

|                |  |
|----------------|--|
| Project        | <b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >   |
| Title          | <b>Proposed Change for the DL and UL Persistent Allocation A-MAP IEs in the IEEE 802.16m AWD</b>   |
| Date Submitted | <b>2009-07-06</b>  |
| Source(s)      | Seho Kim, Jason Junsung Lim, Heewon Kang, Hokyung Choi    seho42.kim@samsung.com<br><i>Samsung Electronics Co., Ltd.</i>   |
| Re:            | Category: AWD comments / Area: Chapter 15.3.6 (DL-CTRL)<br>“Comments on AWD 15.3.6 DL-CTRL”  |
| Abstract       | The contribution proposes updates to the text related to persistent allocation in the 802.16m AWD  |
| Purpose        | To be discussed and adopted by TGm for the 802.16m amendment.  |
| Notice         | <i>This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups. It represents only the views of the participants listed in the “Source(s)” field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.</i>   |
| Release        | The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE’s name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE’s sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.   |
| Patent Policy  | The contributor is familiar with the IEEE-SA Patent Policy and Procedures:<br>< <a href="http://standards.ieee.org/guides/bylaws/sect6-7.html#6">http://standards.ieee.org/guides/bylaws/sect6-7.html#6</a> > and<br>< <a href="http://standards.ieee.org/guides/opman/sect6.html#6.3">http://standards.ieee.org/guides/opman/sect6.html#6.3</a> >.<br>Further information is located at < <a href="http://standards.ieee.org/board/pat/pat-material.html">http://standards.ieee.org/board/pat/pat-material.html</a> > and<br>< <a href="http://standards.ieee.org/board/pat">http://standards.ieee.org/board/pat</a> >. |

# Proposed Change for the DL and UL Persistent Allocation A-MAP IEs in the IEEE 802.16m AWD

*Seho Kim, Jason Junsung Lim, Heewon Kang, Hokyu Choi,  
Samsung Electronics Co., Ltd.*

## Introduction

This contribution proposes changes to the DL and UL Persistent Allocation A-MAP IEs currently defined in the 802.16m AWD [1] to include more efficient signaling for persistent operation.

This contribution proposes that N\_ACID (number of ACID) is calculated with Allocation Period and maximum HARQ retransmission delay that is specified as delay bound for DL and N\_MAX\_ReTx for UL. To avoid collision of ACID of VoIP, ACID of VoIP bursts should be distinguished with other VoIP bursts transmitted until maximum HARQ retransmission delay of initially transmitted VoIP burst. The number of VoIP bursts transmitted until maximum HARQ retransmission delay is determined according to Allocation Period of PA, and the number of VoIP bursts transmitted until maximum HARQ retransmission delay of initially transmitted VoIP burst becomes N\_ACID. Using this mechanism, N\_ACID can be determined with Allocation Period and maximum HARQ retransmission delay. N\_ACID field is eliminated and Allocation Period and N\_ACID field is included in DL/UL Individual Persistent A-MAP IE and DL/UL Composite Persistent A-MAP IE.

This contribution also proposes elimination of Resource Allocation field in case of deallocation. Persistently allocated resource can be only one in a subframe so that Resource Allocation field is redundant in case of deallocation. For subframe ratio is DL:UL=3:5, Allocation Relevance field is included for deallocation in UL.

This contribution proposes following changes in the DL and UL Persistent Allocation A-MAP IEs.

- Size of A-MAP IE Type is changed from 4 to 3 bits.
- Signaling associated with A-MAP region occurrence every 2 frames is deleted
- In DL MIMO, Modulation constellation of the paired user field is included.
- In UL MIMO, CSM field is eliminated since the fields containing the number of streams in the transmission (Mt) and the total number of streams in the LRU (TNS) can be used to determine if CSM is used or not .

The proposed IEs are consistent with the MAC procedure described in the latest revision of [2].

The current AWD text in sections 15.3.6.5.2.6 and 15.3.6.5.2.7 have been replaced by the proposed text as shown below. Proposed text has been underlined in blue, AWD text that has been deleted has been marked in red and struck through.

## References

- [1] P802.16m Amendment Working document, 802.16m-09/0010r2, May 2009.
- [2] C802.16m-09/1136, "Proposed Text for the MAC Procedure for DL and UL Persistent Allocation in the IEEE 802.16m Amendment", May 2009.

## Amendment text proposal for inclusion in 802.16m-09/0010r2

----- Start Text Proposal -----

### 15.3.6.5.2.6 DL PA A-MAP IE

The DL persistent A-MAP IE is specified in Table 675.

**Table 675: DL Persistent A-MAP IE**

| Syntax                                       | Size in bits | Description/Notes  |
|--|--------------|--|
| DL Persistent A-MAP_IE() {                   | -            | -  |
| A-MAP IE Type                                | 43           | DL Persistent A-MAP IE   |
| if MCRC is masked with Station ID {          |              |  |
| DL Individual Persistent A-MAP_IE()          |              | Refer to Table 665   |
| } else if MCRC is masked with Composite ID { |              |  |
| DL Composite Persistent A-MAP_IE()           |              | Refer to Table 666   |
| }  |              |  |
| MCRC   | [16]         | 16 bit CRC masked by Station ID for individual PA and masked with composite ID (well-known ID specified in the system, TBD) for multi-user PA. |
| }  |              |  |

#### 15.3.6.5.2.6.1 DL Individual PA A-MAP IE

The DL individual persistent A-MAP IE is specified in Table 676.

