

TEST SUMMARY

1.0 SAR Evaluation FCC

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* ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{(\text{GHz})}}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR,}^{25} \text{ where}$

- $f_{(\text{GHz})}$ 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 ≤ 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) $[\text{Power allowed at numeric threshold for } 50 \text{ mm in step 1} + (\text{test separation distance} - 50 \text{ mm}) \cdot (f_{(\text{MHz})}/150)] \text{ mW, at } 100 \text{ MHz to } 1500 \text{ MHz}$
 - b) $[\text{Power allowed at numeric threshold for } 50 \text{ mm in step 1} + (\text{test separation distance} - 50 \text{ mm}) \cdot 10] \text{ mW at } > 1500 \text{ MHz and } \leq 6 \text{ GHz}$
- 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 $[1 + \log(100/f_{(\text{MHz})})]$ 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* ≤ 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

$$\text{Calculation} = [P/D] * [\sqrt{f_{(\text{GHz})}}]$$

where:

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- P = max power of channel including tuneup tolerance mW
- 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	2440	MHz
Antenna gain(typical):	2.7	dBi
Maximum peak output power at antenna input terminal: P	-5.47	dBm
Tune up tolerance	0	dB
Maximum conducted output power plus Tune up tolerance	-5.47	dBm
Maximum conducted output power plus Tune up tolerance (rounded to the nearest mW)	0	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)]*[\sqrt{f} (GHz)]	0.09	
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	0.1 <= 3	

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

Test result Pass

2.0 SAR Evaluation ISED

Limit as per IC RSS 102 issue 6 Table 11

Prediction frequency:	2440	MHz
Conducted Power at Antenna input: P	-5.47	dBm
Antenna Gain	2.70	dBi
Antenna Gain: G (dBi - 2.15 = dBd)	0.55	dBd
Time Averaging Factor: (Taf)	0	dB
Tune up tolerance : (Tut)	0	dB
ERP dBm (P+G-Taf+Tut)	-4.92	dBm
ERP mW (P+G-Taf+Tut)	0.32	mW
Minimum separation distance: D	≤5	mm
Exemption limit for Routine Evaluation SAR :	3.05	mW
Head and Body SAR; General pop/Uncontrolled		
Test Result : EUT meets the SAR Exemption Limit for Routine Evaluation : SAR test not required 0.32 < = 3.05	Pass	

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

End of report