VLBA TEST MEMO No. 49

# Front-end / IF Passband Measurements at St. Croix

March 1995

B. Brundage and J. Oty

Some VLBA observers and testers have expressed some concern over passband shapes of baseband converters (BBC), especially at the wider bandwidths of 4, 8 and 16 MHz. Some of the sloped and curved passbands arise not in the BBC but instead in the combined system of front-end ("F"module), coaxial cable, frequency converter ("T" module), antenna coaxial cable, intermediate frequency (IF) equalizer amplifier, and IF distributor (T121 module). Also, reflections between subreflector/apex and feed cone (~7.5 meter) and in parts of the antenna coaxial cable appear to create spectral ripples with a period of about 20 MHz.

J. Oty measured zenith system noise power passbands at the output (monitor port) of the IF distributors during the maintenance team visit to St. Croix, 27 February - 05 March 1995. These system passbands show steep slopes and quasi-ripples in all bands 20-0.7 cm, and for multiple LO synthesizer (L104 module) frequency settings. System noise power variations with frequency and passband slopes sometimes exceed 1 dB/16 MHz, which is a power ratio of 1.26 across a 16 MHz bandwidth.

All spectral power plots span the 500 - 1000 MHz IF range (except plot #3 which spans 600 - 1100 MHz). Horizontal scale divisions are 50 MHz. Horizontal axes are labeled in sky frequency in GHz. Vertical scale is 1 dB per division, where dB = 10 log($P_1/P_0$). A Hewlett-Packard 8590B swept frequency spectrum analyzer made the plots. Settings were resolution bandwidth = 1 MHz, video bandwidth =100 Hz, sweep time = 15 sec, mode = peak hold, number of sweeps = 1. Future measurements will be mode = average, number of sweeps ~10.

## 20 cm, 1.5 GHz Receiver, Plots #2 - 3

St. Croix has an additional IF passband filter following the T103 frequency converter which limits the IF range to 700 - 1000 MHz. Plot #3 spans 600 to 1100 MHz of IF, 1.8 to 1.3 GHz of sky frequency. Steep slopes occur at 1.4 to 1.5 GHz and at 1.6 GHz. Strong interference occurs at 1.46, 1.55, 1.57 and 1.73 GHz. Extremely strong radar pulses at 1.33 and 1.35 GHz do not appear in Plot #2, because the Pico del Este radar was down for maintenance at that time.

The small 1.37 - 1.43 GHz frequency overlap between plots #2 and #3 differ considerably. This indicates that the spectral variations occur in or downstream from the mixer in the T103 frequency converter.

13 cm, 2.3 GHz , Plots #4 - 5

Plot #4 spans 1.9 - 2.4 GHz and shows a number of large slopes which do not track in L and R polarizations. It also shows a hint of 20 MHz reflection ripple in RCP from 2.3 to 2.4 GHz. Strong interference occurs at 1.95 - 2.03 GHz and at 2.16 - 2.2 GHz.

Plot #5 spans 2.1 - 2.6 GHz and shows a number of large slopes which do not track in L and R polarizations. It also shows a severe dip in RCP and a peak in LCP at 2.46 GHz.

The 2.10 - 2.40 GHz frequency overlap between plots #4 and #5 differ considerably. This indicates that the spectral variations and 20 MHz ripple occur in or downstream from the mixer in the T104 frequency converter.

6 cm, 4.8 GHz, plots #6 - 7

Plot #6 spans 4.4 - 4.9 GHz and shows steep slopes, bumps and dips. An especially deep dip occurs in LCP at 4.76 GHz. RCP at 4.55 GHz and both R and L at 4.7 GHz show a hint of a 20 MHz reflection ripple.

Plot #7 spans 4.6 - 5.1 GHz and shows steep slopes and bumps. Both polarizations show 20 MHz reflection ripples near 4.63 and 4.9 GHz.

The 4.60 - 4.90 GHz frequency overlap between plots differ considerably. This indicates that the spectral variations occur in or downstream from the mixer in the T105 frequency converter.

4 cm, 8.4 GHz, Plots #8 - 10

Plot #8 spans 7.9 - 8.4 GHz, #9 spans 8.1 - 8.6 GHz, and #10 spans 8.4 - 8.9 GHz. All show steep slopes, bumps and dips. The trend to similar peaks at 850 - 1000 MHz and at 650 MHz IF frequency suggests reflection effects in the IF. A hint of this in the 13 cm and 6 cm plots suggest short-length reflection effects in the vertex-to-building coaxial cable, possibly near the bulkhead lightning arrestors at the antenna vertex or the building.

The 8.1 - 8.4 GHz and 8.4 - 8.6 GHz frequency overlaps between plots differ considerably. This indicates that the spectral variations occur in or downstream from the mixer in the T106 frequency converter.

2 cm, 14 GHz, Plots #11 - 17

Because the 2 cm front end F108 covers the wide frequency range from 12.4 to 15.4 GHz, a set of 4 bandpass filters provides rejection of the image response 0.5 - 1.0 GHz above the L104 synthesizer frequency. The 14 GHz converter module T108 contains the filters. Several combinations of LO frequency and filter cause a steep slope in system power in the low end of the IF spectrum, 500 to 650 MHz.

Plot #12 spans 12.4 - 12.9 GHz, #13 spans 12.9 - 13.4 GHz, #14 spans 13.4 - 13.9 GHz, #15 spans 13.9 - 14.4 GHz, #16 spans 14.4 - 14.9 GHz, and #17 spans 14.9 - 15.4 GHz.

Limited time prevented measurements of the overlapping spectra produced by the plus-lock L104 frequencies of (N*500+100) MHz. Therefore, we cannot compare spectra at overlapping frequencies.

All plots show some spectral ripples at ~20 MHz (~7.5 m) period. These ripples occur at various sky frequency ranges and at the nominally same IF frequency ranges, but which vary with polarization. Therefore reflections downstream from the T108 mixer produce these ripples.

7mm, 43 GHz, Plots #20 - 24

The 7mm receiver front end F110 uses the 3rd harmonic of L104 synthesizer #3 (10.9 - 12.1 GHz ) to convert sky frequencies (40 - 45GHz) to the first IF of 7.7 - 9.1 GHz. The L104 synthesizer #2 (7.4 - 8.1 GHz) mixes the first IF to the final IF (0.5 - 1.0 GHz ) in the T110 converter module.

Plots #20 - 24 cover sky frequencies 40.8 to 44.9 GHz with some frequency gaps because of limited time for measurements.

All plots show a spectral ripple of ~25 MHz period with peaks at the same final IF frequency near 800 MHz and near 550 MHz. Reflections downstream from the T110 converter module probably cause these ripples.

Also all plots show a large broad peak near 900 - 950 MHz and another near 650 MHz of the final IF. This suggests a short-spaced reflection in the T110 converter or B-rack coax.

1.2 cm, 23 GHz, plots #25 - 36

The 1.2 cm receiver frontend F108 uses the L104 synthesizer #3 to convert sky frequencies (20 - 25 GHz) to the first IF of 9.3 - 10.2 GHz. The L104 synthesizer #1 mixes the first IF to the final IF (0.5 - 1.0 GHz) in the 8.4/23 GHz T106 converter module.

Plots #25-34 cover sky frequencies 21.7 - 24.5 GHz with 0.2 or 0.3 GHz spectral overlap between sequential plots.

Several plots shows a bit of 20 - 25 MHz spectral ripple of one to two periods. These mostly occur at the same final IF frequencies near 550 - 600 MHz which suggest reflections downstream from the T106 converter module, possibly at the vertex room bulkhead feedthru panel or building bulkhead feedthru panel (coaxial lightning arrestors?).

A spike at 22.3 GHz in both polarizations may be emission from atmospheric water vapor.

The sky frequency overlap between plots occurs at the upper IF frequency 800 - 1000 MHz on one plot and the lower IF frequency 500 - 700 MHz on the sequential plot. Comparing the overlaps between plots shows little if any correlation, which indicates that the broad spectral variations arise in or downstream from the second mixer in the T106 converter module.

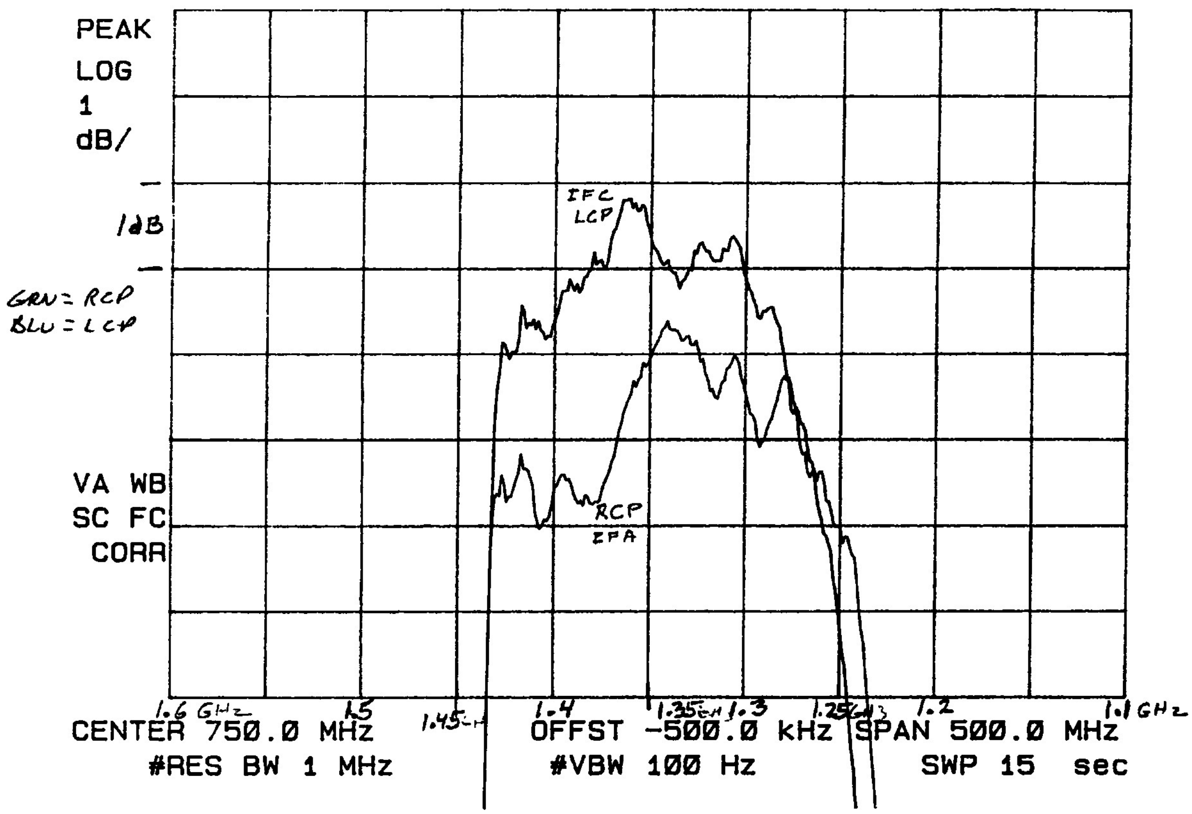
Plot #35 and #36 cover the same sky frequency span (22.0 - 22.5 GHz) as plot #26, but with different signal paths set by transfer switches S106D and S5/S6. Plot #35 has S106D in the X position (S5/S6 normal) which interchanges RCP and LCP between the first and second mixers. Comparing Plots #35 and #26 shows the broad spectral bumps at 22.35 - 22.5 GHz swap polarizations, which indicates the cause is downstream from S106D, in or beyond the T106 mixer.

Plot #36 has S5/S6 in the X position (S106D normal) which moves the T106 second IF outputs from BD to AC telescope coaxial cables. Comparing Plots #36 and #26 shows quite different spectral ripples and variations which suggest most spectral variations occur within the IF transmission between the B-rack in the antenna vertex and the IF distributors in the D-rack/building.

#2

20CM

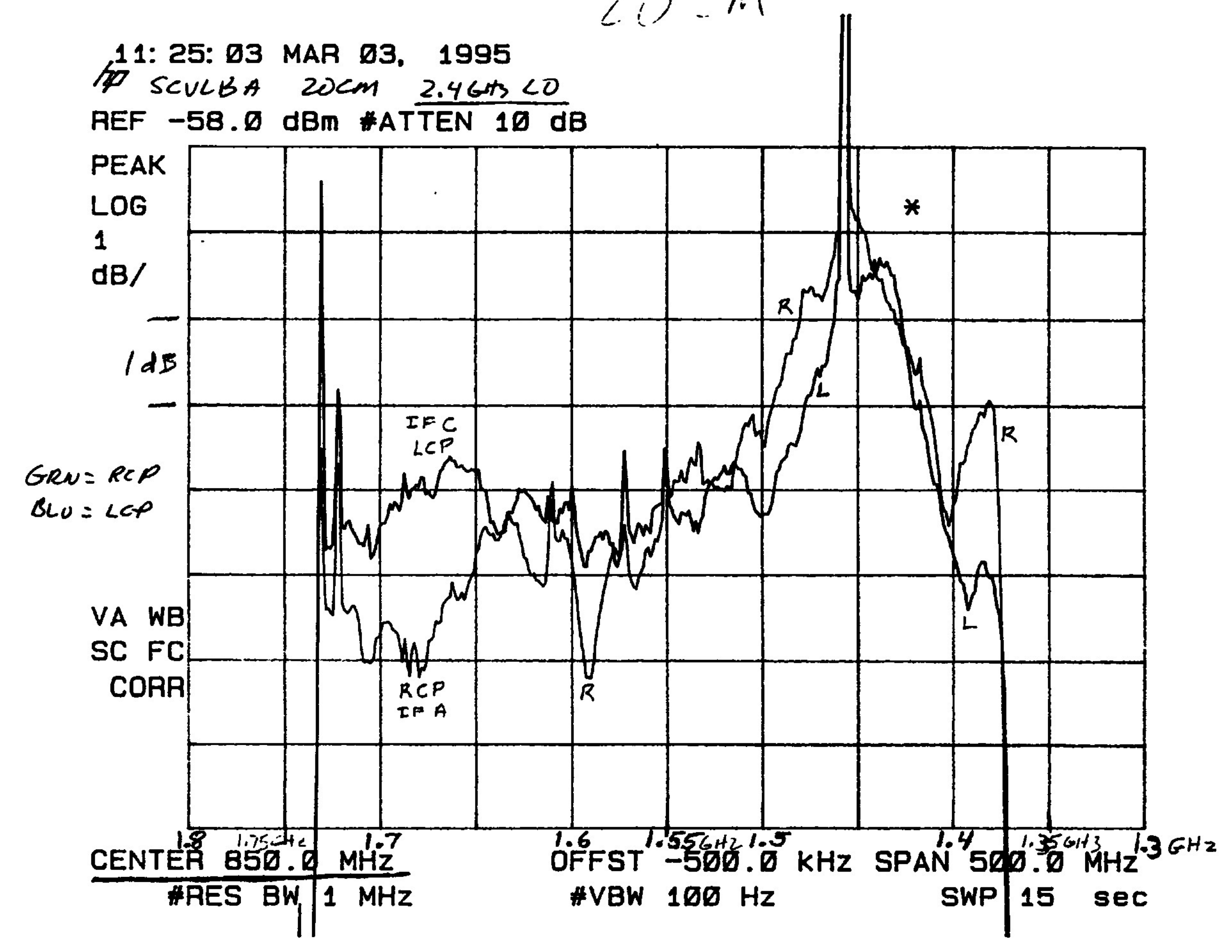
Ø5: Ø9: 59 MAR Ø3, 1995
SC VLBA 20 cm LO = 2.1 GHz
REF -57.0 dBm #ATTEN 10 dB



