

## RF EXPOSURE EVALUATION

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)

FCC ID: 2AOKB-D2150X

### EUT Specification

EUT	Wifi Digital Photo Frame
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz <input checked="" type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: Bluetooth: 2402-2480MHz
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Antenna gain (Max)</b>	BDR+EDR: 3.1 dBi BLE: 3.1 dBi WiFi 2.4G ANT A: 3.1 dBi WiFi 2.4G ANT B: 3 dBi WiFi 5.1G ANT A: 4.1 dBi WiFi 5.1G ANT B: 4 dBi WiFi 5.8G ANT A: 4.1 dBi WiFi 5.8G ANT B: 4 dBi
<b>Directional Gain (Max)</b>	WiFi 2.4G: 6.06dBi WiFi 5.1G/ WiFi 5.8G: 7.06 dBi
<b>Evaluation applied</b>	<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
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

### Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

Where

$P_d$ = Power density in mW/cm<sup>2</sup>

$P_{out}$ =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<sup>2</sup>. 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.

### Max Measurement Result

Operating Mode	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm <sup>2</sup> )
	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	
BDR+EDR	6.857	6.857±1	7.857	3.1	0.0025	1
BLE	7.700	7.700	8.700	3.1	0.0030	1
2.4G WIFI ANT A	18.27	18.27±1	19.270	3.1	0.0344	1
2.4G WIFI ANT B	18.31	18.31	19.310	3	0.0339	1
5.2G WIFI ANT A	19.66	19.66±1	20.660	4.1	0.0596	1
5.2G WIFI ANT B	19.36	19.36±1	20.360	4	0.0543	1
5.8G WIFI ANT A	19.15	19.15±1	20.150	4.1	0.0530	1
5.8G WIFI ANT B	19.26	19.26±1	20.260	4	0.0531	1

## For Transmit Simultaneously Mode:

### 2.4G WIFI A+B:

$$\begin{aligned} &= \text{MPE}_{2.4\text{G WiFi(A)}} / \text{Limit}_{\text{above 1500}} + \text{MPE}_{2.4\text{G WiFi(B)}} / \text{Limit}_{\text{above 1500}} \\ &= 0.0344 + 0.0339 \\ &= 0.0683 < 1 \end{aligned}$$

### 5.2G WIFI A+B:

$$\begin{aligned} &= \text{MPE}_{5.2\text{G WiFi(A)}} / \text{Limit}_{\text{above 1500}} + \text{MPE}_{5.2\text{G WiFi(B)}} / \text{Limit}_{\text{above 1500}} \\ &= 0.0596 + 0.0543 \\ &= 0.1139 < 1 \end{aligned}$$

### 5.8G WIFI A+B:

$$\begin{aligned} &= \text{MPE}_{5.8\text{G WiFi(A)}} / \text{Limit}_{\text{above 1500}} + \text{MPE}_{5.8\text{G WiFi(B)}} / \text{Limit}_{\text{above 1500}} \\ &= 0.0530 + 0.0531 \\ &= 0.1061 < 1 \end{aligned}$$