National Radio Astronomy Observatory
Green Bank, WV

Memorandum

May 11, 2001

To: M. Mckinnon, R. Fisher

From: R. Norrod, M. Stennes

Subject: L-band Reflection Measurement

copy: GBTarchive Electronics File
Keys: Electronics, Feedarm, Subreflector

On 2/1/2001, reflection measurements were made at L-Band from the secondary focus of the GBT. The technique used was similar to earlier measurements at C-Band (see gbtarchive memo E0086). An HP8720 network analyzer with time domain option was used to perform the measurements. The analyzer was set to sweep the 1.2-1.7 GHz range, sampling 801 points. A circular-to-rectangular waveguide transition and coaxial adapter were calibrated using a waveguide calibration set, and connected to the throat section of the L-Band feedhorn.

Figures 1 and 2 show distances in meters from the secondary focus to three locations on the subreflector and main reflector. The waveguide calibration reference point is approximately 1.8 meters below the secondary focus, so 1.8 meters should be added when looking at the analyzer plots. Figure 3 shows a long-range reflection measurement. Reflections from distances near the feed aperture and the subreflector ranges are easily seen. However no reflections are seen above the analyzer noise floor at the main reflector range.

Figure 4 shows a 22.5 meter range measurement. The reflection at 3.6 m is most likely an artifact caused by the large feed aperture reflection; similar artifacts were seen and investigated during the earlier C-Band measurements. The double peaks centered at 17.2 meter are probably from the A and B rim edges (Figure 2) of the subreflector, as these edges are roughly parallel to the polarization of the transmitted signal. Figure 5 shows a measurement using the orthogonal polarization. The single peak at 17.2 m is probably from the rims of the subreflector which are nearest and furthest from a viewer of Figure 2.

Figures 6-9 show measurements with the subreflector moved along it's Y (focus) axis.

