TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

March 7, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

Your letter to W. F. Willis dated September 26, 1985 requested copies of investigation reports and related documents dealing with potentially safety-related employee concerns on TVA's nuclear plants. Copies of the requested information as outlined in TVA's October 7, 1985 letter are enclosed as enclosure 1 and cover the period of February 27, 1986 through March 5, 1986. TVA has previously submitted copies of the requested information through February 26, 1986. We are also enclosing computer summaries of the information which we have transmitted to date. This weekly submittal is now being prepared by the Employee Concern Project Manager located at Watts Bar Nuclear Plant.

Enclosure 2 is a list of Employee Concern Summaries for active concerns identified through the new Employee Concern Program started February 1, 1986. We will submit the summaries weekly as committed to in the October 7, 1985 letter.

If you have questions concerning the material transmitted, please telephone R. F. Campbell at FTS 858-4892.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. L. Gridley
Manager of Licensing

Enclosures
cc (Enclosures):
Mr. James M. Taylor, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. J. Nelson Grace
Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30323

Mr. Braj K. Singh, Project Manager
Office of Nuclear Reactor Regulation
Phillips Building (MS-R-128)
U.S. Nuclear Regulatory Commission
Bethesda, Maryland 20555

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1/1

8603110489 860307
PDR ADOCK 05000259
P PDR

ATTACHMENT

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
ADDITIONAL DATA FROM IN-SITU TESTING
OF MAIN CONTROL ROOM

The information contained within and on the attached plots comprises a supplement to the original test report entitled: "Watts Bar Nuclear Plant, Main Control Room - Main Control Boards, Structural Dynamic Response Test and Analysis."

Electromechanical Shaker Orientation

Orientation for the electromechanical shaker was based on the fact that the main control boards are less restrained in the X direction and at the top of the structure. The top of either end of the horseshoe shaped structure could have been chosen. Location "A-1" was chosen as a matter of convenience.

X and Y directions were tested for the best orientation of the input forcing function. Structural responses measured during this preliminary testing confirmed the location and direction for the electromechanical shaker should be A-1-X. The shaker remained at this location (A-1-X) throughout testing.

Plots

Transfer functions, coherence functions, and averaged power spectrums are included in this supplement. X and Y direction data is attached for each response accelerometer location. The Z direction (vertical) data was excluded because accelerometer responses in the Z direction were always small.

- Transfer Function

  The transfer function is a relation between output and input which describes the transmission characteristics of a structure at each frequency. It is used for studying structural dynamic response to a standard input. The transfer function plots are labeled as "TRANS," with the vertical axis representing the amplitude ratio of output/input on a logarithmic scale. Frequency is displayed on a linear scale on the horizontal axis.

- Coherence Function

  The coherence function is a dimensionless frequency-domain function with a range of values from 0 to +1. At each frequency, it represents the fraction of the system output power directly related to the input. The coherence plot is labeled "COHER" and the vertical scale is linear. A linear scale also defines frequency on the horizontal axis.

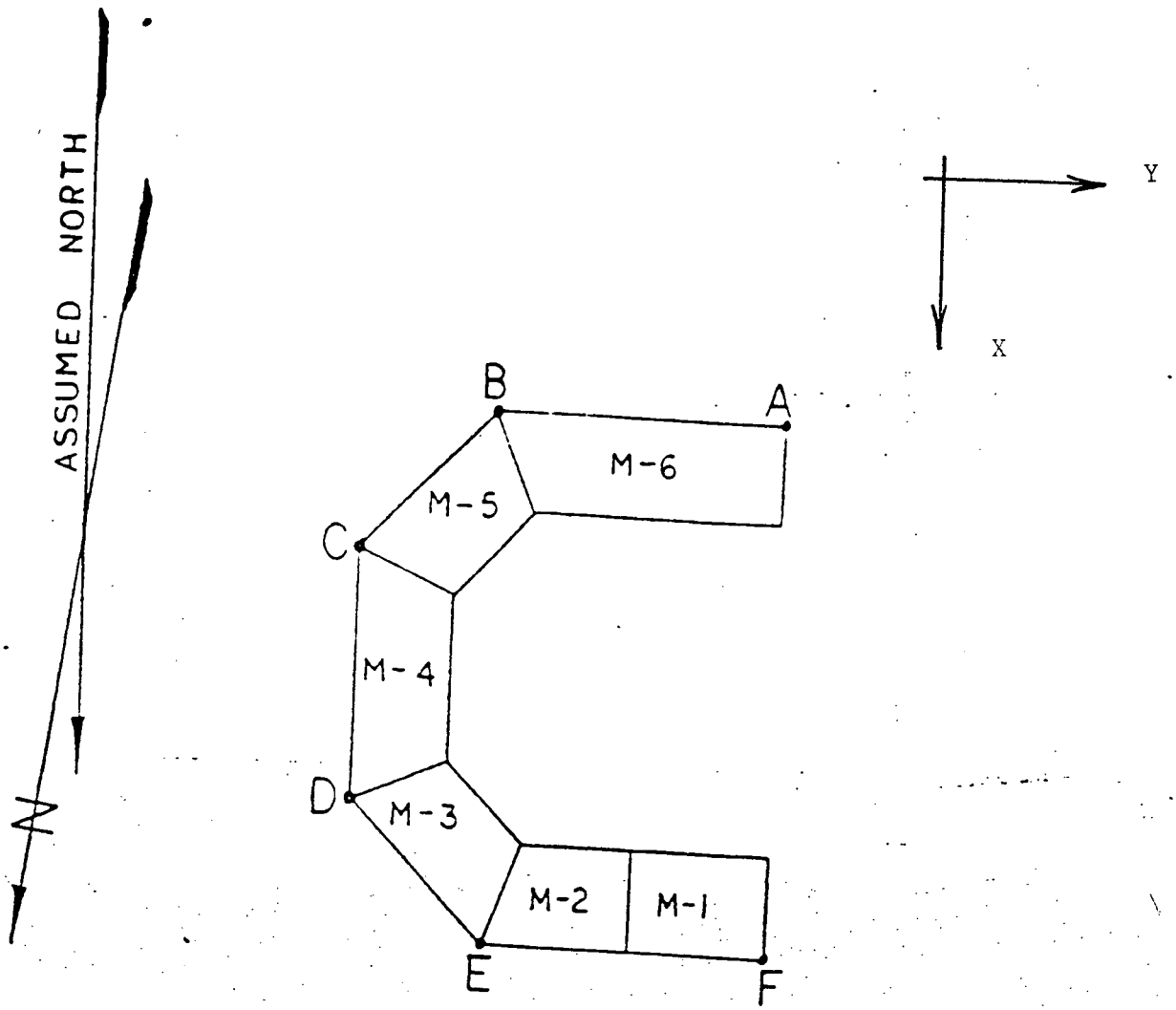
- Power Spectrum

  Time domain signals from the response accelerometers are Fast Fourier Transformed and averaged to produce an averaged power spectrum of amplitude versus frequency. This spectrum is labeled "A SPEC." Response amplitude is shown on a linear scale on the vertical axis. The horizontal scale is a linear frequency scale.

Signal to Noise Ratio

As mentioned earlier, the cabinet structure is more restrained from top to bottom. This causes a corresponding decrease in signal to noise ratio of the response measurements and consequently poorer data as one tries to measure responses near the bottom of the structure. This can be witnessed in the attached plots.

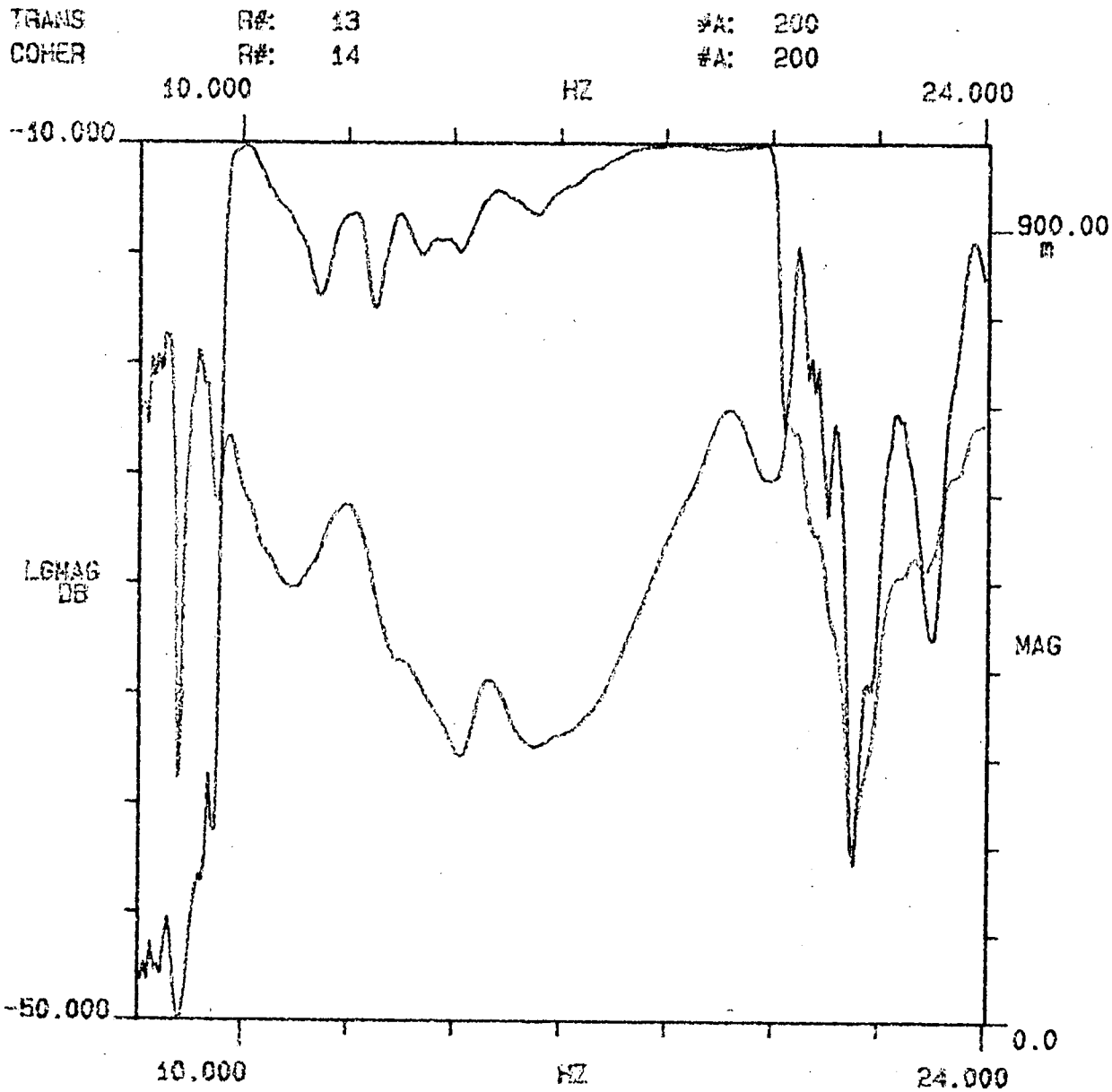
JRO:JLR
Attachment
10/25/85
A1297A.JR



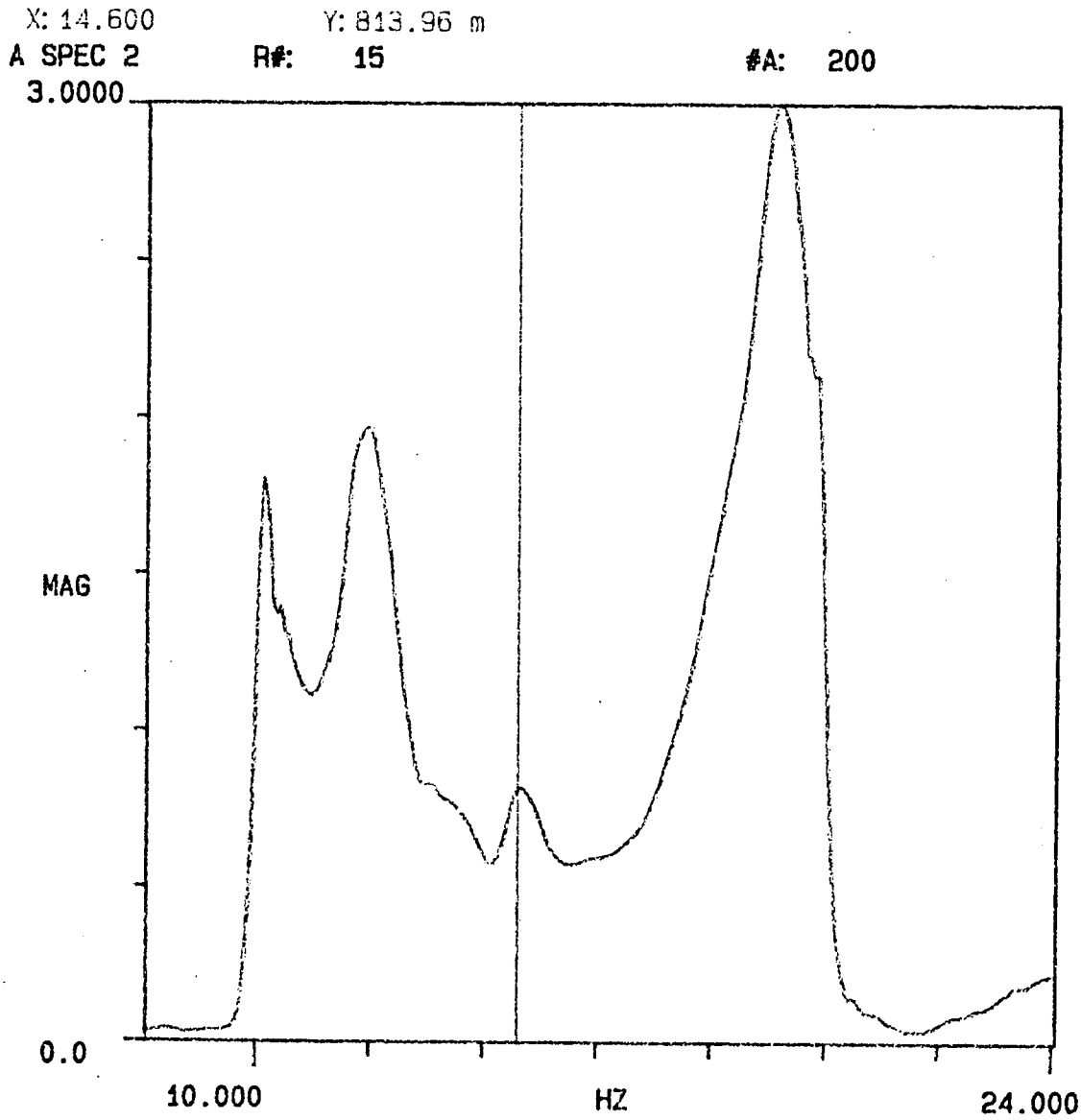
WBNP UNIT TWO MCR MAIN CONTROL BOARDS
STRUCTURAL DYNAMIC RESPONSE TEST
DATA LOCATIONS ~ A ~ B ~ C ~ D ~ E ~ F
ELECTROMECHANICAL SHAKER LOCATION ~ A

PANEL HEIGHT LOCATIONS

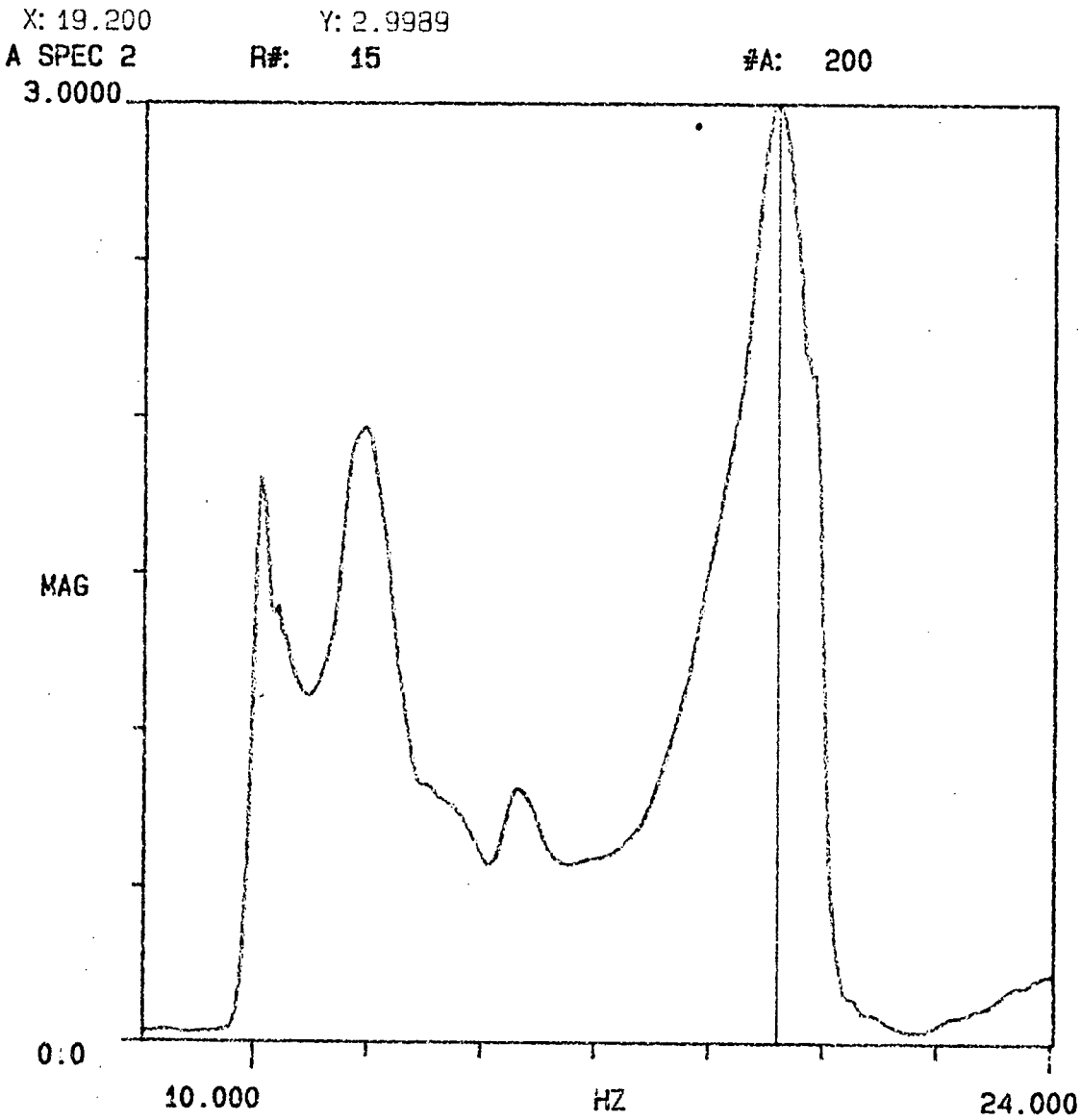
1--TOP OF PANEL
2--MIDDLE
3--BOTTOM OF PANEL



SINE 10-20 HZ. RESPONSE A-1-X



SINE 10-20 HZ. RESPONSE A-1-X



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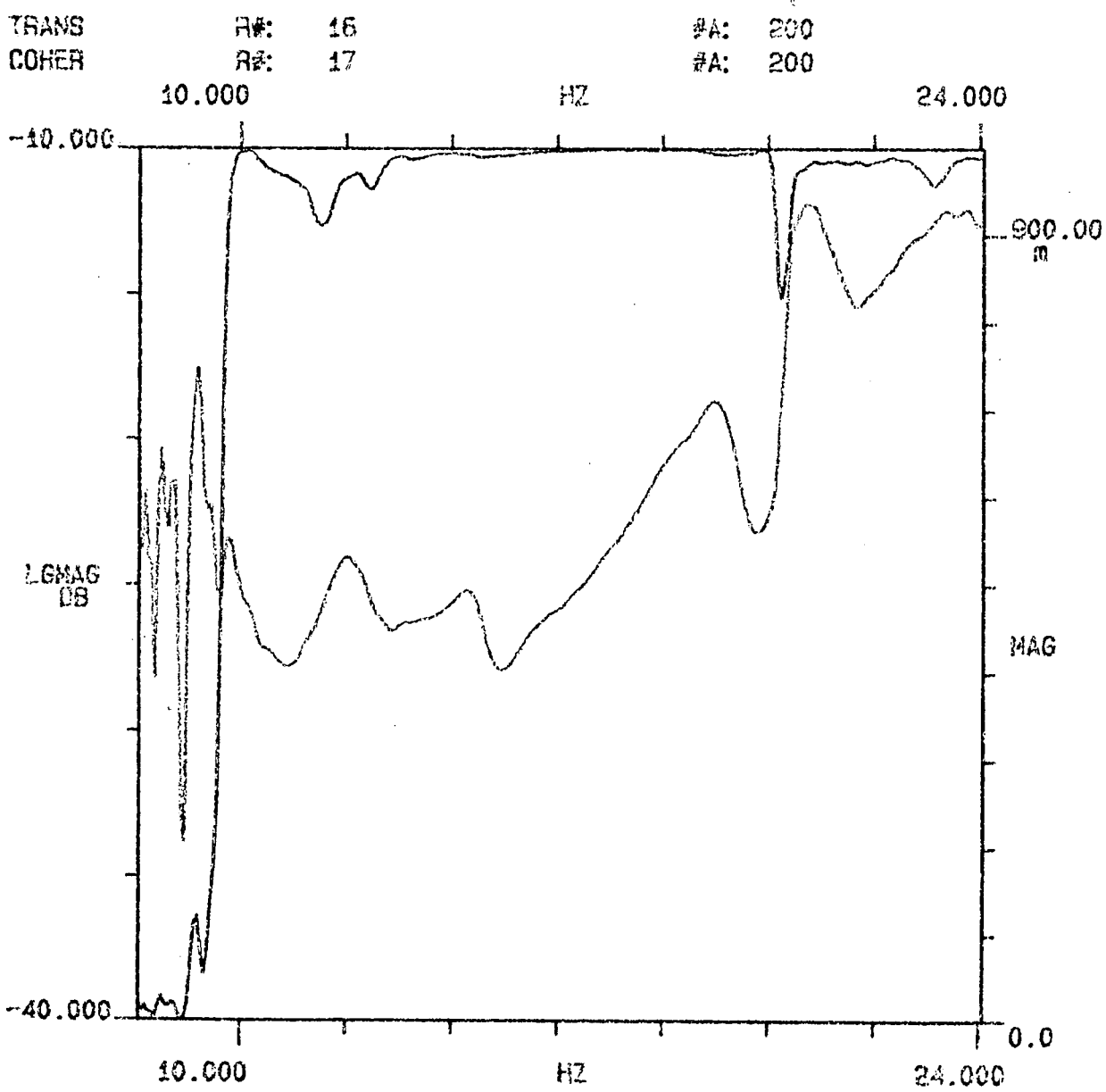

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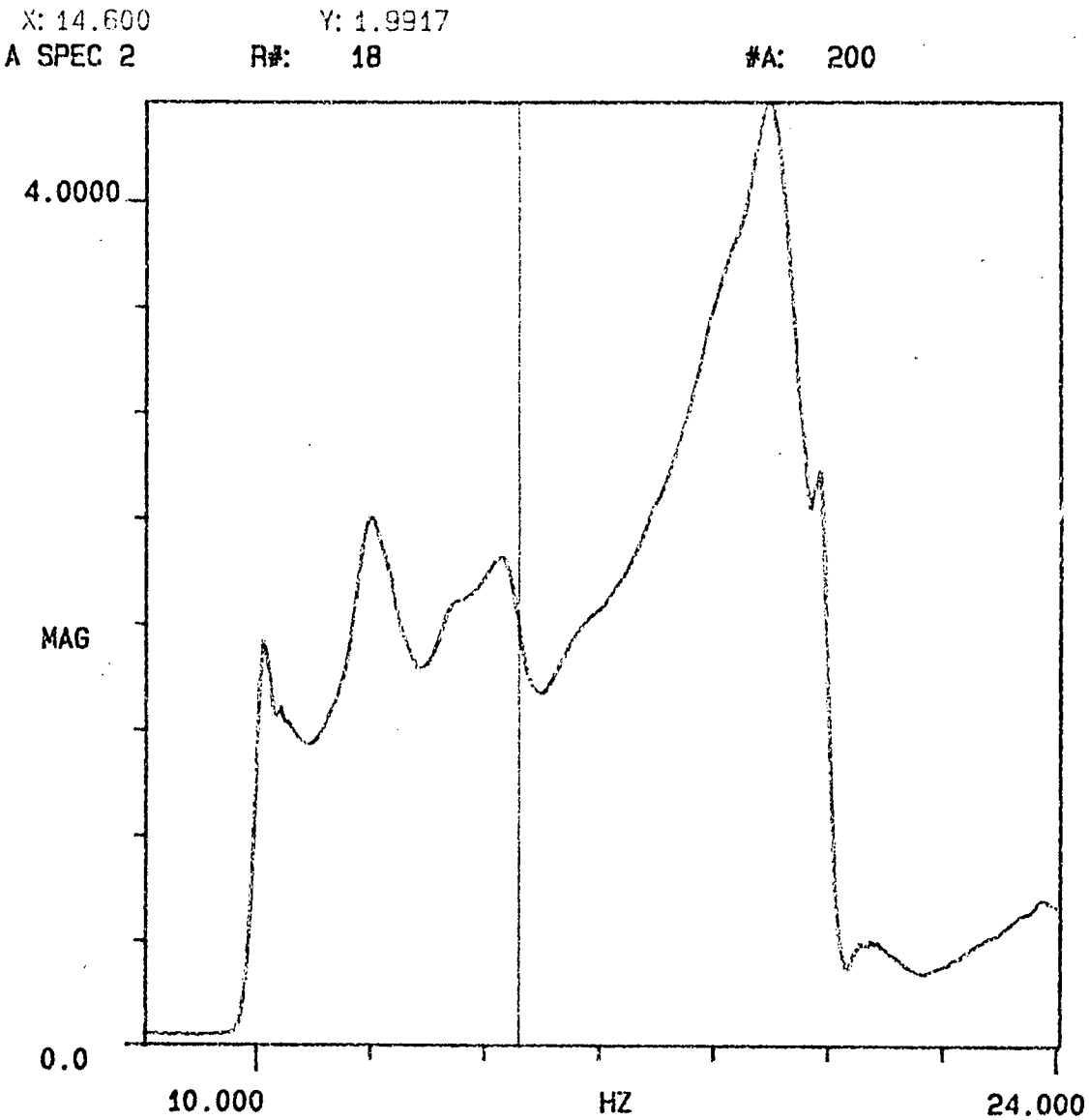

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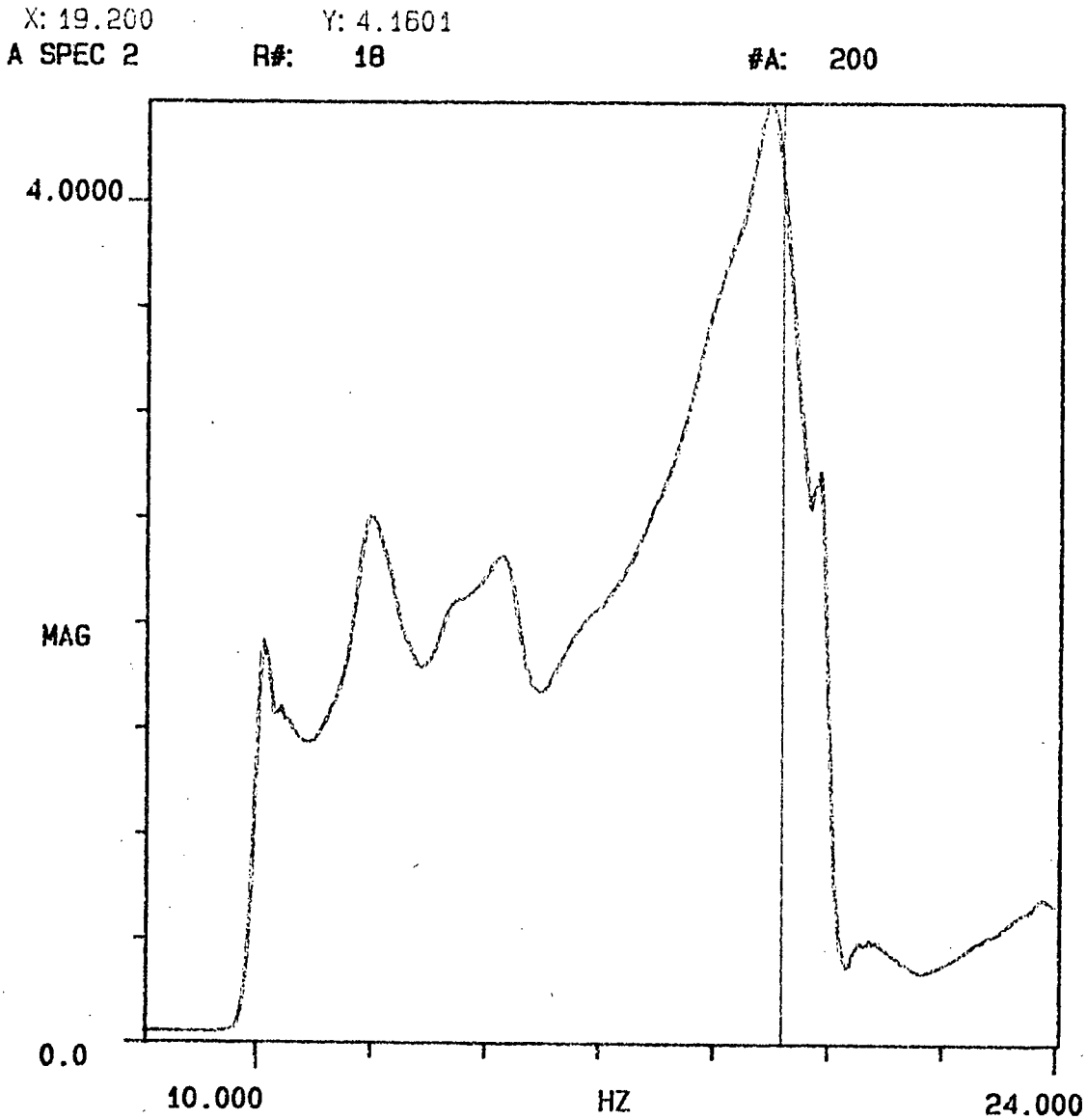
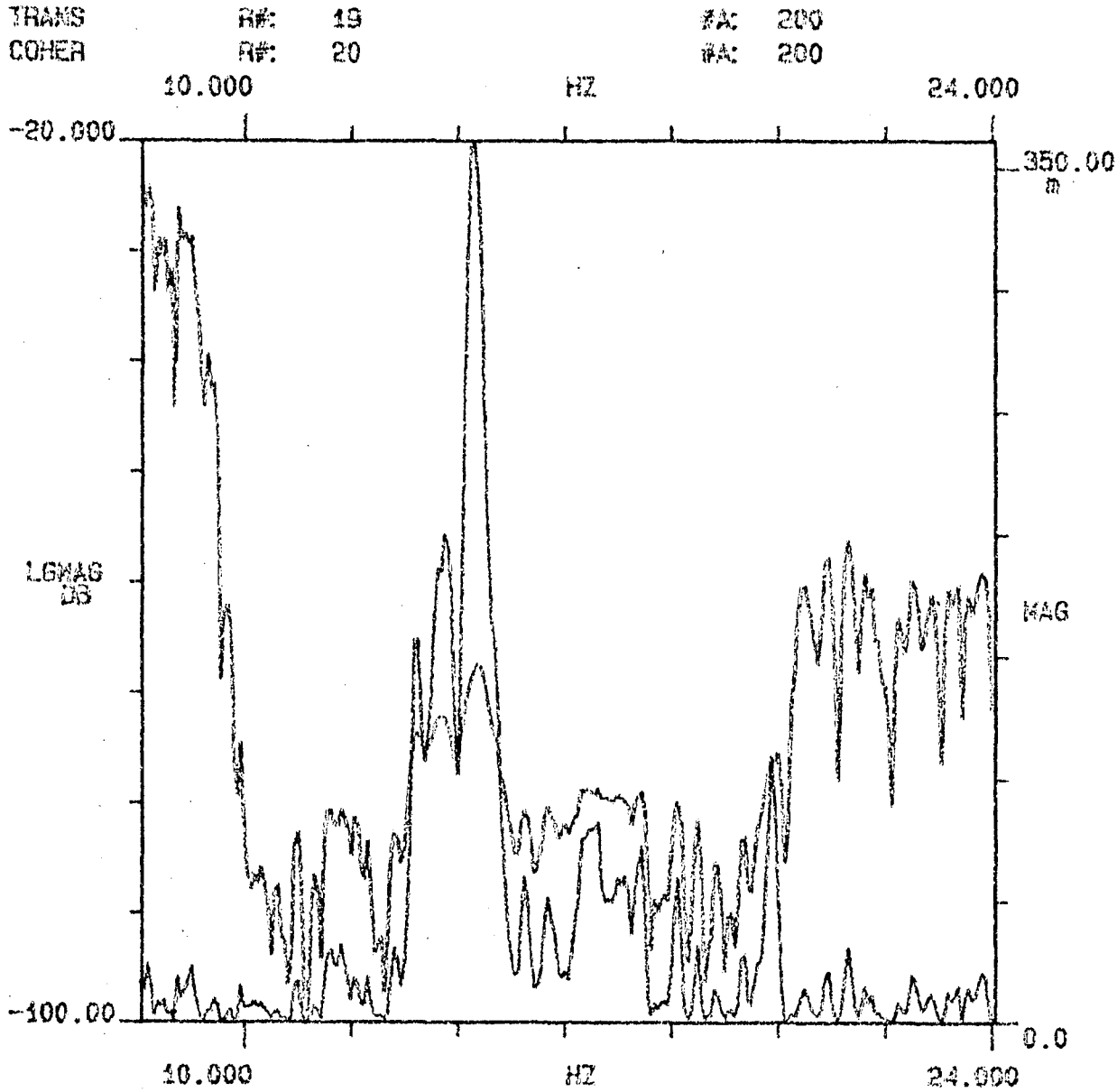


SINE 10-20 HZ. RESPONSE A-1-Y



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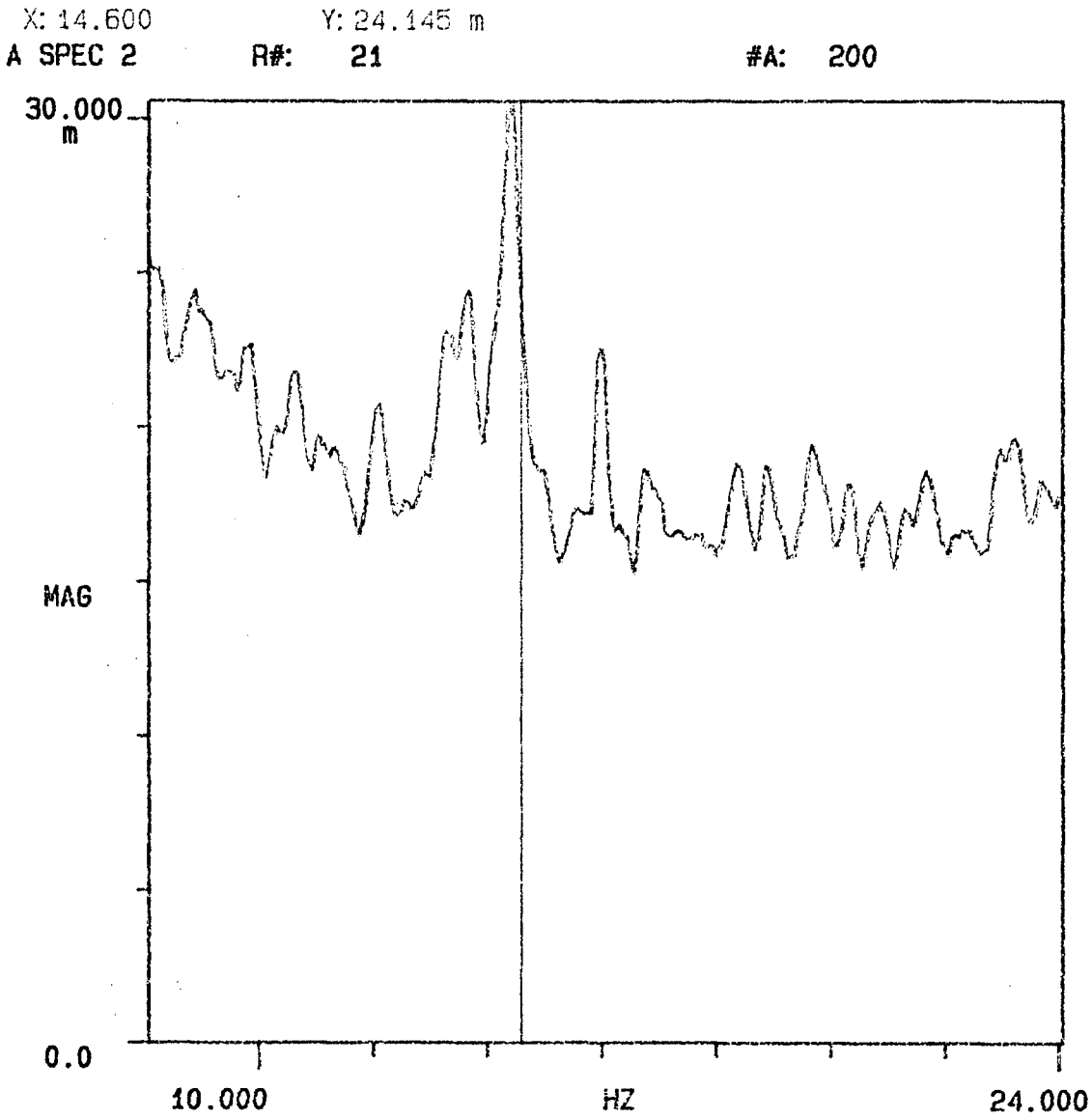

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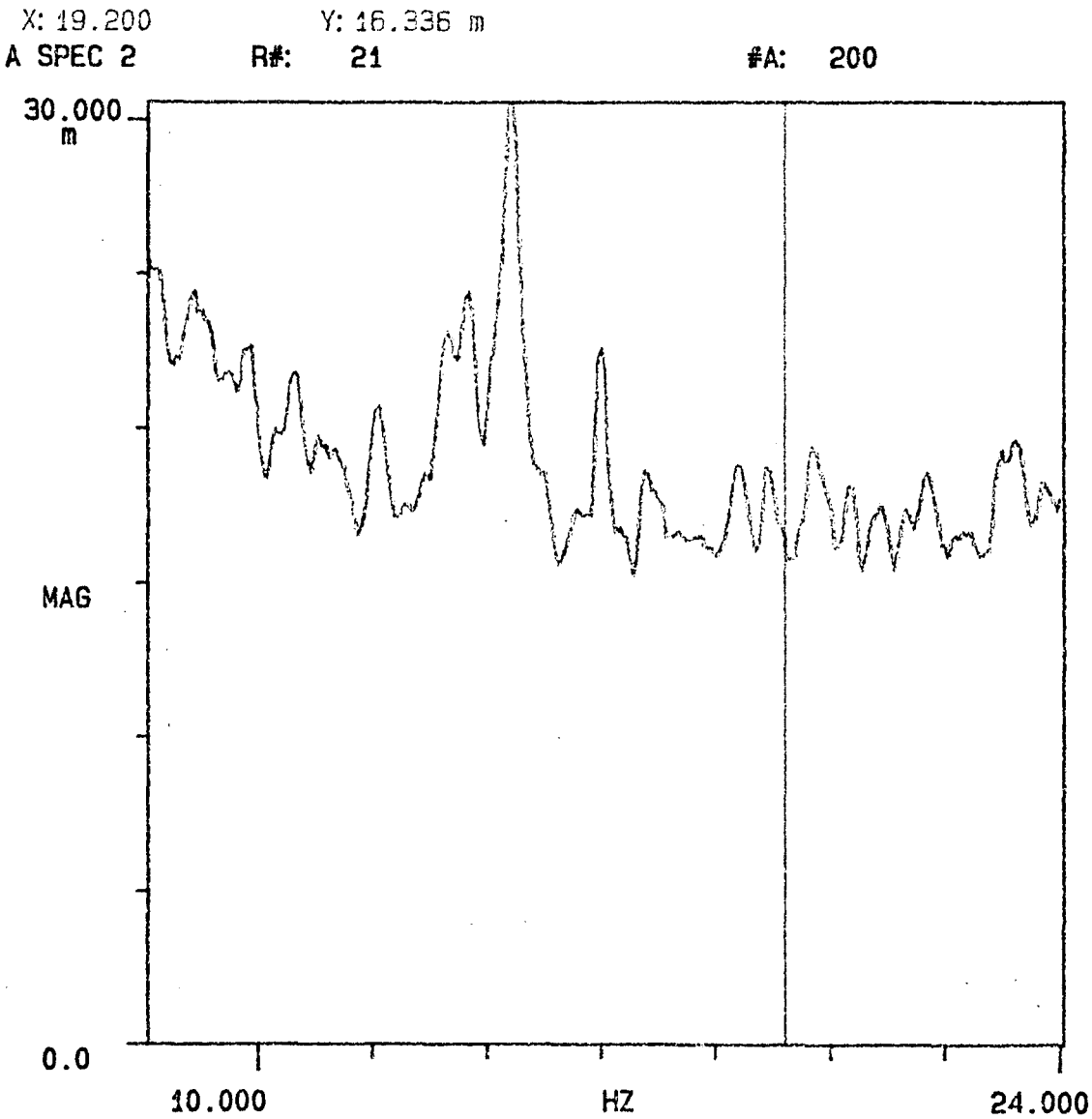

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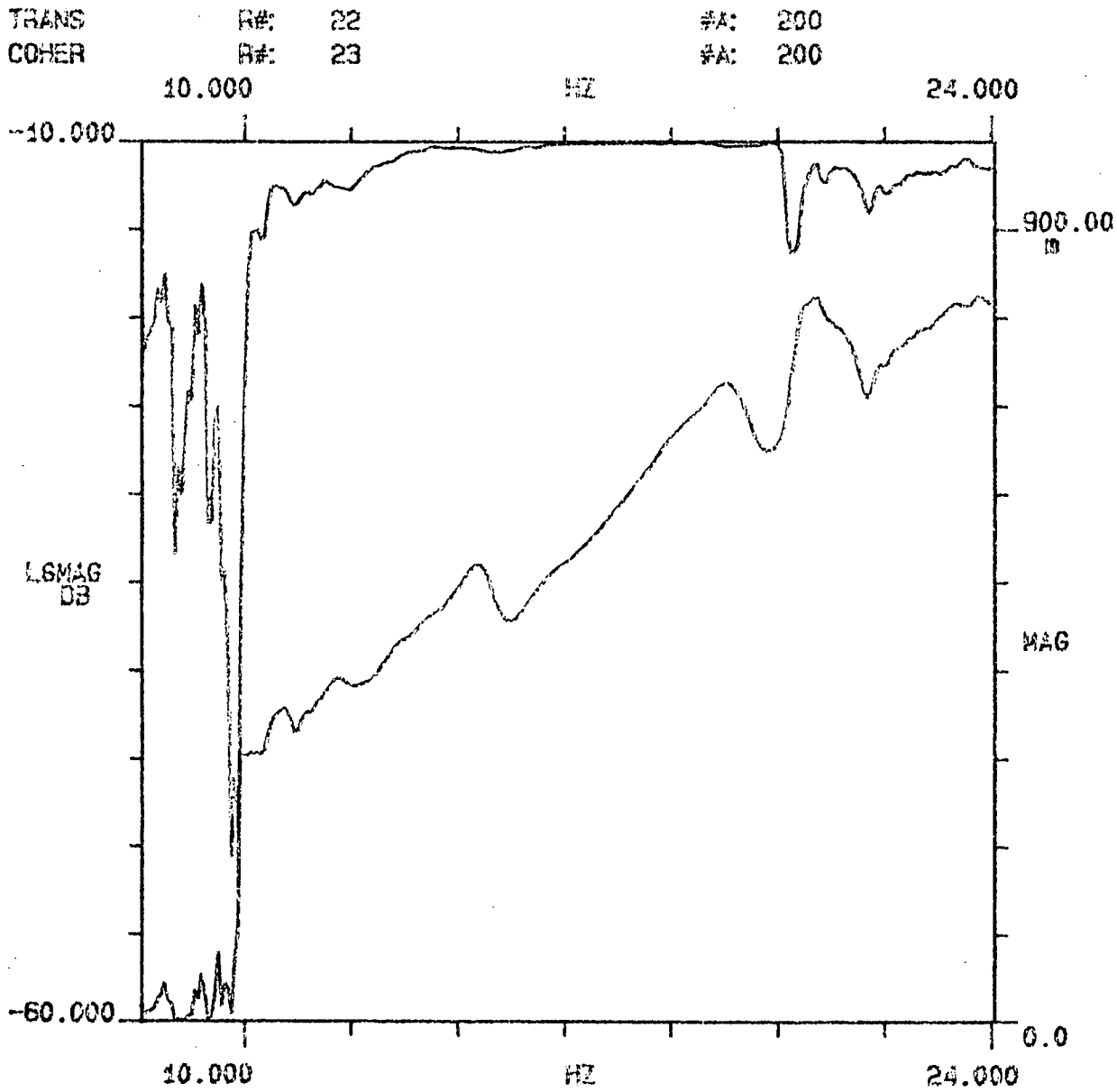
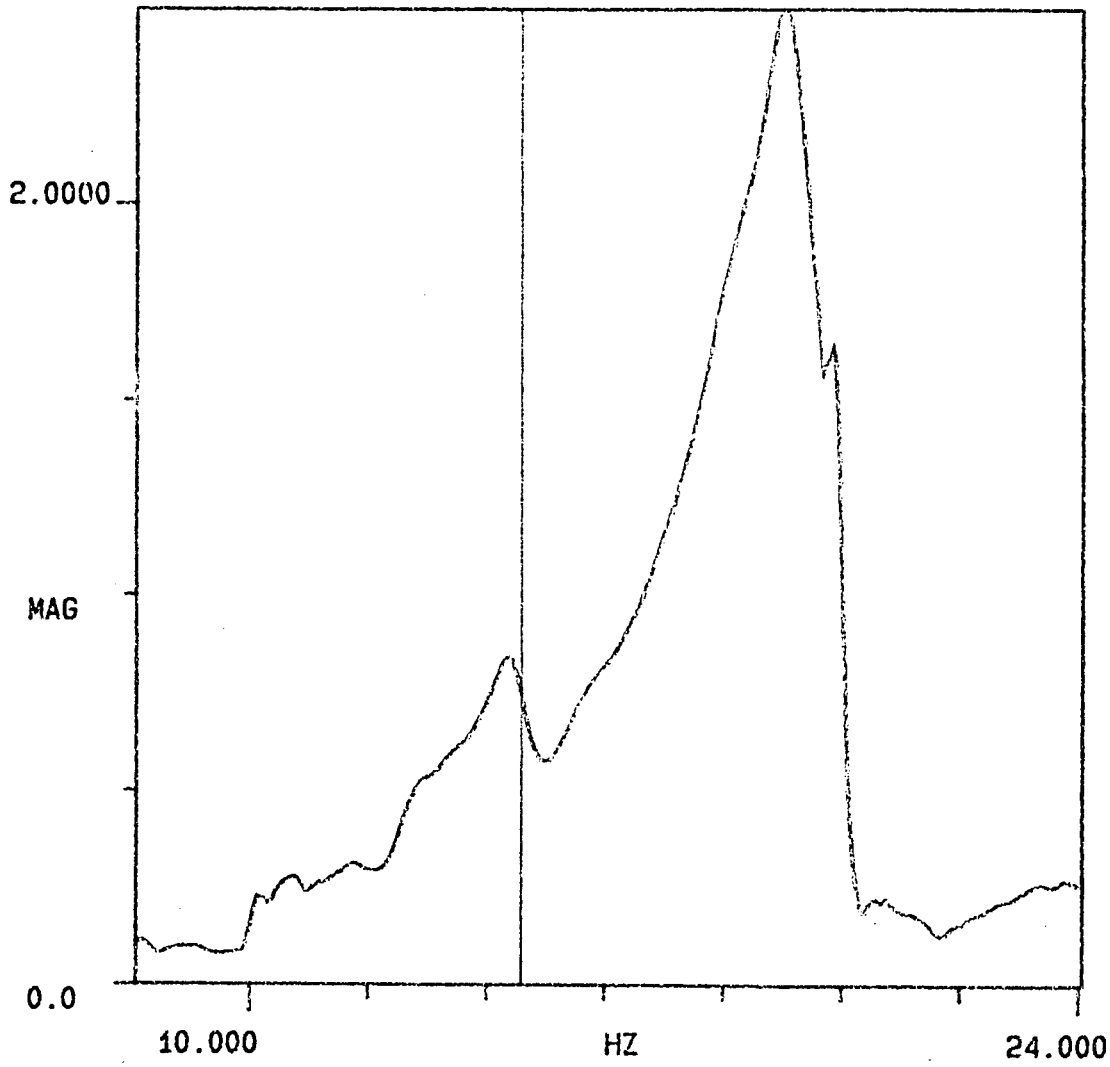


