**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title |  | |
| Date Submitted | 15 July 2010 | |
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| Re: | LB53 Comment Resolution | |
| Abstract | Working draft, proposed resolution to CID #: 1382, 1383, 1514 | |
| Purpose | Support LB53 Comment Resolution | |
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Proposed resolution to CID #: 1382, 1383, 1514

Include the following changes to MLME-SCAN.request

**7.1.11.1 MLME-SCAN.request**

The MLME-SCAN.request primitive is used to initiate a channel scan over a given list of channels. A device

can use a channel scan to measure the energy on the channel, search for the coordinator with which it

associated, or search for all, or a subset of, coordinators transmitting beacon frames within the POS of the scanning device.

The active scan is performed on each channel by the MLME first sending a beacon request command (see

7.3.7) or an EBR (7.3.13). The MLME then enables the receiver and records the information contained in each received beacon in a PAN descriptor structure (see Table 55 in 7.1.5.1.1). The active scan on a particular channel terminates when the number of PAN descriptors stored equals an implementation-specified maximum or when

[*aBaseSuperframeDuration* \* (2*n* + 1)] symbols, where *n* is the value of the ScanDuration parameter, have

elapsed, whichever comes first. See 7.5.2.1.2 for more detailed information on the active channel scan

procedure.

Add to table 55 and to MLME-BEACON-NOTIFY.indication the contents of the enhanced beacon.

Replace 7.3.13.1 in d1 with the following content of 7.3.13.1:

**7.3.13.1 EBR-Enhanced Beacon request command**

**7.3.13.1.1 General**

The enhanced beacon request command is used by an EBR capable device to locate a subset of coordinators within its POS during an active scan.

This command is optional for an FFD and an RFD.

The enhanced beacon request command shall be formatted as illustrated in Figure 65.oo.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MHR | CFID | Request Field | Request Field | Link Quality | Percent filter | PIB Identifier List |

**7.3.13.1.2 Request Field**

Update table 84.e in d1 with:

|  |  |
| --- | --- |
| **Bit** | **SubField** |
| 0 | Permit Joining On |
| 1 | Link Quality |
| 2 | Percent filter |
| 3-4 | Number of entries in PIB Identifier list |
| 5-7 | Reserved |

Add 7.3.13.1.2 before “Extended Payload” and re-number “Extended Payload” subclause:

**7.3.13.1.2.5** PIB Identifier List

A list of Boolean PIB attributes IDs for attributes which define device capabilities. When *macEBRattributeList* is not empty, the contents of *macEBRattributeList* are copied into this field, and bits 3-4 of the request field are set to the number of elements in *macEBRattributeList*. When a PIB identifier list is present, the nhanced beacon capable devices shall respond to the enhanced beacon request when all of the capabilities identified in the list are supported.

**7.3.13.1.2.6 Extended Payload**

Add description of the new Enhanced Beacon frame in the appropriate subclause (to be determined by the editors):

**7.2.x.1 Enhanced Beacon**

The enhanced beacon is transmitted by an EB capable device in response to the EBR (7.3.13), as described in 7.5.2.1.2.

This command is optional for an FFD and an RFD.

The enhanced beacon shall be formatted illustrated in Figure zzz.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Octets: 1/2 | 0/1 |  |  | 1 | Variable | 0/2/4 |
| Frame Ctrl | BSN | Addressing | Aux Sec | Beacon  Type = 2 | Information Response (IE List) | FCS |
| MHR | | | |  | | MFR |

Figure zzz

**7.2.x.1.1 Enhanced Beacon frame MHR fields**

The MHR for an enhanced beacon frame shall contain the Frame Control field and may contain a Sequence Number field, the Source PAN Identifier field, and the Source Address field. The order of MHR fields of the enhanced beacon frame shall conform to the order of the general MAC frame as illustrated in Figure 41.

In the Frame Control field, the Frame Type subfield shall contain the value that indicates a beacon frame, as shown in Table 79, and the Source Addressing Mode subfield shall be set as appropriate for the address of the coordinator transmitting the enhanced beacon frame. When the enhanced beacon is generated in response to an EBR, the Destination Addressing Mode will be set appropriate to the source address in the received EBR.

If protection is used for the beacon, the Security Enabled subfield shall be set to one. The Frame Version subfield shall be set to two (10b). If security is enabled, the Security Enabled subfield is set to one and the FCS is omitted as described in 7.2.1.9. If a broadcast data or command frame is pending, the Frame Pending subfield, if present, shall be set to one, otherwise the Frame Pending subfield is set to zero. All other subfields shall be set to zero and ignored on reception.

