



15W C band SSPA Technology Transfer Event



Between
Space Applications Centre (ISRO)
and
Astra Microwave Products Limited

September 8, 2014

Organised by
Technology Transfer & Industry Interface Division
Planning & Projects Group

BRIEF ABOUT 15W C band SOLID STATE POWER AMPLIFIER

The normal C band is allocated for a range of applications including FSS, DTH and MSS. The growing demand for bandwidth to support such applications is calling for a large number of transponders to be deployed in the coming years. A typical C band payload in the GEOSAT series would carry from twelve to twenty-four numbers of Normal C-Band SSPAs.

The downlink power in these transmitters is provided by 15 Watt C-band Solid State Amplifiers (SSPAs). Space Applications Centre (ISRO) has developed and qualified a design tailored to meet this requirement on board GEOSAT satellites.

DESCRIPTION

The SSPAs consists of (a) an RF Assembly and (b) an Electronic Power Conditioner [EPC] Assembly.

Attenuators

The SSPA has two PIN attenuator circuits. One is a two-section commandable attenuator providing up to 24 dB of attenuation for on-board gain control. The second attenuator is used for compensation of gain variation against temperature. Each attenuator section employs 3 dB Lange couplers with two PIN diodes.

The commandable attenuator is externally controlled through serial commands. These commands are processed within the SSPA using a decoder comprising integrated circuits CD4050, CD40174, CD4015, CD40106 and CD4051. This decoder, along with biasing arrangements for all devices, is implemented on a PCB which is housed in a separate section of the RF assembly. The temperature compensation network is also included on this card.

RF Amplifier

The RF Assembly consists of low, medium and high power amplifier stages along with two attenuators. The nominal RF output power of the SSPA is 15 Watts (41.8 dBm) in the specified operating frequency band. Nine amplifier stages provide the required 86 dB gain. The small signal stages employ five CFY25-20 devices in a 3 + 2 chain. These small signal stages will drive the medium power stages based on MGF2407 & MGF2430. All these stages are housed in one section of the RF package. The output of this section (i.e. small and medium power stages) is fed to the Power Amplifier section of the same housing, via co-axial cable. The Power Section houses the MGF38V and MGF44V devices, the latter being a 25 Watt output device. The space between the low power and high power sections is occupied by interconnections and harnessing.



(Above): Sh. G R Shinde witnessing agreement document, Sh. M V Reddy, Sh. R K Arora and Sh. Y P Rana TTID in photograph.

(Below): Sh. M V Reddy, Director (Marketing and Operations) from AMPL, Hyderabad signing the agreement. Shri R. K. Arora, Dy. Director ESSA in photograph.





(Above): Sh. J P Joshi - Head, ETAD/SNPA witnessing the agreement. Sh. Amit Bhatt, Sh. N V Bijeev, Sh. Praveen S Bharadhwaj , Sh. Amit Jain in photograph.
(Below) Sh. R J Doshi - Head , AD/SNPA signing the agreement.





Sh. D K Singh - Group Director, RFSG/SNPA (above) exchanging the TT Document.

Sh. Ratnesh Kumar – Sr. Accounts Officer (below) receiving the license fees.





Congratulation to SAC - ISRO Team

*Thank you for Kind Cooperation & Support
Provided*

Looking forward to more technology transfer offers

*This was 96th agreement signed by SAC,
First was signed in 1977.*

**TTID / PPG
Team**

Photo Courtesy: Sh. R K Dave, Photographer, RACF/EPSA