Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	Discussion on implementing the energy pulse	
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Re:	80216h-06_016：Second Working Group Review: P802.16h Working Document (2006-06-05)	
Abstract	Discuss the changes to be made about the energy pulse in implementation from non-WirelessMAN-CX scheme into WirelessMAN-CX scheme.	
Purpose	To show the feasibility of implementation on energy pulse.	
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Discussion on implementing the energy pulse

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Overview

Last meeting we've start to discuss the issues in how we can implement the energy pulse approach with current PHY scheme. Considering IEEE802.16 PHY, the most thing we are concern is base band, therefore, in most time when we said PHY, we are talking about base band actually.

This paper are showing the idea that we are not going to make any base band change in implementing the energy pulse mechanism dealing with coexistence interference identification, but to add some function specific for the coexistence purpose into MAC and RF part in current non-WirelessMAN-CX scheme. These changes are not to change any base band scheme.

We have no proposed text in this paper yet, but we can discuss whether we have the necessity to propose some text into the WD or draft.

Reference:

[1] *IEEE 802.16h-06/014: 802.16h License-Exempt Task Group Meeting Minutes (2006-05-31)*

[2] *IEEE 802.16h-06/015: Working Document for P802.16h (2006-05-31)*

[3] *IEEE 802.16h-06/016: Second Working Group Review: P802.16h Working Document (2006-06-05)*

[4] *RECOMMENDATION ITU-R M.1652 (2003)*

[5] *DFS Dynamic Frequency Selection Testing Update – Cetecom (2005)*

In this paper, we are mostly discuss on using time domain energy pulse, just to show the scheme of changes from non-WirelessMAN-CX system to WirelessMAN-CX system. Another assumption in this paper is that we talk about energy pulse mechanism implementation scheme in downlink only, and uplink scheme is very similar and not discussed in this paper.

Firstly, let's see the normal scheme of non-WirelessMAN-CX system. It's can be easily devide into MAC, BB and IF/RF part, as shown in the figure below:

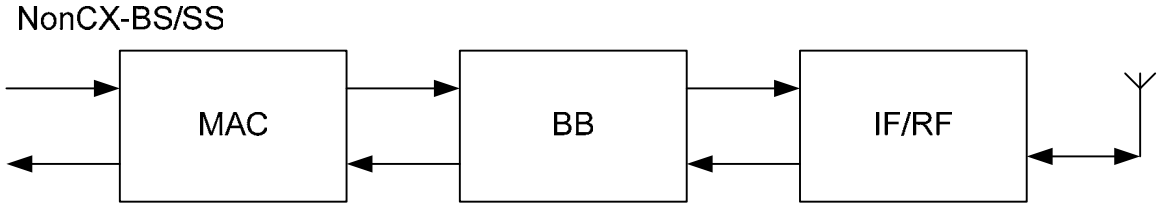

Figure1. non-WirelessMAN-CX system scheme

When we try to implement the WirelessMAN-CX functionality, we may think about enhance some coexistence function into MAC, but only the MAC changes are not enough naturally. The MAC need to control the IF/RF part in order to detect, scan, or even send out some signaling in behavior rather different with non-WirelessMAN-CX systems. For example DFS need the MAC and IF/RF do more than what non-WirelessMAN-CX system, regardless whether to implement energy pulse approach. ***The energy pulse method is born with the similarity of aspect with the DFS mechanism.***

