Supporting Information

Tunable aryl imidazolium recyclable ionic liquid with dual Brønsted and Lewis acid as green catalyst for Friedel-Crafts acylation and thioesterification

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[4]Morrison Academy, Taichung 406, Taiwan

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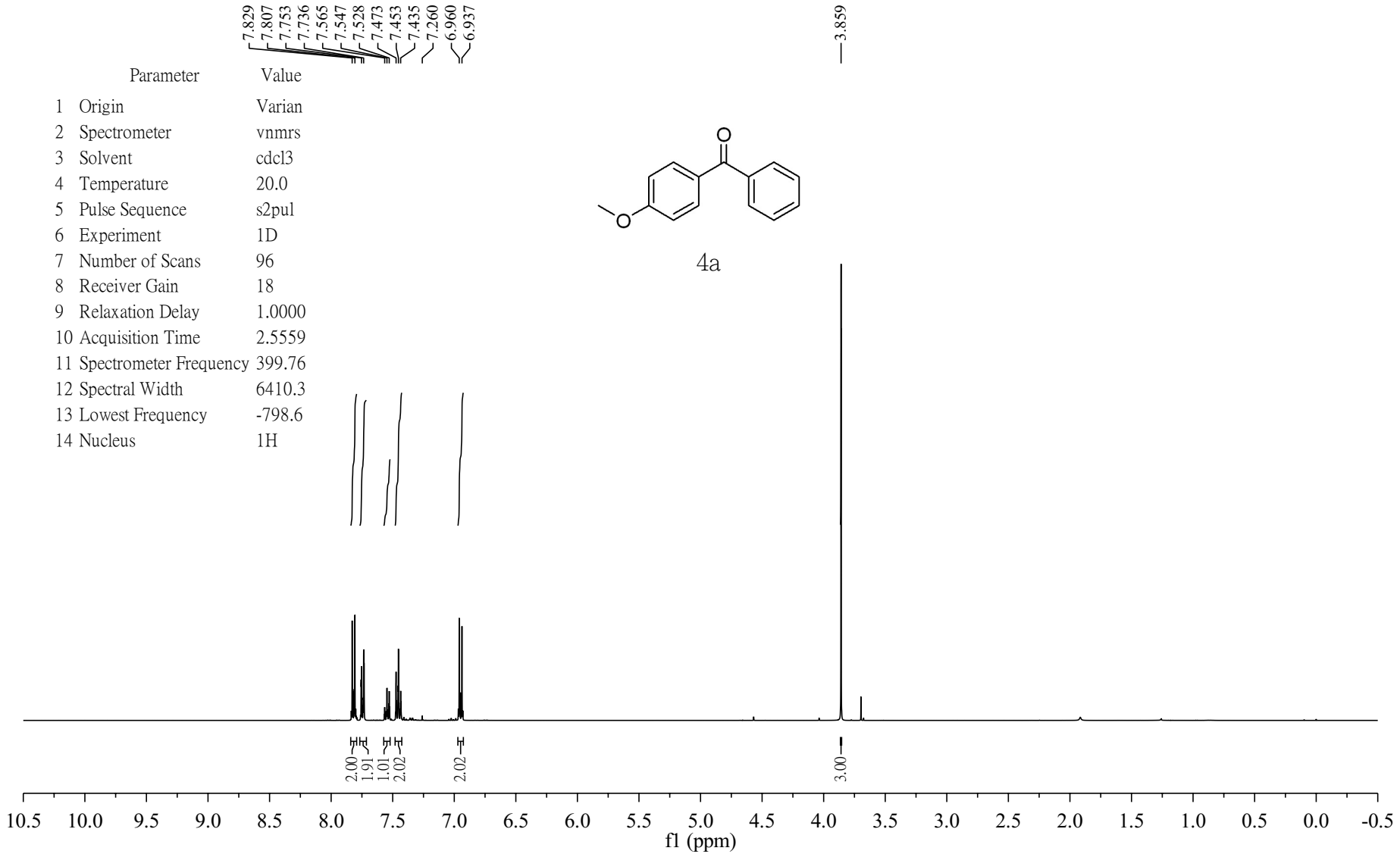
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7.435
7.260
6.960
6.937
3.859
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2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 96
8 Receiver Gain 18
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -798.6
14 Nucleus 1H
O
O
4a
2.00
1.91
1.01
2.02
2.02
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
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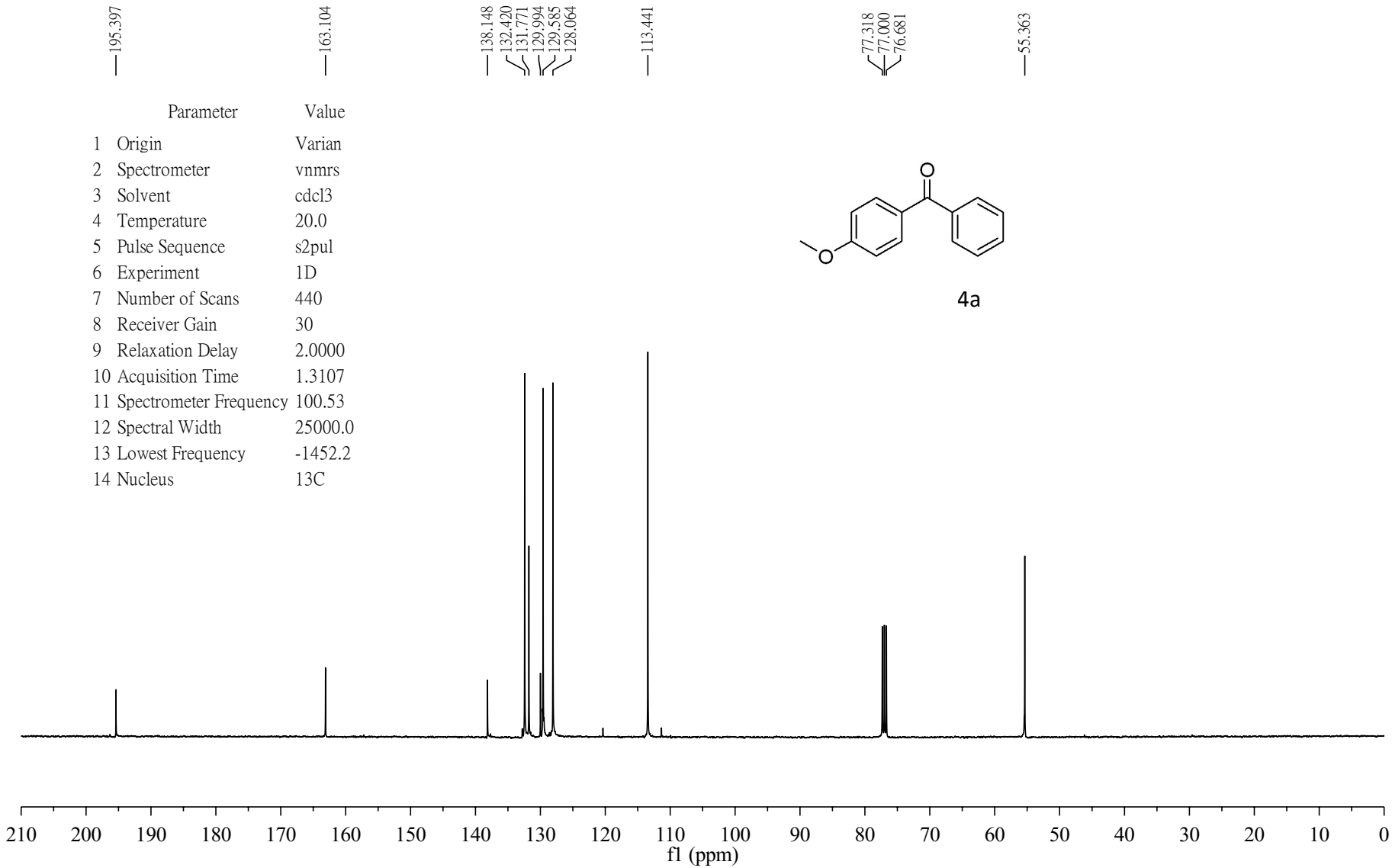
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77.318
77.000
76.681
55.363
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2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
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6 Experiment 1D
7 Number of Scans 440
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12 Spectral Width 25000.0
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O
4a
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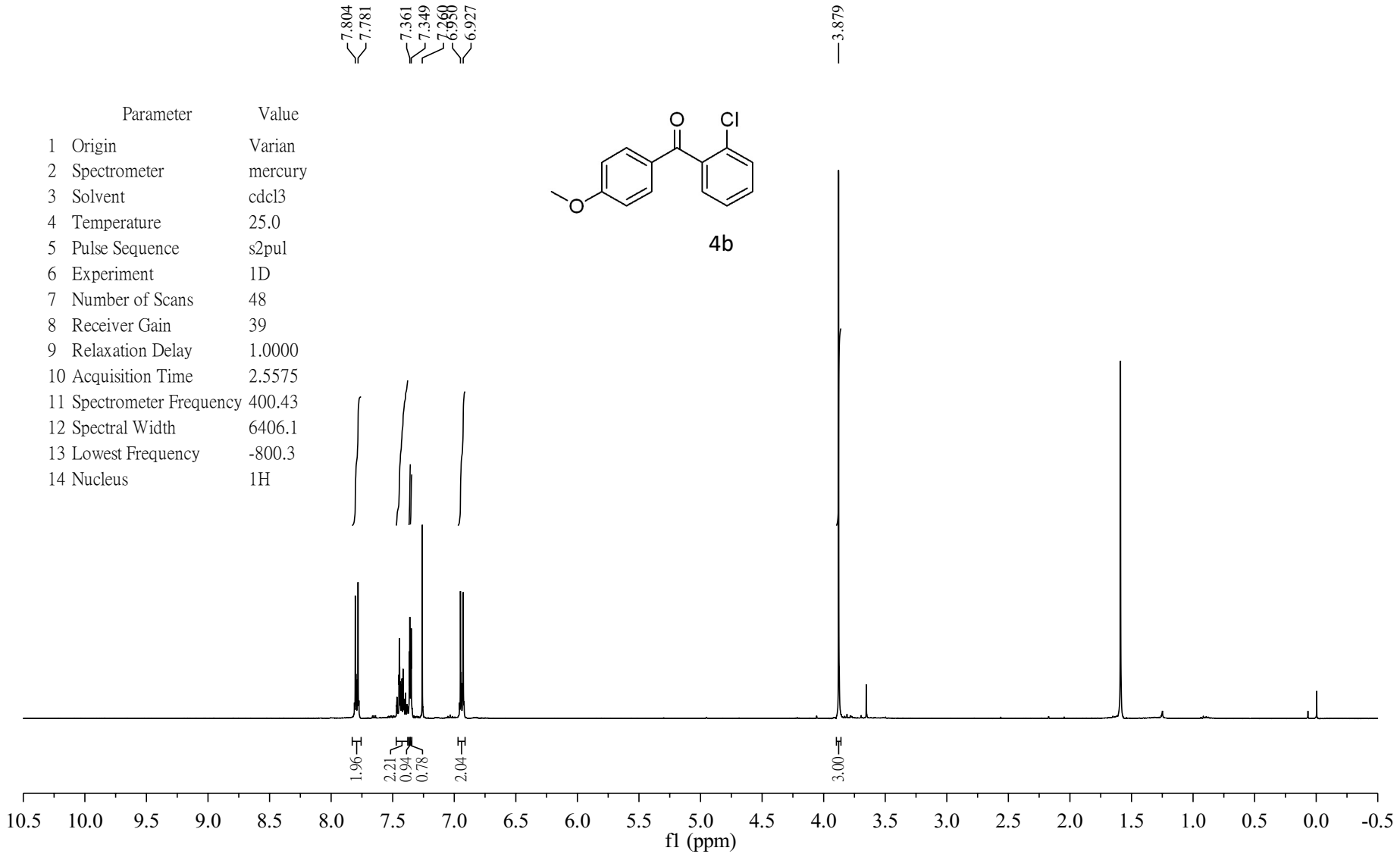
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7.260
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6.927
3.879
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3 Solvent cdcl3
4 Temperature 25.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 48
8 Receiver Gain 39
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5575
11 Spectrometer Frequency 400.43
12 Spectral Width 6406.1
13 Lowest Frequency -800.3
14 Nucleus 1H
O
Cl
O
4b
1.96
2.21
0.94
0.78
2.04
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
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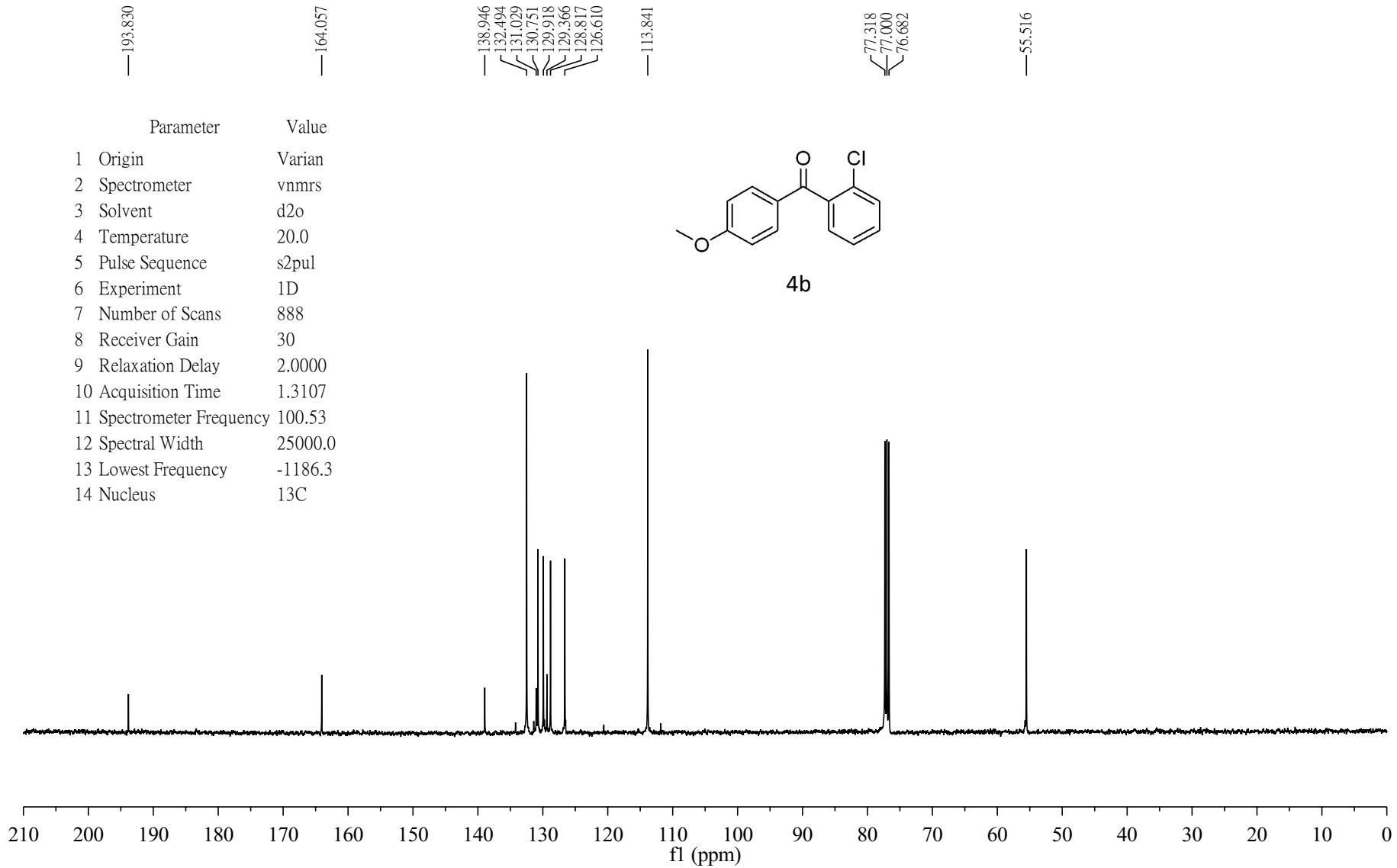
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77.000
76.682
55.516
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2 Spectrometer vnmrs
3 Solvent d2o
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
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8 Receiver Gain 30
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Cl
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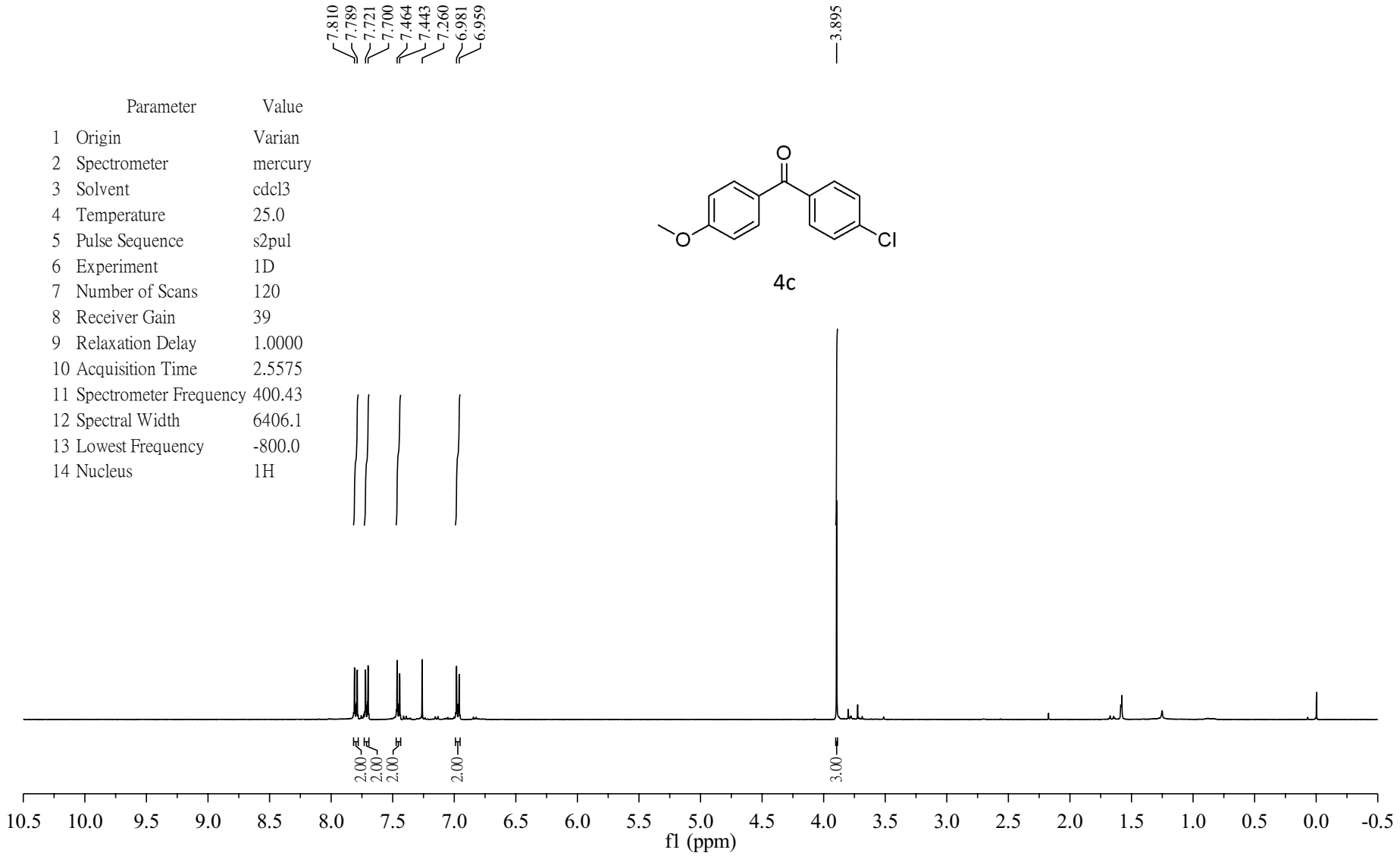
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3 Solvent cdcl3
4 Temperature 25.0
