

VLA ELECTRONICS MEMO No. 214

NATIONAL RADIO ASTRONOMY OBSERVATORY

Socorro, NM

RFI SURVEY FOR THE UNIVERSITY OF ARIZONA

MT. GRAHAM RADIO OBSERVATORY SITE

Safford, Arizona

August 1985

Jim Oty

(1)

A special Radio Frequency Interference test was conducted on Mt. Graham, near Safford, AZ., at the request of the University of Arizona. The test consisted of a quick look at the frequency range of 75 MHz. to 10.0 GHz. The same equipment and procedure used for the VLBA RFI Surveys was used, however, it was necessary to use a gasoline generator for power as commercial power was not available. Plots were made of segments of the RF spectrum and are included in this report.

A brief explanation of the system used may be helpful. The RF monitoring system is based around a Hewlett-Packard Digital Spectrum Analyzer. A directional antenna and high gain, low noise amplifiers are connected to the input of the spectrum analyzer. The analyzer is tuned to a portion of the spectrum of interest and allowed to scan for a number of scans. This data is dumped into a computer. The output of the spectrum analyzer is in dBm, however, the computer converts this data into power (Watts/M<sup>2</sup>) using the known antenna characteristics and the system gain (amplifier gain minus cable loss). The log of the power is plotted on a X-Y plotter as a record. Several of these records, each plotted with a slight offset, form a three dimensional plot of frequency, amplitude and time. To provide complete coverage, plots are made in four directions for each band segment, usually N, S, E, and W.

The plots included in this report cover the frequency spectrum from 75 MHz. to 6 GHz. The spectrum above 6 GHz. (up to 10 GHz.) was carefully checked but no signals were seen so no plots were generated. The following summary lists the plots included. Where possible, signals are marked for frequency and power (W/M<sup>2</sup>).

(2)

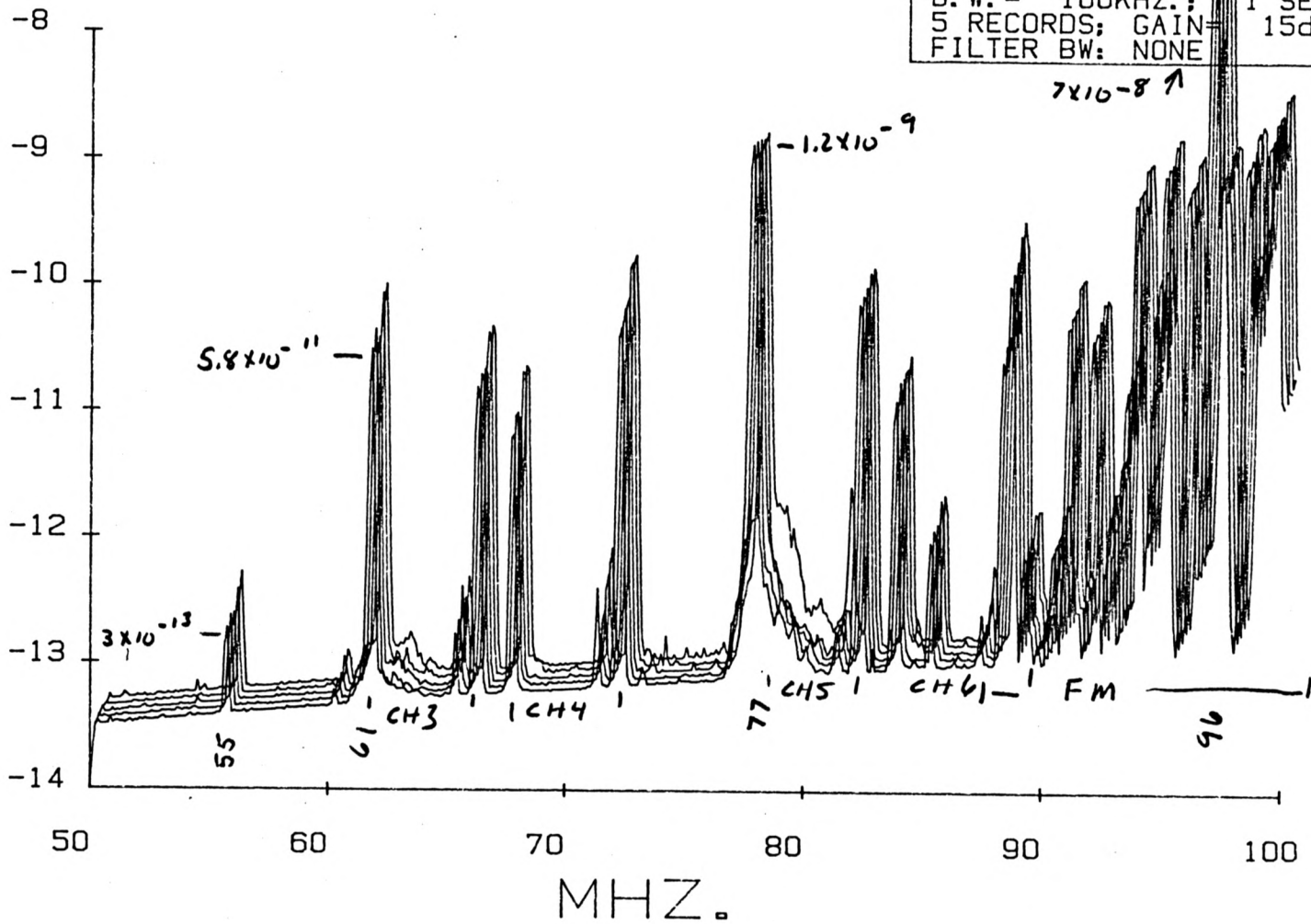
Plot #	Frequency	Comments
1	50 MHz. to 100 MHz.	North. Dominated by TV and FM.
2	50 MHz. to 100 MHz.	East. Same as above.
3	50 MHz. to 100 MHz.	South. Same as above.
4	50 MHz. to 100 MHz.	West. Same as above.
5	100 MHz. to 600 MHz.	North. Lots of TV.
6	100 MHz. to 600 MHz.	East. Same as above.
7	100 MHz. to 600 MHz.	South. Strong signal at 147 MHz. Ham repeater??
8	100 MHz. to 600 MHz.	West. Lots of TV.
9	500 MHz. to 1000 MHz.	North. Two TV staations.
10	500 MHz. to 1000 MHz.	East.
11	500 MHz. to 1000 MHz.	South.
12	500 MHz. to 1000 MHz.	West.
13	1000 MHz. to 1500 MHz.	North.
14	1000 MHz. to 1500 MHz.	East.
15	1000 MHz. to 1500 MHz.	South.
16	1000 MHz. to 1500 MHz.	West.
17	1500 MHz. to 2000 MHz.	North.
18	1500 MHz. to 2000 MHz.	East.
19	1500 MHz. to 2000 MHz.	South.
20	1500 MHz. to 2000 MHz.	West.
21	2000 MHz. to 2400 MHz.	North. Note amplifier gain decrease around 2400 MHz.
22	2000 MHz. to 2500 MHz.	East.
23	2000 MHz. to 2500 MHz.	South.
24	2000 MHz. to 2500 MHz.	West.
25	2000 MHz. to 3000 MHz.	West. No amplifiers available to cover this range. Only gain supplied by analyzer.
26	3000 MHz. to 4000 MHz.	West. No amplifiers available to cover this range. Only gain supplied by analyzer.
27	4000 MHz. to 5000 MHz.	North.
28	4000 MHz. to 5000 MHz.	East.
29	4000 MHz. to 5000 MHz.	South.
30	4000 MHz. to 5000 MHz.	West.
31	5000 MHz. to 6000 MHz.	West. Only signal from any direction found in this band.

No plots above 6000 MHz. as no signals were found.

FLUX (LOG W/SQ. M)

PLOT # 1

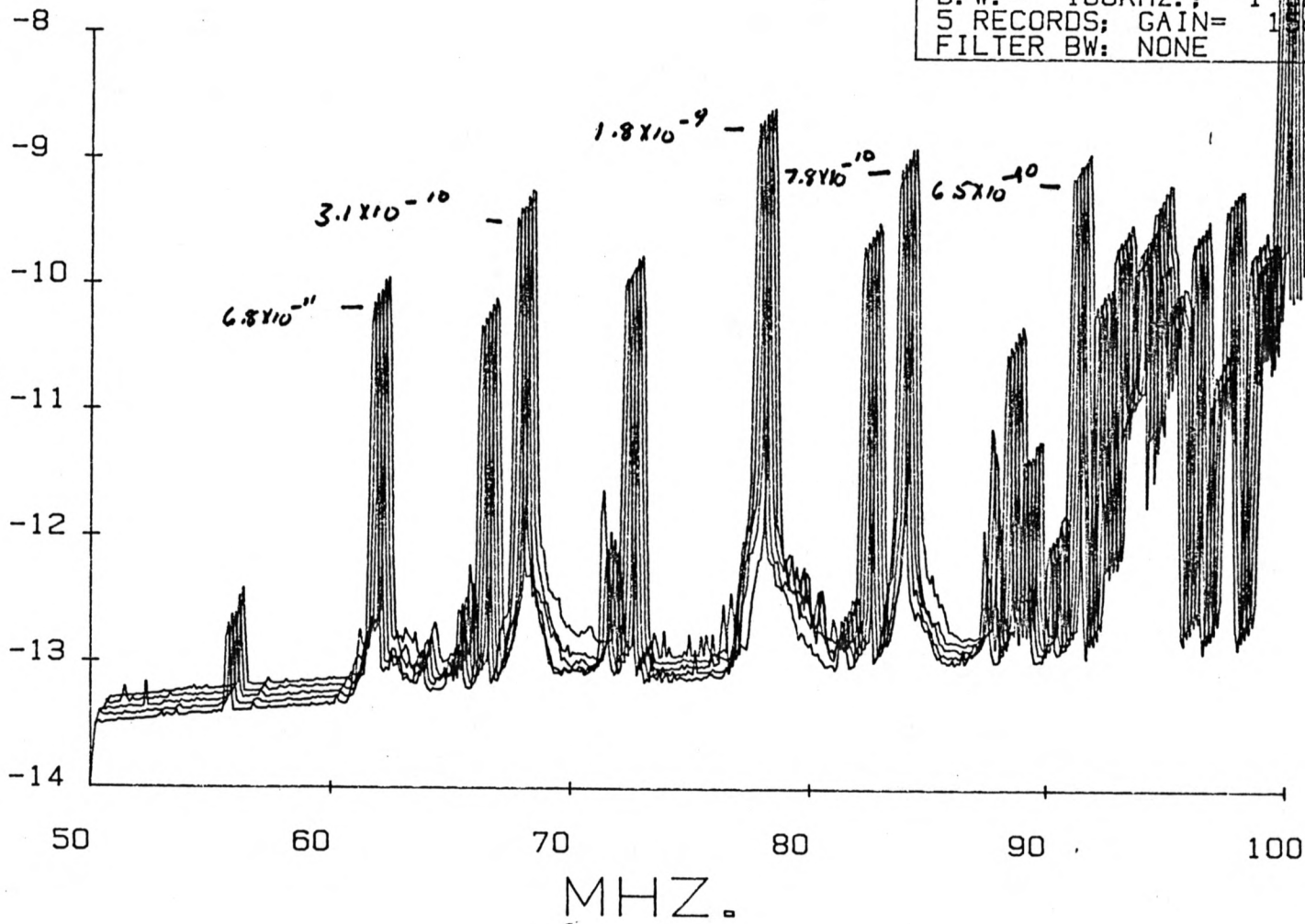
RFI SURVEY	
LOCATION: MT GRAHAM	
START:	12:05 08-18-1985
STOP :	12:16 08-18-1985
50 TO 100 MHZ.	0 DEG AZ.
B. W. =	100KHZ.; 1 SEC/CM.
5 RECORDS;	GAIN= 15dB
FILTER BW:	NONE



FLUX (LOG W/SQ. M)

PLOT # 2

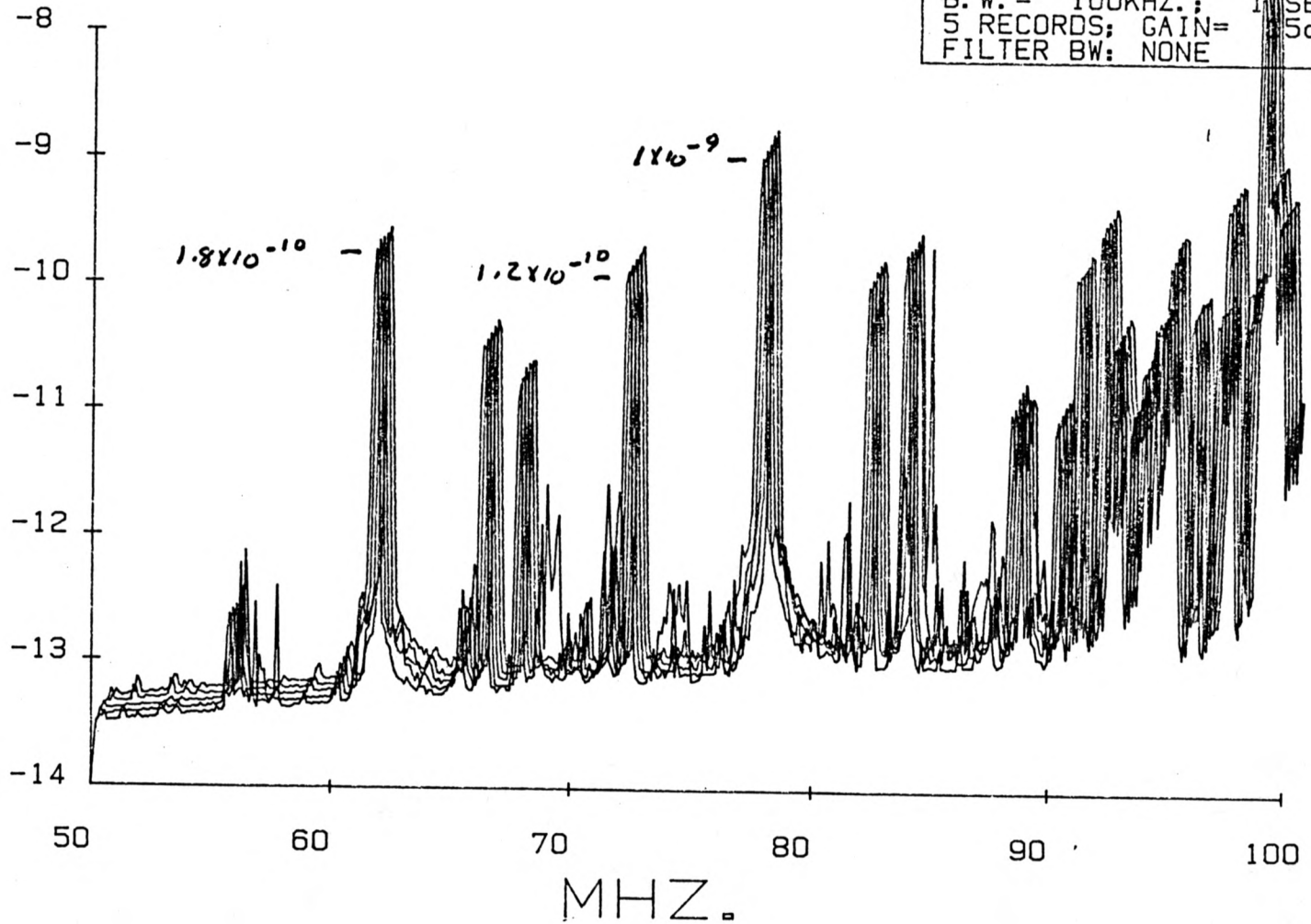
RFI SURVEY
LOCATION: MT GRAHAM
START: 12:18 08-18-1985
STOP : 12:28 08-18-1985
50 TO 100 MHZ. 90 DEG AZ.
B. W. = 100KHZ.; 1 SEC/CM.
5 RECORDS; GAIN= 15dB
FILTER BW: NONE



