PROGRESS ON THE VALIDATION OF SHORT-DISTANCE,
GROUND-TO-GROUND PROPAGATION MODELS AT VHF
FREQUENCIES

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At the 2002 URSI conference in Boulder, one of the authors gave a presentation entitled "A Streamlined Approach for Collecting Signal Strength Data to Validate a Ground-To-Ground Propagation Model" which describes an approach for collecting a large amount of propagation data for use in model validation. At that time, only preliminary results were reported. The focus of this presentation is to review validation work that has been performed since the last presentation.

Recently, additional VHF signal strength data have been collected over a range of terrain types (from relatively flat terrain to mountainous terrain) and distances (10 to 100 miles) for a fairly low receiver height of 4 feet.  In some cases, data were collected repeatedly over the same locations to gain information about measurement repeatability and the relationship between receiver velocity and small-scale fading characteristics. These data have been used to validate a GTD-based ray-tracing model and a model based upon the parabolic wave equation.  No meteorological measurements were made during the radio measurement campaign.  However, for these low receiver heights the dominant propagation mechanism is diffraction, and for short ranges a standard refractive linear gradient can be assumed.  For longer ranges (near 100 miles) non-standard refraction and possibly troposcatter can play a more important role.  These effects, along with variations in model predictions due to differences in terrain elevation profiles from different terrain database sources (USGS and DTED) will be investigated in the validation study.

This presentation overviews the data collection hardware and software and then focuses on the results obtained, both measured and modeled. Related topics, such as signal statistics, measurement repeatability, and model operation are also addressed.