supporting information for

Visible-Light-Induced Tandem Reaction of Quinoxalin-2(1H)-ones, Alkenes, and Sulfonyl Chlorides

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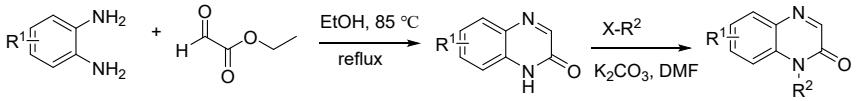
Contents

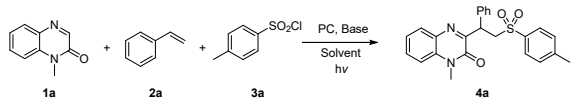
1. General procedure for the synthesis of substrates 1a-1q



Ethyl 2-oxoacetate (50% in toluene, 4.5g, 22.0 mmol, 1.1 equiv.) was added to a suspension of o-arylenediamine (20.0 mmol, 1.0 equiv.) in ethanol (40 mL, 0.5 M). The reaction mixture was stirred and refluxed in an oil bath for 1 h, then stirred at room temperature for 16 h. Upon completion (as monitored by TLC), the precipitate was filtered and washed with ethanol, then dried to give quinoxalinone. For alkylation, the corresponding halogenoalkane (16 mmol, 1.6 equiv.) was added to a suspension of quinoxalinone (10 mmo, 1.0 equiv.) and potassium carbonate (12 mmo, 1.2 equiv.) in DMF (20.0 mL, 0.5M). The mixture was stirred at room temperature for 16 h. Upon completion (as monitored by TLC), the reaction mixture was washed with saturated solution of ammonium chloride (5.0 mL), ethyl acetate (10.0 mL) and water (10.0 mL). The organic layer was separated and the aqueous layer was extracted with ethyl acetate (2 × 10.0 mL). The combined organic layers were dried with anhydrous Na_2SO_4, filtered and concentrated under reduced pressure. The resulting organic residue was purified by flash chromatography column over silica gel (SiO_2) to afford the alkylated quinoxalinone.

2. Reaction optimization

Table S1 Reaction Optimization[a]



1a 2a 3a 4a

Entry	**2a** (eq.)	**3a** (eq.)	PC (mol%)	Base (eq.)	Solvent (mL)	Light Source	Time (h)	Yield (%)
1	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	DCE (2.0)	24 W Green	12	0
2	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	DCE (2.0)	24 W White	12	46
3	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	DCE (2.0)	24 W Purple	12	trace
4	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	DCE (2.0)	24 W Blue	12	54
5	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	Toluene (2.0)	24 W Blue	12	15
6	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	MeCN (2.0)	24 W Blue	12	trace
7	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	THF (2.0)	24 W Blue	12	trace
8	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	DMAc (2.0)	24 W Blue	12	34
9	2.0	2.0	4-CzIPN (2.0)	K_2HPO_4 (1.5)	acetone (2.0)	24 W Blue	12	34
10	2.0	2.0	4-CzIPN (2.0)	KF (1.5)	DCE (2.0)	24 W Blue	12	76
11	2.0	2.0	4-CzIPN (2.0)	DBU (1.5)	DCE (2.0)	24 W Blue	12	53
12	2.0	2.0	4-CzIPN (2.0)	K_2CO_3(1.5)	DCE (2.0)	24 W Blue	12	57
13	2.0	2.0	4-CzIPN (2.0)	Na_2CO_3 (1.5)	DCE (2.0)	24 W Blue	12	34
14	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	89
15	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.0)	DCE (2.0)	24 W Blue	12	83
16	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (2.0)	DCE (2.0)	24 W Blue	12	84
17	2.0	2.0	PTH (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	76
18	2.0	2.0	fac-Ir(ppy)$_3$ (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	13
19	2.0	2.0	Ir[dF(CF$_3$)ppy]$_2$(dtbbpy)PF$_6$ (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	32
20	2.0	2.0	Na_2 Eosin Y (10)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	0
21	1.5	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	82

22	2.5	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	81
23	2.0	1.5	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	83
24	2.0	2.5	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	81
25	2.0	2.0	4-CzIPN (1.5)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	85
26	2.0	2.0	4-CzIPN (2.5)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	87
27	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (1.5)	24 W Blue	12	84
28	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.5)	24 W Blue	12	86
29	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	18 W Blue	12	81
30	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	30 W Blue	12	84
31	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Green	12	0
32	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W White	12	46
33	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Purple	12	trace
34	2.0	2.0	-	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	0
35	2.0	2.0	-	K_3PO_4 (1.5)	DCE (2.0)	24 W Purple	12	0
36	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	0(air)
37	2.0	2.0	4-CzIPN (2.0)	K_3PO_4 (1.5)	DCE (2.0)	24 W Blue	12	0(dark)

[a] **1a** (0.20 mmol), **2a** (0.30-0.50 mmol), **3a** (0.30-0.50 mmol), photocatalyst (0.003-0.02 mmol), base (0.20-0.40 mmol) in solvent (1.5-2.5 mL) under the irradiation of LEDs for 12 h at 40 °C.

3. Larger-scale experiments

To a 100.0 mL flame-dried round Schlenk tube equipped with a magnetic stir bar was added quinoxalin-2(1H)-ones **1a** (0.64 g, 4.0 mmol), styrene **2a** (0.83 g, 8.0 mmol) and tosyl chloride **3a** (1.53 g, 8.0 mmol), K_3PO_4 (1.27 g, 6.0 mmol), 4CzIPN (64.0 mg, 0.08 mmol) and dry DCE (40.0 mL). The resulting mixture was charged with argon. Then, the solution was stirred under the irradiation of 24 W blue LEDs at 40 °C for about 12 h under argon atmosphere. The organic phase was evaporated under reduced pressure to give a residue, which was then purified with chromatography column on silica gel (PE : EA = 3 : 1) to give the corresponding products **4a** as a white solid (1.38 g, 83%).

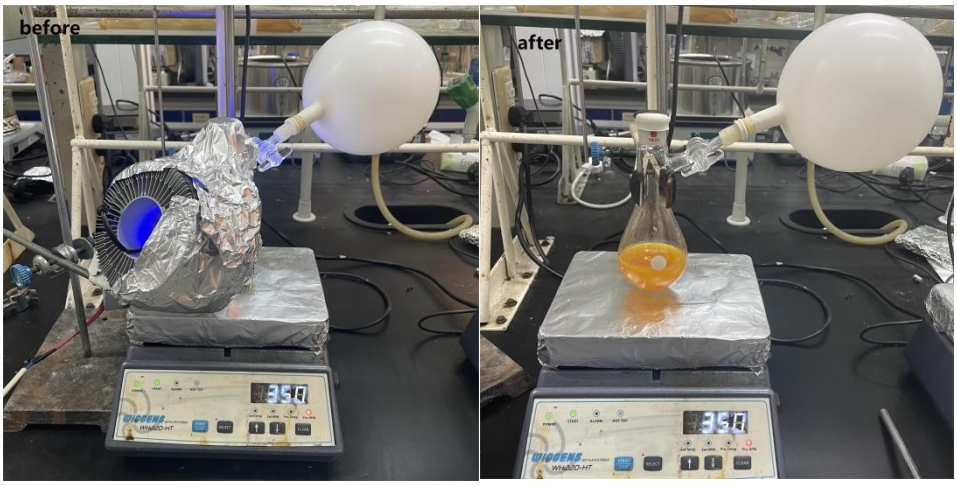
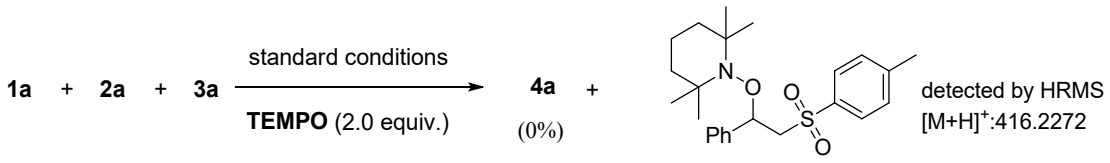


Figure S1. The setup for the blue LEDs-driven large-scale reaction

4. Radical trapping experiments



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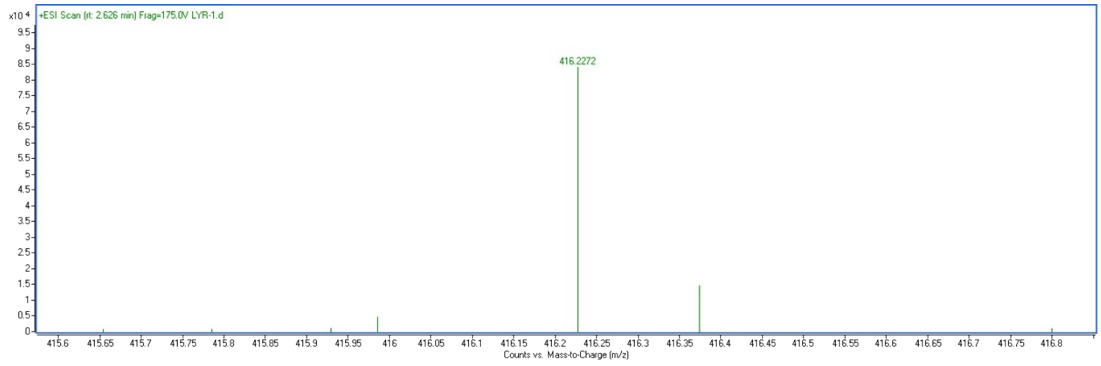
To a solution of **1a** (0.20 mol), **2a** (0.40 mmol), **3a** (0.40 mmol), K_3PO_4 (0.30 mmol), 4CzIPN (2 mol%), TEMPO (0.4 mmol) and dry DCE (2.0 mL). The reaction mixture was evacuated and with argon for three times and stirred under the irradiation of 24 W blue LEDs at 40 °C for about 12 h under argon atmosphere. The reaction was completely inhibited, no desired product was obtained and TEMPO-trapped complex (**5**) was detected by LC-MS analysis. HRMS ESI (m/z): $[M+H]^+$ calcd for $C_{24}H_{34}NO_3S^+$ 416.2254, found: 416.2272.



5. Fluorescence quenching studies

The fluorescence emission intensity of the reaction solution was recorded using a Cary Eclipse Fluorescence spectrophotometer (Agilent Technologies, USA).The emission wavelength was 537 nm. The samples were prepared by mixing 4CzIPN (1.0×10^{-3} mol/L) and different amounts of quinoxalin-2(*H*)-one (**1a)** in DCE (total volume = 2.0 mL) in an optical path quartz fluorescence cuvette. The concentration of quinoxalin-2(*H*)-one (**1a**) solution in DCE was 1.0×10^{-3} mol/L. In each quenching experiment, a different amount of quinoxalin-2(H)-one solution was titrated into 0.02 mL of 4CzIPN mixed solution (total volume = 2.0 mL). The emission intensity was then collected and the results are shown in Figure S1.

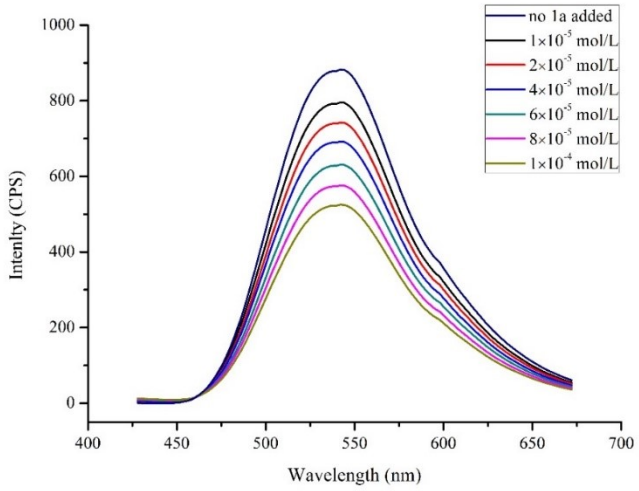


Figure S1. Quenching of 4CzIPN fluorescence emission in the presence of quinoxalin-2(*H*)-one.

An indeed fluorescence quenching phenomenon of 4CzIPN under various concentrations of quinoxalin-2(*H*)-one **1a** was demonstrated in a curve of [I_0/I] vs C [**1a**], as shown in Figure S2 (Stern-Volmer plots).

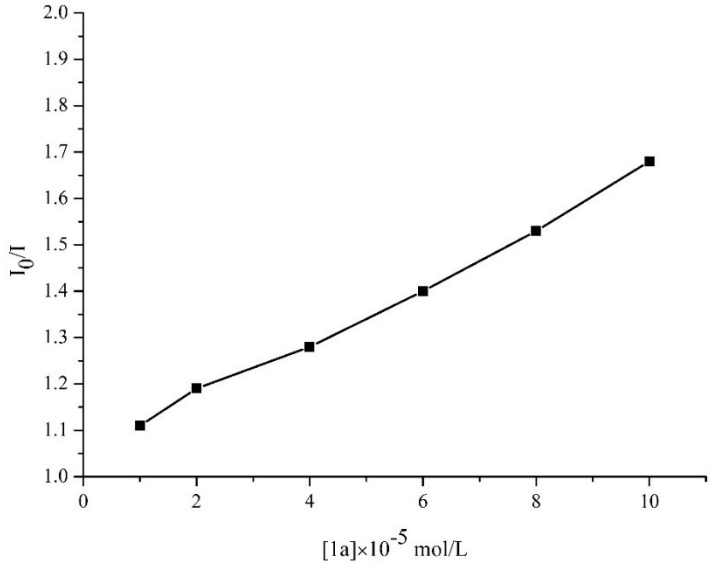


Figure S2. Stern-volmer plots. I_0 is the inherent fluorescence intensity of 4-CzIPN. I is the fluorescence intensity of 4-CzIPN in the presence of **1a**

The fluorescence emission intensity of the reaction solution was recorded using a Cary Eclipse Fluorescence spectrophotometer (Agilent Technologies, USA).The emission wavelength was 537 nm.The samples were prepared by mixing 4CzIPN (1.0×10^{-3} mol/L) and different amounts of p-toluenesulfonyl chloride (**3a)** in DCE (total volume = 2.0 mL) in an optical path quartz fluorescence cuvette. The concentration of p-Toluenesulfonyl chloride solution in DCE was 1.0×10^{-3} mol/L. In each quenching experiment, a different amount of p-toluenesulfonyl chloride (**3a**) solution was titrated into 0.02 mL of 4CzIPN mixed solution (total volume = 2.0 mL). The emission intensity was then collected and the results are shown in Figure S3.

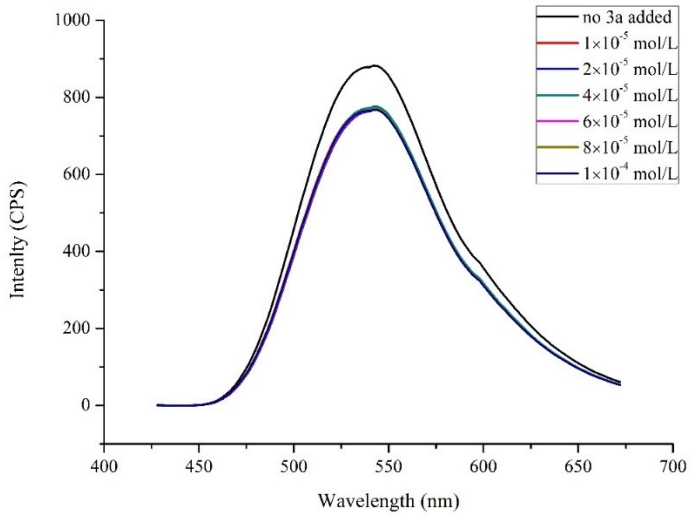


Figure S3. Quenching of 4CzIPN fluorescence emission in the presence of **3a**.

An indeed fluorescence quenching phenomenon of 4CzIPN under various concentrations of p-toluenesulfonyl chloride (**3a)** was demonstrated in a curve of [I_0/I] vs C [**3a**], as shown in Figure S2 (Stern-Volmer plots).

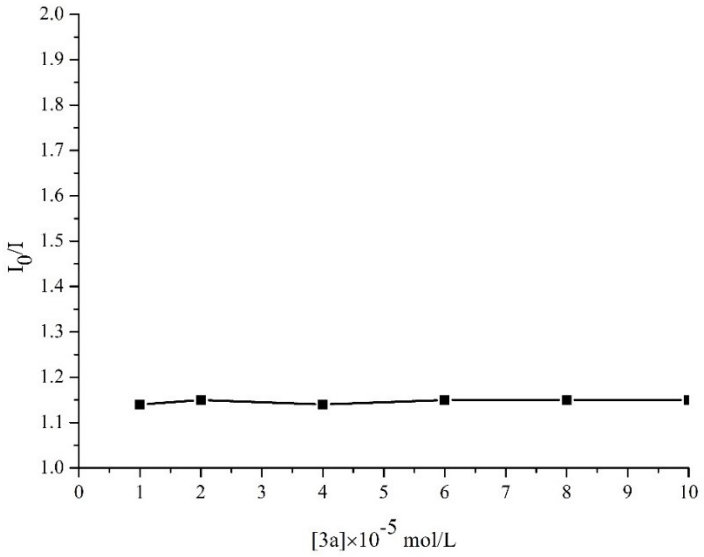


Figure S4. Stern-volmer plots. I_0 is the inherent fluorescence intensity of 4-CzIPN. I is the fluorescence intensity of 4-CzIPN in the presence of **3a**

6. Unsuitable substrates

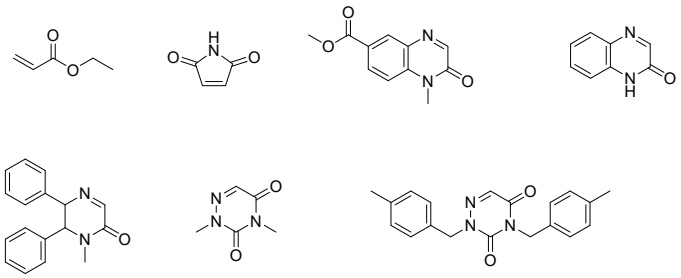


Figure S5. Unsuitable substrates

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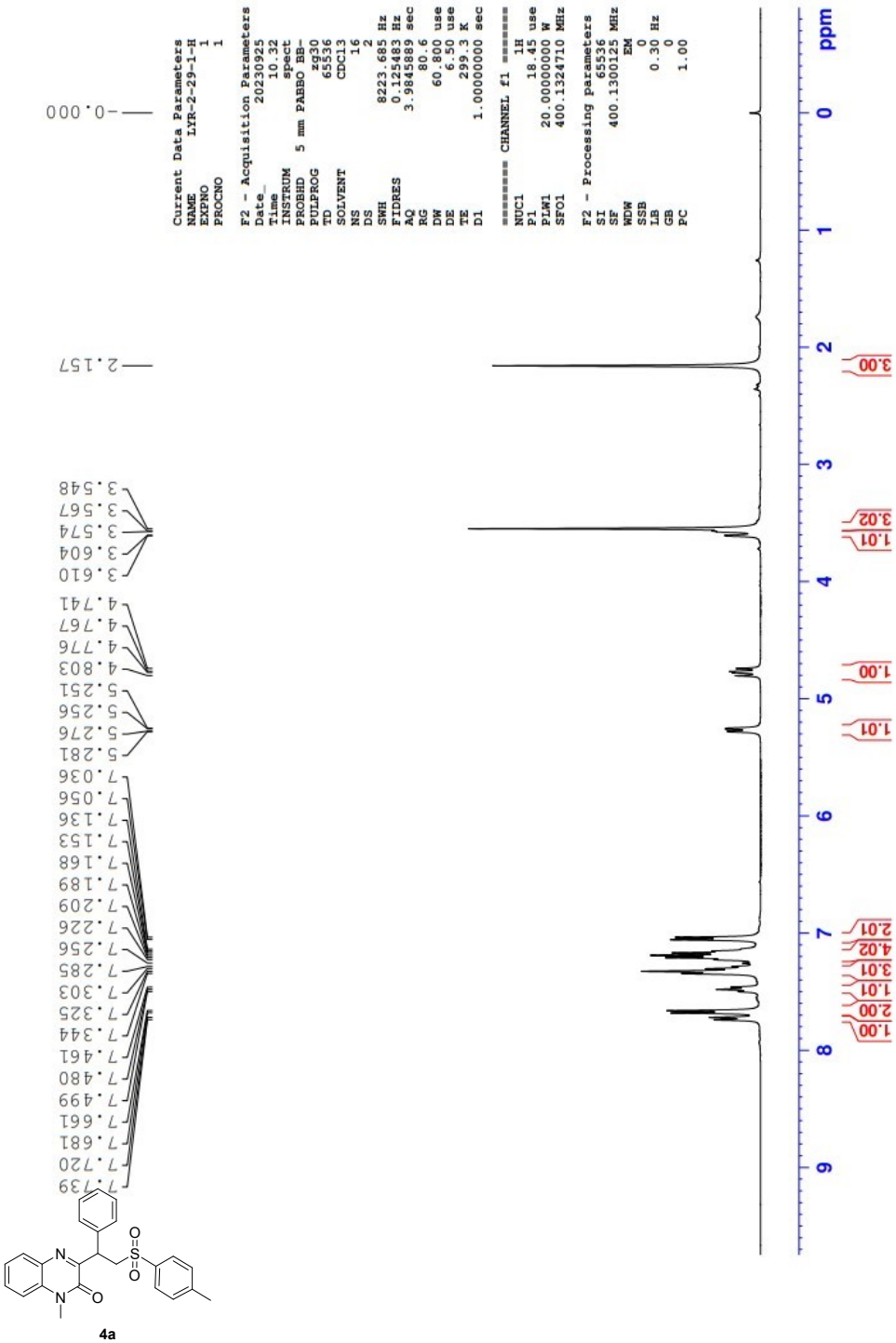

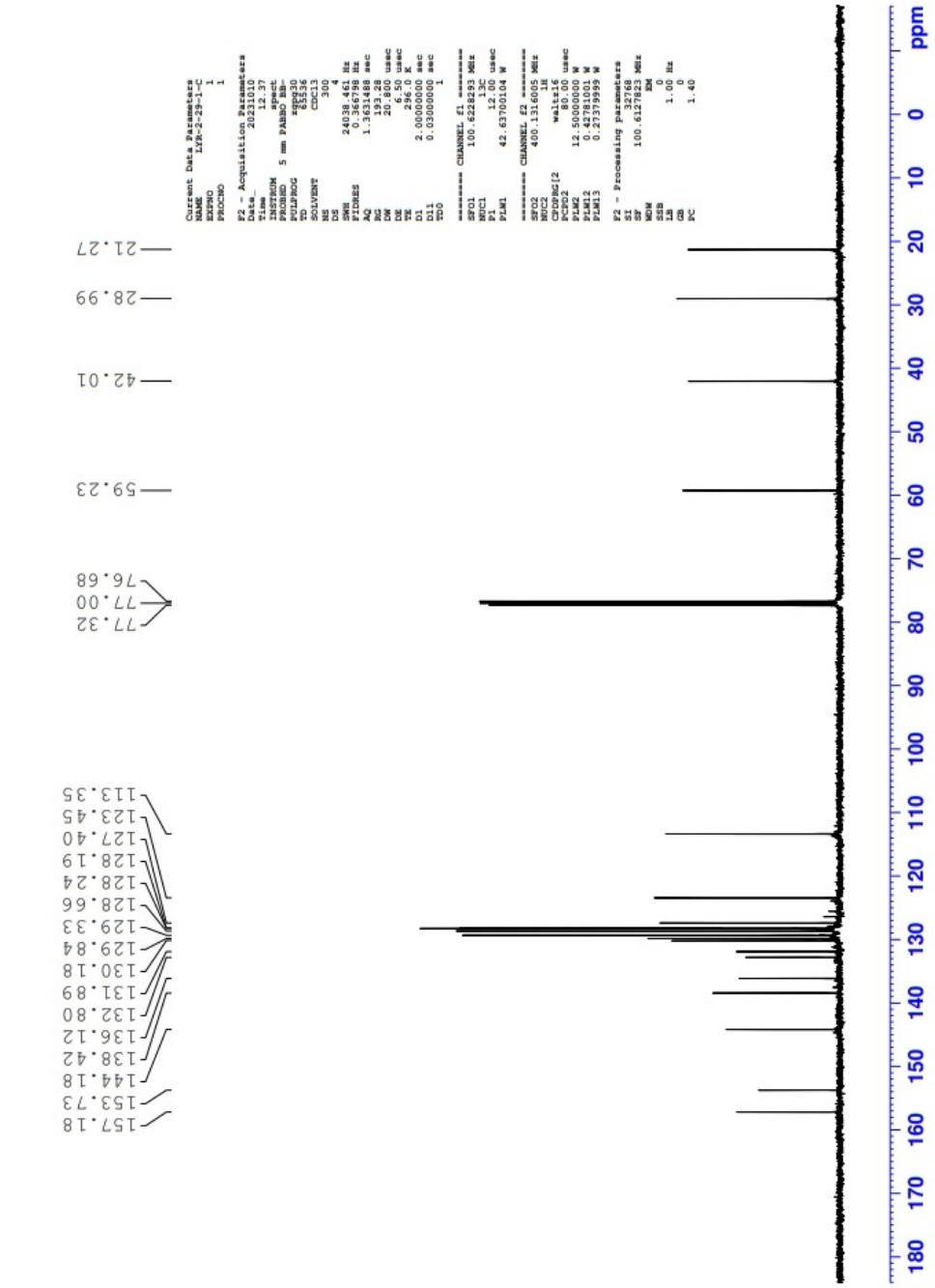
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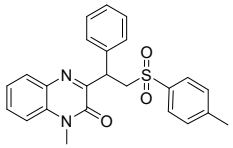

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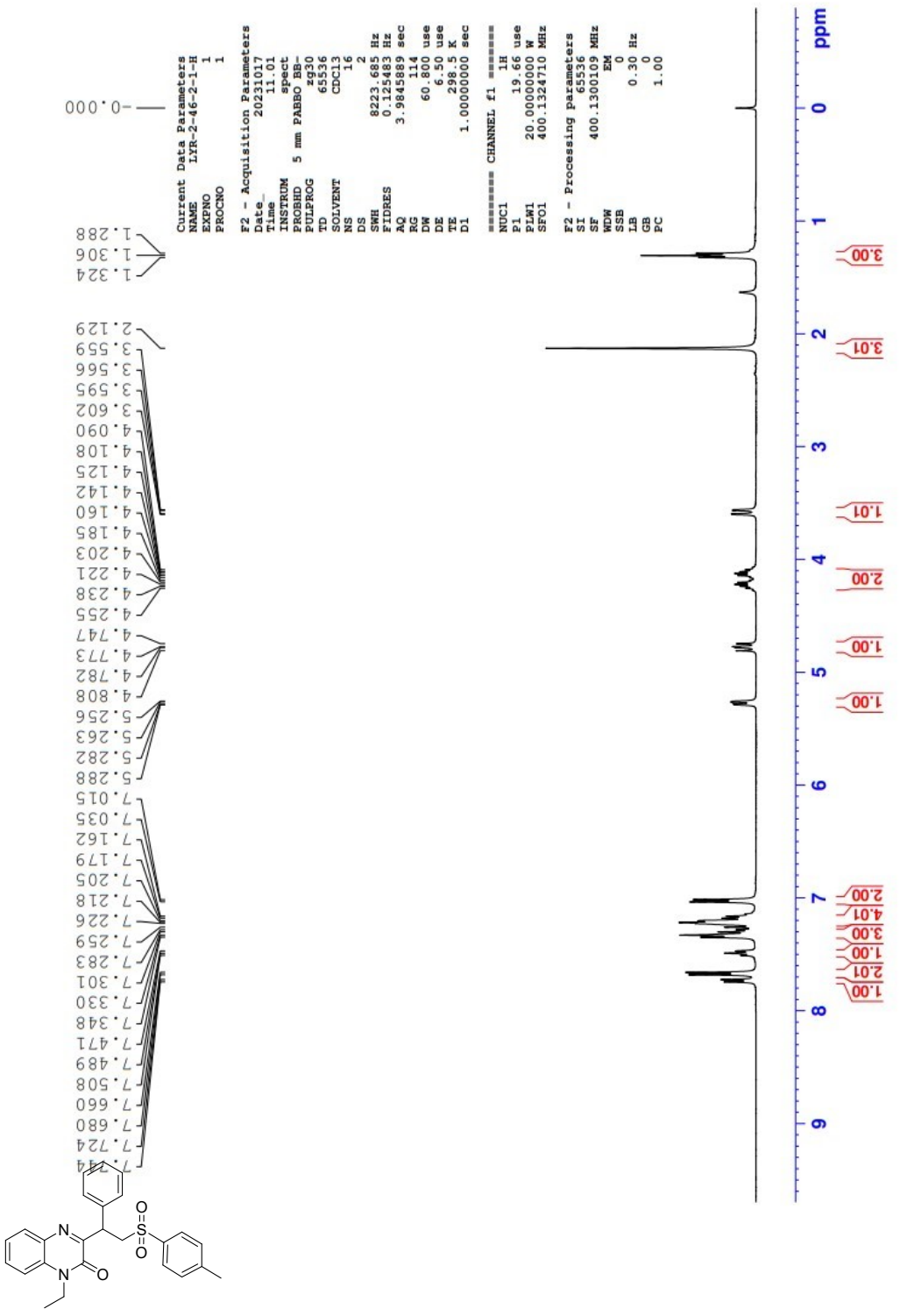
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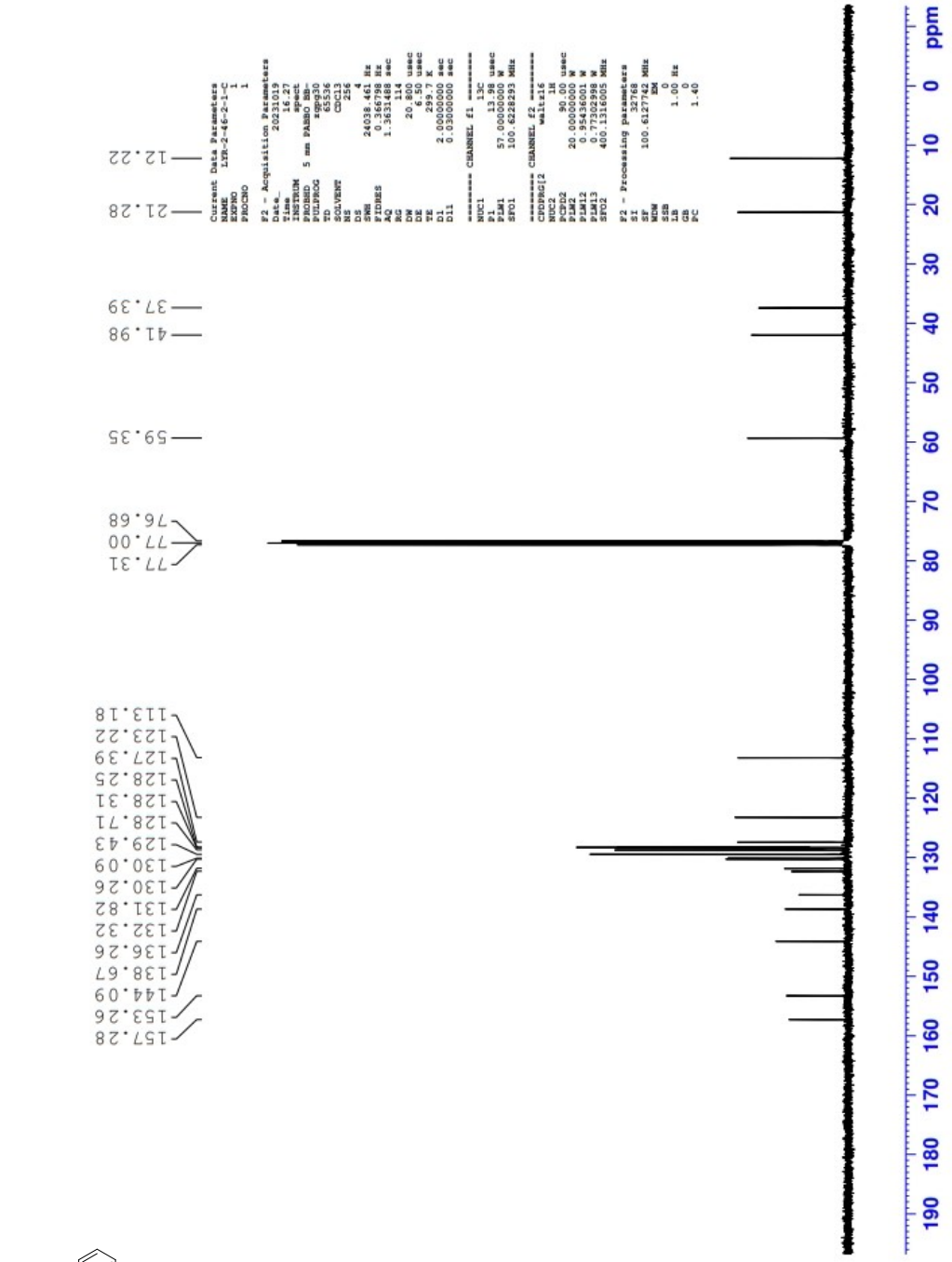
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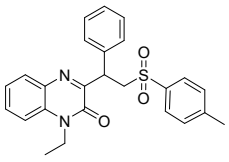

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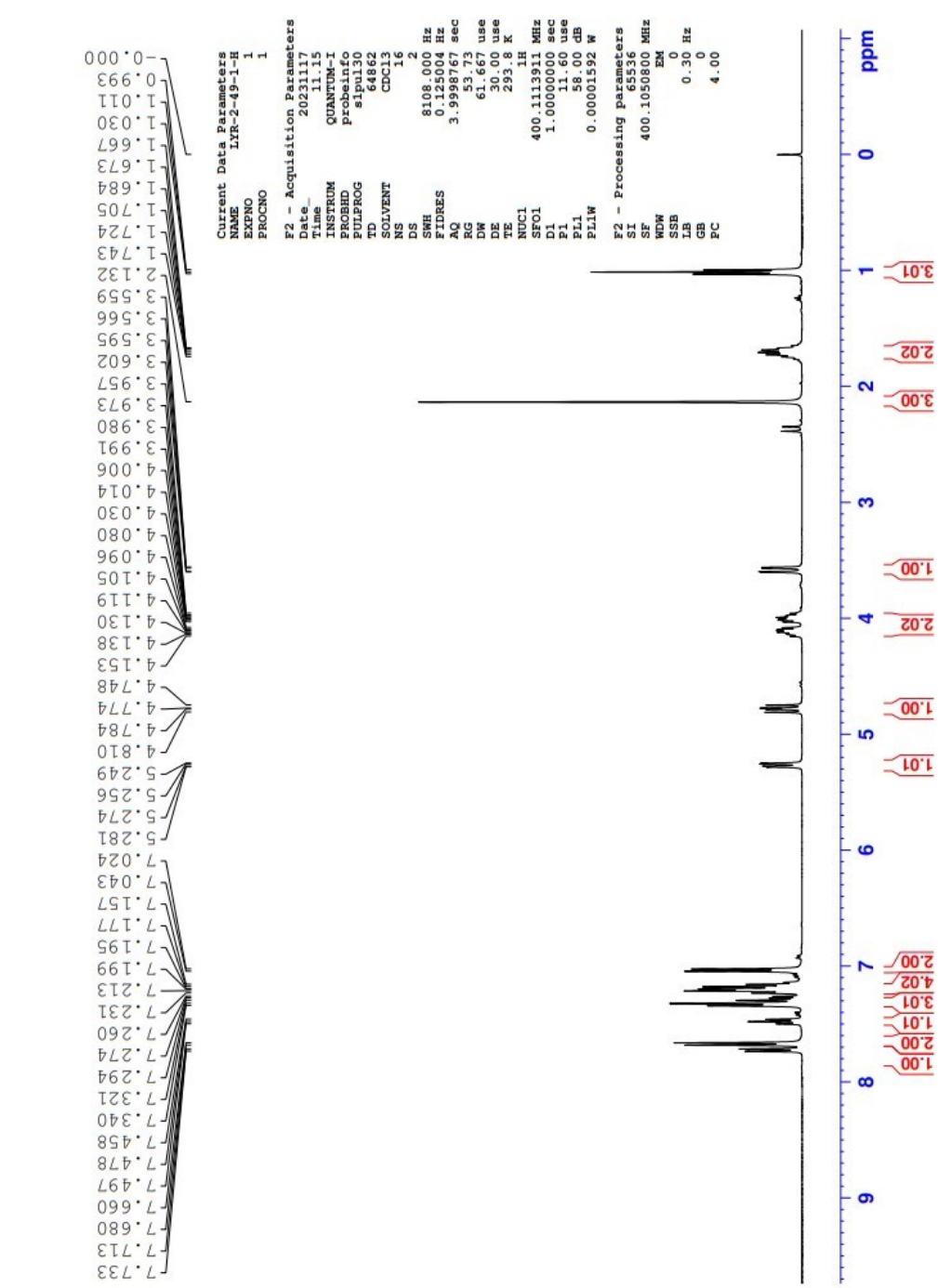
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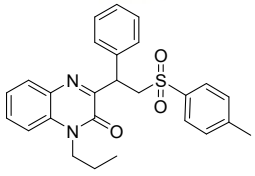
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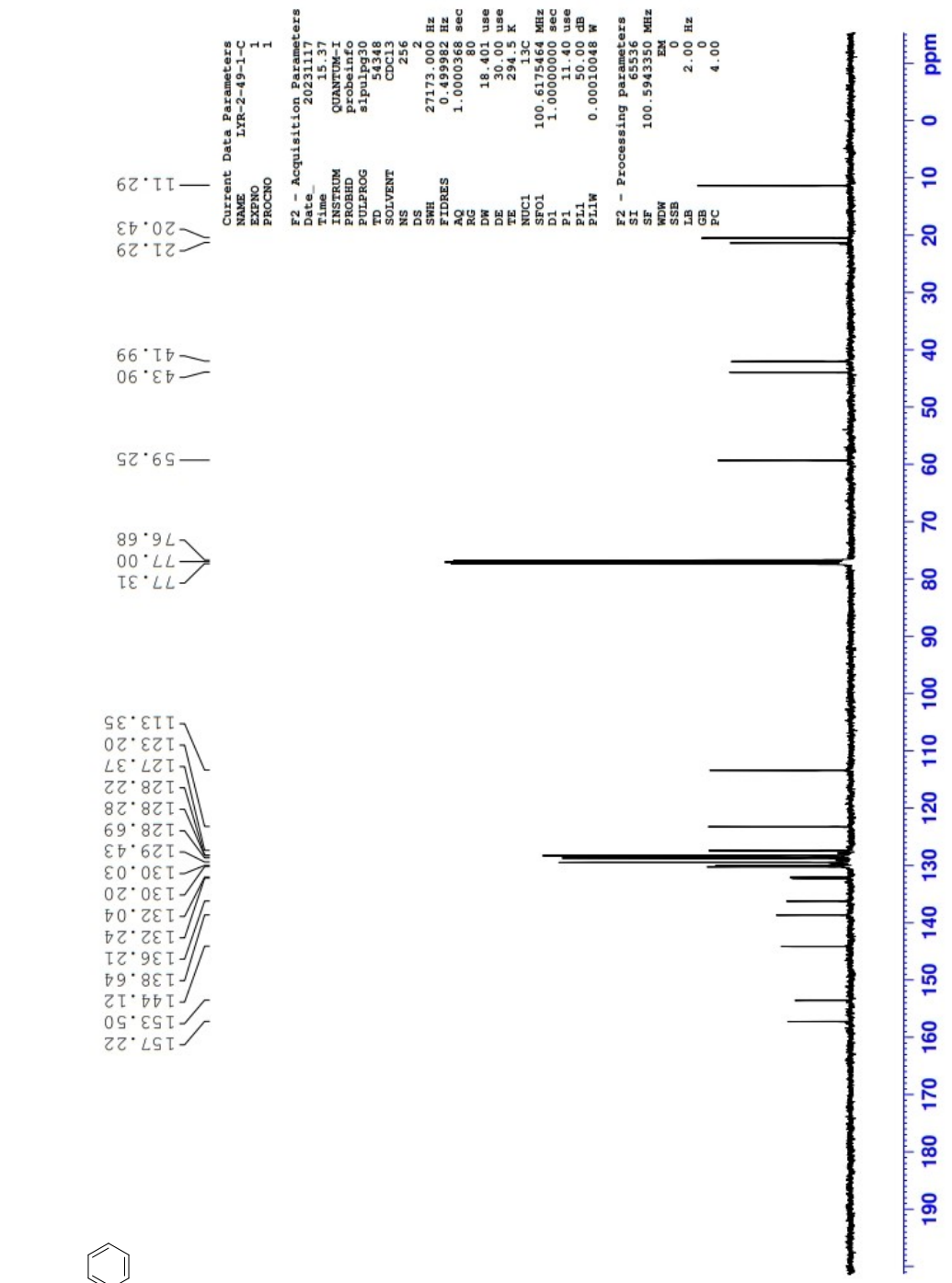
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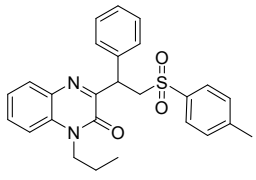
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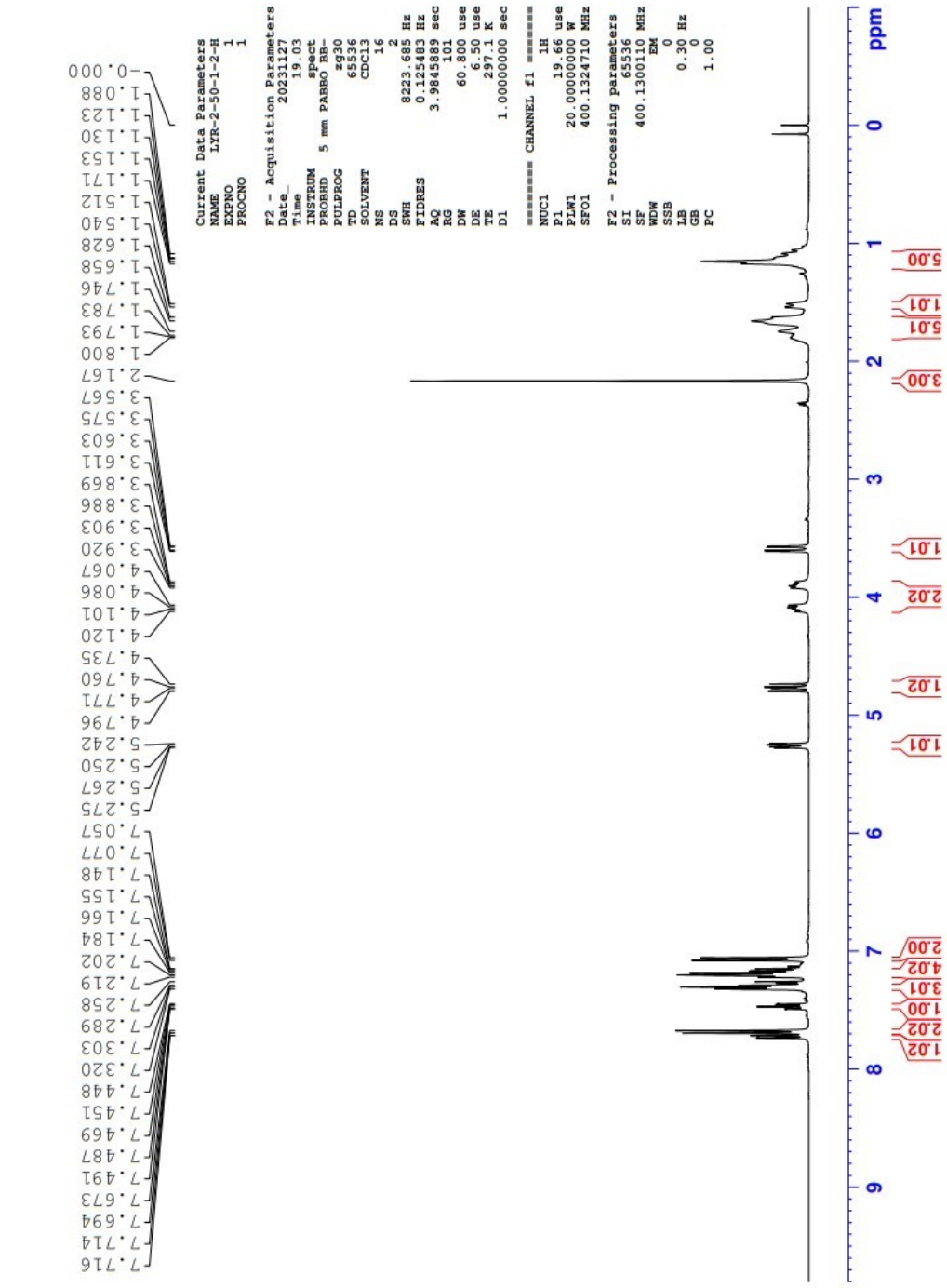
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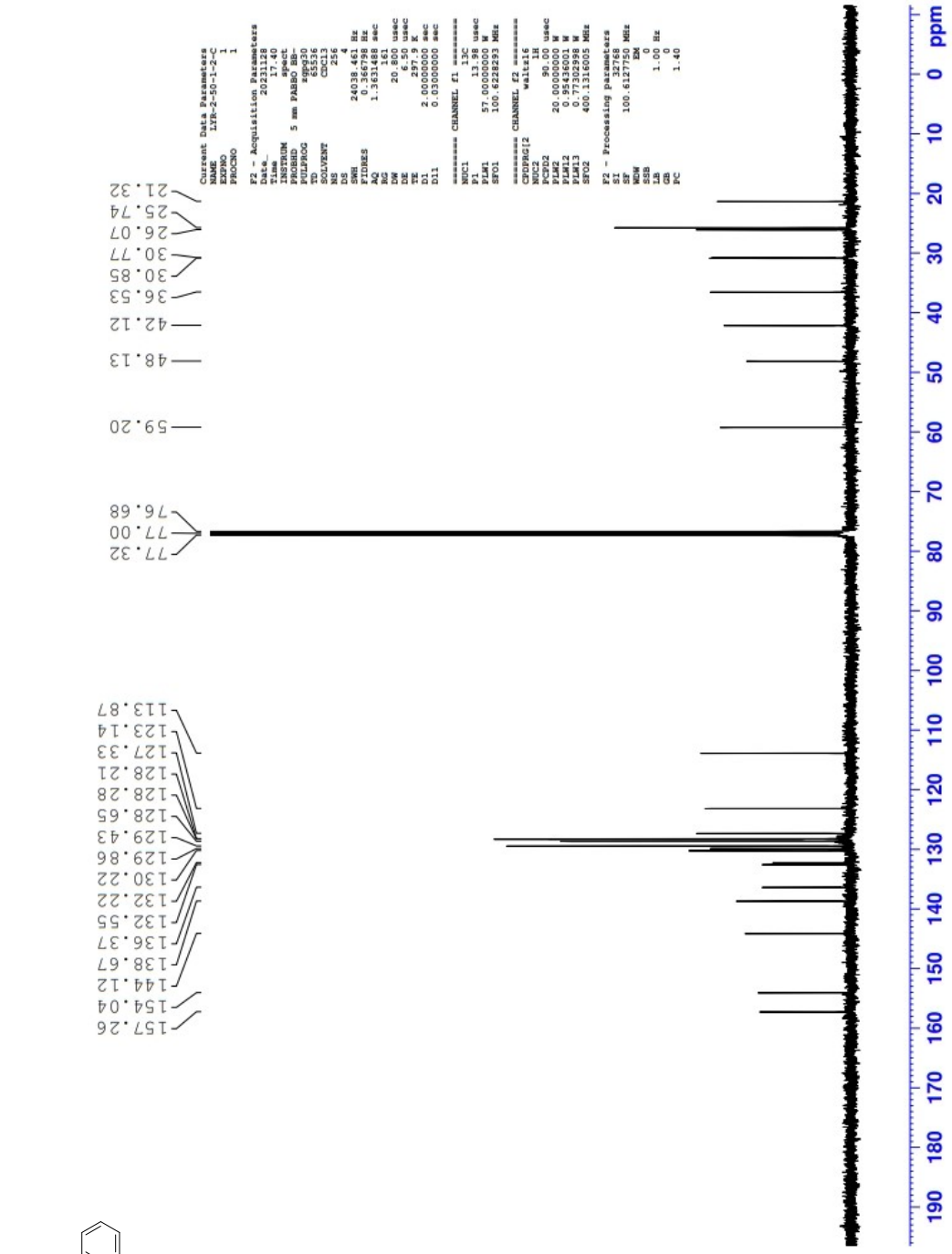
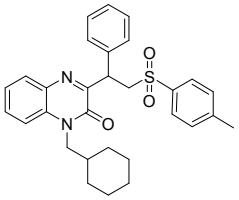
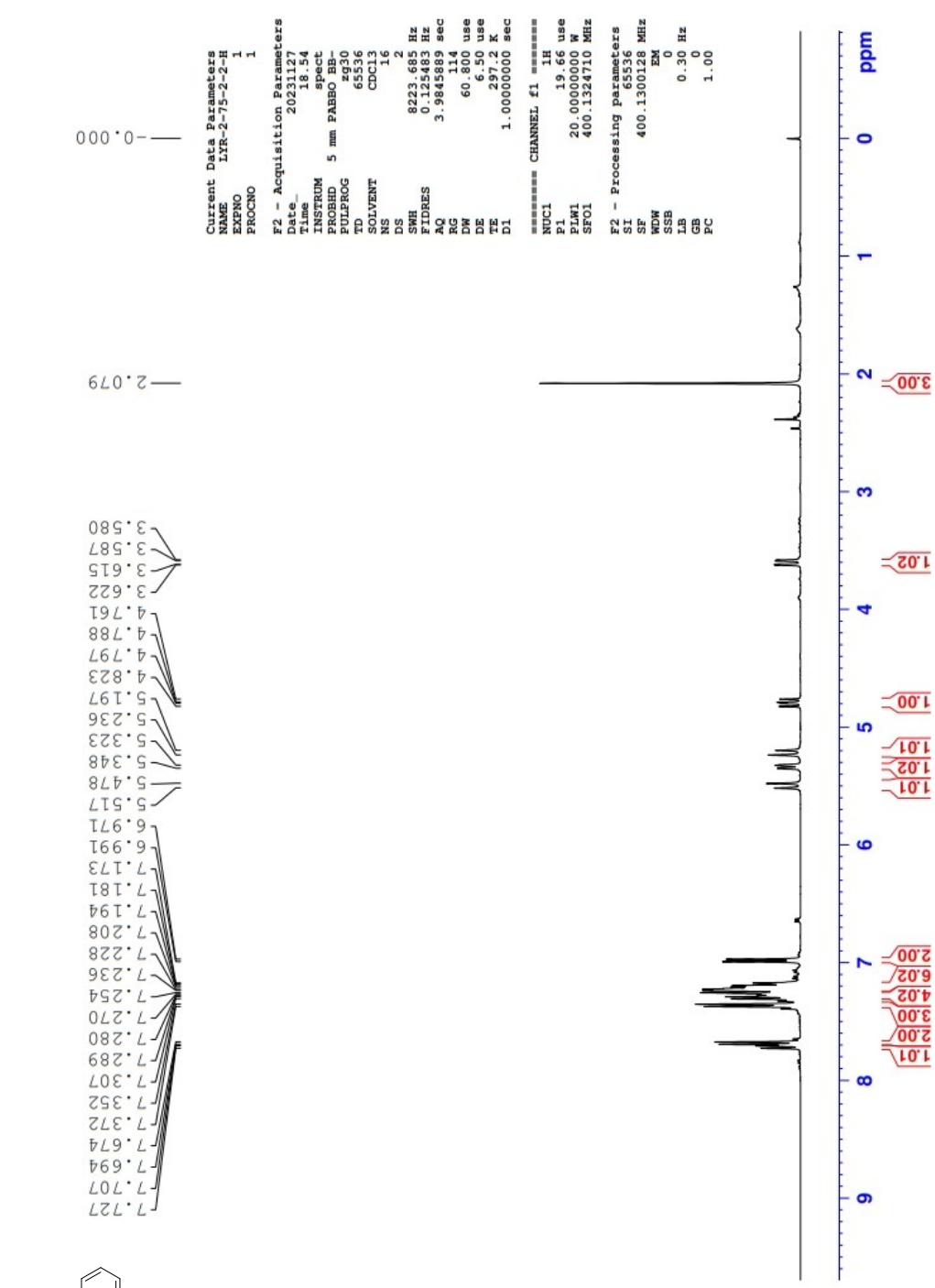
4d


21.32
25.74
26.07
30.77
30.85
36.53
42.12
48.13
59.20
76.68
77.00
77.32
113.87
123.14
127.33
128.21
128.28
128.65
129.43
129.86
130.22
132.22
132.55
136.37
138.67
144.12
154.04
157.26
ppm



4d


Current Data Parameters
NAME LYR-2-75-2-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231127
Time 18.54
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 114
DW 60.800 use
DE 6.50 use
TE 297.2 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300128 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
2.079
3.580
3.587
3.615
3.622
4.761
4.788
4.797
4.823
5.197
5.236
5.323
5.348
5.478
5.517
6.971
6.991
7.173
7.181
7.194
7.208
7.228
7.236
7.254
7.270
7.280
7.289
7.307
7.352
7.372
7.674
7.694
7.707
7.727
ppm
3.00
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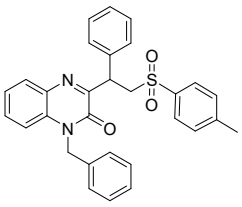
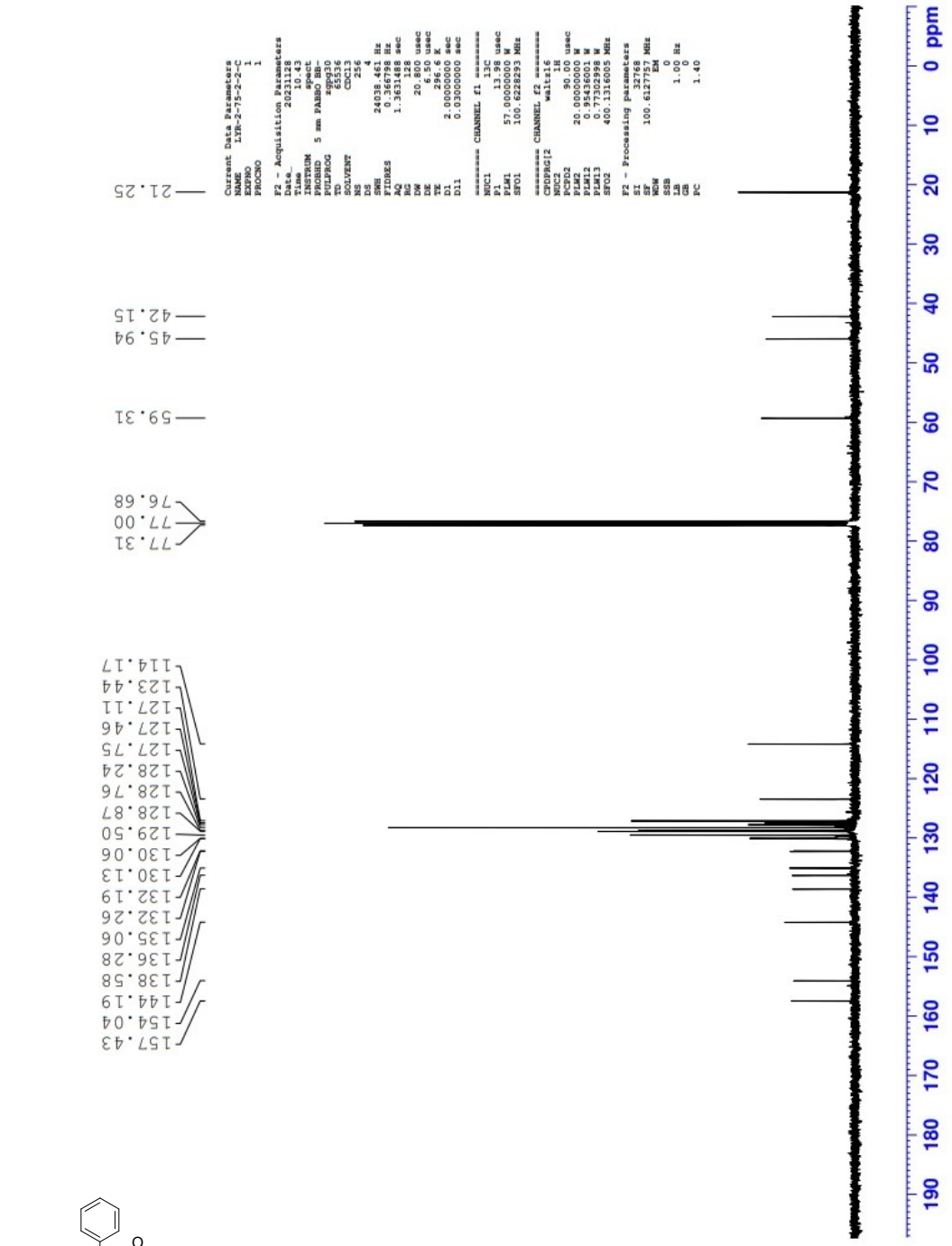
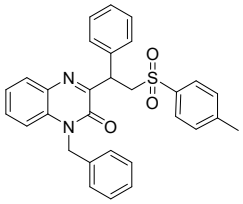
2.00
6.02
4.02
3.00
2.00
1.01

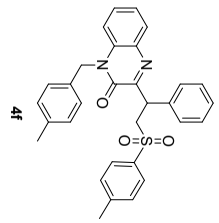


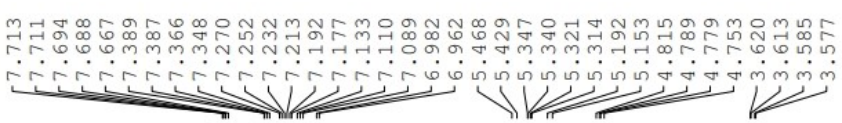
4e

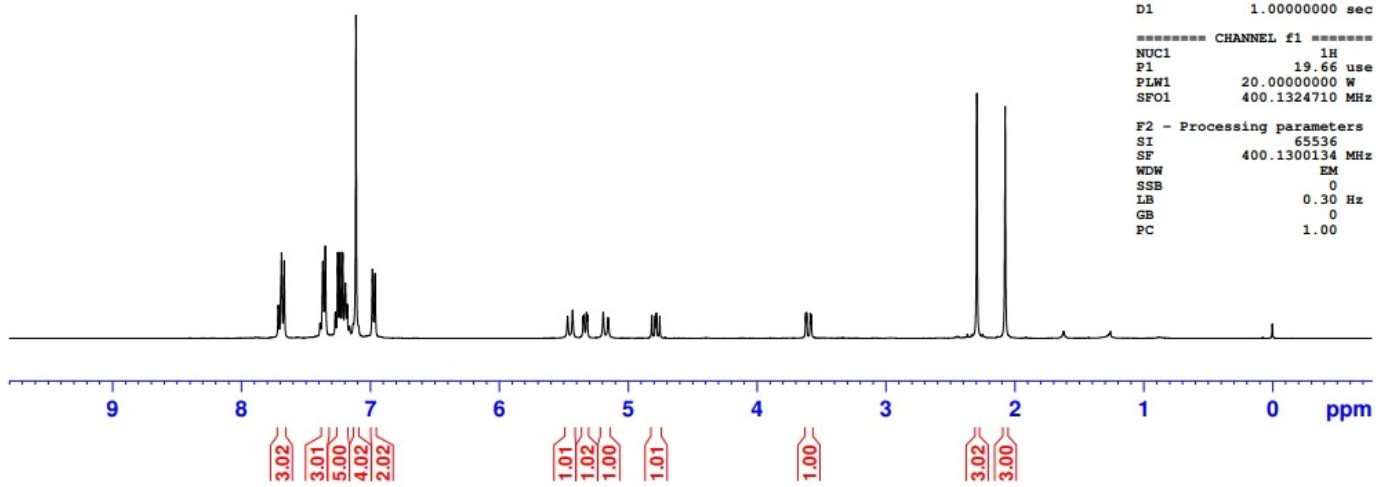

21.25
42.15
45.94
59.31
76.68
77.00
77.31
114.17
123.44
127.11
127.46
127.75
128.24
128.76
128.87
129.50
130.06
130.13
132.19
132.26
135.06
136.28
138.58
144.19
154.04
157.43
0 ppm



