

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	FCH for 128 FFT mode	
Date Submitted	[2004-07-07]	
Source(s)	Hassan Yaghoobi, Randall Schwartz, Jose Puthenkulam	Voice: 408-545-6162, mailto:hassan.yaghoobi@intel.com Voice: 408-545-9876, mailto:randall.c.schwartz@intel.com Voice: 503 264-6121, mailto:jose.p.puthenkulam@intel.com
	Intel Corporation CHP3-105 350 East Plumeria Dr. San Jose, CA 95134	
Re:	Supporting document for recirculation ballot #14b.	
Abstract	In OFDMA mode, FCH message requires total of four subchannels per segment. In 128 FFT case, there are only total of three DL PUSC subchannels available for all three segments. The proposal is to use a modified compressed version of DLFP and allocate the two required subchannels per segment in time using two consecutive slots formed by four consecutive OFDM symbols.	
Purpose	To adopt the enhancements to OFDMA PHY in P802.16e/D3 draft.	
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures < http://ieee802.org/16/ipr/patents/policy.html >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair < mailto:chair@wirelessman.org > as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site < http://ieee802.org/16/ipr/patents/notices >.	

1 **1 Introduction**

2 In OFDMA mode, FCH message requires total of four subchannels per segment. In 128 FFT case, there
3 are only total of three DL PUSC subchannels available for all three segments.

4 The proposal is to modify the OFDMA DLFP to a compressed version of half its original size (12
5 effective un-coded bits compared to its current 24 bits) satisfying the needs of 128 FFT case more
6 efficiently and allocating the required two slots per segment in time formed by four consecutive OFDM
7 symbols. The 12 bits are coded and repeated 2 times to create 48 bits, then modulated with repetition
8 code X2.

9 In modifying the DLFP message the following considerations are used:

- 0 1. Because of the small number of subchannels remaining in 128 FFT case, there is no need to more
1 than 2 bits for “Used subchannel bitmap”.
- 2 2. Will not include four reserved bits.
- 3 3. Will allocate only 6 bits to “DL-Map_Length”. This means that the max length is 64 slots out of
4 the worst case (for 20 msec, 1.25 MHz BW) ~100 slots
- 5 4. Fix the “Repetition_Coding_Indication” to “No repetition coding on DL-MAP” and save the two
6 bits.

7 **2 Proposed Text Changes**

8 **Change 1:** Change the Title of Table 266 to “**OFDMA downlink Frame Prefix format for all FFT sizes
9 except 128**”

10 **Change 2:** Add the following text and table for DLFP format for 128 FFT to the end of Section 8.4.4.3:

11 For the case of 128 FFT, the following compressed format shall be used for DLFP.

12 **Table xxx—OFDMA downlink Frame Prefix format for 128 FFT**

Syntax	Size	Notes
DL_Frame_Prefix_Format() {		
Used_subchannel_bitmap	2 bits	0b00: Subchannels 0 is used 0b01: Subchannels 1 is used 0b10: Subchannels 2 is used 0b11: Reserved
Ranging_Change_Indication	1 bit	
Coding_Indication	3 bits	Refer to definition of Coding_Indication in Table 266.
DL-Map_Length	6 bits	
}		

13 **Change 3:** Add the following text as the second paragraph of Section 8.4.4.4 at line 46:

14 In PUSC 128 FFT case, any segment used shall be allocated one subchannel. The first 2 slots in the
15 downlink part of the segment contain the FCH as defined in 8.4.4.3. These slots contain 24 bits modulated
16 by QPSK with coding rate 1/2 and repetition coding of 4. Equivalently, this means that the 12 bits are
17 coded and repeated 2 times to create 48 bits, then the 6 bytes are modulated with repetition code of 2.

18 **Change 4:** Add the following text to the end of Section 8.4.5.3:

In the case of 128 FFT, Repetition Coding Indication bits are Reserved and are not used.

19 **3 References**

20 [1] IEEE P802.16-REVd/D5-2004 Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed
21 Broadband Wireless Access Systems

- 1 [2] IEEE P802.16-REVe/D3-2004 Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed
- 2 Amendment for Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands