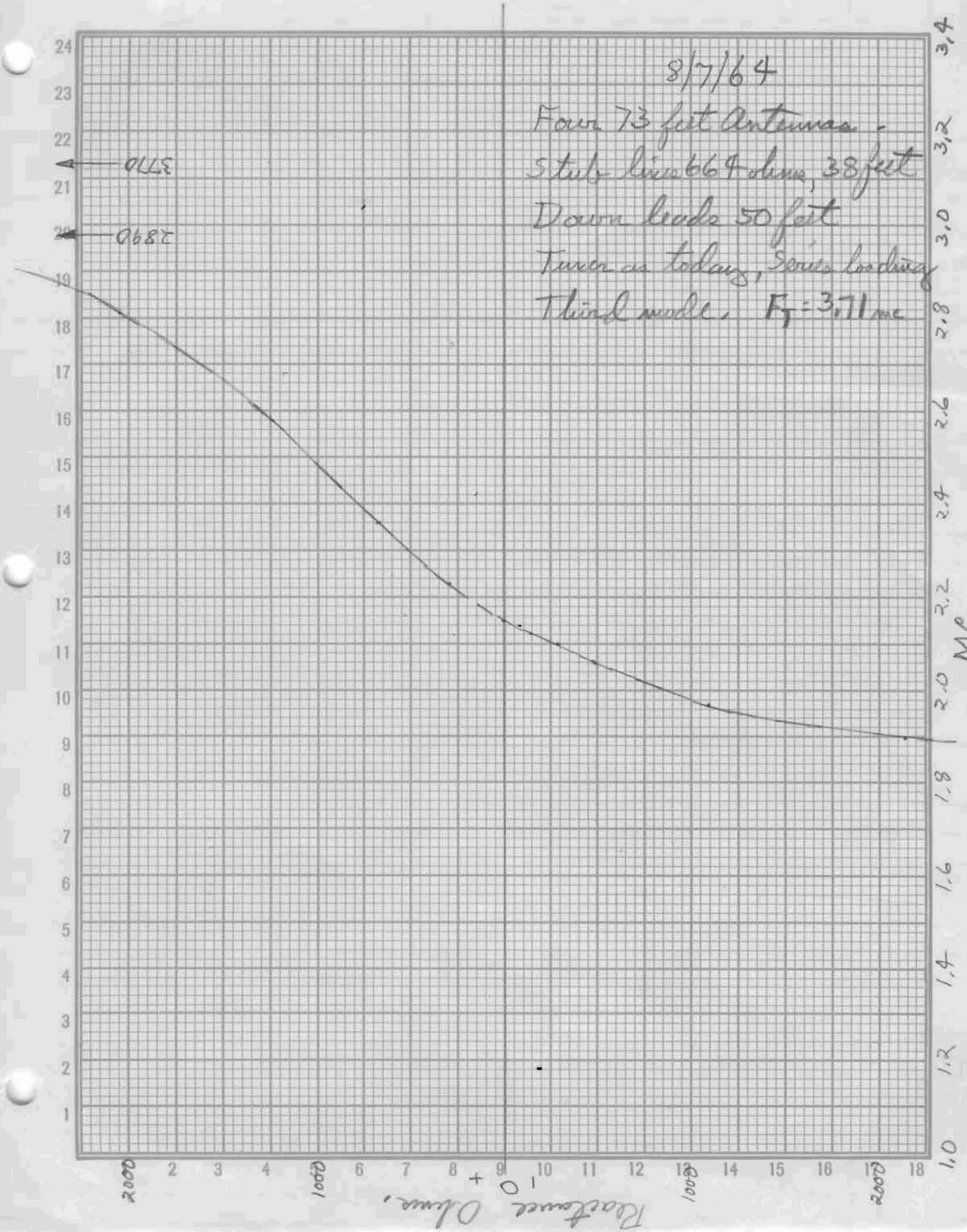

8/7/64
Four 73 foot Antennas -
Stub line 66 ohms, 38 feet
Down leads 50 feet
Tuned as today, Series loading
Third mode, $F_T = 3.71$ mc
3770
2890
MC
Reflection Ohms
2000
1000
0
1000
2000

11/7/64

T3
3L

Antenna testing
antennas 146 feet long with 66ft stub 38 ft long at center
Down leads, 50 feet, 3μh inductances as dummy primary.
$L_T$ = $C_T$ = $F_T$ = 3,23 mc

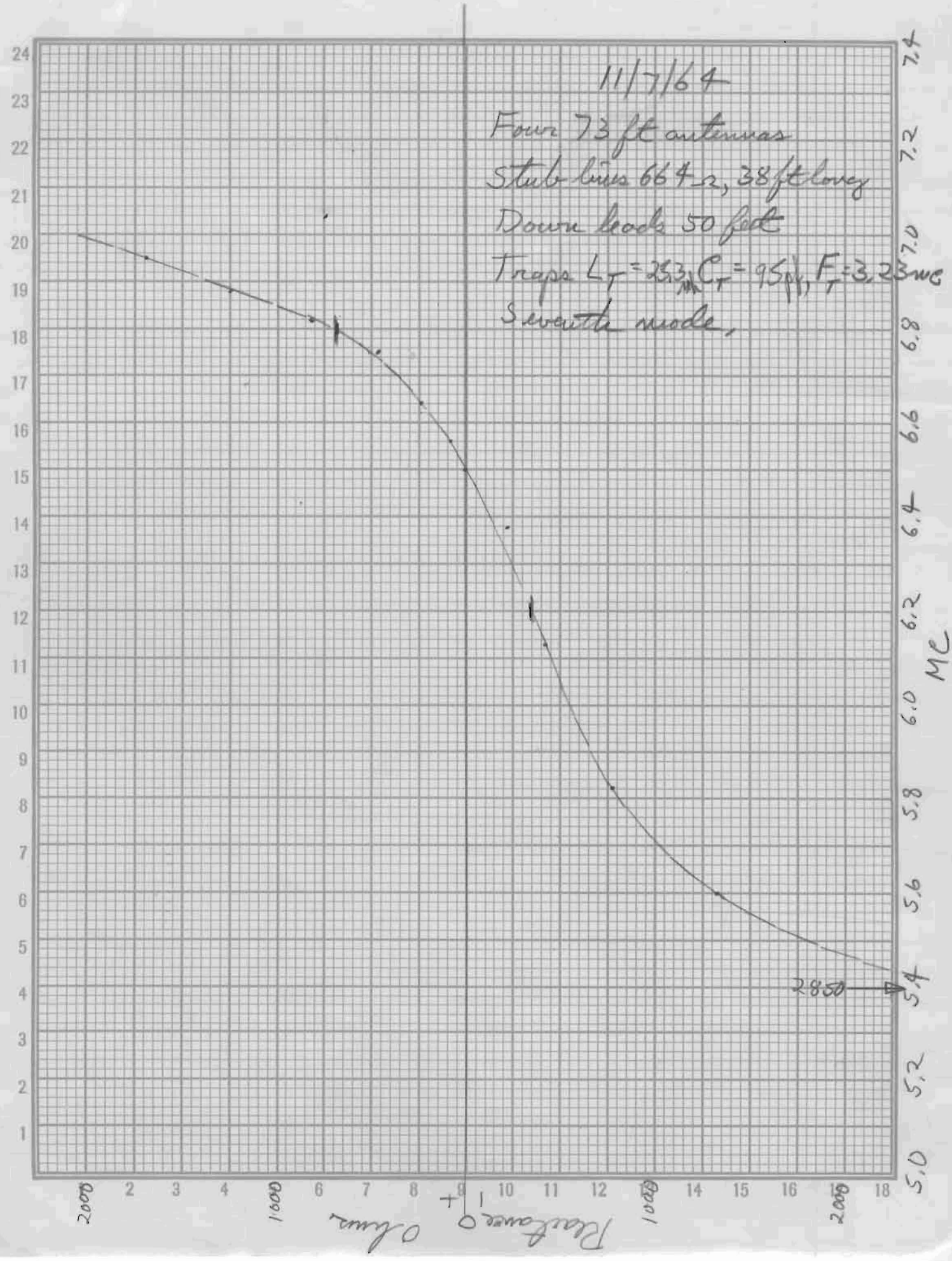
| $L_T$ | Stub line ft. | F1. | F3 | Capacity Pf. | Low Frequency MC | Mode Reactance Ohms | High Frequency MC | Mode. Reactance Ohms |
|---|---|---|---|---|---|---|---|---|
| 20t | 38 | 2.20 | 6.60 | | | | | |
| 21.7μh | 40 | 2.19 | 6.50 | | | | | |
| $C_T$ = 80,3pf $F_T$ = 3,8 | 42 | 2.18 | 6.40 | 27 | 2.81 | 4190 | 6.95 | 1700 |
| | | | | 37 | 2.72 | 3170 | 6.88 | 1250 |
| 22t | 42 | 2.11 | 6.40 | 56 | 2.60 | 2180 | 6.82 | 834 |
| 25.3μh | 40 | 2.13 | 6.50 | 99 | 2.43 | 1320 | 6.75 | 476 |
| $C_T$ = 80.3pf $F_T$ = 3,5 | 38 | 2.15 | 6.60 | 199 | 2.28 | 704 | 6.64 | 241 |
| | | | | 490 | 2.18 | -298 | 6.56 | -99 |
| 22t | 38 | 2.14 | 6.50 | ∞ | 2.14 | 0 | 6.50 | 0 |
| 25.3μh | | | | | | | | |
| $C_T$ = 95pf. $F_T$ = 3,23 | | | | | | | | |