**Table 676: DL Individual Persistent A-MAP IE**

| Syntax                                       | Size in bits | Description/Notes   |
|--|--------------|---|
| DL Persistent A-MAP_IE() {                   | -            | -   |
| Allocation Period <a href="#">and N_ACID</a> | 2            | Period of persistent allocation<br>If (Allocation Period <a href="#">and N_ACID</a> ==0b00), it indicates the deallocation of a persistently allocated resource.<br><br><del>0b00: deallocation</del><br><del>0b01: 2 frames</del><br><del>0b10: 4 frames</del><br><del>0b11: 6 frames</del><br><a href="#">0b00: deallocation</a><br><a href="#">0b01: Allocation Period=2 frames,</a> |

|  |                     |  |
|--|---------------------|--|
|  |                     | <p><u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/2\} + 1</math></u><br/> <u>0b10: Allocation Period=4 frames,</u><br/> <u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/4\} + 1</math></u><br/> <u>0b11: Allocation Period=6 frames,</u><br/> <u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/6\} + 1</math></u></p> <p><u><math>N\_ACID</math> is number of ACIDs for implicit cycling of HARQ channel identifier. <math>N\_ACID</math> is calculated with Maximum HARQ retransmission delay and Allocation period as <u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/(\text{Allocation\_Period})\} + 1</math></u> where Max_Retx_Dealy and Allocation Period is unit of frame.</u><br/> <u>In case of VoIP in DL, maximum HARQ retransmission dealy is the delay bound of VoIP.</u></p> |
| If (Allocation Period <u>and</u> <u><math>N\_ACID == 0b00</math></u> ){        |                     |  |
| <del>Resource Allocation</del>   | <del>Variable</del> | <p><del>Variable number of bits depends on system bandwidth. Information may include:</del></p> <ul style="list-style-type: none"> <li><del>• Type of resource unit (DRU/CRU)</del></li> <li><del>• Location (start/end)</del></li> <li><del>• Allocation size</del></li> </ul>  |
| HFA  | [4]                 | TBD<br>HARQ Feedback Allocation  |
| } else if (Allocation Period <u>and</u> <u><math>N\_ACID != 0b00</math></u> ){ |                     |  |
| MCS  | 4                   | Depends on supported modes, 16 modes assumed as baseline   |
| MEF  | 2                   | MIMO encoder format<br>0b00: SFBC<br>0b01: Vertical encoding<br>0b10: Horizontal encoding<br>0b11: n/a   |
| if (MEF == 0b01){  |                     | Parameters for vertical encoding   |
| if(Nt == 2){   |                     |  |
| Mt   | 1                   | Number of streams in transmission for $N_t = 2$<br>( $M_t \leq N_t$ )<br>0b0: 1 stream<br>0b1: 2 streams   |
| }else if(Nt == 4){   |                     |  |
| Mt   | 2                   | Number of streams in transmission for $N_t = 4$<br>( $M_t \leq N_t$ )<br>0b00: 1 stream<br>0b01: 2 streams<br>0b10: 3 streams<br>0b11: 4 streams   |

|                         |          |   |
|-------------------------|----------|---|
| }else if(Nt == 8){      |          |   |
| Mt                      | 3        | Number of streams in transmission for Nt = 8<br>( $M_t \leq N_t$ )<br><br>0b000: 1 stream<br>0b001: 2 streams<br>0b010: 3 streams<br>0b011: 4 streams<br>0b100: 5 streams<br>0b101: 6 streams<br>0b110: 7 streams<br>0b111: 8 streams |
| }                       |          |   |
| } else if(MEF == 0b10){ |          |   |
| if(Nt == 2){            |          |   |
| PSI                     | 1        | Allocated pilot stream index for Nt = 2<br><br>0b0: #1 stream<br>0b1: #2 stream   |
| Mt                      | 1        | Number of streams in transmission for Nt = 2<br>( $M_t \leq N_t$ )<br><br>0b0: 1 stream<br>0b1: 2 streams   |
| <u>M<sub>p</sub></u>    | <u>2</u> | <u>Modulation constellation of the paired user</u><br><br><u>0b00: QPSK</u><br><u>0b01: 16 QAM</u><br><u>0b10: 64 QAM</u><br><u>0b11: n/a</u>   |
| } else{                 |          |   |
| PSI                     | 2        | Allocated pilot stream index for Nt = 4 or 8<br><br>0b00: #1 stream<br>0b01: #2 stream<br>0b10: #3 stream<br>0b11: #4 stream  |
| Mt                      | 2        | Number of streams in transmission for Nt = 4 or 8<br>( $M_t \leq N_t$ )<br><br>0b00: 1 stream<br>0b01: 2 streams<br>0b10: 3 streams<br>0b11: 4 streams  |
| }                       |          |   |
| }                       |          |   |
| Resource Allocation     | Variable | Variable number of bits - depends on system bandwidth.  |

