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To: EDGES Group  
From: Alan E.E. Rogers  
Subject: Two tone test of EDGES-3

A 2-tone test was made of the EDGES-3 following the tests made in memo 364. The 2-tone test was made using 2 RF explorer signal generators. The output of each generator was attenuated using 40 dB SMA attenuators on its output. The outputs of the attenuators were then added with a SMA tee and then passed through another 10 dB attenuator which was connected to the EDGES-3 antenna input. This scheme was used to optimize the isolation between two signal generators.

This scheme results in a loss of 53.5 dB of the power from each signal generator. With each signal generator set an output level of -27.5 dBm the level of each is -81 dBm going into the input of EDGES-3 which would be connected to the other "box" which forms the dipole antenna. Figure 1 shows the spectrum obtained for the antenna position of the 3-position switch for signal generator set at 100 and 110 MHz. In this case the ADC level for the antenna position increases from 0.24 to 0.35 relative to 0.5 for full scale. When the power from the signal generator at 110 MHz is increased by 8 dB distortion products start to appear at an ADC level of 0.49 as shown in Figure 2 and increase further as occasional saturation occurs with a 10 dB increase to -71 dBm as shown in Figure 3. Figure 4 shows the 3-position switched output for both signals at -81 dBm with heavy RFI filtering and Figure 5 shows the 3-position switched output for a single at -81 dBm with RFI filtering.

Figures 4 and 5 show that if Orbcomm is below about -85 dBm, which should be the case, it should be removed by RF excision in the frequency domain and should not cause loss of data away from the Orbcomm frequency range.

