Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**TLV supporting energy signaling mechanism in DCD**
Date Submitted	**2007-07-17**
Source(s)	Wu Xuyong Huawei, Huawei Industry Base, Bantian, Longgang, Shenzhen, China 518129 Voice: +86-755-28976776 Fax: wuxuyong@huawei.com，
Re:	IEEE 802.16-07/013：Task Group Review: Working Group Draft P802.16h/D2b (2007-06-19)
Abstract	Consolidation text according to the group decision on comment017 in 80216h-07_014r1.
Purpose	To consolidate the 16h 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>.

TLV supporting energy signaling mechanism in DCD

Wu Xuyong
Huawei Tech.

Overview

Comment 017 in 80216h-07_014r1 by Kenneth Stanwood:
Comment:
The newly agreed to control channel structure eliminates the need to schedule the CSI since it's occurrence will be well known, which is more efficient.
Suggested Remedy:
1) delete section 8.2.1.9.2.8 page 37, line 59 through page 38, line 26
2) delete section 8.3.6.2.10 page 38, line 59 through page 39, line 25
3) delete section 8.4.5.3.31 page 42 line 28 through line 63

Discussion

In order to simplify the mechanisms and lower down the overhead in the DL_MAP, we agree to delete the new DL_MAP IEs added in 8.2/ 8.3/ 8.4 for CSI timing, and move the parameters into DCD.

Reference:

[1] *IEEE 802.16-07/016r7: Letter Ballot Recirc #24a Comment Database (2007-06-12)*

[2] *IEEE P802.16h/D2b: 802.16h draft for Task Group Review (2007-05-18)*

[3] *IEEE 802.16-07/013： Task Group Review: Working Group Draft P802.16h/D2b (2007-06-19)*

[4] *IEEE 802.16-2004: IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems (2004-10-01)*

[5] *IEEE 802.16e-2005: IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems Amendment 2: Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands and Corrigendum 1 (2006-02-28)*

Proposed Changes accordingly:

Firstly, implement the remedy from Ken:

1) delete section 8.2.1.9.2.8 page 37, line 44 through page 38, line 26
2) delete section 8.3.6.2.10 page 38, line 38 through page 39, line 25
3) delete section 8.4.5.3.31 page 42 line 25 through line 63

Additionally, implement the text changes as following

11. TLV encodings

11.4 DCD management message encodings

11.4.1 DCD channel encodings

[Insert the following entries into Table 358:]

Name	Type(1 byte)	Length	Value(variable length)	PHY Scope
~~CX interference criteria~~	~~61~~	~~1~~	~~Minimum interference-plus-noise to noise ratio~~ ~~(in unit of 0.5 dB)~~	~~(default value is 2, indicating 1 dB) All~~
CSI allocation	62	1	Bit0-3: CSI Cycle (the number of CX-Frames between the bits in CSI sequence of one system) Default value - 2 Bit4-5: CSIN of this system (indicating the OCSI allocation of this system) 0-OCSI1 1-OCSI2 2-OCSI3 3-reserved Bit6-7: reserved	WirelessMAN-CX (SCa/OFDM/OFDMa)
CSI Timing	63	6	Bit0-15: $T_{CSITSTART}$: Starting PSs/symbol number of CSI signaling transmition (offset from the starting point of Frame) Bit16-31: $T_{CSIDSTART}$: Starting PSs number of CSI signaling receiving (offset from the point of $T_{CSITSTART}$) Bit32-48: $T_{CSIDDUR}$: CSI detection duration in unit of PSs	WirelessMAN-CX (SCa/OFDM/OFDMa)

3.100 Coexistence Signaling Interval Number (CSIN): the ~~periodical number~~ allocation of CSI according to the time order within CX-Frame. The range of CSIN is from 0 to 3~~the number of CSI in one OCSI cycle~~ while 0-3 is referring to OCSI1/OCSI2/OCSI3/ICSI respectively.

