

INNCOM TXR RF Module Datasheet

Overview

The INNCOM TXR series of embedded RF radio modules provides INNCOM products with a common radio platform. The TXR RF radios are used in the point to point Layer-1 in-room network and in Layer-2 802.15.4 Zigbee 2006 mesh network topologies at 2.4 GHz.



Features

- Common footprint designed for use with a variety of host products
- Multiple antenna options
- 2.4Ghz IEEE 802.15.4 compliant RF transceiver (CC2430 radio core)
- Low power and long range variants available
- Industrial temperature ratings 0-65 C°
- FCC Part 15C

Table 1 INNCOM TXR Radio Specifications

| Performance | 02-9994 | 02-9894 | 02-9927 |
|--|-------------|---------------------|---------------|
| RF Data Rate | 250kbps | 250kbps | 250kbps |
| Antenna Type | SMT | u.FL male connector | SMT |
| Indoor Range | 70ft | 98ft | 100ft |
| Outdoor/ RF line-of-sight range | 540ft | 980ft+ | 1000ft+ |
| Transmit Power | 1mW (+0dBm) | 2mW (+2dBm) | 10mW (+18dBm) |
| Receive Sensitivity | -94.6dBm | -94dBi | -94.6dBm |
| Frequency Band | 2.4Ghz | 2.4Ghz | 2.4Ghz |
| Encryption | AES-128 | AES-128 | AES-128 |
| Protocol | 802.15.4 | 802.15.4 | 802.15.4 |
| Frequency Channels | 11-26 | 11-26 | 11-26 |
| Dimensions | 28mm x 38mm | 28mm x 38mm | 28mm x 38mm |

Ranges are determined by performing an RF link quality test using two identical e528.3G thermostats containing radios as defined in tables 2 and 3. The maximum distance threshold is based on a 95% overall link quality. Outdoor ranges were conducted in a low noise, free air environment. Indoor ranges are for reference. Indoor ranges are impacted by the ambient environmental noise floor, and building construction materials.

Secondary Range Performance Data

The following table describes the indoor and outdoor range when using un-like antenna combinations.

Table 2 INNCOM TXR Radio Indoor Range

| Transmitter | Receiver | Receiver | Receiver |
|----------------|----------------|----------------|----------------|
| | 02-9994 | 02-9894 | 02-9927 |
| 02-9994 | 70ft (21m) | 73ft (22m) | 98ft (30m) |
| 02-9894 | 100ft (31m) | 100ft (31m) | 100ft (31m) |
| 02-9927 | 90ft (27m) | 100ft (31m) | 98ft (30m) |

Table 3 INNCOM TXR Radio Outdoor Range

| Transmitter | Receiver | Receiver | Receiver |
|----------------|----------------|----------------|----------------|
| | 02-9994 | 02-9894 | 02-9927 |
| 02-9994 | 540ft (165m) | 570ft (174m) | 654ft (199m) |
| 02-9894 | 640ft (195m) | 980ft+ (299m+) | 768ft (234m) |
| 02-9927 | 550ft (168m) | 620ft (189m) | 980ft+ (299m+) |

Table 4 INNCOM TXR Operating Conditions

| Parameter | Min | Max | Unit |
|--|-----|-----|------|
| Operating ambient temperature range | -40 | 85 | °C |
| Operating supply voltage | 2.0 | 3.6 | V |

The supply pins to the radio must be driven by the 1.8VDC on-chip voltage regulator.

Table 5 INNCOM TXR Safety / Regulatory

| Agency Approval | Specification | Status |
|-----------------|---------------|---|
| FCC | 15.247 | 02-9994 Certified under FCC ID: GTC029994TXR |
| FCC | 15.247 | 02-9894 Certified under FCC ID: GTC029894TXR |

Only approved antennas can be used with this module. Additional antennas would require an application filing with the FCC in order to have them approved. Antennas which have either a higher gain or are of a different type may not be used, with this module, unless additional certification is obtained.

All Final Products containing the INNCOM TXR 02-9994 must contain the following statements on their label:

This device contains FCC ID: GTC029994TXR.

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.

The followings statements are required in the final product user manuals:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This

equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

All Final Products containing the INNCOM TXR 02-9894 should keep a safe distance of at least 20cm from all persons. The final product cannot be co located with any other antenna or transmitter.

Modifications not expressly approved by INNCOM International Inc. could void the user's authority to operate the equipment.

Ordering Information

| Part Number | Model Number | Assembly |
|----------------|------------------|--|
| 02-9994 | TXR-154.1 | 0dB radio with SMT antenna |
| 02-9927 | TXR-154.x | 0dB radio with 5"u.fl to rpsma harness / ½ wave dipole antenna |
| 02-9894 | TXR-154.2 | 20dB radio with SMT antenna |

Document Revision History

| Revision | Date Issued | Reason |
|------------|-------------|--|
| 0.1 | 20-Mar-2009 | FCC Reports for 02-9894, 02-9927 |
| 0.2 | 24-Mar-2009 | Revised for formatting and style |
| 0.3 | 27-Mar-2009 | Revised to update range performance data |
| 1.0 | 07-Apr-2009 | Released |
| 1.1 | 23-Dec-2009 | Updated to add FCC statements |
| 1.2 | 07-Jan-2010 | Added modifications warning |
| 1.3 | 14-Jan-2010 | Updated FCC statements |