FLUX (LOG W/SQ. M)

PLOT # 3

RFI SURVEY
LOCATION: MT GRAHAM
START: 12:30 08-18-1985
STOP : 12:39 08-18-1985
50 TO 100 MHZ. 180 DEG AZ.
B. W. = 100KHZ.; 1 SEC/CM.
5 RECORDS; GAIN= 5dB
FILTER BW: NONE

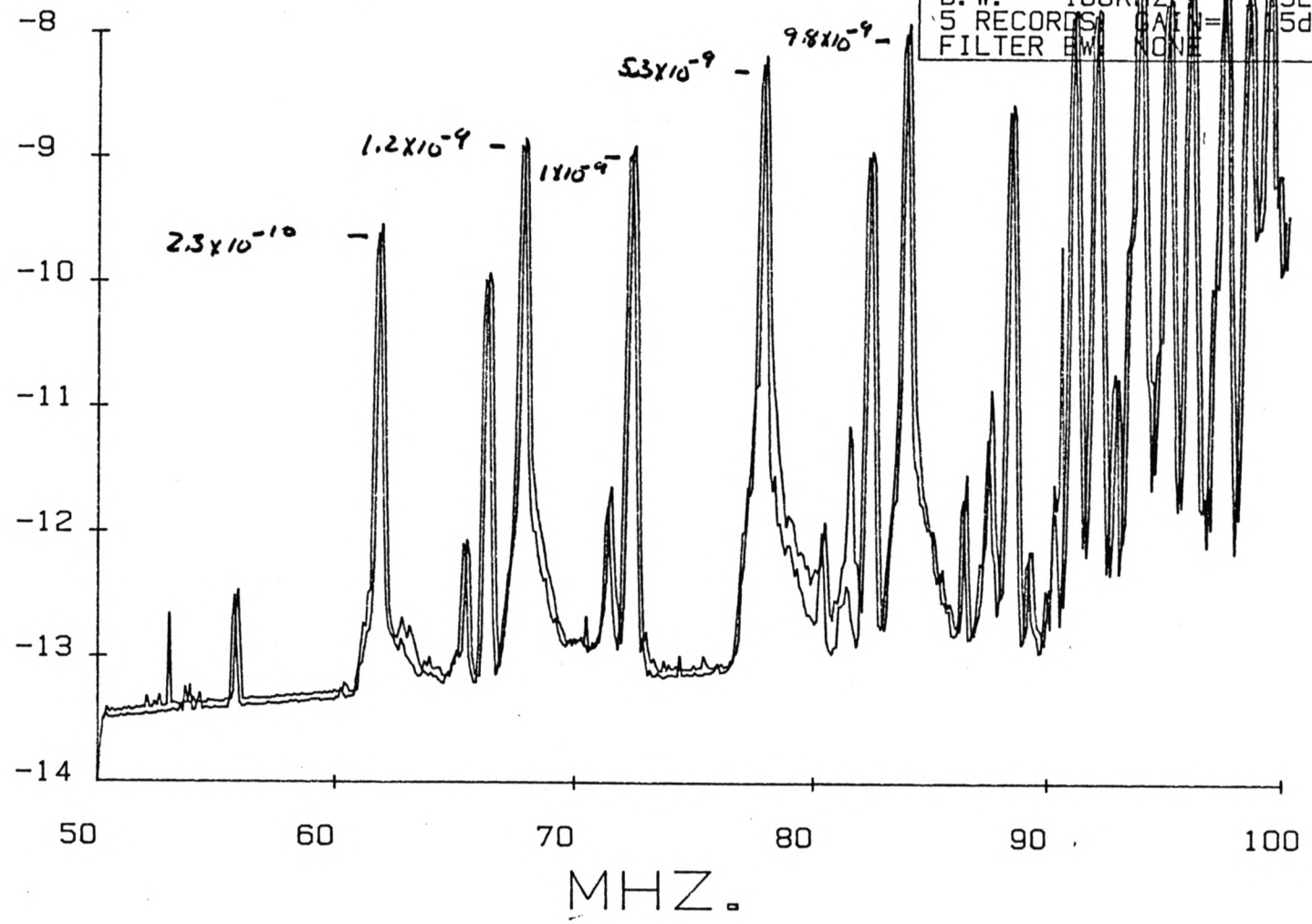


$2.1 \times 10^{-8}$

FLUX (LOG W/SQ. M)

PLOT #4

RFI SURVEY
LOCATION: MT GRAHAM
START: 12:41 08-18-1985
STOP : 12:45 08-18-1985
50 TO 100 MHZ. 270 DEG AZ.
B.W. = 100KHZ. 1 SEC/CM.
5 RECORDS GAIN = 5dB
FILTER BW ONE



$2.3 \times 10^{-10}$

$1.2 \times 10^{-9}$

$1.1 \times 10^{-9}$

$5.3 \times 10^{-9}$

$9.8 \times 10^{-9}$

$2.9 \times 10^{-8}$

50

60

70

80

90

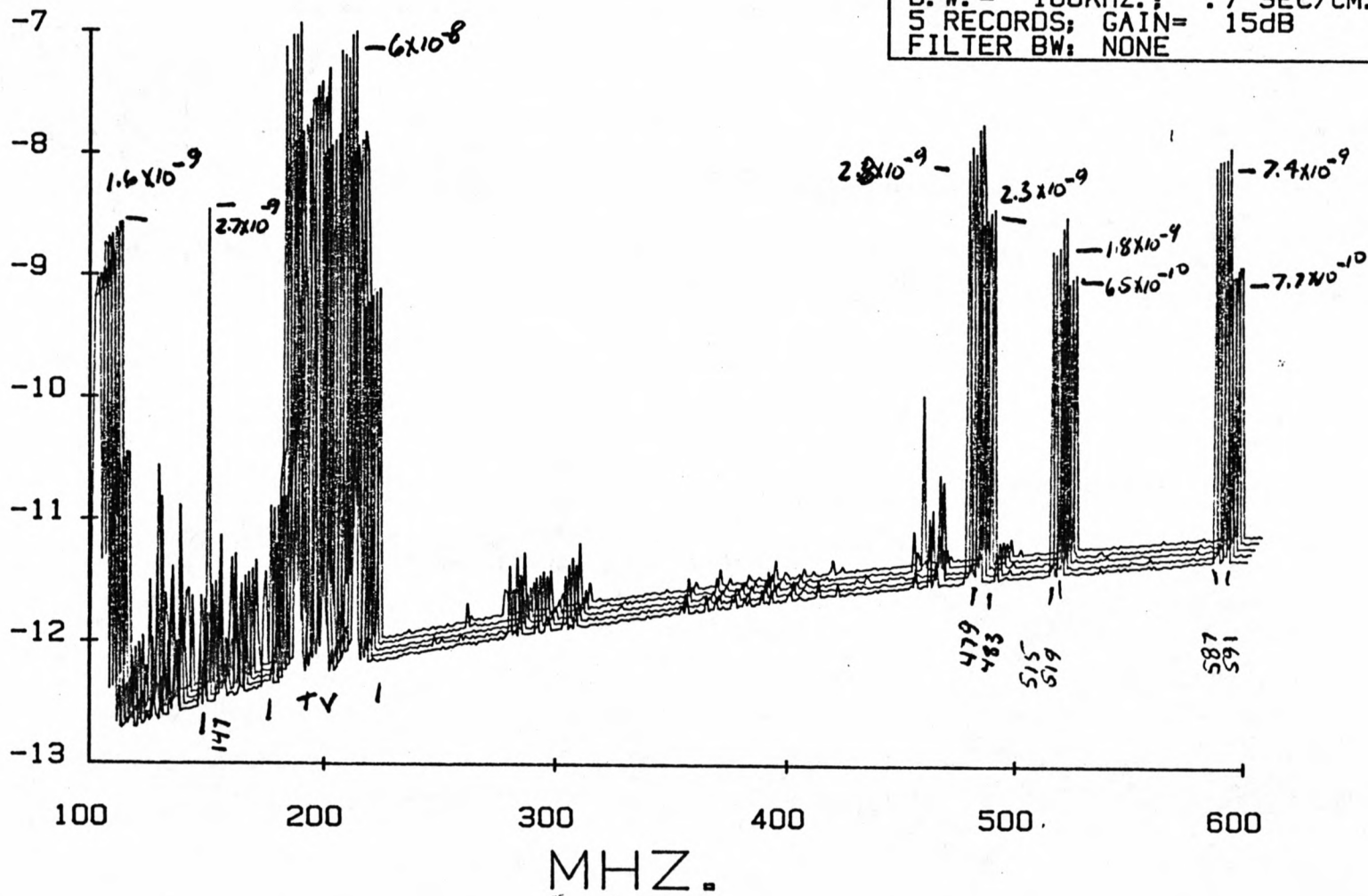
100

MHZ.

FLUX (LOG W/SQ. M)

PLOT # 5

RFI SURVEY
LOCATION: MT GRAHAM
START: 11:10 08-18-1985
STOP: 11:20 08-18-1985
100 TO 600 MHZ. 0 DEG AZ.
B. W. = 100KHZ.; .7 SEC/CM.
5 RECORDS; GAIN= 15dB
FILTER BW: NONE

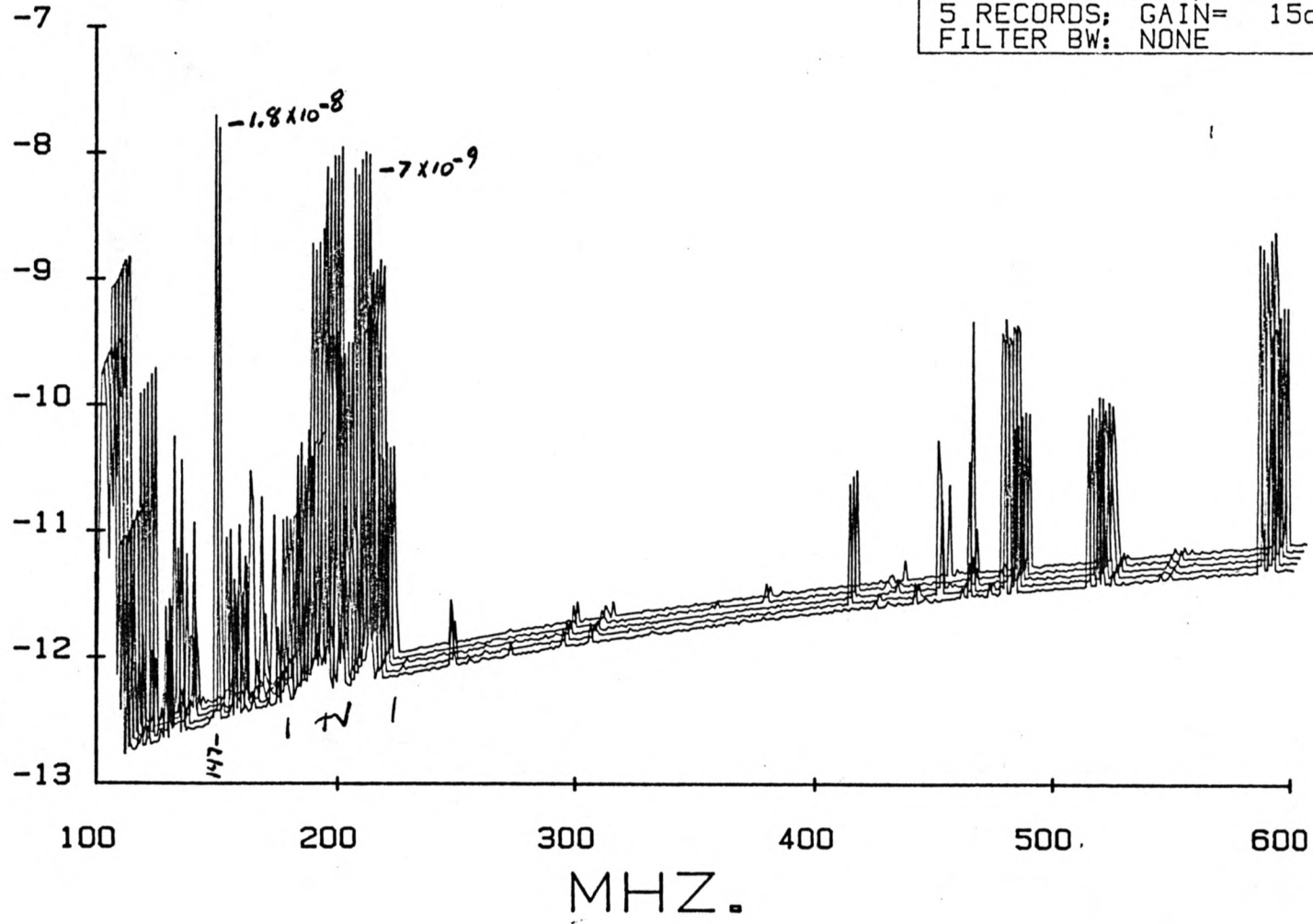




FLUX (LOG W/SQ. M)

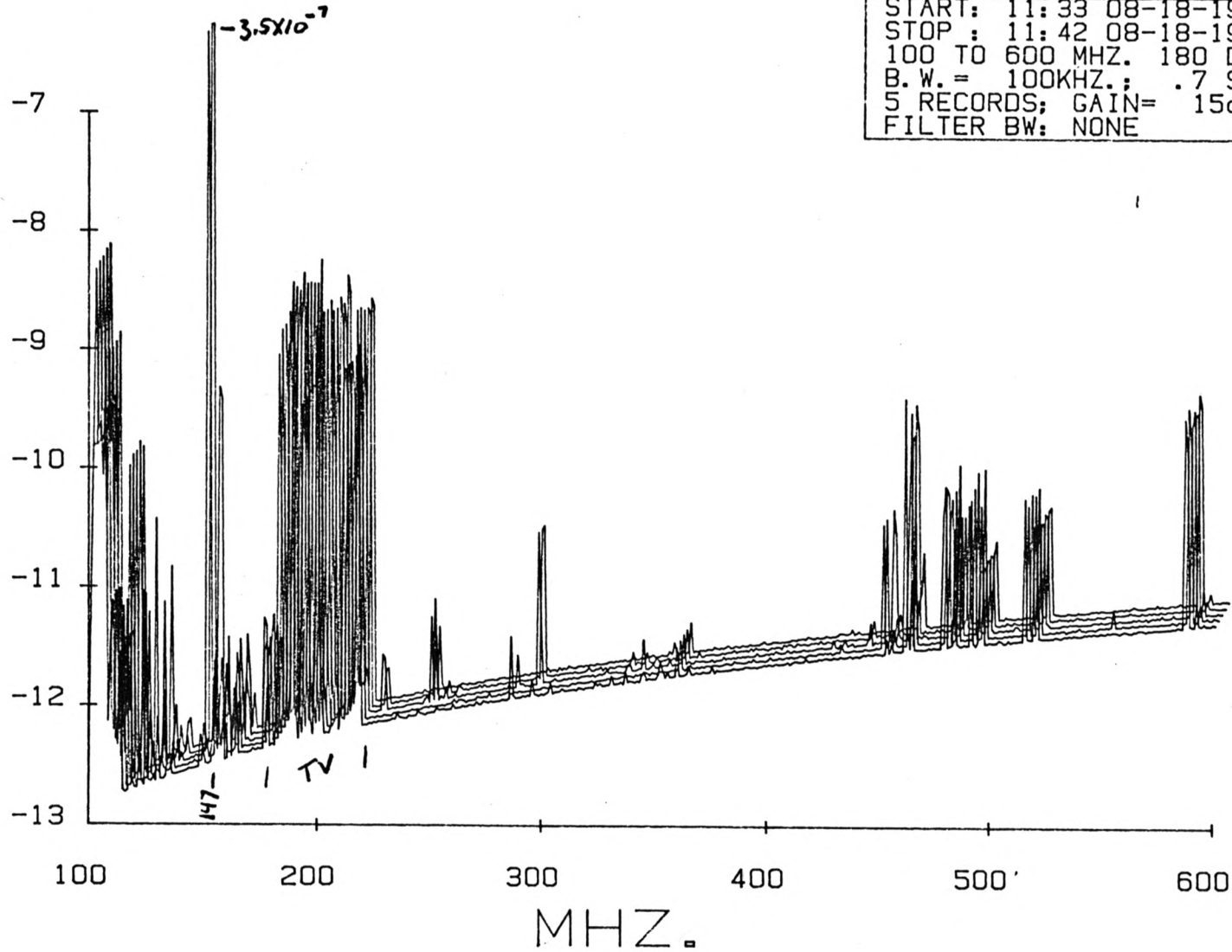
PLOT #6

RFI SURVEY
LOCATION: MT GRAHAM
START: 11:22 08-18-1985
STOP : 11:31 08-18-1985
100 TO 600 MHZ. 90 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
5 RECORDS; GAIN= 15dB
FILTER BW: NONE



