Scandinavian Reach Technologies AS

User manual & Product Data sheet

SRT PT-01

In:Range Personnel Tag

SCAN REACH

On-board Wireless Connectivity

Content

Preface

Copyright

Disclaimer

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Declaration of Conformity

FCC

Federal Communications Commission Statement

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.

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End user must follow the specific operating instructions for satisfying RF exposure compliance.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

Warranty and RMA

According to General Sales Terms and conditions.

Safety Information

Before installing and using this device, note the following precautions:

- Read all instructions carefully.
- Follow all warnings and cautions in this manual.
- Battery inside is not replaceable nor rechargeable.
- Discard device according to relevant disposal policy.

Safety Precautions

Before installing and using this device, note these safety instructions carefully:

1. Keep this User Manual for later reference.
2. All cautions and warnings on the equipment should be noted.
3. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
4. If one of the following situations arises, get the equipment checked by service personnel:
    a. The equipment does not work well, or you cannot get it to work according to the user's manual.
    b. The equipment has been damaged.
    c. The equipment has obvious signs of breakage.
    d. Liquid has penetrated the equipment.
5. Do not place heavy objects on the equipment.

Technical Support and Assistance

1. For the most updated information of Scandinavian Reach Technologies AS products, visit the company website at www.scanreach.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:

- Product name and serial number
- Detailed information of the peripheral devices
- A complete description of the problem

Caution! To keep the unit clean, use only approved cleaning products or clean with a dry cloth.

Global Service Contact Information

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Product and Architectural Design information SRT PT-01

Functional description

The Scandinavian Reach Technologies AS SRT PT-01 Personnel tag is a wearable device intended to report its location within predefined areas. The tag communicates with Scandinavian Reach Technologies AS Mesh nodes via built-in 2,4 GHz Bluetooth radio.

The Personnel tag includes a pressable button. The function of this button is:

1. To trigger alarm in case of emergency issues.
2. To activate and de-activate the tag.

Further, a LED diode, placed on the upper surface will indicated status of the tag.

Software/Firmware specification

The tag is from factory equipped with firmware which periodically advertise a Bluetooth beacon message containing:

- The unique address of the tag
- The battery status of the tag
- Button press status
- The temperature of the tag

The firmware also handles how the LED diode is used. Typically indicating power on, low battery and alarm triggered.

It is not possible to update the firmware after the SRT PT-01 has been produced.

Specification of frequency band(s), power output and power management

The SRT PT-01 operates in the non-licensed 2,4GHz band with the following characteristics.

- 2,4 GHz Bluetooth (2.4 - 2.4835GHz)
- TX power +4 dBm
- Antenna – PCB (1.5dBi gain)

When the SRT PT-01 is not advertising data, it sets itself into sleep mode waiting for the next TX-interval. This to use as little energy as possible.

Power usage

- ~ 0.4 µA at system off
- ~ 7 mA at +4 dBm

Specification of modulation type and data protocol

In normal operation the SRT PT-01 is configured using advertisement over Bluetooth 5 Low Energy[1]. The modulation is GFSK.

Running in advertising mode, advertising packets are sent periodically on each advertising channel. The time interval between packet set has both a fixed interval and a random delay. The interval is specified between the set of 3 packets over the 3 used channels (37, 38 and 39).

The Bluetooth Specification defines the top-level packet in Bluetooth LE with two data units. The packet itself has several parts including a preamble and access address, as well as a CRC.

The Packet data unit for the advertising channel (called the Advertising Channel PDU) includes a 2-byte header and a variable payload from 6 to 37 bytes. The actual length of the payload is defined by the 6-bit Length field in the header of the Advertising Channel PDU.

Description of integrity and authenticity measures

The SRT PT-01 relies on the Bluetooth protocol for managing message integrity. The protocol handles checksum validation for every received package (based on 3 bytes of CRC included in the package itself). Regarding authentication, the SRT PT-01 will not accept any inbound connections from other devices as the device is not connectable. Advertisements from SRT PT-01 includes a unique identifier describing the SRT PT-01 as a type of device. This unique identifier is used by the SRT MN-01 when filtering for SRT PT-01 devices. In addition, the system uses whitelisting of both SRT PT-01 and SRT-MN-01 based on unique MAC addresses[1]. This ensures external or unknown devices are not able to connect or join the network. Data from unrecognized mesh nodes or tags will be discarded.