SINE 10-20 HZ. RESPONSE A-2-Y

X: 14.600 Y: 738.78 m

A SPEC 2 R#: 24 #A: 200



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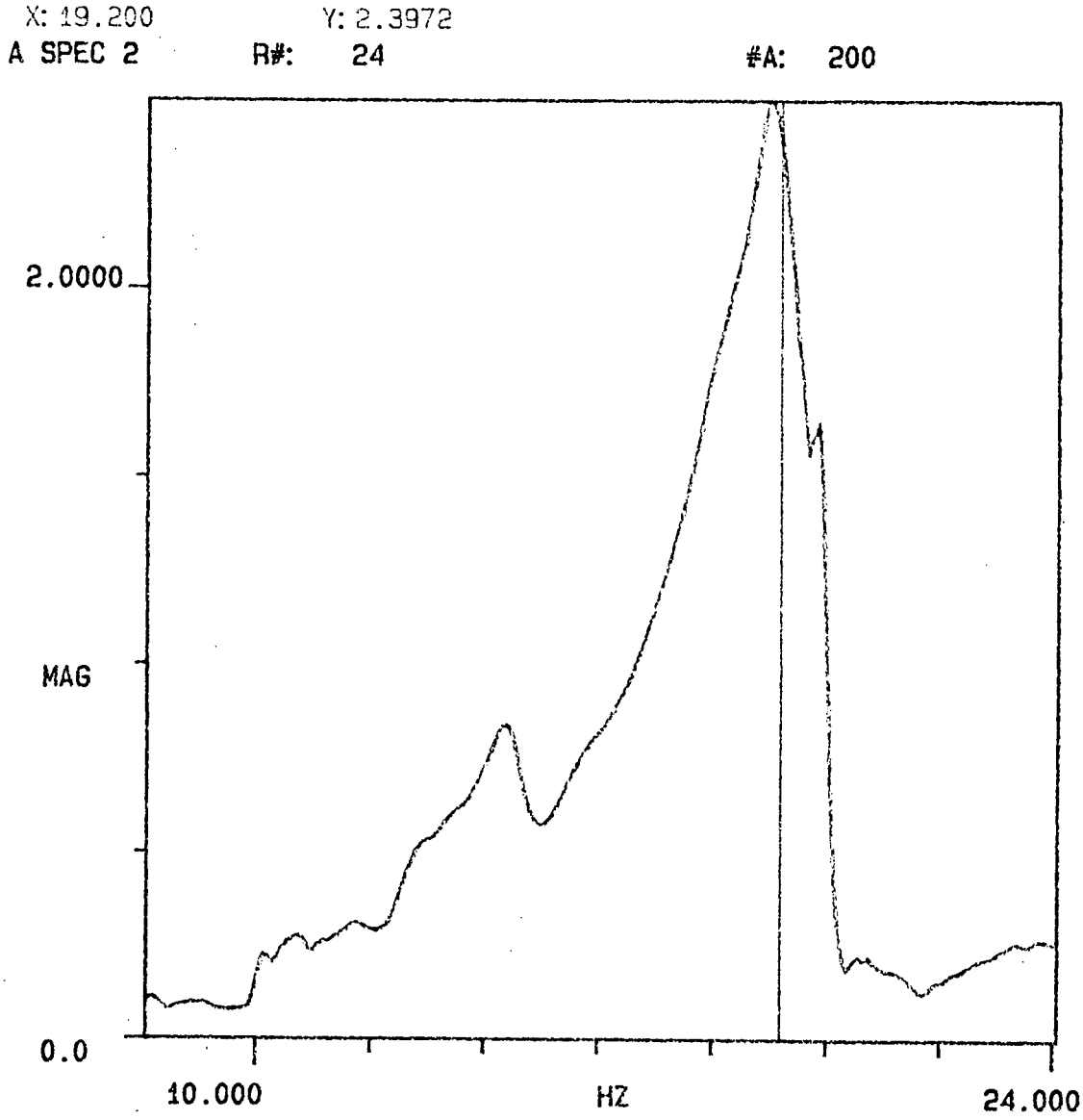

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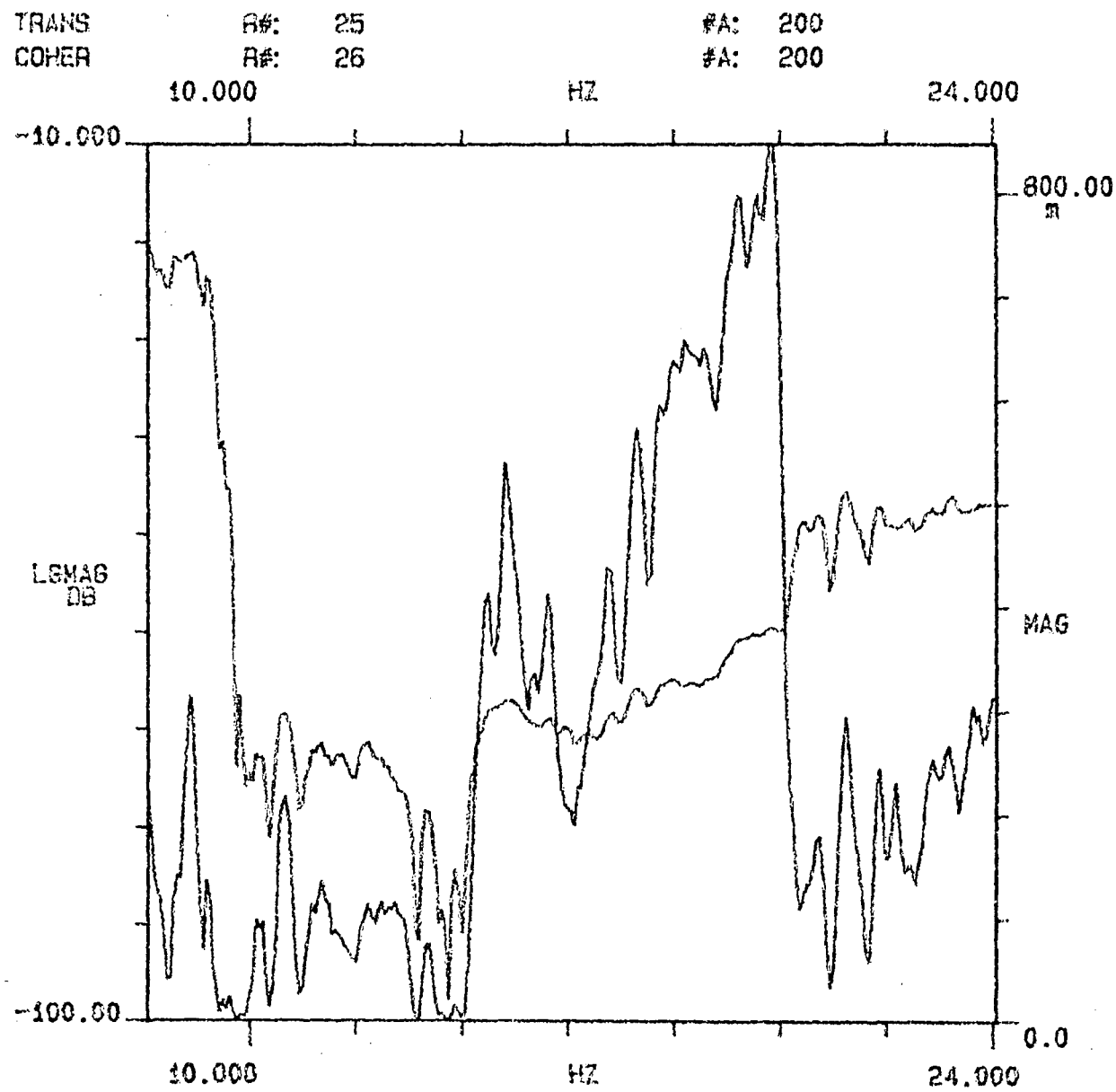
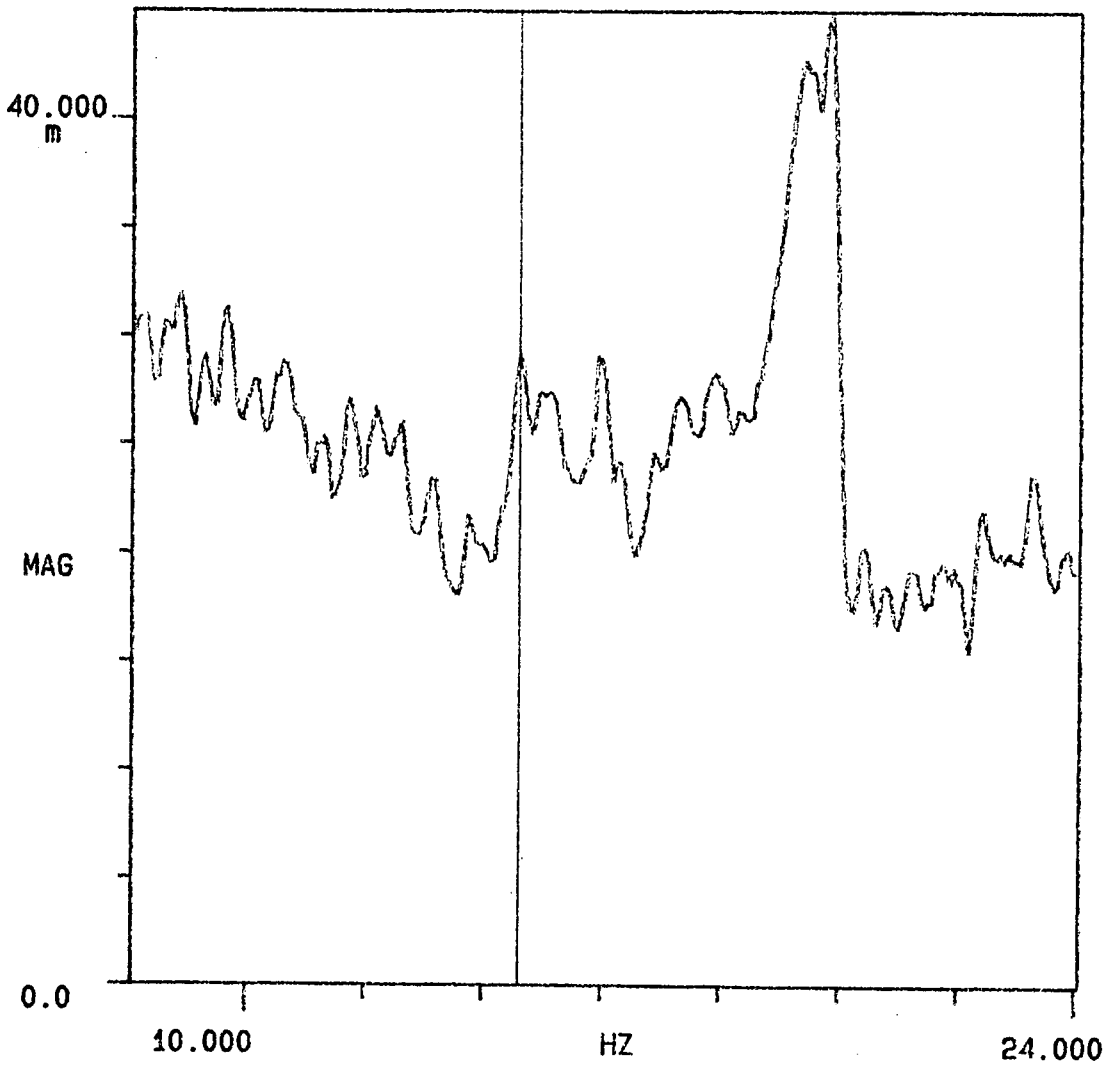


SINE 10-20 HZ. RESPONSE A-3-X

X: 14.600 Y: 28.667 m

A SPEC 2 R#: 27 #A: 200



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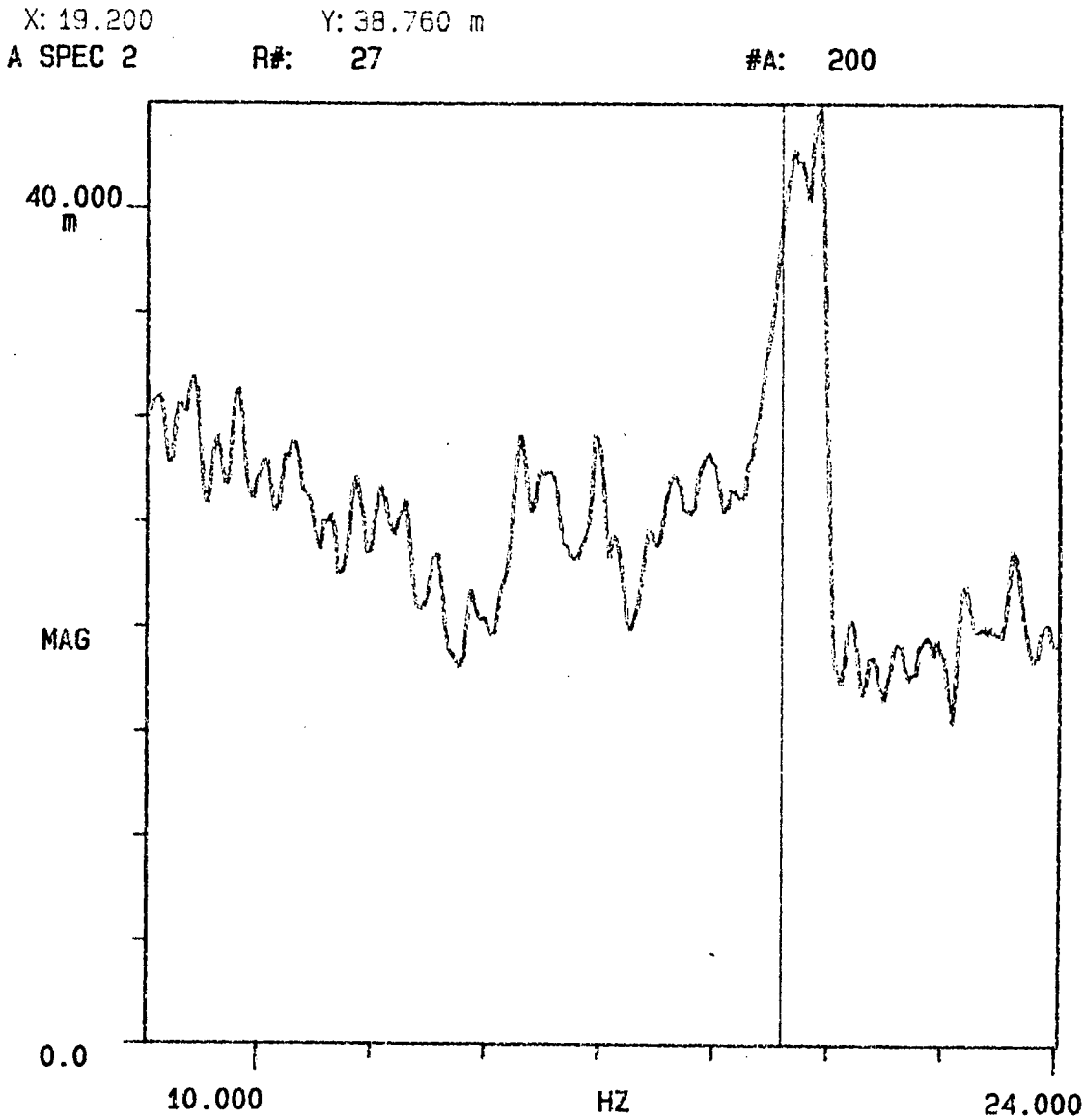

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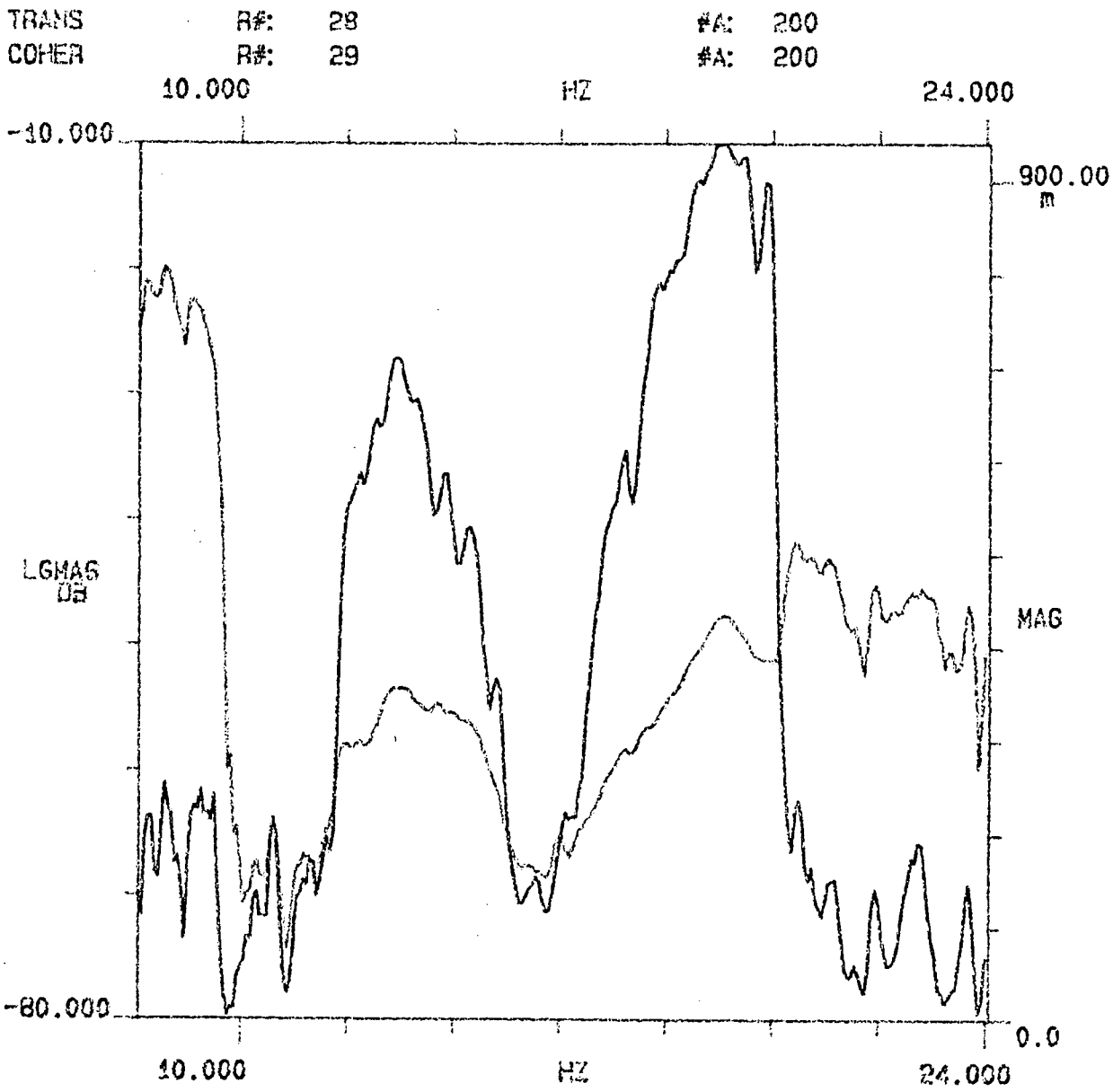

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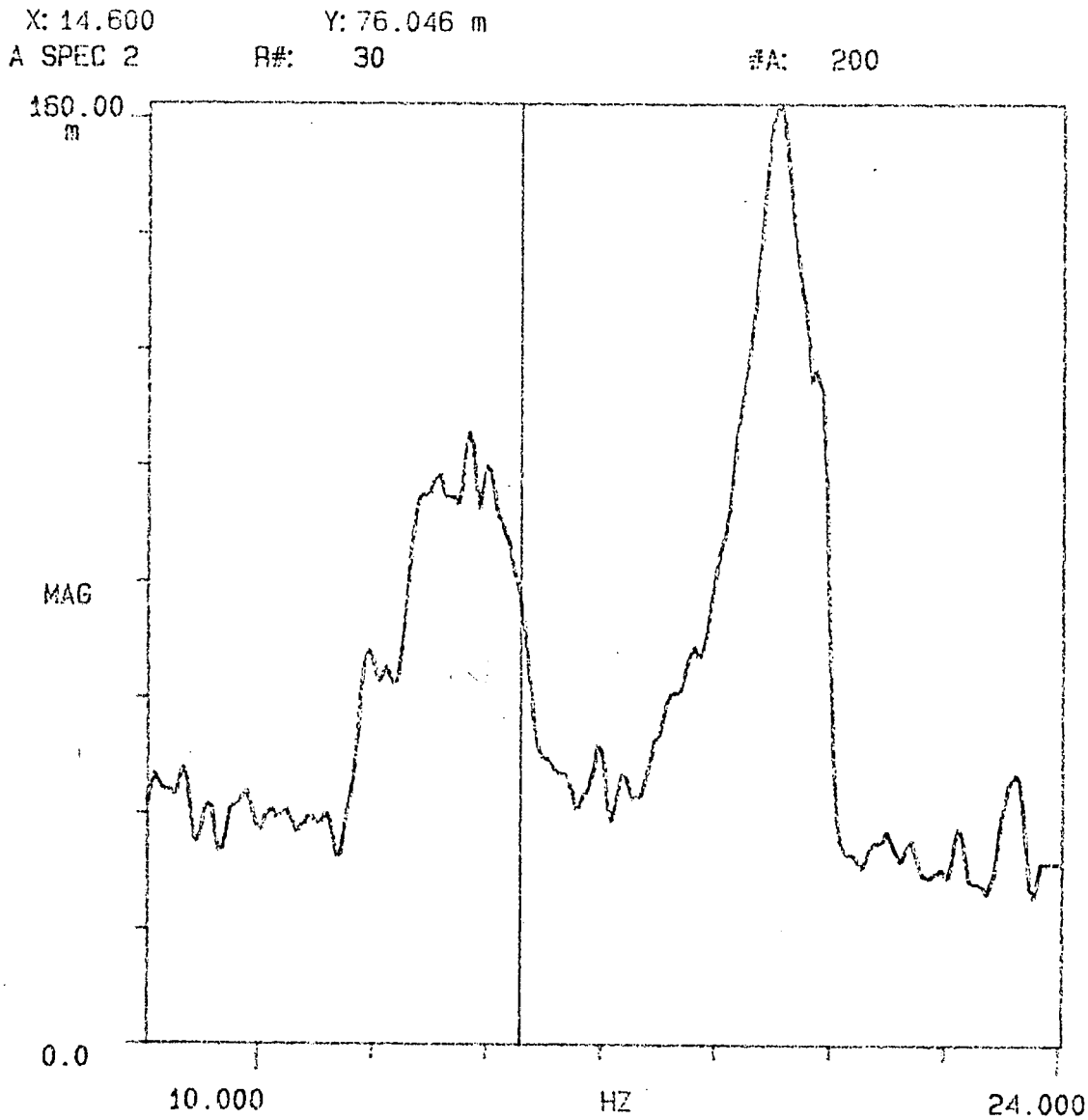

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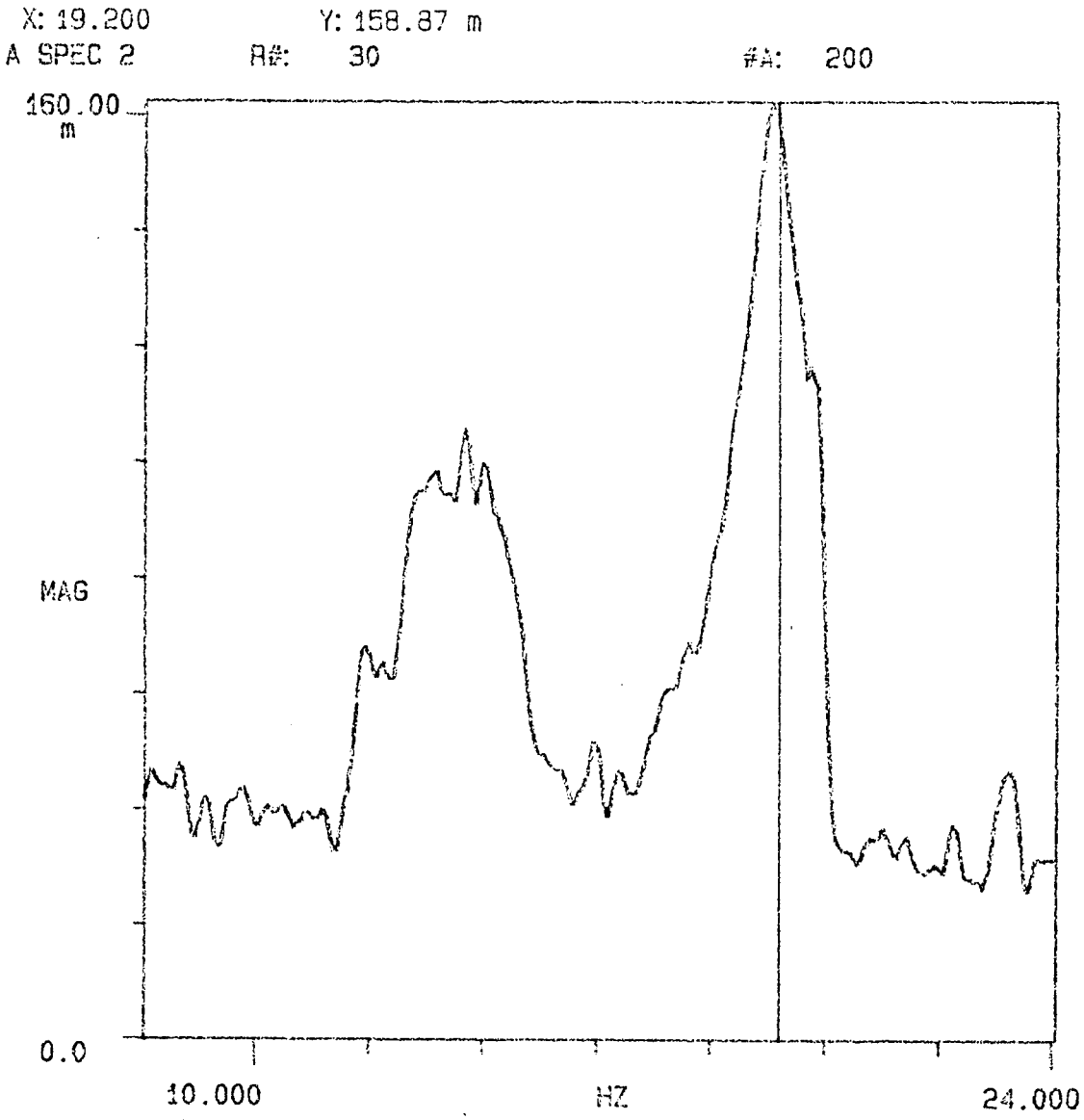

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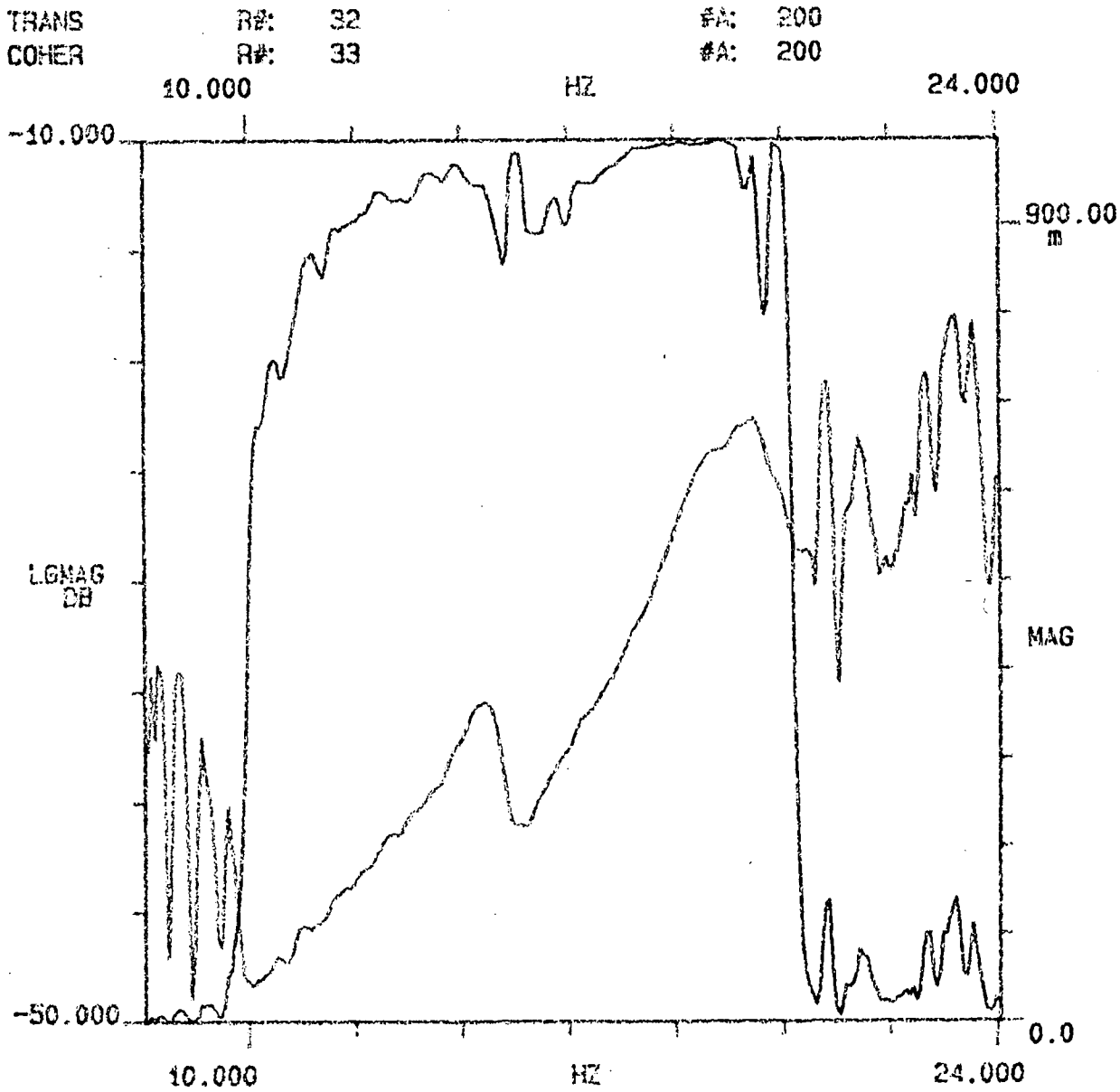

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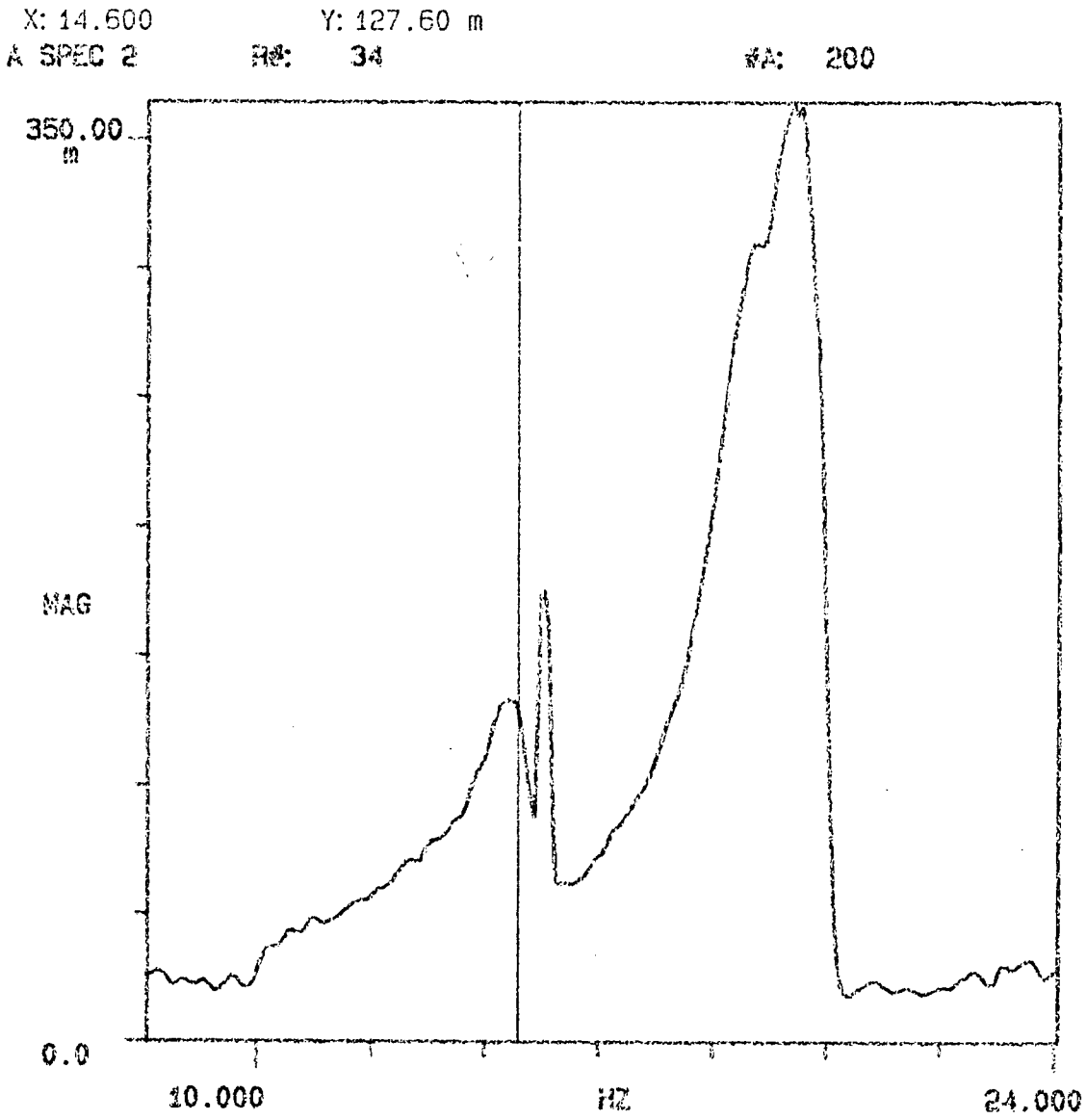

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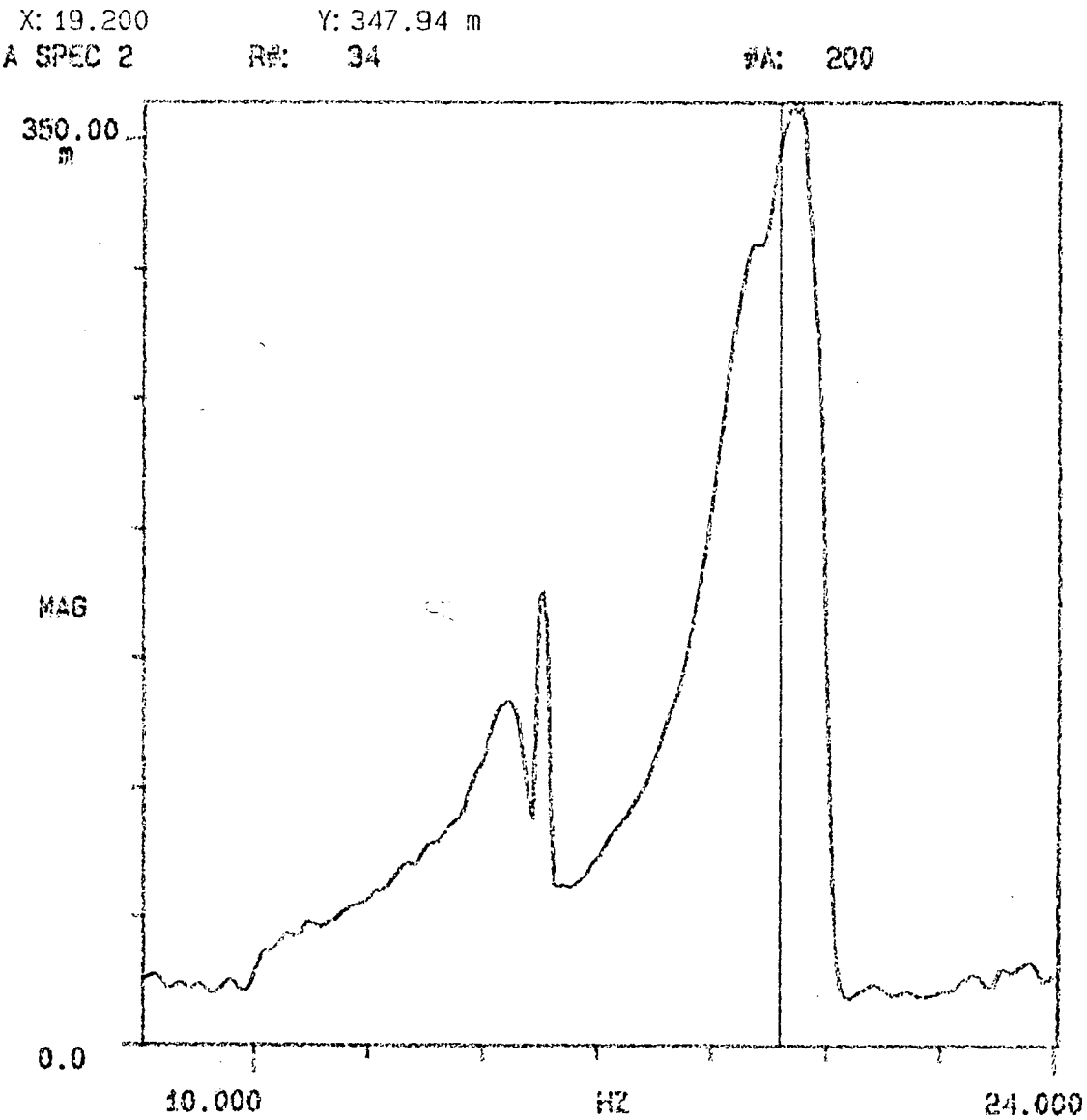

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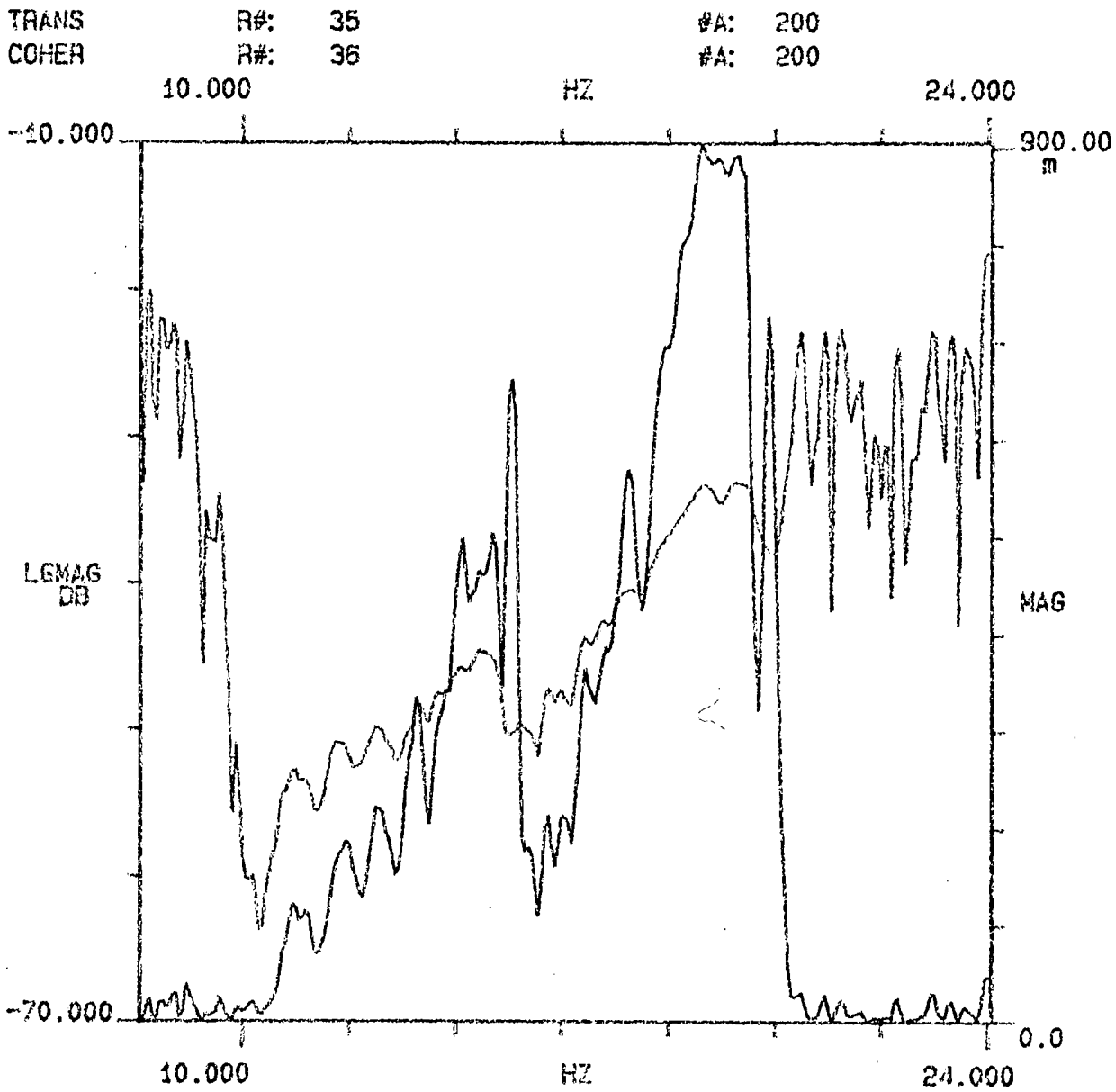

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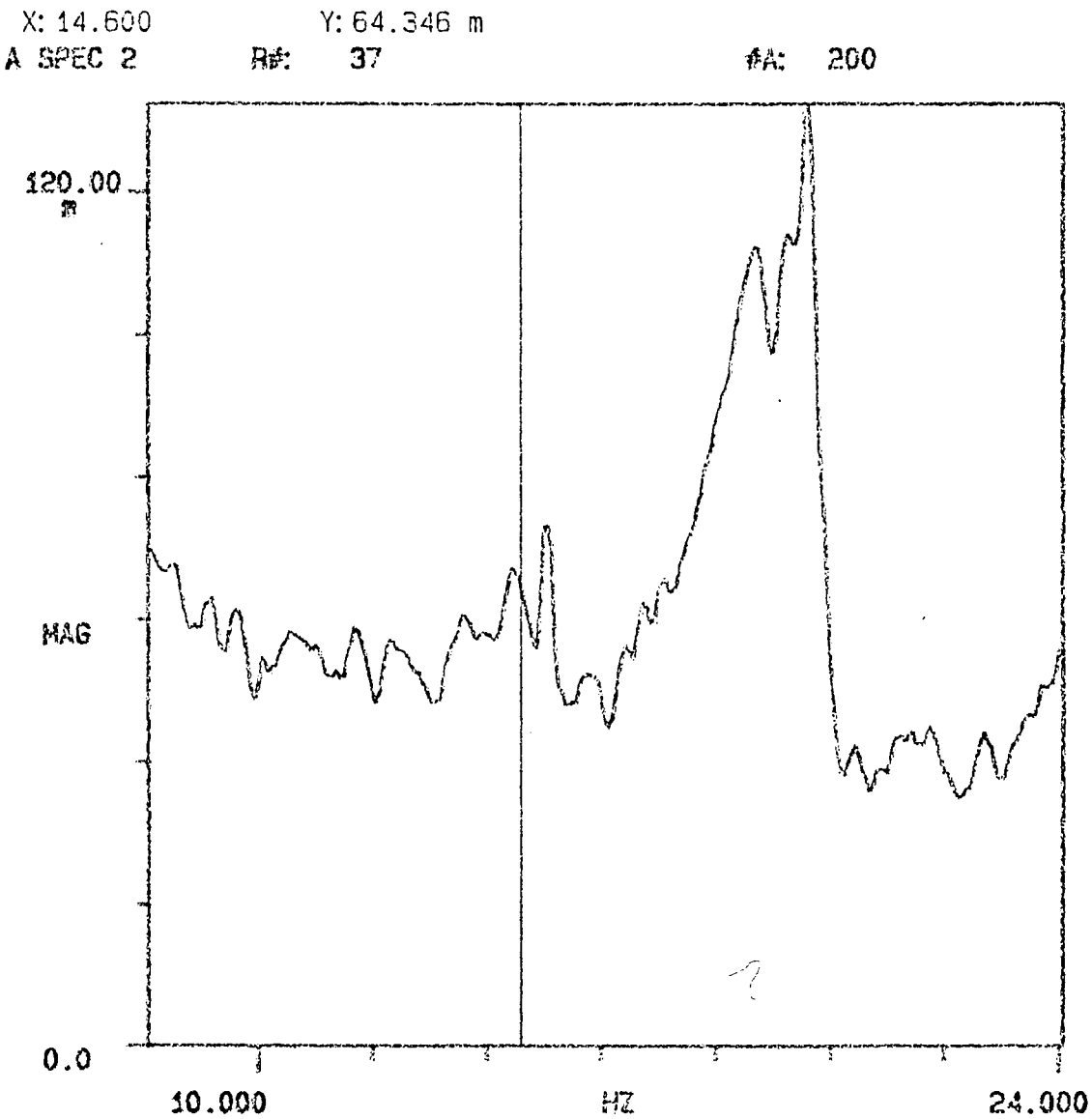
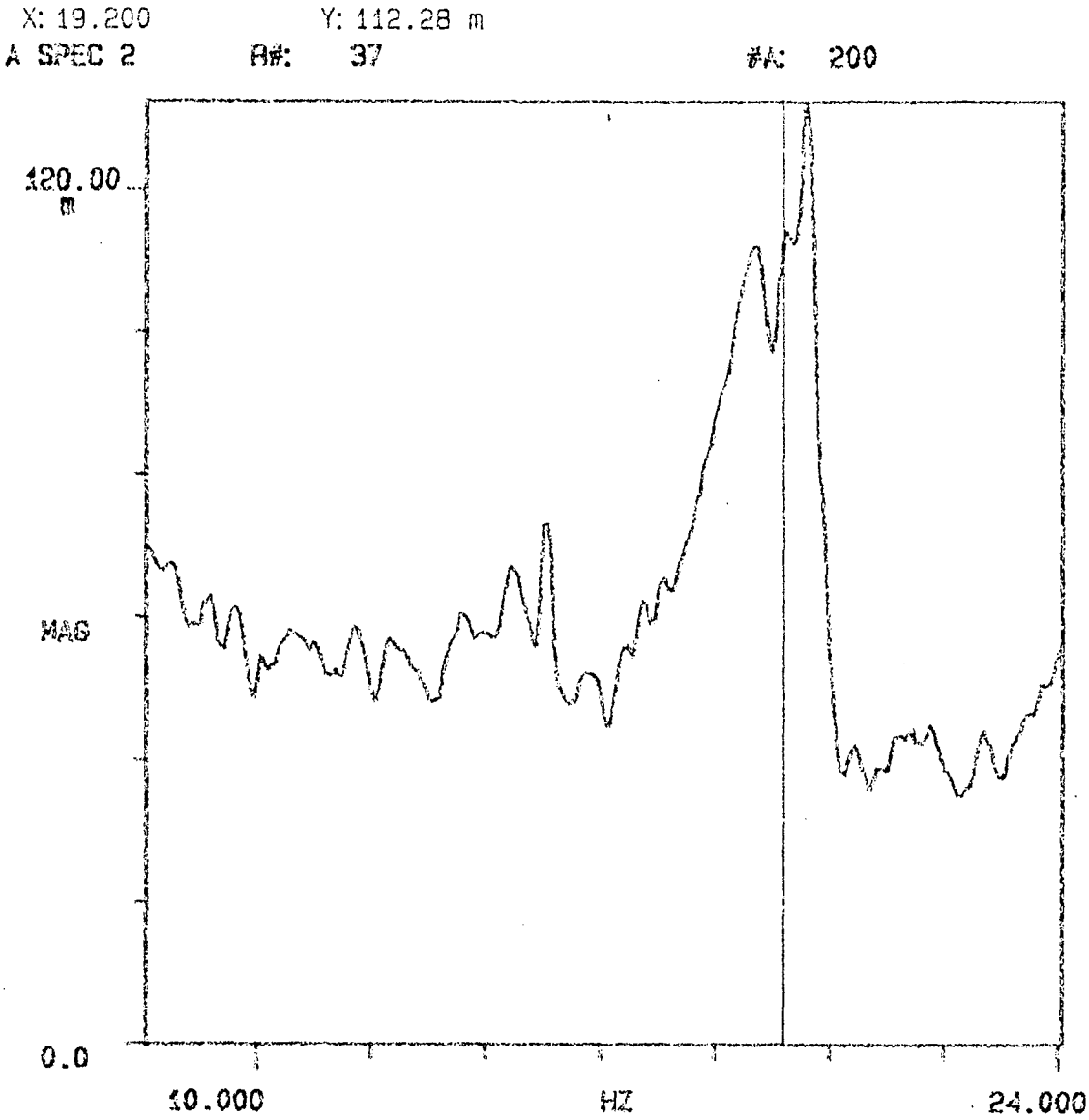


