

# XMM-Newton CCF Release Note

XMM-CCF-REL-319

## Update of the RGS Gain and CTI

R. González-Riestra and C. de Vries

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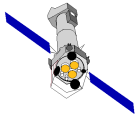
### 1 CCF components

Name of CCF	VALDATE	List of Blocks changed	XSCS flag
RGS1_ADUCONV_0025	2013-01-01T00:00:00	OFFSET_GAIN	NO
RGS2_ADUCONV_0028	2013-01-01T00:00:00	OFFSET_GAIN	NO
RGS1_CTI_0013	2013-01-01T00:00:00	CTI CTIEXTENDED XCTI CTIY1-9	NO
RGS2_CTI_0014	2013-01-01T00:00:00	CTI CTIEXTENDED XCTI CTIY1-9	NO

### 2 Changes

Last revision of the RGS Gain and CTI took place in July 2012 [1], when CCFs covering the time period since August 2007, when RGS2 started to be read through a single node, were released. The values of these parameters have now been revised by C. de Vries (SRON) using calibration observations of Capella and PKS 2155-304 taken along the last two years. PKS 2155-304 has been used in the derivation of these CCFs because Mkn 421, that was used for this purpose in the past, was not observable with XMM-Newton during this period. It will be observed regularly again starting in Spring 2015.

Serial CTI and Gain are derived from on-axis observations of Capella and PKS 2155-304. Observations of the latter displaced  $\pm 2$  arcmin off-axis in the cross-dispersion direction have been used to derive the parallel CTI.



Figures 1, 2 and 3 show the evolution of the Gain and the Serial and Parallel CTIs over the last years.

### 3 Scientific Impact of this Update

The values of the RGS CCDs Gain and CTI are used to compute the energy (PI) of each detected event. The regular monitoring of these parameters is important to verify the correct placement of the extraction masks in the Wavelength/PI plane, the separation of the spectral orders and the separation of the first order from the system peak at long wavelengths.

### 4 Test procedures & results

- The fits viewer `fv` has been used to inspect the new CCFs, their structure, validity dates and contents.
- The SAS task `cifbuild` has been run to confirm that the right CCFs version is selected.
- The observation of PKS 2155-304 in rev. 2633 (727770901) has been processed with SASv13.5 using the new CCFs. Output files have been compared with the result of the processing with the current CCFs (see Fig. 4). No significant differences have been found, as expected, given the small change in the CTI and Gain values.

### 5 Expected Updates

Both CCFs should be revised regularly to evaluate the degradation due to radiation. Observations of a bright continuum source off axis in the cross-dispersion direction must be performed every two years to monitor the parallel CTI.

### 6 References

- [1] “Recent evolution of RGS gain and CTI”, A. Pollock, XMM-CCF-REL-289, July 2012 (<http://xmm2.esac.esa.int/docs/documents/CAL-SRN-0289-1-0.ps.gz>)

