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Title	**Persistent Allocation with support for IR HARQ and MIMO Modes**	
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Source(s)	Yair Bourlas, Lei Wang; Nextwave Sean McBeath; Huawei Mo-Han Fong; Nortel	Voice: E-mail: smcbeath@huawei.com ybourlas@nextwave.com lwang@nextwave.com mhfong@nortel.com *<http://standards.ieee.org/faqs/affiliationFAQ.html>
Re:	802.16 Working Group Letter Ballot #26a	
Abstract	The resource allocation scheme of 802.16e is extended to enable persistent allocations (also referred to as periodic allocations).	
Purpose	Accept the proposed specification changes on IEEE P802.16Rev2.	
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Persistent Allocation with support for IR HARQ and MIMO Modes

Introduction

The amount of MAP overhead per frame is proportional to the number of MSs scheduled per frame. IEEE 802.16e-2005 is expected to support 200 VoIP users for an effective UL bandwidth of 5 MHz [1]. Assuming voice activity factor of 50%, this corresponds to approximately 20 users scheduled per 5 ms frame. The resultant MAP overhead is large.

Proposed Solution

For periodic type of traffic such as VoIP where the packet arrival is predictable, it is not necessary to send the burst assignment signaling for each packet transmission. Burst assignment can be sent once at the beginning to assign periodic recurring resource to an MS with a given period. Both the assigned resource and MCS are fixed until the persistent assignment is released or overridden.

Here is a summary of the persistent assignment scheme:

- The BS assigns a periodically recurring resource to an MS by sending newly defined persistent IE, as described below. These IEs can be sent on normal MAP, compressed MAP and sub-MAPs.
- In a series of HARQ packets, the persistent assignment is applicable for the first sub-packet of each packet.
  - HARQ retransmissions are non-persistently assigned.
- The BS explicitly de-assigns resources by sending another persistent IE to terminate the outstanding assignment.

Proposed Text

Modify the mode field of the existing HARQ DL MAP IE as follows:

Mode	4	Indicates the mode of this HARQ region: 0b0000: Chase HARQ 0b0001: Incremental redundancy HARQ for CTC 0b0010: Incremental redundancy HARQ for Convolutional Code 0b0011: MIMO Chase HARQ 0b0100: MIMO IR HARQ 0b0101: MIMO IR HARQ for Convolutional Code 0b0110: MIMO STC HARQ 0b0111: *Reserved* 0b1000: Persistent Chase HARQ 0b1001: Persistent Incremental redundancy HARQ for CTC 0b1010: Persistent Incremental redundancy HARQ for Con-volutional Code 0b1011: Persistent MIMO Chase HARQ 0b1100: Persistent MIMO IR HARQ 0b0101: MIMO IR HARQ for Convolutional Code 0b1110: Persistent MIMO STC HARQ 0b1111–*Reserved*

Deleted: -0b1111

Formatted: English (U.S.)

Add the following else if statements to the existing HARQ DL MAP IE

} else if (Mode == 0b1000) {	–	–
Persistent_DL_HARQ_Chase_Sub-Burst_IE()	*variable*	–

} else if (Mode == 0b1001) {	–	–
Persistent_DL_HARQ_IR_CTC_Sub-Burst_IE()	*variable*	–
} else if (Mode == 0b1010) {	–	–
Persistent_DL_HARQ_IR_CC_Sub-Burst_IE()	*variable*	–
} else if (Mode == 0b1011) {	–	–
Persistent_MIMO_DL_Chase_HARQ_Sub-Burst_IE()	*variable*	–
} else if (Mode == 0b1100) {	–	–
Persistent_MIMO_DL_IR_HARQ_Sub-Burst_IE()	*variable*	–
} else if (Mode == 0b1001) {	–	–
Persistent_MIMO_DL_IR_HARQ_for_CC_Sub-Burst_IE()	*variable*	–
} else if (Mode == 0b1100) {	–	–
Persistent_MIMO_DL_STC_HARQ_Sub-Burst_IE()	*variable*	–

Add new section to 8.4.5.3.21

8.4.5.3.21.2 Downlink Persistent Allocations

Downlink persistent allocations are used by the base station to make downlink time-frequency resource assignments which repeat periodically. The logical time-frequency resource assigned using the HARQ DL MAP IE repeats at a periodic interval. For downlink persistent allocations, the base station transmits the HARQ DL MAP IE, with the mode field set to one of the following values:

