Project	**IEEE 802.16e Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Clarification for UL Tx Timing for Initial Ranging**
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Re:	Call for contributions, IEEE P802.16e-2005 Sponsor Ballot
Abstract	This document suggests changes in TGe Draft Document IEEE 802.16e-2005 to clarify the uplink transmit timing for initial ranging
Purpose	Adopt into the current TGe working draft
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Clarification for Uplink Transmit Timing for Initial Ranging

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Background

In the current standard [1][2], it is not clear in what timing the MS should transmit uplink signal at the initial network entry stage, where the MS does not receive any timing correction from BS yet. Someone may insist that the UL transmit timing shall be referenced to the UL MAP allocation start time, but others may argue that the MS shall transmit the uplink initial ranging signal with referring to the timing of switching from Rx to Tx at MS right after the end of DL subframe.

Proposed Remedy

Proposed remedy is to introduce an UCD TLV which defines an initial timing offset for uplink transmission for initial ranging. The MS shall apply this offset value in order to set its initial transmit timing with respect to the allocation start time defined in UL MAP IE.

Proposed Text Changes

6.3.9.5.1 Contention based initial ranging and automatic adjustments

[Modify the text in IEEE802.16-2004 as followings]

Ranging adjusts each SS's timing offset such that it appears to be co-located with the BS. The SS shall set its initial timing offset to the amount of internal fixed delay ~~equivalent to colocating the SS next to the BS. T~~ and this amount includes delays introduced through a particular implementation and shall include downlink PHY interleaving latency, if any. In TDD with OFDMA PHY systems if the BS transmits UL_initial_transmit_timing TLV in UCD, the SS's transmit timing shall be referenced to the value indicated by this TLV. Otherwise, the SS's transmit timing shall be referenced to the 'UL Allocation Start Time' value specified in the UL-MAP.

8.4.4.2 PMP frame structure

[Modify the text in IEEE802.16e-2005 as followings]

In TDD and H-FDD systems, subscriber station allowances must be made by a SSRTG and by a SSTTG. The BS shall not transmit downlink information to a station later than (SSRTG+RTD) before the beginning of its first scheduled uplink allocation in any UL-subframe, and shall not transmit downlink information to it earlier than (SSTTG-RTD) after the end of the last scheduled uplink allocation, where RTD denotes Round-Trip Delay. In addition the SS should be allowed to receive the downlink preamble for each frame that contains DL data for it, by assuring the period specified above does not overlap with the preamble. If the BS transmits UL_initial_transmit_timing TLV in UCD , the SS's transmit timing shall be referenced to the value indicated by this TLV. Otherwise, the SS's transmit timing shall be referenced to the 'UL Allocation Start Time' value specified in the UL-MAP. The parameters SSRTG and SSTTG are capabilities provided by the SS to BS upon request during network entry (see 11.8.3.1).

11.3.1 UCD channel encodings

[Insert the following entry in Table 353(UCD PHY-specific channel encodings--WirelessMAN-OFDMA)]

Name	Type (1 Byte)	Length	Value
UL_initial_transmit_timing	207	1	0b00000000: The timing is referenced to the 'UL_Allocation_Start_Time'. 0b00000001-0b11111110: Timing offset in unit of 2 PSs (two physical slots) before 'UL_Allocation_Start_Time' to which the MS timing shall be referenced. If this value is larger than 'TTG-SSRTG', then MS shall consider this value as 'TTG-SSRTG'. For example, 0b00000001 means 'initial timing reference = UL_Allocation_Start_Time - 2 PSs'. 0b11111111: The timing is referenced to the 'UL_Allocation_Start_Time-TTG+SSRTG'. If this TLV is not present, the default value of initial timing at MS shall be 'UL_Allocation_Start_Time'.

References

[1] IEEE Std 802.16e 2005 (Corrigendum to IEEE Standard for Local and Metropolitan Area Networks)

[2] IEEE Std 802.16-Cor2/D2