

## ***SE159:Wireless communication module***

---

### **Product Specifications**

**Model : SE159**

**Version : 1.0**

**2012-07-30**

# 1 Introduction

SE159 is a Wireless communication module, intended to be used as a general purpose radio transceiver compliant to IEEE 802.15.4. On each side of the PCB there contact to connect I/O, alimentation and programming pin related to the microcontroller. The modules provide up to 16 channels of operation in the ISM 2.4GHz frequency band.

## 1.1 Scope

SE159 Wireless communication module is designed to operate in 2.4 GHz ISM frequency band. The circuit mainly consists of a single-chip microcontroller with build-in radio transceiver.

## 1.2 Features

- Wireless communication module used as stand-alone module or as a peripheral via serial communication
- Design based on the single-chip microcontroller to support IEEE@802.15.4
- Powered by a single supply voltage in the range of 1.8V to 3.6V
- Modulation O-QPSK
- Operating frequency 2405 – 2480 MHz (16 Channels)

## 2 Product information

### 2.1 Specification Overview

<b>Standards</b>	IEEE 802.15.4
<b>Operating frequency</b>	2405 – 2480 MHz (16 Channels)
<b>Modulation</b>	O-QPSK
<b>Maximum peak power</b>	9.12 dBm
<b>Receiver sensitivity</b>	-100 dBm
<b>Operating voltage</b>	1.8 - 3.6 V

### 2.2 Hardware information

SE159 is a low power consumption and low cost wireless module to be used as stand-alone or as a communication peripheral.

