

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Action Item from Session #46: Consolidation of Uncoordinated Coexistence	
Date Submitted	2007-01-08	
Source(s)	Paul Piggin NextWave Broadband Inc. 12670 High Bluff Drive San Diego CA 92130 USA	Voice: 1 858 480 3100 Fax: 1 858 480 3105 ppiggin @ nextwave.com
Re:	Working Group Letter Ballot #24 for IEEE P802.16h/D1.	
Abstract	This document contains proposed editorial and technical changes to sub clause 6.4 ' <i>Uncoordinated Coexistence</i> ' and associated sub clauses. A number of comments from Working Group Letter Ballot #24 considered at Session #46 are related to this clause. This document addresses these comments and suggests a harmonization of the comments presenting accompanying editorial instruction to implement the changes.	
Purpose		
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 >.	

Action Item from Session #46: Consolidation of Uncoordinated Coexistence

Paul Piggin
NextWave Broadband Inc.

Overview

This contribution addresses an action item assigned to the author at Session #45 concerning sub clause 6.4 ‘*Uncoordinated Coexistence*’ and associated sub clauses in [1].

A number of comments from the [2] are resolved through this contribution. Specifically the comments from [2] are 99, 101, 206, 207, 208, and 255. These comments are detailed in Annex 1. The following section provides specific editorial instruction specifying changes required to [1] to address the comments described. The comments listed in Annex 1 are addressed accordingly:

Comment 99: Rejected: There is every need to separate coordinated and uncoordinated coexistence mechanisms – not least based on how the two ideas have been added to the draft standard. The material in 6.4 is added with the intention of specific technical modification to the draft. Clause 15 provides ideas and solutions but very few specific hooks into the draft standard. Comparing with the base standard then the material in 6.4 is well aligned with material in 6.x; containing such material as network entry, ranging, and procedures for MAC support for the PHY. Sub clause 6.4 is clean and implemented correctly and consistently.

Comment 101: Accepted as suggested.

Comment 206: Suggested remedy: Remove reference to uncoordinated operation in 15.1.2, and add suitable text at the beginning of sub clause 6.4.

Comment 207: Accepted-modified: Replace the instance of ‘collaborative’ with ‘Coordinated’ in table h3.

Comment 208: Editorial instruction suggested.

Comment 255: Comment withdrawn from this action item by author.

Specific editorial changes

This section provides a list of changes to IEEE P802.16h/D1 document [1].

[Blue underlined text](#) represents specific editorial additions.

~~Red strikethrough~~ text is to be deleted.

Black text is text already in the draft.

Bold italic text is editorial instructions to the editor.

~ ~ ~

There are 13 instances of ‘collaborative’ or ‘non-collaborative’ in [1].

Replace all instances of ‘collaborative’ with ‘coordinated’; and all instances of ‘non-collaborative’ with ‘uncoordinated’.

~ ~ ~

There are 12 instances of ‘ACS’ or ‘Adaptive Channel Selection’ in [1].

Replace all instances of ‘ACS’ with ‘DCS’; and all instances of ‘adaptive channel selection’ with ‘dynamic channel selection’.

~ ~ ~

Make the following changes to subclause 6.4.

6.4 Enhancement [Procedures](#) for uncoordinated coexistence

This sub clause describes enhancements in support of operation in non-exclusively assigned and non-exclusively licensed bands. Firstly, general concepts are described, after which details of support for uncoordinated coexistence mechanisms are presented. [The mechanisms detailed are:](#)

- [Coexistence with Specific Spectrum Users \(SSUs\) \(6.4.2.2\) often termed DFS \(Dynamic Frequency Selection\) \[B11\].](#)
- [Coexistence with non-Specific Spectrum Users \(non-SSUs\) \(6.4.2.3\). Dynamic Channel Selection \(DCS\) \(6.4.2.3.2\) is a realization.](#)

- Uncoordinated Coexistence Protocol (UCP) (6.4.2.4). UCP uses the following techniques:
 - Extended Quiet Periods (EQP) (6.4.3.3).
 - Adaptive Extended Quiet Periods (aEQP) (6.4.3.4).
 - Listen Before Talk (LBT) (6.4.3.5).

~~The m~~Mechanisms are related to bands containing ~~SSUs~~~~Specific Spectrum Users~~ and those containing non-SSUs ~~Non-specific Spectrum Users~~. It shall be left to regulation to mandate such mechanisms for a particular band.

6.4.1 General concepts

6.4.1.1 Capability Negotiation

A Base Station is made aware of the WirelessMAN-CX/WirelessHUMAN capabilities and functionality support by the SS using the field described in section 11.7.8.

A mechanism is provided by which WirelessMAN-CX/WirelessHUMAN and non-WirelessMAN-CX/WirelessHUMAN devices are to interwork. This is an important mechanism for deployment scenarios where regulatory designation of WirelessMAN-CX/WirelessHUMAN operation is required. Some examples of how the capability negotiation can be used are given:

— A device with WirelessMAN-CX/WirelessHUMAN functionality will need to interwork with infrastructure that knows nothing of WirelessMAN-CX/WirelessHUMAN.

— A non-WirelessMAN-CX/WirelessHUMAN device will need to interwork with WirelessMAN-CX/WirelessHUMAN compliant infrastructure.

— A non-WirelessMAN-CX/WirelessHUMAN device shall have the ability to be barred from working in a Wireless-MAN-CX/WirelessHUMAN system - this is deployment specific.

— A WirelessMAN-CX/WirelessHUMAN device shall work in a non-WirelessMAN-system as a 'normal' non-WirelessMAN-CX/WirelessHUMAN device.

