

FCC §15.247 (i) & §1.1307 (b) (3) & §2.1091- RF EXPOSURE

Applicable Standard

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

An alternative to the SAR-based exemption is provided in § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power. For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).

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	$19.2 R^2$.

f = frequency in MHz;

R = minimum separation distance from the body of a nearby person (appropriate units, e.g., m);

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**For worst case:**

Mode	Frequency (MHz)	Antenna Gain [#]		Max Tune-up Power [#]		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G Wi-Fi	2412-2462	6.97	4.98	29.0	794.33	28	0.402	1.0
5.2G Wi-Fi	5180-5240	9.61	9.14	26.0	398.11	28	0.370	1.0
5.3G Wi-Fi	5260-5320	9.61	9.14	22.0	158.49	28	0.147	1.0
5.6G Wi-Fi	5500-5700	9.61	9.14	22.0	158.49	28	0.147	1.0
5.8G Wi-Fi	5745-5825	9.61	9.14	25.0	316.23	28	0.294	1.0
5.9G Wi-Fi	5845-5885	9.61	9.14	24.0	251.19	28	0.233	1.0

Note:

- 1) The tune up conducted power and antenna gain was declared by the applicant.
- 2) For the Wi-Fi mode, the antenna gain would be the directional gain.
- 3) The 2.4G Wi-Fi and 5G Wi-Fi can transmit simultaneously.

The ratio= $MPE_{2.4G\ Wi-Fi}/limit + MPE_{5G\ Wi-Fi}/limit = 0.402/1.0 + 0.370/1.0 = 0.772 < 1.0$, simultaneous exposure is not required.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 28cm from nearby persons.

Result: Compliant