Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

Homoallylic amines as efficient chiral inducing framework in the conjugated addition of amides to α,β-unsaturated esters. An entry to enantio-enriched diversely substituted amines.

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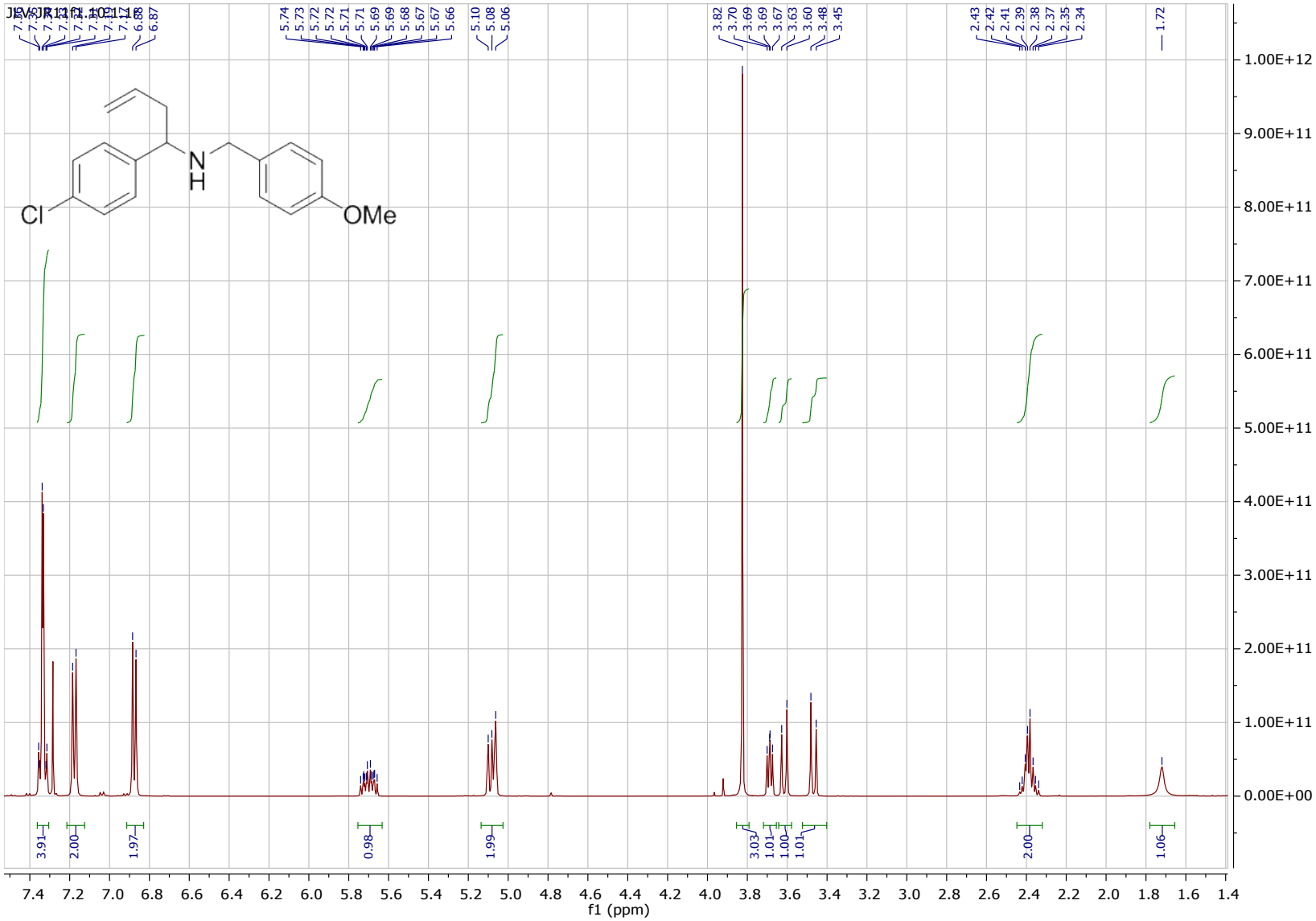
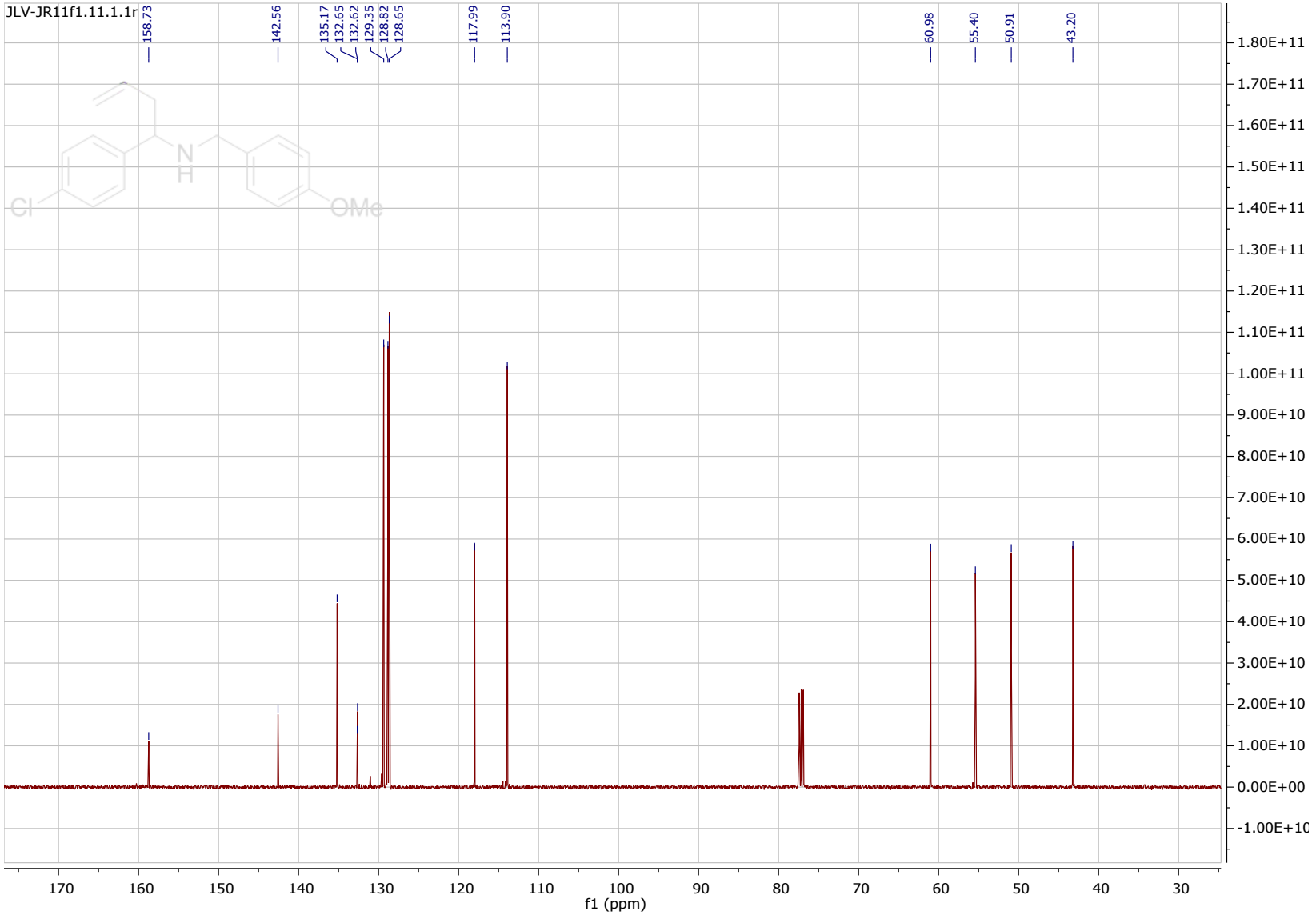
^{1}H and ^{13}C NRM spectra copies

***N*-Benzyl-1-(4-chlorophenyl)but-3-en-1-amine 1c**

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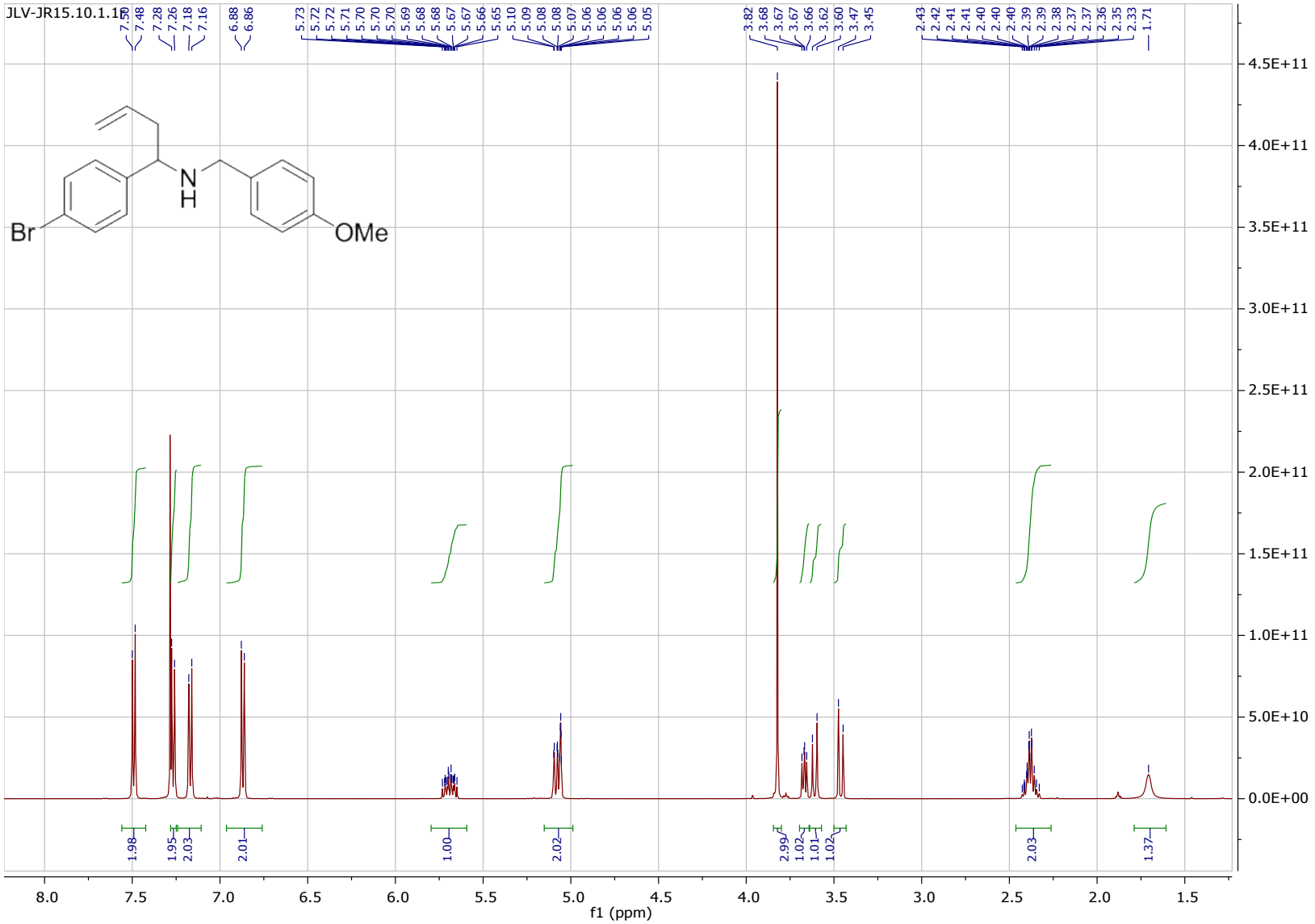
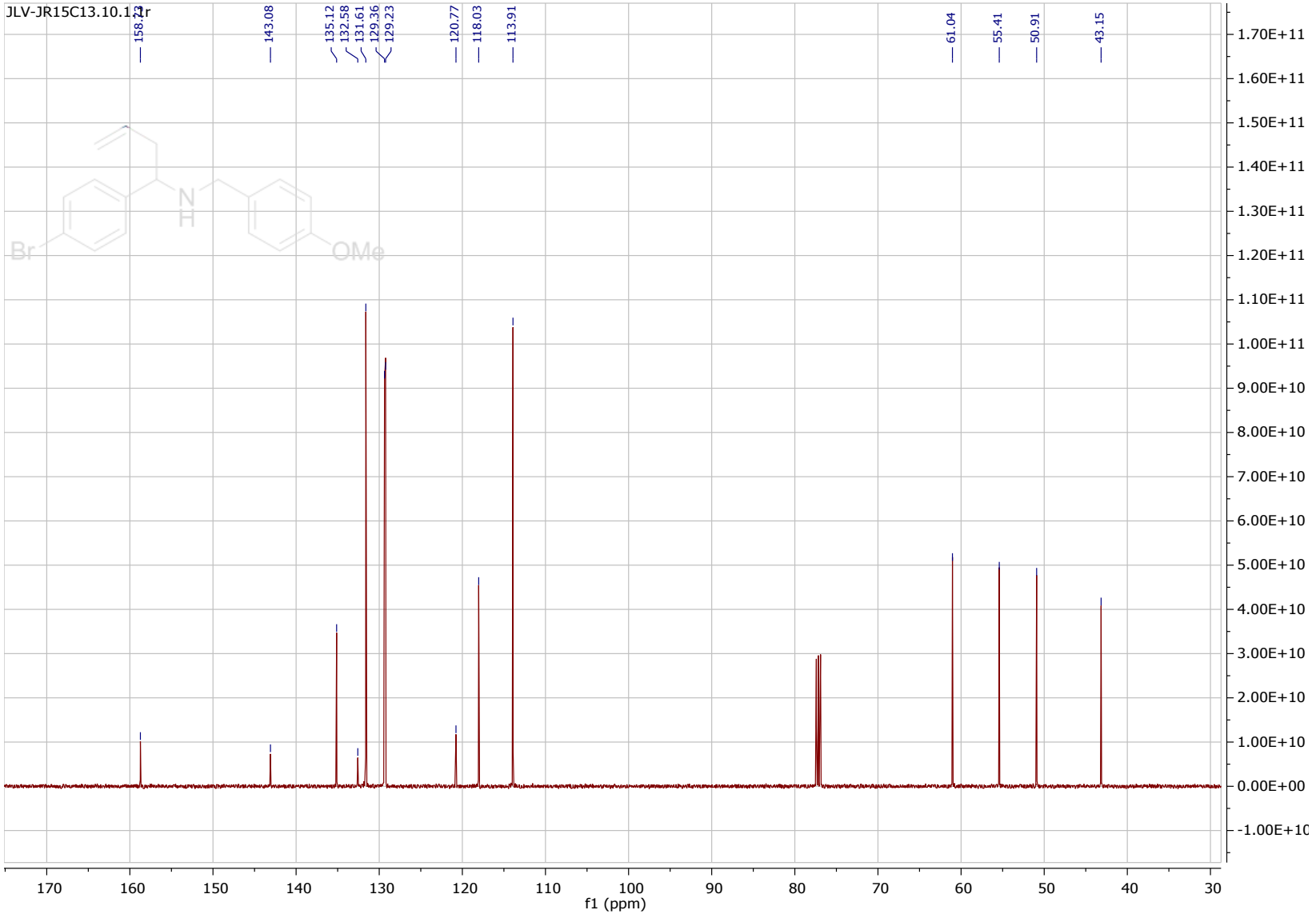
142.56
135.17
132.65
132.62
129.35
128.82
128.65
117.99
113.90
60.98
55.40
50.91
43.20
Cl
N
H
OMe
1.80E+11
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

1-(4-Bromophenyl)-*N*-(4-methoxybenzyl)but-3-en-1-amine 1d




JLV-JR15C13.10.11r
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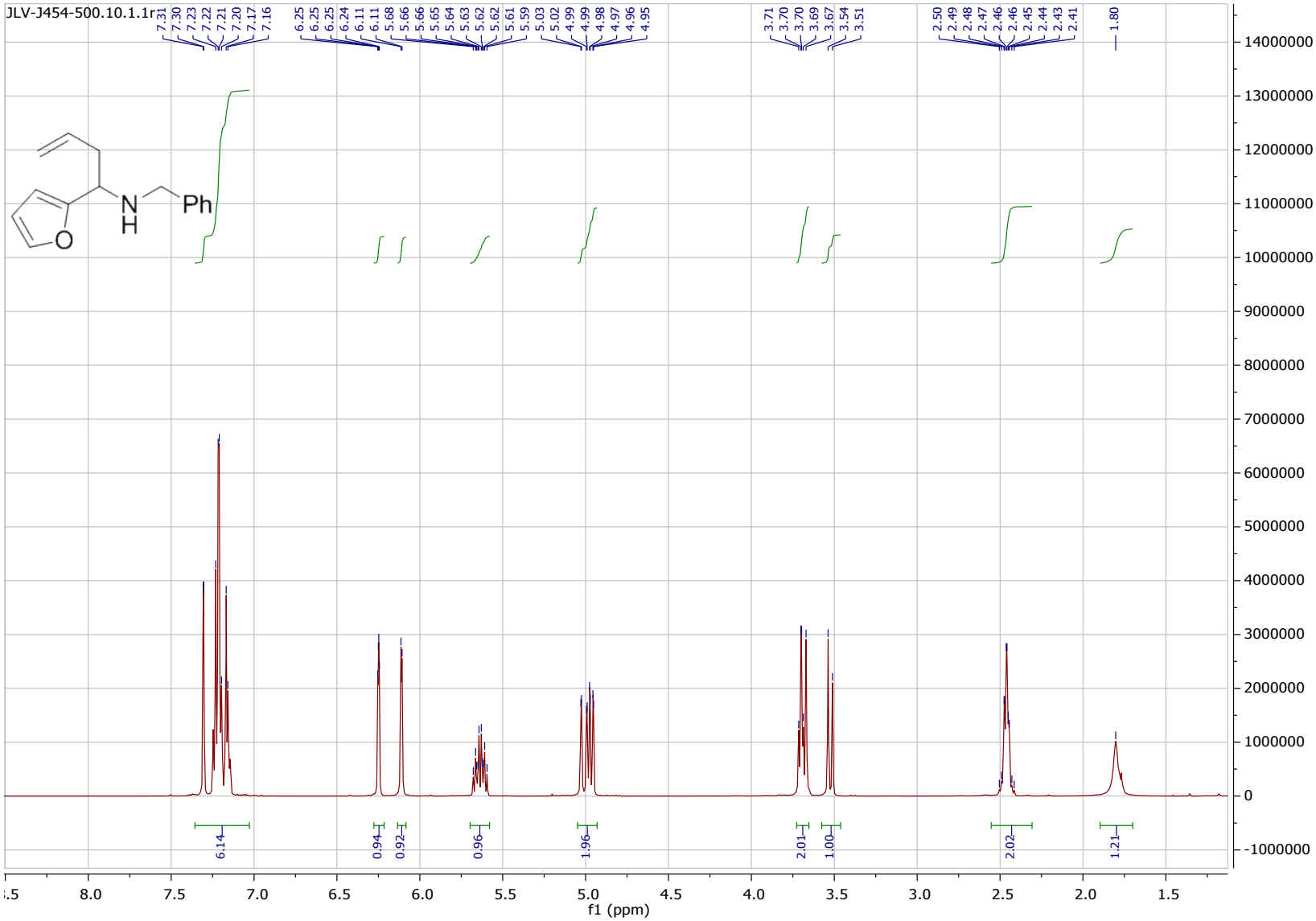
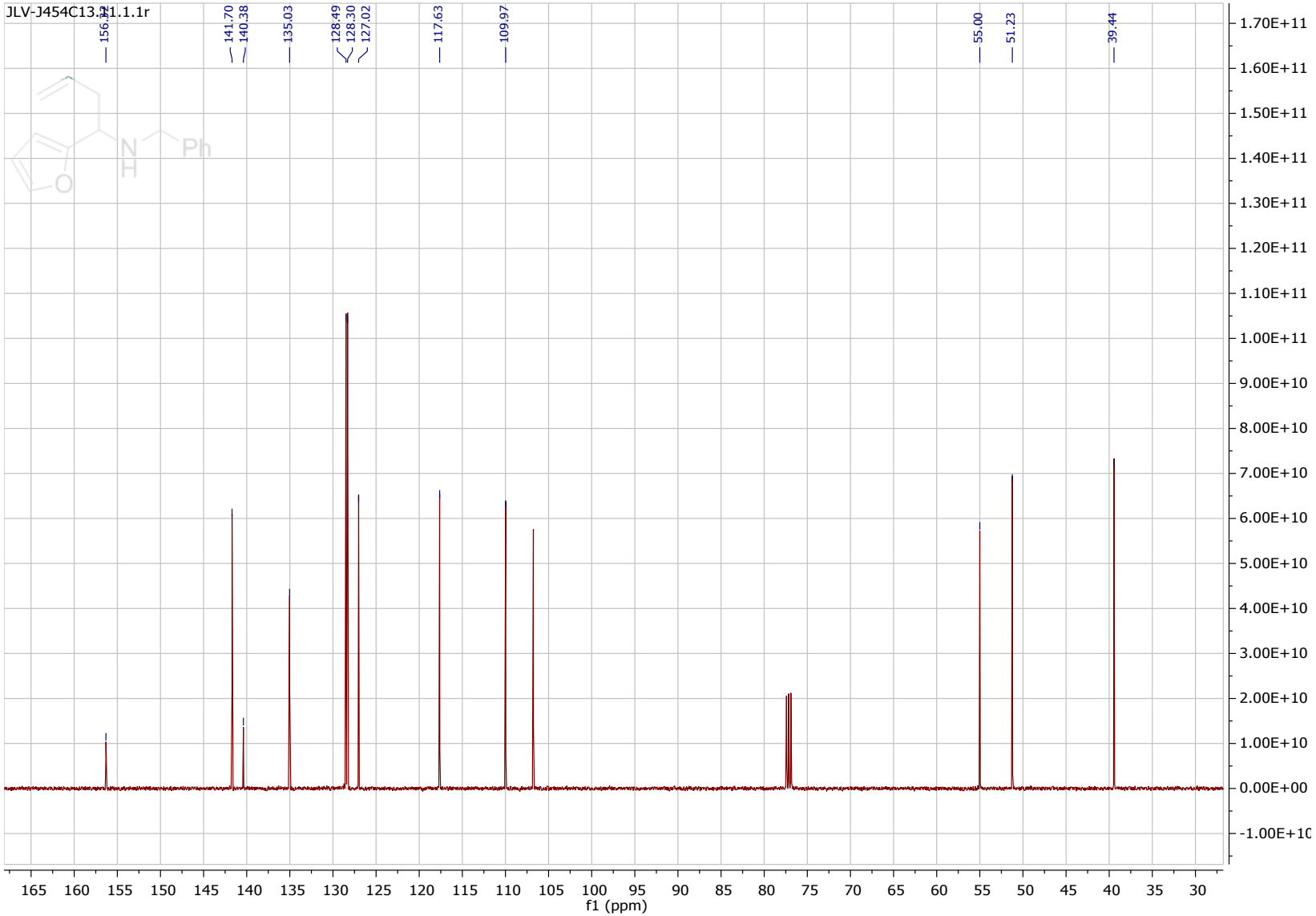
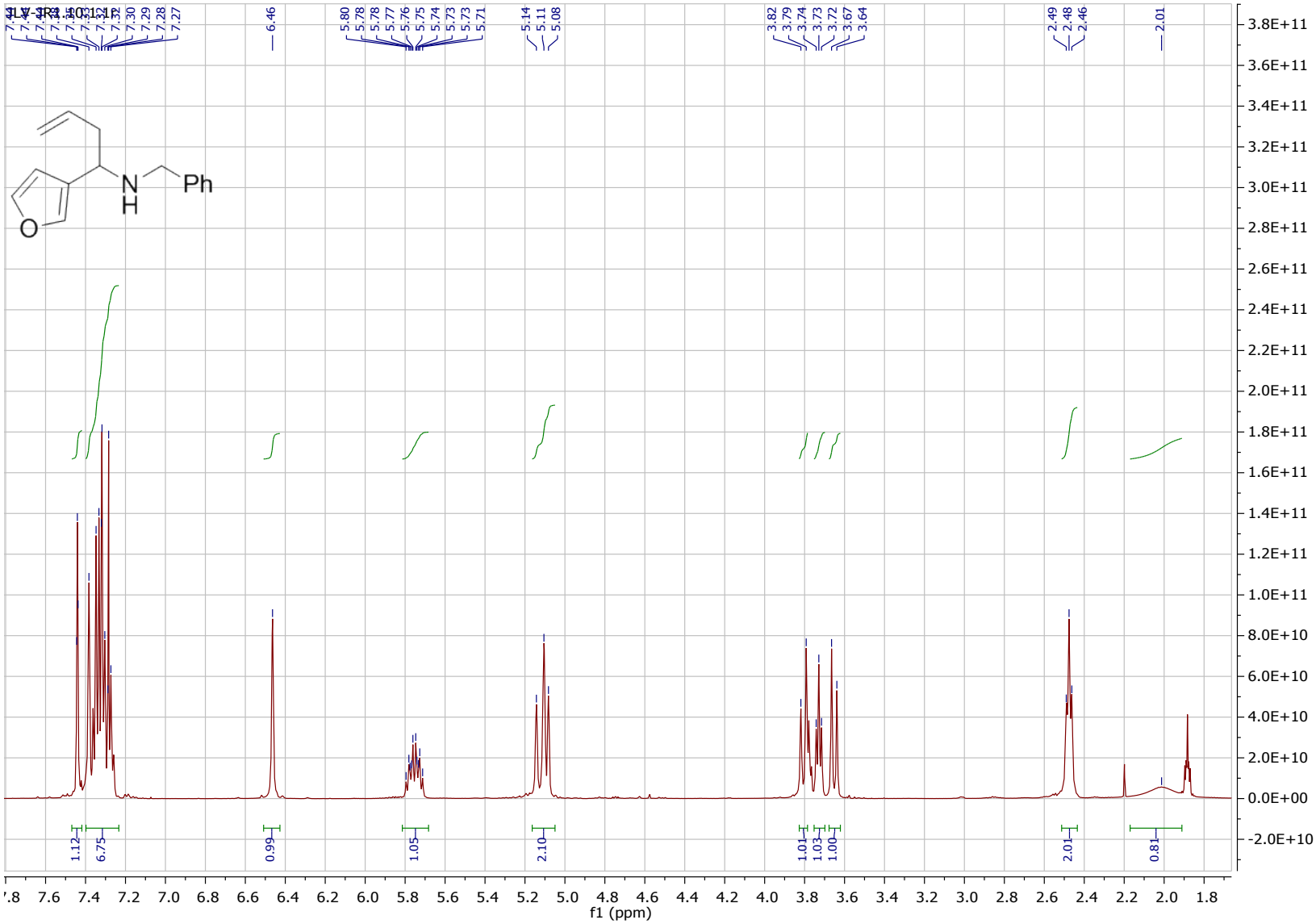
143.08
135.12
132.58
131.61
129.36
129.23
120.77
118.03
113.91
61.04
55.41
50.91
43.15
Br
N
H
OMe
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

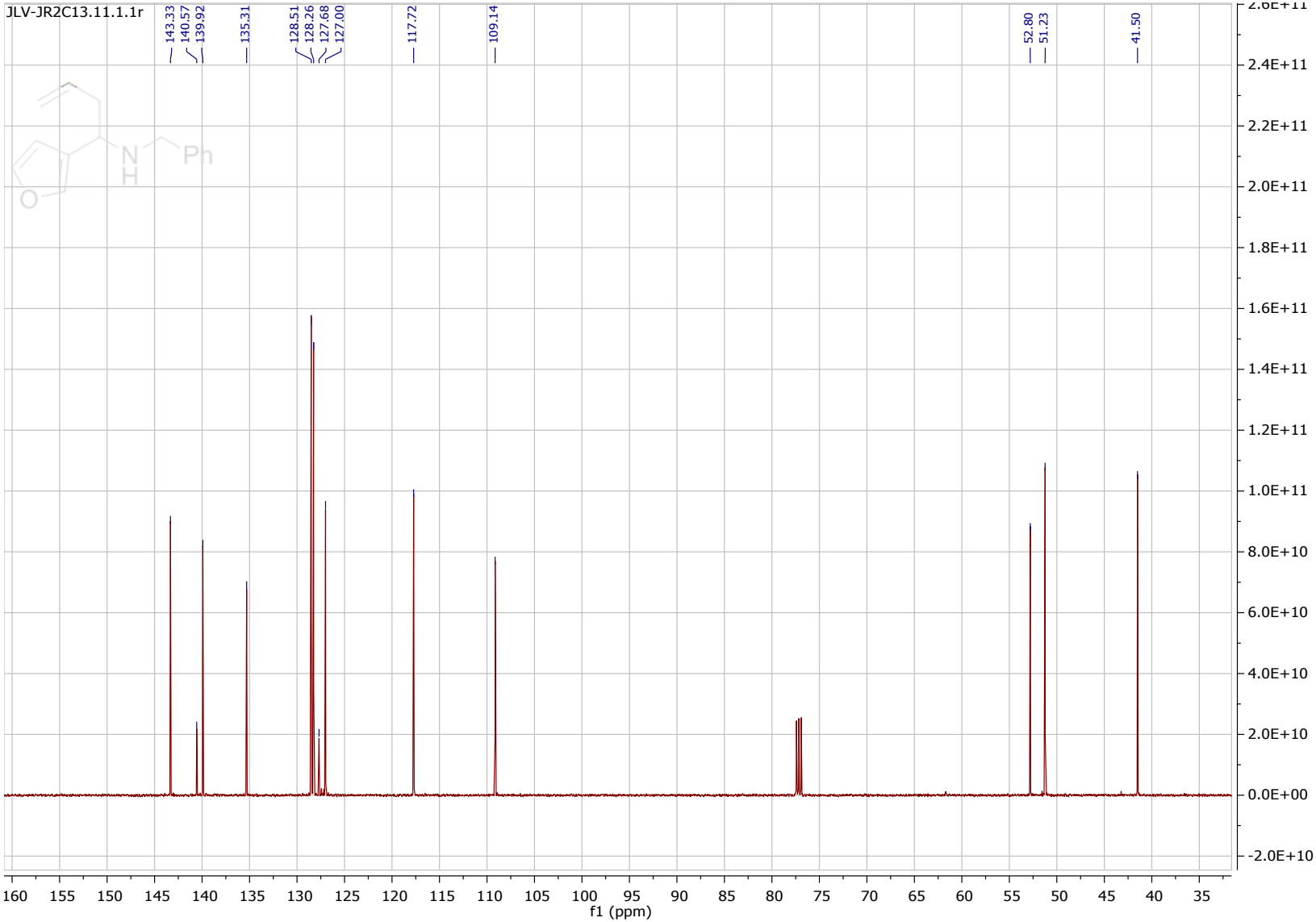
***N*-Benzyl-1-(furan-2-yl)but-3-en-1-amine 1f**



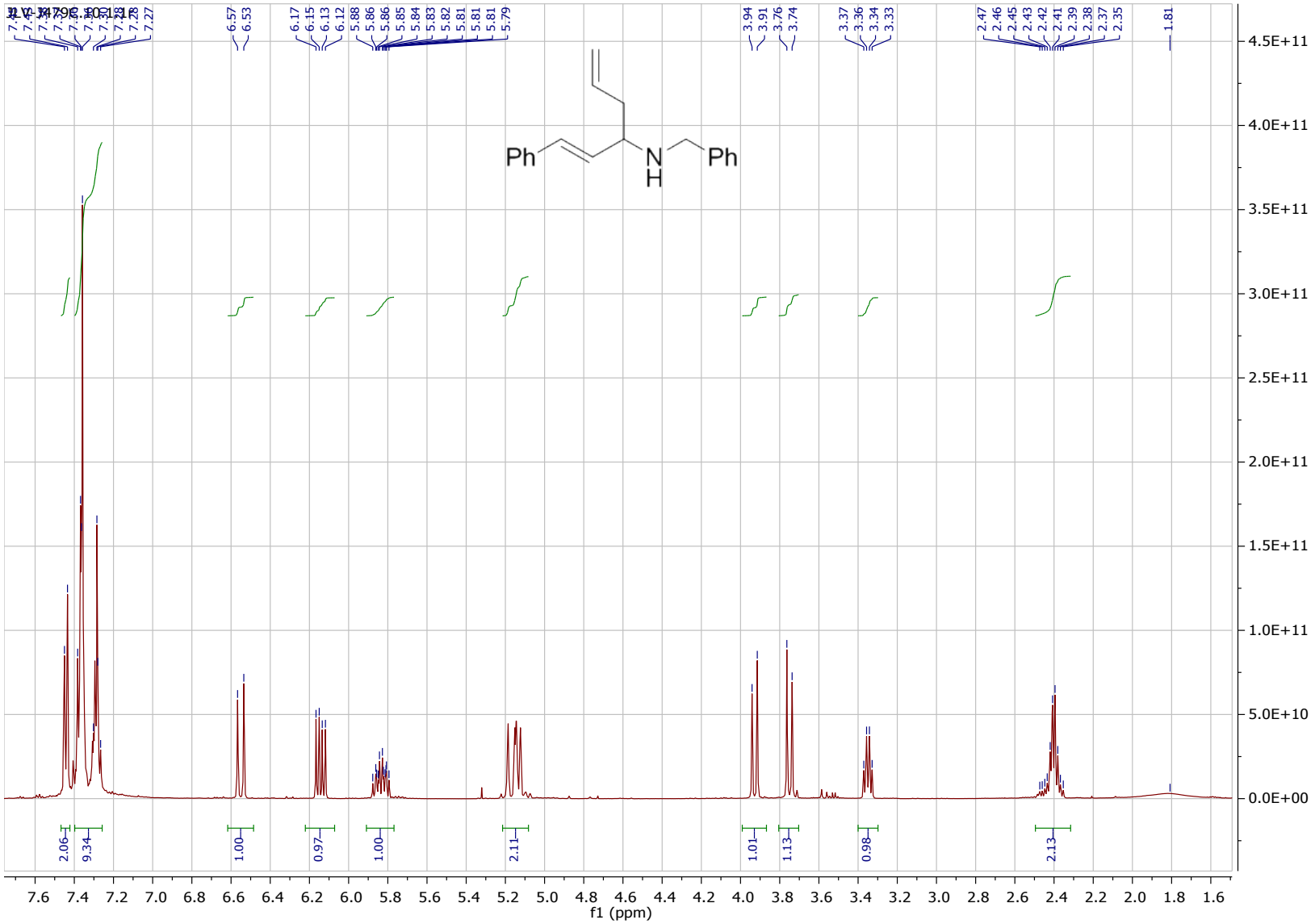

JLV-J454C13.21.1.1r
156.21
141.70
140.38
135.03
128.49
128.30
127.02
117.63
109.97
55.00
51.23
39.44
N
H
O
Ph
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30
f1 (ppm)

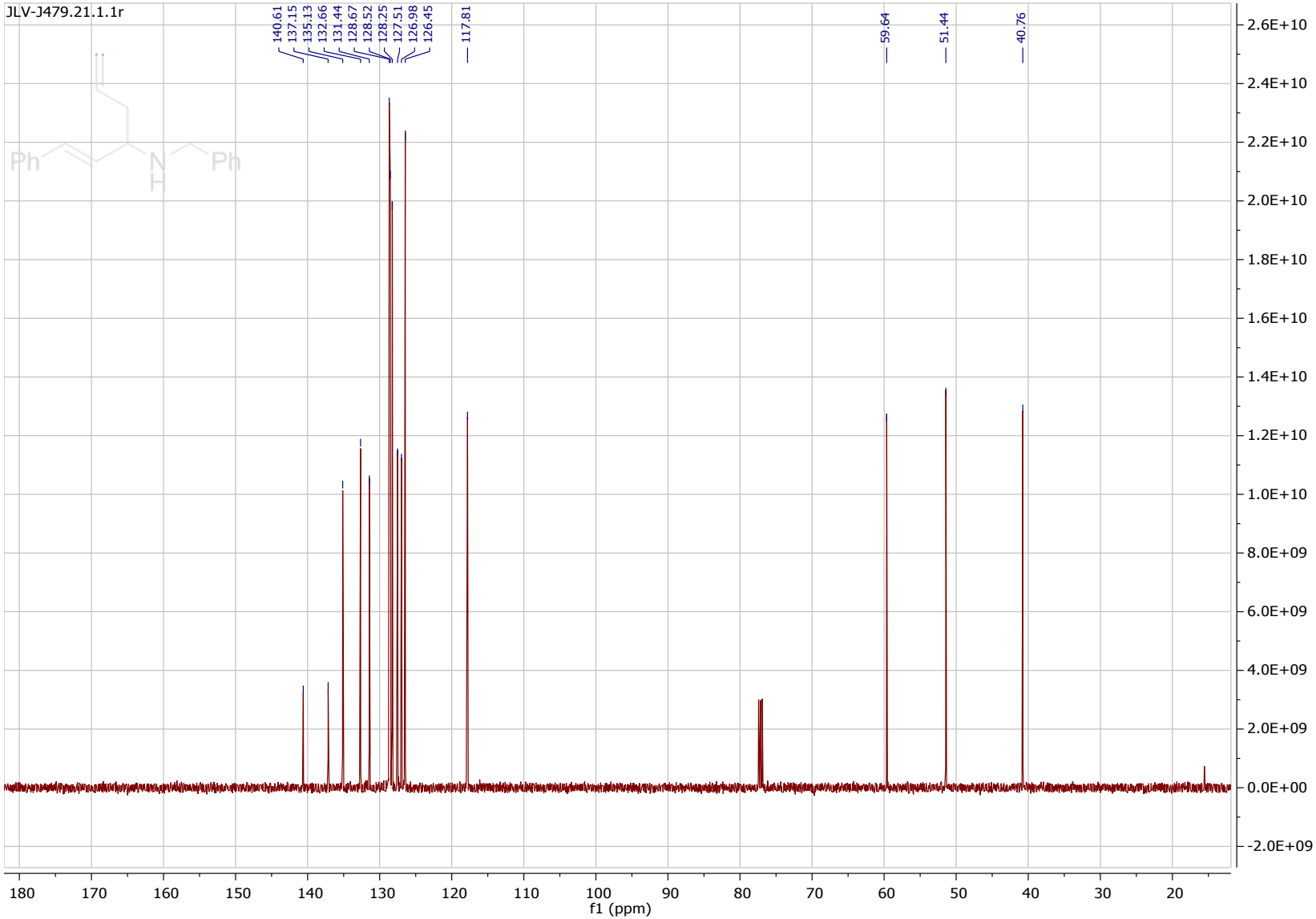
***N*-Benzyl-1-(furan-3-yl)but-3-en-1-amine 1g**



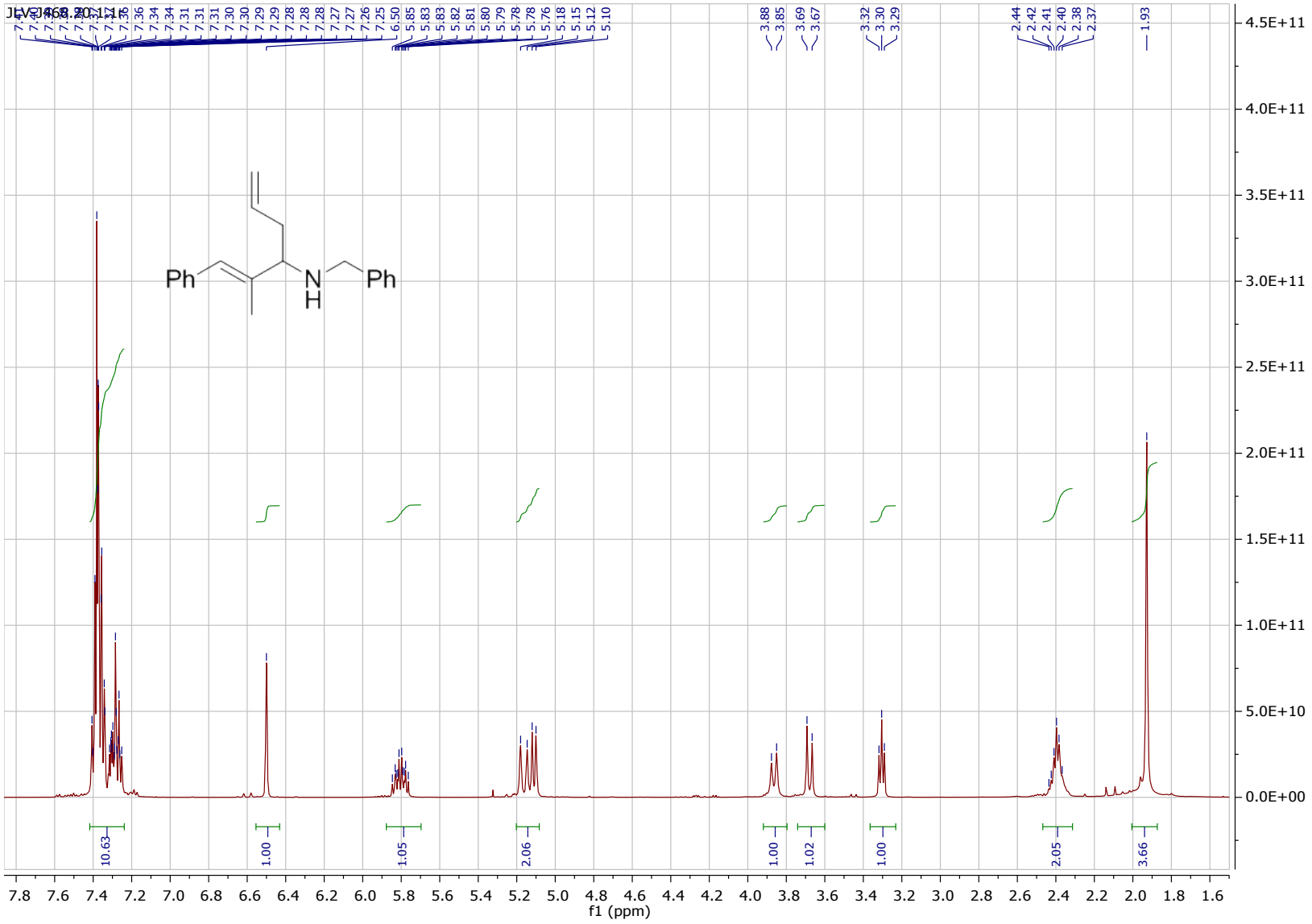

JLV-JR2C13.11.1.1r
143.33
140.57
139.92
135.31
128.51
128.26
127.68
127.00
117.72
109.14
52.80
51.23
41.50
N
H
Ph
O
2.6E+11
2.4E+11
2.2E+11
2.0E+11
1.8E+11
1.6E+11
1.4E+11
1.2E+11
1.0E+11
8.0E+10
6.0E+10
4.0E+10
2.0E+10
0.0E+00
-2.0E+10
160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35
f1 (ppm)

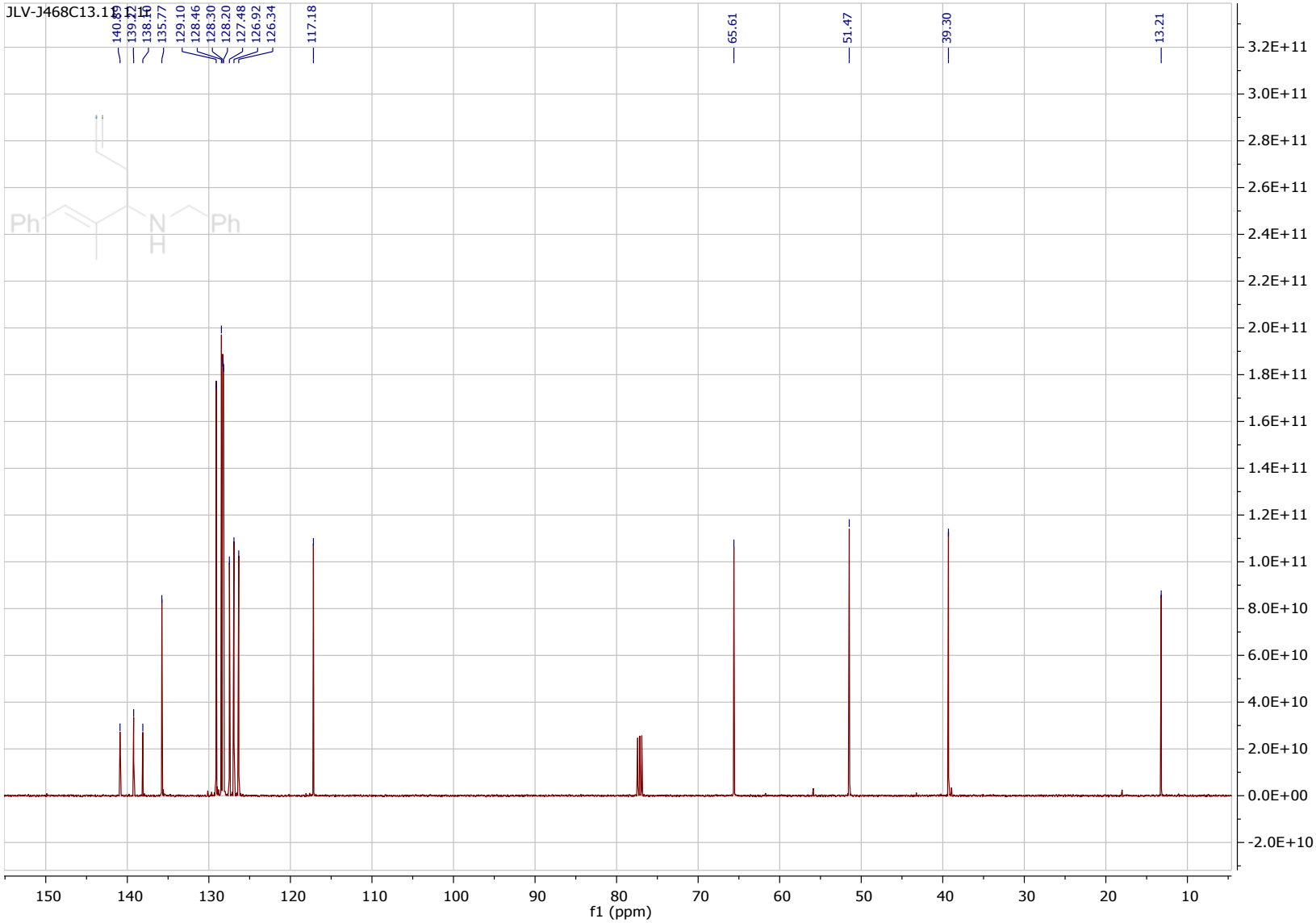
(*E*)-*N*-Benzyl-1-phenylhexa-1,5-dien-3-amine 1i



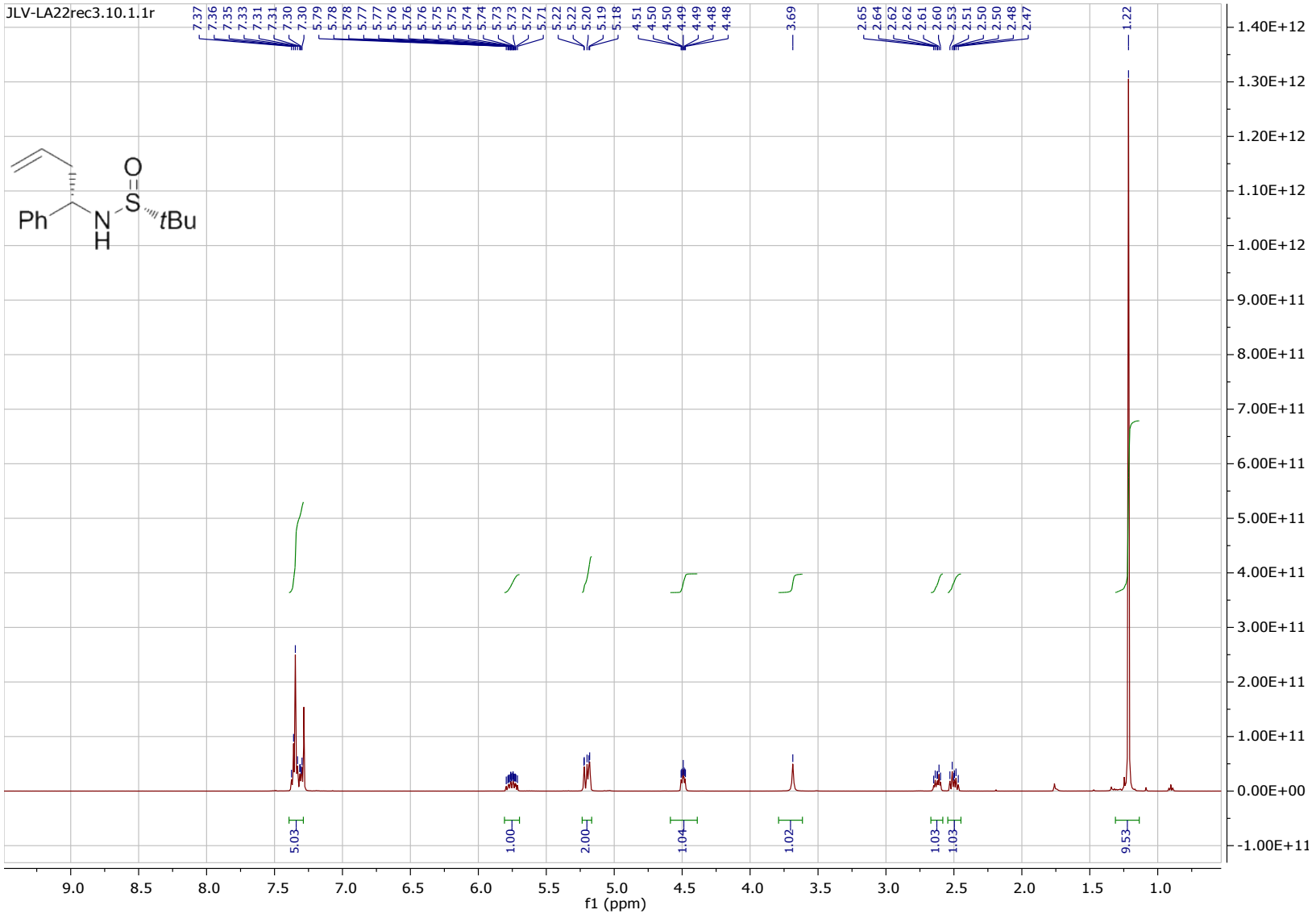

JLV-J479.21.1.1r
140.61
137.15
135.13
132.66
131.44
128.67
128.52
128.25
127.51
126.98
126.45
117.81
59.64
51.44
40.76
Ph
N
H
Ph
2.6E+10
2.4E+10
2.2E+10
2.0E+10
1.8E+10
1.6E+10
1.4E+10
1.2E+10
1.0E+10
8.0E+09
6.0E+09
4.0E+09
2.0E+09
0.0E+00
-2.0E+09
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

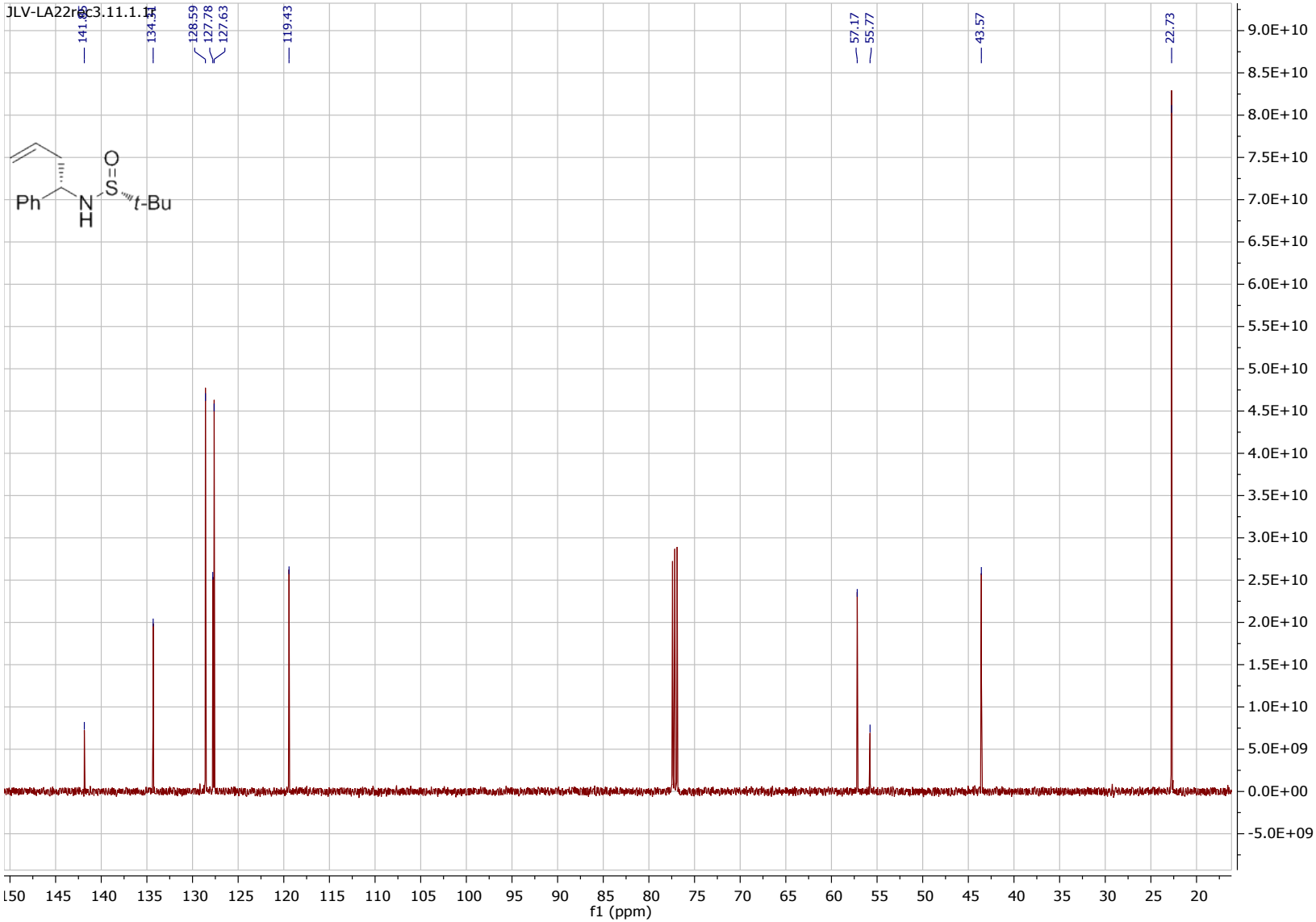
(*E*)-*N*-(Benzyl)-2-methyl-1-phenylhexa-1,5-dien-3-amine 1j



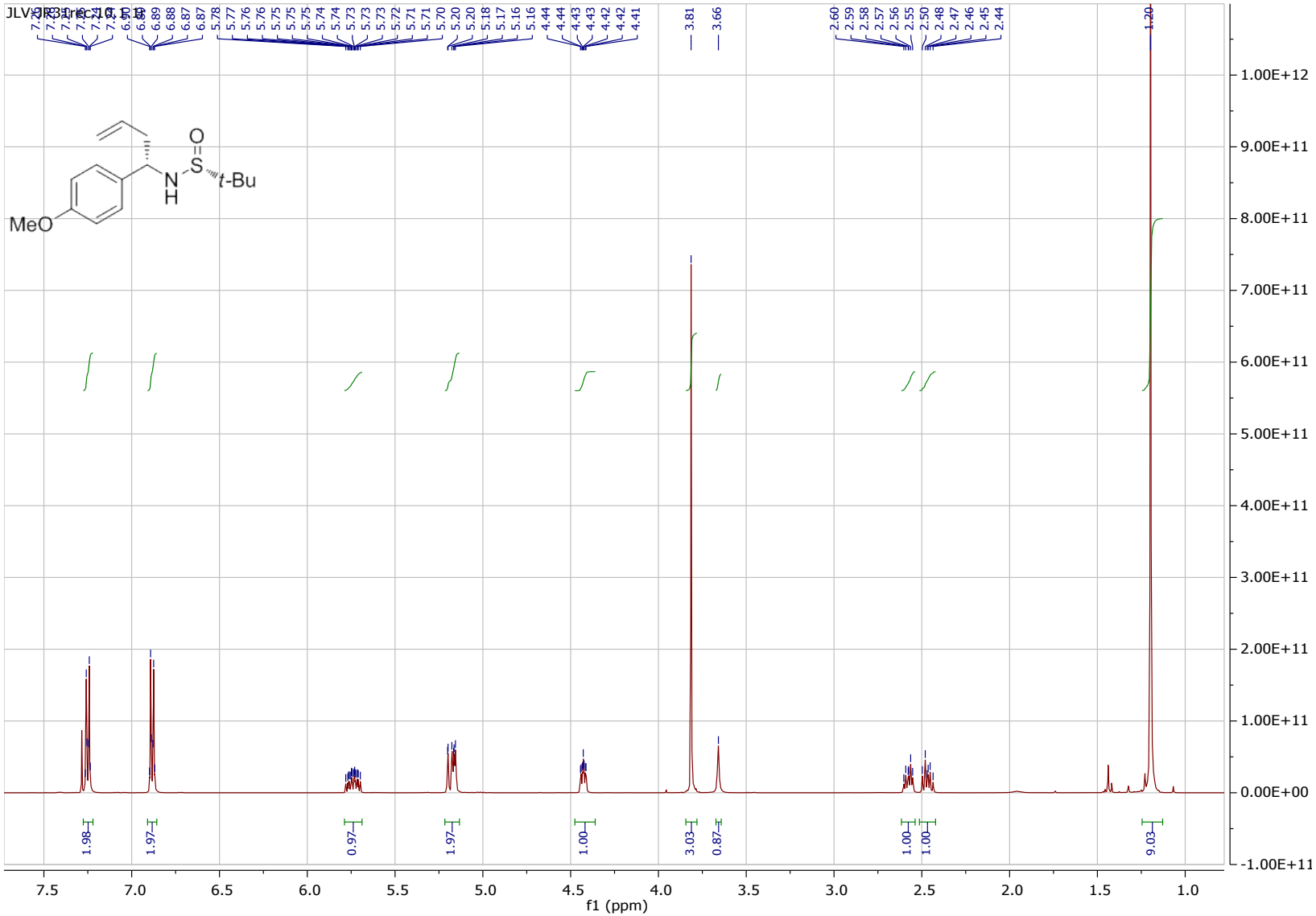

JLV-J468C13.11.11
140.83
139.21
138.11
135.77
129.10
128.46
128.30
128.20
127.48
126.92
126.34
117.18
65.61
51.47
39.30
13.21
Ph
N
H
Ph
3.2E+11
3.0E+11
2.8E+11
2.6E+11
2.4E+11
2.2E+11
2.0E+11
1.8E+11
1.6E+11
1.4E+11
1.2E+11
1.0E+11
8.0E+10
6.0E+10
4.0E+10
2.0E+10
0.0E+00
-2.0E+10
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

