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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW

1st Review Date: 6/9/98	Determination (Circle Numbers):
Authority: ADD	1. Classification Retained
Name: R B Craner	2. Classification Changed to: UNCL
2nd Review Date: 6-16-98	3. Contains No DOE Classified Information
Authority: ADD	4. Coordinate With:
Name: W C Layne	5. Contains UCAI?
	6. Comments: DECLASSIFY

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T-11141 NOV - 4 1965 File: XW-45

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NOV 05 1965

CENTRAL TECH. FILE

SHIPPING VIBRATION OF THE MK 45 MOD 3
UNIT NO. 6 (U)

Organization 7300 Envrionmental Test Report

CENTRAL TECHNICAL FILE	
ACCOUNTABILITY CARD	
FILE NO. 45 - Program	
880	3-2

J. A. Enlow, Org. 7324

Approved by D. R. Kuehl
Project Leader, 7324

Approved by E. White
E. White, 7331

PROGRAM	CATEGORY	ORG.	DATE
04590	30213	207	6580 43

Distribution:
R. J. Tockey, 8124, Attn: S. W. Mayer (4)
E. White, 7331
M. R. Madsen, 7324
Central Technical File, 3428-1
Central Technical File, 8232

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP

CLASSIFICATION CHANGED TO: U	AUTHORITY: W. C. Layne
Emelda Selph 6/24/98	
PERSON CHANGING MARKING & DATE	RECORD ID: 98SN2430
W C Layne 6/24/98	
PERSON VERIFYING MARKING & DATE	DATED: 6/16/98

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SHIPPING VIBRATION OF THE MK 45 MOD 3
UNIT No. 6 (U)

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Introduction

This test was conducted to evaluate the newly designed Mk 45 Mod 3 ADM weapon system when subjected to shipping and transportation vibration. The system consists of an XW-45 subassembly in a protective case, which is supported in rubberized hair in an H-815 shipping container (Test Unit No. 6).

The object of this test was to determine if the protective case will maintain its seal integrity when subjected to a simulated shipping vibration test.

The H-815 container with XW-45 in the protective was subjected to sinusoidal and random vibrations at +160°F and -65°F. The input was applied individually in the longitudinal (X-axis), lateral (Y-axis) and vertical (Z-axis) of the H-815.

The sinusoidal vibration specification was:

5 to 43 cps	1.5 g
43 to 55 cps	.016 inch D.A.
55 to 500 cps	2.5 g

One cycle from 500-5 cps at a cyling rate of ½ octave/minute.

The random vibration specification was:

.012 g^2/cps flat spectrum from 20-500 cps.

Test duration - five minutes per axis.

This test was requested by S. Mayer, 8124, on June 21, 1965. Messrs. J. Bear and J. M. Carmichael, 7331, were the Test Project Engineers. The test item was ready for testing on August 13, 1965; the test was completed on September 3, 1965.

Summary

The vibration test was conducted in a total of 12 test runs. The gross leakage test which was performed after each axis, detected no excess leakage resulting from the environment.

Procedure and Results

The XW-45 protective case and the H-815 container which make up Test Unit No. 6, were not instrumented for this test.

The input to the H-815 was controlled from the signal of an accelerometer mounted on one of the four adapter plates used to attach the container feet to the vibration table, which is the same position used in previous tests. An additional accelerometer was mounted on two of the other three adapter plates to define the acceleration at these locations and further substantiate the input to the unit. Figures 1 through 3 show the test setup and accelerometer locations used during the tests.

During the sinusoidal tests, the input signal was filtered with a Spectral Dynamics Tracking Filter using a 10 cps filter bandwidth from 5 to 300 cps and a 100 cps filter bandwidth from 300 to 500 cps. The random tests were equalized with a narrow band automatic equalizer/analyzer system.

The requested sinusoidal input of 1.5 g from 5 to 43 cps could not be obtained because the maximum available table displacement of the machine used for these tests (Machine #17) is limited to 0.5 inch D.A. Therefore, all sinusoidal tests were run at 0.5 inch D.A. from 5 cps to approximately 7.5 cps, at which frequency the 0.5 inch D.A. was equal to an acceleration input of 1.5 g.

In most of the data plots, a discontinuity is evident at approximately 13 cps, which was caused by stopping the test at this frequency to lock or unlock the trunions of the exciter.

Following each test a leak test of the protective case was performed by the T.P.E. The leak test consisted of reducing the internal pressure inside the protective case to 50 mm of mercury and observing any pressure increase over a 30-minute period. No significant pressure changes were observed during any of the tests.

This test consisted of a total of 12 runs. The sequence of the test runs, the test conditions, and the respective data plots are listed in Table I.

The data plots for Run 1 and 3 show a discrepancy of approximately 10 to 15% between the amplitudes of the input and the plots for accelerometers 1 and 2. Following Run 3 the instrumentation circuits were calibrated using a calibration frequency of 30 cps instead of 1 kc, as had been used for Runs 1 and 3. A more favorable comparison of the data plots resulted, which strongly indicates that the instrumentation circuits used have a frequency response error of approximately 10-15% between 5 cps and 1 kc. Calibration of a lower frequency obviously does not eliminate this error, but certainly improves the accuracy of the low frequency data.

JAE:7324:ya

TABLE I

SEQUENCE OF THE VIBRATION TEST OF THE
XW-45 ADM/H-815

Run No.	Unit Axis	Type of Test	Temp.	Input Plot	Response Plots
1	Z	Sine	+160	Figure 4	Figures 5 and 6
2	Z	Random	+160	Figure 7	Figures 8 and 9
3	Z	Sine	- 65	Figure 10	Figures 11 and 12
4	Z	Random	- 65	Figure 13	Figures 14 and 15
5	Y	Sine	+160	Figure 16	Figures 17 and 18
6	Y	Random	+160	Figure 19	Figures 20 and 21
7	Y	Sine	- 65	Figure 22	Figures 23 and 24
8	Y	Random	- 65	Figure 25	Figures 26 and 27
9	X	Sine	+160	Figure 28	Figures 29 and 30
10	X	Random	+160	Figure 31	Figures 32 and 33
11	X	Sine	- 65	Figure 34	Figures 35 and 36
12	X	Random	- 65	Figure 37	Figures 38 and 39

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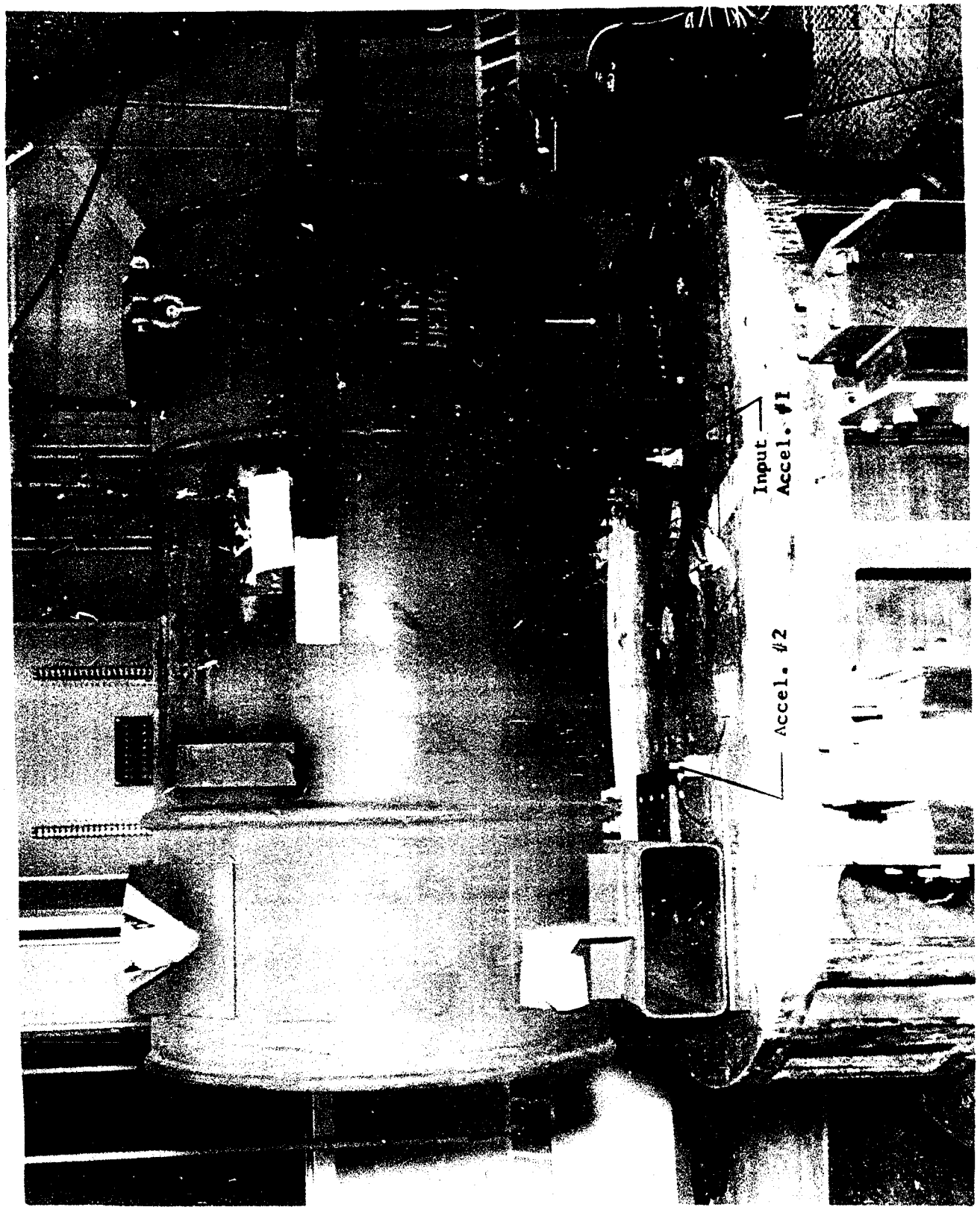

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FIGURE 1. [illegible]-315 CONTAINER MOUNTED IN THE Z AXIS

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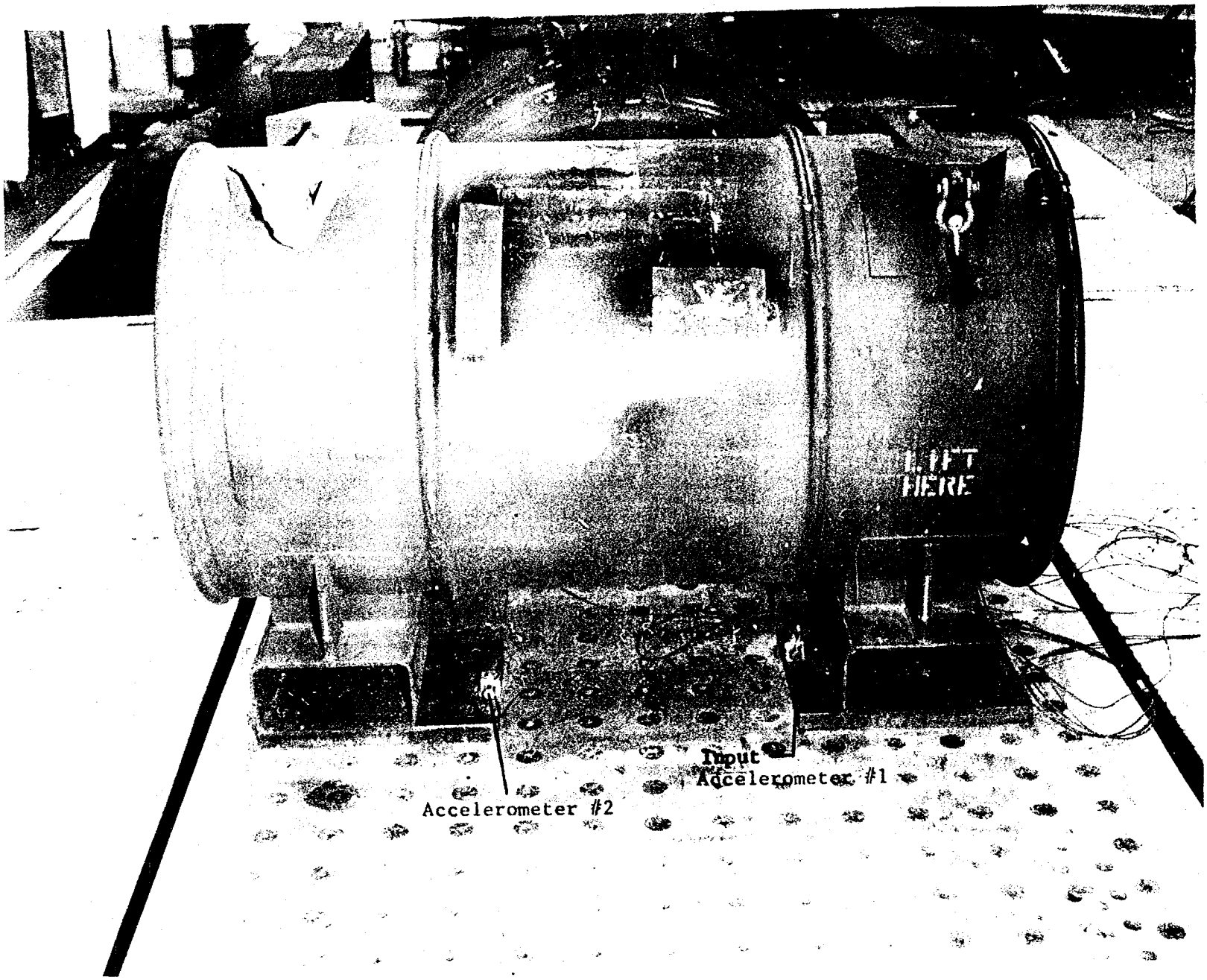

FIGURE 2. H-815 CONTAINER MOUNTED IN THE Y AXIS T-11141

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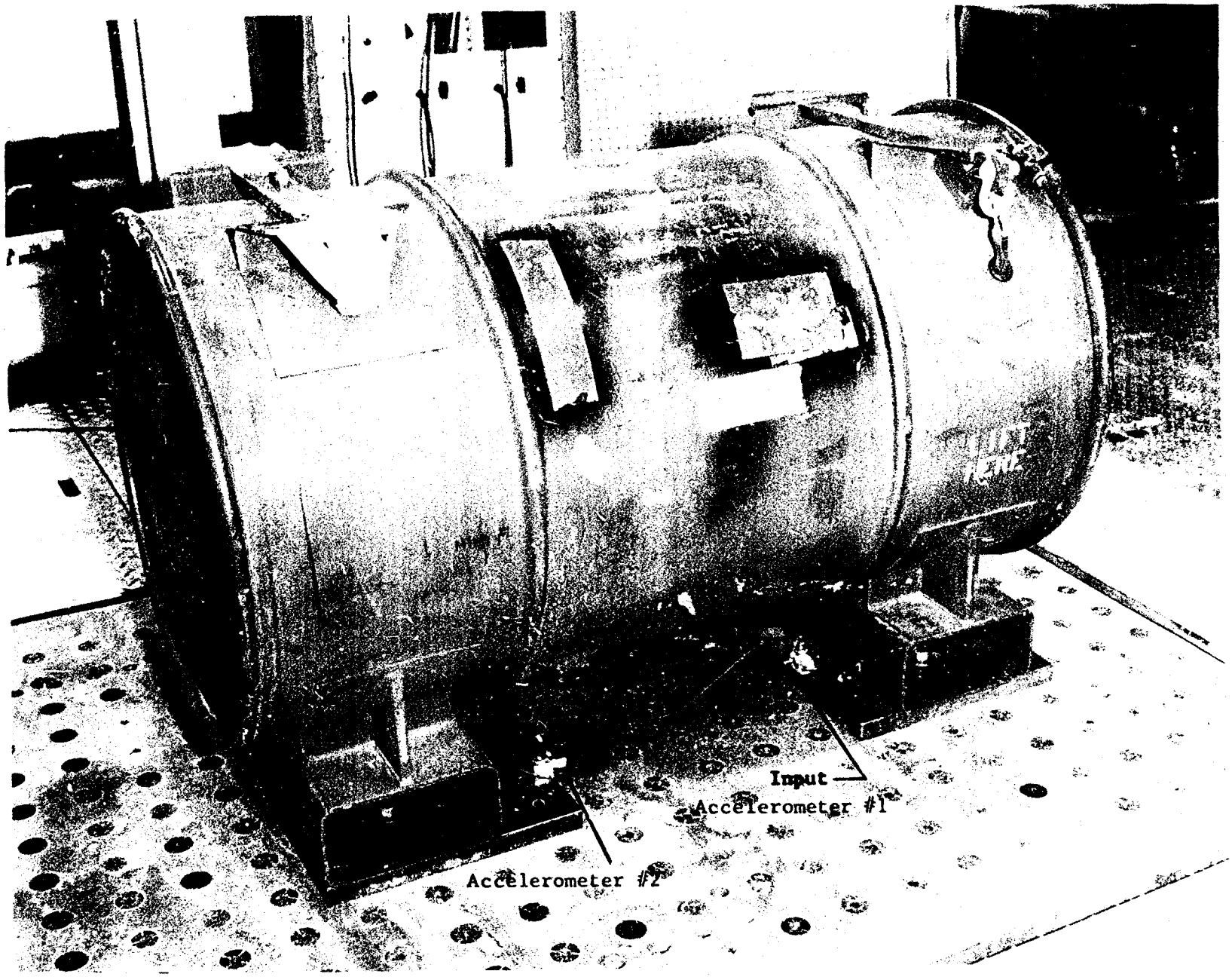

FIGURE 3. H-815 CONTAINER MOUNTED IN THE X AXIS T-11141

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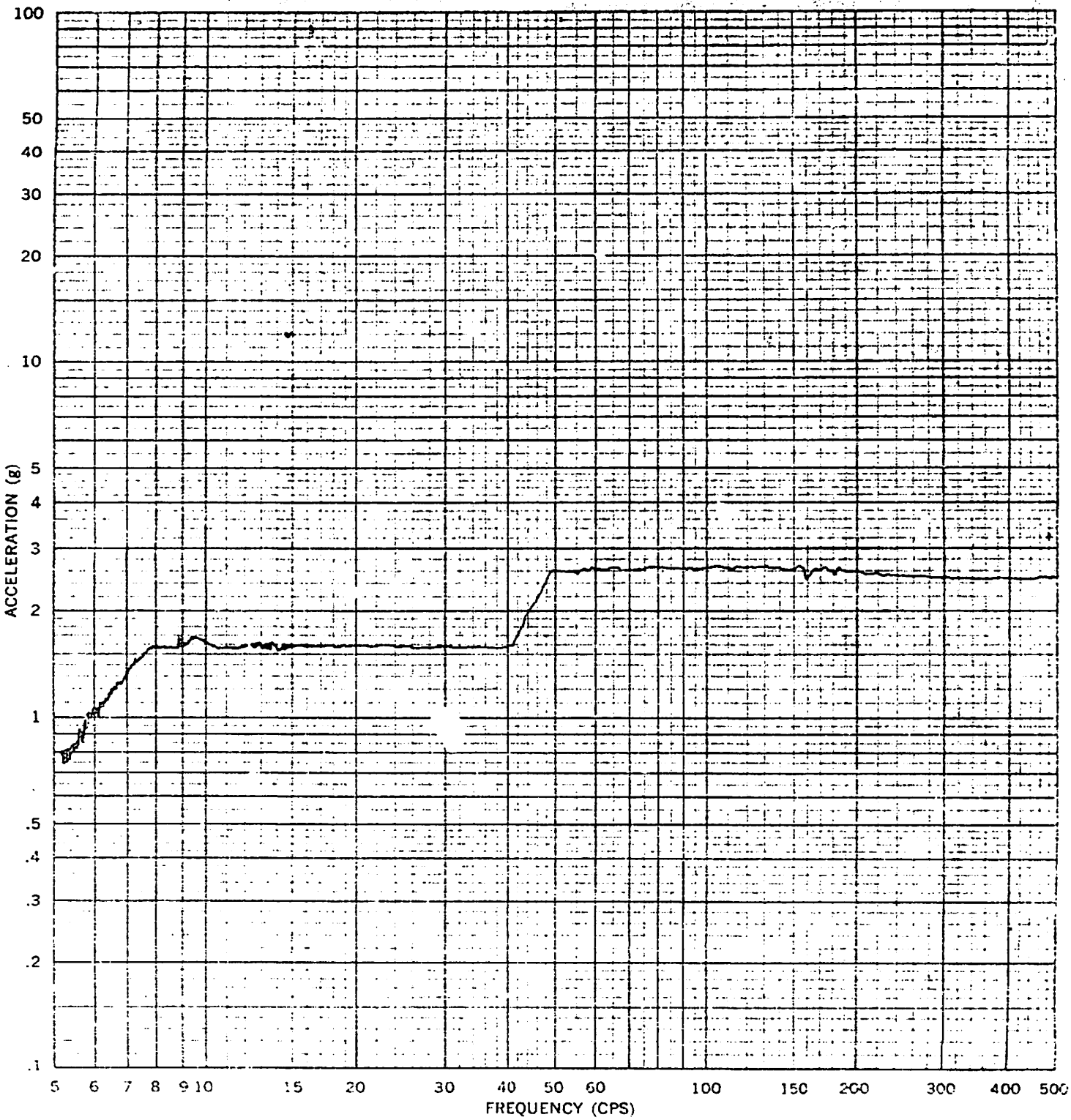

