

PROINDMV CIRCUIT DESCRIPTION & BLOCK DIAGRAM

CFR47, §2.1033(4). For Part 15 a brief description of the circuit functions of the device.

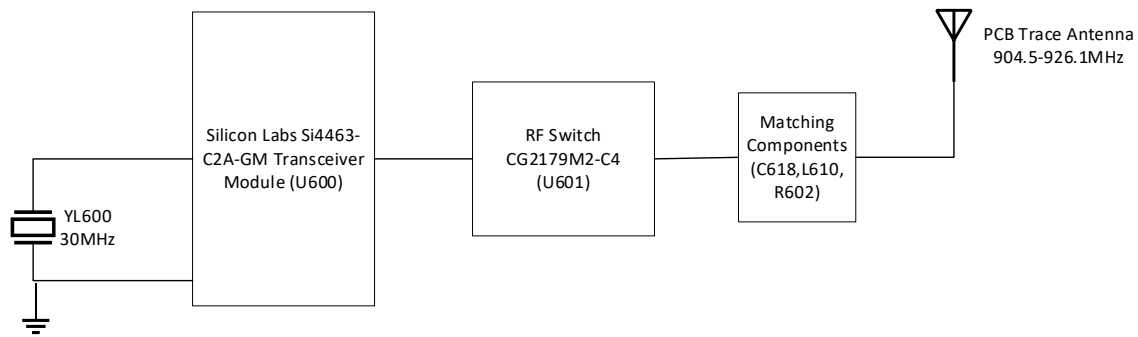
The PROINDMV is a wireless motion viewer transmitter which utilizes Honeywell Home's Wiselink protocol using Silicon Laboratories' Si446x devices are high-performance, low-current transceivers covering the sub-GHz frequency bands from 904.5MHz to 926.1MHz. The radio is part of the EZRadioPRO® family, which includes a complete line of transmitters, receivers, and transceivers covering a wide range of applications. All parts offer outstanding sensitivity of -129 dBm while achieving extremely low active and standby current consumption. Output power level is up to be 20dbm, add saw filter B39921B3728 (FL1) to ensure high receivers' sensitivity.

The system, based on 25 hopping frequencies, complies FCC 15.247 using the band [902-928MHz]. Each channel has a 20-dB bandwidth greater than 250 kHz. The number of channels for frequency hopping is fixed with a pseudo-random order. There is no mechanism for the detection / avoidance of interference – if there is a communication failure, the device will simply retry on another channel. All 25 channels are affected the same.

Each device handles a pointer which indicates the next channel to be used. This pointer is incremented at each hop and it returns to the value 1 after the value 25. In this way, all channels are used the same amount of time, in average. In addition, as all channels may not be used for each transmission, each second, the pointer is initialized to a start value which would be the next channel in the list. The Si446x has a complete fixed IF digital signal processing with an input bandwidth programmed to 330.55 kHz for Wiselink US configuration and 483.90 kHz for streaming US configuration. In both instances, the receiver bandwidth matches the bandwidth of the transmitted signal. An additional Frequency Hopping Exhibit provides a discussion on the packet formats with preamble and sync word, which shows how the associated receiver can shift frequency in synchronization with the transmitted signals. The system receiver has input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals per CFR 47 Part 15.247(a)(1) requirements. The device does not have the ability to coordinate with other FHSS systems to avoid the simultaneous occupancy of individual hopping frequencies used by multiple transmitters.

The Wiselink transmitter is not configured to transmit in selected time slots, so it is considered to have a 100% duty cycle. The dwell time per hop of the device was found to be 2.13ms.

The maximum rated output power of the PROINDMV is 0.0899W (19.54dBm) and has an antenna gain of 2.2dBi.



System Block Diagram

Additional Wiselink Radio Description

01.NA Physical layer (Wiselink)

(1) The FCC rules allow high power transmission with spread spectrum technics. In order to use the same RF platform, the frequency hopping solution has been chosen. (The 25-channel scheme (FCC 15.247) allows a maximum ERP of +24dBm)

(2) The NA ISM band starts from 902MHz and ends at 928MHz.

So, the Wiselink NA format is using a 25-channel frequency hopping spread spectrum (FHSS) scheme to satisfy the FCC requirements.

And it has evolved to introduce some new features like improvement of collisions management.

02.The general rules are:

(1) All frames are sent twice on two different channels, starting from the Current Channel ("c").

(All frames are duplicated for error recovery in case of jammed channel.)

(2) The messages that don't fit on a single frame are segmented over several frames

(3) Frequency hopping timing protection

When a channel is jammed, the RF transceiver may not receive properly the preamble/sync correctly. In this case, the MCU should hop to the next channel after a predefined time-out (corresponding roughly to the dwell time). This time-out timer should be activated after each hop to maintain the hopping rhythm.

Also, if the next channel is also jammed, the Panel and Device also have the retransmission mechanism, then the Panel (AP) or Device will re-do above "behavior" for many times (e.g. 5 times)

03.For the TPP (Peripheral try to talk with Control Panel) (only up-link time-slot)

(1) For the uplink time slot, all messages length is fixed to one frame

(2) The control panel selects among "c" or "c+1" to listen for device messages, depending on the channel qualities observed during the previous communications.

04.For the TPC (Control Panel try to talk with Peripheral) (down and up-link time-slot)

During the time-slot TPC (down and up-link), there is no dedicated time-slots, so the panel and the devices can use either single frame messages or multi-frame messages (frequency hopping).