Supporting Information

Synthesis of *N*-alkyl Substituted Azasugar-tetrazole Hybrid Molecules *via* Ugi-azide Reaction

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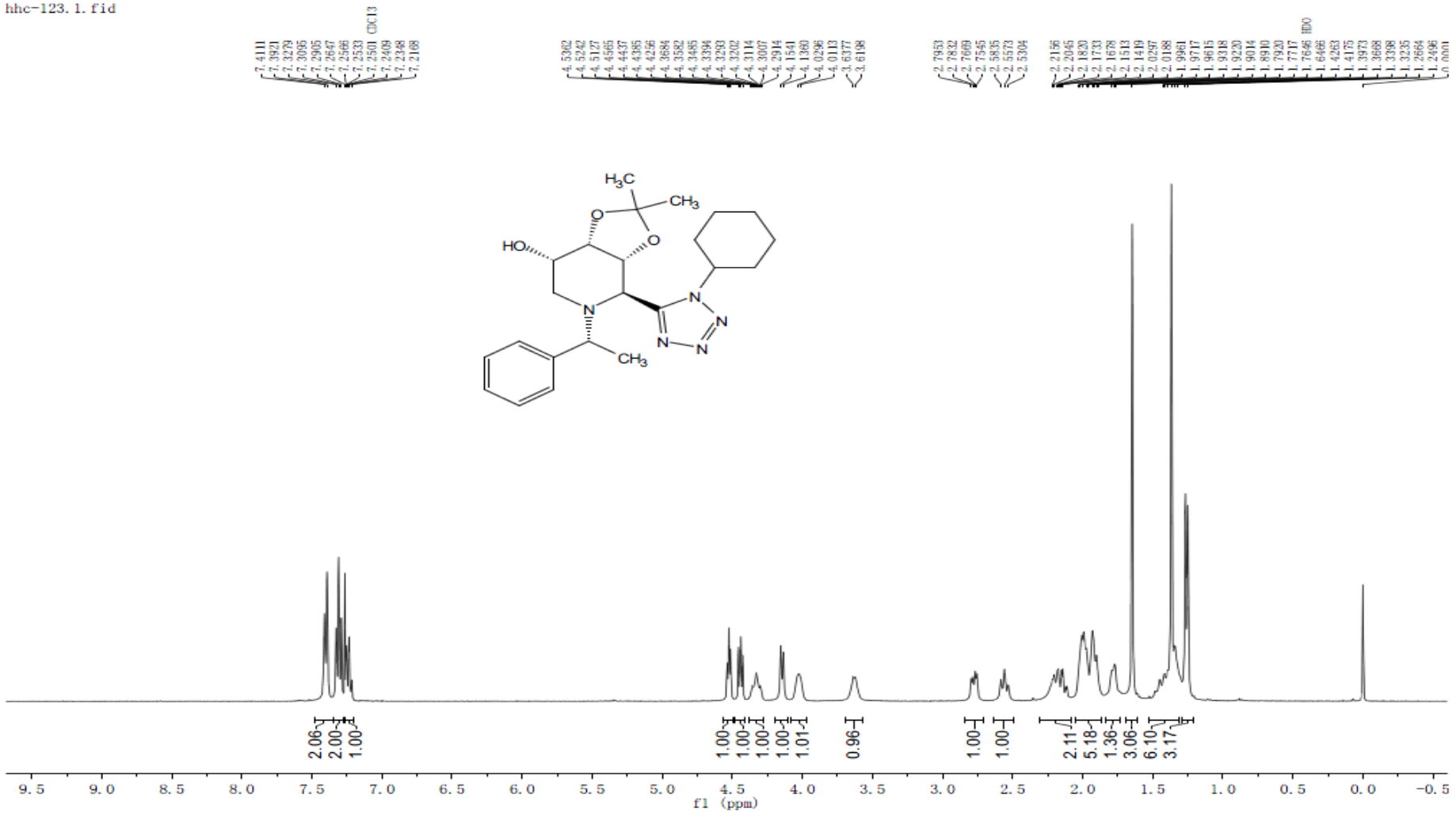
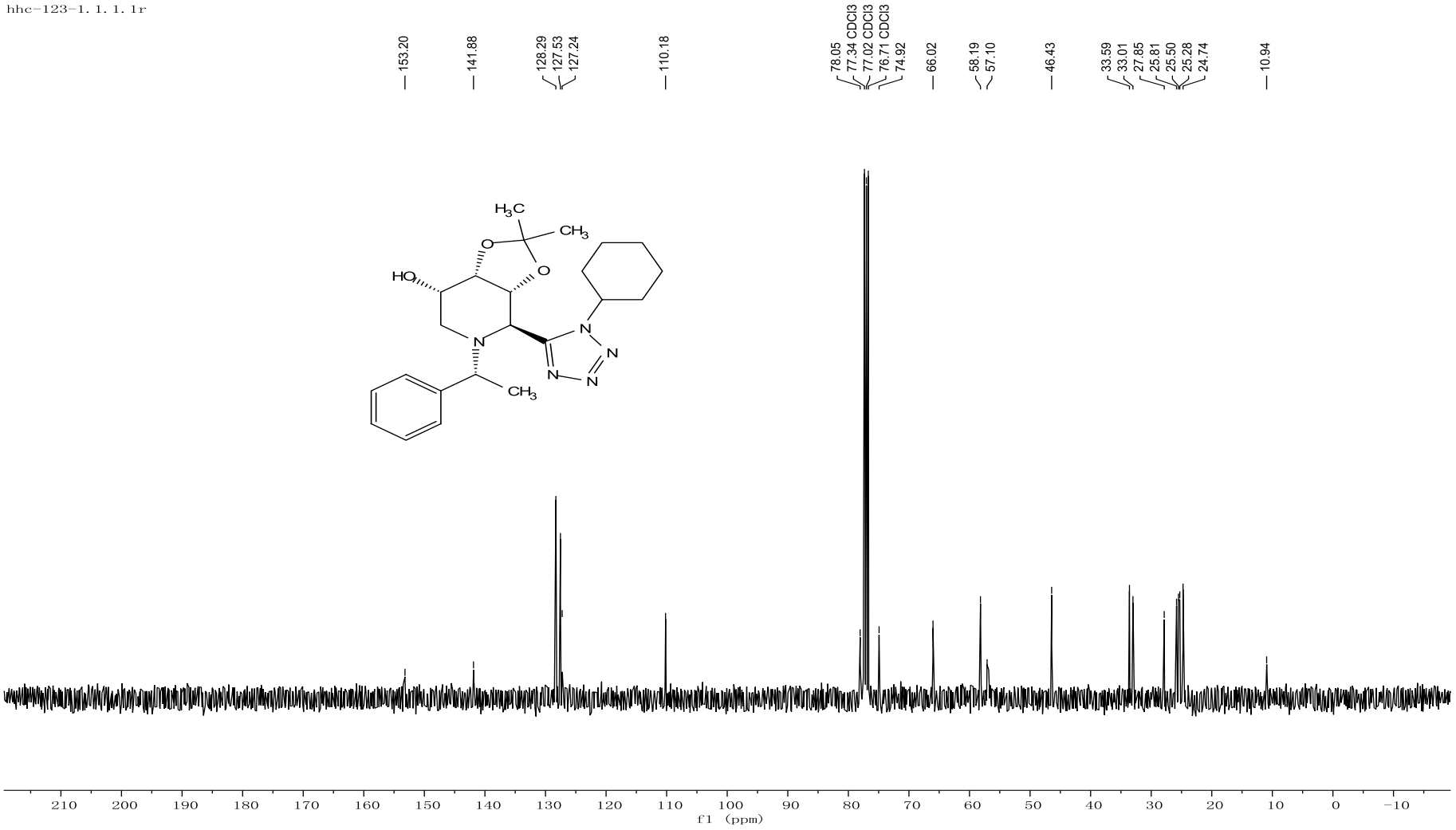
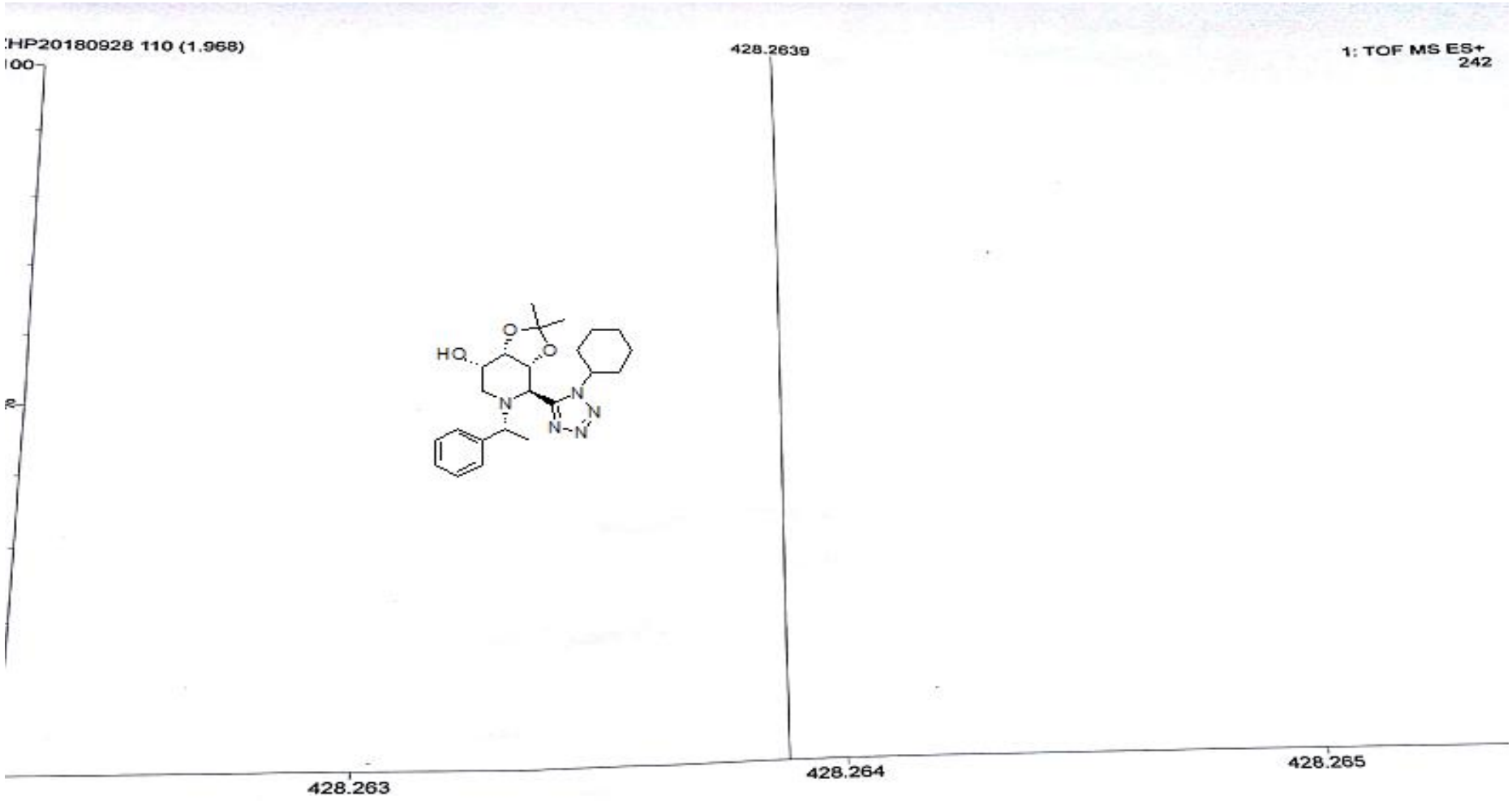
4a: ^{1}H NMR


