

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Action Item from Session #46: Rationalization of clause 3 - Definitions</b>	
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Re:	Working Group Letter Ballot #24 for IEEE P802.16h/D1.	
Abstract	This document contains proposed editorial and technical changes to clause 3 'Definitions'. A number of comments from Working Group Letter Ballot #24 considered at Session #46 suggested additions, deletions, and modification to this clause. This document addresses these comments and suggests a harmonization of the comments presenting accompanying editorial instruction to implement the changes.	
Purpose		
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## Action Item from Session #46: Rationalization of clause 3 'Definitions'

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### Overview

This contribution addresses an action item assigned to the author at Session #45 concerning clause 3 'Definitions' in [1]. This action item is related to specific issues (seen in comment 14 of [2]) of:

- *Duplicate and redundant definitions,*
- *Definitions which are currently TBD or Tbc,*
- *Incorrect definitions.*
- *Conflicting definitions in the base standard.*

A number of comments from the [2] are resolved through this contribution. Specifically the comments from [2] are 14, 30, 35, 37, 40, 42, 43, 44, 45, and 47. These comments are detailed in Annex 1. The following section provides specific editorial instruction specifying changes required to clause 3 [1] to address the comments described. The comments listed in Annex 1 are addressed accordingly:

*Comment 14:* This document addresses this comment as a whole.

*Comment 30:* Accepted suggested remedy with some slight rewording.

*Comment 35:* Definition deleted.

*Comment 37:* 3.110 = Deleted, 3.112 = Definition added, 3.116 = Definition added, 3.123 = Deleted.

*Comment 40:* The definition is deleted as suggested.

*Comment 42:* A definition is proposed.

*Comment 43:* A definition is proposed.

*Comment 44:* A resolution is suggested.

*Comment 45:* Comment resolved as requested.

*Comment 47:* Comment resolved as requested.

### Specific editorial changes

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

~ ~ ~

### **General editorial instruction:**

*Reorder the definitions in clause 3 into alphabetical order and modify the sub clause numbering accordingly.*

~ ~ ~

*Make the following changes to clause 3 ‘Definitions’:*

### **3. Definitions**

*[Insert following sentence after first paragraph:]*

Within each definition a term written using *italics* is itself defined as a term in this clause.

*[Insert following sections after 3.85:]*

~~**3.86 WirelessMAN-CX:** The designation used to describe the realization that adds co-existence procedures to systems implemented below 11GHz, in license exempt bands or whenever improved inter-system coexistence is needed. This designation is PHY independent and adds additional MAC functionality, together with a recommended practice as high level protocols for achieving coexistence.~~

**3.87 Interference Neighborhood:** Interference neighborhood is relative to a system (~~BS and its subscribers~~). A system (~~BS and its SSs~~) will perceive as interference neighbors, all other systems (~~BSs and their SSs~~) which create/receive interference to/from it.

**3.88 Community:** A community is composed of those systems (~~BSs and their SSs~~) which coordinate to resolve their interference.

**3.89 Coexistence Community:** A coexistence community is relative to a system and is composed of those systems (~~BSs and their SSs~~) which have resolved their interference and coexist within it.

**3.xx IP Coordinated Coexistence Protocol:** A set of IP based backhaul procedures handling *coordinated coexistence* between WirelessMAN-CX systems, or between WirelessMAN-CX systems and non WirelessMAN-CX systems.

**3.90 Coexistence Proxy (CXPRX):** Coexistence proxy acts as an agent to forward and receive ~~the~~ Coexistence Protocol (CXP) messages ~~between its BSs and other BSs and terminals~~ over the internet.

**3.91 Random Temporary Key (RTK):** The temporary key generated and sent by the BS over the air, and is required to be contained in the request messages of the coexistence protocol sent to this BS. RTK is used to obstruct the coexistence requests from unauthenticated internet terminals.

**3.92 Alternative Channel (ALTCH):** The alternative working channel is a physical (frequency) channel decided determined by the base station, ~~on which the base station has not detected any user and also not currently chosen to be the working channel of this base station.~~ as being a suitable alternative physical channel for use if its current physical channel becomes unavailable.

**3.93 Alternative Subframe (ALTSF):** ~~The~~ An alternative ~~working~~ subframe that can be used by the base station ~~in the of a~~ system because it is unoccupied., ~~able to be used as its master subframe in its capable channel, on which the base station haven't detected any user and also not currently chosen to be the working channel of this base station.~~

**3.94 Coexistence Signaling Interval (CSI):** ~~a~~ A predefined time slot not associated with the CXCC, used for ~~the~~ coexistence ~~protocol~~ signaling purposes between systems having different PHYs. This technique uses power keyed energy symbols and RSSI detection especially for the by a BS to contact its coexistence neighbor BS through one or more coexistence neighbor SSs in the common coverage area.