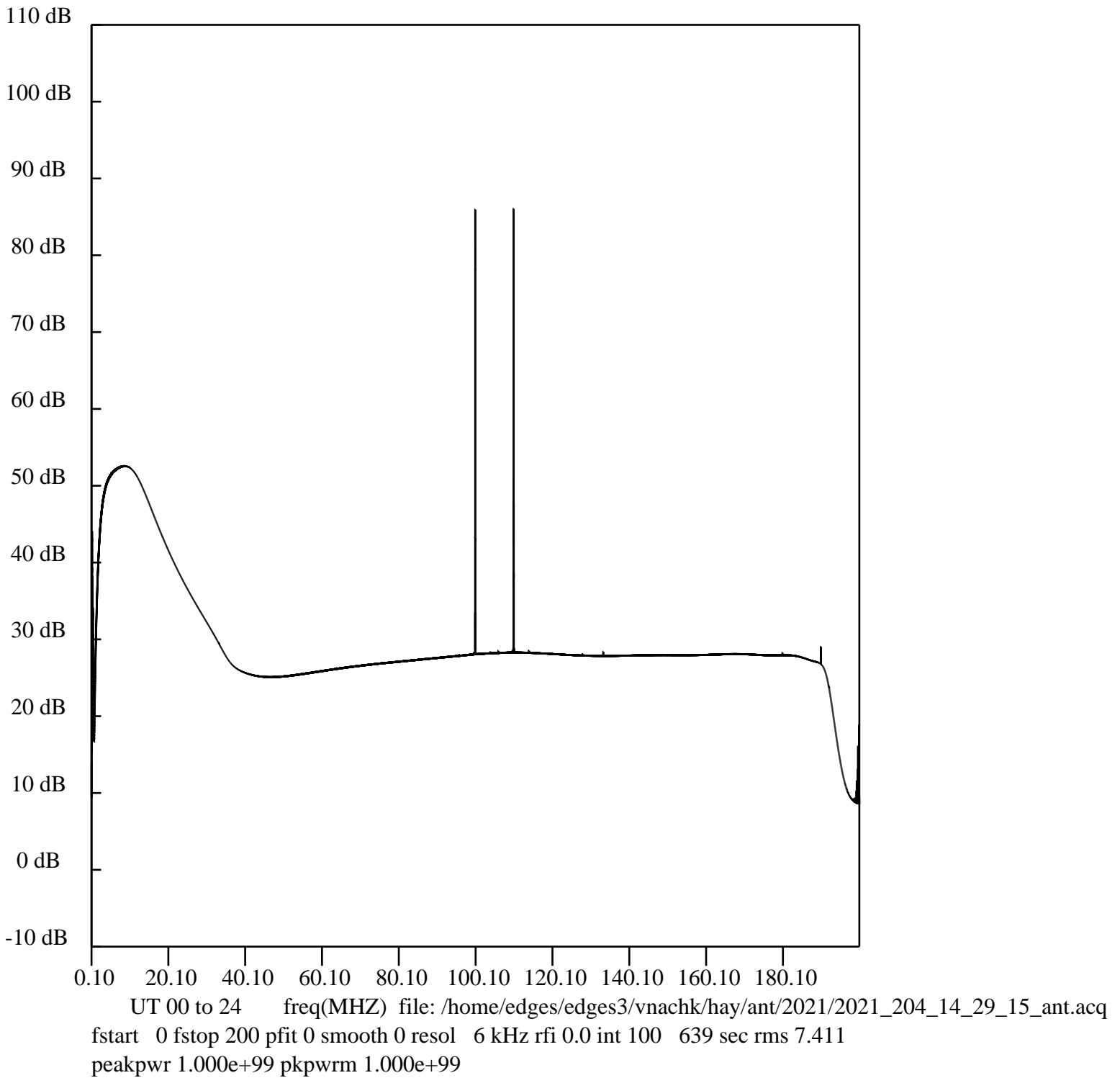
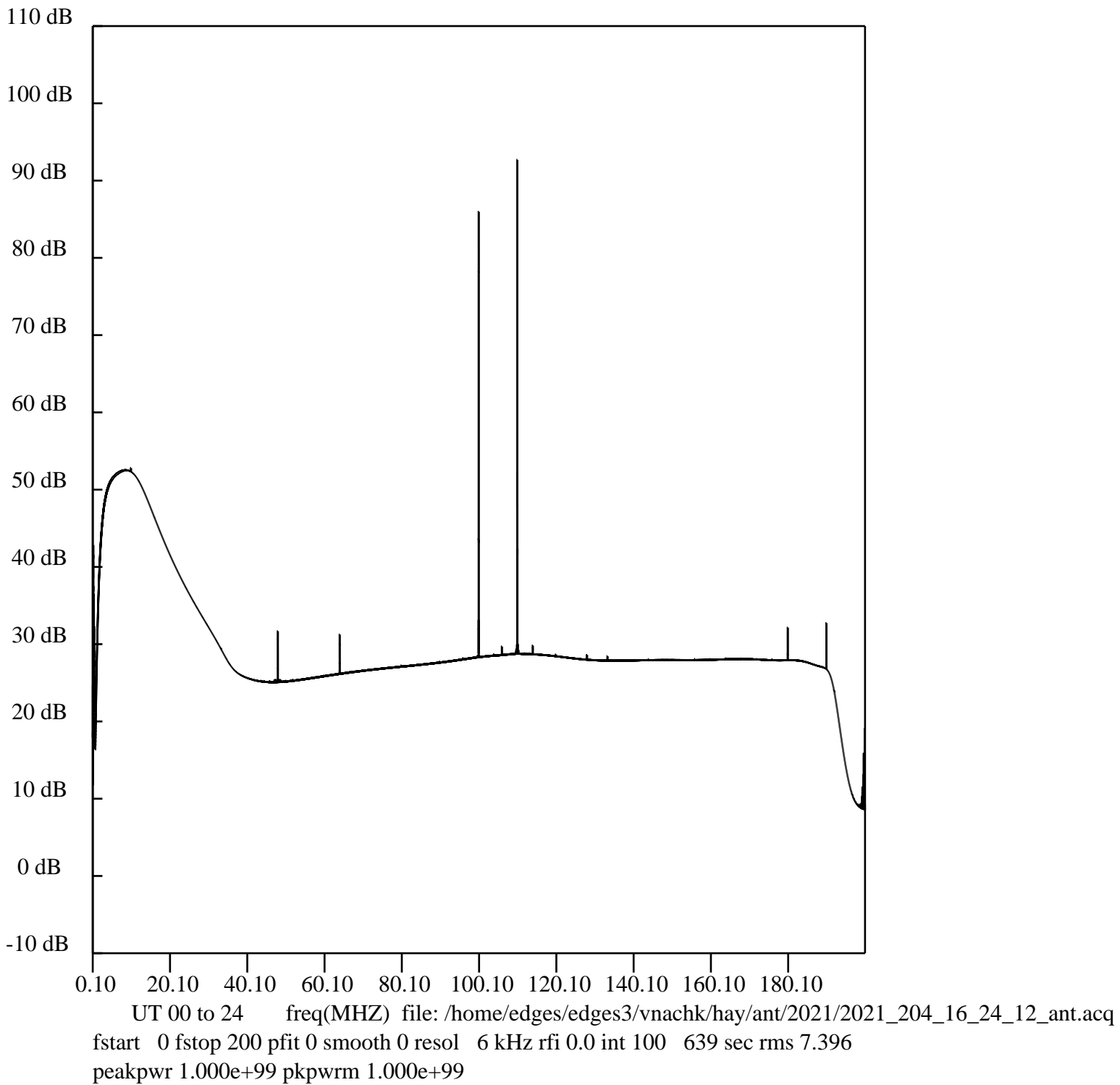


