Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Consideration on the profile issue in coexistence**
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Re:	80216h-05_028：Call for Comments and Contributions: IEEE 802.16 License-Exempt Task Group (2005-12-15)
Abstract	According to the PAR and detailed scope, to limit the system in 16h to specific profile of OFDM or OFDMA to ensure the communication between the coexistence neighbor should be consider as out of scope in 16h now, and to limit the profile to communicate between neighbor stations will cause other issues that may disrupt the advantage of 16 systems.
Purpose	To clarify the profile issue in coexistence. To propose not to limit the profile for coexistence purpose in further discussion and contribution.
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Consideration on the profile issue in coexistence
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Overview

In last meetings, there is some discussion on specifying a existing profile into CTS and even limiting all the PHY used in 16h into one existing profile, so that the neighbor network can talk with each other much easier.

Seeing to the problems which should be solved in 16h and the result if we really commit the group to use only one profile in defining coexistence, we find it's not realistic to do so. Here is some comment on this topic.

Reference:

[1]   *IEEE802.16-2004: IEEE standard for Local and metropolitan area networks Part16: Air Interface for Fixed Broadband Wireless Access Systems 2004-10-01*

[2]   *IEEE 802.16h-05/026: License-Exempt Task Group Meeting Minutes for Session #40 (2005-12-06)*

[3]   *IEEE 802.16-05/027: Working Document for P802.16h (2005-12-02)*

[4]   *P802.16h PAR : IEEE 802.16h PAR (as approved 04/12/08)*

[5]   *IEEE 802.16h-05/003: Detailed Scope of IEEE 802.16h Standard*

Discussion

Applicability

According to the 16h PAR:14a. Reason for the standardization project:

"The mechanisms specified need to be widely implemented and interoperable for their benefits to be realized, so standardization is required."

> **14a. Reason for the standardization project:**
> This standard will improve the coexistence in license-exempt (LE) operation for IEEE 802.16 fixed wireless systems. It will reduce the potential for interference caused by such systems sharing the same LE bands. The mechanisms specified need to be widely implemented and interoperable for their benefits to be realized, so standardization is required. As result there will be improved user service experience and increased robustness and efficiency of spectrum use. This will expand
> " the market opportunities for enterprise, service provider, and consumer applications.   "

According to IEEE 802.16h-05/003: Detailed Scope of IEEE 802.16h Standard:

The mechanisms used in the 16h standard shall provide coexistence between different 802.16 PHY modes and the transmission between different network systems shall be in a PHY independent mode.

Pro-active cognitive approach
  – Announce when a system/unit transmits and receives
  – Discussion: another system will try avoiding interfering or be interfered; this approach will be useful for providing coexistence between different 802.16 PHY modes (as OFDM, OFDMA, SC) or between 802.16 and other
" spectrum users "

  • A system should know the Network Management address of other systems
       • Discussion: to communicate
  – Should be transmitted in a PHY independent mode
       • Discussion: to address inter-802.16 PHY modes (OFDM, OFDMA,SC) transmission; messages that can be translated in simple PHY properties may
" be used by each one of the PHY modes. "

Complexity

Ranging

As we known, the communication between neighbors does not contain any service data and need to keep as less content as possible. It means that efficiency will not be the most important issue when considering the communication between neighbors. The current solution described in the WD is trying to use some add-ons to ensure the neighbor to exchange some message with low content, with out complex procedures such as ranging. We use PHY independent mechanism like time domain or frequency domain energy detection, which only need mostly some AGC technology that already exist in the current chipsets and necessary for all possible solutions. We need to make lest change to the existing 16 standard.

Unfortunately to use a specific profile between neighbors is not as simple. If we communicate the BS or SS to neighbor stations using the profile which now applied in the service data of BS and SS, we need ranging process between the SS and the neighbor BS and even between the BS and neighbor BS if talk directly. Notice here, the neighbors mentioned here is normally a plural. That's big-ticket for all the fixed stations, even for the mobile ones.

SS vs. Multi BS

In current PMP fixed solution, SS is only communicate to one BS with the whole set of parameter of the link chain. The current solution in the working document is trying to use some low complexity broadcasting mechanism that make all the SS and BS does not need to dealing with all the problems aroused by SS linking to multi BS. Such as time domain energy pulse using the existing item of RSSI mechanism and frequency domain energy bin using existing FFT, these existing solution in the WD tried to prevent the SS system to change much and prevent the SS to update link chain parameters frequently and switch them from time to time in frames between BSs.

Effectiveness

SNR and range

In coexistence topic, the main purpose of talking with the neighbor is not to transmit a lot of data to the neighbors, but to identify the interference situation between the neighbors and fairly make it less harmful to the main wireless service. So we need to make the SNR requirement in neighbor wireless communication as low as possible, that will make the radio-signature and other signaling between neighbors acquire better reachable range and make the coexistence mechanism more effective.

To use the same PHY inner the wireless service network and between the wireless service network will lead to same SNR requirement on dealing these two different topic, which means unnecessarily high SNR requirement in coexistence wireless signaling between neighbor wireless networks, that will reduce the opportunity and reachable range of successful communication between neighbors.

Considering current working document, to improve the simple PHY properties which have lower SNR requirement should be the right direction to solve the issues we are facing in this group.

Conclusion

We are not trying to enumerate all the issues that may caused by limiting the profile to get coexistence. But as our perspective and the reasons above, we believe it's not the preferred way to ensure coexistence by limiting the 16h applicability to specific profile.

We believe the following topic as out of 16h scope, content based on these topic should be limited into the *15.2.2.3.1 same PHY profile* or *ANNEX* according to some particular scenario:

1. To limit profile in order to transmit message between coexistence neighbors;

2. To specify the profile in CTS in order to communicate between coexistence neighbors;

3. Approaches in coexistence depended on certain specified profile condition or limitation on profile applicability.