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18 May 1960

NOTE:

A. 1. In making the voice recordings used in all intelligibility tests associated with the ASR-1 receiver, the input to the tape recorder was taken from the "AUDIO P.A." jack of the ASR-1. In field use the input into the tape recorder is normally taken from the "AUDIO DET." jack of the ASR-1.

2. The audio signal, when taken from the "AUDIO DET." jack, is independent of the audio gain setting of the receiver. The output at the "AUDIO P.A." jack, however, is controlled directly by the audio gain control.

3. The frequency response viewed at the "AUDIO P.A." jack drops off ~~very~~ rapidly at frequencies below ~~1000~~ 400 cps, while at the "AUDIO DET." jack it remains essentially constant from 50-1000 cps. The response above 1000 cps drops off at approximately the same rate for both jacks.

B. 1. At several points in the text of this report, reference is made to the bandwidth of the ASR-1 placing a limitation on the allowable deviation of the RT-3R. It is felt that if the RT-3R deviation is set as suggested in the RT-3R operation manual, the input from an operational microphone installation would have insufficient amplitude to cause the transmitter deviation to exceed the bandwidth of the ASR-1.

NOTE: The above information should be kept in mind when reading paragraph 2.10 and all other portions of the report concerned with the performance of the microphone, transmitter, and receiver when used as a system.

B. 1. The RT-3R transmitter is normally paired with an MC-30 microphone in field use. When this arrangement is used in conjunction with the ASR receivers the deviation setting of the RT-3R as suggested in the RT-3R operation manual, is adequate. However, when the BK-6B microphone is used with the RT-3R and ASR receiver, the RT-3R deviation should be set to its maximum value. This was shown to vary from 19KC to 33KC per 100 MV. input for the units tested in this report. This larger deviation setting allows the BK-6B — RT-3R system to make full use of the ASR deviation limits. Since the RT-3R deviation setting is necessary because the signal fed to the RT-3R from the BK-6B microphone is approximately 17 db below that of a MC-30 microphone with equal sound pressure levels. This greater deviation sensitivity of the RT-3R, when the BK-6B, RT-3R, and ASR are used as a system, should decrease the effect of noise on the system intelligibility.

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MC-30

OUTPUT

E @ 71 db S.P. = 250 μV. for MC-30

E @ 86 db S.P. = 1400 μV. for MC-30

E @ 78.5 db S.P. = 600 μV. for MC-30

20 log $\frac{\text{E OUT OF MC-30}}{\text{E OUT OF BK-6B}}$ = 7.1 = 17 db

$600\ \mu V. = 10^{-\frac{X}{20}}$

$1670 = 10^{\frac{X}{20}}$

let $\frac{X}{20} = y$

$10^y = 1670$

$y = 3.223$

$X = 20y = 20(3.23) = 64.5$

S.P. for above $X = (69 - 64.5) + 74 = 4.5 + 74$

$= \underline{78.5\ db}$

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BK-6B

OUTPUT

E @ 71 db sp. = 35.4 MV. for BK-6B

E @ 86 db sp. = 200 MV. for BK-6B

E @ 100 db sp. = 1000 MV. " "

E @ 95.4 db sp. = 600 MV. " "

$$600\ MV. = 10^{-\frac{x}{20}}$$

$$\therefore 1670 = 10^{\frac{x}{20}}$$

let $\frac{x}{20} = y$

$$10^{y} = 1670$$

$$y = 3.223$$

$$x = 20y = 20(3.223) = 64.6$$

S.P. for drone x = (86 - 64.6) + 74 = 74 + 21.4

= 95.4 db.

$100\ \mu V = 10^{-\frac{x}{20}}$

$10{,}000 = 10^{y}$

$y = 4$

$\frac{x}{20} = 4$

$x = 80\ db$

an MC-30 for equal, microphone sound pressures. This greater deviation sensitivity of the RT-3R, when the BK-6B, RT-3R, and ASR are used as a system, should decrease the effect noise, picked up by the BK-6B, has on the system's intelligibility.

B. 1. The RT-3R transmitter is normally used with an MC-30 microphone in the field. When this arrangement is used in conjunction with an ASR receiver, the 5 KC per 100 μV transmitter deviation setting, as suggested in the transmitter operation manual, is adequate. However, when the BK-6B microphone is used with the RT-3R transmitter and ASR receiver, the transmitter deviation capability should be set to its maximum value, which is shown to vary from 19 KC to 33 KC per 100 μV for the units tested in this report. This greater deviation sensitivity setting is necessary to allow the BK-6B — RT-3R system to make fullest use of the ASR deviation capability, since the amplitude of a signal fed to the transmitter from the BK-6B is approximately 18 % of that from

since the output from a BK-6B is 15 dB below that of an MC-30, this transmitter deviation

undue distortion.

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graph ordinate represents response and is a function of $\left(\frac{\text{voltage}}{\text{pressure}}\right)$.

EXAMPLE: BK-6B CURVE WITHOUT AMPLIFIER.

