Sideband development in a high-power traveling-wave tube microwave amplifier

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The work presented describes the characteristics of single stage and severed high-efficiency, high-power traveling-wave tube amplifiers operating in *X* band at 8.76 GHz. Average amplified output powers of 210 MW have been achieved at 24% efficiency. At high output power levels (> 100 MW) sidebands develop increasing the average radiated power to over 400 MW with a microwave conversion efficiency of over 45%. In single frequency operation phase stability to within $\pm 8°$ has been demonstrated.