Diffraction and Interference

Experiment Data

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Laser wavelength $\lambda = (632,8 \pm 0,1)$ nm

Assignment 2 : Measurement of grating specifications with microscope

calibration:

zero @ 3,72 units

3 mm @ 9,64 units

$\Rightarrow$ 1 unit = 0,507 mm ± 0,003 mm

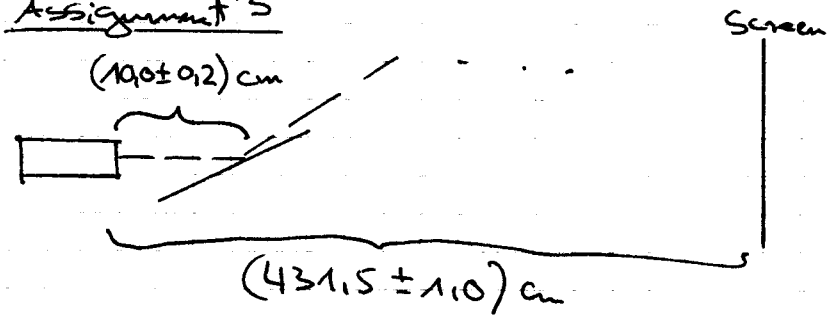
measurements of specs

right slit left boarder @ 5,05 units