- 0b1000: Persistent Chase HARQ
- 0b1001: Persistent Incremental redundancy HARQ for CTC
- 0b1010: Persistent Incremental redundancy HARQ for Convolutional Code
- 0b1011: Persistent MIMO Chase HARQ
- 0b1100: Persistent MIMO IR HARQ
- 0b1101: Persistent MIMO IR HARQ for Convolutional Code
- 0b1110: Persistent MIMO STC HARQ

Table 355 - Persistent DL HARQ Chase Subburst IE format

Syntax	**Length (bits)**	**Comments**
Persistent_DL_HARQ_Chase_Sub-Burst_IE() {		
N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
RCID_IE()	*variable*	
Duration	10	Duration in slots

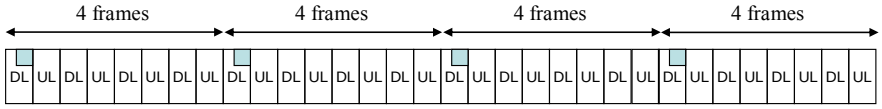
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
Sub-burst DIUC indicator	1	If Sub-Burst DIUC Indicator is 1, it indicates that DIUC is explicitly assigned for this subburst. Otherwise, this subburst will use the same DIUC as the previous subburst. If j is 0 then this indicator shall be 1.
Reserved	1	Shall be set to 0
If (Sub-burst DIUC indicator ==1) {		
DIUC	4	-
Repetition coding indication	2	0b00: No Repetition coding 0b01: Repetition coding of 2 used 0b10: Repetition coding of 4 used 0b11: Repetition coding of 6 used
Reserved	2	
}		
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
ACID	4	-
AI_SN	1	Initial AI_SN for each ACID
ACK disable	1	When ACK Disable == 1, the allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
If (ACK disable== 0) {		

ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-bursts as defined in 8.4.5.4.25.
}		
Dedicated DL control Indicator	2	LSB #0 indicates inclusion of CQI control LSB #1 indicates inclusion of Dedicated DL Control IE.
If (LSB #0 of dedicated DL control indicator ==1){		-
Duration (d)	4	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS for 2(d–1) frames. If d is 0b0000, deallocates all CQI feedback when the current ACID is completed successfully. If d is 0b1111, the MS should report until the BS command for the MS to stop.
If (Duration !=0b0000){		
Allocation index	6	Index to the channel in a frame the CQI report should be transmitted by the SS.
Period (p)	3	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS in every 2^p frames.
Frame offset	3	The MS starts reporting at the frame of which the number has the same 3 LSB as the specified frame offset. If the current frame is specified, the MS should start reporting in eight frames.
}		
}		
If (LSB #1 of dedicated DL control indicator ==1){		
Dedicated DL control IE ()	*variable*	
}		
}		
}		

Allocation Period (ap)

The allocation period (ap) shall be set to the period of the persistent allocation, in units of frames. If the allocation period is equal to 0, the time-frequency resource assignment does not repeat periodically (non-persistent). If the allocation period is greater than 0, the time-frequency resource assignment repeats every ap frames. For example, as illustrated below, if ap=4, the time-frequency resource

assignment is valid in frames N, N+4, N+8, etc.



Slot Offset

The slot offset shall be set to the first slot in the time-frequency resource assignment with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region.

Allocation flag

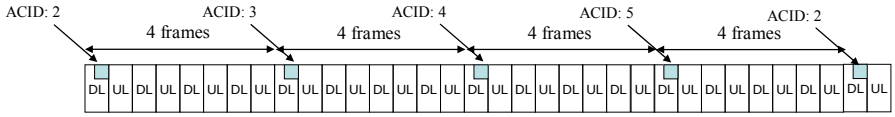
The allocation flag shall be set to 1 if the sub-burst IE is allocating time-frequency resources and shall be set to 0 if the sub-burst IE is de-allocating time-frequency resources.

ACID

The ACID field shall be set to the beginning ACID as described below.

Number of ACID

The Number of ACID (N_ACID) shall be set to one less than the number of HARQ channel identifiers (Num_HARQ_Chan) for this persistent allocation. The Number of ACID and ACID fields are used together to establish an implicit cycling of ACID as follows. If Num_HARQ_Chan is greater than 1, and if the allocation period is greater than 0, the ACID corresponding to the first occurrence of the persistent allocation corresponds to the ACID field, and the ACID corresponding to the second occurrence of the persistent allocation corresponds to the ACID field + 1, etc. The ACID corresponding to the Num_HARQ_Chanth occurrence of the persistent allocation corresponds to the ACID field + Num_HARQ_Chan – 1, and the ACID corresponding to the (Num_HARQ_Chan + 1)th occurrence of the persistent allocation corresponds to the ACID field. This process is repeated for additional occurrences of the persistent allocation. As illustrated below, if the allocation period equals 4, if N_ACID = 0b0011 (Num_HARQ_Chan = 4), and if ACID = 2, the ACID follows the pattern 2, 3, 4, 5, 2, 3, 4, 5, etc.