10.5.3 CSI timing parameters

System	Name	Time reference	Minimum Value	Default Value	Maximum Value
……	……	……	……	……	……
BS/SS	CSI cycle	CSI cycle in unit of ~~frames~~ CX-Frame ~~(power of 2)~~ (15.3.1.1)		~~4~~ 2	
BS/SS	CSI sequence length	length of CSI sequence(15.3.1.1.2)	256	256	256
BS/SS	~~Offset Frames~~ CSIN	~~the frame number offset of CSI allocation~~ the OCSI allocation of this system(OCSI1-OCSI3)	0 (OCSI1:OCSI in frame 4N)	~~0~~	2 (OCSI3:OCSI in frame 4N+2)~~CSI cycle -1~~
~~BS/SS~~	~~ICSI cycle~~	~~ICSI cycle in unit of CSI cycle (power of 2) (15.3.1.1.1)~~		~~4~~	
~~BS/SS~~	~~OCSI cycle~~	~~OCSI cycle in unit of ICSI cycle (power of 2) (15.3.1.1.1)~~		~~1~~	
~~BS/SS~~	~~CSI Symbol Duration~~	~~The duration for each CSI symbol(15.3.1.1.3)~~	~~25us~~		~~1ms~~
……	……	……	……	……	……

P76L22

o Master 1 sub-frame DL: CX_MAC_NO mod ~~O~~CSI_cycle*4 = 0

o Master 2 sub-frame DL: CX_MAC_NO mod ~~O~~CSI_cycle*4 = 1

o Master 3 sub-frame DL: CX_MAC_NO mod ~~O~~CSI_cycle*4 = 2

o Shared sub-frame DL: CX_MAC_NO mod ~~O~~CSI_cycle*4 = 3

Figure h21 / Figureh22:
Change the figure and the timing label according to the 15.1.5.3

P69L20

And parameters that deal with the ~~ICSI and O~~CSI cycle (see *15.3.1.1.1*):

~~— *NICSI_Cycle*: ICSI cycle counted in CSI intervals~~

— ~~NO~~CSI_Cycle: Number of ~~ICSI cycles~~CX-Frames between ~~OCSI recurrences of the same system~~ the bits in CSI sequence of one system

Assuming ~~NCSIintv =4, NICSI_Cycle =4, NO~~CSI_Cycle =2, an example of the timing indication is illustrated in *Figure h 22*.The first IBS that enters an environment where none of the OCSIs is occupied. It uses the ICSI to broadcast coexistence signaling, then, since it has

not detected any other CSI signal, it becomes OBS1 and chooses OCSI1 as the OCSI occupied for its system. Afterwards IBS2 starts up and uses ICSI to broadcast coexistence signaling. It finds its neighbor system, OBS1, occupying OCSI1, chooses OCSI2 as its OCSI and become OBS2 after the initializing phase. (see also *15.3.1.1.1*). IBS2 can be made aware of the occupation of OCSI1 by OBS1 either by detecting signald from the system OBS1, or by information received via CXP messages as feedback to the IBS2's broadcasting signals by the OBS1's SS's.

15.3.1.1.1 CSI scheduling

~~Downlink~~ CSI is used by the BSs to broadcast signaling to the neighbor systems (see *15.1.4.1.1*). These signals are used for interference identification ~~and resolution~~. In order not to collide with the other neighboring interferers, the coordinated community should prevent neighboring BSs from using the same CSI.

There is one ICSI for IBS in an ~~I~~CSI cycle, in the example figure below, each ~~I~~CSI cycle has 4 CSIs and CSIN ~~0~~ 3 indicate the CSI numbers of the ICSI. The other CSI is left to the OBS as OCSI, as shown in *Figure h 33*. Every OBS needs to obtain an OCSI allocation in one OCSI cycle, which is formed by multiple ~~ICSI cycles~~ CX-Frames~~so that an IBS can get more opportunities than OBS~~. There are ~~1 ICSI cycles inside one OCSI cycle and~~ 4 CSIs in each ~~I~~CSI cycle ~~in the example~~, so that there are 1 ICSI intervals for the IBS and 3 intervals for up to 3 OBSs.

P160L53

CSI parameter(){		Regulated by region/country
Tcsi_start	16bits	In ~~microseconds~~PSs/Symobls
Tcsi_duration	8bits	In ~~microseconds~~PSs/Symobls
Period of CX-~~f~~Frames	8bits	~~frames~~CSI Cycle
~~Starting frames offset~~ CSIN	16bits	frame serial number of the ~~first frame that~~ OCSI presented within the CX-Frame
Starting of CSI measurement	16bits	in PSs
Length of ~~Symbols~~ CSI measurement	~~8bits~~ 16bits	In ~~microseconds~~PSs~~, need to be 1/n of Tcsi_duration~~
~~ICSI cycle~~	~~8bits~~	~~ICSI cycle counted in CSI cycles~~
~~OCSI cycle~~	~~8bits~~	~~OCSI cycle counted in ICSI cycles~~
}		