left slit left boarder @ 5,55 units
} $\Rightarrow g$

left slit right boarder @ (5,46 ± 0,02) units

↳ for all measurements

Assignment 3



Scale measured : 0,5 mm

3c. 0,05 rad

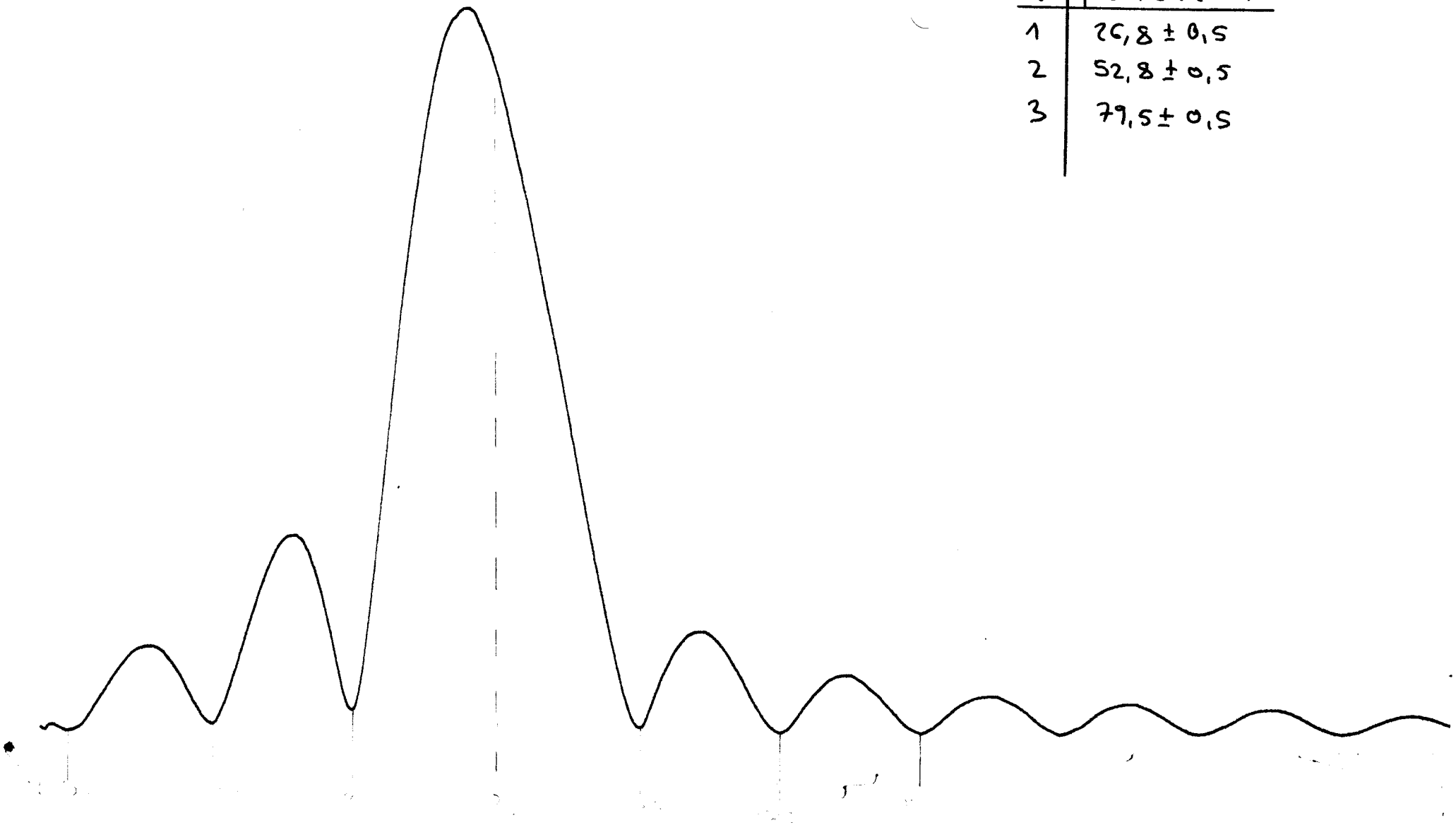
n	x (mm)
0	204 ± 2
1	339 ± 3
2	427 ± 3
3	494 ± 4
4	535 ± 4
5	602 ± 4
6	648 ± 4
7	690 ± 4
8	729 ± 5
9	767 ± 5
10	803 ± 5
11	837 ± 5
12	870 ± 5
13	901 ± 5
14	932 ± 5

