

# XMM-Newton CCF Release Note

XMM-CCF-REL-182

## Energy correction for the Extended Full Frame mode

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### 1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
EPN_CTL0014	2000-01-01T00:00:00	eFF_GAIN	3.172.5	NO

### 2 Changes

The EPIC-pn Extended Full Frame (eFF) mode showed an overcorrection for the onboard calibration source at Al and Mn energies compared to the Full Frame (FF) mode. A special calibration observation was performed in order to measure these differences for more energies using the line rich SNR Cas-A. Cas-A spectral line positions have been fitted both in FF and eFF modes. The determined ratio of the line positions are shown in Fig. 1. A smooth Boltzmann function was fitted to the ratio and implemented in the CAL (version 3.172.5.) and corresponding parameters have been added to the EPN\_CTL0014.CCF in the extension eFF\_Gain. This tuning function needs epevents-6.41

### 3 Scientific Impact of this Update

Line energy determination over the whole EPIC energy range will change by up to 0.4 % for observations performed in the Extended Full Frame mode.

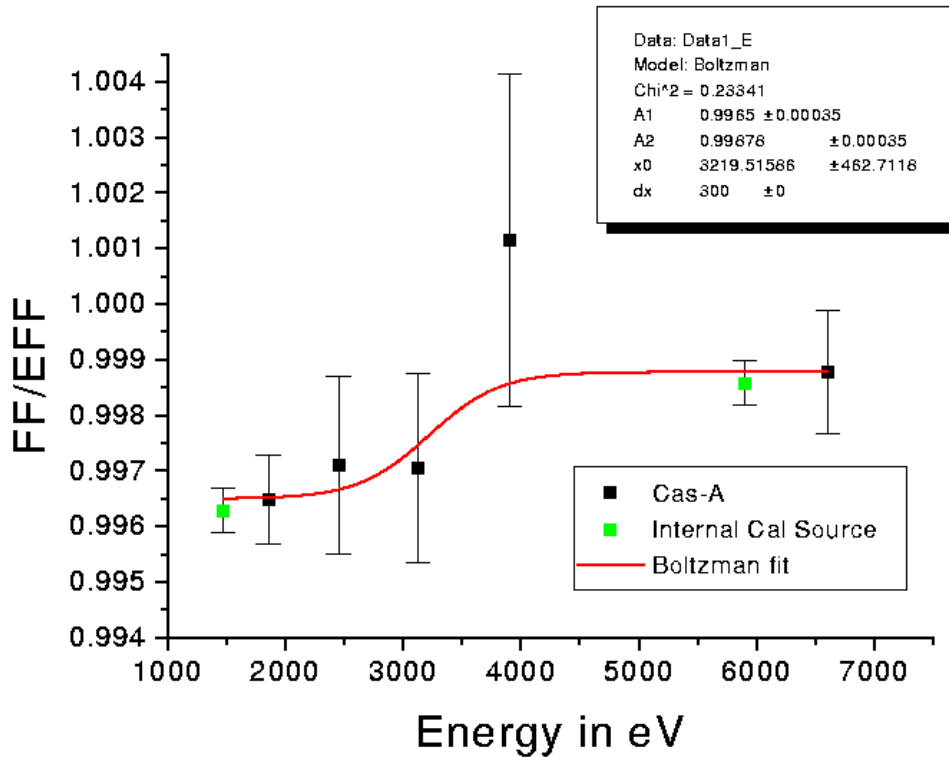
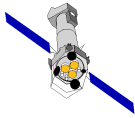


Figure 1: Gain tuning function to adjust EFF to FF gain.

## 4 Estimated Scientific Quality

The accuracy of the Extended Full Frame mode energy calibration is now supposed to be better than 0.1 % over the whole energy range. This is comparable to the accuracy in Full Frame mode.

