

## 6 Safety Human Exposure

### 6.1 Radio Frequency Exposure Compliance

#### 6.1.1 Electromagnetic Fields

**RESULT:****Pass****Test Specification**

Test standard : CFR47 FCC Part 2: Section 2.1091  
CFR47 FCC Part 1: Section 1.1310  
FCC KDB Publication 447498 v06  
FCC KDB Publication 865664 D02 v01r02  
OET Bulletin 65 (Edition 97-01)  
RSS-102 Issue 5 March 2019

**FCC requirement:** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

**MPE Calculation Method according to OET Bulletin 65**

Power Density:  $S_{(mW/cm^2)} = PG/4\pi R^2$  or  $EIRP/4\pi R^2$

Where:

S = power density (mW/cm<sup>2</sup>)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

**The nominal maximum conducted output power specified:**

Lora FHSS: 20.62 dBm

Lora DTS: 24.08 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (2.3 dBi Lora FHSS and Lora DTS), the RF power density can be calculated as below:

For Lora FHSS:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.054$  mW/cm<sup>2</sup>

For Lora DTS:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.119$  mW/cm<sup>2</sup>

**Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310: 1.0 mW/cm<sup>2</sup>**

➤ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

#### **Exemption from Routine Evaluation Limits – RF Exposure Evaluation**

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

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 than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;

- RF exposure evaluation exempted power for Lora FHSS & DTS: 1.37 W

#### **The nominal maximum conducted output power specified:**

Lora FHSS: 20.62 dBm

Lora DTS: 24.08 dBm

Antenna Gain: 2.3 dBi Lora FHSS and Lora DTS

The Max. e.i.r.p. for Lora FHSS: 22.92dBm = 0.196 W

The Max. e.i.r.p. for Lora DTS: 26.38dBm = 0.435 W

Both e.i.r.p. for the Lora FHSS and Lora DTS are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

**“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”**