<table>
<thead>
<tr>
<th>Project</th>
<th>IEEE 802.16 Broadband Wireless Access Working Group <a href="http://ieee802.org/16">http://ieee802.org/16</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Clarification of MAC Extended Subheader</td>
</tr>
<tr>
<td>Date Submitted</td>
<td>2005-04-27</td>
</tr>
<tr>
<td>Source(s)</td>
<td>Yongseok Jin, Bin-Chul Ihm, and Jinyoung Chun</td>
</tr>
<tr>
<td>Voice:</td>
<td>82-31-450-7187</td>
</tr>
<tr>
<td>Fax:</td>
<td>82-31-450-7129</td>
</tr>
<tr>
<td>email:</td>
<td><a href="mailto:jayjay@lge.com">jayjay@lge.com</a></td>
</tr>
</tbody>
</table>

Re: This is a contribution to IEEE 802.16e.

Abstract C802.16e-05/163r3 and C802.16e-05/95r3 related to extended subheader were also accepted. However, the content of these contributions wasn’t reflected.

Purpose This contribution proposes to clarify new extended subheaders which were not incorporated into D7 and rearrange section number.

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Clarification of MAC Extended Subheader

Yongseok Jin, Bin-Chul Ihm, and Jin young Chun
LG Electronics Inc.

Introduction
C802.16e-05/163r3 and C802.16e-05/95r3 related to extended subheader were also accepted. However, the content of these contributions wasn’t reflected.

Proposal
This contribution proposes to clarify new extended subheaders which were not incorporated into D7 and rearrange section number.

References
a) IEEE Std 802.16-2004
b) IEEE P802.16e-D7
c) Comment resolution 80216-05_012r3
d) C80216e-05/163r3
e) C80216e-05/95r3
f) C80216e-05/197r2

Suggested Changes
Notes to editor: In this section, the text in black is the original text in p802.16e/D7. Instruction to editor is in ‘GREEN’. Proposed text change is in ‘BLUE’ and ‘RED’.

6.3.2.2.7 Extended Subheader Format
The Extended Subheader format is specified in Figure 20f. The Extended Subheader Field, when used, shall always appear immediately after the GMH and before all other subheaders, as described in 6.3.2.2. The ESF and all extended subheaders related to it shall not be encrypted, but shall be protected by the payload CRC field. The ESF and all extended subheaders associated to it are transmitted sequentially.

<table>
<thead>
<tr>
<th>Extended sub-header group length in bytes (8 bits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rsv=0 (1)</td>
</tr>
</tbody>
</table>

Extended sub-header body

Figure 21 - Extended Subheader Format

The fields of the Extended Subheader structure are described in Table 13a
Table 13a - Extended subheader format (ESF)

<table>
<thead>
<tr>
<th>Name</th>
<th>Length (bits)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended subheader group length</td>
<td>8</td>
<td>The Extended Subheader Group Length field indicates the length of the subheader group, including all the subheader, and including this length byte</td>
</tr>
<tr>
<td>Reserved</td>
<td>1</td>
<td>Reserved =0</td>
</tr>
<tr>
<td>Extended Subheader type</td>
<td>7</td>
<td>Type of subheader as defined in table 13b</td>
</tr>
<tr>
<td>Extended subheader body</td>
<td>Variable</td>
<td>As defined in table 13b</td>
</tr>
</tbody>
</table>

1. Modify the Table 13b based on 80216-05_012r3

Table 13b - Description of extended subheaders

<table>
<thead>
<tr>
<th>ESF Type value</th>
<th>Name</th>
<th>Length (bytes)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SDU_SN Extended subheader</td>
<td>1</td>
<td>See 6.3.2.2.7.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6.3.2.2.7.7.1</td>
</tr>
<tr>
<td>1</td>
<td>Generic downlink sleep header</td>
<td>3</td>
<td>See 6.3.2.2.7.2</td>
</tr>
<tr>
<td></td>
<td>DL Sleep control Extended subheader</td>
<td></td>
<td>6.3.2.2.7.8</td>
</tr>
<tr>
<td>2</td>
<td>Feedback request Extended subheader</td>
<td>3</td>
<td>See 6.3.2.2.7.3</td>
</tr>
<tr>
<td>3</td>
<td>MIMO mode feedback</td>
<td>1</td>
<td>See 6.3.2.2.7.1</td>
</tr>
<tr>
<td></td>
<td>Extended subheader</td>
<td></td>
<td>6.3.2.2.7.4</td>
</tr>
<tr>
<td>4</td>
<td>UL TX power report Extended subheader</td>
<td>1</td>
<td>See 6.3.2.2.7.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6.3.2.2.7.5</td>
</tr>
<tr>
<td>5</td>
<td>Mini-Feedback Extended subheader</td>
<td>2</td>
<td>See 6.3.2.2.7.6</td>
</tr>
<tr>
<td>Bits #6-127</td>
<td>Reserved</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Change section 6.3.2.2.7.3 to section 6.3.2.2.7.1 and include comment #3098 resolution

6.3.2.2.8 6.3.2.2.7.1 SDU SN Extended Subheader

The SDU SN Extended subheader shall only be sent by the BS if SN Feedback capability is supported and if SDU_SNSN Feedback is enabled for a DL connection. The SDU SN Extended subheader shall contain the last virtual MAC SDU sequence number of current MAC PDU. The format of the Feedback request extended subheader is as described in Table 13g. The format of the SDU SN Extended subheader is as described in Table 13h.

