



Supporting Information

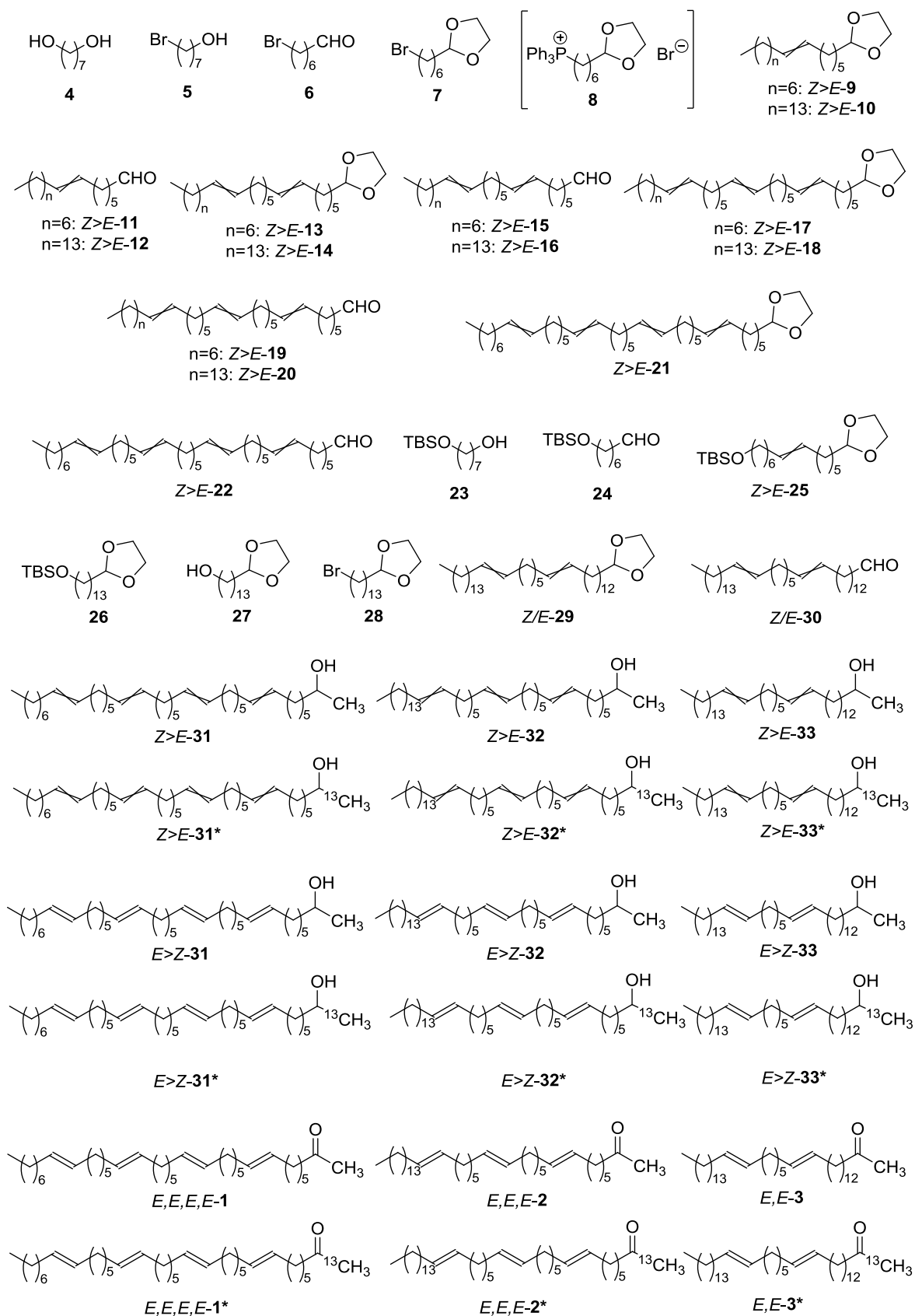
Synthesis of C₃₇-Alkenones for Past Climate Reconstructions

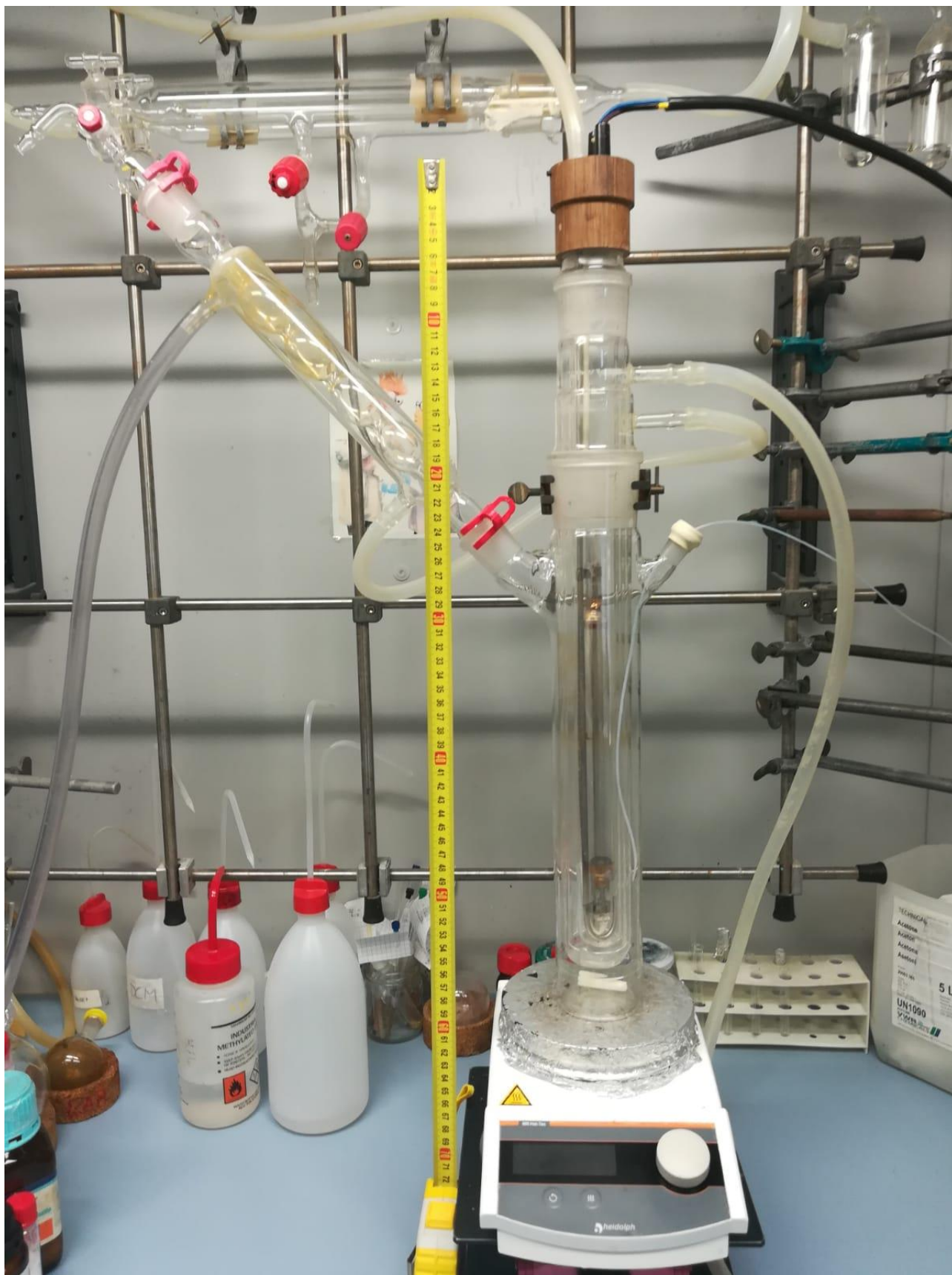
Giacomo Berton, Sarah Pizzini, Fabrizio Fabris,* Tommaso Bertolin, Eugenia Pafumi, Leonardo Ceccon, Jonas Daelemans, Giuseppe Borsato, Alessandro Scarso, Rossano Piazza, and Patrizia Ferretti

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Table of Substances discussed in the manuscript

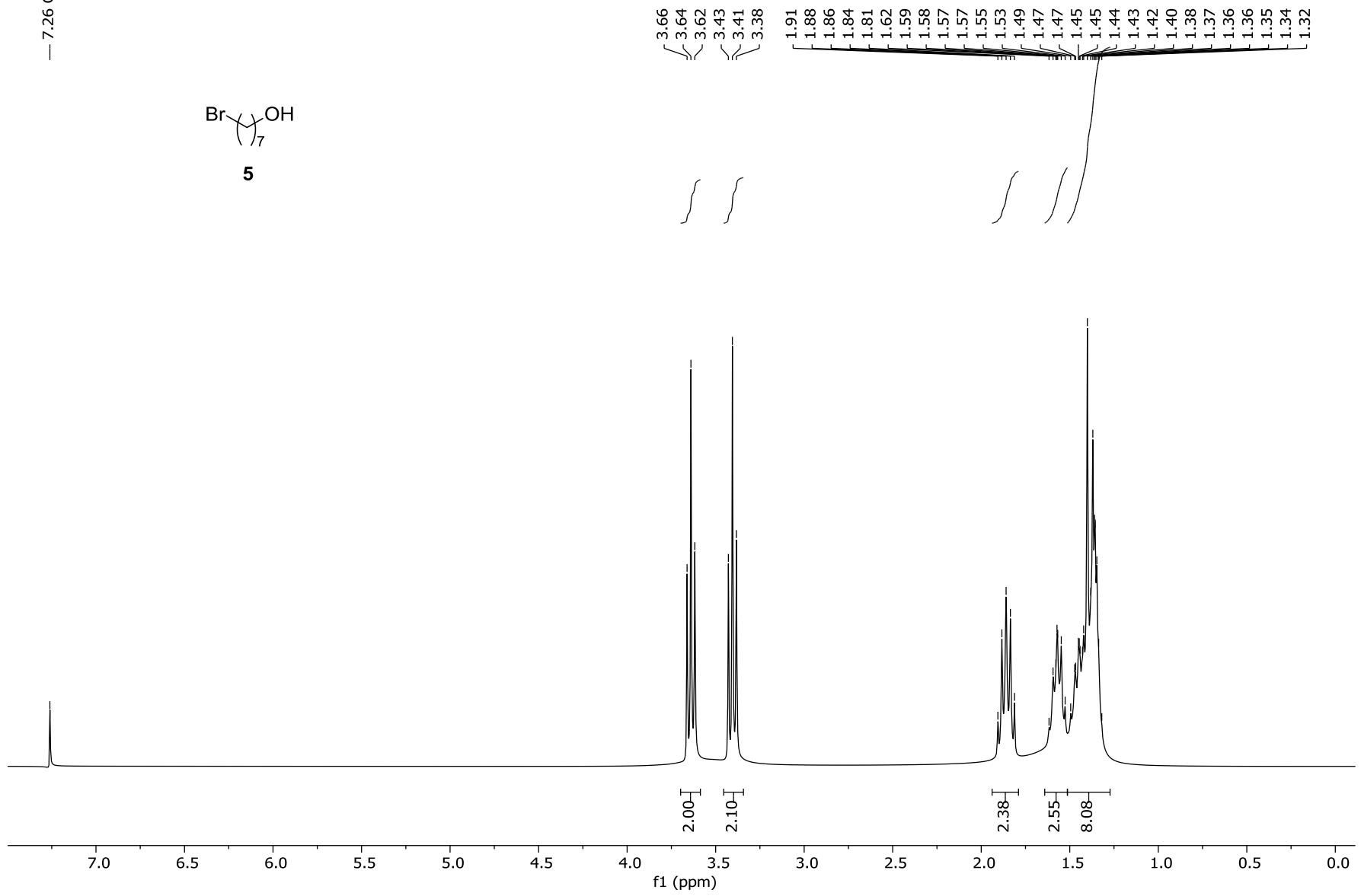
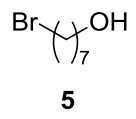


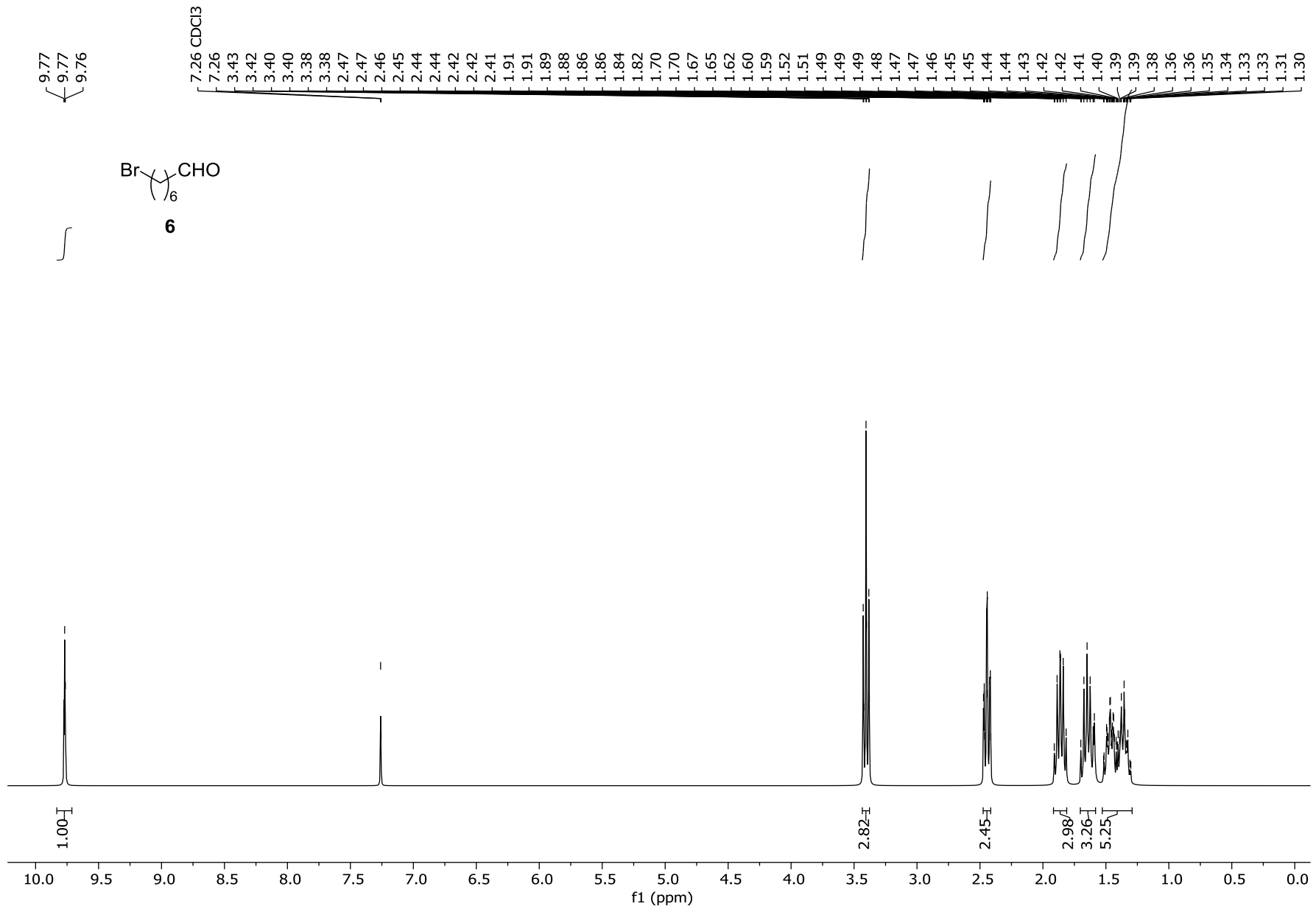


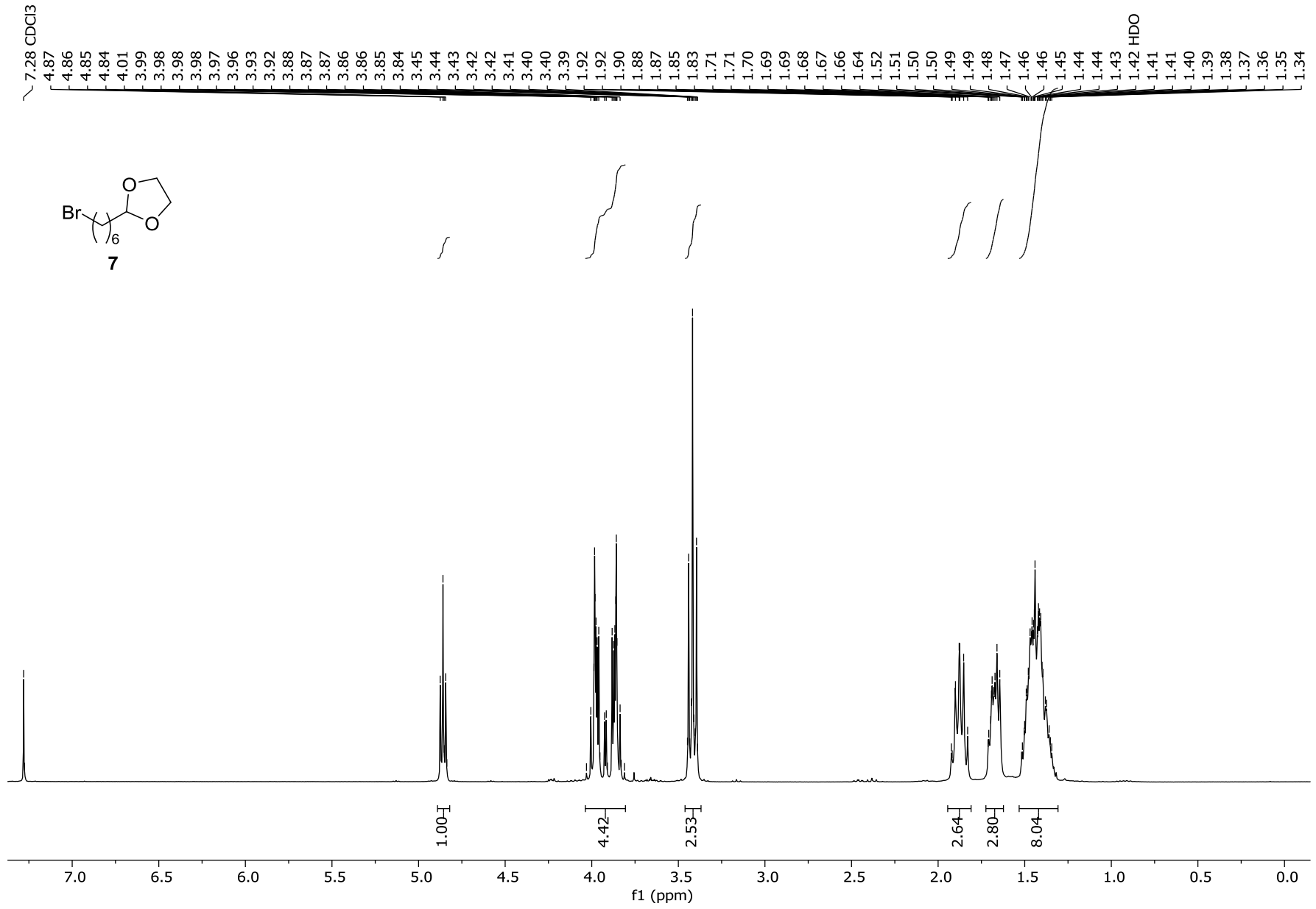
The apparatus is formed by an air-cooled high-pressure 500W Hg lamp. The lamp is inserted in a double-jacketed quartz water-cooled insert. This assembly is inserted in a coaxial glass reactor equipped with a large magnetic stirring bar, condenser, and a capillary argon inlet.

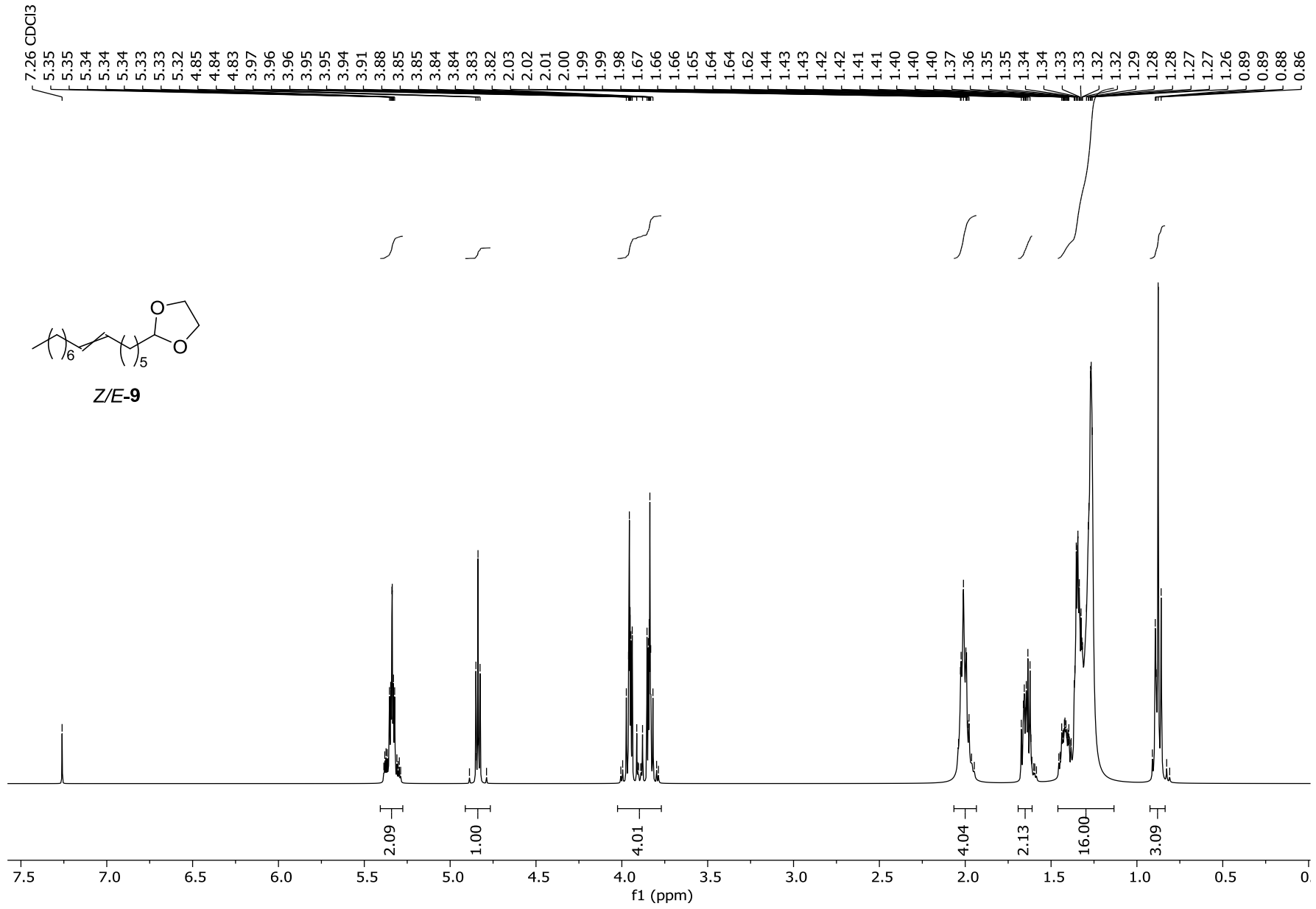
^1H NMR, $^{13}\text{C}\{^1\text{H}\}$ NMR and MS Spectra