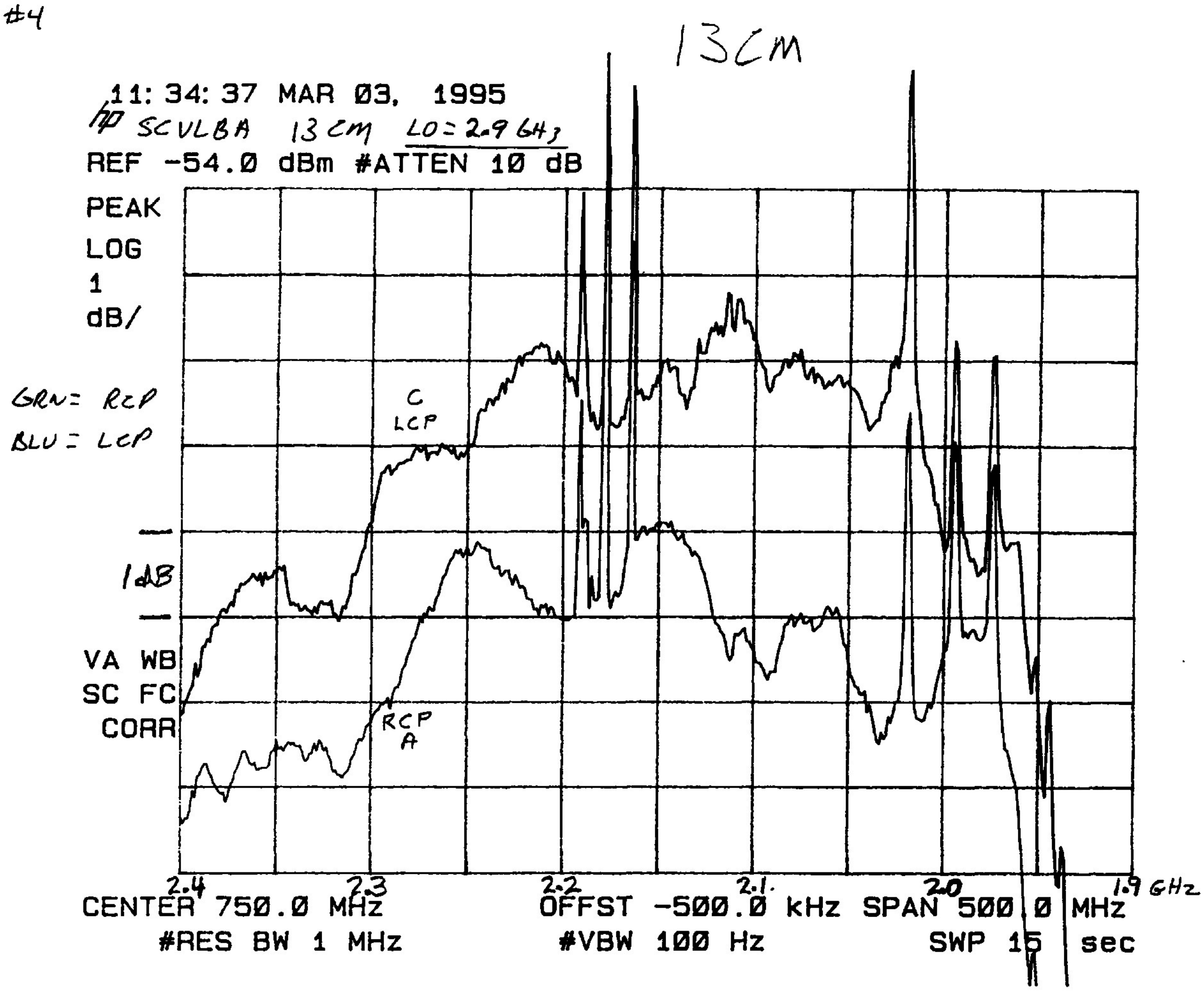

#3

20CM

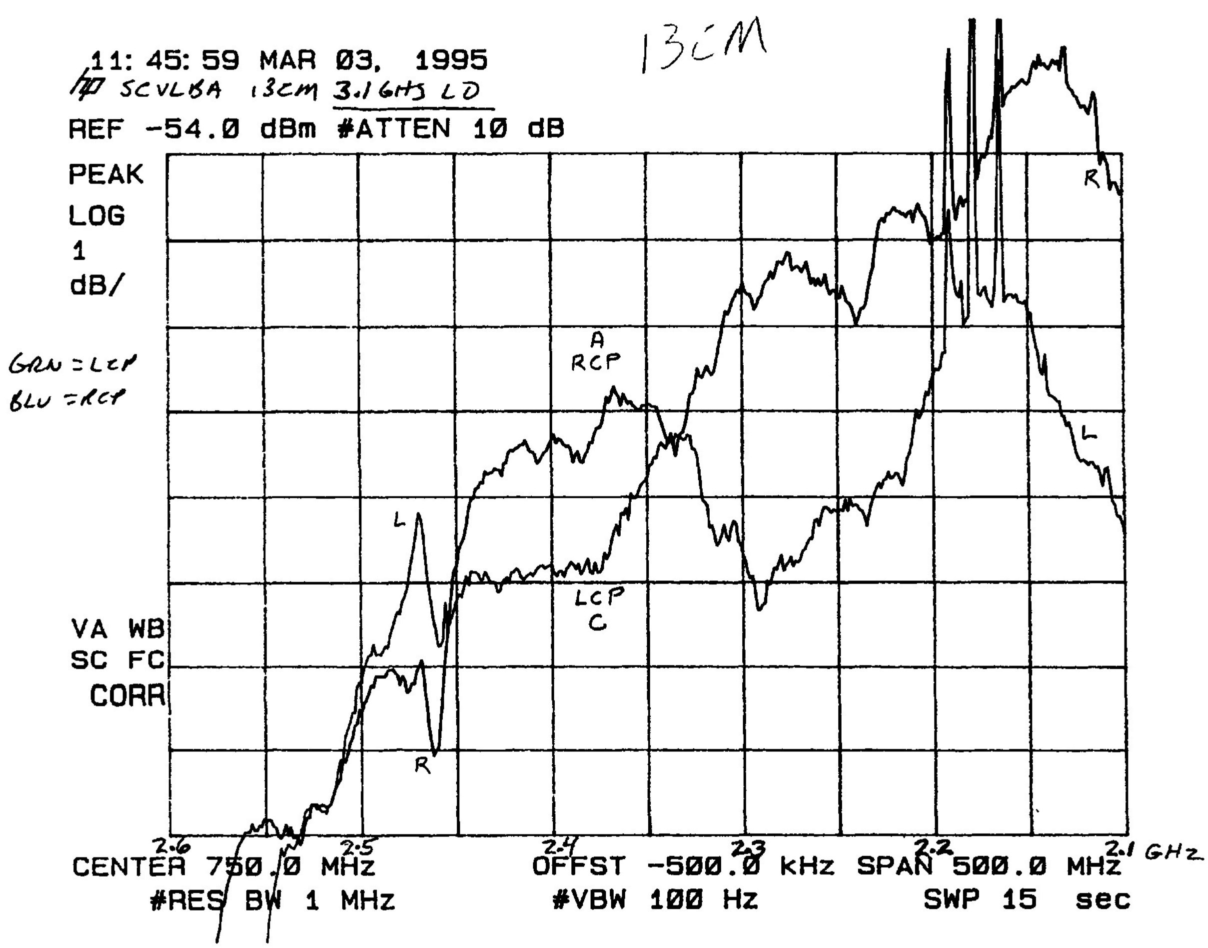
11: 25: Ø3 MAR Ø3, 1995
SCVLBA 20cm 2.4GHz LO
REF -58.0 dBm #ATTEN 10 dB



#4

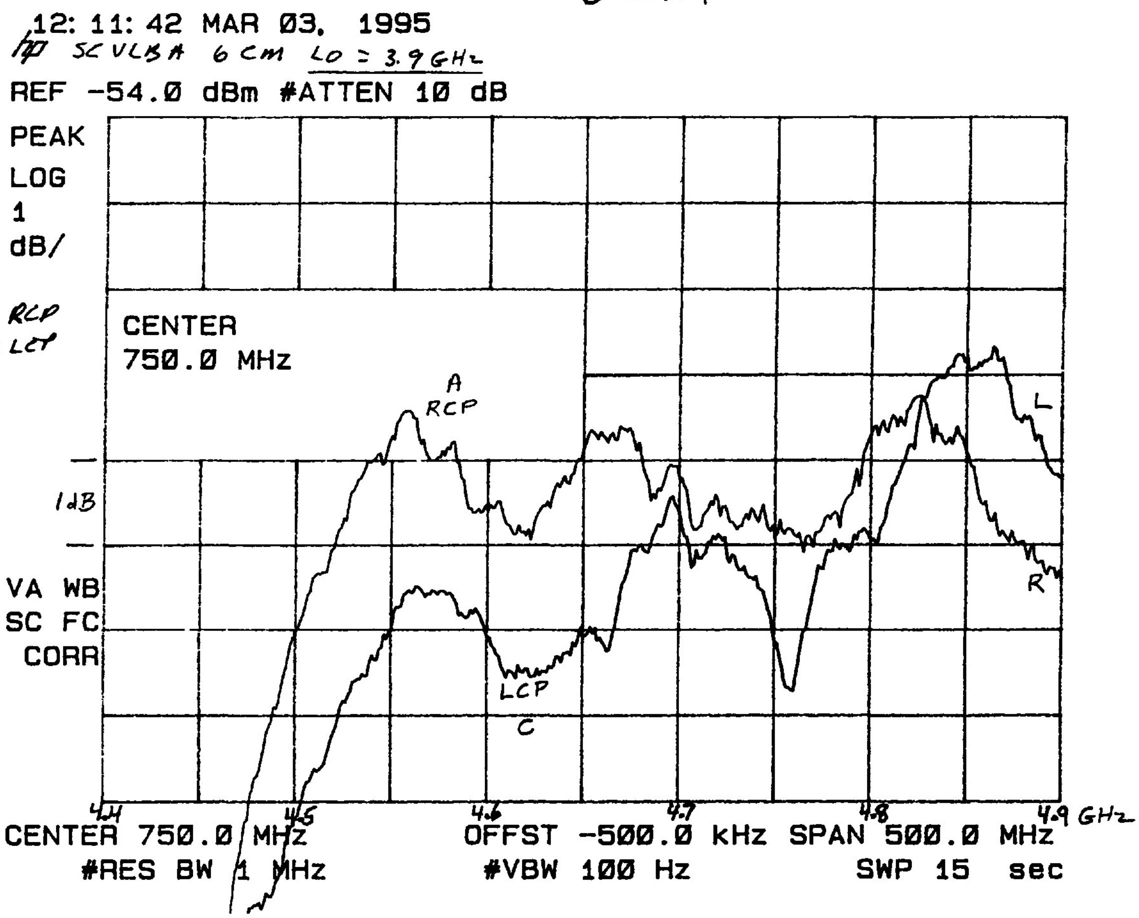

13CM
11: 34: 37 MAR 03, 1995
hp SCVLBA 13 cm LO=2.9 GHz
REF -54.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN= RCP
BLU= LCP
C
LCP
1dB
VA WB
SC FC
CORR
RCP
A
2.4
2.3
2.2
2.1
2.0
1.9 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#5


13CM
11: 45: 59 MAR 03, 1995
hp SCVLBA 13cm 3.1 GHz LO
REF -54.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN=LCP
BLU=RCP
A
RCP
L
R
L
LCP
C
R
VA WB
SC FC
CORR
2.6
2.5
2.4
2.3
2.2
2.1 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#6

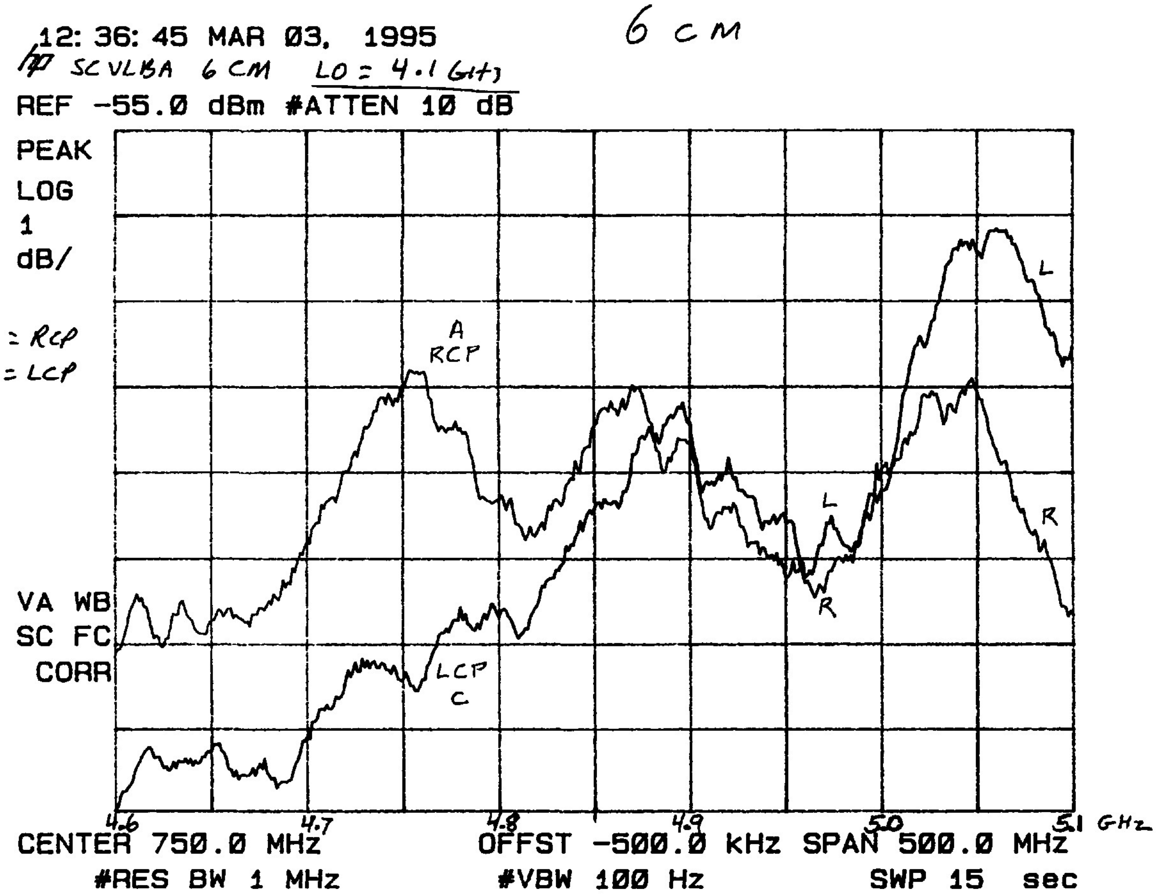
6 CM



12: 11: 42 MAR 03, 1995
SC VLBA 6 CM LO = 3.9 GHz
REF -54.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
CENTER
750.0 MHz
A
RCP
1dB
L
R
VA WB
SC FC
CORR
LCP
C
4.4
4.5
4.6
4.7
4.8
4.9 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec


#7

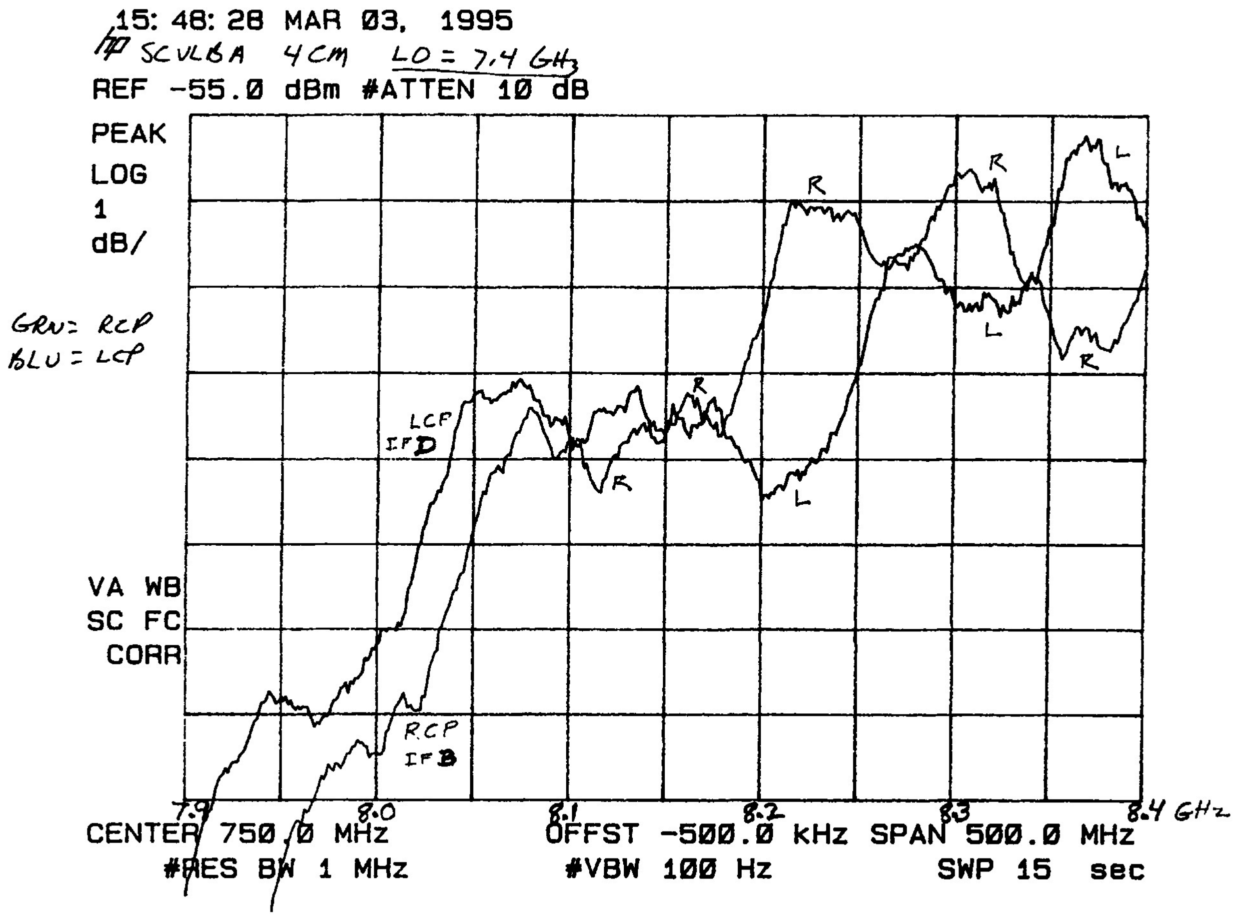
6 CM



12: 36: 45 MAR 03, 1995
SC VLBA 6 CM LO = 4.1 GHz
REF -55.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
A
RCP
L
R
L
R
VA WB
SC FC
CORR
LCP
C
4.6
4.7
4.8
4.9
5.0
5.1 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

