**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Text for Link-ID assignment and management** |
| Date Submitted | November 2016 |
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| Re: | draft text for inclusion into 802.15.8 |
| Abstract | This describes the mechanisms for assigning and managing the optional Link-ID that may be used by the 802.15.8 MAC to reduce the number of addressing octets needed in PD-to-PD MAC frames. |
| Purpose | The purpose of this document is to provide text for link-ID assignment and management with a view to incorporating it into the IEEE 802.15.8 draft |
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**Link-ID assignment and management**

***This document contains text for integration into the 802.15.8 draft.***

*Note to editor****: Please search the existing text for the word link and where the usage is for “Link-ID”, please ensure it is consistently given as “Link” with a capital “L”, a non-breaking hyphen, and capital “ID”, i.e. “Link‑ID”.***

1. MAC protocol
	1. MAC functional description

***Insert the following new clause in an appropriate place in the draft, maybe as the final sub-clause of the MAC functional description….***

* + 1. Link-ID
			1. Introduction

This clause describes assignment and management of Link-IDs. The use of Link-IDs and the provisions of this clause are optional in this standard. The benefit of using the Link-ID is that for directly addressed PD to PD communications the source address may be reduced from a full 48-bit address to an 8-bit Link-ID saving five octets of overhead per frame.

* + - 1. Procedure for assigning Link-ID

Each Link-ID relates to a single direction of frame transfer. The destination PD chooses and assigns the Link‑IDs pertaining to each communication link from selected peers. A destination PD supporting Link‑ID shall maintain a list of Link-IDs, each uniquely cross-referenced to the corresponding source address (i.e. the ID) of a PD with which it is peered.

After successful peering, a PD supporting Link-ID, and wishing to afford its remote peer PD the opportunity to employ a Link-ID for its future communication, chooses a unique Link-ID, (typically its lowest numbered unused Link‑ID), and reserves it for the peer PD by creating a record in the *macOwnLinkIdList* as described in 5.2.1. The PD then informs the peer PD of the chosen Link-ID using the Link-ID Assignment IE defined in 5.2.4.3.2. *<Please insert correct hyperlinked cross-reference to the clause titled “Link-ID Assignment IE”>*

A PD that does not wish to support the use of Link-ID may ignore any Link-ID Assignment IEs it receives.

Upon receipt of a Link-ID Assignment IE from a peered PD, the receiving PD supporting Link-ID creates (or updates) a record in its *macTxLinkIdList* as described in 5.2.2. This list is indexed by PD destination address. The records in the *macTxLinkIdList* store the assigned Link-ID for each destination PD. If a Link-ID Assignment IE is received from a peer PD for which there is already a record in the *macTxLinkIdList*, then that record is updated with the new Link-ID assignment.

* + - 1. Procedure for using Link-ID
				1. Transmission of Link-ID

Whenever a PD is sending a frame to a peer PD for which it has an entry in its *macTxLinkIdList*, the sending PD may substitute the shorter, 8-bit or 16-bit, *associatedLinkId* in place of its full 48-bit source address, and set the source addressing mode field in Frame Control field according to the definition in 5.8.2.1.3. *<Please insert correct hyperlinked cross-reference to the clause titled “Source addressing mode (SAM) field”>* Where the Link‑ID is less than 256 the 8-bit format may be used, if the Link-ID is 256 or greater the 16-bit format shall be used.

* + - * 1. Reception of Link-ID

Whenever a PD receives a frame with a Link-ID it validates that the Link-ID is present in the *macOwnLinkIdList* as part of the MAC receive frame filtering defined in 5.3.2. *<Please insert correct hyperlinked cross-reference to the clause titled “Reception and rejection”>*. At the same time, the MAC retrieves the *associatedSourceAddress* from the *macOwnLinkIdList* to report in the MCPS-DATA.indication.

* + - 1. Deleting a Link-ID

Once a Link-ID assignment is made between a pair of peered PDs, this assignment persists for as long as those PDs remain peered. There is no separate mechanism to remove or delete a Link-ID assignment.

When a pair of peered PDs becomes de-peered they shall delete any corresponding Link‑ID record entries in their *macOwnLinkIdList* and *macTxLinkIdList* if any are present.

***In clause 5.3.2 “Reception and rejection” add the following frame filtering rule between the rule beginning “If a 48-bit destination address is included in the frame…”, and the rule beginning “If a 16-bit multicast group destination address is included in the frame…”:***

* If a 48-bit destination address is included in the frame, and the source address is a Link-ID then the Link-ID must match one of the active Link-IDs that the receiving PD has assigned, i.e. it must be present in the *macOwnLinkIdList*.
	1. PAC information base (PIB)

***Add the new PIB attribute and constant definitions below to the appropriate places in Table 73 “PIB attributes” and Table 74 “PAC constants”***

*Ensure the following sentence appears in the paragraph just before the PIB table.*

Attributes marked with a dagger (†) are read-only attributes (i.e. the attribute can only be set by the MAC sublayer).

*Modify “Table 73—PIB attributes” to add the following new attributes:*

Table 7—PIB fields

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field** | **Type** | **Range** | **Default** | **Description** |
| *macLinkIdSupported*† |  Boolean | FALSE,TRUE | - | This attribute tells the upper layer whether or not the MAC includes support Link-ID  |
| *macOwnLinkIdList* | See 5.2.1 | See 5.2.1 | Empty | This is the list of active Link-ID cross-reference records as defined in 5.2.1. These are the Link-IDs that the local PD has assigned to its remote peered PDs. |
| *macTxLinkIdsList* | See 5.2.2 | See 5.2.2 | Empty | This is the list of cross-reference records, as defined in 5.2.2, for peer assigned Link-IDs. This lists the peer destinations for which the local PD has been assigned a Link-ID by a remote peered PD. |

* + 1. Link-ID assignment cross-reference records

The *macOwnLinkIdList* PIB attribute is a list of Link-ID cross-reference records consisting of the elements defined by Table 7. This is the list of Link-IDs chosen by the local PD as described in 5.1.1.2 (and notified to the remote PD by the Link-ID Assignment IE defined in 5.2.4.3.2 *<insert correct hyperlinked cross-reference to the clause titled “Link-ID Assignment IE”>*.

Table 7— Elements of the Link-ID cross-reference record

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field** | **Type** | **Range** | **Default** | **Description** |
| *assignedLinkId* |  integer | 0x0000 to 0xFFFF | - | This element is the assigned Link-ID  |
| *associatedSourceAddress* | 48-bit address | 48-bits | empty | This element is the 48-bit address corresponding to the assigned Link-ID |

* + 1. Cross-reference records for peer assigned Link-IDs

The *macTxLinkIdList* PIB attribute is a cross-referenced list recording the peer PD addresses for which the local PD has been assigned a Link-ID. These records consist of the elements defined by Table 7.

Table 7— Elements of the Link-ID cross-reference record

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field** | **Type** | **Range** | **Default** | **Description** |
| *destinationAddress* | 48-bit address | 48-bits | empty | This is the 48-bit address of a peered device for which the local PD has received a Link-ID assignment IE |
| *associatedLinkId* |  integer | 0x0000 to 0xFFFF | - | This element is the Link-ID associated with the destination address.  |

**<END>**