

**Appendix G: General SAR test reduction and exclusion guidance****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.

In the frequency range below 100 MHz to 6 GHz and test separation distance of 50mm, the SAR Test Exclusion Threshold for operation in the 2400 – 2483.5 MHz band will be determined as follows

**SAR Exclusion Threshold (SARET)**

SAR Exclusion Threshold = Step 1 + 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) (inc tune up)  
TSD<sup>A</sup> = Min Test separation Distance or 50mm (whichever is lower) = 50

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<sup>B</sup> = Min Test separation Distance (mm) = 50

**Operating Frequency 2.425 GHz**

$$\begin{aligned} \text{SARET} &= [ (3.0 \times 50) / \sqrt{2.425} ] + \{ (50 - 50) * 10 \} \\ \text{SARET} &= [150 / 1.55] + (0 * 10) \\ \text{SARET} &= 96.77\text{mW} \end{aligned}$$

**Operating Frequency 2.450 GHz**

$$\begin{aligned} \text{SARET} &= [ (3.0 \times 50) / \sqrt{2.450} ] + \{ (50 - 50) * 10 \} \\ \text{SARET} &= [150 / 1.56] + (0 * 10) \\ \text{SARET} &= 96.15\text{mW} \end{aligned}$$

**Operating Frequency 2.475 GHz**

$$\begin{aligned} \text{SARET} &= [ (3.0 \times 50) / \sqrt{2.475} ] + \{ (50 - 50) * 10 \} \\ \text{SARET} &= [150 / 1.57] + (0 * 10) \\ \text{SARET} &= 95.54\text{mW} \end{aligned}$$

| Channel Frequency (MHz) | EIRP (W) | SAR Exclusion Threshold | SAR Evaluation |
|-------------------------|----------|-------------------------|----------------|
| 2425                    | 0.0025   | 96.77mW                 | Not Required   |
| 2450                    | 0.0025   | 96.15mW                 | Not Required   |
| 2475                    | 0.0023   | 95.54mW                 | Not Required   |

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

**Appendix G Continued****MPE Calculation****47 CFR §§1.1310****Prediction of MPE limit at a given distance**

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

where:

S = power density

R = distance to the centre of radiation of the antenna

EIRP = EUT Maximum power

**Result**

| Prediction Frequency (MHz) | Maximum EIRP (W) | Power density limit (S) (mW/cm <sup>2</sup> ) | Distance (R) cm Required to be less than 1 mW/cm <sup>2</sup> |
|----------------------------|------------------|-----------------------------------------------|---------------------------------------------------------------|
| 2425                       | 0.0025           | 1                                             | 0.01                                                          |
| 2450                       | 0.0025           | 1                                             | 0.01                                                          |
| 2475                       | 0.0023           | 1                                             | 0.01                                                          |