**3.95 Initialization Coexistence Signaling Interval (ICSI):** the periodically appointed CSI specially used by Initializing Base Station (IBS) to contact its neighbor OBS. When the IBS gets the OCSI allocation and starts the operating stage, it will cease from using the ICSI.

**3.96 Operation Coexistence Signaling Interval (OCSI):** the rest CSI other than ICSI, periodically reallocated to OBSs.

**3.97 Coexistence Signaling Interval Number (CSIN):** the periodical number of CSI according to the time order. The range of CSIN is from 0 to the number of CSI in one OCSI cycle.

**3.98 Coexistence Signaling:** the signaling mechanism defined in WirelessMAN-CX to exchange information between wireless systems with or without the same PHY profiles.

**3.99 Coexistence Messaging:** ~~T~~he messaging mechanism defined in WirelessMAN-CX to exchanged information specifically between wireless systems with the same PHY profiles.

**3.100 Common sub-frame:** That part of the MAC Frame when all the systems of a coexistence community may operate in parallel., ~~for the communication between BS and SSs which are not affected by harmful interference in the same system.~~ (The operation during these sub-frame may require limitations of the transmit power.)

**3.101 Master sub-frame:** That part of the MAC frame which is used by a specific system (master system) of a coexistence community to operate with reduced interference from its neighboring systems., ~~with special~~

~~coexistence properties for systems owning this sub-frame as Masters; during this sub-frame a Master system operates with reduced interference and may use its maximum transmission power.~~

**3.xx Master system:** A specific system which operates during the master sub-frame and which may use its maximum transmission power. Systems of a coexistence community equally share the role of Master system on a rotating basis.

**3.102 Slave sub-frame:** That part of the MAC frame coinciding with the Master sub-frame in which all systems (other than the Master) of the coexistence community have restricted operation.

**3.yy Slave system:** A specific system which operates during the slave sub-frame. ~~with special restrictions for systems operating as Slaves; This Slave-systems~~ shall not create interference to the master systems which operate during their Master sub-frame.

**3.103 Dynamic Channel Selection (DCS):** The ability of a system to switch to a different *physical (frequency)* ~~logical operating~~ channel based on channel measurements avoiding interference in *non-exclusively assigned or non-exclusively licensed* ~~license-exempt and uncoordinated~~ bands of operation. DCS is distinct from DFS (Dynamic Frequency Selection) in that DCS is not used for interference avoidance to regulatory protected devices, such as radar systems, but to other non-SSUs in the band. ~~Logical channels can be constructed from: frequency band, portion of a frequency band, time, or a combination of these elements.~~

**3.104 Coexistence Control Channel (CXCC):** ~~is e~~ A logical channel composed from a sequence of time slots, which may be used for synchronization, cumulated interference sensing per sub-frame and broadcast of the coexistence related information.

~~**3.105 Ad-hoc systems:** Those systems not using the Coexistence Protocol.~~

**3.106 Cognitive Radio Signaling:** ~~t.b.e~~ (CR) : A cognitive radio system is a system that has the capability to sense and be aware of its operational environment, to share information regarding its spectral/temporal/spatial characteristics with other systems and to dynamically and autonomously adjust its radio operating parameters depending of the results of its actions and environmental usage patterns.

**3.107 Coordinated coexistence mechanism:** A coexistence mechanism relying on exchange of protocol-based messages among radios.

**3.108 Uncoordinated coexistence mechanism:** A mechanism by which a radio system attempts to achieve coexistence without exchanging messages with other spectrum users.

**3.109 Coexistence:** A state of acceptable operation of two or more radio systems (possibly using different wireless access technologies) within the same geographical area.

~~**3.110 Coordinated Allocation:** TBD.~~

**3.111 Exclusive Assignment:** A situation whereby a channel is occupied by a single (licensed) known operator. This is synonymous with *exclusively licensed* operation.

**3.112 Exclusive License:** ~~TBD.~~ [A situation the same as \*exclusive assignment\* whereby a channel is occupied by a single \(licensed\) known operator.](#)

**3.113 License:** An authorization issued by a regulatory body to use a specific frequency block in a specified area for the purpose of transmitting. A *license* grants an entity 'rights' and may include constraints based upon some *licensing* conditions.

