	Frequency hopping spread spectrum system operational requirements:
1.	Describe whether the carrier is modulated with the coded information in a conventional manner causing a conventional spreading of the RF energy about the frequency carrier *(Notes: system that employs useless modulation just to meet the paragraph (a)(1) TX/RX bandwidth requirement does not meet the intent of Section 2.1)*
	The RL78/G1H adopts the modulation method with the RF transceiver function that complies with 2FSK/GFSK and 4FSK/GFSK defined in the IEEE802.15.4g [3]. Also refer to page 1 of RL78/G1H Hardware User's Manual [4].
2.	Provide a sample of a few hop sequences (at least two). Each sequence must have a minimum number of hops (i.e. a minimum number of channel changes), such as 8 to 15 channel changes.
	Examples as provided in Section 9.3 of [1]: First hop sequence: 19, 128, 3, 53, 79, 24, 68, 118, 7, 51 Second hop sequence: 82, 47, 102, 83, 89, 5, 23, 121, 70, 98
3.	Provide a description of how the pseudorandom hop sequence is generated
	The pseudorandom hop sequence is generated using the Direct Hash Channel Function (DH1CF) as defined in Section 9 of [1]. The DH1CF itself is based on the Jenkins Hash Algorithm [2].
4.	Describe how the near term distribution of hops appears random
	The DH1CF takes following input parameters: • Slot number • Device extended address • Number of channels Due to the avalanche property of the Jenkins hash function the change from one slot to the next slot leads to significantly different output of the function, i.e. the near-term distribution is random.
5.	Describe how the long term distribution appears evenly distributed over the hop set. *(Notes: Each individual EUT must meet the requirement that each of its hopping channels is used equally on average (e.g., that each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event). The long term distribution of the sequence must be uniform (i.e. equal probability mass function), and all channels must have an equal probability of selection once all channel numbers are randomly generated.)*
	When using the DH1CF, the pseudorandom hopping sequence is comprised of 2^16 slots (numbered 0 to 2^16-1). The total sequence duration is thus 2^16 hops, which provides an appropriate long term distribution of all available channels.
6.	Describe how the sequential hops are randomly distributed in both direction and magnitude of change in the hop set.
	The DH1CF takes following input parameters: • Slot number • Device extended address • Number of channels Due to the avalanche property of the Jenkins hash function the change from one slot to the next slot leads to significantly different output of the function, i.e. the distribution is random in both direction and magnitude of change.

7.	System Receiver Input Bandwidth - Describe how the associated receiver(s) complies with the requirement that its input bandwidth (either RF or IF) matches the bandwidth of the transmitted signal.
	The receiver-side of RL78/G1H transceiver has more bandwidth than the occupied channel bandwidth.
8.	System Receiver Hopping Capability - Describe how the associated receiver(s) has the ability to shift frequencies in synchronization with the transmitted signals.
	The DH1CF takes following input parameters: • Slot number • Device extended address • Number of channels As transmitter and receiver are synchronized in time by mechanisms described in [1], the output of the channel function is a direct function of the device's extended address. This means, a transmitter will always send on the receivers hopping sequence.
9.	Describe how the system, consisting of both the transmitter and the receiver, is designed to comply with all of the regulations in this Part should the transmitter be presented with a continuous data (or information) stream.
	The RL78/G1H is designed to meet FCC.15.247 as shown in the application note below [5].
10.	Describe how a system employing short transmission bursts complies with the definition of a frequency hopping system and distributes its transmissions over the minimum number of hopping channels specified in this Part
	Transmissions must follow the dwell interval specification given in [1], i.e. a channel hop needs to happen after expiration of the dwell interval which can be configured to values between 15ms and 255ms.
11.	Describe how the EUT complies with the requirement that it does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.
	The DH1CF takes following input parameters: • Slot number • Device extended address • Number of channels The device extended address is a unique MAC address as assigned by the IEEE registration authority. As the hopping sequence depends on this unique device address it cannot be synchronized with any other FHSS system.
12.	Compliance with carrier frequency separation requirement
	The RL78/G1H complies with FCC Part 15.247 because the channel spacing is 200kHz@50kbps and 400KHz@150kbps for 20dB bandwidth (103KHz@50kbps and 185KHz@150kbps). Refer to Chapter 3 of the application note [5].
13.	Compliance with the minimum number of hopping frequencies requirement
	The Wi-SUN FAN software stack can allocate up to 129channels for 50 kbps and up to 64channels for 150kbps for frequency hopping. By setting 50 or more channels, it is possible to satisfy "the requirement of 50 channels or more of FCC Part 15.247".
14.	Compliance with the time of occupancy (dwell time) requirement
	Dwell times can be configured between 15ms and 255ms, which is less than 400ms as per FCC Part15.247, when hopping is set to 50 channels.

15.	Compliance with the occupied bandwidth requirement
	For 20dB bandwidth, refer to Chapter 3 of the application note [5].

[1] Wi-SUN FAN specification v1.0,
https://wi-sun.org/download/fan-working-group-technical-profile/

[2] Jenkins Hash Algorithm,
http://burtleburtle.net/bob/c/lookup3.c

[3] IEEE802.15.4g,
https://standards.ieee.org/standard/802_15_4g-2012.html

[4] RL78/G1H User's Manual,
https://www.renesas.com/us/en/document/hw-manual?hwLayerShowFlg=false&prdLayerId=null&layerName=null&coronrService=null&hwDocUrl=%2Fus%2Fen%2Fdoc%2Fproducts%2Fmpumcu%2Fdoc%2Frl78%2Fr01uh0575ej0130-rl78g1h.pdf&hashKey=866e506215be2c9c1c6db7732e497af2

[5] Application note: R01AN4877EJ0100 Rev.1.00
https://www.renesas.com/us/en/doc/products/mpumcu/apn/rl78/003/r01an4877ej0100-rl78g1h-raa604s00.pdf