4e





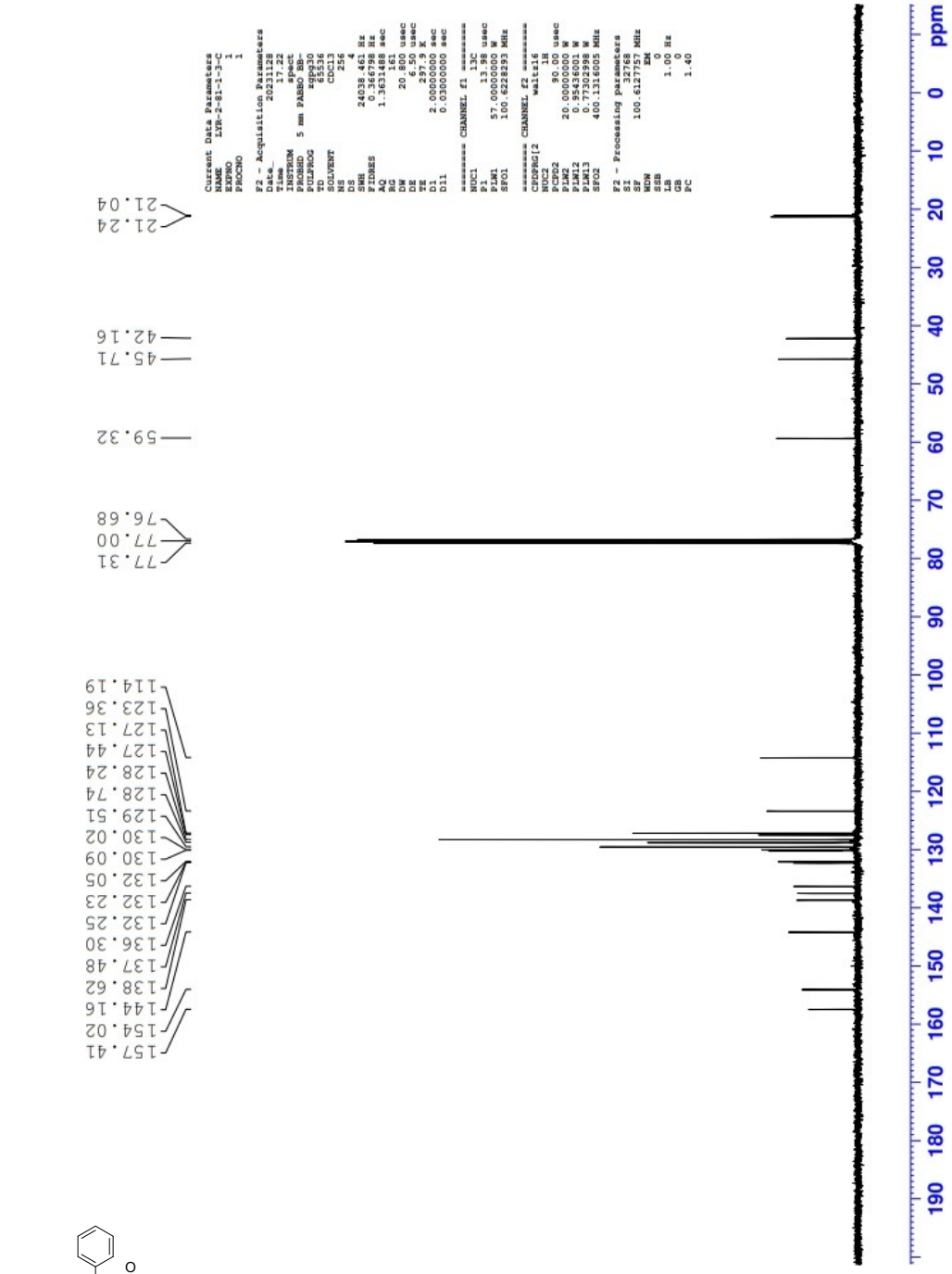



```
Current Data Parameters
NAME      LYR-2-81-1-3-H
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231127
Time               18.59
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                   114
DW                60.800 use
DE                 6.50 use
TE                297.2 K
D1             1.00000000 sec

======== CHANNEL f1 =======
NUC1                  1H
P1                 19.66 use
PLW1         20.00000000 W
SFO1         400.1324710 MHz

F2 - Processing parameters
SI                 65536
SF          400.1300134 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```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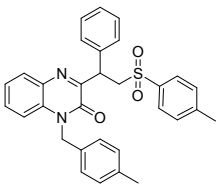
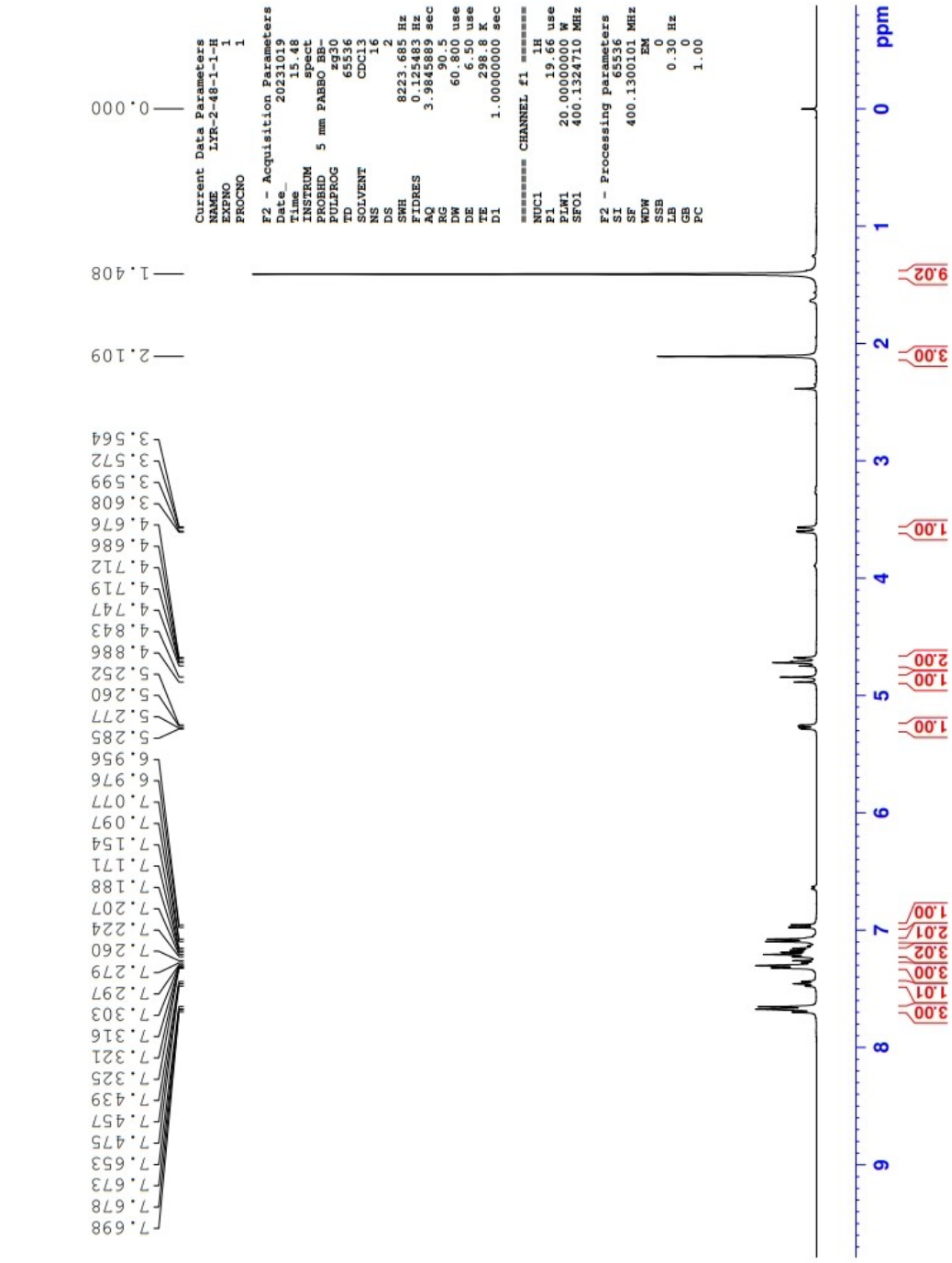
21.24
42.16
45.71
59.32
76.68
77.00
77.31
114.19
123.36
127.13
127.44
128.24
128.74
129.51
130.02
130.09
132.05
132.23
132.25
136.30
137.48
138.62
144.16
154.02
157.41
ppm



4f


Current Data Parameters
NAME LYR-2-48-1-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231019
Time 15.48
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 90.5
DW 60.800 use
DE 6.50 use
TE 298.8 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300101 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
1.408
2.109
3.564
3.572
3.599
3.608
4.676
4.686
4.712
4.719
4.747
4.843
4.886
5.252
5.260
5.277
5.285
6.956
6.976
7.077
7.097
7.154
7.171
7.188
7.207
7.224
7.260
7.279
7.297
7.303
7.316
7.321
7.325
7.439
7.457
7.475
7.653
7.673
7.678
7.698
ppm
9.02
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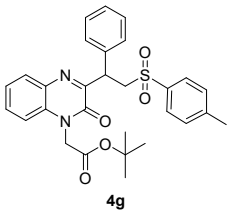
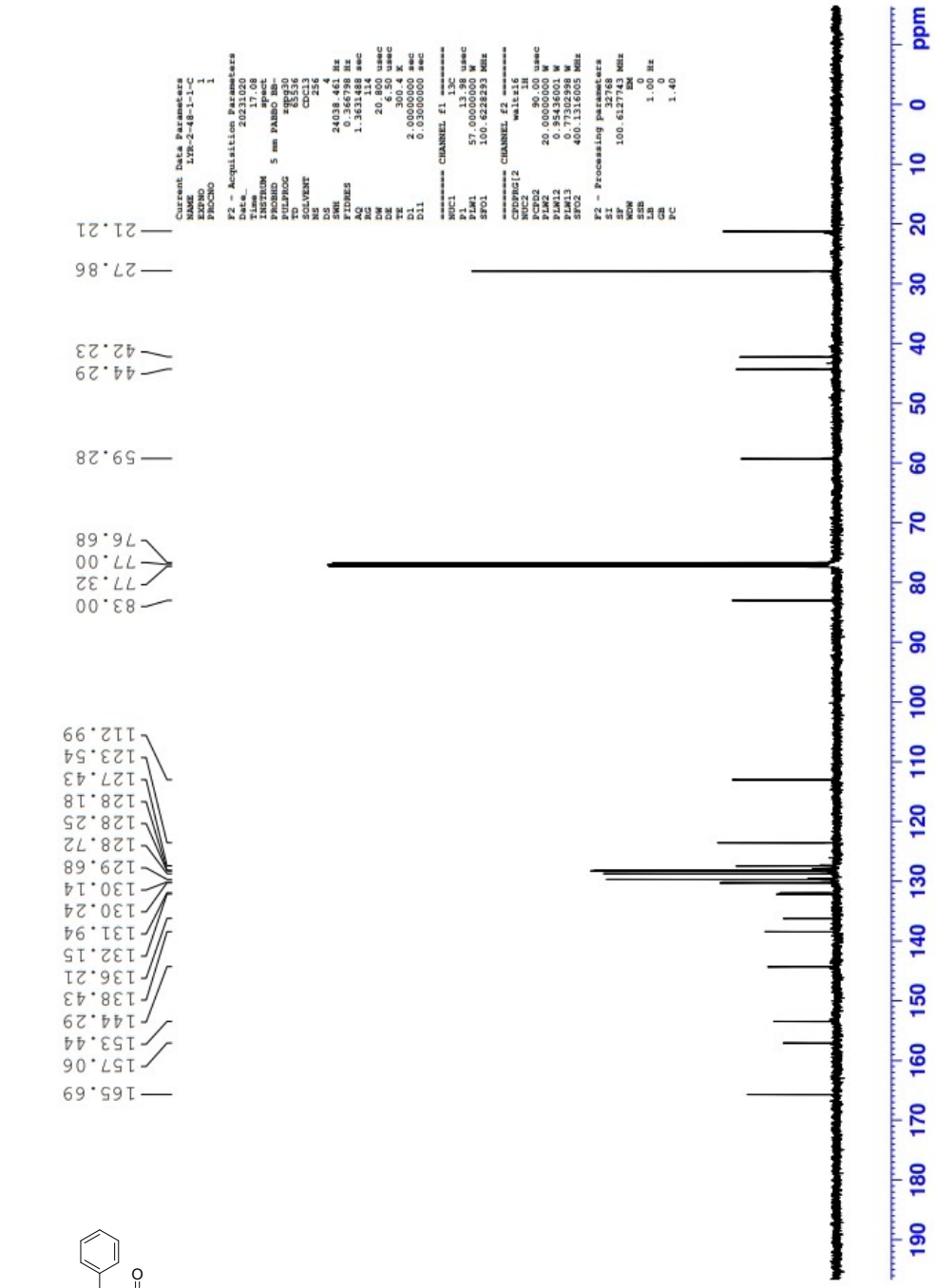
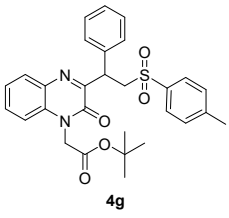
1.00
2.00
1.00
1.00
1.00
2.01
3.02
3.00
1.01
3.00

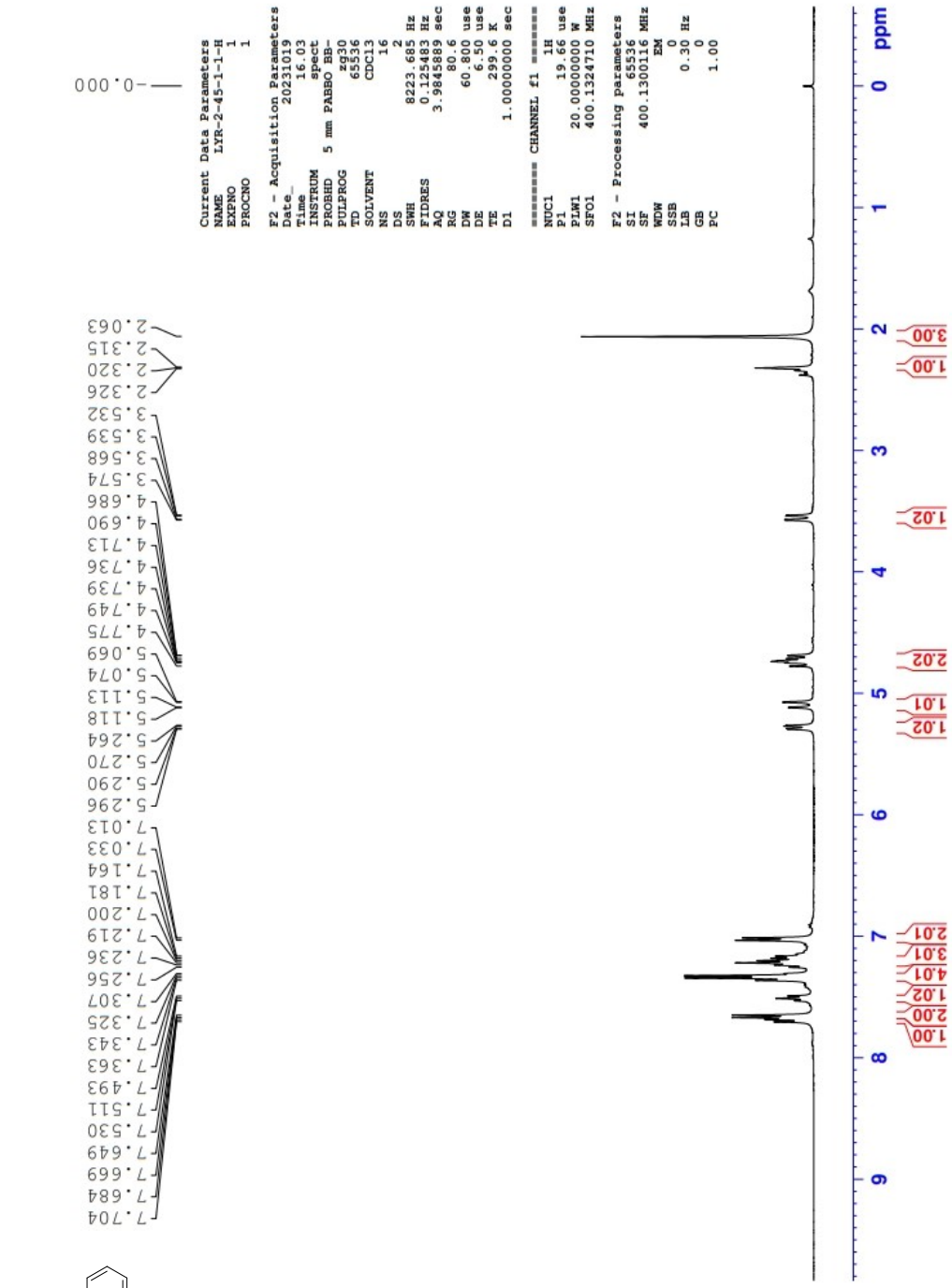


4g


21.21
27.86
42.23
44.29
59.28
76.68
77.00
77.32
83.00
112.99
123.54
127.43
128.18
128.25
128.72
129.68
130.14
130.24
131.94
132.15
136.21
138.43
144.29
153.44
157.06
165.69
ppm



4g


Current Data Parameters
NAME LYR-2-45-1-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231019
Time 16.03
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 80.6
DW 60.800 use
DE 6.50 use
TE 299.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300116 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.063
2.315
2.320
2.326
3.532
3.539
3.568
3.574
4.686
4.690
4.713
4.736
4.739
4.749
4.775
5.069
5.074
5.113
5.118
5.264
5.270
5.290
5.296
7.013
7.033
7.164
7.181
7.200
7.219
7.236
7.256
7.307
7.325
7.343
7.363
7.493
7.511
7.530
7.649
7.669
7.684
7.704
ppm
3.00
1.00
1.02
2.02
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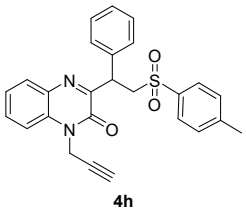
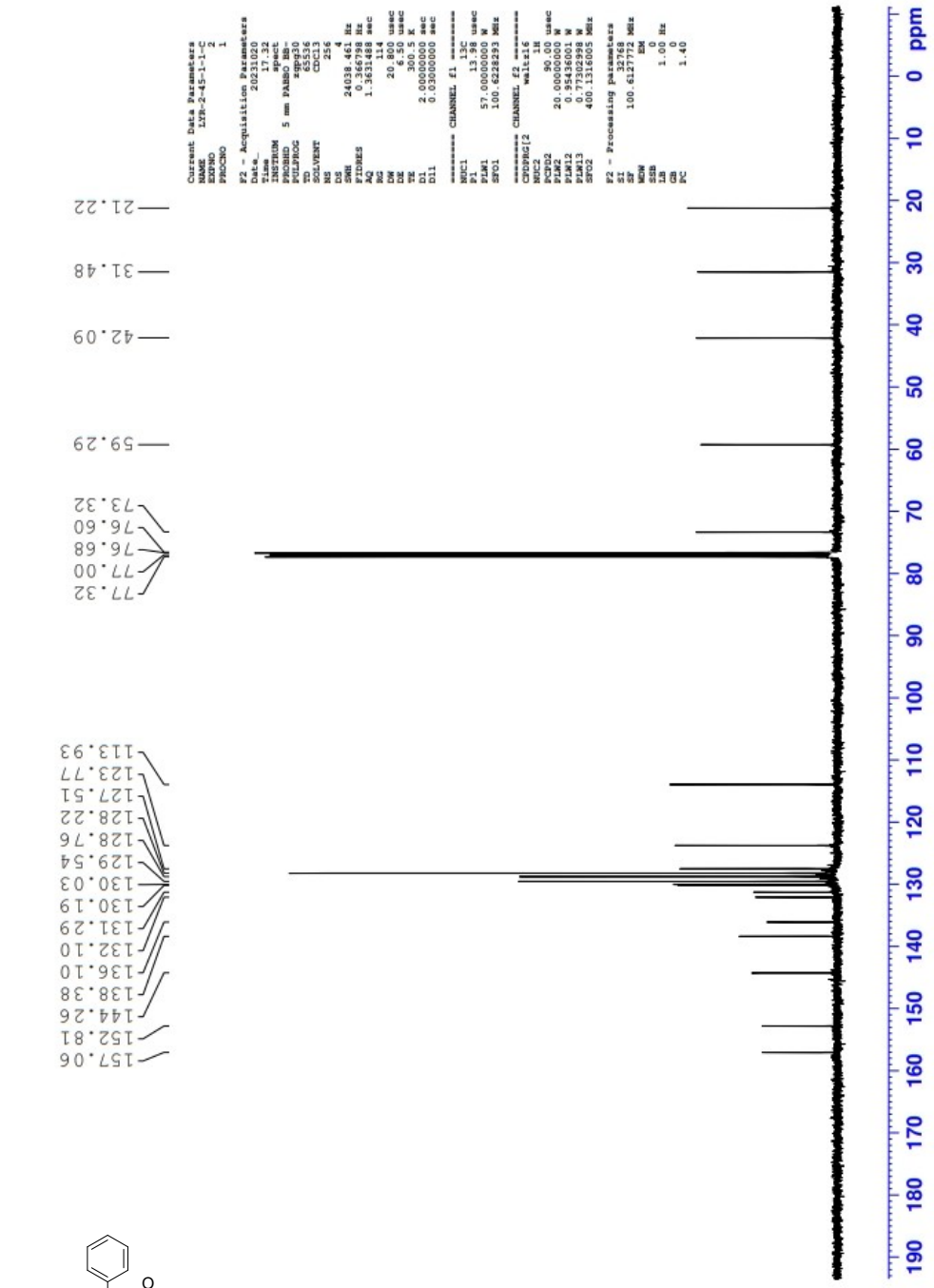
2.01
3.01
4.01
1.02
2.00
1.00


O
S
O
N
N
O

4h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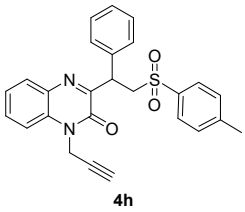
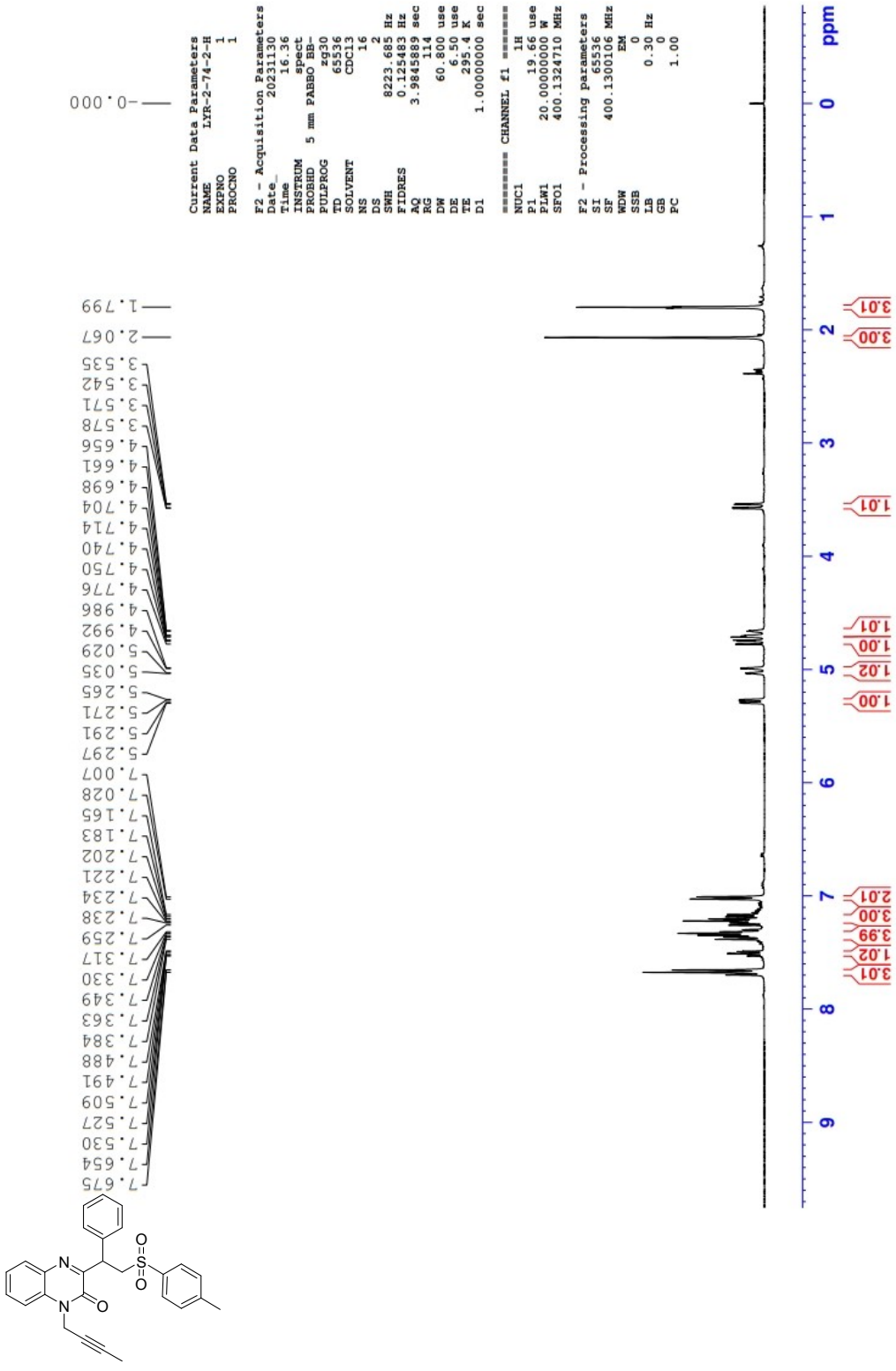
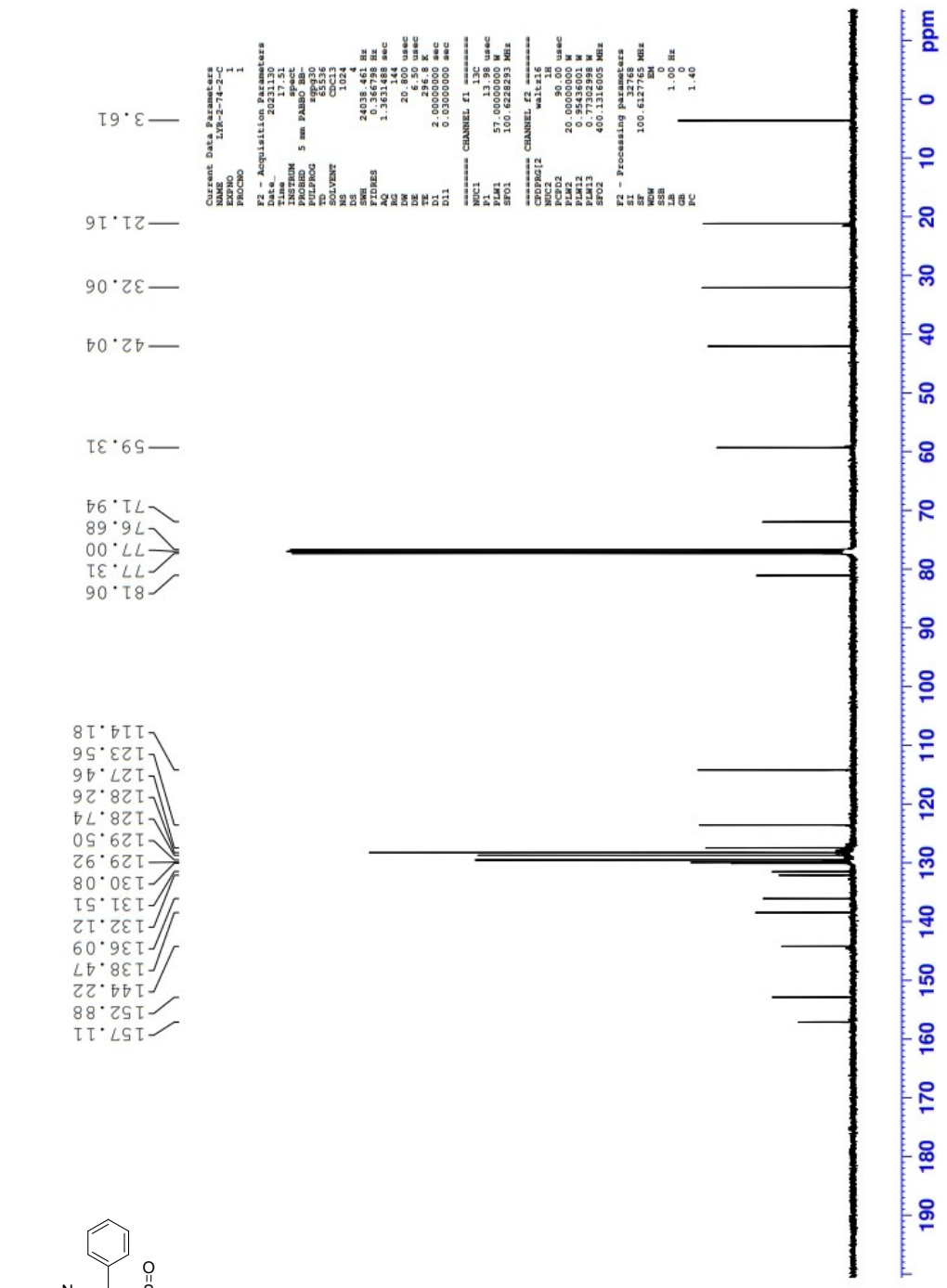
31.48
42.09
59.29
73.32
76.60
76.68
77.00
77.32
113.93
123.77
127.51
128.22
128.76
129.54
130.03
130.19
131.29
132.10
136.10
138.38
144.26
152.81
157.06
0 ppm

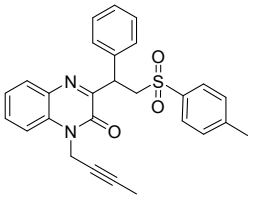


4h

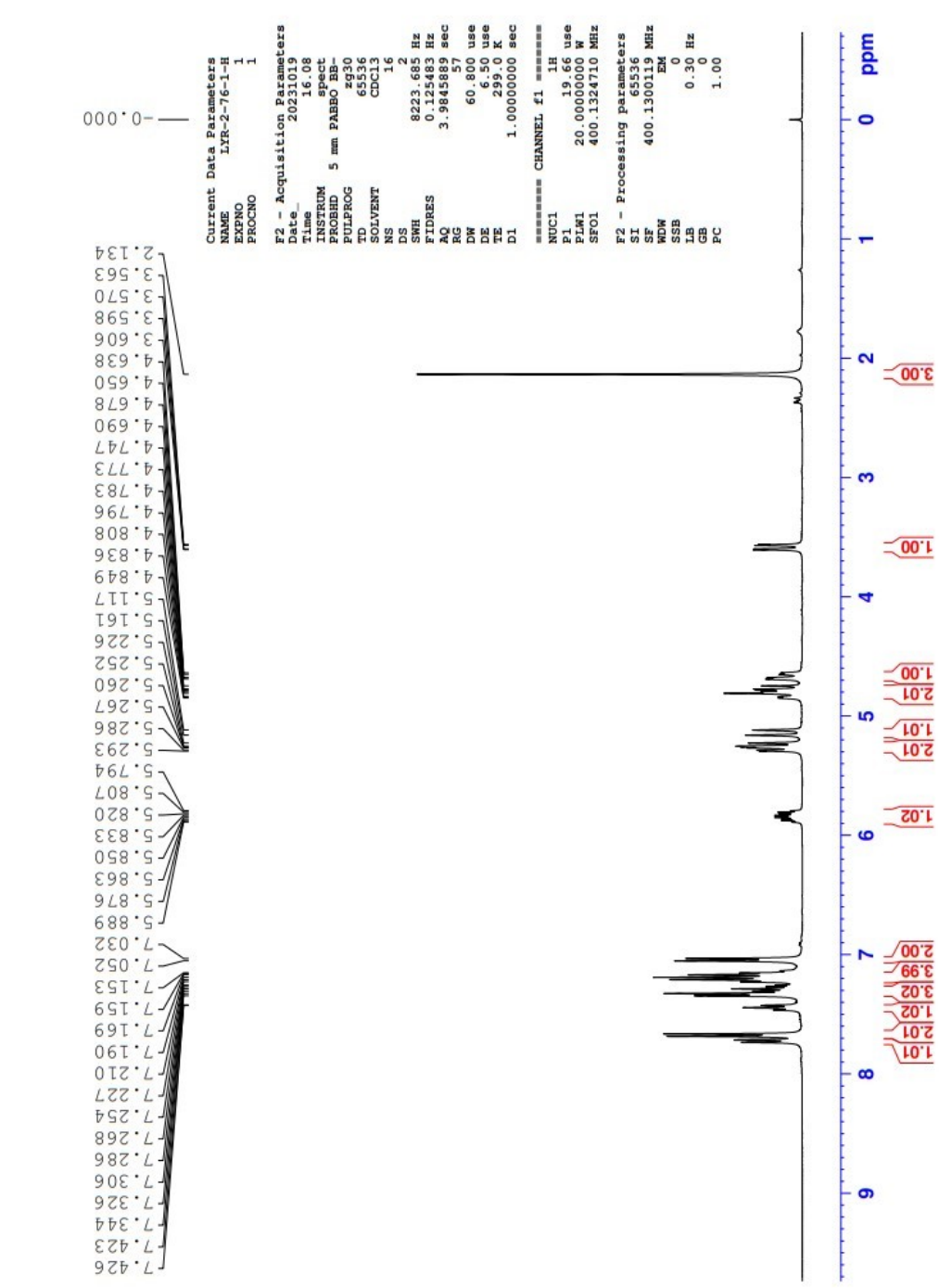

Current Data Parameters
NAME LYR-2-74-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231130
Time 16.36
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 114
DW 60.800 use
DE 6.50 use
TE 295.4 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300106 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
1.799
2.067
3.535
3.542
3.571
3.578
4.656
4.661
4.698
4.704
4.714
4.740
4.750
4.776
4.986
4.992
5.029
5.035
5.265
5.271
5.291
5.297
7.007
7.028
7.165
7.183
7.202
7.221
7.234
7.238
7.259
7.317
7.330
7.349
7.363
7.384
7.488
7.491
7.509
7.527
7.530
7.654
7.675
3.01
3.00
1.01
1.01
1.00
1.02
1.00
2.01
3.00
3.99
1.02
3.01
ppm

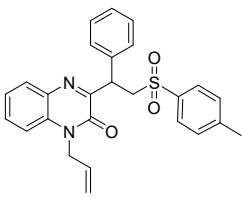
4i


3.61
21.16
32.06
42.04
59.31
71.94
76.68
77.00
77.31
81.06
114.18
123.56
127.46
128.26
128.74
129.50
129.92
130.08
131.51
132.12
136.09
138.47
144.22
152.88
157.11
ppm

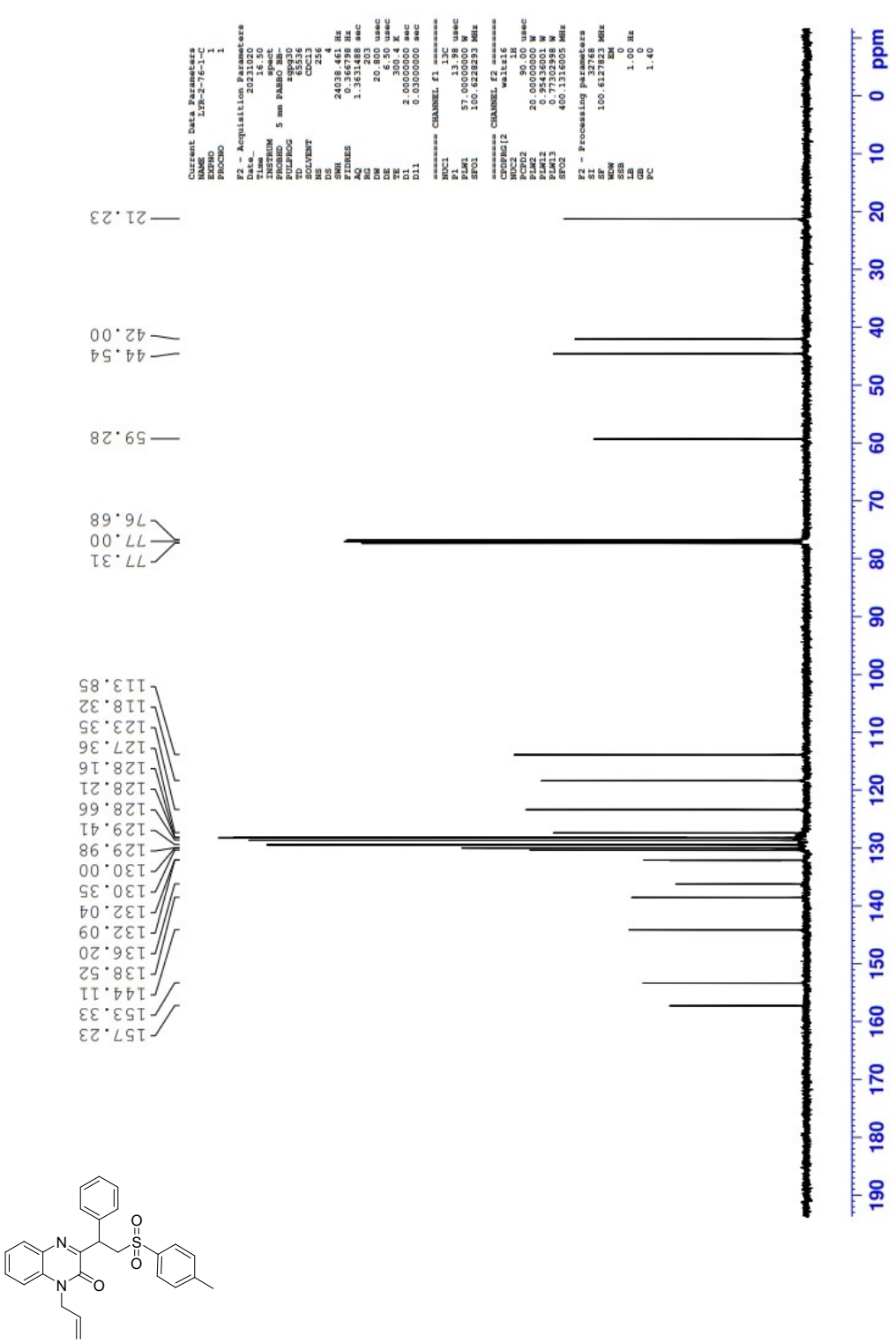


4i


Current Data Parameters
NAME LYR-2-76-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231019
Time 16.08
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 57
DW 60.800 use
DE 6.50 use
TE 299.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300119 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.00
1.00
1.00
2.01
1.01
2.01
1.02
2.00
3.99
3.02
1.02
2.01
1.01

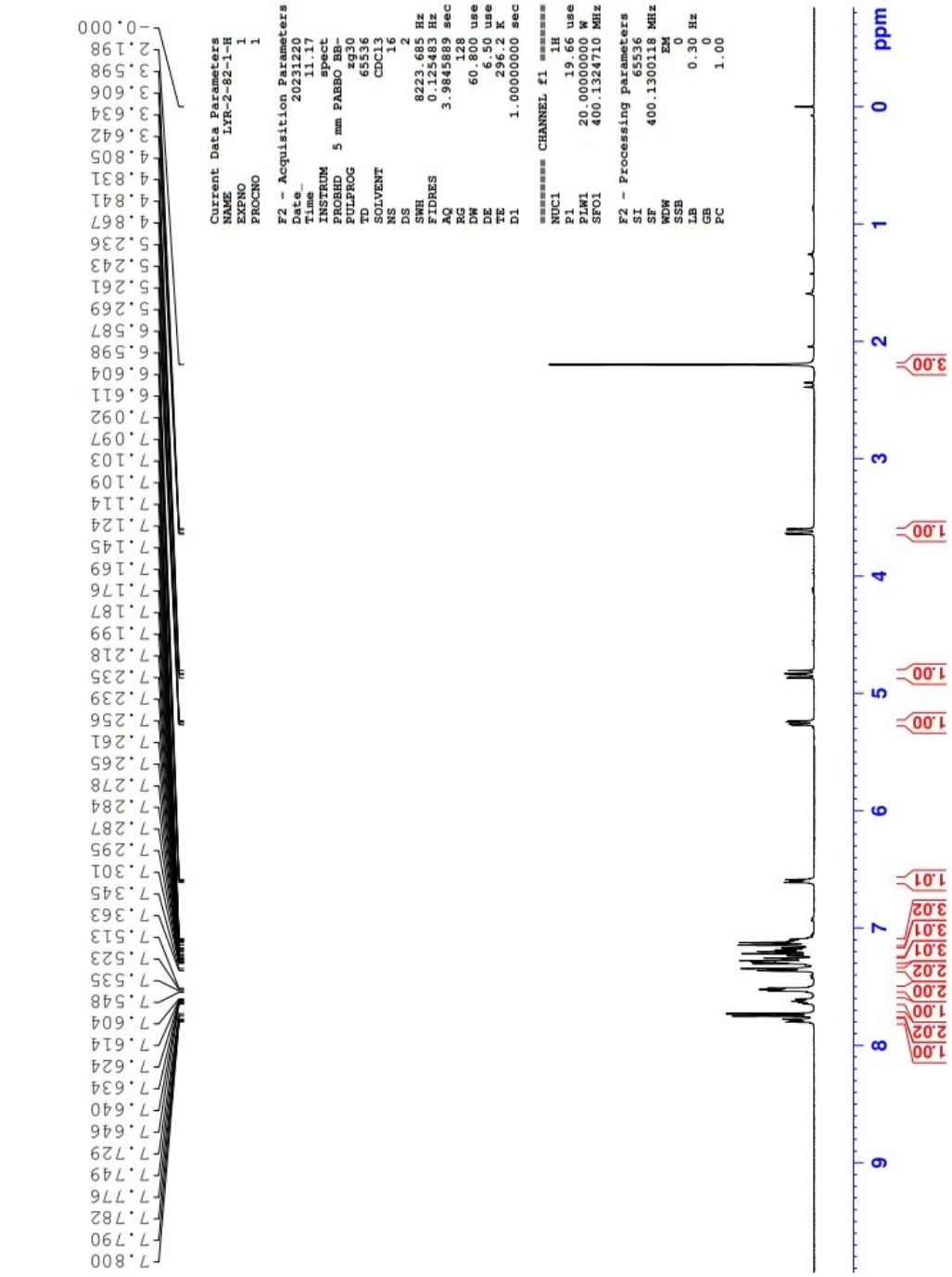


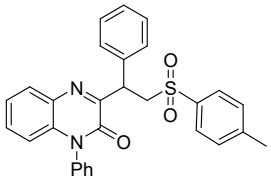
4j


21.23
42.00
44.54
59.28
76.68
77.00
77.31
113.85
118.32
123.35
127.36
128.16
128.21
128.66
129.41
129.98
130.00
130.35
132.04
132.09
136.20
138.52
144.11
153.33
157.23
ppm

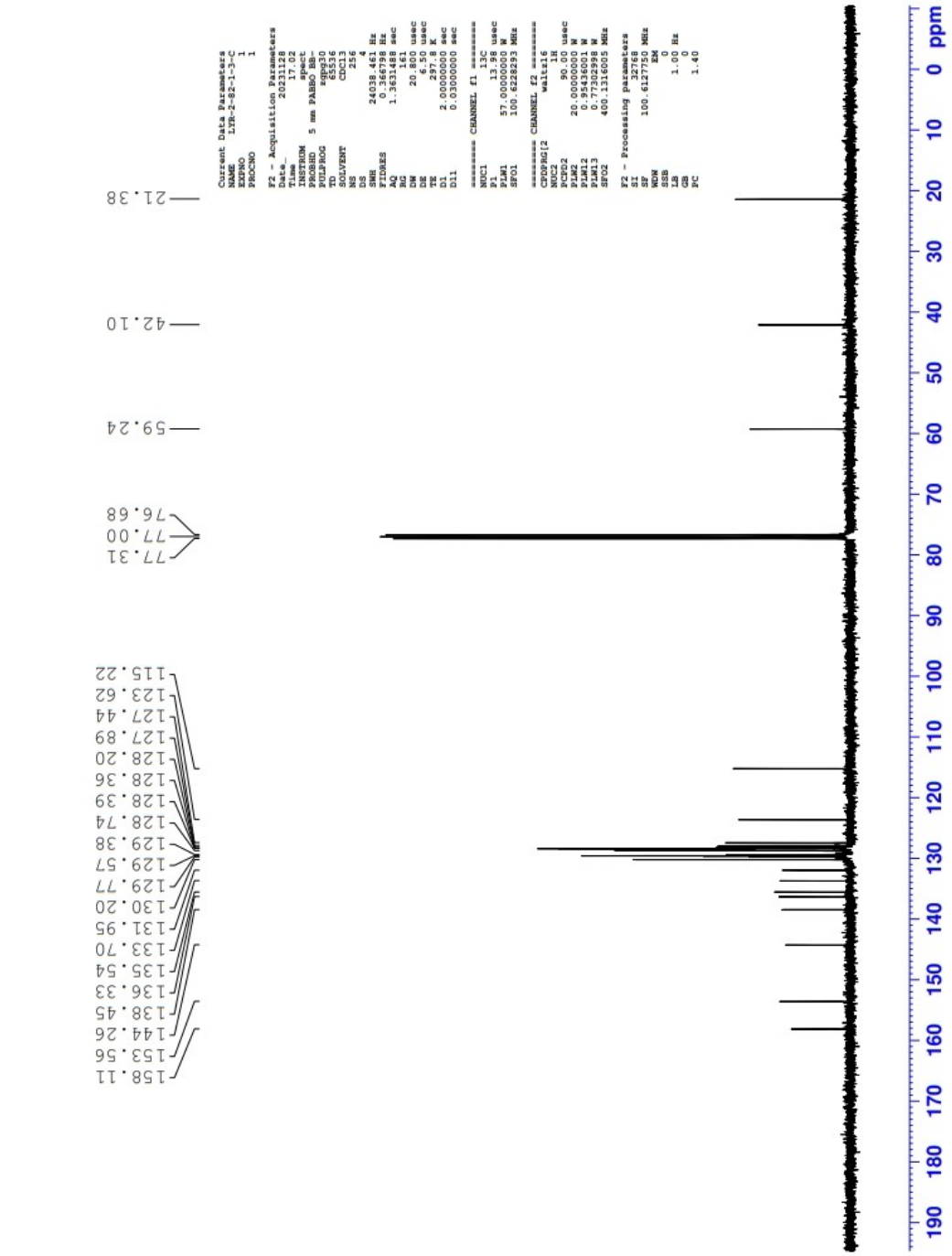
N
O
O
S
O
N
O

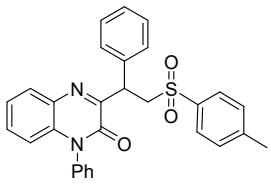
4j


Current Data Parameters
NAME LYR-2-82-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231220
Time 11.17
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 use
DE 6.50 use
TE 296.2 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300118 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.00
1.00
1.00
1.00
1.01
3.02
3.01
3.01
2.02
2.00
1.00
2.02
1.00


N
O
S
O
O
N
O
Ph

4k


21.38
42.10
59.24
76.68
77.00
77.31
115.22
123.62
127.44
127.89
128.20
128.36
128.39
128.74
129.38
129.57
129.77
130.20
131.95
133.70
135.54
136.33
138.45
144.26
153.56
158.11
0 ppm

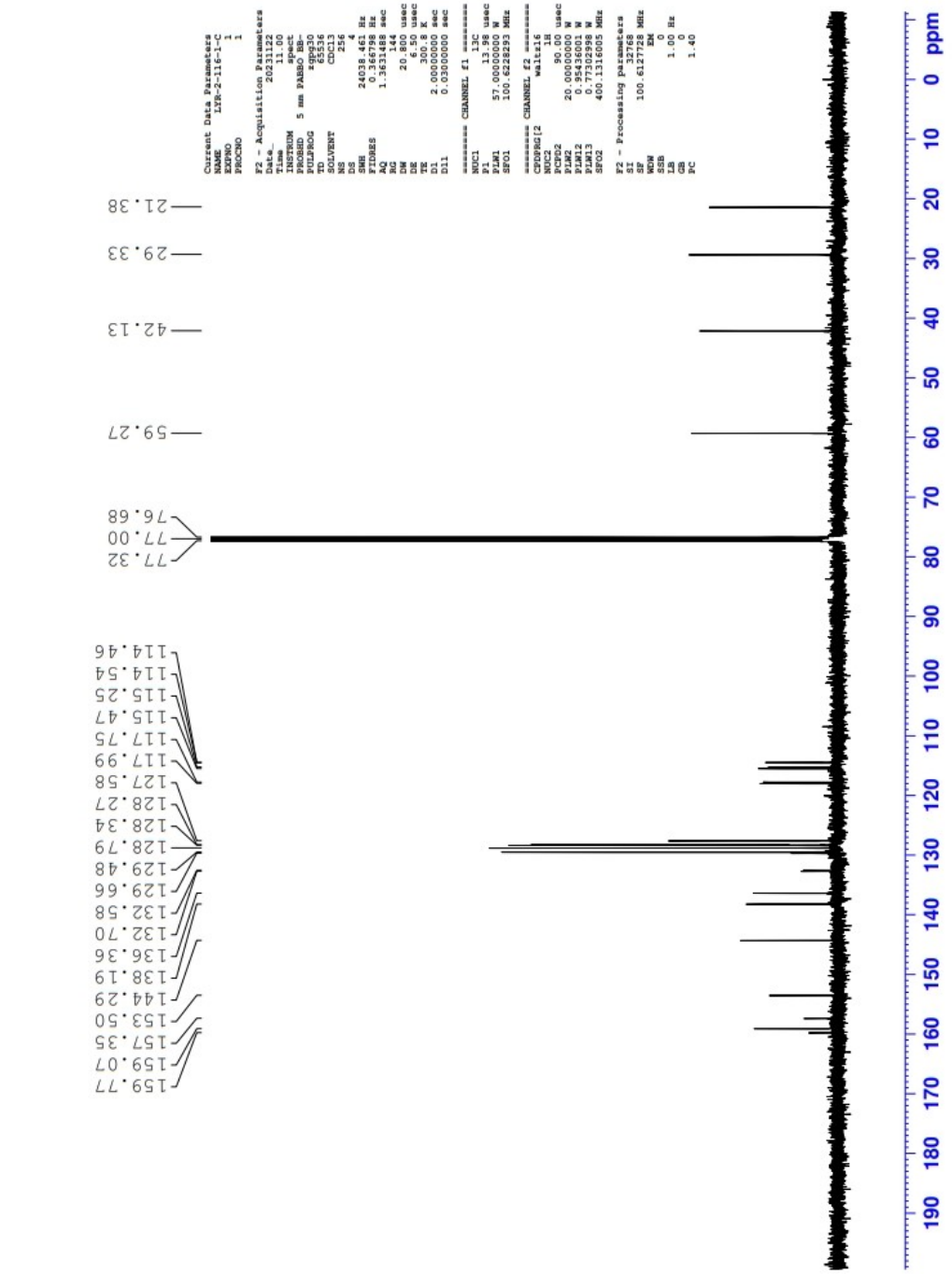

N
O
S
O
O
N
O
Ph

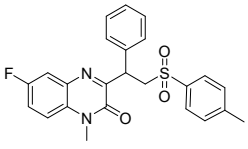
4k

Current Data Parameters
NAME LYR-2-116-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231121
Time 16.41
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pu130
TD 64862
SOLVENT CDCl3
NS 16
DS 2
SWH 8108.000 Hz
FIDRES 0.125004 Hz
AQ 3.9998767 sec
RG 60.88
DW 61.667 use
DE 30.00 use
TE 296.0 K
NUC1 1H
SFO1 400.1113911 MHz
D1 1.00000000 sec
P1 11.60 use
PL1 58.00 dB
PL1W 0.00001592 W
F2 - Processing parameters
SI 65536
SF 400.1050788 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 4.00
0.000
2.230
3.557
3.576
3.593
3.600
4.703
4.730
4.738
4.765
5.256
5.261
5.282
5.287
7.109
7.128
7.151
7.172
7.186
7.203
7.221
7.238
7.260
7.315
7.332
7.444
7.460
7.681
7.701
3.00
4.00
1.00
1.00
2.00
5.01
2.00
1.01
2.01
ppm

F
N
O
S
O
O
N

4l


21.38
29.33
42.13
59.27
76.68
77.00
77.32
114.46
114.54
115.25
115.47
117.75
117.99
127.58
128.27
128.34
128.79
129.48
129.66
132.58
132.70
136.36
138.19
144.29
153.50
157.35
159.07
159.77
ppm

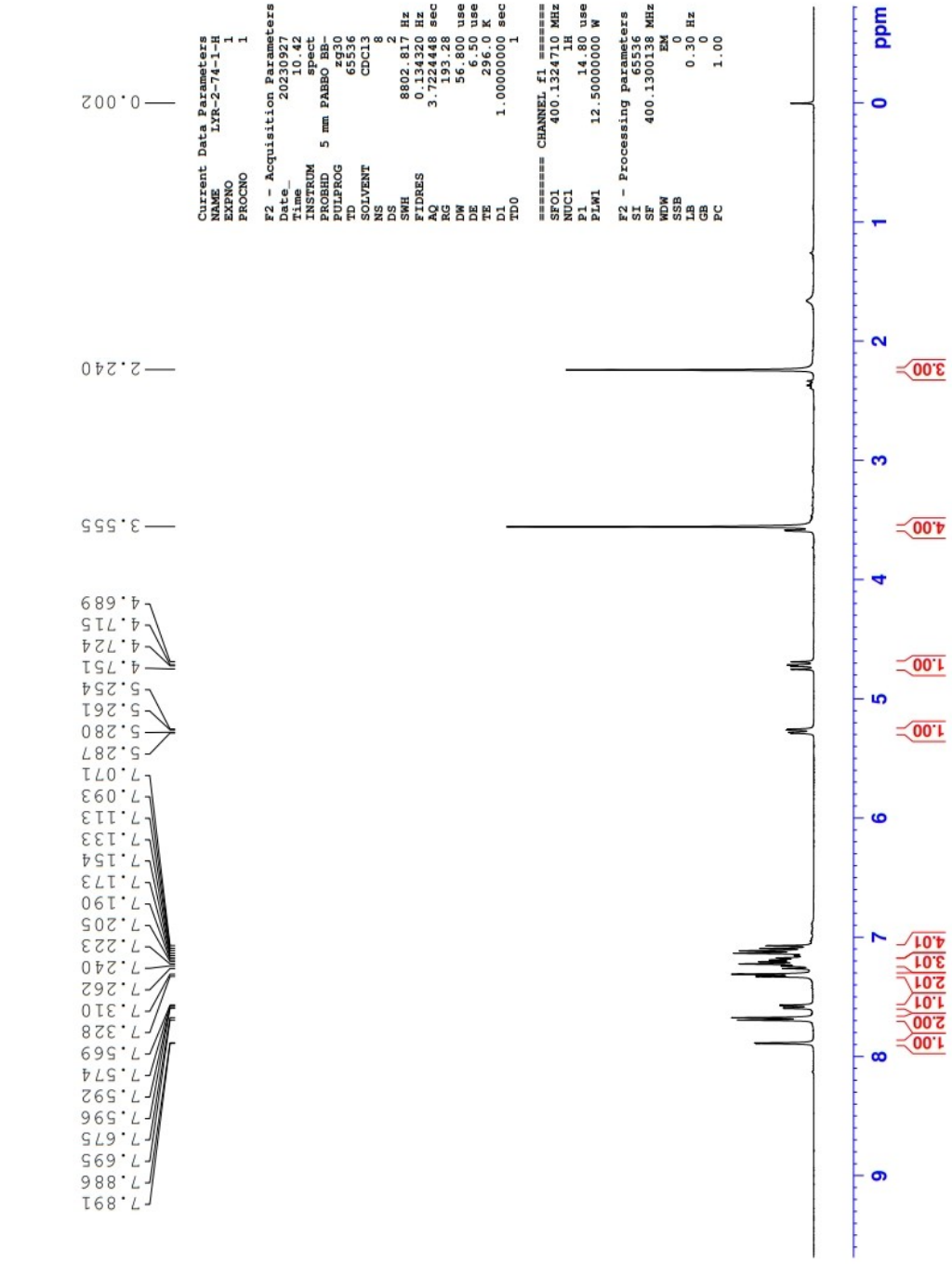

F
N
O
S
O
O
N

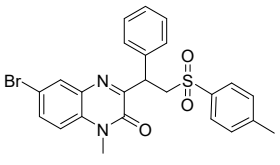
4l

Current Data Parameters
NAME LYR-2-116-1-F
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231122
Time 10.44
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfhigqn
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340032 sec
RG 203
DW 5.600 use
DE 6.50 use
TE 300.1 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 19F
P1 23.17 use
PLW1 18.19700050 W
SFO1 376.4607164 MHz
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 use
PLW2 20.00000000 W
PLW12 0.95436001 W
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-118.97
ppm
-40
-60
-80
-100
-120
-140
-160
-180
-200

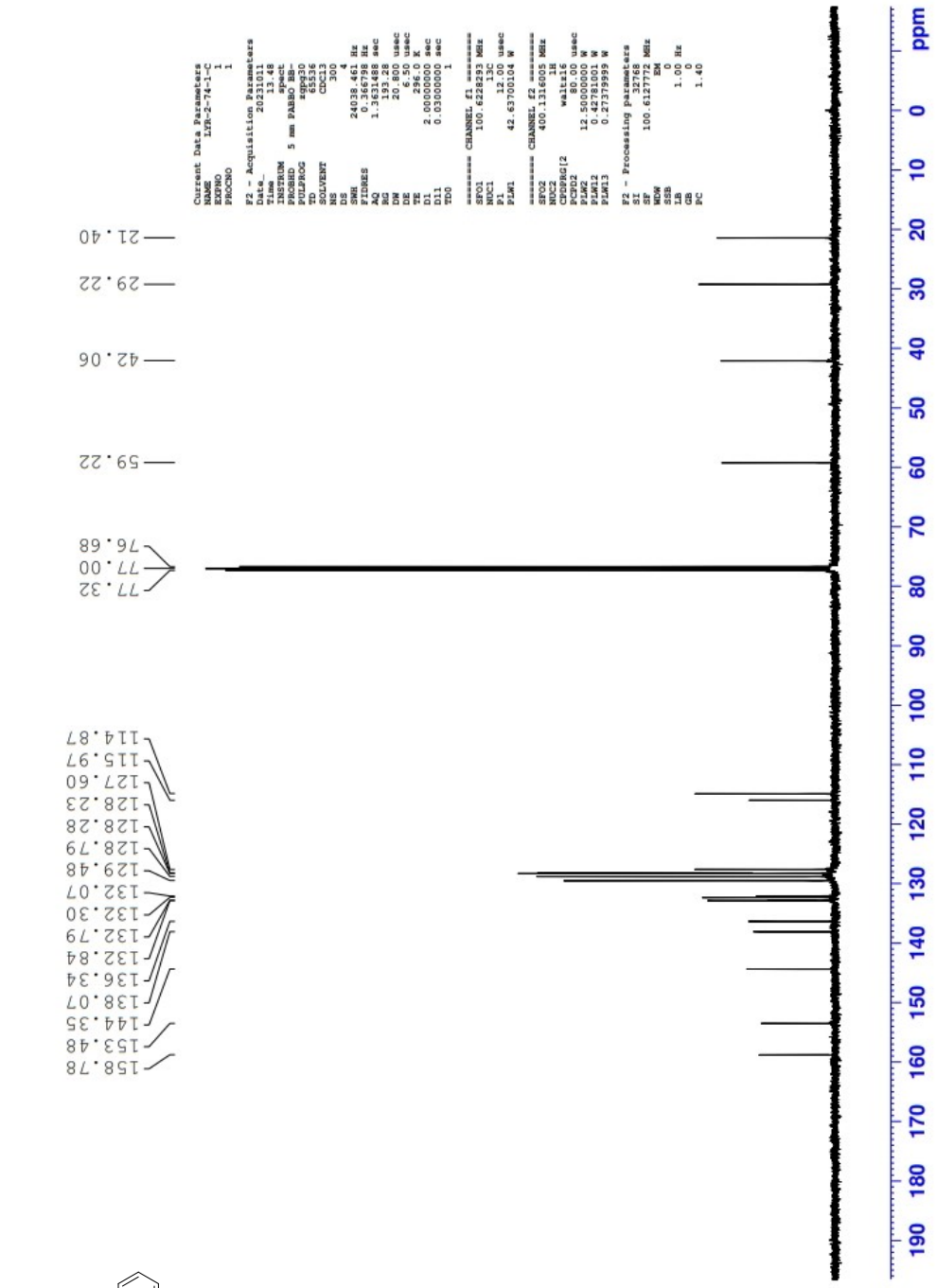
F
N
O
O
S
O
N
O

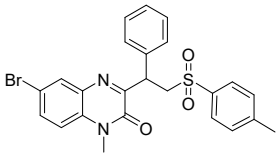
4l


Current Data Parameters
NAME LYR-2-74-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230927