FIGURE 1

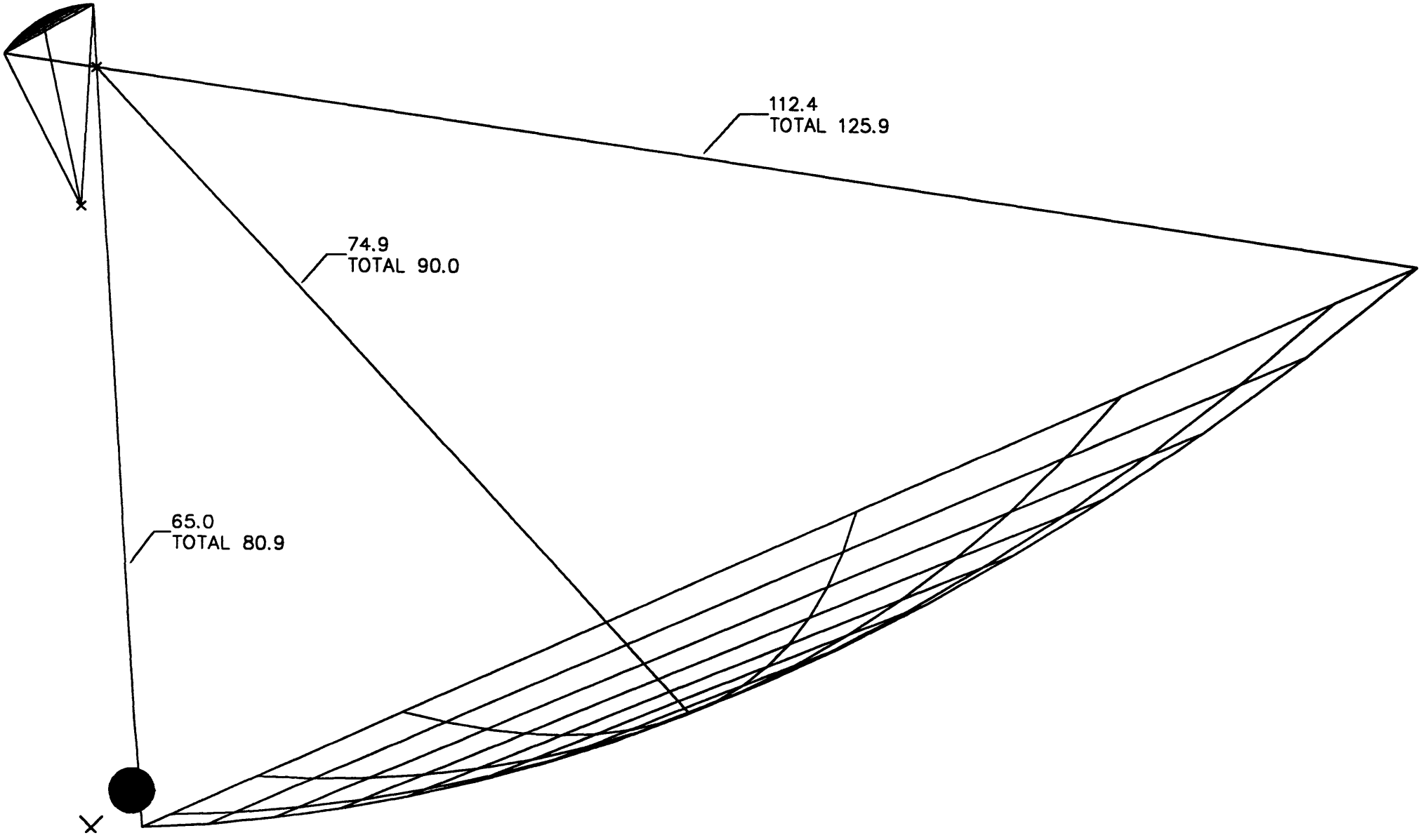