— 7.26 CDCl₃









130.27
130.19
129.81

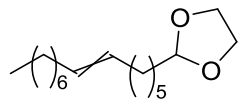
— 104.81

77.48 CDCl₃
77.16 CDCl₃
76.84 CDCl₃

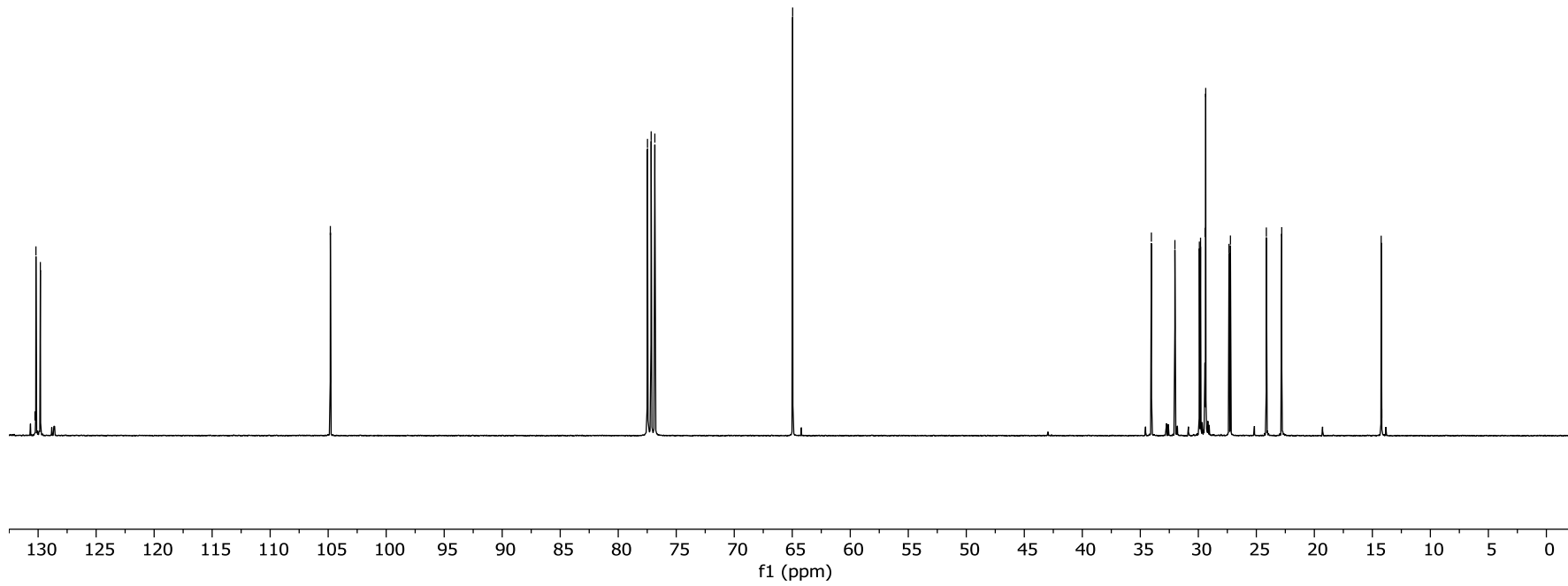
— 64.96

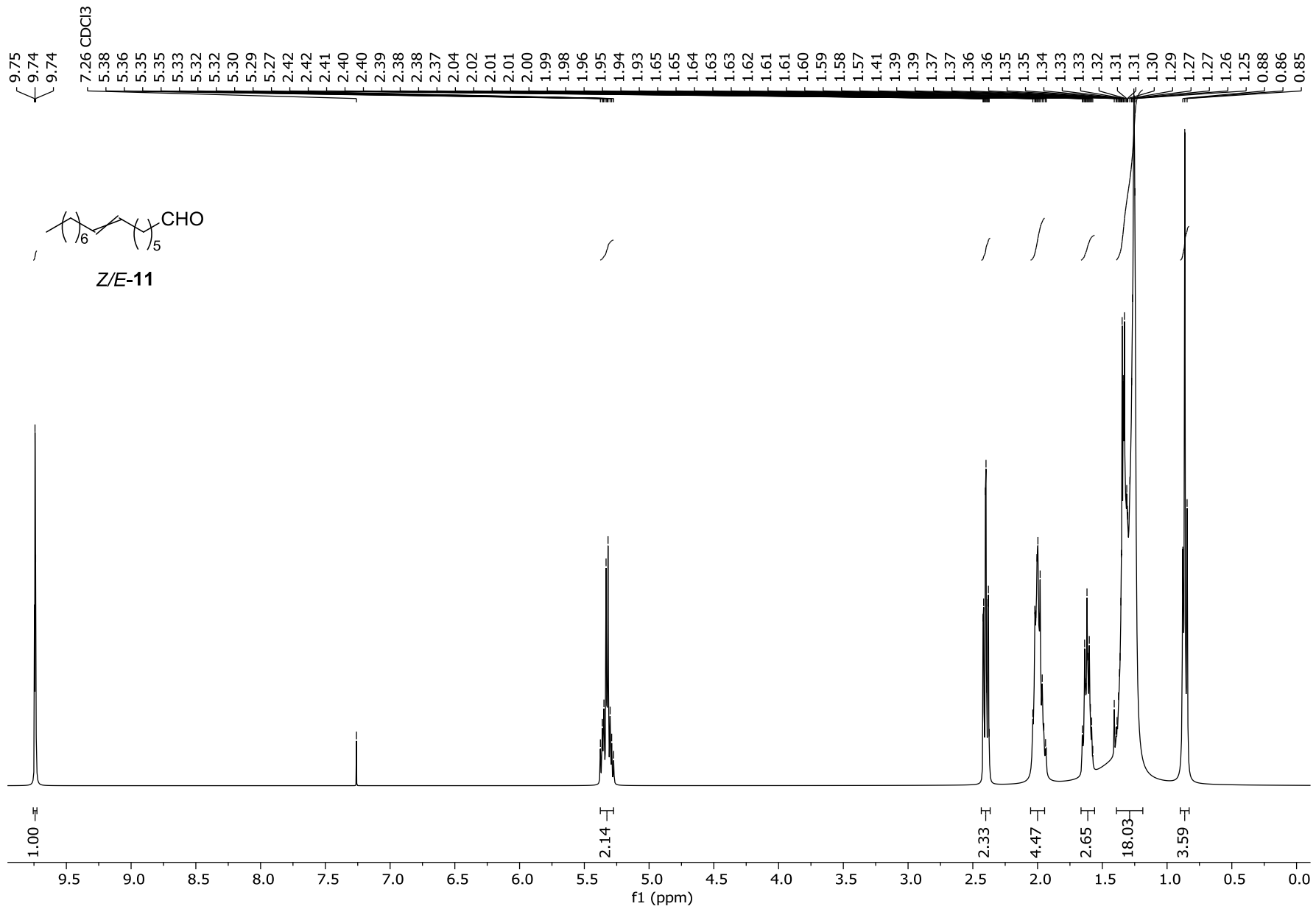
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32.02
29.91
29.81
29.42
29.36
27.36
27.23
24.14
22.81