hhc-123.1.fid
CDCl3
H3C
CH3
O
O
HO
N
N
N
N
N
CH3
2.06
2.00
1.00
1.00
1.00
1.00
1.01
0.96
1.00
1.00
2.11
5.18
1.36
3.06
6.10
3.17
f1 (ppm)

4a: ^{13}C NMR

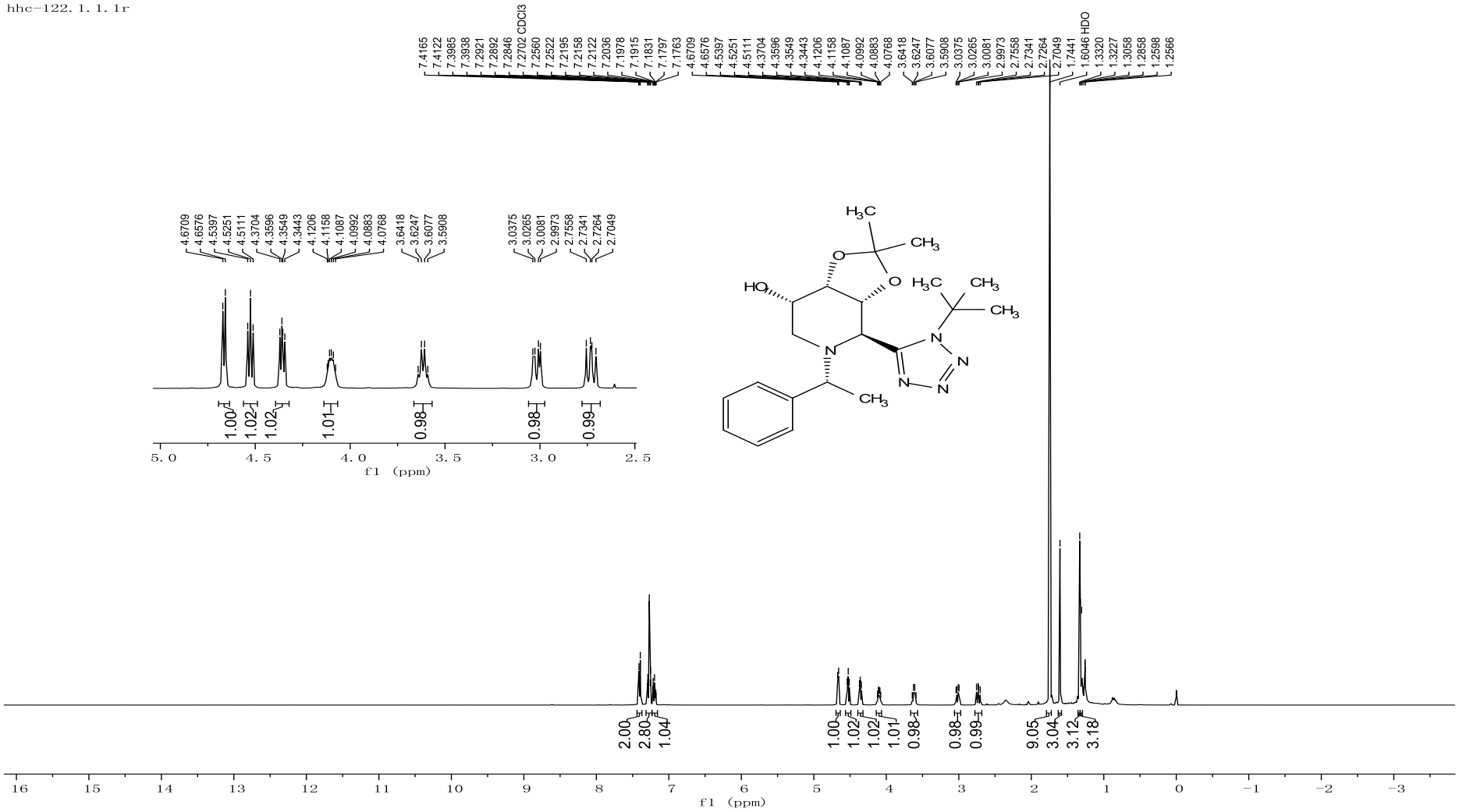

hhc-123-1. 1. 1. 1r
153.20
141.88
128.29
127.53
127.24
110.18
78.05
77.34 CDCl3
77.02 CDCl3
76.71 CDCl3
74.92
66.02
58.19
57.10
46.43
33.59
33.01
27.85
25.81
25.50
25.28
24.74
10.94
H3C
CH3
O
O
HO
N
N
N
N
N
CH3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 −10
f1 (ppm)

