Issues with E230: November 2011 – March 2012

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This is a brief report of problems encountered with spectra taken with E230 in the period November 2011 till March 2012.

The EMIR 230 GHz band, and also the 345 GHz band, were upgraded in early November 2011, installing sideband separating mixers offering 8 GHz per sideband in both polarisations. After a short commissioning period (Kramer et al. 2-Dec-2011), regular observations started again in mid-November.

In February 2012, observers have encountered spurious signals and calibration problems in the spectra taken with E230 which are summarized below. During a period of two weeks, 23-Feb till 10-March, we hence stopped offering E2 to the astronomers. After improving on the tuning table and parts of the EMIR control software, we started to offer E2 again to the community. Since then, E2 works without major problems.

Below, we briefly describe the problems seen between November and February, to inform the community. Observers are advised to reduce data of both polarisations separately and check for differences.

- 1. Wrong intensity calibration. This has been noted in spectra of the vertical polarisation, taken in February 2012, and has been reported for sky frequencies above 250 GHz (cf. Fig. 1).
- 2. Ghost lines show-up in some spectra of the vertical polarisation. They have been reported for frequencies above 250 GHz (Fig. 2). Ghost lines appear to be spaced by 168 MHz. Changing the mixer bias sometimes helps to get rid of the ghost lines.
- 3. Spurious signal of about 100 MHz width (Figs.3,4). This feature is infrequently seen in the spectra and was already noted during commissioning in November.
- 4. Strong excess noise. This showed-up repeatedly in observers spectra near 224 GHz, e.g. Fig. 5, and is also seen in the bandpass of the horizontal polariation (Fig. 6). Changing the attenuator settings did not help.



Figure 1: Wrong intensity scale: 19-Feb, E2, 272.0GHz Fsky. The vertical polsarisation shows reduced line temperatures. From OCS report by N.Biver, 135-11.



Figure 2: Ghost lines: 15-Feb, E2, 254.1GHz Fsky. The vertical polsarisation shows reduced line temperature and ghost lines. From OCS report by N.Biver, 135-11.



Figure 3: Spurious signal: 15-Nov-2011, E2, 230.5 Fsky. Vertical Polarisation. From the commissioning report Nov-2011.



Figure 4: Spurious signal seen in the bandpasses: 30-Nov-2011, E2, 230.5 Fsky. Vertical Polarisation.





Figure 5: Excess noise: 17-Feb, E2, \sim 224GHz Fsky. This was seen with the FTS and with WILMA. From Aod report by CB and project 195-11. It hindered the frequency survey done during this period.



Figure 6: Excess noise is also seen in the bandpass of the horizontal polarisation.

References:

• C.Kramer, S. Trevino, M.Gonzalez, G. Paubert, F.Damour, C.Buchbender, N. Billot, S.Navarro, "EMIR commissioning after the upgrade of bands 3 and 4 in November 2011", 2-Dec-2011 (see EMIR home-page)