Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
Title	Action Item from Session #47: DRRM SS and DRRM BS text remedy
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Re:	Working Group Letter Ballot #24a for IEEE P80216h/D2
Abstract	It has been decided during session # 47 that DRRM should be removed and adapted in the draft. With respect to this, this contribution provides text remedies on DRRM SS and DRRM BS.
Purpose	Action Item from Session #47: DRRM SS and DRRM BS text remedy
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Action Item from Session #47: DRRM SS and DRRM BS text remedy

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Overview

It has been decided during session # 47 that DRRM should be removed and adapted in the draft (Action item related to comment 296 in [2]). With respect to this, this contribution provides text remedies on DRRM SS and DRRM BS.

Specific editorial changes

This section provides a list of changes to the draft document.

Blue 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.

Proposed text changes

[Remove DRRM acronym from the section 4 (Abbreviations and acronyms)]

[Update text of section 15.1.6 as follows:]

15.1.6 Architecture for WirelessMAN-CX

The architecture for Radio Resource Management in the context of this clause is a distributed one and allows communication and exchange of parameters between different systems. A system consists of a base station, its associated subscriber stations and its coexistence proxy. This architecture is used in support of the coordinated coexistence protocol for interference identification, prevention and resolution. Every system includes ~~a distributed radio resource management (DRRM) entity, to apply the spectrum sharing policies, and~~ a data base (DB) to store the shared information regarding the actual usage and the intended usage of the radio resource.

~~A subscriber station may include an instance of DRRM, adapted to SS functionality~~.

System Architecture illustrates the System Architecture.
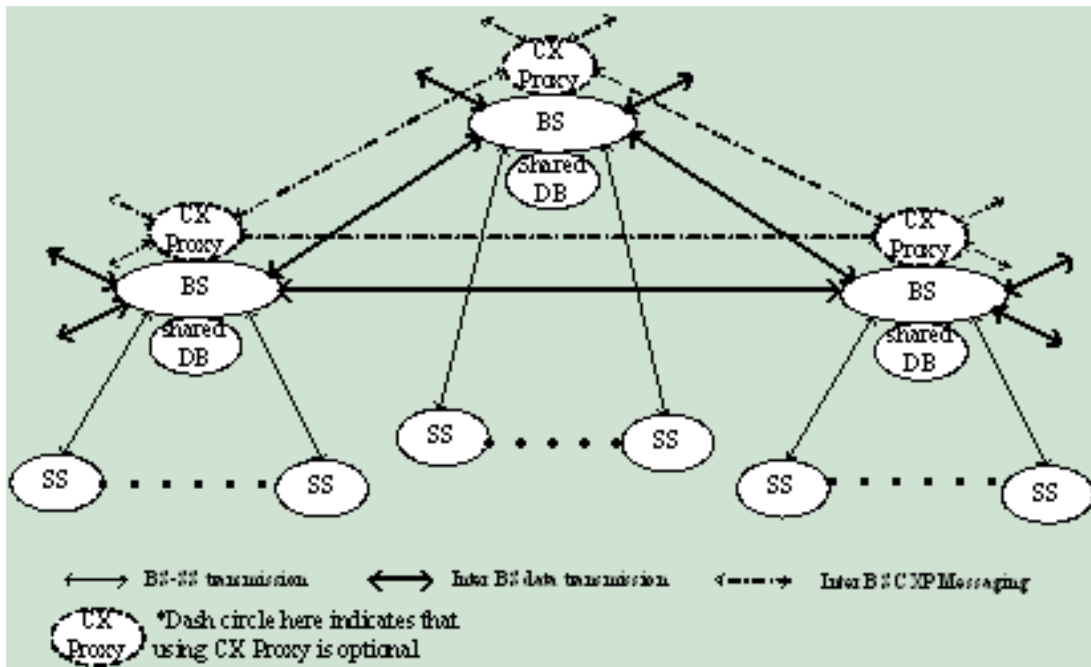

Figure h26—System Architecture

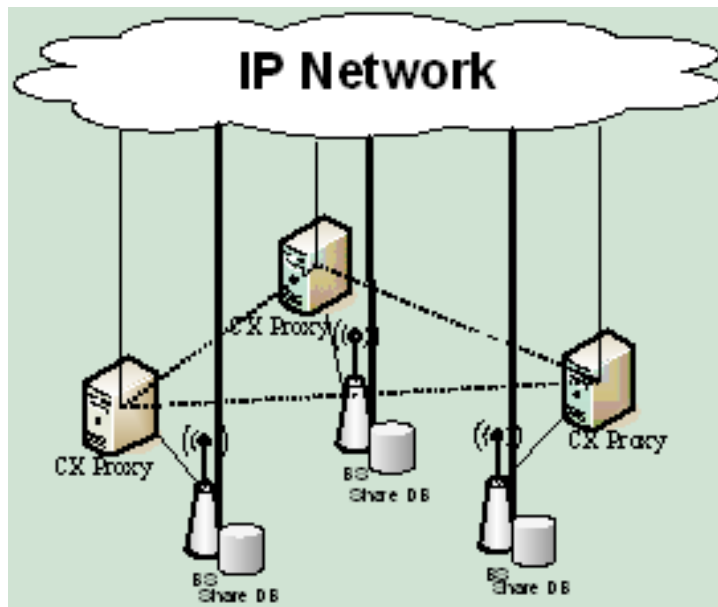Inter-system Communication Architecture shows the WirelessMAN-CX inter-system communication architecture:

Figure h27—   **Inter-system Communication Architecture**

General architecture includes the components operating over IP-based network:
The coexistence proxy of every base station maintains the mapping of the IP address and the BSID of their serving BSs. All the CXP messages between the different systems should be sent and received via their coexistence proxies instead of directly between the base stations. So the IP address will not be known outside the system. The coexistence proxy will forward the CXP messages for the base station.