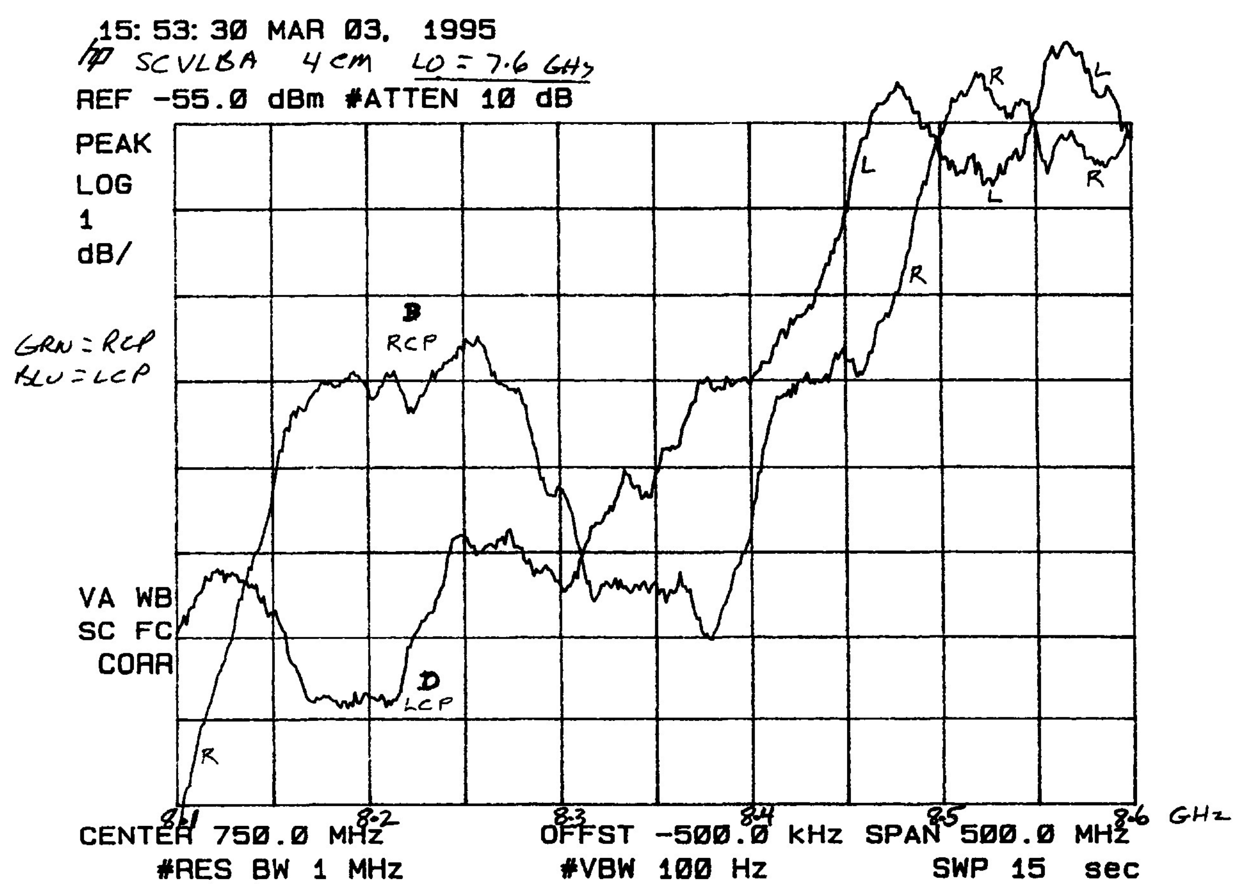
#8

4 CM


15: 48: 28 MAR 03, 1995
SCVLBA 4CM LO = 7.4 GHz
REF -55.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
VA WB
SC FC
CORR
LCP
IF D
RCP
IF B
R
L
7.9
8.0
8.1
8.2
8.3
8.4 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

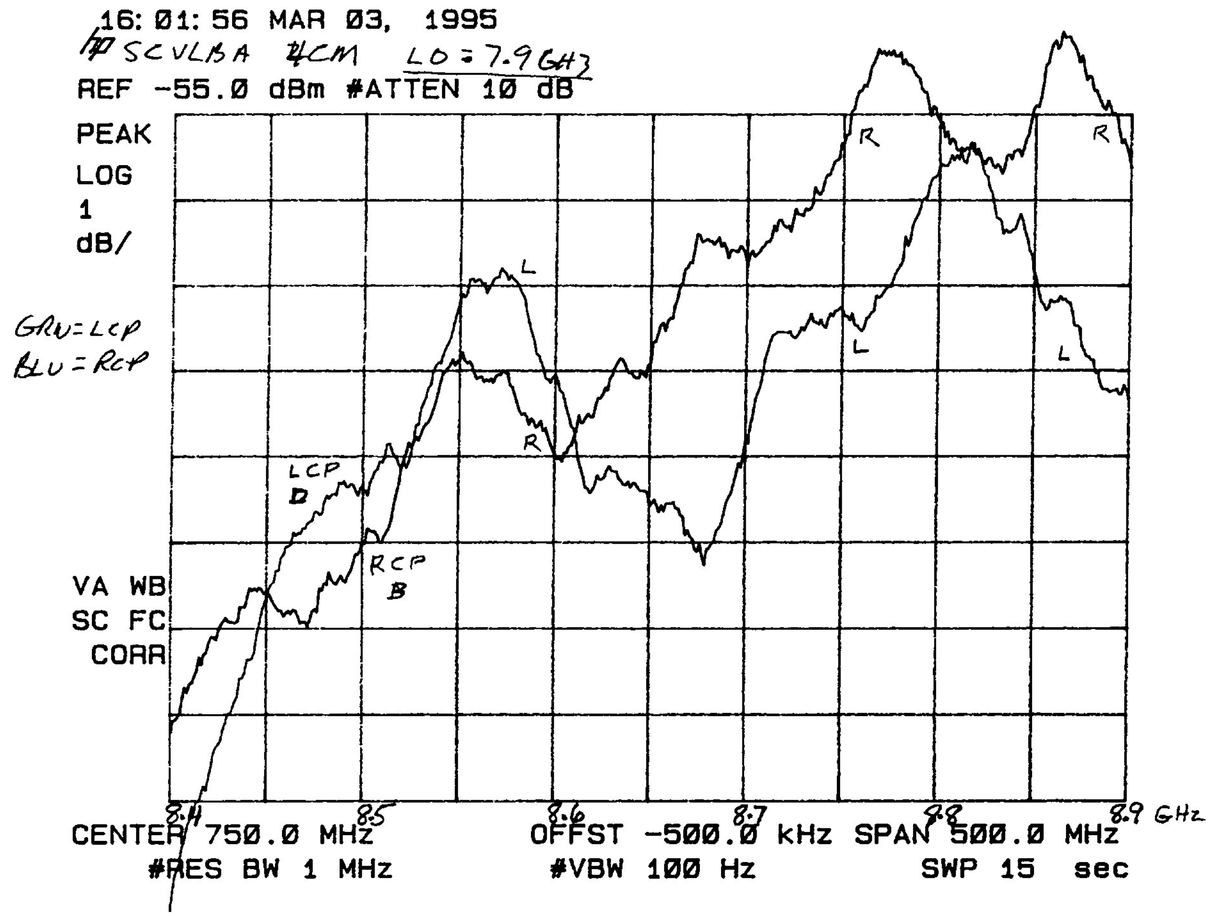
#9

4CM


15: 53: 30 MAR 03, 1995
SCVLBA 4CM LO = 7.6 GHz
REF -55.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
VA WB
SC FC
CORR
B
RCP
D
LCP
R
L
8.1
8.2
8.3
8.4
8.5
8.6 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#10

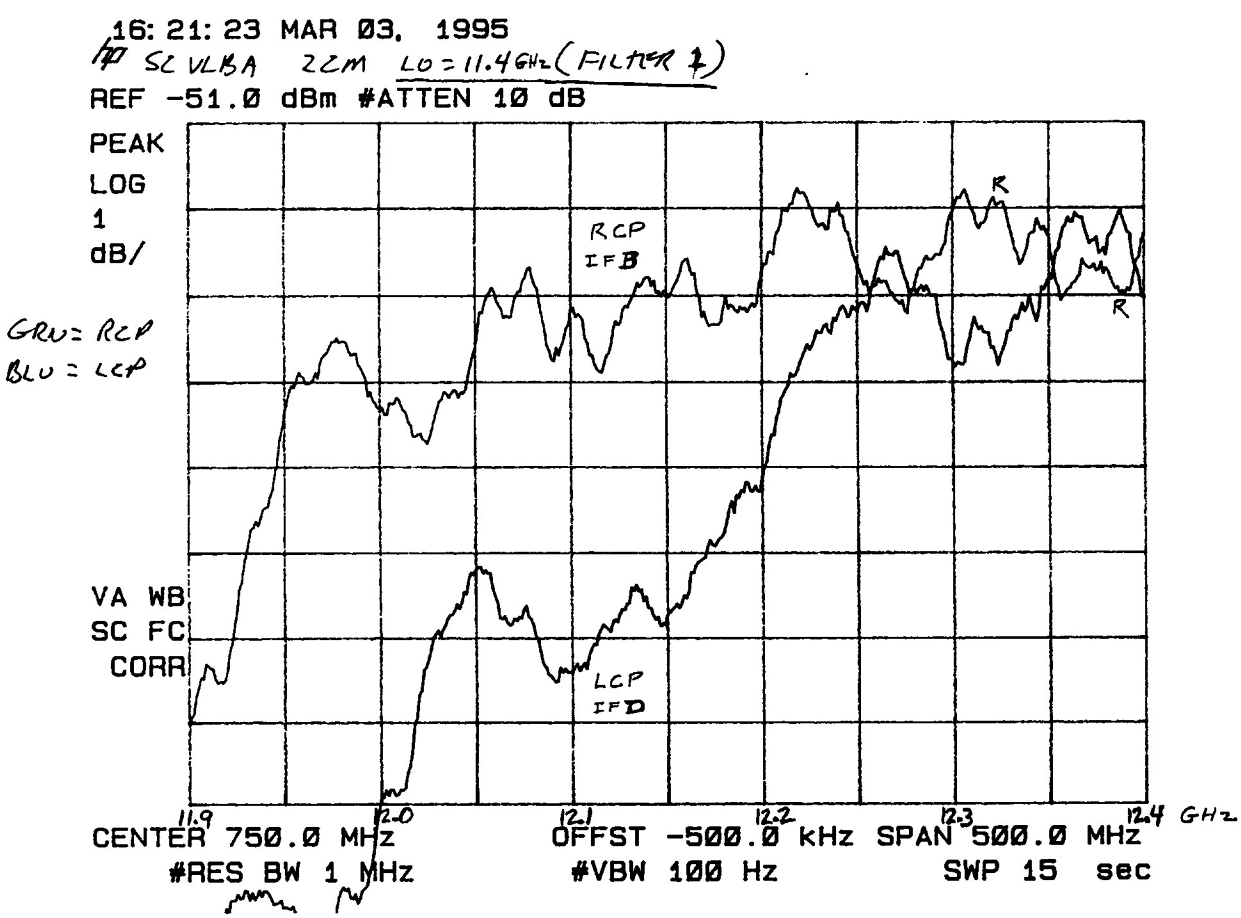
4CM



16:01:56 MAR 03, 1995
SCVLBA 4CM LO=7.9GHz
REF -55.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN=LCP
BLU=RCP
L
R
LCP
D
RCP
B
VA WB
SC FC
CORR
8.4
8.5
8.6
8.7
8.8
8.9 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec


#11

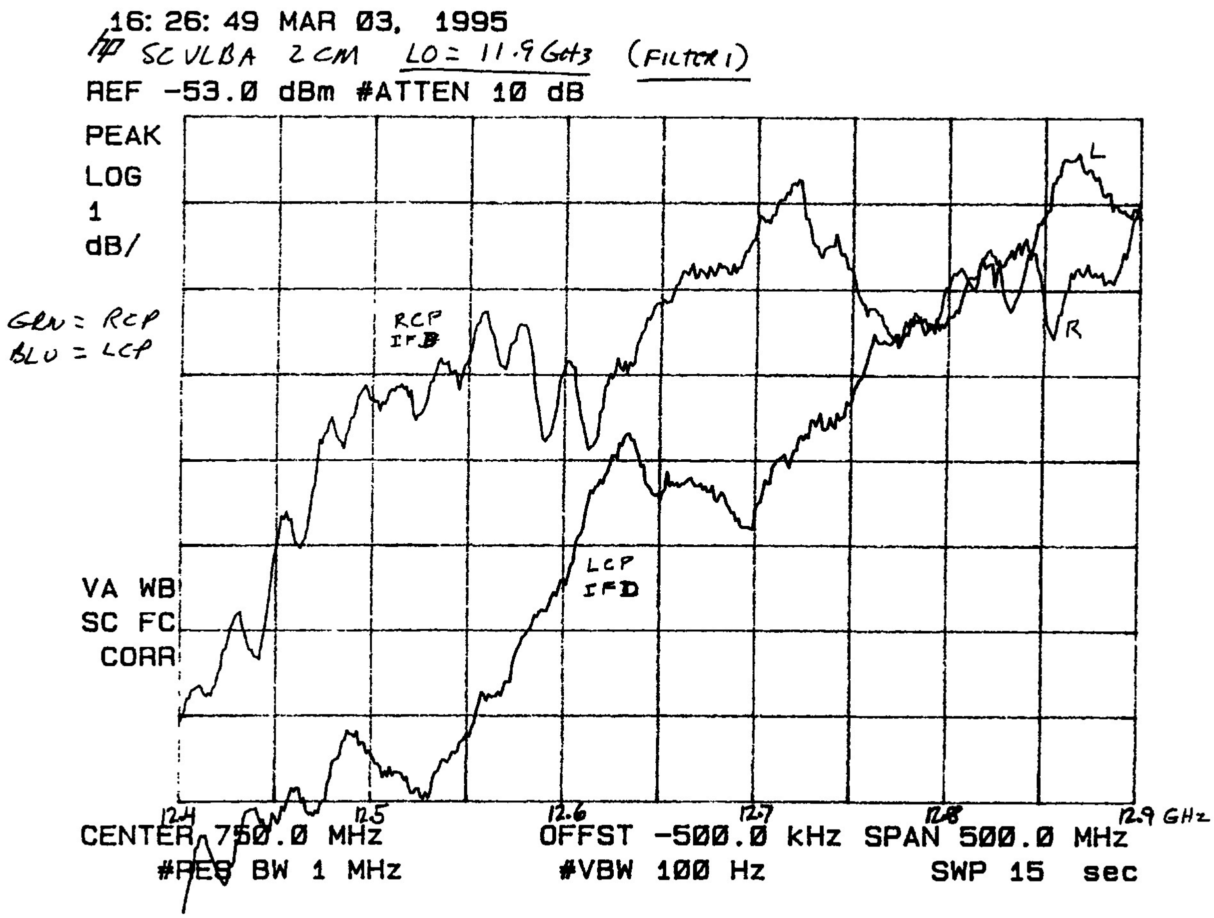
2CM



16:21:23 MAR 03, 1995
SC VLBA 2CM LO=11.4GHz (FILTER 2)
REF -51.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN=RCP
BLU=LCP
RCP
IF B
R
LCP
IF D
VA WB
SC FC
CORR
11.9
12.0
12.1
12.2
12.3
12.4 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

