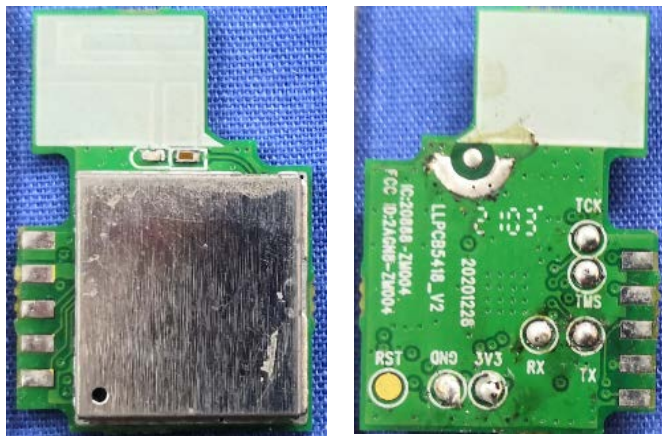


# ZM004 User Manual

## 1. Introduction

ZM004 is a cost-effective embedded ZIGBEE Low Energy module launched by sengled, CustomNodes EFR32MG21 technology, which are fully integrated System-on-Chips that integrate a 2.4 GHz, IEEE 802.15.4-2003-compliant transceiver, 32-bit ARM Cortex-M33 core, maximum working frequency of 80 MHz, 1024 kB flash and 96 kB of RAM, 12 channel peripherals reflection system, may realize the MCU peripheral autonomous interaction. Integrated PA, TX power up to 10 dBm (2.4 GHz) powerful peripherals, 4 x4 QFN package as many as 20 GPIO.

## 2. Module samples



## 3. General information

1. At 2.4 GHz (250 KBPS O-QPSK DSSS), the Rx current is 9.4 mA
2. A combination of 80 MHz ARM Cortex-M33 and a high-performance 2.4 GHz radio is designed for IoT connectivity. Provide industry-leading energy-saving wireless SoC
3. Built-in 96kBytes SRAM, 1024KBytes Flash
4. Single power supply 1.71 to 3.8V
5. Class 1 supported with 10dBm maximum TX power
6. 10 golden-finger pins are easy installation with PCB-Through-PCB
7. Compact size 24\*17
8. PCB antenna

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## OEM Guidance

### 1. Applicable FCC rules

This module is granted by Single Modular Approval. It complies to the requirements of FCC part 15C, section 15.247 rules.

### 2. The specific operational use conditions

This module can be used in IoT devices. The input voltage to the module is nominally 3.3V DC. The operational ambient temperature of the module is -20 to 85 degree C. Only the embedded PCB antenna is allowed. Any other external antenna is prohibited.

### 3. Limited module procedures

N/A

### 4. Trace antenna design

N/A

### 5. RF exposure considerations

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment can operated with minimum distance 20cm between the radiator and your body. If the device built into a host as a portable usage, the RF exposure evaluation may be required as specified by§2.1093.

## 6. Antenna

Antenna type :PCB Antenna; Antenna Max. Peak Gain 1 dBi

## 7. Label and compliance information

An exterior label on OEM's end product can use wording such as the following: "Contains FCC ID: 2AGN8-ZM004" "Contains IC: 20888-ZM004"

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

a)The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

b)The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.

c)If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference have been corrected .

9. Additional testing, Part 15 Sub part B disclaimer The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation. When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly-available drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory 50 devices or drivers are not available. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details.

The product under test is set into a link/association with a partnering device, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.

**FCC Statement:**

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

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

**ISED RSS Warning:**

This device complies with Innovation, Science and Economic Development Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation

est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

**ISED RF exposure statement:**

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Le rayonnement de la classe b respecte ISED fixaient un environnement non contrôlés. Installation et mise en œuvre de ce matériel devrait avec échangeur distance minimale entre 20 cm ton corps.