

XMM-Newton CCF Release Note

XMM-CCF-REL-126

EPIC MOS Bad Pixels

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1 CCF components

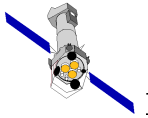
Name of CCF	VALDATE (start of val. period)	EVALDATE (end of validity period)	List of Blocks changed	CAL VERSION	XSCS flag
EMOS1_BADPIX_0016	2002-12-11T12:00:00		BADPIX		NO
EMOS2_BADPIX_0016	2002-12-11T12:00:00		BADPIX		NO

2 Changes

Completely new set of bad pixels tables have been derived, applicable for the MOS cool operations, that started on revolution 533. The operating CCD temperatures of both MOS were lowered from -100C to -120C, in order i) to mitigate the effects of CTI degradation on the energy resolution and ii) to reduce the number of bad pixels.

As anticipated and shown for the previous MOS2 cooling test in revolution 448, reducing the CCD operating temperature was very successful in reducing hot pixels and defects such as the high-PHA high recurrence frequency pixels, from the micrometeoroid impacts. The number of hot pixels, determined as having a mean recurrence frequency above 1% went down from MOS1 from 98 to 38 and for MOS2 from 167 to 24, for all CCDs. And these are the one that have been flagged in the new BADPIX CCFs.

The start start validity date (VALDATE keyword) will have to be coordinated with the uplink of the new MOS bright pixel table, as soon as possible after revolution 533.



3 Scientific Impact of this Update

With the cool (-120C) CCD operations the new bad pixel tables are matching better than earlier the real hot pixels.

4 Estimated Scientific Quality

There should be no more any pixels above 1% recurrence frequency.

Besides the general low-energy noise is also severely reduced, reducing further the electronic background of the data.

One issue still need to be addressed and checked: with the CCD cooling the energy of the high-PHA hot pixels, from the micrometeoroid impacts went down. A few that were filtered by the EDU thresholding before have appeared and are now flagged. Most of the ones present before have virtually disappeared, but one ought to check if some valid X-ray event can be generated and detected at the place where there was such defects before, i.e. "holes" of 3x3 pixels flagged before with an "H" in the CCF (= "not-uplinked bad pixels), which are not flagged as such in this new release.

5 Test procedures & results

First, the start validity date of this new CCF still has to be defined. Second, an ODF from observation acquired after revolution 533 and with the corresponding new bad pixel tables uploaded on-board shall be used to properly test these CCF (iseu 16) in the future.

6 Expected Updates

Further in time, as the CCD will continue degrading some more pixels shall appear, for instance in the dramatic case of the dust micrometeoroid impacts, necessitating further updates of this CCF, to reduce TM bandwidth and raw event file sizes.