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HIGH TECHNOLOGY FOR THE GLOBAL SATELLITE MARKET

Over the course of five decades, Tesat-Spacecom has developed in-depth expertise in manufacturing of payload equipment for communication satellites and has established itself as a clear European market leader. On its 60,000m² premises in Backnang, Germany, 1,200 employees develop, assemble, integrate, and test systems and equipment for telecommunications via satellite. To date, more than 700 space projects have been completed. The accumulated in-orbit lifetime heritage exceeds 250 million hours.

Our product offerings encompass highly reliable equipment as for example the travelling wave tube amplifiers, multiplexers, waveguide switches, and modulators, which along with complete systems are delivered to all leading satellite manufacturers worldwide.

Therefore, we offer the complete communication technology necessary to disseminate television signals via satellite to each household on ground. More than half of all communication satellites in orbit operate with Tesat equipment on board. The future global communication infrastructure has to support security-related real time applications with ubiquitous coverage. This will only be viable with most advanced communication systems operating in space.

Tesat has successfully developed the key element for this space infrastructure, the optical broadband Laser Communication Terminal (LCT). Using lasers, such terminals can transmit data and imagery between satellites and from satellites to ground at unprecedented data rates. We at Tesat have demonstrated for the first time the operational capabilities of such broadband LCTs in space. Given our competitive position in the commercial satellite market and our top quality standards, Tesat products are today the first choice for various satellite-based systems operated by several governments worldwide for security and defense related applications.

THE WORLD OF TESAT-SPACECOM

Amplifier Products

Passive Microwave Products

Communication Systems

Datalink Products

Laser Products

Parts Agency
Why use Tesat’s amplifier products?

The heart of communication satellites are Power Amplifiers. For more than 40 years Tesat has been developing and producing Travelling Wave Tube Amplifiers (TWTAs) and Solid State Power Amplifiers (SSPAs) for space applications.

Today, Tesat is the market leader worldwide in this area with more than 50% market share. At a production rate of more than 1,000 units per year we are close to series production of space equipment whilst all assembly, integration and testing is also conducted in-house.

The standard amplifier is our Microwave Power Module (MPM) which is an “all-in-one” comprising of the TWT, the EPC and the Linearized Channel Amplifier (LCAMP) with significant mass and footprint savings. Additional cost and mass savings can also be found with the use of the Dual-MPM versions. New developments in this segment are high power MPMs with up to 500 W RF power.

SSPA

Based on 30 years experience, Tesat has designed and manufactured several hundreds of SSPAs for space applications. The focus was the low power class with up to 20 W of RF output power. Since 2008, Tesat has invested in the new promising GaN-Technology to increase the power and efficiency capabilities of our SSPAs.

With this new generation, we are now able to offer up to 120 W SSPA in L- and S-Band and up to 60 W in C-Band. To serve market needs and high volume production of SSPAs, we have harmonized our capabilities between MPM and SSPA manufacturing lines. New aims in this segment are higher integrated solutions and to develop SSPAs for Ku-/Ka-Band.

Key benefits:

MPM

• “All-in-one” concept to save mass and footprint
• Optimized efficiency
• Flex functionality
  • Adjustable RF output power
  • Optimized RF performance in different frequency bands

SSPA

• High volume manufacturing
• Use of common building blocks
• Easy adaptable to customer needs
Key components for telecommunication satellites are the Power Amplifiers in the Payload. Tesat-Spacecom has built a 50% world market share based on four decades of experience providing Travelling Wave Tube Amplifiers (TWTAs) and Solid State Power Amplifiers (SSPAs) for space applications. In communication satellites, Tesat-Spacecom Amplifiers have now accumulated more than 300 million operating hours in space and maintained high quality performance over their 18 year average lifetime.

Power Amplifiers are key elements for satellite transponders and TWTAs/MPMs are used in the majority of them. Tesat-Spacecom has provided Power Amplifiers which have satisfied the requirements of NASA, ESA, Intelsat, Inmarsat, European, Asian as well as US commercial and military programs. Starting from frequencies at 1.5 GHz up to 60 GHz, Tesat-Spacecom has TWTAs available with RF output power ranges from 10 W up to 300 W and SSPAs up to 120 W.

