Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	**Support for Different Channel Bandwidths in DL and UL FDD/HFDD Systems**	
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Source(s)	Lei Wang, Yair Bourlas, Wee Peng Goh NextWave Broadband	Voice: [Telephone Number (optional)]] E-mail: lwang@nextwave.com; ybourlas@nextwave.com; wgoh@nextwave.com *<http://standards.ieee.org/faqs/affiliationFAQ.html>
Re:	802.16 Working Group Letter Ballot #26	
Abstract	FDD/HFDD systems have to efficiently support asymmetric traffic loads over the air link, as DL traffic and UL traffic over an air link are naturally not symmetric. The FDD/HFDD systems with different channel in the DL and UL are commonly referred as Asymmetric FDD/HFDD (A-FDD/HFDD) systems, which effectively enable FDD/HFDD systems to support asymmetric DL/UL traffic loads. Some FDD-allowed band classes have clear indications of benefits from Asymmetric FDD/HFDD (e.g., WCS band and 700MHz band). In addition, some service providers' spectrum holdings have the need to support Asymmetric FDD/HFDD. This document describes the required supports in the 802.16 Rev2 spec to enable Asymmetric FDD/HFDD.	
Purpose	To be discussed and adopted by 802.16 Rev2.	
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Support for Different Channel Bandwidths in DL and UL in FDD/HFDD Systems

Lei Wang, Yair Bourlas, Wee Peng Goh,
NextWave Broadband

Introduction

FDD/HFDD systems have to efficiently support asymmetric traffic loads over the air link, as DL traffic and UL traffic over an air link are naturally not symmetric. The FDD/HFDD systems with different channel sizes in the DL and UL are commonly referred as Asymmetric FDD/HFDD (A-FDD/HFDD) systems, which effectively enable FDD/HFDD systems to support asymmetric DL/UL traffic loads. Some FDD-allowed band classes have clear indications of benefits from Asymmetric FDD/HFDD (e.g., WCS band and 700MHz band). In addition, some service providers' spectrum holdings have the need to support Asymmetric FDD/HFDD. This document describes the required supports in the 802.16 Rev2 spec to enable Asymmetric FDD/HFDD.

Proposed Solution

In the current 802.16 OFDMA PHY, TDD systems and FDD systems advertise the DL center frequency and UL center frequency as TLVs in the DCD/UCD messages, respectively.

To support Asymmetric FDD/HFDD (A-FDD/HFDD), in addition to UL center frequency, the BS should also advertise the UL channel bandwidth, FFT size, and cyclic prefix (CP) which may be different from DL channel. The proposed solution is to add one TLV in UCD to specify UL channel bandwidth, FFT size, and cyclic prefix.

To support HO between A-FDD/HFDD systems, no additional changes are required, because, if the DL/UL channel characteristics are different from the servicing BS, the MOB_NRB-ADV will advertise:

- the neighbor BS's DL channel characteristics, including, DL center frequency, channel bandwidth, FFT size, cyclic prefix in its DCD_setting compound TLV and PHY Mode ID TLV;
- the neighbor BS's UL channel characteristics in the MOB_NRB-ADV through UCD_setting compound TLV, where the UL center frequency is covered by the existing UCD TLV; and the UL channel bandwidth, FFT size, and cyclic prefix will be covered by the new UCD TLV proposed by this contribution.

In summary, this contribution proposes an addition, only one TLV to the UCD message, to support Asymmetric FDD/HFDD. It is flexible for all possible asymmetric FDD use cases. No hardware changes are needed.

Suggested Changes in Rev2/D1

In Rev2/D1, page 1171, line 28, append one row in Table 610 as follow, where the new row is marked by blue and underlined.

Table 610 — UCD PHY-specific channel encodings – WirelessMAN-OFDMA

Name	Type (1 byte)	Size	Value
UL PHY Mode ID	208	2	Bits 0 – 7: Channel bandwidth in units of 125 kHz; Bits 8 -10: FFT size 0b000= 2048 0b001= 1024 0b010=512 0b011=128 0b100 – 0b111: reserved Bits 11 – 13: Cycle Prefix (CP) 0b000= 1/4 0b001= 1/8 0b010=1/16 0b011=1/32 0b100 – 0b111: reserved Bits 14 – 15: reserved