#### 2.2.1 Block Diagram

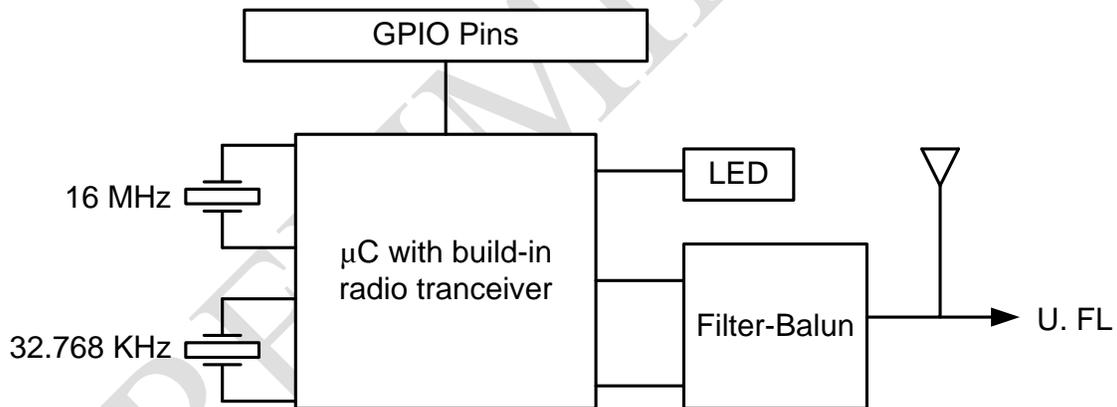


Figure 1: SE159 - Block diagram

## 2.3 Mechanical Information

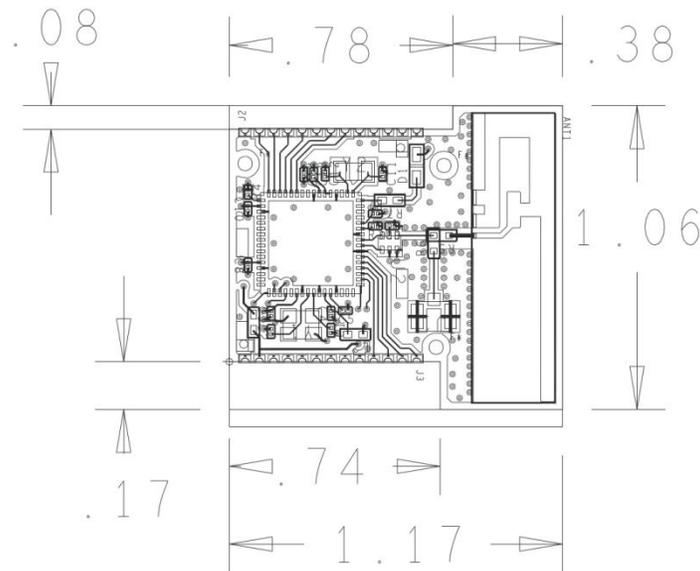


Figure 2: SE159 - Mechanical dimension in inch

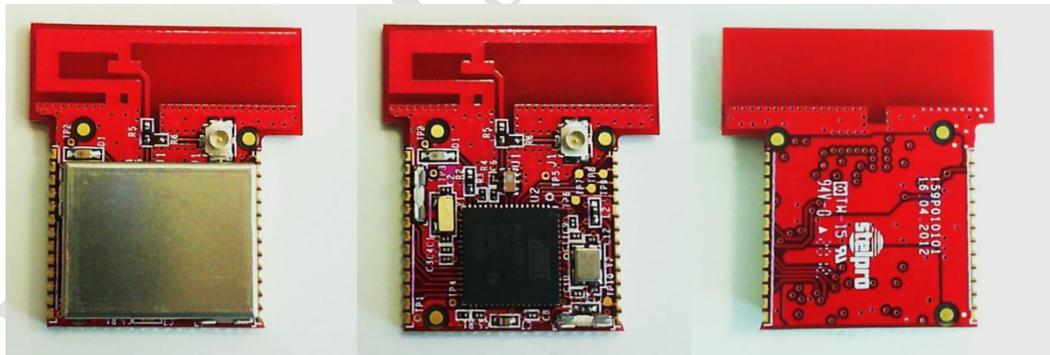


Figure 3: SE159 PCB Photo.

## 2.4 FCC Approved

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.

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

NOTE: 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.

This transmitter complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## 2.5 Canada (IC)

This device complies with Industry Canada license-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.

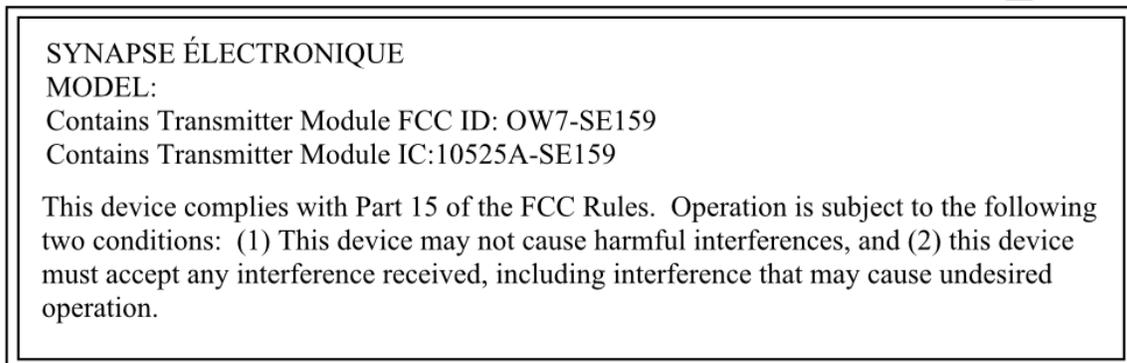
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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 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.

### 3 OEM Labeling Requirements

NOTICE: The OEM must make sure that FCC and Industry Canada labeling requirements are met. This includes a clearly visible exterior label on the outside of the final product housing that displays the contents shown in Figure 4.



**Figure 4: OEM Labeling Requirements**

## 4 Reference

- [1] ATmega128RFA1; 8-bit AVR Microcontroller with Low Power 2.4GHz Transceiver for ZigBee, IEEE 802.15.4, 6LoWPAN, RF4CE, SP100, Wireless HART and ISM Applications; Preliminary Datasheet; Rev. 8266D-MCU Wireless-06/12; Atmel Corporation.