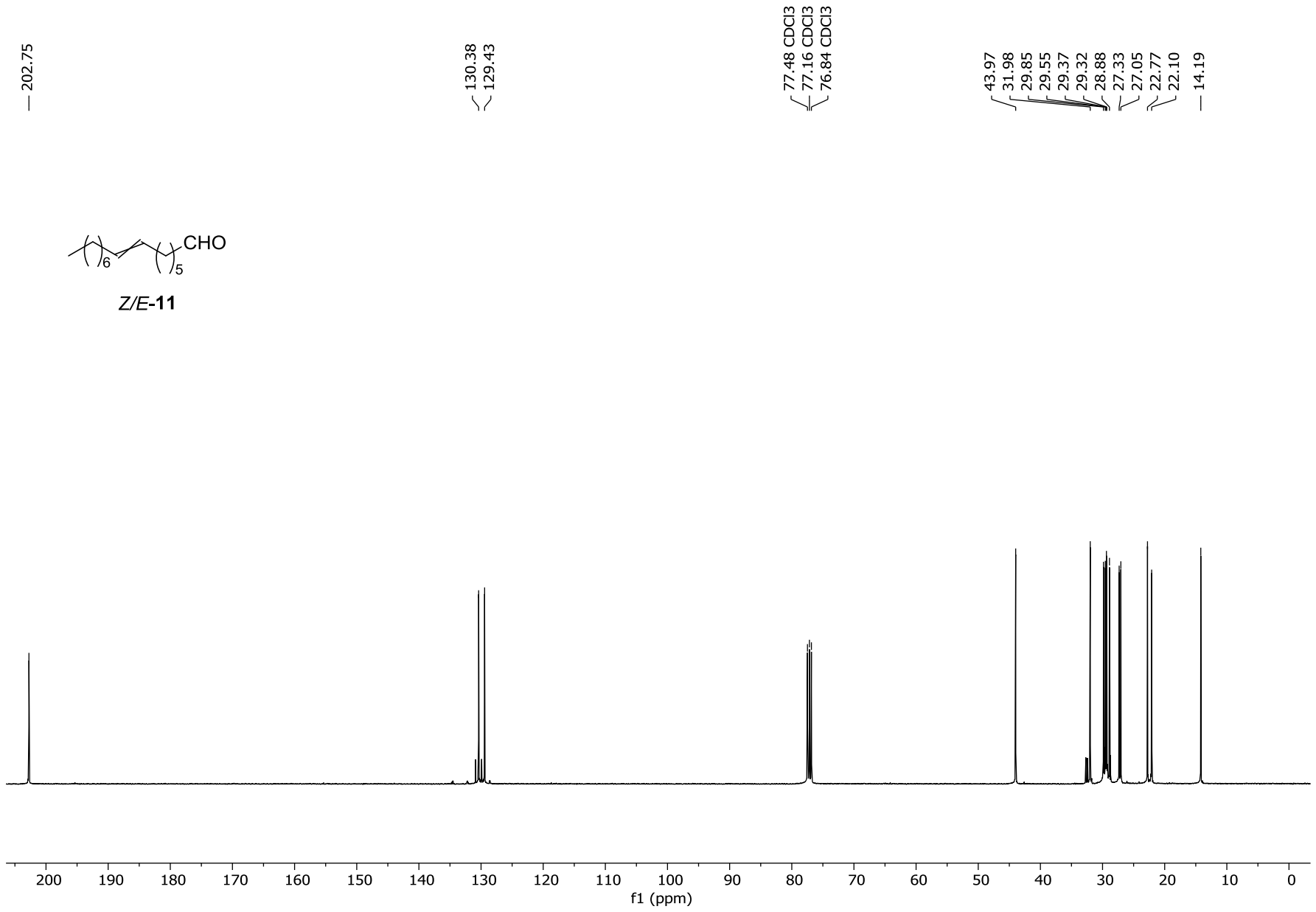
14.24
14.19

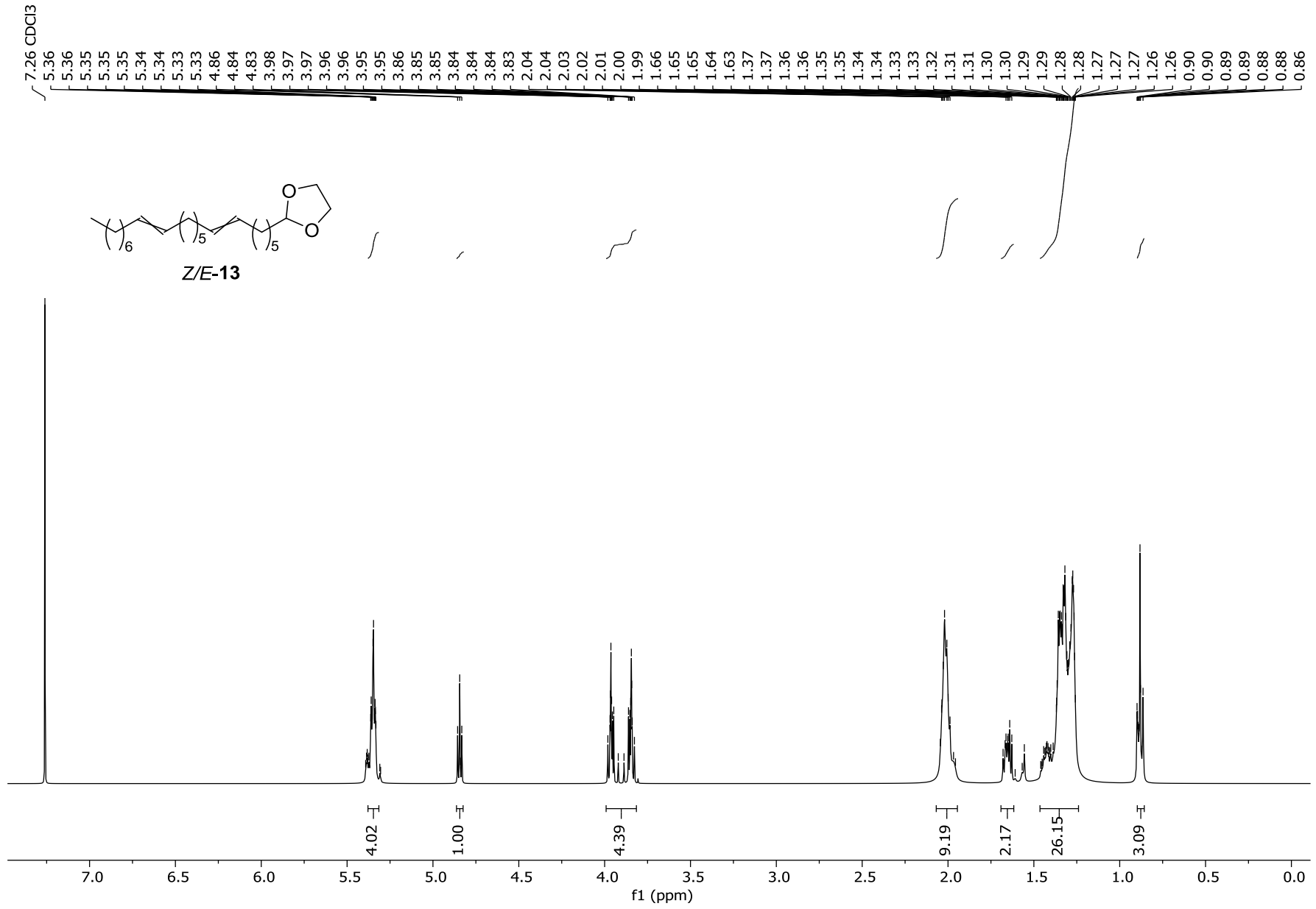


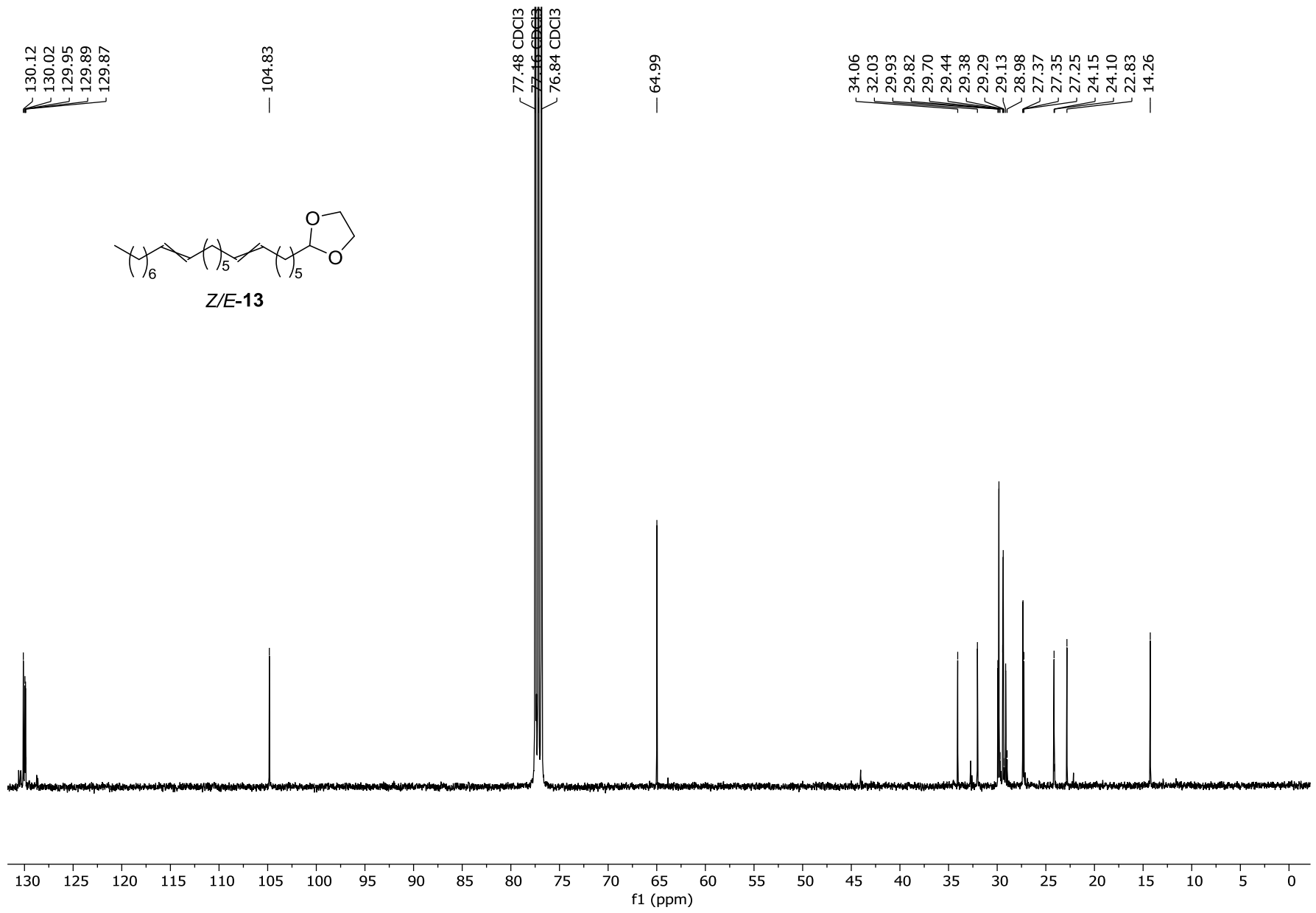
Z/E-9

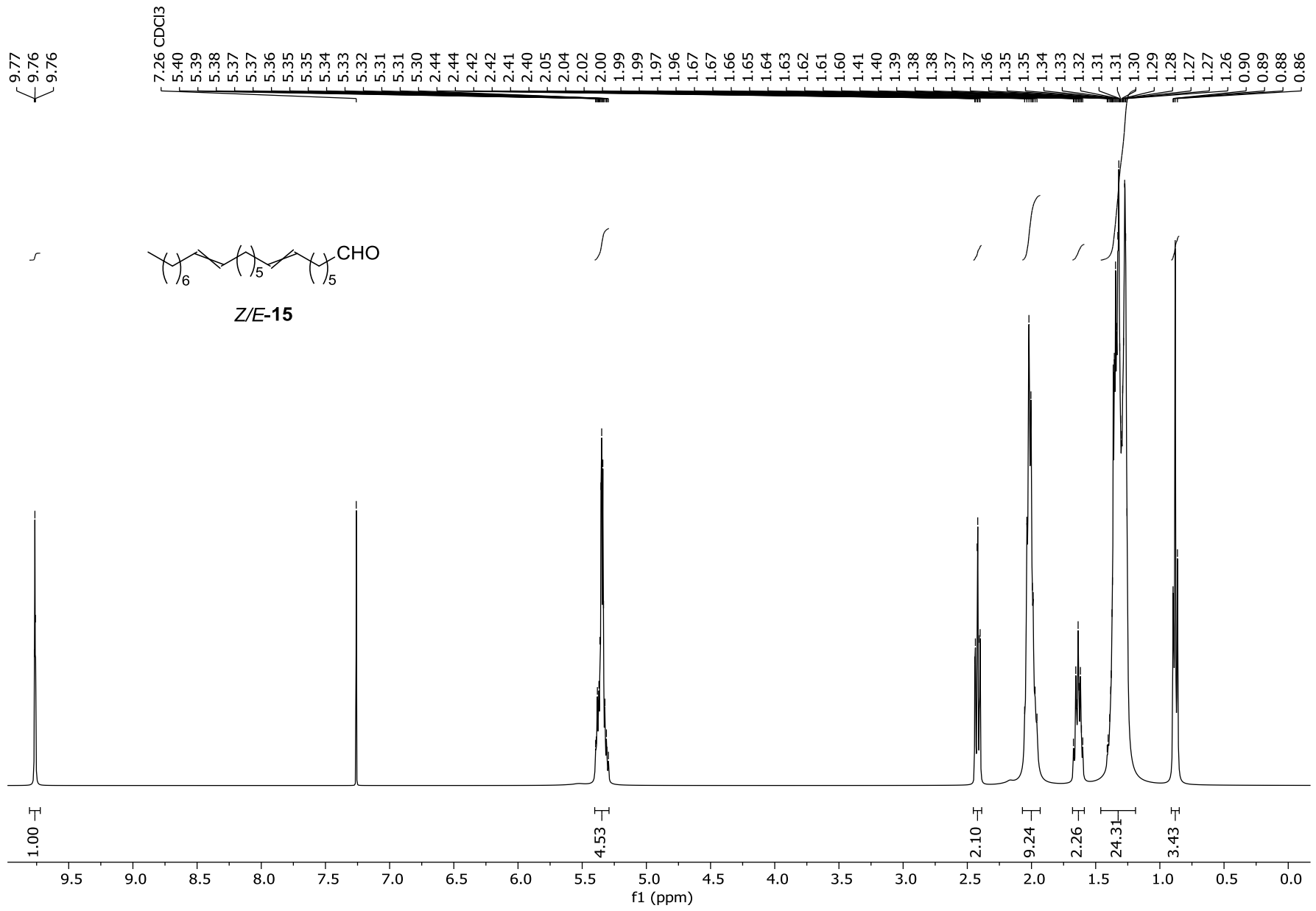




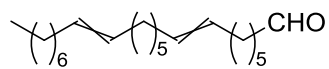








— 202.91

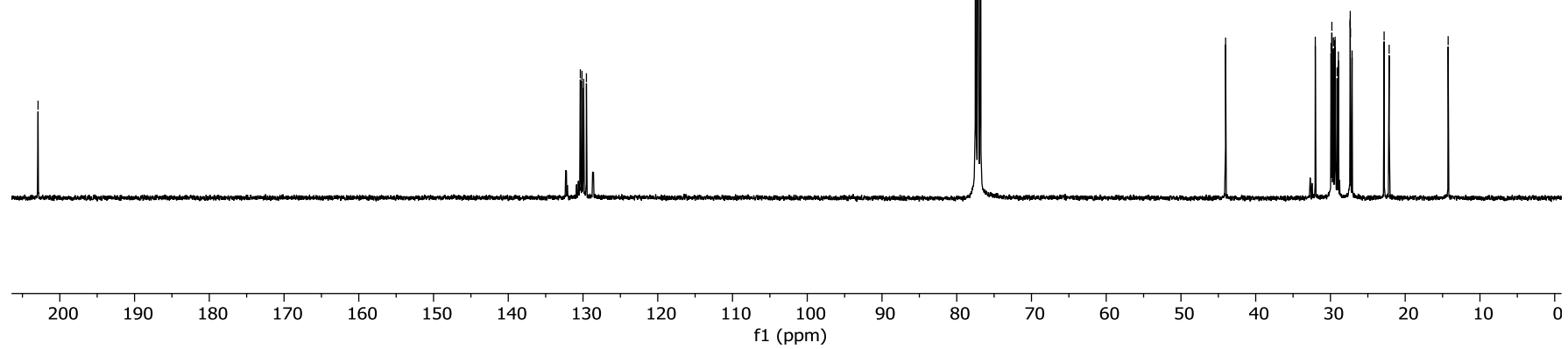


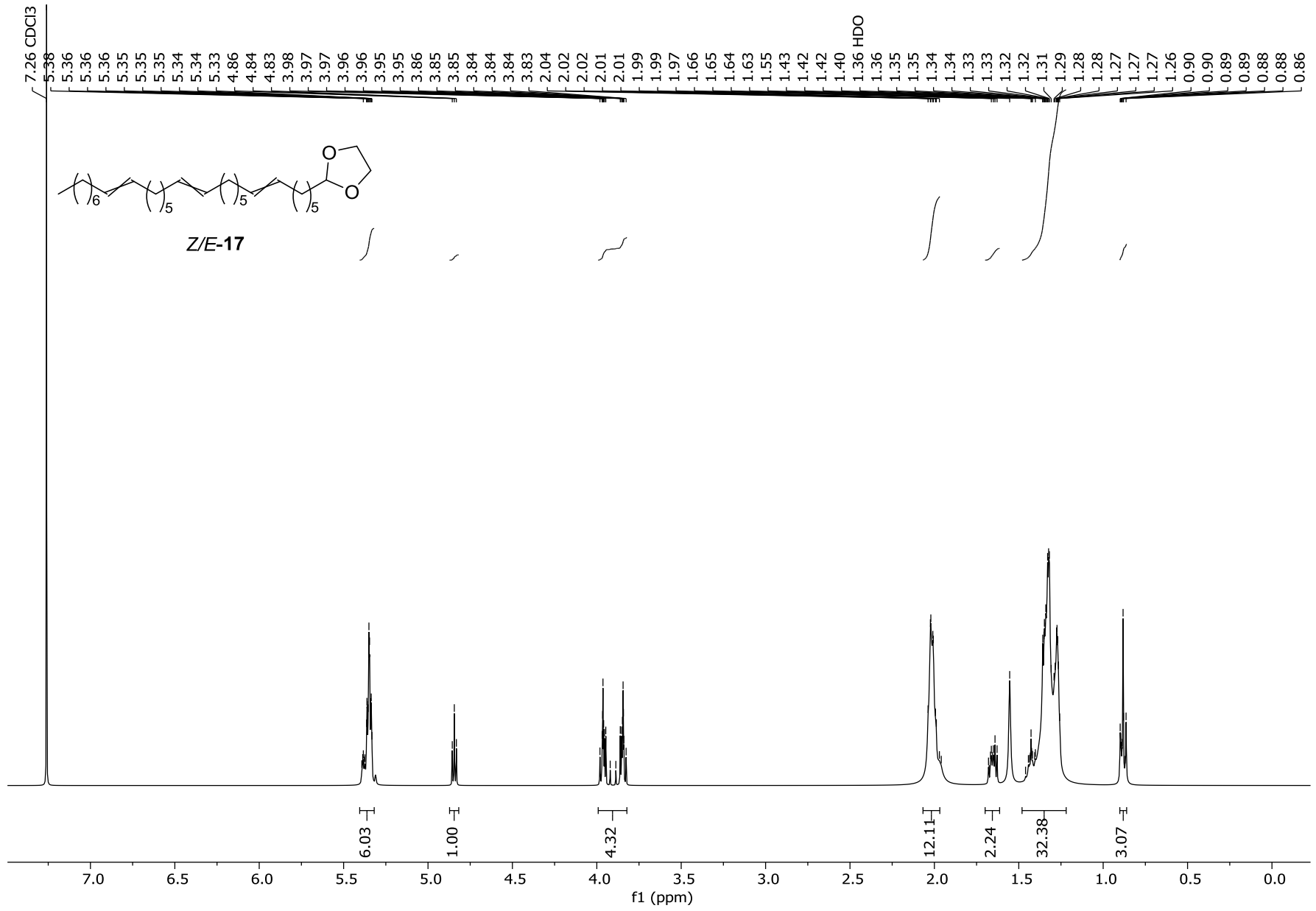
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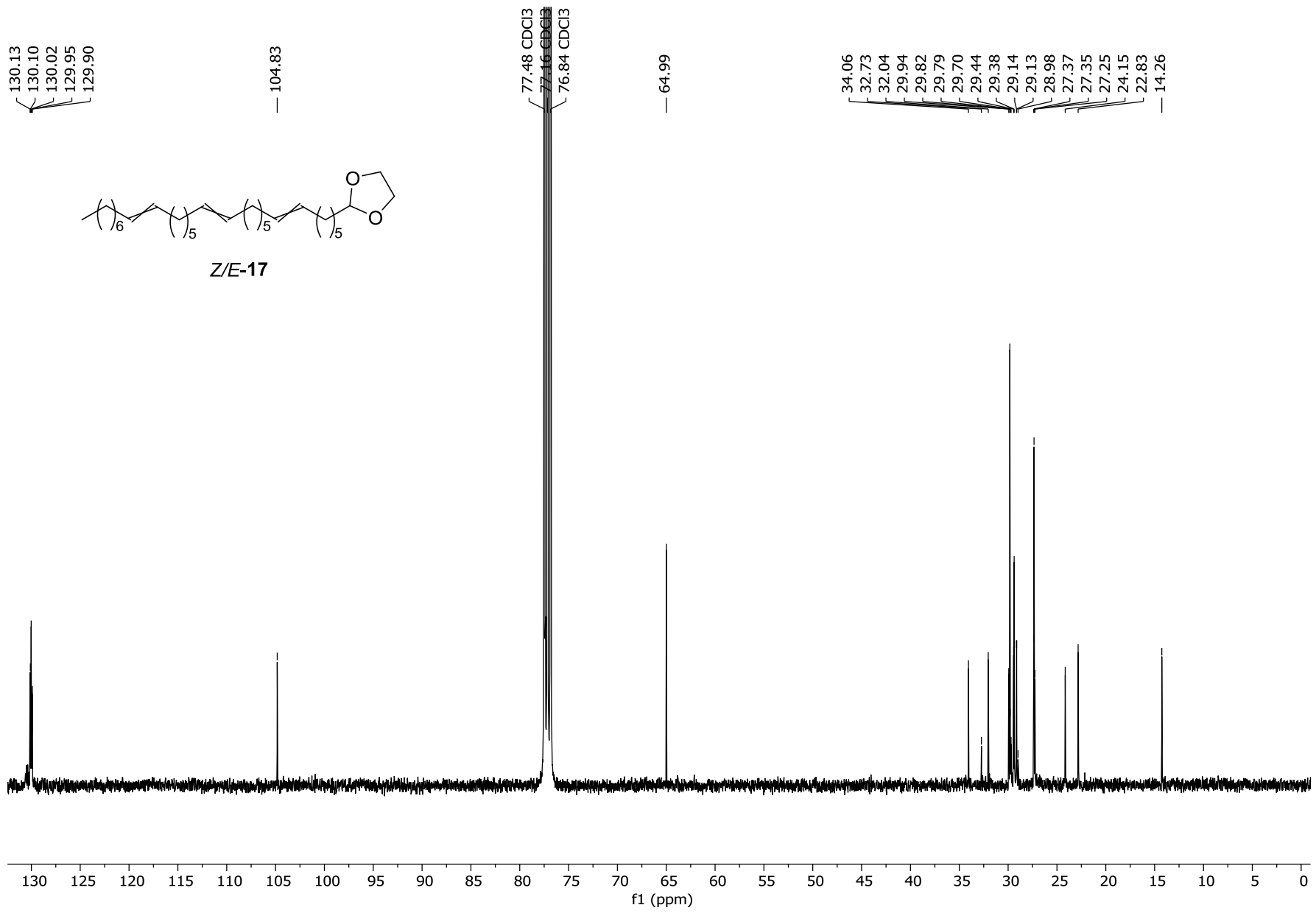
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130.14
129.91
129.54

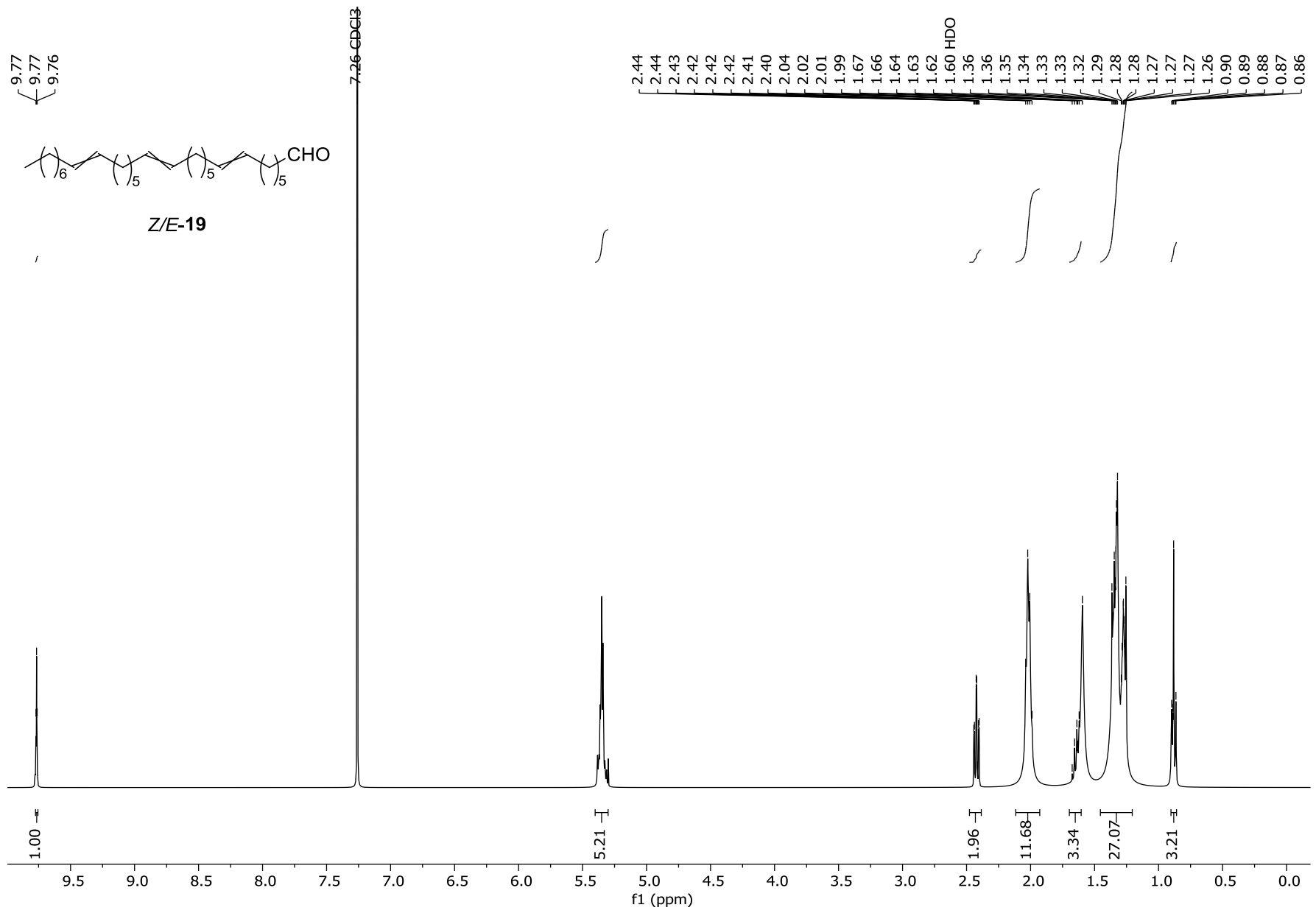
77.48 CDCl3
77.16 CDCl3
76.84 CDCl3

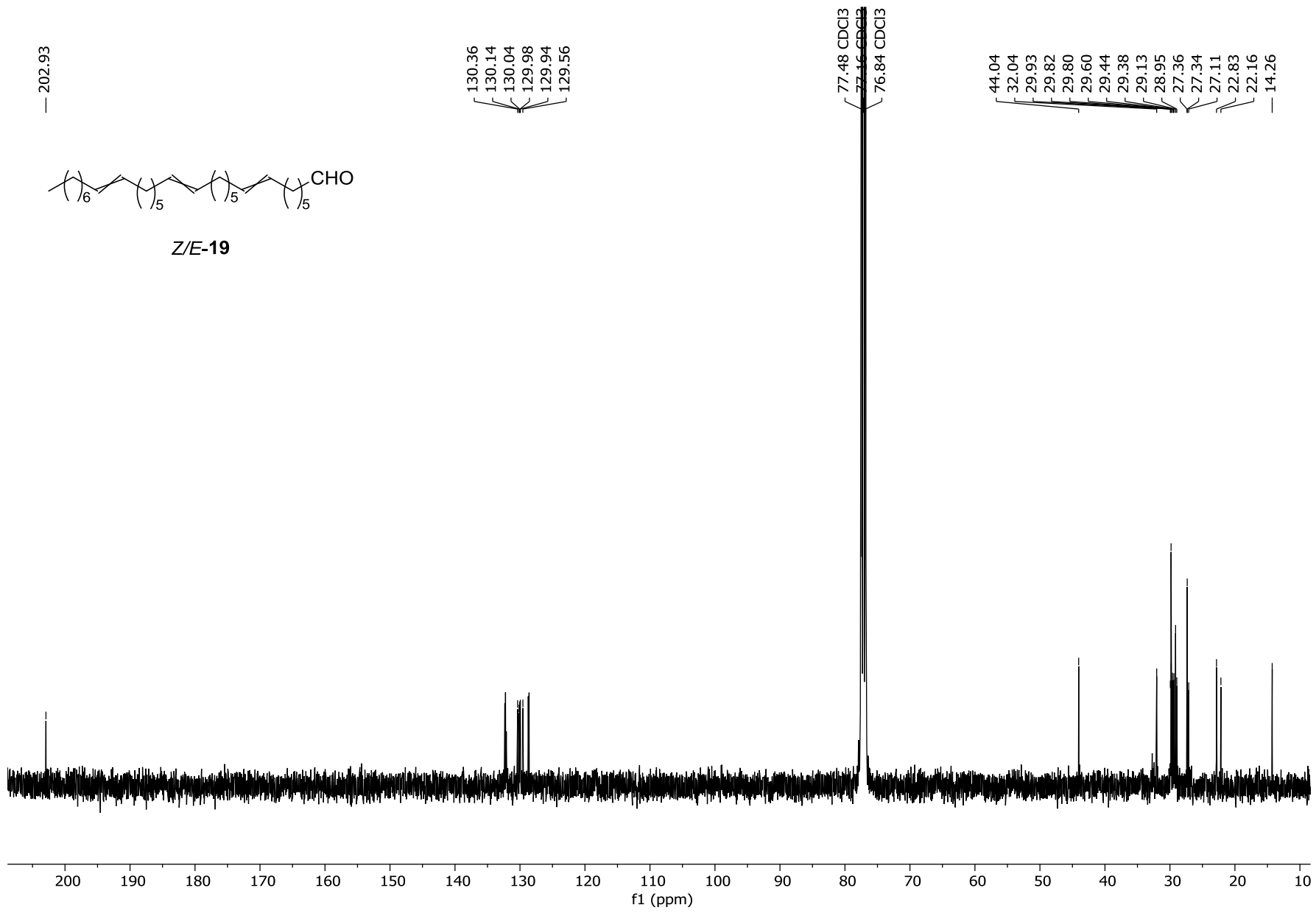
44.03
32.03
29.92
29.81
29.79
29.75
29.69
29.66
29.60
29.43
29.37
29.34
29.28
29.11
28.97
28.94
27.37
27.35
27.32
27.11
22.82
22.15
22.10
14.26