ACK channel

The ACK channel shall be set to the number of the ACK channel within the HARQ ACK Region. The mobile station shall use the indicated ACK channel for transmitting acknowledgment information for each packet received using the time-frequency resource referred to by this persistent allocation. For persistent allocations, the mobile station shall not transmit a NACK using the assigned ACK channel resource in frame N if it was unable to correctly decode the DL-MAP in frame N – HARQ ACK delay for DL burst.

AI_SN

The AI_SN shall be set to the initial AI_SN for each ACID in the sequence of ACID values. The AI_SN shall toggle from 1 to 0 or 0 to 1 for each occurrence of a particular ACID. For example, if the allocation period equals 4, if Num_HARQ_Chan = 4, if ACID = 2, and if AI_SN = 0, the ACID follows the pattern 2, 3, 4, 5, 2, 3, 4, 5, etc, and the AI_SN follows the pattern 0, 0, 0, 0, 1, 1, 1, 1, etc.

Table 356 – Persistent DL HARQ IR CTC Subburst IE format

Syntax	Length (bits)	Comments
Persistent_DL_HARQ_IR_CTC Sub-Burst_IE() {		
N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
RCID_IE()	*variable*	
N_{EP}	4	
N_{SCH}	4	
SPID	2	
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
ACID	4	-
AI_SN	1	Initial AI_SN for each ACID
ACK disable	1	When ACK Disable == 1, the allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
Reserved	2	Shall be set to 0
If (ACK disable== 0) {		
ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-

		bursts as defined in 8.4.5.4.25.
}		
Dedicated DL control Indicator	2	LSB #0 indicates inclusion of CQI control LSB #1 indicates inclusion of Dedicated DL Control IE.
If (LSB #0 of dedicated DL control indicator ==1){		-
Duration (d)	4	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS for 2(d–1) frames. If d is 0b0000, deallocates all CQI feedback when the current ACID is completed successfully. If d is 0b1111, the MS should report until the BS command for the MS to stop.
If (Duration !=0b0000){		
Allocation index	6	Index to the channel in a frame the CQI report should be transmitted by the SS.
Period (p)	3	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS in every 2^p frames.
Frame offset	3	The MS starts reporting at the frame of which the number has the same 3 LSB as the specified frame offset. If the current frame is specified, the MS should start reporting in eight frames.
}		
}		
If (LSB #1 of dedicated DL control indicator ==1){		
Dedicated DL control IE ()	*variable*	
}		
}		
}		

SPID

Defines subpacket identifier, which is used to identify the four subpackets generated from an encoder packet. The SPID field only applies to FEC modes supporting incremental redundancy. The SPID numbering shall follow the rules for subpacket generation of section 6.3.17.1 Subpacket generation.

Table 357 – Persistent DL HARQ IR CC Subburst IE format

Syntax	Length (bits)	Comments
Persistent_DL_HARQ_IR_CC_Sub-Burst_IE() {		
N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
RCID_IE()	*variable*	
Duration	10	Duration in slots
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
Sub-burst DIUC indicator	1	If Sub-Burst DIUC Indicator is 1, it indicates that DIUC is explicitly assigned for this subburst. Otherwise, this subburst will use the same DIUC as the previous subburst. If j is 0 then this indicator shall be 1.
Reserved	1	Shall be set to 0
If (Sub-burst DIUC indicator ==1) {		
DIUC	4	-
Repetition coding indication	2	0b00: No Repetition coding 0b01: Repetition coding of 2 used 0b10: Repetition coding of 4 used 0b11: Repetition coding of 6 used
Reserved	2	
}		
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
ACID	4	-
AI_SN	1	Initial AI_SN for each ACID
SPID	2	-
ACK disable	1	When ACK Disable == 1, the allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK

		channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
If (ACK disable== 0) {		
ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-bursts as defined in 8.4.5.4.25.
}		
Dedicated DL control Indicator	2	LSB #0 indicates inclusion of CQI control LSB #1 indicates inclusion of Dedicated DL Control IE.
Reserved	2	Shall be set to 0
If (LSB #0 of dedicated DL control indicator ==1){		-
Duration (d)	4	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS for 2(d–1) frames. If d is 0b0000, deallocates all CQI feedback when the current ACID is completed successfully. If d is 0b1111, the MS should report until the BS command for the MS to stop.
If (Duration !=0b0000){		
Allocation index	6	Index to the channel in a frame the CQI report should be transmitted by the SS.
Period (p)	3	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS in every 2^p frames.
Frame offset	3	The MS starts reporting at the frame of which the number has the same 3 LSB as the specified frame offset. If the current frame is specified, the MS should start reporting in eight frames.
}		
}		

