**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | Resolution for comments about capability |
| Date Submitted | 19 May 2016 |
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| Re: | In response to CID 22, 82, 95, 96, 97, 98, 99, 100 and 101 (16/0162r4) from LB114 and editorial comments from LB119 |
| Abstract | Revised version of capability table and its description are provided. |
| Purpose | To apply changes to current draft based on comments from LB114 and LB119. |
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**6.4.11a HRCP PNC Capability IE**

***Replace Figure 6-88b with the following figure:***

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Figure 6-88b HRCP PNC Capability field format

***Replace Text and tables after Figure 6-88b as follows.***

The SC Capable field shall be set to one if the DEV supports the SC PHY, as defined in 11a.2, and shall be set to zero otherwise.

The OOK Capable field shall be set to one if the DEV supports the OOK PHY, as defined in 11a.3, and shall be set to zero otherwise.

The supported SIFS field contains the value of the shortest SIFS supported by the DEV in units of 0.1 μs encoded as an unsigned integer. For example, a value of 0b01001 indicates that the shortest SIFS supported by the DEV is 0.9μs. Values greater than 2.5 μs are reserved.

The low latency power save (LLPS) Control field contains LLPS related parameters as defined in Figure 6-88c

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits: b0** | **b1** | **b2** | **b3** | **b4** | **b5** | **b6** | **b7** |
| LLPSAllow | LLPSInterval | LLPSStart | LLPSExtend |

Figure 6-88c LLPS Control field format

The LLPS Allow field shall be set to one if the HRCP PNC allows the HRCP DEVs to use power save mode after association is completed, otherwise it is set to zero.

The LLPS Interval field indicates the value of ACK sending interval when the DEV is in HRCP Sleep mode. The field is defined in Table 6-17a.

Table 6-17a LLPS interval field values

|  |  |  |  |
| --- | --- | --- | --- |
| **Bits: b0** | **b1** | **B2** | **LLPS interval** |
| 0 | 0 | 0 | 1 ms |
| 0 | 0 | 1 | 5 ms |
| 0 | 1 | 0 | 10 ms |
| 0 | 1 | 1 | 50 ms |
| 1 | 0 | 0 | 100 ms |
| 1 | 0 | 1 | Reserved |
| … | … | ... |
| 1 | 1 | 1 |

The LLPS Start field indicates the value of consecutive ACKs duration to start LLPS. The valid values of the LLPS Start field are given in Table 6-17b.

Table 6-17b LLPS Start field values

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **LLPS interval** |
| 0 | 0 | 0.1 ms |
| 0 | 1 | 1 ms |
| 1 | 0 | 10 ms |
| 1 | 1 | Reserved |

The LLPS Extend field indicates the value of consecutive ACKs duration to extend LLPS. The valid values of the LLPS Extend field are given in Table 6-17c.

Table 6-17c LLPS Extend field values

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **LLPS Extend** |
| 0 | 0 | 0.1 ms |
| 0 | 1 | 1 ms |
| 1 | 0 | 10 ms |
| 1 | 1 | Reserved |

The Preferred Payload Size field indicates the maximum preferred data size of a single subframe payload to be received by the DEV. This field shall be formatted as illustrated in Table 6-17d.

Table 6-17d Preferred Payload Size field values

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **Preferred Payload Size** |
| 0 | 0 | 2048 octets |
| 0 | 1 | 4096 octets |
| 1 | 0 | 8192 octets |
| 1 | 1 | Reserved |

The Preferred Total Aggregation Size field indicates the maximum preferred total data size in a single frame to be received by the DEV when fragmentation is used. This field shall be formatted as illustrated in Table 6-17e.