**3.114 License-exempt (LE):** A generic term to imply the designation of a band in which devices with similar and/or different wireless technologies are permitted to operate with no requisite application to a regulatory authority and no limitation on application. *License exemption* results in *non-exclusive assignment*. Under a *license-exempt* regime, users operating in the same band or locality have a need to *coexist*, whether or not mandatory *coexistence* rules are imposed by regulation. *Light-licensing*; (in the UK), where operating sites require registration but assignments are not *coordinated*, should be treated in the same way as *license-exemption* in this context.

**3.115 Licensing Regime:** Specific service rules defined by a regulatory body for a given band [and possibly region of operation](#).

**3.116 Light Licensing:** ~~TBD.~~ [A term \(used for example in the UK\) to describe a particular \*licensing regime\* in which wireless systems access a \*non-exclusively assigned\* band only under a license defining some restrictions, such as in this case, a requirement for registration of base station location.](#)

**3.117 Non-exclusive Assignment:** A situation whereby a band is not *exclusively assigned* to a single operator or technology, but instead may be authorized for use by a number of operators or technologies using a ~~*license-exemption scheme*~~ [method that takes into account the possibility of other users in the band.](#) ~~The operators may or may not be required to coexist.~~

**3.118 Non-exclusive Licensing:** A situation whereby a band is not *licensed* to a single operator, but instead may be authorized, [using a \*licensing regime\*](#), for use ~~of~~ [by](#) a number of operators using, for example, a *light licensing* registration scheme. The operators may or may not be required to *coexist*.

**3.119 Primary User:** See *Specific Spectrum User*.

**3.120 Non-specific Spectrum users:** *Non-specific Spectrum users* are not protected by regulation and are not considered *Specific Spectrum Users* (SSU).

**3.121 Shared band:** A generic term used to describe bands in which more than one wireless services or applications ~~operates~~ [operates](#) in the same geographical location. This term is generally applied to both *exclusively* and *non-exclusively assigned* bands.

**3.122 Specific Spectrum User (SSU):** A service specifically identified in regulation as requiring protection from harmful interference. These systems are given a priority from a regulatory point of view within a given *shared band*.

[3.xxx System: A Base Station and its Subscribers.](#)

~~3.123 Uncoordinated Allocation: TBD.~~

**3.124 WirelessHUMAN:** The designation used to describe the realization that adds *uncoordinated coexistence* mechanisms to systems operating below 11 GHz in *non-exclusively assigned* or *non-exclusively licensed* bands.

**3.125 WirelessMAN-CX:** The designation used to describe the realization that adds ~~improved~~ coordinated coexistence mechanisms to systems operating below 11 GHz in *non-exclusively assigned* or *non-exclusively licensed* bands.

**3.126 Coexistence Messaging Interval (CMI) :** A unique repetitive interval claimed by a system and used to differentiate it from other systems in its coexistence community. The CMI appears in the CXCC and is used by the claiming system for Coexistence Messaging and noise/interference monitoring purposes.

*Add the following definition to clause 4: ‘Abbreviations and Acronyms’*

CXCC                      Coexistence Control Channel

*Make the following changes whenever the word “cognitive”, appear in [1], specifically:*

*Delete lines 25 and 30 of clause 4: ‘Abbreviations and Acronyms’*

25        ~~CNTI~~                      ~~Cognitive Network Time Interval~~  
30        ~~CR\_NOC~~                      ~~Cognitive Radio Network Operations Centre.~~

*Add the following to clause 4: ‘Abbreviations and Acronyms’*

60        NTI                                      Network Time Interval

*Make the following modifications to Table 345a in sub clause 10.5.1.*

**Table 345a—parameter of absolute time reference**

Absolute time Reference	Chapter	Reference	Value
AT1	Radio signaling	Start of the first MAC Frame (no. N) <del>including cognitive radio</del>	0003:000, 15:000, 27:000, 39:000,

	(15.4.3.2)	<del>signaling of CXCC</del>	51:000
AT2	Radio signaling (15.4.3.2)	Start of the 2nd MAC Frame <del>including cognitive radio</del> <del>signaling of CXCC</del>	AT1+0001:000
AT3	Radio signaling (15.4.3.2)	Start of the 3rd MAC Frame <del>including cognitive radio</del> <del>signaling of CXCC</del>	AT1+0002:000
AT4	Radio signaling (15.4.3.2)	Start of the 4th MAC Frame <del>including cognitive radio</del> <del>signaling of CXCC</del>	AT1+0004:000

*Make the following modifications to Table 345b in sub clause 10.5.1:*

**Table 345b—parameter of radio signaling timer**

T_congn	Radio signaling (15.4.3.2)	Repetition period of the <del>cognitive signaling</del> CXCC	12s
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*Make the following change to lines 16 and 17 in sub clause 15.1.2:*

- 16 For inter-system communication, IP-level messages, MAC level messages and ~~Cognitive Radio~~  
17 Coexistence Signaling are defined at infrastructure and radio level.

