Supporting Information

Total Synthesis of the Marine Cyclic Depsipeptide Lagunamide D

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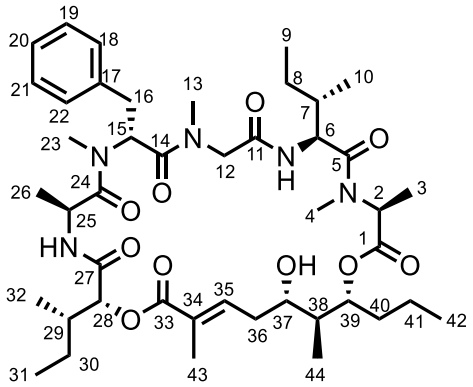
1. **Table S1**. Comparison of ^{13}C NMR (600 MHz) for Natural and Synthetic Lagunamide D in DMSO-*d6*.

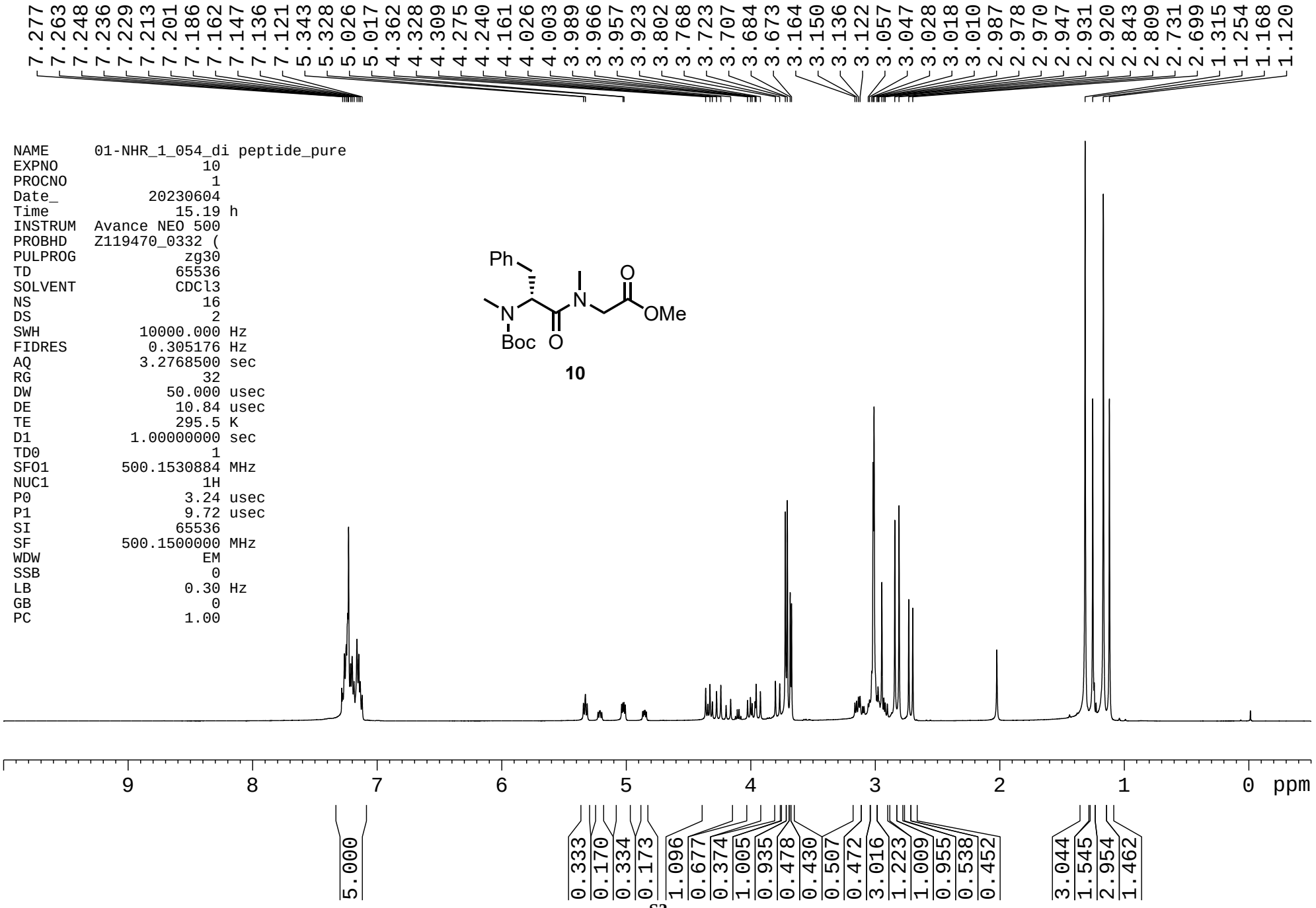


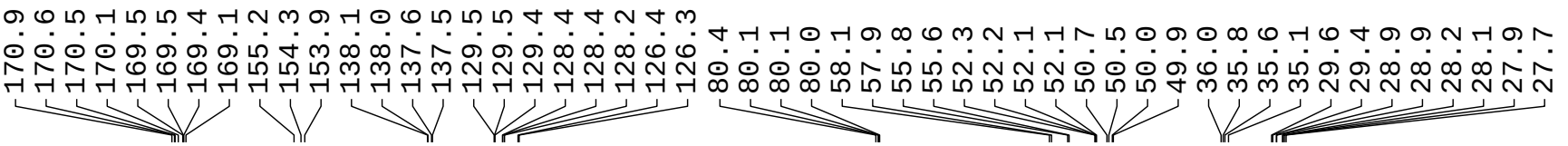
Lagunamide D (**1**)

C No.	δC*i* (Natural)/ppm	δC*s* (Synthetic)/ppm	ΔδC (δC*s*-δC*i*)/ppm
24	172.45	172.45	0.00
5	170.88	170.80	-0.08
14	170.18	170.14	-0.04
1	170.17	170.11	-0.06
27	169.49	169.52	0.03
33	168.34	168.23	-0.11
11	168.18	168.01	-0.17
35	144.45	144.45	0.00
17	137.16	137.17	0.01
18/22	129.3	129.18	-0.12
19/21	127.51	127.48	-0.03
34	126.83	126.83	0.00
20	125.93	125.84	-0.09
28	75.30	75.36	0.06
39	74.56	74.62	0.06
37	69.24	69.30	0.06
2	57.93	58.07	0.14
15	52.33	52.45	0.12
6	51.07	51.10	0.03
12a	50.38	50.4	0.02
25	44.51	44.65	0.14
38	40.85	40.89	0.04
7	37.20	37.29	0.09
4	36.95	37.10	0.15
29	36.21	36.27	0.06
13	35.65	35.79	0.14
16a	34.25	34.42	0.17
40a	33.62	33.86	0.24
36a	29.56	29.6	0.04
23	29.24	29.36	0.12

30a	25.65	25.83	0.18
8a	23.00	23.19	0.19
41	16.84	17.05	0.21
26	14.68	14.89	0.21
10	14.55	14.69	0.14
42	14.12	14.06	-0.06
32	14.00	13.92	-0.08
3	12.74	12.93	0.19
43	11.84	11.98	0.14
31	11.52	11.40	-0.12
9	10.13	10.27	0.14
44	9.40	9.60	0.20

2. NMR Spectra



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TD                65536
SOLVENT           CDCl3
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DS                    4
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FIDRES         0.919204 Hz
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RG                  101
DW                16.600 usec
DE                 6.50 usec
TE                296.2 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1
SFO1        125.7753938 MHz
NUC1                13C
P0                 3.33 usec
P1                10.00 usec
SI                32768
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SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
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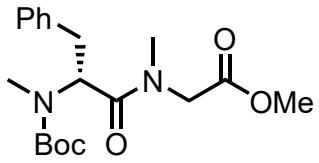

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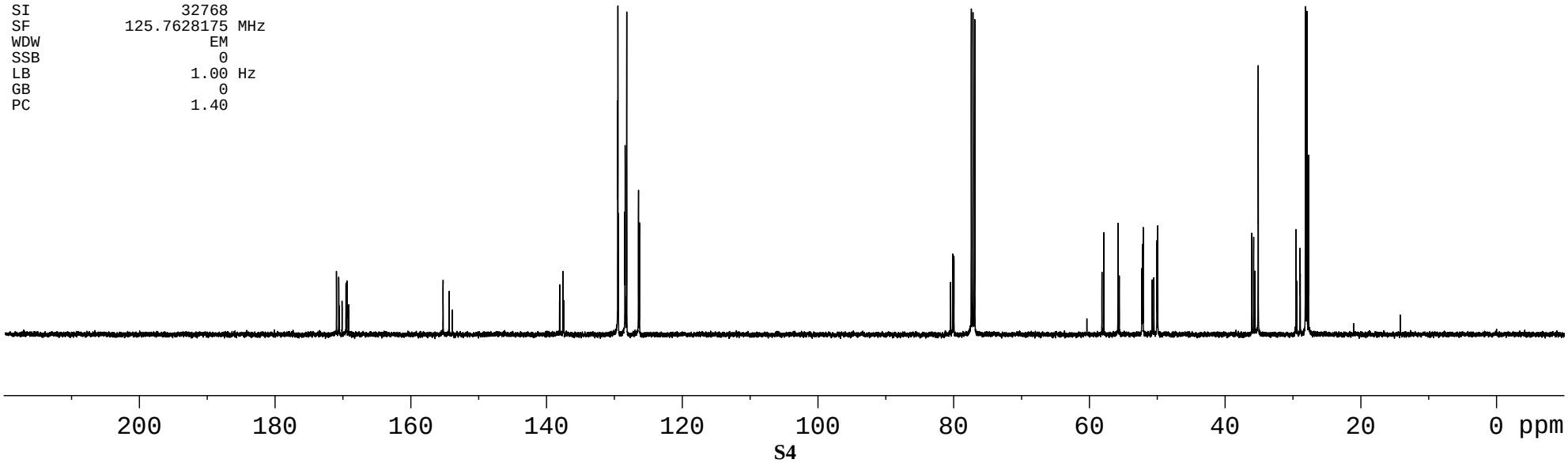

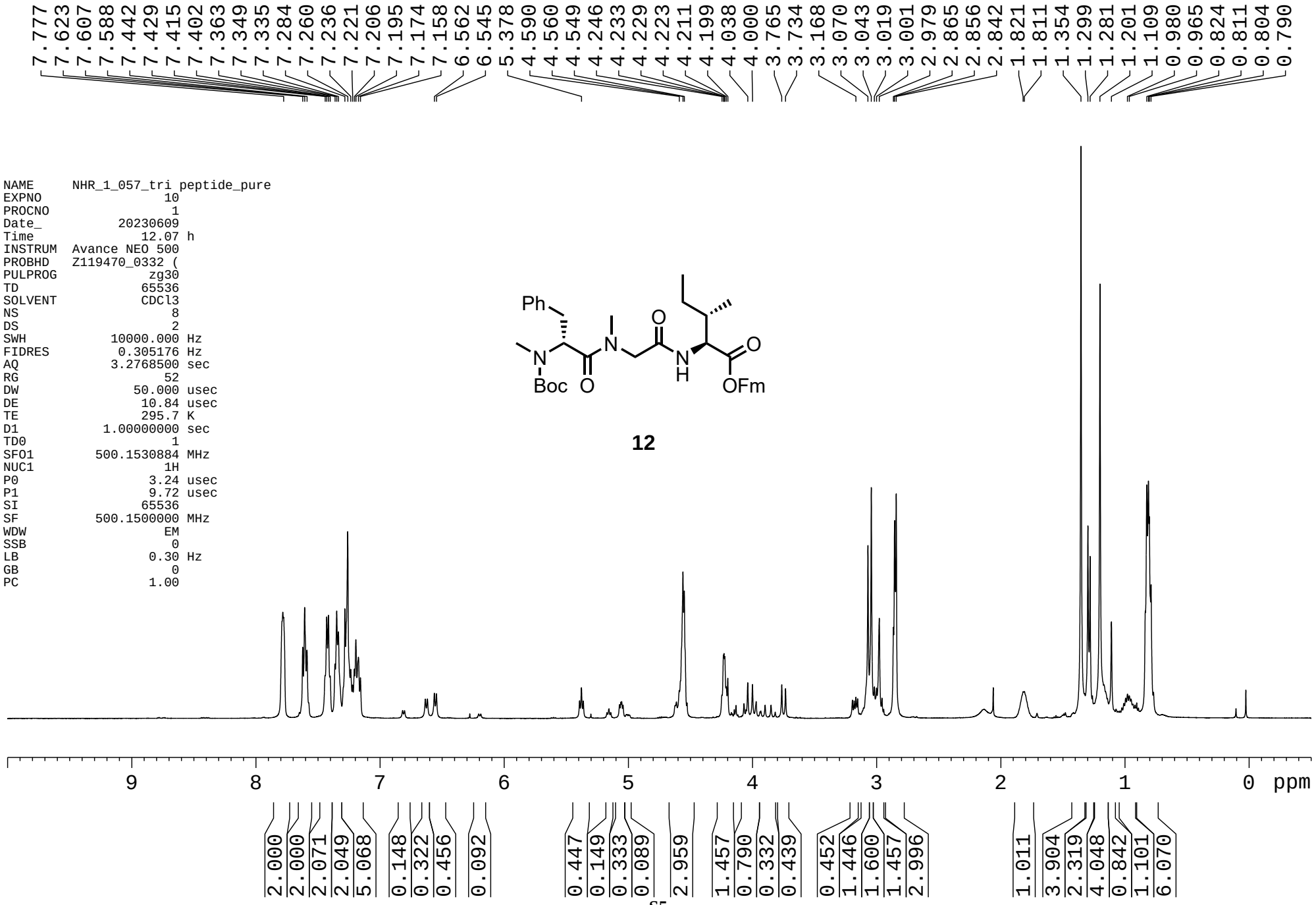
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4.549
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4.229
4.223
4.211
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FIDRES 0.305176 Hz
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RG 52
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DE 10.84 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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N
H
O
Boc O
OFm
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7
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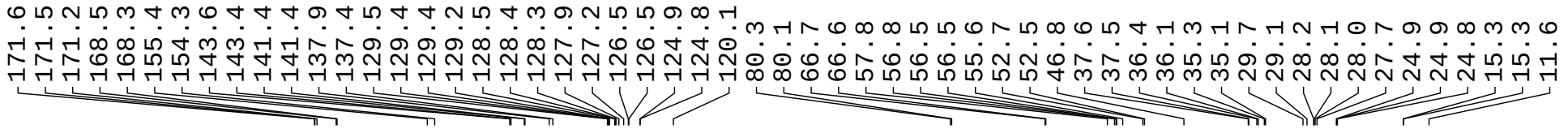


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SOLVENT             CDCl3
NS                    188
DS                      4
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FIDRES           0.919204 Hz
AQ               1.0879476 sec
RG                    101
DW                  16.600 usec
DE                    6.50 usec
TE                   296.3 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1
SFO1          125.7753938 MHz
NUC1                  13C
P0                    3.33 usec
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SI                   32768
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LB                   1.00 Hz
GB                      0
PC                   1.40
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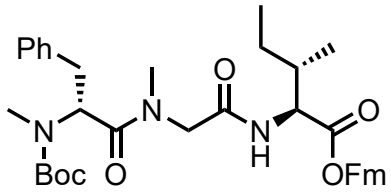

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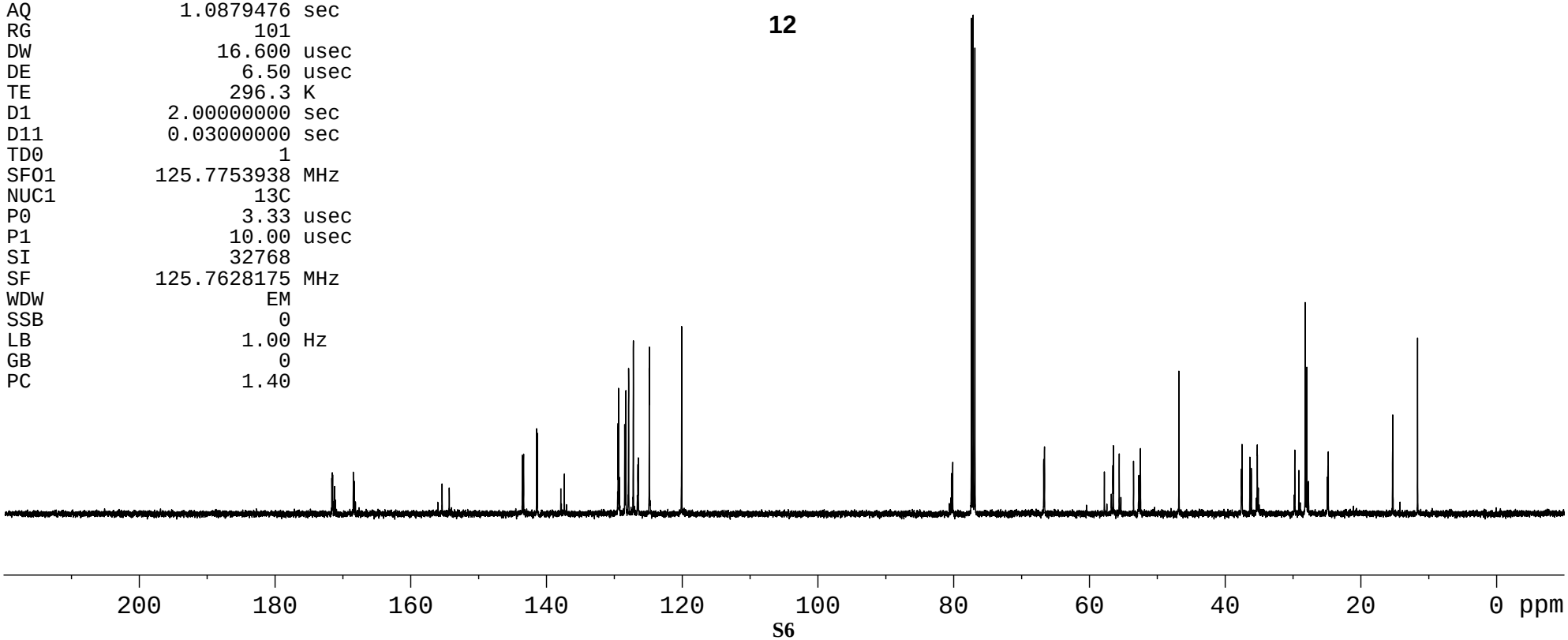

