



EVM-915-250

Data Guide
(Preliminary)

Wireless made simple[®]

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Description

The EVM-915-250 evaluation module supports developments with the TRM-915-R250 embedded radio module.

The EVM-915-250 module combines a state-of-the-art low power wireless transceiver with a powerful multipoint-to-multipoint protocol controller to form a

complete wireless communication solution. With a simple UART interface, a 130dB link budget and very low power operation modes. The module is excellent for Automatic Meter Reading (AMR), fleet management, RFID, gas and oil sensing, Home Automation, and many other cable replacement applications requiring long range and long battery life.



Figure 1: EVM-915-250-FCx

The module can operate as a transparent wire replacement solution. It can also operate in a peer-to-peer networked mode that supports node addressing and assured delivery. The module is designed to be totally transparent. Data is validated using an internally generated CRC-16 and encoded using a proprietary Frequency Hopping Spread Spectrum algorithm. Multiple modules can operate on the same channel because of the built-in carrier-sense-multiple-access (CSMA) protocol.

Ordering Information

| Ordering Information | | |
|----------------------|---|------------------------------|
| Product Part No. | Description | Radiotronix Part No. |
| EVM-915-250-FCR | TRM-915-R250 Evaluation Module, Right Angle RP-SMA Connector, FCC Approved | Wi.232FHSS-250-FCC-RA-R |
| EVM-915-250-FCS | TRM-915-R250 Evaluation Module, Straight RP-SMA Connector, FCC Approved | Wi.232FHSS-250-FCC-ST-R |
| EVM-915-250-BZR | TRM-915-R250 Evaluation Module, Right Angle RP-SMA Connector, Brazil Anatel Approved | Wi.232FHSS-250B-RA-R |
| EVM-915-250-BZS | TRM-915-R250 Evaluation Module, Straight RP-SMA Connector, Brazil Anatel Approved | Wi.232FHSS-250B-ST-R |
| EVM-915-250-CFR | TRM-915-R250 Evaluation Module, Right Angle SP-SMA Connector, Mexico CoFeTel Approved | Wi.232FHSS-250-FCC-CFTC-RA-R |
| EVM-915-250-CFS | TRM-915-R250 Evaluation Module, Straight RP-SMA Connector, Mexico CoFeTel Approved | Wi.232FHSS-250-FCC-CFTC-ST-R |

Figure 2: Ordering Information

Electrical Specifications

| Electrical Specifications | | | | | | |
|----------------------------------|-------------|------|------|----------|-------|-------|
| Parameter | Designation | Min. | Typ. | Max. | Units | Notes |
| Power Supply | | | | | | |
| Operating Voltage | V_{CC} | 4 | | 12 | VDC | |
| Supply Current | I_{CC} | | | | | |
| Receive | | | | 25 | mA | |
| Transmit, $P_o = 8\text{dBm}$ | | | | 60 | mA | |
| Transmit, $P_o = 23.5\text{dBm}$ | | | | 200 | mA | |
| Digital Interface | | | | | | |
| Output | | | | | | |
| Logic Low | V_{OL} | 0 | | 0.4 | VDC | |
| Logic High | V_{OH} | 2.5 | | V_{CC} | VDC | |

Electrical Specifications Continuation

| Parameter | Designation | Min. | Typ. | Max. | Units | Notes |
|-----------------------------|-------------|--------------------|------|--------------------|-------|-------|
| Input | | | | | | |
| Logic Low | V_{IL} | 0 | | $0.3 \cdot V_{CC}$ | VDC | |
| Logic High | V_{IH} | $0.7 \cdot V_{CC}$ | | V_{CC} | VDC | |
| Environmental | | | | | | |
| Operating Temperature Range | | -40 | | 85 | °C | |

Figure 3: Electrical Specifications

Warning: Linx radio frequency (“RF”) products may be used to control machinery or devices remotely, including machinery or devices that can cause death, bodily injuries, and/or property damage if improperly or inadvertently triggered, particularly in industrial settings or other applications implicating life-safety concerns. No Linx Technologies product is intended for use in any application without redundancies where the safety of life or property is at risk.

The customers and users of devices and machinery controlled with RF products must understand and must use all appropriate safety procedures in connection with the devices, including without limitation, using appropriate safety procedures to prevent inadvertent triggering by the user of the device and using appropriate security codes to prevent triggering of the remote controlled machine or device by users of other remote controllers.

