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 ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following: [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, [30] where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation31
- 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 ≤ 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.

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

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

where:

  pt = transmitter output power in watts,

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

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

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

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

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=±1dB,

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 √0.520000 GHz = 0.024 <3

So (0.162 mW)/5.0mm)x √0.526300 GHz = 0.024 <3

So (0.162 mW)/5.0mm)x √0.538950 GHz = 0.024 <3

Then SAR evaluation is not required