Assg. 1

y-axis: 1mV/cm speed 5sec/cm

Slit 1 (smallest slit)

$d = (43 \pm 1,5 \pm 1,0)$ cm



Minima

n	position (mm)
1	$26,8 \pm 0,5$
2	$52,8 \pm 0,5$
3	$79,5 \pm 0,5$

Assy. 1

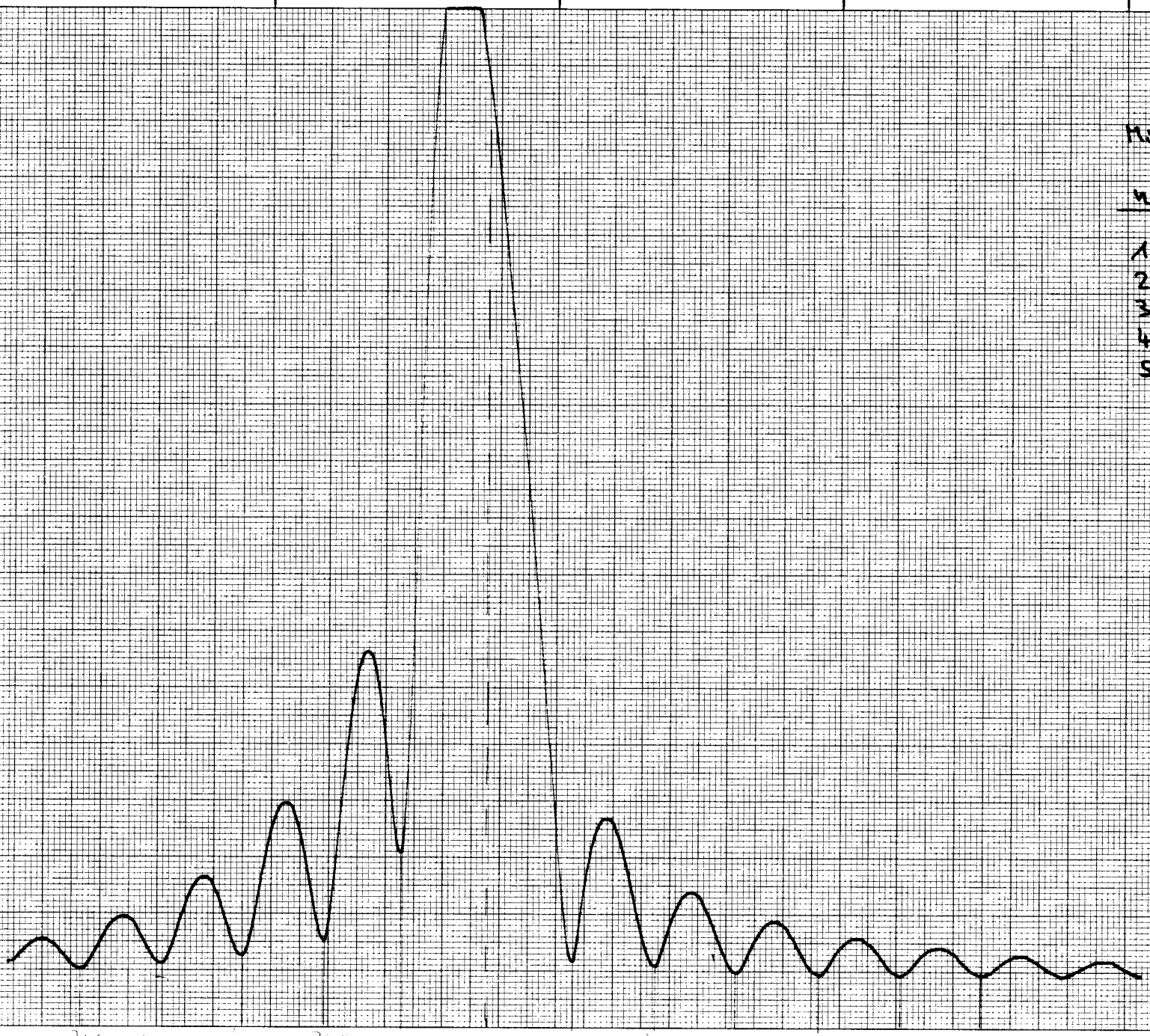
y-axis: 1 mV/cm Speed 5 sec/cm

Slit B (medium slit)

$d = (43{,}5 \pm 1{,}0)$ cm

Minima

n	position (mm)
1	$15{,}0 \pm 0{,}5$
2	$29{,}3 \pm 0{,}5$
3	$43{,}5 \pm 0{,}5$
4	$57{,}5 \pm 0{,}5$
5	$72{,}3 \pm 0{,}5$

