# Proposed structure to harmonize the CMI and CSI timing in control channel

Document Number:
    IEEE S802.16h-06/085r1
Date Submitted:
    2006-09-26
Source:

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Re:
    802.16h-06/021：Third Working Group Review: P802.16h Working Document (2006-08-10)

Abstract:
    We need to figure out a common frame structure for the CMI and CSI, so that it can be unified as a whole to form a so called control channel.

Purpose:
    To consolidate the working document.Purpose:

# Proposed structure to harmonize the CMI and CSI timing in control channel

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# Outline

- Candidate Scheme_ Frame Structure
- Conclusion
- Discussion
- CXCC Superframe Scheme

# Candidate Scheme_ Frame Structure

Scheme 1: flexible frame duration with:
1) flexible CXCC slots
2) 3 kind of frame structure timing for each system
3) but problematic UL/DL interference confliction
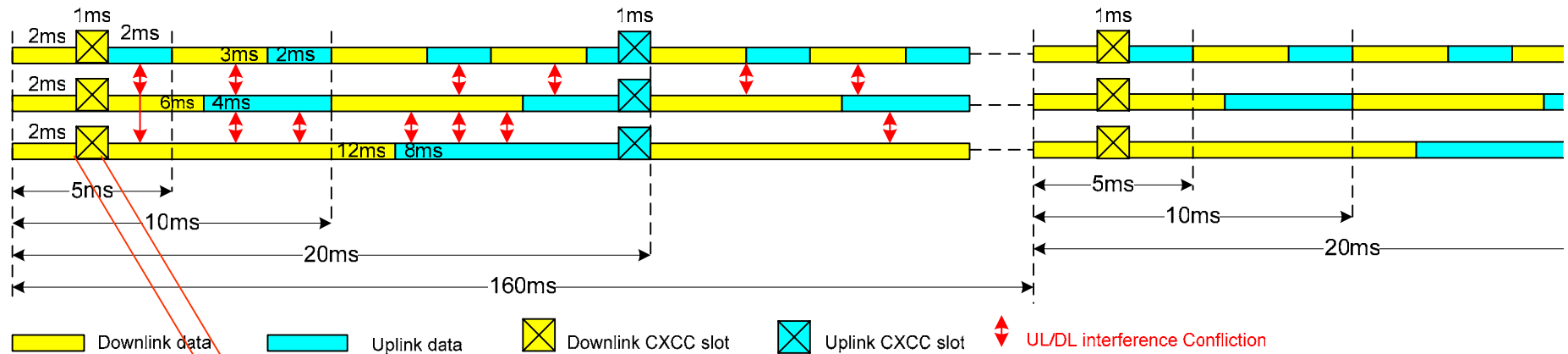


**2 gaps needed!!!**

# Candidate Scheme_ Frame Structure

Scheme 2: fix frame duration with:
1) flx CXCC slots
2) 2 kind of frame structure timing for each system
3) no UL/DL interference confliction because of synchronization



| | Downlink data | | Uplink data | | Downlink CXCC slot | | Uplink CXCC slot | | UL/DL interference Confliction |
|---|---|---|---|---|---|---|---|---|---|

# Conclusion

1) **Inter-system UL/DL interference confliction**
   - Scheme1: If the frame duration is not fixed in some region ,and we use flexible frame duration(eg.5/10/20ms), it will <u>be problematic on</u> inter-system UL/DL interference confliction, even we can figure out flexible CXCC slots timing suitable for each duration.
   - Scheme2: If the frame duration is fixed in some region by regulatory, it will have <u>no issue on</u> inter-system UL/DL interference confliction and easy synchronized;

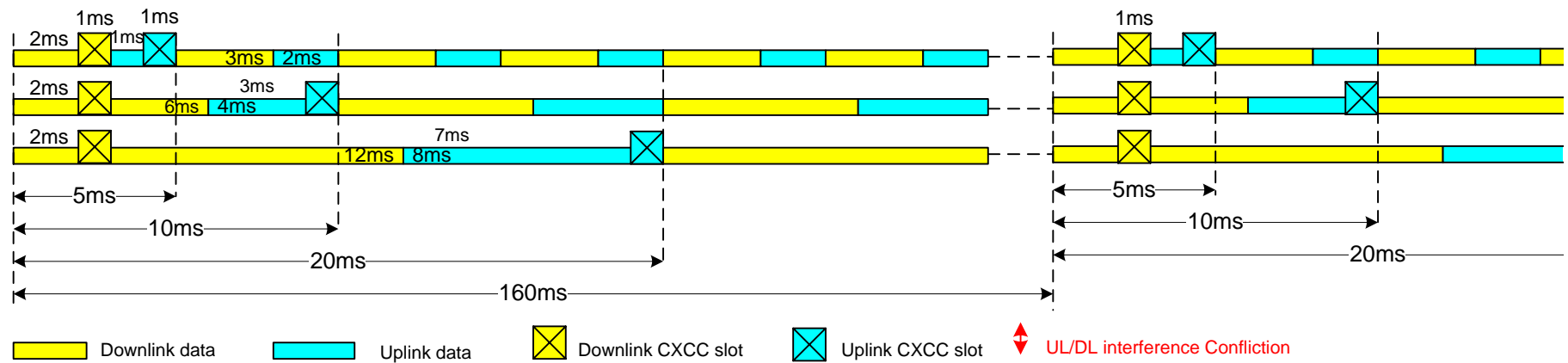2) **Number of types of the frame structure**
   - Scheme1: <u>3 kinds</u> of frame structure: 1)with UL CXCC slot only, 2)with DL CXCC slot only, and 3)normal frame without CXCC slot
   - Scheme2: <u>2 kinds</u> of frame structures only: 1) with DL and UL CXCC slots; 2) normal frame without any CXCC slot

