

MPE ESTIMATION

FCC ID: 2A49R-X1

1, According to §1.1310, Limit for General Population/ Uncontrolled Exposures

Frequency	Power density (mW/ cm ²)	Averaging time(minutes)
300MHz----1.5GHz	F/1500	30
1.5GHz---100GHz	1.0	30

2, Estimation Result

For BT and WIFI:

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
BLE	-5.31	-5±1(-4)	0.40	0.11	1.03	0.00008
EDR	3.23	3±1(4)	2.51	0.11	1.03	0.00051
2.4G WIFI Ant1	12.76	12±1(13)	19.95	-1.14	0.77	0.00305
2.4G WIFI Ant2	10.35	10±1(11)	12.59	0.11	1.03	0.00257
MIMO	/	/	/	/	/	0.00562
5.2G WIFI Ant1	10.08	10±1(11)	12.59	0.22	1.05	0.00264
5.2G WIFI Ant2	12.25	12±1(13)	19.95	1.81	1.52	0.00602
MIMO	/	/	/	/	/	0.00866
5.3G WIFI Ant1	11.93	11±1(12)	15.85	0.23	1.05	0.00333
5.3G WIFI Ant2	10.40	10±1(11)	12.59	2.75	1.88	0.00472
MIMO	/	/	/	/	/	0.00805
5.6G WIFI Ant1	10.44	10±1(11)	12.59	0.13	1.03	0.00258
5.6G WIFI Ant2	8.93	8±1(9)	7.94	2.12	1.63	0.00258
MIMO	/	/	/	/	/	0.00516
5.8G WIFI Ant1	9.02	9±1(10)	10.00	0.89	1.23	0.00244
5.8G WIFI Ant2	9.31	9±1(10)	10.00	0.97	1.25	0.00249
MIMO	/	/	/	/	/	0.00493
5.9G WIFI Ant1	11.61	11±1(12)	15.85	1.76	1.50	0.00473
5.9G WIFI Ant2	11.77	11±1(12)	15.85	1.01	1.26	0.00398
MIMO	/	/	/	/	/	0.00871
WiFi6E Ant1	13.47	13±1(14)	25.12	3.02	2.00	0.01002
WiFi6E Ant2	10.70	10±1(11)	12.59	3.37	2.17	0.00544
MIMO	/	/	/	/	/	0.01547

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note: PK Output power= conducted power in mW.

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna in cm

Conducted power see the test report HK2502140540-1E/2E/3E/4E/5E/6E/7E/8E,

BT antenna gain=0.11dBi

2.4G antenna 1 gain=-1.14dBi, 2.4G antenna 2 gain=0.11dBi;

5.2G antenna 1 gain=0.22dBi, 5.2G antenna 2 gain=1.81dBi;

5.3G antenna 1 gain=0.23dBi, 5.3G antenna 2 gain=2.75dBi;

5.6G antenna 1 gain=0.13dBi, 5.6G antenna 2 gain=2.12dBi;

5.8G antenna 1 gain=0.89dBi, 5.8G antenna 2 gain=0.97dBi.

5.9G antenna 1 gain=1.76dBi, 5.9G antenna 2 gain=1.01dBi;

WiFi6E antenna 1 gain=3.02dBi, WiFi6E antenna 2 gain=3.37dBi.

2.4G WIFI MPE (max)= 0.00562 (mW/cm²)

5.2G WIFI MPE (max)= 0.00866 (mW/cm²)

5.3G WIFI MPE (max)= 0.00805 (mW/cm²)

5.6G WIFI MPE (max)= 0.00516 (mW/cm²)

5.8G WIFI MPE (max)= 0.00493 (mW/cm²)

5.9G WIFI MPE (max)= 0.00871 (mW/cm²)

WiFi6E MPE (max)= 0.01547 (mW/cm²)

2.4GHz & 5GHz/6GHz technology cannot be transmitted at the same time.

Simultaneously MPE

2.4GWiFi + Bluetooth = 0.00562 + 0.00051 = 0.00613

5.2GWiFi + Bluetooth = 0.00866 + 0.00051 = 0.00917

5.3GWiFi + Bluetooth = 0.00805 + 0.00051 = 0.00856

5.6GWiFi + Bluetooth = 0.00516 + 0.00051 = 0.00567

5.8GWiFi + Bluetooth = 0.00493 + 0.00051 = 0.00544

5.9GWiFi + Bluetooth = 0.00871 + 0.00051 = 0.00922

WiFi6E + Bluetooth = 0.01547 + 0.00051 = 0.01598

When the minimum test separation distance is >20 cm, a distance of 20 cm is applied to determine RF Exposure test exclusion. The test exclusion threshold is 0.01598 which is < 1.0 , RF Exposure testing is not required.

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