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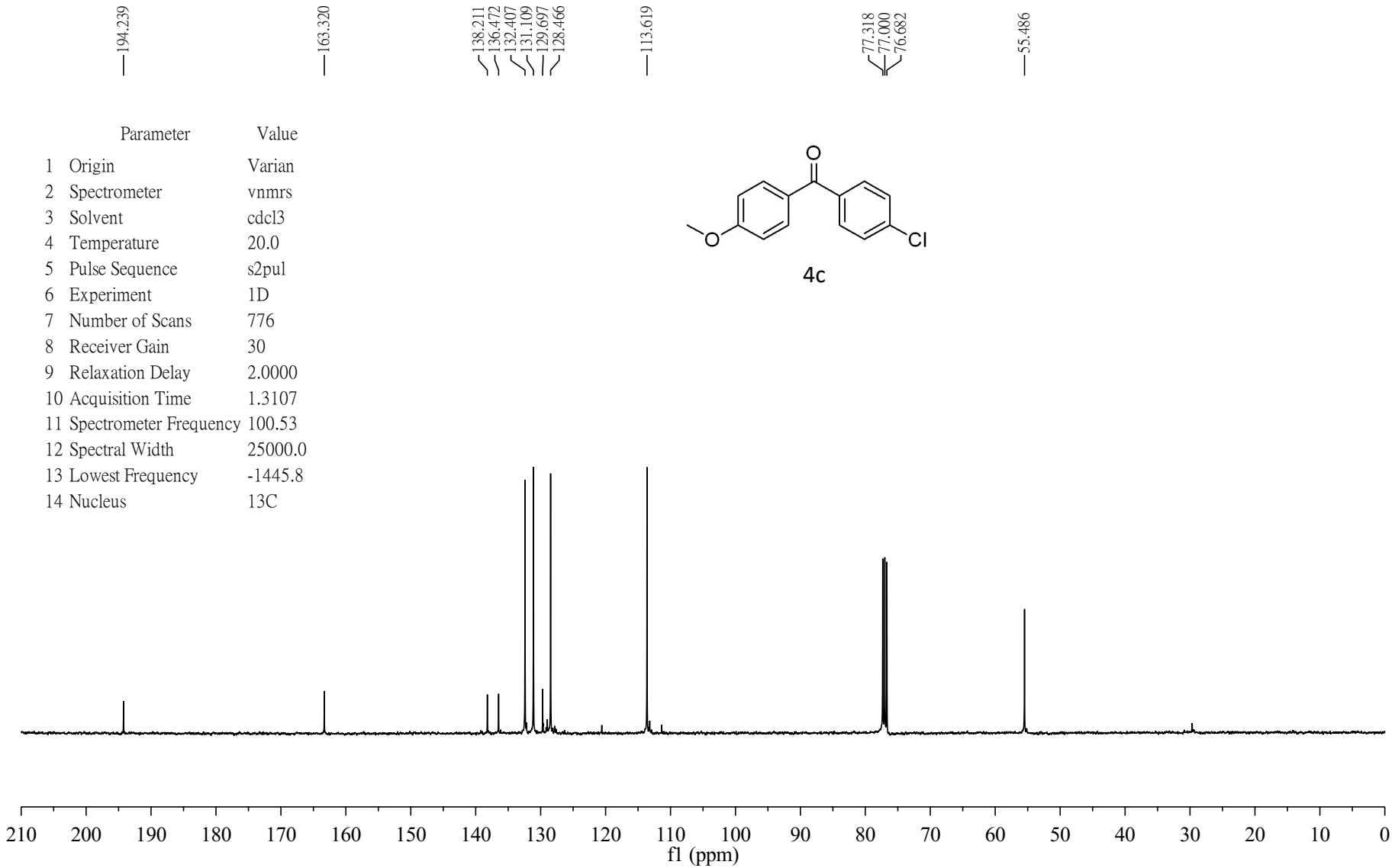
12 Spectral Width 6406.1
13 Lowest Frequency -800.0
14 Nucleus 1H
O
O
Cl
4c
2.00
2.00
2.00
2.00
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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77.000
76.682
55.486
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3 Solvent cdcl3
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O
Cl
4c
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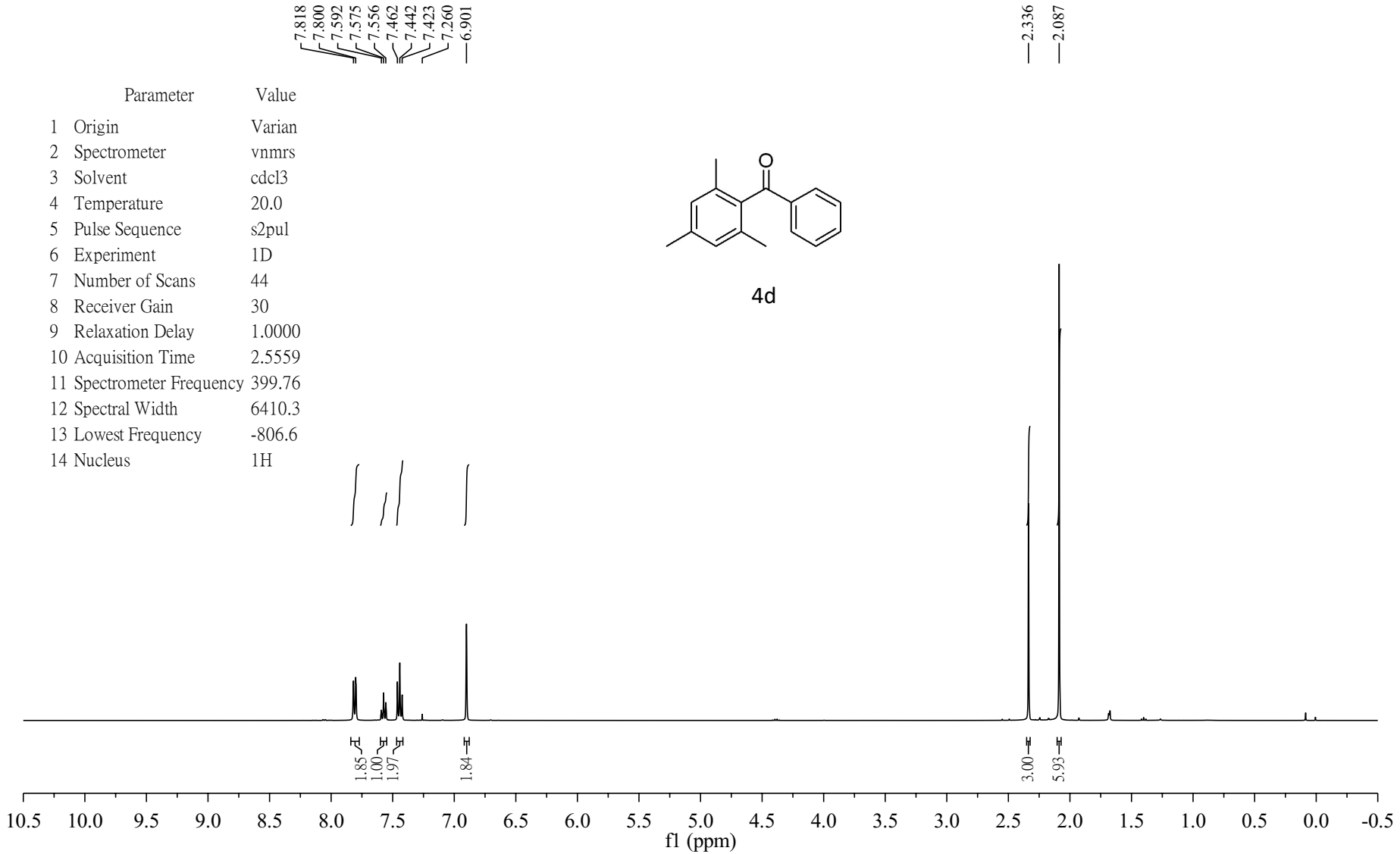
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7.423
7.260
6.901
2.336
2.087
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2 Spectrometer vnmrs
3 Solvent cdcl3
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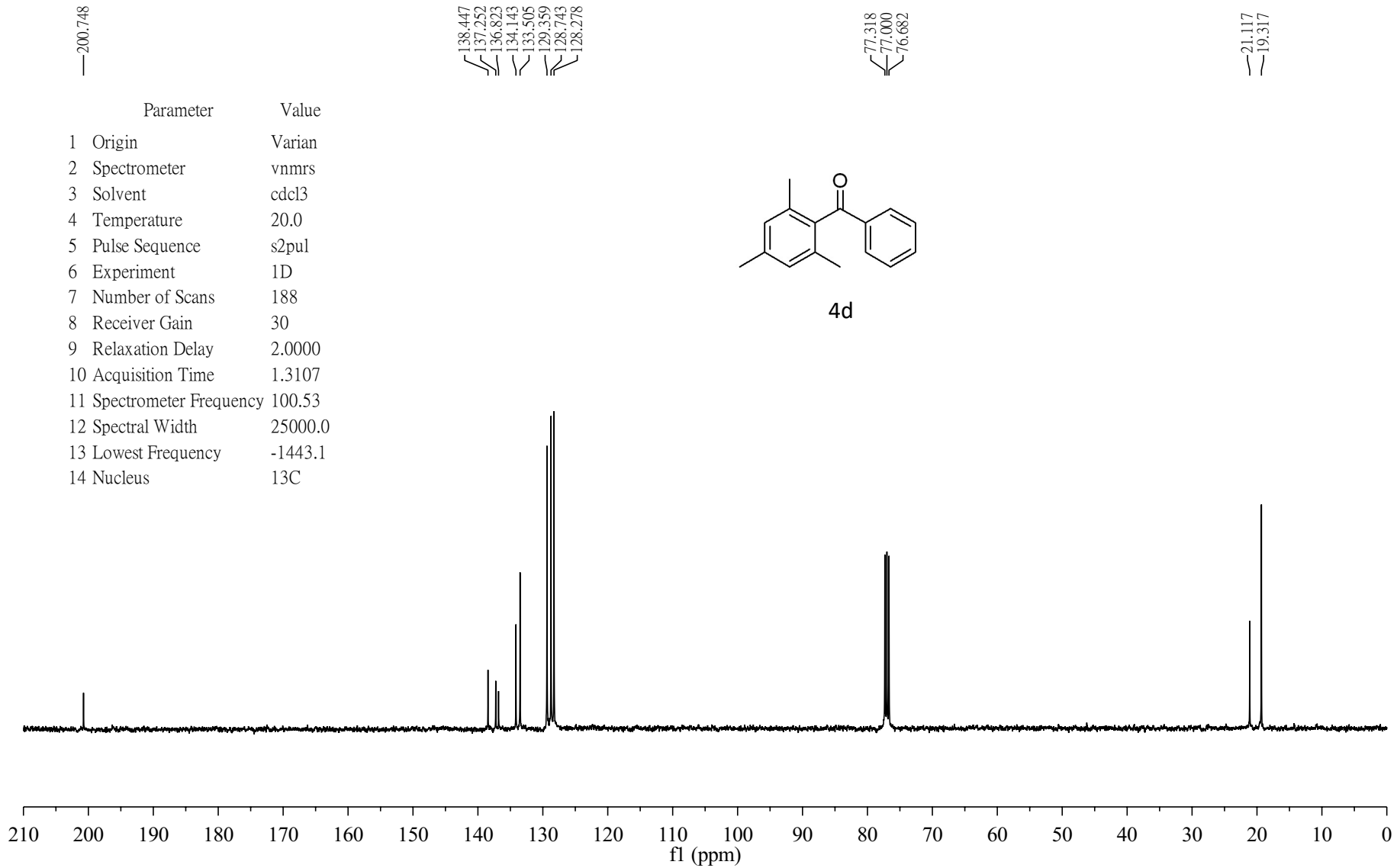
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 44
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -806.6
14 Nucleus 1H
O
4d
1.85
1.00
1.97
1.84
3.00
5.93
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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77.000
76.682
21.117
19.317
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2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
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8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
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14 Nucleus 13C
O
4d
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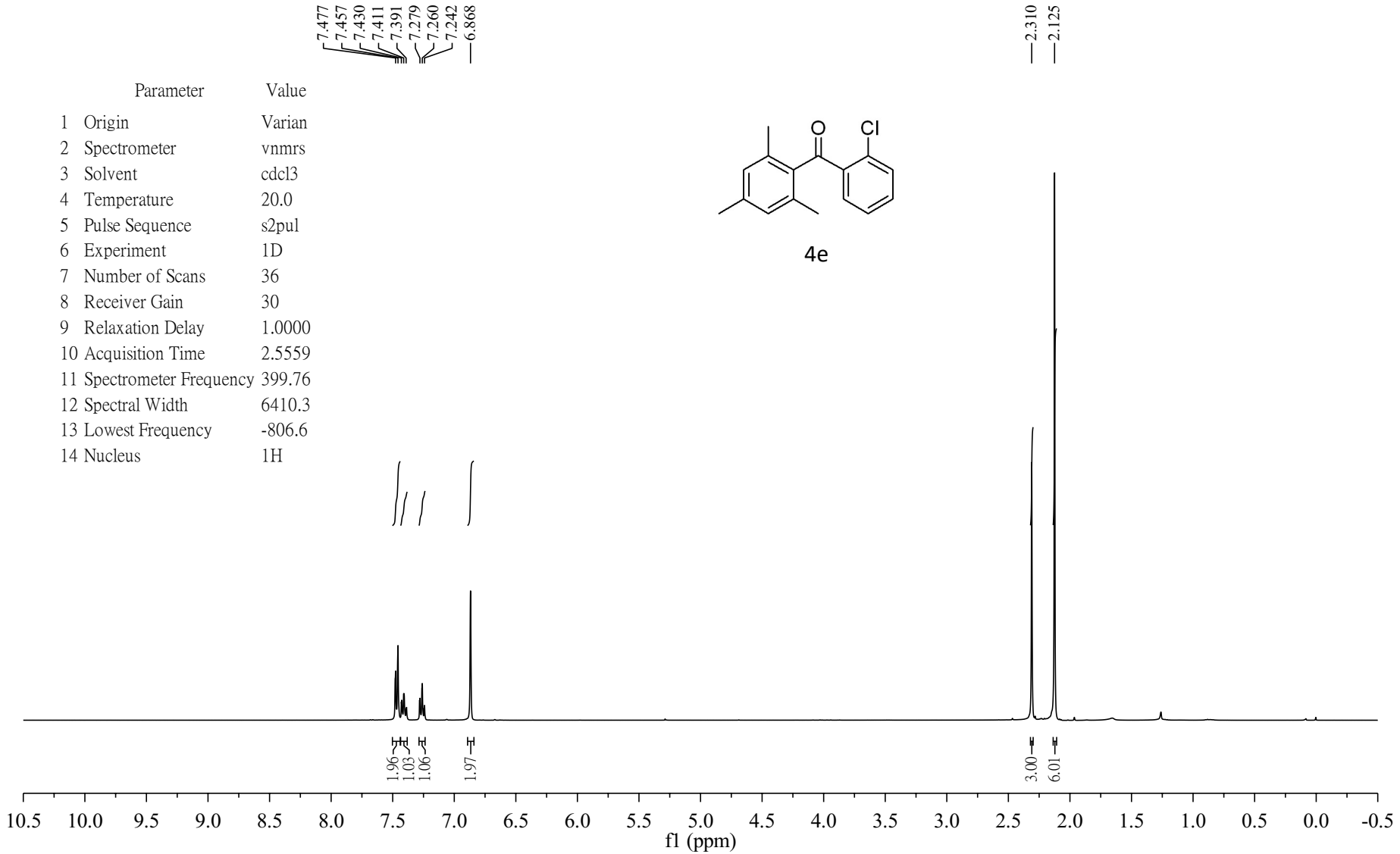
f1 (ppm)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7.391
7.279
7.260
7.242
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2.310
2.125
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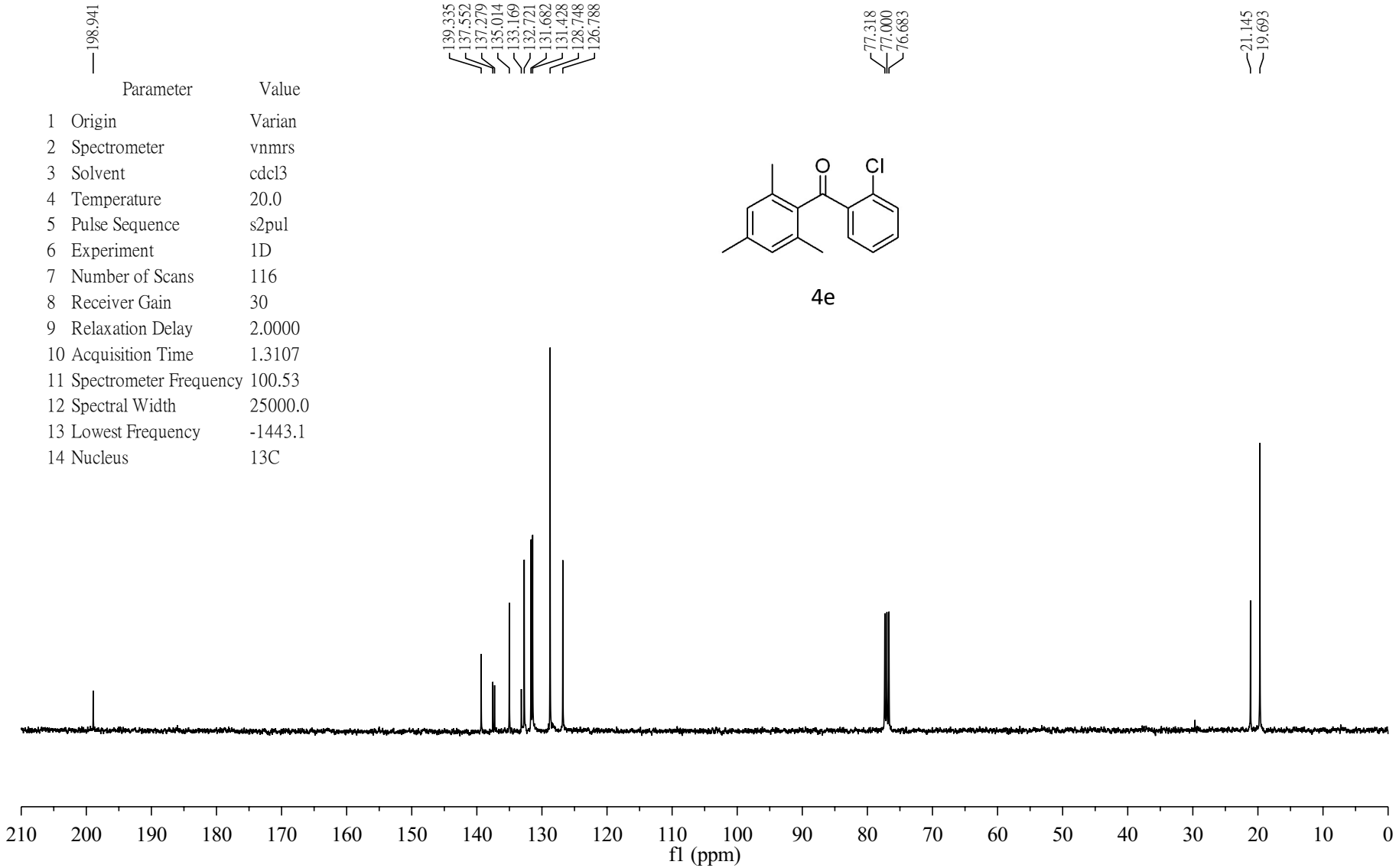
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 36
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -806.6
14 Nucleus 1H
O
Cl
4e
1.96
1.03
1.06
1.97
3.00
6.01
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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132.721
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128.748
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77.318
77.000
76.683
21.145
19.693
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 116
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
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14 Nucleus 13C
O
Cl
4e
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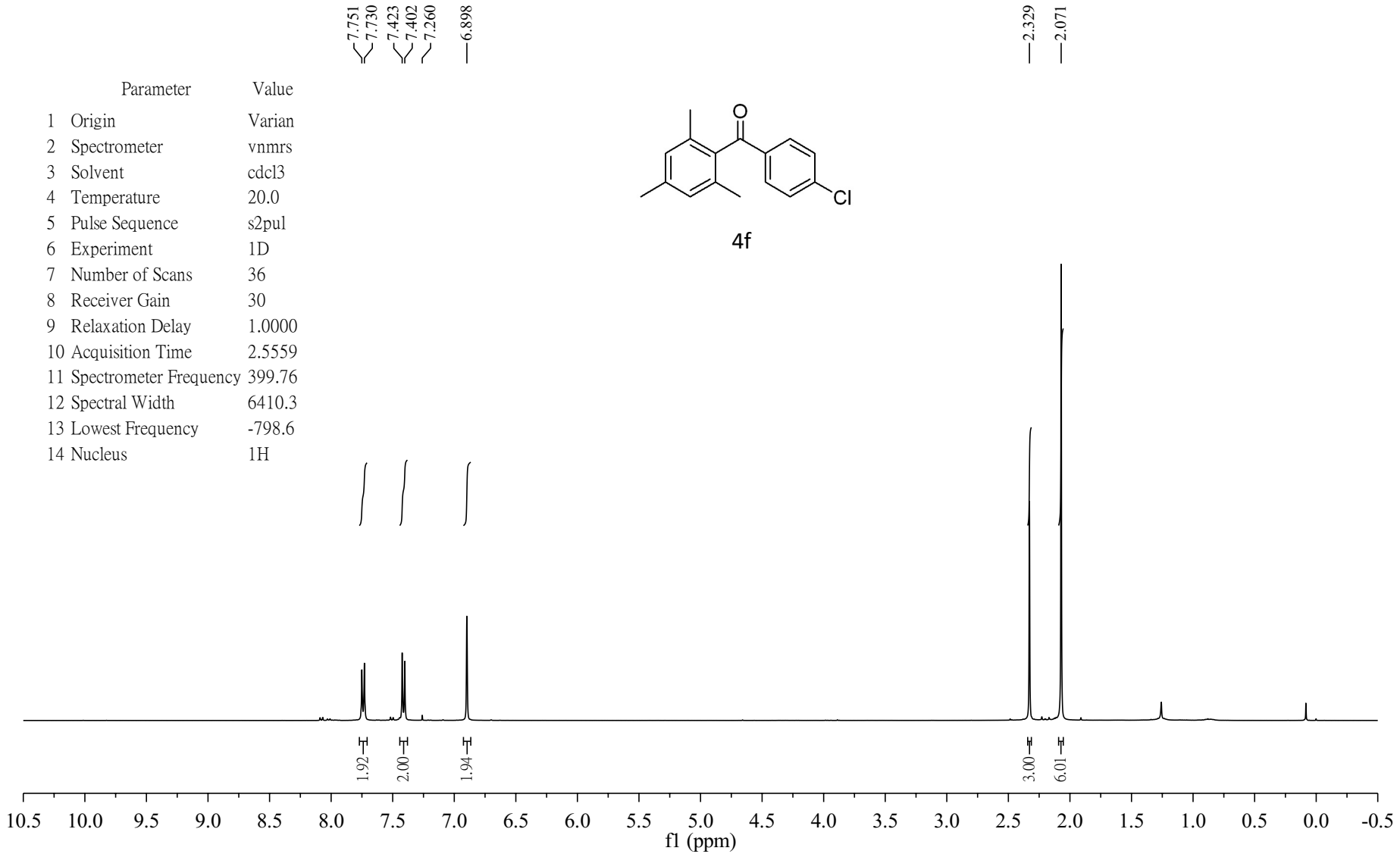
f1 (ppm)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7.402
7.260
6.898
2.329
2.071
Parameter Value
