

A.4: Development of Solid State RF Amplifiers at 352 MHz and 505.8 MHz

This article reports development and measured performance of RF Solid State Power Amplifiers operating at 352 MHz and 505.8 MHz and capable of providing output power of 2 kW and 4 kW respectively.

The 2 kW amplifier with 60 dB RF power gain at 505.8 MHz comprises of eight numbers of 300 W amplifier modules, two numbers of eight-way power combiner/divider, high power square coaxial type directional coupler and driver amplifier stages. Each of these RF components has been designed and developed indigenously. Design architecture is similar to earlier developed air-cooled 2 kW amplifier at 352 MHz, except water cooling used in present system (Fig. A.4.1).

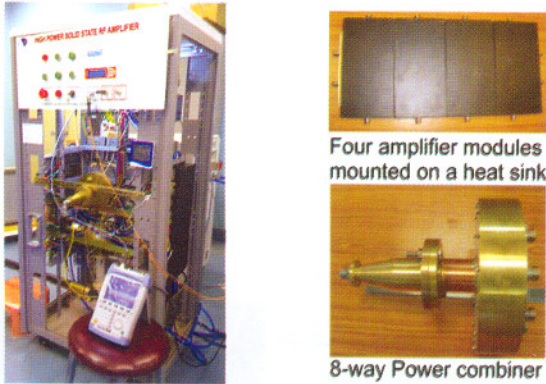


Fig. A.4.1: 2 kW amplifier rack with power combiner/divider and amplifier modules at 505.8 MHz

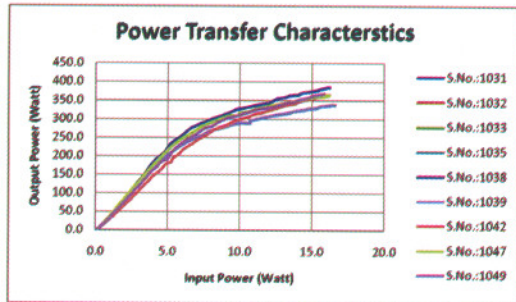


Fig. A.4.2: Measured performance of 300 W amplifier modules at 505.8 MHz

Measured response of 300 W amplifier modules is shown in Fig. A.4.2. Maximum saturated power obtained is in excess of 300 W with saturated gain of 13 dB. Assembled rack has been tested up to 2 kW for more than 30 hours, with each test segment stretching 3-6 hours in time. Wall plug efficiency measured was in excess of 45%.

Encouraged by successful results of 2 kW amplifier at 352 MHz and 505.8 MHz, 4 kW amplifier at 352 MHz (Fig. A.4.3) has been fabricated. At the core of this unit, 16 numbers of 270 W amplifier modules have been power combined using 16-way radial power combiner. This combiner, and low power and high power directional coupler, developed in house, have been used for combining and measurement.

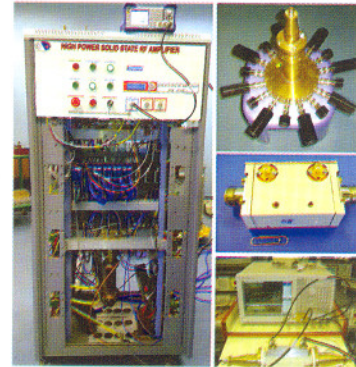


Fig. A.4.3: 4 kW amplifier at 352 MHz showing amplifier, power combiner and directional coupler developed for 1 kW and 4 kW RF power

Measured performance of this amplifier is shown in Fig. A.4.4.

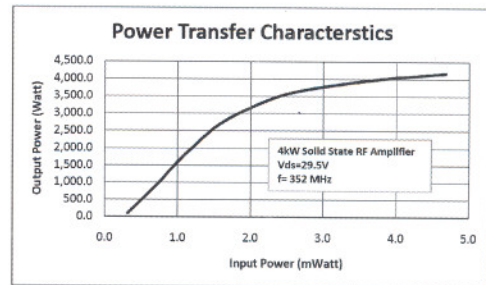
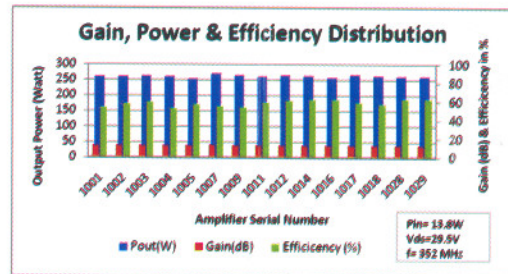


Fig. A.4.4: Measured performance of individual modules (top) and power transfer characteristics of 4 kW amplifier (bottom)

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