DCR Stability Monitoring of X-band Receiver
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1 Setup

The DCR was used to record the total power from the X-band (Rcvr8-10) receiver, as detected in the IF Rack. The center sky frequency was 9GHz. IF Rack 3000/320MHz filters were selected. DCR $tau = 1s$, $ScanTime = 300s$, $BlankingTime = 2mS$, and switching mode Total Power with Cal were used. Only ten minutes was available for this test. Weather conditions were light snow, temperature 21F, and winds of 5-10mph. M&C version 3.9 was active.

2 Measurements

The system was configured so that the receiver IFs were connected to Optical Driver modules 6 and 8. The corresponding Optical Receiver outputs were then connected through two independent Converter and Sampler/Filter module paths. Data from detectors in the ODM and SF modules was recorded by the DCR.

Connections:
X-L → ODM6 → OR6 → CM11-12 → SF3-4 → DCR ch11-12
X-R → ODM8 → OR8 → CM15-16 → SF7-8 → DCR ch15-16

The GBT was set to track approximate RA 06:50 and Dec 56:50, placing elevation near 50 and azimuth near 40.

Scan 32 st@ 01:21:51 → Scan 33 fi @ $\tilde{0}$1:31.

Discussion: Figure 1 shows the total power during scans 32 and 33. Both channels exhibit fluctuations of a few percent. Figure 2 shows the receiver T_{sys}/T_{cal}.

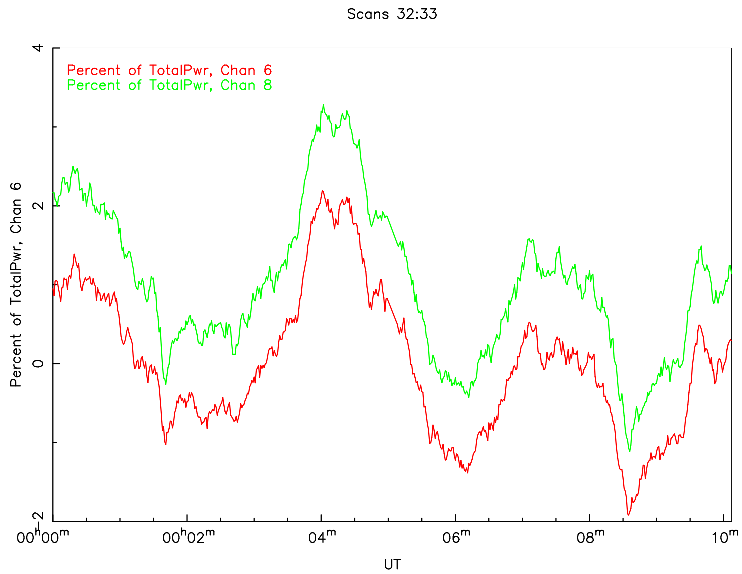

Figure 1: Total Power from X-band channels L (red) and R (green), as measured at detectors in ODM 6 and 8. The GBT was tracking at sidereal rate.

3 Summary

Total power data was recorded for ten minutes from both channels of the X-band receiver. Could this be atmosphere? This behavior is similar to that seen this evening using the Ku-band receiver. If it is due to cryogenic receiver temperature fluctuations, it would have to be due to variations less than 1K. Figure 3 shows the receiver cryogenic temperature for the test period.

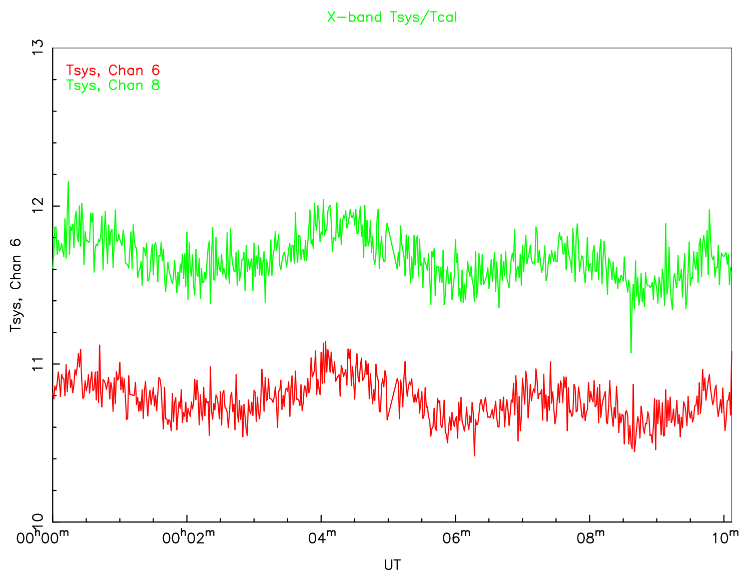

Figure 2: T_{sys}/T_{cal} for the Xband receiver. The green trace (R channel) is offset up one unit for clarity.

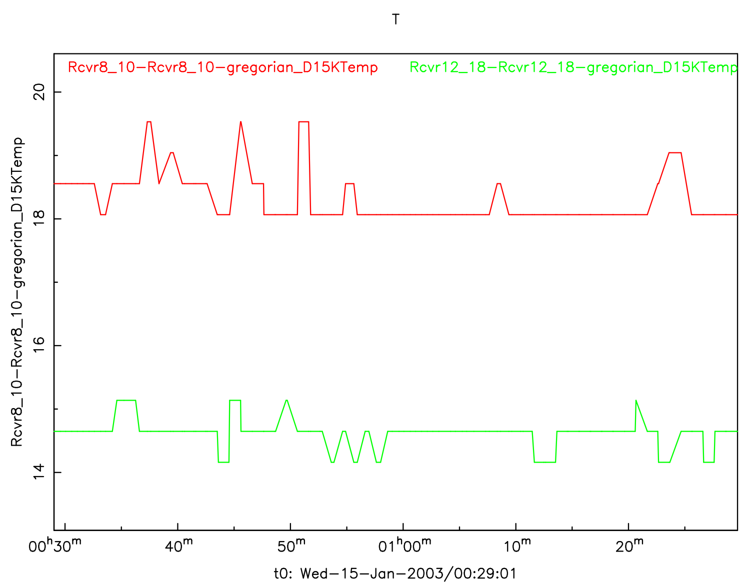

Figure 3: Cryogenic temperatures as measured near the receiver LNAs. Data in Figures 1 and 2 was taken during the last ten minutes of this plot.