

## FCC §1.1307(b) & §2.1091 – RF EXPOSURE EVALUATION

### Applicable Standard

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.4 –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  $\lambda$  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 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	$0.0128 R^2f$ .
1,500-100,000	$19.2R^2$ .

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:

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

**Test result**

For worst case:

Mode	Frequency Range (MHz)	Tune-up Output Power		Antenna Gain		ERP		Evaluation Distance (cm)	MPE-Based Exemption Threshold (W)
		(dBm)	(W)	(dBi)	(dBd)	(dBm)	(W)		
DECT	1920-1930	17.0	0.050	0	-2.15	14.85	0.031	20	0.768
BT	2402-2480	5.826	0.0038	0.5	-1.65	4.176	0.003	20	0.768
BLE	2402-2480	5.799	0.0038	0.5	-1.65	4.149	0.003	20	0.768

Note 1: The EUT contains a certified module (FCC ID: 2ABRU-BDM209A)

Note 2: The tune-up power and antenna gain was declared by the applicant.

Note 3: 0dBd=2.15dBi

Note 4: The Bluetooth and DECT can transmit at same time

Simultaneous transmitting consideration (worst case):

The ratio= $ERP_{BT}/limit + ERP_{DECT}/limit = 0.003/0.768 + 0.031/0.768 = 0.044 < 1.0$ , so simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliant.**