RESPONSE = − 86 db MAX

25X1

25X1

SUPPOSE S. P. AT MIC [redacted] 15+71 db re $\frac{.0002 \text{ dyne}}{\text{cm}^2}$

AMPLITUDE OF MIC OUTPUT IS CALCULATED AS FOLLOWS:

VOICE PRES. = − 3 db re $\frac{1 \text{ dyne}}{\text{cm}^2}$ (74 - 71)

$E = -86 + (-3) = -89$ db re 1 VOLT

$$20 \log \frac{E}{1 \text{ V.}} = -89$$

$$E = 10^{-\left(\frac{89}{20}\right)} (1 \text{ V.}) = 10^{-4.45} = 35.4 \text{ MV.}$$

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dev. = 15 Kc CONFIDENTIAL 0 db +4 dbm

20 MV.

freq.	PA	det.	.05 @ 1 Kc
50	−11.5	0	
100	−6.0	0	
400	−1.0	0	
1 Kc	0	0	.05 V.
5 "	−1.0	−1.5	
7.5 "	−2.5	−3.0	
10 "	−7.0	−5.0	.028 V.

dev. = 50 Kc

			DET. DIST.	P.A. DIST.
50	−11.5	0		
100	−6.5	0		
400	−1.0	0	1.7 %	4.3 %
1 Kc (.16 V)	0	0		4.3 %
5 "	−4.0	−4.5		
7.5 "	−8.0	−8.0		
10 "	−11.5	−10.0		5.0 %

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30 KC DEV. 0 = +4 dbm

freq.	PA	DET
50	-11.5	0
100	-6.0	0
400	-1.0	0
1 KC (.10V)	0	0
5 KC	-2.5	-2.0
7.5 KC	-6.0	-5.0
10 KC	-9.5	-7.5

31 db SIG/NOISE @ 50 KC DEV. — 20 μV in

29 db " @ 30 KC DEV. — 20 μV in

27 db " @ " " " — 1.5 μV in

28 db " @ " " " — 1.5 μV.

What deviation used? 10 KC

Output power level for various gain settings? (at 1 Kc)

Check original data to make sure that response falls off at high frequencies with max. gain.

Why did you reverse yourself in 2.10

How was receiver output measured
VOLTAGE — BALLANTINE

Was Z matched between BK-68 & RT-3R

559

Conclusions Sect 2.0.

2.06 equip ceased to operate

Page 3.08 probably part of Pete's reasoning
ASR-1 60 kc.

Page 5.09. states here deviation suffers the
when modulation is limited
before you said operation ceases
over 40°C (conclusions)

Figure 45° does show noise deviation
going up some with temp 4.5 kc 45 kc

Curve Page 4.59 shows noise deviation
~~stability~~ after 2½ hours.

Question (own test) we don't know how
hot tuner is either on skin or
inside
150°F = 65°C it worked. how can
you say it doesn't work at 40-60°C

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Page 4.47

Curves 4.47, 4.48 show power output always above spec.

" 4.49, 4.50 ~~no~~ temp cycle noise deviation does exist but nowhere did unit cease to operate

our unit for 0 – .8 kc
the other 0 – 5 kc
should have tested most units

Again we don't know what type of equipment was.

Statements ~~and~~ conclusion leading to believe that oven tests are not valid or equipment should have ceased to operate.

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Conclusions ~~are~~ to be based only on [redacted] 25X1
not any made to over-

no others in [redacted] do you get 25X1
any evidence to the contr.

Page 6.29 Table 605.
worst condition
deviation up to 12.2 kc
UNINSULATED
Inlet temp rise 25 - 29.5°C ± 26 - 38.1°C INSULATED
Power Supply 27 - 31.9 ± 28 - 40.5°C

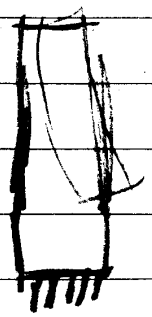
Page 3.07 saied 30°F - 150°F deviation
varies from 7kc to 13.4kc.

talking about over test
Page 3.08 at bottom in summary
only moderately affected.
"exception" of one unit
should have checked another
one & did operate CONFIDENTIAL unit.