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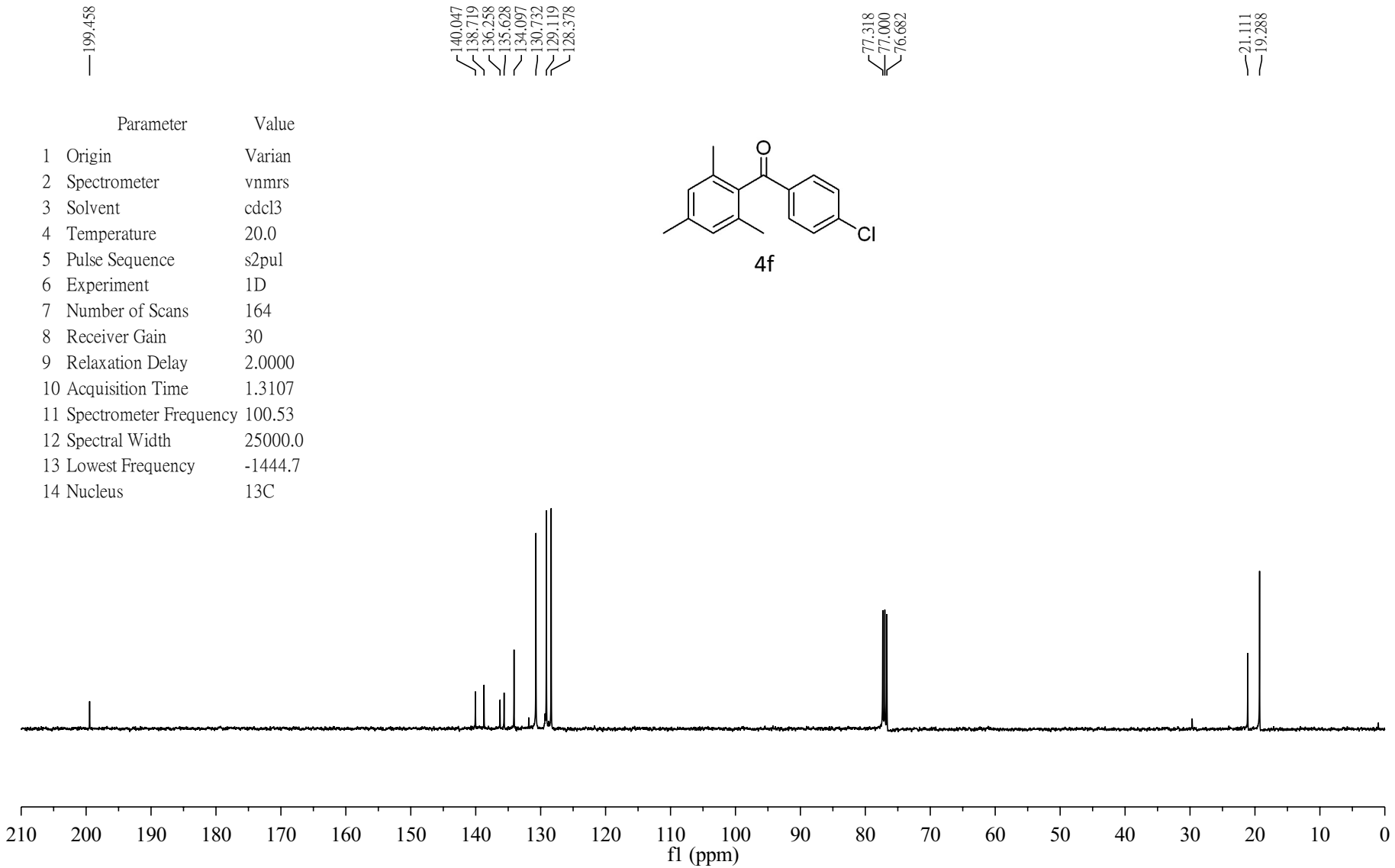
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 36
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -798.6
14 Nucleus 1H
O
Cl
4f
1.92
2.00
1.94
3.00
6.01
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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135.628
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130.732
129.119
128.378
77.318
77.000
76.682
21.111
19.288
Parameter Value
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2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 164
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
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12 Spectral Width 25000.0
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14 Nucleus 13C
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Cl
4f
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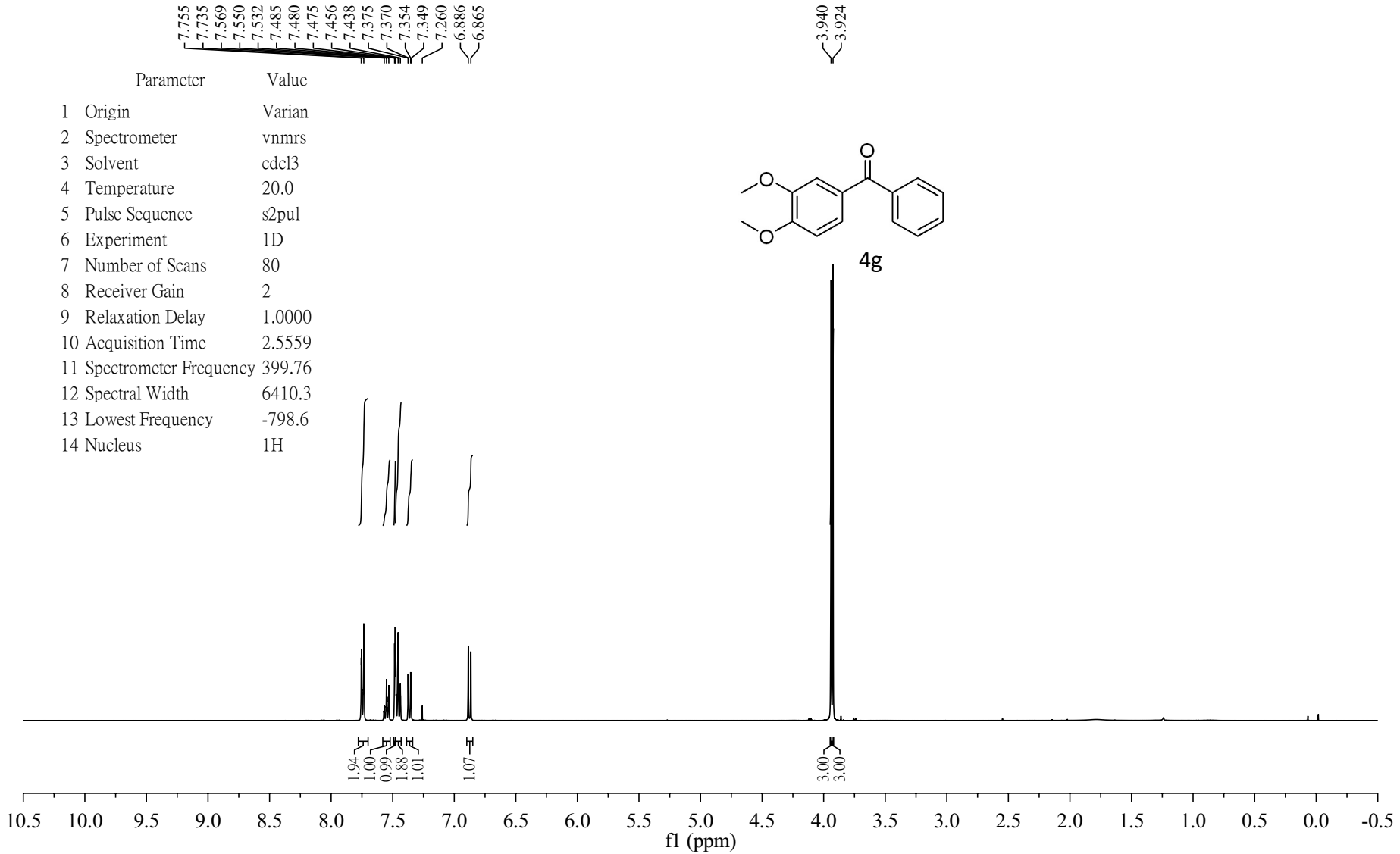
f1 (ppm)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7.354
7.349
7.260
6.886
6.865
3.940
3.924
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2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
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9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -798.6
14 Nucleus 1H
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1.07
3.00
3.00
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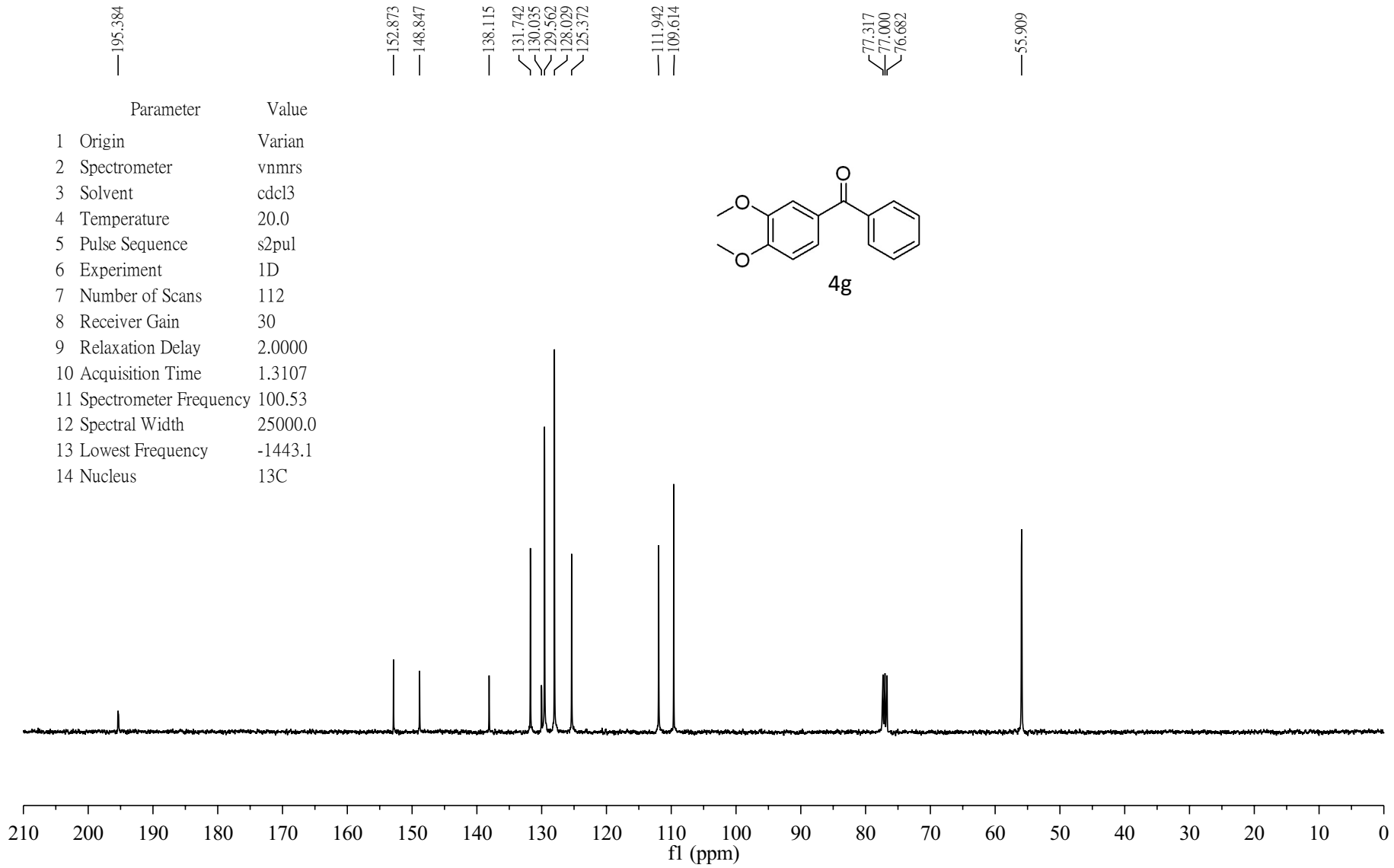
f1 (ppm)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77.317
77.000
76.682
55.909
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2 Spectrometer vnmrs
3 Solvent cdcl3
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5 Pulse Sequence s2pul
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8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
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O
O
4g
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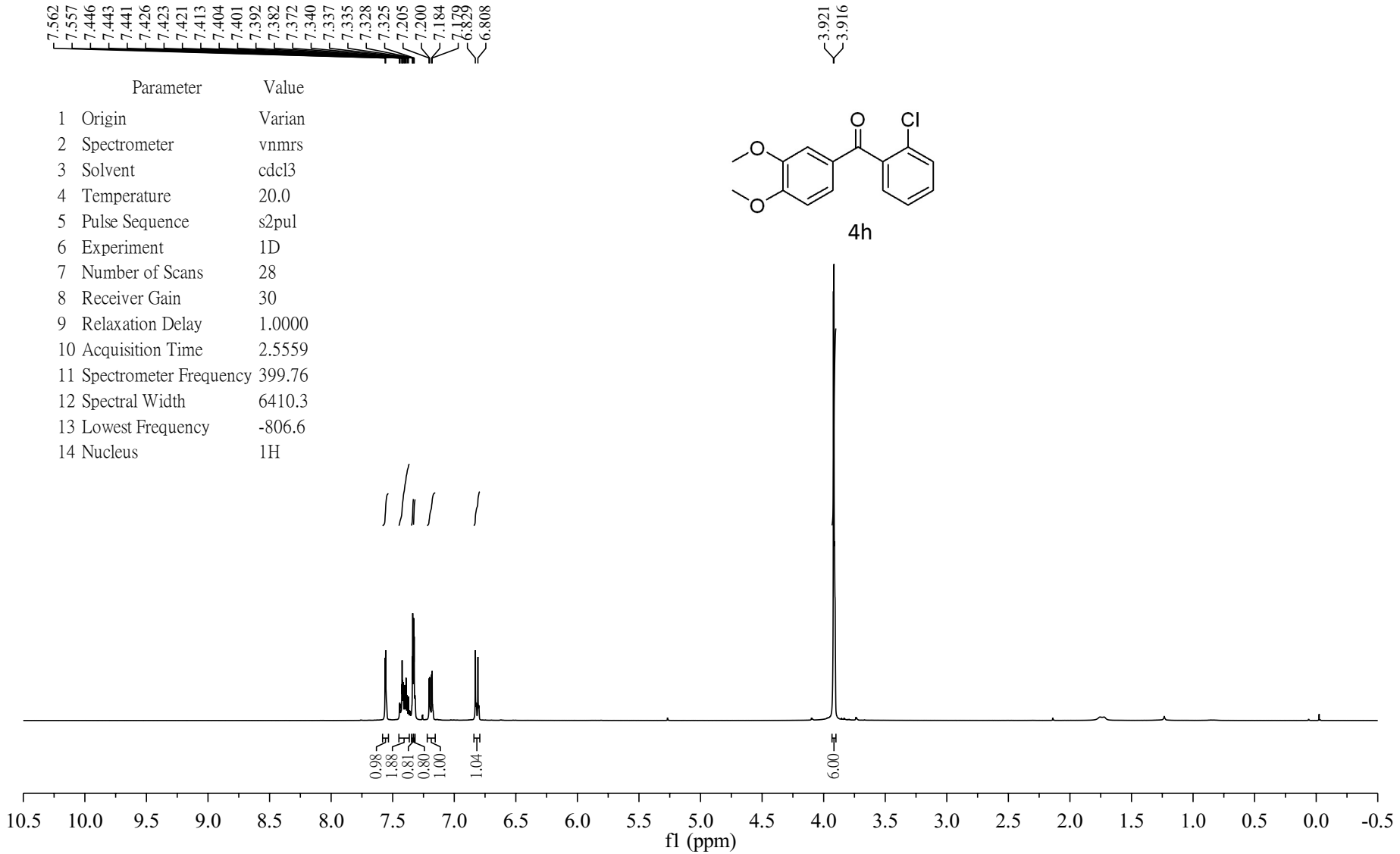
f1 (ppm)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7.441
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7.423
7.421
7.413
7.404
7.401
7.392
7.382
7.372
7.340
7.337
7.335
7.328
7.325
7.205
7.200
7.184
6.829
6.808
3.921
3.916
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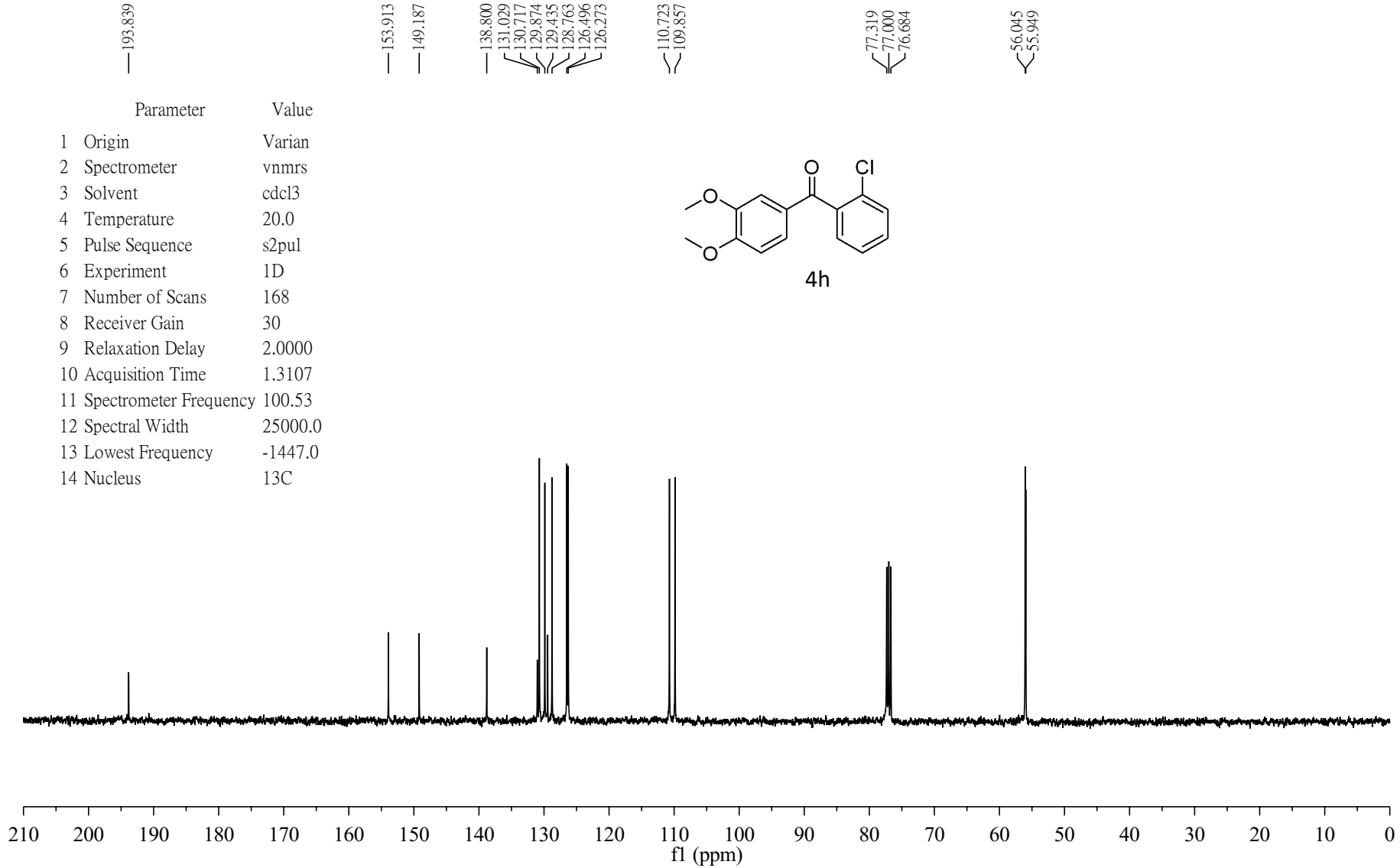
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 28
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -806.6
14 Nucleus 1H
O
Cl
O
O
4h
0.98
1.88
0.81
0.80
1.00
1.04
6.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