Mesh node and Personnel communication pattern

The SRT PT-01 (wearable tag) will typically be used in conjunction with SRT MN-01 (static located mesh node). A mesh node will listen for advertisements from all nearby tags based on the unique advertisement identifier. The mesh-node will forward the information from tag advertisements to an upstream gateway where this information will be used to create value. If the gateway is not reachable directly the mesh node will depend on other upstream mesh nodes to forward the information. As already mentioned, whitelisting of both mesh nodes and tags is used ensuring unwanted access.

[1] https://en.wikipedia.org/wiki/MAC_address

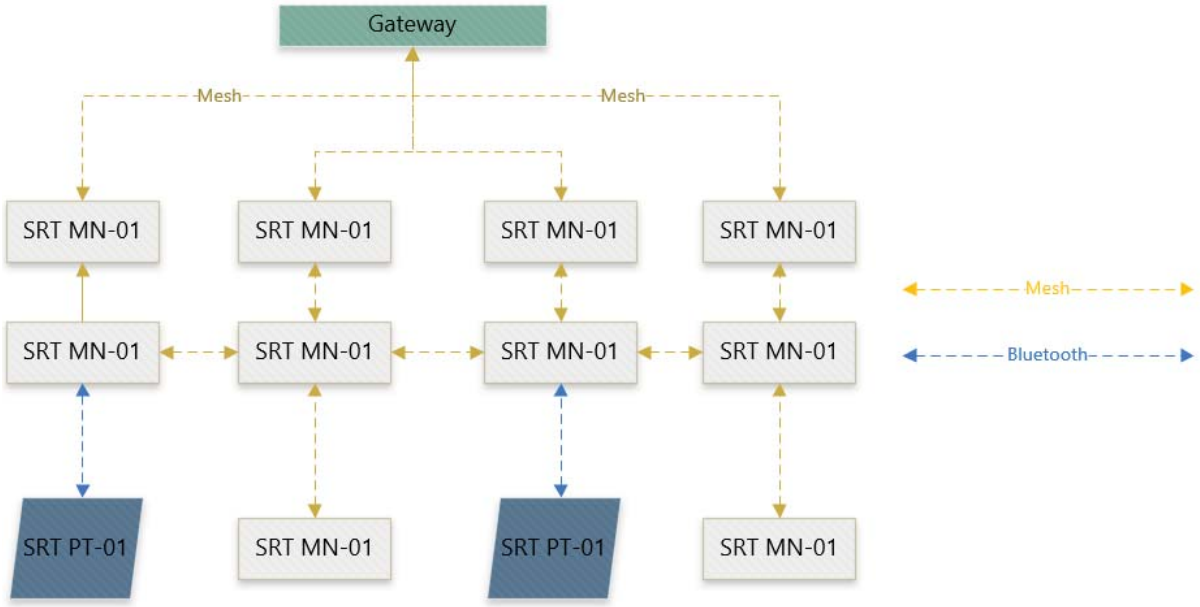

Figure 1- Tag and Meshnode overview

Figure 2- Tag and Meshnode communication pattern

Hardware specifications

Power input

- Battery: CR 2032 3V Li-ion

Power usage

- ~ 0.4 µA at sleep
- ~ 7 mA at 0 dBm

Physical dimensions

- Size: 43mm x 28mm x 10mm
- Wearable strap (bracelet, necklace or anklet) maximum size 19mm x 3mm

Radio transmitter characteristics

- 2,4 GHz Bluetooth (2.4 - 2.4835GHz)
- TX power +4 dBm
- Antenna – PCB, 1.5dBi gain

Certifications

- CE (pending)
- FCC Class B (pending)
- DNV-GL CG0339 & CP0302 (pending)

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In:Range SRT PT-01

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