Thermal Vacuum Test Procedure

IMAGE FUV Main Electronics Package (MEP)

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Drawing No. 8310-W7 Rev A

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1. GENERAL

1.1 Scope

This procedure is intended for thermal vacuum testing of IMAGE flight equipment in the UCB/SSL Thermal Vacuum Chamber. Prior to beginning this procedure the chamber should be precleaned and certified as described in UCB document titled "Thermal Vacuum Chamber Cleaning and Cleanliness Certification Procedure", document # UCB-BYW-1.

1.2 Clean Room Operations

This procedure involves operations in class 10,000 cleanrooms. All personnel requirements for the facility (gowning, materials, etc.) must be met.

1.3 Acronyms and Definitions

NVR	Non-volatile residue; molecular contamination occupying a volume of air or vacuum in a gaseous or liquid-droplet state, which can precipitate onto surfaces
RGA	Residual Gas Analyzer; A laboratory instrument designed to evaluate partial pressures of residual gasses in vacuum, and which is able to resolve partial pressures to less than 1 amu (atomic mass unit)
TQCM	Thermally Controlled Quartz Crystal Microbalance; A laboratory instrument designed to detect changes in the amount of molecular surface contamination on a thermally controlled surface
MEP	FUV Main Electronics Package

2. THERMAL VACUUM TEST PROCEDURES

2.1 Preparation

1. Deleted.

2. Install the MEP into the chamber. Install vacuum feed throughs and appropriate cables to bring all connectors on the MEP package out side of the chamber. Set up the MEP GSE along with simulators or ETU or flight equipments for the SI detectors, the SI electrical system, the WIC FEC with detector, the WIC electrical system, and the GEO system. All hardware put in the vacuum chamber, including cables and fixtures, shall be pre-cleaned and have suitable materials that meet out-gassing requirements for space flight hardware.

3. Perform the MEP functional test (Dwg No 8311-W7) before the chamber is pumped down to ensure that the system electronics are fully functional and that cable and harness continuity has been achieved.

2.2 Pump down

1. Pump down the chamber to $<10^{-4}$ torr. The chamber must be at 10^{-4} torr or below for one hour before turning on power to the MEP.

2. 3 Thermal Cycle Tests

1. Once at high vacuum, perform and record a functional test using the forms in dwg 8311-W7 at ambient temperature (~25C). Turn MEP power OFF.

2. Set the shroud and baseplate temperature to +50˚C. If there will be operators present, it may be desirable to set the shroud and baseplate temperatures 5˚ to 10˚ beyond the desired limits to accelerate the heating process. Shroud and baseplate temperatures should be restored to desired instrument temperature after the instrument is within 5˚ of the desired temperature.

3. Once the system temperature has stabilized for at least 2 hours at the desired temperature, turn the MEP power ON and perform the 8311-W7 functional test record the test data..

4. Turn the MEP power OFF, and cool the system to -30C.

5. Once the system temperature has stabilized for at least 2 hours at the desired temperature, turn the MEP power ON and perform functional test 8311-W7.

6. Set the temperature to +40˚C,

7. Once the system temperature has stabilized for at least 2 hours at the desired temperature, turn the MEP power ON and perform the 8311-W7 functional test and record the test data..

8. Turn the MEP power OFF, and cool the system down to -20C.

9. Once the system temperature has stabilized for at least 2 hours at the desired temperature, turn the MEP power ON and perform the 8311-W7 functional test and record the test data.

10. With the MEP power ON, perform 6 more thermal cycles between +40˚C and -20˚C, with functional testing at each high and low temperature dwell.

11. After completion of functional testing at +40C in cycle 8 , with the MEP power ON, cool the system to +20C and record functional data.

12. Complete cycle 8 functional testing at -10C, and then turn MEP power OFF. Heat system to ambient (+25C).

13. Turn on MEP power and record the final functional in vacuum at +25C.

14. Turn all electronics OFF.

On completion of the test:

15. Record the base pressure of the chamber.

16. Delete

17. Vent the chamber to air.

Thermal Vacuum Log
IMAGE FUV Project

Date:_____ Performed by:_____

Time pump down is begun:_____

Time to reach 30 microns:_____

Time from 30 microns to 1.0 x 10e-5 Torr:_____

TQCM Data (TQCM = -20C) : (note - 1.56 x 10-9 g/cm2/Hz)

Time	Tank Temperature	TQCM Frequency

** Record data on continuation sheet if necessary

T-V test completed at (time/date):_____

TQCM rate of change at completion:_____

Chamber base pressure:_____

Thermal Vacuum Log
IMAGE FUV Project
(continued)

Page No. _____

Time	Tank Temperature	TQCM Frequency