4a: TOF MS ES+

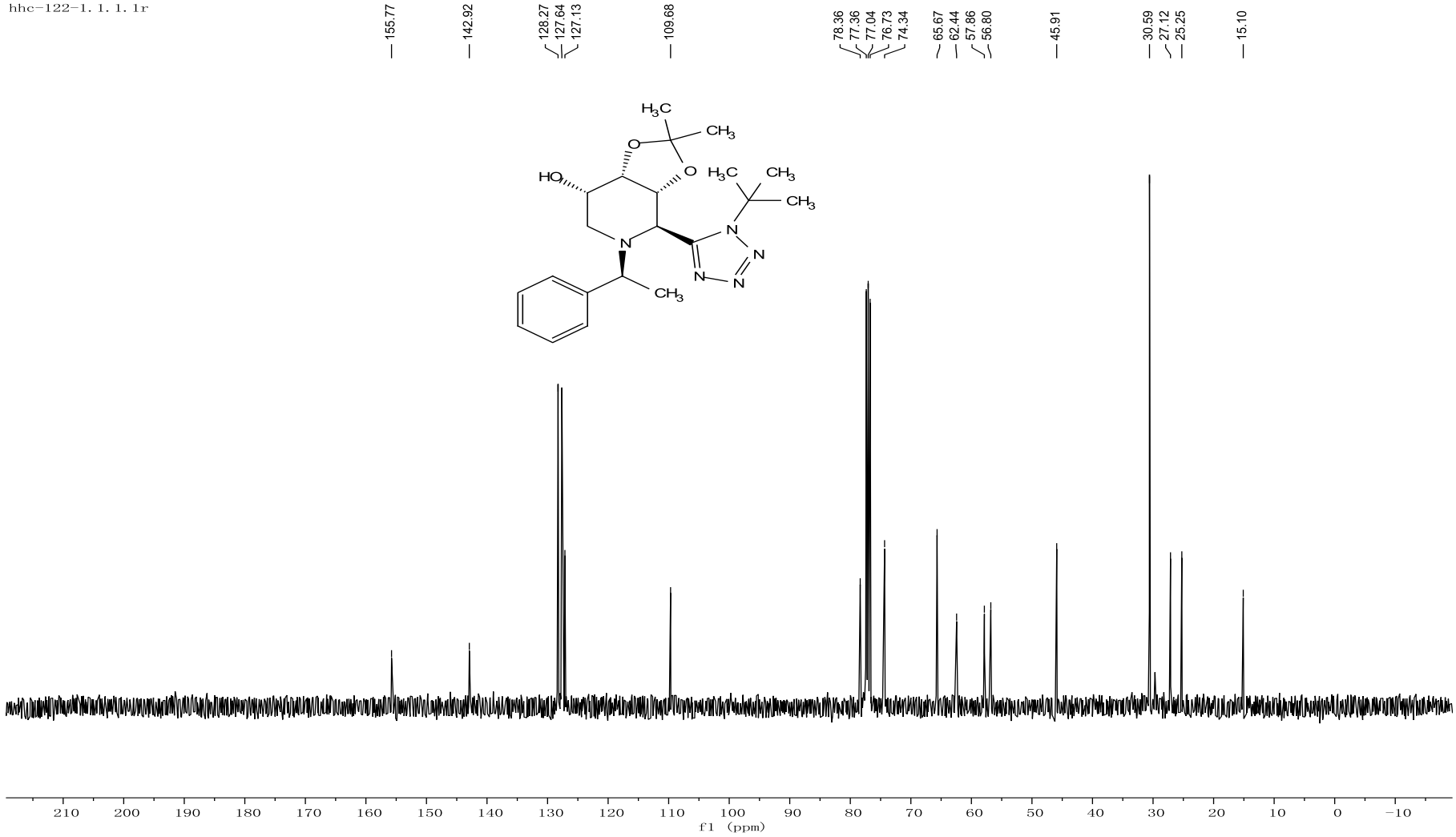

HP20180928 110 (1.968)
100
428.2639
1: TOF MS ES+
242
HO
O
O
N
N
N
N
428.263
428.264
428.265

4b: ^{1}H NMR

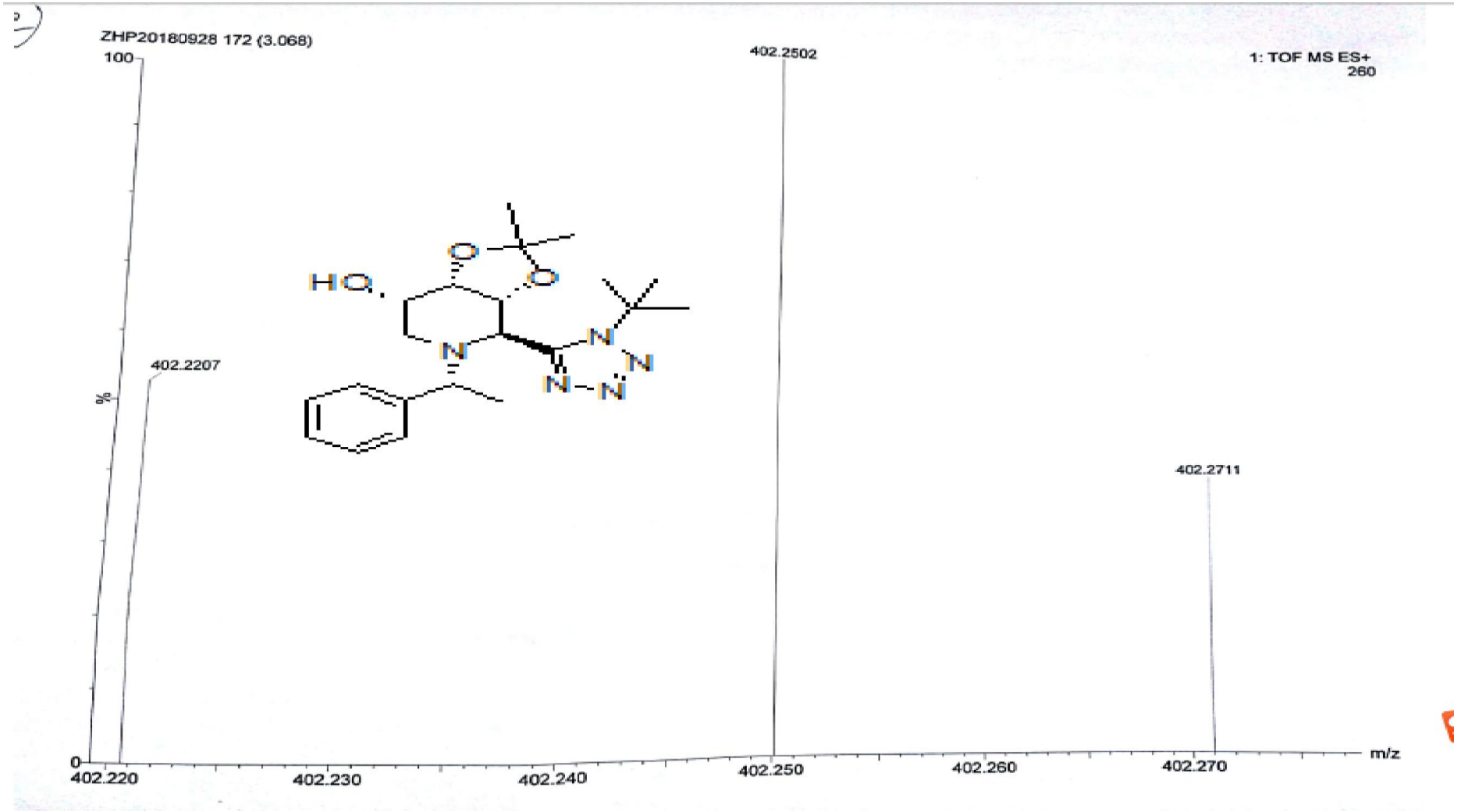
hhc-122. 1. 1. 1r



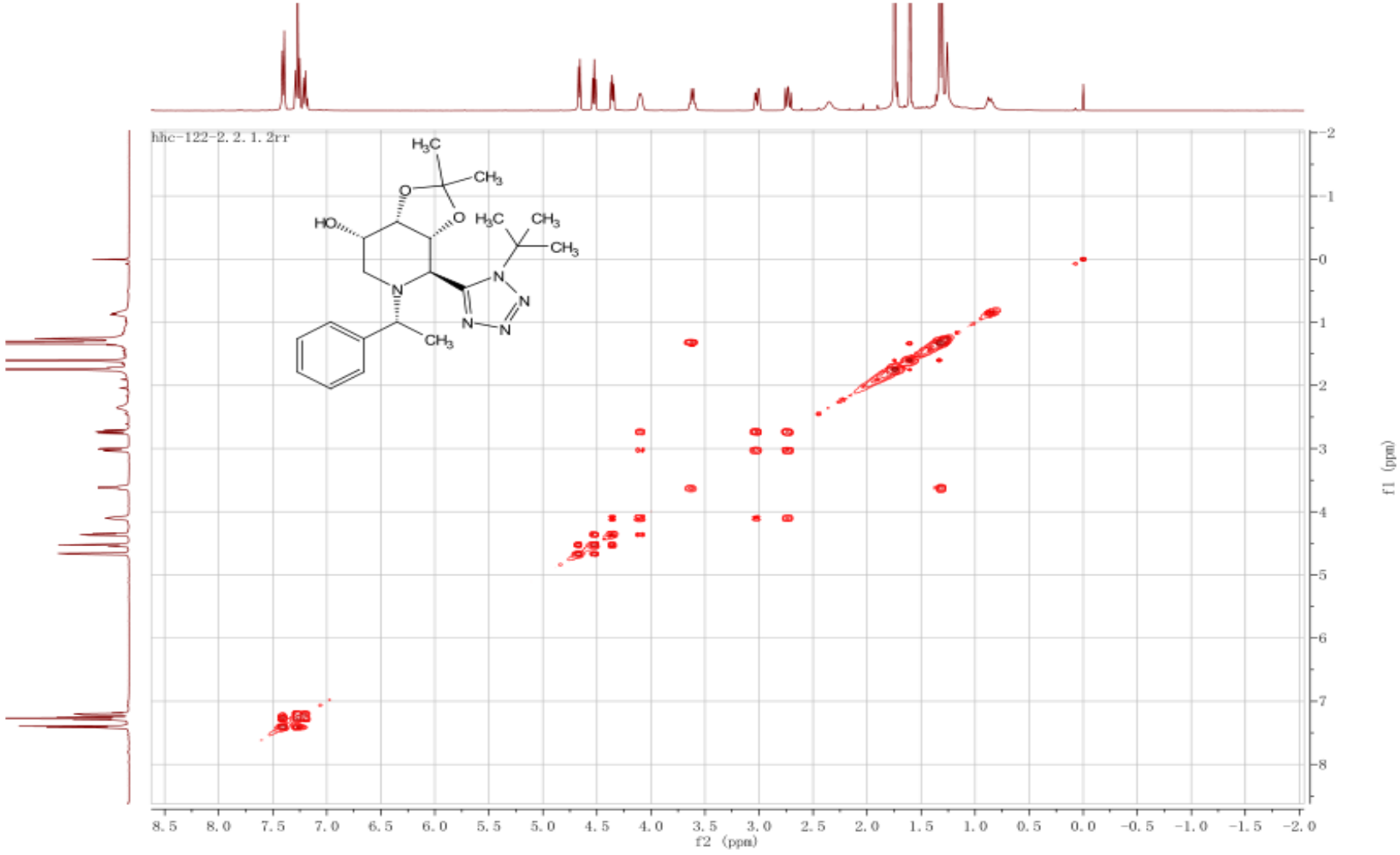
4b: ^{13}C NMR


hhc-122-1.1.1.1r
155.77
142.92
128.27
127.64
127.13
109.68
78.36
77.36
77.04
76.73
74.34
65.67
62.44
57.86
56.80
45.91
30.59
27.12
25.25
15.10
f1 (ppm)