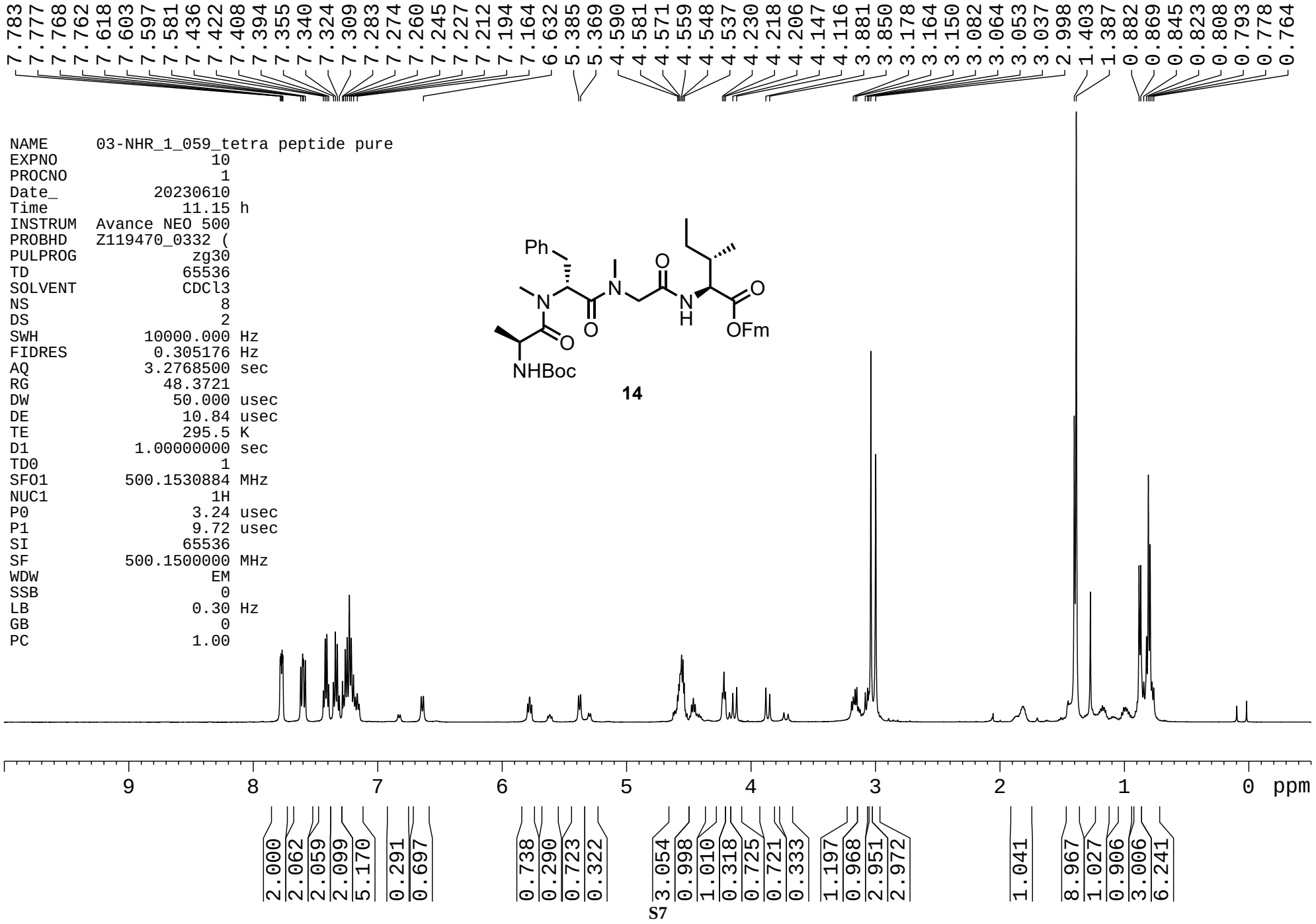
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PROCNO 1
Date_ 20230610
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DE 10.84 usec
TE 295.5 K
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TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
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Ph
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O
NHBoc
OFm
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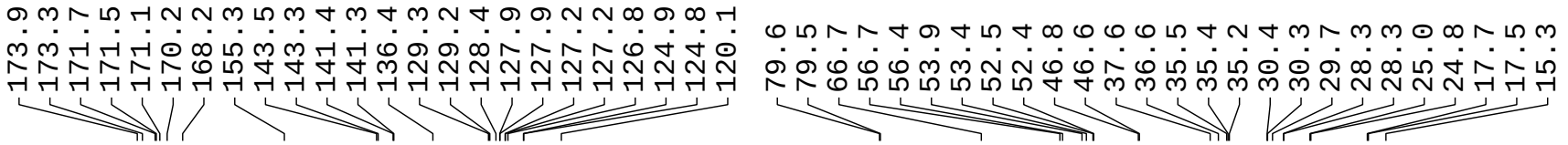


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PROCNO                 1
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PROBHD    Z119470_0332 (
PULPROG           zgpg30
TD                65536
SOLVENT           CDCl3
NS                  200
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FIDRES         0.919204 Hz
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RG                  101
DW                16.600 usec
DE                 6.50 usec
TE                296.2 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                   1
SFO1          125.7753938 MHz
NUC1                13C
P0                 3.33 usec
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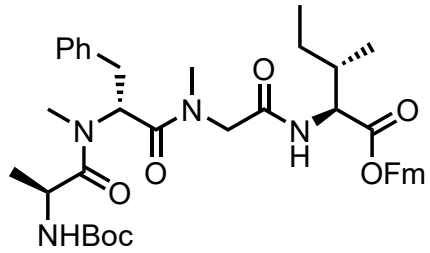

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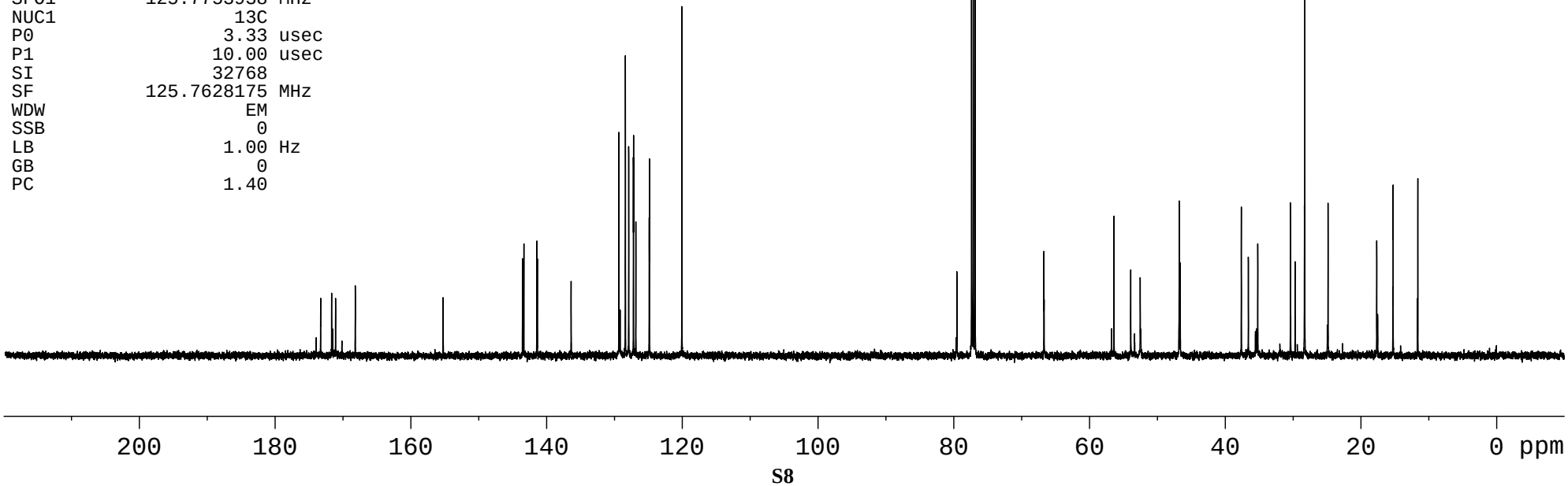

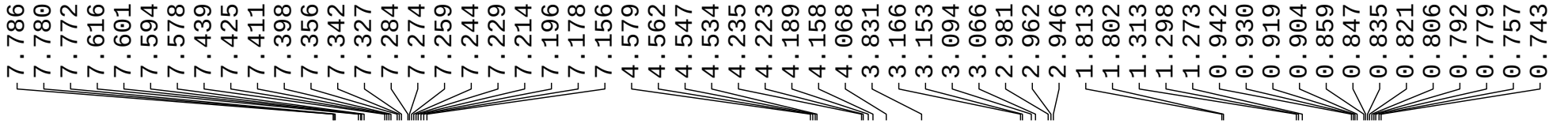


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PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
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FIDRES              0.305176 Hz
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RG                   67.0968
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DE                    10.84 usec
TE                    295.3 K
D1             1.00000000 sec
TD0                     1
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NUC1                   1H
P0                    3.24 usec
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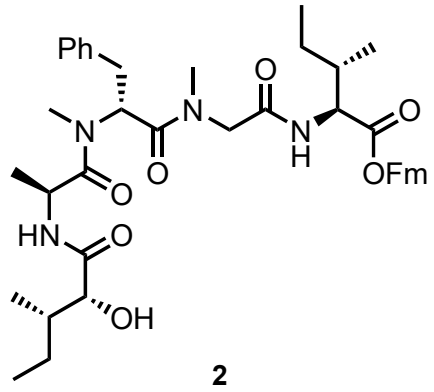

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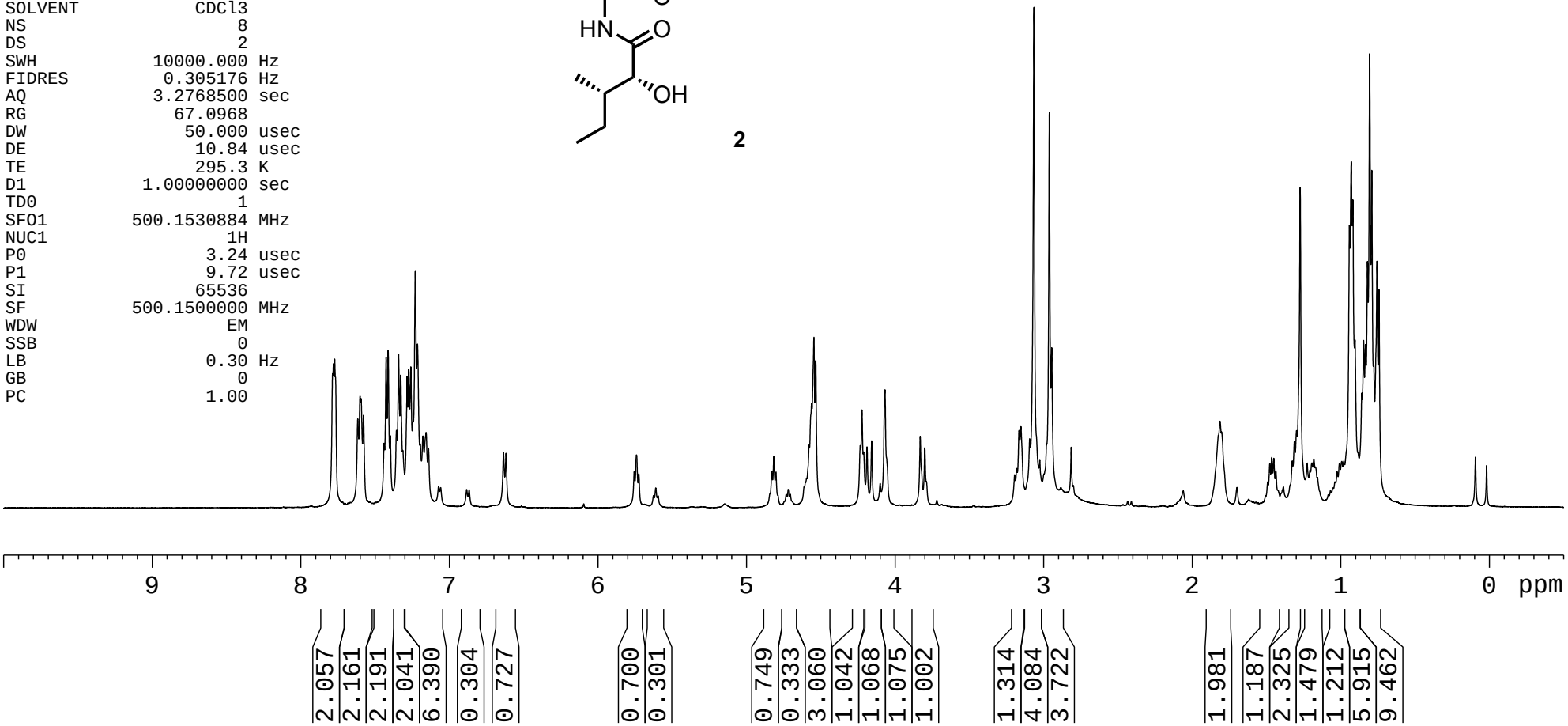

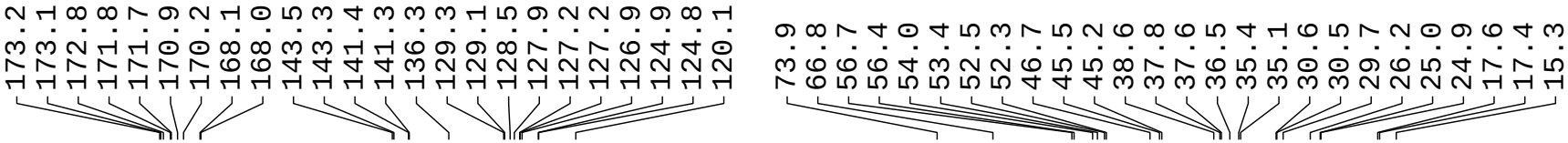


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FIDRES          0.919204 Hz
AQ             1.0879476 sec
RG                   101
DW                16.600 usec
DE                 6.50 usec
TE                296.1 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1
SFO1          125.7753938 MHz
NUC1                  13C
P0                  3.33 usec
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SF            125.7628175 MHz
WDW                   EM
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LB                  1.00 Hz
GB                     0
PC                  1.40
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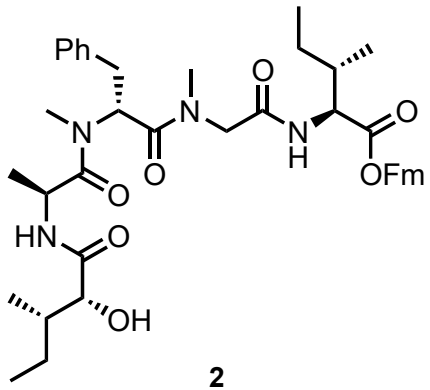

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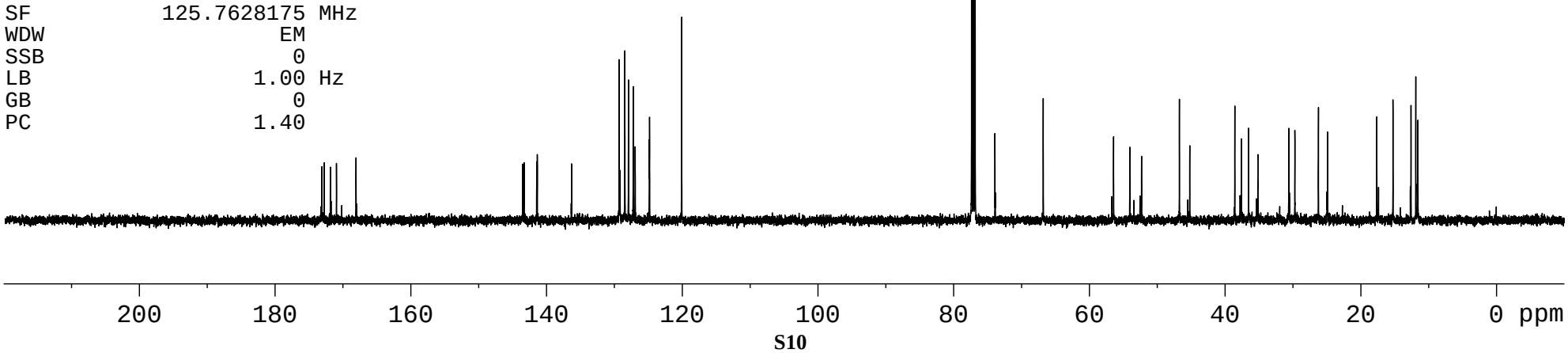