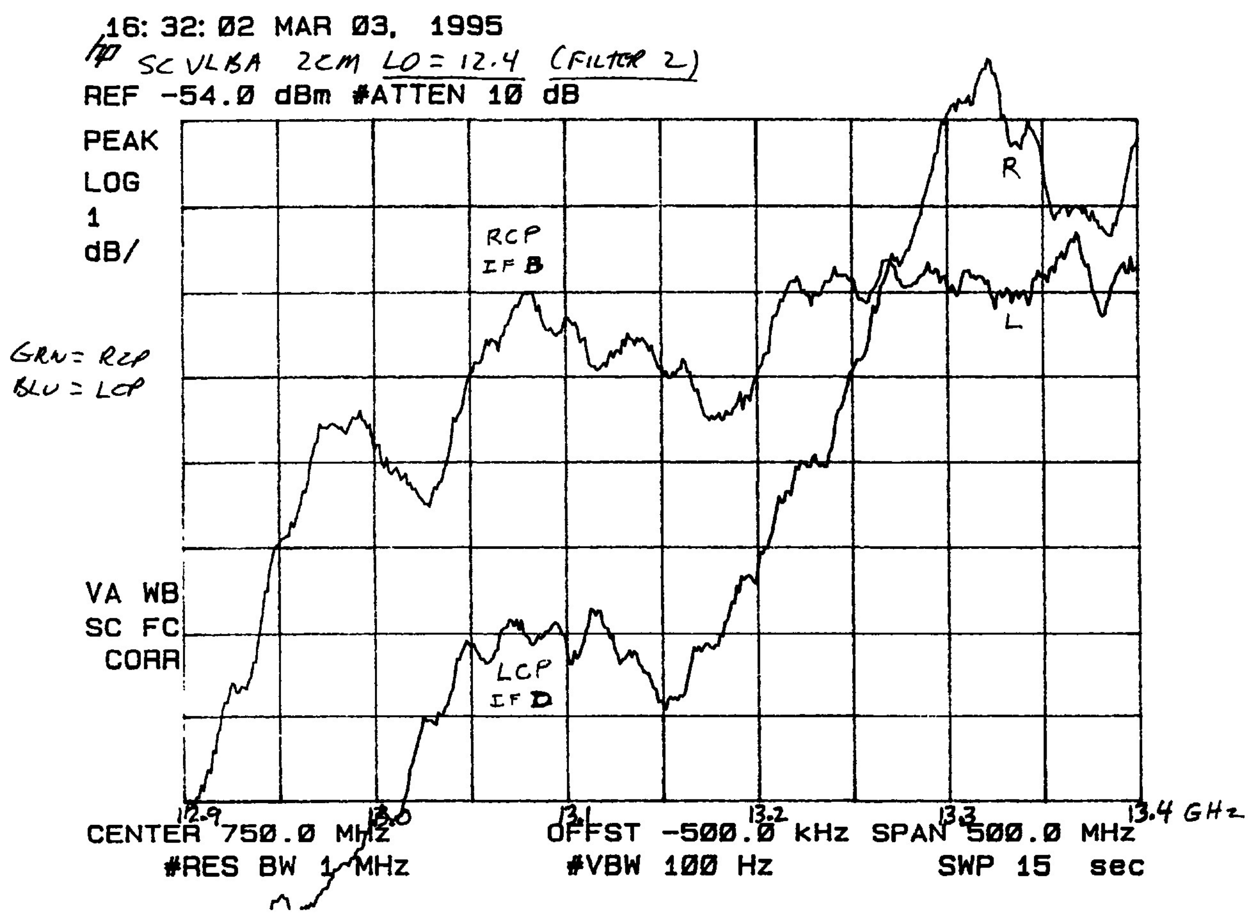
#12

2cm

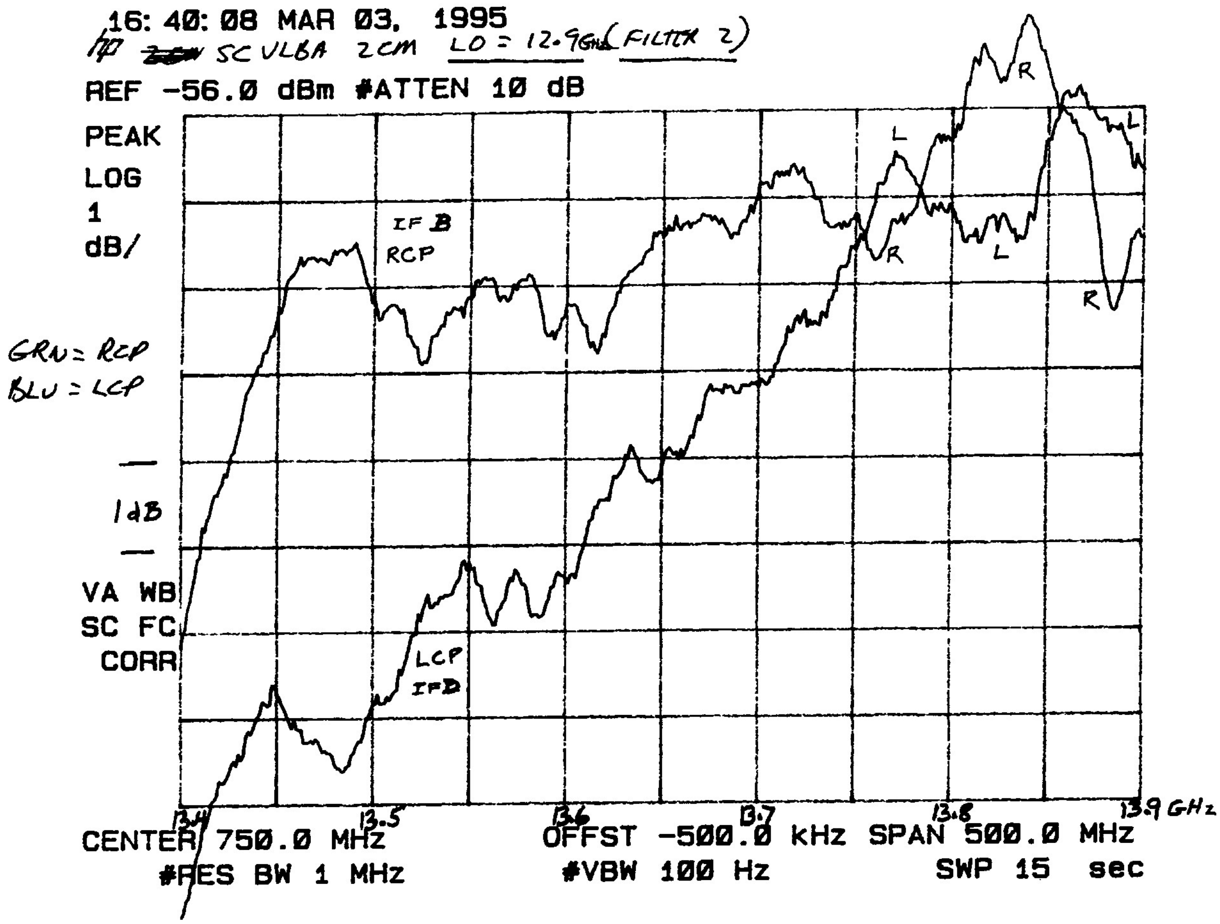

16: 26: 49 MAR 03, 1995
hp SC VLBA 2CM LO = 11.9 GHz (FILTER 1)
REF -53.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
RCP
IF B
LCP
IF D
L
R
VA WB
SC FC
CORR
12.4
12.5
12.6
12.7
12.8
12.9 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#13

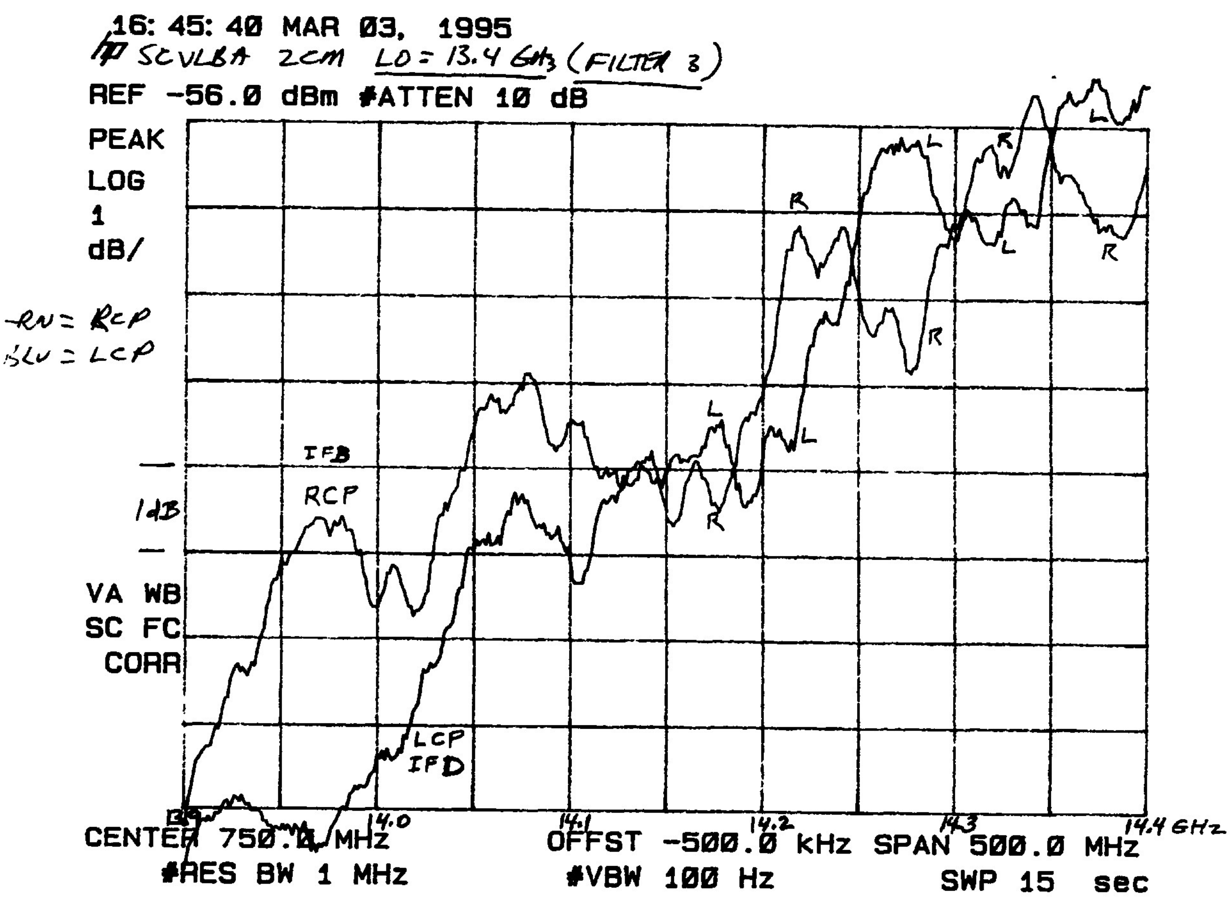
2CM


16: 32: 02 MAR 03, 1995
hp SC VLBA 2CM LO = 12.4 (FILTER 2)
REF -54.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
RCP
IF B
LCP
IF D
R
L
VA WB
SC FC
CORR
12.9
13.0
13.1
13.2
13.3
13.4 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#14 2CM


16: 40: 08 MAR 03, 1995
SC VLBA 2cm LO = 12.9GHz (FILTER 2)
REF -56.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
1dB
VA WB
SC FC
CORR
IF B
RCP
LCP
IF D
L
R
13.4
13.5
13.6
13.7
13.8
13.9 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

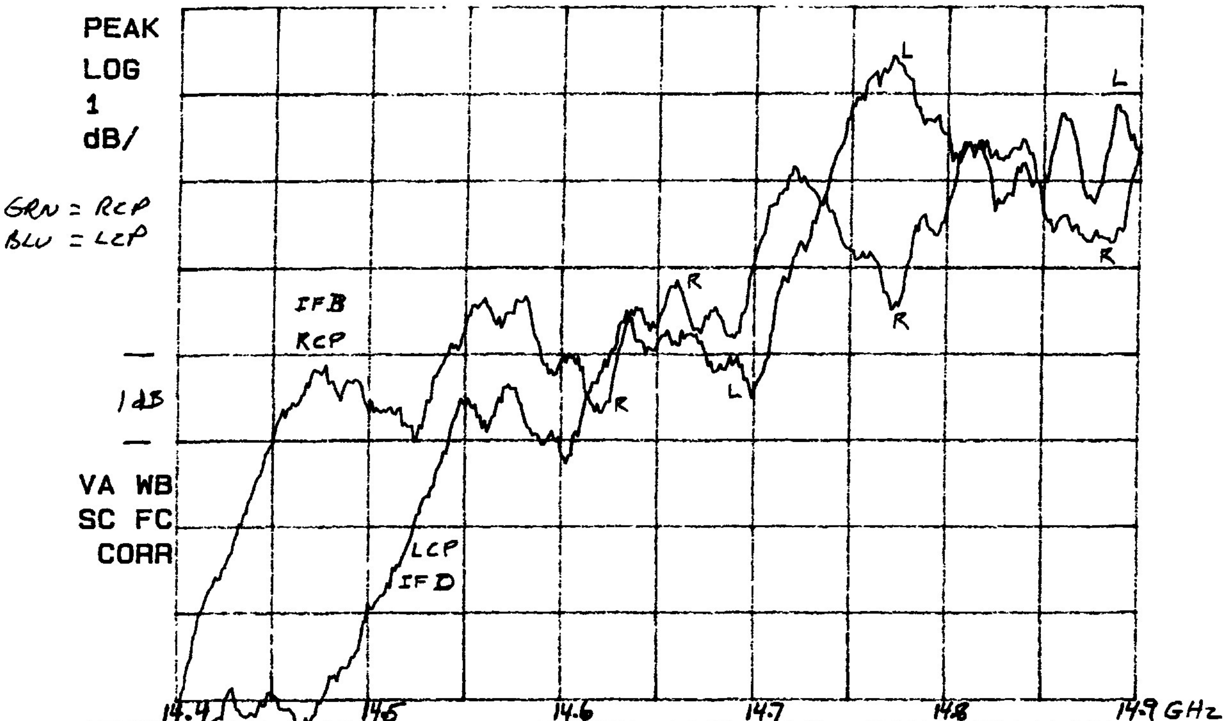
#15 2CM


16: 45: 40 MAR 03, 1995
SCVLBA 2cm LO = 13.4 GHz (FILTER 3)
REF -56.0 dBm #ATTEN 10 dB
PEAK
LOG
1
dB/
RN = RCP
BLU = LCP
1dB
VA WB
SC FC
CORR
IF B
RCP
LCP
IF D
L
R
14.0
14.1
14.2
14.3
14.4 GHz
CENTER 750.0 MHz
OFFST -500.0 kHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#16

2 cm

16: 51: 42 MAR 03, 1995
hp SCVLBA 2 cm LO = 13.9 GHz (FILTER 3)
REF -56.0 dBm #ATTEN 10 dB