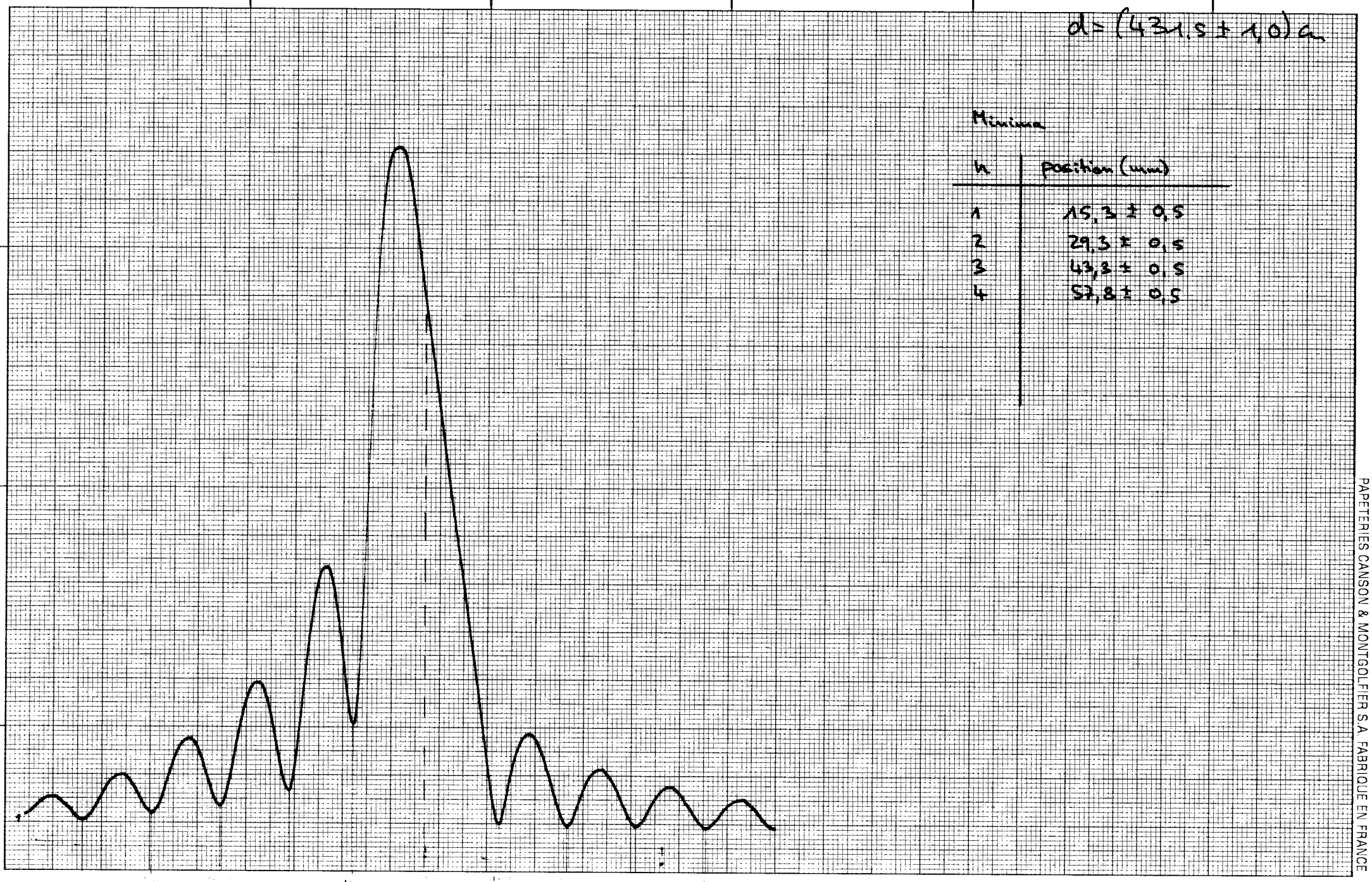


Assg. 1 y-axis : 1mV/cm Speed 10sec/cm Slit B (medium sl.)

$d = (431.5 \pm 1.0)$ a.

