

## *User manual*

### Caution:

This device complies with Part 15 of the FCC Rules / Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. this device may not cause harmful interference.
2. this device must accept any interference received, including interference that may cause undesired operation.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

*Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut*

*fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé 2 pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.*

**Information for the OEM Integrators**

This device is intended for OEM integrators only. Please see the full grant of equipment document for restrictions.

**Label Information to the End User by the OEM or Integrators**

If the FCC ID of this module is not visible when it is installed inside another device, then the outside of the device into which the module is installed must be label with

“Contains FCC ID: 2AVFQ-MCUDISP and IC: 25762-MCUDISP

The requirement for KDB 996369 D03:

**1. List of applicable FCC rules**

FCC Part 15. 249.

**2. Summarize the specific operational use conditions**

None

**3. Limited module procedures**

The module is a single module, so this requirement is not applicable to the product.

**4. Trace antenna designs**

The module uses the PCB antenna, so this requirement is not applicable to the product.

**5. RF exposure considerations**

None

**6. Antennas**

PCB antenna

**7. Label and compliance information**

If this certified module is installed inside the host device, then the outside of the host must be labeled with “Contains FCC ID: 2AVFQ-MCUDISP and IC: 25762-MCUDISP”.

**8. Information on test modes and additional testing requirements**

The host manufacturer can use the software of “prodtest.exe” to make the Bluetooth transmit continuously.

**9. Additional testing, Part 15 Subpart B disclaimer**

The module only complies with the FCC Part 15.249. If the module is installed in the host device, the host manufacturer is responsible for the compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. For example, if the host manufacturer markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the host manufacturer shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

## 1.Introduction

The MCU\_Display module integrated with a MCU and Bluetooth module LBCA2HNZY-711. The MCU IC communicate with the Bluetooth module by SPI interface. The LBCA2HNZY-711 is a Bluetooth Low Energy Module 4.2 with internal PCB printing antenna. Please see LBCA2HNZY-711 spec for detail information.

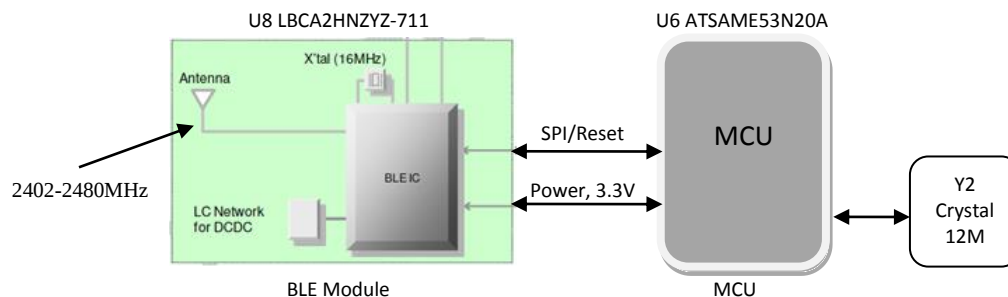
## 2.Features

- Bluetooth standard: BLE4.2
- Frequency range: 2400~2480MHz
- Receiver sensitivity (Ideal transmitter PER <= 30.8%): -93dBm(TYP), -70dBm(MAX)
- Maximum input signal level (PER <= 30.8%):-10dBm(MIN)
- Power supply: 3.3V
- RX MODE:5.1mA ,TX mode:4.8mA
- Low power consumption
- Operating Temperature range: 0°C~ +55°C
- RoHS Compliance

## 3. Applications

- Industrial Measurement and Control

## 4. Module Diagram



## 5. Operating Condition

| Parameter                              | Min   | Typ  | Max   |
|----------------------------------------|-------|------|-------|
| Operate Temperature                    | 0°    | 25 ° | 55°   |
| Transportation and Storage Temperature | -40 ° |      | 66°   |
| Work Voltage                           | 2.5V  | 3.3V | 3.45V |
| RF Load Impedance                      |       | 50Ω  |       |

## 6. RF Electronic Specification

Normal Condition: VBAT=3.0V, +25deg.C, (otherwise notified)