If (LSB #1 of dedicated DL control indicator ==1){		
Dedicated DL control IE ()	*variable*	
}		
}		
}		

Table 358 – Persistent MIMO DL Chase HARQ Subburst IE format

Syntax	**Length (bits)**	**Comments**
Persistent_MIMO_DL_Chase_HARQ_Sub-Burst_IE() {		
N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
MU Indicator	1	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1	-
ACK disable	1	When ACK Disable == 1, the allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
If (MU indicator==0) {		
RCID_IE()	*variable*	
}		
If (Dedicated MIMO DL Control Indicator == 1) {	-	-
Dedicated MIMO DL Control IE ()	*variable*	
}		
Duration	10	Duration in slots
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)

Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
For (i=0; i<N_layer; i++) {	-	-
If (MU indicator==1) {		
RCID IE()	*variable*	
}		
DIUC	4	
Repetition coding indication	2	0b00: No Repetition coding 0b01: Repetition coding of 2 used 0b10: Repetition coding of 4 used 0b11: Repetition coding of 6 used
If (ACK disable== 0) {		
ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-bursts as defined in 8.4.5.4.25.
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
ACID	4	-
AI_SN	1	Initial AI_SN for each ACID
}		
}		
}		
Padding	*variable*	Padding to nibble; shall be set to 0.
}		

Table 359 – Persistent MIMO DL IR HARQ Subburst IE format

Syntax	**Length (bits)**	**Comments**
Persistent_MIMO_DL_IR_HARQ_Sub-Burst_IE() {		
N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
MU Indicator	1	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1	-
ACK disable	1	When ACK Disable == 1, the

		allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
If (MU indicator==0) {		
RCID_IE()	*variable*	
}		
If (Dedicated MIMO DL Control Indicator == 1) {	-	-
Dedicated MIMO DL Control IE ()	*variable*	
}		
N_{SCH}	4	In case of vertical encoding, the value should be half the values calculated based on 8.4.9.2.3.5.6.
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
For (i=0; i<N_layer; i++) {	-	-
If (MU indicator==1) {		
RCID IE()	*variable*	
}		
N_{EP}		
If (ACK disable== 0) {		
ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-bursts as defined in 8.4.5.4.25.
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
SPID	2	-

ACID	4	-
AI_SN	1	Initial AI_SN for each ACID
}		
}		
}		
Padding	*variable*	Padding to nibble; shall be set to 0.
}		

Table 360 – Persistent MIMO DL IR HARQ for CC Subburst IE format

Syntax	**Length (bits)**	**Comments**
Persistent_MIMO_DL_IR_HARQ_for_CC_Sub-Burst_IE() {		
N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
MU Indicator	1	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1	-
ACK disable	1	When ACK Disable == 1, the allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
If (MU indicator==0) {		
RCID_IE()	*variable*	
}		
If (Dedicated MIMO DL Control Indicator == 1) {	-	-
Dedicated MIMO DL Control IE ()	*variable*	
}		
Duration	10	Duration in slots
Allocation Period (ap)	5	Period of the persistent

		allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
For (i=0; i<N_layer; i++) {	-	-
If (MU indicator==1) {		
RCID IE()	*variable*	
}		
DIUC	4	
Repetition coding indication	2	0b00: No Repetition coding 0b01: Repetition coding of 2 used 0b10: Repetition coding of 4 used 0b11: Repetition coding of 6 used
If (ACK disable== 0) {		
ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-bursts as defined in 8.4.5.4.25.
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
ACID	4	-
AI_SN	1	Initial AI_SN for each ACID
SPID	2	-
}		
}		
}		
Padding	*variable*	Padding to nibble; shall be set to 0.
}		

Table 361 – Persistent MIMO DL STC HARQ Subburst IE format

Syntax	**Length (bits)**	**Comments**
Persistent_MIMO_DL_STC_HARQ_Sub-Burst_IE() {		

