Subject: RE: K-band receiver noise characterization
From: "Horiuchi, Shinji" <shoriuchi@cdscc.nasa.gov>
Date: Tue, 8 Oct 2013 15:55:05 +1100
To: "Olin, Timothy R" <TOlin@cdscc.nasa.gov>, Tom Kuiper <kuiper@jpl.nasa.gov>
CC: "Baines, Graham P" <GBaines@cdscc.nasa.gov>

Hi Tom and all,

I made some quick look plots for Tim's ACME-PM data (for Beam-1&2 Pol-1/Low) using only 1st column of the data and saw a significant difference in signal stability. See 1st and 2nd of the attached plots (note I needed to split the data into two plots to cope with PM/AM time). It looks Beam-1 power (Ch1, red) was going off in time while Beam-2 (Ch2, green) was stable. When we started we set Beam-2 attenuation (attenuator-3) fixed and adjusted only that for Beam-1 (attenuator-1) to match the signal level.

Could it be atmospheric change affecting more to Beam-1 than Beam-2 because we optimised sub-reflector position for Beam-1, or just receiver gain instability? Your detail analysis for Allan variance etc. using all the data may able to tell what's happening here.

Also attached are squarelaw detector data for (Beam-1&2 Pol-2/Low), which unfortunately I don't have much confident because of various issues. I first ran this at 2Hz mode after adjusting attenuators at backend before the squarelaw detector. Then later I saw the Ch1 power is getting up and I adjusted the D/C attenuator for Beam-1 (attenuator 2) at around 23:48z. There was also a squalaw detector failure around 00:05z and I needed to restart it. Then at 01:15z I restarted it at 100Hz mode and ran for the next 10 minutes. Then I realised that the squarelaw detector frequency range should have been 0~200 MHz, according to the Document TP513583, while I was using bandpass filters for 200-500 MHz! I tried to set up patching for correct configuration but ran out of time. The squarelaw plots attached are not accurate but shows some trends. It looks Beam-2 power (green) shows the similar power declining as the ACME-PM Beam1 data. The Beam-1 power (red) shows some fluctuation, which is hard to understand.

We might better do some gain stability test with ambient loads as well although I think we have done that before.

Cheers,
Shinji.

-----Original Message-----
From: Olin, Timothy R
Sent: 2013/10/08 Tue 14:17
To: 'Tom Kuiper'
Cc: Baines, Graham P; Horiuchi, Shinji
Subject: RE: K-band receiver noise characterization

Hi Tom,

Attached are the log files from today's effort.

The '43_HxP1L_CHx' files are from the start before we were able to rotate the subreflector to the correct position, while the ones with '_SR' on the end are after it was correctly moved. The 'x' in the filename is either 1 or 2 and refers to the horn/beam.

ACME only records power meter readings to 2 decimal places, with about 100 readings every second. We normally just average the 1 second's worth of data if we're not looking for sub-1 second changes. The date format is US-style and the time is UTC.

Let me know if this is what you were after and/or expecting?

Regards,

Timothy Olin

From: Horiuchi, Shinji
Sent: Tuesday, 8 October 2013 11:26 AM
To: Tom Kuiper
Cc: Olin, Timothy R; Baines, Graham P
Subject: RE: K-band receiver noise characterization

Hi Tom,

This morning we managed to rotate sub-reflector R/y/z and started data recording after reasonably fine attenuator adjustment. We are recording Beam1&2 Pol-1/Low outputs to ACME power meters and Beam1&2 Pol-2/Low outputs to squarelaw detector for about a couple of hours. The weather here is fine with clouds at some part of the sky.

By the way, did you mean to address your original email to David Rodstad, or rather to Dave Rochblatt?

Cheers,

Shinji.

From: Tom Kuiper [mailto:kuiper@jpl.nasa.gov]
Sent: Saturday, 5 October 2013 4:44 AM
To: Olin, Timothy R
Cc: Teitelbaum, Larry; greenhill@cfa.harvard.edu; Baines, Graham P; Horiuchi, Shinji; Rogstad, David
Subject: Re: K-band receiver noise characterization

On 10/03/2013 09:55 PM, Olin, Timothy R wrote:

We've had a look over the proposed approach, one issue we'll have is that we can only get the power levels to within 1dB of each other through ACME.