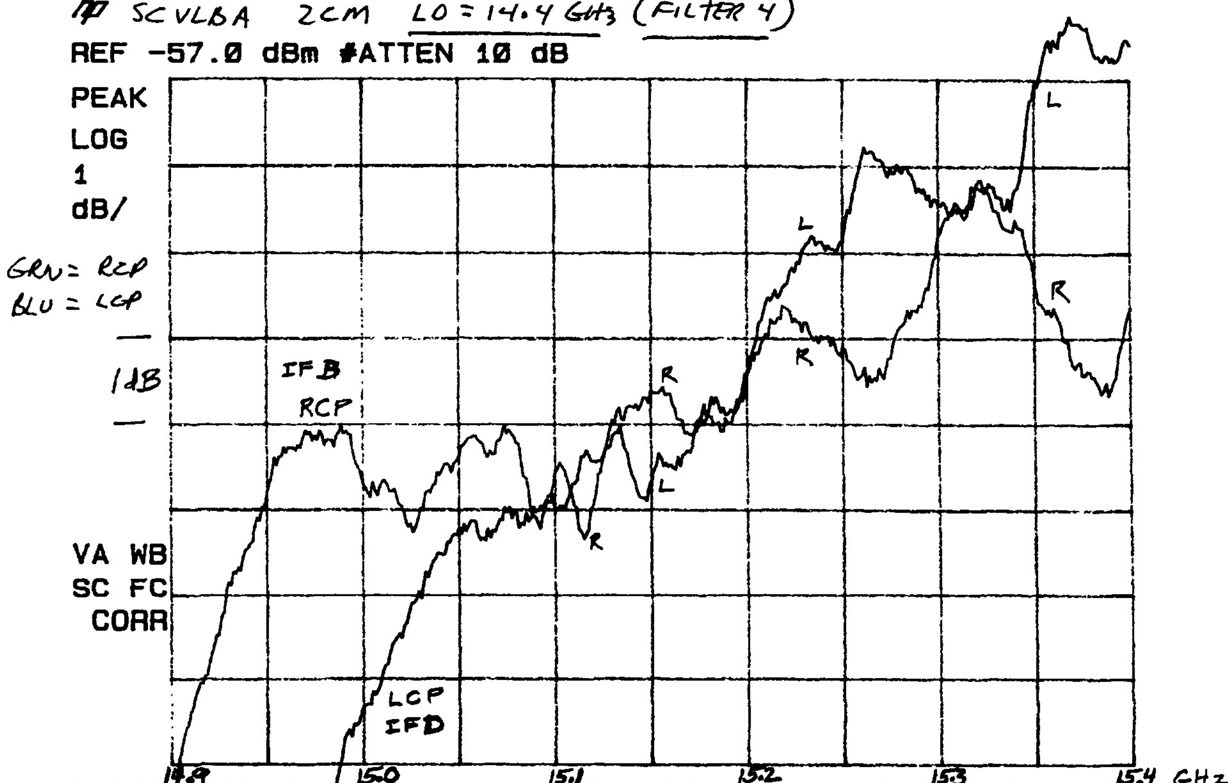



CENTER 750.0 MHz OFFST -500.0 kHz SPAN 500.0 MHz
#RES BW 1 MHz #VBW 100 Hz SWP 15 sec

#17

2 cm

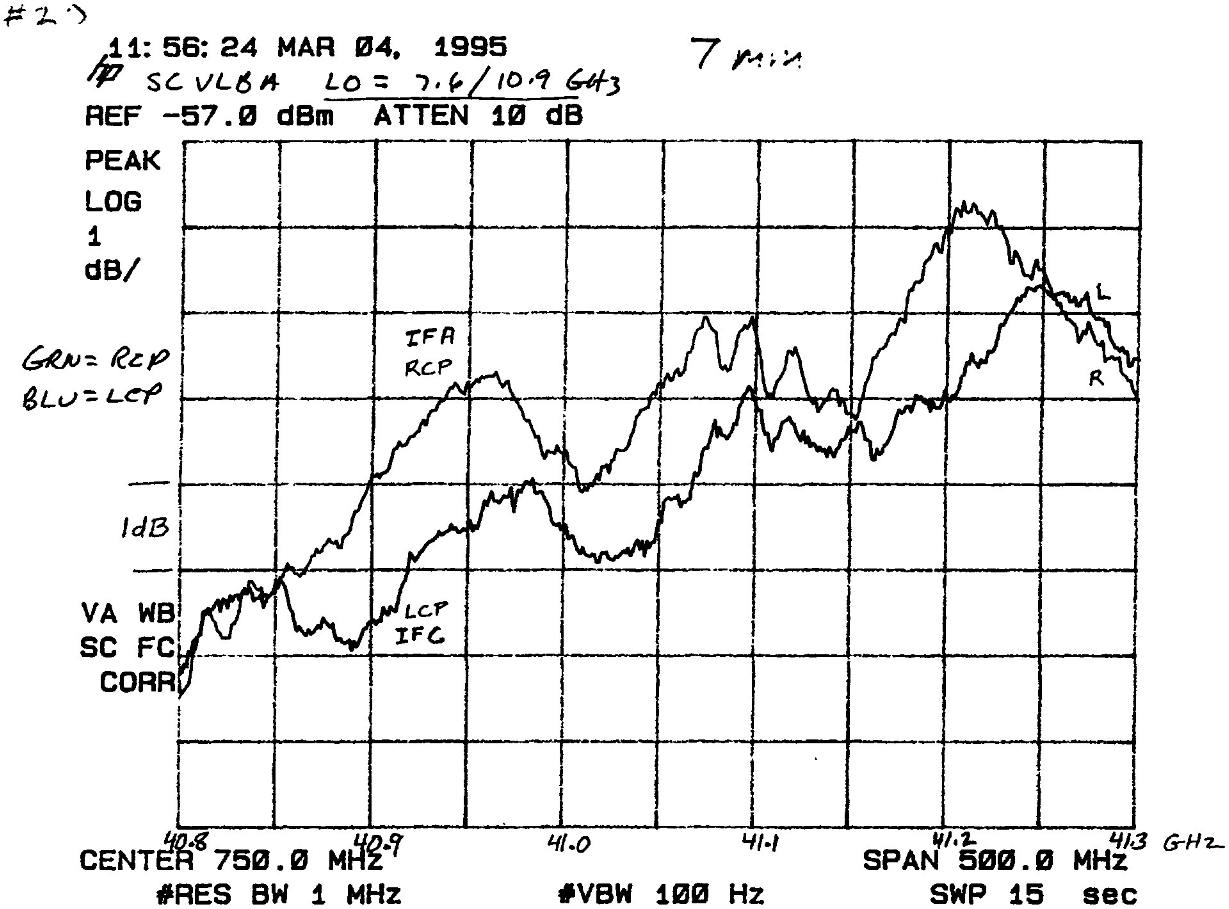
16: 57: 55 MAR 03, 1995
hp SCVLBA 2 cm LO = 14.4 GHz (FILTER 4)
REF -57.0 dBm #ATTEN 10 dB




CENTER 750.0 MHz OFFST -500.0 kHz SPAN 500.0 MHz
#RES BW 1 MHz #VBW 100 Hz SWP 15 sec

#20

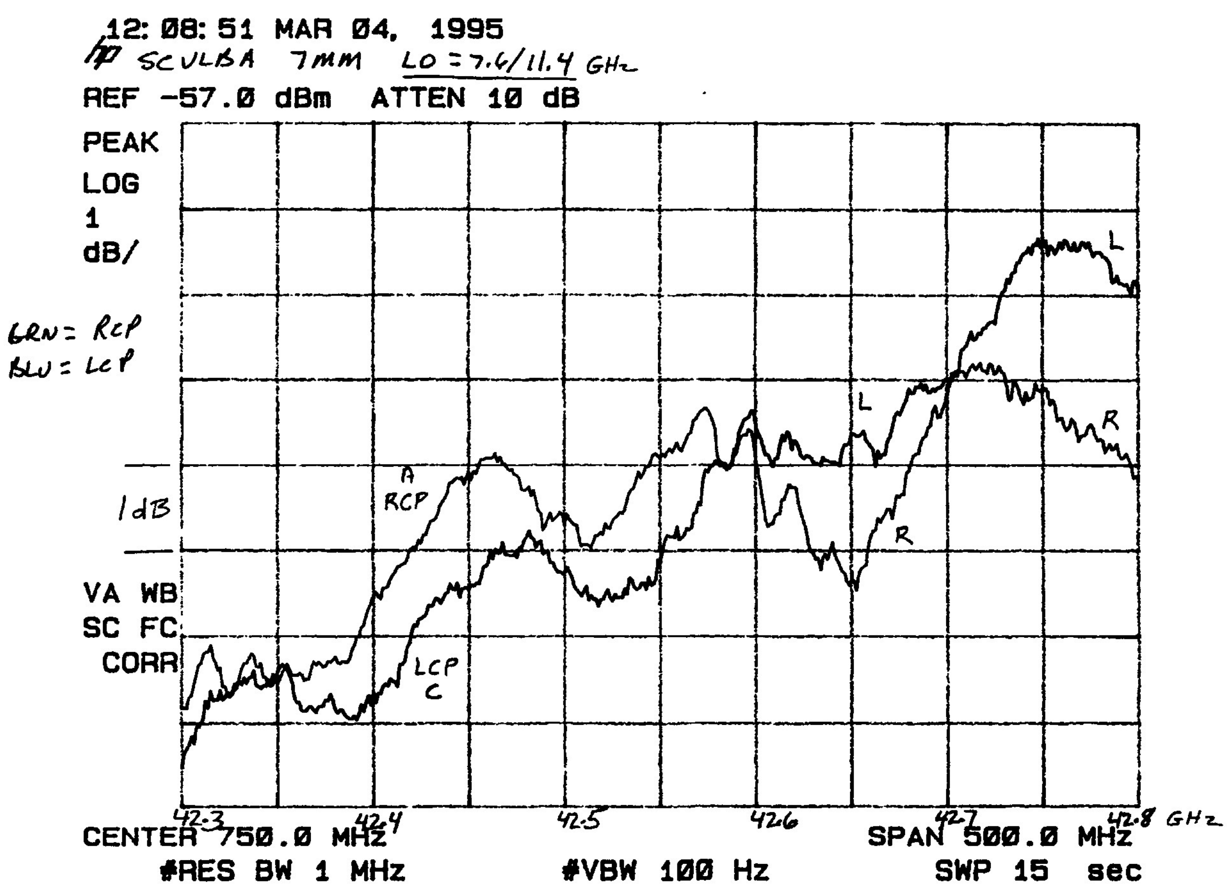
7mm



11: 56: 24 MAR 04, 1995
7mm
SC VLBA LO = 7.6/10.9 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
IFA
RCP
L
R
1dB
VA WB
SC FC
CORR
LCP
IFC
40.8
40.9
41.0
41.1
41.2
41.3 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec


#21

7mm

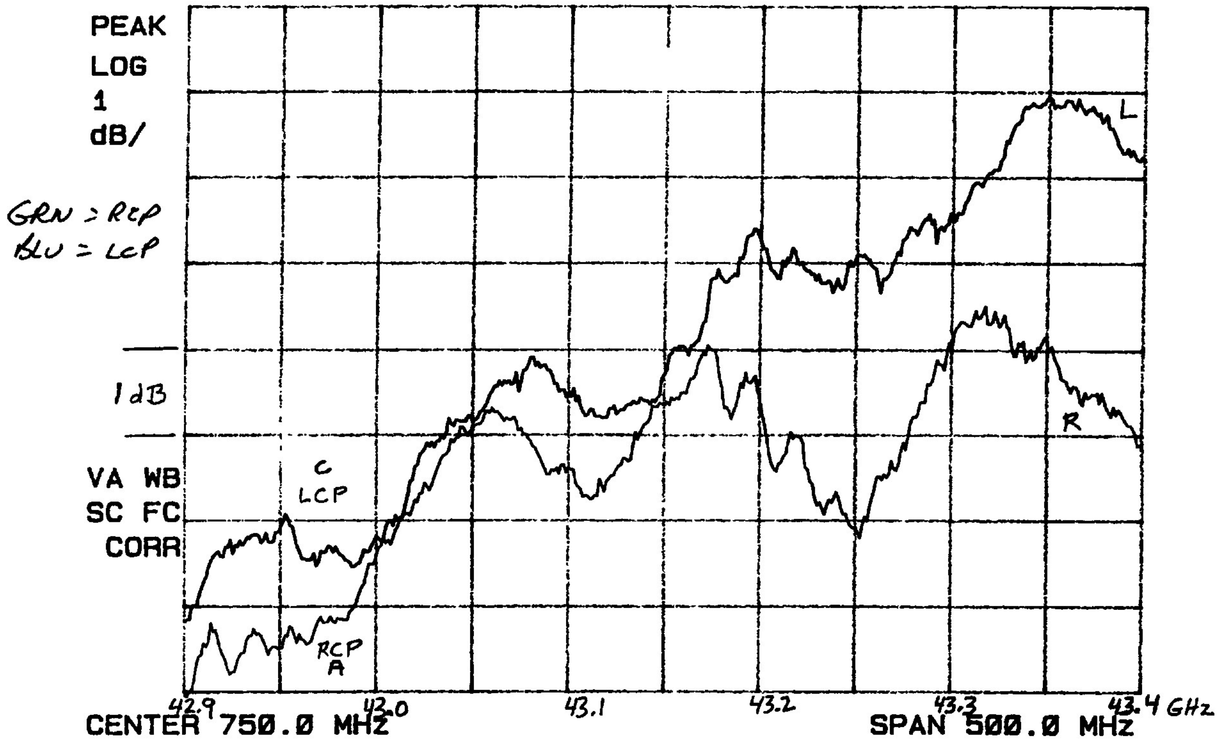


12: 08: 51 MAR 04, 1995
SCVLBA 7MM LO = 7.6/11.4 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
L
L
R
A
RCP
R
1dB
VA WB
SC FC
CORR
LCP
C
42.3
42.4
42.5
42.6
42.7
42.8 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#22

7mm

12: 16: 14 MAR 04, 1995
hp SCVLBA 7mm LO = 7.6/11.6 GHz
REF -57.0 dBm ATTEN 10 dB

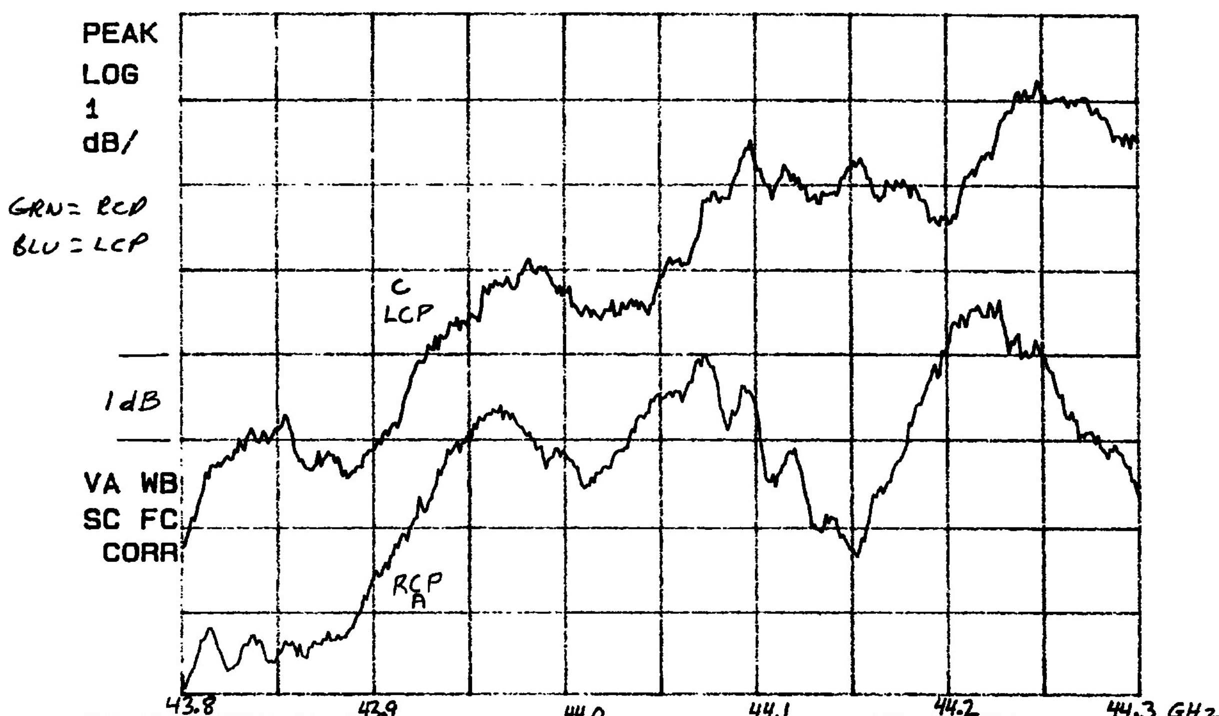



CENTER 750.0 MHz SPAN 500.0 MHz
#RES BW 1 MHz #VBW 100 Hz SWP 15 sec

#23

7mm

12: 21: 22 MAR 04, 1995
hp SCVLBA 7mm LO = 7.6/11.9 GHz
REF -59.0 dBm ATTEN 10 dB

