**CID#27:**

Common channel hopping is not a consideration for DSME channel diversity scheme. There are several reasons for this.

What I suggest is that the commenter may propose the common channel hopping mechanism to DSME group. If DSME members agree to include the scheme, the commenter shall provide the draft material of this scheme in WORD format so as to be incorporated in the next draft without much effort to the editor.

**CID#108: (Change Aip to A)**

Accept the proposed change.

**CID#225:**

* In page 24 at line 20,

*Remove the parameter* ***ChannelSequenceRequest****.*

**CID#241:**

The sub-clause 7.2.4.2.1.9 shall be removed in the next draft.

**CID#297: (Change Aip to A)**

* In page 21 at line 16,

*Insert the parameter* ***HoppingSequenceID*** *for the primitive* ***MLME-ASSOCIATE.request****.*

* In page 22 at line 12,

*Insert the following parameter in Table 47:*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| HoppingsequenceID | Integer | 0x00-0x0f | Indicate the ID of channel hopping sequence in use:  0x00: a default hopping sequence  0x01: a hopping sequence generated by PAN coordinator  0x02-0x0f: a hopping sequence set by NHL  If a coordinator receives an association request command with HoppingSequenceID of 1, it replies channel hopping sequence in an association response command. |

**CID#298: (Change Aip to A)**

* In page 23 at line 10,

*Insert the parameter* ***HoppingSequenceID*** *for the primitive* ***MLME-ASSOCIATE.indication****.*

* In page 24 at line 1,

*Insert the following parameter in Table 48:*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| HoppingsequenceID | Integer | 0x00-0x0f | Indicate the ID of channel hopping sequence in use:  0x00: a default hopping sequence  0x01: a hopping sequence generated by PAN coordinator  0x02-0x0f: a hopping sequence set by NHL  If a coordinator receives an association request command with HoppingSequenceID of 1, it replies channel hopping sequence in an association response command. |

**CID#306: (Change Aip to A)**

On page 108,

*Change Figure 65g with the following one:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octets: | 1 | 1 | 1 | 1 |
| MHR fields | Command Frame Identifier  (See Table 82) | Capability  Information | HoppingSequenceID | ChannelOffset |

**CID#322: (Change Aip to A)**

In page 98, at line 27,

*Add the following sentence at the end of the line:*

“For DSME-enabled PAN, BSN shall be present.”

**CID#323: (Change Aip to A)**

In page 98, at line 22,

*Add the following sentence at the end of the line:*

“For DSME-enabled PAN, the length of Frame Control field is fixed to 2 octets.”

**CID#328: (Change Aip to A)**

In page 164, at line 5,

*Add the following sentence at the end of the line:*

“Tx device shall switch channel to Rx's channel to send a data frame. If Rx device receives the data frame successfully, Rx sends an ACK frame to the Tx device on the same channel.”

**CID#461:**

Refer to the proposed resolution for CID#328.

**CID#462: (Change Aip to A)**

DSME shall use the enhanced beacon frame type. DSME beacon frame structure is defined in Figure 54.r of 7.2.4.2.1.8.

**CID#610:**

The sub-clause 7.2.2.6.2.1 shall be removed in the next draft.

**CID#611: (Change Aip to R)**

This comment should be Rejected, since it is wrongly referring to RFID multipurpose frame, which is defined properly.

**CID#47:**

Refer to the proposed resolution for CID#225

**CID#50:**

The parameter name **DCHDescriptor** is changed to **HoppingDescriptor**.

Thus, the followings shall be changed.

* On page 33, at line 21,

*Change* ***DCHDescriptor*** *to* ***HoppingDescriptor****.*

* In Table 72 on page 34,

*Change the description of DCHDescriptor with the following one:*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| HoppingDescriptor | HoppingDescriptor Value | See Table 72a. | Specifies the channel hopping information for DSME-enabled PAN. |

* On page 35, at line 2,

*Change the caption of Table 72a with the following one:*

“Table 72a – Elements of HoppingDescriptor”

* On page 176 (7.5.10.14), at line 13,

*Change the sentence*

“.. shall update the values of DCHDescriptor with the values of the DCHDescriptor parameter.”

*with the following one:*

“.. shall update the values of HoppingDescriptor with the HoppingDescriptor parameter.”

**CID# 843:**

Refer to the proposed resolution for CID#225.

