

RF Exposure Evaluation

1 RF Exposure Compliance Requirement

1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{(\text{min. test separation distance, mm}) \cdot \sqrt{f(\text{GHz})}} \right] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

f(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

1.3 EUT RF Exposure

$$\text{eirp} = \text{pt} \times \text{gt} = (\text{E} \times \text{d})^2 / 30$$

where:

pt = transmitter output power in watts,

gt = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, $\text{---}10^{((\text{dB}\mu\text{V}/\text{m})/20)}/10^6$,

d = measurement distance in meters (m)---3m,

$$\text{So pt} = (\text{E} \times \text{d})^2 / 30 / \text{gt}$$

The worst case (refer to report CQASZ170501320EW-01) is below:

Antenna polarization: Horizontal		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	86.83	Peak
433.92	77.23	Average

Antenna polarization: Vertical		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	78.44	Peak
433.92	68.84	Average

For 433.92MHz wireless:

Field strength = 86.83dB μ V/m @3m

Ant. gain 0dBi; so Ant numeric gain=1.0

So $P_t = \{ [10^{(86.83/20)} / 10^6 \times 3]^2 / 30 / 1.0 \} \times 1000 \text{mW} = 0.145 \text{mW}$

So $(0.145 \text{mW} / 5 \text{mm}) \times \sqrt{0.43392 \text{GHz}} = 0.019$,

0.019 < 3.0 for 1-g SAR

So the SAR report is not required.