SINE 10-20 HZ. RESPONSE B-1-Y



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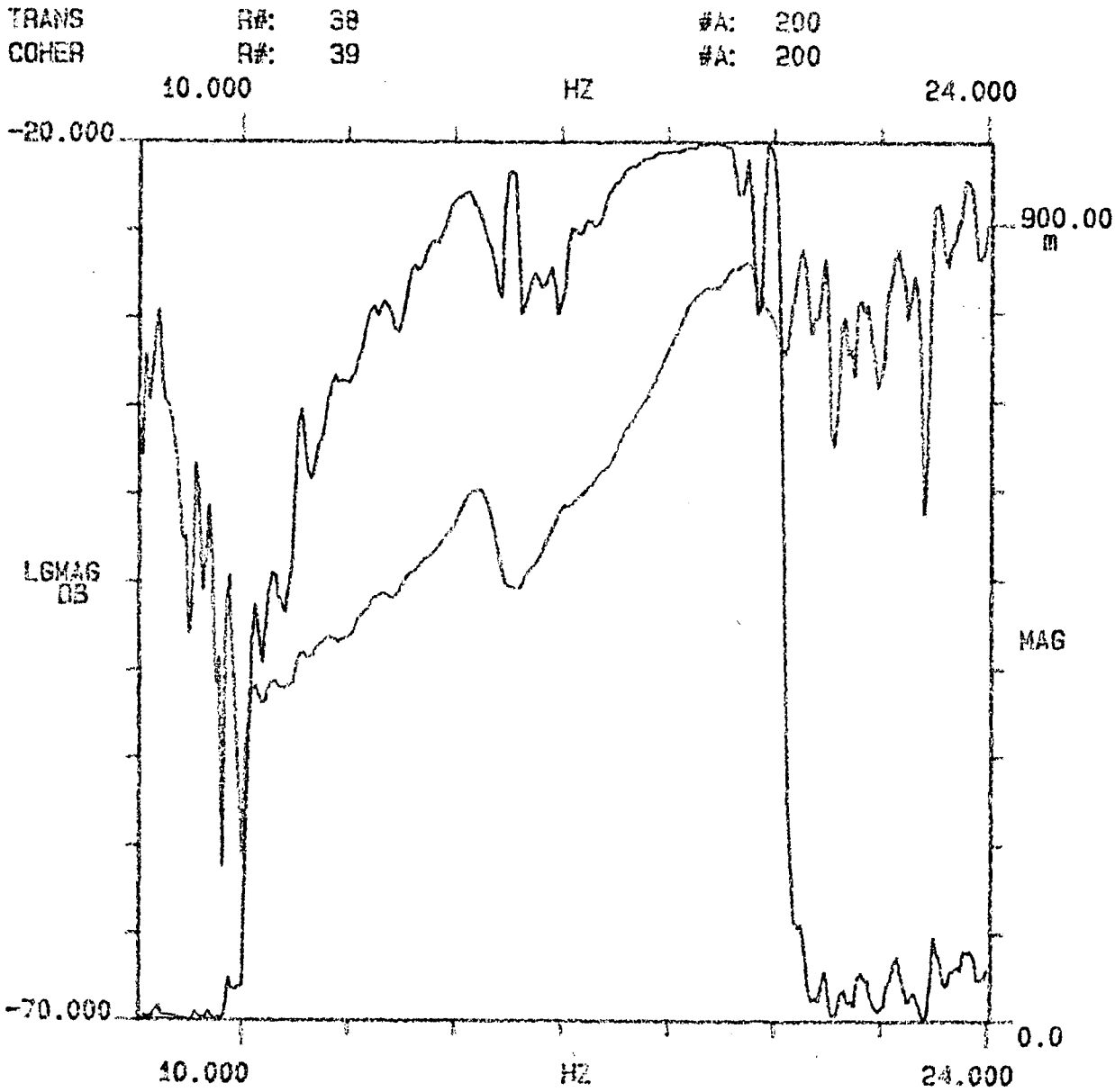
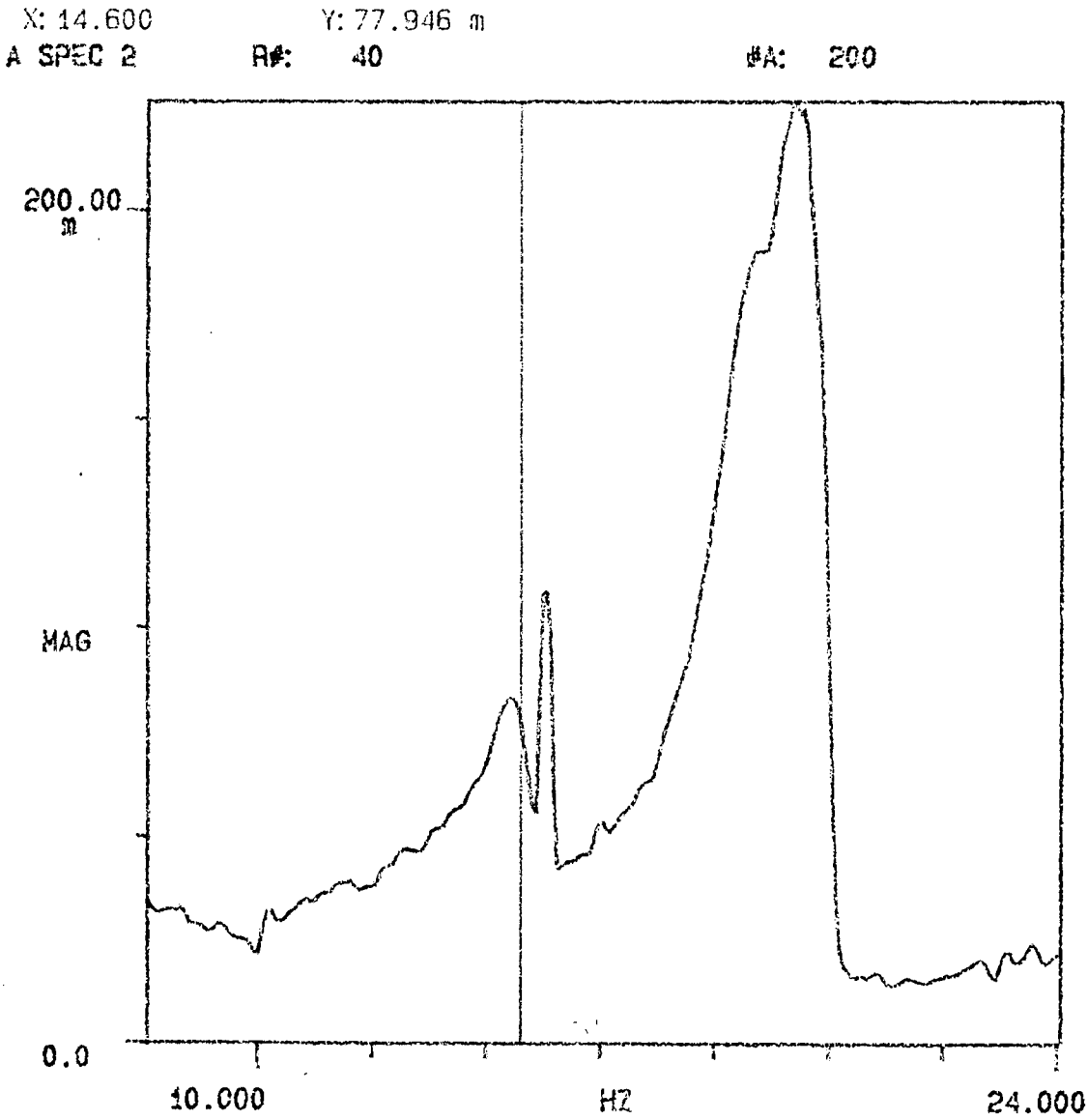


SINE 10-20 HZ. RESPONSE B-2-X



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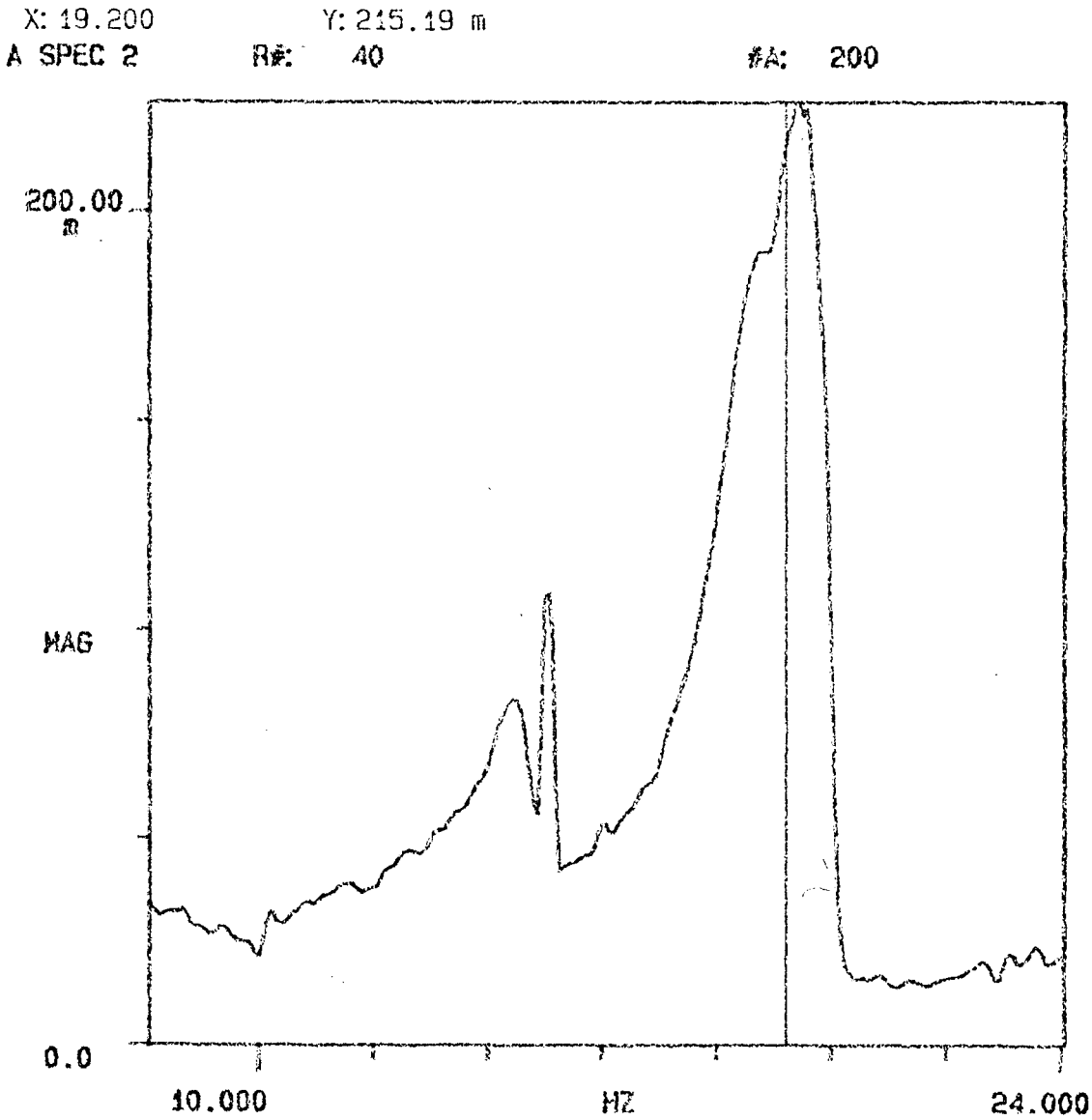

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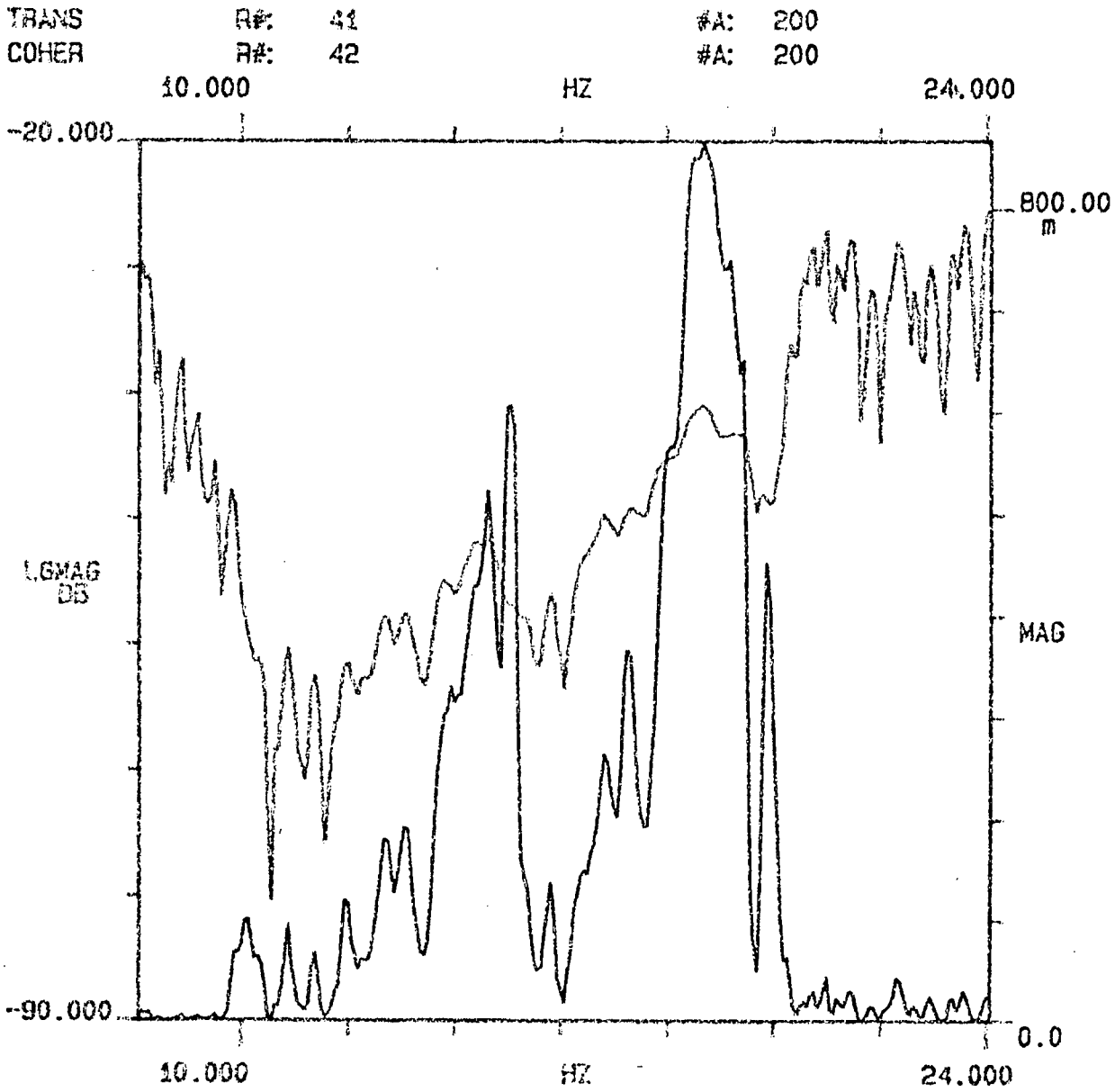

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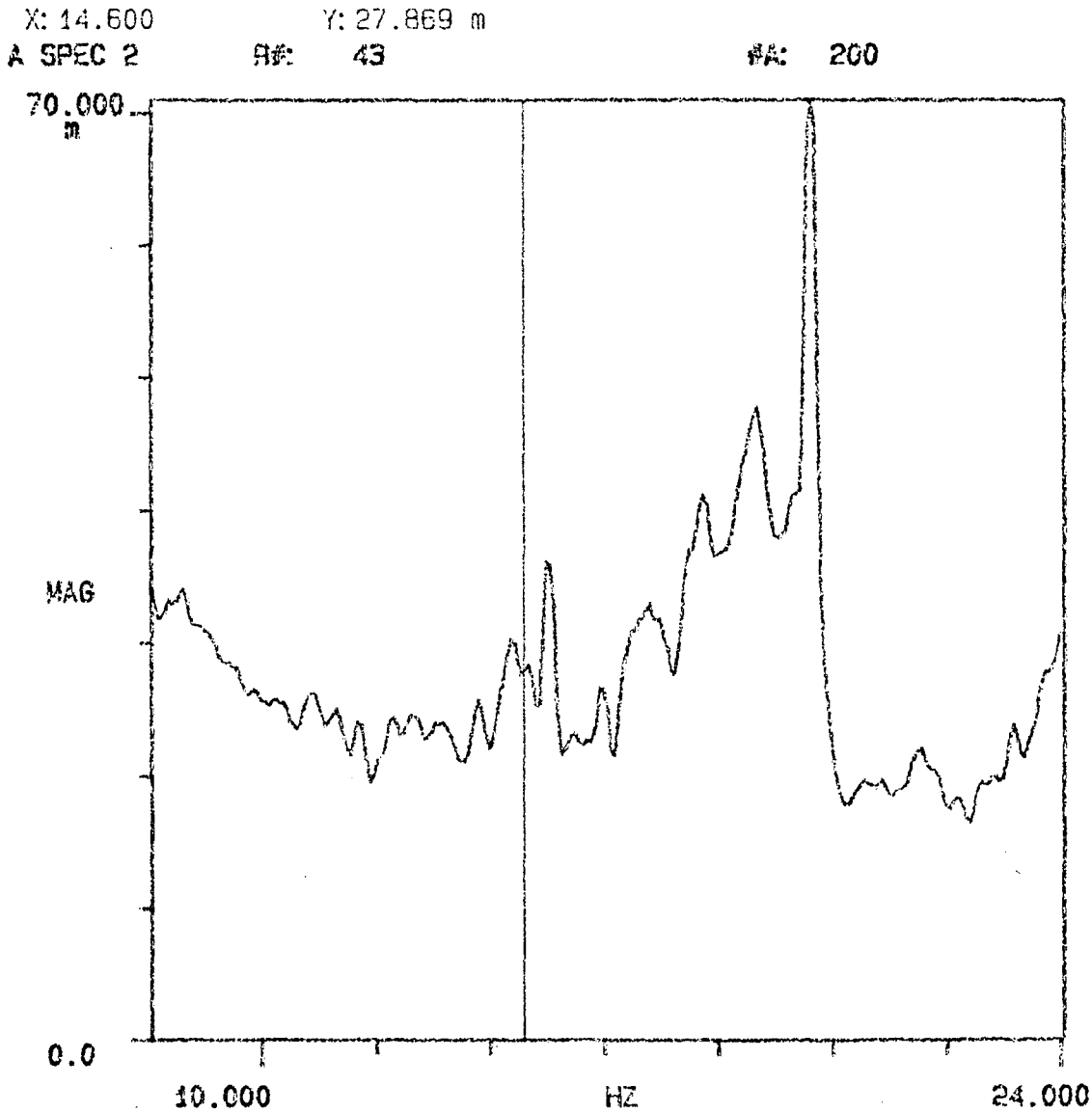

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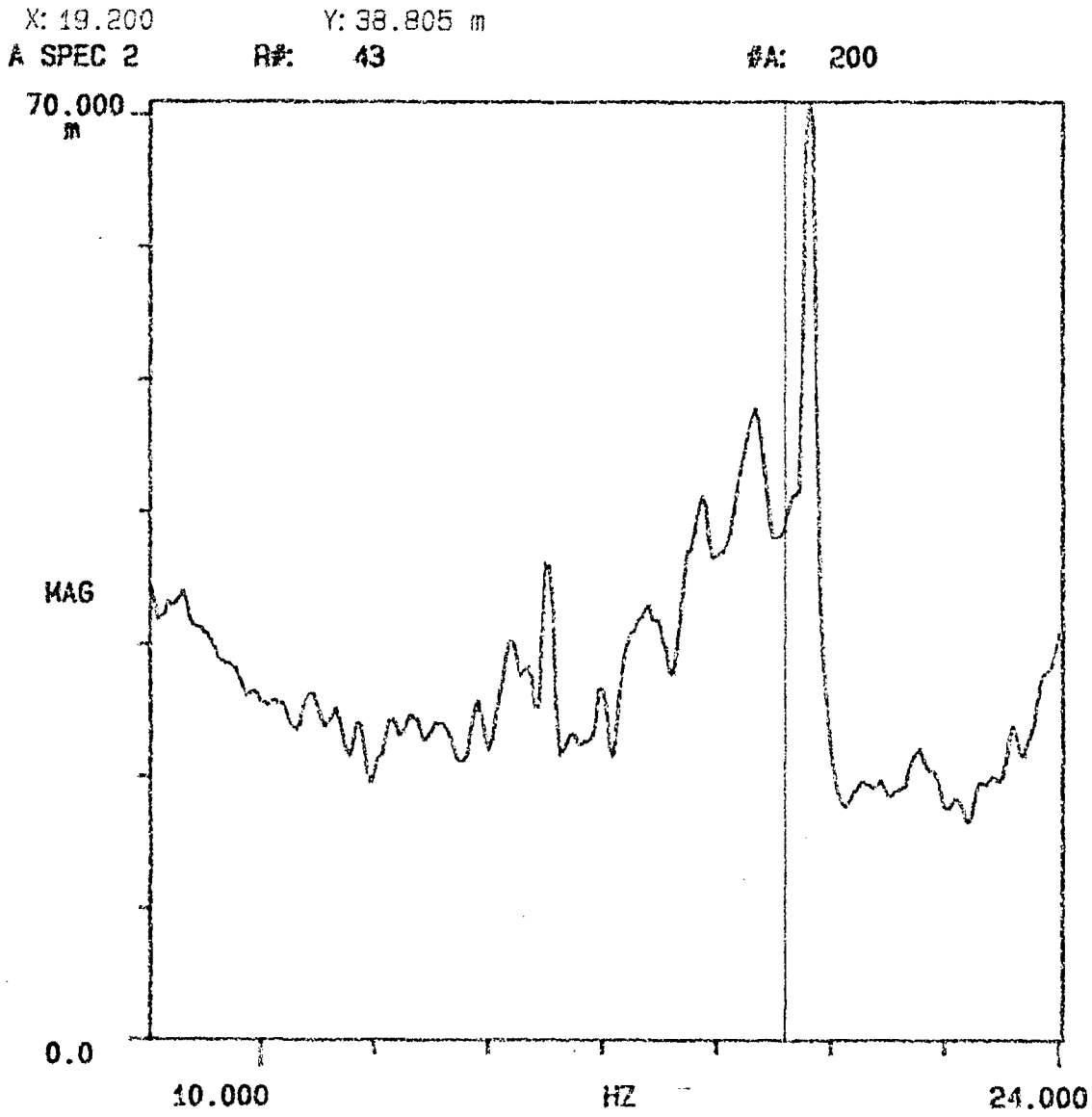

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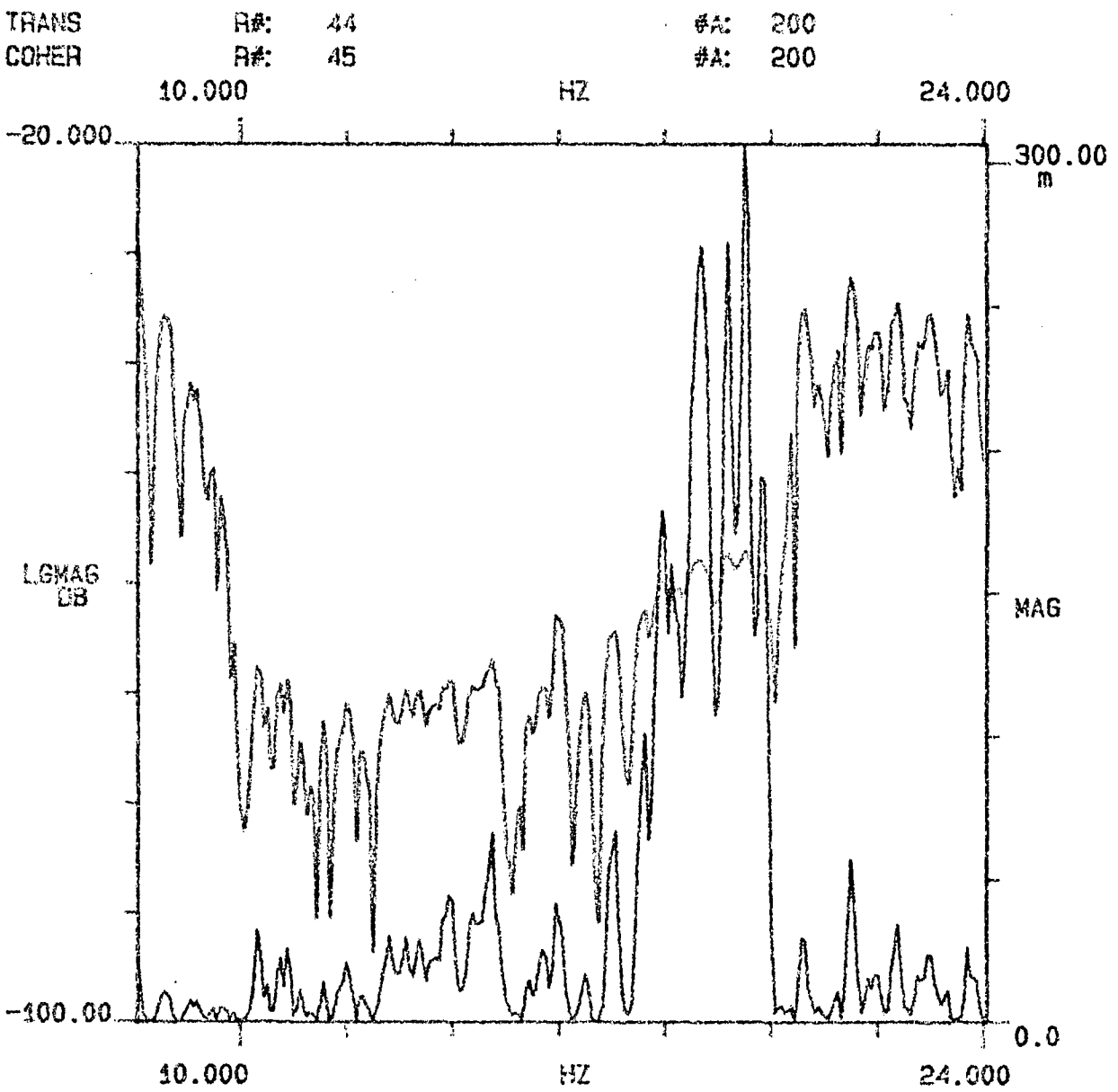
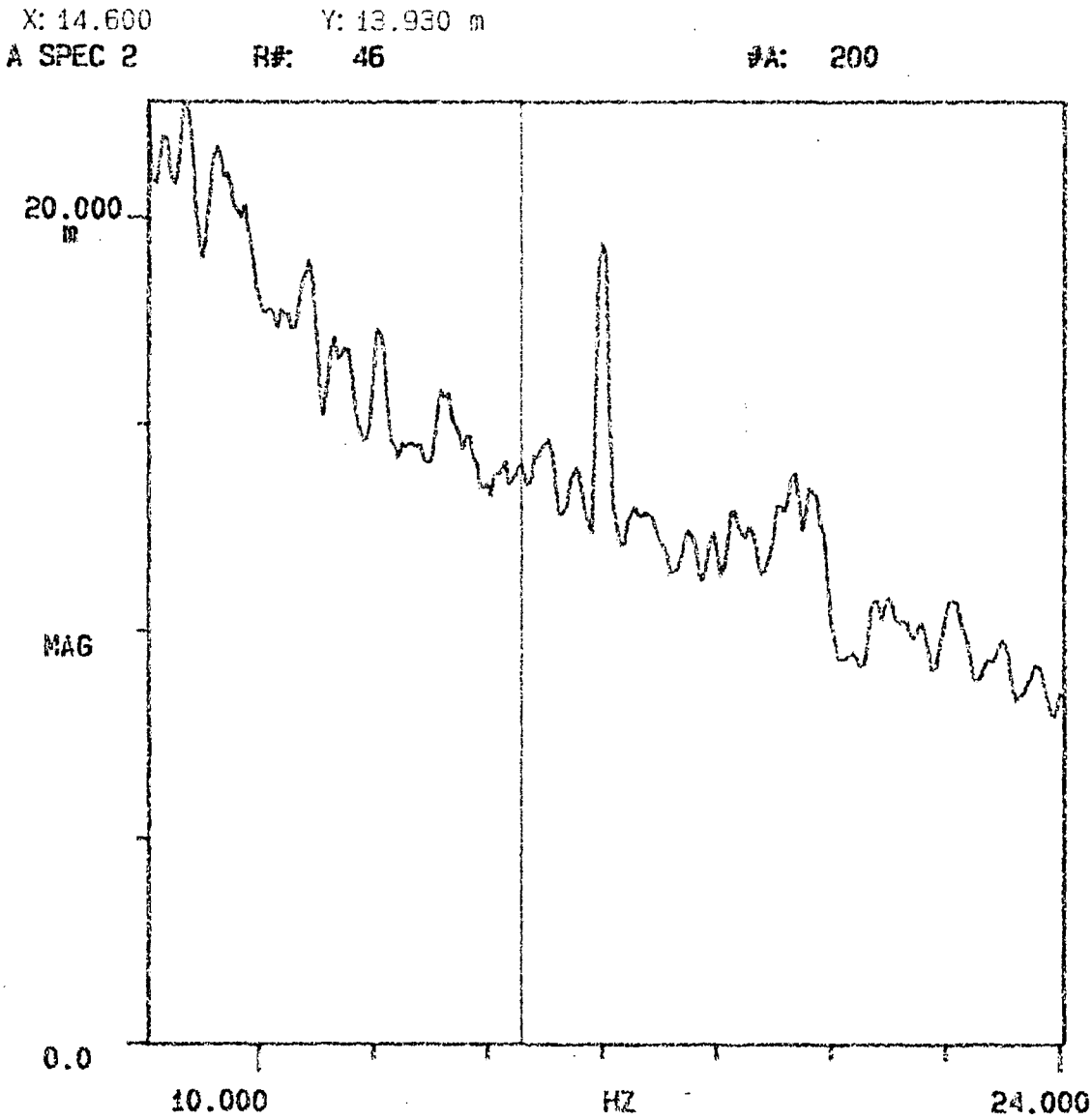


SINE 10-20 HZ. RESPONSE B-3-X



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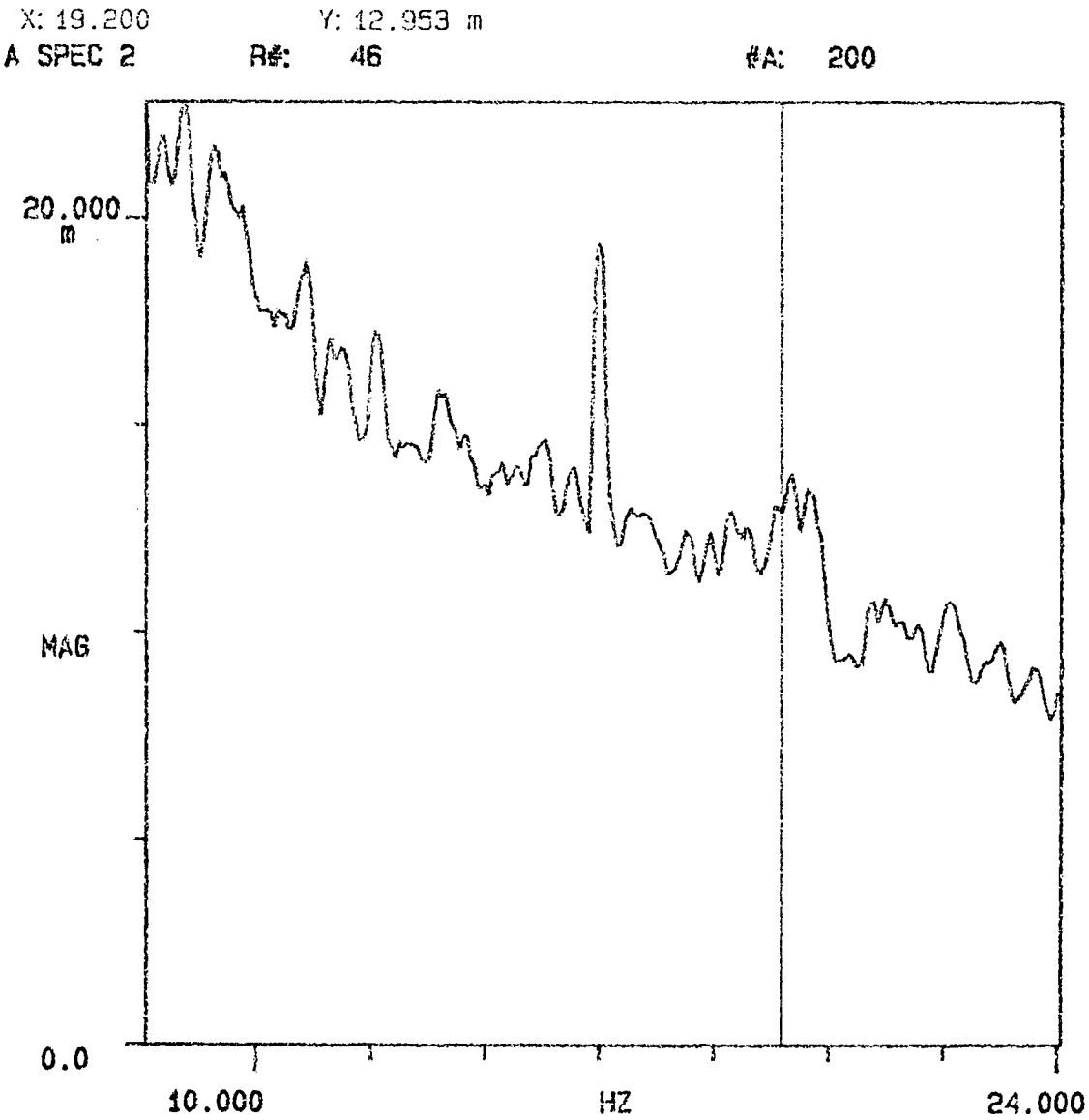

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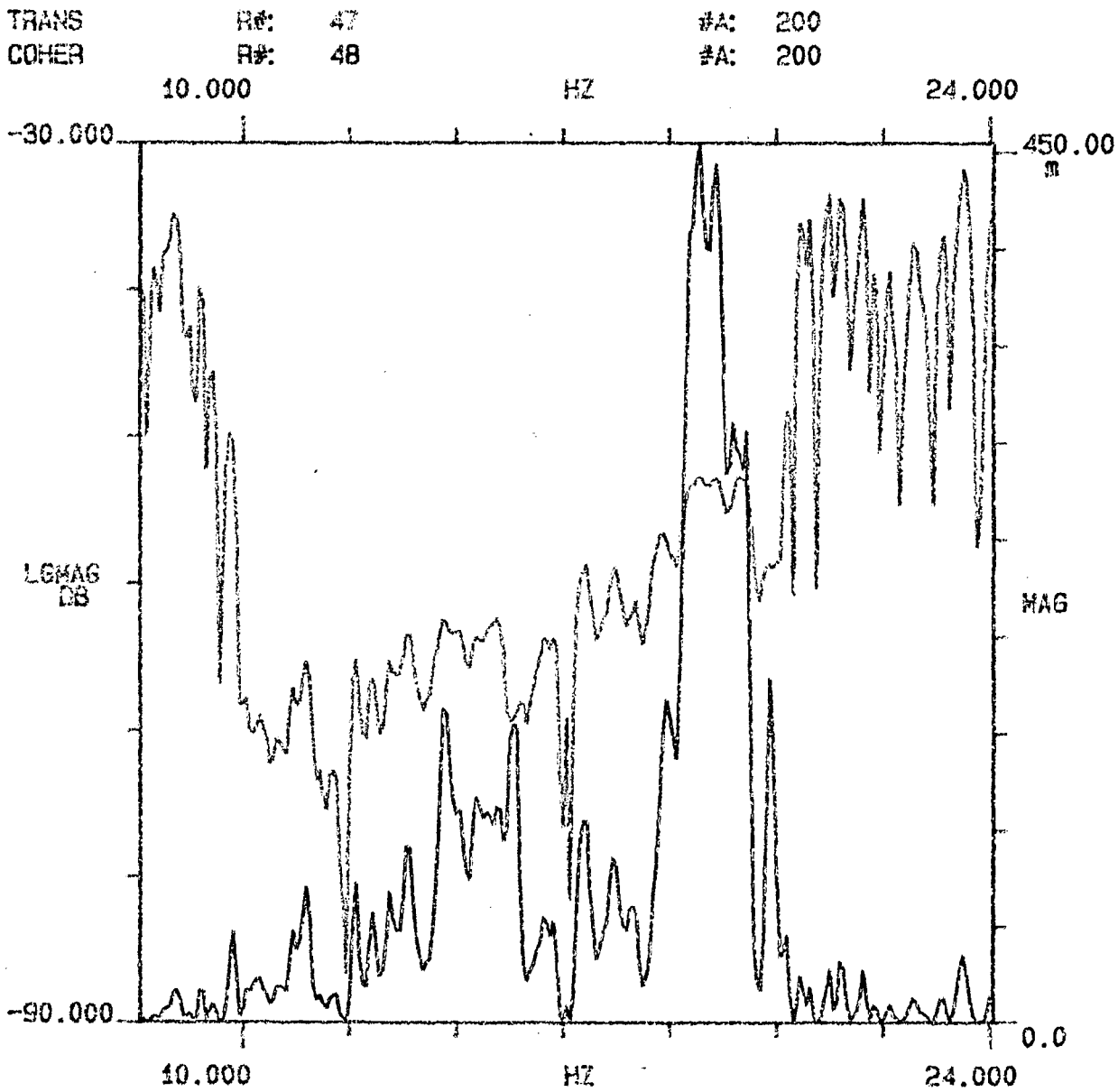

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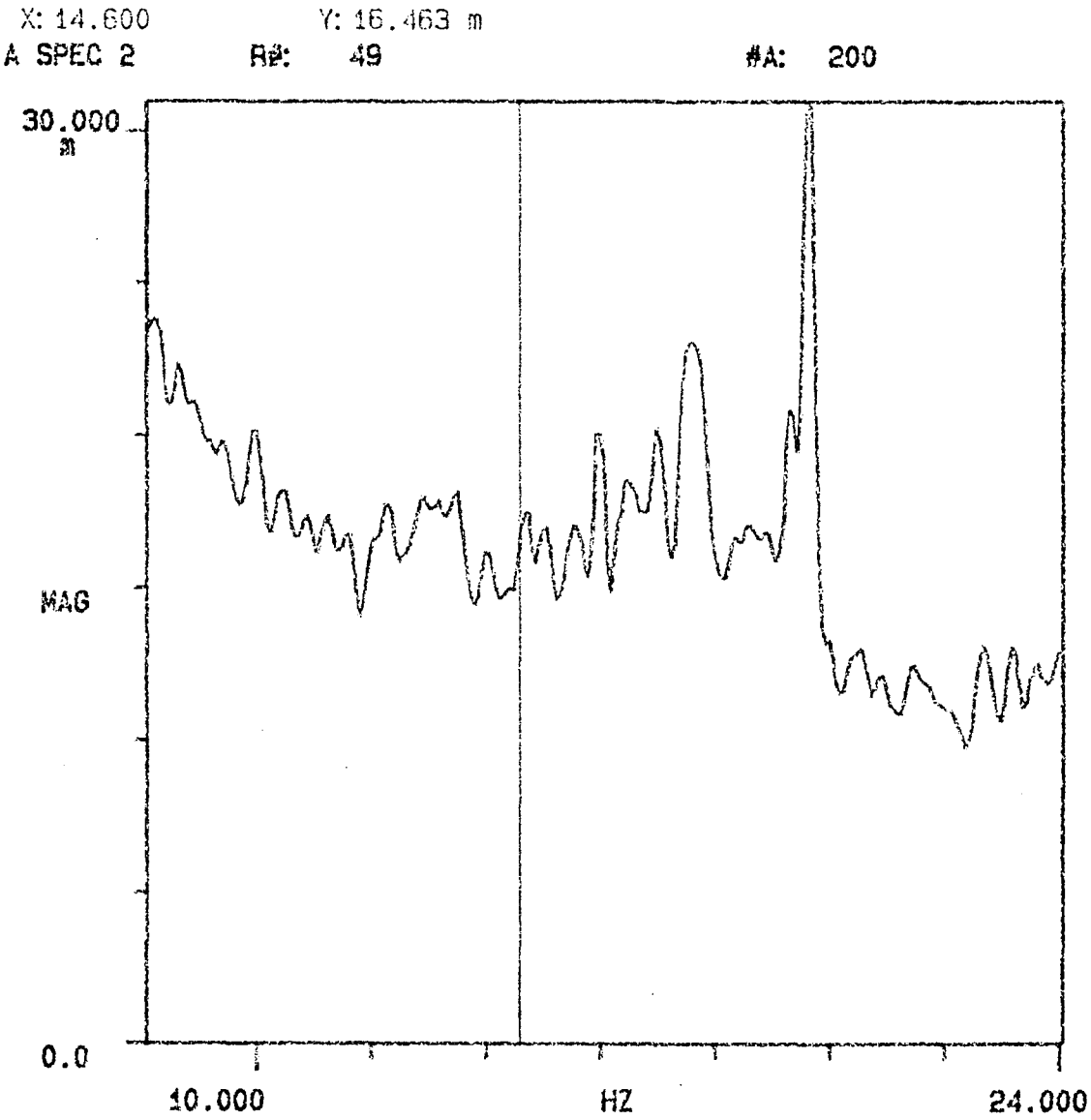

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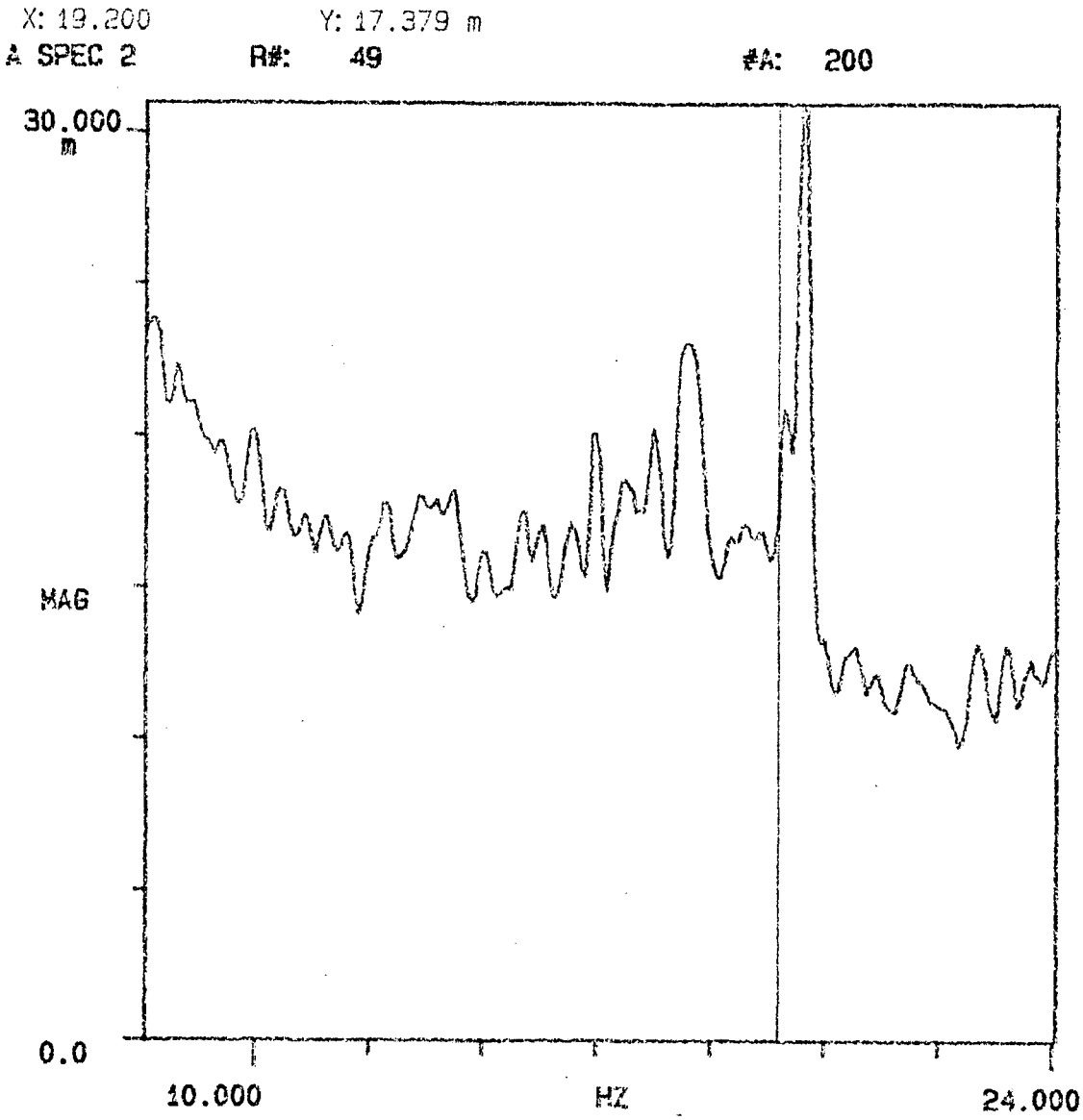

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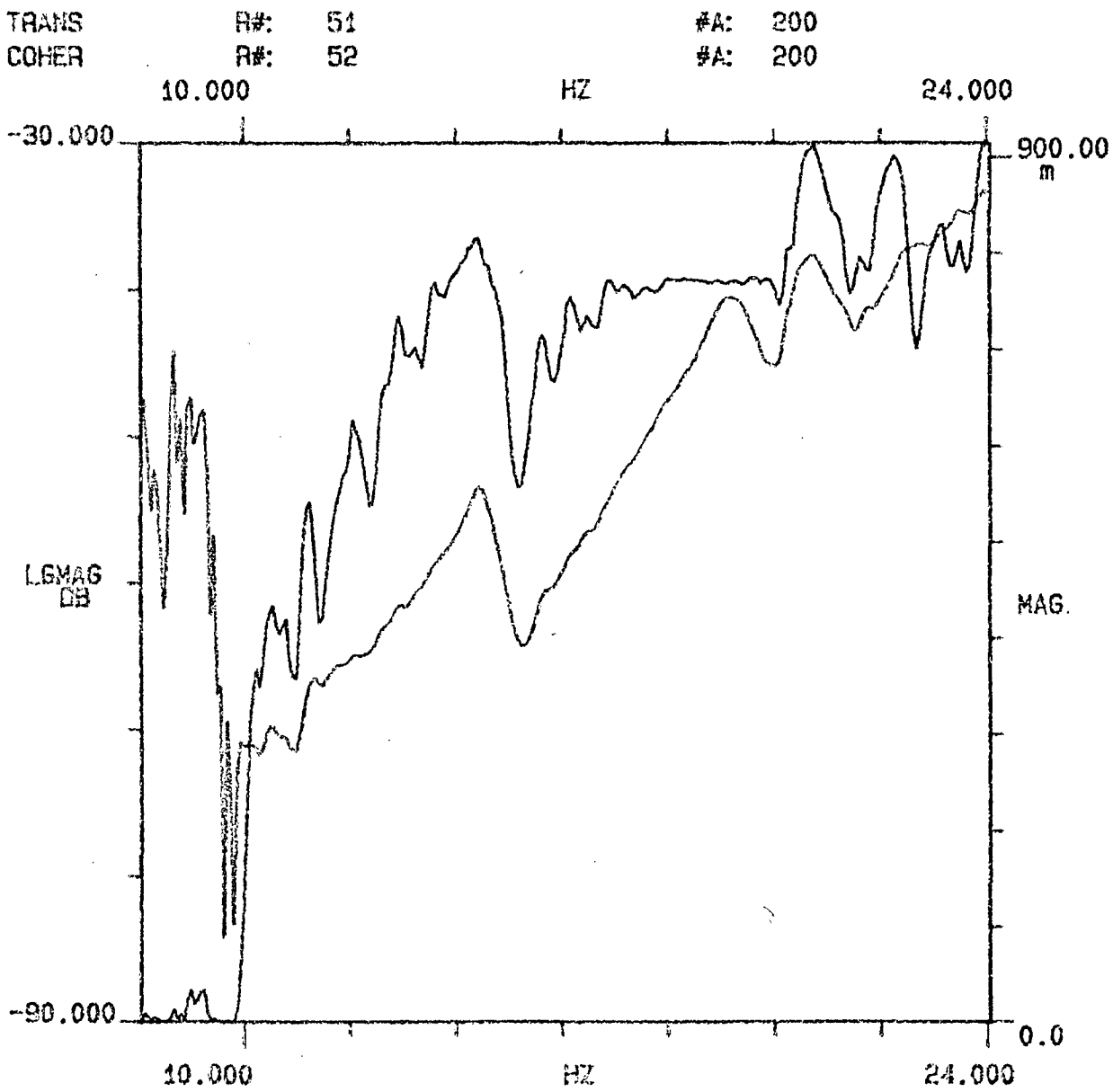
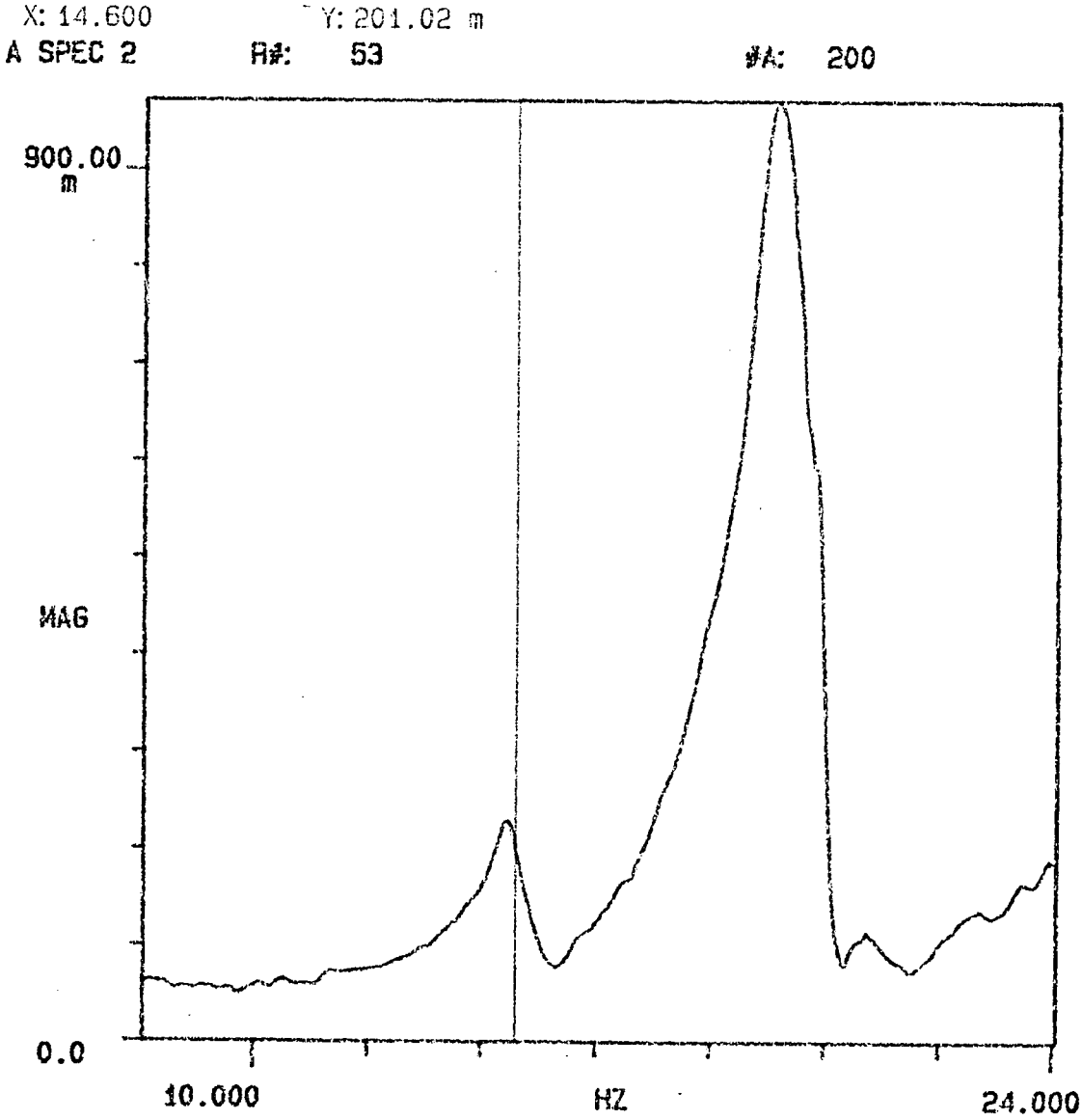