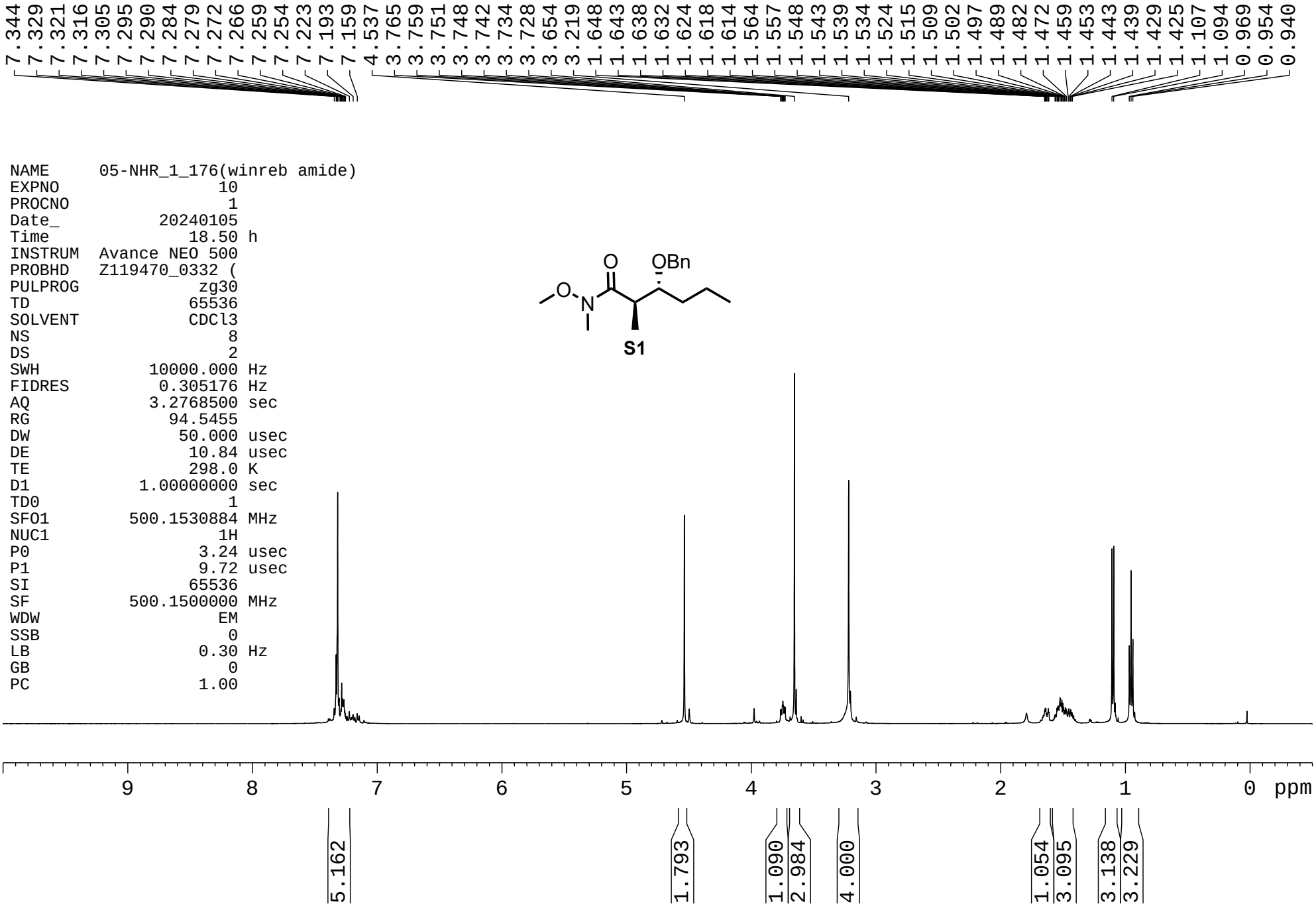
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TD 65536
SOLVENT CDCl3
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RG 94.5455
DW 50.000 usec
DE 10.84 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
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OBn
O
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8
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6
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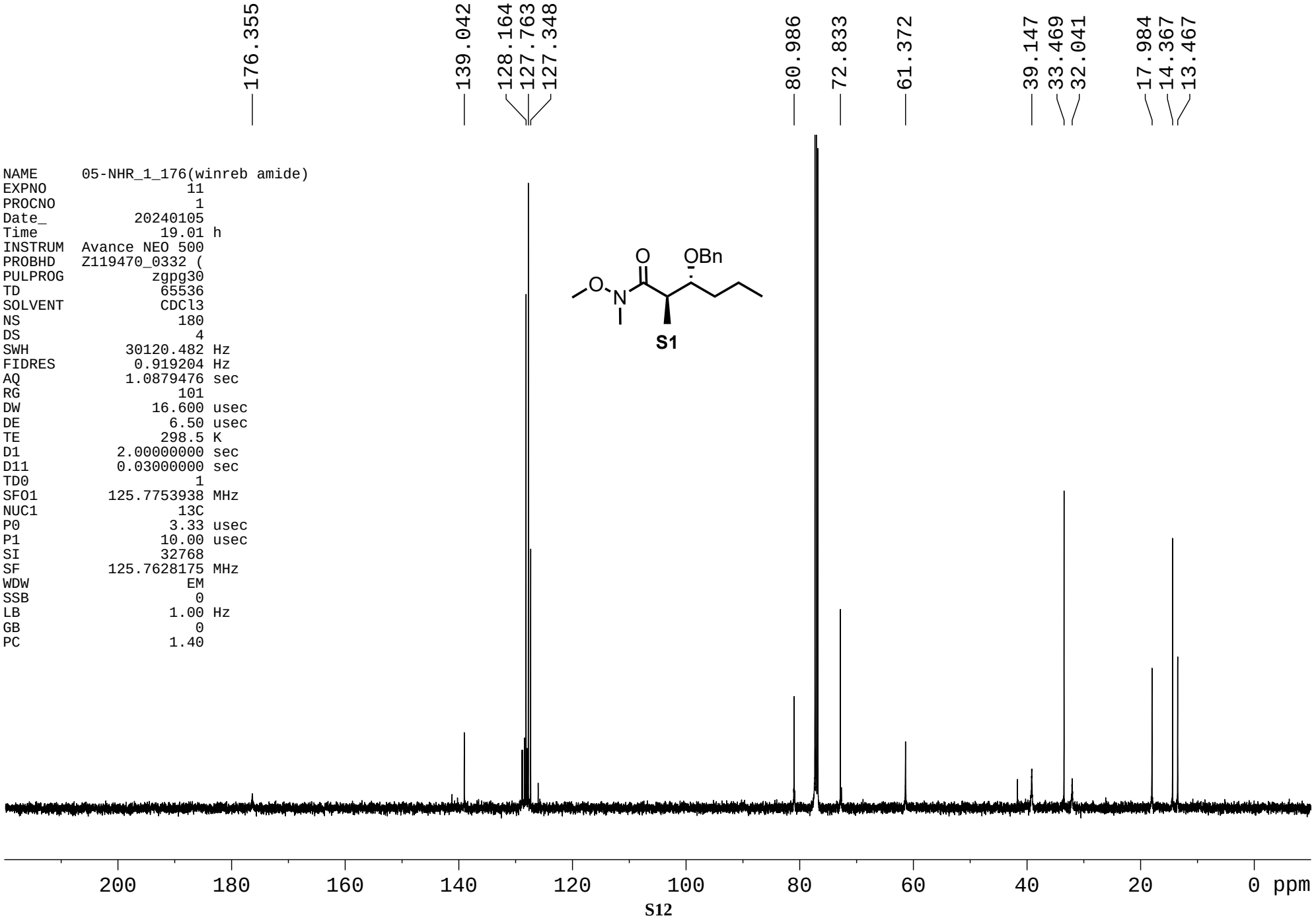
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13.467
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TD 65536
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FIDRES 0.919204 Hz
AQ 1.0879476 sec
RG 101
DW 16.600 usec
DE 6.50 usec
TE 298.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 125.7753938 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
SI 32768
SF 125.7628175 MHz
WDW EM
SSB 0
LB 1.00 Hz
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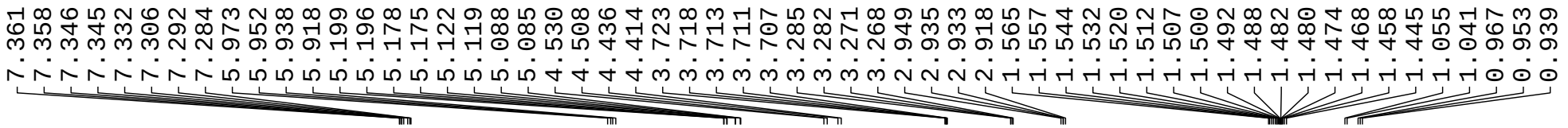


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PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                       8
DS                       2
SWH             10000.000 Hz
FIDRES              0.305176 Hz
AQ                3.2768500 sec
RG                      80
DW                   50.000 usec
DE                   10.84 usec
TE                   296.3 K
D1               1.00000000 sec
TD0                      1
SFO1           500.1530884 MHz
NUC1                    1H
P0                    3.24 usec
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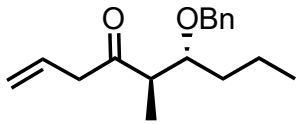

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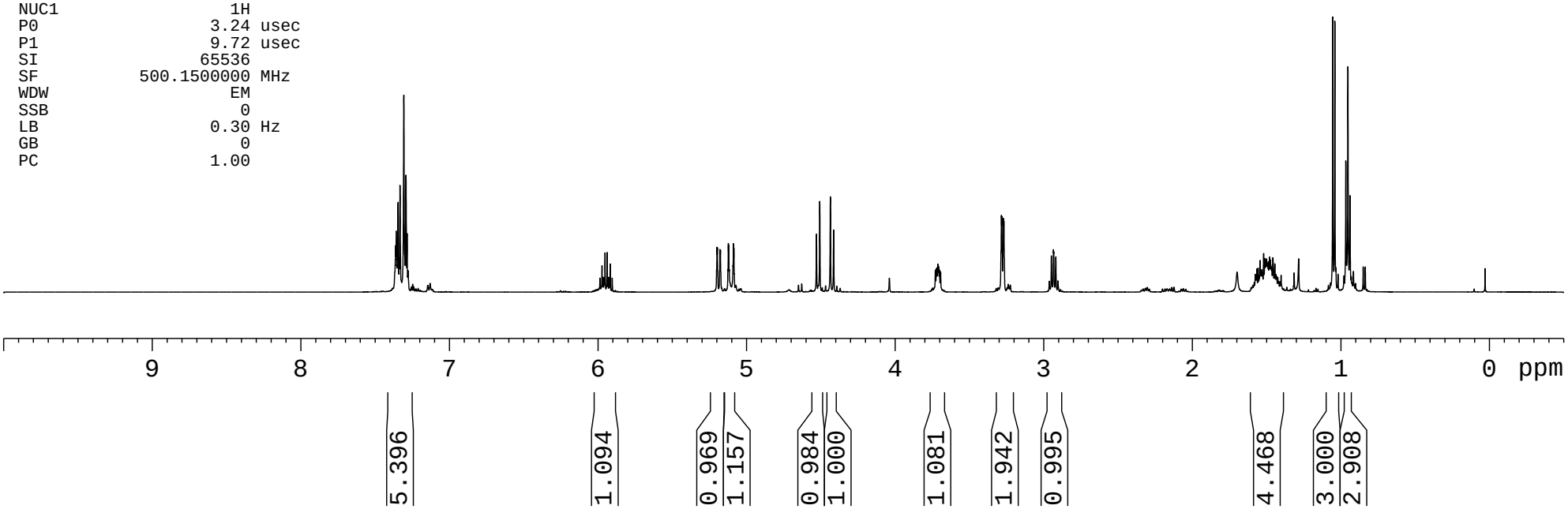
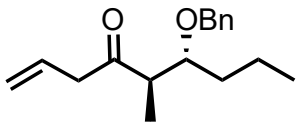
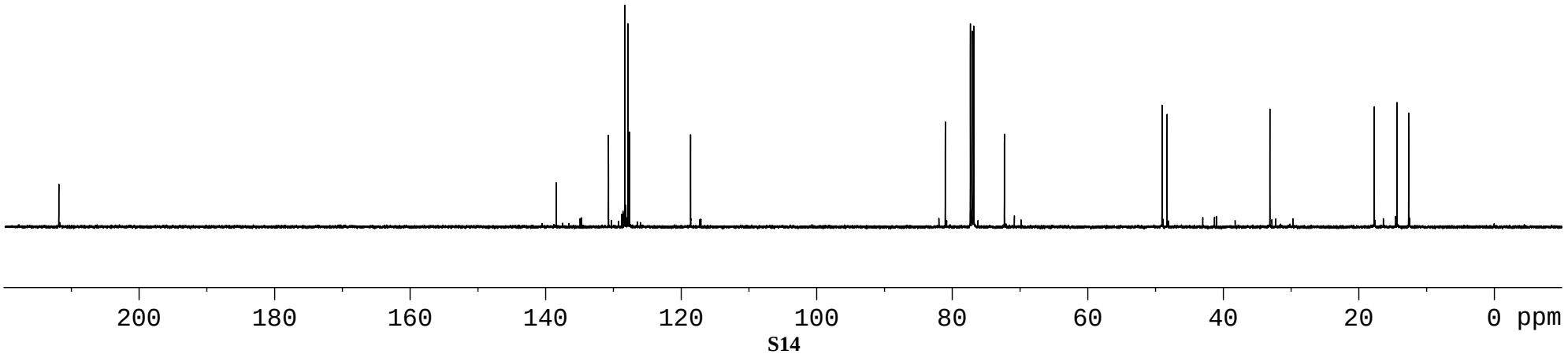


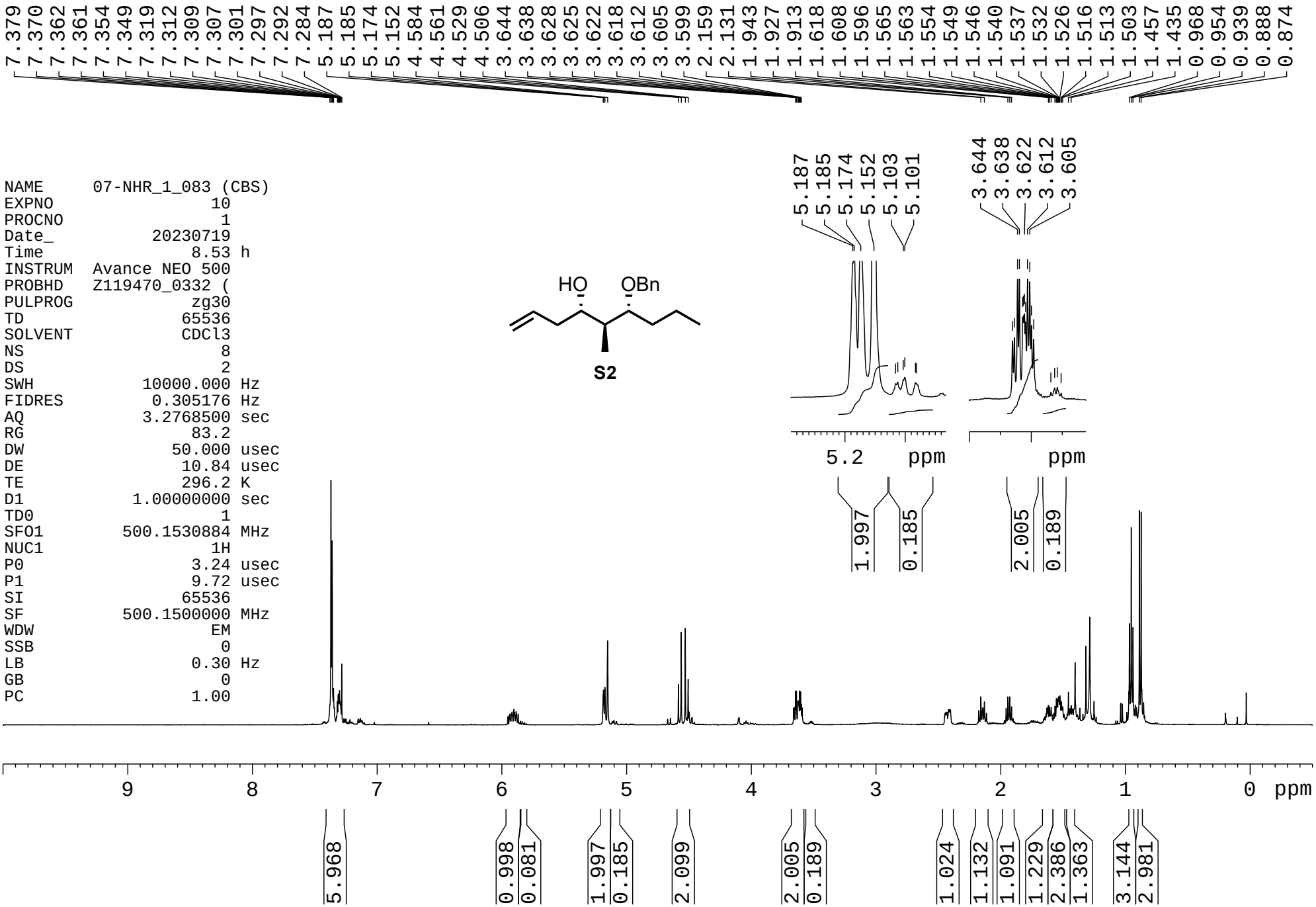
211.8
138.4
130.7
128.3
127.9
127.6
118.6
81.0
72.3
49.0
48.3
33.1
17.7
14.3
12.6