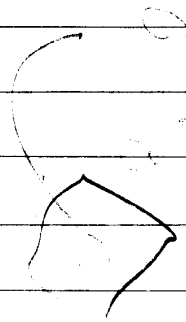
With Filter

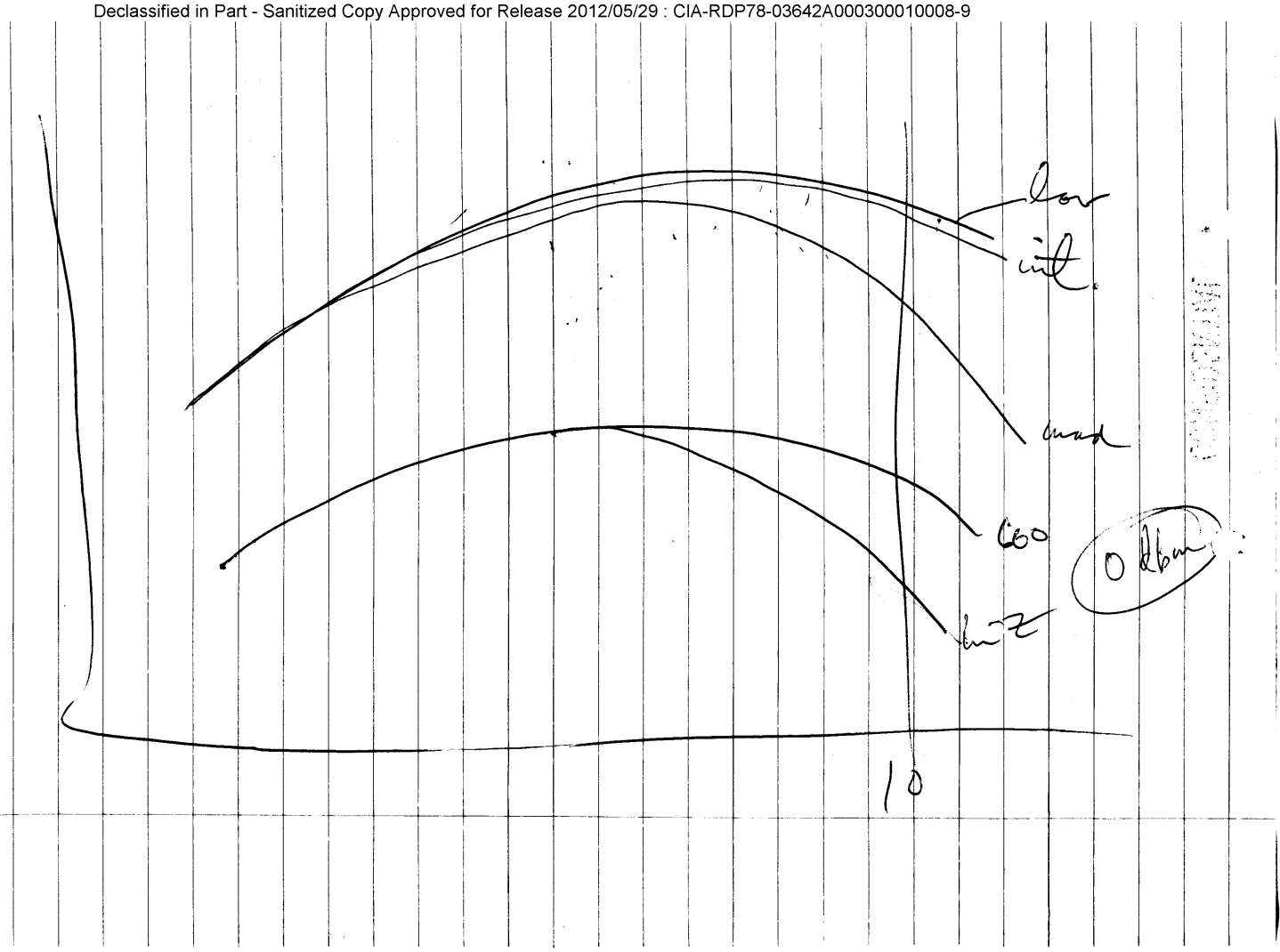
10 μv. 30 Kc deviation

100	+3	+4.5	-7	-7	-12	-7
400	+7.5	0	-0.5	-0.5	-5.5	-0.5
1K	+7.5	0	0	0	-5	0
5K	+1.5	-6	-9	-9	-13	-8
7.5 K	+2	-5.5	-10	-10	-13.5	-8.5
10 K	-0.5	-8	-15.5	-15.5	-19	-14



