

325 MHz RF Component Test Facility Overview and RF Test Program Proposal Requirements

This document is to provide an overview of the 325 MHz RF Component Test Facility, its operational procedures, and the information necessary to generate a RF Test Program Proposal.

Introduction and Overview

The 325 MHz RF Component Test Facility in the Meson Detector Building ultimately offers up to 2.5 MW of pulsed 325 MHz RF power at pulse lengths up to 3.5 milliseconds at 2.5 Hz and 1.5 milliseconds at 10 Hz. The RF power is made available in a ~10'x10' shielding cage via a 6" EIA coaxial adapter fed by WR2300 waveguide. Except in special circumstances, the RF peak pulse power will be operationally limited to <650 kW and, pending installation of the final modulator charging power supply, the maximum repetition rate is limited to 1 HZ.

Component testing in the Cage shall be done only within the scope of an approved written RF Test Program Proposal. Proposals are reviewed by a Cage Operations review panel comprised of, at minimum, one or more qualified 325 MHz RF system operators and one or more representatives from the HINS Program management team. With the panel's recommendation, proposals are approved by the Meson HINS Program manager.

325 MHz RF System operations for component testing shall be attended at all times by a qualified 325 MHz RF operator and by a member of the test team identified in the respective Test Program Proposal. If the RF operator and test team member is the same person, a second person from either group is required. Two persons shall be present at all times that RF power is being delivered to the Cage for component testing.

I. Required RF Test Program Proposal Components

A. General Description of the Proposed RF Tests

A written general description of the proposed test program shall be provided, including, at a minimum, the following information:

- 1) Name of Test Program
- 2) Purpose
- 3) Methodology
- 4) Identification of any special requirements and/or hazards

B. Contact Information

The lead person responsible for the proposed test program shall be identified and contact information shall be provided. Any additional members of the test program team should also be listed.

C. Description of Items and Drawing of Layout

- 1) A written description of the item(s) to be tested shall be provided.
- 2) A drawing or sketch of the item(s) to be tested and associated RF components and how it (they) connects to the RF power system shall be provided, unless a few written words can completely describe a simple configuration.

D. Run Plan

A written general run plan for the proposed test program shall be provided, including, at a minimum, the following information:

- 1) Desired start date and expected duration of the program
- 2) Expected frequency of access to the cage
- 3) Pulse repetition rate and RF power levels required
- 4) Description of measurements to be made.

E. Identification of Special Hazards

A description of any special hazards and any special precautions associated with the proposed testing shall be provided. Any special equipment interlocks required shall be identified.

II. 325 MHz RF Component Test Facility Operations

A. Accessing the 325 MHz RF Component Test Cage

- 1) A trained, authorized person, acting in the role of lead authorized employee, must perform “325 MHz RF Power Distribution System LOTO Procedure”, ADDP-RF-7902 prior to any access to the Cage.
- 2) Each person who enters the Cage to connect, disconnect, or work on any RF component connected to the RF power system must perform LOTO following the lead authorized person in Step 1 above.

For any person without LOTO Level 2 training, this becomes a “supervised LOTO” procedure. Regarding supervised LOTO, the Fermilab ES&H Manual states “If the subject individual is an employee, he or she will be scheduled for the earliest available LOTO Level 2 training.”

- 3) RF Cage Enter Key is obtained from the 325 MHz RF Permit/Switch Control chassis in Rack PD-R6 or from the key tree in Meson Control Room.
- 4) Use Enter Key to unlock cage door.

B. Installation and Cage Housekeeping

- 1) Items to be tested and all associated components must be installed according to generally accepted good electrical and mechanical practices.
- 2) The Cage must be kept in a clean and orderly condition at all times.

C. Exiting and Re-Securing the RF Cage

- 1) The RF power system in the Cage must be left in a secure state, properly terminated by an approved ‘device for test’ or a suitable blank-off.
- 2) A trained, authorized person must search and secure the Cage according to the Cage search and secure procedure.
- 3) The RF Cage Reset Key should then be returned to the key tree in Meson Control Room or retained by the RF operator if another access is anticipated in a short time.
- 4) The RF Cage Enter Key should be returned to the 325 MHz RF Permit/Switch Control chassis in Rack PD-R6 if operation is imminent or to the key tree in Meson Control Room if current operations are completed.
- 5) The “325 MHz RF Power Distribution System LOTO Procedure” ‘return to service’ steps may then be executed.

D. RF System Operation

- 1) The RF system may be operated only by a trained 325 MHz RF System Operator.
- 2) It is the RF System Operator’s responsibility to see that all testing procedures are within the scope of the respective approved RF Test Program Proposal.
- 3) Procedures for transmitting RF power into the Cage are a part of the 325 MHz klystron operator’s manual.