Dear Tim,

we have control if the K-band IF levels to about 0.01 dBm in the K-band down-converter. Ashish and Shinji know how to set the PIN diodes using remote access to the down-converter. I can also do it from here but that would be a little more awkward as you tell me the power levels and I adjust the PIN diodes.

Our plan for Tuesday is to setup the test in the morning and let it run through the half day maintenance period. I can then collect and forward the ACME readings to yourself that afternoon. The current weather forecast is 'partly cloudy', so hopefully there'll be some clouds around to get your ideal situation.

That sounds excellent!

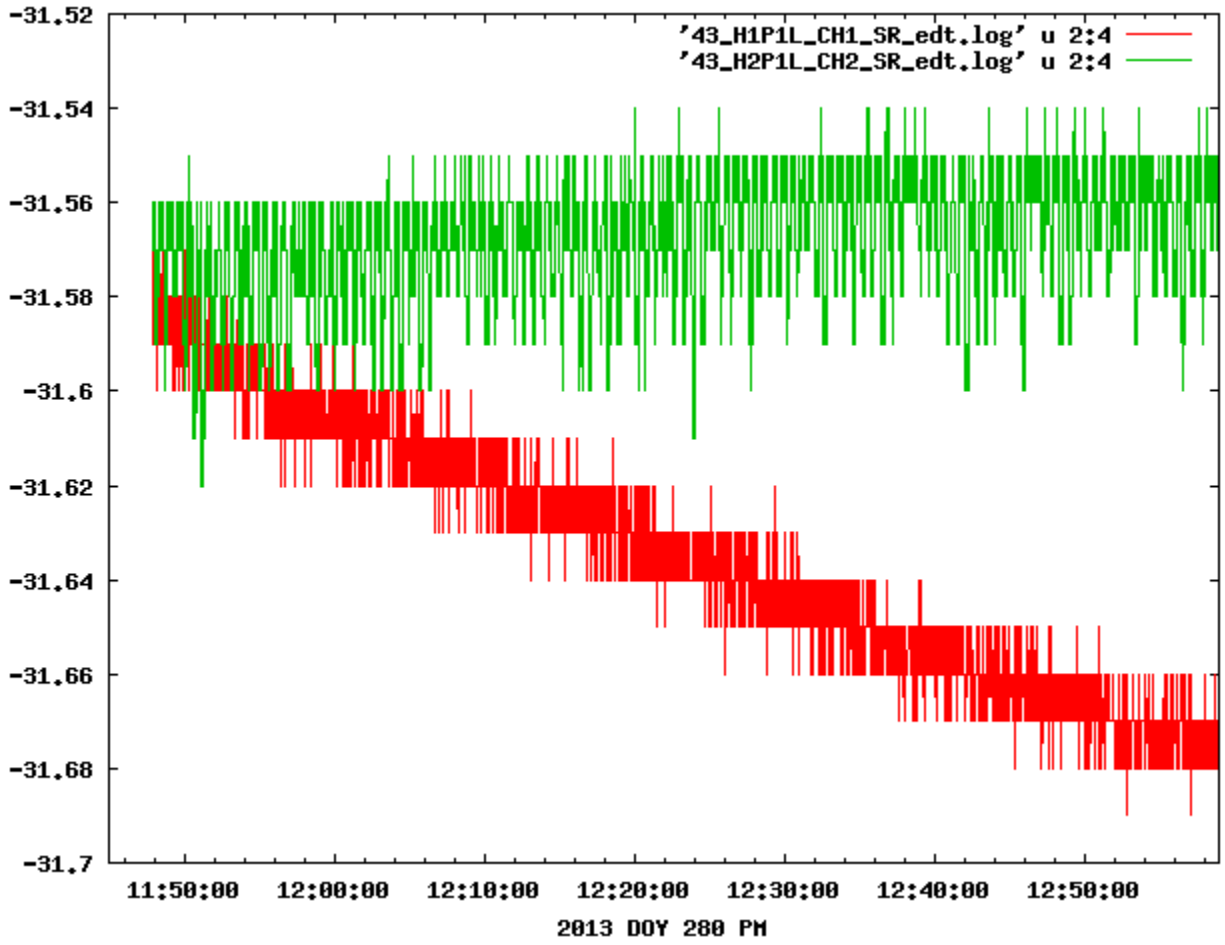
Please confirm that you would like us to proceed and measure the system temperature as described above, or that you would want us to revert to power measurements with the above mentioned constraint.