Table 13h – SDU SN Extended Subheader format

3. Change section 6.3.2.2.10 to section 6.3.2.2.7.2

6.3.2.2.10 6.3.2.2.7.2 DL Sleep control Extended subheader

The following message DL Sleep control Extended subheader is sent by the BS to activate/ deactivate certain Power Saving Class. The requested operation is effective from the next frame after the one where the message was transmitted. The format of DL Sleep control Extended subheader is as described in Table 13d.
4. Change section 6.3.2.2.11 to section 6.3.2.2.7.3

6.3.2.2.11 Feedback request Extended subheader

The Feedback request Extended subheader shall be only sent by BS to allocate dedicated UL resource for obtaining the feedback value from an MSS. The format of Feedback request Extended subheader is as described in Table 13g.

<table>
<thead>
<tr>
<th>Table 13g – Feedback request Extended subheader format</th>
</tr>
</thead>
</table>

5. Include comment #3092 (C80216e-05/163r3) resolution

[Insert new section 6.3.2.2.7.4]

6.3.2.2.7.4 MIMO mode Feedback Extended subheader

An MS uses the MIMO Feedback Extended Subheader to provide its feedback in terms of MIMO mode feedback. When there is an UL MAC PDU payload to be transmitted at the same time. The format of the MIMO mode Feedback Extended subheader is as described in Table 13f.

<table>
<thead>
<tr>
<th>Table 13f – MIMO mode Feedback Extended subheader format</th>
</tr>
</thead>
</table>

6. Include comment #3053 (C80216e-05/95r3) resolution

6.3.2.2.7.5 UL Tx Power Report Extended Subheader

This subheader is sent from MS to BS to report the Tx power of the burst that carries this subheader. The format of the UL Tx power report Extended subheader is as described in Table 13g.
Table 13g—UL Tx power report Extended subheader format

<table>
<thead>
<tr>
<th>Name</th>
<th>Size (bits)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL Tx power</td>
<td>7</td>
<td>Tx power level for the burst carries this header (11.1.1). The maximum value shall be reported for the burst</td>
</tr>
<tr>
<td>Reserved</td>
<td>1</td>
<td>Set to 0</td>
</tr>
</tbody>
</table>

7. Include comment #3066 resolution

6.3.2.2.7.6 Mini-Feedback Extended Subheader

The format of the mini-feedback Extended subheader is shown in table 13h

Table 13h - Description of Mini-Feedback Extended Subheaders (UL)

<table>
<thead>
<tr>
<th>Name</th>
<th>Size (bits)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback type</td>
<td>4</td>
<td>Type of feedback: see table 7i</td>
</tr>
<tr>
<td>Feedback content</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

[Remove section 6.3.2.1.6.2]

6.3.2.1.6.2 Mini Feedback header

8. Insert capability related to extended subheader based on C802.16e-05/197r2

11.8.6 Extension capability

Specifies extension capability supports

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Value</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>1</td>
<td>Bit #0: Support Extended subheader format</td>
<td>SBC-REQ/RSP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit #1-7: Reserved</td>
<td></td>
</tr>
</tbody>
</table>

[Change 11.8.2 Capabilities for construction and transmission of MAC PDUs]

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Value</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>Bit #0: Ability to receive requests piggybacked with data</td>
<td>REG-REQ, REG-RSP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit #1: Specifies the size of FSN values used when forming MAC PDUs on non-ARQ connections</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0: Only 3-bit FSN values are supported</td>
<td>SBC-REQ, SBC-RSP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: Only 11-bit FSN values are supported</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bits #2-7: Reserved; shall be set to zero</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit #2: Specifies support for MSF extended subheader (see 6.3.2.2.7.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit #3: Specifies support for Generic Sleep Extended subheader (see 6.3.2.2.7.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit #4: Specifies support for Feedback Request</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extended subheader (see 6.3.2.2.7.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bits #5-#7: Reserved; shall be set to zero</td>
<td></td>
</tr>
</tbody>
</table>
[Modify 11.7.17 MS Feedback support because the Mode selection Feedback subheader and header already removed]

The ‘MS Feedback support’ field indicates the support of Mode Selection Feedback Feedback Header

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Value</th>
<th>Scope</th>
</tr>
</thead>
</table>
| 20   | 1      | Bit #0: Mode Selection Feedback Extended Subheader supported, Feedback Header supported  
Bit #1: Mode Selection Feedback Header  
Bits #2-1-7: Reserved: shall be set to zero | REG-REQ  
REG-RSP  |