

Frequency Hopping Design and Operation Description (MicroLink BVLOS Data Link Transceiver)

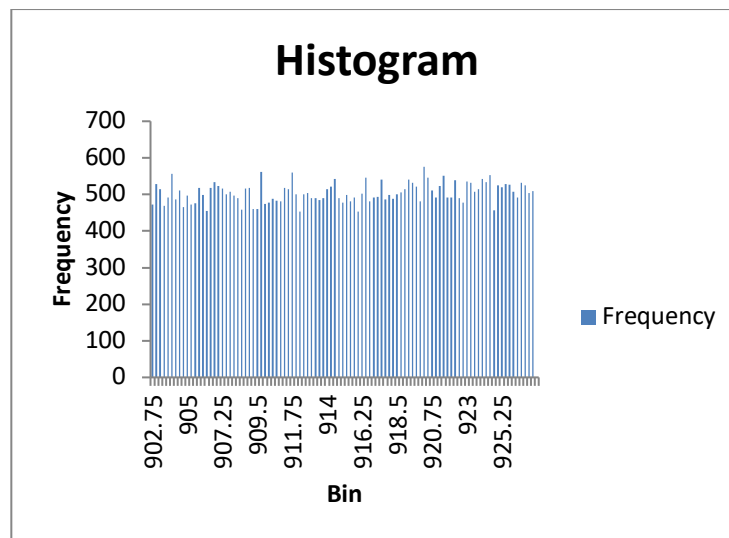
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uAvionix FRN: 0024651283

1) Section 15.247(a)(1):**i) Pseudorandom frequency hopping sequence**

We've defined channels which range in frequency from 902.75MHz to 927.25MHz and each channel is spaced 250kHz apart. This makes channel 0 = 902.75MHz, 1 = 903MHz and 98 = 927.25MHz. When a hop table is generated, 50 randomly selected channels from this set of 98 is selected ensuring no channel is selected more than once for each unique table. The random number generator is seeded with the time in milliseconds to ensure each table generated is random in the short term and unique in the long term. As part of the testing of the randomly generated table algorithm, we generated 1000 hopping tables and generated a histogram of the channel usage across the band. The graph below shows the equal distribution of the 1000 generated hopping tables across the band.

**ii) Equal hopping frequency use**

Since the hopping table is generated with random channel assignments, the table is simply used sequentially and wrapped back to the beginning when the end is reached. This ensures each channel is used equally over any duration.

iii) System receiver input bandwidth

The programmable RF filter within the transceiver IC is programmed to a width of 225kHz which matches our transmission bandwidth of 200kHz and provides rejection from adjacent channels if they're occupied by co-located systems.

iv) System receiver hopping capability

Both radios are synchronized through the use of GPS time synchronization. This allows each device to know the absolute time and synchronize their receive radios to the frequency/time relationship dictated by the hopping table.

2) Section 15.247(g):

Since both devices use the hop table equally at all times, there is no difference between short term and long term. Each device is hopping 20 times a second at all times which makes the usage of the band perfectly equal.

3) Section 15.247(h):

Since both devices have the use the same hop table along with the absolute time provided by GPS, the devices are implicitly sync'd. An adjacent system wouldn't have the same hopping table and thus would not be able to sync due to a mismatch between the frequency/time relationship.