N sub burst	4	Number of sub-bursts in the 2D rectangular region is this field value plus 1
For (j=1;j<Number of sub bursts; j++) {		
Tx count	2	0b00: initial transmission 0b01: odd retransmission 0b10: even retransmission 0b11: Reserved
Duration	10	Duration in slots
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the lowest numbered OFDM symbol and the lowest numbered subchannel in the HARQ region:
Allocation flag	1	1= allocate; 0= de-allocate
RCID_IE()	*variable*	
ACK disable	1	When ACK Disable == 1, the allocated subburst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.25). In this case, no ACK channel is allocated for the subburst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN and SPID, which shall be set to 0 by BS if they exist. The CRC shall be appended at the end of each sub-burst regardless of the ACK disable bit.
Reserved	1	Shall be set to 0
If (Tx count == 00) {		
Dedicated MIMO DL Control Indicator	1	
If (Dedicated MIMO DL Control Indicator == 1) {	-	-
Dedicated MIMO DL Control IE ()	*variable*	
}		
DIUC	4	
Repetition coding indication	2	0b00: No Repetition coding 0b01: Repetition coding of 2 used 0b10: Repetition coding of 4 used

		0b11: Repetition coding of 6 used
If (ACK disable== 0) {		
ACK channel	8	Indicates the ACK channel to be used for this sequence of sub-bursts as defined in 8.4.5.4.25.
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
ACID	4	-
}		
}		
}		
Padding	*variable*	Padding to nibble; shall be set to 0.
}		

8.4.5.4.4.2 UL-MAP Extended-2 IE format

Modify Table 368 as follows.

Table 368 - Extended-2 UIUC code assignment for UIUC = 11

Extended-2 Type (hexadecimal)	Usage
00	CQICH Enhanced Allocation IE
01	HO Anchor Active UL-MAP IE
02	HO Active Anchor UL-MAP IE
03	Anchor BS Switch IE
04	UL Sounding Command IE
05	*Reserved*
06	MIMO UL Enhanced IE
07	HARQ UL MAP IE
08	HARQ ACKCH Region Allocation IE
09	MIMO UL Basic IE
0A	Mini-subchannel allocation IE
0B	Persistent HARQ UL MAP IE
0C…0D	*Reserved*
0E	AAS SDMA UL IE
0F	Feedback Polling IE

Deleted: 0B

Add a new section to 8.4.5.4.24

8.4.5.4.24.3 Uplink Persistent Allocations

Uplink persistent allocations are used by the base station to make uplink time-frequency resource assignments which repeat periodically. The logical time-frequency resource assigned using the Persistent HARQ UL MAP IE repeats at a periodic interval. Uplink persistent allocations are not compatible with the HARQ ACK bitmap. Therefore, the base station shall set the value ACK Disable field to 1 in the sub-burst IEs within the Persistent HARQ UL MAP for uplink persistent allocations.

Table 423 - Persistent HARQ UL MAP IE

Syntax	**Length (bits)**	**Comments**
Persistent HARQ_UL-MAP_IE() {		
Extended 2- UIUC	4	Persistent HARQ_UL-MAP_IE() = 0x0B
Length	8	Length of the IE
RCID Type	2	0b00: Normal CID 0b01: RCID11 0b10: RCID7 0b11: RCID3
Reserved	2	
While (data remains) {	-	-
Mode	3	Indicates the mode of this IE: 0b000: Chase HARQ 0b001: Incremental redundancy HARQ for CTC 0b010: Incremental redundancy HARQ for convolutional code 0b011: MIMO Chase HARQ 0b100: MIMO IR HARQ 0b101: MIMO IR HARQ for convolutional code 0b110: MIMO STC HARQ 0b111: Reserved
Allocation Start Indication	1	0: No allocation start information 1: Allocation start information follows
If (Allocation Start Indication ==1) {	-	-
OFDMA Symbol offset	8	This value indicates start symbol offset of subsequent subbursts in this Persistent HARQ UL MAP IE with reference to the start of the

