

Herschel / Planck Project

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Subject	Herschel EQM (ISO Cryostat) - Radiated EMC Test				
reference					

Dear all,

Please find below an assessment of the radiated EMC test discussed in the frame of the Herschel CQM (ISO QM) test sequence. As was discussed in the last meeting on that subject the idea was to perform a radiated test with an antenna directly facing the aperture of the cryostat. Only this part of the CQM test is addressed below.

Our understanding of the objective of the test is to verify that radiation (RF) entering the cryostat from whatever source (e.g. spacecraft SVM) will not affect the instrument performance.

It has been proposed to perform a radiated susceptibility test on the instruments by placing a radiating test antenna either inside the cryostat or in a test adaptor at the cryostat aperture.

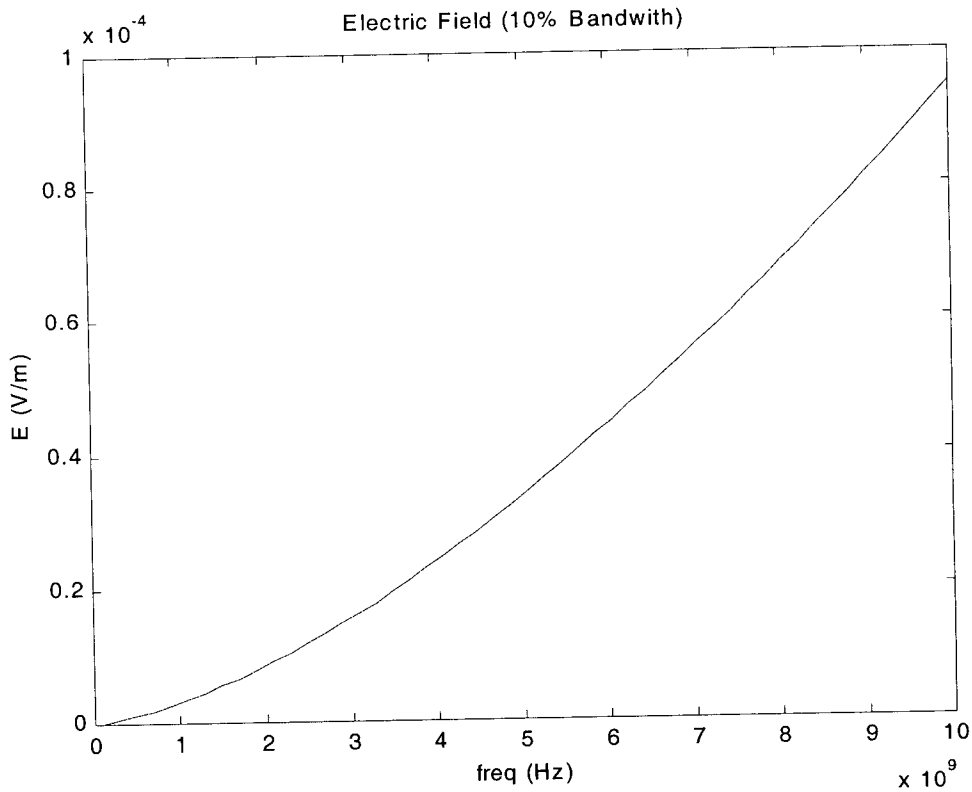
This method has several complications in implementation. Not only will it need to be done in an anechoic chamber but also it will require an accurate control of the electric field injected into the CVV. This is a difficult task. In fact, the electric field inside the cryostat will need to be measured and compared with the required levels at several locations inside the CVV. With standard EMC instrumentation this appears impracticable. In addition, even assuming this procedure is feasible, it would require a significant amount of time.

Since the susceptibility level to test the Instruments should be tailored to the S/C radiated emissions reaching the inside of the cryostat we have made a first cut of the level that can be expected to enter the cryostat via the aperture (or any other RF opening).

Using a typical SVM (ISO) emission spectrum in the range from 1 kHz to 1GHz, - and with the TX Off, there is nothing emitted of similar significance above this level,- and taking into account

the minimum attenuation that is achieved by the cryostat (see ASPI-TN-0177) the level expected to enter the cryostat aperture is considered to be insignificant (below one microV/m).

In addition one can evaluate the level of radiation from the sun in the range from 1-100GHz that is diffracted at the edge of the sunshade and enters the cryostat as straylight noise (far above microV/m – see below figure) and finds this is higher than the levels “seen” from the SVM.



Based on the above, we believe a radiated test into the aperture of the cryostat is **not** useful.

Could you review/comment the above ASAP and if you agree with the approach we would stop any further effort on the design of a cryogenic test adapter (CTA) for radiated EMC testing.

Best regards

T. Passvogel