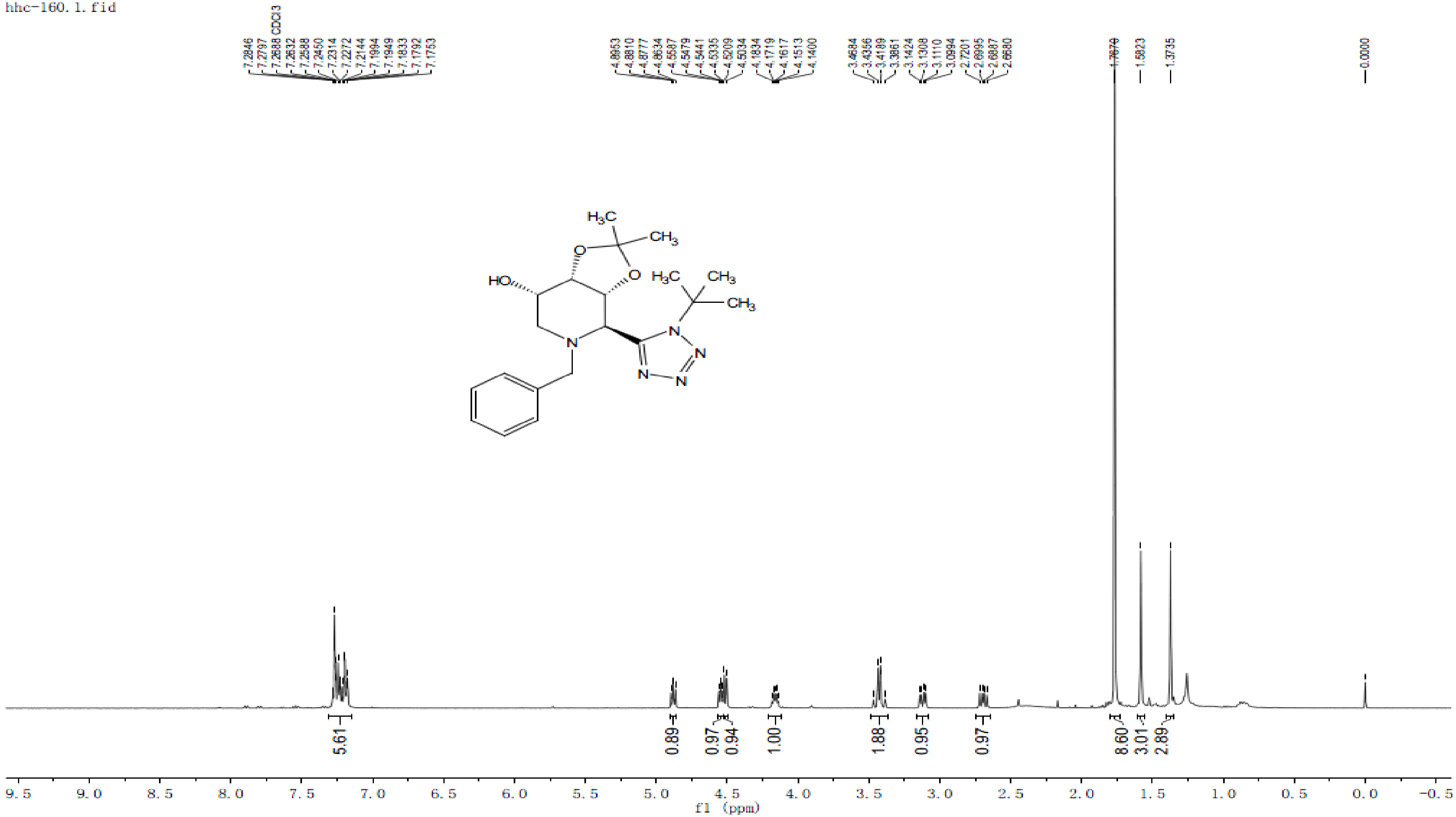
4b: TOF MS ES+


ZHP20180928 172 (3.068)
100
%
0
402.2207
402.2502
402.2711
1: TOF MS ES+
260
HO
O
O
N
N
N
N
N
402.220
402.230
402.240
402.250
402.260
402.270
m/z

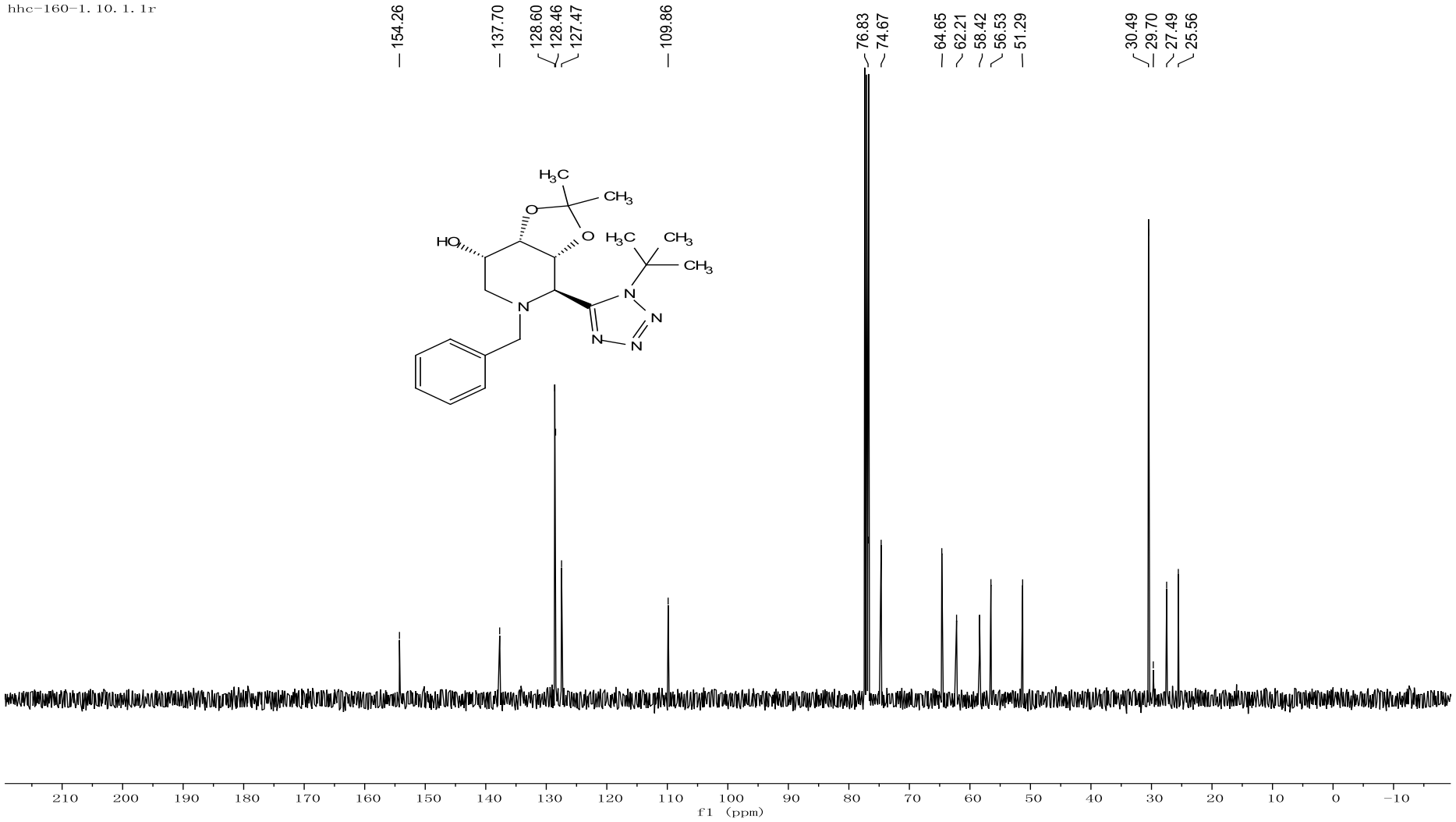
4b: H-H COSY


hhc-122-2.2.1.2rr
HO
O
O
N
N
N
N
CH3
H3C
CH3
CH3
H3C
CH3
CH3
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 -1.0 -1.5 -2.0
f2 (ppm)
f1 (ppm)

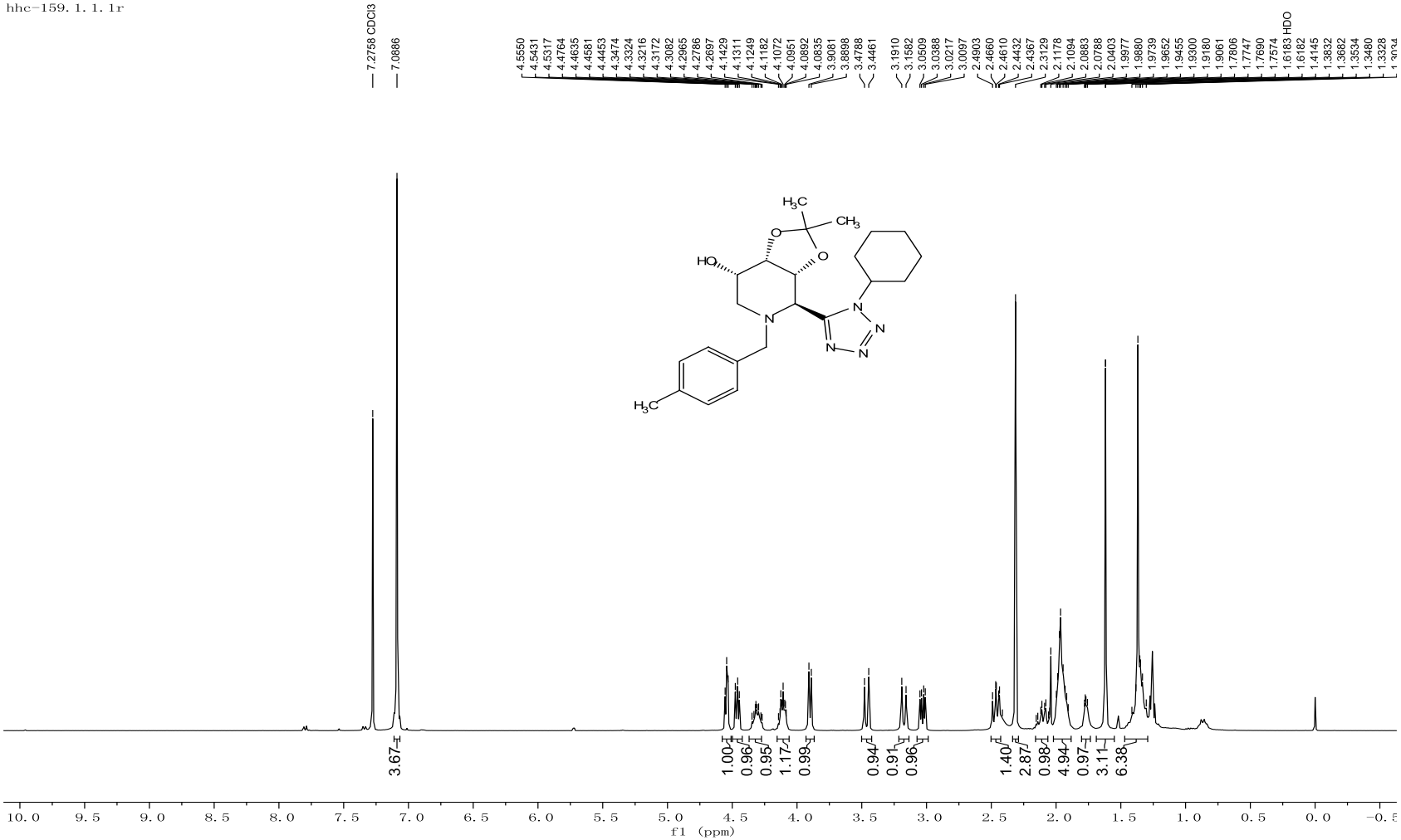
4c: [1]H NMR


hhc-160.1.fid
H3C
CH3
HO
O
O
H3C
CH3
CH3
N
N
N
N
N
5.61
0.89
0.97
0.94
1.00
1.88
0.95
0.97
8.60
3.01
2.89
f1 (ppm)