|   |              |  |
|---|--------------|--|
|   |              | Information may include: <ul style="list-style-type: none"> <li>Type of resource unit (DRU/CRU)</li> <li>Location (start/end)</li> <li>Allocation size</li> </ul>  |
| Long TTI Indicator                                | 1            | Indicates number of subframes spanned by the allocated resource.<br>0b0: 1 subframe (default)<br>0b1: 4 DL subframes for FDD or all DL subframes for TDD   |
| <del>if (N<sub>subframe, A-MAP</sub> == 2){</del> |              |  |
| <del>Allocation Relevance</del>                   | <del>1</del> | <del>Subframe index when an A-MAP region occurs every 2-subframes (N<sub>subframe, A-MAP</sub> = 2)</del><br><del>0b0: Allocation in the first DL subframe relevant to an A-MAP region</del><br><del>0b1: Allocation in the second DL subframe relevant to an A-MAP region</del> |
| <del>}</del>                                      |              |  |
| HFA   | [4]          | TBD<br>HARQ Feedback Allocation  |
| ACID  | 4            | HARQ channel identifier. The ACID field shall be set to the initial value of HARQ channel identifier for implicit cycling of HARQ channel identifiers.   |
| <del>N_ACID</del>                                 | <del>2</del> | <del>Number of ACIDs for implicit cycling of HARQ channel identifier</del><br><del>0b00: 2</del><br><del>0b01: 3</del><br><del>0b10: 4</del><br><del>0b11: 5</del>   |
| }   |              |  |
| Reserved  | TBD          | Reserved bits  |
| Padding   | Variable     | Padding to reach byte boundary   |
| }   | -            | -  |

### 15.3.6.5.2.6.2 DL Composite PA A-MAP IE

The DL composite persistent A-MAP IE is specified in Table 677.

**Table 677: DL Composite Persistent A-MAP IE**

| Syntax | Size in bits | Description/Notes |
|--------|--------------|-------------------|
|--------|--------------|-------------------|

|   |          |  |
|---|----------|--|
| DL Composite Persistent A-MAP_IE() {        | -        | -  |
| Number of allocations                       | 5        | Number of allocation specified   |
| RCID Type                                   | 2        | 0b00: Normal CID<br>0b01: RCID11<br>0b10: RCID7<br>0b11: RCID3   |
| For (j=0;j<Number of allocations;<br>j++) { |          | For loop where each loop element specifies information for one allocation.   |
| Persistent Flag                             | 1        | 0 = non-persistent<br>1 = persistent   |
| RCID  | variable | Specifies the station ID in RCID format, type defined by RCID Type   |
| Allocation MCS indicator                    | 1        | If Allocation MCS Indicator is 1, it indicates that MCS is explicitly assigned for this allocation. Otherwise, this allocation will use the same MCS as the previous subburst. If j is 0 then this indicator shall be 1. |
| if (Allocation MCS indicator == 1) {        |          |  |
| MCS   | 4        | Depends on supported modes, 16 modes assumed as baseline   |
| }   |          |  |
| MEF   | 2        | MIMO encoder format<br><br>0b00: SFBC<br>0b01: Vertical encoding<br>0b10: Horizontal encoding<br>0b11: n/a   |
| if (MEF == 0b01){                           |          | Parameters for vertical encoding   |
| if(Nt == 2){                                |          |  |
| Mt  | 1        | Number of streams in transmission for Nt = 2<br>(Mt <= Nt )<br><br>0b0: 1 stream<br>0b1: 2 streams   |
| }else if(Nt == 4){                          |          |  |
| Mt  | 2        | Number of streams in transmission for Nt = 4<br>(Mt <= Nt )<br><br>0b00: 1 stream<br>0b01: 2 streams<br>0b10: 3 streams<br>0b11: 4 streams   |
| }else if(Nt == 8){                          |          |  |
| Mt  | 3        | Number of streams in transmission for Nt = 8<br>(Mt <= Nt )<br><br>0b000: 1 stream   |

|                               |          |  |
|-------------------------------|----------|--|
|                               |          | 0b001: 2 streams<br>0b010: 3 streams<br>0b011: 4 streams<br>0b100: 5 streams<br>0b101: 6 streams<br>0b110: 7 streams<br>0b111: 8 streams   |
|                               |          | }  |
|                               |          | } else if(MEF == 0b10){  |
|                               |          | if(Nt == 2){   |
| PSI                           | 1        | Allocated pilot stream index for Nt = 2<br><br>0b0: #1 stream<br>0b1: #2 stream  |
| Mt                            | 1        | Number of streams in transmission for Nt = 2<br>(Mt <= Nt )<br><br>0b0: 1 stream<br>0b1: 2 streams   |
| <u>M<sub>p</sub></u>          | <u>2</u> | <u>Modulation constellation of the paired user</u><br><br><u>0b00: QPSK</u><br><u>0b01: 16 QAM</u><br><u>0b10: 64 QAM</u><br><u>0b11: n/a</u>  |
|                               |          | } else{  |
| PSI                           | 2        | Allocated pilot stream index for Nt = 4 or 8<br><br>0b00: #1 stream<br>0b01: #2 stream<br>0b10: #3 stream<br>0b11: #4 stream   |
| Mt                            | 2        | Number of streams in transmission for Nt = 4 or 8<br>(Mt <= Nt )<br><br>0b00: 1 stream<br>0b01: 2 streams<br>0b10: 3 streams<br>0b11: 4 streams  |
|                               |          | }  |
|                               |          | }  |
| Resource Allocation Indicator | 1        | If Resource Allocation Indicator is 1, it indicates that Duration is explicitly assigned for this subburst (allocation or deallocation). Otherwise, this subburst (allocation or deallocation) will use the same Duration as the previous subburst.<br><br>If j is 1 then this indicator shall be 1. |