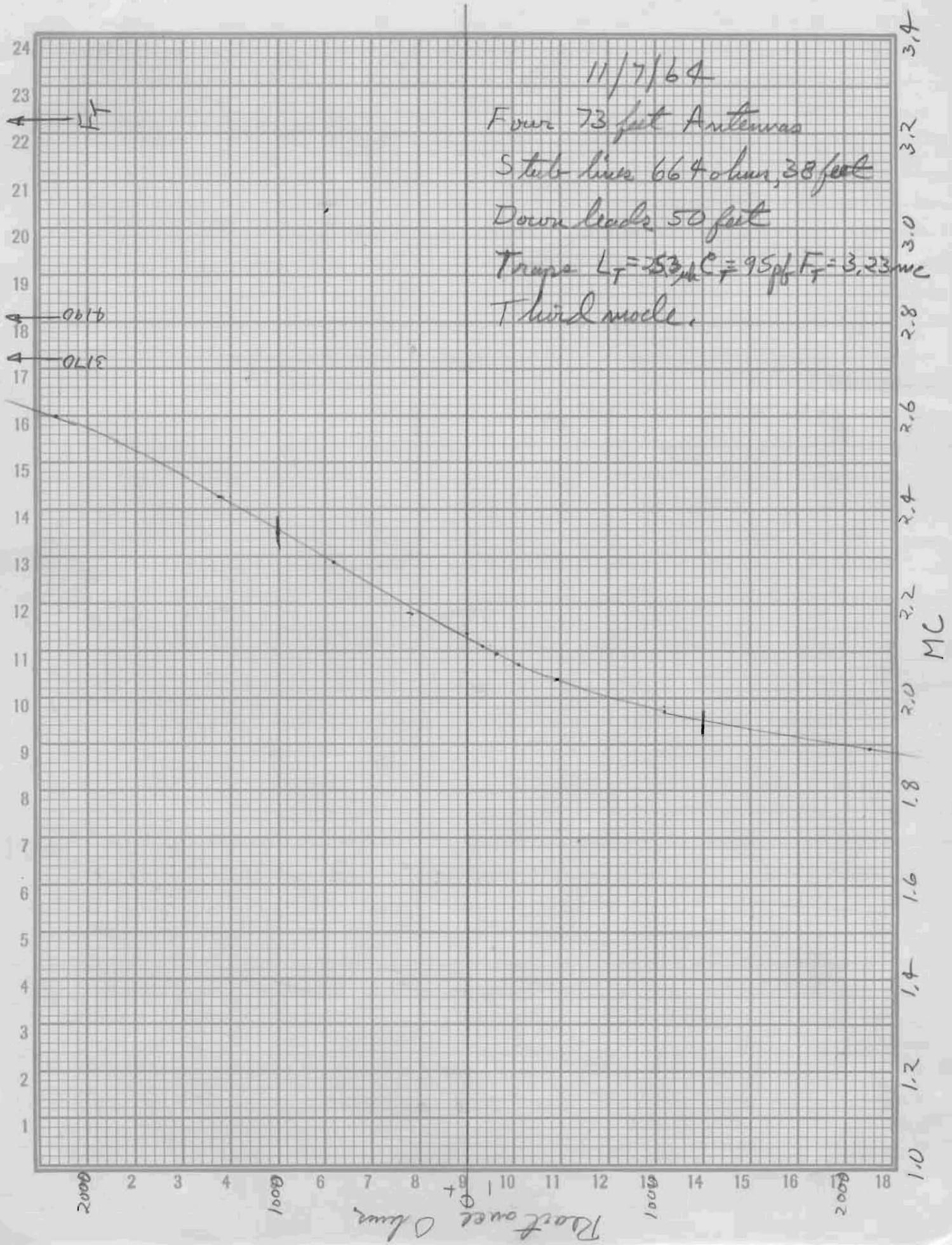
Trap coil performance

| MC | pf | Q | ohms |
|---|---|---|---|
| 2,1 | 226.5 | 260 | 1,29 |
| 4,2 | 56,0 | 297 | 2,25 |

$C_o$ = 0,8 pf $L_o$ = 25,3μh
$R$ = 159 MC/Q
$F_T$ = 3,25 mc computed,

| Inductance μh | Low Frequency MC | Mode Reactance Ohms | High Frequency MC | Mode. Reactance Ohms |
|---|---|---|---|---|
| 5.7 | 2.11 | 96 | 6.38 | 228 |
| 11.0 | 2.09 | 144 | 6.13 | 424 |
| 21.2 | 2.07 | 275 | 5.82 | 775 |
| 37.5 | 2.04 | 480 | 5.60 | 1320 |
| 84 | 1.97 | 1040 | 5.40 | 2850 |
| 178 | 1.89 | 2120 | Too faint | |


11/7/64
Four 73 ft antennas
Stub lines 664-2, 38 ft long
Down leads 50 feet
Traps $L_T = 25.3\,\mu h$, $C_T = 95\,pf$, $F_T = 3.23\,mc$
Seventh mode,
2850
MC
7.4
7.2
7.0
6.8
6.6
6.4
6.2
6.0
5.8
5.6
5.4
5.2
5.0
Reactance
Ohms
2000
1000
0
1000
2000


11/7/64
Four 73 foot Antennas
Stub line 66 ohm, 38 feet
Down leads 50 feet
Trap $L_T$ = 53 μh $C_T$ = 95 pf $F_T$ = 3.23 mc
Third mode.
LT
MC
Roof over Ohio

12/7/64

# Antenna Performance

Down leads only, 51 feet long on 30/5/64 will tune to 2.15 and 6.50 mc each in quarterwave mode when trap inductance is 16.0 μh and trap capacity 101 pf. Trap resonance 3.96 mc. Coupler primary inductance 6 μh included in system.

Down leads reduced to 50 feet and a single 73 feet antenna added to each at top. System resonates at 6.50 mc when trap inductance 16.0 μh and trap capacity 110 pf. Trap resonance 3.60 mc. See 10/6/64. Apparently these antennas resonate closely to 6.50 mc.

Stub lines 38 feet long and second 73 feet antenna added at each end on 11/7/64. Now system tunes to 2.15 mc and 6.50 mc when trap inductance is 25.3 μh and trap capacity is 95 pf. Trap resonance 3.23 mc. The two antennas plus stub are too short at 2.15 mc which requires a larger trap inductance. They are too long at 6.50 mc which requires a smaller trap capacity. This combination seems like a reasonable compromise.

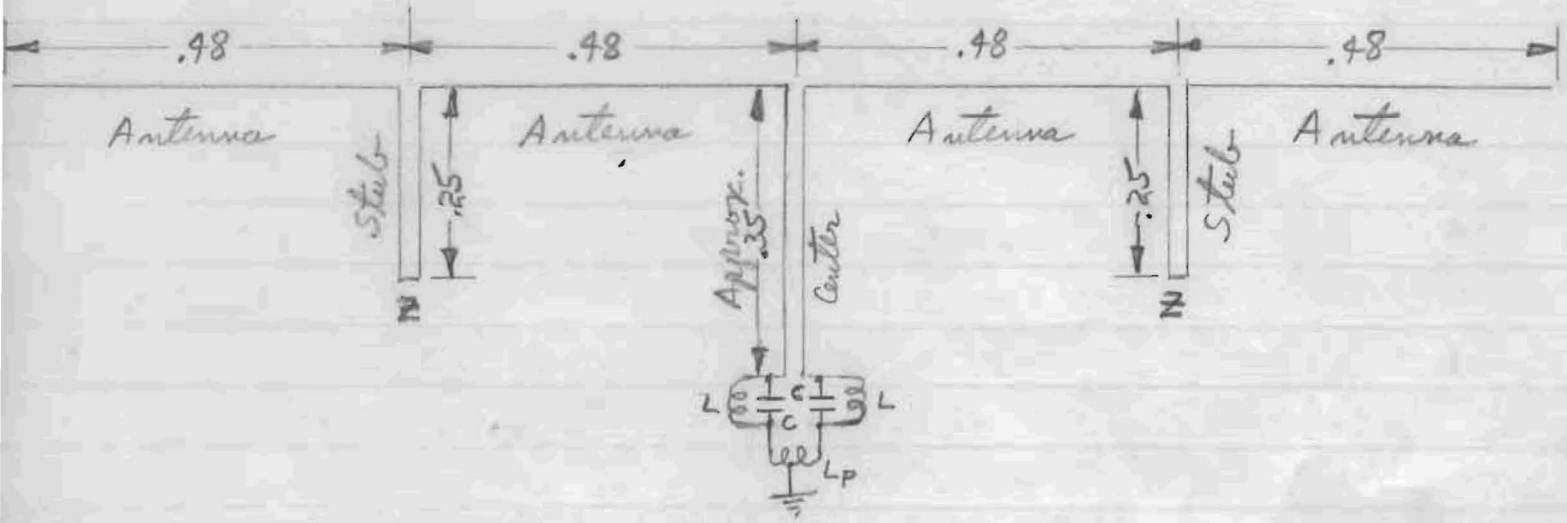
$F_H = 6.50$ mc, $F_L = 2.15$ mc, $F_H/F_L = 3.02$, $(F_H F_L)^{1/2} = 3.74$ mc
$\lambda_H = 151.5$ ft, $\lambda_L = 457.2$ ft,
$.25\lambda_H = 37.9$ ft, $.35\lambda_H = 53.0$ ft, $.48\lambda_H = 72.8$ ft
Bolt the pole 54 feet above ground on 9/5/64

| | |
|---|---|
| Two antennas @ 73 feet | 146 |
| Top of stub | 1 |
| ½ Top of center | 1 |
| End allowance | 2 |
| Total | 150 |

Pole spacing = 2 × 150 = 300 feet

14/7/64

# Antenna Design




A. Choose two frequencies $F_H$ and $F_L$; $2.6 < F_H/F_L < 3.2$

B. Erect the antenna according to diagram where numbers are parts of a wavelength at $F_H$.

C. Connect traps built according to $(L/C)^{1/2} = 600$, $F_T = (F_H F_L)^{1/2}$, $4\pi^2 LC = 1$ or $C = 1/1200\pi(F_H F_L)^{1/2}$ and $L = 300(F_H F_L)^{1/2}/\pi$

D. Add $L_P$ of a few microhenries to represent primary of antenna coupler.

E. Check system for resonance by using a grid dip meter coupled to $L_P$. Adjust L and C to give desired $F_H$ and $F_L$. Keep $1.4F_L < (F_H F_L)^{1/2} < 0.7 F_H$

F. The impedance Z of stubs and length of center line may be altered to keep $(F_H F_L)^{1/2}$ within limits.

G. If center line is inconveniently long physically, it may be shortened and small series inductances added above traps.

1/8/64

# Antenna Testing.

Antenna 146 ft long with duplex winding coils at centre.
Down leads 50 ft. / traps
$L_T = 16\ \mu h$ $C_T = 110\ \mu f.$, 3 $\mu h$ primary inductances

| coil turns | F1 MC. | F3 M.C. | coil 467R dia |
|---|---|---|---|
| none | – | 6.50 | |
| 70 | | 6.42 | 4.2 |
| 68 | | 6.42 | 4.4 |
| 66 | | 6.42 | 4.5 |
| 64 | | 6.42 | 4.65 |
| 60 | | 6.42 | 4.95 |
| 54 | | 6.42 | 5.50 |
| 44 | 1.69? | 6.42 | 6.65 |
| 38 | 1.83 | 6.42 | |
| 32 | 1.95 | 6.42 | |
| 26 | 2.10 | 6.42 | |
| 25 | 2.12 | 6.42 | |
| 24 | 2.15 | 6.42 | |

| Capac. pf. | Low Freque M.C. | Mode React Ohms | High Freque M.C. | Mode React. Ohms |
|---|---|---|---|---|
| 27 | 3.12 | | 7.12 | |
| 37 | 3.10 | | 7.03 | |
| 56 | 2.93 | | 6.93 | |
| 99 | 2.69 | | 6.81 | |
| 199 | 2.43 | | 6.67 | |
| 490 | 2.26 | | 6.52 | |
| ∞ | 2.15 | | 6.42 | |

| Inductor $\mu h$ | | | |
|---|---|---|---|
| 5.7 | 2.12 | | 6.28 |
| 11.0 | 2.09 | | 6.09 |
| 21.2 | 2.06 | | 5.75 |
| 37.5 | 2.00 | | 5.50 |
| 84 | 1.91 | | 5.30 |
| 178 | 1.84 | | |
| | | | 6.60 |

Duplex coils 24 turns 4 1/8" D 6" long
Wire pvc covered 23-0.8076 strands.

| MC | M | Q | R |
|---|---|---|---|
| 1.25 | 4.23 | 112 | 2.4 |
| 2.50 | 70 | 38 | 14.1 |

$C_0 = 48\ pf$
$L_0 = 34.3\ \mu h$
$R = 215\ MC/Q$

Idea was to simulate a stub line coiled up. It didn't work. also PVC insulation has a lot of loss at each place winding crossed.