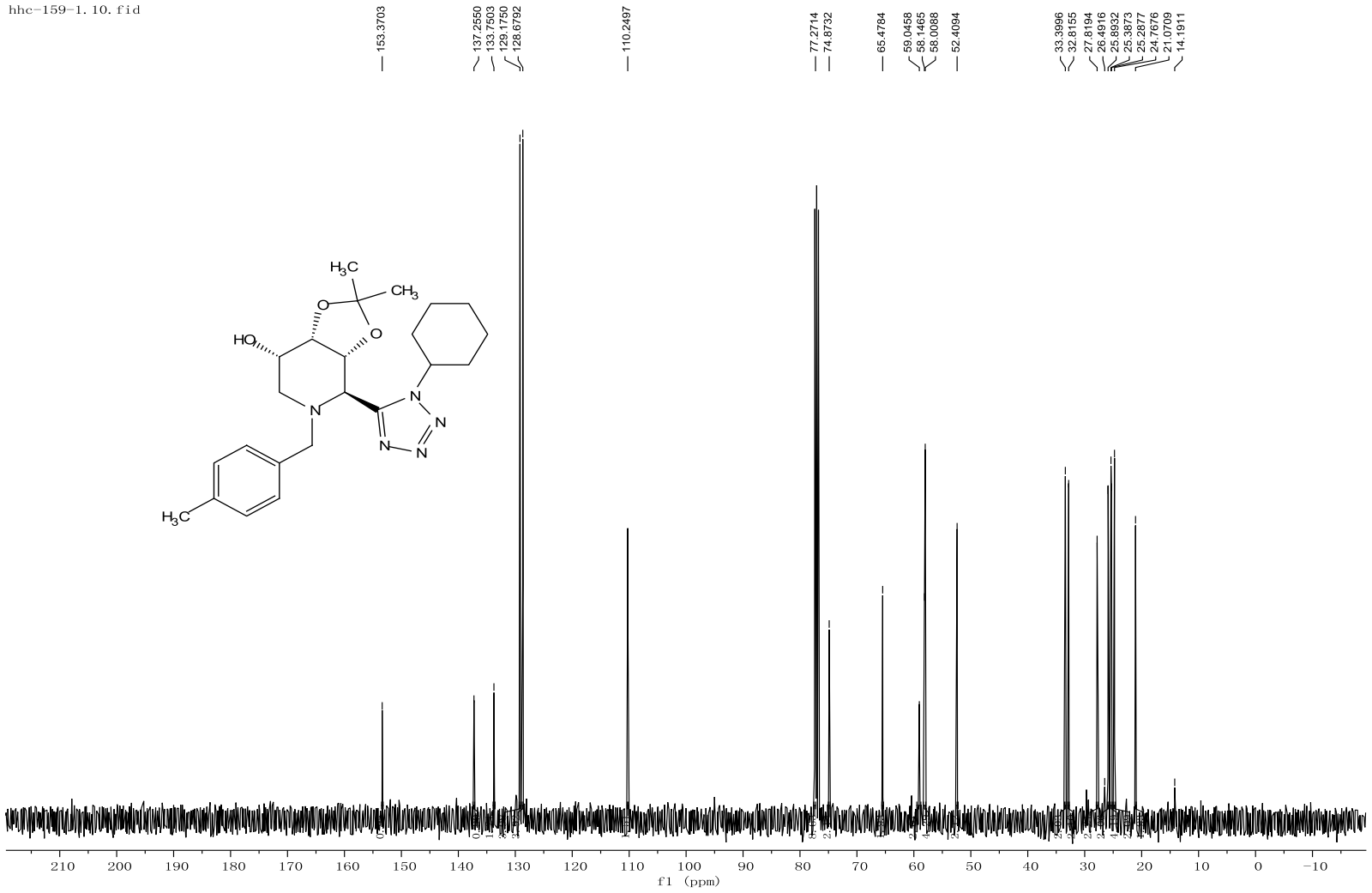
4c: ^{13}C NMR


hhc-160-1. 10. 1. 1r
154.26
137.70
128.60
128.46
127.47
109.86
76.83
74.67
64.65
62.21
58.42
56.53
51.29
30.49
29.70
27.49
25.56
f1 (ppm)

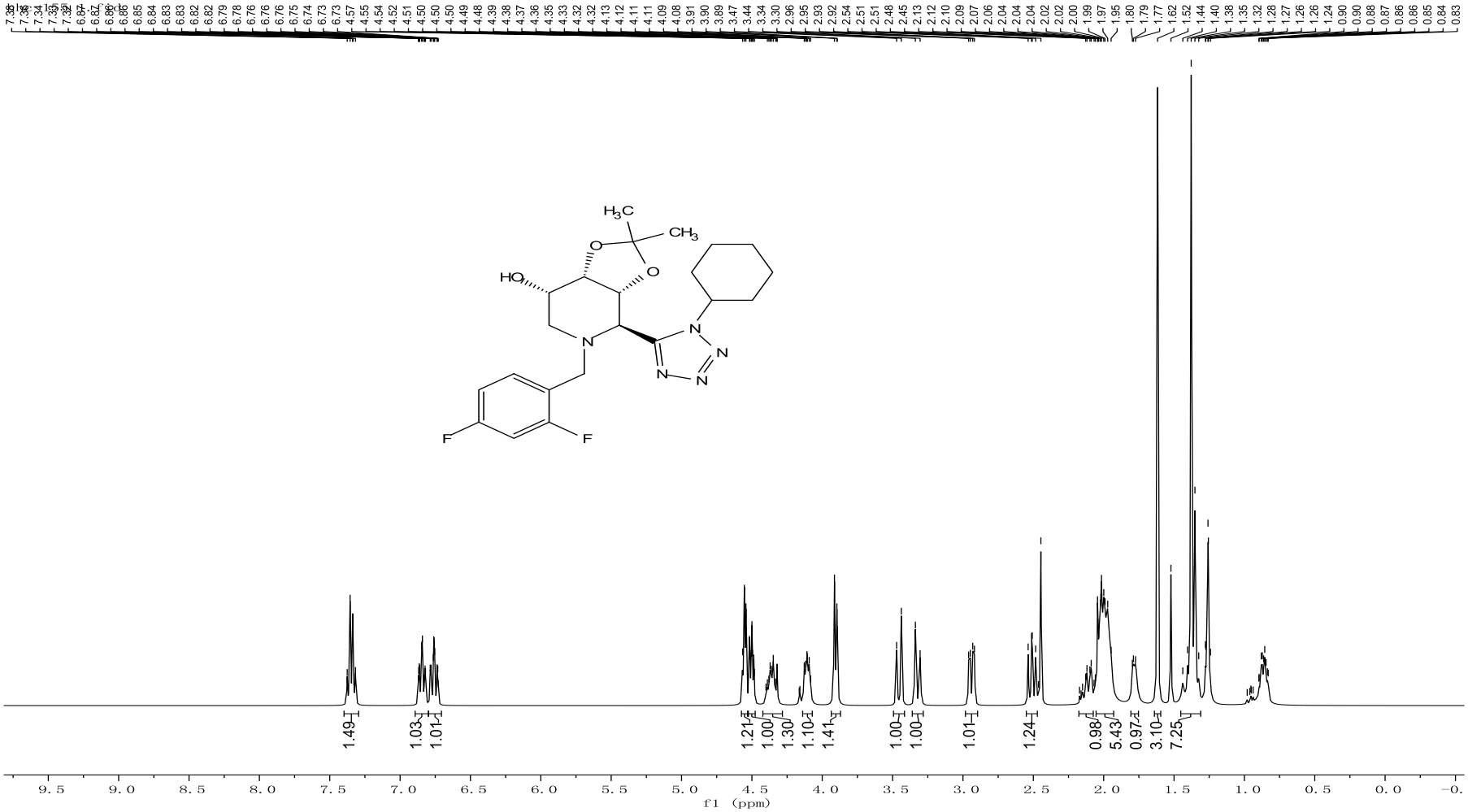
4d: ^{1}H NMR


hhc-159. 1. 1. 1r
7.2758 CDCl3
7.0886
4.5550
4.5431
4.5317
4.4764
4.4635
4.4581
4.4453
4.3474
4.3324
4.3216
4.3172
4.3082
4.2965
4.2786
4.2697
4.1429
4.1311
4.1249
4.1182
4.1072
4.0951
4.0892
4.0835
3.9081
3.8898
3.4788
3.4461
3.1910
3.1582
3.0509
3.0388
3.0217
3.0097
2.4903
2.4660
2.4610
2.4432
2.4367
2.3129
2.1178
2.1094
2.0883
2.0788
2.0403
1.9977
1.9880
1.9739
1.9652
1.9455
1.9300
1.9180
1.9061
1.7806
1.7747
1.7690
1.7574
1.6183 HDO
1.6182
1.4145
1.3832
1.3682
1.3534
1.3480
1.3328
3.67
1.00
0.96
0.95
1.17
0.99
0.94
0.91
0.96
1.40
2.87
0.98
4.94
0.97
3.11
6.38
f1 (ppm)