FLUX (LOG W/SQ. M)

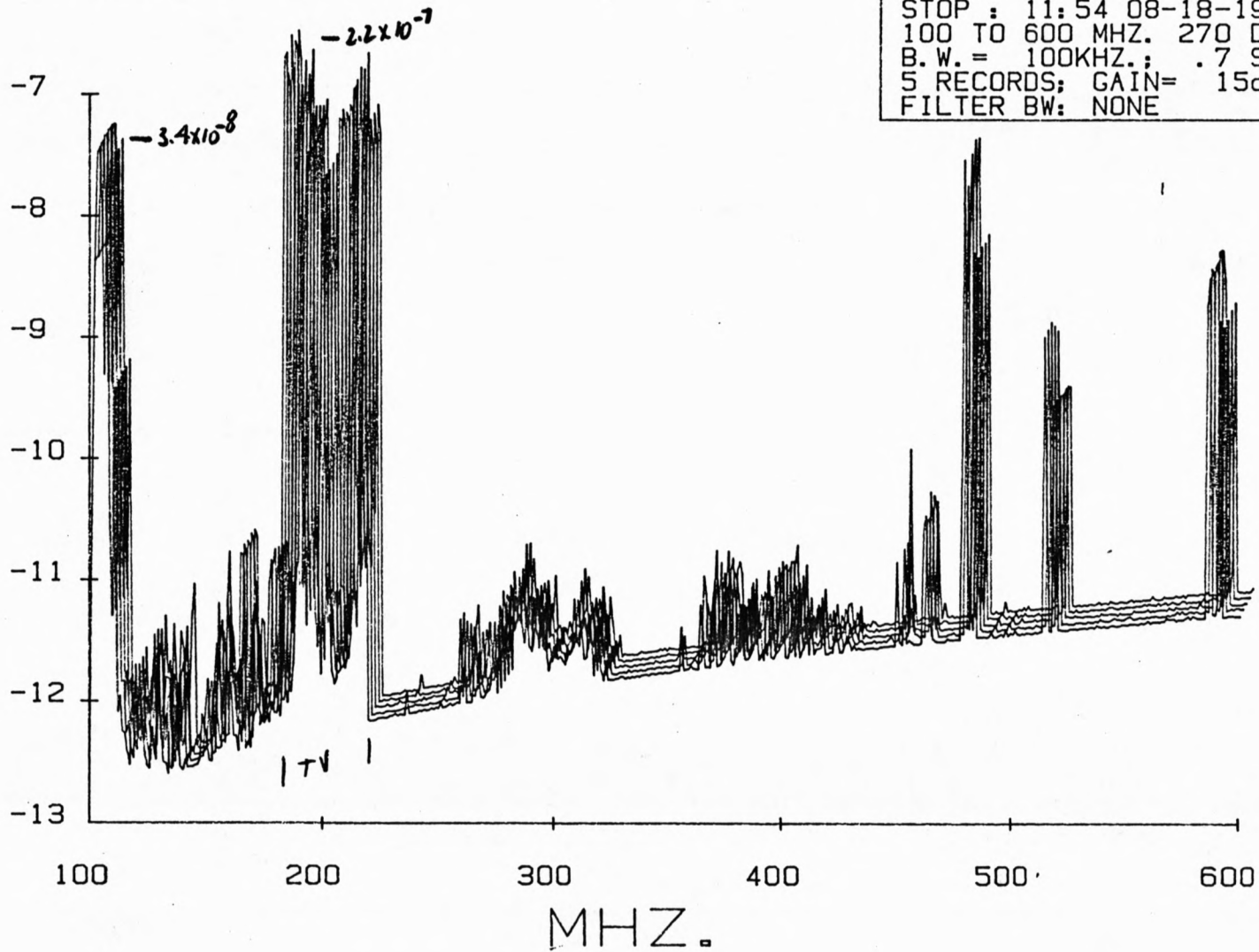
PLOT # 7



RFI SURVEY
LOCATION: MT GRAHAM
START: 11:33 08-18-1985
STOP : 11:42 08-18-1985
100 TO 600 MHZ. 180 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
5 RECORDS; GAIN= 15dB
FILTER BW: NONE

FLUX (LOG W/SQ. M)

PLOT # 8

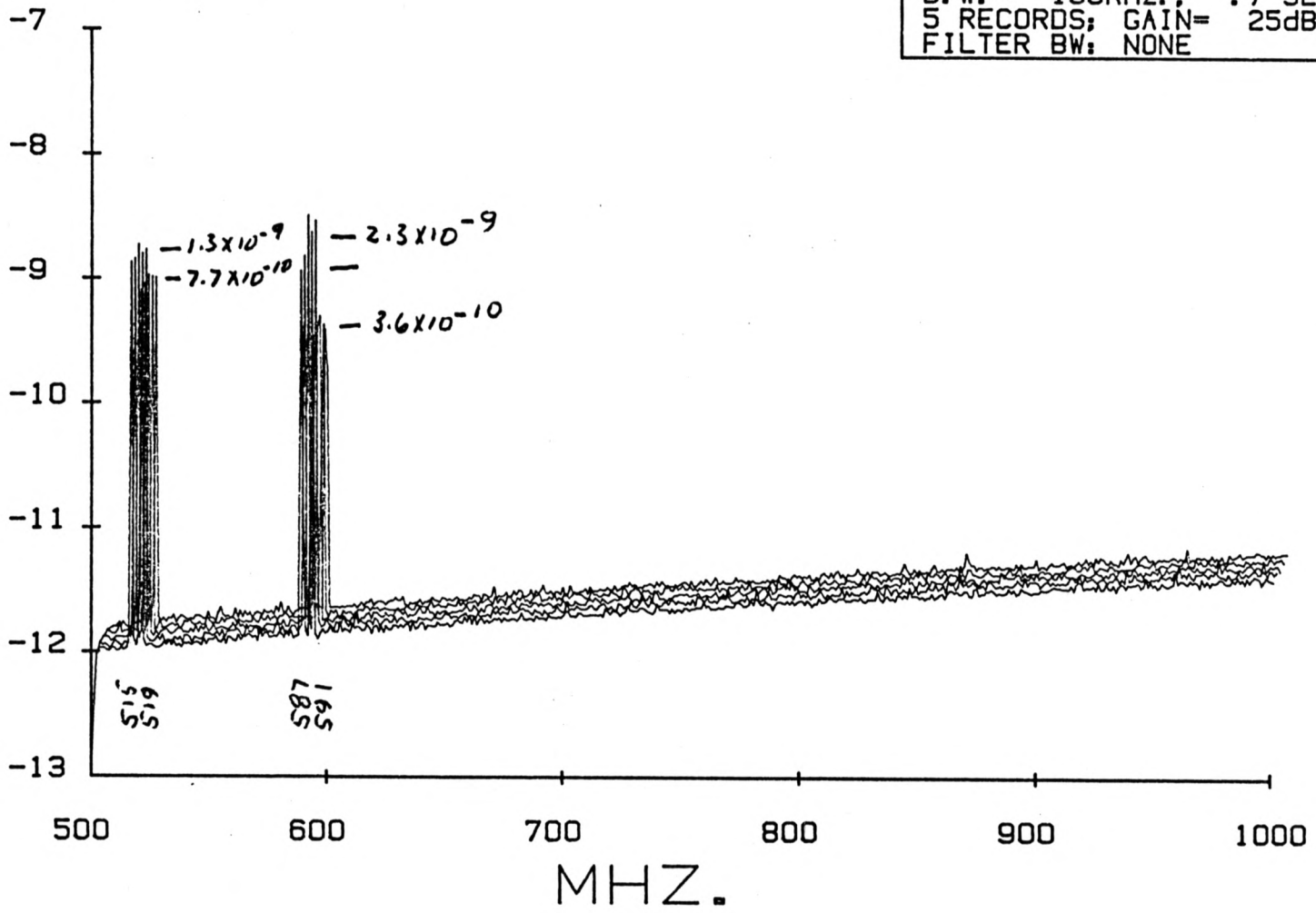


RFI SURVEY	
LOCATION: MT GRAHAM	
START: 11:45 08-18-1985	
STOP : 11:54 08-18-1985	
100 TO 600 MHZ. 270 DEG AZ.	
B.W. = 100KHZ.; .7 SEC/CM.	
5 RECORDS; GAIN= 15dB	
FILTER BW: NONE	

FLUX (LOG W/SQ. M)

PLOT #9

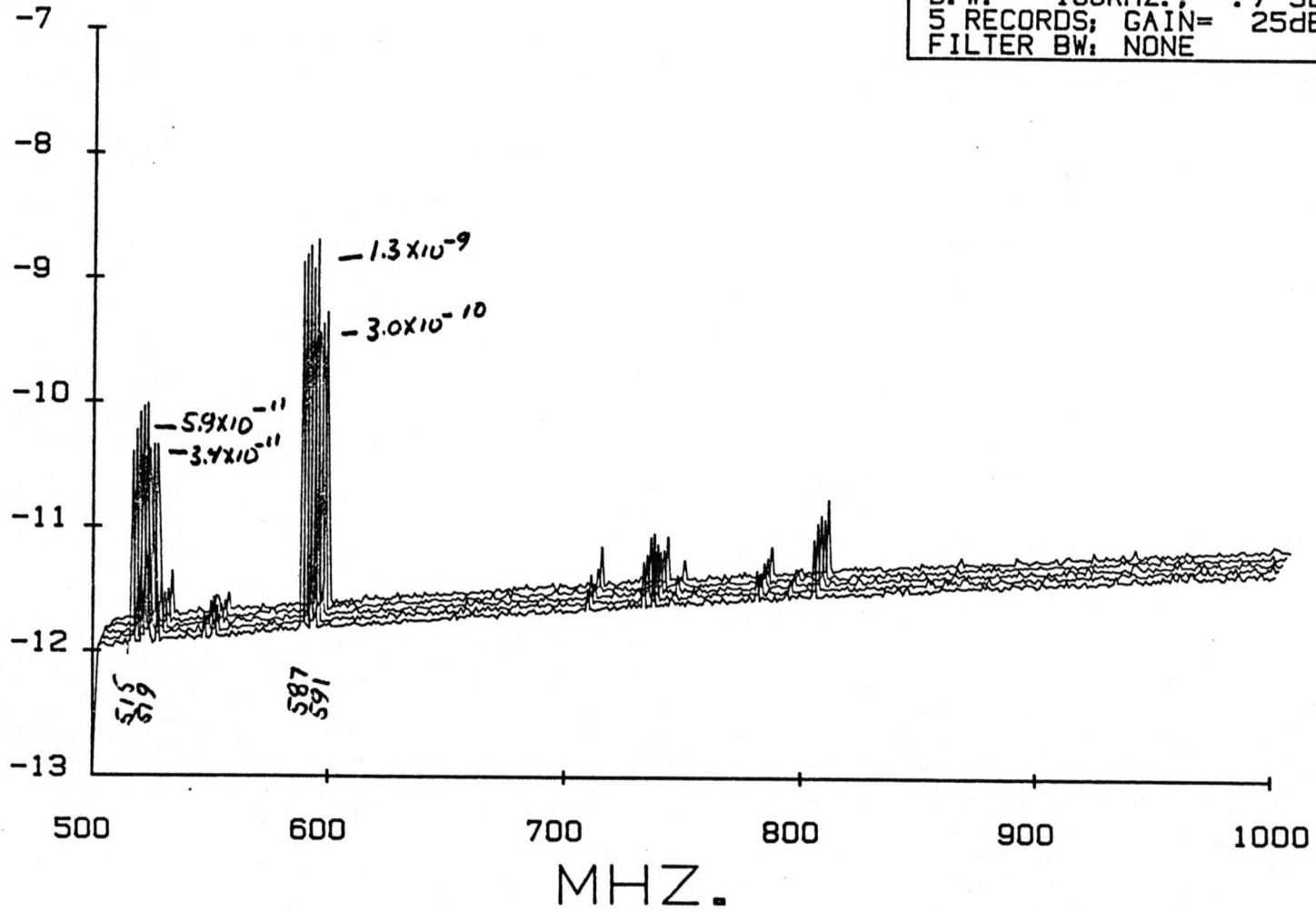
RFI SURVEY
LOCATION: MT GRAHAM
START: 10:12 08-18-1985
STOP : 10:21 08-18-1985
500 TO 1000 MHZ. 0 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
5 RECORDS; GAIN= 25dB
FILTER BW: NONE



FLUX (LOG W/SQ. M)

PLOT # 10

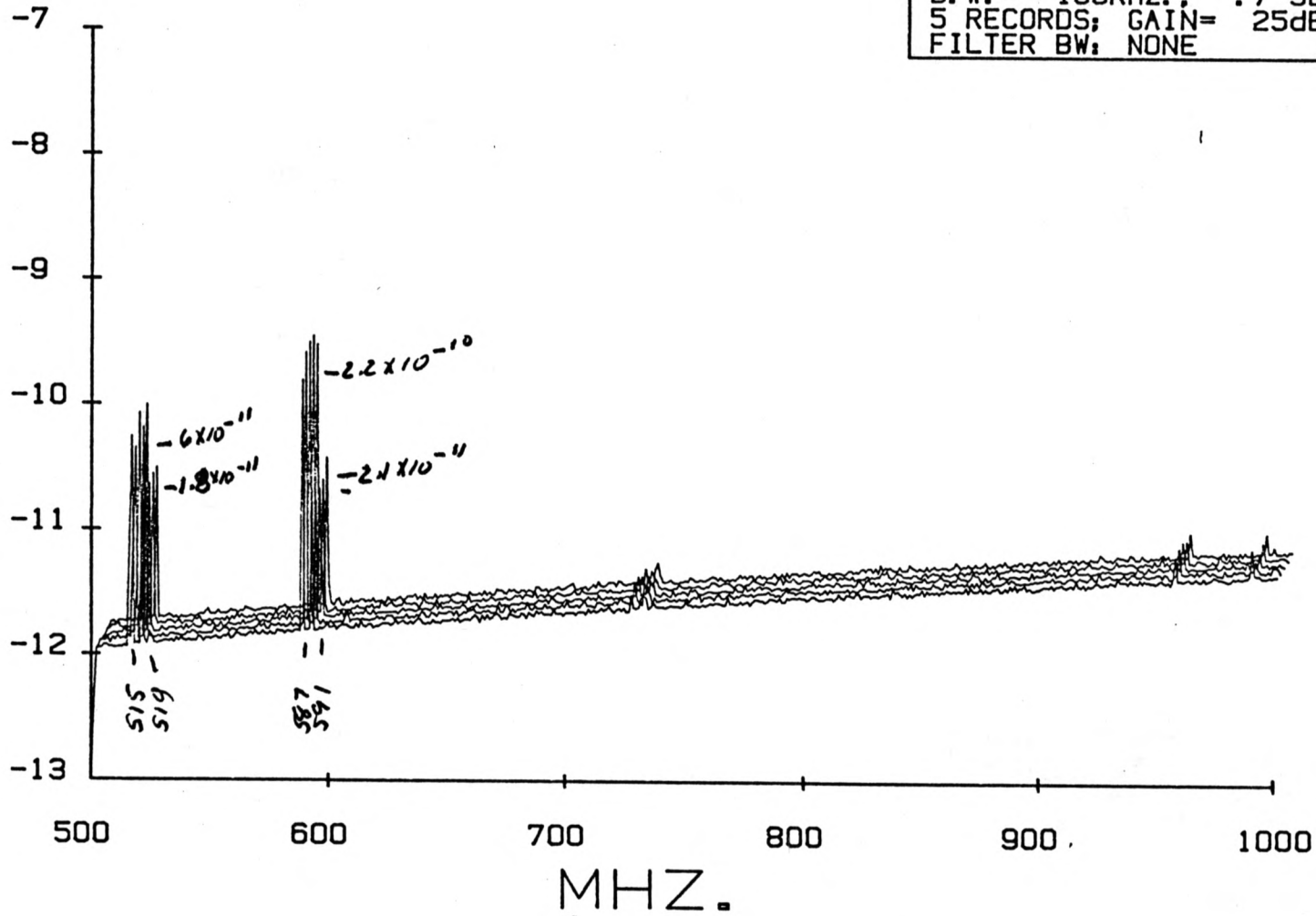
RFI SURVEY
LOCATION: MT GRAHAM
START: 10:23 08-18-1985
STOP : 10:32 08-18-1985
500 TO 1000 MHZ. 90 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
5 RECORDS; GAIN= 25dB
FILTER BW: NONE