VIBRATION TEST OF XW-45/H-815 RUN #1

WITH INPUT ALONG THE Z AXIS, AT +160 °F T. 11:41

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/16/65

AXIS Z FIGURE 4

FILTER BANDWIDTH 5 CPS PAGE 9

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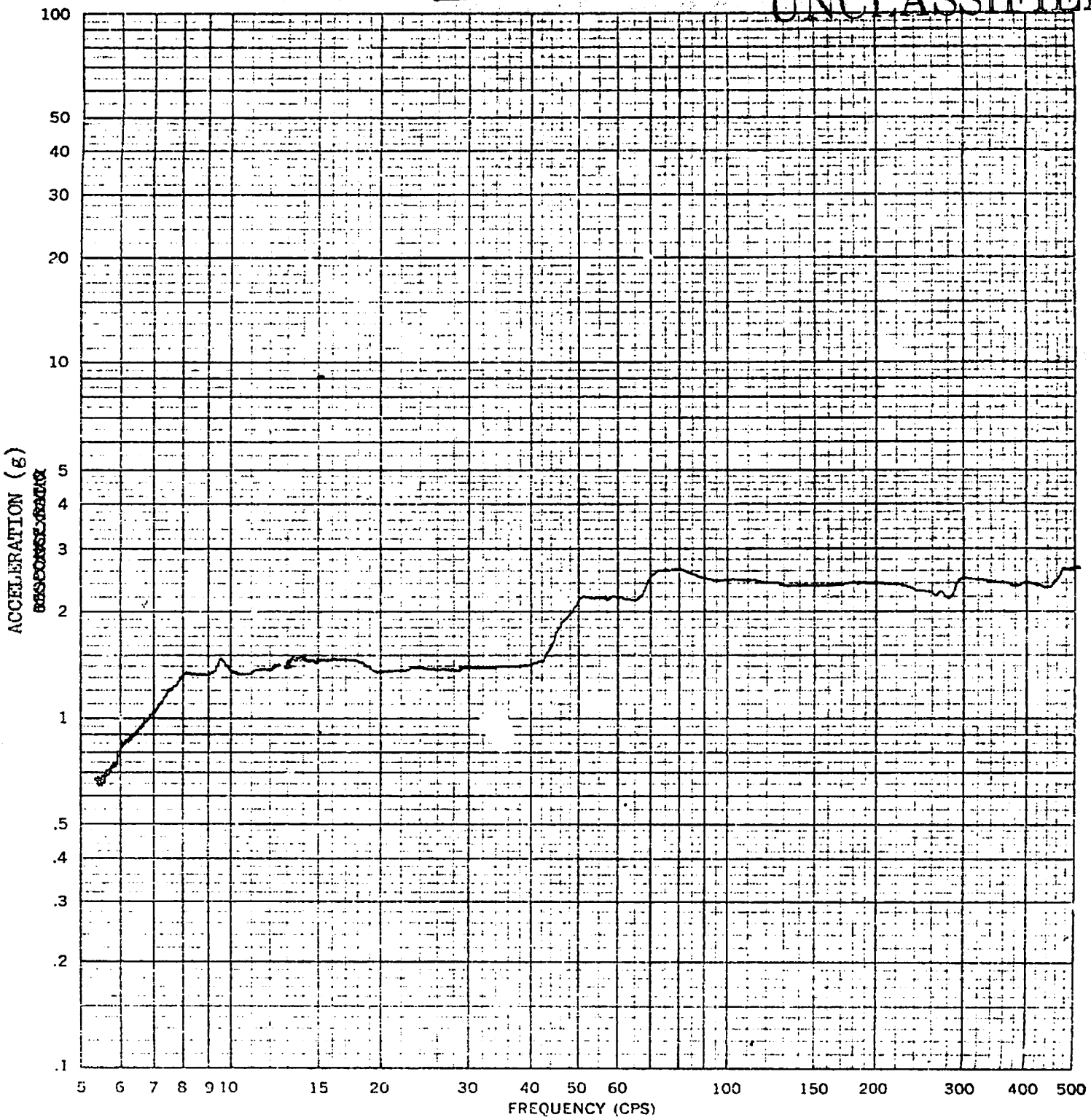

VIBRATION TEST OF XW-45/H-815 RUN #1

WITH INPUT ALONG THE Z AXIS, AT 160 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/16/65

AXIS Z FIGURE 3

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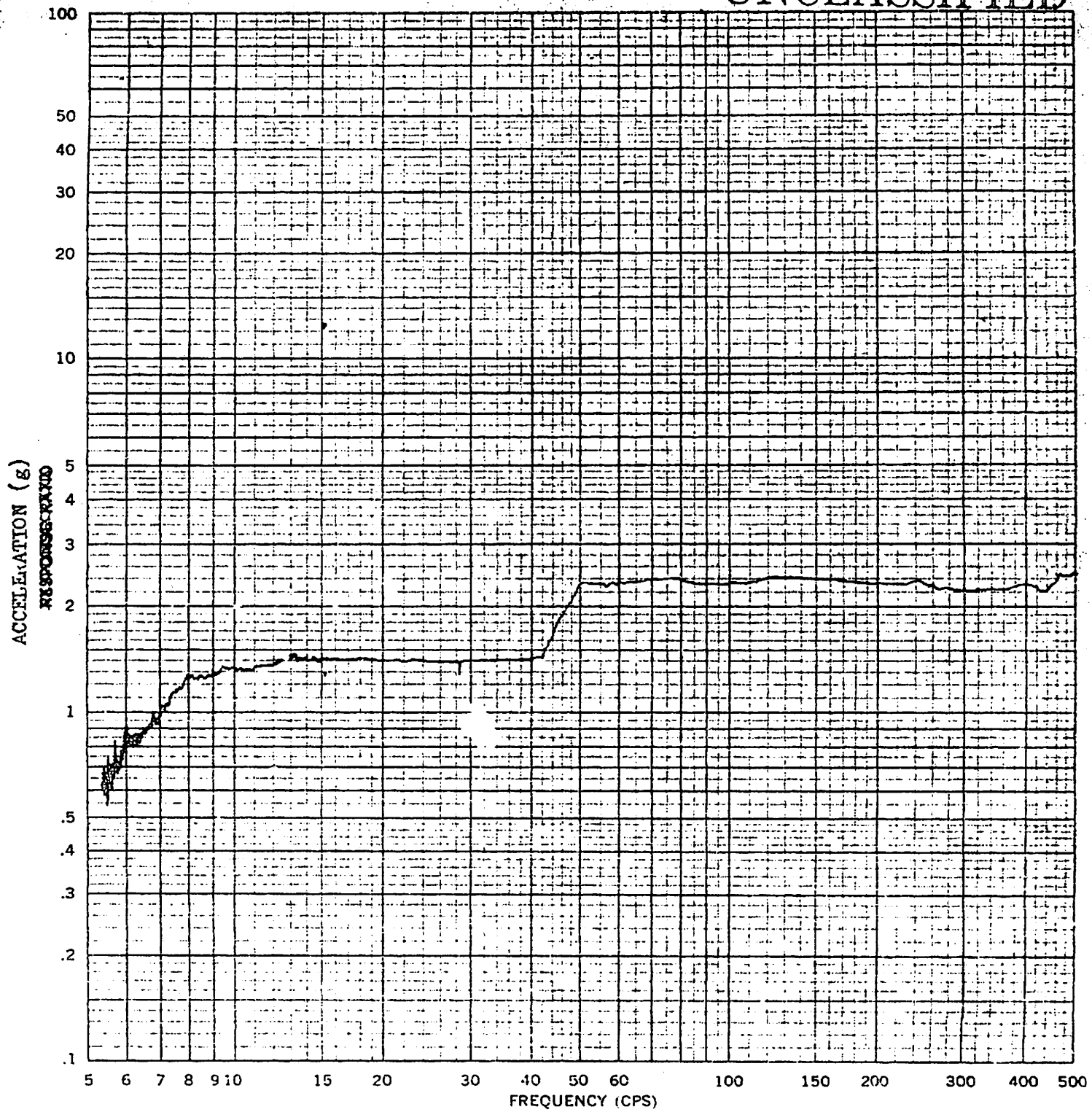

VIBRATION TEST OF XW-45/H-815 RUN #1

WITH INPUT ALONG THE Z AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/16/65

AXIS Z FIGURE 6

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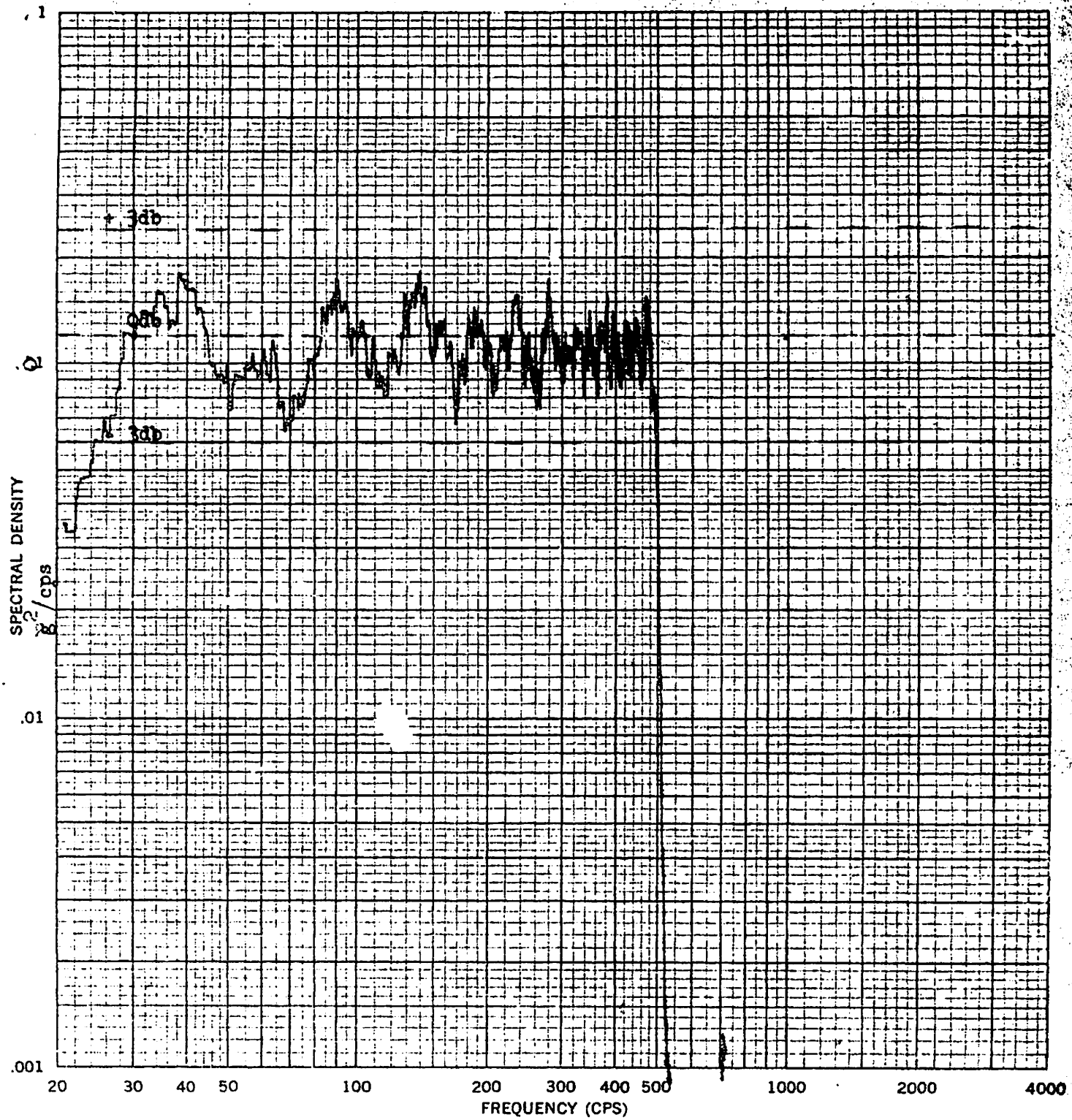

VIBRATION TEST OF XW-45/H-815 RUN #2

WITH INPUT ALONG THE Z AXIS, AT +160 °F T- 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/16/65

AXIS Z UNCLASSIFIED FIGURE 7

FILTER BANDWIDTH 5 CPS CV PAGE 12

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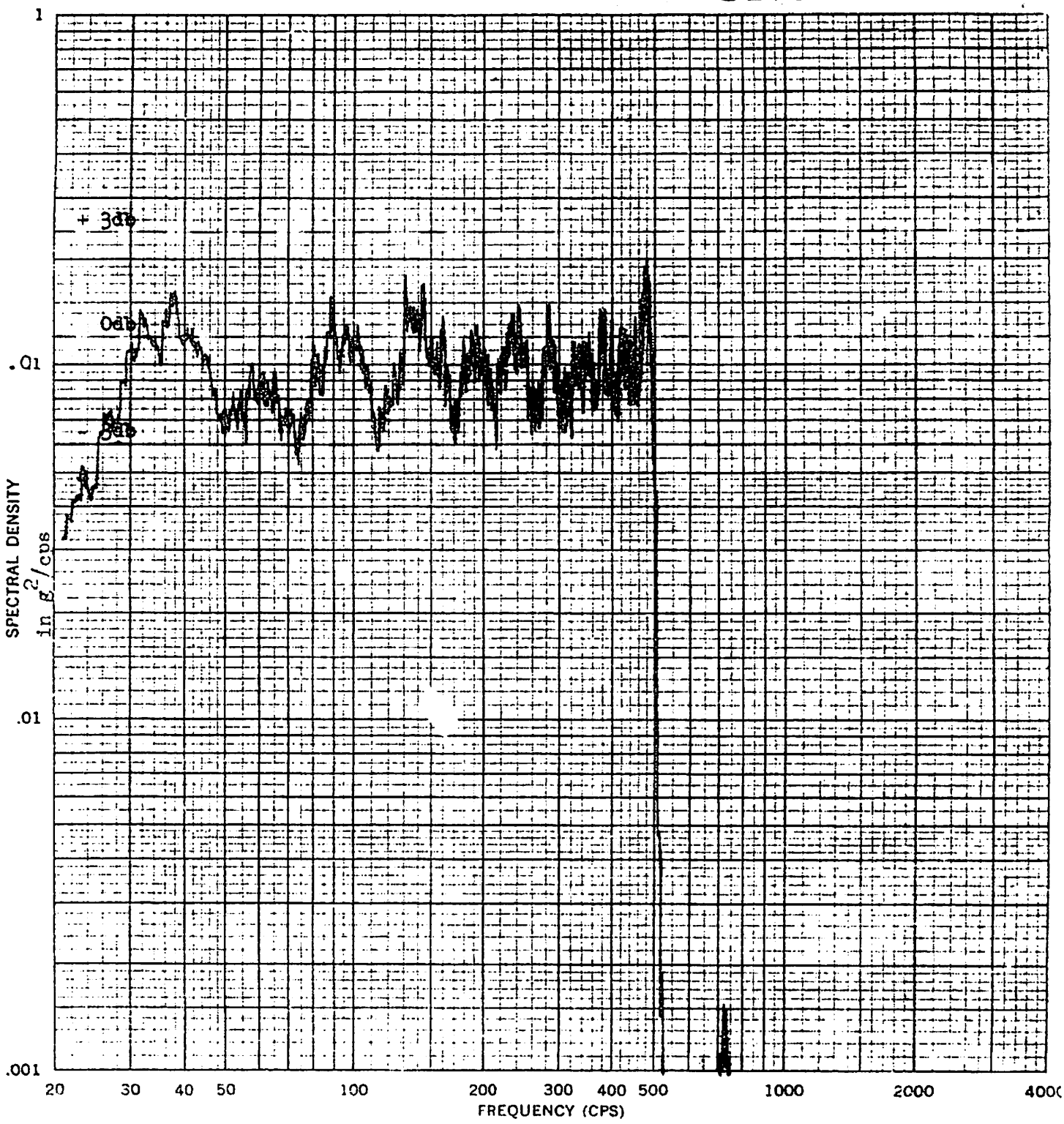

VIBRATION TEST OF XW-45/H-815 RUN #2

WITH INPUT ALONG THE Z AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/16/65

AXIS Z UNCLASSIFIED FIGURE 8

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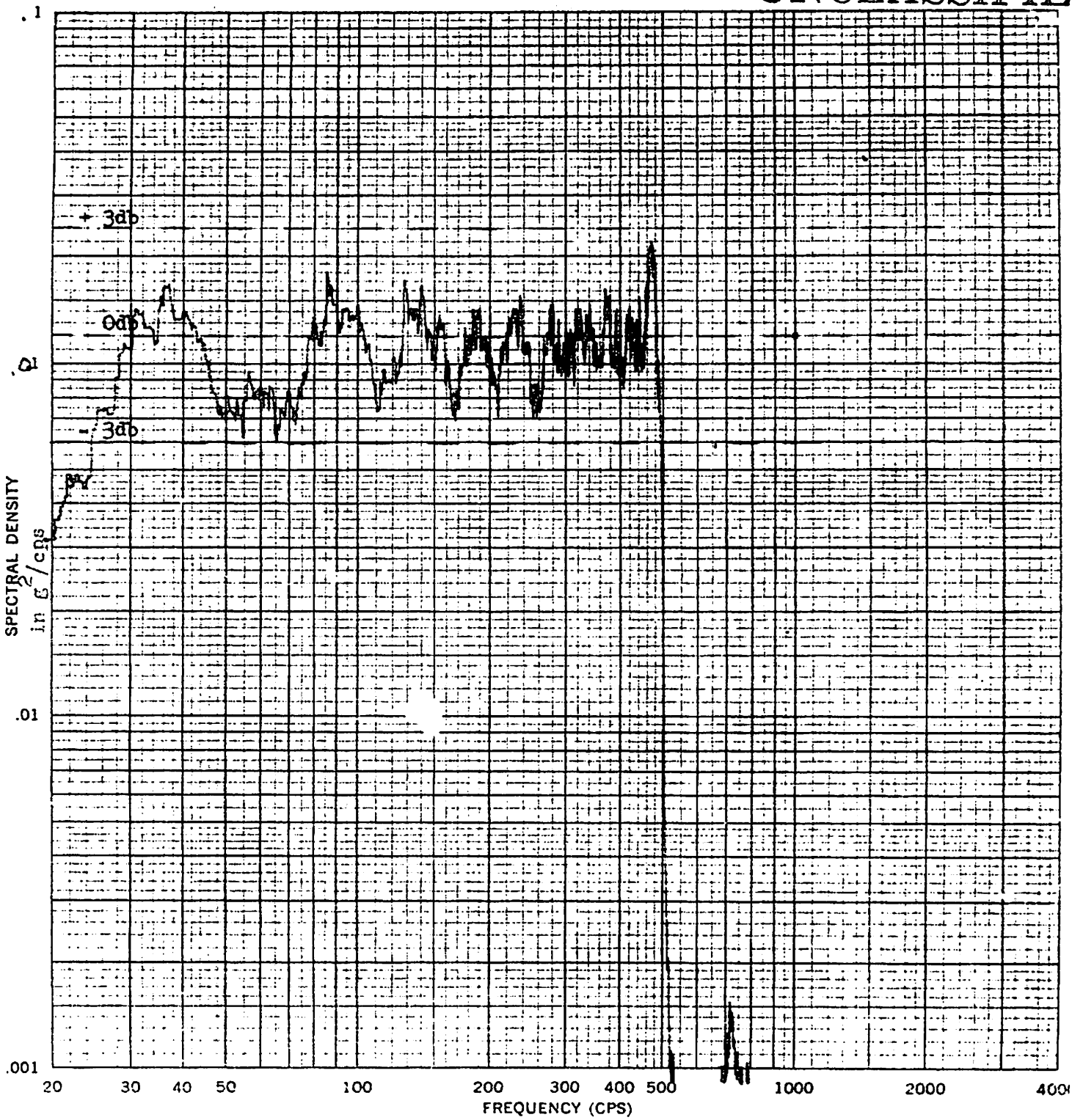

