Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	Discussion on the CTS duration
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Re:	80216h-06_016： Second Working Group Review: P802.16h Working Document (2006-06-05)
Abstract	Discussion on the CTS duration, regarding the QOS and Fairness
Purpose	Consolidate the WirelessMAN-CX mechanisms.
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Discussion on the CTS duration

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Overview

There is some discussion in the 16h-CX-OVR ad-hoc about the CTS/CSI/CMI duration, this paper are to discuss some possibility of the issues according to the proposed parameter, regarding the QOS and fairness.

There is no certain conclusion about this topic, just to rise the discussion.

Reference:

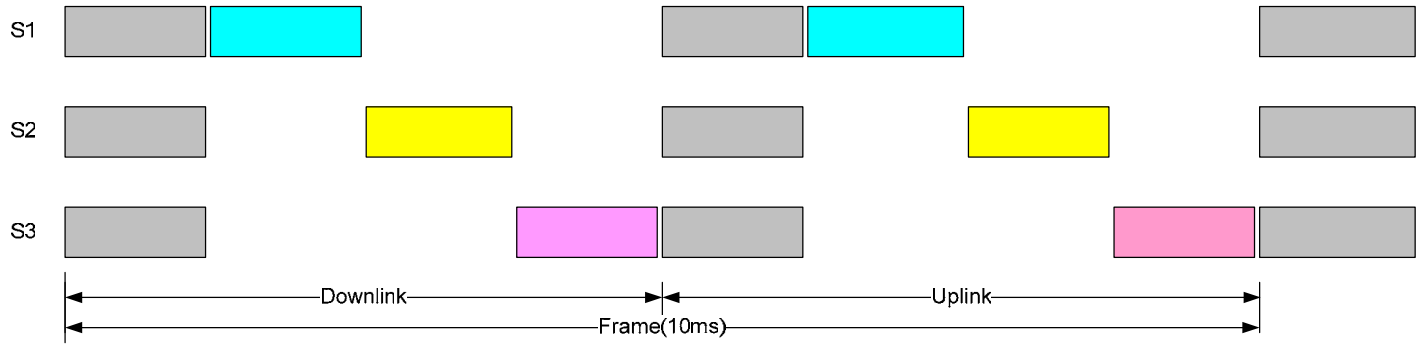
[1] *IEEE 802.16h-06/014: 802.16h License-Exempt Task Group Meeting Minutes (2006-05-31)*

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

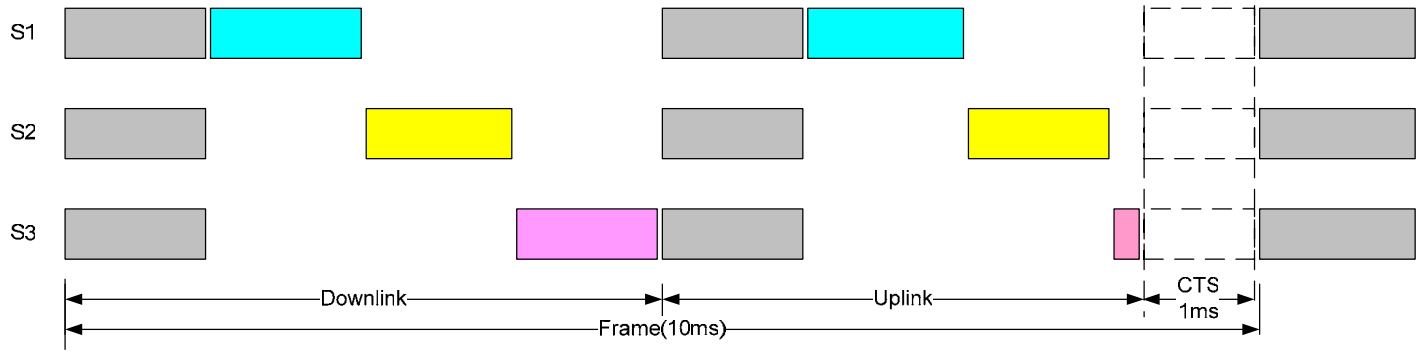
[3] *IEEE 802.16h-06/016: Second Working Group Review: P802.16h Working Document (2006-06-05)*