|   |              |   |
|---|--------------|---|
| if (Resource Allocation Indicator == 1) { |              |   |
| Resource Allocation                       | Variable     | Variable number of bits - depends on system bandwidth.<br>Information may include: <ul style="list-style-type: none"> <li>Type of resource unit (DRU/CRU)</li> <li>Location (start/end)</li> <li>Allocation size</li> </ul>   |
| <del>if (Nsubframe, A-MAP == 2) {</del>   |              |   |
| <del>Allocation Relevance</del>           | <del>1</del> | <del>Subframe index when an A-MAP region occurs every 2-subframes (Nsubframe, A-MAP=2)-</del><br><br><del>0b0: Allocation in the first DL subframe relevant to an A-MAP region</del><br><del>0b1: Allocation in the second DL subframe relevant to an A-MAP region</del>  |
| <del>}</del>                              |              |   |
| }   |              |   |
| Long TTI Indicator                        | 1            | Indicates number of subframes spanned by the allocated resource.<br><br>0b0: 1 subframe (default)<br>0b1: 4 DL subframes for FDD or all DL subframes for TDD  |
| HFA                                       | [4]          | TBD<br><br>HARQ Feedback Allocation   |
| if (Persistent Flag == 1) {               |              |   |
| Allocation Period <u>and N_ACID</u>       | 2            | Period of persistent allocation<br>If (Allocation Period <u>and N_ACID</u> == 0b00), it indicates the deallocation of a persistently allocated resource.<br><br><del>0b00: deallocation</del><br><del>0b01: 2 frames</del><br><del>0b10: 4 frames</del><br><del>0b11: 6 frames</del><br><u>0b00: deallocation</u><br><u>0b01: Allocation Period=2 frames,</u><br><u>          N_ACID=Floor{(Max_Retx_Delay)/2}+1</u><br><u>0b10: Allocation Period=4 frames,</u><br><u>          N_ACID=Floor{(Max_Retx_Delay)/4}+1</u><br><u>0b11: Allocation Period=6 frames,</u><br><u>          N_ACID=Floor{(Max_Retx_Delay)/6}+1</u><br><br><u>N_ACID is number of ACIDs for implicit cycling of HARQ channel identifier. N_ACID is calculated with Maximum HARQ retransmission delay and Allocation period as</u><br><u>N_ACID=Floor{(Max_Retx_Delay)/(Allocation_Period)}+1</u><br><u>where Max_Retx_Dealy and Allocation_Period is unit of</u> |

|   |          |  |
|---|----------|--|
|   |          | <u>frame.</u><br><u>In case of VoIP in DL, maximum HARQ retransmission delay is the delay bound of VoIP.</u>   |
| if (Allocation Period <u>and</u> <u>N_ACID</u> ==0b00){         |          |  |
| <del>Resource Allocation</del>                                  | Variable | <del>Variable number of bits—depends on system bandwidth.</del><br><del>Information may include:</del><br>• <del>Type of resource unit (DRU/CRU)</del><br>• <del>Location (start/end)</del><br><del>Allocation size</del>  |
| HFA   | [4]      | TBD<br>HARQ Feedback Allocation  |
| } else if (Allocation Period <u>and</u> <u>N_ACID</u> != 0b00){ |          |  |
| Allocation Period and ACID Indicator                            | 1        | If Allocation Period and ACID Indicator is 1, it indicates that allocation information (allocation period, Number of ACID (ACID) is explicitly assigned for this allocation. Otherwise, this allocation will use the same allocation period as the previous allocation.<br>If j is 0 then this indicator shall be 1. |
| if (Allocation Period and ACID Indicator == 1) {                | -        | -  |
| Allocation Periodicity  | 2        | Periodicity of persistent allocation<br>If (Allocation Period==0b00), it indicates the deallocation of a persistently allocated resource.<br><br>0b00: deallocation<br>0b01: 2 frames<br>0b10: 4 frames<br>0b11: 8 frames  |
| Allocation Period (AP)  | 5        | Period of the persistent allocation is this field value plus 1 (unit is sub-frame/frame TBD)   |
| ACID  | 4        | Number of HARQ channels associated with this persistent assignment is this field value plus 1  |
| }   |          |  |
| }   |          |  |
| }   |          |  |
| }   |          |  |
| }   |          |  |

### 15.3.6.5.2.7 UL PA A-MAP IE

The UL persistent A-MAP IE is specified in Table 678.

**Table 678: UL Persistent A-MAP IE**

| Syntax                                       | Size in bits | Description/Notes  |
|--|--------------|--|
| UL Persistent A-MAP_IE() {                   | -            | -  |
| A-MAP IE Type                                | 43           | UL Persistent A-MAP IE   |
| if MCRC is masked with Station ID {          |              |  |
| UL Individual Persistent A-MAP_IE()          |              | Refer to Table 668   |
| } else if MCRC is masked with Composite ID { |              |  |
| UL Composite Persistent A-MAP_IE()           |              | Refer to Table 669   |
| }  |              |  |
| MCRC   | [16]         | 16 bit CRC masked by Station ID for individual PA and masked with composite ID (well-known ID specified in the system, TBD) for multi-user PA. |
| }  |              |  |

**15.3.6.5.2.7.1 UL Individual PA A-MAP IE**

The UL individual persistent A-MAP IE is specified in Table 679.