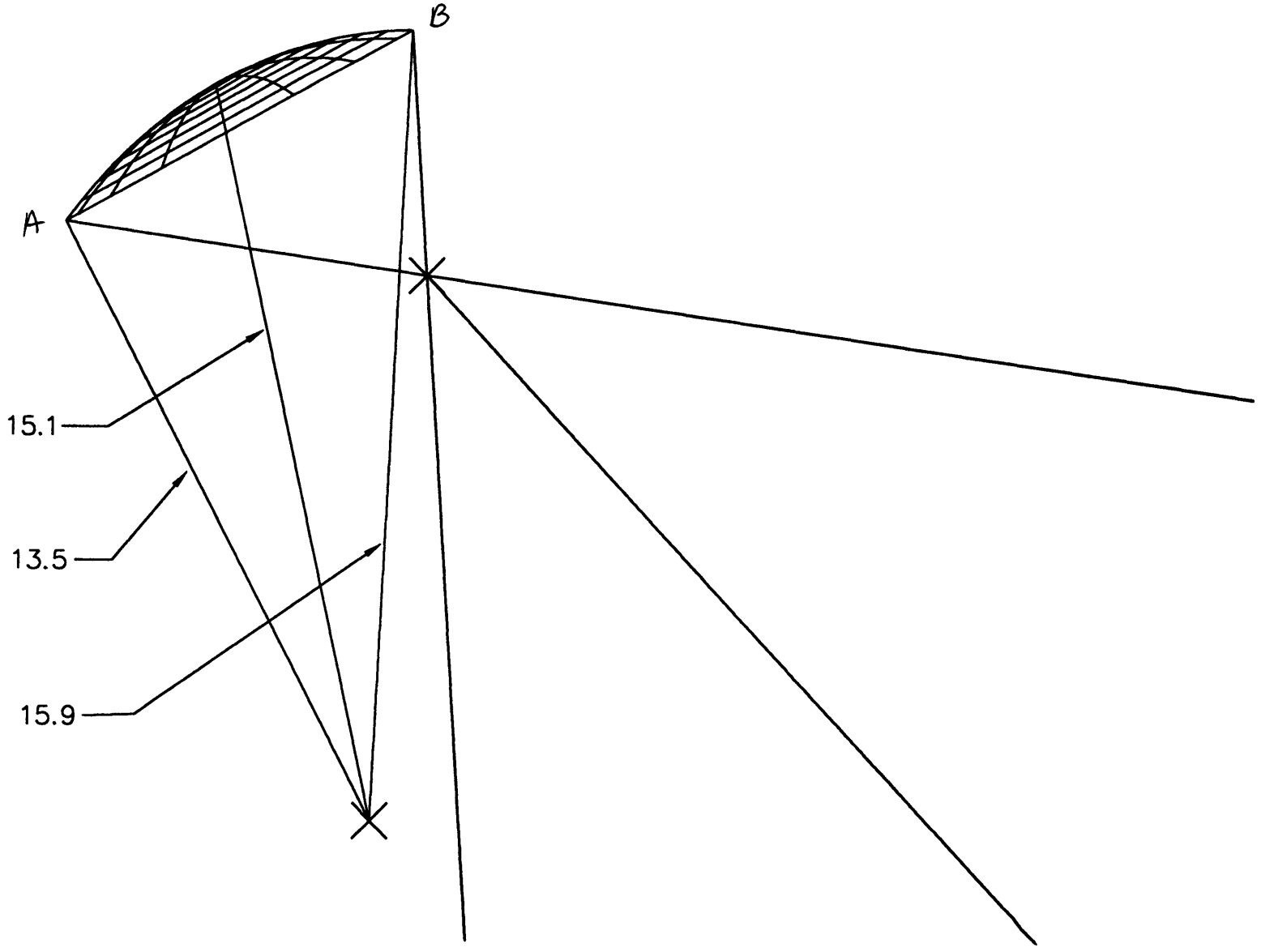
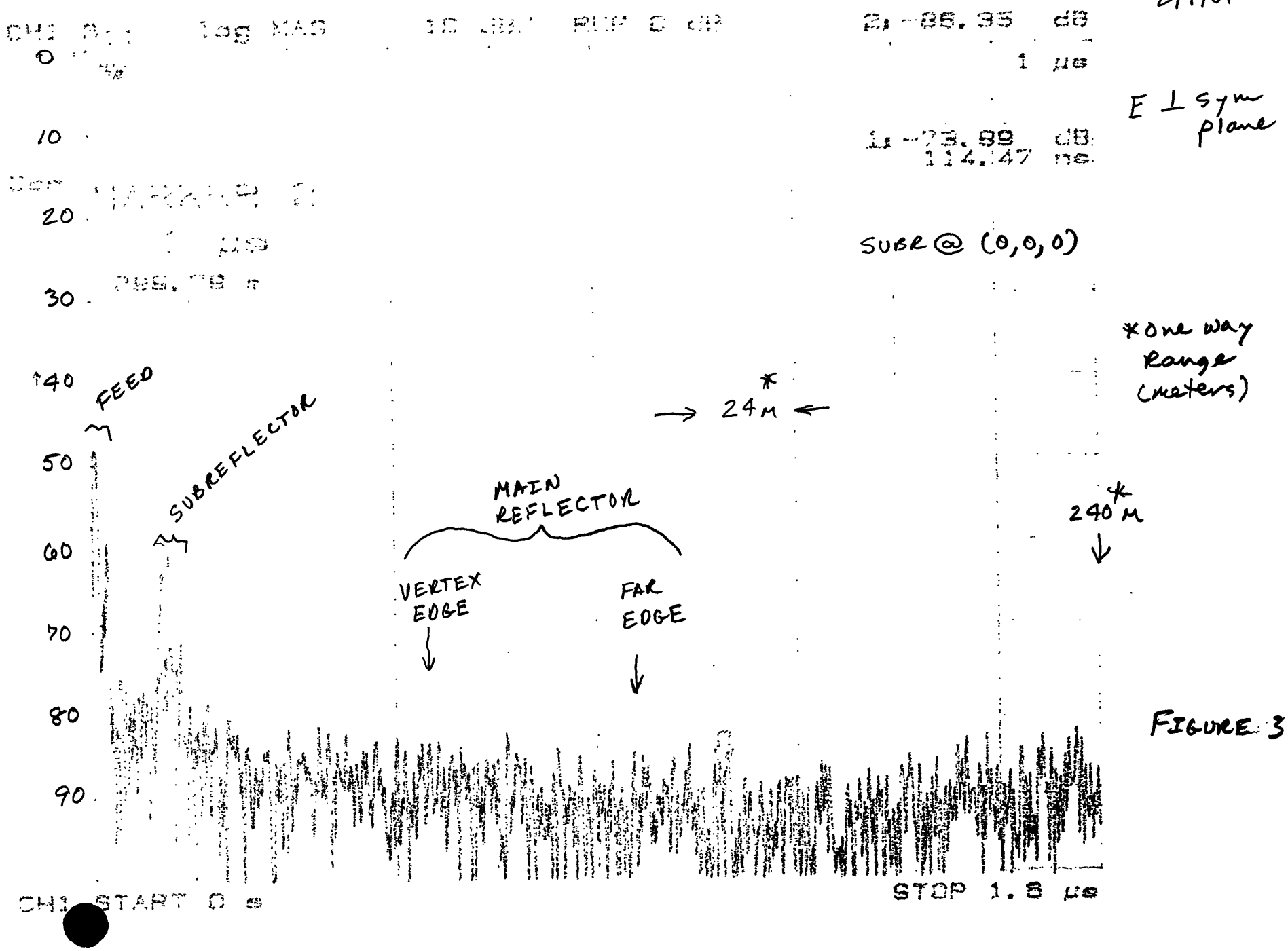


