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Title	**The 2nd fast feedback channel region to reduce transfer delay of fast feedback data for 2-hop MR system**
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Re:	This is a response to Call for Technical Proposals regarding IEEE project P802.16j
Abstract	In this contribution, we propose the 2nd fast feedback channel region between RS and MR-BS
Purpose	Adoption of the proposed text and tables
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The 2nd fast Feedback channel region to reduce transfer delay of fast feedback data for 2-hop MR system

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1. Motivation

Generally, the fast feedback data in uplink fast feedback channel should be transferred as fast as possible. If MS sends the feedback data to MR-BS via RS with one or more frame transfer delays, the channel adaptation for MS can not be performed promptly by MR-BS. Therefore, the additional feedback channel region for rapid and accurate transmission of feedback data of MS in RS area is required. On the other hand, CQI is not seriously affected by transfer delay. However, If CQI can be also transmitted to MR-BS in a frame, MR-BS can easily control the CQICH allocation of MSs. Therefore, this additional feedback channel region can be also used to transfer the CQI of MS. Consequently, in our proposal, MR-BS can obtain the feedback data and CQI from MS in a frame by inserting another fast feedback channel region within RB period where RS can send the uplink data to MR-BS. Therefore, we can expect to get better system performance if the transfer delay can be reduced by the proposed fast feedback channel region.

2. Suggested Remedy

2.1 Proposed Fast Feedback Channel Structure for 2-hop MR system

Figure 1 shows the example of feedback channel allocation in the case of using two fast feedback channel regions in a frame. In order to reduce the transfer delay of fast feedback data, we propose another fast feedback channel region in addition to conventional one. This 2nd fast feedback channel region may be located within RB period where RS can send the uplink data to MR-BS. However, the location of 2nd fast feedback channel region which is informed by additional fast feedback allocation IE can be changed according to the position of RB period. The time-slot difference between the 1st and 2nd fast feedback channel region must be considered in the view of the processing time which is the time to retransmit the feedback data of MS1 to MR-BS after processing it. In RB period, MR-BS sets up the Tx fast feedback channel for RS in order to transmit fast feedback data and also sets up the Rx fast feedback channel for MR-BS to receive fast feedback data.