Please record ACME power levels but adjust the down-converter PIN diodes first as per the above.

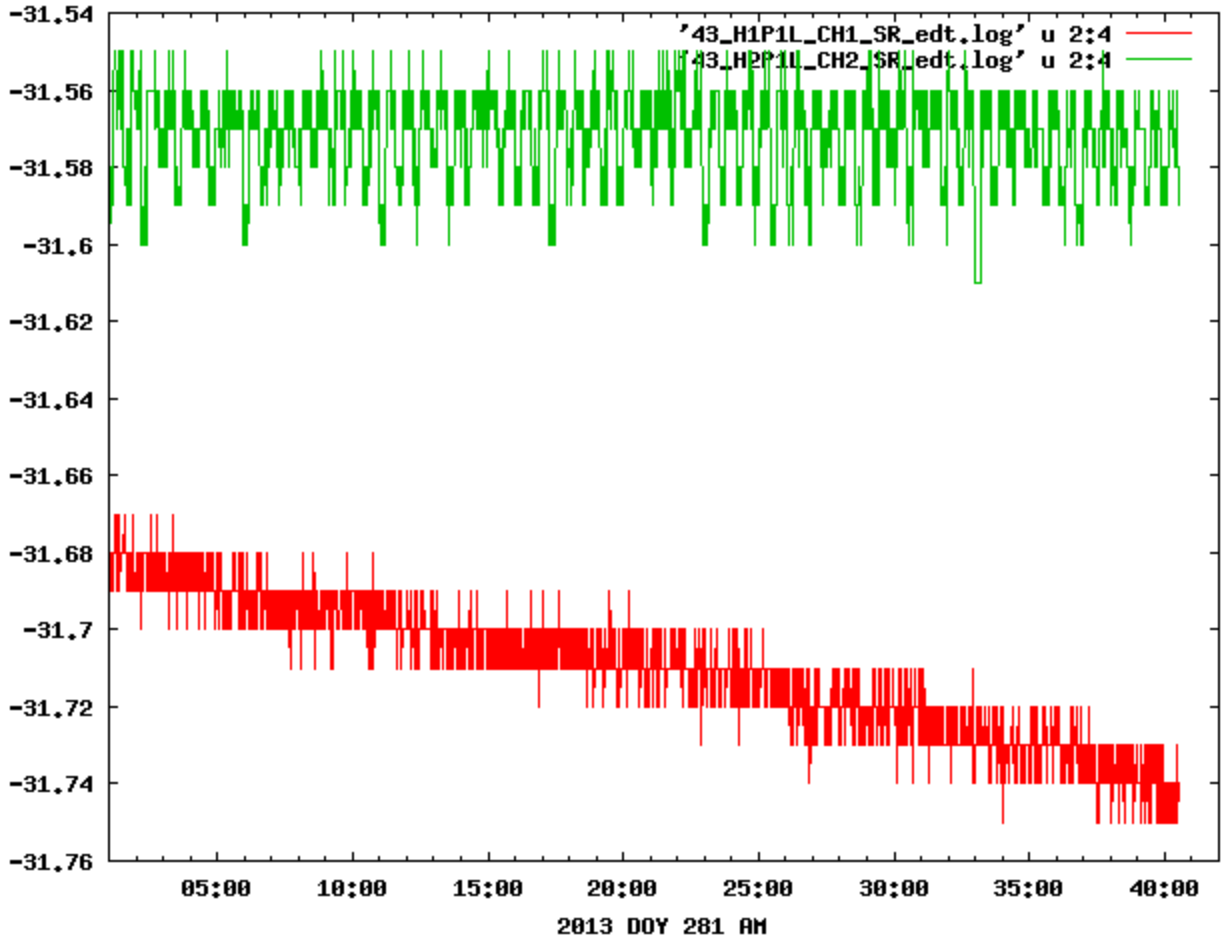
Thanks very much!

