<table>
<thead>
<tr>
<th><strong>Project</strong></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><strong>Title</strong></td>
<td>Corrections for Reduced Compressed Private Maps</td>
</tr>
<tr>
<td><strong>Date Submitted</strong></td>
<td>2005-4-27</td>
</tr>
<tr>
<td><strong>Source(s)</strong></td>
<td>Dave Pechner, Doug Dahlby, Asaf Matatyaou, Arvind Raghavan</td>
</tr>
<tr>
<td><strong>ArrayComm Inc.</strong></td>
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</tr>
</tbody>
</table>

**Re:** IEEE P802.16e/D7 and C802.16e-05/071r3 plus C802.16e-05/096r2

**Abstract**
This contribution makes corrections for Reduced Private Maps

**Purpose**
Adopt into P802.16e/D7

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Corrections for Reduced Private Maps

Dave Pechner, Doug Dahlby, Asaf Matatyaou, Arvind Raghavan

1 Problem Statement

1) Descriptive text following reduced private map was out-dated and incorrect
2) Definition of zone offset was not clear.
3) There is currently no mechanism to receive a DL H-ARQ ACK indication.

2 Proposed Solution

1) Include all required descriptive text as notes in Tables 308a and 308b and remove descriptive text (editorial)
2) Modify the definition of Zone offset to be more consistent with the rest of the specification. Add an optional private map allocation start time field.
3) Add a DL HARQ ACK bitmap

3 Proposed Text Changes

[Editors Note: The following changes are relative to contribution C802.16e/D7 with changes from two contributions that have not been correctly incorporated:

- C802.16e-05/071r3 which was accepted at session 35 (comment 2241) and re-accepted at session 36 (comment 3416).
- C802.16e-05/096r2 which was accepted at session 36 (comment 3417)

The text in black incorporates all changes accepted prior to Session 37].

[Modify the text in section 8.4.5.8 as follows:]

8.4.5.8 Optional reduced AAS private maps

Reduced AAS private maps are based upon the compressed map format, however they are specifically designed to support a single unicast IE per map. Their use is identical to compressed private maps, however, fields have been removed that are not required to support a single IE. The reduced AAS private map will be pointed to by a broadcast map or private compressed map which will define the values of several fields that will be constant for the duration of the private map chain. The behavior of the compressed map fields that are not present in the reduced AAS private map are described below:

1) Frame Duration – Acquired by the map that initiated the private map chain. Assumed constant for the duration of the private map chain.
2) Frame Number – Acquired by the map that initiated the private map chain. Counted by the SS for the duration of the private map chain.
3) DCD Count – Optionally included. Only required if DCD count changes
4) Operator ID – Acquired by the map that initiated the private map chain. Assumed constant for the duration of the private map chain.
5) Sector ID – Acquired by the map that initiated the private map chain. Assumed constant for the duration of the private map chain.

6) CID – Only required in first map of private map chain.

7) UCD Count – Optionally included. Only required May be sent in the first UL map of private map chain. If not included, the last received UCD Count shall be used.

8) Allocation Start Time – Optionally defined by Private Map Allocation Start Time which may be sent in the first UL map of private map chain. If not included, the UL subframe start time is assumed to be static and defined by the last received Allocation Start Time in an UL map. UL start time relative to TTG plus an integer number of symbol times.

[Modify table 308a as follows:]