SINE 10-20 HZ. RESPONSE C-1-X



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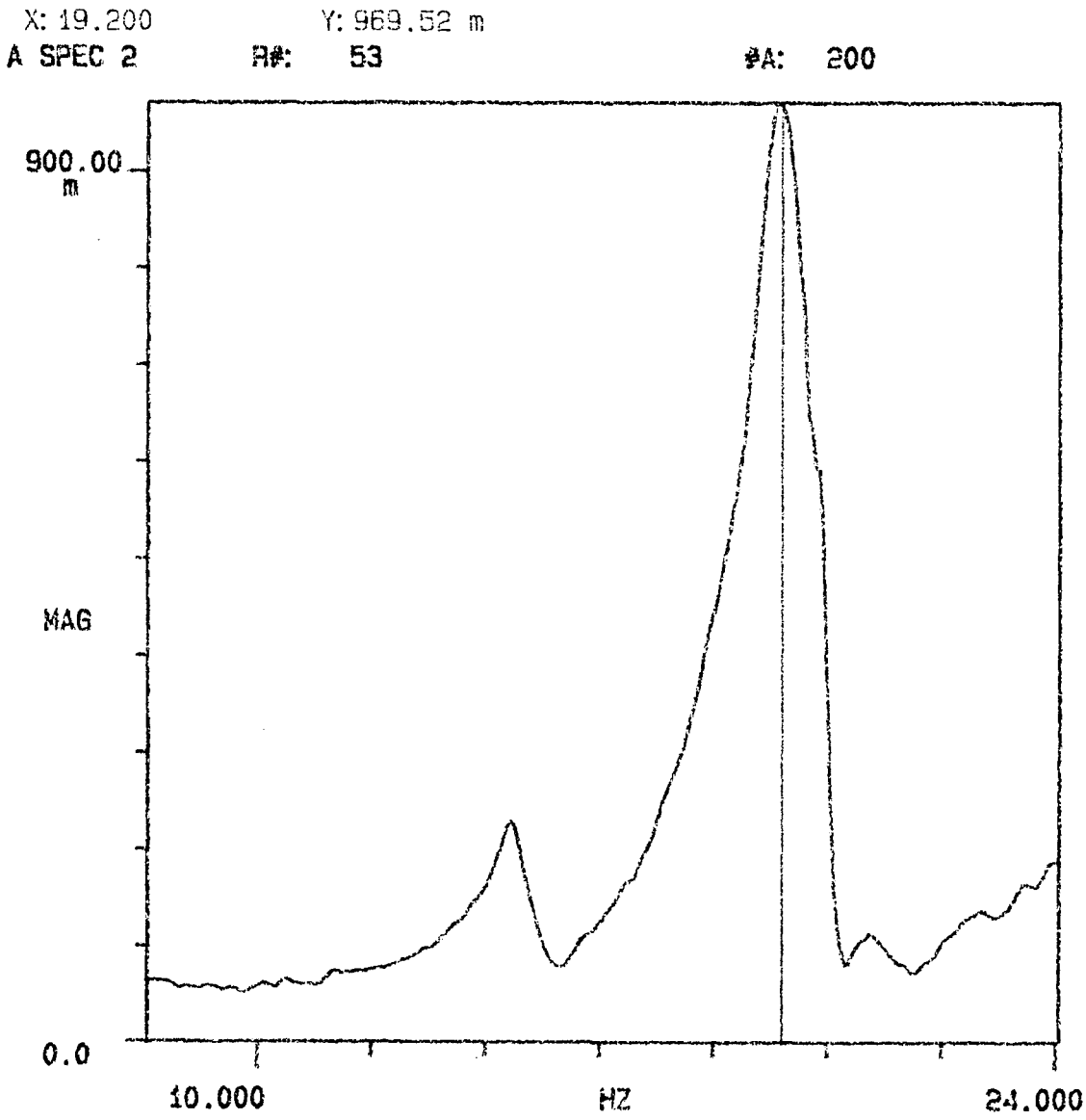
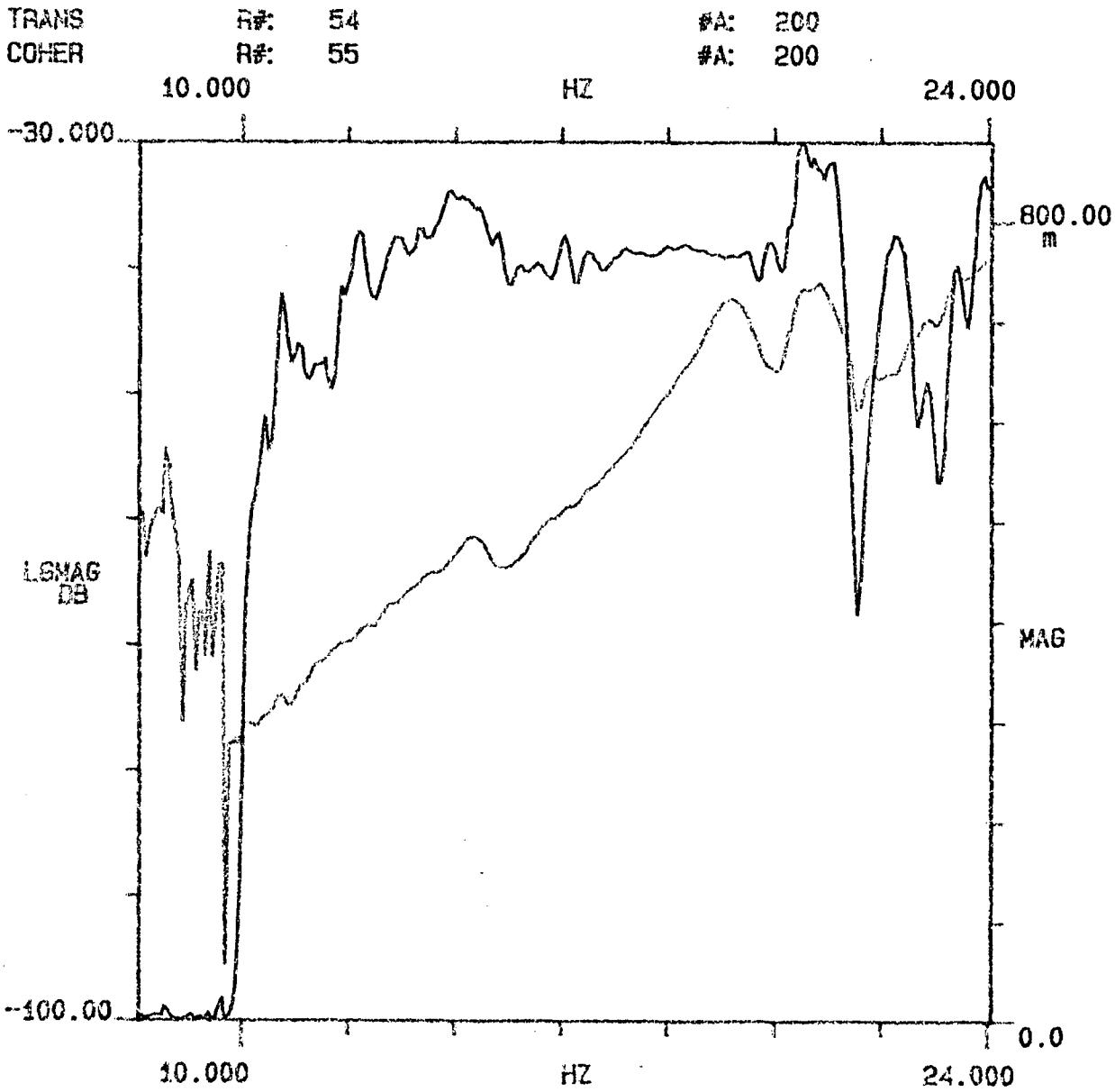
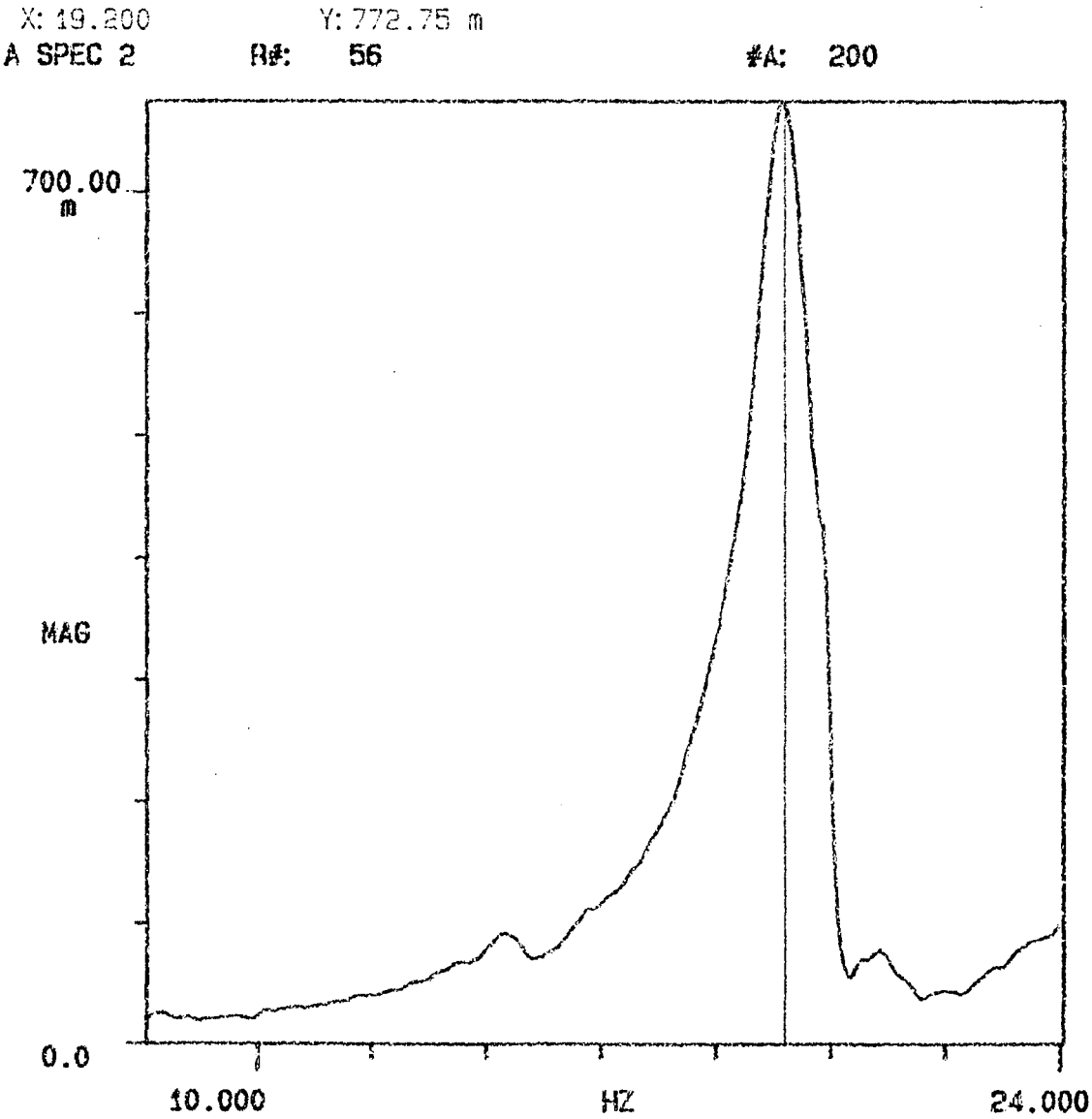


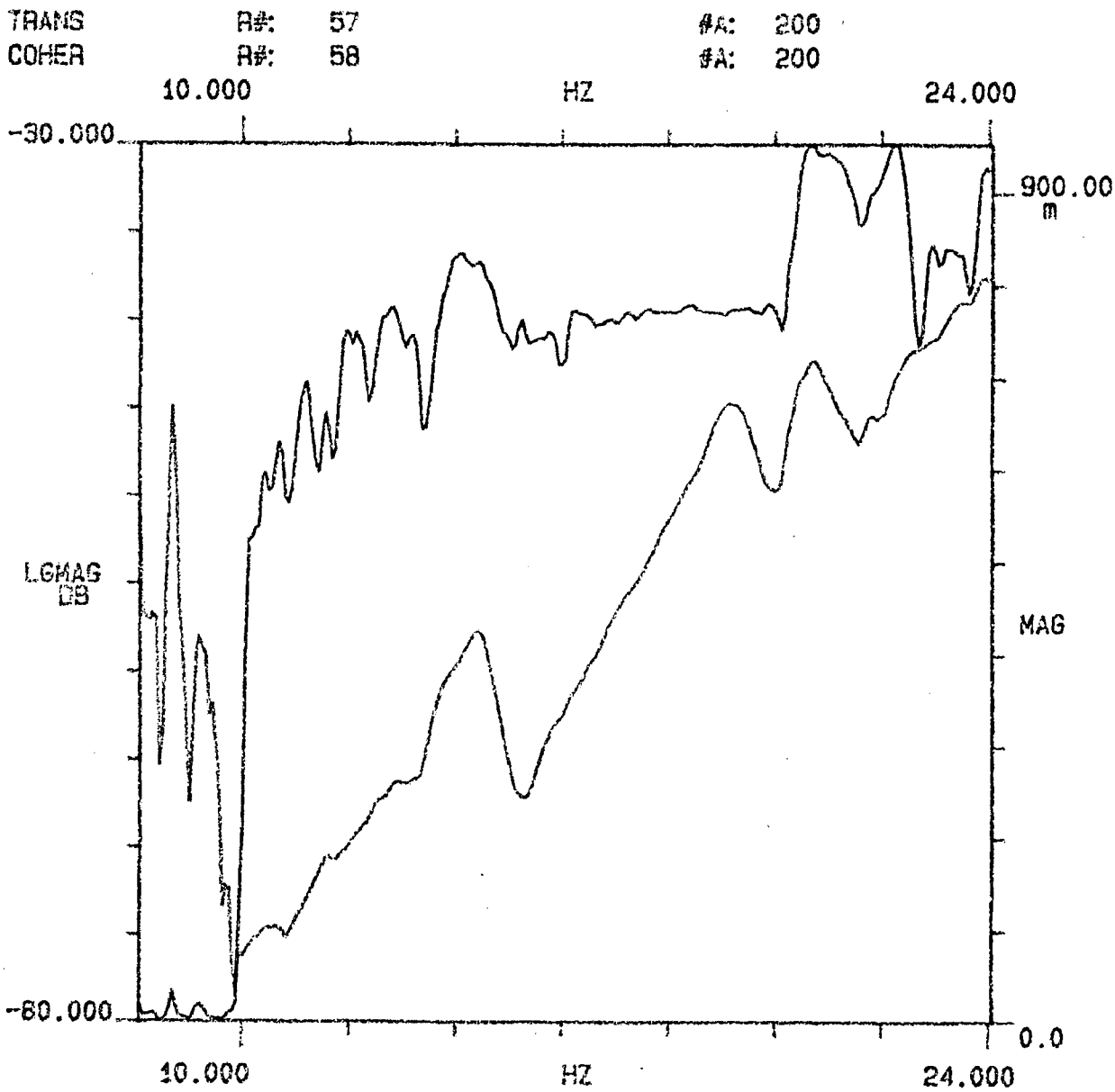
SINE 10-20 HZ. RESPONSE C-1-X



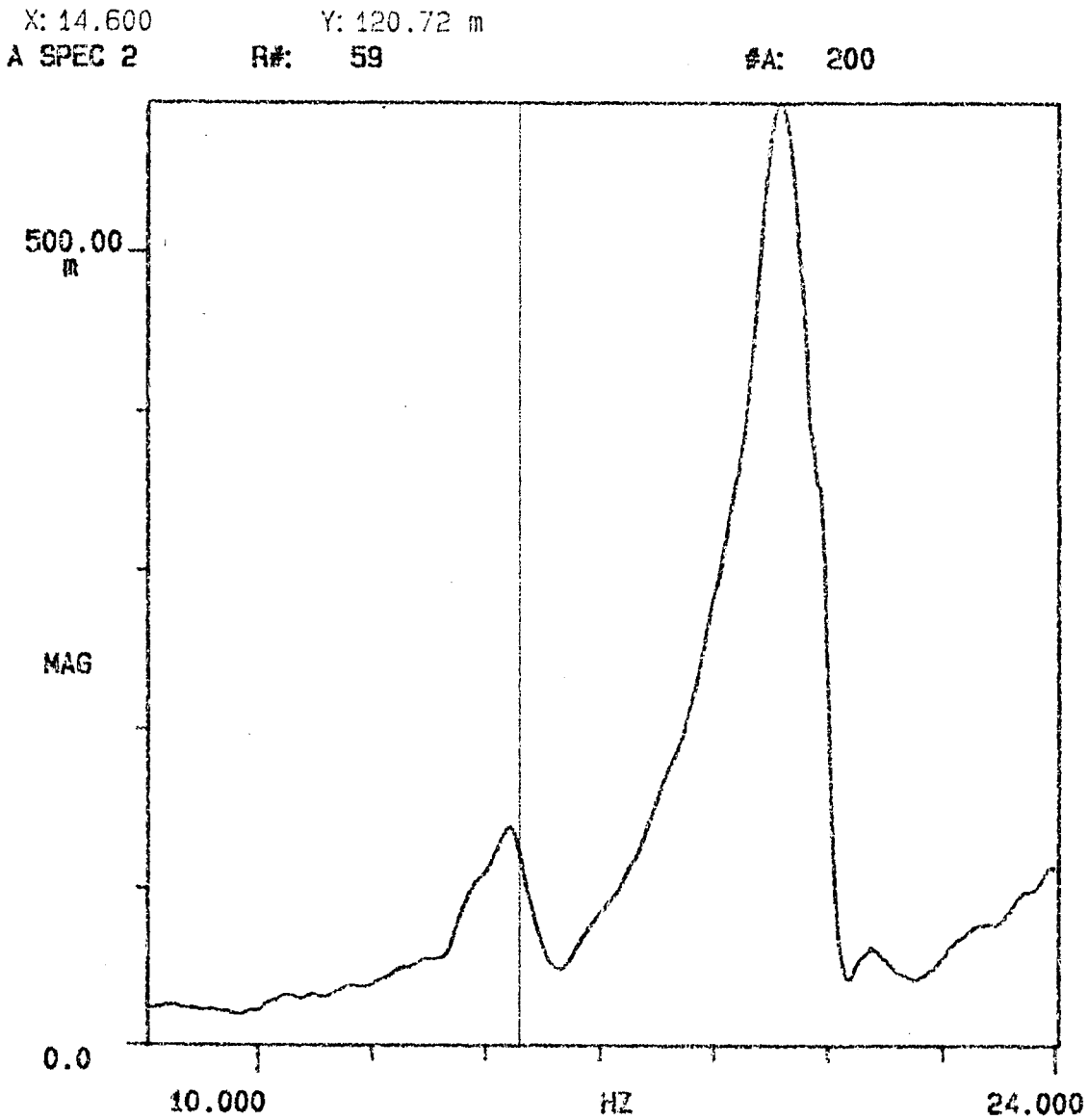
SINE 10-20 HZ. RESPONSE C-1-Y



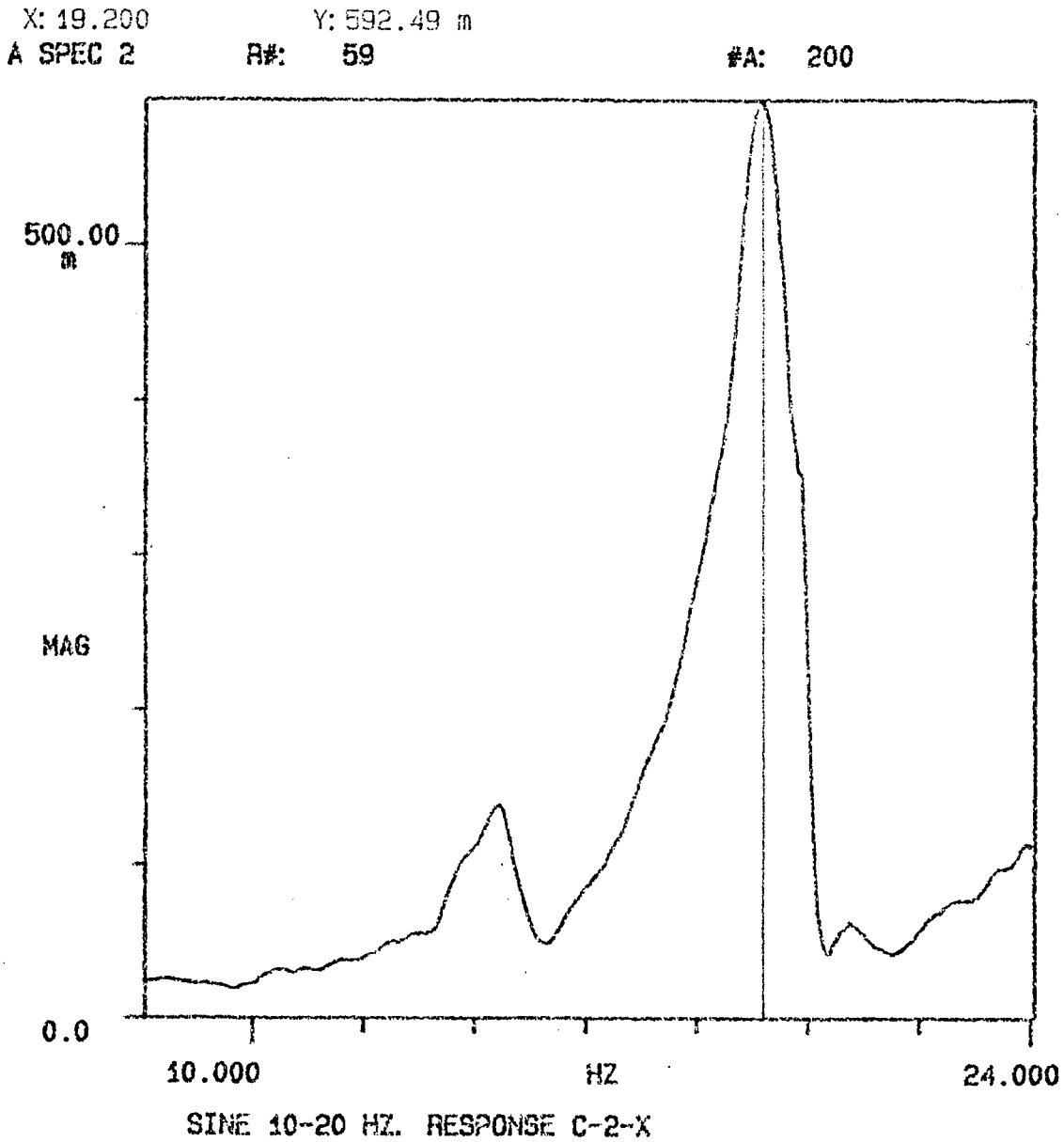
SINE 10-20 HZ. RESPONSE C-1-Y

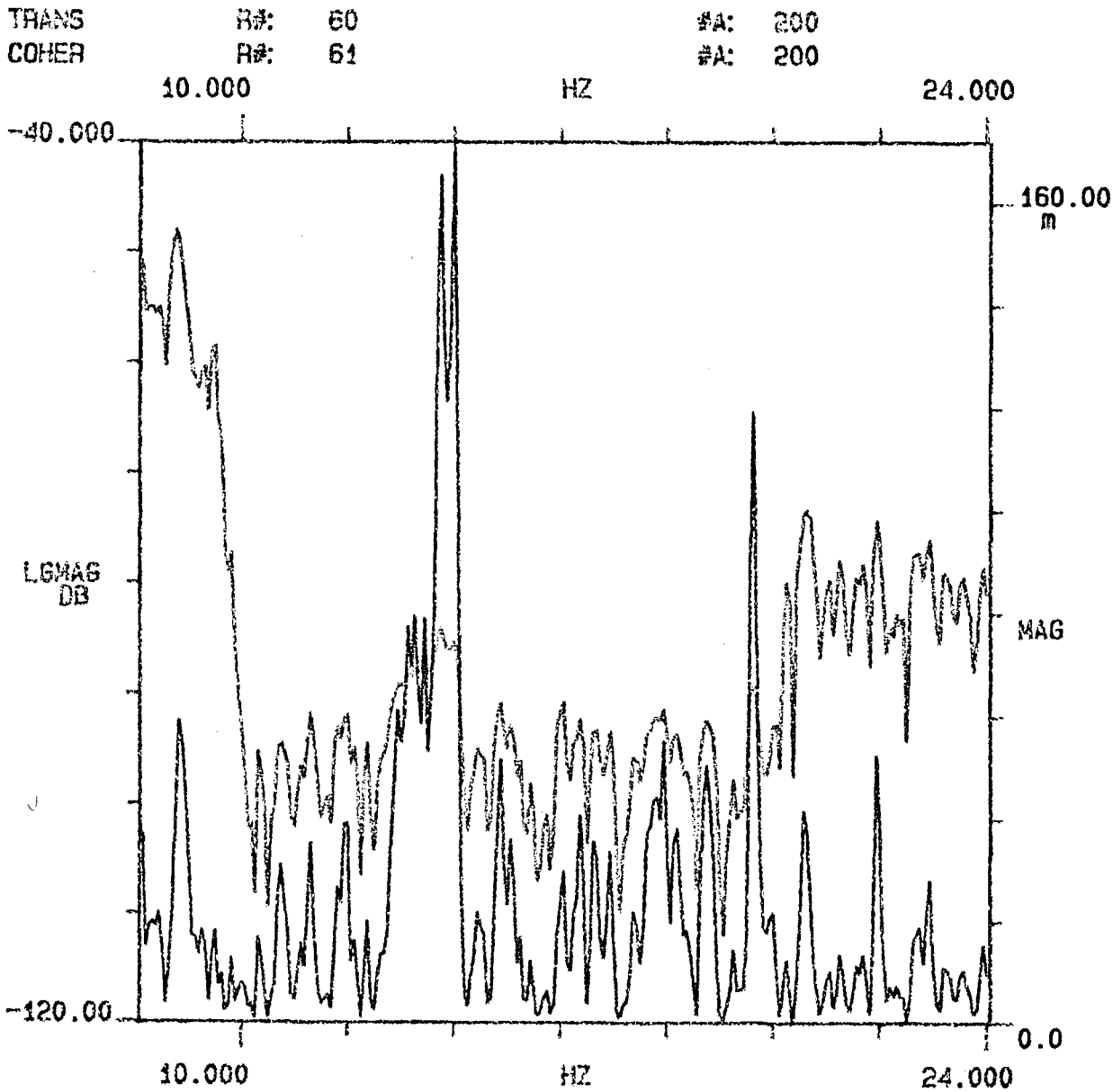


SINE 10-20 HZ. RESPONSE C-2-X



SINE 10-20 HZ. RESPONSE C-2-X

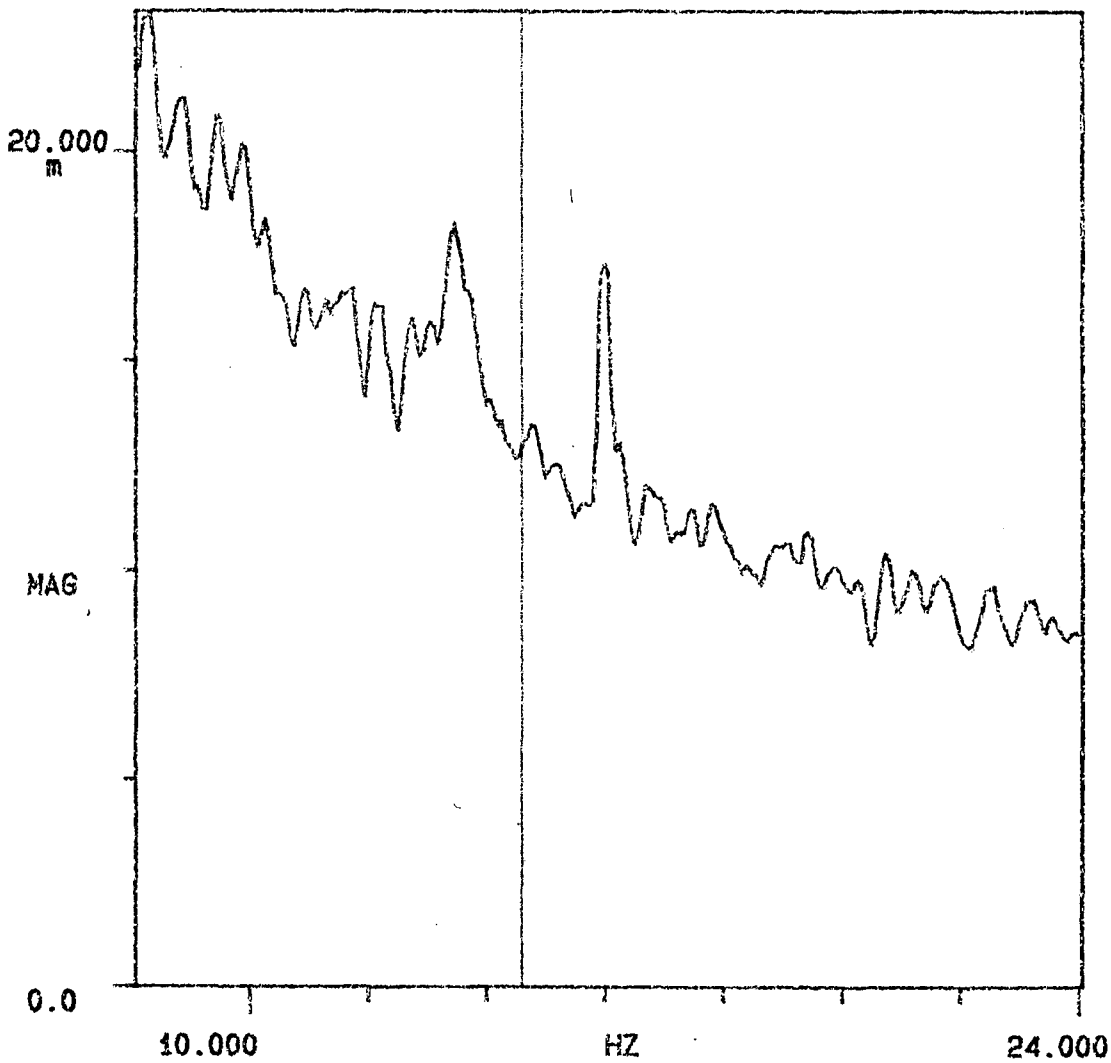

X: 19.200
Y: 592.49 m
A SPEC 2
R#: 59
#A: 200
500.00 m
MAG
0.0
10.000
HZ
24.000
SINE 10-20 HZ. RESPONSE C-2-X



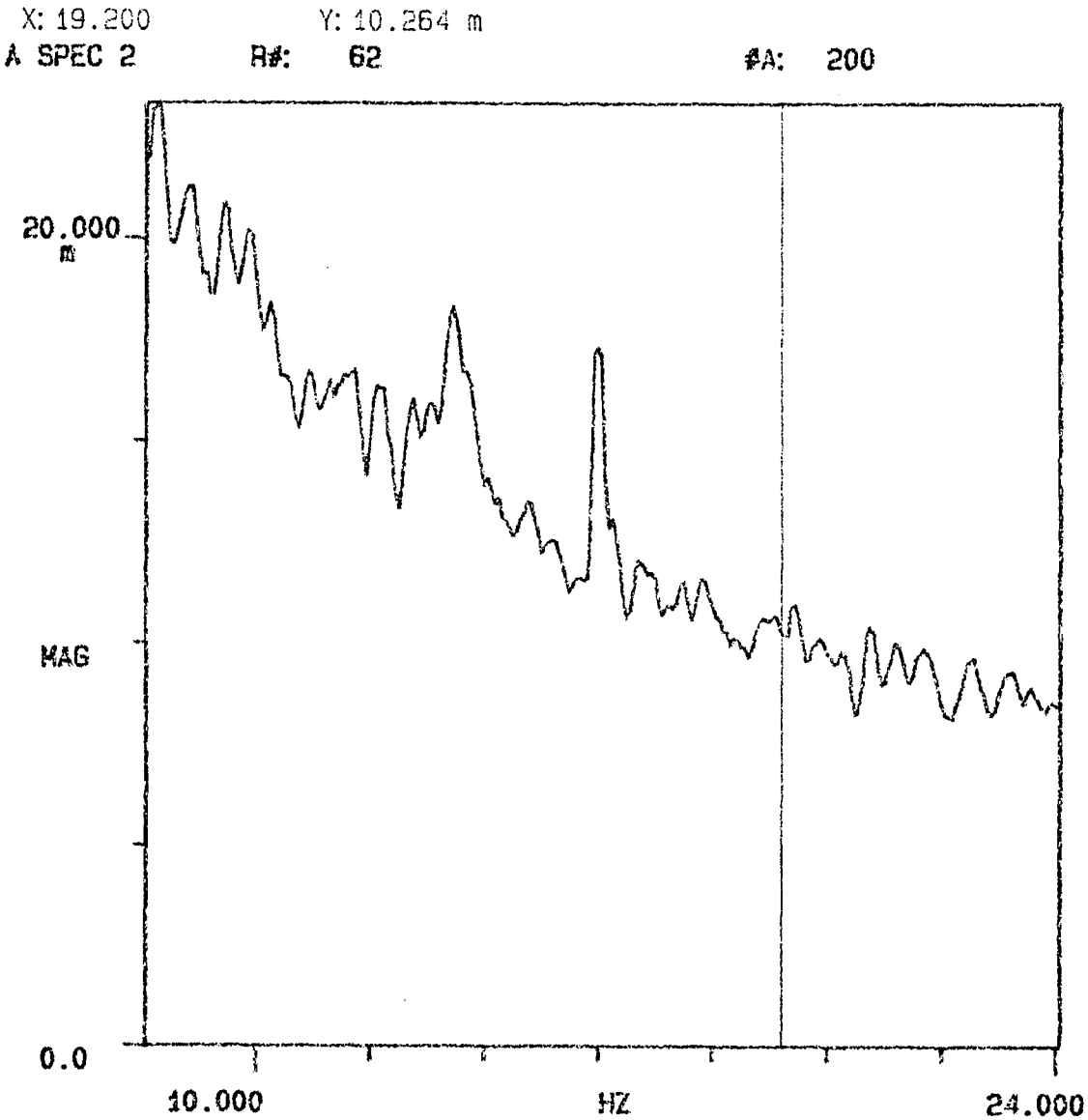
SINE 10-20 HZ. RESPONSE C-2-Y

X: 14.600 Y: 12.949 m

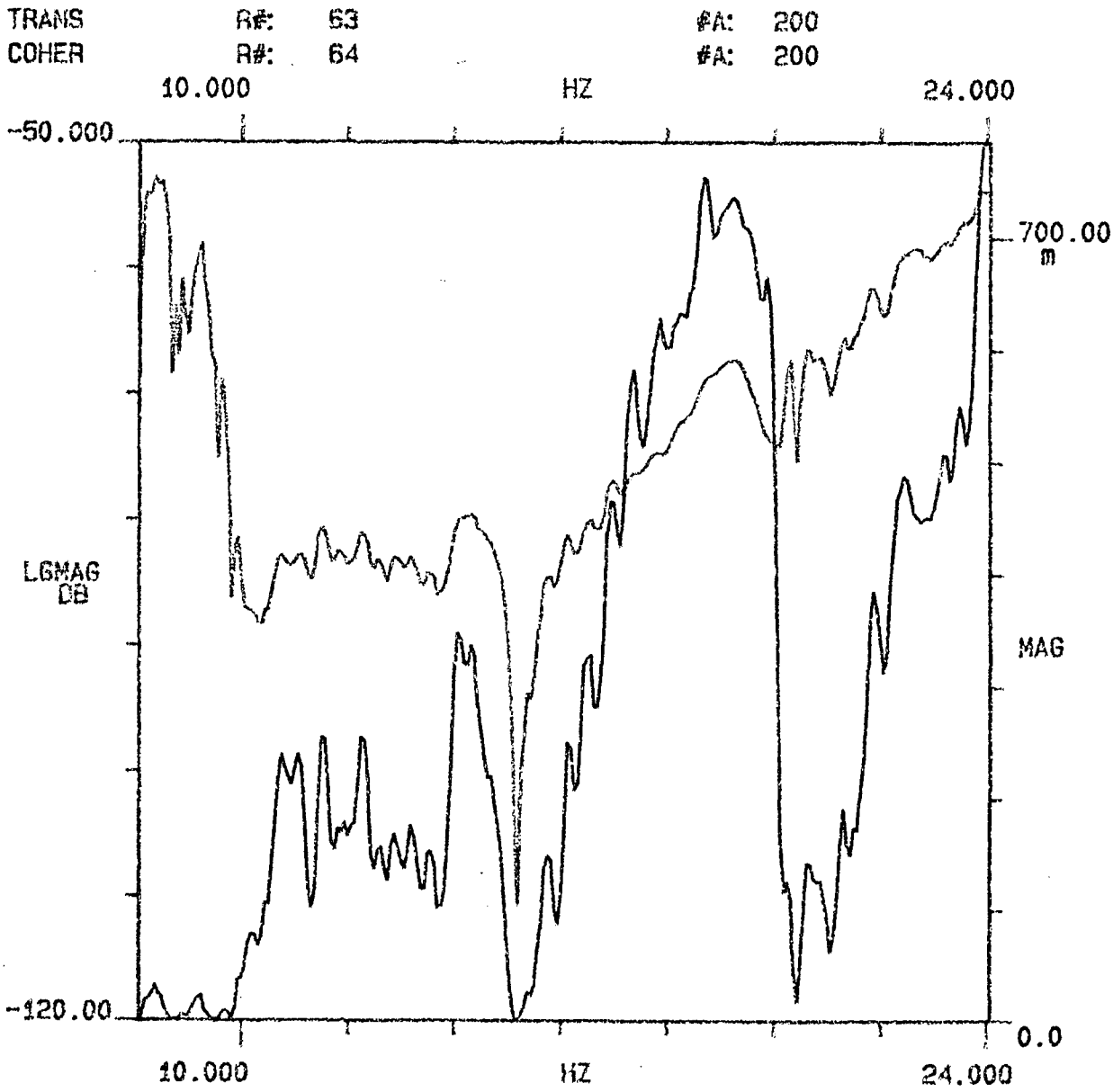
A SPEC 2 R#: 62 #A: 200



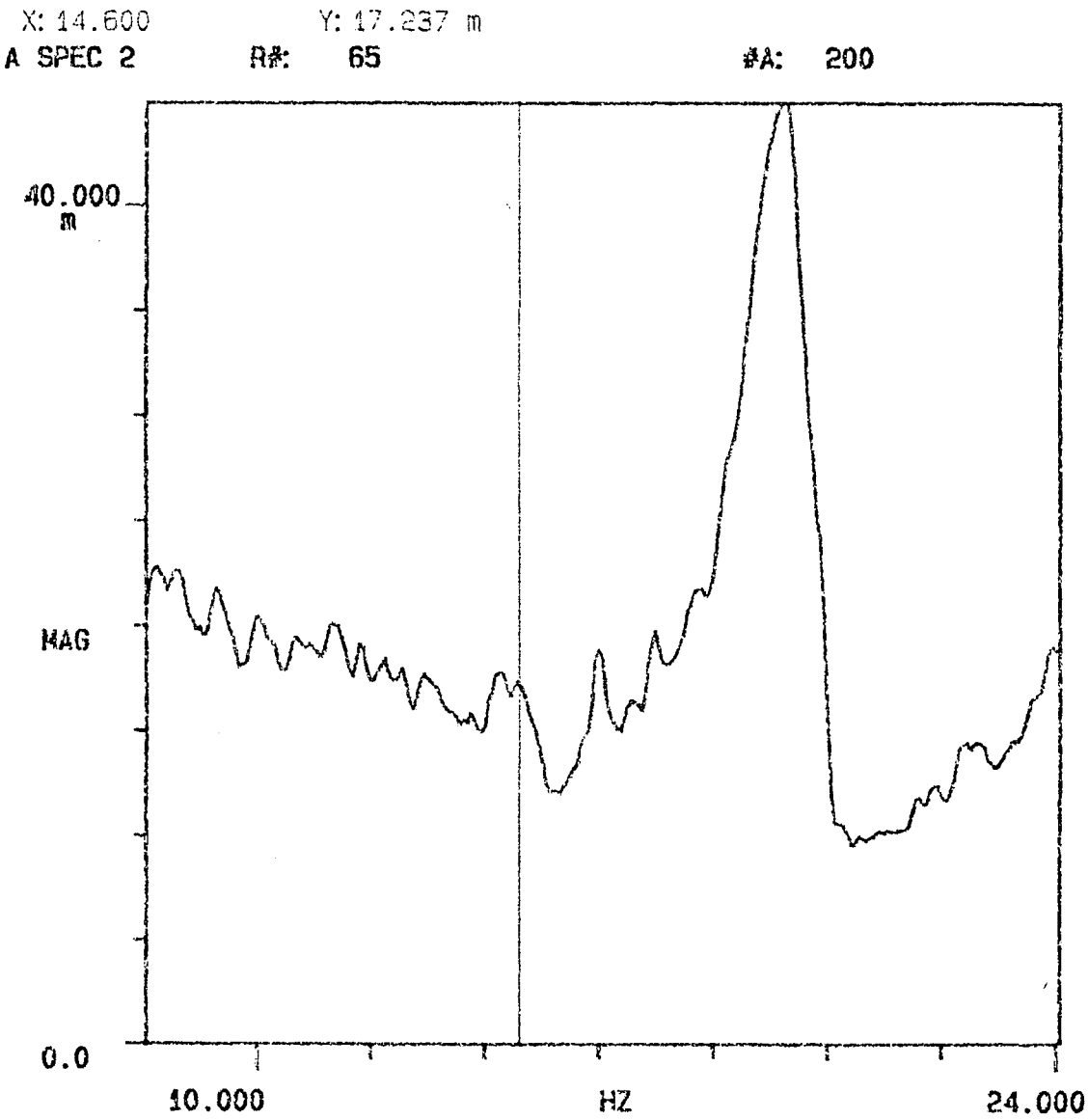
SINE 10-20 HZ. RESPONSE C-2-Y



SINE 10-20 HZ. RESPONSE C-2-Y



SINE 10-20 HZ. RESPONSE C-3-X



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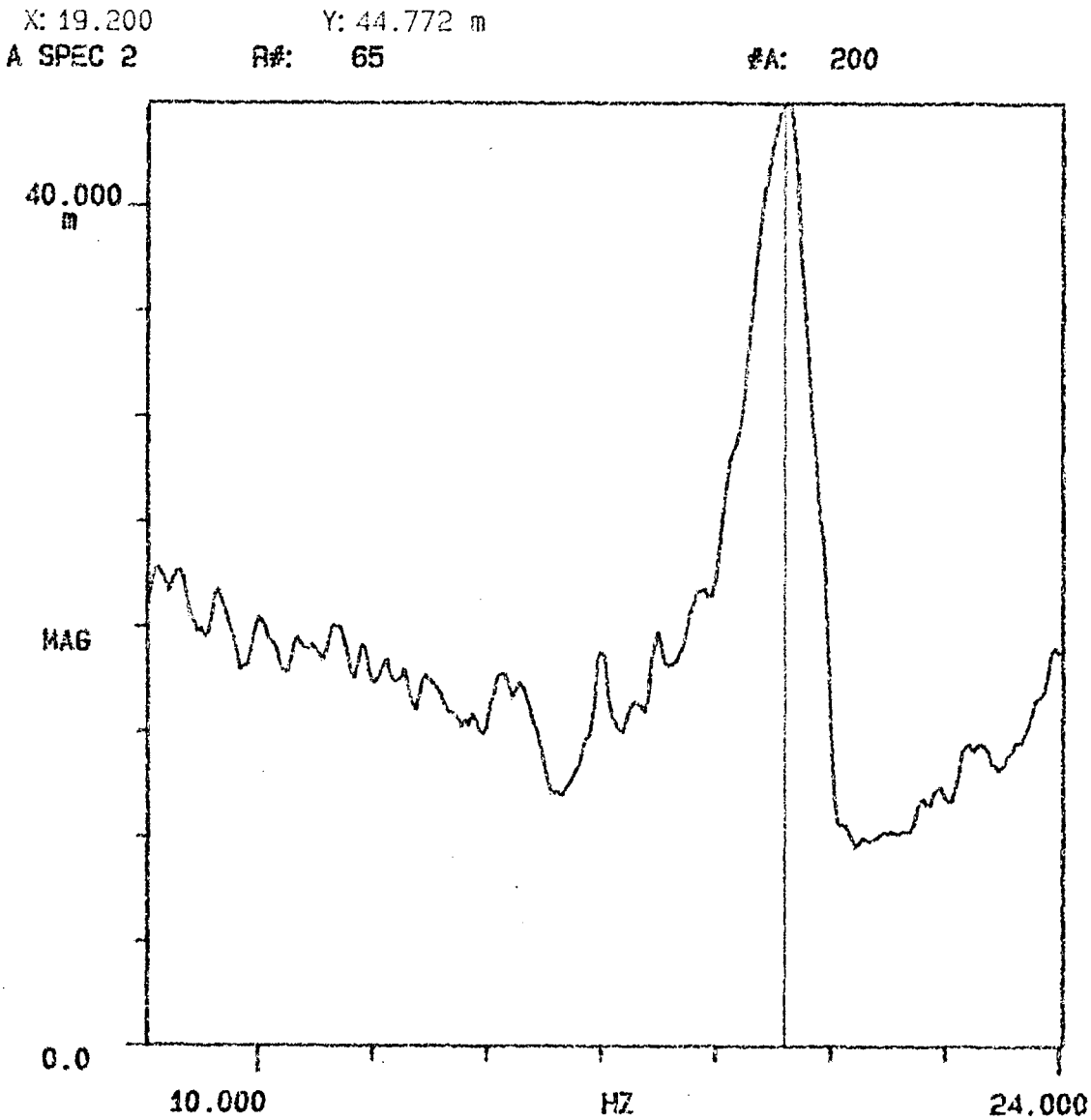
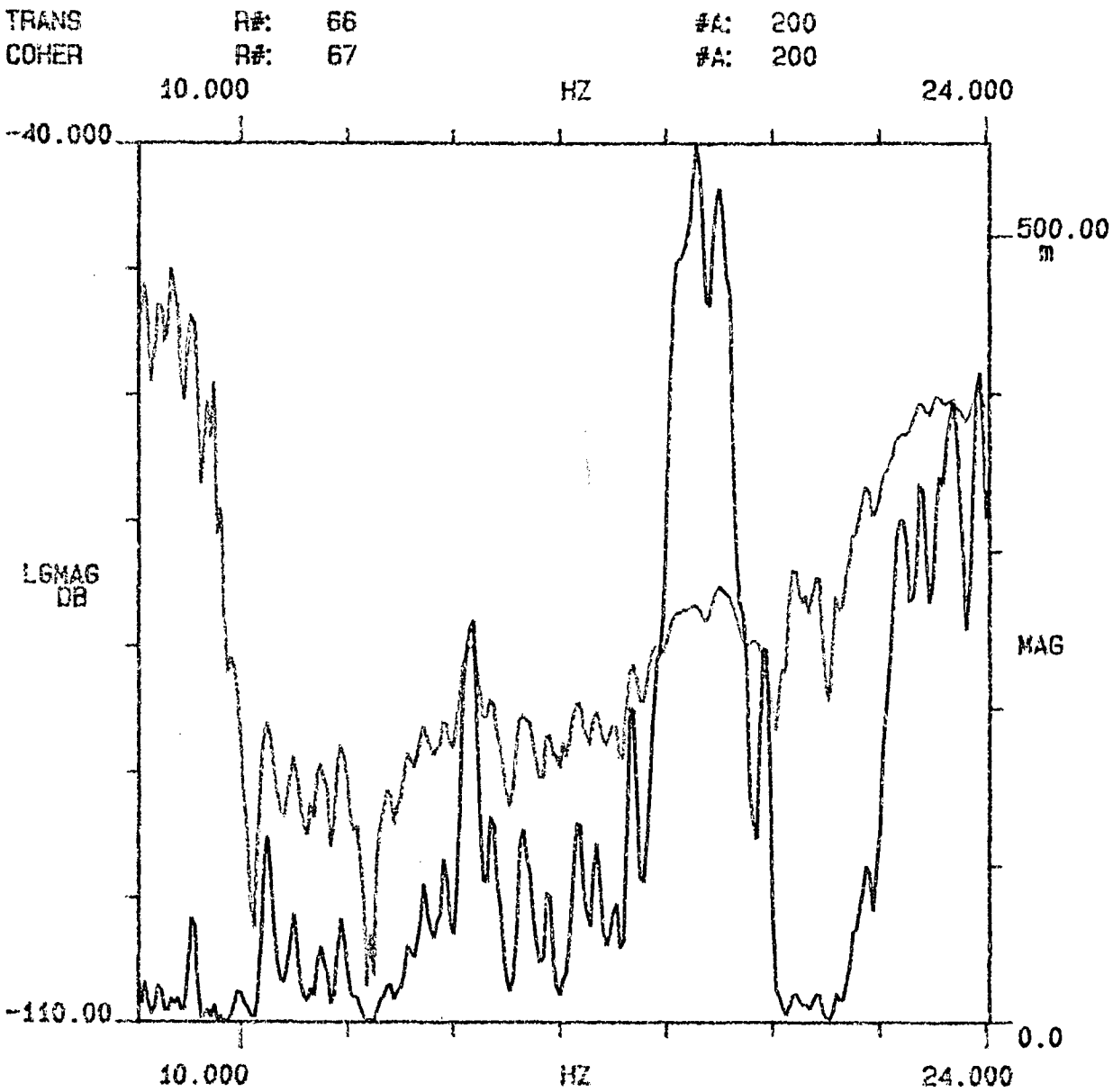
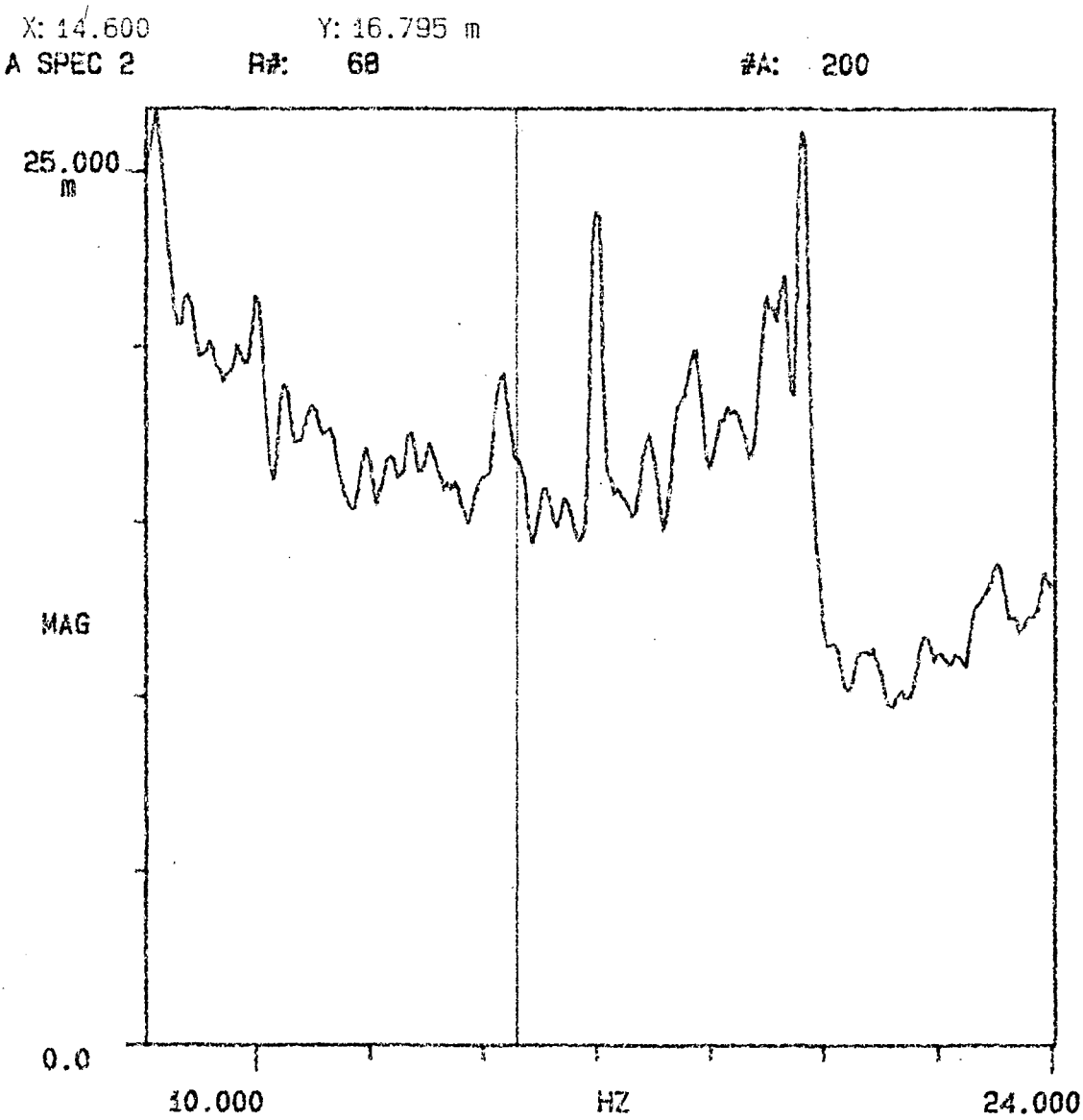