hf





10 Kc deviation

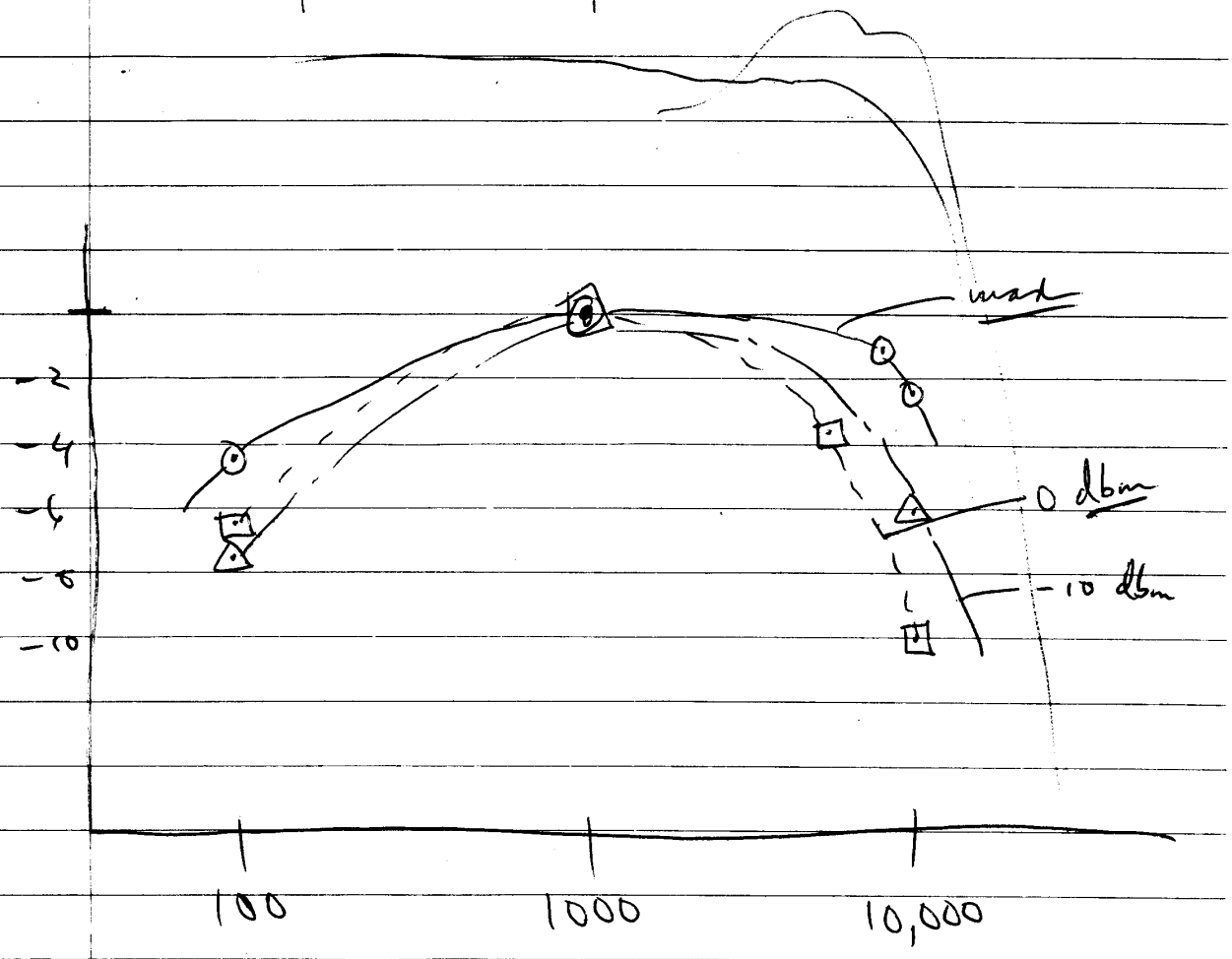
	max gain			-4 dbm		
100	-3.5	-6		-11	-7	
400	+1.5	-1		-5	-1	
1K	+2.5	0	0 0	-4	0	0
5K	+2.5	0		-6	-2	
7.5K	2	-0.5		-8.5	-4.5	
10K	1	-1.5		-11	-7	

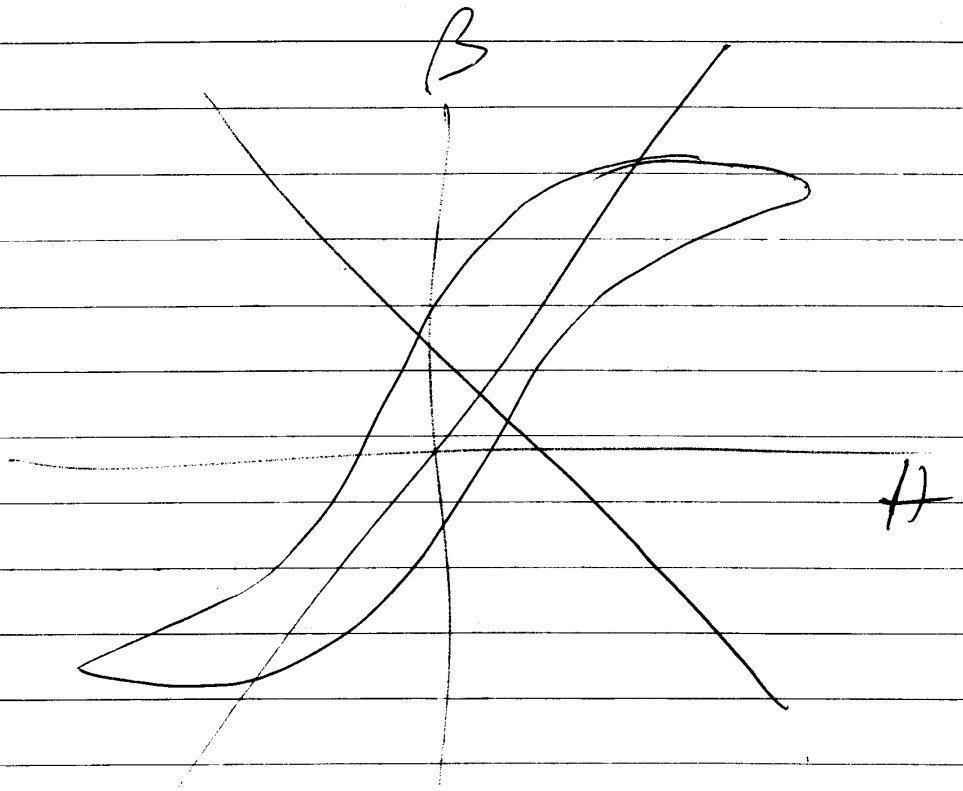
50 Kc deviation

	max		-4 dbm	
100	3	-4	-11	-7
400	6.5	-0.5	-5	-1
1K	7	0	-4	0
5K	7	0	-7.5	-3.5
7.5K	6.5	-0.5	-10.5	-6.5
10K	5.5	-1.5	-13.5	-9.5

