

# **Session III**

## **MMIC Power Amplifiers**

**Co-Chairmen:**

**E. D. Cohen**  
DARPA

**I. J. Bahl**  
ITT

Power output and power added efficiency of monolithic power amplifiers continue to set new benchmarks. This year, papers will be presented that collectively cover the frequency ranges from 0.9 GHz through 35 GHz. At UHF, a 4-stage monolithic power amplifier with a novel miniaturized second harmonic tuning circuit has been developed. This amplifier has an efficiency of 63% with a saturated output power of 1.3 watts. At 4 GHz, a new topology has led to improved performance from power amplifiers with large gate peripheries. Experimental results include achievement of 5 watts with 22% power added efficiency. The 6 to 18 GHz frequency band is of importance for a multiplicity of applications. Over this range, power added efficiency has increased to 16% with 18 dB gain from a single chip. These results were achieved at the 1 watt power output level. Heterojunction bipolar transistors (HBTs) have demonstrated very high power, high efficiency performance. Continuing this trend, single chip HBTs have produced over 12.5 Watts cw at 9.2 GHz. Power added efficiency was 31%.

New pseudomorphic HEMT amplifiers using devices with 0.25  $\mu\text{m}$  gate lengths have yielded over 0.5 watt with 8.5 dB gain and 32% power added efficiency at 30 GHz. Future power amplifier MMICs are expected to demonstrate increased power output and efficiency over wider bandwidths. At the same time, advances in processing technology will continue to result in increased yields and steadily declining costs. As a result, these circuits will be incorporated into many military and commercial systems.

**1:30 p.m.–3:00 p.m., Monday, June 1, 1992**  
**Ballroom A**