VIBRATION TEST OF XW-45/H-815 RUN #2

WITH INPUT ALONG THE Z AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/16/65

AXIS Z FIGURE 9

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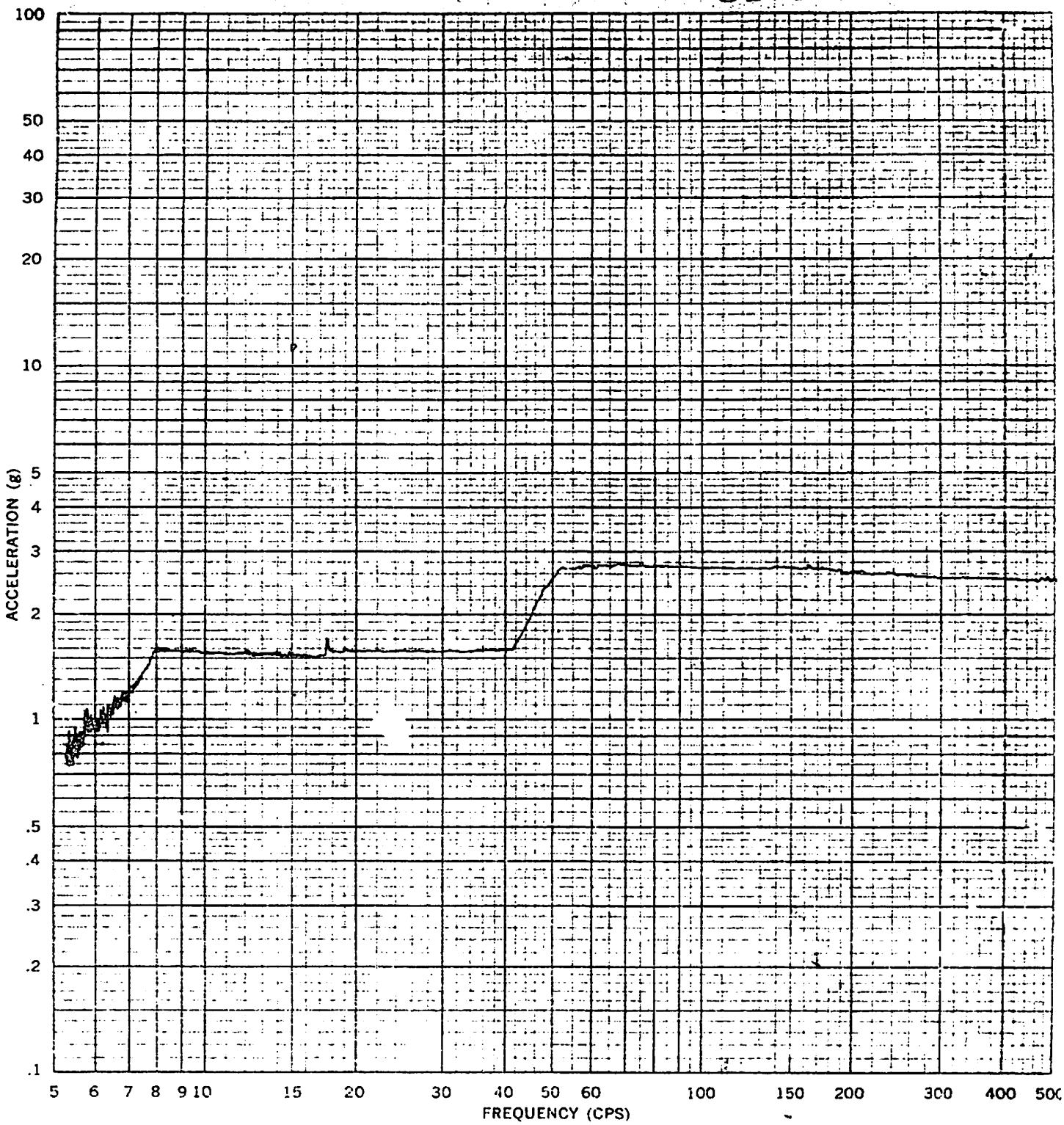

VIBRATION TEST OF XW-45/H-815 RUN #3

WITH INPUT ALONG THE Z AXIS, AT -65 °F T- 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/20/65

AXIS Z FIGURE 10

FILTER BANDWIDTH 5 CPS

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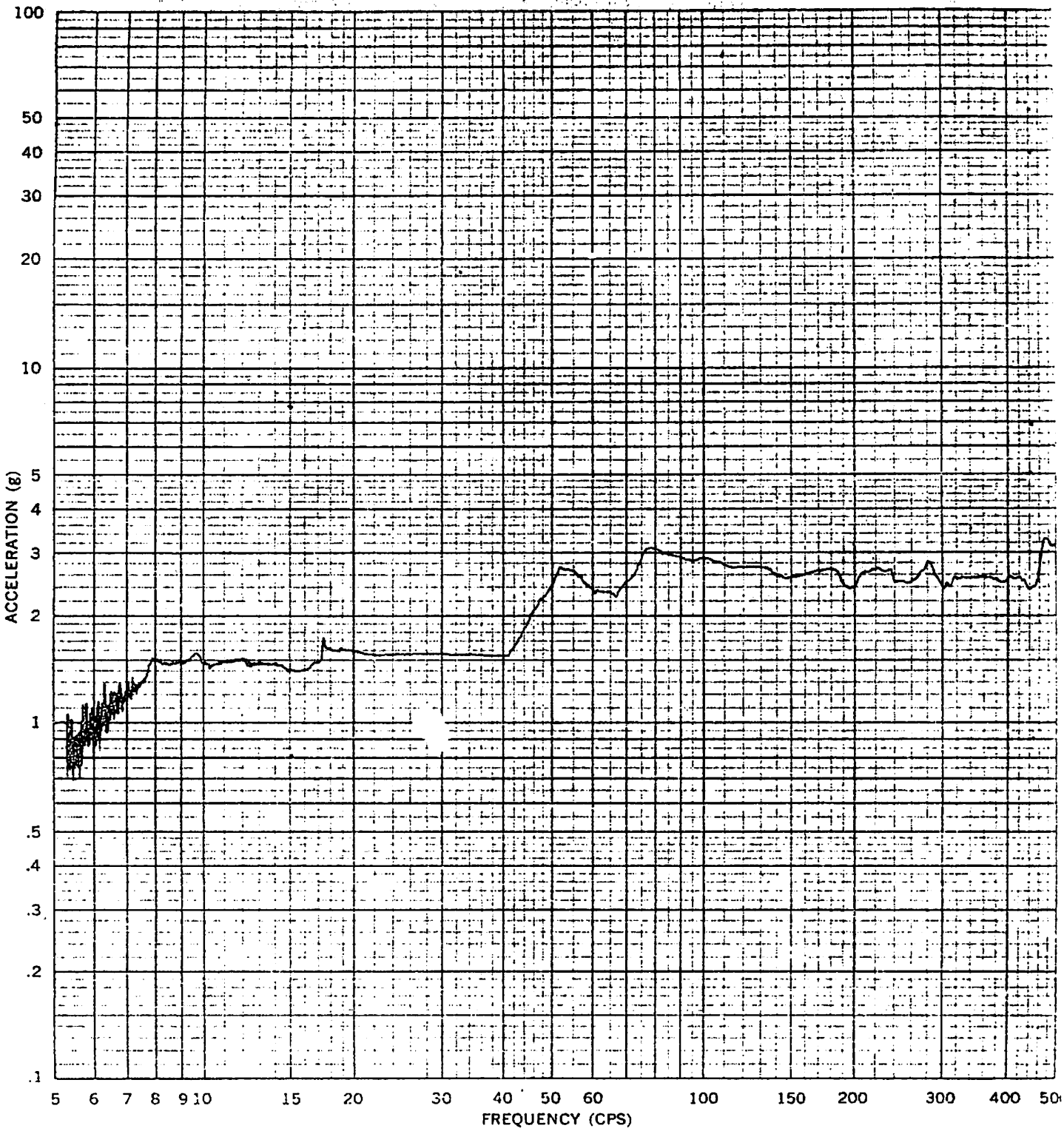

VIBRATION TEST OF XW-45/H-015 RUN #3

WITH INPUT ALONG THE Z AXIS, AT -65 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/20/65

AXIS Z FIGURE 11

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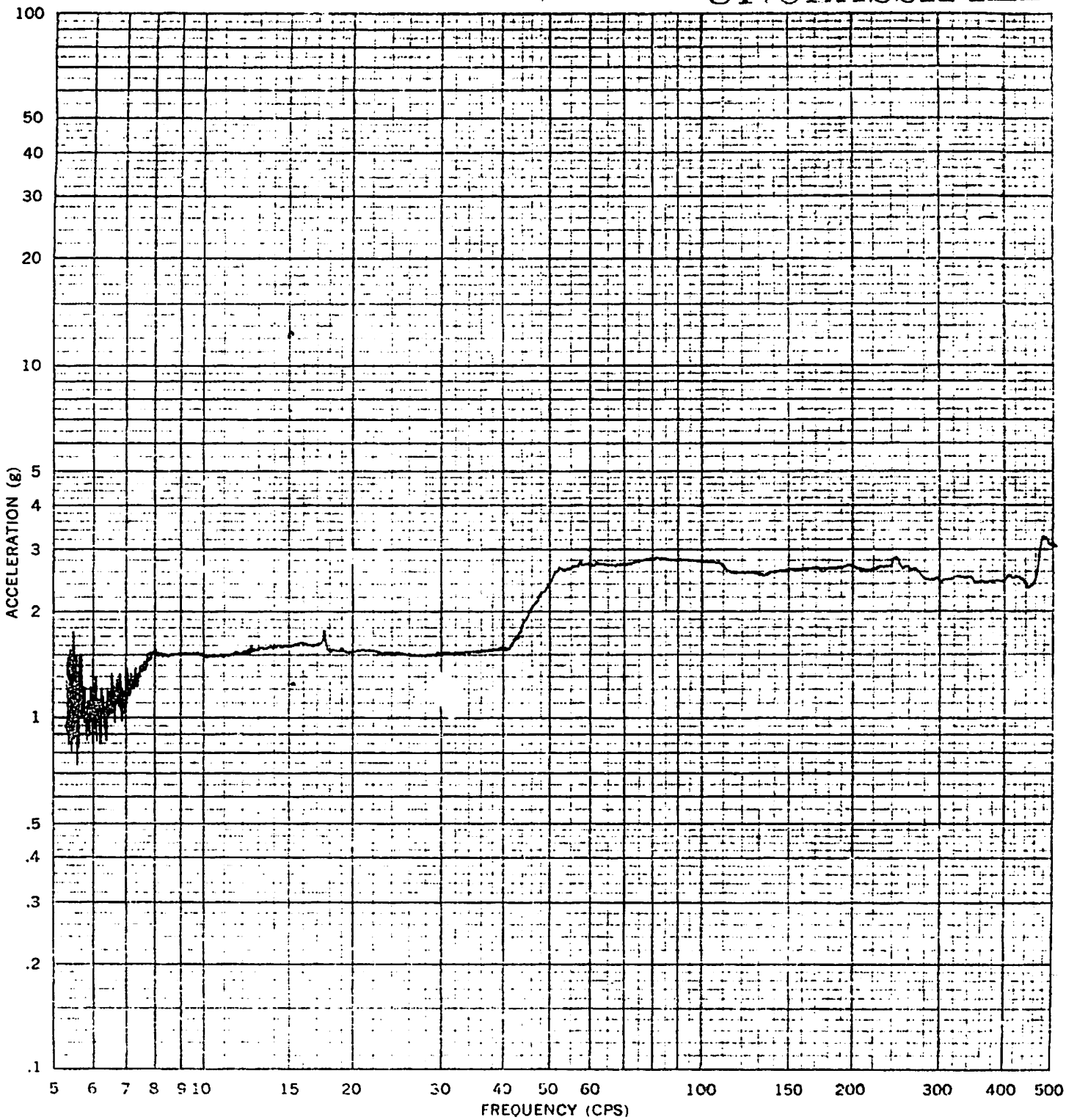

VIBRATION TEST OF XW-45/H-815 RUN #3

WITH INPUT ALONG THE Z AXIS, AT -65 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/20/65

AXIS Z FIGURE 12

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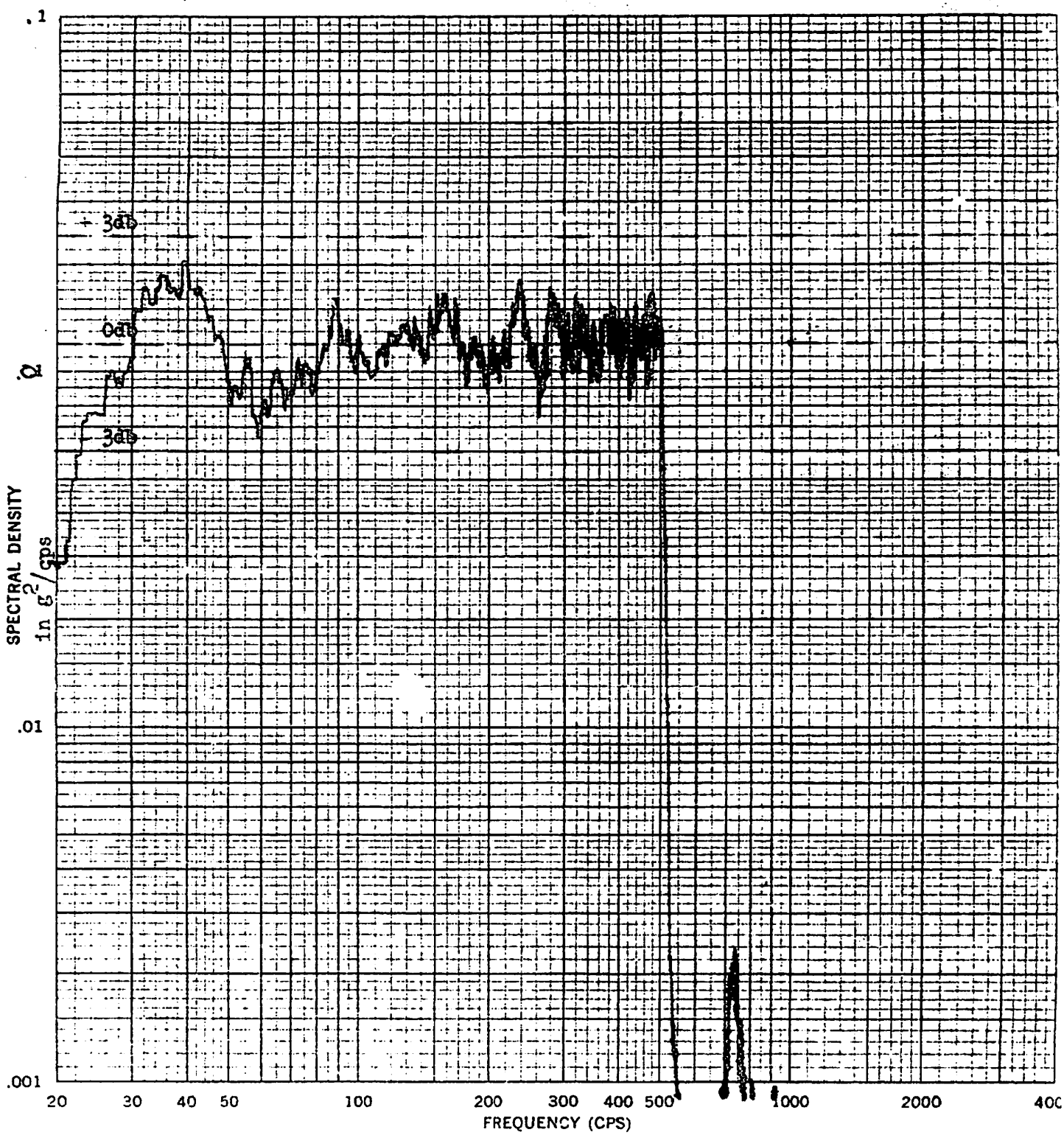

VIBRATION TEST OF XW-45/H-815 RUN #4

WITH INPUT ALONG THE Z AXIS, AT -65 °F T- 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/20/65

AXIS Z UNCLASSIFIED FIGURE 13

FILTER BANDWIDTH 5 CPS CV PAGE 18

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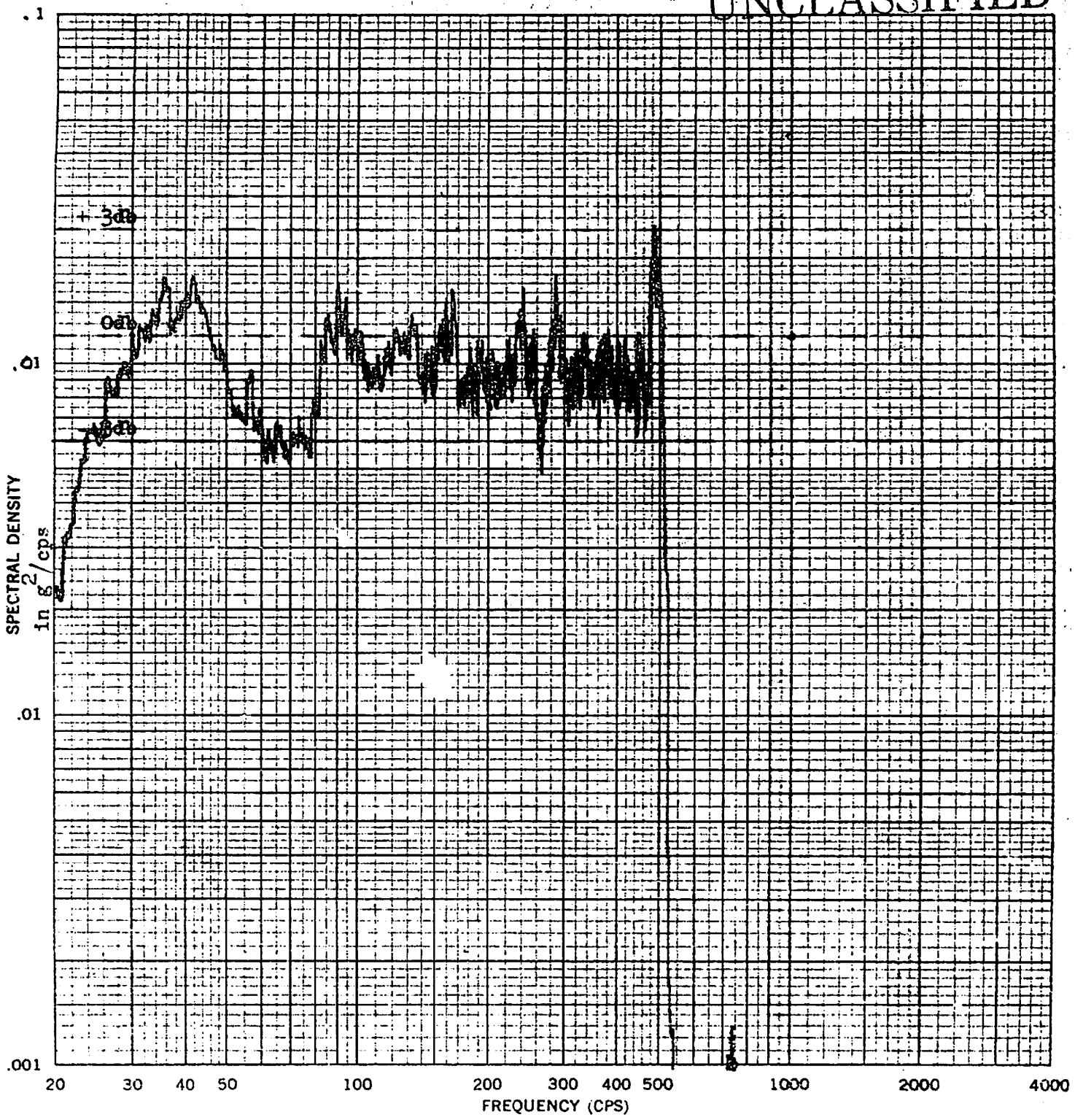

