

Manufacturer: Mirka Ltd
Device: Random Orbital Sander with Bluetooth Low Energy technology
Model: Leros 950X
FCC ID: 2AK2S-LCX
ISED ID: 22379-LCX

REFERENCE DOCUMENTS

KDB447498 D01 General RF Exposure Guidance v06, 23 October 2015
294936-1, FCC IC RF Test Report v1.2, 22 February 2019

EUT SPECIFICATION

RF characteristics of the assessed radio:

Operating Frequency Range:	2402 - 2480 MHz
Channels:	40
Channel separation:	1 MHz
Maximum conducted power:	0.19 dBm
Modulation:	GFSK
Antenna gain:	0 dBi
Antenna type:	Internal antenna
Antenna count:	1
Device category:	Portable Device (Human body distance < 20cm)

SAR EXCLUSION JUSTIFICATION

Guidance document reference: KDB447498 D01 General RF Exposure Guidance v06, page 12, paragraph 4.3.1(a).

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined:

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

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric threshold in the step b)

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 distance is < 5 mm, a distance of 5 mm according to f) 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 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:

$$P_w = P_{MAX} + \text{TuneUp} = 0.19 \text{ dBm} + 2 \text{ dB} = 2.19 \text{ dBm} = 1.66 \text{ mW}$$

Source-base time-averaged power:

Duty cycle of 100% is used on calculations (worst case).

Actual evaluation:

$$\frac{1.66 \text{ mW}}{5 \text{ mm}} * \sqrt{2.480 \text{ GHz}} \approx 0.523 \leq 3.0$$

CONCLUSION

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

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Mikko Halonen
Development Engineer