Minima

n	position (mm)
1	15,3 ± 0,5
2	29,3 ± 0,5
3	43,3 ± 0,5
4	57,8 ± 0,5



Assg. 1

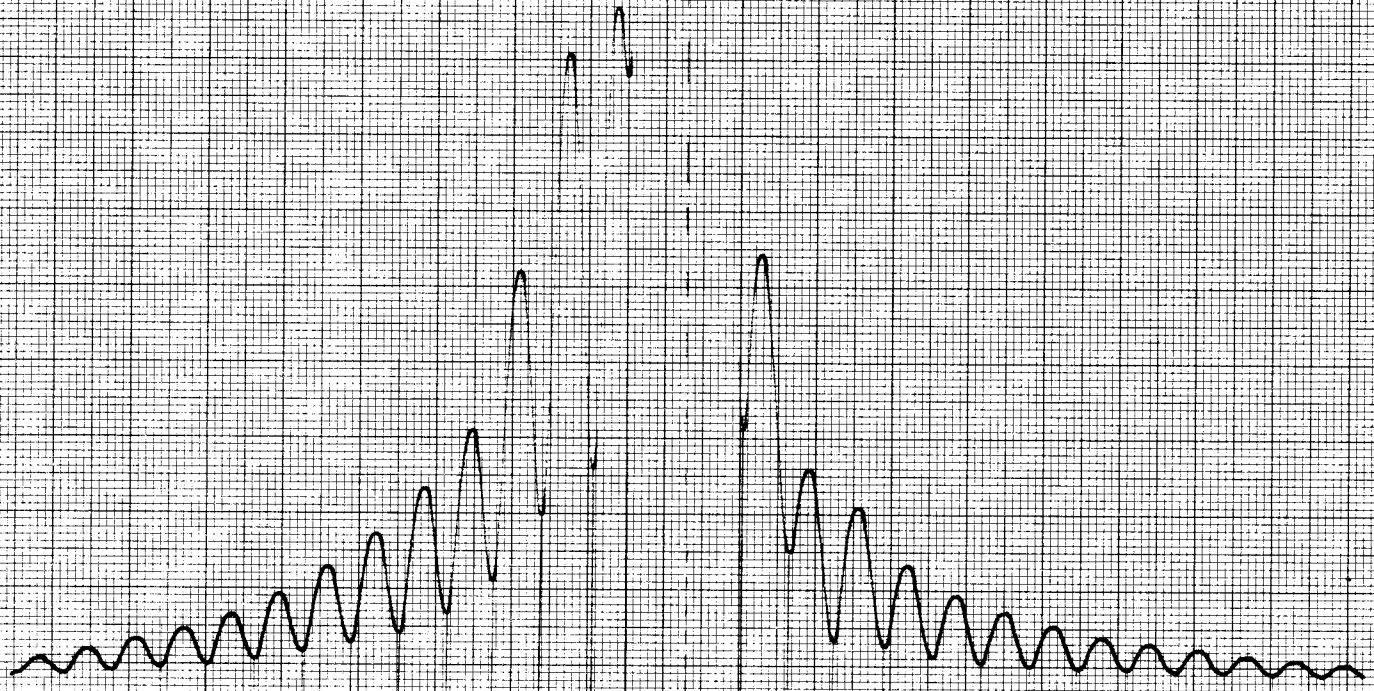
y-axis : 1 mV/cm speed 5 sec/cm

Slit C (thick slit)