**Table 679: UL Individual Persistent A-MAP IE**

| Syntax                              | Size in bits | Description/Notes   |
|-------------------------------------|--------------|---|
| UL Persistent A-MAP_IE() {          | -            | -   |
| Allocation Period <u>and N_ACID</u> | 2            | <p>Period of persistent allocation<br/>           If (Allocation Period <u>and N_ACID</u> ==0b00), it indicates the deallocation of a persistently allocated resource.</p> <p>0b00: 0 frame<br/>           0b01: 2 frames<br/>           0b10: 4 frames<br/>           0b11: 6 frames</p> <p>0b00: deallocation<br/>           0b01: Allocation Period=2 frames,<br/>                 <u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/2\} + 1</math></u><br/>           0b10: Allocation Period=4 frames,<br/>                 <u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/4\} + 1</math></u><br/>           0b011: Allocation Period=6 frames,<br/>                 <u><math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/6\} + 1</math></u></p> <p><u>N_ACID is number of ACIDs for implicit cycling of HARQ channel identifier. N_ACID is calculated with Maximum HARQ retransmission delay and Allocation period as <math>N\_ACID = \text{Floor}\{(\text{Max\_Retx\_Delay})/(\text{Allocation\_Period})\} + 1</math> where Max_Retx_Dealy and Allocation Period is unit of frame.</u><br/> <u>In case of VoIP in UL, maximum HARQ retransmission dealy is the maximum number of HARQ retransmission so</u></p> |

|   |                     |   |
|---|---------------------|---|
|   |                     | that Max Retx Delay is $N_{MAX\_ReTx}$ .  |
| If (Allocation Period <u>and</u> <u><math>N\_ACID == 0b00</math></u> ){                                 |                     |   |
| <u>if</u> ( <u><math>N_{subframe, A-MAP} == 1</math></u> <u>and</u> <u><math>DL:UL == 3:5</math></u> ){ |                     |   |
| <u>Allocation Relevance</u>   | <u>1</u>            | <u>Subframe index when an A-MAP region occurs every subframes (<math>N_{subframe, A-MAP} = 1</math>) and DL:UL subframe ratio is 3:5 i.e., the first A-MAP region is relevant to the first UL subframe and the next two A-MAP regions are relevant to two UL subframes each.</u><br><br><u>0b0: Allocation in the first UL subframe relevant to an A-MAP region</u><br><u>0b1: Allocation in the second UL subframe relevant to an A-MAP region</u> |
| <u>}</u>  |                     |   |
| <del>Resource Allocation</del>  | <del>Variable</del> | <del>Variable number of bits—depends on system bandwidth—</del><br><del>Information may include:</del> <ul style="list-style-type: none"> <li><del>• Type of resource unit (DRU/CRU)</del></li> <li><del>• Location (start/end)</del></li> <li><del>• Allocation size</del></li> </ul>  |
| HFA   | [4]                 | TBD<br><br>HARQ Feedback Allocation   |
| } else if (Allocation Period <u>and</u> <u><math>N\_ACID != 0b00</math></u> ){                          |                     |   |
| MCS   | 4                   | MCS used for burst  |
| <u><math>M_t</math></u>   | <u>2</u>            | <u>Number of streams in transmission (<math>M_t \leq N_t</math>), up to 2 streams per AMS supported</u><br><br><u>0b00: 1 stream</u><br><u>0b01: 2 streams</u><br><u>0b10: 3 stream</u><br><u>0b11: 4 streams</u>   |
| <u>TNS</u>  | <u>2</u>            | <u>Total number of streams in the LRU for CSM</u><br><br><u>0b00: reserved</u><br><u>0b01: 2 streams</u><br><u>0b10: 3 streams</u><br><u>0b11: 4 streams</u>  |
| <u>if</u> ( <u><math>TNS &gt; M_t</math></u> ){   |                     | <u>Parameters for CSM without PMI</u>   |
| <u>if</u> ( <u><math>TNS == 2</math></u> ){   |                     |   |
| <u>SI</u>   | <u>1</u>            | <u>First pilot index for CSM with <math>TNS = 2</math></u>  |
| <u>} else{</u>  |                     |   |
| <u>SI</u>   | <u>2</u>            | <u>First pilot index for CSM with <math>TNS = 3,4</math></u>  |
| <u>}</u>  |                     |   |
| <u>}</u>  |                     |   |