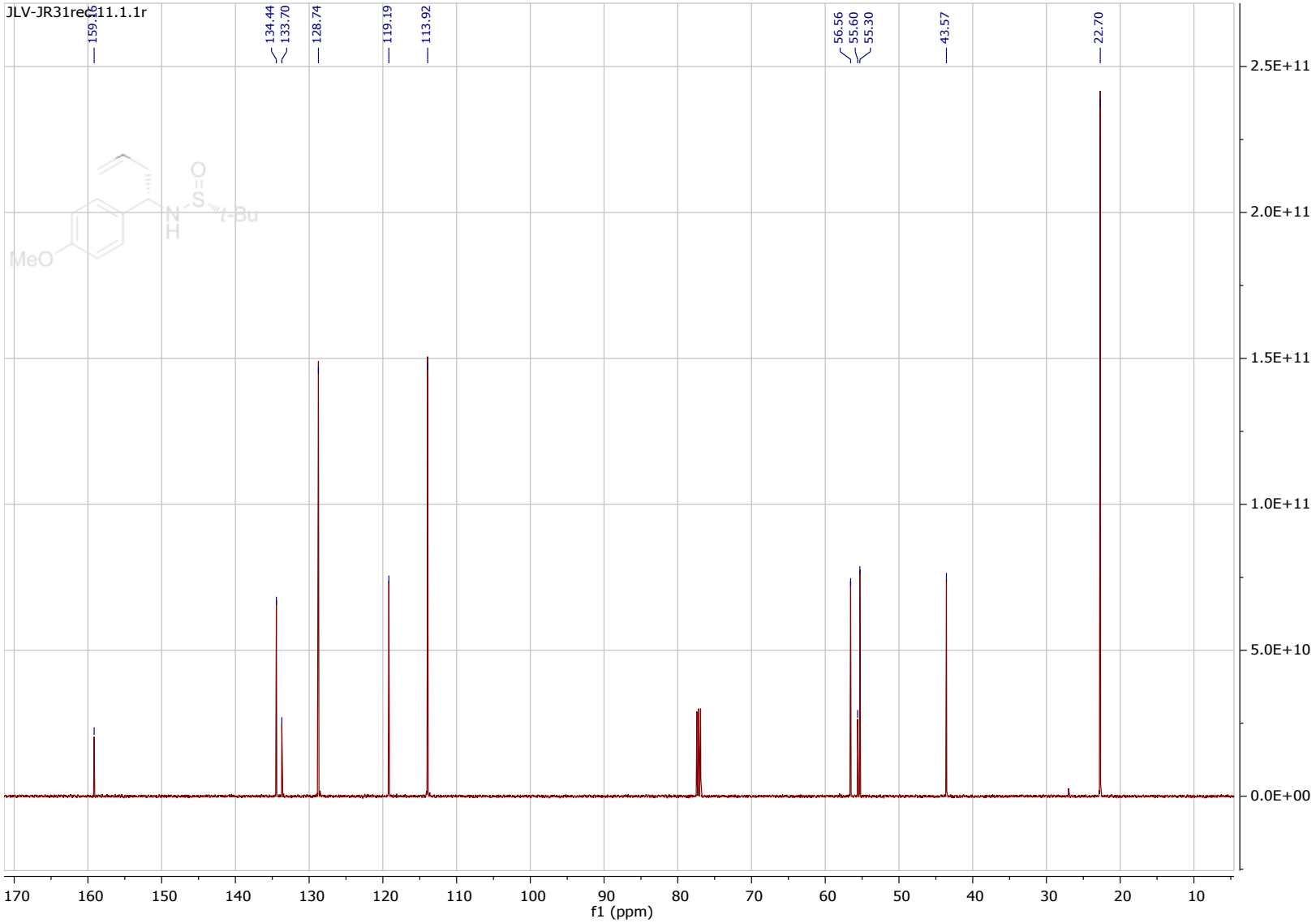
(*R*)-2-Methyl-*N*-[(*S*)-1-phenylbut-3-en-1-yl]propane-2-sulfinamide 5a



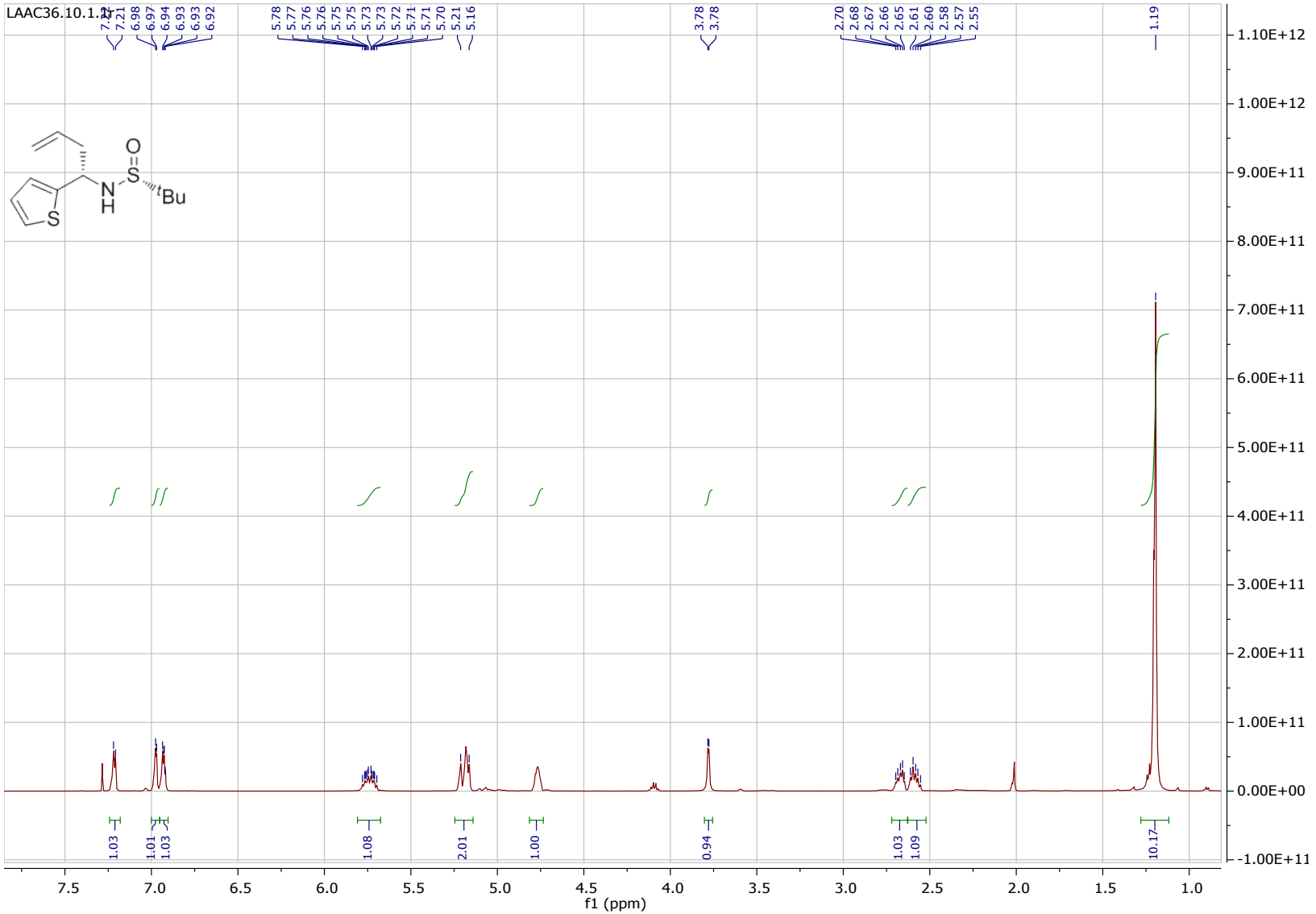

JLV-LA22rec3.11.1.1r
141.84
134.51
128.59
127.78
127.63
119.43
57.17
55.77
43.57
22.73
Ph
N
H
S
O
t-Bu
9.0E+10
8.5E+10
8.0E+10
7.5E+10
7.0E+10
6.5E+10
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20
f1 (ppm)

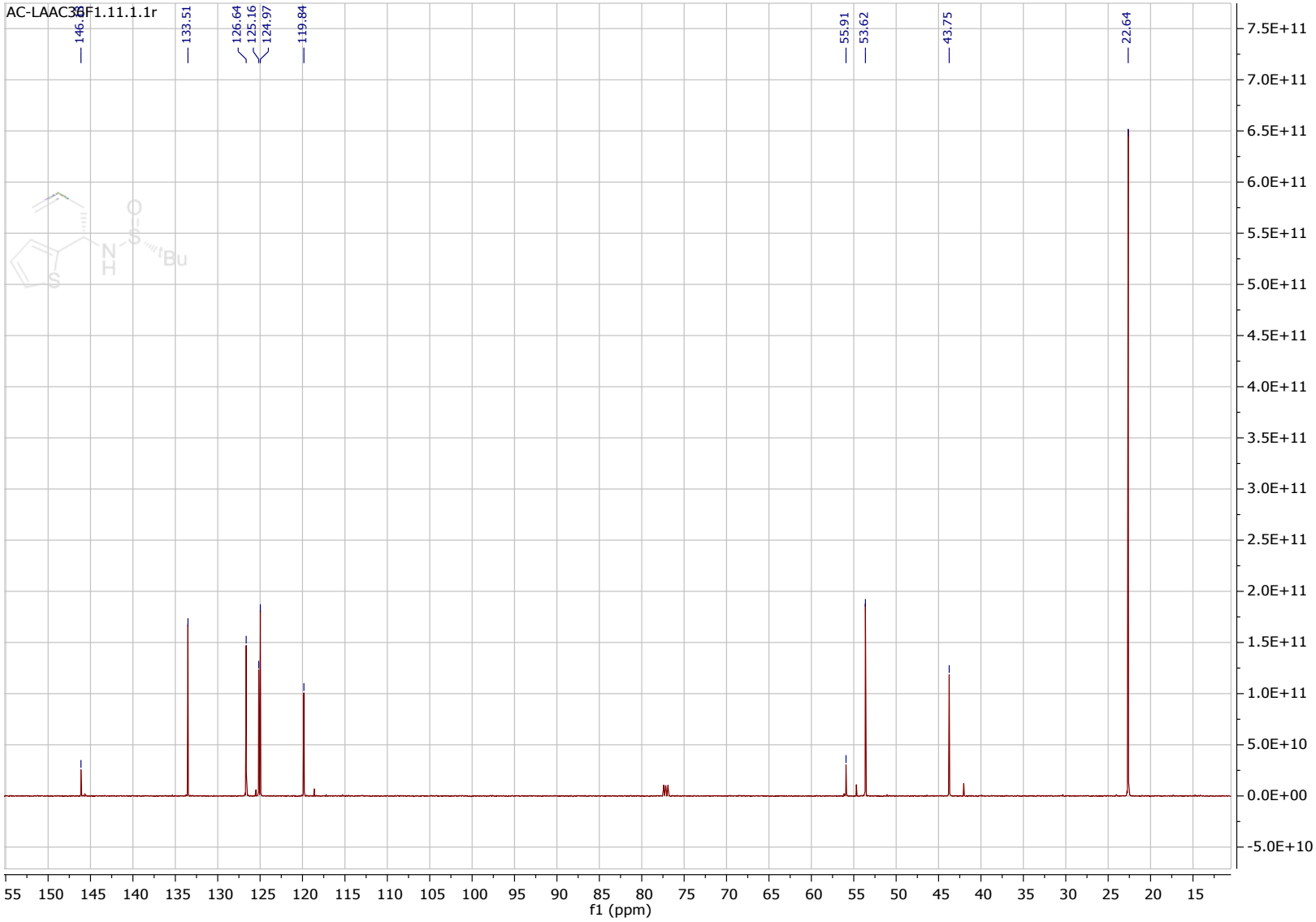
(*R*)-*N*-[(S)-1-(4-Methoxyphenyl)but-3-en-1-yl]-2-methylpropane-2-sulfinamide 5k



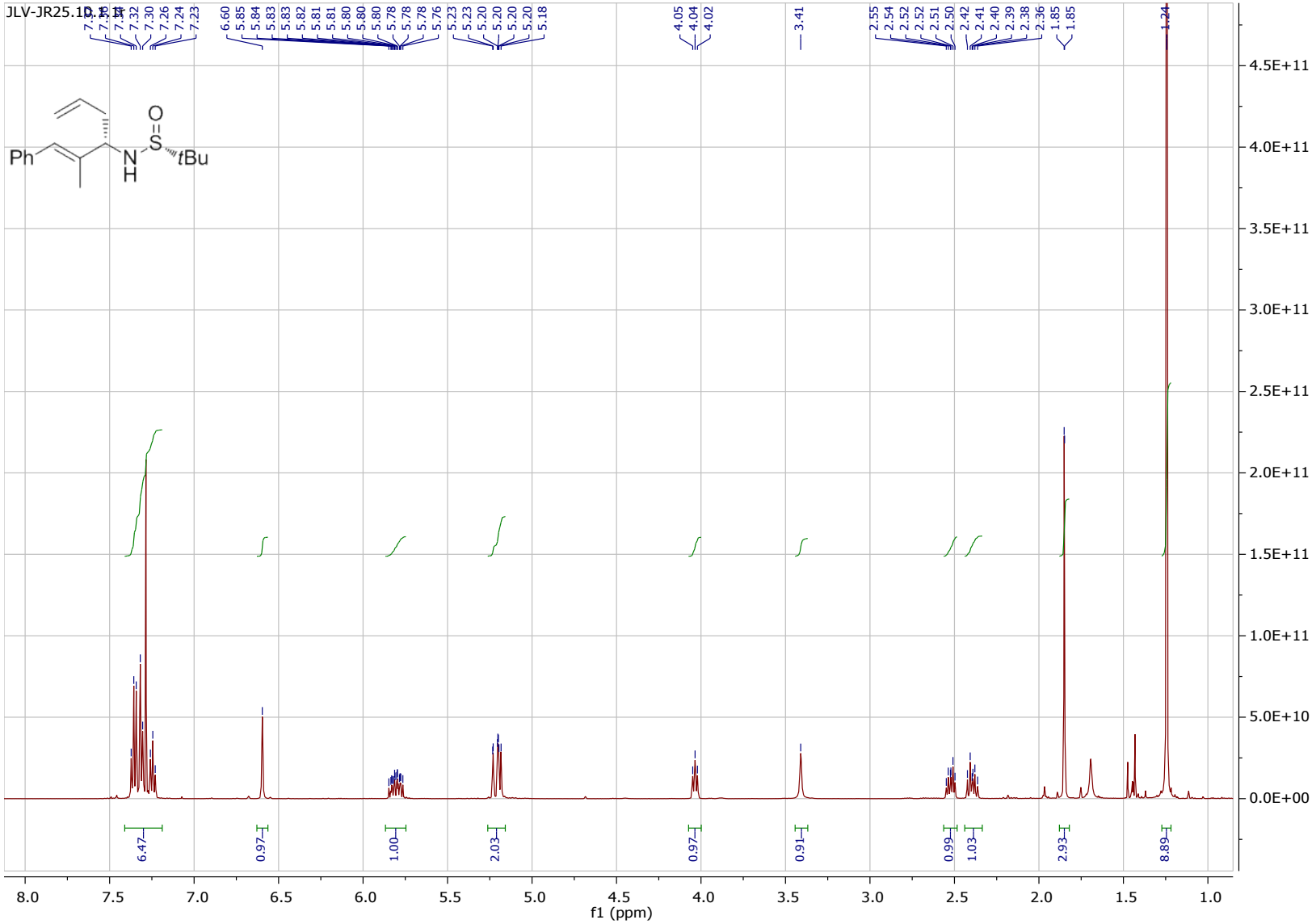

JLV-JR31rec11.1.1r
159.16
134.44
133.70
128.74
119.19
113.92
56.56
55.60
55.30
43.57
22.70
MeO
O=S
N
H
t-Bu
2.5E+11
2.0E+11
1.5E+11
1.0E+11
5.0E+10
0.0E+00
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

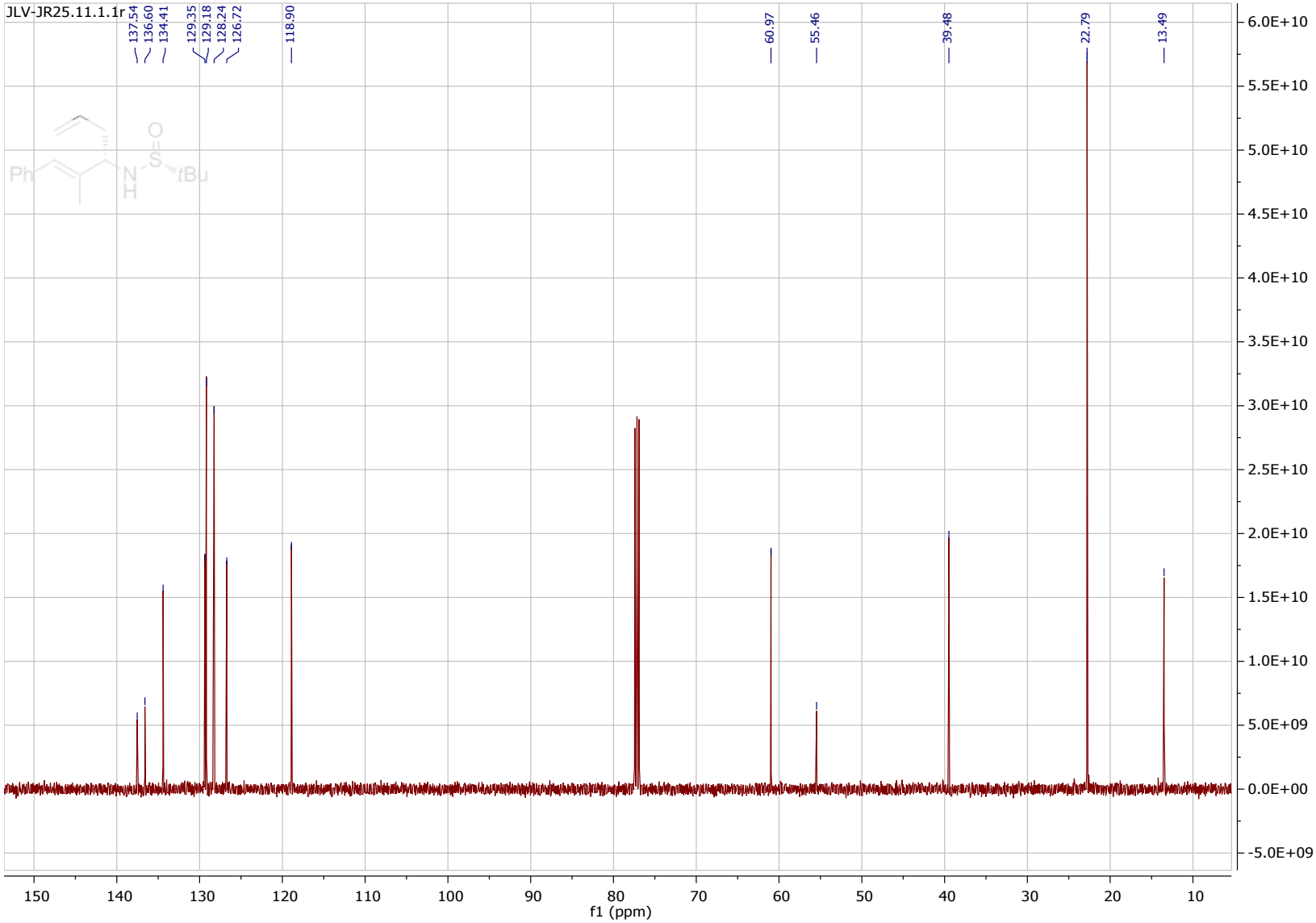
(*R*)-2-Methyl-*N*-[(S)-1-(thiophen-2-yl)but-3-en-1-yl]propane-2-sulfinamide 5e



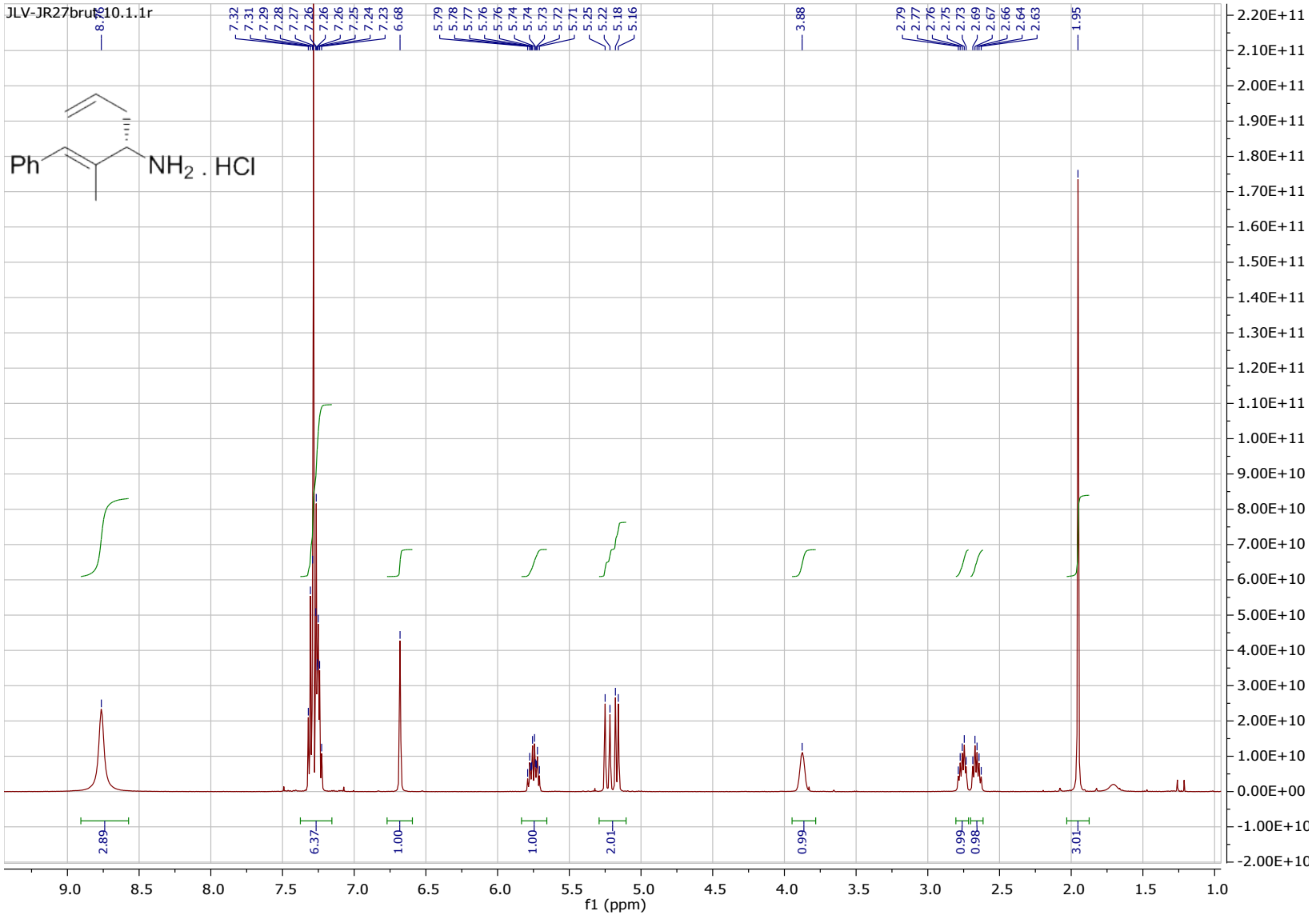

AC-LAAC36F1.11.1.1r
146.
133.51
126.64
125.16
124.97
119.84
55.91
53.62
43.75
22.64
7.5E+11
7.0E+11
6.5E+11
6.0E+11
5.5E+11
5.0E+11
4.5E+11
4.0E+11
3.5E+11
3.0E+11
2.5E+11
2.0E+11
1.5E+11
1.0E+11
5.0E+10
0.0E+00
-5.0E+10
55 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15
f1 (ppm)

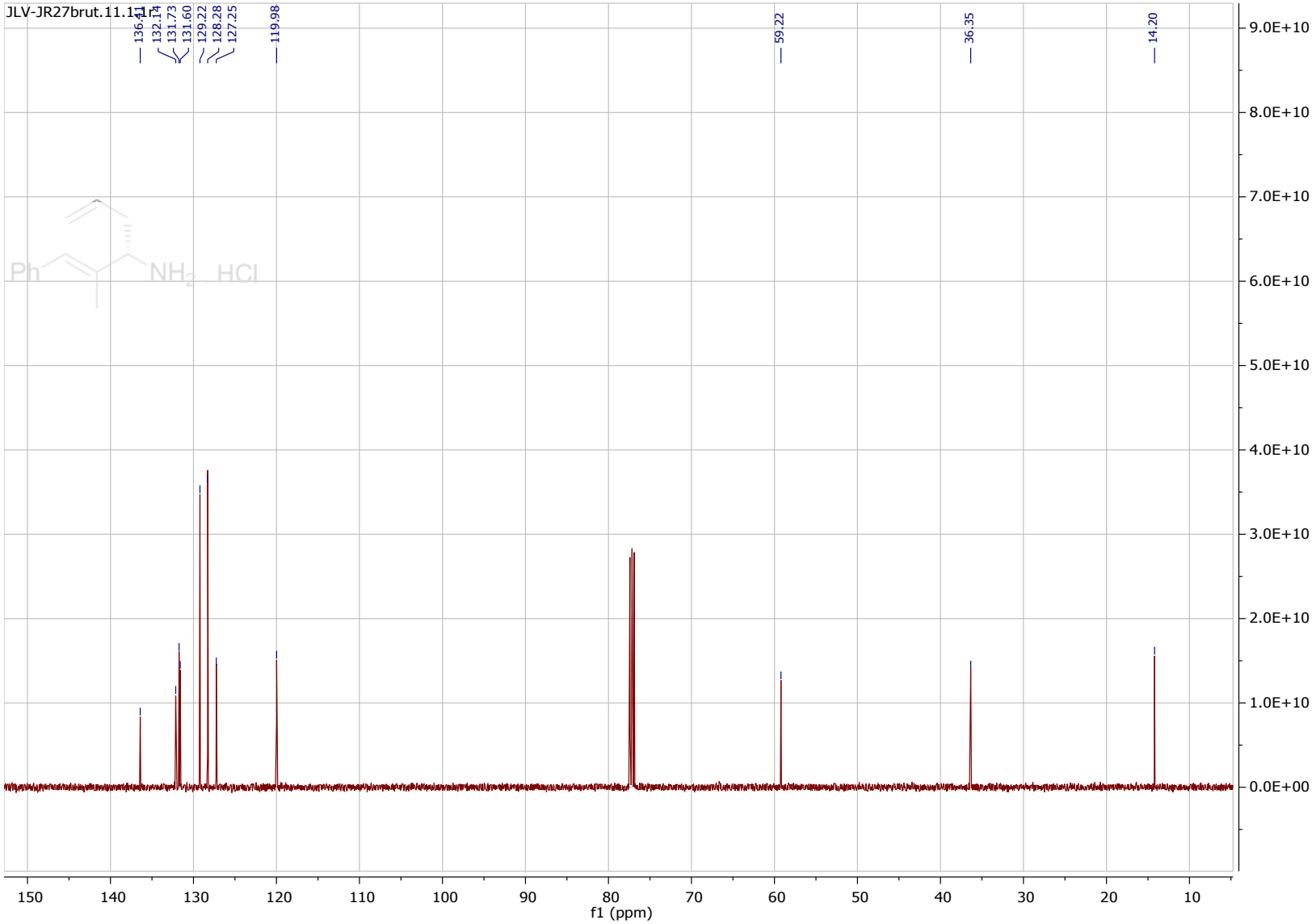
(*R*)-2-Methyl-*N*-[(*S,E*)-2-methyl-1-phenylhexa-1,5-dien-3-yl]propane-2-sulfinamide 5l



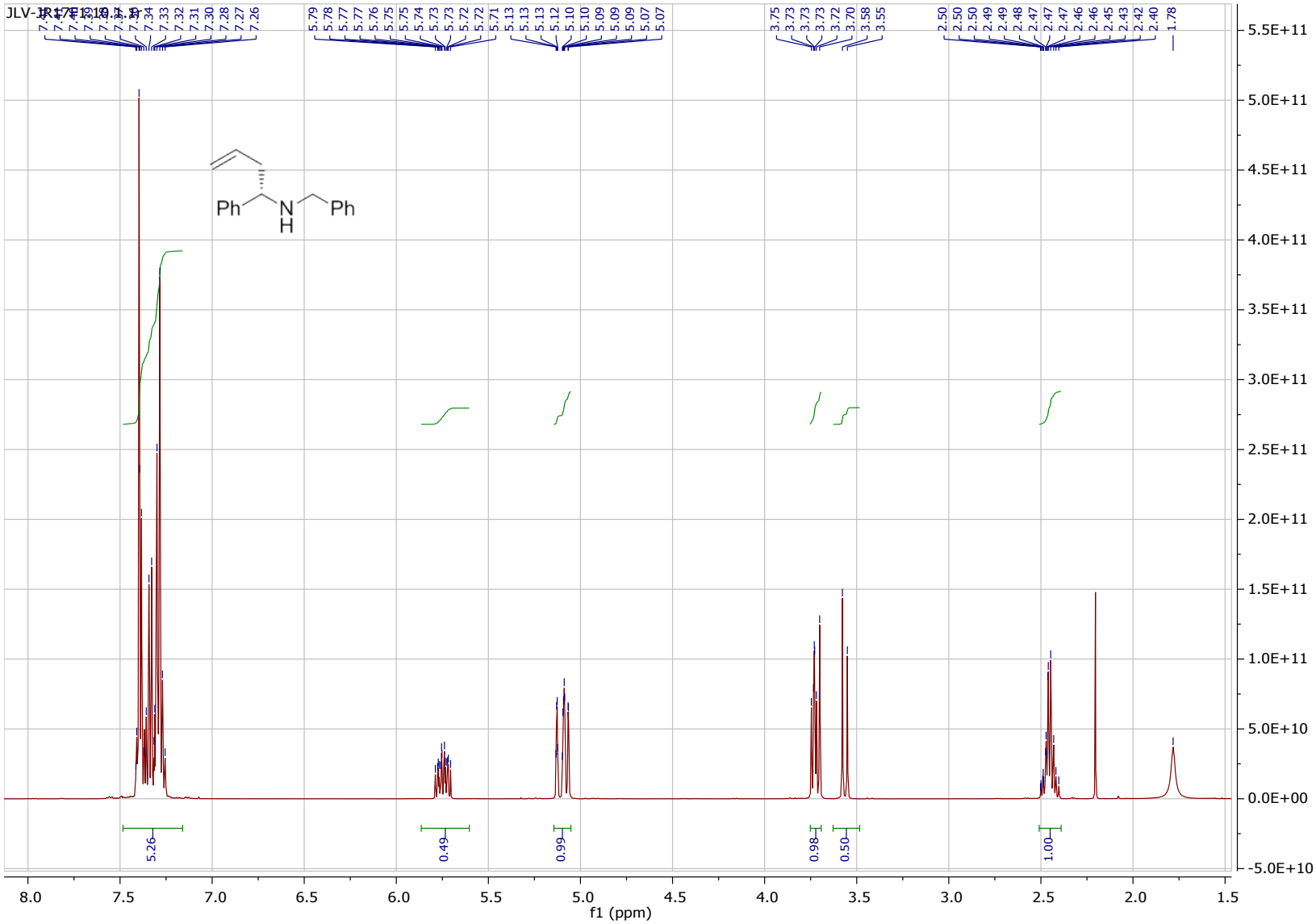

JLV-JR25.11.1.1r
137.54
136.60
134.41
129.35
129.18
128.24
126.72
118.90
60.97
55.46
39.48
22.79
13.49
Ph
N
H
O
S
tBu
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

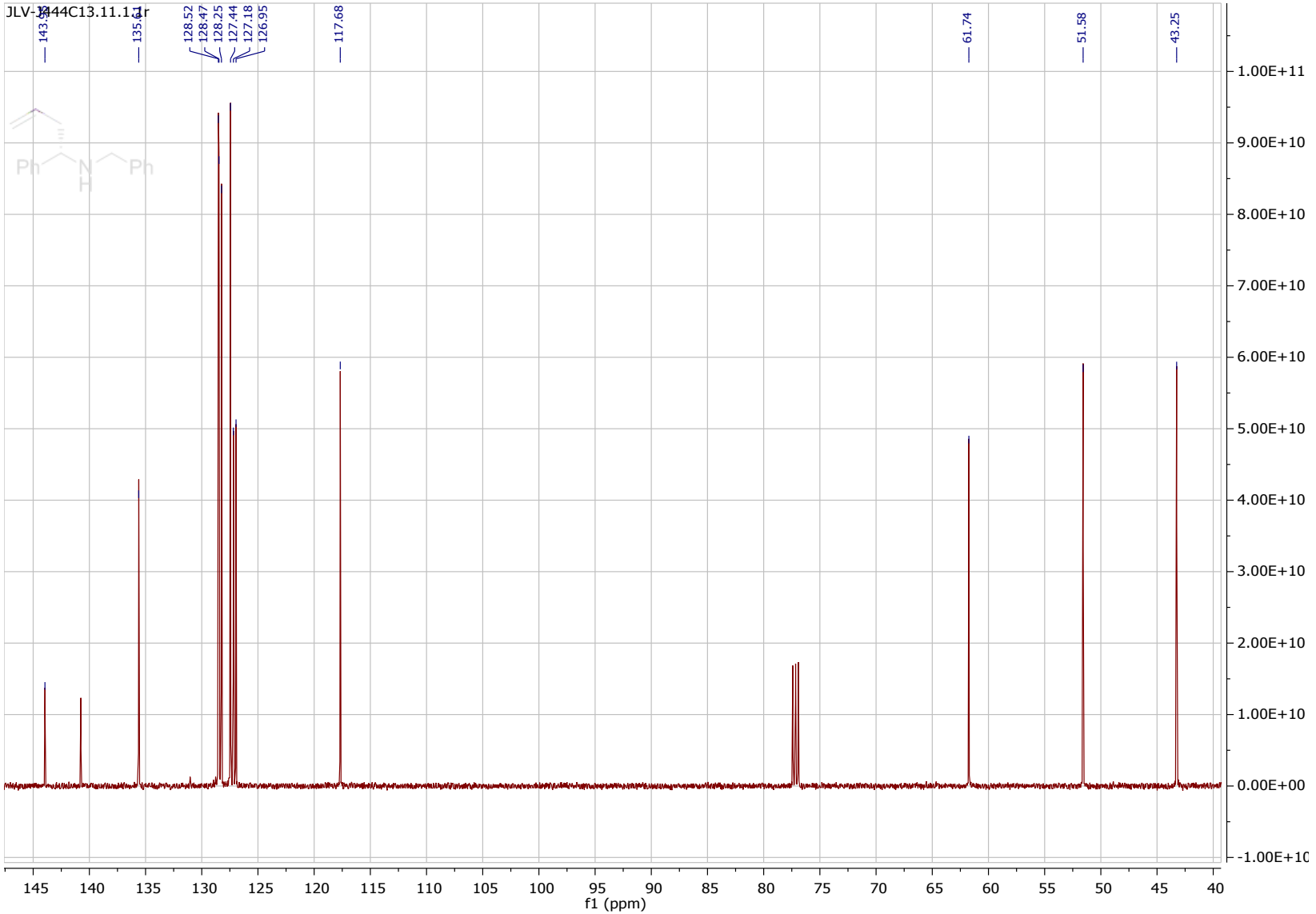
(*S,E*)-2-Methyl-1-phenylhexa-1,5-dien-3-amonium chloride



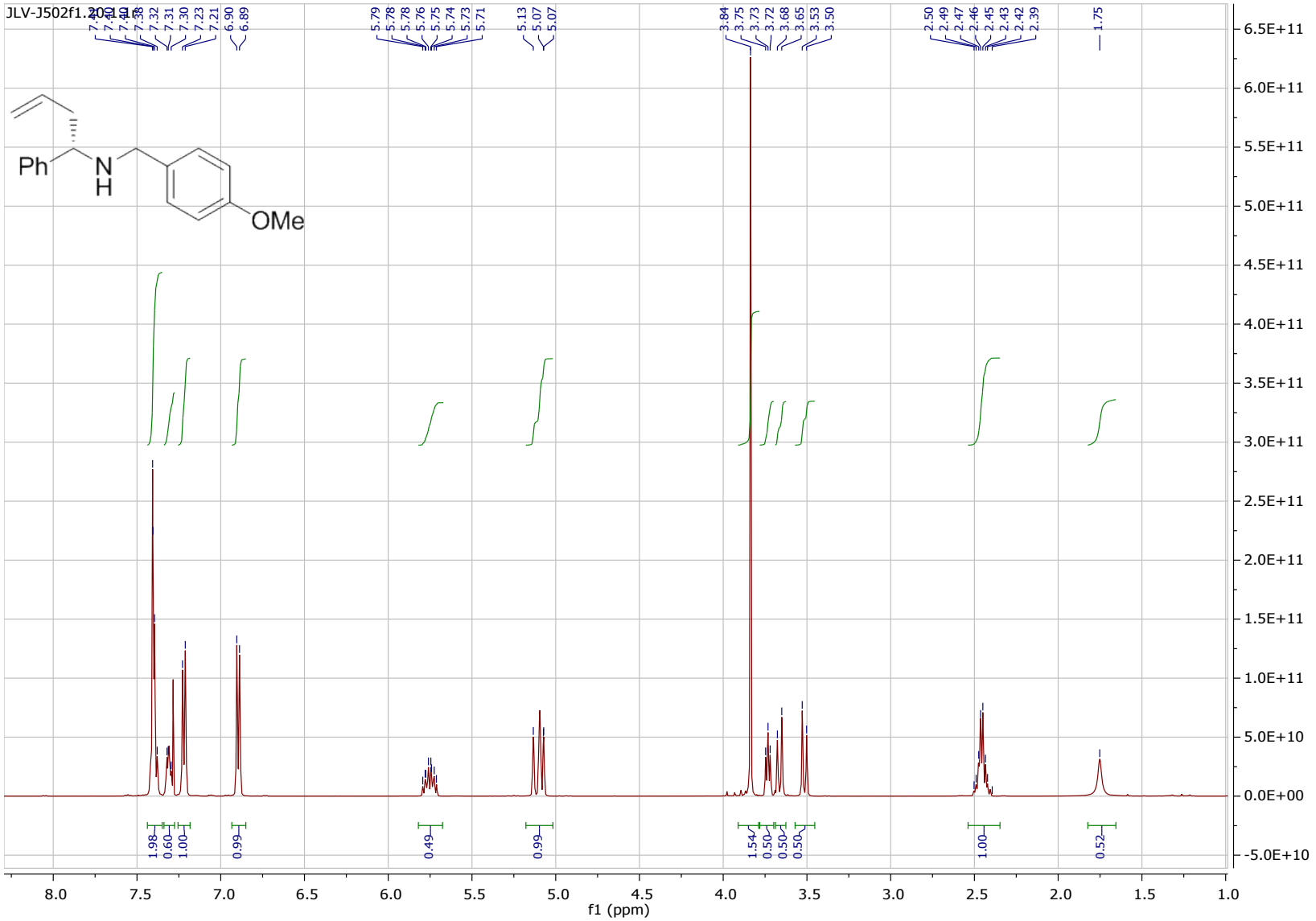

JLV-JR27brut.11.1.1r
136.41
132.14
131.73
131.60
129.22
128.28
127.25
119.98
59.22
36.35
14.20
Ph
NH2 . HCl
9.0E+10
8.0E+10
7.0E+10
6.0E+10
5.0E+10
4.0E+10
3.0E+10
2.0E+10
1.0E+10
0.0E+00
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

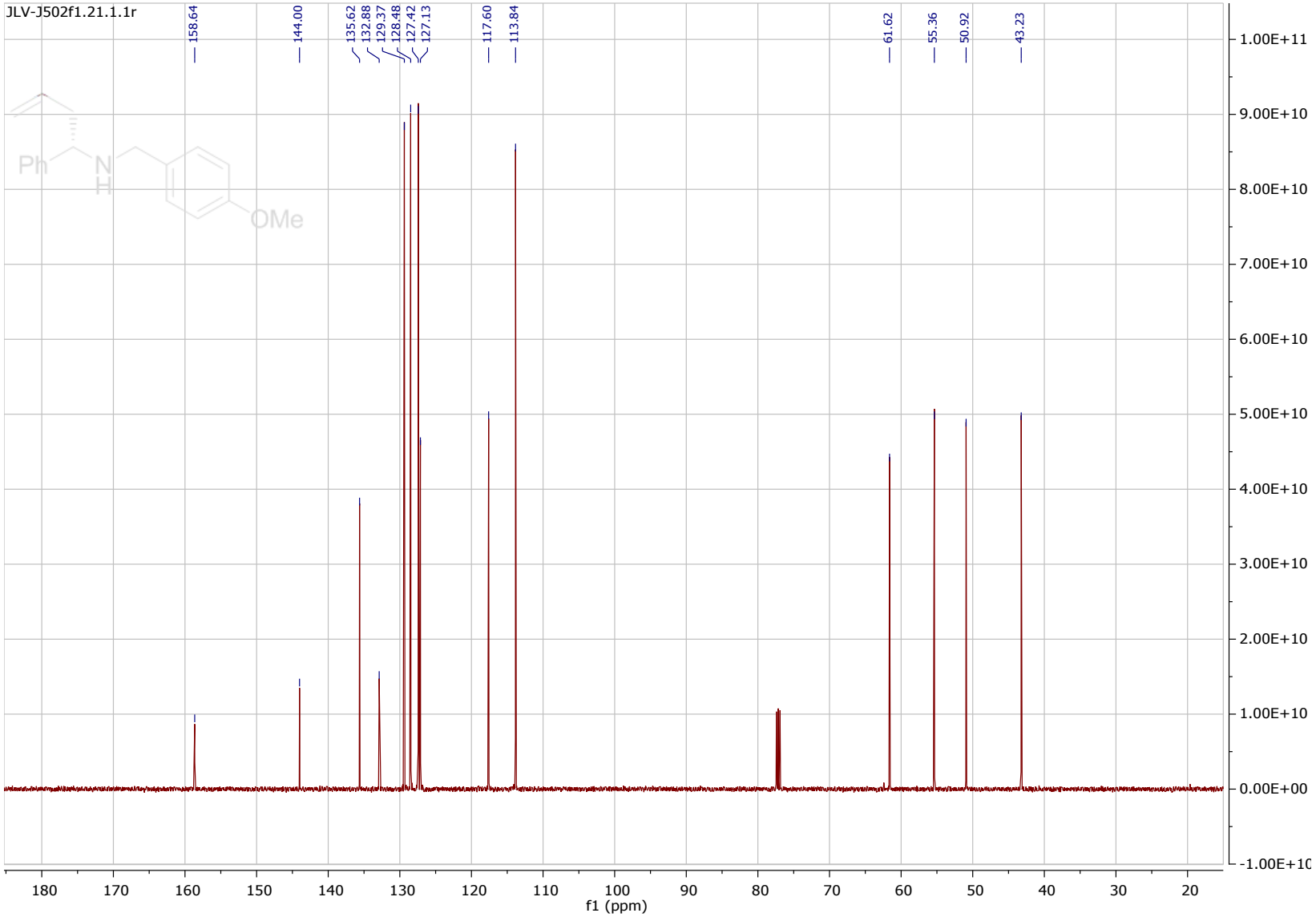
***(S)*-*N*-Benzyl-1-phenylbut-3-en-1-amine 1a**



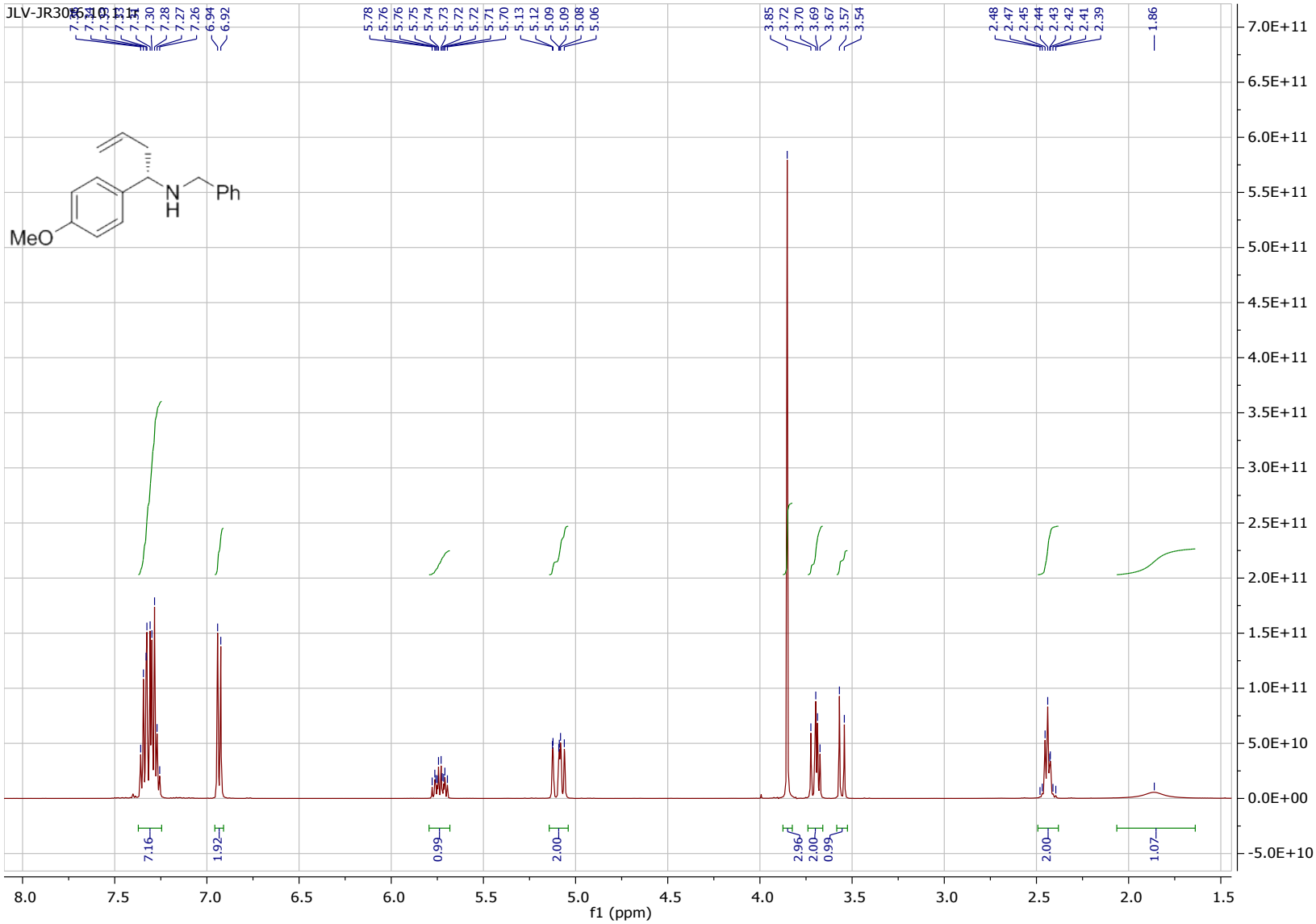

JLV-1444C13.11.11.1r
143.58
135.44
128.52
128.47
128.25
127.44
127.18
126.95
117.68
61.74
51.58
43.25
Ph
N
H
Ph
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40
f1 (ppm)

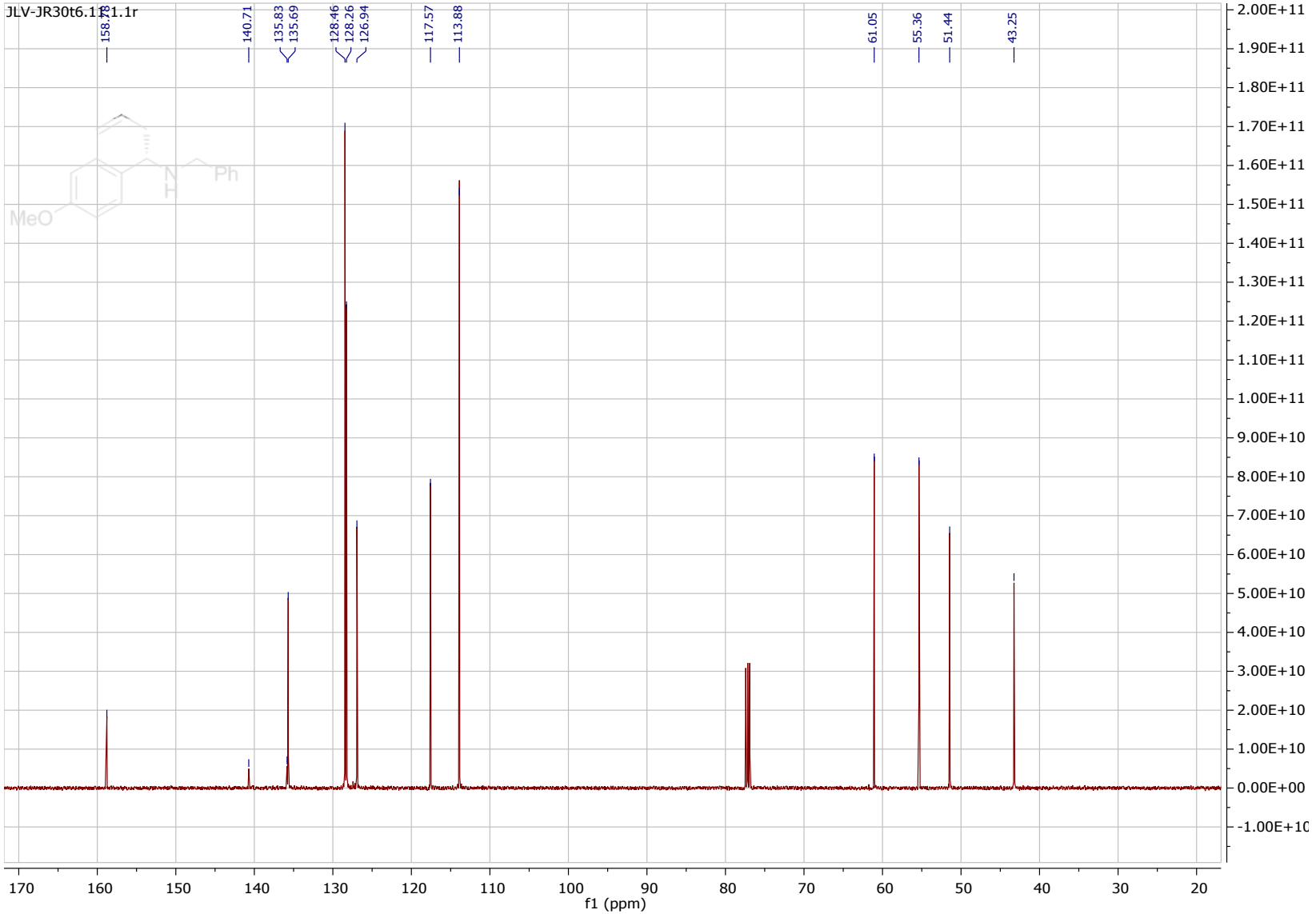
***(S)-N*-(4-Methoxybenzyl)-1-phenylbut-3-en-1-amine 1b**



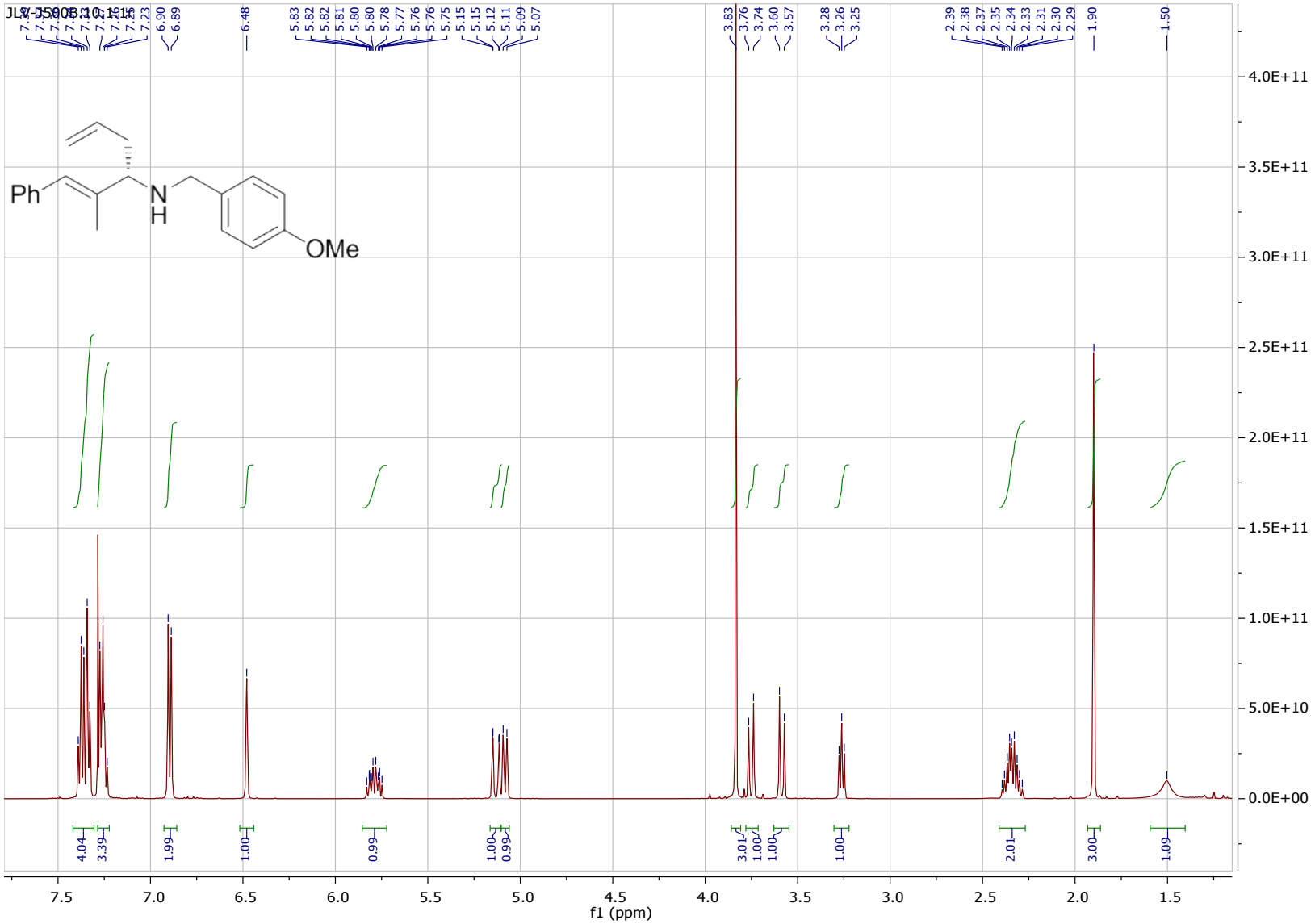

JLV-J502f1.21.1.1r
158.64
144.00
135.62
132.88
129.37
128.48
127.42
127.13
117.60
113.84
61.62
55.36
50.92
43.23
Ph
N
H
OMe
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

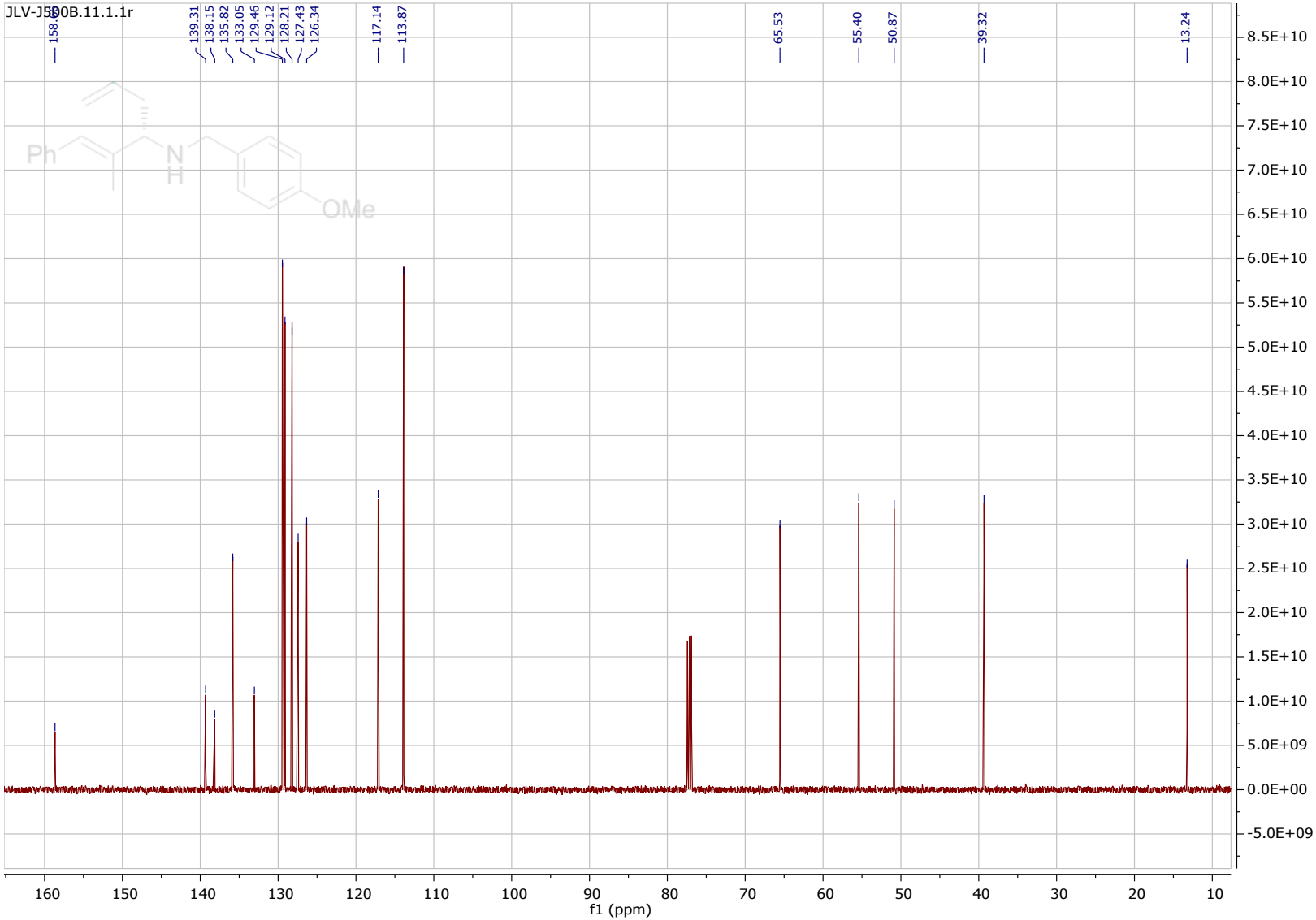
(*S*)-*N*-benzyl-1-(4-methoxyphenyl)but-3-en-1-amine 1k



