Abstracts

Randomly Imperfect Waveguides for Millimeter and Submillimeter Wavelengths for Long-Distance Transmission Applications

M. Koyama and K. Hashimoto. "Randomly Imperfect Waveguides for Millimeter and Submillimeter Wavelengths for Long-Distance Transmission Applications." 1975 Transactions on Microwave Theory and Techniques 23.7 (Jul. 1975 [T-MTT]): 561-565.

Randomly imperfect waveguides are considered for use in long-distance transmission at millimeter and submillimeter wave-lengths. The steady-state attenuation constant, modal power distribution, and pulse spreading are calculated from Marcuse's coupled power equations. The result shows that a random waveguide can transmit 3.6 Gbit/s per square root of kilometer with a loss of 1.7 dB/km at 500 GHz. Mode conversions due to circular bends are considered next. It is shown that the systematic mode conversion due to bends is not of prime importance if the random coupling coefficient is much larger than the systematic one. This may be the most important feature of random metal waveguides for long-distance transmission applications.

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