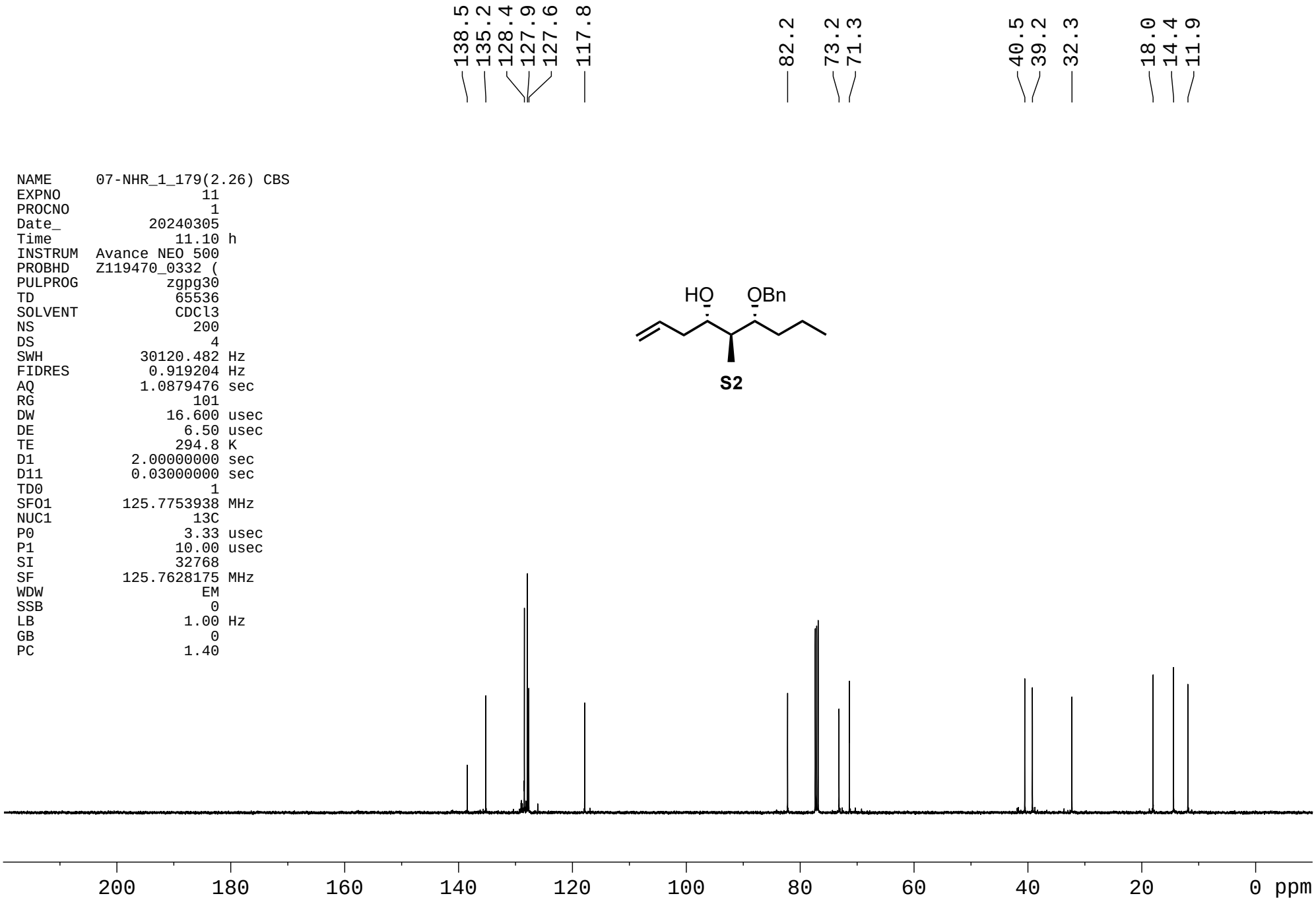
```
NAME      06-NHR_1_082(3) ketone
EXPNO                  11
PROCNO                  1
Date_            20230719
Time                8.49 h
INSTRUM   Avance NEO 500
PROBHD    Z119470_0332 (
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    188
DS                      4
SWH             30120.482 Hz
FIDRES           0.919204 Hz
AQ               1.0879476 sec
RG                    101
DW                  16.600 usec
DE                   6.50 usec
TE                  296.8 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1
SFO1          125.7753938 MHz
NUC1                  13C
P0                   3.33 usec
P1                  10.00 usec
SI                  32768
SF            125.7628175 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```

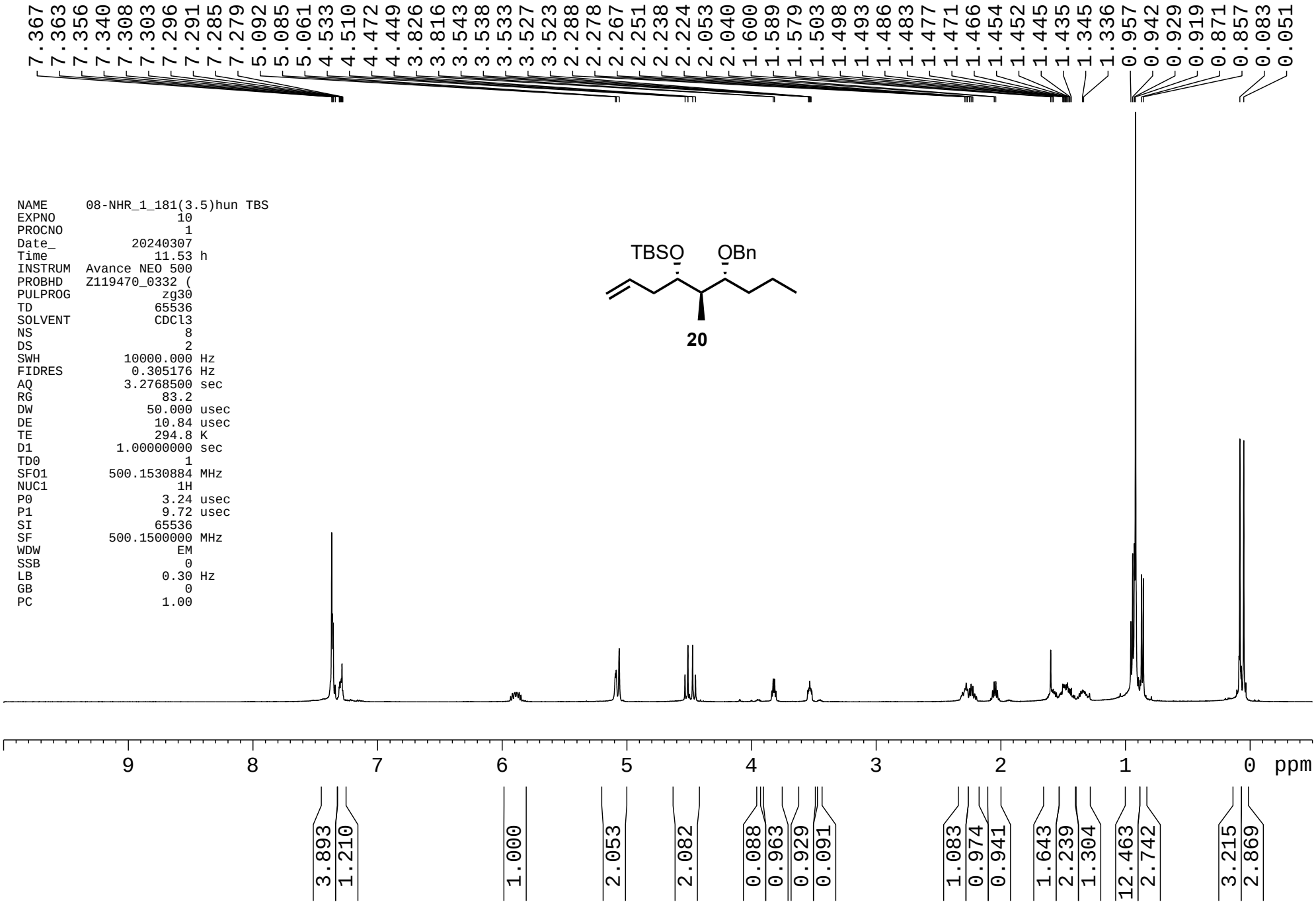


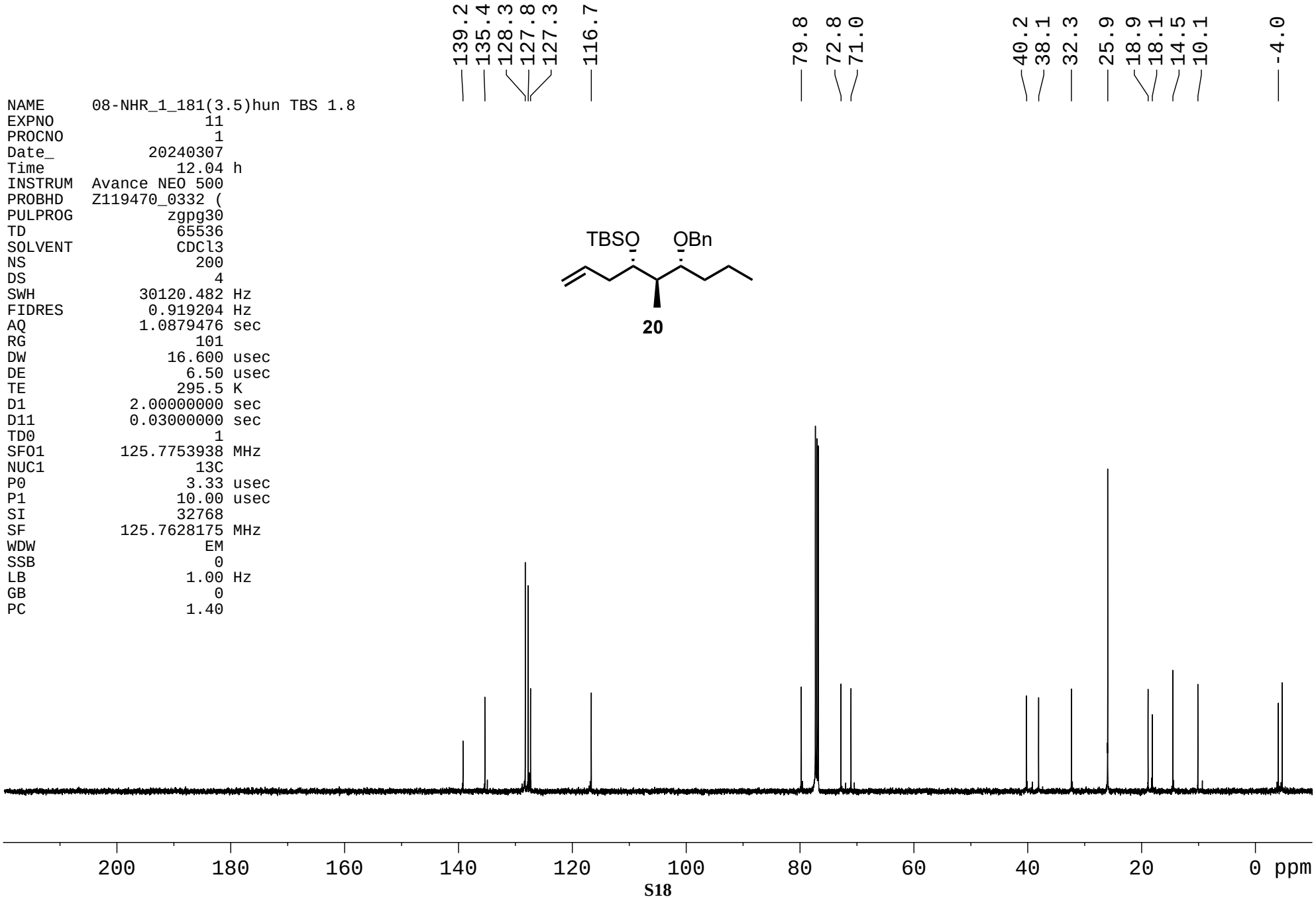
18

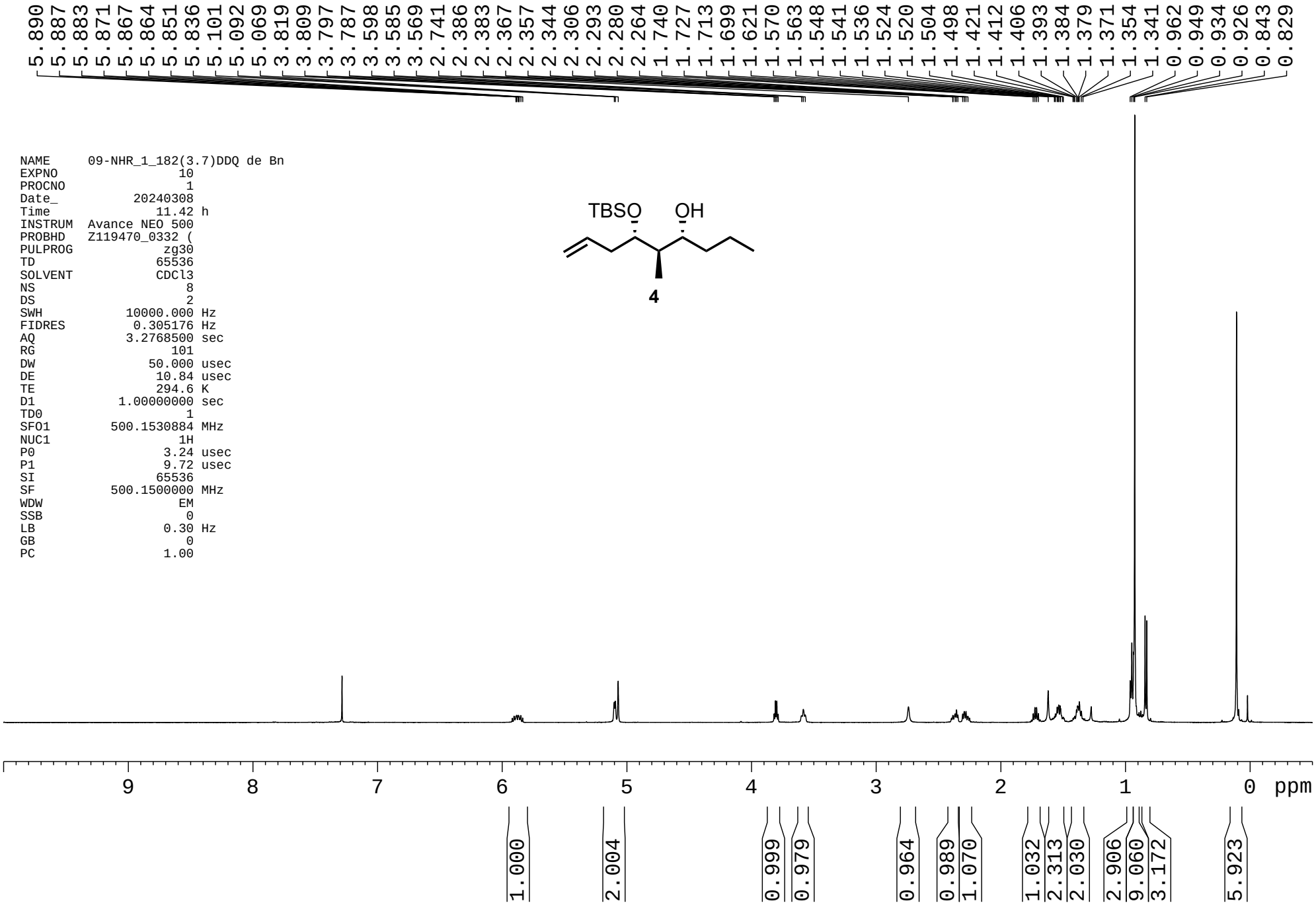


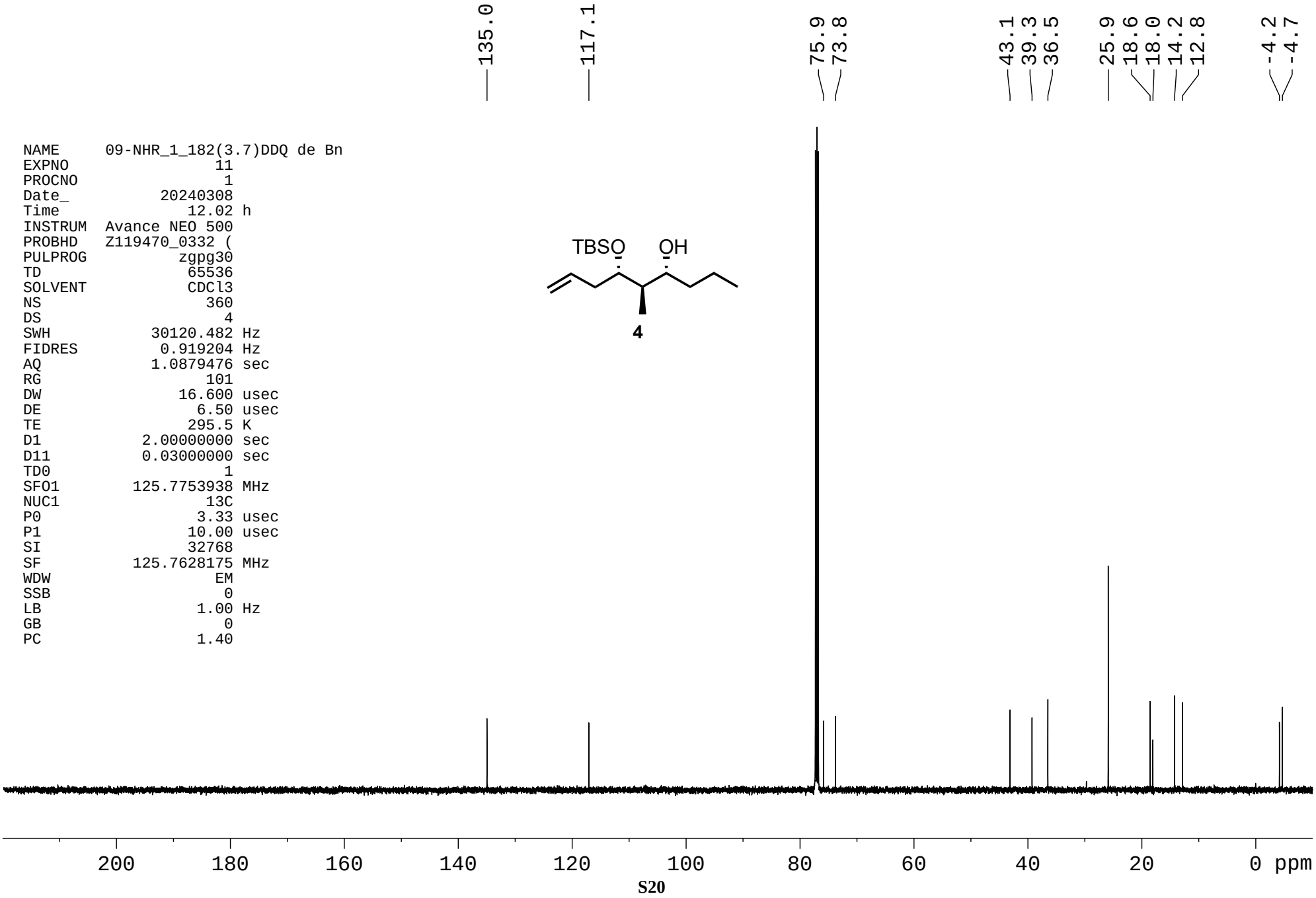

7.379 7.370 7.362 7.361 7.354 7.349 7.319 7.312 7.309 7.307 7.301 7.297 7.292 7.284 5.187 5.185 5.174 5.152 4.584 4.561 4.529 4.506 3.644 3.638 3.628 3.625 3.622 3.618 3.612 3.605 3.599 2.159 2.131 1.943 1.927 1.913 1.618 1.608 1.596 1.565 1.563 1.554 1.549 1.546 1.540 1.537 1.532 1.526 1.516 1.513 1.503 1.457 1.435 0.968 0.954 0.939 0.888 0.874
NAME 07-NHR_1_083 (CBS)
EXPNO 10
PROCNO 1
Date_ 20230719
Time 8.53 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 3.2768500 sec
RG 83.2
DW 50.000 usec
DE 10.84 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
HO
OBn
S2
5.187 5.185 5.174 5.152 5.103 5.101
3.644 3.638 3.622 3.612 3.605
5.2 ppm
ppm
1.997 0.185 2.005 0.189
9 8 7 6 5 4 3 2 1 0 ppm
5.968 0.998 0.081 1.997 0.185 2.099 2.005 0.189 1.024 1.132 1.091 1.229 2.386 1.363 3.144 2.981

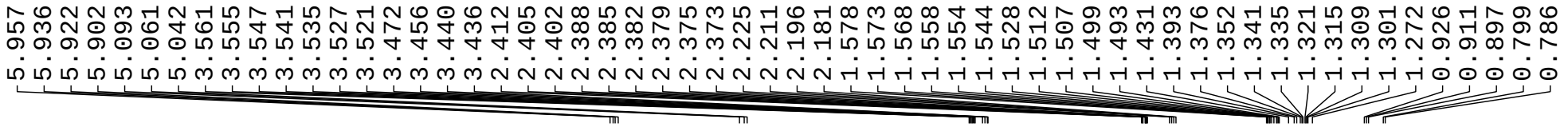

138.5
135.2
128.4
127.9
127.6
117.8
82.2
73.2
71.3
40.5
39.2
32.3
18.0
14.4
11.9
NAME 07-NHR_1_179(2.26) CBS
EXPNO 11
PROCNO 1
Date_ 20240305
Time 11.10 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 4
SWH 30120.482 Hz
FIDRES 0.919204 Hz
AQ 1.0879476 sec
RG 101
DW 16.600 usec
DE 6.50 usec
TE 294.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 125.7753938 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
SI 32768
SF 125.7628175 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
HO
OBn
S2
200
180
160
140
120
100
80
60
40
20
0 ppm


7.367
7.363
7.356
7.340
7.308
7.303
7.296
7.291
7.285
7.279
5.092
5.085
5.061
4.533
4.510
4.472
4.449
3.826
3.816
3.543
3.538
3.533
3.527
3.523
2.288
2.278
2.267
2.251
2.238
2.224
2.053
2.040
1.600
1.589
1.579
1.503
1.498
1.493
1.486
1.483
1.477
1.471
1.466
1.454
1.452
1.445
1.435
1.345
1.336
0.957
0.942
0.929
0.919
0.871
0.857
0.083
0.051
NAME 08-NHR_1_181(3.5)hun TBS
EXPNO 10
PROCNO 1
Date_ 20240307
Time 11.53 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 3.2768500 sec
RG 83.2
DW 50.000 usec
DE 10.84 usec
TE 294.8 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
TBSO
OBn
20
9
8
7
6
5
4
3
2
1
0
ppm
3.893
1.210
1.000
2.053
2.082
0.088
0.963
0.929
0.091
1.083
0.974
0.941
1.643
2.239
1.304
12.463
2.742
3.215
2.869

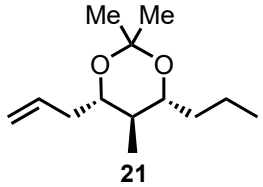

139.2
135.4
128.3
127.8
127.3
116.7
79.8
72.8
71.0
40.2
38.1
32.3
25.9
18.9
18.1
14.5
10.1
-4.0
NAME 08-NHR_1_181(3.5)hun TBS 1.8
EXPNO 11
PROCNO 1
Date_ 20240307
Time 12.04 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 4
SWH 30120.482 Hz
FIDRES 0.919204 Hz
AQ 1.0879476 sec
RG 101
DW 16.600 usec
DE 6.50 usec
TE 295.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 125.7753938 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
SI 32768
SF 125.7628175 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
TBSO
OBn
20
200
180
160
140
120
100
80
60
40
20
0 ppm


5.890
5.887
5.883
5.871
5.867
5.864
5.851
5.836
5.101
5.092
5.069
3.819
3.809
3.797
3.787
3.598
3.585
3.569
2.741
2.386
2.383
2.367
2.357
2.344
2.306
2.293
2.280
2.264
1.740
1.727
1.713
1.699
1.621
1.570
1.563
1.548
1.541
1.536
1.524
1.520
1.504
1.498
1.421
1.412
1.406
1.393
1.384
1.379
1.371
1.354
1.341
0.962
0.949
0.934
0.926
0.843
0.829
NAME 09-NHR_1_182(3.7)DDQ de Bn
EXPNO 10
PROCNO 1
Date_ 20240308
Time 11.42 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 3.2768500 sec
RG 101
DW 50.000 usec
DE 10.84 usec
TE 294.6 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
TBSO
OH
4
9
8
7
6
5
4
3
2
1
0
ppm
1.000
2.004
0.999
0.979
0.964
0.989
1.070
1.032
2.313
2.030
2.906
9.060
3.172
5.923

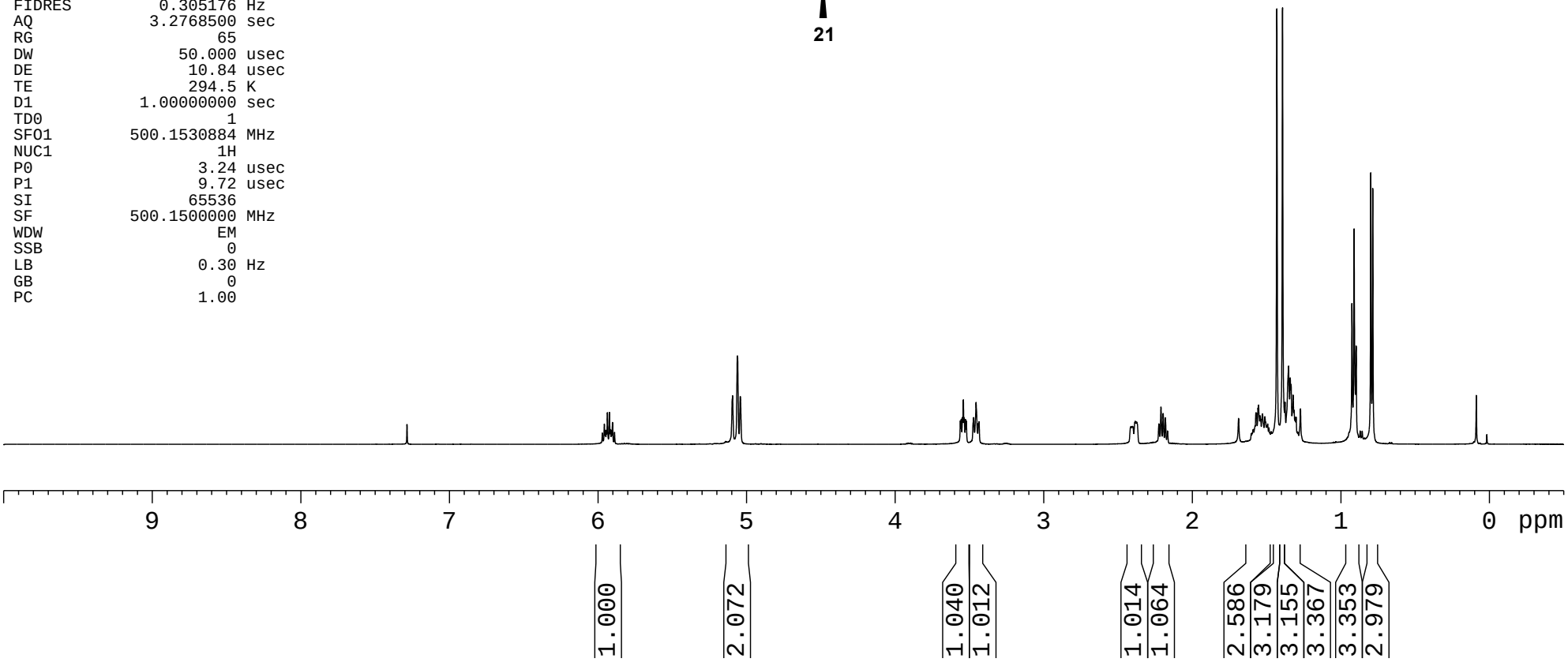

135.0
117.1
75.9
73.8
43.1
39.3
36.5
25.9
18.6
18.0
14.2
12.8
-4.2
-4.7
NAME 09-NHR_1_182(3.7)DDQ de Bn
EXPNO 11
PROCNO 1
Date_ 20240308
Time 12.02 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 360
DS 4
SWH 30120.482 Hz
FIDRES 0.919204 Hz
AQ 1.0879476 sec
RG 101
DW 16.600 usec
DE 6.50 usec
TE 295.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 125.7753938 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
SI 32768
SF 125.7628175 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
TBSO
OH
4
200
180
160
140
120
100
80
60
40
20
0 ppm

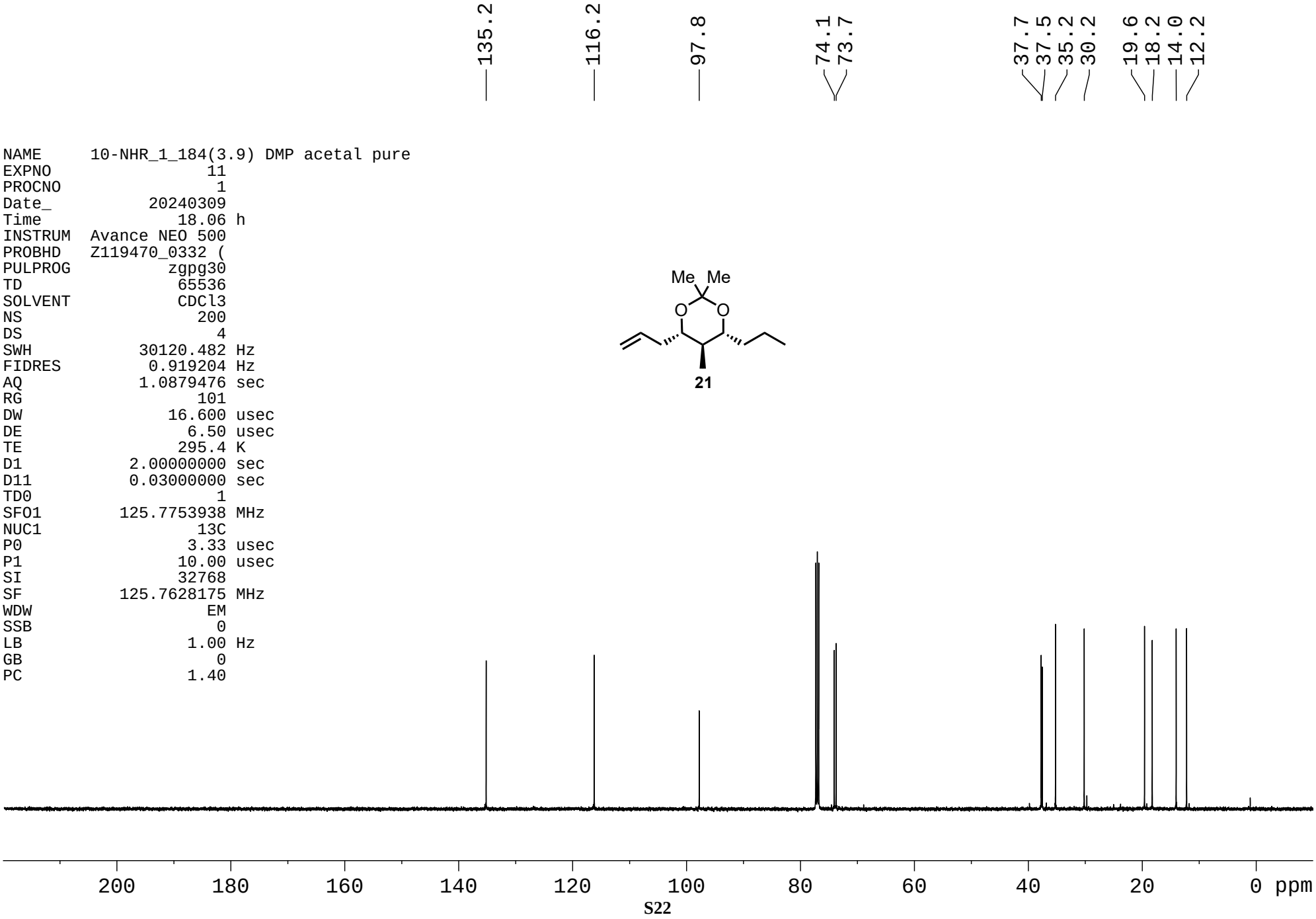


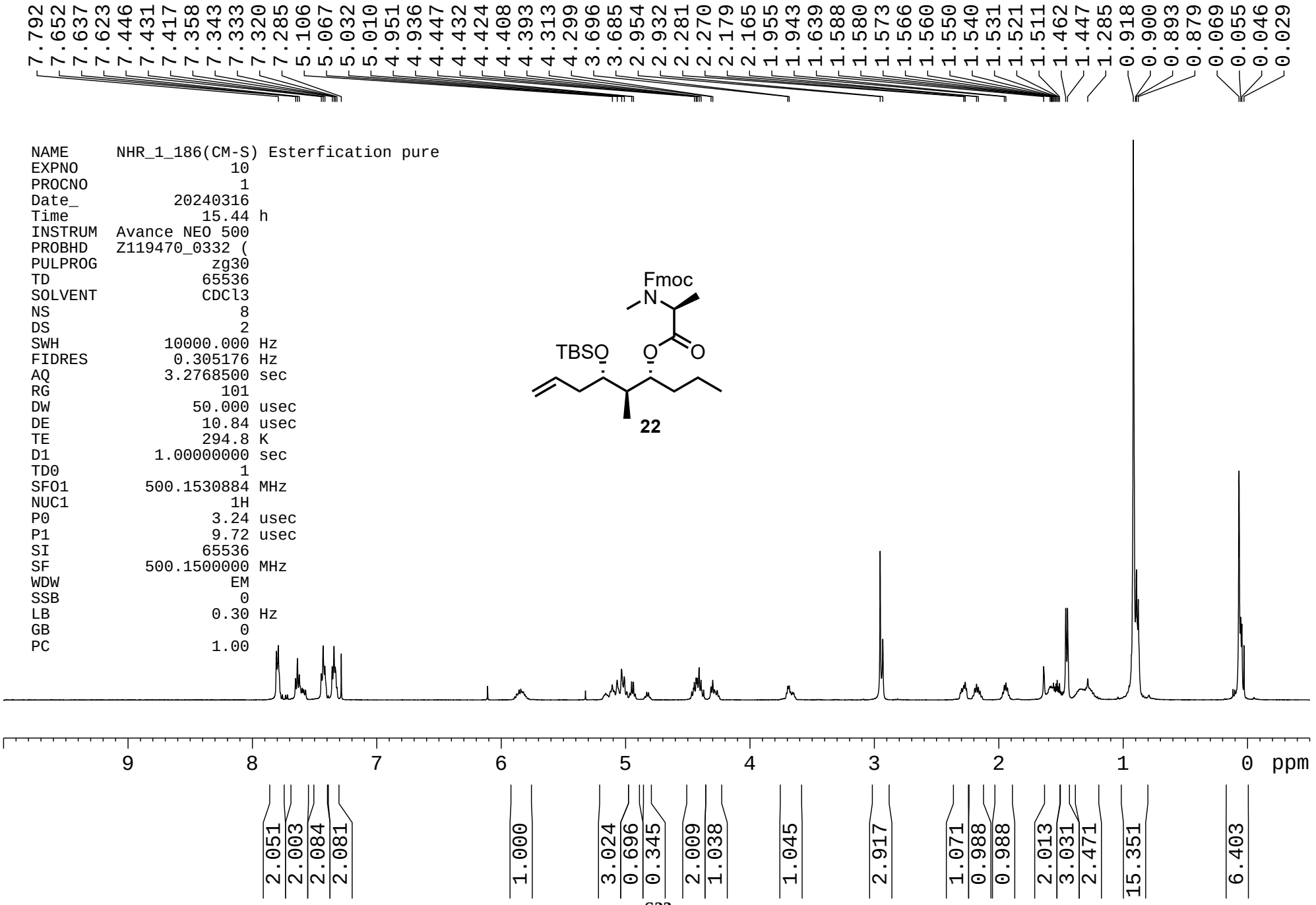

