

**MULTI-MODE VARIABLE BANDWIDTH
REPEATER SWITCH AND METHOD
THEREFOR**

FIELD OF THE INVENTION

This invention relates generally to the field of wireless communication and, more specifically, to methods and systems that provide variable bandwidths to users.

BACKGROUND OF THE INVENTION

Communication systems generally are designed to facilitate transmission of a defined or predictable type such as voice, data, or video and transmit such data using a pre-defined and designed bandwidth. Such rigid bandwidth designs are sufficient for providing basic services to subscriber units designed to transmit only limited forms of data at constant bandwidths, however, for subscriber units that employ multiple forms of media requiring diverse data rates, or for communication that may occasionally involve the transfer of substantial amounts of information, rigid and fixed bandwidths for data transfers limit the performance of such communication systems.

Independent communication systems have evolved to handle specific forms of diverse media such as cellular communication systems for handling voice communication, local and wide area networks for distributing computer data, and wide bandwidth satellite and fiber optic systems for transceiving video and other high data rate information. Transmission of information not specifically or ideally tailored for a specific system incurs needless expense or protracted transmission of non-ideal information. For example, transmitting video imagery over a low data-rate cellular or telephone system requires substantial time and inserts considerable delay into the transmission path between images. Furthermore, substantial expense may be incurred for additional connect time to these services. Conversely, transmission of low data-rate information such as a voice conversation over a high bandwidth satellite communication link or fiber optic link may be expensive for the amount of data actually transferred.

Thus, what is needed is a system and method for detecting the availability of enhanced communication services, and dynamically allocating bandwidth to a subscriber unit as needed for improving efficiency of transfer of information.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is pointed out with particularity in the appended claims. However, a more complete understanding of the present invention may be derived by referring to the detailed description and claims when considered in connection with the figures:

FIG. 1 illustrates a communication system having an enhanced services region, in accordance with a preferred embodiment of the present invention;

FIG. 2 illustrates a simplified block diagram of a variable bandwidth repeater switch for use in a communication system, in accordance with a preferred embodiment of the present invention;

FIG. 3 is a flowchart of a method for dynamically allocating bandwidth to a subscriber unit in an enhanced services region, in accordance with a preferred embodiment of the present invention; and

FIG. 4 is a flowchart of a method performed by a subscriber unit that utilizes dynamically allocated bandwidth through a variable bandwidth repeater switch in an

enhanced services region of a communication system, in accordance with a preferred embodiment of the present invention.

The exemplification set out herein illustrates a preferred embodiment of the invention in one form thereof, and such exemplification is not intended to be construed as limiting in any manner.

DETAILED DESCRIPTION OF THE DRAWING

The present invention provides, among other things, a method and system for dynamically allocating bandwidth through a variable bandwidth repeater switch to a subscriber unit located in an enhanced services region. The method and system include detecting the availability of enhanced services, evaluating the availability of requested bandwidth, and allocating the requested bandwidth to the subscriber unit.

The present invention further provides a method for a subscriber unit to employ enhanced services by allocating bandwidth in a variable bandwidth repeater switch. The switch has a plurality of interconnections and can detect the availability of enhanced services, request enhanced services, and employ the requested services when granted.

FIG. 1 illustrates a communication system having an enhanced services region, in accordance with a preferred embodiment of the present invention.

In enhanced communication system 10, a subscriber unit 55 employs standard communication techniques over standard communication link 50 with a standard services communication system 51. Standard services communication system 51 is a typical cellular communication system or other two-way wireless or wired communication system. A subscriber unit 49 or 109 also communicates with standard services communication system 51 over standard communication link 60. Subscriber unit 49 may be a cellular phone-type communication transceiver while subscriber unit 109 may be a data terminal such as a computer device.

Enhanced communication system 10 provides enhanced services to users therein by dynamically allocating bandwidth to subscriber units resident in an enhanced services region 58. In a preferred embodiment, enhanced services region 58 is formed by transmission of an enhanced services beacon signal 52. All subscriber units capable of receiving enhanced services beacon signal 52 may request enhanced services from enhanced services communication system 10. Enhanced services beacon signal 52 propagates outside of enhanced services region 58 to subscriber unit 55, but the received signal level is degraded such that an enhanced services communication link with subscriber unit 55 is not practical.

Subscriber units 49 and 109, when located within enhanced services region 58, may request enhanced services. Enhanced services may include dynamically allocating bandwidth for transceiving data. Dynamic allocation includes increasing the data transfer rate or bandwidth over enhanced services communication link 56, or decreasing the data transfer rate by interconnecting to a more economical lower data-rate bandwidth service sufficient for the needs of the user of subscriber units 49 and 109.

Enhanced services requests are evaluated by a variable bandwidth repeater switch 42 by determining if communication resources are available to accommodate the requested bandwidth. If resources are available, variable bandwidth repeater switch 42 dynamically allocates the requested bandwidth to the requesting subscriber unit. Variable bandwidth repeater switch 42 has a variety or plurality of alternative