

According to KDB 447498 D04 Interim General RF Exposure Guidance v01

1. 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	0.012 8 R ² f
1 500-100 000	19.2 R ²

2. RF Exposure Test Exemptions for Single Source

Mode	Port	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Output Power (dBm)	Antenna Gain (dBi)	ERP		Threshold ERP (mW)	Ratio	Result
						(dBm)	(mW)			
Bluetooth	0	2 402 ~ 2 480	20	3	2.28	3.13	2.06	768	0.003	Pass
Bluetooth Low energy	0	2 402 ~ 2 480	20	8	2.28	8.13	6.50	768	0.008	Pass
WLAN 2	1	2 412 ~ 2 462	20	14	1.84	13.69	23.39	768	0.030	Pass
WLAN 5	0	5 150 ~ 5 250	20	10	1.68	9.53	8.97	768	0.012	Pass
	1		20	10	1.90	9.75	9.44	768	0.012	Pass
	0	5 250 ~ 5 350	20	10	1.68	9.53	8.97	768	0.012	Pass
	1		20	10	2.92	10.77	11.94	768	0.016	Pass
	0	5 470 ~ 5 725	20	10	2.38	10.23	10.54	768	0.014	Pass
	1		20	10	3.55	11.40	13.80	768	0.018	Pass
	0	5 725 ~ 5 850	20	10	3.04	10.89	12.27	768	0.016	Pass
	1		20	10	3.32	11.17	13.09	768	0.017	Pass

Note ;

- ERP (dBm) = Maximum average output power (dBm) + Antenna gain (dBi) - 2.15 (dB).
- The ERP threshold as the "R must be at least $\lambda/2\pi$ " as per 1.1307 b)3)C) table 1
- Maximum average output power is the manufacturer's declared rated power

3. Simultaneous Transmission SAR Test Exemption with Respect to Multiple Exemption Criteria

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR ($Evaluated_k$ term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

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

Mode	P _i /P _{th} Ratio Mode A	P _i /P _{th} Ratio Mode B	Σ P _i /P _{th} Ratio Mode A+B	Result
Bluetooth Low energy + WLAN 2	0.008	0.030	0.038	Pass
WLAN 5 + WLAN 5	0.016	0.017	0.033	Pass

Note ;

WLAN 2 and WLAN 5 can't simultaneous transmission at the same time.

4. Conclusion: No SAR is required.