Abstracts

Low-Loss Design Method for a Planar Dielectric-Waveguide Y Branch: Effect of a Taper of Serpentine Shape

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A new design method is proposed for a planar dielectric waveguide Y branch with low loss caused by radiation. In contrast to the usual design methods, in which the generation of the radiation wave is kept as small as possible, the present method positively uses, for the first time, the behavior of such a radiation wave. We intentionally generate the radiation wave at any local position along a taper section of the Y branch, and its power conversion and reconversion with the surface-wave mode are controlled to reduce the insertion loss for the surface-wave mode. A design example shows that the low-loss Y branch should have a serpentine taper, which is an unexpected shape from the usual design point of view. The effectiveness of our design method presented here is confirmed by comparing the numerical results with those of the usual types of Y branches and with measurements.

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