

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	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dBm)	Maximum Tune up (dB)	Maximum Average Power (dBm)	Antenna Gain (dBi)	ERP		P _{th} (mW)	Ratio	Result
							(dBm)	(mW)			
Lora DTS	902 ~ 928	20	20.00	2	22.00	2.30	22.15	164	462	0.355	Pass
Lora Hybrid	902 ~ 928	20	18.50	1	19.50	2.30	19.65	92	462	0.199	Pass

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
WCDMA II	1 850 ~ 1 910	24	1.82	20	23.67	233	768	0.303	Pass
WCDMA IV	1 710 ~ 1 755	24	1.19	20	23.04	201	768	0.262	Pass
WCDMA V	824 ~ 849	24	-0.08	20	21.77	150	422	0.355	Pass
LTE 2	1 850 ~ 1 910	24	1.82	20	23.67	233	768	0.303	Pass
LTE 4	1 710 ~ 1 755	24	1.19	20	23.04	201	768	0.262	Pass
LTE 12	699 ~ 716	24	-2.59	20	19.26	84	358	0.235	Pass

Note ;

- Maximum average target power is the manufacturer's declared rated power.
- Maximum average power = Maximum average target power (dBm) + Maximum tune up (dB).
- ERP (dBm) = Maximum average Power (dBm) + Antenna Gain (dBi) -2.15

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)].

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

Lora DTS + WCDMA V : 0.355 + 0.355 = 0.710 < 1

Lora DTS and Lora Hybrid can't simultaneous transmission at the same time.

4. Conclusion: No SAR is required.