Time 10.42
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8802.817 Hz
FIDRES 0.134320 Hz
AQ 3.7224448 sec
RG 193.28
DW 56.800 use
DE 6.50 use
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.80 use
PLW1 12.50000000 W
F2 - Processing parameters
SI 65536
SF 400.1300138 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.002
2.240
3.555
4.689
4.715
4.724
4.751
5.254
5.261
5.280
5.287
7.071
7.093
7.113
7.133
7.154
7.173
7.190
7.205
7.223
7.240
7.262
7.310
7.328
7.569
7.574
7.592
7.596
7.675
7.695
7.886
7.891
3.00
4.00
1.00
1.00
4.01
3.01
2.01
1.01
2.00
1.00
ppm

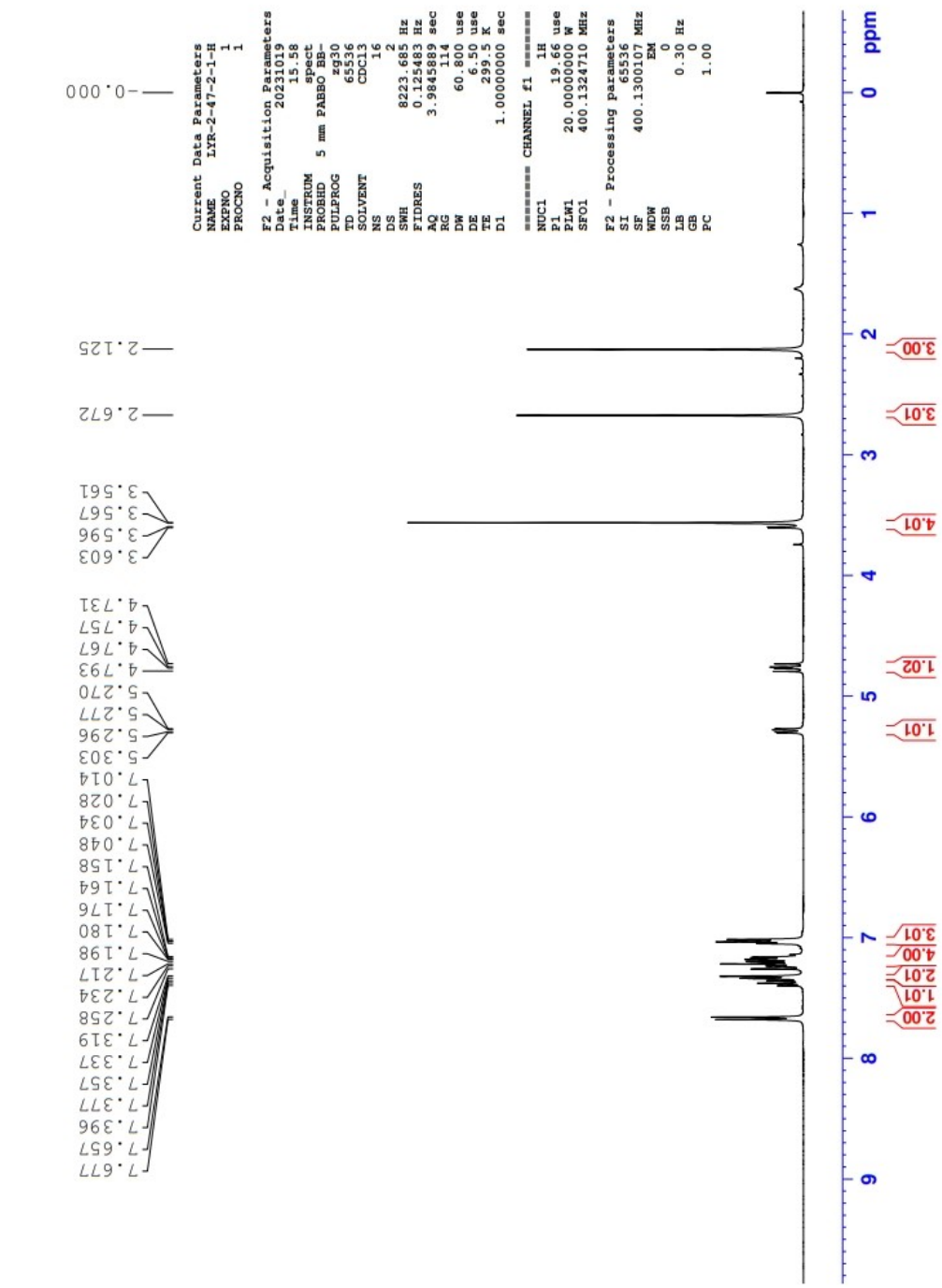

Br
N
O
S
O
O
N
O

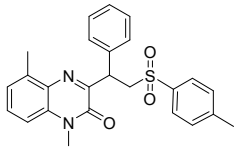
4m


21.40
29.22
42.06
59.22
76.68
77.00
77.32
114.87
115.97
127.60
128.23
128.28
128.79
129.48
132.07
132.30
132.79
132.84
136.34
138.07
144.35
153.48
158.78
ppm

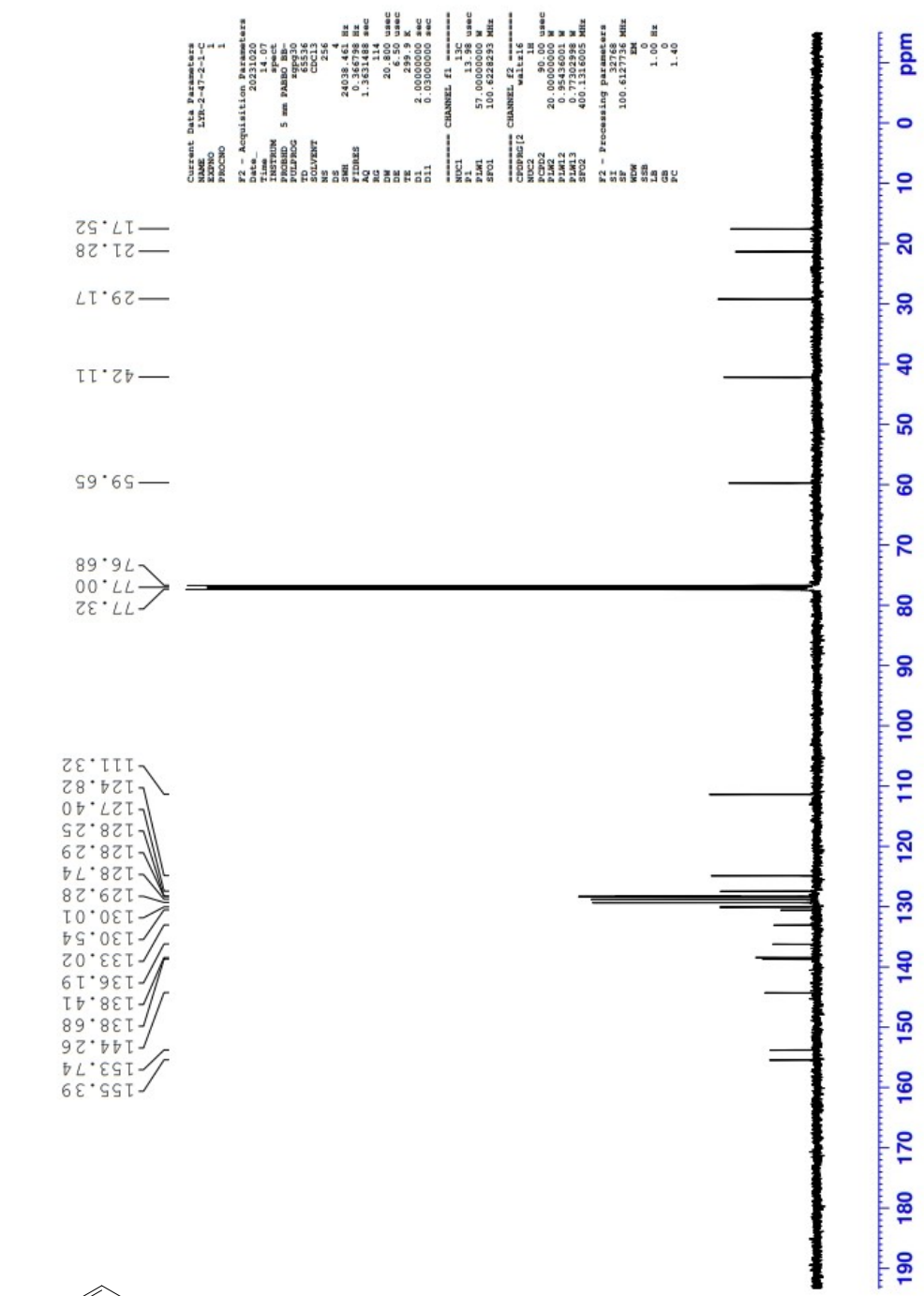

Br
N
O
S
O
O
N
O

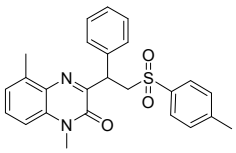
4m


Current Data Parameters
NAME LYR-2-47-2-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231019
Time 15.58
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 114
DW 60.800 use
DE 6.50 use
TE 299.5 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300107 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
2.125
2.672
3.561
3.567
3.596
3.603
4.731
4.757
4.767
4.793
5.270
5.277
5.296
5.303
7.014
7.028
7.034
7.048
7.158
7.164
7.176
7.180
7.198
7.217
7.234
7.258
7.319
7.337
7.357
7.377
7.396
7.657
7.677
3.00
3.01
4.01
1.02
1.01
3.01
4.00
2.01
1.01
2.00
ppm

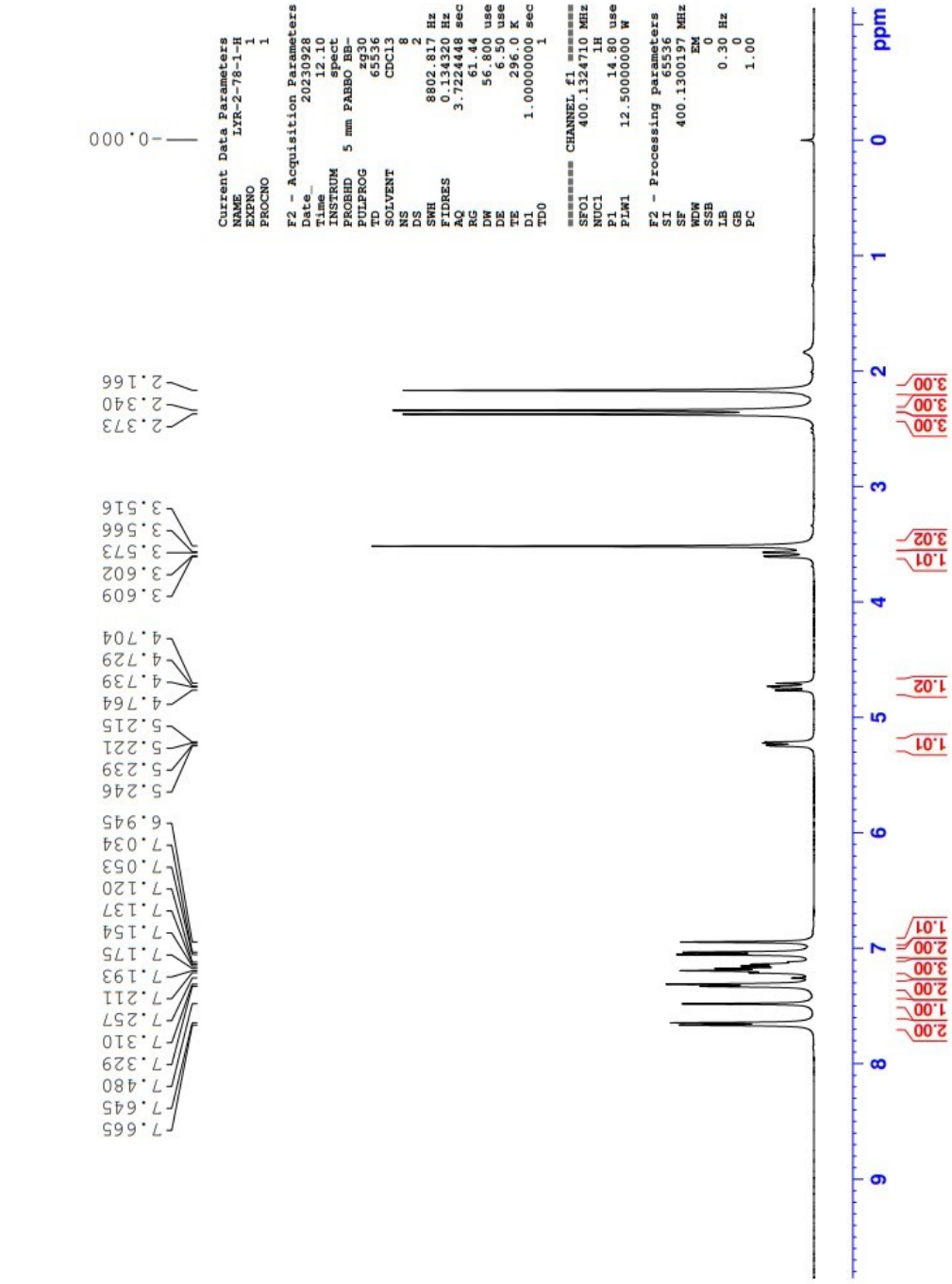


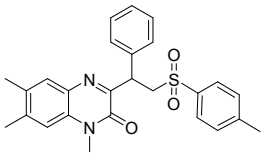
4n


17.52
21.28
29.17
42.11
59.65
76.68
77.00
77.32
111.32
124.82
127.40
128.25
128.29
128.74
129.28
130.01
130.54
133.02
136.19
138.41
138.68
144.26
153.74
155.39
ppm

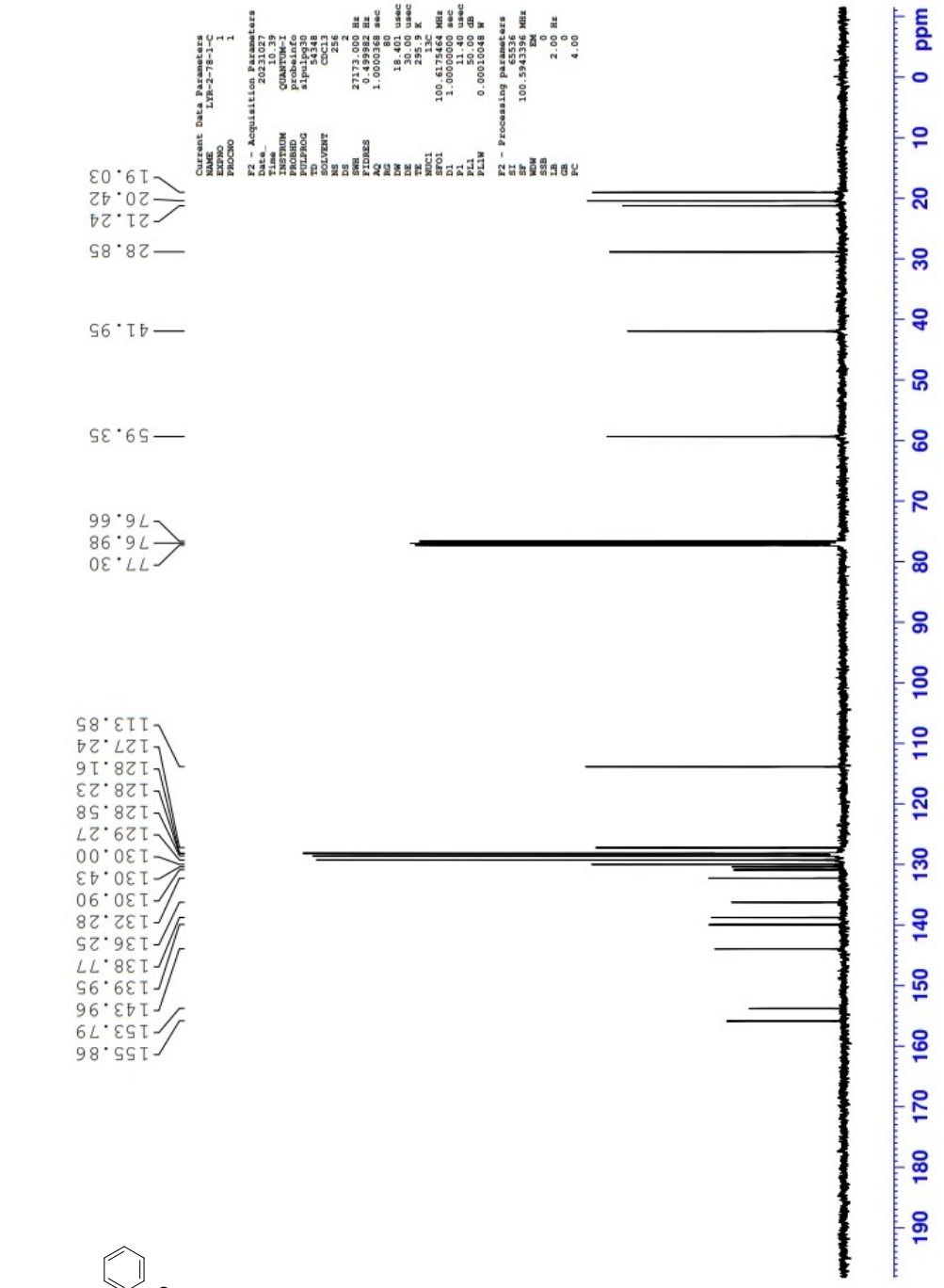


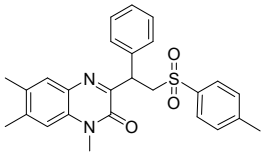
4n


Current Data Parameters
NAME LYR-2-78-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230928
Time 12.10
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 2
SWH 8802.817 Hz
FIDRES 0.1343320 Hz
AQ 3.7224448 sec
RG 61.44
DW 56.800 use
DE 6.50 use
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 14.80 use
PLW1 12.50000000 W
F2 - Processing parameters
SI 65536
SF 400.1300197 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
2.166
2.340
2.373
3.516
3.566
3.573
3.602
3.609
4.704
4.729
4.739
4.764
5.215
5.221
5.239
5.246
6.945
7.034
7.053
7.120
7.137
7.154
7.175
7.193
7.211
7.257
7.310
7.329
7.480
7.645
7.665
3.00
3.00
3.00
3.02
1.01
1.02
1.01
1.01
2.00
3.00
2.00
1.00
2.00
ppm

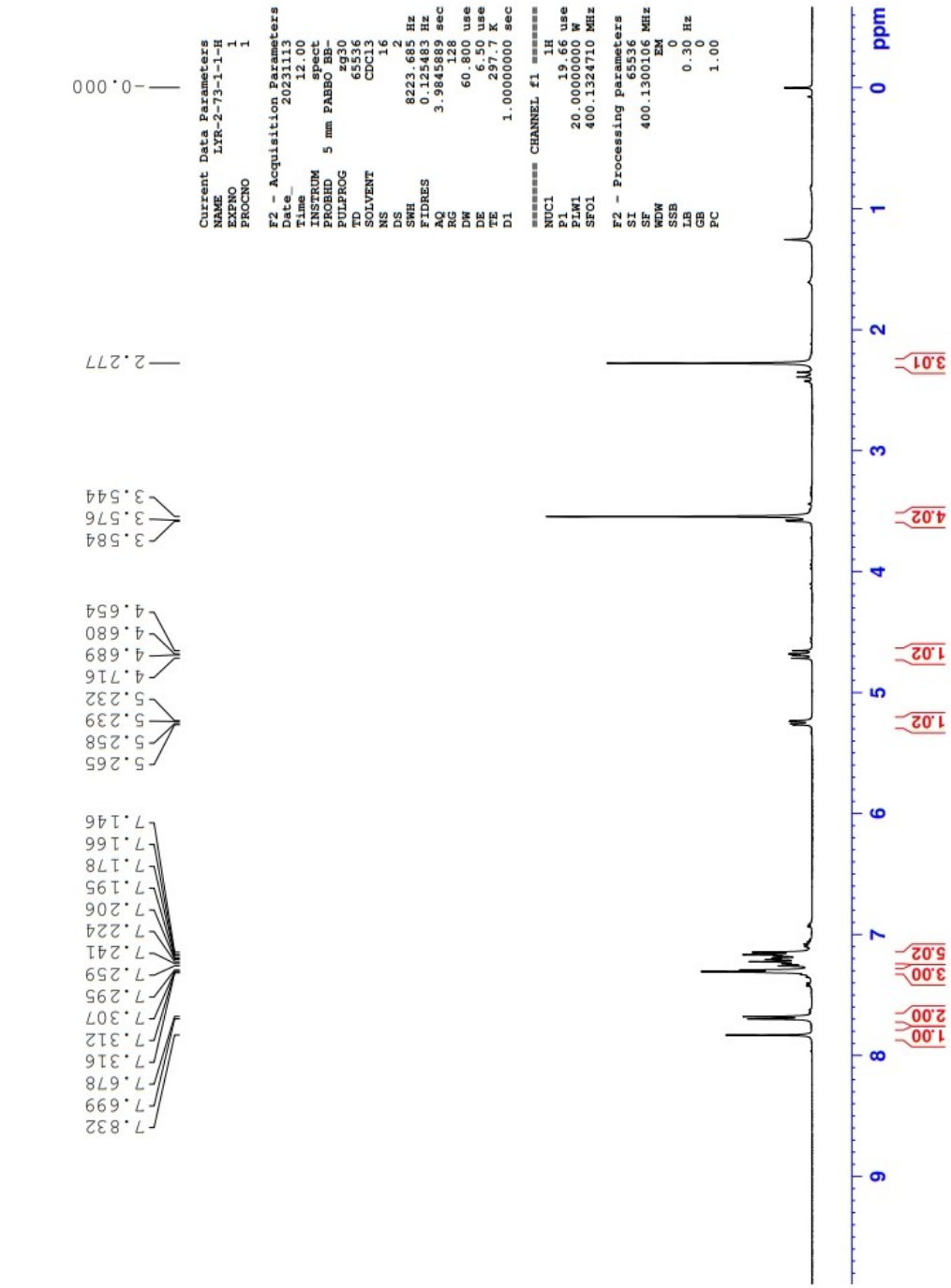


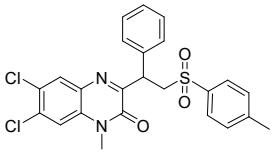
4o


19.03
20.42
21.24
28.85
41.95
59.35
76.66
76.98
77.30
113.85
127.24
128.16
128.23
128.58
129.27
130.00
130.43
130.90
132.28
136.25
138.77
139.95
143.96
153.79
155.86
Current Data Parameters
NAME LYR-2-78-1-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231027
Time 10.39
INSTRUM QUANTUM-I
PROBHD PFG Triple 5mm
PULPROG zgpg30
TD 54348
SOLVENT CDCl3
NS 256
DS 2
SWH 27173.000 Hz
FIDRES 0.499982 Hz
AQ 1.0000368 sec
RG 80
DW 18.400 usec
DE 30.00 usec
TE 295.9 K
NUC1 13C
SFO1 100.6175464 MHz
D1 1.0000000 sec
P1 11.40 usec
PL1 50.00 dB
PL1W 0.00010048 W
F2 - Processing parameters
SI 65536
SF 100.5943396 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 4.00
ppm

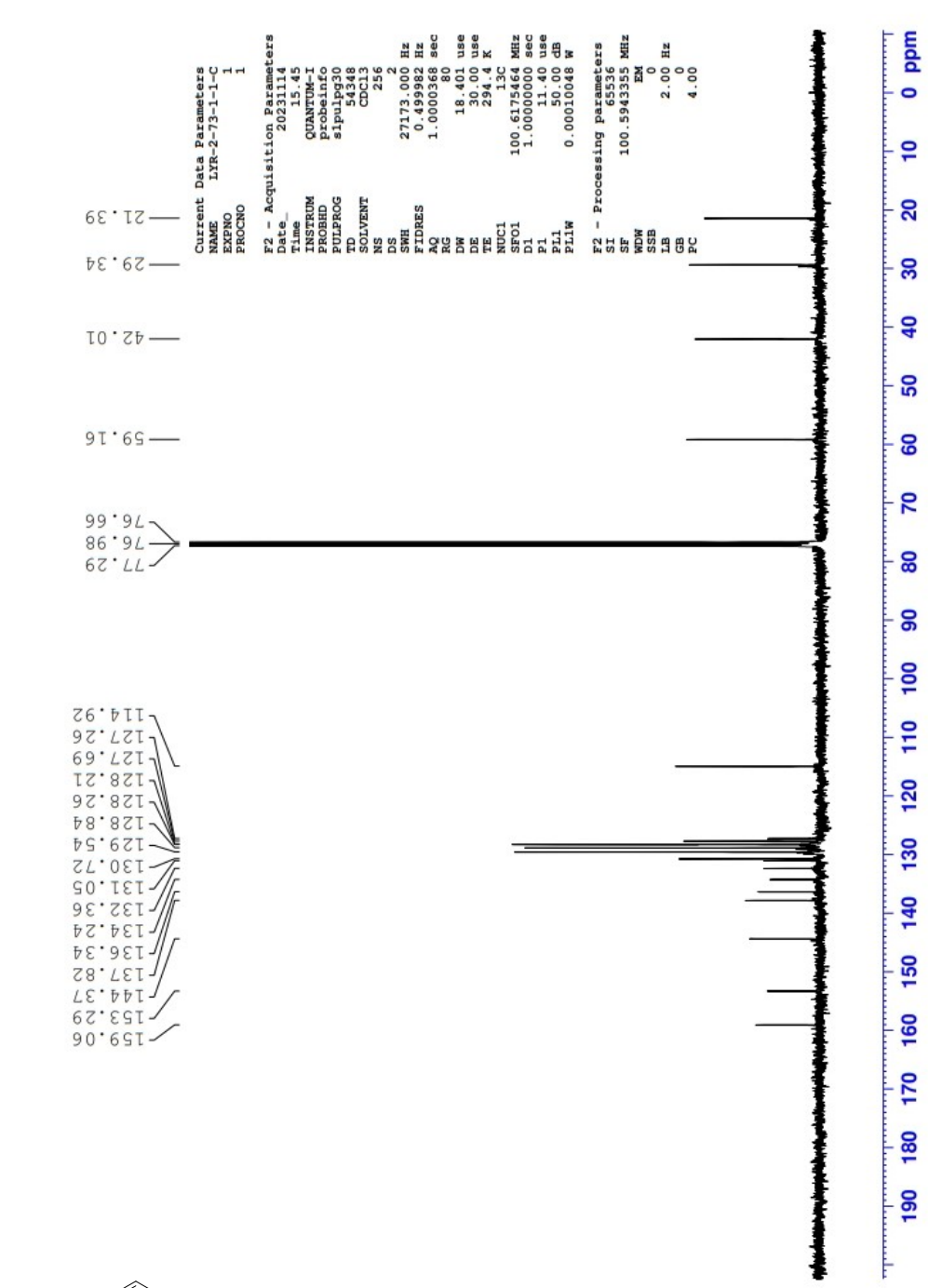


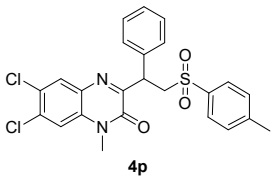
4o


Current Data Parameters
NAME LYR-2-73-1-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231113
Time 12.00
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 use
DE 6.50 use
TE 297.7 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300106 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
2.277
3.544
3.576
3.584
4.654
4.680
4.689
4.716
5.232
5.239
5.258
5.265
7.146
7.166
7.178
7.195
7.206
7.224
7.241
7.259
7.295
7.307
7.312
7.316
7.678
7.699
7.832
3.01
4.02
1.02
1.02
5.02
3.00
2.00
1.00
ppm

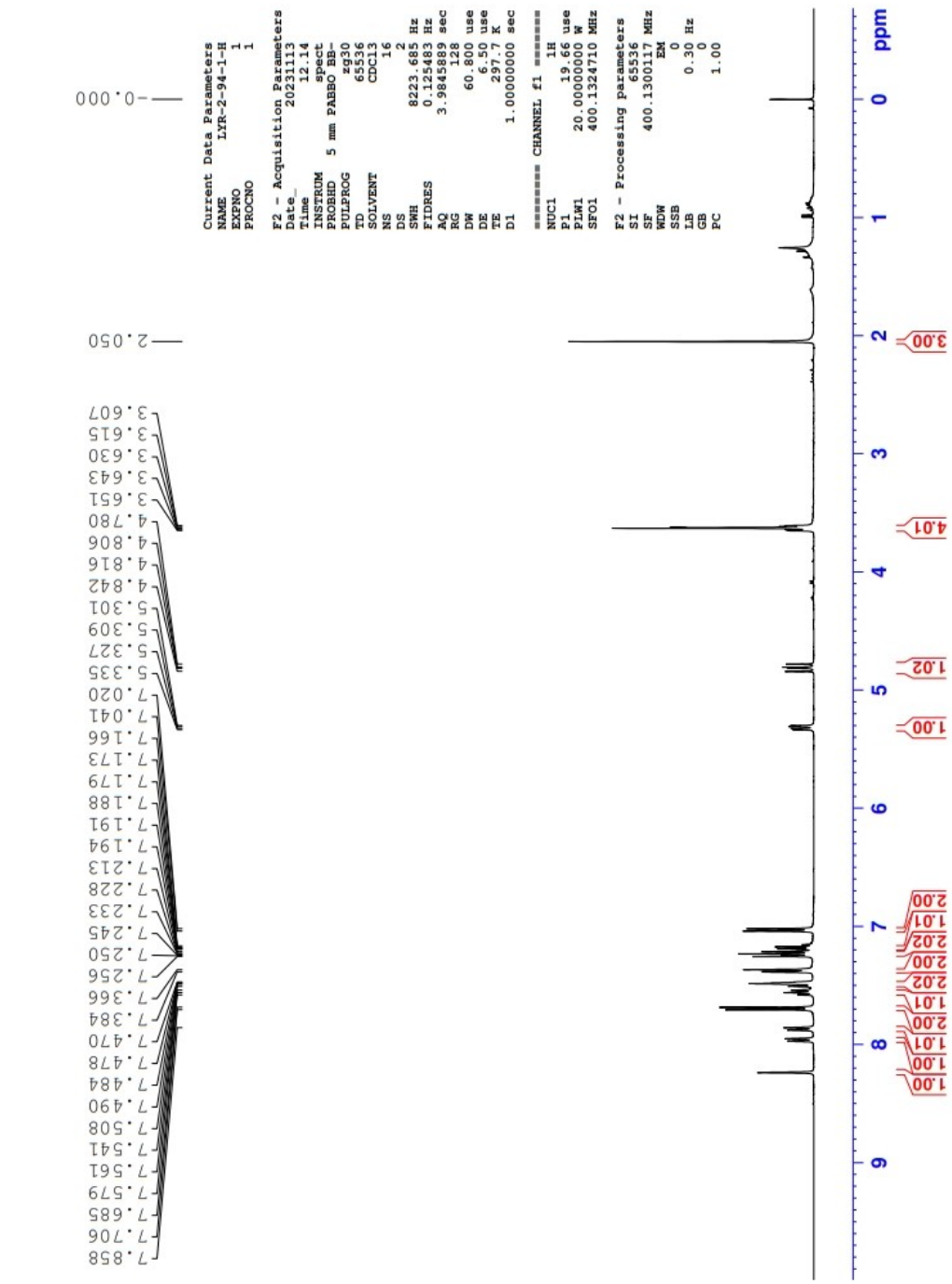

Cl
Cl
N
N
O
O
S
O
O

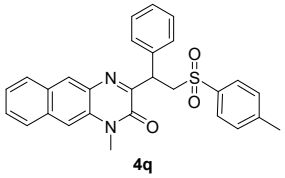
4p


Current Data Parameters
NAME LYR-2-73-1-1-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231114
Time 15.45
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pulpg30
TD 54348
SOLVENT CDCl3
NS 256
DS 2
SWH 27173.000 Hz
FIDRES 0.499982 Hz
AQ 1.0000368 sec
RG 80
DW 18.401 use
DE 30.00 use
TE 294.4 K
NUC1 13C
SFO1 100.6175464 MHz
D1 1.00000000 sec
P1 11.40 use
PL1 50.00 dB
PL1W 0.00010048 W
F2 - Processing parameters
SI 65536
SF 100.5943355 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 4.00
21.39
29.34
42.01
59.16
76.66
76.98
77.29
114.92
127.26
127.69
128.21
128.26
128.84
129.54
130.72
131.05
132.36
134.24
136.34
137.82
144.37
153.29
159.06
0 ppm


Cl
Cl
N
N
O
O
S
O
O

4p


Current Data Parameters
NAME LYR-2-94-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231113
Time 12.14
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 use
DE 6.50 use
TE 297.7 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300117 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
2.050
3.607
3.615
3.630
3.643
3.651
4.780
4.806
4.816
4.842
5.301
5.309
5.327
5.335
7.020
7.041
7.166
7.173
7.179
7.188
7.191
7.194
7.213
7.228
7.233
7.245
7.250
7.256
7.366
7.384
7.470
7.478
7.484
7.490
7.508
7.541
7.561
7.579
7.685
7.706
7.858
ppm
3.00
4.01
1.02
1.00
2.00
1.01
2.02
2.00
2.02
1.01
2.00
1.01
1.00
1.00



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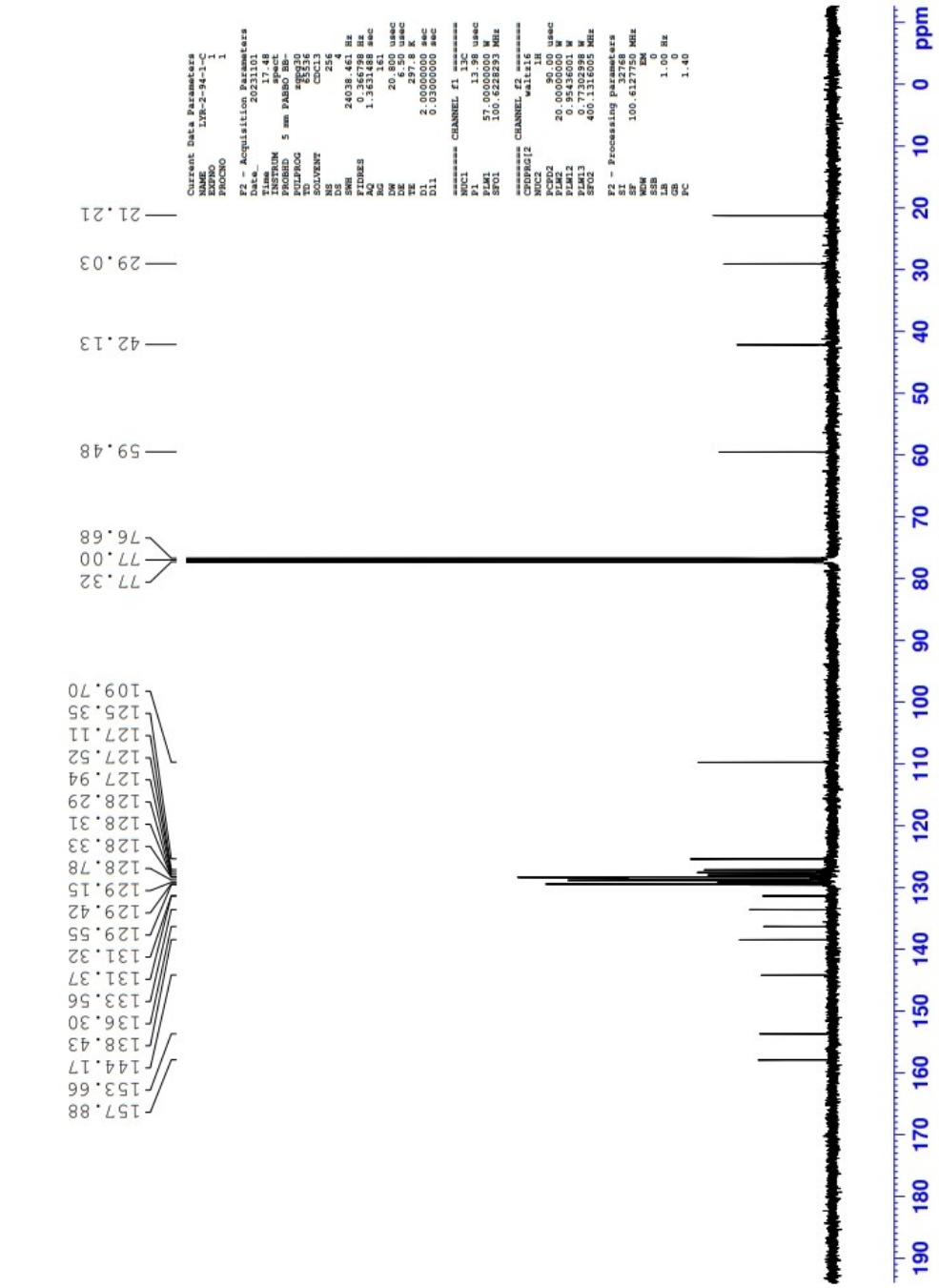
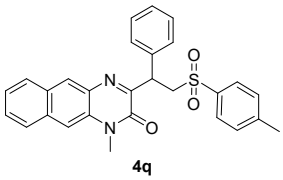
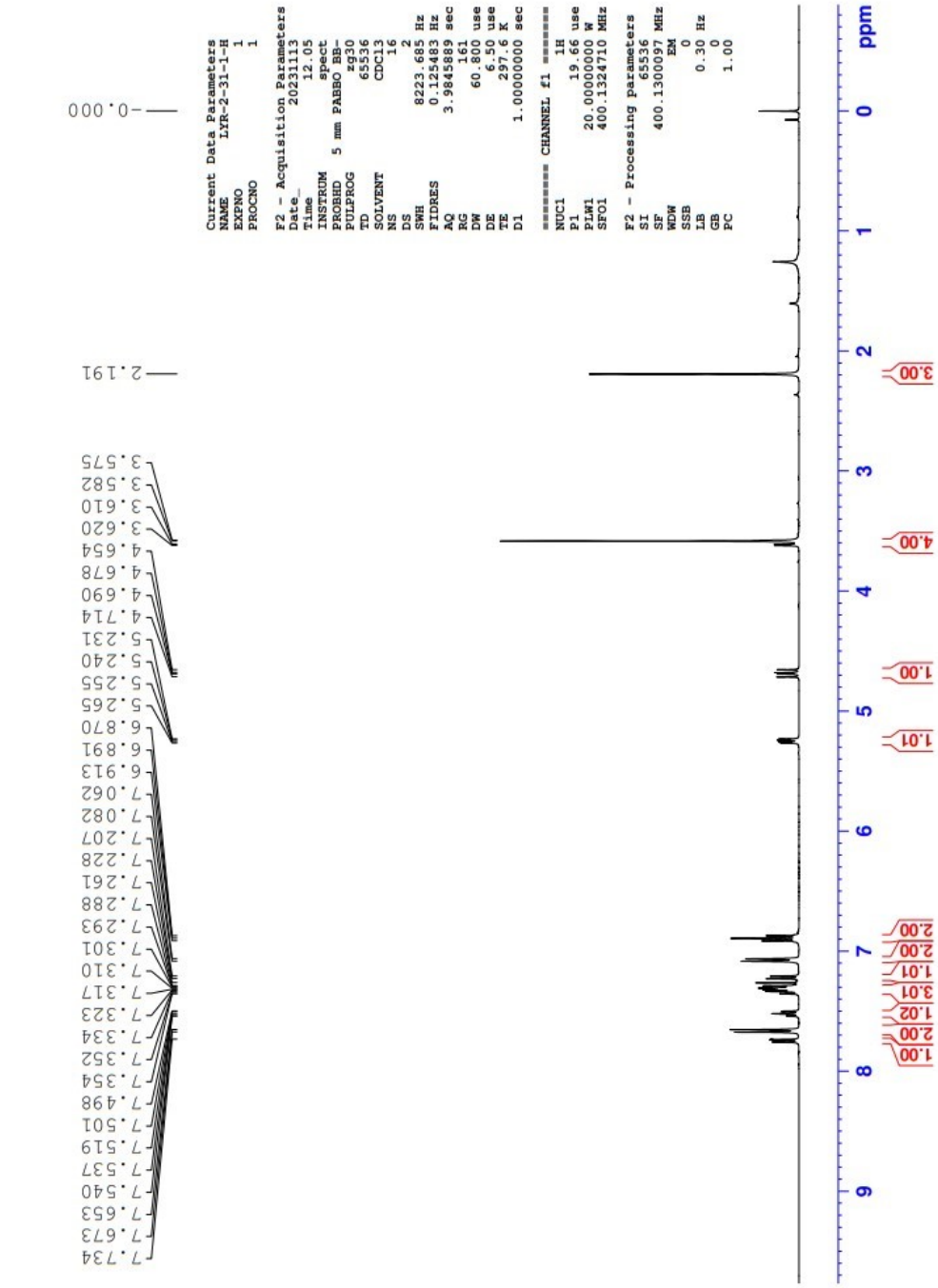
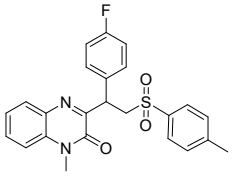

21.21
29.03
42.13
59.48
76.68
77.00
77.32
109.70
125.35
127.11
127.52
127.94
128.29
128.31
128.33
128.78
129.15
129.42
129.55
131.32
131.37
133.56
136.30
138.43
144.17
153.66
157.88
ppm

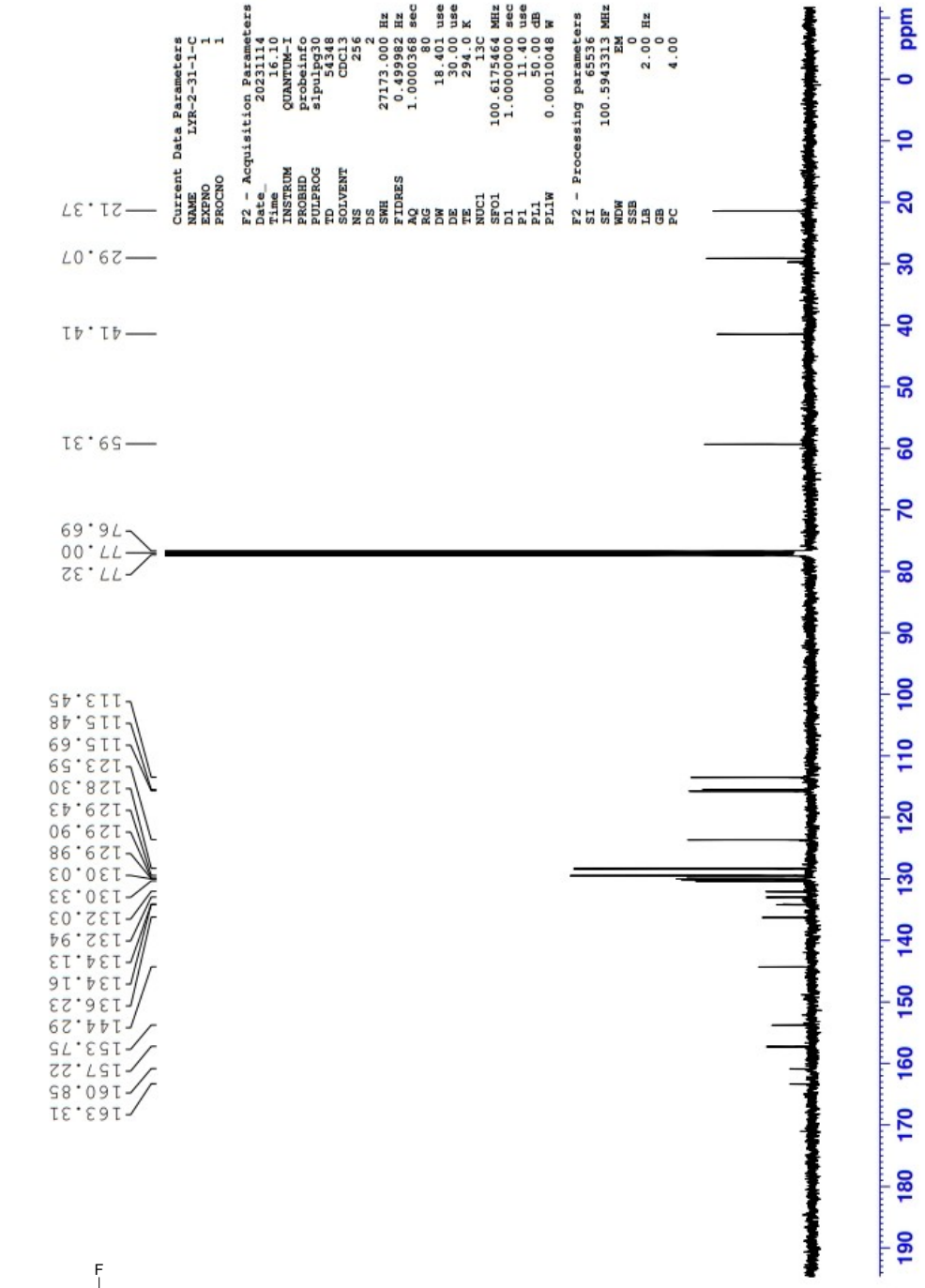


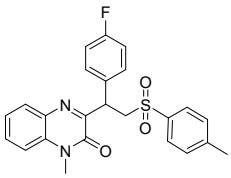
4q


Current Data Parameters
NAME LYR-2-31-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231113
Time 12.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 161
DW 60.800 use
DE 6.50 use
TE 297.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
2.191
3.575
3.582
3.610
3.620
4.654
4.678
4.690
4.714
5.231
5.240
5.255
5.265
6.870
6.891
6.913
7.062
7.082
7.207
7.228
7.261
7.288
7.293
7.301
7.310
7.317
7.323
7.334
7.352
7.354
7.498
7.501
7.519
7.537
7.540
7.653
7.673
7.734
3.00
4.00
1.00
1.01
2.00
2.00
1.01
3.01
1.02
2.00
1.00
ppm

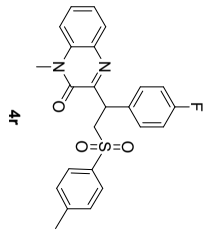


4r

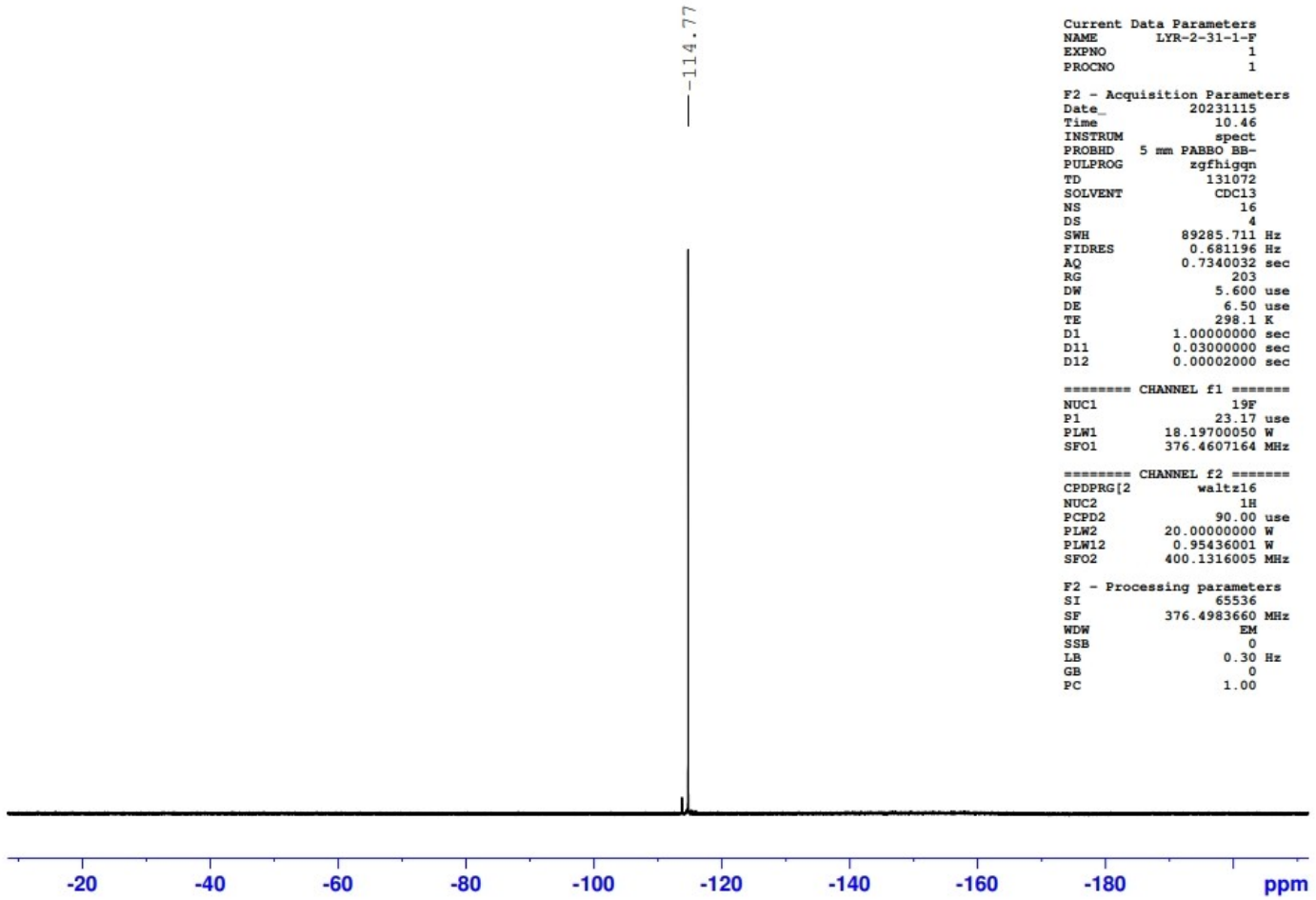

Current Data Parameters
NAME LYR-2-31-1-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231114
Time 16.10
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG zgpg30
TD 54348
SOLVENT CDCl3
NS 256
DS 2
SWH 27173.000 Hz
FIDRES 0.499982 Hz
AQ 1.0000368 sec
RG 80
DW 18.401 use
DE 30.00 use
TE 294.0 K
NUC1 13C
SFO1 100.6175464 MHz
D1 1.00000000 sec
P1 11.40 use
PL1 50.00 dB
PL1W 0.00010048 W
F2 - Processing parameters
SI 65536
SF 100.5943313 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 4.00
21.37
29.07
41.41
59.31
76.69
77.00
77.32
113.45
115.48
115.69
123.59
128.30
129.43
129.90
129.98
130.03
130.33
132.03
132.94
134.13
134.16
136.23
144.29
153.75
157.22
160.85
163.31
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 ppm


F
O
S
O
N
N
O

4r



4f



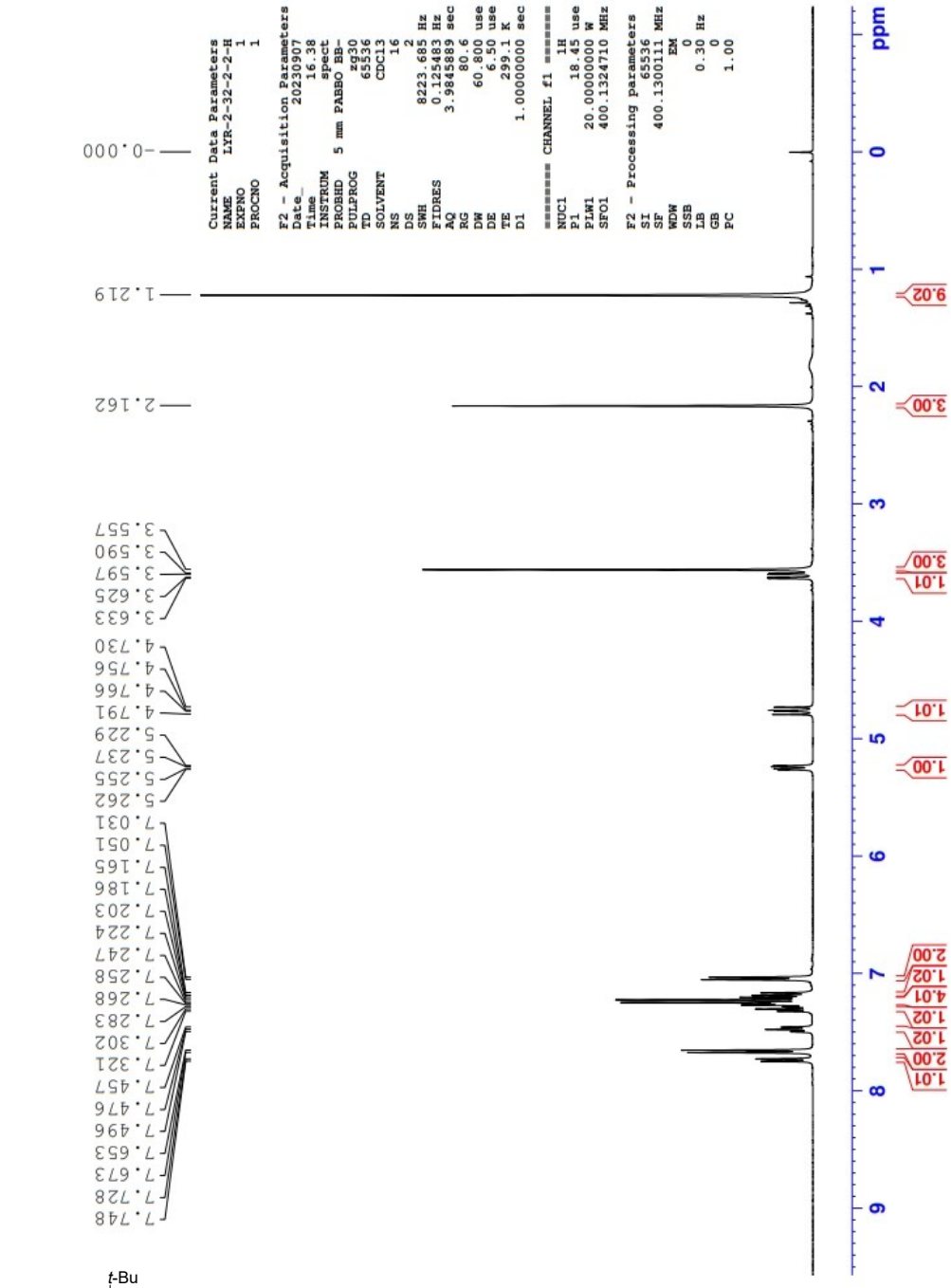