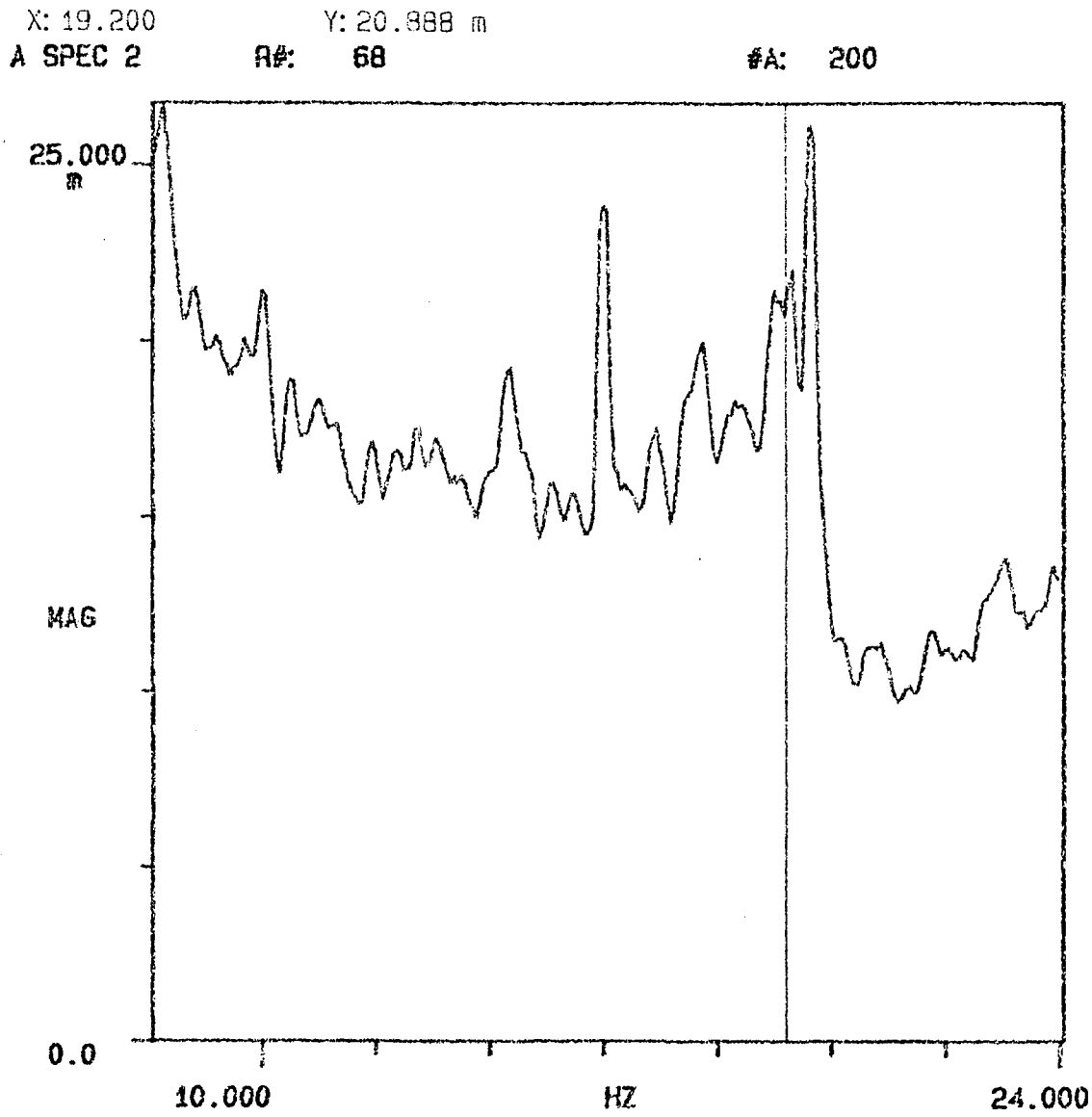
SINE 10-20 HZ. RESPONSE C-3-X



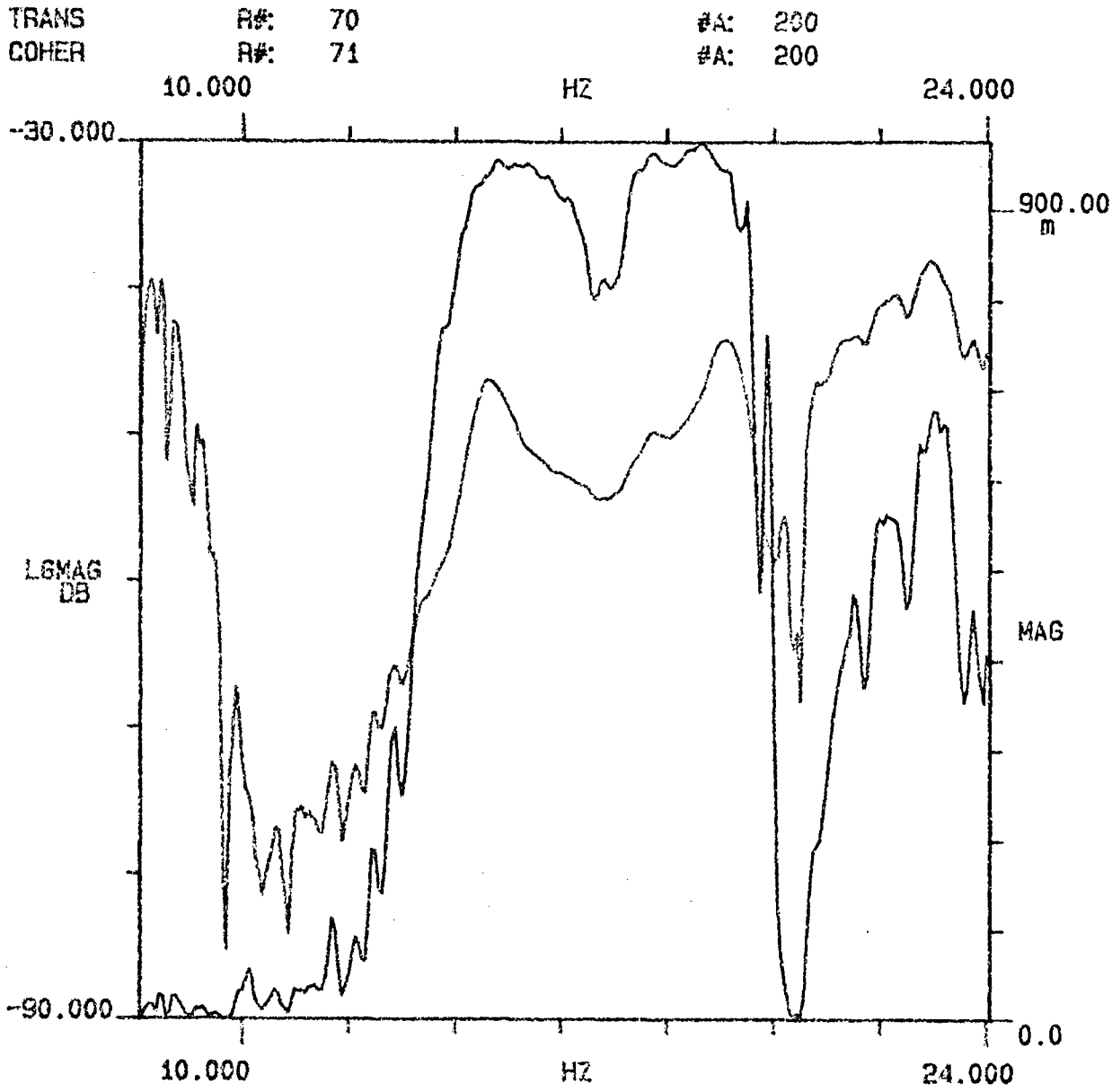
SINE 10-20 HZ. RESPONSE C-3-Y



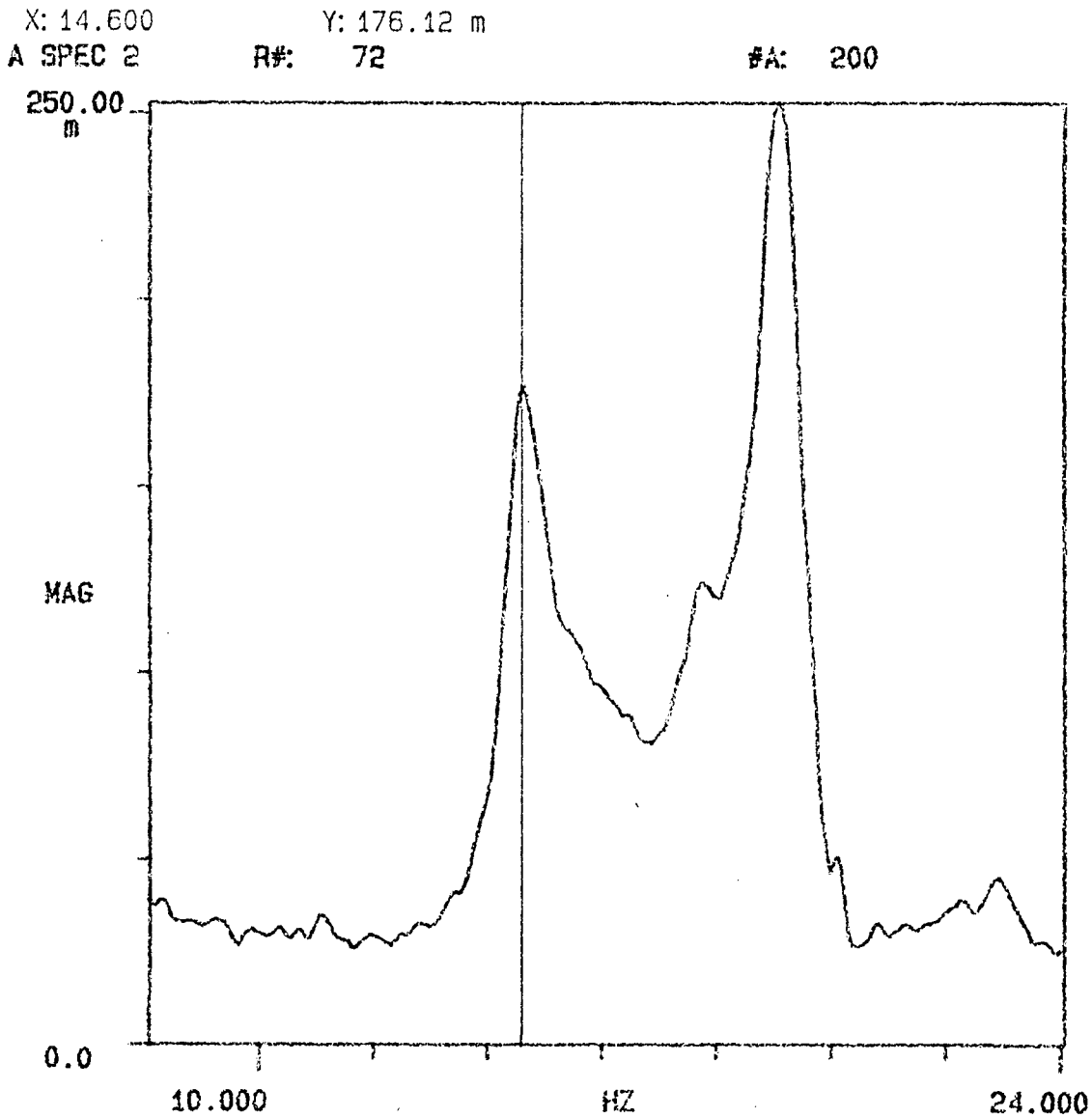
SINE 10-20 HZ. RESPONSE C-3-Y



SINE 10-20 HZ. RESPONSE C-3-Y



SINE 10-20 HZ. RESPONSE D-1-X



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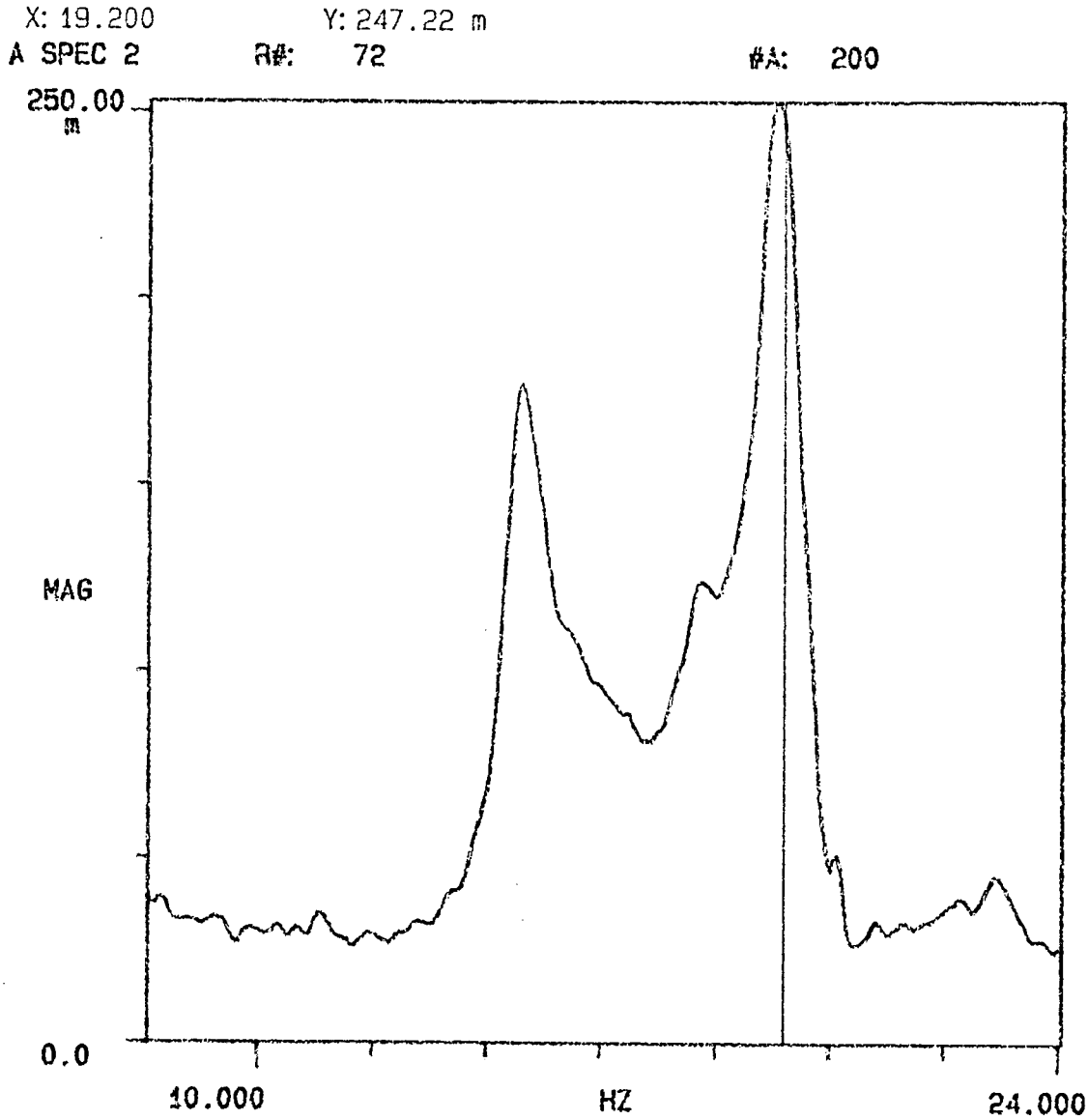
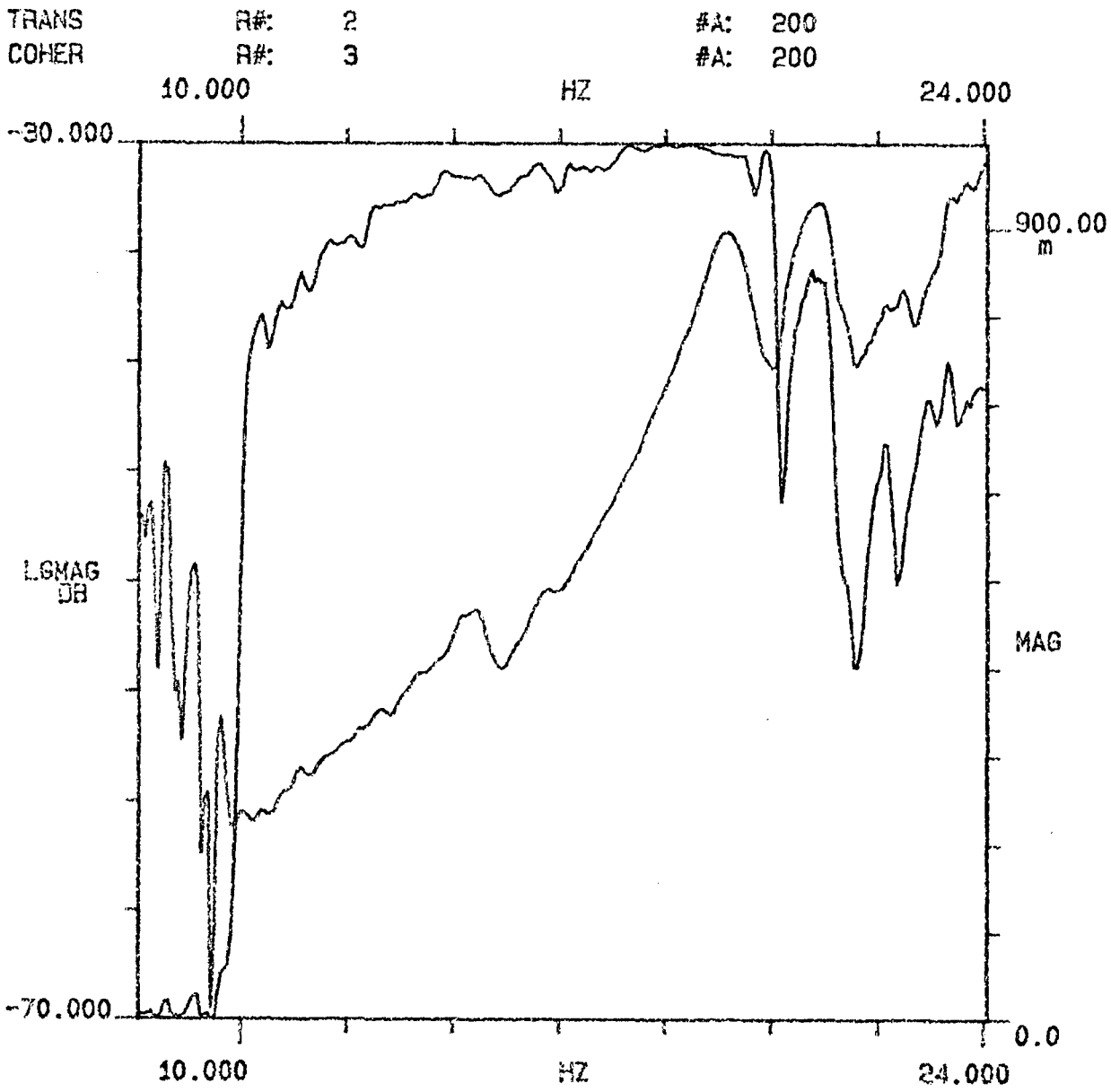


SINE 10-20 HZ. RESPONSE D-1-X



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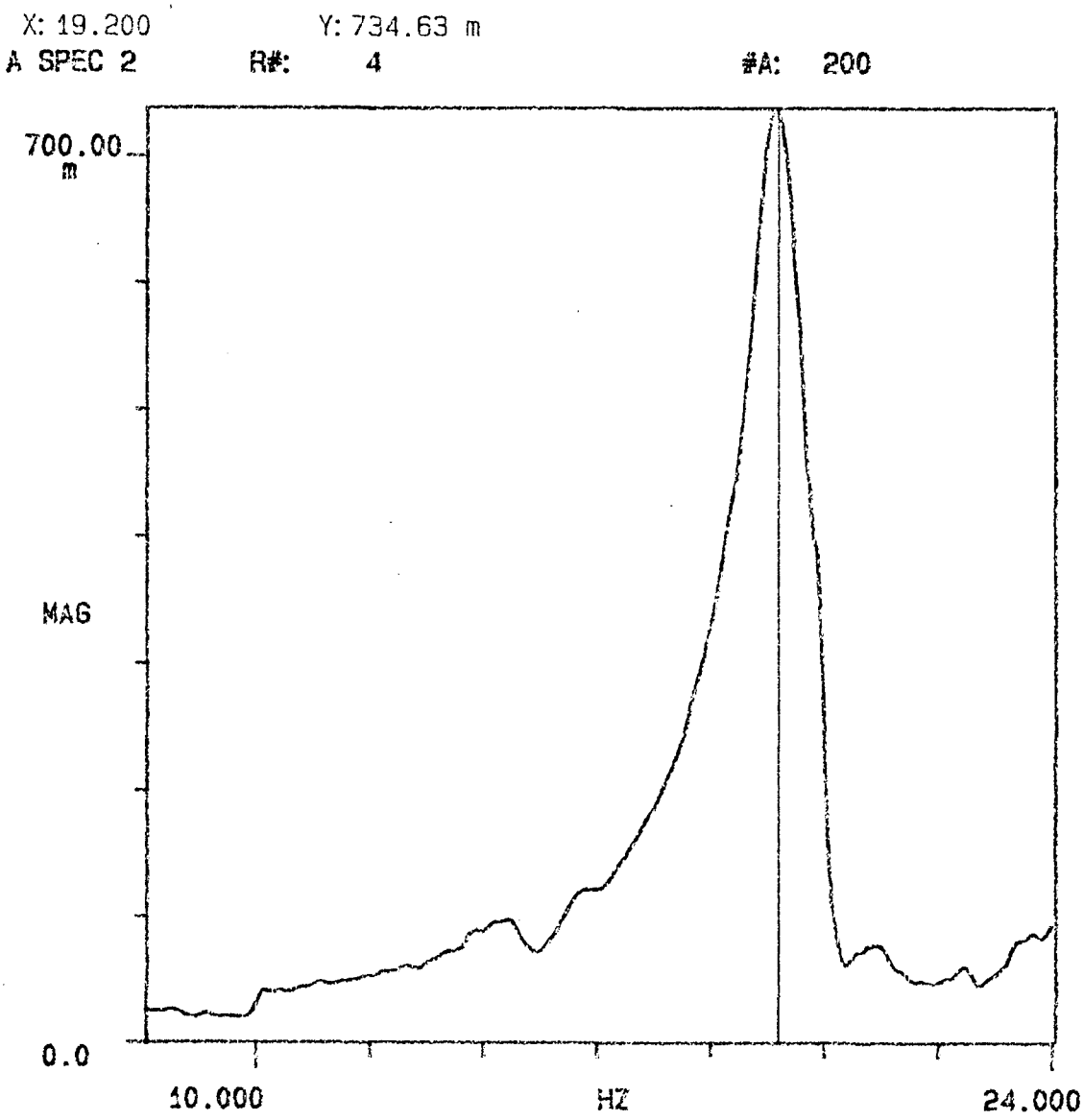

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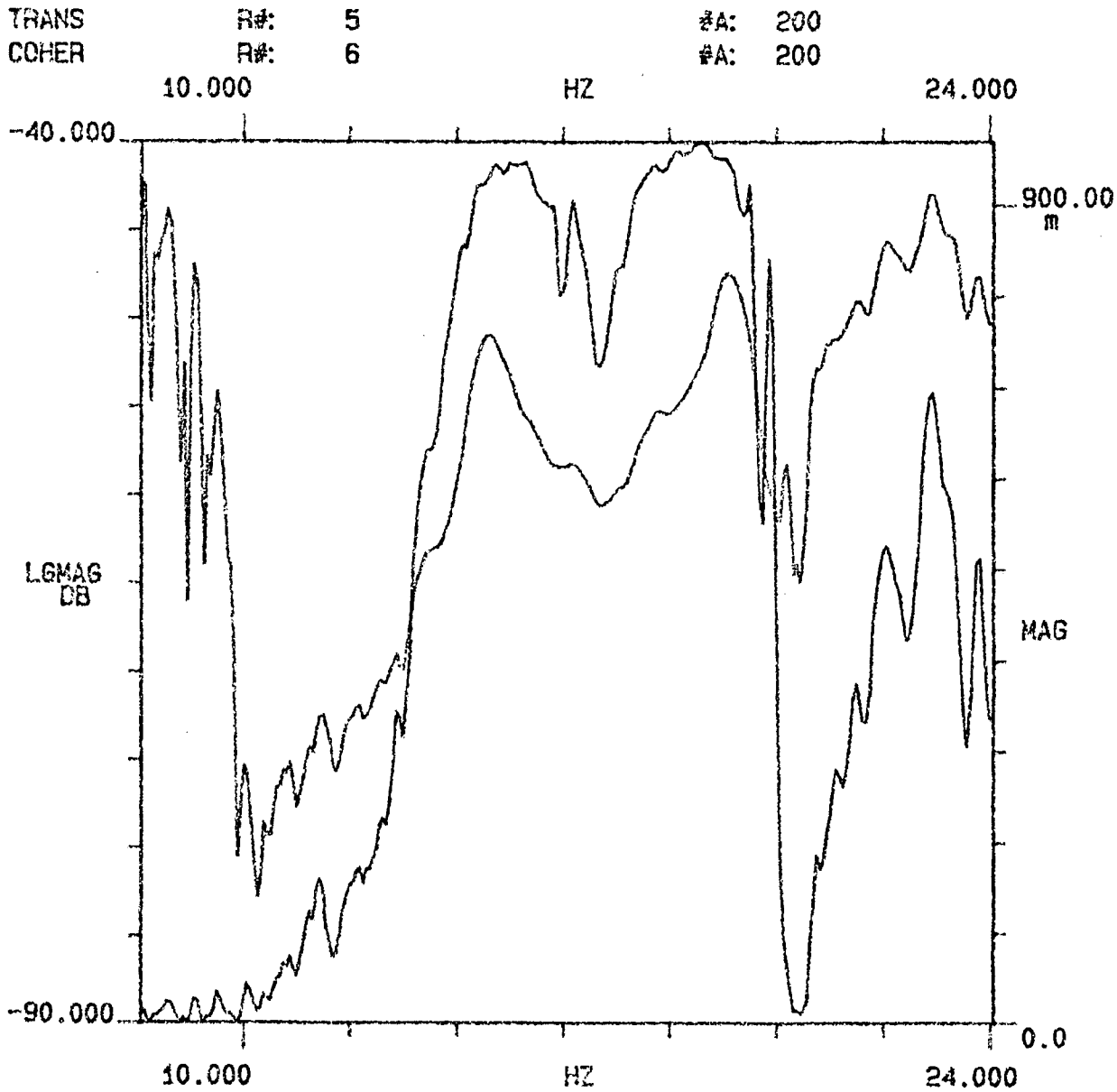
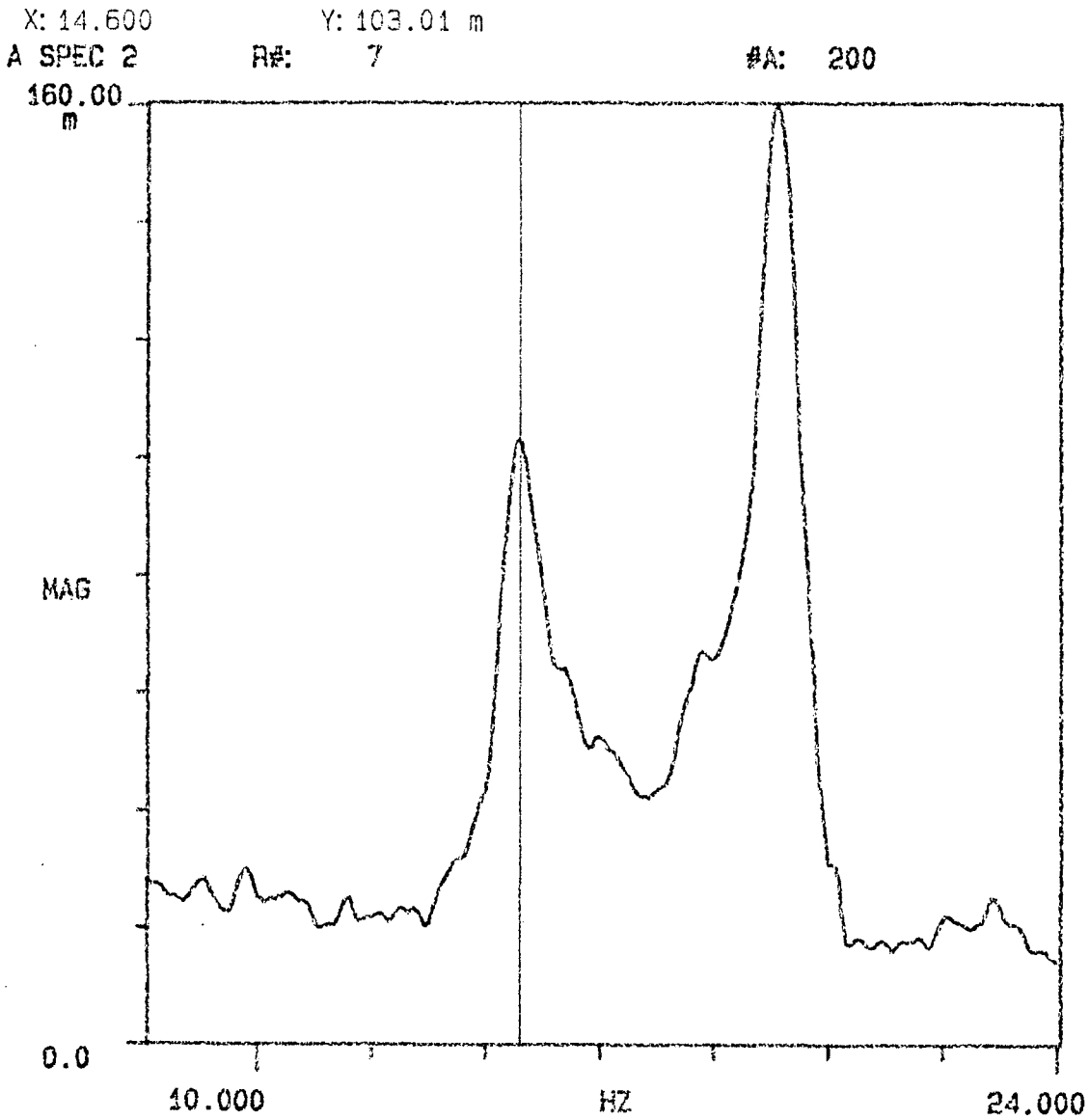
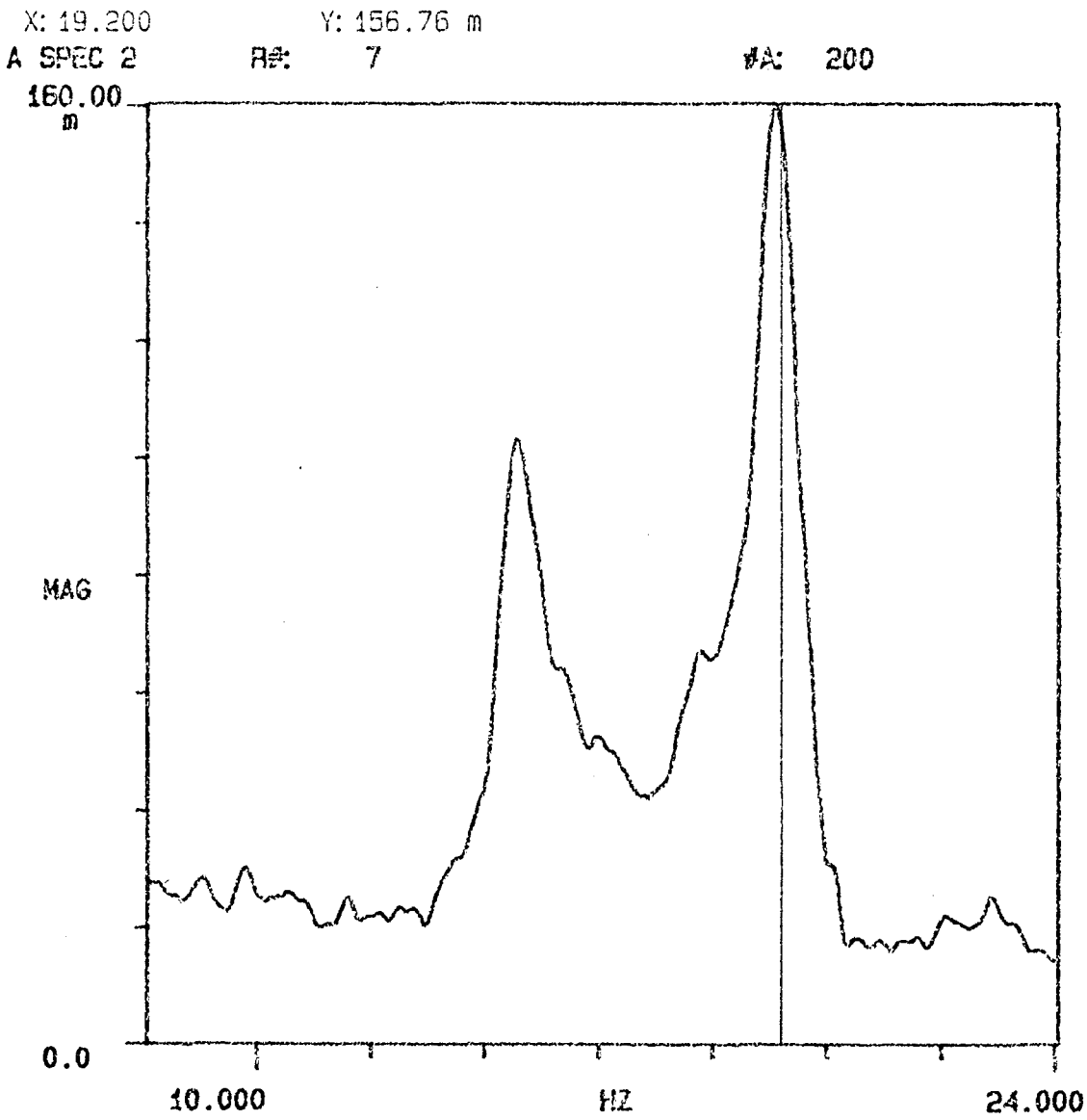


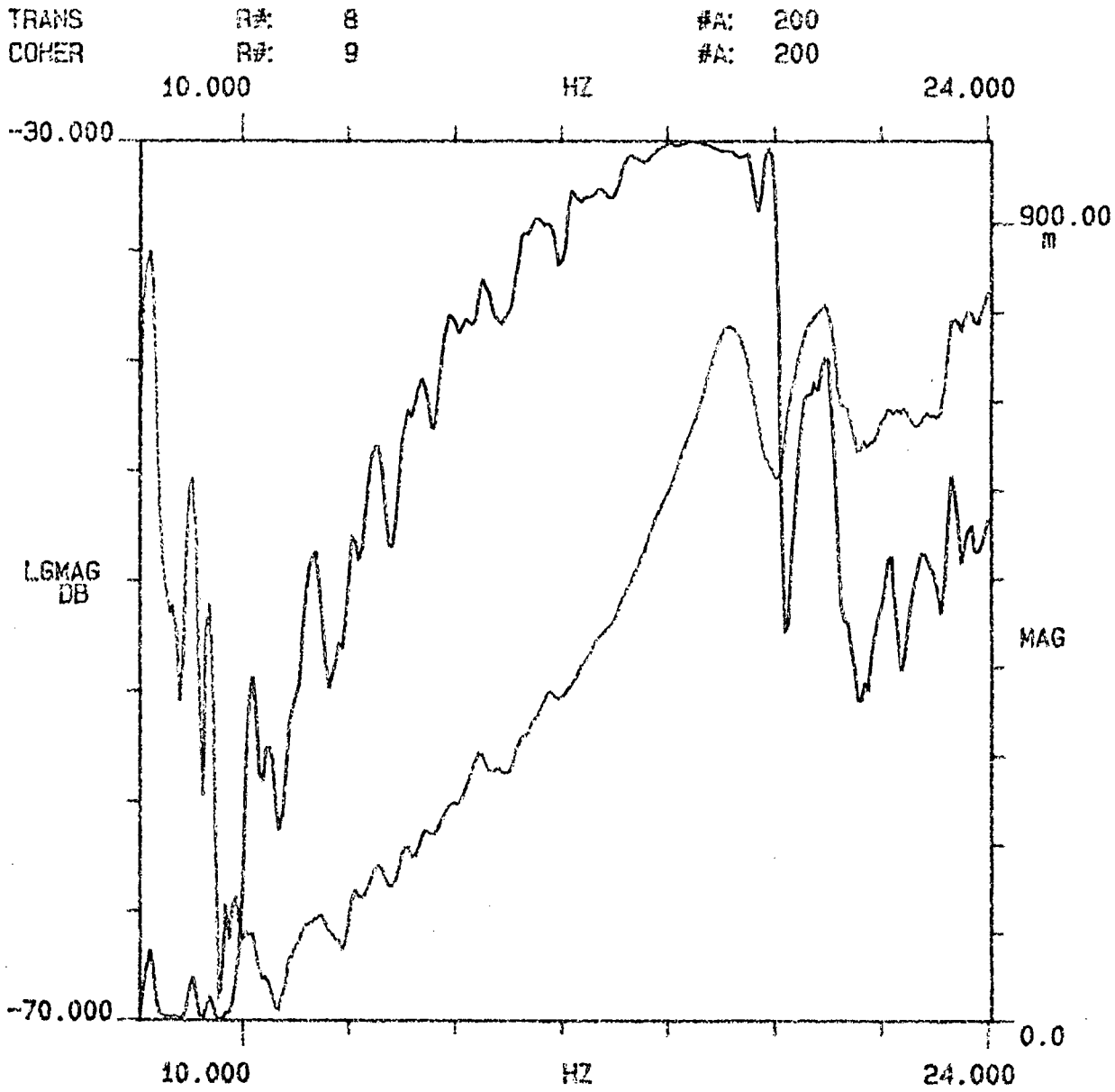
SINE 10-20 HZ. RESPONSE D-2-X



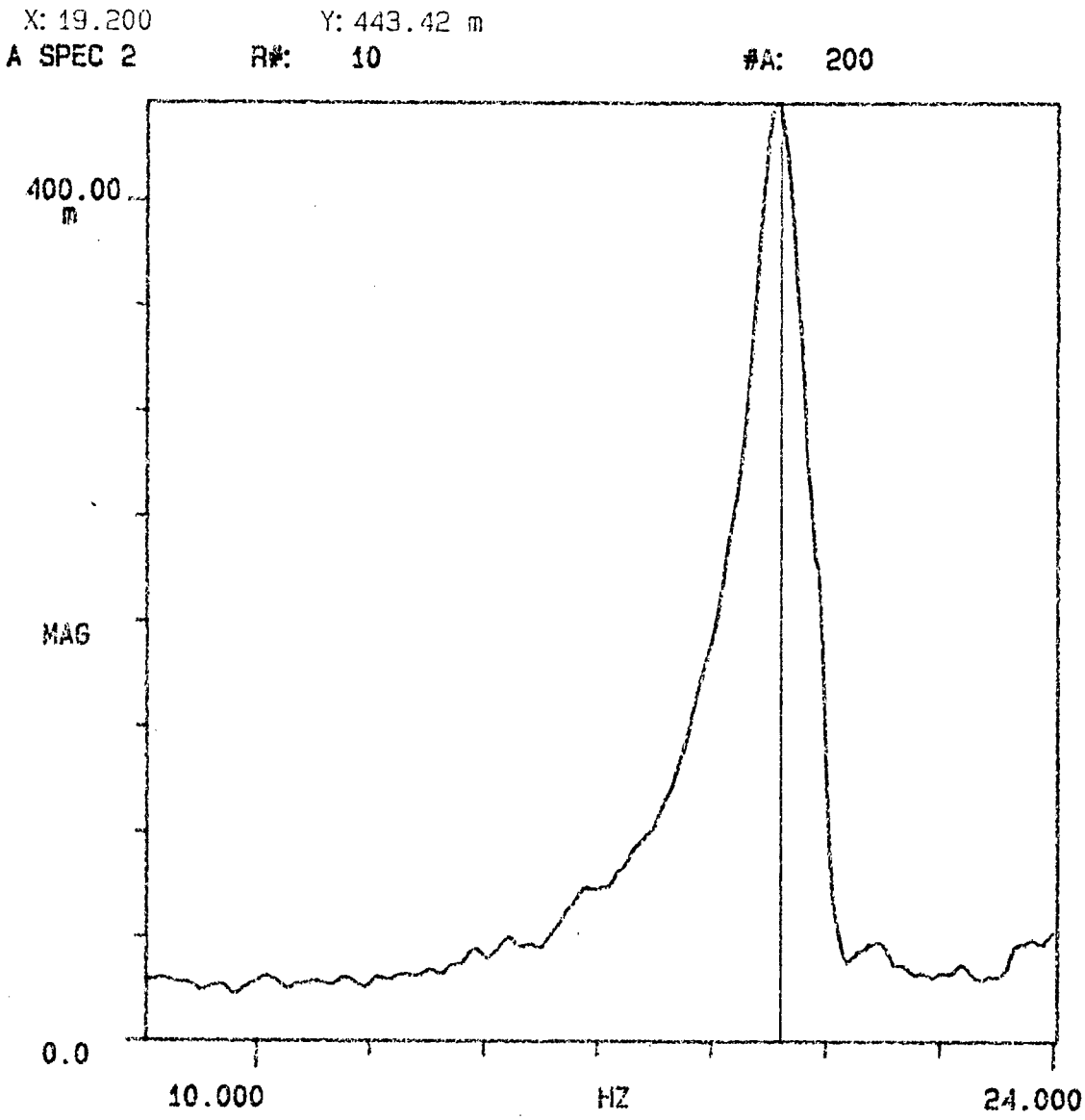
SINE 10-20 HZ. RESPONSE D-2-X



SINE 10-20 HZ. RESPONSE D-2-X



SINE 10-20 HZ. RESPONSE D-2-Y



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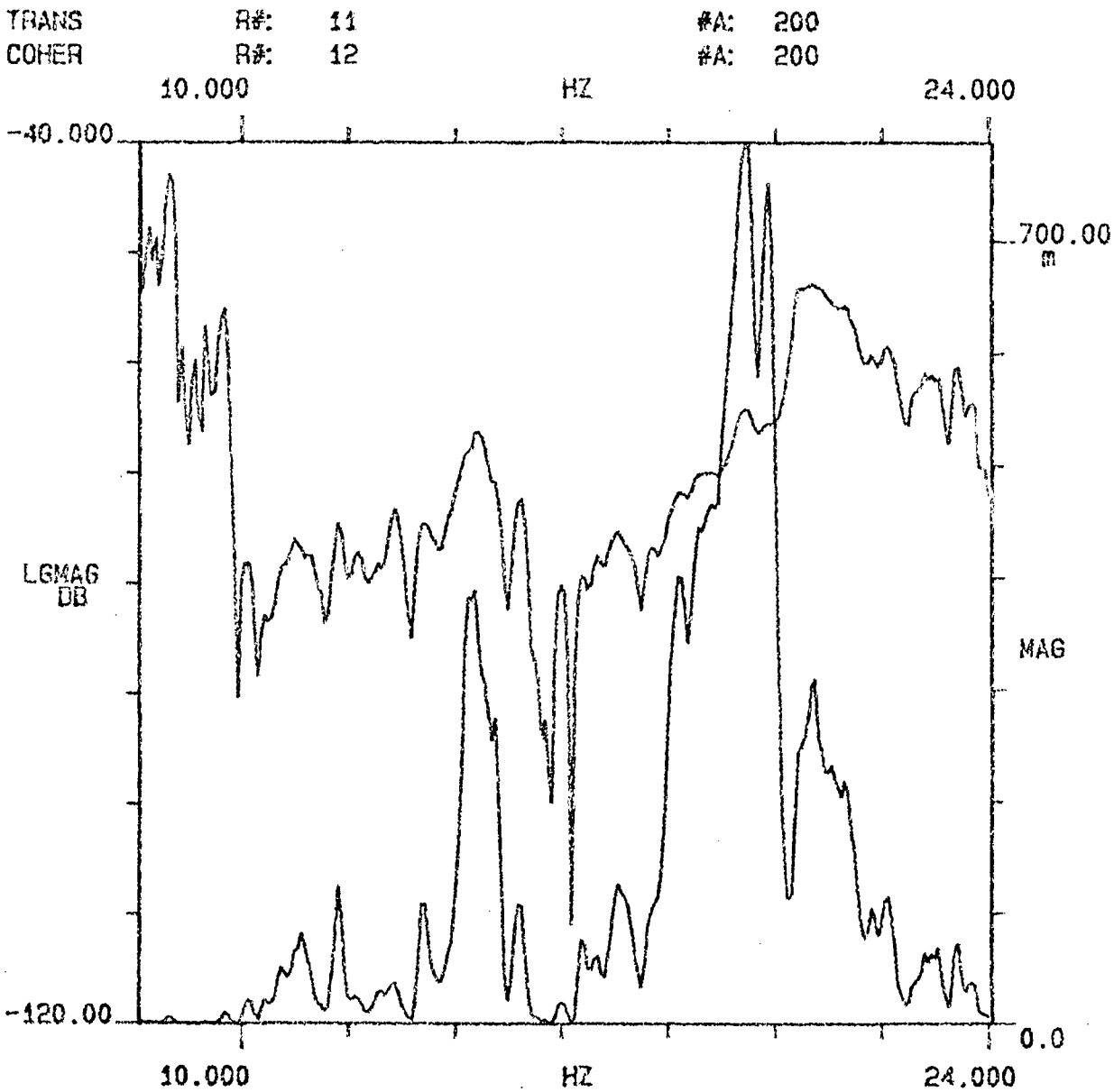
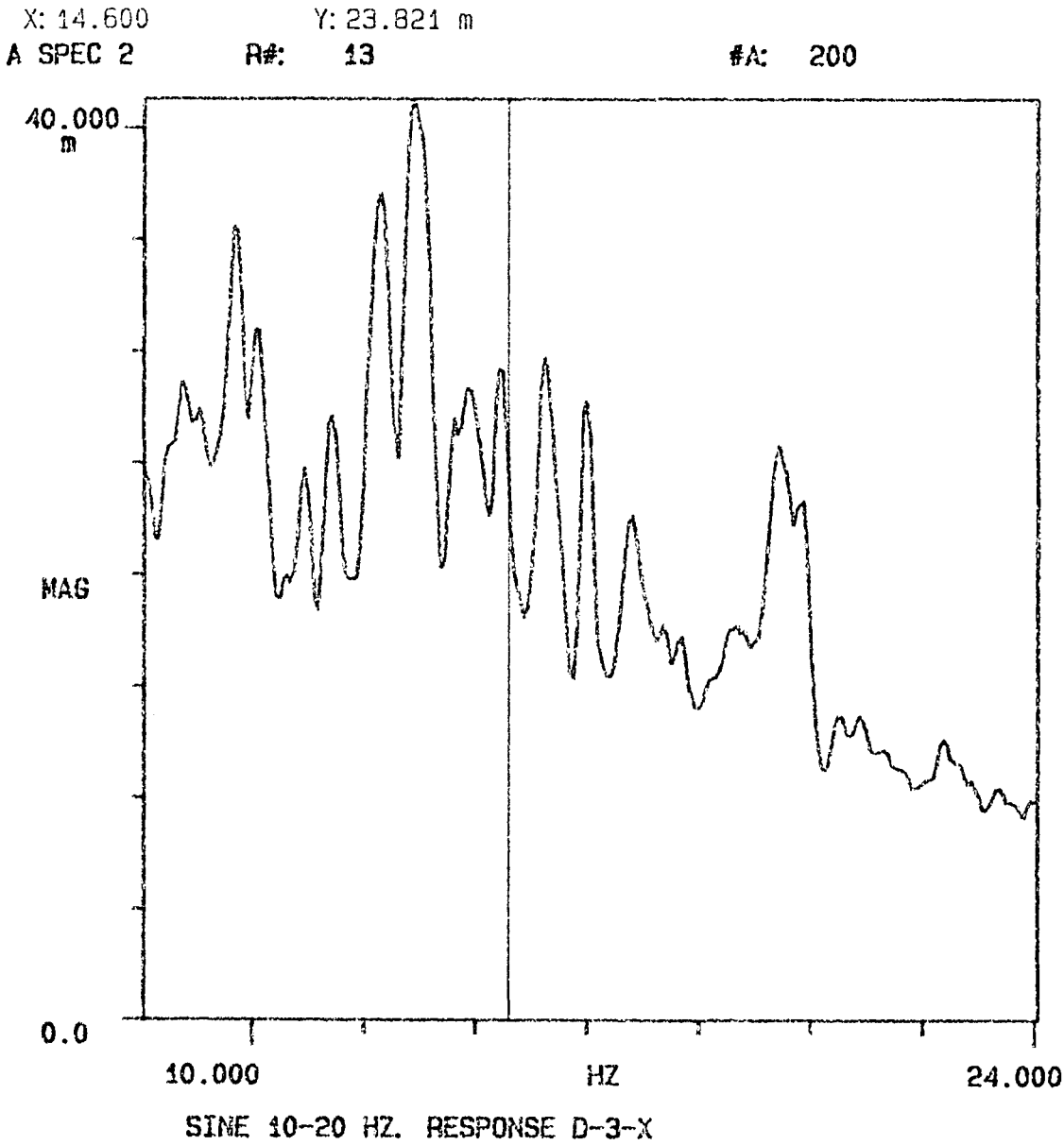
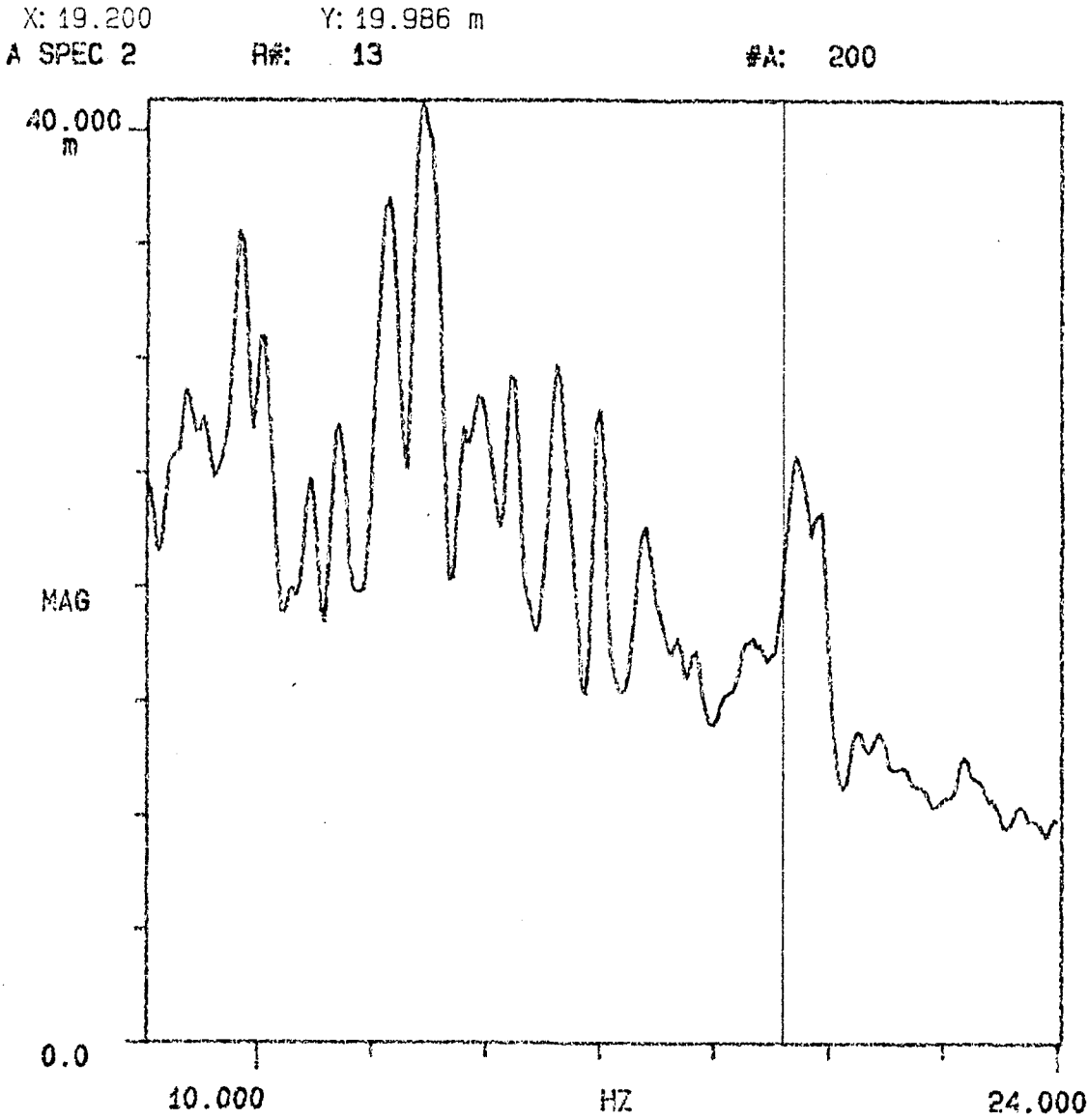


