

RF packaging challenges for high efficiency, space compliant RF power Amplifier

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Abstract

Climate change, security and telecoms are among the key themes driving a boom in the space economy. Satellite operators see value across all three orbital altitudes—GEO, MEO and LEO (Geostationary Equatorial Orbit, Medium Earth Orbit and Low Earth Orbit, respectively)—with companies taking different approaches to blend them. GEO still underpins the industry, but telecoms also want to provide differentiated broadband services with integrated, seamless offerings for consumer, business and government customers.

Amid LEO constellation programs, the telecom industry continues to debate optimal satellite constellation design and the best end markets. They are also taking different approaches to the various markets, such as aerospace, in-flight connectivity for commercial airlines, maritime communications, navigation and whole new markets such as 5G NTN where roaming between terrestrial and satellite networks are the focus. This “New Space” paradigm demands advanced packaging technologies both adapted to specific requirements and with access from low to medium production scale. At TAS, we defined a packaging roadmap to fit with this new market policy.

In the foreseen presentation, we will focus on High Power Amplifier (HPA) packaging from the die to the equipment applicable to spaceborne systems and subsystems. We will illustrate the evolution of the RF power packaging technologies in the past 10 years. From high cost, high reliability ECSS compatible single die hermetic packages toward highly integrated System in Package (SiP). Depending on the power level, we will also describe the material and techniques to insure high efficiency thermal solution from high thermal conductivity material toward microfluidic passive and active solutions.

As a result, this presentation will pave the way for a consolidated roadmap toward high efficiency, space compliant RF power amplifiers.