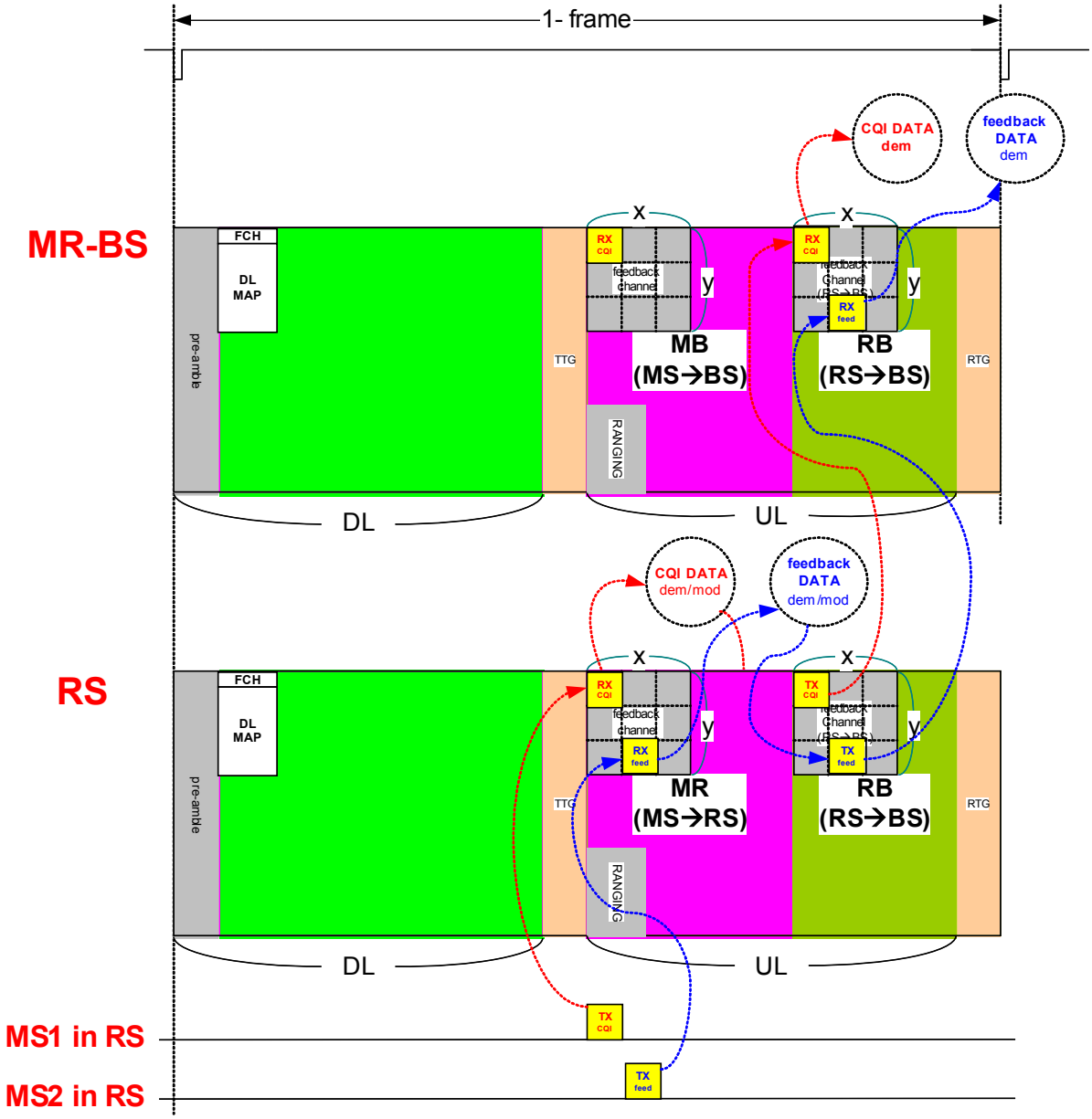

Figure 1. The example of fast feedback channel allocation in the case of using two fast feedback channel regions in a frame

Figure 2 shows the process diagram for the proposed fast feedback channel allocation. First of all, MR-BS broadcasts the 1st fast feedback channel allocation information by using FAST_FEEDBACK allocation IE. Therefore, all MSs and RSs in MR-BS can know the 1st fast feedback channel region. In the case of MS1 in MR-BS area, MR-BS allocates the fast feedback channel #n for MS1. After measuring downlink channel quality information, MS1 sends the fast feedback data through fast feedback channel #n and MR-BS can detect the fast feedback data of MS1.