193.839
153.913
149.187
138.800
131.029
130.717
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109.857
77.319
77.000
76.684
56.045
55.949
Parameter Value
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2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 168
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
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O
Cl
O
O
4h
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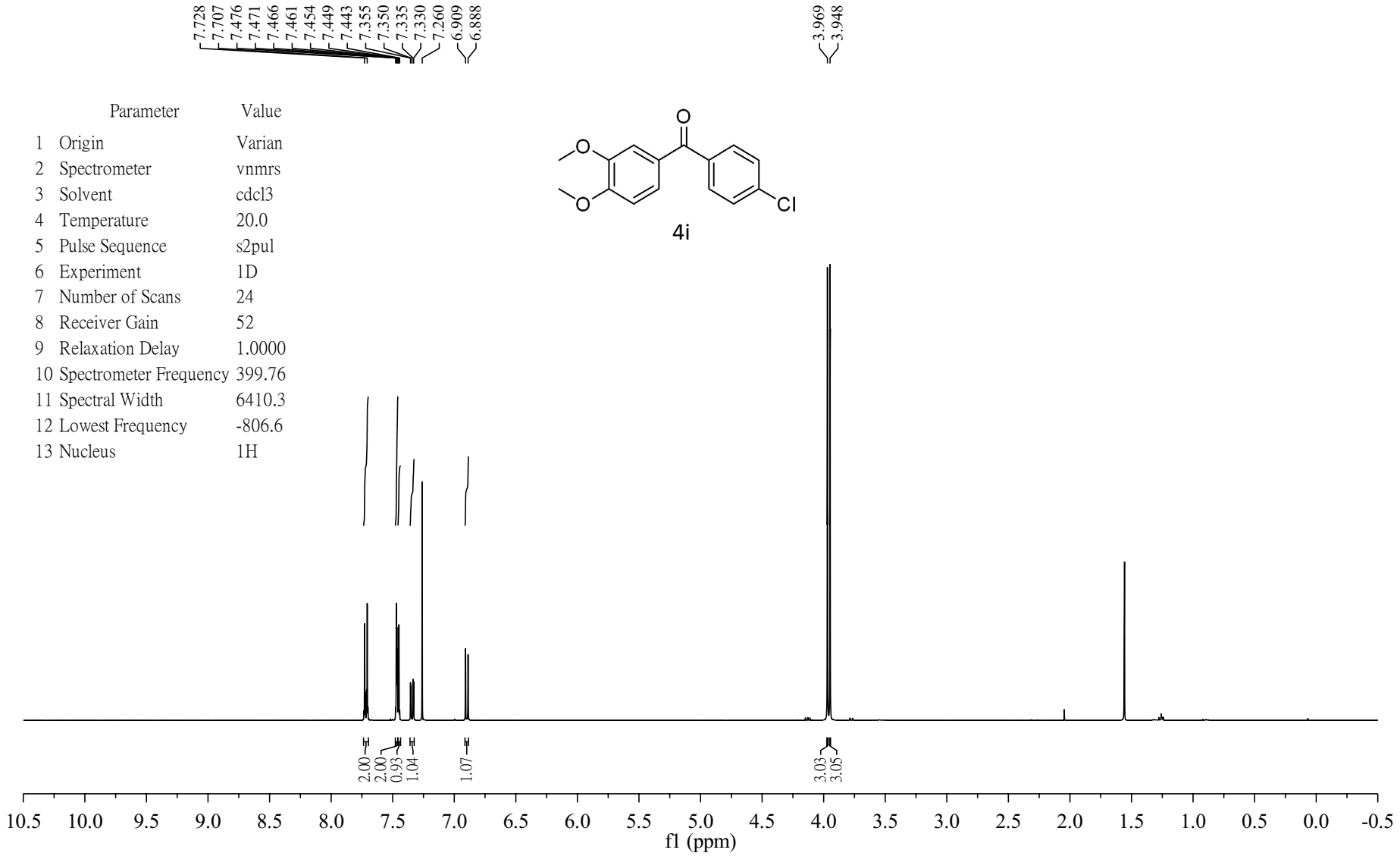
f1 (ppm)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7.443
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7.330
7.260
6.909
6.888
3.969
3.948
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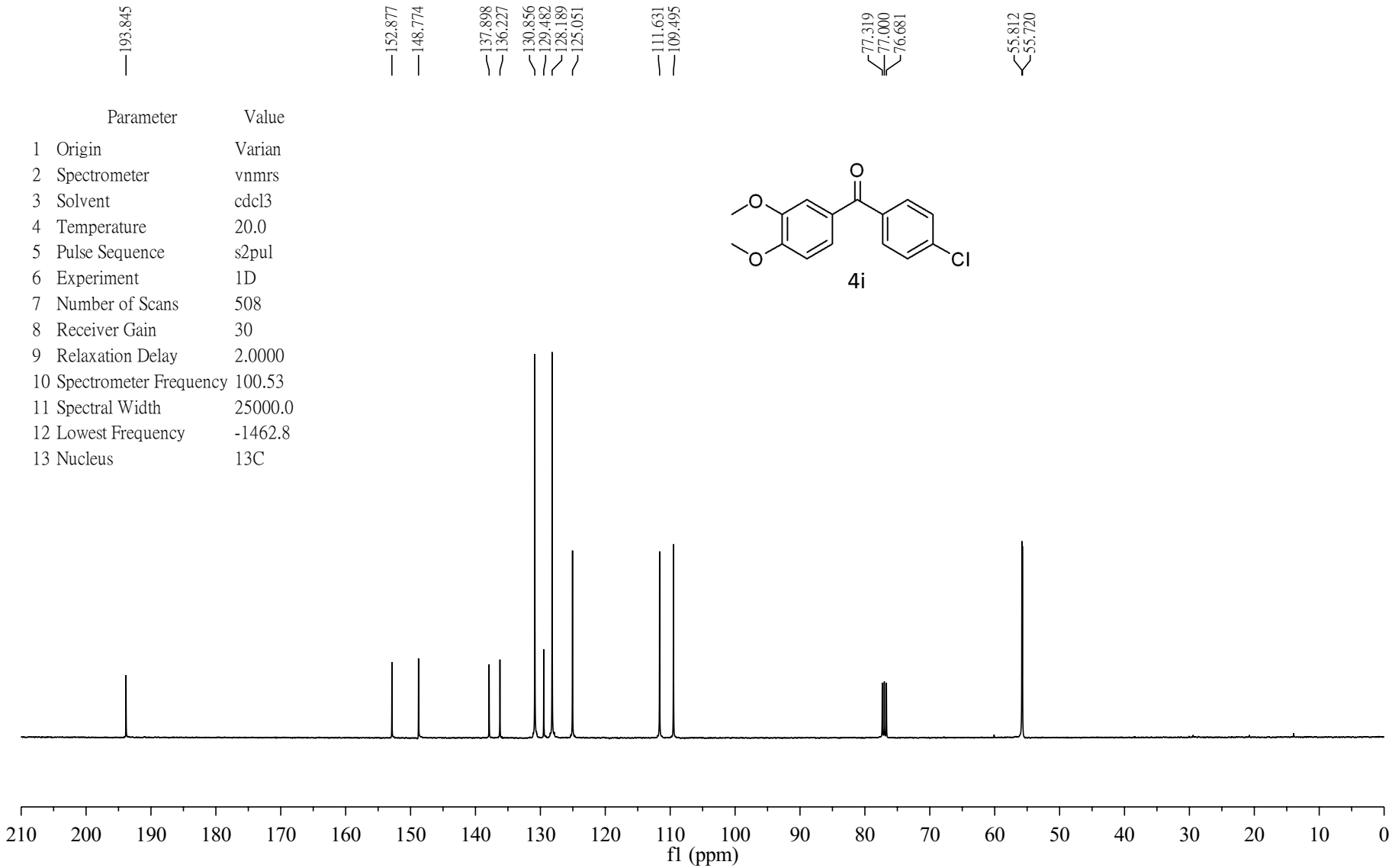
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 24
8 Receiver Gain 52
9 Relaxation Delay 1.0000
10 Spectrometer Frequency 399.76
11 Spectral Width 6410.3
12 Lowest Frequency -806.6
13 Nucleus 1H
O
O
O
Cl
4i
2.00
2.00
0.93
1.04
1.07
3.03
3.05
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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125.051
111.631
109.495
77.319
77.000
76.681
55.812
55.720
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 508
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Spectrometer Frequency 100.53
11 Spectral Width 25000.0
12 Lowest Frequency -1462.8
13 Nucleus 13C
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O
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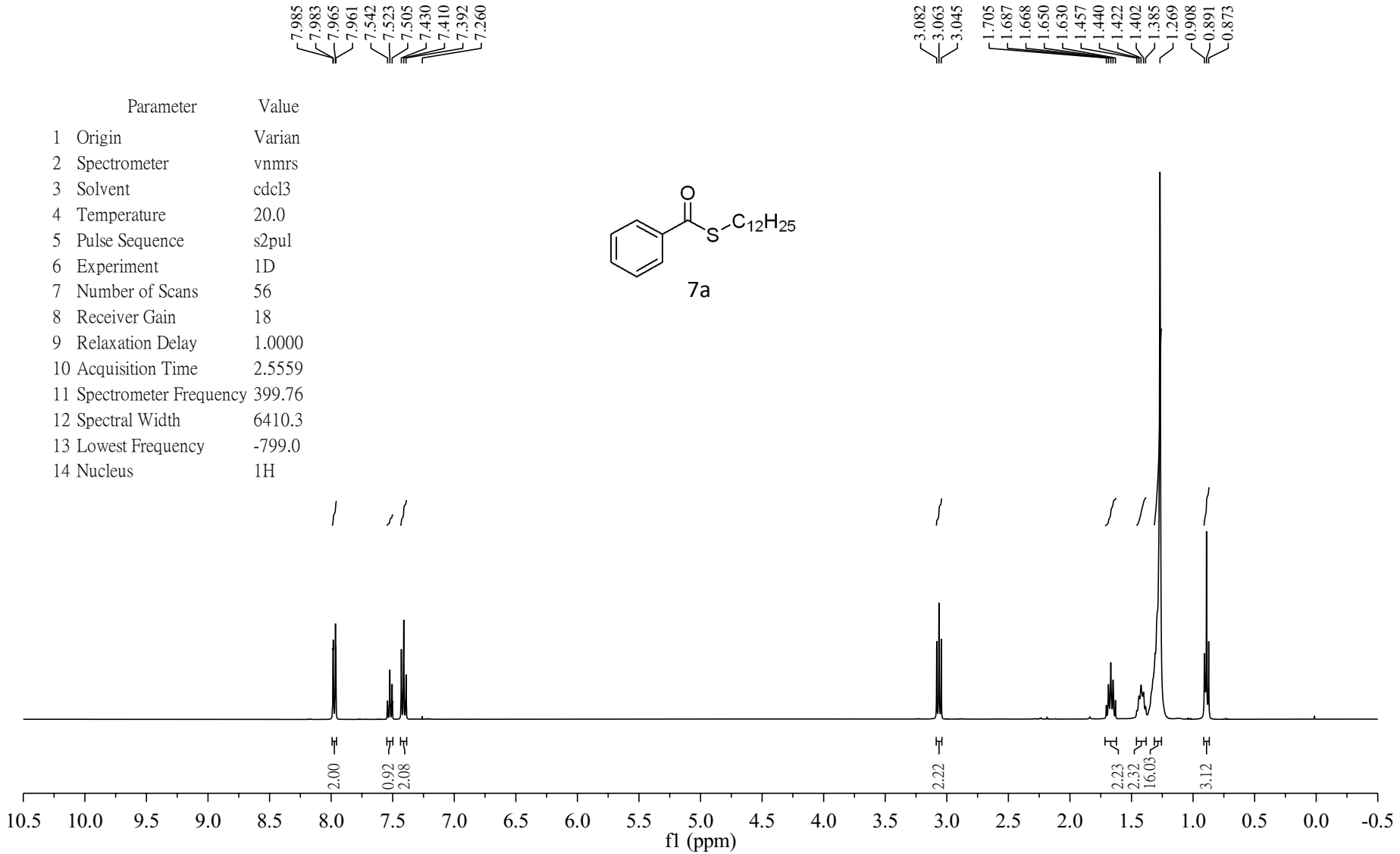
f1 (ppm)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1.687
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1.630
1.457
1.440
1.422
1.402
1.385
1.269
0.908
0.891
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Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 56
8 Receiver Gain 18
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -799.0
14 Nucleus 1H
O
S
C12H25
7a
2.00
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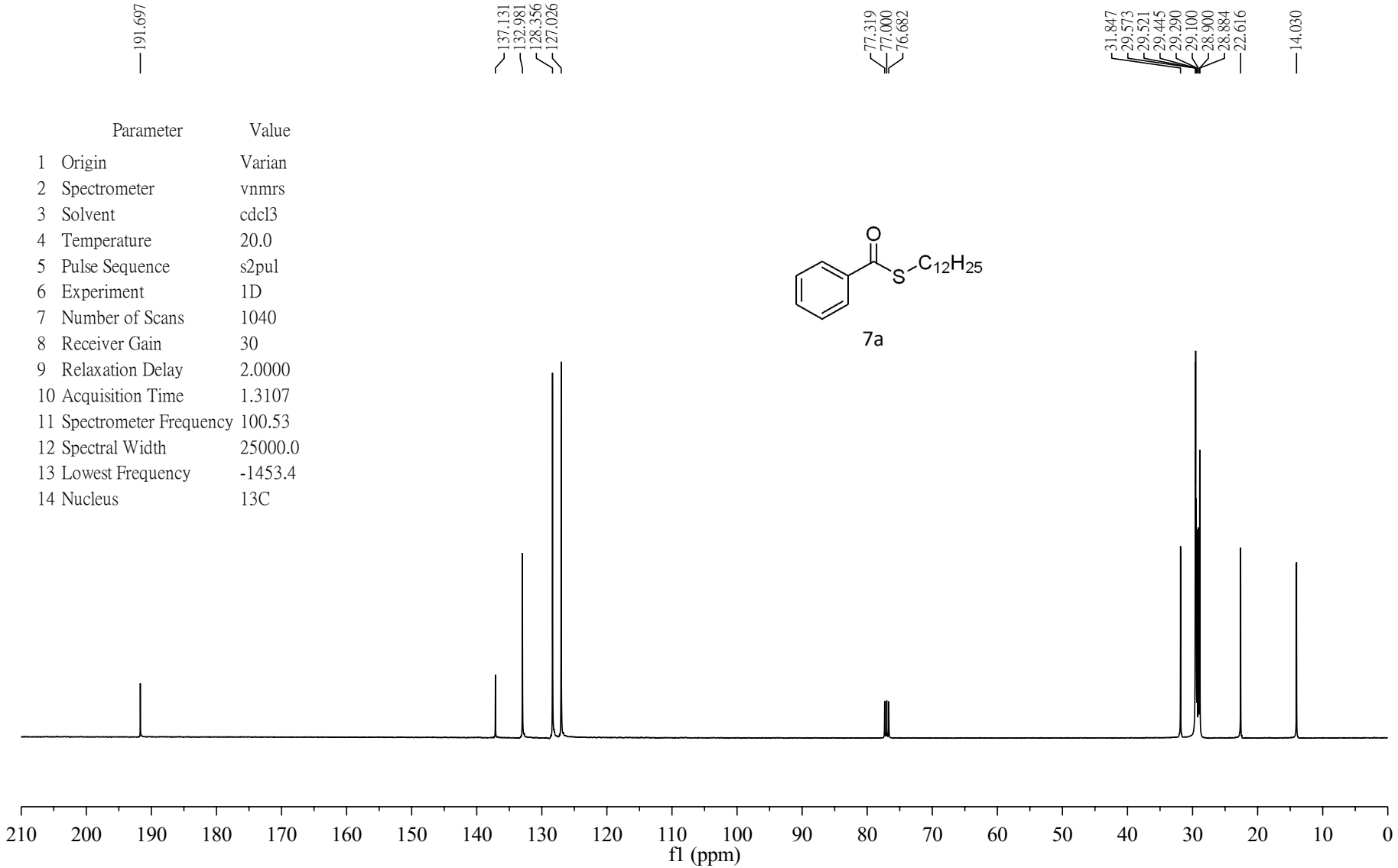
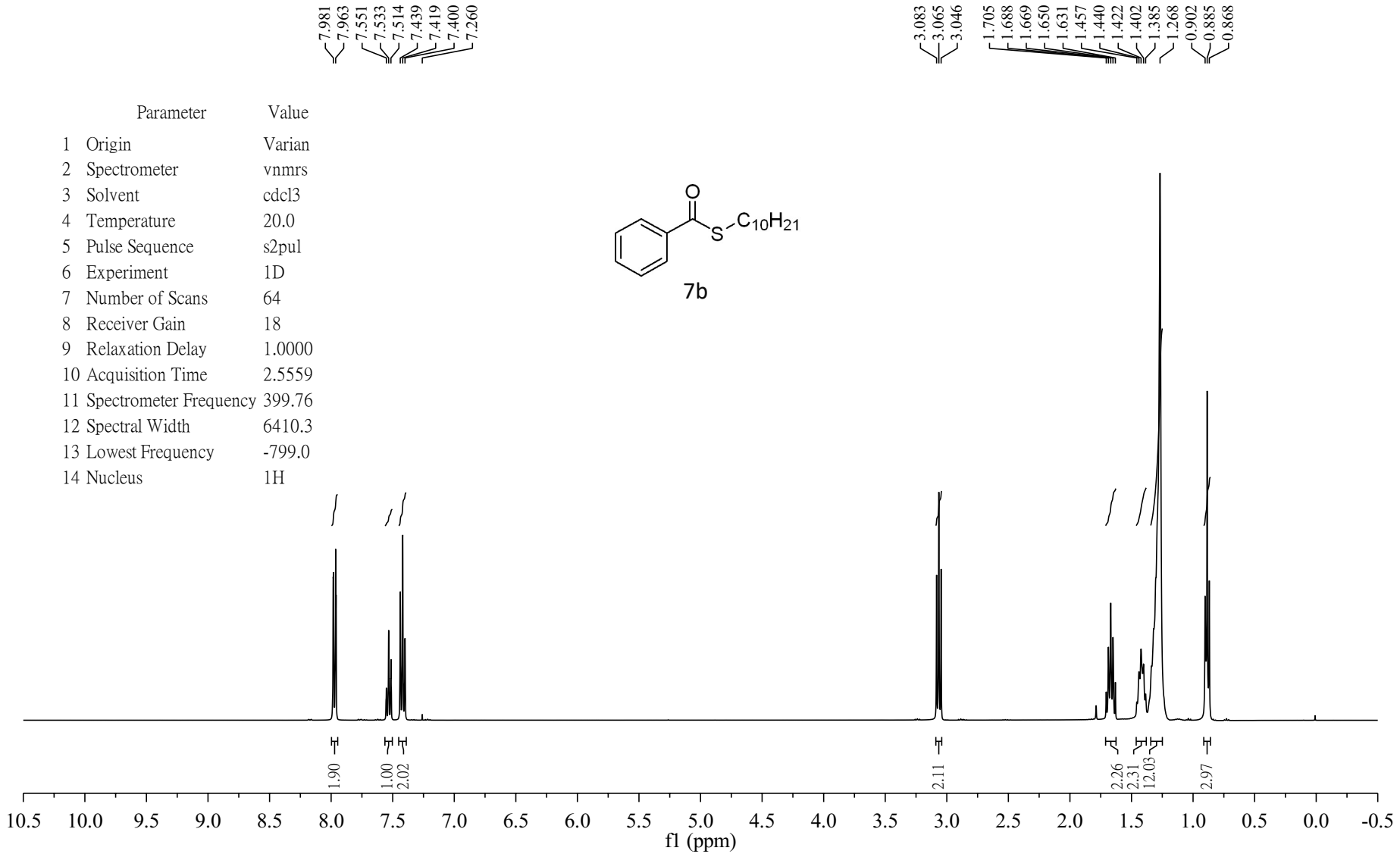
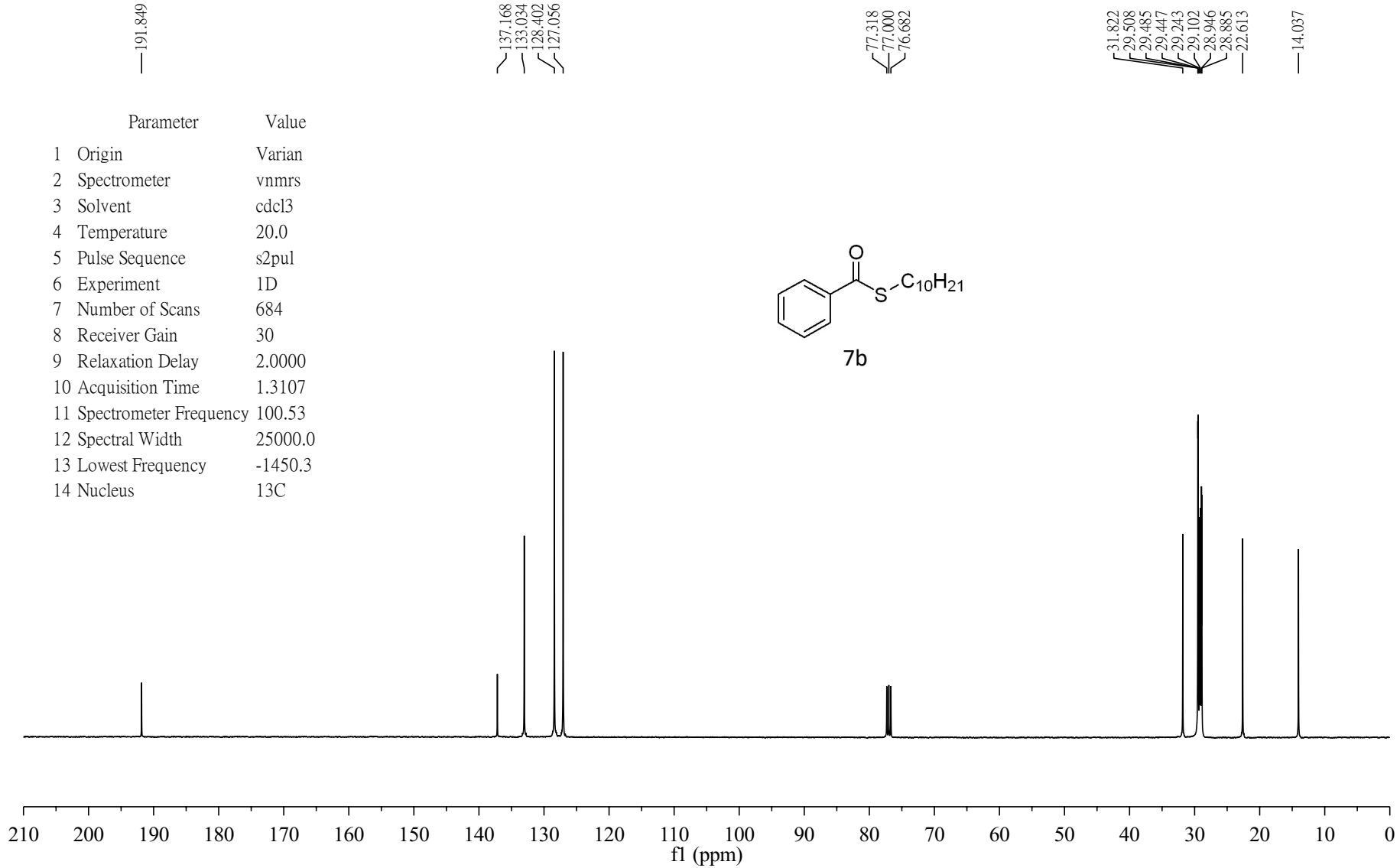
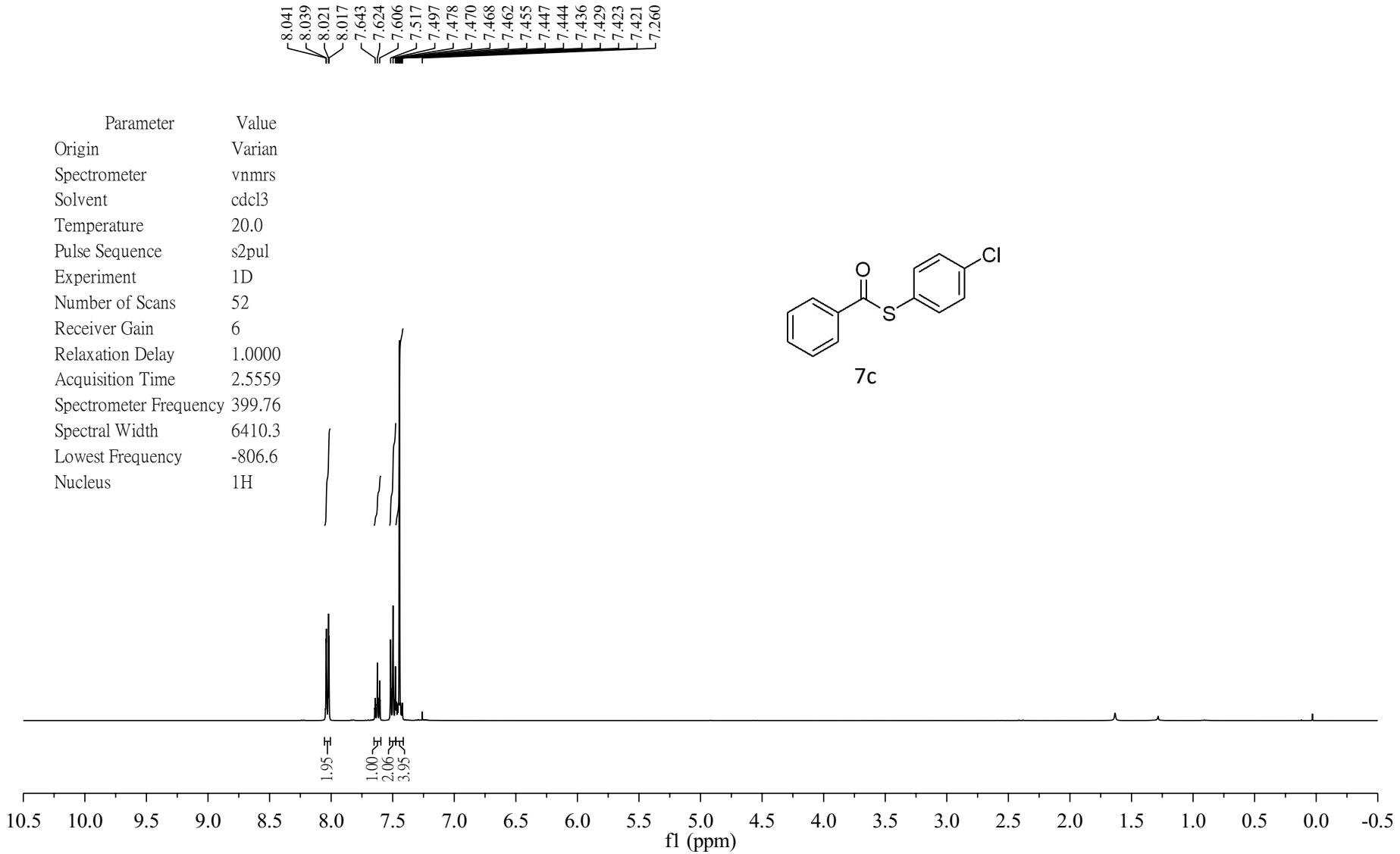
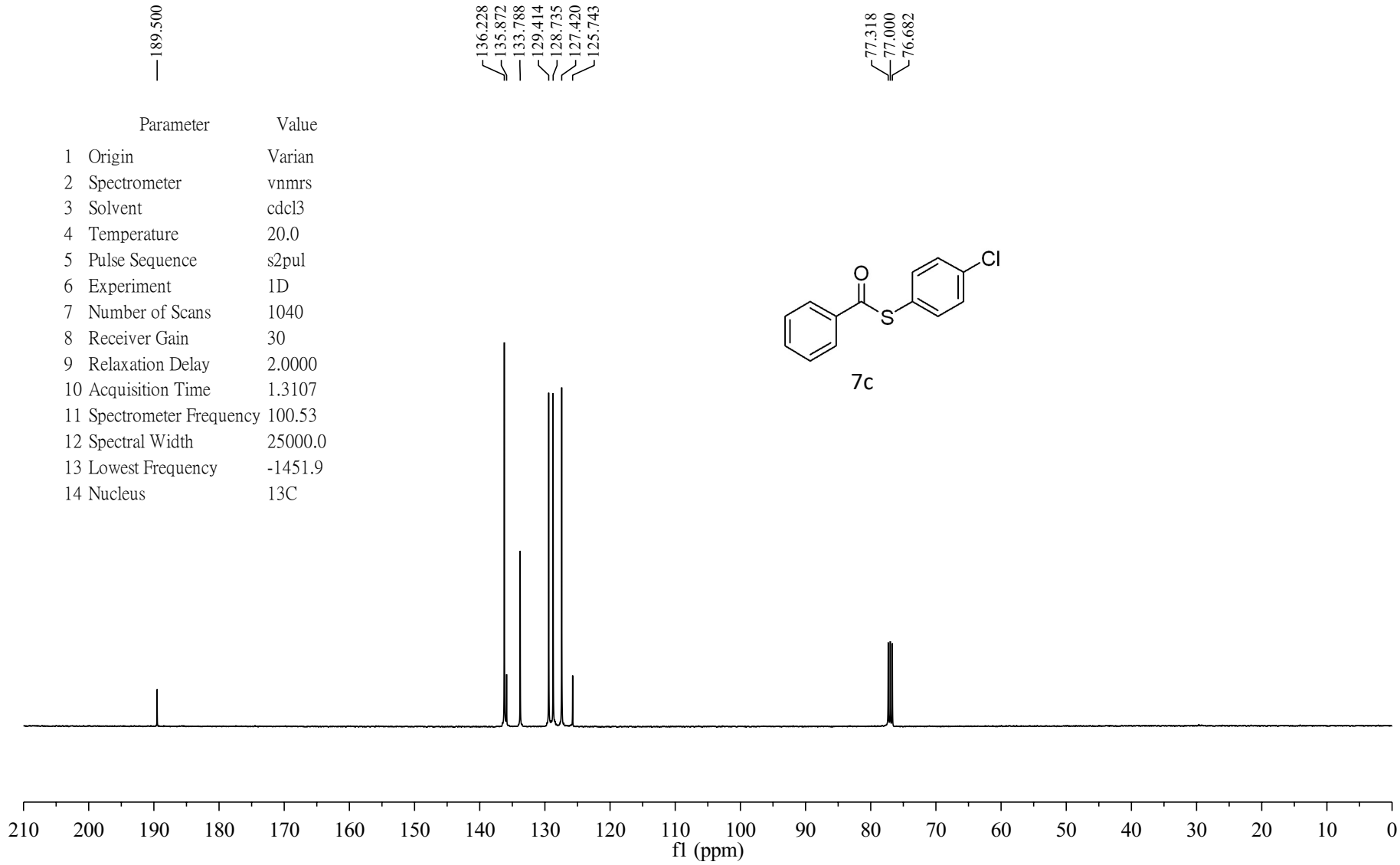
2.08
2.22
2.23
2.32
16.03
3.12
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