FIGURE 2



2/1/01



E ⊥ sym plane

SUBR @ (0,0,0)

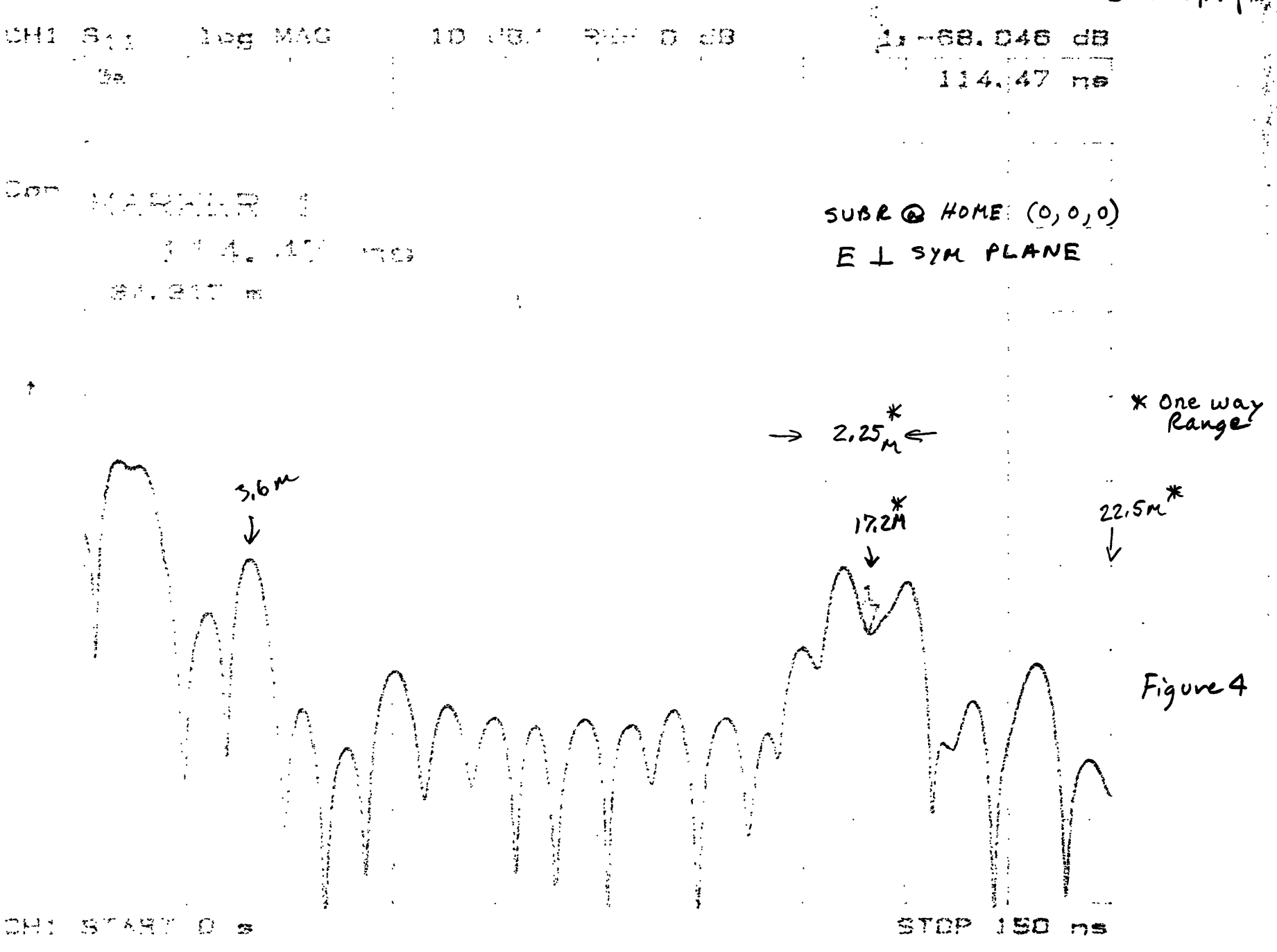
*one way Range (meters)

