

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	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

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	7.0	3.13	0.98	7.98	6.28	0.2	768
BLE	2402-2480	4.5	3.13	0.98	5.48	3.53	0.2	768
2.4G Wi-Fi	2412-2462	21.5	3.13	0.98	22.48	177.01	0.2	768
5.2G Wi-Fi	5180-5240	11.0	5.60	3.45	14.45	27.86	0.2	768
5.3G Wi-Fi	5260-5320	13.0	5.73	3.58	16.58	45.50	0.2	768
5.6G Wi-Fi	5500-5720	12.5	4.84	2.69	15.19	33.04	0.2	768
5.8G Wi-Fi	5745-5825	11.0	1.53	-0.62	10.38	10.91	0.2	768
LTE B2	1850-1910	25.0	2.33	0.18	25.18	329.61	0.2	768
LTE B4	1710-1755	25.0	2.68	0.53	25.53	357.27	0.2	768
LTE B12	699-716	25.0	0.39	-1.76	23.24	210.86	0.2	358
LTE B13	777-787	25.0	1.23	-0.92	24.08	255.86	0.2	398

- Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
 2. 0dBd=2.15dBi
 3. The BT and 5G Wi-Fi can transmit at same time, the BT/5G and 2.4G Wi-Fi cannot transmit at same time.
 4. The device contains a certified WWAN model (model: LE910C4-NF, FCC ID: RI7LE910CXNF)

Simultaneous transmitting consideration (worst case):

The ratio= $ERP_{2.4G\ Wi-Fi}/limit + ERP_{LTE\ B13}/limit = 177.01/768 + 255.86/398 = 0.87 < 1.0$

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