10 μv 50 Ω termination

	max gain		hi mit.		low		-4 dbm low mit.	
100	2.5	-4.5	-6.5	-6.5	-17	-7	-11	-7
400	6.5	-0.5	-1	-1	-11	-1	-5	-1
1K	+7	0	0	0	-10	0	-4	0
5K	7	0	-3.5	-3.5	-11	-1	-5.5	-1.5
7.5K	6	-1	-6.5	-6.5	-13.5	-3.5	-9	-5
10K	4.5	-2.5	-10	-10	-16	-6	-12	-8





TRANSMITTAL SLIP | DATE: 21Feb61

TO: TSD/EB, [redacted] 25X1

ROOM NO.: 210 | BUILDING: Westout

REMARKS:

I can not be sure whether I got the attached from you or [redacted] 25X1 If they are not yours, will you kindly send them to him. Thanks.

WSH

Reid EB
21

FROM: TSD/TAG

ROOM NO. | BUILDING | EXTENSION

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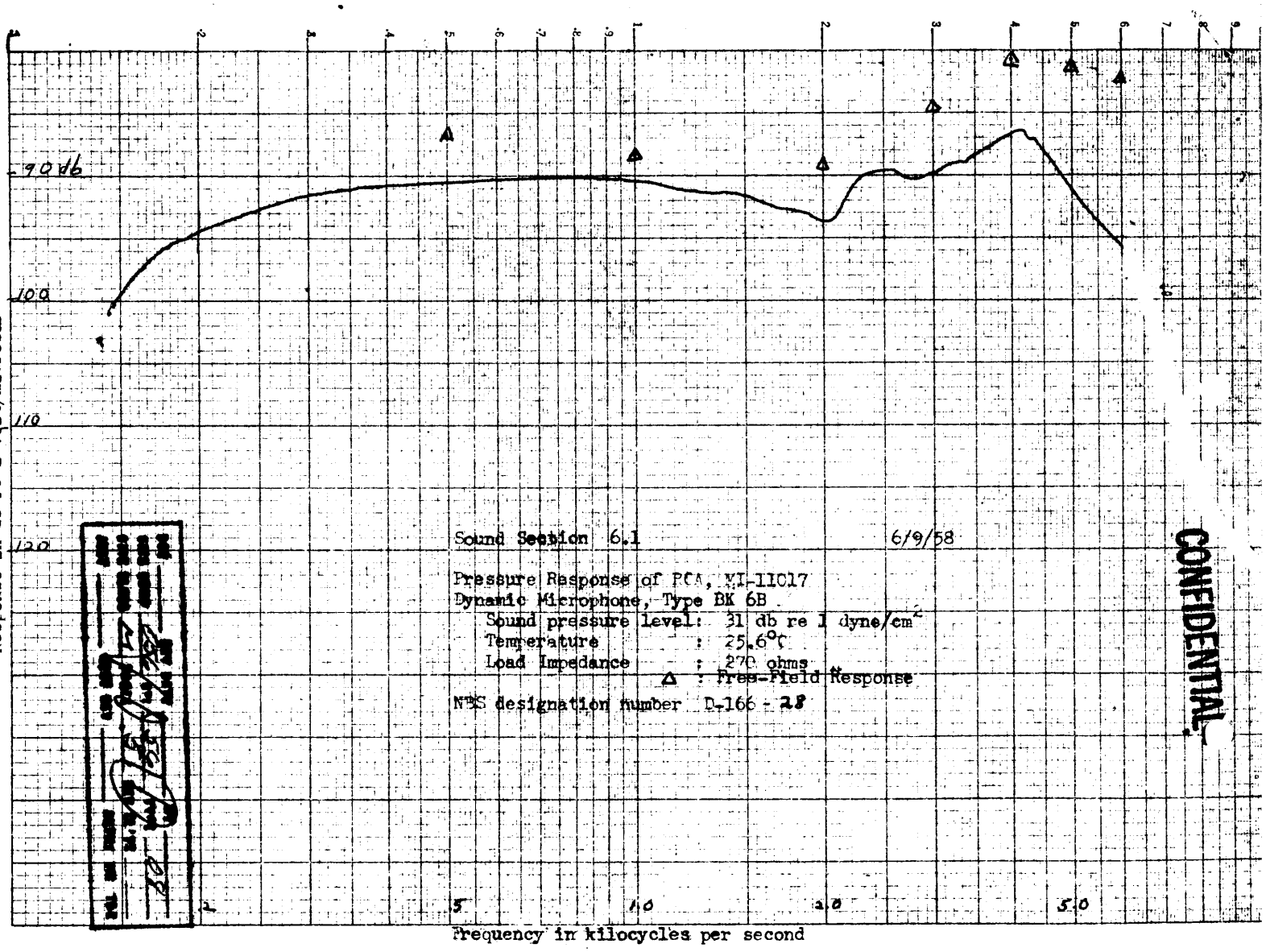

