BluSDR-6 SAR Exclusion Document

The BluSDR-6-210250 is a 2.4GHz small form factor software-defined radio conceived primarily for systems integration into unmanned platforms (including controllers) and communications infrastructure.

The follow analysis is based on the Federal Communications Commission Office of Engineering and Technology Laboratory Division document KDB 447498 D01 General RF Exposure Guidance v06.

Re-arranging the formula in KDB 447498 D01 General RF Exposure Guidance v06, clause 4.3.1. Standalone SAR test exclusion considerations, a), the maximum power allowed at a separation distance of 50mm is:

a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f$_{(GHz)}$] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR,[30] where

$$(\max power\ of\ channel\ mW) \leq \frac{(3.0\ for\ 1g\ SAR)}{\sqrt{f(GHz)}} * (min, test\ seperation\ distance, mm)$$

The most stringent requirement is calculated using the highest operating frequency for the BluSDR-6-210250:

$$(\max power\ of\ channel\ mW) \leq \frac{3.0}{\sqrt{2.483}} * 50$$

$$(\max power\ of\ channel\ mW) \leq 95.2$$

The user instructions for the BluSDR-6-210250 require a separation distance of 20cm (Exhibit 08 - BluSDR-6 Hardware Guide, 9. Appendix C – Safety and Maintenance, 9.1 Cautions and Warnings):

RF emissions	When using this device please ensure 20cm is maintained between your device and your body while the device is transmitting.

The power allowed at this distance can be calculated according to KDB 447498 D01 General RF Exposure Guidance v06, clause 4.3.1. Standalone SAR test exclusion considerations, b) 2):

b) For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following (also illustrated in Appendix B):[32]

   1) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance − 50 mm)·($f_{(MHz)}$/150)]} mW, for 100 MHz to 1500 MHz

   2) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance − 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

$$SAR\ test\ exclusion\ threshold$$
$$= \{[Power\ allowed\ at\ numeric\ threshold\ for\ 50mm\ in\ step\ a)]$$
$$+ [(test\ seperation\ distance - 50\ mm) * 10]\}\ mW$$

$$SAR\ test\ exclusion\ threshold = \{[95.2] + [(200 - 50\ mm) * 10]\}\ mW$$

$$SAR\ test\ exclusion\ threshold = 1,595.2mW$$

Since the BluSDR-6-210250 produces a transmitter power of 200mW, SAR testing is not required.