

ORNL
INSTRUMENT EVALUATION SUMMARY

Eberline Alpha 7L Alpha Air Monitor

Description: The Eberline Alpha 7L Continuous Air Monitor is a solid-state detector based continuous alpha air monitor. The Alpha 7L is designed specifically for Los Alamos National Laboratory. The unit consists of two components – a radial entry detector head connected through a RF-shielded communications cable.

Ranges Tested: N/A

Report Date: July 19, 2002

General Comments:

1. Confidence intervals used to ascertain whether results are conclusive or inconclusive are determined using the 0.95 quantile of the student's t distribution (95% confidence interval).

RADIATION RESPONSE

Probe Surface Sensitivity: N/A

ELECTRONIC and MECHANICAL REQUIREMENTS and TESTS

Line Noise: No response changes were indicated during and after exposure to combination wave (1.5/50 μ s – 8/20 μ s) and 100 kHz ring wave pulses at 2kV amplitude.

Power Line Variations: No response changes were observed when operated at 103 and 129 VAC relative to results obtained at the reference voltage of 117 VAC.

Conducted Radio Frequency: No response changes were indicated during exposure to injected RF energy over a frequency range of 150 kHz to 80 MHz at an intensity of 140 dB (μ V).

INTERFERING RESPONSES TEST RESULTS

Radio Frequency/Microwave: Susceptibilities were observed throughout the test being indicated by spectral counts and changes to the operational status. After applying recommended changes, most indicated susceptibilities did not affect the operation of the monitor. Additional details are available in the test report.

Electric Fields: Not performed.

Magnetic Fields: No response abnormalities were observed when exposed to a 10 Gauss DC field

and 60 Hz (1.26 Gauss) AC field in two orientations.

Interfering Ionizing Radiations: No susceptibilities were observed when exposed to a 1 rad/hr ^{137}Cs gamma field. Problems were indicated when exposed to an unmoderated ^{252}Cf source at 1 rem/hr.

ENVIRONMENTAL FACTORS

Temperature: No susceptibilities were observed over the test range of -10 to 50 °C (+14 to +122 °F). Additional test were performed at -20 °C with similar results.

Temperature Shock: Not performed

Humidity: Some minimal susceptibilities were observed during exposure to 95% relative humidity at 30 ± 2 °C for 24 hours. This was not observed on the Alpha 7 version.

Vibration: Not performed.