

SAR EXCLUSION JUSTIFICATION

Manufacturer Quha Oy
Device Quha Zono
FCC ID 2AB48QZ01

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Guidance document reference: KDB447498 D01 General RF Exposure Guidance v05r02, page 11, paragraph 4.3.1(1).

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:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 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 calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

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 according to 5) in section 4.1 is applied to determine SAR test exclusion.

These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

CALCULATIONS AND ASSUMPTIONS

Since the exact distance from the body may vary during use the worst possible distance where the device is in direct contact with the skin will be chosen as test separation distance in calculations. In this condition the antenna is 5 mm away from the body.

Power with tune-up:

$$P_{MAX} = \frac{(ER)^2}{30} = \frac{(0.0033)^2}{30} = 0.0026 \text{ mW} = -25.8 \text{ dBm}, \text{ where } E \text{ is the average value of field strength.}$$

$$P_W = P_{MAX} + \text{TuneUp} = -25.8 \text{ dBm} + 2 \text{ dB} = -23.8 \text{ dBm} = 0.0042 \text{ mW}$$

Actual evaluation:

$$\frac{0.0042 \text{ mW}}{5 \text{ mm}} \times \sqrt{2.44 \text{ GHz}} \approx 0.0013 \leq 3.0$$

CONCLUSION

The analysis shows that the device qualifies for exemption from SAR testing.

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