```
Current Data Parameters
NAME        LYR-2-31-1-F
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231115
Time               10.46
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG         zgfhigqn
TD               131072
SOLVENT            CDC13
NS                    16
DS                     4
SWH            89285.711 Hz
FIDRES         0.681196 Hz
AQ             0.7340032 sec
RG                   203
DW                 5.600 use
DE                 6.50 use
TE                298.1 K
D1           1.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec

======== CHANNEL f1 =======
NUC1                19F
P1                23.17 use
PLW1        18.19700050 W
SFO1       376.4607164 MHz

======== CHANNEL f2 =======
CPDPRG[2         waltz16
NUC2                1H
PCPD2             90.00 use
PLW2        20.00000000 W
PLW12        0.95436001 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF         376.4983660 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```


Current Data Parameters
NAME LYR-2-32-2-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230907
Time 16.38
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845589 sec
RG 80.6
DW 60.800 use
DE 6.50 use
TE 299.1 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300111 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
1.219
2.162
3.557
3.590
3.597
3.625
3.633
4.730
4.756
4.766
4.791
5.229
5.237
5.255
5.262
7.031
7.051
7.165
7.186
7.203
7.224
7.247
7.258
7.268
7.283
7.302
7.321
7.457
7.476
7.496
7.653
7.673
7.728
7.748
ppm
9.02
3.00
3.00
1.01
1.01
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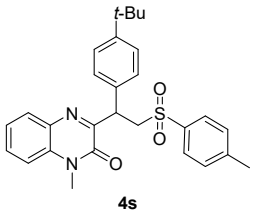
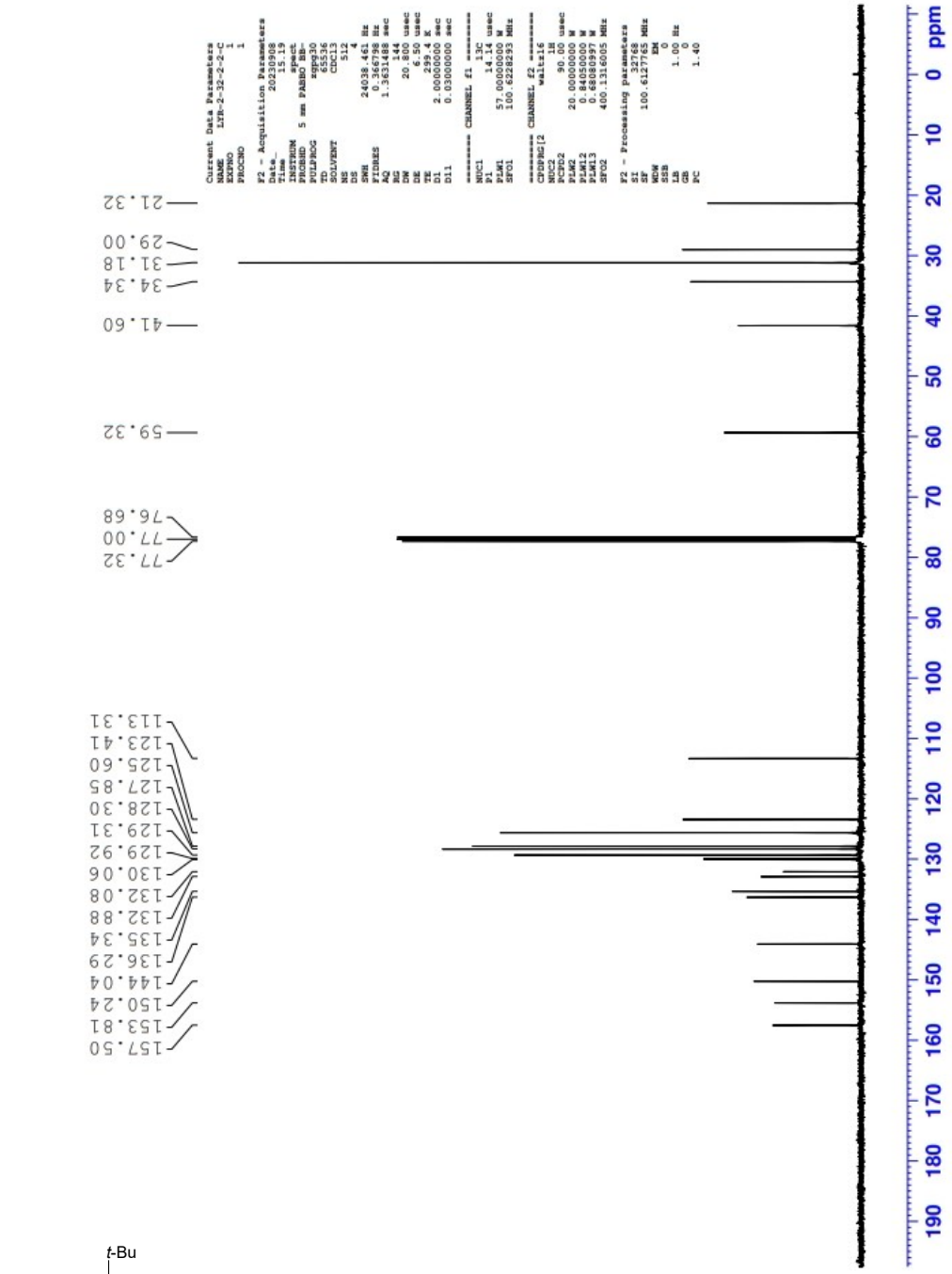
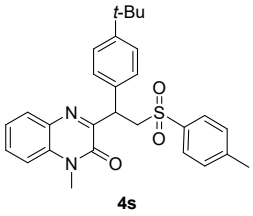
1.02
4.01
1.02
1.02
2.00
1.01

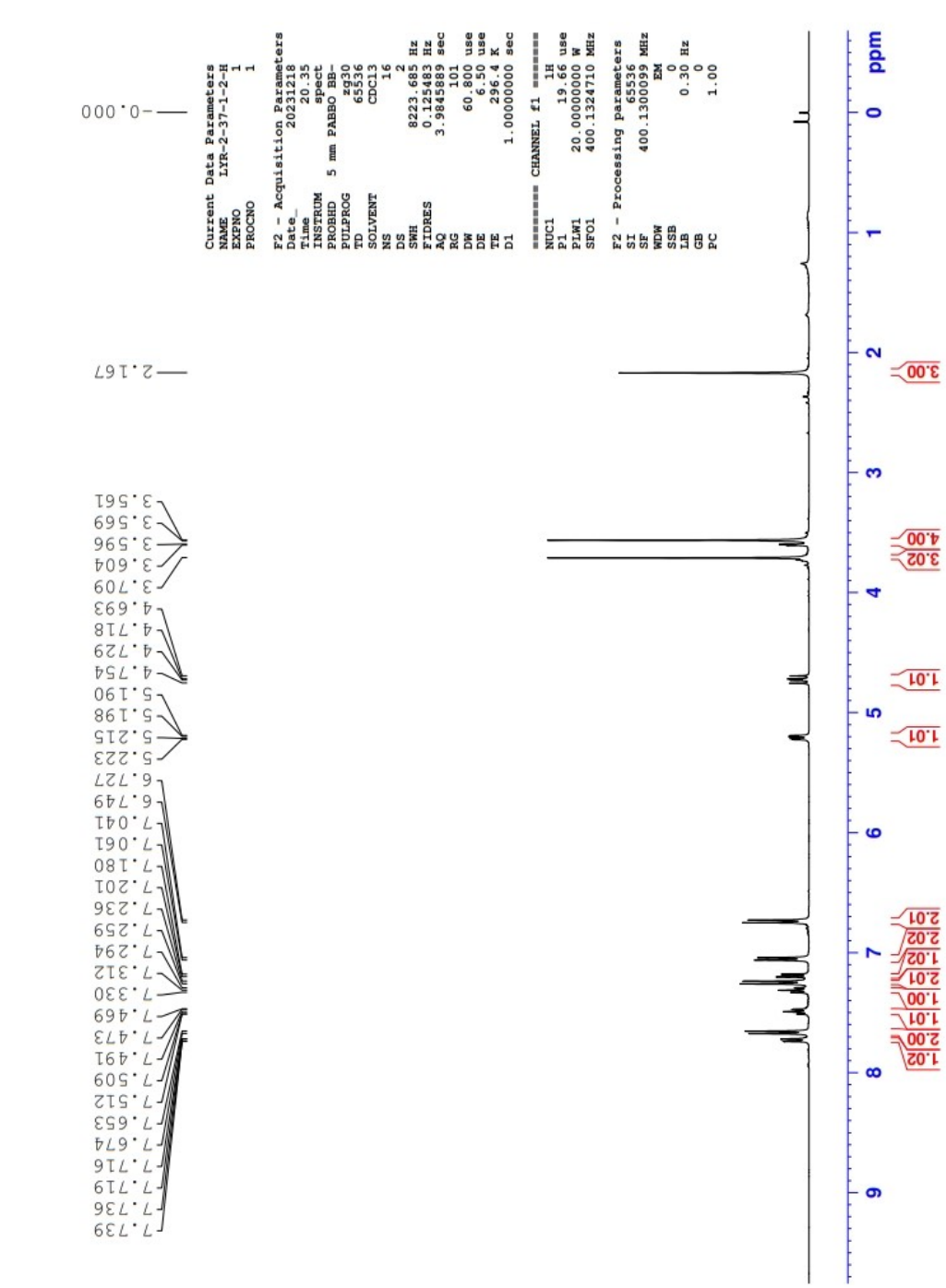

t-Bu
N
O
S
O
O
N
O

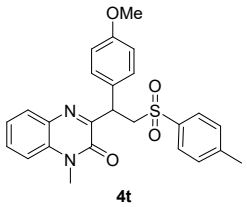
4s


21.32
29.00
31.18
34.34
41.60
59.32
76.68
77.00
77.32
113.31
123.41
125.60
127.85
128.30
129.31
129.92
130.06
132.08
132.88
135.34
136.29
144.04
150.24
153.81
157.50
ppm

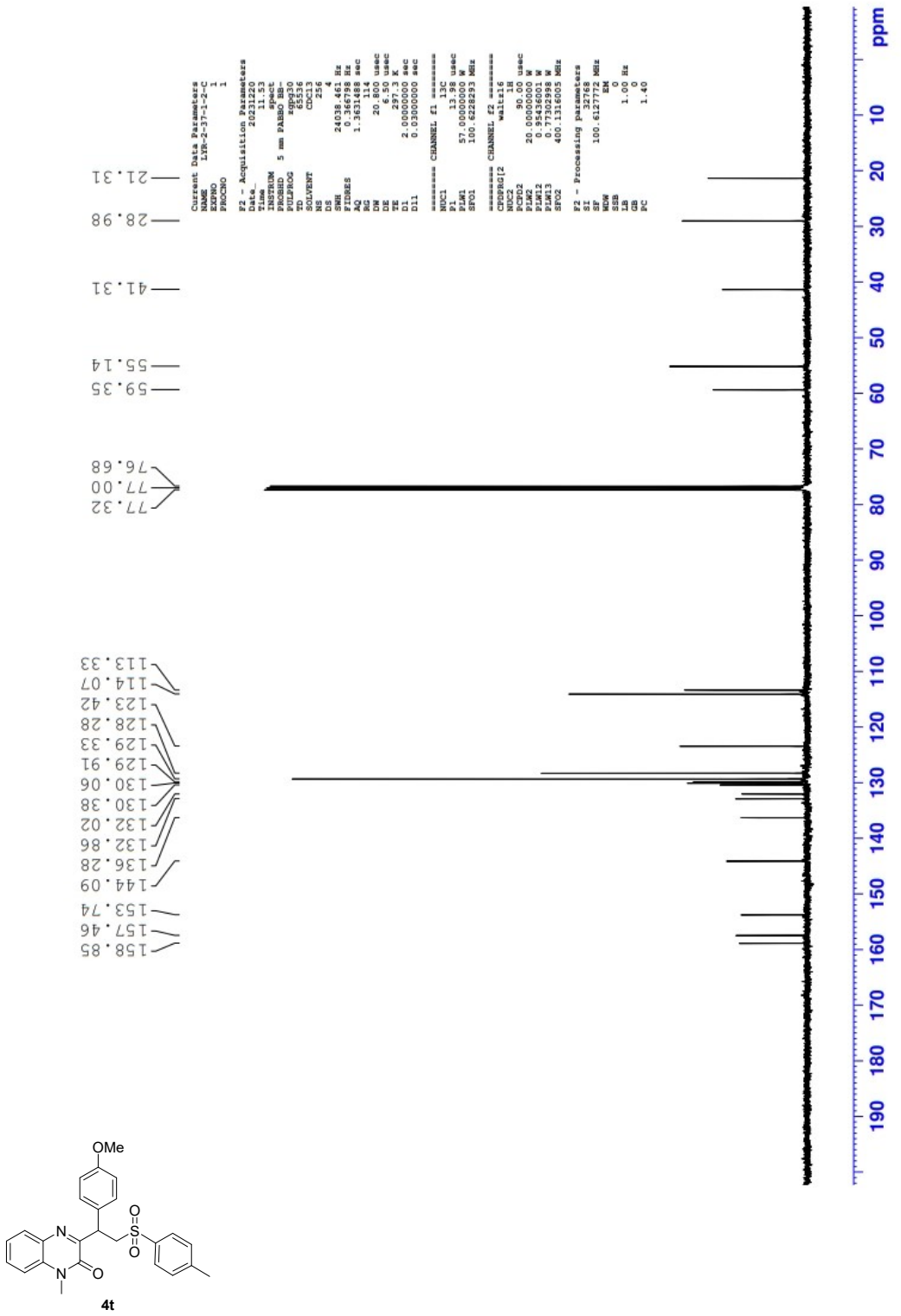

t-Bu
N
O
S
O
O
N
O

4s


Current Data Parameters
NAME LYR-2-37-1-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231218
Time 20.35
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 101
DW 60.800 use
DE 6.50 use
TE 296.4 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
2.167
3.561
3.569
3.596
3.604
3.709
4.693
4.718
4.729
4.754
5.190
5.198
5.215
5.223
6.727
6.749
7.041
7.061
7.180
7.201
7.236
7.259
7.294
7.312
7.330
7.469
7.473
7.491
7.509
7.512
7.653
7.674
7.716
7.719
7.736
7.739
3.00
4.00
3.02
1.01
1.01
2.01
2.02
1.02
2.01
1.00
1.01
2.00
1.02
ppm


OMe
N
O
S
O
O
N
O

4t

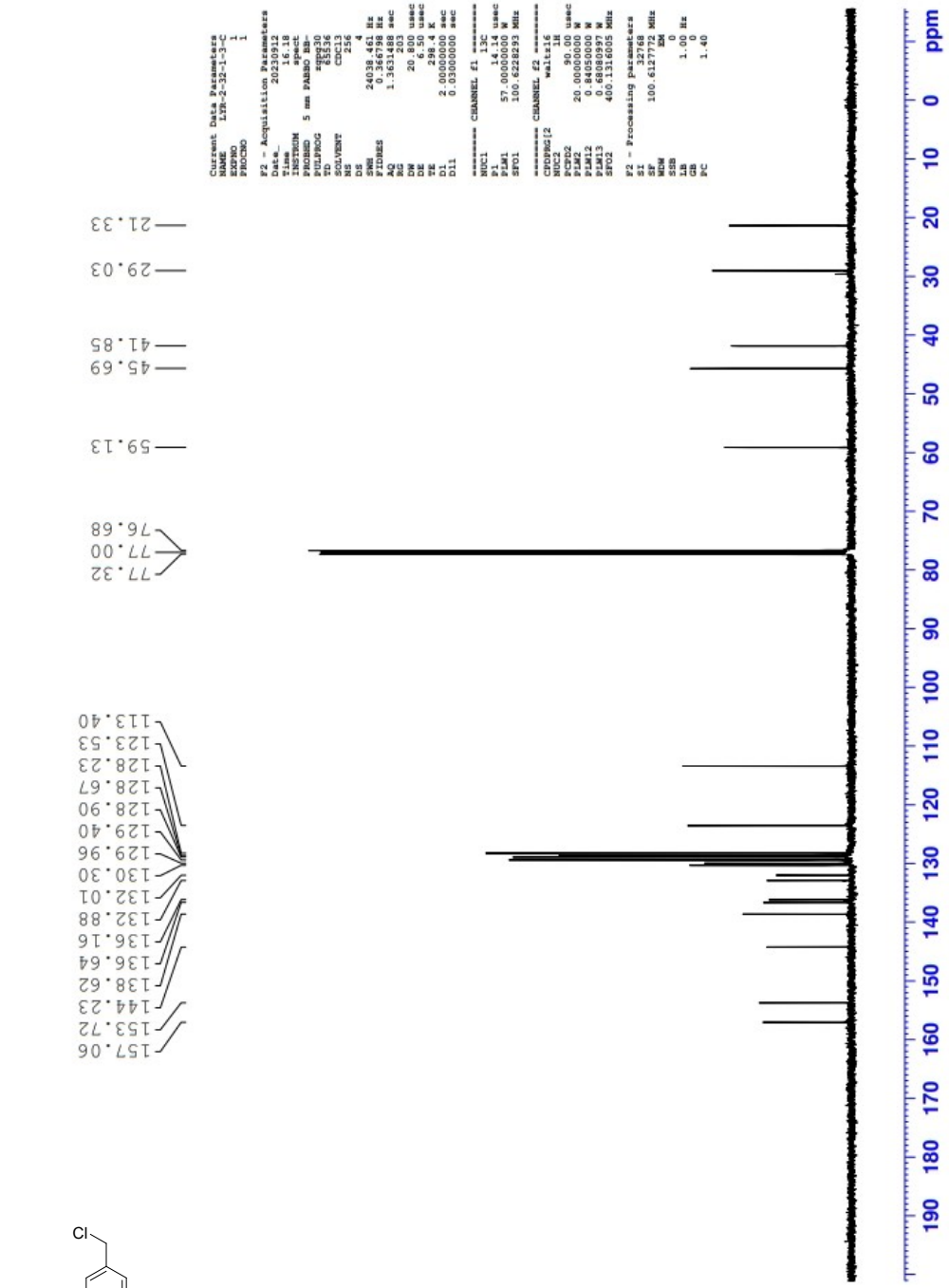

21.31
28.98
41.31
55.14
59.35
76.68
77.00
77.32
113.33
114.07
123.42
128.28
129.33
129.91
130.06
130.38
132.02
132.86
136.28
144.09
153.74
157.46
158.85
ppm

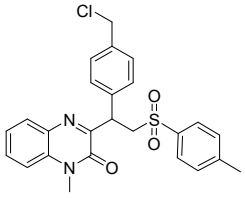
OMe
N
O
N
O
S
O
O

4t

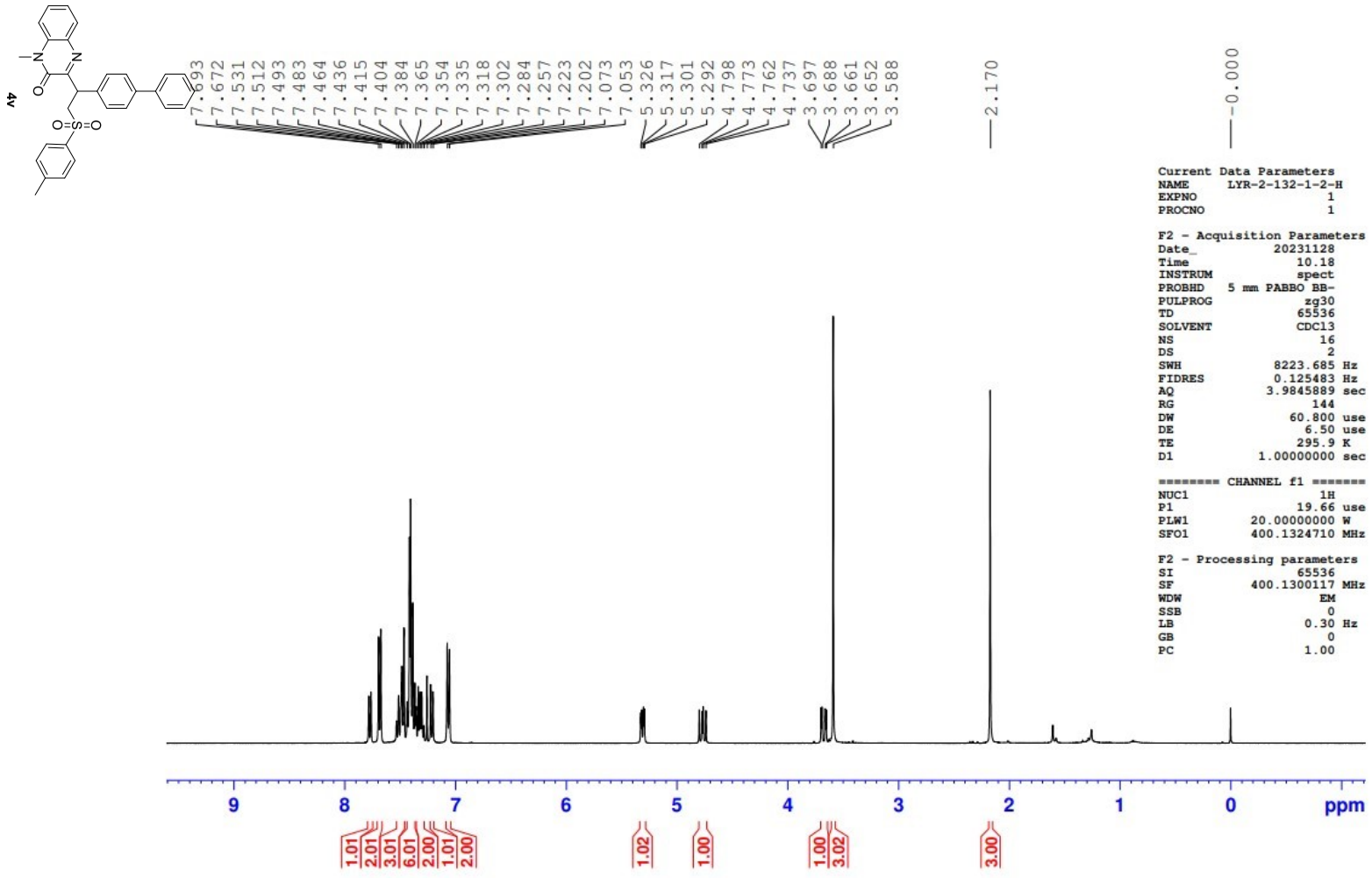
Current Data Parameters
NAME LYR-2-32-1-3-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230911
Time 16.39
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 90.5
DW 60.800 use
DE 6.50 use
TE 298.3 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
2.179
3.563
3.603
3.613
3.639
3.649
4.468
4.673
4.697
4.708
4.733
5.251
5.261
5.276
5.285
7.049
7.069
7.191
7.210
7.231
7.261
7.302
7.304
7.318
7.339
7.483
7.487
7.504
7.522
7.526
7.643
7.664
7.732
7.735
7.752
7.755
3.00
1.00
3.00
2.00
1.00
1.00
2.00
3.01
3.01
1.01
2.00
1.00
ppm
Cl
O
S
O
N
N
O

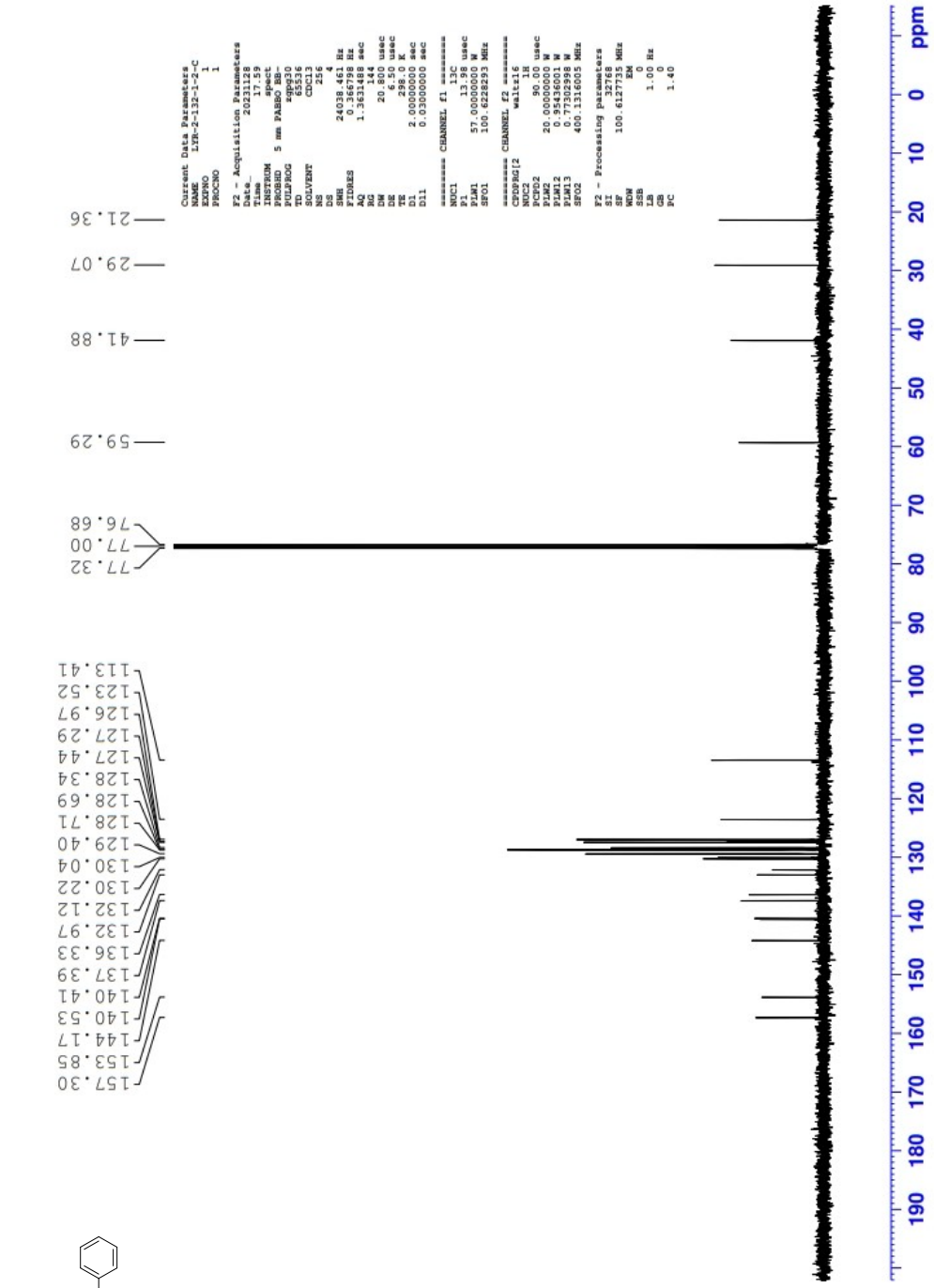
4u

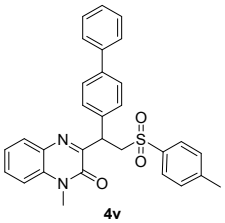

21.33
29.03
41.85
45.69
59.13
76.68
77.00
77.32
113.40
123.53
128.23
128.67
128.90
129.40
129.96
130.30
132.01
132.88
136.16
136.64
138.62
144.23
153.72
157.06
ppm


Cl
N
O
S
O
O
N

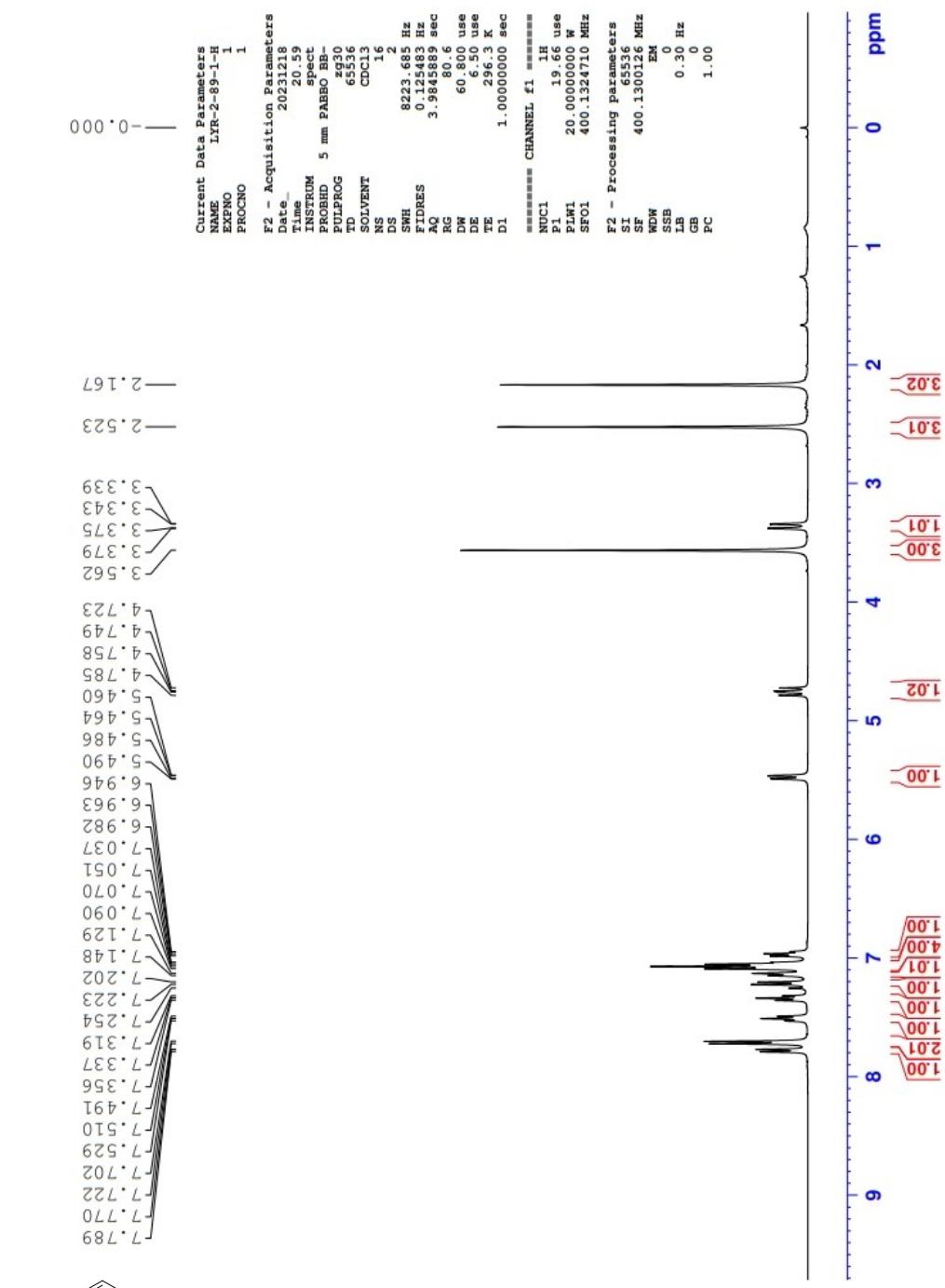
4u

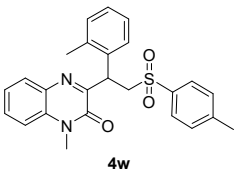

4v
7.693
7.672
7.531
7.512
7.493
7.483
7.464
7.436
7.415
7.404
7.384
7.365
7.354
7.335
7.318
7.302
7.284
7.257
7.223
7.202
7.073
7.053
5.326
5.317
5.301
5.292
4.798
4.773
4.762
4.737
3.697
3.688
3.661
3.652
3.588
2.170
0.000
Current Data Parameters
NAME LYR-2-132-1-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231128
Time 10.18
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 144
DW 60.800 use
DE 6.50 use
TE 295.9 K
D1 1.00000000 sec
======== CHANNEL f1 =======
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300117 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0
ppm
1.01
2.01
3.01
6.01
2.00
1.01
2.00
1.02
1.00
1.00
3.02
3.00


21.36
29.07
41.88
59.29
76.68
77.00
77.32
113.41
123.52
126.97
127.29
127.44
128.34
128.69
128.71
129.40
130.04
130.22
132.12
132.97
136.33
137.39
140.41
140.53
144.17
153.85
157.30
ppm

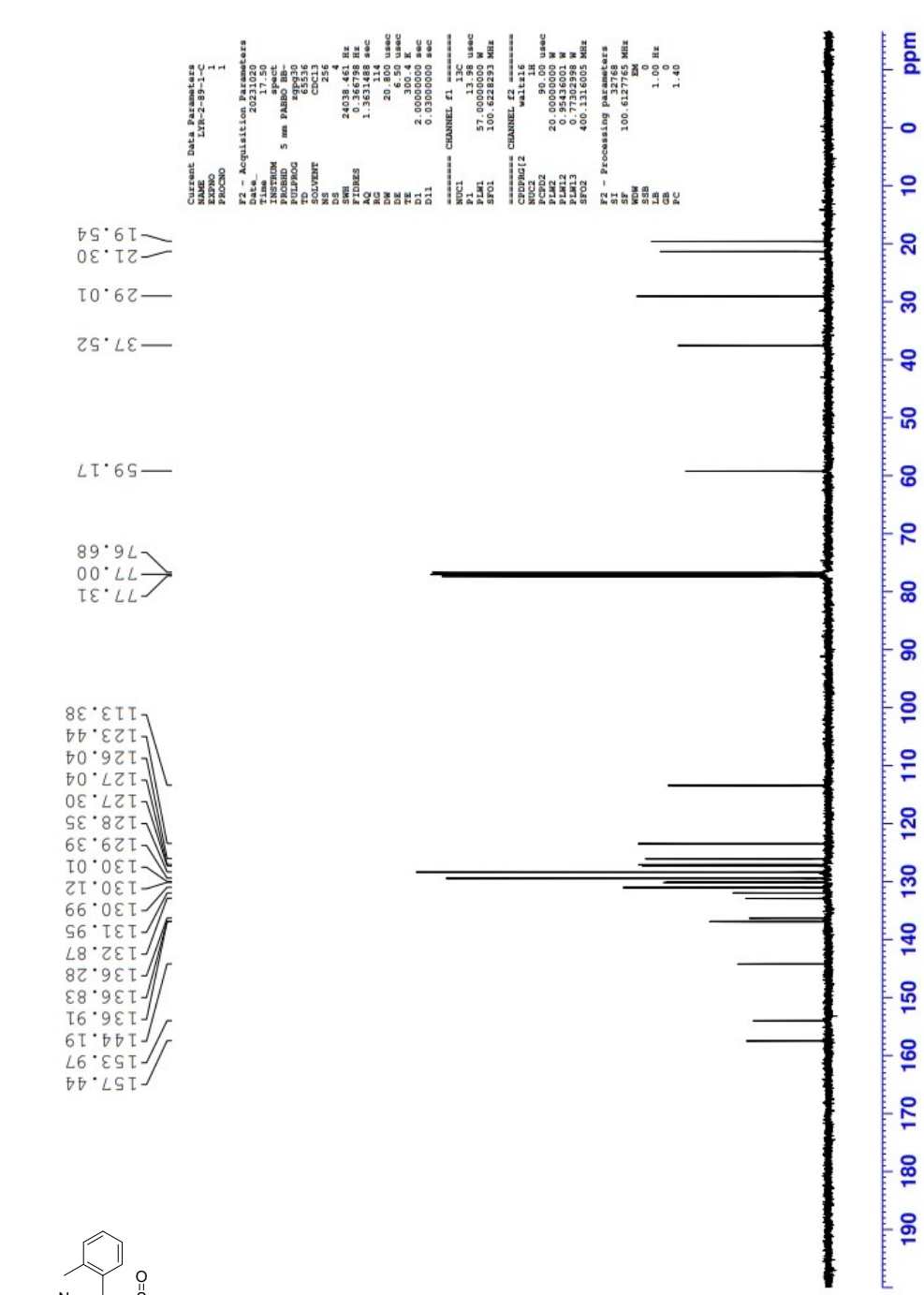


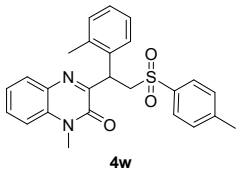
4v


Current Data Parameters
NAME LYR-2-89-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231218
Time 20.59
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 80.6
DW 60.800 use
DE 6.50 use
TE 296.3 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300126 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
2.167
2.523
3.339
3.343
3.375
3.379
3.562
4.723
4.749
4.758
4.785
5.460
5.464
5.486
5.490
6.946
6.963
6.982
7.037
7.051
7.070
7.090
7.129
7.148
7.202
7.223
7.254
7.319
7.337
7.356
7.491
7.510
7.529
7.702
7.722
7.770
7.789
3.02
3.01
1.01
3.00
1.02
1.00
1.00
4.00
1.01
1.00
1.00
1.00
2.01
1.00
ppm

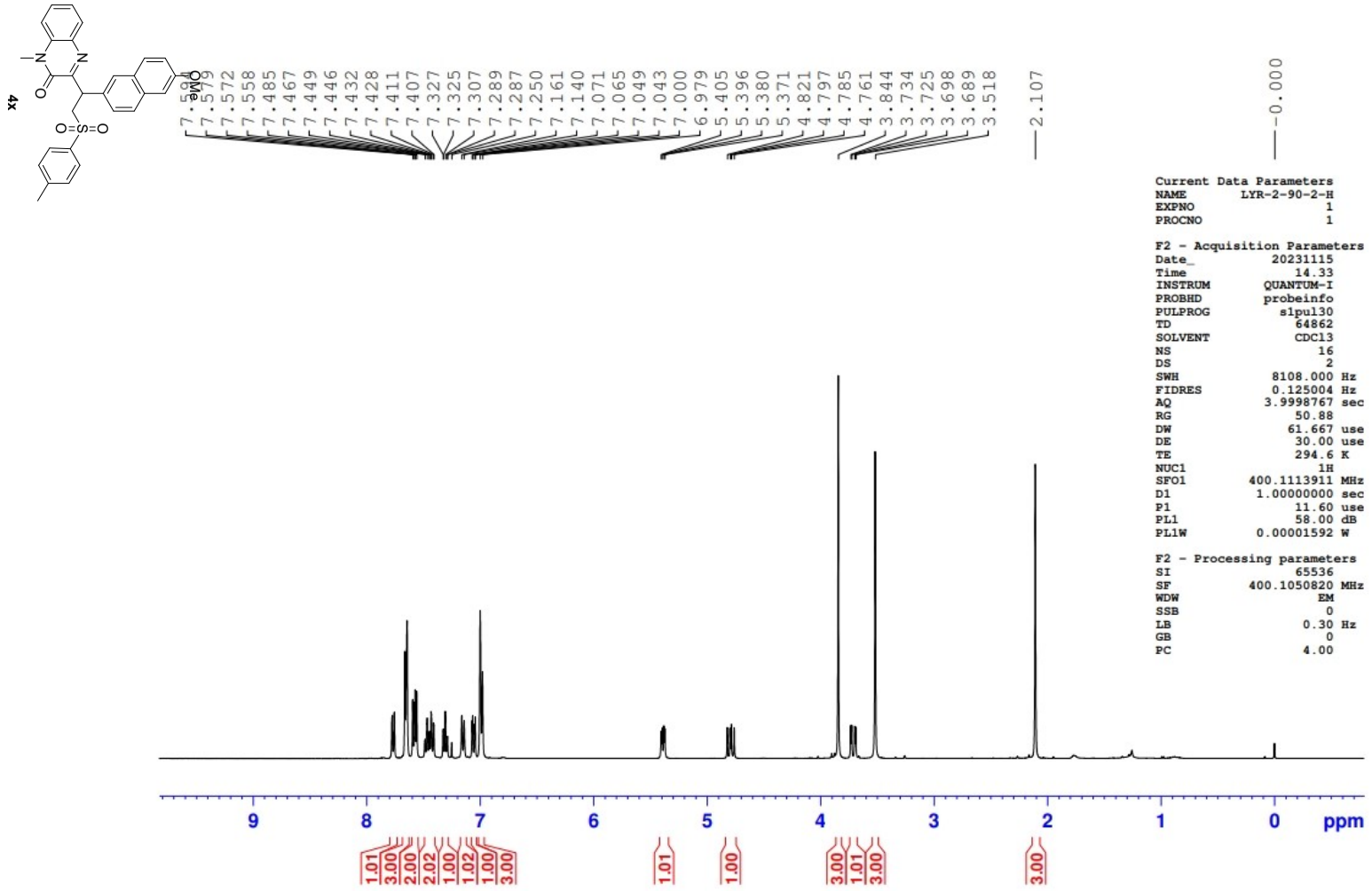


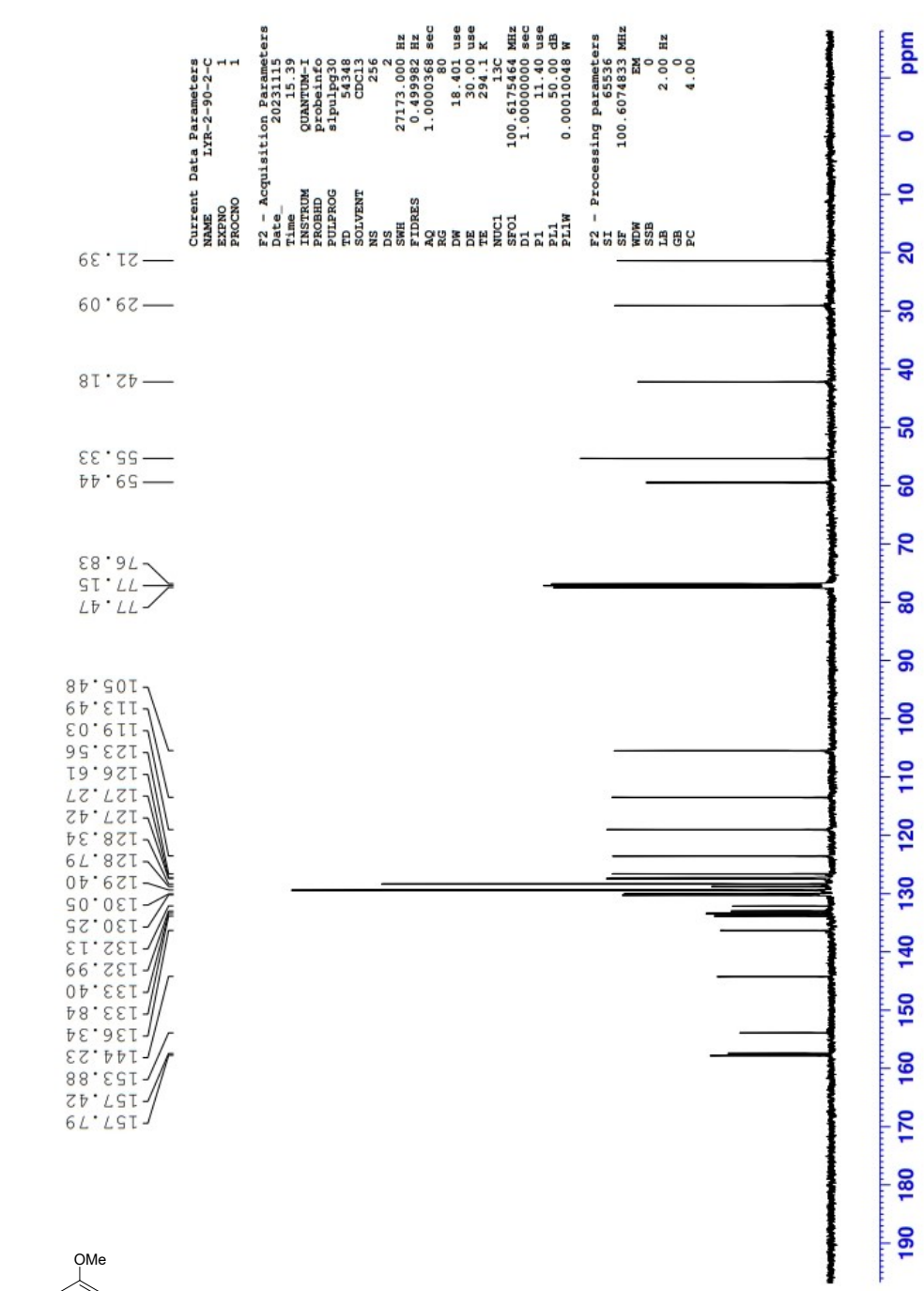
4w

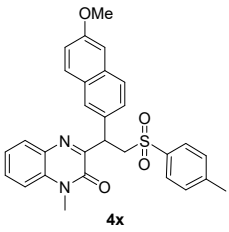

19.54
21.30
29.01
37.52
59.17
76.68
77.00
77.31
113.38
123.44
126.04
127.04
127.30
128.35
129.39
130.01
130.12
130.99
131.95
132.87
136.28
136.83
136.91
144.19
153.97
157.44
ppm



