IEEE 802.11 Wireless Access Method and Physical Specification

Title:

Response to Plenary Request to Review Infrared (IR)-PHY Committee Approved FQPSK Modulation Scheme

Date:

July 12, 1994

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The modulated specifications for the IR-PHY where reviewed by the IR committee and are presented here, based on the July 11, 1994 instruction of the joint MAC-PHY. After review, the previously approved specifications were again approved unanimously by the IR committee on July 12, 1994. The following is a summary of the technical aspects of this review.

Overview of IR Transmitters

The Infrared diode (transmitter) is a **non-linear** element. There are no known techniques available today that allow the IR diode to operate in a linear region--eliminating the possibility of using any linearly-modulated scheme.

Why was FQPSK Proposed?

FQPSK is a patented filtered offset QPSK technique that is well suited for power efficient, non-linear operation. The specification includes time- and frequency-domain masks. Although the patented technique satisfies the IR committee specifications, there may be other non-patented techniques that meet the specifications as well. All IEEE IP requirements have been met.

Comparative Study of Alternatives

The IR committee revisited submissions related to FQPSK and alternative techniques, which are documented in many 802.11 and other public domain documents. The review concluded that FQPSK is:

- 6 dB to 15dB more power efficient than all other considered alternatives and is the only technique that achieves a BER of 10^{-5} at $E_b/N_o = 13$ dB.
- Doubles the transmitted bit rate [capacity] compared to other alternatives for the current IR technology limit of 30 MHz.