SINE 10-20 HZ. RESPONSE D-3-X



SINE 10-20 HZ. RESPONSE D-3-X



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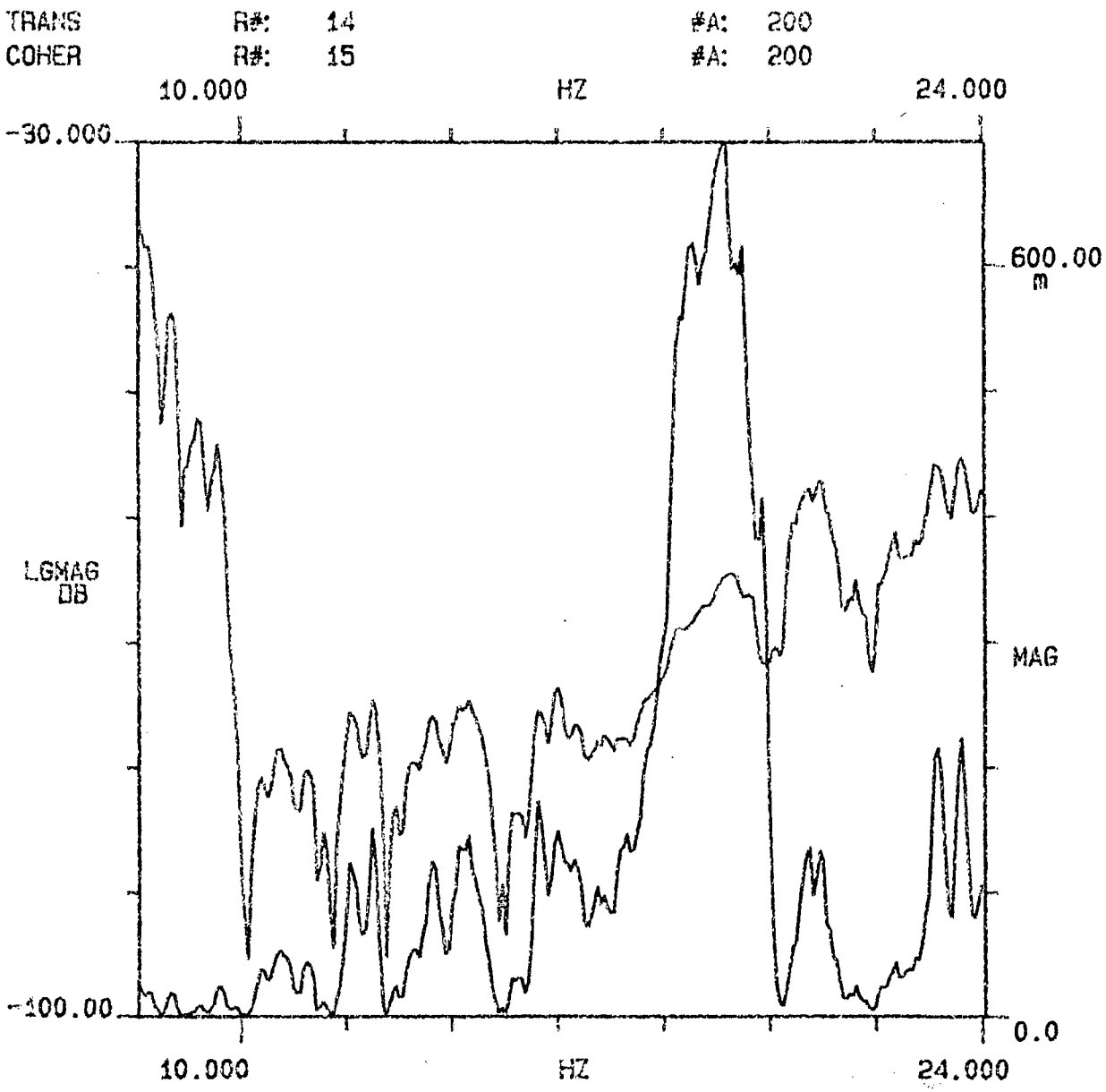

SINE 10-20 HZ. RESPONSE D-3-Y

X: 14.600 Y: 15.473 m

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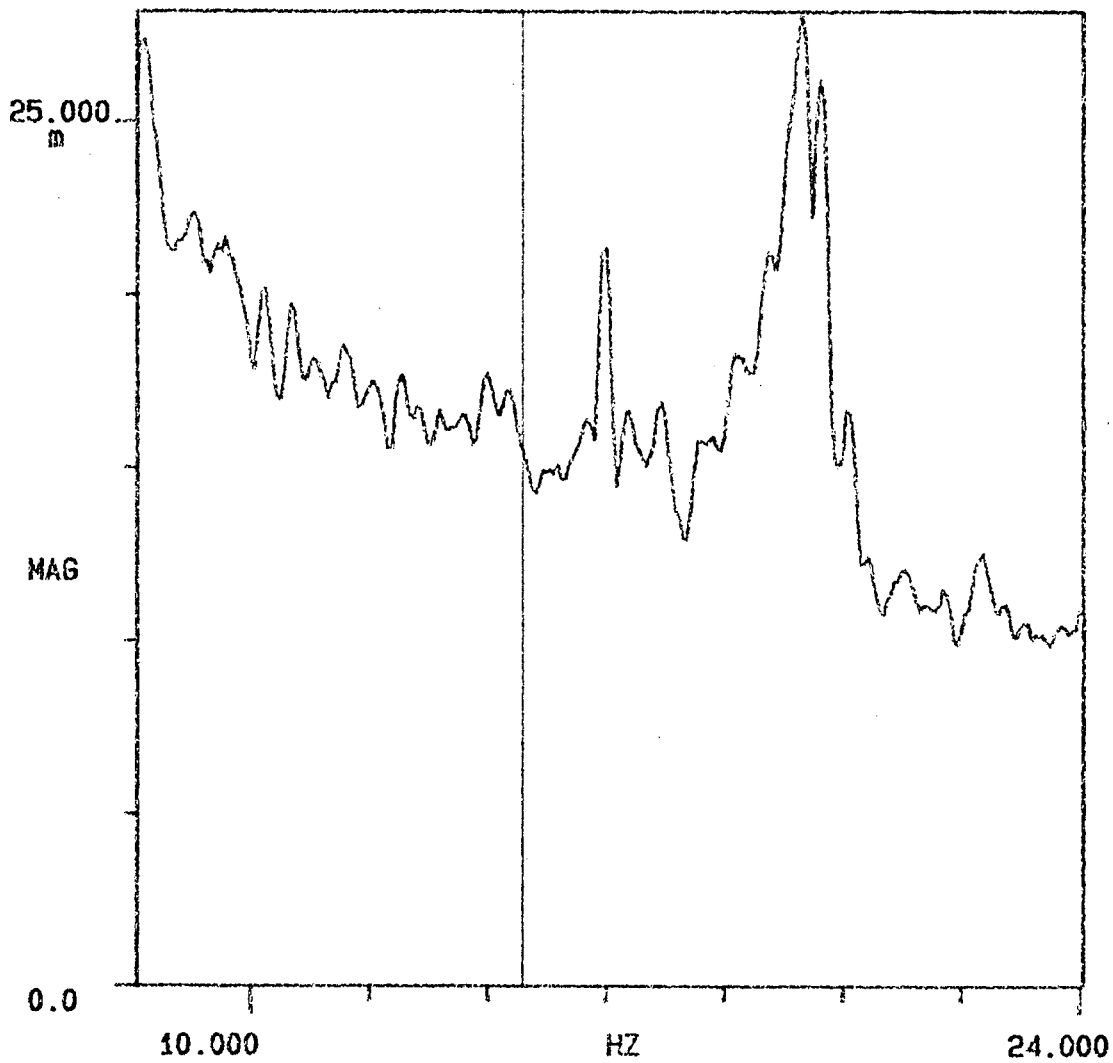
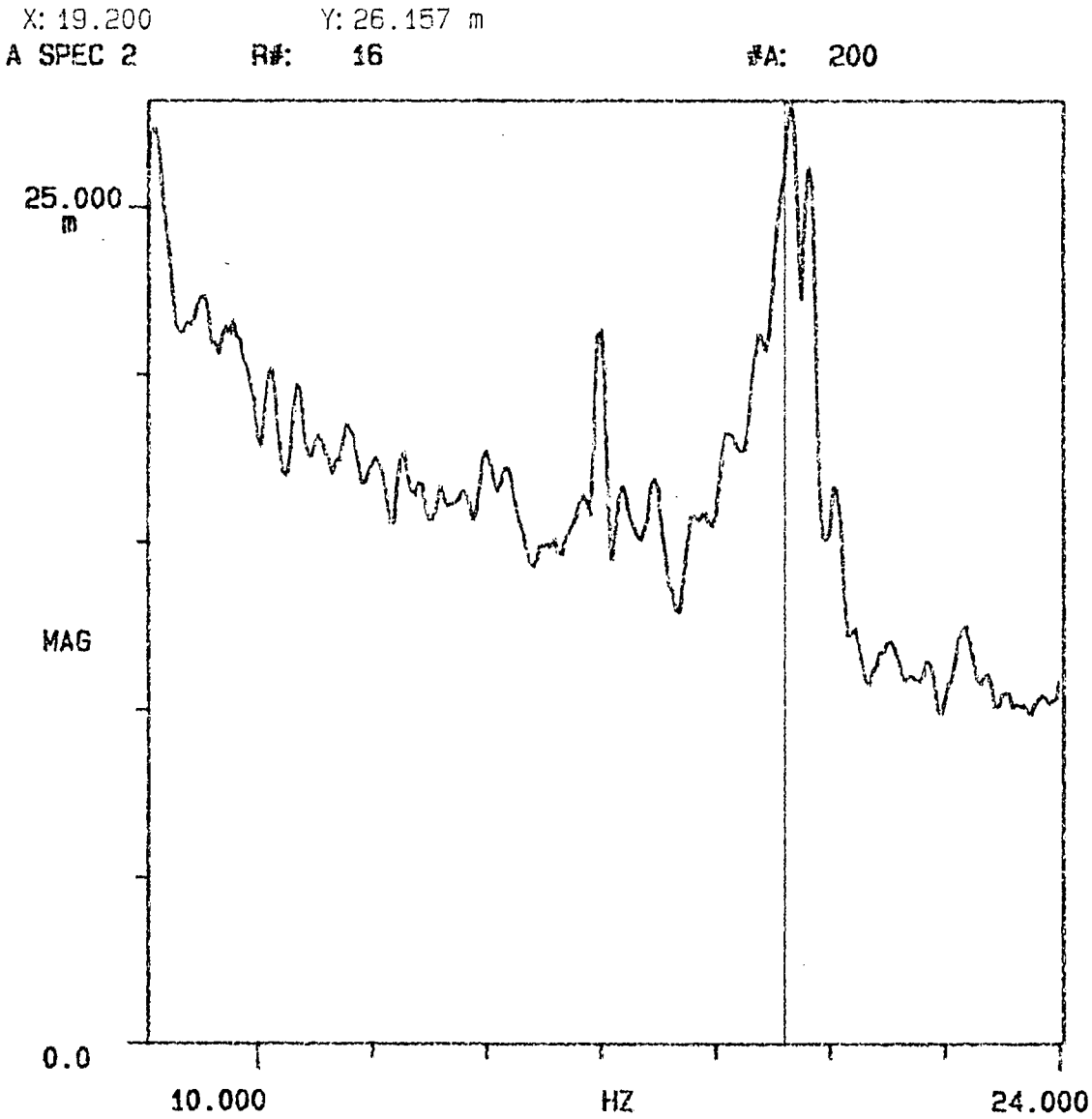
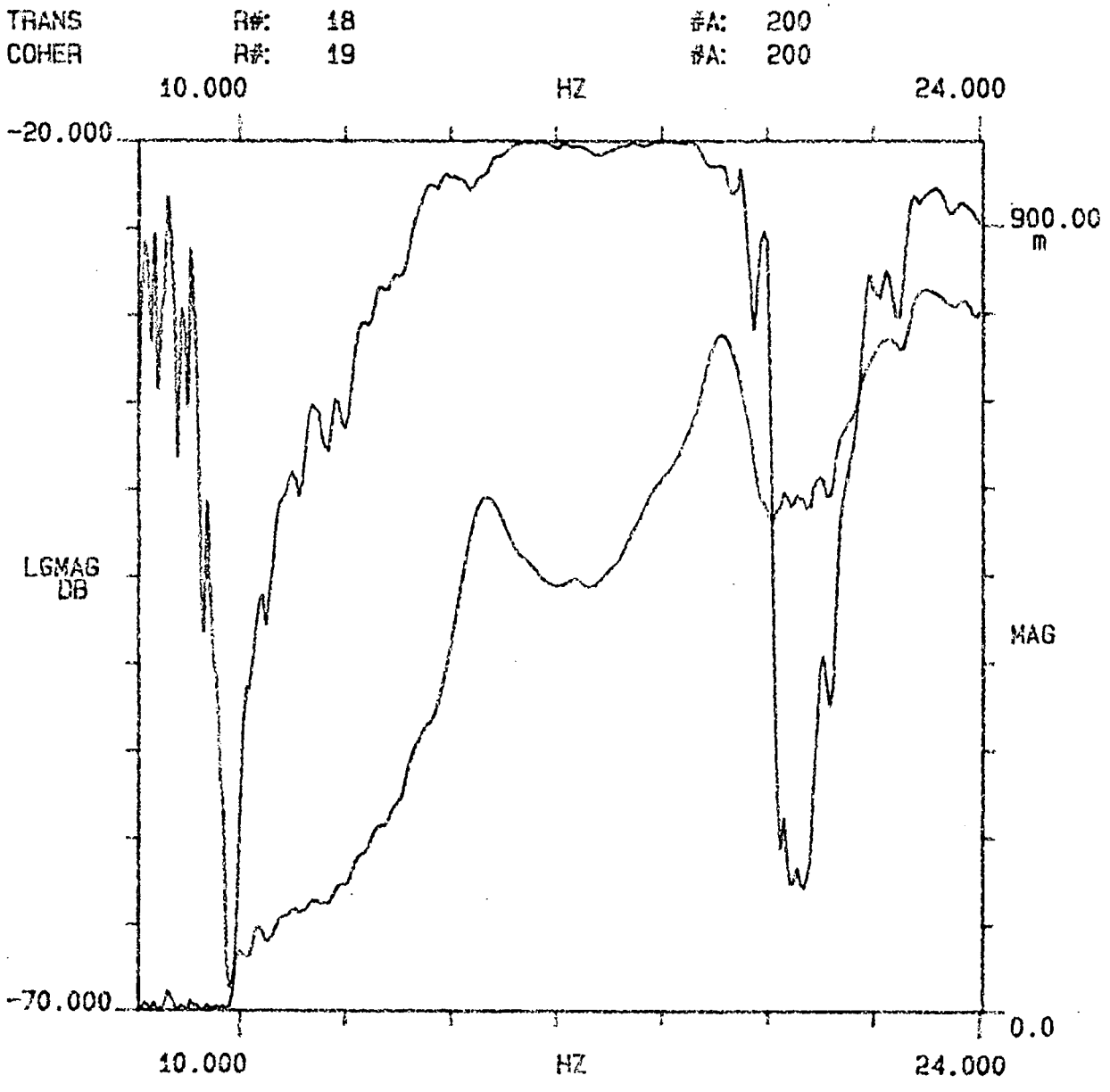


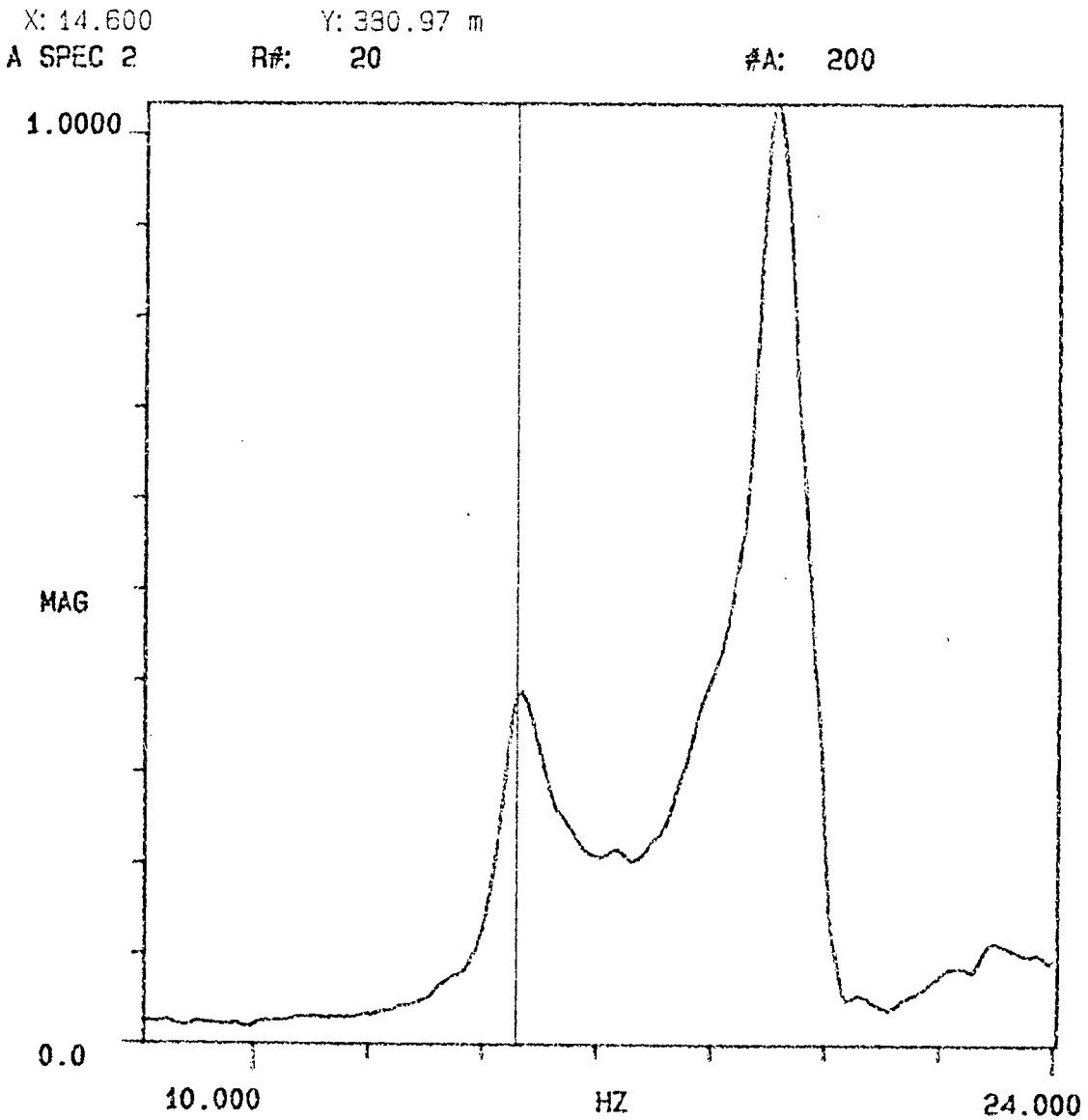
SINE 10-20 HZ. RESPONSE D-3-Y



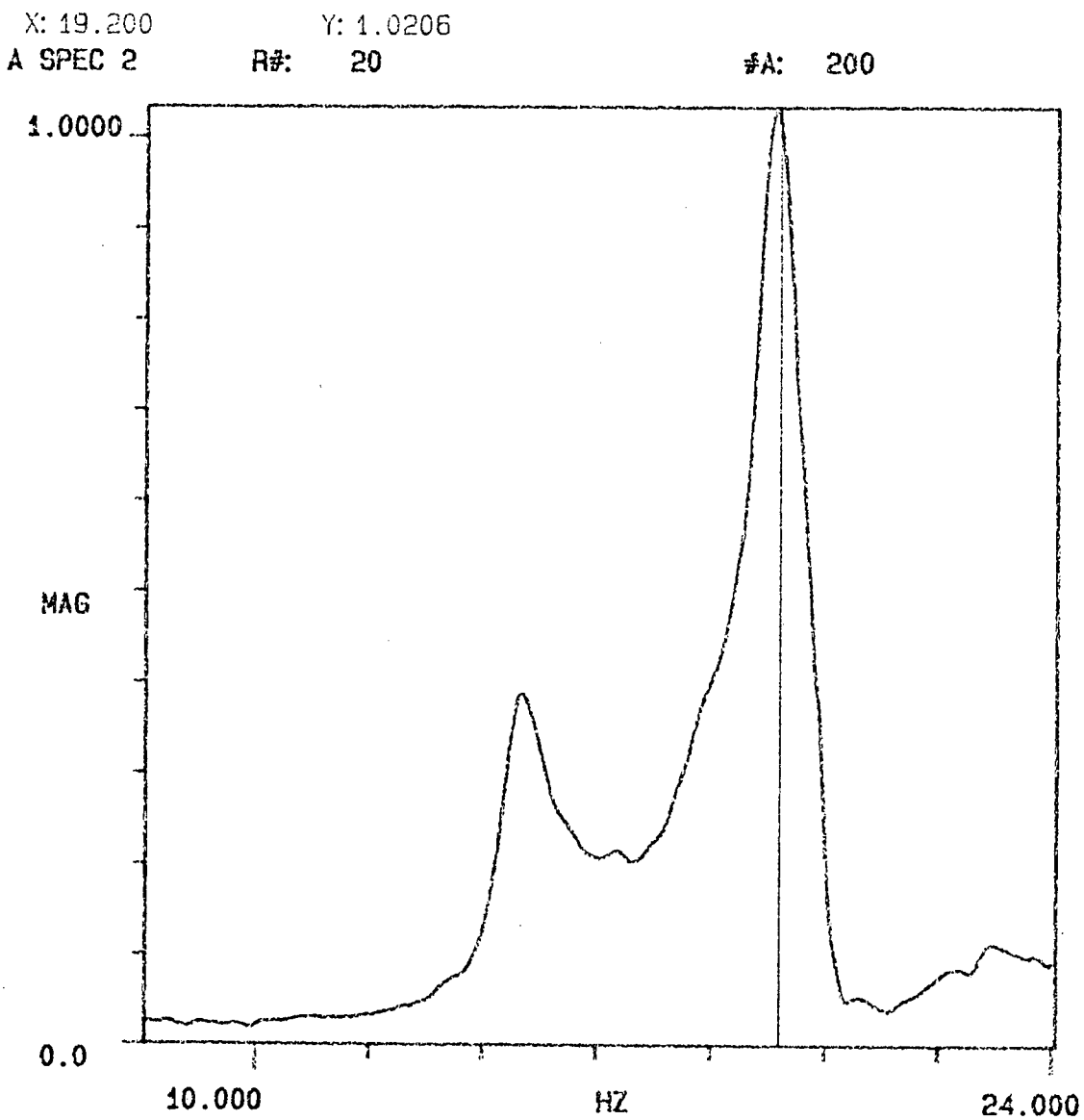
SINE 10-20 HZ. RESPONSE D-3-Y



SINE 10-20 HZ. RESPONSE E-1-X



SINE 10-20 HZ. RESPONSE E-1-X



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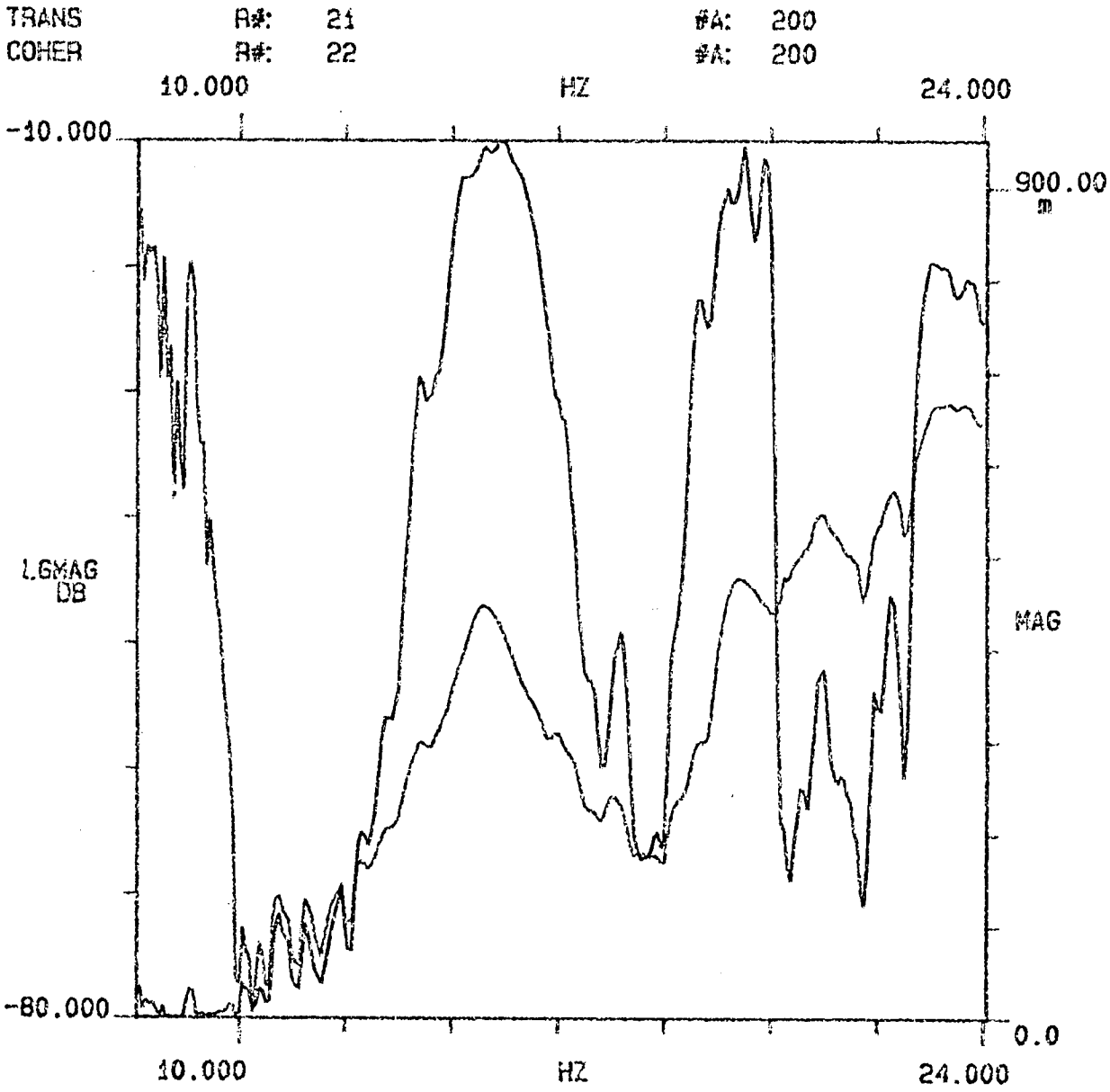

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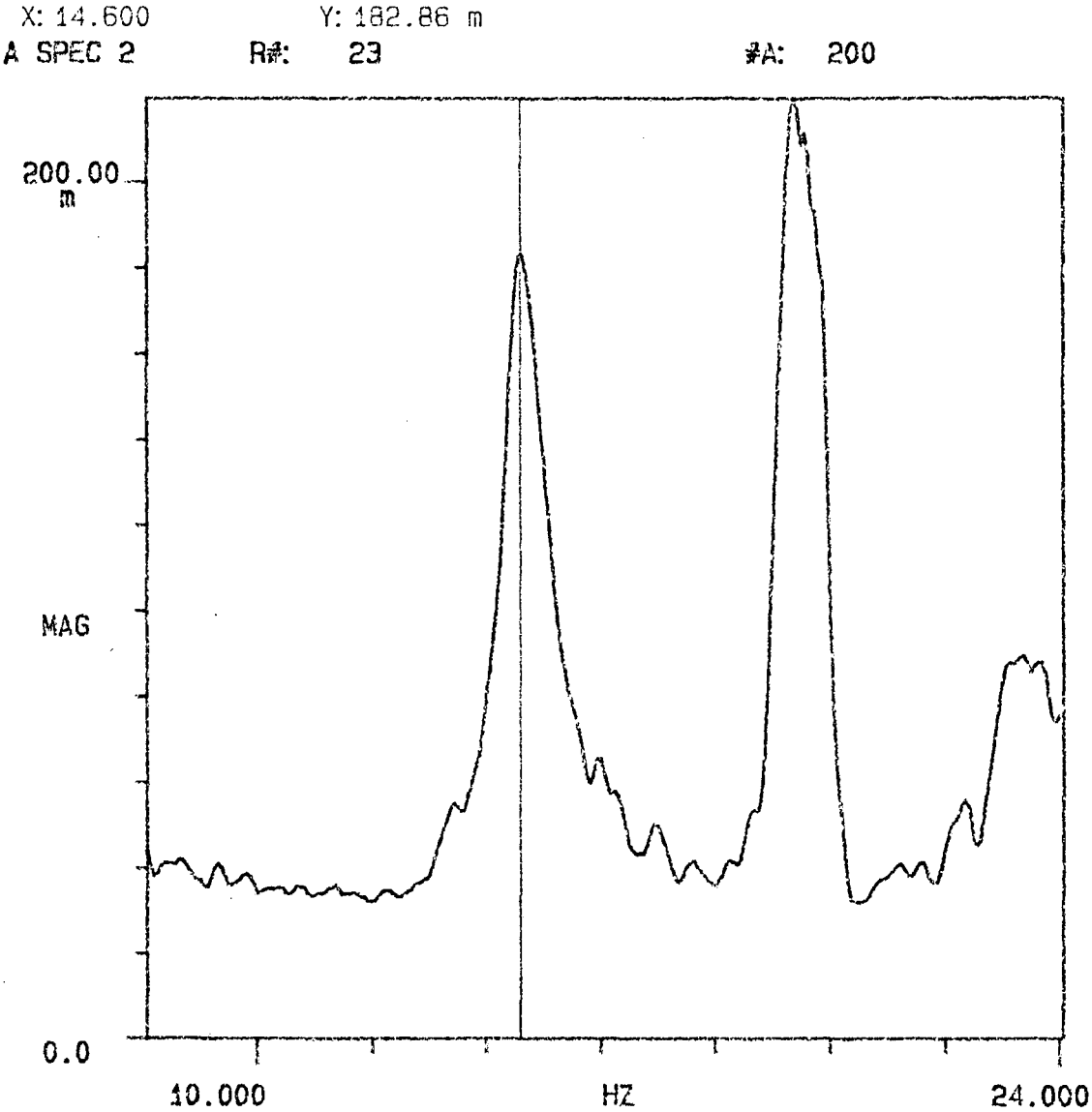

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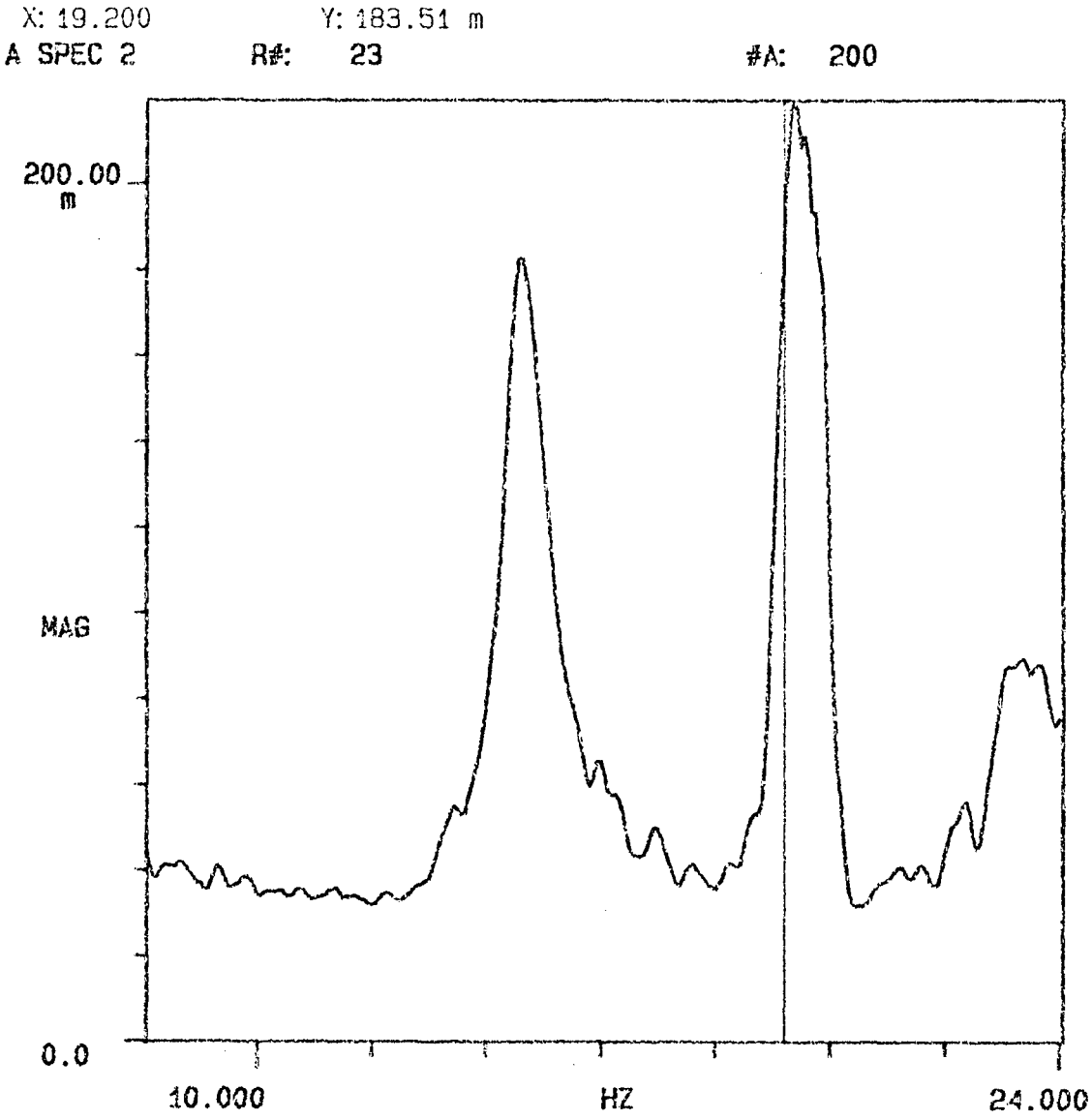
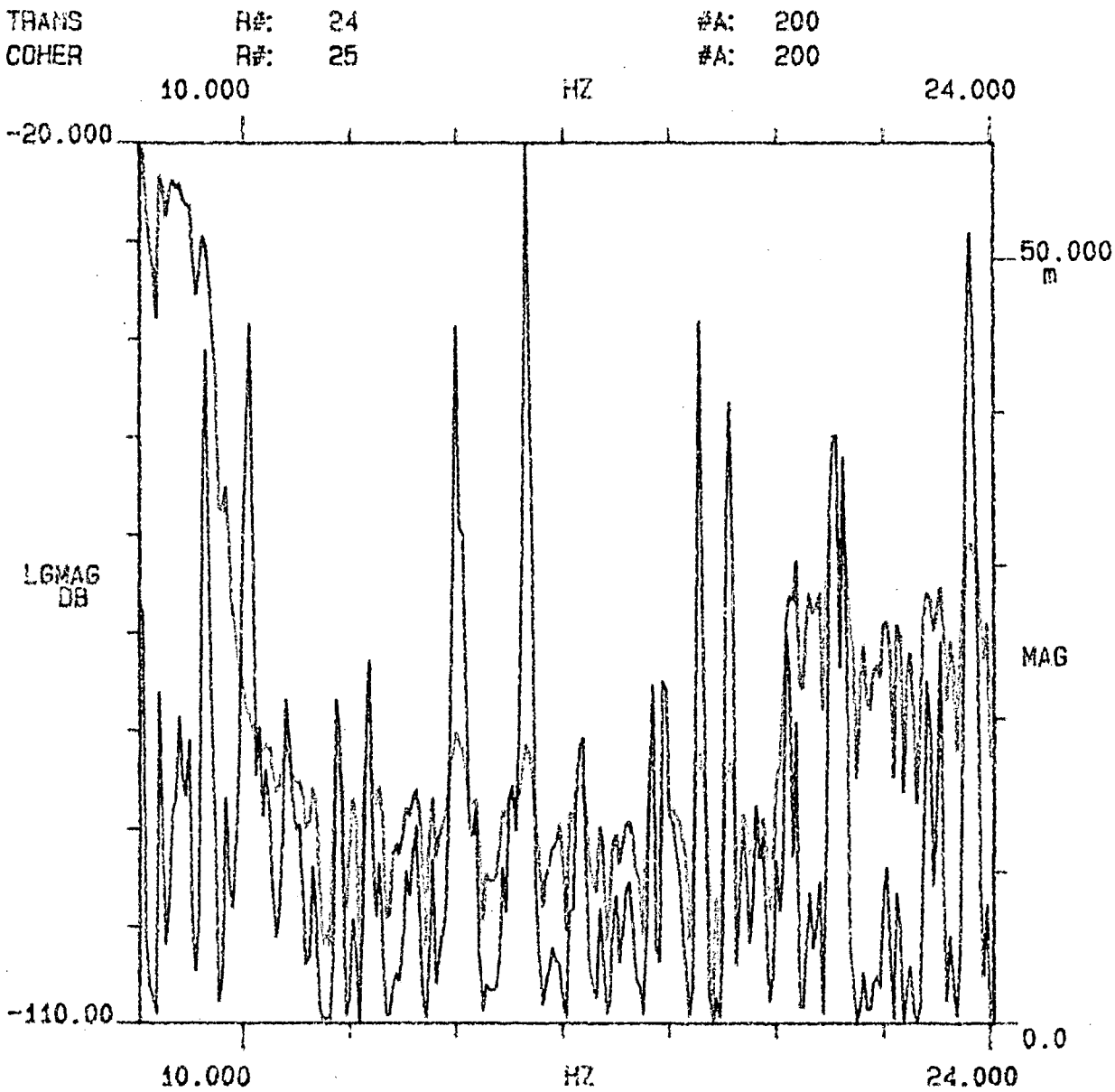


SINE 10-20 HZ. RESPONSE E-1-Y



SINE 10-20 HZ. RESPONSE E-2-X

X: 14.600 Y: 14.819 m

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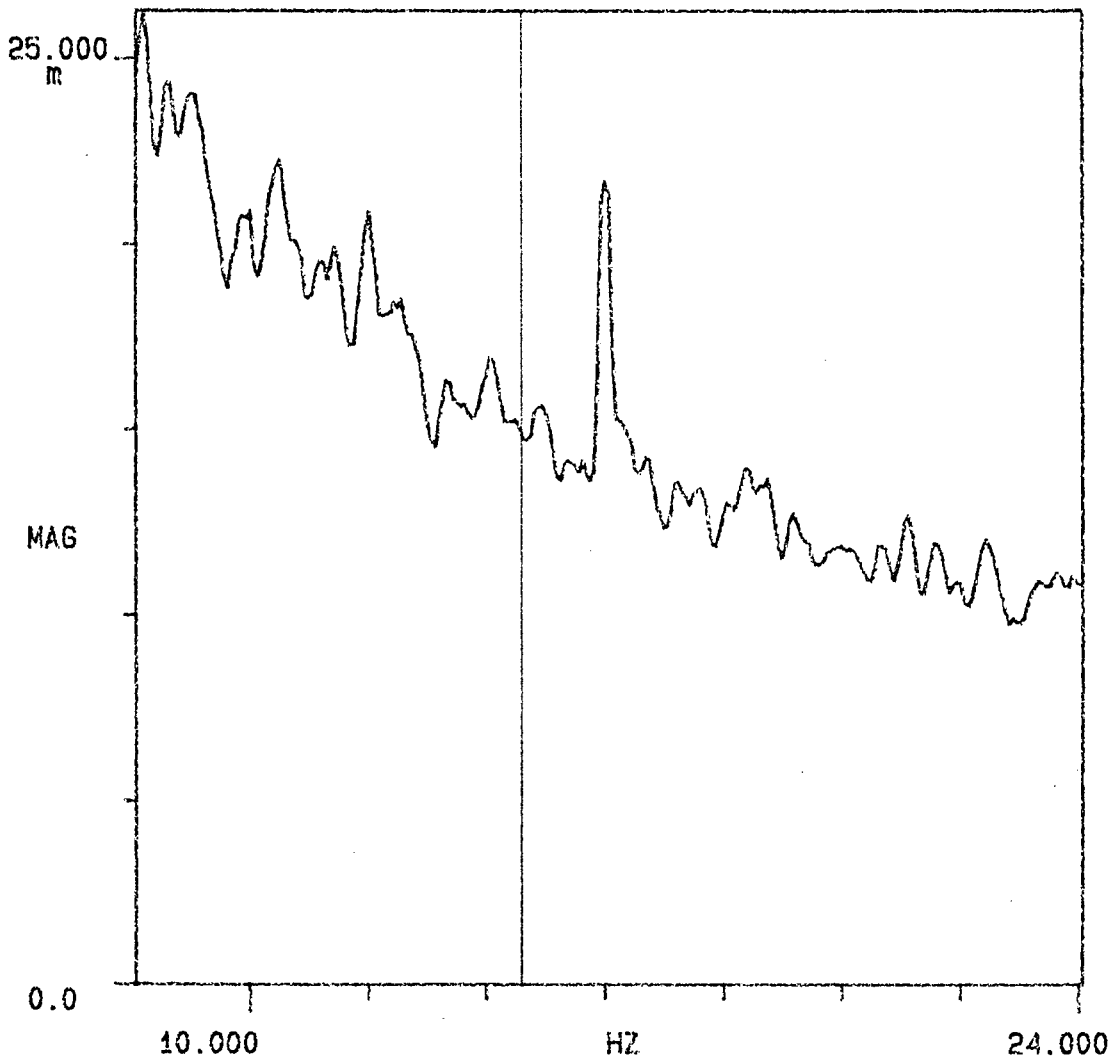
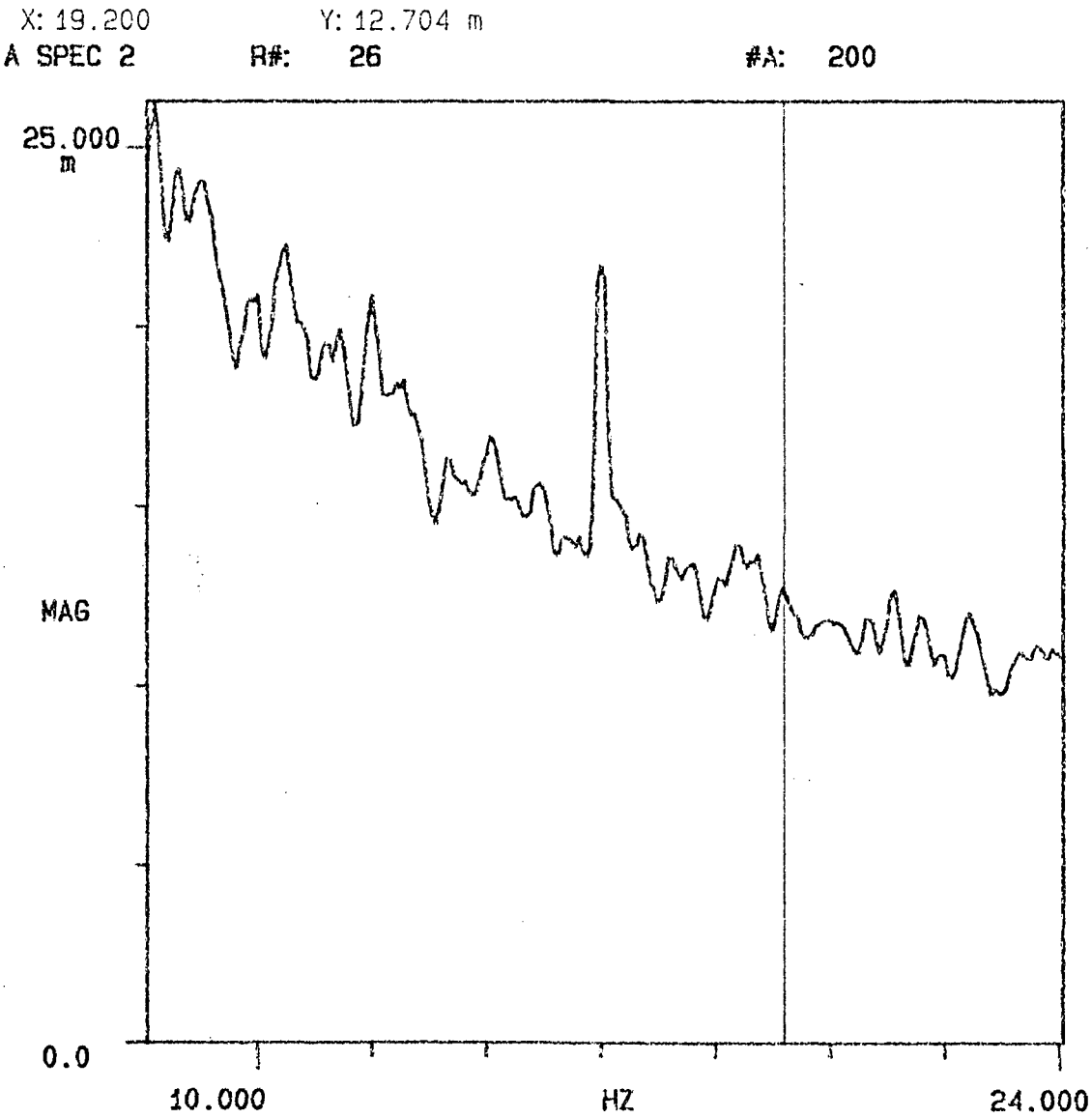
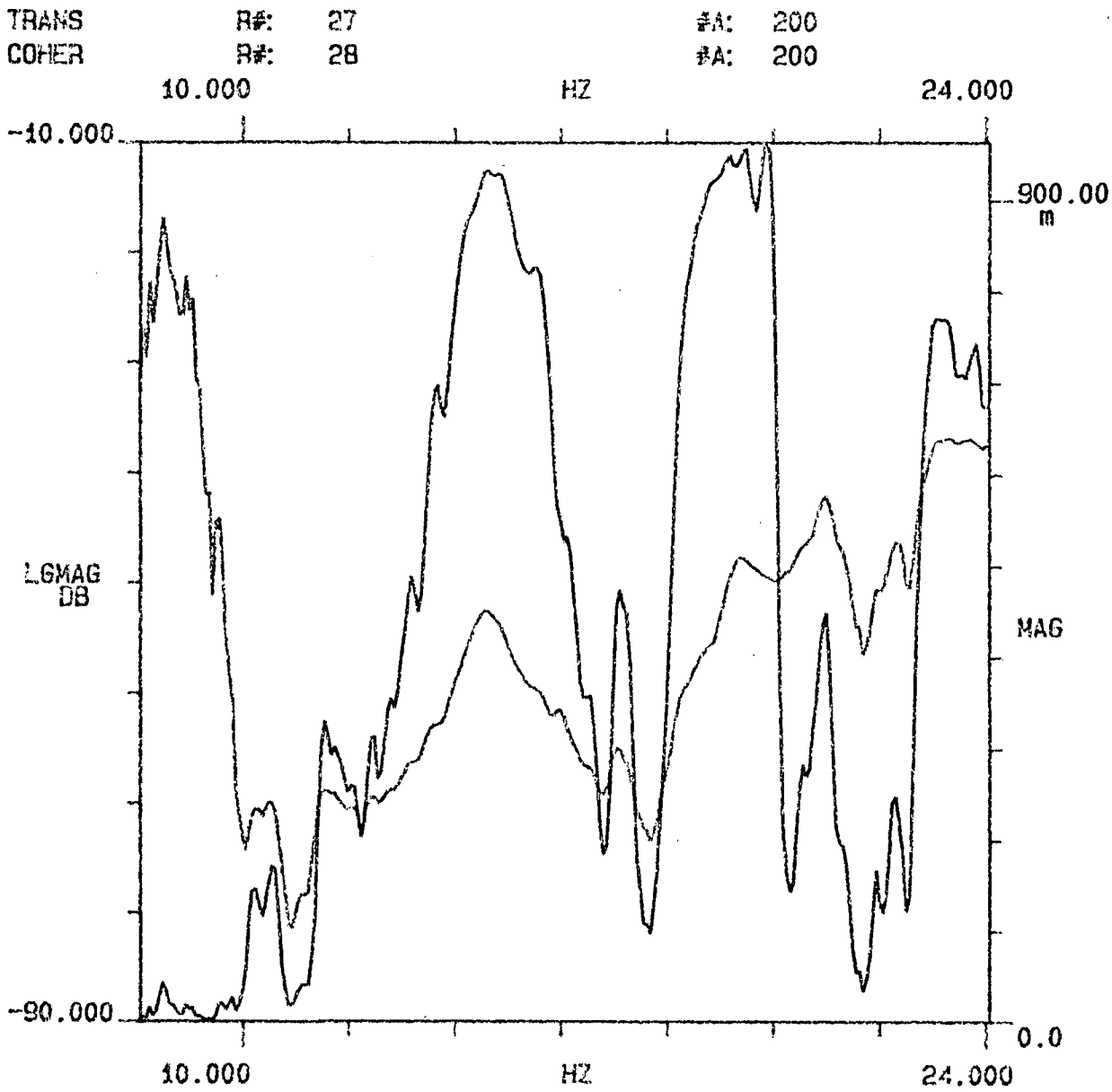