FLUX (LOG W/SQ. M)

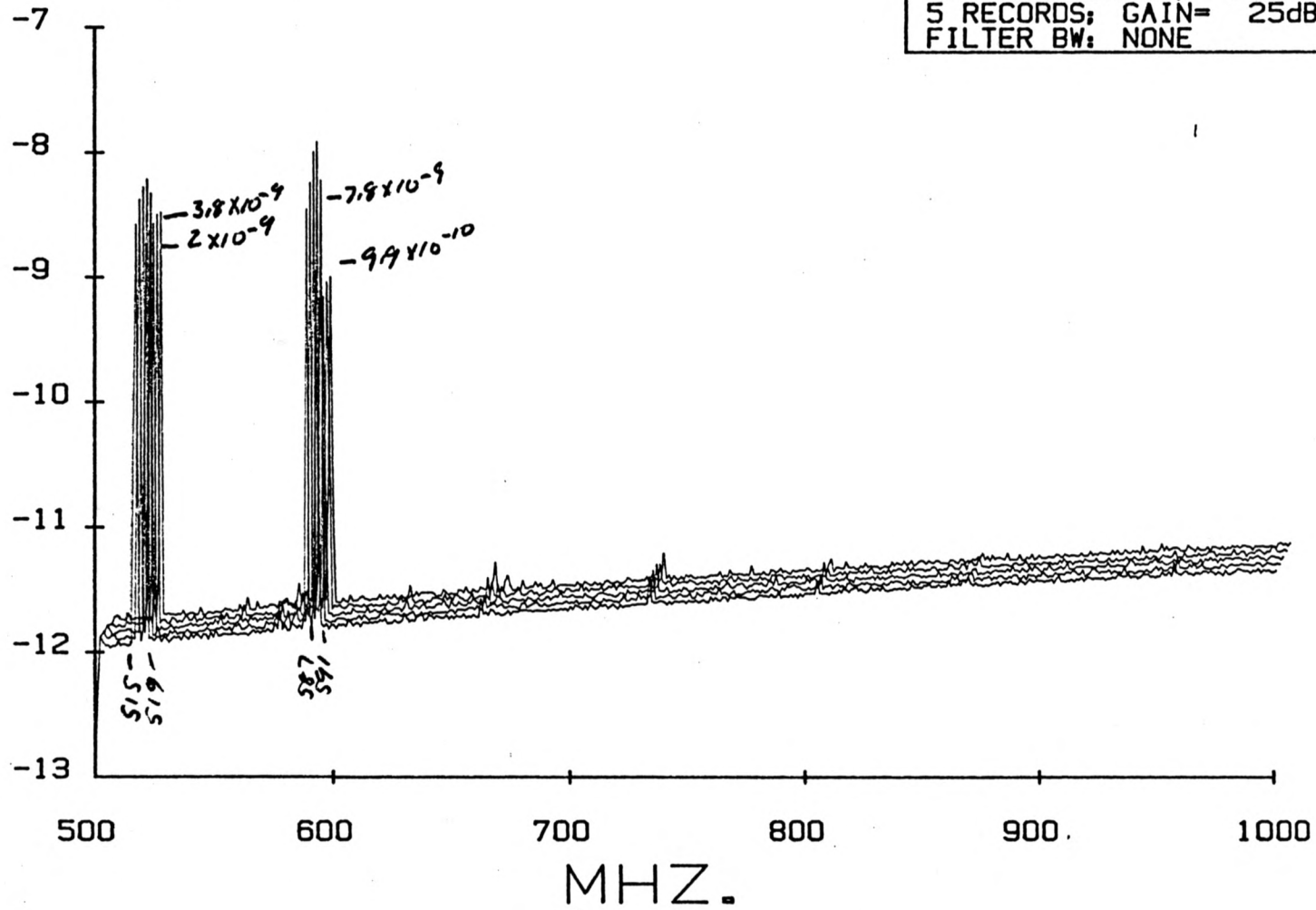
PLOT # 11

RFI SURVEY	
LOCATION: MT GRAHAM	
START: 10:34 08-18-1985	
STOP : 10:44 08-18-1985	
500 TO 1000 MHZ. 180 DEG AZ.	
B.W. = 100KHZ.; .7 SEC/CM.	
5 RECORDS; GAIN= 25dB	
FILTER BW: NONE	



FLUX (LOG W/SQ. M)

PLOT # 12

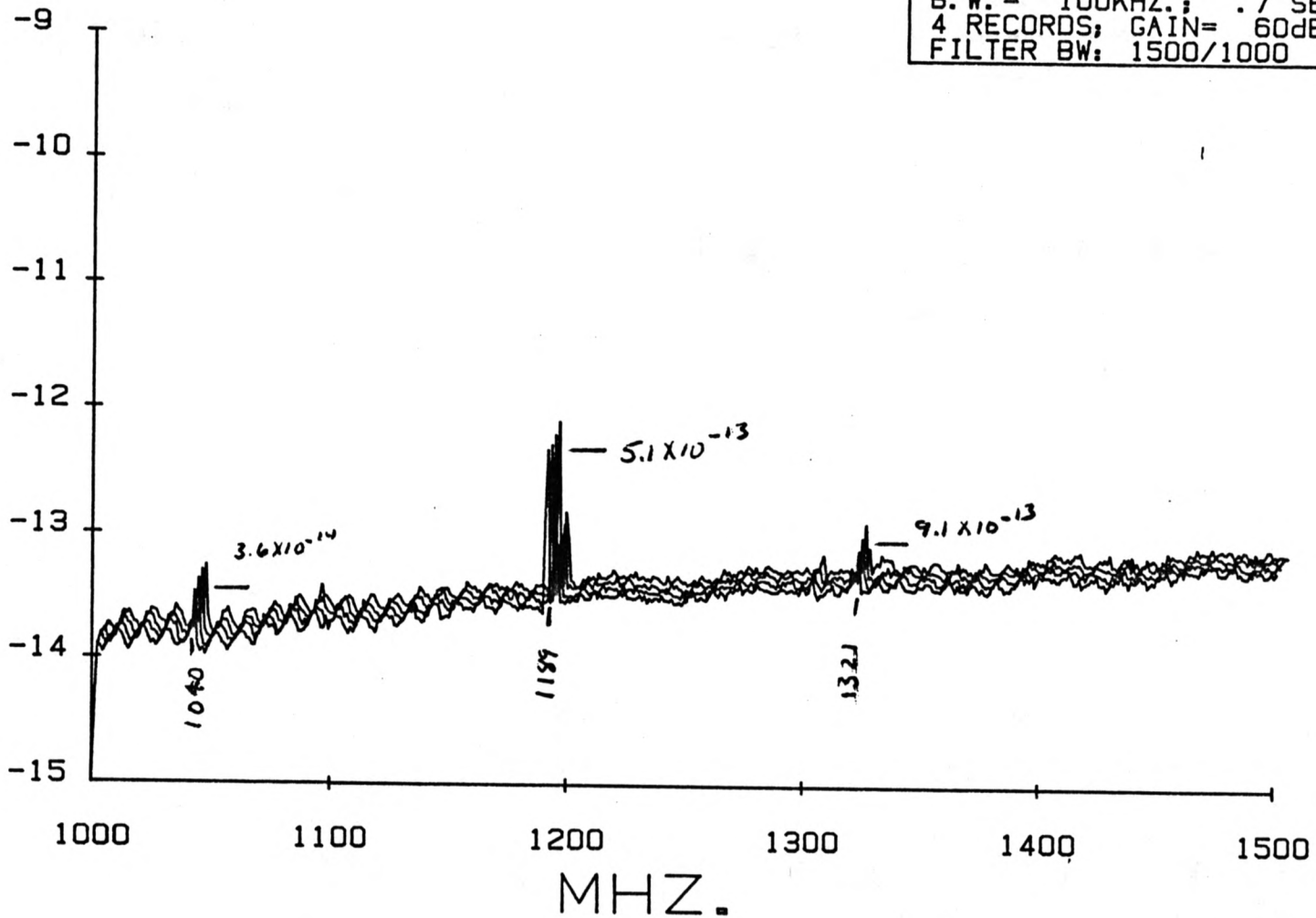


RFI SURVEY	
LOCATION: MT GRAHAM	
START: 10:46 08-18-1985	
STOP : 10:55 08-18-1985	
500 TO 1000 MHZ. 270 DEG AZ.	
B.W. = 100KHZ.; .7 SEC/CM.	
5 RECORDS; GAIN= 25dB	
FILTER BW: NONE	

FLUX (LOG W/SQ. M)

PLOT # 13

RFI SURVEY
LOCATION: MT GRAHAM
START: 14:15 08-17-1985
STOP : 14:23 08-17-1985
1000 TO 1500 MHZ. 0 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000

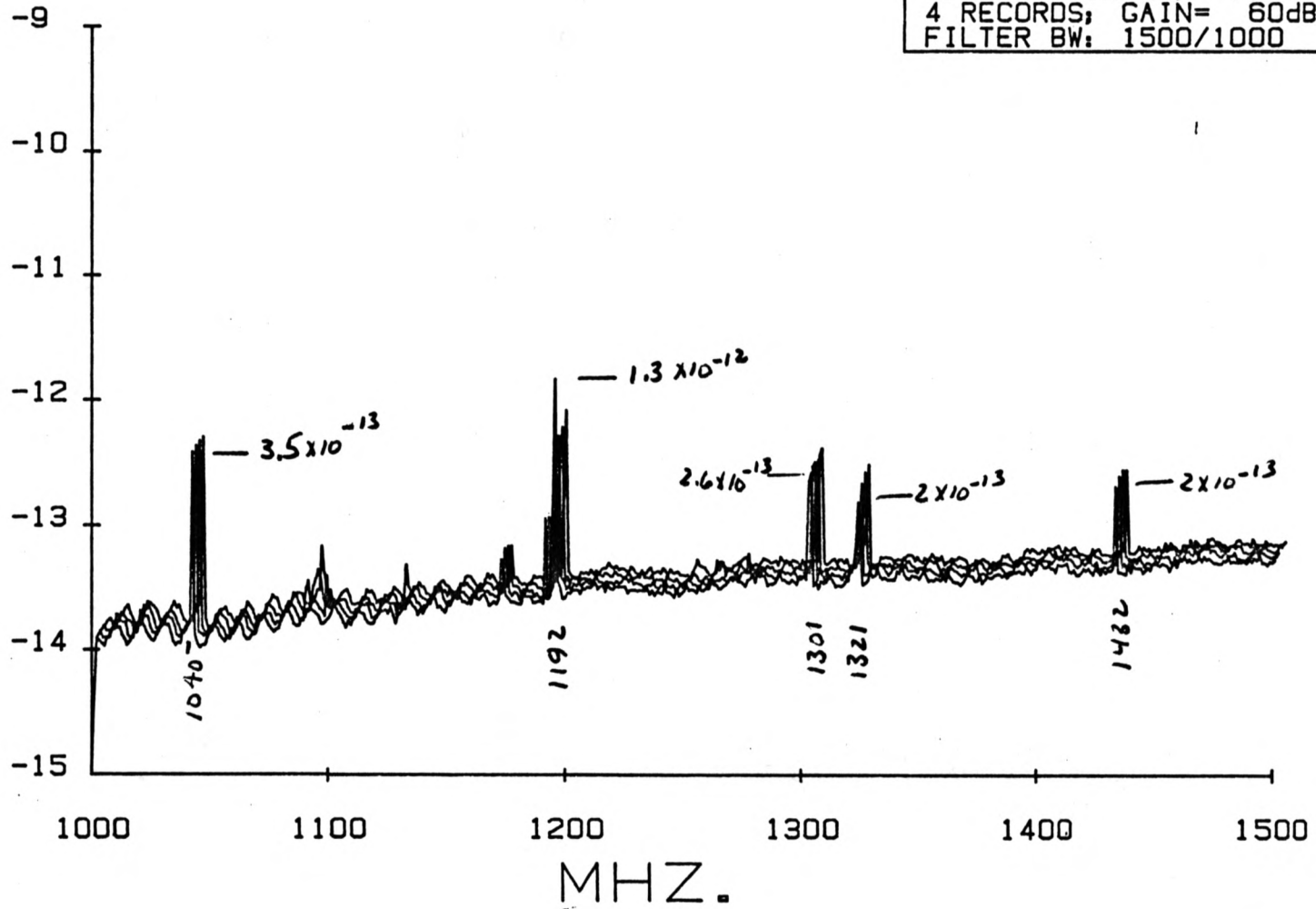




FLUX (LOG W/SQ. M)

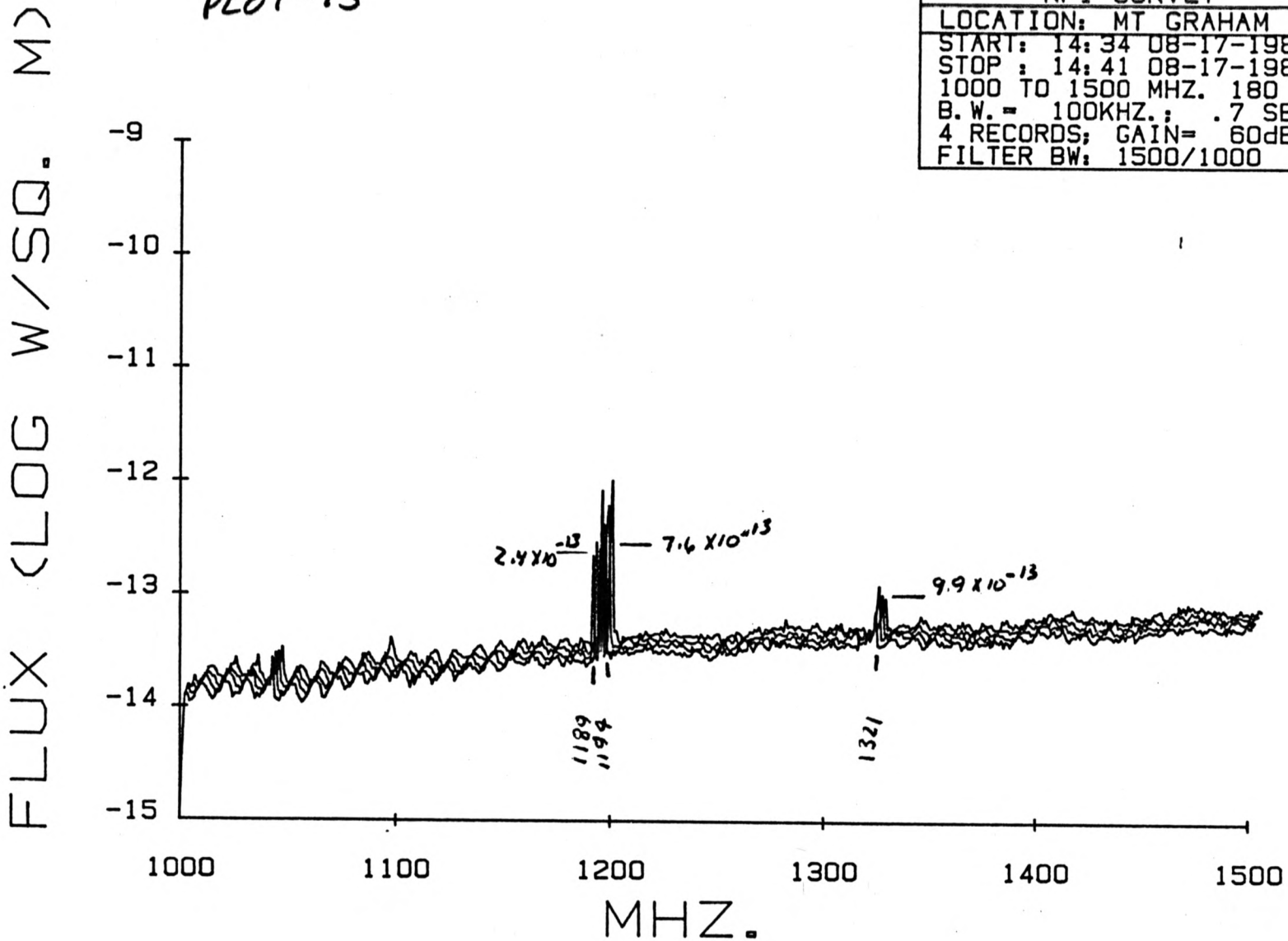
PLOT #14

RFI SURVEY
LOCATION: MT GRAHAM
START: 14:25 08-17-1985
STOP : 14:32 08-17-1985
1000 TO 1500 MHZ. 90 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000