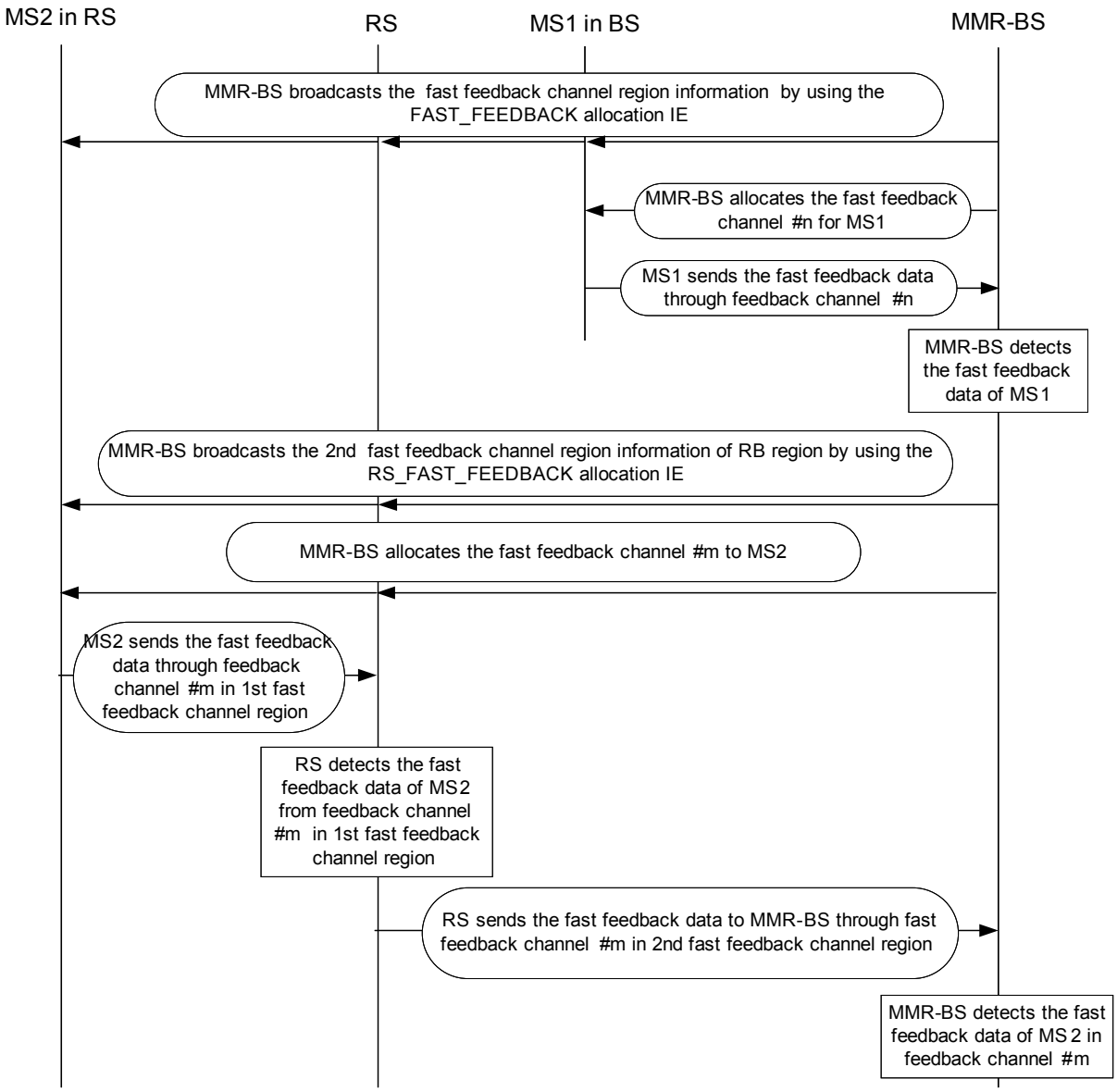

Figure 2. The process diagram for the proposed fast feedback channel allocation

In the case of MS2 in RS area, after broadcasting the 2nd fast feedback channel allocation information by using the RS_FAST_FEEDBACK allocation IE, MR-BS and RS allocate the 2nd fast feedback channel region within RB region. MR-BS allocates the fast feedback channel #m in 1st feedback channel region to MS2. And then, MS2 sends the fast feedback data through feedback channel #m. RS detects the fast feedback data of MS2 from feedback channel #m in the 1st fast feedback channel region. And then, RS sends the fast feedback data to MR-BS through feedback channel #m in 2nd fast feedback channel region. Finally, MR-BS detects the fast feedback data of MS2 from feedback channel #m in 2nd fast feedback channel region. Generally, the 2nd fast feedback channel with the same size of 1st fast feedback

channel should be allocated within RB period. Optionally, BS may allocate different size of region for the 1st and 2nd fast feedback channels. In this case, BS shall provide the RS with the mapping table of the 1st and the 2nd fast feedback channels. But this kind of method is also ignored in this contribution due to the complexity of pre/post processing.

3. Proposed Text Changes

[*insert section 8.4.5.29 as follow*]

8.4.5 Map message fields and IEs

8.4.5.4.29 RS-FAST-FEEDBACK allocation IE

MR-BS may place RS-FAST-FEEDBACK allocation IE() in the UL-MAP to allocate RS-FAST-FEEDBACK region. RS forwards the fast feedback messages from MS to MR-BS through RS-FAST-FEEDBACK region. The format of RS-FAST-FEEDBACK allocation IE is defined in Table xxx.

Table xxx. RS-FAST-FEEDBACK allocation IE Format

Syntax	Size	Notes
RS_FAST_FEEDBACK allocation IE {		
OFDMA symbol offset	8 bits	
Subchannel offset	7 bits	
No. OFDMA symbols	7 bits	
No. subchannels	7 bits	
Reserved	3 bits	
}		

4. References

[1] The 2nd fast feedback channel region to reduce transfer delay of fast feedback data for 2-hop MMR system, C802.16j-06_120.doc, Ki Seok Kim, Hyunjae Kim, Sungcheol Chang, Young-il Kim, Kyu Ha Lee, Changkyoon Kim, ETRI, Samsung Thales