DCR Stability Monitoring of X-band Receiver Project TBASErdn030121 January 21, 2003

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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 and in the Analog Filter rack. The center sky frequency was 9GHz, and front-end IF 500MHz filters were selected. IF Rack 3000/80MHz filters were selected. Both circular polarizations were recorded.

DCR $tau = 1s$, $ScanTime = 120s$, $BlankingTime = 2mS$, and switching mode Total Power with Cal were used. Weather conditions were clear, temperature 15F, and winds of 5-10mph. M&C version 3.10 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. 200MHz filters were selected in the SF modules. Data from detectors in the ODM and SF modules was recorded by the DCR.

Connections:
X-L → ODM6 → OR6 → CM9-10 → SF1-2 → DCR ch9-10
X-R → ODM8 → OR8 → CM13-14 → SF5-6 → DCR ch13-14

DCR channels 6, 8 , 9, 10, 13, and 14 were recorded.

The GBT was arbitrarily set to track RA 03:30:45; Dec 31:28:25. Initial elevation and azimuth were approximately 75 and 112 degrees.

Scan 54 st @ 23:43:28 → Scan 68 fi @ 00:15:22.

Discussion: Figure 1 shows the total power detected at the IF Rack. Figure 2 shows the total power for channel L as also detected in the Analog Filter rack.

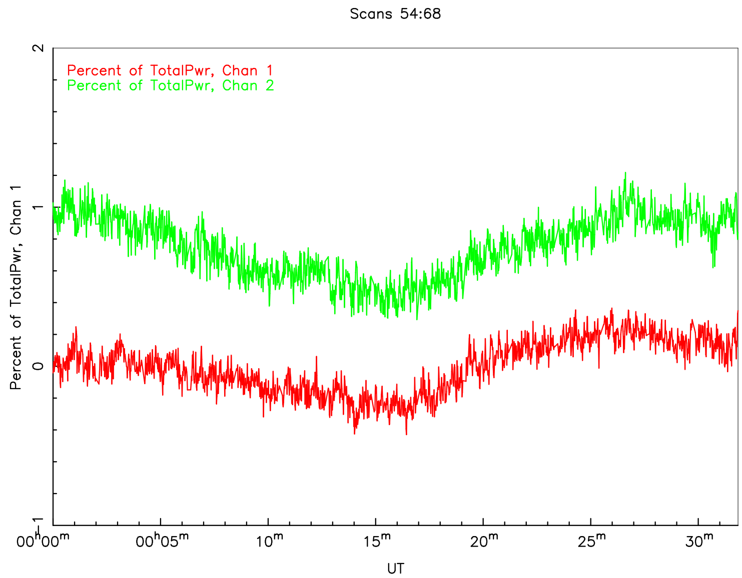

Figure 1: Total Power from X-Band channels L (red) and R (green) as measured at detectors in ODM 6 and 8. The green trace is offset by 0.75% for clarity.

Figure 3 shows the total power for channel R as also detected in the Analog Filter rack. It can be seen that fluctuations are correlated across the polarizations, and fluctuations prior to the IF Rack dominate.

Figure 4 shows the T_{sys}/T_{cal} for both polarizations. The published T_{cal} values for L and R channels are 2.74K and 2.66K, indicating measured T_{sys} of 28K and 26K respectively.

3 Summary

Total power data was recorded for thirty minutes from both polarizations of the X-band receiver, as the GBT tracked what appeared to be cold sky. Nothing remarkable was seen.