Tom

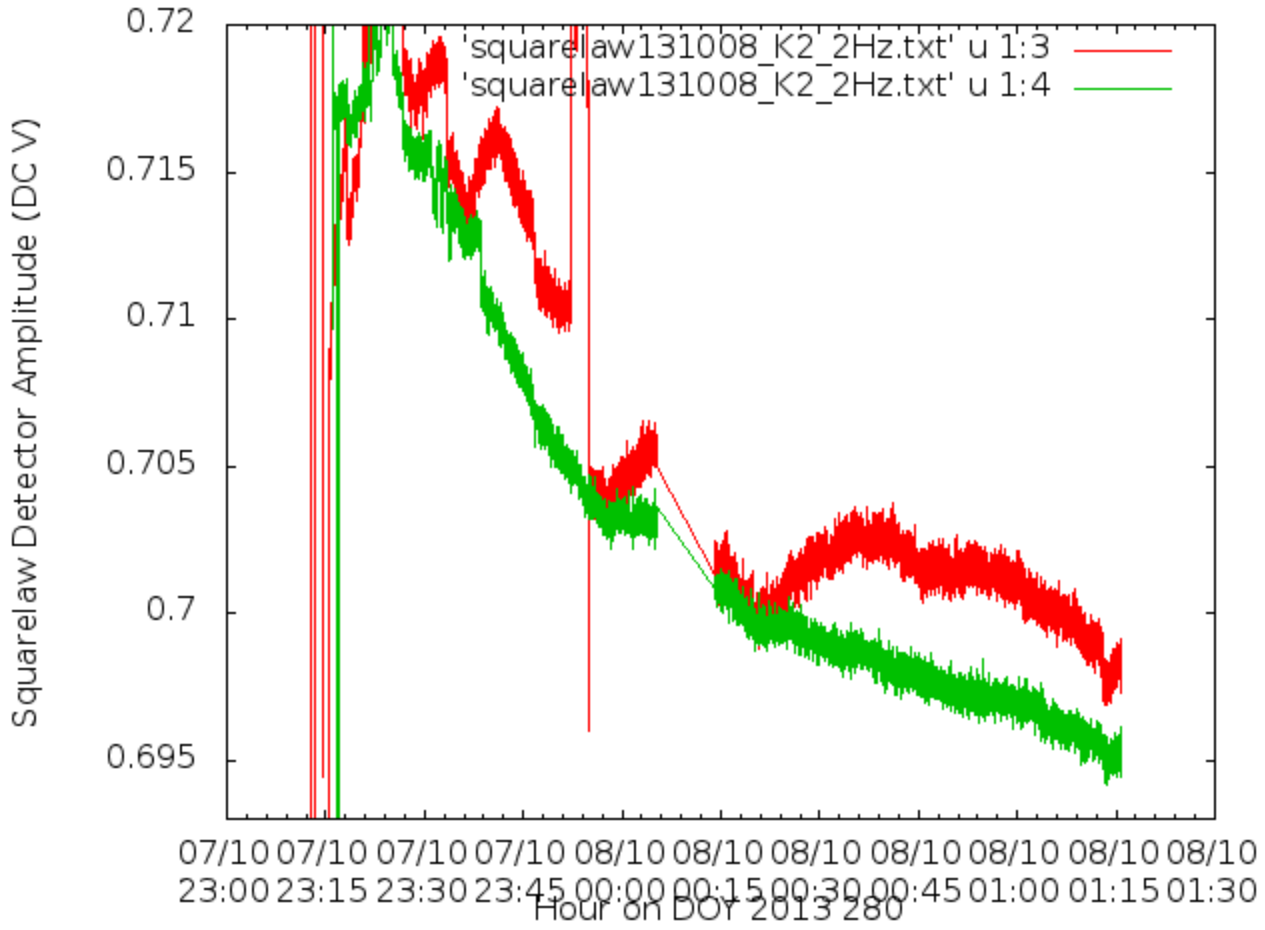
43_ACME_SR_edt_1.png



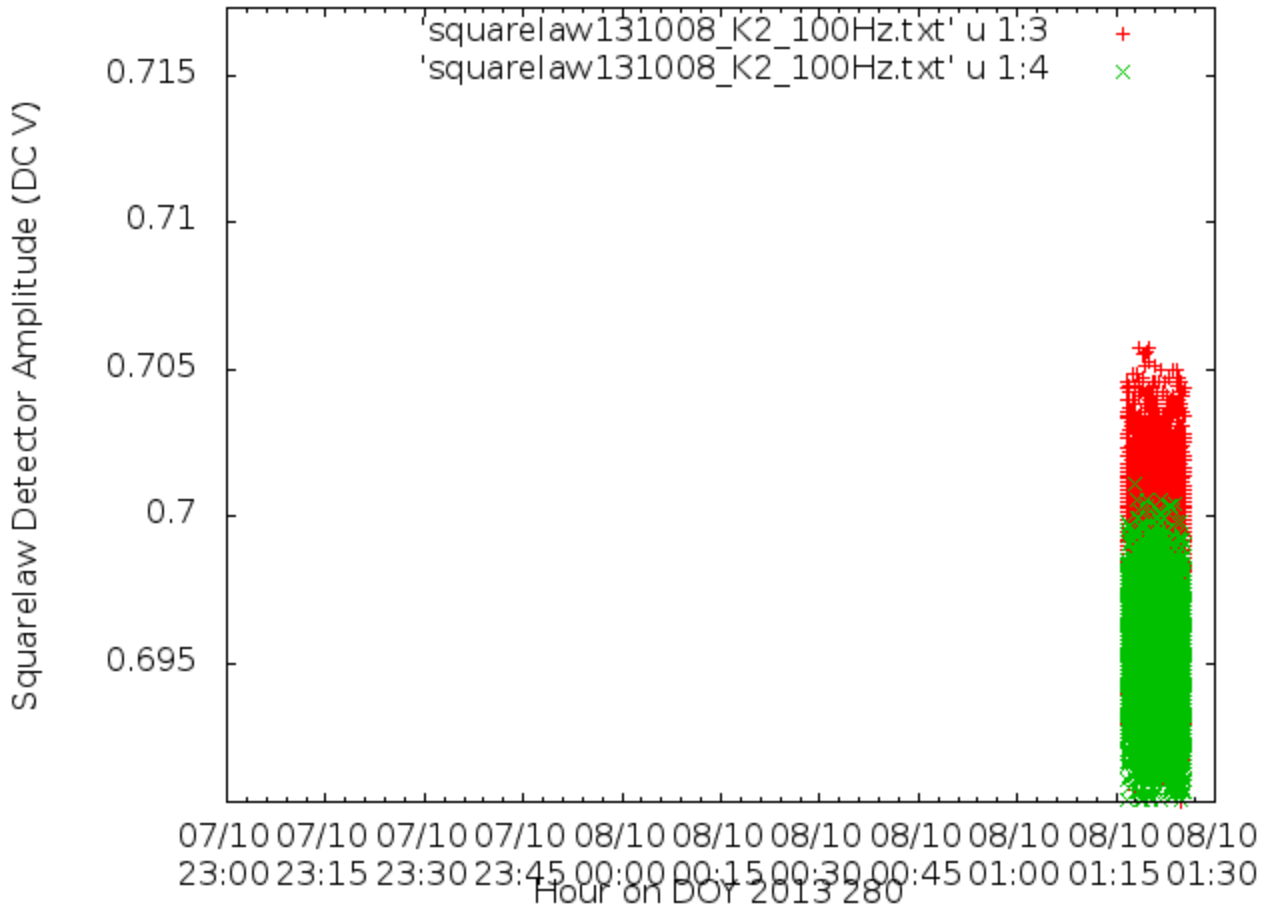
43_ACME_SR_edt_2.png



squarelaw131008_K2_2Hz.png



squarelaw131008_K2_100Hz.png



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