

# 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  $\leq 50$  mm are determined by:

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

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  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,  $10^{((\text{dB}\mu\text{V/m})/20)/10^6}$ ,

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 CQASZ161001342E-01) is below:

For 2.4G wireless:

Field strength = 100.95dB $\mu$ V/m @3m

Ant gain 3.3dBi; so Ant numeric gain=2.14

$$\text{So pt} = \{ [10^{(100.95/20)} / 10^6 \times 3]^2 / 30 / 2.14 \} \times 1000 \text{mW} = 1.746 \text{mW}$$

$$\text{So } (1.746 \text{mW} / 5 \text{mm}) \times \sqrt{2.405 \text{GHz}} = 0.542,$$

$$0.503 < 3.0 \text{ for 1-g SAR}$$

So the SAR report is not required.