

Diurnal and seasonal variability of HF Spectral Occupancy over the eastern Mediterranean

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The HF spectrum can ideally accommodate only about 10,000 separate voice channels. However, varying HF propagation conditions restrict the usable frequency bandwidth to be much less than the ideal 27 MHz. This is a limiting factor in communication system performance and is particularly acute at night, due to prevailing ionospheric conditions. In these circumstances, successful communications may depend on finding windows in the frequency band where the interference level is acceptable. Defence forces need to use systems with special characteristics such as NVIS (Near Vertical Incidence Skywave) to survive in the electronic warfare environment. To effectively operate NVIS at HF, users must have current, complete, and accurate information on propagation conditions, current spectrum occupancy data, and historical channel occupancy information. Interference from other users is frequently more important than man-made noise from incidental radiators or atmospheric noise from lightning.

A dedicated measurement system has been operating in Cyprus for more than one year facilitating the effective measurement and analysis of HF spectral occupancy over the eastern Mediterranean. The ultimate aim of these systematic measurements is to compile an adequate dataset that will enable an investigation into the parameters that define the variability of HF spectral occupancy. In this paper the diurnal and seasonal variability of HF spectral occupancy will be presented that describes the diurnal variability of interference characteristics within the individual frequency bands allocated by the ITU to separate radio services during the rising phase of the current solar cycle.