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Re:	IEEE 802.16j-07/013: "Call for Technical Comments Regarding IEEE Project 802.16j"
Abstract	This contribution provides R-FCH
Purpose	Text proposal for 802.16j Baseline Document
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R-FCH for Relay Zone

Introduction

In IEEE 802.16j-026r3, there are three issues in section 8.4.4.7.3 R-FCH channel:

(1) The subchannel allocation of R-FCH in RS_Zone with FUSC or AMC permutation is not defined

(2) FEC Code type and modulation type is not flexible enough.

(3) RS-Zone prefix format for 128 FFT is not defined whose length is only 12 bits.

Remedy

If RS_Zone is FUSC or AMC permutation, the R-FCH shall be allocated as follows. For FFT sizes other than 128, the first 4 slots in the downlink part of subchannel contain the R-FCH. These slots contain 48 bits modulated by QPSK with coding rate 1/2 and repetition coding of 4. For FFT-128, the first slot in the downlink part of the subchannel is dedicated to R-FCH and repetition is not applied. Figure 3d depicts this structure.

Figure 3c R-FCH subchannel allocation for FUSC or AMC zone
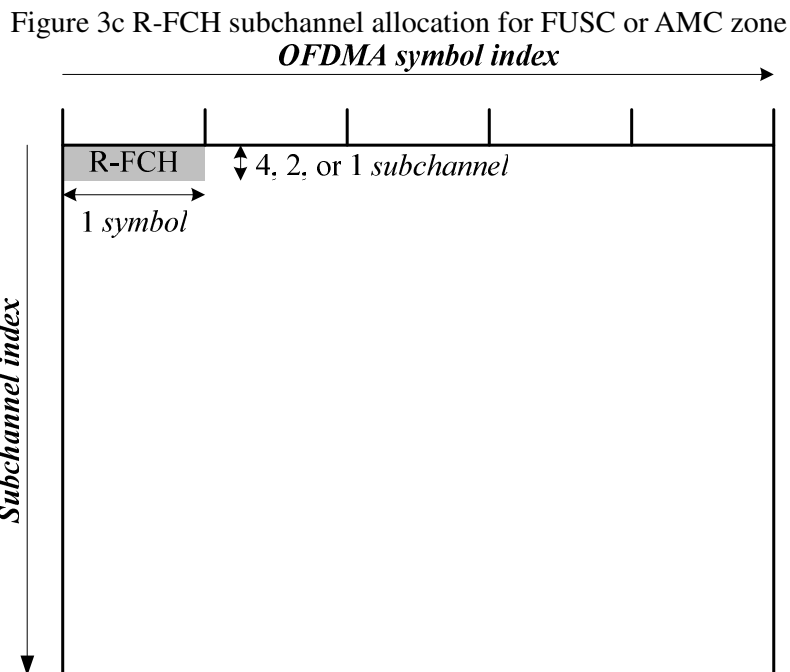
The R-FCH shall be transmitted using QPSK rate 1/2 with four repetitions using the mandatory coding scheme (i.e., the R-FCH information will be sent on four subchannels with successive logical subchannel numbers). For FFT sizes other than 128, **the 24-bit DL Frame Prefix shall be duplicated to form a 48-bit block**, which is the minimal FEC block size. For the case of 128 FFT, the following compressed format shall be used for R-FCH. Before being mapped to the R-FCH, **the 12-bit DL Frame Prefix shall be repeated four times to form a 48-bit block**, which is the minimal FEC block size.

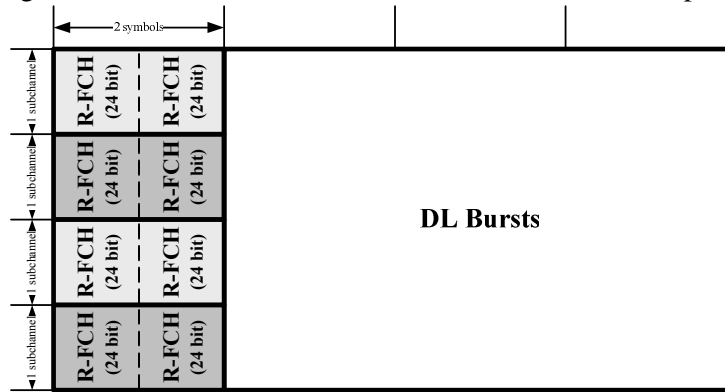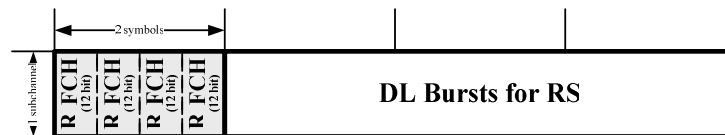Figure 3a OFDMA FCH allocation for all FFT sizes except 128

1 subchannel	R-FCH (24 bit)	R-FCH (24 bit)	
1 subchannel	R-FCH (24 bit)	R-FCH (24 bit)	
1 subchannel	R-FCH (24 bit)	R-FCH (24 bit)	**DL Bursts**
1 subchannel	R-FCH (24 bit)	R-FCH (24 bit)	

Figure 3b OFDMA FCH allocation for 128 FFT

1 subchannel	R FCH (12 bit)	R FCH (12 bit)	R FCH (12 bit)	R FCH (12 bit)	**DL Bursts for RS**

Text Proposal

8.4.4.7.2 Frame structure for non-transparent mode

[Change the following text as indicated]:

8.4.4.7.2.1 MR-BS frame structure

The first non-AAS DL Relay_Zone shall include a R-FCH and a R-MAP. In the DL Relay_Zone, the subchannel allocation may be the same as that in the DL Access_Zone. The R-FCH may be the same as the CH in the DL Access_Zone. Other attributes of the MR-BS frame and the RS frame such as transition between modulation and coding presence of multiple zones, may be the same as those described in 8.4.4.2.