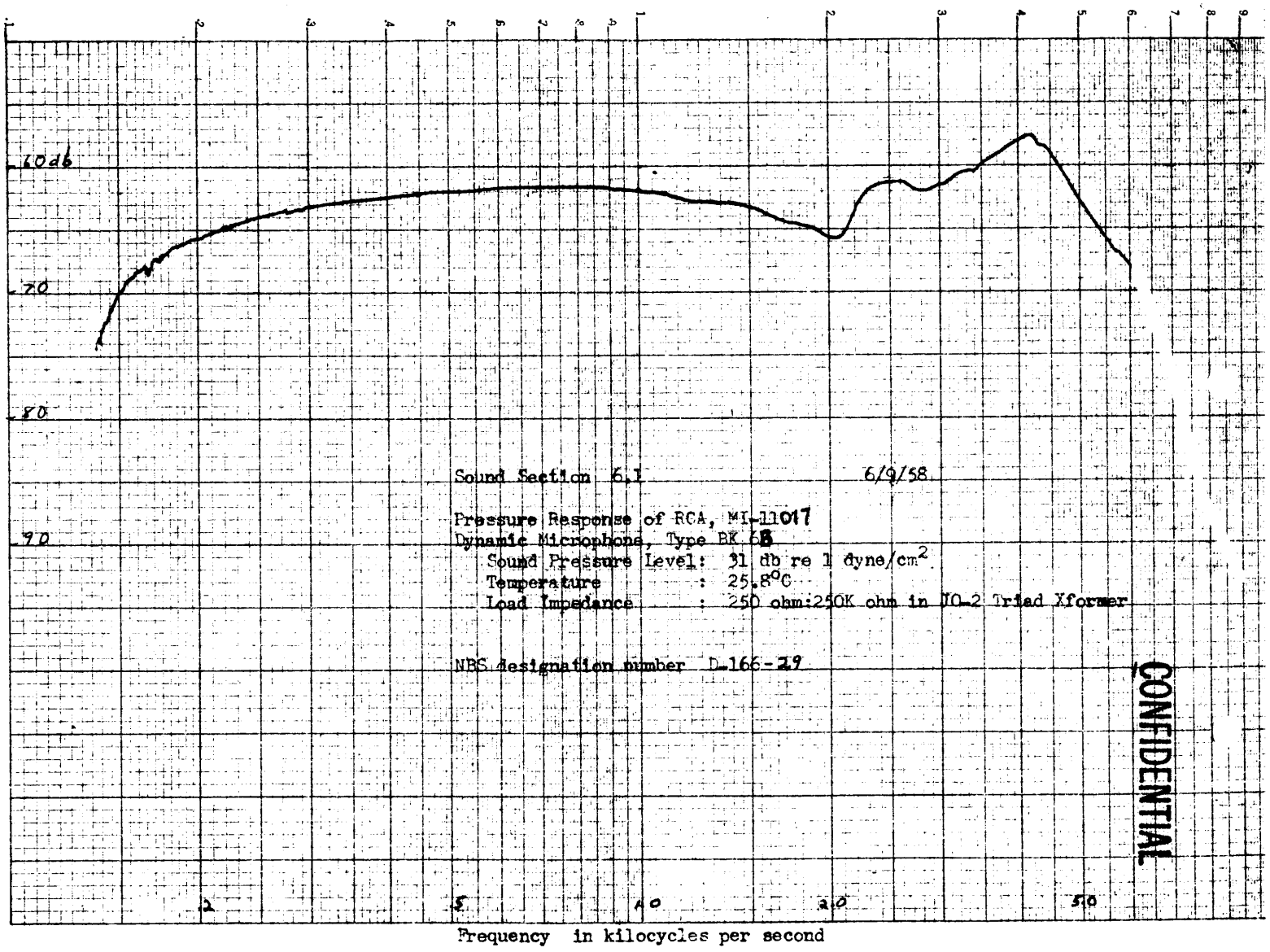

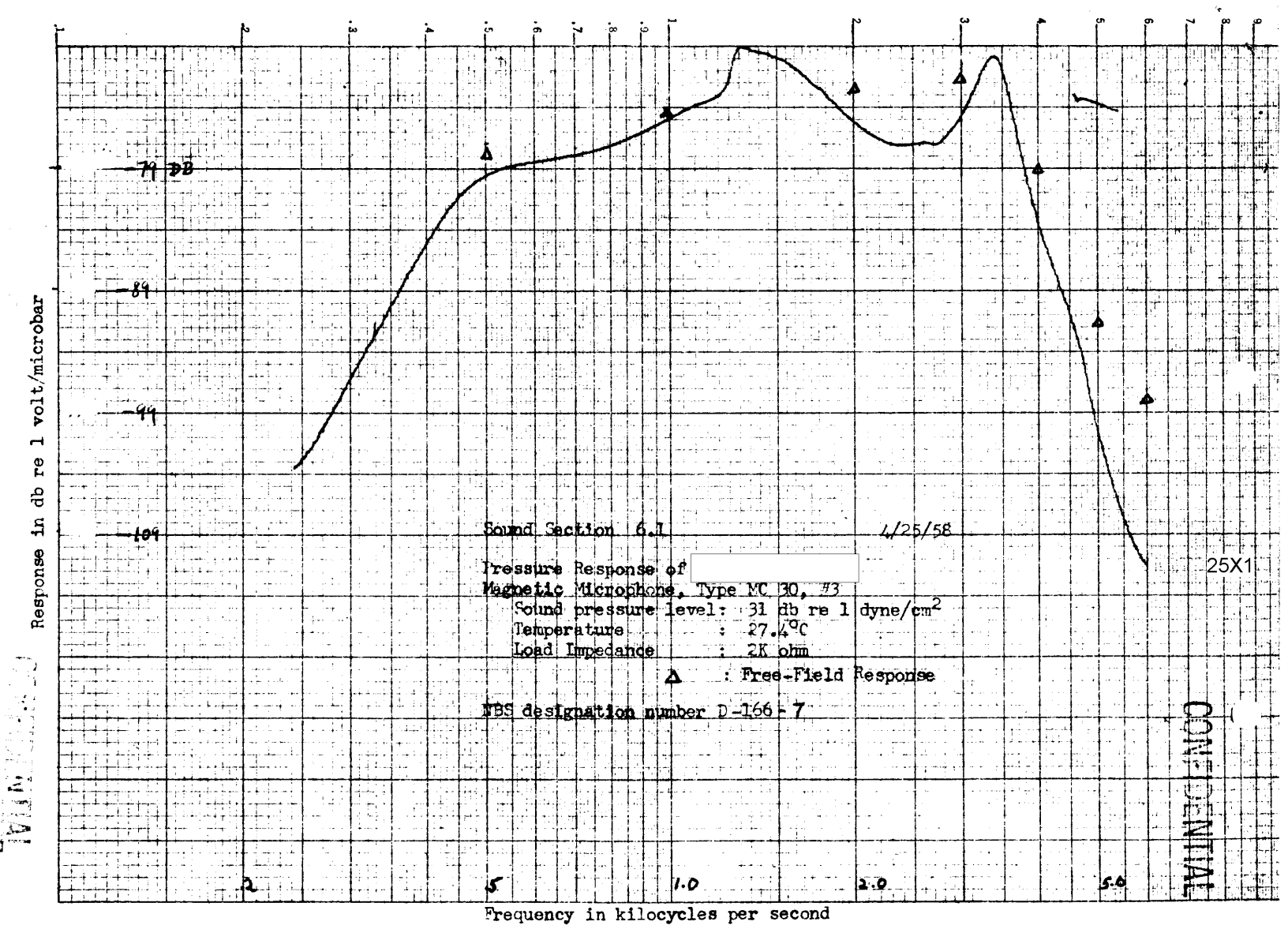

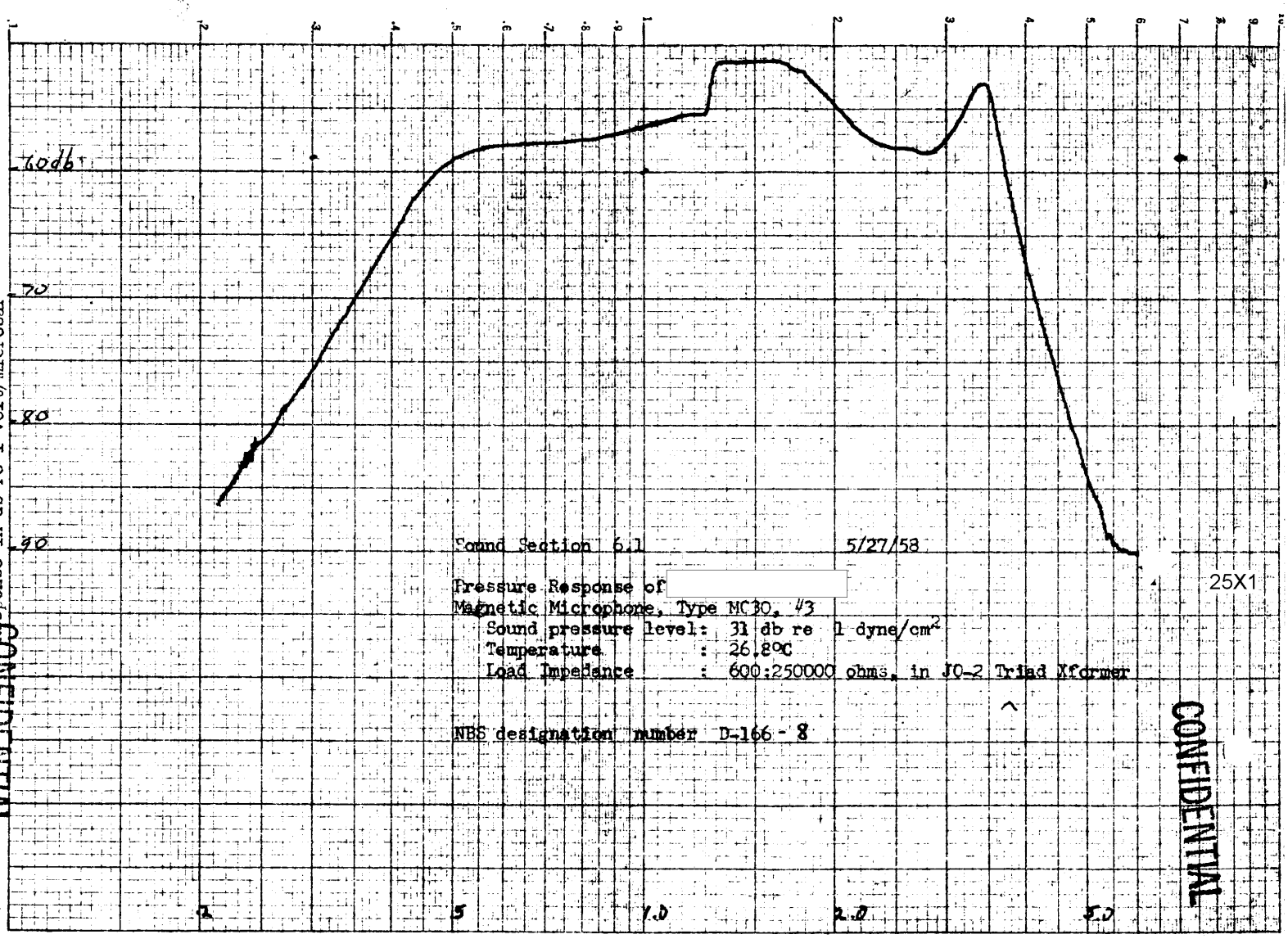