		UL sub-frame.
Subchannel offset	7	This value indicates start Subchannel offset of subsequent subbursts in this Persistent HARQ UL MAP IE
Reserved	1	Shall be set to zero
}	-	-
N sub-bursts	4	Number of sub-bursts in this Persistent HARQ UL MAP IE is this field value plus 1.
For (i=0;i<Number of sub-burst; i++) {		
Allocation Period (ap)	5	Period of the persistent allocation (0 = non-persistent, unit is frame)
Slot Offset	10	Indicates the start of this persistent allocation in OFDMA slots, with respect to the start of the UL subframe if an allocation start indication is not included in this IE and with respect to OFDM symbol offset and subchannel offset if an allocation start indication is included in this IE
Number of ACID (N_ACID)	4	Number of HARQ channels associated with this persistent assignment is this field value plus 1
Allocation flag	1	1= allocate; 0= de-allocate
If (mode == 000) {		
UL HARQ Chase Sub-Burst IE ()		
} else if (mode == 001) {		
UL HARQ IR CTC Sub-Burst IE ()		
} else if (mode == 010) {		
UL HARQ IR CC Sub-Burst IE ()		
} else if (mode == 011) {		
MIMO UL Chase HARQ Sub-Burst IE ()		
} else if (mode == 100) {		
MIMO UL IR HARQ Sub-Burst IE ()		
} else if (mode == 101) {		
MIMO UL IR HARQ for CC Sub-Burst IE ()		
} else If (mode == 110) {		
MIMO UL STC HARQ Sub-Burst IE ()		
}		

}		
}		
Padding	*Variable*	Padding to byte; shall be set to 0
}		

In the UL subframe for which the MS fails to receive the relevant UL MAP, the MS shall not send data bursts using the persistently assigned time-frequency resource.

Slot Offset

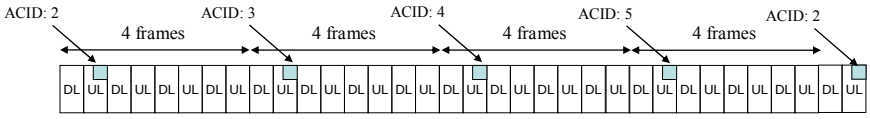
The slot offset shall be set to the first slot in the time-frequency resource assignment. The slot offset is defined with respect to the lowest numbered slot of the UL subframe if an allocation start indication is not included in this IE, and the slot offset is defined with respect to the indicated OFDM symbol offset and subchannel offset if an allocation start indication is included in this IE.

Allocation flag

The allocation flag shall be set to 1 if the sub-burst IE is allocating time-frequency resources and shall be set to 0 if the sub-burst IE is de-allocating time-frequency resources.

Number of ACID

The Number of ACID (N_ACID) shall be set to one less than the number of HARQ channel identifiers (Num_HARQ_Chan) for this persistent allocation. The Number of ACID and ACID fields are used together to establish an implicit cycling of ACID as follows. If Num_HARQ_Chan is greater than 1, and if the allocation period is greater than 0, the ACID corresponding to the first occurrence of the persistent allocation corresponds to the ACID field, and the ACID corresponding to the second occurrence of the persistent allocation corresponds to the ACID field + 1, etc. The ACID corresponding to the Num_HARQ_Chanth occurrence of the persistent allocation corresponds to the ACID field + Num_HARQ_Chan – 1, and the ACID corresponding to the (Num_HARQ_Chan + 1)th occurrence of the persistent allocation corresponds to the ACID field. This process is repeated for additional occurrences of the persistent allocation. As illustrated below, if the allocation period equals 4, if N_ACID = 0b0011 (Num_HARQ_Chan = 4), and if ACID = 2, the ACID follows the pattern 2, 3, 4, 5, 2, 3, 4, 5, etc.



Sub-burst IEs

ACID

The ACID field shall be set to the beginning ACID as described above.

AI_SN

The AI_SN shall be set to the initial AI_SN for each ACID in the sequence of ACID values. The AI_SN shall toggle from 1 to 0 or 0 to 1 for each occurrence of a particular ACID. For example, if the allocation period equals 4, if Num_HARQ_Chan = 4, if ACID = 2, and if AI_SN = 0, the ACID follows the pattern 2, 3, 4, 5, 2, 3, 4, 5, etc and the AI_SN follows the pattern 0, 0, 0, 0, 1, 1, 1, 1, etc.

SPID

Defines subpacket identifier, which is used to identify the four subpackets generated from an encoder packet. The SPID field only applies to FEC modes supporting incremental redundancy. The SPID numbering shall follow the rules for subpacket generation of section 6.3.17.1 Subpacket generation.

References:

[1] Draft Standard for Local and Metropolitan Area Networks; Part 16: Air Interface for Broadband Wireless Access Systems; **P802.16Rev2/D2 (December 2007)**

[2] Contribution C80216maint-08_xxx.doc; Baseline Persistent Allocation IE for Chase Combine HARQ