# Antenna Testing

Traps 16 μh + 105 pf. Tuner as 10/6/64 29/8/64

Bifilar Loading coils 3" dia, 3/8" pitch, 3/16" wire centers

| Each Winding Turns | Resonance MC Low No coils | High | Capacity pf. | Low Mode Frequency MC | Low Mode Reactance Ohms | High Mode Frequency MC | High Mode Reactance Ohms |
|---|---|---|---|---|---|---|---|
| 53 | 0.83, 4.55 | 6.42 | 27 | | | | |
| 48 | 0.97, 3.72 | 6.75 | 37 | | | | |
| 43 | 0.48, 4.15 | 6.75 | 56 | | | | |
| 38 | 2.20, 5.95 | 6.42 | 99 | | | | |
| 33 | 1.72 | 6.42 | 199 | | | | |
| 28 | 1.84 | 6.92 | 490 | | | | |
| 23 | 1.96 | 6.42 | ∞ | | | | |
| 18 | 2.10 | 6.42 | Inductance | | | | |
| 16 | 2.16 | 6.42 | μh | | | | |
| Windings connected in series aiding, end to end. | | | 5.7 | | | | |
| | | | 11.0 | | | | |
| | | | 21.2 | | | | |
| | | | 37.5 | | | | |

Coil performance on Q machine

| MC | Mf | Q | R |
|---|---|---|---|
| 1.2 | 472 | 146 | 1,8 Ω |
| 2.4 | 92 | 50 | 10,5 Ω |

$C_0$ = 35 pf

$L_0$ = 34.7 μh

$R$ = 218 MC/Q

Coils act merely as chokes and disconnect the outside antennas from system. all coils of 17/6, 24/6, 1/8 & 29/8 act the same.

# Antenna Testing

2/9/64

Binocular coils at center of each 146 ft span.
Two coils of 19/6/64 cut in half and hung parallel below center insulator. Wide pitch end at top.

| Coil center spacing | 12" | | 6" | | $2\frac{11}{16}$" | | $1\frac{7}{8}$" | |
|---|---|---|---|---|---|---|---|---|
| Mode | Low | High | Low | High | Low | High | Low | High |
| Turns each | Resonant frequency in Megacycles. | | | | | | | |
| 82 | 2.00 | 6.42 | 2.00 | 6.42 | 1.99 | 6.42 | 196 | 6.42 |
| 72 | | | | | | | 2.03 | 6.42 |
| 62 | | | | | | | 2.11 | 6.42 |
| 57 | | | | | | | 2.15 | 6.42 |

Tuner at bottom same as 10/6/64.

Characteristics of pair of 57 turn coils.

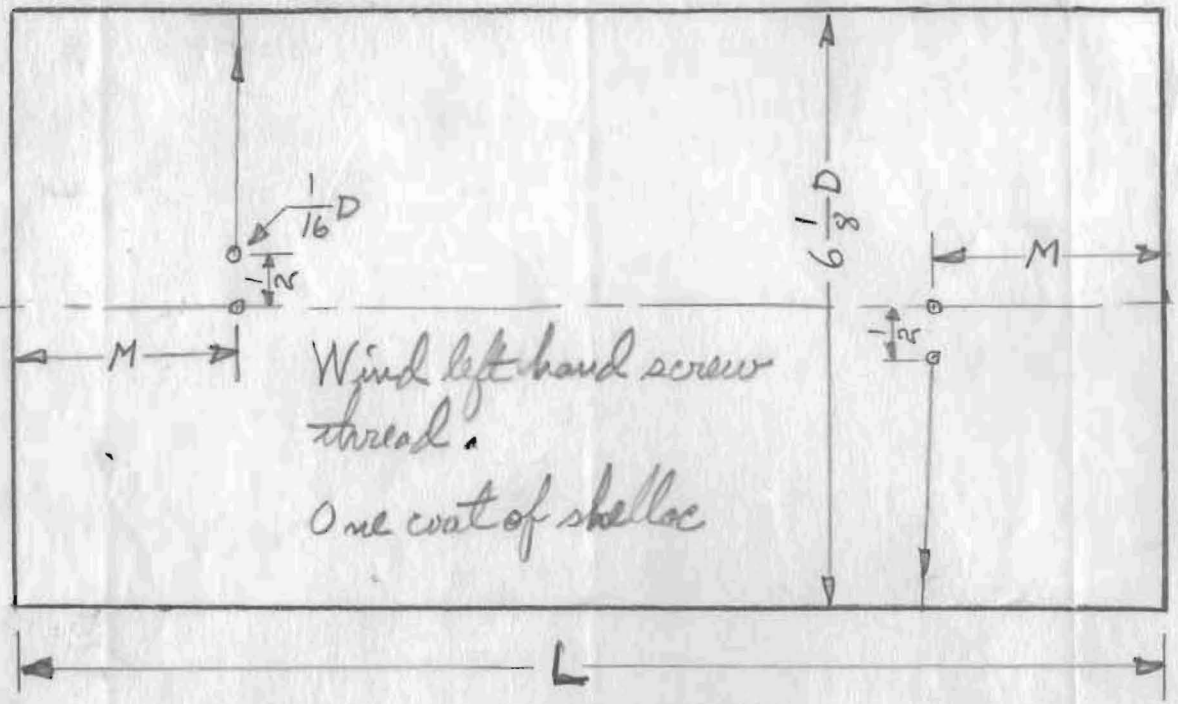
| MC | pf | Q | ohms |
|---|---|---|---|
| 1.2 | 414 | 127 | 2.4 |
| 2.4 | 91.5 | 80 | 7.7 |

$C_0 = 16.3$ pf
$L_0 = 40.9$ μh
$R = 257 MC/Q$

# Secondary

| Coil Turns | $F_1$ in air MC | $F_3$ in air MC | $F_3/F_1$ | l | d | l/d |
|---|---|---|---|---|---|---|
| 123 | 2.06 | 5.96 | 2.89 | 7.33" | 6.15" | 1.191 |
| 111 | 2.10 | 6.20 | 2.95 | 6.11" | 6.15" | .994 |

Wanted 5/6/64




One each making two coils with 0.028" dia enamelled copper wire.

L = 12", M = 2 3/8", 123 turns at 16.6 tpi

L = 11 1/4", M = 2 9/16", 111 turns at 18 tpi

Grote Reber
28/5/64

15/8/64 H = high + M = Middle Scales on Detector

| Turns | 117 | 117 | 117 | 115 | 115 | 115 | 113 | 113 | 113 |
|---|---|---|---|---|---|---|---|---|---|
| Taps | 6 | 8 | 10 | 6 | 8 | 10 | 6 | 8 | 10 |
| MC | H | H | H | H | H | H | H | H | H |
| 1·9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1·95 | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 10 | 5 |
| 2·00 | 75 | 60 | 25 | 80 | 45 | 60 | 60 | 40 | 30 |
| 2·05 | 230 | 190 | 140 | 245 | 180 | 240 | 200 | 170 | 125 |
| 2·10 | 360 | 405 | 345 | 350 | 380 470 | 470 | 295 | 335 | 325 |
| 2·13 | 415 | 217 425 | 214 370 | 213 370 | 212 385 | 211 510 | | | |
| 2·15 | 400 | 350 | 250 | 360 | 340 | 395 | 265 | 255 | 210 |
| 2·2 | 160 | 140 | 105 | 200 | 145 | 190 | 140 | 110 | 90 |
| 2·25 | 40 | 90 | 40 | 60 | 60 | 90 | 50 | 45 | 40 |
| 2·3 | 10 | 20 | 15 | 15 | 20 | 30 | 15 | 20 | 15 |
| 2·35 | 5 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 5 |
| 2·4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| | M | M | M | M | M | M | M | M | M |
| 5·5 | 20 | 15 | 5 | 20 | 10 | 10 ? | 20 | 20 | 10 |
| 5·6 | 40 | 25 | 10 | 45 | 20 | 25 | 40 | 30 | 20 |
| 5·7 | 85 | 55 | 25 | 95 | 45 | 50 | 90 | 60 | 40 |
| 5·8 | 160 | 100 | 60 | 160 | 85 | 100 | 160 | 110 | 70 |
| 5·9 | 230 | 155 | 100 | 240 | 140 | 180 | 240 | 165 | 120 |
| 6·0 | 300 | 230 | 165 | 340 | 220 | 280 | 345 | 255 | 190 |
| 6·1 | 370 | 300 | 240 | 430 | 300 | 400 | 440 | 355 | 270 |
| 6·2 | 455 | 420 | 360 | 530 | 435 | 565 | 570 | 500 | 420 |
| 6·3 | 510 | 520 | 485 | 600 | 540 | 710 | 665 | 640 | 560 |
| 6·4 | 560 | 620 | 600 | 650 | 640 | 815 | 705 | 730 | 690 |
| 6·5 | 540 | 635 | 615 | 655 | 655 | 870 | 715 | 750 | 705 |
| 6·6 | 420 | 515 | 505 | 540 | 550 | 735 | 580 | 620 | 570 |
| 6·7 | 230 | 310 | 320 | 330 | 345 | 540 | 370 | 420 | 400 |
| 6·8 | 95 | 150 | 165 | 140 | 180 | 285 | 195 | 225 | 210 |
| 6·9 | 20 | 50 | 70 | 40 | 65 | 120 | 60 | 95 | 110 |
| 7·0 | 5 | 10 | 20 | 10 | 15 | 40 | 15 | 30 | 40 |
| 7·1 | 0 | 5 | 10 | 5 | 5 | 10 | 10 | 15 | 20 |
| 7·2 | 0 | 0 | 5 | 0 | 0 | 5 ? | 5 | 10 | 20 |