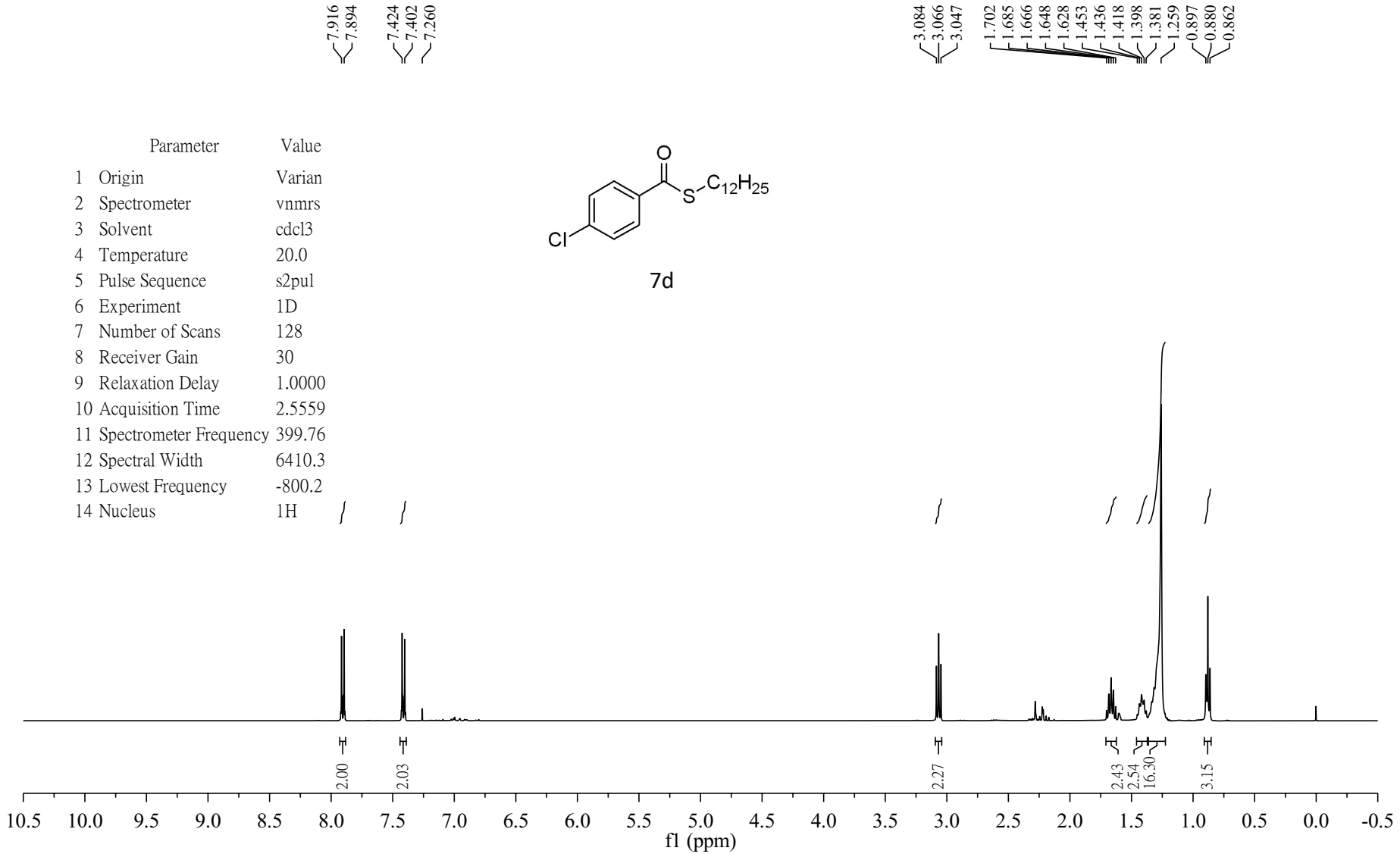

191.697
137.131
132.981
128.356
127.026
77.319
77.000
76.682
31.847
29.573
29.521
29.445
29.290
29.100
28.900
28.884
22.616
14.030
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 1040
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1453.4
14 Nucleus 13C
O
S
C12H25
7a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

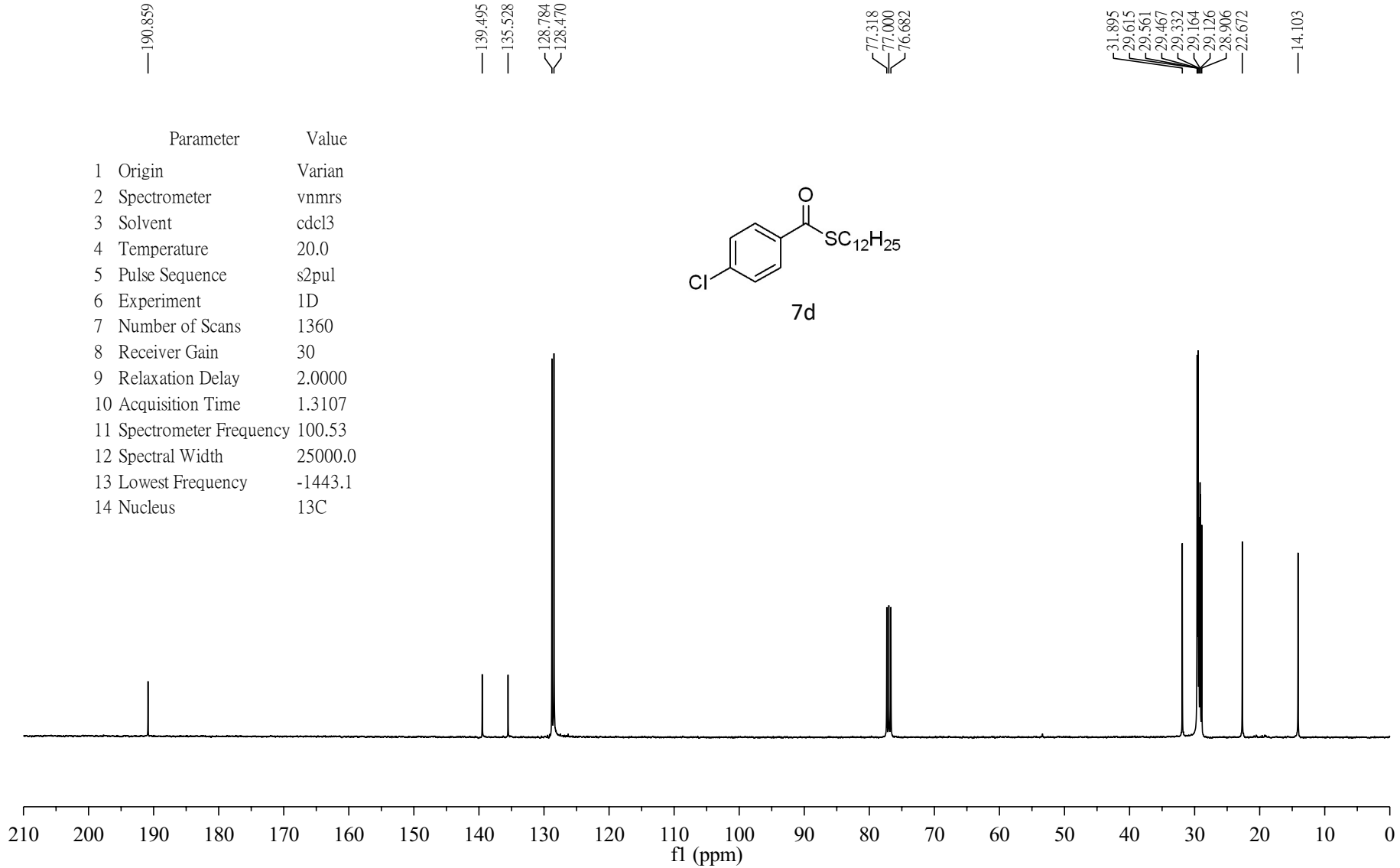

7.981
7.963
7.551
7.533
7.514
7.439
7.419
7.400
7.260
3.083
3.065
3.046
1.705
1.688
1.669
1.650
1.631
1.457
1.440
1.422
1.402
1.385
1.268
0.902
0.885
0.868
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 64
8 Receiver Gain 18
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -799.0
14 Nucleus 1H
O
S
C10H21
7b
1.90
1.00
2.02
2.11
2.26
2.31
12.03
2.97
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

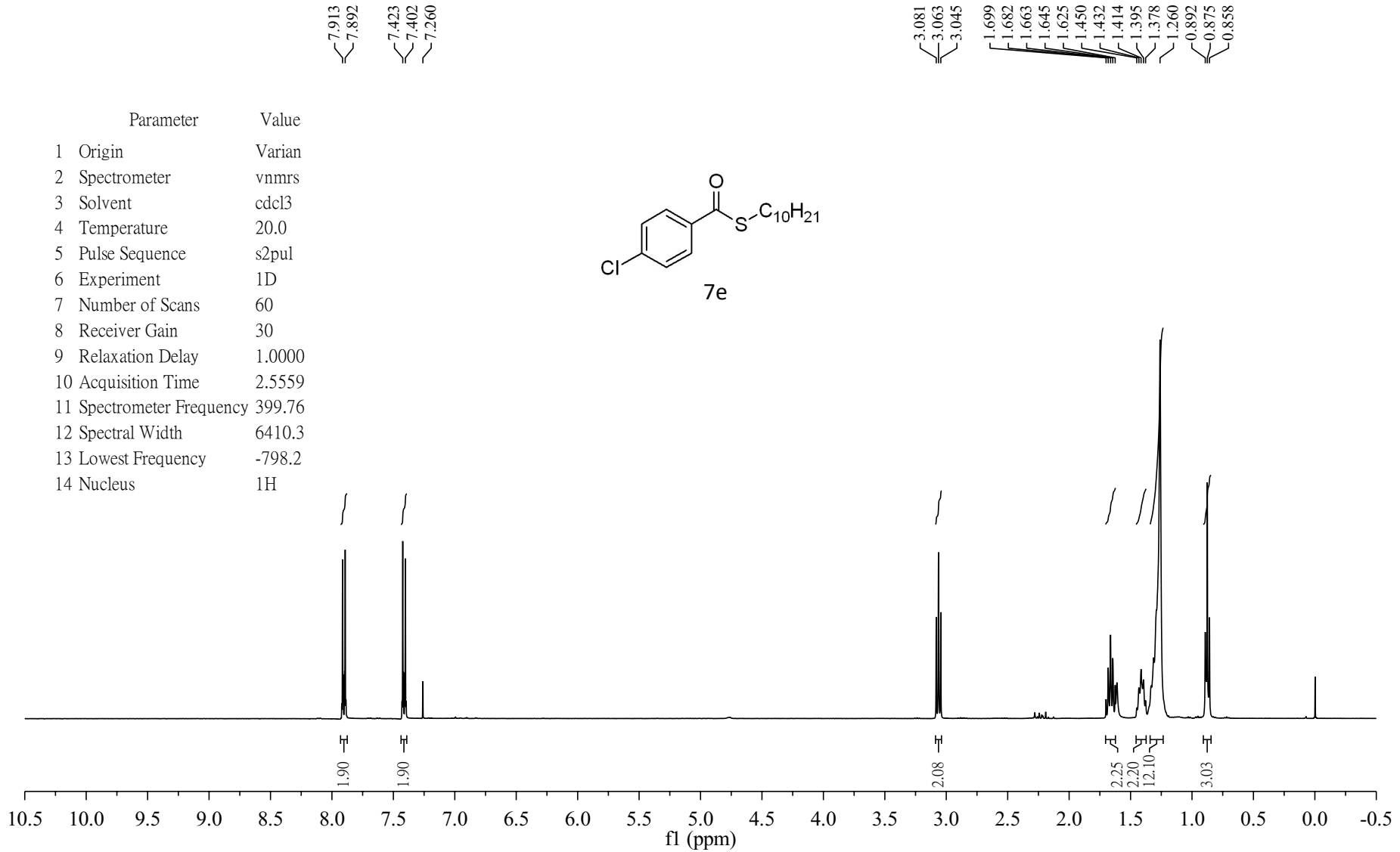

191.849
137.168
133.034
128.402
127.056
77.318
77.000
76.682
31.822
29.508
29.485
29.447
29.243
29.102
28.946
28.885
22.613
14.037
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 684
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1450.3
14 Nucleus 13C
O
S
C10H21
7b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