## 5 Test procedures & results

All available CALCLOSED data have been reprocessed with the EPN\_CTI\_0014.CCF and Al and Mn line positions have been compared in FF and eFF mode. Figure 2 shows the line positions of Al and Mn for CCD4 with EPN\_CTI\_0013.CCF and EPN\_CTI\_0014.CCF.

Cas-A data for both FF and eFF mode have also been reprocessed and line positions have been fitted.

Figure 3 shows the ratio of line positions for Cas-A for eFF versus FF mode with the old and new

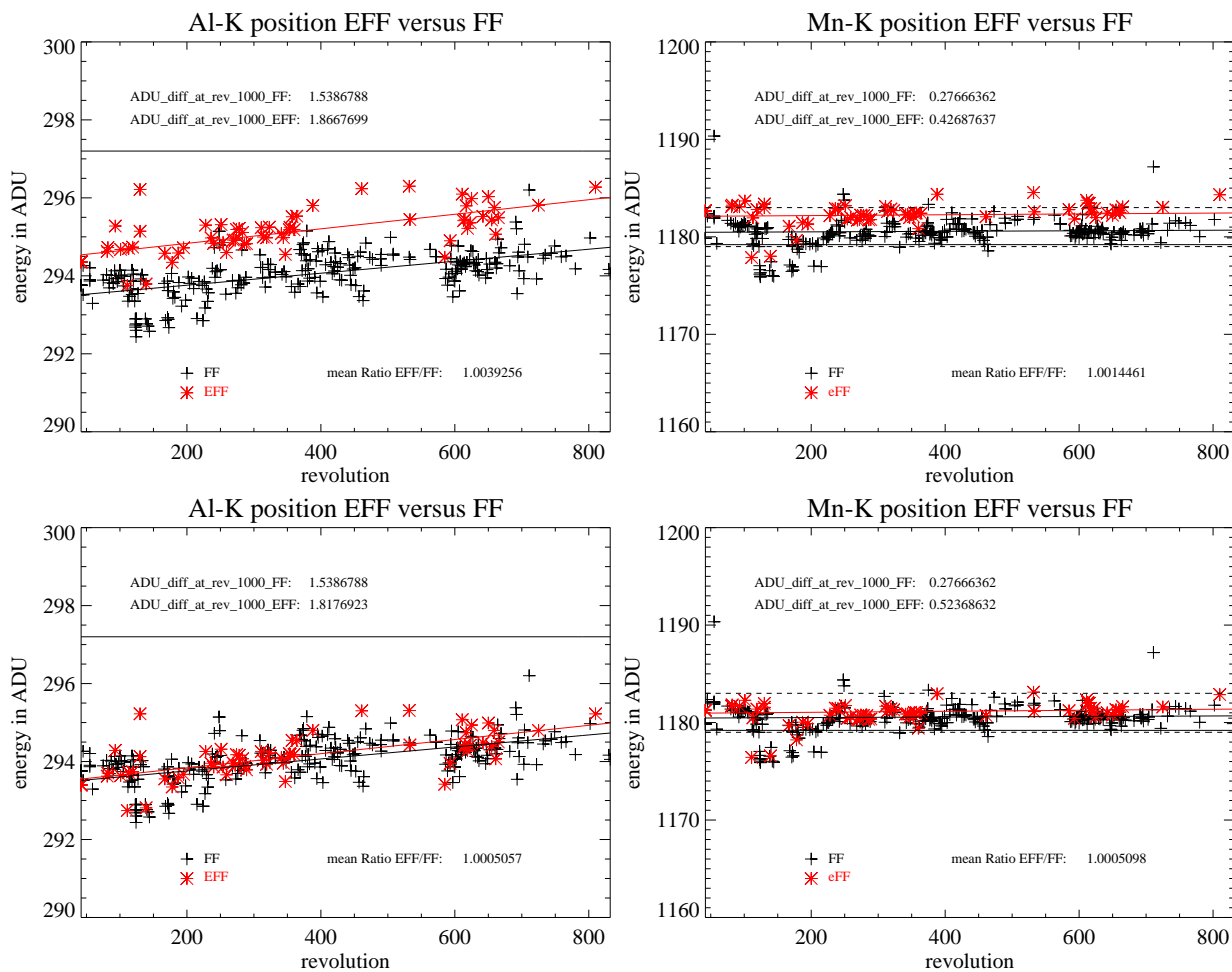
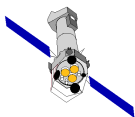


