Amplitude Calibration

Giuseppe Cimò, JIVE
April 25, 2008

Amplitude Calibration

What's going on at the telescopes?

`tpical` = BBC power levels when the cal diode is fired.
`tpi'` = BBC power levels without the cal diode, but measured close in time to the firing of the cal diode.
`tpi` = BBC power levels monitored during the scan.
`tpzero` = BBC power level when maximum attenuation is on.

`tpical` and `tpi'` are typically measured at the beginning/end of scans.
The difference `(tpical-tpi')` is used to derive the conversion factor from `tpi` level to T_{sys} .

The T_{sys} is given by the expression:

$$T_{\rm sys} = T_{\rm cal} \times \frac{\rm tpi - tpzero}{(\rm tpical - tpi')}$$

where T_{cal} is the temperature of the calibration diode (read from the RXG file).

The RXG file contains the values of the T_{cal} for each receiver as function of the frequency and they are measured during *ad hoc* experiments. The `tpi`'s values are read from the Field System log file.
The Tsys is therefore calculated using the script *antabfs.pl* (run at the stations).

Amplitude Calibration

What do we do at JIVE?

• We receive the antab files produced at the station **TWO** weeks after the session …*more or less on time.*
(In case of e-EVN experiments, the antab files are usually sent shortly after the experiment.)

• The ANTAB files from the antennas are checked for obvious inconsistencies. In case of problems, we communicate with the antenna's *VLBI friends.*

• When everything looks fine, we pipeline the data after the post-correlation operations (i.e. after releasing the FITS files to the PIs).

What should the PI do?

•Download the ANTAB file for the experiment from the JIVE archive and apply the calibration to the data.
or
•Copy the CL2 table from the TASAV file (on the JIVE archive) to the multi-source file.

• Check the amplitude calibration.

• *Please, enjoy your data!*

Calibration Accuracy

How about the overall calibration of the EVN?

The EVN is healthy! *…though improvements are always possible.*
NME experiments and ftp tests are important to spot on-the-fly problems and issues at the stations. (VoIP conversations)

Strong communication and two-directional feedback between JIVE and the antenna's *VLBI friends.* (Pipeline results, NME reports, TOG meetings, EVNTech)

• At L-band, RFI remains the major source of errors. Calibration at this frequency is quite variable with occasional experiments having quite large errors. However, most L-band experiments give good results. *We are working on a system to monitor the RFIs at the different antennas.*

• Weather
• Cm does not provide T_{sys} monitoring *(in progress)*
• Jb Mk2 does not provide T_{sys} at K-band *(under investigation)*
• *antabfs.pl* always improving (MK5B T_{sys} from the logs)

• **Next step and in progress: Opacity corrected gain curves (mainly at K-band)**