

RF Exposure evaluation

According to KDB 447498 D01 General RF Exposure Guidance v05

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ 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

For WiFi:

Worse case is as below: [2412 MHz 8.21dBm (6.622mW) output power]

$$(6.622\text{mW} / 5\text{mm}) \cdot [\sqrt{2.412(\text{GHz})}] = 2.1 < 3.0 \text{ for 1-g SAR}$$

For 915 MHz transmitter:

$$\text{eirp} = \text{pt} \times \text{gt} = (\text{EXd})^2/30$$

where:

pt = transmitter output power in watts,

gt = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, --- $10^{((\text{dBuV/m})/20)/10^6}$

d = measurement distance in meters (m)---3m

$$\text{So pt} = (\text{EXd})^2/30 \times \text{gt}$$

Ant gain 2 dBi ;so Ant numeric gain=1.585

Field strength = 67.76 dBuV/m @3m

$$\text{So Pt} = \{ [10^{(67.76/20)/10^6} \times 3]^2/30 \times 1.585 \} \times 1000 \text{ mW} = 0.0018 \text{ mW}$$

$$\text{So } (0.0018 \text{ mW}/5\text{mm}) \times \sqrt{0.915 \text{ GHz}} = 0.00034 < 3$$

$$2.1 + 0.00034 = 2.10034 < 3$$

Then SAR evaluation is not required