Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	**Persistent Allocation – Data Delivery Type Indication**	
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Re:	Ballot 26c	
Abstract	The grant per terminal mechanism is a fundamental philosophy of 802.16; it allows the MS to decide 'what is the best packet' to send in a specific uplink allocation. However, the MS has no way of knowing what's the Base Station's QoS 'plan' for the allocation and therefore its choice of the 'best packet' may not in fact be the correct choice. We propose to help the MS make the right choice.	
Purpose	Accept the proposed specification changes on IEEE P802.16Rev2/D4.	
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Data Delivery Type Indication

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Introduction

The grant per terminal mechanism is a fundamental philosophy of 802.16; it allows the MS to decide 'what is the best packet' to send in a specific uplink allocation;

However, the MS has no way of knowing what's the Base Station's QoS 'plan' for the allocation and therefore its choice of the 'best packet' may not in fact be the correct choice. We propose to help the MS make the right choice.

Consider the case:

- The MS may put VoIP packet in an allocation intended for BE; the BS scheduler will have low PER and high latency QoS goal associated with this allocation; it is unlikely that the VoIP packet will be delivered in time.
- The MS puts high priority MAC signalling packet in an allocation intended for VoIP; the target PER for MAC signalling should be lower than VoIP; the BS scheduler will only try one or two retransmissions and give up. The MAC messages would be lost

Other problematic use case can also be envisioned

Proposed Solution

Add a two bits indication to the UL Persistent Allocation IEs to signal the base station's 'plan' for the allocation. We call this indication Data Delivery Type indication. Data Delivery types are defined in section 6.3.20.1

Data Delivery Type Indication

Type 0 → UGS/ERT-VR
Type 1 → RT-VR
Type 2 → NRT-VR/BE
Type 3 → MAC Management

Note that the MS can still use the allocation for any transport or management CID regardless of the Data Delivery Type Indication. There is not need to change the Grant per Terminal mechanism of 802.16. This indication simply helps the MS to make the best choice of which packet to place in the allocation.

Proposed Text Changes

Add to table as shown

Table 439 - Persistent UL HARQ Chase Subburst IE format

Syntax	Length (bits)	Comments
Persistent UL HARQ Chase Sub-Burst IE {		
Allocation Flag	1	1 = allocate 0 = de-allocate
If (Allocation Flag == 0) {		
RCID_IE()	*variable*	--
…		…
…		…
…		…
…		…
If (Allocation Flag == 1) {		
RCID_IE()	*variable*	--
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
Persistent Flag	1	0 = non-persistent 1 = persistent
Duration	*variable*	Duration in slots. OFDMA Frame duration dependant 7 bits – 2.5 ms frame 8 bits – 5 ms frame 9 bits – 10 ms frame 10 bits – 20 ms frame
…		…

Data Delivery Type indicator

Indicates the type of data delivery the base station is intending for this allocation. This indication aids the MS in selecting the service flow for this allocation. However, it should be noted that the MS can select any service flow for this allocation subject to MS UL scheduler implementation

Add to table as shown

Table 440 - Persistent UL HARQ IR CTC Subburst IE format

Syntax	Length (bits)	Comments
Persistent UL HARQ IR CTC Sub-Burst IE {		
Allocation Flag	1	1 = allocate 0 = de-allocate
If (Allocation Flag == 0) {		
RCID_IE()	*variable*	--
…		
…		

If (Allocation Flag == 1) {		
RCID_IE()	*variable*	--
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
Persistent Flag	1	0 = non-persistent 1 = persistent
Duration	*variable*	Duration in slots. OFDMA Frame duration dependant 7 bits – 2.5 ms frame 8 bits – 5 ms frame 9 bits – 10 ms frame 10 bits – 20 ms frame
…		…