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced AAS Private DL-MAP()</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressed map indicator</td>
<td>3 bits</td>
<td>Set to binary 110 for compressed format</td>
</tr>
<tr>
<td>UL-MAP appended</td>
<td>1 bit</td>
<td>1 = reduced UL Private map is appended</td>
</tr>
<tr>
<td>Compressed Map Type</td>
<td>2 bits</td>
<td>Shall be set to 0b11 for reduced private map</td>
</tr>
<tr>
<td>Multiple IE</td>
<td>1 bit</td>
<td>1 = Multiple IE Mode</td>
</tr>
<tr>
<td>Reserved</td>
<td>1 bit</td>
<td>Shall be set to zero</td>
</tr>
<tr>
<td>If (Multiple IE) {}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUM IE</td>
<td>8 bits</td>
<td>NUM IE set to 1 if not in multiple IE mode</td>
</tr>
<tr>
<td>For (ii = 1:NUM IE) {}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodicity</td>
<td>2 bits</td>
<td>00 = single command, not periodic, or terminate periodicity. Otherwise, repeat DL and UL allocations once per r frames, where r = 2^(n-1), where n is the decimal equivalent of the periodicity field.</td>
</tr>
<tr>
<td>CID Included</td>
<td>1 bit</td>
<td>1 = CID included. The CID shall be included in the first compressed private MAP if it was pointed to by a DL-MAP IE with INC_CID == 0 or by a DL-MAP IE with a multicast CID.</td>
</tr>
<tr>
<td>DCD Count Included</td>
<td>1 bit</td>
<td>1 = DCD Count included. The DCD count is expected to be the same as in the broadcast map that initiated the private map chain. The DCD count can be included in the private map if it changes.</td>
</tr>
<tr>
<td>PHY modification Included</td>
<td>1 bit</td>
<td>1 = included.</td>
</tr>
<tr>
<td>Encoding Mode</td>
<td>2 bits</td>
<td>Encoding for DL traffic burst. 00: No H-ARQ 01: Chase Combing H-ARQ 10: Incremental Redundancy H-ARQ 11: Conv. Code Incremental Redundancy</td>
</tr>
<tr>
<td>CQICH Control Indicator</td>
<td>1 bit</td>
<td>1 = CQICH control information included.</td>
</tr>
<tr>
<td>Separate MCS Enabled</td>
<td>1 bit</td>
<td>Separate coding applied for reduced AAS_Private_MAP and DL data burst</td>
</tr>
<tr>
<td>If (Separate MCS Enabled) {}</td>
<td></td>
<td>Specifies coding for the next private map in the allocation specified by this private map</td>
</tr>
<tr>
<td>Duration</td>
<td>10 bits</td>
<td>Slot duration for reduced AAS Private Map</td>
</tr>
<tr>
<td>DIUC</td>
<td>4 bits</td>
<td>Modulation &amp; Coding Level</td>
</tr>
</tbody>
</table>
| Repetition Coding Indication| 2 bits| 00: No repetition 01: Repetition of 2
If (CID Included) {
   CID 16 bits Must be a unicast CID
}

If (CQICH Control Indicator == 1) {
   Allocation Index 6 bits CQICH Sub-channel index within Fast-feedback region marked with UIUC = 0
   Report Period 3 bits Reporting period indicator (in frames)
   Frame offset 3 bits Start frame offset for initial reporting
   Report Duration 4 bits Reporting duration indicator
   CQI Measurement Type 2 bits 0b00 – CINR measurement based upon DL allocation
                                 0b01 – CINR measurement based upon DL frame preamble
                                 0b10 – reserved
                                 0b11 – reserved
   Reserved 2 bits
}

If (DCD Count Included) {
   DCD Count 8 bits Matches the value of the configuration change count of the DCD, which describes the downlink burst profiles that apply to this map.
}

If (PHY modification Included) {
   Preamble Select 1 bit 0 = Frequency shifted preamble
                                 1 = Time shifted preamble
   Preamble Shift Index 4 bits Updated preamble shift index to be used starting with the frame specified by the Frame Offset.
   Pilot Pattern Modifier 1 bit 0: Not applied, 1: Applied
   Pilot Pattern Index 2 bits 00 – Pilot Pattern #A
                                 01 – Pilot Pattern #B
                                 10 – Pilot Pattern #C
                                 11 – Pilot Pattern #D
}

DL Frame Offset 3 bits Defines the frame in which the burst is located. A value of zero indicates an allocation in the subsequent frame.

If (current zone permutation is FUSC or O-FUSC) {
   Zone symbol offset 8 bits The offset of the OFDMA symbol in which the zone containing the burst starts, measured in OFDMA symbols from beginning of the downlink frame referred to by the Frame Offset.
}

OFDMA Symbol Offset 8 bits Starting symbol offset referenced to DL preamble of the downlink frame specified by the Frame Offset.

If (current zone permutation is AMC, TUSC1 or TUSC2) {
   Subchannel offset 8 bits AMC (2 x 3 type), TUSC1 and TUSC2 all have triple symbol slot lengths
   No. OFDMA triple symbol 5 bits Number of OFDMA symbols is given in multiples of 3 symbols
}
<table>
<thead>
<tr>
<th>Syntax</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced AAS Private UL-MAP() {</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AAS zone configuration Included</td>
<td>1 bit</td>
<td>1 = AAS zone configuration included. AAS configuration should be included in the first UL map of a private map chain to</td>
</tr>
</tbody>
</table>

