EDGES MEMO #282

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Subject: Results of field measurements of noise source antenna simulator.

A noise source antenna simulator based on the hardware described in memo 199 was deployed at the MRO where it was connected to the receiver at lowband2 instead of the antenna. This was accomplished by moving the antenna by a few inches to allow the simulator to be located under the ground plane and to be directly connected to the receiver as shown in a, b, c, and d photos in Figure 1. A separate DC source was used to power the simulator. Figure 2 shows the spectrum of the noise source from 2018 day 193 and Figure 3 shows the residuals with a 5-term polynomial removed and Figure 4 shows a signature search for an absorption with tau=7 using 5-polynomial terms to model the shape of the noise source spectrum.

The origin of the dip at 60 MHz in Figure 2 is not yet known. Apart from the structure below about 52 MHz the residuals to a 5-term polynomial fit from 60 to 99 MHz shown in Figure 3 have low residuals. The data from day 181 to 193 was taken with the most efficient FASTSPEC (see ASU memo #121) and has less noise than the earlier data taken with the standard PXSPEC. The search for an absorption signature in Figure 4 shows that the noise source and receiver has no structure similar to what is observed when the receiver is connected to the antenna.

Figure 1a

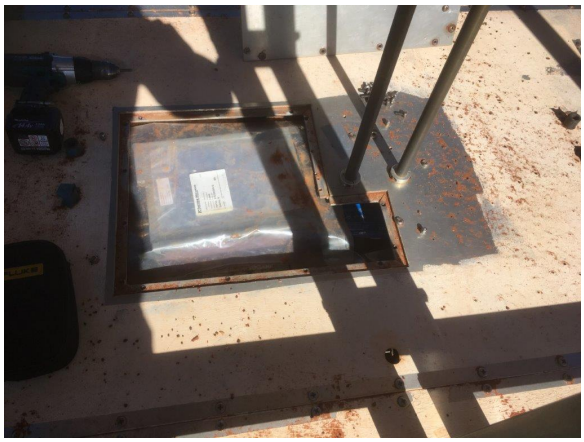

Figure 1b

Figure 1c

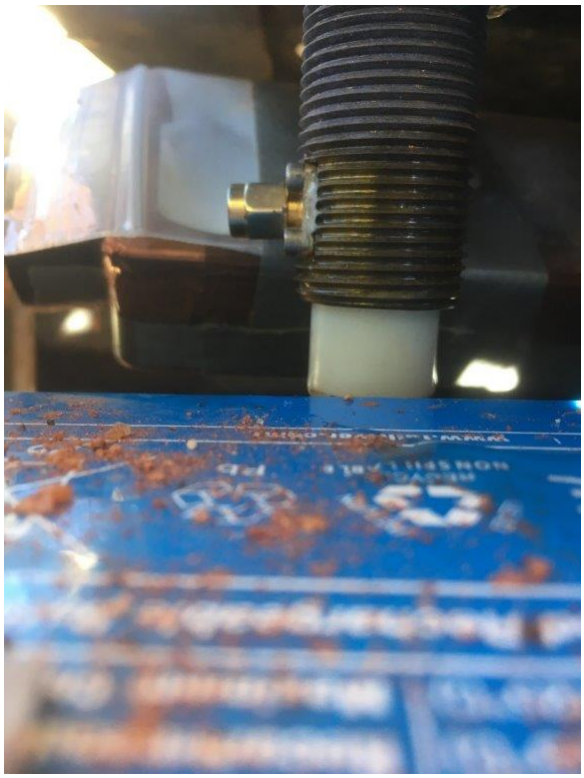

Figure 1d

Figure 1. Photos of noise source attached to receiver in place of antenna.