Discussion

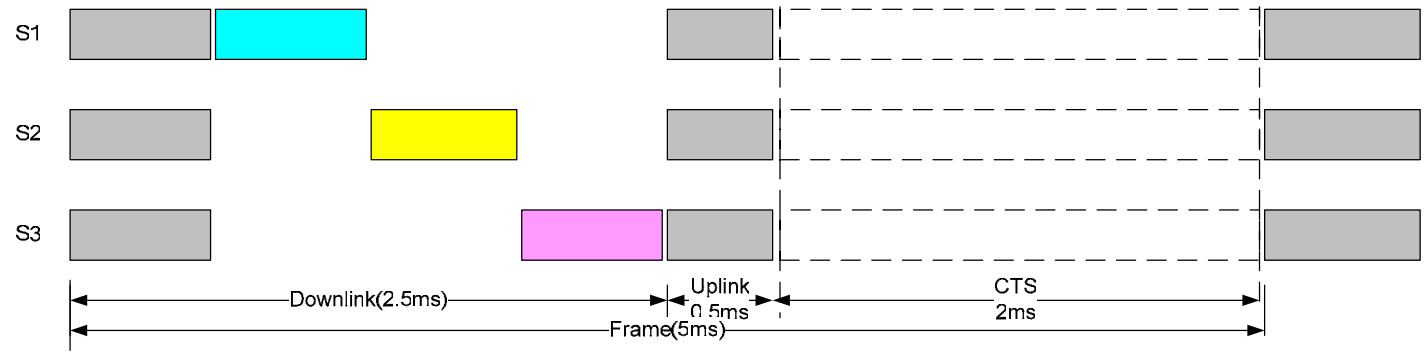
Normal structure of TDD frame containing 3 master subframe (using type 1 inside the working document) is shown below:



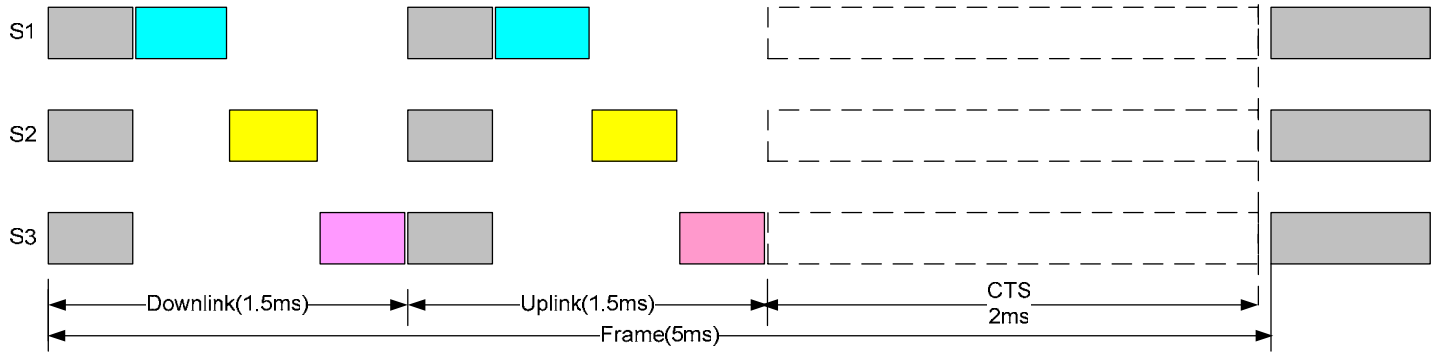
If the CTS/CSI/CMI interval duration is 1ms, and no other changes on the synchronized subframe boundary, the rough structure of the frame containing the CTS/CSI/CMI interval is shown below:



The S3 master subframe in this frame are shortened significantly and may affect the QOS capability of S3 without fairness with other systems. If we consider severer case, using 2ms CTS/CSI/CMI duration inside the 5ms frame. The structure may looks like the following figure:



This scheme hurt more on the performance on QOS and fairness on all the systems involved. One possible solution might be evenly shrink all the subframe to vacate the CTS/CSI/CMI duration. E.g.:



This may solved the fairness issue and part of the QOS capability but still will cause some issue of QOS and implementation.

Conclusion and further discussion needed:

To lower down the QOS and fairness affection, we may:

1) Make the coexistence interval shorter,

2) Better to evenly decrease the duration of each subframe within the frames containing coexistence interval.

However, the duration of CTS are still in discussion. As a simple calculation, counting on current BS_NURBC message (96bits for IPv4), if the symbol carrying one bit is 10us in width, the message will occupy about 1.2ms by 120 symbols (8 bits for type/length/check each plus the 96bits value), regardless the gap on the boundary of data and CTS/CSI/CMI and the SOF/EOF symbols.

So if the CSI is 1ms, every BS_NURBC message may need no less than 2 ICSI interval, or use 1 ICSI interval of 2ms. The structure inside CSI signaling TLV and CSI frame is shown in 15.3.1.1.2 in C80216h-06_048.