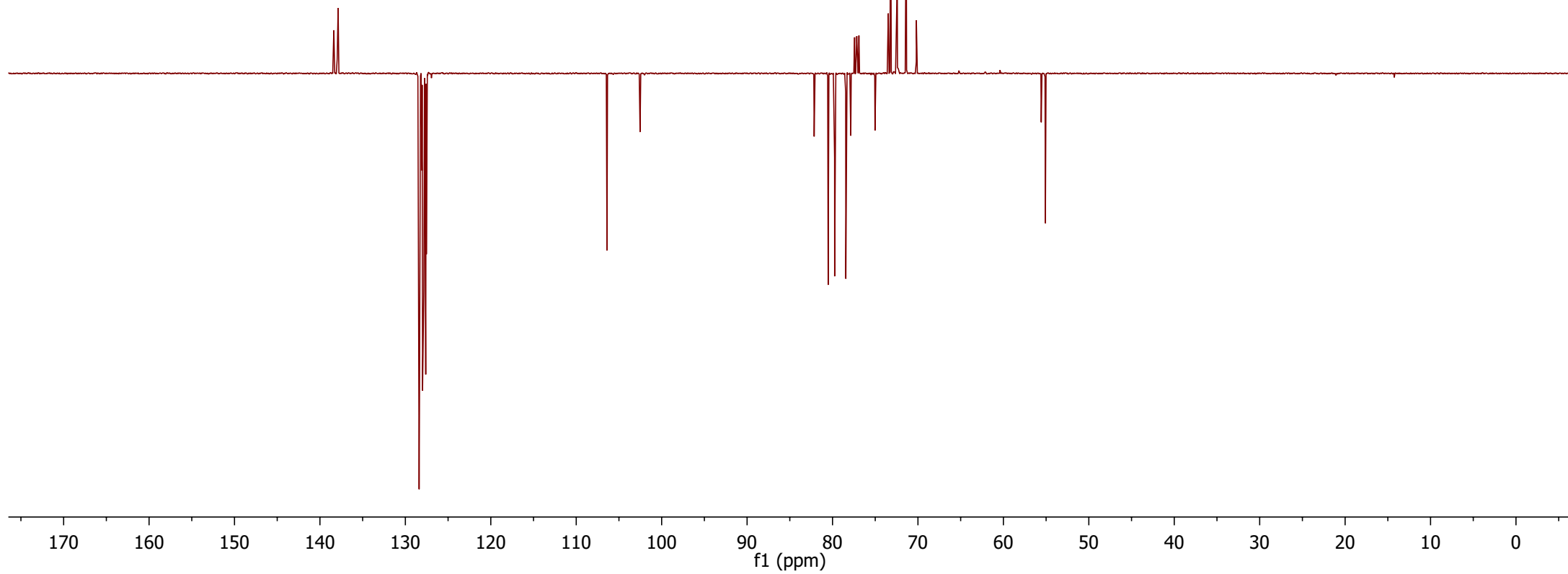
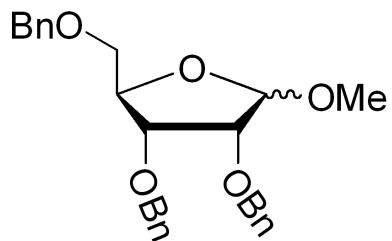


Compound **5**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz

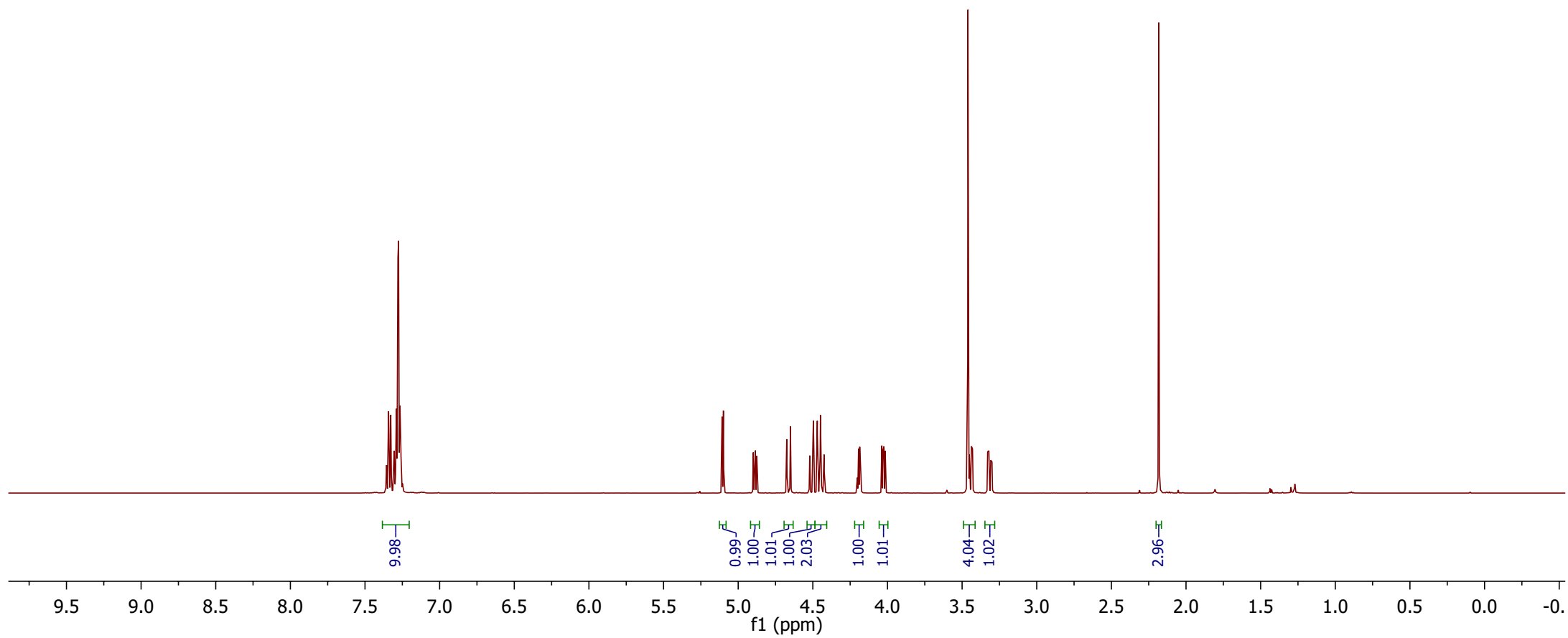
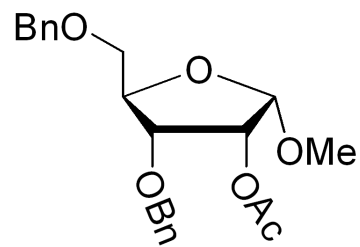
138.37  
138.31  
137.98  
137.89  
137.87  
128.44  
128.41  
128.39  
128.35  
128.34  
128.31  
128.05  
127.99  
127.95  
127.91  
127.84  
127.80  
127.71  
127.69  
127.67  
127.63  
127.61  
127.54  
106.40  
102.53  
82.15  
80.51  
79.75  
78.44  
77.86  
75.03  
73.48  
73.19  
72.47  
72.45  
72.35  
72.34  
71.37  
70.19  
55.57  
55.09



Compound **6**,  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 500 MHz

7.36  
7.34  
7.34  
7.33  
7.33  
7.33  
7.30  
7.30  
7.29  
7.29  
7.29  
7.28  
7.27  
7.27  
7.27  
7.26  
7.26  
7.26  
7.26  
5.11  
5.10  
4.90  
4.89  
4.88  
4.88  
4.67  
4.65  
4.52  
4.50  
4.47  
4.45  
4.45  
4.42  
4.19  
4.19  
4.04  
4.03  
4.02  
4.02  
3.46  
3.45  
3.44  
3.43  
3.33  
3.32  
3.31  
3.30

2.18



Compound **6**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz

—170.22

—137.75

—137.74

—128.21

—128.17

—127.97

—127.67

—127.50

—101.64

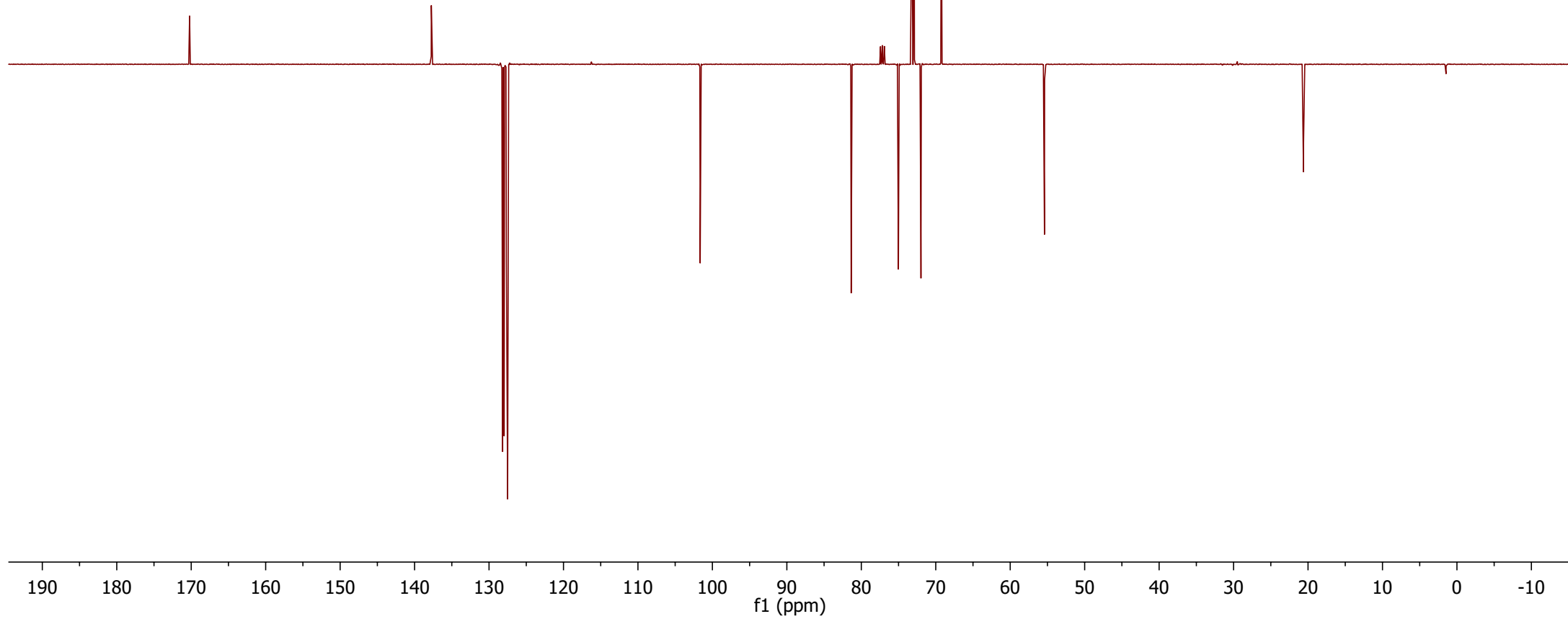
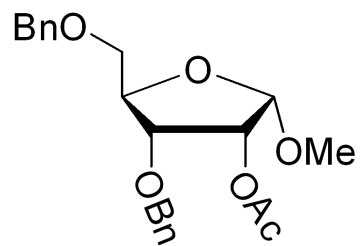
—81.36

—75.01

—71.99

—55.40

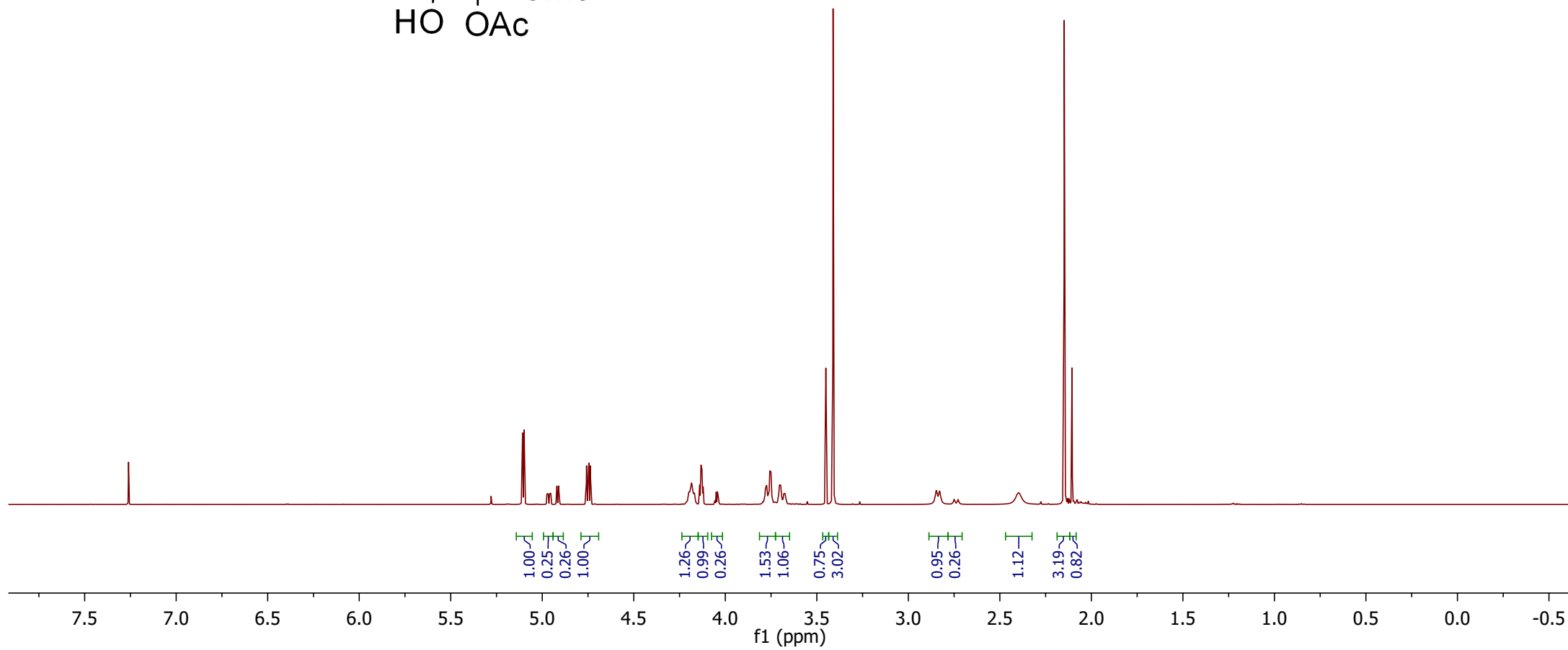
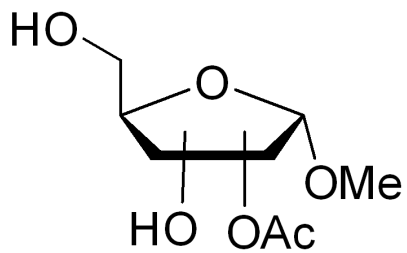
—20.61



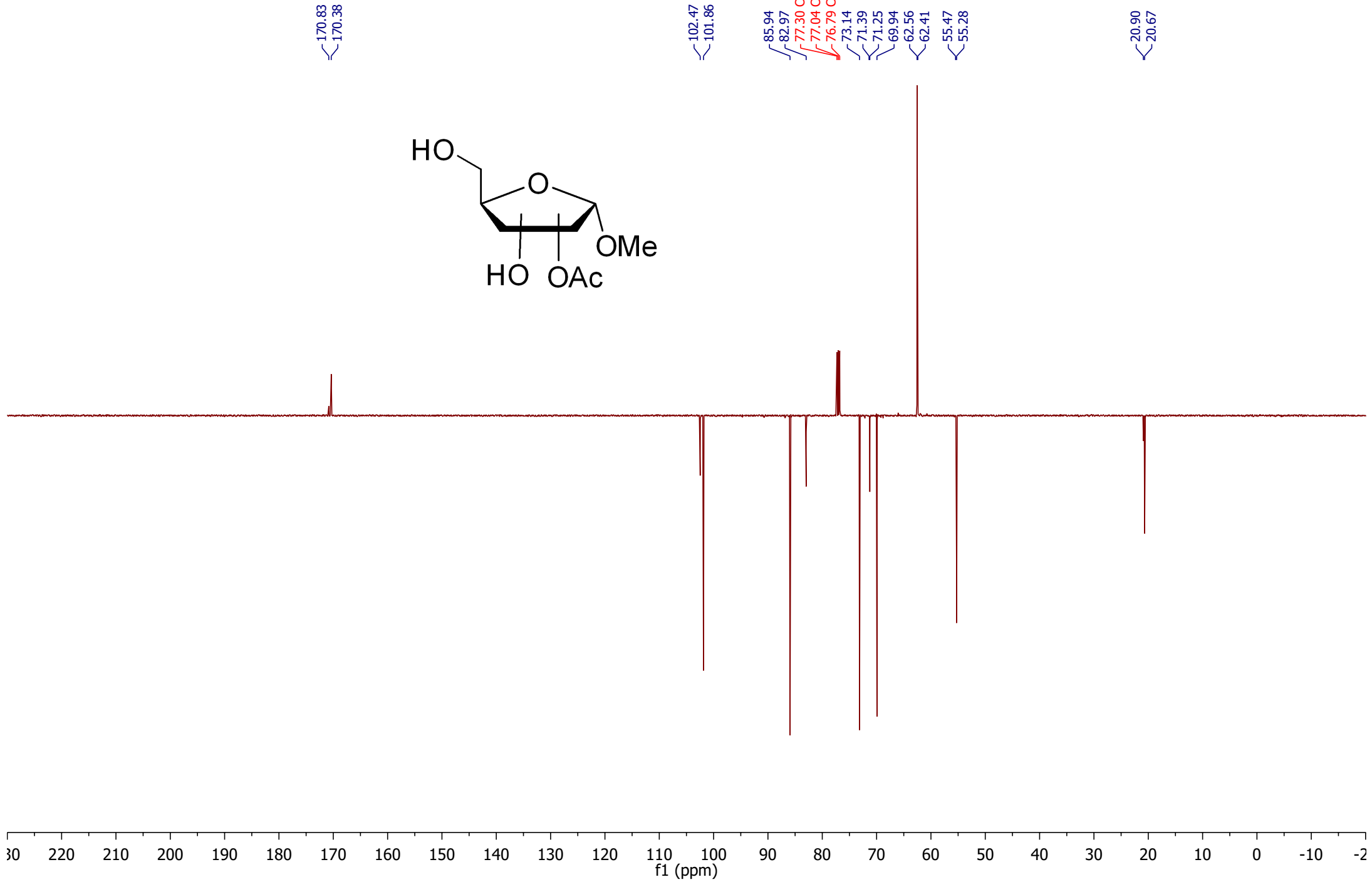
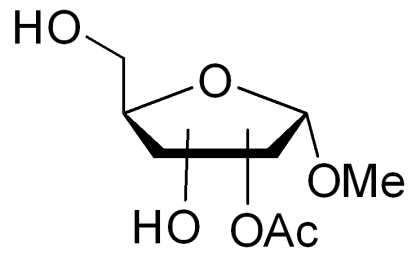
Compound 7,  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 500 MHz

—7.26  $\text{CDCl}_3$

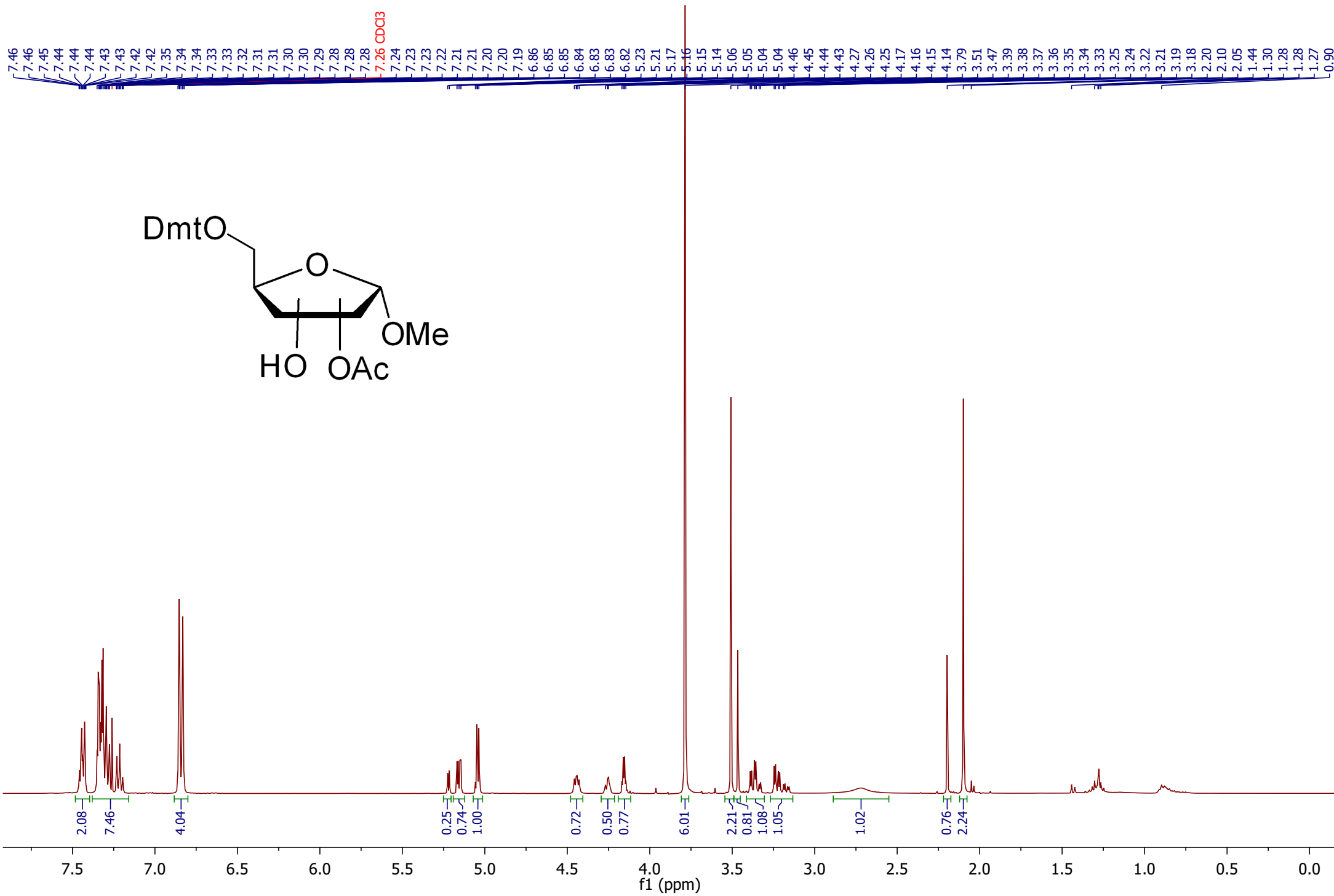
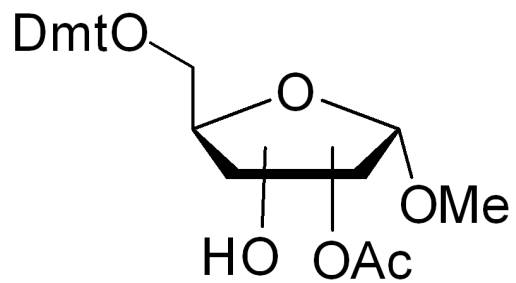
5.28  
5.11  
5.10  
4.97  
4.97  
4.96  
4.95  
4.92  
4.91  
4.76  
4.75  
4.74  
4.21  
4.20  
4.20  
4.19  
4.18  
4.18  
4.17  
4.14  
4.14  
4.13  
4.13  
4.12  
4.06  
4.05  
4.04  
4.04  
3.80  
3.79  
3.78  
3.77  
3.77  
3.76  
3.75  
3.70  
3.70  
3.68  
3.67  
3.67  
3.45  
3.41  
2.85  
2.83  
2.75  
2.73  
2.40  
2.15  
2.14  
2.13  
2.12  
2.11  
2.10  
2.08  
1.23