VIBRATION TEST OF XW-45/H-815 RUN #4

WITH INPUT ALONG THE Z AXIS, AT -65 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/20/65

AXIS Z FIGURE 14

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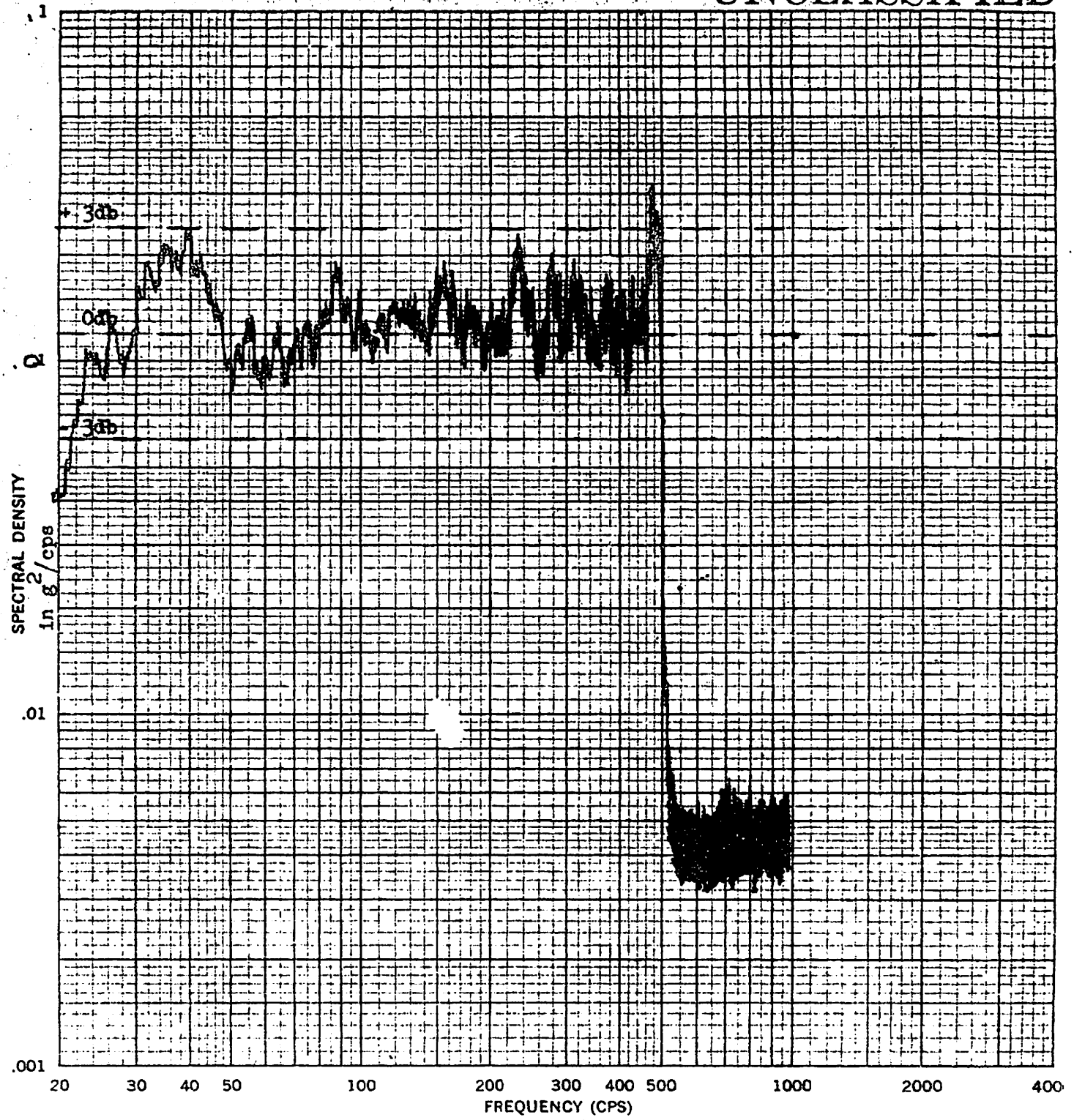

VIBRATION TEST OF XW-45/H-815 RUN #4

WITH INPUT ALONG THE Z AXIS, AT -65 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/20/65

AXIS Z UNCLASSIFIED FIGURE 15

FILTER BANDWIDTH 5 CPS CV PAGE 20

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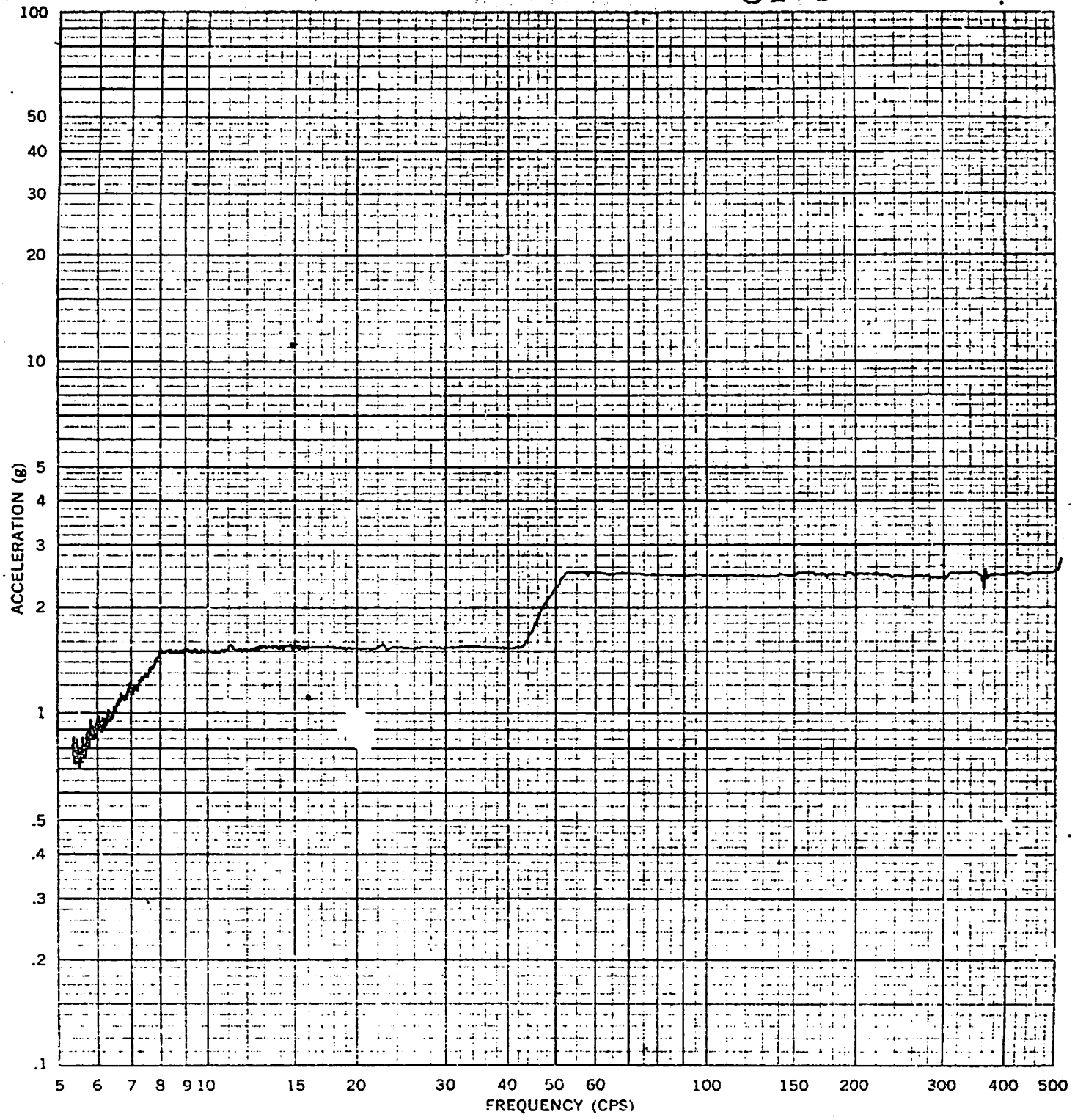

VIBRATION TEST OF XW-45/H-815 RUN #5

WITH INPUT ALONG THE Y AXIS, AT +160 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/24/65

AXIS Y FIGURE 14

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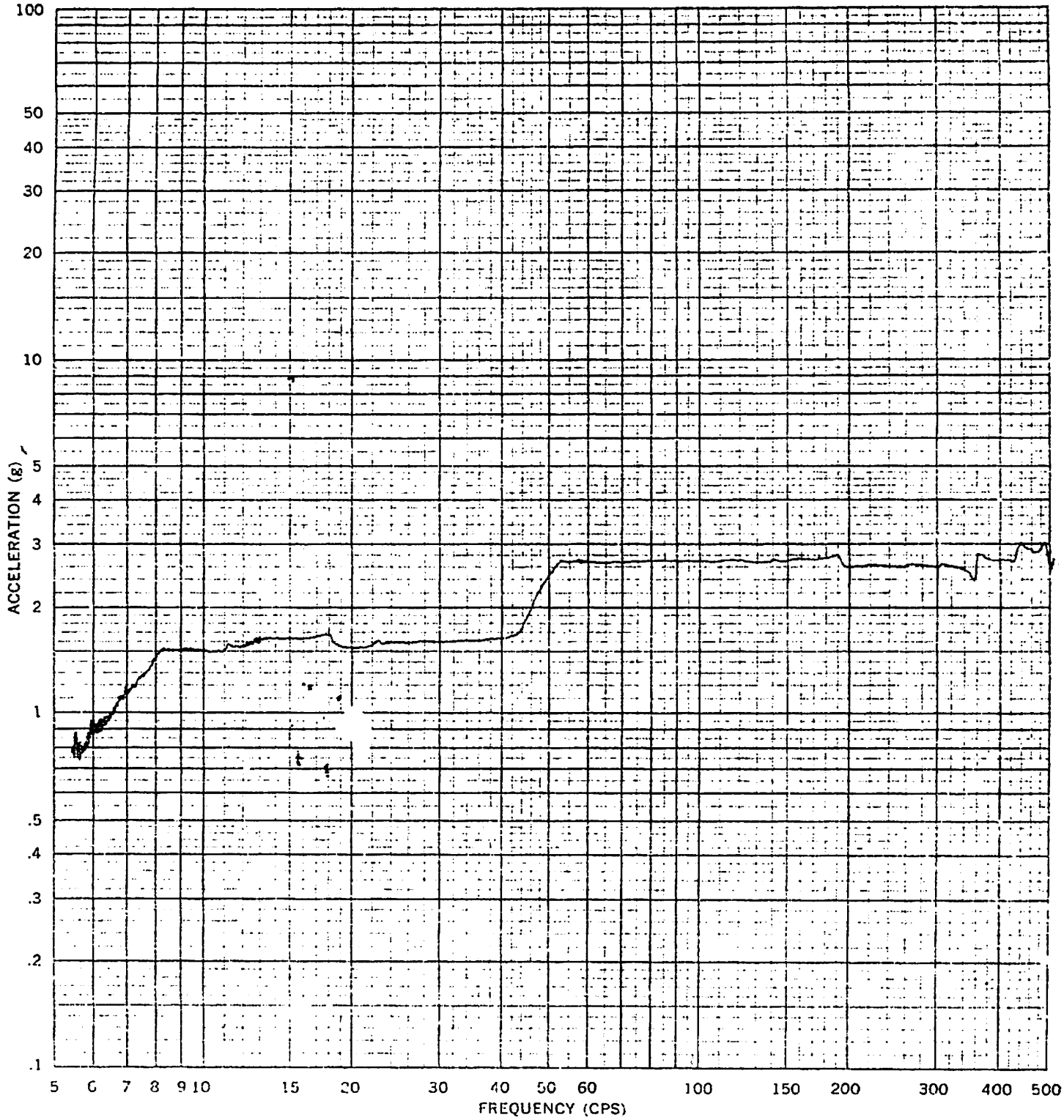

VIBRATION TEST OF XW-45/R-815 RUN #5

WITH INPUT ALONG THE Y AXIS, AT +160 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/24/65

AXIS Y FIGURE 14

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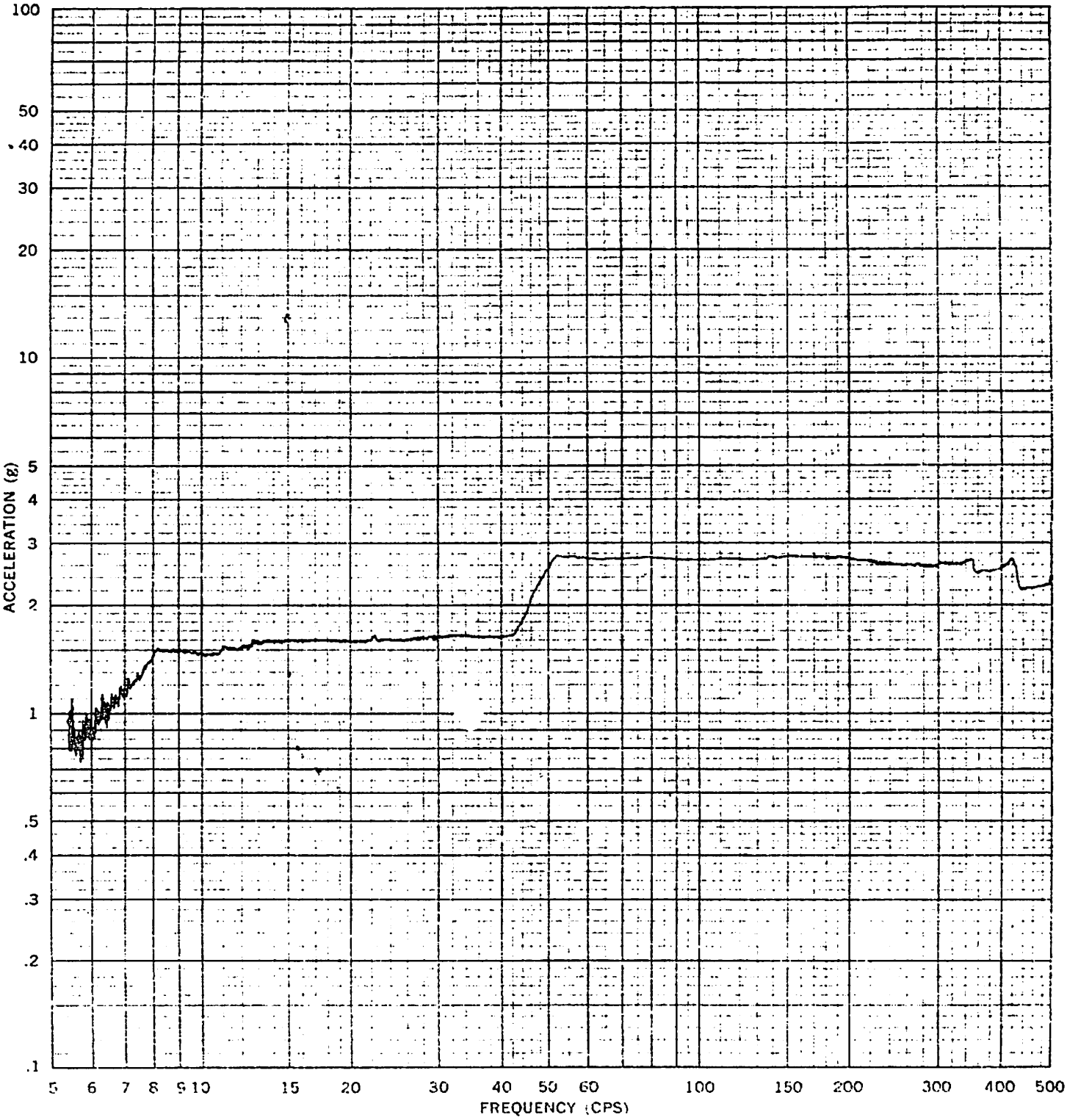

VIBRATION TEST OF XW-45/H-815 RUN #5

WITH INPUT ALONG THE Y AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #1 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 1/24/65

AXIS Y FIGURE 10

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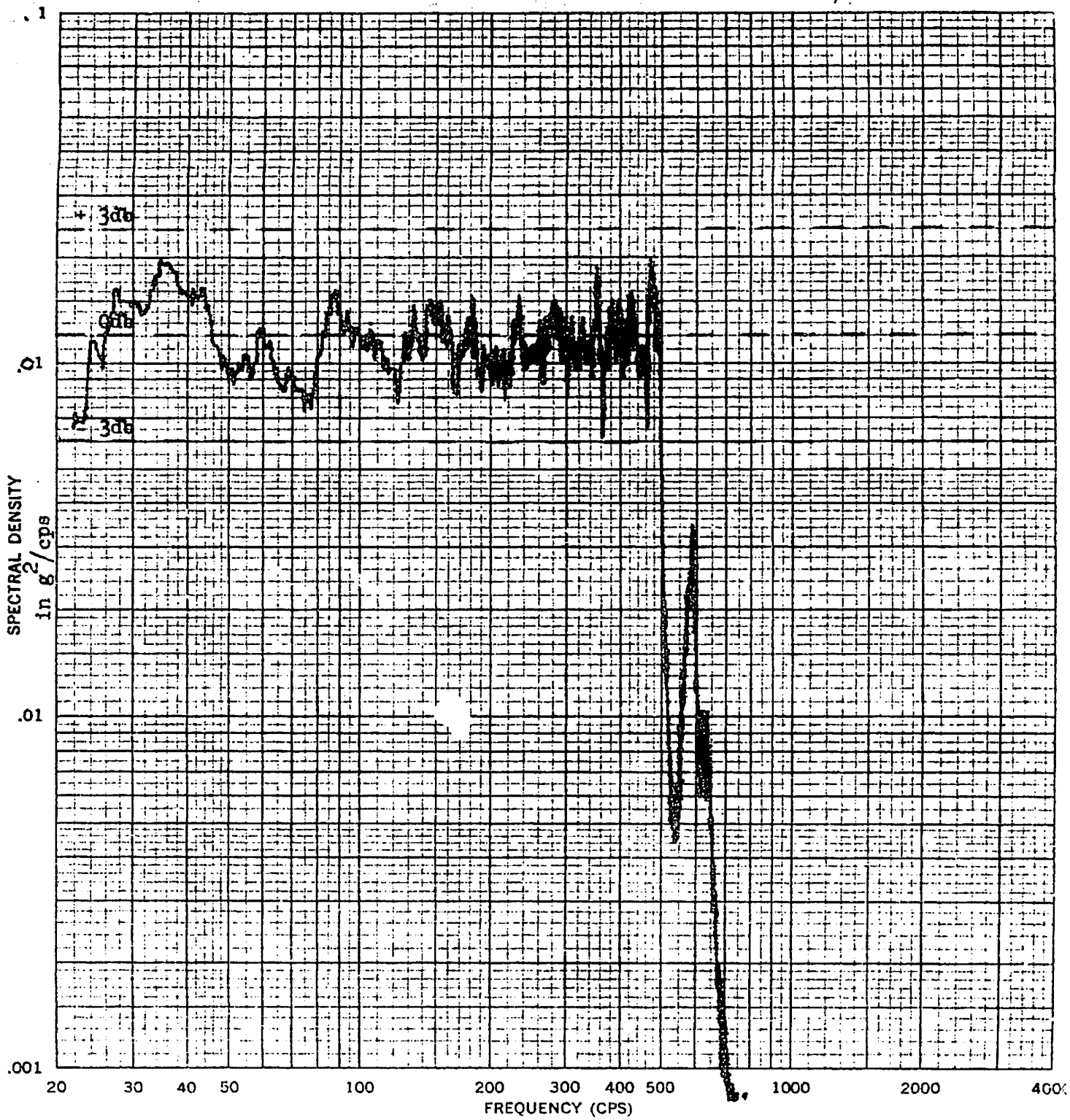