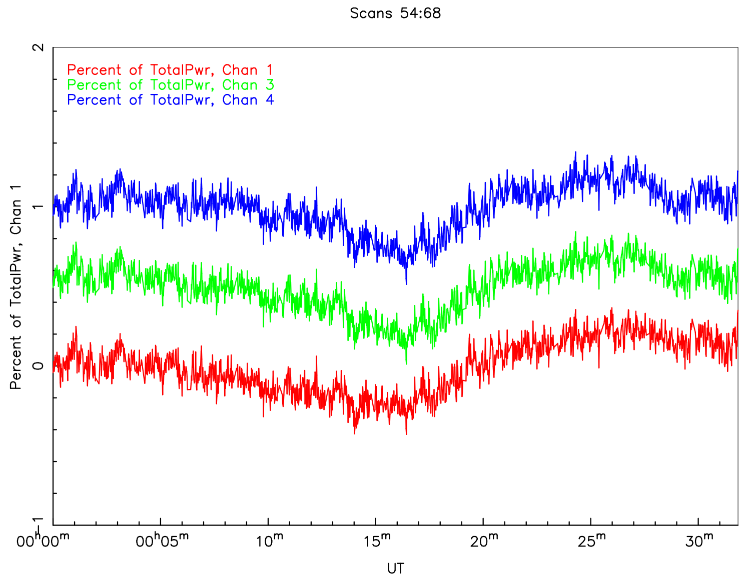

Figure 2: Total Power from X-Band channel L as measured at the ODM 6 (red), SF1 (green), and SF2 (blue) detectors. The traces are offset by 0.5% for clarity.

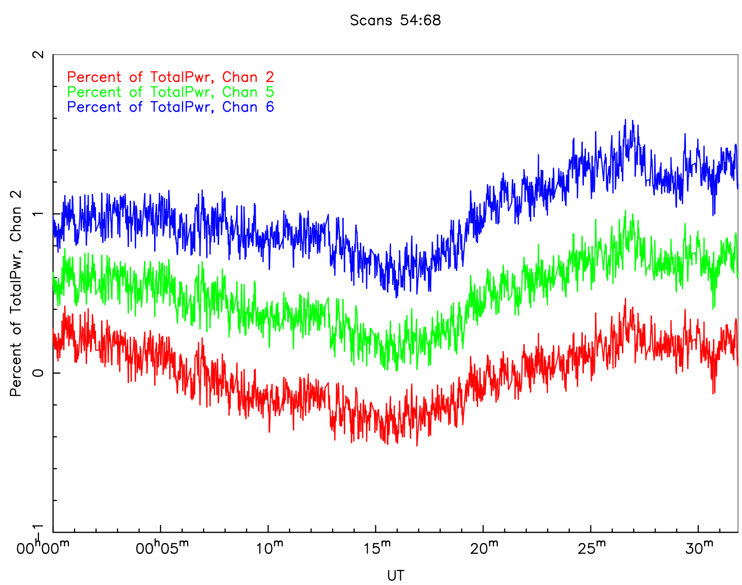

Figure 3: Total Power from X-Band channel R as measured at the ODM 8 (red), SF5 (green), and SF6 (blue) detectors. The traces are offset by 0.5% for clarity.

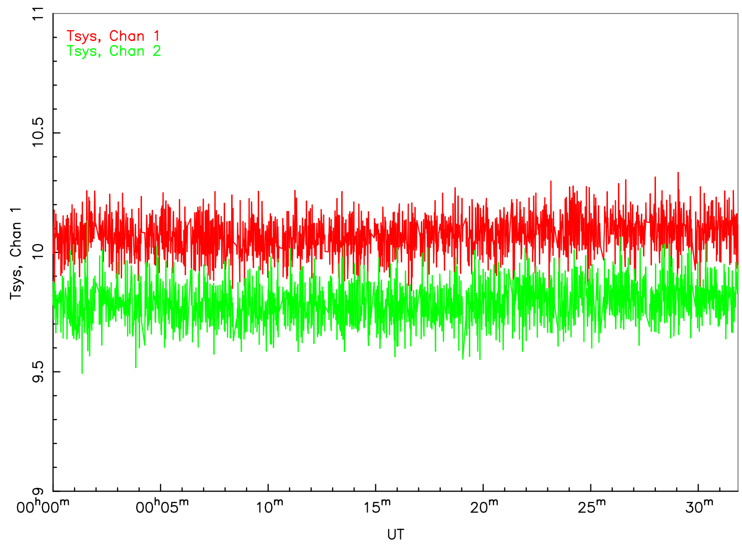

Figure 4: T_{sys}/T_{cal} from X-Band channel L (red) and R (green) as measured at the IF Rack detectors.