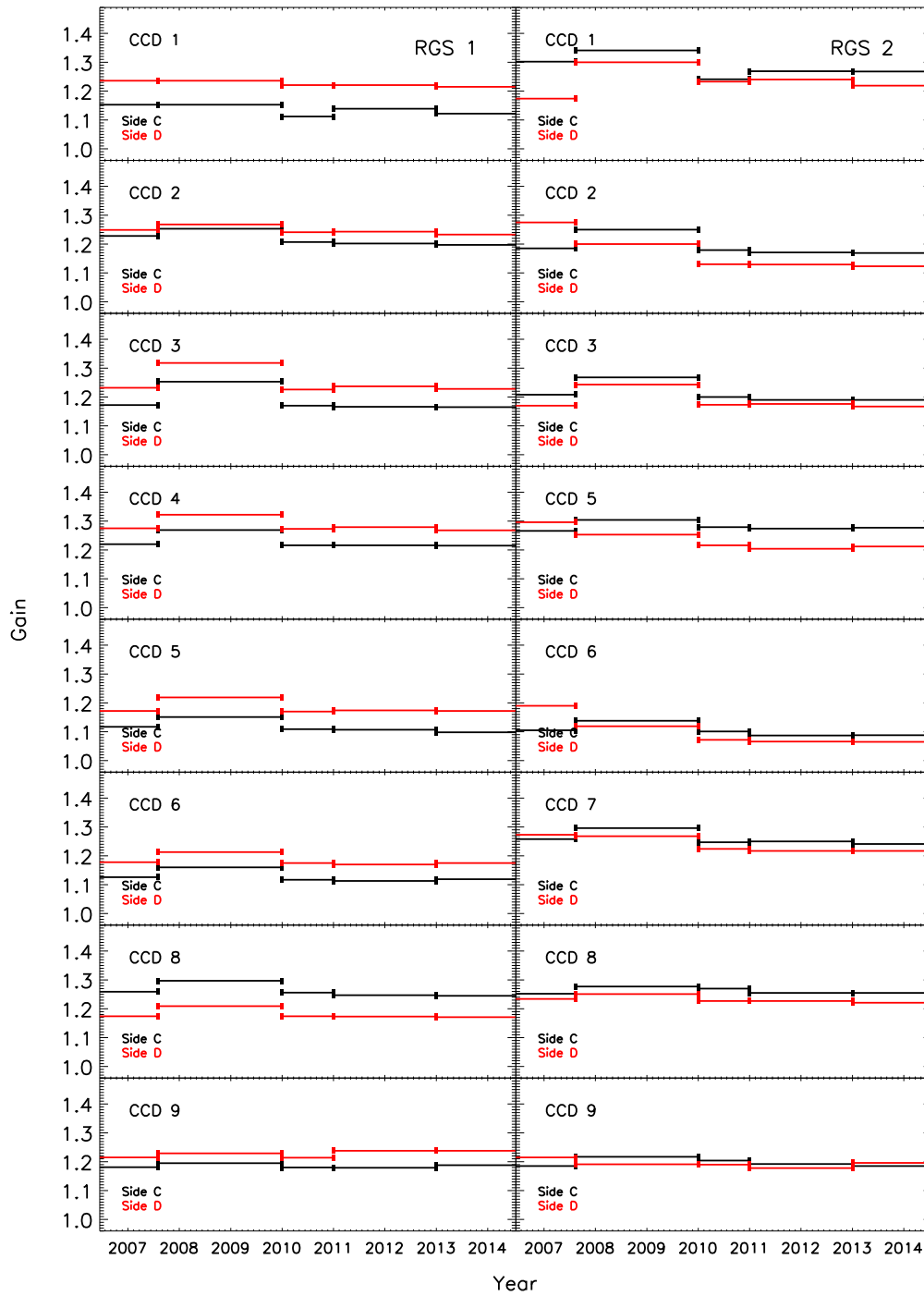
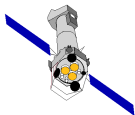


Figure 1: Evolution of the RGS Gain since 2007 (left RGS1, right RGS2). The horizontal lines mark the validity periods of the different CCF versions.