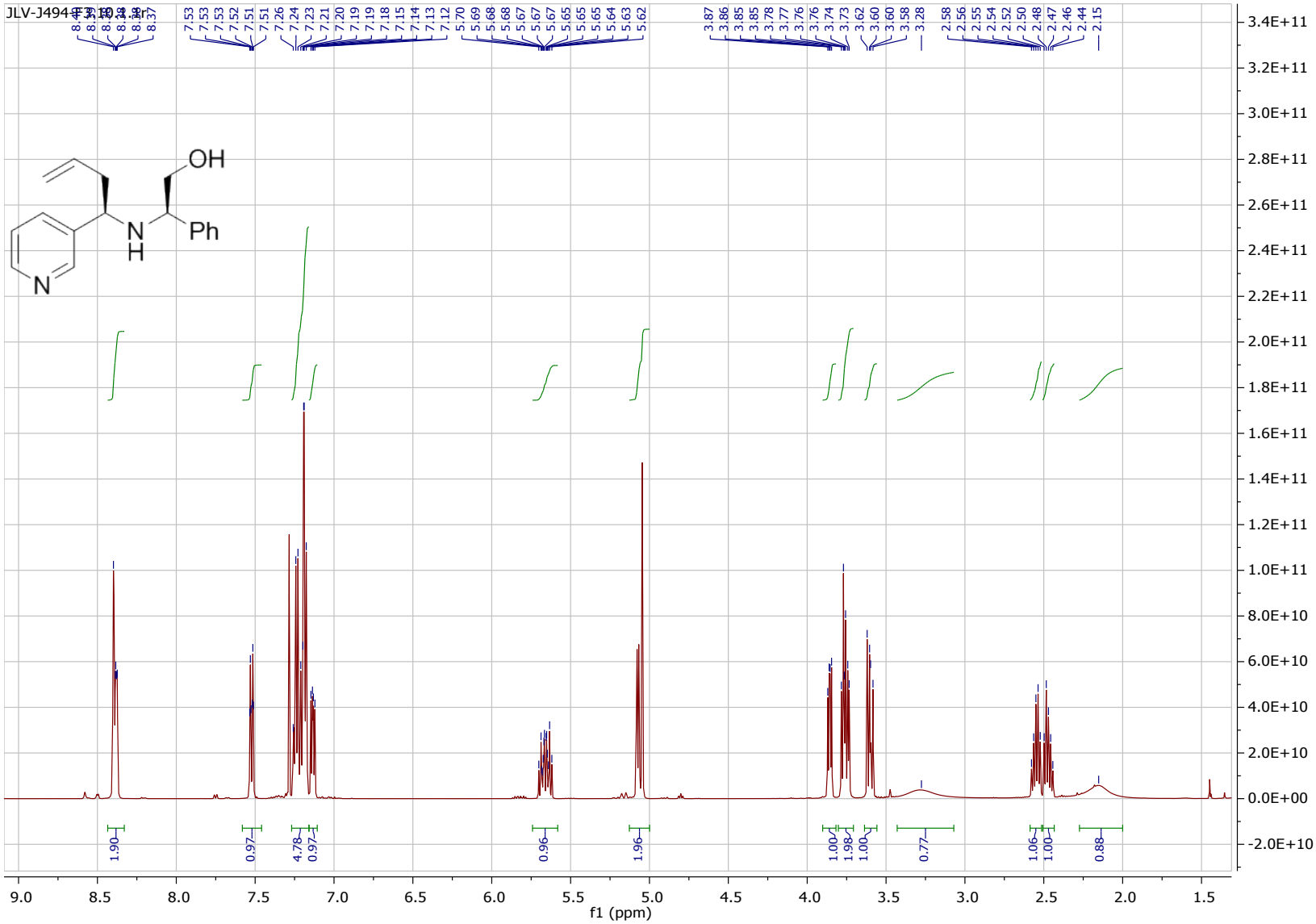

JLV-JR30t6.11.1.1r
158.71
140.71
135.83
135.69
128.46
128.26
126.94
117.57
113.88
61.05
55.36
51.44
43.25
MeO
N
H
Ph
2.00E+11
1.90E+11
1.80E+11
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

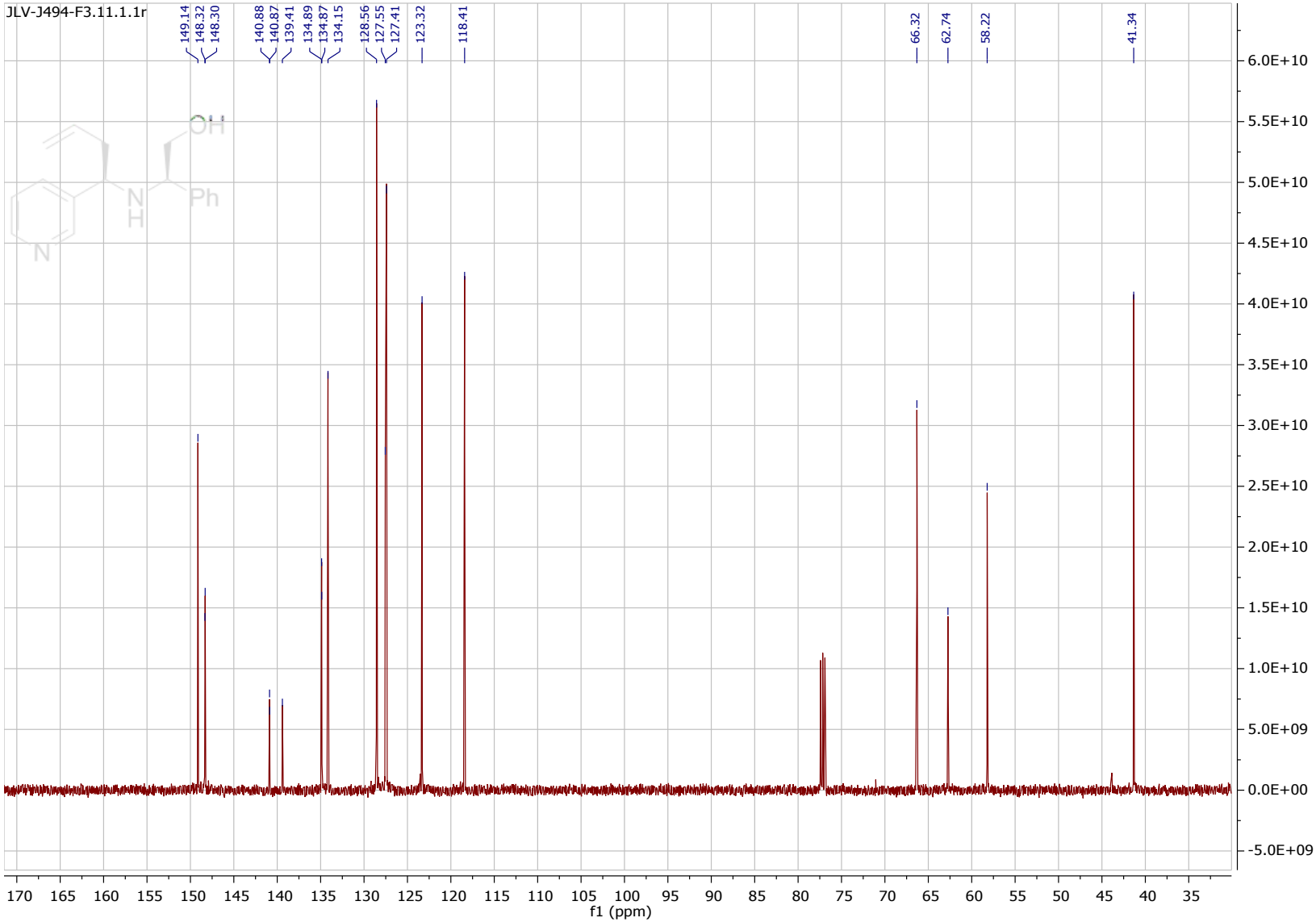
(*S,E*)-N-(4-Methoxybenzyl)-2-methyl-1-phenylhexa-1,5-dien-3-amine 1l



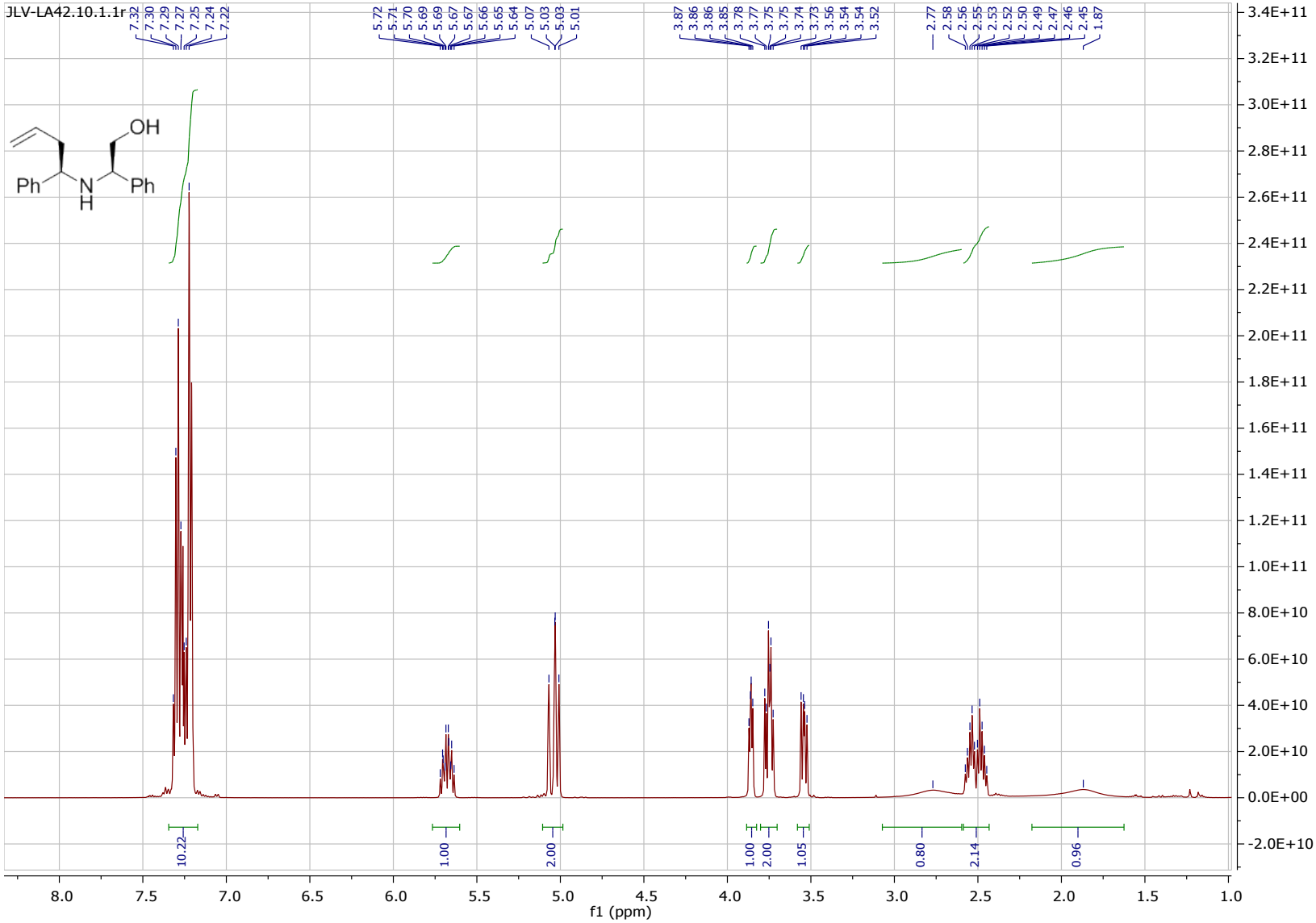

JLV-J500B.11.1.1r
158.
139.31
138.15
135.82
133.05
129.46
129.12
128.21
127.43
126.34
117.14
113.87
65.53
55.40
50.87
39.32
13.24
Ph
N
H
OMe
8.5E+10
8.0E+10
7.5E+10
7.0E+10
6.5E+10
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

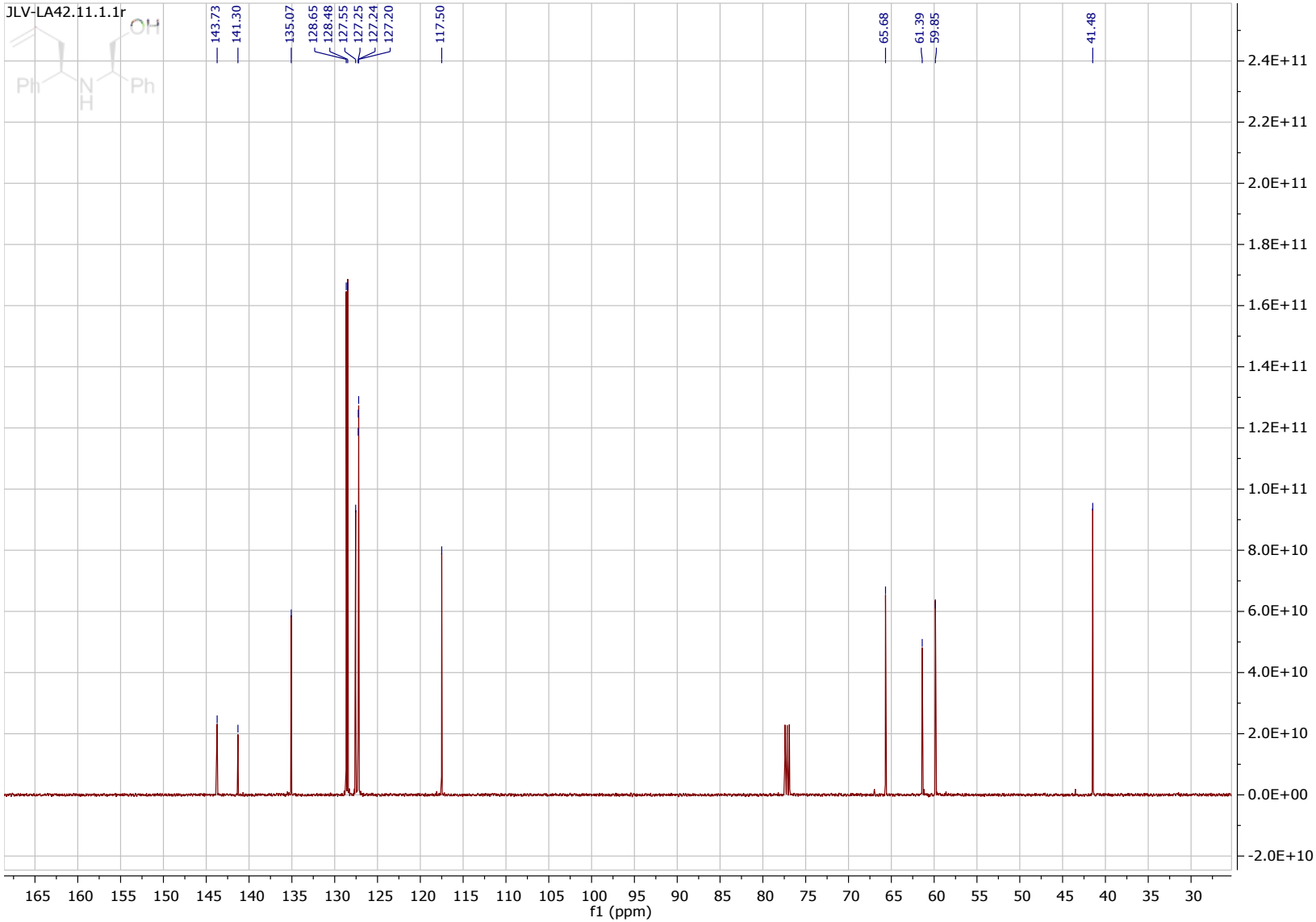
(*R*)-2-Phenyl-2-{[(*R*)-1-(pyridin-3-yl)but-3-en-1-yl]amino}ethanol 5h



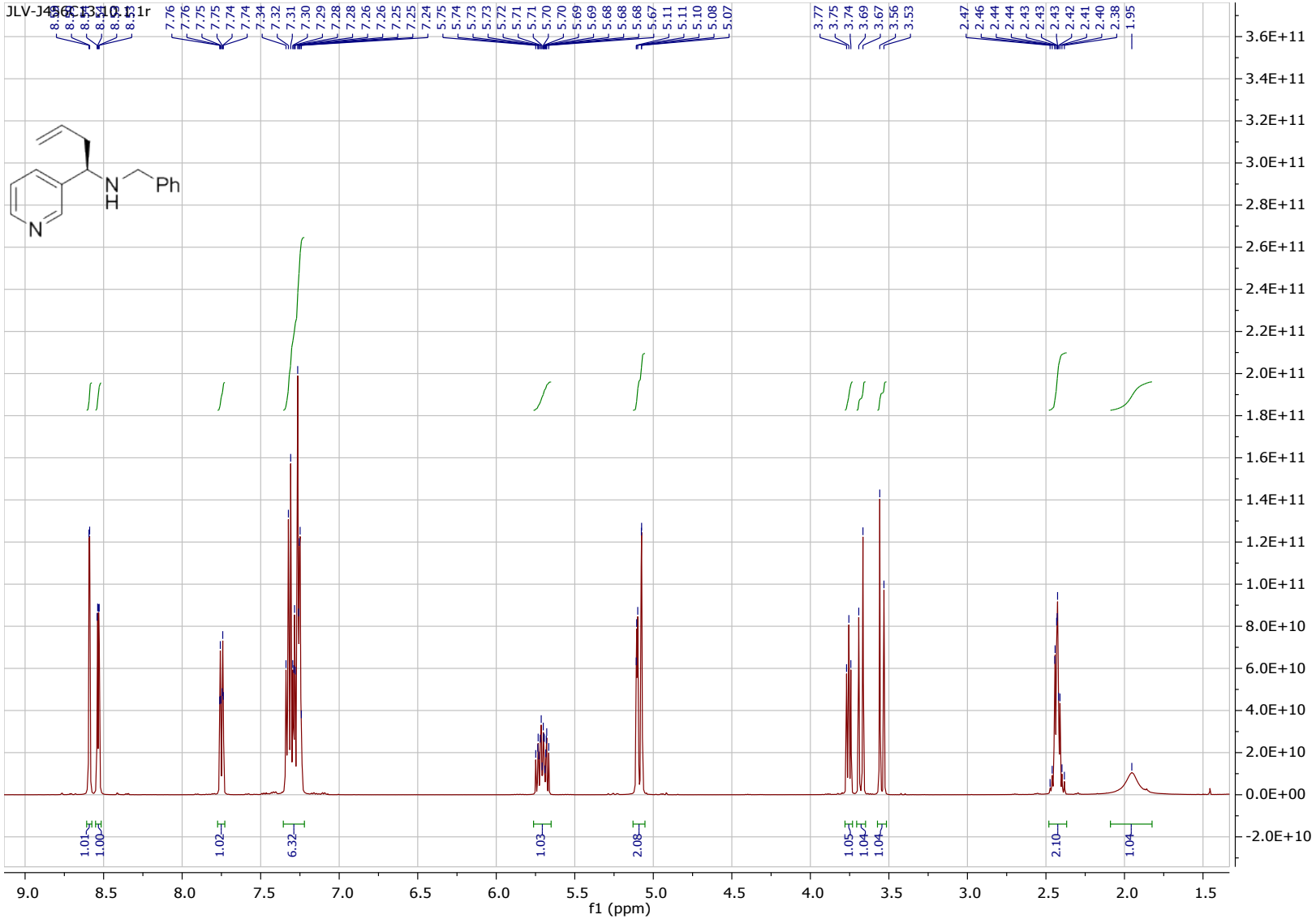

JLV-J494-F3.11.1.1r
149.14
148.32
148.30
140.88
140.87
139.41
134.89
134.87
134.15
128.56
127.55
127.41
123.32
118.41
66.32
62.74
58.22
41.34
OH
N
H
Ph
N
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
170 165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35
f1 (ppm)

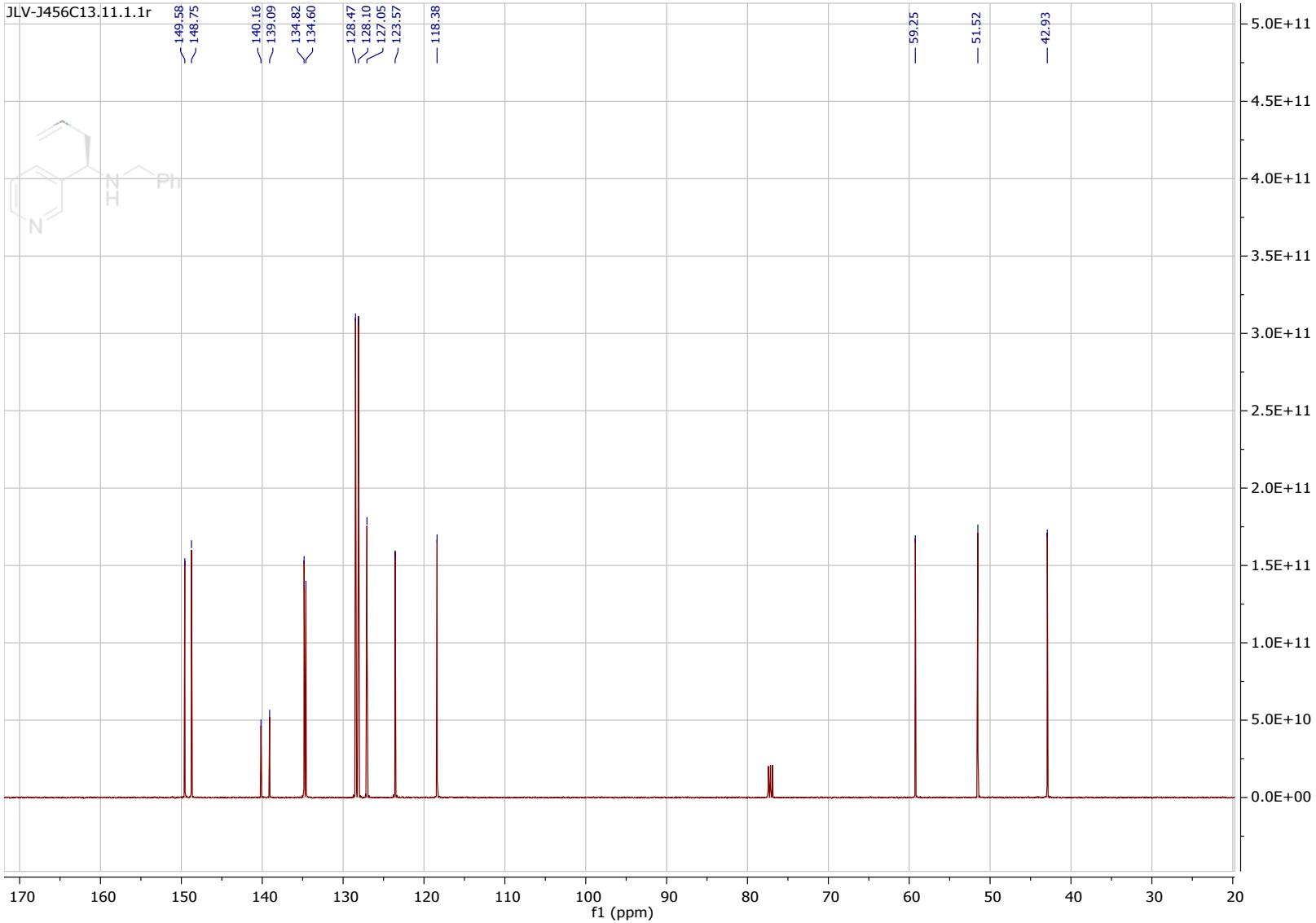
(*R*)-2-Phenyl-2-{[(*R*)-1-phenylbut-3-en-1-yl]amino}ethanol



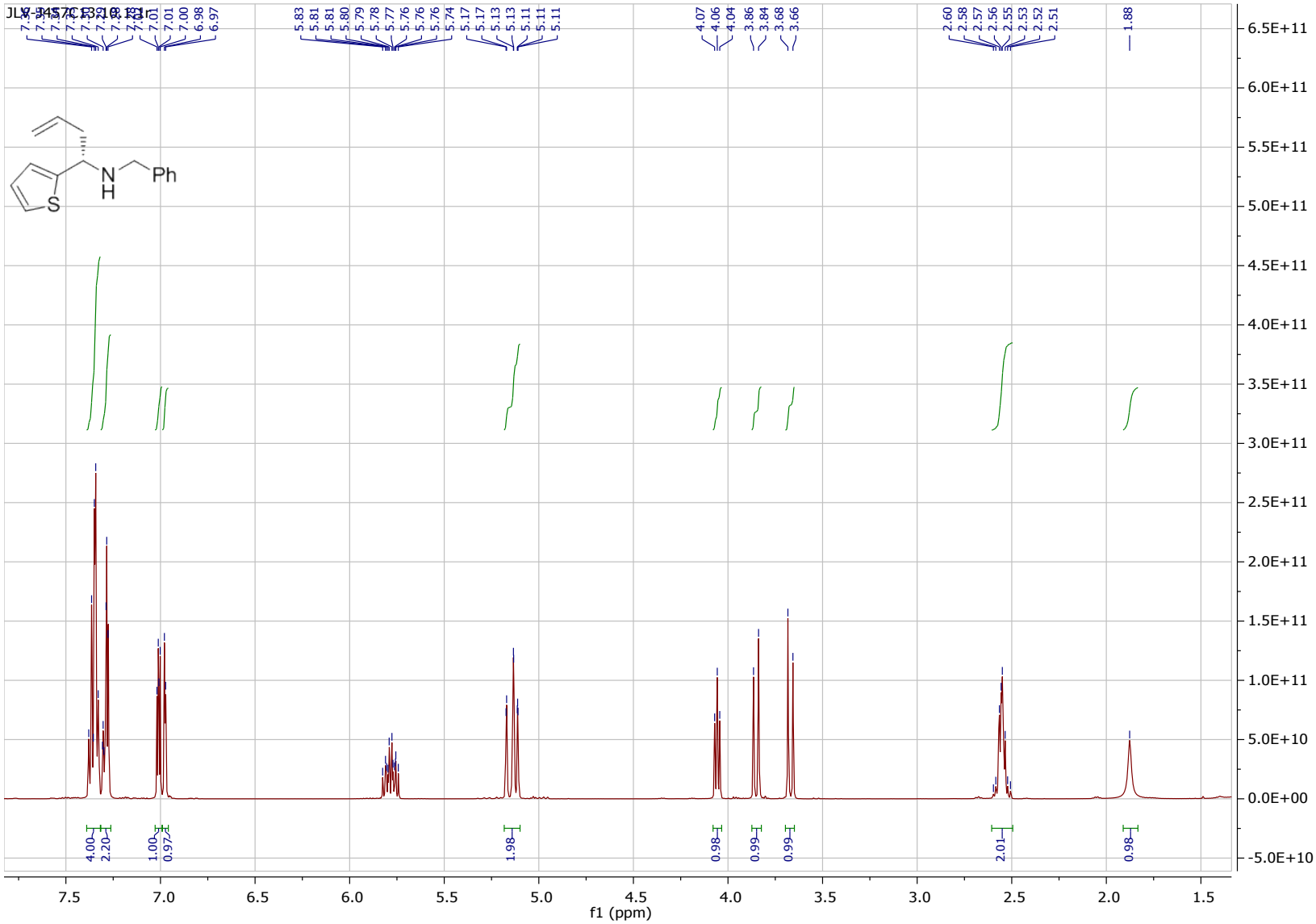

JLV-LA42.11.1.1r
OH
Ph
N
H
Ph
143.73
141.30
135.07
128.65
128.48
127.55
127.25
127.24
127.20
117.50
65.68
61.39
59.85
41.48
2.4E+11
2.2E+11
2.0E+11
1.8E+11
1.6E+11
1.4E+11
1.2E+11
1.0E+11
8.0E+10
6.0E+10
4.0E+10
2.0E+10
0.0E+00
-2.0E+10
165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30
f1 (ppm)

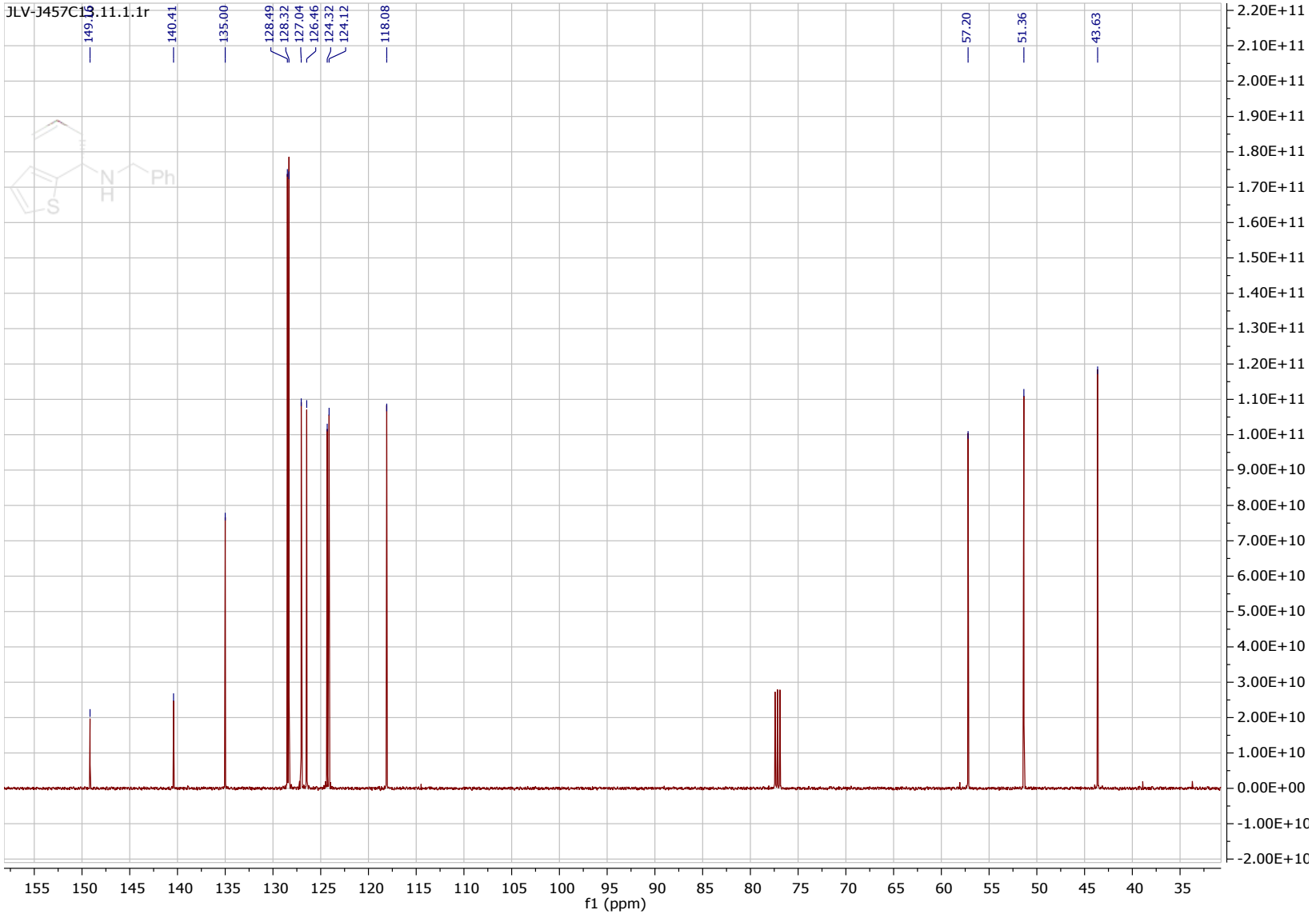
(*R*)-*N*-Benzyl-1-(pyridin-3-yl)but-3-en-1-amine 1h



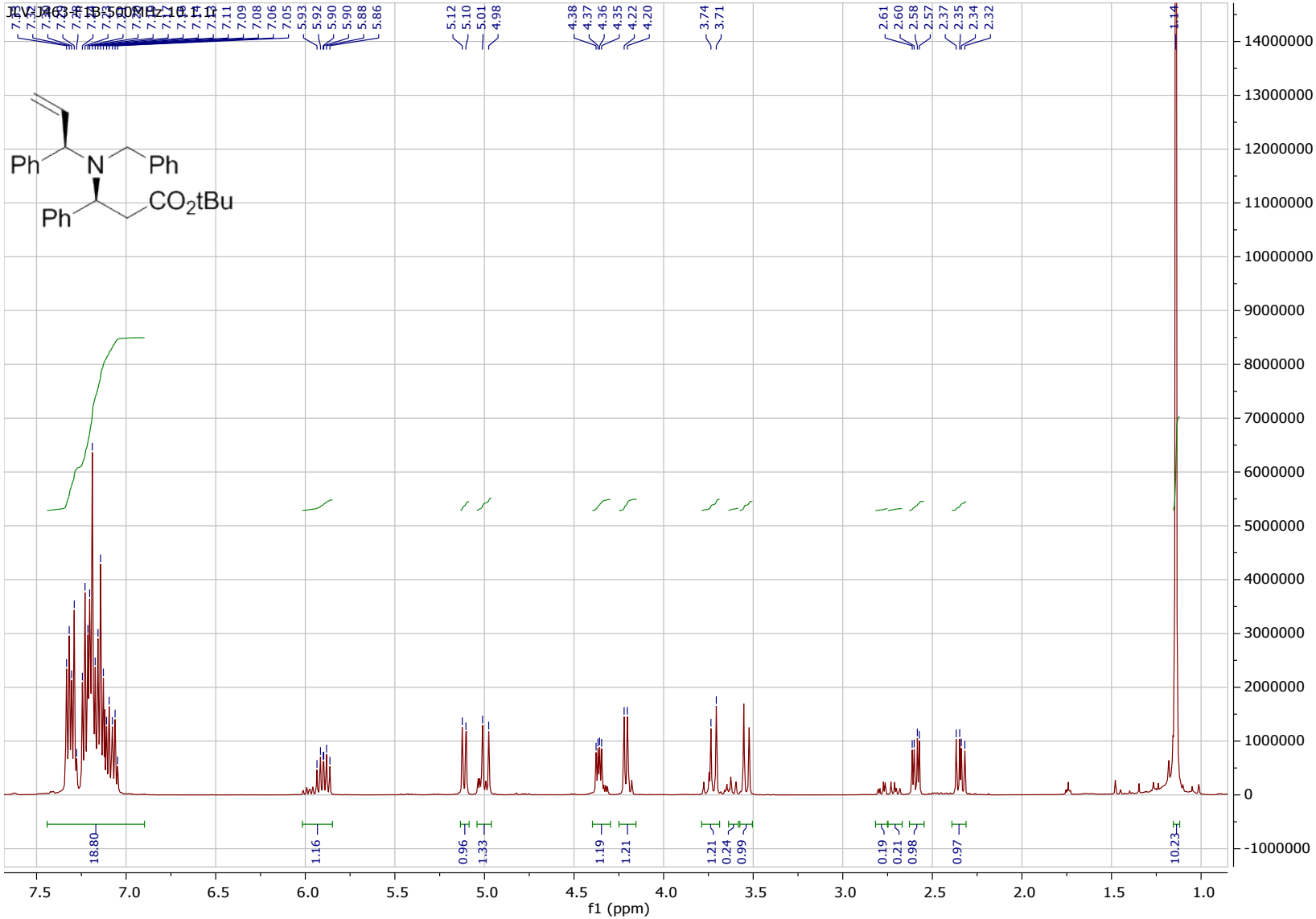

JLV-J456C13.11.1.1r
149.58
148.75
140.16
139.09
134.82
134.60
128.47
128.10
127.05
123.57
118.38
59.25
51.52
42.93
N
H
Ph
N
5.0E+11
4.5E+11
4.0E+11
3.5E+11
3.0E+11
2.5E+11
2.0E+11
1.5E+11
1.0E+11
5.0E+10
0.0E+00
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

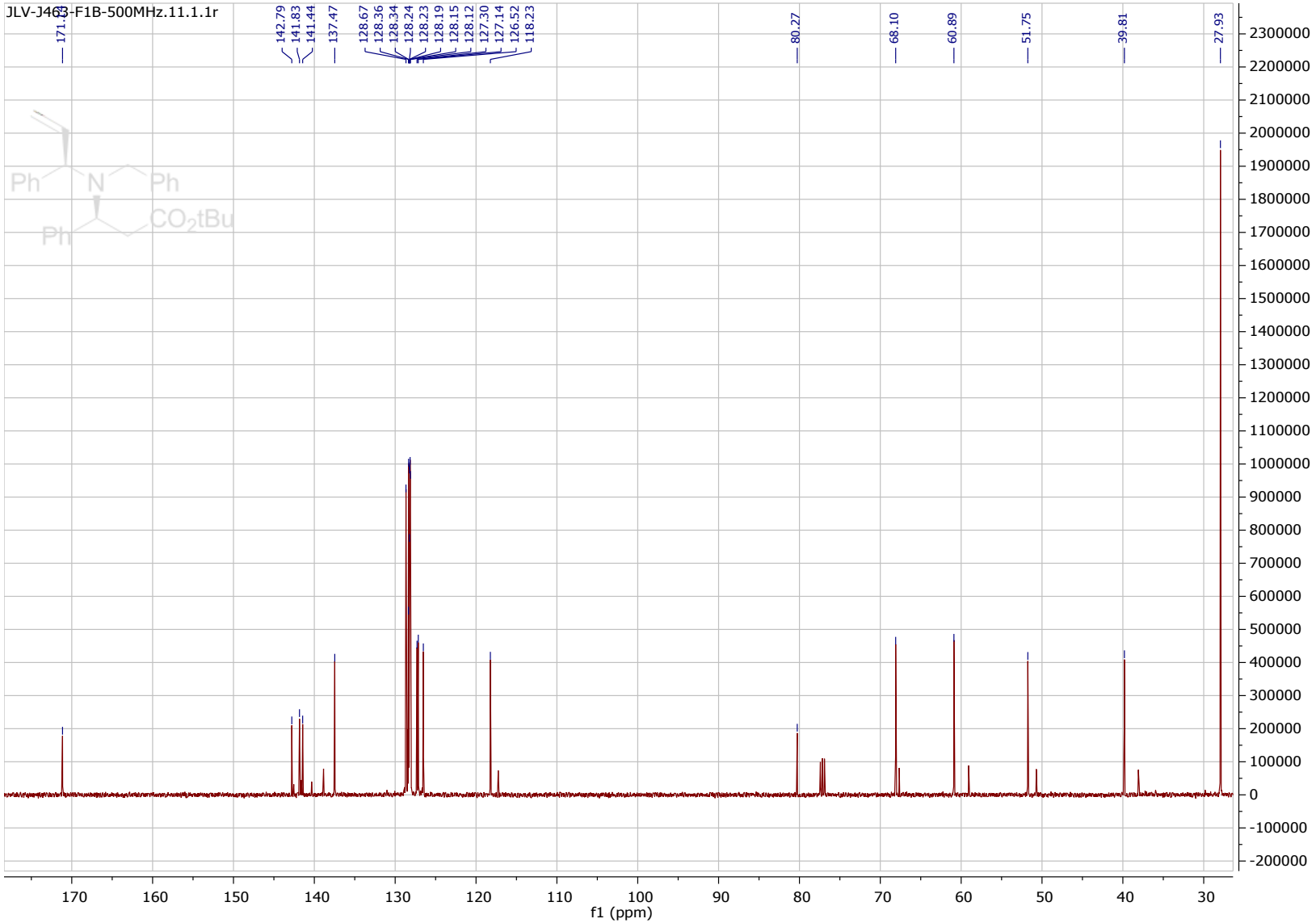
***(S)*-*N*-Benzyl-1-(thiophen-2-yl)but-3-en-1-amine 1e**



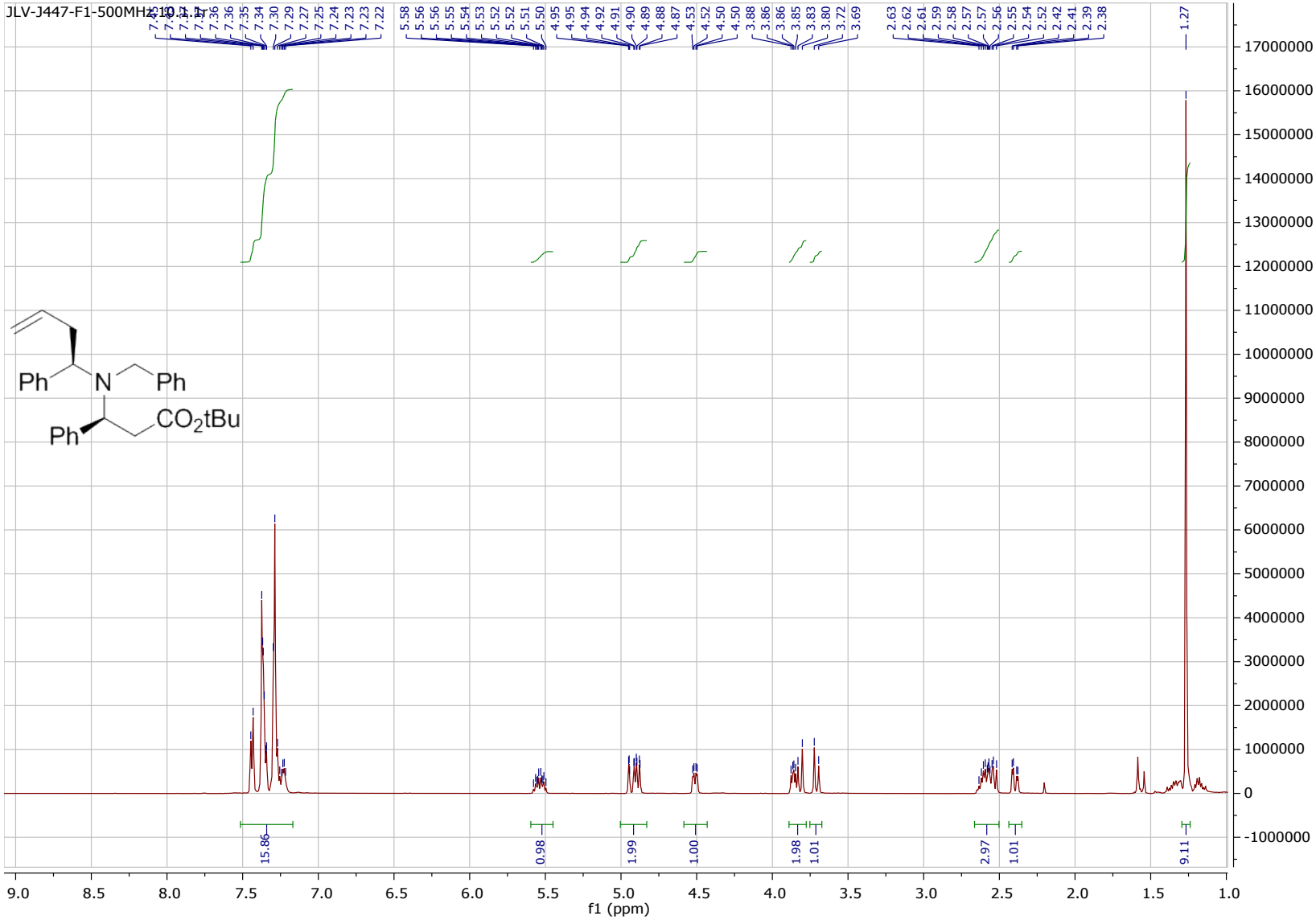

JLV-J457C13.11.1.1r
149.16
140.41
135.00
128.49
128.32
127.04
126.46
124.32
124.12
118.08
57.20
51.36
43.63
N
H
Ph
S
f1 (ppm)

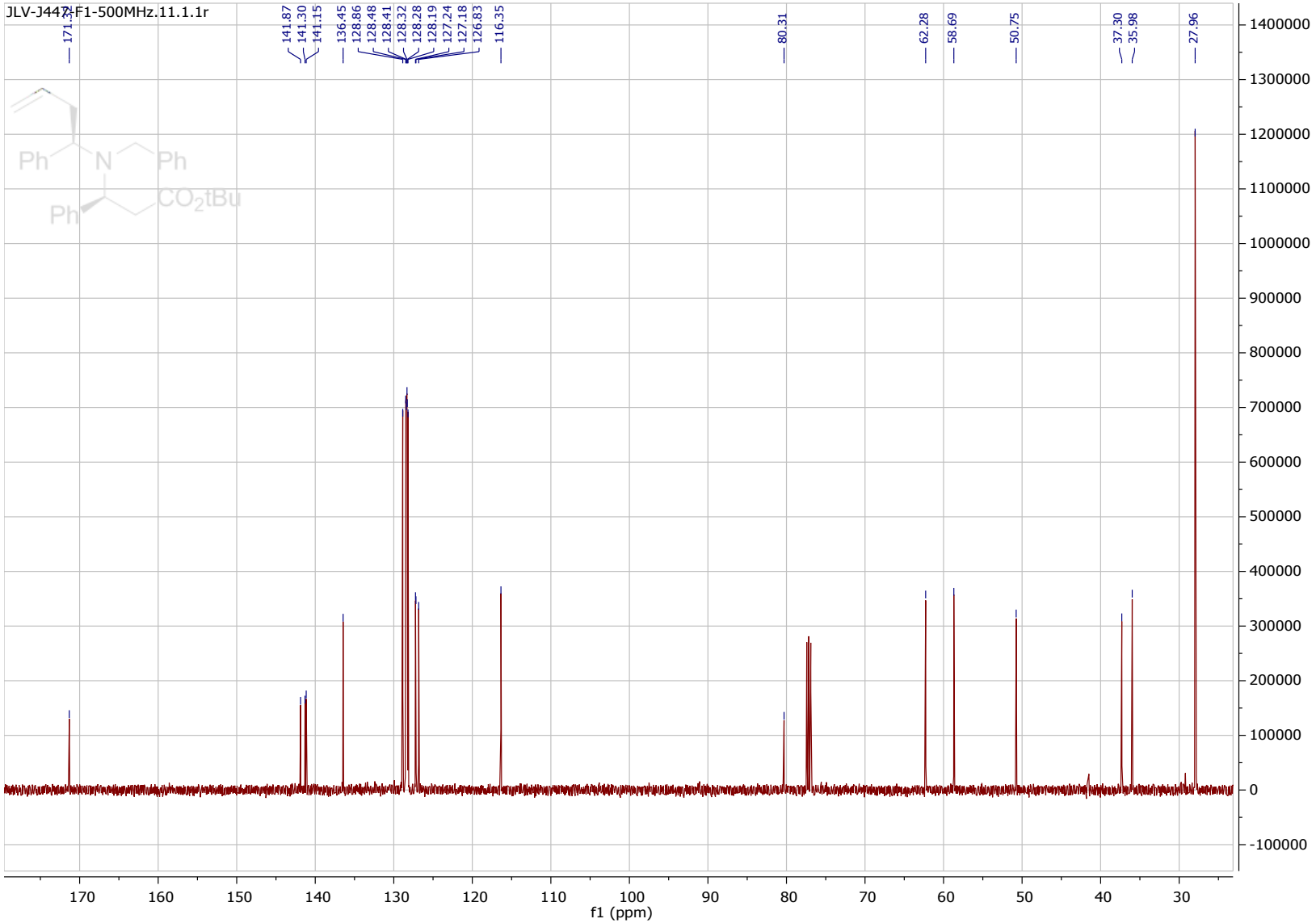
(*S*)-*Tert*-Butyl 3-(benzyl((*R*)-1-phenylallyl)amino)-3-phenylpropanoate 4



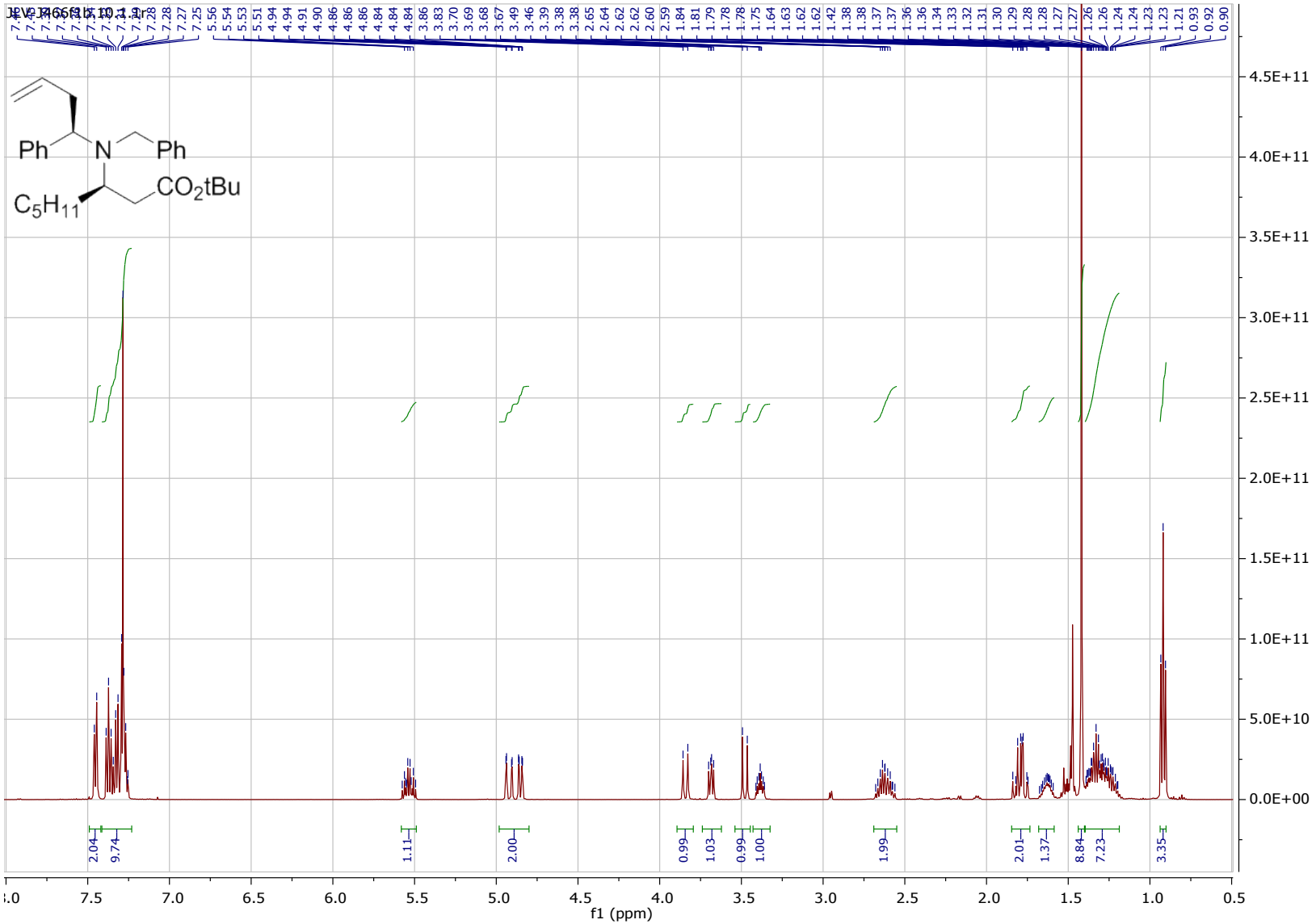

JLV-J463-F1B-500MHz.11.1.1r
171.13
142.79
141.83
141.44
137.47
128.67
128.36
128.34
128.24
128.23
128.19
128.15
128.12
127.30
127.14
126.52
118.23
80.27
68.10
60.89
51.75
39.81
27.93
Ph
N
Ph
CO2tBu
Ph
2300000
2200000
2100000
2000000
1900000
1800000
1700000
1600000
1500000
1400000
1300000
1200000
1100000
1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
-100000
-200000
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

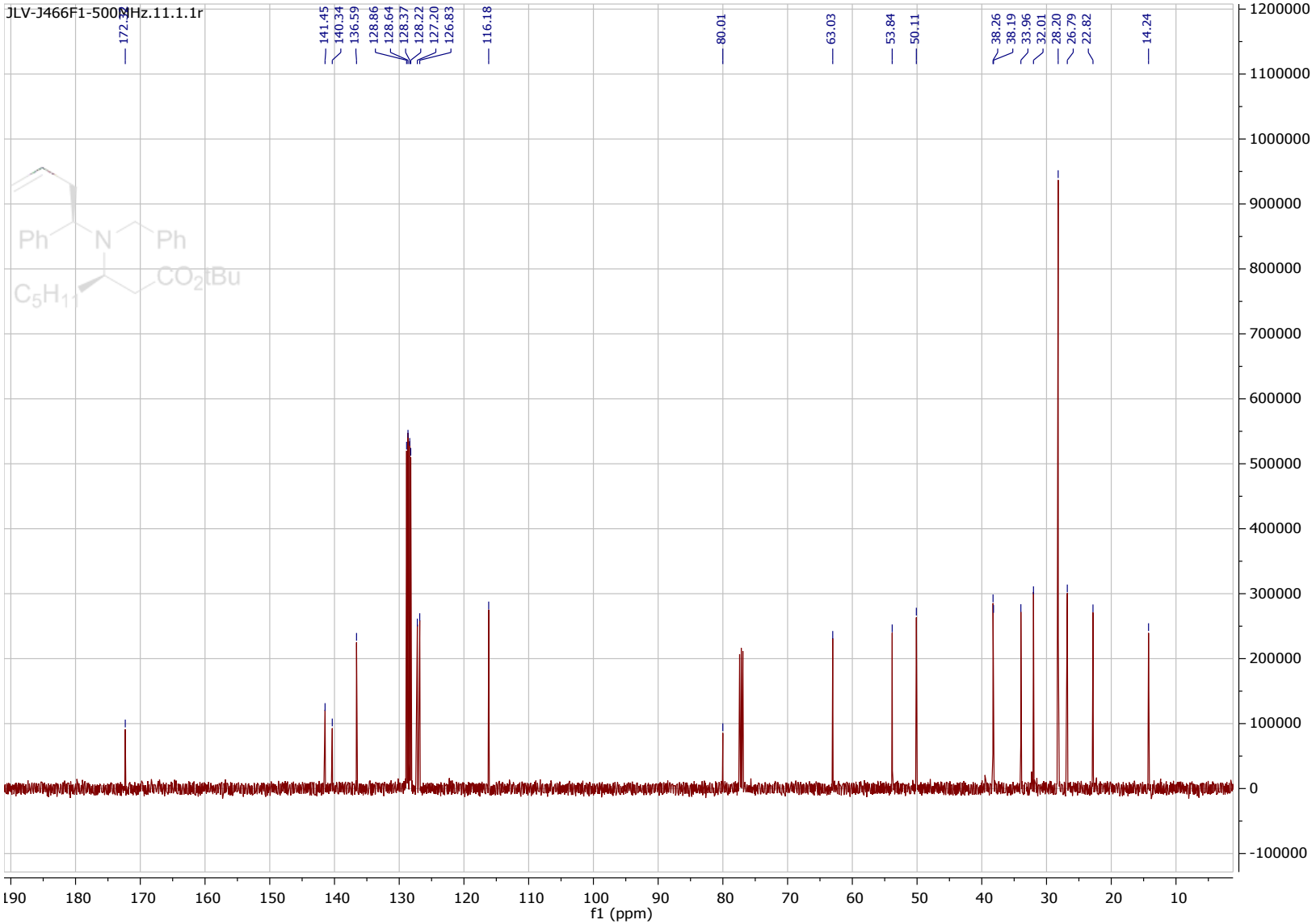
(*S*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-phenylbut-3-en-1-yl]amino}-3-phenylpropanoate 3a