**CID# 329:**

* In Table 72a at line 2 on page 35,

*Replace the row for the element SequenceID with the following one:*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| HoppingSequenceID | Integer | 0x00-0x0f | Indicate the ID of channel hopping sequence in use:  0x00: a default hopping sequence  0x01: a hopping sequence generated by PAN coordinator  0x02-0x0f: a hopping sequence set by NHL  If a coordinator receives an association request command with HoppingSequenceID of 1, it replies channel hopping sequence in an association response command. |

**CID#296: (Change Aip to A)**

Jargon changes

1. **SequenceID** to **HoppingSequenceID**

* In Table 49 at line 6 on page 25,

*Change the Description for the parameter* ***ChannelHoppingSequenceLength*** *with the following one:*

“Specifies the length of HoppingSequence. This parameter shall be set to zero when the value of *macHoppingSequenceID* is other than ‘1’.”

* In Table 50 at line 1 on page 27,

*Change the Description for the parameter* ***ChannelHoppingSequenceLength*** *with the following one:*

“Specifies the length of HoppingSequence. This parameter shall be set to zero when the value of *macHoppingSequenceID* is other than ‘1’.”

* In Table 72a at line 2 on page 35,

*Change the Description for the parameter* ***ChannelHoppingSequence*** *with the following one:*

“Specifies the sequence of logical channel numbers, which is set by NHL. PAN coordinator may select the sequence to use when it establishes a PAN. In such case, the HoppingSequenceID shall be set to 1.”

* On page 109, at line 18,

*Replace the sentence*

“When the value of SequenceID is other than one, …”

*with the following one:*

“When *macHoppingSequenceID* is other than one, …”

2. **ChannelHoppingSequence** to **HoppingSequence** &

**ChannelHoppingSequenceLength** to **HoppingSequenceLength**

* In Table 47 at line 12 on page 22,

*Change the Description for the parameter* ***ChannelOffset*** *with the following one:*

“Specifies the offset value of HoppingSequence.”

* In Table 48 at line 1 on page 24,

*Change the Description for the parameter* ***ChannelOffset*** *with the following one:*

“Specifies the offset value of HoppingSequence.”

* At line 1 and line 2 on page 25,

*Change the name of the parameters*

***ChannelHoppingSequenceLength*** *and* ***ChannelHoppingSequence***

*to*

***HoppingSequenceLength*** *and* ***HoppingSequence****.*

* In Table 49 at line 6 on page 25,

*Change the Description for the parameter* ***ChannelOffset*** *with the following one:*

“Specifies the offset value of HoppingSequence.”

* In Table 49 at line 6 on page 25,

*Change the name of the parameters*

***ChannelHoppingSequenceLength*** *and* ***ChannelHoppingSequence***

*to*

***HoppingSequenceLength*** *and* ***HoppingSequence****.*

* In Table 49 at line 6 on page 25,

*Change the Description for the parameter* ***ChannelHoppingSequence*** *with the following one:*

“Specifies the sequence of logical channel numbers which is set by NHL. This parameter shall be present only if *macHoppingSequenceLength* is non-zero.”

* At line 15 and line 16 on page 26,

*Change the name of the parameters*

***ChannelHoppingSequenceLength*** *and* ***ChannelHoppingSequence***

*to*

***HoppingSequenceLength*** *and* ***HoppingSequence****.*

* In Table 50 at line 1 on page 27,

*Change the Description for the parameter* ***ChannelOffset*** *with the following one:*

“Specifies the offset value of HoppingSequence.”

* In Table 50 at line 1 on page 27,

*Change the name of the parameters*

***ChannelHoppingSequenceLength*** *and* ***ChannelHoppingSequence***

*to*

***HoppingSequenceLength*** *and* ***HoppingSequence****.*

* In Table 50 at line 1 on page 27,

*Change the Description for the parameter* ***ChannelHoppingSequence*** *with the following one:*

“Specifies the sequence of logical channel numbers which is set by NHL. This parameter shall be present only if *macHoppingSequenceLength* is non-zero.”

* In Table 72a at line 2 on page 35,

*Change the Valid Range of the element* ***ChannelHoppingSequence*** *with the following one:*

“0x0000-0x01ff for each channel”

* In Table 72a at line 2 on page 35,

*Change the name of the elements*

***ChannelHoppingSequenceLength*** *and* ***ChannelHoppingSequence***

*to*

***HoppingSequenceLength*** *and* ***HoppingSequence****.*

* In Table 72a at line 2 on page 35,

*Change the Description for the element* ***ChannelHoppingSequenceLength*** *with the following one:*

“Specifies the length of HoppingSequence. This element shall be set to zero when the value of *macHoppingSequenceID* is other than ‘1’.”

* In Table 72a at line 2 on page 35,

*Change the Description for the element* ***ChannelOffset*** *with the following one:*

“Specifies the offset value of HoppingSequence.”

* In Table 86h, at line 1 on page 130,

*Change the Description for the attributes* ***macHoppingSequence*** *with the following one:*

“Sequence of logical channel numbers, which is set by NHL.”

* In Table 86h, at line 1 on page 130,

*Change the Description for the attributes* ***macChannelOffset*** *with the following one:*

“Offset value of HoppingSequece in use”

* *Replace the Figure 54t on page 95 with the following one:*

|  |  |  |  |
| --- | --- | --- | --- |
| Octets:  2 | 1 | 2 | Variable |
| Short Address | Association  Status | Hopping Sequence Length | Hopping Sequence |

* *Replace the Figure 65h on page 109 with the following one:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Octets: | 1 | 2 | 1 | 1 | Variable |
| MHR fields | Command Frame Identifier  (See Table 82) | Short Address | Association Status | Hopping Sequence Length | Hopping Sequence |

* *Change the title of sub-clauses 7.3.11.3.5 and 7.3.11.3.6 with the followings:*

“7.3.11.3.5 Hopping Sequence Length field”

and

“7.3.11.3.6 Hopping Sequence field”.

* At line 16 on page 109,

*Change the whole paragraph of 7.3.11.3.5 with the following one:*

“The Channel Hopping Sequence Length field is 2 octets in length and shall specify the length of the channel hopping sequence used in the PAN if the PAN runs in both beacon-enabled mode and Channel Hopping mode, i.e., ChannelDiversityMode of 1. When the value of HoppingSequenceID is other than one, this field shall be set to zero. HoppingSequence field shall be present only if the value of Hopping Sequence Length field is not zero.”

* At line 22 on page 109,

*Change the whole paragraph of 7.3.11.3.6 with the following one:*

“The size of the Hopping Sequence subfield is defined by the Hopping Sequence Length subfield and the Hopping Sequence field specifies the channel hopping sequence used in the PAN, if the PAN runs in both beacon-enabled mode and Channel Hopping mode, i.e., ChannelDiversityMode of 1. This field shall be present only if the value of Hopping Sequence Length is not zero.”

**CID#464:**

* *Remove the Table 55 at line 25 on page 28*
* *In Table 55a on page 29,*

*1. Change the Valid Range of DSMESuperframeSpecification to the following one:*

“See 7.2.4.2.1.8.1”

*2. Change the Valid Range of ChannelHoppingSpecification to the following one:*

“See 7.2.4.2.1.8.2”

*3. Change the Valid Range of TimeSynchronizationSpecification to the following one:*

“See 7.2.4.2.1.8.3”

*4. Change the Valid Range of BeaconBitmap to the following one:*

“See 7.2.4.2.1.8.4”

* At line 15 on page 94,

*Remove the sentence “See 7.2.2.5 for details on subfields.”*

* *Insert the following sub-clauses after the sub-clause 7.2.4.2.1.8 on page 94:*

***(Note that all the cross reference numbered as ?? should be corrected at the final step.)***

7.2.4.2.1.8.1 DSME Superframe Specification field

The DSME Superframe Specification field shall be formatted as illustrated in Figure 54.ra

| bits:  0-3 | 4 | 5 | 6 | 7-22 | 23-30 | 31 | 32-34 | variable |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Multi-superframe Order (MO) | CAP Reduction Flag | Embedded CAP/CFP Flag | ChannelDiversityMode | CAP Index | Number of Subslots | GACK Flag | ECFP Start Slot Length | ECFP Start Slot |

Figure 54.ra—Format of the DSME Superframe Specification field

The Multi-superframe Order subfield is 4 bits in length and shall specify the length of time during which a group of superframes that is considered as one multi-superframe is active (i.e. receiver enabled), including the beacon frame transmission time. See 7.???? for an explanation of the relationship between the Multi-superframe Order and the multi-superframe duration.

The CAP Reduction Flag subfield is 1 bit in length and shall be set to one if the CAP reduction is enabled. Otherwise, the CAP Reduction Flag subfield shall be set to zero.

The Embedded CAP/CFP Flag subfield is 1 bit in length, and shall be set to zero if the Embedded CAP is used (see 7.???). The Embedded CAP/CFP Flag bit shall be set to zero if the Embedded CFP is used (see 7.??).

The Channel Diversity mode subfield is 1 bit in length and shall indicate the type of channel diversity. If this value is ‘0’, DSME runs on channel adaptation mode. If this value is ‘1’, DSME runs on channel hopping mode. If this subfield is ‘0’, the following Channel Hopping Specification field is not present.

The CAP Index subfield is 2 octets in length and shall specify the number of superframes before the next CAP begins. This subfield is valid only if the CAP Reduction Flag subfield is set to one.

The Number of Sub-slots subfield is 8 bits in length and shall specify the number of sub-slots which are divided within a slot. This subfield is valid only if the Embedded CAP/CFP Flag subfield is set to zero.

The GACK Flag subfield is 1 bit in length and shall indicate whether the transmitting device is using DSME multi-frame structure with group acknowledgement mechanism. If the GACK Flag subfield is set to ‘1’, the superframe of the transmitting device shall be using group acknowledge mechanism, and have a structure as shown in Figure 73.??. If the GACK Flag subfield is set to ‘0’, the transmitting FFD can not support group acknowledgement mechanism, the superframe structure is shown as Figure 73.??, and the following ECFP Start subfield is not present.

The ECFP Start Slot Length subfield, see Figure 54.ra, is 3 bits in length and shall specify the length of the ECFP Start subfield.

The ECFP Start subfield shall specify the timeslot number of GACK frame transmitting (see 7.????), as the end of the CFP and start of the ECFP in the superframe structure as shown in Figure 73.??. The length of the ECFP Start subfield is variable and specified by the ECFP Start Length subfield.

7.2.4.2.1.8.2 Channel Hopping Specification field

The Channel Hopping Specification field shall be formatted as illustrated in Figure 54.rb.

| octets: 1 | 1 | 1 | variable |
| --- | --- | --- | --- |
| HoppingSequenceID | Channel Offset | ChannelOffset Bitmap Length | ChannelOffset Bitmap |

Figure 54.rb— Format of the ChannelHoppingSpecification field

The HoppingSequenceID is 1 octet in length and indicate the ID of channel hopping sequence in use. HoppingSequenceID of 0 indicates that a default hopping sequence shall be used. HoppingSequenceID of 1 indicates that a hopping sequence generated by PAN coordinator shall be used. The other value of HoppingSequenceID denotes the sequence set by NHL shall be used. A device shall request a channel hopping sequence to its coordinator when it associates to a PAN, if HoppingSequenceID is 1.

The Channel Hopping Specification field shall be present, if Channel Diversity Mode subfield in the DSME Superframe Specification field is set to ‘1’.

The ChannelOffset subfield is 1 octet in length and shall specify the channel hopping offset value of the device.

The ChannelOffsetBitmapLength subfield is 1 octet in length and shall specify the length of ChannelOffsetBitmap subfield.

The ChannelOffsetBitmap subfield shall indicate the occupancy of channel hopping offset values among neighbor devices and be represented in bitmap. Each bit shall be set to '1', if the corresponding channel hopping offset value is already occupied by the neighbor devices, otherwise it shall be set to '0' if the corresponding channel hopping value is not occupied. For instance, ChannelOffsetBitmap of 1100100..0 indicates that channel hopping offset values of 0, 1, and 4 are being used by neighbor devices. Note that the (i)th bit in the ChannelOffsetBitmap corresponds to (i-1)th channel offset value. The length of ChannelOffsetBitmap subfield is variable, which is defined by the values specified in ChannelOffsetBitmapLength subfield

7.2.4.2.1.8.3 Time Synchronization Specification field

The Time Synchronization Specification field is 4 octets in length and shall be formatted as illustrated in Figure 54.rc.

| bits: 0 | 1-4 | 5-7 | 8-55 |
| --- | --- | --- | --- |
| Deferred Beacon Flag | Deferred Beacon Time | Reserved | Beacon Timestamp |

Figure 54.rc—Format of the Time Synchronization Specification field

The Deferred Beacon Flag subfield is 1 bit in length and shall be set to one if the device uses CCA before transmitting beacon frame, otherwise the bit shall be set to zero if the device shall not use CCA before transmitting beacon.

The Deferred Beacon Time subfield is 4 bits in length and shall specify the number of backoff period for CCA. If the Deferred Beacon Flag bit is set to zero, this subfield shall be ignored.

The Beacon Timestamp subfield is 6 octets in length and shall specify the time of beacon transmission in unit of 1us for time synchronization.

7.2.4.2.1.8.4 Beacon Bitmap field

The Beacon Bitmap field shall be formatted as illustrated in Figure 54.rd.

| octets: 2 | variable |
| --- | --- |
| SD Index | SD Bitmap |

Figure 54.rd—Format of the Beacon Bitmap field

The SD Index subfield is 2 octets in length and specifies the Superframe Duration (SD) bank number that is allocated to the Source device of the beacon.

The SD Bitmap subfield is 2(BO-SO) bits in length and shall indicate the beacon frame allocation information of neighbor nodes. This subfield is expressed in bitmap format which orderly represents the schedule of beacons, with corresponding bit shall be set to one if a beacon of neighbor nodes is allocated in that SD.

**CID#546, 547: (Proposed to change AiP to R)**

Reason for Reject:

7.5.1a explains how hopping sequence can be generated in terms of HoppingSequenceID. When HoppingSequenceID is 0, devices are advised to generate default hopping sequence denoted in 7.5.1a. Other than this value 0, optional mode shall use its own method to generate hopping sequence.

In DSME hopping mode, hopping sequences are set by NHL. Hopping sequence may be generated algorithmically. However, it is NHL’s responsibility to generate the sequence. MAC does not specify how to generate it except for the default hopping sequence.

As stated in Table 49 and 50, the parameter ***HoppingSequence*** shall be present only if HoppingSequenceID is 1. When HoppingSequenceID is 1, hopping sequence is generated by a PAN coordinator. This hopping sequence information shall be shared when a node device associates a PAN. A node device shall be informed the hopping sequence upon the receipt of ASSOCIATE response command. And MAC shall set the hopping sequence using MLME-ASSOCIATE.confirm primitive set by NHL.

If HoppingSequenceID is other than 1, hopping sequence is set by NHL when MLME issues MLME-START.request. (See Table 72a.)

**CID#596:**

See the proposed resolution for CID#464

**CID#458:**

See the proposed resolution for CID#314.

**CID#484:**

At 11 on page 163 (7.5.10.1.4)

*Replace the sentence with the following:*

“In channel hopping mode (i.e., ChannelDiversityMode is set to ‘1’), each DSME-GTS hops over predefined frequency channels to receive Data frames.”

**CID#314:**

See the proposed resolution for CID#464.

**CID#626:**

See the proposed resolution for CID#296.

**CID#640:**

In Table 86h on page 129,

* *Remove the Attribute macHoppingSequence.*

At line 7 on page 164,

* *Replace the equation and the following paragraph as follows:*

*“C*(*i*) = *macHoppingSequenceList*[(*i*+*macChannelOffset*+BSN) % *macHoppingSequenceLength*]

where *macHoppingSequenceList*[*j*] represents the (*j*)th channel number in *macHoppingSequenceList*, *macChannelOffset* is the channel offset value of the receiver device, *macHoppingSequenceLength* is the length of channel hopping sequence and BSN is a beacon sequence number.”

**CID#317:**

In Table 86h on page 129,

* *Replace the Description of macChannelDiversityMode with the following:*

“Indicates the type of channel diversity mode:

0x00 = Channel Adaptation

0x01 = Channel Hopping

This value is not valid for a non-beacon enabled PAN.”

* *Replace the Range of macDSMESAB with the following:*

“See Figure 65m and Figure 65n in sub-clause 7.3.11.4.5.”

* *Replace the Range of macSDBitmap with the following:*

“See Figure 54.rd”

* *Replace the Type of macChannelStatus with the following:*

“List of LinkStatus entries (see Figure 65t)”

* *Replace the Range of macChannelStatus with the following:*

“See Figure 65t”

**CID# 85:**

*Replace Figure M.2 with the following one:*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Channels | 11 |  |  |  |  | **PPDU** |
| 12 |  |  |  |  |  |
| 13 |  |  |  |  |  |
| 14 |  |  |  |  |  |
| 15 |  |  |  |  |  |
| 16 |  |  |  |  |  |
| 17 |  |  |  |  |  |
|  | Slot n-2 | Slot n-1 | Slot n | Slot n+1 | Slot n+2 |

(a)

|  |  |
| --- | --- |
|  | PPDU |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Channels | 11 |  |  |  |  |  |
| 12 |  |  |  |  |  |
| 13 |  |  |  |  |  |
| 14 |  |  |  |  |  |
| 15 |  |  |  |  |  |
| 16 |  |  |  |  |  |
| 17 |  |  |  |  |  |
|  | Sub Slot n-2 | Sub Slot n-1 | Sub Slot n | Sub Slot n+1 | Sub Slot n+2 |

(b)

Figure M.2 – Illustration of channel hopping in (a) MAC (b) PHY Layer