|   |              |   |
|---|--------------|---|
| <u>else if ( (TNS == Mt) and (PMI Flag == 0) ) {</u>        |              | <u>Parameters without CSM and PMI</u>   |
| <u>    MEF</u>  | <u>1</u>     | <u>MIMO encoder format</u><br><u>0b0: SFBC</u><br><u>0b1: Vertical encoding</u>   |
| <u>    }</u>  |              |   |
| <del>    MEF</del>  | <del>1</del> | <del>MIMO encoder format</del><br><del>0b0: SFBC</del><br><del>0b1: Vertical encoding</del>   |
| <del>    CSM</del>  | <del>1</del> | <del>0b0: CSM enabled</del><br><del>0b1: No CSM enabled</del>   |
| <del>    if(MEF == 0b1){</del>                              |              | <del>Parameters for vertical encoding</del>   |
| <del>        Mt</del>                                       | <del>2</del> | <del>Number of streams in transmission-<br/>(<math>M_t \leq N_t</math>)</del><br><del>0b00: 1 stream</del><br><del>0b11: 2 streams</del><br><del>0b00: 3 stream</del><br><del>0b11: 4 streams</del>                               |
| <del>    if(CSM == 0b1){</del>                              |              | <del>Total number of streams in the LRU for CSM</del>   |
| <del>        TNS</del>                                      | <del>2</del> | <del>0b00: reserved</del><br><del>0b01: 2 streams</del><br><del>0b10: 3 streams</del><br><del>0b11: 4 streams</del>   |
| <del>    if(TNS == 0b01){</del>                             |              |   |
| <del>        SI</del>                                       | <del>1</del> | <del>First pilot index for CSM with TNS = 2</del>   |
| <del>    } else if( TNS == 0b10-<br/>or TNS == 0b11){</del> |              |   |
| <del>        SI</del>                                       | <del>2</del> | <del>First pilot index for CSM with TNS = 3,4</del>   |
| <del>    }</del>  |              |   |
| <del>    }</del>  |              |   |
| PF  | 1            | Precoding Flag<br>0b0: non adaptive precoding<br>0b1: adaptive codebook precoding using the precoder of rank $M_t$ of MS's choice   |
| }   |              |   |
| Resource Allocation   | Variable     | Variable number of bits - depends on system bandwidth.<br>Information may include: <ul style="list-style-type: none"> <li>• Type of resource unit (DRU/CRU)</li> <li>• Location (start/end)</li> <li>• Allocation size</li> </ul> |

|   |              |   |
|---|--------------|---|
| Long TTI Indicator  | 1            | Indicates number of subframes spanned by the allocated resource.<br><br>0b0: 1 subframe (default)<br>0b1: 4 UL subframes for FDD or all UL subframes for TDD  |
| <del>if (N<sub>subframe, A-MAP</sub> == 2){</del>                       |              |   |
| <del>if (DL:UL != 3:5){</del>   |              |   |
| <del>Allocation Relevance</del>   | <del>1</del> | <del>Subframe index when an A-MAP region occurs every 2 subframes (N<sub>subframe, A-MAP</sub> = 2) and DL:UL subframe ratio is 8:0, 6:2, 4:4 or 5:3</del><br><br><del>0b0: Allocation in the first UL subframe relevant to an A-MAP region</del><br><del>0b1: Allocation in the second UL subframe relevant to an A-MAP region</del>   |
| <del>}else if (DL:UL == 3:5){</del>                                     |              |   |
| <del>Allocation Relevance</del>   | <del>2</del> | <del>Subframe index when an A-MAP region occurs every 2 subframes (N<sub>subframe, A-MAP</sub> = 2) and DL:UL subframe ratio is 3:5 i.e., the first A-MAP region is relevant to the first two UL subframes and the second A-MAP region is relevant to the last 3 UL subframes</del><br><br><del>0b00: Allocation in the first UL subframe relevant to an A-MAP region</del><br><del>0b01: Allocation in the second UL subframe relevant to an A-MAP region</del><br><del>0b10: Allocation in the third UL subframe relevant to an A-MAP region</del><br><del>0b11: reserved</del> |
| <del>}</del>  |              |   |
| <del>}</del>  |              |   |
| <del>else if (N<sub>subframe, A-MAP</sub> == 1 and DL:UL == 3:5){</del> |              |   |
| Allocation Relevance  | 1            | Subframe index when an A-MAP region occurs every subframes (N <sub>subframe, A-MAP</sub> = 1) and DL:UL subframe ratio is 3:5 i.e., the first A-MAP region is relevant to the first UL subframe and the next two A-MAP regions are relevant to two UL subframes each.<br><br>0b0: Allocation in the first UL subframe relevant to an A-MAP region<br>0b1: Allocation in the second UL subframe relevant to an A-MAP region  |
| }   |              |   |
| HFA   | [4]          | TBD<br><br>HARQ Feedback Allocation   |
| ACID  | 3            | HARQ channel identifier   |

|                   |          |   |
|-------------------|----------|---|
| <del>N_ACID</del> | <u>2</u> | <del>Number of ACID for implicit cycling of HARQ channel identifier</del><br><del>0b00: 1</del><br><del>0b01: 2</del><br><del>0b10: 3</del><br><del>0b11: 4</del> |
| }                 |          |   |
| Reserved          | TBD      | Reserved bits   |
| Padding           | Variable | Padding to reach byte boundary  |
| }                 | -        | -   |

### 15.3.6.5.2.7.2 UL Composite PA A-MAP IE

The UL composite persistent A-MAP IE is specified in Table 680.

**Table 680: UL Composite Persistent A-MAP IE**

| Syntax                                   | Size in bits | Description/Notes  |
|--|--------------|--|
| UL Composite Persistent A-MAP_IE() {     | -            | -  |
| Number of allocations                    | 5            | Number of allocation specified   |
| RCID Type                                | 2            | 0b00: Normal CID<br>0b01: RCID11<br>0b10: RCID7<br>0b11: RCID3   |
| For (j=0;j<Number of allocations; j++) { |              | For loop where each loop element specifies information for one allocation.   |
| Persistent Flag                          | 1            | 0 = non-persistent<br>1 = persistent   |
| RCID                                     | variable     | Specifies the station ID in RCID format, type defined by RCID Type   |
| Allocation MCS indicator                 | 1            | If Allocation MCS Indicator is 1, it indicates that MCS is explicitly assigned for this allocation. Otherwise, this allocation will use the same MCS as the previous subburst. If j is 0 then this indicator shall be 1. |
| if (Allocation MCS indicator == 1) {     |              |  |
| MCS                                      | 4            | Depends on supported modes, 16 modes assumed as baseline   |
| }  |              |  |
| <u>Mt</u>                                | <u>2</u>     | <u>Number of streams in transmission (<math>M_t \leq N_t</math>), up to 2 streams per AMS supported</u><br><u>0b00: 1 stream</u><br><u>0b01: 2 streams</u>   |

