SAR Exclusion Limits

Excerpt from 447498 KDB (47498 D01 General RF Exposure Guidance v06)

Section 4.3.1 Standalone SAR Test exclusion considerations

4.3.1. Standalone SAR test exclusion considerations

- 1) 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:
 - [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] $\cdot [\sqrt{f_{(GHz)}}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,²⁵ where
 - $f_{(GHz)}$ is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation²⁶
 - The result is rounded to one decimal place for comparison
 - 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 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 5) in section 4.1 is applied to determine SAR test exclusion.

- 2) At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:²⁷
 - a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance 50 mm) ($f_{(MHz)}/150$)] mW, at 100 MHz to 1500 MHz
 - b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
- 3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion, and as illustrated in Appendix C:²⁸
 - a) The power threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by $[1 + \log(100/f_{(MHz)})]$ for *test separation distances* > 50 mm and < 200 mm
 - b) The power threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$ for *test separation distances* \leq 50 mm
 - c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

Appendix 1 FCC

Head and Body SAR

Calculation = $[P/D] * [Vf_{(GHz)}]$

where:

+ $f_{\rm (GHz)}\,is$ the RF channel transmit frequency in GHz

- $\bullet P = max$ power of channel including tuneup tolerance mW
- • \mathbf{D} = min separation distance mm
- •Power and distance are rounded to the nearest mW and mm before calculation25
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

Prediction frequency: f	2480	MHz
Antenna gain:	1.5	dBi
Maximum peak output power at antenna input terminal: P	-0.34	dBm
Tune up tolerance	1	dB
Maximum conducted output power plus Tune up tolerance	0.66	dBm
Maximum conducted output power plus Tune up tolerance (rounded to the nearest mW)	1	mW
Minimum separation distance: D	5	mm
Duty cycle factor (calc over max 30 mins)	0	dB
Calculation [(Max, power of channel, including tune up tolerance, mW / min.test separation		
distance ,mm)]*[√f (GHz)]	0.37	
Head and Body SAR 100K-100MHz ;<50mm		
General pop/Uncontrolled Environment		
Numeric Threshold for 1g SAR	3	
Result meets the SAR test exclusion threshold ==> SAR Test not required	0.4 <= 3	

The EUT meets the SAR test exclusion limits for a separation distance of ≤5 mm

Test result Pass

End of report