

Instruction
Hardware Engineering

No. LMS 1-13

Subject: Radiation Control

APPROVED BY Manager, Hardware Engineering

STATUS Maintenance Revision

PURPOSE Defines the testing and marking requirements for all items that have the potential of emanating ionization radiation. These requirements are based on the radiological health standards of the Code of Federal Regulation, (CFR) Title 21 and apply to purchased equipment, modified purchased equipment, and L-3 Communications Corporation, Link Simulation & Training Division (hereafter referred to as Link)-manufactured equipment. Link personnel shall follow the requirements of this instruction when testing and marking items that emanate ionization radiation.

AFFECTED FUNCTIONS Hardware Engineering
Manufacturing

REFERENCES F-5728 Radiation Survey Report Form
1000770 Certification Decal
Part 1020 Code of Federal Regulation, Title 21

DEFINITIONS

External surface. The cabinet or enclosure provided by the manufacturer as part of the unit.

Maximum test voltage. If the unit is operated from a nominal 110 to 120 RMS volt power source, maximum test voltage is 130 RMS volts. If the unit is designed to operate from a power source other than from nominal 110 to 120 RMS volts, maximum test voltage means 110 percent of the RMS voltage specified by Link for the power source.

Service controls. All of those controls of adjustment which under normal usage are not accessible to the user.

Television receiver. For this LMS, television receiver means an electronic product designed to display a television picture on closed-circuit television.

Usable picture. A picture in synchronization and transmitting viewable intelligence.

User controls. All of those controls provided by the manufacturer for purposes of adjustment which, on a fully assembled display system under normal usage, are accessible to the user.

INSTRUCTION

1. Requirements

- 1.1 Conditions requiring tests. Any one of the following conditions shall be justification for testing equipment in accordance with this instruction:
- a. All Link-manufactured displays.
 - b. When Link modifies a purchased display in a manner that could cause X-radiation to be increased (e.g., an increase in anode voltage).
 - c. When this LMS is called out as applicable on a drawing.
 - d. When any CRT display is suspected of emitting hazardous X-radiation.
 - e. When any Link product has the potential for X-radiation but may not fall completely within the requirements of the Food and Drug Administration.
- 1.2 Test equipment.
- a. Survey meter. A dose-rate meter (electrostatically shielded) for probing or rapid surveying of a radiation field (Victoreen Model 440 RF/C or equivalent).
 - b. Voltmeter (1 percent accuracy). A meter for measuring the input voltage from the power source.

- 1.3 Test conditions.
- a. A sufficient warm-up period shall be provided for both the equipment under test and the test equipment in order to obtain stable operating conditions before proceeding with measurements.
 - b. All measurements shall be made with the unit displaying a usable picture.
 - c. All measurements shall be made at maximum test voltage.
- 1.4 Test procedure.
- d. The background radiation shall be measured with all of the equipment under test in an off condition. These results shall be deducted from the readings taken during the actual test.
 - e. The unit under test shall then be turned on and warmed up.
 - f. The controls shall then be adjusted to obtain a usable picture from the unit.
 - g. A general (unrecorded) survey shall then be made to determine a place on the external surface (no more than 5 centimeters from the surface) where the X-radiation is at the highest level.
 - h. With the survey meter in this location, the user and service controls shall be adjusted to combinations which result in the highest reading on the survey meter. A general survey shall again be made in an attempt to obtain a higher reading at a distance of no more than 5 centimeters from the external surface of the unit. This process shall be repeated until the highest evident reading can be obtained. The location and the reading shall be recorded.
 - i. If the measured X-radiation with the background radiation deducted is above .5 milliroentgens per hour, the equipment shall be turned off, the Project Manager, Safety Administrator, and Product Safety Engineer shall be notified via telephone, and the unit placed on rejection.

- j. If no readings above .5 milliroentgens per hour are recorded, the unit shall be acceptable from a radiation standpoint.

NOTE

The power supply system shall have a safety device which will limit the voltage from exceeding the operating level of the system. If not, radiation measurement must be made under identical conditions to those which result from the component or circuit failure which would maximize the X-radiation emissions.

1.5 Reporting and labeling.

- a. At the completion of the tests outlined in paragraph 1.4, a Radiation Survey Report, Link form number F-5728, shall be completed in triplicate. If the report covers a final survey conducted prior to shipment of the equipment, "YES" shall be checked on the "CERTIFICATION LABEL AFFIXED" entry. The cognizant Test Supervisor shall assure that one copy of the data is sent to the Plant Safety Director and one copy (including any raw test data) sent to the Product Safety Engineer. The final copy shall be retained by the Test Supervisor.
- b. Certification labels are required on all television receivers. Purchased television receivers will normally have the certification label affixed. If a label is not in evidence, tests in accordance with paragraph 1.4 shall be conducted and a certification label affixed in a conspicuous location. For Link-manufactured or modified displays, the certification label (Link PN 1000770-03) shall be affixed in accordance with the applicable assembly drawing after the final X-radiation test.

2. Quality Assurance Provisions

- 2.1 The Quality Assurance Organization shall be responsible for assuring that the requirements of this instruction are met.

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NOT CONTROLLED**



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3. Preparation For Delivery (Not applicable)