

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: 2A4K9-K8

EUT Specification

EUT	Projector
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.18GHz ~ 5.24GHz ☒ WLAN: 5.745GHz ~ 5.825GHz ☒ Others: 2.402GHz~2.480GHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	BDR+EDR: 3.55dBm (0.0023W) WIFI 2.4G ANT1: 17.28dBm (0.0535W) WIFI 2.4G ANT2: 17.47dBm (0.0560W) WIFI 5.2G ANT1: 14.45dBm (0.0279W) WIFI 5.2G ANT2: 13.12dBm (0.0205W) WIFI 5.8G ANT1: 12.72dBm (0.0187W) WIFI 5.8G ANT2: 12.67dBm (0.0185W)
Antenna gain (Max)	BDR+EDR: 2dBi WiFi 2.4G ANT1/ANT2: 2dBi WiFi 5.2G ANT1/ANT2: 2dBi WiFi 5.8G ANT1/ANT2: 2dBi
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

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.

Max Measurement Result

Operating Mode	Measured Power	Tune up tolerance	Max. Tune up Power	Antenn a Gain	Power density at 20cm	Power density Limits
	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	(mW/cm ²)
BDR+EDR	3.55	3.55 ±1	4.55	2	0.0009	1
WiFi 2.4G ANT1	17.28	17.28 ±1	18.28	2	0.0212	1
WiFi 2.4G ANT2	17.47	17.47 ±1	18.47	2	0.0222	1
WiFi 5.2G ANT1	14.45	14.45 ±1	15.45	2	0.0111	1
WiFi 5.2G ANT2	13.12	13.12 ±1	14.12	2	0.0081	1
WiFi 5.8G ANT1	12.72	12.72 ±1	13.72	2	0.0074	1
WiFi 5.8G ANT2	12.67	12.67 ±1	13.67	2	0.0073	1

The WiFi 2.4G ANT1 and WiFi 2.4G ANT2 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$=S_{WiFi2.4 ANT1}/S_{limit-2.4}+ S_{WiFi2.4 ANT2}/S_{limit-2.4}$$

$$=0.0212/1+0.0222/1$$

$$=0.0434$$

$$< 1.0$$

The WiFi 5.2G ANT1 and WiFi 5.2G ANT2 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$=S_{WiFi5.2 ANT1}/S_{limit-5.2}+ S_{WiFi5.2 ANT2}/S_{limit-5.2}$$

$$=0.0111/1+0.0081/1$$

$$=0.0192$$

$$< 1.0$$

The WiFi 5.8G ANT1 and WiFi 5.8G ANT2 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$=S_{WiFi5.8 ANT1}/S_{limit-5.8}+ S_{WiFi5.8 ANT2}/S_{limit-5.8}$$

$$=0.0073/1+0.0074/1$$

$$=0.0147$$

$$< 1.0$$

The BT&WiFi and WiFi 2.4G&WiFi 5G can' t transmit simultaneously, only WiFi 2.4G and WiFi 5G support MIMO.