**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **Offering alternative resolution for the sequence number discussion** | |
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| Re: | Sequence number discussion related to the 802.15.10 Consolidated Comment Entry Form, CID #257, R201, R225, R212, R19, R20, R116, R156 | |
| Abstract | Provides an alternative resolution to doc# 15-15-459-00 which addresses the resolution to CID #257, R201, R225, R212, R19, R20, R116, R156 | |
| Purpose | To discuss | |
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1. **Alternative resolution to doc #15-15-459-00**

**An issue on the current resolution:**

There are L2R IEs which contains a sequence number as follows.

* TC IE (1 byte)
* STOP-L2R-RQ IE (1 byte)
* STOP-L2R-RP IE (1 byte)
* RA IE (1 byte)
* SRA IE (1 byte)
* P2P-RQ IE (4 bytes)
* L2R Routing IE (1 byte)
* Short L2R Routing IE (1 byte)
* E2E ACK IE (1 byte)

SN for TC IE represents what generation of update for routing information is exchange. Thus, TC IE SN is updated only by the tree root as the initiator of the tree formation.

SN for RA, there are several choices – one is using TC IE SN which make it possible to announce what generation of update by TC IE reflects the information contained by RA IE. In this case, it needs to keep SN for RA. Another is issuing SN per device. It can be used for detection of duplicate or knowing oldness. It can be used for frame validation. It may be same as one of routing IE. Thus, it can be deleted from RA IE format.

SN for L2R Routing IE (and short L2R routing IE), it represents ID of transaction and it can be used for duplication detection, telling oldness and matching to response (E2E ACK IE).

SN defined in IEEE802.15.4 is used only for communication on the link (neighbors in radio area). SN per device is fine to share small amount of numbers of neighbors. However, for the routing IE, SN may be shared with thousands of nodes. 1 byte may not be enough to detect wrap around, oldness of frame and not enough for ACK matching purpose under sharing SN by 10 thousands of destinations. The current resolution described in 15-15-0459-00 is to use 1byte SN per device.

One of solutions may be having bigger size of SN like 3 bytes or more.

The other solution is having SN per devices of pair-wise (having counter per each destination). Devices on the L2R tree mainly communicate with tree root. This may not cause to have many memories for counters. For the tree root, it may have counters for all of nodes in the tree. The root may needs to manage transactions including their addresses. Does preparing 1 byte for each destination make a big problem?

For the STOP-L2R-RQ IE and its response STOP-L2R-RP IE, SN L2R routing IE can be used when SN is per devices of pair-wise. SNs from these two IEs can be deleted. SN should be contained in L2R routing IE than in common field of L2RIEs since the SN is associated to the pair of source and destination.

For the P2P-RQ IE, it already has 4 byte sequence number.

**Proposed Resolution:**

* SN:
  + Having SN per devices of pair-wise (having counter for each destination in one device) in L2R Routing IE and other IEs to communicate E2E don’t have their own SNs and let them use the one in L2R routing IE
  + Having SN per root in TC IE – nothing to change
  + P2P related IEs – nothing to change
* For RA IE:
  + Option A: Having SN in RA which is copied from the one in TC IE
  + Option B: Delete SN from RA and let it use SN in L2R routing IE