

Theory of Operation

A functional block diagram of the Acuity RF module is shown on the following page. This module is a direct sequence spread spectrum transceiver operating in the 2400MHz to 2483.5MHz ISM band. The system is based on the IEEE 802.15.4 standard, with channels spaced at 5MHz intervals in the ISM band.

The system operates at a chip rate of 2Mcps, a symbol rate of 62.5kpbs, and a bit rate of 250kbps. O-QPSK modulation is used with 16-ary orthogonal symbols. The module transmits with a maximum power of +16dBm into either the integral or an external antenna. The module does not transmit for more than 10ms over any 125ms time period.

The module is a low-IF receiver, amplifying the signal with a low noise amplifier and then down-converting to a 1st IF of 65MHz and then into I and Q (quadrature) to a 1MHz IF. Differential chip detection is then performed digitally and the correlator de-spreads the DSS O-QPSK signal, extracting symbols and packets.