FIGURE 3

0,0,0

2/1/01

E ⊥ sym plane



* One way Range

Figure 4

15

Y = 0.0

2/1/

E // sym plane

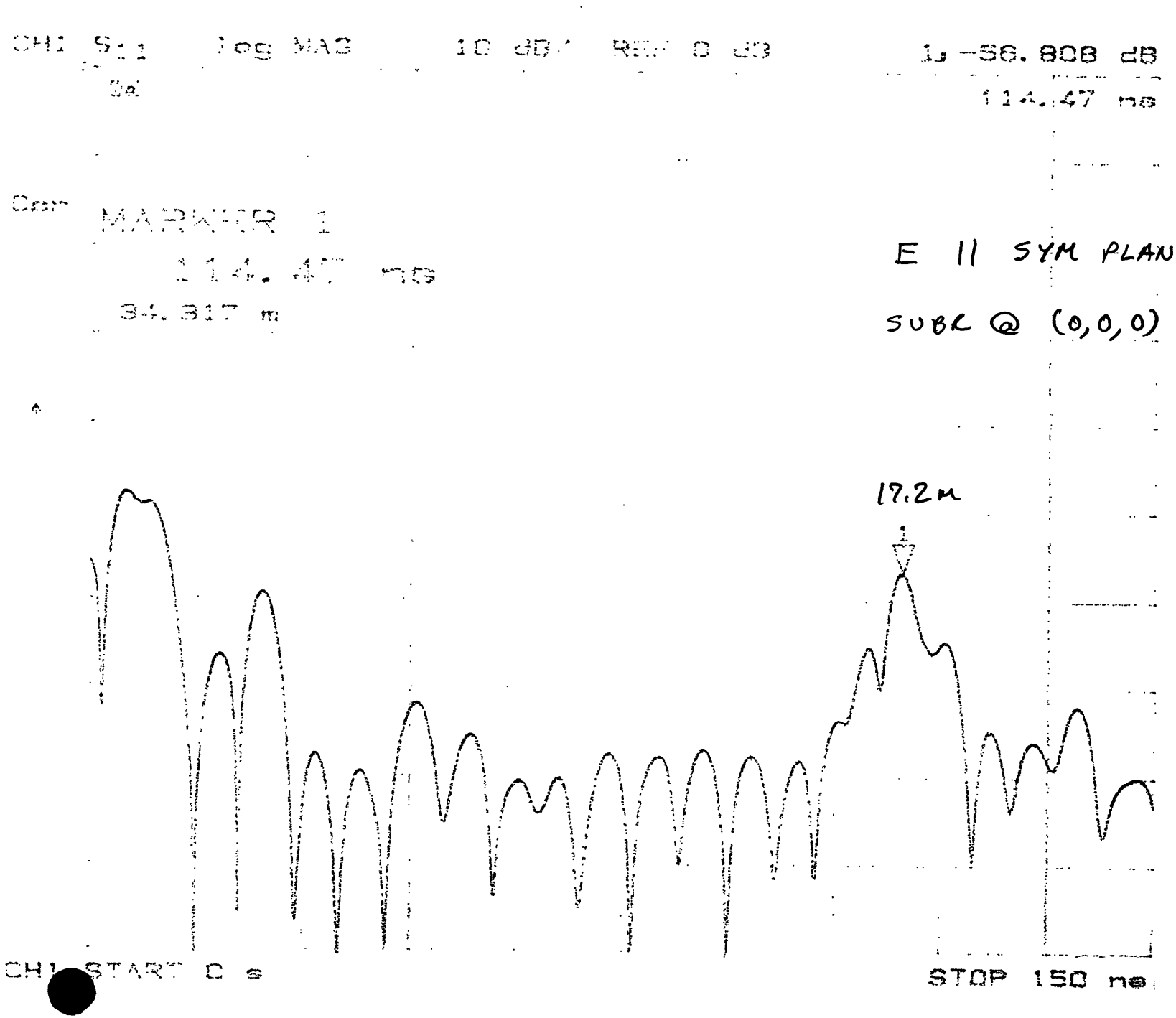


FIGURE 5

Y = -10

E ⊥ sym plane

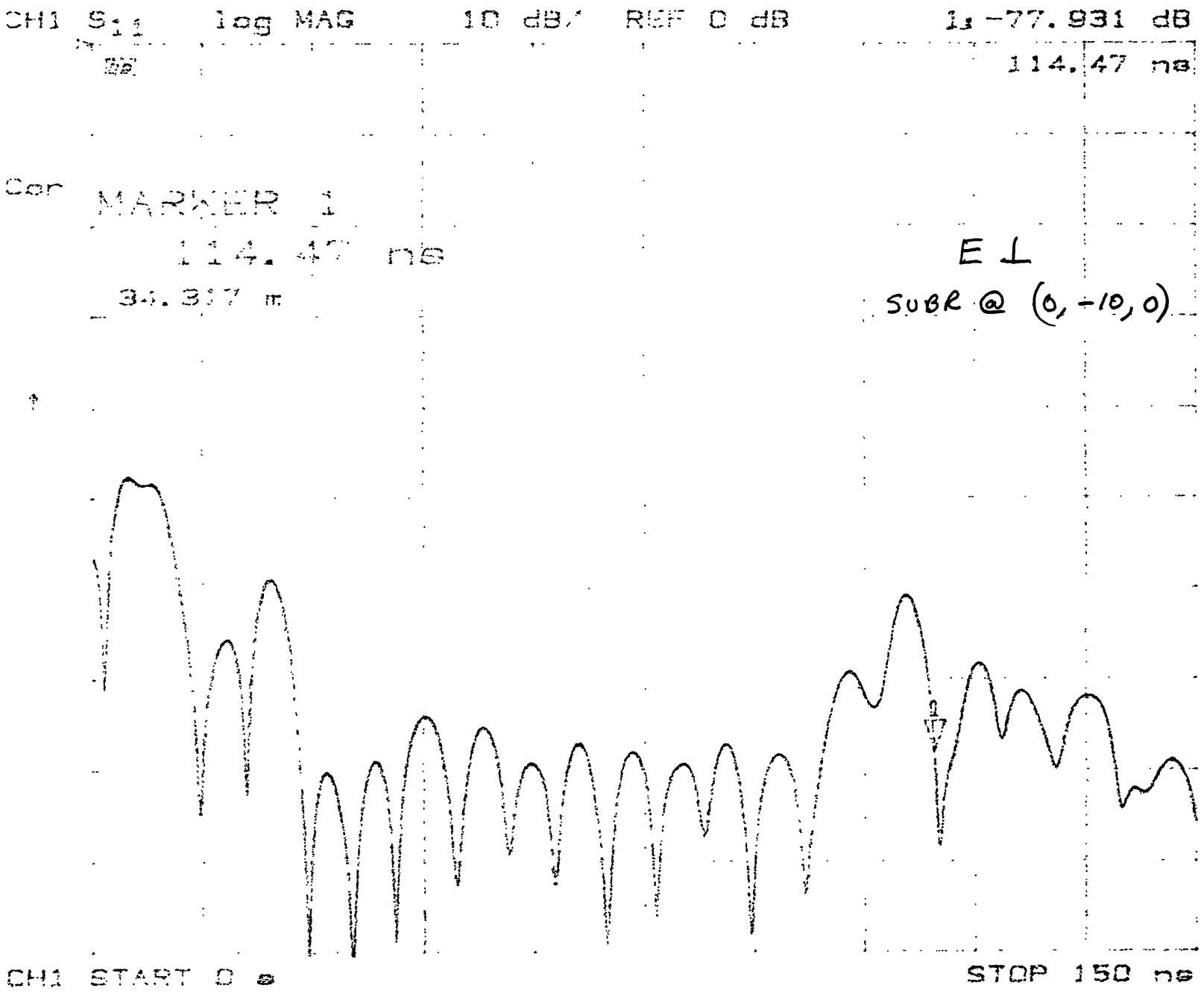


FIGURE 6

