EDGES MEMO #060

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To: EDGES Group
From: Alan E.E. Rogers
Subject: Extending spectrometer frequency range

The EDGES electronics used with the AC240 spectrometer was modified to extend its operation from a frequency range of 80-210 MHz to about 50-210 MHz. This was accomplished by reducing the frequency range of the added out of band noise. With this change the range of low receiver noise is extended down to 50 MHz where it reaches 160 K from a minimum of 30 K as shown in Figure 1.

Results of tests with filtered noise to simulate antenna output.

Frequency range (MHz)	# poly. Terms	rms (m K)
70-140	7	94
70-140	9	21
70-140	11	3.5
70-140	13	2.3

In addition tests were made of the effects of adding a strong signal at 138 MHz to simulate the efforts of the Orbcomm satellite.

Strength of signal at 138 MHz	rms (m K)
+ 33 dB	7.2
+ 27 dB	2.7
+ 17 dB	2.2

A signal of 33 dB above the background in the 31 kHz resolution of the AC240 corresponds to an increase of the power averaged over 70-140 MHz of 29%.

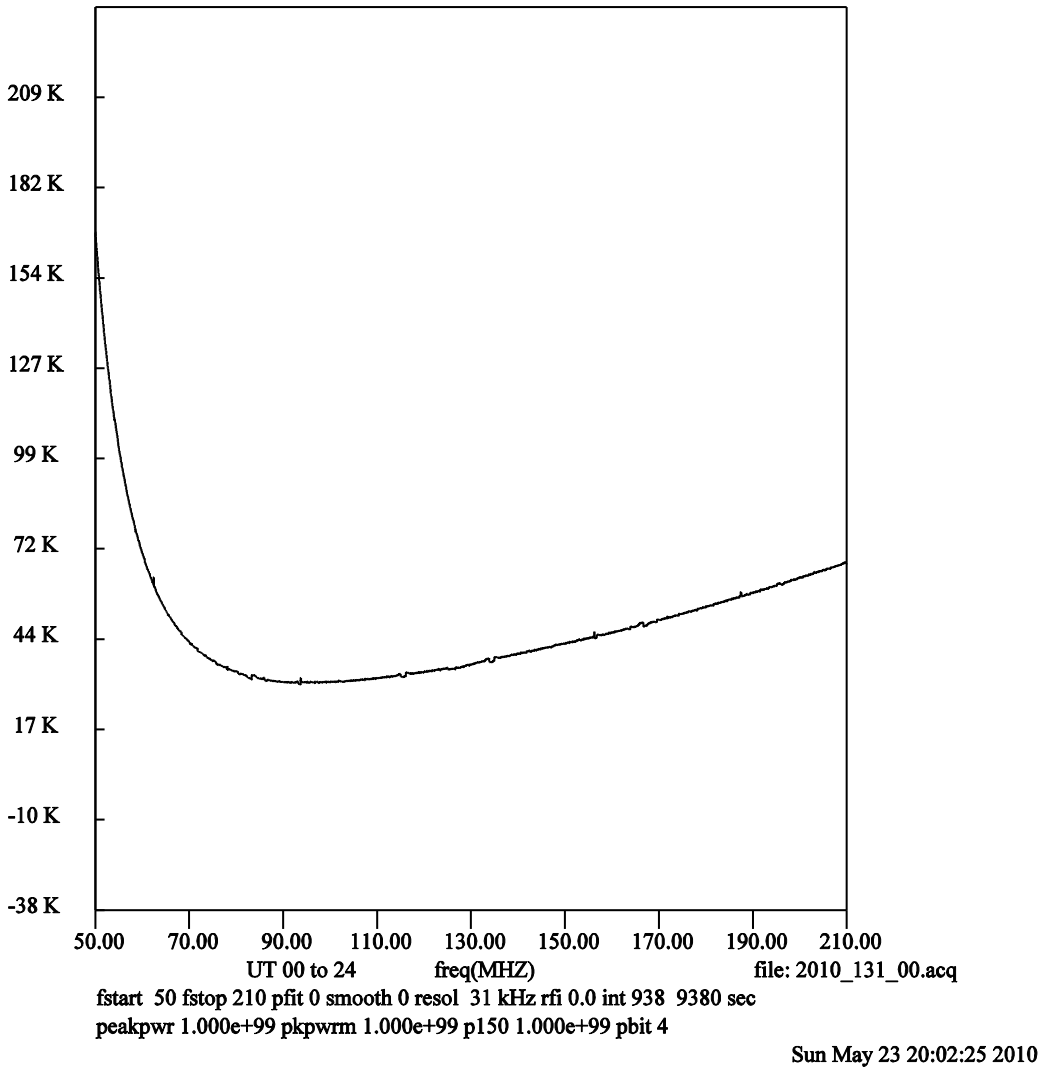
209 K
182 K
154 K
127 K
99 K
72 K
44 K
17 K
-10 K
-38 K
50.00
70.00
90.00
110.00
130.00
150.00
170.00
190.00
210.00
UT 00 to 24
freq(MHZ)
file: 2010_131_00.acq
fstart 50 fstop 210 pfit 0 smooth 0 resol 31 kHz rfi 0.0 int 938 9380 sec
peakpwr 1.000e+99 pkpwrm 1.000e+99 p150 1.000e+99 pbit 4
Sun May 23 20:02:25 2010

Figure 1.