Figure 1. Antenna spectrum with -81 dBm signals from RF explorer signal generators at 100 and 110 MHz



Sat Jul 24 17:39:46 2021

Figure 2. Power level of 110 MHz increased to -73 dBm

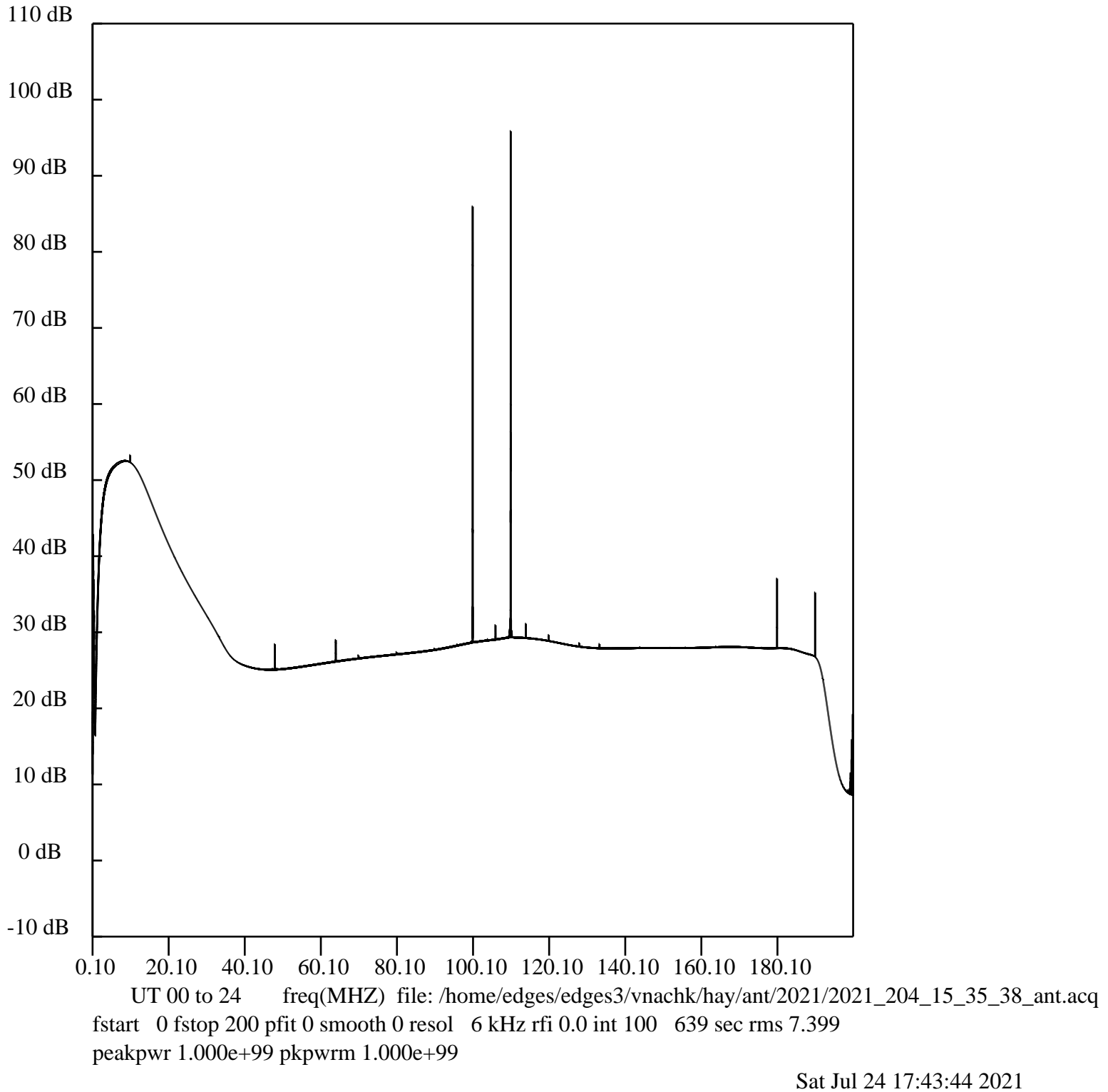
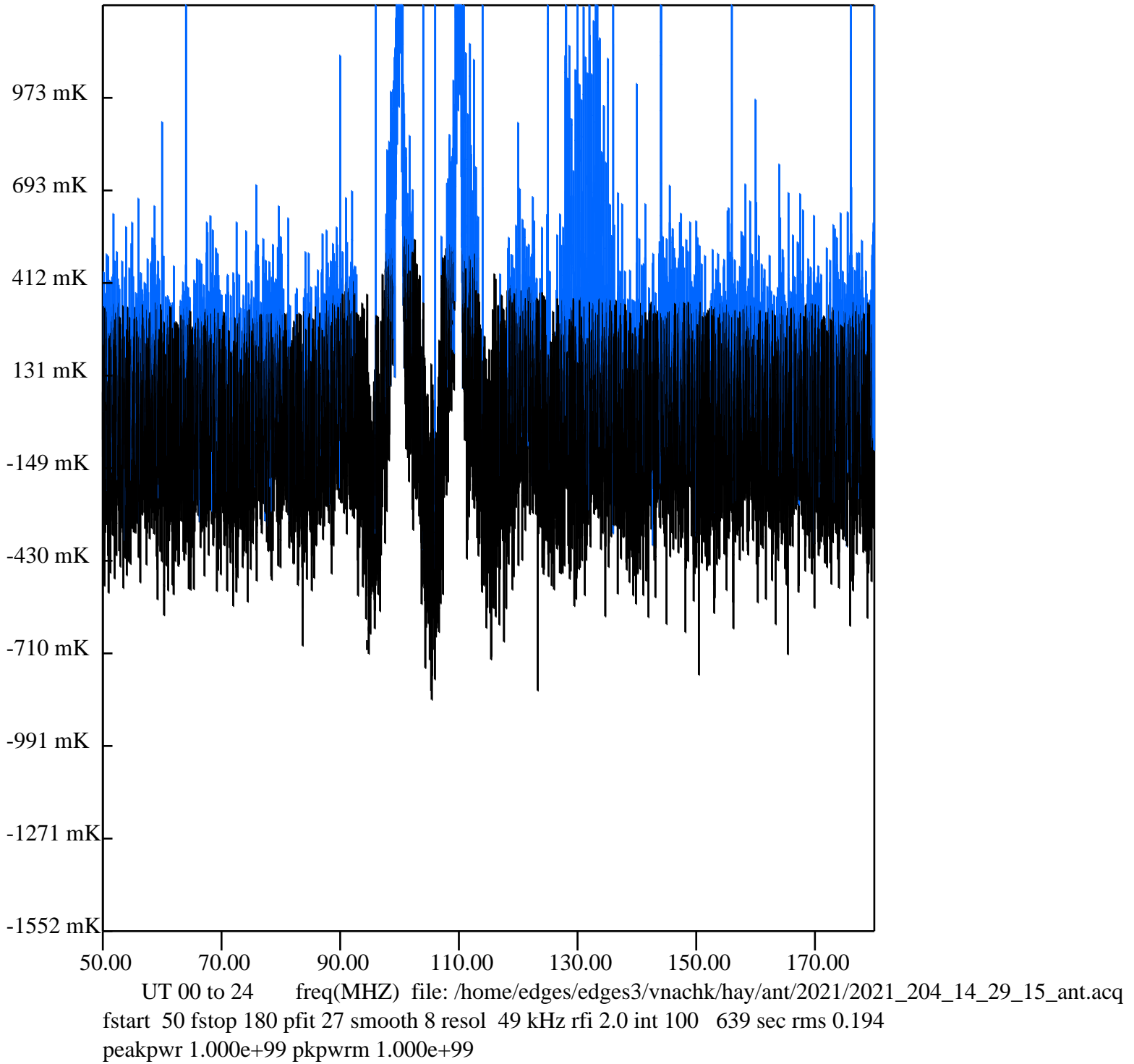
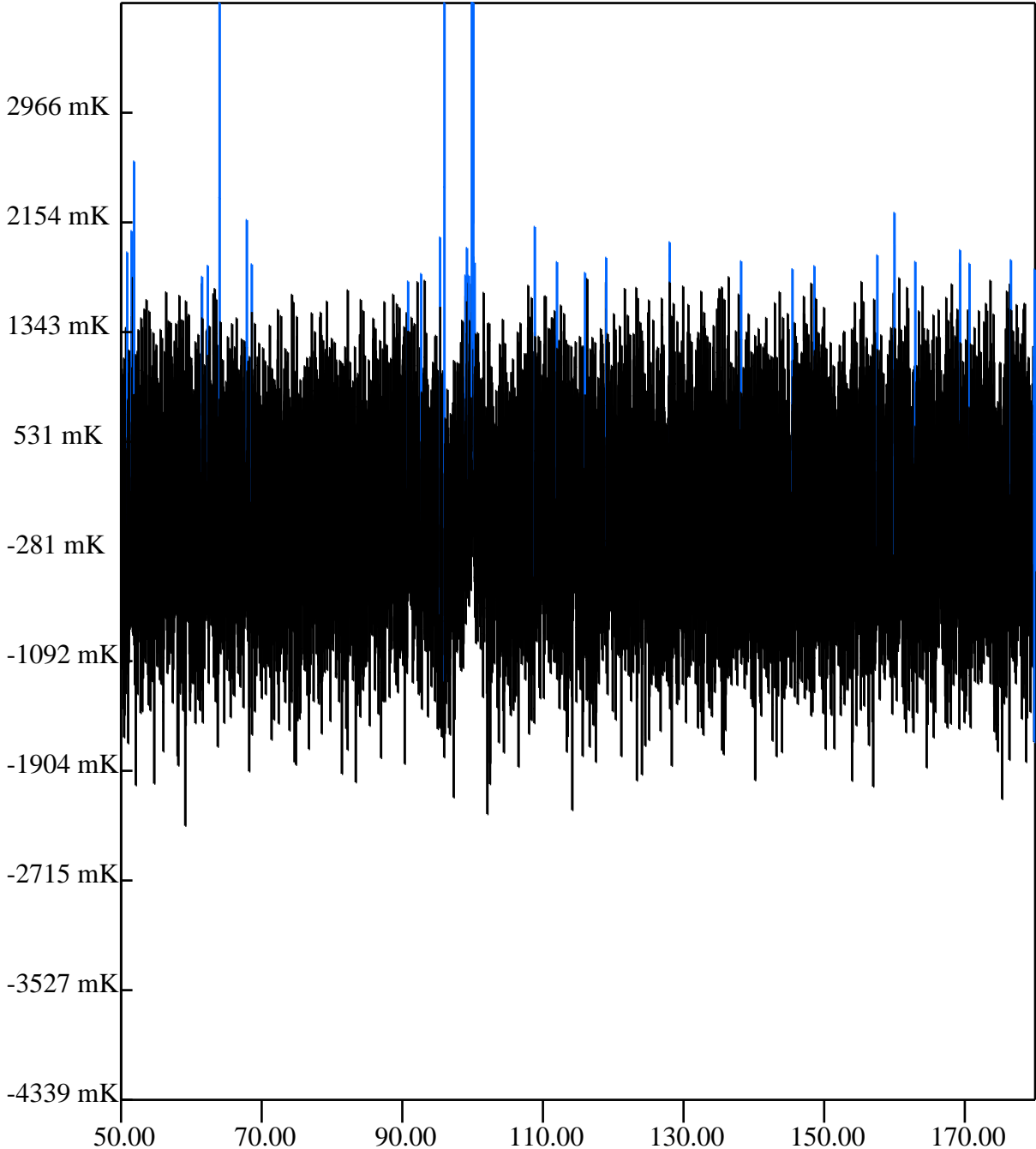


Figure 3. Power level of 110 MHz increased to -71 dBm at which point the ADC is saturating.



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Figure 4. 3 Position switched power with RFI excision when both signals at 81 dBm.



UT 00 to 24 freq(MHZ) file: /home/edges/edges3/vnachk/hay/ant/2021/2021\_201\_15\_18\_35\_ant.acq  
 fstart 50 fstop 180 pfit 27 smooth 8 resol 49 kHz rfi 3.0 int 10 64 sec rms 0.584  
 peakpwr 1.000e+99 pkpwr 1.000e+99

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Figure 5. 3 Position switched power with RFI excision with only one signal at 100 MHz at 81 dBm