VIBRATION TEST OF XW-45/H-815 RUN #6

WITH INPUT ALONG THE Y AXIS, AT +160 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/24/65

AXIS Y UNCLASSIFIED FIGURE 19

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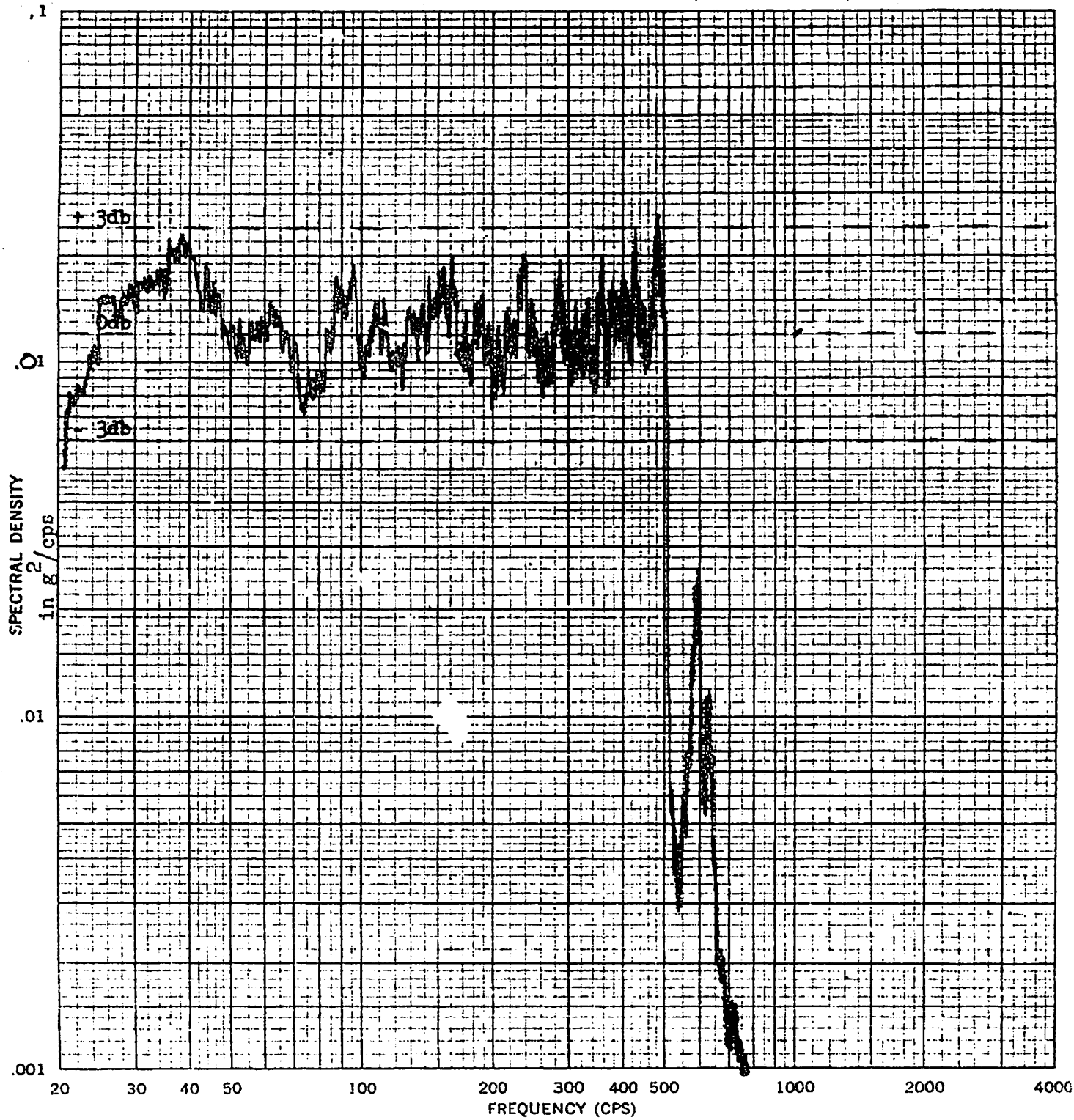

VIBRATION TEST OF XW-45/H-815 RUN #6

WITH INPUT ALONG THE Y AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 accel. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/24/65

AXIS Y FIGURE 20

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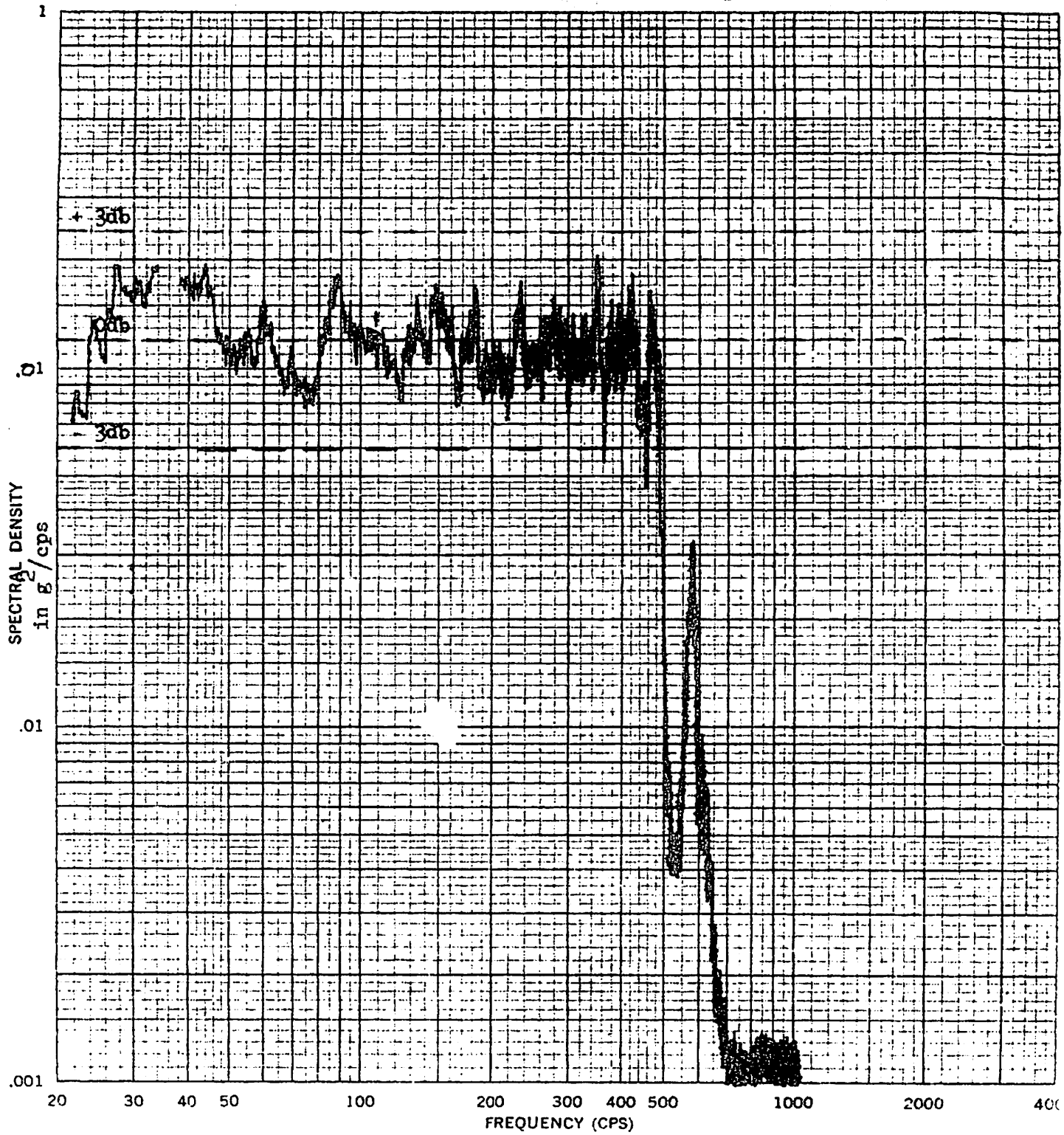

VIBRATION TEST OF XW-45/H-815 RUN #6

WITH INPUT ALONG THE Y AXIS, AT +160 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/24/65

AXIS Y FIGURE 21

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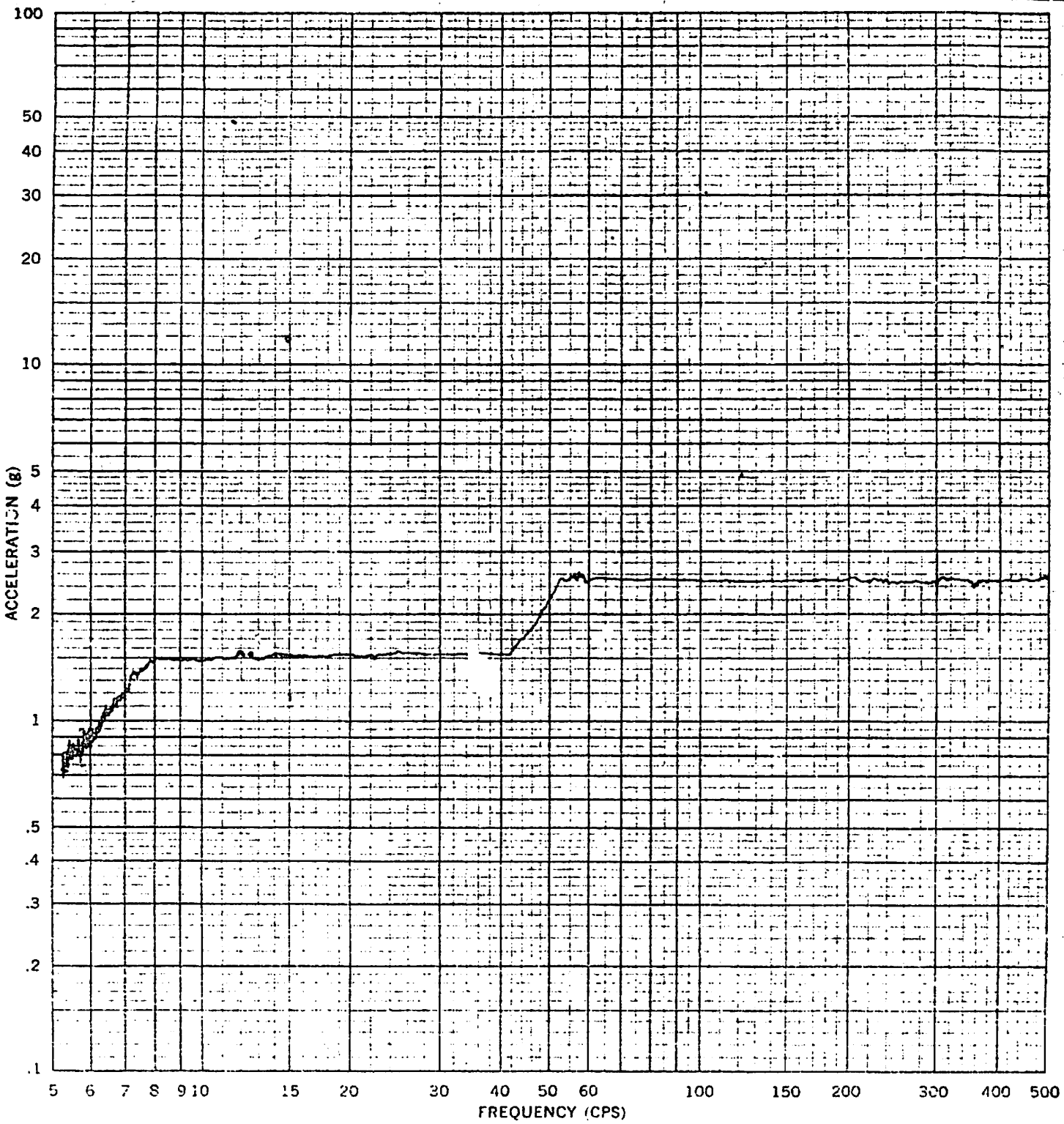

VIBRATION TEST OF XW-45/H-815 RUN #7

WITH INPUT ALONG THE Y AXIS, AT -65 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/27/65

AXIS Y FIGURE 22

FILTER BANDWIDTH 5 CPS PAGE 27

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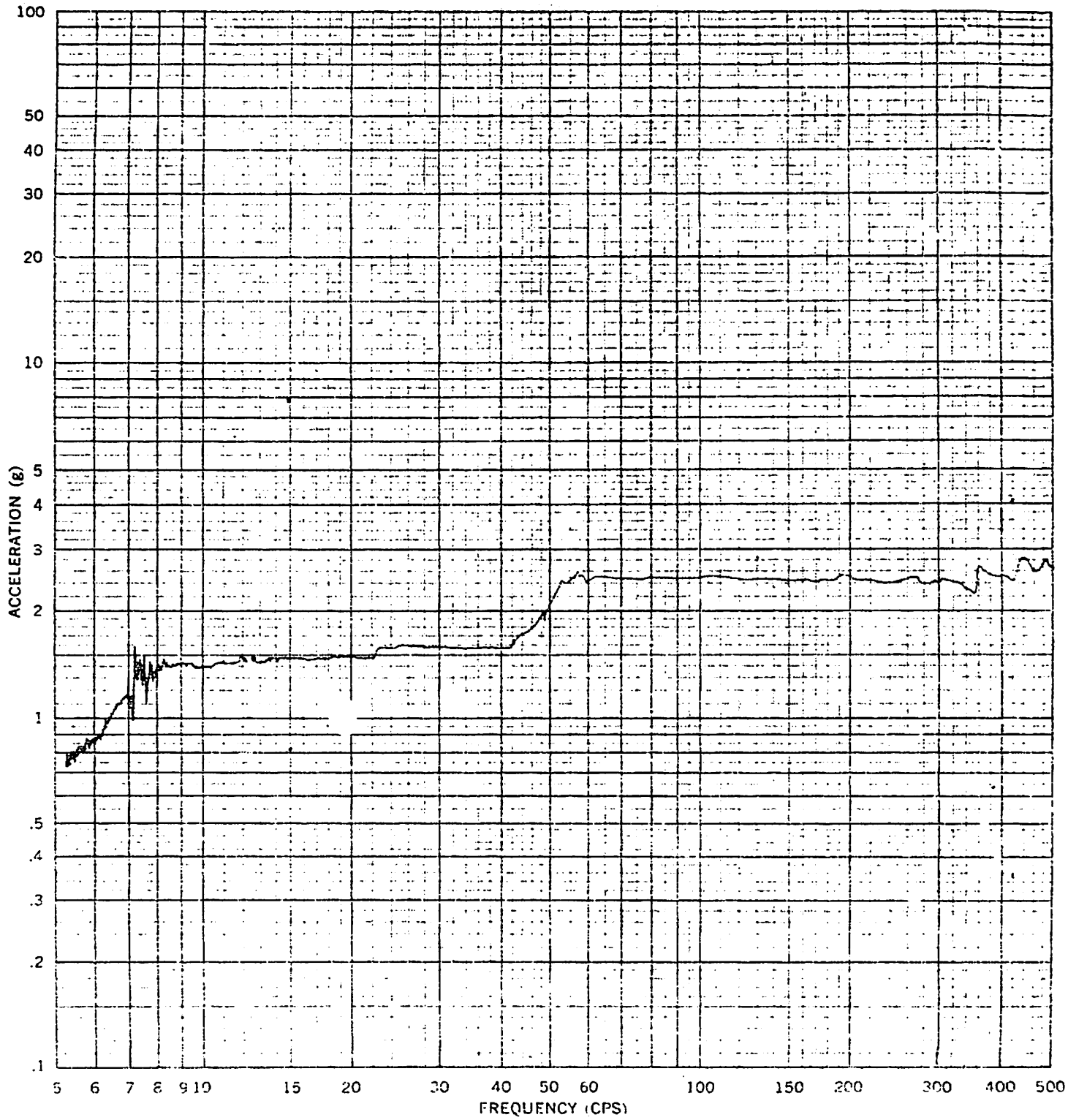


VIBRATION TEST OF XW-45/H-815 RUN #7

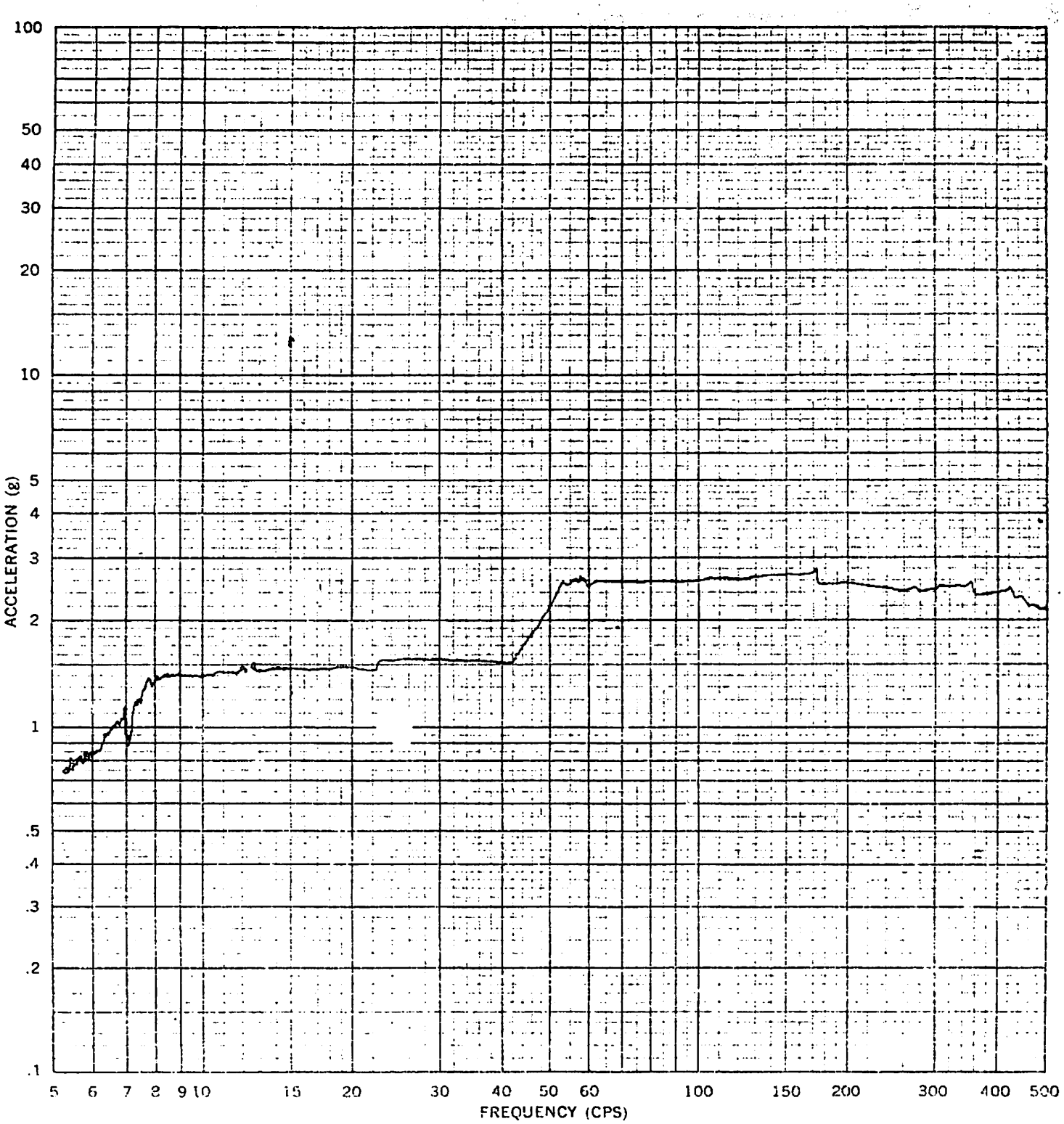
WITH INPUT ALONG THE Y AXIS, AT -65 F 1 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/27/65

AXIS Y FIGURE 23

FILTER BANDWIDTH 5 CPS PAGE 23



VIBRATION TEST OF XW-45/H-815 RUN #7

WITH INPUT ALONG THE Y AXIS, AT -65 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/27/65