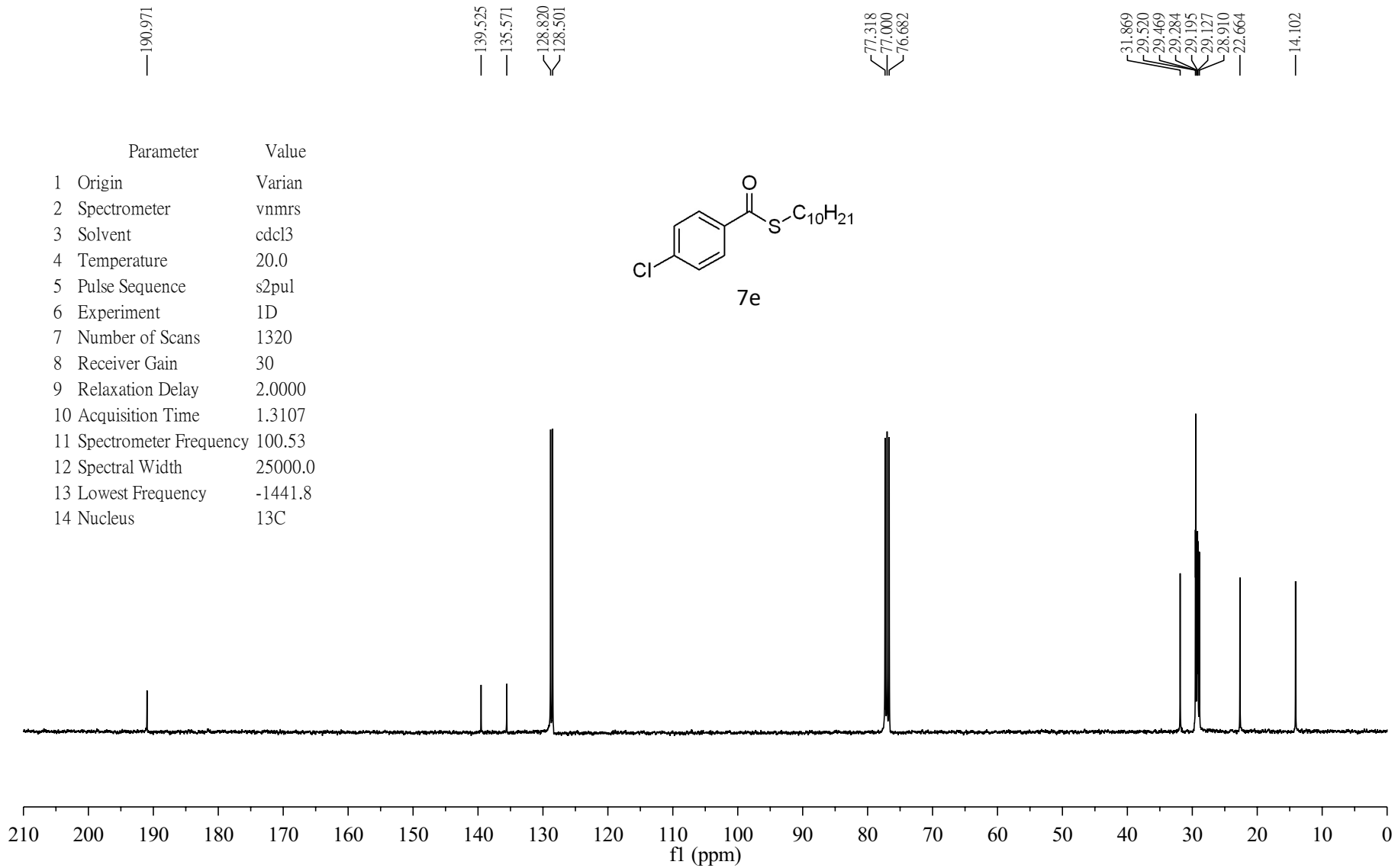

8.041
8.039
8.021
8.017
7.643
7.624
7.606
7.517
7.497
7.478
7.470
7.468
7.462
7.455
7.447
7.444
7.436
7.429
7.423
7.421
7.260
Parameter Value
Origin Varian
Spectrometer vnmrs
Solvent cdcl3
Temperature 20.0
Pulse Sequence s2pul
Experiment 1D
Number of Scans 52
Receiver Gain 6
Relaxation Delay 1.0000
Acquisition Time 2.5559
Spectrometer Frequency 399.76
Spectral Width 6410.3
Lowest Frequency -806.6
Nucleus 1H
O
S
Cl
7c
1.95
1.00
2.06
3.95
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

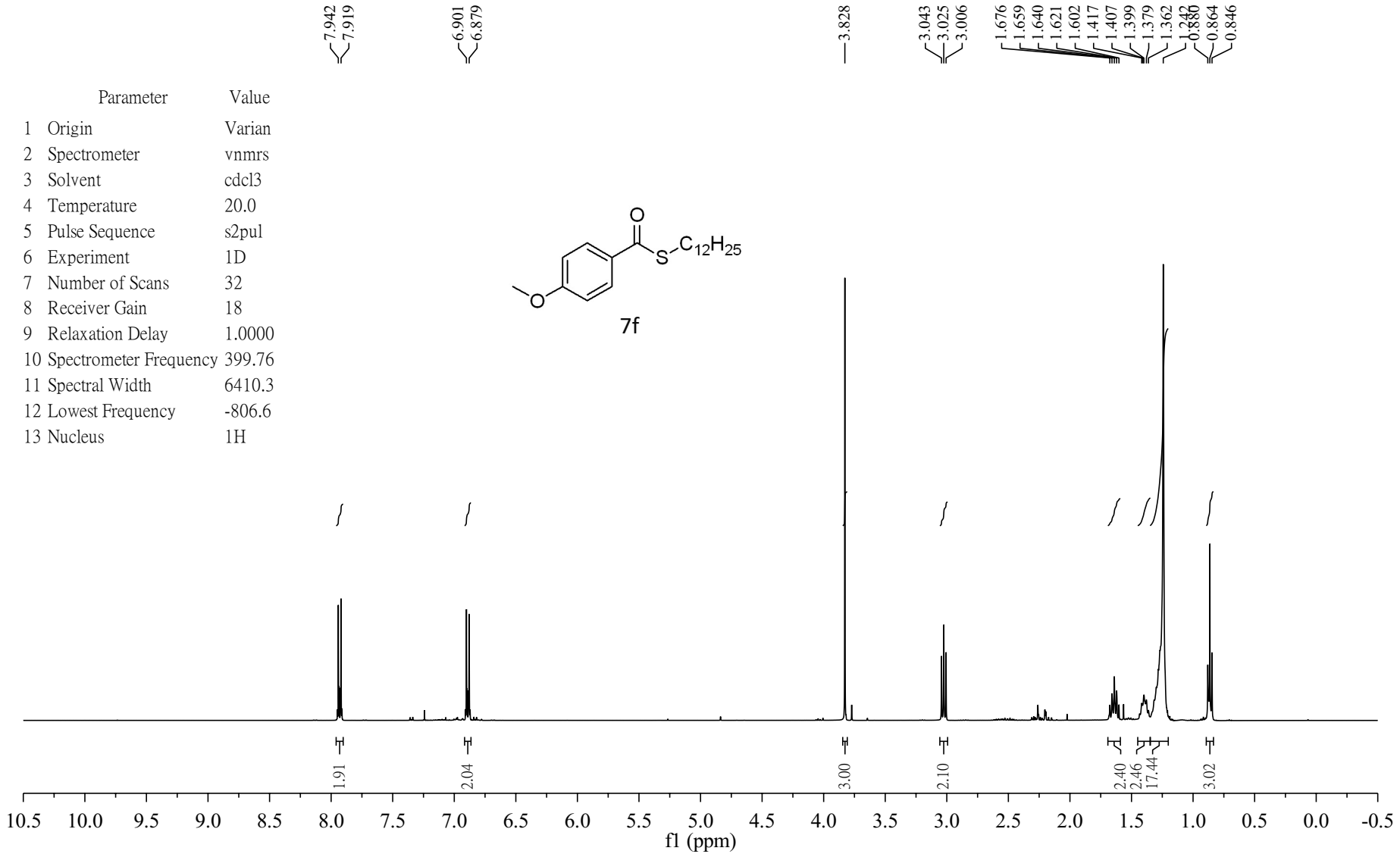

189.500
136.228
135.872
133.788
129.414
128.735
127.420
125.743
77.318
77.000
76.682
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 1040
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1451.9
14 Nucleus 13C
O
S
Cl
7c
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

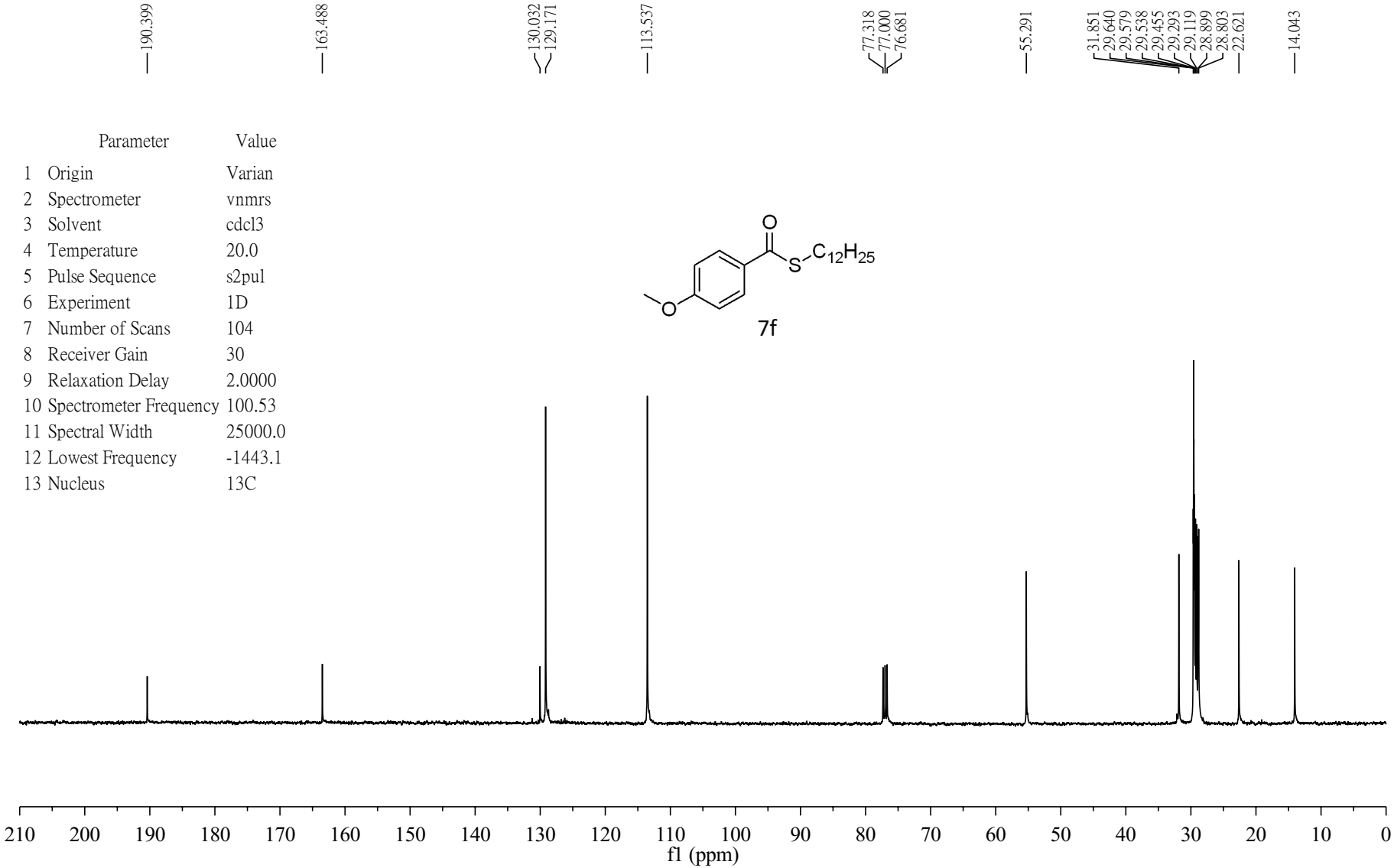

7.916
7.894
7.424
7.402
7.260
3.084
3.066
3.047
1.702
1.685
1.666
1.648
1.628
1.453
1.436
1.418
1.398
1.381
1.259
0.897
0.880
0.862
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 128
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -800.2
14 Nucleus 1H
O
S
C12H25
Cl
7d
2.00
2.03
2.27
2.43
2.54
16.30
3.15
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

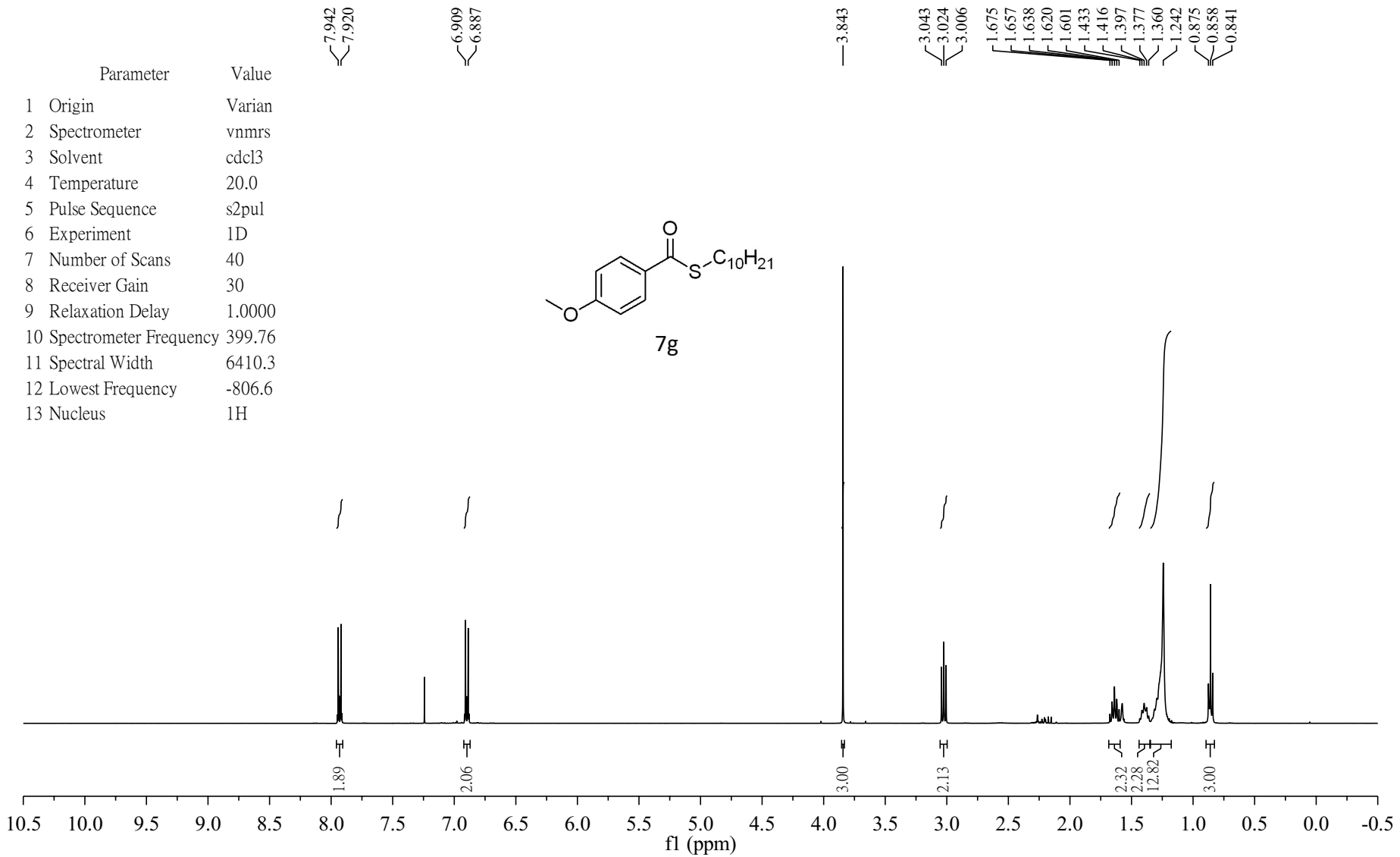

190.859
139.495
135.528
128.784
128.470
77.318
77.000
76.682
31.895
29.615
29.561
29.467
29.332
29.164
29.126
28.906
22.672
14.103
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 1360
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1443.1
14 Nucleus 13C
O
SC12H25
Cl
7d
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

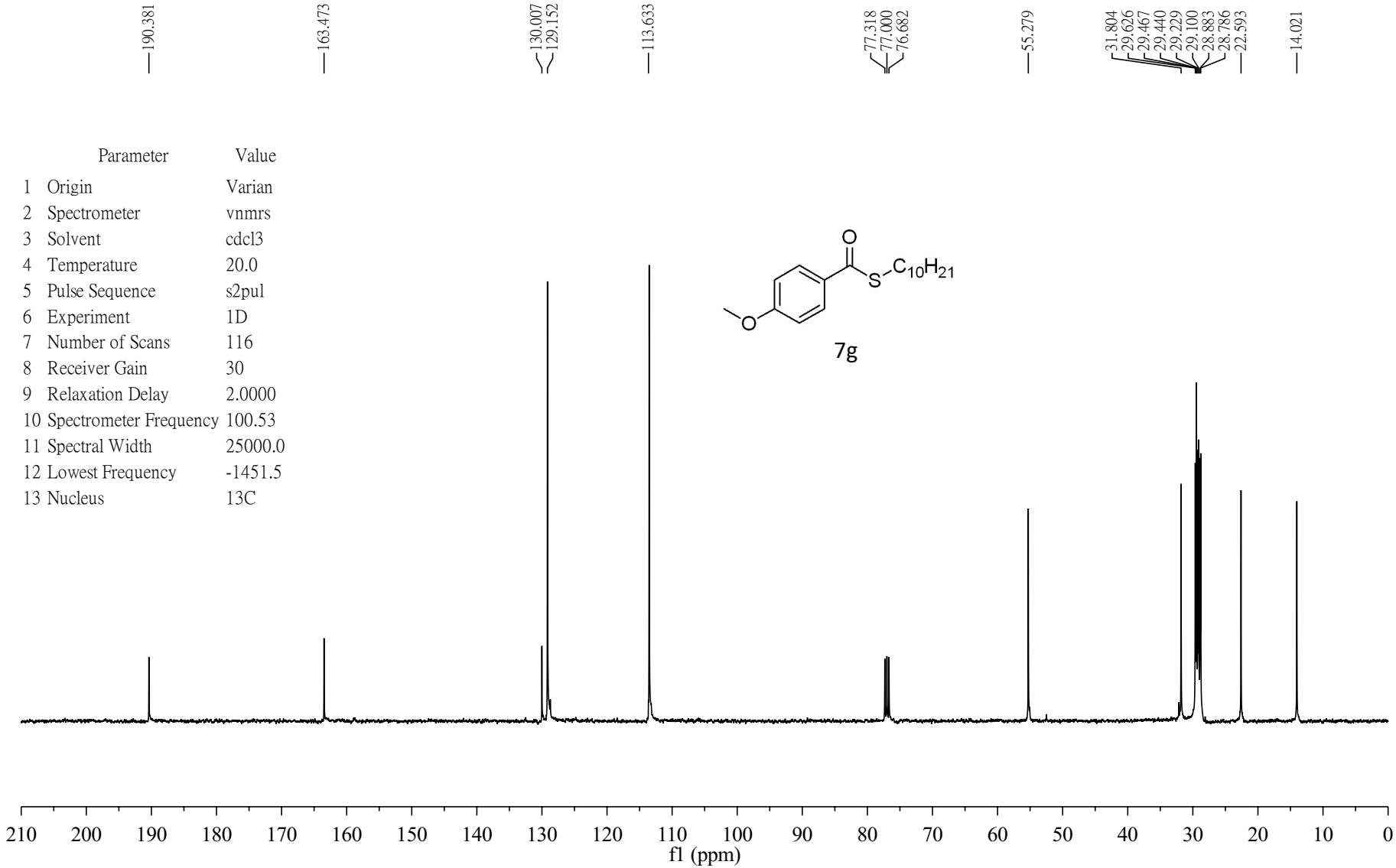

7.913
7.892
7.423
7.402
7.260
3.081
3.063
3.045
1.699
1.682
1.663
1.645
1.625
1.450
1.432
1.414
1.395
1.378
1.260
0.892
0.875
0.858
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 60
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -798.2
14 Nucleus 1H
O
S
C10H21
Cl
7e
1.90
1.90
2.08
2.25
2.20
12.10
3.03
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


190.971
139.525
135.571
128.820
128.501
77.318
77.000
76.682
31.869
29.520
29.469
29.284
29.195
29.127
28.910
22.664
14.102
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 1320
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1441.8
14 Nucleus 13C
O
S
C10H21
Cl
7e
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.942
7.919
6.901
6.879
3.828
3.043
3.025
3.006
1.676
1.659
1.640
1.621
1.602
1.417
1.407
1.399
1.379
1.362
1.242
0.880
0.864
0.846
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 32
8 Receiver Gain 18
9 Relaxation Delay 1.0000
10 Spectrometer Frequency 399.76
11 Spectral Width 6410.3
12 Lowest Frequency -806.6
13 Nucleus 1H
O
S
C12H25
O
7f
1.91
2.04
3.00
2.10
2.40
2.46
17.44
3.02
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