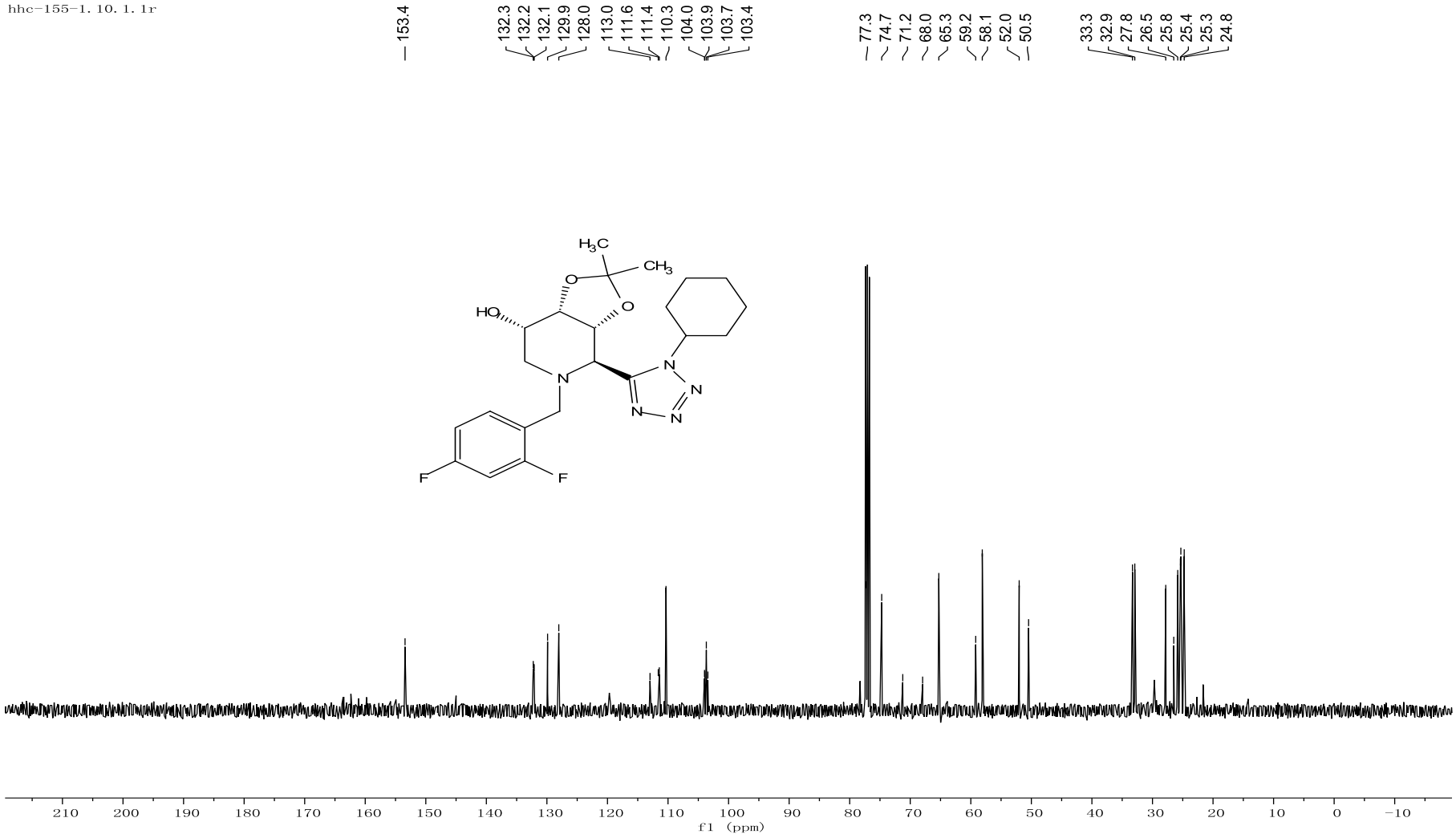
4d: ^{13}C NMR


hhc-159-1.10.fid
153.3703
137.2550
133.7503
129.1750
128.8792
110.2497
77.2714
74.8732
65.4784
59.0458
58.1465
58.0088
52.4094
33.3996
32.8155
27.8194
26.4916
25.8932
25.3873
25.2877
24.7676
21.0709
14.1911
H3C
CH3
O
O
HO
N
N
N
N
N
H3C
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 −10
f1 (ppm)

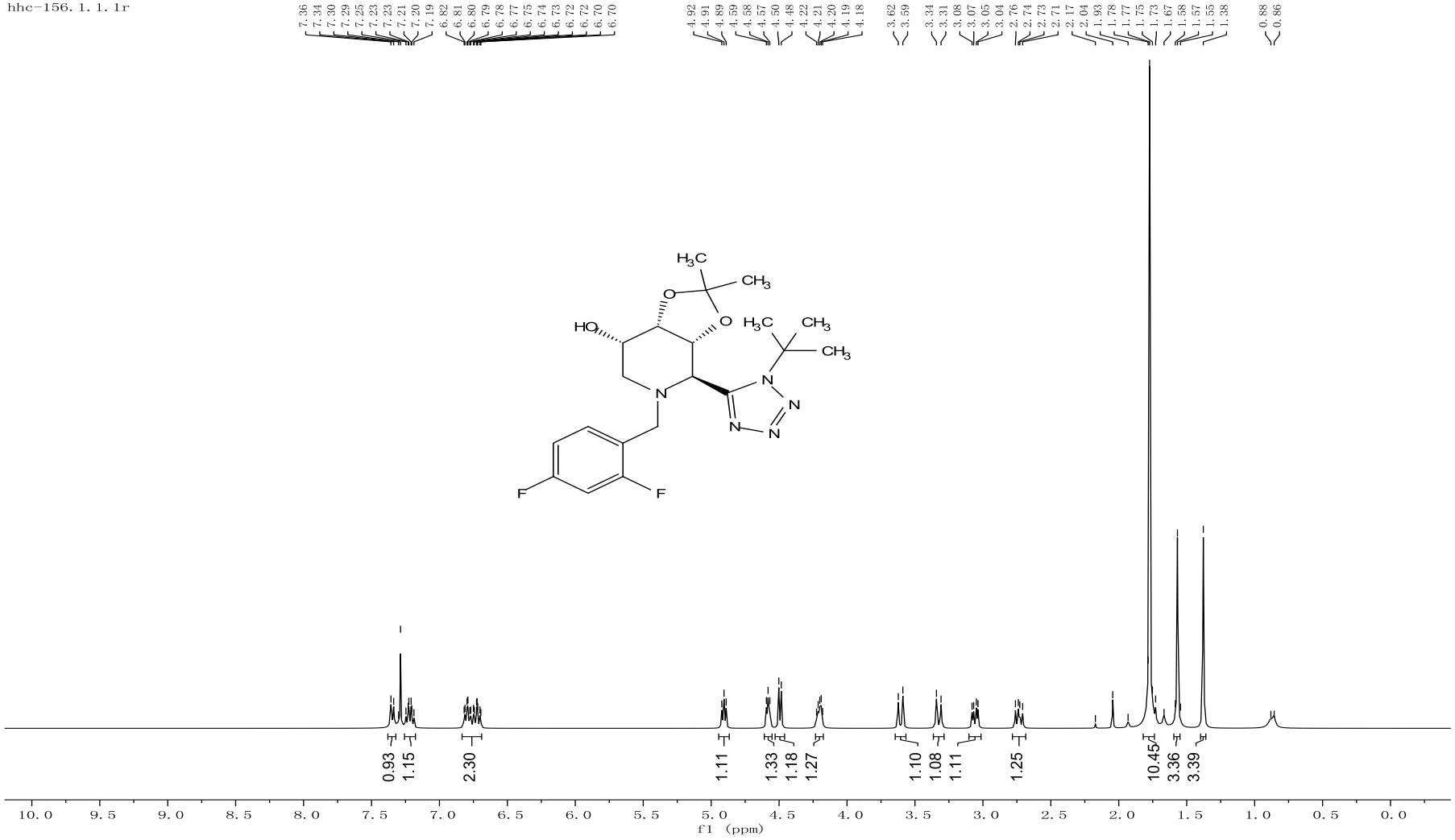
4e: ^{1}H NMR


H3C
CH3
O
O
HO
N
N
N
N
N
F
F
1.49
1.03
1.01
1.21
1.00
1.30
1.10
1.41
1.00
1.00
1.01
1.24
0.98
5.43
0.97
3.10
7.25
f1 (ppm)