AXIS Y FIGURE 24

FILTER BANDWIDTH 5 CPS PAGE 29

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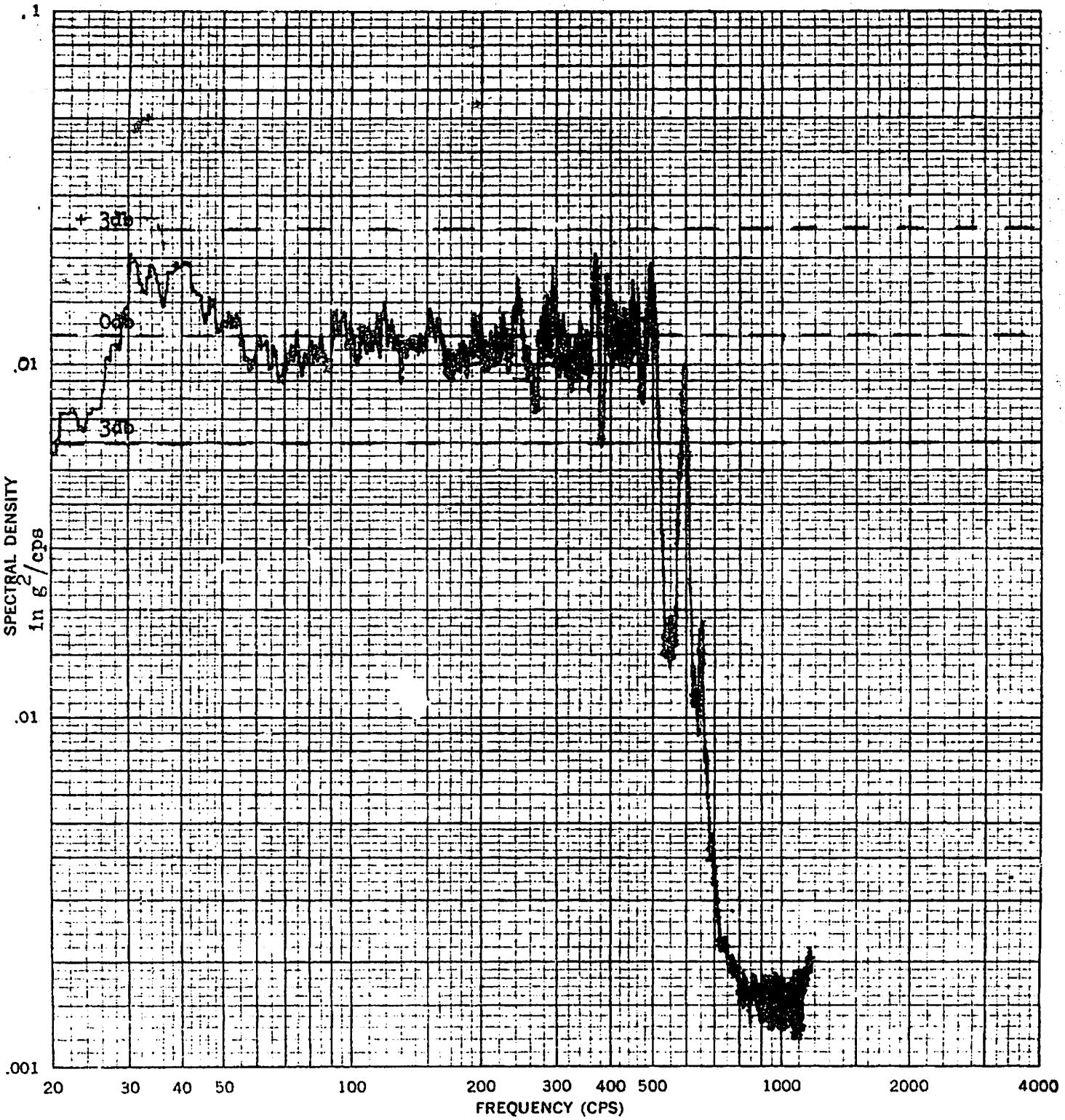

VIBRATION TEST OF XW-45/H-815 RUN #8

WITH INPUT ALONG THE Y AXIS, AT -65 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/27/65

AXIS Y FIGURE 25

FILTER BANDWIDTH 5 CPS CV PAGE 30

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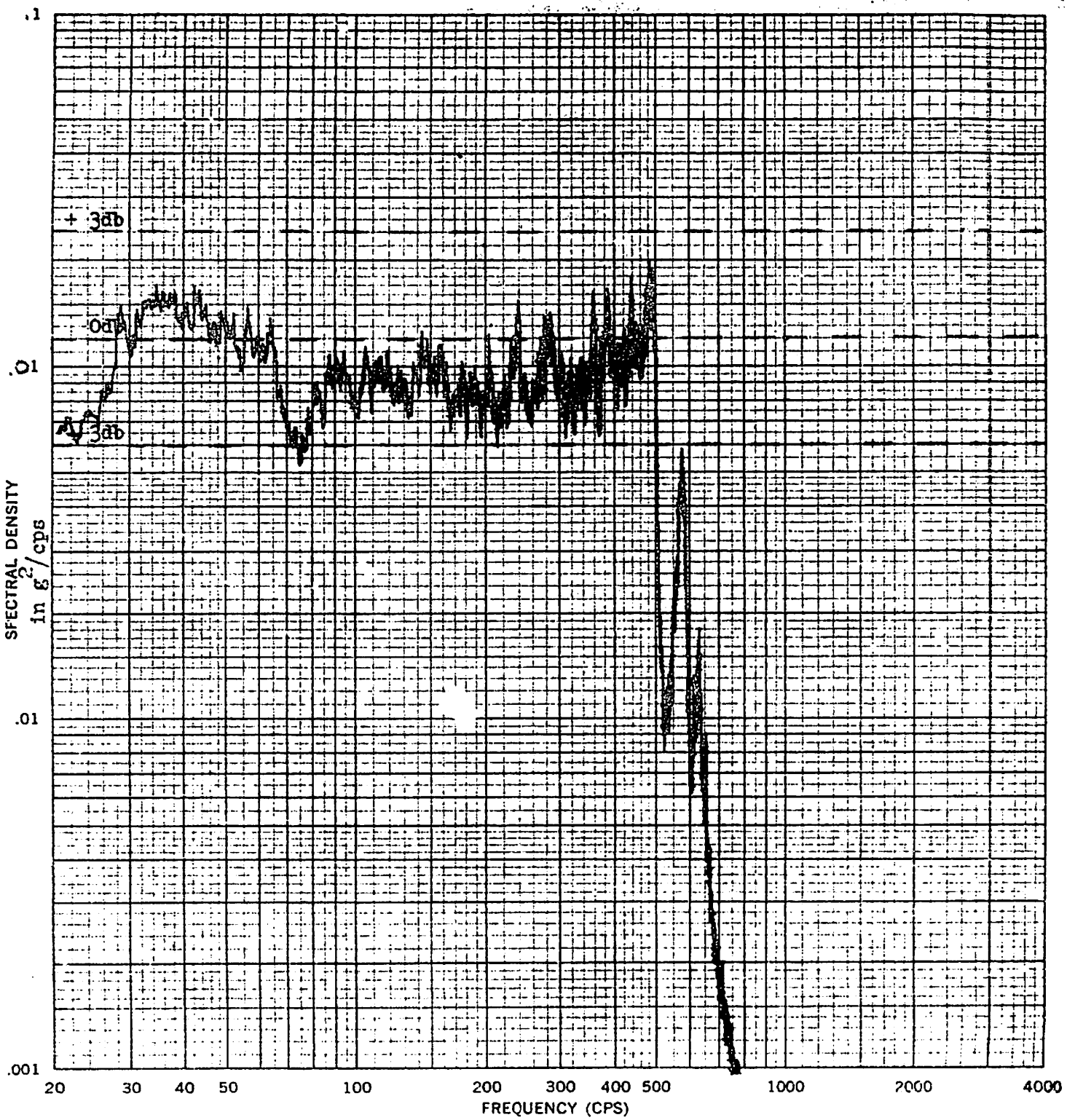


VIBRATION TEST OF XW-45/H-815 RUN #8

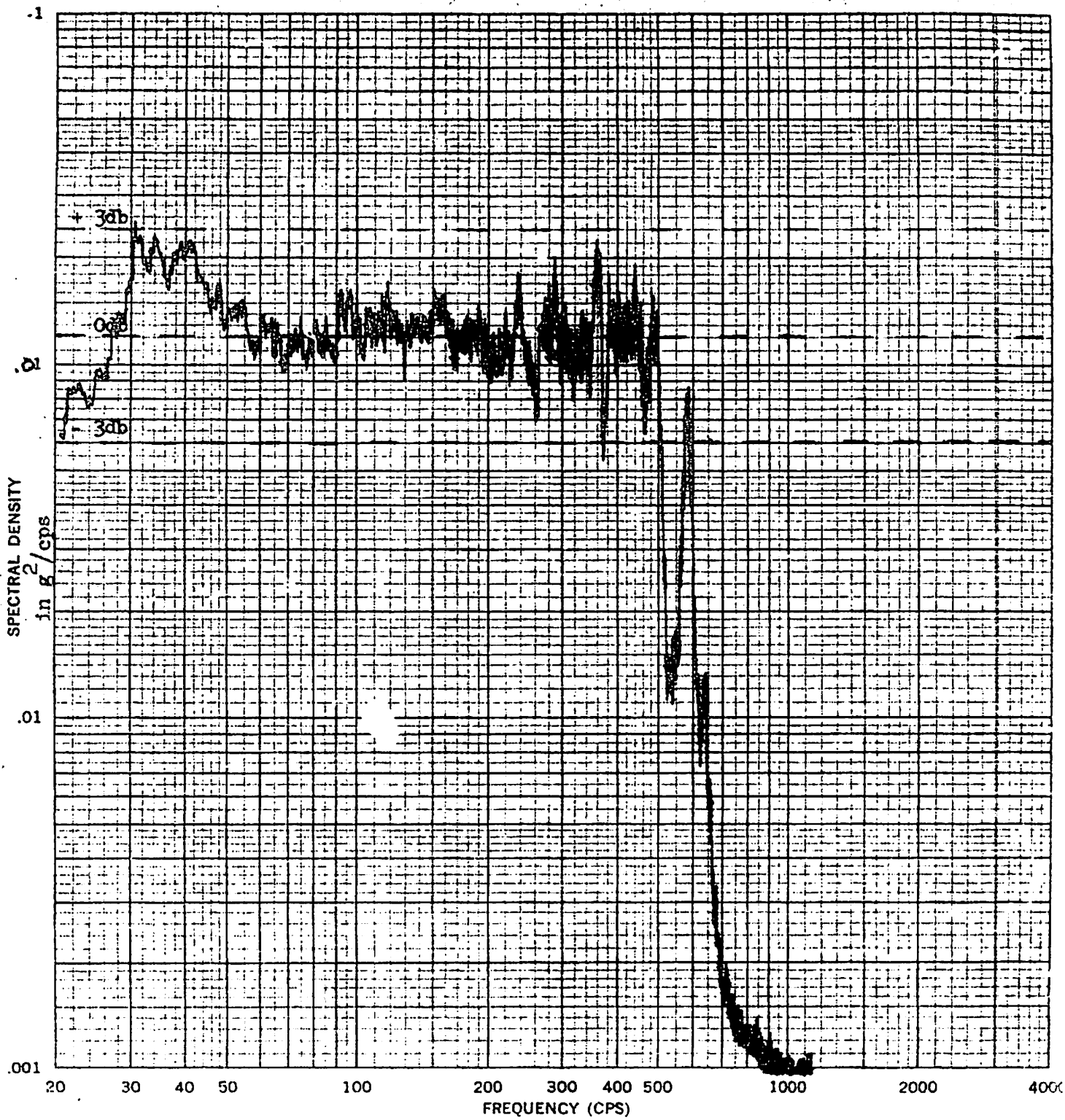
WITH INPUT ALONG THE Y AXIS, AT -65 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/27/65

AXIS Y FIGURE 26

FILTER BANDWIDTH 5 CPS CV PAGE 31



VIBRATION TEST OF XW-45/H-815 RUN #8

WITH INPUT ALONG THE Y AXIS, AT -65 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/27/65

AXIS Y FIGURE 27

FILTER BANDWIDTH 5 CPS CV PAGE 32

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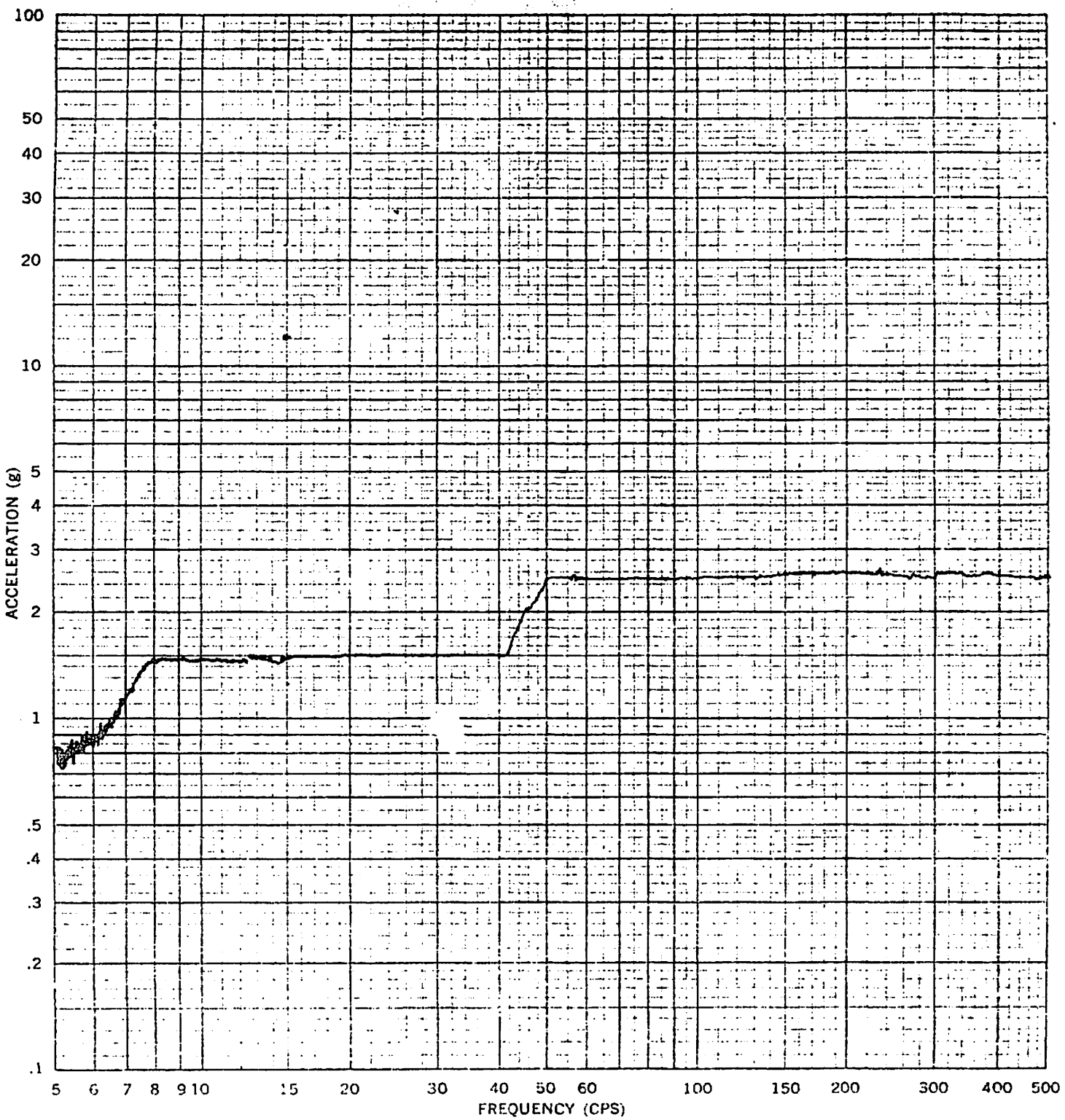


VIBRATION TEST OF XW-45/H-815 RUN #9

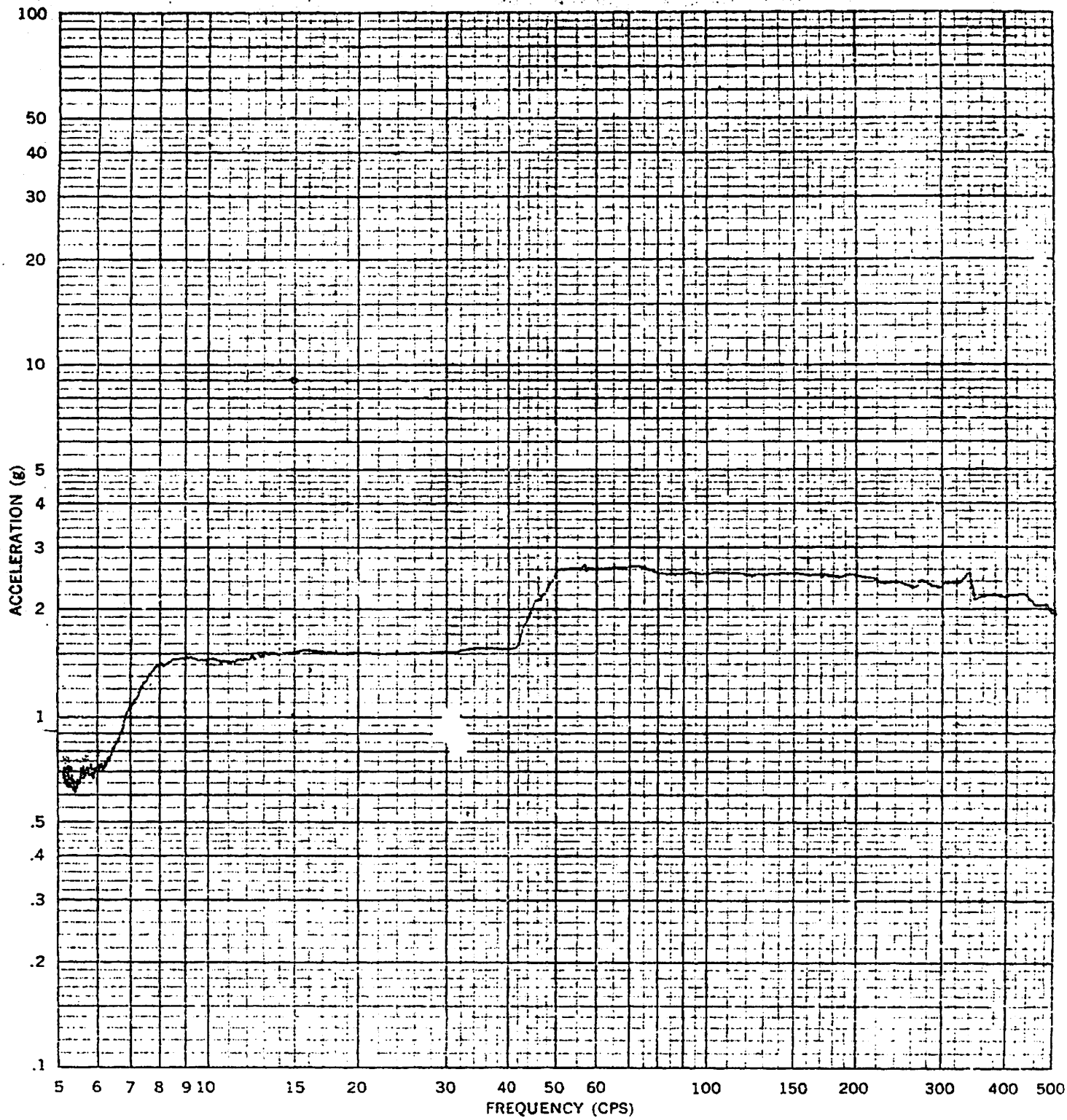
WITH INPUT ALONG THE X AXIS, AT +160 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/31/65

