**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |  |
| --- | --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | Suggested changes to subclause 5.4.3 for discovery procedure | |
| Date Submitted | May 2016 | |
| Source | Huan-Bang Li (NICT)  Marco Hernandez (NICT)  Ryu Miura (NICT)  Fumihide Kojima (NICT) |  |
| Re: | TG8 draft text for discovery procedure for 802.15.8 | |
| Abstract | This is the work in progress text of the MAC component for IEEE 802.15.8 group for PAC. | |
| Purpose | This document provides the details of draft text to IEEE 802.15.8 | |
| Notice | This document does not represent the agreed views of the IEEE 802.15 Working Group or IEEE 802.15.8 Task Group. It represents only the views of the participants listed in the “Source(s)” field above. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. | |
| Release | The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15. | |
| Patent Policy | The contributor is familiar with the IEEE-SA Patent Policy and Procedures:  <http://standards.ieee.org/guides/bylaws/sect6-7.html#6> and  <http://standards.ieee.org/guides/opman/sect6.html#6.3>.  Further information is located at <http://standards.ieee.org/board/pat/pat-material.html> and  <http://standards.ieee.org/board/pat>. | |

# [This is draft text for correcting discovery procedure TG8]

* 1. Discovery procedure

As shown in Figure 31, a general discovery procedure may contain the following steps.

1. A PD’s higher layer, such as PD1’s higher layer, triggers discovery with an MLME-DISCOVERY. request.
2. The PD’s MAC, such as PD1’s MAC, broadcasts the Discovery Request message.
3. A PD, such as PD2, scans during the Discovery Period and detects the Discovery Request message.
4. The PD’s MAC, such as PD2’s MAC, sends the detected Discovery Request message with an MLME-DISCOVERY.indication to its Higher Layer.
5. The Higher Layer receiving the Discovery Request, such as PD2’s Higher Layer, decides either to send the Discovery Response or not and indicates it to the MAC accordingly with an MLME-DISCOVERY.confirm.
6. The PD’s MAC, such as PD2’s MAC, sends Discovery Response message to the Discovery requester, such as PD1, if requested by the higher layer.
7. The PD’s MAC, such as PD1’s MAC, sends the received Discovery Response message to PD1’s Higher Layer with an MLME-DISCOVERY.report.



Figure 31—General discovery message sequence chart

* + - 1. One-way discovery

The procedure for one-way discovery follows the steps as shown in Figure 32.

1. A PD (i.e. PD1) broadcasts Discovery Request message during discovery period.
2. A PD or PDs (i.e. PD2 ~ PD4) may scan during discovery period. After receiving the Discovery Request message, the PD (i.e. PD2~ PD4) sends it to the Higher Layer.



Figure 32—One-way discovery procedure message sequence chart

* + - 1. Untargeted two-way discovery

Untargeted two-way discovery follows the steps as shown in Figure 33.

1. A PD (i.e. PD1) broadcasts Discovery Request message during discovery period.
2. PDs (i.e. PD2 ~ PD4) may scan during discovery period. After receiving the Discovery Request message, PDs (i.e. PD2 ~ PD4) send it to the Higher Layer.
3. Upon the higher layer MLME-DISCOVERY.confirm received, PDs (i.e. PD2 ~ PD4) respond to the sender PD (i.e. PD1) with a Discovery Response message.



Figure 33—Untargeted two-way discovery procedure message sequence chart

* + - 1. Targeted two-way discovery

This process is after finding desired PDs. Targeted two-way discovery follows the steps as shown in Figure 34.

1. A PD (i.e. PD1) unicasts or multicasts Discovery Request message during discovery period.
2. PDs (i.e. PD2 ~ PD4) may scan during discovery period. After receiving the Discovery Request message, PDs (i.e. i.e. PD2 ~ PD4) send it to Higher Layer.
3. Upon the Higher Layer MLME-DISCOVERY.confirm received, the queried PD (i.e. PD\_queried) responds to the sender PD (i.e. PD1) with a Discovery Response message.



Figure 34—Targeted two-way discovery procedure message sequence chart

* + - 1. Procedure for many-to-many discovery

Many-to-many discovery is defined for a number of neighbouring PDs. Among these neighbouring PDs, any PD shall be able to communicate with all other PDs. Therefore, physical links must be available between any pair of PDs. Procedure for many-to-many discovery follows the steps as shown in Figure 35.

1. The higher layer of an initiator PD (I-PD) triggers discovery procedure with an MLME-DISCOVERY.request to its MAC layer.
2. The I-PD’s MAC layer broadcasts Discover Request with its own PD ID (I-PD ID) and an empty list.
3. Each of the other PDs that captured the Discovery Request sends an MLME-DISCOVERY.indication to its higher layer. A PD, that receives an MLME-DISCOVERY.confirm from its high layer, broadcasts Discovery Response message. Hereafter, the responded PD is referred to as responder PD (R-PD). The Discovery Response message is broadcasted with its own ID (R-PD ID), I-PD ID, and IDs of all received PDs.
4. The I-PD broadcasts Discover Request with its own PD ID (I-PD ID) and a updated list.. The time period between the broadcasts of two Discovery Request is referred to as a random access duration, T\_rar, which is much smaller than the discovery period within a super frame.
5. The random access period is repeated until the I-PD stops to further broadcast Discover Request. .



Figure 35—Discovery procedure sequence chart for forming many-to-many group