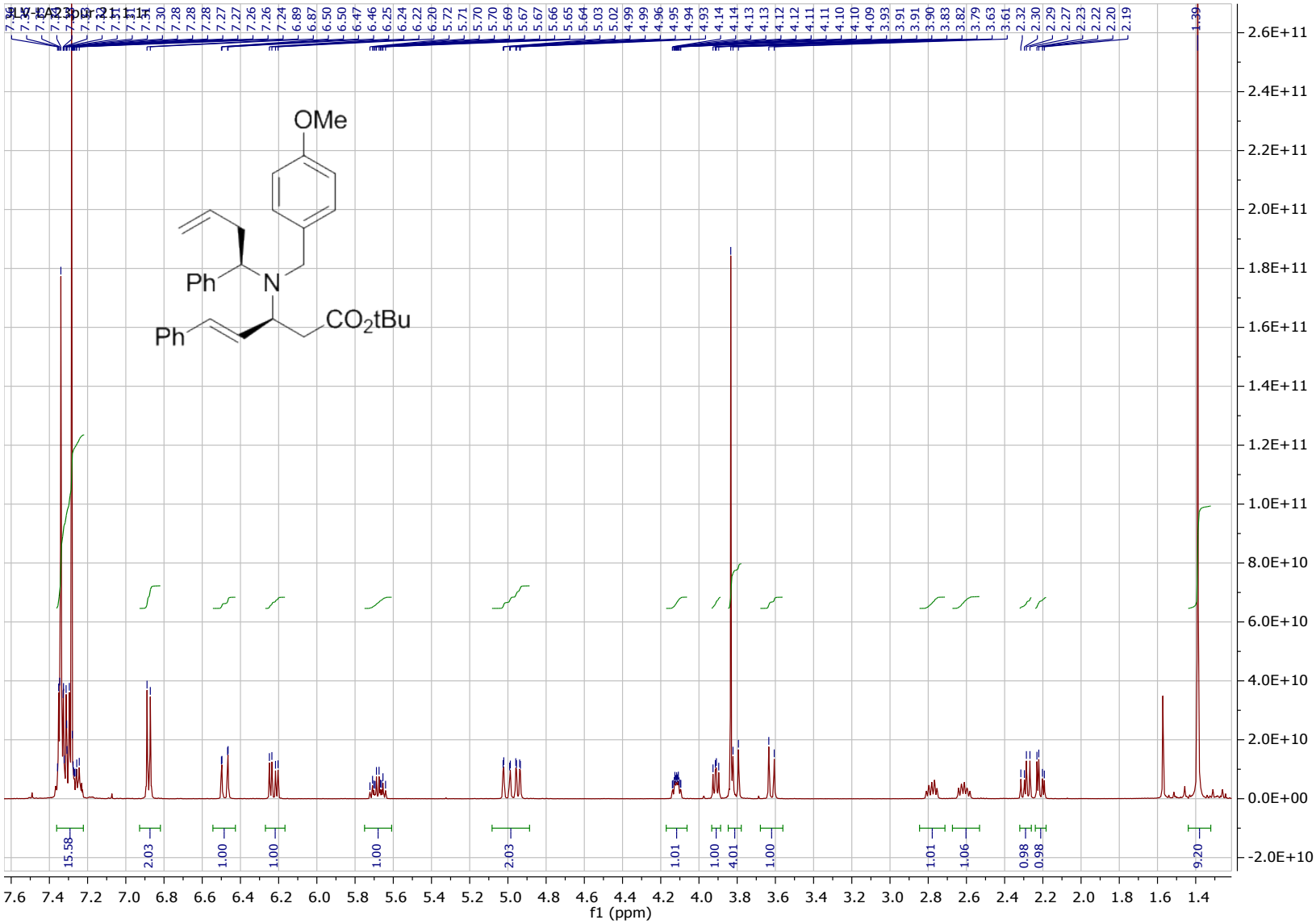

JLV-J447-F1-500MHz.11.1.1r
171.37
141.87
141.30
141.15
136.45
128.86
128.48
128.41
128.32
128.28
128.19
127.24
127.18
126.83
116.35
80.31
62.28
58.69
50.75
37.30
35.98
27.96
Ph
N
Ph
Ph
CO2tBu
1400000
1300000
1200000
1100000
1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
-100000
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

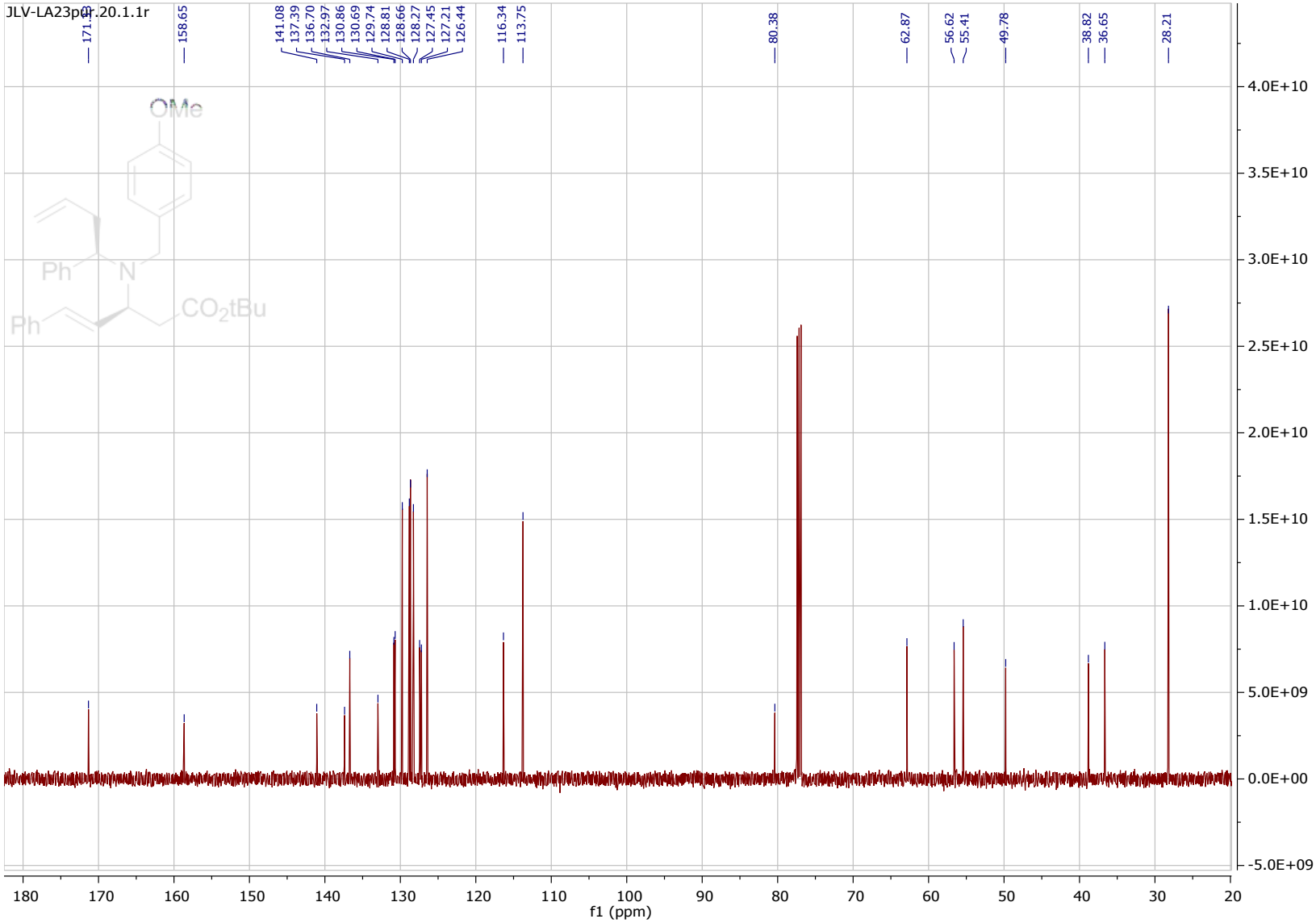
(±)-(*R*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-phenylbut-3-en-1-yl]amino}octanoate 3b



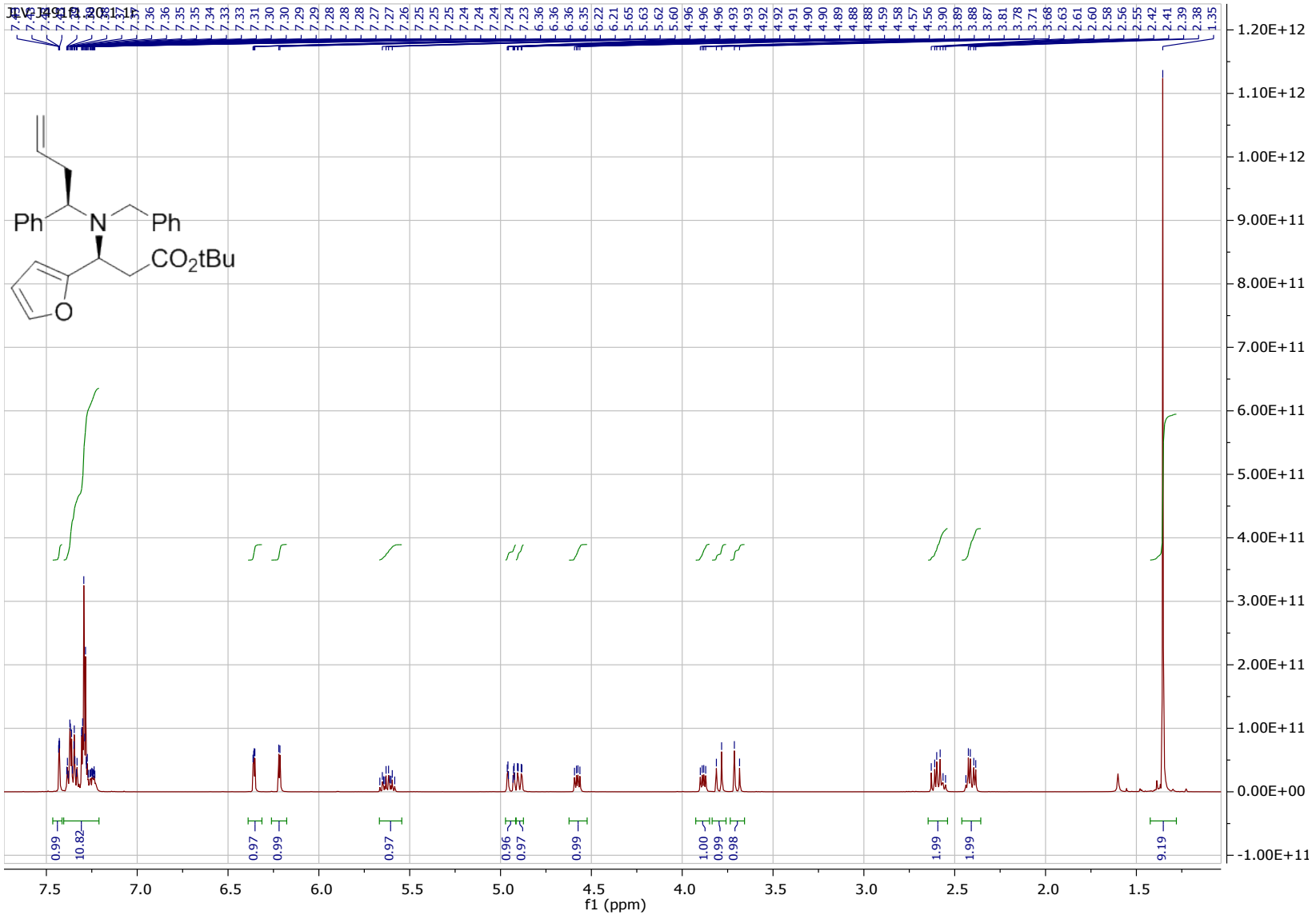

JLV-J466F1-500MHz.11.1.1r
172.73
141.45
140.34
136.59
128.86
128.64
128.37
128.22
127.20
126.83
116.18
80.01
63.03
53.84
50.11
38.26
38.19
33.96
32.01
28.20
26.79
22.82
14.24
Ph
N
Ph
CO2tBu
C5H11
f1 (ppm)

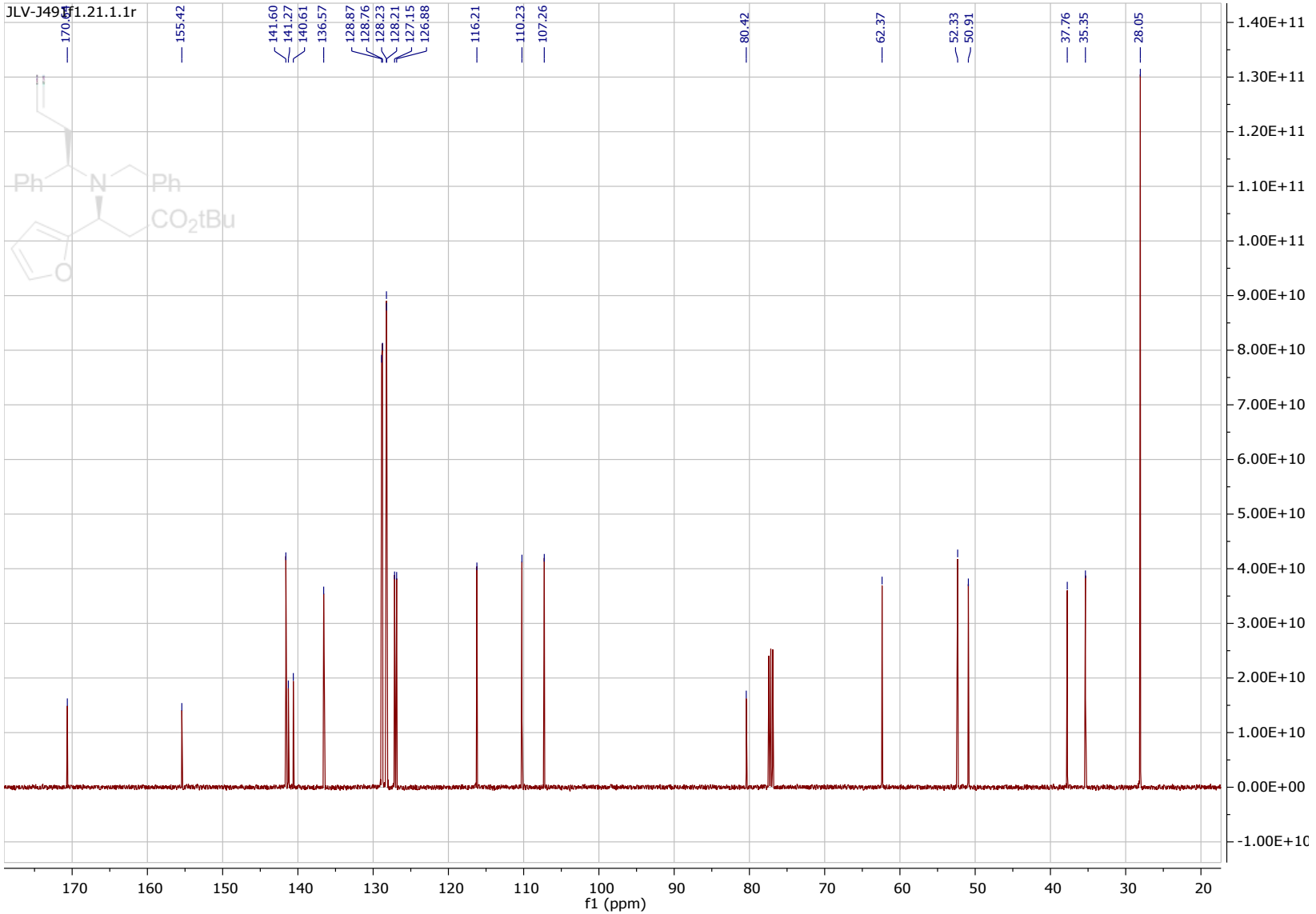
(±)-(*S,E*)-*Tert*-Butyl 3-{(4-methoxybenzyl)[(*R*)-1-phenylbut-3-en-1-yl)amino}-5-phenylpent-4-enoate 3c



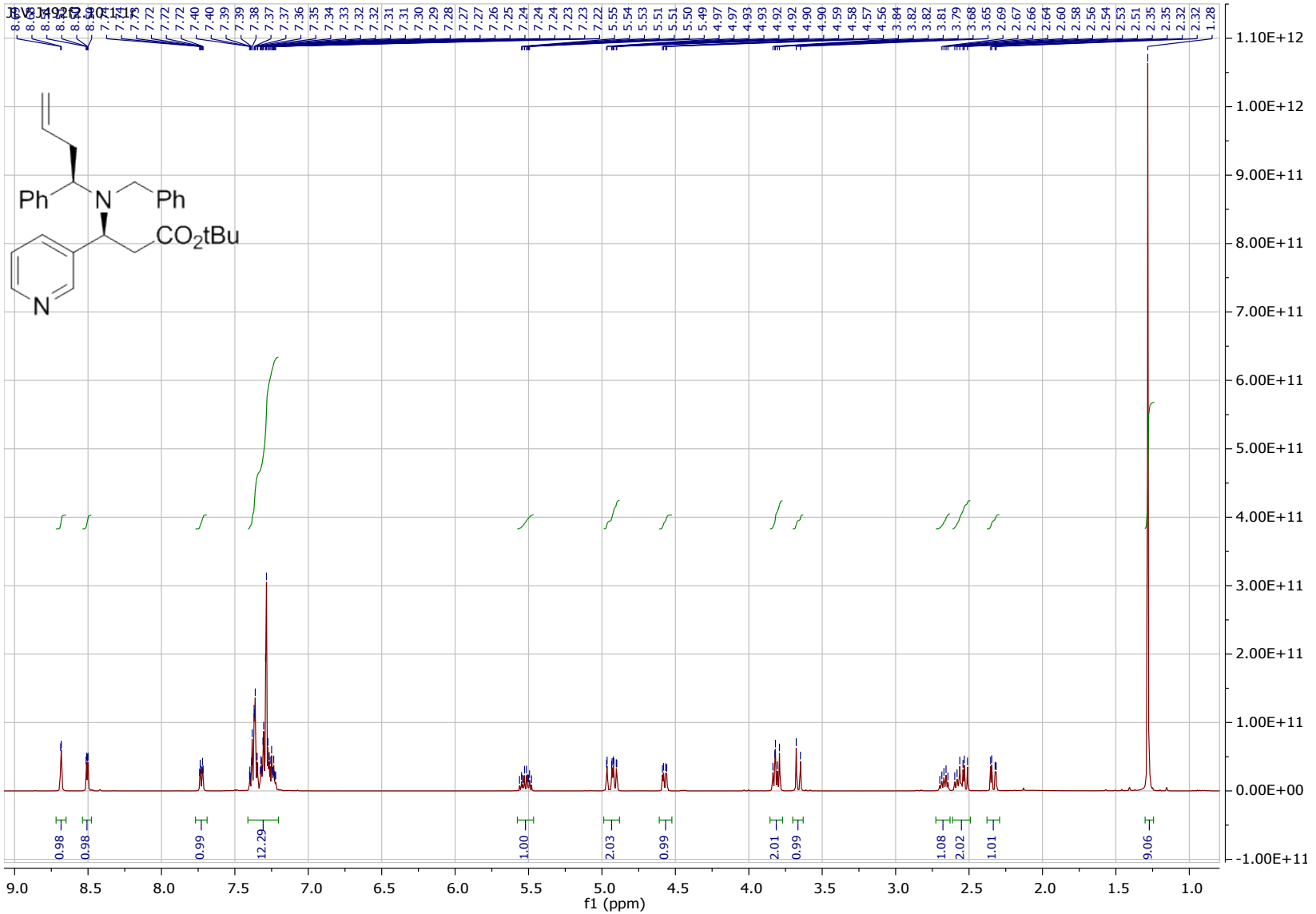

JLV-LA23pdr.20.1.1r
171.49
158.65
141.08
137.39
136.70
132.97
130.86
130.69
129.74
128.81
128.66
128.27
127.45
127.21
126.44
116.34
113.75
80.38
62.87
56.62
55.41
49.78
38.82
36.65
28.21
OMe
Ph
N
CO2tBu
Ph
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

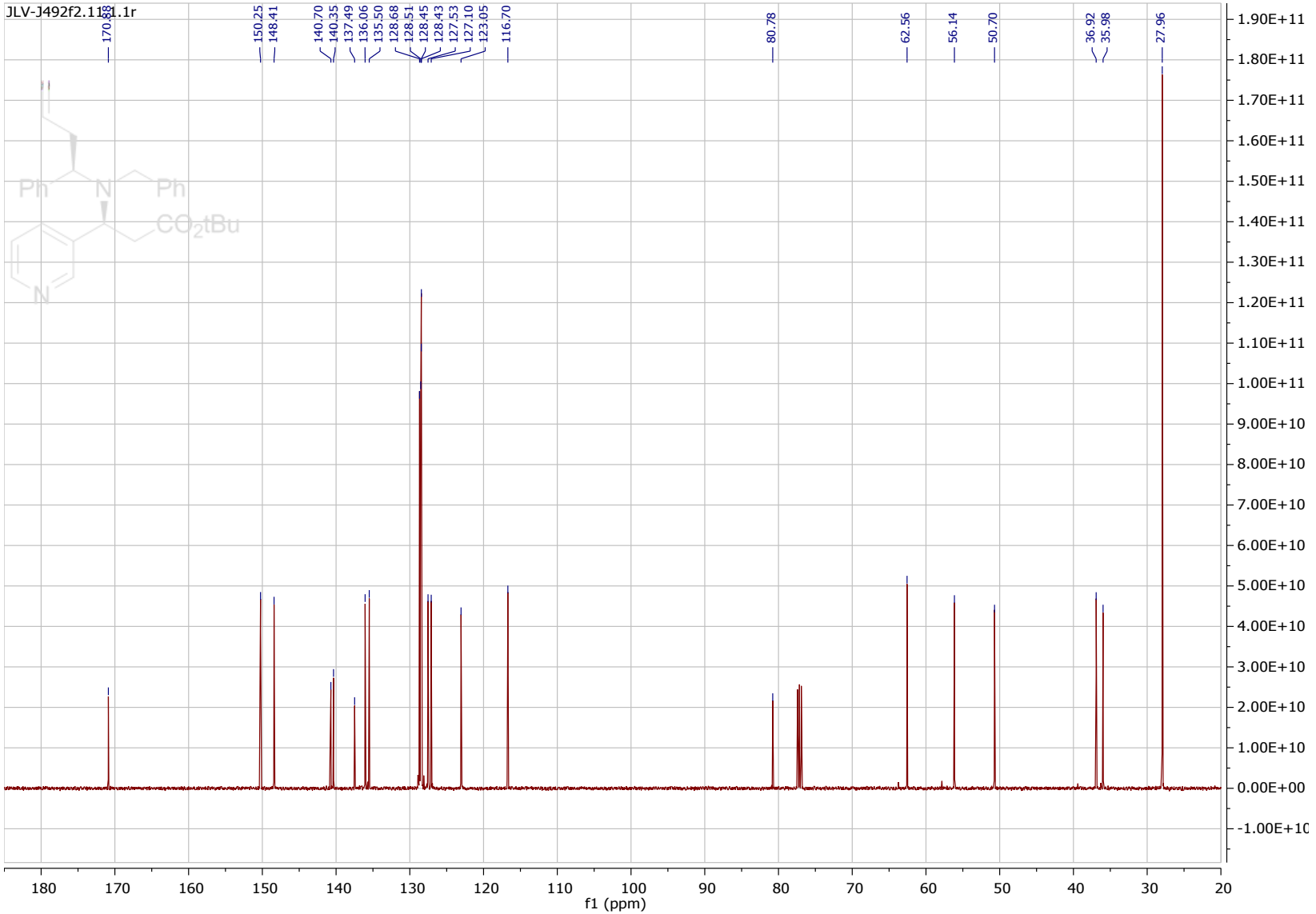
(±)-(*S*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-phenylbut-3-en-1-yl]amino}-3-(furan-2-yl)propanoate 3d



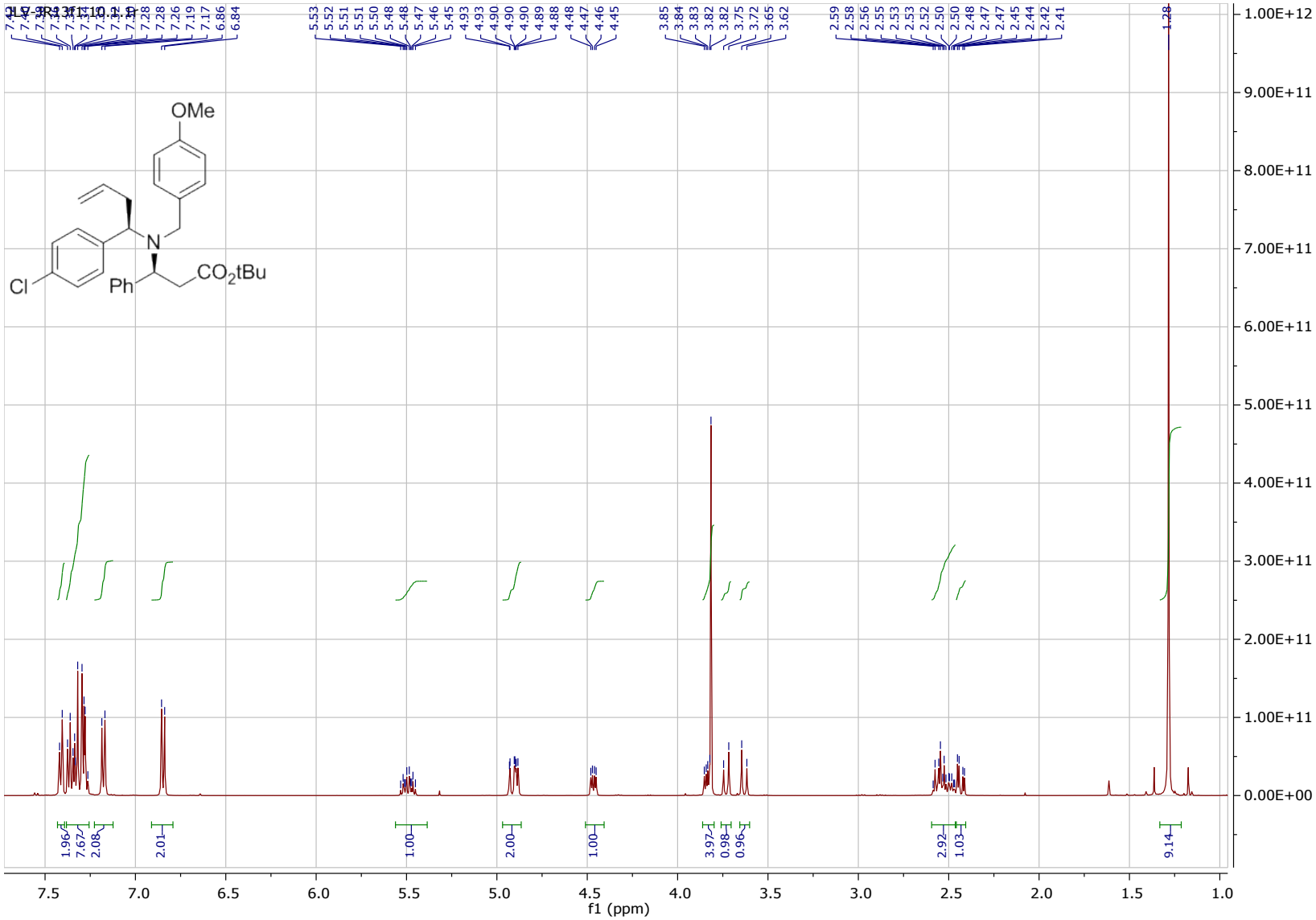

JLV-J491f1.21.1.1r
170.85
155.42
141.60
141.27
140.61
136.57
128.87
128.76
128.23
128.21
127.15
126.88
116.21
110.23
107.26
80.42
62.37
52.33
50.91
37.76
35.35
28.05
Ph
N
Ph
CO2tBu
O
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

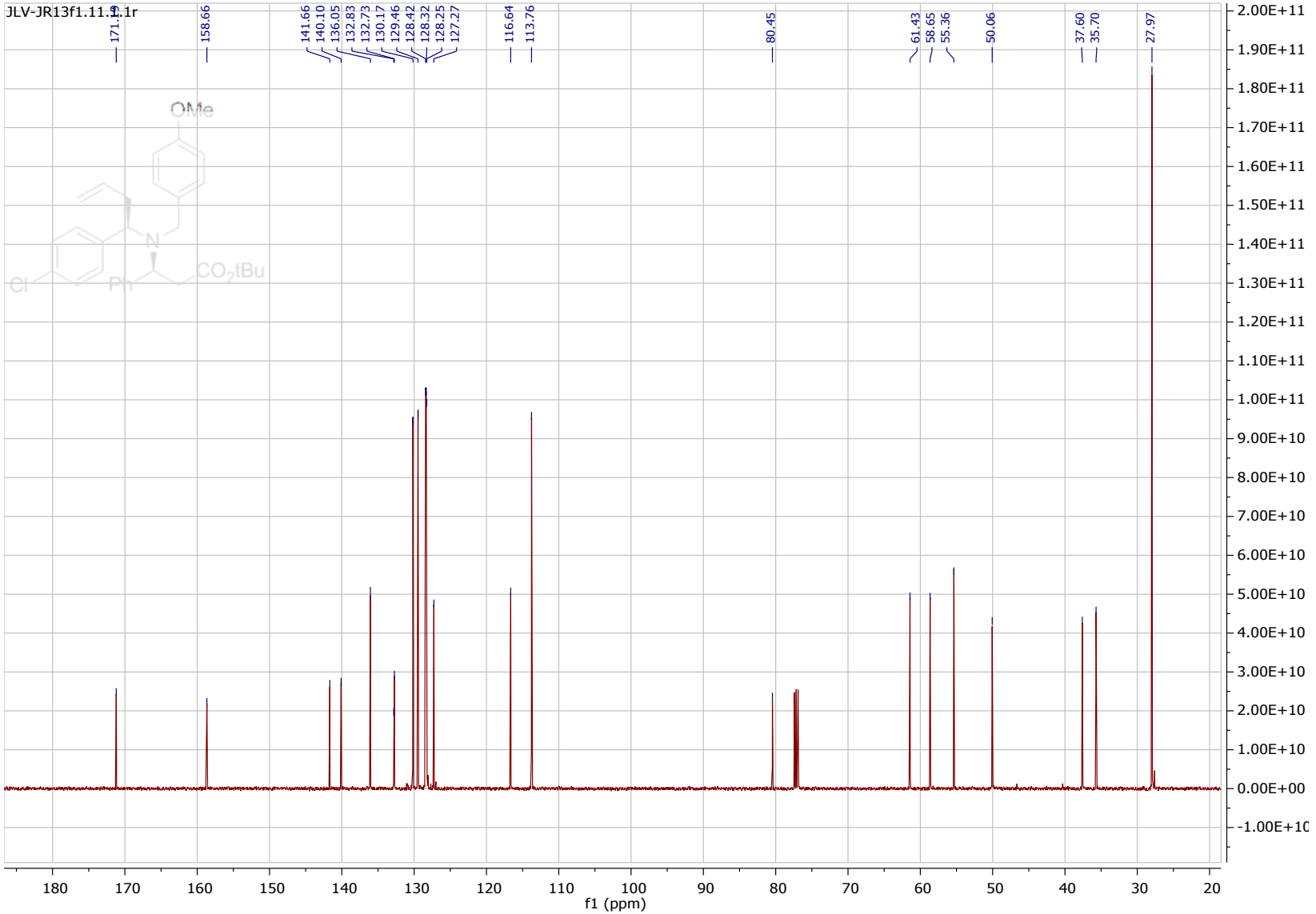
(±)-(*S*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-phenylbut-3-en-1-yl]amino}-3-(pyridin-3-yl)propanoate 3e



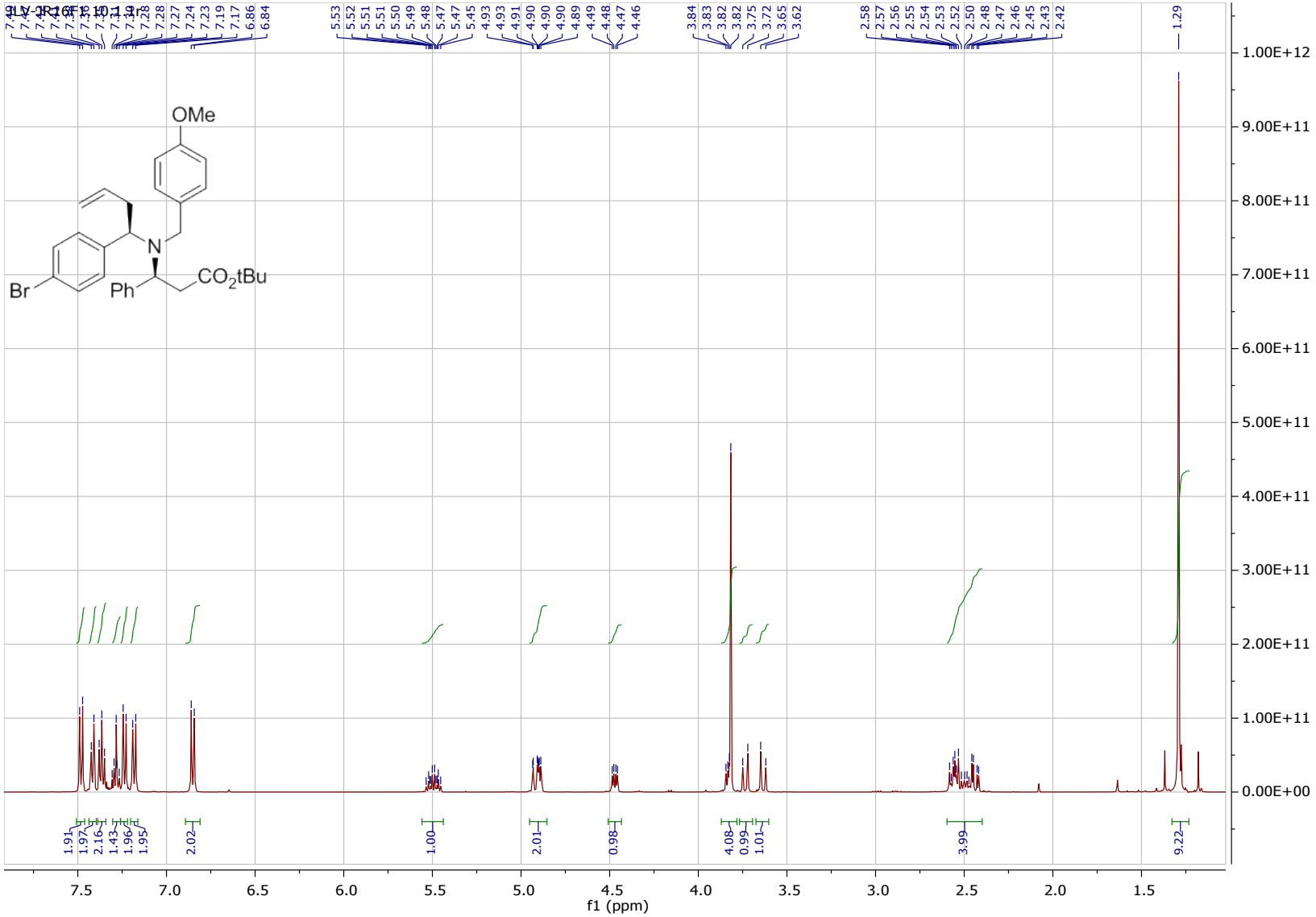

JLV-J492f2.11.1.1r
170.31
150.25
148.41
140.70
140.35
137.49
136.06
135.50
128.68
128.51
128.45
128.43
127.53
127.10
123.05
116.70
80.78
62.56
56.14
50.70
36.92
35.98
27.96
Ph
N
Ph
CO2tBu
N
1.90E+11
1.80E+11
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

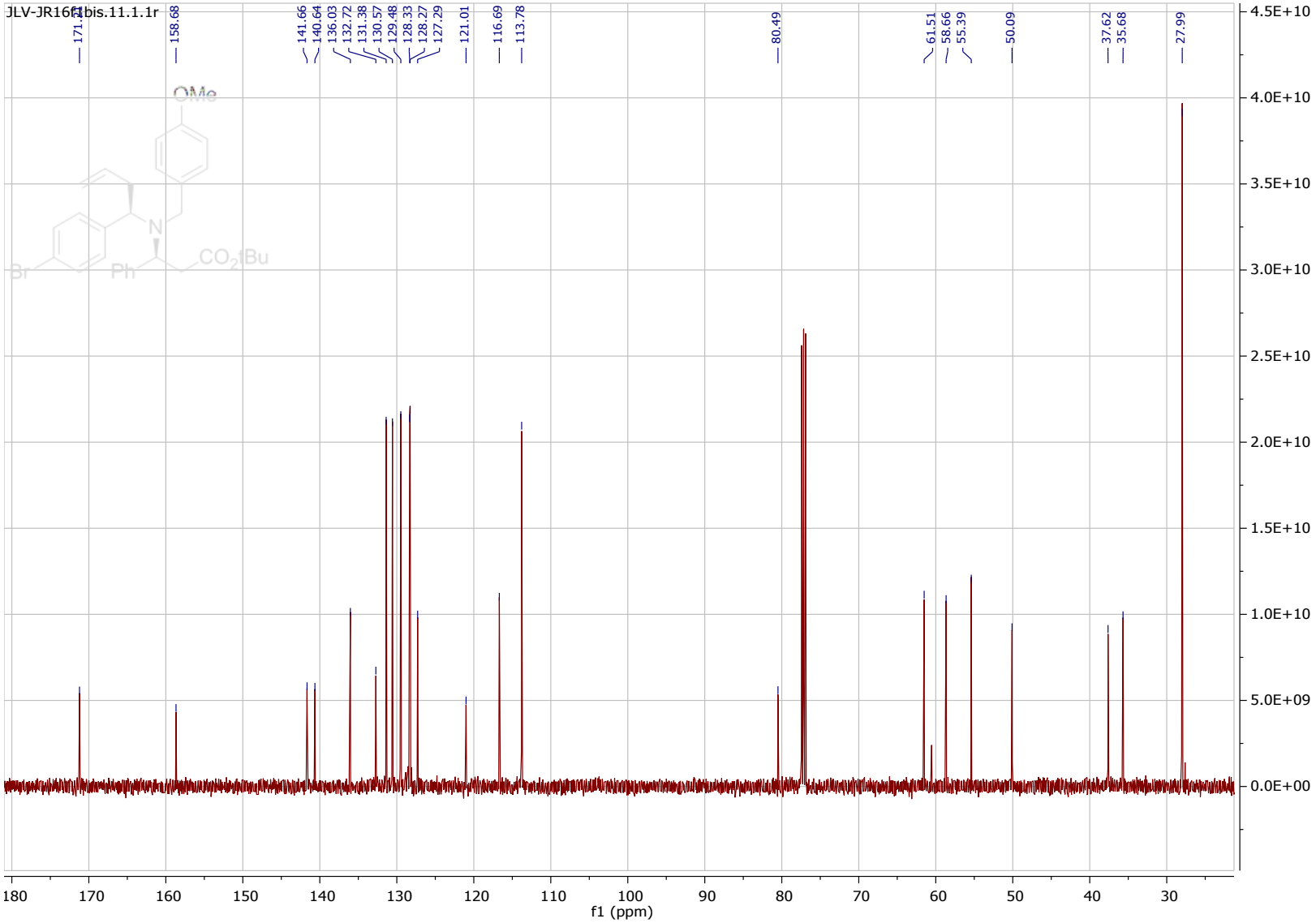
(±)-*(S)*-*Tert*-Butyl 3-{[(*R*)-1-(4-chlorophenyl)but-3-en-1-yl](4-methoxybenzyl)amino}-3-phenylpropanoate 3f



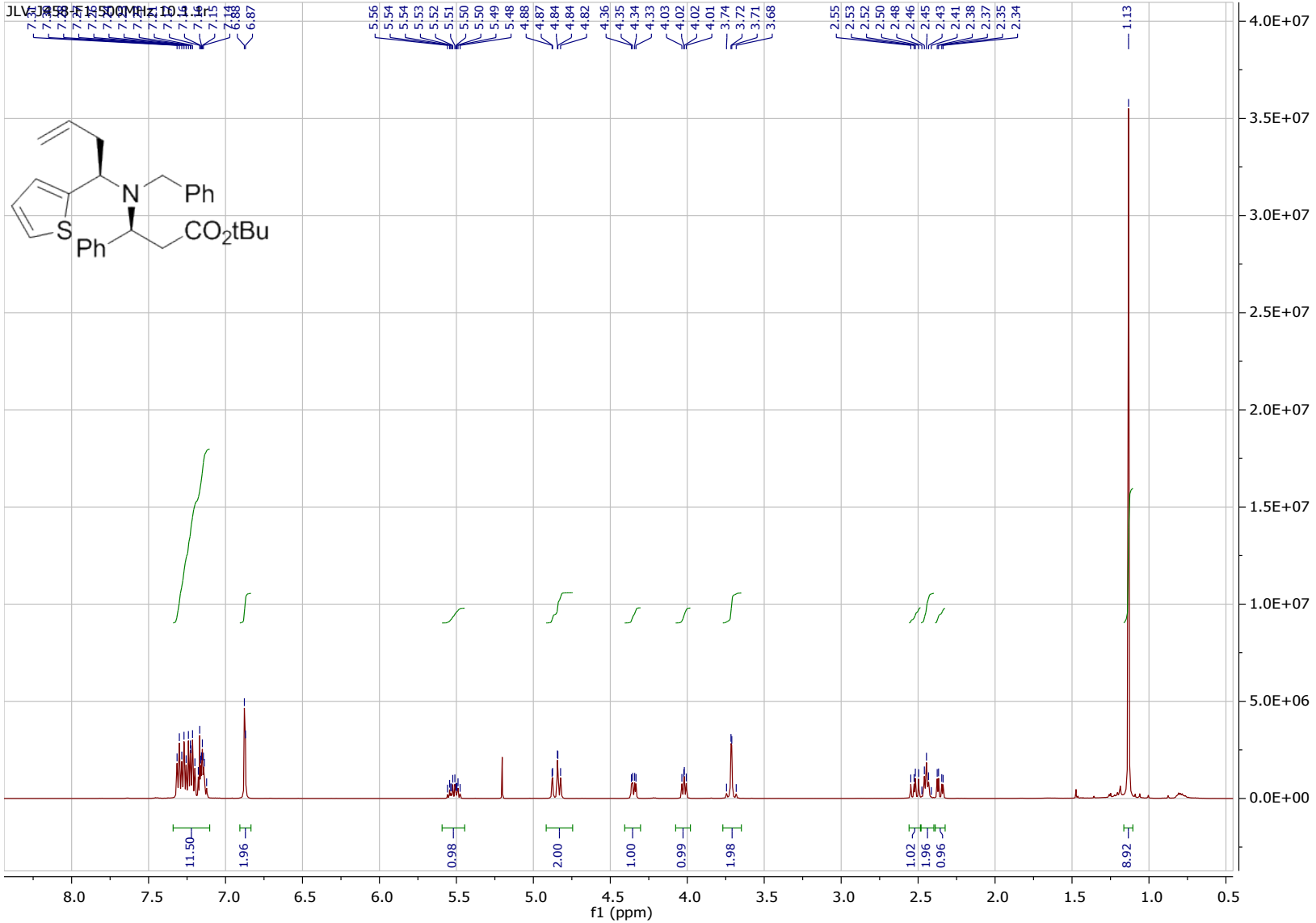

JLV-JR13f1.11.1.1r
171.19
158.66
141.66
140.10
136.05
132.83
132.73
130.17
129.46
128.42
128.32
128.25
127.27
116.64
113.76
80.45
61.43
58.65
55.36
50.06
37.60
35.70
27.97
OMe
N
Cl
Ph
CO2tBu
2.00E+11
1.90E+11
1.80E+11
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

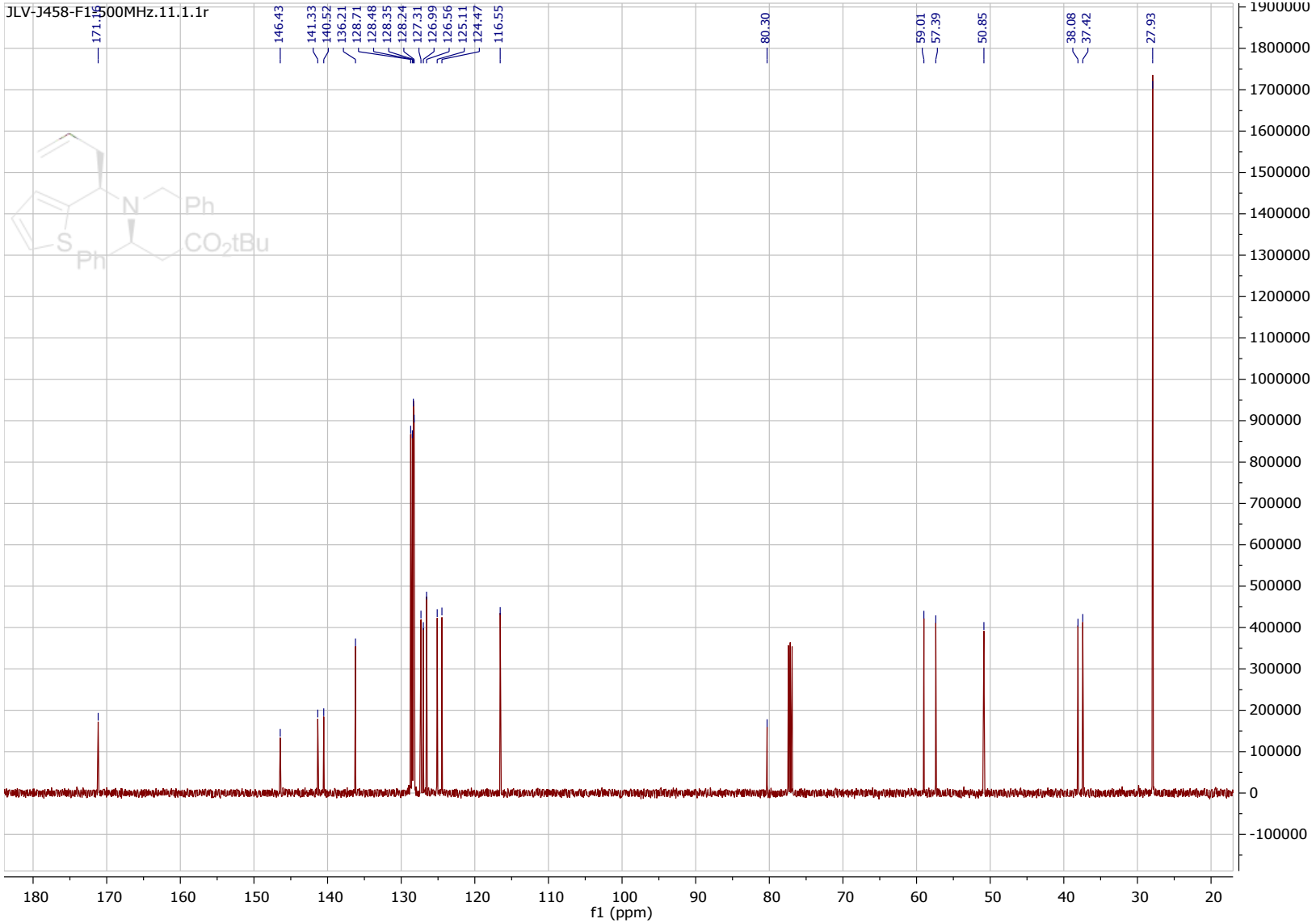
(±)-*(S)*-*Tert*-Butyl 3-{[(*R*)-1-(4-bromophenyl)but-3-en-1-yl](4-methoxybenzyl)amino}-3-phenylpropanoate 3g



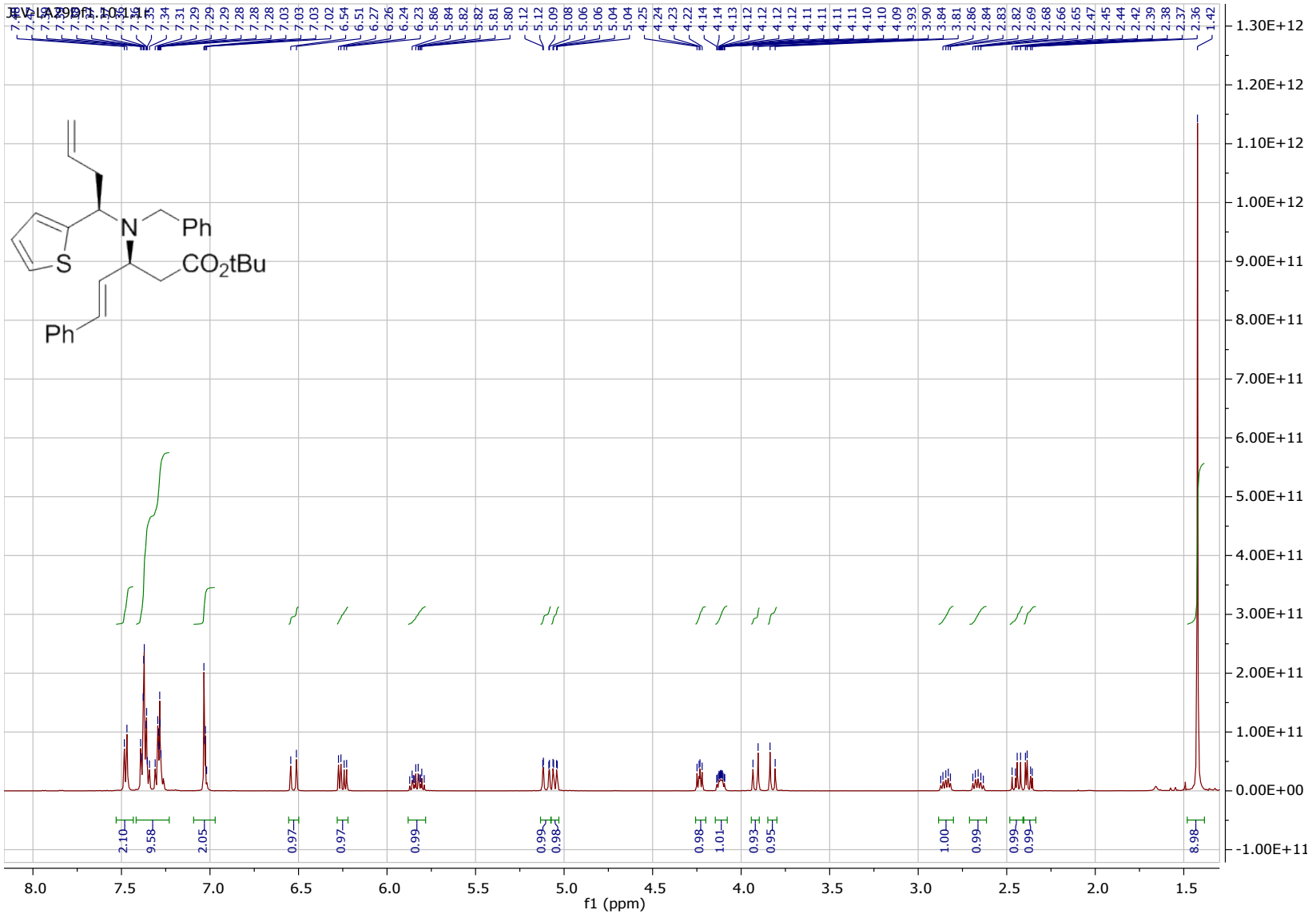

JLV-JR16f1bis.11.1.1r
171.41
158.68
141.66
140.64
136.03
132.72
131.38
130.57
129.48
128.33
128.27
127.29
121.01
116.69
113.78
80.49
61.51
58.66
55.39
50.09
37.62
35.68
27.99
OMe
N
Br
Ph
CO2tBu
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

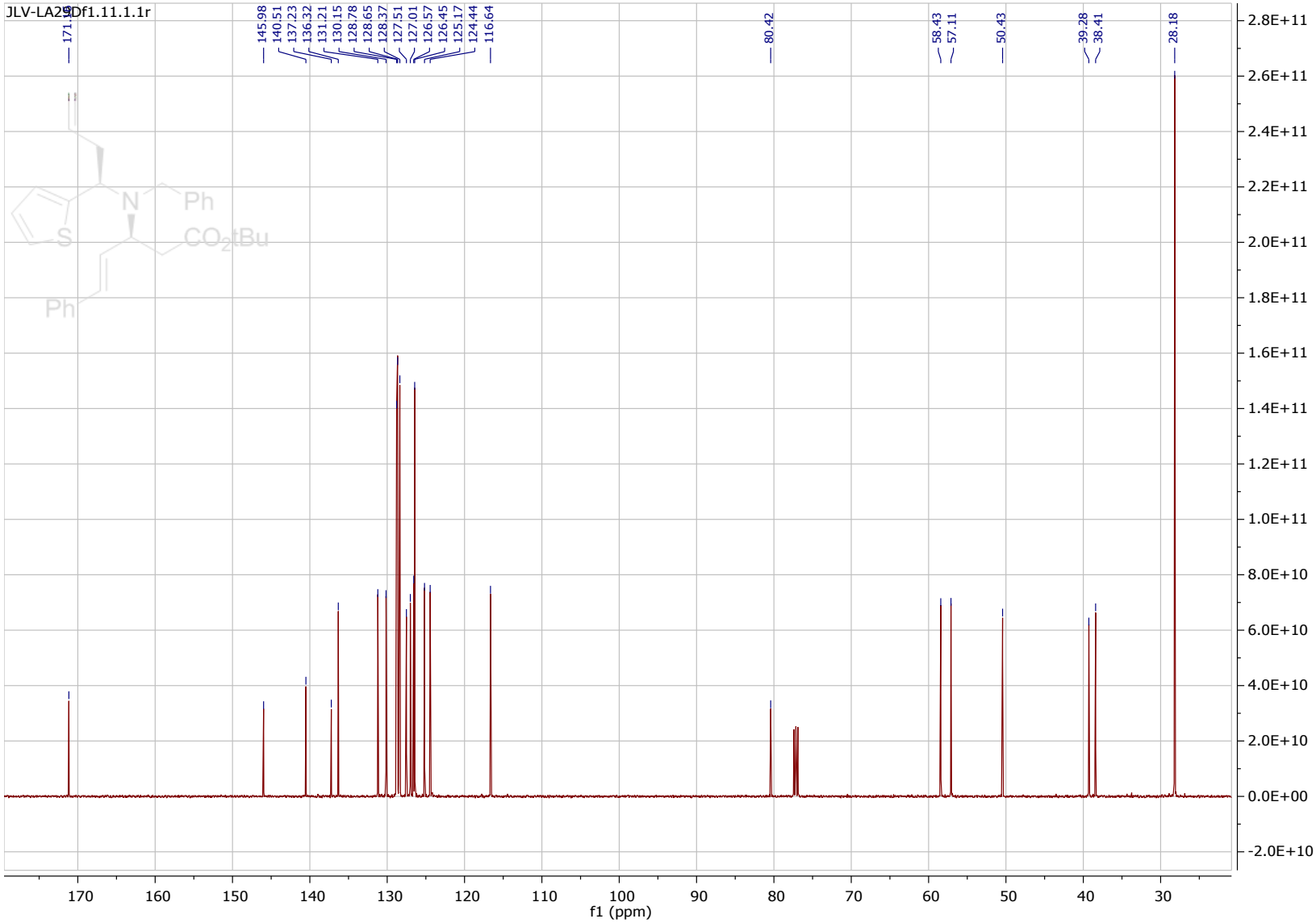
(±)-(*S*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-(thiophen-2-yl)but-3-en-1-yl]amino}-3-phenylpropanoate 3h



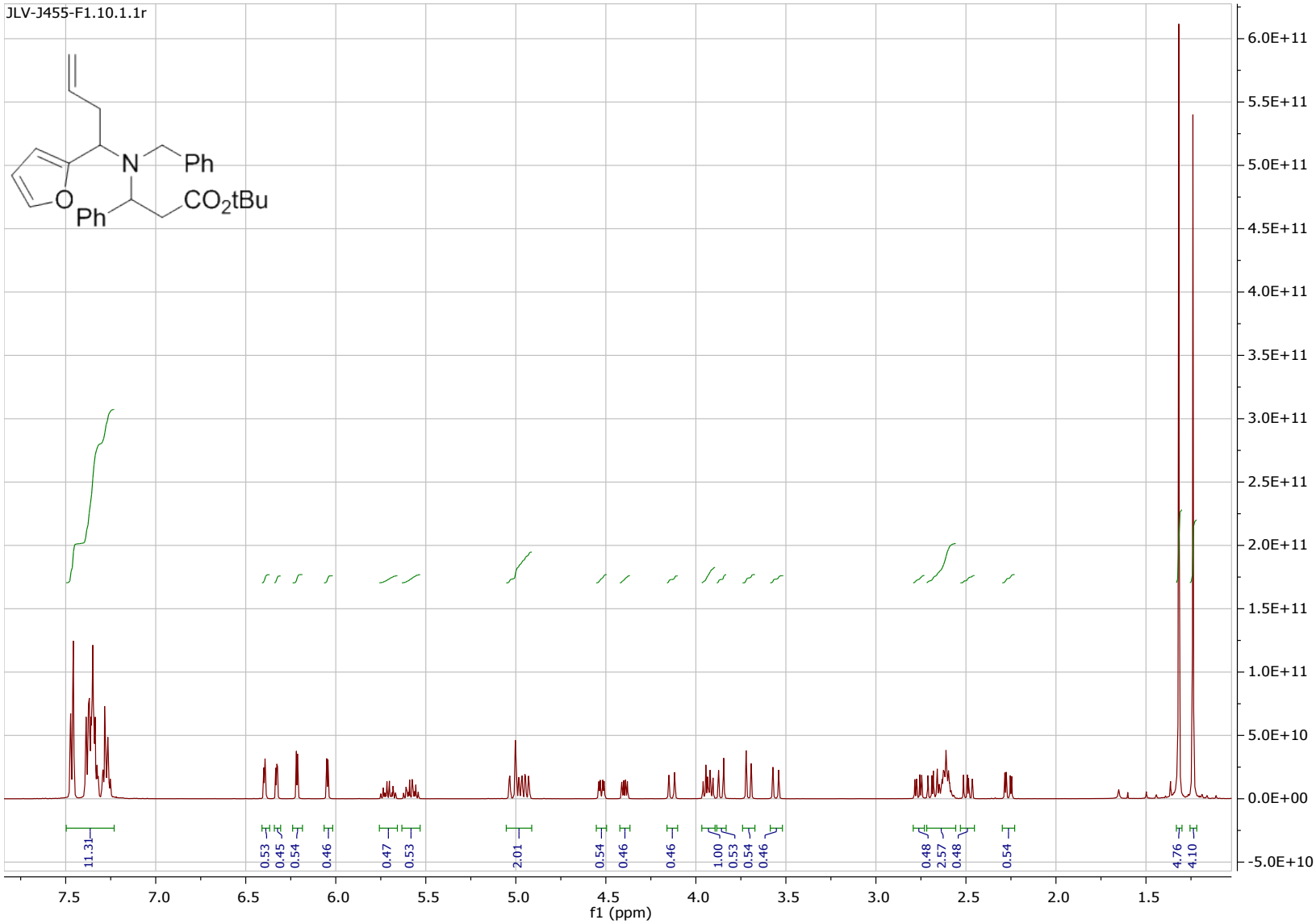

JLV-J458-F1-500MHz.11.1.1r
171.15
146.43
141.33
140.52
136.21
128.71
128.48
128.35
128.24
127.31
126.99
126.56
125.11
124.47
116.55
80.30
59.01
57.39
50.85
38.08
37.42
27.93
N
Ph
S
Ph
CO2tBu
f1 (ppm)