Inter-system communication
The inter-system communication consists of:

— Inter-system *messages*

  o Base Station to/from Base Station

  o The subscriber stations are used to forward the information contained in the signaling and messaging from the neighbor BS to its serving BS.

— Open access to the ~~DRRM~~ Data Base (*optionally via a coexistence proxy*):

  o To read the parameters of the hosting Base Station

  o *To request c*hanges of the hosting Base Station operating parameters.

Coexistence Protocol
In order to obtain a coexistence neighbor topology, the Base Station uses the Coexistence Protocol (CXP) to coordinate with its neighbor systems. ***Error! Reference source not found.*** describes the coexistence protocol layering for WirelessMAN-CX systems. The diagram indicates that ~~the DRRM,~~ the Coexistence Protocol and the Shared DB belong to the CX Management Part located in management plane and the CXP messages (see ***Error! Reference source not found.***) will be exchanged over an IP network. ~~Thus, the DRRM in t~~The CX Management Part uses the Coexistence Protocol to communicate with other BSs and with the BSIS over the CXP SAP in order to interact with the MAC or PHY. ***Error! Reference source not found.*** illustrates the CX BS architecture with the Coexistence Protocol. The gray area indicates that there is no connection between blocks. The Distribution System Medium (DSM) is another interface to the backbone network which carries the IP communication. Note that this layering diagram is only for reference. Similarly, ***Error! Reference source not found.*** also illustrates the BSIS layering protocol, which is co-located with the BSIS. The service primitives are described in *[Appendix? t.b.d.]* A BS uses the Coexistence Protocol to perform the coexistence resolution and negotiation procedures.

[Remove DRRM in Figures h28 and h29]

[Update text of section 15.4 as follows:]

15.4 Interference prevention

This subclause describes the methods of preventing the interference, based on the information of the interference that the system had identified (section 15.3).

The approaches for interference resolution are based on MAC Frame synchronization and separation of the interference in the frequency and time domains.

An IBS, not being able to recover the GPS synchronization signal, is not allowed to start the operation before scanning the above frequencies for the GPS (or equivalent) sync signals sent during the first four coexistence control channel slots. If such signals are not found, the IBS is allowed to start the operation, but will have to look every 10min. for these signals.

The separation of interference in the frequency domain is undertaken first, followed by the separation of remaining interference in the time domain, using procedures of the Coexistence Protocol. The Coexistence Protocol is defined at the IP level and is mainly intended for BS-BS communication.

In order to obtain the IP addresses of the Base Stations within the Coexistence Neighborhood, a number of procedures are defined, based on operator coordination, or on indirectly transmitting the contact information for the IP network.

The operators can exchange information tables containing the deployment information, such as GPS coordinates, IP address of the CX entity in the Base Station, etc.

Operators may also maintain a common database, including both deployment information and an IP identifier for allowing the operation of a technology-independent coexistence approach. In this case, it is assumed that:

1) Every Base Station includes a data base, based on which the Base Station negotiates with other systems in the community; the BS data-base contains information necessary for spectrum sharing, and includes the information related to the Base Station itself and the associated SSs. Other Base Stations can send queries related to the information in the ~~database to the DRRM entity, located in a~~ Base Station database (see System Architecture).The base station shall represent its system in the cooperation with other systems when communicating over the backbone. The SSs may forward the information from the neighbor system, which is derived from CX signaling or messaging, to their serving BS. The base station locations may be obtained by GPS or other positioning systems, however there is no need to register the subscriber locations;

2) If the region/country database is not available, the base stations should try to find their neighbors and the community topology in a coordinatively distributed fashion.

3) All the Base Stations forming a community will have synchronized MAC frames and frame numbers.

4) A community should be addressed within one or two hops of neighbor relationship, respectively for each system.

5) All base stations are synchronized to a GPS clock. The start of all MAC frames and other events are referenced to the rising edge of this clock.

6) Every system should be assigned a minimum access time for the use of the radio resource without interference higher than the [light] interference threshold by other systems within the coexistence community.

References

[1] IEEE 802.16h/D2: Part 16: Air Interface for Fixed Broadband Wireless Access Systems Amendment for Improved Coexistence Mechanisms for License-Exempt Operation; 2007-01-30
[2] IEEE 80216h-06_068r5: *Letter Ballot #24 Commentary file with resolutions from Session #47.*

Annex

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

Comment 296:
(David Grandblaise)

Page: 55
Line: 19
Subclause: *15.1.6*

Comment:
"DRRM SS" is used anywhere else in the draft

Suggested Remedy:
Define and use DRRM SS in the document if its is required, or simply remove DRRM SS if not relevant.

Resolution:
1) Simply change "DRRM BS" and "DRRM SS" to "BS" and "SS" in figure h20.

2) and make it consistent with the text in the whole document.
AI taken by David.