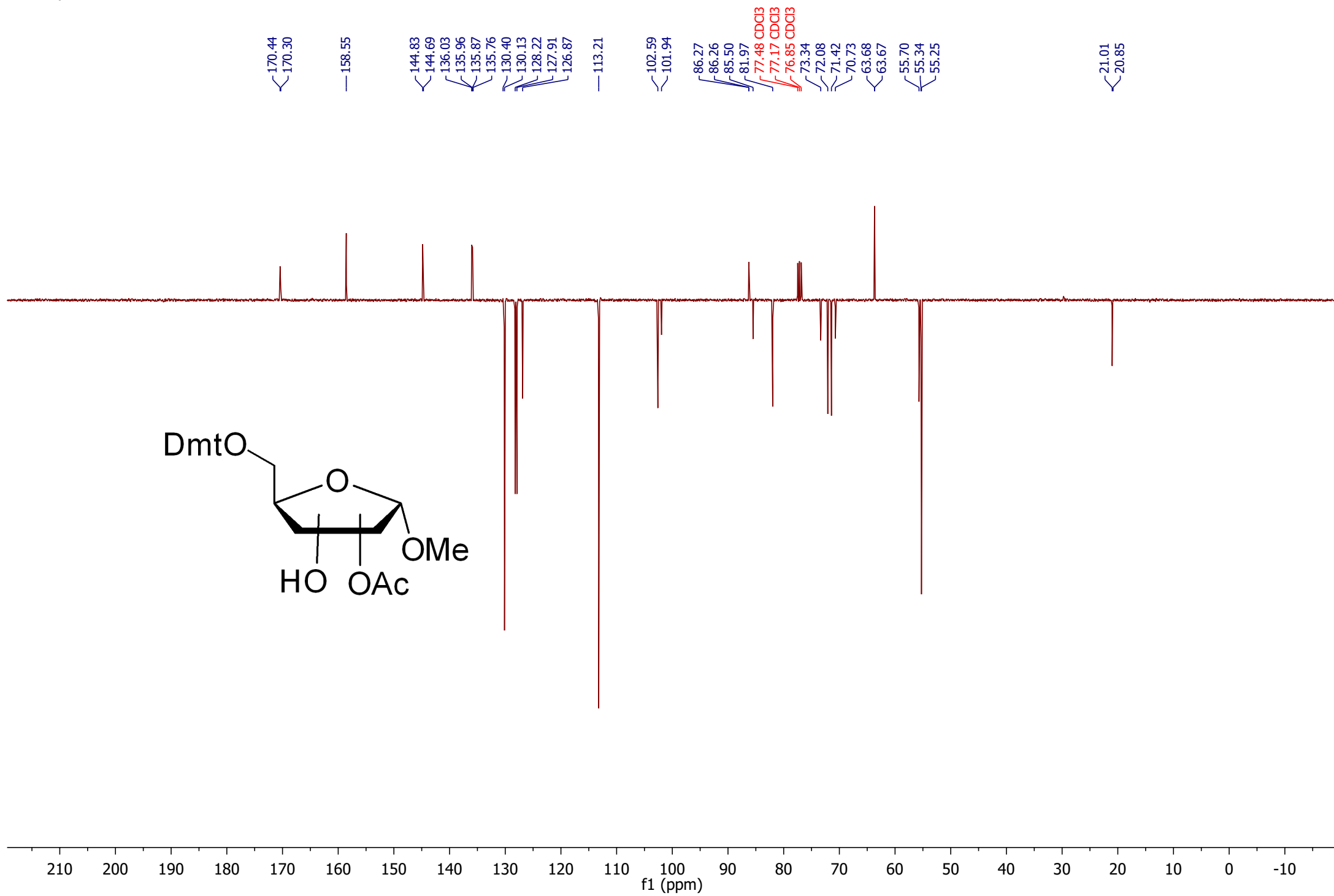
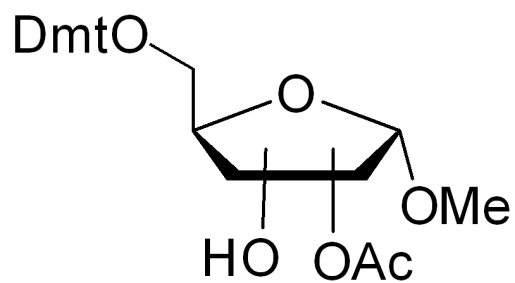
Compound 7,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz



Compound **8**, <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz



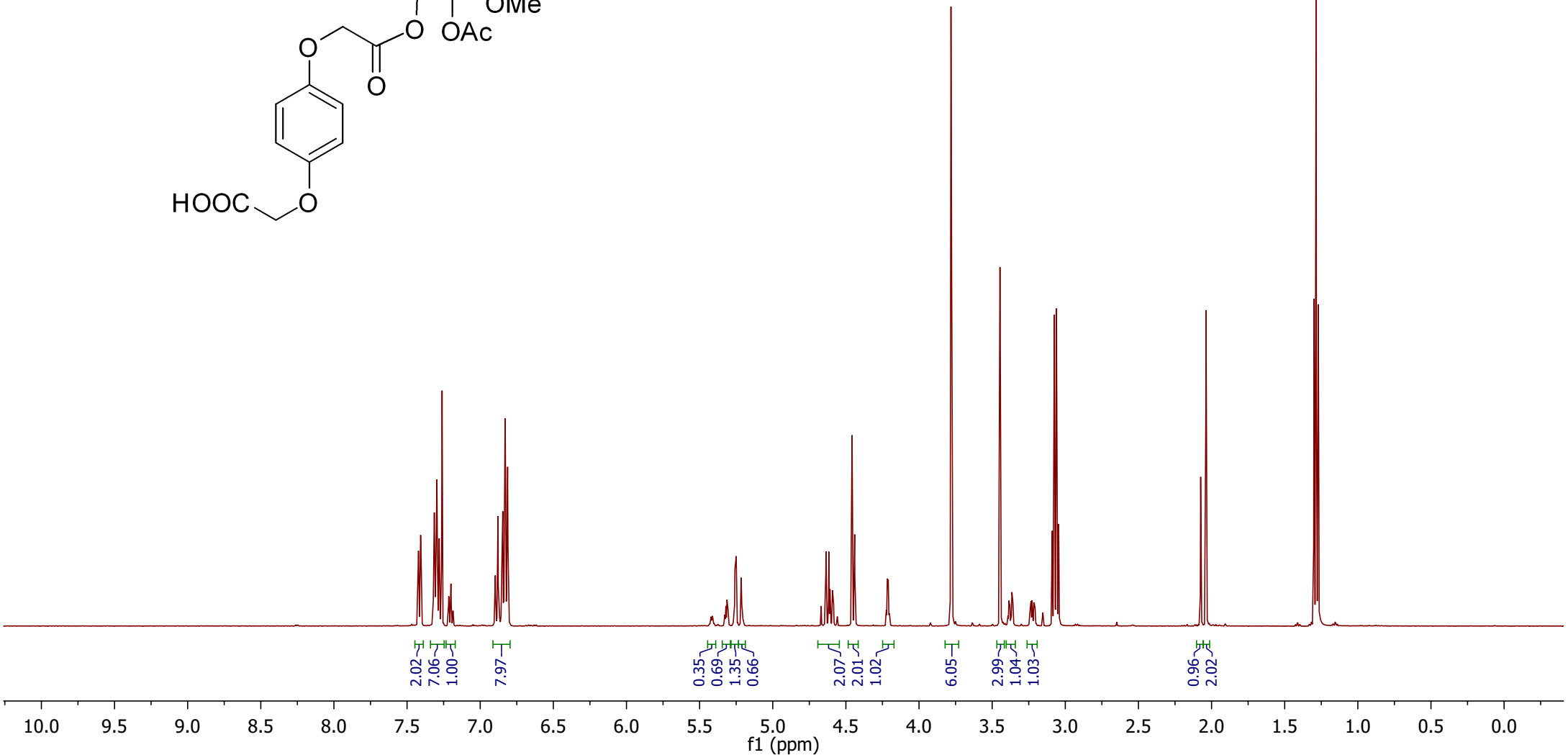
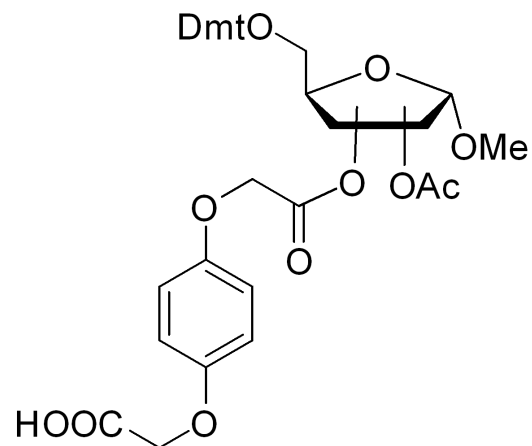
Compound **8**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 101 MHz





Compound 10, <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 500 MHz

7.42 7.42 7.41 7.41 7.40 7.32 7.31 7.31 7.30 7.30 7.30 7.29 7.28 7.26 7.26 7.22 7.22 7.21 7.20 7.19 7.18 7.18 6.90 6.89 6.88 6.87 6.86 6.85 6.85 6.84 6.83 6.83 6.83 6.81 6.81 6.81 6.81 6.81 5.42 5.41 5.33 5.32 5.31 5.31 5.31 5.27 5.26 5.26 5.25 5.25 5.21 5.21 4.67 4.64 4.64 4.62 4.62 4.61 4.59 4.58 4.46 4.44 4.22 4.22 4.21 4.21 4.20 3.78 3.78 3.45 3.44 3.39 3.39 3.38 3.38 3.36 3.36 3.24 3.23 3.23 3.21 3.21 3.09 3.07 3.06 3.05 2.07 2.04



Compound **10**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz

174.15  
174.14  
170.34  
169.88  
168.67  
168.30

158.52  
158.50  
153.69  
152.00  
151.98

144.60

135.85  
135.81  
135.70  
135.63  
130.06  
130.04  
128.14  
127.86  
126.84  
126.82

115.85  
115.76  
115.56  
113.16

101.51  
101.49

86.33  
86.28

81.06  
80.88

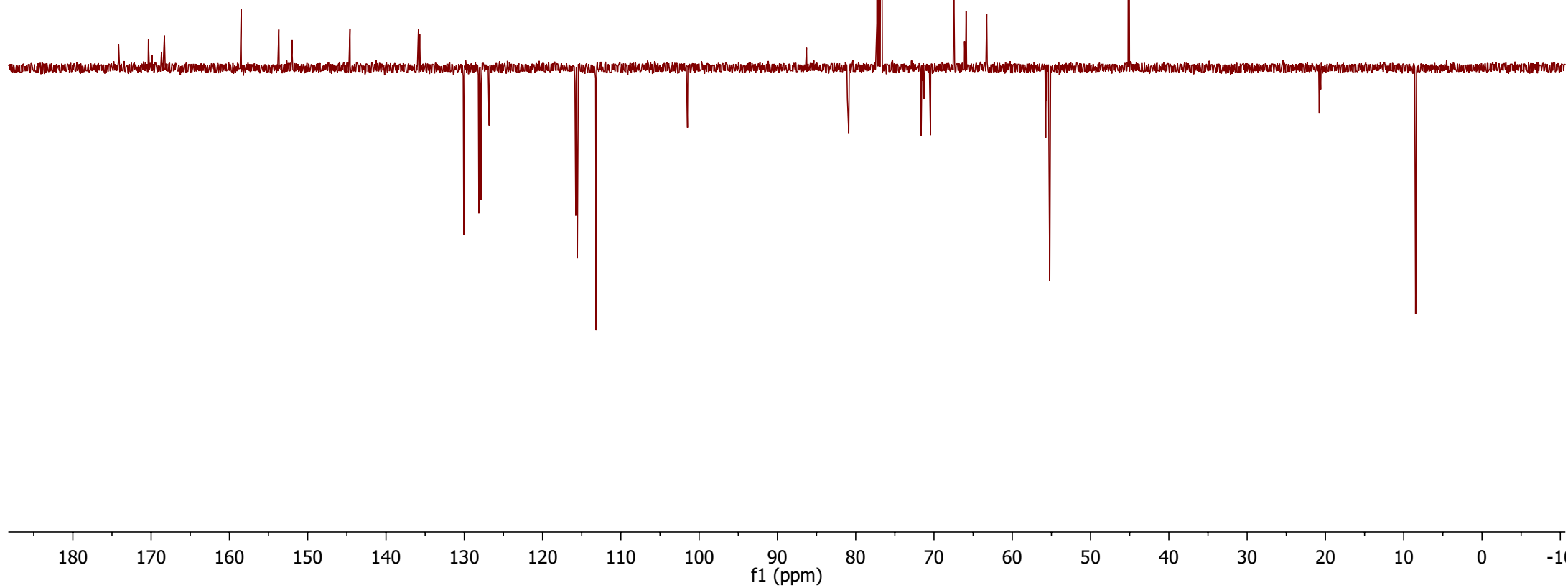
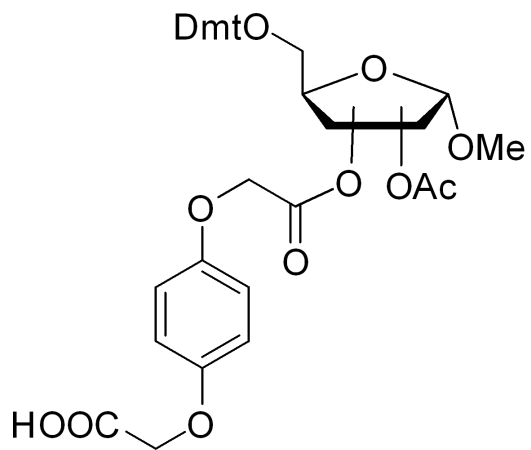
71.64  
71.49  
71.27  
70.45

67.47  
66.10  
65.90

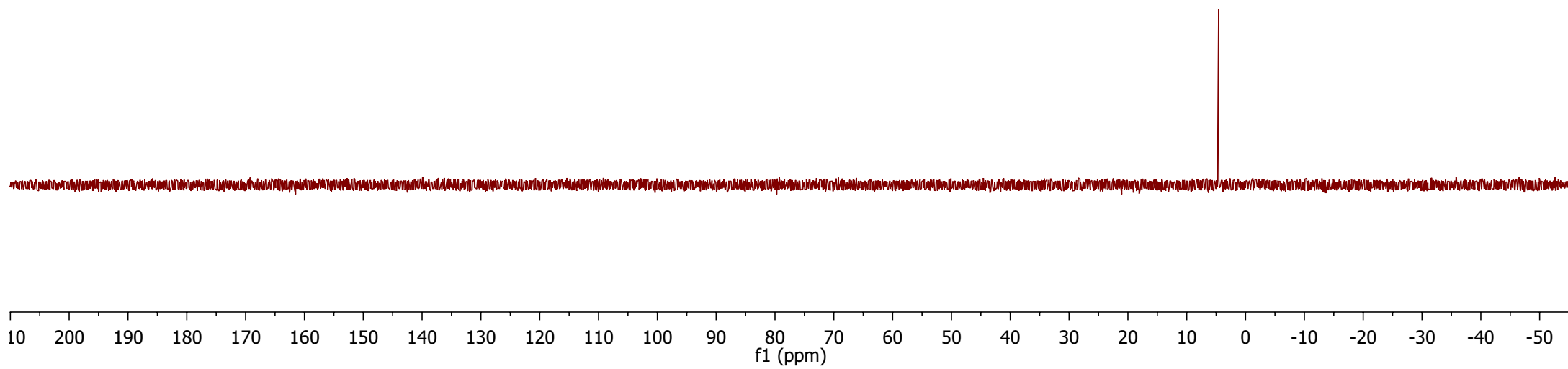
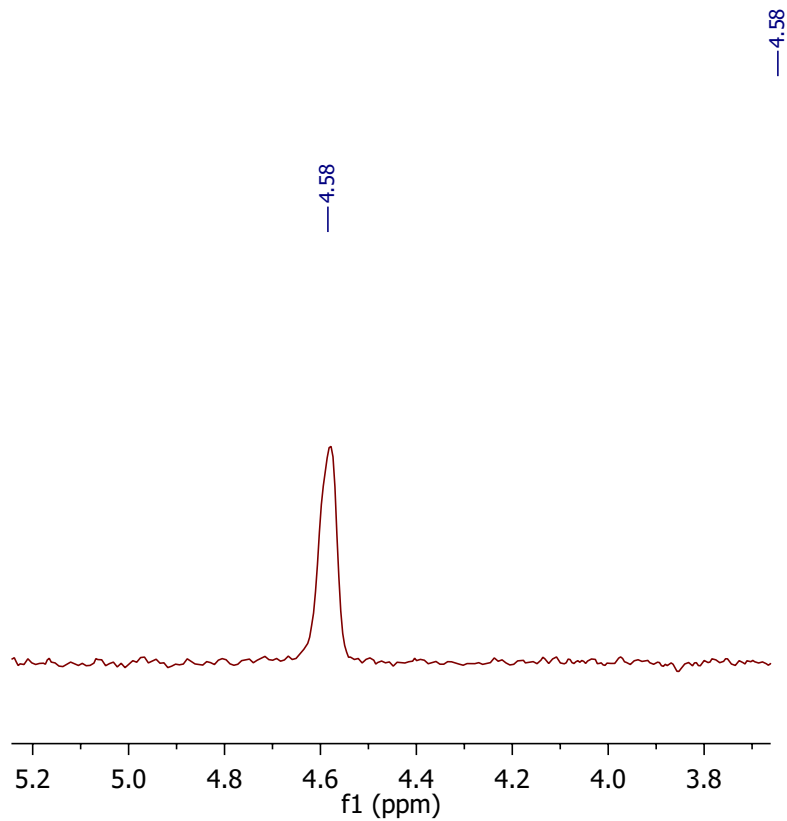
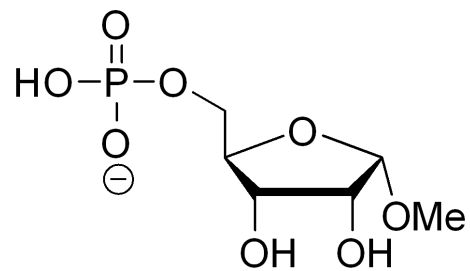
63.30  
63.27