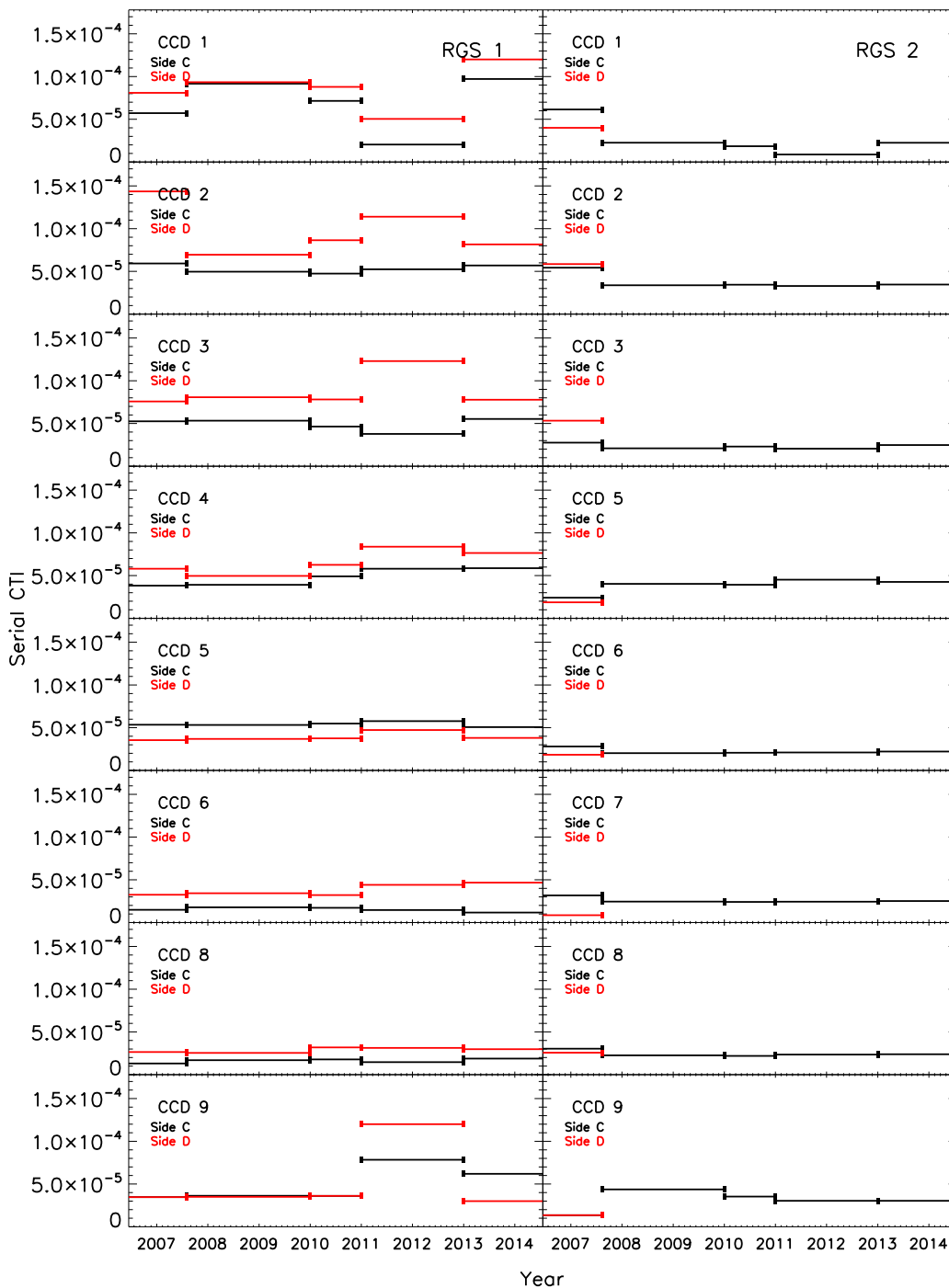
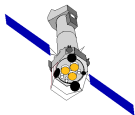


Figure 2: Evolution of the RGS Serial CTI since 2007 (left RGS1, right RGS2). RGS2 started to be read through a single node (C) in August 2007. Since then, the serial CTI for RGS2 (formerly) node D is simply the negative of the node C values. The horizontal lines mark the validity periods of the different CCF versions.