The Sequence Number field, if present, shall contain the current value of macEBSN.

The Source PAN Identifier field, when present, shall contain the PAN identifier. The Source Address field shall contain address of the device transmitting the enhanced beacon. When the enhanced beacon is generated in response to an EBR, the Destination Address Field shall contain the source address contained in the received EBR.

The Auxiliary Security Header field, if present, shall contain the information required for security processing of the enhanced beacon frame, as specified in 7.2.1.7.

When generated in response to an EBR, the content of the enhanced shall include the information elements corresponding requested attribute ID and information element shown in table zzz2

PIB attribute IDs which may be contained in the PIB Attribute ID list:

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute ID | Attribute | IE ID | Information to include |
| 0x99 | macTSCHenabled |  | TSCH Advertisement information (7.3.10.1) |
|  | macDSMEenabled |  | DSME enhanced beacon information (7.2.4.2.2) |
|  | macLEenabled |  | Value of macCSLperiod or macRITperiod. |
|  | macHoppingEnabled |  | Hopping Parameters (7.3.17.1.5) |
|  |  |  |  |

Table zzz2

**7.4.2**

Add to table 86:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute** | **Identifier** | **Type** | **Range** | **Description** | **Default** |
| macActiveScanRequestType |  | enumeration | REGULAR, ENHANCED | Indicates whether to use the beacon request or the EBR for an active scan. Set to REGULAR the Beacon Request command (7.3.7) is used; If set to ENHANCED, the EBR command (7.3.13) is used. |  |
| EBRPermitJoining |  | Boolean | TRUE, FALSE | When true, the Permit Joining request will be included in the EBR |  |
| macEBRRequestField |  | List of Booleans |  | Contains which EBR request field bits should be set |  |
| macEBRLinkQuality |  | Integer | 0x00 – 0xFF | Link quality level to be transmitted in the EBR |  |
| macEBRPercentFilter |  | Integer | 0 - 100 | Percent filter threshold value to be transmitted in the EBR |  |
| macEBRattributeList |  | List of PIB IDs | 0x00 – 0xFF | Contains zero to four attribute IDS. Each ID must identify a PIB attribute. Refer to 7.3.13 and 7.3.17. |  |
| macEBRFilteringEnabled |  | Boolean | TRUE, FALSE | Indicates if devices should perform filtering in response to EBR |  |
| macHoppingEnabled |  | Boolean | TRUE, FALSE | Set to TRUE if if frequency hopping is in use. |  |
| MacEBSN |  | Integer | 0x00 – 0xFF | Beacon Sequence Number used for Enhanced Beacon Frames |  |

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Change active scan description as indicated:

**7.5.2.1.2 Active channel scan**

An active scan over a specified set of logical channels is requested using the MLME-SCAN.request

primitive with the ScanType parameter set to indicate an active scan. For each logical channel, the device

shall first switch to the channel, by setting *phyCurrentChannel* and *phyCurrentPage* accordingly, and send a

beacon request command (see 7.3.7) or an EBR (7.3.13), as indicated by *macActiveScanRequestType*. Upon successful transmission of the beacon request command, the device shall enable its receiver for at most [*aBaseSuperframeDuration* \* (2*n* + 1)] symbols, where *n* is the value of the ScanDuration parameter. During this time, the device shall reject all nonbeacon frames and record the information contained in all unique beacons in a PAN descriptor structure (see Table 55 in 7.1.5.1.1). If a beacon frame is received when *macAutoRequest* is set to TRUE, the list of PAN descriptor structures shall be stored by the MAC sublayer until the scan is complete; at this time, the list shall be sent to the next higher layer in the PANDescriptorList parameter of the MLME-SCAN.confirm primitive. A device…

After paragraph 8 add:

If a coordinator capable of responding to the EBR command and capable of filtering as described in 7.3.13.1 receives an EBR command, it shall perform the filtering as indicated in the EBR. If the filter conditions are satisfied it shall transmit the appropriate enhanced beacon as per table [z1].

Table z1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mode of Operation | Response Required | Access Method | When to respond | Notes |
| Beacon PAN | Y | Slotted CSMA-CA | Next available CAP |  |
| Non beacon PAN | Y | unslotted CSMA-CA | ASAP |  |
| DSME beacon | Y | Slotted CSMA-CA | Next available CAP |  |
| DSME non-beacon | Y | unslotted CSMA-CA | ASAP |  |
| TSCH | Y | Slotted CSMA-CA | Next available timeslot |  |
| LL | N | Not Applicable | Not Applicable | May respond |
|  |  |  |  |  |