



KOLLOQUIUM

Institut für Elektrotechnik, Elektronik und Informationstechnik

Transmitters for Wireless Communication

Prof. Dr. Dave Rutledge

California Institute of Technology (Caltech), Pasadena, Kalifornien, USA

Montag, der 07.02.2005, 17¹⁵ Uhr

Seminarsaal SR 4.14, Lehrstuhl für Technische Elektronik, Cauerstr. 9

Sondertermin!

Diskussionsleitung: Professor Dr. R. Weigel

The talks presents recent results in my research group in new transmitters for wireless communications. We have been investigating single-chip grid amplifiers that use spatial power combining. The feed for the grid is a waveguide mode converter with a TE₀₁ input. Recently this approach has been used by the Wavestream Corporation to build a single-chip grid amplifier with an output of 20W at 30GHz. This chip could have applications for satellite Internet uplinks. Recently, we built a grid amplifier for the 80-GHz frequency range with Northrop-Grumman's InP technology. This approach could be useful for the new 71-86GHz fixed wireless band recently approved by the FCC. At lower frequencies, we have demonstrated a new type of switching amplifier called Class E/F that combines the soft-switching characteristics of Class E with the harmonic control of class F. We have used this approach to make an amplifier with an output of 200 W at 7 MHz. The supply voltage is only 12.8V, and the drain efficiency of 83%. We also demonstrated a Class E/F amplifier for 1.1GHz with an output power of 60W and a drain efficiency of 70%. At microwave frequencies, we have been concerned with the problem of how to make a high-power transmitter that is suitable for wireless network connections for notebook computers. We have demonstrated Class E/F CMOS amplifiers in the 2-GHz range with output powers greater than 2W and a power-added efficiency of 50%. This work has been done in collaboration with Professor Ali Hajimiri. In addition, the talk discusses current research programs in Electrical Engineering at Caltech, including a privately funded initiative in advanced network research, the Lee Center for advanced networking.