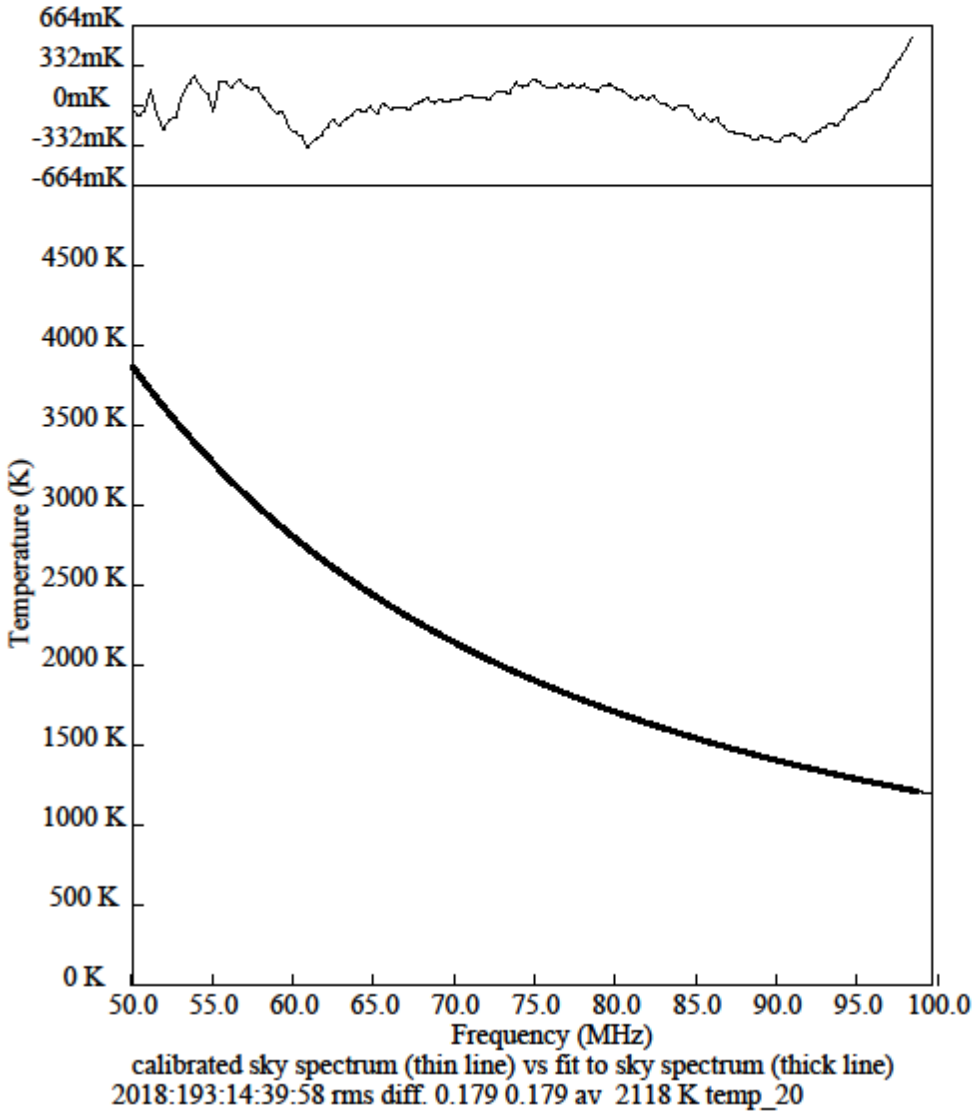

Figure 2. Calibrated spectrum of noise source. Top are the residuals to a 5-term fit.