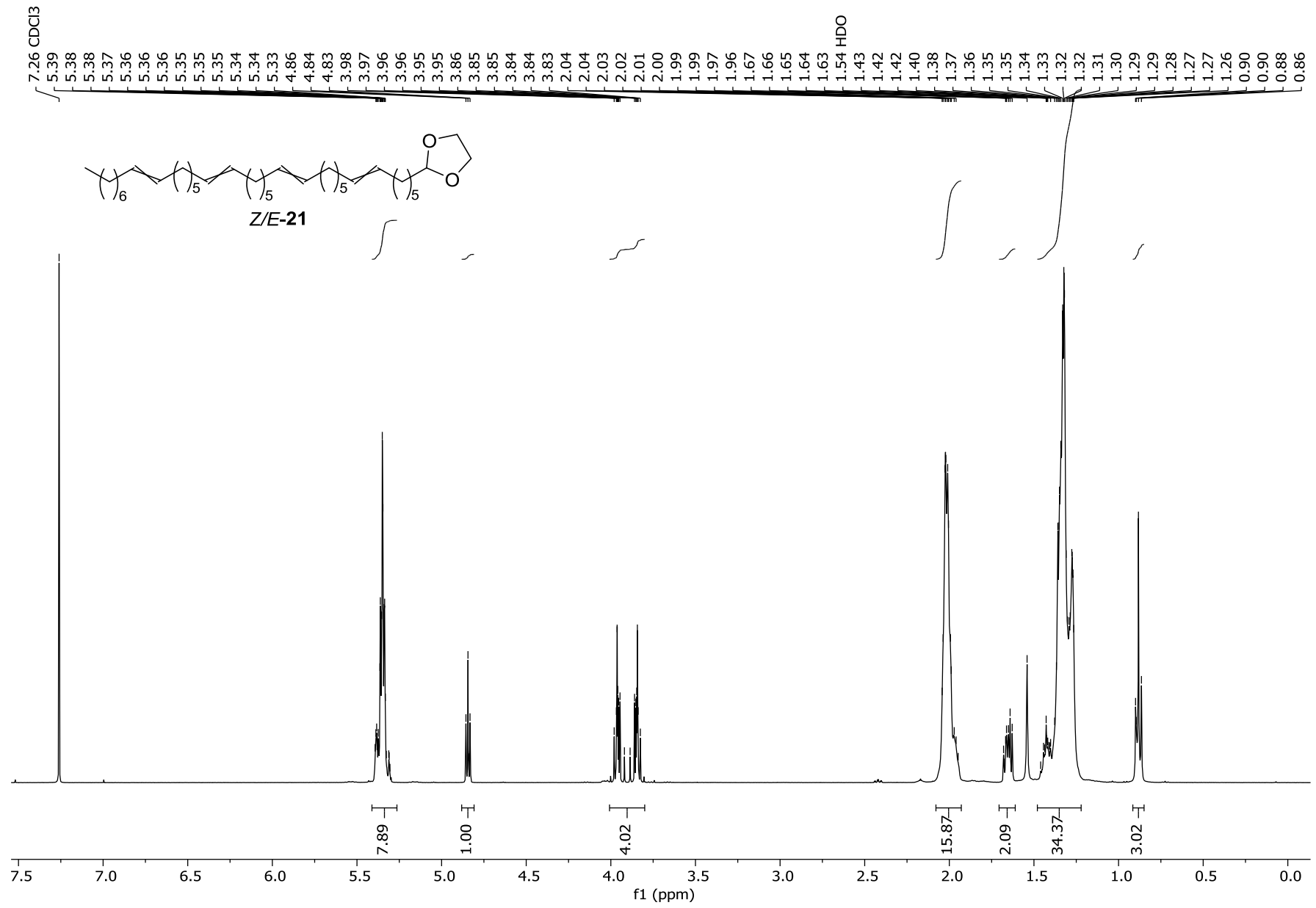


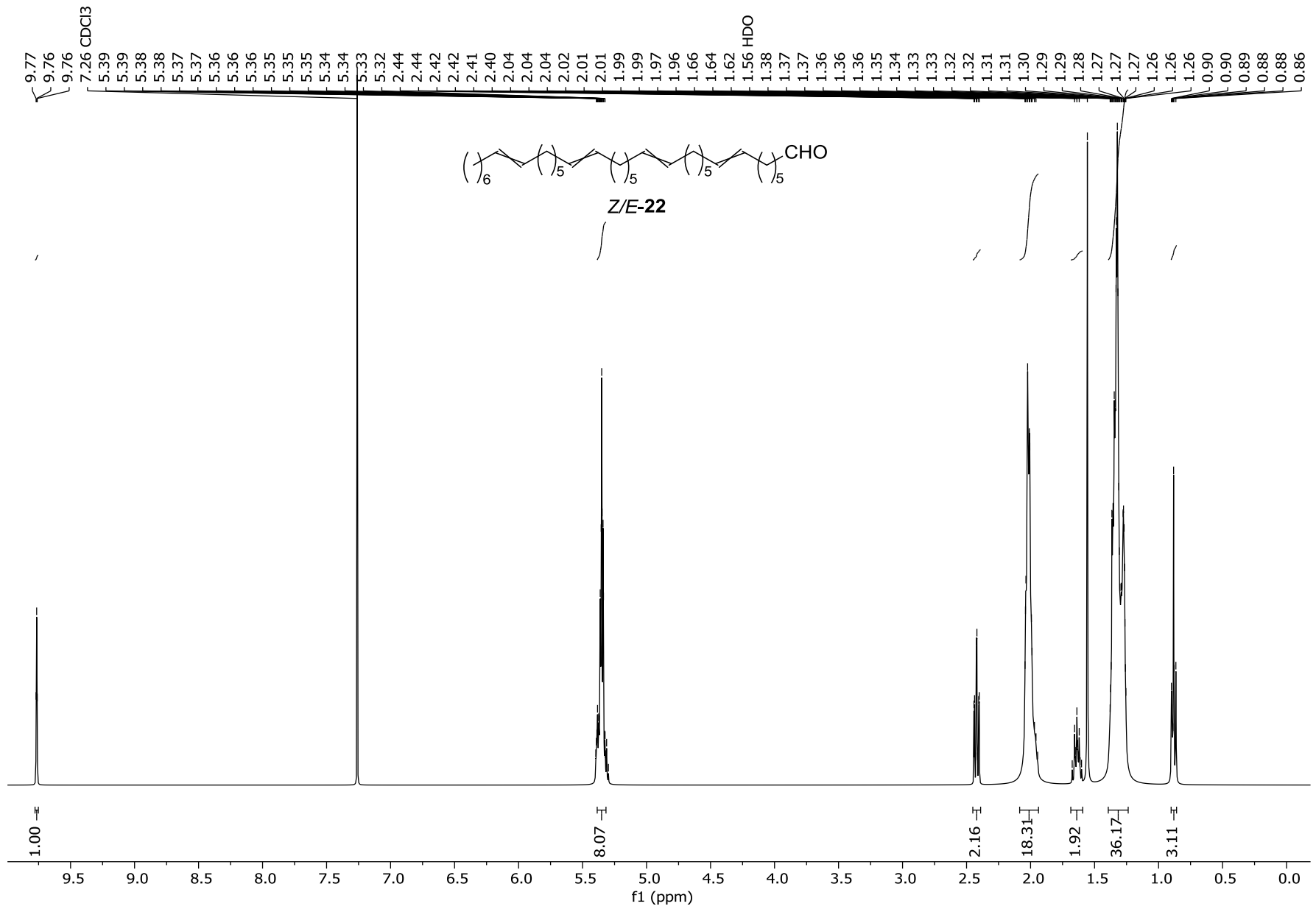




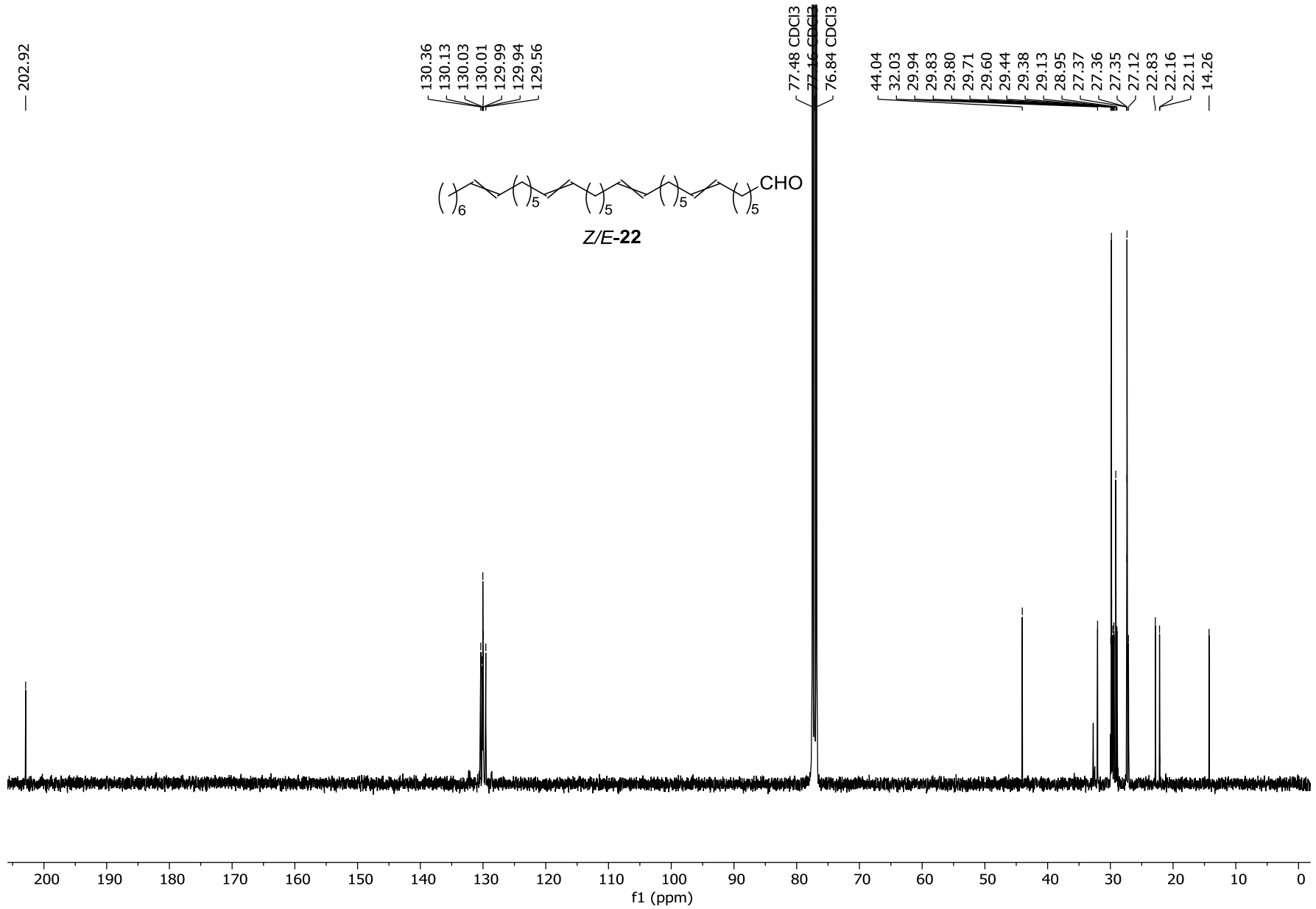


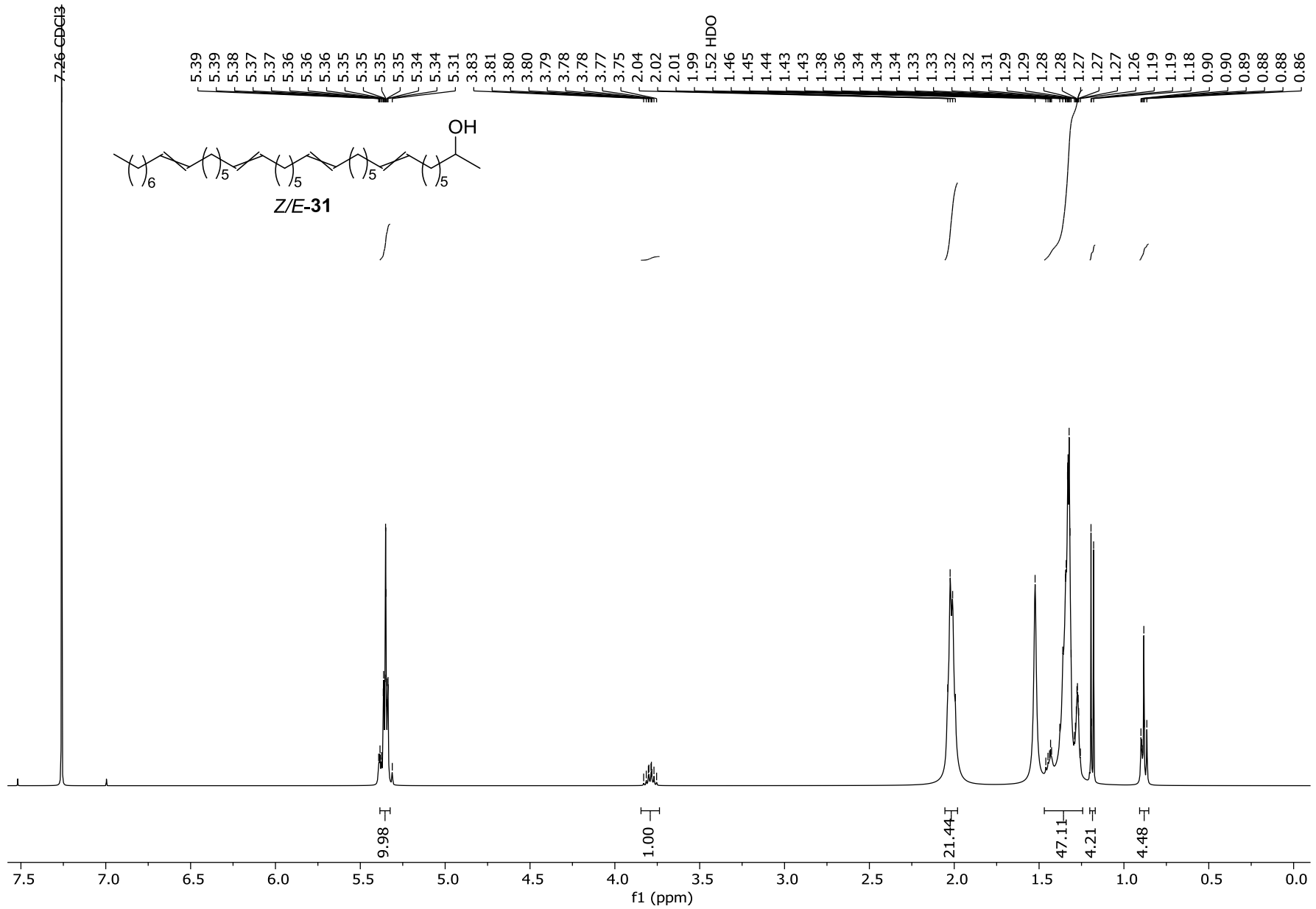


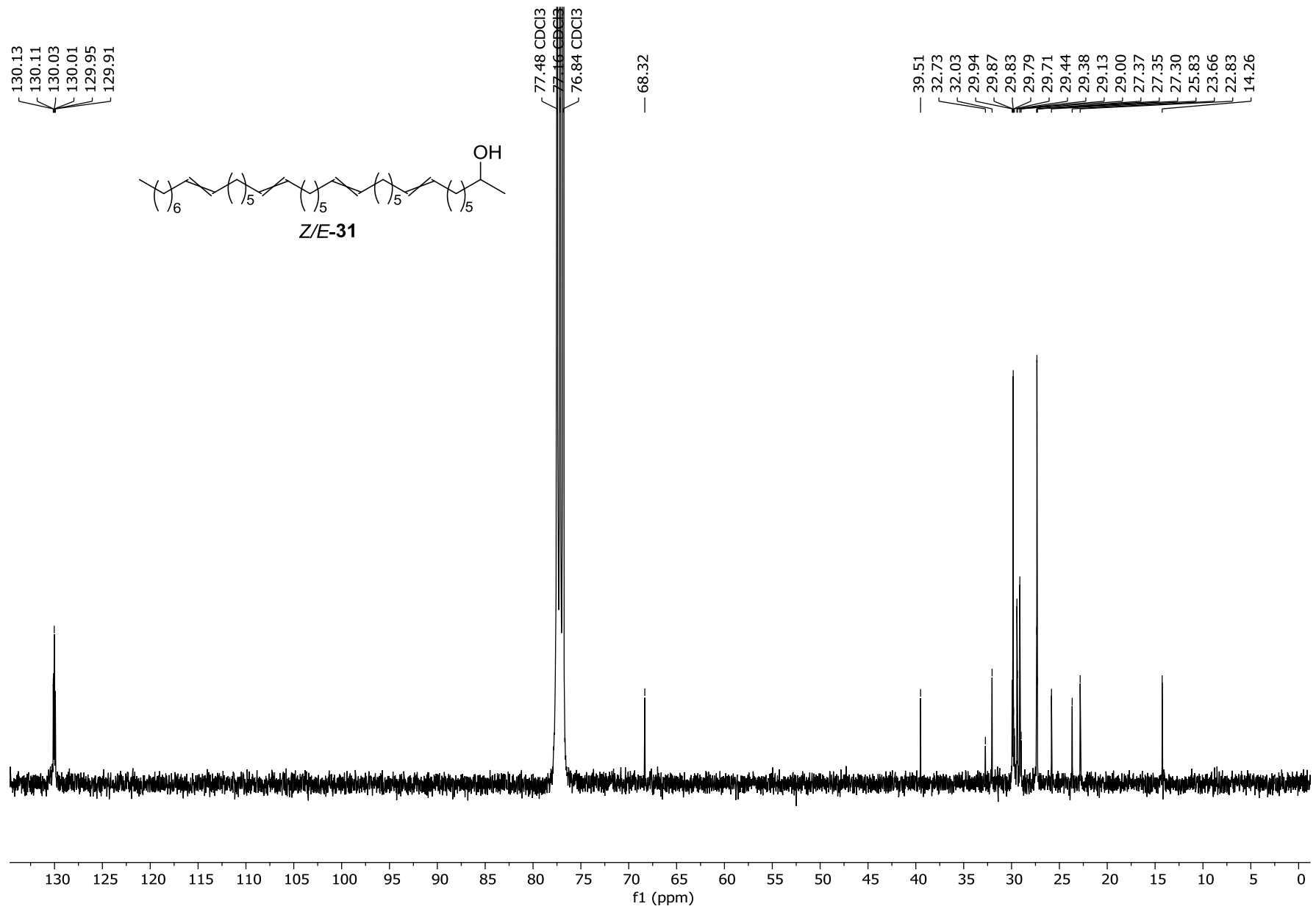


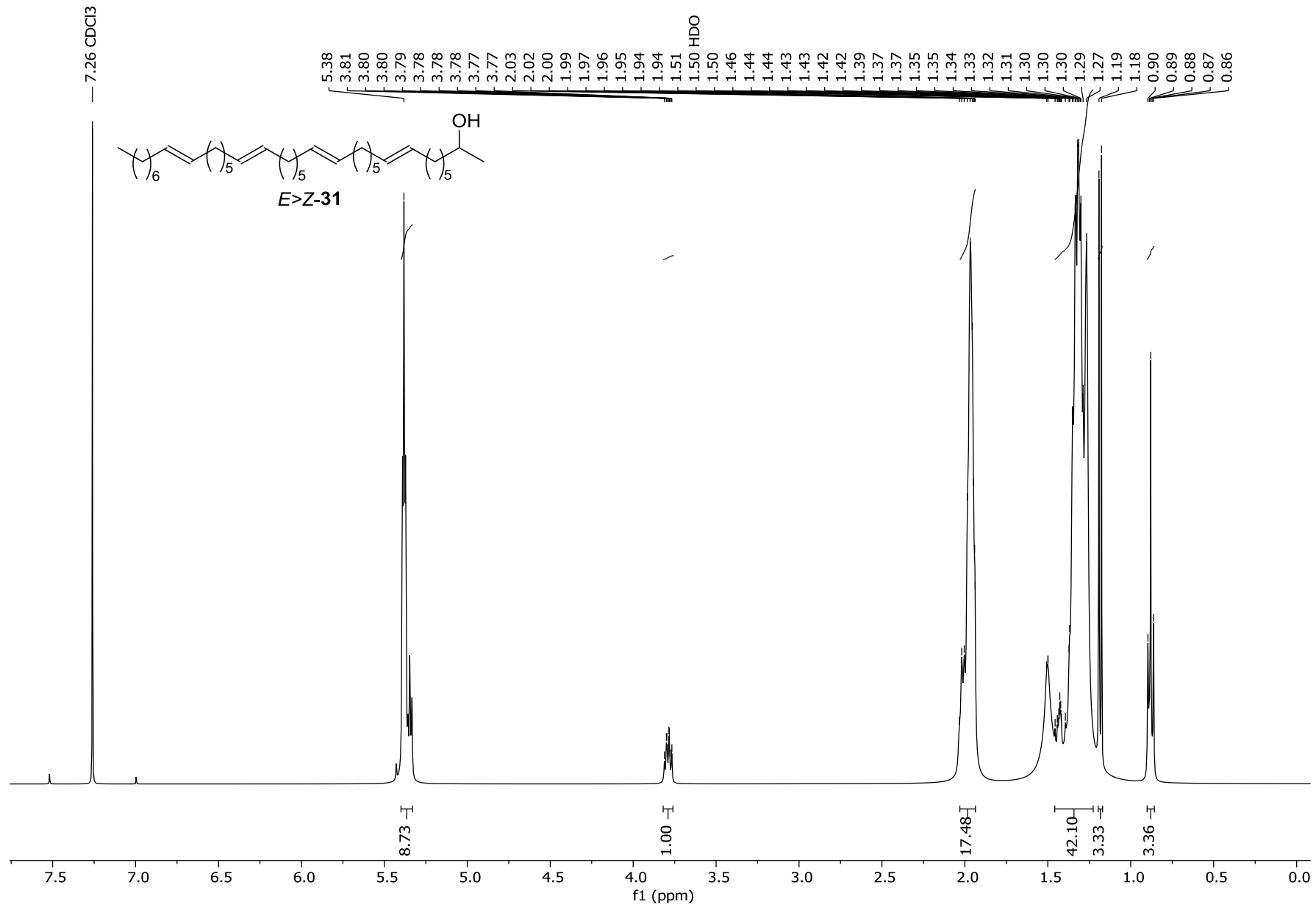


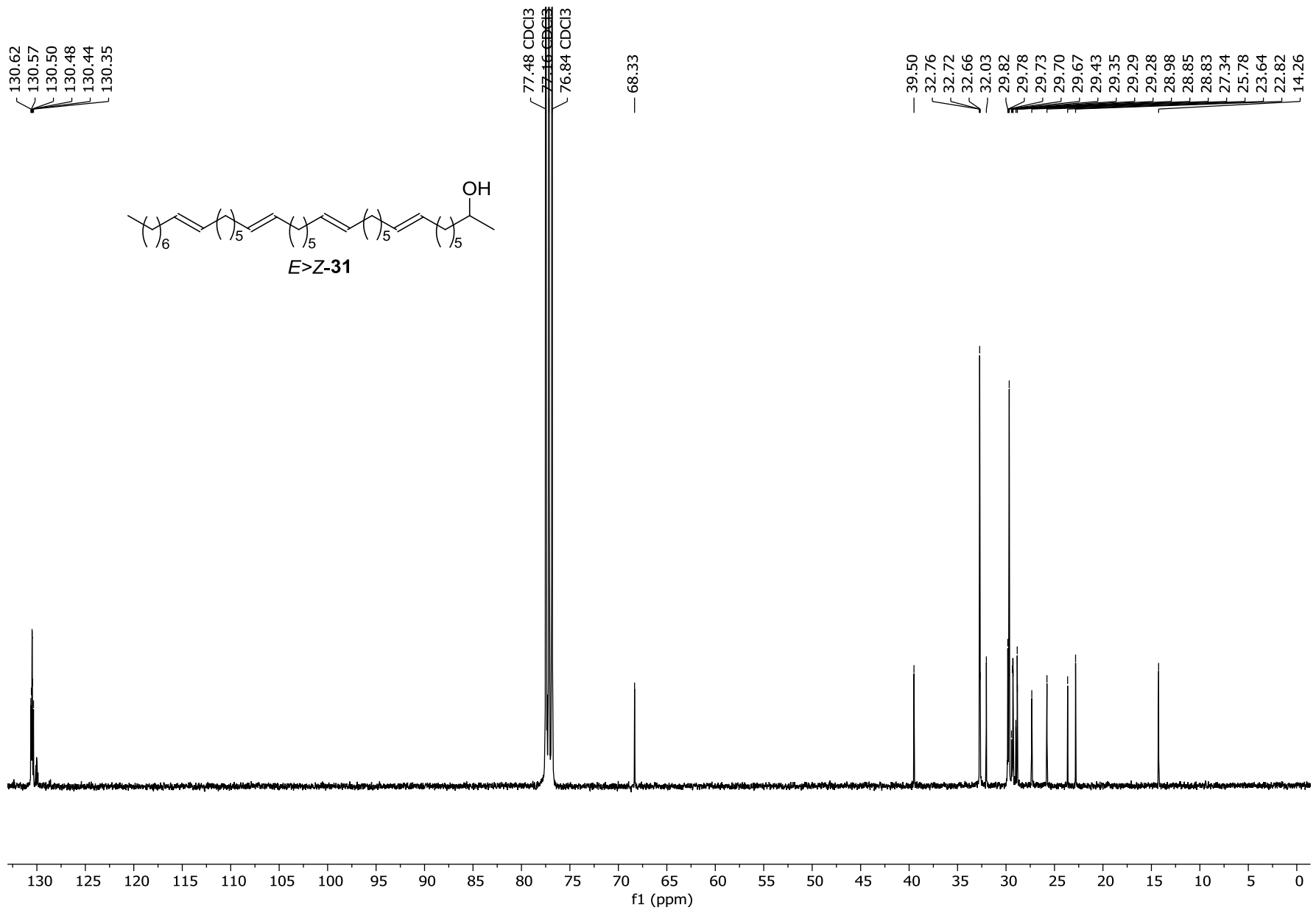
— 202.92

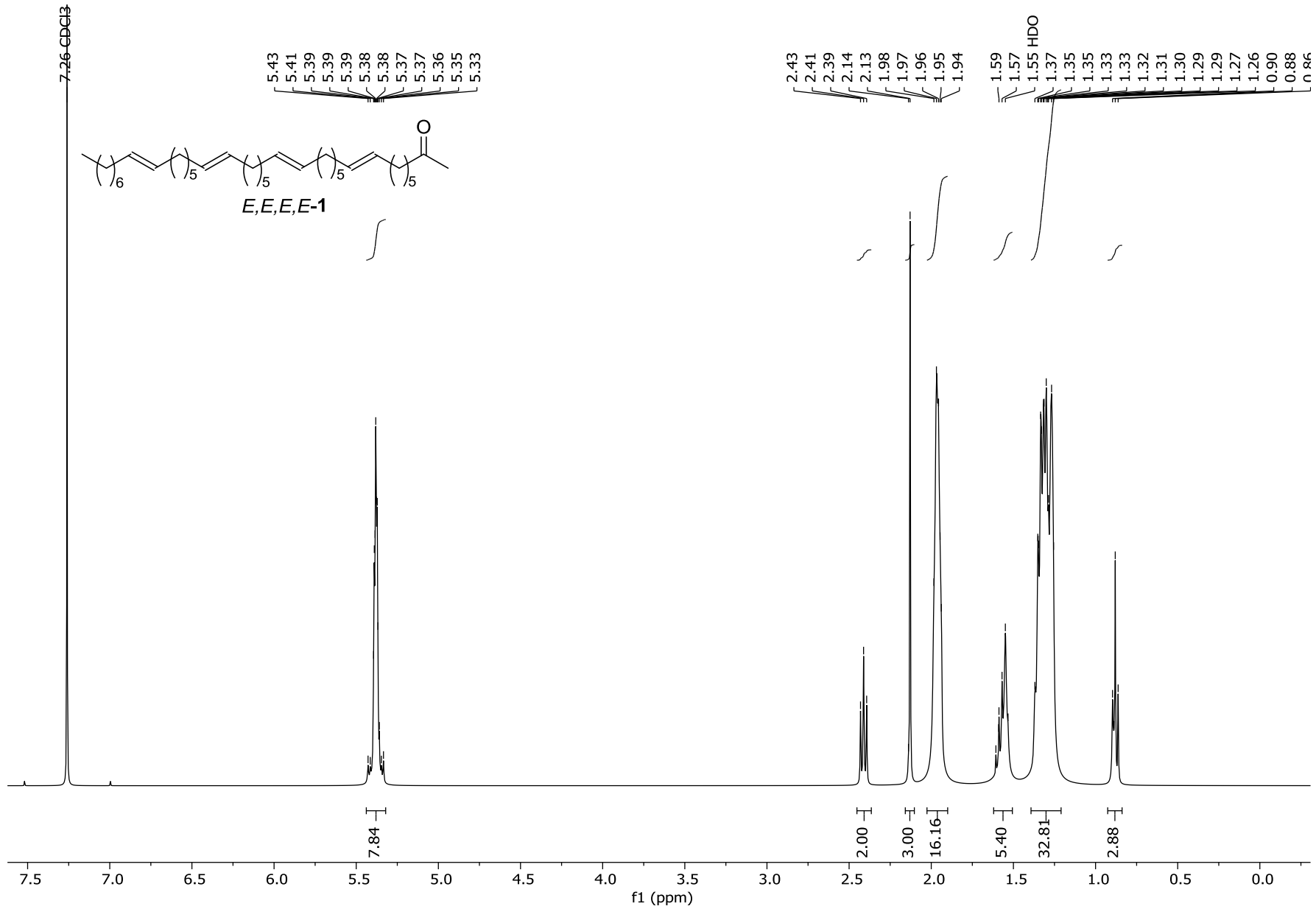




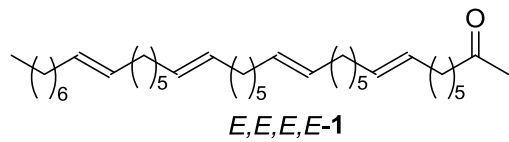








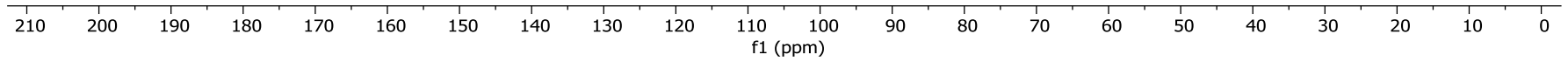
— 209.41



130.78
130.57
130.50
130.48
130.45
130.14

77.48 CDCl3
77.16 CDCl3
76.84 CDCl3

43.94
32.76
32.72
32.53
32.03
29.99
29.82
29.68
29.66
29.52
29.35
29.29
28.86
28.85
28.83
28.82
23.88
22.83
14.26

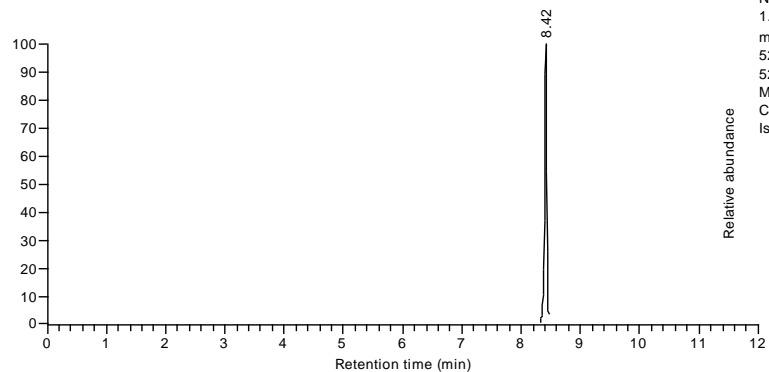


003) C37-4 - Isotope cluster
Alkenones C37

10/07/2019 15.55.56

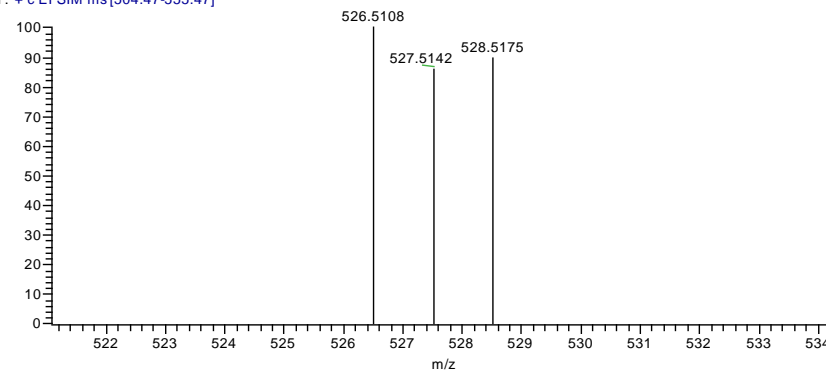
Standard - C37:4

RT: 0.00 - 12.02 SM: 7G

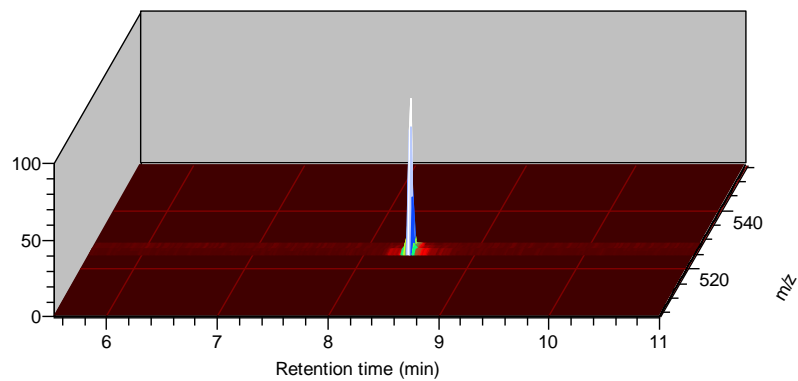


NL:
1.45E4
m/z=
526.4845-
526.5371
MS 003)
C37-4 -
Isotope cluster

003) C37-4 - Isotope cluster #73 RT: 6.14 AV: 1 NL: 2.90E1
T: + c EI SIM ms [504.47-555.47]

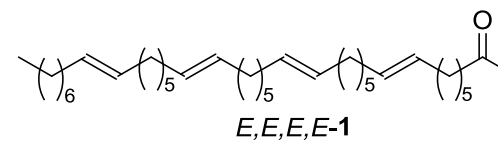


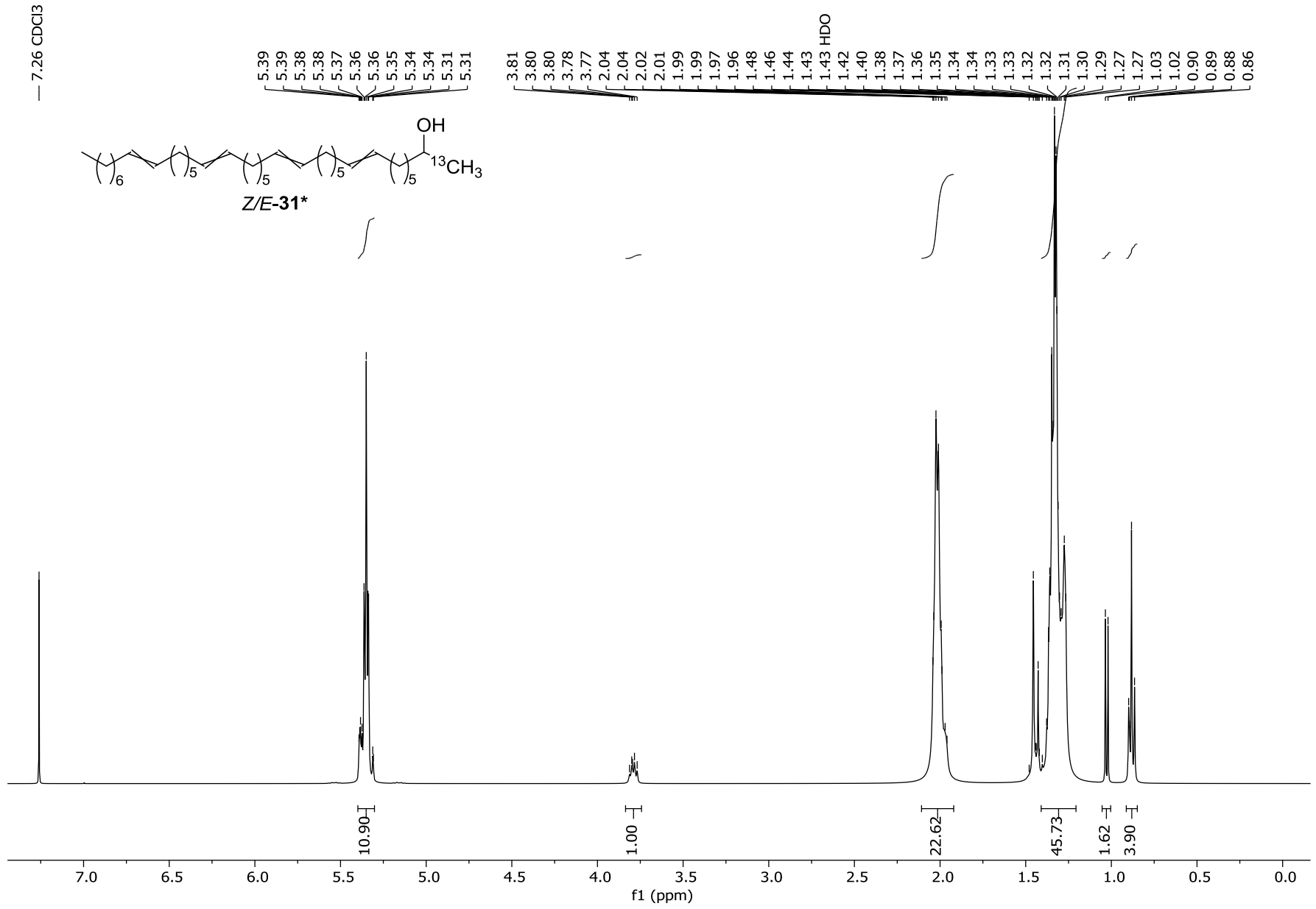
003) C37-4 - Isotope cluster RT: 5.52 - 11.00 Mass: 504.47 - 555.47 NL: 1.85E4