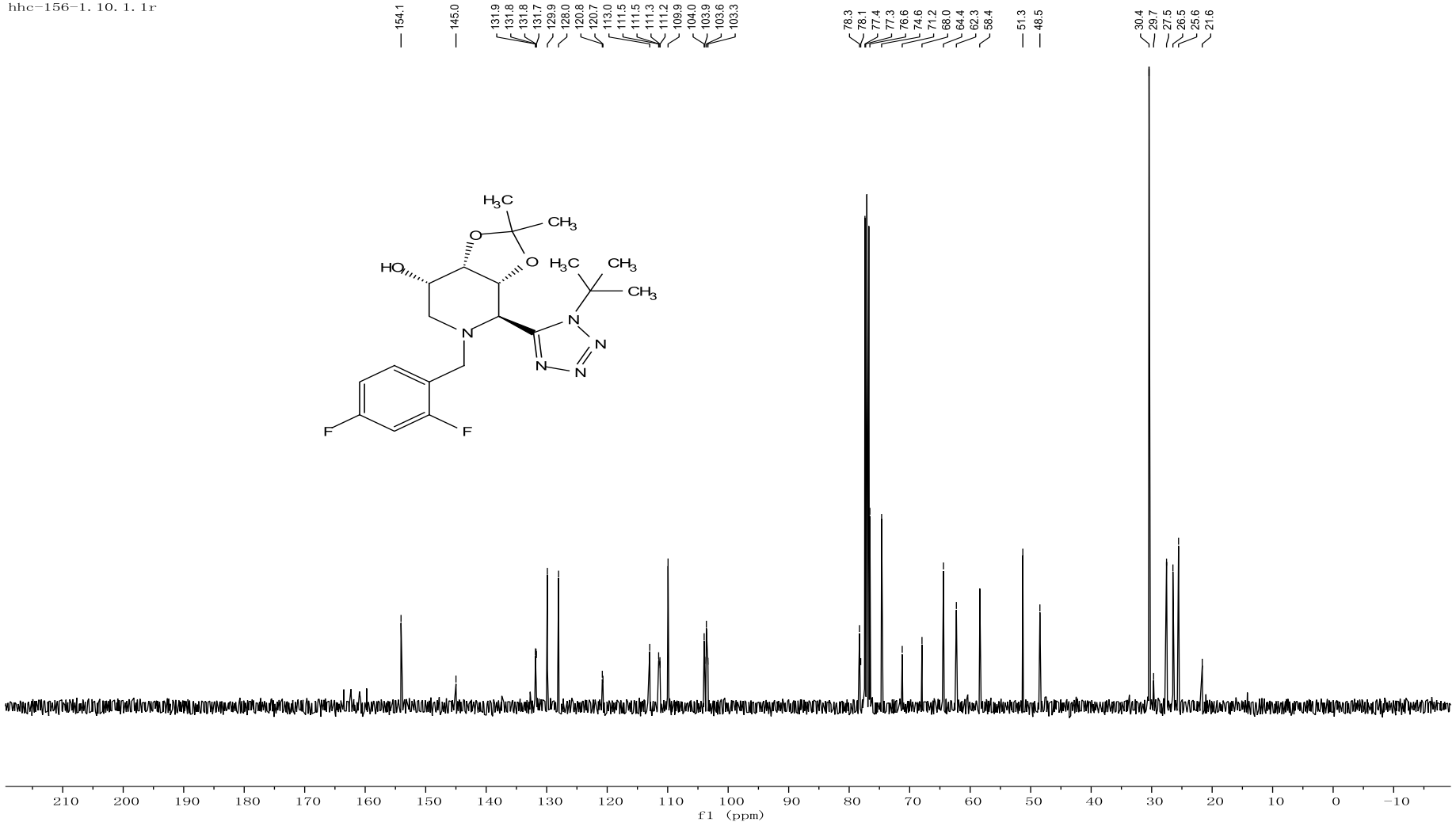
4e: ^{13}C NMR


hhc-155-1. 10. 1. 1r
153.4
132.3
132.2
132.1
129.9
128.0
113.0
111.6
111.4
110.3
104.0
103.9
103.7
103.4
77.3
74.7
71.2
68.0
65.3
59.2
58.1
52.0
50.5
33.3
32.9
27.8
26.5
25.8
25.4
25.3
24.8
H3C
CH3
O
O
HO
N
N
N
N
N
F
F
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)

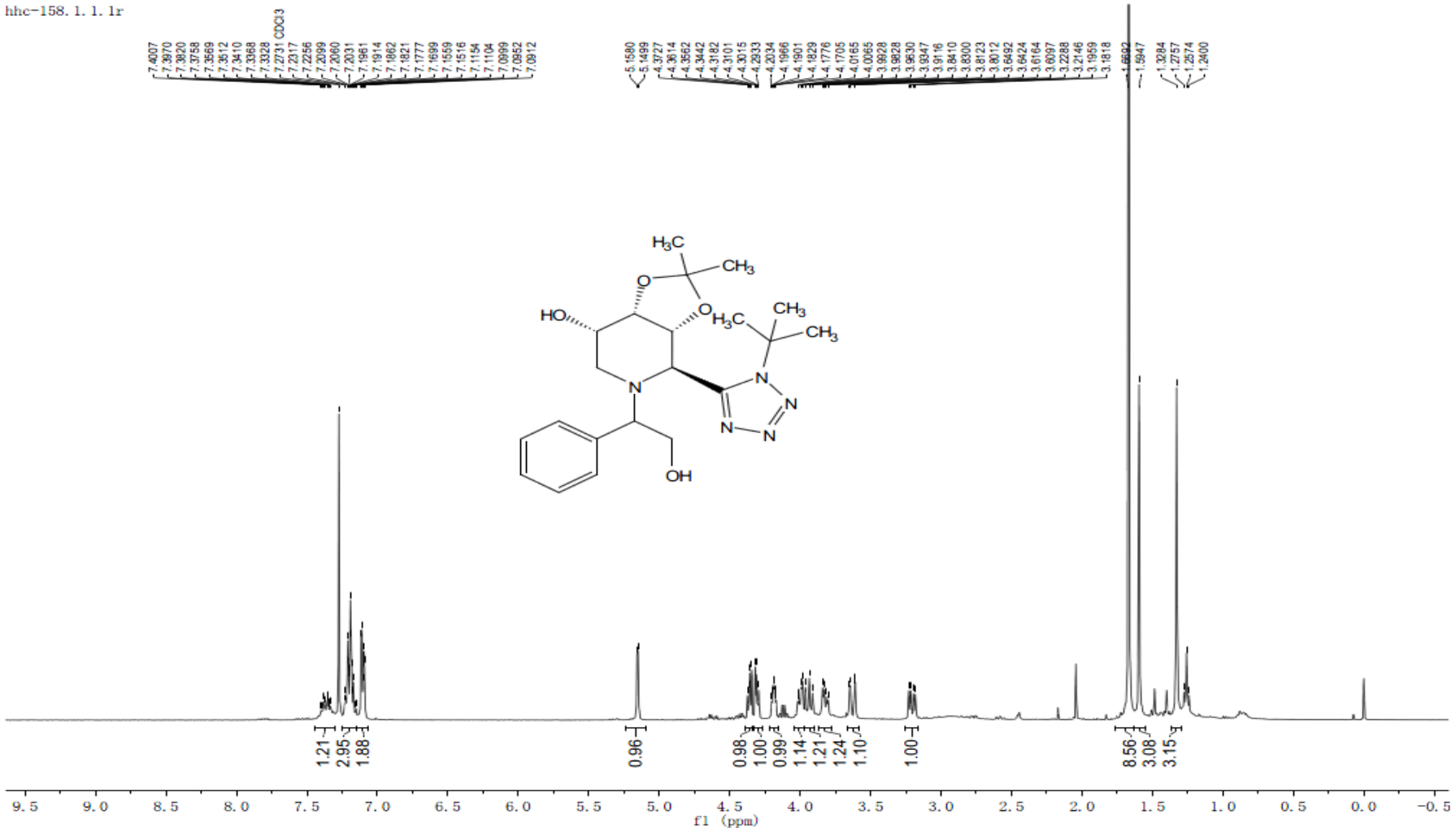
4f: ^{1}H NMR


hhc-156. 1. 1. 1r
7.36 7.34 7.30 7.29 7.25 7.23 7.23 7.21 7.20 7.19 6.82 6.81 6.80 6.79 6.78 6.77 6.75 6.74 6.73 6.72 6.72 6.70 6.70
4.92 4.91 4.89 4.59 4.58 4.57 4.50 4.48 4.22 4.21 4.20 4.19 4.18 3.62 3.59 3.34 3.31 3.08 3.07 3.05 3.04 2.76 2.74 2.73 2.71 2.17 2.04 1.93 1.78 1.77 1.75 1.73 1.67 1.58 1.57 1.55 1.38 0.88 0.86
H3C CH3 O O HO H3C CH3 CH3 N N N N F F
0.93 1.15 2.30 1.11 1.33 1.18 1.27 1.10 1.08 1.11 1.25 10.45 3.36 3.39
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
f1 (ppm)

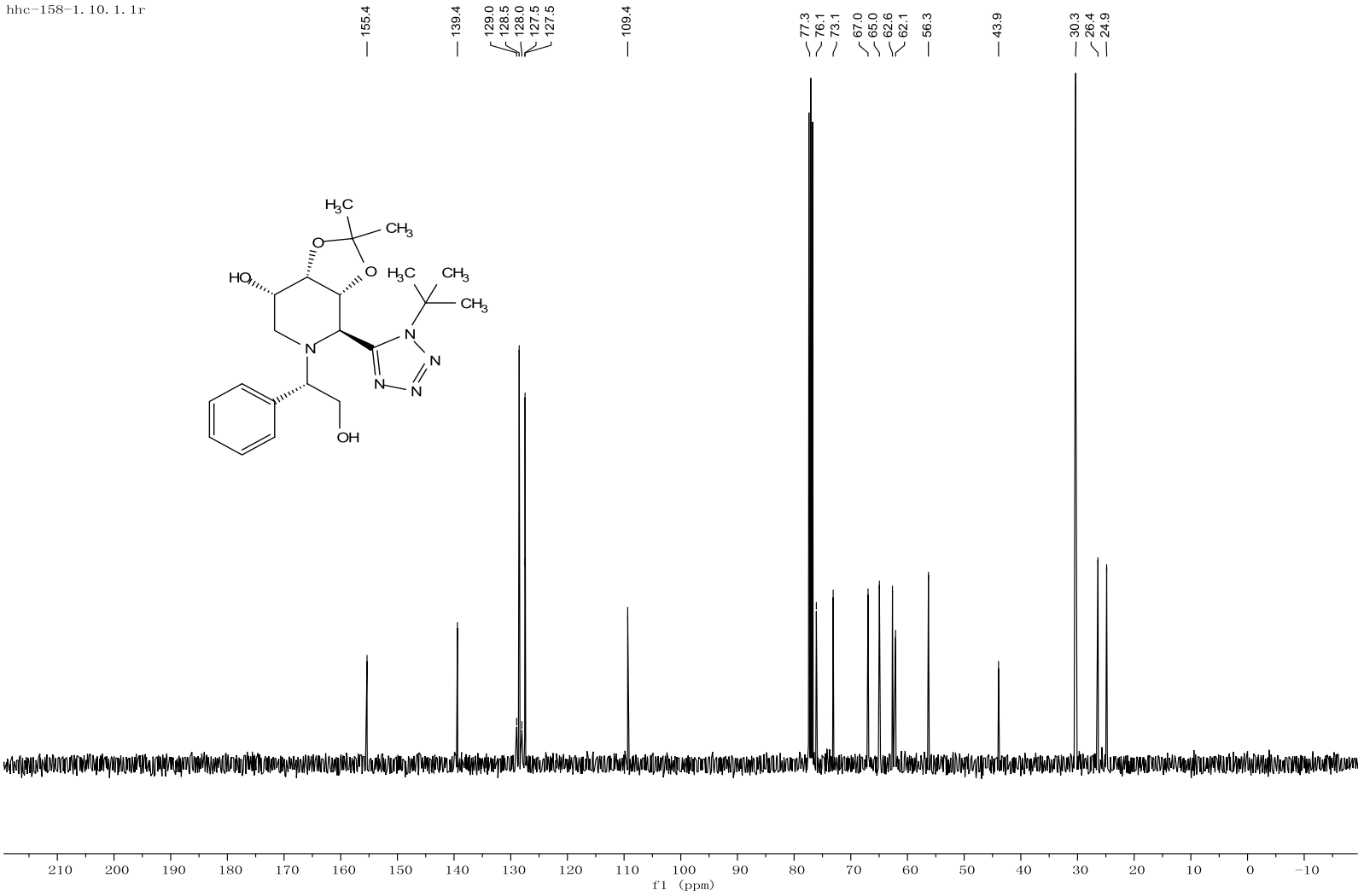
4f: ^{13}C NMR


hhc-156-1. 10. 1. 1r
154.1
145.0
131.9
131.8
131.8
131.7
129.9
128.0
120.8
120.7
113.0
111.5
111.5
111.3
111.2
109.9
104.0
103.9
103.6
103.3
78.3
78.1
77.4
77.3
76.6
74.6
71.2
68.0
64.4
62.3
58.4
51.3
48.5
30.4
29.7
27.5
26.5
25.6
21.6
H3C
CH3
O
O
HO
H3C
CH3
CH3
N
N
N
N
N
F
F
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)

