

18 RF Exposure

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 50 mm, 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^A = Min Test separation Distance or 50mm (whichever is lower)

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 = Min Test separation Distance (mm)

Re-arranging for Min. Test separation Distance (mm):

$$TSD = (Max Power of channel / 3.0) * \sqrt{f_{GHz}}$$

In order to find the closest test separation distance at which the EUT meets the requirements:

Channel Frequency (MHz)	Conducted Power (mW)	Calculated TSD (mm)	SAR Evaluation
2402	21	10.85	Not Required
2442	21	10.94	Not Required
2480	21	11.02	Not Required

The largest calculated minimum separation distance is 11.02 mm, for the purposes of these calculations this must be rounded up to the next largest whole mm, or 12 mm.

Operating Frequency 2.402 GHz

$$\begin{aligned} \text{NT} &= [(21 / 12) * \sqrt{2.402}] \\ \text{NT} &= [1.75 * 1.55] \\ \text{NT} &= 2.7 \end{aligned}$$

Operating Frequency 2.442 GHz

$$\begin{aligned} \text{NT} &= [(21 / 12) * \sqrt{2.442}] \\ \text{NT} &= [1.75 * 1.56] \\ \text{NT} &= 2.7 \end{aligned}$$

Operating Frequency 2.480 GHz

$$\begin{aligned} \text{NT} &= [(21 / 12) * \sqrt{2.48}] \\ \text{NT} &= [1.75 * 1.57] \\ \text{NT} &= 2.8 \end{aligned}$$

Channel Frequency (MHz)	Measured Numeric Threshold	Required Numeric Threshold	SAR Evaluation
2402	2.7	3.0	Not Required
2442	2.7	3.0	Not Required
2480	2.8	3.0	Not Required

The Numeric Threshold calculated from the measured results based on a test separation distance of 12 mm was less than the required Numeric Threshold. The EUT meets the SAR Exclusion criteria based on a 12 mm minimum separation distance and therefore standalone SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.