Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>
Title	**DL TDD HARQ Timing (16.2.14.2.2.2.1)**
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Re:	Category: P802.16m/D3 comments for LB30b Area: Chapter 16.2.14.2.2.2.1
Abstract	Subclause 16.2.14.2.2.2.1 on DL TDD HARQ Timing distributes the definition of the HARQ timing as a confusing mix of formulas, tables and prose. This contribution makes a modest attempt at clarifying the definition of the HARQ timing with a minimal change to the variables and no change to the actual timing.
Purpose	To be discussed and adopted by TGm for the 802.16m Amendment.
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DL TDD HARQ Timing (16.2.14.2.2.2.1)

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1. Introduction

Subclause 16.2.14.2.2.2.1 on DL TDD HARQ Timing distributes the definition of the HARQ timing as a confusing mix of formulas, tables and prose. In addition, several of the variable references are ambiguously defined. For example, the values “D” and “U” are used within the equations but were defined several sections earlier. Moreover, “D” and “U” are used in later subclause as part of the frame configuration table. The values in the frame configuration table appear to be the appropriate values for these equations but that is not obvious.

This contribution makes a modest attempt at clarifying the definition of the HARQ timing with a minimal change to the variables and no change to the actual timing. In effect, this re-write is believed to be substantially editorial (although it clearly technical by ballot rules).

2. Proposed Text Changes in P802.16m/D3

[Remedy 1: Replace lines 39 on page 232 through line25 on page 233 with the following]

DL HARQ subpacket transmission corresponding to a DL Basic Assignment A-MAP IE in *l*-th DL subframe of the *i*-th frame shall begin in the *m*-th DL subframe of the *i*-th frame. A HARQ feedback for the DL HARQ subpacket shall be transmitted in the *n*-th UL subframe of the *j*-th frame. The subframe index *m*, *n* and frame index *j* shall be determined by using *l* and *i*, as shown in Table 725.

Table 752 –TDD DL HARQ timing

Content	Subframe index	Frame index
Basic Assignment A-MAP IE Tx in DL	l	i
HARQ Subpacket Tx in DL	$m = l$	i
HARQ feedback in UL	For $D > U$, $n = \begin{cases} 0, & \text{for } 0 \le m < K \\ m-K, & \text{for } K \le m < U+K \\ U-1, & \text{for } U+K \le m < D \end{cases}$ where $K = floor((D\text{-}U)/2)$	$j = (i+z) \bmod 4$ where $z = \begin{cases} 0 & if\ (D-m-N_{TTI}+n) \ge T_{proc} \\ 1 & else \end{cases}$
	For $D \le U$, $n = m - K$ where $K = -ceil((U\text{-}D)/2)$	

Where:

D – is the number of downlink subframes as defined by the frame configuration table

U – is the number of uplink subframes as defined by the frame configuration table

l – is the reference to the DL subframe, starting from 0 for the first downlink subframe and numbering up to *D-1*, where the A-MAP is transmitted

m – is the reference to the DL subframe, starting from 0 for the first downlink subframe and numbering up to *D-1*, where HARQ subpacket begins its transmission

n – is the reference for the UL subframe, starting from 0 for the first uplink subframe and numbering up to *U-1*, where the HARQ acknowledgement is sent

N_{TTI} – is the number of AAI subframes which a HARQ subpacket spans; i.e., 1 for the default TTI and D for long TTI in TDD DL

T_{proc} – is the data burst processing time required by the mobile and measured in subframes