PLOT #15

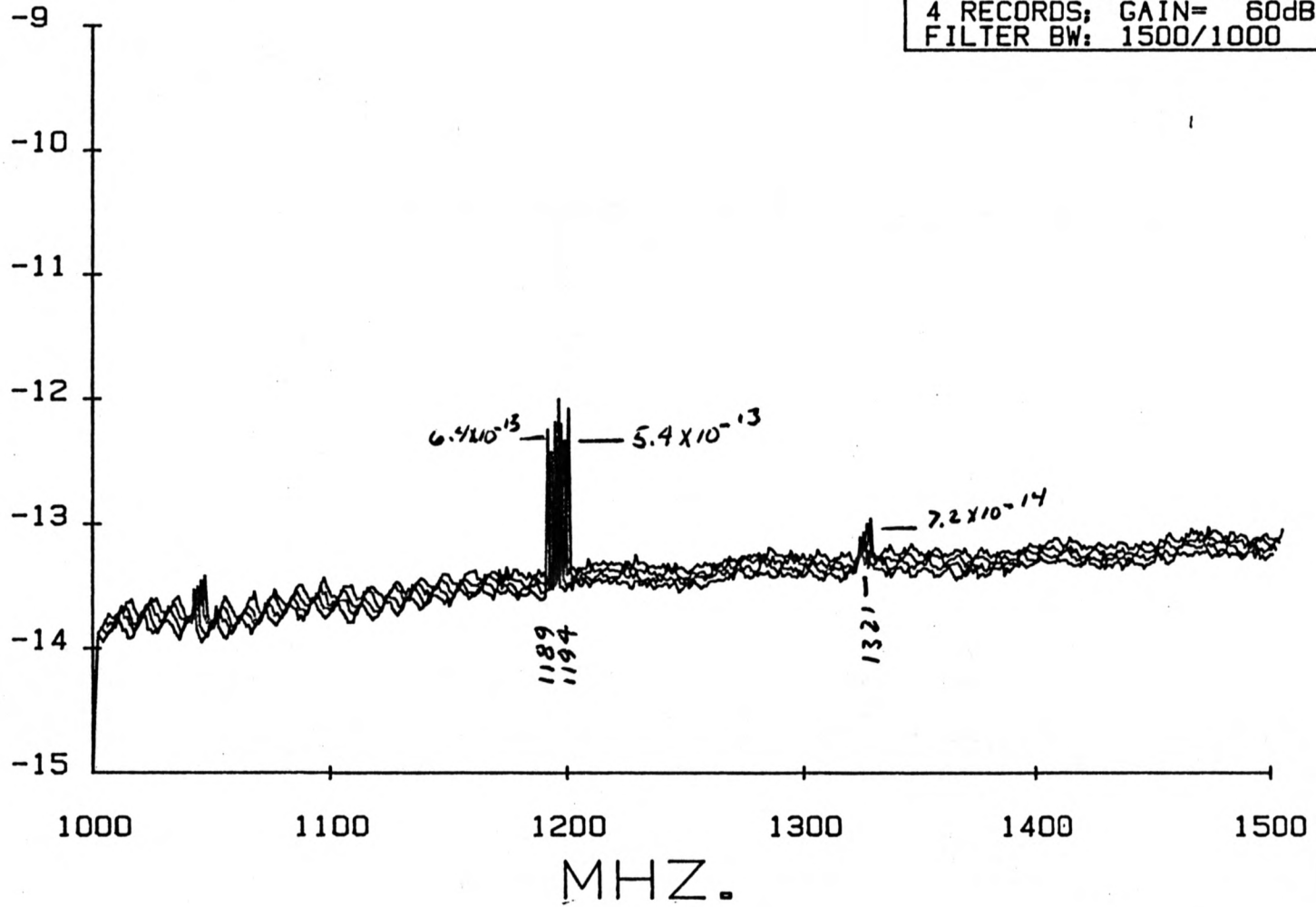
RFI SURVEY
LOCATION: MT GRAHAM
START: 14:34 08-17-1985
STOP : 14:41 08-17-1985
1000 TO 1500 MHZ. 180 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000



FLUX (LOG W/SQ. M)

PLOT # 16

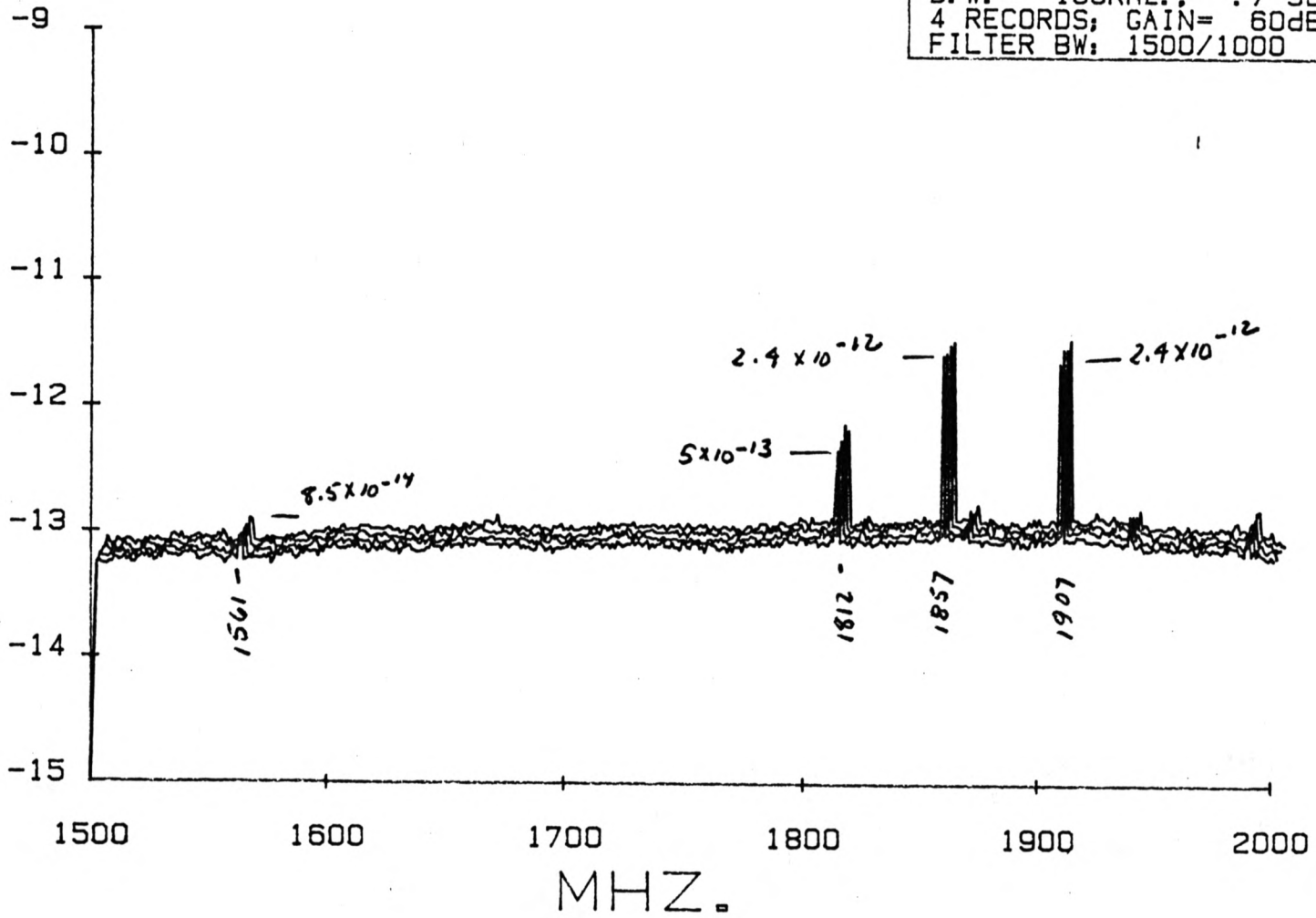
RFI SURVEY
LOCATION: MT GRAHAM
START: 14:43 08-17-1985
STOP : 14:51 08-17-1985
1000 TO 1500 MHZ. 270 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000



FLUX (LOG W/SQ. M)

PLOT # 17

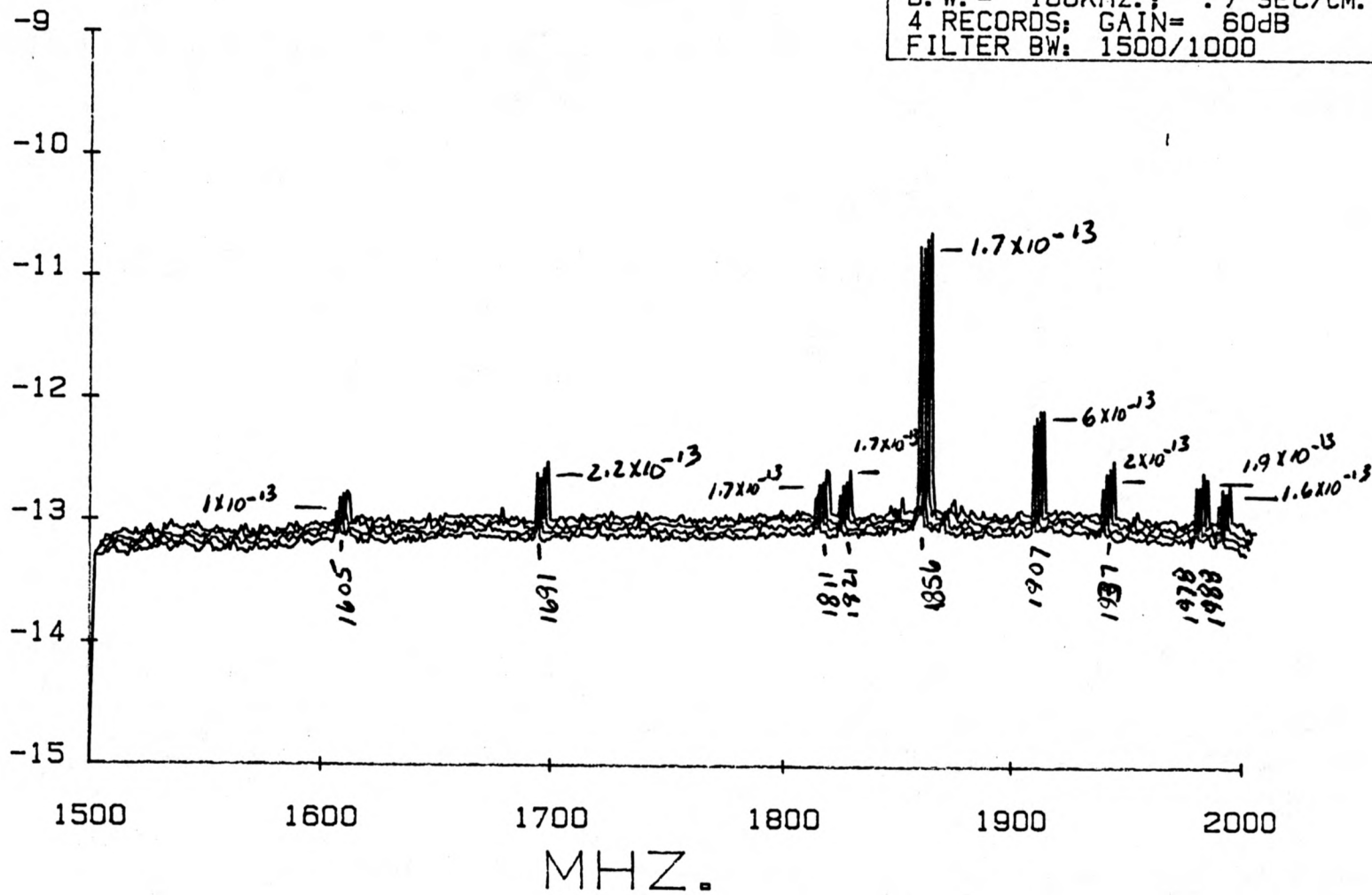
RFI SURVEY
LOCATION: MT GRAHAM
START: 14:53 08-17-1985
STOP : 15:00 08-17-1985
1500 TO 2000 MHZ. 0 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000



FLUX (LOG W/SQ. M)

Plot # 18

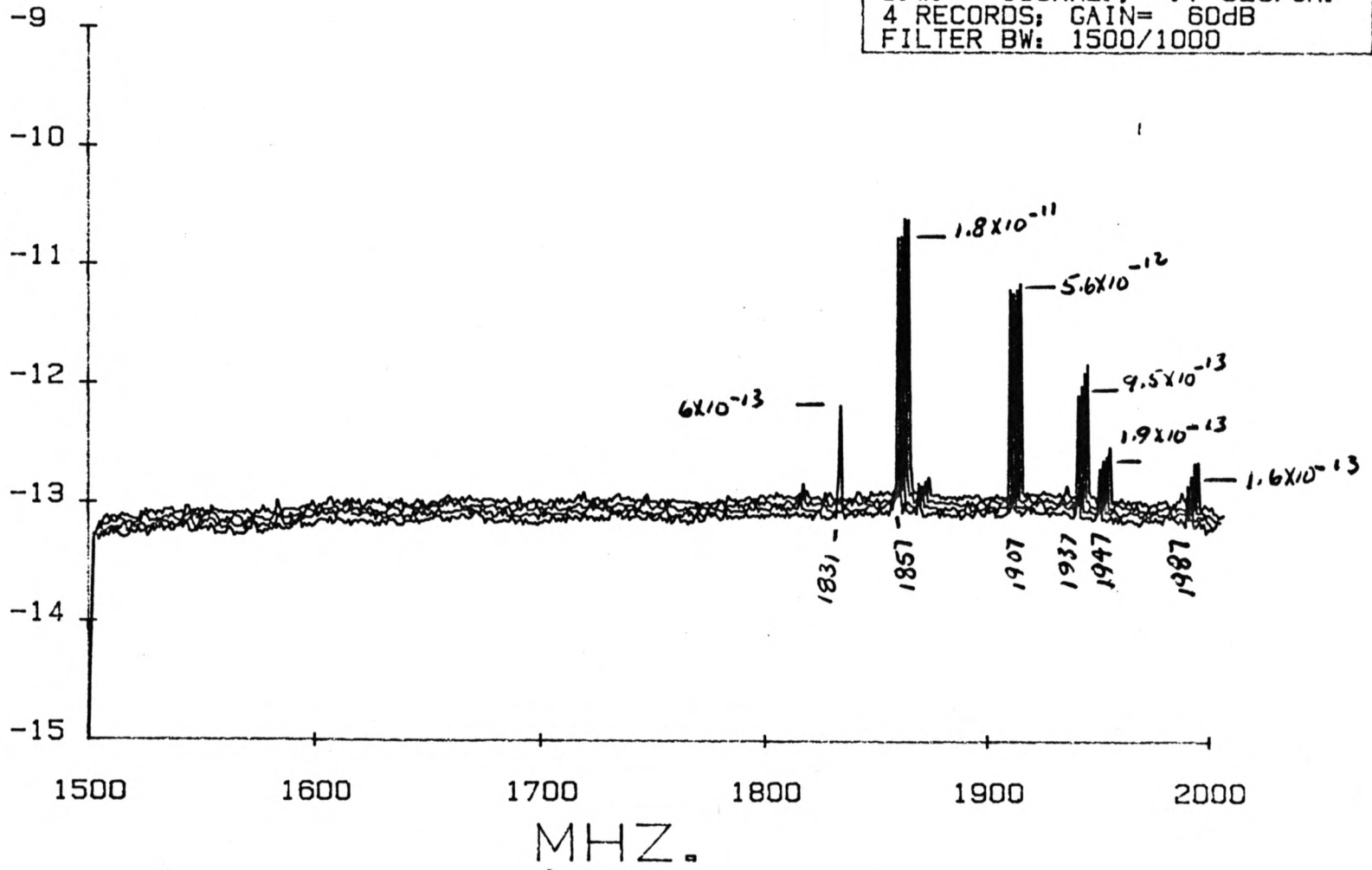
RFI SURVEY
LOCATION: MT GRAHAM
START: 15:03 08-17-1985
STOP : 15:10 08-17-1985
1500 TO 2000 MHZ. 90 DEG AZ.
B. W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000