55.73  
55.62  
55.21

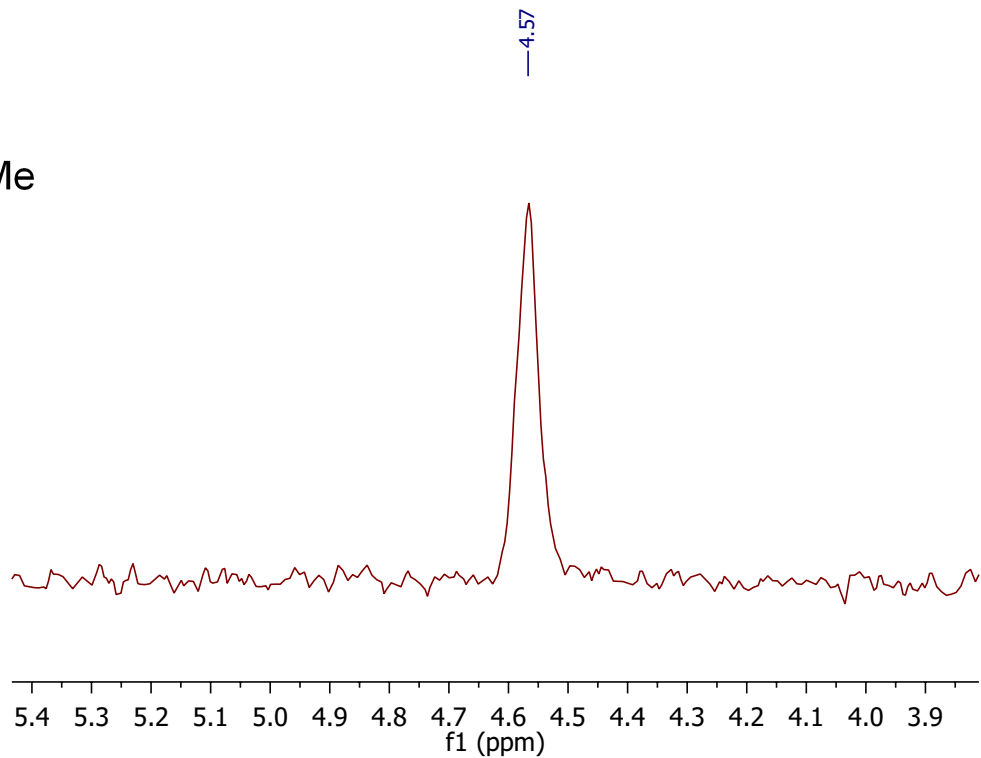
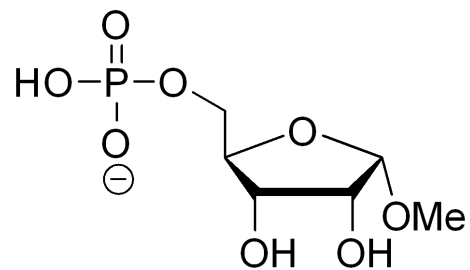
20.79  
20.60



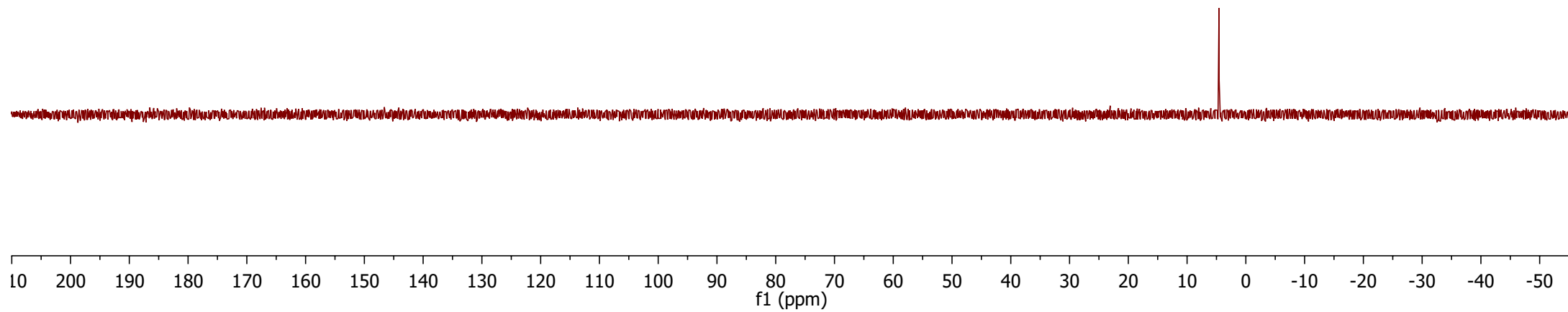
Compound **2m** (deprotected),  $^{31}\text{P}$ -NMR,  $\text{D}_2\text{O}$ , 162 MHz



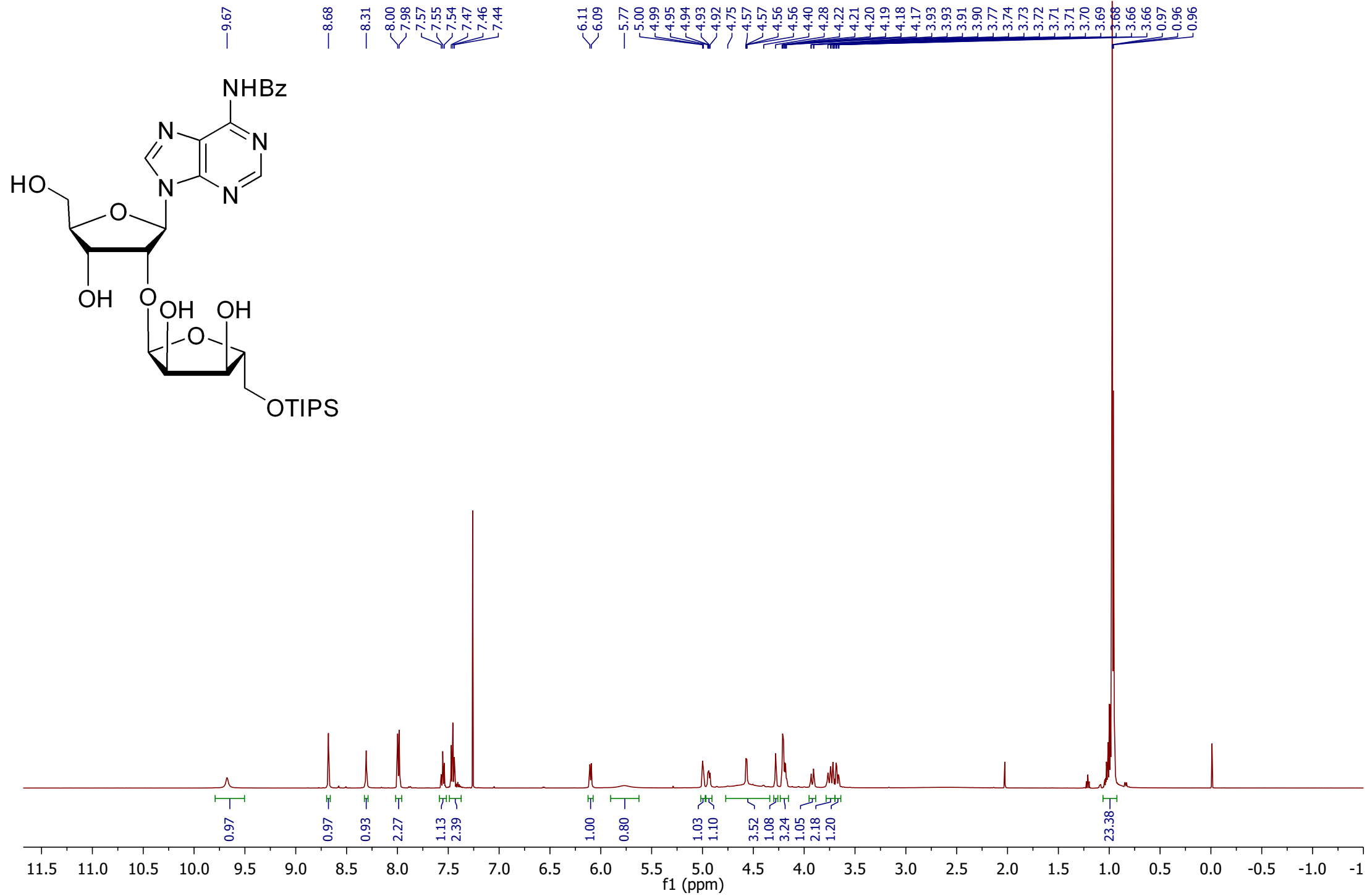
Compound **2k** (deprotected),  $^{31}\text{P}$ -NMR,  $\text{D}_2\text{O}$ , 162 MHz



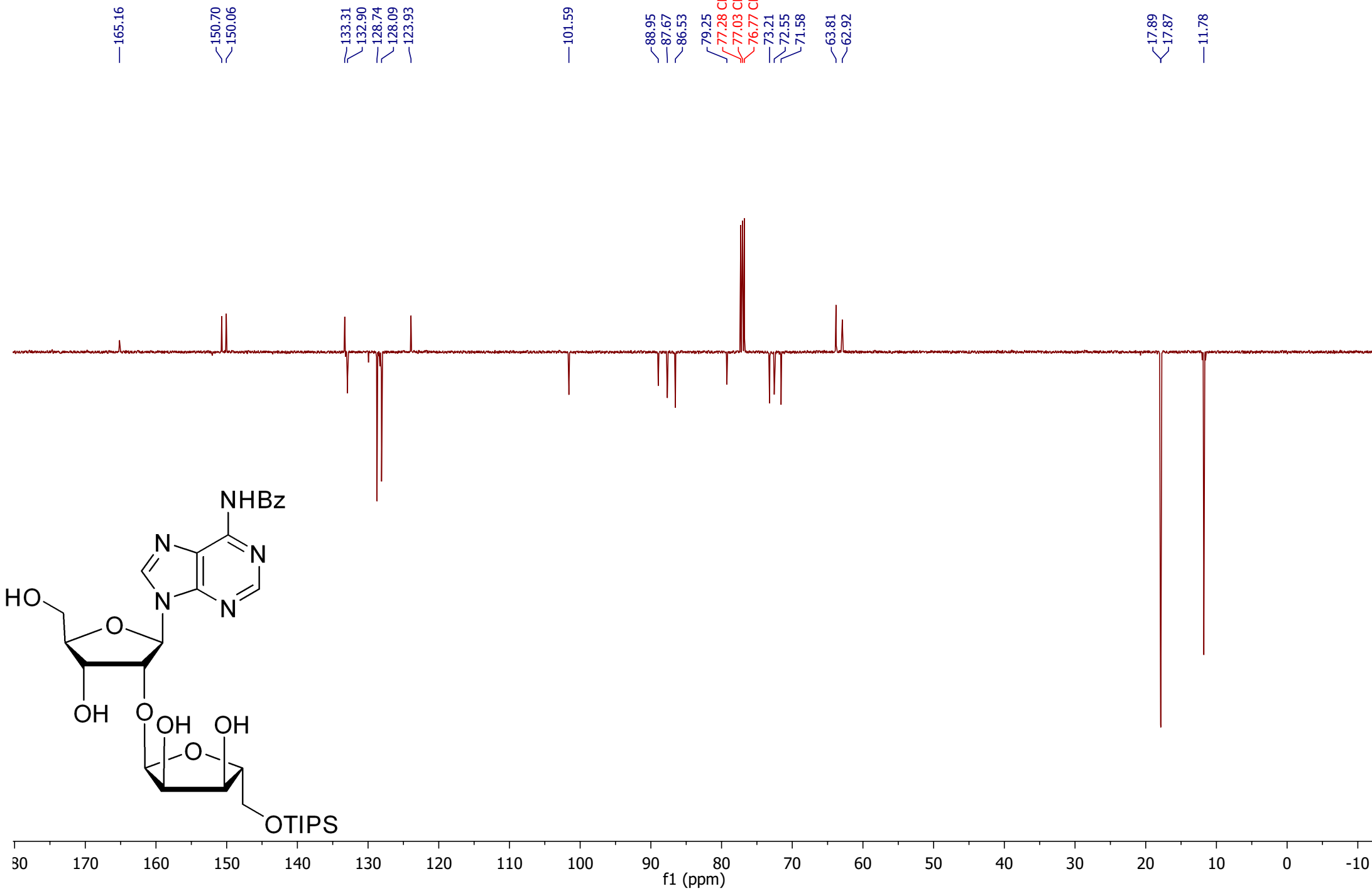
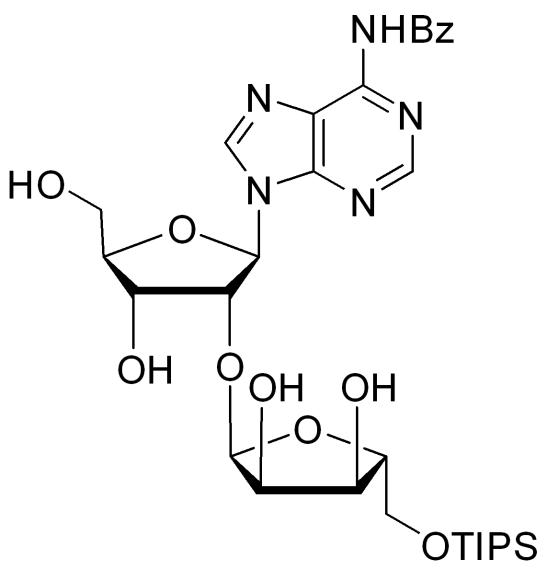
4.57



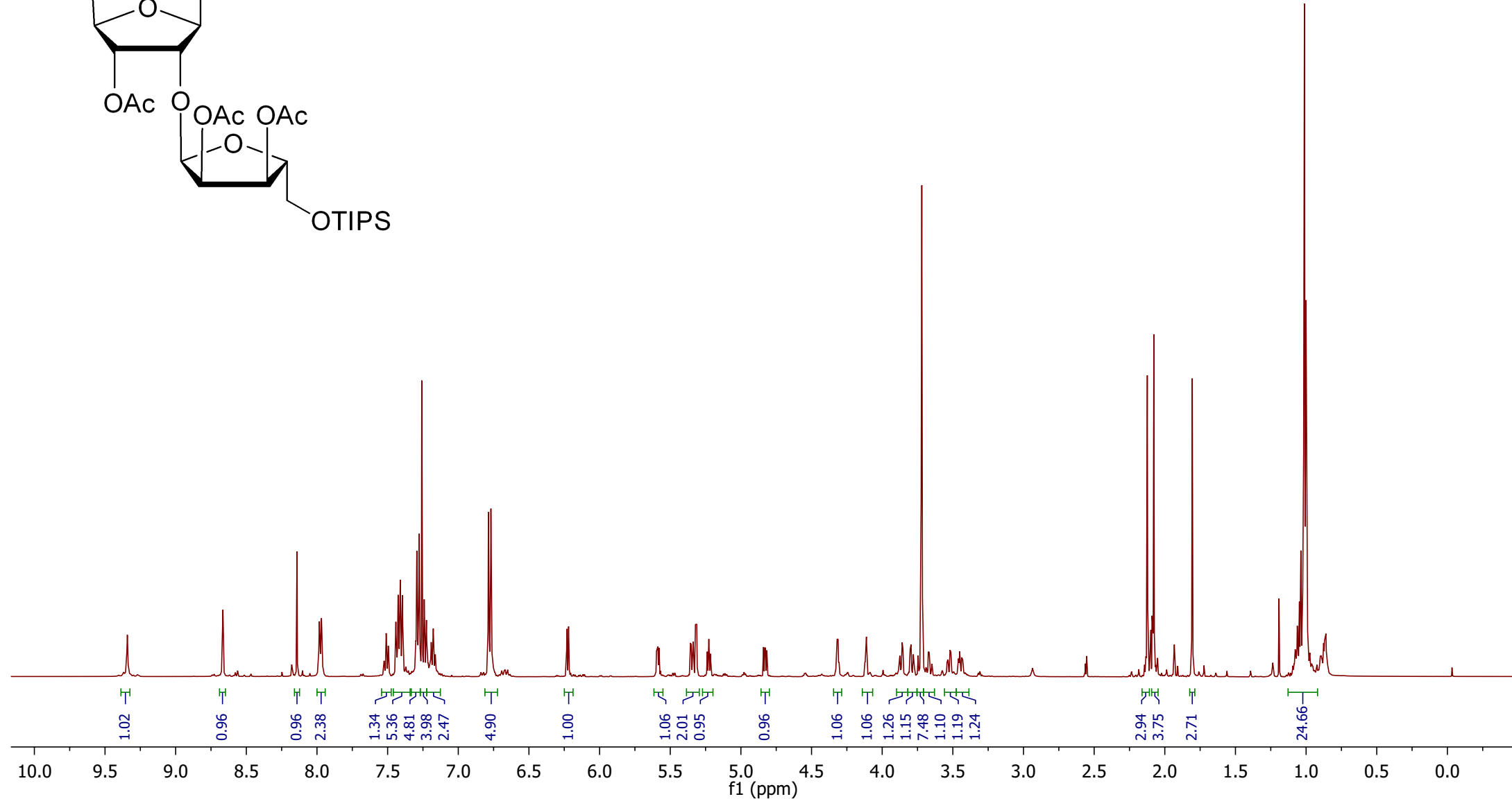
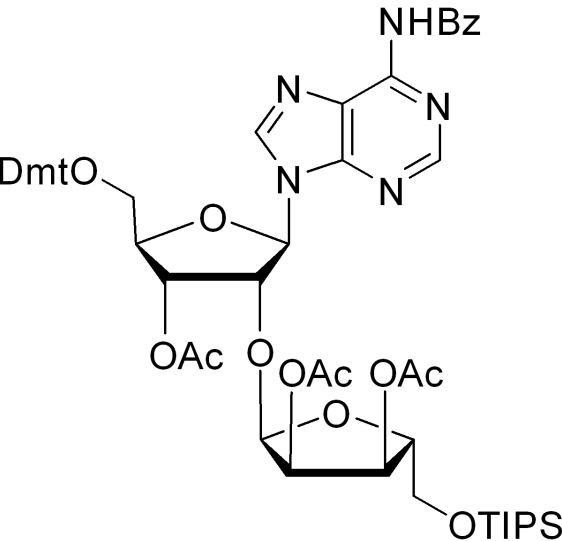
Compound **15**,  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 500 MHz



Compound **15**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz



Compound **16**,  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 500 MHz



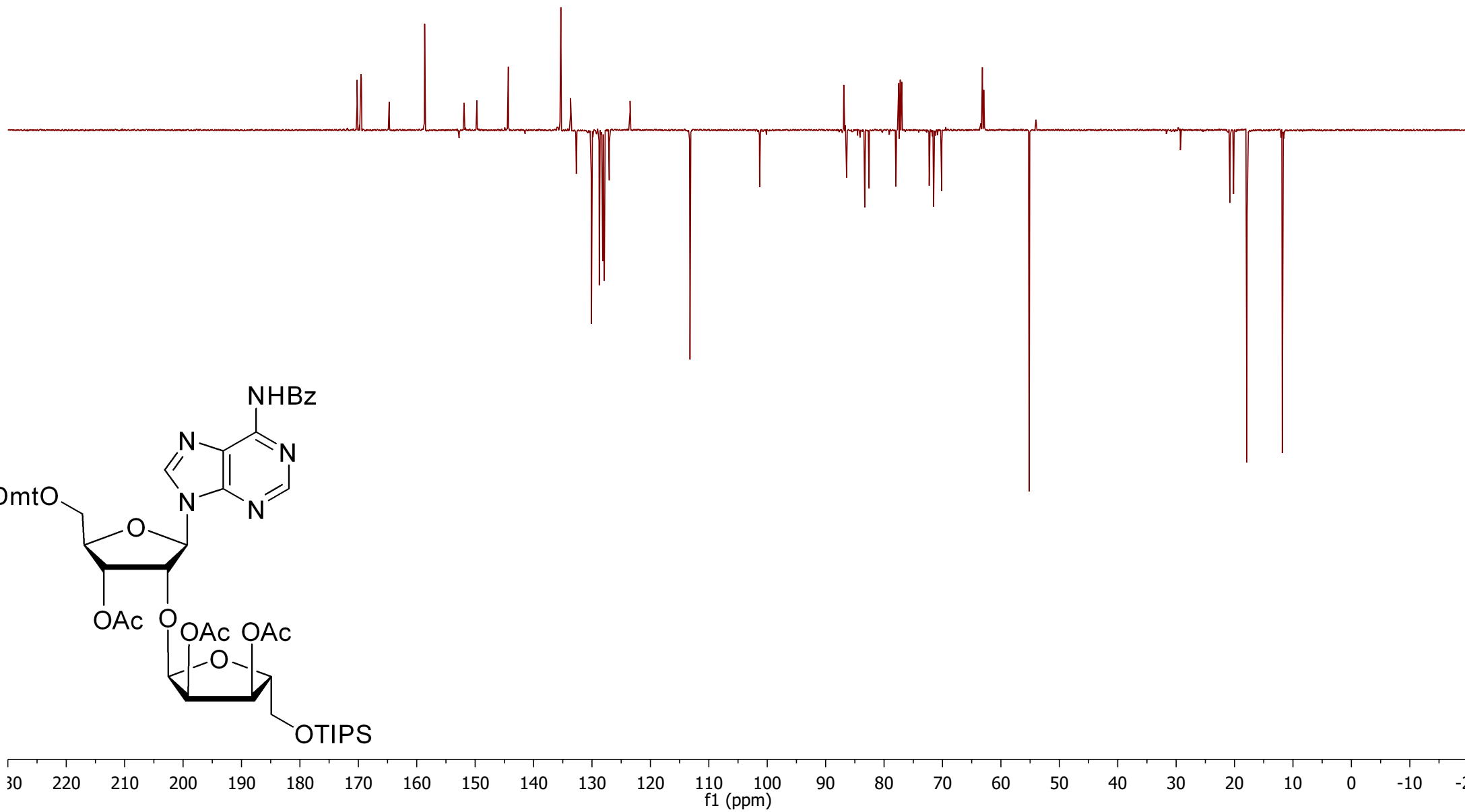
Compound **16**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz

170.20  
169.56  
169.47  
164.72  
158.64  
152.75  
151.91  
149.70  
144.33  
141.45  
135.33  
133.66  
132.68  
130.11  
128.75  
128.17  
127.91  
127.89  
127.05  
123.48  
113.22

