

## RF Exposure Evaluation

According to KDB 447498 D01 V06 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

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

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})]$ .

$[\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, and  $\leq 7.5$  for 10-g extremity SAR,<sup>30</sup> 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<sup>31</sup>
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

b) 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 (also illustrated in Appendix B):<sup>32</sup>

- 1)  $\{[\text{Power allowed at numeric threshold for 50 mm in step a}]] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]\} \text{ mW}$ , for 100 MHz to 1500 MHz
- 2)  $\{[\text{Power allowed at numeric threshold for 50 mm in step a}]] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\} \text{ mW}$ , for  $> 1500$  MHz and  $\leq 6$  GHz

c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):<sup>33</sup>

- 1) For test separation distances  $> 50$  mm and  $< 200$  mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by  $[1 + \log(100/f(\text{MHz}))]$
- 2) For test separation distances  $\leq 50$  mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by  $\frac{1}{2}$
- 3) SAR measurement procedures are not established below 100 MHz.

(1)  $P_b(\text{mW}) * [1 + \log(100/f(\text{MHz}))] = 474 \text{ mW} * [1 + \log(100/f(\text{MHz}))]$

(2)  $P_b(\text{mW}) * [1 + \log(100/f(\text{MHz}))] * 0.5 = 474 \text{ mW} * [1 + \log(100/f(\text{MHz}))] * 0.5 = 237 * [1 + \log(100/f(\text{MHz}))]$

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

EIRP is the equivalent isotropically radiated power, in dBm

$E_{\text{Meas}}$  is the field strength of the emission at the measurement distance, in dB  $\mu$  V/m

$d_{\text{Meas}}$  is the measurement distance, in m

Here,

Field strength (dB $\mu$ V/m)	EIRP (dBm)	Max tune-up (mW)	Frequency (MHz)	Min. distance(mm)	Limit (mW)
54.92	-40.2	0.000095	27.145	50	371

So a SAR test is not required