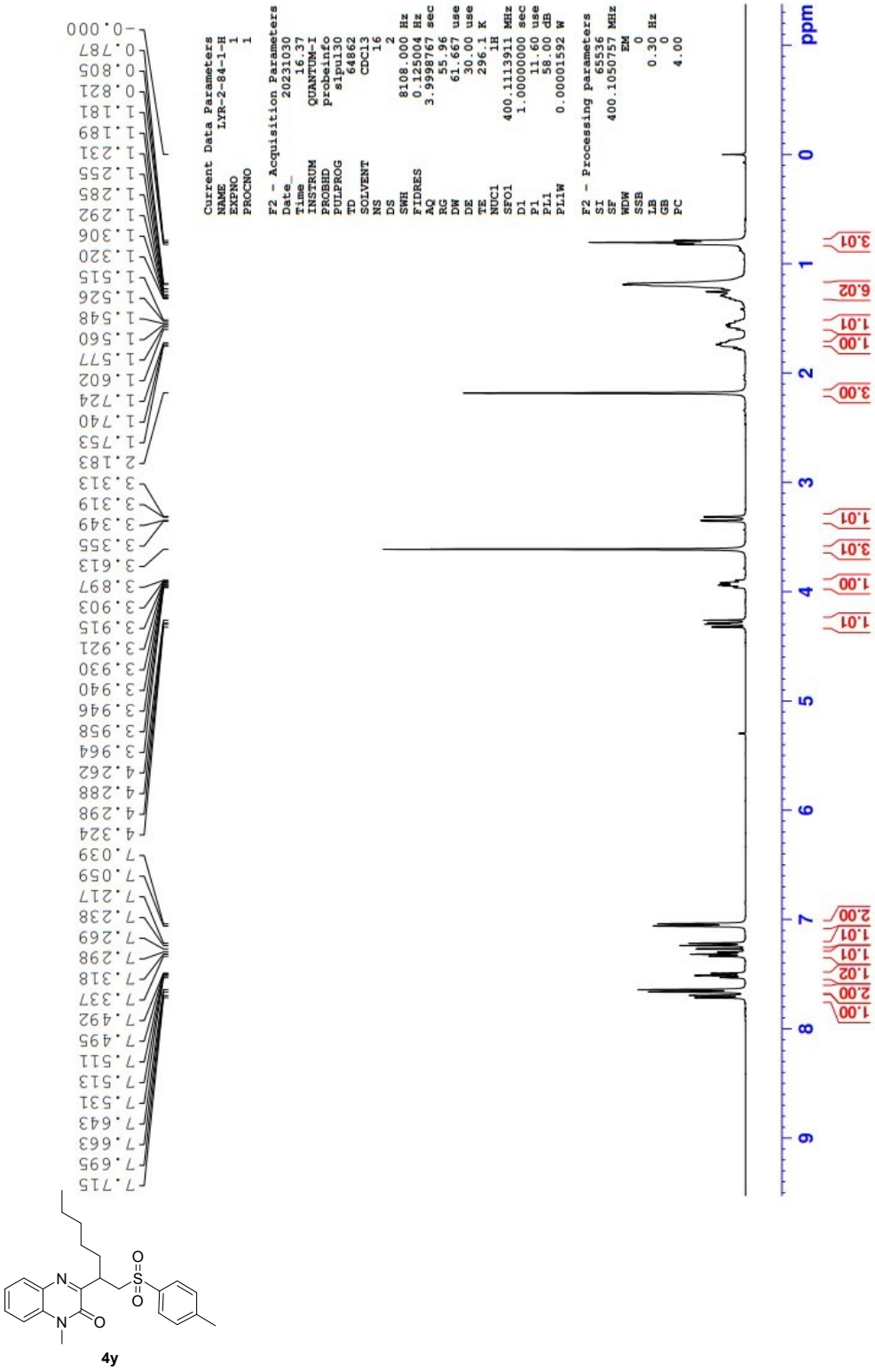
4w


4x
7.594
7.579
7.572
7.558
7.485
7.467
7.449
7.446
7.432
7.428
7.411
7.407
7.327
7.325
7.307
7.289
7.287
7.250
7.161
7.140
7.071
7.065
7.049
7.043
7.000
6.979
5.405
5.396
5.380
5.371
4.821
4.797
4.785
4.761
3.844
3.734
3.725
3.698
3.689
3.518
2.107
0.000
Current Data Parameters
NAME LYR-2-90-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231115
Time 14.33
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pul30
TD 64862
SOLVENT CDCl3
NS 16
DS 2
SWH 8108.000 Hz
FIDRES 0.125004 Hz
AQ 3.9998767 sec
RG 50.88
DW 61.667 use
DE 30.00 use
TE 294.6 K
NUC1 1H
SFO1 400.1113911 MHz
D1 1.00000000 sec
P1 11.60 use
PL1 58.00 dB
PL1W 0.00001592 W
F2 - Processing parameters
SI 65536
SF 400.1050820 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 4.00
9
8
7
6
5
4
3
2
1
0
ppm
1.01
3.00
2.00
2.02
1.00
1.02
1.00
3.00
1.01
1.00
3.00
1.01
3.00
3.00

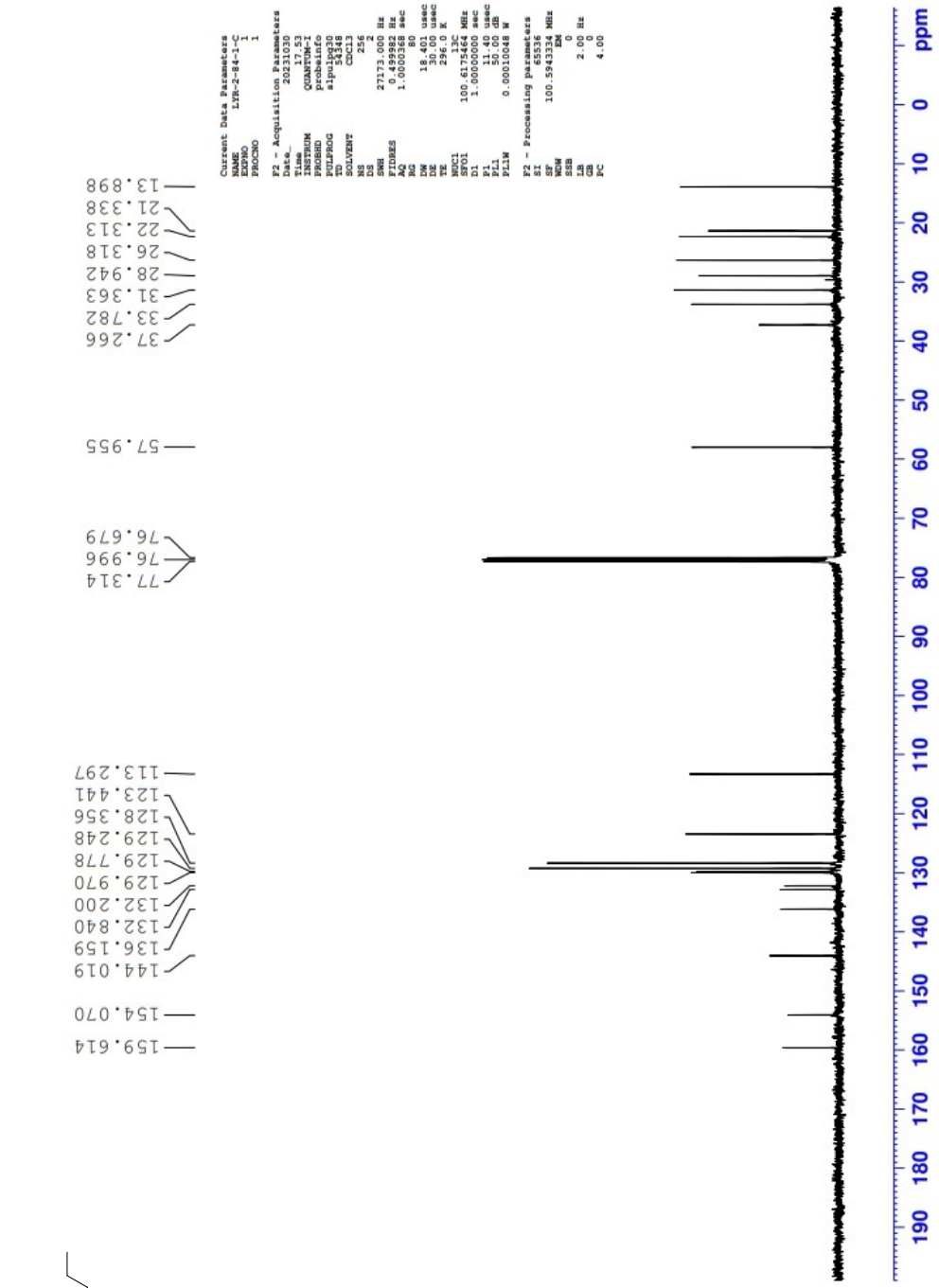

21.39
29.09
42.18
55.33
59.44
77.47
77.15
76.83
105.48
113.49
119.03
123.56
126.61
127.27
127.42
128.34
128.79
129.40
130.05
130.25
132.13
132.99
133.40
133.84
136.34
144.23
153.88
157.42
157.79
Current Data Parameters
NAME LYR-2-90-2-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231115
Time 15.39
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pulpg30
TD 54348
SOLVENT CDCl3
NS 256
DS 2
SWH 27173.000 Hz
FIDRES 0.499982 Hz
AQ 1.0000368 sec
RG 80
DW 18.401 use
DE 30.00 use
TE 294.1 K
NUC1 13C
SFO1 100.6175464 MHz
D1 1.00000000 sec
P1 11.40 use
PL1 50.00 dB
PL1W 0.00010048 W
F2 - Processing parameters
SI 65536
SF 100.6074833 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 4.00
ppm
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

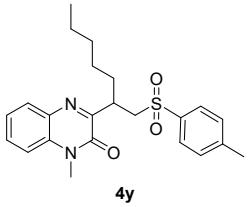

OMe
N
O
S
O
O
N

4x

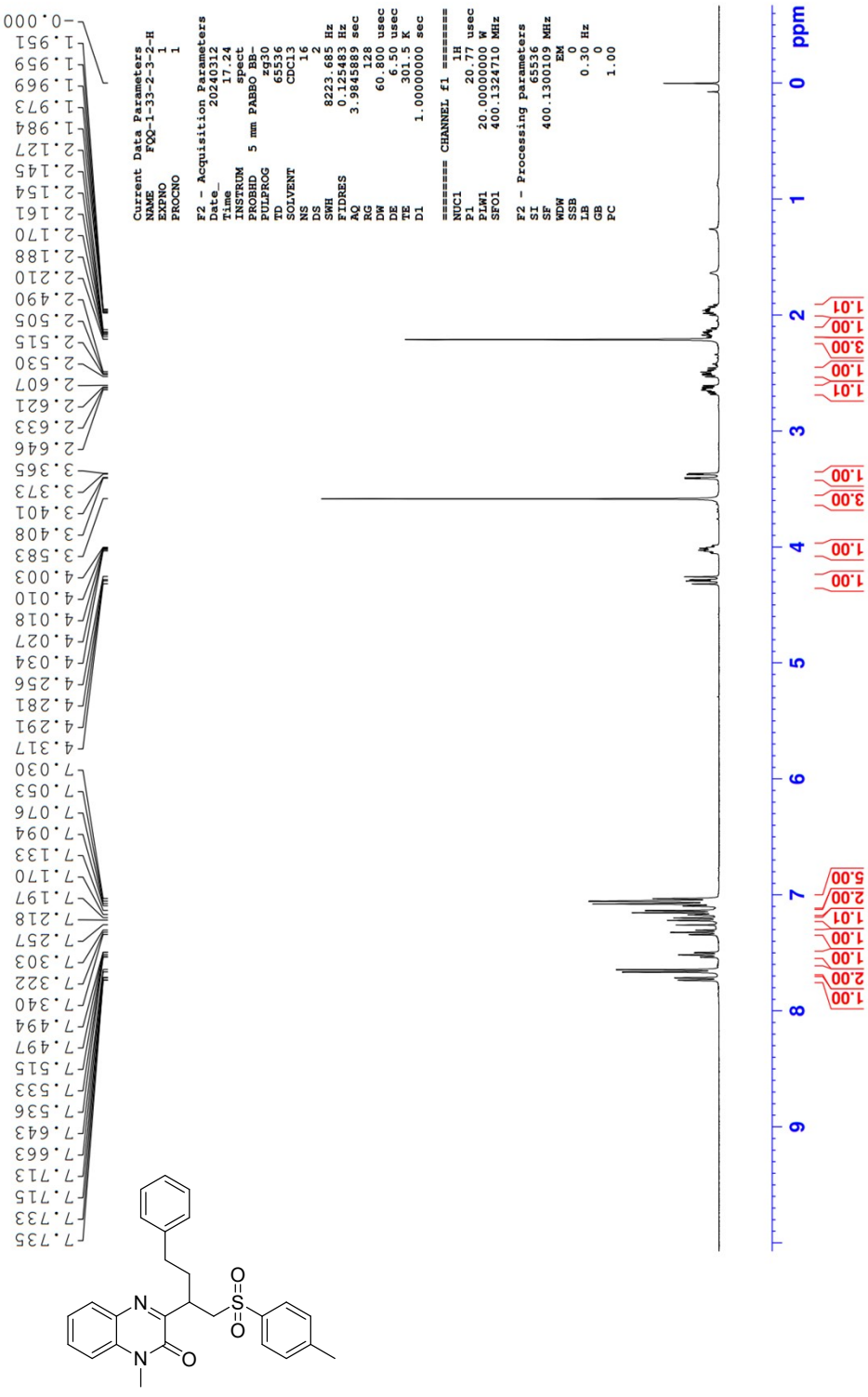

Current Data Parameters
NAME LYR-2-84-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231030
Time 16.37
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG slpu130
TD 64862
SOLVENT CDCl3
NS 16
DS 2
SWH 8108.000 Hz
FIDRES 0.125004 Hz
AQ 3.9998767 sec
RG 55.96
DW 61.667 use
DE 30.00 use
TE 296.1 K
NUC1 1H
SFO1 400.1113911 MHz
D1 1.00000000 sec
P1 11.60 use
PL1 58.00 dB
PL1W 0.00001592 W
F2 - Processing parameters
SI 65536
SF 400.1050757 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 4.00
ppm
3.01
6.02
1.01
1.00
3.00
1.01
3.01
1.00
1.01
2.00
1.01
1.01
1.02
2.00
1.00

4y

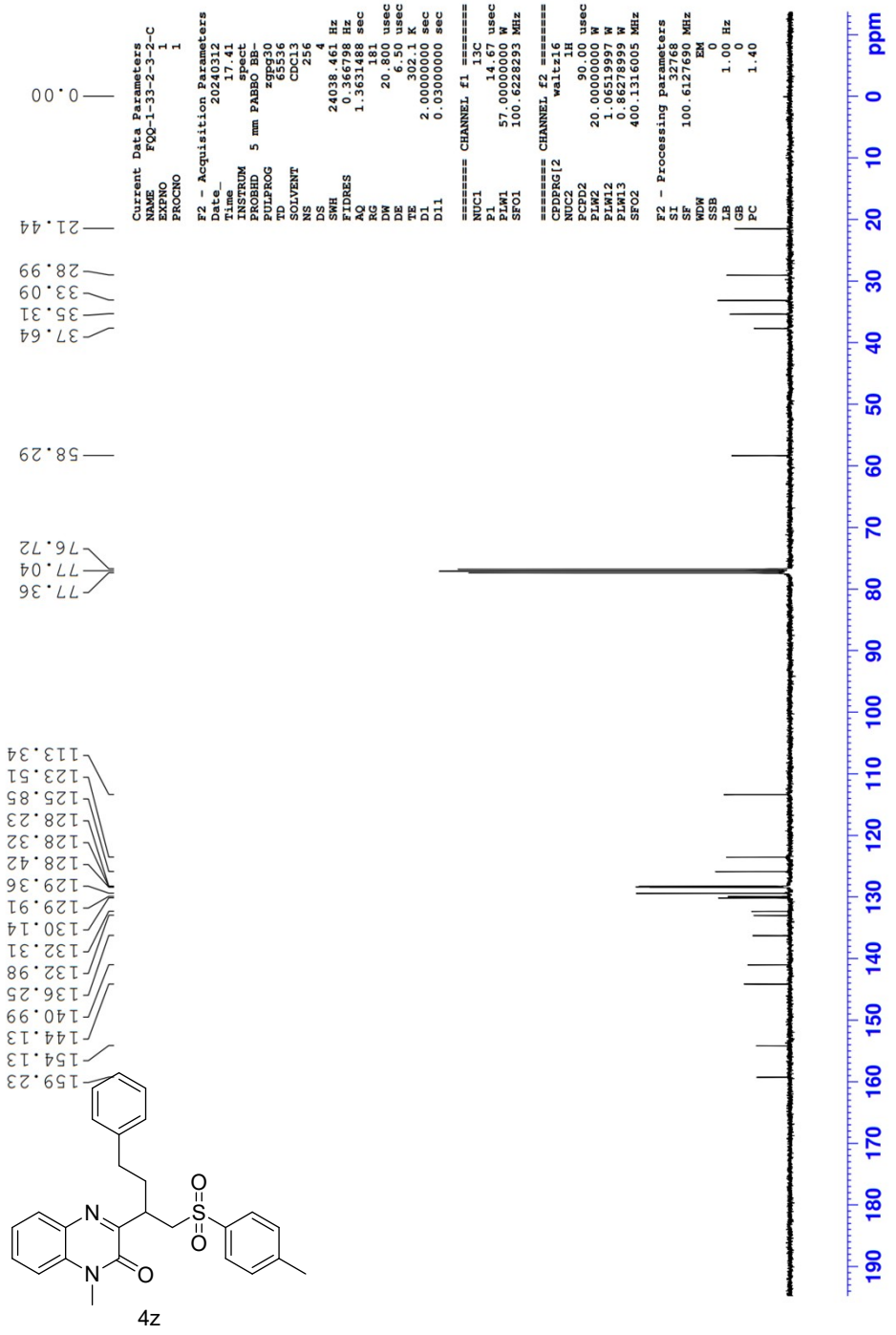

13.898
21.338
22.313
26.318
28.942
31.363
33.782
37.266
57.955
76.679
76.996
77.314
113.297
123.441
128.356
129.248
129.778
129.970
132.200
132.840
136.159
144.019
154.070
159.614
ppm

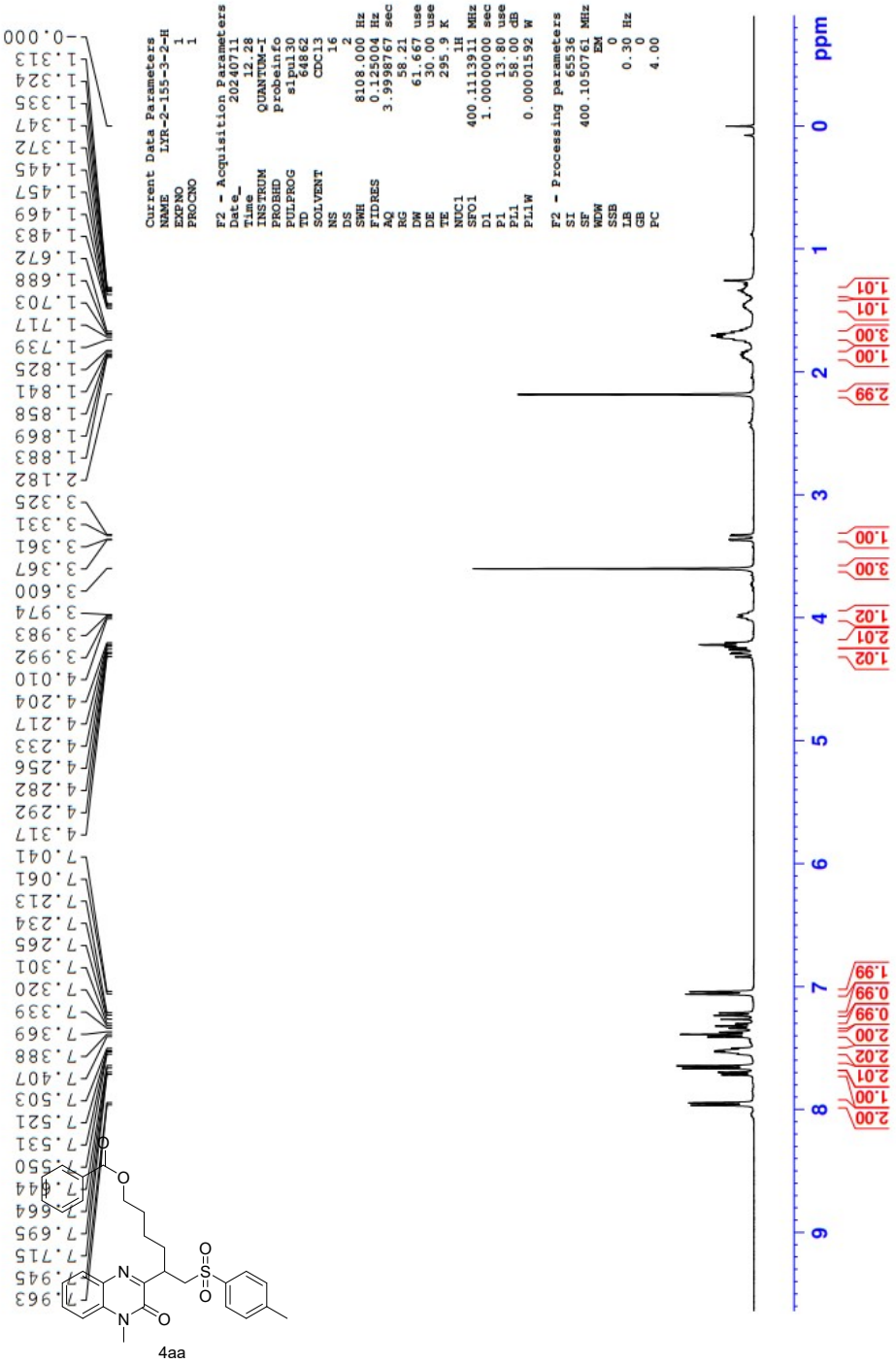


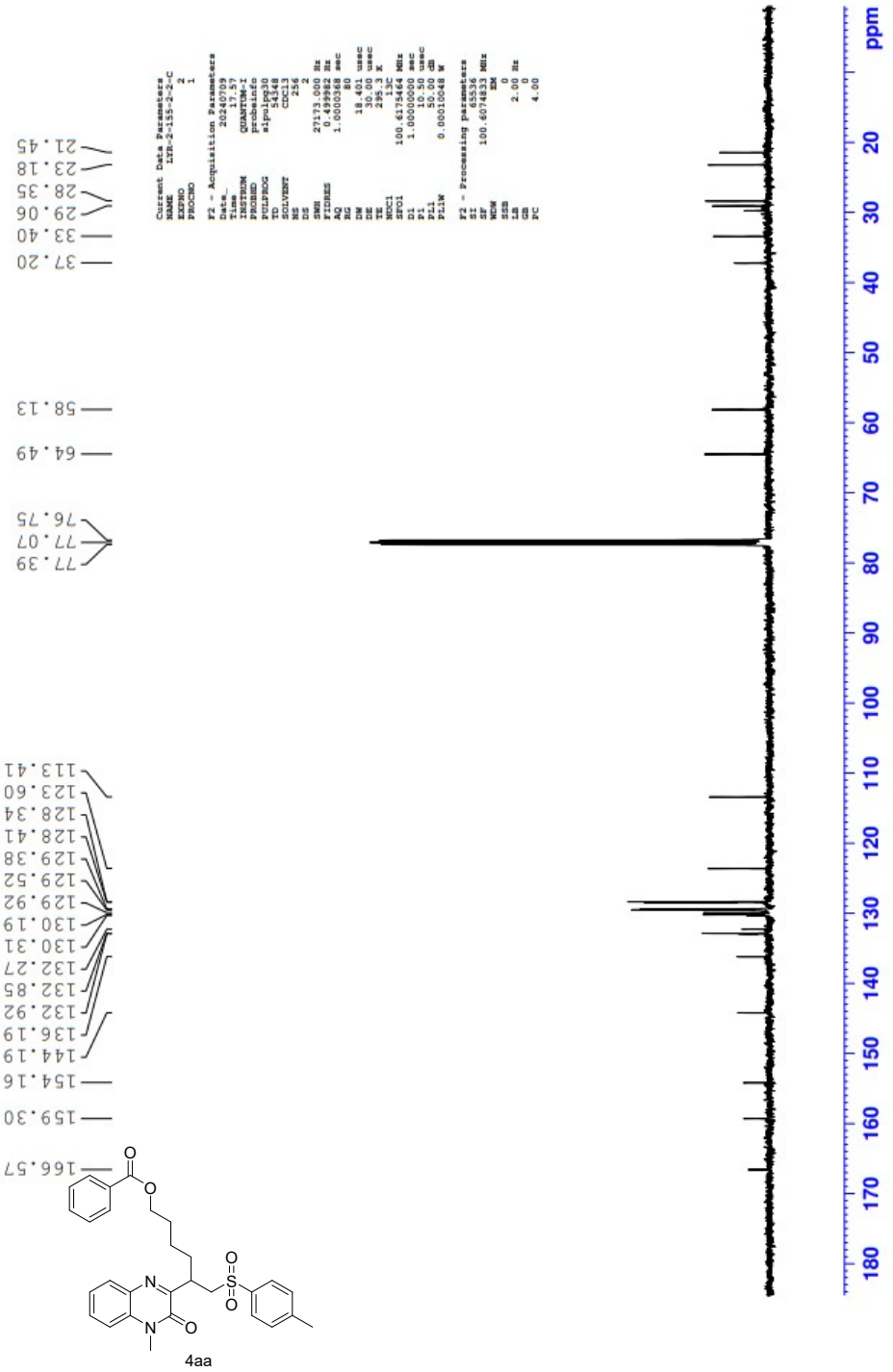
4y


Current Data Parameters
NAME FQQ-1-33-2-3-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240312
Time 17.24
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 usec
DE 6.50 usec
TE 301.5 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 20.75 usec
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300109 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
1.01
1.00
3.00
1.00
1.01
3.00
1.00
1.00
1.00
5.00
2.00
1.01
1.00
1.00
2.00
1.00

4z

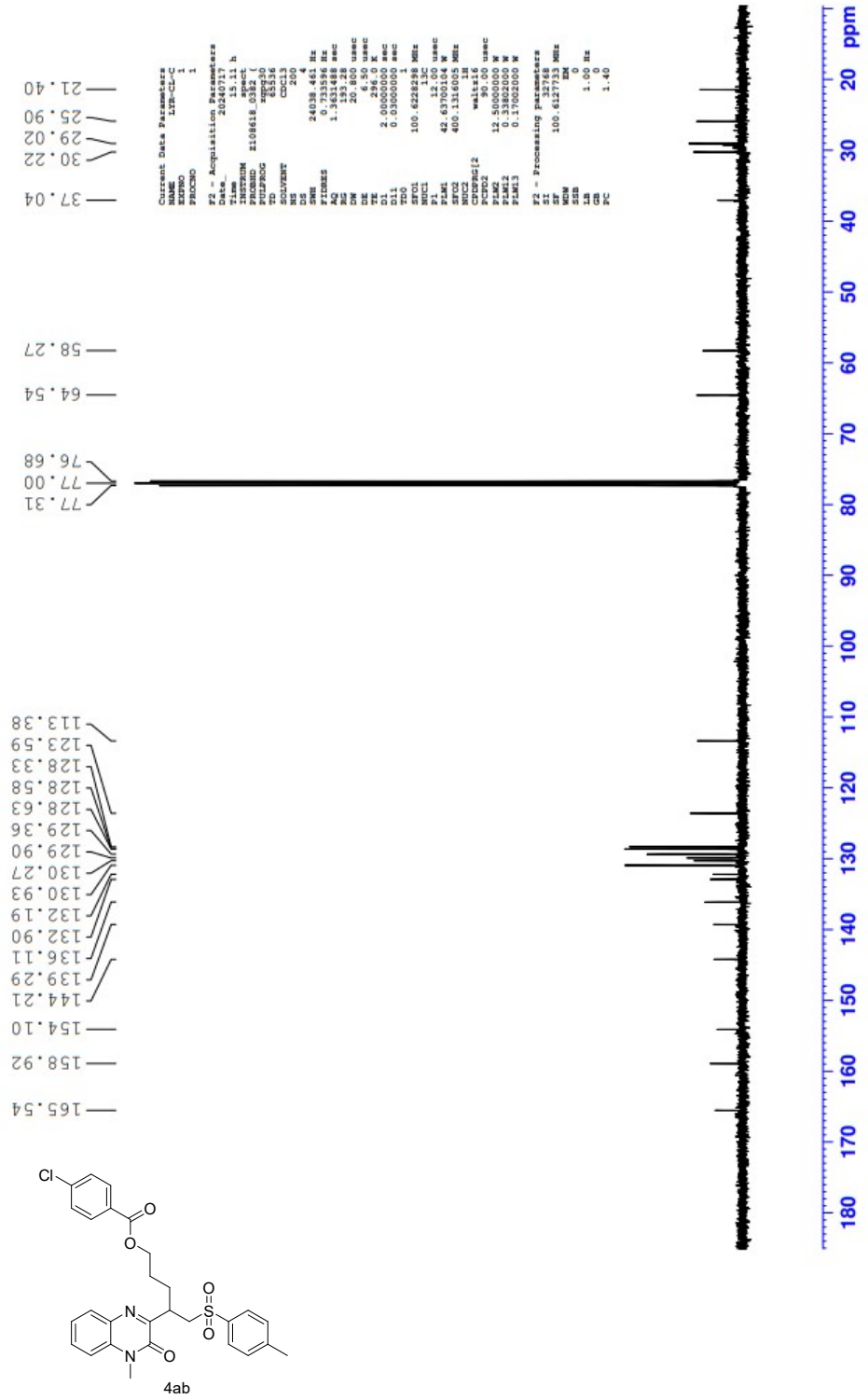

Current Data Parameters
NAME FQQ-1-33-2-3-2-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240312
Time 17.41
INSTRUM spect
PROBHD 5 mm PABBO BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 181
DW 20.800 usec
DE 6.50 usec
TE 302.1 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 14.67 usec
PLW1 57.00000000 W
SFO1 100.6228293 MHz
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 20.00000000 W
PLW12 1.06519997 W
PLW13 0.86278999 W
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
0.00
21.44
28.99
33.09
35.31
37.64
58.29
76.72
77.04
77.36
113.34
123.51
125.85
128.23
128.32
128.42
129.36
129.91
130.14
132.31
132.98
136.25
140.99
144.13
154.13
159.23
ppm
4z


Current Data Parameters
NAME LYR-2-155-3-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240711
Time 12.28
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pul30
TD 64862
SOLVENT CDC13
NS 16
DS 2
SWH 8108.000 Hz
FIDRES 0.125004 Hz
AQ 3.9998767 sec
RG 58.21
DW 61.667 use
DE 30.00 use
TE 295.9 K
NUC1 1H
SFO1 400.1113911 MHz
D1 1.00000000 sec
P1 13.80 use
PL1 58.00 dB
PL1W 0.00001592 W
F2 - Processing parameters
SI 65536
SF 400.1050761 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 4.00
ppm
4aa


21.45
23.18
28.35
29.06
33.40
37.20
58.13
64.49
76.75
77.07
77.39
113.41
123.60
128.34
128.41
129.38
129.52
129.92
130.19
130.31
132.27
132.85
132.92
136.19
144.19
154.16
159.30
166.57
ppm

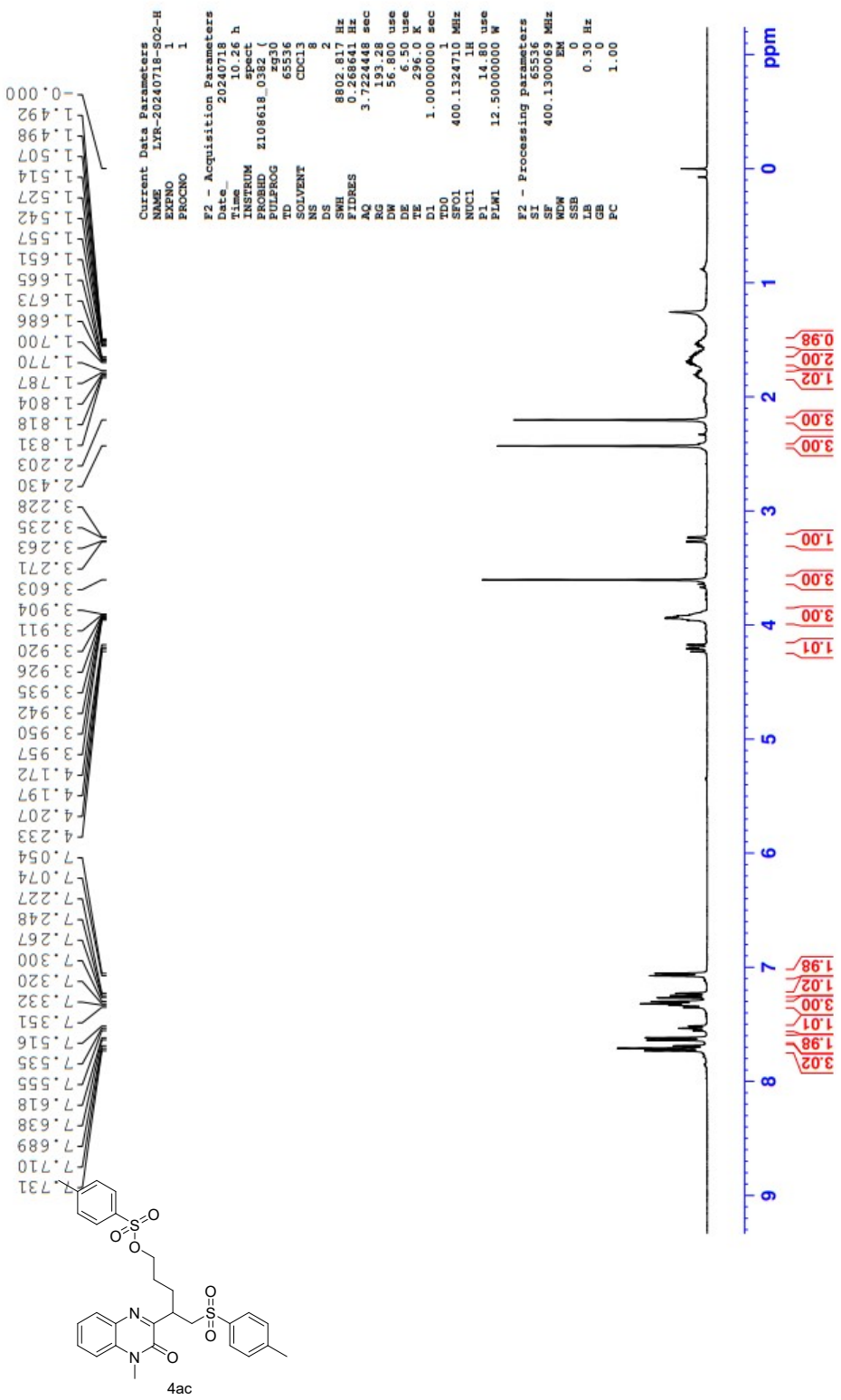
4aa

Current Data Parameters
NAME LYR-Cl-H
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240717
Time 14.24 h
INSTRUM spect
PROBHD Z108618_0382 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8802.817 Hz
FIDRES 0.268641 Hz
AQ 3.7224448 sec
RG 193.28
DW 56.800 use
DE 6.50 use
TE 296.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324710 MHz
NUC1 1H
P1 14.80 use
PLW1 12.50000000 W
F2 - Processing parameters
SI 65536
SF 400.1300077 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Cl
O
O
N
O
S
O
O
N
4ab

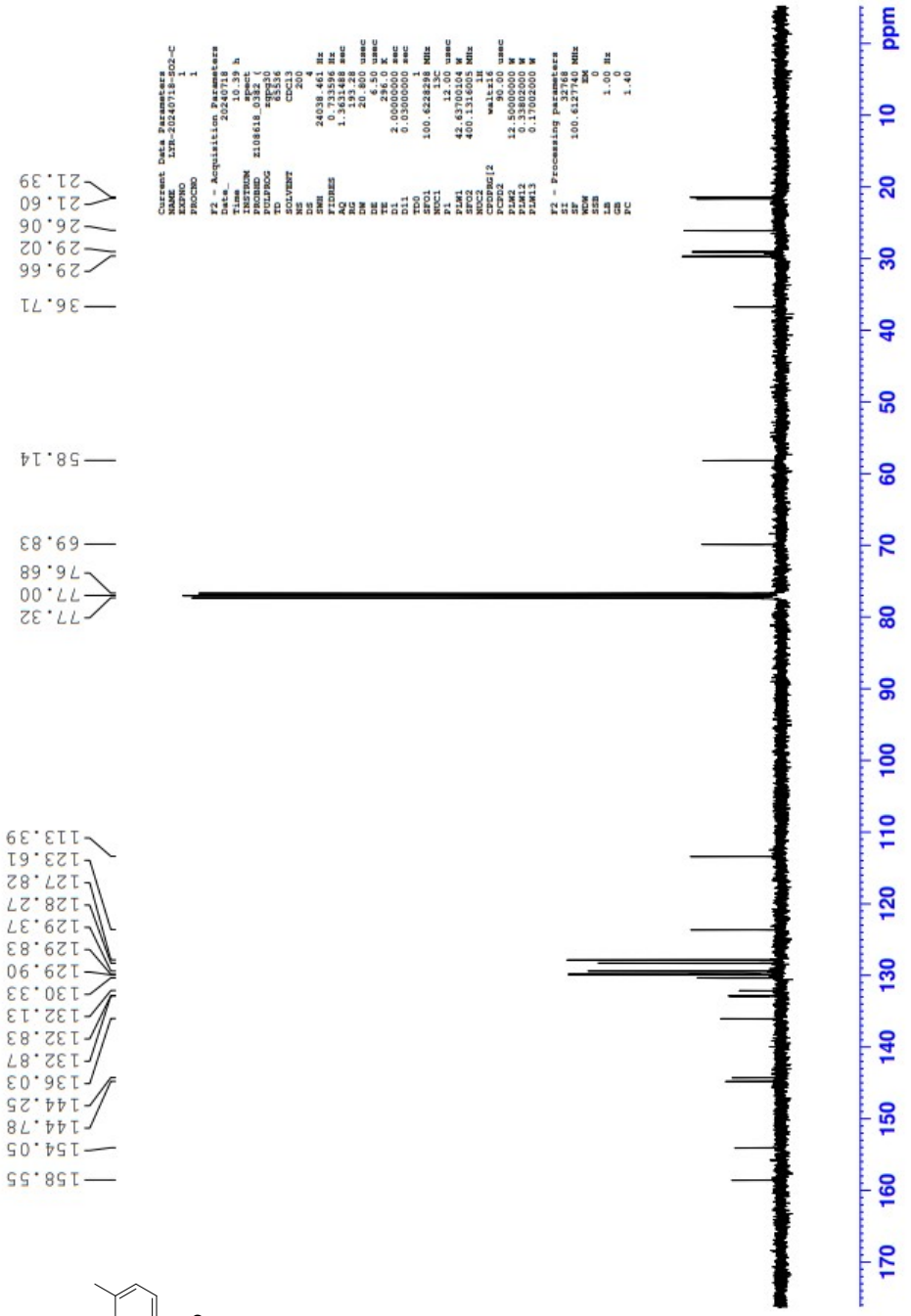

21.40
25.90
29.02
30.22
37.04
58.27
64.54
76.68
77.00
77.31
113.38
123.59
128.33
128.58
128.63
129.36
129.90
130.27
130.93
132.19
132.90
136.11
139.29
144.21
154.10
158.92
165.54
ppm