101.30

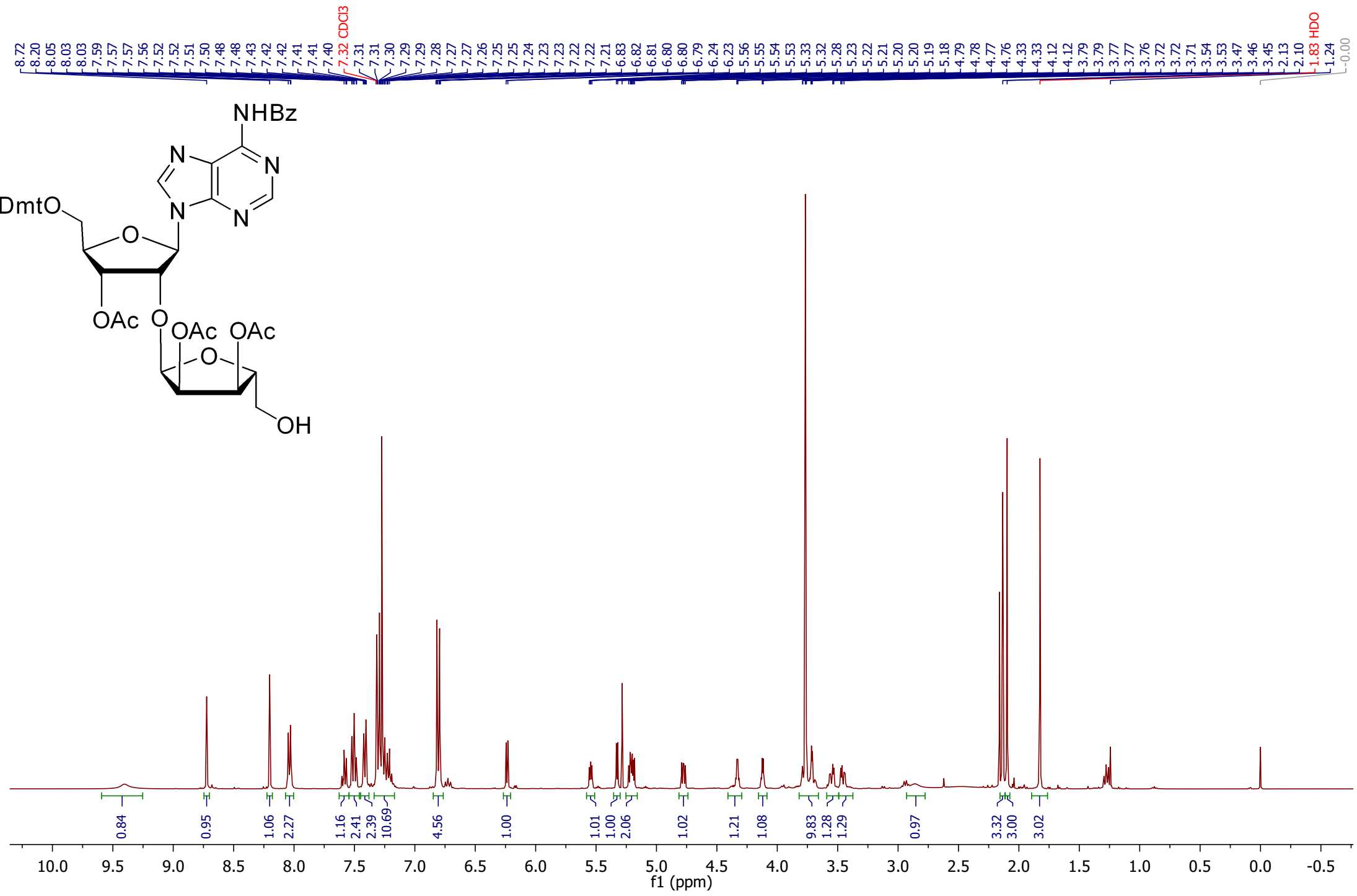
86.90  
86.41  
83.31  
82.56  
77.97  
72.27  
71.52  
70.13  
63.17  
62.93  
55.16

20.84  
20.80  
20.17  
17.89  
17.86  
11.83

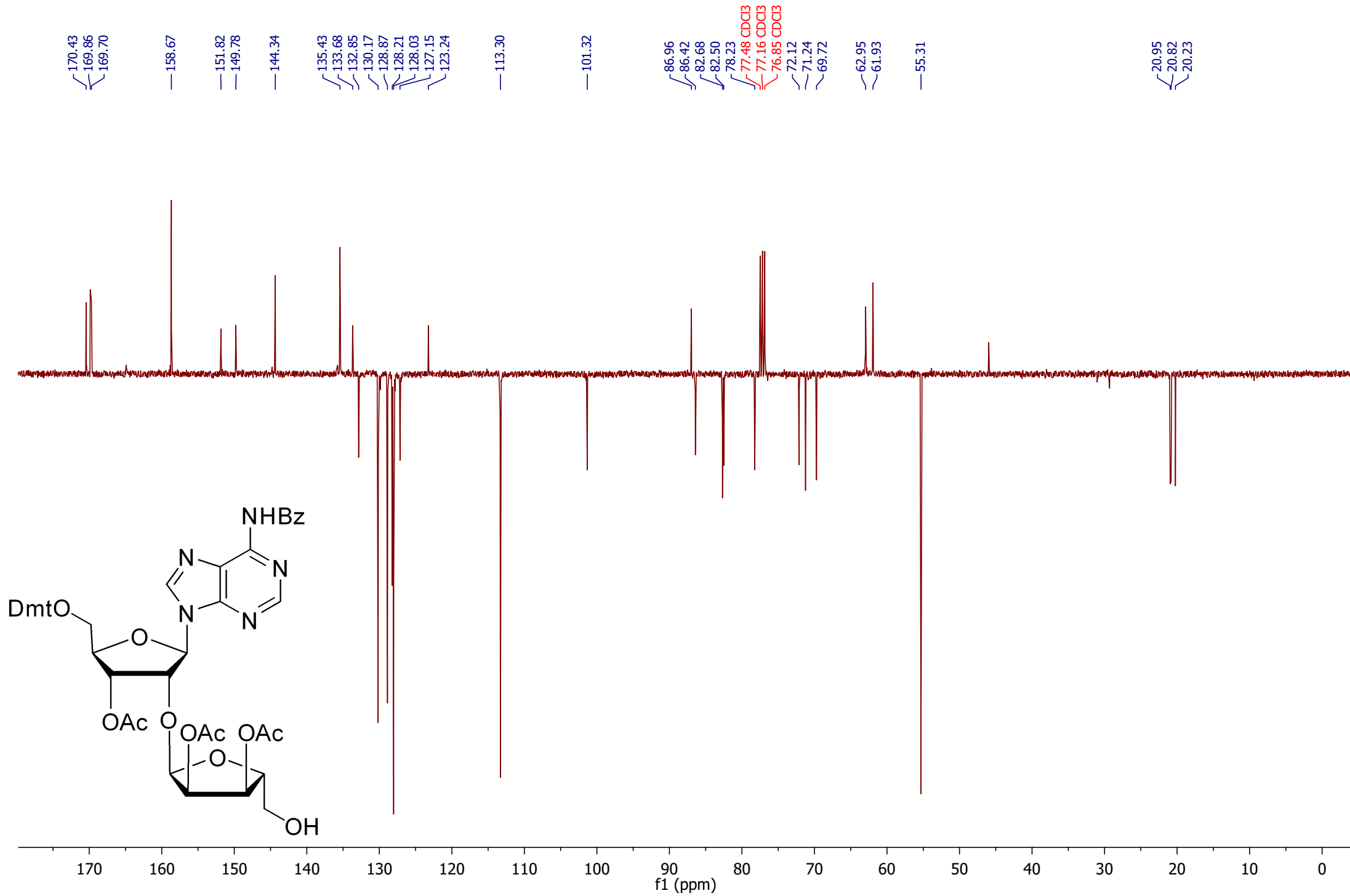




Compound 17, <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz

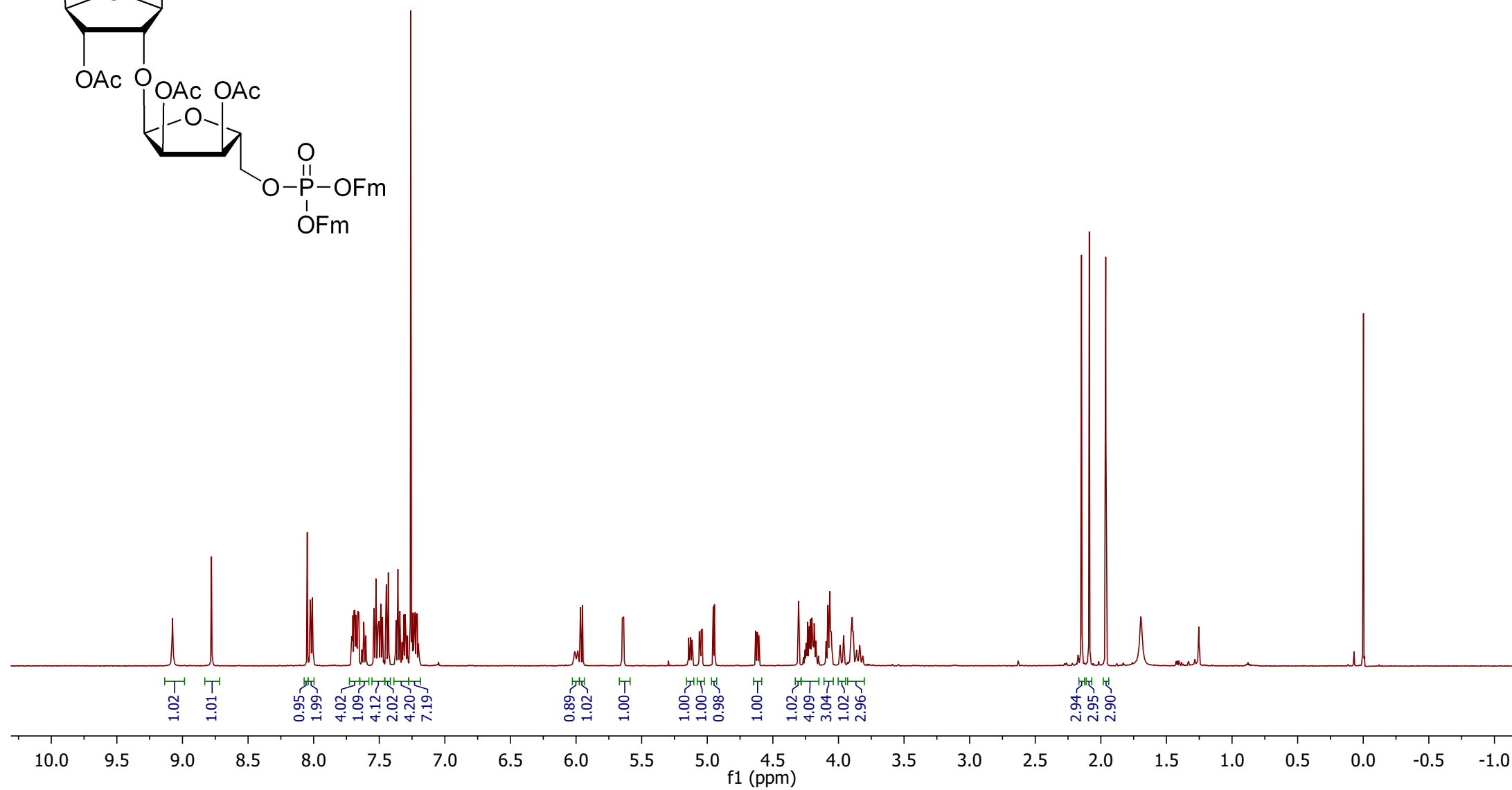
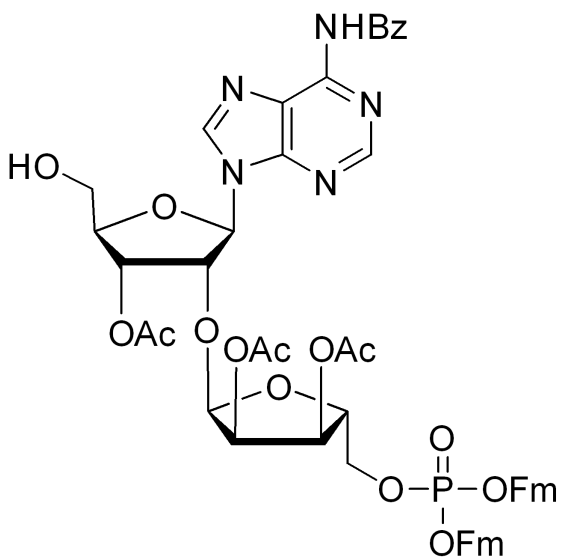


Compound **17**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 101 MHz



Compound **18**,  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 500 MHz

9.08, 8.78, 8.05, 8.02, 8.01, 8.01, 7.71, 7.70, 7.69, 7.69, 7.68, 7.67, 7.66, 7.62, 7.54, 7.52, 7.51, 7.50, 7.50, 7.49, 7.49, 7.49, 7.49, 7.48, 7.47, 7.45, 7.43, 7.37, 7.36, 7.34, 7.31, 7.31, 7.30, 7.30, 7.27, 7.26, 7.25, 7.25, 7.24, 7.24, 7.23, 7.23, 7.22, 7.22, 7.22, 7.21, 7.21, 5.97, 5.95, 5.65, 5.64, 5.06, 5.05, 5.05, 5.04, 4.95, 4.94, 4.63, 4.62, 4.62, 4.31, 4.30, 4.23, 4.23, 4.22, 4.22, 4.21, 4.21, 4.20, 4.20, 4.20, 4.19, 4.18, 4.08, 4.07, 4.06, 4.05, 3.96, 3.90, 3.89, 3.89, 2.15, 2.09, 1.96



Compound **18**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz

169.87  
169.47  
169.20  
164.33  
152.32  
150.50  
150.43  
143.01  
142.96  
142.93  
142.85  
141.34  
141.30  
133.38  
132.96  
128.92  
127.89  
127.88  
127.84  
127.11  
125.10  
125.08  
125.06  
124.57  
119.98  
119.97  
119.95  
119.94

100.97

89.43

86.58

80.24

77.62

73.60

70.84

69.35

69.31

69.14

66.10

62.75

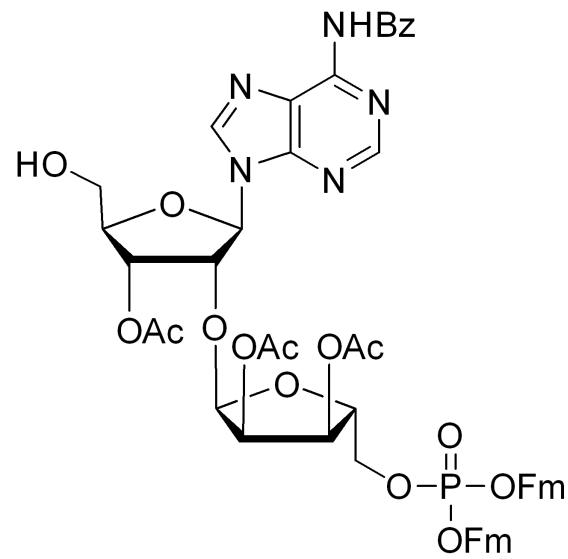
47.83

47.77

20.88

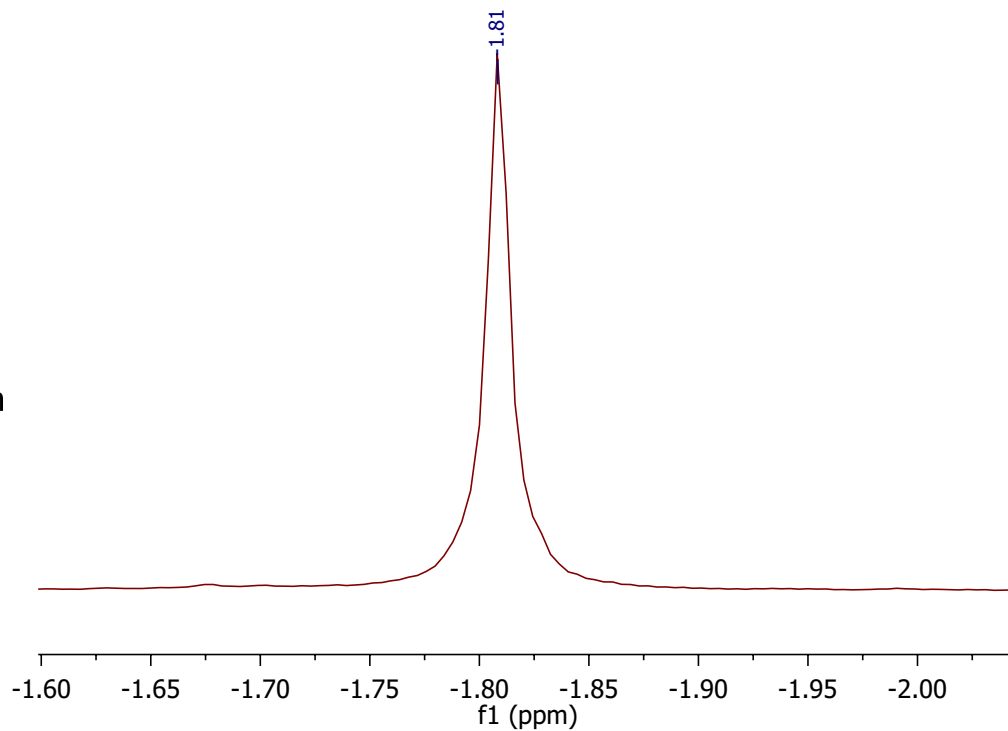
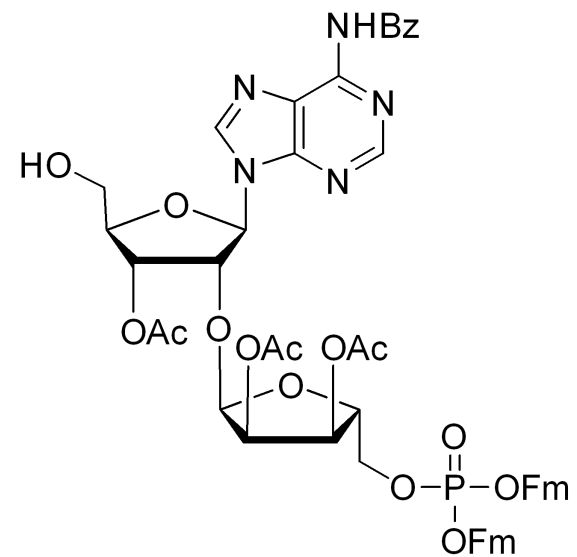
20.62

20.25

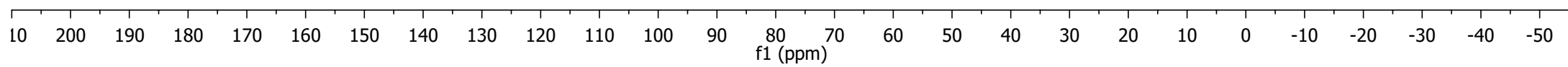


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0  
f1 (ppm)

Compound **18**,  $^{31}\text{P}$ -NMR,  $\text{CDCl}_3$ , 202 MHz

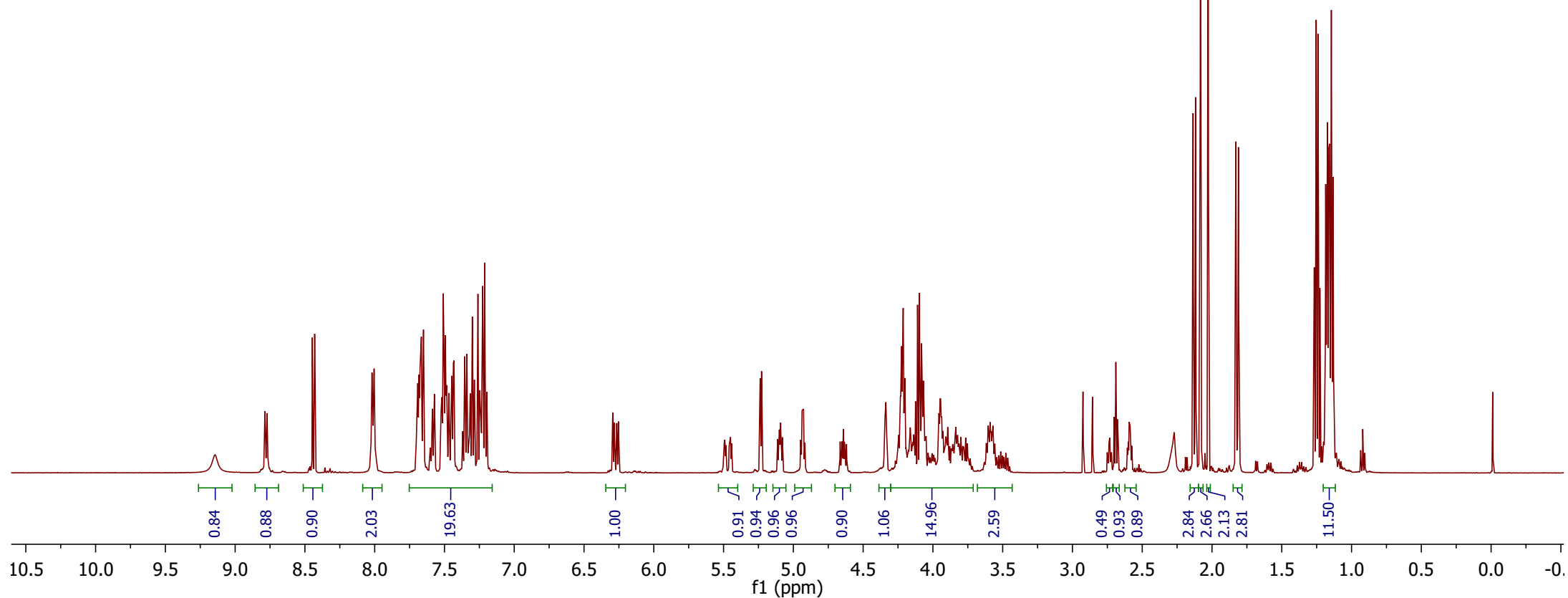
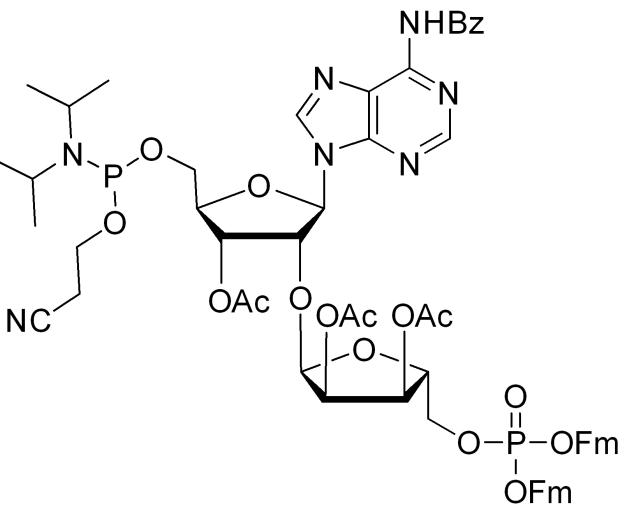