AXIS X FIGURE 28

FILTER BANDWIDTH 5 CPS PAGE 33



VIBRATION TEST OF XW-45/H-815 RUN #9

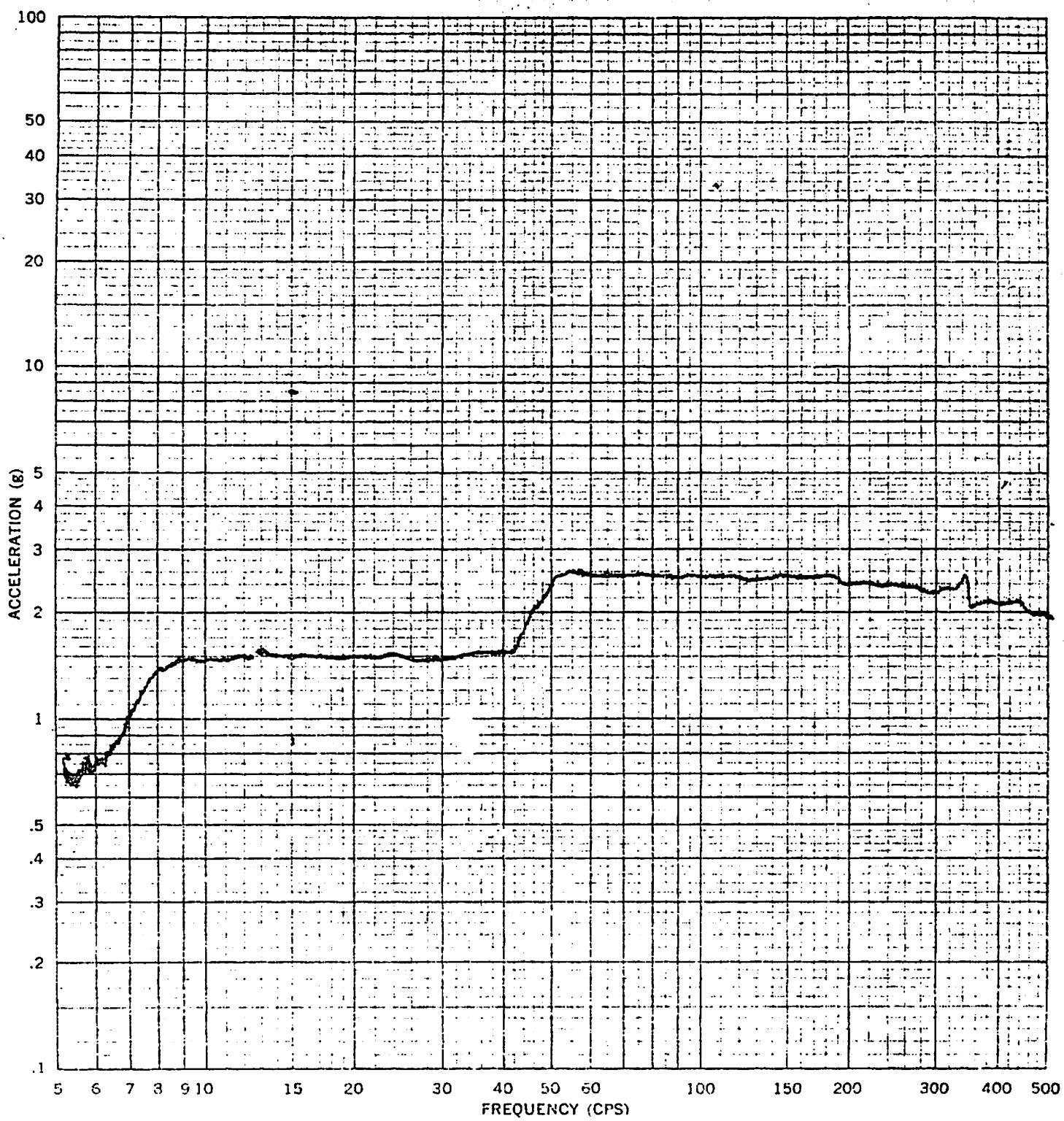
WITH INPUT ALONG THE X AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/31/65

AXIS Y FIGURE 29

FILTER BANDWIDTH 5 CPS PAGE 34



VIBRATION TEST OF XW-45/H-815 RUN #9

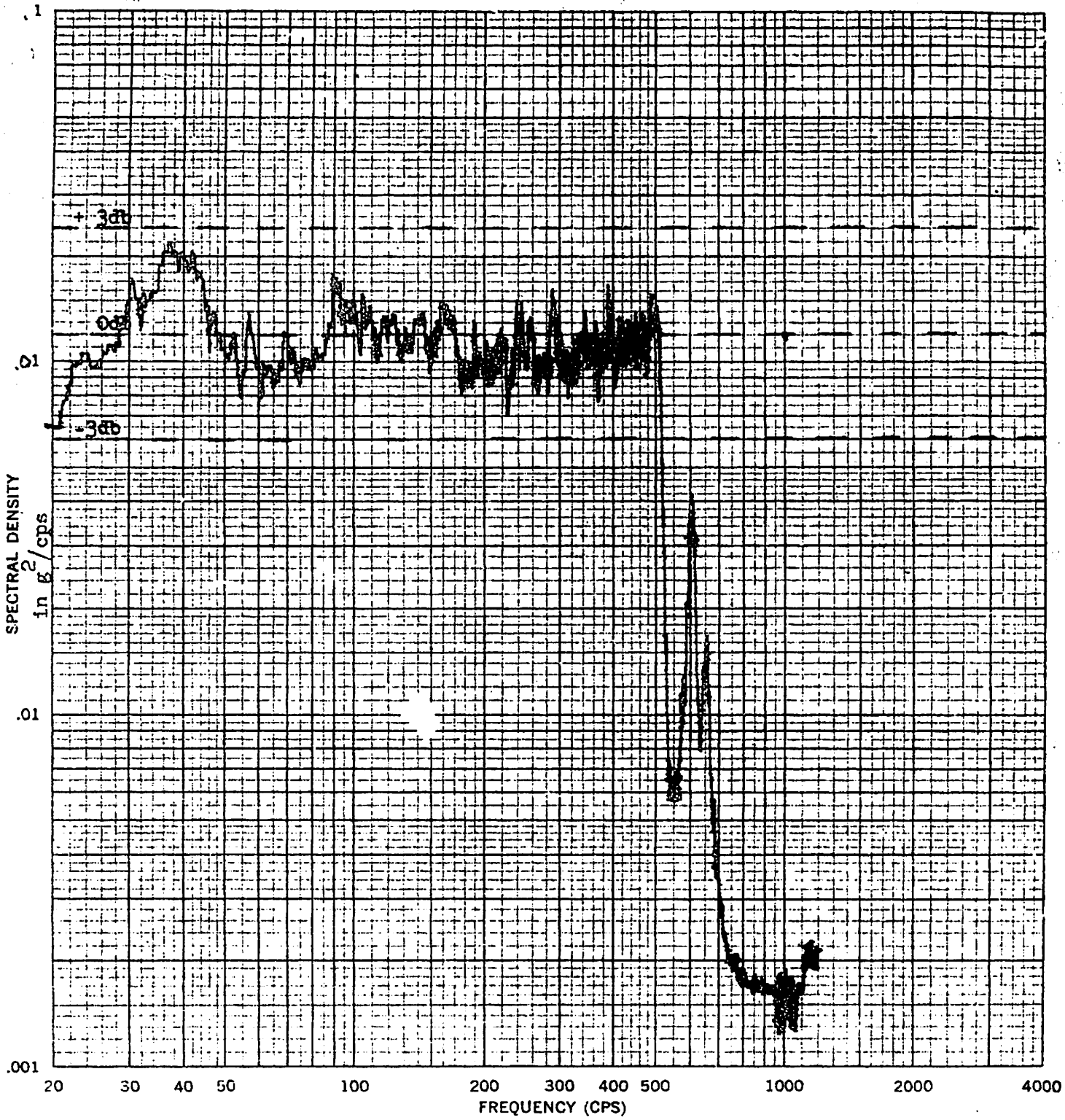
WITH INPUT ALONG THE X AXIS. AT 1160 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/31/65

AXIS Y FIGURE 30

FILTER BANDWIDTH 5 CPS PAGE 35



VIBRATION TEST OF XW-45/H-815 RUN #10

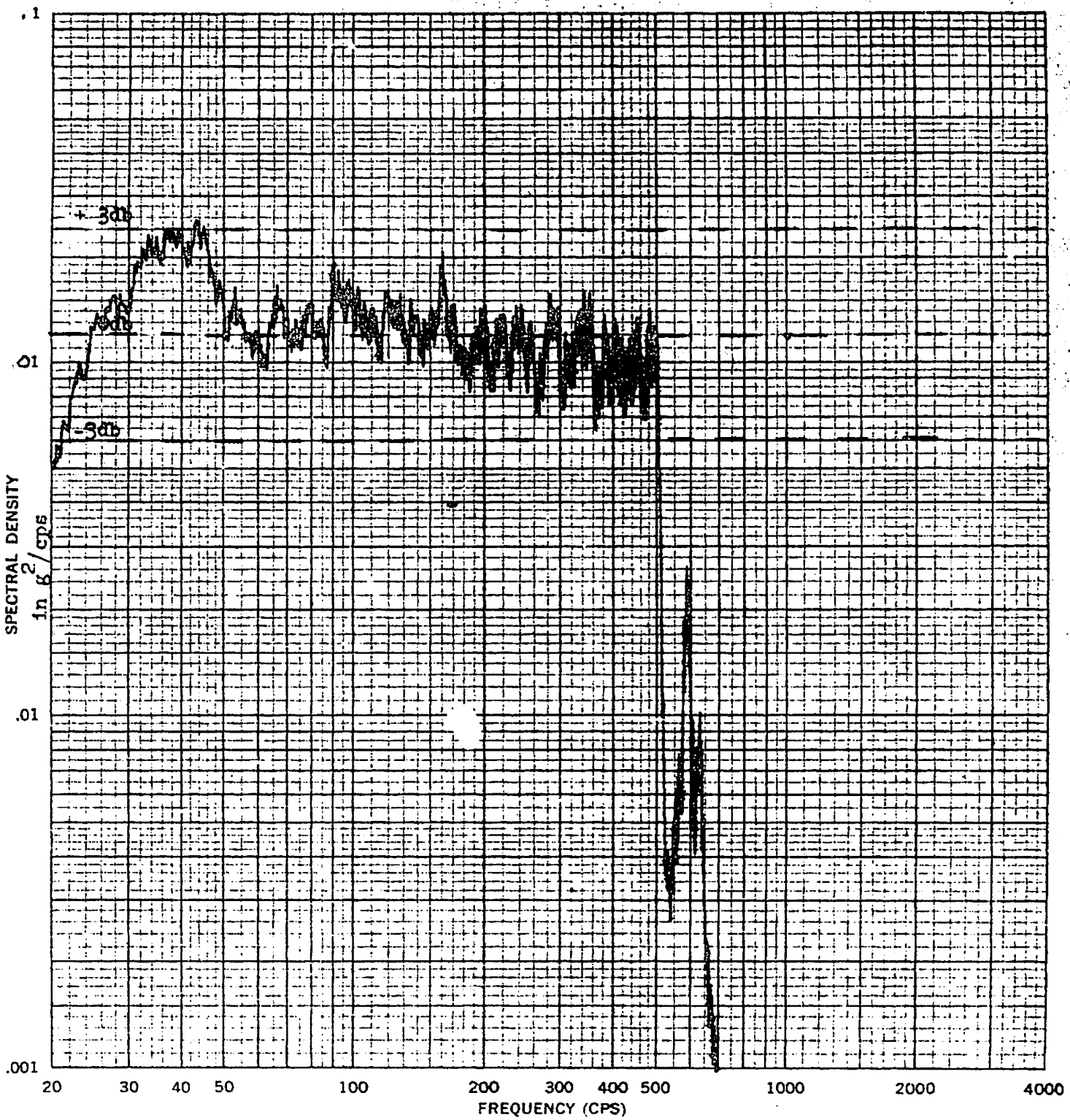
WITH INPUT ALONG THE X AXIS, AT +160 °F T- 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/31/65

AXIS Y FIGURE 31

FILTER BANDWIDTH 5 CPS CV PAGE 36



VIBRATION TEST OF XW-45/H-815 RUN #10

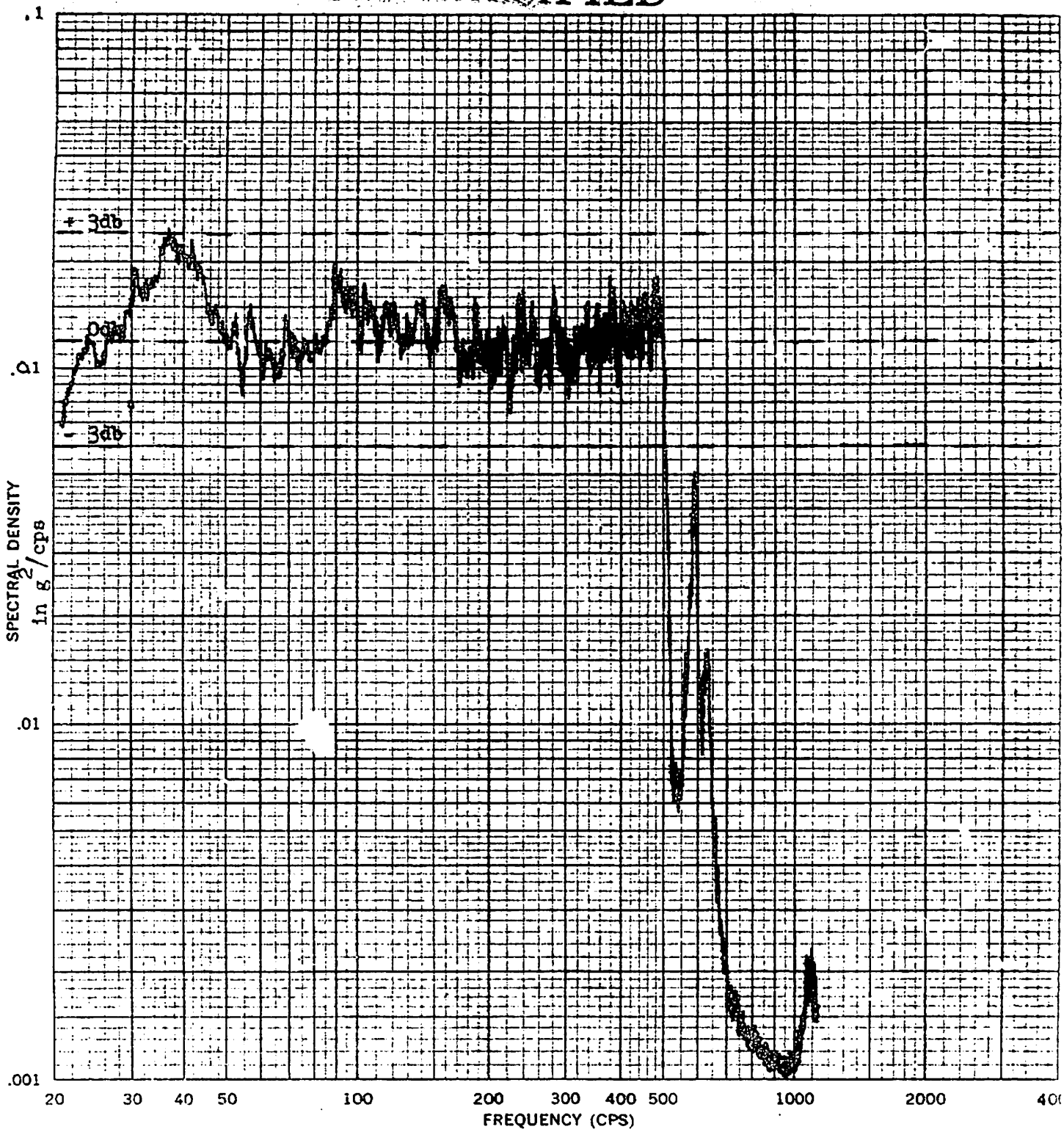
WITH INPUT ALONG THE X AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/31/65

AXIS Y FIGURE 32

FILTER BANDWIDTH 5 CPS CV PAGE 37



VIBRATION TEST OF XW-45/H-815 RUN #10

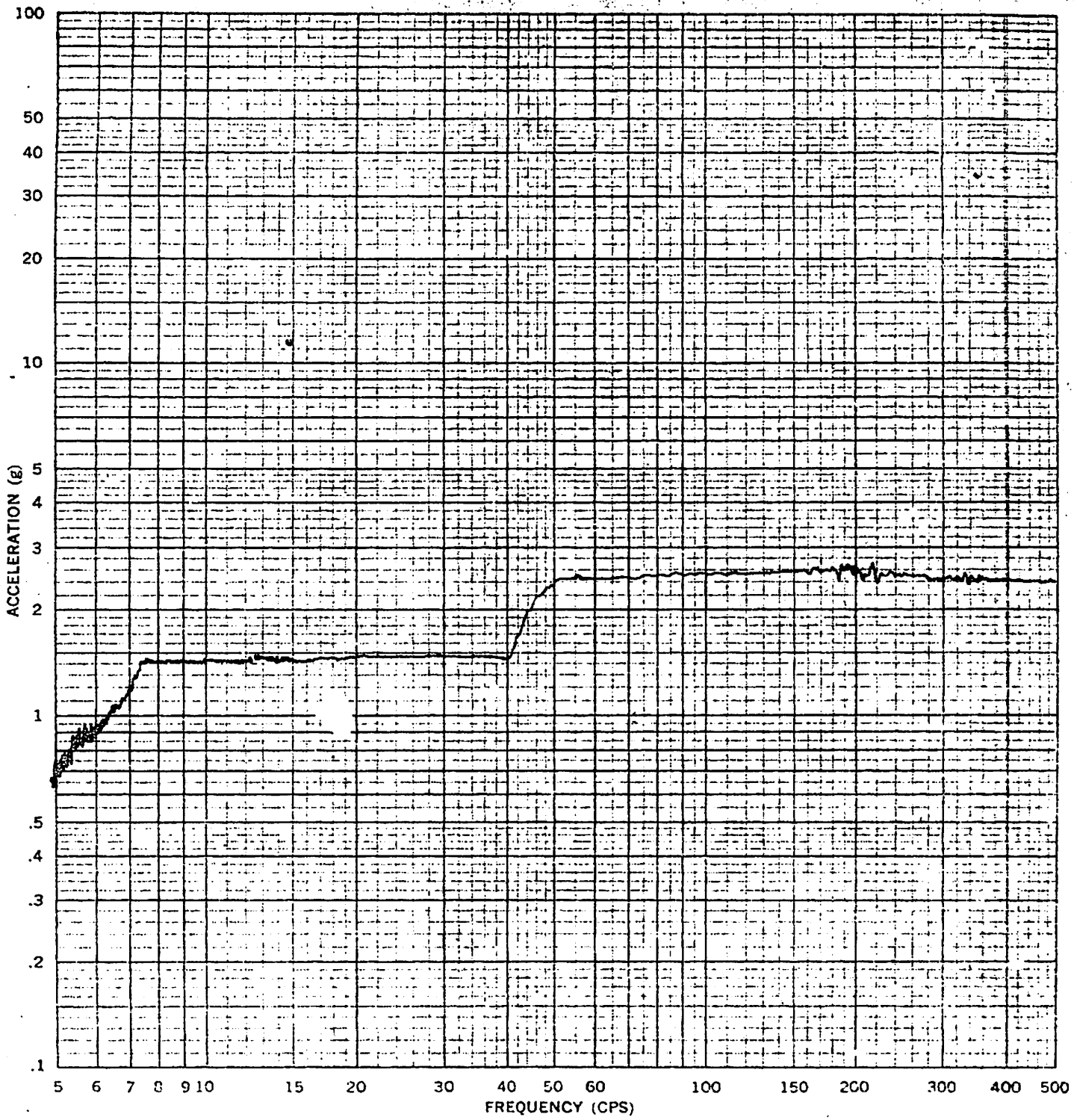
WITH INPUT ALONG THE X AXIS, AT +160 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 8/31/65

