19 General SAR test reduction and exclusion guidance/RF Exposure

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 frequency range below 100 MHz will be determined as follows.

SAR Exclusion Threshold (SARET) = (Step 1 + Step 2) * Step 3

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^{A} = Min Test separation Distance or 50mm (whichever is lower) = 5mm (in this case)

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) = 50

Note: Step 2 doesn't apply here as the TSD^{A} is less than 50 mm

Step 3

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 steps 1 for 50 mm and 100 MHz is multiplied by ½ for test separation distances ≤ 50 mm

SARET = $[(NT \times TSD^{A}) / \sqrt{f_{GHz}}] * {}^{1}/_{2}$

SARET = $[(3.0 \times 50) / \sqrt{0.1}] * {}^{1}/_{2}$

SARET = 474.34 mW

Channel Frequency (MHz)	EIRP (mW)	SAR Exclusion Threshold (mW)	SAR Evaluation
13.56	4.36×10^{-5}	474.34	Not Required

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

Prediction of MPE limit at a given distance

$$S = \frac{EIRP}{4\pi R^2} \quad \text{re-arranged } R = \sqrt{\frac{EIRP}{S4\pi}}$$

Where:

S = power density
R = distance to the centre of radiation of the antenna
EIRP = EUT Maximum power

Note: The EIRP value was calculated using the E-Field measurement.

FCC Result

Prediction Frequency (MHz)	Maximum EIRP (mW)	Power density limit (S) (mW/cm^2)	Distance (R) cm required to be less than 0.98 mW/cm^2
13.56	4.36×10^{-4}	0.98	0.006

IC Result

Prediction Frequency (MHz)	Maximum EIRP (W)	Exemption limit (W)	RF Exposure calculation
13.56	4.36×10^{-7}	1.00	Not Required