**Table 308b—Reduced AAS private UL-MAP message format**
<table>
<thead>
<tr>
<th>Field</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AAS zone position Included</strong></td>
<td>1 bit</td>
<td>1 = AAS zone position included. AAS zone position should be included in the first UL map of a private map chain to define the UL AAS Zone and any time the UL AAS zone is changed.</td>
</tr>
<tr>
<td><strong>UL MAP Information UCD Count Included</strong></td>
<td>1 bit</td>
<td>1 = UL Map Information is included (UCD Count and Private Map Allocation Start Time). These fields should be included in the first allocation of a private map chain.</td>
</tr>
<tr>
<td><strong>PHY modification Included</strong></td>
<td>1 bit</td>
<td>1 = Preamble shift index included.</td>
</tr>
<tr>
<td><strong>Power Control Included</strong></td>
<td>1 bit</td>
<td>1 = Power control value included</td>
</tr>
<tr>
<td><strong>Include Feedback Header</strong></td>
<td>2 bits</td>
<td>0b00 = No feedback 0b01 = MSS shall transmit a CINR feedback header (type 0b1011) based upon the DL allocation 0b10 = MSS shall transmit a CINR feedback header (type 0b1011) based upon the DL frame preamble 0b11 = Reserved</td>
</tr>
<tr>
<td><strong>Encoding Mode</strong></td>
<td>2 bits</td>
<td>00: No H-ARQ 01: Chase Combing H-ARQ 10: Incremental Redundancy H-ARQ 11: Conv. Code Incremental Redundancy</td>
</tr>
<tr>
<td>if (AAS Zone Config Included) {</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permutation</strong></td>
<td>2 bits</td>
<td>0b00 = PUSC permutation 0b01 = Optional PUSC permutation 0b10 = AMC permutation 0b11 = Reserved</td>
</tr>
<tr>
<td><strong>UL PermBase</strong></td>
<td>7 bits</td>
<td>0b00 - 0 symbols 0b01 - 1 symbols 0b10 - 2 symbols 0b11 - 3 symbols</td>
</tr>
<tr>
<td><strong>Preamble Indication</strong></td>
<td>2 bits</td>
<td>0b00 - 0 symbols 0b01 - 1 symbols 0b10 - 2 symbols 0b11 - 3 symbols</td>
</tr>
<tr>
<td><strong>Padding</strong></td>
<td>5 bits</td>
<td></td>
</tr>
<tr>
<td>} if (AAS Zone Position Included) {</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Zone Symbol Offset</strong></td>
<td>8 bits</td>
<td>The symbol offset of the UL AAS Zone referenced to the start of the UL subframe in the frame specified by the UL frame offset. This is referenced to the DL preamble of the frame pointed to by the UL frame offset, and consists of an integer symbol offset specified here, as well as the addition of the TTG known from DCD messages. If TTG is not present in the DCD (for FDD) it is assumed to be zero. This is referenced to the “Allocation Start Time” field in the UL-MAP.</td>
</tr>
<tr>
<td><strong>Zone Length</strong></td>
<td>8 bits</td>
<td>The duration of the UL AAS Zone, specified in number of OFDMA symbols.</td>
</tr>
</tbody>
</table>
if (UCD Count UL MAP Information Included) {
  UCD Count 8 bits  Matches the value of the configuration change count of the UCD, which describes the uplink burst profiles that apply to this map.

  Private Map Allocation Start Time 32 bits  Defines the start of the UL subframe relative to the start of the frame pointed to by the UL frame offset. This is defined in units of PS, and restricted to be less than TF.
}

if (PHY modification Included) {
  Preamble Select 1 bit  0 = Frequency shifted preamble  
                        1 = Time shifted preamble

  Preamble Shift Index 4 bits  Updated preamble index to be used starting the with the frame specified by the Frame Offset

  Pilot Pattern Modifier 1 bit  0: Not applied, 1: Applied

  Pilot Pattern Index 2 bits  00 – Pilot Pattern #A  
                               01 – Pilot Pattern #B  
                               10 – Pilot Pattern #C  
                               11 – Pilot Pattern #D
}

if (Power Control Included) {
  Power Control 8 bits  Signed integer in 0.25 dB units
}

UL Frame Offset 3 bits  Defines the frame in which the burst is located. A value of zero indicates an allocation in the subsequent frame.

Slot Offset 12 bits  The offset to the starting location of the uplink burst from the beginning of the UL AAS zone in slots.

Duration 10 bits  The duration of the UL burst, specified in slots

UIUC/N

EP 4 bits  UIUC for Encoding Mode 00, 01, 11  
            N
            EP for Encoding Mode 10

If (H-ARQ Enabled) {
  Encoding Mode 01, 10, 11

  ACID 4 bits  H-ARQ channel ID

  AI_SN 1 bit  H-ARQ Seq. Number Indicator

  Reserved 3 bits

  N
  SCH 4 bits  Applied for Encoding Mode 10

  SPID 2 bits  Applied for Encoding Mode 10 and 11

  Reserved 2 bits
}

Repetition Coding Indication 2

Applied for Encoding Mode 00 and 01
0b00: No repetition
0b01: Repetition of 2
0b10: Repetition of 4
0b11: Repetition of 6

[Remove all descriptive text following table 308b]