— -1.81



Compound **3**, <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 500 MHz

8.45, 8.43, 8.02, 8.01, 8.00, 7.70, 7.70, 7.69, 7.69, 7.68, 7.68, 7.68, 7.67, 7.67, 7.66, 7.66, 7.65, 7.65, 7.52, 7.51, 7.50, 7.49, 7.49, 7.48, 7.47, 7.45, 7.45, 7.45, 7.45, 7.44, 7.44, 7.43, 7.43, 7.43, 7.35, 7.34, 7.34, 7.34, 7.32, 7.32, 7.30, 7.29, 7.28, 7.26, 7.25, 7.23, 7.23, 7.22, 7.21, 7.21, 7.21, 7.20, 5.24, 5.23, 4.23, 4.23, 4.22, 4.22, 4.22, 4.21, 4.21, 4.20, 4.20, 4.11, 4.10, 4.08, 4.08, 4.07, 3.95, 2.69, 2.13, 2.08, 2.03, 1.83, 1.81, 1.27, 1.25, 1.25, 1.24, 1.24, 1.24, 1.23, 1.18, 1.18, 1.17, 1.16, 1.16, 1.15, 1.14, 1.13



Compound **3**,  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 126 MHz

170.01  
170.00  
169.70  
169.66  
169.33  
169.30  
164.59  
164.56

151.91  
151.81  
149.61  
142.97  
142.95  
142.88  
142.87  
141.34  
141.32

132.76  
132.75  
128.86  
128.84  
127.87  
127.11  
125.06  
125.02  
123.12

122.99  
119.99  
119.95  
117.90  
117.68  
101.51

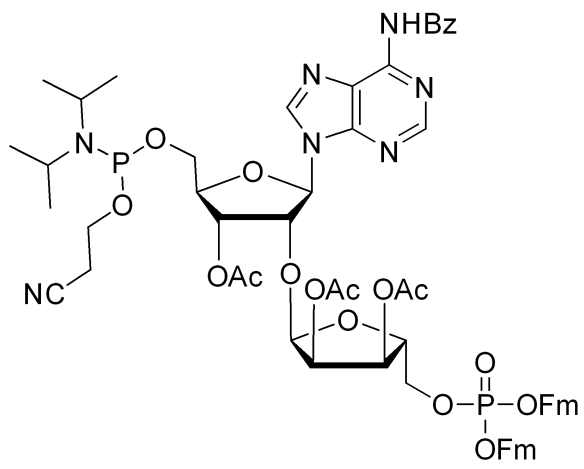
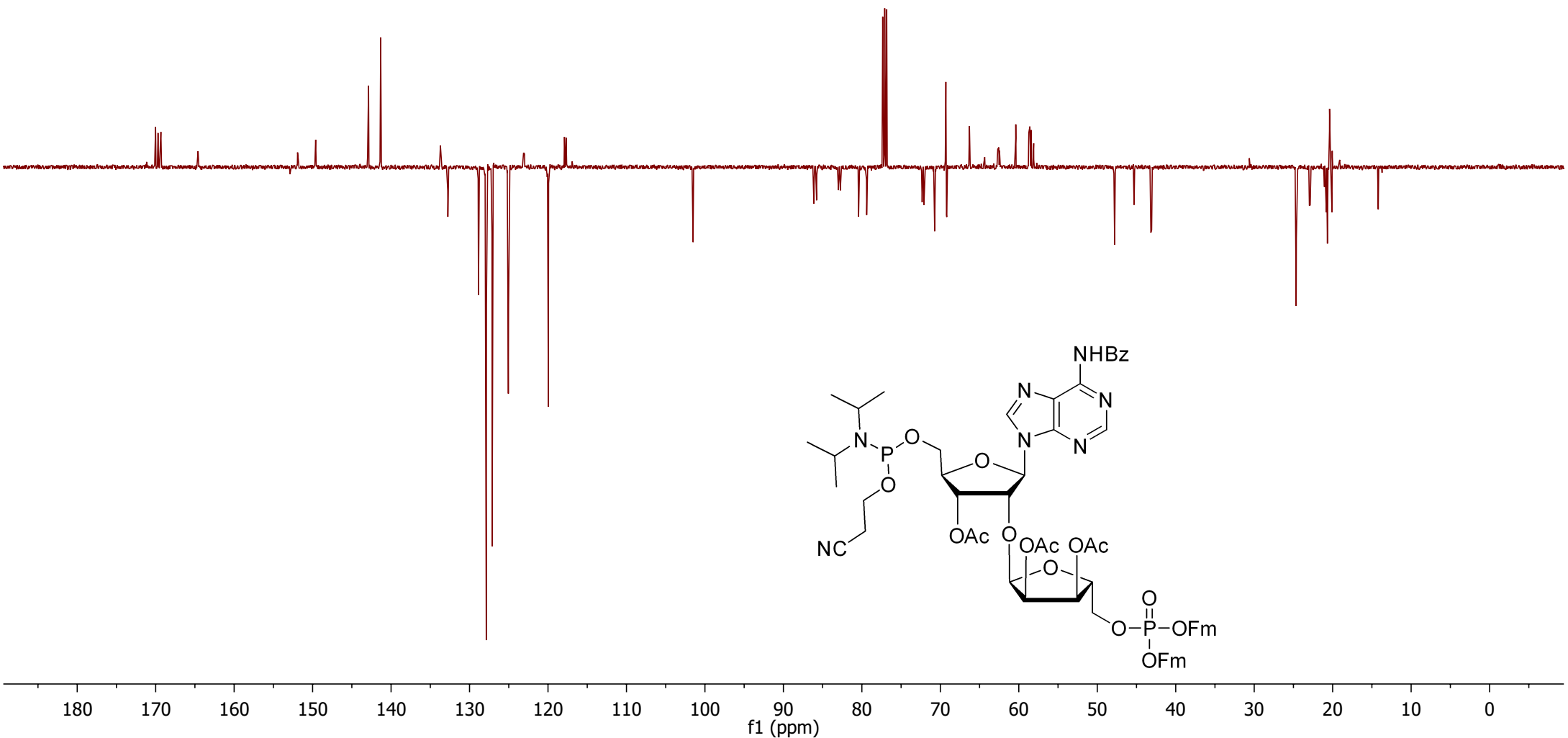
86.11  
85.77  
83.06  
82.99  
82.75  
82.67  
80.42  
80.36  
79.39  
79.36

72.32  
72.09  
70.72  
70.70  
69.33  
69.29  
69.22  
69.18

66.33  
66.29  
66.25  
62.68  
62.59  
62.55  
62.46  
58.72  
58.59

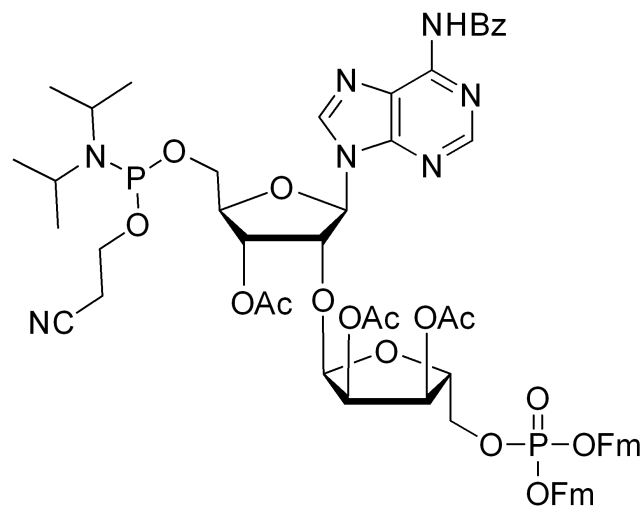
58.56  
58.42  
47.85  
47.82  
47.79  
47.76  
43.22  
43.17  
43.12

43.07  
24.70  
24.65  
20.88  
20.81  
20.67  
20.40  
20.34  
20.11  
20.08



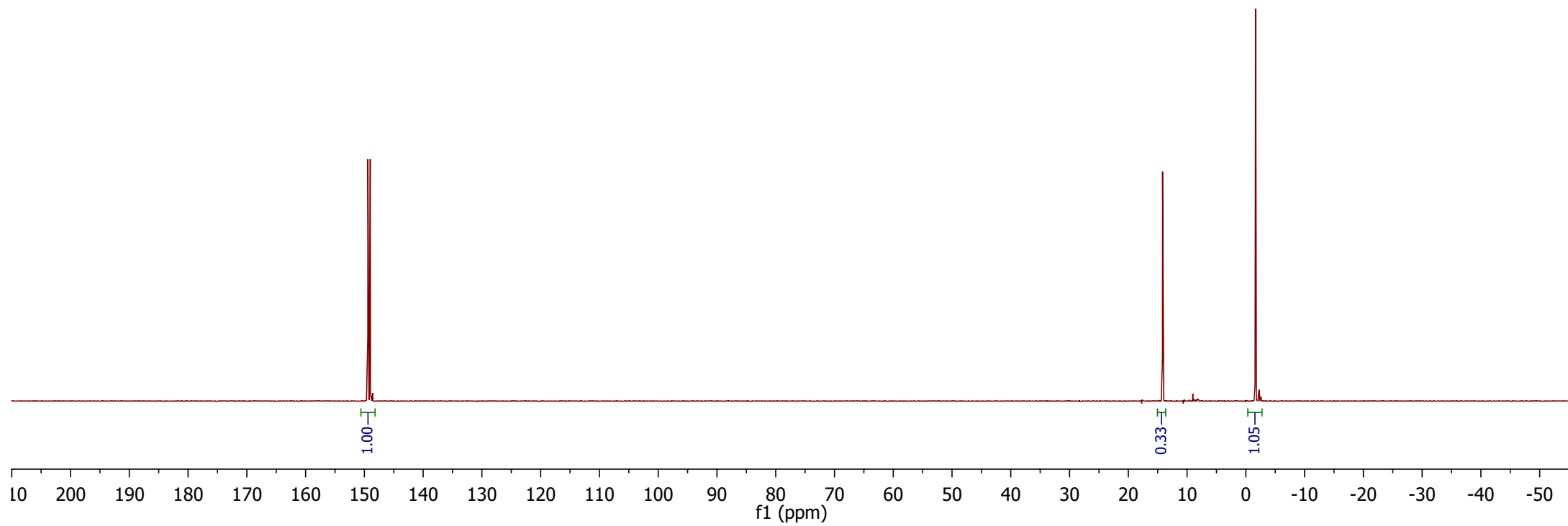
Compound **3**,  $^{31}\text{P}$ -NMR,  $\text{CDCl}_3$ , 202 MHz

149.40  
149.00



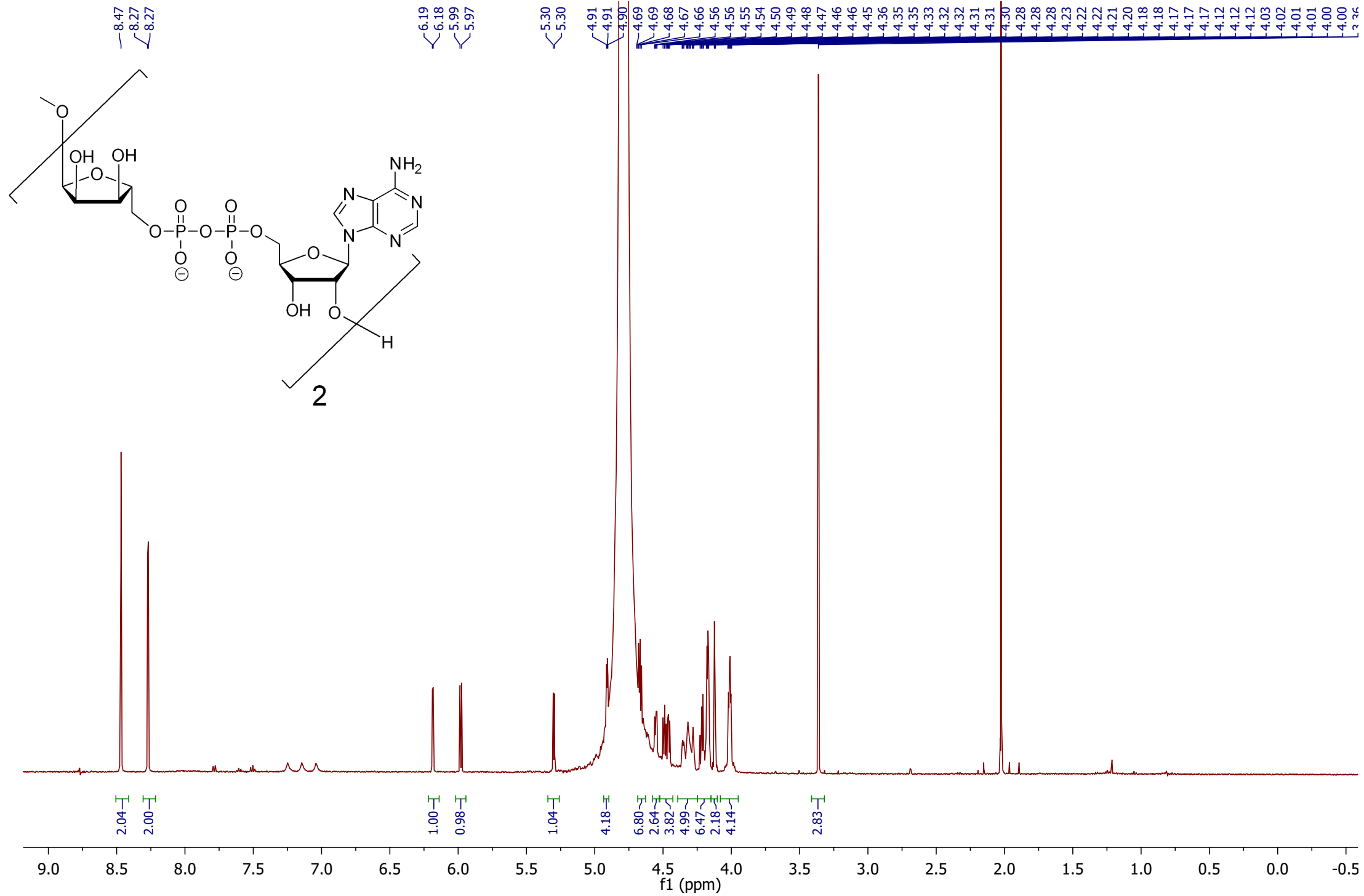
14.17

-1.67  
-1.69

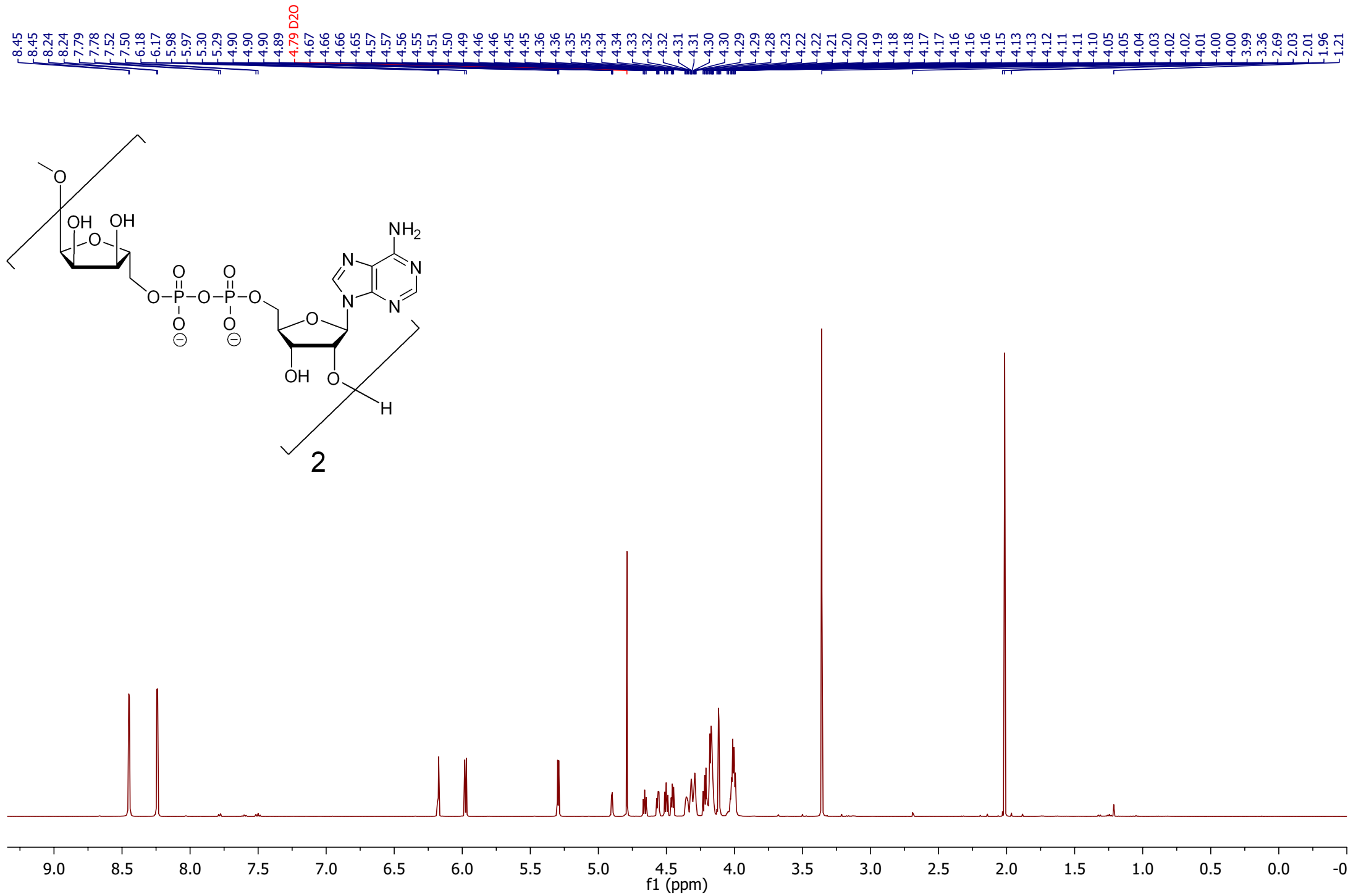




Compound **1a**, <sup>1</sup>H-NMR, D<sub>2</sub>O, 850 MHz



Compound **1a**,  $^1\text{H}$ -NMR,  $\text{D}_2\text{O}$ ,  $\text{H}_2\text{O}$  suppression, 850 MHz



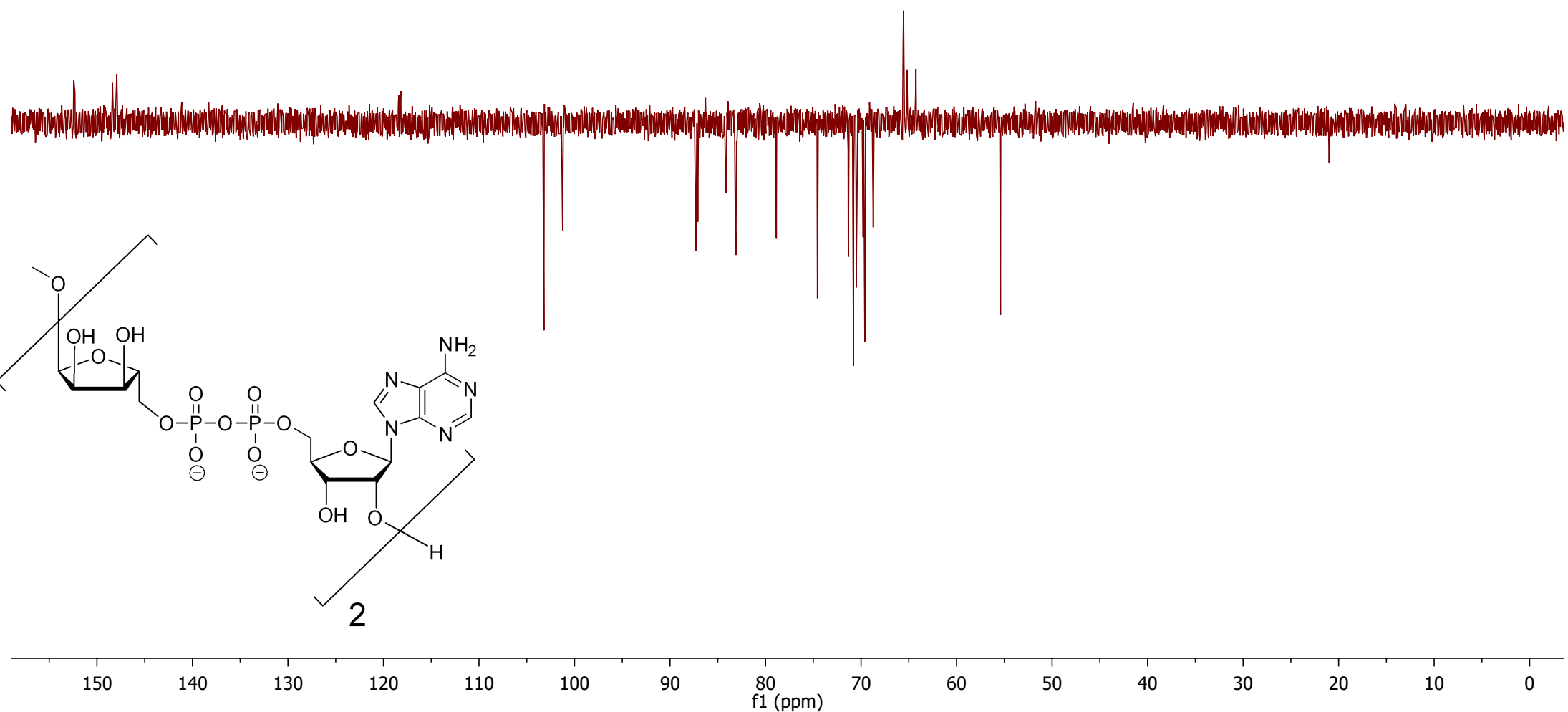
Compound **1a**,  $^{13}\text{C}$ -NMR,  $\text{D}_2\text{O}$ , 202 MHz