*Make the following change to line 31 in sub clause 15.1.2:*

- 31 The ~~Cognitive Radio~~ Coexistence signaling uses elements of the existing PHY modes and allows simple communication

*Make the following change to line 20 (page 45) in sub clause 15.1.3.1:*



- 19 o A new BS uses the interference free slot to broadcast the message containing the contact  
 20 request and/or the ~~eognitive-radio~~ coexistence signal ~~transmitting~~ carrying the IP address

***Make the following change to line 6 (page 61) in sub clause 15.1.6:***

- 6 using a regional data base approach or/and by using ~~eognitive-radio~~ coexistence signaling.

***Make the following change to lines 6 and 7 (page 71) in sub clause 15.3.1.3:***

- 6 broadcast its coexistence proxy's IP address and the BSID of its IBS, by sending a message and/or  
~~eognitive~~  
 7 ~~radio~~ coexistence signaling. A coexistence neighbor operating BS (OBS) finds the initializing  
 coexistence neighbor in

***Make the following change to line 37 in sub clause 15.4.2.3:***

- 36 after that other means (such as ~~eognitive-radio~~ coexistence signaling) should be applied, or it  
 will be

***Make the following change to line 32 in sub clause 15.4.3.2:***

- 32 — During the MAC frame starting at the absolute time AT2, ~~eognitive~~ coexistence signals will  
 indicate the beginning

***Make the following change to line 41 in sub clause 15.4.3.2:***

- 41 the ~~eognitive~~ coexistence signaling; the registration interval has the duration of Tcr\_reg seconds;  
 The ad-hoc

## Annex 1

This annex contains the comment from [2] to be resolved via this the action item covered by the contribution.

**Comment 14:**

Xuyong Wu

*Comment:*

DEFINITION subclause need reorganization for:

- Duplication and redundancy
- Never used
- Missing definition
- TBDs
- Defining on well-known general term
- Conflicting with definition in primary standard
- Ordering issue

**Comment 30:**

David Grandblaise

*Comment:*

Define "Coexistence Protocol" (or Coordinated Coexistence Protocol) if previous comment is accepted.

*Suggested Remedy:*

Add the following definition:

Coordinated Coexistence Protocol: Set of IP based backhaul procedures handling coordinated coexistence between WirelessMAN-CCX systems, or between WirelessMAN-CCX systems and non WirelessMAN-CCX systems.

**Comment 35:**

Lei Wang

*Comment:*

A TBD technical definition in a document in letter ballot is unacceptable.

*Suggested Remedy:*

Delete section 3.106

**Comment 37:**

David Johnston

*Comment:*

Undefined terms for 3.110, 3.112, 3.116 and 3.123.

*Suggested Remedy:*

Delete them.

**Comment 40:**

Lei Wang

*Comment:*

A TBD technical definition in a document in letter ballot is unacceptable.

*Suggested Remedy:*  
Delete section 3.112

**Comment 42:**  
Avi Freedman

*Comment:*  
Definition is TBD (Sub clause 3.116)

*Suggested Remedy:*  
Change TBD to:  
Light-licensing, (in the UK), where operating sites require registration but assignments are not coordinated,

**Comment 43:**  
Lei Wang

*Comment:*  
A TBD technical definition in a document in letter ballot is unacceptable.

*Suggested Remedy:*  
Delete section 3.116

**Comment 44:**  
David Grandblaise

*Comment:*  
Difference between "Non-exclusive Assignment" and "Non exclusive Licensing" definitions is not clear

*Suggested Remedy:*  
Clarify both definitions

Avi Freedman (reply comment): 1. In licensing, add: a situation whereby a license is required for operation but the band may be authorized for use of a number of operators using, for example, a light licensing registration scheme.

2. Shouldn't there be some reference to the area or region of operation?

**Comment 45:**  
Ken Stanwood

*Comment:*  
"Non-exclusive" does not imply "licensed-exempt scheme". In fact, there's no definition of "licensed-exempt scheme".

*Suggested Remedy:*  
Starting on line 35, change "using a licensed-exempt scheme" to "using a method that take into account the possibility of other users of the band"

**Comment 47:**  
David Grandblaise

*Comment:*  
This definition is already defined in section 3.86

*Suggested Remedy:*  
Combine both definitions into a single one by including 3.125 text into section 3.86 text.

Also, in section 3.125, change the text "improved coexistence mechanisms" by "improved **coordinated** coexistence mechanisms"

Avi Freedman (Reply comment): [According to previous comments.](#)

## 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.*