DIN-FN60049
Copy #2

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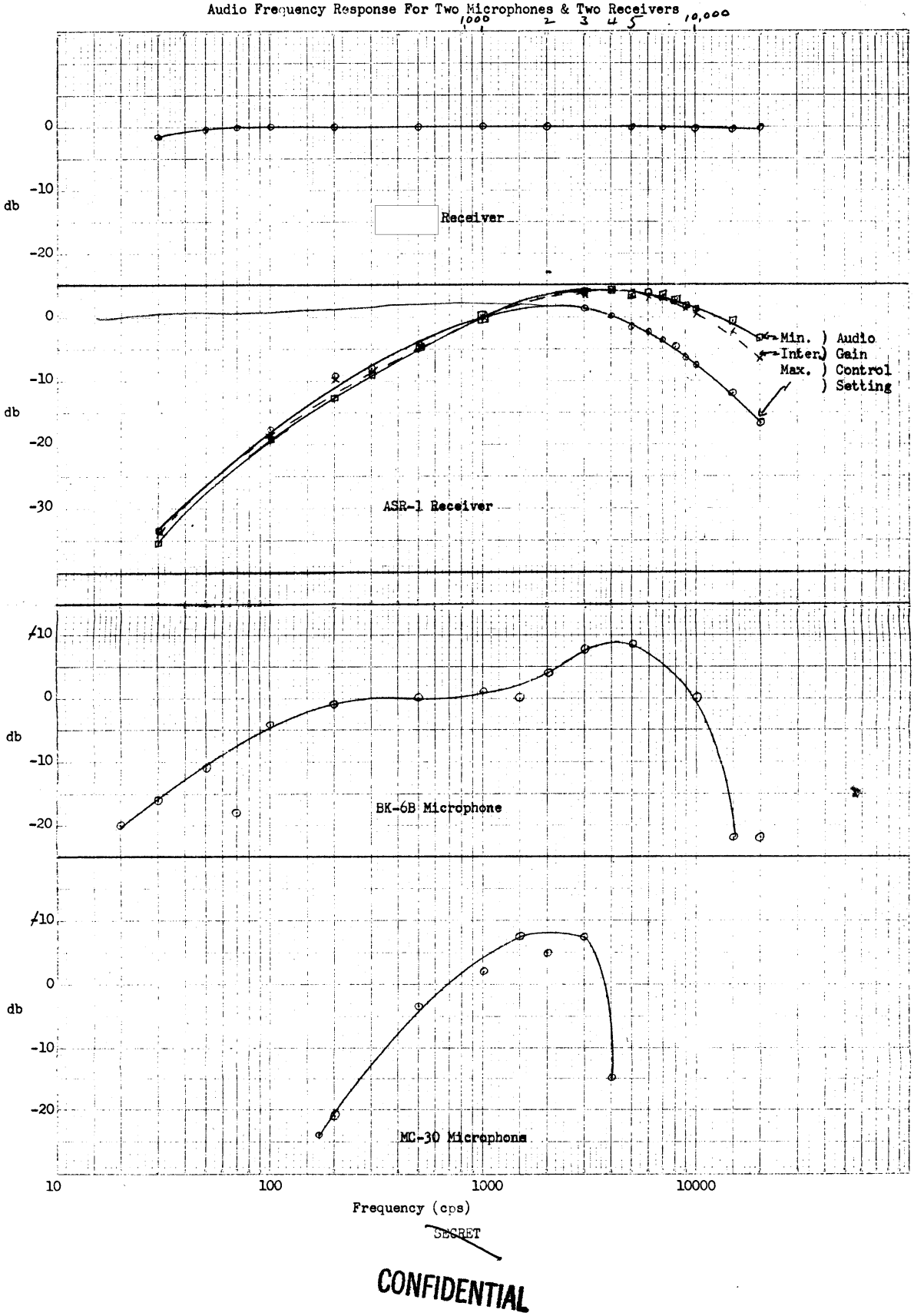
25X1

~~SECRET~~

Audio Frequency Response For Two Microphones & Two Receivers



25X1

~~SECRET~~

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