Abstracts

An X-Band Spacecraft Transponder for Deep Space Applications--Design Concepts and Breadboard Performance

N.R. Mysoor, J.D. Perret and A.W. Kermode. "An X-Band Spacecraft Transponder for Deep Space Applications--Design Concepts and Breadboard Performance." 1992 Transactions on Microwave Theory and Techniques 40.6 (Jun. 1992 [T-MTT] (Special Issue on Microwaves in Space)): 1192-1198.

This article summarizes the design concepts and measured performance characteristics of an X-band bread-board deep-space transponder (DST) for future spacecraft applications, with the first use scheduled for the Cassini missions in 1997 and 1996, respectively. The DST consists of a double-conversion, superheterodyne, automatic phase tracking receiver, and an X-band exciter to drive redundant downlink power amplifiers. The receiver acquires and coherently phase tracks the modulated or unmodulated X-band uplink carrier signal. The exciter phase modulates the X-band downlink signal with composite telemetry and ranging signals. The measured tracking threshold, automatic gain control (AGC), static phase error, and phase jitter characteristics of the breadboard DST are in good agreement with the expected performance. The measured results show a receiver tracking threshold of -158 dBm and a dynamic signal range of 88 dB.

❑ Return to main document.