190.399
163.488
130.032
129.171
113.537
77.318
77.000
76.681
55.291
31.851
29.640
29.579
29.538
29.455
29.293
29.119
28.899
28.803
22.621
14.043
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 104
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Spectrometer Frequency 100.53
11 Spectral Width 25000.0
12 Lowest Frequency -1443.1
13 Nucleus 13C
O
S
C12H25
O
7f
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.942
7.920
6.909
6.887
3.843
3.043
3.024
3.006
1.675
1.657
1.638
1.620
1.601
1.433
1.416
1.397
1.377
1.360
1.242
0.875
0.858
0.841
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 40
8 Receiver Gain 30
9 Relaxation Delay 1.0000
10 Spectrometer Frequency 399.76
11 Spectral Width 6410.3
12 Lowest Frequency -806.6
13 Nucleus 1H
O
S
C10H21
O
7g
1.89
2.06
3.00
2.13
2.32
2.28
12.82
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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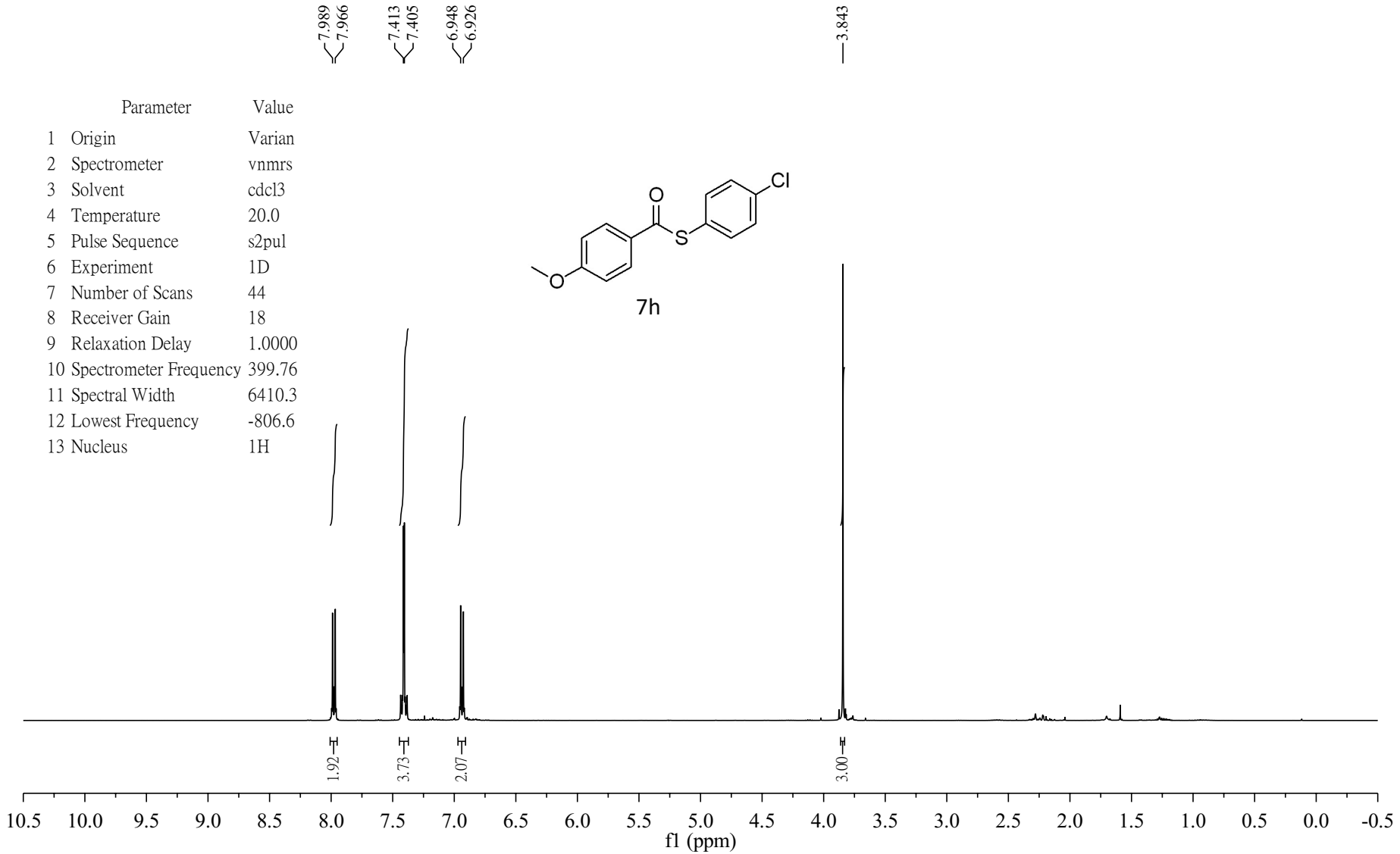
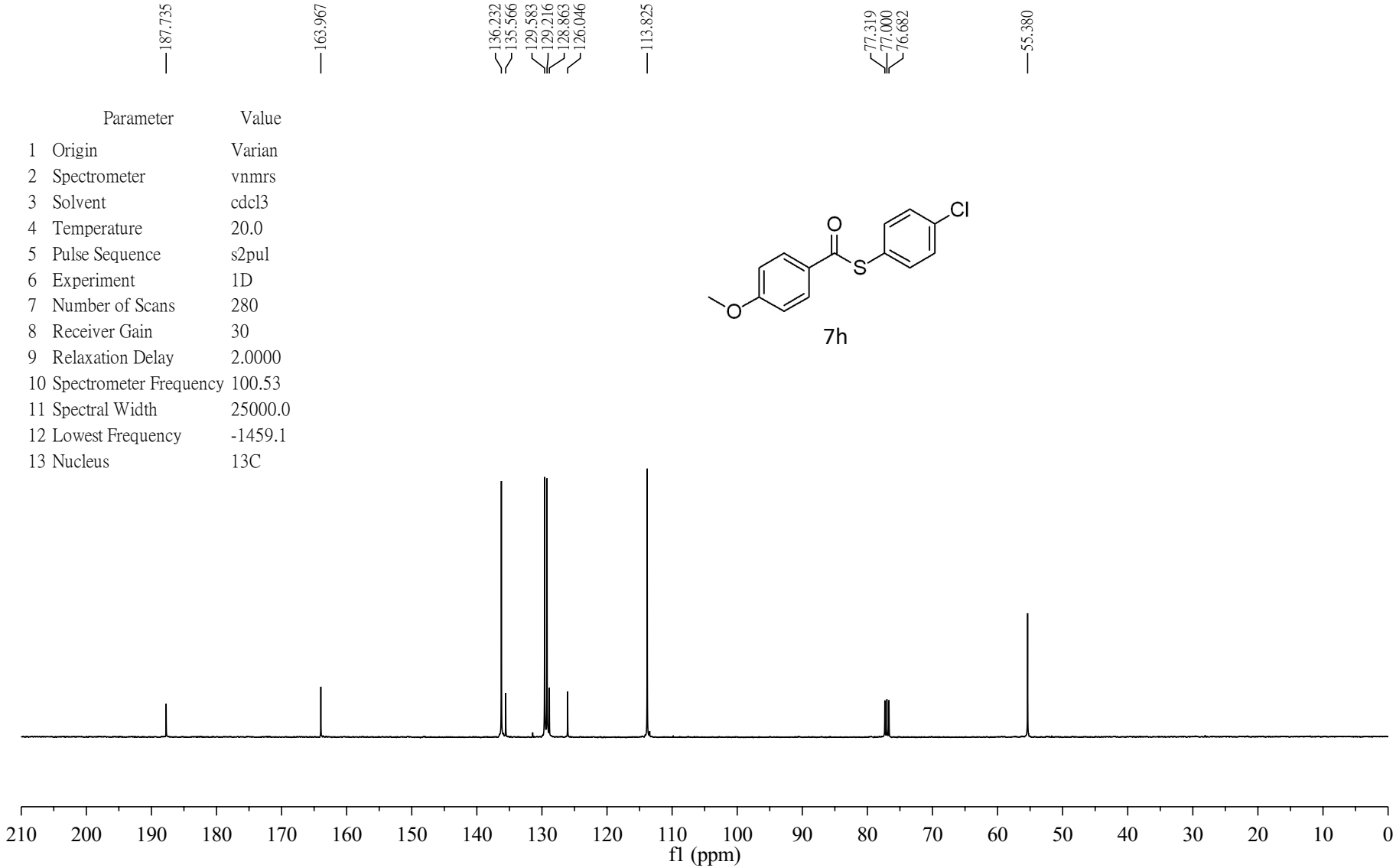
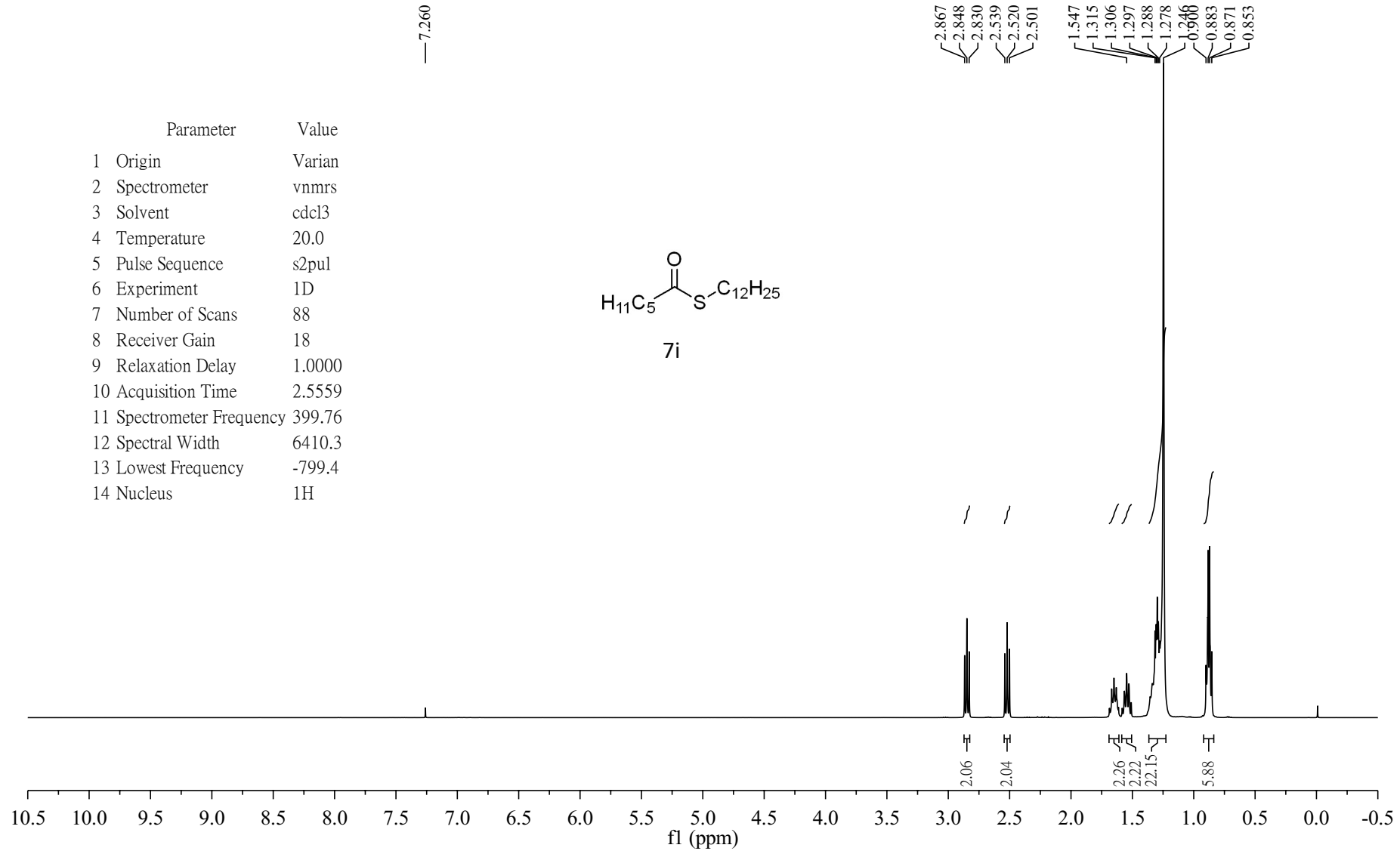
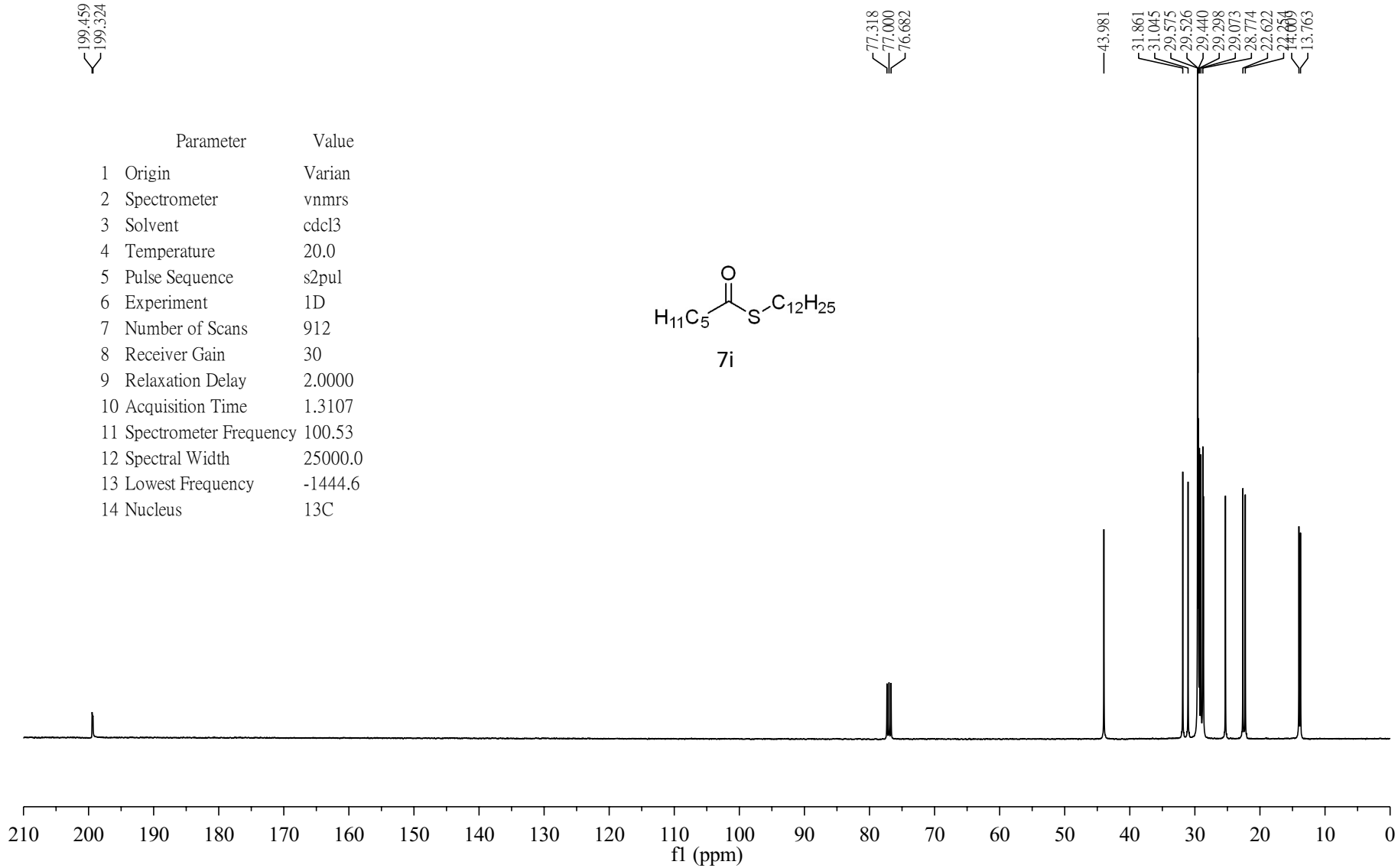
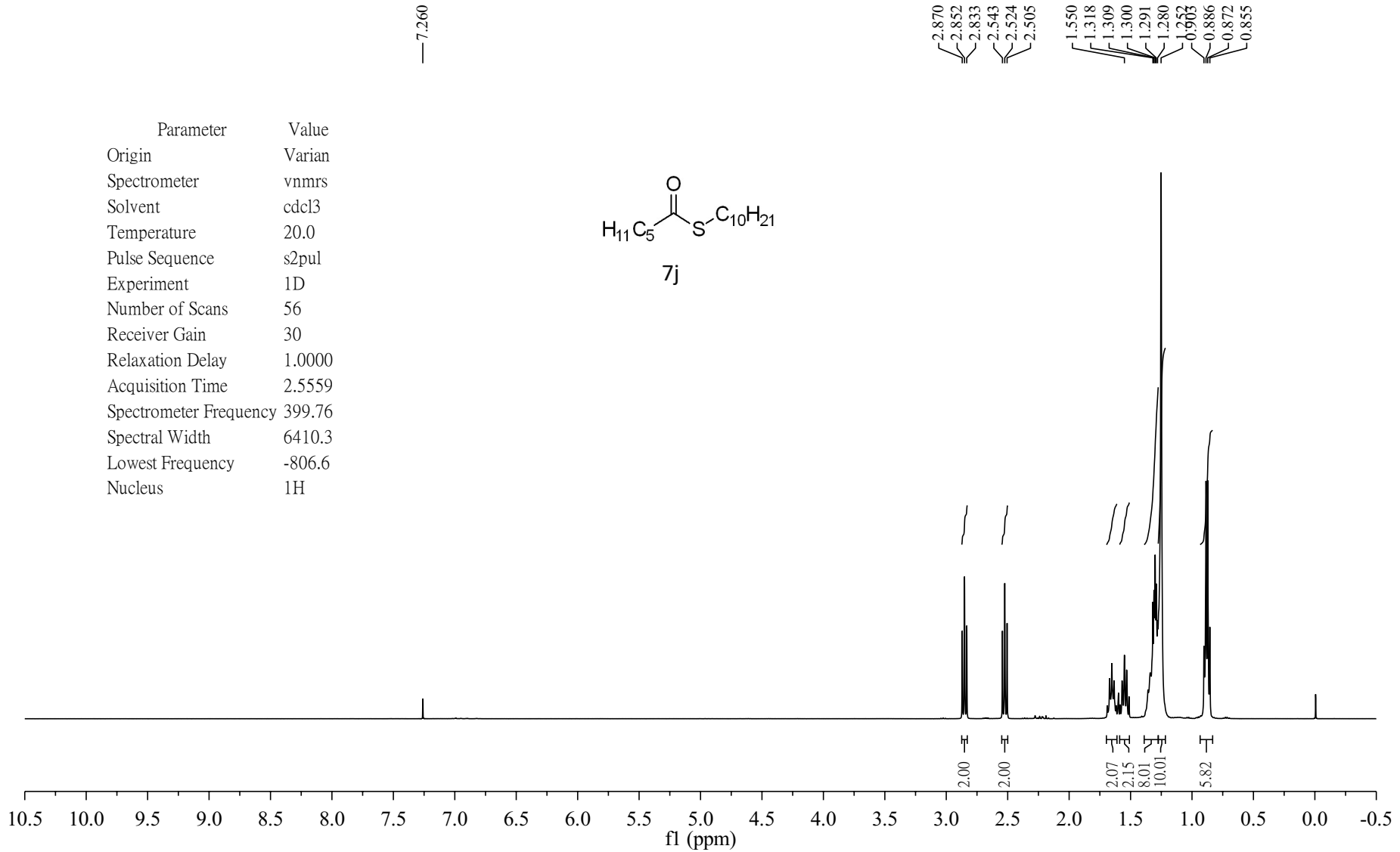
130.007
129.152
113.633
77.318
77.000
76.682
55.279
31.804
29.626
29.467
29.440
29.229
29.100
28.883
28.786
22.593
14.021
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 116
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Spectrometer Frequency 100.53
11 Spectral Width 25000.0
12 Lowest Frequency -1451.5
13 Nucleus 13C
O
S
C10H21
O
7g
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

