

# SAR Evaluation for extremity conditions

## 1. Extremity exposure conditions

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity *SAR Test Exclusion Thresholds* should be applied to determine SAR test requirements.

## 2. Standalone SAR test exclusion considerations

### For FCC:

- 1) 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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f_{(\text{GHz})}}$$

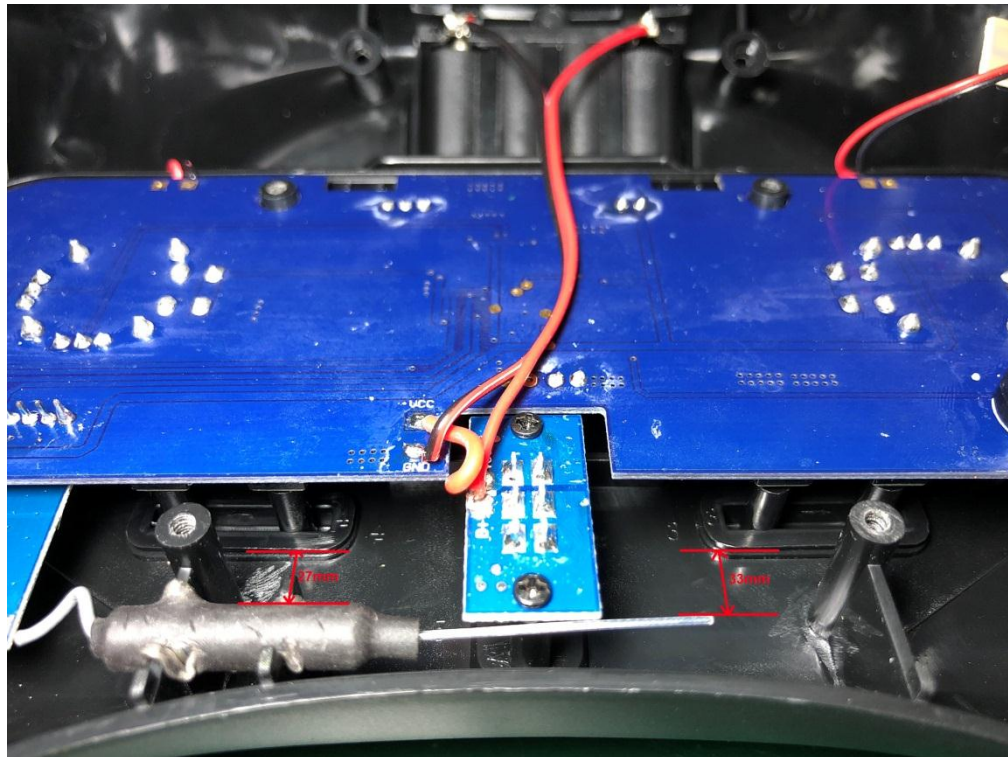
$\leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f_{(\text{GHz})}$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- 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*  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz

- 2) At 100 MHz to 6 GHz and for *test separation distances*  $> 50$  mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B of KDB 447498
  - [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW, at 100 MHz to 1500 MHz
  - [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at  $> 1500$  MHz and  $\leq 6$  GHz

### 3. UT Description (worst case)



Distance of antenna to extremity exposure positions(mm)	
Top button	27

For FCC:

Conducted Power of EUT						
Frequency (MHz)	Power (dBm)	Power (mW)	Tune-up power (dBm)	Tune-up power (mW)	Test distances (mm)	Limit (10-g SAR)
2405	18.15	65.31	18.50	70.79	27	4.07

$$(70.79 \times \sqrt{2.405}) / 27 = 4.07 < 7.5$$

### 4. Conclusion

SAR test for 10-g extremity is exclusion.