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Title	**CQICH Reporting in Centralized Scheduling**
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Re:	This is in response for call for comments on P80216j/D1
Abstract	Efficient CQICH reporting for optimum scheduling and reducing overhead in MR system
Purpose	Review and adopt
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CQICH reporting in Centralized scheduling

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Introduction

In centralized scheduling, MR-BS controls and schedules the resources on relay and access link. In order to make efficient scheduling, MR-BS requires knowledge of channel qualities of relay links and access links. In IEEE p802.16j/D1, no mechanism is defined for CQI parameter reporting therefore, MR-BS cannot implement centralized scheduling efficiently. Therefore need some mechanism to fix this issue.

Proposed Remedy

In IEEE 802.16-2004 and 802.16e-2005, CQICH channel is defined to provide channel quality feedback. In general, CQI feedback requires 1 UL OFDM Slot for reporting. Extending same scheme over multi-hop will introduce significant overhead. This contribution proposes bandwidth efficient CQI parameter reporting, which is based on differential CQI reporting. Differential CQI parameter reporting will require fewer resources therefore multiple MS can be mapped on a 6-bit CQICH channel.

Specification changes

[Insert new sub clause 8.4.5.4.10.16]

8.4.5.4.10.16 Fast feedback reporting in MR system for enhanced fast feedback channel

In multi-hop relay system with centralized scheduling, MR-BS may configure RS to report on the relay link, either full or differential fast feedback reporting using enhanced fast feedback channel. Differential fast feedback reporting uses less than one UL slot; therefore RS can map multiple MS's fast feedback information on the one fast feedback channel defined by Figure 285.

Differential feedback reporting can be used to report either physical CINR feedback or effective CINR feedback.

MR-BS may allocate MR-Fast-Feedback region on the relay link for forwarding MS CQI parameters reports using MR-Fast-Feedback region allocation IE as defined in Table xxa.

Table xxa- MR-Fast-Feedback region allocation IE format

Syntax	Size (in bits)	notes
MR-Fast-Feedback region allocation IE {		
Type	5	02
Length	4	Length in bytes
OFDMA Symbol offset	8	-

Subchannel offset	7	-
No. OFDMA symbols	7	-
No. subchannels	7	-
Full_differential_feedback_reporting	1	0 = full feedback reporting 1 = differential feedback reporting
If(full_differential_feedback_reporting = 1) {	-	-
N_agg	1	0 = differential feedback of 2 MSs mapped to 1 fast feedback channel 1 = differential feedback of 3 MSs mapped to 1 fast feedback channel
}		
N_CID	4	Number of RS CID
For(i=0; i < N_CID; i ++) {	-	-
RCID_IE()	Variable	Reduced CID of RS
Offset	8	Starting position in the fast feedback region where RS reports the MS's fast feedback information
}	-	-
}	-	-

Access RS performs the differential feedback reporting on behalf of MS. Access RS extracts the MSs fast feedback channel information from CQICH_Allocation_IE or CQICH_enhanced_allocation_IE transmitted in UL-MAP. When access RS perform the differential feedback reporting, it uses N_agg field of MR-Fast-Feedback region allocation IE for aggregating differential feedback reporting for 2 or 3 MSs on a single fast feedback channel according to Tables xxb and xxc, respectively.

The 6-bits payload of enhanced fast feedback channel used in Table 298d is constructed by aggregating the payload bits from Table xxb or Table xxc, starting from the most significant bits to least significant bits. The access RS aggregates the payloads of the corresponding MSs in the 6-bit enhanced fast-feedback channel in the UL relay zone, starting with the MSB and ending with LSB. The aggregation is performed in the order of the feedback information received in the UL access zone by the RS. Dummy payload bits corresponding to dummy MS are set to zeros, and these bits may be used to fill the payload of the fast-feedback channel.

Table xxb: 3 bit Differential Fast feedback encoding per differential CQI report with 8 steps of quantization

Differential Fast feedback channel (differential CQICH channel) 3 bit differential CQI parameter reporting	
Quantization step	Payload bits
+3	011

+2	010
+1	001
0	000
-1	101
-2	110
-3	111
-4	100

Table xxc : 2 bit differential feedback encoding per differential CQI report with 4 steps of quantization

Differential Fast feedback channel (differential CQICH channel) 2 bit differential CQI parameter reporting	
Quantization step	Payload bits
+1	01
0	00
-1	11
-2	10

Access RS stores the last received full feedback information of the MSs and performs the differential feedback reporting based on received feedback information and last stored full feedback information. Access RS quantize the difference into either 8 or 4 steps according to Tables xxb or xxc, respectively. If the difference of the two full feedback information is outside the range of supported number of quantization steps, then RS reports the closest quantization step for differential feedback reporting.

When access RS is requested to transmit differential feedback reporting, it transmits the differential feedback information to super-ordinate RS according to the same order in which it receives the fast feedback reporting from the MSs in the fast feedback region of the UL access zone.

Intermediate RSs simply forward to super-ordinate station, the fast feedback information received on the relay zone. When RS forwards the fast feedback information to super-ordinate station, it puts the differential fast feedback information corresponding to its access zone before the fast feedback information received on the relay zone.

[insert following line before reserved field of table 496c]

02	MR-Fast-feedback region allocation IE