IEEE P802.22
Wireless RANs

|  |
| --- |
| TGb LB1 CID 216 Comment Resolution  |
| Date: 2014-02-26 |
| Author(s): |
| Name | Company | Address | Phone | email |
| Ranga Reddy | Self |  |  | ranga.reddy@me.com |
|  |  |  |  |  |

Abstract

Proposed resolution for Comment ID 216, as listed in the TGb Letter Ballot 1 comment database, DCN: 22-13/158r0 (or latest revision).

R0: Initial version of this contribution

R1: Modification to proposed resolution as per discussion on 02/20/2014

**Notice:** This document has been prepared to assist IEEE 802.22. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.

**Release:** The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE’s name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE’s sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.22.

**Patent Policy and Procedures:** The contributor is familiar with the IEEE 802 Patent Policy and Procedures

<[**http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf**](http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf)>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair Apurva Mody <apurva.mody@ieee.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.22 Working Group. **If you have questions, contact the IEEE Patent Committee Administrator at <****patcom@ieee.org****>**.

**Introduction**

This document proposes a resolution to CID 216 in the TGb LB1 ballot. The resolution to this comment will have an affect on how PHY Mode 1 and 2 and are handled when considering a mix of Legacy and Advanced CPEs.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 216 | Ranga Reddy | Self | 7 | 7.4a.3 | 1 | 18 | 37 | TR | Here the OFDM slot is defined as 4 symbols by 1 subchannel. If a slot is constructed this way, it breaks compatibility with legacy CPEs. Future deployments may have to consider legacy/1st generation CPEs connecting to R-CPEs or MR-BS directly. MAPs/MAP IEs define allocations in terms of slots. A legacy CPE will not be able to process MAPs issued by a R-CPE or MR-BS |

**Background**

This amendment introduces two PHY modes, 1 and 2. The OFDM slot structure of PHY Mode 1 is defined as 1 symbol by 1 subchannel. This PHY mode is backwards-compatible with the base standard (IEEE Std. 802.22-2011). The OFDM slot structure of PHY Mode 2 is defined as 4 symbols by 1 subchannel. This PHY mode is not backwards-compatible with the base standard. The difference in slot sizes between both modes is along the time domain, e.g. in terms of # of symbols.

The issue arise when there is a mixed deployment of Legacy & Advanced S-CPE’s w/in a cell or Access Zone. This issue poses the following questions:

1. How will PHY Mode usage be handled between the zones of both types, distributed & centralized, R-CPE’s where there is a mix of S-CPE types?
2. If both modes can be used simultaneously, how do we deal with translating slot allocations between zones where different PHY modes are engaged?
3. Do we even attempt to support simultaneous use of both PHY Modes?

**Discussion**

Let us first address the distinction between both types of R-CPE’s. When engaging centralized scheduling R-CPEs, the S-CPEs are dependent upon receiving the same FCH and MAPs as transmitted by the MR-BS. So, all S-CPEs in the cell all have to be on the same page with regard to how large a slot is in the time domain. So, in the case of centralized scheduling R-CPE, only one PHY mode can be engaged at a time. For centralized R-CPEs, this means that only PHY Mode 1 can be used if there are Legacy S-CPEs in the cell, and only PHY Mode 2 can be used if the cell consists entirely of Advanced S-CPEs.

When engaging distributed R-CPEs, we have more flexibility than we do have with centralized R-CPEs. This flexibility comes from the fact that Distributed R-CPE’s make their own scheduling decisions and transmit their own FCH/MAPs. This allows the PHY Mode for the AZ of the MR-BS and R-CPEs to be determined by the presence of Legacy S-CPEs in that zone. If Legacy S-CPEs exist in a zone, then the PHY Mode 1 would be engaged, other wise PHY Mode 2 would be engaged.

However, the flexibility allowed to us for mixing PHY Modes by using distributed R-CPEs requires the distributed R-CPE scheduler to take bandwidth granted by the MR-BS, and make slot allocations in accordance with the PHY Mode configured for the DRZ.

**Proposed Resolution**

For centralized R-CPEs, only one PHY Mode can be engaged throughout the MR-BS cell at given time. For distributed R-CPE zones, DRZ can be operated in a PHY mode independent of what the MR-BS operates in. We propose some additional text in the sections that describe the types of zones, clarifies what PHY Mode is used per zone approach, and what is used to signal the type of zone.

**Proposed Text Modifcations to draft**

***Add the following text after line 57, pg 24, Section 7.4b.3.4***

7.4b.3.4 Application of PHY Mode to Zone Type

When the MR-BS is operating in PHY Mode 1, the DS AZ and DS CRZ shall be operated by PHY Mode 1. Advanced S-CPEs shall use PHY Mode 1 to communicate with the MR-BS in the DS AZ and DS CRZ.

When the MR-BS is operating in PHY Mode 2, the DS AZ and DS CRZ shall be operated by PHY Mode 2. Advanced S-CPEs shall use PHY Mode 2 to communicate with the MR-BS in the AZ and CRZ.

The DS DRZ and Advanced S-CPEs operating in the DS DRZ, may be operated by either PHY Mode, independent of what PHY Mode the MR-BS employs in the DS.

The MR-BS may switch between operating PHY Mode types. Switching between PHY Modes shall only be done on a frame-by-frame basis. The MR-BS and R-CPE indicate the PHY Mode a zone is currently operated in by selecting one of several different Local Frame Preamble Types, see 9.4a.1.1.

The corresponding US portion of a zone, shall use the same PHY Mode as the DS portion of the zone.

Legacy S-CPEs shall only operate in AZ, CRZ, or DRZ that are configured for PHY Mode 1. To support Legacy S-CPEs, that can only process the (legacy) Frame Preamble, the MR-BS and distributed R-CPE shall only transmit the (legacy) Frame Preamble in the AZ/DRZ.

**References:**

[1] IEEE P802.22b WRAN Amendment: Enhancement for broadband services and monitoring applications Draft 1.0 WG Letter Ballot Template, DCN 22-13/158r2, https://mentor.ieee.org/802.22/dcn/13/22-13-0158-02-000b-802-22b-letter-ballot-1-comment-database.xls