PLOT # 19

RFI SURVEY	
LOCATION: MT GRAHAM	
START: 15:18 08-17-1985	
STOP : 15:18 08-17-1985	
1500 TO 2000 MHZ. 180 DEG AZ.	
B.W. = 100KHZ.; .7 SEC/CM.	
4 RECORDS; GAIN= 60dB	
FILTER BW: 1500/1000	

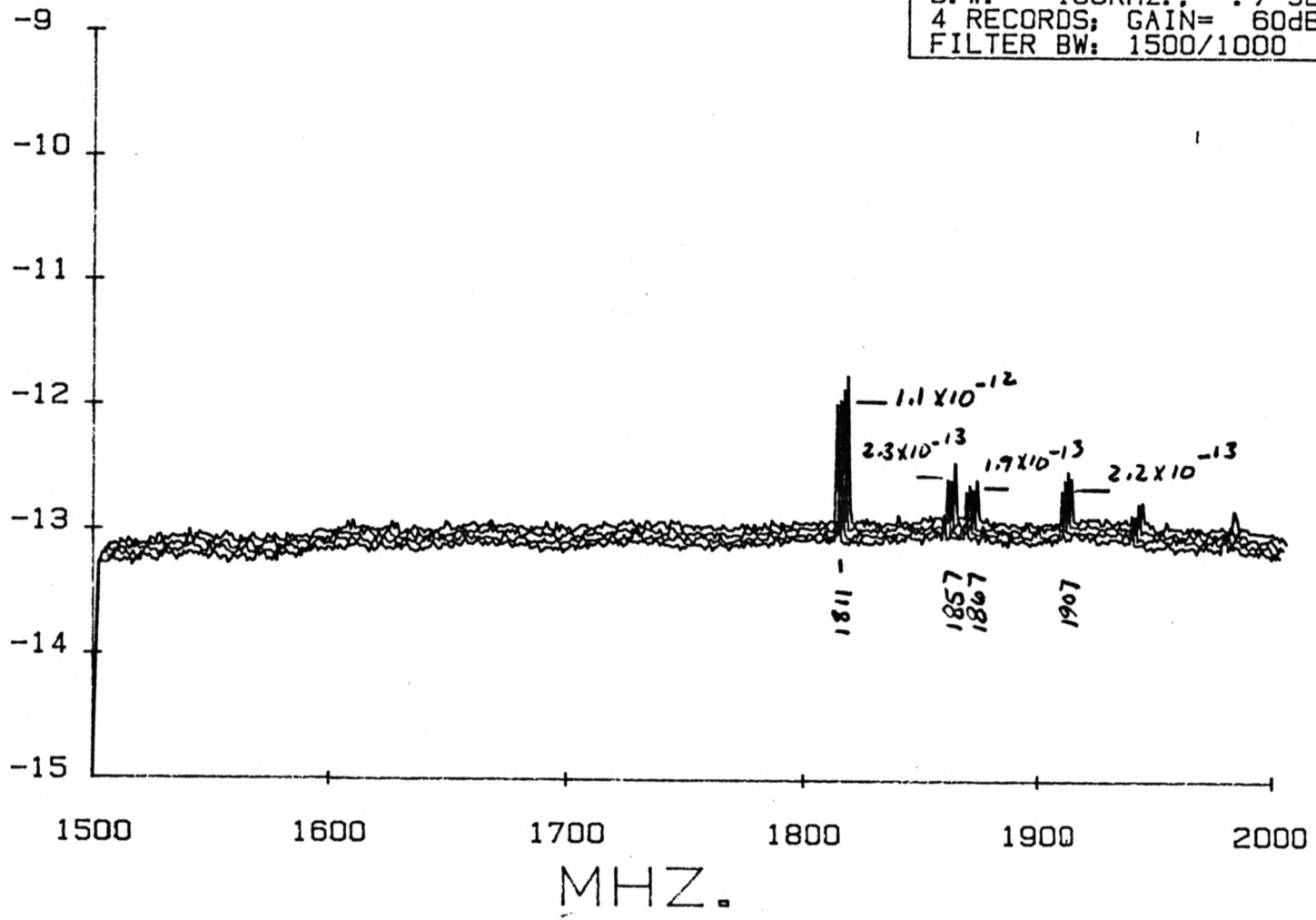
FLUX (LOG W/SQ. M)



PLOT # 20

RFI SURVEY
LOCATION: MT GRAHAM
START: 15:18 08-17-1985
STOP : 15:18 08-17-1985
1500 TO 2000 MHZ. 270 DEG AZ.
B. W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: 1500/1000

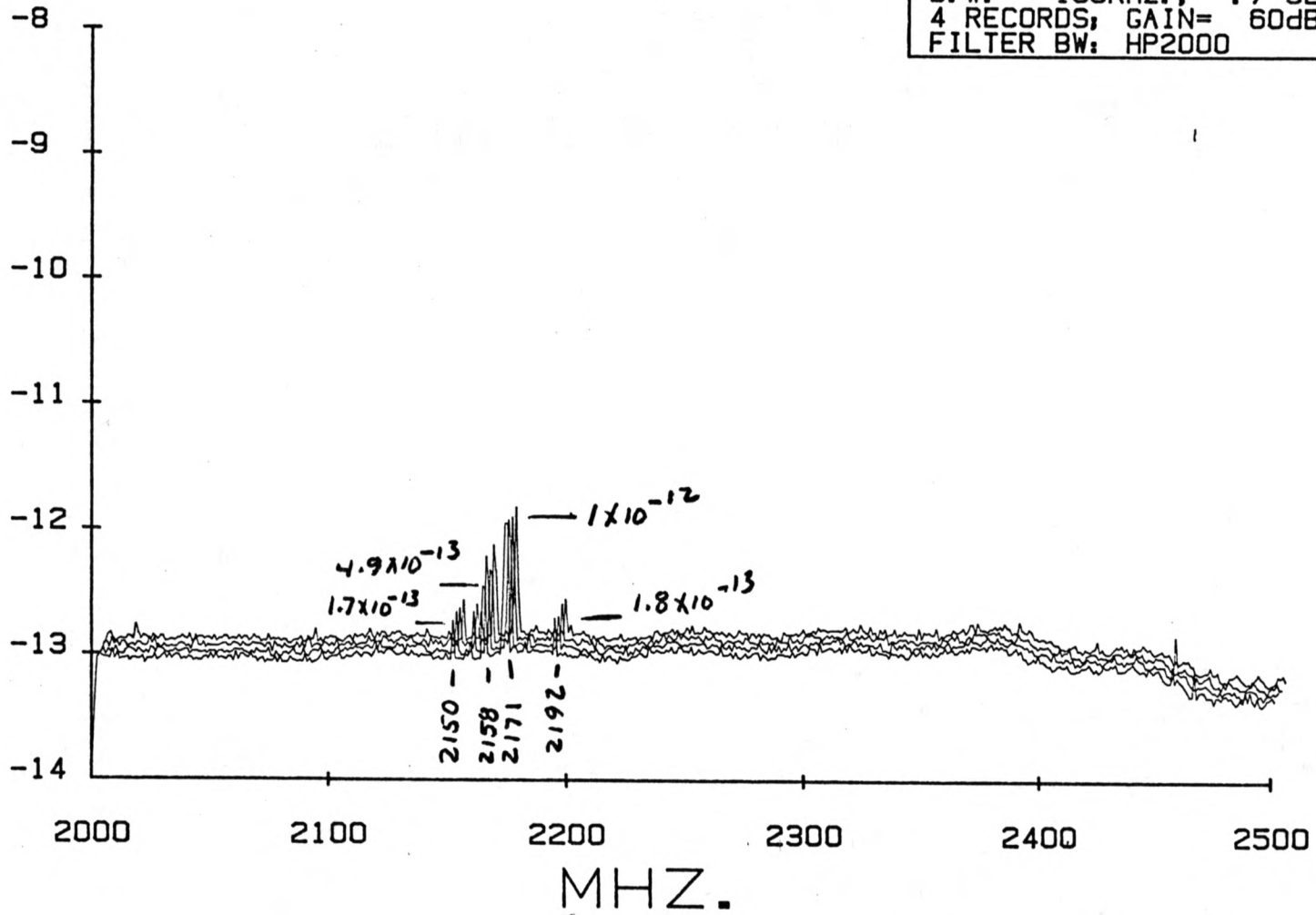
FLUX (LOG W/SQ. M)



PLOT # 21

RFI SURVEY
LOCATION: MT GRAHAM
START: 15:46 08-17-1985
STOP : 15:53 08-17-1985
2000 TO 2500 MHZ. 0 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP2000

FLUX (LOG W/SQ. M)

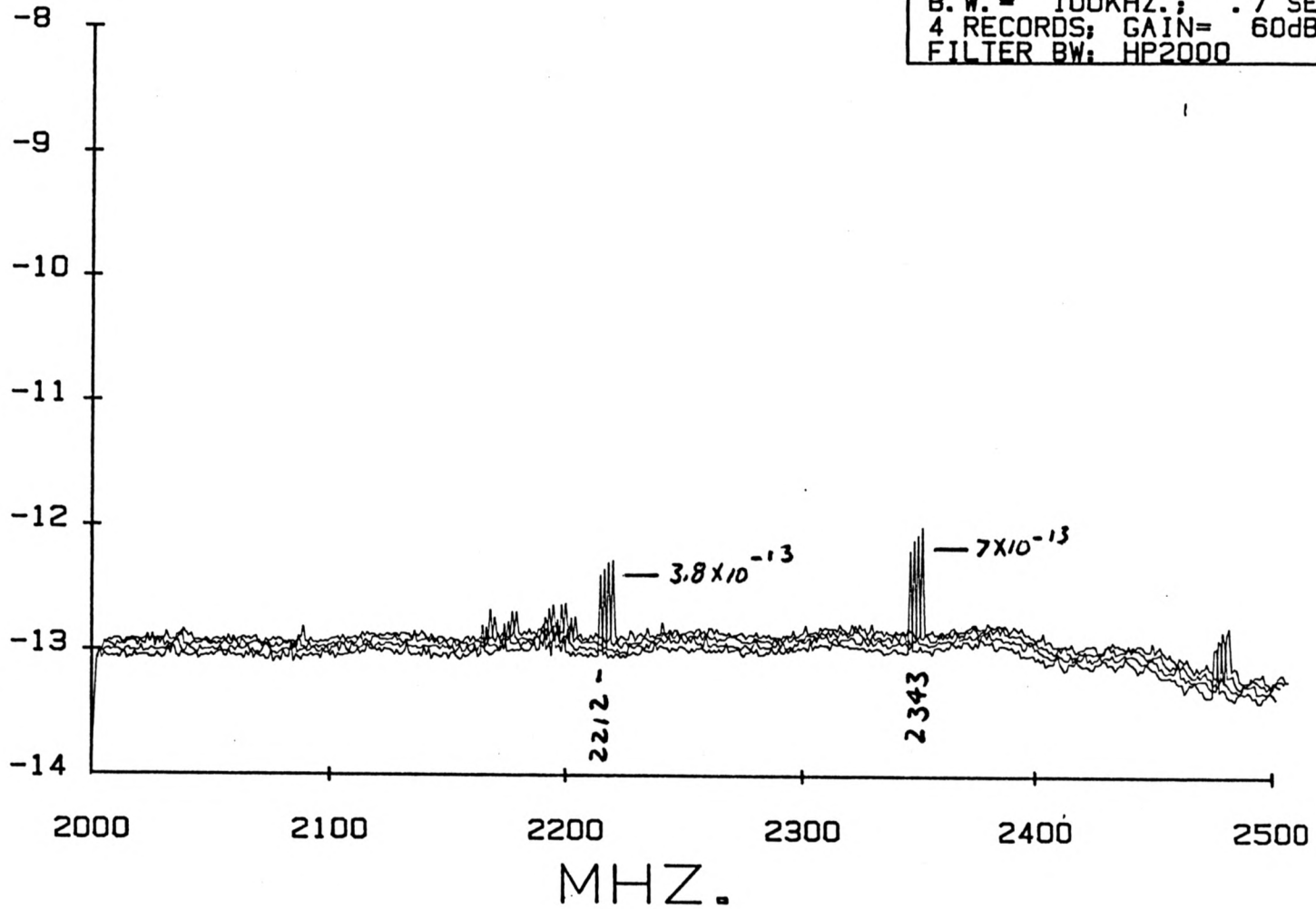




FLUX (LOG W/SQ. M)