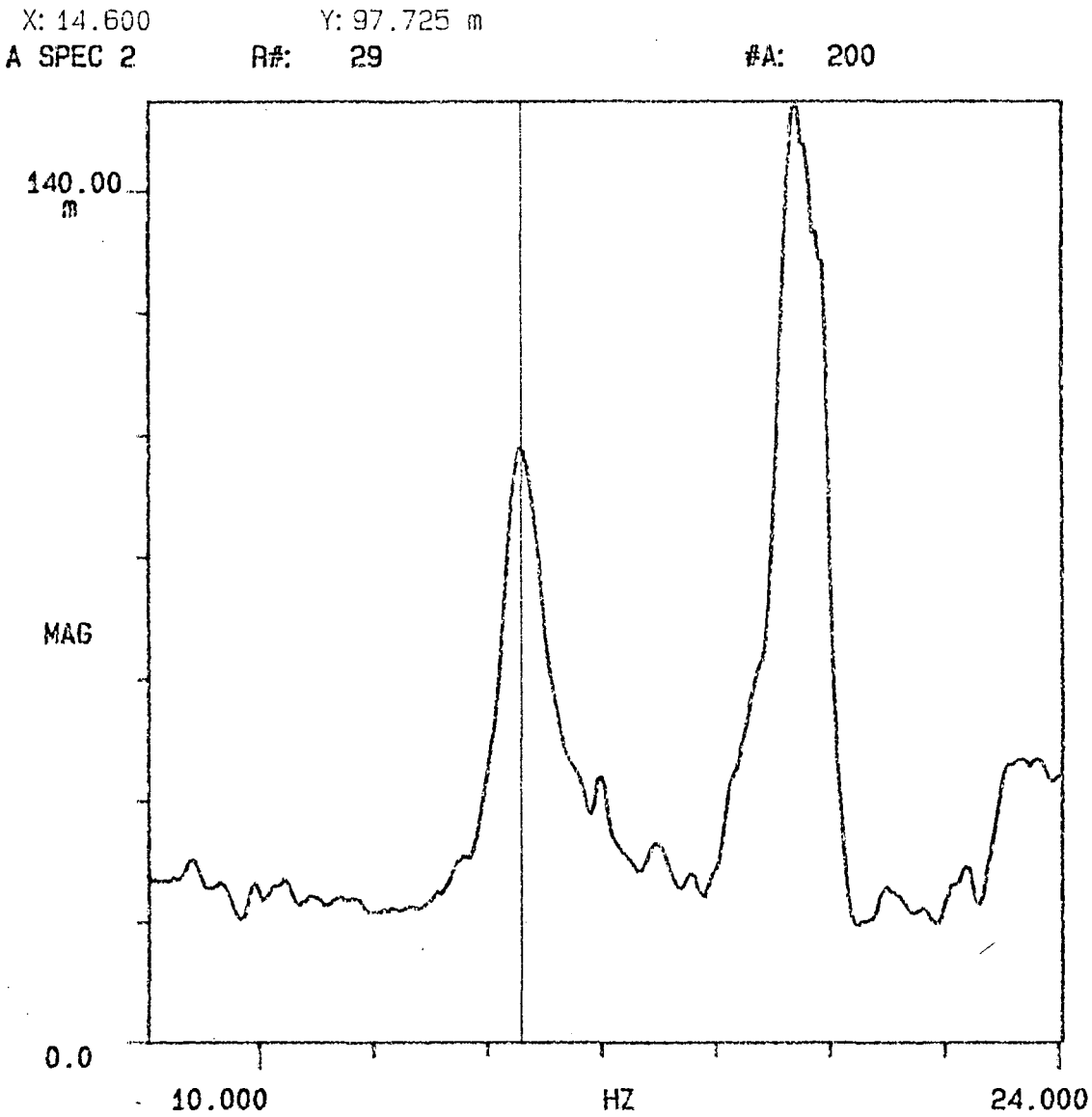
SINE 10-20 HZ. RESPONSE E-2-X



SINE 10-20 HZ. RESPONSE E-2-X



SINE 10-20 HZ. RESPONSE E-2-Y



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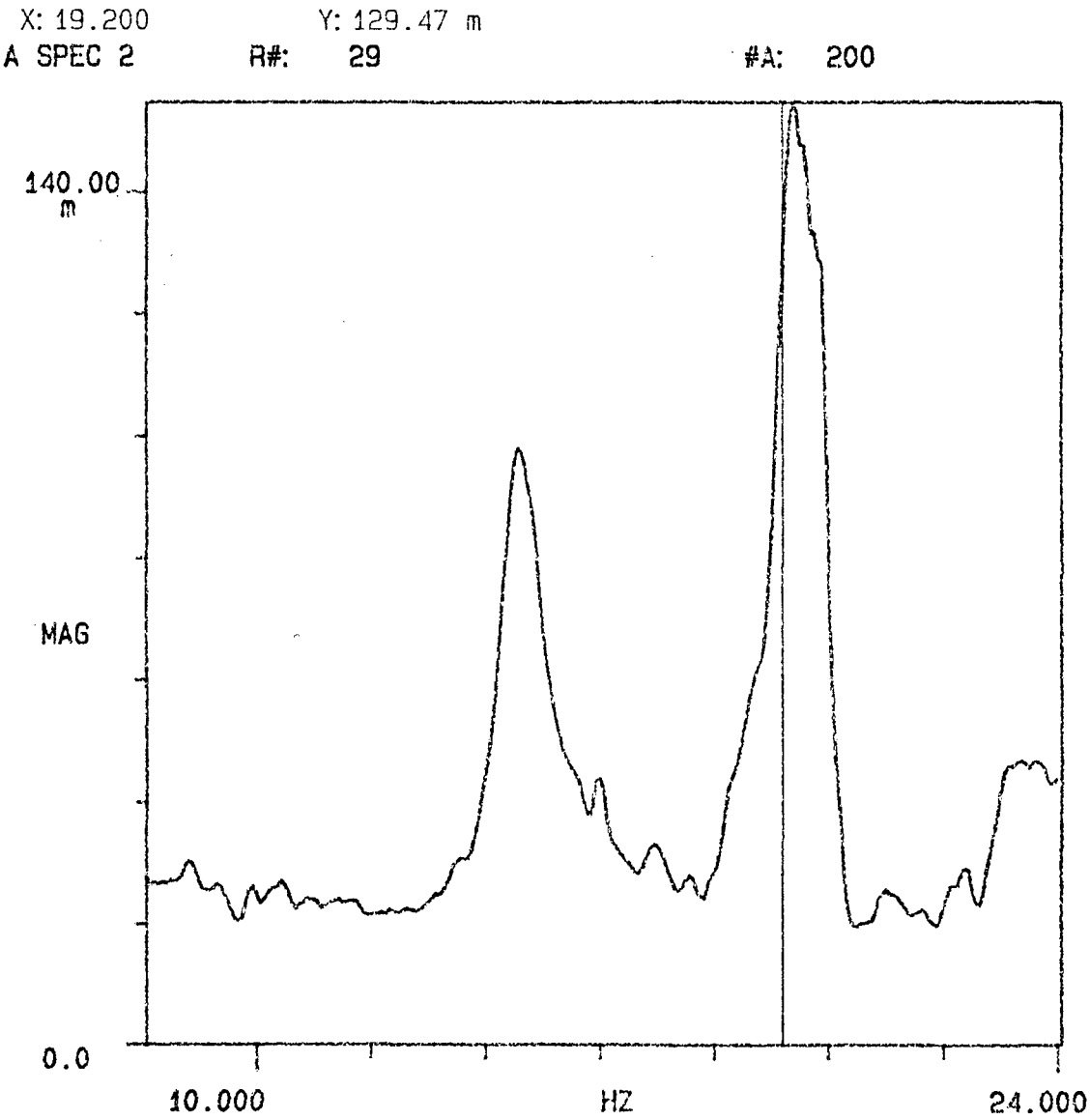

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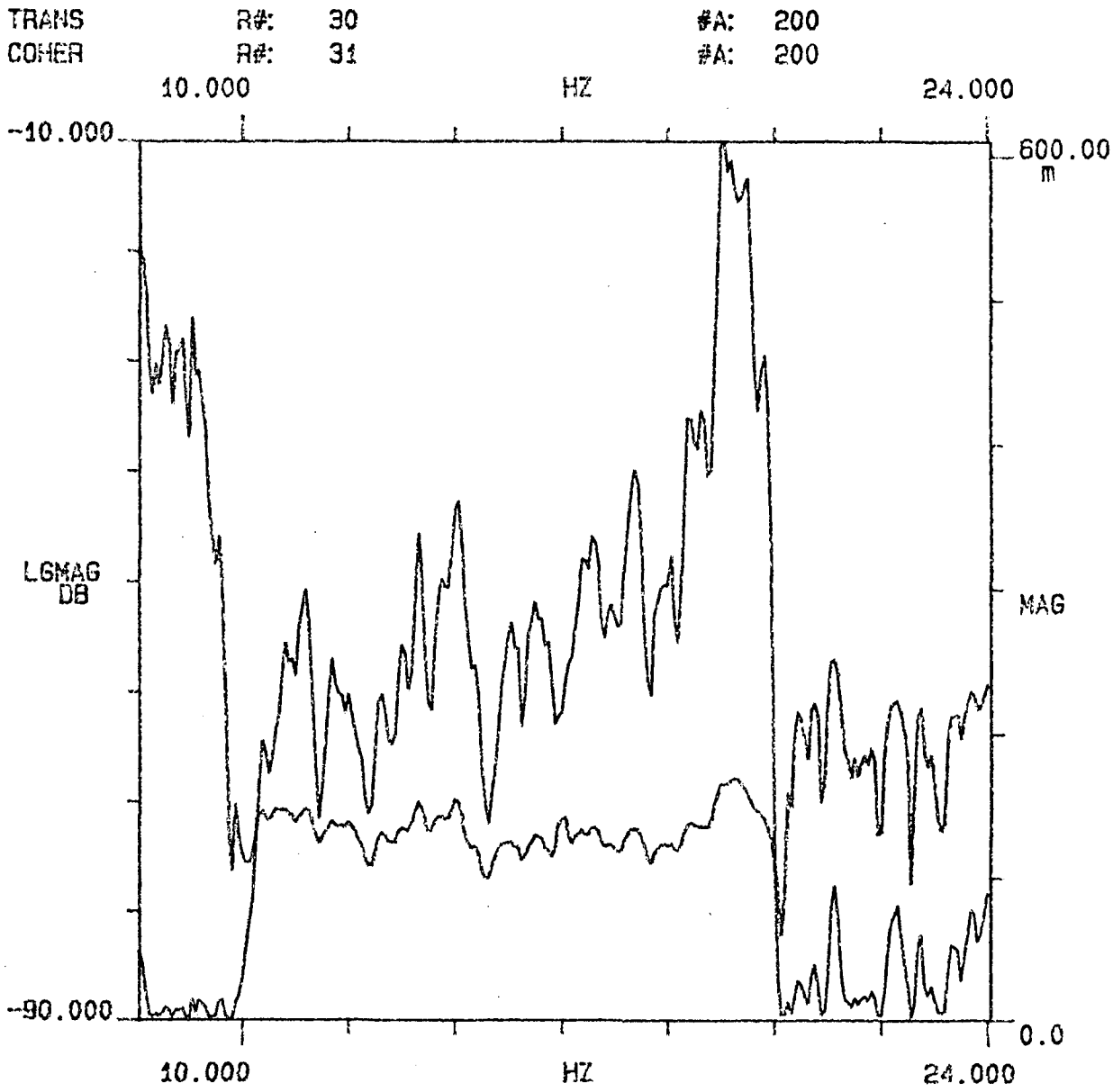

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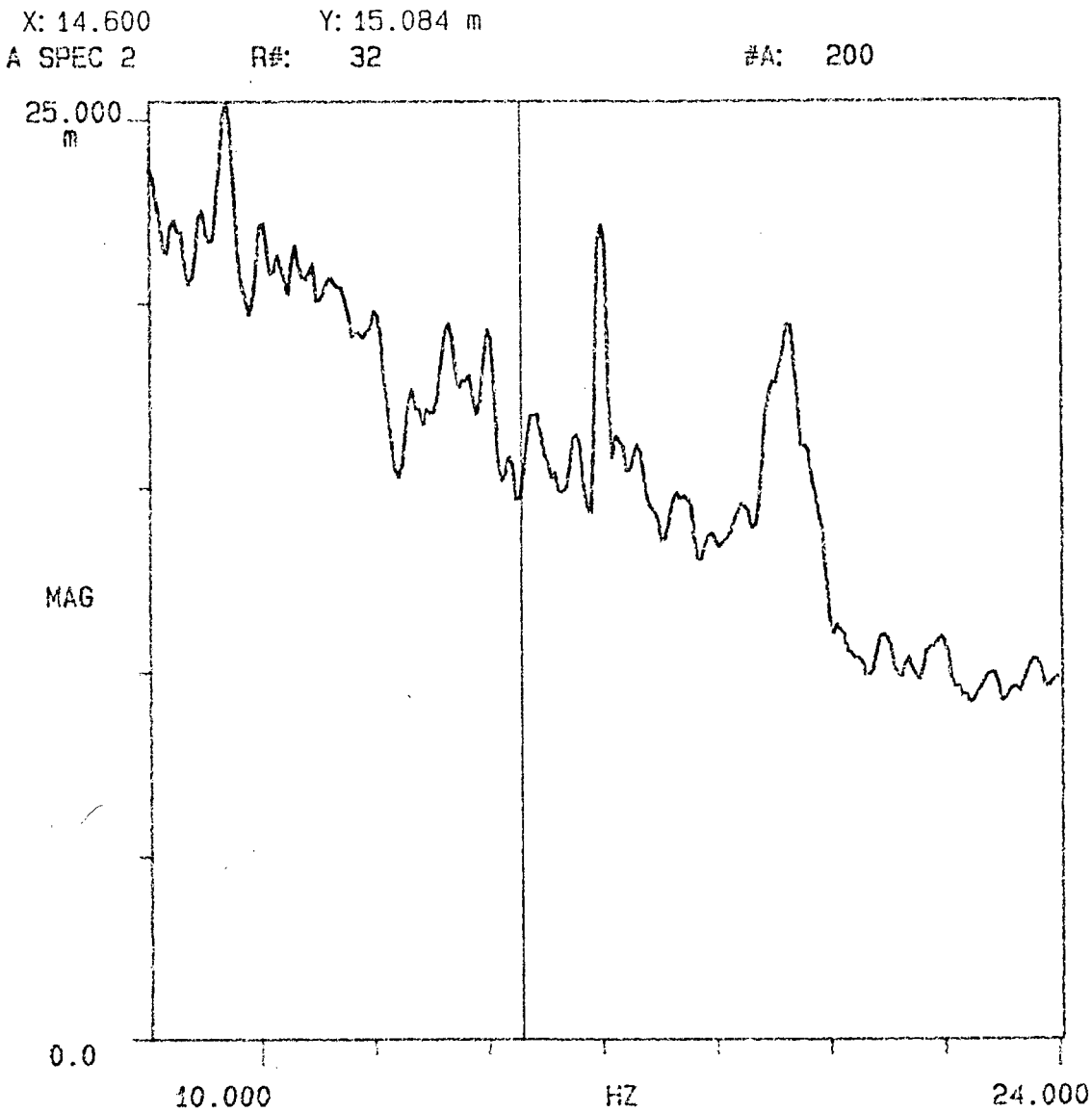
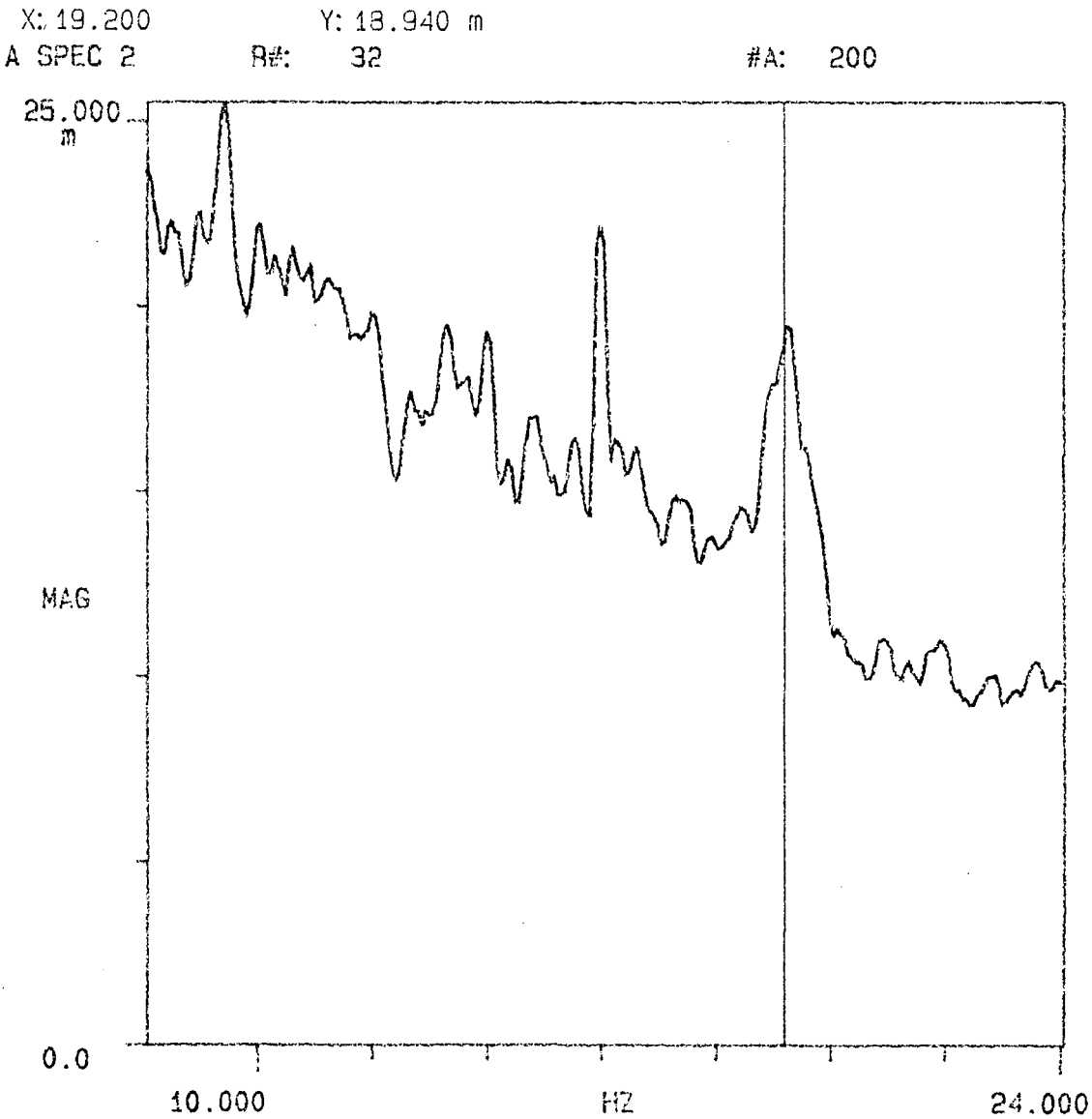


SINE 10-20 HZ. RESPONSE E-3-X



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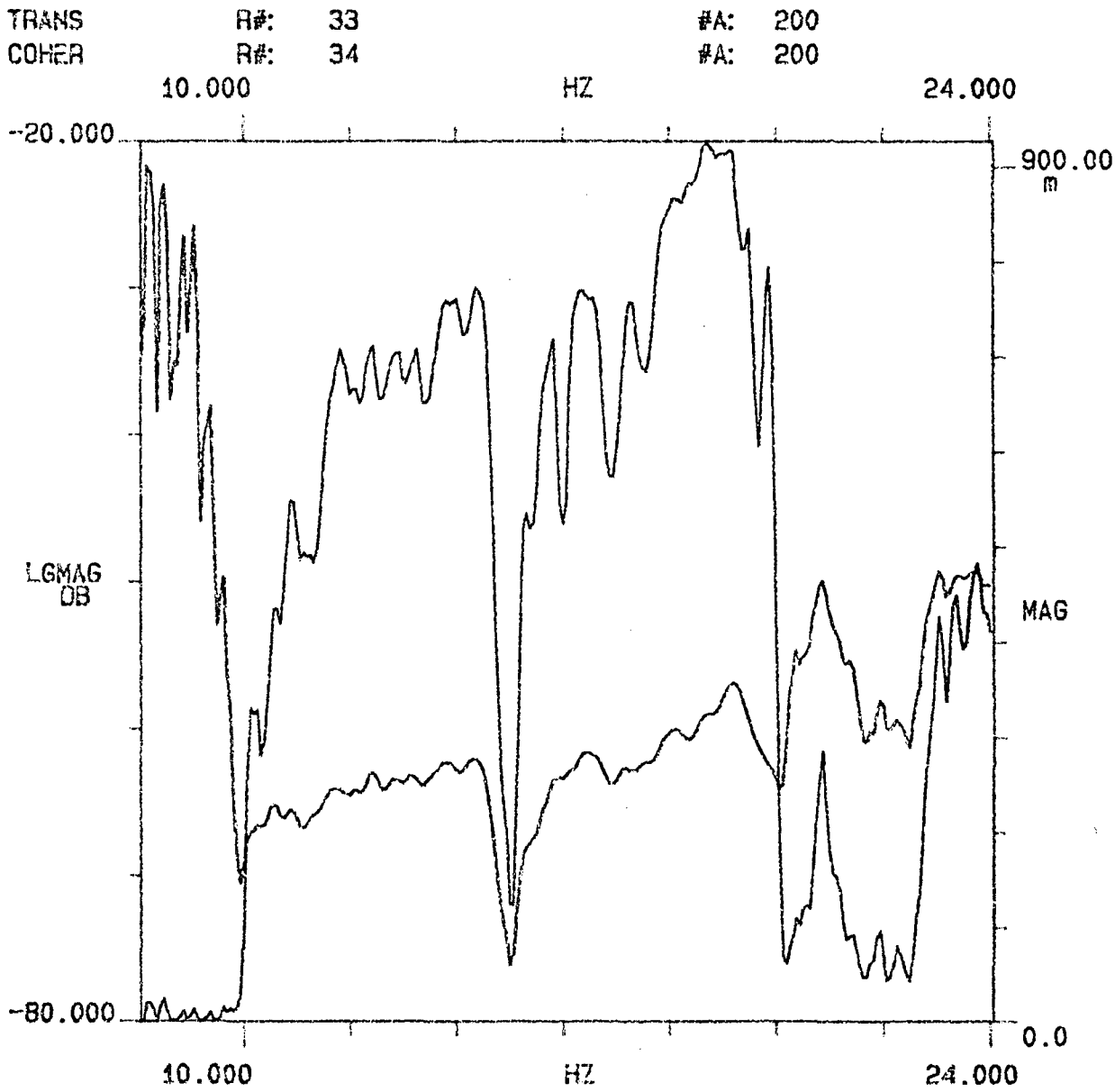

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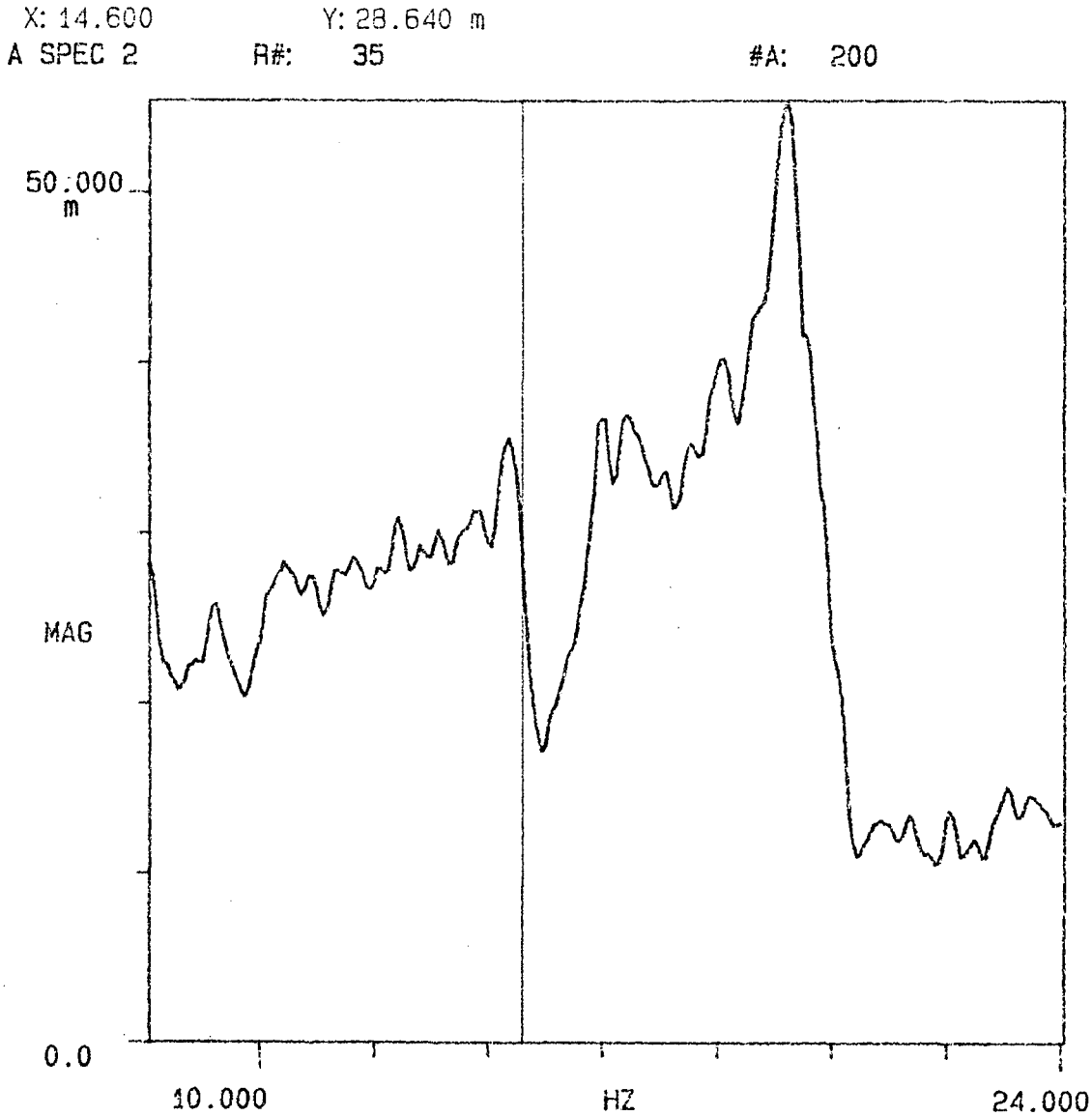

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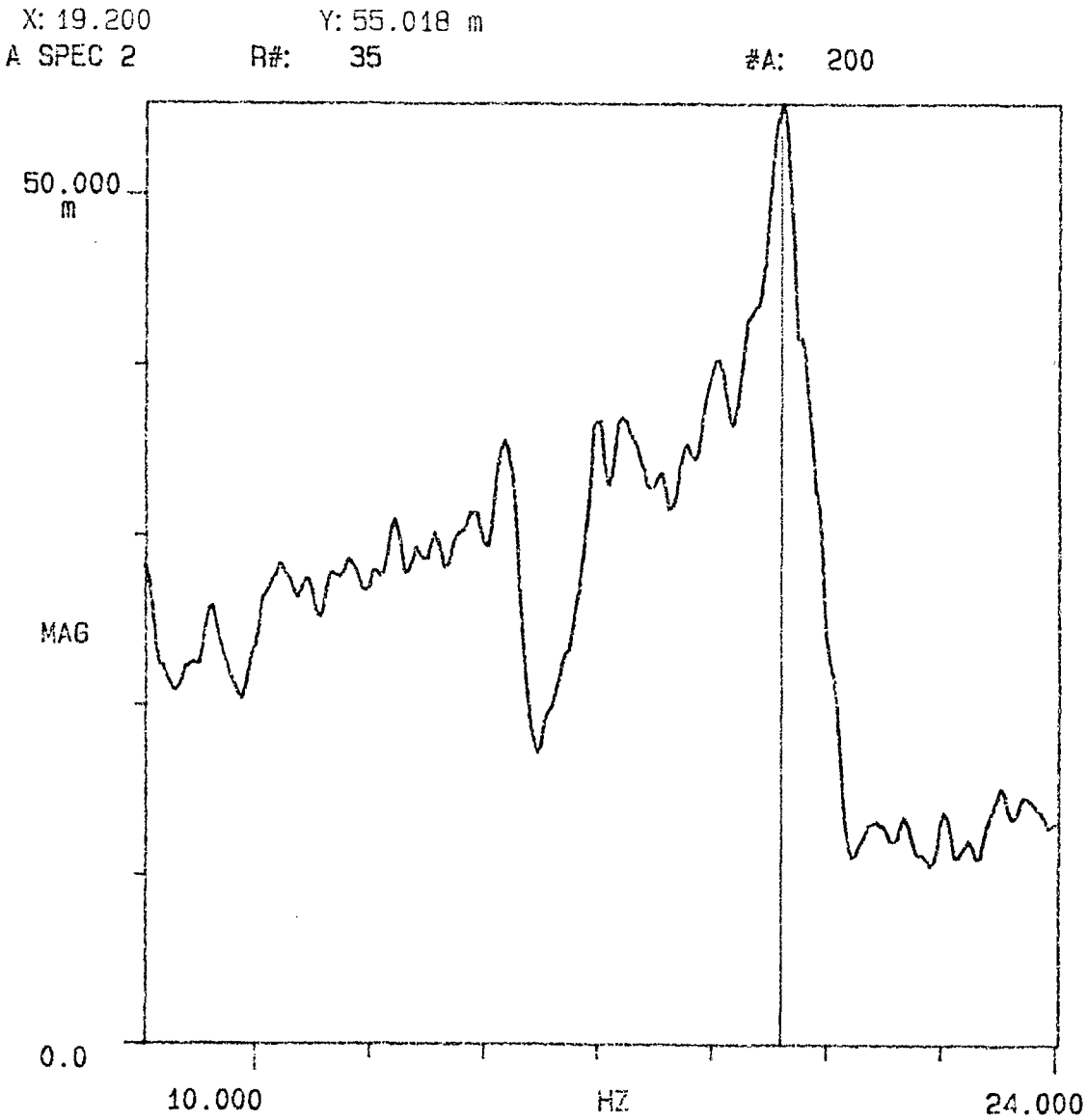

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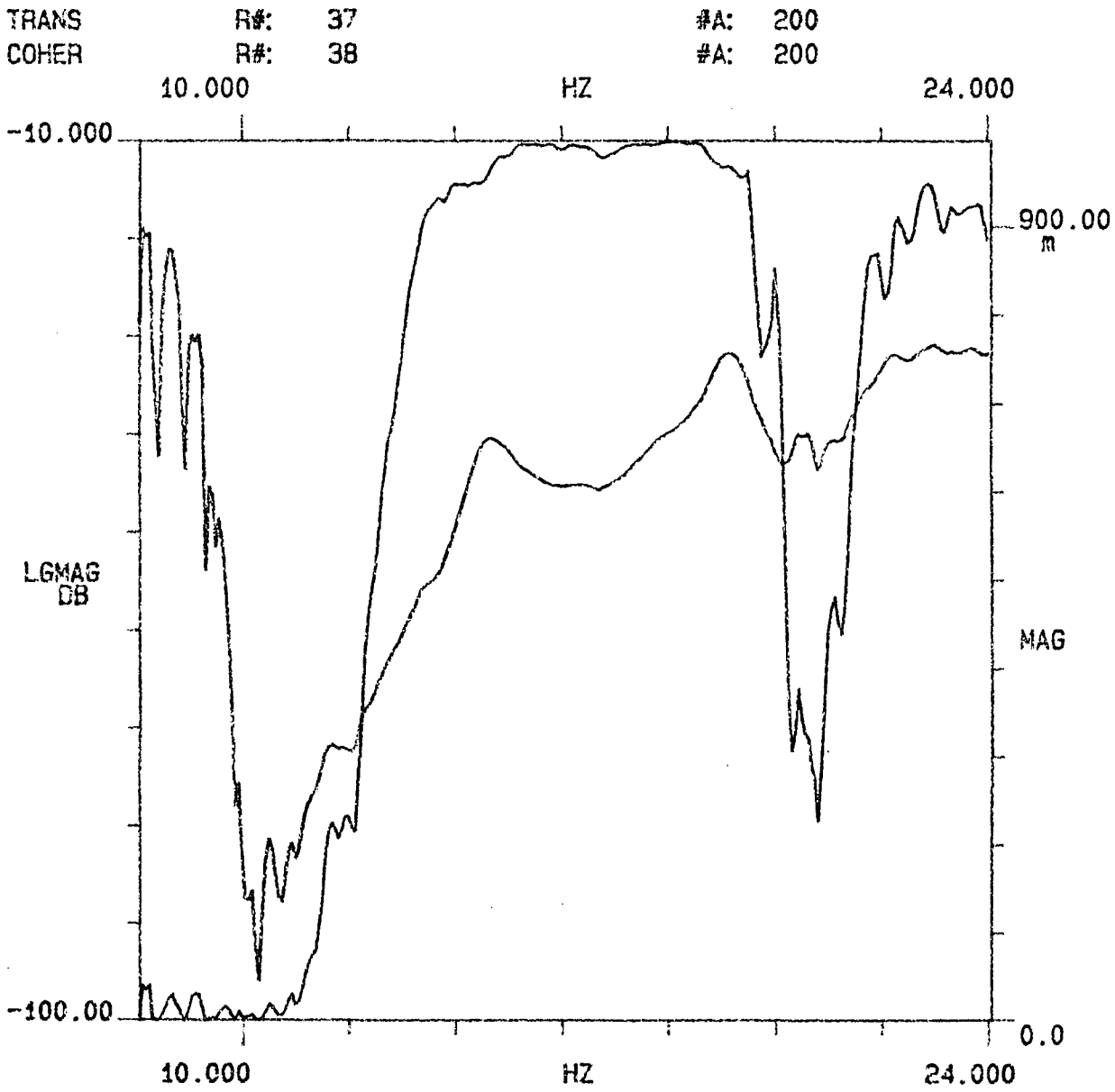
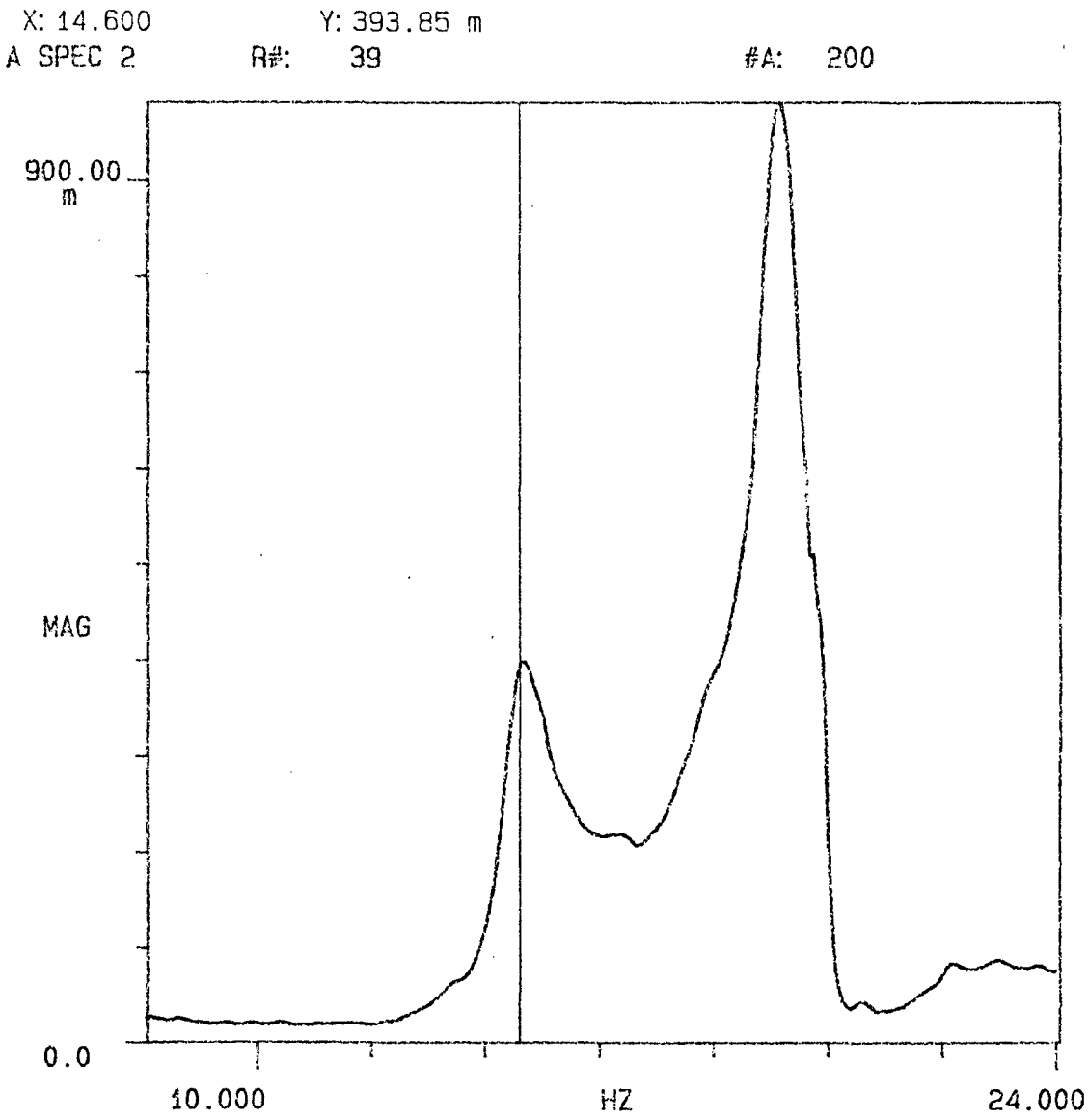
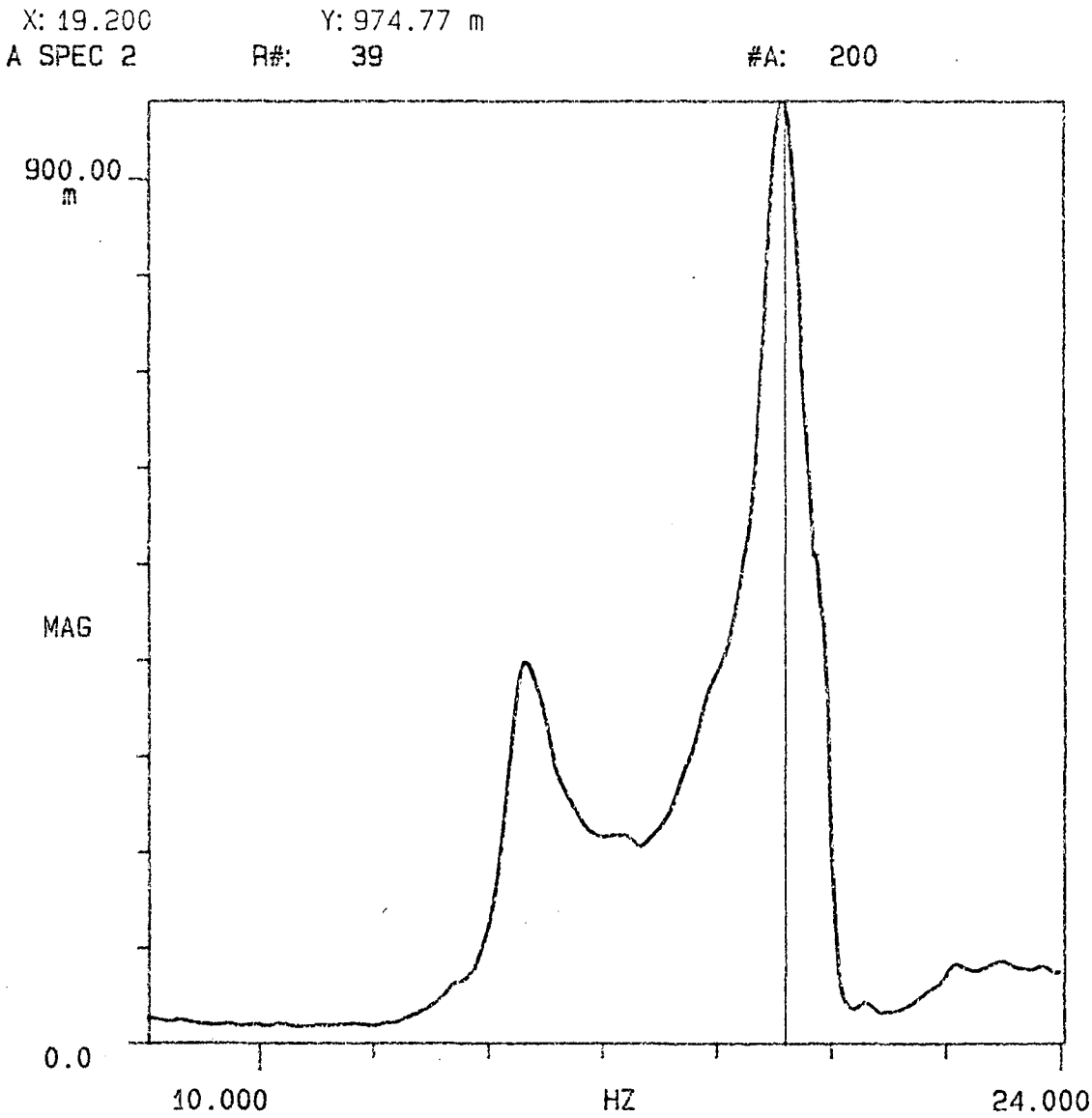


