# 1    RF Exposure Requirements

## 1.1    General Information

## Client Information

**Applicant** ...................................... : MeLaSen Electronics CO., LTD

**Address of applicant** ................... : No.29 Industrial Road, Xiaolan Industrial Estate, Xiaolan Town, Zhongshan, 528415 Guangdong, P.R. China

**Manufacturer** ................................. : MeLaSen Electronics CO., LTD

**Address of manufacturer** ............. : No.29 Industrial Road, Xiaolan Industrial Estate, Xiaolan Town, Zhongshan, 528415 Guangdong, P.R. China

## General Description of E.U.T

**FCC ID** ........................................... : 2AYGE-MLSH8

**Equipment Type** ............................ : Portable Device

**Product Name** ............................... : Remote Control

**Model No.** ..................................... : MLSH8

**Model Description** ........................ : ---

**Rated Voltage** ............................... : Battery 3V (2*1.5V AAA)

**Battery Capacity** ........................... : ---

**Power Adapter** .............................. : ---

## Technical Characteristics of EUT

**Operating Frequency** ................... : 433.92 MHz

**Max. Field Strength** ...................... : 83.69dBuV/m (at 3m distance)

**Modulation** .................................... : ASK

**Type of Antenna** ........................... : PCB Printed Antenna

**Antenna Gain** ................................ : 3dBi

**Lowest oscillator** .......................... 13.56MHz

## 1.2 RF Exposure Exemption

According to S1.1307(b)(3) and 447498 D04 Interim General RF Exposure Guidance v01, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radiofrequency energy level in excess limit for maximum permissible exposure.

**Option A:** FCC Rule Part 1.1307 (b)(3)(i)(A):The available maximum time-averaged power is no more than1mW,regardless of separation distance.

**Option B:** FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold $P_{th}$ (mW) described in the following formula. $P_{th}$ is given by

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20\,cm}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20\,cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\,cm} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$ = the separation distance (cm);

**Option C:** FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where $\lambda$ is the free-space operating wavelength in meters.

| Single RF Sources Subject to Routine Environmental Evaluation ||
| :---: | :---: |
| RF Source frequency (MHz) | Threshold ERP (watts) |
| 0.3-1.34 | $1,920R^2$ |
| 1.34-30 | $3,450 \ R^2/f^2$ |
| 30-300 | $3.83 \ R^2$ |
| 300-1,500 | $0.0128 \ R^2 f$ |
| 1,500-100,000 | $19.2R^2$ |

**For multiple RF sources:** FCC Rule Part 1.1307 (b)(3)(ii)

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

## 1.3 Calculated Result

| Radio Access Technology | Prediction Frequency (MHz) | Max. Field Strength (dBµV/m) | Antenna Gain (dBi) | Output Power (dBm) | Tune-up Power (dBm) | ERP (dBm) |
|---|---|---|---|---|---|---|
| SRD | 433.92 | 83.69 | 3 | -14.57 | -14.00 | -13.72 |

| Frequency (MHz) | Option | Min. Distance (cm) | Max. Power (dBm) | Max. Power (mW) | Exposure Limit (mW) | Ratio | Result |
|---|---|---|---|---|---|---|---|
| 433.92 | B | 0.5 | -13.72 | 0.04 | 23.17 | 0.01 | Pass |

Note:

1. EIRP= E-104.8+20logD; E=electric field strength in dBuV/m, D= specified measurement distance in meters.

   Output Power=EIRP-Antenna Gain;

   ERP=EIRP-2.15dB.

2. Option A, B and C refers as clause 1.2.

3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power;

   For option C, ERP converts to Max. Power.

4. For option B, Pth (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).

5. Ratio= Tune-Up ERP (mW)/Exposure Limit (mW).

**Mode for Simultaneous Multi-band Transmission:**

| Radio Access Technology | Ratio 1 | Ratio 2 | Simultaneous Ratio | Limit | Result |
|---|---|---|---|---|---|
| / | / | / | / | / | / |

Result: Pass

======End of Report======