152.43  
152.30  
148.37  
147.92

118.40  
118.19

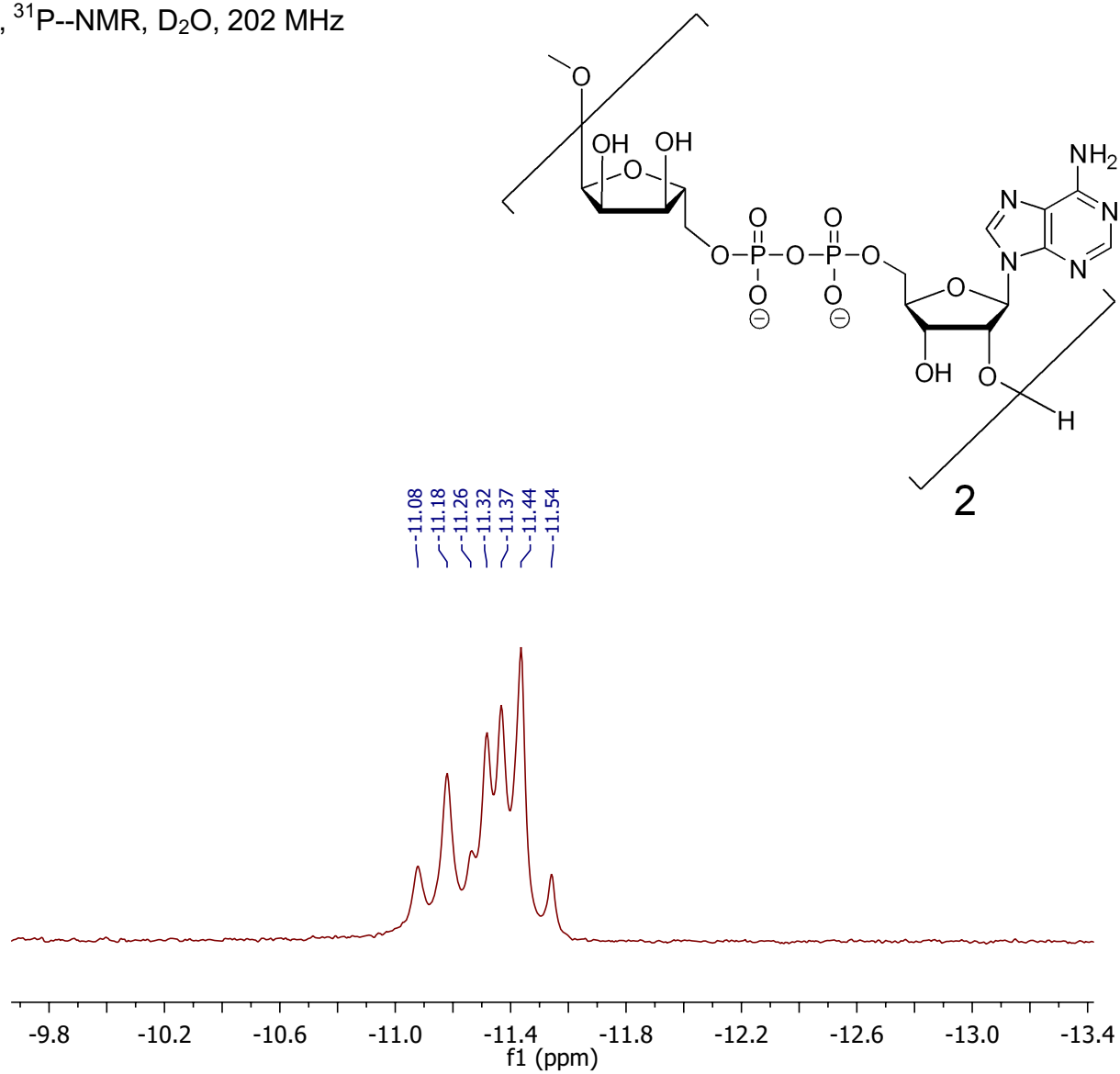
103.20  
101.24

87.27  
87.09  
84.19  
84.15  
84.13  
83.17  
83.10  
83.02  
78.87  
74.57  
71.33  
70.78  
70.49  
69.78  
69.61  
68.72  
65.59  
65.55  
65.23  
65.21  
64.29  
64.25  
55.40



2

Compound **1a**,  $^{31}\text{P}$ -NMR,  $\text{D}_2\text{O}$ , 202 MHz

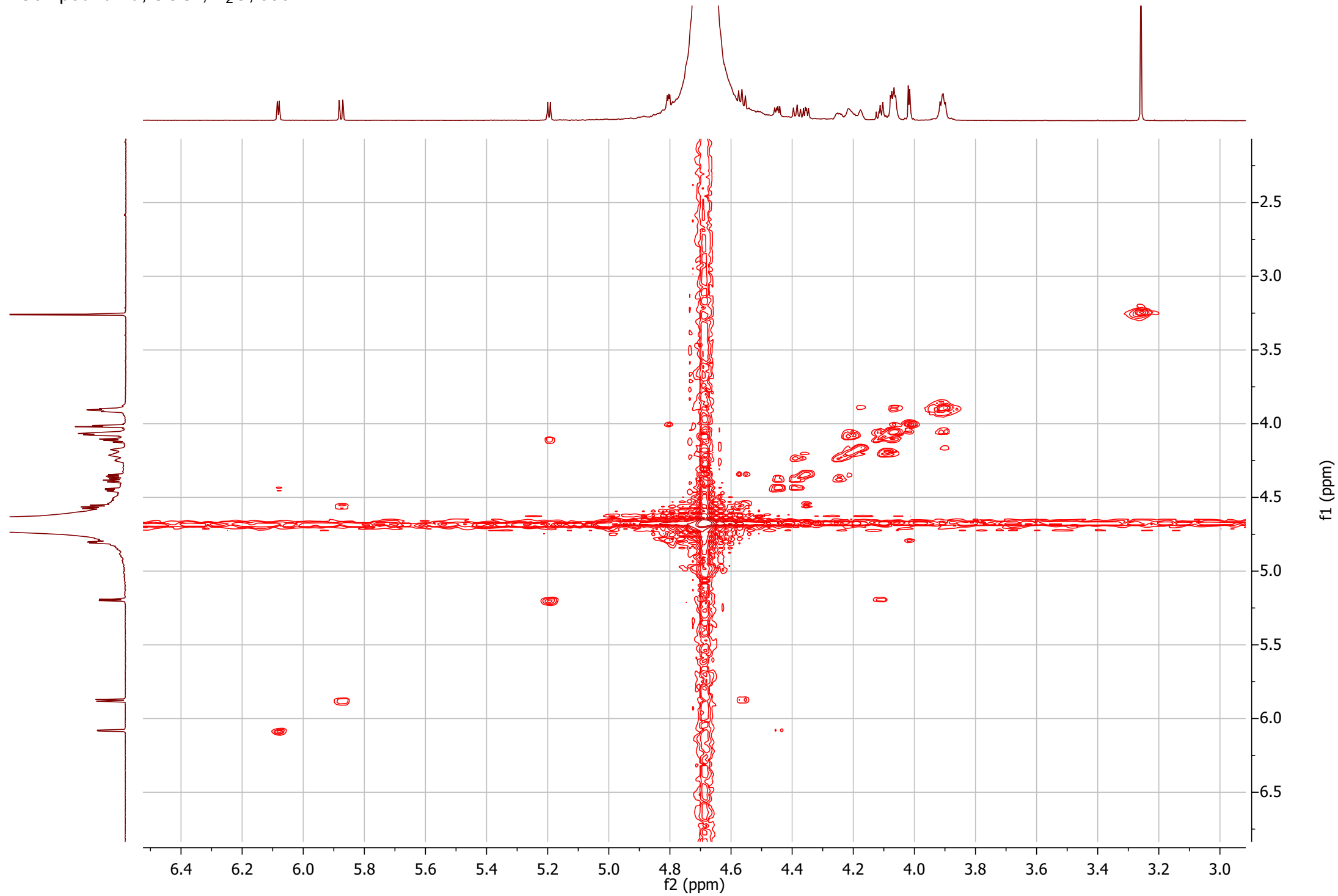


-11.08  
-11.18  
-11.26  
-11.32  
-11.37  
-11.44  
-11.54

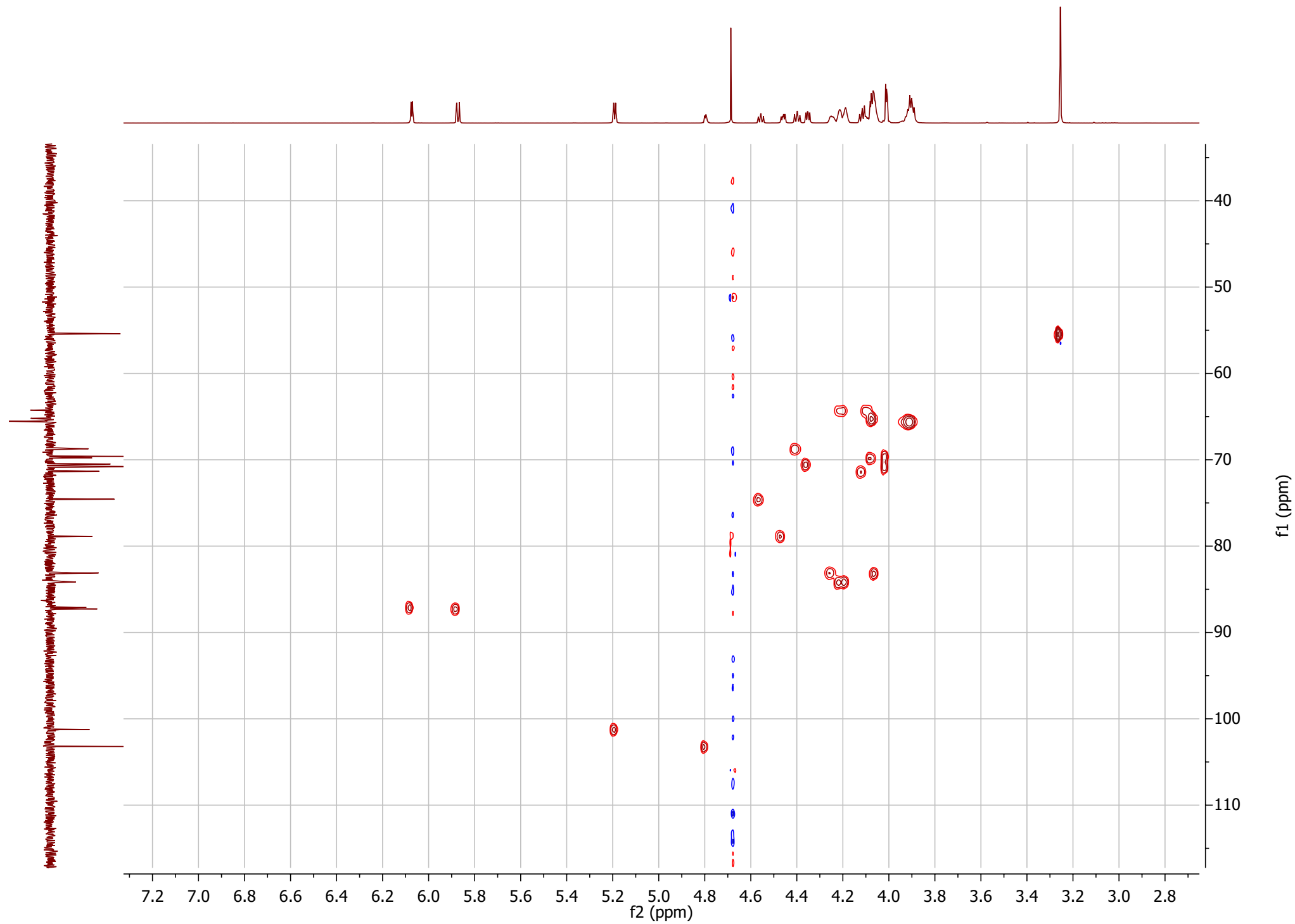
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -50

f1 (ppm)

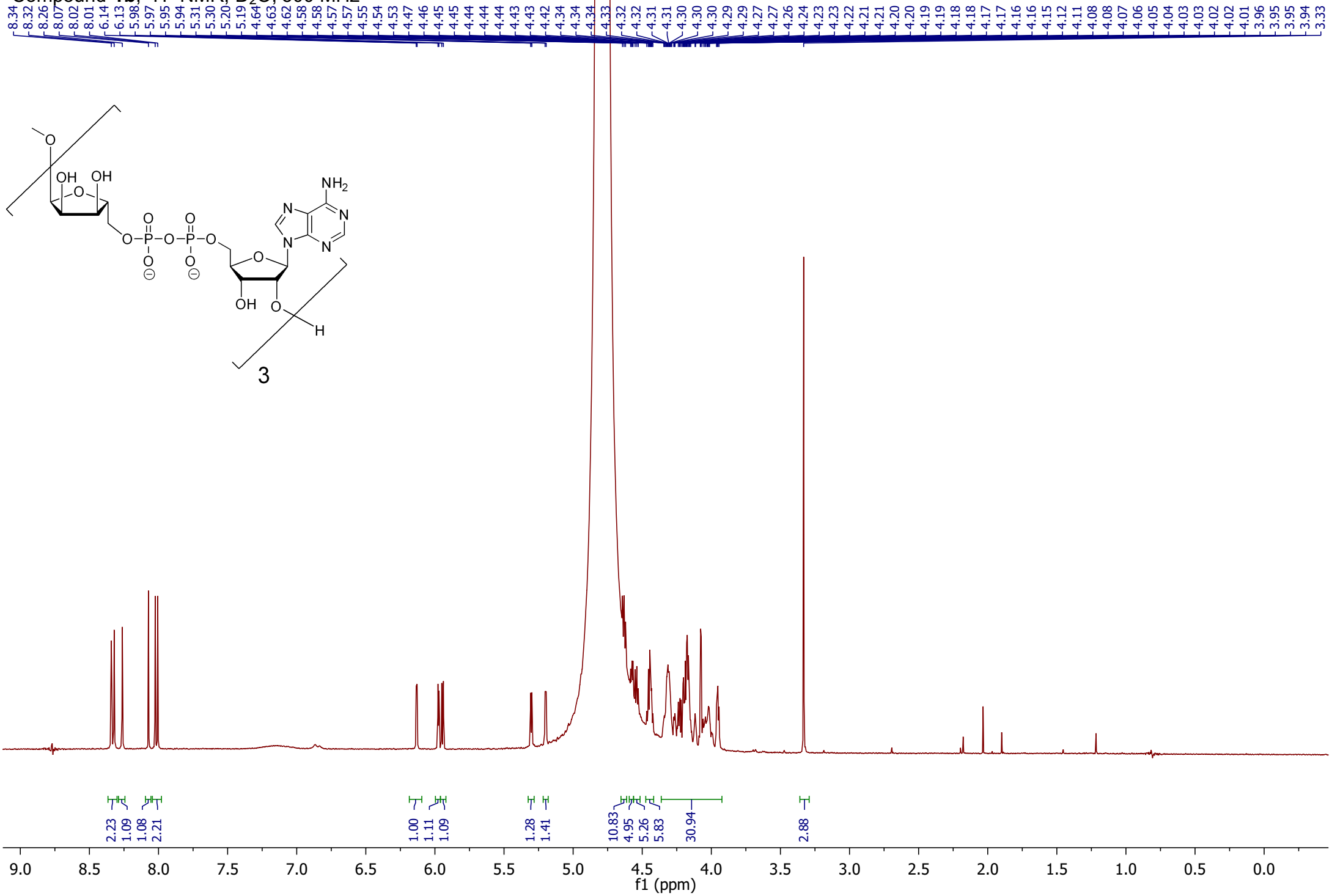
Compound **1a**, COSY, D<sub>2</sub>O, 850 MHz



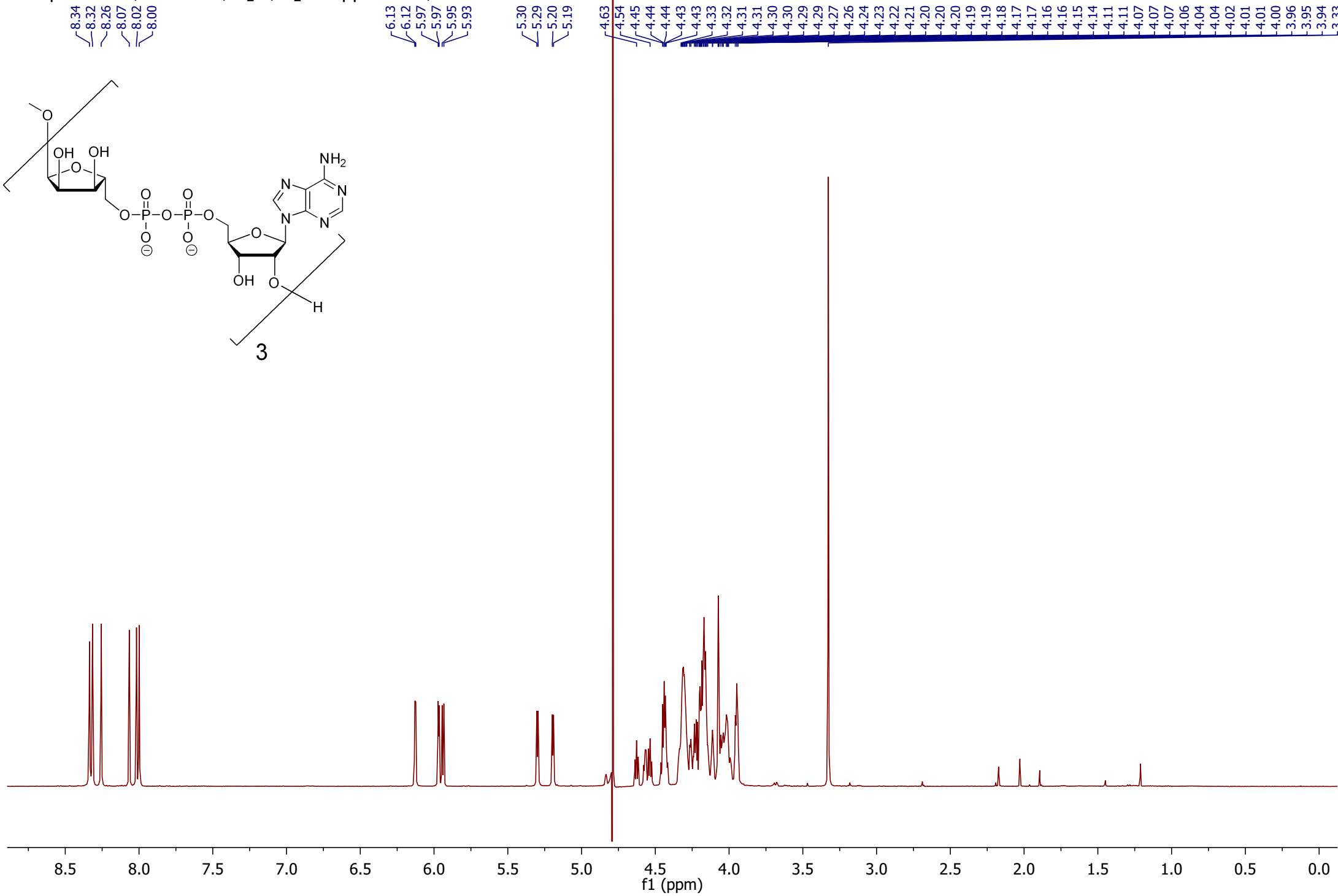
Compound **1a**, HSQC, D<sub>2</sub>O, 850 MHz



Compound **1b**,  $^1\text{H-NMR}$ ,  $\text{D}_2\text{O}$ , 500 MHz



Compound **1b**,  $^1\text{H}$ -NMR,  $\text{D}_2\text{O}$ ,  $\text{H}_2\text{O}$  suppression, 500 MHz



