Appendix G: General SAR exclusion 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.

In the frequency range below 100 MHz to 6 GHz and test separation distance of 50mm, the SAR Test Exclusion Threshold 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) = 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

Not applicable as TSD^{A} = 50 mm

Operating Frequency 903 MHz

MP= [(3 x 50) / √0.903]
MP= [150 / √0.903]
MP= 157.85 mW
The calculated output power 130 mW (Peak) is less than the SAR Exclusion Threshold of 157.85 mW.

Operating Frequency 916 MHz

MP= [(3 x 50) / √0.916]
MP= [150 / √0.916]
MP= 156.73 mW
The calculated output power 120 mW (Peak) is less than the SAR Exclusion Threshold of 156.73 mW.

Operating Frequency 927 MHz

MP= { [(3 x 50) / √0.927]
MP= { [150 / √0.927]
MP= 155.79 mW
The calculated output power 120 mW (Peak) is less than the SAR Exclusion Threshold of 155.79 mW.

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

Result:

Prediction Frequency (MHz)	Maximum EIRP (mW)	Power density limit (S) (mW/cm^2)	Distance (R) cm required to be less than $0.6mW/cm^2$
903.0	130.0	0.6	4.2