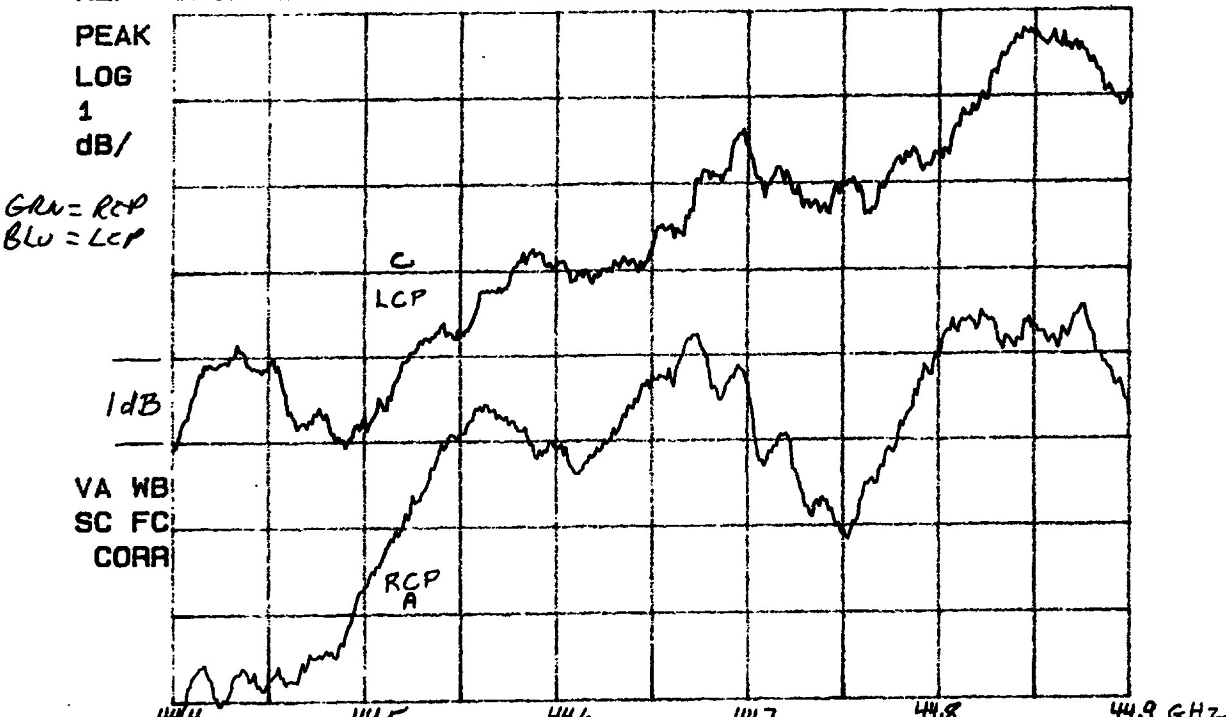



CENTER 750.0 MHz SPAN 500.0 MHz
#RES BW 1 MHz #VBW 100 Hz SWP 15 sec

# 24

7 MM

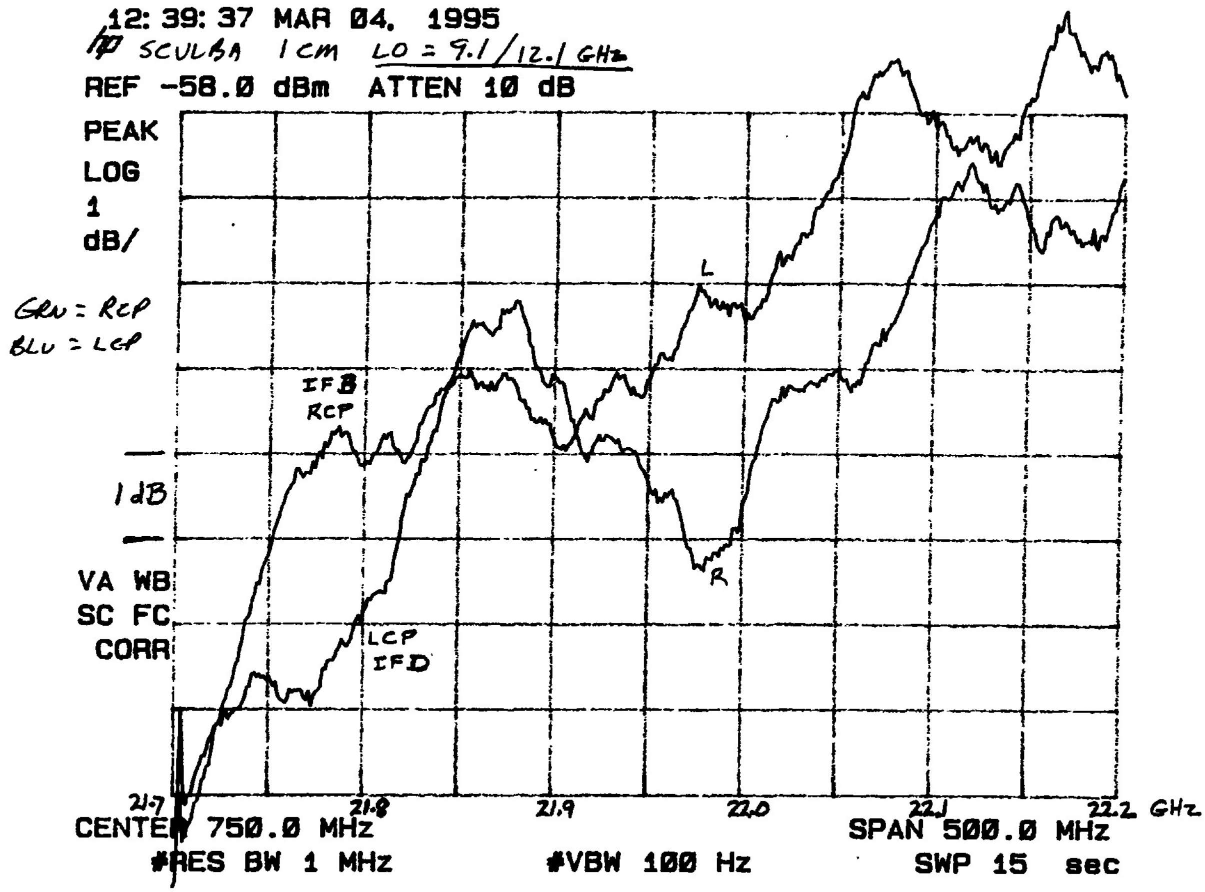
12: 26: 12 MAR 04, 1995
hp SC VLBA 7mm LO = 7.6/12.1 GHz
REF -60.0 dBm ATTEN 10 dB




CENTER 750.0 MHz SPAN 500.0 MHz
#RES BW 1 MHz #VBW 100 Hz SWP 15 sec

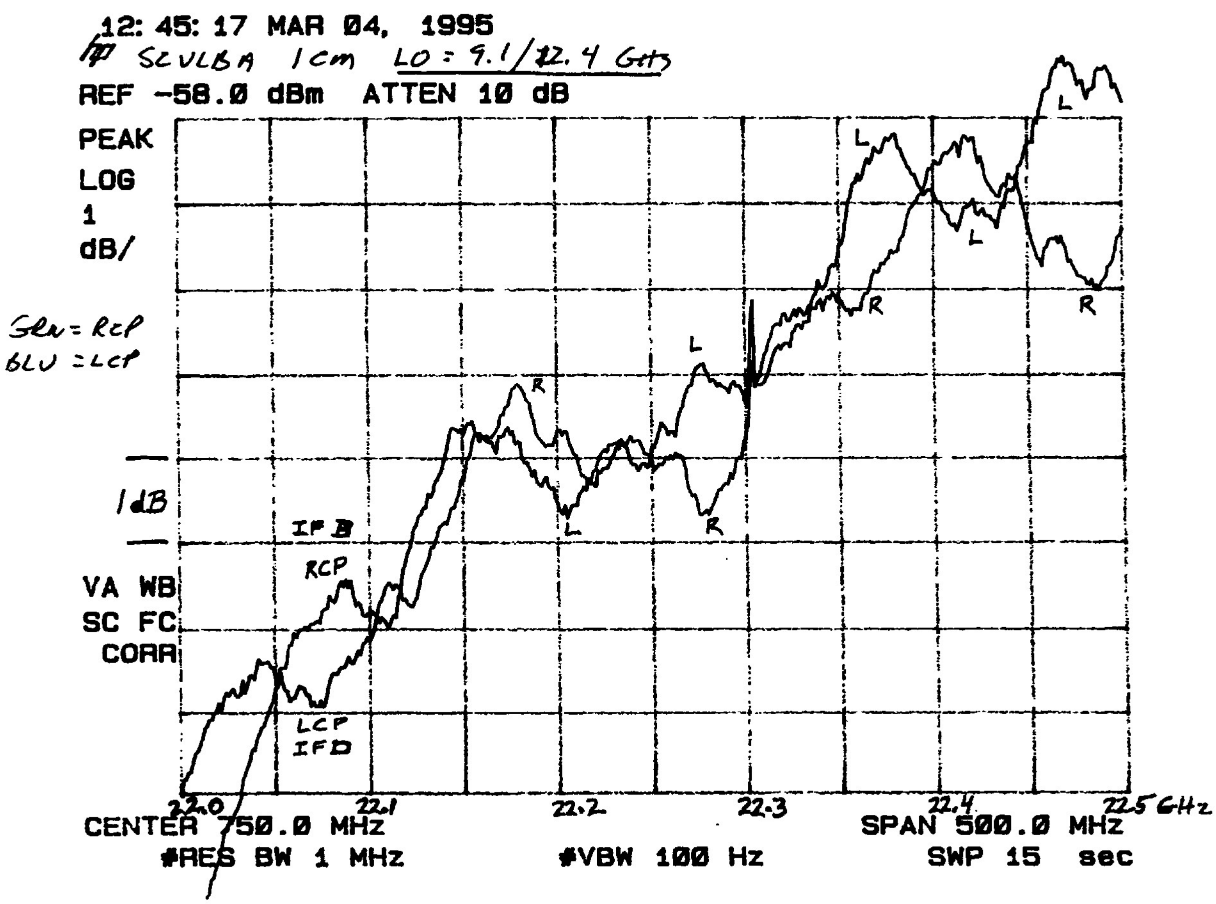
#25

1 CM


12: 39: 37 MAR 04, 1995
hp SCULBA 1 cm LO = 9.1/12.1 GHz
REF -58.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
IF B
RCP
1 dB
VA WB
SC FC
CORR
LCP
IF D
L
R
21.7
21.8
21.9
22.0
22.1
22.2 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

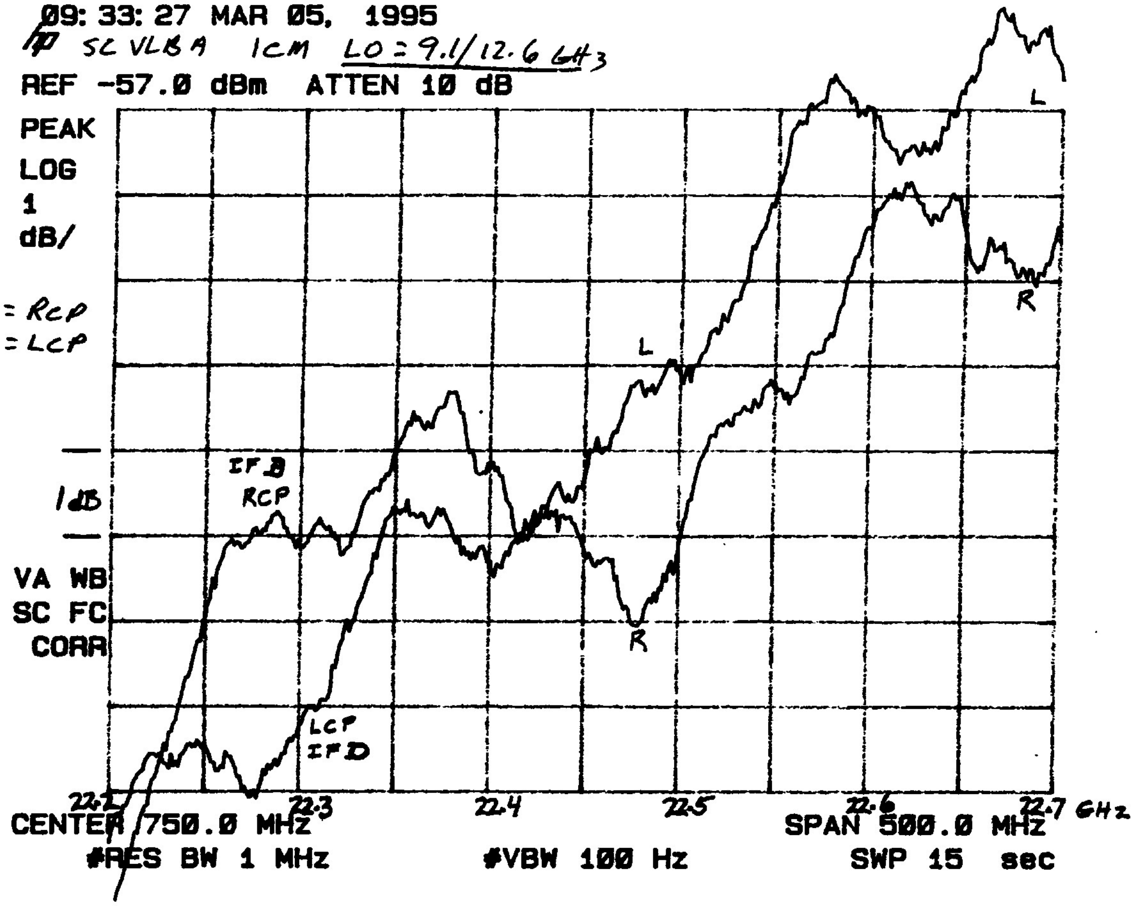
#26

1 CM


12: 45: 17 MAR 04, 1995
hp SCULBA 1 cm LO = 9.1/12.4 GHz
REF -58.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
L
R
1 dB
IF B
RCP
VA WB
SC FC
CORR
LCP
IF D
22.0
22.1
22.2
22.3
22.4
22.5 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#27

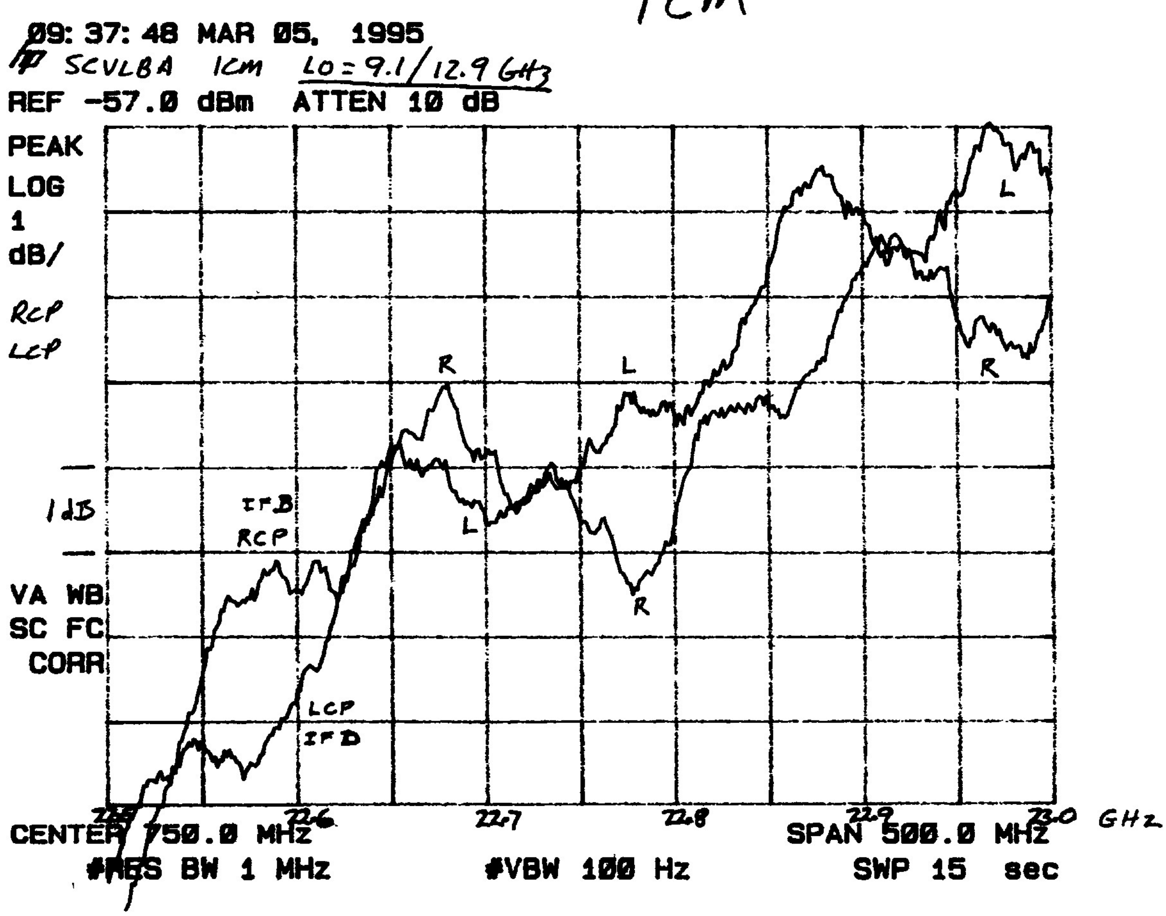
1CM



09: 33: 27 MAR 05, 1995
SC VLBA 1CM LO = 9.1/12.6 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
1dB
IF B
RCP
LCP
IF D
L
R
L
R
VA WB
SC FC
CORR
22.2
22.3
22.4
22.5
22.6
22.7 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