19/8/64

Secondary 16.6 tpi 15/8/64

| Turns. | 123 | 123 | 123 | 121 | 121 | 121 | 119 | 119 | 119 |
|---|---|---|---|---|---|---|---|---|---|
| Taps. | 6 | 8 | 10 | 6 | 8 | 10 | 6 | 8 | 10 |
| M.C. | H | H | H | H Microamperes | H | H | H | H | H |
| 1·9 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 1·95 | 20 | 22 | 5 | 15 | 10 | 2 | 10 | 10 | 5 |
| 2·00 | 70 | 15 | 25 | 65 | 50 | 35 | 90 | 45 | 25 |
| 2·05 | 130 | 140 | 100 | 140 | 150 | 125 | 155 | 155 | 120 |
| 2·10 | 265 | 440 | 310 | 260 | 330 | 340 | 300 | 330 | 330 |
| 2·11 | 335 | | 320 | 325 | 370 | 360 | 345 | 350 | 340 |
| 2·12 | | | | | | | | | |
| 2·15 | 225 | 280 | 210 | 260 | 270 | 250 | 310 | 285 | 225 |
| 2·20 | 30 | 160 | 50 | 45 | 80 | 80 | 80 | 80 | 80 |
| 2·25 | 5 | 130 | 15 | 10 | 20 | 25 | 15 | 20 | 25 |
| 2·30 | 2 | 60 | 5 | 5 | 5 | 10 | 5 | 5 | 5 |
| | M | M | M | M | M | M | M | M | M |
| 5·5 | 30 | 20 | 10 | 40 | 20 | 10 | 25 | 20 | 5 |
| 5·6 | 60 | 35 | 15 | 65 | 30 | 20 | 50 | 30 | 15 |
| 5·7 | 105 | 60 | 30 | 110 | 60 | 40 | 100 | 60 | 30 |
| 5·8 | 160 | 105 | 60 | 170 | 100 | 65 | 165 | 100 | 65 |
| 5·9 | 200 | 140 | 95 | 220 | 145 | 110 | 230 | 155 | 100 |
| 6·0 | 240 | 200 | 155 | 270 | 200 | 160 | 240 | 225 | 165 |
| 6·1 | 280 | 260 | 200 | 315 | 270 | 230 | 350 | 310 | 240 |
| 6·2 | 315 | 340 | 300 | 360 | 360 | 320 | 420 | 410 | 350 |
| 6·3 | 340 | 400 | 390 | 390 | 435 | 430 | 465 | 500 | 460 |
| 6·4 | 355 | 450 | 475 | 420 | 490 | 520 | 500 | 580 | 570 |
| 6·5 | 335 | 445 | 480 | 410 | 500 | 520 | 500 | 580 | 600 |
| 6·6 | 200 | 305 | 350 | 280 | 360 | 400 | 360 | 450 | 460 |
| 6·7 | 75 | 150 | 190 | 120 | 180 | 230 | 195 | 270 | 300 |
| 6·8 | 20 | 45 | 85 | 30 | 70 | 110 | 60 | 120 | 140 |
| 6·9 | 5 | 10 | 20 | 5 | 20 | 40 | 20 | 35 | 60 |
| 7·0 | 0 | 5 | 5 | 0 | 5 | 10 | 5 | 10 | 15 |

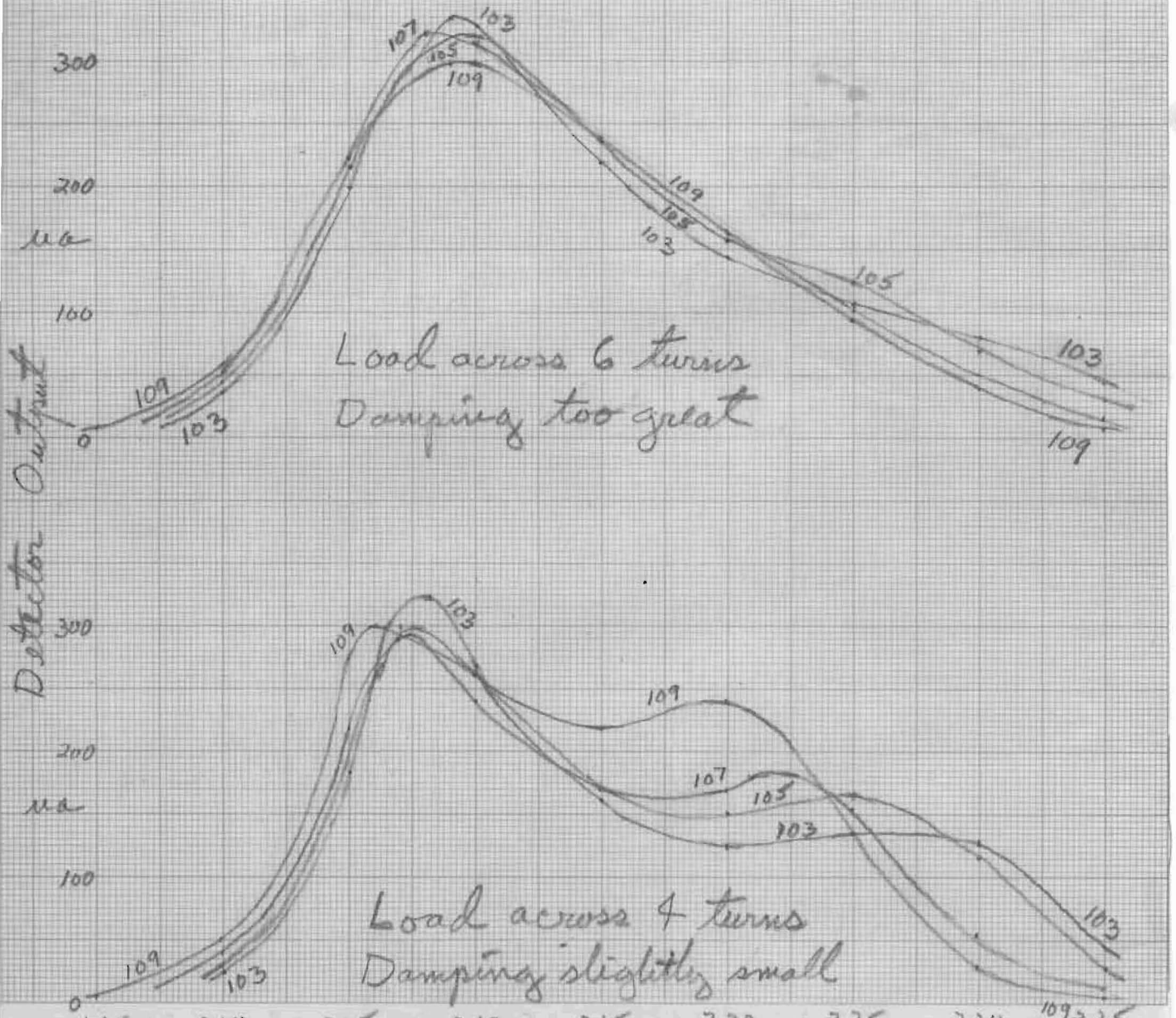
| | | | 19/8/64 | | | | | 19/8/64 | |
|---|---|---|---|---|---|---|---|---|---|
| Turns | 111 | 111 | 111 | 109 | 109 | 109 | 107 | 107 | 107 |
| Tops. | 6 | 8 | 10 | #6 | #8 | #10 | H | H | H |
| MC | H | H | H | H | H | H | | | |
| 1.95 | 5 | 5 | 5 | 5 | 0 | 5 | | | |
| 2.00 | 45 | 35 | 25 | 40 | 25 | 20 | | | |
| 2.05 | 190 | 150 | 120 | 200 | 145 | 115 | | | |
| 2.10 | 295 | 320 | 320 | 300 | 310 | 340 | | | |
| 2.15 | 260 | 230 | 215 | 240 | 220 | 200 | | | |
| 2.20 | 170 | 110 | 90 | 165 | 120 | 80 | | | |
| 2.25 | 80 | 60 | 45 | 85 | 60 | 35 | | | |
| 2.30 | 20 | 20 | 20 | 40 | 25 | 15 | | | |
| 2.35 | 5 | 5 | 10 | 10 | 10 | 5 | | | |
| 2.40 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | M | M | M | M | M | M | | | |
| 5.6 | 35 | 25 | 20 | 25 | 20 | 10 | | | |
| 5.7 | 80 | 55 | 35 | 70 | 40 | 20 | | | |
| 5.8 | 155 | 100 | 65 | 140 | 90 | 50 | | | |
| 5.9 | 240 | 160 | 100 | 225 | 145 | 90 | | | |
| 6.0 | 355 | 240 | 175 | 360 | 240 | 155 | | | |
| 6.1 | 460 | 345 | 265 | 490 | 350 | 240 | | | |
| 6.2 | 605 | 510 | 410 | 660 | 510 | 390 | | | |
| 6.3 | 710 | 645 | 550 | 760 | 655 | 540 | | | |
| 6.4 | 780 | 760 | 685 | 825 | 785 | 670 | | | |
| 6.5 | 780 | 760 | 705 | 835 | 810 | 705 | | | |
| 6.6 | 640 | 630 | 580 | 710 | 670 | 580 | | | |
| 6.7 | 440 | 435 | 390 | 525 | 480 | 400 | | | |
| 6.8 | 235 | 240 | 220 | 300 | 285 | 225 | | | |
| 6.9 | 85 | 120 | 105 | 130 | 120 | 100 | | | |
| 7.0 | 25 | 40 | 40 | 35 | 40 | 40 | | | |
| 7.1 | 10 | 20 | 25 | 10 | 20 | 20 | | | |
| 7.2 | 5 | 15 | 20 | 5 | 10 | 10 | | | |