AXIS Y FIGURE 33

FILTER BANDWIDTH 5 CPS CV PAGE 38



VIBRATION TEST OF XW-45/H-815 RUN #11

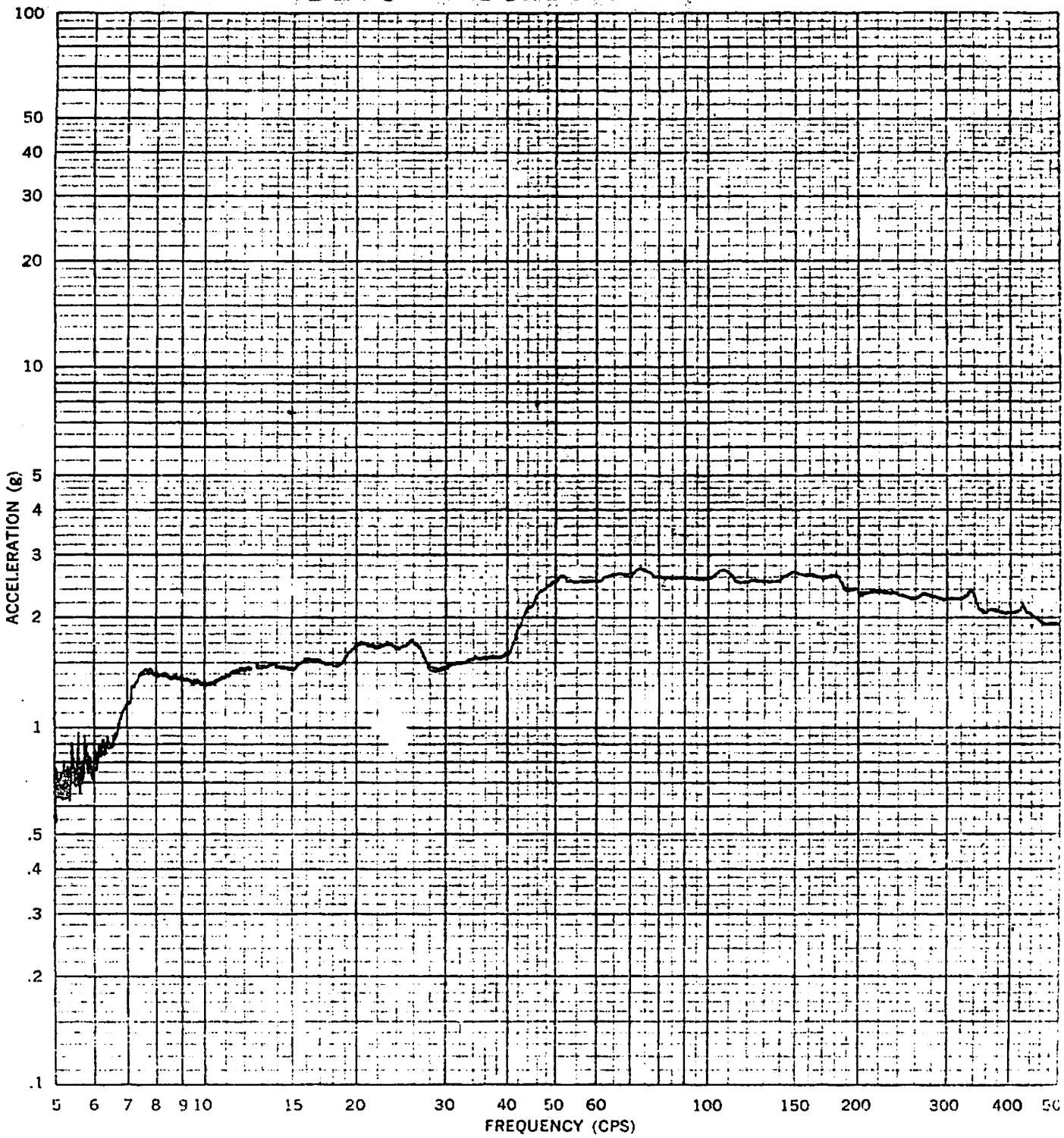
WITH INPUT ALONG THE X AXIS, AT -65 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 9/3/65

AXIS X FIGURE 34

FILTER BANDWIDTH 5 CPS PAGE 39



VIBRATION TEST OF XW-45/H-815 RUN #11

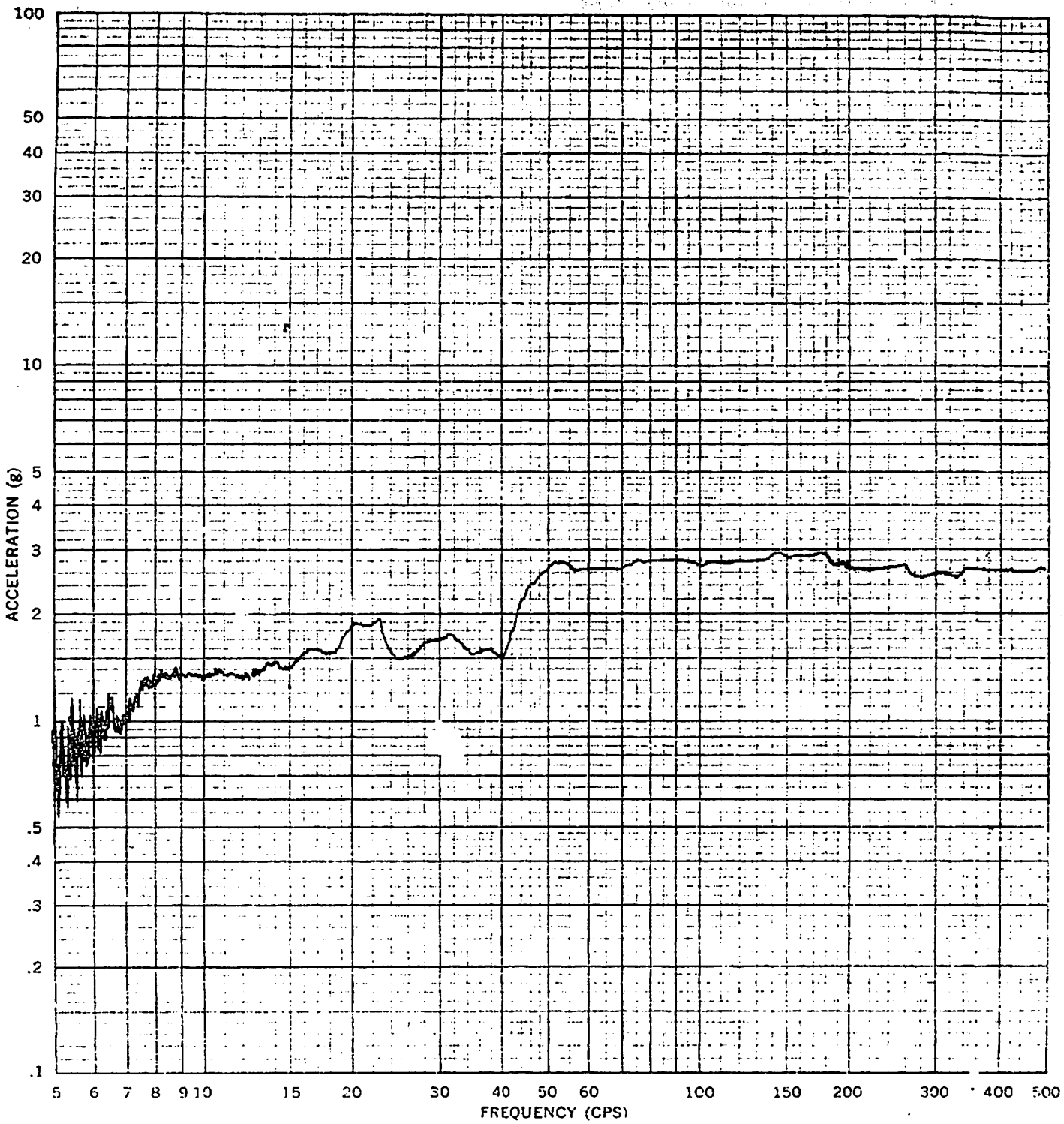
WITH INPUT ALONG THE X AXIS, AT -65 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 2/3/65

AXIS Y FIGURE 35

FILTER BANDWIDTH 5 CPS PAGE 40



VIBRATION TEST OF XW-45/II-815 RUN #11

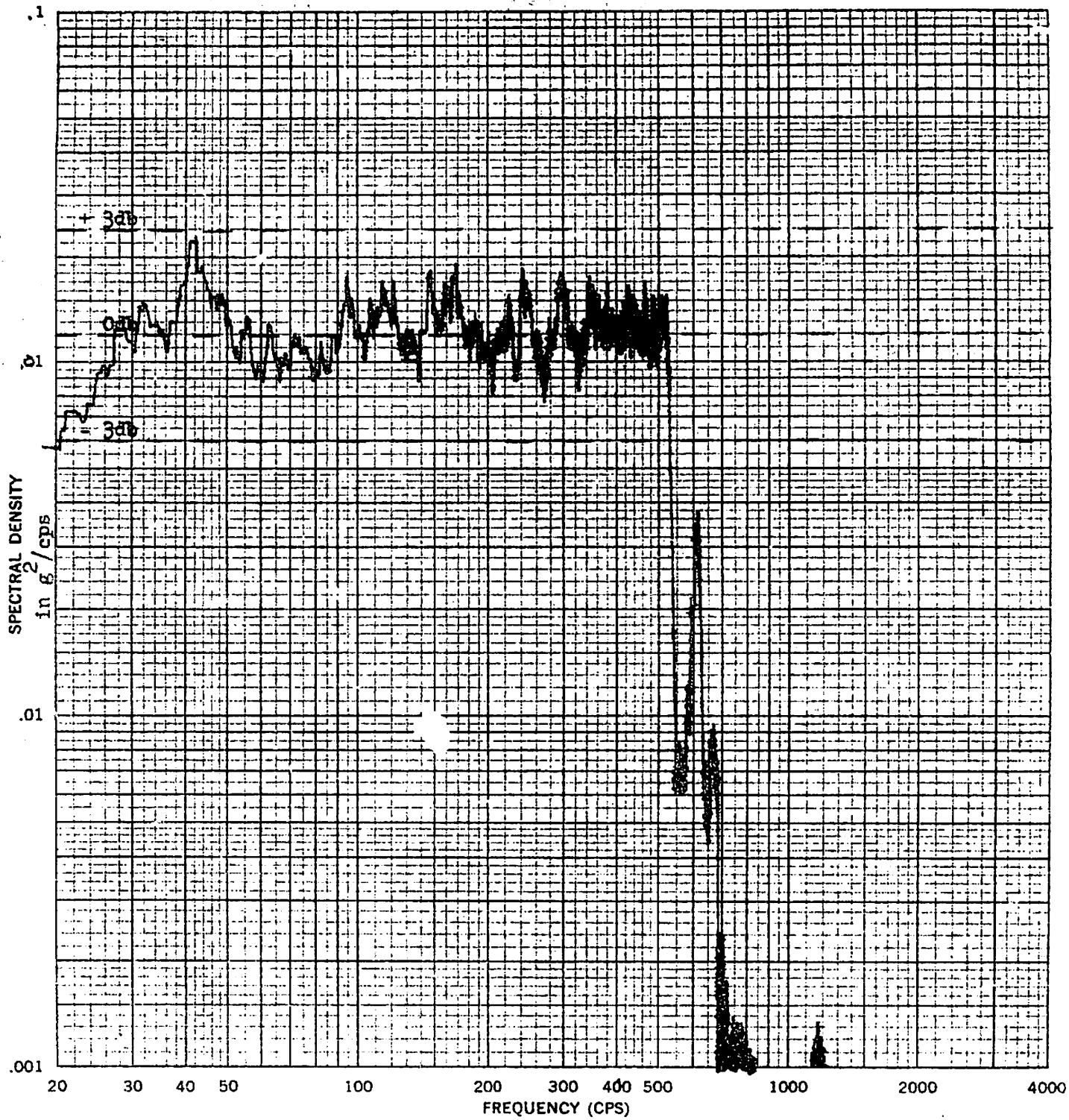
WITH INPUT ALONG THE X AXIS, AT -65 °F T. 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 9/3/65

AXIS Y FIGURE 35

FILTER BANDWIDTH 5 CPS PAGE 41



VIBRATION TEST OF XW-45/H-815 RUN #12

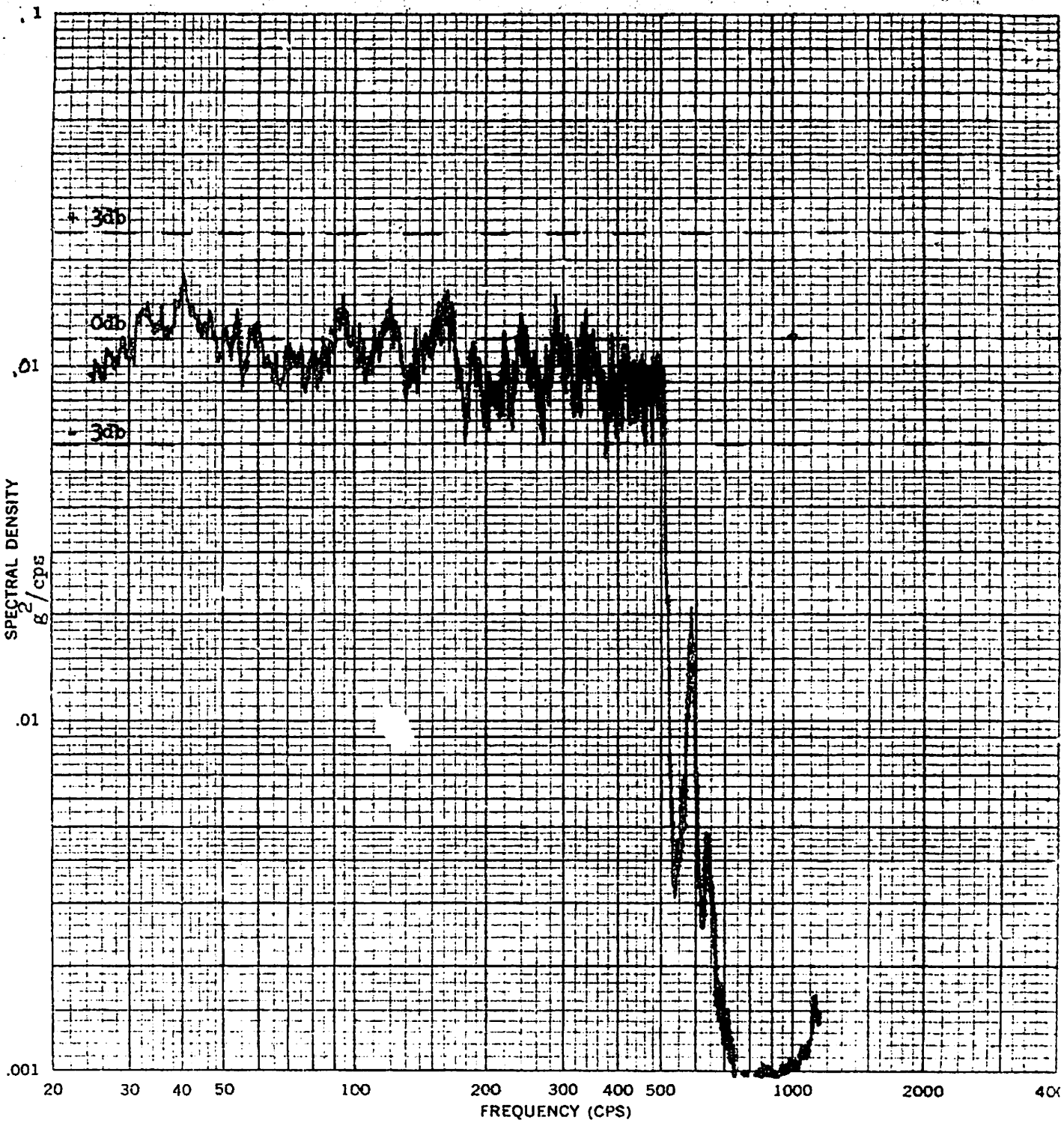
WITH INPUT ALONG THE X AXIS, AT -65 °F T. 11141

ACCEL. LOCATION INPUT, ADAPTER PLATE #1 ACCEL. #1 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 9/3/65

AXIS Y FIGURE 37

FILTER BANDWIDTH 5 CPS CV PAGE 42



VIBRATION TEST OF XW-45/H-815 RUN #12

WITH INPUT ALONG THE X AXIS, AT -65 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #2 ACCEL. #2 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 9/3/65

AXIS Y FIGURE 38

FILTER BANDWIDTH 5 CPS CV PAGE 43

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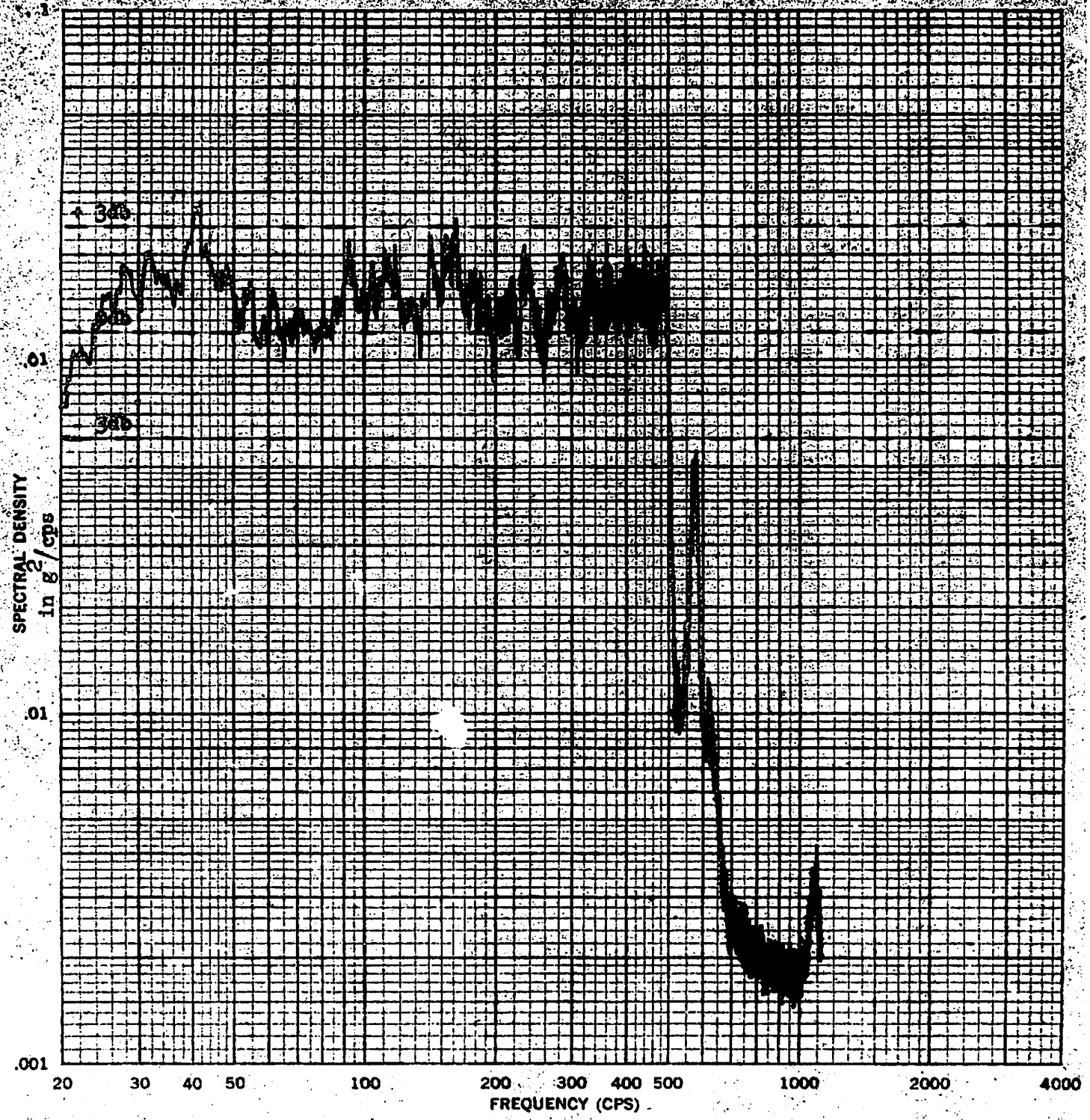

VIBRATION TEST OF XW-45/H-815 RUN #12

WITH INPUT ALONG THE X AXIS, AT -65 °F T- 11141

ACCEL. LOCATION ADAPTER PLATE #4 ACCEL. #3 REF. SYM.

FIGURE REFERENCE 1 TEST DATE 9/3/65

AXIS Y FIGURE 39

FILTER BANDWIDTH 5 CPS CV PAGE 44

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