All RF products are susceptible to RF interface that can prevent communication.

Do not use any Linx product over the limits in this data guide.

Excessive voltage or extended operation at the maximum voltage could cause product failure. Exceeding the reflow temperature profile could cause product failure which is not immediately evident.

Do not make any physical or electrical modifications to any Linx product. This will void the warranty and regulatory and UL certifications and may cause product failure which is not immediately evident.

Pin Assignments

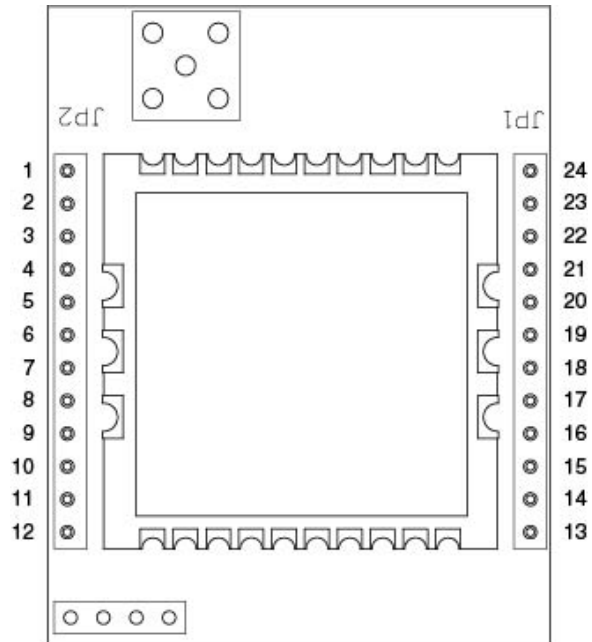


Figure 3: Pin Assignments

Pin Descriptions

| Pin Descriptions | | |
|------------------|-------------|------------------------------------|
| Pin No. | Name | Description |
| 1 | Vcc | 4V to 12V Supply Voltage |
| 2 | RXD0 | Serial Port Receive Data |
| 3 | TXD0 | Serial Port Transmit Data |
| 4 | CTS0 | Serial Port Clear To Send |
| 5 | COMMAND | Command |
| 6 | N/C | No Electrical Connection |
| 7 | N/C | No Electrical Connection |
| 8 | N/C | No Electrical Connection |
| 9 | N/C | No Electrical Connection |
| 10 | N/C | No Electrical Connection |
| 11 | GND | Analog Ground |
| 12 | GND | Analog Ground |
| 13 | GND | Analog Ground |
| 14 | GND | Analog Ground |
| 15 | N/C | No Electrical Connection |
| 16 | N/C | No Electrical Connection |
| 17 | N/C | No Electrical Connection |
| 18 | N/C | No Electrical Connection |
| 19 | PD5-EX | Exception |
| 20 | RSSI | Received Signal Strength Indicator |
| 21 | AD0-CMD_RSP | Command Response |
| 22 | AD1-BE | Buffer Empty |
| 23 | GND | Analog Ground |
| 24 | GND | Analog Ground |