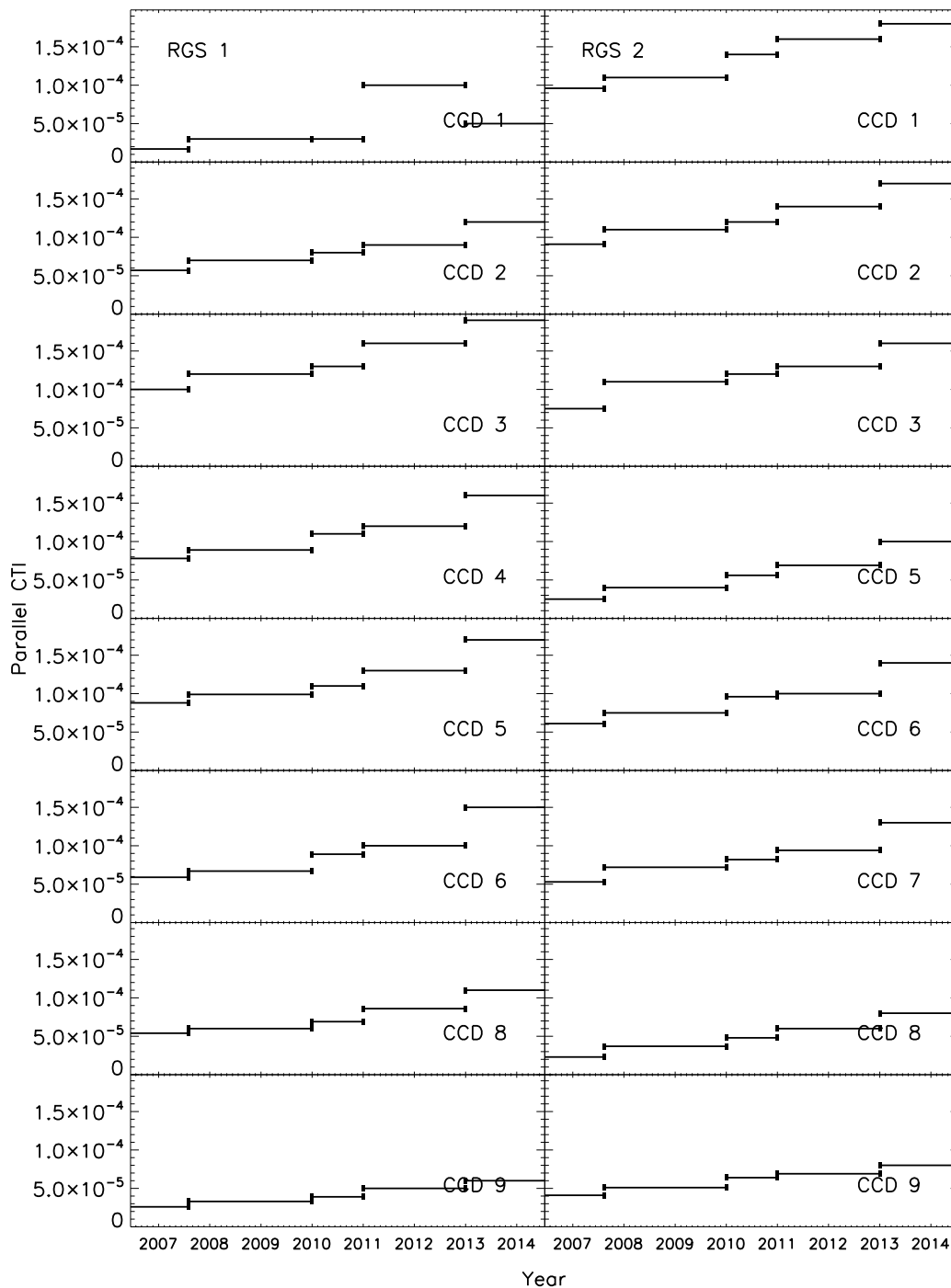
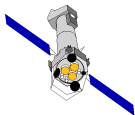


Figure 3: Evolution of the RGS Parallel CTI since 2007 (left RGS1, right RGS2). The points represented are the CTI values far from the chips edges. The horizontal lines mark the validity periods of the different CCF versions.