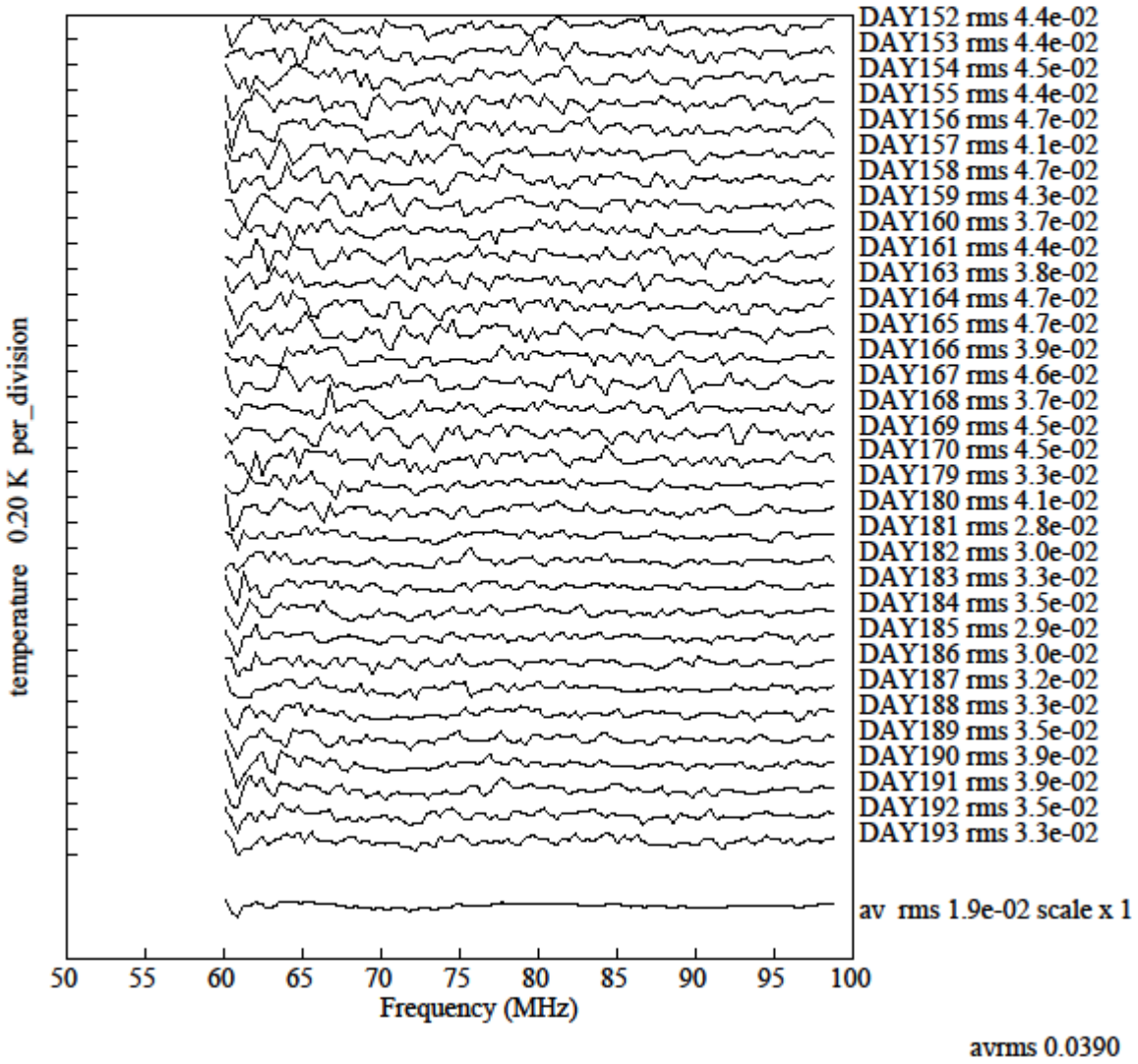

Figure 3. Residuals to a 5-term polynomial fit for each day data from day 181 to 193 used FASTSPEC.

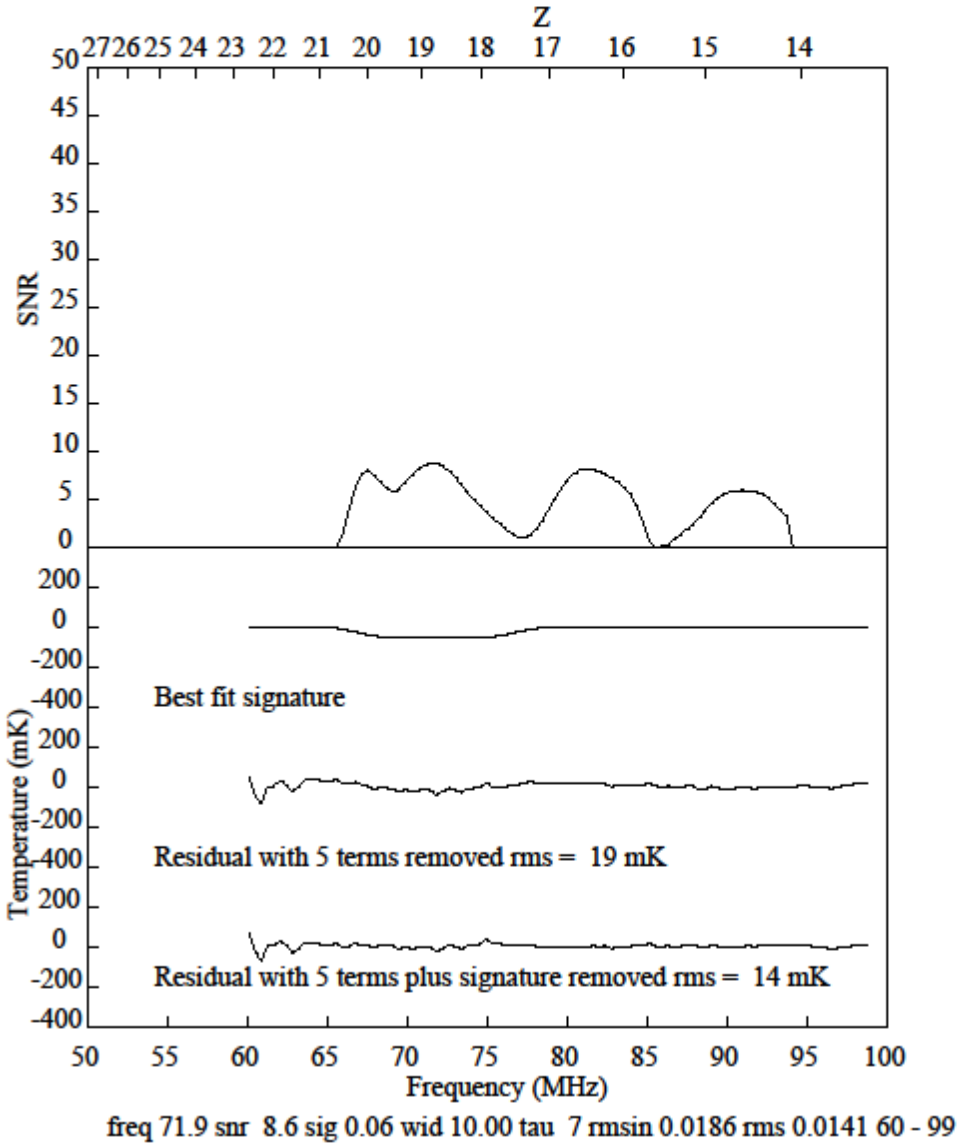

Figure 4. Signature structure search.