

ULTRA VIOLET IMAGING TELESCOPE (UVIT)

EMI/EMC Test on the Detector System

UVIT-CDR-01-004.1

**Indian Institute of Astrophysics
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**EMI/ EMC Test Non Conformance Report On
EM UVIT Detector System
Version 1.0**

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Non-Conformance Report (NCR)

Problem: Extra Noise in Detector during EMI/ EMC- Radiated Susceptibility test.

EMI-EMC Test Setup:

In ASTROSAT, UVIT detector & high voltage unit will be mounted on Satellite cylinder (i.e ground plane-1) and UVIT- Electronics Unit (EU) will be mounted on EP-04 (i.e ground plane-2). Both mounting planes don't have a continuous ground plane. To maintain the continuity between the 2 separate ground planes (ground plane-1 & ground plane-2), both the ground planes will be connected through EMI-Braids.

To check the EMI-EMC performance of UVIT detector system in Spacecraft (S/C) configuration, following test setup as shown in figure 1 was followed during the test.

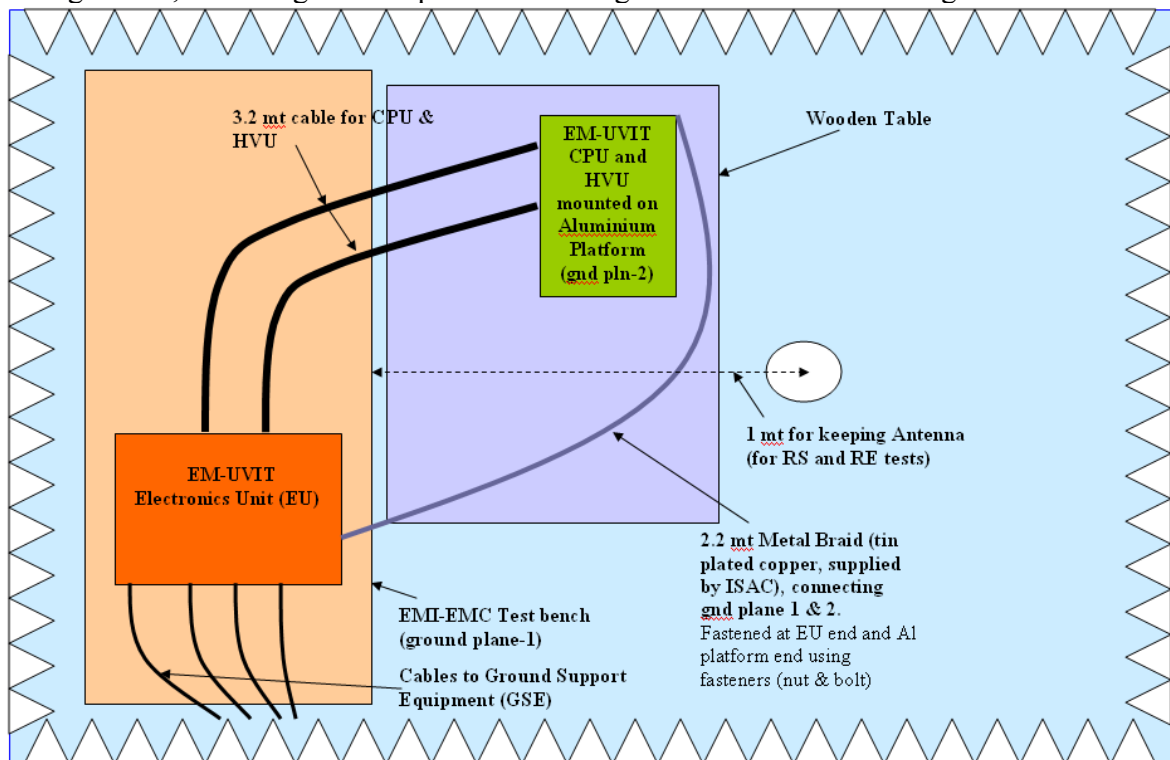


Figure 1 EM UVIT DS Test Setup in EMI/EMC LAB at ISAC

List of EMI-EMC test Done:

Following EMI-EMC tests as per ISAC standard was conducted on UVIT detector system:

- Conducted Emissions on Primary Power lead (15 kHz to 50 MHz)
- Conducted Susceptibility Tests on Primary Power lead
 - Sine Susceptibility, CS02 (50 kHz to 50 MHz)
 - Spike Susceptibility, CS06 (36 V_{peak})
- Radiated Emission Test (Electric Field - 14 kHz to 18 GHz)

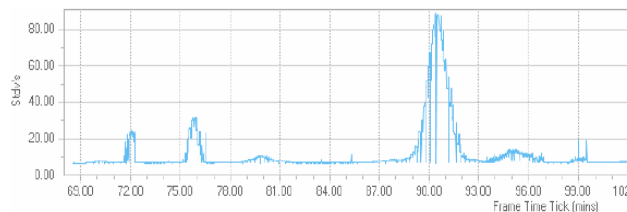
d) Radiated Susceptibility Test (Electric Field - 20 MHz to 18 GHz)

Description of Problem: During EMI-EMC- Radiated Susceptibility test on UVIT Detector System in Split Ground Plane Configuration the Detector system was susceptible at frequency bands of 33MHz to 34.8MHz and 59.5MHz to 63MHz. Observed maximum standard deviations in frequency band 33MHz to 34.8MHz is 31.28 and for frequency band 59.5MHz to 63MHz is 88.48. (Acceptable standard deviation is ≤ 30).

This Sheet Explains the Observations on Standard Deviation of Image Frame for RS and CS tests

PS: From Canadian Science Team, Oct 2008: " Below 30 count Standard Deviation is OKAY" [Ref: CSA (Routes)-CDR Slides of Environment testing]

Name of Test	Frequency Range	Data File Name	Frame Stdv with EMI	Stdv (Stdv)	Frame Stdv without EMI	Notes	Conclusion
RS	20M-200MHz	s_0094_i_0035	6.62-88.61	10.39	6.19-6.81	First Peak of Stdv 31.23 at 75.83 min; 12585th Frame. Peak of Stdv 88.48 at 90.38 min; 37650th Frame. See RS20M-200MHz and RS 20MHz-200MHz (Time Vs Freq) worksheets for more details	Failed at freq band 33-34.8MHz and 59.5-63MHz. Stdv peak (88.48) at 61.6238 MHz, Stdv Start corrupting from Freq 59.5MHz and Recovered at 63MHz.



Frame Time Tick (mins): It shows the time (in minutes) how long the system is ON (it get RESET if system resets)

IMPLICATIONS of the NOISE for OBSERVATIONS:

The noise at some frequencies is seen as 80 units rms. In photon counting mode, average energy of the photons is ~ 3000 units. Thus, the noise of 80 units rms would give an rms error on each coordinate of the centroid (3 X 3 window) of 0.1 pixel or $\sim 0.2''$ rms. This additional error would increase effective resolution of the detector to $1.15''$ from $1''$, and the overall resolution would increase from $1.5''$ ($1.8''$) to $1.6''$ ($1.9''$). In the integration mode the effect on the original resolution of $\sim 3''$ is very small.

This is acceptable.