Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Legacy Support Modes in D2 (15.3.3.5)**
Date Submitted	**2009-11-06**
Source(s)	Mark Cudak, Fred Vook, Bill Hillery, Anup Talukdar and Eugene Visotsky mark.cudak@motorola.com Motorola
Re:	Category: P802.16m/D2 comments for LB30a Area: Chapter 15.3.3.5 (Frame structure supporting WirelessMAN-OFDMA)
Abstract	The current backward compatibility modes in D2 do not meet the requirements for legacy support defined in the SRD. The document proposes changes to the frame structure to meet the goals of the SRD.
Purpose	Discuss and adopt
Notice	
Release	
Patent Policy	

Legacy Support Modes in D2 (15.3.3.5)

Mark Cudak, Fred Vook, Bill Hillery, Anup Talukdar and Eugene Visotsky
Motorola

1. Introduction

The current backward compatibility modes in D2 do not meet the requirements for legacy support in the SRD. Specifically, the performance does not scale with the fraction of deployed 16m mobiles. Modest changes to the frame structure and definition of backward compatibility are needed.

2. Problem

See the associated slides, S80216m-09_2310.pdf, for a detailed problem description of the problem.

3. Proposed Text Changes

<Modify section 15.3.3.5.1 as follows>

15.3.3.5.1 TDD frame structure

The WirelessMAN-OFDMA and the Advanced Air Interface frames shall be offset by a fixed number of subframes, FRAME_OFFSET = 1,2, ... , K as shown in Figure 478 and Figure 479. The FRAME_OFFSET of different ABSs shall be the same wthin the same deployment region. When the Advanced Air Interface frames support the WirelessMAN-OFDMA for 5, 10, 20 MHz channel bandwidths, all subframes in the Advanced Air Interface DL Zone are type-1 subframes. The number of symbols in the WirelessMAN-OFDMA DL Zone is 5+6·(FRAME_OFFSET-1). When the Advanced Air Interface frames support the WirelessMAN-OFDMA for the 8.75 MHz channel bandwidth with 15 UL OFDM symbols and for the 7 MHz channel bandwidth with 12 UL OFDM symbols, all subframes in the Advanced Air Interface DL Zone are type-1 subframe. The number of symbols in the WirelessMAN-OFDMA DL Zone is 3+6·(FRAME_OFFSET - 1) for 8.75 MHz and 9+6·(FRAME_OFFSET - 1) for 7 MHz. The maximum value of parameter K is equal to the number of DL subframes minus two

The offset K is determined by the TDD ratio of the Advanced Air Interface frame. For example, a TDD ratio of 4:4 with 4 downlink subframes and two uplink subframes shall have a FRAME_OFFSET of 5. Similarly, a TDD ratio of 5:3 shall have a FRAME_OFFSET of 5. At minimum, one Advanced Air Interface subframe shall exist caring the Advanced Air Interface subframe. Additional subframes may precede the subframe carrying the Advanced Air Interface subframe if additional capacity is required.

In the DL, a subset of DL AAI subframes is dedicated to the WirelessMAN-OFDMA operation to enable

one or more WirelessMAN-OFDMA DL time zones. The subset includes the 1st WirelessMAN-OFDMA DL time zone to support the transmission of the preamble, FCH and MAP, which are defined in 8.4.

Data bursts for the WirelessMAN-OFDMA MSs shall not be transmitted in the DL AAI subframes for operation of the Advanced Air Interface. Those DL AAI subframes shall be indicated as a DL time zone by transmitting an STC_DL_ZONE_IE() with the Dedicated Pilots field set to 1, as defined in Table 328, in the DL-MAP messages.

Bursts for AMS can be scheduled in either zone (Advanced Air Interface DL Zone or WirelessMAN OFDMA DL Zone) according to the mode (Advanced Air Interface or WirelessMAN-OFDMA) with which the AMS is connected to the ABS, but not in both zones at the same time.

In the UL, the two configurations are applicable:

1) FDM mode: A group of subcarriers (subchannels), spanning the entire UL transmission, is dedicated to the WirelessMAN-OFDMA operation. The remaining subcarriers, denoted the Advanced Air Interface UL subchannels group and forming the Advanced Air Interface UL AAI subframes, are dedicated to the Advanced Air Interface operation. Figure 478 illustrates an example frame configuration for supporting the WirelessMAN-OFDMA operation when FDM mode is used. In the case of 5, 7, 10, and 20 MHz, all UL AAI subframes are type-1 AAI subframes. In the case of 8.75 MHz with 15 UL OFDM symbols, the [first] UL AAI subframe is type-4 AAI subframe and the second UL AAI subframe is type-1 AAI subframe.
Data bursts from the WirelessMAN-OFDMA MSs shall not be transmitted in the UL subchannels group for operation of the Advanced Air Interface. The UL subchannels group for operation of the WirelessMAN-OFDMA shall be indicated by the UL allocated subchannels bitmap TLV or the UL AMC Allocated physical bands bitmap TLV, defined in Table TBD, in the UCD message.
Bursts for AMS can be scheduled in either group of UL subchannels (group of UL subchannels for Advanced Air Interface or WirelessMAN OFDMA) according to the mode (Advanced Air Interface or WirelessMAN-OFDMA) with which the AMS is connected to the ABS, but not in both groups at the same time.

