Cover Sheet for Presentation to IEEE 802.16 Broadband Wireless Access Working Group (Rev. 0)

Document Number:
    802.16pc-99/21

Title:
    Physical Layer Proposal for BWA

Date Submitted:
    1999-11-09

Source:

Wayne Hunter/Leland Langston	Voice:	972.344.5195
Raytheon Telecommunications Co.	Fax:	972.344.5201
17217 Waterview Parkway	E-mail:	w-hunter3@raytheon.com
Dallas, TX 75252		j-langston2@raytheon.com

  Venue:

    PHY Meeting Session #4, Agenda Slot Number 2.4

Base Document:
    802.16pc-99/21

Purpose:
    Presentation of proposed PHY.

Notice:
    This document has been prepared to assist the 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 acknowledges and accepts that this contribution may be made public by 802.16.

IEEE Patent Policy:

    The contributor is familiar with the IEEE Patent Policy, which is set forth in the IEEE-SA Standards Board Bylaws <http://standards.ieee.org/guides/bylaws> and includes the statement: "IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing the standard."

Physical Layer Proposal for BWA

• This contribution proposes that the Physical Layer standard for Broadband Wireless Access be based on the DOCSIS standard with modifications required for Radio Frequency transmission.

• The development of modems for BWA using DOCSIS based standards should be possible at lower cost and shorter cycle times

> • The component parts (both hardware and software) have been developed for cable modems and can be modified for the unique requirements of BWA.

• Unique to BWA, is the need to define a flexible air interface frequency plan that supports both FDD and TDD systems.

• **This contribution proposes such a frequency plan as part of this PHY standard.**

Physical Layer Proposal for BWA

- Major Features

    - Duplexing

        - Both FDD and TDD should be supported

        - Primary mode of operation would be FDMA/TDMA

            - Base Station assigns frequency and time slot

    - Timing, Ranging and Power controlled by Base Station (BST) on an active bases.

    - Modulation

        - Support of QPSK, 8-QAM/PSK, 16-QAM and 64-QAM as a minimum

   - RF Transmission & Reception
        - The combination of BST and CPE electrical characteristics must support transmission of the specified modulation types and rate over a range of 200 meters to 5000 meters.

        - The system must have sufficient margin to maintain a bit error rate, without FEC, lower than 1×10^{-4} at 99.9% reliability for the rain region in which the system is deployed.

Physical Layer Proposal for BWA

- Major Features

  - Band Plan and Channelization

    - **No specific channel bandwidth is defined**

    - Channel spacing would be on integer multiples of 1.25 MHz

    - LMDS A and B

802.16 PROPOSAL
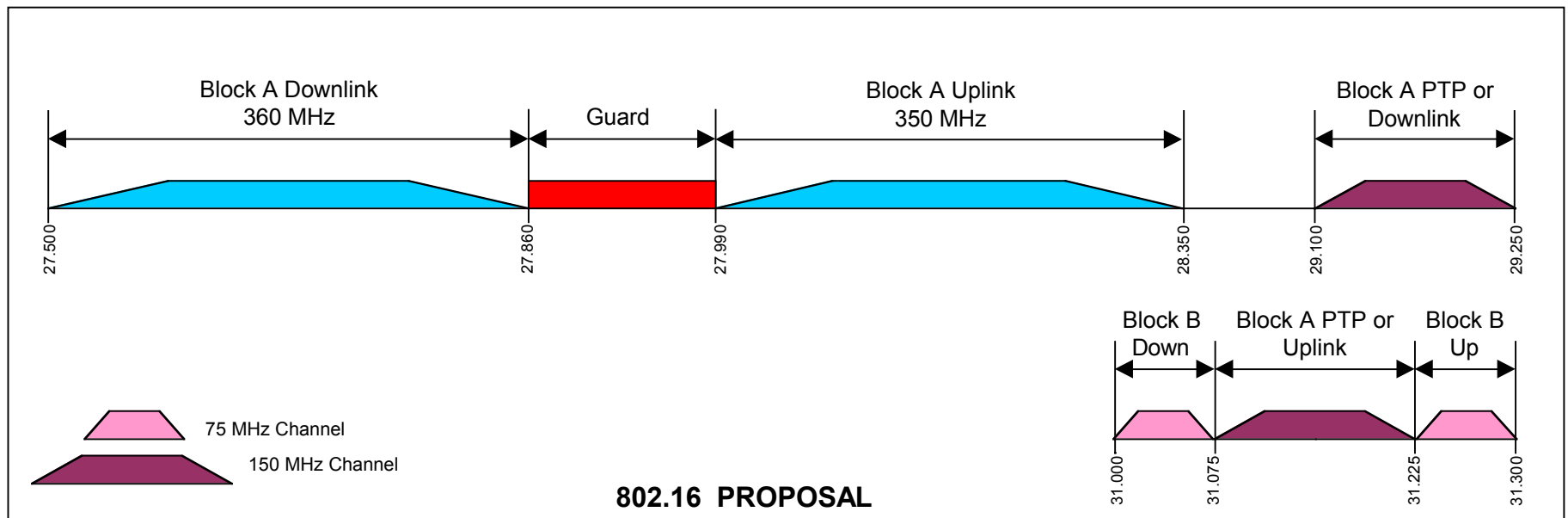
Physical Layer Proposal for BWA

- Major Features

  - LMDS Band Plan (Continued)

    - The following channel arrangement and constraints will permit interoperability of TDD and FDD system flexibility.
      - Channel centering to within 1.25 MHz integer increments measured from band edge. This limits channel bandwidths to integer multiples of 1.25 MHz but does not specify bandwidths. It is left to the system designer to choose bandwidths suitable for that system

      - Frequency accuracy: 1 ppm maximum

      - No FDD system BST will transmit on frequencies greater than 27.925 GHz

      - No FDD system CPE will transmit on frequencies below 27.925 GHz

      - Block B downstream is 31.0 to 31.075 GHz and upstream is 31.225 to 31.3 GHz for BST to CPE systems

Physical Layer Proposal for BWA

- Major Features

  - Band Plans and Channelization (Continued)

    - Other Frequency Ranges

      - Band Plans and Channelization for other frequencies ranges would use the same 1.25 MHz channel spacing requirement

      - FDD systems would use LMDS as model.