

FCC ID: 2AV2J-DBOX01

### **RF Exposure Evaluation**

#### Limits

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)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)				
	(A) Limits for Occupational/Controlled Exposures							
0.3–3.0	614	1.63	*(100)	6				
3.0–30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6				
30–300	61.4	0.163	1.0	6				
300–1500			f/300	6				
1500–100,000			5	6				
	(B) Limits for (	General Population/Uncontro	olled Exposure					
0.3–1.34	614	1.63	*(100)	30				
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30				
30–300	27.5	0.073	0.2	30				
300–1500			f/1500	30				
1500–100,000			1.0	30				

f = frequency in MHz

Friis transmission formula:  $Pd = (Pout*G)/(4*pi*r^2)$ 

#### Where

**Pd** = power density in mW/cm<sup>2</sup>, **Pout** = 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

Pd id the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

#### **Test Procedure**

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



# **Test Result of RF Exposure Evaluation**

## **BT EDR**

Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
2480MHz	5.67	3.69	0.0028	1.0	PASS

Antenna gain=5.8dBi

### BLE

C. C. C. C. C. J. J.	Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
	2480MHz	2.86	1.93	0.0015	1.0	PASS

Antenna gain=5.8dBi

## Wifi 2.4G

Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm²)	Limit (mW/cm²)	Result
2412MHz MIMO 802.11n(HT20)	15.56	35.97	0.0384	1.0	PASS
2462MHz ANT 2 802.11n(HT20)	16.39	43.55	0.0228	1.0	PASS

ANT 1: 4.4dBi ANT 2: 4.2dBi MIMO: 7.3dBi

## Wifi 5.2G

Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm²)	Limit (mW/cm²)	Result
5230 MHz MIMO 802.11n(HT40)	16.57	45.39	0.0377	1.0	PASS
5240MHz ANT 2 802.11a	16.64	46.13	0.0201	1.0	PASS

ANT 1: 3.0dBi ANT 2: 3.4dBi MIMO: 6.21dBi



### Wifi 5.3G

Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm²)	Result
5310MHz MIMO 802.11ac (HT40)	17.10	51.29	0.0408	1.0	PASS
5290MHz ANT 2 802.11ac (HT80)	16.85	48.42	0.0179	1.0	PASS

ANT 1: 3.3dBi ANT 2: 2.7dBi MIMO: 6.02dBi

#### Wifi 5.6G

Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
5510MHz MIMO 802.11n (HT40)	16.99	50.00	0.0448	1.0	PASS
5500MHz ANT 2 802.11ac( HT20)	17.28	53.46	0.0207	1.0	PASS

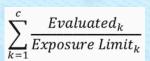
ANT 1: 4.1dBi ANT 2: 2.9dBi MIMO: 6.53dBi

### Wifi 5.8G

Channel	Max output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
5755MHz MIMO 802.11ac(HT40)	17.13	51.64	0.0401	1.0	PASS
5775MHz ANT 2 802.11ac( HT80)	16.91	49.09	0.0190	1.0	PASS

ANT 1: 2.9dBi ANT 2: 2.9dBi MIMO: 5.91dBi

### BT and WIFI Simultaneous Transmission:



BT EDR + 2.4G WIFI MIMO+5.6G WIFI MIMO =(0.0028/1)+(0.0384/1) +(0.0448/1) =0.0028+0.0384+0.0448=01336<1

The max power density is less than MPE exempt limit, so it is compliance.