Figure 2: Line positions of the internal calibration source for old FF (black) and eFF (red) mode for Mn-K(alpha) and Al-K. Upper: EPN\_CTI\_0013.CCF, Lower: EPN\_CTI\_0014.CCF

CCF (EPN\_CTI\_0013.CCF and EPN\_CTI\_0014.CCF) in combination with the ratio of the line positions from the internal calibration source.

## 6 Expected Updates

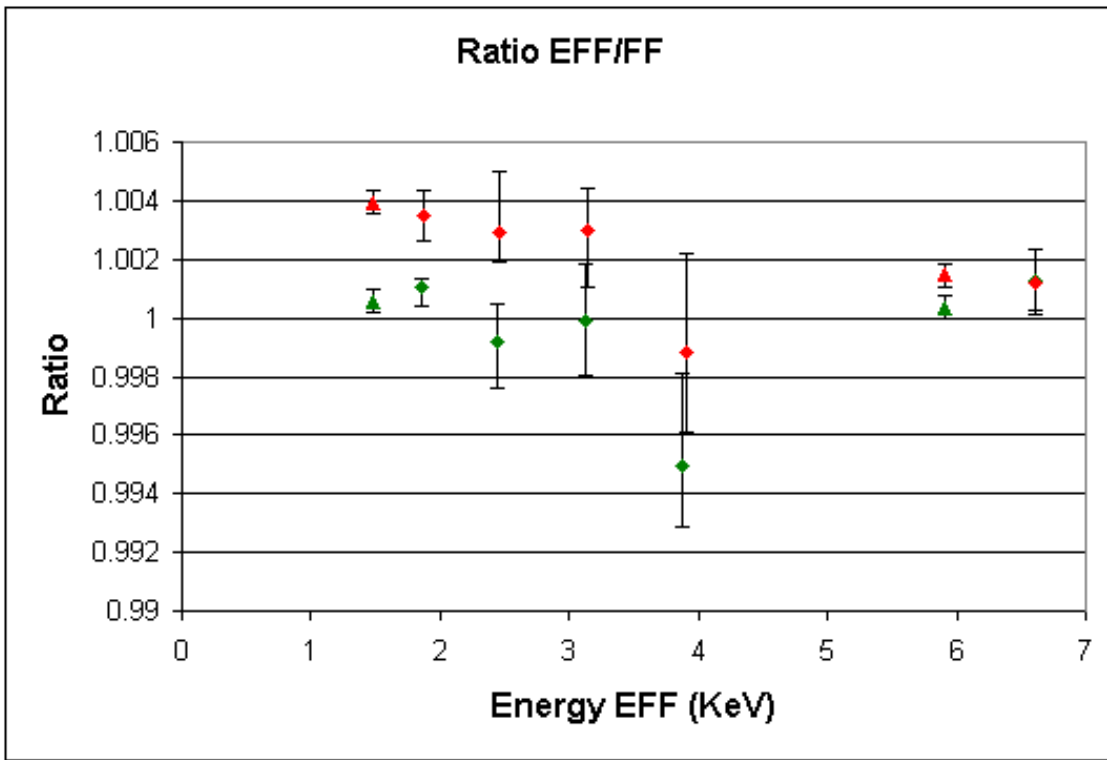
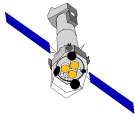


Figure 3: Ratio of line positions of Cas-A for eFF versus FF mode. Red: EPN\_CTI\_0013.CCF, Green: EPN\_CTI\_0014.CCF. Overplotted are also the mean differences between the line positions of the lines of the internal calibration source Al and Mn (triangles).