[Change the following text as indicated]:

8.4.4.7.2.2 Relay frame structure

The R-FCH and the R-DL-MAP shall be transmitted in the first non-AAS DL Relay zone that is in Tx mode

[Change the following text as indicated]:

8.4.4.7.3 R-FCH channel

If a DL RS_Zone contains a R-FCH channel, the R-FCH channel shall be transmitted as FCH described in 8.4.4.2. The R-FCH contains the RS-Zone Prefix as described in 8.4.4.7.4. In case that RS_Zone is PUSC permutation, the subchannel of R-FCH shall be allocated as FCH described in 8.4.4.4. In case that RS_Zone is FUSC or AMC permutation, the first 4 slots in the downlink part of subchannel contain the R-FCH for FFT sizes other than 128. The first slot in the downlink part of the subchannel is dedicated to R-FCH for FFT-128.

[Change the following text as indicated]:

8.4.4.7.4 RS-Zone prefix

The RS-Zone prefix is a data structure transmitted on R-FCH of a DL RS_Zone. The RS-Zone prefix includes information regarding the location of the first RS_Zone in the next frame and the information required for decoding R-MAP. Table XXX defines the format of RS_Zone prefix.

Table xxx-a: RS-Zone prefix format for all FFT sizes except 128

Syntax	Size(bits)	Notes
RS_Zone_Prefix_format () {		
RS_Zone location	8~~7~~	The field indicates the OFDM symbol index reference to the beginning of next frame in unit of ~~2~~ OFDM symbol~~s~~
If(RS_Zone is PUSC zone) {		
Used_subchannel_bitmap	6	Bit #0: Subchannel group 0 Bit #1: Subchannel group 1 Bit #2: Subchannel group 2 Bit #3: Subchannel group 3 Bit #4: Subchannel group 4 Bit #5: Subchannel group 5
} else {		
Reserved	6	Shall be zero
}		
R-MAP length	5	Length in unit of slot
FEC Code type and modulation type	~~5~~4	0b0000 = QPSK (CTC) 1/2 0b0001 = QPSK (CTC) ¾3/4 0b0010 = 16-QAM (CTC) 1/2 0b0011 = 16-QAM (CTC) 3/4 0b0100 = 64-QAM (CTC) 1/2 0b0101 = 64-QAM (CTC) 2/3 0b011~~1~~0 = 64-QAM (CTC) 3/4 0b~~1000~~111 = 64-QAM (CTC) 5/6 0b1000 = QPSK (CC) 1/2 0b1001 = QPSK (CC) 3/4 0b1010 = 16-QAM (CC) 1/2 0b1011 = 16-QAM (CC) 3/4 0b1100 = 64-QAM (CC) 1/2 0b1101 = 64-QAM (CC) 2/3 0b1110 = 64-QAM (CC) 3/4 ~~0b1001~~ 0b1111 reserved
Repetition_Coding_Indication	1	0: No repetition coding on R-MAP 1: Repetition coding of 2 used on R-MAP
}		

Table xxx-b: RS-Zone prefix format for 128 FFT

Syntax	Size(bits)	Notes
RS_Zone_Prefix_format () {		

Used subchannel indicator	1	0: Subchannel 0 is used for segment 0,
		   Subchannel 1 is used for segment 1,
		   Subchannel 2 is used for segment 2,
		1: Use all subchannels

R-MAP length	5	Length in unit of slot
FEC Code type and modulation type	4	0b0000 = QPSK (CTC) 1/2 0b0001 = QPSK (CTC) ¾3/4 0b0010 = 16-QAM (CTC) 1/2 0b0011 = 16-QAM (CTC) 3/4 0b0100 = 64-QAM (CTC) 1/2 0b0101 = 64-QAM (CTC) 2/3 0b0110 = 64-QAM (CTC) 3/4 0b0111 = 64-QAM (CTC) 5/6 0b1000 = QPSK (CC) 1/2 0b1001 = QPSK (CC) 3/4 0b1010 = 16-QAM (CC) 1/2 0b1011 = 16-QAM (CC) 3/4 0b1100 = 64-QAM (CC) 1/2 0b1101 = 64-QAM (CC) 2/3 0b1110 = 64-QAM (CC) 3/4 0b1111 reserved
Repetition_Coding_Indication	1	0: No repetition coding on R-MAP 1: Repetition coding of 2 used on R-MAP
reserved	1	Shall be zero
}		

RS_Zone location

An indicator regarding the location of RS_Zone in the next frame. The first OFDM symbol in each frame is indexed as 0. The RS_Zone location indicates the OFDM symbol index relative to the first OFDM symbol in next frame. The unit is 2 OFDM symbols.