4g: ^{1}H NMR

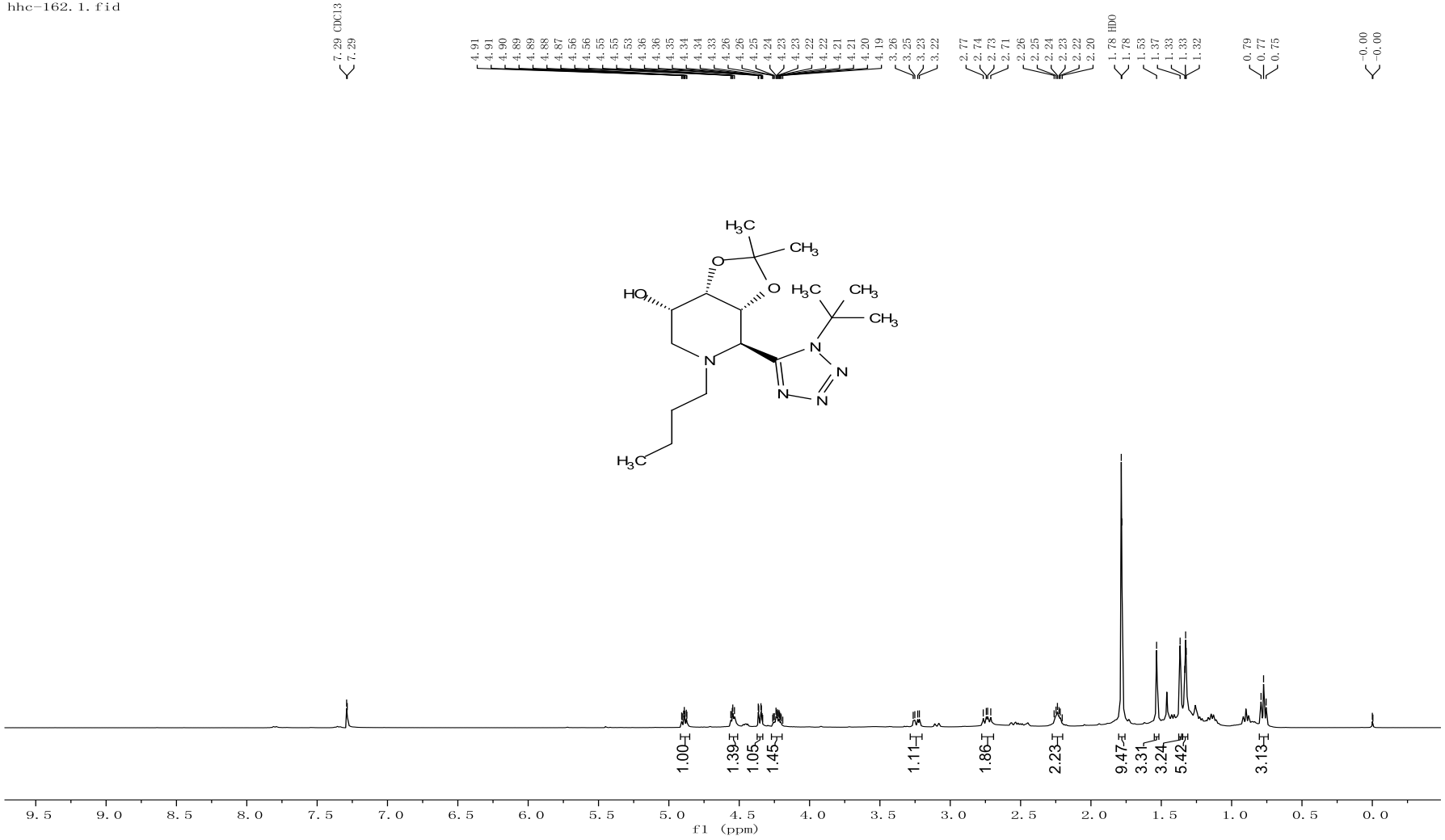


4g: ^{13}C NMR

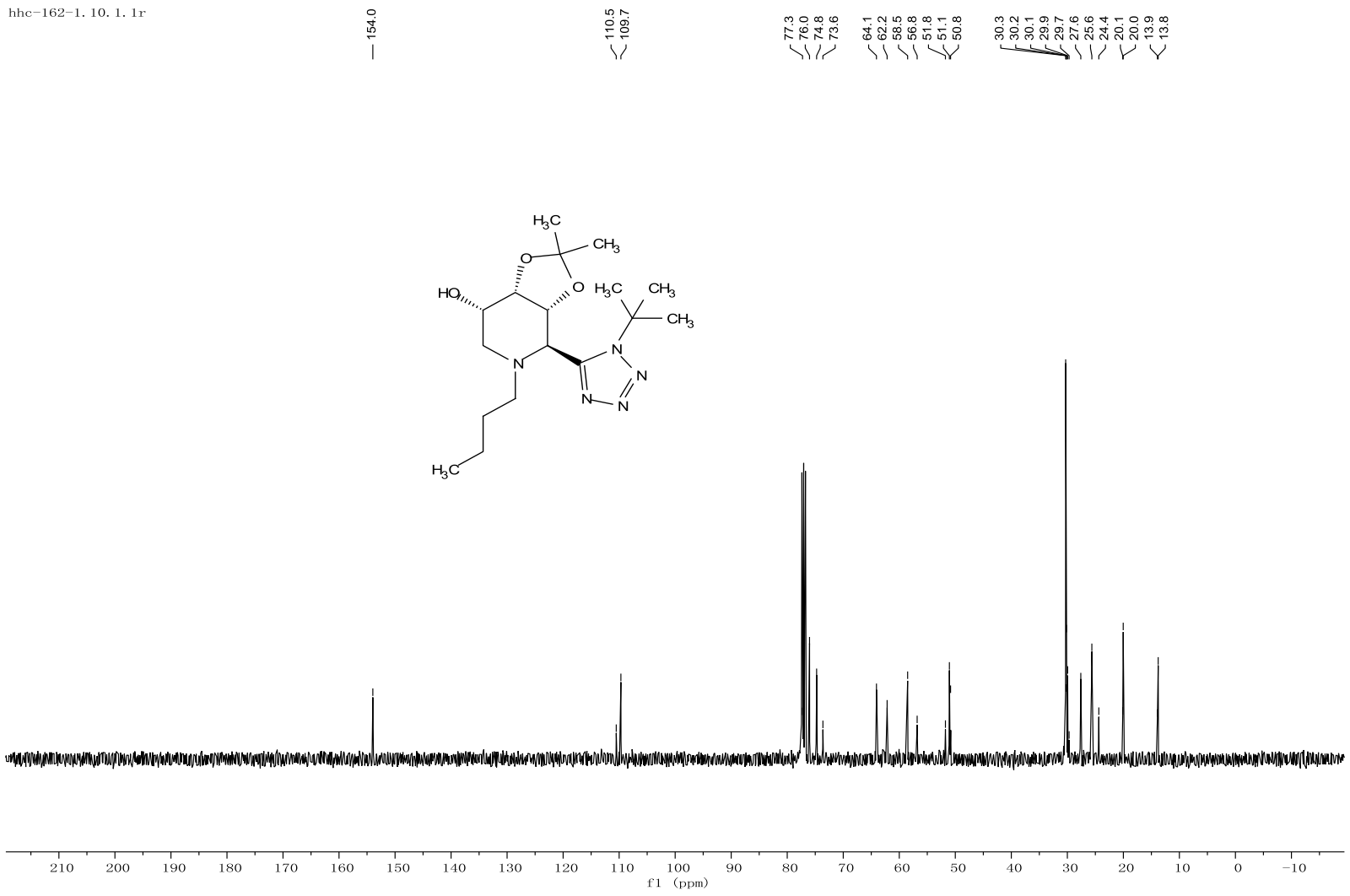

hhc-158-1.10.1.1r
155.4
139.4
129.0
128.5
128.0
127.5
127.5
109.4
77.3
76.1
73.1
67.0
65.0
62.6
62.1
56.3
43.9
30.3
26.4
24.9
H3C
CH3
O
O
HO
H3C
CH3
CH3
N
N
N
N
N
OH
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

4h: ^{1}H NMR

hhc-162.1.fid



4h: ^{13}C NMR


hhc-162-1. 10. 1. 1r
154.0
110.5
109.7
77.3
76.0
74.8
73.6
64.1
62.2
58.5
56.8
51.8
51.1
50.8
30.3
30.2
30.1
29.9
29.7
27.6
25.6
24.4
20.1
20.0
13.9
13.8
HO
O
O
N
N
N
N
f1 (ppm)