3) **Gaps overhead**
   - Scheme1: 2 additional GAPs needed for each DL slots in case of 10ms /20ms frame duration
   - Scheme2: 1 additional GAPs needed for each DL slots in case of 10ms /20ms frame duration

*Preference: Scheme 2*

# Discussion

- Regulatory: Is it a Regulatory issue to limit the frame duration in one region? Anyway, to limit the frame duration into 5/10/20ms is more or less the same with to have only one considering the regulatory limitation. (10ms or one of them chosen by region regulatory entity?) Why not just *limit to only one duration*?

- QOS: CXCC Slots should be *no more than 1ms* so that to allow 50% duration in the frame *(which have the CXCC slots inside)* to carry normal data transfer. *(also see resolution of C80216h-06_055 PLS)*

# Discussion ☹

- ## From minutes for 44# meeting:

Comment: 1066

Discussion on the CTS duration
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Contribution: IEEE C802.16h-06/055

This contribution discussed the CTS duration, regarding QoS and fairness, and consolidated the WirelessMAN-CX mechanisms.
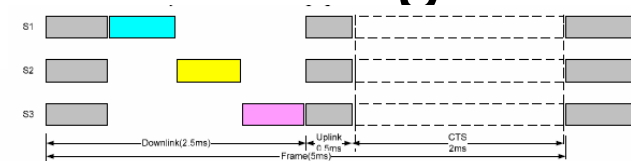
The contribution IEEE C802.16h-06/055 was accepted with no objection.

- ## From C802.16h-06/055 in 44# meeting:



**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.

# CXCC Superframe Scheme

| Index for CXCC composition | Function Of Control Channel* | Name& reference ** | CXCC Mac frame number *** | | |
|---|---|---|---|---|---|
| | | | 5ms (Index-1)/2*32 | 10ms (Index-1)/2*16 | 20ms (Index-1)/2*8 |
| 1 | GPS timing recovery DL | CX_CC_GPS_D1 (15.2.1.1) | 0 | 0 | 0 |
| 2 | GPS timing recovery UL | CX_CC_GPS_U1 (15.2.1.1) | 0 | 0 | 0 |
| 3 | GPS timing recovery DL | CX_CC_Sync_D1 (15.2.1.1) | 32 | 16 | 8 |
| 4 | GPS timing recovery UL | CX_CC_ Sync_U1 (15.2.1.1) | 32 | 16 | 8 |
| 5-61 (mod4=1) | CSI DL (15 slots) | CX_DCSI [(index-5)/4] (15.3.1.1)**** | (Index-1)/2*32 | (Index-1)/2*16 | (Index-1)/2*8 |
| 6-62 (mod4=2) | CSI UL (15 slots) | CX_UCSI [(index-6)/4] (15.3.1.1)**** | (Index-2)/2*32 | (Index-2)/2*16 | (Index-2)/2*8 |
| 7 | No & Interference (No+Io) | CX_CC_No1 | 96 | 48 | 24 |
| 8 | AT1 | CX_AT1 (15.4.3.2) | 96 | 48 | 24 |
| 11-31 (mod4=3) | CMI DL (6 slots) | CX_DCMI [(index-7)/4] (15.1.4.1) | (Index-1)/2*32 | (Index-1)/2*16 | (Index-1)/2*8 |
| 12-32 (mod4=0) | CMI UL (6 slots) | CX_DCMI [(index-8)/4] (15.1.4.1) | (Index-2)/2*32 | (Index-2)/2*16 | (Index-2)/2*8 |
| 35 | No & Interference (No+Io) | CX_CC_No2 | 544 | 272 | 136 |
| 36 | AT2 | CX_AT2 (15.4.3.2) | 544 | 272 | 136 |
| 39-64 (mod4=3or0) | Reserved (14 slots) | Reserved | (Index-2)/2*32 | (Index-2)/2*16 | (Index-2)/2*8 |

# Notice

**\*Control Channel duration Tcc_s is 1 ms (_C80216h-06_055_ )**

**\*\* CXCC Mac frame number start counting at 0 at absolute time 0030:000 sec and repeats every T_cogn.**

**\*\*\* T_cogn =5.12 seconds, with MAX CXCC MAC frame number equaling respectively 1024, 512 and 256 for Frame durations of 5,10,and 20 msec.**

**\*\*\*\* the CSI scheduling in 15.3.1.1 should change the first ICSI to be GPS usage**

# Discussion