PFR-008 Title: SST Sensor Mechanical Reinforcement Bracket

Assembly : THM-SST-MEC-010	**SubAssembly :** N/A
Component : SST Sensor	**Unit Serial #:** THM-SST-ETU-002
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Failure Occurred During (Check one √)

□ Functional test √ Qualification test □ S/C Integration □ Launch operations

Environment when failure occurred:

□ Ambient √ Vibration □ Shock □ Acoustic
□ Thermal □ Vacuum □ Thermal-Vacuum □ EMI/EMC

Problem Description

(In this section it is important to document the specific symptoms which exhibited the problem. In the event we see it happen again, we would like to know as much as possible.)

During qualification level random vibration testing on ETU #2 along the instrument X-axis, pre- and post-sine sweeps showed a downward shift of 35 Hz in the first frequency. Visual inspection revealed a hairline stress fracture at the base of the support structure.

Analyses Performed to Determine Cause

(How do we know how the failure happened? Was it a bad part, bad handling, what?)

The support structure wall thickness at the vicinity of the stress fracture was measured (0.018") for identical parts in the same batch as ETU #2 components and determined to be within acceptable limits.

ETU #1 successfully passed qualification level vibration testing on 6/11/04, but required input level notching to keep measured responses within design limits due to severe vibration levels provided by Swales per SAI-TM-2510. However, for ETU #2 the decision was made not to use input level notching during vibration testing due to updated random vibration levels provided by Swales per SAI-TM-2655.

Corrective Action/ Resolution

(How do we fix the unit? And how do we make sure it doesn't happen again?)

An external reinforcement plate was designed, manufactured, and bonded onto ETU #2 in the stress fracture region to provide additional mechanical strength. ETU #2 was successfully retested on 1/3/05 to qualification vibration levels in all three instrument axes.

Therefore, the external reinforcement plate will be implemented on all flight units.

Acceptance:

MAM: Ron Jackson_____; MSE: Ellen Taylor_____

PM: Peter Harvey_____; Cognizant Engineer_____

Date of Closure_____