Figure 4: Pin Descriptions

PCB Footprint

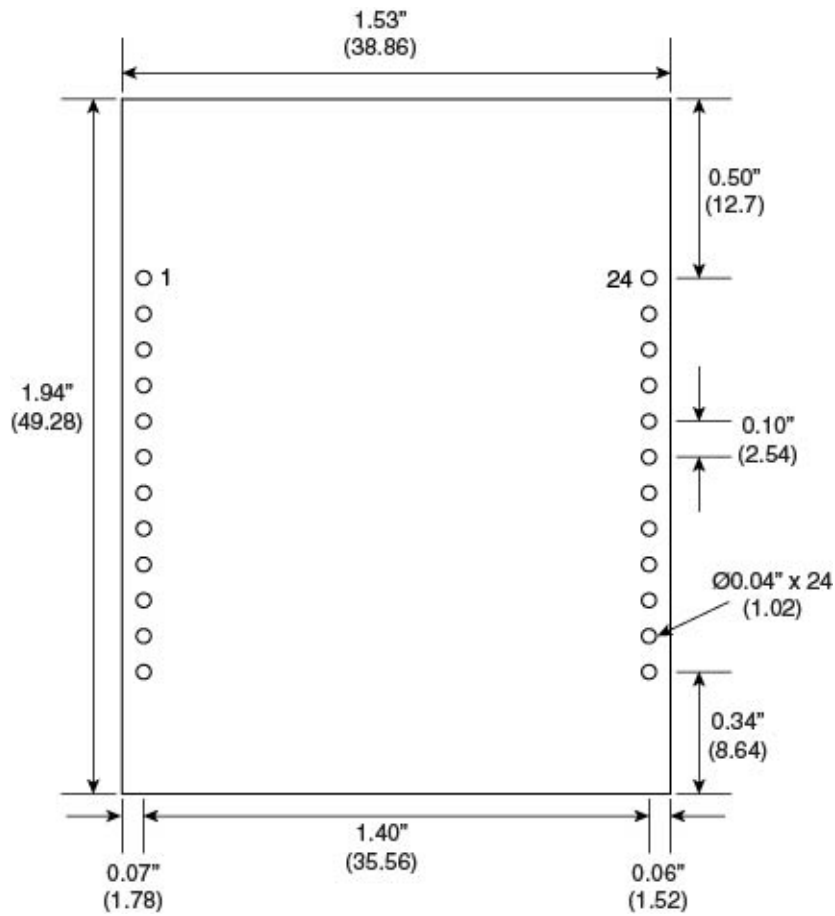


Figure 5: PCB Footprint

Schematic Diagram

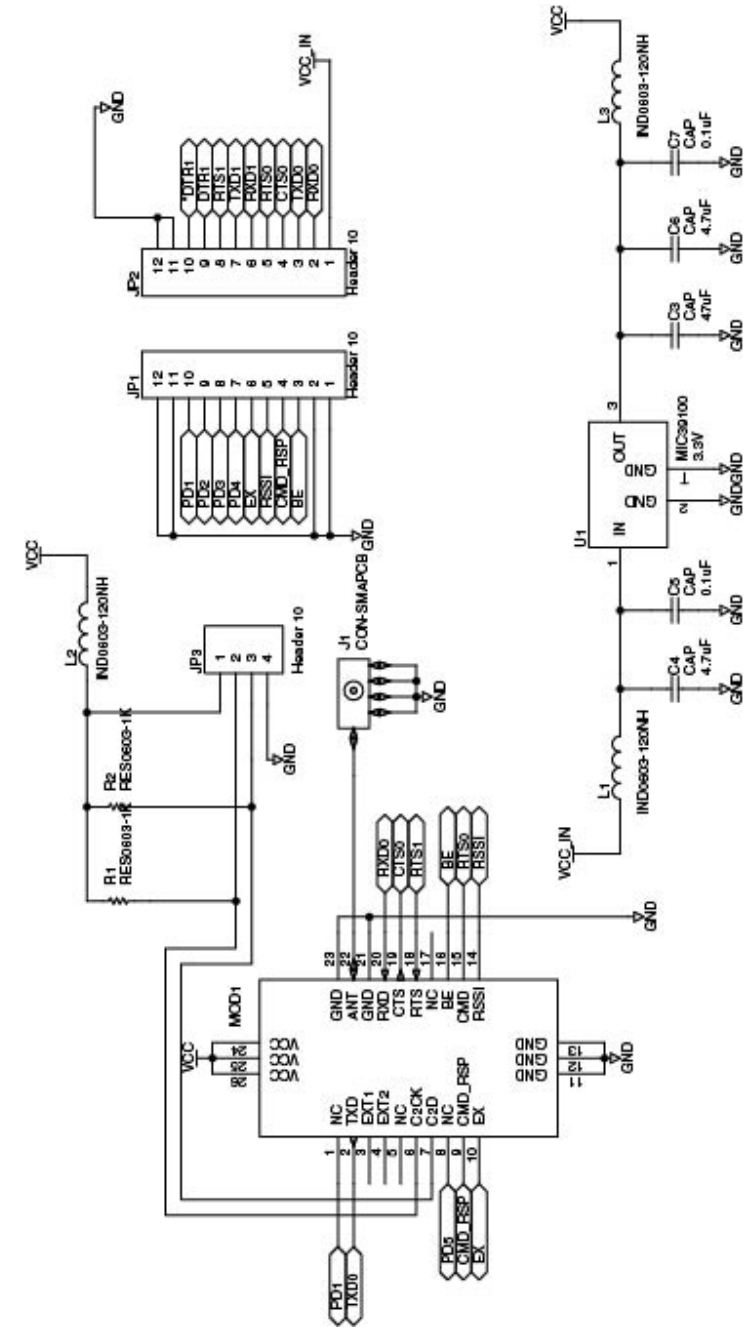


Figure 6: Schematic

Usage Guidelines for FCC Compliance

The EVM-915-250-FCx modules have been awarded a FCC and IC modular approval. The EVM-915-250-BZx have passed Anatel compliance testing. That means that this module, when integrated into your end product, requires no FCC part 15 or IC RSS-210 testing as long as the following guidelines are met. Failure to meet any of the following guidelines will prevent the inheritance of the FCC and IC modular certifications.

