DBBC2 PFB: FULL 512 MHz BAND magnitude bit setting and control

G. Tuccari 11.05.16

The full band mode requires preliminary settings to control the output data statistics. Moreover due to verified low amplitude zero-baseline correlations it is worth to include a preliminary check to verify the proper operating status. The following procedure is recommended before any observation at the start-up of the DBBC2 configured in PFB mode.

After having run the latest firmware and software version and then having the system calibrated and configured for PFB modes, still maintaining the default channel assignment with 15 output channels, a preliminary check is to verify if normal conditions are verified.

Similarly to the calibration procedure, using the filter 2 (0-512 MHz) introduce in each CoMo a tone from a frequency synthesizer at 130 MHz, -15 dBm, and verify that with the 'power=1|2|3|4' command the presence of such signal is seen in a single channel (the fourth).

A possible ghost signal at a significant lower level is normally visible at the symmetric channel from the higher band edge. If the ghost channel presents an amplitude similar to the main one, an anomalous synchronization between the sampler and the processing board affected the system and it's necessary to re-run the configuration process. This is normally solving the issue. Having this status verified the full mode can be selected and then proceed to the statistics setting, which requires some preliminary adjustment.

In the PFB configuration indeed there are two parameters affecting the statistics of the data output in 'full band', depending it on the input power levels: the selection of the magnitude bit and CoMo total power control. A simple procedure is described here.

1) Select full band mode with the command **dbbcform=full**

2) Select the input band for each IF using the regular command **dbbcif(a|b|c|d)**=…. adopting the default total power target value as set by the configuration text file .

3) Test the data statistics from a short recorded file as it is (using the 'bstate' tool from Haystack or any other method). The measured statistics will be divided in the 15

channels showing overall similar results, and the actual full band statistics will be an average of them. A single channel is then representative of the full band.

4) By default the magnitude bit selection is set as bit3 because for the power levels normally used in PFB mode such value accompanied by the total power target in the CoMo allows to control the statistics with sufficient accuracy. Here below a rule in case it would be needed to modify such default state.

Type the command **reg=core2#,6,value**

where **value = 16 * *K* + 4**

K
7 <= bit7
6 <= bit6
5 <= bit5
4 <= bit4
3 <= bit3 < default
2 <= bit2
1 <= bit1
0 <= bit0

5) Using the **dbbcif(a|b|c|d)**=input_ch,attenuation,filter,**target_agc_value**
slightly modify the target value until you get the needed 18%,32%,32%,18% statistics, repeating the recording/bstate evaluation. Such value can be left to control in AGC the proper statistics. Could be indication of very wrong settings (calibration, levels) or RFI in band.