APPENDIX A

The FSM Technique

The FSM technique uses a conventional SSB receiver to allow measurement and calculation of field strength of radio signals or interference.

The technique depends on the fact that the audio output power of an SSB receiver is linearly related to the RF input power (including the equivalent internal noise power) up to the onset of AGC action, which is typically a little more than 20dB above the equivalent receiver input noise power.

By using a known external attenuator to keep measured signals within this linear range, relative measurements can be made of the receiver audio output power and absolute results calculated by factoring in the attenuator, receiver equivalent internal noise power, and other scenario variables.

Effectively, the SSB receiver is used as a linear down converter, to translate a narrow RF spectrum segment of interest to audio frequencies, and to analyse the audio output of the receiver using FSM. You could think of the combination as a multiple conversion super-heterodyne receiver where the last IF is at audio frequencies.

FSM has the capability to sample the audio for a defined period (default is 8K samples or about 372mS) and calculates summary statistics; the relative DC offset, RMS, Quasi-peak and Peak voltages. Measurements made in this way of the internal noise of the sound card connection, the receiver internal noise, and the external signal, along with measurements or estimates of the test environment are used to calculate the received power and electric field strength of the external signal, noise or interference.