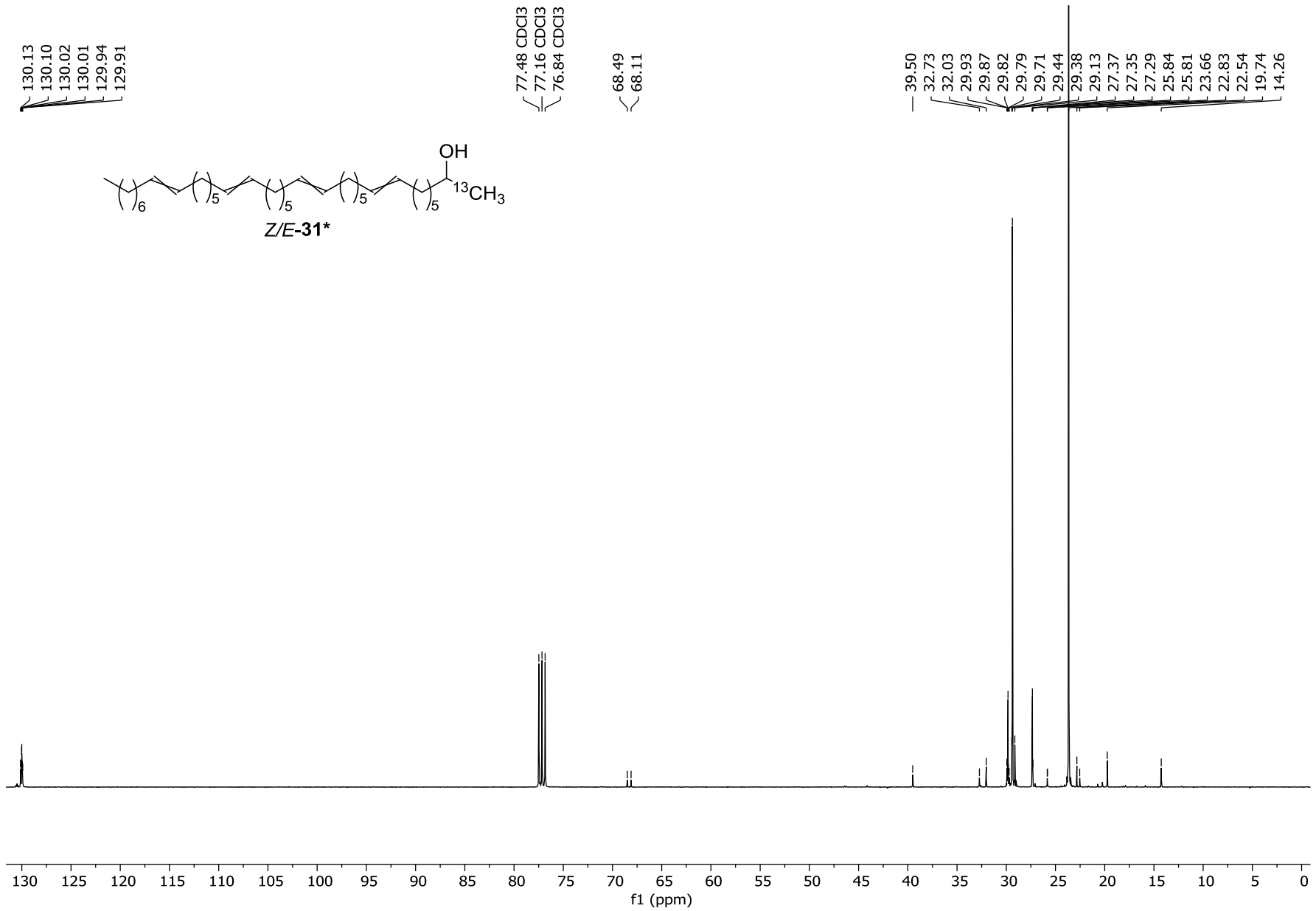


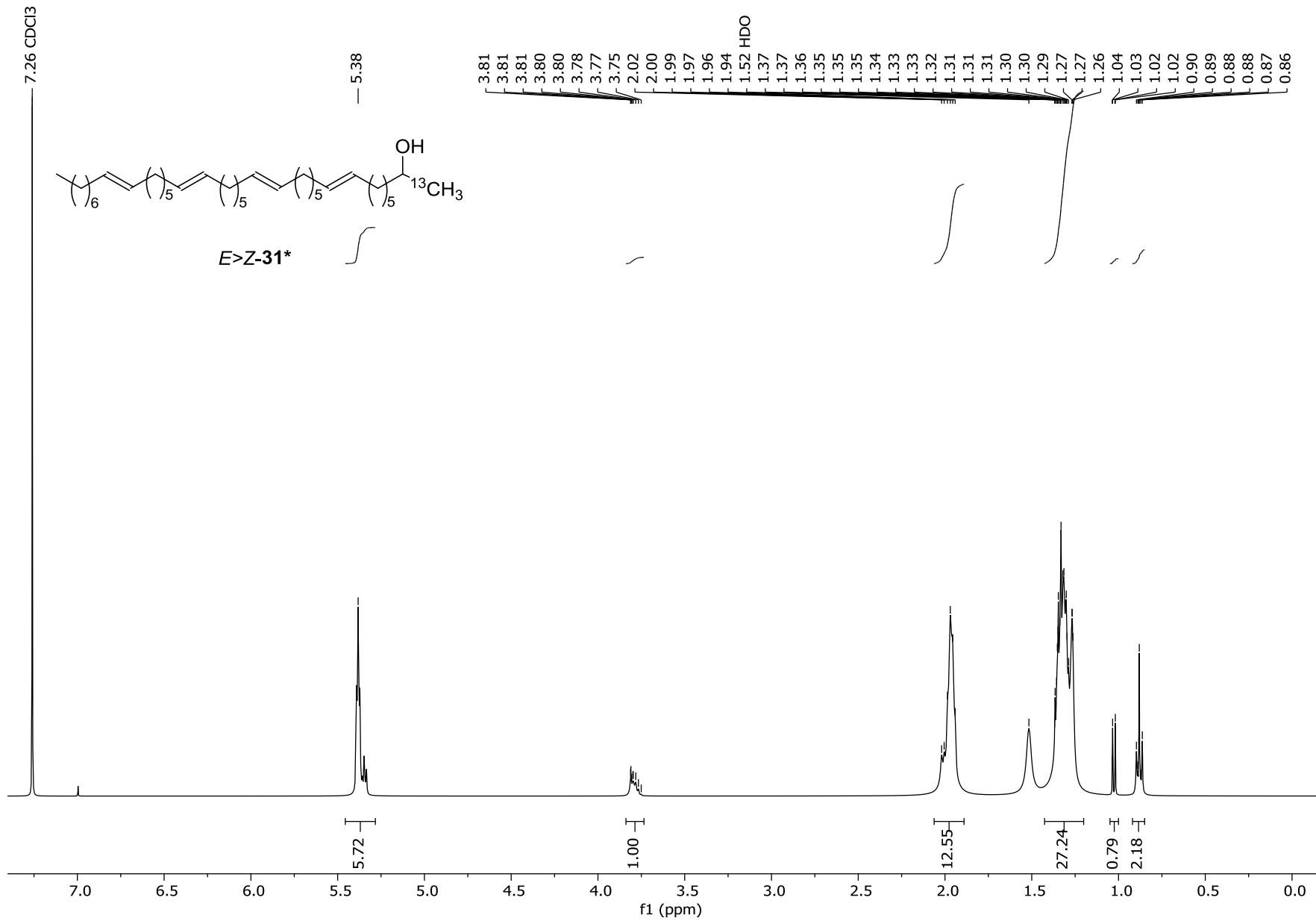
003) C37-4 - Isotope cluster #1 RT: 5.52
T: + c EI SIM ms [504.47-555.47]

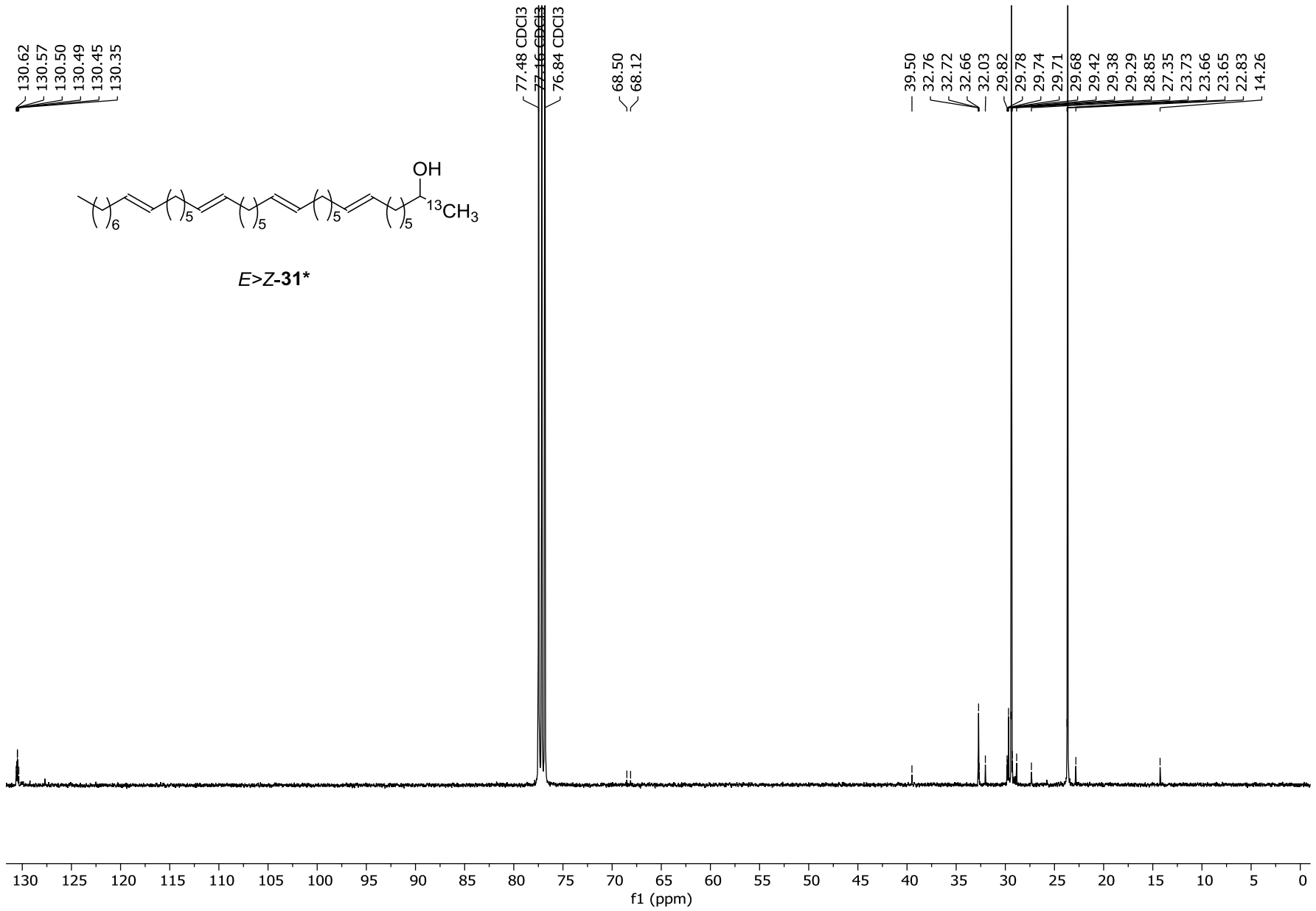
m/z	Intensity	Relative
526.5108	26.0	70.27
527.5142	20.0	54.05
528.5175	37.0	100.00

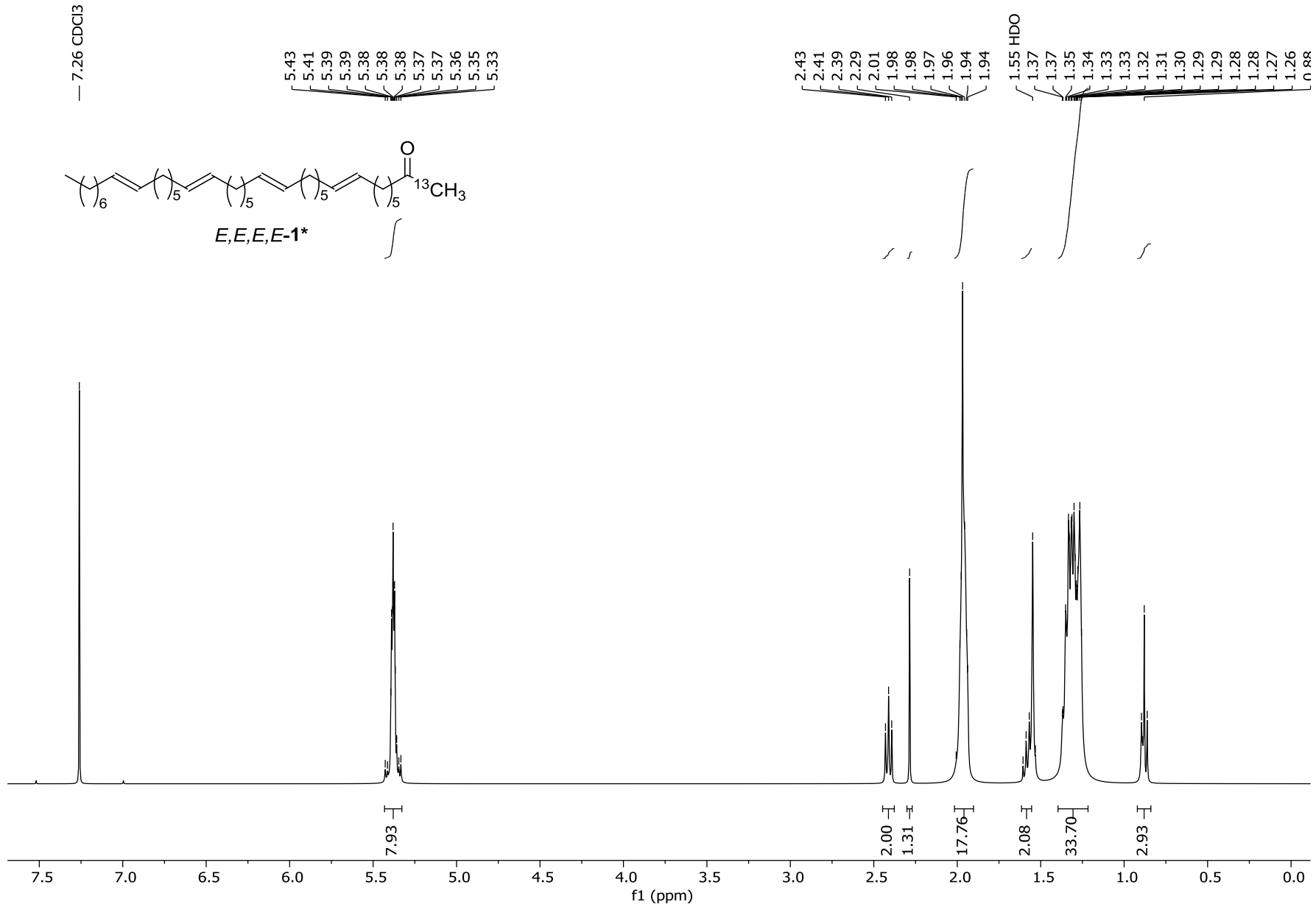


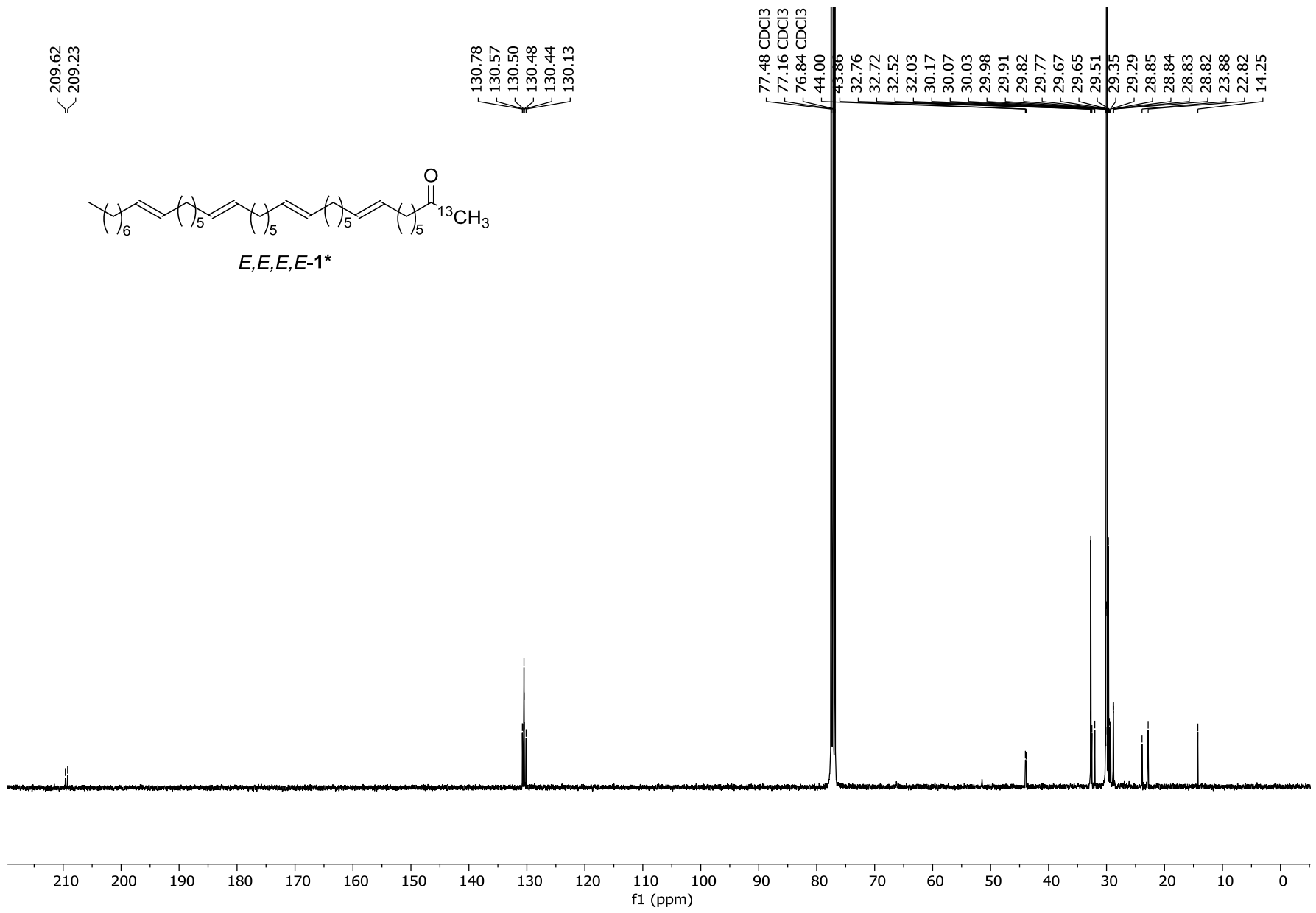










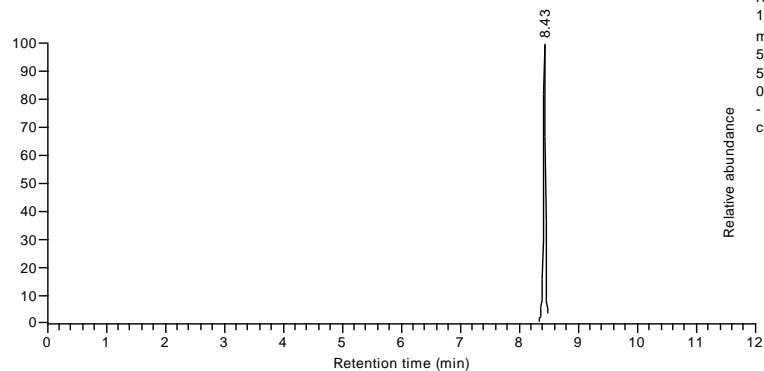


003) 13C37-4 - Isotope cluster
Alkenones C37

10/07/2019 16.16.54

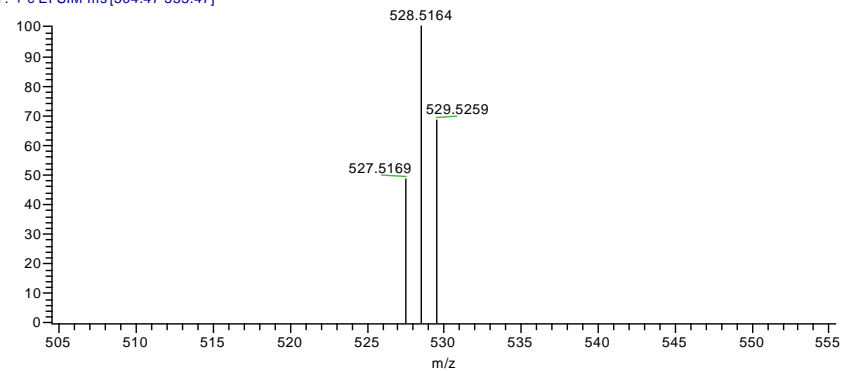
Standard - C37:4*

RT: 0.00 - 12.02 SM: 7G

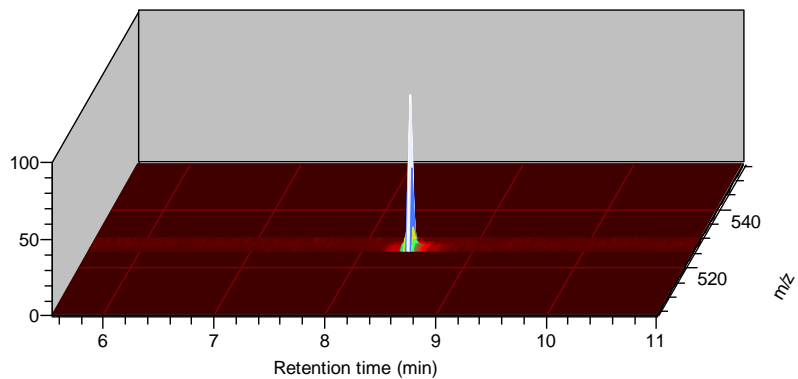


NL:
1.46E4
m/z=
527.4771-
527.5299 MS
003) 13C37-4
- Isotope
cluster

003) 13C37-4 - Isotope cluster #1 RT: 5.52 AV: 1 NL: 4.10E1
T: + c EI SIM ms [504.47-555.47]