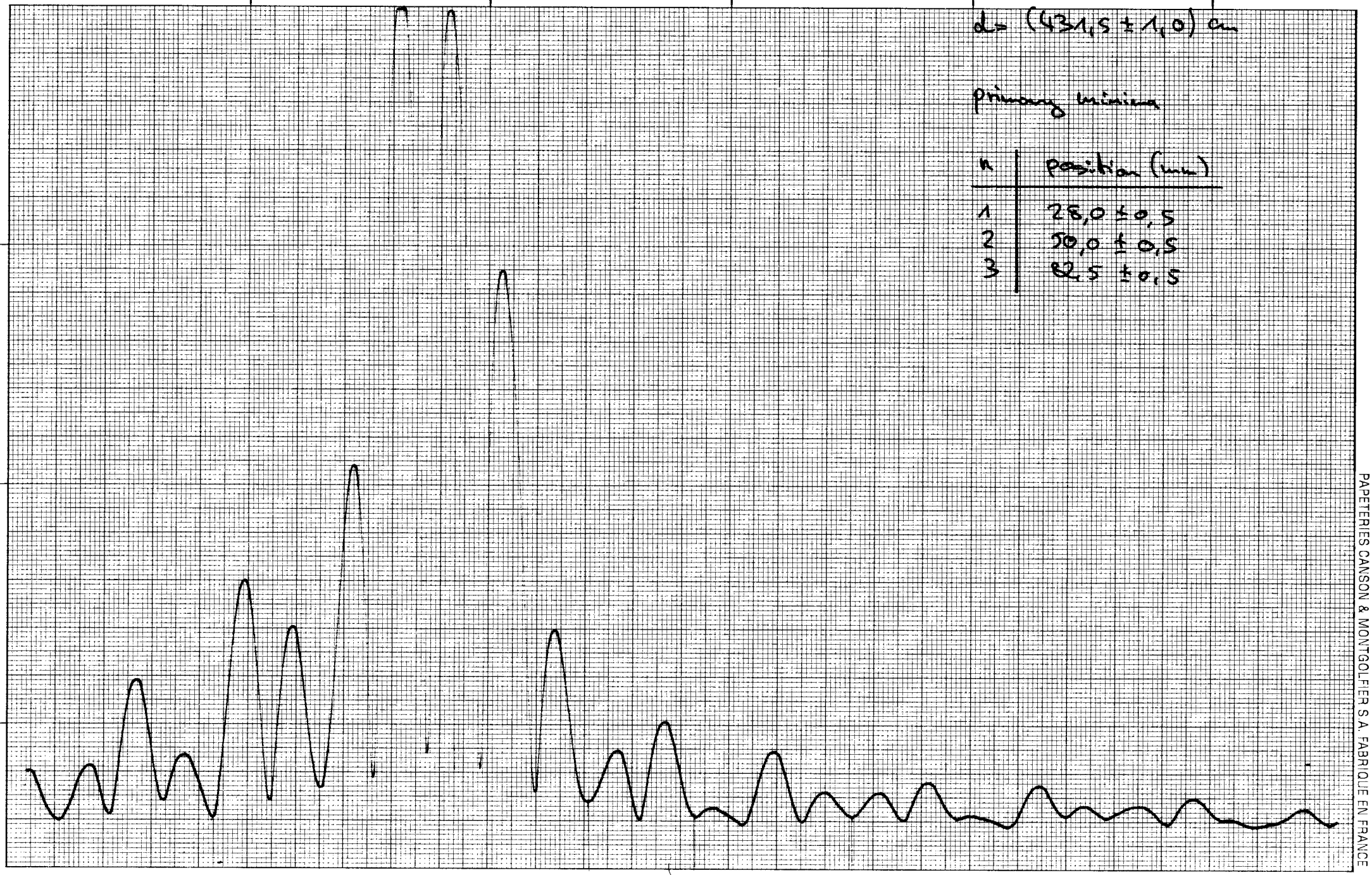
$d = (431,5 \pm 1,0)$ cm

Minima

n	Position (mm)
1	$7,5 \pm 0,5$
2	$12,8 \pm 0,5$
3	$19,3 \pm 0,5$
4	$26,0 \pm 0,5$
5	$32,0 \pm 0,5$
6	$38,3 \pm 0,5$
7	$44,5 \pm 0,5$
8	$50,5 \pm 0,5$
9	$57,5 \pm 0,5$
10	$63,5 \pm 0,5$
11	$70,0 \pm 0,5$
12	$76,3 \pm 0,5$



