

RE: File # 0228-EX-PL-2016

APPLICANT: Mark L. Langenfeld

March 25, 2016

Applicant seeks to conduct experiments involving observation of the performance of sub-optimal (electrically short) medium-frequency (MF) transmitting antennas over poor ground -- particularly, terrain with shallow depth to bedrock -- over maximum achievable signal path distances. Trials will involve one- and two-way test communications relying solely upon narrow-band modes, including CW telegraphy, slow CW (QRSS), low-baud-rate phase shift keying (PSK), and minimum shift keying (MSK). Observations will attempt to account for both long-term (seasonal/climatic) and diurnal variations in signal propagation mechanisms and ground characteristics.

The primary objective of these observations is to provide useful information and data to those seeking to maximize the efficiency of simple, small-footprint MF transmitting antennas and ground systems in difficult terrain. Information regarding the results of these trials will be made freely available to the public, radio amateurs, and other Part 5 licensees engaged in related experimentation.

Equipment to be employed in this program will include both commercially manufactured HF exciters paired with experimental frequency downconverters and experimental low-power MF transmitters (all utilizing crystal-controlled PLLs or other highly accurate/stable means of frequency control), each followed -- as required by the objectives of the experimental trial -- by suitable, purpose-built buffer/amplifiers not to exceed 200 Watts output. Initial tests will employ an existing MF antenna structure which has been in service for other applications during the past three years. Future changes/improvements to that antenna system (other than those required by routine maintenance) will be based upon the findings from and requirements of the work described above. No substantial increases in antenna height or footprint area are anticipated.

The transmitters and antenna will be sited on a 5-acre parcel in a rural/agricultural setting. The nearest occupied residence (other than applicant's) is 0.45 km away; the distances to the nearest municipality and nearest landing field are 3.6 km and 11.8 km, respectively.

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