Table 6-17e Preferred Total Aggregation Size field values

|  |  |  |  |
| --- | --- | --- | --- |
| **Bits: b0** | **b1** | **b2** | **Preferred Total Aggregation Size** |
| 0 | 0 | 0 | 16448 octets |
| 0 | 0 | 1 | 32896 octets |
| 0 | 1 | 0 | 65792 octets |
| 0 | 1 | 1 | 131584 octets |
| 1 | 0 | 0 | 263168 octets |
| 1 | 0 | 1 | 526336 octets |
| 1 | 1 | 0 | 1050624 octets |
| 1 | 1 | 1 | 2099200 octets |

The Supported Unit of Subframe Padding field indicates the unit of the subframe padding that can be received by the DEV as defined in Figure 6-88d. Each field shall be set to one for supported capability, and otherwise set to zero.

|  |  |
| --- | --- |
| **Bits: b0** | **b1** |
| 64 bit unit of padding supported | 128 bit unit of padding supported |

Figure 6-88d Supported Unit of Subframe Padding field format

The Pilot Symbol capable field shall be set to one if the DEV is capable of decoding the frame with pilot symbols, and shall be set to zero otherwise.

The SC Supported MCS field shall be formatted as illustrated in Figure 6-88e.

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **b2** |
| SC 16-QAM supported | SC 64-QAM supported | SC 256-QAM supported |

Figure 6-88e SC Supported MCS field format

The SC 16-QAM field shall be set to one if 16-QAM modulation is supported by the SC PHY DEV and shall be set to zero otherwise. The SC 64-QAM field shall be set to one if 64-QAM modulation is supported by the SC PHY DEV and shall be set to zero otherwise. The SC 256-QAM field shall be set to one if 256-QAM modulation is supported by the SC PHY DEV and shall be set to zero otherwise.

The SC Supported Channel Bonding field indicates the number of bonded channels supported by the SC-PHY DEV. The Supported OOK Channel bonding field shall be formatted as illustrated in Figure 6-88f.

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **b2** |
| SC 2 channel bonding is supported | SC 3 channel bonding is supported | SC 4 channel bonding is supported |

Figure 6-88f SC Supported Channel Bonding field format

SC 2 channel bonding uses CHNL\_ID 2 and 3. SC 3 channel bonding uses CHNL\_ID 1, 2 and 3. SC 4 channel bonding uses CHNL\_ID 1, 2, 3 and 4.

The SC Supported Channel Aggregation pattern field indicates the supported combinations of CHNL\_IDs used for channel aggregation by the SC-PHY DEV. The SC Supported Channel Aggregation field shall be formatted as illustrated in the Figure 6-88g and Table 6-17f. Each field shall be set to one for supported combinations, and shall be set to zero otherwise. Hence, if all bits set to be zero, the SC-PHY DEV does not support any channel aggregation pattern. Check mark in the Table 6-17e means the allowable aggregation channel for each pattern.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits: b0** | **b1** | **b2** | **b3** | **b4** | **b5** | **b6** | **b7** | **b8** | **b9** | **b10** |
| pattern0 | pattern1 | pattern2 | pattern3 | pattern4 | pattern5 | pattern6 | pattern7 | pattern8 | pattern9 | pattern10 |

Figure 6-88g SC Supported Channel Aggregation pattern field

Table 6-17f Channel Aggregation Patterns for SC PHY in Figure 6-88c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CHNL\_ID** | **1** | **2** | **3** | **4** |
| pattern0 | 🗸 | 🗸 |  |  |
| pattern1 | 🗸 |  | 🗸 |  |
| pattern2 | 🗸 |  |  | 🗸 |
| pattern3 |  | 🗸 | 🗸 |  |
| pattern4 |  | 🗸 |  | 🗸 |
| pattern5 |  |  | 🗸 | 🗸 |
| pattern6 | 🗸 | 🗸 | 🗸 |  |
| pattern7 | 🗸 | 🗸 |  | 🗸 |
| pattern8 | 🗸 |  | 🗸 | 🗸 |
| pattern9 |  | 🗸 | 🗸 | 🗸 |
| pattern10 | 🗸 | 🗸 | 🗸 | 🗸 |

The OOK spreading field shall be set to one if spreading factor 2 is supported by the HRCP-OOK PHY DEV and shall be set to zero if spreading is not supported by the DEV.