# Antenna Testing. Detector on High Scale 22/8/64

| Turns | 109 | 109 | 107 | 107 | 105 | 105 | 103 | 103 | |
|---|---|---|---|---|---|---|---|---|---|
| Taps | 4 | 6 | 4 | 6 | 4 | 6 | 4 | 6 | Traps Resonate at 3,45 mc, 22½ Turns 95 pf. |
| MC | Detector Output Microamperes | | | | | | | | |
| 1.95 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | |
| 2.00 | 50 | 60 | 40 | 95 | 30 | 55 | 25 | 40 | |
| 2.05 | 275 | 225 | 220 | 225 | 220 | 220 | 185 | 200 | |
| 2.06 | 300 209 | 300 207 | 290 208 | 325 207 | 300 208 | 355 208 | 325 209 | 335 | |
| 2.10 | 260 | 300 | 240 | 315 | 260 | 340 | 265 | 325 | |
| 2.15 | 220 | 240 | 170 | 240 | 170 | 240 | 160 | 220 | |
| 2.20 | 240 | 165 | 170 | 165 | 150 | 160 | 125 | 145 | |
| 2.25 | 135 | 95 | 2021 180 155 | 100 | 165 | 120 | 135 | 105 | |
| 2.30 | 30 | 40 | 55 | 50 | 115 | 70 | 125 | 80 | |
| 2.35 | 5 | 10 | 10 | 15 | 25 | 30 | 45 | 45 | |
| 2.40 | 0 | 0 | 5 | 5 | 5 | 10 | 5 | 20 | |
| | | | | | | | | | |
| 5.6 | 20 | 20 | 20 | 15 | 10 | 15 | 10 | 10 | |
| 5.7 | 40 | 30 | 40 | 25 | 25 | 30 | 25 | 25 | |
| 5.8 | 80 | 55 | 70 | 50 | 55 | 55 | 50 | 45 | |
| 5.9 | 120 | 80 | 115 | 80 | 95 | 80 | 90 | 70 | |
| 6.0 | 170 | 110 | 170 | 110 | 155 | 120 | 145 | 110 | |
| 6.1 | 205 | 145 | 210 | 145 | 200 | 160 | 205 | 145 | |
| 6.2 | 230 | 185 | 245 | 200 | 245 | 215 | 260 | 205 | |
| 6.3 | 240 | 220 | 250 | 230 | 260 | 255 | 280 | 245 | |
| 6.4 | 240 | 245 | 255 | 260 | 260 | 285 | 285 | 280 | |
| 6.5 | 235 | 250 | 245 | 260 | 255 | 290 | 280 | 275 | |
| 6.6 | 205 | 215 | 225 | 230 | 230 | 250 | 260 | 250 | |
| 6.7 | 160 | 160 | 170 | 170 | 185 | 200 | 205 | 195 | |
| 6.8 | 95 | 100 | 100 | 110 | 120 | 135 | 145 | 140 | |
| 6.9 | 40 | 55 | 50 | 60 | 65 | 75 | 80 | 80 | |
| 7.0 | 15 | 20 | 15 | 25 | 20 | 30 | 35 | 40 | |
| 7.1 | 10 | 15 | 10 | 15 | 10 | 20 | 15 | 20 | |
| 7.2 | 5 | 10 | 5 | 10 | 5 | 15 | 10 | 15 | |

# Antenna Performance in Low Band 22/8/64

Trap coil 22 turns = 25.3μh. Primary 4 turns
Response for 109, 107, 105, 103 secondary turns
Resonance too high at 109 turns.
Probably 113 turns gives correct resonance



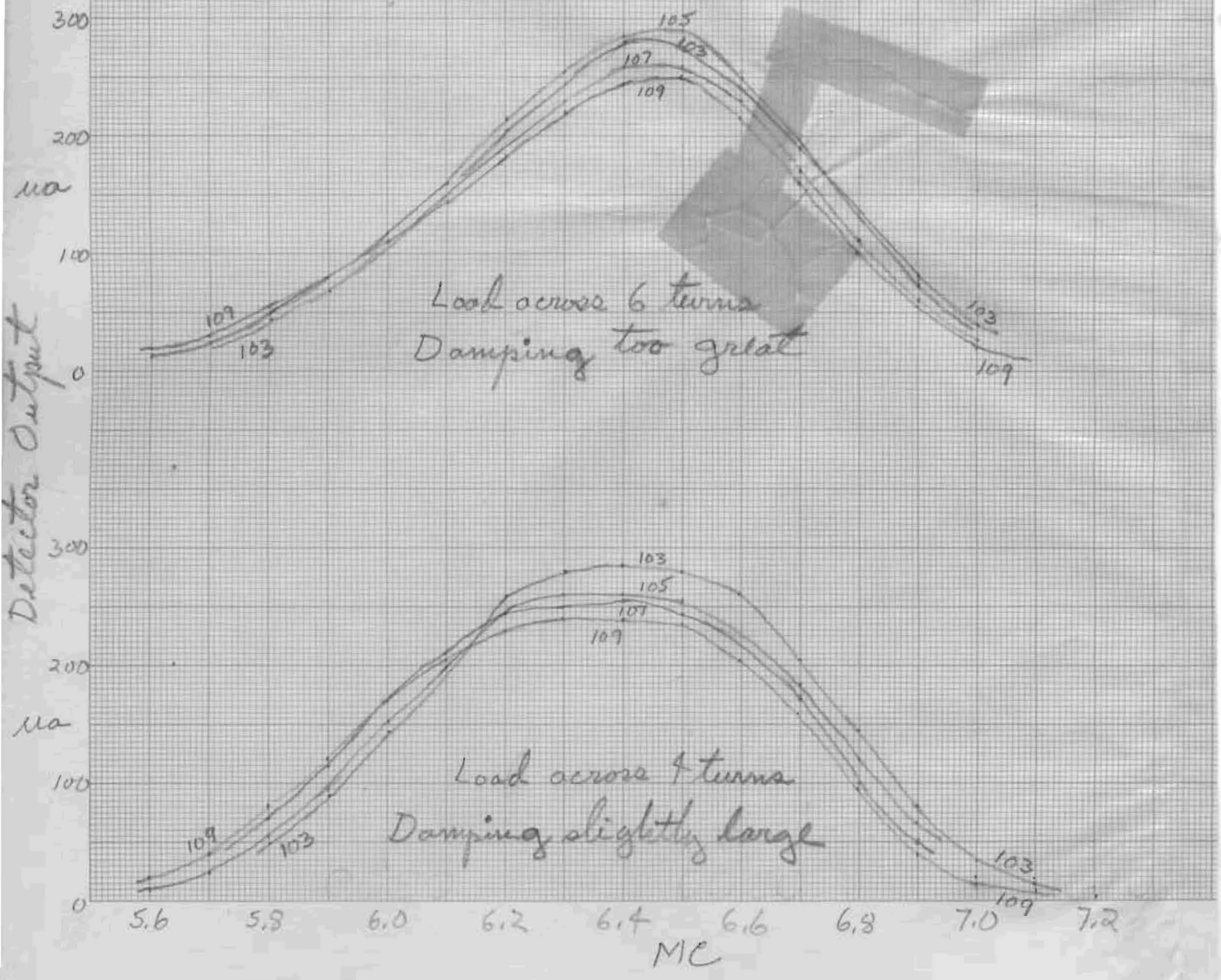
# Antenna Performance in High Band 22/8/64

Trap capacity 95 pf. Primary 4 turns

Response for 109, 107, 105, 103 secondary turns

Resonance a bit low at 103 turns

Probably 99 turns gives correct resonance.



Antenna Tests: Detector on High, Secondary 103 turns 26/8/64

| Trap | 3.74mc 19 turns 102 pf | | 3.61mc. 18 turns 115 pf | | 3.79mc 17 turns 115 pf. | |
|---|---|---|---|---|---|---|
| Load | 4 | 6 | 4 | 6 | 4. | 6. |
| MC | Detector Output Microamperes. | | | | | |
| 2.05 | 165 | 90 | 55 | 65 | 40 | 55 |
| 2.10 | 280 | 255 | 190 | 175 | 165 | 160 |
| 2.15 | 410 | 455 | 420 | 390 | 400 | 320 |
| 2.20 | 320 | 2.17 490 485 | 360 | 495 | 2.18 480 495 | 525 |
| 2.25 | 305 | 400 | 320 | 440 | 380 2.23 | 550 |
| 2.30 | 355 | 320 | 355 | 360 | 395 2.27 | 535 |
| 2.35 | 240 | 205 | 2.32 365 310 | 230 | 480 | 440 |
| 2.40 | 80 | 100 | 80 | 100 | 225 | 230 |
| 2.45 | 30 | 45 | 25 | 45 | 75 | 120 |
| 2.50 | 10 | 20 | 10 | 15 | 25 | 55 |
| 5.6 | 15 | 20 | 15 | 20 | | |
| 5.7 | 30 | 30 | 25 | 30 | | |
| 5.8 | 60 | 55 | 60 | 55 | | |
| 5.9 | 90 | 80 | 95 | 80 | | |
| 6.0 | 150 | 120 | 160 | 130 | | |
| 6.1 | 215 | 155 | 225 | 175 | | |
| 6.2 | 265 | 210 | 280 | 230 | | |
| 6.3 | 290 | 255 | 300 | 275 | | |
| 6.4 | 295 | 290 | 290 | 295 | | |
| 6.5 | 285 | 300 | 280 | 285 | | |
| 6.6 | 265 | 265 | 255 | 250 | | |
| 6.7 | 220 | 205 | 215 | 200 | | |
| 6.8 | 160 | 145 | 160 | 145 | | |
| 6.9 | 85 | 90 | 95 | 90 | | |
| 7.0 | 40 | 50 | 40 | 45 | | |
| 7.1 | 20 | 30 | 20 | 25 | | |
| 7.2 | 15 | 25 | 15 | 25 | | |

Secondary resonance
6.50 & 2.25 in air

$\frac{6.50}{2.25} = 2.89 = \frac{F_H}{F_L}$

6.40 & 2.27 in can

$\frac{6.40}{2.27} = 2.82 = \frac{F_H}{F_L}$

6.156" long, 6.153" dia.