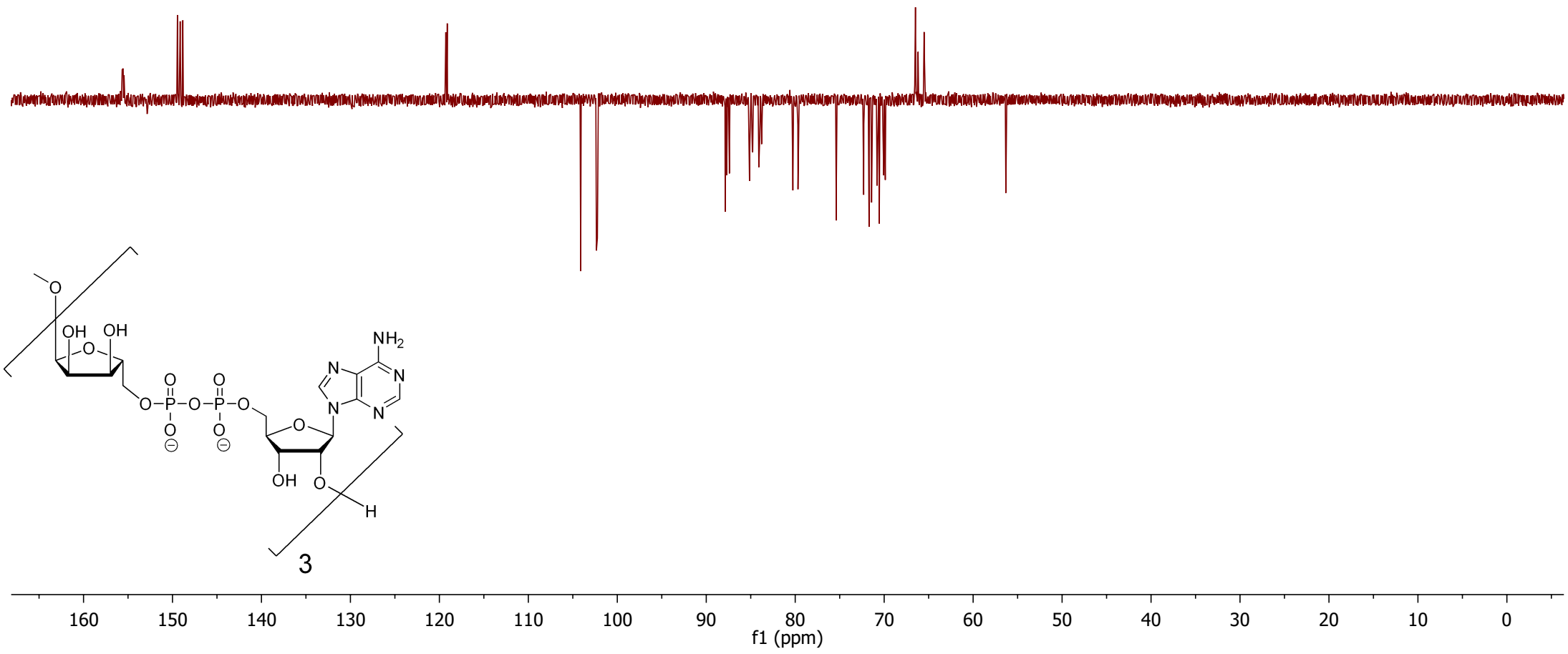


Compound **1b**,  $^{13}\text{C}$ -NMR,  $\text{D}_2\text{O}$ , 214 MHz

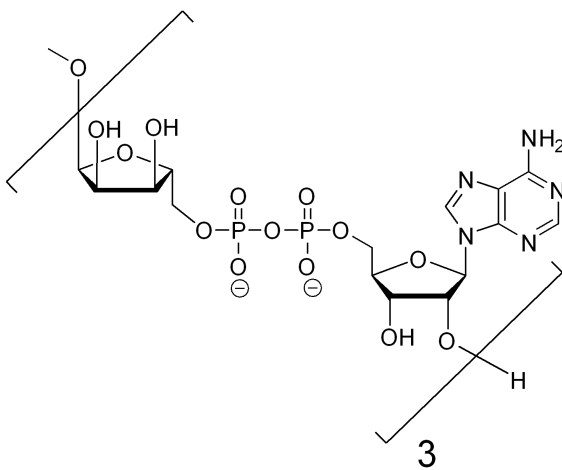
155.66  
155.55  
155.45  
149.44  
149.14  
148.84

119.28  
119.11  
119.00

104.13  
102.35  
102.24  
87.87  
87.71  
87.40  
85.18  
85.14  
85.10  
84.82  
84.78  
84.09  
84.05  
84.01  
83.96  
83.81  
83.78  
80.26  
79.69  
75.38  
72.33  
72.30  
71.70  
71.41  
70.82  
70.81  
70.80  
70.55  
70.05  
69.87  
66.50  
66.19  
65.51  
56.33  
56.32

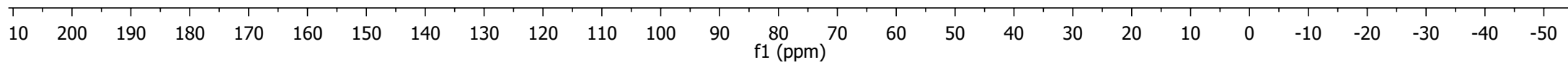
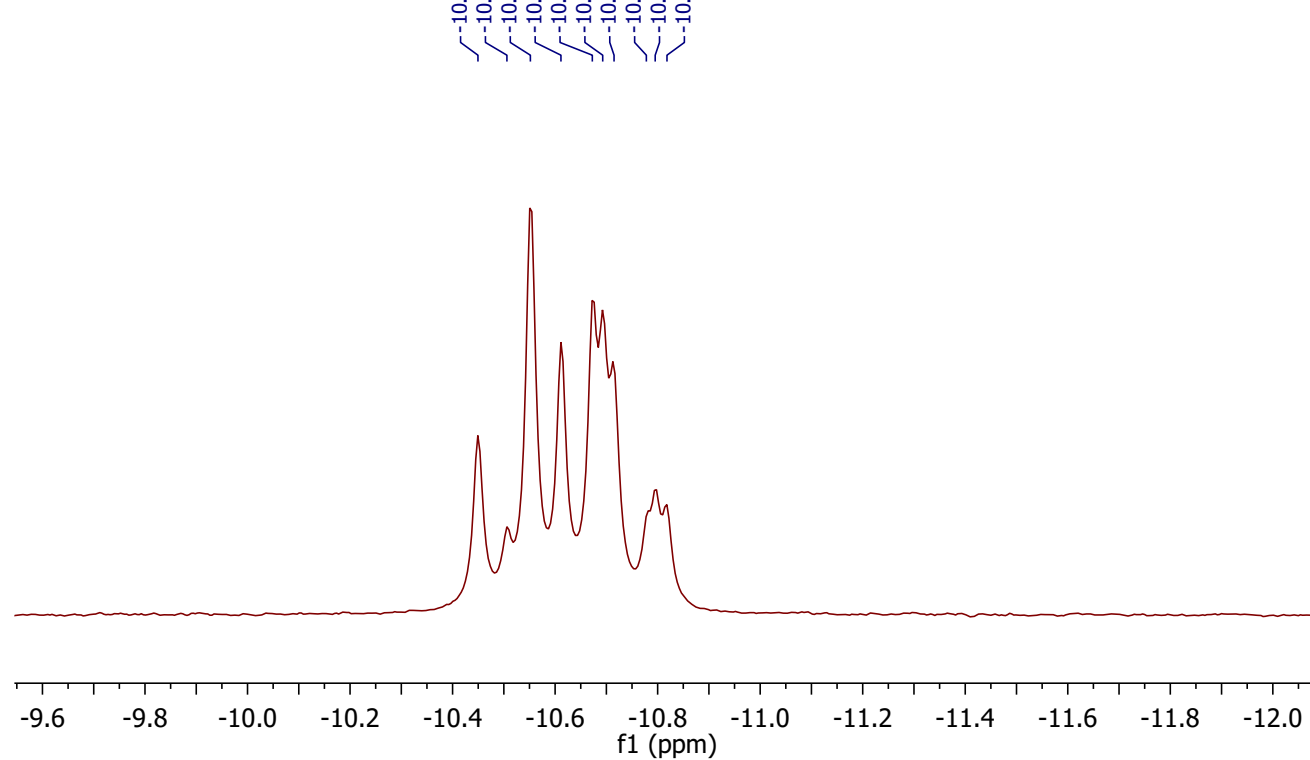


Compound **1b**,  $^{31}\text{P}$ -NMR,  $\text{D}_2\text{O}$ , 202 MHz

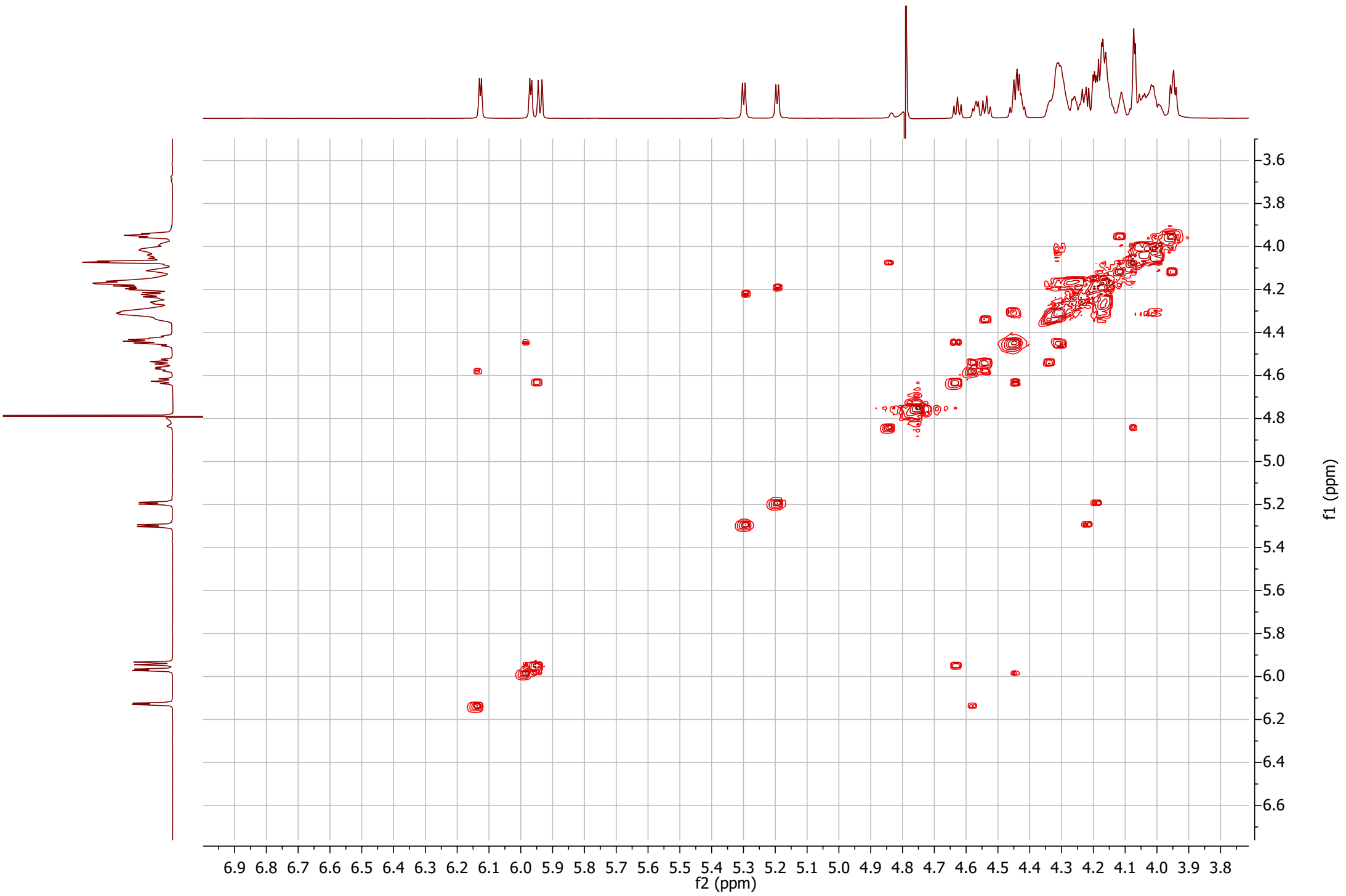


-10.45  
-10.51  
-10.55  
-10.61  
-10.67  
-10.69  
-10.71  
-10.78  
-10.80  
-10.82

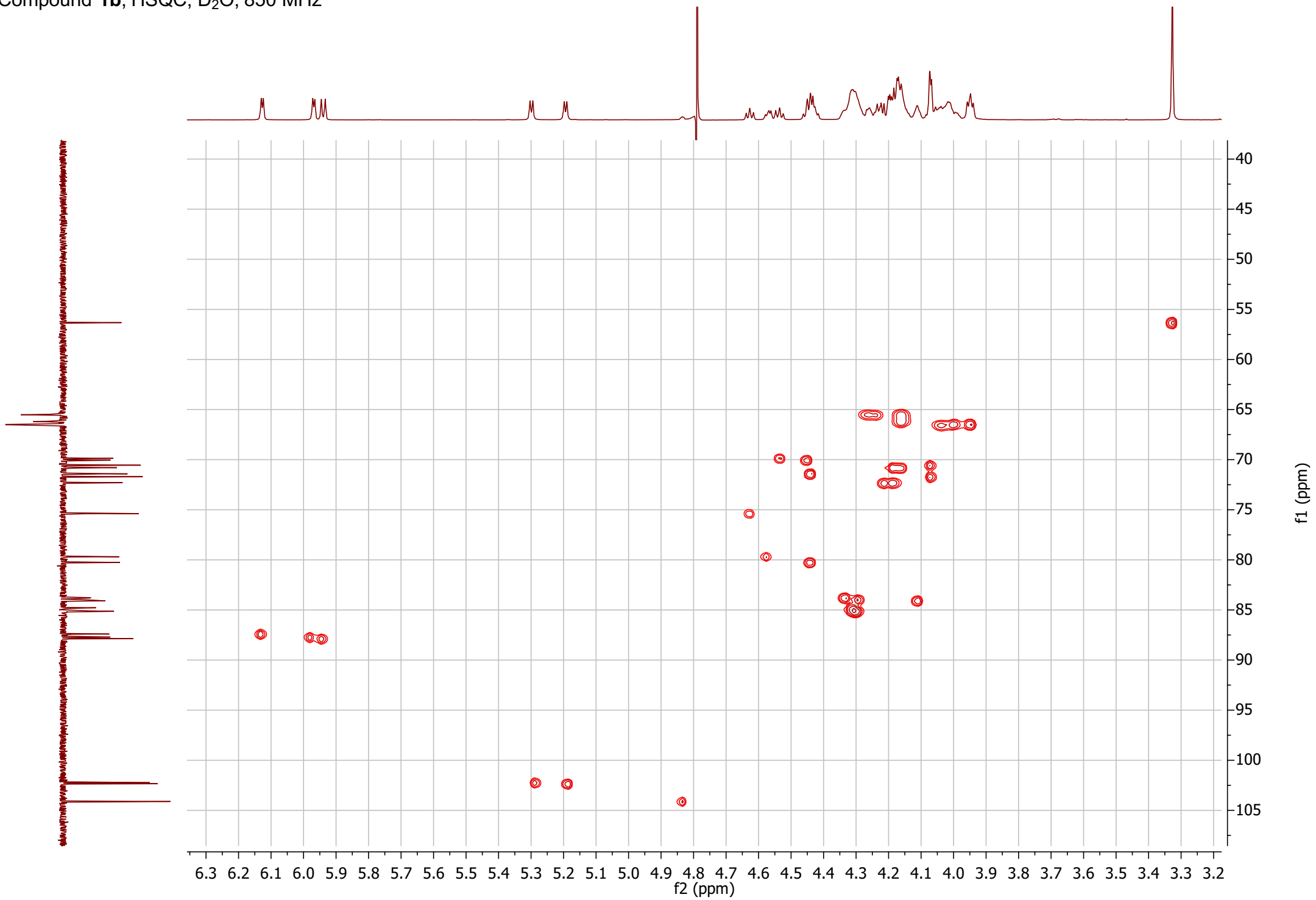
-10.45  
-10.51  
-10.55  
-10.61  
-10.67  
-10.69  
-10.71  
-10.78  
-10.80  
-10.82



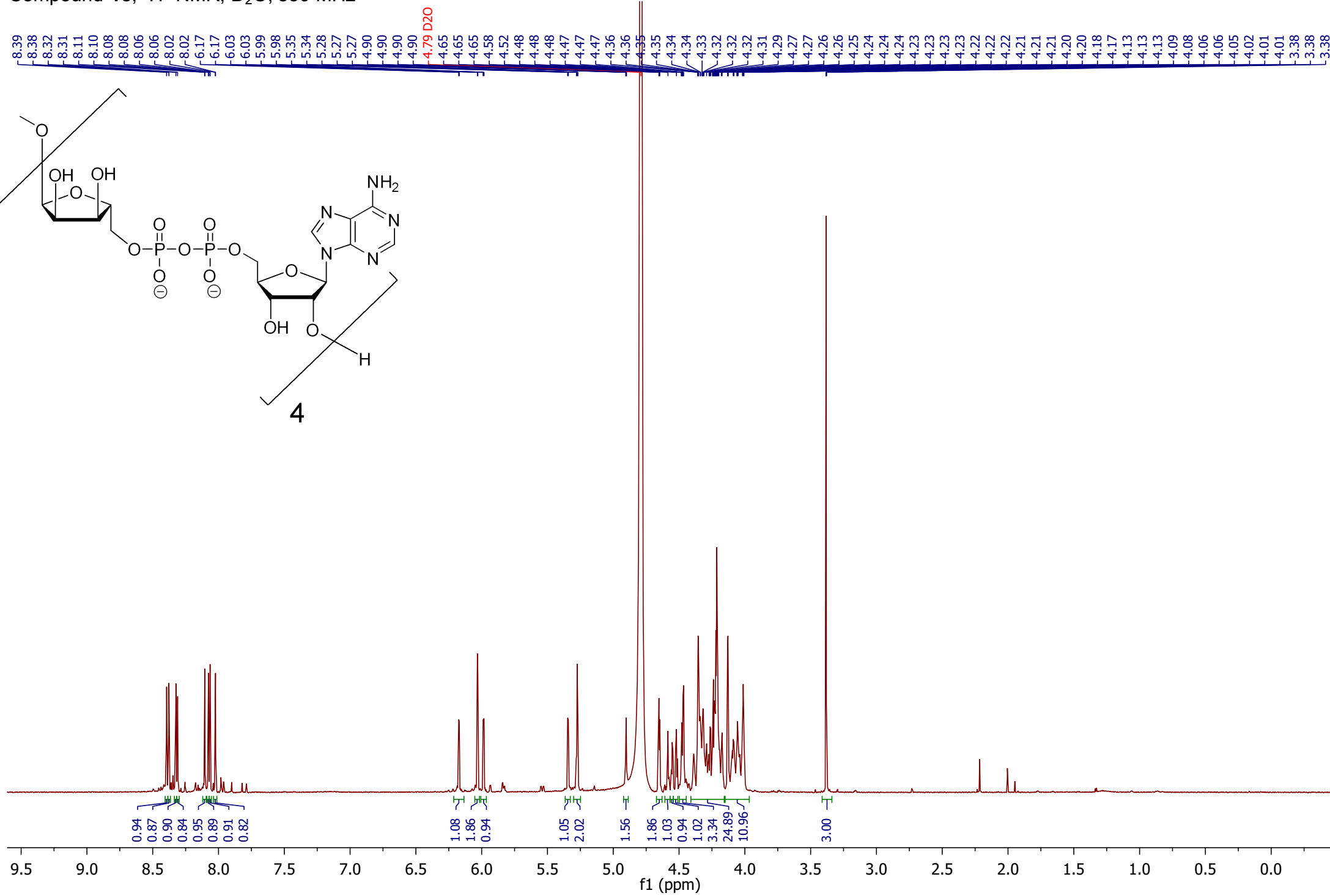
Compound **1b**, COSY, D<sub>2</sub>O, 850 MHz



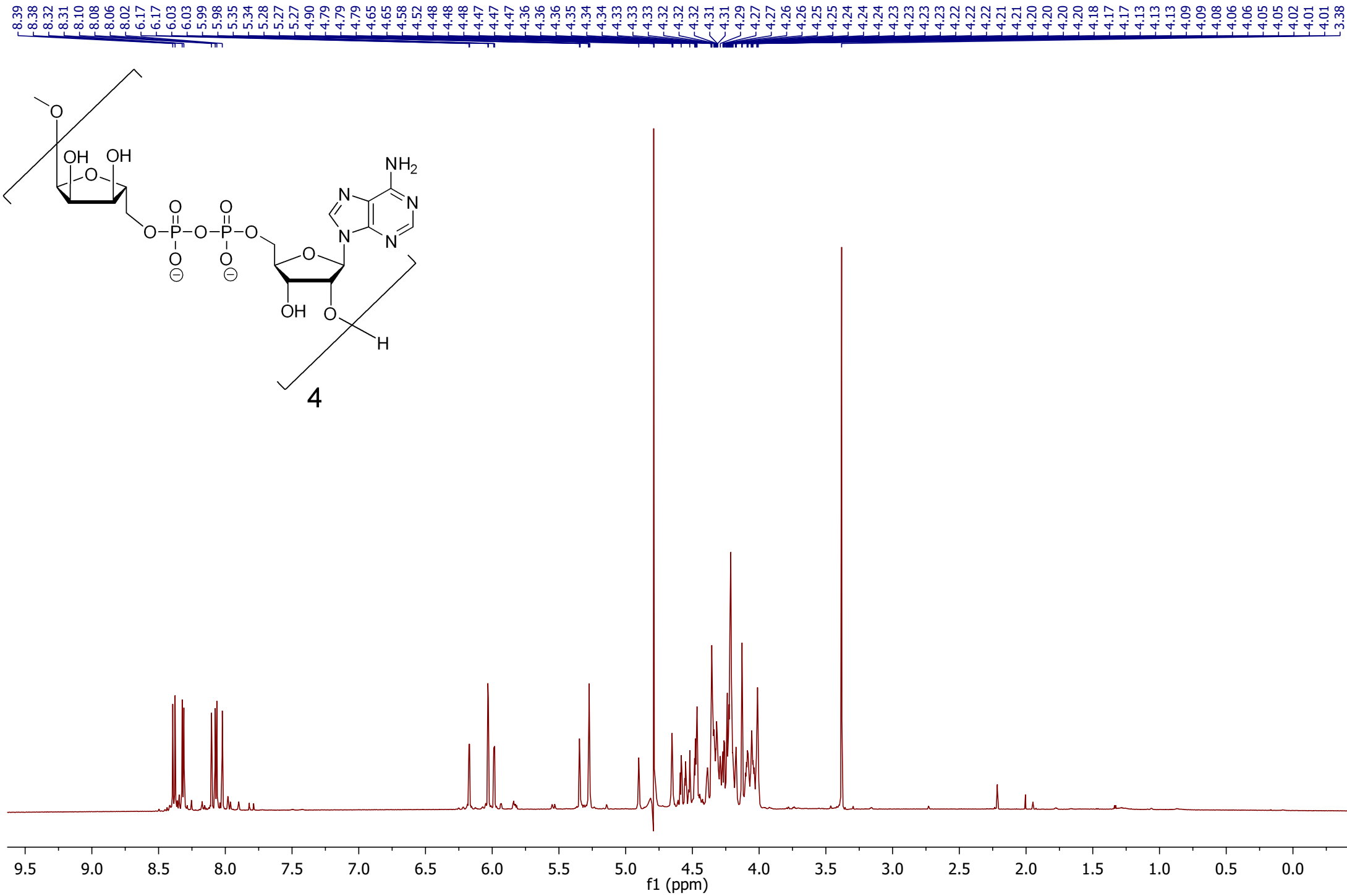
Compound **1b**, HSQC, D<sub>2</sub>O, 850 MHz