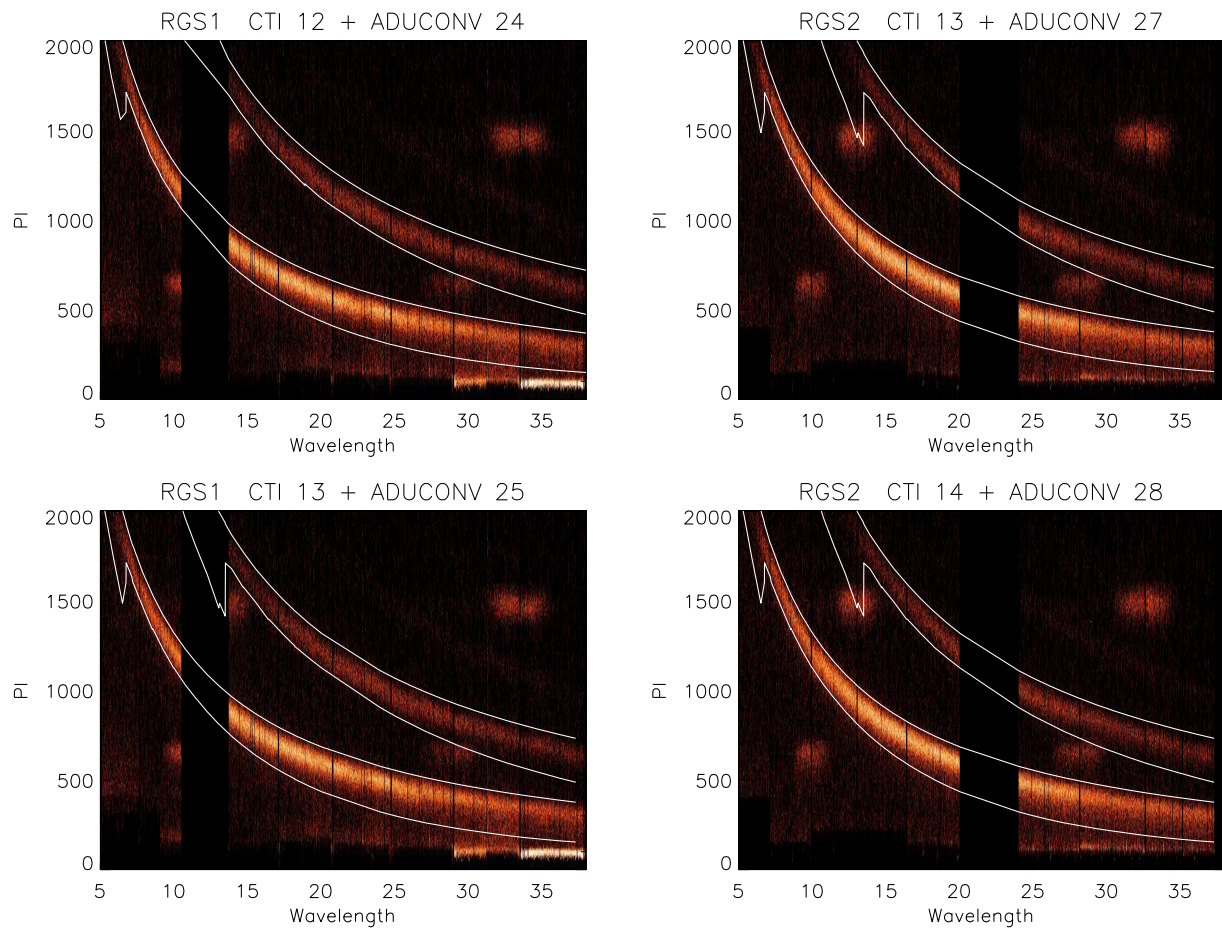
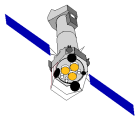


Figure 4: Result of processing the observation of PKS 2155-304 taken in rev. 2633 (727770901) with the current CCFs (top) and the new ones (bottom). The white lines are the default (95%) PI extraction regions for first and second orders.