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MPE Calculation

Project No: G3474/1
Date: 20th July 2023

Product details:

Product name	R3-mote
Company name	R3 IoT Ltd
Address	4/2 Turnberry House
	175 West George Street
	Glasgow
	G2 2LB
	United Kingdom
Contact	Kevin Quillien
Email	kevin@r3-iot.com

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MPE Calculation for R3 IoT Ltd

FCC requirement:

This report contains calculation of maximum Possible Exposure for the K-Mote.

Required distance to the user is assumed to be 20 cm

Mobile devices are defined by the FCC as transmitters designed to be used in other than fixed locations and generally to be used in such a way that a separation distance of 20cm is normally maintained between radiating structures and the body of the user or nearby persons.

These devices are normally evaluated for exposure potential with relation to the MPE limit.

As the 20cm separation may not be achievable under normal operating conditions, an RF exposure calculation is used to demonstrate the minimum distance required to be less than the power density limit, as required under FCC rules.

FCC rule part:47CFR2.1091(3)

Power density (S) relates to Equivalent Isotropic Radiated power (EIRP) according to the following:

$$S = \frac{EIRP}{4\pi R^2}$$

Where,

R is the distance to the centre of radiation of the antenna (cm)

LoRa Power Density

The worst case output power of the LoRa module was = 48.0 mW

(Value obtained from test report C14855TR4)

The antenna gain was taken to be 1 dBi.

The Power density (S) is calculated as:

Frequency (MHz)	**Maximum EIRP (mW)**	**Power density (S) (mW/cm^2)**	**Power density limit (S) (mW/cm^2) 47CFR1.1310 Table 1**
903.0	60.1	0.0120	0.602 (f/1500)

f = Frequency (MHz)

Conclusion:

The product was shown to be compliant with the 20cm power density limit.

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ISED Requirement

RSS Standard:

RSS-102 Issue 5 Posted on Industry Canada website: March 19, 2015

Clause:2.5.2 Exemption Limits for Routine Evaluation — RF Exposure Evaluation

At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less then, in Watts,

$$1.31 \times 10^{-2} \, f^{0.6834}$$

adjusted for tune-up tolerance, where f is in MHz

SRD Evaluation

Calculation of e.i.r.p.:
Peak conducted power was measured, see Test Report C14855TR4.
The antenna gain was taken to be 1 dBi.

frequency (MHz)	Maximum EIRP (W)	Limit (W)
903.0	0.060	1.37

Conclusion
The apparatus meets the exclusion requirements for RF exposure Evaluation.

Prepared by:

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