

### **1. Transmitted modulation:**

The product: RX12 receiver (FCC ID: TBQRX12-915) uses the Semtech SX1211 as the RF Transceiver chipset. The SX1211 transmits at a bit rate of 20 kbps bitrate with 50 kHz frequency deviation, when using the default 12.8MHz crystal of the SM1211 reference design.

### **2. Hopping frequency assignments:**

25 radio channels are used with a constant spacing of 350 kHz between carrier/center frequencies. The lowest frequency is centered at 910MHz, and the highest at 918.4MHz. The random ordering of channels is obtained from <http://random.org/sequences/> using a min and max of 0 and 25

### **3. Compliance description of hopping Algorithm:**

The following describes equal frequency usage, and how the hopping algorithm occupies each radio channel for less than 400ms in a 10 second period, using 25 hopping channels.

- Slaves nodes in the system listen for synchronization messages from the master when the slaves are not previously synchronized. Once a slave has received the master synchronization message, it tracks the channels used by the master with identical timing. Slaves do not transmit until requested to by the master. Both Slaves and master are programmed with identical hopping frequency tables.
- In synchronization mode, the master node sweeps 25 hopping channels at a rate of 2 milliseconds per channel. The transmitted message (occupancy) on each channel takes 65~75 milliseconds. The total time spent in synchronization mode is 750ms for 25 hopping messages and on SYNC\_END notification.
- In dialog mode, the master hops at a rate of 750 milliseconds. On each radio channel, each of the four slaves is contacted.
- Or, if any of the four nodes fail to respond, the system will re-enter synchronization mode for one sweep of all the channels with sync messages. The master cycles into synchronization mode every 2.54 seconds, with approx 2.13 seconds in dialog mode, and the other 0.4 seconds in the synchronization mode. Dialog mode hops five times between each synchronization mode, four attempts to contact each node and one notification that synchronization mode will begin.

### **4. Lab results of compliance test:**

These tests were performed on nodes operating at a 20,000bps bitrate from 12.8MHz crystal on the SX1211.

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- Carrier frequency separation: Measured 350 kHz
- 20 dB bandwidth: 286 kHz
- Band edge spurious: Within 100 kHz BW, spurious < -20dBc
- Spurious conducted emission: compliant



***Signature***

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