

CORRELATION OF LASER DIODE TWO AND ONE-TONE TESTS TO MULTICHANNEL COMPOSITE TESTS

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Cable Television transmission has migrated to the use of highly linear fiber optic transmitters and receivers for transporting broadband video and data signals to customer neighborhoods. In order to test the Carrier-to-Noise Ratio (CNR), Composite Second Order Distortion, and Composite Third Order Distortion, a multichannel signal generator (such as the one manufactured by Matrix Corporation) is used. The multichannel signal generator allows testing with 79 channels and can be used to characterize laser diode linearity performance for transmitter designs. Unfortunately, multichannel signal generators are very expensive to have as standard test equipment in the manufacturing environment.

In order to reduce the equipment cost for laser linearity tests, two-tone and one-tone testing schemes have been applied to determine second-order distortions and compared to standard multi channel composite distortion results. Results show that second order distortions tested by both two-tone and one-tone tests correlate with result composite distortions measured with the use of a multichannel signal generator. Fifteen lasers were tested with the methods outlined.

Proper equivalent Optical Modulation Indices (OMIs) must be used when comparing the approximately 3.5

Second order distortions tested by both two-tone and one-tone were shown to have very good correlation with the multichannel signal generator method. The maximum difference between multichannel signal generator method and the two-tone or one-tone was 3.5dB. The average difference was about 1 dB.

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