$\frac{l}{d} = 1.00$

$f_c = 150 \cdot 39.37 / 103\pi \cdot 6.15$
$= 2.965$ mc

$K = 2.965 / 2.27 = 1.308$

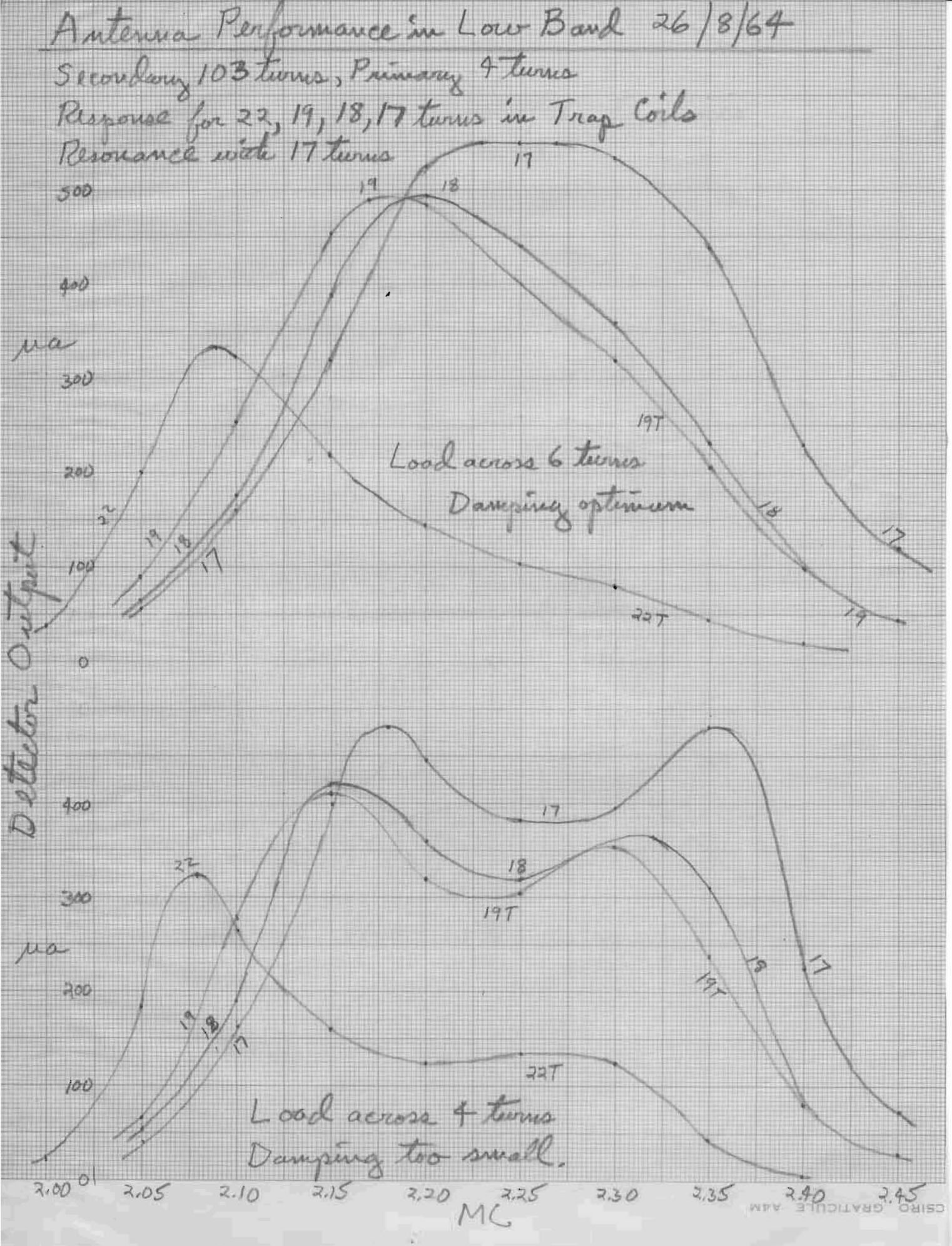
Secondary 16.6 tpi

# Antenna Performance in Low Band 26/8/64

Secondary 103 turns, Primary 4 turns

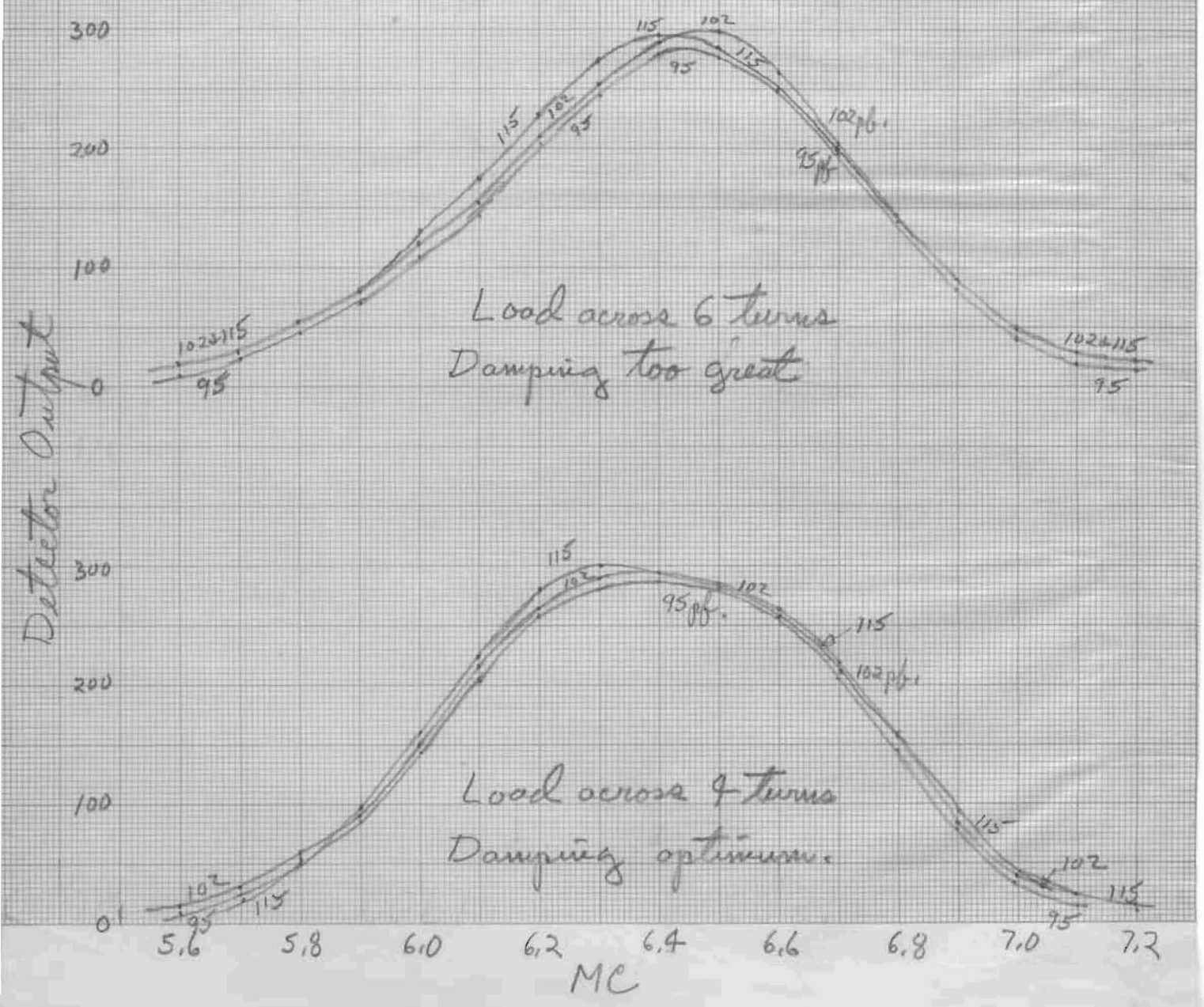
Response for 22, 19, 18, 17 turns in Trap Coils

Resonance with 17 turns



# Antenna Performance in High Band 26/8/64

Secondary 103 turns, Primary 4 turns
Response for 95, 102, 115 pf Trap condensers.
Resonance with 102 pf.

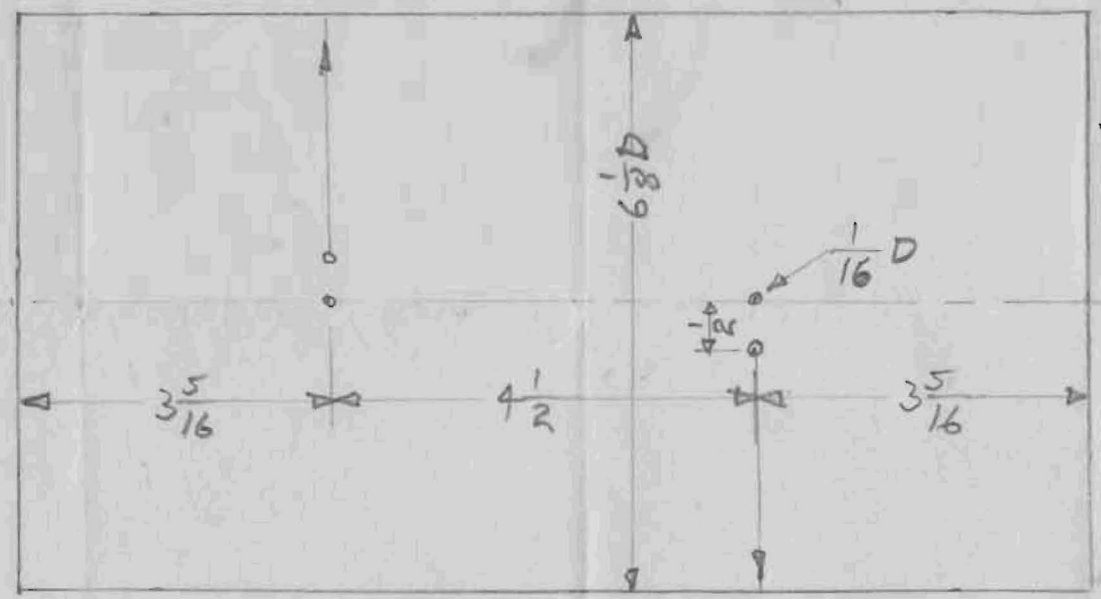


27/8/64

# Revised Antenna Coupler Calculations

In can $f_3 = 6.50$, $f_1 = 2.15$, $f_3/f_1 = 3.02$
From probable curve $l/d = 0.70$, $K = 1.34$, $d = 6.15"$
$l = 0.70 \times 6.15 = 4.3"$ long.
$N_a = 1805/K d f_1 = 1805/1.34 \cdot 6.15 \cdot 2.15 = 1805/177 = 102$ turns
tpi $= 102/4.3 = 23.7$, say $24 = .042"$ centers,
$w = 1/2 \cdot 24 = 0.021"$ dia, say $.025"$ dia wire, $0.17"$ gap.
Wind coil $4\frac{1}{2}"$ at 24 tpi = 108 turns to start.
Put taps at 3, 5, 7 turns

# One Coil




Wind left hand screw thread
108 turns at 24 turns per inch
0,025" dia wire
One coat of shellac

Grote Reber
22786
27/8/64

# Secondary 24 tpi

## Antenna Tests

5/9/64

Detector on High Scale, Traps 23½ turns at 11 tpi & 95 pf, resonance 3.37 mc.