Y= +10 2/1/01

E ⊥ sym plane

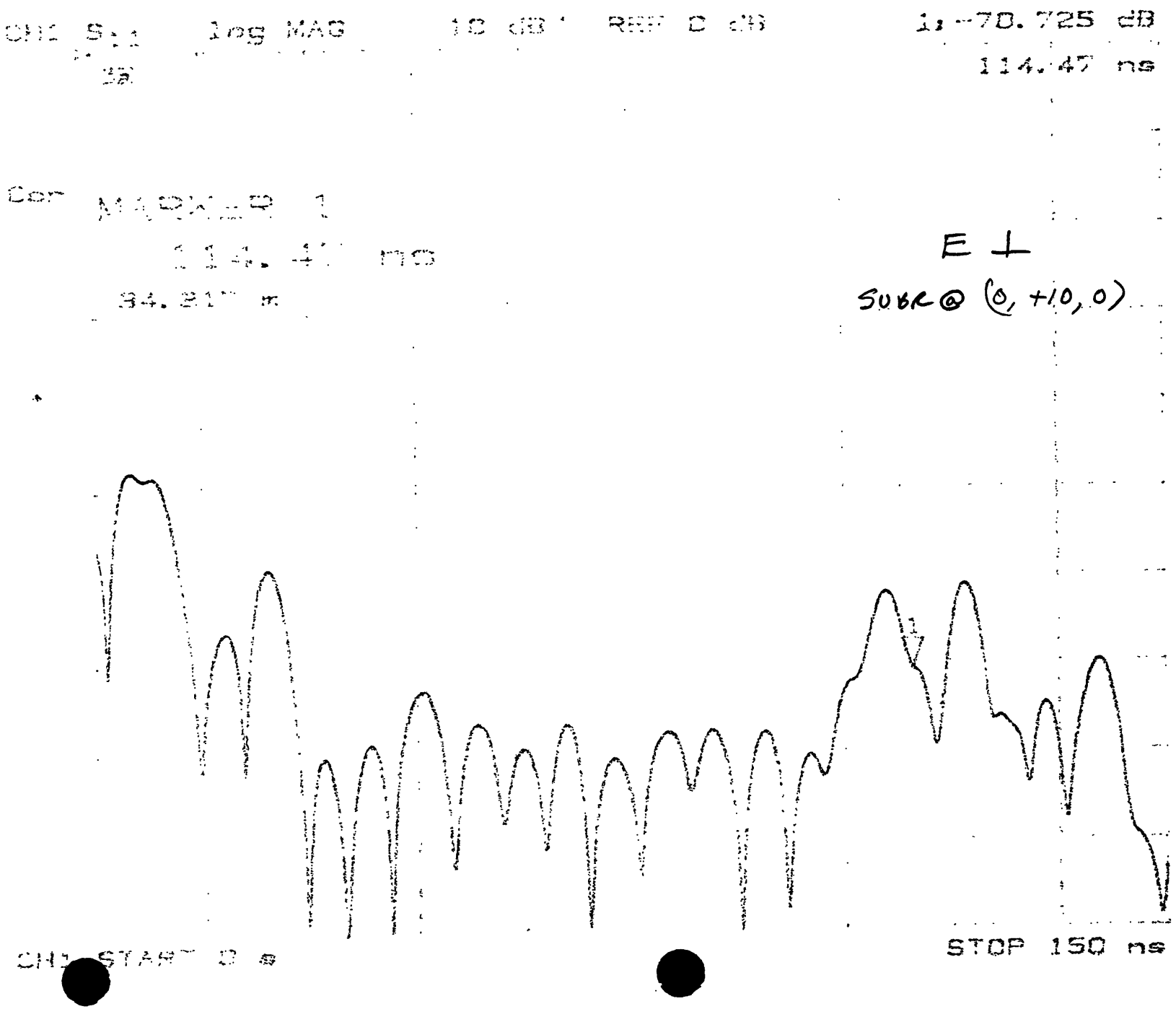
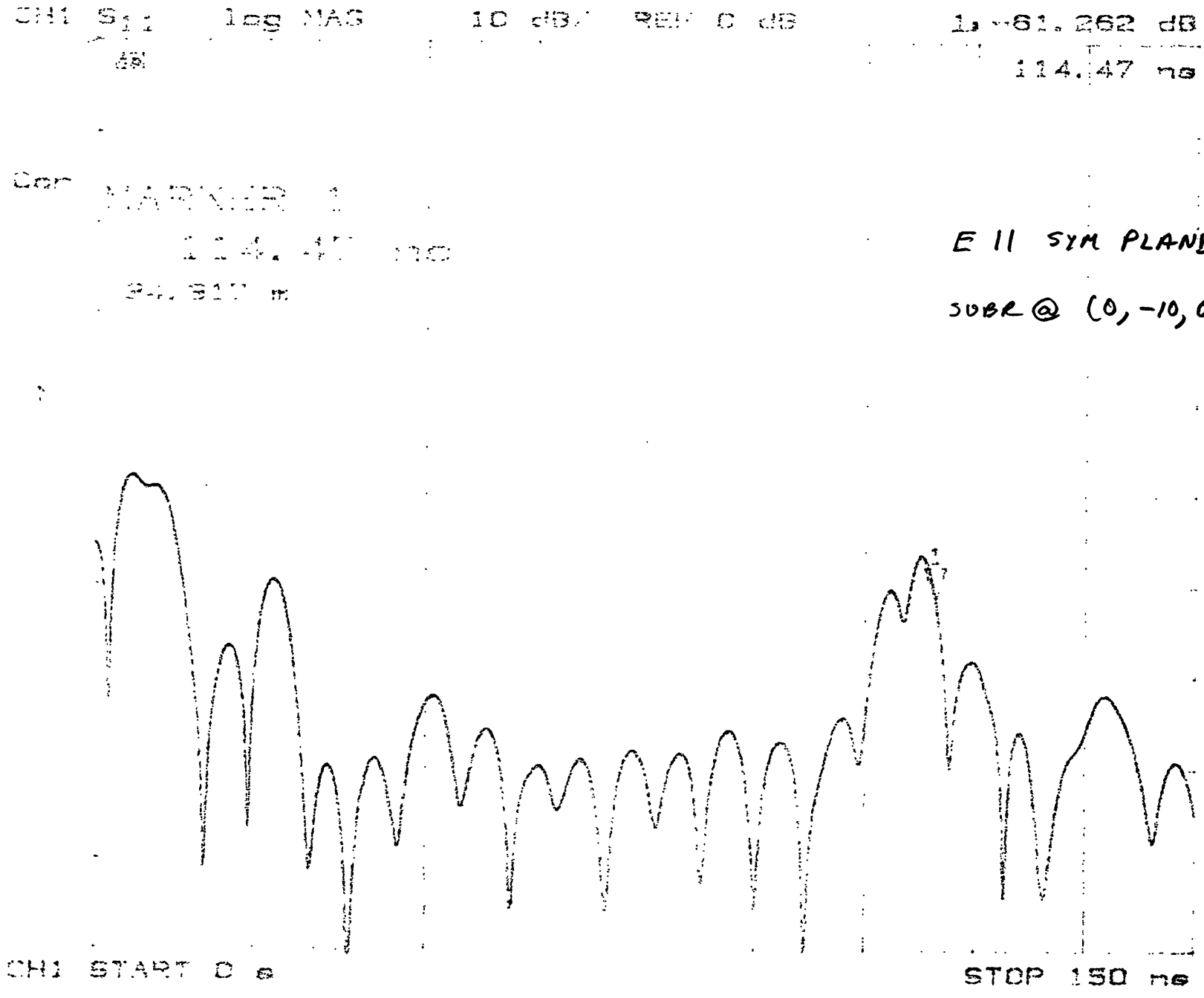