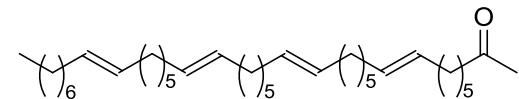


003) 13C37-4 - Isotope cluster RT: 5.53 - 11.01 Mass: 504.47 - 555.47 NL: 1.84E4

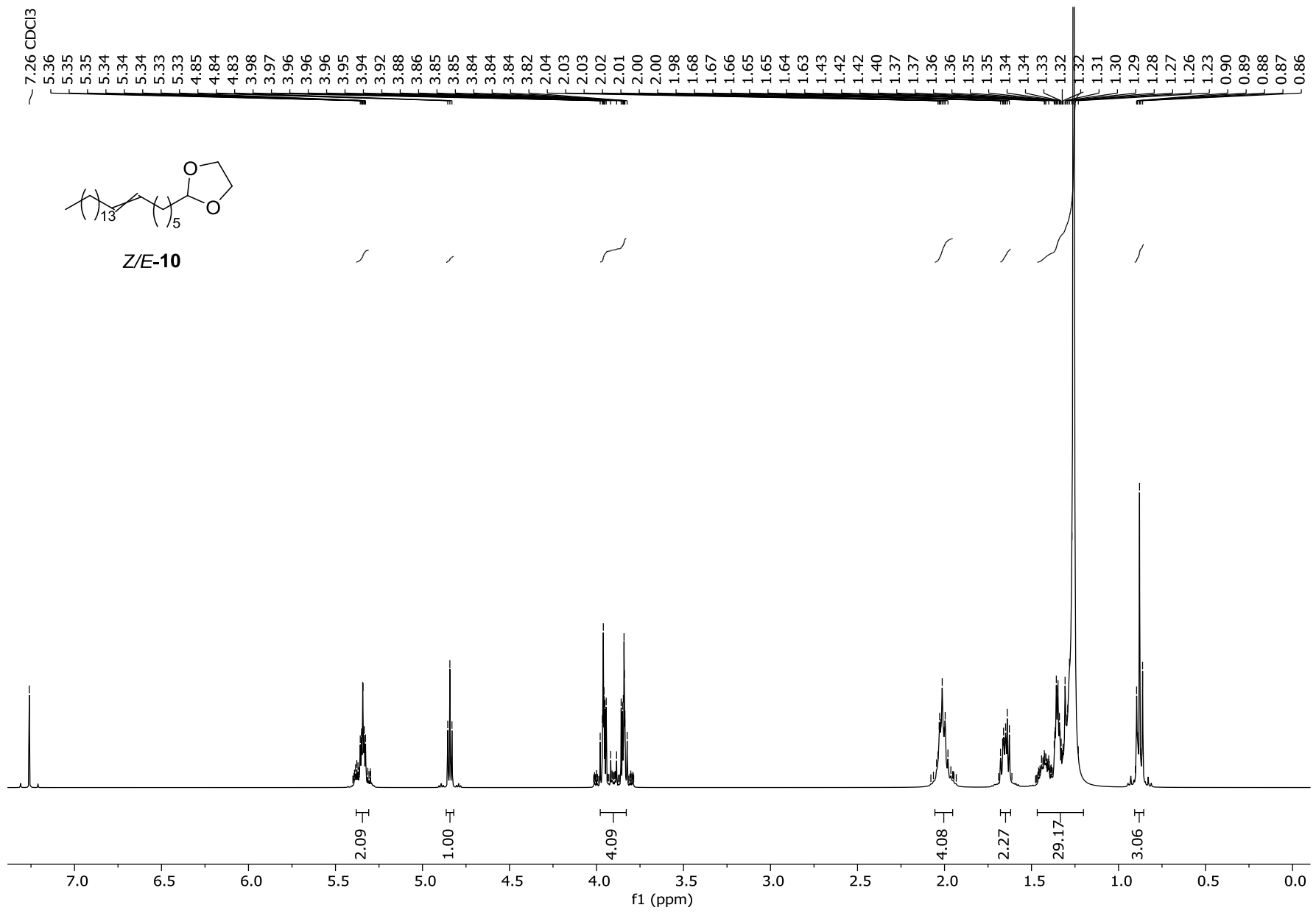


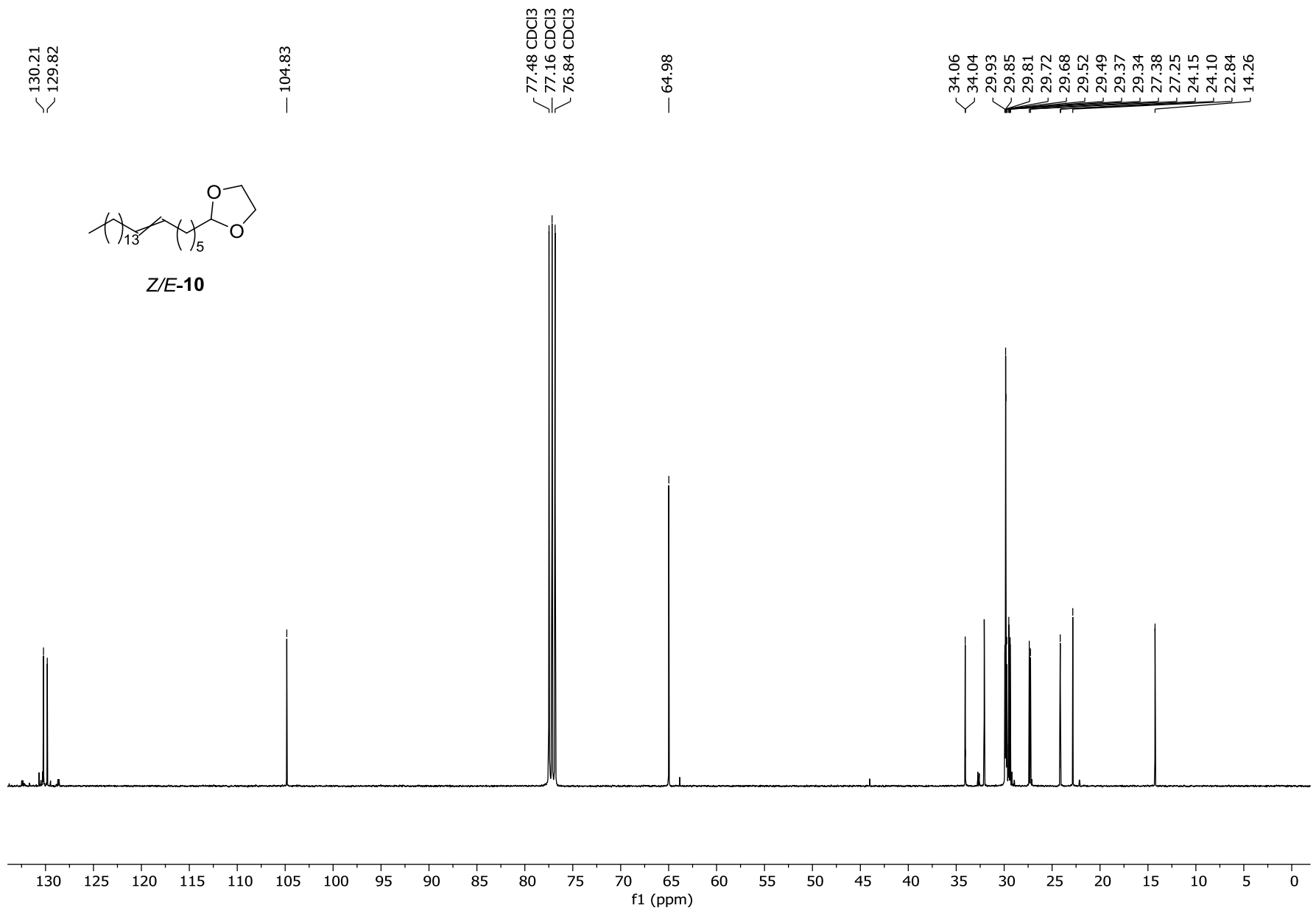
003) 13C37-4 - Isotope cluster #1 RT: 5.52
T: + c EI SIM ms [504.47-555.47]

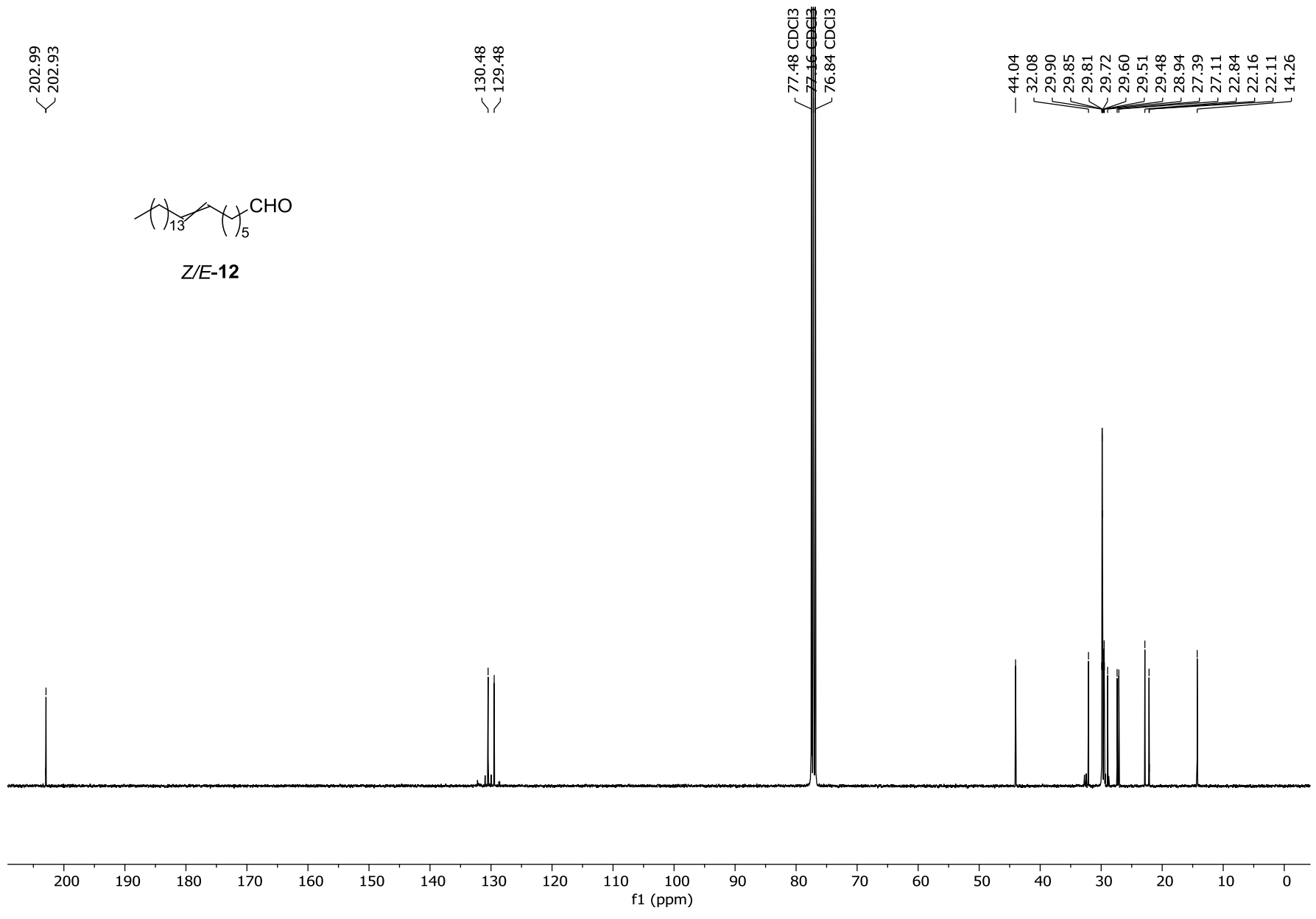
m/z	Intensity	Relative
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528.5164	41.0	100.00
529.5259	28.0	68.29

