

FCC §15.247 (i) & §2.1091- RF EXPOSURE

Applicable Standard

According to subpart 15.247 (i) and 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)(1)(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	$0.0128 R^2f$.
1,500-100,000	$19.2R^2$.

R is the minimum separation distance in meters

f = frequency in MHz

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Result

Mode	Frequency (MHz)	Antenna Gain		Tune up conducted power		ERP		Evaluation Distance (m)	ERP Limit (W)
		(dBi)	(dBd)	(dBm)	(W)	(dBm)	(W)		
Bluetooth	2402-2480	4.88	2.73	12.0	0.016	14.73	0.030	0.2	0.768
BLE	2402-2480	4.88	2.73	10.5	0.011	13.23	0.021	0.2	0.768
Wi-Fi	2412-2462	4.88	2.73	18.0	0.063	20.73	0.118	0.2	0.768
	5180-5240	4.98	2.83	16.0	0.040	18.83	0.076	0.2	0.768
	5260-5320	4.98	2.83	17.5	0.056	20.33	0.108	0.2	0.768
	5500-5700	4.98	2.83	16.5	0.045	19.33	0.086	0.2	0.768
	5745-5825	4.98	2.83	16.0	0.040	18.83	0.076	0.2	0.768

Note:

1. The tune up conducted power and antenna gain was declared by the applicant.

2: 0dBd=2.15dBi.

3: The Bluetooth/BLE can transmit at same time with 2.4G Wi-Fi or 5G Wi-Fi

Simultaneous transmitting consideration (worst case):

The ratio= $ERP_{BT}/ERP + ERP_{Wi-Fi}/ERP = 0.030/0.768 + 0.118/0.768 = 0.193 < 1.0$, so simultaneous exposure is compliant.

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

Result: Compliance