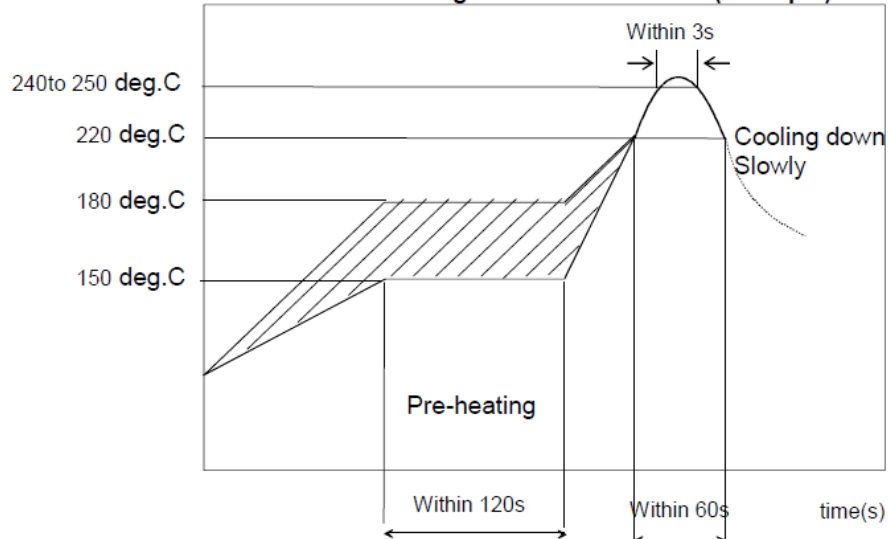
| Item / Conditions                                     | Spec. |     |      | Unit |
|-------------------------------------------------------|-------|-----|------|------|
|                                                       | MIN   | TYP | MAX  |      |
| Center frequency                                      | 2402  | -   | 2480 | MHz  |
| Channel Spacing                                       | -     | 2   | -    | MHz  |
| Number of RF Channels                                 | -     | 40  | -    | -    |
| Output power (Measured at ANT pin)                    | -     | -1  | -    | dBm  |
| Modulation characteristics                            |       |     |      |      |
| 1) $\Delta f_{1\text{avg}}$                           | 225   | -   | 275  | kHz  |
| 2) $\Delta f_{2\text{max}}$ (at 99.9%)                | 185   | -   | -    | kHz  |
| 3) $\Delta f_{2\text{avg}} / \Delta f_{1\text{avg}}$  | 0.8   | -   | -    | -    |
| Carrier frequency offset and drift                    |       |     |      |      |
| 1) Frequency offset: $ f_n - f_{TX} $                 | -     | -   | 150  | kHz  |
| 2) Frequency drift: $ f_0 - f_n $                     | -     | -   | 50   | kHz  |
| 3) Drift rate #0: $ f_1 - f_0 $                       | -     | -   | 20   | kHz  |
| 4) Drift rate #n: $ f_n - f_{n-5} $                   | -     | -   | 20   | kHz  |
| Receiver sensitivity (Ideal transmitter PER <= 30.8%) | -     | -93 | -70  | dBm  |
| Maximum input signal level (PER <= 30.8%)             | -10   | -   | -    | dBm  |
| PER Report Integrity (-30dBm input)                   | 50    | -   | 65.4 | %    |
| TX Current consumption                                | -     | 4.8 | -    | mA   |
| RX Current consumption                                | -     | 5.1 | -    | mA   |

## 7. Reflow Profile for BLE module

The recommendation conditions of soldering are as in the following figure.

When products are immersed in solvent after mounting, pay special attention to maintain the temperature difference within 100°C. Soldering must be carried out by the above mentioned conditions to prevent products from damage. Set up the highest temperature of reflow within 260 ° C. Contact Murata before use if concerning other soldering conditions.

**Reflow soldering standard conditions(Example)**



Please use the reflow within 2 times.

Use rosin type flux or weakly active flux with a chlorine content of 0.2 wt % or less.