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DISRUPTIVE TECHNOLOGIES

Sensor RF module 2AA (US) - 102540 - User Manual

Summary:

The Sensor RF module 2AA (US) **shall be used only in internal Disruptive Technologies products** and is mounted inside the products during manufacturing according to a manufacturing flow developed and maintained by Disruptive Technologies engineers. A simple installation guide is given for reference only.

The Sensor RF module 2AA (US) is designed to support the proprietary RF protocol Secure Data Shot (SDS) of Disruptive Technologies and shall be used in devices for establishing an RF link with SDS enabled devices.

Revision History Table				
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1. Installation and use of the module

The Sensor RF module 2AA (US) **shall be used only in internal Disruptive Technologies products** and is mounted inside the products during manufacturing according to a manufacturing flow developed and maintained by Disruptive Technologies engineers. A simple installation guide is given for reference only.

2. General description

The Sensor RF module 2AA (US), with part number 102540, is designed to support the proprietary Disruptive Technologies RF protocol, Secure Data Shot (SDS). The module shall be used in products for establishing an RF link with SDS enabled gateways.

The Sensor RF module 2AA (US) contains one radio IC and an internal PCB antenna together with a digital interface that is meant to be used for connecting various digital sensing elements or modules. Details can be found in the "Block Diagram" section in this document.

Additionally, the module supports power management circuitry to allow the device to be powered from batteries and be isolated from the variation in battery voltage. The typical power supply is two AA batteries.

3. Compliance Statement

The FCC and Industry Canada statements as printed below apply to the Sensor RF module 2AA (US).

The FCC and Industry Canada statements must be included in the user manual of any host product incorporating the module and both must be printed on the host product exterior if it is big enough to accommodate the print.

FCC (Federal Communications Commission) statements

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

1) The device may not cause harmful interference, and

2) The device Module must accept any interference received, including interference that may cause undesired operation.

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Important 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.

This transmitter must not be co-located or operating in conjunction with any other antennas or transmitters. It is the responsibility of the host device manufacturer to ensure continued compliance with FCC rule part 15B once the module has been installed in the host device.

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

The concerned end product must be labeled to say "Contains FCC ID: 2ATFX-102540"

Industry Canada statements

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1) The device may not cause interference, and

2) The device must accept any interference, including interference that may cause undesired operation of the device.

Important note: To comply with Industry Canada RF exposure limits, the antenna used for this device must be installed to provide a separation distance of at least 20cm from all persons. RF exposure is in accordance with RSS-102, section 2.5.2.

The concerned end product must be labelled to say: "Contains IC: 25087-102540"

Declarations d'Industry Canada

Cet equipement est conforme aux normes d'exemption de licence RSS d'Industry Canada. Son utilisation est soumise aux deux conditions suivantes:

1) Le dispositif ne doit pas provoquer d'interference, et

2) Le dispositif doit accepter toute interference, y compris des interferences susceptibles de provoquer un fonctionnement indesirable de l'equipement.

Remarque importante: Pour respecter les limites d'exposition aux radiofrequences d'Industry Canada, l'antenne utilisée pour cet appareil doit être installé pour fournir une distance de séparation d'au moins 20 cm de toutes les personnes. L'exposition aux RF est conforme à la norme RSS-102, section 2.5.2.

Le produit final concerne doit porter une etiquette avec la mention: "Contient IC: 25087-101941"

4. Block Diagram

The block diagram of the Sensor RF module 2AA (US) is shown in figure 1.



Figure 1. Block diagram

The antenna is integrated into the PCB of the Sensor RF module 2AA (US). The Sensor RF module 2AA (US) contains all required functionality to communicate on the SDS protocol and connect to the hardware attached to the I2C/SPI bus connector. The signals available on the connector are described in the section "Electrical Interface".

5. Antenna requirements

The antenna details are:

- Antenna Type: Integrated PCB Antenna Helix type
- Gain: -0.8 dBi
- Antenna Details: PN 102385 "Sensor RF module 2AA PCB"
- Manufacturer: Disruptive Technologies Research AS

The antenna is located on the module as shown in figure 2 below.

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Figure 2. Location of the antenna

6. Electrical Interface

The electrical interface to the Sensor RF module 2AA (US) is available on a connector, J3 (A and B). It consists of power supply pins, ground pins, and digital I/O pins. The power supply is regulated inside the module to supply all the power domains of the module. Table 1 lists the electrical parameters of the signals.

Table 1

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Group (signal)	Min	Тур	Мах	Unit
Supply voltage (VDD and VDD1)	3.2	3.3	3.6	V
Supply current			40	mA
Ground (GND)	Connect closely to system ground			
Digital I/O signaling voltage	3.0	3.3	3.6	V
Digital I/O (I2C_SCL, I2C_SDA, READY)				

7. Requirements for assembly

- Make sure that no metal objects in the enclosure are closer than 1 cm from the antenna
- Do not put any other PCB above or below the antenna area closer than 1 cm
- Use 3.3V CMOS digital signaling for digital interface pins
- Do not remove any of the shield boxes assembled around the RF circuitry
- Do not draw more than 40 mA from VDD and VDD1 in total