|  |              |   |
|--|--------------|---|
|  |              | <u>0b10: 3 stream</u><br><u>0b11: 4 streams</u>   |
| <u>TNS</u>   | <u>2</u>     | <u>Total number of streams in the LRU for CSM</u><br><br><u>0b00: reserved</u><br><u>0b01: 2 streams</u><br><u>0b10: 3 streams</u><br><u>0b11: 4 streams</u>  |
| <u>if (TNS &gt; Mt){</u>                               |              | <u>Parameters for CSM without PMI</u>   |
| <u>if(TNS == 2){</u>                                   |              |   |
| <u>SI</u>  | <u>1</u>     | <u>First pilot index for CSM with TNS = 2</u>   |
| <u>} else{</u>   |              |   |
| <u>SI</u>  | <u>2</u>     | <u>First pilot index for CSM with TNS = 3,4</u>   |
| <u>}</u>   |              |   |
| <u>} else if ( (TNS == Mt) and (PMI Flag == 0) ) {</u> |              | <u>Parameters without CSM and PMI</u>   |
| <u>MEF</u>   | <u>1</u>     | <u>MIMO encoder format</u><br><br><u>0b0: SFBC</u><br><u>0b1: Vertical encoding</u>   |
| <u>}</u>   |              |   |
| <del>MEF</del>   | <del>1</del> | <del>MIMO encoder format</del><br><br><del>0b0: SFBC</del><br><del>0b1: Vertical encoding</del>   |
| <del>CSM</del>   | <del>1</del> | <del>0b0: CSM enabled</del><br><del>0b1: No CSM enabled</del>   |
| <del>if(MEF == 0b1){</del>                             |              | <del>Parameters for vertical encoding</del>   |
| <del>Mt</del>  | <del>2</del> | <del>Number of streams in transmission-</del><br><del>(<math>M_r \leq N_r</math>)</del><br><br><del>0b00: 1 stream</del><br><del>0b11: 2 streams</del><br><del>0b00: 3 stream</del><br><del>0b11: 4 streams</del> |
| <del>if(CSM == 0b1){</del>                             |              |   |
| <del>TNS</del>   | <del>2</del> | <del>Total number of streams in the LRU for CSM</del><br><br><del>0b00: reserved</del><br><del>0b01: 2 streams</del><br><del>0b10: 3 streams</del><br><del>0b11: 4 streams</del>                                  |
| <del>if(TNS == 0b01){</del>                            |              |   |
| <del>SI</del>  | <del>1</del> | <del>First pilot index for CSM with TNS = 2</del>   |
| <del>} else if( TNS == 0b10 or</del>                   |              |   |



|   |              |   |
|---|--------------|---|
| <del>TNS==0b11){</del>                                    |              |   |
| <del>—————SI</del>  | <del>2</del> | <del>First pilot index for CSM with TNS = 3,4</del>   |
| <del>—————}</del>   |              |   |
| <del>—————}</del>   |              |   |
| PF  | 1            | Precoding Flag<br>0b0: non adaptive precoding<br>0b1: adaptive codebook precoding using the precoder of rank $M_t$ of MS's choice   |
| Resource Allocation Indicator                             | 1            | If Resource Allocation Indicator is 1, it indicates that Duration is explicitly assigned for this subburst (allocation or deallocation). Otherwise, this subburst (allocation or deallocation) will use the same Duration as the previous subburst.<br>If $j$ is 1 then this indicator shall be 1.  |
| if (Resource Allocation Indicator ==1) {                  |              |   |
| Resource Allocation                                       | Variable     | Variable number of bits - depends on system bandwidth. Information may include: <ul style="list-style-type: none"> <li>Type of resource unit (DRU/CRU)</li> <li>Location (start/end)</li> <li>Allocation size</li> </ul>  |
| <del>—————if (N<sub>subframe, A-MAP</sub>==2){</del>      |              |   |
| <del>—————if (DL:UL != 3:5){</del>                        |              |   |
| <del>—————Allocation Relevance</del>                      | <del>1</del> | <del>Subframe index when an A-MAP region occurs every 2 subframes (N<sub>subframe, A-MAP</sub>=2) and DL:UL subframe ratio is 8:0, 6:2, 4:4 or 5:3—</del><br><del>0b0: Allocation in the first UL subframe relevant to an A-MAP region</del><br><del>0b1: Allocation in the second UL subframe relevant to an A-MAP region</del>  |
| <del>—————}else if (DL:UL == 3:5){</del>                  |              |   |
| <del>—————Allocation Relevance</del>                      | <del>2</del> | <del>Subframe index when an A-MAP region occurs every 2 subframes (N<sub>subframe, A-MAP</sub>=2) and DL:UL subframe ratio is 3:5 i.e., the first A-MAP region is relevant to the first two UL subframes and the second A-MAP region is relevant to the last 3 UL subframes</del><br><del>0b00: Allocation in the first UL subframe relevant to an A-MAP region</del><br><del>0b01: Allocation in the second UL subframe relevant to an A-MAP region</del><br><del>0b10: Allocation in the third UL subframe relevant to an A-MAP region</del><br><del>0b11: reserved</del> |
| <del>—————}</del>   |              |   |
| <del>—————}else if (N<sub>subframe, A-MAP</sub>== 1</del> |              |   |

