Abstracts

Input impedance conditions for minimizing the noise figure of an analog optical link (1997 Vol. I [MWSYM])

E. Ackerman, C. Cox, G. Betts, H. Roussell, K. Ray and F. O'Donnell. "Input impedance conditions for minimizing the noise figure of an analog optical link (1997 Vol. I [MWSYM])." 1997 MTT-S International Microwave Symposium Digest 1. (1997 Vol. I [MWSYM]): 237-240.

It has been previously shown that 3 dB is the lowest noise figure attainable for an amplifierless optical link with perfect lossless impedance matching to the RF source. In a prior experimental link with near-perfect impedance matching, dissipative loss in our input matching circuit prevented us from achieving a measured noise figure of less than 4 dB. Investigation of the effects of input impedance mismatch indicates that mismatch can actually lower the noise figure to below 3 dB even in the presence of some dissipative loss in the input circuit. We have verified this theory by using the mismatch effect to reduce the measured noise figure of our link to 2.5 dB at 130 MHz. We believe this is the first demonstration of amplifierless link noise figure of less than 3 dB. We confirmed the validity of our measurement technique by also measuring the noise figure of a 2.5 dB RF attenuator to be 2.5 dB.

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