Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**OFDMA PHY Enhancements for better mobility performance**
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Source(s)	John Liebetreu, Jeff Foerster, Jose Puthenkulam, Randall Schwartz, David Johnston, Hassan Yaghoobi, Intel Corporation Panyuh Joo, Seungjoo Maeng, Jaeho Jeon, Soonyoung Yoon, Jeong-Heon Kim, Jaehyok Lee, Myungkwang Byun, JeongTae Oh, Wonil Roh, Inseok Hwang, Jaehee Cho, Sanghoon Sung, Hun Huh, Jiho Jang, Ikbeom Lee, HeeSang Seo, Sijun Cho, Chiwoo Lim, Youngbin Chang, Jaeweon Cho, Jaeyoel Kim, Sung-Eun Park, Samsung Electronics Co. Ltd. Naftali Chayat, Tal Kaitz, Mohammed Shakouri, Alvarion Ltd. Shawn Taylor, Wi-LAN Inc. J. Pierre Lamoureux, Frank Draper, Wavesat Inc Martin Lysejko, Airspan Raja Banerjea, Don Leimer, Proxim Inc Phil Barber, Broadband Mobile Technologies Dale Branlund, Lalit Kotecha, Mike Webb, BeamReach Networks
Re:	Working Group Review of P802.16-REVd_D3
Abstract	
Purpose	To propose enhancements to the OFDMA PHY in 802.16REVd_D3 draft for better performance in a broad set of channel widths.
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OFDMA PHY Enhancements

1 Introduction

In this contribution we propose enhancements to the WirelessMAN OFDMA PHY, so that it can perform more optimally in channel bandwidths ranging from 1.25MHz to 20 MHz with fixed subcarrier spacing but dynamic selection of the number of subcarriers for mobile applications. The following are some of the parameters that are required to meet the requirements from service providers.

2 Bandwidth

For service providers who would like to deploy a high speed public cellular network, the system bandwidths are limited to 1.25, 2.5, 5, and 10 MHz for licensed bands and 10 and 20MHz for unlicensed bands.

3 Sampling Frequency

According to the allowed bandwidth, the sampling frequency needs to be the same as bandwidth.

4 FFT Size and CP duration

In order to support full coverage and full mobility with low overhead for CP duration, the FFT size corresponding to the bandwidth should be scalable, i.e., 128-FFT for 1.25 MHz BW, 256-FFT for 2.5 MHz BW, 512-FFT for 5 MHz, 1024-FFT for 10 MHz BW, and 2048-FFT for 20 MHz BW. The CP duration is kept to be 1/8 of the OFDMA symbol duration since the OFDMA symbol durations for all bandwidth configurations are equal and the maximum delay of multipath channel up to 10 us should be supported.

5 Frame Length

Frame length is from 2msec to 20msec with identical frame structure for various channel bandwidths in licensed operation.

6 Proposed Text Changes

[Change the existing text in “8.4.1 Introduction” as follows]

The WirelessMAN-OFDMA PHY ([B39]), based on OFDM modulation, is designed for NLOS operation in the 2.11 GHz frequency.bands. The allowed channel bandwidths shall be 1.25, 2.5, 5, and 10 MHz for licensed bands and 10 and 20MHz for unlicensed bands.

[Insert a following section ‘8.4.2.6 Basic system parameters’ after ‘8.4.2.5 Transmitted signal’]

8.4.2.6 Basic system parameters

The basic system parameters to characterize an OFDMA signal are described in **Error! Reference source not found.**.

Table 1 –Basic system parameters

Parameters	Values				
System bandwidth	1.25 MHz	2.5 MHz	5 MHz	10 MHz	20 MHz
Sampling frequency (F_s)	1.25 MHz	2.5 MHz	5 MHz	10 MHz	20 MHz
Sample time ($1/F_s$)	800 nsec	400 nsec	200 nsec	100 nsec	50 nsec
FFT size (N_{FFT})	128	256	512	1024	2048
Number of used subcarriers	108	216	432	864	1728
Number of data subcarriers	96	192	384	768	1536
Number of pilot subcarriers	12	24	48	96	192

Subcarrier frequency spacing	9.765625 kHz
Useful symbol time (T_b=1/_f)	102.4 _s
CP time (T_g=T_b/8)	12.8 _s
OFDMA symbol time (T_s=T_b+T_g)	115.2 _s

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2 **7 Enhancements to the frame structure**

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4 TBD.

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