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To: EDGES Group  
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Subject: Minor changes to increase EDGES accuracy

1] Data with LNA connected to an open by setting the VNA switch to “measure antenna S11” but with the VNA turned off.

This allows us to check for changes in the receiver calibration whenever the antenna S11 measurements are made in the field. When compared with “open” reference data taken in the lab.

2] Open and (shorted) balun S11 in the field when second low band antenna is installed

If possible take antenna S11 data with the top cap removed and center conductor shielded with shipping pipe and (center conductor shorted). Shorting with top cap is also possible – as in memo 210 – but take care not to pull too hard on center conductor.)

3] Added thermistor to measure temperature gradient in receiver.

4] Lower noise with more efficient processing – work being done by Judd. To preserve compatibility (see memo 230) with current calibration multiple blocks of the same number of samples (and windowing) as used in calibration should be written out for each position of the switch rather than speeding up the switch rate. For example, in the case that twice as many samples can be processed this same time as in calibration two blocks of data should be written out for each switch position and the two three position calculations are then obtained for each three position cycle each with the same noise bias as in the calibration. The compatibility should be tested in the lab with the next receiver, which is currently under construction. I suggest files written in new processing modes have different letters following the “.”. i.e. \*.acq2.

The inclusion of a spectrum looking at the open part of the VNA S11 switch provides a sensitive test of the receiver calibration in the field and a comparison of the receiver calibration installed under the antenna with the calibration in the lab. Figure 1 shows the effect of changes in the LNA input S11 on the calibrated spectrum of the “open” for  $\pm 0.1$  dB and  $\pm 30$  ps.

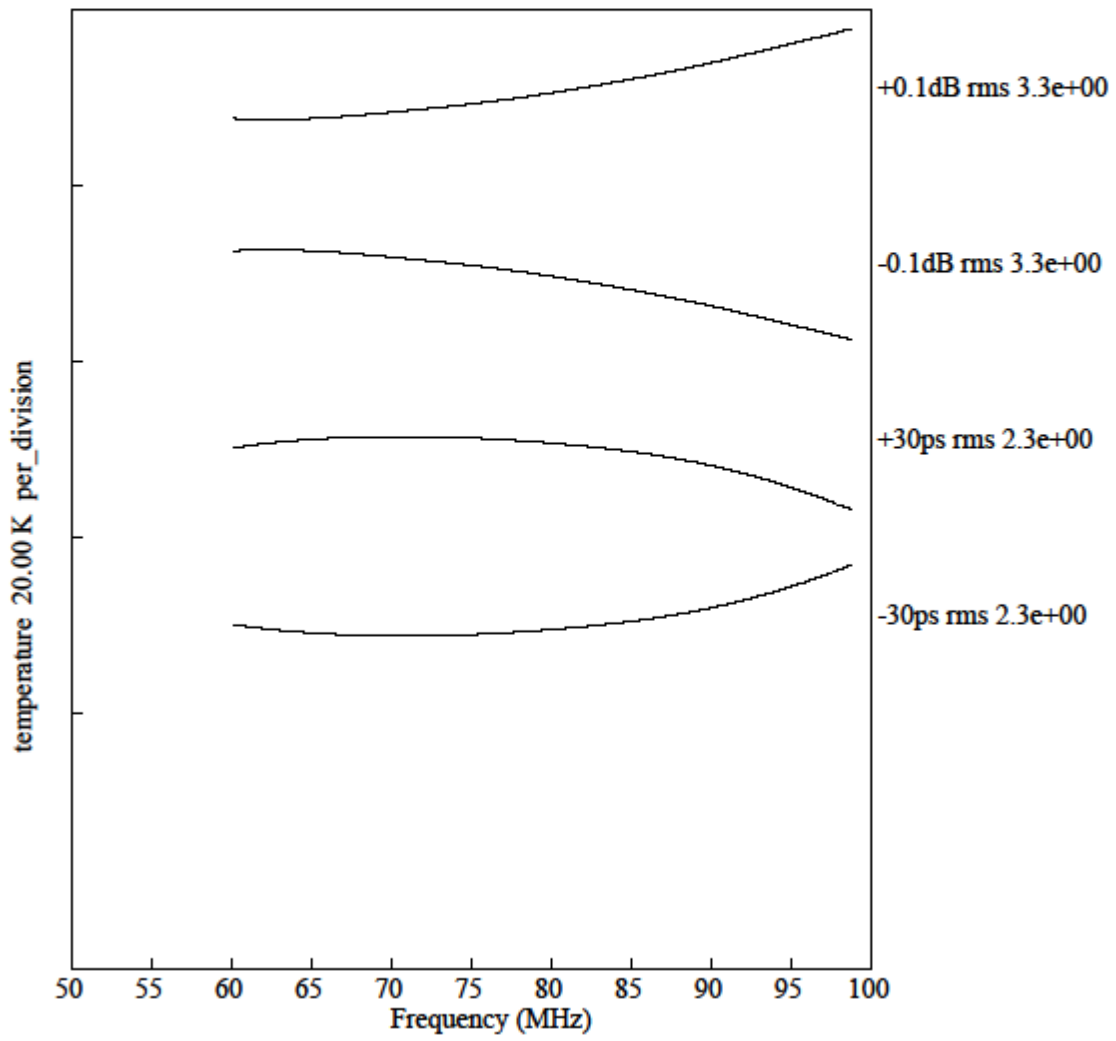


Figure 1. Change in “open” spectrum with a change in LNA S11.