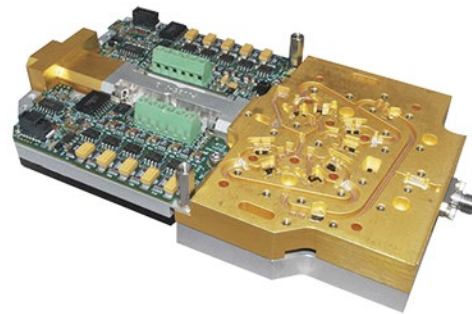
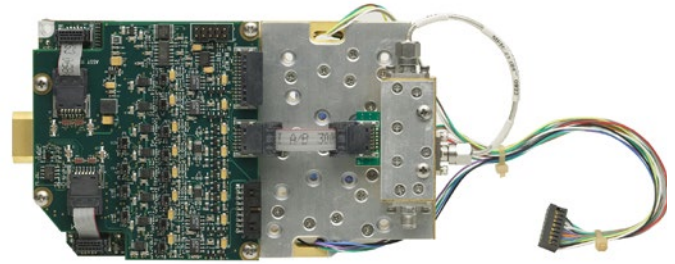


# Solid State Power Amplifiers

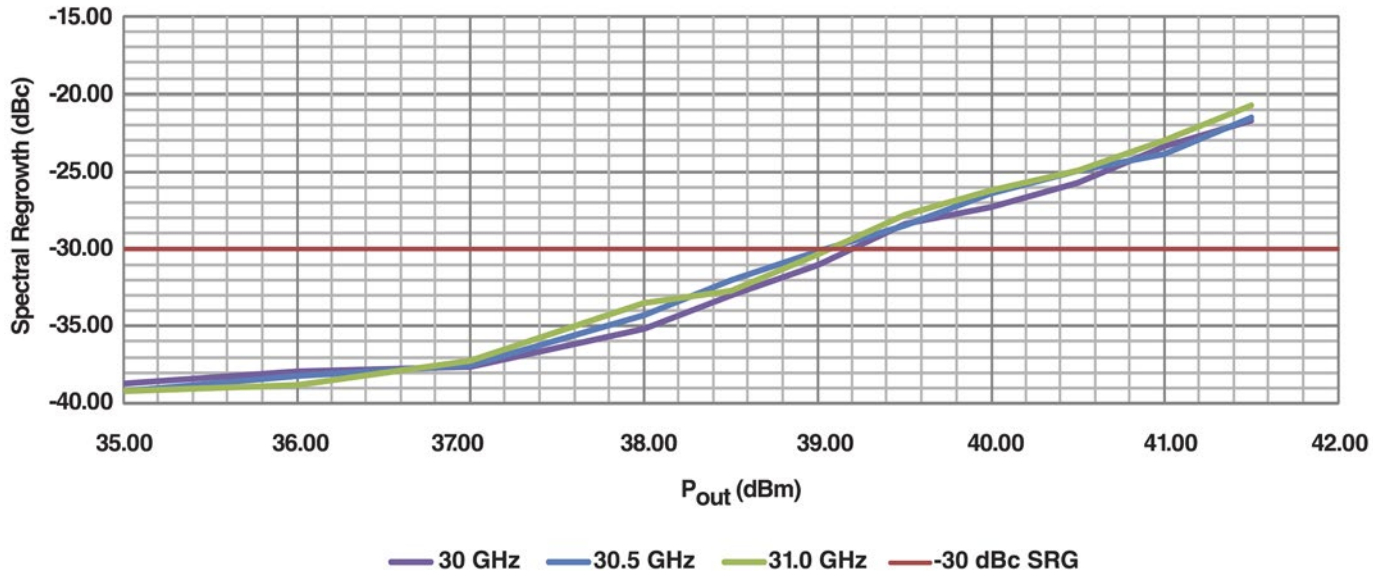
## Solid State Power Amplifiers

- Military SATCOM, COTM and ManPack Applications
- X-Band through Ka-Band
- Output Power Levels to 32W (P1dB)
- Ethernet, RS-485 (other standard interfaces available)
- High Linearity
- Very Small and Lightweight



Narda Microwave has developed and manufactured numerous reduced size, weight, and power (SWAP), high linearity, satellite communication (SATCOM) SSPA designs, spanning X-Band through Ka-Band, for use in earth terminal, Communications on the Move (COTM) and Man-Portable (Manpack) applications.

