



FCC Form 442 EXHIBIT Number 4

Modulating Signal Description

The MSSSI HF wideband pulse generator for ionospheric soundings will modulate its transmitter with a 60 nanosecond HF pulse every 10 milliseconds for a 100 Hz pulse repetition rate. The HF transceiver system will operate as a radar to record the ionosphere's reflection response to the wideband HF pulse. MSSSI will sample potential reflections at a constant time delay from transmission representing a radar return range bin. Collecting range returns from 5000 pulses will provide processing gain to overcome HF background noise and will require a total sampling time of 50 seconds. After sampling at a range bin, the transmitter will be turned off and the timing adjustments will be made for sampling the atmospheric response at the next range bin to repeat the process.

EXHIBIT Number 1 shows the time and frequency response of the MSSSI HF UWB pulse.