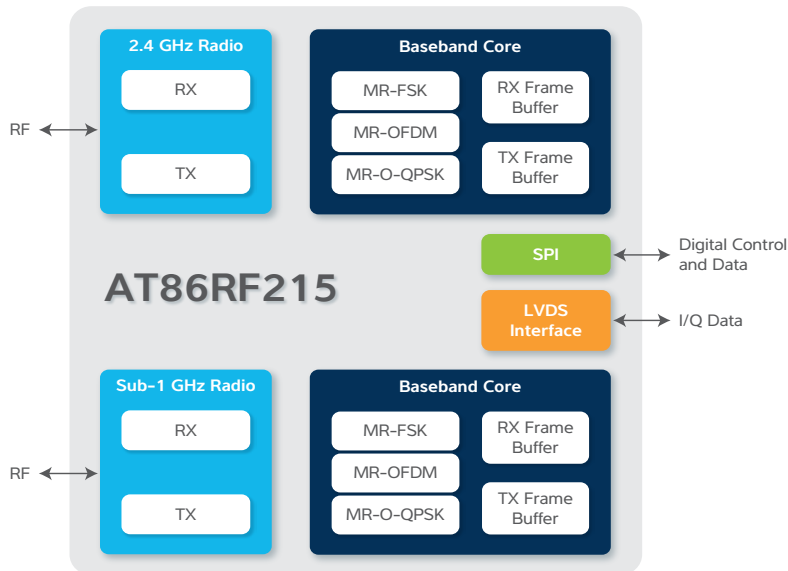# Atmel

Atmel AT86RF215
IEEE 802.15.4g Transceiver

The Atmel® AT86RF215 transceiver is a dual-band sub-1 GHz/2.4 GHz device compliant to IEEE 802.15.4g-2012 and ETSI TS 102 887-1. It targets Smart Energy and automation applications and addresses the metering industry's need for low-cost multi-protocol connectivity solutions.
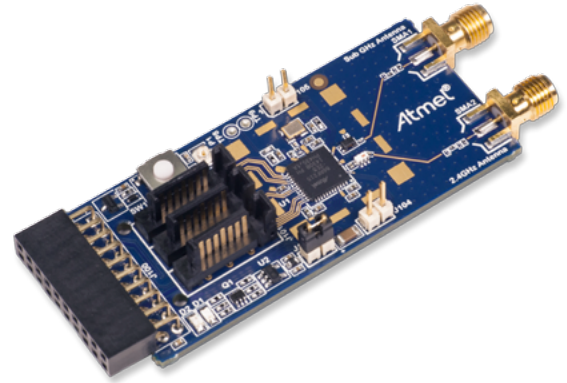
The AT86RF215 offers very high flexibility by supporting a variety of data rates with three modulation schemes: multi-rate and multi-regional frequency shift keying (MR-FSK), orthogonal frequency division multiplexing (MR-OFDM), and offset quadrature phase-shift keying (MR-O-QPSK). This includes the physical layer used for ZigBee® Pro and IP. Simultaneous operation at sub-1 GHz and 2.4 GHz enables new capabilities and the right cost structure in smart metering, smart lighting, home energy gateways and other industrial and automation equipment.

Key Features

- Fully integrated radio transceiver covering 389.5-510 MHz, 779-1020 MHz, and 2400-2483.5 MHz, including
  - European bands at 863-870 MHz, 870-876 MHz, and 915-921 MHz
  - Chinese bands at 470-510 MHz and 779-787 MHz
  - North American band at 902-928 MHz
  - Korean band at 917-923.5 MHz
  - Japanese band at 920-928 MHz
  - Worldwide ISM band at 2400-2483.5 MHz

- Supported PHYs (IEEE 802.15.4g-2012, IEEE 802.15.4-2011, and proprietary modes)
  - MR-FSK: 50...400 kbit/s with optional forward error correction and interleaving
  - MR-OFDM: 50...2400 kbit/s
  - MR-O-QPSK: 6.25...1000 kbit/s, 100...2000 kchip/s
  - O-QPSK: 250...1000 kbit/s, 1000 and 2000 kchip/s

- Simultaneous operation at sub-1 GHz and 2.4 GHz

- Bi-directional differential RF signal ports, one for sub-1 GHz and one for 2.4 GHz

- SPI interface to access registers and frame buffers

- LVDS interface to access 13-bit I/Q data

- IEEE 802.15.4 MAC support
  - Frame filter
  - FCS handling
  - Automatic acknowledgement
  - CCA with automatic transmit

- Industry-leading link budget
  - Programmable TX output power up to +14 dBm
  - Receiver sensitivity down to -123 dBm

- Low power supply voltage from 1.8V to 3.6V

- Low current consumption
  - 30 nA in SLEEP mode
  - 28 mA in RX mode
  - 65 mA in TX mode @ 14 dBm output power

- Industrial temperature range from -40°C to +85°C

- 48-pin low-profile lead-free plastic QFN package

2.4 GHz Radio
- RX
- TX

Baseband Core
- MR-FSK
- MR-OFDM
- MR-O-QPSK
- RX Frame Buffer
- TX Frame Buffer

AT86RF215

SPI → Digital Control and Data

LVDS Interface → I/Q Data

Sub-1 GHz Radio
- RX
- TX

Baseband Core
- MR-FSK
- MR-OFDM
- MR-O-QPSK
- RX Frame Buffer
- TX Frame Buffer

AT86RF215 Block Diagram

REB215-XPRO Evaluation Board

Device Family Overview

Device	Description
AT86RF215	Sub-1 GHz/2.4 GHz transceiver compliant to IEEE 802.15.4g-2012, IEEE 802.15.4-2011, and ETSI TS 102 887-1
AT86RF215M	Sub-1 GHz transceiver compliant to IEEE 802.15.4g-2012, IEEE 802.15.4-2011, and ETSI TS 102 887-1
AT86RF215IQ	Sub-1 GHz/2.4 GHz I/Q radio

Atmel | Enabling Unlimited Possibilities®