```
NAME      10-NHR_1_184(3.9) DMP acetal pure
EXPNO                 10
PROCNO                 1
Date_           20240309
Time                17.55 h
INSTRUM   Avance NEO 500
PROBHD    Z119470_0332 (
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                      8
DS                      2
SWH            10000.000 Hz
FIDRES          0.305176 Hz
AQ              3.2768500 sec
RG                     65
DW                 50.000 usec
DE                 10.84 usec
TE                 294.5 K
D1            1.00000000 sec
TD0                     1
SFO1          500.1530884 MHz
NUC1                   1H
P0                  3.24 usec
P1                  9.72 usec
SI                  65536
SF            500.1500000 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```

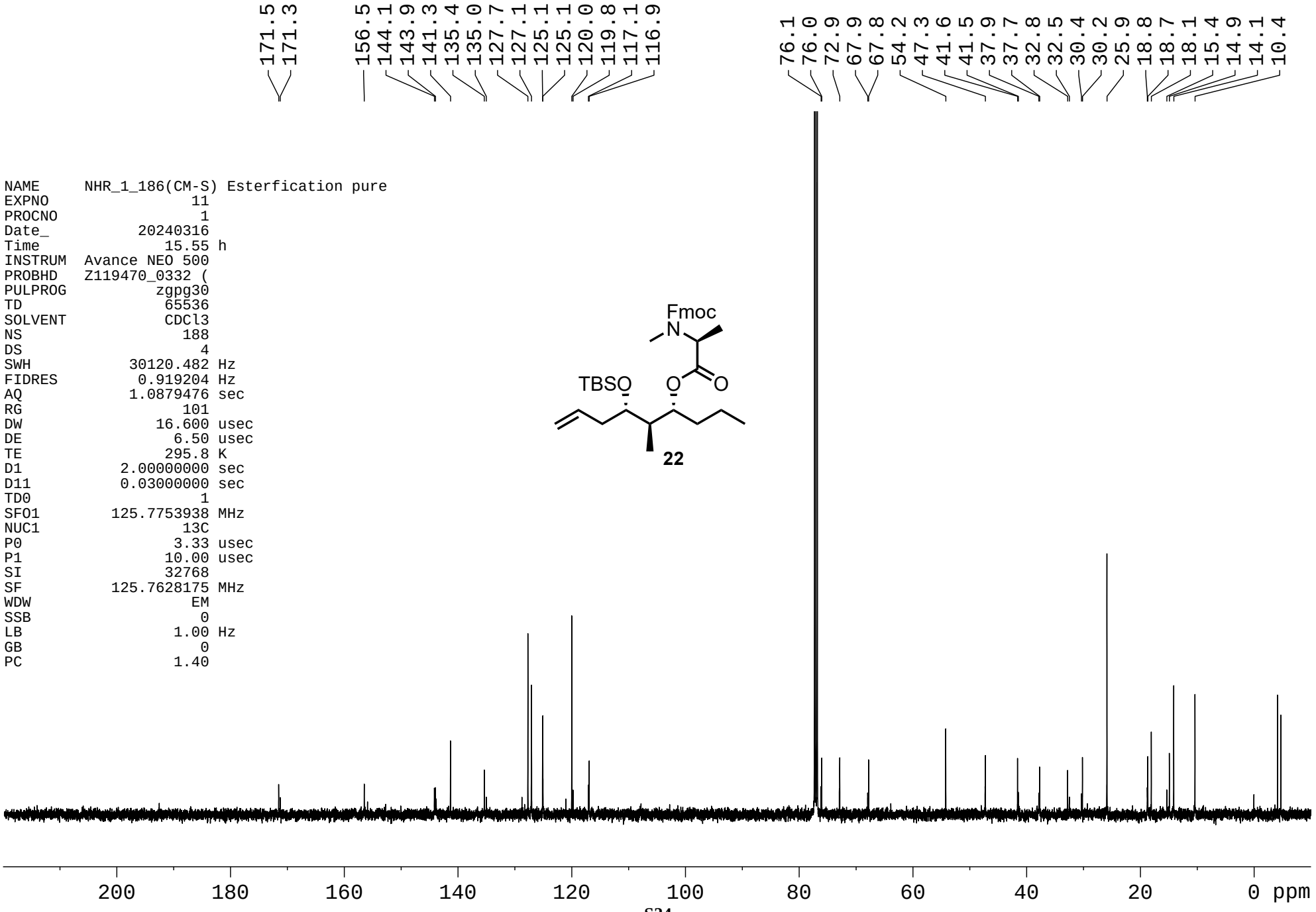


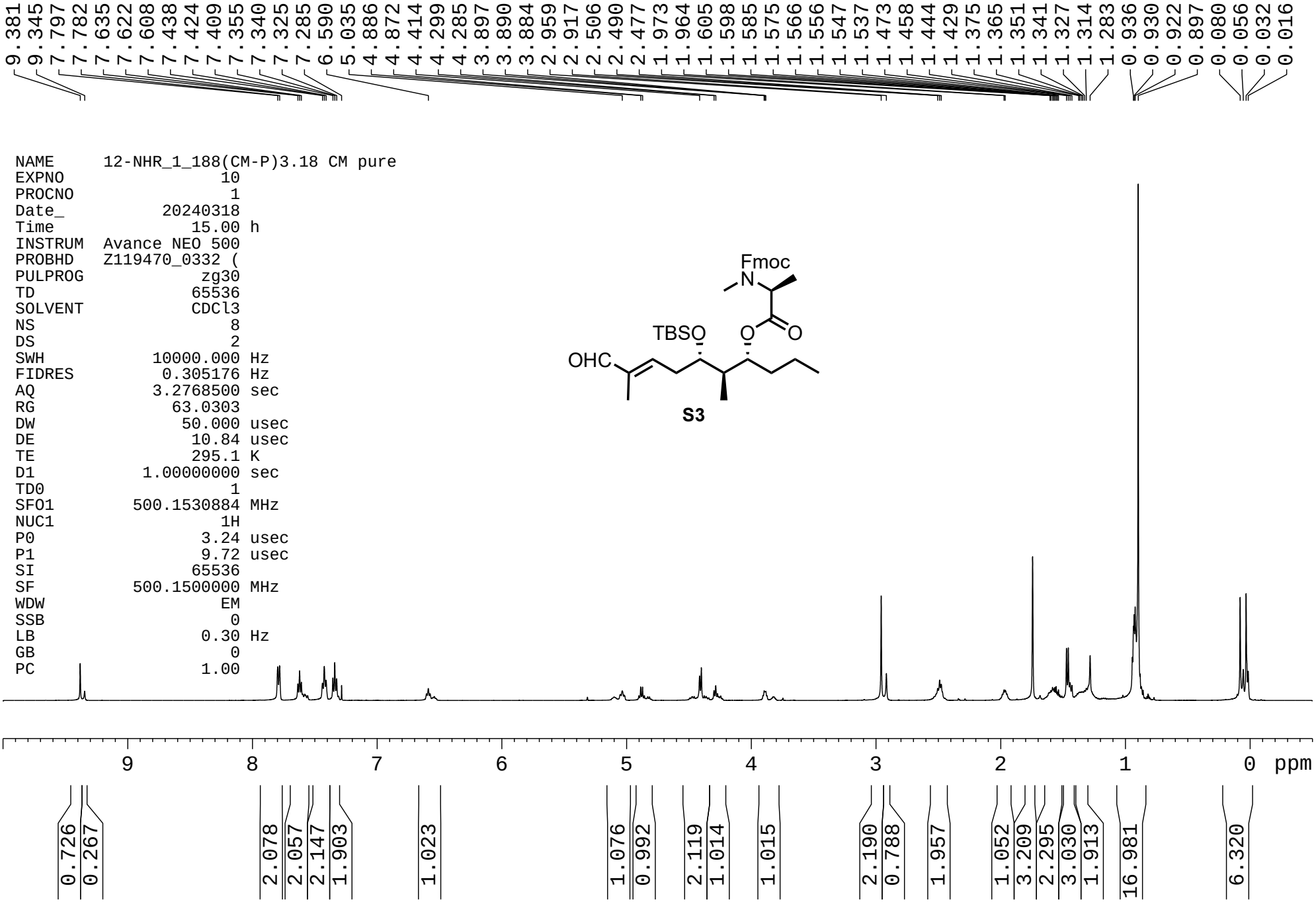
21




135.2
116.2
97.8
74.1
73.7
37.7
37.5
35.2
30.2
19.6
18.2
14.0
12.2
NAME 10-NHR_1_184(3.9) DMP acetal pure
EXPNO 11
PROCNO 1
Date_ 20240309
Time 18.06 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 4
SWH 30120.482 Hz
FIDRES 0.919204 Hz
AQ 1.0879476 sec
RG 101
DW 16.600 usec
DE 6.50 usec
TE 295.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 125.7753938 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
SI 32768
SF 125.7628175 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Me Me
O
O
21
200
180
160
140
120
100
80
60
40
20
0 ppm