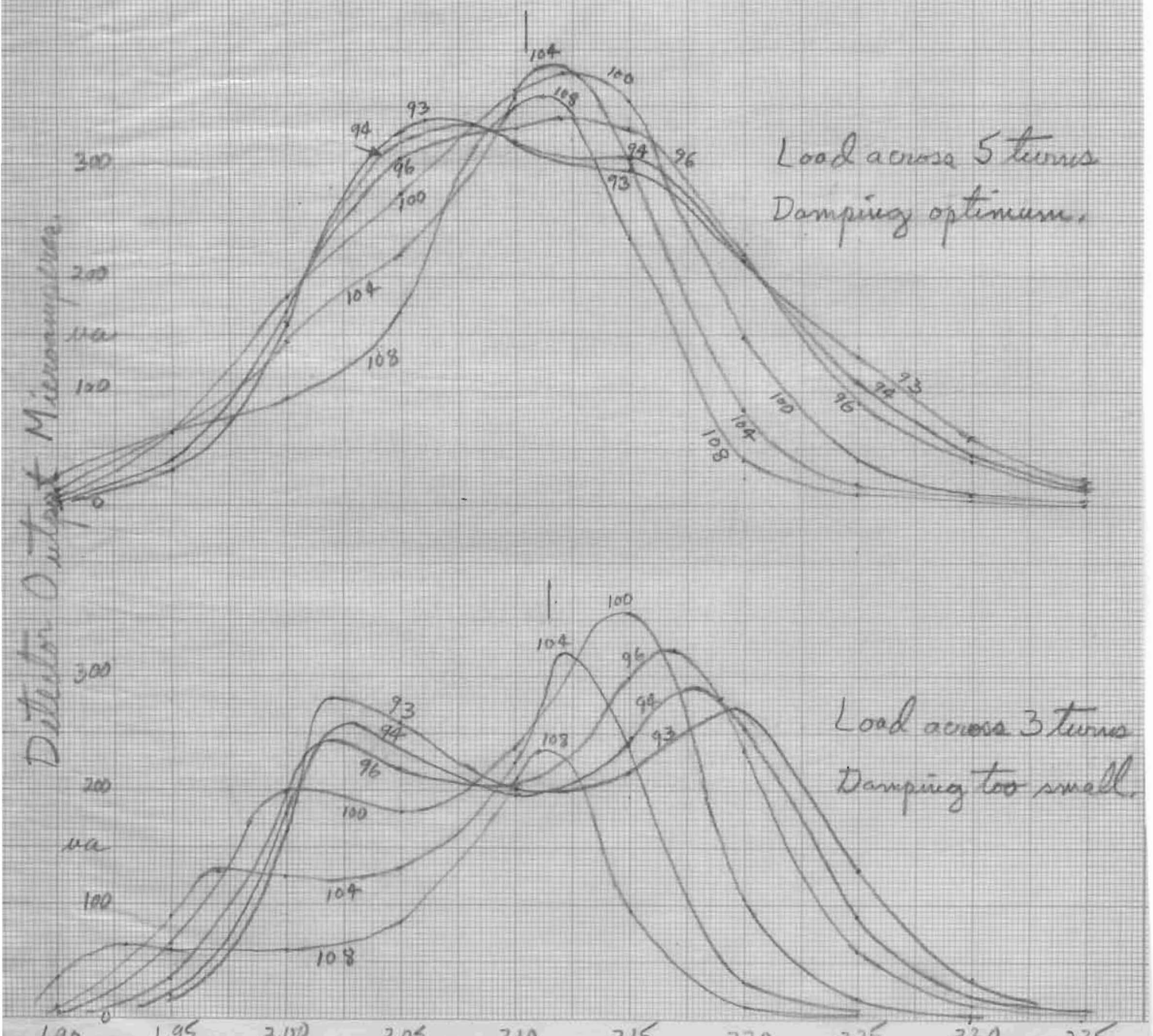
| Secondary Turns / Load Turns / MC | 108 3 | 108 5 | 108 7 | 104 3 | 104 5 | 104 7 | 100 3 | 100 5 | 100 7 |
|---|---|---|---|---|---|---|---|---|---|
| | Detector Output Microamperes. | | | | | | | | |
| 1.90 | 35 | 25 | 15 | 10 | 15 | 10 | 5 | 10 | 10 |
| 1.93 | 65 | | | | | | | | |
| 1.95 | 160 | 65 | 40 | 90 | 65 | 40 | 65 | 65 | 40 |
| 1.97 | | | | 130 | | | | | |
| 2.00 | 60 | 95 | 105 | 125 | 145 | 110 | 200 | 185 | 150 |
| 2.05 | 85 | 170 | 210 | 130 | 220 | 260 | 180 | 275 | 305 |
| 2.10 | 210 | 350 | 395 | 225 | 360 | 400 | 235 | 365 | 415 |
| 2.11 | 235 | 360 | | 320 | 385 | | | 380 | |
| 2.12 | | 2.11 | | 2.12 | 2.11 | | | 2.12 | |
| 2.15 | 95 | 185 | 200 | 240 | 300 | 270 | 355 | 355 | 300 |
| 2.2 | 10 | 40 | 50 | 35 | 85 | 100 | 105 | 150 | 140 |
| 2.25 | 5 | 10 | 15 | 5 | 20 | 35 | 20 | 40 | 60 |
| 2.30 | 0 | 5 | 5 | 0 | 10 | 10 | 5 | 10 | 20 |
| 2.35 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 10 5 |
| 5.8 | 20 | 20 | 15 | 30 | 20 | 15 | 25 | 20 | 15 |
| 5.9 | 20 | 25 | 20 | 40 | 35 | 20 | 50 | 40 | 25 |
| 6.0 | 20 | 30 | 30 | 45 | 50 | 35 | 70 | 60 | 40 |
| 6.1 | 20 | 40 | 45 | 45 | 65 | 50 | 80 | 80 | 60 |
| 6.2 | 20 | 45 | 65 | 45 | 80 | 80 | 80 | 105 | 90 |
| 6.3 | 20 | 55 | 80 | 50 | 90 | 100 | 80 | 120 | 120 |
| 6.4 | 25 | 65 | 90 | 55 | 105 | 125 | 85 | 140 | 145 |
| 6.5 | 25 | 65 | 95 | 55 | 105 | 130 | 85 | 145 | 160 |
| 6.6 | 20 | 70 | 80 | 45 | 90 | 115 | 75 | 135 | 140 |
| 6.7 | 10 | 25 | 50 | 25 | 60 | 95 | 50 | 100 | 100 |
| 6.8 | 5 | 10 | 20 | 10 | 30 | 40 | 25 | 55 | 65 |
| 6.9 | 0 | 5 | 10 | 5 | 10 | 20 | 10 | 25 | 30 |
| 7.0 | 0 | 0 | 5 | 0 | 0 | 5 | 5 | 5 | 10 |

# Antenna Performance in Low Band 5+9/9/64

Trap coils $23\frac{1}{2}$ turns = Primary 4 turns

Response for 108, 104, 100, 96, 94, 93 secondary turns

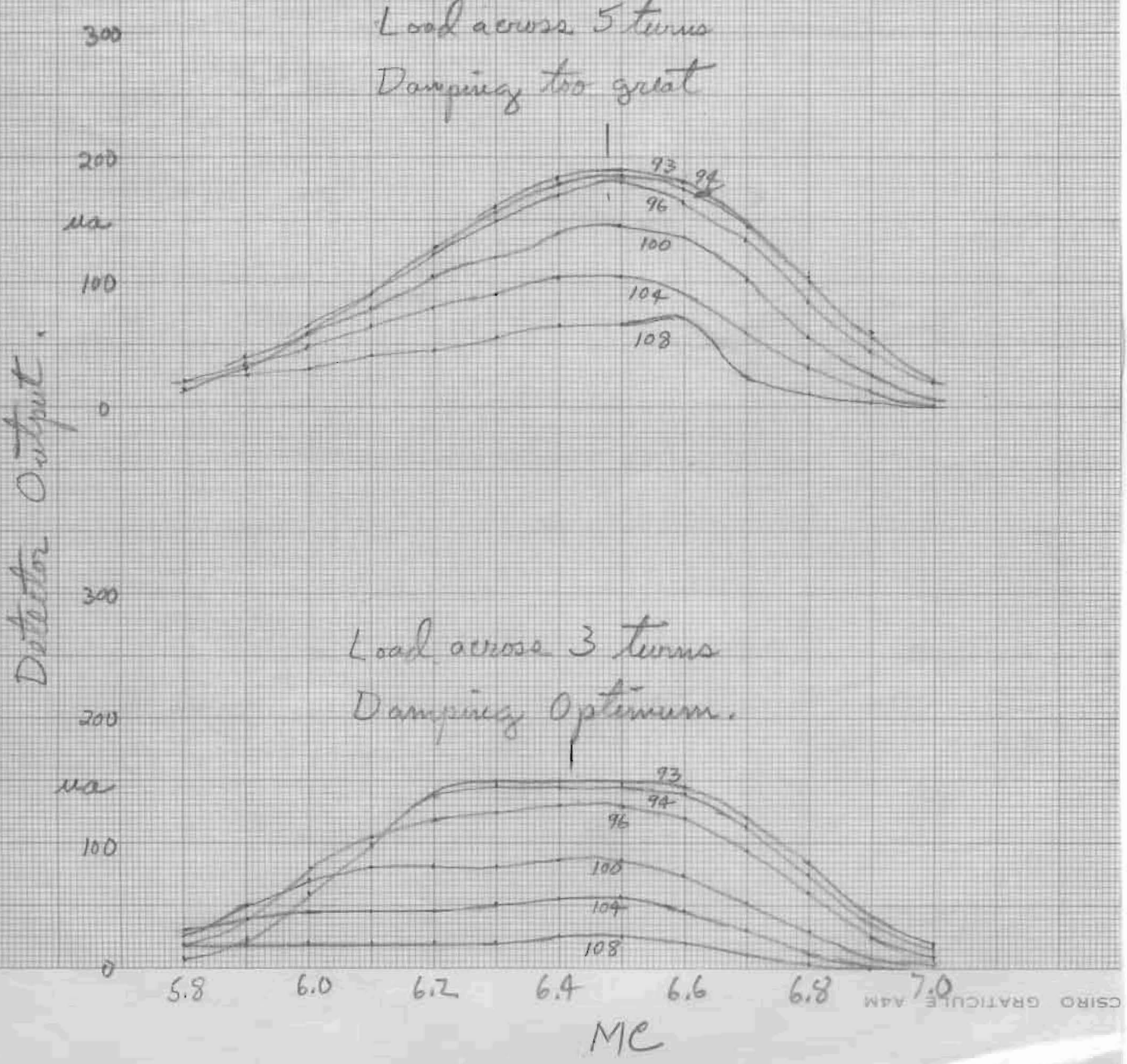
Correct secondary 95 turns for optimum Damping.