Assy. 2 y-axis: 1mV/cm speed 5sec/cm g: 0.25 b: 0.10



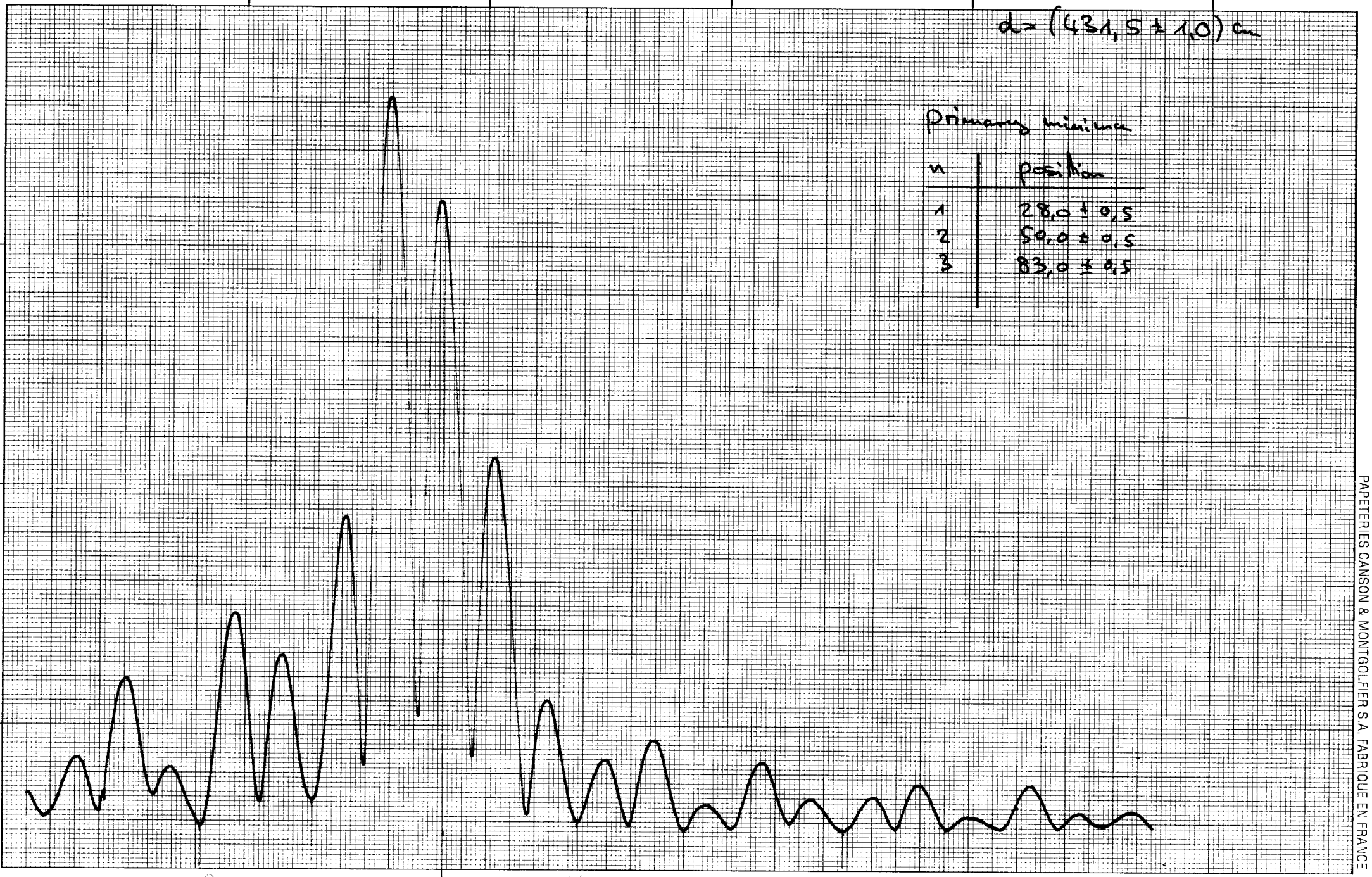
$d = (431,5 \pm 1,0)$ cm

primary minima

n	position (mm)
1	$28,0 \pm 0,5$
2	$50,0 \pm 0,5$
3	$82,5 \pm 0,5$

Anregg. 2 y-axis: 1 mV/cm spread 10 sec/cm g: 0.25 b: 0.10

$d = (431{,}5 \pm 1{,}0)$ cm



Primary minima

n	position
1	$28{,}0 \pm 0{,}5$
2	$50{,}0 \pm 0{,}5$
3	$83{,}0 \pm 0{,}5$

Assay 2 — y-axis: 1mV/cm — speed 10sec/cm — g: 0,25 — b: 0,20

$d = (431,5 \pm 1,0)$ cm

Primary minima

n	position (mm)
1	$15,8 \pm 1,0$
2	$27,0 \pm 1,0$
3	$40,5 \pm 1,0$
4	$51,5 \pm 1,0$

Assy. 2 — y-axis: 1 mV/cm — speed 5 sec/cm — unknown specs measured with microscope