Add to table as shown

Table 441 - Persistent UL HARQ IR CC Subburst IE format

Syntax	Length (bits)	Comments
Persistent UL HARQ IR CC Sub-Burst IE {		
Allocation Flag	1	1 = allocate 0 = de-allocate
If (Allocation Flag == 0) {		
RCID_IE()	*variable*	--
…		
…		
…		
If (Allocation Flag == 1) {		
RCID_IE()	*variable*	--
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
Persistent Flag	1	0 = non-persistent 1 = persistent
Duration	*variable*	Duration in slots. OFDMA Frame duration dependant 7 bits – 2.5 ms frame 8 bits – 5 ms frame 9 bits – 10 ms frame 10 bits – 20 ms frame
…		…

Add to table as shown

Table 442 – Persistent MIMO UL Chase HARQ IR CC Subburst IE format

Syntax	Size (bits)	Notes

Persistent_MIMO_UL_Chase_HARQ_Sub-Burst_IE() {		
MU Indicator	1	Indicates whether this UL burst is intended for multiple MS 0 = Single MS 1 = multiple MS
Allocation Flag	1	1 = allocate 0 = de-allocate
Dedicated MIMO UL Control Indicator	1	0 == MS shall use the stored Dedicated MIMO UL Control information from the last burst allocation where this information was included. 1 = MS uses the Dedicated MIMO UL control information is this IE
…		
…		
…		
If (Allocation Flag == 1) {		
RCID_IE()	*variable*	--
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
If (Dedicated MIMO UL Control indicator == 1) {		
Dedicated MIMO UL Control IE ()	*variable*	
}		
Persistent Flag	1	0 = non-persistent allocation 1 = persistent allocation
Duration	*variable*	See definition above in this IE
…		
…		
If (MU Indicator == 1) {		
If (Dedicated MIMO UL Control indicator == 1) {		
Dedicated MIMO UL Control IE ()	*variable*	
}		
Layer Relevance Bitmap	4	4 bit bitmap indicating if layer processing should be skipped in the subsequent 'for loop'. The bit position indicates the layer. The bit value: 0 = skip the layer; 1 = process the layer
For (i=0; i<N_Layers; i++) {		
…		
…		
…		
If (Allocation Flag == 1) {		
RCID IE ()	*variable*	
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
Persistent flag	1	
…		
…		

Add to table as shown

Table 443 – Persistent MIMO UL IR HARQ Subburst IE format

Syntax	Size (bits)	Notes
Persistent_MIMO_UL_IR_HARQ_Sub-Burst_IE() {		
MU Indicator	1	Indicates whether this UL burst is intended for multiple MS 0 = Single MS 1 = multiple MS
Allocation Flag	1	1 = allocate 0 = de-allocate
Dedicated MIMO UL Control Indicator	1	0 == MS shall use the stored Dedicated MIMO UL Control information from the last burst allocation where this information was included. 1 = MS uses the Dedicated MIMO UL control information is this IE
If (MU Indicator == 0) {		
…		
…		
…		
If (Allocation Flag == 1) {		
RCID_IE()	*variable*	--
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
If (Dedicated MIMO UL Control indicator == 1) {		
Dedicated MIMO UL Control IE ()	*variable*	
}		
Persistent Flag	1	0 = non-persistent allocation 1 = persistent allocation
…		
…		
If (MU Indicator == 1) {		
…		
…		
…		
If (Allocation Flag == 1) {		
RCID IE ()	*variable*	
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
Persistent flag	1	
Slot Offset	*variable*	See definition above in this IE
…		
…		

Add to table as shown

Table 444 – Persistent MIMO UL STC HARQ Subburst IE format

Syntax	Size	Notes

	(bits)	
Persistent_MIMO_UL_STC_HARQ_Sub-Burst_IE() {		
Allocation Flag	1	--
if (Allocation Flag == 0) {		// De-allocate
…		
…		
…		
if (allocation flag ==1)		// allocation
RCID_IE()	*variable*	
Data Delivery Type Indicator	2	00 = UGS/ERT-VR 01 = RT-VR 10 = NRT-VR/BE 11 = MAC management
Persistent Flag	1	
If (Persistent Flag == 1) {		
Allocation period (ap)		
…		
…		