The RF performance characteristics such as high gain, gain flatness, low phase distortion and high linearity are combined with straightforward mechanical design which results in low mass and small dimensions.

Tesat-Spacecom’s Microwave Power Modules are designed to be compatible with any TWT by optimizing the high voltages for the individual approaches. The integration and testing of the TWT, the EPC and the complete Power Amplifier is all performed by Tesat-Spacecom bringing in-house expertise to the full value chain.
Being a key element for a satellite transponder, the commitment of Tesat to quality and performance make it frequently the preferred choice of major commercial and military satellite system suppliers. With frequencies from 1.5 GHz up to 60 GHz and output ranges from 10 W up to 300 W, Tesat has TWTAs available for the most diverse requirements.
The Microwave Power Module (MPM) is our solution for the increasing complexity of Satellite Systems and Payloads. It combines the traditional TWTA (EPC and TWT) and the Channel Amplifier (CAMP) or Linearized Channel Amplifier (LCAMP) in one housing.

This integrated solution gives many advantages in terms of mass, mounting area and simplification in payload integration. In addition we can archive better EMC characteristics and centralized connections to the EPC for DC and all TC/TM functions of the MPM. MPMs exist as single as well as dual units. Dual units use one EPC to supply two independent TWTs. Most MPMs are also available with radiation or conduction cooled TWTs.

- Highest integration level and smallest footprint industry-wide
- Off-the-shelf L-, S-, C-, X-, Ku- and Ka-Band
- All major bus systems accommodatable
- Flexible DC power interface
- Optimized designs for various RF output power
- Single or dual design available
- Flex functionality

Over the last 8 years, we have invested into the new GaN-Technology to develop high efficiency & reliable SSPA in the lower frequency bands (L-, S-, C-, X-Bd). In the future, we will extend our portfolio with Ku- & Ka-Band. In terms of functionality and complexity Tesat can deliver either high power hybrids usable in active antennas or SSPAs as equipment with a DC/DC converter and extended functionality like channel amplification etc.

- Baseline designs for L-, S-, C-, X-Bd
- High efficiency SSPA
- All major bus systems accommodatable
- Power flexibility
- Optimized designs for various RF output power
- Combines with Channel Amplifiers and Linearizers
- Power Hybrids for active phased array antennas

Based on 30 years SSPA heritage, Tesat has developed and manufactured several hundreds of SSPAs in GaAs- and GaN-Technology. Due to our flexible building blocks and modular concepts, we are able to design, manufacture and test customer specific solutions within standard commercial programs.

- Baseline designs for L-, S-, C-, X-Bd
- High efficiency SSPA
- All major bus systems accommodatable
- Power flexibility
- Optimized designs for various RF output power
- Combines with Channel Amplifiers and Linearizers
- Power Hybrids for active phased array antennas
In the last decade, Tesat has had successful cooperation with DLR and ESA in designing new products and placing them on the market, which is a key contribution in the satellite equipment engineering and research process.

Tesat manufactures more than 1,000 flight equipment units (TWTa/MM/SSP) per year and has established efficient high quality production with a high degree of automation. Amplifier products are being manufactured within this production department, guaranteeing an industrial standard which is a benchmark for the space industry. We are well prepared and look forward to work with our customers on their future programs.

Tesat’s Amplifier Product line is the number one partner to provide our customers individual solutions for the most diverse applications. We are continuously analyzing the needs for future missions and developing new product generations to fulfill these needs.

Based on heritage – discover the future

Based on our knowledge and experience, we intend to set new standards in technology, series production and automated testing in the space industry. The goal is to have reliable short lead times for our Amplifier Products.

The continuous improvement of our products is based on the following three principles:

- We stay in direct personal contact to our globally operating customers/suppliers and promote enterprise working throughout the supply chain. We listen to identify future needs and optimize our designs and product development strategies.
- Based on our knowledge and experience, we intend to set new standards in technology, series production and automated testing in the space industry. The goal is to have reliable short lead times for our Amplifier Products.
- We constantly invest in the education and training of our current and future workforce to master changes and seek new solutions that go beyond today’s state-of-the-art.
More than 300 flight programs and more than 190 million operating hours in space – The Tesat-Spacecom Amplifier Products Division