Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Correction to Power Control for OFDMA PHY**
Date Submitted	**2005-4 -22**

Source(s)	Yonah Lasker, Yaron Alpert, Ran Yaniv, Tal Kaitz **Alvarion Ltd.**	yonah.lasker@alvarion.com yaron.alpert@alvarion.com ran.yaniv@alvarion.com tal.kaitz@alvarion.com

Purpose	Call for comments, maintenance task group
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>.

Correction to Power Control for OFDMA PHY

Yonah Lasker, Yaron Alpert, Ran Yaniv, Tal Kaitz
Alvarion Ltd.

1 Introduction

Section 8.4.10.3 discuses specific cases in which the SS should calculate on its own the transmit power to use. It is not clear what happens in the other cases. There is no reason to make a distinction of the way to decide on the transmit power between all the different types of transmissions.
Moreover a clear definition of SS response to Tx power modification commands needs to be defined.

2 Power control mechanism

To maintain at the BS a power density consistent with the modulation and FEC rate used by each SS, the BS may change the SS TX power as well as the SS assigned modulation and FEC rate. The BS should do this by sending the SS an offset (Offset_BSperSS) to be added to the power calculated by the SS.

The base station continuously monitors the uplink and measures the link quality. If the link quality starts to diminish, then the base station commands the SS, by changing Offset_BSperSS, to power up. If the link quality is too good, then there is excess power on the uplink. In this case, the base station commands the SS to power down. The base station should send the power-control adjustment commands using one of the following options:

- Fast Power Control (FPC) message (6.3.2.3.34).
- OFDMA Power Control IE (8.4.5.4.5) message.
- Ranging response (RNG-RSP) message (6.3.2.3.6) Power Adjust Information - Power Level Adjust TLV (11.6 type 2).

3 Detailed Text Changes

1. ***[change section 8.4.10.3, page 149 line 20 to page 150 line 5]***

-------- BEGIN --------

[Change the text describing Equation 138 as indicated:]

To maintain at the BS a power density consistent with the modulation and FEC rate used by each SS, the BS may change the SS TX power as well as the SS assigned modulation and FEC rate. ~~There are, however, situations where the SS should automatically update its TX power, without being explicitly instructed by the BS. This happens when the SS transmits in region marked by UIUC = 0, UIUC = 12, or UIUC = 14.~~ The BS should do this by sending the SS an offset (Offset_BSperSS) to be added to the power calculated by the SS.

~~In all these situations, t~~The SS shall use a ~~temporary~~ TX power value set according to Equation (138) (in dB),

$$Pnew = Plast + (C/Nnew - C/Nlast) - (10log10(Rnew) - 10log10(Rlast)) + (Offset\_BSperSSnew - Offset\_BSperSS\ last) \quad (138)$$

Where,

P_{new}	is the temporary TX Power
P_{last}	is the last used TX Power.
C/N_{new}	is the normalized C/N of new modulation/FEC rate instructed by the UIUC.
C/N_{last}	is the normalized C/N of the last used modulation/FEC rate.
R_{new}	is the number of repetitions for the new modulation/FEC rate instructed by the UIUC.
R_{last}	is the number of repetitions on the last used modulation/FEC rate.
Offset_BSperSSnew	is the correction term used for the current transmission (SS-specific power offset).
Offset_BSperSSlast	is the correction term used for the last transmission (for SS-specific power offset).

The default normalized C/N values per modulation are given by Table 334. These values may be overridden by the BS by using a dedicated UCD message TLV.

The BS adjusts the Offset_BSperSS using Fast Power Control (FPC) message (6.3.2.3.34), Power Control IE (8.4.5.4.5), or Ranging response (RNG-RSP) message (6.3.2.3.6) with Power Adjust Information - Power Level Adjust TLV (11.6 type 2). The accumulated power control value shall be used for Offset_BSperSS.

-------- END --------