**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **Proposed comment resolution for CID #257, R201, R225, R212, R19, R20, R116, R156 of LB104** | |
| Date Submitted | 2 June 2015 | |
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| Re: | 802.15.10 Consolidated Comment Entry Form, CID #257, R201, R225, R212, R19, R20, R116, R156 | |
| Abstract | Provides a proposed resolution to CID #257, R201, R225, R212, R19, R20, R116, R156 | |
| Purpose | To be used by the technical editor to apply the necessary changes to the draft to resolve CID #257, R201, R225, R212, R19, R20, R116, R156 | |
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1. **Kinds of SN : CID R19, R20, R116, R156, R201, R212, R225**

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| **CID** | **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| R19 | Charlie Perkins | 4 | 3.2 | 47 | SN | Clarify relation to DSN, MSN, L2RSN, etc. |
| R20 | Charlie Perkins | 4 | 3.2 | 47 | SN | Is it per node? Per tree? Per MAC address? |
| R116 | Charlie Perkins | 40 | 5.4.2 | 54 | Is L2R SN per mesh root? | Should be specified somewhere if not already |
| R156 | Charlie Perkins | 52 | 6.2.1 | 46 | There is no SN field in the IE | Insert if needed |
| R201 | Charlie Perkins | 59 | 6.2.3 | 52 | Which sequence number is this? | Insert clarifying text |
| R212 | Charlie Perkins | 63 | 6.2.6.5 | 8 | "the sequence identifier of the RA IE" | Is this the same as the L2R Sequence Number? |
| R225 | Charlie Perkins | 68 | 6.2.10 | 7 | "L2R Sequence Number" is explicit; are all other SNs like this? | Insert clarifying text |
| 257 | Tero Kivinien | 33 | 5.3.1 | 16 | I would have assumed the SN here would use some kind of sequence number arithmetics, to detect whether it wraps around, From this it seems that when SN reaches 0xff, then no more updates can be done, and devices needs to be reset and L2R mesh needs to be recreated (or do you need to throw the devices away, and buy new ones :-) | Define how SN is incremented, and how it can wrap around (i.e. most likely if new SN < old SN, and old SN > 0x80, then you accept new SN even when it is lower. |

* There is a MSN (Mesh SN) for the TC IE per mesh tree, set by the mesh root.
* The L2R-D does not require a SN since it is sent only once at the time of discovery.
* A device uses one SN counter of 2 octets for the remaining IEs with a SN field LSN (L2R SN) except for the IEs sent along with a (Short) L2R Routing IE.
* If the mesh root sends a frame requiring an E2E ACK IE to a sleeping device, it shall wait for the E2E ACK IE or for the expiration of a reasonable timeout
* The sequence numbers are permitted to roll over.

**Resolution**

* ***Insert the following acronyms in clause 3.2:***

MSN mesh sequence number

LSN L2R sequence number

* ***Delete the “SN” acronym from clause 3.2***
* ***Replace “Sequence number” with “Mesh sequence number (MSN)” in Table 1.***
* ***Modify the description of the “Sequence number” in Table 1 as follows:***

Set by the mesh root and propagated by the rest of the L2R mesh. Used to determine the latest mesh information.

* ***Delete the “Sequence number” row in Table 2.***
* ***Insert the following text before 5.2.1:***

Each device generates a L2R sequence number (LSN) regardless of the unique devices with which it wishes to communicate. The LSN is incremented before the transmission of a new IE used by the L2R sublayer requiring a sequence number with the exception of the TC IE. The LSN is permitted to roll over.

* ***Modify the second paragraph of clause 5.2.6 as follows:***

When a device receives a P2P-RQ IE, it records the SA in the NT, into the list of reachable destinations of the neighbor the IE was received from. When a device receives a P2P-RP IE, it records the address contained in the Route Destination Address field in the list of reachable destinations of the neighbor the IE was received from. When a device receives a P2P-RQ IE, it records the SA and the LSN; if it receives another P2P-RQ IE with the same SA and LSN or with a SN older than the latest LSN received, the IE is discarded.

- ***Insert the following clause after clause 5.4.1.3***

**5.4.1.4. End to end acknowledgement**

A source device may request the final destination to transmit an E2E ACK IE upon receiving a frame by setting the E2E AR field of the L2R Routing IE to one.

A source device that sends a frame with the E2E AR field set to zero in the L2R Routing IE assumes that the frame has been successfully transmitted to the final destination.

A source device that sends a frame with the E2E AR field set to one in the L2R Routing IE waits for the final destination to respond with an E2E ACK IE. If the E2E ACK IE is received within the expected time with a LSN corresponding to the LSN of the original L2R Routing IE, the transmission is considered successful. If the E2E ACK IE is not received during the expected time or contains a LSN that does not correspond to the LSN of the original L2R Routing IE, the source device concludes that the transmission has failed.

If a source device sends a data frame requiring an E2E ACK IE to a device with sleeping cycles, the source device should wait for the E2E ACK IE or for the expiration of the expected time to receive the E2E ACK IE before sending another frame to the same device.

The expected time to receive an E2E ACK IE depends on the various parameters in an implementation such as the network size or the existence of duty cycling devices and is out of the scope of this document.

The setting of the E2E AR field in the L2R Routing IE depends on the value of the E2E AR parameter in the L2R-DATA.request primitive.

* ***Modify Figure 32 as follows:***

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits:0-7** | **8-14** | **15** | **Octets: 0/1/2** | **0/2/8** | **0/Variable** | **0/1** | **0/2** | **0/1** | **0/10** | **0/1** | **0/1** | **0/Variable** | **0/Variable** |
| Length | Sub-ID | Type = 0 | Descriptor | Mesh Root Address | Entity ID List | Depth | MSN | TC IE Interval | MCO Descriptor | DAgg Buffering Time | Security Level | PQM List | Path to Root |

* ***Replace “Sequence number” with “MSN” in clause 6.2.2.5***
* ***Replace “Sequence number” with “LSN” in:***
  + ***Figure 46***
  + ***clause 6.2.6.5***
  + ***Figure 52***
  + ***Clause 6.2.8.6***
  + ***Figure 60***
  + ***Clause 6.2.12.2***
* ***Replace “SN” with “LSN” in:***
  + ***Figure 51***
  + ***Clause 6.2.7.1***
  + ***clause 6.2.7.2***
* ***Replace “L2R Sequence Number” with “LSN” in:***
  + ***Figure 56***
  + ***Clause 6.2.10.5***
  + ***Figure 59***
  + ***Clause 6.2.11.3***
* ***Replace “L2R SN” with “LSN” in:***
  + ***Figure 62***
  + ***Clause 6.2.13.2***
* ***Set all the LSN sizes to 2 octets in all IE concerned except for the SLR IE***