

## RF Exposure evaluation

According to 447498 D01 General RF Exposure Guidance v06

### 4.3. General SAR test exclusion guidance

#### 4.3.1. Standalone SAR test exclusion considerations

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

<sup>30</sup> This is equivalent to the formula written as:  $[(\text{max. power of channel, including tune-up tolerance, mW}) / (60 / \sqrt{f(\text{GHz})} \text{ mW})] \cdot [20 \text{ mm} / (\text{min. test separation distance, mm})] \leq 1.0$  for 1-g SAR; also see Appendix A for approximate exclusion threshold numerical values at selected frequencies and distances.

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

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

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

## RF Exposure evaluation

Copied from the FCC test report:

| Carrier Frequency (MHz) | Reading Value conducted output power dBm | Cable loss (dB) | True Value conducted output power dBm (mW) | Limit in 74.861 e) 1) |
|-------------------------|------------------------------------------|-----------------|--------------------------------------------|-----------------------|
| 520.000                 | -9.3dBm                                  | 0.5             | -8.8dBm(i.e.0.132 mW)                      | 24 dBm (i.e. 250 mW)  |
| 526.300                 | -9.3dBm                                  | 0.5             | -8.9dBm(i.e.0.129 mW)                      |                       |
| 538.950                 | -9.4dBm                                  | 0.5             | -8.9dBm(i.e 0.129 mW)                      |                       |

tune-up tolerance= $\pm 1$ dB,

min. test separation distance = 5 mm, since the min distance from the antenna to the outer = 1.0 mm

Conducted power = -8.8 dBm in 520.000MHz

Conducted power = -8.9 dBm in 526.300MHz

Conducted power = -8.9 dBm in 538.950MHz

Max. power of channel after included tune-up tolerance

Conducted power = -7.8 dBm=0.166 mW in 520.000MHz

Conducted power = -7.9 dBm=0.162 mW in 526.300MHz

Conducted power = -7.9 dBm=0.162 mW in 538.950MHz

So ( 0.166 mW )/5.0mm)x  $\sqrt{0.520000}$  GHz = 0.024 <3

So ( 0.162 mW )/5.0mm)x  $\sqrt{0.526300}$  GHz = 0.024 <3

So ( 0.162 mW )/5.0mm)x  $\sqrt{0.538950}$  GHz = 0.024 <3

Then SAR evaluation is not required