Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	**Proposal to include Synchronization Section in the SDD document**	
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Re:	IEEE C802.16m-08/147	
Abstract	In order to simplify co-existence issues between different TDD radio systems, it is suggested to adopt a flexible solution to define the frame start of the IEEE802.16m solution.	
Purpose	[Description of what *specific* action is requested of the 802.16 Working Group or subgroup.]	
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Proposal to include Synchronization Section to the SDD document

Jean-Pierre Balech

Rationale for the contribution

[3] is putting requirements on co-existence of different radio access system on adjacent channels. According to that, [6] is describing a frame structure able to co-exist with TD-SCDMA and LTE-TDD from the TDD ratio perspective. However it is not enough to ensure co-existence, not only TDD ration must be compatible but the Tx starts of the two systems must be the same in order to avoid strong interferences between the two systems.

From [7] and [8], the frame start of LTE system with respect to the GPS pps signal can be deduced. But the frame start of the LTE system is not aligned with the first Tx symbol.

In a contrary, [4] and [5] are defining the alignment of the first Tx symbol (excluding CP) with the GPS pps signal.

In order to ensure co-existence with optimal usage of spectrum, it is proposed to add the possibility to shift the frame start of the 802.16m frame by a settable number of micro-seconds in order to have the Tx and RX part of the frame of two different access system aligned.

For this, in relation with [1] , it is suggested to add in [2] the following section:

8.3 Synchronization

8.3.1 Network synchronization

For TDD and FDD realizations, it is recommended that all BSs be time synchronized to a common timing signal. In the event of the loss of the network timing signal, BSs shall continue to operate and shall automatically resynchronize to the network timing signal when it is recovered. The synchronizing reference shall be a 1 pps timing pulse and a 10 MHz frequency reference. These signals are typically provided by a GPS receiver but can be derived from any other source which has the required stability and accuracy.

For both FDD and TDD realizations, frequency references derived from the timing reference may be used to control the frequency accuracy of BSs provided that they meet the frequency accuracy requirements of [tbd]. This applies during normal operation and during loss of timing reference.

8.3.2 Transmitter reference timing accuracy

At the BS, the transmitted downlink radio frame shall be time-aligned with the 1pps timing pulse with a possible delay shift of n micro-seconds (n being between 0 and 4999). The start of the preamble symbol, excluding the CP duration, shall be time aligned with 1pps plus the delay of n micro-seconds timing pulse when measured at the antenna port.

Reference documents

[1] Call for contribution on Project 802.16m System Description Document (SDD) IEEE 802.16m-08/005

[2] The draft IEEE 802.16m System Description Document IEEE 802.16m-08/003

[3] IEEE 802.16m System Requirements 802.16m-07/002r4

[4] IEEE Std 802.16-2004

[5] IEEE Std 802.16e-2005 and IEEE Std 802.16-2004/Cor1 2005

[6] Frame structure for IEEE 802.16m IEEE S802.16m-08/087r1

[7] 3rd Generation Partnership Project;Technical Specification Group Radio Access Network;Evolved Universal Terrestrial Radio Access (E-UTRA);Physical Channels and Modulation (Release 8): 3GPP TS 36.211 V8.1.0 (2007-11)

[8] 3rd Generation Partnership Project;Technical Specification Group Radio Access Network;Synchronisation in UTRAN Stage 2 (Release 7): 3GPP TS 25.402 V7.5.0 (2007-12)