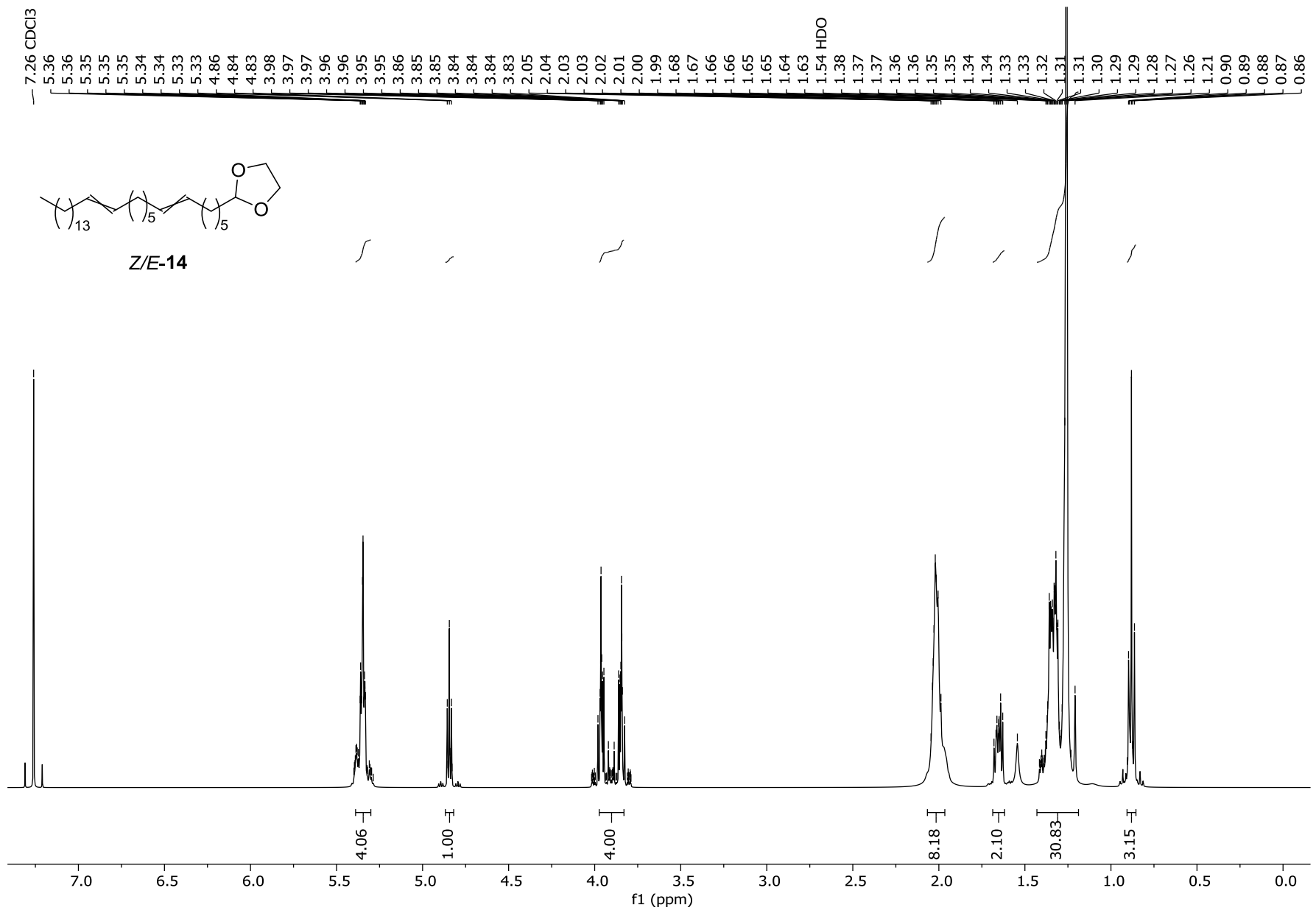


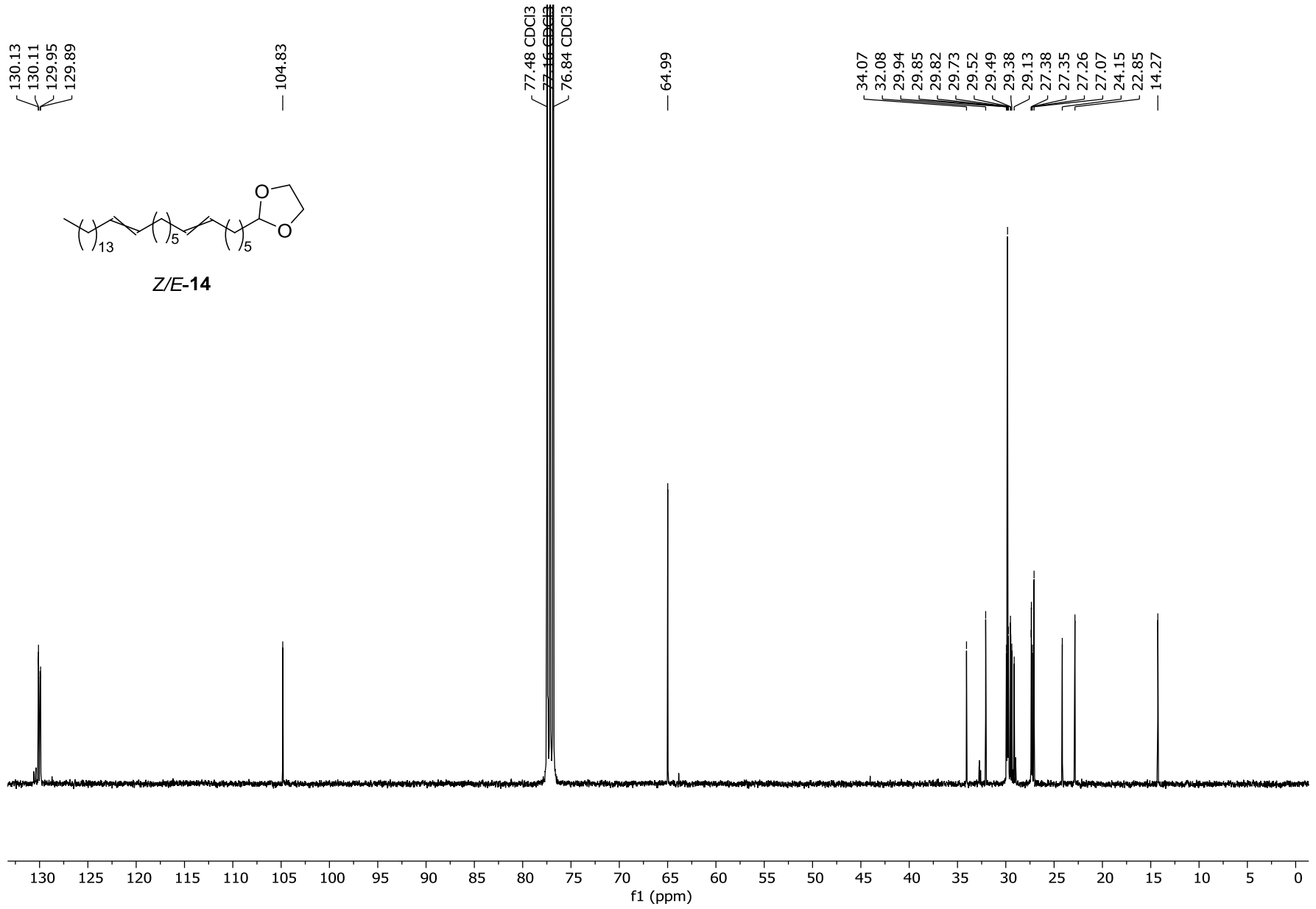
*E,E,E,E-1**

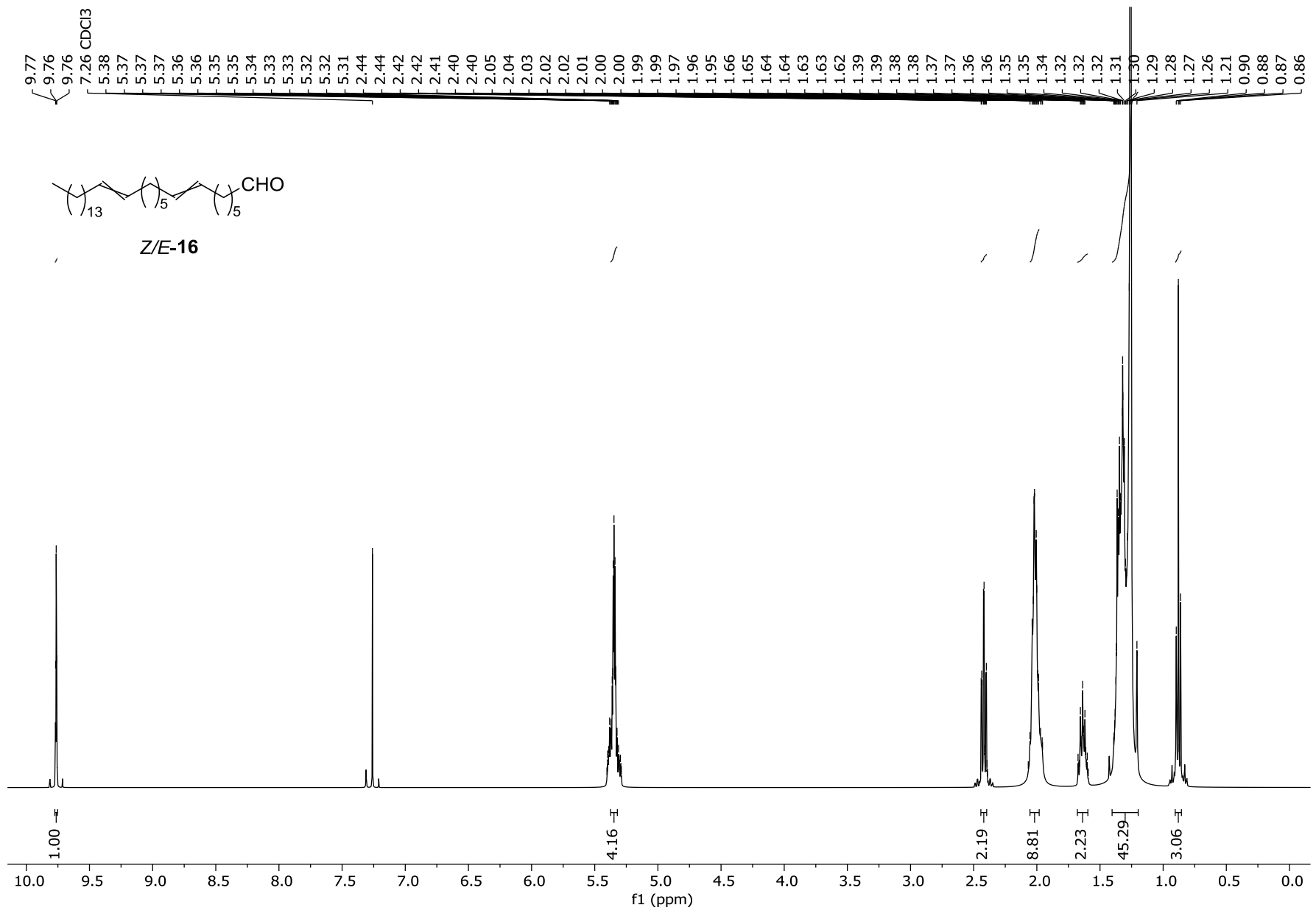


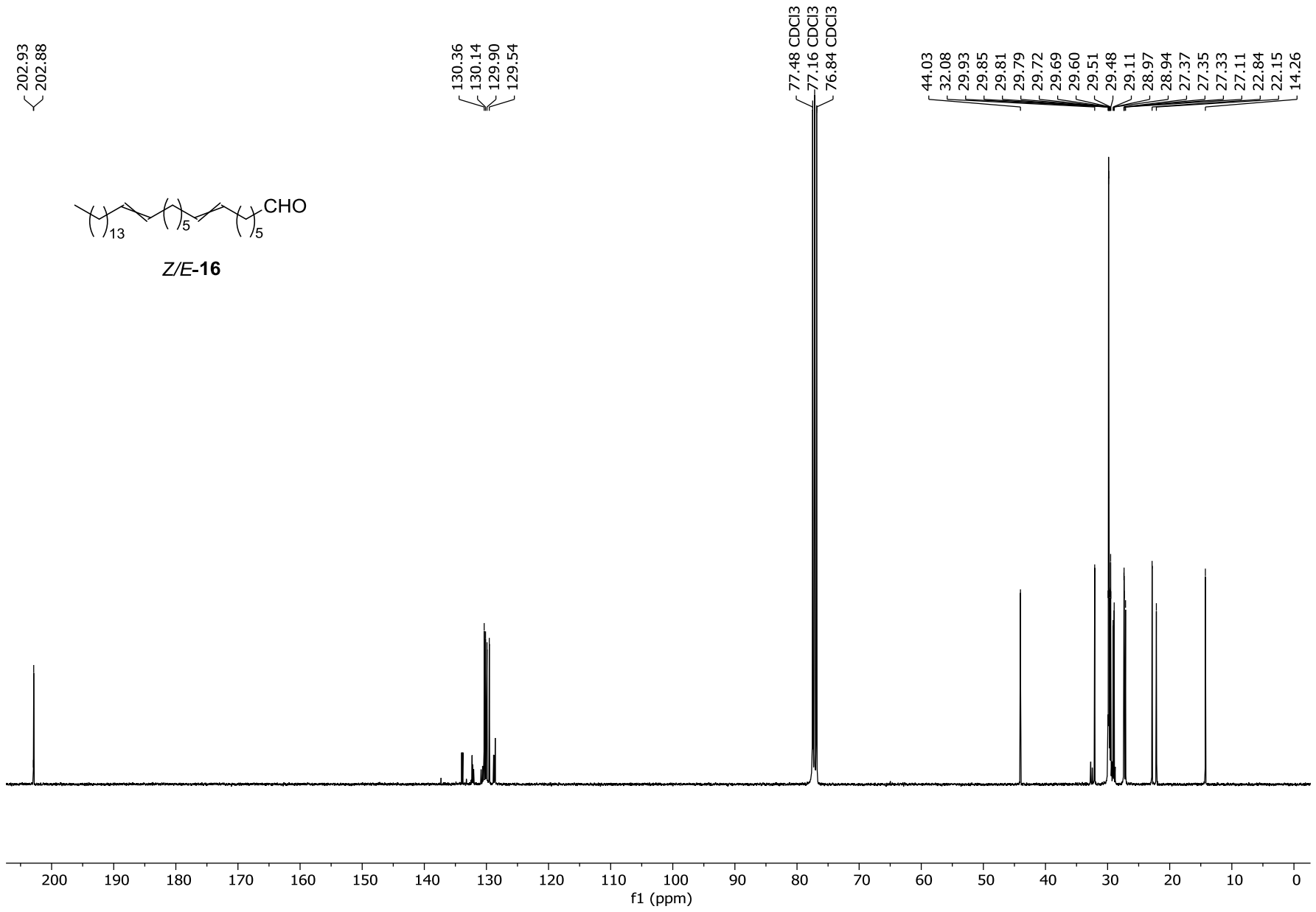


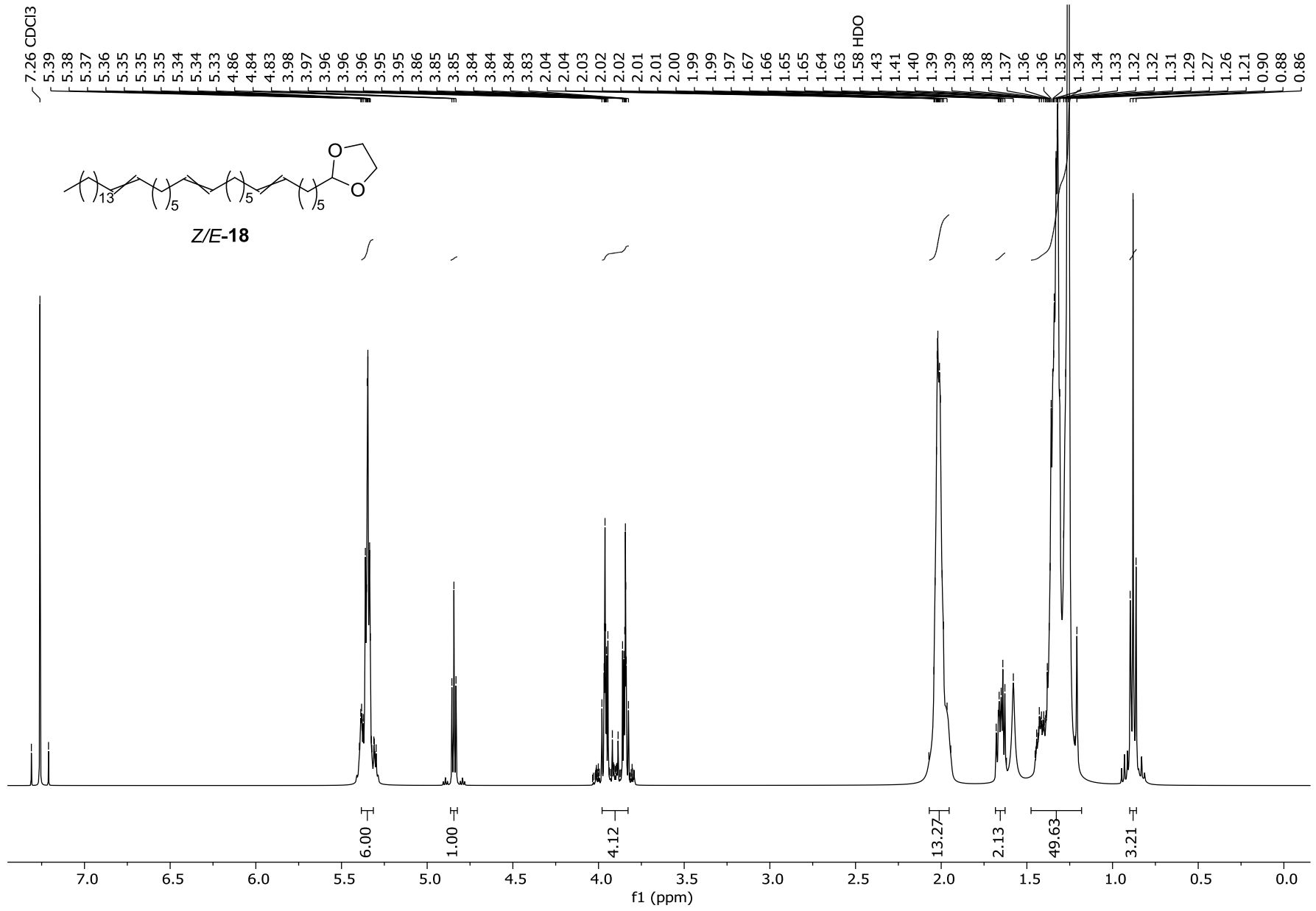


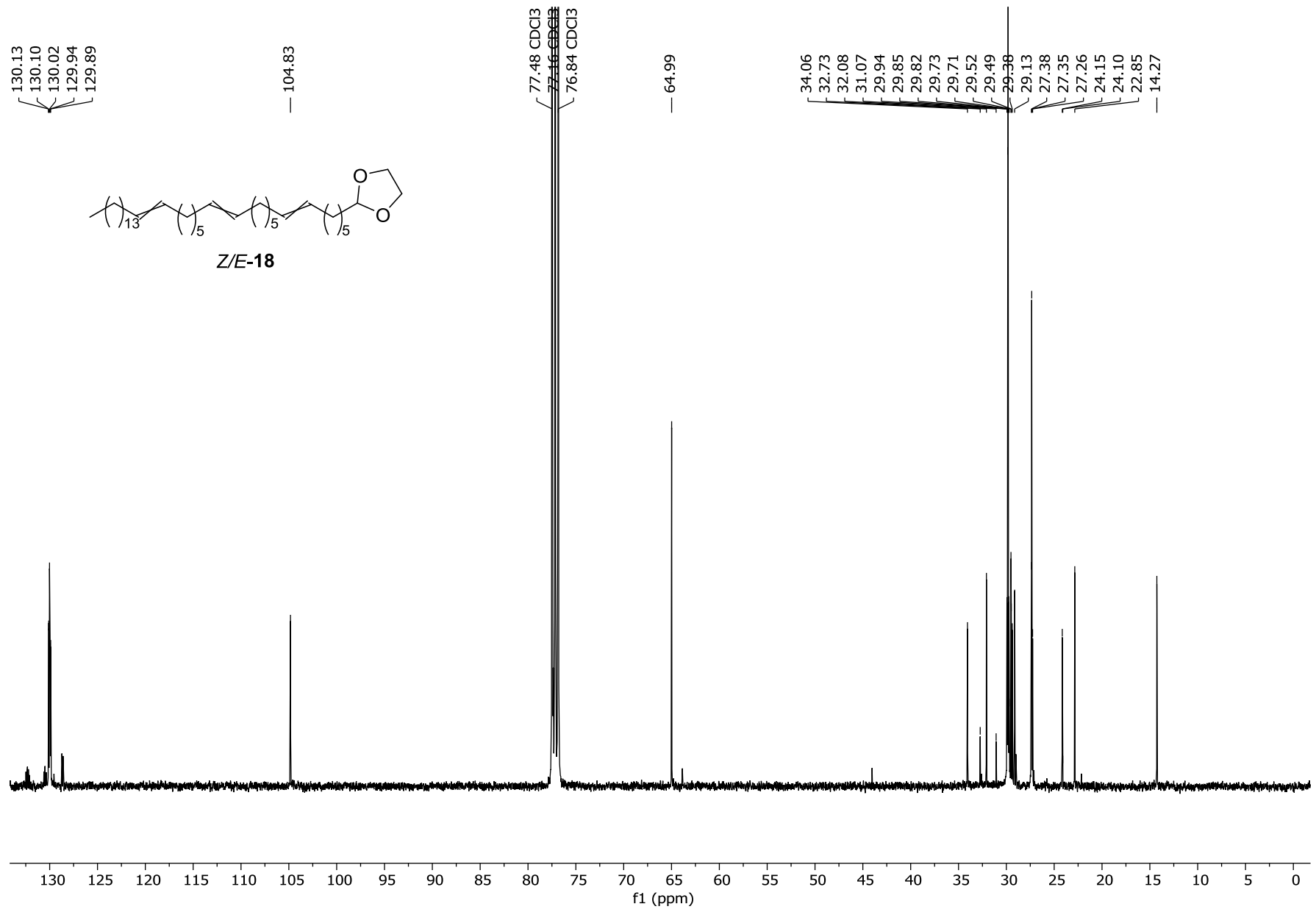


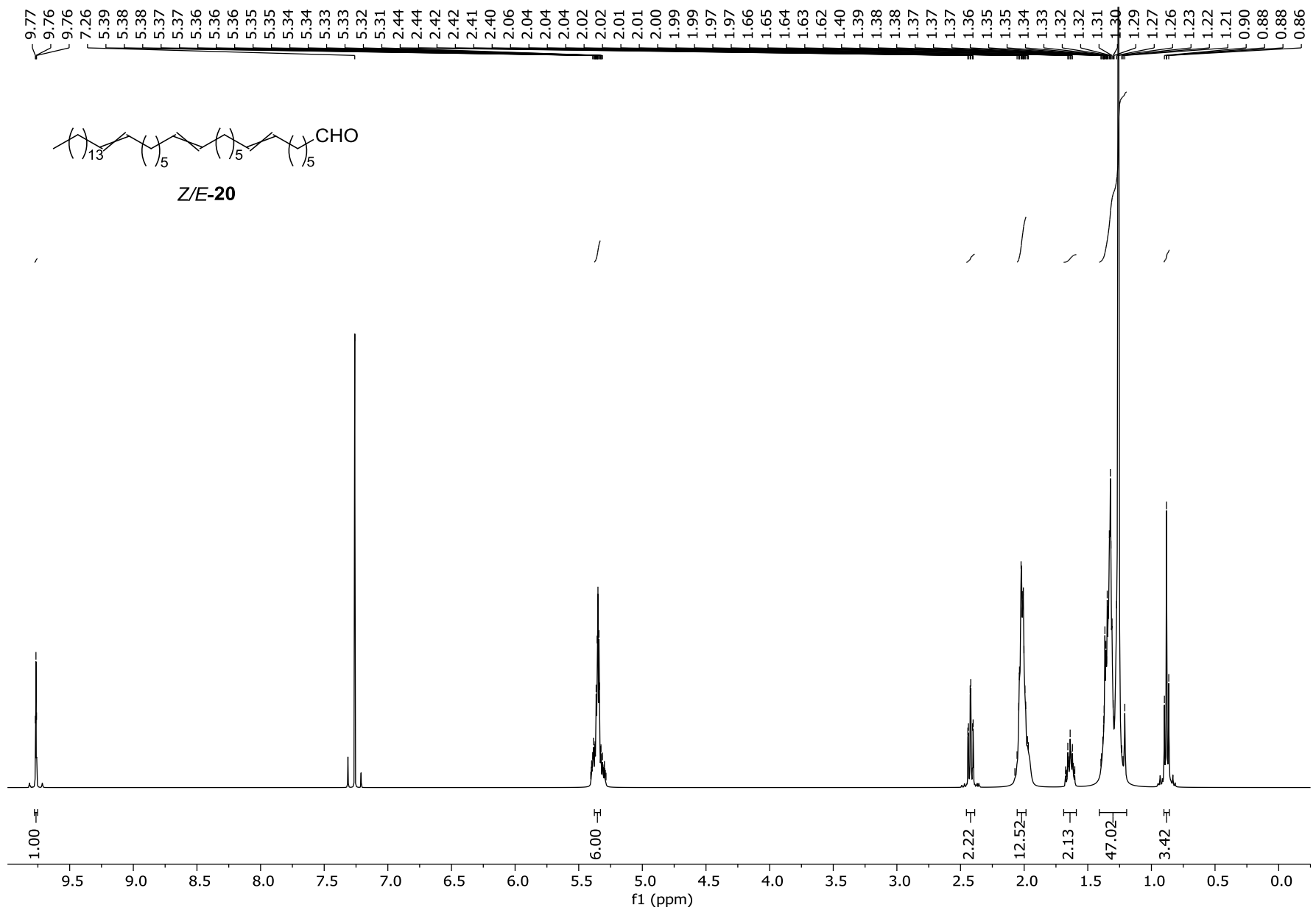


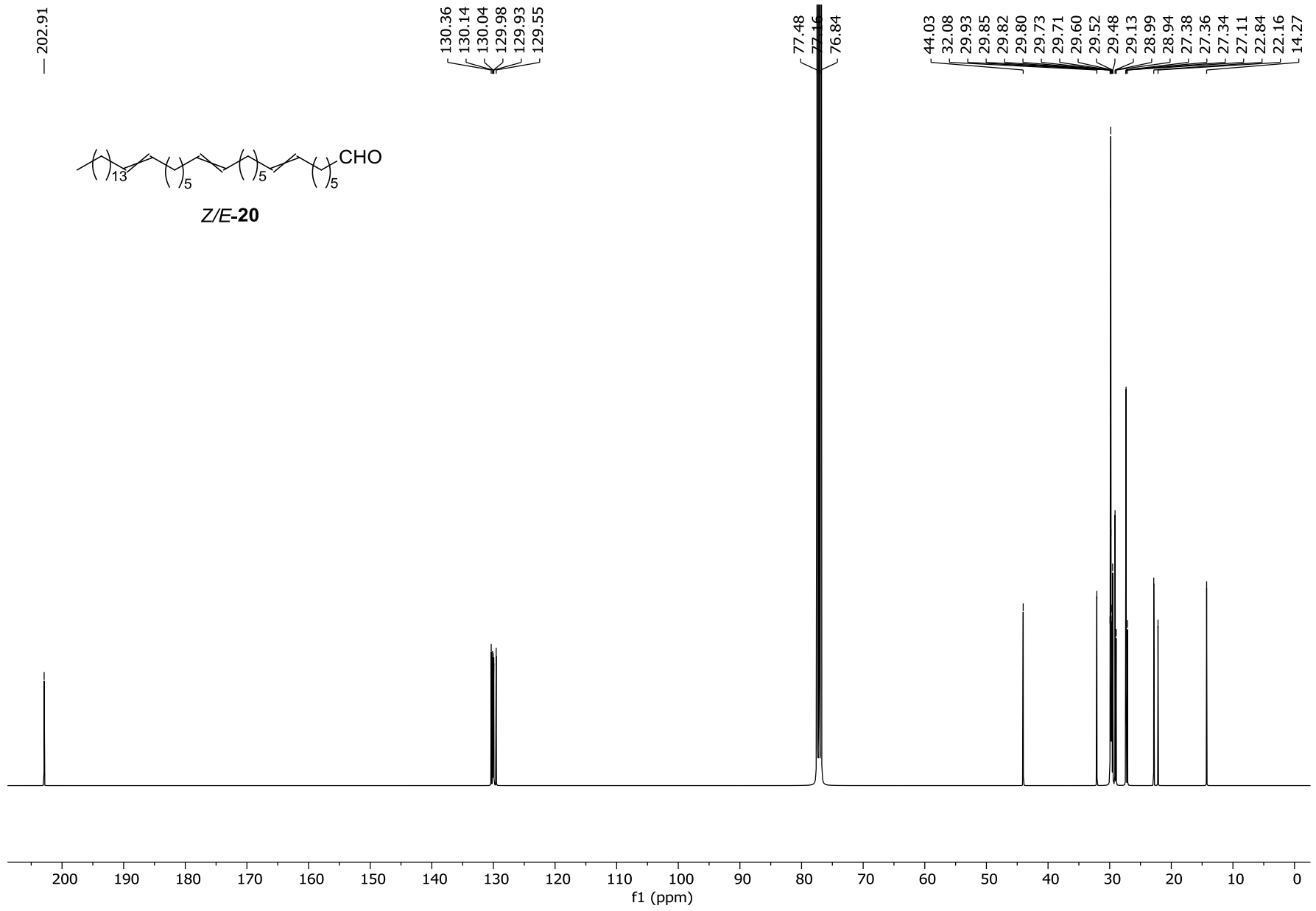


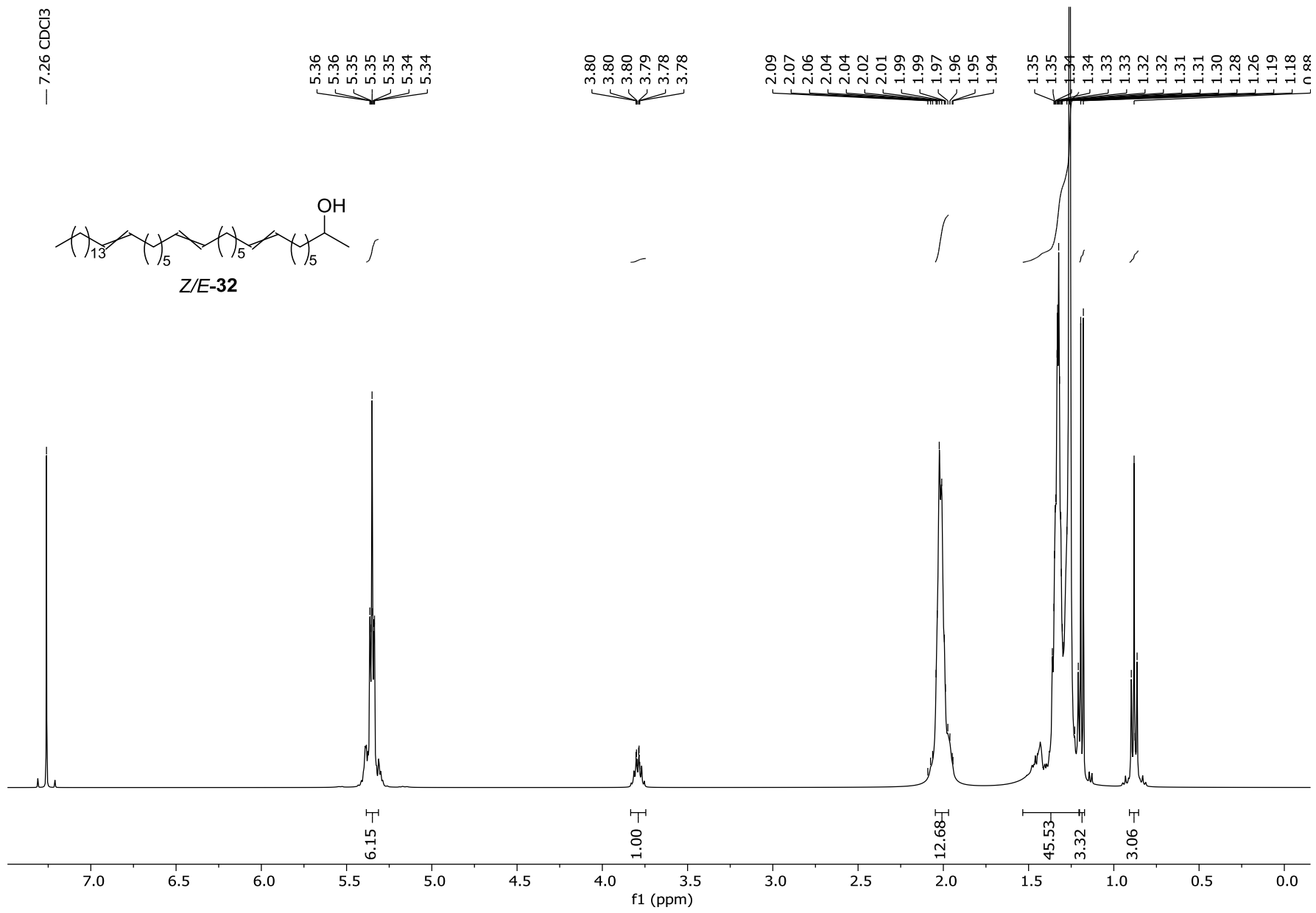


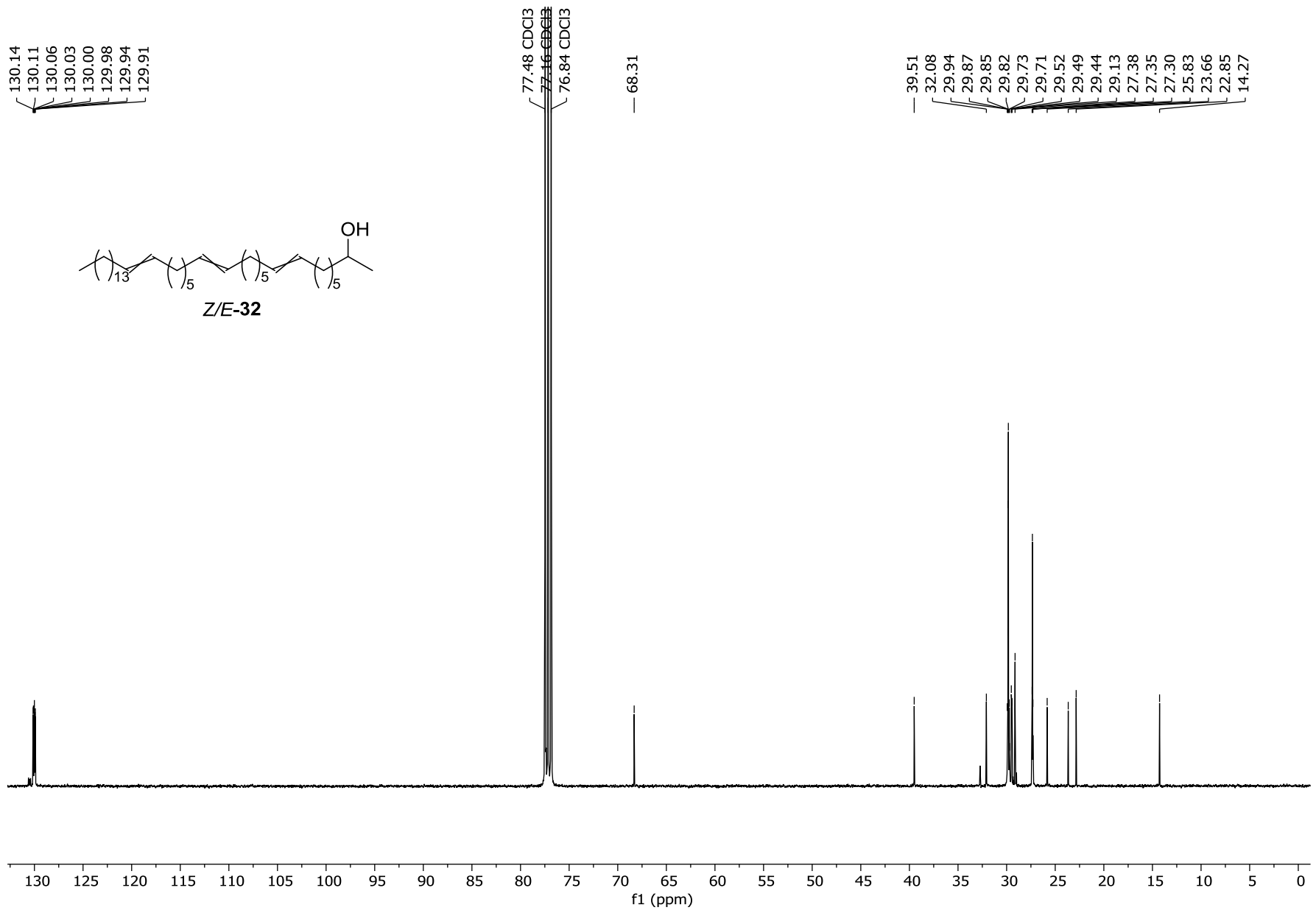


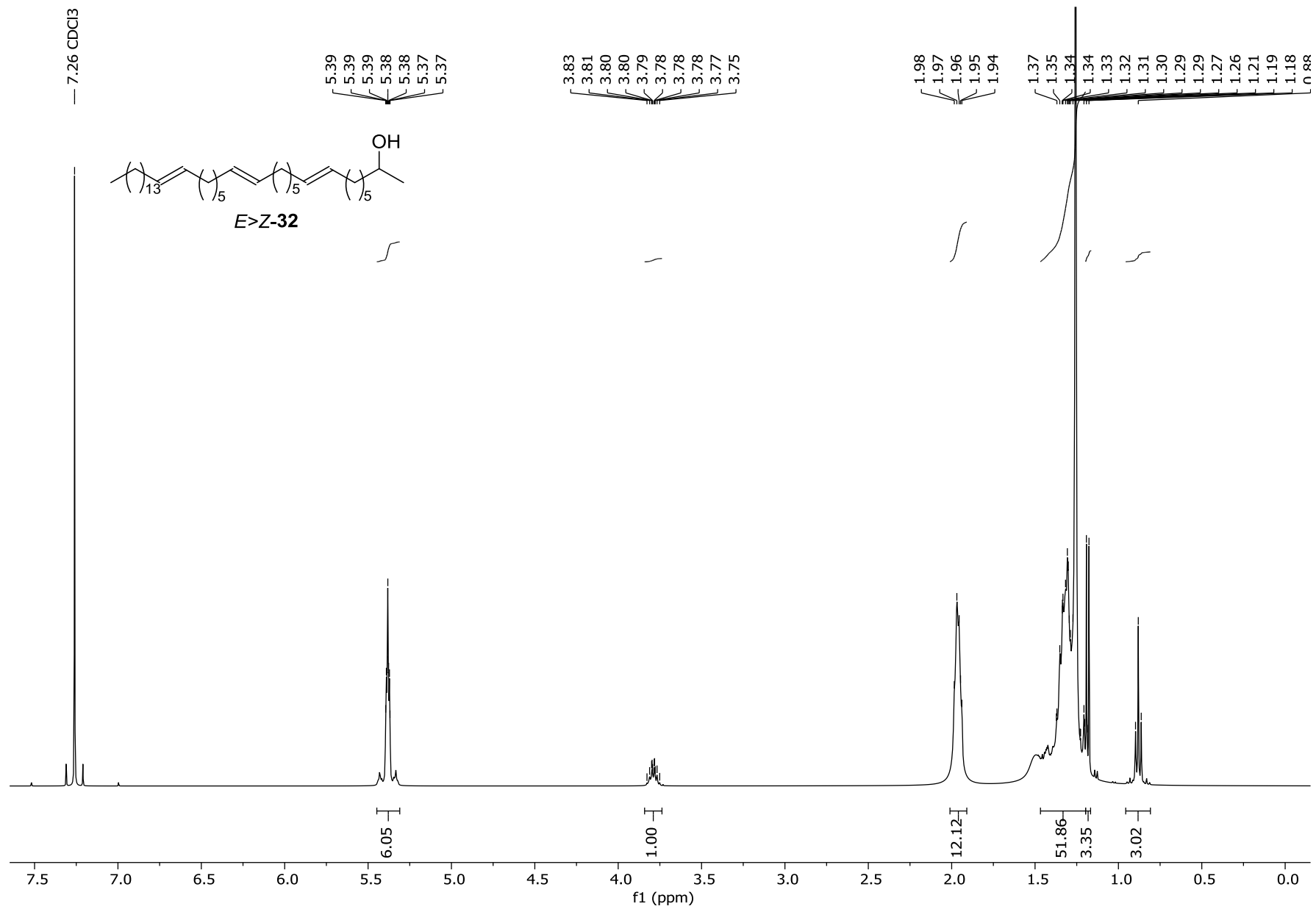


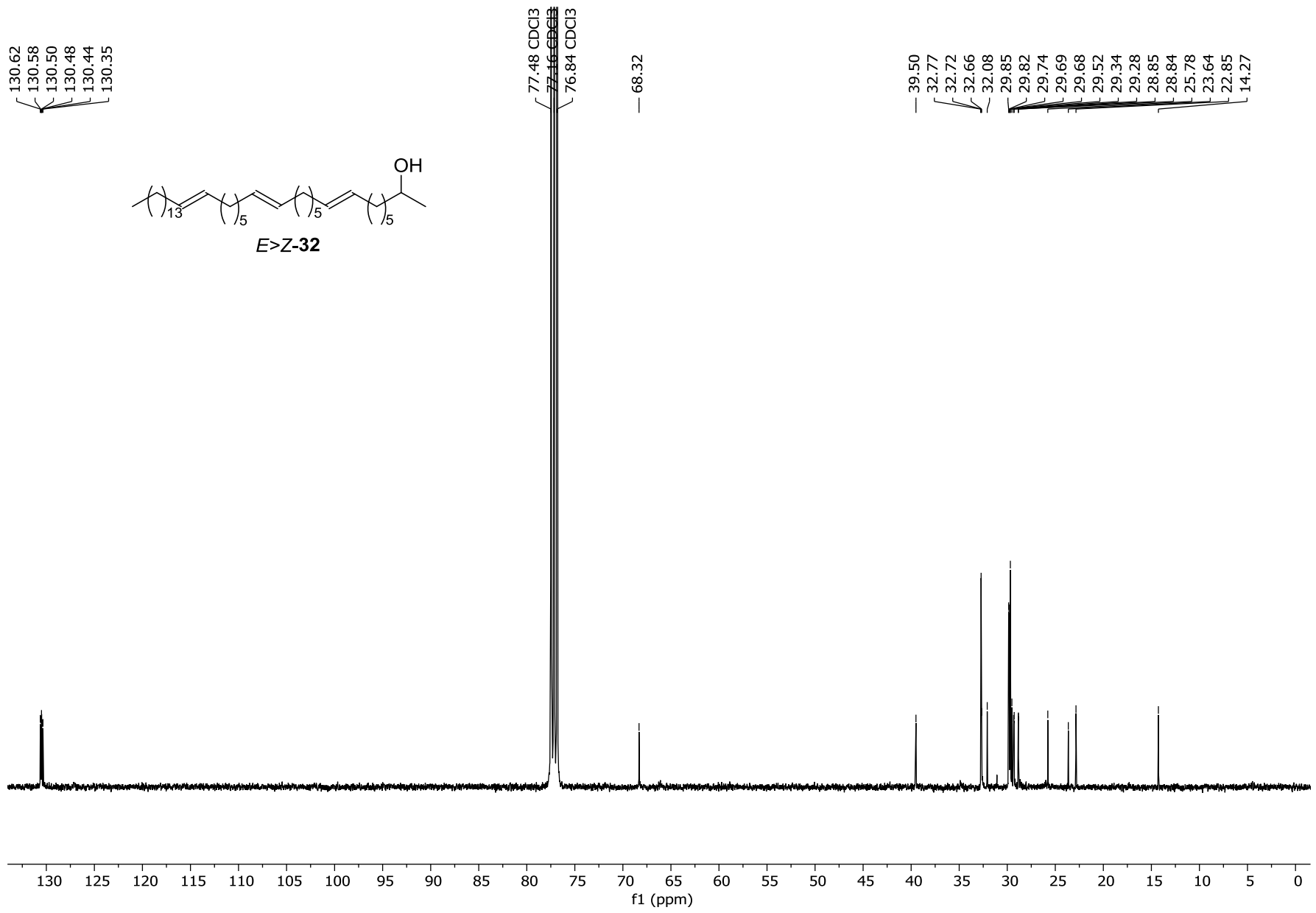


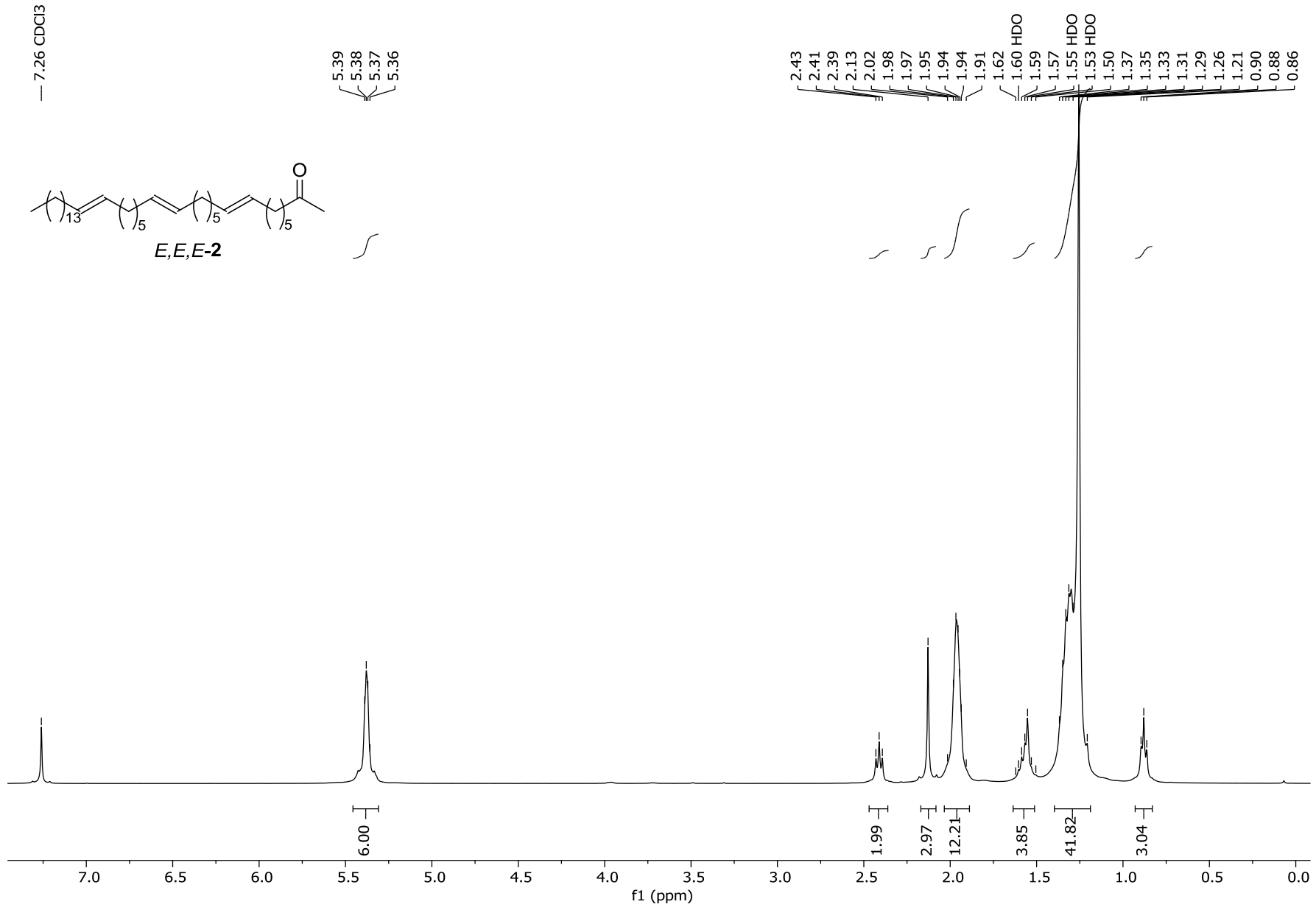


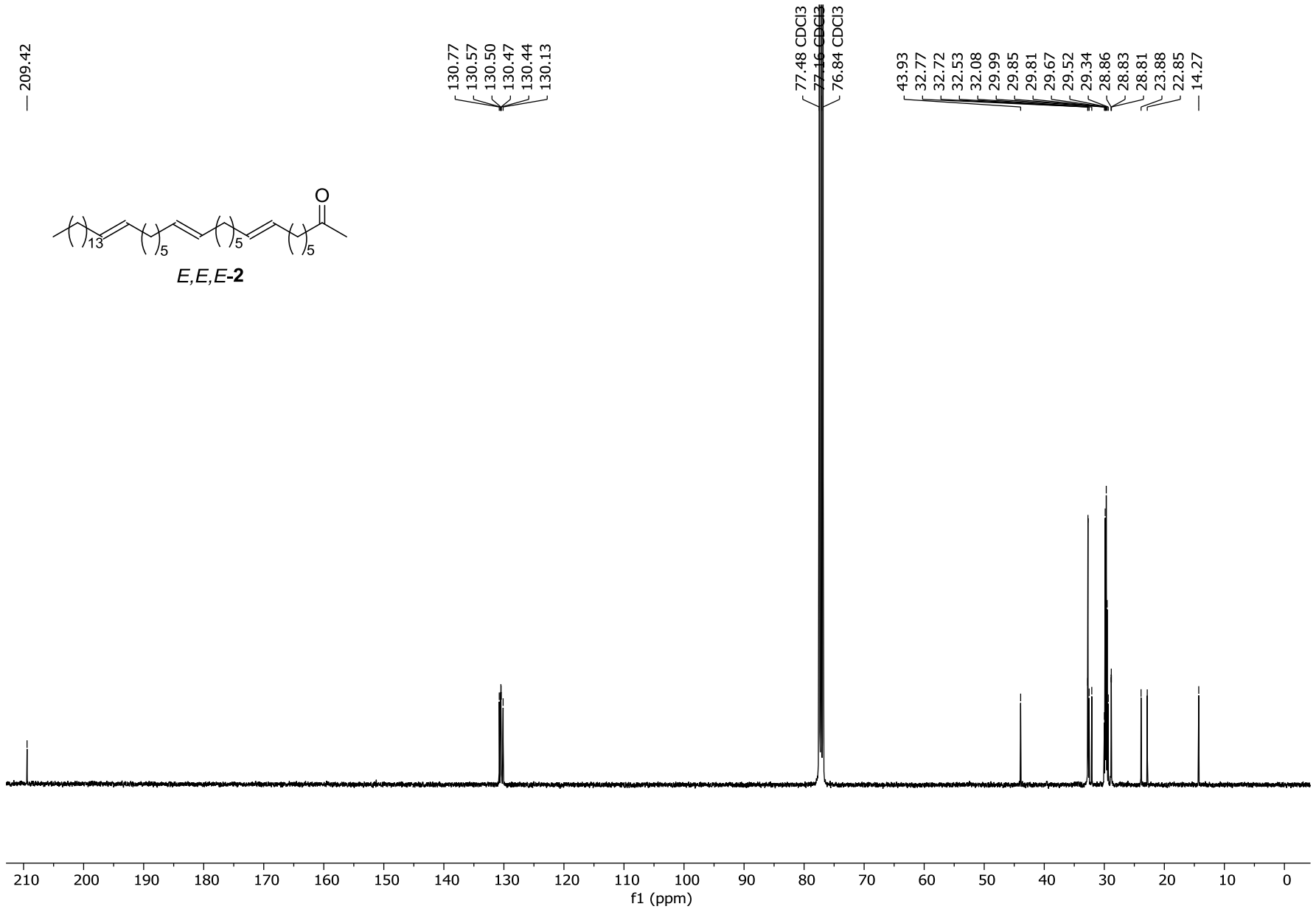










