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To: EDGES Group
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 Subject: Lowband1 2017 calibration differences

Lowband1 was re-calibrated in May 2017. Based on data from the re-deployment in June 2017 it is clear that the receiver had changed since the previous calibration in 2015. The reasons for the changes are not yet understood but could be from a combination of component aging, small mechanical changes due to shock in shipping, and changes in the internal temperature gradients. This memo concentrates on some issues with the 2017 calibration and does not discuss the change between calibrations. One aspect of the 2017 calibration different from previous calibrations is that data was taken over a wider bandwidth which allows a comparison between the calibration results for different frequency ranges. For the comparison of the effect of using different frequency ranges in the calibration data at GHA=12 hrs is simulated using a calibration made 50 to 100 MHz and processed with a calibration made over a different frequency and/or with various changes in smoothing parameters used in the calibration process. The rms residual with 4 polynomial terms removed from 60 to 99 MHz is used as a metric for comparison. The results show significant changes with the changes in calibration processing parameters. A large fraction of these changes are due to the presence of RFI in the calibration spectra and reprocessing with RFI excision, not normally used in calibration processing, reduces the changes with calibration spectra range to less than 12 mK.

Change	rms (mK)
2015 calibration	120
Noise wave fit wfit 5 to 6 poly	5
Calibration parameter fit cfit 6 to 7 poly	1
Frequency range 50 to 120 MHz	20
Frequency range 50 to 110 MHz	20
Frequency range 50 to 105 MHz	9
Frequency range 50 to 102 MHz	4
Frequency range 40 to 100 MHz	5
Frequency range 45 to 100 MHz	20
Frequency range 45 to 120 MHz	16
Calibration reprocessed with RFI excision	10
Calibration reprocessed without shorted cable	20
Calibration reprocessed without open cable	20

Table 1. rms residuals to 4 term fit for 60-99 MHz for changes in calibration – see text.

Figure 1 shows the calibrated spectra for the open and shorted cables. The data with the open cable was limited to a shorter integration because much of the data was inconsistent with the data from the shorted cable. This inconsistency is attributed to a change in temperature.

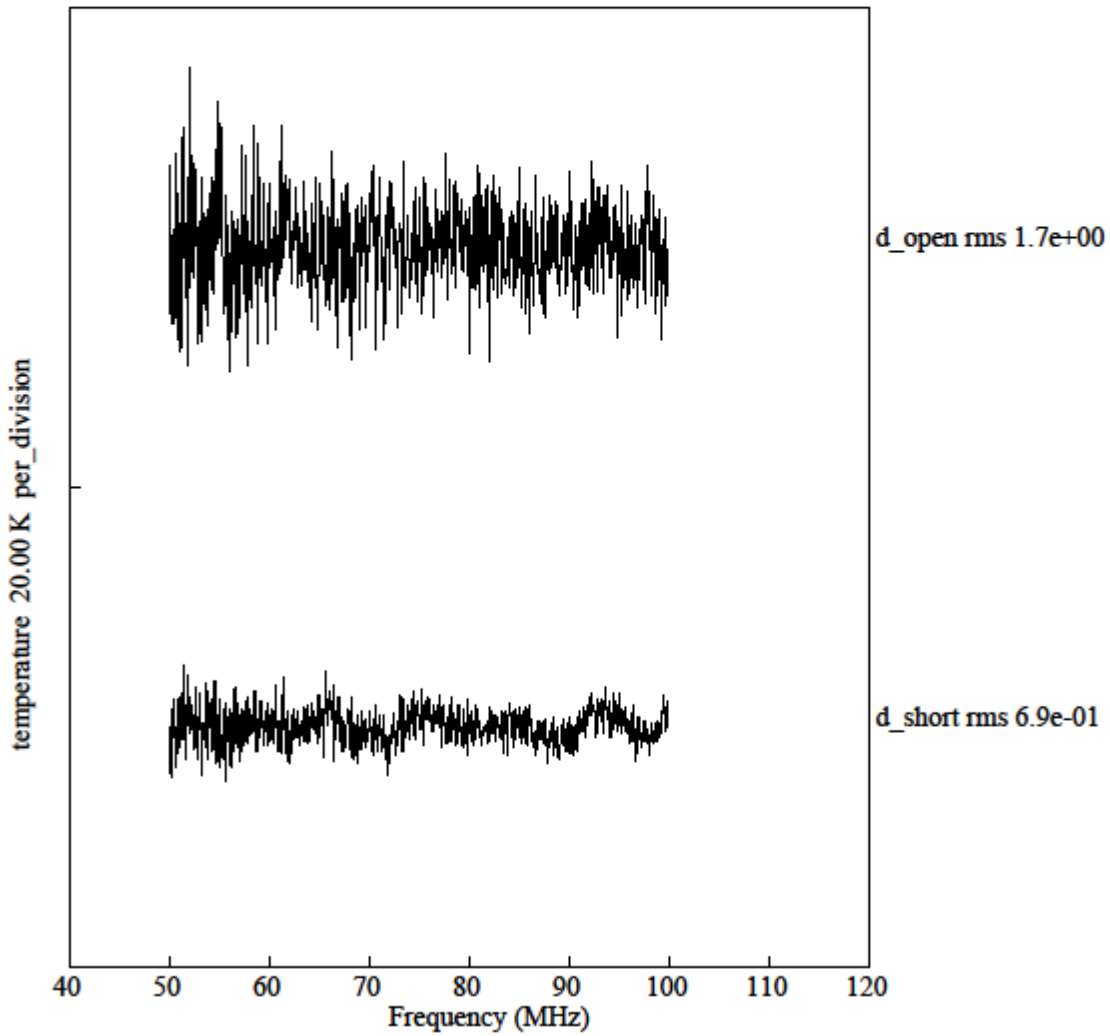


Figure 1. Calibrated spectra of open and shorted cable.