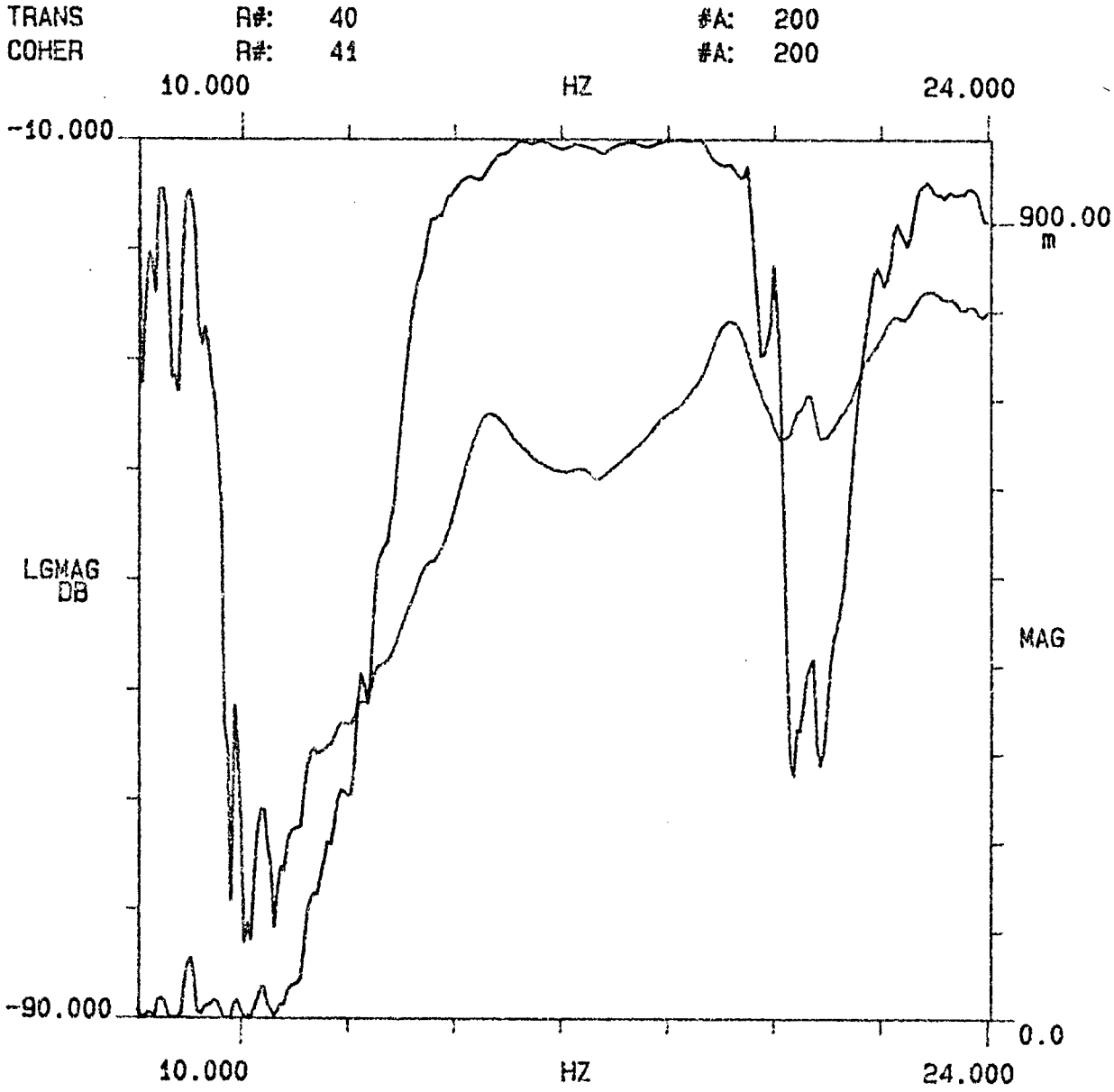
SINE 10-20 HZ. RESPONSE F-1-X



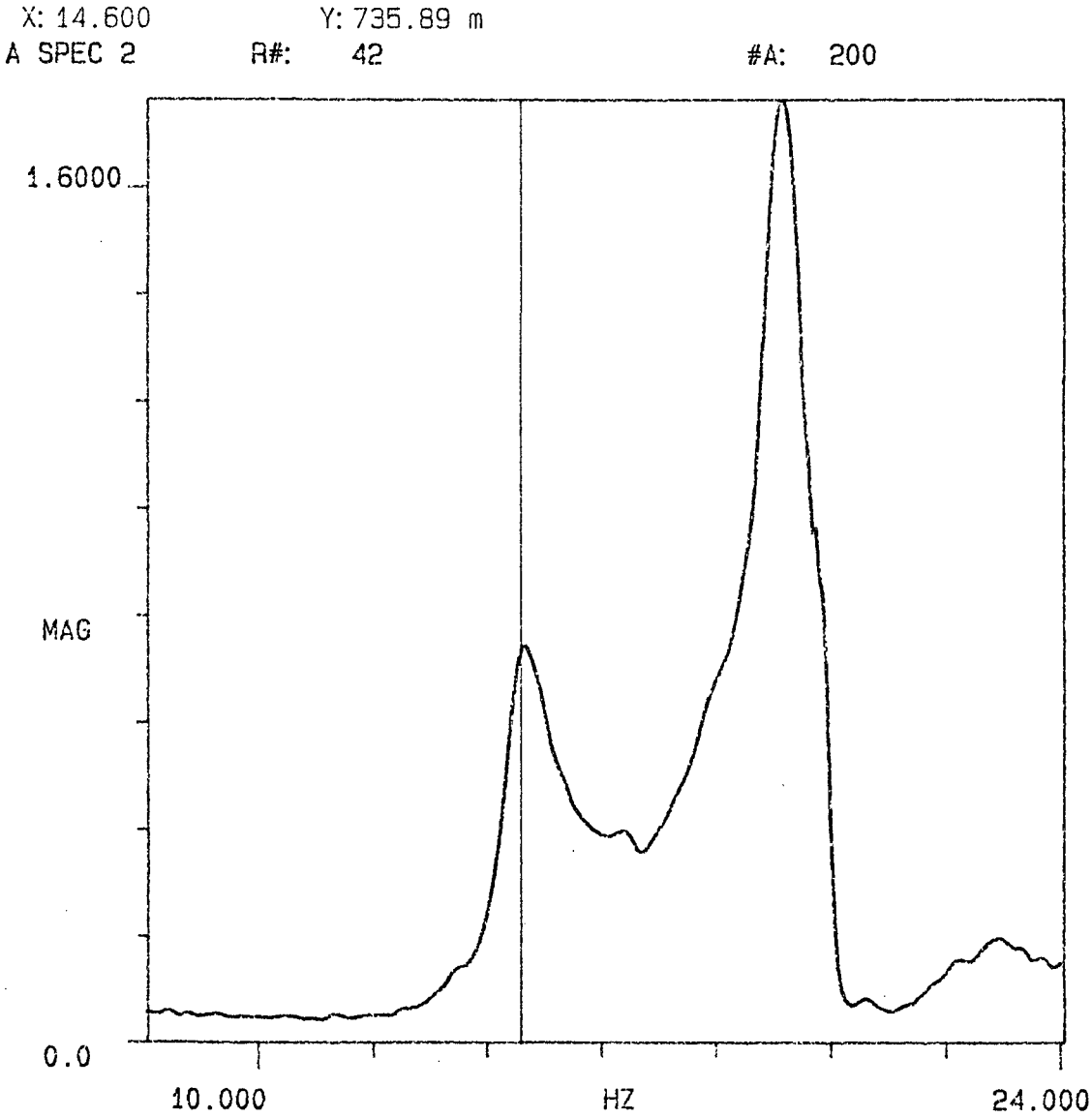
SINE 10-20 HZ. RESPONSE F-1-X



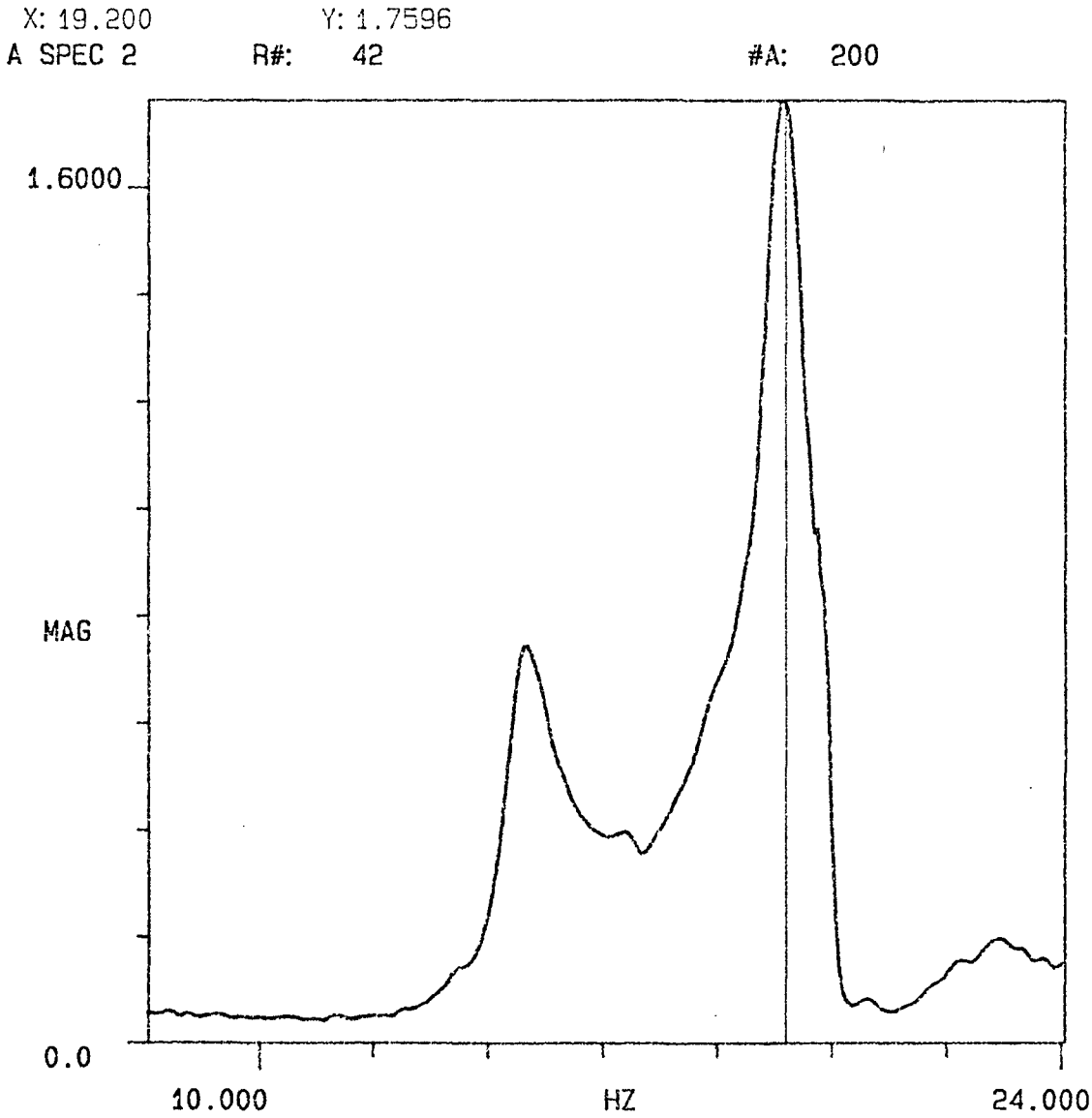
SINE 10-20 HZ. RESPONSE F-1-X



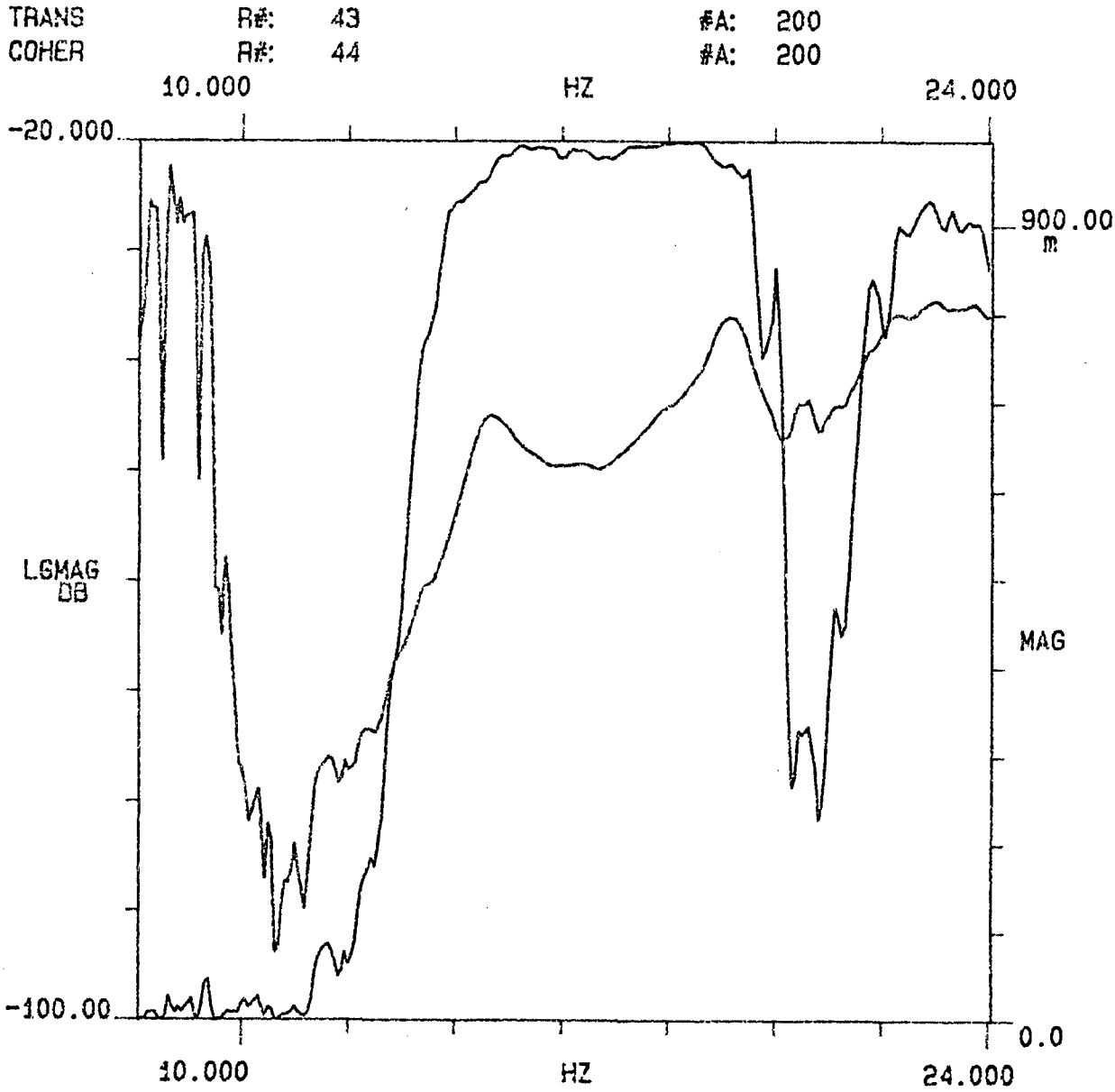
SINE 10-20 HZ. RESPONSE F-1-Y



SINE 10-20 HZ. RESPONSE F-1-Y



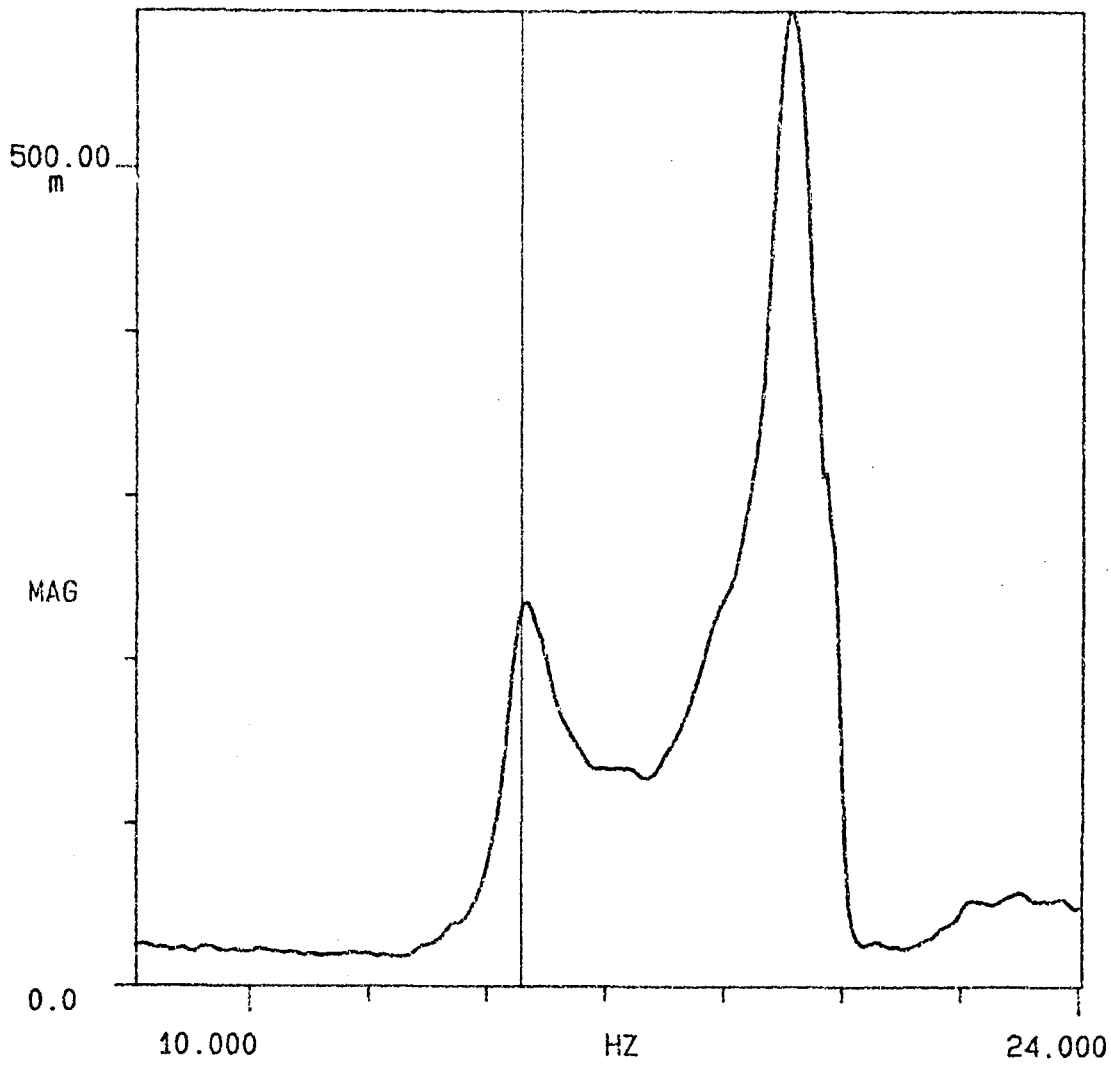
SINE 10-20 HZ. RESPONSE F-1-Y



SINE 10-20 HZ. RESPONSE F-2-X

X: 14.600 Y: 231.92 m

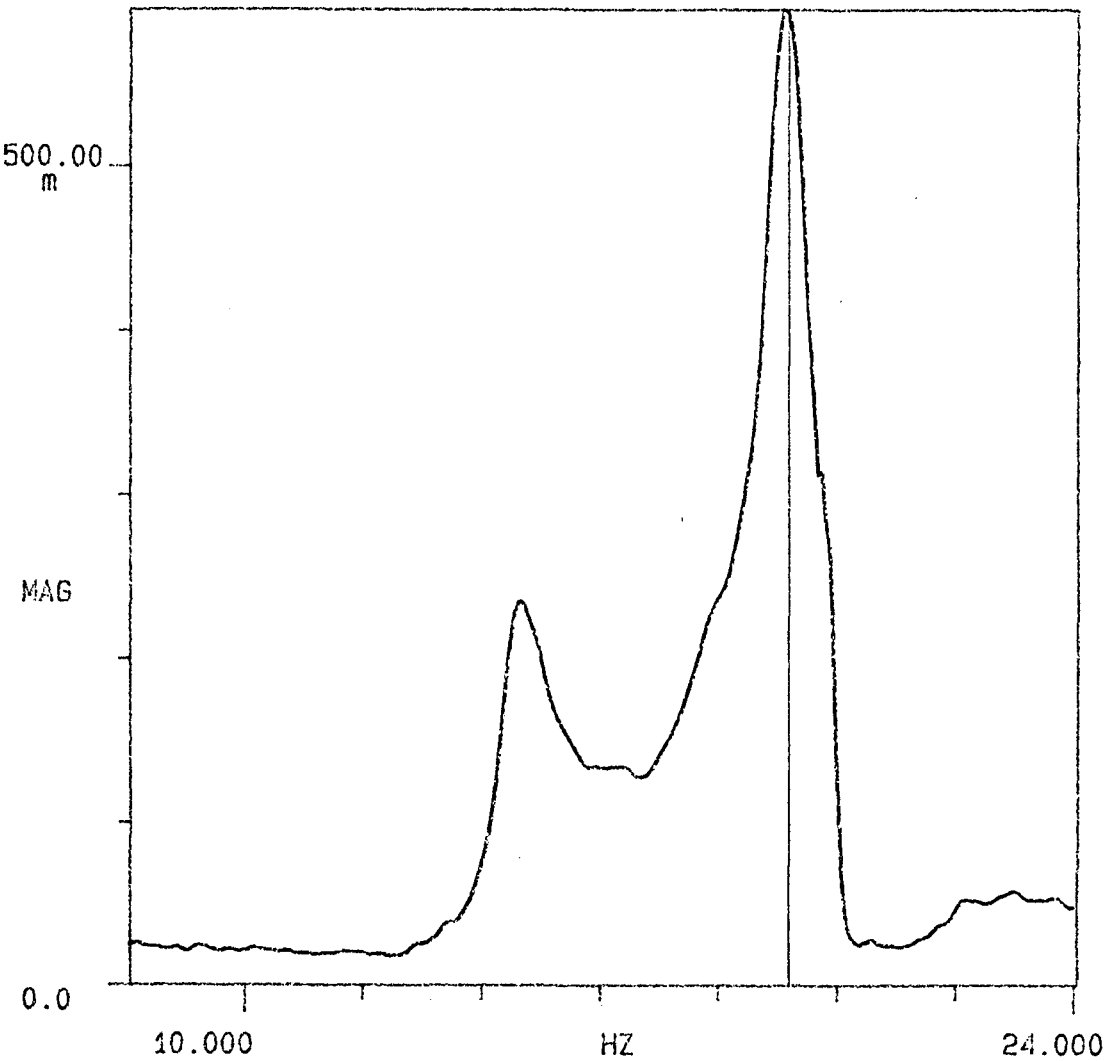
A SPEC 2 R#: 45 #A: 200



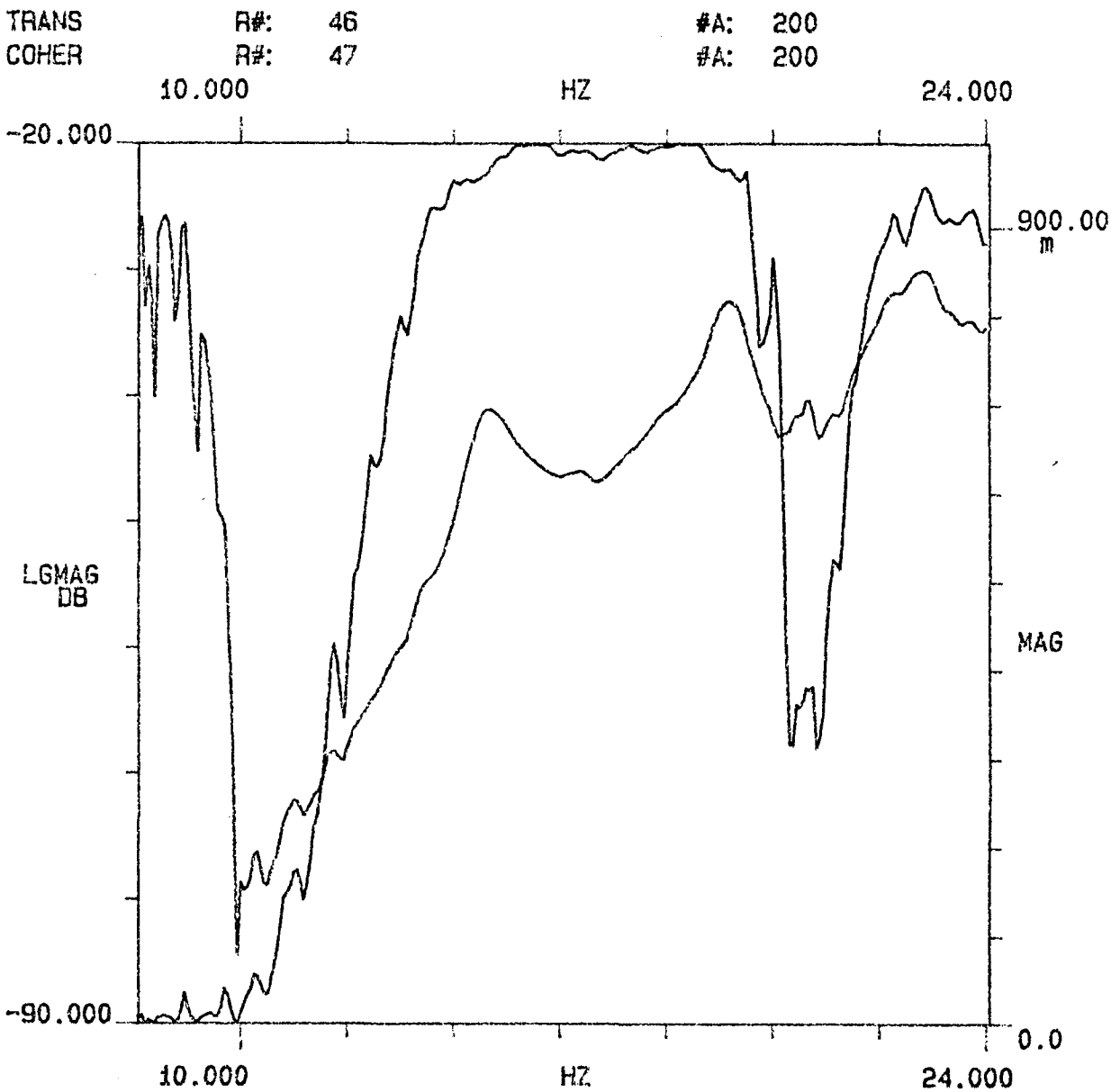
SINE 10-20 HZ. RESPONSE F-2-X

X: 19.200 Y: 592.04 m

A SPEC 2 R#: 45 #A: 200



SINE 10-20 HZ. RESPONSE F-2-X



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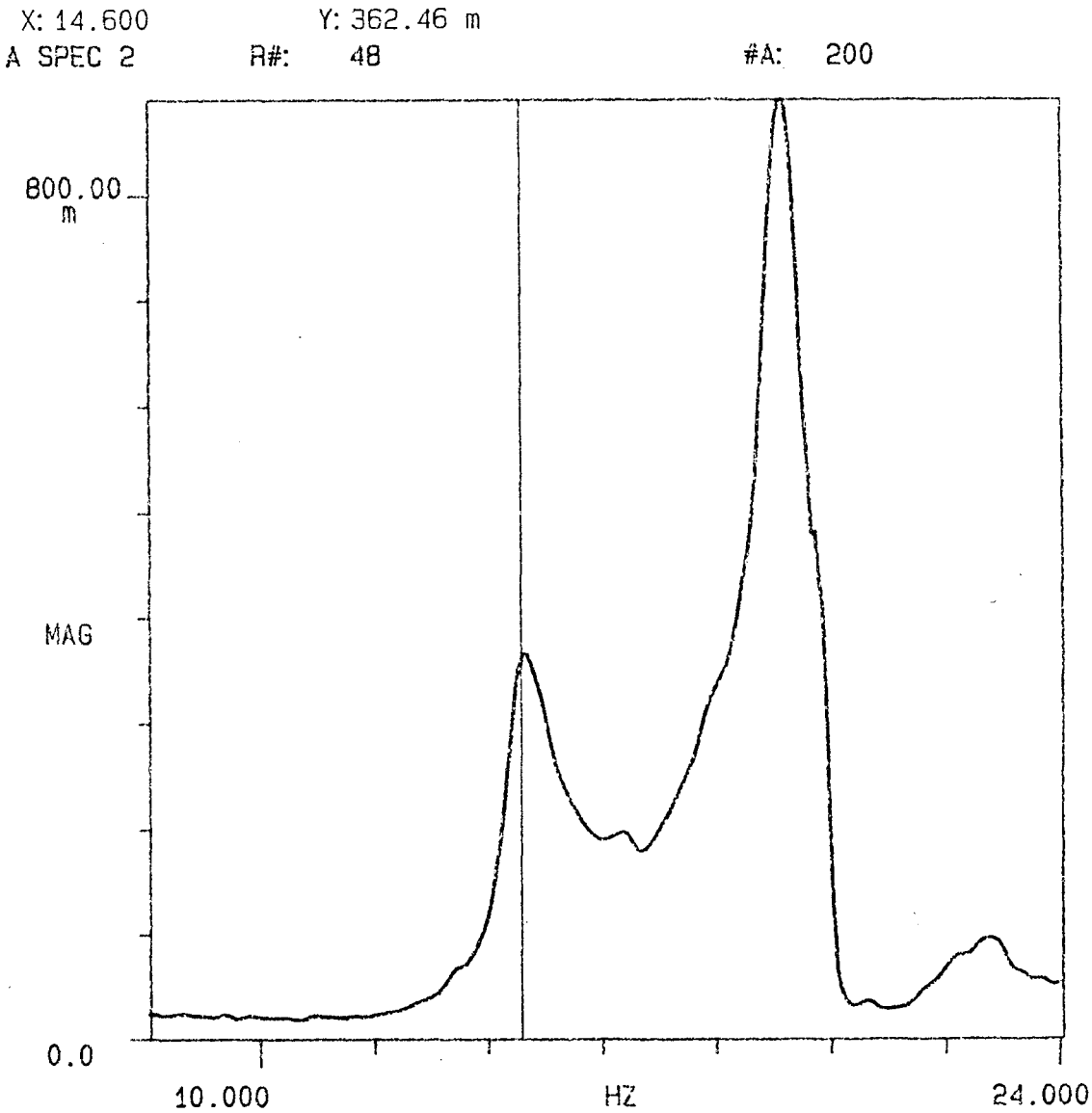
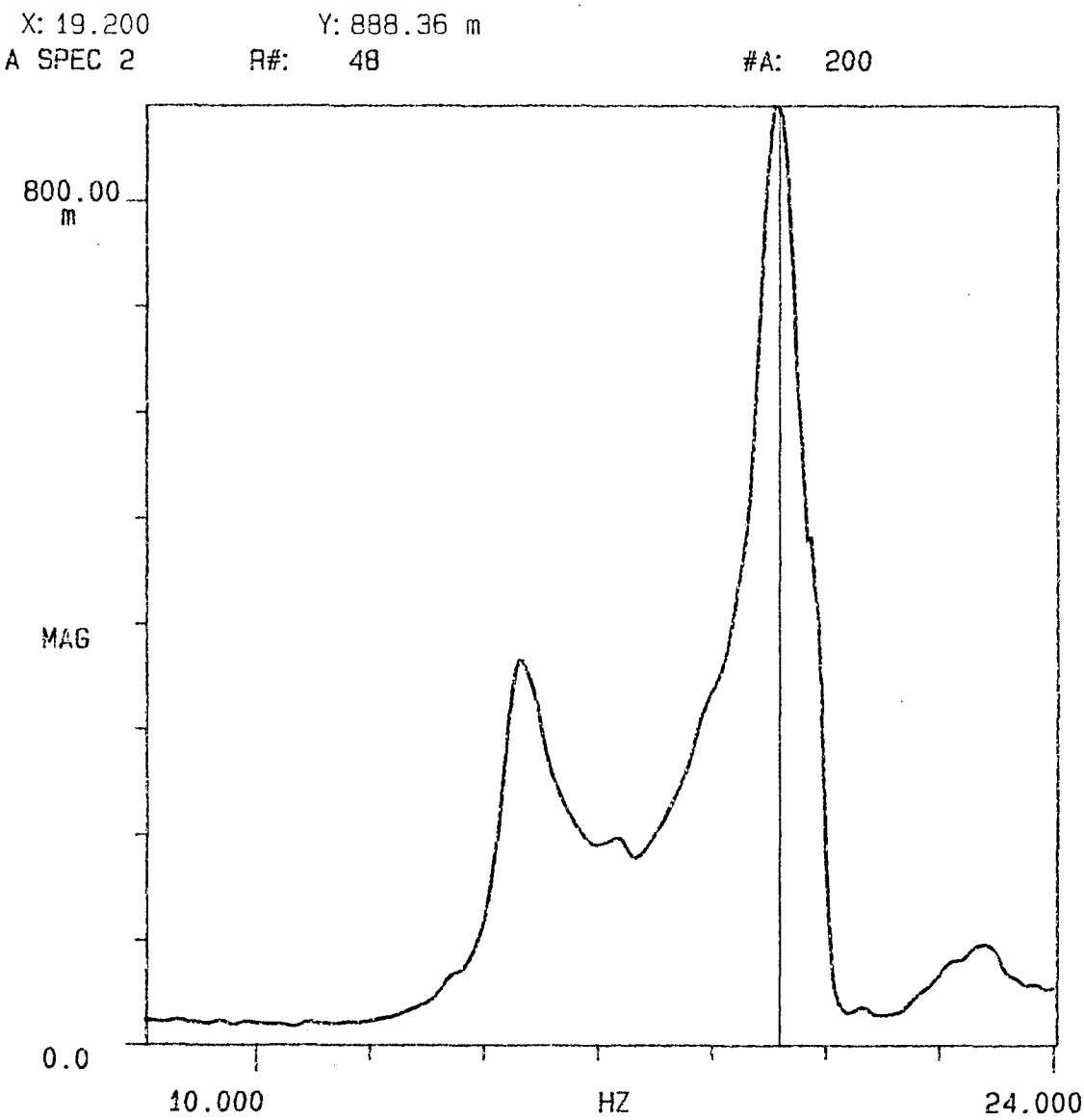
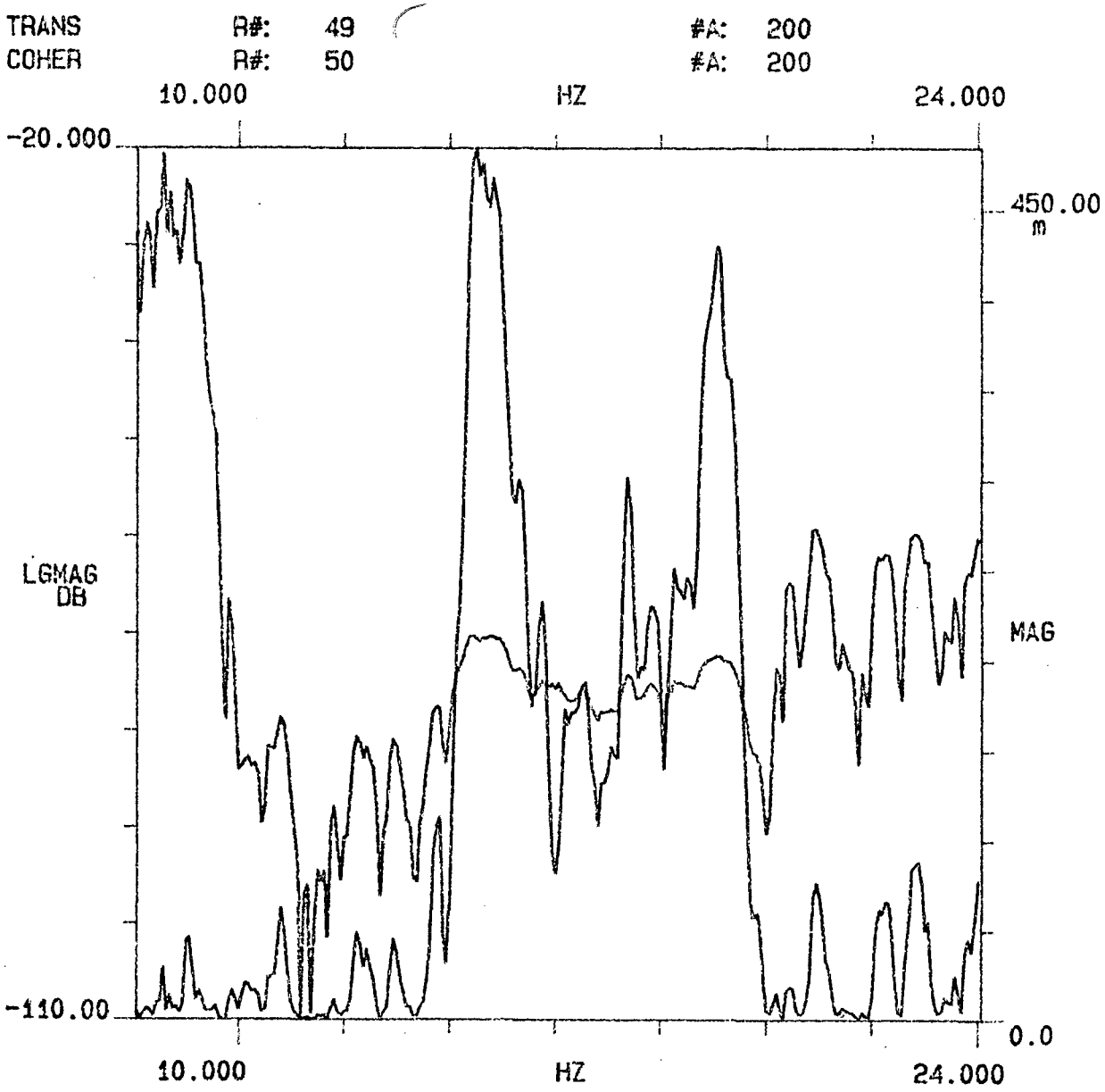


SINE 10-20 HZ. RESPONSE F-2-Y



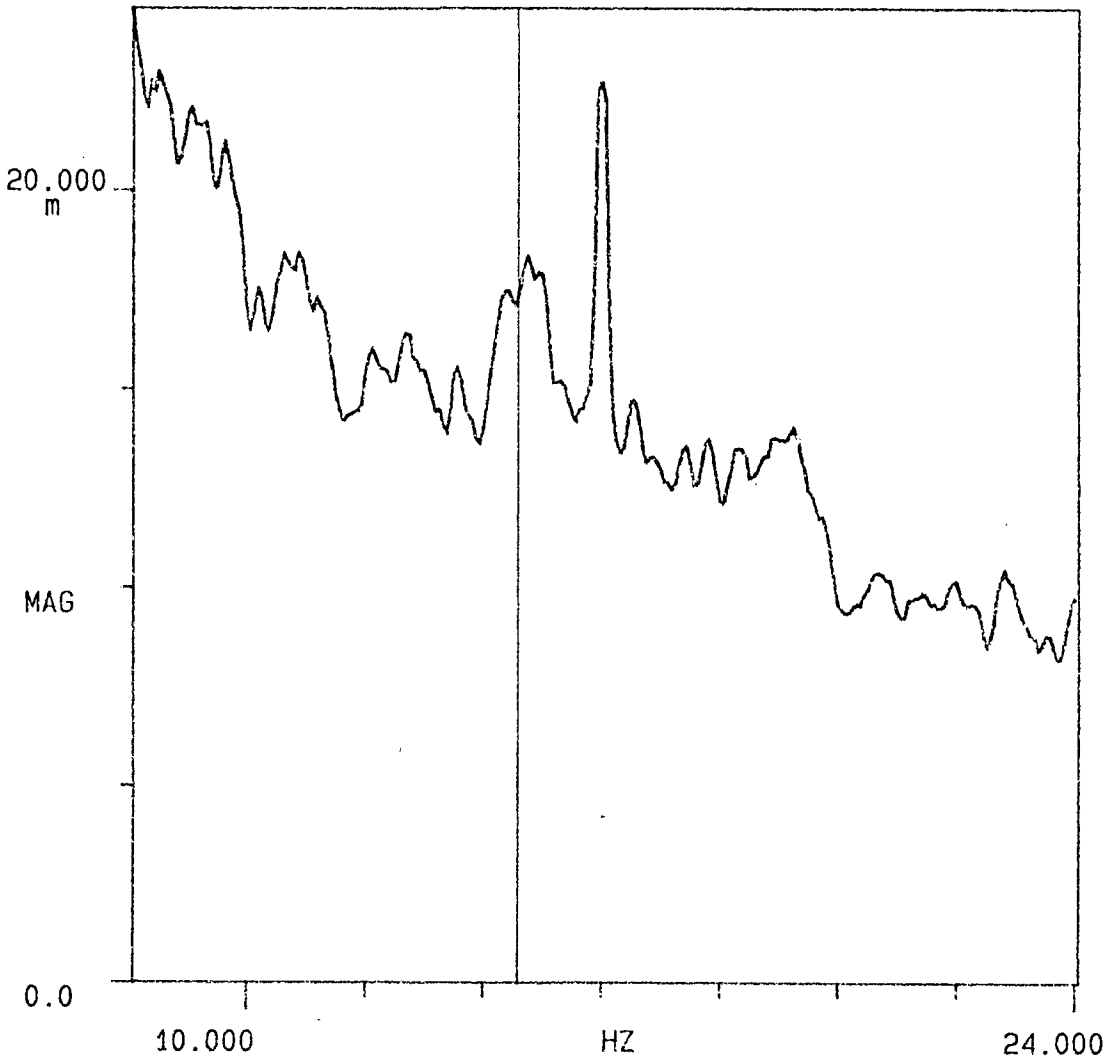
SINE 10-20 HZ. RESPONSE F-2-Y



SINE 10-20 HZ. RESPONSE F-3-X

X: 14.600 Y: 17.359 m

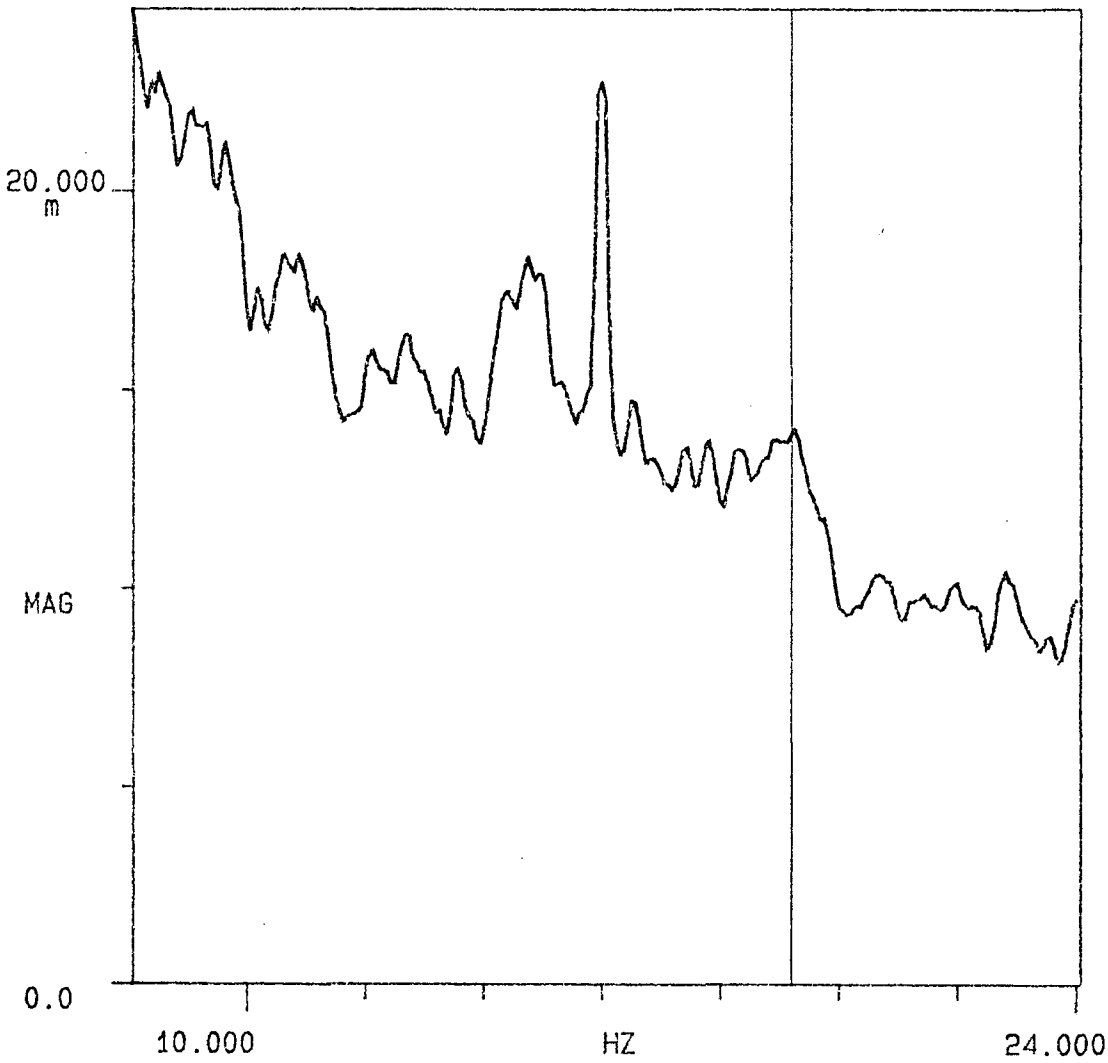
A SPEC 2 R#: 51 #A: 200



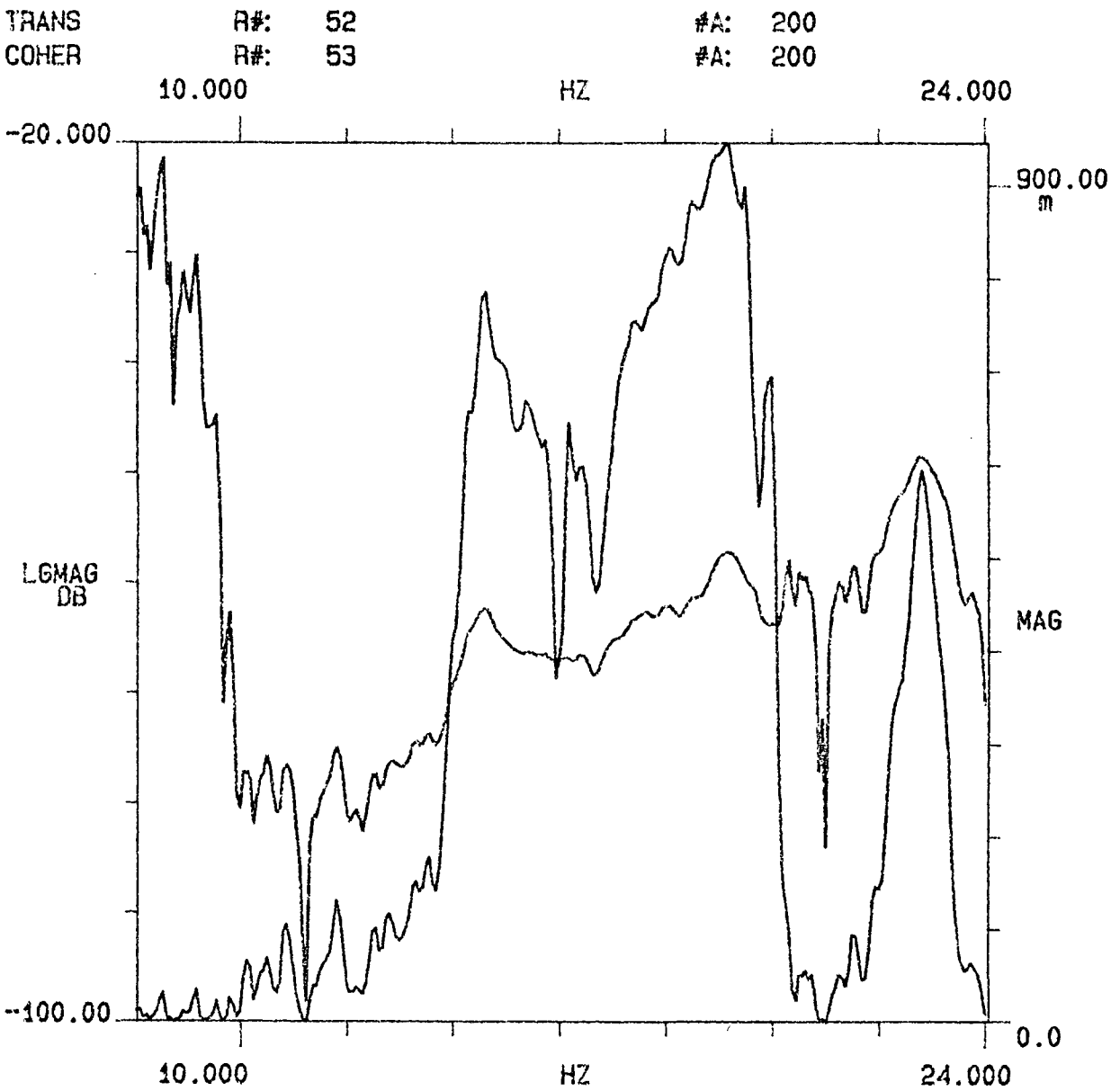
SINE 10-20 HZ. RESPONSE F-3-X

X: 19.200 Y: 13.923 m

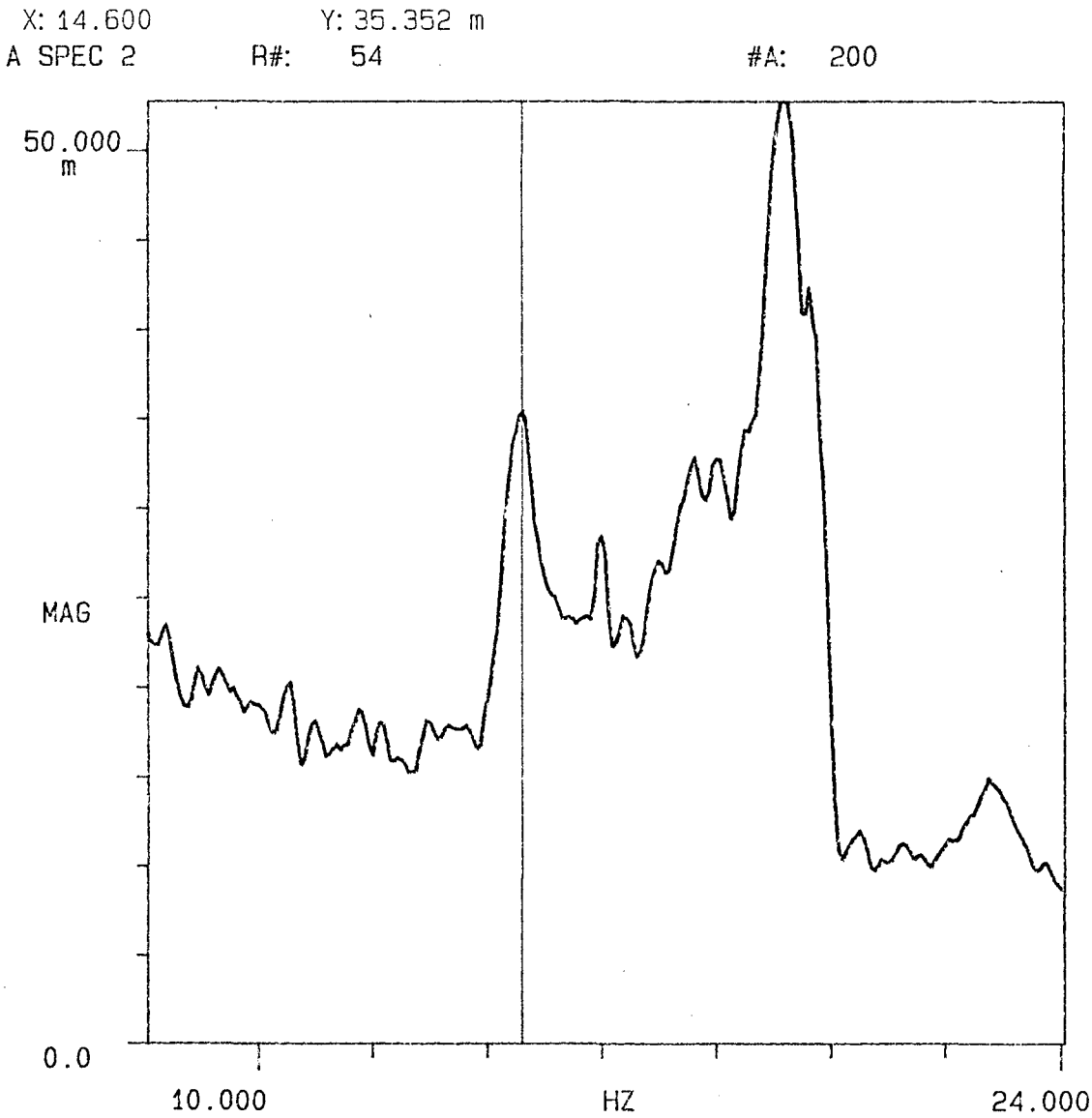
A SPEC 2 R#: 51 #A: 200



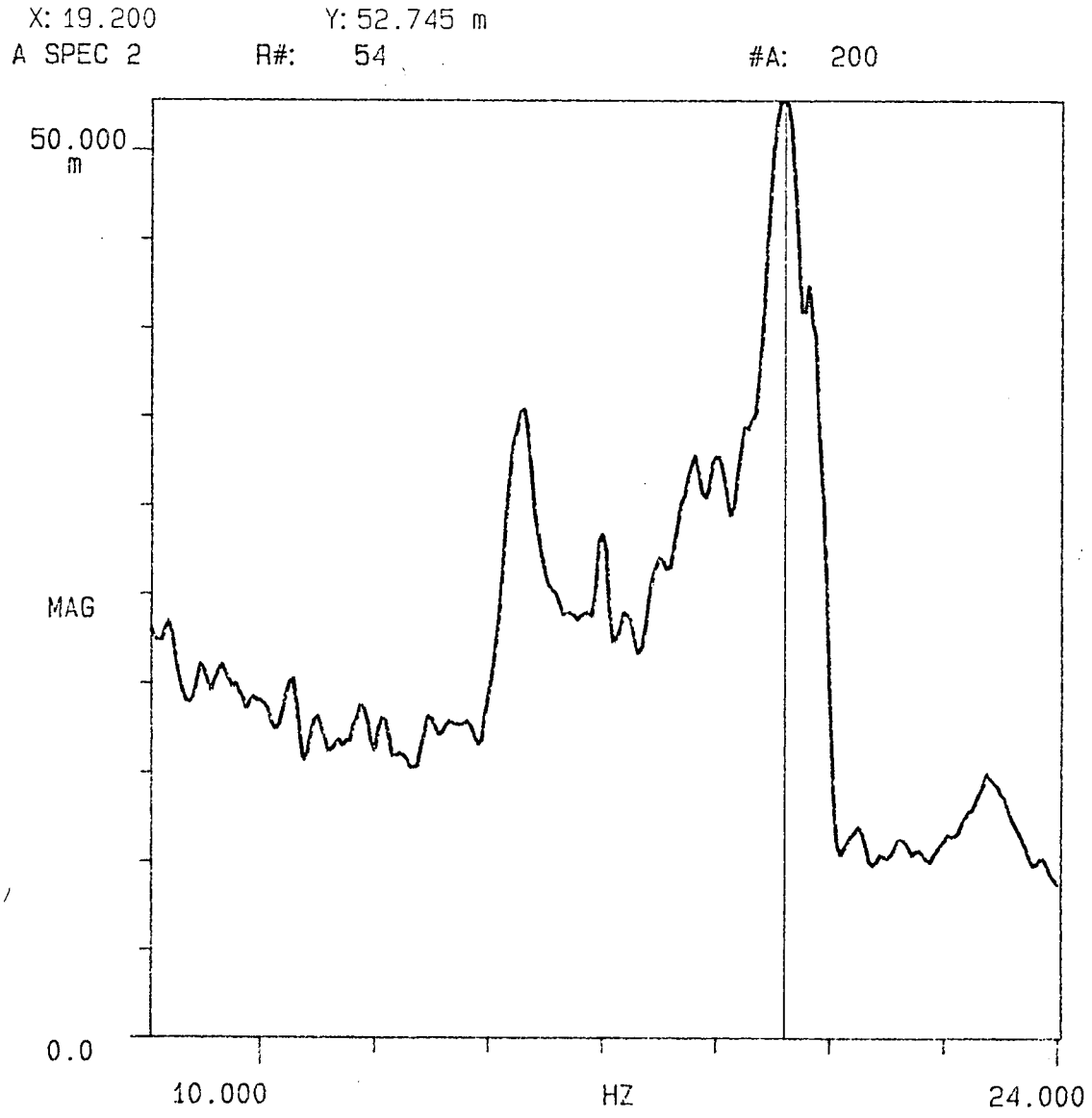
SINE 10-20 HZ. RESPONSE F-3-X



SINE 10-20 HZ. RESPONSE F-3-Y



SINE 10-20 HZ. RESPONSE F-3-Y



SINE 10-20 HZ. RESPONSE F-3-Y