Plot # 22

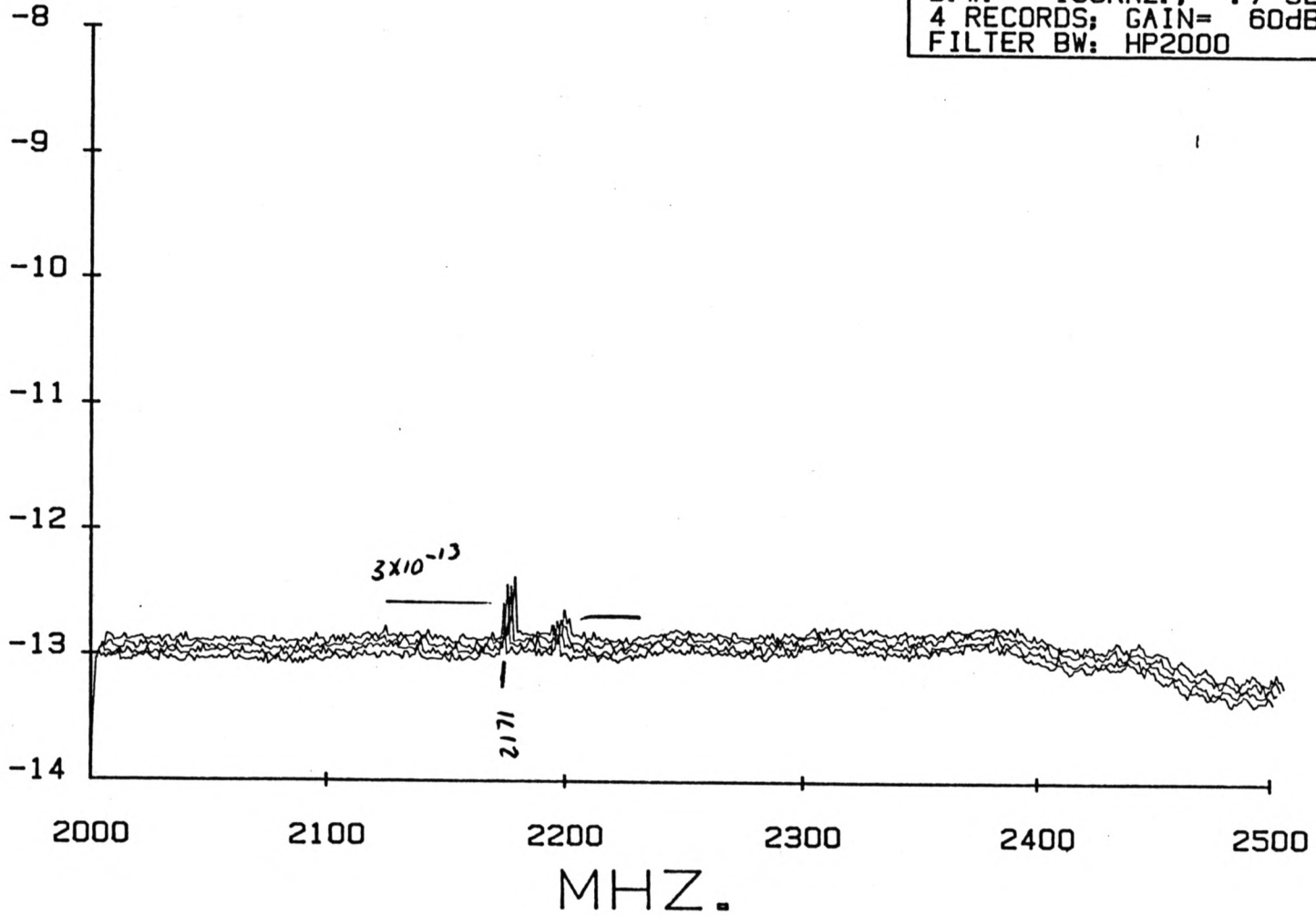
RFI SURVEY
LOCATION: MT GRAHAM
START: 15:56 08-17-1985
STOP : 16:03 08-17-1985
2000 TO 2500 MHZ. 90 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP2000



FLUX (LOG W/SQ. M)

PLOT # 23

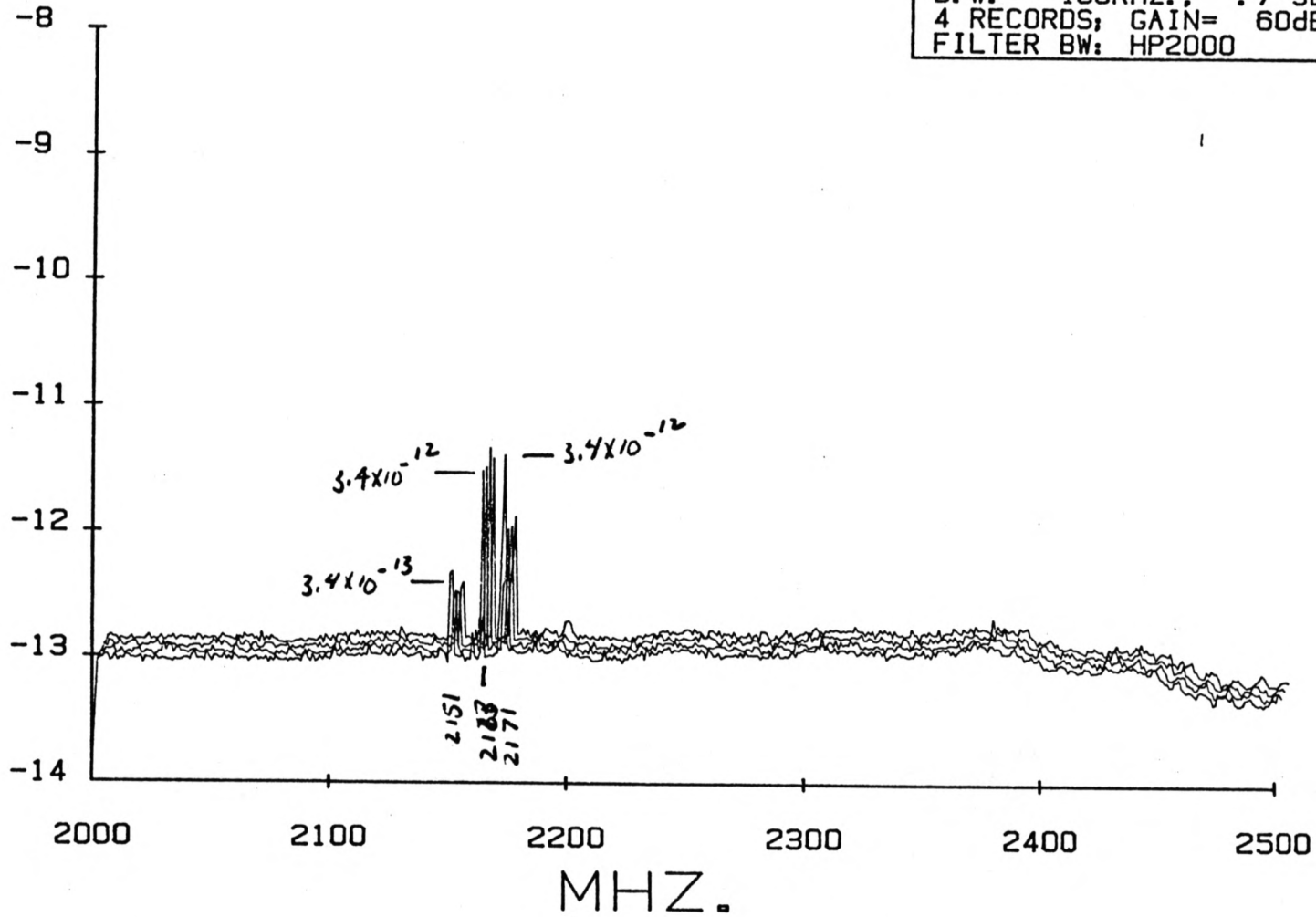
RFI SURVEY
LOCATION: MT GRAHAM
START: 16:05 08-17-1985
STOP : 16:12 08-17-1985
2000 TO 2500 MHZ. 180 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP2000



FLUX (LOG W/SQ. M)

PLOT # 24

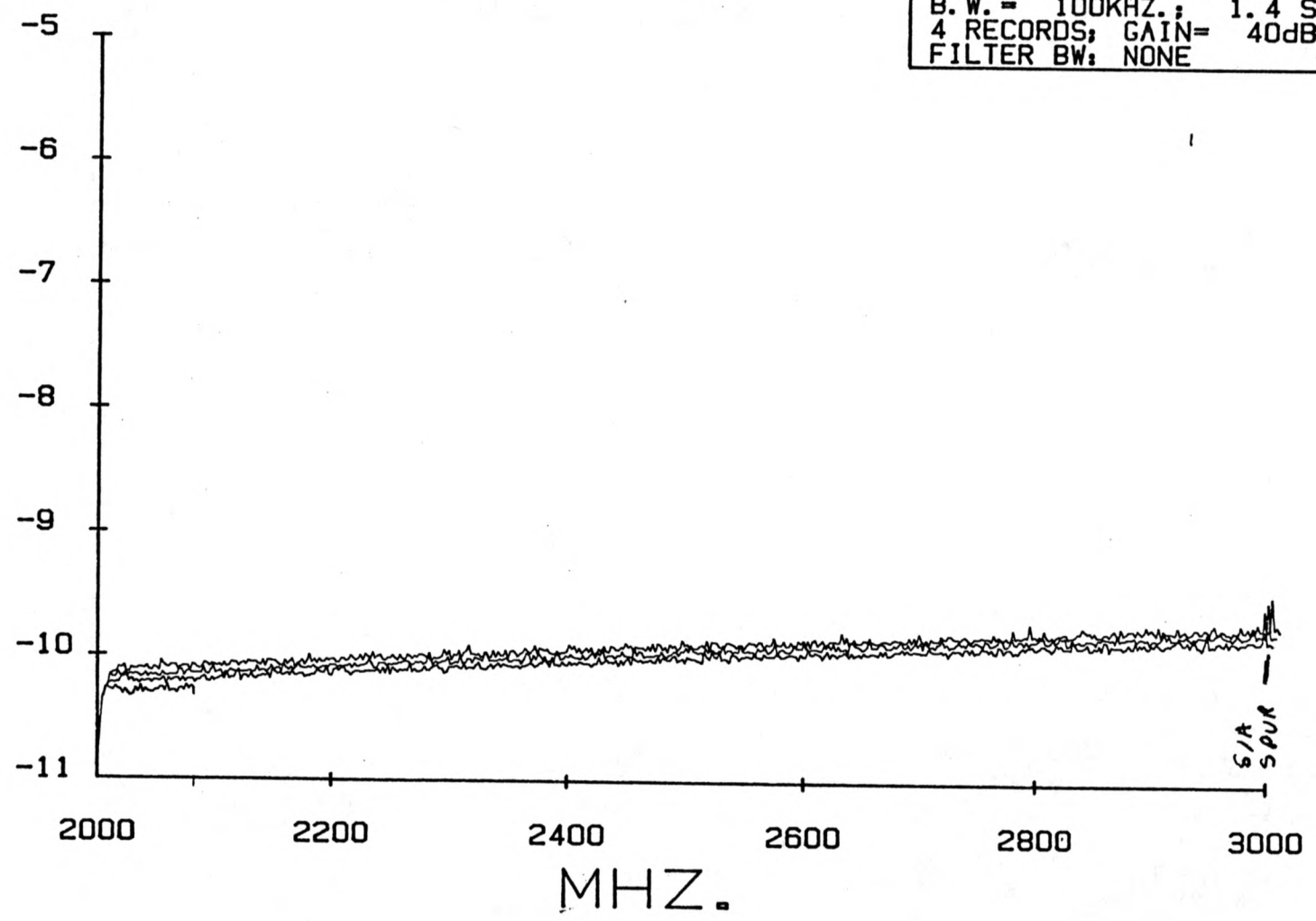
RFI SURVEY
LOCATION: MT GRAHAM
START: 16:14 08-17-1985
STOP : 16:22 08-17-1985
2000 TO 2500 MHZ. 270 DEG AZ.
B.W. = 100KHZ.; .7 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP2000



PLOT # 25

RFI SURVEY	
LOCATION: MT GRAHAM	
START: 16:43 08-17-1985	
STOP : 16:50 08-17-1985	
2000 TO 3000 MHZ. 270 DEG AZ.	
B.W. = 100KHZ.; 1.4 SEC/CM.	
4 RECORDS; GAIN= 40dB	
FILTER BW: NONE	

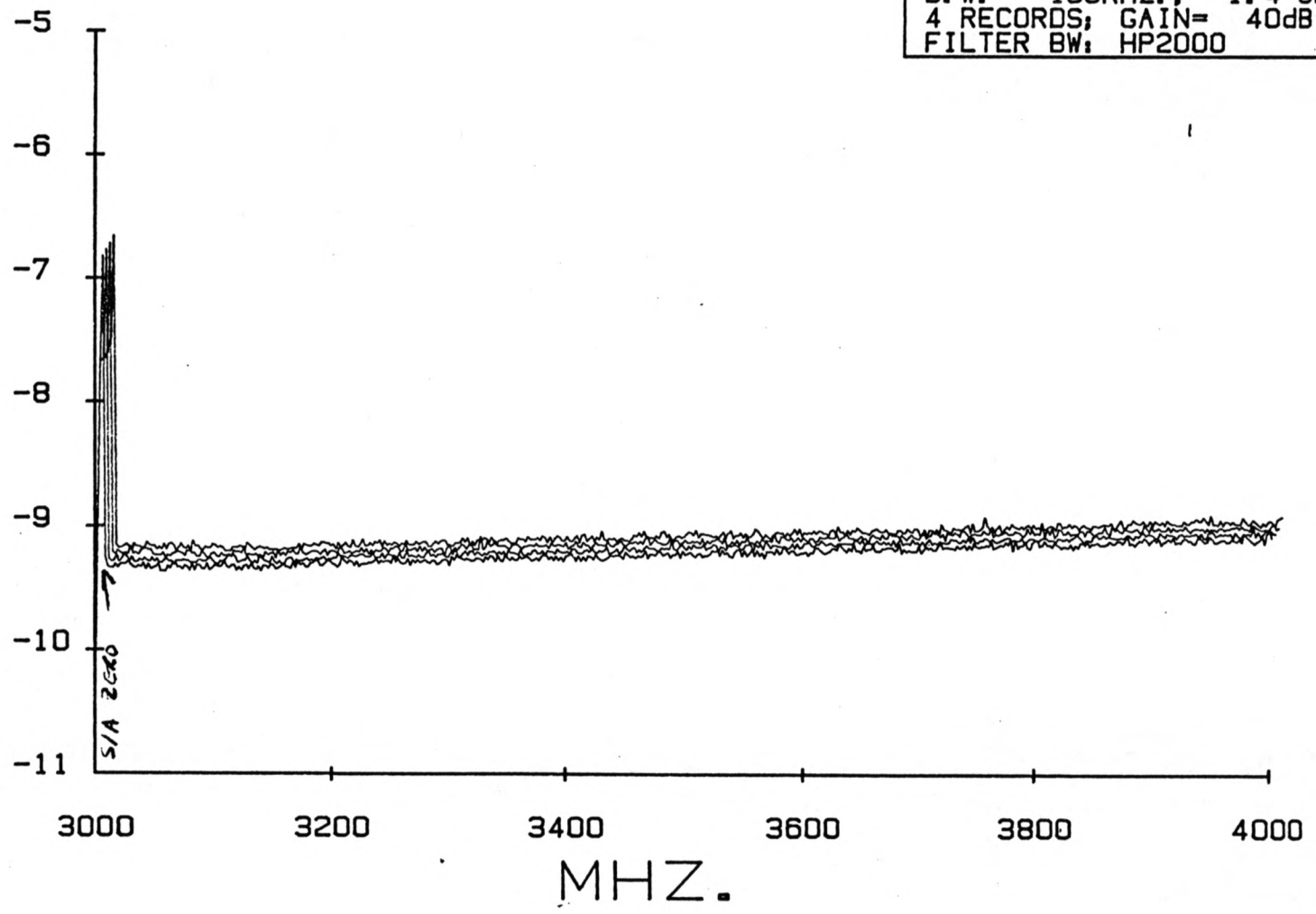
FLUX (LOG W/SQ. M)



PLOT # 26

RFI SURVEY
LOCATION: MT GRAHAM
START: 16:57 08-17-1985
STOP : 17:04 08-17-1985
3000 TO 4000 MHZ. 270 DEG AZ.
B. W. = 100KHZ.; 1.4 SEC/CM.
4 RECORDS; GAIN= 40dB
FILTER BW: HP2000

