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Title	Access Messages for Direct Signaling in the AAS Relay Zone.	
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Re:	Working Group Letter Ballot #28, Technical Comments and Contributions regarding IEEE Project P802.16j; Draft Amendment P802.16/D1.	
Abstract	This contribution describes the Direct Signaling messages transmitted in the access channel of the AAS Relay Zone to accomplish ranging and bandwidth request and grant.	
Purpose	This document provides the necessary access messaging to properly accomplish ranging and bandwidth request/grant within the AAS Relay Zone for Direct Signaling mode of operation.	
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Access Messages for Direct Signaling in the AAS Relay Zone

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This document describes the access messages required to support bandwidth request/grant, range, frequency, power adjustment in Direct Signaling mode of operation within the AAS Relay Zone.

Background

Direct Signaling operation within the relay zone provides a bandwidth request mechanism that can scale with an M-fold increase in the number of users afforded by multi-user beamforming.

Section 8.4.4.7.2.3 of Draft Amendment P802.16j/D1 describes the AAS Relay Zone access channel but does not detail the access messaging required for managing channel descriptor request, initial bandwidth request/grant, codeword assignment, range/frequency/power adjustment.

Proposed Solution

The proposed solution is to describe the bandwidth request/grant mechanism and the required Direct Signaling Access Messages to accomplish it within the AAS Relay Zone.

Detailed Solution

The RLP is used to request bandwidth for ranging via the RLP purpose, request bandwidth for transport via the RLP purpose, transport CID, and queue depth, or to request the compact or full channel descriptor (as described in 8.4.4.7.2.3.3) via the RLP purpose.

The following table defines the AAS_RLP Message structure:

RLP Component	Bits	Reps	Slot	Comment
AAS_RLP Message {				
CID	16	1		Transport CID
Queue Depth	2	1		Sized for 4 levels
RLA Purpose	4	1		value 0=Transport BW Request 1=Ranging BW Request 2=Compact Chan Description Req 3=Full Chan Description Req
Reserve	18	1		Reserved for Future use
CRC	8	1		CRC-8
}				
Total RLP Bits	48		1	

The FLP provides code word assignments during initial ranging and provides bandwidth grant, codeword assignment, supportable MCS for UL/DL, and range time/frequency/power adjustment during the bandwidth grant exchange.

The following table defines the AAS_FLP Message structure:

FLP Component	Bits	Reps	Slot	Comment
AAS_FLP Message {				
Partition grant	42	1		
DL MCS level	3	1		
UL Differential MCS	2	1		
UL Range Error	2	1		
UL Frequency Error	2	1		
UL PwrCtrl, 2 b/prt	12	1		
UL Access PwrCtrl, 2 b/prt	2	1		
Assigned Codeword Index	16	1		
Codeword Type	1	1		0=access, 1=transport
Reserve	6	1		
CRC	8	1		
}				
Total FLP Bits	96		2	

Proposed Text Changes

Insert the following subclause:

8.4.4.7.2.3.4 AAS Relay Zone Access Channel Messaging

8.4.4.7.2.3.4.1 Reverse Link Payload Message

The RLP is used to request bandwidth for ranging via the RLP purpose, request bandwidth for transport via the RLP purpose, transport CID, and queue depth, or to request the compact or full channel descriptor (as described in 8.4.4.7.2.3.3) via the RLP purpose.

Insert Table 2xx (.16e)/Table 3xx (Rev2) as indicated:

Syntax	Size	Notes
AAS_RLP() {		
RLA Purpose	4 bits	0x0 = Transport Bandwidth Request 0x1 = Ranging Bandwidth Request 0x2 = Compact Channel Description Request 0x3 = Full Channel Description Request 0x4-0xF = <i>Reserved</i>
CID	16 bits	Transport CID
Qdepth	2 bits	Qdepth level 0b00 = level1 0b01 = level2 0b10 = level3 0b11 = level4
<i>Reserved</i>	18 bits	Shall be set to zero
CRC	8 bits	CRC-8
}		

Insert the following parameter descriptions following Table 2xx (.16e)/Table 3xx (Rev2) as indicated:

RLA Purpose

The purpose for which the asynchronous access is being requested, including:

0x0 = Transport Bandwidth Request

0x1 = Ranging Bandwidth Request

0x2 = Compact Channel Description Request as described in section 8.4.4.7.2.3.3

0x3 = Full Channel Description Request as described in section 8.4.4.7.2.3.3

CID

Transport CID for which a bandwidth request is being made

Qdepth

Qdepth level of the transport CID that is requesting bandwidth. Four levels can be described.

CRC

CRC-8 covers the whole slot

8.4.4.7.2.3.4.1 Forward Link Payload Message

The FLP provides code word assignments during initial ranging and provides bandwidth grant, codeword assignment, supportable MCS for UL/DL, and range time/frequency/power adjustment during the bandwidth grant exchange.

Insert Table 2xx (.16e)/Table 3xx (Rev2) as indicated:

Syntax	Size	Notes
AAS FLP() {		
Partition Grant	42 bits	7 bits per partition -
DIUC	3 bits	
UIUC offset	2 bits	Differential offset from the DIUC index
UL Range Adjust	2 bits	Encoded step adjustments
UL Frequency Adjust	2 bits	Encoded step adjustments
UL Partition Power Adjust	12 bits	2 bits encoded adjustment per described partition
UL Access Power Adjust	2 bits	Encoded step adjustments
Assigned Codeword Index	16 bits	
Codeword Type	1 bit	0 = Access codeword 1=Transport codeword
<i>Reserved</i>	6 bits	Shall be set to zero
CRC	8 bits	CRC-8
}		

Insert the following parameter descriptions following Table 2xx (.16e)/Table 3xx (Rev2) as indicated:

Partition Grant

7 bits per partition

DIUC

DIUC

UIUC Offset

Offset from the DIUC

UL Range Adjust

Range Adjustment.

UL Power Adjust

Power adjustment for the bearer partitions (up to 6 described in the partition grant control)

UL Access Power Adjust

Power adjustment for the access channel

Assigned Codeword Index

Assigned codeword (may be RLA or RLT)

Codeword Type

Describes the response type (assigning RLA or RLT)

CRC

CRC-8 covers the whole slot