Murandi
Communications Ltd.
Innovative Radio Frequency Solutions

EUM3006 Functional Overview

The EUM3006 is a 900MHz radio module intended to provide connectivity between an end-user's computer and an Internet Service Provider. It is a single PCB wireless solution based on the Intersil PRISM II Direct Sequence Chip Set. The EUM3006 is functionally equivalent to the EUM3004 (previously certified with FCC ID: OOX-EUM3004) in regards to frequency of operation and modulation scheme. Changes to the output power, antenna, power source and microprocessor/MAC controller require that the EUM3006 be re-submitted for certification.

Overall functionality

The EUM3006 consists of two main sections; the digital and the RF section. Block diagrams for both sections can be found in the document "EUM3006 Block Diagrams". The digital section contains the following functionality:

1. I/O
2. Ethernet PHY
3. Microprocessor/MAC
4. Memory
5. Power Regulation

The radio module's RF section contains the following functionality:

1. Baseband Processor
2. Modulator/Demodulator (with IF synthesizer)
3. RF Synthesizer
4. Up Converter
5. Power Amplifier
6. Low Noise Amplifier (LNA)
7. Down Converter
8. RF VCO
9. IF VCO
10. Reference Oscillator
11. Antenna (RF) Interface

During transmission, data obtained by the Microprocessor from the I/O ports, is transferred to the MAC. The MAC reformats the data and places it on the Baseband Processor TX data line. This data is modulated using CCK modulation and then spread using a defined PN code such that the data is sent at a rate of 2.75Mbit/s. The data is preceded by a header that uses DPSK modulation. Two signals are generated, the In-Phase (I) and Quadrature (Q) components. The I & Q signals are sent to the Modulator/Demodulator where they are first filtered and then modulated with the IF frequency (70 MHz).

The IF oscillator generates a 140 MHz signal which is divided by two inside the Modulator/Demodulator and used to modulate the I & Q signals. The final IF signal of 70 MHz is then sent to the Up converter. The Up converter will shift this signal to the RF frequency for the channel programmed in the synthesizer, for operation within the 902-928 MHz ISM band. In the final stage, this signal is amplified to produce +25.8 dBm RF power as measured at the antenna port.

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In receive mode, the radio signal is amplified by the LNA, and then sent to the Down converter. The Down converter converts this signal from the 902-928 MHz range to the IF frequency, 70 MHz. The Modulator/Demodulator then converts the signal to baseband and splits the signal into its I & Q components, before sending it to the Baseband Processor. Finally, the Baseband Processor despreads and demodulates the data contained in the CCK format, and places it on the RX data line to the MAC. The MAC modifies the data, then transfers it to the Microprocessor which reformats the information and sends it out the I/O ports.

The RF and IF Local Oscillator signals are generated using the synthesizers and voltage controlled oscillators. The RF synthesizer is programmed with the desired RF channel frequency plus the IF frequency. The IF synthesizer in the Modulator/Demodulator is programmed with 140MHz. The baseband processor and the synthesizer are driven from a common 44 MHz oscillator to control the timing of these chips.

Example (for Channel 1 operation)**:**

RF		**IF**		**LO**
905 MHz	+	70 MHz	=	975 MHz

Antenna

The antenna (RF) connector is a standard SMB connector and is connected directly to the integrated antenna. Note that the user does not have access to the RF connector and can only use the EUM3006 with the integrated antenna.

For an output power of 25.8dBm at the antenna port, the antenna system gain shall be 10.2 dBi or less in order to meet the regulatory requirements of 15.247(b)(4).