Narda Microwave possesses extensive experience developing Solid State Power Amplifiers (SSPAs) and holds a unique understanding of the electrical and mechanical design challenges confronted when developing high performance, producible power amplifiers. We have delivered hundreds of custom designs to a variety of SATCOM system providers for use in high data rate communication links operating under adverse environmental conditions and temperature extremes. Our present offering of amplifiers includes SSPAs that operate over standard SATCOM bands from X through Ka (including the 29-30 GHz commercial Ka-Band), many of which are currently in use on a number of programs including Ka-Band COTM for WIN-T and X, Ku and Ka-Band Manpack for USSOCOM and others. All of our SSPAs undergo extensive thermal analysis and many utilize custom designed housings made from high thermal conductivity, controlled expansion materials that allow for unprecedented reductions in size and weight. This careful selection of materials and innovative housing design also allows for improved electrical, thermal and reliability performance, making our SSPAs ideally suited for high temperature operation without the need for noisy and unreliable cooling fans.

**Ka SSPA Spectral Regrowth****SSPA Design Considerations**

All of Narda's Ka-Band SSPAs are micro-processor ( $\mu$ P) controlled, utilize custom designed power supply circuitry containing both DC-to-DC converters and low drop-out linear regulators, employ high current HEXFET drain switches and ample bias line filtering. All key voltages are continuously monitored to denote power supply health. Voltage variable attenuators (VVAs), digital-to-analog (D/A) converters and I2C temperature sensors are used to control gain and DC bias points over temperature. Output power detectors allows the  $\mu$ P to automatically shut down the SSPA to protect against over-power or high VSWR conditions. We routinely work with customers to incorporate custom features into the  $\mu$ P firmware, offering the user unmatched control over amplifier operating parameters and yielding system level benefits not available from other suppliers. All standard digital interfaces are supported, including RS-485 and Ethernet. We specialize in designing application specific solutions that offer our customers the best electrical, thermal and mechanical performance with very competitive lead times and price points.

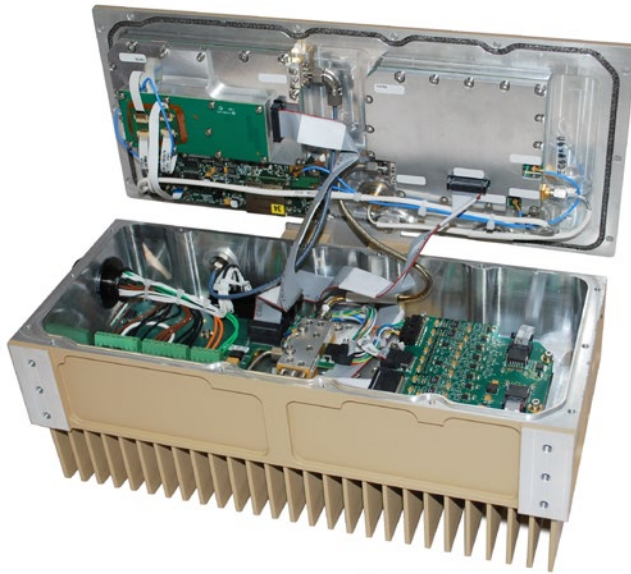
Narda's SSPA assemblies utilize both commercial off the shelf (COTS) and custom GaAs MESFET, pHEMT and InP HVHBT discrete and MMIC-based devices. All COTS devices have been carefully selected, characterized and specified to insure that only the best linearity and highest efficiency devices are utilized. This allows us to achieve linear operation much closer to the 1dB compression point than most SSPAs on the market, without the use of linearizers. We are currently designing a Ka-Band SSPA MMIC based on InP HVHBT technology to cover both commercial and military SATCOM operating bands. HVHBT technology offers exceptional linearity and efficiency performance compared to COTS pHEMT devices and we plan



## Solid State Power Amplifiers

to offer 12.5, 25, 45, and 90W P1dB versions in the very near future. These next generation amplifiers will demonstrate linearity and efficiency performance not currently achievable with FET-based technologies and will offer significant performance improvements to Ka-Band SATCOM system providers.

From our current SSPA offerings and our future development efforts, Narda Microwave continues to push the boundaries of SSPA performance. Please contact your local representative if you have further interest in this product area.



**Ka-Band Outdoor Transceiver  
with 12.5W SSPA**

**Ka-Band BUC with 25W SSPA**