FIGURE 7

(13)

Y = -10

E || [redacted] plane



E || SYM PLANE

SUBR @ (0, -10, 0)

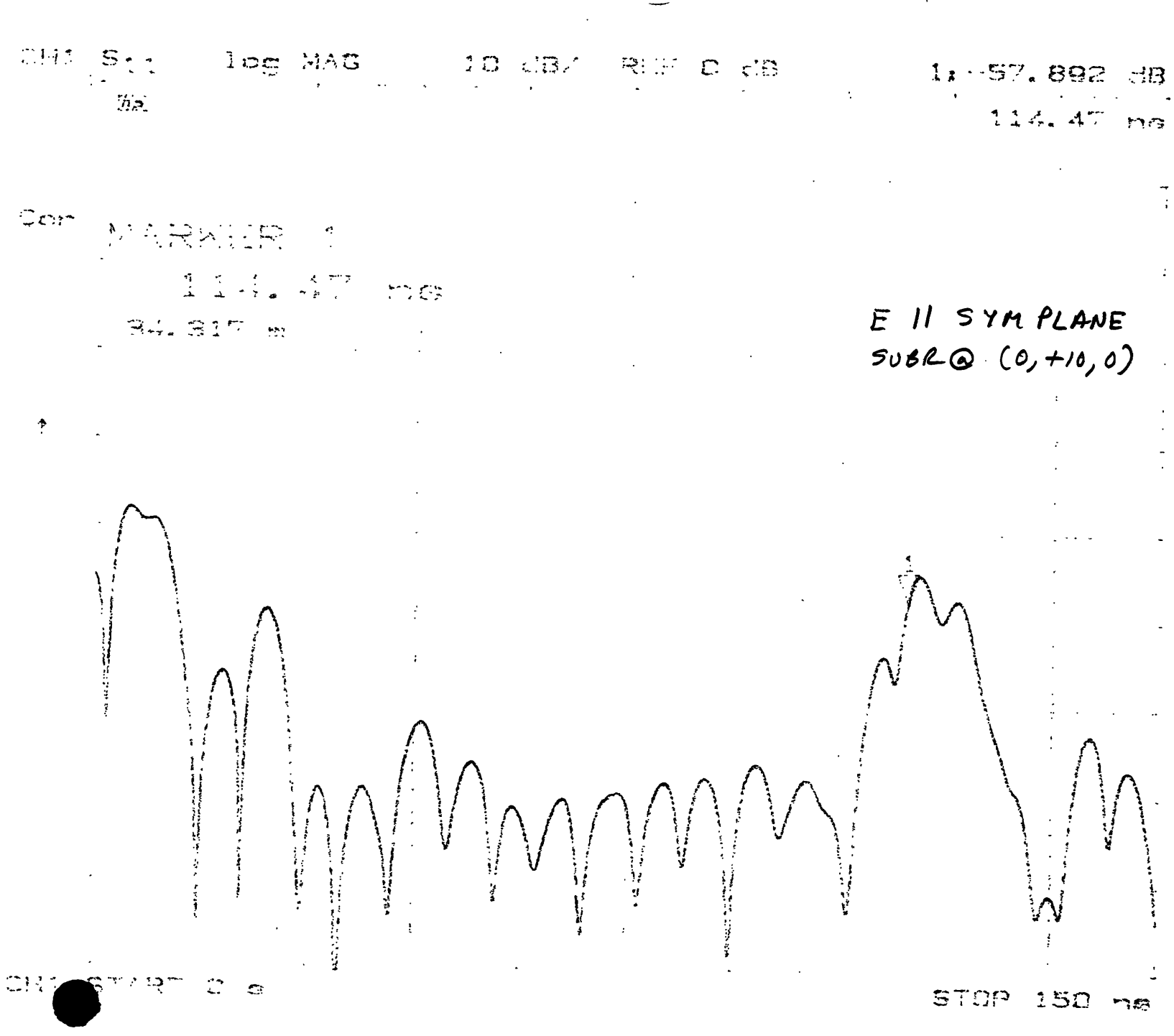
FIGURE 8

14)

Y = +10

41/00

E // Sym plane



E // SYM PLANE
SUBR @ (0, +10, 0)

FIGURE 9