

RF EXPOSURE EVALUATION

MPE-Based Exemption

Applicable Standard

According to subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(3)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

R is the minimum separation distance in meters

f = frequency in MHz

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Result

Mode	Frequency (MHz)	Tune up conducted power [#] (dBm)	Antenna Gain [#]		ERP		Evaluation Distance (m)	ERP Limit (W)
			(dBi)	(dBd)	(dBm)	(W)		
BT	2402-2480	8.0	1.99	-0.16	7.84	0.006	0.2	0.768
BLE	2402-2480	8.0	1.99	-0.16	7.84	0.006	0.2	0.768
2.4G Wi-Fi	2412-2462	22.5	1.99	-0.16	22.34	0.171	0.2	0.768
5.2G Wi-Fi	5180-5240	11.5	3.52	1.37	12.87	0.019	0.2	0.768
5.8G Wi-Fi	5745-5825	12.5	3.52	1.37	13.87	0.024	0.2	0.768

Note:

- 1) The tune up conducted power and antenna gain was declared by the applicant.
- 2) The BT/2.4G and 5G Wi-Fi can simultaneous transmitting, BT and 2.4G Wi-Fi cannot simultaneous transmitting.

Simultaneous transmitting consideration (worst case):

The ratio= $ERP_{2.4G\ Wi-Fi}/limit + ERP_{5G\ Wi-Fi}/limit = 0.171/0.768 + 0.024/0.768 = 0.254 < 1.0$,
so simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant