

## IEEE P802.15 Wireless Personal Area Networks

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| Project        | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)  |  |
| Title          | <b>STP changes</b>  |  |
| Date Submitted | [20 September, 2005]  |  |
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| Re:            | []  |  |
| Abstract       | [This document contains the changes to implement the STP proposal and other changes to the draft for SB1.]  |  |
| Purpose        | [To provide a record of the changes required to implement the STP proposal and other changes to the draft for SB1.]   |  |
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## 1. Stream timeout period

This section includes the changes necessary for stream timeout period. In addition, some of the changes required for Next PNC are included as well.

## 4. Acronyms

STP - stream timeout period

### 6.5.1 MAC PIB characteristics group

*Add the following entries to Table 34:*

**Table 1—MAC PIB implementation group parameters**

| Managed object              | Octets | Definition  | Access    |
|-----------------------------|--------|---|-----------|
| MACPIB_AlwaysAwake          | 1 bit  | As defined in 7.4.11  | Read only |
| MACPIB_ListenToSource       | 1 bit  | As defined in 7.4.11  | Read only |
| MACPIB_ListenToMulticast    | 1 bit  | As defined in 7.4.11  | Read only |
| MACPIB_CTARelinquishCapable | 1 bit  | Indicates if the DEV is capable of using time relinquished in a CTA by another DEV.<br>0 - DEV does not support.<br>1 - DEV does support. | Read only |
| MACPIB_DlyACK Capable       | 1 bit  | Indicates if the DEV is capable of using Dly-ACK as the source.<br>0 - DEV does not support.<br>1 - DEV does support.                     | Read only |
| MACPIB_ImpACKCapable        | 1 bit  | Indicates if the DEV is capable of using implied ACK (Imp-ACK) as the source.<br>0 - DEV does not support.<br>1 - DEV does support.       | Read only |
| MACPIB_STPCapable           | 1 bit  | Indicates if the DEV is capable of using the stream termination period (STP).<br>0 - DEV does not support<br>1 - DEV does support         | Read only |

## 7.4 Information elements

*Change Table 48 as shown:.*

**Table 48—Information elements**

| Element ID<br>hex value | Element                       | Subclause     | Present in<br>beacon |
|-------------------------|-------------------------------|---------------|----------------------|
| 0x0F                    | Piconet Services              | 7.4.16        | Non-beacon IE        |
| 0x10                    | <u>Group ID</u>               | <u>7.4.18</u> | <u>Non-beacon IE</u> |
| 0x11                    | <u>Stream Renew</u>           | <u>7.4.19</u> | <u>Non-beacon IE</u> |
| 0x12                    | <u>Next PNC</u>               | <u>7.4.20</u> | <u>As needed</u>     |
| 0x13                    | <u>Piconet channel status</u> | <u>7.4.21</u> | <u>Non-beacon IE</u> |
| 0x14-0x7F               | Reserved                      |               |                      |
| 0x80-0xFF               | Vendor Specific               | 7.4.17        | As needed            |

### 7.4.11 Capability

*Change Figure 42 as shown:*

| bits:<br>b23-b13 | b14 | b13               | b12         | b11         | b10                    | b9                  | b8              | b7-b5                         | b4-b0                   |
|------------------|-----|-------------------|-------------|-------------|------------------------|---------------------|-----------------|-------------------------------|-------------------------|
| Reserved         | STP | CTA<br>relinquish | Imp-<br>ACK | Dly-<br>ACK | Listen to<br>Multicast | Listen to<br>Source | Always<br>AWAKE | Preferred<br>fragment<br>size | Supported<br>data rates |

**Figure 42—DEV capabilities field format**

*Add the following paragraphs after the paragraph that begins “The Listen to Multicast bit shall be ...”*

The CTA Relinquish bit shall be set to one if the DEV is capable of participating in the CTA relinquish procedure as defined in 8.4.3.8. Otherwise the bit shall be set to zero.

The Dly-ACK bit shall be set to one if the DEV is capable of performing the Dly-ACK procedure as defined in 8.8.3. Otherwise the bit shall be set to zero.

The Imp-ACK bit shall be set to one indicate that the DEV is capable of performing the Imp-ACK procedure as defined in 8.8.4. Otherwise the bit shall be set to zero.

The STP bit shall be set to one to indicate that the DEV is capable of renewing its streams within the stream timeout period, as defined in 8.3.4. Otherwise the bit shall be set to zero.

### 7.4.19 Stream Renew

The Stream Renew IE is used by a DEV to renew the STP for streams for which it is the source. The Stream Renew IE shall be formatted as illustrated in Figure 48b.

|                |     |                |                |                    |            |
|----------------|-----|----------------|----------------|--------------------|------------|
| octets: 0-252  | ... | 1              | 1              | 1                  | 1          |
| Stream index n | ... | Stream Index 2 | Stream Index 1 | Length (=0 to 252) | Element ID |

**Figure 48b—Stream renew information element format**

The Stream Index fields contain the stream indices that the DEV wants to maintain.

## 7.5 MAC command types

### 7.5.4 Information request commands

#### 7.5.4.5 Probe request

*Change Table 51 as shown:*

**Table 51—Rules for requesting IEs in a Probe Request command**

| Information element           | Subclause     | PNC allowed to request?  | DEV allowed to request?                         |
|-------------------------------|---------------|--------------------------|---|
| CTA status                    | 7.4.10        | Shall not request        | <del>Shall not request</del> <u>May request</u> |
| <u>Group ID</u>               | <u>7.4.18</u> | <u>Shall not request</u> | <u>May request</u>                              |
| <u>Stream renew</u>           | <u>7.4.19</u> | <u>Shall not request</u> | <u>Shall not request</u>                        |
| <u>Next PNC IE</u>            | <u>7.4.20</u> | <u>Shall not request</u> | <u>Shall not request</u>                        |
| <u>Piconet channel status</u> | <u>7.4.21</u> | <u>May request</u>       | <u>May request</u>                              |

#### 7.5.4.6 Probe response

*Change Table 52 as shown:*

**Table 52—Rules for responding to requests in Probe commands**

| Information element           | Subclause     | DEV receives request from DEV | DEV receives request from PNC | PNC receives request from DEV          |
|-------------------------------|---------------|-------------------------------|-------------------------------|--|
| CTA status                    | 7.4.10        | Shall ignore                  | Shall ignore                  | <del>Shall ignore</del> <u>respond</u> |
| <u>Group ID</u>               | <u>7.4.18</u> | <u>Shall ignore</u>           | <u>Shall ignore</u>           | <u>Shall respond</u>                   |
| <u>Stream renew</u>           | <u>7.4.19</u> | <u>Shall ignore</u>           | <u>Shall ignore</u>           | <u>Shall ignore</u>                    |
| <u>Next PNC IE</u>            | <u>7.4.20</u> | <u>Shall ignore</u>           | <u>Shall ignore</u>           | <u>Shall ignore</u>                    |
| <u>Piconet channel status</u> | <u>7.4.21</u> | <u>May respond</u>            | <u>May respond</u>            | <u>May respond</u>                     |

## 7.5.5 Information announcement commands

### 7.5.5.2 Announce

*Change Table 53 as illustrated:*

**Table 53—Rules for sending IEs in an Announce command**

| Information element           | Subclause     | PNC allowed to send?  | DEV allowed to send?  |
|-------------------------------|---------------|-----------------------|-----------------------|
| <u>Group ID</u>               | <u>7.4.18</u> | <u>May send</u>       | <u>Shall not send</u> |
| <u>Stream renew</u>           | <u>7.4.19</u> | <u>May send</u>       | <u>Shall not send</u> |
| <u>Next PNC IE</u>            | <u>7.4.20</u> | <u>May send</u>       | <u>Shall not send</u> |
| <u>Piconet channel status</u> | <u>7.4.21</u> | <u>Shall not send</u> | <u>May send</u>       |

### 7.5.6.2 Channel time response

*Change the enumerated list in the seventh paragraph as shown:*

- 13→ PNC handover in progress
- 14→ STP expired
- ~~13-255~~~~14-254~~→ Reserved
- 255→ Other failure

### 8.3.4 Disassociation

*After the third paragraph, add the following paragraphs:*

If the DEV is STP capable, as indicated by the STP bit in its Capability IE, and is the originator of any allocated streams, it shall send an Announce command that includes the Stream Renew IE to reset the STP of all its streams. This command will also reset the ATP of the DEV.

If the DEV supports reporting the Piconet Channel Status, as defined in 8.2.3b, it should include the Piconet Channel Status IE in an Announce command sent to the PNC that is used to reset the ATP.

*After the sixth paragraph, add the following paragraph:*

If the DEV is disassociated, the PNC shall terminate all of the streams allocated to the disassociated DEV with its DEVID as either the SrcID or DestID. The PNC follows the process described in 8.5.1.3 except that it does not send any of the commands that would have had the disassociated DEV as the destination.

### 8.5.1.1 Isochronous stream creation

*After the fourteenth paragraph that begins “If the target DEV is in DSPPS mode ...” add the following paragraph:*

An STP capable DEV shall renew its allocated streams at least once every ATP by sending an Announce command with the Stream Renew IE to the PNC containing the stream index of every stream that the originator wants to keep.

### 8.5.1.2 Isochronous stream modification

*After the eighth paragraph that begin “If the Channel Time Request command ...” add the following paragraph:*

If the DEV is STP capable, a request to modify a stream will reset the STP of that stream.

### 8.5.1.3 Isochronous stream termination

*After the fourth paragraph that begins “In the case where the PNC ...” add the following paragraph:*

If the originator of a stream is STP capable, the PNC may terminate any stream that has not been renewed within the ATP of the originator of the stream. If the PNC terminates the stream, it shall use the stream termination procedure described in this subclause for the PNC terminating a stream with the Reason Code in the Channel Time Response command set to “STP expired.”

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