

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Fixed and Broadcast Communications (3)

Author: Mr. Robert D. Briskman  
Sirius XM Radio, United States, rbriskman@verizon.net

Mr. Ernst Bosch  
Thales Electron Devices GmbH, Germany, Ernst.Bosch@thalesgroup.com

Mr. Joseph Foust  
Maxar, United States, foustj@ssd.loral.com

Mr. Karl-Heinz Huebner  
Tesat-Spacecom GmbH & Co.KG, Germany, Karl-Heinz.Huebner@tesat.de

Mr. Robert Strauss  
Rand D Strauss Associates, United States, RandDStrauss@aol.com

SATELLITE BROADCAST USAGE AND LIFE TEST OF HIGH POWER S-BAND TRAVELING  
WAVE TUBE AMPLIFIERS**Abstract**

Broadcasting radio programming from satellites to mobile users has been operating for many years in the United States, Canada and South Korea. The service, generally called Satellite Radio, is provided at S-Band radio frequencies. Satellite Radio users require near perfect service availability. Since most users are mobile (automobiles and handheld reception), the antennas of their receivers have little gain necessitating very high effective isotropic radiated power (EIRP) from the satellite(s) to provide the required availability, particularly under fading conditions. Despite using a directive satellite transmitting antenna, the achievement of this high EIRP requires a satellite transmitter radio frequency output power of over 7 kilowatts. This is typically achieved by paralleling 32 Traveling Wave Tube Amplifiers (TWTAs). The configuration, usage and technical aspects of such satellite transmitters are described. These satellite transmitters are critical to Satellite Radio service both as to performance and to operating lifetime, typically over 15 years. Because of this importance, detailed lifetime laboratory testing is being done on the TWTAs as reported herein