# Antenna Performance in High Band 5th 9/9/64

Trap capacity 95pf  Primary 4 turns

Response for 108, 104, 100, 96, 94, 93 secondary turns



9/9/64

Best compromise is: 94 turns secondary, Load across 4 turns.

| Load Turns | Low Band Center MC | Low Band Damping | High Band Center MC | High Band Damping | $\frac{F_H}{F_L}$ | |
|---|---|---|---|---|---|---|
| 3 | 2.112 | Too small | 6.42 | Optimum | 3.035 | In can |
| 4 | 2.108 | Trifle small | 6.45 | Trifle large | 3.062 | |
| 5 | 2.105 | optimum | 6.48 | Too large | 3.080 | |

Resonances in Air: 6.41mc + 2.06mc : $F_H/F_L = 3.11$

$l = 3.85$, $d = 6.15$; $l/d = 0.626$, $n = 93$ turns

$f_c = 150 \cdot 39.37/94\pi 6.15 = 3.255$ mc for 94 turns, $l = (94-1)/24 = 3.870$

$K = 3.255/2.108 = 1.545$, $l/d = 3.870/6.15 = 0.630$

Secondary 24 tpi

# Antenna Tests

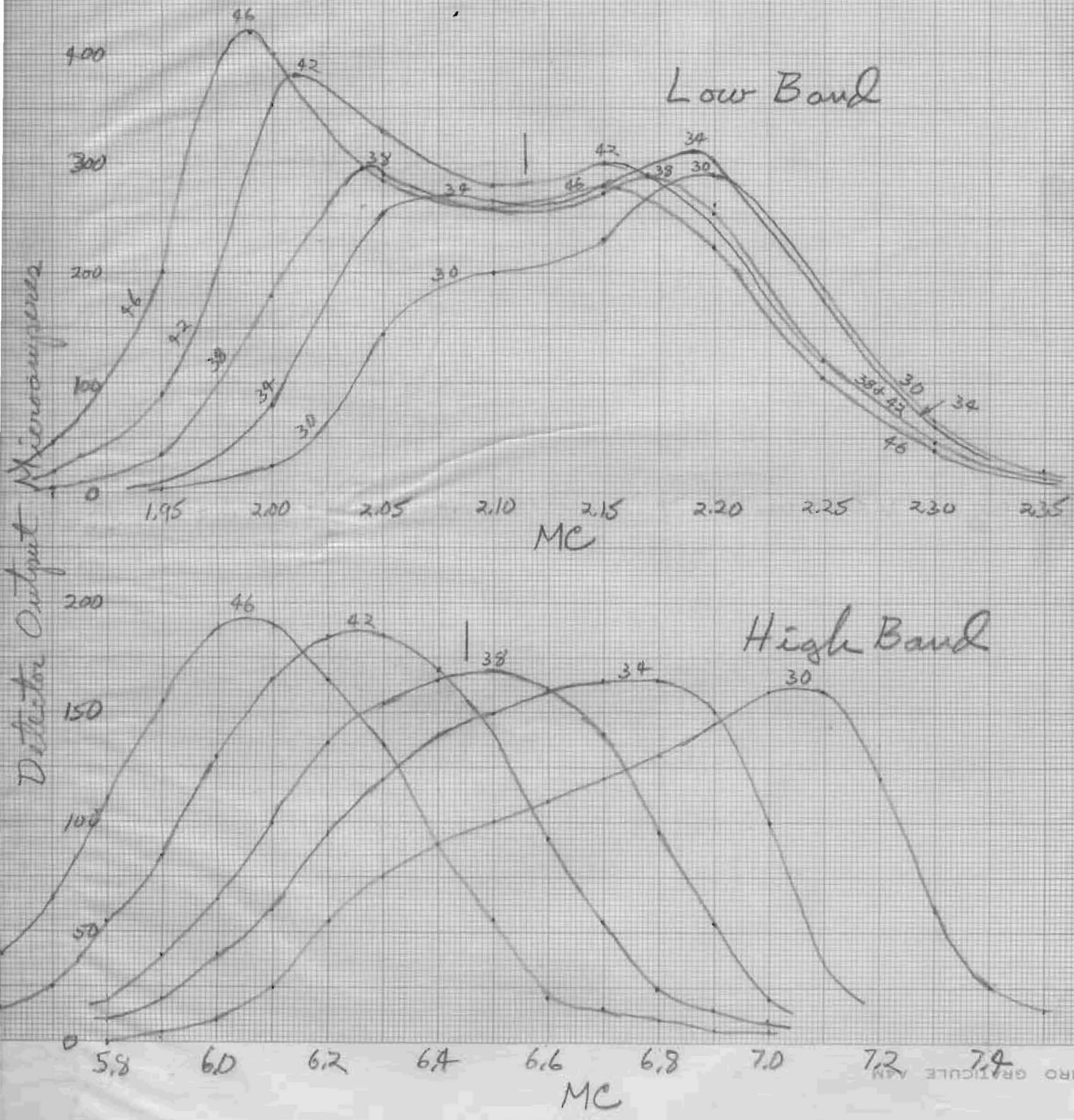
9/9/64

Detector on High Scale, Traps 23½ T at 11 tpi + 95 pf, Resonance 3.37 mc.

| Secondary Turns | 96 | | | 94 | | | 93 | | |
|---|---|---|---|---|---|---|---|---|---|
| Load Turns | 3 | 5 | 7 | 3 | 5 | 7 | 3 | 5 | 7 |
| MC | Detector Output, Microamperes. | | | | | | | | |
| 1.90 | 5 | 5 | 10 | 0 | 5 | 5 | 0 | 0 | 5 |
| 1.95 | 35 | 40 | 30 | 20 | 40 | 30 | 20 | 35 | 30 |
| 2.00 | 200 | 170 | 125 | 180 | 165 | 120 | 165 | 160 | 125 |
| 2.02 | 245 | | | 2.03 260 | | | 2.02 280 | | |
| 2.05 | 220 | 305 | 300 | 235 | 320 | 325 | 260 | 330 | 325 |
| 2.08 | | | | | 335 | 390 | | 340 | 390 |
| 2.10 | 210 | 330 | 375 | 195 | 320 | 370 | 200 | 320 | 375 |
| 2.12 | 300 | 340 | | | | | | | |
| 2.15 | | 330 | 285 | 245 | 305 | 280 | 215 | 295 | 270 |
| 2.17 | 325 | | | 2.18 290 | | | 2.19 280 | | |
| 2.20 | 235 | 220 | 160 | 255 | 215 | 165 | 270 | 220 | 160 |
| 2.25 | 60 | 90 | 90 | 90 | 110 | 90 | 130 | 130 | 100 |
| 2.30 | 20 | 40 | 50 | 20 | 45 | 45 | 35 | 60 | 60 |
| 2.35 | 10 | 15 | 20 | 5 | 20 | 20 | 5 | 25 | 25 |
| 5.8 | 20 | 20 | 15 | 10 | 15 | 15 | 10 | 20 | 10 |
| 5.9 | 40 | 40 | 25 | 25 | 30 | 25 | 25 | 30 | 20 |
| 6.0 | 80 | 65 | 45 | 60 | 60 | 40 | 60 | 60 | 40 |
| 6.1 | 105 | 90 | 70 | 100 | 90 | 65 | 100 | 90 | 60 |
| 6.2 | 120 | 125 | 100 | 140 | 130 | 100 | 140 | 130 | 95 |
| 6.3 | 125 | 155 | 140 | 145 | 155 | 140 | 150 | 160 | 130 |
| 6.4 | 130 | 170 | 170 | 145 | 180 | 175 | 150 | 185 | 165 |
| 6.5 | 130 | 180 | 180 | 145 | 185 | 185 | 150 | 190 | 175 |
| 6.6 | 120 | 165 | 170 | 140 | 180 | 170 | 145 | 180 | 165 |
| 6.7 | 95 | 135 | 130 | 115 | 145 | 130 | 120 | 145 | 130 |
| 6.8 | 60 | 85 | 90 | 75 | 100 | 85 | 85 | 105 | 85 |
| 6.9 | 25 | 45 | 50 | 35 | 55 | 55 | 40 | 60 | 55 |
| 7.0 | 10 | 20 | 25 | 10 | 20 | 20 | 20 | 25 | 20 |

# Antenna Response versus Stub Length 12/9/64

Trap 23½ turns = [illegible] ufd and 95 pf. Primary 4 turns
Secondary 94 turns @ 24 tpi, Load across 4 turns
Stub lengths 30, 34, 38, 42, 46 feet



# Antenna Response versus Stub Length 12/9/64

Secondary 94 turns @ 24 tpi, 0.025" wire. Primary 4 turns.
Load Taps 4 turns, 6 DB attenuator.
Traps 23½ turns = ___ uh, ± 95 pf. Resonance 3.37 mc.

| Stub lines | 30' | 34' | 38' | 42' | 46' |
|---|---|---|---|---|---|
| MC | Detector Output Microamperes on High Scale | | | | |
| 1.90 | 0 | 0 | 5 | 20 | 45 |
| 1.95 | 5 | 10 | 35 | 90 | 200 |
| 1.99 | | | | | 420 |
| 2.00 | 25 | 80 | 180 | 355 | 400 |
| 2.01 | | | | 380 | |
| 2.04 | | | 295 | | |
| 2.05 | 145 | 255 | 290 | 330 | 285 |
| 2.08 | | 270 | | | |
| 2.10 | 200 | 265 | 260 | 280 | 260 |
| 2.15 | 230 | 280 | 275 | 300 | 280 |
| 2.17 | | | 290 | | |
| 2.19 | | 310 | | | |
| 2.20 | 290 | 300 | 255 | 260 | 225 |
| 2.25 | 185 | 175 | 170 | 120 | 105 |
| 2.30 | 65 | 60 | 45 | 45 | 40 |
| 2.35 | 20 | 20 | 20 | 20 | 20 |
| | | | | | 5 |
| 2.40 | 5 | 10 | 5 | 10 | |
| 5.6 | | | | 15 | 40 |
| 5.7 | | | | 25 | 65 |
| 5.8 | 0 | 10 | 20 | 55 | 110 |
| 5.9 | 5 | 20 | 40 | 85 | 155 |
| 6.0 | 10 | 40 | 65 | 130 | 185 |
| 6.1 | 25 | 60 | 100 | 165 | 185 |
| 6.2 | 55 | 95 | 135 | 185 | 165 |
| 6.3 | 75 | 120 | 155 | 185 | 135 |
| 6.4 | 90 | 140 | 165 | 170 | 90 |
| 6.5 | 100 | 150 | 170 | 140 | 55 |
| 6.6 | 110 | 160 | 160 | 85 | 20 |
| 6.7 | 120 | 165 | 140 | 55 | 15 |
| 6.8 | 130 | 165 | 95 | 25 | 10 |
| 6.9 | 145 | 150 | 55 | 15 | 5 |
| 7.0 | 160 | 100 | 20 | 10 | 5 |

| | |
|---|---|
| 7.1 | 160 |
| 7.2 | 120 |
| 7.3 | 60 |
| 7.4 | 25 |
| 7.5 | 15 |