

FCC ID: 2BRKV-1018

Maximum Permissible Exposure (MPE)

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)

According to KDB447498 D01 General RF Exposure Guidance V06

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Calculated Result

BT:

Channel Freq. (MHz)	Band	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2402	8DPSK	6.64	6±1	7	5.012	0.7	1.17	0.001171	1
2440		6.58	6±1	7	5.012	0.7	1.17	0.001171	1
2480		6.82	6±1	7	5.012	0.7	1.17	0.001171	1

BLE:

Channel Freq. (MHz)	Band	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	4.32	4±1	5	3.162	0.7	1.17	0.000739	1
2440		4.22	4±1	5	3.162	0.7	1.17	0.000739	1
2480		4.25	4±1	5	3.162	0.7	1.17	0.000739	1

Wi-Fi 2.4G:

Channel Freq. (MHz)	Band	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limite (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	15.39	15±1	16	39.811	0.5	1.12	0.008886	1
2437		15.34	15±1	16	39.811	0.5	1.12	0.008886	1
2462		15.24	15±1	16	39.811	0.5	1.12	0.008886	1

Wi-Fi 5G:

Channel Freq. (MHz)	Band	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
5180	802.11n20	14.974	14±1	15	31.623	3.5	2.24	0.014084	1
5200		14.942	14±1	15	31.623	3.5	2.24	0.014084	1
5240		13.771	14±1	15	31.623	3.5	2.24	0.014084	1
5745	802.11n20	14.986	14±1	15	31.623	3.5	2.24	0.014084	1
5785		13.7	14±1	15	31.623	3.5	2.24	0.014084	1
5825		13.824	14±1	15	31.623	3.5	2.24	0.014084	1

NFC:

Transmit power:

Freq.	Field Strength(dBuV/m)	Factor	EIRP (dBm)
13.56MHz	67.98	95.2	-27.22

Channel Freq. (MHz)	Band	Max		Evaluation result (mW/cm2)	Power density Limits
		tune-up power			(mW/cm2)
		(dBm)	(mW)		
13.56	NFC	-27.22	0.002	0.0000004	0.98

Max. Simultaneous Transmissions Mode

Mode	Standalone (mW/cm ²)	Limits (mW/cm ²)	Sum	Limits
BT+WIFI 5.2G+NFC	0.001171	1	0.015255	1
	0.014084	1		
	0.0000004	0.98		

Conclusion:

For the max result: $0.015255 \leq 1$, Compliance with RF Exposure requirement.

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