Antenna Selection

In order to maintain compliance with FCC, Industry Canada and Anatel regulations, an antenna with no more than 3dBi gain must be used. This module has been tested with the following antennas:

| Antenna Selection | | |
|-------------------|------------------|--------------|
| Link Part No. | Antenna Type | Antenna gain |
| ANT-916-CW-HW | RP ½ Wave Dipole | 2.5dBi |

Figure 7: Antenna Selection

An approved antenna must be directly attached to the module's reverse-polarity SMA connector or through an approved shielded coaxial extension cable in the final application to inherit the FCC and IC modular certifications.

Module Modification

The module must not be physically altered in any way. If any connections are made to the modules that bypass the module pins, socket or antenna connector, the certifications cannot be inherited.

End Product Labeling Requirements

Pursuant to FCC public notice DA 00-1407, the end product must be labeled on its exterior with the following:

“Contains FCC ID: Q7V-3F090009X”

Additional FCC Testing Requirements

While the module's FCC certification can be inherited if the guidelines are met, additional testing will be required to achieve full FCC compliance for the end-product. The integrator is required to perform unintentional radiator testing on the final product per FCC sections 15.107 and 15.109. Additional product-specific testing might be required. Please contact the FCC regarding regulatory requirements for your application. Ultimately it is the integrator's responsibility to show that their product complies with the regulations applicable to their product.

FCC Statements of Modular Compliance

FCC / IC NOTICE (FCC ID: Q7V-3F090009X / IC: 5589A-3F090009)

This device complies with the rules set forth in Part 15 by the Federal Communications Commission and RSS-210/RSS-Gen by Industry Canada. Operation is subject to the following two conditions:

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

Any changes or modifications not expressly approved by Linx Technologies could void the user's authority to operate the equipment.

The EVM-915-250-FCx module is provided with an inheritable FCC Modular Certification. This certification may be inherited in an end-user product, negating the need for FCC part 15 and IC RSS-210 intentional radiator testing on this module, provided that the following guidelines are met:

1. An approved antenna must be directly coupled to the module's RP-SMA connector or through an approved coaxial extension cable.
2. The module must not be modified in any way. Coupling of external circuitry must not bypass the provided connectors.
3. End product must be externally labeled with "Contains FCC ID: Q7V-3F090009X / IC: 5589A-3F090009"
4. The end product's user's manual must contain an FCC statement equivalent to that listed on page 8 of this manual.
5. The antenna used for this transceiver must not be co-located or operating in conjunction with any other antenna or transmitter.
6. The integrator must not provide any information to the end-user on how to install or remove the module from the end-product.

The integrator is required to perform unintentional radiator testing on the final product per FCC sections 15.107 and 15.109.

FCC/IC Pre-certified EVM-915-250

FCC ID: Q7V-3F090009X

IC: 5589A-3F090009

Customer FCC Warning Requirements

The end-product user's manual must contain the following or equivalent statements.

FCC / IC NOTICE

(Containing FCC ID: Q7V-3F090009X / IC: 5589A-3F090009)

The RF module (FCC ID: Q7V-3F090009X / IC: 5589A-3F090009) contained within this device complies with the rules set forth in Part 15 by the Federal Communications Commission and RSS-210/Gen by Industry Canada. Operation is subject to the following conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.
3. An approved antenna must be directly coupled to the module's RP-SMA connector or through an approved coaxial extension cable.
4. The module must not be modified in any way. Coupling of external circuitry must not bypass the provided connectors.
5. The antenna used for this transceiver must not be co-located or operating in conjunction with any other antenna or transmitter.

Any changes or modifications could void the user's authority to operate the equipment.

FCC/IC Pre-certified EVM-915-250

FCC ID: Q7V-3F090009X

IC: 5589A-3F090009



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