7.792 7.652 7.637 7.623 7.446 7.431 7.417 7.358 7.343 7.333 7.320 7.285 5.106 5.067 5.032 5.010 4.951 4.936 4.447 4.432 4.424 4.408 4.393 4.313 4.299 3.696 3.685 2.954 2.932 2.281 2.270 2.179 2.165 1.955 1.943 1.639 1.588 1.580 1.573 1.566 1.560 1.550 1.540 1.531 1.521 1.511 1.462 1.447 1.285 0.918 0.900 0.893 0.879 0.069 0.055 0.046 0.029
NAME NHR_1_186(CM-S) Esterfication pure
EXPNO 10
PROCNO 1
Date_ 20240316
Time 15.44 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 3.2768500 sec
RG 101
DW 50.000 usec
DE 10.84 usec
TE 294.8 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Fmoc
N
TBSO
O
O
22
9 8 7 6 5 4 3 2 1 0 ppm
2.051 2.003 2.084 2.081 1.000 3.024 0.696 0.345 2.009 1.038 1.045 2.917 1.071 0.988 0.988 2.013 3.031 2.471 15.351 6.403


171.5
171.3
156.5
144.1
143.9
141.3
135.4
135.0
127.7
127.1
125.1
125.1
120.0
119.8
117.1
116.9
76.1
76.0
72.9
67.9
67.8
54.2
47.3
41.6
41.5
37.9
37.7
32.8
32.5
30.4
30.2
25.9
18.8
18.7
18.1
15.4
14.9
14.1
10.4
NAME NHR_1_186(CM-S) Esterfication pure
EXPNO 11
PROCNO 1
Date_ 20240316
Time 15.55 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 188
DS 4
SWH 30120.482 Hz
FIDRES 0.919204 Hz
AQ 1.0879476 sec
RG 101
DW 16.600 usec
DE 6.50 usec
TE 295.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 125.7753938 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
SI 32768
SF 125.7628175 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Fmoc
N
TBSO
O
O
22
200
180
160
140
120
100
80
60
40
20
0 ppm


9.381 9.345 7.797 7.782 7.635 7.622 7.608 7.438 7.424 7.409 7.355 7.340 7.325 7.285 7.590 5.035 4.886 4.872 4.414 4.299 4.285 3.897 3.890 3.884 2.959 2.917 2.506 2.490 2.477 1.973 1.964 1.605 1.598 1.585 1.575 1.566 1.556 1.547 1.537 1.473 1.458 1.444 1.429 1.375 1.365 1.351 1.341 1.327 1.314 1.283 0.936 0.930 0.922 0.897 0.080 0.056 0.032 0.016
NAME 12-NHR_1_188(CM-P)3.18 CM pure
EXPNO 10
PROCNO 1
Date_ 20240318
Time 15.00 h
INSTRUM Avance NEO 500
PROBHD Z119470_0332 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 3.2768500 sec
RG 63.0303
DW 50.000 usec
DE 10.84 usec
TE 295.1 K
D1 1.00000000 sec
TD0 1
SFO1 500.1530884 MHz
NUC1 1H
P0 3.24 usec
P1 9.72 usec
SI 65536
SF 500.1500000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Fmoc
N
TBSO
O
O
OHC
S3
9 8 7 6 5 4 3 2 1 0 ppm
0.726 0.267 2.078 2.057 2.147 1.903 1.023 1.076 0.992 2.119 1.014 1.015 2.190 0.788 1.957 1.052 3.209 2.295 3.030 1.913 16.981 6.320

