LynQ - FHSS Statements

1) Section 15.247(a)(1):

i) Pseudorandom frequency hopping sequence

The device LYNQ is a group-based device. During Group Forming (pairing mode) stage, each member exchanges a randomly generated ID to each other. Using these randomly generated values a unique key value is selected/generated and shared with all the devices in the group. This key is used to generate the Frequency Hop Sequence of the group.

Each hop sequence has no less than 51 channels. The actual number of channels is dependent on the number of members in the Group. Using the Frequency Hop Group Sequence each device transmits in turn using a TDMA approach.

The hop sequence is derived from a list of equally spaced channels in the 902-928 MHz band, the spacing being dependent upon the bandwidth required. Using the randomly generated key as an initial offset, the set of hopping channels (the 'hop set') is established and shared with all units in the group. Frequency-hopping is achieved by all the units in a group tuning to each frequency in this hop set in turn after a predefined interval.

ii) Equal hopping frequency use

Each of the devices in a group has a GPS receiver, which can be used to align all units in a group onto a common time base. This common time base is used to implement a Time Division Multiple Access (TDMA) method. Each device uses this time base to establish a local clock which is synchronized to the other units. This local clock, along with the hop set table, determines which frequency to tune to, and whether a unit is to transmit or receive. After a certain interval, the all devices tune to the next frequency in the hop set.

iii) System receiver input bandwidth

In FHSS mode, each EUT has the circuitry to be programmed with a bandwidth of 64, 125 or 250 KHz. For our application in FHSS mode, the EUT is hard programmed to use one bandwidth only (125 KHz). The devices only transmit and receive this bandwidth. All the other signals with different bandwidths are disregarded.

iv) System receiver hopping capability

As Stated earlier, each device uses a TDMA approach, in this device is aware of when to transmit and receive a transmission. As the Hop set is shared to the group members in pairing mode. Each device is aware which frequency to listen to with a bandwidth (125 KHz) for the maximum period of time which is less than maximum dwell time stated by FCC (400ms)

2) Section 15.247(g):

In FHSS mode, all transmissions of the EUT have a transmit time less than the maximum dwell time defined in the FCC regulations for the 900 ISM band (400mS). Following each transmission, all devices in the system jump to the next communication frequency in the hop set described above. The specific frequency selected is a function of the current time, the number of EUTs communicating with each other, as well as the key seed value, which is exchanged when the devices are first connected to each other.

3) Section 15.247(h):

The EUT receiver circuitry is limited in such a way that it may listen to, at most, a 500 kHz-wide portion of the 902-928 MHz ISM band at any given time. As such, our device lacks the means of ascertaining the

FHSS behavior of another device operating in the same band: even if EUT were to intercept a single transmission from such a device, it would not be able to detect enough additional transmissions made on subsequent hops by the other device to define a pattern, as these would be spread throughout the band, and therefore outside EUT's ability to receive.