Abstracts

400-Mb/s QPSK Repeater for 20-GHz Digital Radio-Relay System

H. Yamamoto, K. Kohiyama and K. Morita. "400-Mb/s QPSK Repeater for 20-GHz Digital Radio-Relay System." 1975 Transactions on Microwave Theory and Techniques 23.4 (Apr. 1975 [T-MTT] (Special Issue on Microwave Communications)): 334-341.

This paper describes the design and performance of a repeater for a 20-GHz high-speed digital radio-relay system with a transmission capacity of 400 Mb/s. The repeater is totally solid state for miniaturization, high reliability and economy with the adoption of microwave IC's, monolithic lC's, and direct oscillation by Gunn diodes in the 20-GHz band. The modulation and demodulation techniques of the repeater employ QPSK, which has a theoretical advantage over FSK, DPSK, or ASK in error rate performance, considering spectrum utilization. The error rate performance is further improved by using a simple digital equalization for intersymbol interference. The error rate performance of this system was measured. From the test results, it became evident that the equivalent carrier-to-noise ratio (C/N) degradation of error rate performance at a 10/sup -6/ error rate was about 5 dB under fixed temperature conditions and that the equivalent C/N degradation due to a -10°C to +45°C temperature variation was only 1 dB. The experimental 13-hop system employing the repeaters has been operating stably since April 1973.

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