



Exhibit: RF Exposure – FCC

FCC ID: 2AWA9-LHREG
IC: 26059-LHREG

Client	Ludwig System GmbH & Co KG	
Product	LudwigHook	
Standard(s)	FCC Part 15 Subpart 15.247:2016 FCC KDB 447498:2015	

SAR Calculations: 902.8 – 927.7 MHz FHSS transmitter

The EUT contains a 902 – 928 MHz and a 2400 – 2483.5 MHz FHSS transmitters. The firmware guarantees simultaneous operation will not occur and therefore antenna co-location testing is not applicable. This device is designed to be operated handheld and for the purpose of demonstrating compliance with MPE requirements and SAR exemption; we present for a worst case 5mm distance and 100 % duty cycle.

FCC Requirements: SAR test exclusion guidance

As per FCC KDB 447498 D01 Section 4.3.1 a), the 10-g extremity SAR evaluation Test Exclusion Threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm is determined by:

$$\left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \sqrt{f(\text{GHz})} \right] \leq 7.5$$

Performing the calculation, of the worst case mentioned above, using the maximum power measured of 51.85mW (see Table 14 page 32 on R-7169007823-004.pdf) yields to:

$$\frac{51.85}{30} \cdot \sqrt{0.9190} = 1.656;$$

1.656 is below the 7.5 worst case limitⁱ, so this device complies with FCC requirements

ISED Requirements: SAR test exclusion guidance

As per Table 1 in RSS-102, Section 2.5.1, the limit of 81.78mW has been calculated based on the interpolation between the limit of 835MHz is 80mW and 1900MHz is 99mW at 30mm or less.

This device has effective isotropic radiated power with a peak value of 97.7 dB μ V/mⁱⁱ for frequency(919MHz) and a peak value of 96.9 dB μ V/mⁱⁱⁱ for frequency (913.7MHz). Then the device has a combined peak power of:

97.7 dB μ V/m - 95.2 (factor to convert to EIRP at 3 meters) of 2.5dBm, or 1.778mW.

+

96.9 dB μ V/m - 95.2 (factor to convert to EIRP at 3 meters) of 1.7dBm, or 1.479mW.

Which give us a total of 3.257mW

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- 3.257mW is less than 81.78mW limit as per section 2.5.1 on RSS-102, thus the device meets the exception rules.

ⁱ Note the output power was measured at the output of the device, meaning at 30mm from the PCB

ⁱⁱ See Table A.3 in page 73 in TR-7169007823-004.pdf

ⁱⁱⁱ See Table A.3 in page 73 in TR-7169007823-004.pdf