Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
Title	Resolving ambiguities in the definition of CS PDU Formats
Date Submitted	2005-04-22
Source(s)	Mark Thomas, David Castelow, Eyal Verbin Voice: +44 1626 333137 mailto:mthomas@airspan.com Airspan Communications, Cambridge House, Oxford Road, Uxbridge, UK
Re:	Supporting document for Comment to 802.16maint.
Abstract	There is ambiguity in the Ethernet and VLAN CS as to the data that is transported. This document provides resolution to these ambiguities.
Purpose	The document is intended for consideration within the comments resolution process.
Notice	This document has been prepared to assist IEEE 802.16. 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 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, 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 <mailto:chair@wirelessman.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 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Resolving ambiguities in the definition of CS PDU Formats

Mark Thomas, David Castelow, Eyal Verbin, Airspan Networks

April 2005

References

[1] IEEE, “IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems,” IEEE Std 802.16-2004.

[2] IEEE, “Corrigendum to IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems,” IEEE P802.16-2004/Cor1/D2.

Introduction

The changes proposed in this document are to resolve ambiguity in the definition of the convergence sublayer PDU as described in IEEE 802.16-2004 [1].

Description of problem

IEEE 802.16-2004 does not satisfactorily specify if the PDU exchanged between peer convergence sublayers encapsulates the 32-bit 802.3/Ethernet FCS when the convergence sublayer type is 802.3/Ethernet, VLAN, IP over 802.3/Ethernet or IP over VLAN. If the maintenance effort fails to resolve this ambiguity, then the higher-layer entity in the BS or SS cannot determine if the last four octets in the received service data unit (SDU) at the convergence sublayer service access point (CS SAP) represents FCS or data, and so BS and SS based on different interpretations will not be interoperable.

Separate attempts to resolve the FCS ambiguity in IEEE 802.16 Session #36 by (a) always including the FCS, and (b) never including the FCS, both failed to achieve a sufficient level of support.

Proposed solution

In the proposed solution, an SS is required to support a mode in which encapsulated 802.3/Ethernet frames are sent without the FCS, and an alternative mode in which encapsulated 802.3/Ethernet frames are sent with the FCS. A BS must indicate one of these modes to each SS during registration by means of the REG-RSP message. A BS may be capable of supporting only one or both of the FCS modes.

The FCS mode can be selected independently for each SS, although in practice a BS will often apply the same mode across the entire SS population.

If an SS is in the 'without FCS' mode, then the 802.16 MAC CRC should be applied to all uplink and downlink connections using a convergence sublayer type based on 802.3/Ethernet.

Technical Text Changes

At page 13, line 25, of [2] include the following:

> *Add the following paragraph after the first paragraph of 6.3.2.3:*
>
> The MAC CRC should be included for MAC PDUs carried over the OFDM PHY layer using connections with convergence sublayer types of 802.3/Ethernet, 802.1Q VLAN, IP over 802.3/Ethernet, or IP over 802.1Q VLAN, when 802.3/Ethernet FCS is excluded (see 11.7.7.4).

At page 19, line 34, of [2] include the following:

> *Add the following paragraph at the end of section 6.3.2.3.8:*
>
> **Convergence Sublayer Capabilities (11.7.7)**

802.3/Ethernet FCS Mode specified by the BS.

At page 35, line 56, of [2] include the following:

Add the following:

6.3.9.9.1 Specify encapsulation of 802.3/Ethernet FCS

The BS may include the 802.3/Ethernet FCS Mode parameter in the REG-RSP message to command the SS to handle convergence sublayer PDUs using the 'with FCS' or 'without FCS' mode. This is applicable for all connections (including the secondary management channel) with the following convergence sublayer types: 802.3/Ethernet, 802.1Q VLAN, IP over 802.3/Ethernet, IP over 802.1Q VLAN.

At page 165, line 63, of [2] include the following:

Add the following:

11.7.7.4 802.3/Ethernet FCS Mode

This parameter indicates presence or absence of the 802.3/Ethernet FCS encapsulated with the CS SAP SDU in connections (including the secondary management channel) with one of the following convergence sublayer types: 802.3/Ethernet, 802.1Q VLAN, IP over 802.3/Ethernet, IP over 802.1Q VLAN.

At page 165, line 64, of [2] add a table in the established style for TLV definitions, with the following content:

Type: 175 (or other unique value)

Value: 0 = without FCS (default); 1 = with FCS; 2-255 reserved

Length: 1

Scope: REG-RSP