

RF Exposure evaluation

According to 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 \leq 50 mm are determined by:

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

$f(\text{GHz})$ 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

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

where:

pt = transmitter output power in watts,

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

E = electric field strength in V/m, --- $10((\text{dBuV/m})/20)/106$

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

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

RF Exposure evaluation for X-017

Copied from the FCC test report:

Carrier Frequency (MHz)	Factual Level dBm (mW)
614.3.000	-5.2dBm(i.e.0.30 mW)
682.988	-5.4dBm(i.e.0.29 mW)
697.700	-5.4dBm(i.e 0.29 mW)

tune-up tolerance= ± 1 dB,

min. test separation distance = the min distance from the antenna to the outer = 10.0 mm

Field strength = -5.2 dBm=0.30 mW in 614.3.000MHz

Field strength = -5.4 dBm=0.29 mW in 682.988MHz

Field strength = -5.4 dBm=0.29 mW in 697.700MHz

After included tune-up tolerance

Field strength = -4.2 dBm=0.38 mW in 614.3.000MHz

Field strength = -4.4 dBm=0.36 mW in 682.988MHz

Field strength = -4.4 dBm=0.36 mW in 697.700MHz

$$\text{So } (0.38 \text{ mW})/10.0\text{mm}) \times \sqrt{0.614000 \text{ GHz}} = 0.049 < 3$$

$$\text{So } (0.36 \text{ mW})/10.0\text{mm} \times \sqrt{0.682988 \text{ GHz}} = 0.044 < 3$$

$$\text{So } (0.36 \text{ mW})/10.0\text{mm} \times \sqrt{0.697700 \text{ GHz}} = 0.043 < 3$$

Then SAR evaluation is not required