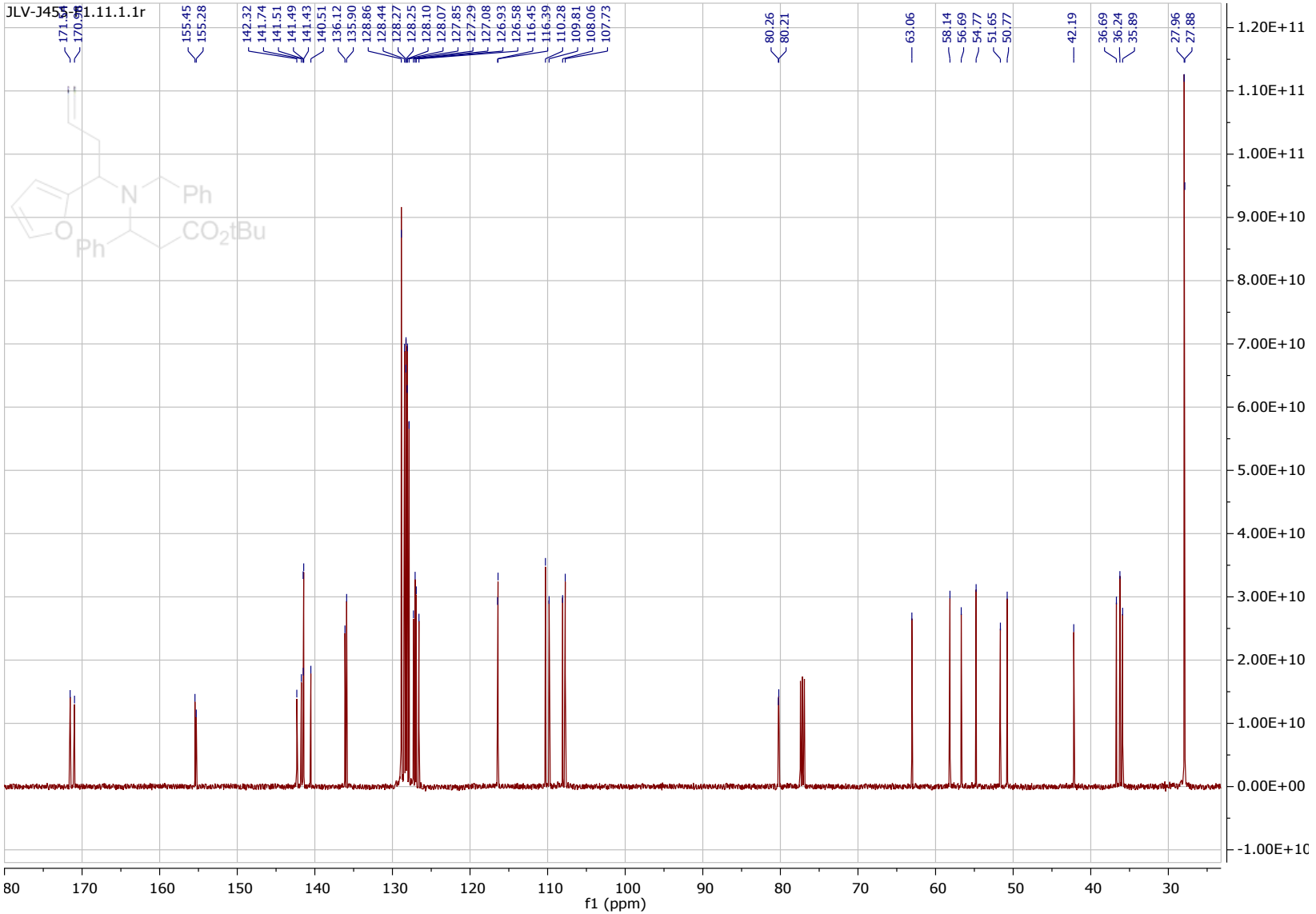
(±)-(*S,E*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-(thiophen-2-yl)but-3-en-1-yl]amino}-5-phenylpent-4-enoate 3i



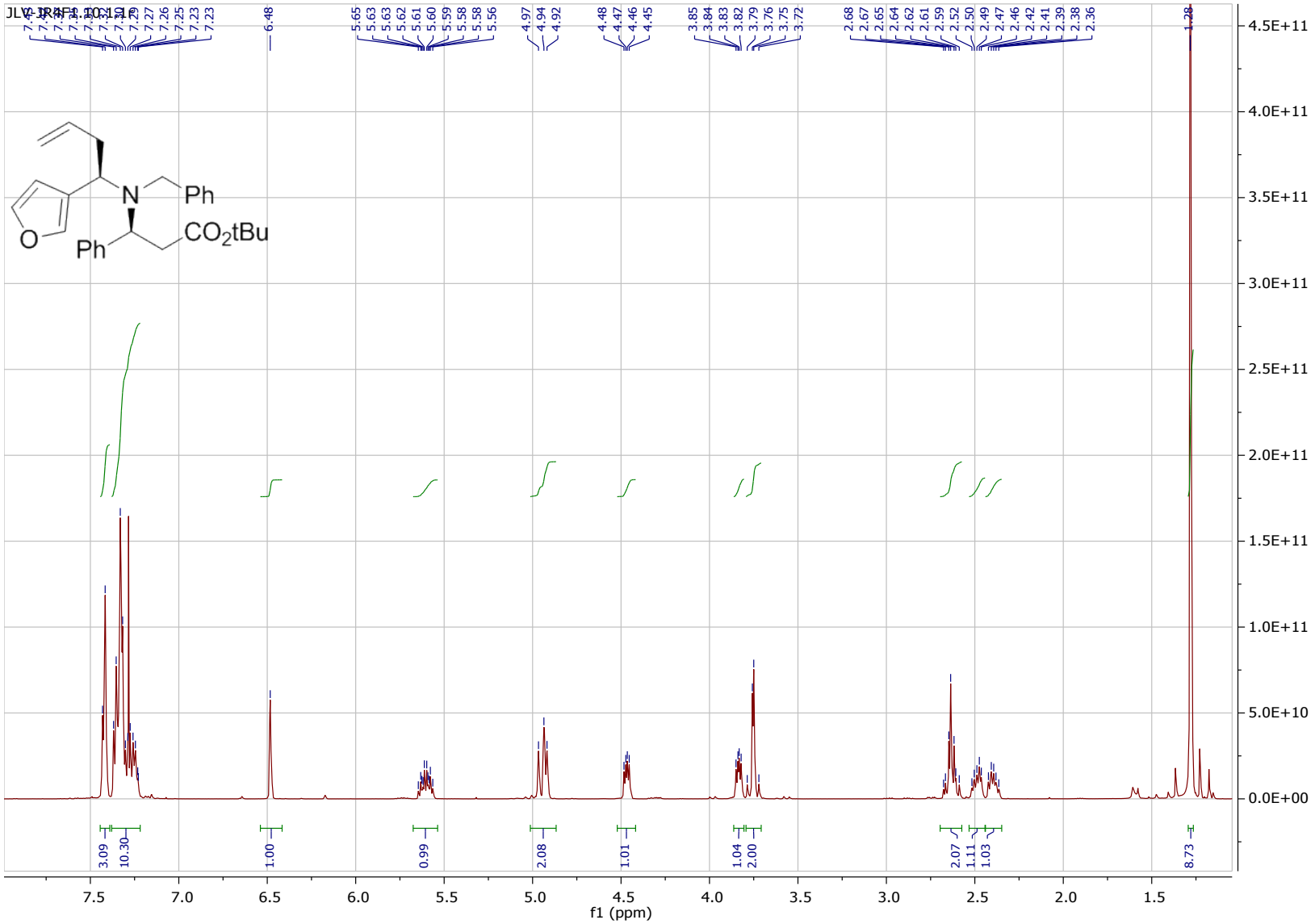

JLV-LA29Df1.11.1.1r
171.19
145.98
140.51
137.23
136.32
131.21
130.15
128.78
128.65
128.37
127.51
127.01
126.57
126.45
125.17
124.44
116.64
80.42
58.43
57.11
50.43
39.28
38.41
28.18
N
Ph
S
CO2tBu
Ph
2.8E+11
2.6E+11
2.4E+11
2.2E+11
2.0E+11
1.8E+11
1.6E+11
1.4E+11
1.2E+11
1.0E+11
8.0E+10
6.0E+10
4.0E+10
2.0E+10
0.0E+00
-2.0E+10
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

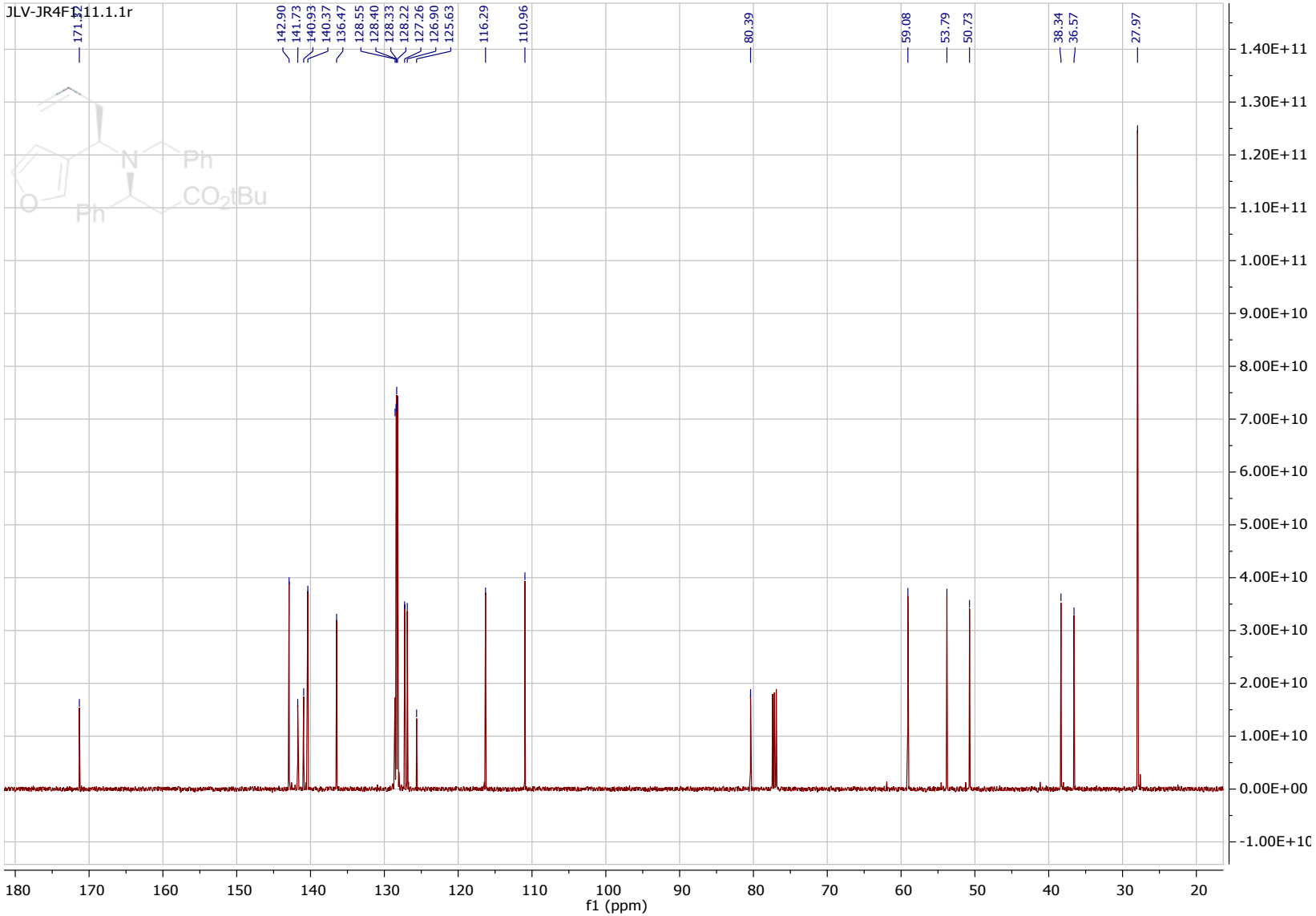
Tert-Butyl 3-{benzyl[-1-(furan-2-yl)but-3-en-1-yl]amino}-3-phenylpropanoate 3j



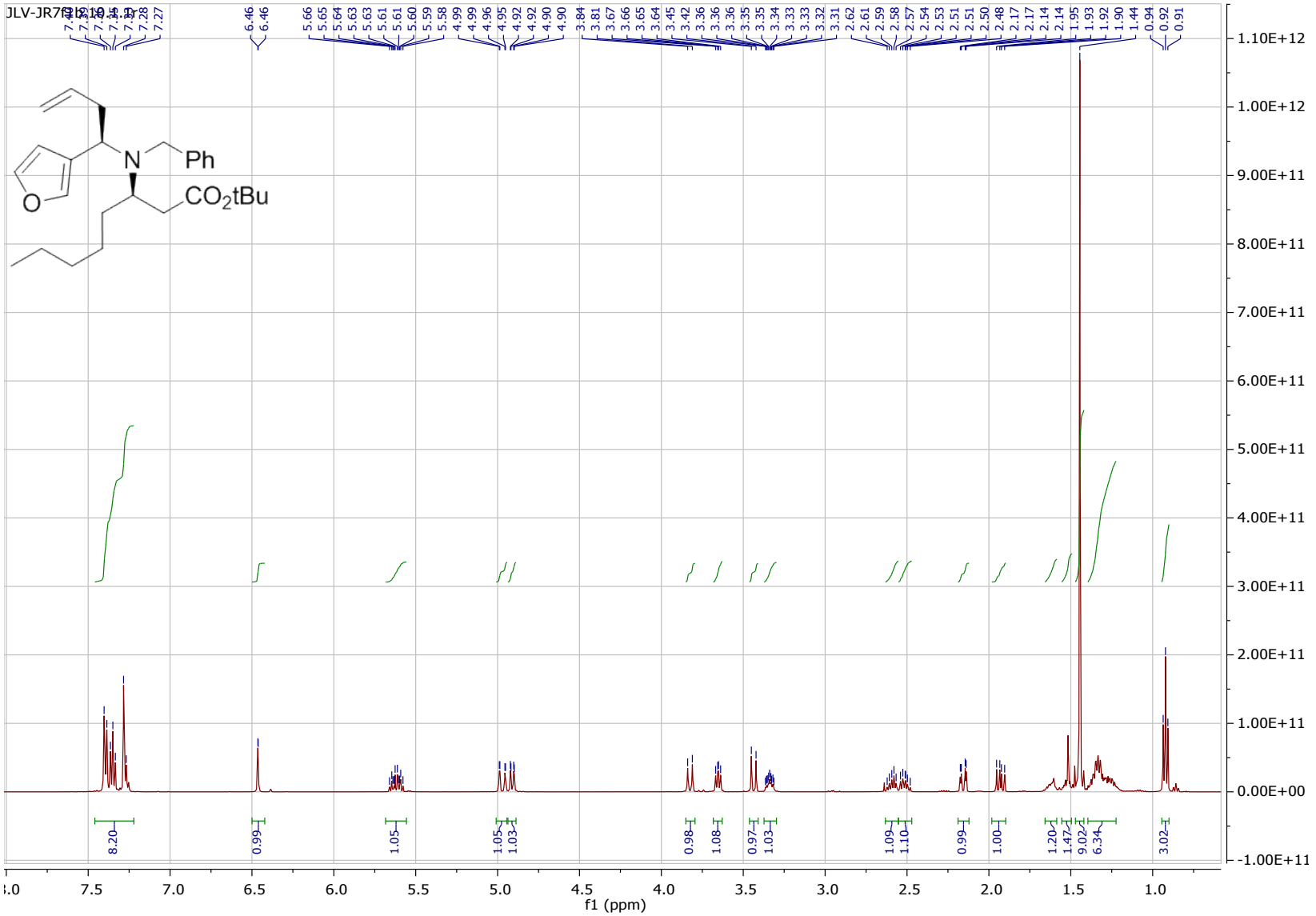

JLV-J455-f1.11.1.1r
171.54
170.97
155.45
155.28
142.32
141.74
141.51
141.49
141.43
140.51
136.12
135.90
128.86
128.44
128.27
128.25
128.10
128.07
127.85
127.29
127.08
126.93
126.58
116.45
116.39
110.28
109.81
108.06
107.73
80.26
80.21
63.06
58.14
56.69
54.77
51.65
50.77
42.19
36.69
36.24
35.89
27.96
27.88
N
Ph
O
Ph
CO2tBu
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
80
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
f1 (ppm)

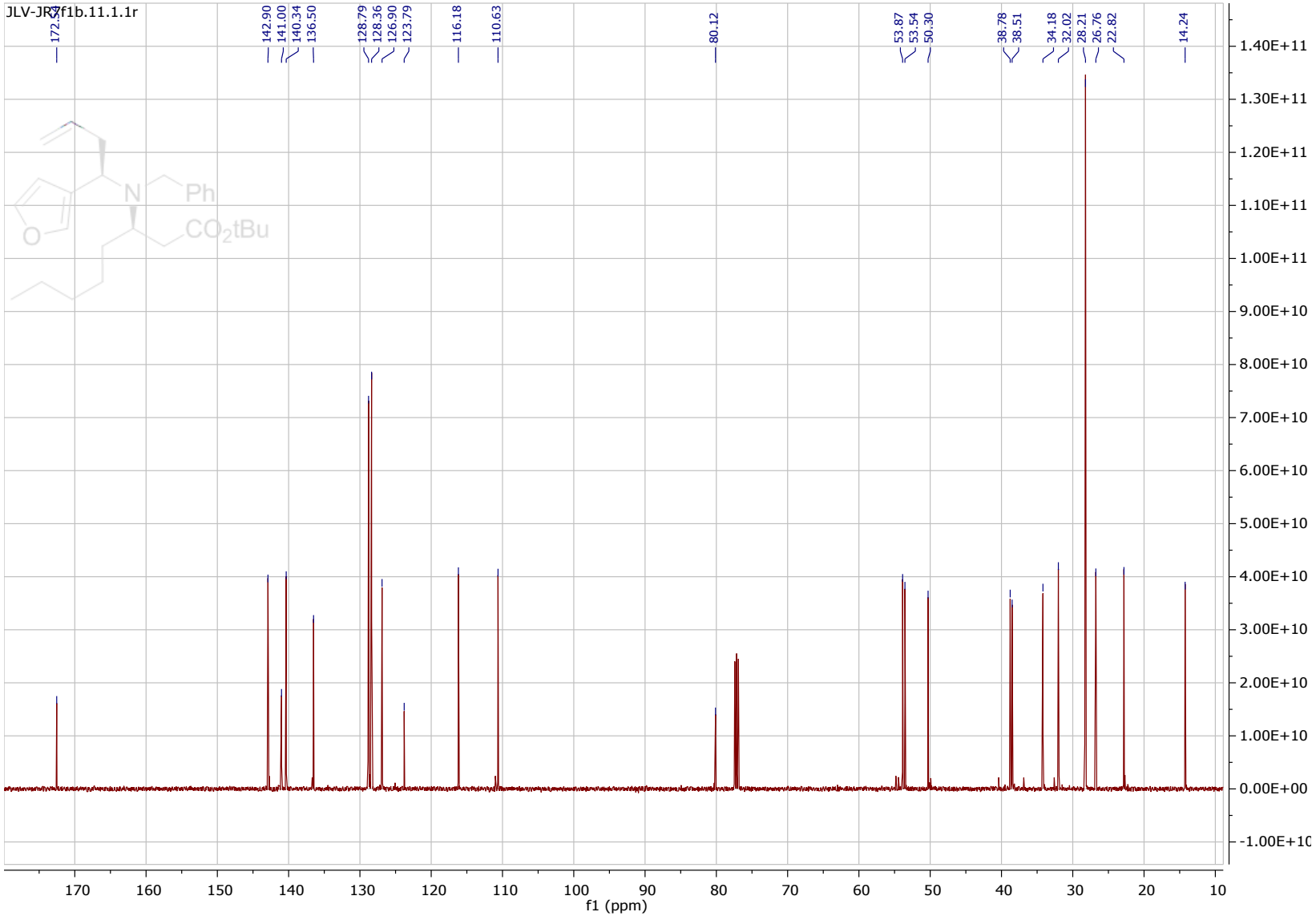
(±)-(S)-*Tert*-Butyl 3-{benzyl[(*R*)-1-(furan-3-yl)but-3-en-1-yl]amino}-3-phenylpropanoate 3k



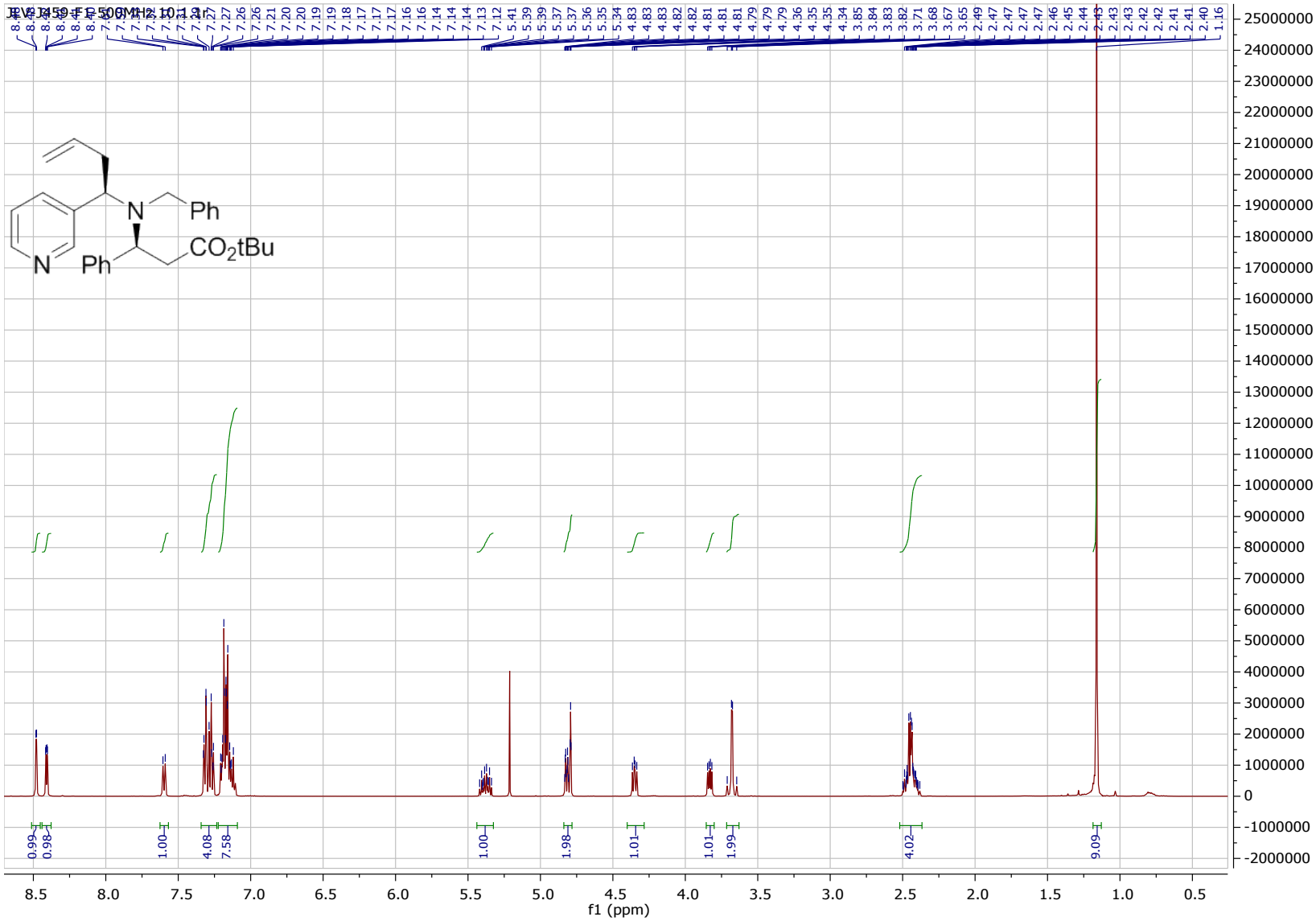

JLV-JR4F1_11.1.1r
171.12
142.90
141.73
140.93
140.37
136.47
128.55
128.40
128.33
128.22
127.26
126.90
125.63
116.29
110.96
80.39
59.08
53.79
50.73
38.34
36.57
27.97
N
Ph
O
Ph
CO2tBu
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

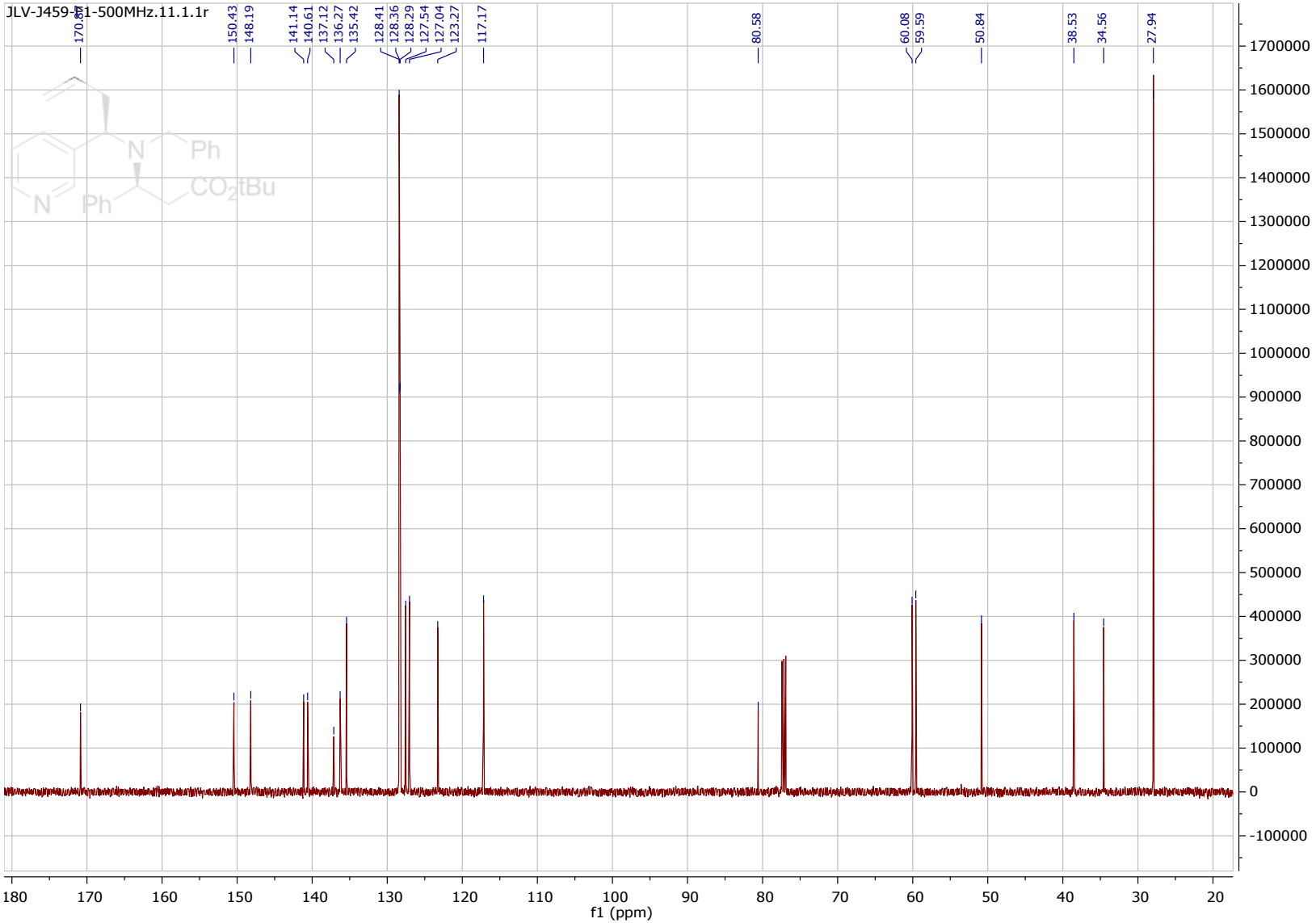
(±)-*(R)-Tert-Butyl* 3-{benzyl[(*R*)-1-(furan-3-yl)but-3-en-1-yl]amino}octanoate 3l



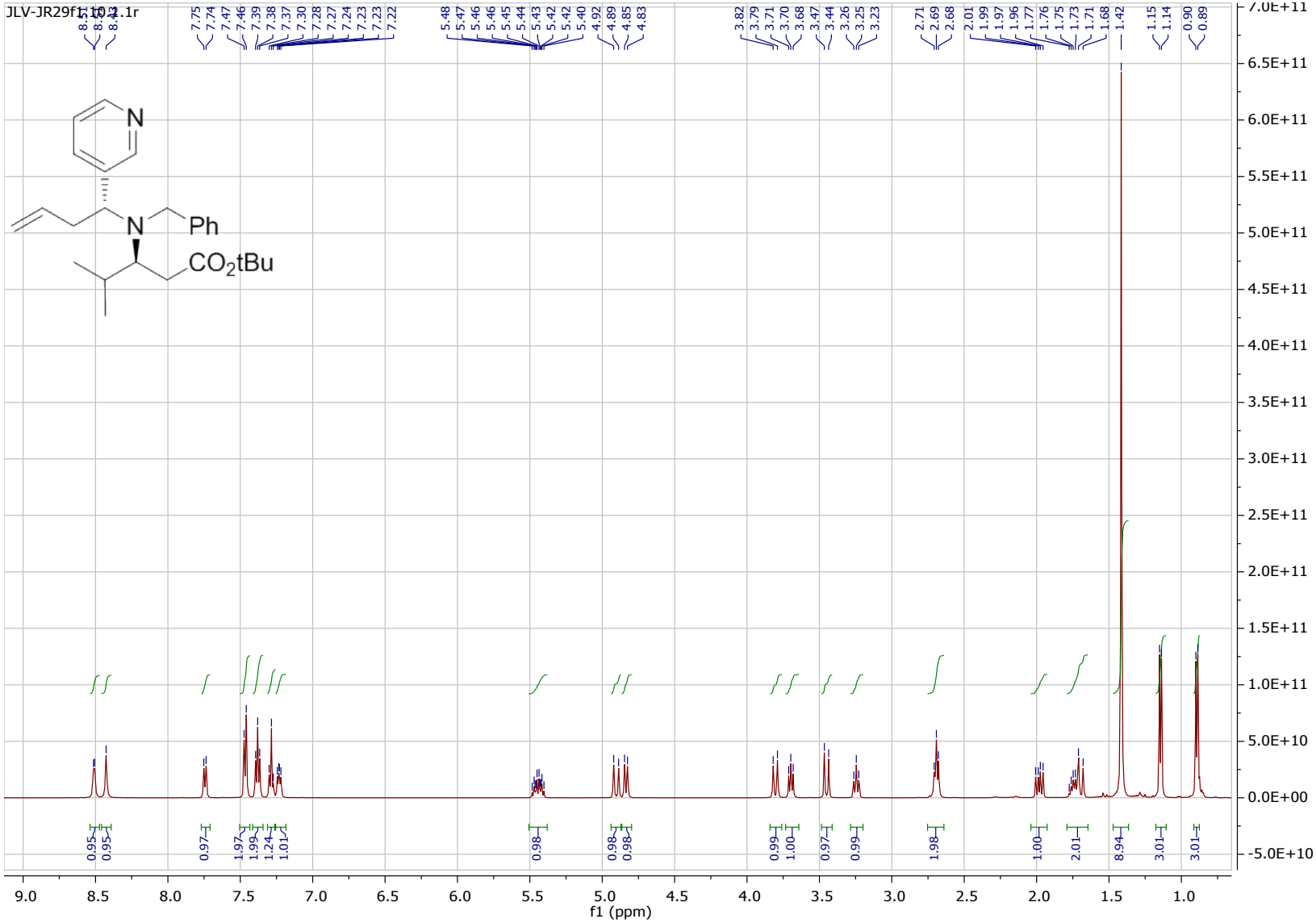

JLV-JR2f1b.11.1.1r
172.52
142.90
141.00
140.34
136.50
128.79
128.36
126.90
123.79
116.18
110.63
80.12
53.87
53.54
50.30
38.78
38.51
34.18
32.02
28.21
26.76
22.82
14.24
N
Ph
CO2tBu
O
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

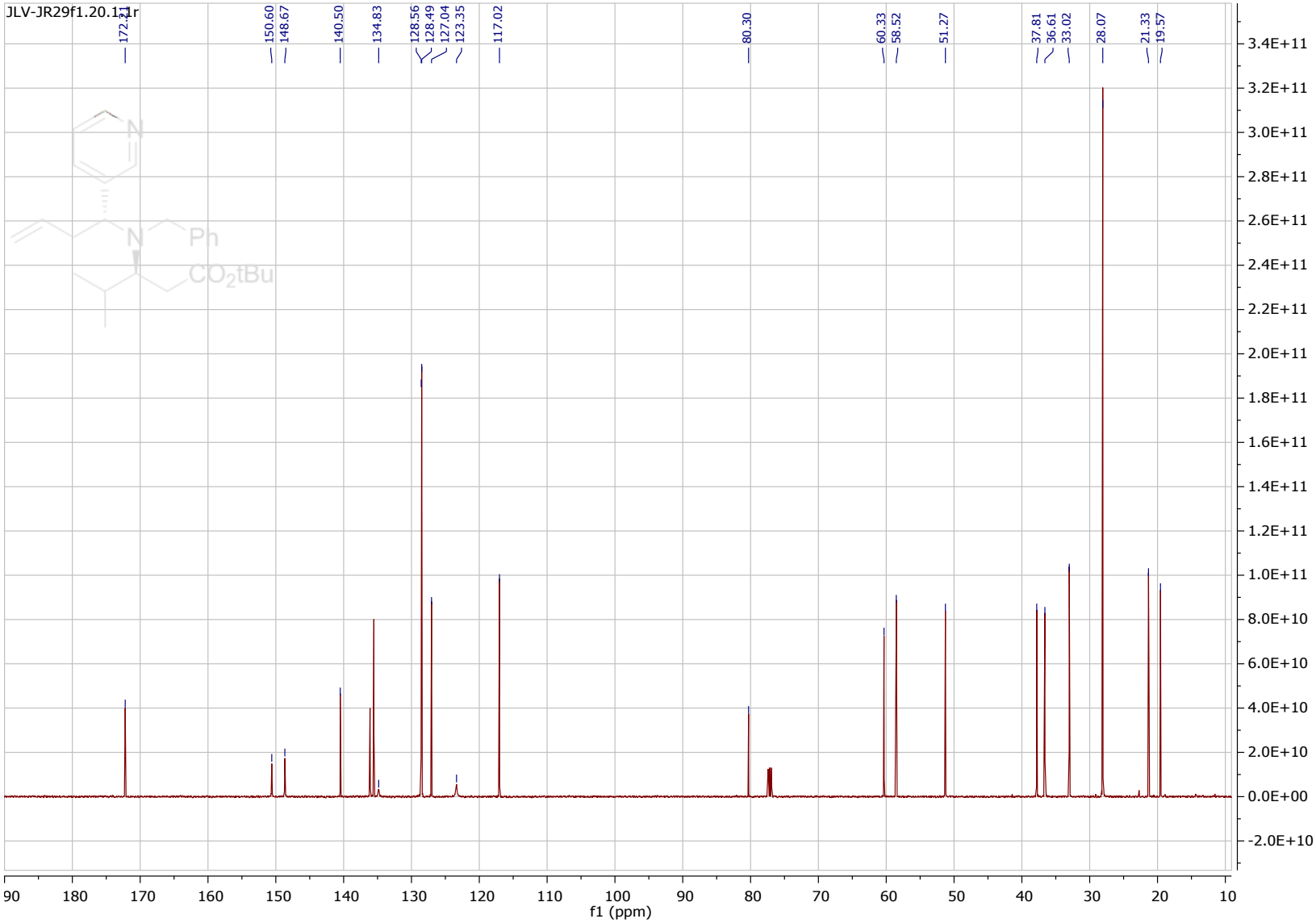
(±)-(*S*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-(pyridin-3-yl)but-3-en-1-yl]amino}-3-phenylpropanoate 3m



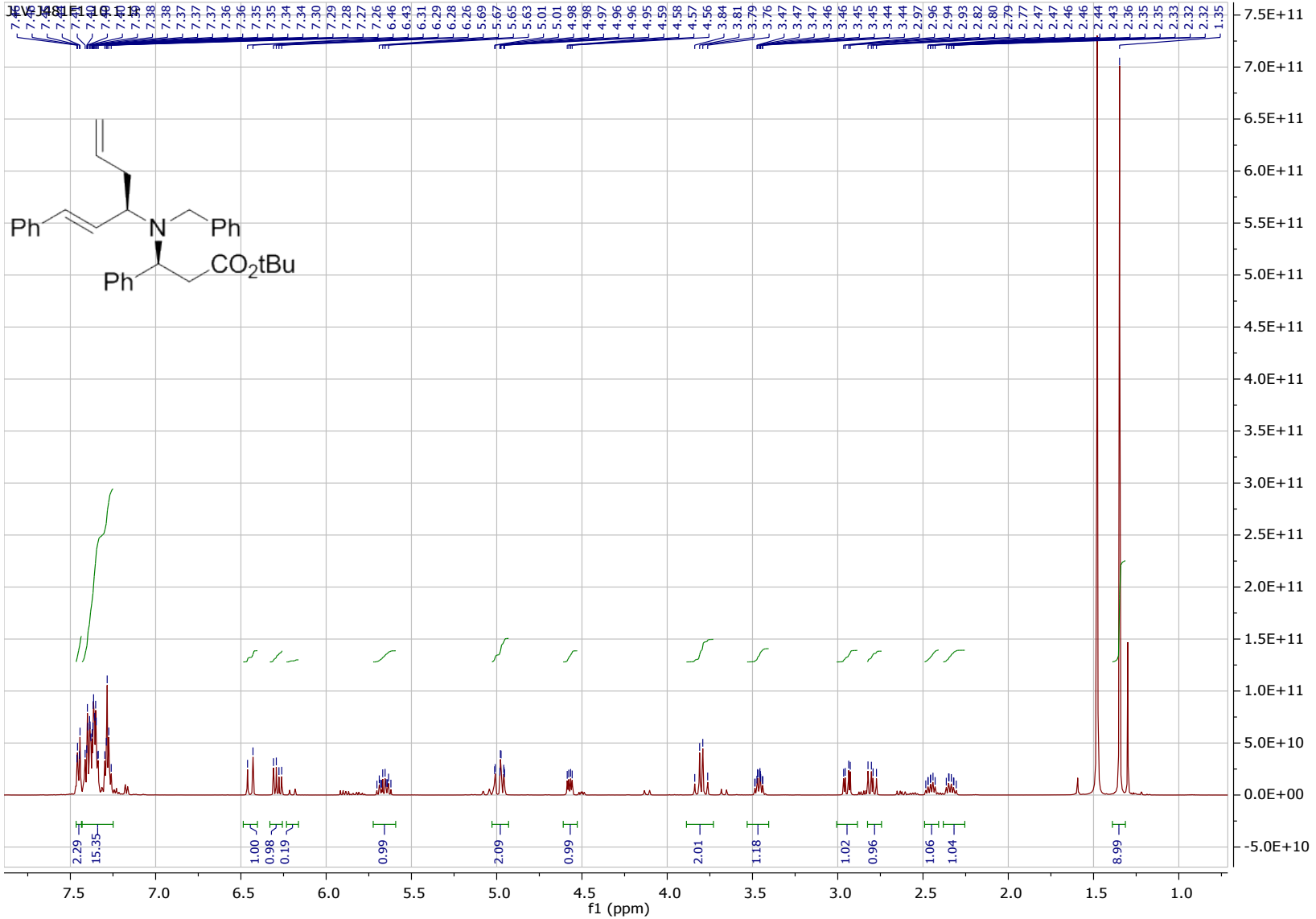

JLV-J459-f1-500MHz.11.1.1r
170.86
150.43
148.19
141.14
140.61
137.12
136.27
135.42
128.41
128.36
128.29
127.54
127.04
123.27
117.17
80.58
60.08
59.59
50.84
38.53
34.56
27.94
N
Ph
N
Ph
CO2tBu
1700000
1600000
1500000
1400000
1300000
1200000
1100000
1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
-100000
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

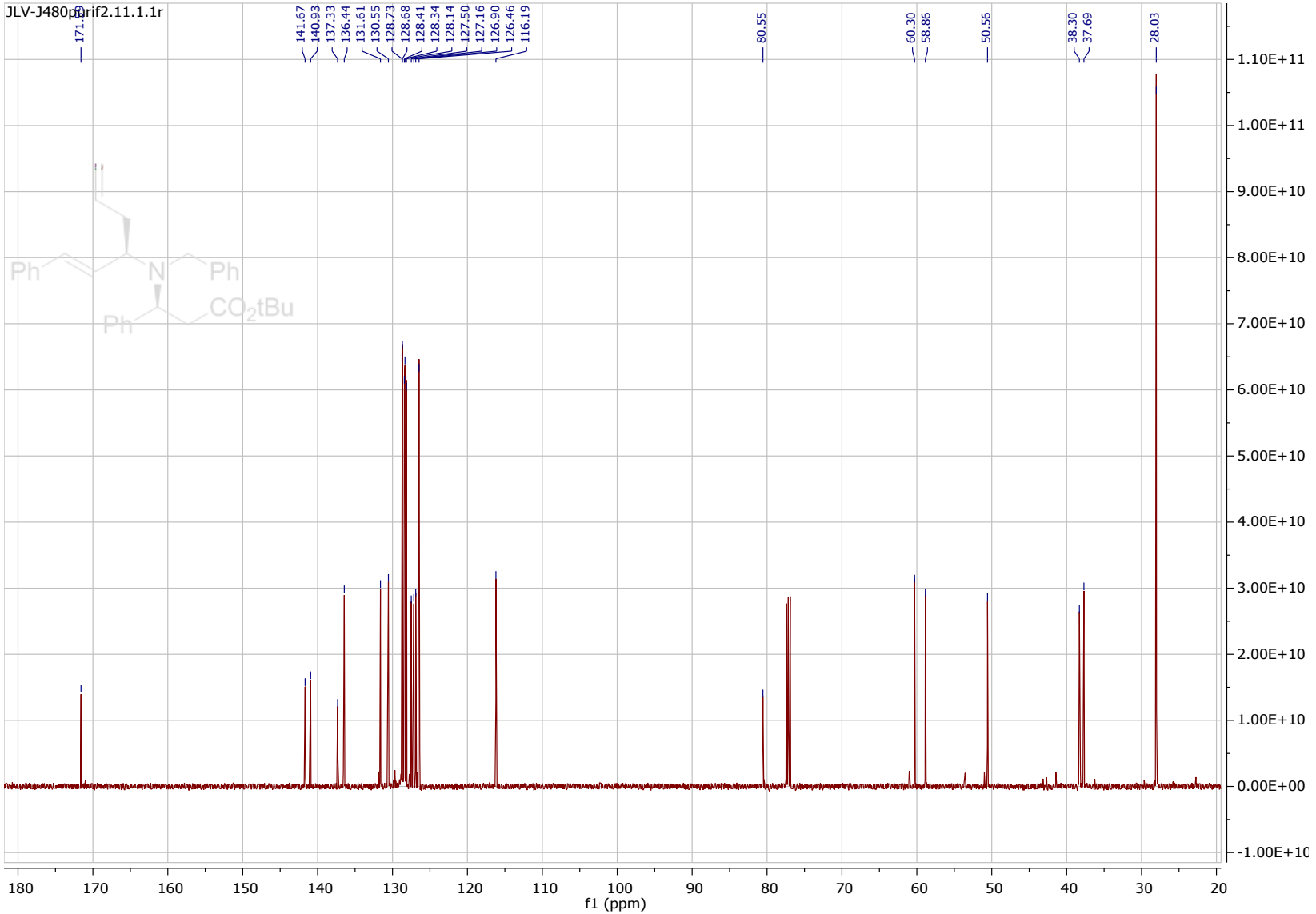
(±)-(*S*)-*Tert-Butyl* 3-{benzyl[(*R*)-1-(pyridin-3-yl)but-3-en-1-yl]amino}-4-methylpentanoate 3n



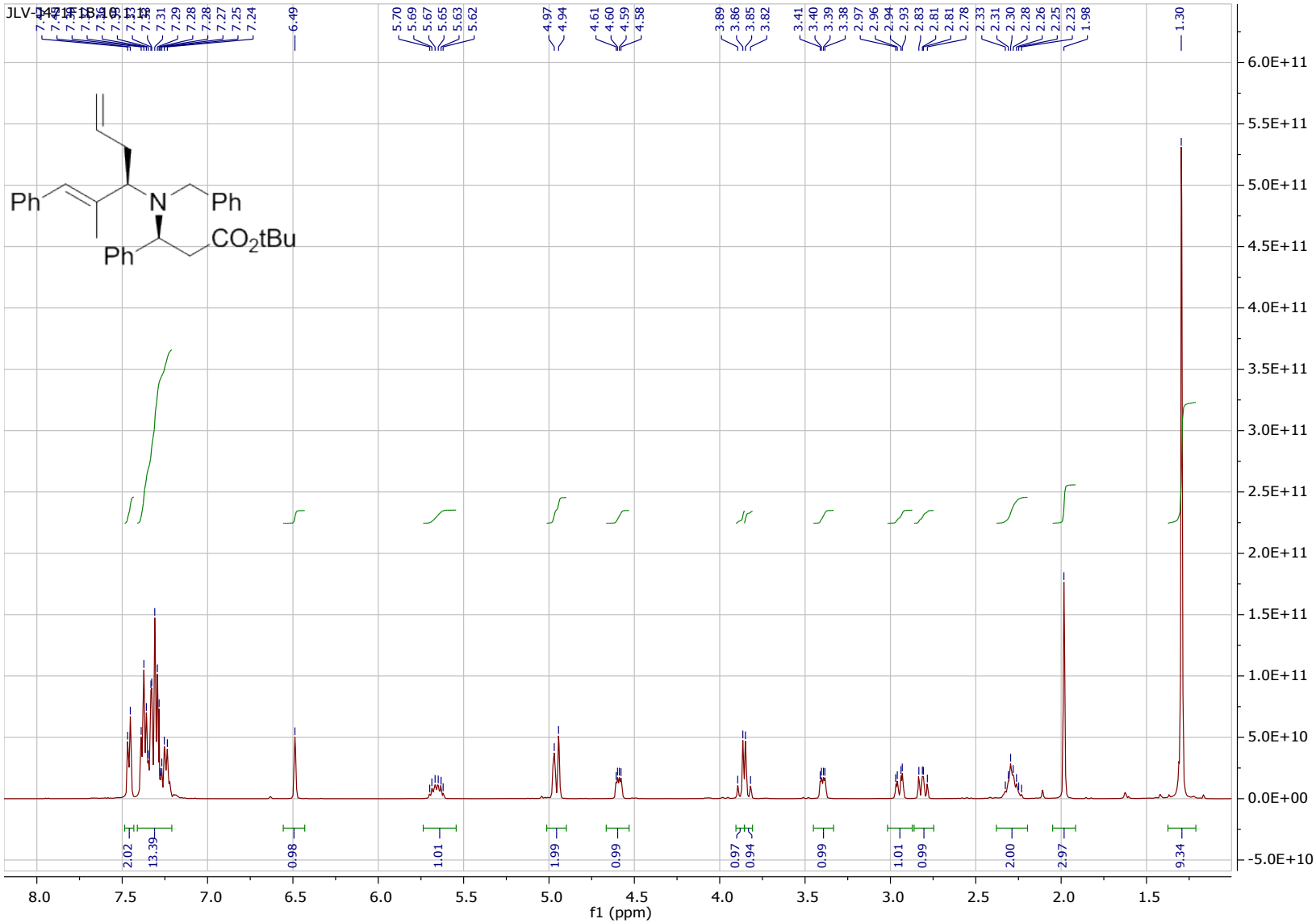

JLV-JR29f1.20.1.1r
172.21
150.60
148.67
140.50
134.83
128.56
128.49
127.04
123.35
117.02
80.30
60.33
58.52
51.27
37.81
36.61
33.02
28.07
21.33
19.57
N
N
Ph
CO2tBu
3.4E+11
3.2E+11
3.0E+11
2.8E+11
2.6E+11
2.4E+11
2.2E+11
2.0E+11
1.8E+11
1.6E+11
1.4E+11
1.2E+11
1.0E+11
8.0E+10
6.0E+10
4.0E+10
2.0E+10
0.0E+00
-2.0E+10
90 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
f1 (ppm)

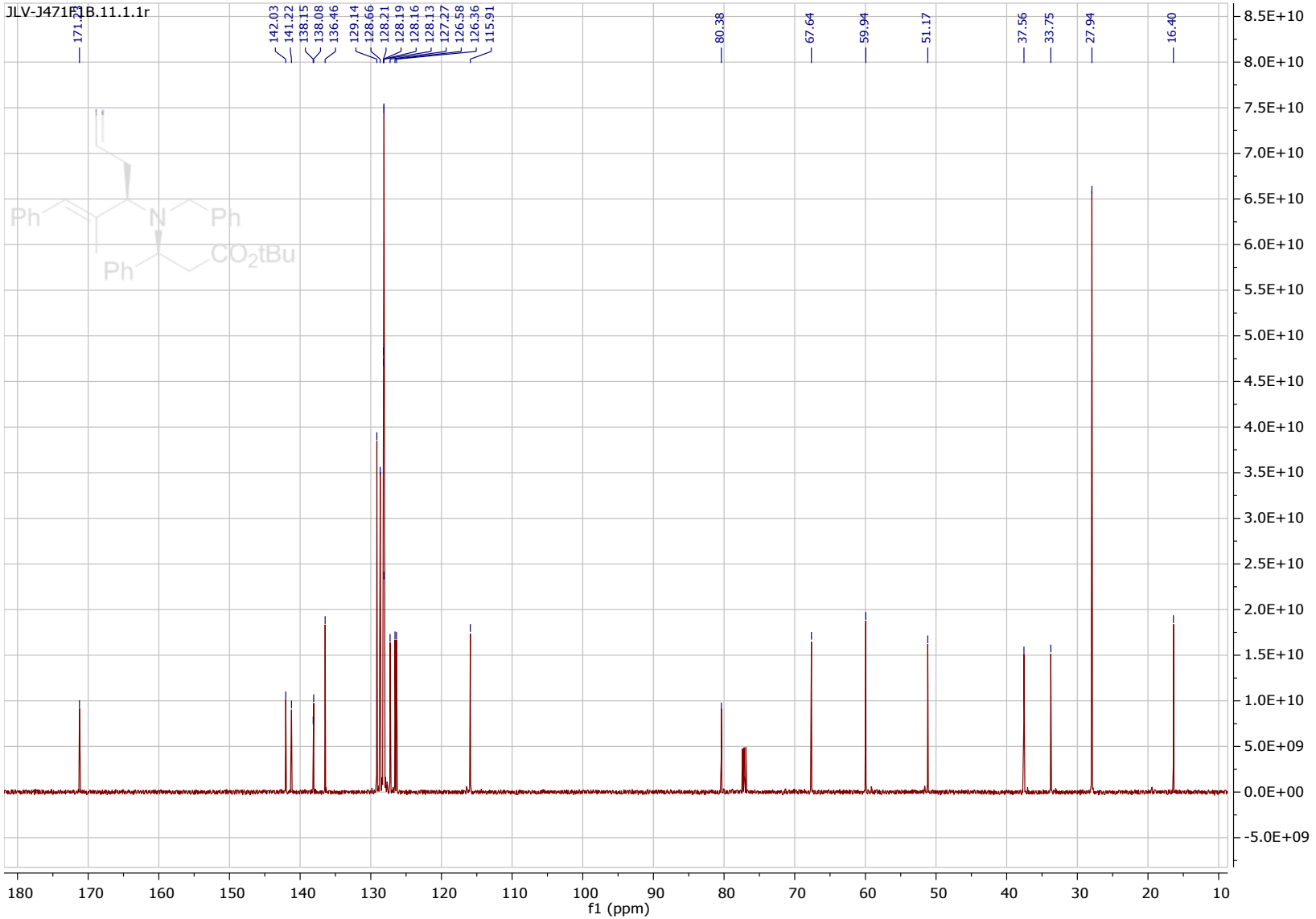
(±)-(*S*)-*Tert*-Butyl 3-{benzyl[(*R*,*E*)-1-phenylhexa-1,5-dien-3-yl]amino}-3-phenylpropanoate 3o



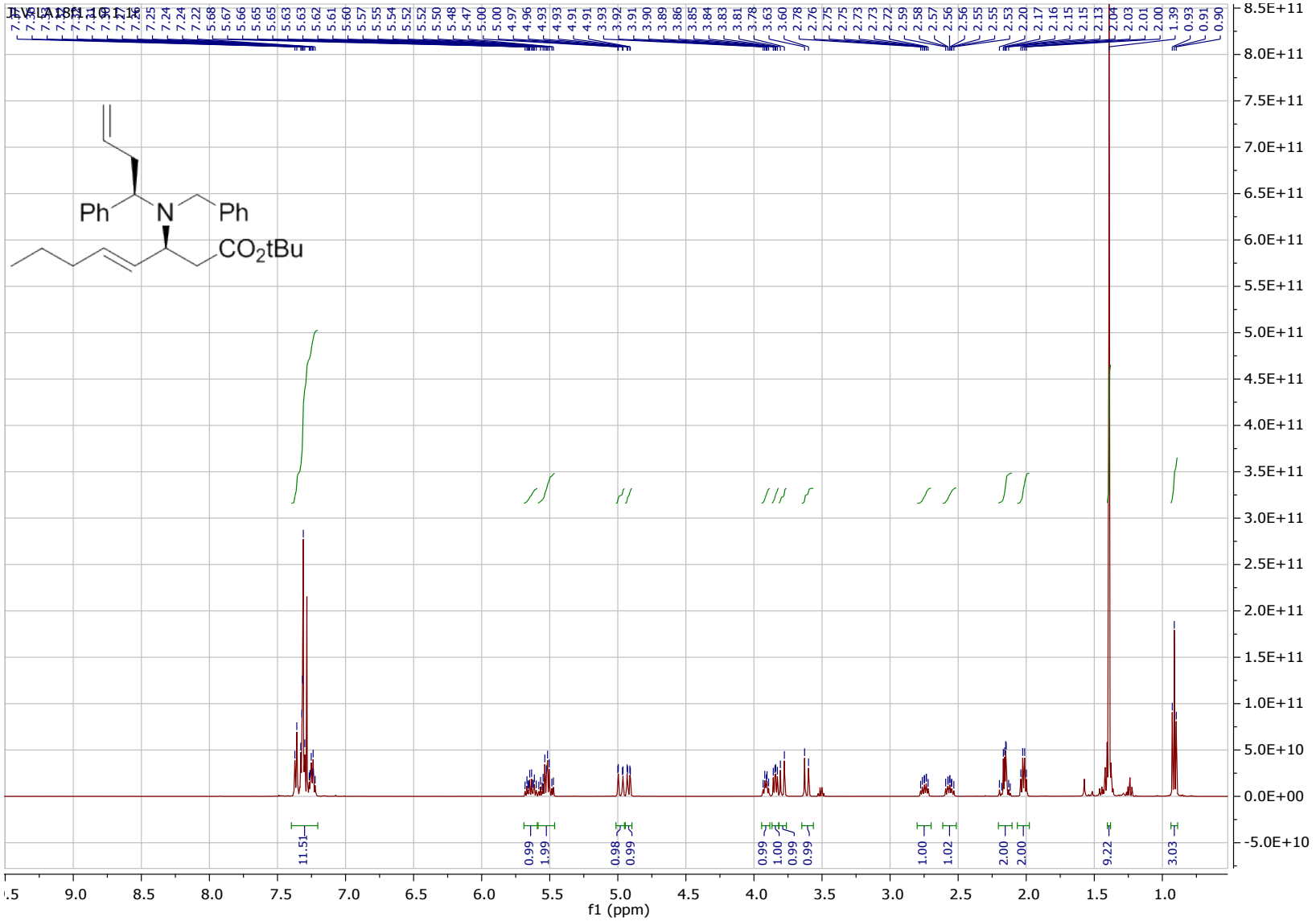

JLV-J480purif2.11.1.1r
171.49
141.67
140.93
137.33
136.44
131.61
130.55
128.73
128.68
128.41
128.34
128.14
127.50
127.16
126.90
126.46
116.19
80.55
60.30
58.86
50.56
38.30
37.69
28.03
Ph
N
Ph
Ph
CO2tBu
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