~ ~ ~

Move sub clause 6.4.1.3 to sub clause 10.5.3.1

~~6.4.1.3 MAC CX-Frame numbering~~

~~The MAC Frame number used by the Coexistence Protocol (CX_MAC_NO) is a running number. The MAC Frame no.1 starts at the absolute time of the day 00:00:30sec and includes the first slot of the Control Channel.~~

~~CX_MAC_NO has a length of 16 bits and wraps around according to the repetition period of the Co-existence Control Channel.~~

10.5.3.1 MAC CX-Frame numbering

The MAC Frame number used by the Coexistence Protocol (CX_MAC_NO) is a running number. The MAC Frame no.1 starts at the absolute time of the day 00:00:30sec and includes the first slot of the Control Channel.

CX_MAC_NO has a length of 16 bits and wraps-around according to the repetition period of the Co-existence Control Channel.

~ ~ ~

Make the following changes to subclause 15.1.2.

15.1.2 Mechanisms in WirelessMAN-CX

Table h3—coexistence mechanism list for WirelessMAN-CX

Applicable Condition	1: with wired IP communication available	Yes				No			
	2: same PHY profile	Yes		No		Yes		No	
	3: in signaling/messaging range*	Y	N	Y	N	Y	N	Y	N
non-collaborative mechanism	*(CXCC:) dynamic frequency selection (DFS)	✓	✓	✓	✓	✓	✓	✓	✓
	*(CXCC:) GPS timing recovery (GPS/UTC)	✓	✓	✓	✓	✓	✓	✓	✓
	Extended quiet periods (EQP)	✓	✓	✓	✓	✓	✓	✓	✓
	Adaptive EQP	✓	✓	✓	✓	✓	✓	✓	✓
	Listen before talk	✓	✓	✓	✓	✓	✓	✓	✓
	Uncoordinated Coexistence Protocol (UCP)	✓	✓	✓	✓	✓	✓	✓	✓
<u>collaborative Coordinated mechanisms</u>	IP network message (CXP message)	✓	✓	✓	✓				
	coexistence proxy (CXPRX)	✓	✓	✓	✓				
	*(CXCC:) coexistence signaling (CSI/ radio signature)	✓		✓		✓		✓	
	*(CXCC:) coexistence messaging (CMI/CCD)	✓				✓			
	sub frame sharing (master sub frame)	✓	✓	✓	✓	✓		✓	
	channel reallocation (ACS)	✓	✓	✓	✓	✓		✓	
	Subframe Reallocation (ASFA)	✓	✓	✓	✓	✓		✓	
credit token	✓	✓	✓	✓					

Table h3—

Annex 1

Comment 99:

Avi Freedman

Clause: 6.4

Comment:

The inclusion of the text in chapter 6 is wrong. There is no point in a separate description for coordinated and uncoordinated coexistence.

Suggested Remedy:

Move the text to chapter 15

Comment 101:

David Johnston

Clause: 6.4

Comment:

The title 'Enhancement ...' makes sense in the context of describing an addition to the spec, but this text will eventually be merged into a document where it will merely be one feature of many, not an enhancement.

Suggested Remedy:

6.4 ~~Enhancement~~ Procedures for uncoordinated coexistence

Comment 206:

David Grandblaise

Clause: 15.1.2

Comment:

Section 15.1.2 (including the Table h3) tackles both the coordinated and uncoordinated coexistence mechanisms whereas section 15 is dedicated to coordinated coexistence mechanisms.

Suggested Remedy:

- Include Table h3 in a common section for the coordinated and uncoordinated coexistence mechanisms. This section could be before section 6.4 dealing with uncoordinated coexistence mechanisms.
- Update section 15.1.2 text and Table h3 text with aspects only related to coordinated coexistence mechanisms.
- Create similar Table h3 in section 6.4 with aspects only related to uncoordinated coexistence mechanisms.

Comment 207:

David Grandblaise

Clause: 15.1.2

Comment:
In Table h3:

- "collaborated" is used instead of coordinated
- "non-collaborated" is used instead of uncoordinated

Suggested Remedy:

Remove the - "collaborated" and "non-collaborated" terminology and use the coordinated/uncoordinated terminology to avoid confusion.

Change the text as follows in the second and third row of Table h3:

- "~~non-collaborated~~ uncoordinated mechanisms"
- "~~collaborated~~ coordinated mechanisms"

Comment 208:

Richard Van Leeuwen

Clause: 15.1.2

Comment:

The terms "collaborative" and "non-collaborative" are not defined.

Note sub-clause 3 does include definitions for "Coordinated coexistence mechanism" and "Uncoordinated coexistence mechanism" but not for "collaborative" and "non-collaborative".

Suggested Remedy:

replace "collaborative" by "coordinated"

replace "non-collaborative" by "uncoordinated"

Comment 255:

David Grandblaise

Clause: 15.1.2

Comment:

In "(CXCC:) coexistence signaling (CSI/ radio signature) 15.3.1", it is supposed that coexistence signaling includes both CSI and radio signature where CSI is an interval and not a signaling in itself. Is it correct from the definition point of view? Does the cognitive radio signaling rather encompass coexistence signaling (CSI based) + radio signature ?

Suggested Remedy:

Clarify the definition between the different terms and their relationship.

References

- [1] IEEE P802.16h/D1: *Air Interface for Fixed Broadband Wireless Access Systems Improved Coexistence Mechanisms for License-Exempt Operation*, Draft Standard.
- [2] IEEE 80216h-06_068r2: *Letter Ballot #24 Commentary file with resolutions from Session #46*.