

Land-Mobile Satellite Link Evaluation Experiment

The Applicant intends to perform tests to evaluate the impact of propagation impairments on the availability of an **actual** L-Band personal land-mobile satellite communications system. The objective of the tests is to develop quantitative and qualitative guidelines for the operation of portable satellite terminals in current or proposed Earth-space systems and to relate these results to previous work performed by the Applicant [1-12] and others. The experimentation will make use of a unique opportunity to ascertain the validity of existing performance prediction algorithms based on indirect measurement methods. It will also allow the gathering of extremely valuable information on how to modify experimental and analytical link-simulations to improve their prediction fidelity. Such model-assessment work can only be done with a real satellite system. In addition, guidelines will be developed to establish procedures to mitigate link outages caused by, but not limited to, the effects of multipath, tree-shadowing, building penetration, and obstacle-blockage. The research is an extension of a program of mobile satellite propagation research carried out by the Applicant over the last ten years.

The equipment to be used for the tests includes an INMARSAT-M Portable Terminal (Inmarsat Serial No. 6NE0019F63B4), manufactured by NEC of America, Inc., Model MLink-5000, D7346B (Serial No. 124), auxiliary audio recording and playback devices, as well as a data logging system. The INMARSAT-M Portable Terminal transmits in the frequency range from 1626.5 to 1660.5 MHz with a maximum output power of 4 Watts, and a maximum EIRP of 25 dBW, peak. Its emission transmits voice signals at a modulation rate of 8 kbps in a required bandwidth of 10 kHz.

The unit will be employed to establish a full duplex **<terminal | satellite | public switched telephone network>** circuit, using one of the INMARSAT satellites available, depending on location. The terminal will be deployed at various locations in the US. Some of the locations will be chosen because they have or will have available results from propagation data measurement campaigns by the Applicant or other researchers. These locations include, but are not limited to, Central Maryland, the Southwest, Southeastern States, the Northwest, and North Central States. The voice signals transmitted with the unit over the satellite link will be recorded at both ends of the communications link. Live voice as well as pre-recorded voice messages will be transmitted. Quantitative and qualitative evaluation will be made of both the link availability as well of the voice quality. All results will be correlated with environmental descriptors.

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