|  |     |  |
|--|-----|--|
| and DL:UL == 3:5){                           |     |  |
| Allocation Relevance                         | 1   | <p>Subframe index when an A-MAP region occurs every subframes (<math>N_{\text{subframe, A-MAP}}=1</math>) and DL:UL subframe ratio is 3:5 i.e., the first A-MAP region is relevant to the first UL subframe and the next two A-MAP regions are relevant to two UL subframes each.</p> <p>0b0: Allocation in the first UL subframe relevant to an A-MAP region<br/>0b1: Allocation in the second UL subframe relevant to an A-MAP region</p>  |
| }  |     |  |
| }  |     |  |
| Long TTI Indicator                           | 1   | <p>Indicates number of subframes spanned by the allocated resource.</p> <p>0b0: 1 subframe (default)<br/>0b1: 4 DL subframes for FDD or all DL subframes for TDD</p>   |
| HFA  | [4] | TBD  |
| if (Persistent Flag == 1) {                  |     |  |
| Allocation Period <a href="#">and N_ACID</a> | 2   | <p>Period of persistent allocation<br/>If (Allocation Period <a href="#">and N_ACID</a> ==0b00), it indicates the deallocation of a persistently allocated resource.</p> <p><del>0b00: deallocation</del><br/><del>0b01: 2 frames</del><br/><del>0b10: 4 frames</del><br/><del>0b11: 6 frames</del></p> <p><a href="#">0b00: deallocation</a><br/><a href="#">0b01: Allocation Period=2 frames,</a><br/><a href="#">N_ACID=Floor{(Max Retx Delay)/2}+1</a><br/><a href="#">0b10: Allocation Period=4 frames,</a><br/><a href="#">N_ACID=Floor{(Max Retx Delay)/4}+1</a><br/><a href="#">0b11: Allocation Period=6 frames,</a><br/><a href="#">N_ACID=Floor{(Max Retx Delay)/6}+1</a></p> <p><a href="#">N_ACID is number of ACIDs for implicit cycling of HARQ channel identifier. N_ACID is calculated with Maximum HARQ retransmission delay and Allocation period as</a><br/><a href="#">N_ACID=Floor{(Max Retx Delay)/(Allocation Period)}+1</a><br/><a href="#">where Max Retx Dealy and Allocation Period is unit of frame.</a><br/><a href="#">In case of VoIP in UL, maximum HARQ retransmission dealy is the maximum number of HARQ retransmission so that</a><br/><a href="#">In case of VoIP in UL, maximum HARQ retransmission dealy is the maximum number of HARQ retransmission so</a></p> |

|   |                     |   |
|---|---------------------|---|
|   |                     | that Max Retx Delay is N_MAX_ReTx.  |
| if (Allocation Period and N_ACID == 0b00){        |                     |   |
| if (N_subframe, A-MAP == 1 and DL:UL == 3:5){     |                     |   |
| Allocation Relevance                              | 1                   | <p>Subframe index when an A-MAP region occurs every subframes (N_subframe, A-MAP=1) and DL:UL subframe ratio is 3:5 i.e., the first A-MAP region is relevant to the first UL subframe and the next two A-MAP regions are relevant to two UL subframes each.</p> <p>0b0: Allocation in the first UL subframe relevant to an A-MAP region<br/>0b1: Allocation in the second UL subframe relevant to an A-MAP region</p> |
| }   |                     |   |
| <del>Resource Allocation</del>                    | <del>Variable</del> | <p><del>Variable number of bits—depends on system bandwidth. Information may include:</del></p> <ul style="list-style-type: none"> <li><del>• Type of resource unit (DRU/CRU)</del></li> <li><del>• Location (start/end)</del></li> </ul> <p><del>Allocation size</del></p>   |
| HFA   | [4]                 | TBD<br>HARQ Feedback Allocation   |
| } else if (Allocation Period and N_ACID != 0b00){ |                     |   |
| Allocation Period and ACID Indicator              | 1                   | If Allocation Period and ACID Indicator is 1, it indicates that allocation information (allocation period, Number of ACID (ACID) is explicitly assigned for this allocation. Otherwise, this allocation will use the same allocation period as the previous allocation.<br>If j is 0 then this indicator shall be 1.  |
| if (Allocation Period and ACID Indicator == 1) {  | -                   | -   |
| Allocation Periodicity                            | 2                   | <p>Periodicity of persistent allocation<br/>If (Allocation Period==0b00), it indicates the deallocation of a persistently allocated resource.</p> <p>0b00: deallocation<br/>0b01: 2 frames<br/>0b10: 4 frames<br/>0b11: 8 frames</p>  |
| Allocation Period (AP)                            | 5                   | Period of the persistent allocation is this field value plus 1 (unit is sub-frame/frame TBD)  |
| ACID  | 4                   | Number of HARQ channels associated with this persistent assignment is this field value plus 1   |
| }   |                     |   |
| }   |                     |   |

|   |  |  |
|---|--|--|
| } |  |  |
| } |  |  |
| } |  |  |

----- End of Proposed Amendment Text -----