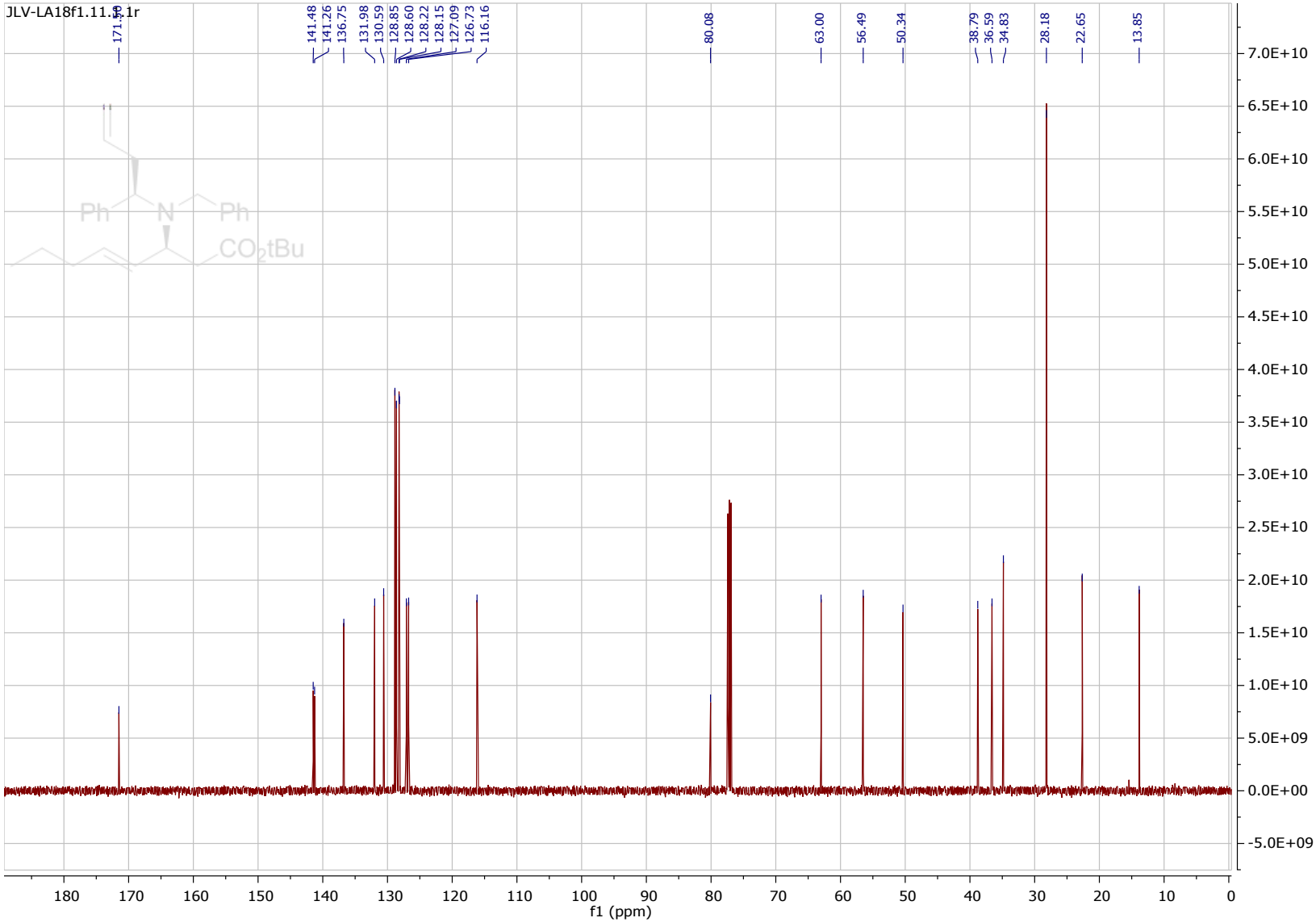
(±)-(*S*)-*Tert*-Butyl 3-(benzyl((*R,E*)-2-methyl-1-phenylhexa-1,5-dien-3-yl)amino)-3-phenylpropanoate 3p



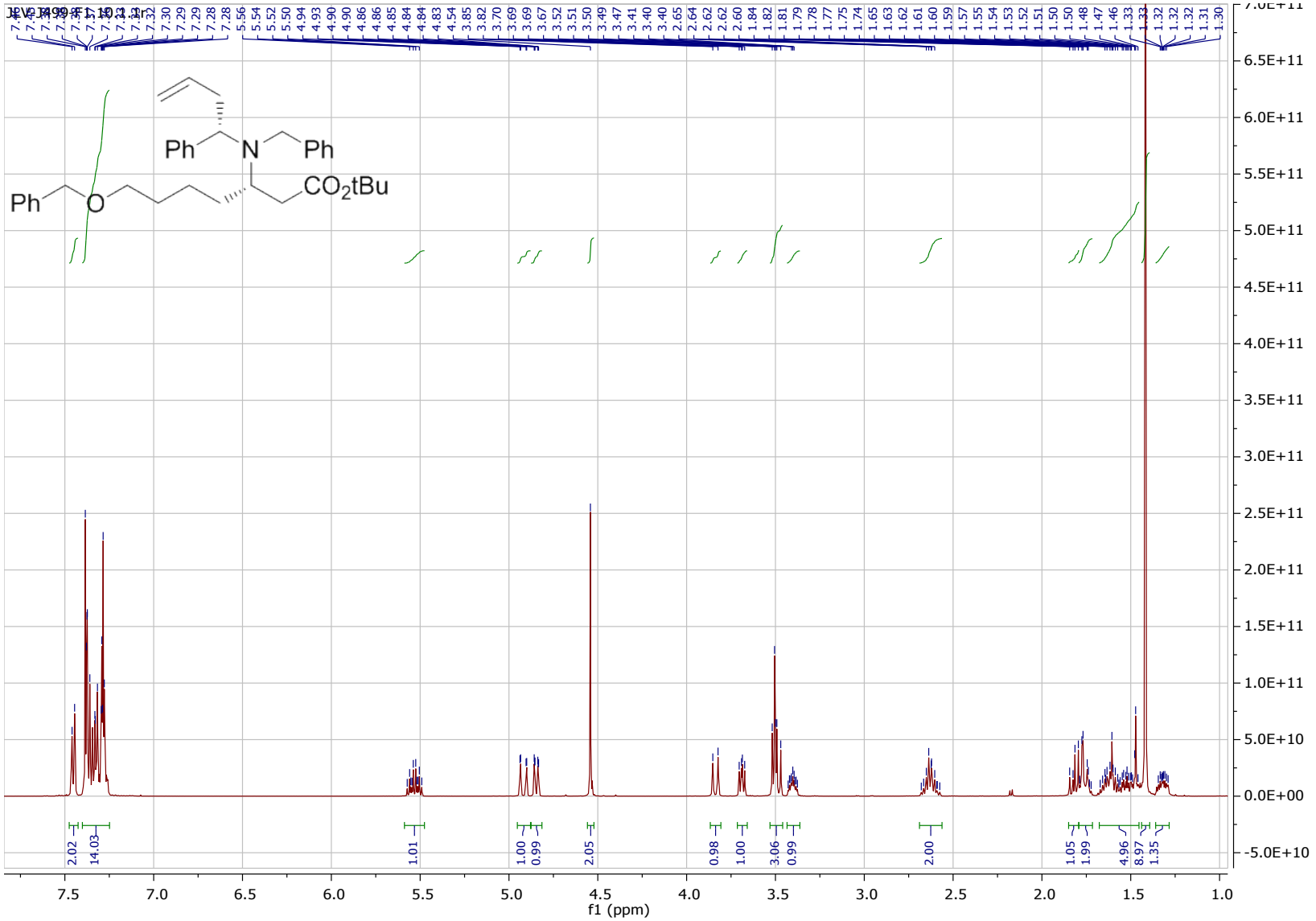


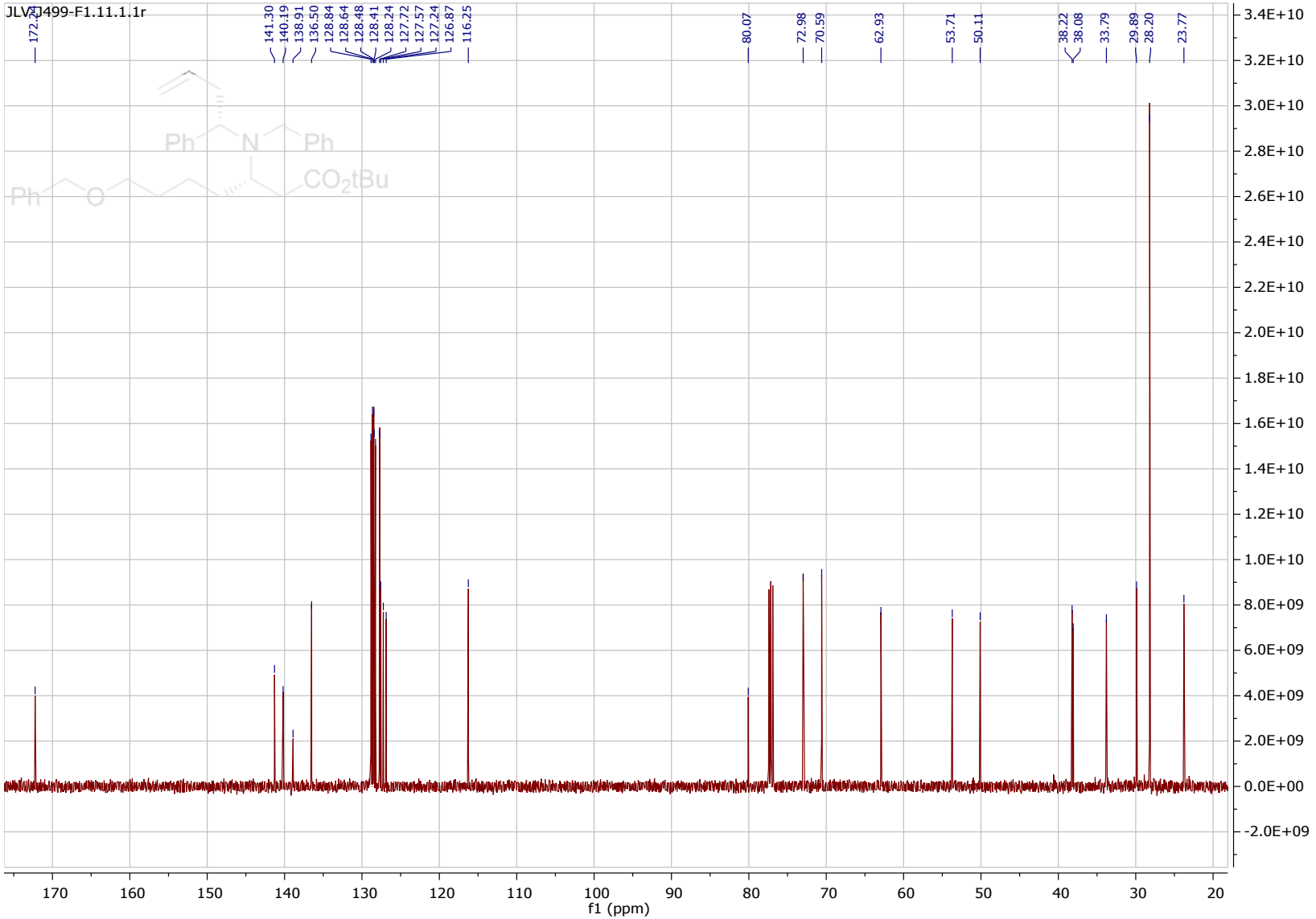
(*S,E*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-phenylbut-3-en-1-yl]amino}oct-4-enoate 3q


Ph
N
Ph
CO2tBu
f1 (ppm)

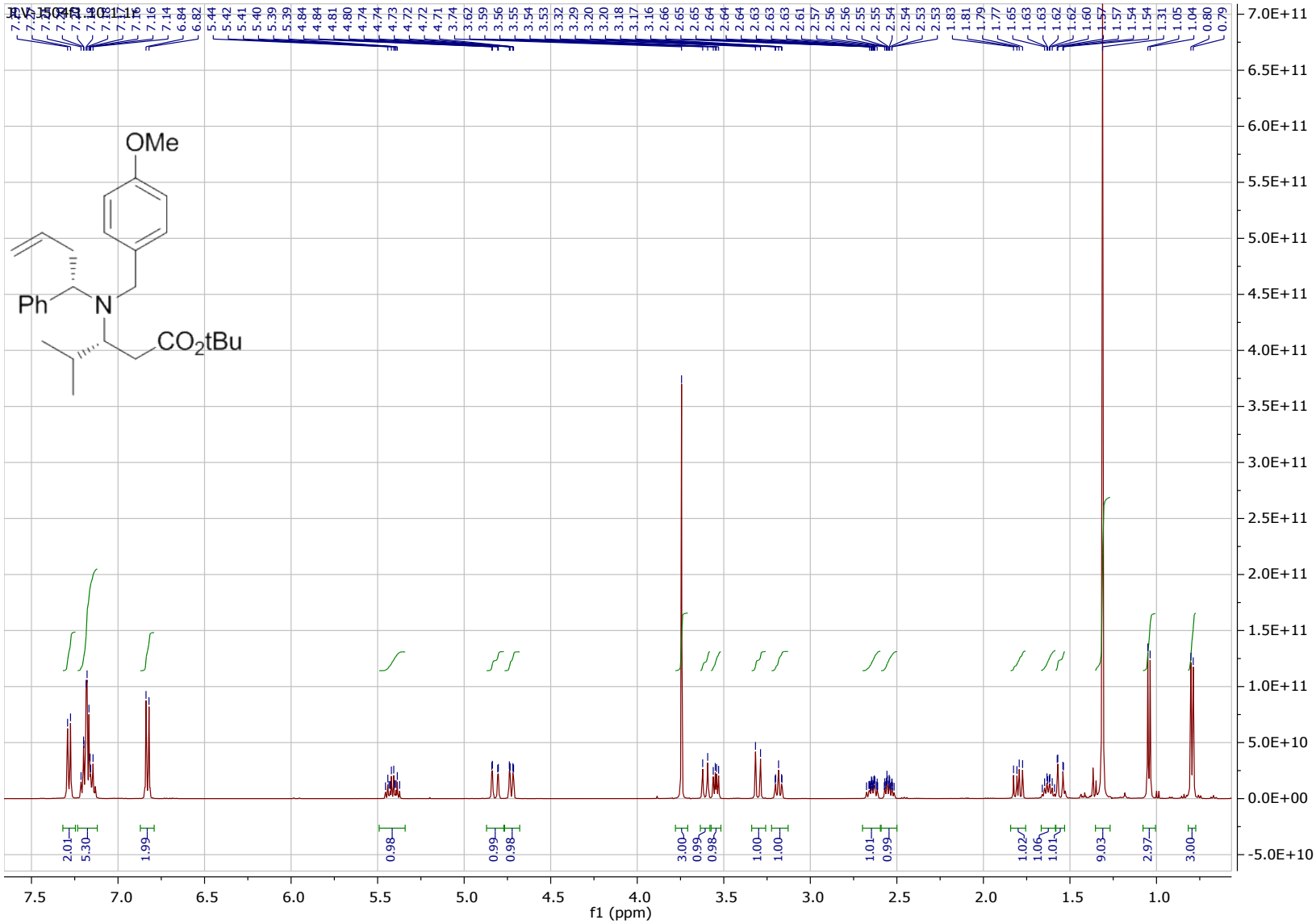

JLV-LA18f1.11.1r
171.59
141.48
141.26
136.75
131.98
130.59
128.85
128.60
128.22
128.15
127.09
126.73
116.16
80.08
63.00
56.49
50.34
38.79
36.59
34.83
28.18
22.65
13.85
Ph
N
Ph
CO2tBu
7.0E+10
6.5E+10
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

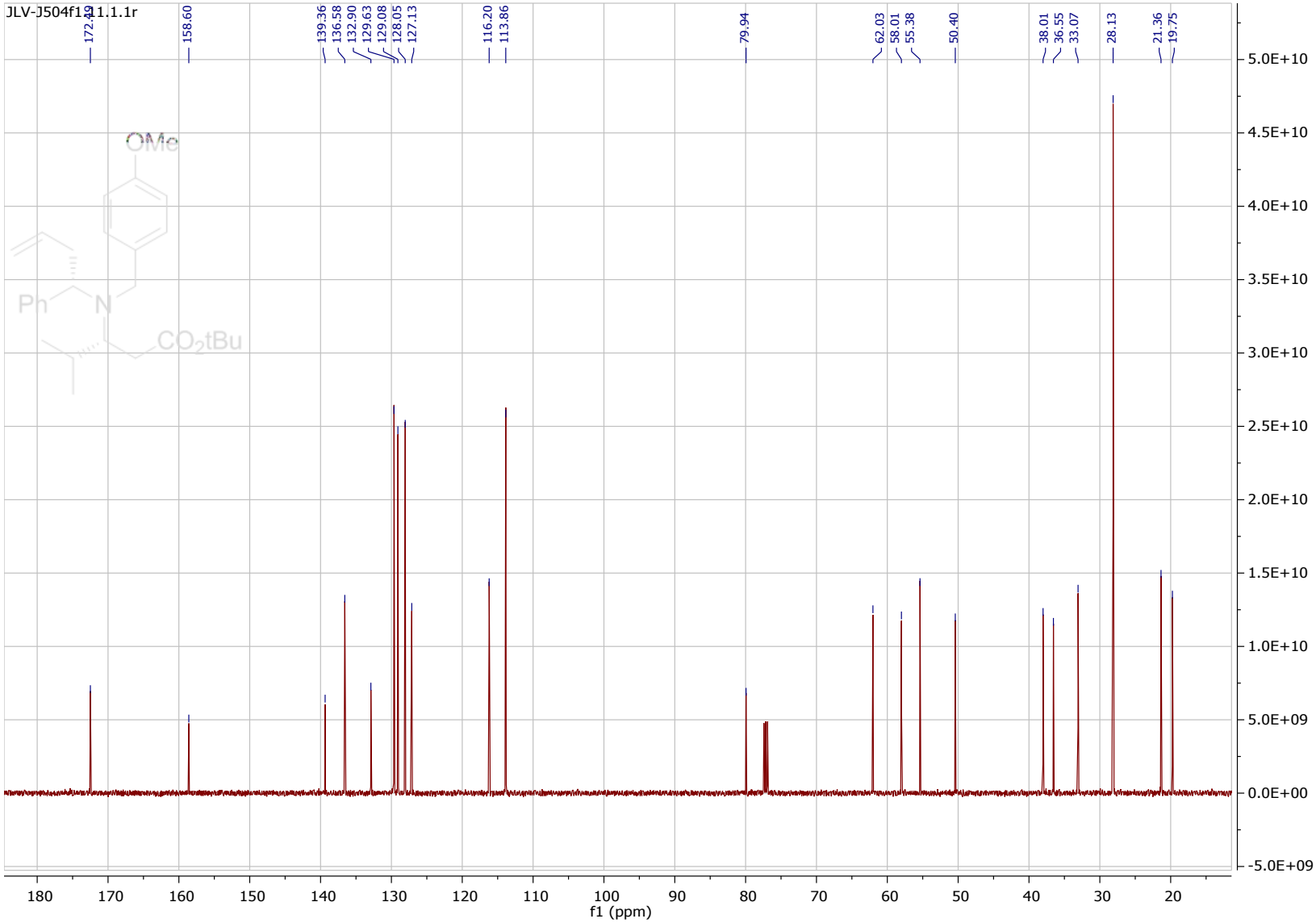
(*S*)-*Tert*-Butyl 3-{benzyl[(*S*)-1-phenylbut-3-en-1-yl]amino}-7-(benzyloxy)heptanoate 3r



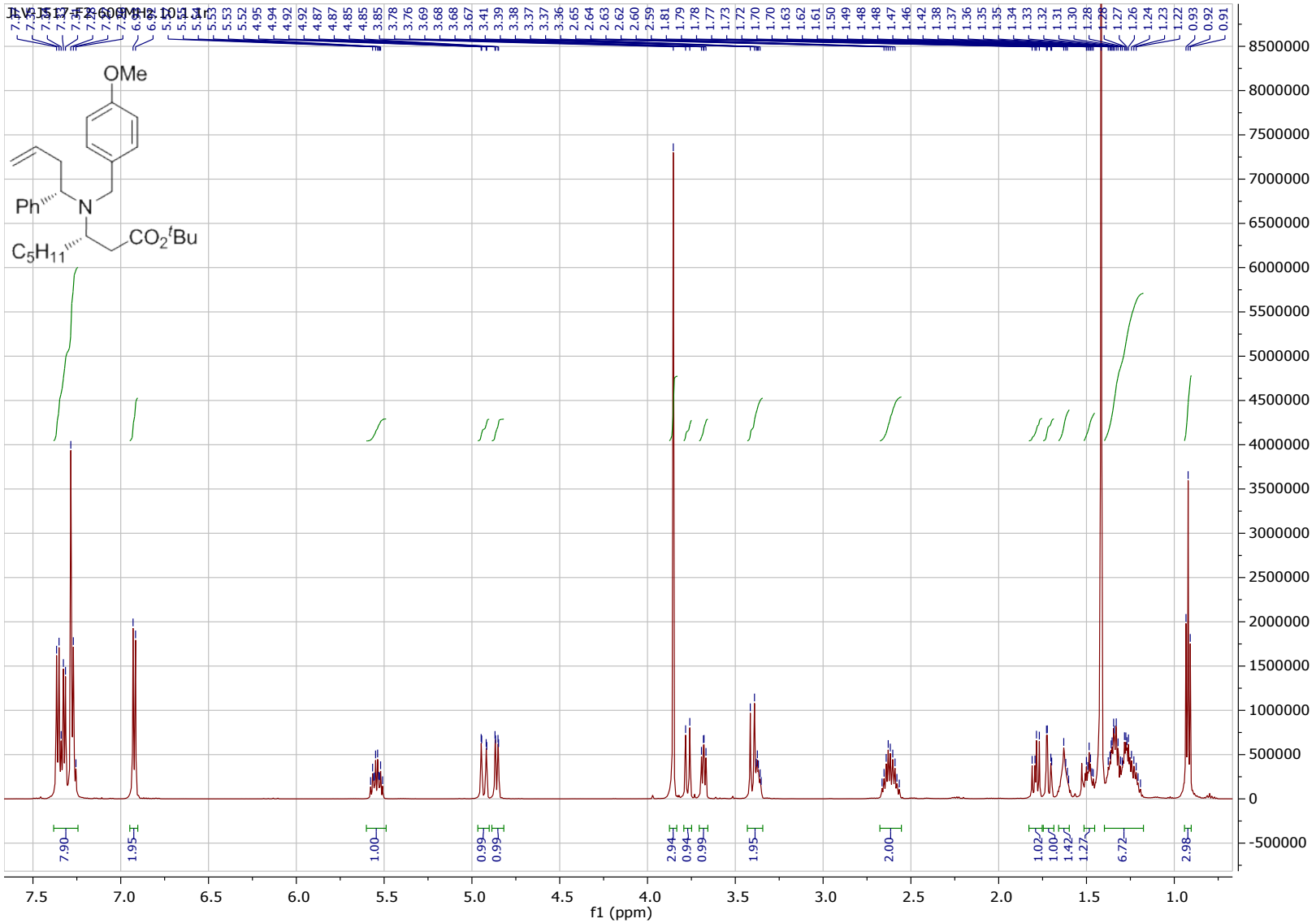

JLV-J499-F1.11.1.1r
172.21
141.30
140.19
138.91
136.50
128.84
128.64
128.48
128.41
128.24
127.72
127.57
127.24
126.87
116.25
80.07
72.98
70.59
62.93
53.71
50.11
38.22
38.08
33.79
29.89
28.20
23.77
Ph
N
Ph
CO2tBu
Ph
O
3.4E+10
3.2E+10
3.0E+10
2.8E+10
2.6E+10
2.4E+10
2.2E+10
2.0E+10
1.8E+10
1.6E+10
1.4E+10
1.2E+10
1.0E+10
8.0E+09
6.0E+09
4.0E+09
2.0E+09
0.0E+00
-2.0E+09
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

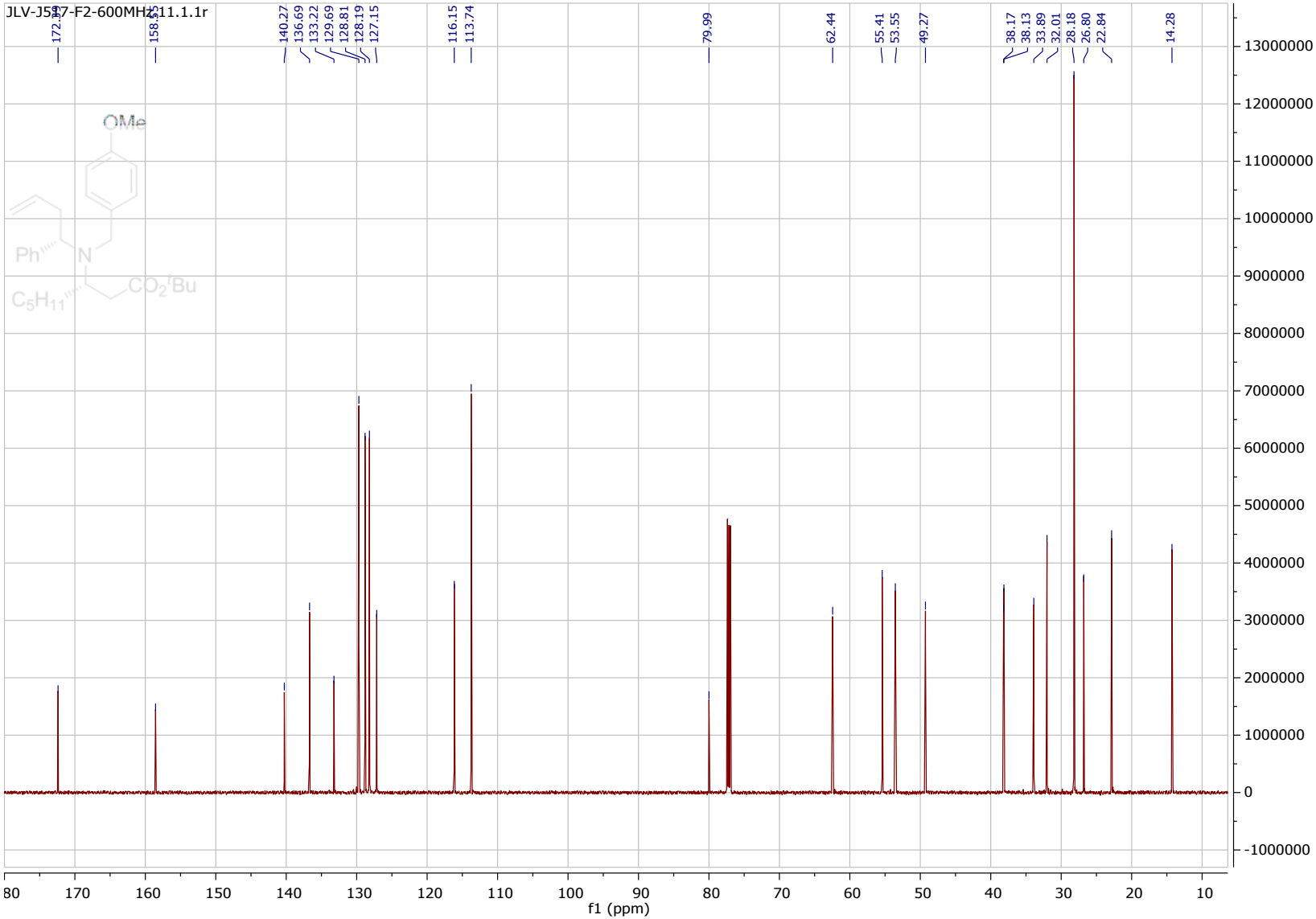
(*R*)-*Tert*-Butyl 3-{(4-methoxybenzyl)[(*S*)-1-phenylbut-3-en-1-yl]amino}-4-methylpentanoate 3s



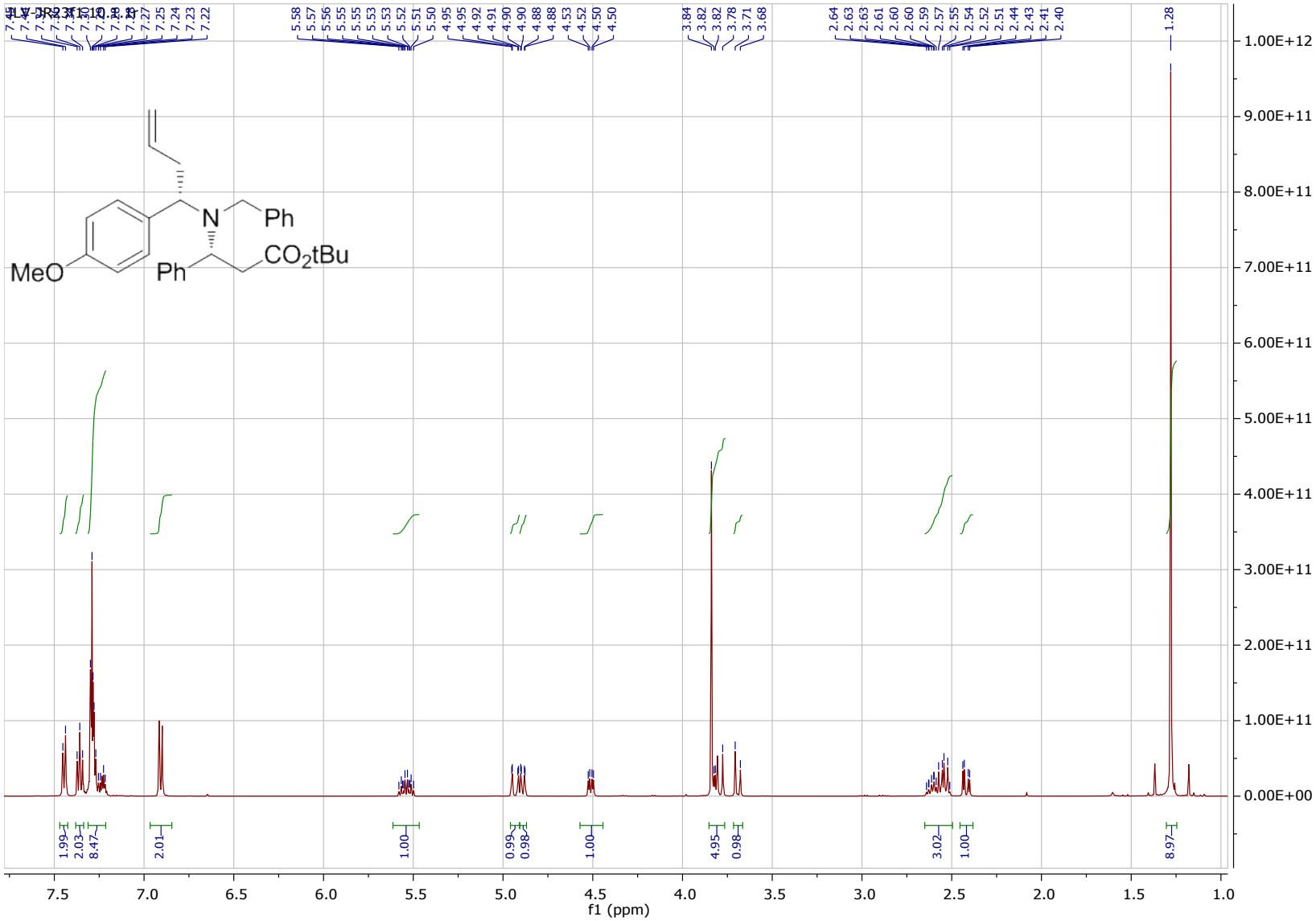

JLV-J504f12.11.1.1r
172.41
158.60
139.36
136.58
132.90
129.63
129.08
128.05
127.13
116.20
113.86
79.94
62.03
58.01
55.38
50.40
38.01
36.55
33.07
28.13
21.36
19.75
OMe
Ph
N
CO2tBu
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

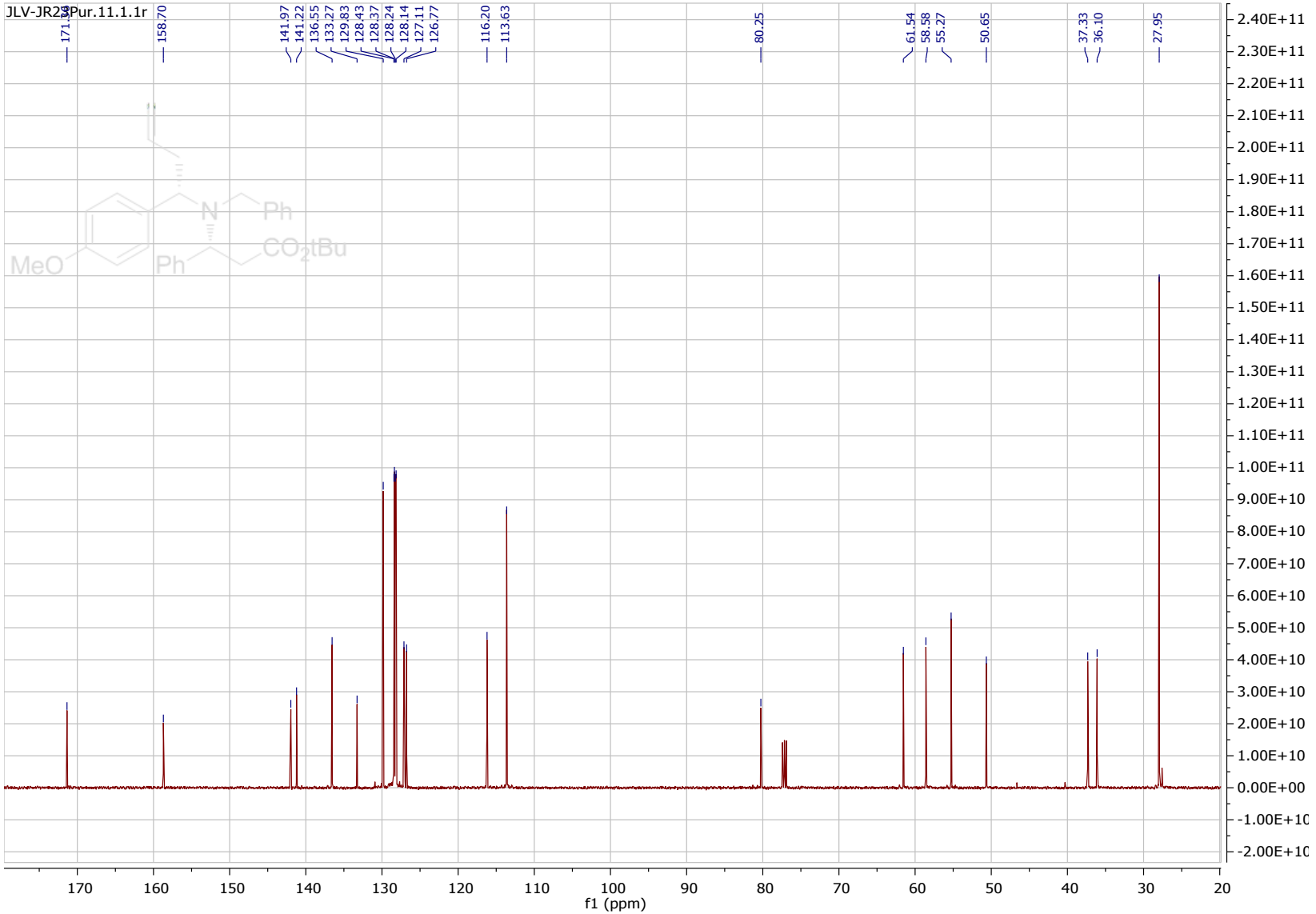
(*S*)-*Tert*-Butyl 3-{(4-methoxybenzyl)[(*S*)-1-phenylbut-3-en-1-yl]amino}octanoate 3t



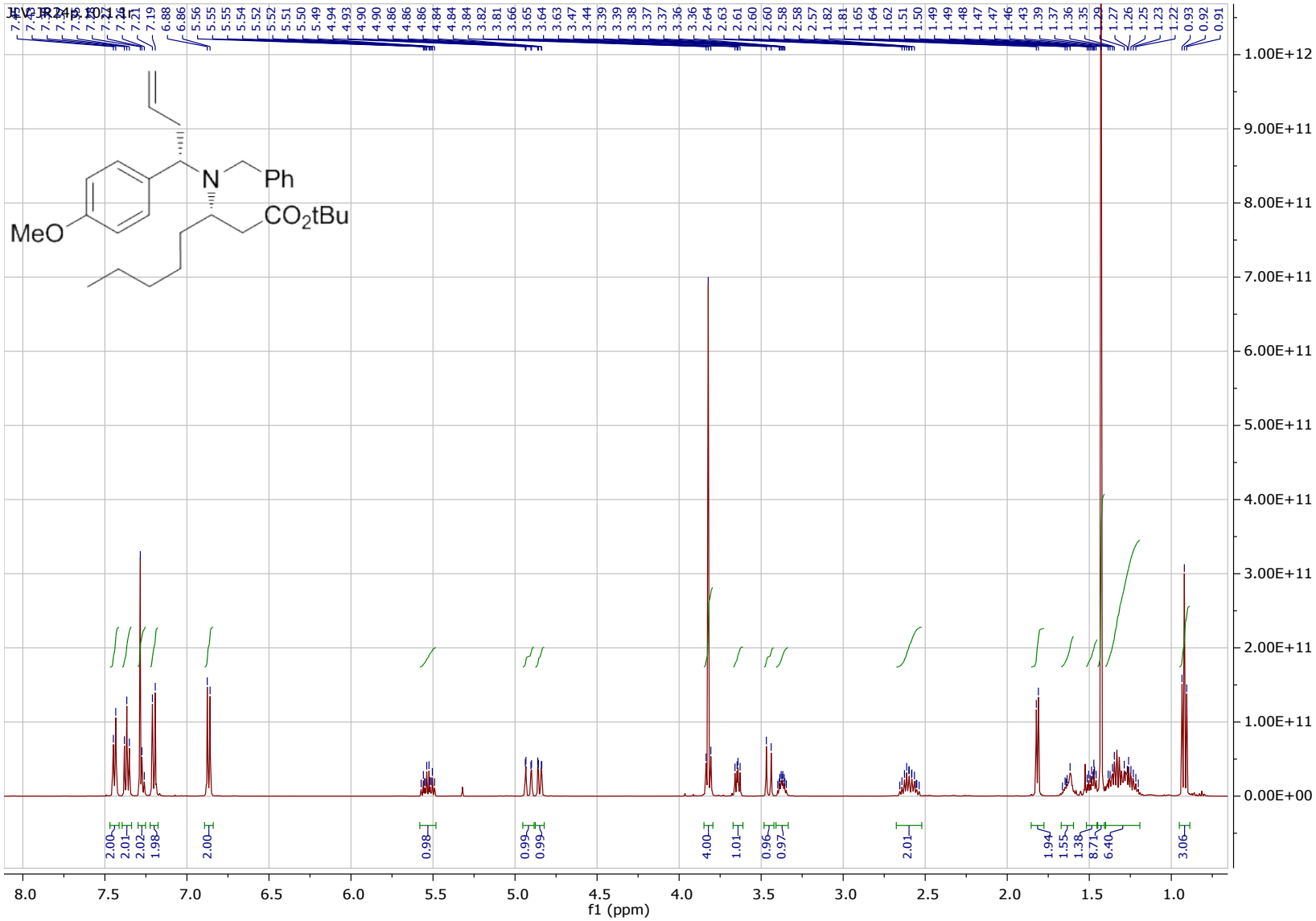

JLV-J537-F2-600MHz-11.1.1r
172.37
158.45
140.27
136.69
133.22
129.69
128.81
128.19
127.15
116.15
113.74
79.99
62.44
55.41
53.55
49.27
38.17
38.13
33.89
32.01
28.18
26.80
22.84
14.28
OMe
Ph
N
C5H11
CO2tBu
13000000
12000000
11000000
10000000
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
-1000000
80
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

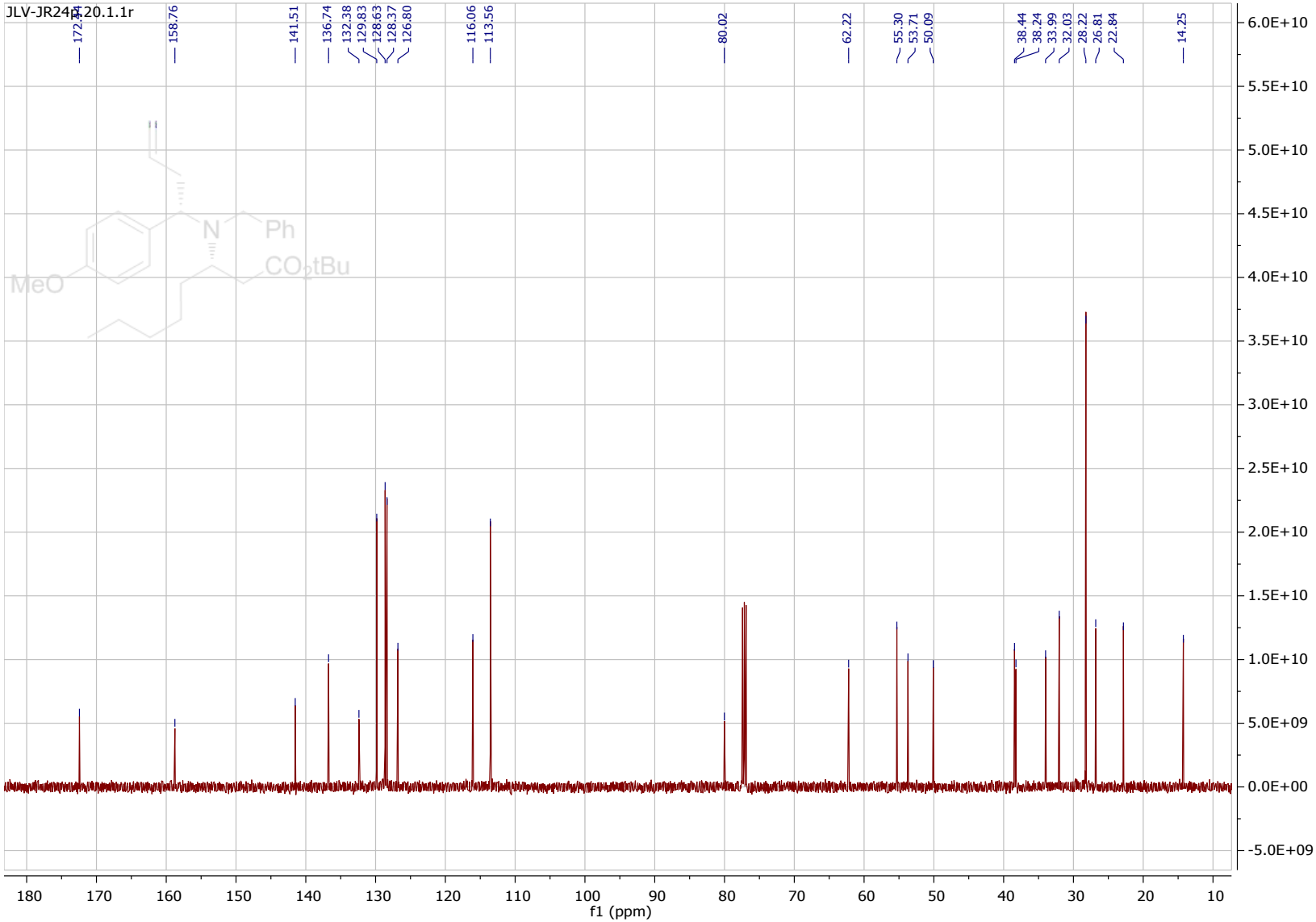
(*R*)-*Tert-Butyl* 3-{benzyl[(*S*)-1-(4-methoxyphenyl)but-3-en-1-yl]amino}-3-phenylpropanoate 3u



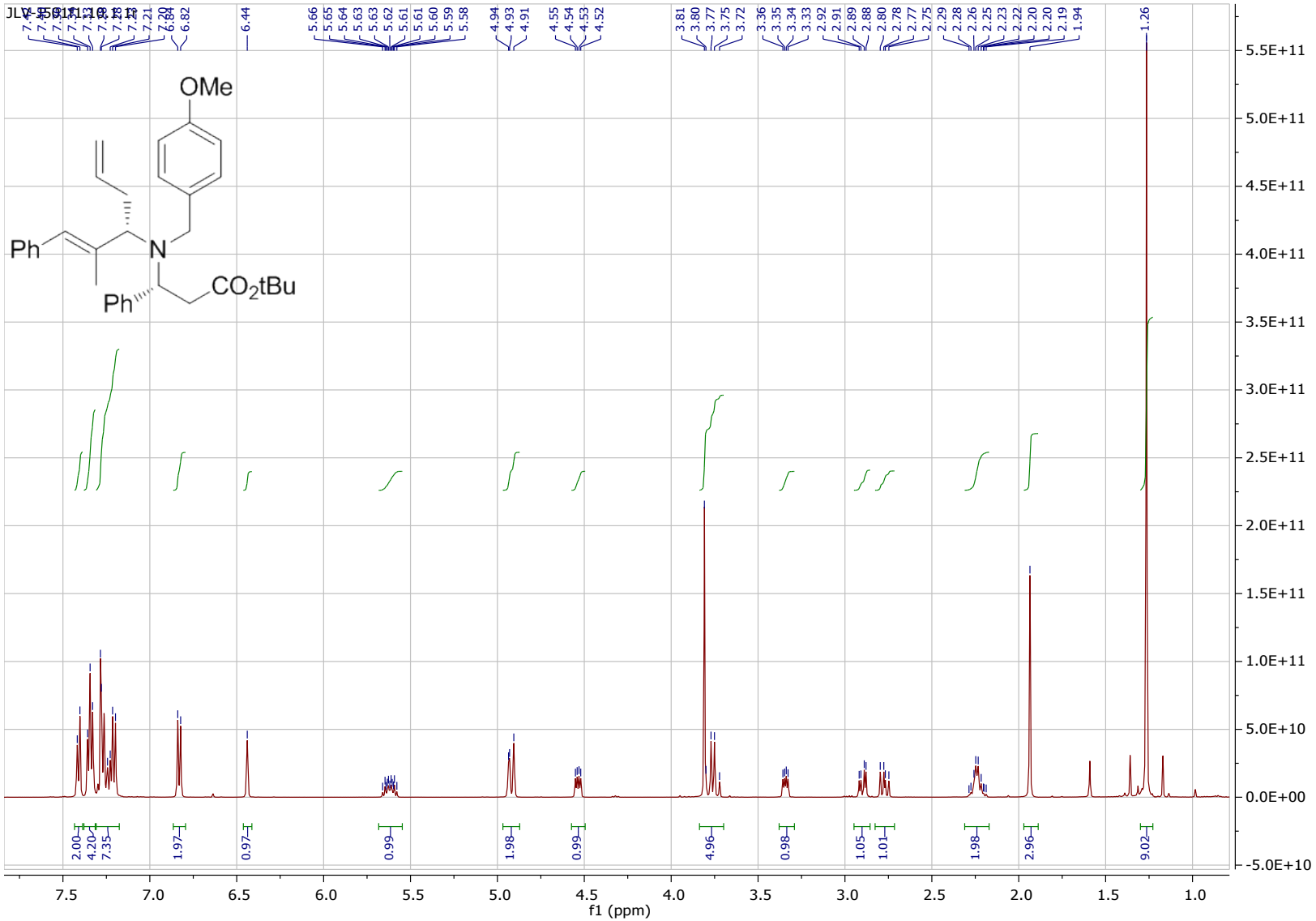

JLV-JR23Pur.11.1.1r
171.13
158.70
141.97
141.22
136.55
133.27
129.83
128.43
128.37
128.24
128.14
127.11
126.77
116.20
113.63
80.25
61.54
58.58
55.27
50.65
37.33
36.10
27.95
MeO
Ph
N
Ph
CO2tBu
f1 (ppm)

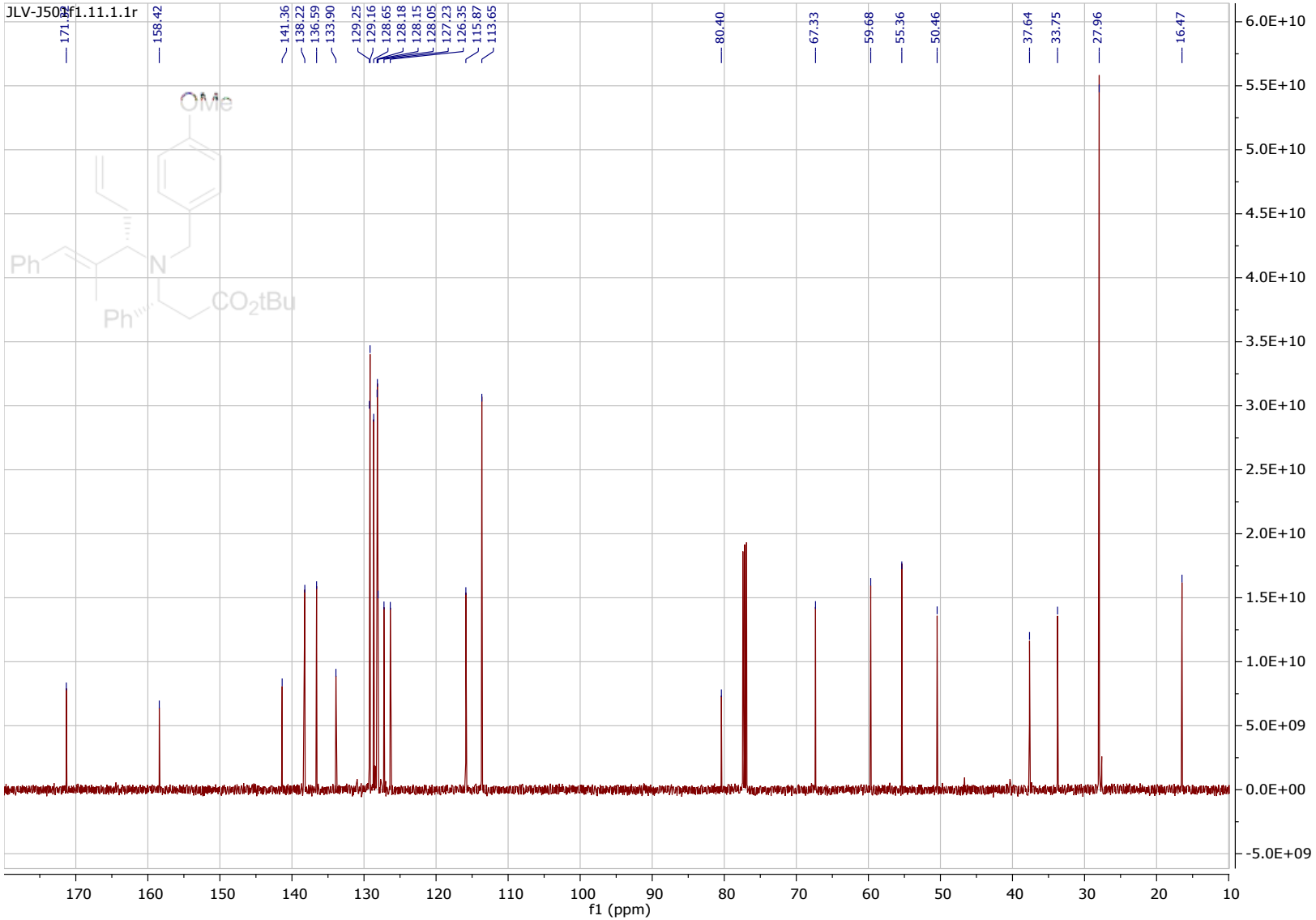
(*S*)-*Tert*-Butyl 3-{benzyl[(*S*)-1-(4-methoxyphenyl)but-3-en-1-yl]amino}octanoate 3v



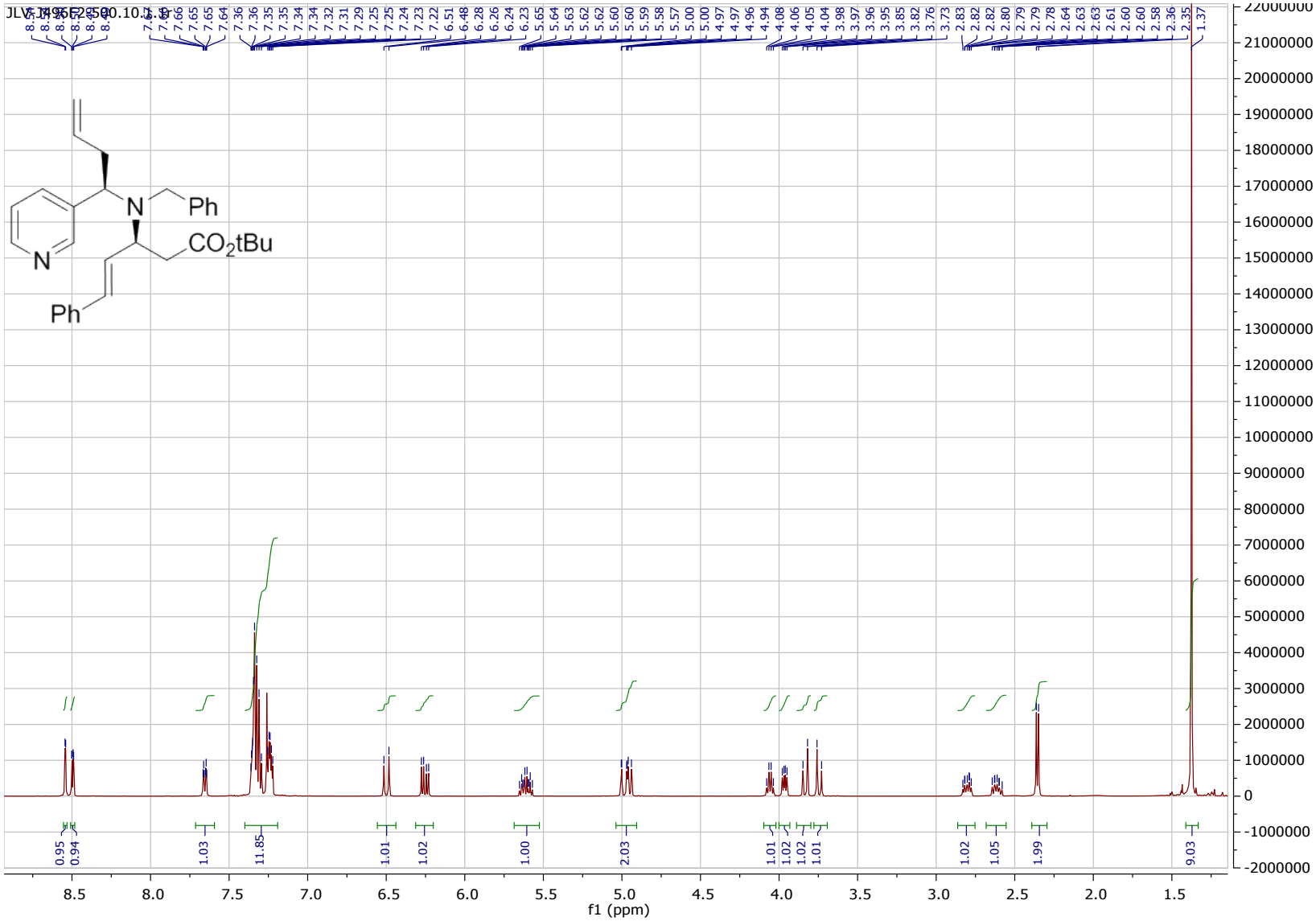

JLV-JR24p.20.1.1r
172.24
158.76
141.51
136.74
132.38
129.83
128.63
128.37
126.80
116.06
113.56
80.02
62.22
55.30
53.71
50.09
38.44
38.24
33.99
32.03
28.22
26.81
22.84
14.25
MeO
N
Ph
CO2tBu
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

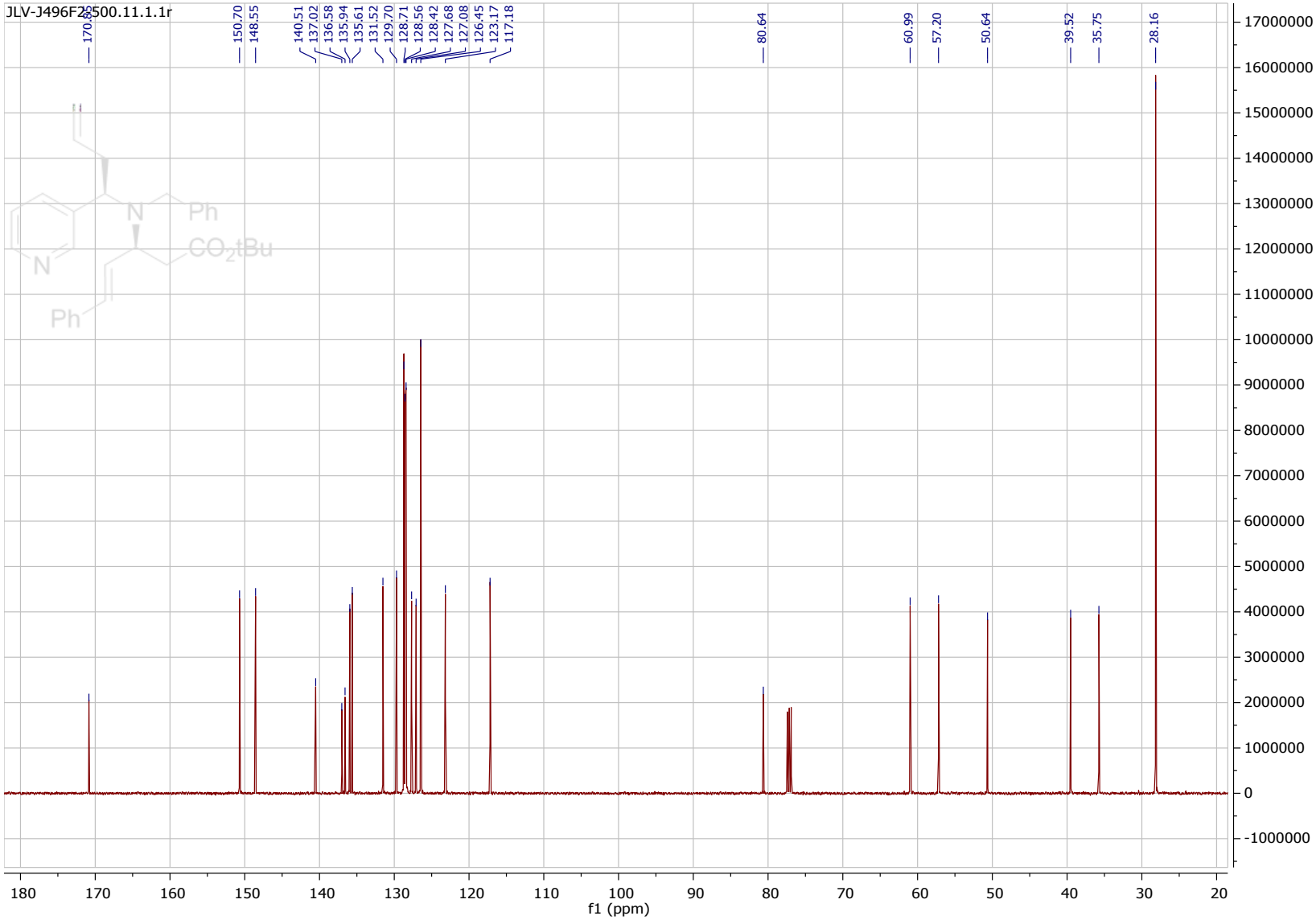
(*R*)-*Tert*-Butyl 3-{(4-methoxybenzyl)[(*S*,*E*)-2-methyl-1-phenylhexa-1,5-dien-3-yl]amino}-3-phenylpropanoate 3w