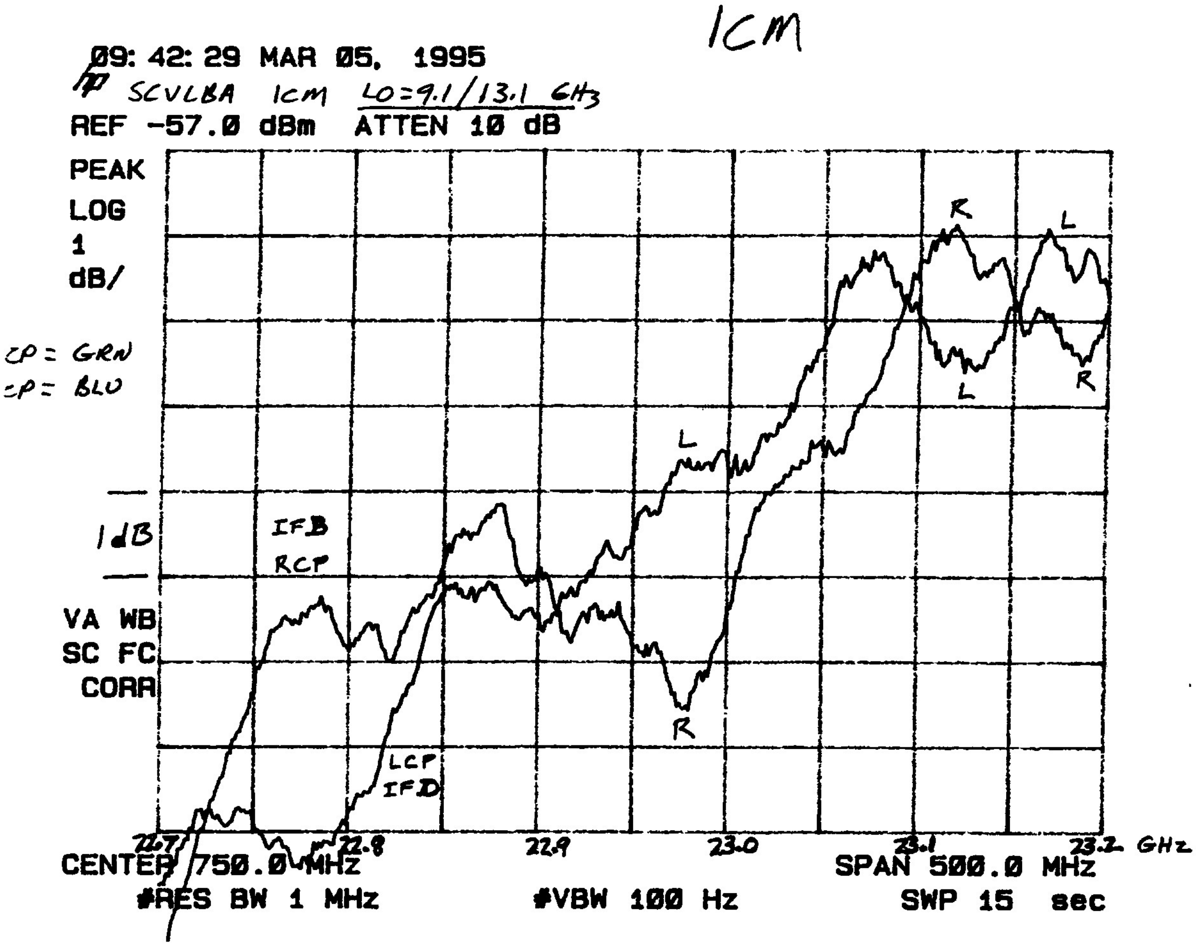

#28

1CM

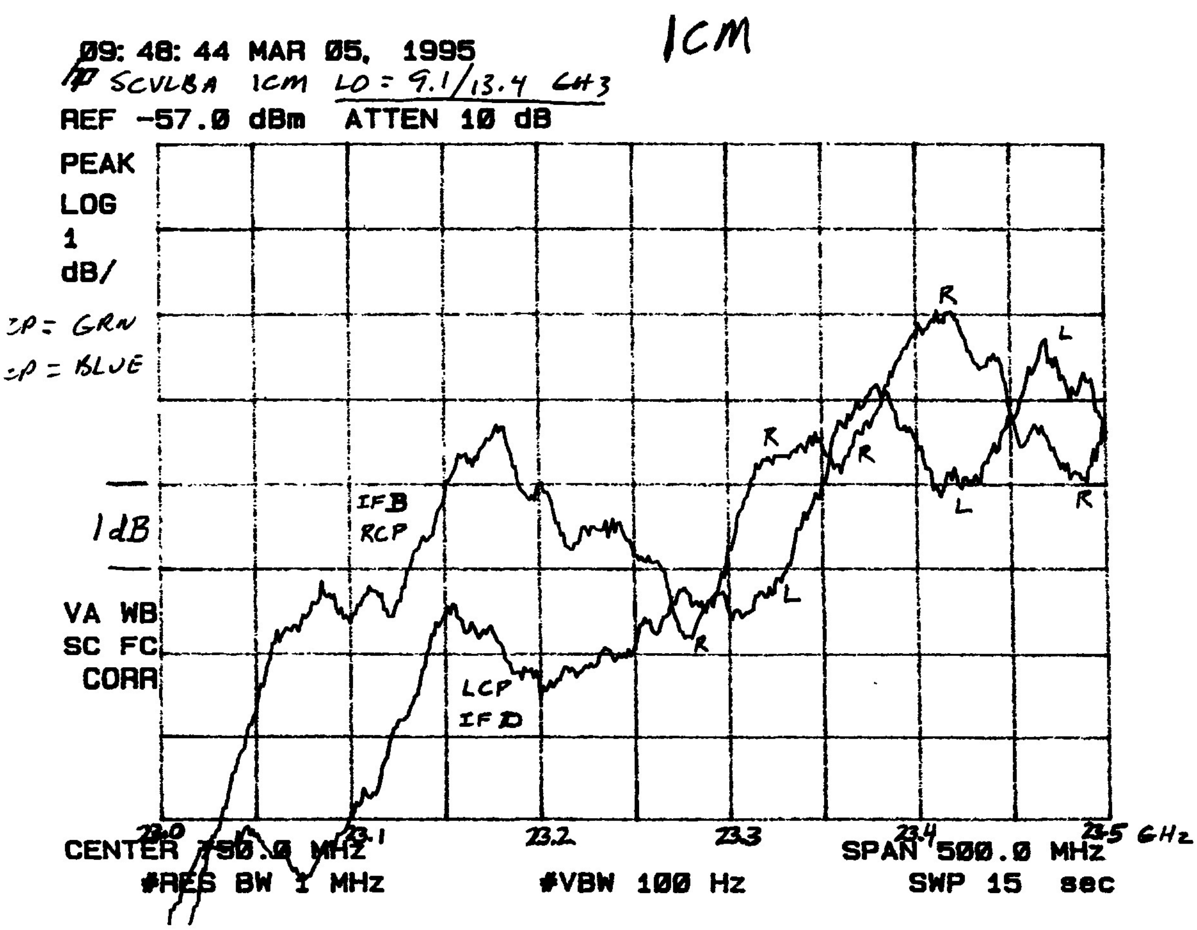


09: 37: 48 MAR 05, 1995
SCVLBA 1CM LO = 9.1/12.9 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
1dB
IF B
RCP
LCP
IF D
R
L
L
R
L
R
VA WB
SC FC
CORR
22.5
22.6
22.7
22.8
22.9
23.0 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

29

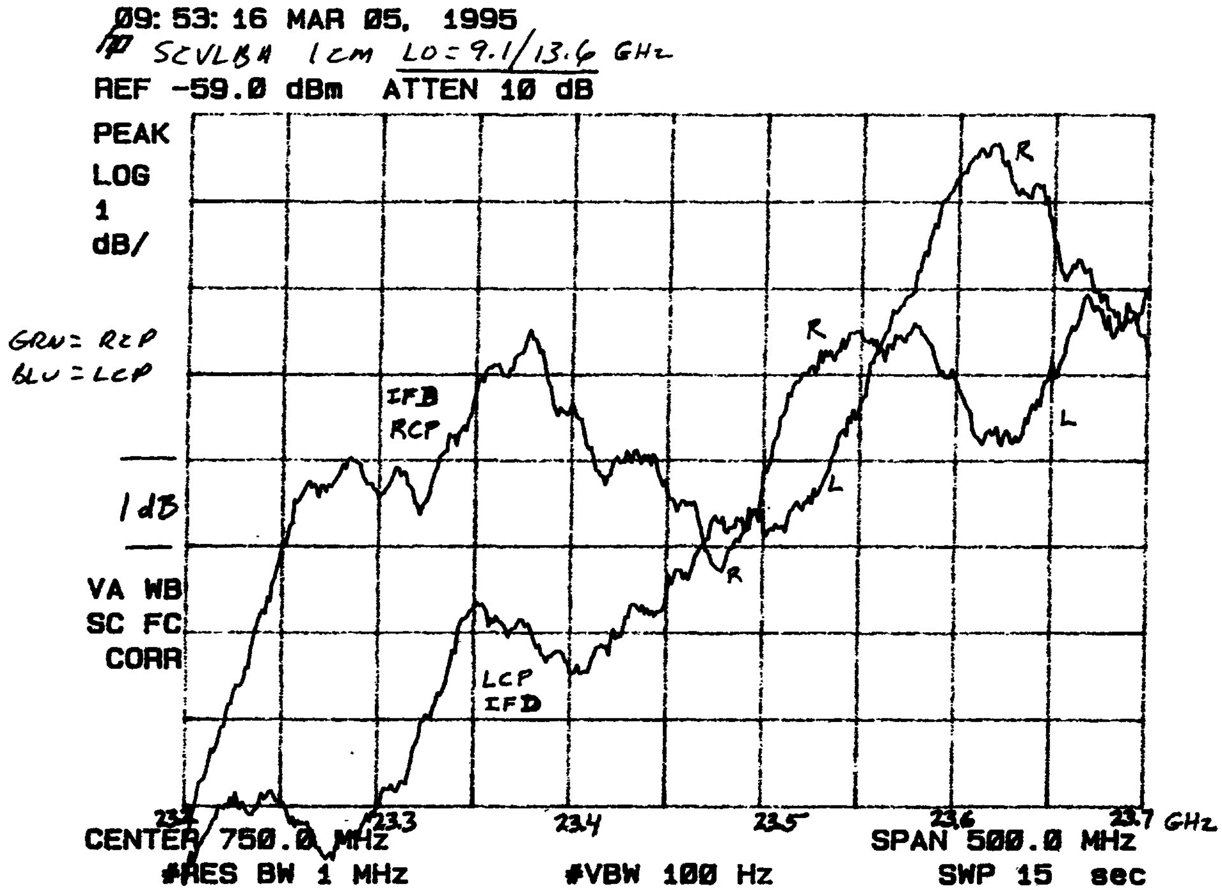

ICM
09: 42: 29 MAR 05, 1995
SCVLBA ICM LO=9.1/13.1 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
RCP = GRN
LCP = BLU
1dB
VA WB
SC FC
CORR
IFB
RCP
LCP
IFD
R
L
22.7
22.8
22.9
23.0
23.1
23.2 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

30


ICM
09: 48: 44 MAR 05, 1995
SCVLBA ICM LO = 9.1/13.4 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
RCP = GRN
LCP = BLUE
1dB
VA WB
SC FC
CORR
IFB
RCP
LCP
IFD
R
L
23.0
23.1
23.2
23.3
23.4
23.5 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#31

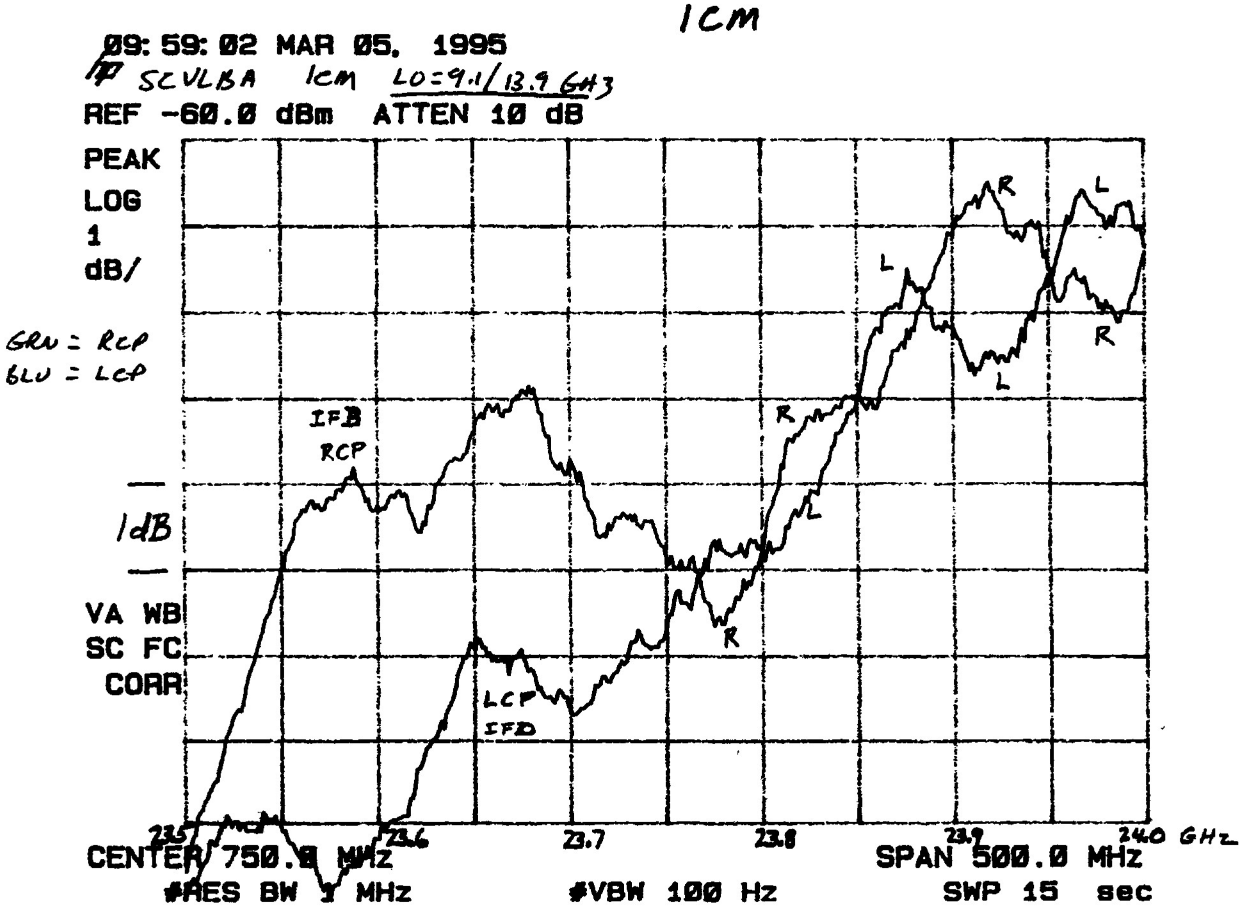
1CM



09: 53: 16 MAR 05, 1995
SCVLBA 1cm LO=9.1/13.6 GHz
REF -59.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
1dB
VA WB
SC FC
CORR
IFB
RCP
LCP
IFD
R
L
23.2
23.3
23.4
23.5
23.6
23.7 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec


