FCC ID: Y4B-FAL-EGW
MODEL: OLGATEWAY

FCC 15.247 and 15.249 Certification Information

Operational Description

The Arrayent/First Alert Ethernet Gateway (EGW) provides Internet connectivity for an ecosystem of home security products using the Arrayent communications network. In addition the product is able to operate on the First Alert Onelink network (FCC ID reference M7U5001L). The EGW acts as a hub and access point for the wireless communications. As the wireless hub for these 900 MHZ wireless products, it manages frequency allocation and packet switching. As the access point it converts radio packets to Internet packets allowing monitoring and control of wireless products from the Internet.

1. Circuit Principle:

The OLGATEWAY product incorporates a Texas Instruments CC1110 system-on-chip radio transceiver. This implements a direct down conversion radio transceiver operating in the 900MHz ISM band. The following sections describe the products operation in both it primary mode licensed under 15.247 and its secondary mode licensed under 15.249.

Primary Operation

The maximum transmitter output power of this device is 10dBm. The OLGATEWAY devices utilize a wideband digital modulation physical layer with the addition of a carrier sense multiple access (CSMA) medium access control (MAC) layer on each frequency channel. The data transmission rate is set to 100kpbs.

Modulation	2-FSK, 240Khz frequency deviation
Radio Type	Low-IF Super heterodyne
Data rate	100kbps
Radio IF Frequency	270.13Khz (fixed)
Signal RF Bandwidth (6db)	540Khz
Maximum transmit power	10dBm
RF transmit frequencies	908.40 + 1.123*n MHz (where 0<=n<=10)
RF channel spacing	1123.54Khz
Maximum packet size	1392 bits
MAC protocol	Carrier sense multiple access (CSMA)
PHY protocol	Digital modulation spread spectrum (>500Khz)

Table 1 Transmitter Details of Operation

Frequency channel	Transmitter Base Channel frequency (MHz)	Receiver Base Channel frequency (MHz)	Frequency channel	Transmitter Base Channel frequency (MHz)	Receiver Base Channel frequency (MHz)
1	908.40	908.40	6	914.02	914.02
2	909.52	909.52	7	915.14	915.14
3	910.65	910.65	8	916.26	916.26
4	911.77	911.77	9	917.39	917.39
5	912.89	912.89	10	918.51	918.51
			11	919.65	919.65

Table 2 15.247 Radio Frequency Channels

Secondary Operation

When the gateway receives a command via its Internet connection, it will switch from the primary operation mode to the secondary mode of operation. This is accomplished by reprogramming the radio's software registers to comply with the following radio specification:

Modulation	2-FSK, 75Khz frequency deviation
Radio Type	Low-IF Super heterodyne
Data rate	8.84kbps
Radio IF Frequency	270.13Khz (fixed)
Signal RF Bandwidth (6db)	200Khz
Maximum transmit power	0dBm
RF transmit frequencies	909.00 MHz, 913.32 MHz and 922.92 MHz
Maximum packet size	104 bits
MAC protocol	Carrier sense multiple access (CSMA)

When the gateway receives a command via its Internet connection, it will switch from the primary mode of operation to the secondary mode of operation. In this mode the gateway operates compliant with FCC Part 15.249. The maximum packet length while operating in the secondary mode is 13 bytes.

2. Radio Signal Flow and Baseband Operations:

The Radio is based on the Texas Instrument CC1110 system-on-chip (SoC) module. The CC1110 features a low-IF receiver. The received RF signal is amplified by the low noise amplifier (LNA) and down-converted in quadrature (I and Q) to the intermediate frequency (IF). At IF, the I/Q signals are digitized by the ADCs. Automatic gain control (AGC), fine channel filtering, demodulation, and bit/packet synchronization is performed digitally.

The transmitter part of the CC1110 is based on direct synthesis of the RF frequency. The frequency synthesizer includes a complete on-chip LC VCO and a 90 degrees phase shifter for generating the I and Q signals to the down-conversion.

3. Antenna:

The antenna is a permanently attached ¼ wavelength monopole. The antenna is permanently affixed to the PCB.