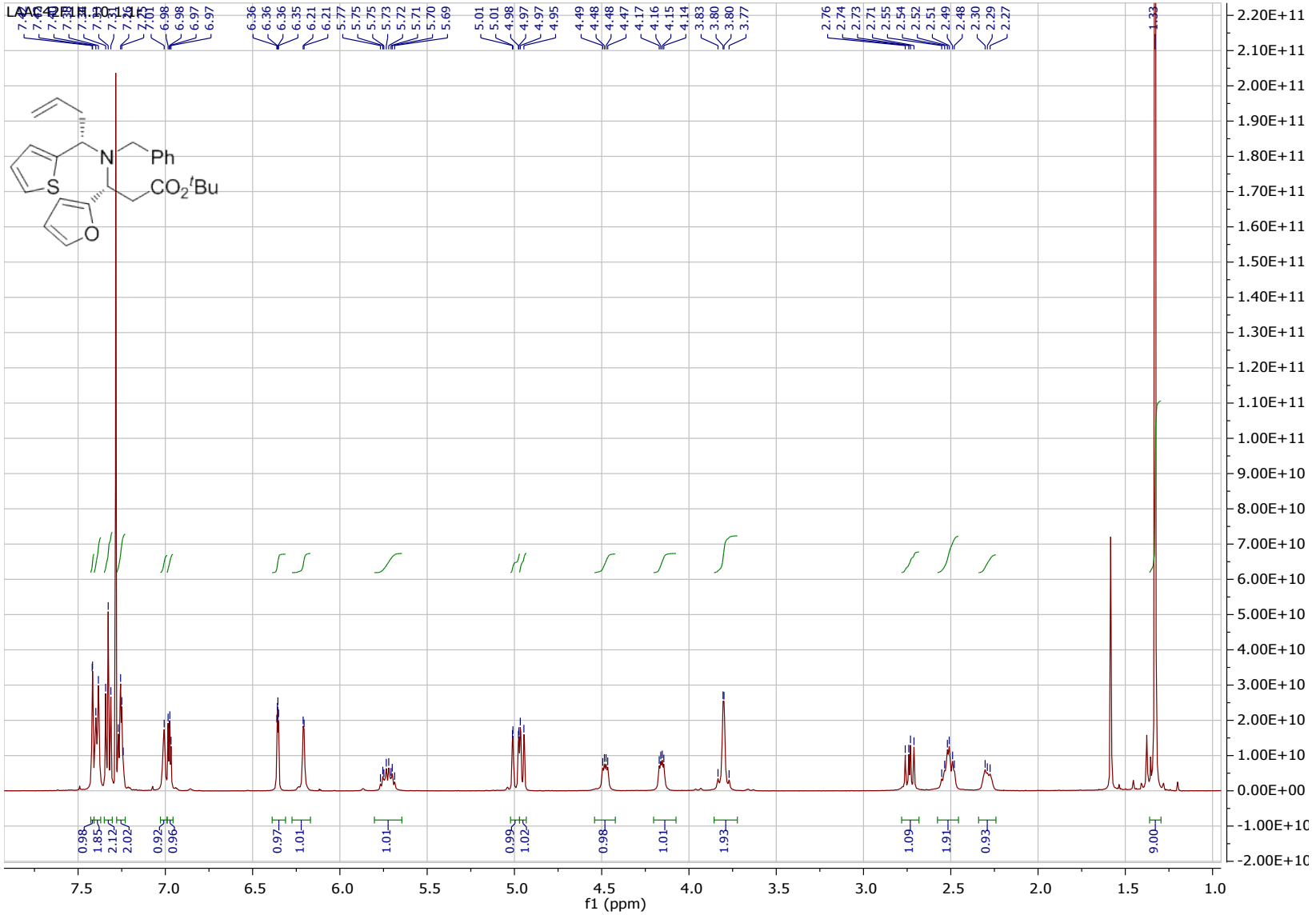

JLV-J503f1.11.1.1r
171.14
158.42
141.36
138.22
136.59
133.90
129.25
129.16
128.65
128.18
128.15
128.05
127.23
126.35
115.87
113.65
80.40
67.33
59.68
55.36
50.46
37.64
33.75
27.96
16.47
OMe
Ph
N
Ph
CO2tBu
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

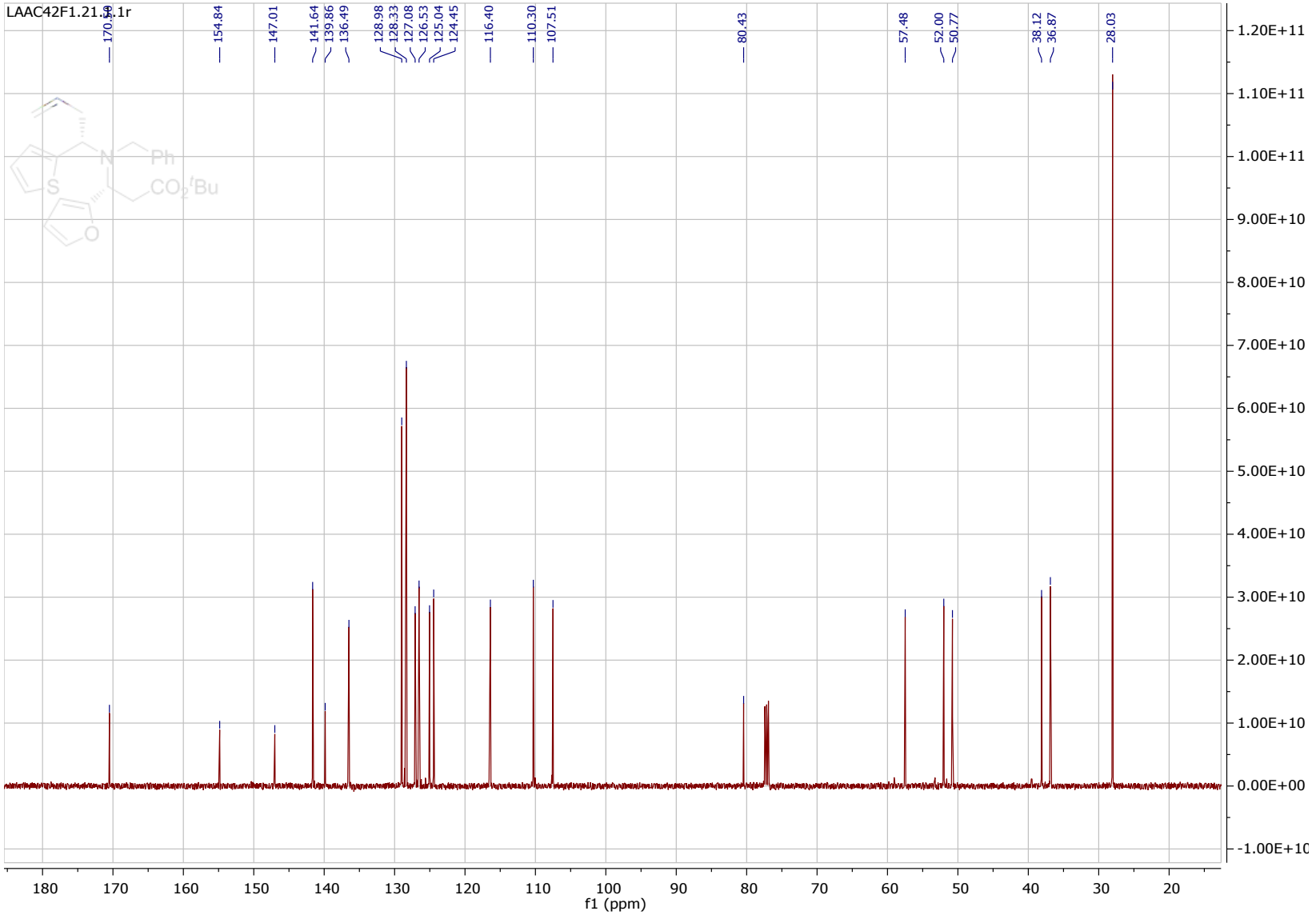
(*S,E*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-(pyridin-3-yl)but-3-en-1-yl]amino}-5-phenylpent-4-enoate 3x



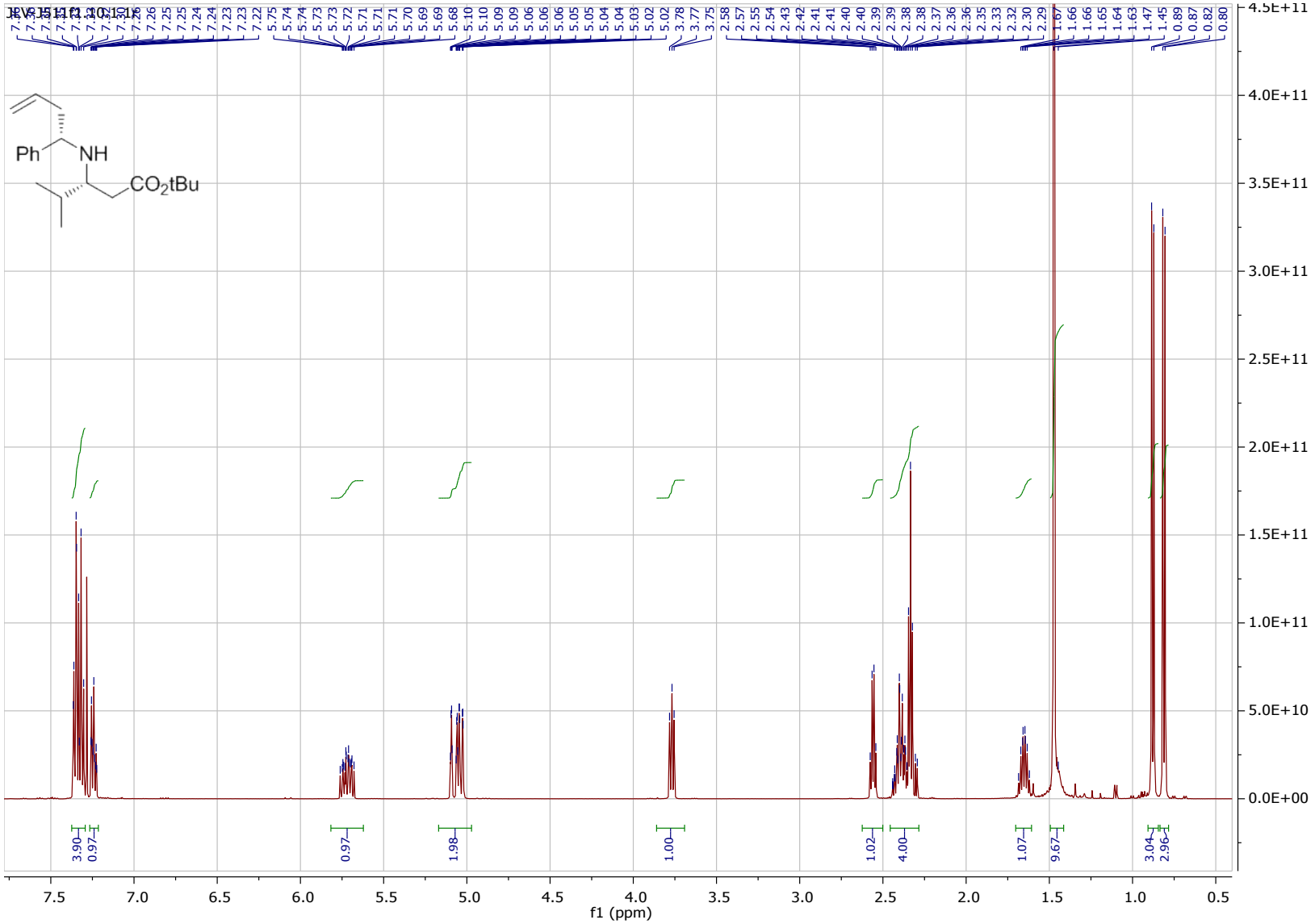

JLV-J496F2_500.11.1.1r
170.26
150.70
148.55
140.51
137.02
136.58
135.94
135.61
131.52
129.70
128.71
128.56
128.42
127.68
127.08
126.45
123.17
117.18
80.64
60.99
57.20
50.64
39.52
35.75
28.16
N
Ph
CO2tBu
N
Ph
17000000
16000000
15000000
14000000
13000000
12000000
11000000
10000000
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
-1000000
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

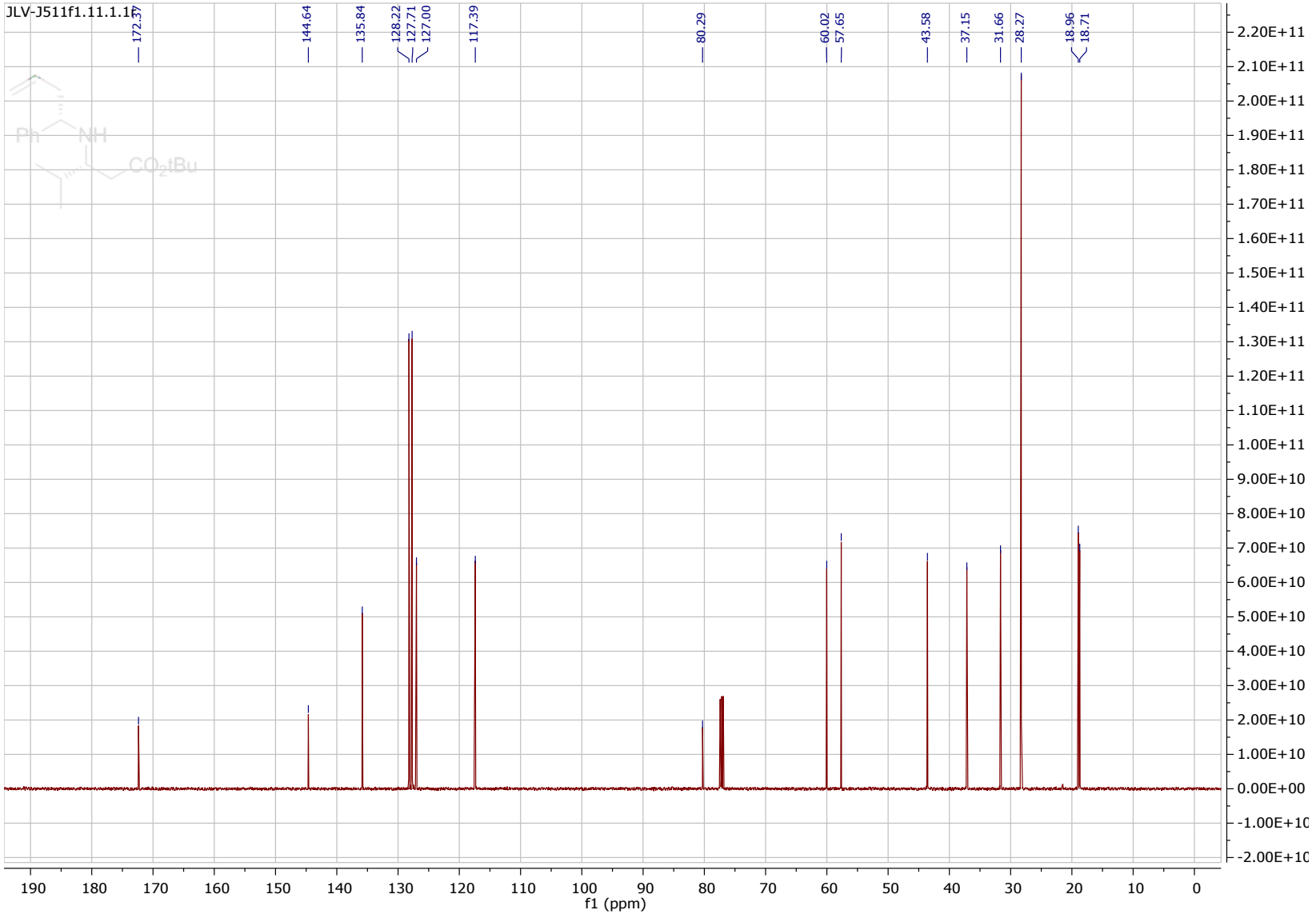
(*R*)-*Tert*-Butyl 3-{Benzyl[(S)-1-(thiophen-2-yl)but-3-en-1-yl]amino}-3-(furan-2-yl)propanoate 3y



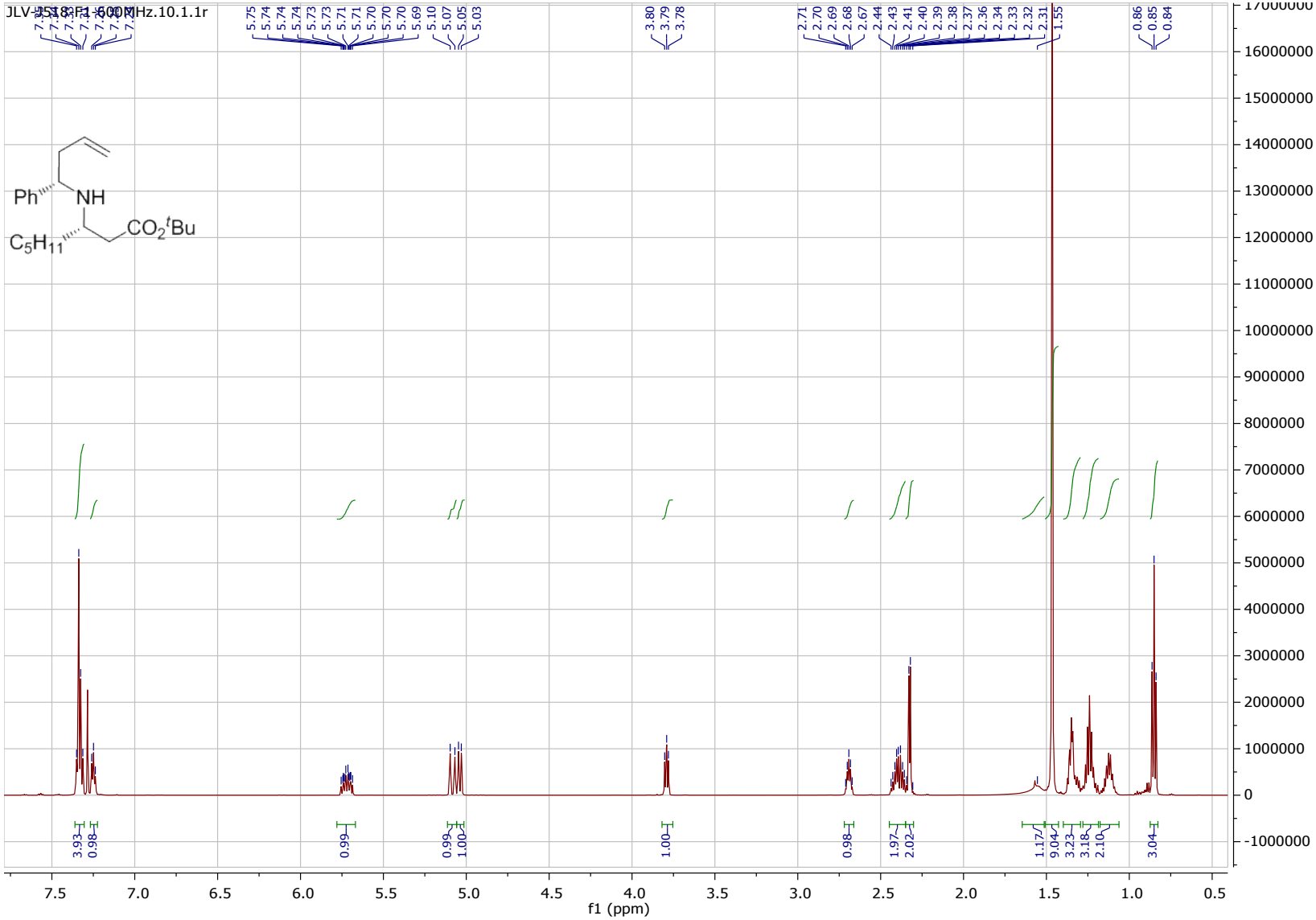

LAAC42F1.21.1r
170.19
154.84
147.01
141.64
139.86
136.49
128.98
128.33
127.08
126.53
125.04
124.45
116.40
110.30
107.51
80.43
57.48
52.00
50.77
38.12
36.87
28.03
Ph
CO2tBu
S
O
N
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

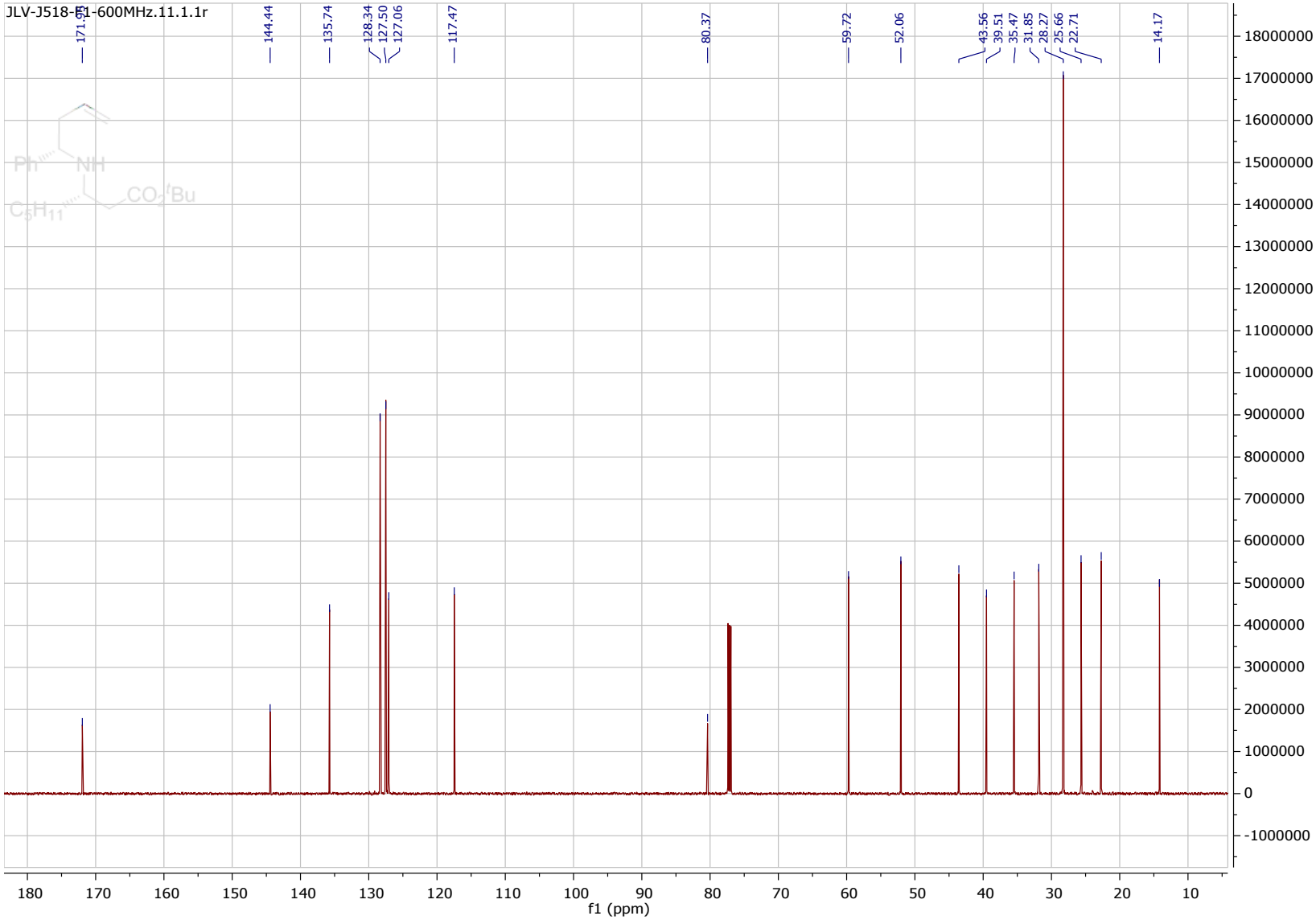
(*R*)-*Tert*-Butyl 4-methyl-3-{[(S)-1-phenylbut-3-en-1-yl]amino}pentanoate 6s



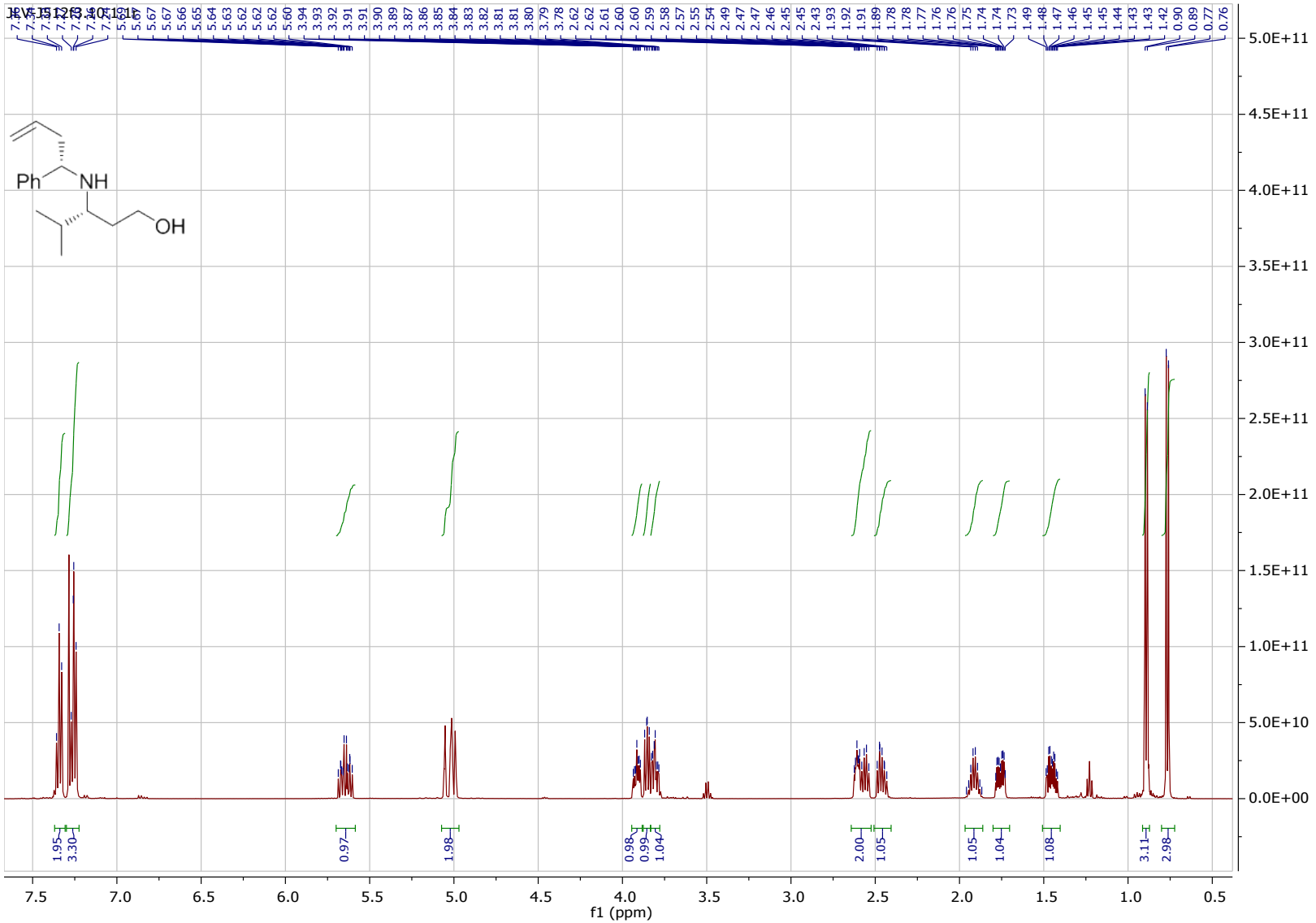

JLV-J511f1.11.1.1r
172.37
144.64
135.84
128.22
127.71
127.00
117.39
80.29
60.02
57.65
43.58
37.15
31.66
28.27
18.96
18.71
Ph
NH
CO2tBu
2.20E+11
2.10E+11
2.00E+11
1.90E+11
1.80E+11
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
-2.00E+10
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

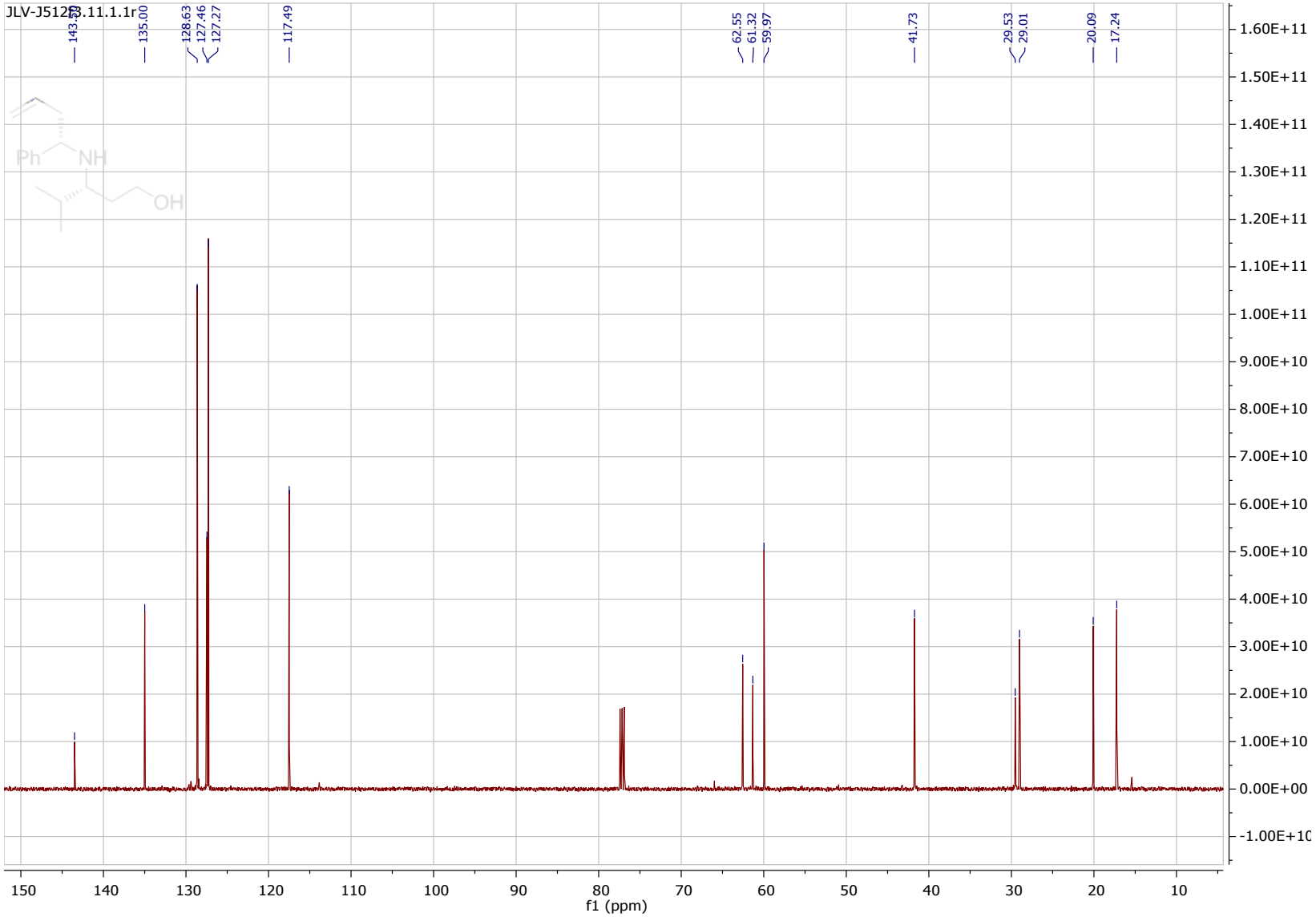
(*S*)-*Tert*-Butyl 3-{[(*S*)-1-phenylbut-3-en-1-yl]amino}octanoate 6t



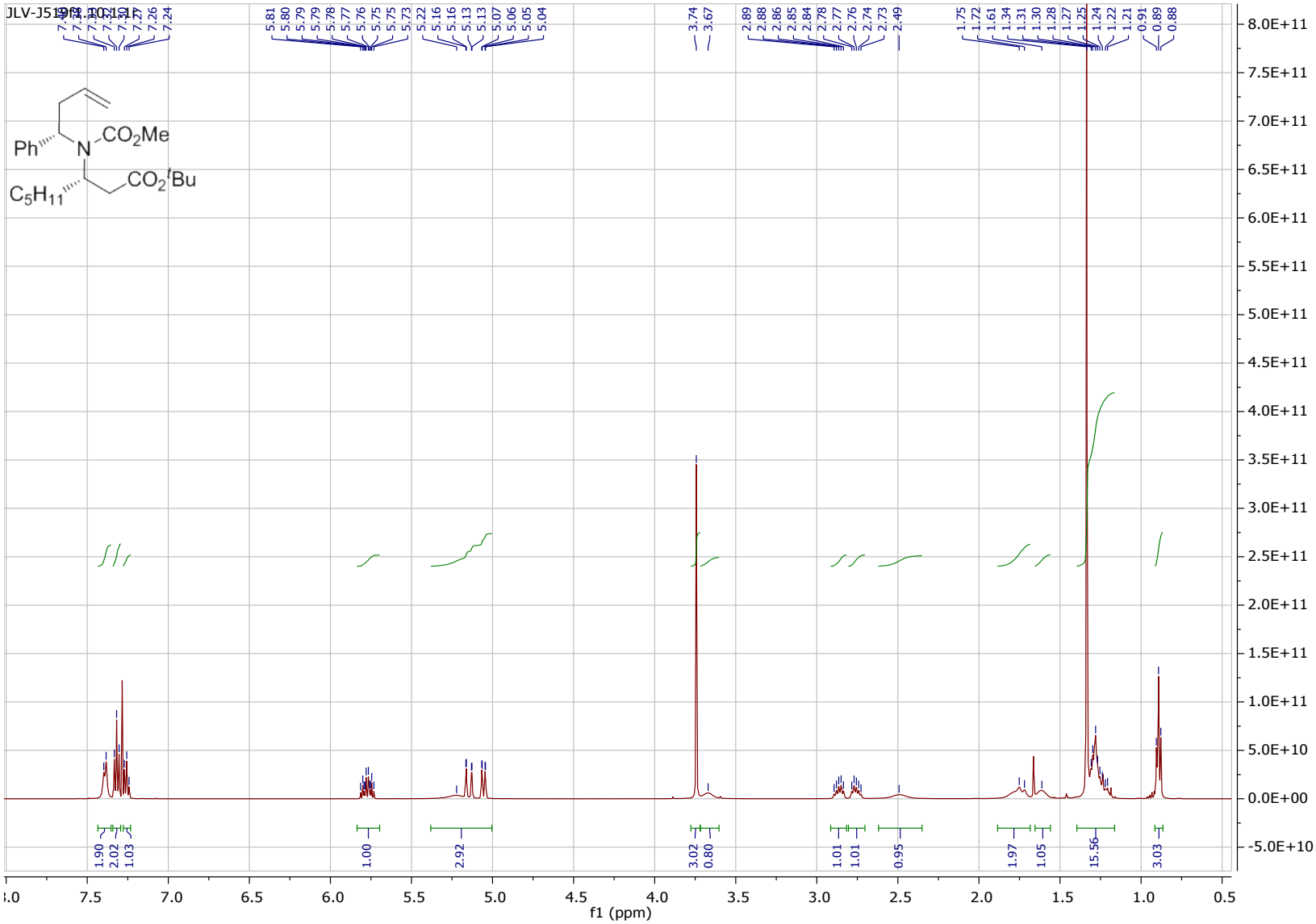

JLV-J518-P1-600MHz.11.1.1r
171.91
144.44
135.74
128.34
127.50
127.06
117.47
80.37
59.72
52.06
43.56
39.51
35.47
31.85
28.27
25.66
22.71
14.17
Ph
NH
CO2tBu
C5H11
18000000
17000000
16000000
15000000
14000000
13000000
12000000
11000000
10000000
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
-1000000
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

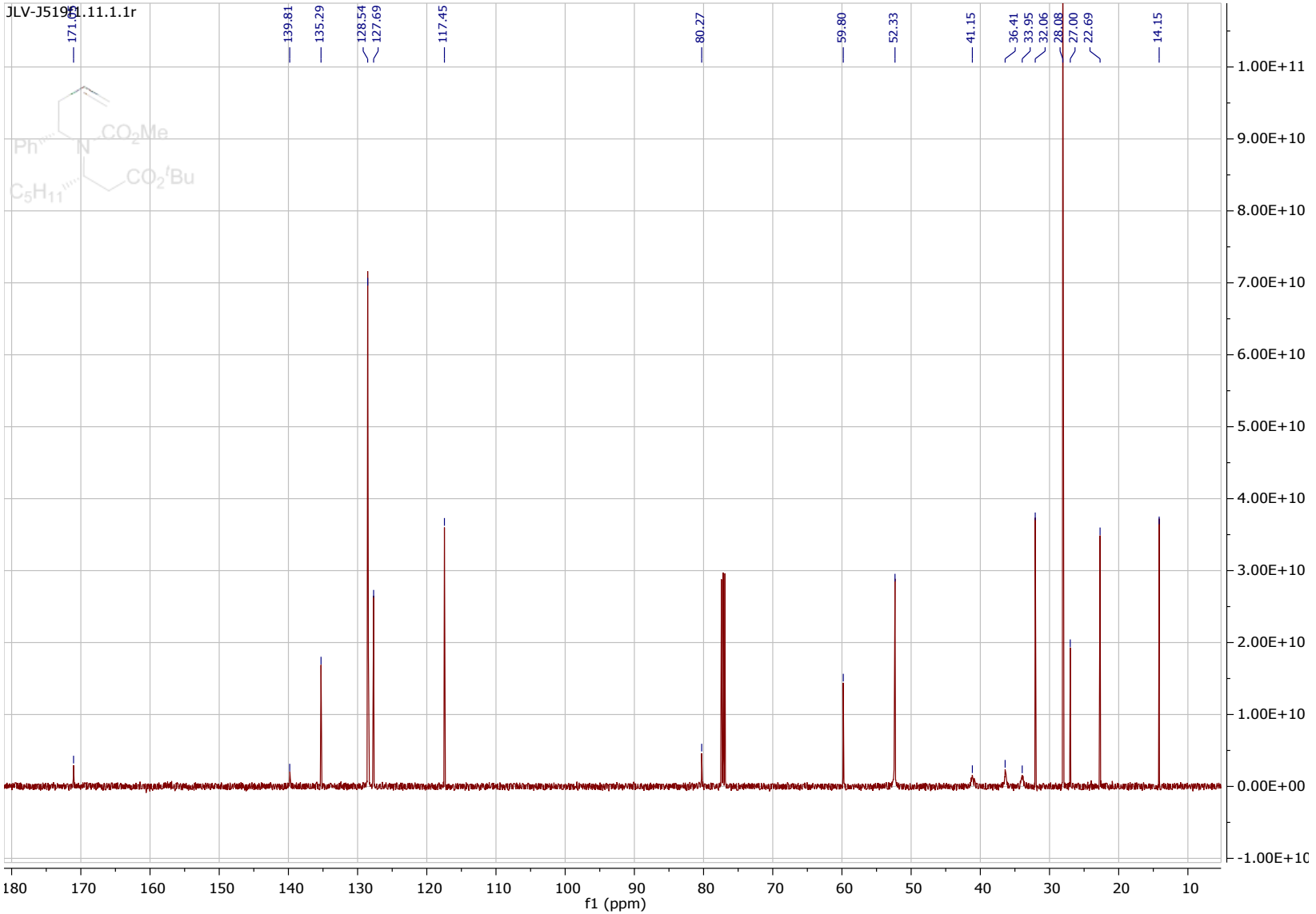
(*R*)-4-Methyl-3-{[(*S*)-1-phenylbut-3-en-1-yl]amino}pentan-1-ol 7



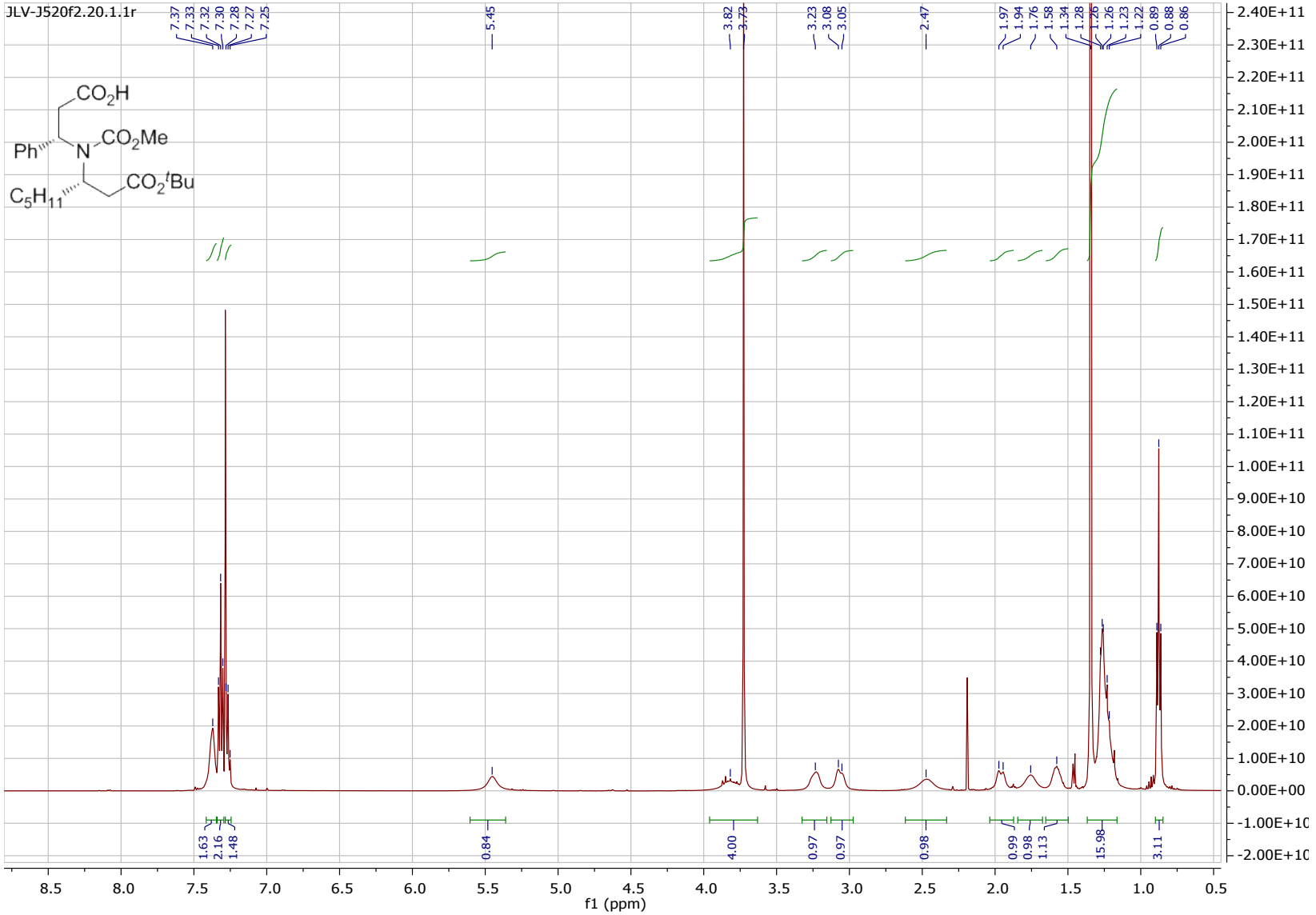

JLV-J5123.11.1.1r
143.53
135.00
128.63
127.46
127.27
117.49
62.55
61.32
59.97
41.73
29.53
29.01
20.09
17.24
Ph
NH
OH
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

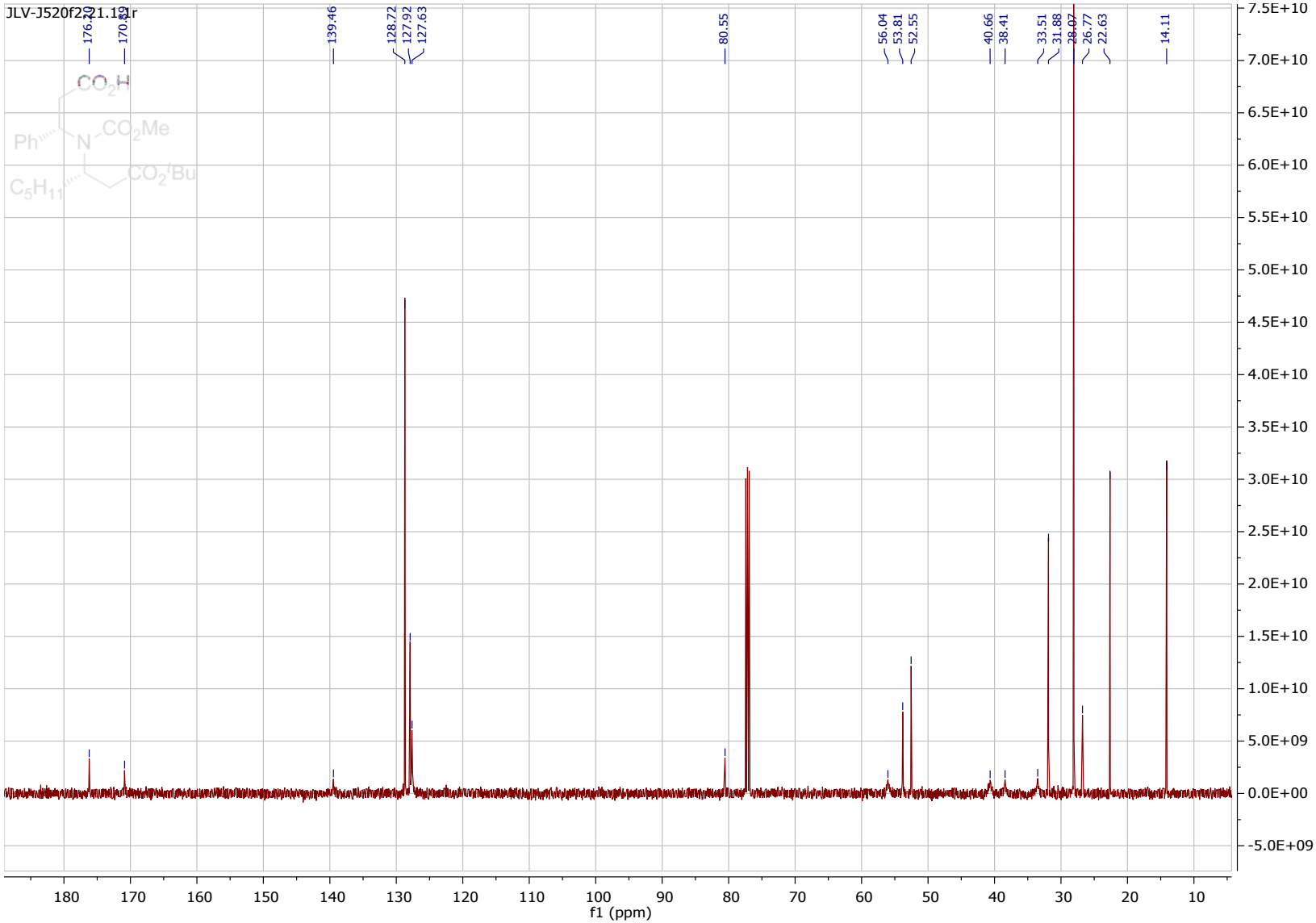
(*S*)-*Tert*-Butyl 3-{(methoxycarbonyl)[(*S*)-1-phenylbut-3-en-1-yl]amino}octanoate 8



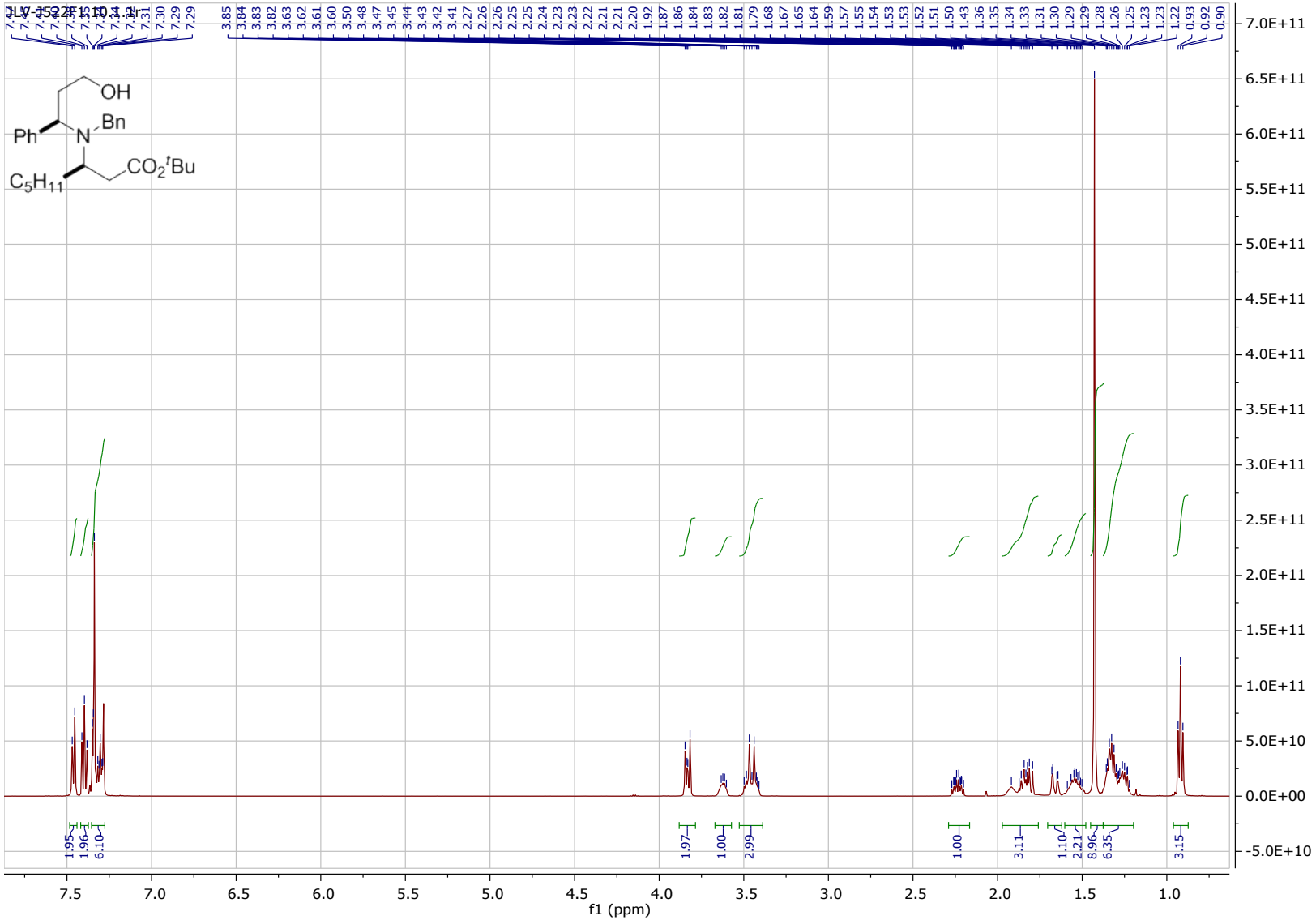

JLV-J519
171.81
139.81
135.29
128.54
127.69
117.45
80.27
59.80
52.33
41.15
36.41
33.95
32.06
28.08
27.00
22.69
14.15
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

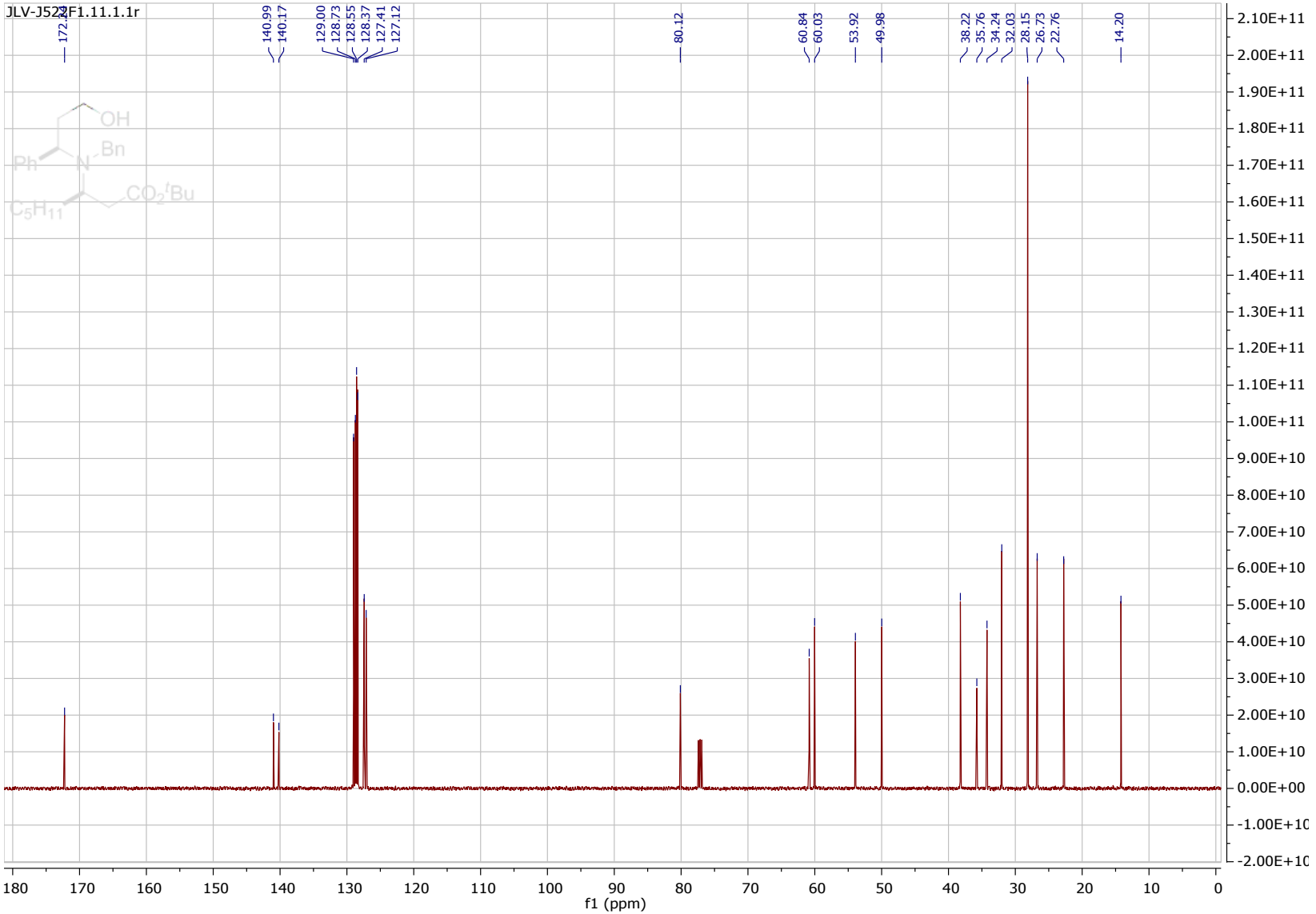
(*S*)-3-{[(*S*)-1-(*Tert*-Butoxy)-1-oxooctan-3-yl](methoxycarbonyl)amino}-3-phenylpropanoic acid 9



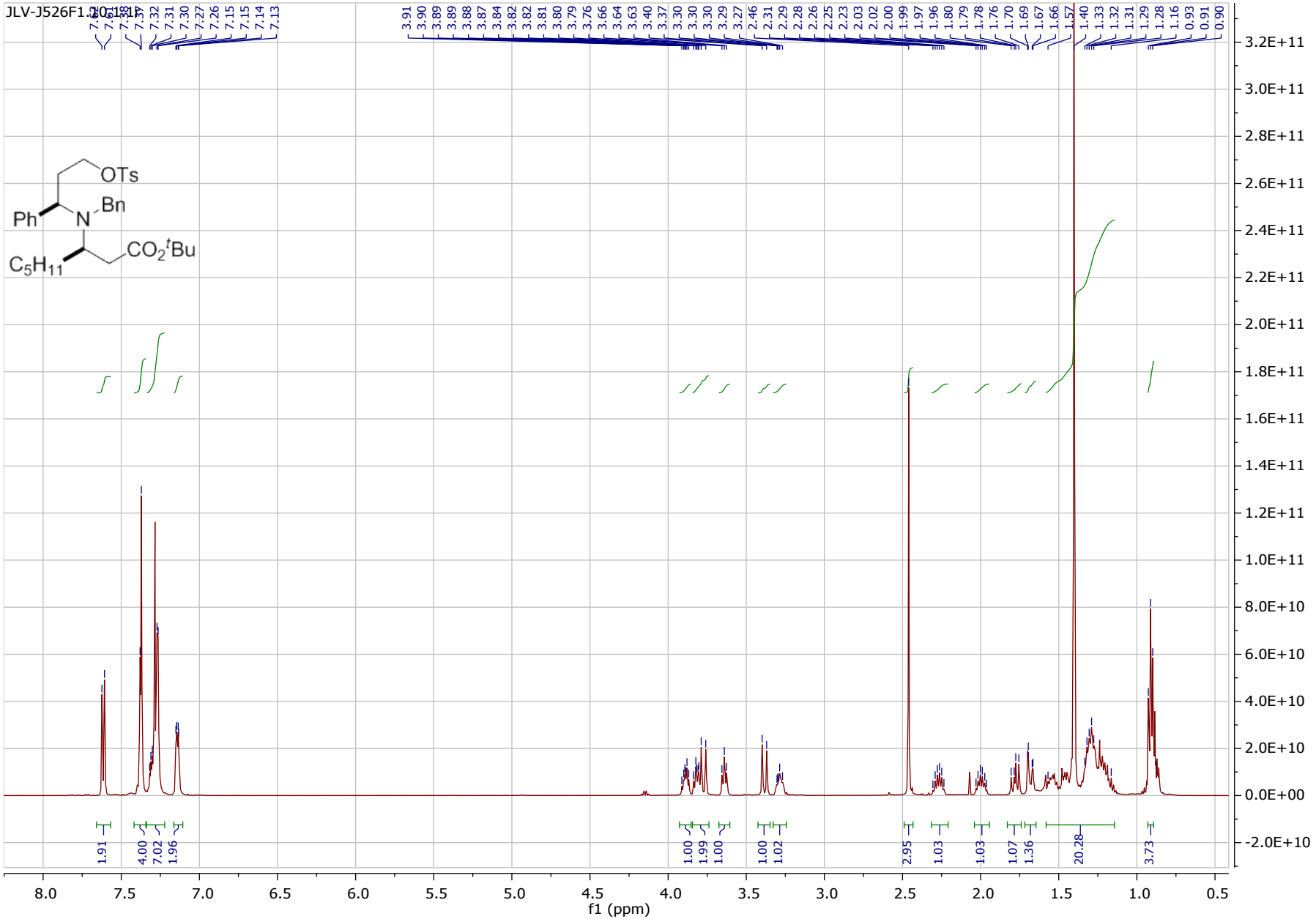

JLV-J520f2221.11r
176.20
170.82
139.46
128.72
127.92
127.63
80.55
56.04
53.81
52.55
40.66
38.41
33.51
31.88
28.07
26.77
22.63
14.11
CO2H
Ph
N
CO2Me
C5H11
CO2tBu
7.5E+10
7.0E+10
6.5E+10
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

