

**Appendix G: General SAR test reduction & exclusion guidance and MPE calculation****KDB 447498**

## Section 4.3 General SAR test reduction and exclusion guidance

For Standalone SAR exclusion consideration, when SAR Exclusion Threshold requirement in KDB 447498 is satisfied, standalone SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.

The SAR Test Exclusion Threshold for 100 MHz to 6 GHz will be determined as follows.

$$\text{SAR Exclusion Threshold (SARET)} = \text{Step 1} + \text{Step 2}$$

**Step 1**

$$NT = [(MP/TSD^A) * \sqrt{f_{GHz}}]$$

NT	=	Numeric Threshold (3.0 for 1-g SAR and 7.5 for 10-g SAR)
MP	=	Max Power of channel (mW) (including tune-up tolerance)
TSD <sup>A</sup>	=	Min Test separation Distance or 50 mm (whichever is lower) = 50 mm

We can transpose this formula to allow us to find the maximum power of a channel allowed and compare this to the measured maximum power.

$$= [(NT \times TSD^A) / \sqrt{f_{GHz}}]$$

For Distances Greater than 50 mm Step 2 applies

**Step 2**

$$(TSD^B - 50mm) * 10$$

Where:

$$TSD^B = \text{Min Test separation Distance (mm)} = 50$$

**Note:** Step 2 doesn't apply here as the TSD<sup>A</sup> is less than 50 mm

**Operating Frequency 2405 MHz**

$$\begin{aligned} \text{SARET} &= [(3.0 \times 50) / \sqrt{0.2405}] \\ \text{SARET} &= 96.58 \text{ mW} \end{aligned}$$

**Operating Frequency 2440 MHz**

$$\begin{aligned} \text{SARET} &= [(3.0 \times 50) / \sqrt{0.2440}] \\ \text{SARET} &= 96.03 \text{ mW} \end{aligned}$$

**Operating Frequency 2475 MHz**

$$\begin{aligned} \text{SARET} &= [(3.0 \times 50) / \sqrt{0.2475}] \\ \text{SARET} &= 95.35 \text{ mW} \end{aligned}$$

Channel Frequency (MHz)	EIRP (mW)	SAR Exclusion Threshold (mW)	SAR Evaluation
2405.0	44.06	96.72	Not Required
2440.0	44.36	96.03	Not Required
2475.0	45.39	95.35	Not Required

Note: EIRP was calculated by addition of the maximum conducted carrier power and the maximum antenna gain (3 dBi).

**Therefore standalone SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.**

**MPE calculation**

Equation from IEEE C95.1

$$S = \frac{EIRP}{4\pi R^2} \text{ re - arranged } R = \sqrt{\frac{EIRP}{S 4\pi}}$$

Where:

S = power density

R = distance to the centre of radiation of the antenna

EIRP = EUT Maximum power

**Result**

Prediction Frequency (MHz)	EIRP (mW)	Power density limit (S) (mW/cm <sup>2</sup> )	Distance (R) cm required to be less than power density limit
2475.0	45.39	1.00	1.91

Note: EIRP was calculated by addition of the maximum conducted carrier power (13.57 dBm) and the maximum antenna gain (3 dBi).