2) TDM mode: A subset of UL AAI subframes is dedicated to the WirelessMAN-OFDMA operation to enable one or more WirelessMAN-OFDMA UL time zones. The subset includes the 1st Wireless-MAN-OFDMA UL time zone to support the transmission of the ranging channel, CQI channel and ACK channel, which are defined in 8.4. Figure 479 illustrates an example frame configuration for supporting the WirelessMAN-OFDMA operation when TDM mode is used. In the case of 5, 7, 10, 20, and 8.75 MHz, all AAI subframes in the Advanced Air Interface UL Zone are type-1 AAI subframes.
Data bursts from the WirelessMAN-OFDMA MSs shall not be transmitted in the UL AAI subframes for operation of the Advanced Air Interface. Those UL AAI subframes shall be indicated as a UL time zone by transmitting an UL_ZONE_IE(), defined in Table TBD, in the UL-MAP message.
Bursts for AMS can be scheduled in either zone (Advanced Air Interface UL Zone or WirelessMAN OFDMA UL Zone) according to the mode (Advanced Air Interface or WirelessMAN-OFDMA) with which the AMS is connected to the ABS, but not in both zones at the same time.
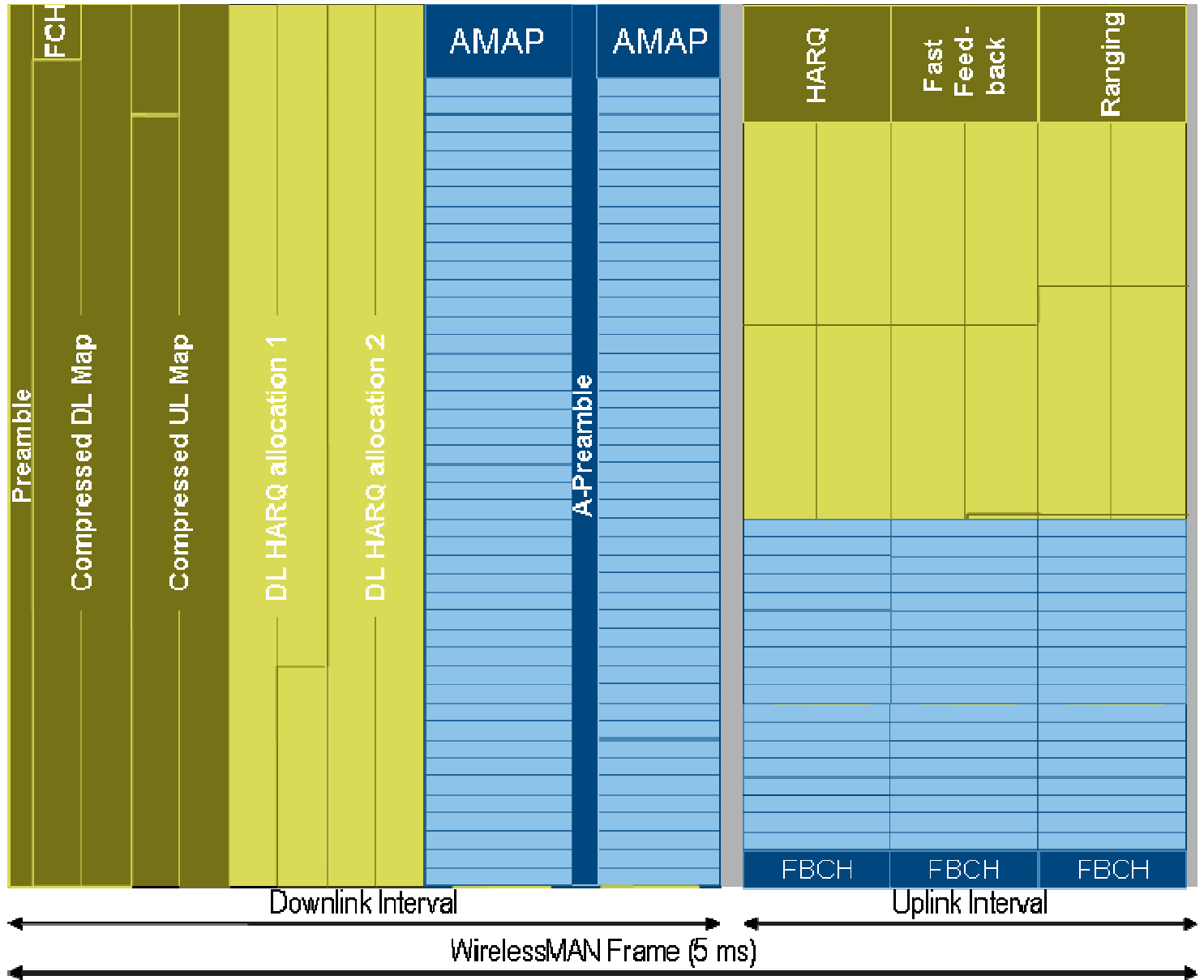
<Replace Figure 478 with the following>

Figure 478—TDD frame configuration for supporting the WirelessMAN-OFDMA operation
with UL FDM