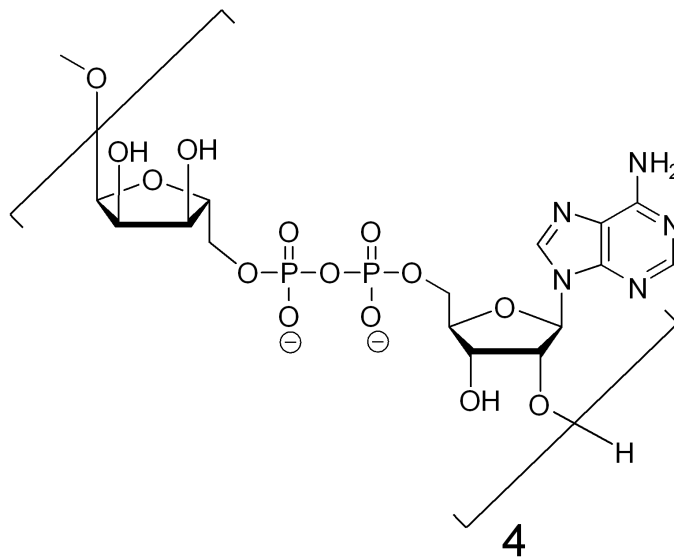
Compound **1c**, <sup>1</sup>H-NMR, D<sub>2</sub>O, 850 MHz



Compound **1c**,  $^1\text{H}$ -NMR,  $\text{D}_2\text{O}$ ,  $\text{H}_2\text{O}$  suppression, 850 MHz

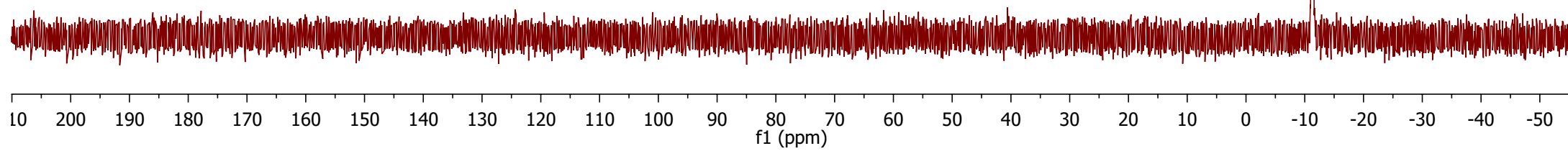
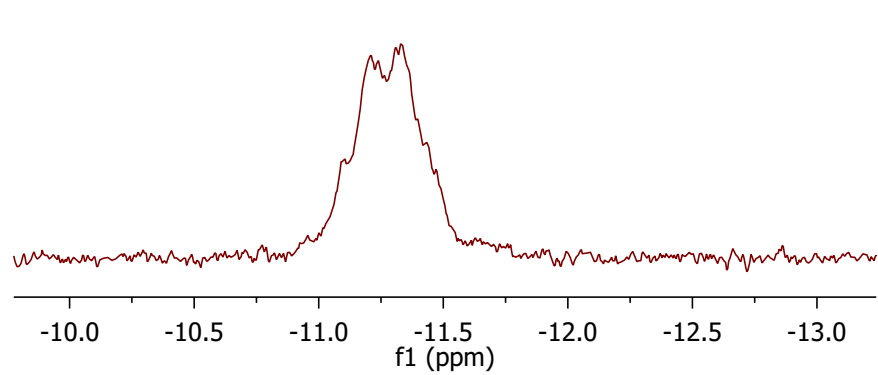


Compound **1c**,  $^{31}\text{P}$ -NMR,  $\text{D}_2\text{O}$ , 202 MHz

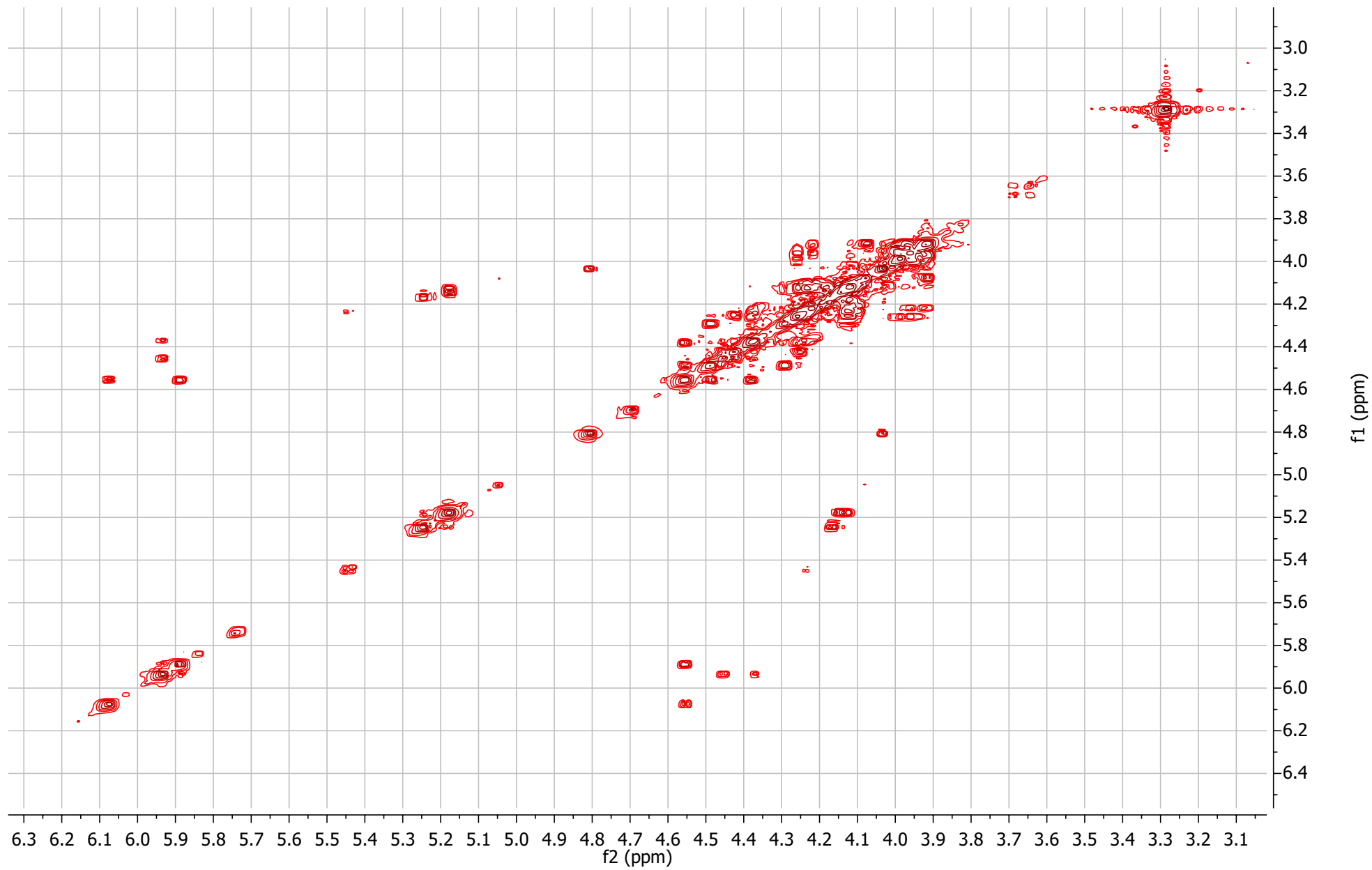
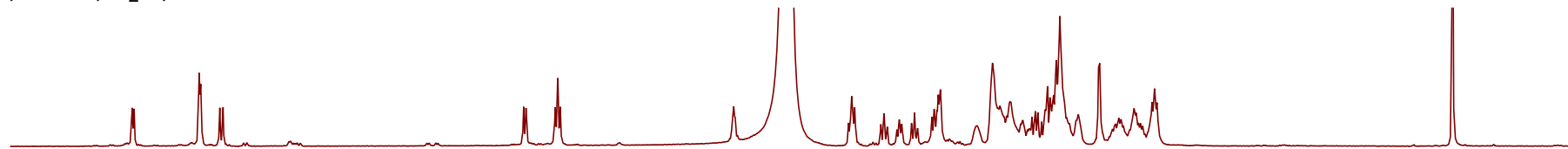


-11.10  
-11.21  
-11.24  
-11.31  
-11.34  
-11.43  
-11.47

-11.10  
-11.21  
-11.24  
-11.31  
-11.34  
-11.43  
-11.47

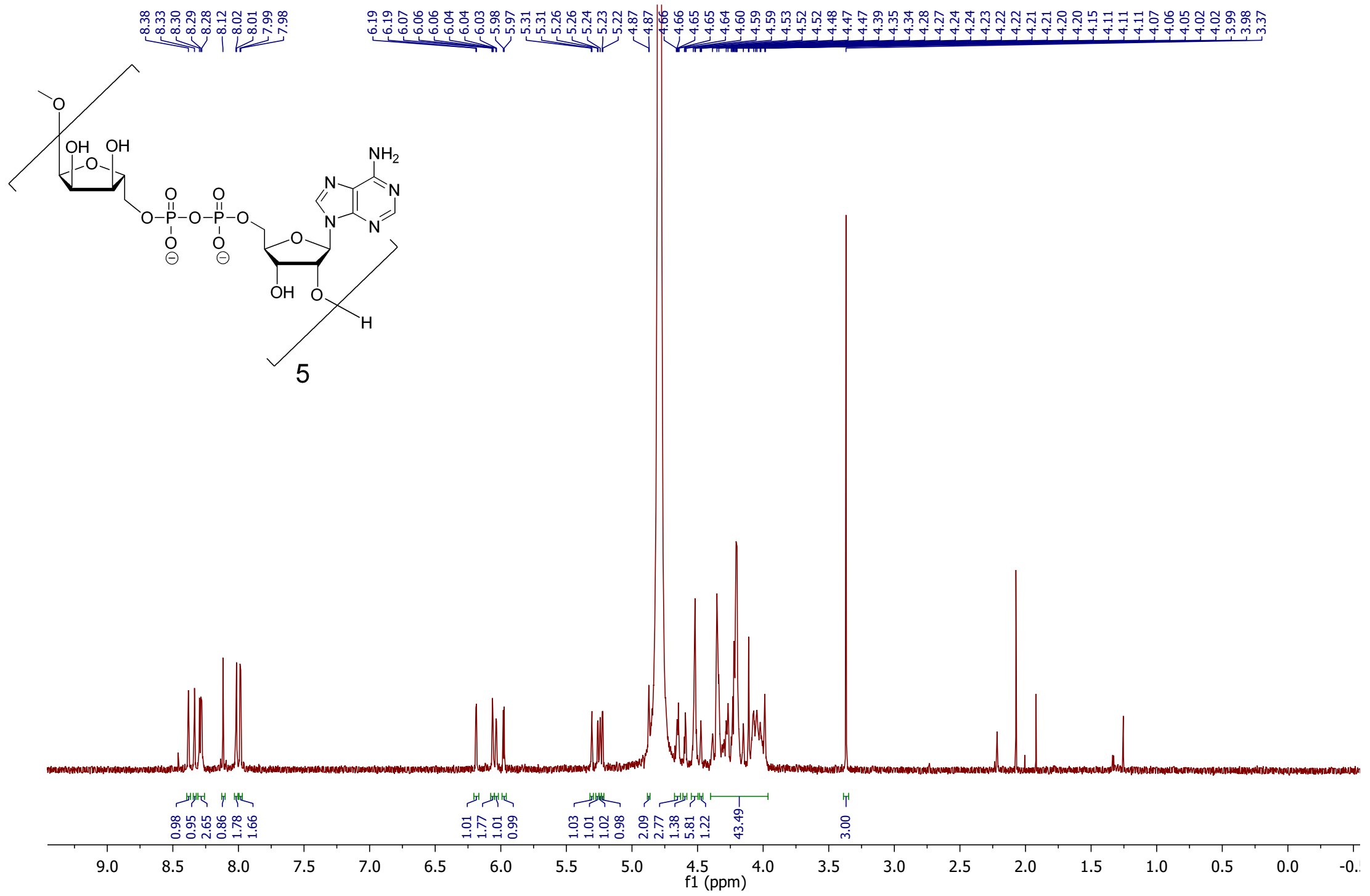


Compound **1c**, COSY, D<sub>2</sub>O, 850 MHz

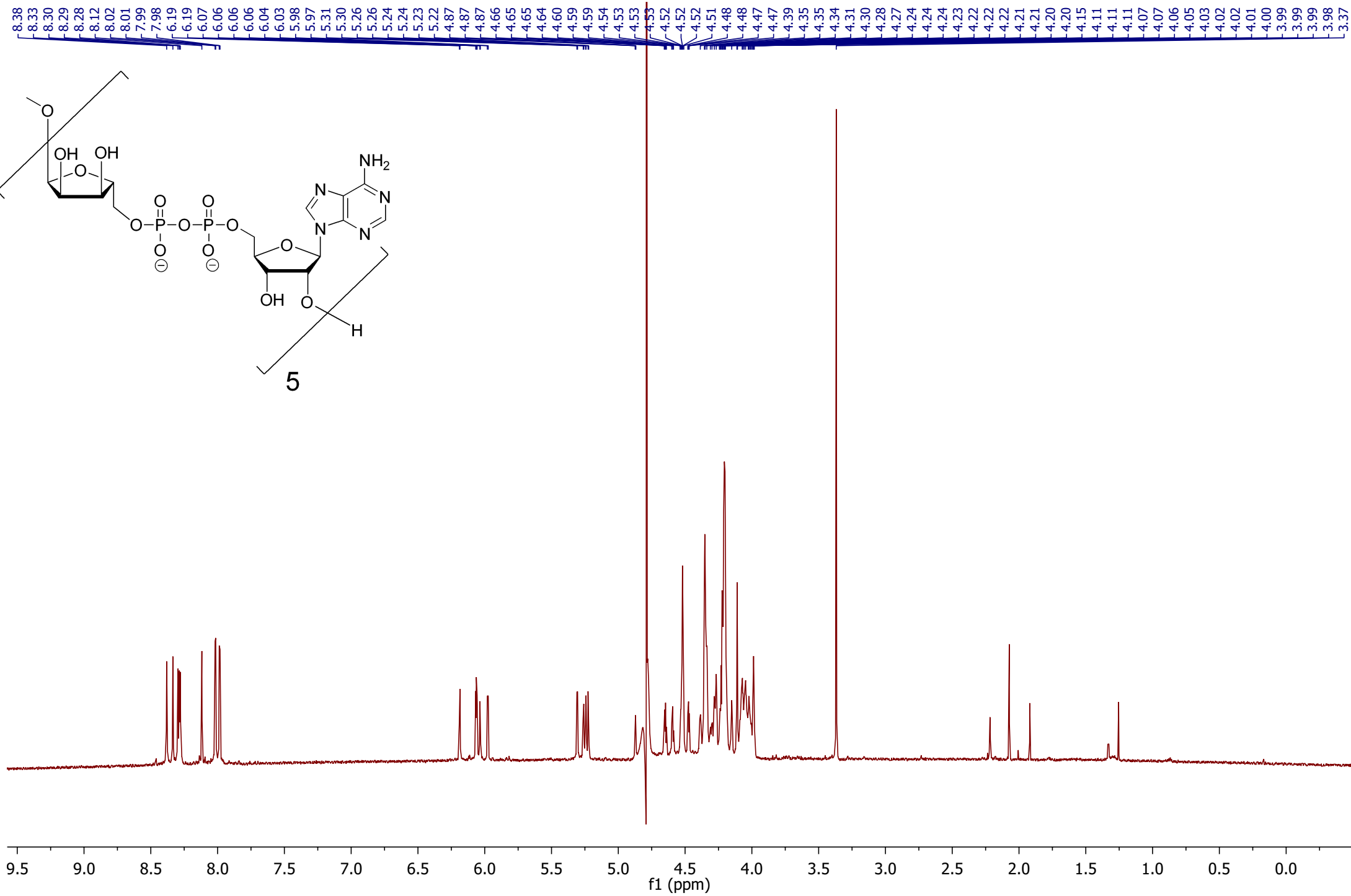




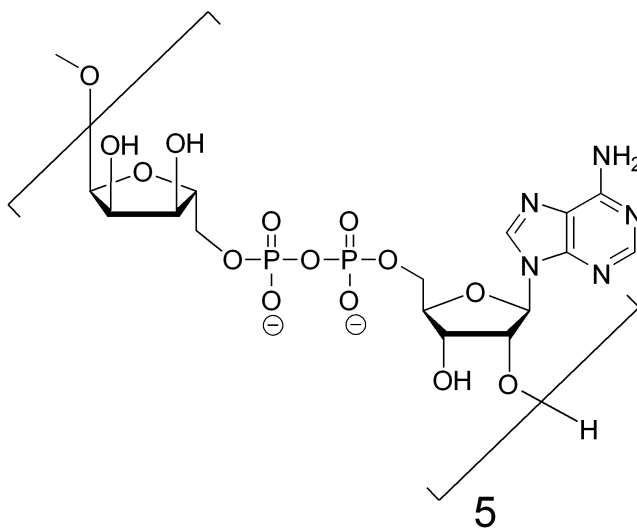
Compound **1d**, <sup>1</sup>H-NMR, D<sub>2</sub>O, 850 MHz



Compound **1d**,  $^1\text{H}$ -NMR,  $\text{D}_2\text{O}$ ,  $\text{H}_2\text{O}$  suppression, 850 MHz

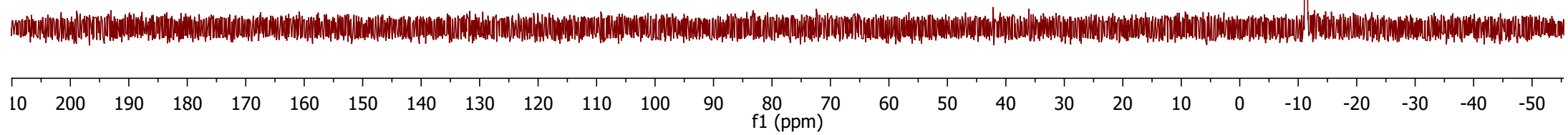
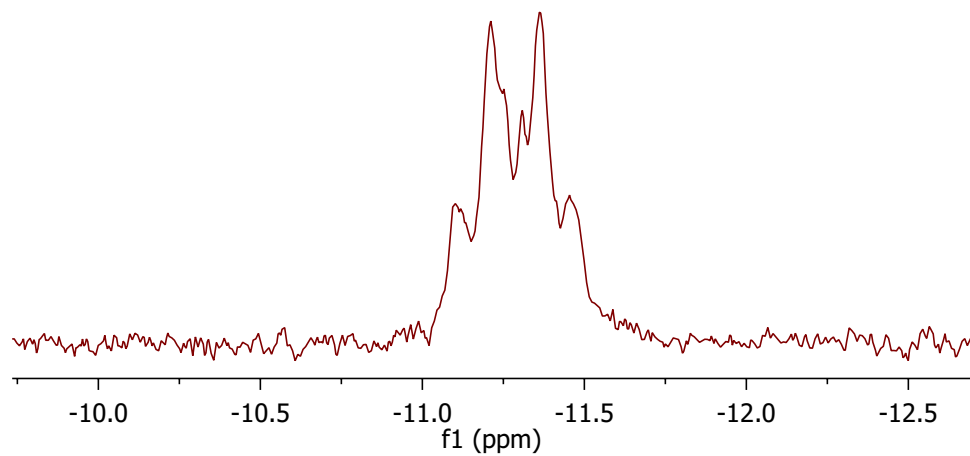


Compound **1d**,  $^{31}\text{P}$ -NMR,  $\text{D}_2\text{O}$ , 202 MHz



-11.10  
-11.10  
-11.12  
-11.21  
-11.25  
-11.31  
-11.36  
-11.45

-11.10  
-11.10  
-11.21  
-11.25  
-11.31  
-11.36  
-11.45



Compound **1d**, COSY, D<sub>2</sub>O, 850 MHz