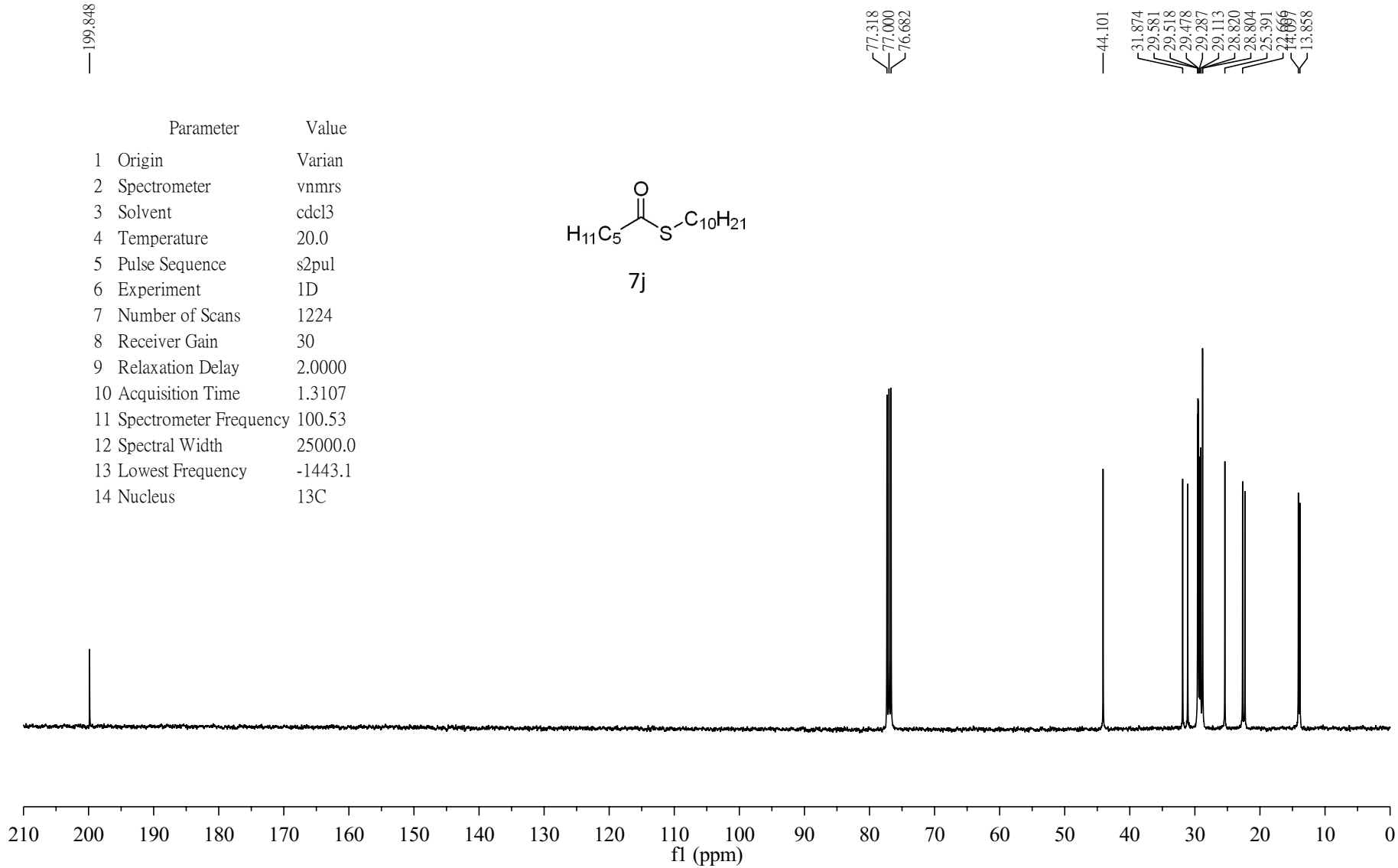

7.989
7.966
7.413
7.405
6.948
6.926
3.843
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 44
8 Receiver Gain 18
9 Relaxation Delay 1.0000
10 Spectrometer Frequency 399.76
11 Spectral Width 6410.3
12 Lowest Frequency -806.6
13 Nucleus 1H
O
S
Cl
O
7h
1.92
3.73
2.07
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


187.735
163.967
136.232
135.566
129.583
129.216
128.863
126.046
113.825
77.319
77.000
76.682
55.380
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 280
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Spectrometer Frequency 100.53
11 Spectral Width 25000.0
12 Lowest Frequency -1459.1
13 Nucleus 13C
O
S
Cl
O
7h
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.260
2.867
2.848
2.830
2.539
2.520
2.501
1.547
1.315
1.306
1.297
1.288
1.278
1.246
0.900
0.883
0.871
0.853
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 88
8 Receiver Gain 18
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -799.4
14 Nucleus 1H
O
H11C5
S
C12H25
7i
2.06
2.04
2.26
2.22
22.15
5.88
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


199.459
199.324
77.318
77.000
76.682
43.981
31.861
31.045
29.575
29.526
29.440
29.298
29.073
28.774
22.622
22.254
14.069
13.763
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 912
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1444.6
14 Nucleus 13C
O
H11C5
S
C12H25
7i
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.260
2.870
2.852
2.833
2.543
2.524
2.505
1.550
1.318
1.309
1.300
1.291
1.280
1.252
0.903
0.886
0.872
0.855
Parameter Value
Origin Varian
Spectrometer vnmrs
Solvent cdcl3
Temperature 20.0
Pulse Sequence s2pul
Experiment 1D
Number of Scans 56
Receiver Gain 30
Relaxation Delay 1.0000
Acquisition Time 2.5559
Spectrometer Frequency 399.76
Spectral Width 6410.3
Lowest Frequency -806.6
Nucleus 1H
O
H11C5
S
C10H21
7j
2.00
2.00
2.07
2.15
8.01
10.01
5.82
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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77.000
76.682
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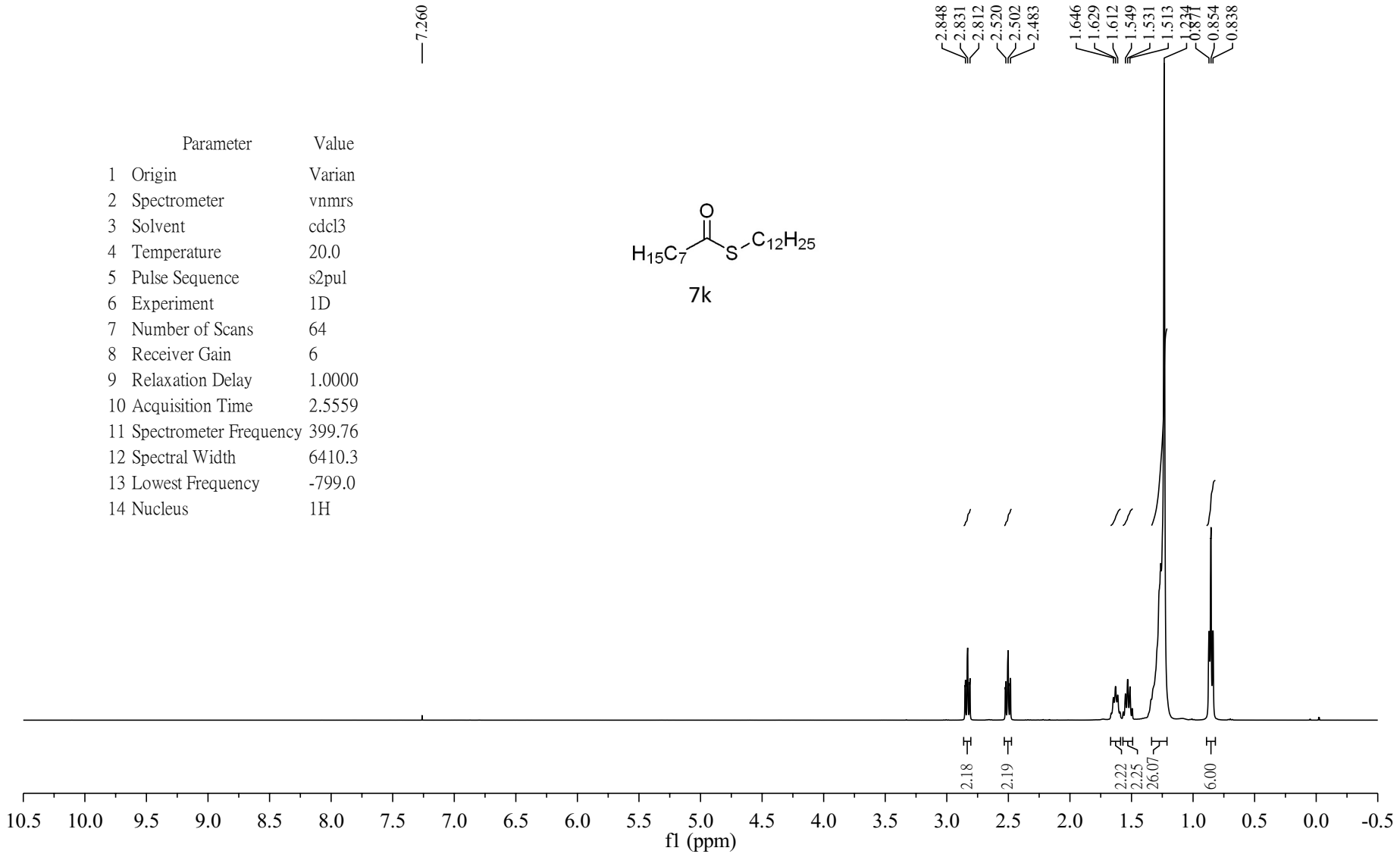
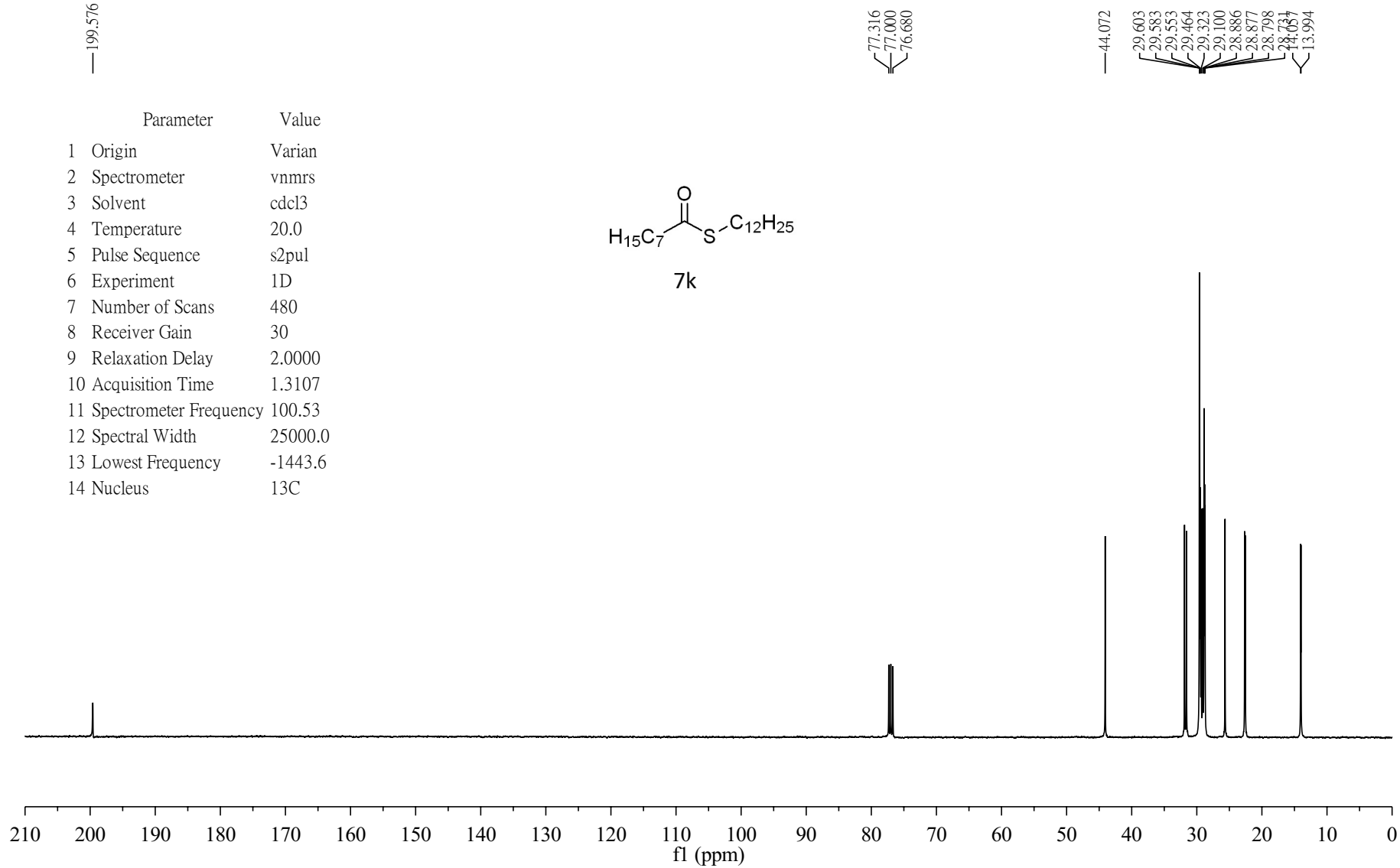
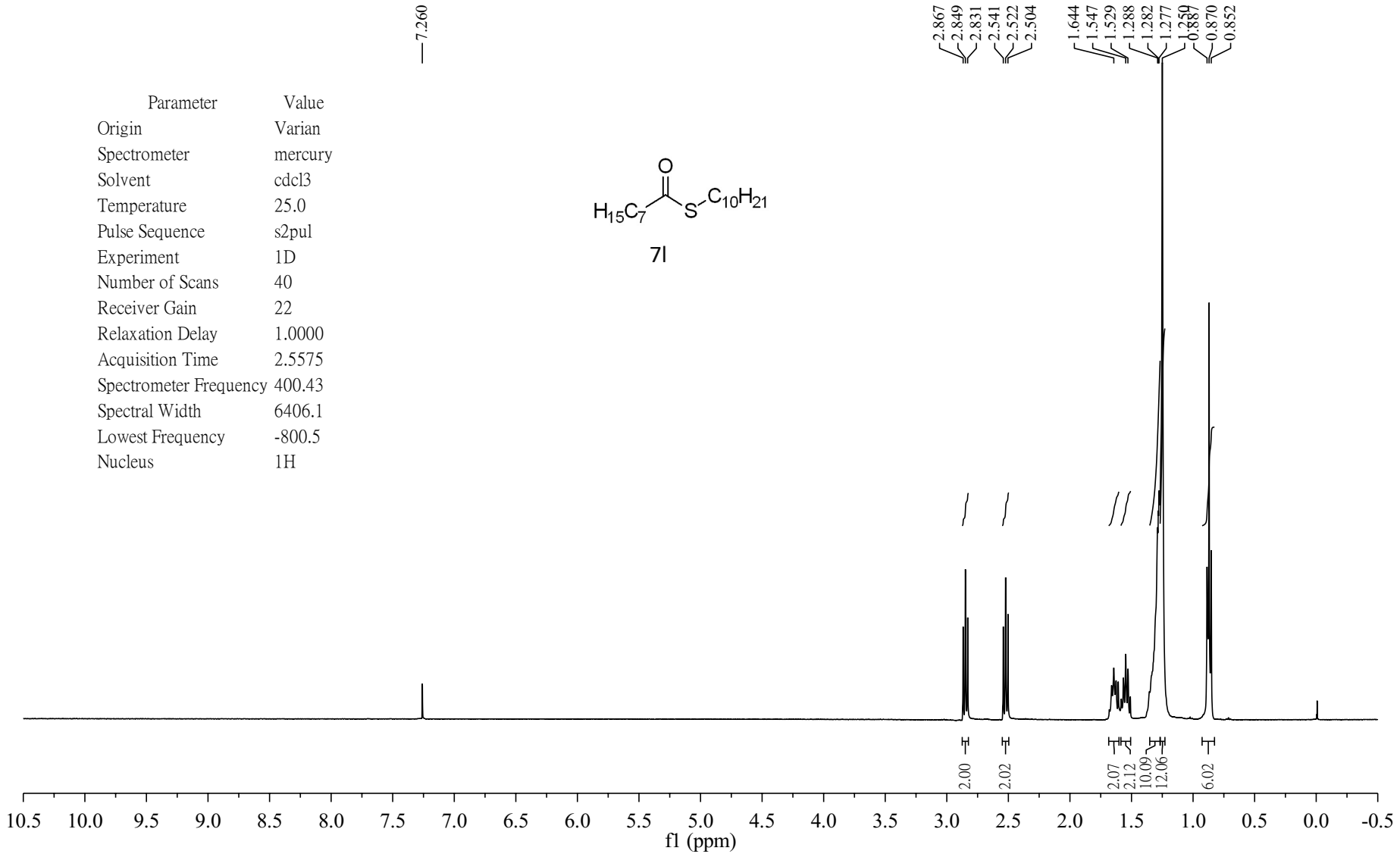
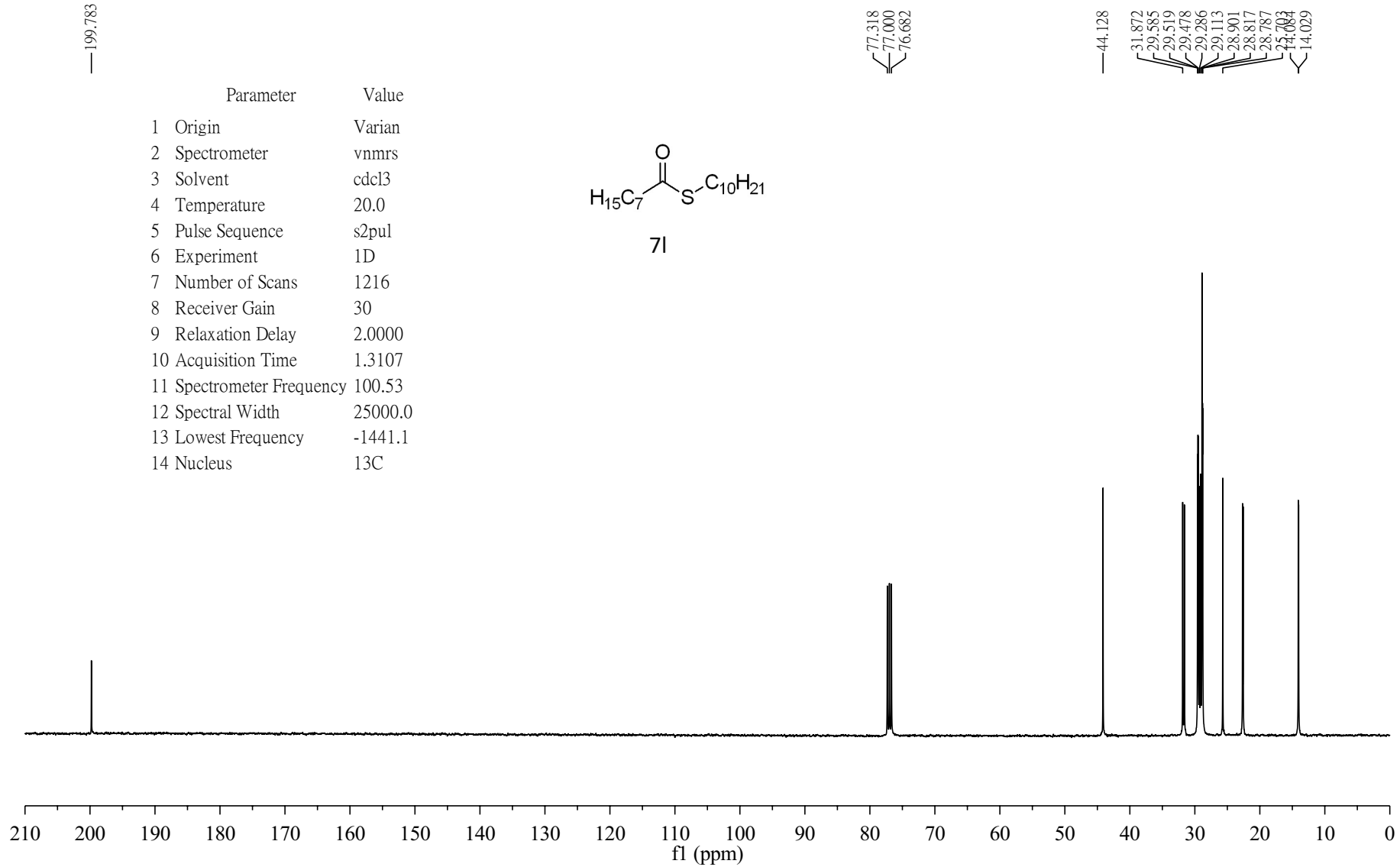
31.874
29.581
29.518
29.478
29.287
29.113
28.820
28.804
25.391
22.666
14.097
13.858
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 1224
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1443.1
14 Nucleus 13C
O
H11C5
S
C10H21
7j
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.260
2.848
2.831
2.812
2.520
2.502
2.483
1.646
1.629
1.612
1.549
1.531
1.513
1.234
0.871
0.854
0.838
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 64
8 Receiver Gain 6
9 Relaxation Delay 1.0000
10 Acquisition Time 2.5559
11 Spectrometer Frequency 399.76
12 Spectral Width 6410.3
13 Lowest Frequency -799.0
14 Nucleus 1H
O
H15C7
S
C12H25
7k
2.18
2.19
2.22
2.25
26.07
6.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


199.576
77.316
77.000
76.680
44.072
29.603
29.583
29.553
29.464
29.323
29.100
28.886
28.877
28.798
28.731
14.057
13.994
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 480
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1443.6
14 Nucleus 13C
O
H15C7
S
C12H25
7k
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.260
2.867
2.849
2.831
2.541
2.522
2.504
1.644
1.547
1.529
1.288
1.282
1.277
1.250
0.887
0.870
0.852
Parameter Value
Origin Varian
Spectrometer mercury
Solvent cdcl3
Temperature 25.0
Pulse Sequence s2pul
Experiment 1D
Number of Scans 40
Receiver Gain 22
Relaxation Delay 1.0000
Acquisition Time 2.5575
Spectrometer Frequency 400.43
Spectral Width 6406.1
Lowest Frequency -800.5
Nucleus 1H
O
H15C7
S
C10H21
7l
2.00
2.02
2.07
2.12
10.09
12.06
6.02
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


199.783
77.318
77.000
76.682
44.128
31.872
29.585
29.519
29.478
29.286
29.113
28.901
28.817
28.787
25.703
14.084
14.029
Parameter Value
1 Origin Varian
2 Spectrometer vnmrs
3 Solvent cdcl3
4 Temperature 20.0
5 Pulse Sequence s2pul
6 Experiment 1D
7 Number of Scans 1216
8 Receiver Gain 30
9 Relaxation Delay 2.0000
10 Acquisition Time 1.3107
11 Spectrometer Frequency 100.53
12 Spectral Width 25000.0
13 Lowest Frequency -1441.1
14 Nucleus 13C
O
H15C7
S
C10H21
7l
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)