



RPT-0026

Digital Radio Testing Using an RF Channel Replicator

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Abstract:

The explosion of wireless digital communication networks and equipment has created a need for compressing more information into a finite spectrum. There is also a need for greater security in communications for both military and commercial applications. As a result, system architecture designers have been prompted to develop wireless communication systems that have increasingly complex modulation, timing, and encryption schemes. Throughout the communication system development process, it is necessary to test system performance by measuring the reliability of transmission and reception of information in the presence of multiple transceivers, in different locations, at different power levels, in the presence of unwanted interferers, reflecting obstacles, and under a variety of environmental conditions. A rapidly operating and sophisticated test apparatus is needed to optimize a transmission system under development and to perform a preliminary qualification of the system prior to expensive and time-consuming field trials.

This paper will describe a bi-directional, multi-port bench-top system which replicates the propagation characteristics of a typical communication channel. The replicator provides simultaneous testing of two or more transceivers using a compact, fiber-optic based system with channel features including multi-path, propagation loss, and variable propagation delay. System performance and characteristics will be presented along with a comparison to conventional emulator systems.

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