

# On the Option of 4-Switching Points in TDD Frame

## IEEE 802.16 Presentation Submission Template (Rev. 9)

Document Number:

IEEE C802.16m-09/0011

Date Submitted:

2009-01-05

Source:

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Venue:

IEEE 802.16m-08/052, “Call for Comments and Contributions on Project 802.16m System Description Document (SDD)”.

- Target topic: Call for Comment on the SDD draft (IEEE 802.16m-08/003r6).

IEEE 802.16m-08/053r1, “Call for Comments and Contributions on Project 802.16m Amendment Working Document”.

- Target topic: Call for Comment on Amendment Working Document Text (IEEE 802.16m-08/050).

Base Contribution:

None

Purpose:

To be discussed and adopted by TGm for the 802.16m SDD and Amendment Working Document

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# On the Option of 4-Switching Points in TDD Frame

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January 2009

# Backgrounds

- Two options for TDD frame in the current SDD and Amendment working doc
  - ① 2-switching points, ② 4-switching points, in 5ms TDD frame
- Comparison results of these two options have been shown in ...
  - C802.16m-08/669 in the session 56, C802.16m-08/1479 in the session 58
- A common observation can be found in both contributions:
  - With Tx/Rx processing time of 1 subframe at BS and MS, 4-switching can further improve latency
  - With Tx/Rx processing time of 2 subframe at BS and MS, gain of 4-switching over 2-switching is not noticeable
  - Tx/Rx processing time is a key factor in comparison of the two options
- However, claims in these two contributions are different:
  - C802.16m-08/669: Remove the 4-switching option
  - C802.16m-08/1479: Keep the 4-switching option
  - Because of *different view on the processing time of 1 subframe*

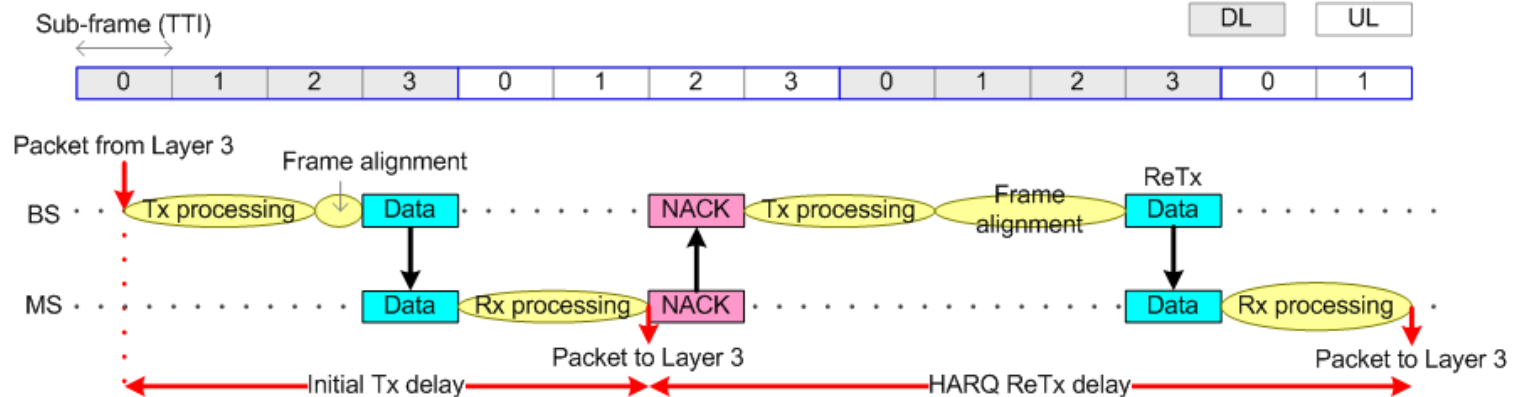
# Comparison Results in the Two Contributions

- Latency (Downlink)

Tx/Rx Processing time	C802.16m-669		C802.16m-1479	
	4 Switching	2 Switching	4 Switching	2 Switching
1 subframe	-	-	3.36 ms	4.41 ms
2 subframes	5.34 ms	5.65 ms	5.34 ms	5.65 ms

HARQ ReTx probability = 30%

## Example of DL Latency calculation for 2 switching



# Processing Time

- Rx processing time at MS includes
  - USCCH (DL MAP) decoding, Data burst decoding, ACK/NACK encoding
- Tx processing time at MS includes
  - USCCH (UL MAP) or ACK/NACK decoding, Data burst encoding
- Rx processing time at BS includes
  - Data burst decoding, Scheduling, ACK/NACK or USCCH (UL MAP) encoding
- Tx processing time at BS includes
  - ACK/NCACK decoding, Scheduling, USCCH (DL MAP) encoding, Data burst encoding
- ❖ Not feasible to perform each whole processes above at either MS or BS within 1 subframe (0.617ms) !!! (even for future implementation)

# Concluding Remarks

- With a practical processing time (even for future implementation), 4-switching cannot provide a noticeable gain over 2-switching points
  - The 4-switching option is useful only with 1 subframe processing time
  - Nevertheless, do we have to keep the 4-switching options?
- What's a burden of keeping BOTH the 2- and the 4-switching options?
  - Note) Round trip time of the 4-switching is a half of the 2-switching
  - Two different sets for every closed-loop operation shall be defined in the specification; e.g. HARQ timing, CQI reporting, CL power control, ...
- Authors' Proposal: Remove the 4-switching option in the 802.16m TDD configuration (for both SDD draft and Amendment working doc)