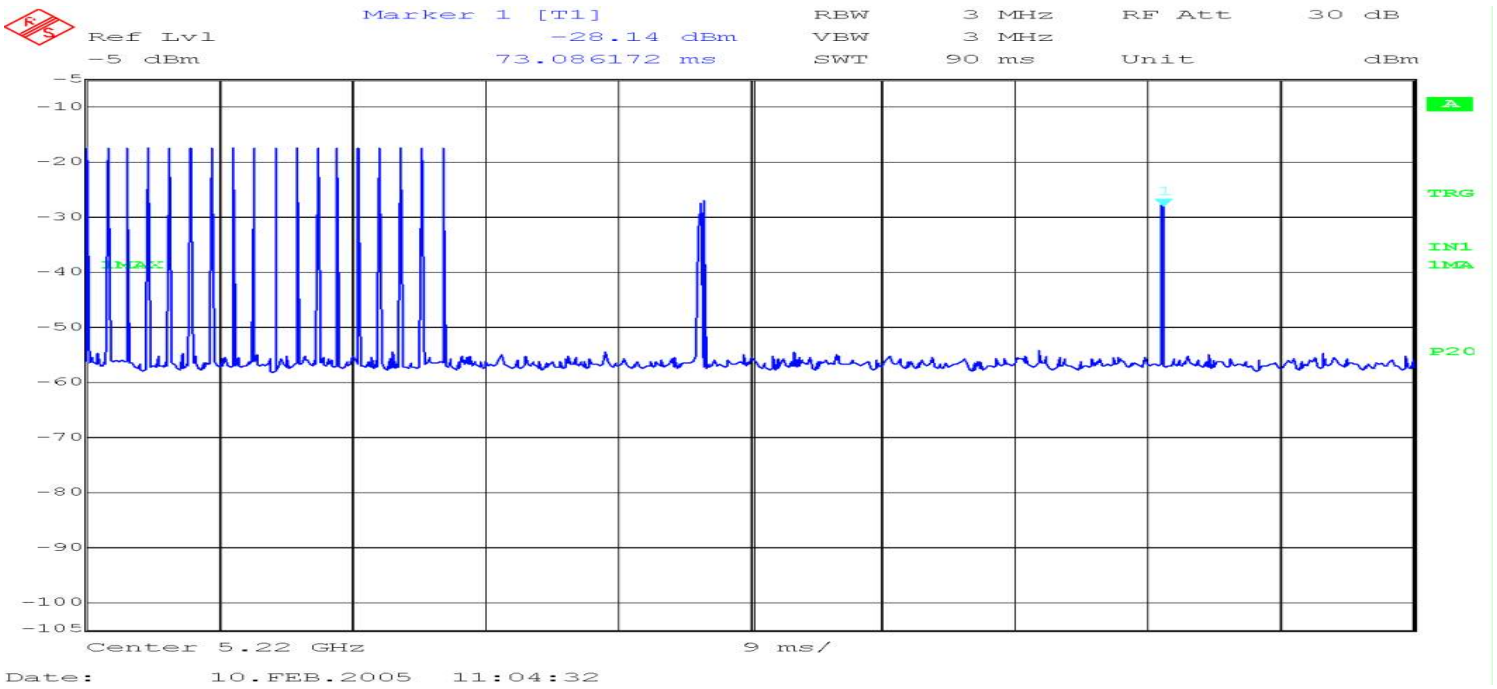

Figure 2-Radar Signal 1, according to EN 301 893 and FCC (Source: Cetecom)

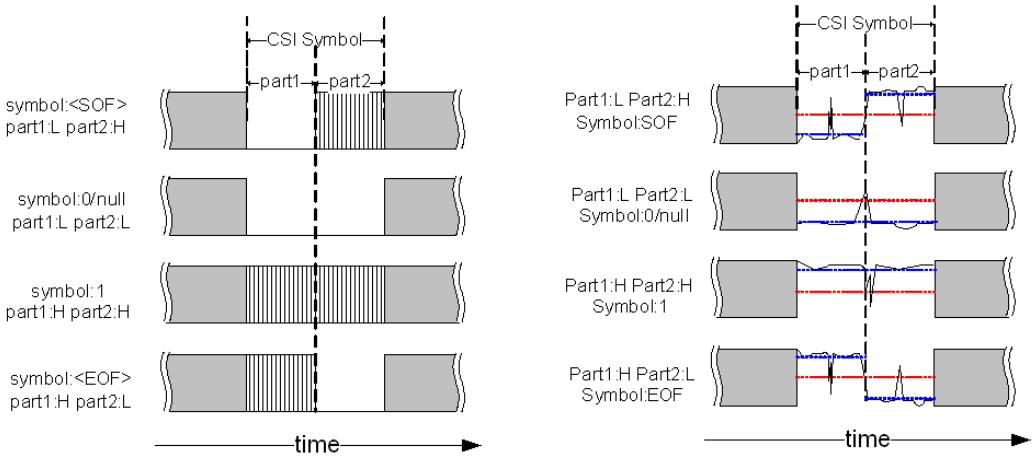

Figure 3 – Energy pulse time domain signal inside current WD

And the difference is energy pulse method inside 16h now makes the energy pulse carry some additional information, this difference does not significantly change the functionality and requirement on the IF/RF part, and say nothing of BB.

The following figure shows the difference between WirelessMAN-CX and Non-WirelessMAN-CX with highlight on the scheme, ***And no changes in the base band part was needed accordingly.***

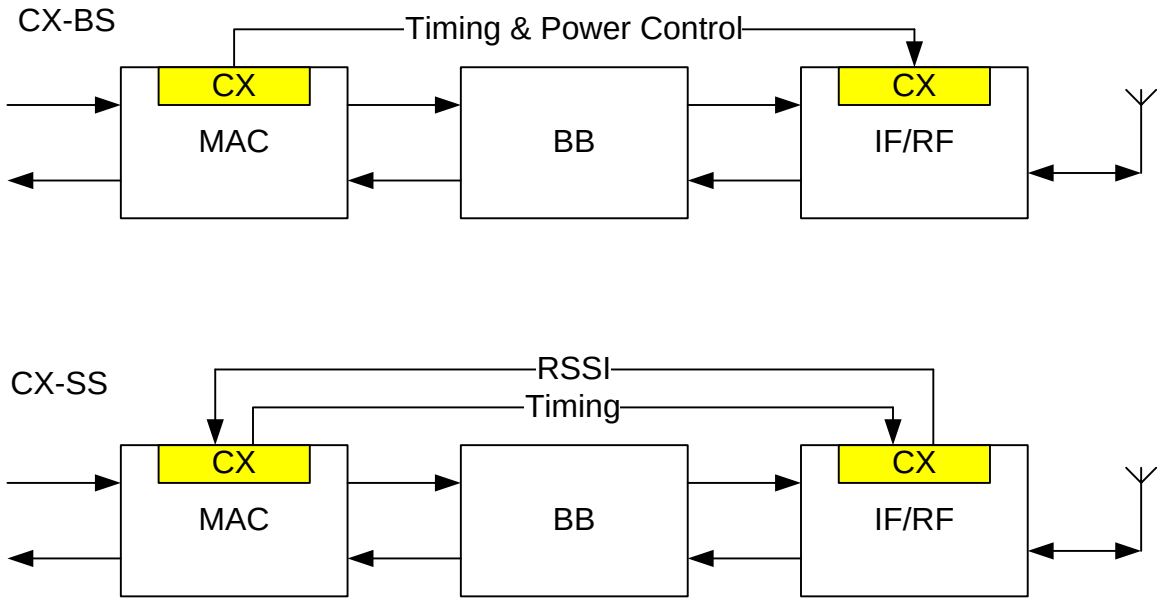

Figure 3. WirelessMAN-CX system scheme

The timing and spectrum parameter spec of the energy pulse are still needed to be consolidated inside 16h task group. Test in real environment may help.