195.3
195.0
171.9
156.5
152.0
151.0
144.0
143.9
141.3
140.3
127.7
127.1
125.0
120.0
75.8
71.4
67.8
54.2
47.2
42.6
33.4
32.2
30.2
25.8
18.5
18.0
14.9
14.1
10.2
9.4
-4.4
-4.7

```
NAME      12-NHR_1_188(CM-P)3.18 CM pure
EXPNO                 11
PROCNO                 1
Date_           20240318
Time                15.11 h
INSTRUM   Avance NEO 500
PROBHD    Z119470_0332 (
PULPROG             zgpg30
TD                  65536
SOLVENT               CDCl3
NS                    188
DS                      4
SWH             30120.482 Hz
FIDRES           0.919204 Hz
AQ               1.0879476 sec
RG                    101
DW                  16.600 usec
DE                   6.50 usec
TE                  295.8 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1
SFO1          125.7753938 MHz
NUC1                  13C
P0                   3.33 usec
P1                  10.00 usec
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SF            125.7628175 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
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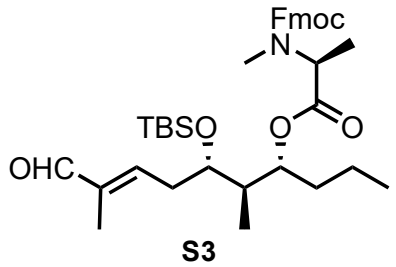
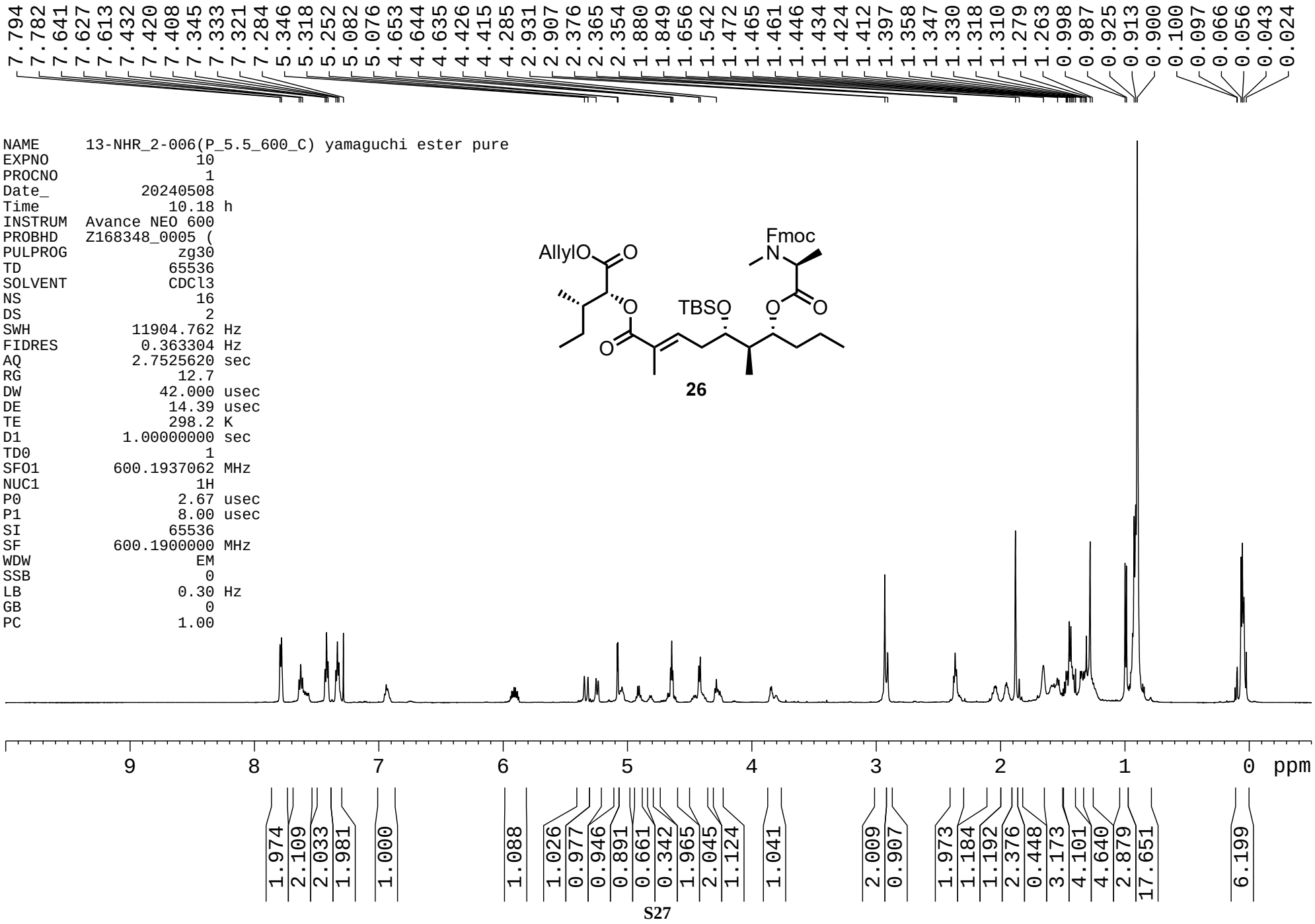


S3

200 180 160 140 120 100 80 60 40 20 0 ppm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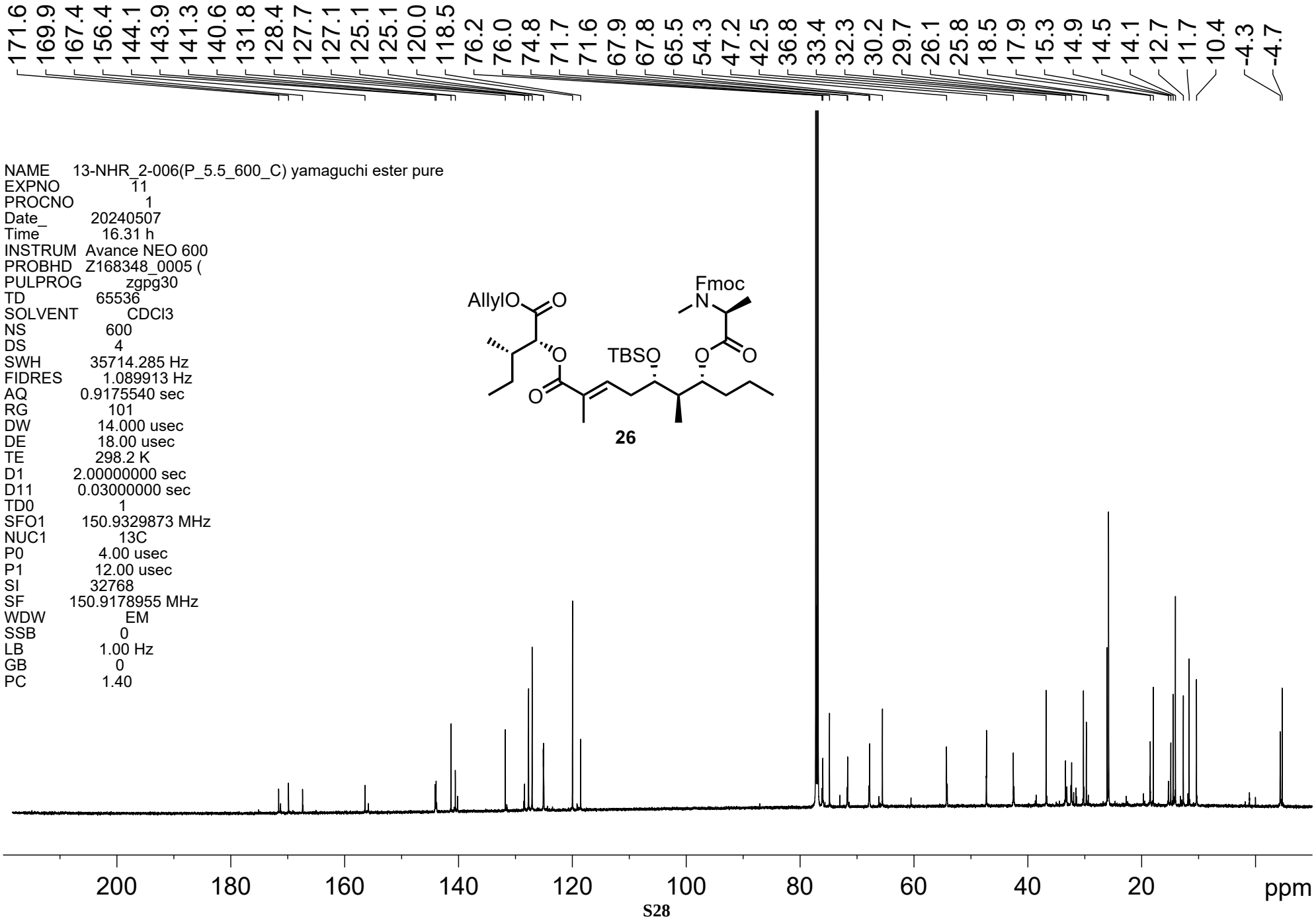
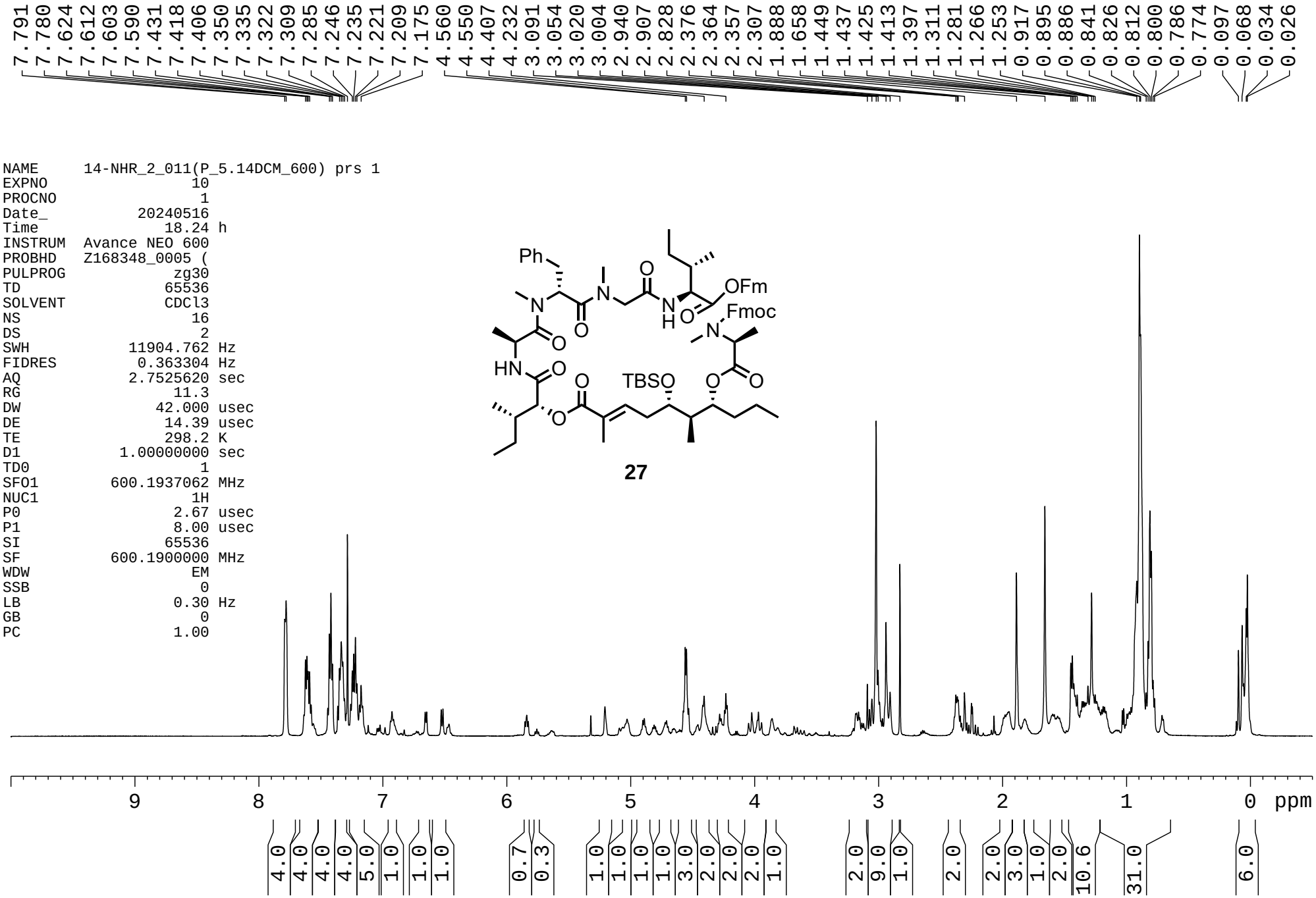
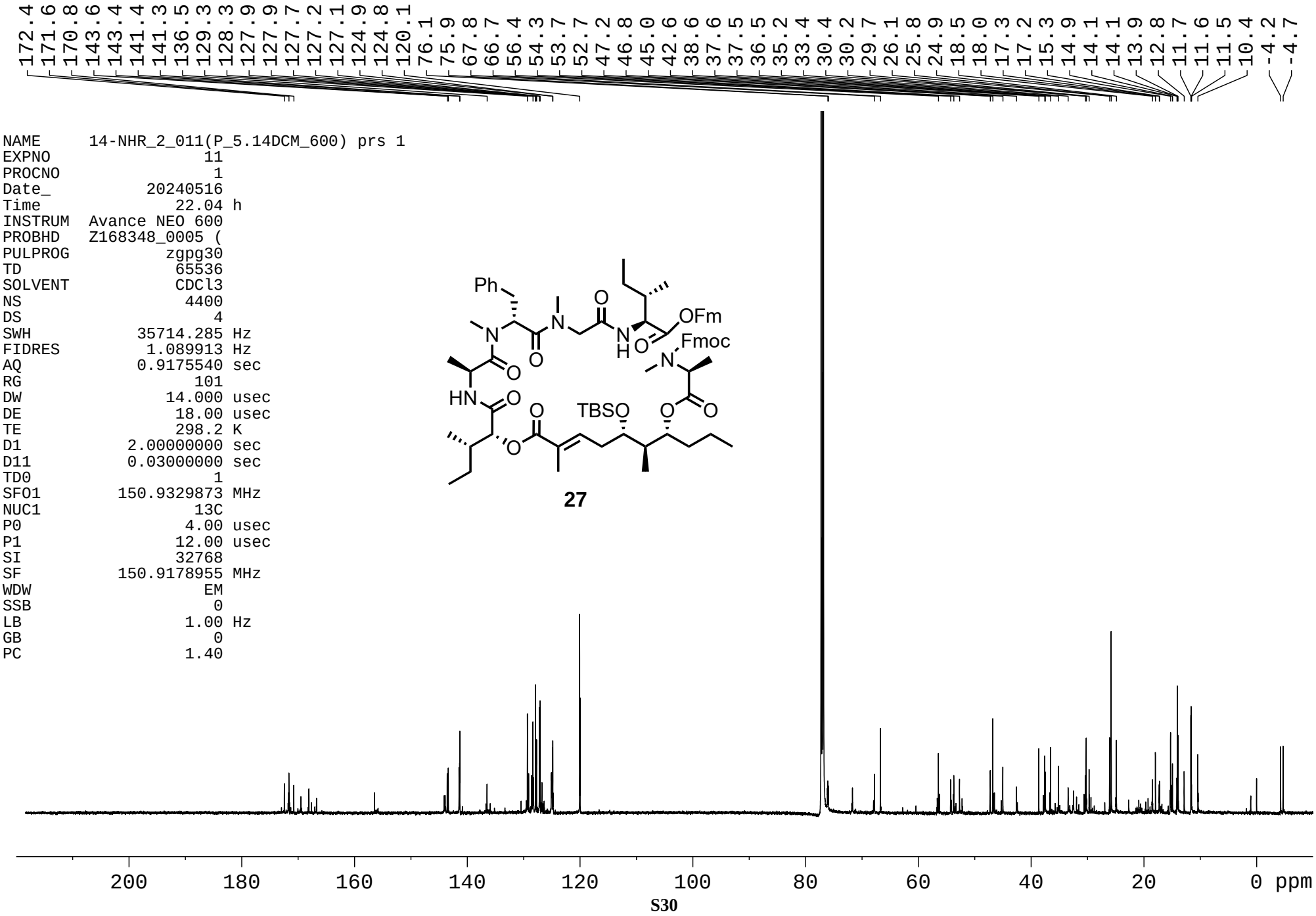
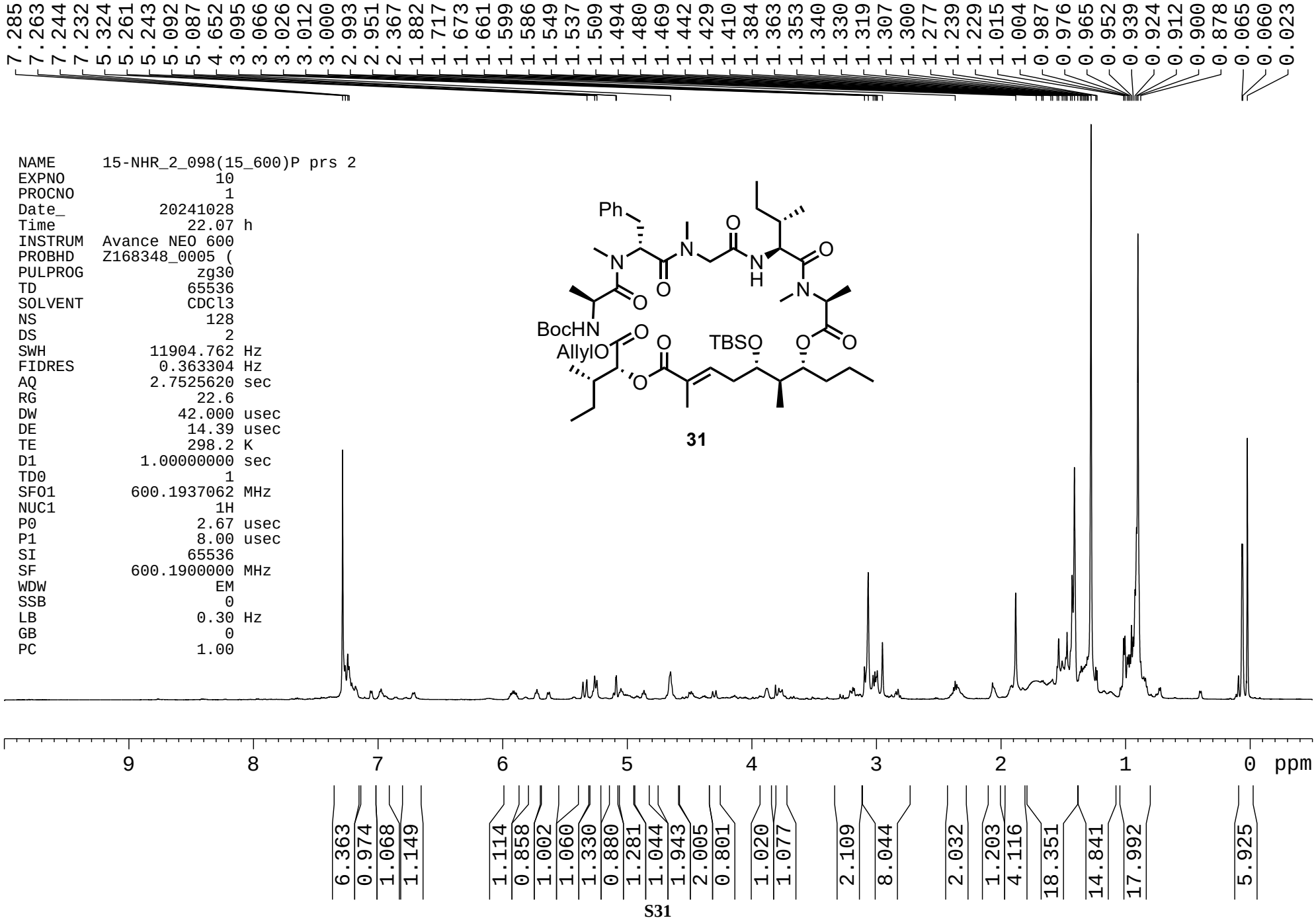
NAME 13-NHR_2-006(P_5.5_600_C) yamaguchi ester pure
EXPNO 10
PROCNO 1
Date_ 20240508
Time 10.18 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 11904.762 Hz
FIDRES 0.363304 Hz
AQ 2.7525620 sec
RG 12.7
DW 42.000 usec
DE 14.39 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 600.1937062 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 600.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
AllylO
O
O
O
TBSO
Fmoc
N
O
O
O
9 8 7 6 5 4 3 2 1 0 ppm
1.974 2.109 2.033 1.981 1.000 1.088 1.026 0.977 0.946 0.891 0.661 0.342 1.965 2.045 1.124 1.041 2.009 0.907 1.973 1.184 1.192 2.376 0.448 3.173 4.101 4.640 2.879 17.651 6.199

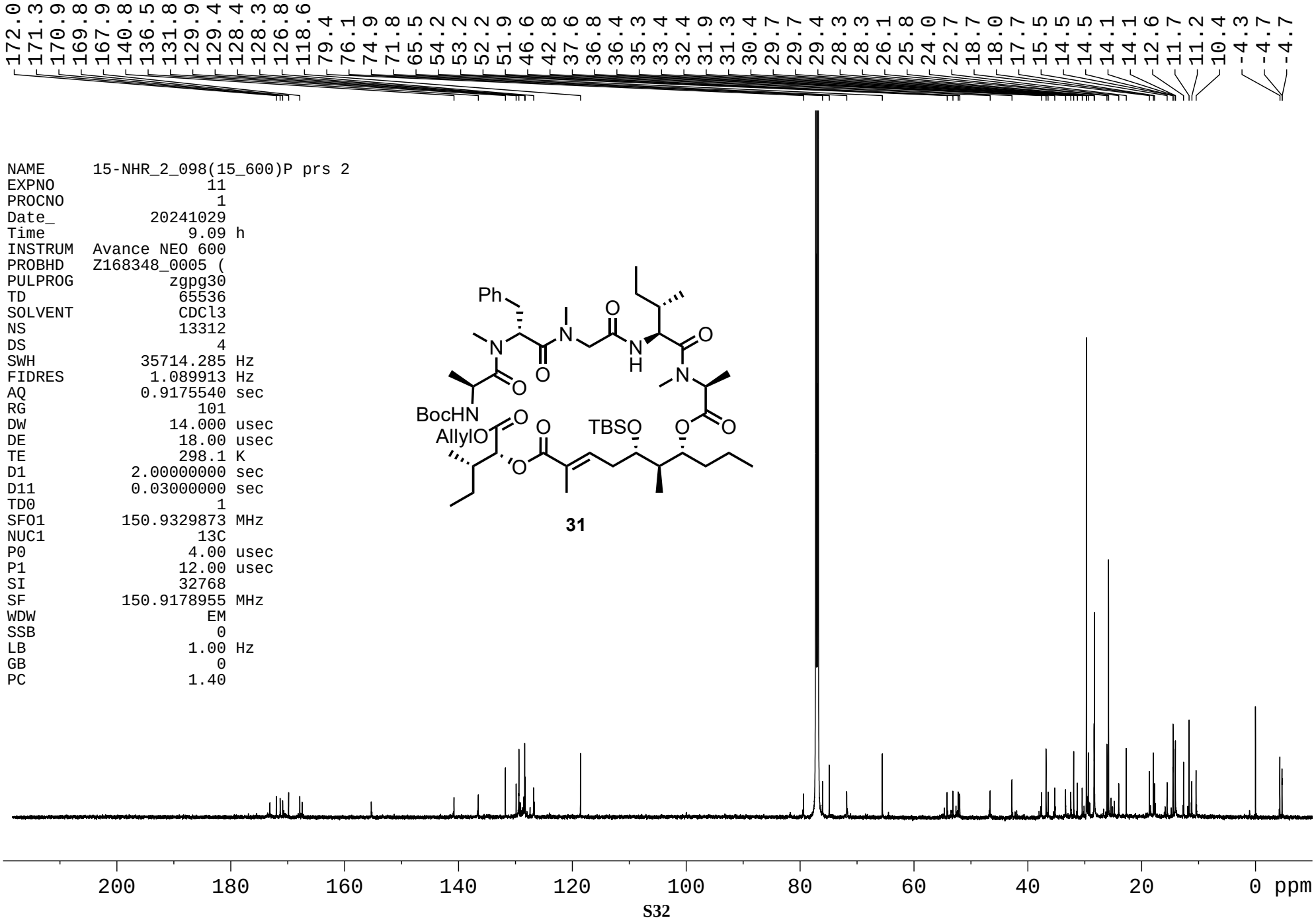
26

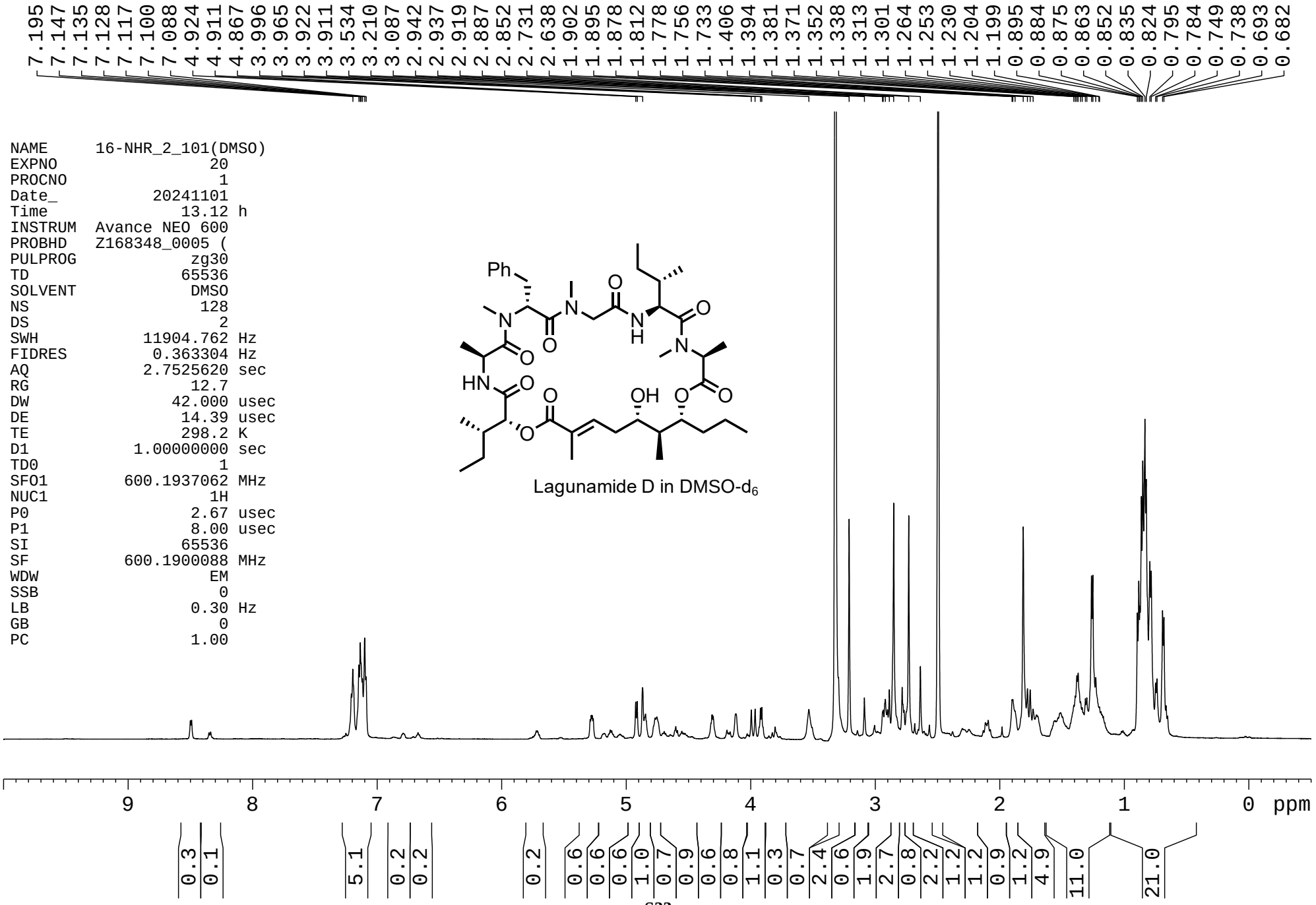

171.6
169.9
167.4
156.4
144.1
143.9
141.3
140.6
131.8
128.4
127.7
127.1
125.1
125.1
120.0
118.5
76.2
76.0
74.8
71.7
71.6
67.9
67.8
65.5
54.3
47.2
42.5
36.8
33.4
32.3
30.2
29.7
26.1
25.8
18.5
17.9
15.3
14.9
14.5
14.1
12.7
11.7
10.4
-4.3
-4.7
NAME 13-NHR_2-006(P_5.5_600_C) yamaguchi ester pure
EXPNO 11
PROCNO 1
Date_ 20240507
Time 16.31 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 600
DS 4
SWH 35714.285 Hz
FIDRES 1.089913 Hz
AQ 0.9175540 sec
RG 101
DW 14.000 usec
DE 18.00 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 150.9329873 MHz
NUC1 13C
P0 4.00 usec
P1 12.00 usec
SI 32768
SF 150.9178955 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
AllylO
O
O
O
TBSO
Fmoc
N
O
O
26
200
180
160
140
120
100
80
60
40
20
ppm


7.791 7.780 7.624 7.612 7.603 7.590 7.431 7.418 7.406 7.350 7.335 7.322 7.309 7.285 7.246 7.235 7.221 7.209 7.175
4.560 4.550 4.407 4.232 3.091 3.054 3.020 3.004 2.940 2.907 2.828 2.376 2.364 2.357 2.307 1.888 1.658 1.449 1.437 1.425 1.413 1.397 1.311 1.281 1.266 1.253 0.917 0.895 0.886 0.841 0.826 0.812 0.800 0.786 0.774 0.097 0.068 0.034 0.026
NAME 14-NHR_2_011(P_5.14DCM_600) prs 1
EXPNO 10
PROCNO 1
Date_ 20240516
Time 18.24 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 11904.762 Hz
FIDRES 0.363304 Hz
AQ 2.7525620 sec
RG 11.3
DW 42.000 usec
DE 14.39 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 600.1937062 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 600.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Ph
N
O
OFm
Fmoc
HN
TBSO
27
9 8 7 6 5 4 3 2 1 0 ppm
4.0 4.0 4.0 4.0 5.0 1.0 1.0 1.0 0.7 0.3 1.0 1.0 1.0 1.0 3.0 2.0 2.0 2.0 1.0 2.0 9.0 1.0 2.0 2.0 3.0 1.0 2.0 10.6 31.0 6.0


172.4 171.6 170.8 143.6 143.4 141.4 141.3 136.5 129.3 128.3 127.9 127.9 127.7 127.2 127.1 124.9 124.8 120.1 76.1 75.9 67.8 66.7 56.4 54.3 53.7 52.7 47.2 46.8 45.0 42.6 38.6 37.6 37.5 36.5 35.2 33.4 30.4 30.2 29.7 26.1 25.8 24.9 18.5 18.0 17.3 17.2 15.3 14.9 14.1 14.1 13.9 12.8 11.7 11.6 11.5 10.4 -4.2 -4.7
NAME 14-NHR_2_011(P_5.14DCM_600) prs 1
EXPNO 11
PROCNO 1
Date_ 20240516
Time 22.04 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 4400
DS 4
SWH 35714.285 Hz
FIDRES 1.089913 Hz
AQ 0.9175540 sec
RG 101
DW 14.000 usec
DE 18.00 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 150.9329873 MHz
NUC1 13C
P0 4.00 usec
P1 12.00 usec
SI 32768
SF 150.9178955 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Ph
N
O
OFm
Fmoc
HN
TBSO
27
200 180 160 140 120 100 80 60 40 20 0 ppm


7.285 7.263 7.244 7.232 5.324 5.261 5.243 5.092 5.087 4.652 3.095 3.066 3.026 3.012 3.000 2.993 2.951 2.367 1.882 1.717 1.673 1.661 1.599 1.586 1.549 1.537 1.509 1.494 1.480 1.469 1.442 1.429 1.410 1.384 1.363 1.353 1.340 1.330 1.319 1.307 1.300 1.277 1.239 1.229 1.015 1.004 0.987 0.976 0.965 0.952 0.939 0.924 0.912 0.900 0.878 0.065 0.060 0.023
NAME 15-NHR_2_098(15_600)P prs 2
EXPNO 10
PROCNO 1
Date_ 20241028