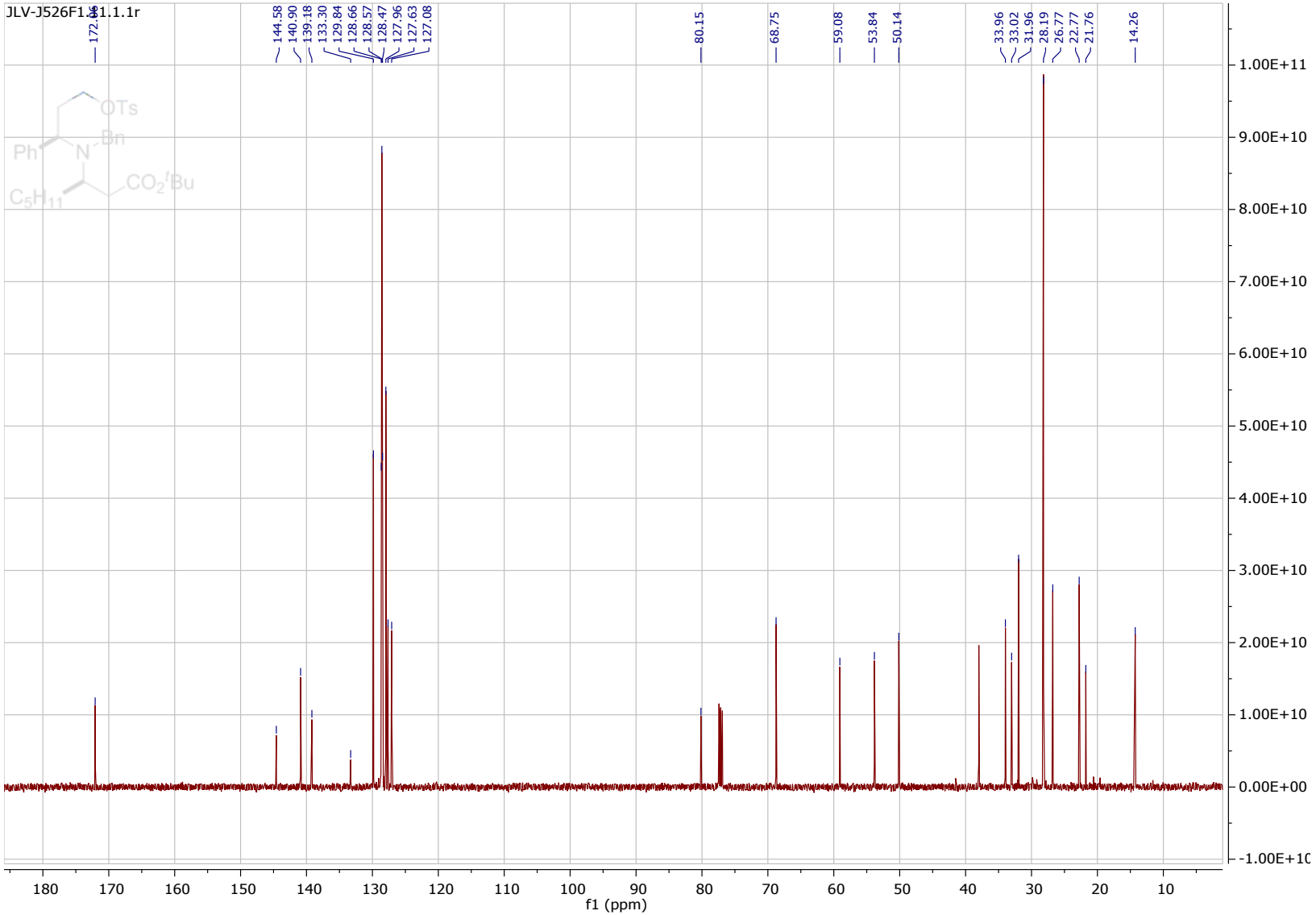
(±)-(*R*)-*Tert*-Butyl 3-{benzyl[(R)-3-hydroxy-1-phenylpropyl]amino}octanoate 10



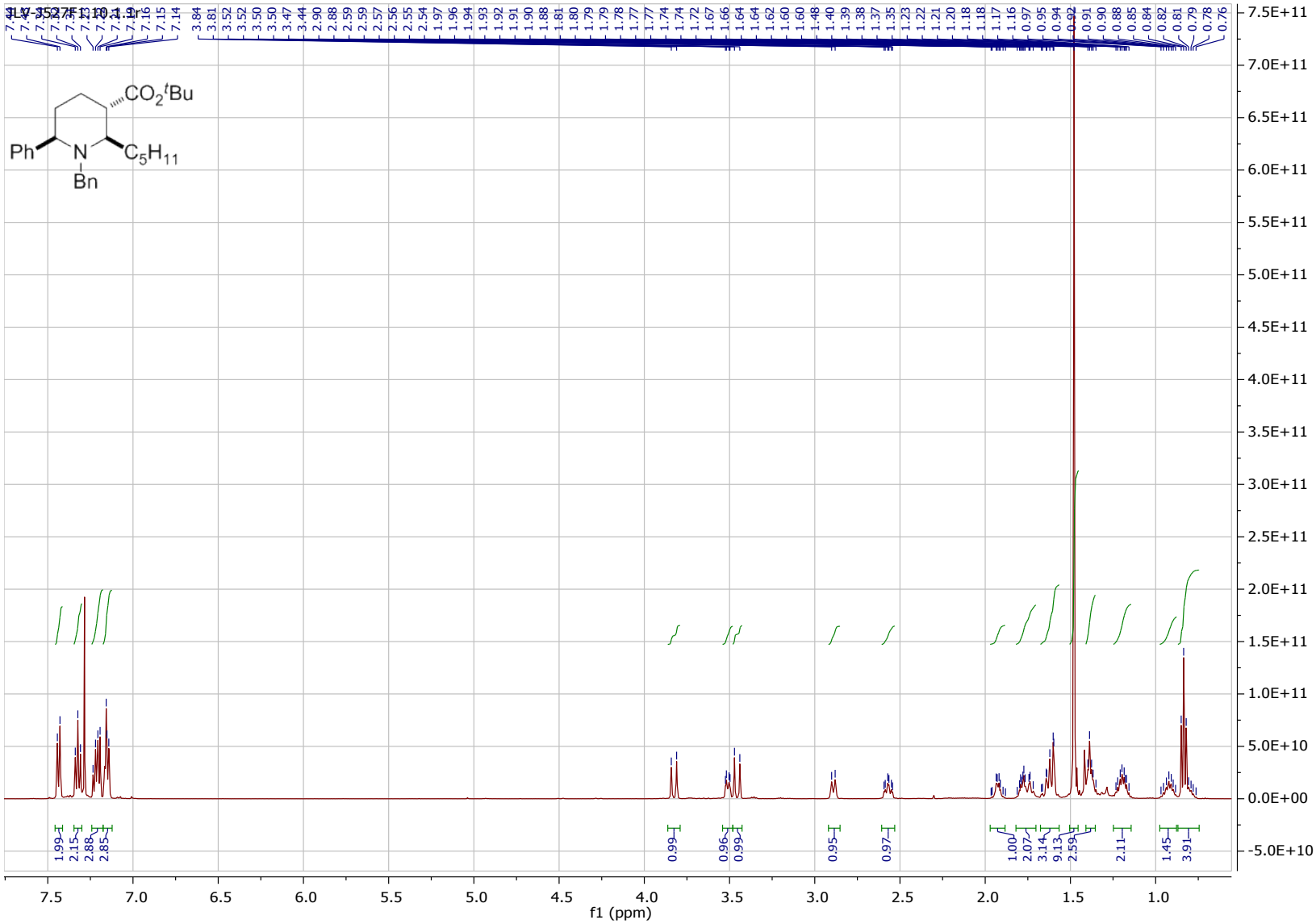

JLV-J522F1.11.1.1r
172.41
140.99
140.17
129.00
128.73
128.55
128.37
127.41
127.12
80.12
60.84
60.03
53.92
49.98
38.22
35.76
34.24
32.03
28.15
26.73
22.76
14.20
OH
Bn
Ph
N
CO2tBu
C5H11
2.10E+11
2.00E+11
1.90E+11
1.80E+11
1.70E+11
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
-2.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

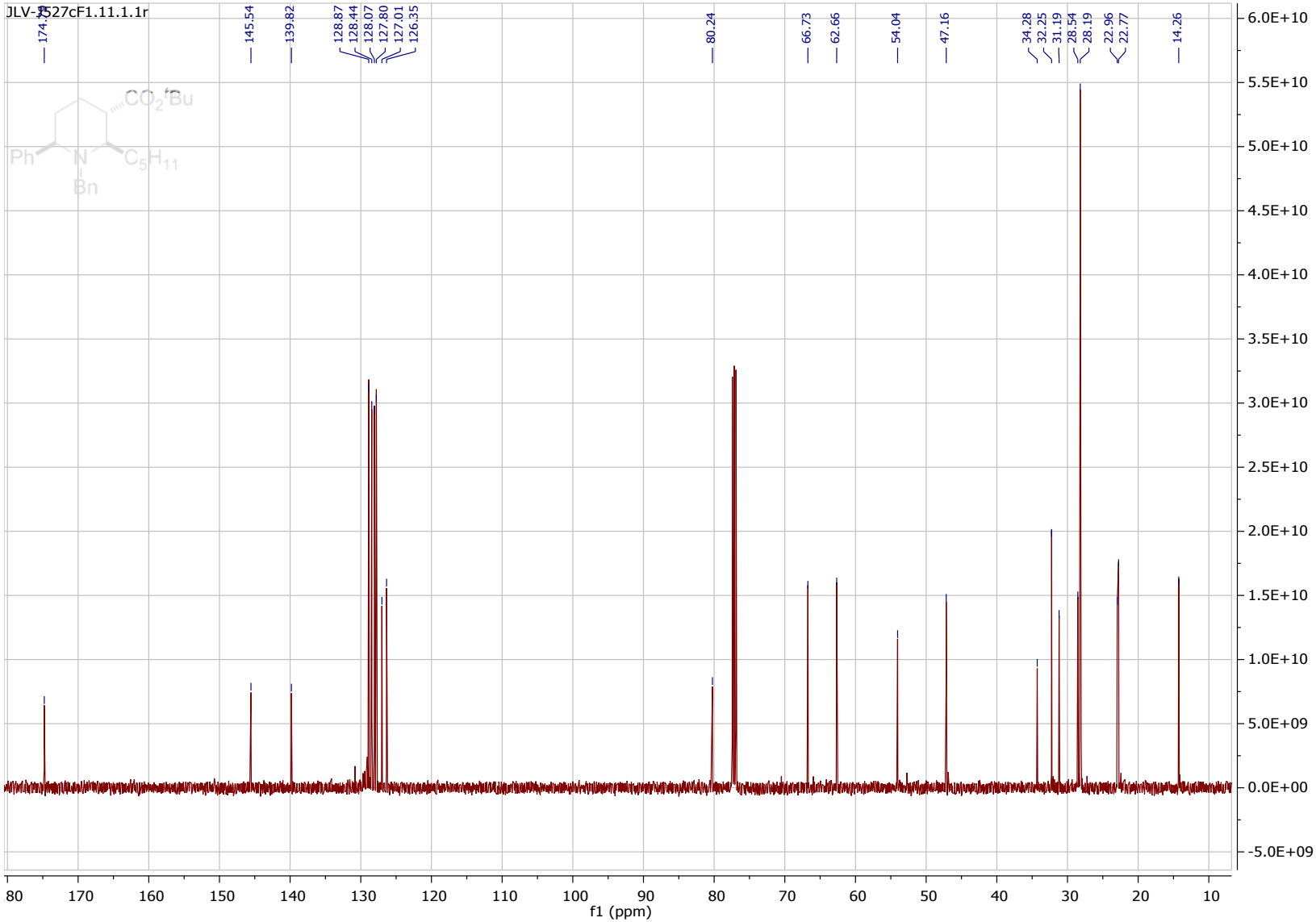
(±)-(*R*)-*Tert*-Butyl 3-{benzyl[(*R*)-1-phenyl-3-(tosyloxy)propyl]amino}octanoate


JLV-J526F1.10.1.1
OTs
Bn
Ph
N
CO2tBu
C5H11
f1 (ppm)

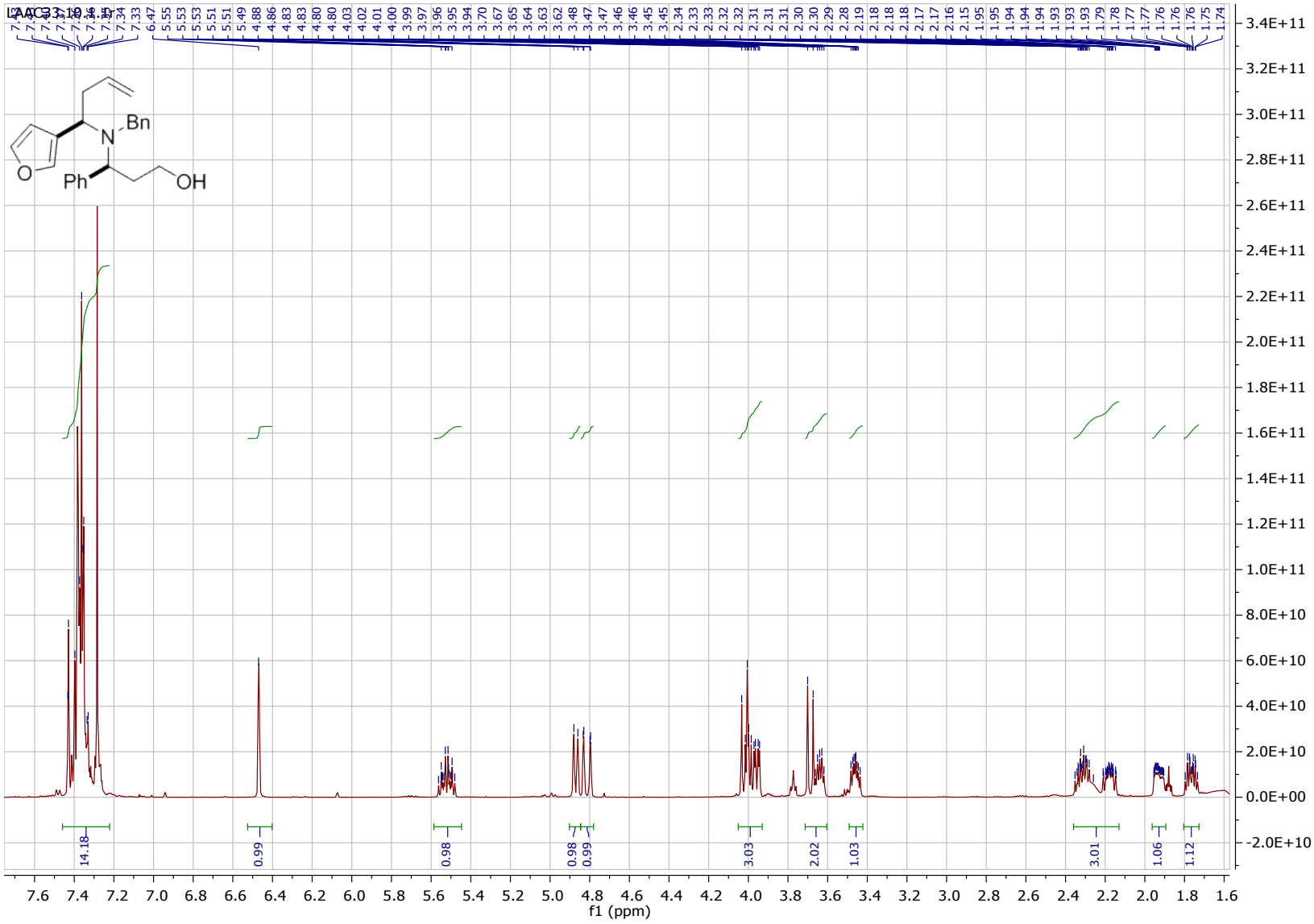

JLV-J526F1.11.1.1r
172.46
144.58
140.90
139.18
133.30
129.84
128.66
128.57
128.47
127.96
127.63
127.08
80.15
68.75
59.08
53.84
50.14
33.96
33.02
31.96
28.19
26.77
22.77
21.76
14.26
OTs
Bn
Ph
N
CO2tBu
C5H11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

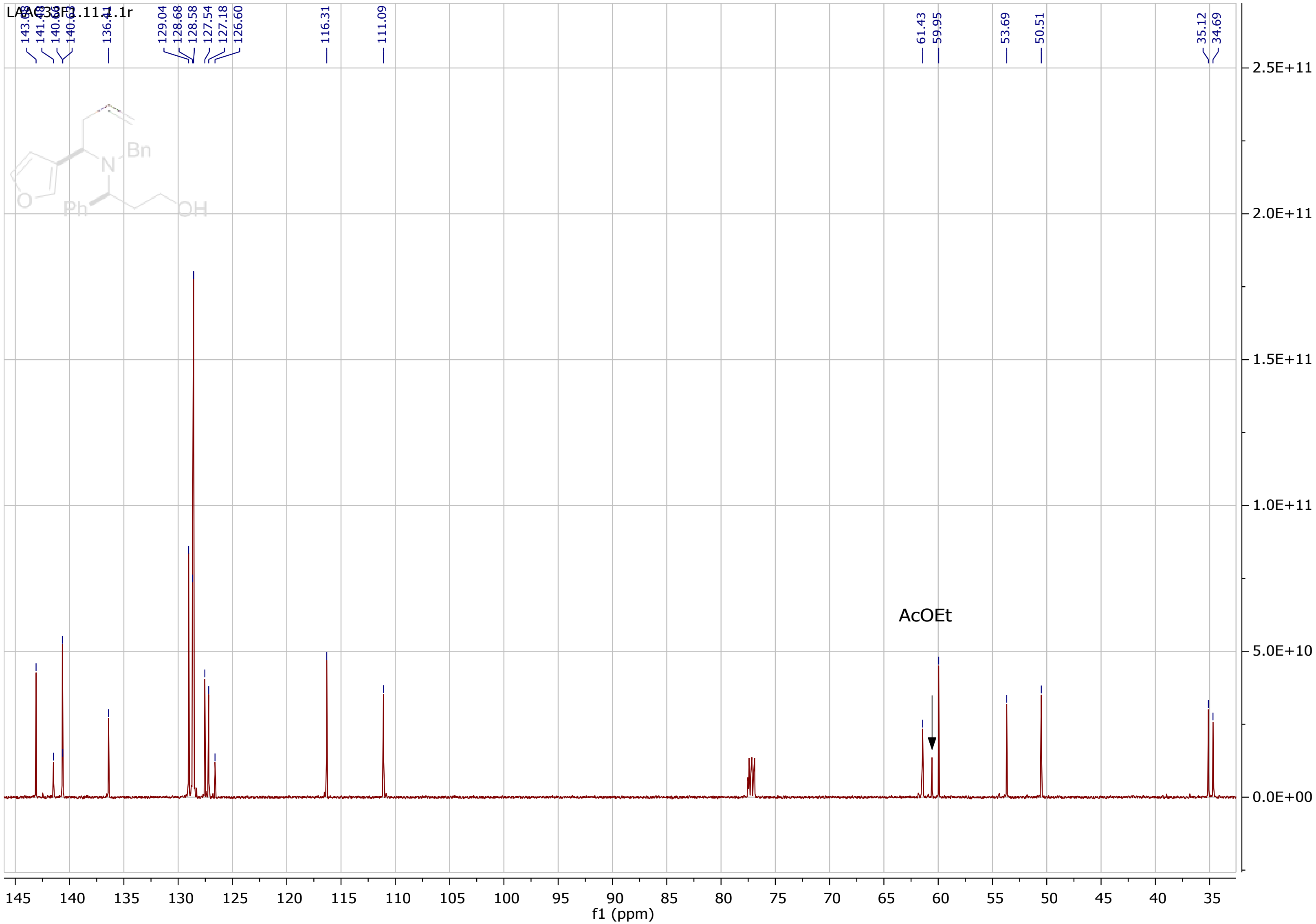
(±)-(2*R*,3*S*,6*R*)-*Tert*-Butyl 1-benzyl-2-pentyl-6-phenylpiperidine-3-carboxylate 11



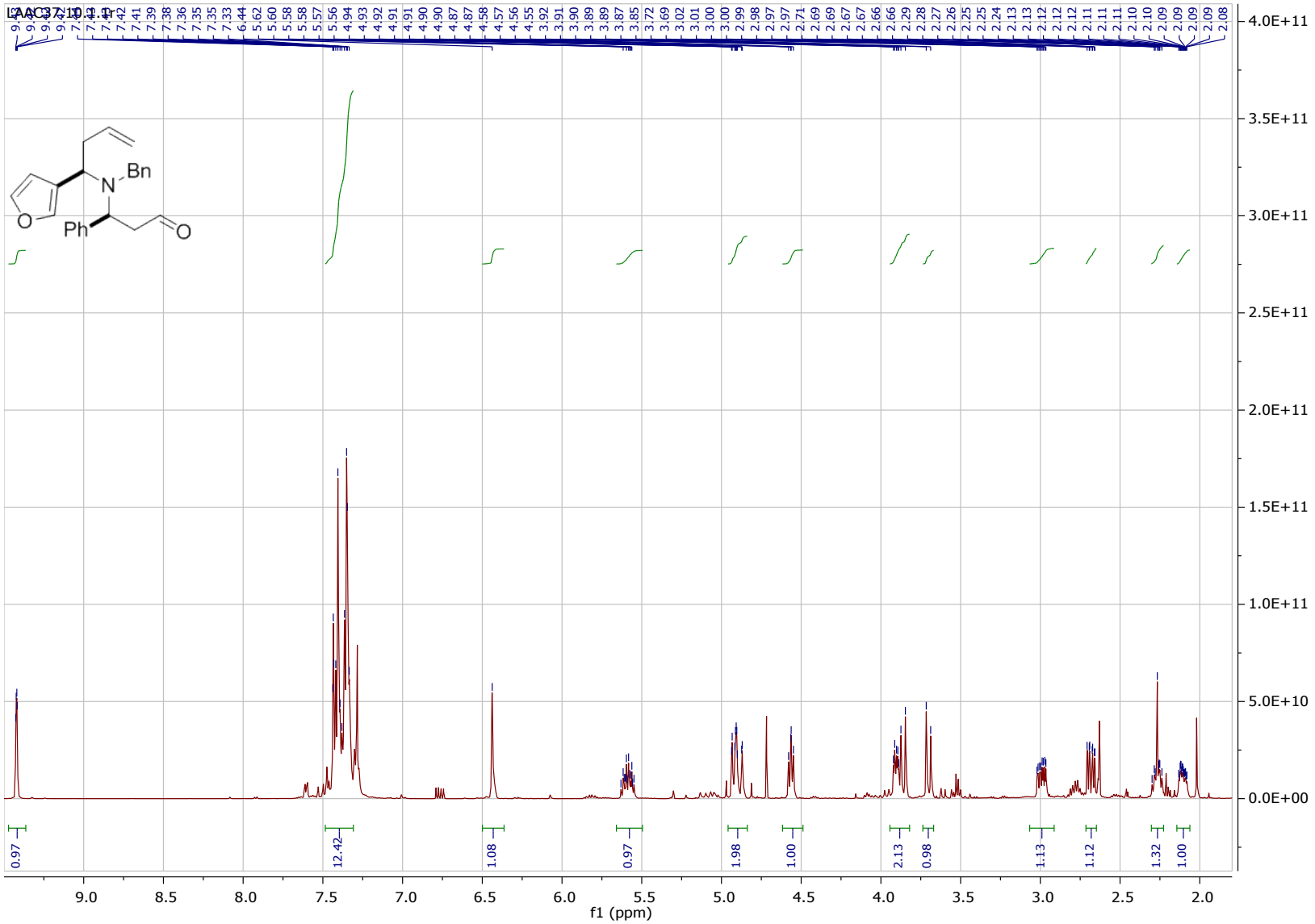

JLV-3527cF1.11.1.1r
174.73
145.54
139.82
128.87
128.44
128.07
127.80
127.01
126.35
80.24
66.73
62.66
54.04
47.16
34.28
32.25
31.19
28.54
28.19
22.96
22.77
14.26
CO2tBu
Ph
N
C5H11
Bn
6.0E+10
5.5E+10
5.0E+10
4.5E+10
4.0E+10
3.5E+10
3.0E+10
2.5E+10
2.0E+10
1.5E+10
1.0E+10
5.0E+09
0.0E+00
-5.0E+09
80
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

(±)-(*S*)-3-{Benzyl[(*R*)-1-(furan-3-yl)but-3-en-1-yl]amino}-3-phenylpropan-1-ol

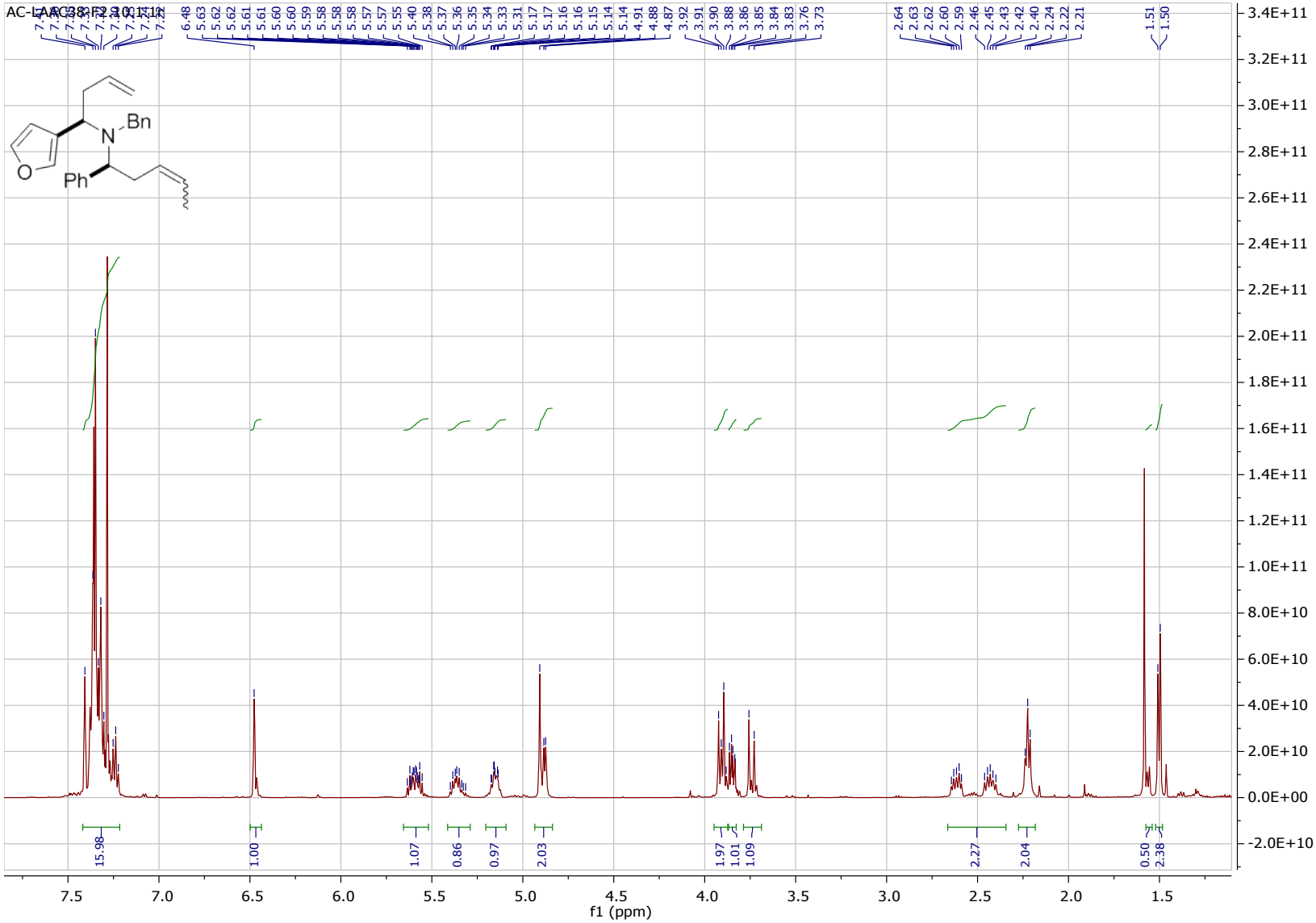


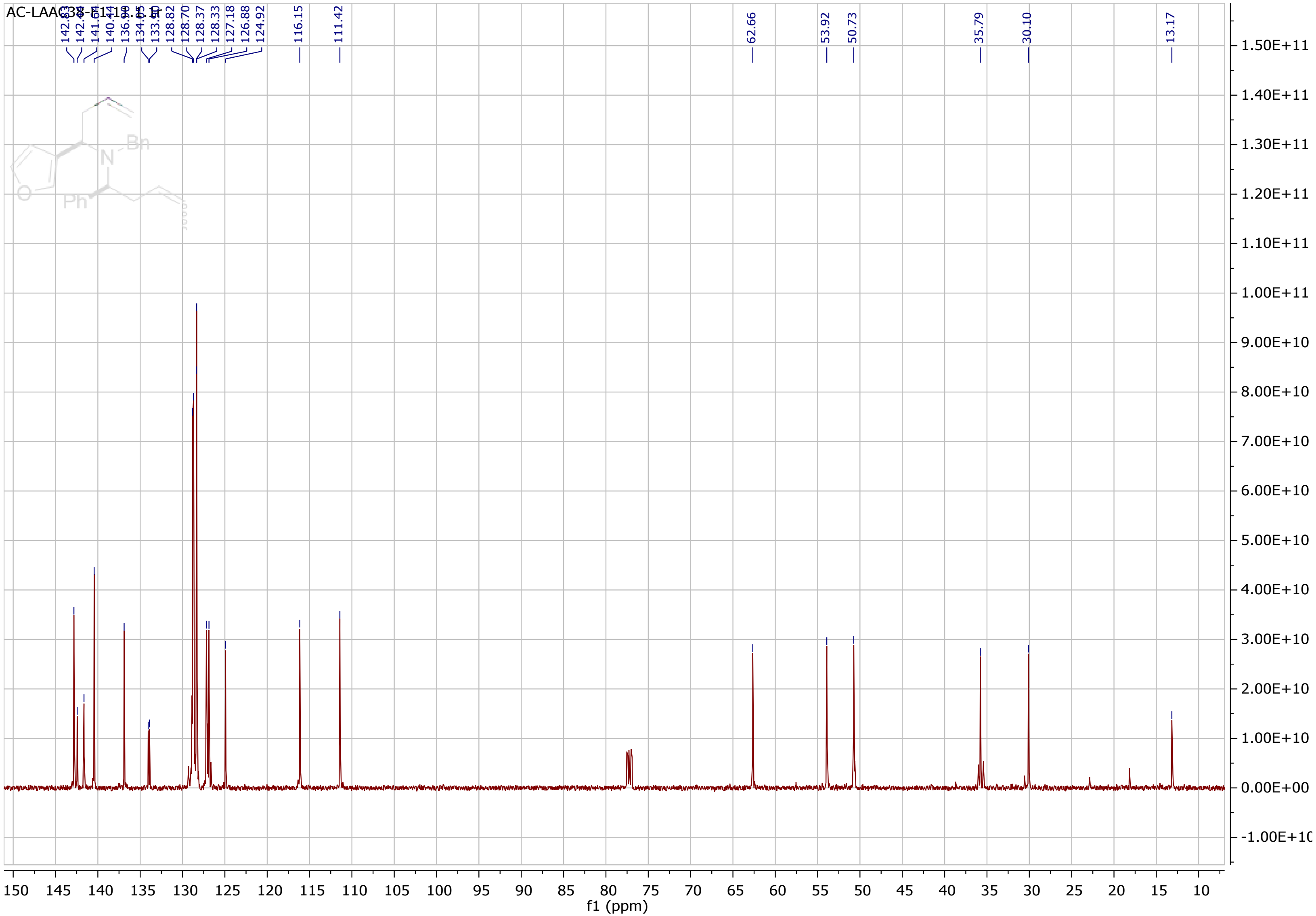

LAAC33F1.11.1.1r
143.0
141.4
140.5
140.4
136.11
129.04
128.68
128.58
127.54
127.18
126.60
116.31
111.09
61.43
59.95
53.69
50.51
35.12
34.69
Bn
N
Ph
OH
O
AcOEt
2.5E+11
2.0E+11
1.5E+11
1.0E+11
5.0E+10
0.0E+00
f1 (ppm)

(±)-(S)-3-{Benzyl[(R)-1-(furan-3-yl)but-3-en-1-yl]amino}-3-phenylpropanal



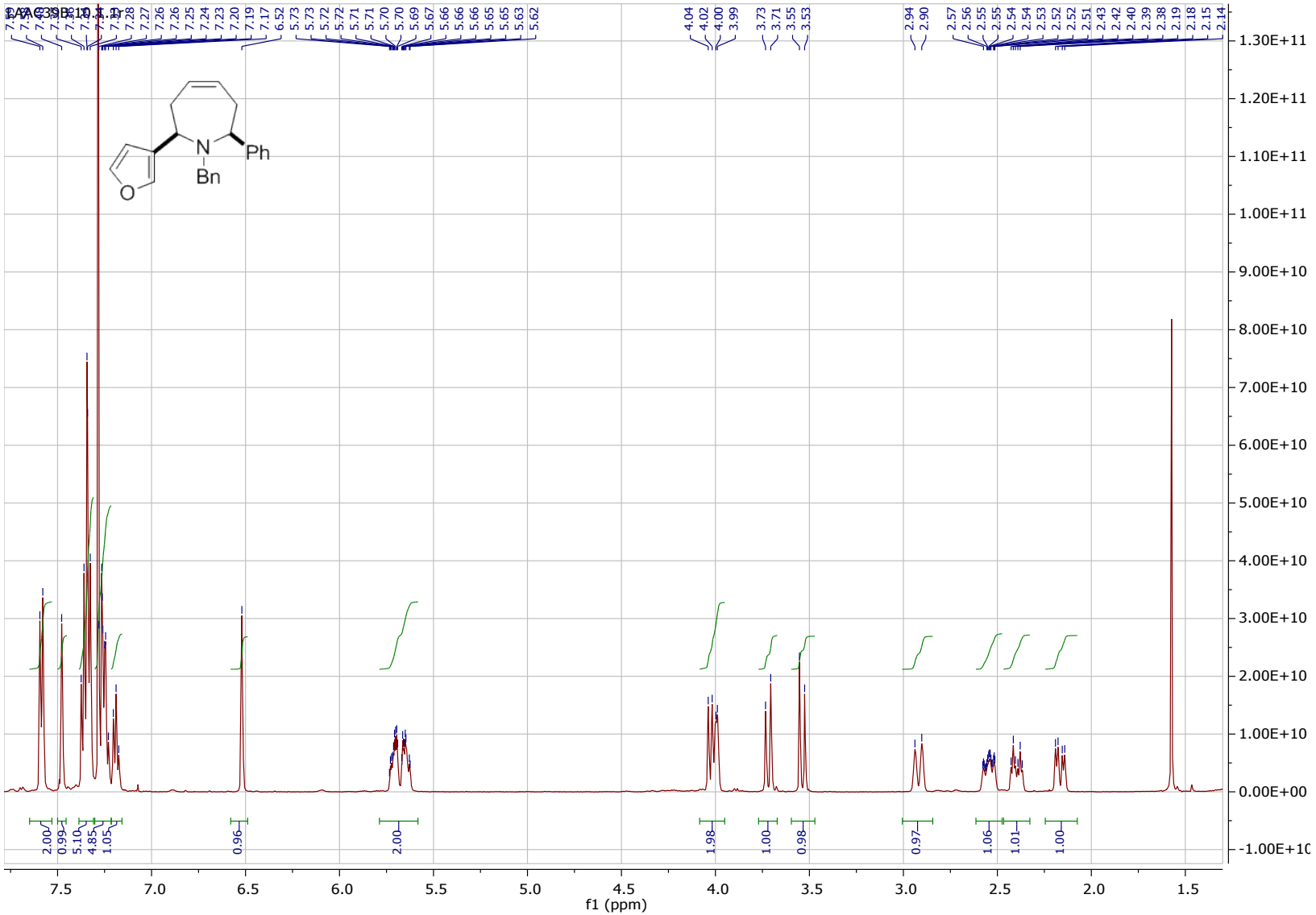
(±)-(*R,Z*)-*N*-Benzyl-*N*-[(R)-1-phenylbut-3-en-1-yl]dec-2-en-5-amine 12

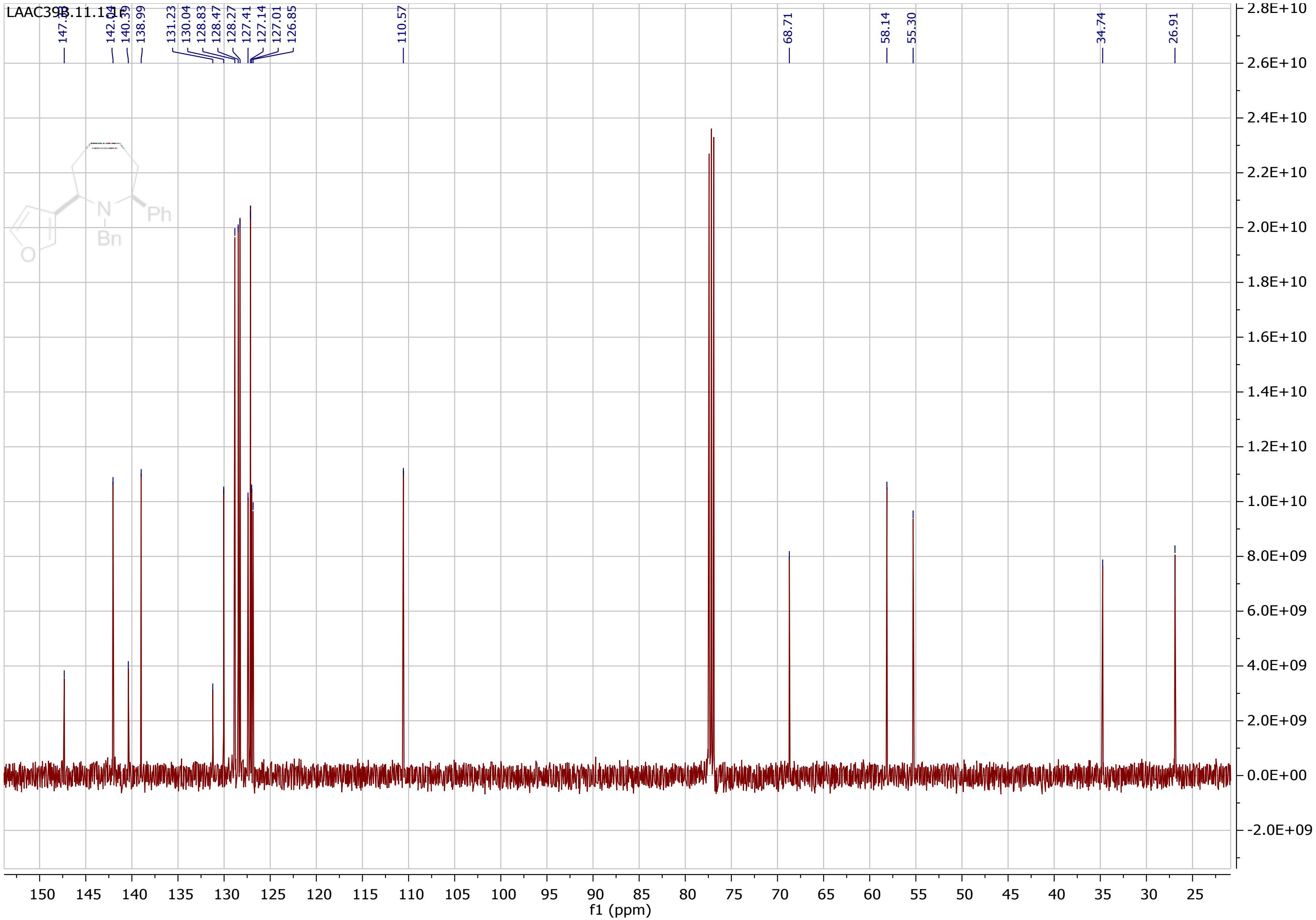




AC-LAAC38-E119.1.fid
142.83
142.47
141.64
140.42
136.99
134.05
133.91
128.82
128.70
128.37
128.33
127.18
126.88
124.92
116.15
111.42
62.66
53.92
50.73
35.79
30.10
13.17
N
Bn
O
Ph
f1 (ppm)

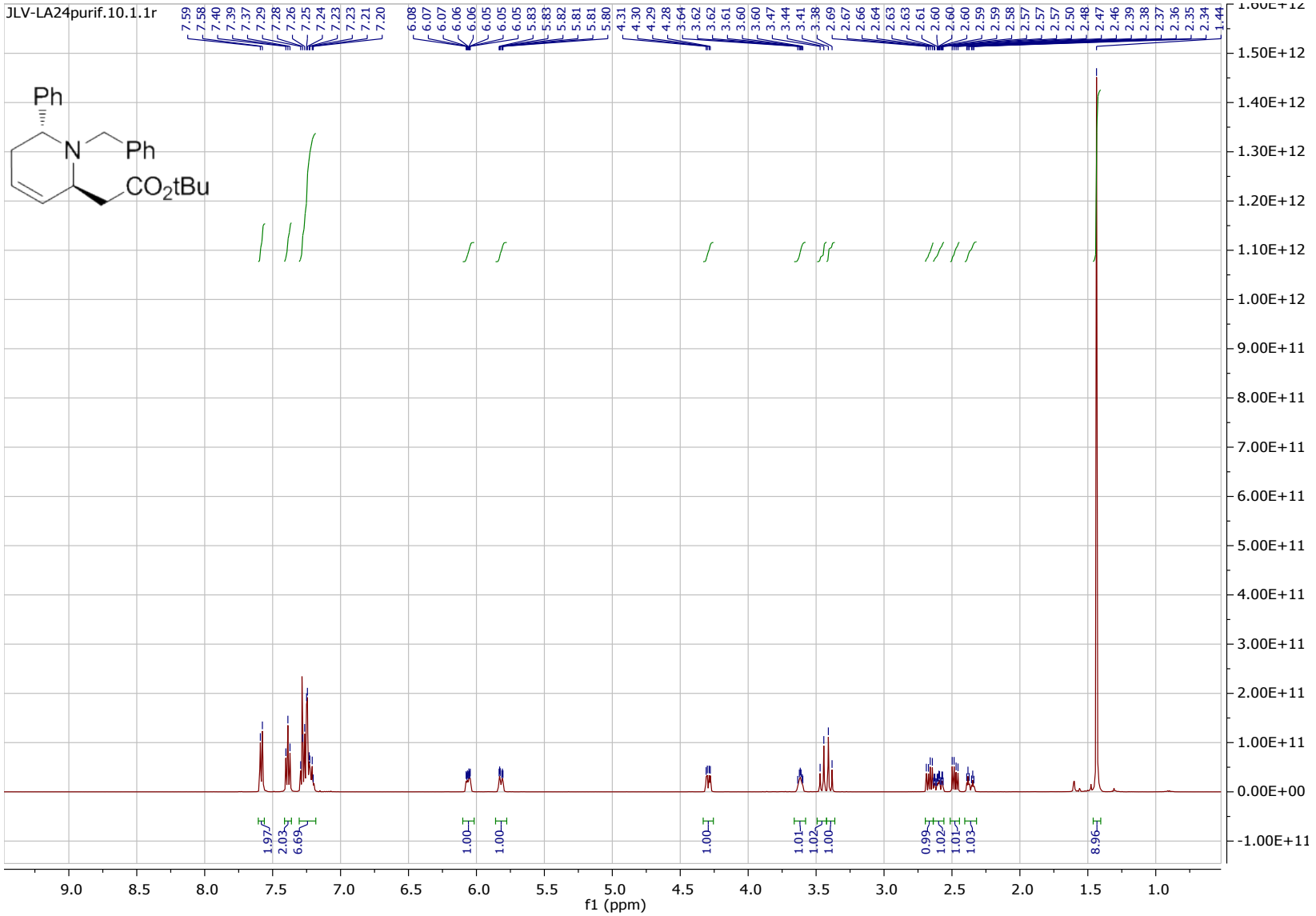
(2*R*,7*S*)-1-Benzyl-2-(furan-3-yl)-7-phenyl-2,3,6,7-tetrahydro-1H-azepine 13

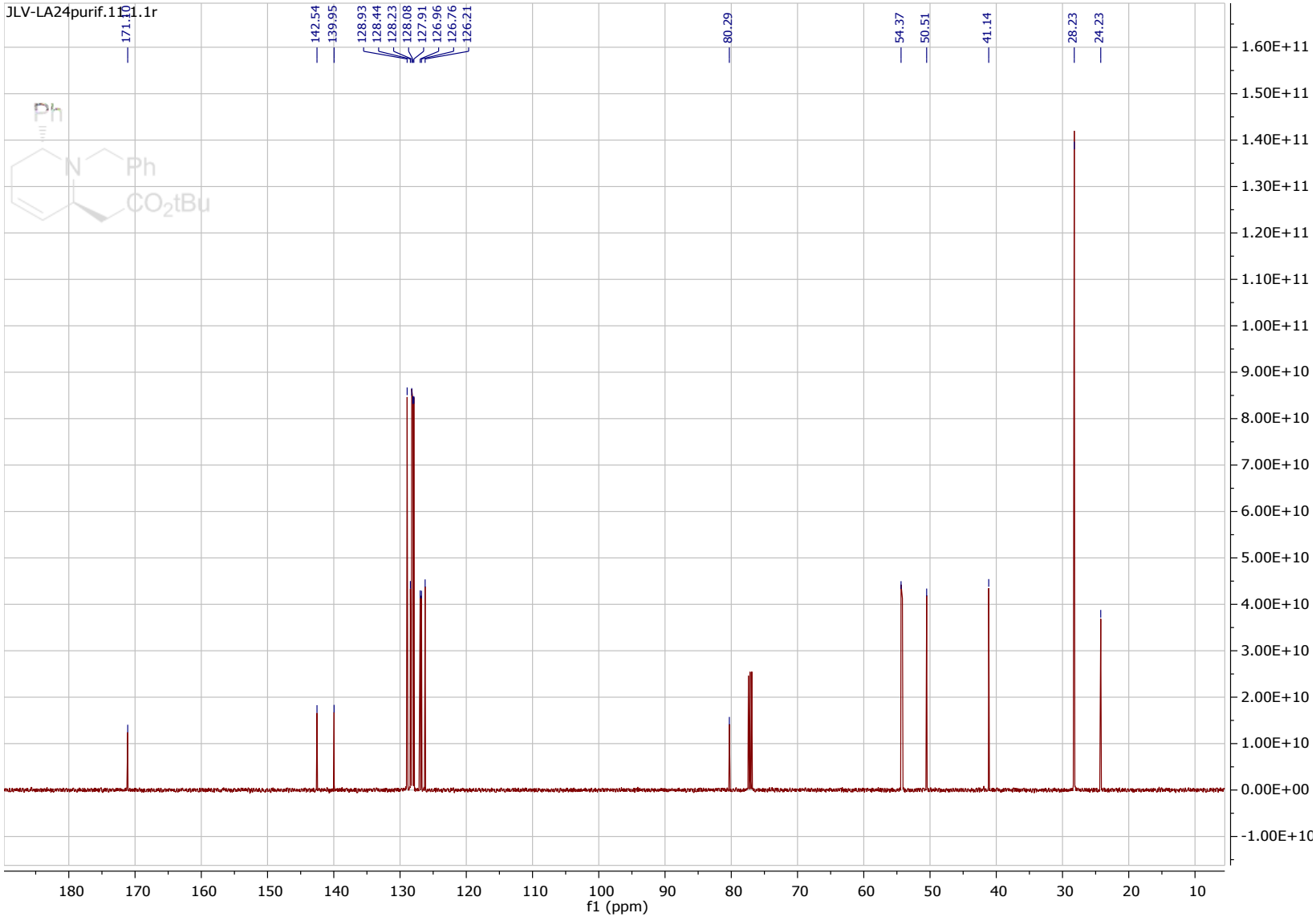




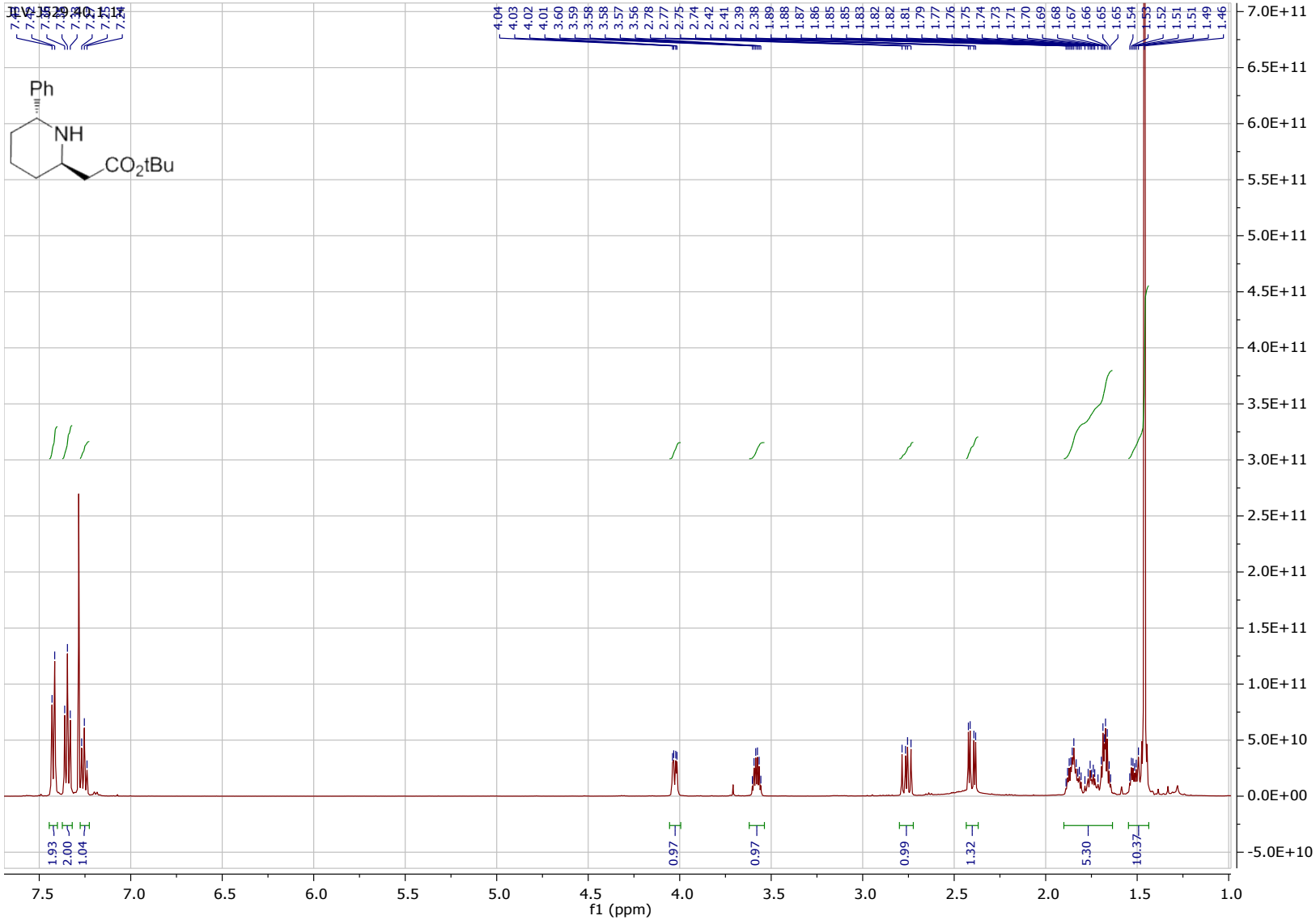
142.04
140.37
138.99
131.23
130.04
128.83
128.47
128.27
127.41
127.14
127.01
126.85
110.57
68.71
58.14
55.30
34.74
26.91
N
Ph
Bn
O
f1 (ppm)

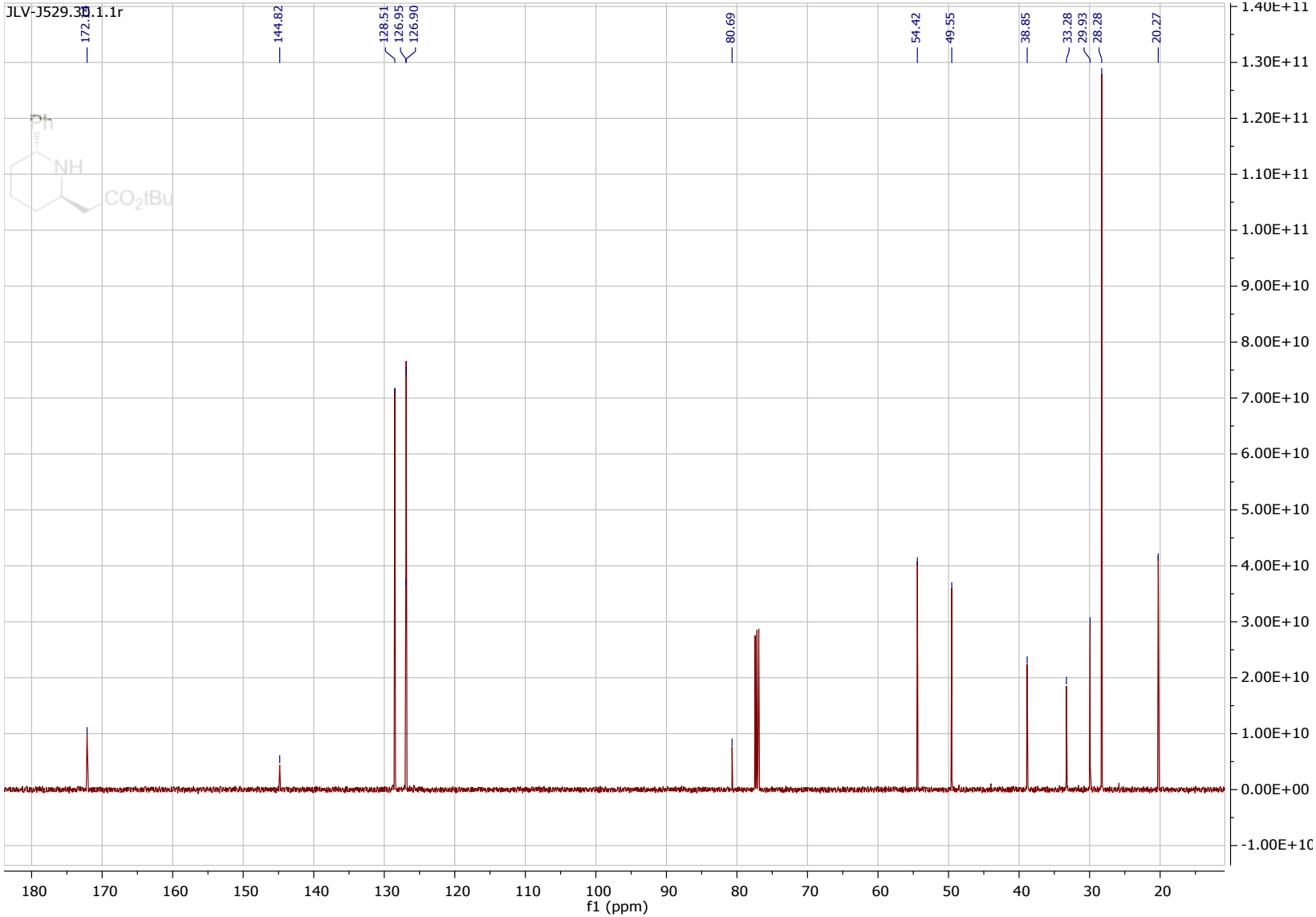
***Tert*-Butyl 2-[(*2S,6R*)-1-Benzyl-6-phenyl-1,2,5,6-tetrahydropyridin-2-yl]acetate 14**




JLV-LA24purif.11.1.1r
171.11
142.54
139.95
128.93
128.44
128.23
128.08
127.91
126.96
126.76
126.21
80.29
54.37
50.51
41.14
28.23
24.23
Ph
N
Ph
CO2tBu
1.60E+11
1.50E+11
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

***Tert*-Butyl 2-[(2*R*,6*R*)-6-phenylpiperidin-2-yl]acetate**




JLV-J529.3
172.
144.82
128.51
126.95
126.90
80.69
54.42
49.55
38.85
33.28
29.93
28.28
20.27
Ph
NH
CO2tBu
1.40E+11
1.30E+11
1.20E+11
1.10E+11
1.00E+11
9.00E+10
8.00E+10
7.00E+10
6.00E+10
5.00E+10
4.00E+10
3.00E+10
2.00E+10
1.00E+10
0.00E+00
-1.00E+10
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)