$d = (42{,}1 \pm 1{,}5 \pm 1{,}0)$ cm

primary minima

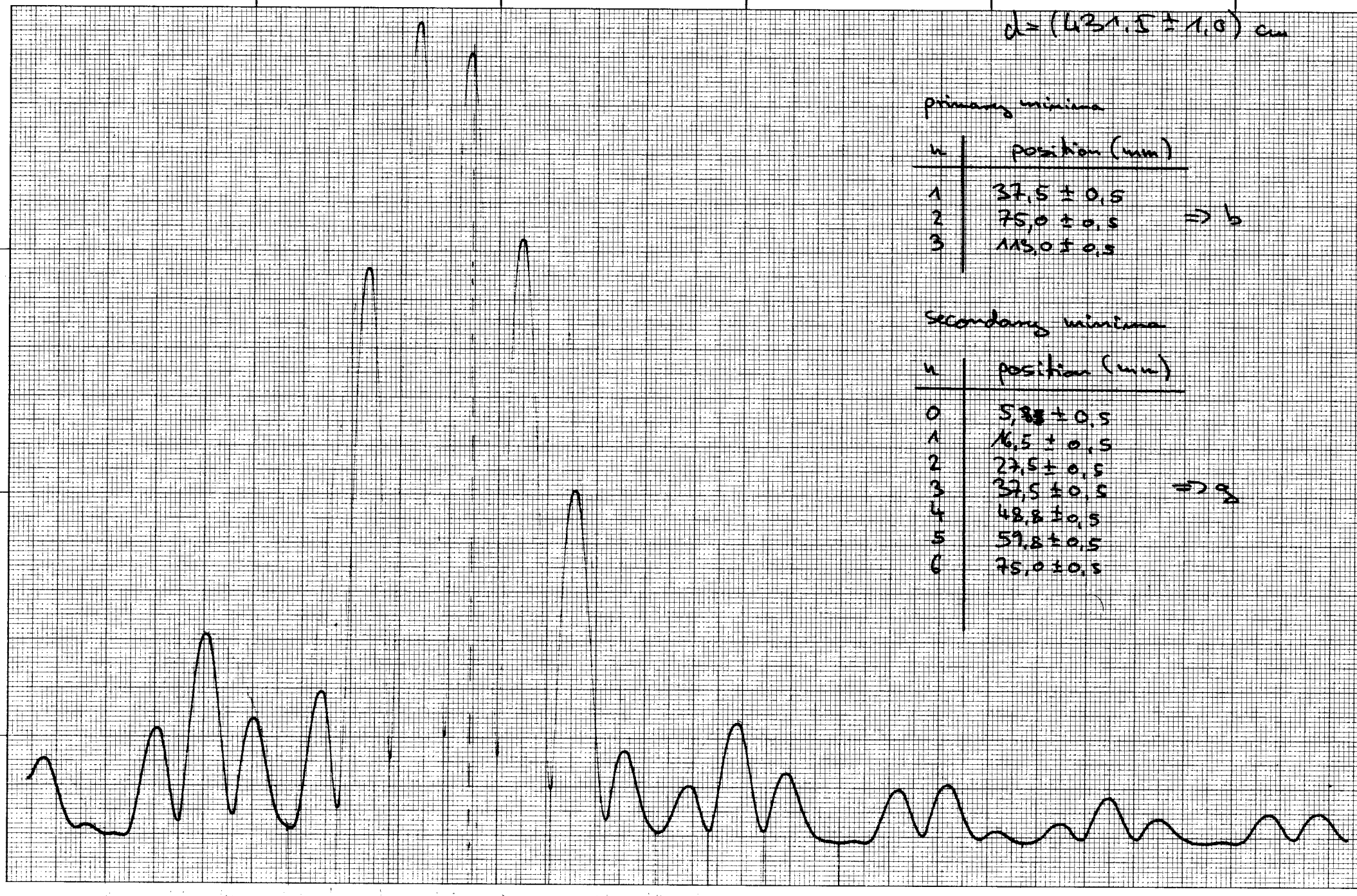
n	position (mm)
1	37,5 ± 0,5
2	75,0 ± 0,5
3	113,0 ± 0,5

$\Rightarrow b$

secondary minima

n	position (mm)
0	5,88 ± 0,5
1	16,5 ± 0,5
2	27,5 ± 0,5
3	37,5 ± 0,5
4	48,8 ± 0,5
5	59,8 ± 0,5
6	75,0 ± 0,5

$\Rightarrow a$



Assg. 2 — y-axis: 1 mV/cm — Speed 5 sec/cm — unknown specs measured with microscope (recalibrated)

$d = (431,5 \pm 1,0)$ mm

Primary minima

n	position (mm)
1	$38,0 \pm 0,5$
2	$74,5 \pm 0,5$
3	$113,0 \pm 0,5$

⇒ b

Secondary minima

n	position (mm)
0	$5,5 \pm 0,5$
1	$16,5 \pm 0,5$
2	$27,5 \pm 0,5$
3	$38,0 \pm 0,5$
4	$48,5 \pm 0,5$
5	$59,5 \pm 0,5$
6	$74,5 \pm 0,5$

⇒ g