Time 22.07 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 128
DS 2
SWH 11904.762 Hz
FIDRES 0.363304 Hz
AQ 2.7525620 sec
RG 22.6
DW 42.000 usec
DE 14.39 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 600.1937062 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 600.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Ph
BocHN
AllylO
TBSO
31
9 8 7 6 5 4 3 2 1 0 ppm
6.363 0.974 1.068 1.149 1.114 0.858 1.002 1.060 1.330 0.880 1.281 1.044 1.943 2.005 0.801 1.020 1.077 2.109 8.044 2.032 1.203 4.116 18.351 14.841 17.992 5.925


172.0 171.3 170.9 169.8 167.9 140.8 136.5 131.8 129.9 129.4 128.4 128.3 126.8 118.6 79.4 76.1 74.9 71.8 65.5 54.2 53.2 52.2 51.9 46.6 42.8 37.6 36.8 36.4 35.3 33.4 32.4 31.9 31.3 30.4 29.7 29.7 29.4 28.3 28.3 26.1 25.8 24.0 22.7 18.7 18.0 17.7 15.5 14.5 14.5 14.1 14.1 12.6 11.7 11.2 10.4 -4.3 -4.7 -4.7
NAME 15-NHR_2_098(15_600)P prs 2
EXPNO 11
PROCNO 1
Date_ 20241029
Time 9.09 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 13312
DS 4
SWH 35714.285 Hz
FIDRES 1.089913 Hz
AQ 0.9175540 sec
RG 101
DW 14.000 usec
DE 18.00 usec
TE 298.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 150.9329873 MHz
NUC1 13C
P0 4.00 usec
P1 12.00 usec
SI 32768
SF 150.9178955 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Ph
BocHN
AllylO
TBSO
31
200 180 160 140 120 100 80 60 40 20 0 ppm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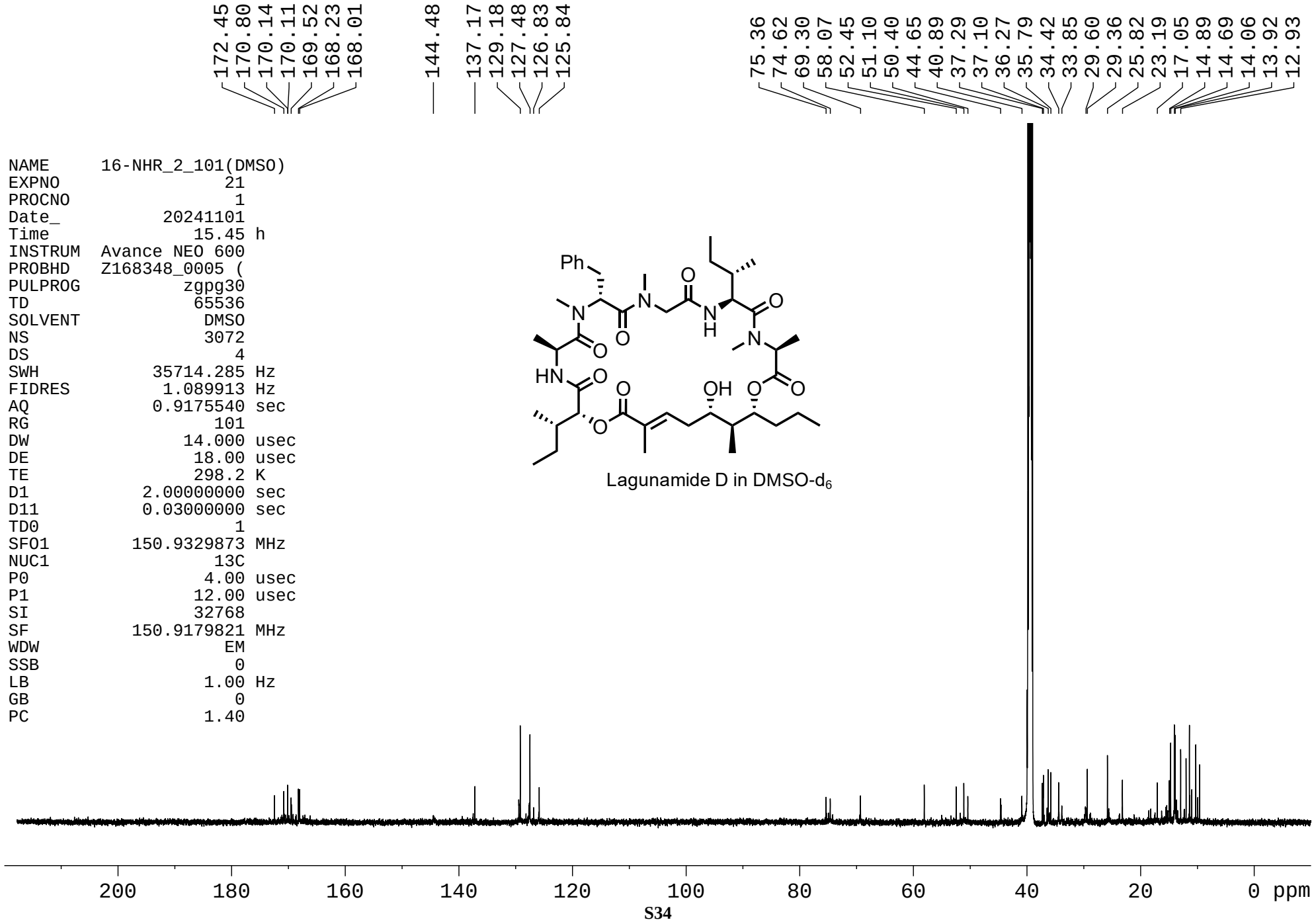
NAME 16-NHR_2_101(DMSO)
EXPNO 20
PROCNO 1
Date_ 20241101
Time 13.12 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 128
DS 2
SWH 11904.762 Hz
FIDRES 0.363304 Hz
AQ 2.7525620 sec
RG 12.7
DW 42.000 usec
DE 14.39 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 600.1937062 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 600.1900088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Ph
N
O
HN
OH
Lagunamide D in DMSO-d6
9 8 7 6 5 4 3 2 1 0 ppm
0.3 0.1 5.1 0.2 0.2 0.2 0.6 0.6 0.6 1.0 0.7 0.9 0.6 0.8 1.1 0.3 0.7 2.4 0.6 1.9 2.7 0.8 2.2 1.2 1.2 0.9 1.2 4.9 11.0 21.0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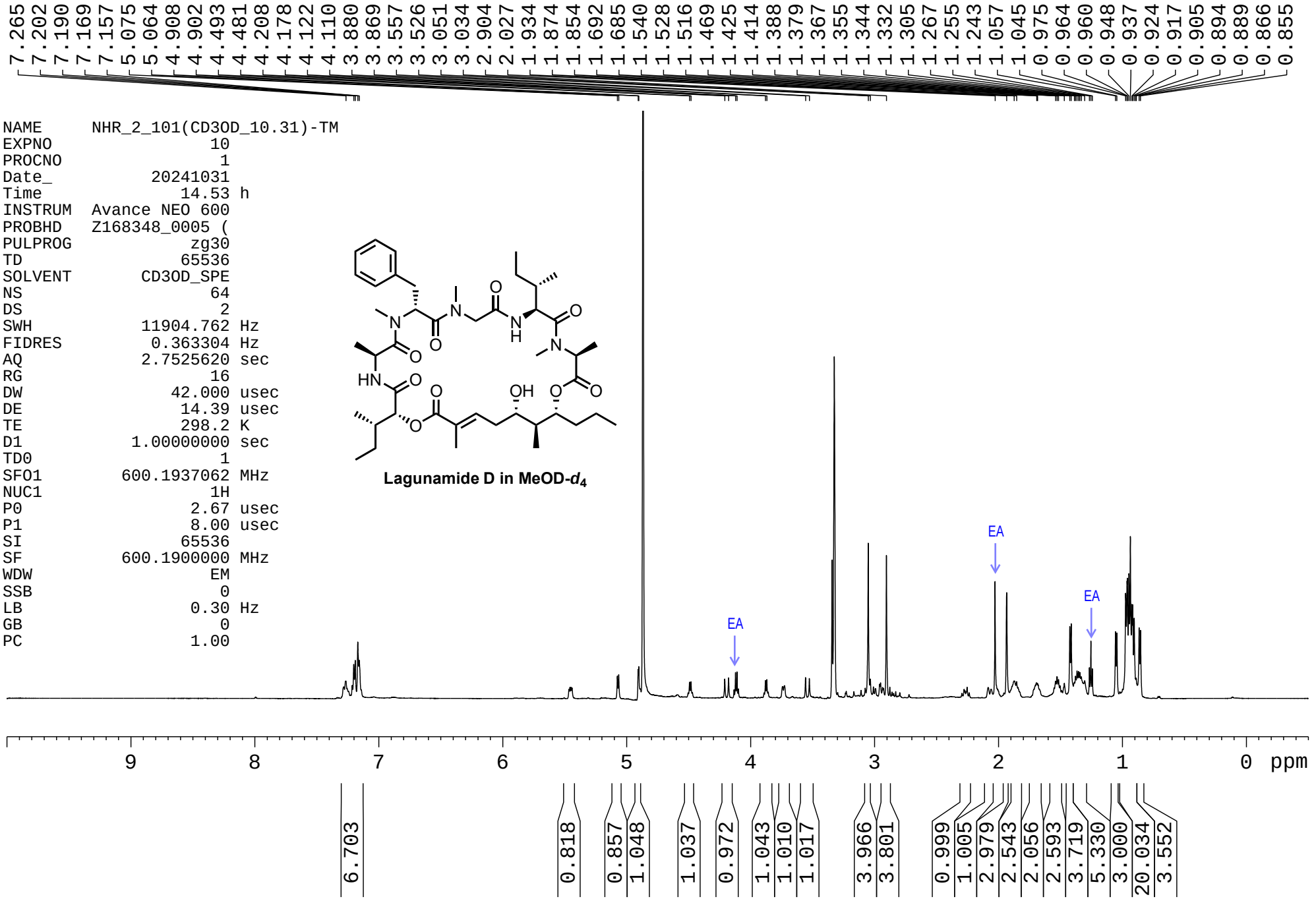
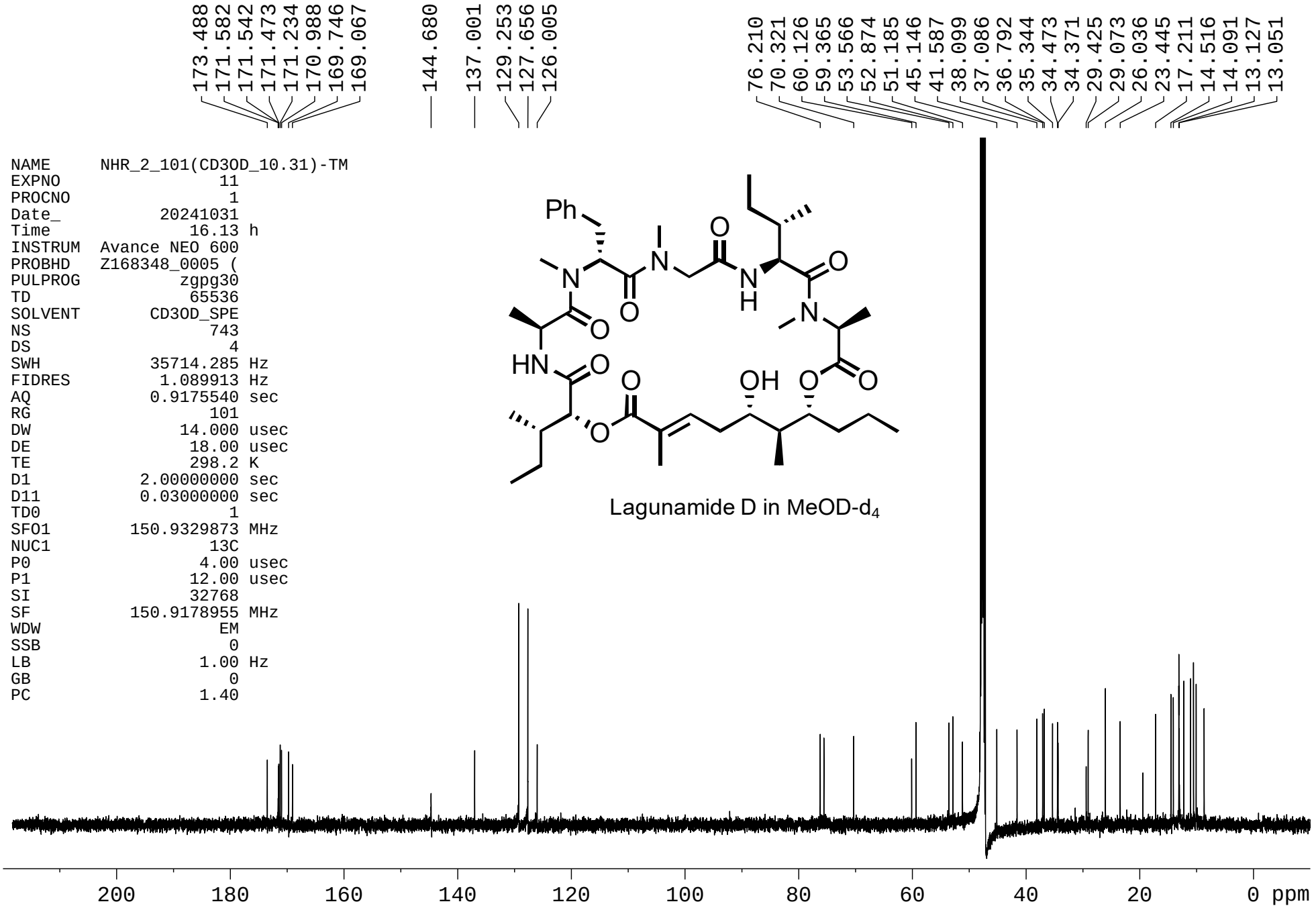
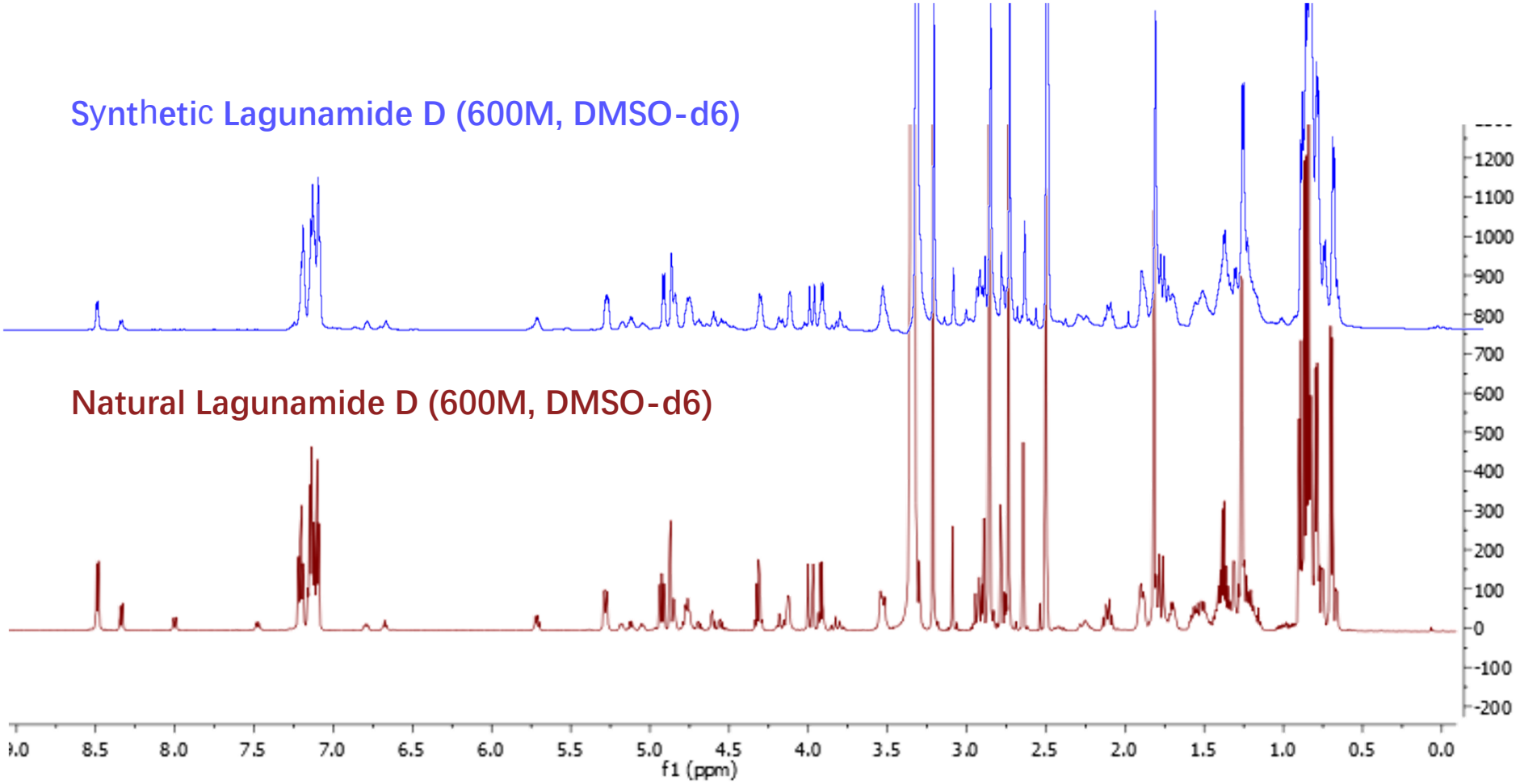
170.14
170.11
169.52
168.23
168.01
144.48
137.17
129.18
127.48
126.83
125.84
75.36
74.62
69.30
58.07
52.45
51.10
50.40
44.65
40.89
37.29
37.10
36.27
35.79
34.42
33.85
29.60
29.36
25.82
23.19
17.05
14.89
14.69
14.06
13.92
12.93
NAME 16-NHR_2_101(DMSO)
EXPNO 21
PROCNO 1
Date_ 20241101
Time 15.45 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 3072
DS 4
SWH 35714.285 Hz
FIDRES 1.089913 Hz
AQ 0.9175540 sec
RG 101
DW 14.000 usec
DE 18.00 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 150.9329873 MHz
NUC1 13C
P0 4.00 usec
P1 12.00 usec
SI 32768
SF 150.9179821 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Ph
N
O
HN
OH
Lagunamide D in DMSO-d6
200
180
160
140
120
100
80
60
40
20
0 ppm


7.265 7.202 7.190 7.169 7.157 7.075 5.064 4.908 4.902 4.493 4.481 4.208 4.178 4.122 4.110 3.880 3.869 3.557 3.526 3.051 3.034 2.904 2.027 1.934 1.874 1.854 1.692 1.685 1.540 1.528 1.516 1.469 1.425 1.414 1.388 1.379 1.367 1.355 1.344 1.332 1.305 1.267 1.255 1.243 1.057 1.045 0.975 0.964 0.960 0.948 0.937 0.924 0.917 0.905 0.894 0.889 0.866 0.855
NAME NHR_2_101(CD3OD_10.31)-TM
EXPNO 10
PROCNO 1
Date_ 20241031
Time 14.53 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zg30
TD 65536
SOLVENT CD3OD_SPE
NS 64
DS 2
SWH 11904.762 Hz
FIDRES 0.363304 Hz
AQ 2.7525620 sec
RG 16
DW 42.000 usec
DE 14.39 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 600.1937062 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 600.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Lagunamide D in MeOD-d_4
EA
EA
EA
9 8 7 6 5 4 3 2 1 0 ppm
6.703 0.818 0.857 1.048 1.037 0.972 1.043 1.010 1.017 3.966 3.801 0.999 1.005 2.979 2.543 2.056 2.593 3.719 5.330 3.000 20.034 3.552


173.488
171.582
171.542
171.473
171.234
170.988
169.746
169.067
144.680
137.001
129.253
127.656
126.005
76.210
70.321
60.126
59.365
53.566
52.874
51.185
45.146
41.587
38.099
37.086
36.792
35.344
34.473
34.371
29.425
29.073
26.036
23.445
17.211
14.516
14.091
13.127
13.051
NAME NHR_2_101(CD3OD_10.31)-TM
EXPNO 11
PROCNO 1
Date_ 20241031
Time 16.13 h
INSTRUM Avance NEO 600
PROBHD Z168348_0005 (
PULPROG zgpg30
TD 65536
SOLVENT CD3OD_SPE
NS 743
DS 4
SWH 35714.285 Hz
FIDRES 1.089913 Hz
AQ 0.9175540 sec
RG 101
DW 14.000 usec
DE 18.00 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 150.9329873 MHz
NUC1 13C
P0 4.00 usec
P1 12.00 usec
SI 32768
SF 150.9178955 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Ph
N
O
HN
OH
Lagunamide D in MeOD-d4
200
180
160
140
120
100
80
60
40
20
0 ppm



3. Figure S1. Comparison of ^{1}H NMR (600 MHz) for Natural [1] and Synthetic Lagunaminde D in DMSO-*d6*.

References

1. Luo, D.; Putra, M. Y.; Ye, T.; Paul, V. J.; Luesch, H., Isolation, Structure Elucidation and Biological Evaluation of Lagunamide D: A New Cytotoxic Macrocyclic Depsipeptide from Marine Cyanobacteria. *Mar. Drugs* **2019**, *17*, 83.