The OOK Supported Channel Bonding field indicates the number of bonded channels supported by the OOK-PHY DEV. The Supported OOK Channel bonding field shall be formatted as illustrated in Figure 6-88h.

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **b2** |
| OOK 2 channel bonding is supported | OOK 3 channel bonding is supported | OOK 4 channel bonding is supported |

Figure 6-88h OOK Supported Channel Bonding field format

The CHNL\_ID used for OOK channel bonding is specified in 11a.3.1.1.

**6.4.11b HRCP PNC Capability IE**

***Change the sentence after figure 6.4.11h as follows:***

The DEV Capability field shall be formatted as illustrated in Figure 6-88b except for the LLPC Control field being reserved.

***Delete Figure 6-88i***

***Replace Text after Figure 6-88i as follows.***

The SC Capable field is defined in 6.4.11a.

The OOK capable field is defined in 6.4.11a.

The Supported SIFS field is defined in 6.4.11a.

The Preferred Payload Size field is defined in 6.4.11a.

The Preferred Total Aggregation Size field is defined in 6.4.11a.

The Supported Unit of Subframe Padding field is defined in 6.4.11a.

The Pilot Symbol Capable field is defined in 6.4.11a.

The SC Supported MCS field is defined in 6.4.11a.

The SC Supported Channel Bonding Capability field is defined in 6.4.11a.

The SC Supported Channel Aggregation Pattern field is defined in 6.4.11a.

The OOK Spreading field is defined in 6.4.11a.

The OOK Supported Channel Bonding field is defined in 6.4.11a.

**6.4.11c HRCP Operation Parameters IE**

***Replace Figure 6-88k with the following figure:***

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Figure 6-88k HRCP Operation Parameters field format

***Replace Text after Figure 6-88k as follows.***

The PHY Mode field indicates which PHY mode is used in the session as defined in Table 6-17l. 10b indicates SC PHY is used, 01b indicates OOK PHY is used and other bit patterns shall not be used.

Table 6-17l PHY Mode field values

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **PHY Mode** |
| 1 | 0 | SC |
| 0 | 1 | OOK |
| 0 | 0 | Reserved |
| 1 | 1 |

The Supported SIFS field is defined in 6.4.11a. The larger value of SIFS in PPC and DEV capability shall be encoded in this field.

The Preferred Payload Size field is defined in 6.4.11a. The smaller value of Preferred Payload Size in PPC and DEV capability shall be encoded in this field.

The Preferred Total Aggregation Size field is defined in 6.4.11a. The smaller value of Preferred Total Aggregation Size in PPC and DEV capability shall be encoded in this field.

The SC Supported MCS field is defined in 6.4.11a. Each bit in this field shall be set to one if both of the bits in SC Supported MCS field in PPC capability IE and DEV capability IE are set to one and shall be set to zero otherwise.

The SC Channel Bonding field indicates the number of bonded channels that shall be used in the current session as defined in the Figure 6-88l and only one bit in the field is allowed to be set to one. All bits of the field shall be set to 0 if the channel bonding is not used.

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **b2** |
| SC 2 channel bonding is used | SC 3 channel bonding is used | SC 4 channel bonding is used |

Figure 6-88l SC Channel Bonding field format

The SC Channel Aggregation Pattern field indicates the combinations of CHNL\_IDs used for channel aggregation in the current session determined by HRCP PNC. The SC Channel Aggregation pattern field shall be formatted as illustrated in the Figure 6-88f and only one bit in the field is allowed to be set to one.

The OOK Channel Bonding field indicates the number of bonded channels that shall be used in the current session as defined in the Figure 6-88m and only one bit in the field is allowed to be set to one. All bits of the field shall be set to 0 if the channel bonding is not used.

|  |  |  |
| --- | --- | --- |
| **Bits: b0** | **b1** | **b2** |
| OOK 2 channel bonding is used | OOK 3 channel bonding is used | OOK4 channel bonding is used |

Figure 6-88m OOK Channel Bonding field format