#32

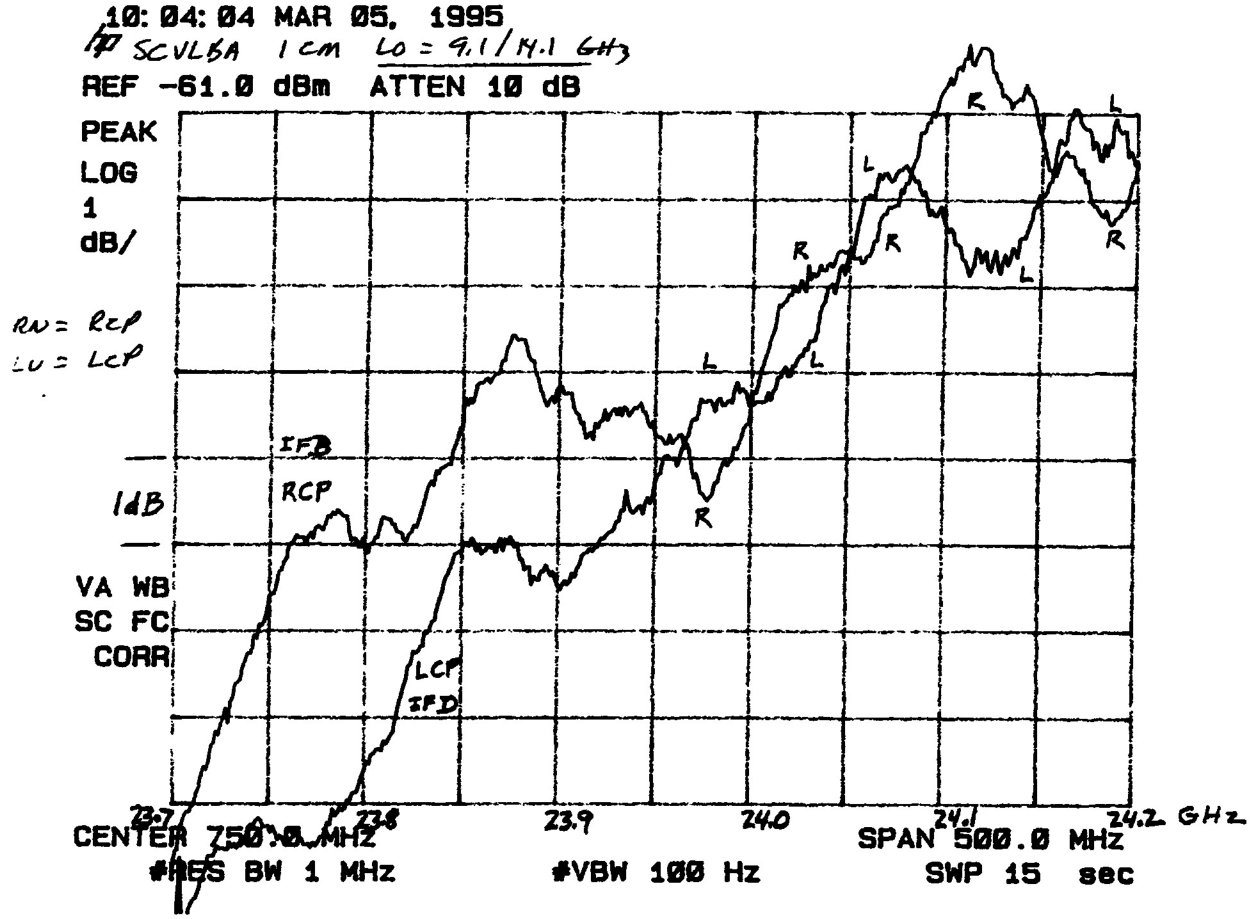
1CM



09: 59: 02 MAR 05, 1995
SCVLBA 1cm LO=9.1/13.9 GHz
REF -60.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = RCP
BLU = LCP
1dB
VA WB
SC FC
CORR
IFB
RCP
LCP
IFD
R
L
23.5
23.6
23.7
23.8
23.9
24.0 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

F33

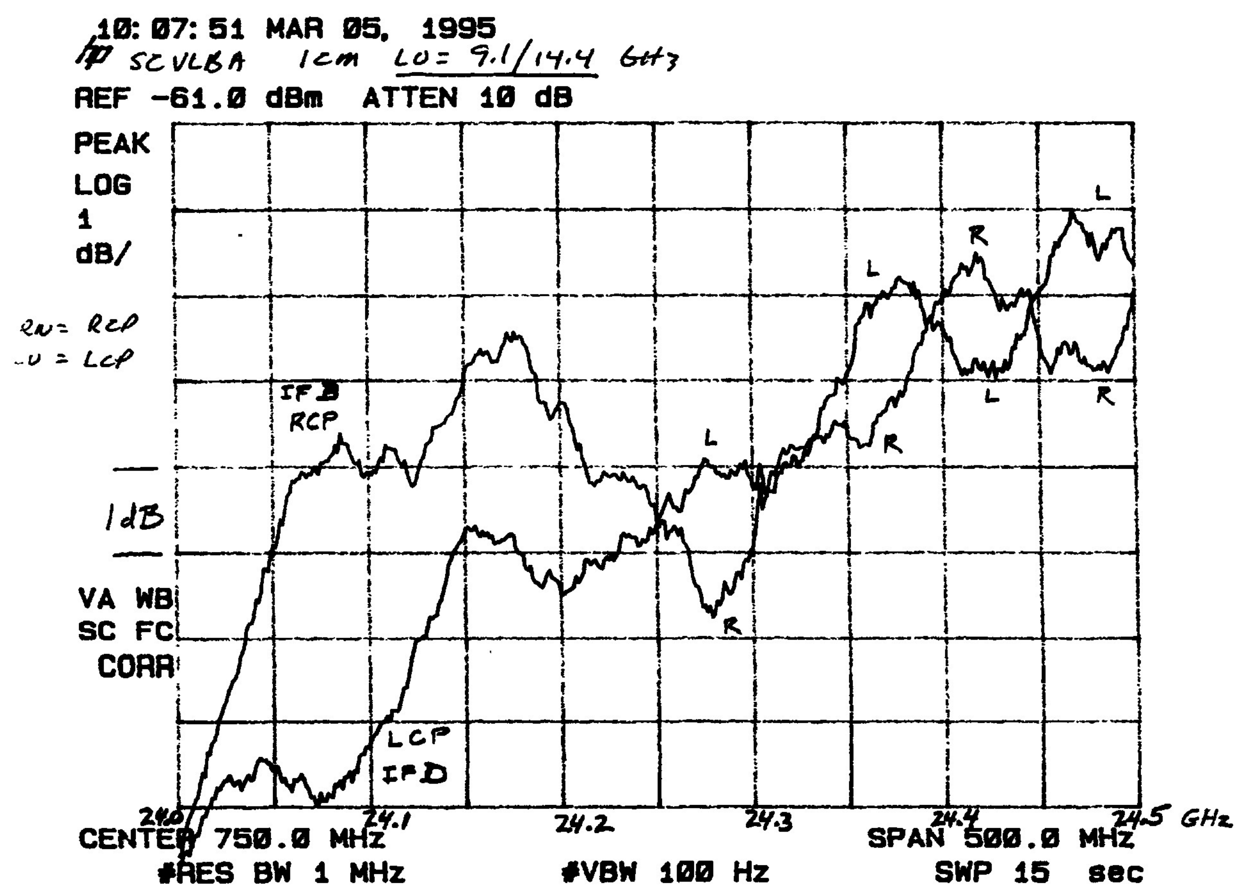
1 CM



10:04:04 MAR 05, 1995
SCVLBA 1 cm LO = 9.1/14.1 GHz
REF -61.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
RW = RCP
LU = LCP
IFB
RCP
1dB
VA WB
SC FC
CORR
LCP
IFD
R
L
23.7
23.8
23.9
24.0
24.1
24.2 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

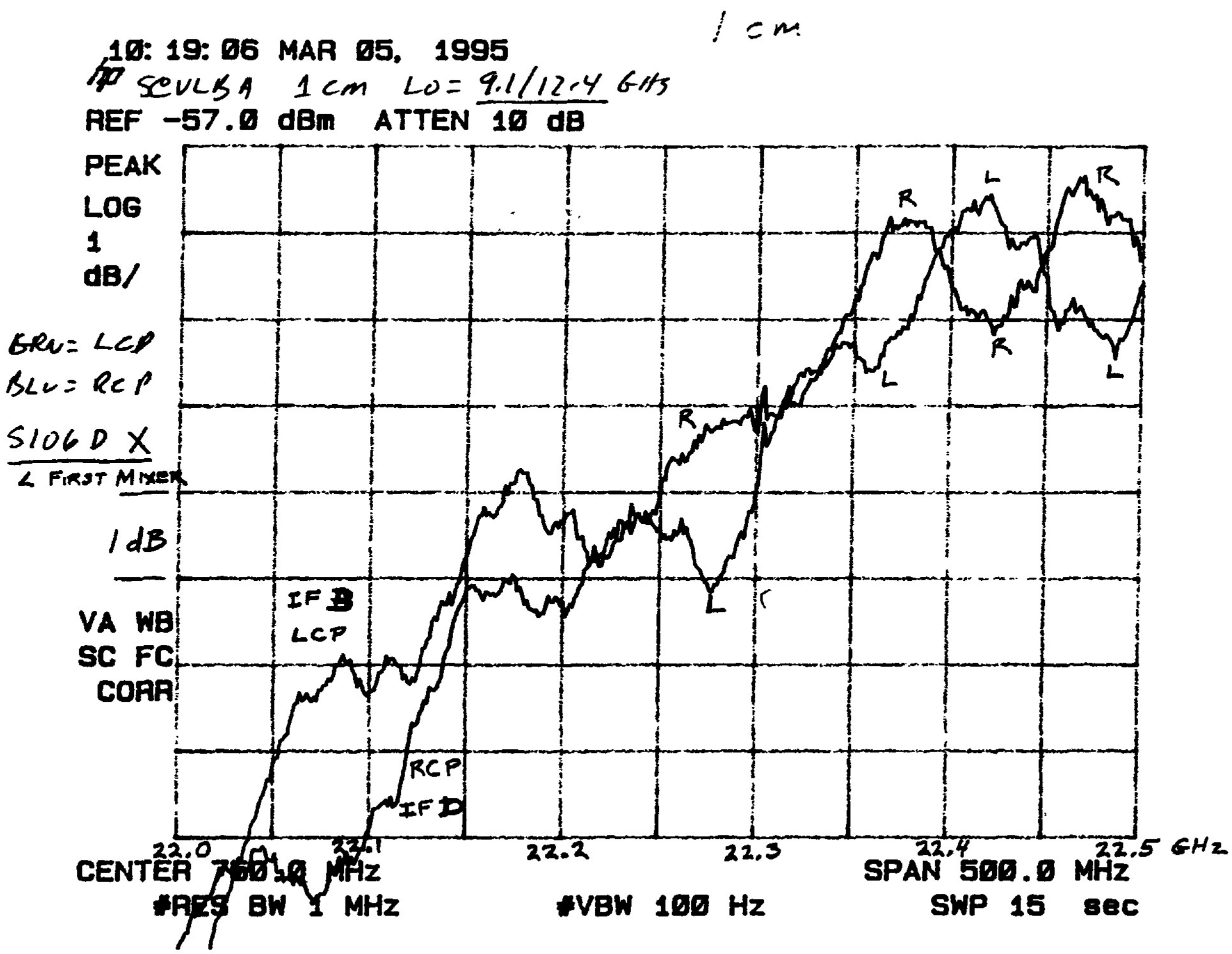

4

1 CM

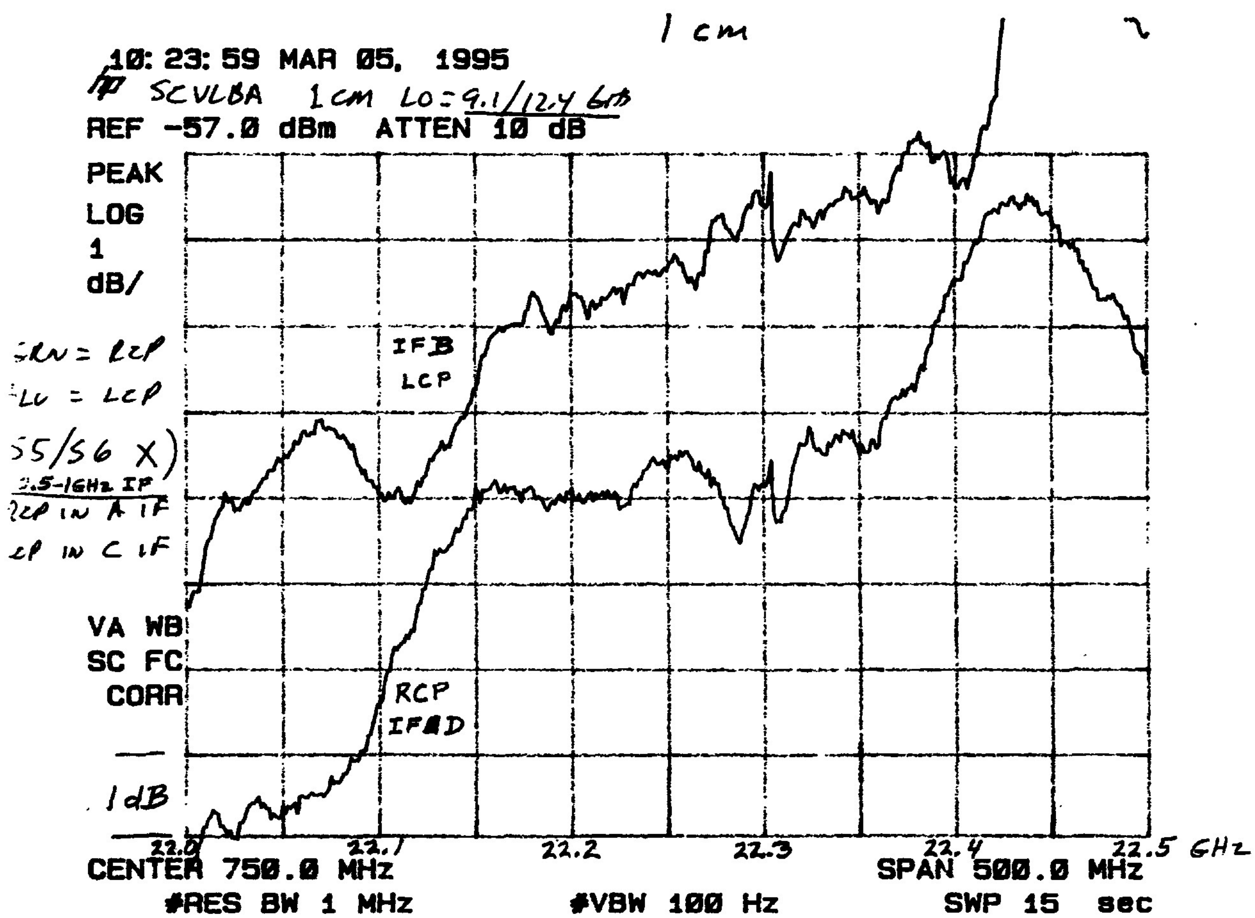


10:07:51 MAR 05, 1995
SCVLBA 1cm LO = 9.1/14.4 GHz
REF -61.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
RW = RCP
LU = LCP
IFB
RCP
1dB
VA WB
SC FC
CORR
LCP
IFD
R
L
24.0
24.1
24.2
24.3
24.4
24.5 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#35


1 cm
10: 19: 06 MAR 05, 1995
SCVLBA 1 cm LO = 9.1/12.4 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = LCP
BLU = RCP
S106D X
& FIRST MIXER
1 dB
IF B
LCP
RCP
IF D
VA WB
SC FC
CORR
R
L
R
L
R
L
R
L
22.0
22.1
22.2
22.3
22.4
22.5 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec

#36


1 cm
10: 23: 59 MAR 05, 1995
SCVLBA 1 cm LO = 9.1/12.4 GHz
REF -57.0 dBm ATTEN 10 dB
PEAK
LOG
1
dB/
GRN = LCP
BLU = LCP
55/56 X
0.5-1GHz IF
RCP IN A IF
LCP IN C IF
IF B
LCP
RCP
IF D
VA WB
SC FC
CORR
1 dB
22.0
22.1
22.2
22.3
22.4
22.5 GHz
CENTER 750.0 MHz
SPAN 500.0 MHz
#RES BW 1 MHz
#VBW 100 Hz
SWP 15 sec