**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 Resolutions for R3056** |
| Date Submitted | 31 Mar 2016 |
| Source | [Noriyuki Sato, Kiyoshi Fukui] [OKI Electric Industry Co., Ltd.][2-5-7, Hommachi, Chuo-ku, Osaka, 541-0073 Japan] | Voice: [+81-6-6260-0700]Fax: [+81-6-6260-0700]E-mail: [sato652@oki.com] |
| Re: | Proposed comment resolutions related to the 802.15.10 Consolidated Comment Entry Form, CID R3056 |
| Abstract | This document provides a proposed comment resolutions for the comments which are related to indirect transmission forwarding of D3 of 802.15.10 |
| Purpose | To propose |
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1. **CID R3056**

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| R3056 | Charlie Perkins | Futurewei | 32 | 5.2.2 | 2 | Difficult to see the usefulness of "mutual link" if out of scope | Calculation should be specified in at least one metric type, or else concept removed from document. |

**AiP**

Fix the wording for ‘incoming’ and ‘outgoing’ metric. They should be ‘observed’ or ‘announced by the neighbor’. Observed metric may be incoming (e.g. RSW) or it may be outgoing (e.g. ETX counting how many transmission and retransmission occurs)

* Replace “incoming metric” with “observed metric” in the whole text except ones listed as exception below .
* Replace “outgoing metric” with “announced metric” in the whole text except ones listed as exception below.

(\*) Exception

On p.32, on l.3-l.4, “the incoming metric from and the outgoing metric to” shall be replaced by “observed metric of and announced metric by”

On p.32, on l.12, l.18 and l.20, “recorded as the incoming metric” shall be replaced by “recorded by the announced metric”

* Modify the definition in 3.1 as following.

**~~incoming~~ observed metric:** Value of the link quality metric ~~from~~ between a neighbor ~~to~~ and the current device that the current device can be observed. ~~used when links are not assumed to be symmetric.~~

**~~outgoing~~ announced metric:** Value of the link quality metric ~~from~~ between the current device ~~to~~ and a neighbor announced by NLM IEs used when links are not assumed to be symmetric.

* Modify the 2nd and 3rd column in table 7 as following

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** | **Condition to record** |
| ~~Incoming~~ Observed metric  | Depends on the metric ID | Depends on the metric ID | Value of the single hop metric ~~from~~ between the neighbor ~~to~~ and the current device that the current device can be observed. | A |
| ~~Outgoing~~ Announced metric | Depends on the metric ID | Depends on the metric ID | Value of the single hop metric ~~from~~ between the current device ~~to~~ and the neighbor ~~retrieved in~~ announced by NLM IEs when applicable. | N |

* Insert an example usage of NLM IE and mutual link as Annex.

New Annex:

This annex shows an example usage of NLM IE and mutual link metric that described in clause 5.2.2, 5.3.1 and 6.1.3.

An LQM is measured or observed by each device to construct and to maintain a L2R mesh as described in clause 5. It may be significantly different value from the one for the opposite link due to some reasons. (e.g. emission power difference among products etc.) If the actual links for upward and downward are different, a path which is not good for both directions may be chosen. The mutual link cost is used to avoid it.

NLM IE is used to announce the LQM observed by the NLM IE sender. When a device receives the NLM IE, it updates ‘announced LQM’ for the NLM IE sender in the global NT. The observed LQM is updated periodically by the device itself. The mutual link metric is calculated from these two values. The following shows an example to calculate it.

For the case of using ETX, mutual link cost is recommended to use max LQM of both directions since the bad link for either direction should not be chosen. Considering ETX represents the inverse number of possibility to send, geometric mean can be used alternatively.

For the case of using RSW, it should be calculated by the max of LQMs.

For the Expected air time, it is the occupancy time measured by the sender and it should use arithmetic average. Recommended equation is listed on Table xx.

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| --- | --- |
| **Metric** | **Recommended equation** |
| ETX | Max (Observed LQM, Announced LQM) or Geometric mean (Observed LQM, Announced LQM) |
| RSW | Max (Observed LQM, Announced LQM) |
| Expected air time | Arithmetic average (Observed LQM, Announced LQM) |

Table xx: Recommended equation to calculate a mutual link