

RF Exposure Evaluation

According to KDB 447498 D01 V06 and part 2.1093, Unless specifically required by the *published RF exposure KDB procedures*, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding *SAR Test Exclusion Threshold* condition(s), listed below, is (are) satisfied.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{(\text{GHz})}}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where

$f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7$$

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dB μ V/m

d_{Meas} is the measurement distance, in m

Here,

For 2.4G

Field strength (dBuV/m)	EIRP (dBm)	Max tune-up (mW)	Frequency (MHz)	Min. distance(mm)	Calc. thresholds	limit
84.66	-10.498	0.112	2480	5	0.035	3.0

For 2.4G

$$\text{MPE} = 0.112 \text{ mW} / 5\text{mm} \cdot \sqrt{(2.480\text{GHz})} = 0.035$$

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7 = 84.66 + 9.542 - 104.7 = -10.498\text{dBm}$$

$$\text{Conducted Power} = \text{EIRP} - \text{ANT}_{\text{Gain}} = -10.498\text{dBm} - 0 = -10.498\text{dBm}$$

$$\text{Max tune-up} = -10.498\text{dBm} \pm 1 = -9.498\text{dBm} = 0.112\text{mW}$$

For BLE

Field strength (dBuV/m)	EIRP (dBm)	Max tune-up (mW)	Frequency (MHz)	Min. distance(mm)	Calc. thresholds	limit
84.09	-11.068	0.098	2480	5	0.031	3.0

For BLE

$$\text{MPE} = 0.098 \text{ mW} / 5\text{mm} \cdot \sqrt{(2.480\text{GHz})} = 0.031$$

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7 = 84.09 + 9.542 - 104.7 = -11.068\text{dBm}$$

$$\text{Conducted Power} = \text{EIRP} - \text{ANT}_{\text{Gain}} = -11.068\text{dBm} - 0 = -11.068\text{dBm}$$

$$\text{Max tune-up} = -11.068\text{dBm} \pm 1 = -10.068\text{dBm} = 0.098\text{mW}$$

Note1: the antenna gain is 0dBi;

So a SAR test is not required.