Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [Comments on preamble length and PHR for LECIM FSK PHY]
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Re: [802.15.TG4k]

Abstract: This contribution is prepared to discuss about preamble length and PHR for LECIM FSK PHY.

Purpose:

Outline

- The goal of this document is to discuss about preamble length and PHR for FSK PHY in preliminary draft 089/r1.

Preamble Length

- ## Preamble field in draft 089/r1

The Preamble field shall contain *phyLECIMFSKPreambleLength* (as defined in 9.3) multiples of the 8-bit sequence "01010101."

Given the asymmetric nature of LECIM networks, greater capabilities of coordinators and low energy end devices, the range of preamble length is 0 to 100 octets. High functioning coordinators may need little or no preamble to synchronize, which reduces the transmit times of battery devices. A maximum preamble length of 100 is sufficient for the radios in end devices to synchronize for transmission.

- ## Comment
  - The range of preamble length: 0-100 octet
  - According to draft, end devices should also have capability to synchronize with no preamble, which makes it difficult to implement low-power end devices

Preamble Length

- ## Uplink
  - High functioning coordinator can synchronize with little or no preamble
  - End device can save transmit power by reducing preamble length

- ## Downlink
  - End device needs several octets of preamble to synchronize with limited resources
  - Coordinator's preamble length should not be zero

Mains-powered Coordinator   uplink   Battery-powered Endpoint device

downlink
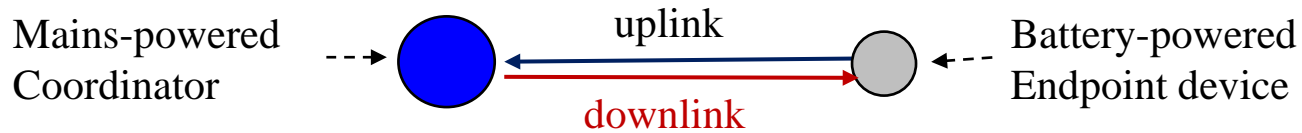
Preamble Length

- ## Suggestion
  - Asymmetric range of preamble length is desirable
  - For example
    - 0-100 octet for end devices
    - 4-100 octet for coordinator

PHR

- ## PHR tables in preliminary draft 089/r1

Bit string index	0	1–7
Bit mapping	0	L_6–L_0
Field name	Extension Bit	Frame Length

Figure 69—PHR for 127 octet packet

Bit string index	0	1–3	1–12
Bit mapping	1	R_2–R_0	L_{11}–L_0
Field name	Extension Bit	Reserved	Frame Length

Figure 70—PHR for 2047 octet packet

- ## Comment 1
  - PHR error in 2047 octet packet entails significant power consumption to recover the wrong PSDU
  - Parity field is required to stop non-necessary PSDU recovery

- ## Comment 2
  - Frame length field should be 11bits for 2047 octet packet
  - Is there any intention to use 12bits?

PHR

- ## Suggestion
  - Reserved bits for 2047 octet packet can be used as parity
    - For example: R_2 in PHR → odd parity
  - Frame length field for 2047 octet packet
    - 12bits → 11bits

Conclusion

- ## Preamble length
  - Asymmetric range of preamble length

- ## PHR for 2047 octet packet
  - Parity field should be included
    - Reserved bits can be used
  - Frame length field
    - 12bits → 11bits