|  |  |  |
| --- | --- | --- |
| Project | **IEEE 802.15 Wireless Specialty Networks Working Group <**<http://ieee802.org/15>**>** | |
| Title | **IEEE 802.15.16t Proposed Elements of the Air Interface Protocol** | |
| Date Submitted | **2021-09-14** | |
| Source(s) | Menashe Shahar (Ondas Networks) | Voice:  E-mail: menashe.shahar@ondas.com |
| Re: | 16t Task Group: Licensed Narrowband Amendment | |
| Abstract | Proposed Point-to-Point Implementation | |
| Purpose | To consider elements of the Air Interface Protocol for 802.16t | |
| Notice | *This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups*. It represents only the views of the participants listed in the “Source(s)” field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein. | |
| Copyright Policy | The contributor is familiar with the IEEE-SA Copyright Policy <http://standards.ieee.org/IPR/copyrightpolicy.html>. | |
| Patent Policy | The contributor is familiar with the IEEE-SA Patent Policy and Procedures:  <<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>> and <rmation is located at <<http://standards.ieee.org/board/pat/pat-material.html>> and <<http://standards.ieee.org/board/pat>>. | |

IEEE802.16t Based Point-to-Point Link Implementation

1. The ieee802.16 air interface protocol is designed to support Point to Multipoint (PtMP) system architecture. A Point to Point (PtP) configuration of the air interface protocol as described in this document, can be optimized for effective implementation of Point-to-Point links.
2. The PtP implementation can be considered as a private case of a PtMP sector with a single remote. Note that the two PtP terminals are not identical. One of the terminals serves as the master and the second terminal serves as a slave.
3. While an implementation of a PtP link as a single sector with a single remote is feasible and straightforward, it is not efficient given the overhead used in a PtMP system for air resource allocations in the downlink and in the uplink direction. This resource allocation is needed when multiple remotes share common air interface resources. For narrow channels, the PtP case allows for a significant overhead reduction and an improvement in frequency utilization. Additional advantages include:
   1. Reduced latency because the remote does not need to wait for allocations
   2. Better power & Gain control
4. The following are the proposed changes for PtP:
   1. Replace FCH, DLMAP and ULMAP by new compact FCH burst. The allocations in both UL and DL are known. As a result, DLMAP and ULMAP messages are not required. Few items like Frame number, DL-FEC, UL-FEC still need to be transmitted by the Master to the Slave but these can be compressed to 1 slot (6 bytes in QPSK 1/2).

* 1. Static dedicated fixed allocations. No dynamic scheduling. The Master and the Salve will assume the statically assigned resources will always be available for their use. Only the FEC code may vary and will be communicated by the Master terminal to the Slave terminal within the compressed FCH.
  2. A Bandwidth request mechanism is not needed. The Slave terminal assumes exclusive uplink resource availability and as a result, there is no need for bandwidth requests. This saves bandwidth and reduces latency since the Slave does not need to wait for allocations.
  3. Power control in the UL direction (slave to master direction) is not needed. The Master terminal can use Automatic Gain Control (AGC) like the Slave terminal. The gain adjustments at the Master are faster than with closed loop and even with open loop power control. This improves performance in a mobile environment. Also, subject to power consumption considerations, this allows for both Master and Slave terminals to transmit always at maximum power for highest DL/UL CINR.