Cl
O
O
N
O
S
O
O
N

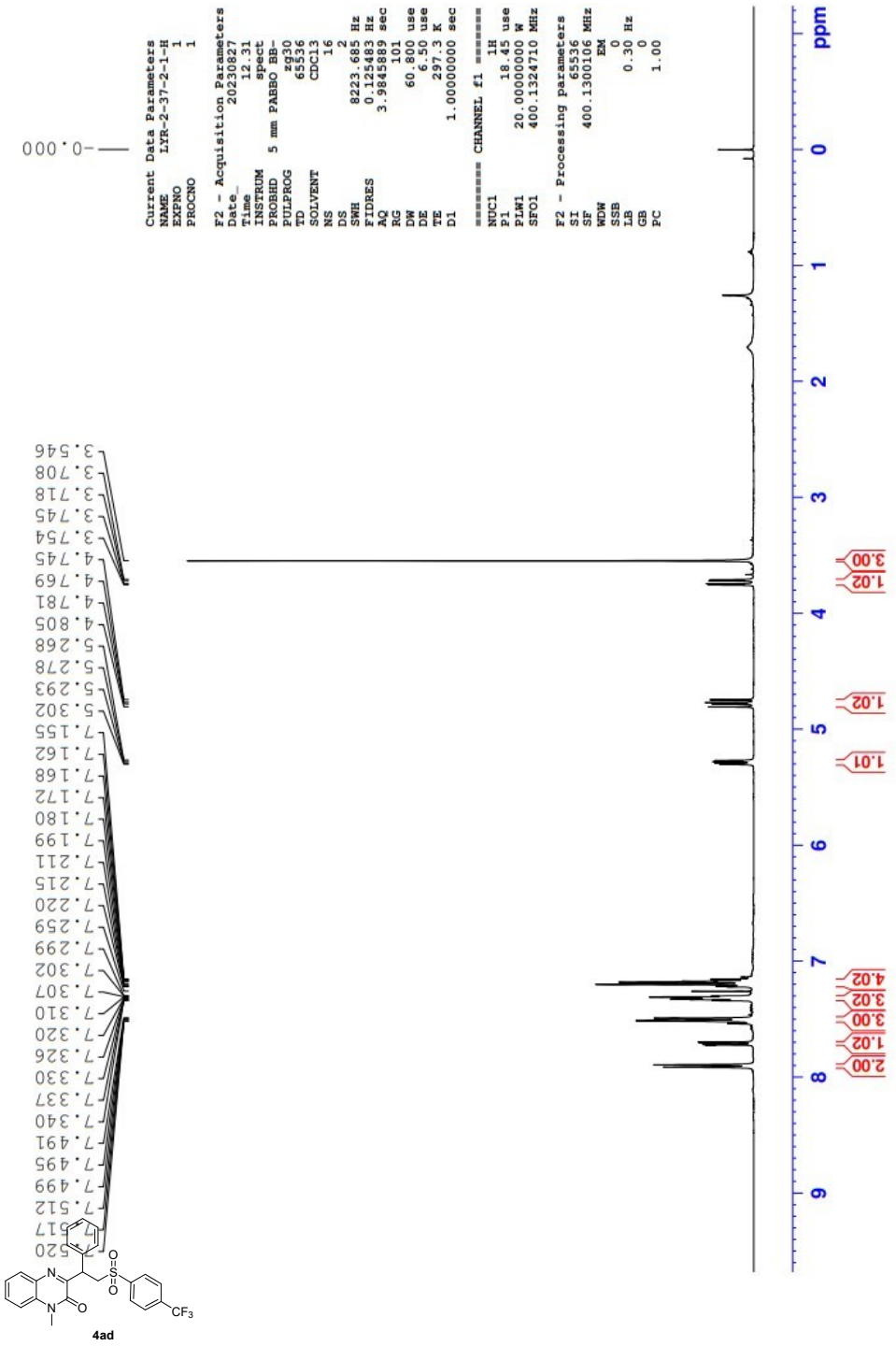
4ab

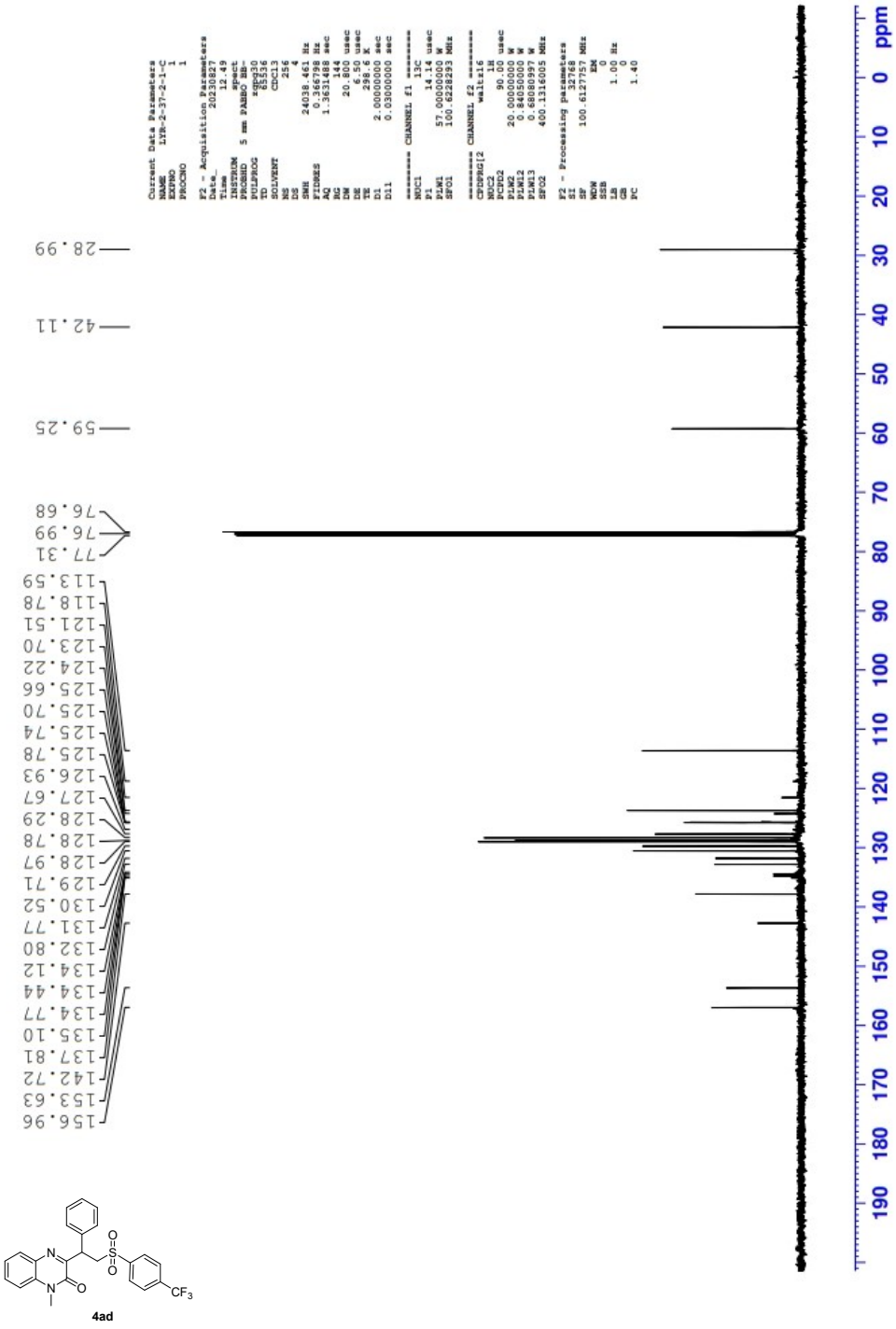

Current Data Parameters
NAME LYR-20240718-SO2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240718
Time 10.26 h
INSTRUM spect
PROBHD Z108618_0382 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8802.817 Hz
FIDRES 0.268641 Hz
AQ 3.7224448 sec
RG 193.28
DW 56.800 use
DE 6.50 use
TE 296.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324710 MHz
NUC1 1H
P1 14.80 use
PLW1 12.50000000 W
F2 - Processing parameters
SI 65536
SF 400.1300069 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
0.98
2.00
1.02
3.00
3.00
1.00
3.00
3.00
1.01
1.98
1.02
3.00
1.01
1.98
3.02

4ac


21.39
21.60
26.06
29.02
29.66
36.71
58.14
69.83
76.68
77.00
77.32
113.39
123.61
127.82
128.27
129.37
129.83
129.90
130.33
132.13
132.83
132.87
136.03
144.25
144.78
154.05
158.55
ppm

4ac


Current Data Parameters
NAME LYR-2-37-2-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230827
Time 12.31
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 101
DW 60.800 use
DE 6.50 use
TE 297.3 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300106 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
3.546
3.708
3.718
3.745
3.754
4.745
4.769
4.781
4.805
5.268
5.278
5.293
5.302
7.155
7.162
7.168
7.172
7.180
7.199
7.211
7.215
7.220
7.259
7.299
7.302
7.307
7.310
7.320
7.326
7.330
7.337
7.340
7.491
7.495
7.499
7.512
7.517
7.520
4ad
ppm
3.00
1.02
1.02
1.01
4.02
3.02
3.00
1.02
2.00


28.99
42.11
59.25
76.68
76.99
77.31
113.59
118.78
121.51
123.70
124.22
125.66
125.70
125.74
125.78
126.93
127.67
128.29
128.78
128.97
129.71
130.52
131.77
132.80
134.12
134.44
134.77
135.10
137.81
142.72
153.63
156.96
ppm
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

O
S
O
N
N
O
CF3

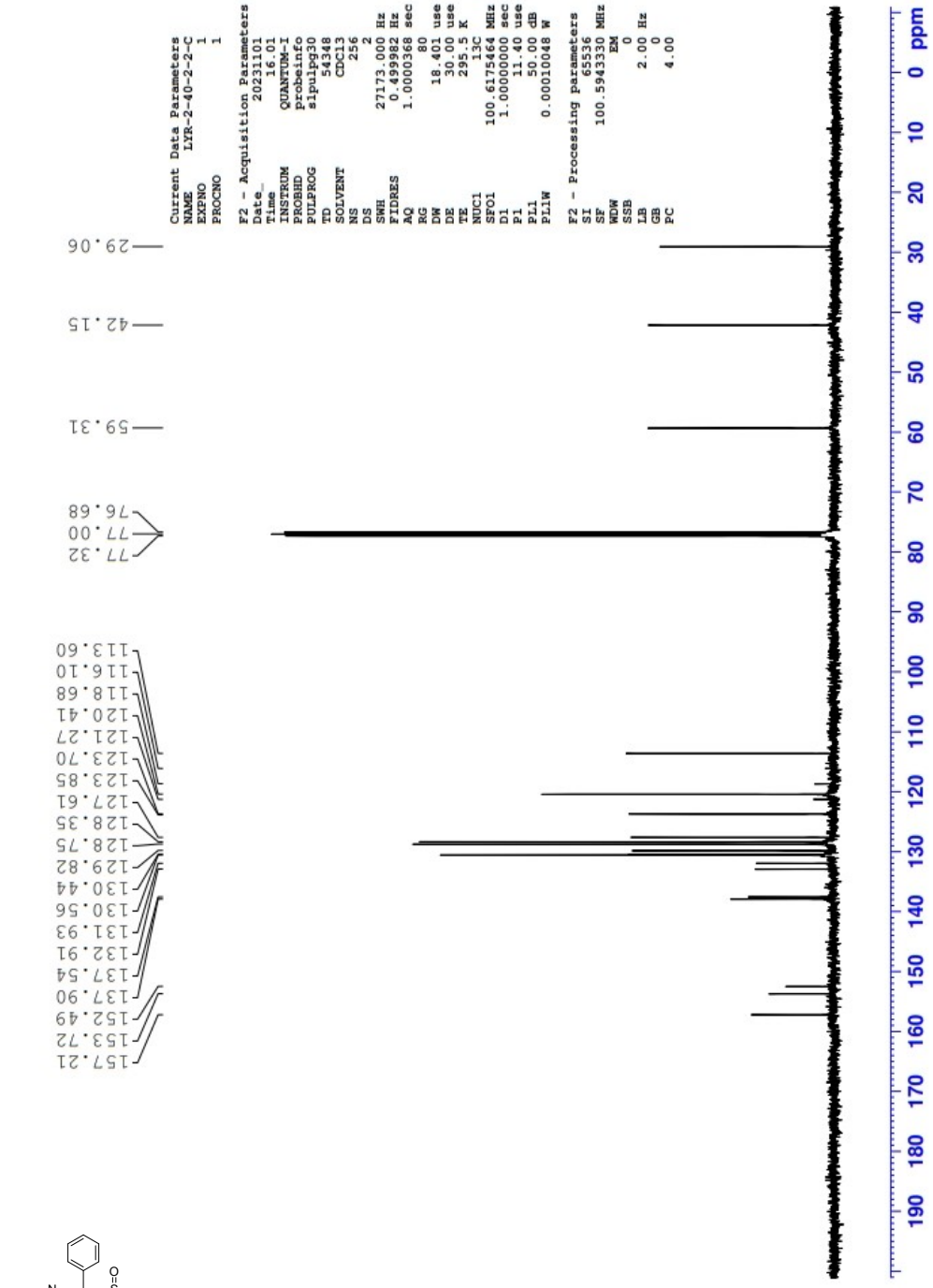
4ad

Current Data Parameters
NAME LYR-2-37-2-1-F
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230827
Time 12.33
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfhigqn
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340032 sec
RG 203
DW 5.600 use
DE 6.50 use
TE 297.6 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 =======
NUC1 19F
P1 25.25 use
PLW1 18.19700050 W
SFO1 376.4607164 MHz
======== CHANNEL f2 =======
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 use
PLW2 20.00000000 W
PLW12 0.84050000 W
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-63.26
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
ppm

N
O
O
S
O
N
O
CF3

4ad

Current Data Parameters
NAME LYR-2-40-2-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231101
Time 4.52
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pu130
TD 64862
SOLVENT CDCl3
NS 16
DS 2
SWH 8108.000 Hz
FIDRES 0.125004 Hz
AQ 3.9998767 sec
RG 57.69
DW 61.667 use
DE 30.00 use
TE 295.8 K
NUC1 1H
SFO1 400.1113911 MHz
D1 1.00000000 sec
P1 11.60 use
PL1 -1.00 dB
PL1W 0.00001592 W
F2 - Processing parameters
SI 65536
SF 400.1050787 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 4.00
ppm
3.00
1.01
1.01
1.00
2.00
1.00
1.01
3.01
4.00
2.01
4ae


Current Data Parameters
NAME LYR-2-40-2-2-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231101
Time 16.01
INSTRUM QUANTUM-I
PROBHD Probeinfo
PULPROG zgpg30
TD 54348
SOLVENT CDCl3
NS 256
DS 2
SWH 27173.000 Hz
FIDRES 0.499982 Hz
AQ 1.0000368 sec
RG 80
DW 18.401 use
DE 30.00 use
TE 295.5 K
NUC1 13C
SFO1 100.6175464 MHz
D1 1.00000000 sec
P1 11.40 use
PL1 50.00 dB
PL1W 0.00010048 W
F2 - Processing parameters
SI 65536
SF 100.5943330 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 4.00
29.06
42.15
59.31
76.68
77.00
77.32
113.60
116.10
118.68
120.41
121.27
123.70
123.85
127.61
128.35
128.75
129.82
130.44
130.56
131.93
132.91
137.54
137.90
152.49
153.72
157.21
0 ppm
10
20
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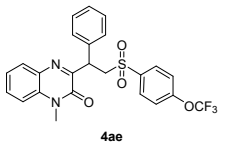
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

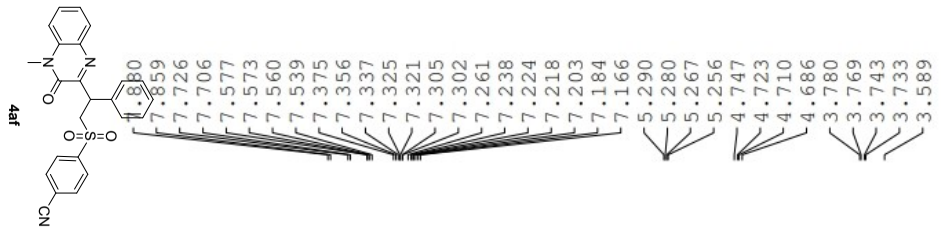

N
O
O
S
O
N
O
OCF3

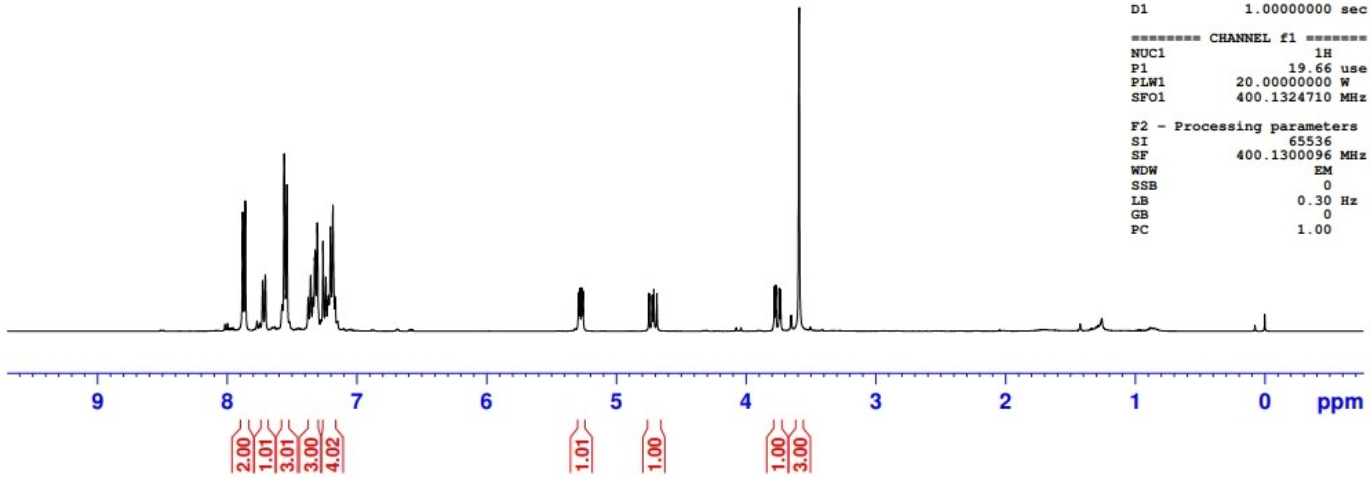
4ae

Current Data Parameters
NAME LYR-2-40-2-2-F
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231107
Time 10.20
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfhigqn
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340032 sec
RG 203
DW 5.600 use
DE 6.50 use
TE 299.2 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 19F
P1 23.17 use
PLW1 18.19700050 W
SFO1 376.4607164 MHz
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 use
PLW2 20.00000000 W
PLW12 0.95436001 W
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-57.78
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
ppm

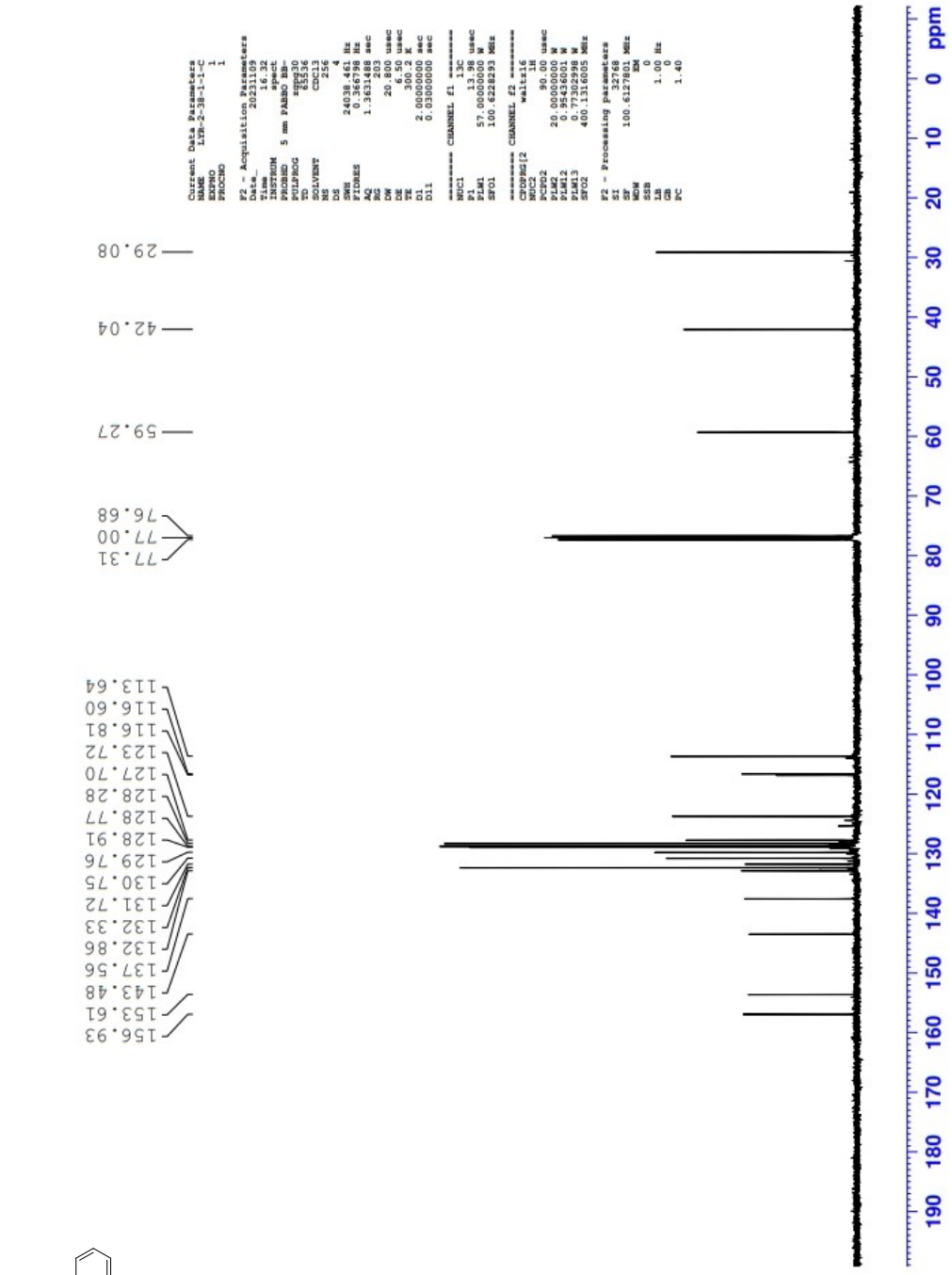
N
O
S
O
O
N
O
OCF3

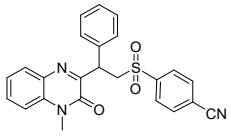
4ae



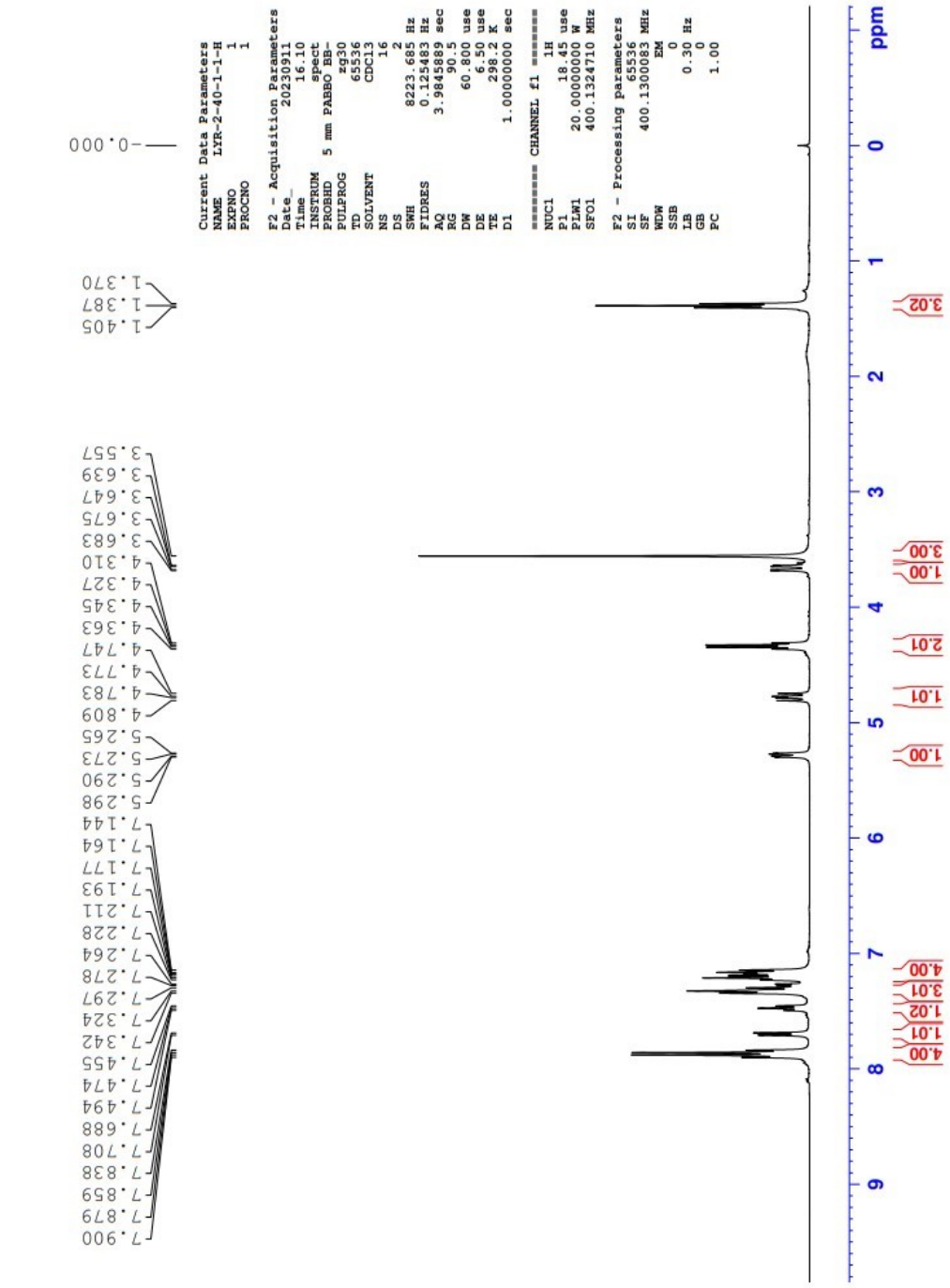


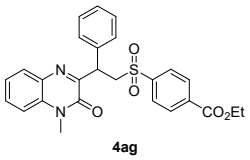

```
Current Data Parameters
NAME      LYR-2-38-1-1-H
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231218
Time               21.04
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                   101
DW                60.800 use
DE                 6.50 use
TE                296.2 K
D1             1.00000000 sec

======== CHANNEL f1 =======
NUC1                  1H
P1                19.66 use
PLW1         20.00000000 W
SFO1        400.1324710 MHz

F2 - Processing parameters
SI                 65536
SF          400.1300096 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```


29.08
42.04
59.27
76.68
77.00
77.31
113.64
116.60
116.81
123.72
127.70
128.28
128.77
128.91
129.76
130.75
131.72
132.33
132.86
137.56
143.48
153.61
156.93
ppm

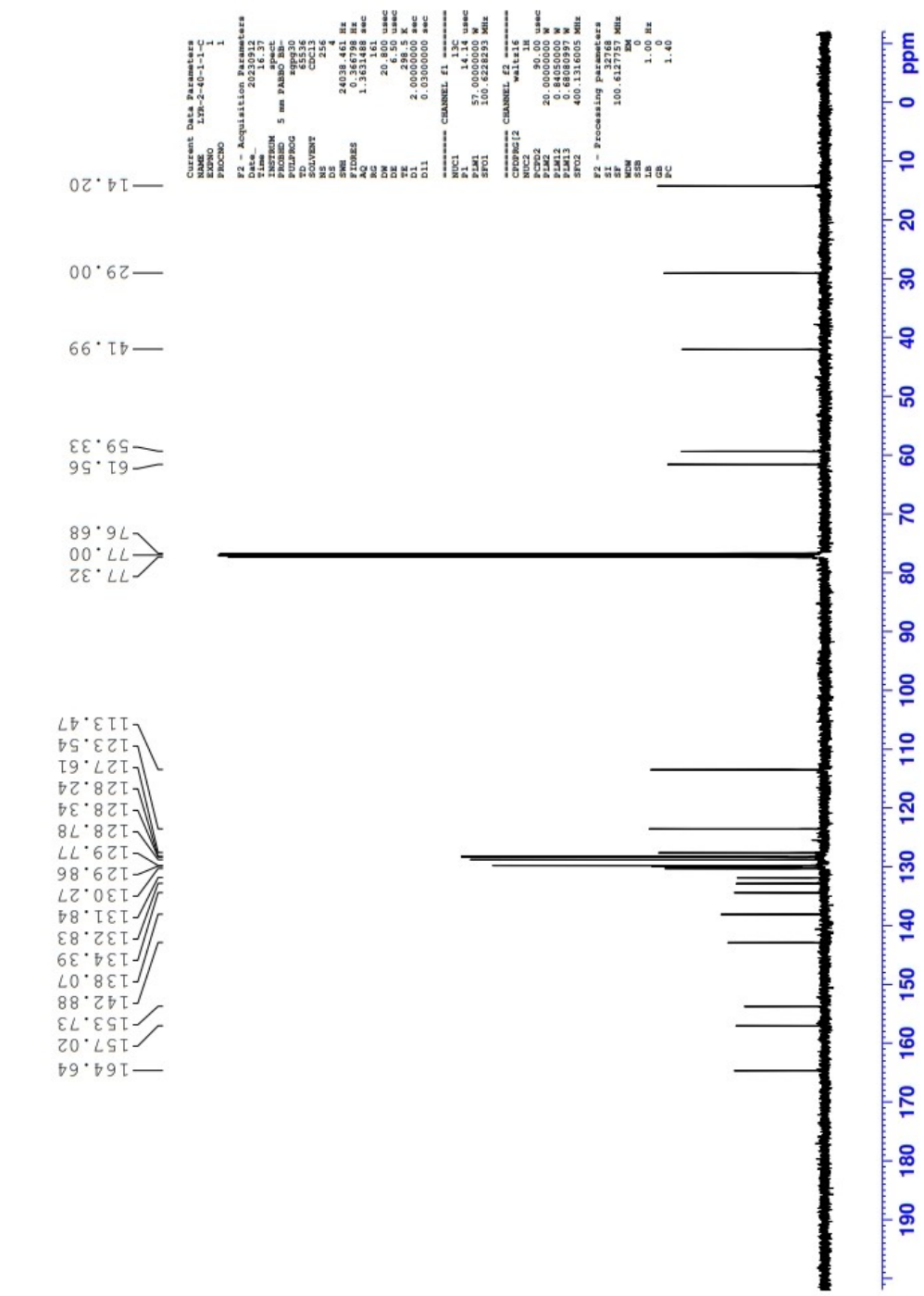

N
O
S
O
O
N
O
CN

4af


Current Data Parameters
NAME LYR-2-40-1-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230911
Time 16.10
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 90.5
DW 60.800 use
DE 6.50 use
TE 298.2 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300083 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.02
3.00
1.00
2.01
1.01
1.00
4.00
3.01
1.02
1.01
4.00


O
S
O
N
O
N
CO2Et

4ag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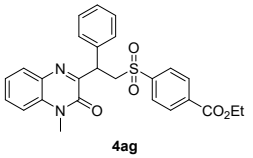
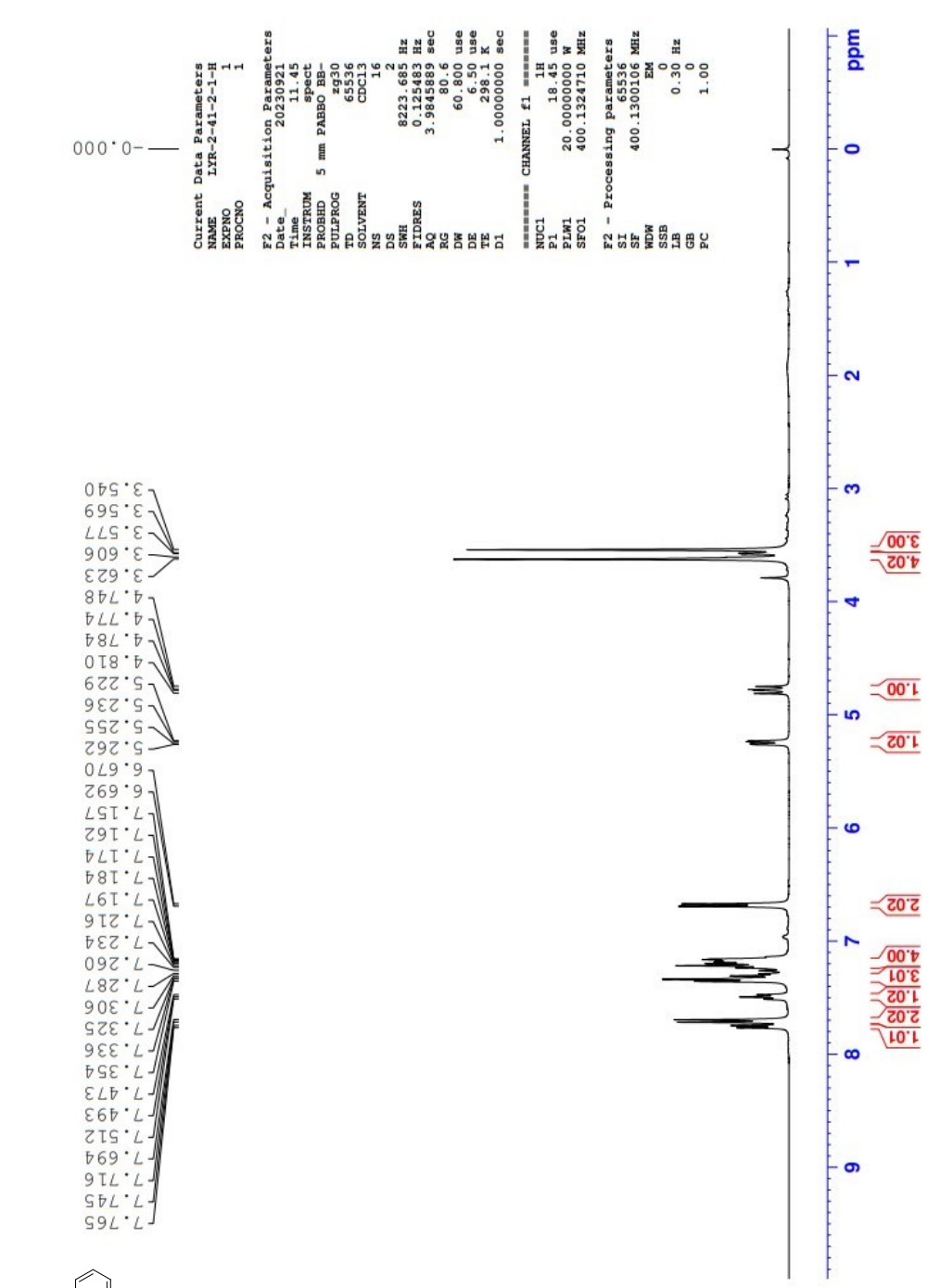
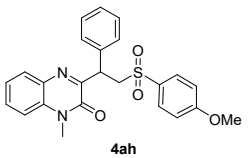
29.00
41.99
59.33
61.56
76.68
77.00
77.32
113.47
123.54
127.61
128.24
128.34
128.78
129.77
129.86
130.27
131.84
132.83
134.39
138.07
142.88
153.73
157.02
164.64
0 ppm

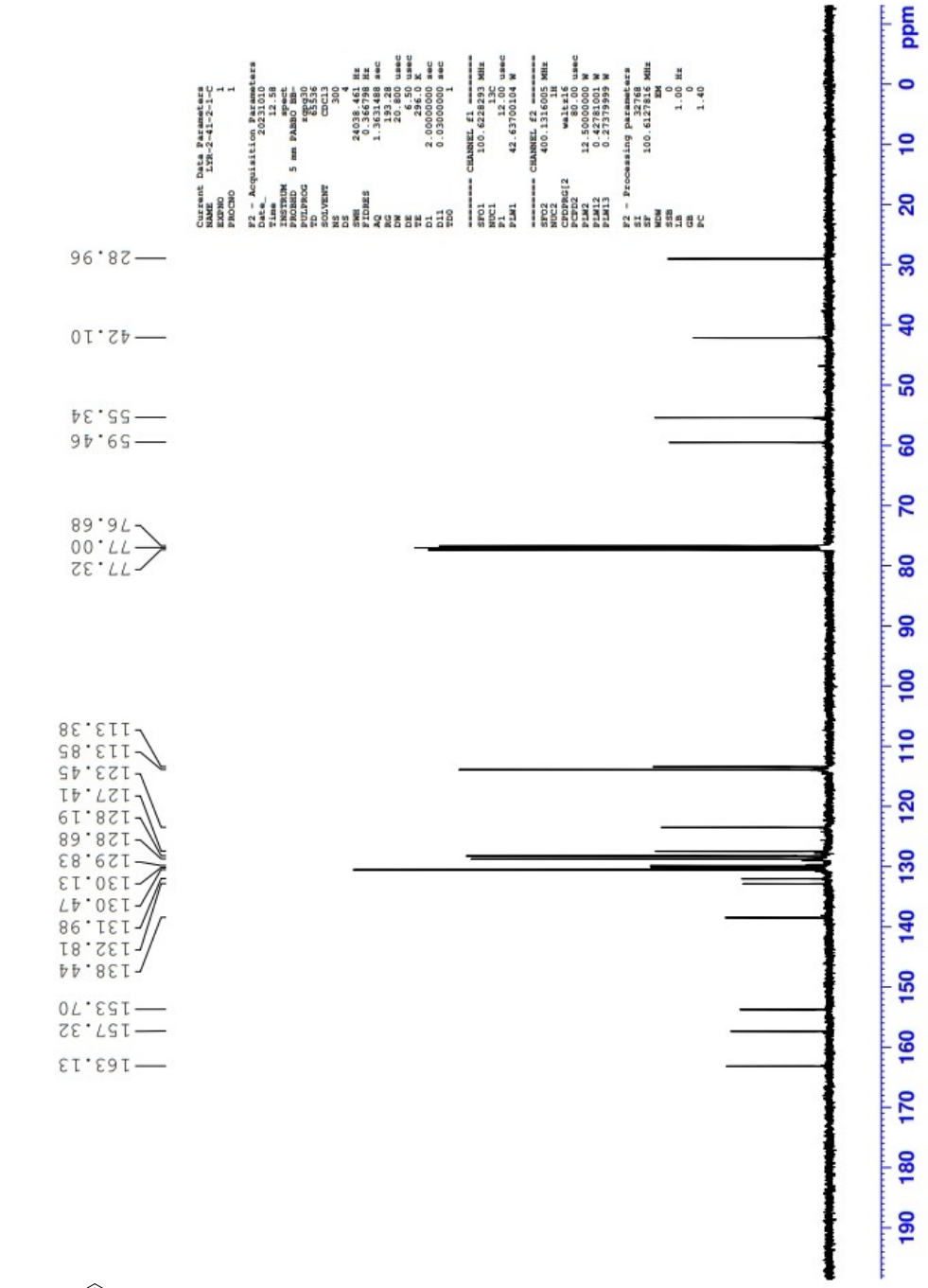

N
O
S
O
O
N
O
CO2Et

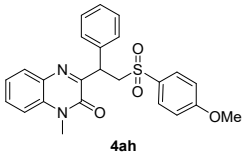
4ag


Current Data Parameters
NAME LYR-2-41-2-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230921
Time 11.45
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 80.6
DW 60.800 use
DE 6.50 use
TE 298.1 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300106 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
-0.000
3.540
3.569
3.577
3.606
3.623
4.748
4.774
4.784
4.810
5.229
5.236
5.255
5.262
6.670
6.692
7.157
7.162
7.174
7.184
7.197
7.216
7.234
7.260
7.287
7.306
7.325
7.336
7.354
7.473
7.493
7.512
7.694
7.716
7.745
7.765
ppm
3.00
4.02
1.00
1.02
2.02
4.00
3.01
1.02
2.02
1.01


N
O
N
O
S
O
OMe

4ah


28.96
42.10
55.34
59.46
76.68
77.00
77.32
113.38
113.85
123.45
127.41
128.19
128.68
129.83
130.13
130.47
131.98
132.81
138.44
153.70
157.32
163.13
ppm

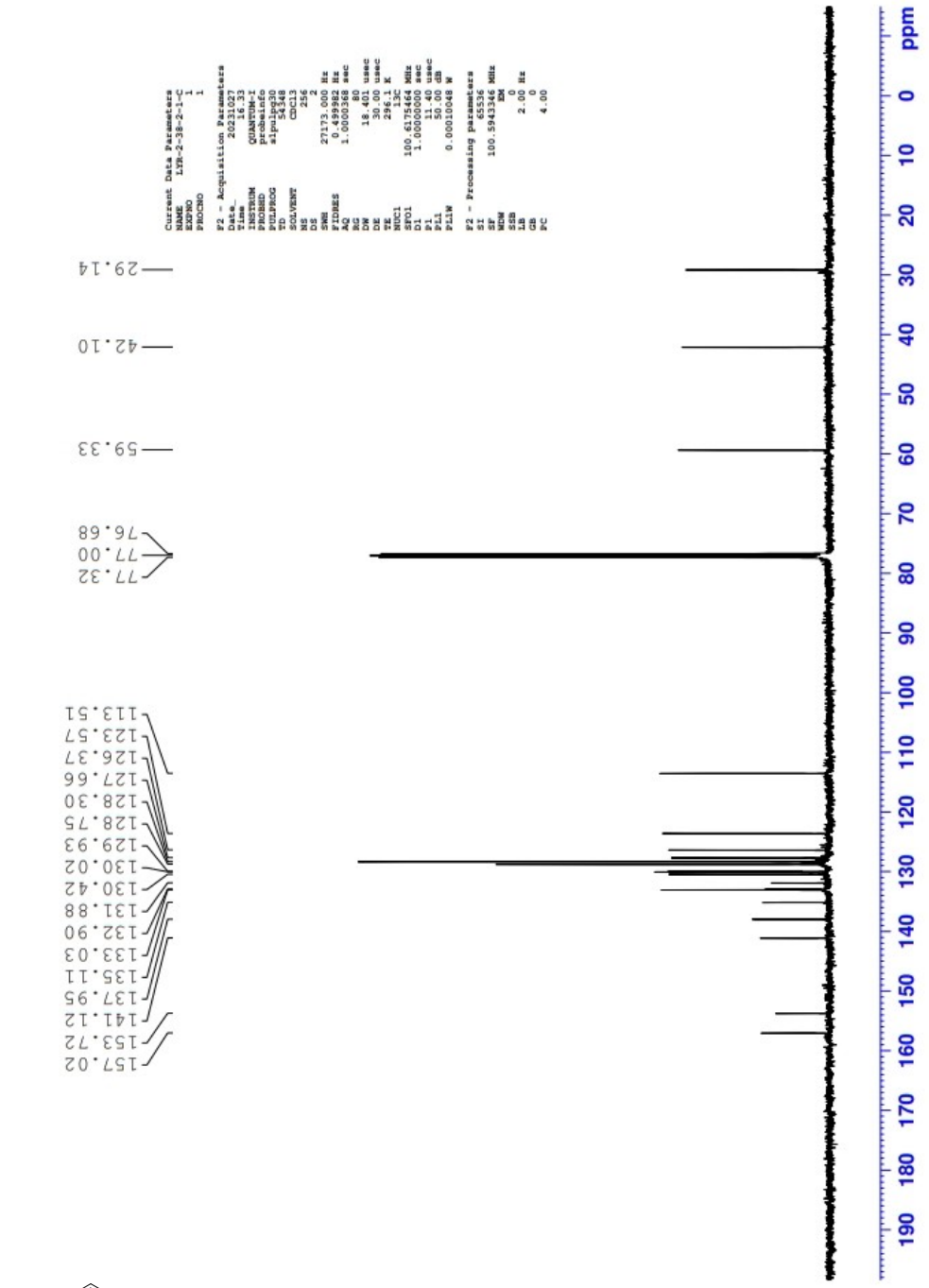

O
S
O
N
N
O
OMe

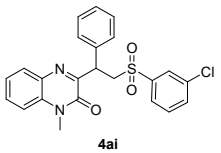
4ah

Current Data Parameters
NAME LYR-2-38-2-1-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231027
Time 10.26
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pul30
TD 64862
SOLVENT CDCl3
NS 16
DS 2
SWH 8108.000 Hz
FIDRES 0.125004 Hz
AQ 3.9998767 sec
RG 55.84
DW 61.667 use
DE 30.00 use
TE 295.8 K
NUC1 1H
SFO1 400.1113911 MHz
D1 1.00000000 sec
P1 11.60 use
PL1 58.00 dB
PL1W 0.00001592 W
F2 - Processing parameters
SI 65536
SF 400.1050780 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 4.00
-0.000
3.586
3.664
3.673
3.700
3.709
4.707
4.732
4.743
4.768
5.289
5.298
5.314
5.323
7.164
7.182
7.197
7.212
7.216
7.234
7.258
7.293
7.312
7.336
7.355
7.496
7.516
7.535
7.673
7.689
7.714
7.733
3.00
1.00
1.00
3.00
6.01
1.01
1.00
1.01
3.00
ppm

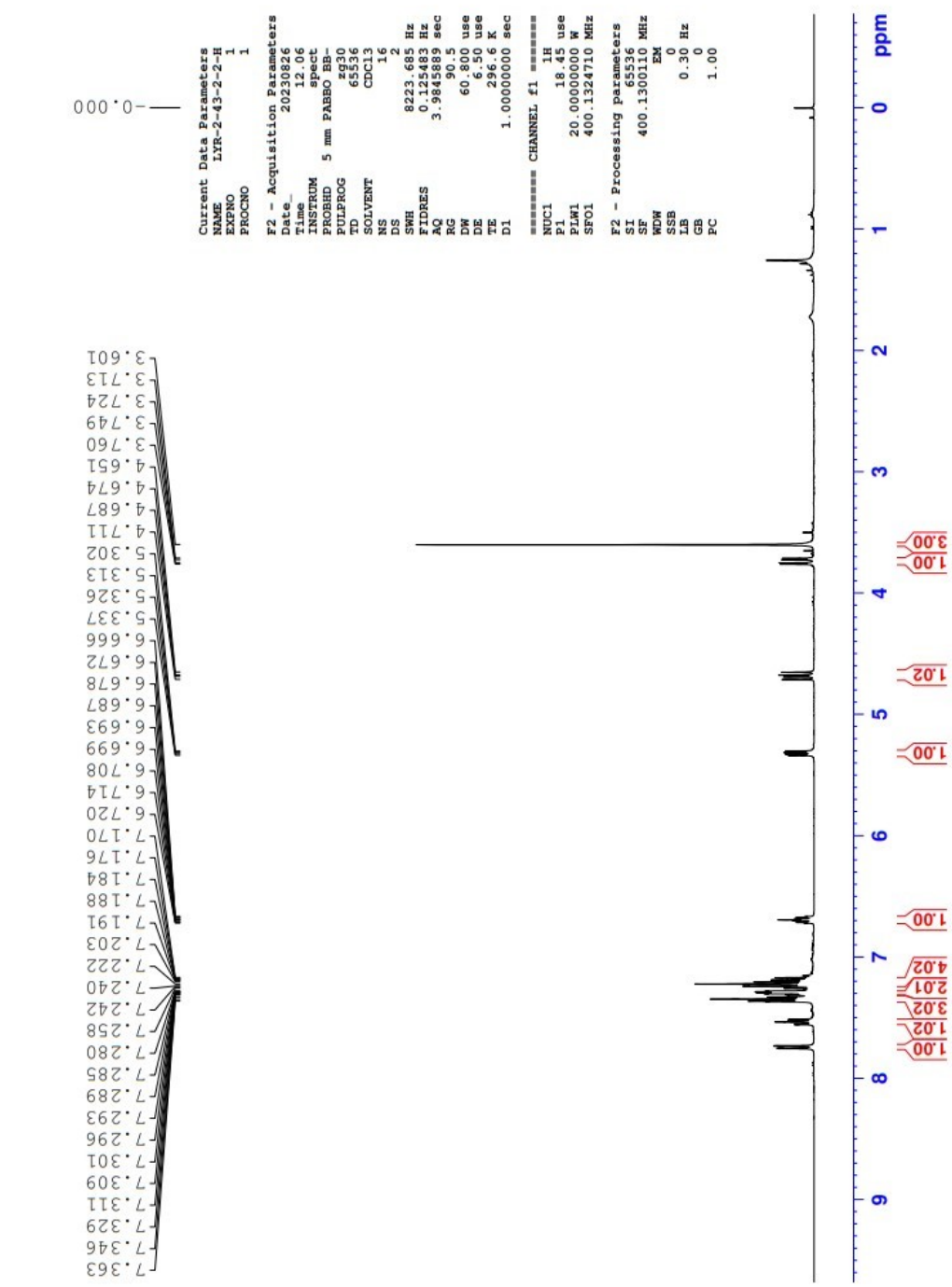
N
O
S
O
O
Cl
N
O

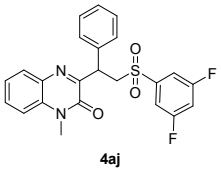
4ai


29.14
42.10
59.33
76.68
77.00
77.32
113.51
123.57
126.37
127.66
128.30
128.75
129.93
130.02
130.42
131.88
132.90
133.03
135.11
137.95
141.12
153.72
157.02
ppm

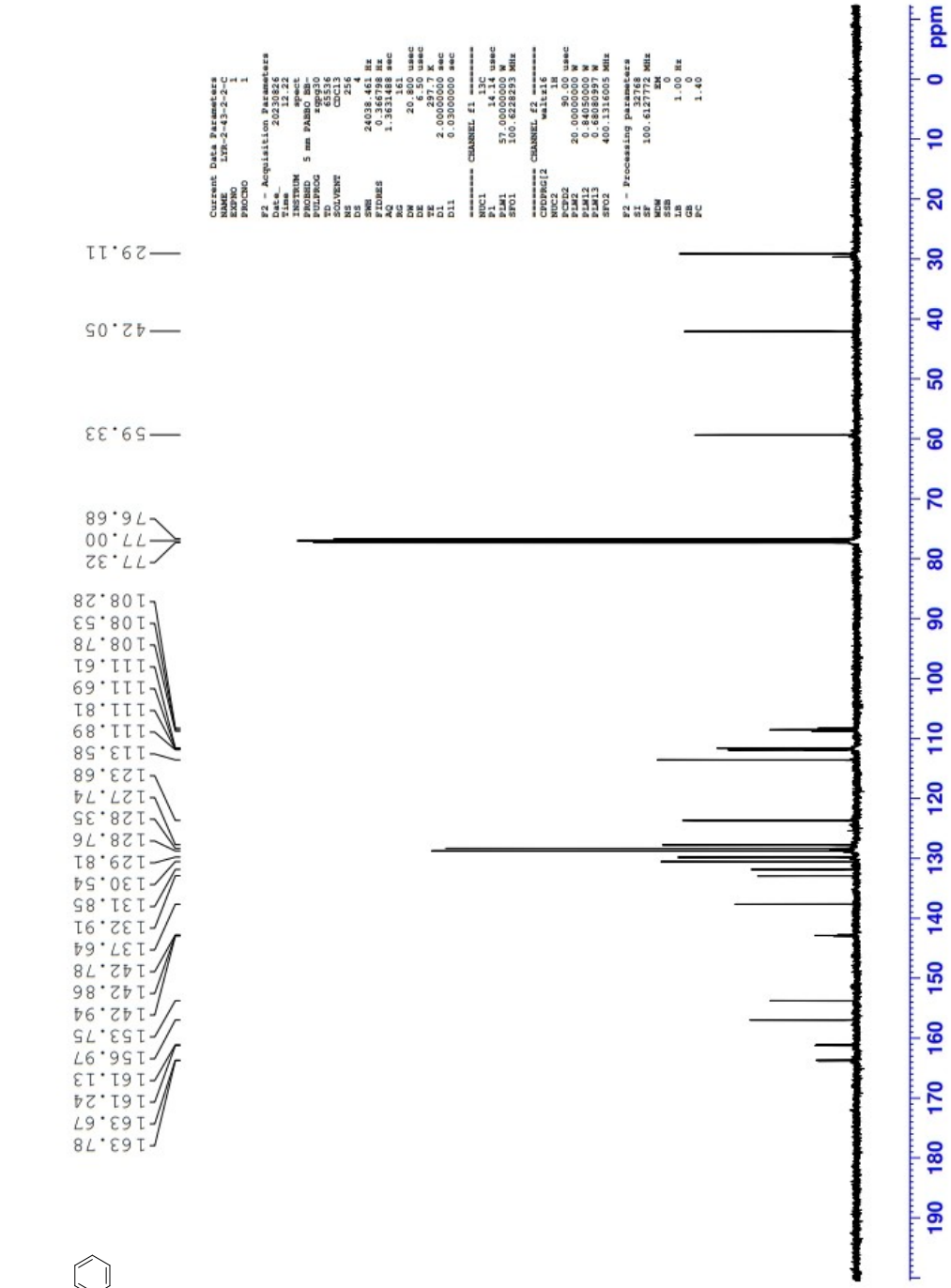

N
O
S
O
O
Cl
N

4ai

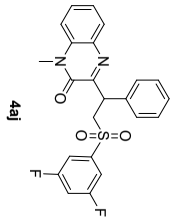

Current Data Parameters
NAME LYR-2-43-2-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230826
Time 12.06
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 90.5
DW 60.800 use
DE 6.50 use
TE 296.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300110 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.00
1.02
1.00
1.00
4.02
2.01
3.02
1.02
1.00



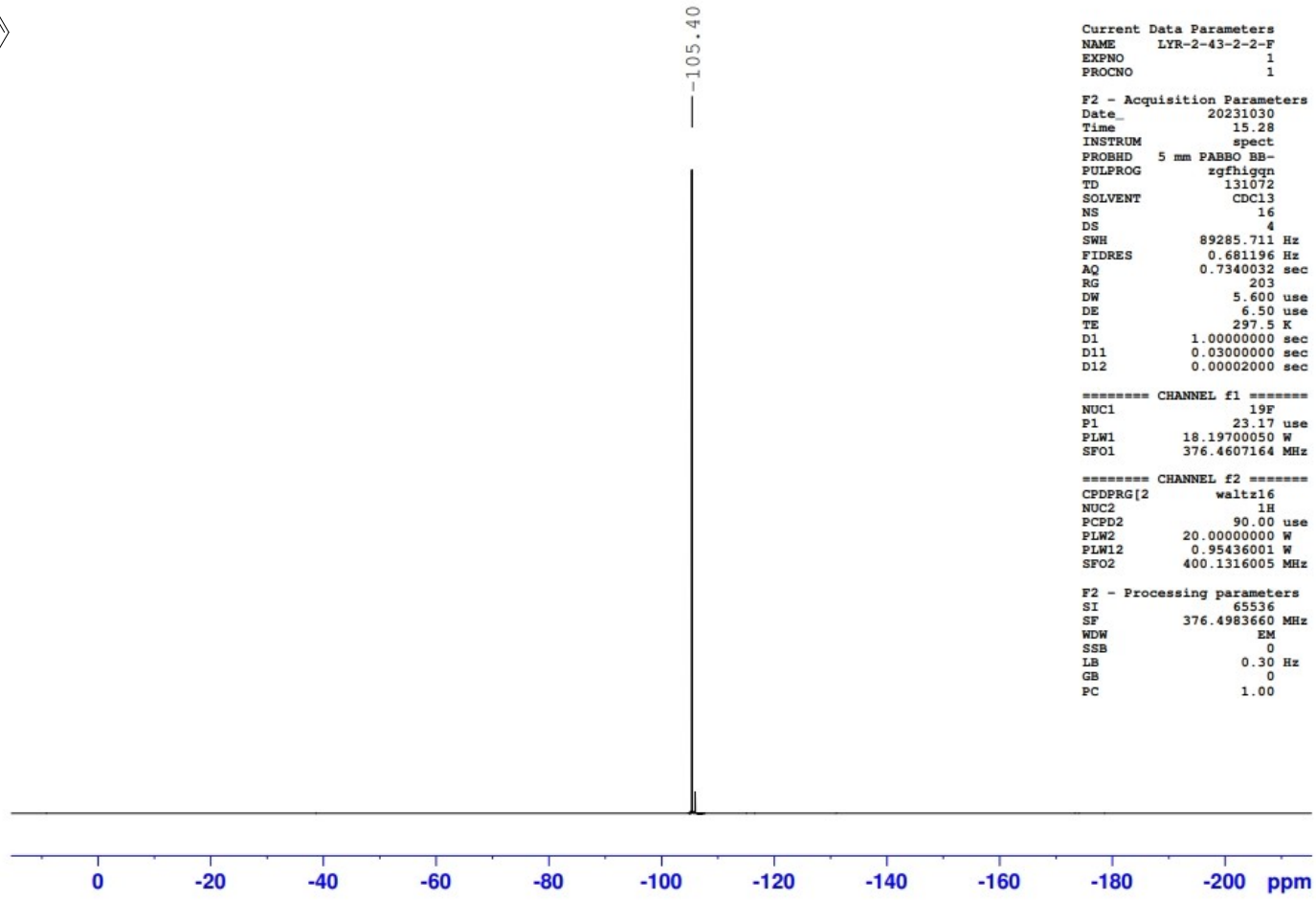
4aj


29.11
42.05
59.33
76.68
77.00
77.32
108.28
108.53
108.78
111.61
111.69
111.81
111.89
113.58
123.68
127.74
128.35
128.76
129.81
130.54
131.85
132.91
137.64
142.78
142.86
142.94
153.75
156.97
161.13
161.24
163.67
163.78
Current Data Parameters
NAME 1YR-2-43-2-2-c
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20210525
Time 12.24
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 161
DW 20.800 usec
DE 6.50 usec
TE 297 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 14.14 usec
PLW1 57.00000000 W
SFO1 100.6228293 MHz
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 20.00000000 W
PLW12 0.84050000 W
PLW13 0.68080997 W
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127772 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
ppm
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
O
S
O
N
N
O
F
F

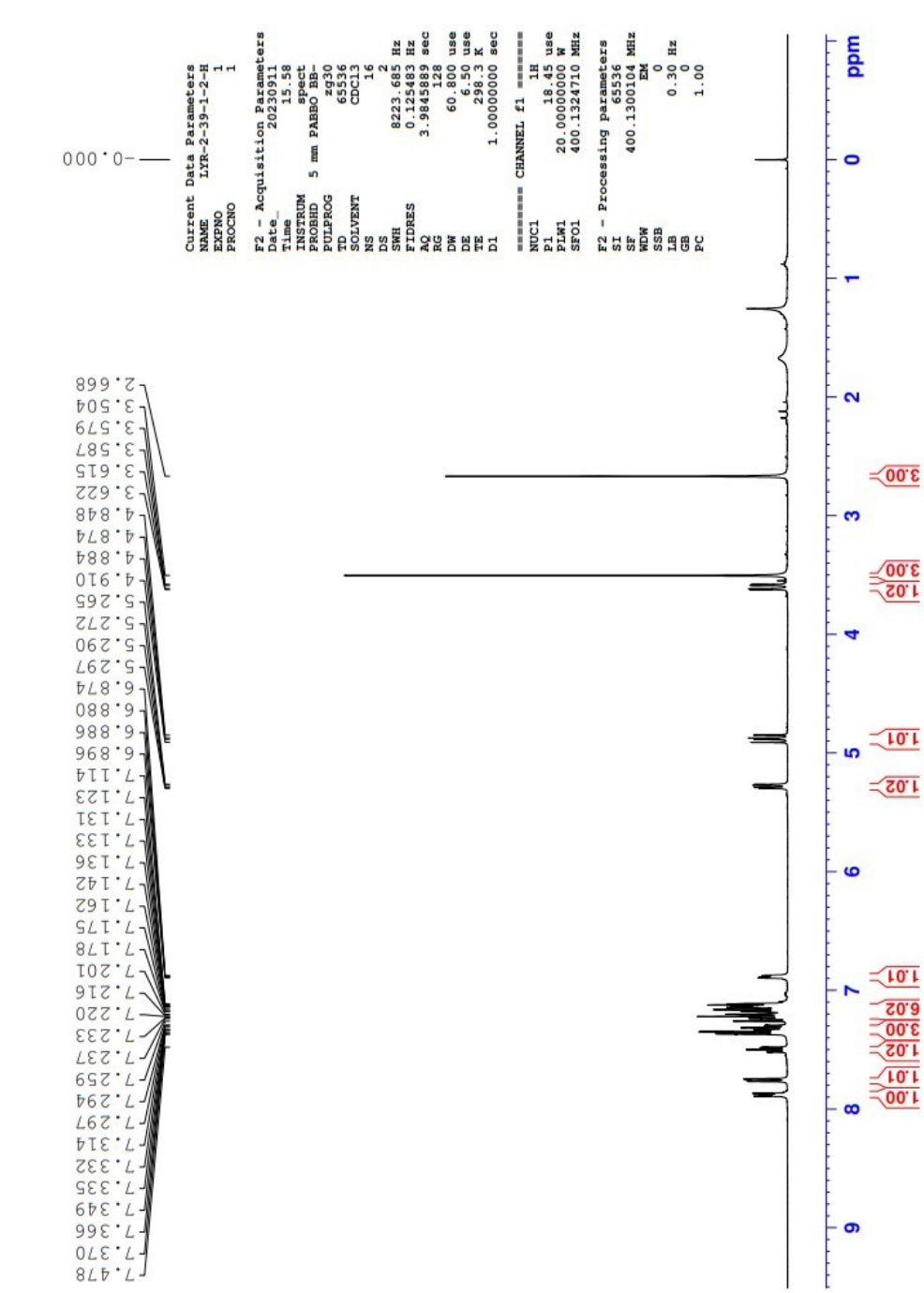
4aj

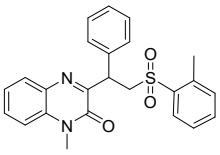


4aj

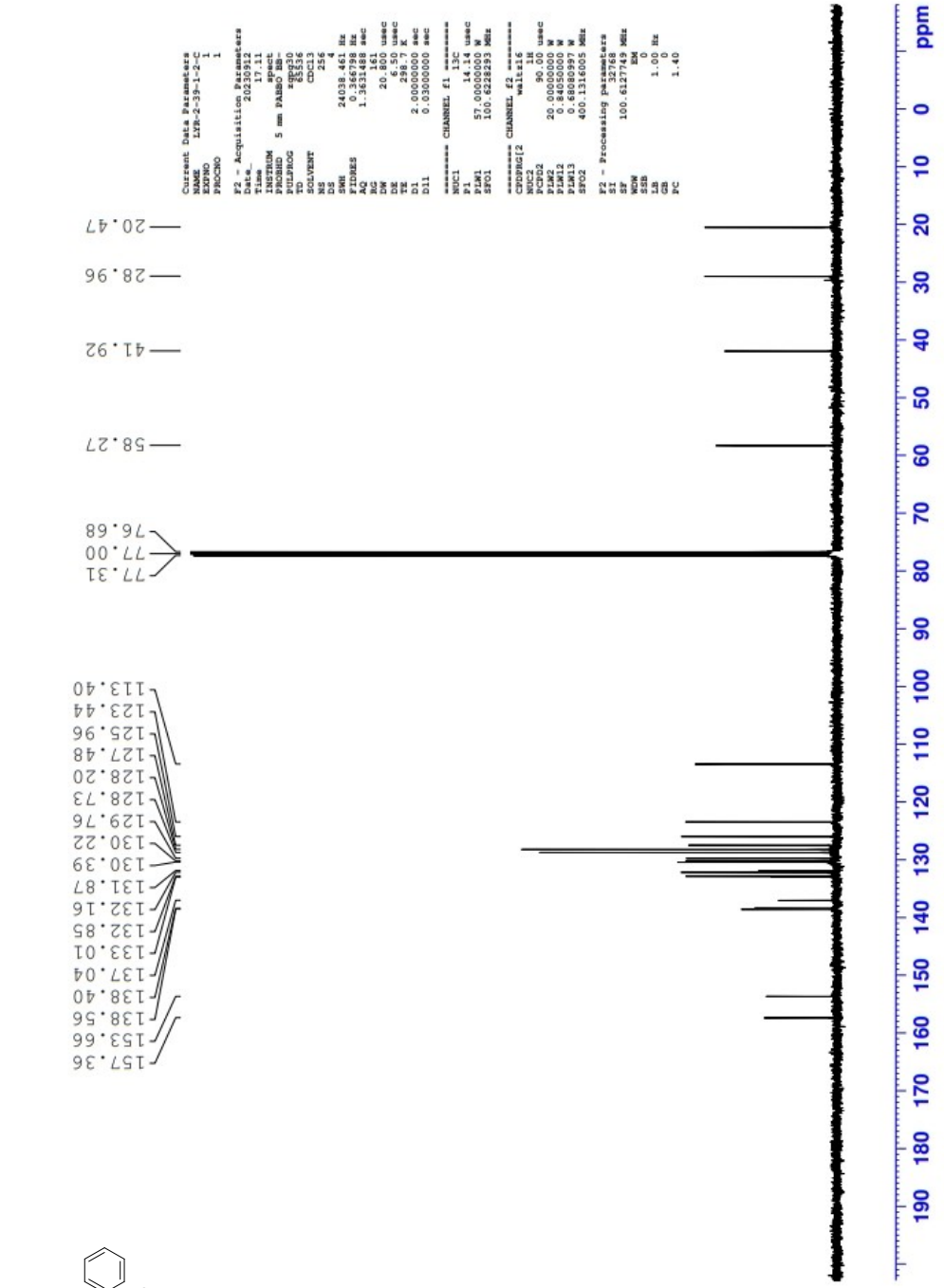


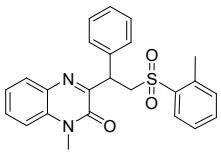