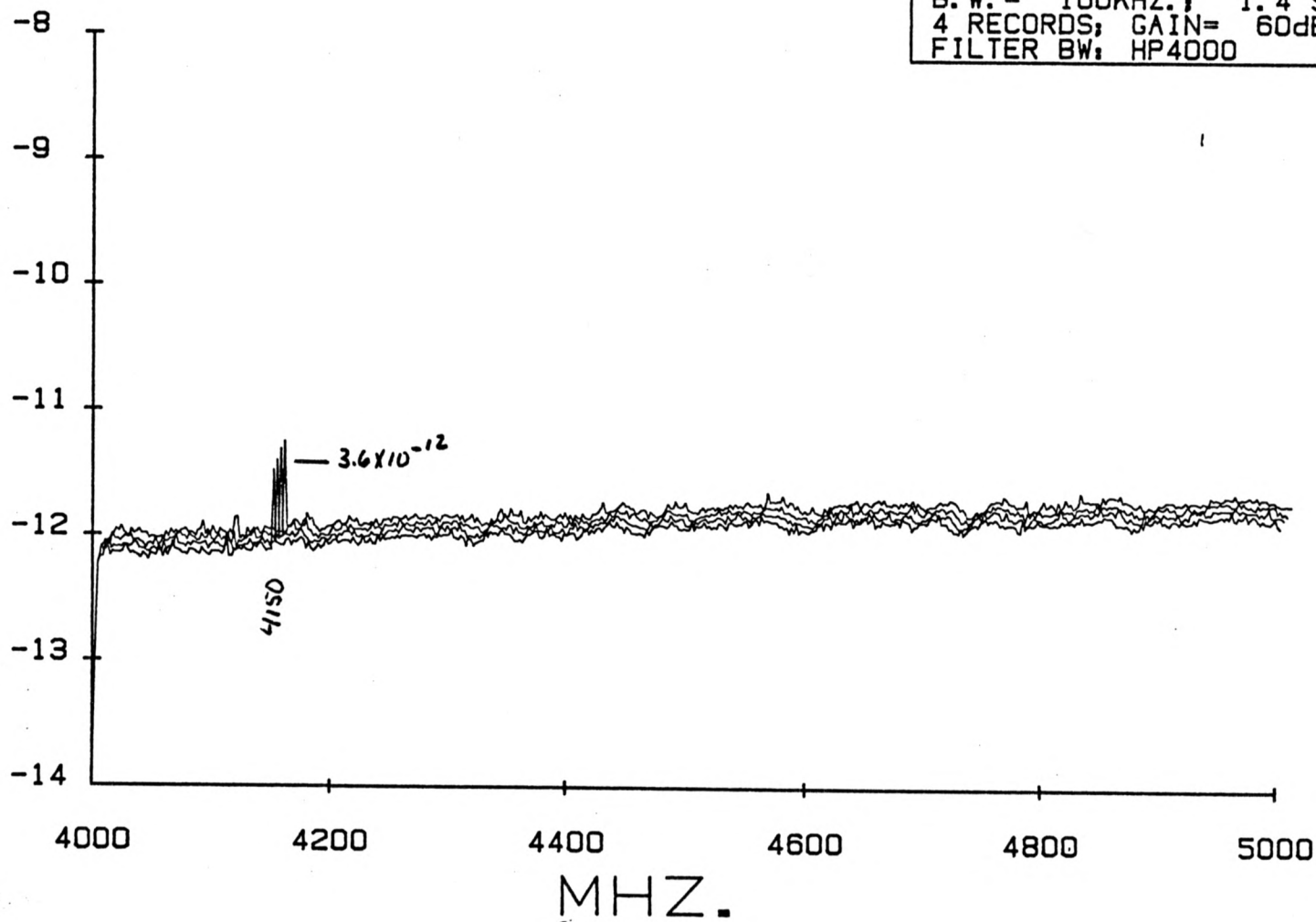
FLUX (LOG W/SQ. M)



PLOT # 27

RFI SURVEY
LOCATION: MT GRAHAM
START: 17:24 08-17-1985
STOP : 17:31 08-17-1985
4000 TO 5000 MHZ. 0 DEG AZ.
B. W. = 100KHZ., 1.4 SEC/CM.
4 RECORDS, GAIN= 60dB
FILTER BW: HP4000

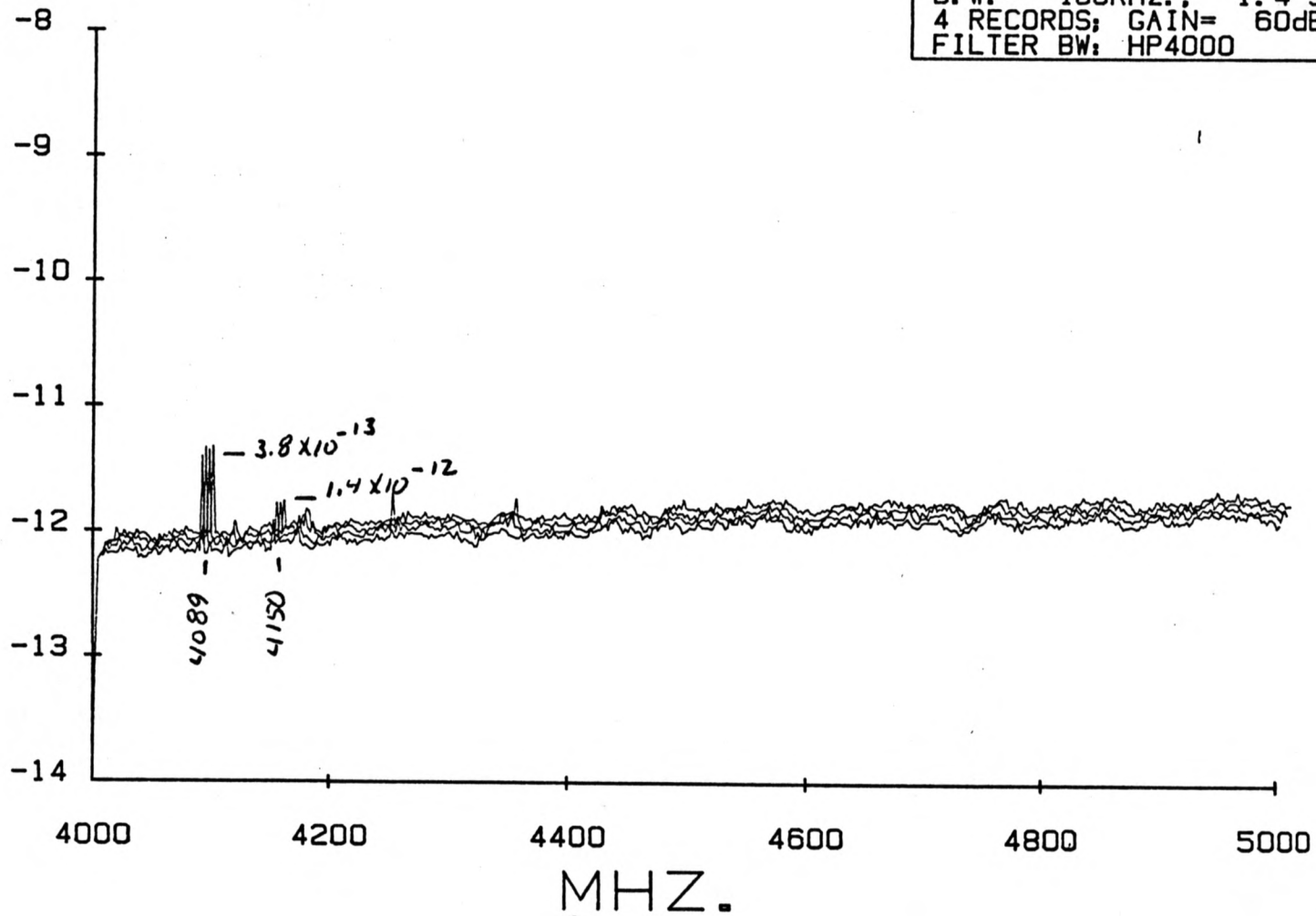
FLUX (LOG W/SQ. M)



FLUX (LOG W/SQ. M)

Plot # 28

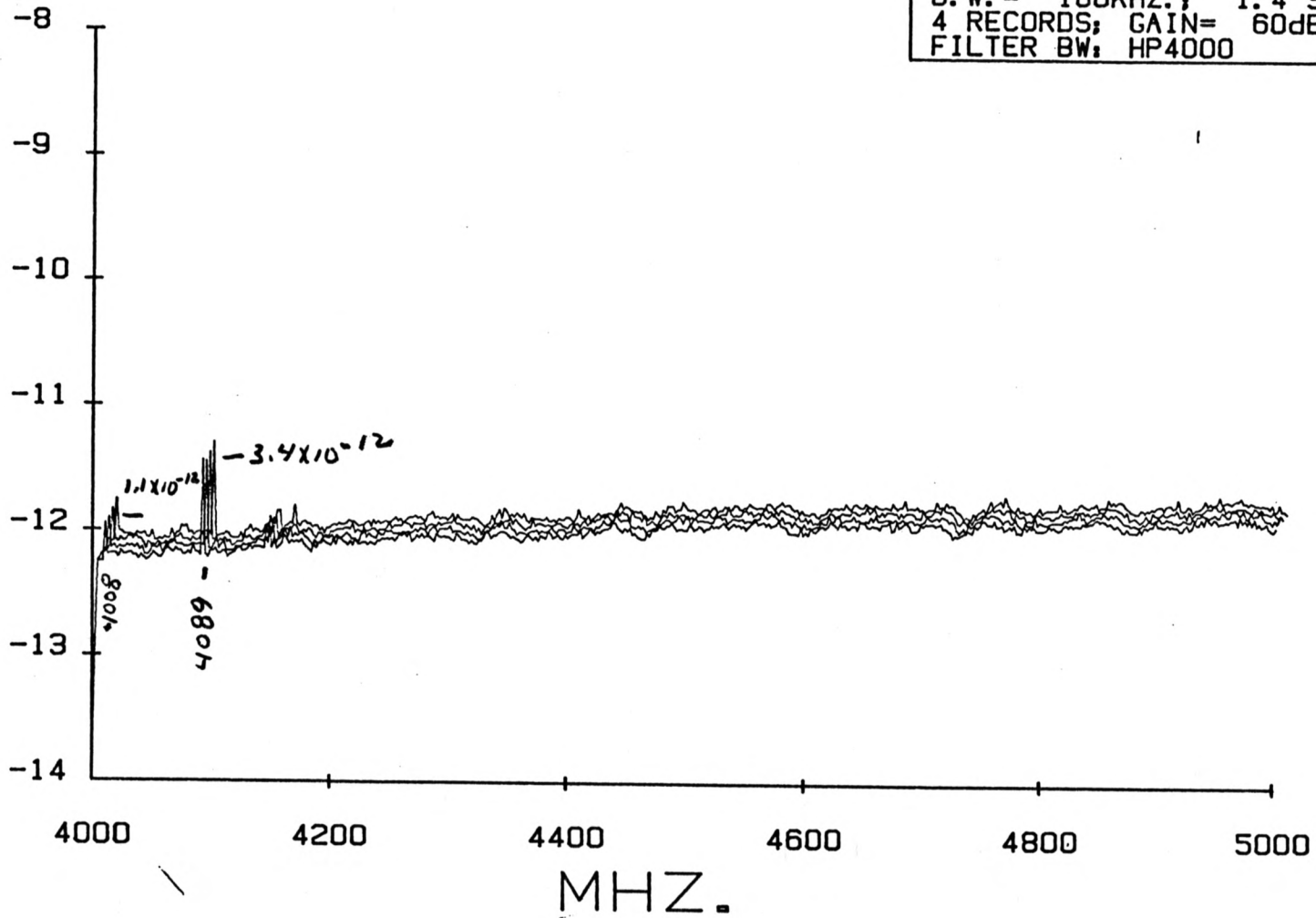
RFI SURVEY
LOCATION: MT GRAHAM
START: 17:36 08-17-1985
STOP : 17:43 08-17-1985
4000 TO 5000 MHZ. 90 DEG AZ.
B. W. = 100KHZ.; 1.4 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP4000



FLUX (LOG W/SQ. M)

PLT # 29

RFI SURVEY
LOCATION: MT GRAHAM
START: 17:45 08-17-1985
STOP : 17:53 08-17-1985
4000 TO 5000 MHZ. 180 DEG AZ.
B.W. = 100KHZ.; 1.4 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP4000

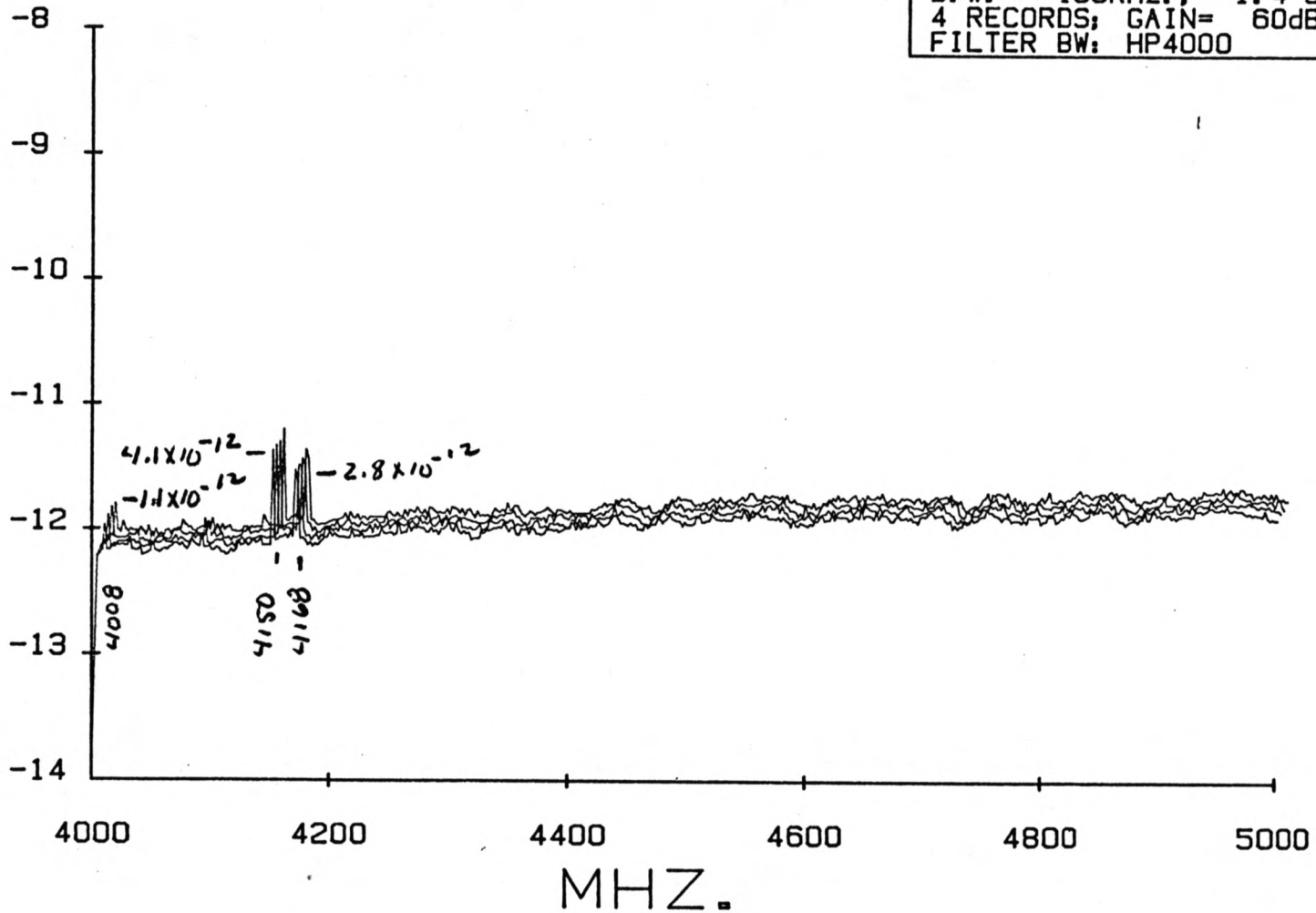




FLUX (LOG W/SQ. M)

PLOT # 30

RFI SURVEY
LOCATION: MT GRAHAM
START: 17:55 08-17-1985
STOP : 18:02 08-17-1985
4000 TO 5000 MHZ. 270 DEG AZ.
B.W. = 100KHZ.; 1.4 SEC/CM.
4 RECORDS; GAIN= 60dB
FILTER BW: HP4000



31

Plot #31

RFI SURVEY
LOCATION: MT GRAHAM
START: 08:05 08-18-1985
STOP : 08:16 08-18-1985
5000 TO 6000 MHZ. 270 DEG AZ.
B.W. = 100KHZ.; 1.4 SEC/CM.
5 RECORDS; GAIN= 60dB
FILTER BW: HP4000

FLUX (LOG W/SQ. M)

