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 v01 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^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)	Tune up conducted power#(dBm)	Antenna Gain#		ERP		Evaluation Distance (m)	ERP Limit (mW)
			(dBi)	(dBd)	(dBm)	(mW)		
BT	2402-2480	5.5	2.22	0.07	5.57	3.61	0.2	768
BLE	2402-2480	0.5	2.22	0.07	0.57	1.14	0.2	768
2.4G Wi-Fi	2412-2462	19.0	4.92	2.77	21.77	150.31	0.2	768
5.2G Wi-Fi	5180-5240	16.0	4.92	2.77	18.77	75.34	0.2	768
5.8G Wi-Fi	5745-5825	13.5	4.83	2.68	16.18	41.50	0.2	768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. 0dBd=2.15dBi
3. For Wi-Fi, the antenna gain should be the directional gain.
4. The BT and Wi-Fi can transmit at same time, the 2.4G and 5G Wi-Fi cannot transmit at same time.

Simultaneous transmitting consideration (worst case):

The ratio= ERP_{BT} /limit + $ERP_{2.4G\ Wi\text{-}Fi}$/limit = 3.61/768+ 150.31/768 =0.200<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