```
Current Data Parameters
NAME      LYR-2-43-2-2-F
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231030
Time               15.28
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG         zgfhigqn
TD               131072
SOLVENT            CDCl3
NS                    16
DS                     4
SWH            89285.711 Hz
FIDRES         0.681196 Hz
AQ             0.7340032 sec
RG                   203
DW                 5.600 use
DE                 6.50 use
TE                297.5 K
D1           1.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec

======== CHANNEL f1 =======
NUC1                19F
P1                23.17 use
PLW1        18.19700050 W
SFO1       376.4607164 MHz

======== CHANNEL f2 =======
CPDPRG[2         waltz16
NUC2                1H
PCPD2             90.00 use
PLW2        20.00000000 W
PLW12        0.95436001 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF          376.4983660 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```


Current Data Parameters
NAME LYR-2-39-1-2-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230911
Time 15.58
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 use
DE 6.50 use
TE 298.3 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 18.45 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300104 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.00
3.00
1.02
1.01
1.02
1.01
6.02
3.00
1.02
1.01
1.00
2.668
3.504
3.579
3.587
3.615
3.622
4.848
4.874
4.884
4.910
5.265
5.272
5.290
5.297
6.874
6.880
6.886
6.896
7.114
7.123
7.131
7.133
7.136
7.142
7.162
7.175
7.178
7.201
7.216
7.220
7.233
7.237
7.259
7.294
7.297
7.314
7.332
7.335
7.349
7.366
7.370
7.478

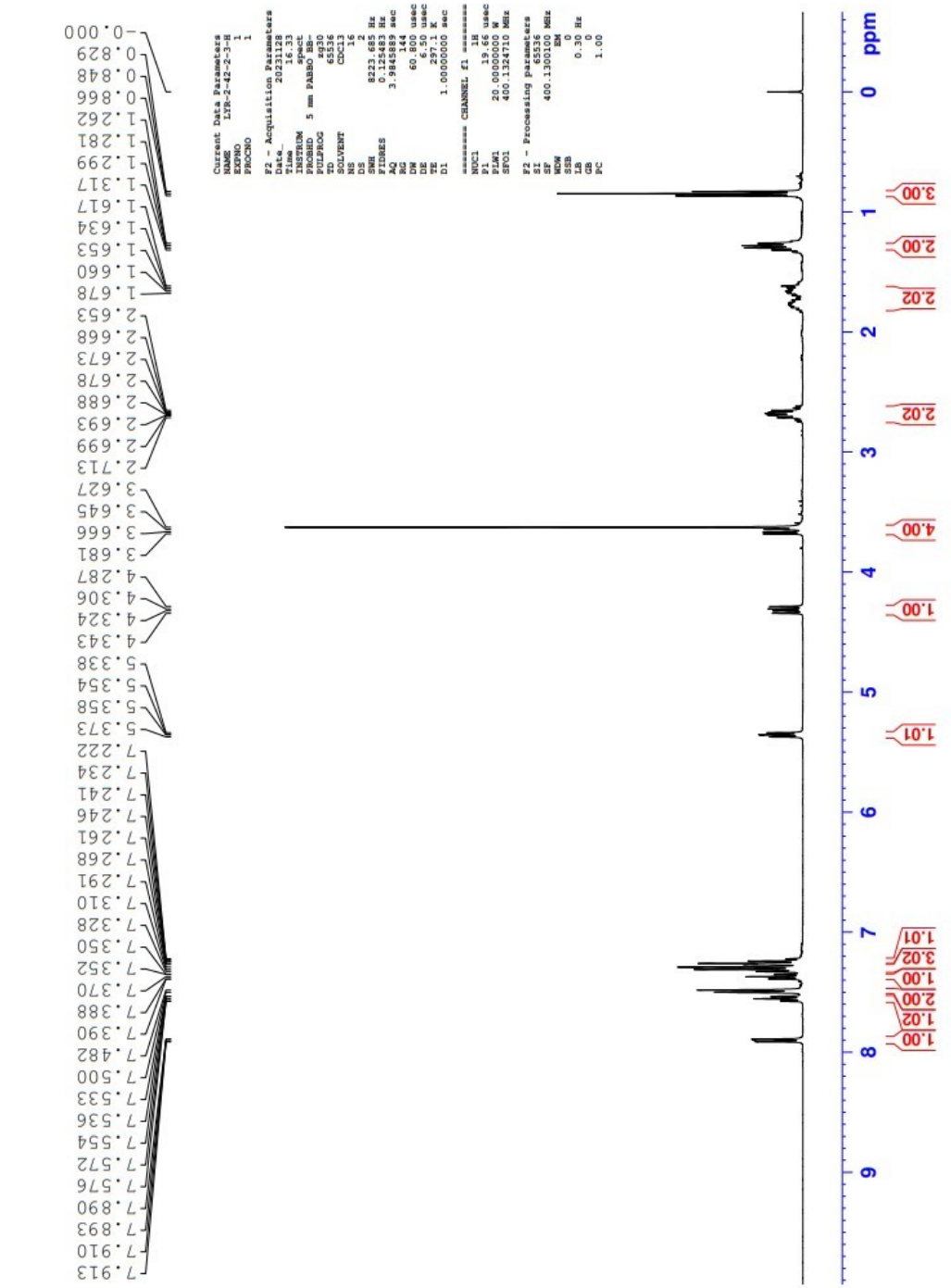

O
S
O
N
N
O

4ak

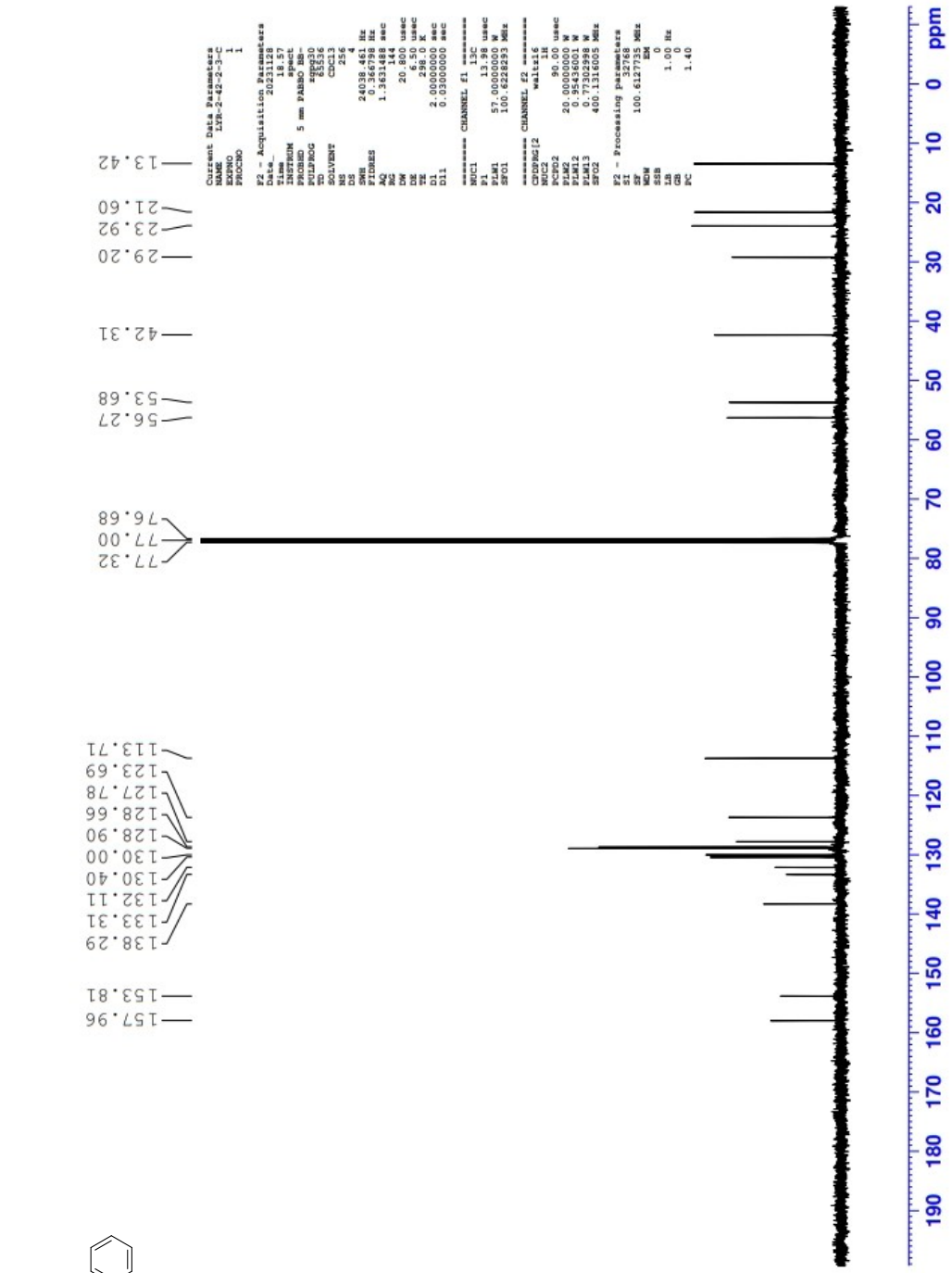

Current Data Parameters
NAME LYR-2-39-1-2-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20230912
Time 17.11
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 161
DW 20.800 usec
DE 6.50 usec
TE 298.7 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 14.14 usec
PLW1 57.00000000 W
SFO1 100.6228293 MHz
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 20.00000000 W
PLW12 0.68000000 W
PLW13 0.68080997 W
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127749 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
20.47
28.96
41.92
58.27
76.68
77.00
77.31
113.40
123.44
125.96
127.48
128.20
128.73
129.76
130.22
130.39
131.87
132.16
132.85
133.01
137.04
138.40
138.56
153.66
157.36
ppm

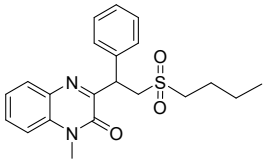


4ak

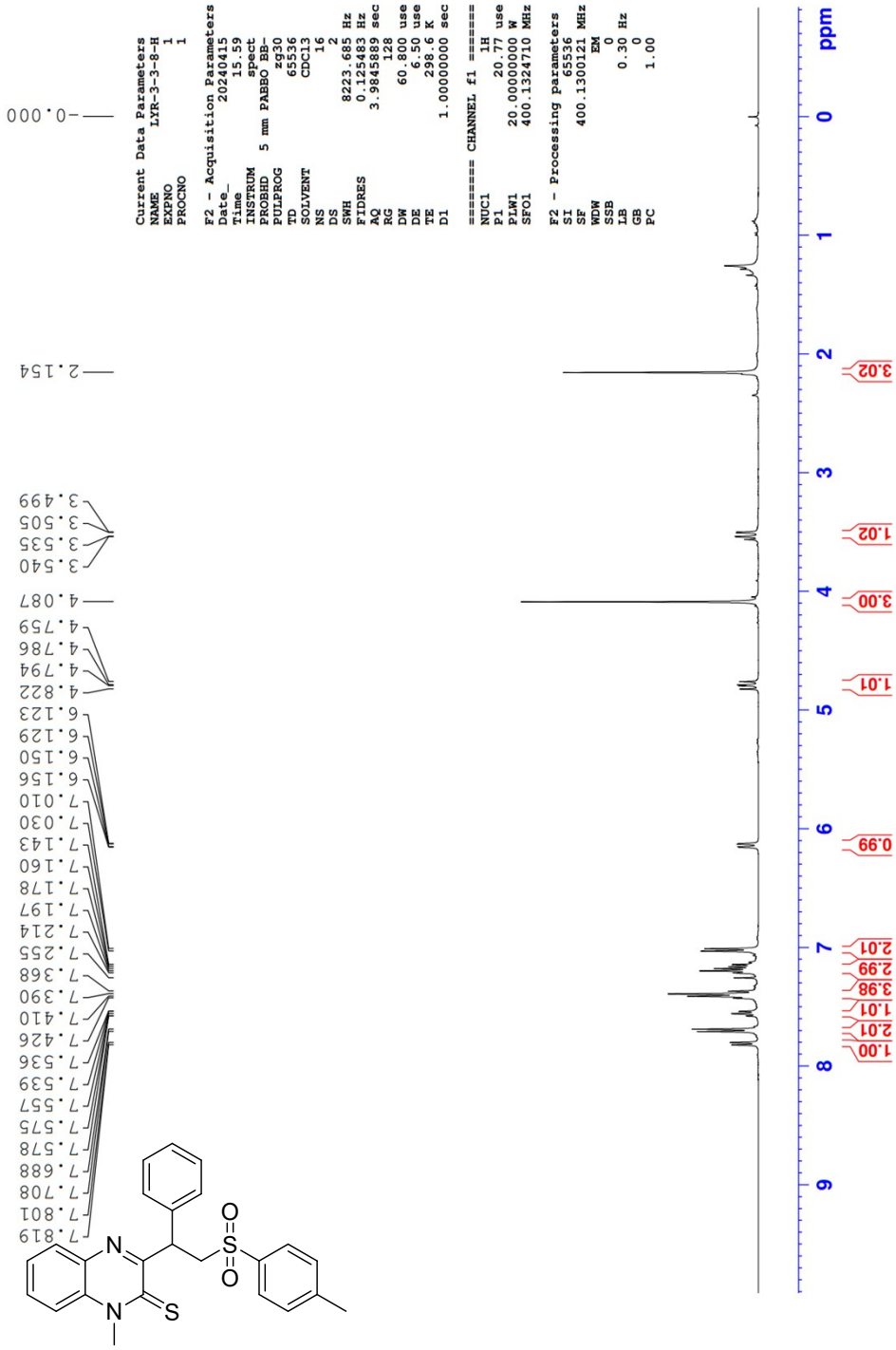

Current Data Parameters
NAME LYR-2-42-2-3-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20231128
Time 16.33
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 14
DW 60.800 usec
DE 6.50 usec
TE 297.1 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 19.66 usec
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300100 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.00
2.00
2.02
2.02
4.00
1.00
1.01
1.01
3.02
1.00
2.00
1.02
1.00

4al

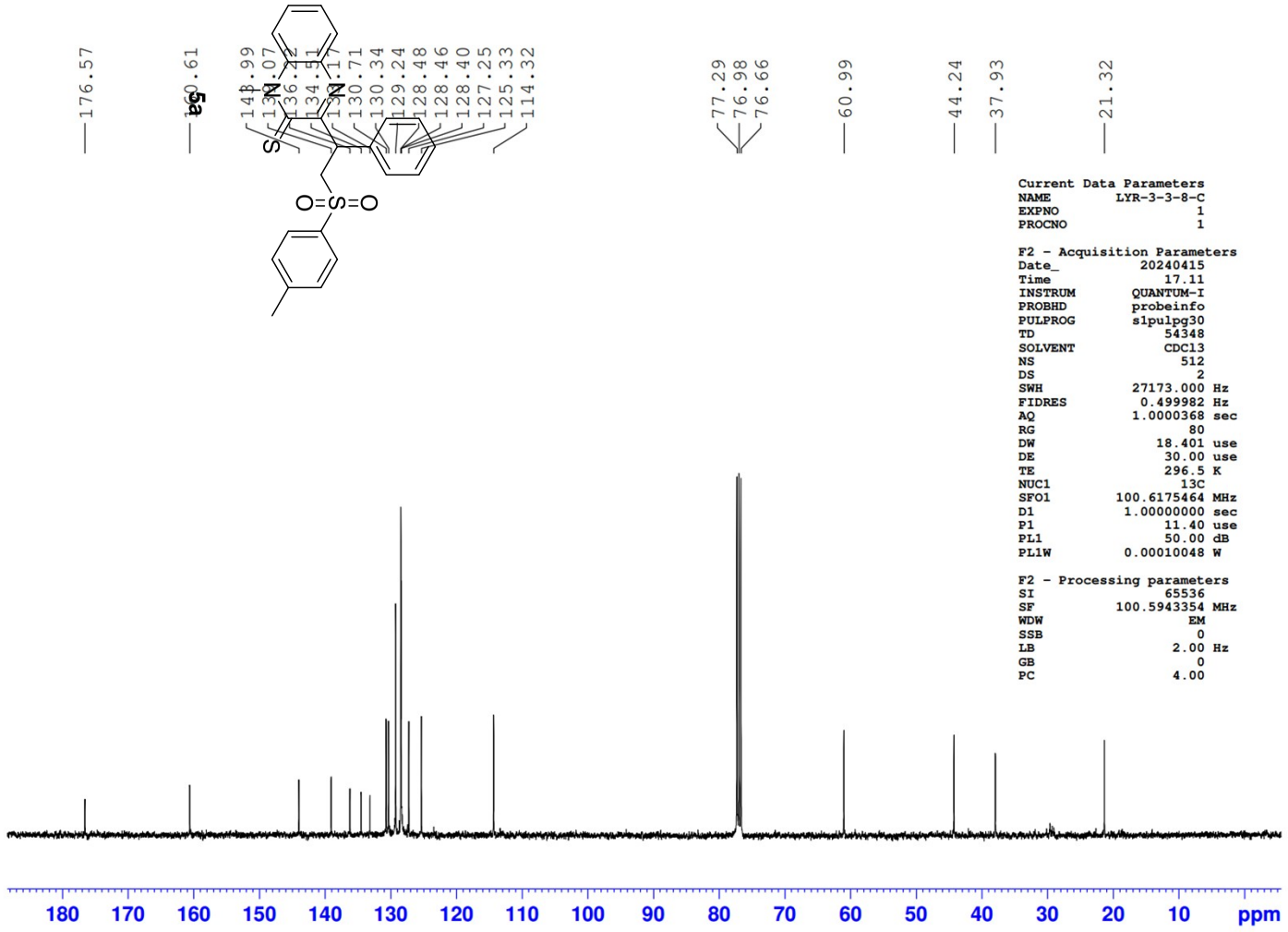

13.42
21.60
23.92
29.20
42.31
53.68
56.27
76.68
77.00
77.32
113.71
123.69
127.78
128.66
128.90
130.00
130.40
132.11
133.31
138.29
153.81
157.96
ppm



4al

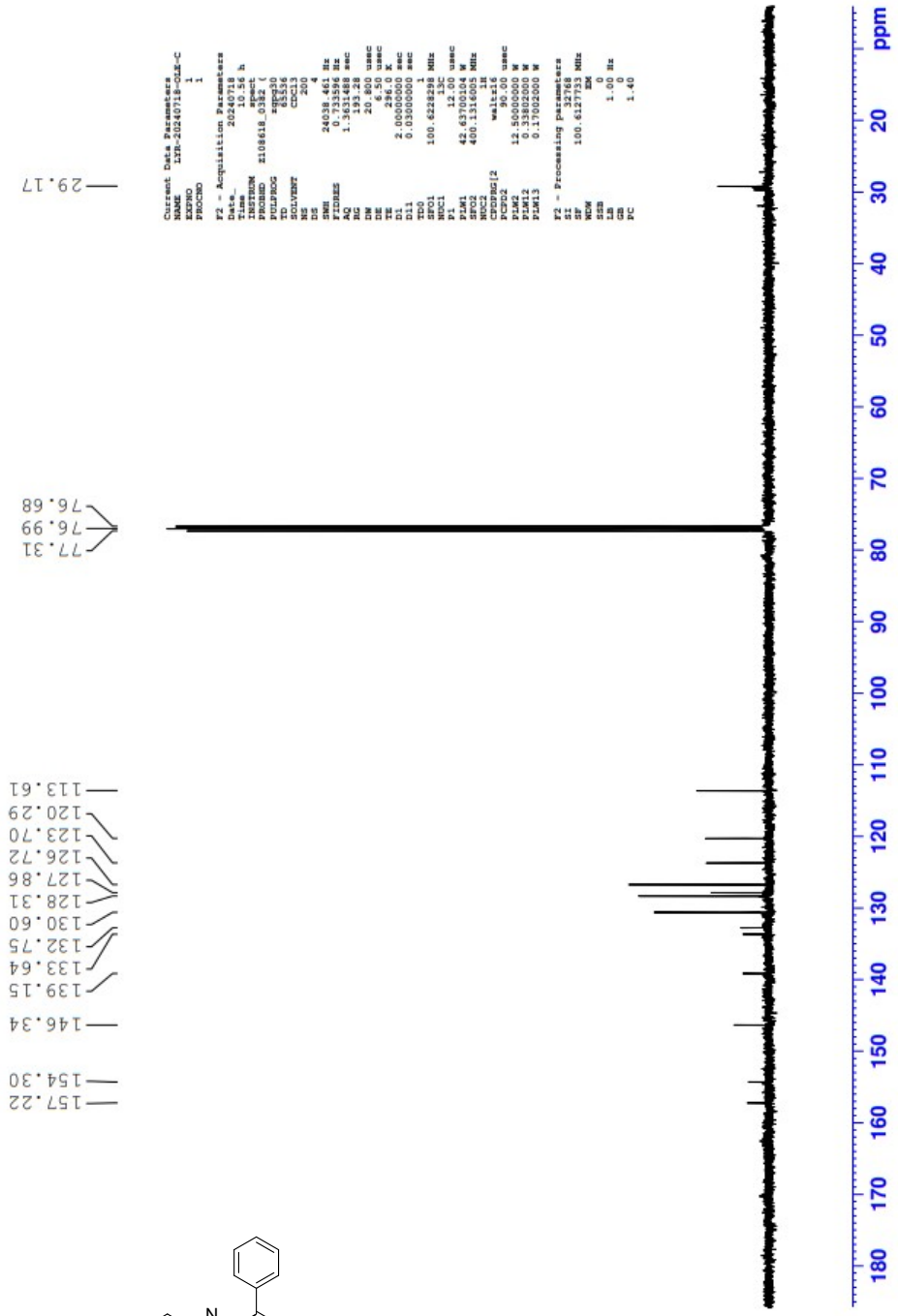

Current Data Parameters
NAME LYR-3-3-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240415
Time 15.59
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 use
DE 6.50 use
TE 298.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 20.77 use
PLW1 20.00000000 W
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 65536
SF 400.1300121 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
2.154
3.499
3.505
3.535
3.540
4.087
4.759
4.786
4.794
4.822
6.123
6.129
6.150
6.156
7.010
7.030
7.143
7.160
7.178
7.197
7.214
7.255
7.368
7.390
7.410
7.426
7.536
7.539
7.557
7.575
7.578
7.688
7.708
7.801
7.819
N
S
O
O
S
N
ppm
0
1
2
3
4
5
6
7
8
9
3.02
1.02
3.00
1.01
0.99
2.01
2.99
3.98
1.01
2.01
1.00

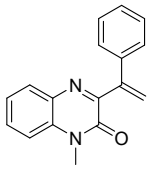
5a


176.57
160.61
148.99
137.07
136.42
134.91
131.17
130.71
130.34
129.24
128.48
128.46
128.40
127.25
125.33
114.32
77.29
76.98
76.66
60.99
44.24
37.93
21.32
5a
N
S
O=S=O
Current Data Parameters
NAME LYR-3-3-8-C
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240415
Time 17.11
INSTRUM QUANTUM-I
PROBHD probeinfo
PULPROG s1pulpg30
TD 54348
SOLVENT CDCl3
NS 512
DS 2
SWH 27173.000 Hz
FIDRES 0.499982 Hz
AQ 1.0000368 sec
RG 80
DW 18.401 use
DE 30.00 use
TE 296.5 K
NUC1 13C
SFO1 100.6175464 MHz
D1 1.00000000 sec
P1 11.40 use
PL1 50.00 dB
PL1W 0.00010048 W
F2 - Processing parameters
SI 65536
SF 100.5943354 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 4.00
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

Current Data Parameters
NAME LYR-20240718-OLE-H
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20240718
Time 10.43 h
INSTRUM spect
PROBHD Z108618_0382 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8802.817 Hz
FIDRES 0.268641 Hz
AQ 3.7224448 sec
RG 193.28
DW 56.800 use
DE 6.50 use
TE 296.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324710 MHz
NUC1 1H
P1 14.80 use
PLW1 12.50000000 W
F2 - Processing parameters
SI 65536
SF 400.1300105 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.000
3.695
5.923
5.982
7.260
7.321
7.332
7.340
7.353
7.375
7.395
7.576
7.595
7.615
7.916
7.936
3.00
1.00
1.00
7.02
0.99
1.00
ppm

6a


29.17
77.31
76.99
76.68
113.61
120.29
123.70
126.72
127.86
128.31
130.60
132.75
133.64
139.15
146.34
154.30
157.22
ppm



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