

FCC ID: VA5CLC350-XC2

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 Output Power (dBm)	Antenna Gain (dBi)	ERP		Threshold ERP (mW)	Ratio	Result
							(dBm)	(mW)			
Bluetooth Low energy	2 402 ~ 2 480	20	-1	1	0	1.69	-0.46	0.899	768	0.001	Pass
WLAN 2	2 412 ~ 2 462	20	11	2	13	1.69	12.54	17.947	768	0.023	Pass

Mode	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Power (dBm)	Antenna Gain (dBi)	ERP		Threshold ERP (mW)	Ratio	Result
					(dBm)	(mW)			
WCDMA II	1 850 ~ 1 910	20	25	2.31	25.16	328.095	768	0.427	Pass
LTE Band 2	1 850 ~ 1 910	20	25	2.31	25.16	328.095	768	0.427	Pass
LTE Band 4	1 710 ~ 1 780	20	25	0.63	23.48	222.844	768	0.290	Pass
LTE Band 12	699 ~ 716	20	25	-1.29	21.56	143.219	358	0.400	Pass

Note ;

- Bluetooth Low Energy or WLAN 2 can transmit simultaneously with WWAN.
- ERP (dBm) = Maximum average power (dBm) + Antenna gain (dBi) -2.15
- Maximum average target power is the manufacturer's declared rated power.
- Maximum average output power = Maximum average target power (dBm) + Maximum tune up (dB).

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	$\Sigma P_i/P_{th}$ Ratio Mode A+B	Result
Bluetooth Low energy + LTE 2	0.001	0.427	0.428	Pass
WLAN 2 + LTE 2	0.023	0.427	0.450	Pass

Note ;

- Bluetooth Low energy and WLAN 2 can't simultaneous transmission at the same time.
- WCDMA and LTE can't simultaneous transmission at the same time.

4. Conclusion: No SAR is required.