

According to KDB 447498 D04 Interim General RF Exposure Guidance v01.

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. Test Result

Mode	Frequency Range (MHz)	Maximum Average Power (dBm)	Antenna Gain (dBi)	Minimum Separation Distance (cm)	ERP (dBm)	ERP (mW)	Limits P_{th} (mW)	Ratio	Result
DTS	2 412 ~ 2 462	20	1.5	20	19.35	86.10	768	0.112	Pass
Bluetooth Low energy	2 402 ~ 2 480	7.50	1.5	20	6.85	4.84	768	0.006	Pass

Mode	Frequency Range (MHz)	Radiated Power (dBuV/m)	Minimum Separation Distance (cm)	ERP (dBm)	ERP (mW)	Limits P_{th} (mW)	Ratio	Result
Microwave	2 400 ~ 2 500	80.75	20	-16.63	0.02	768	0.000 026	Pass

- $EIRP \text{ (dBm)} = E \text{ (dBuV/m)} + 20 \log (3\text{(m)}) - 104.77$
- $ERP = EIRP - 2.15$

Note;

According to ANSI C63.10 Annex G.2

$$ERP = p_t \times g_t = (E \times d)^2 / 49.2$$

Where;

P_t is the transmitter output power in watts

G_t is the numeric gain of the transmitting antenna (dimensionless)

E is the electric field strength in V/m

D is the measurement distance in meters (m)

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)].

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

$$DTS + Microwave: 0.112 + 0.000\ 026 = 0.112\ 026 \leq 1$$

DTS and Bluetooth Low Energy can't simultaneous transmission at the same time.

Bluetooth Low Energy can't simultaneous transmission at the same time.

4. Conclusion: No SAR is required.