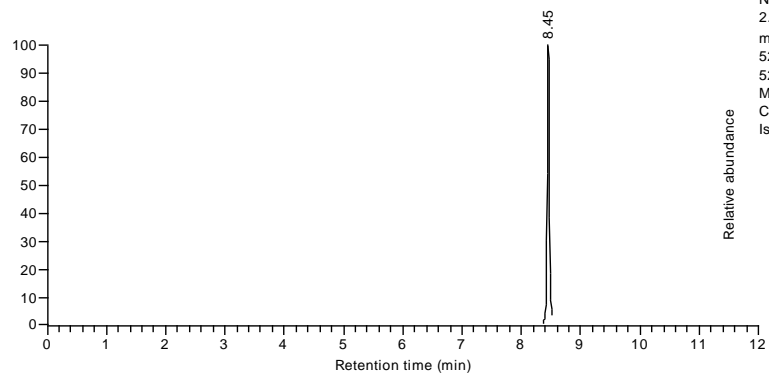


002) C37-3 - Isotope cluster
Alkenones C37

10/07/2019 15.21.13

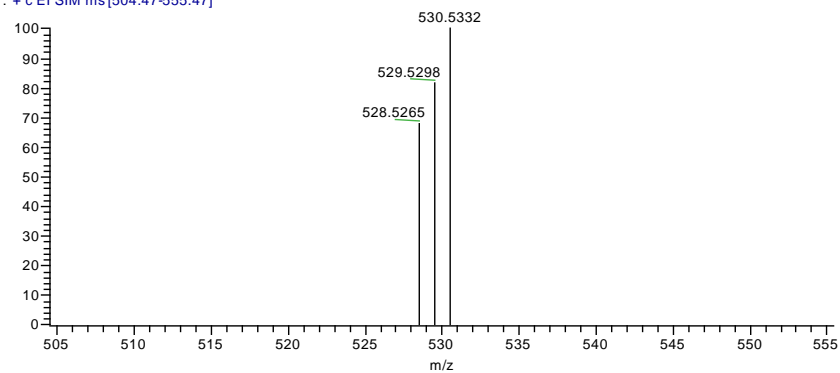
Standard - C37:3

RT: 0.00 - 12.01 SM: 7G

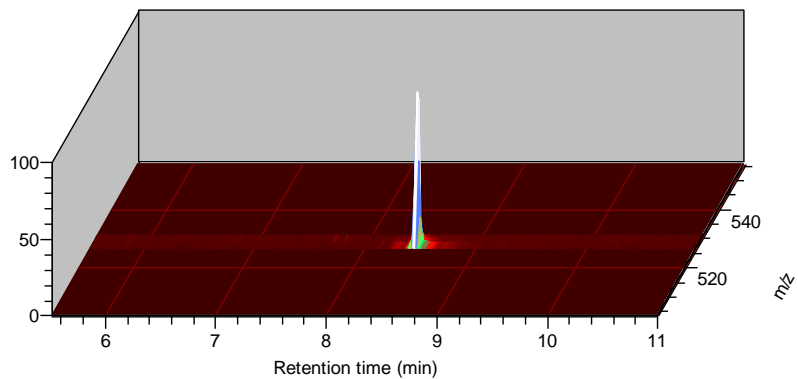


NL:
2.15E4
m/z=
528.5001-
528.5529
MS 002)
C37-3 -
Isotope cluster

002) C37-3 - Isotope cluster #72 RT: 6.13 AV: 1 NL: 4.40E1
T: + c EI SIM ms [504.47-555.47]

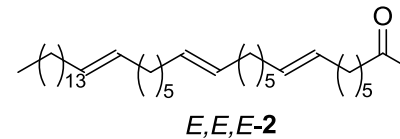


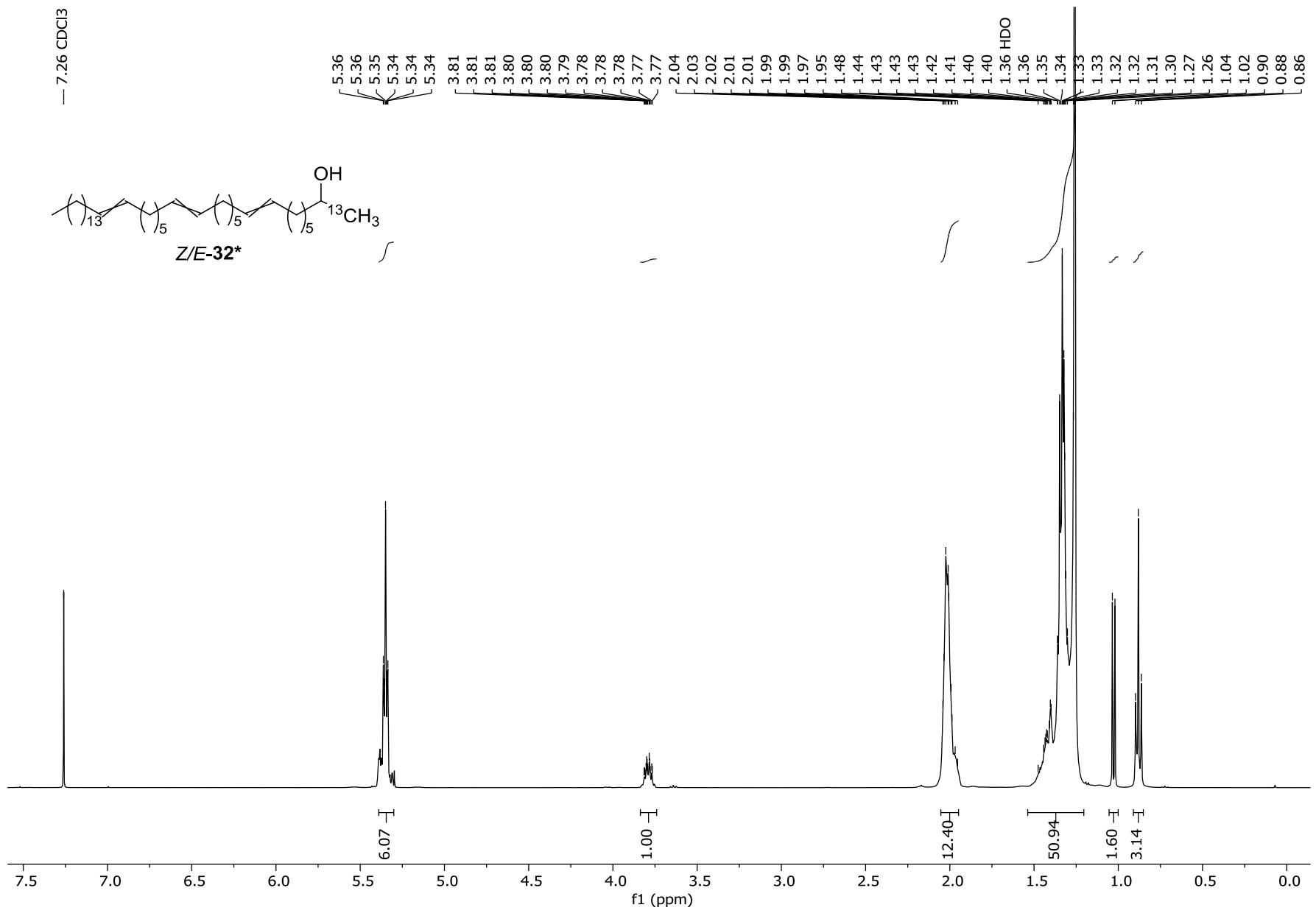
002) C37-3 - Isotope cluster RT: 5.51 - 11.00 Mass: 504.47 - 555.47 NL: 2.67E4

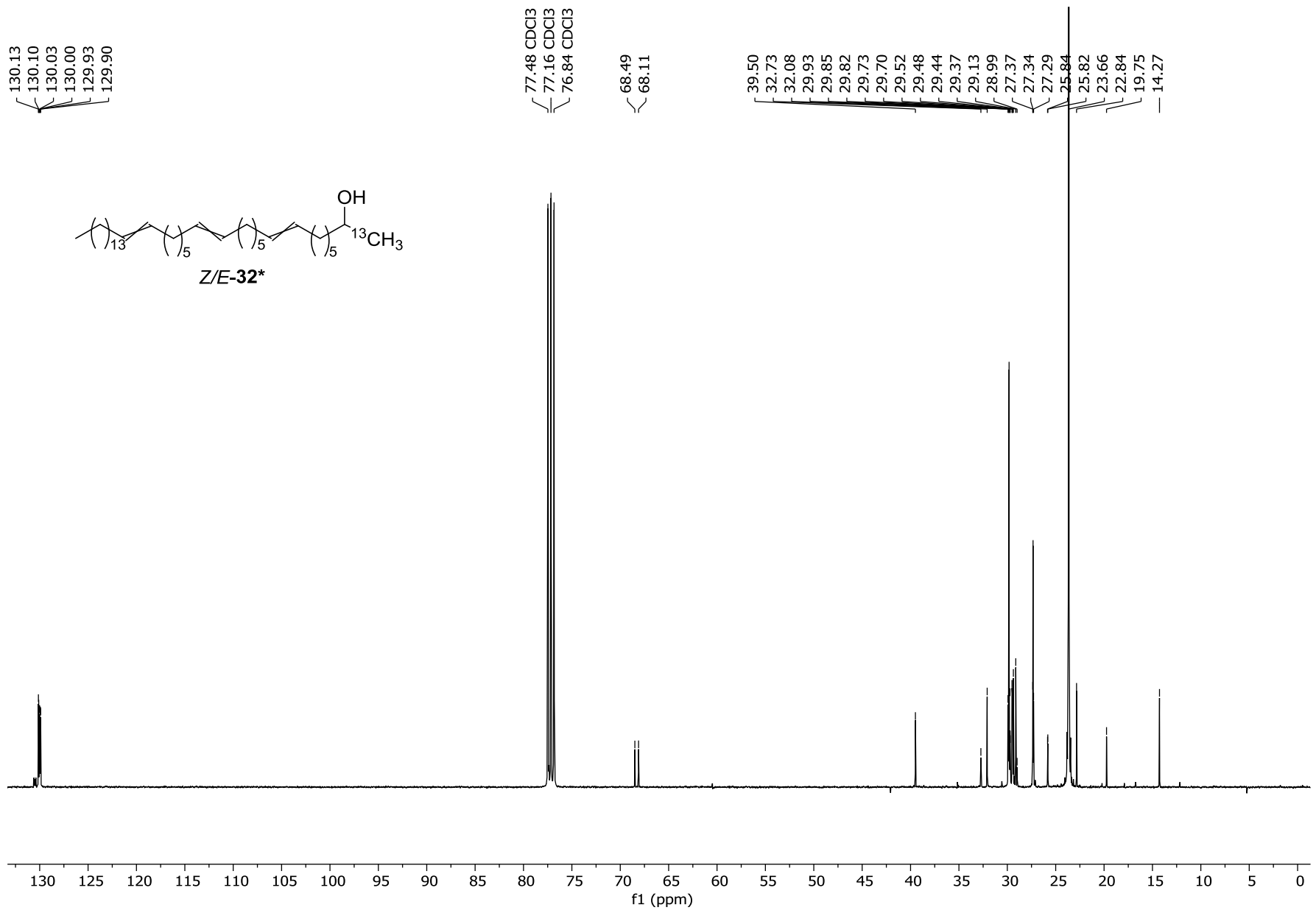


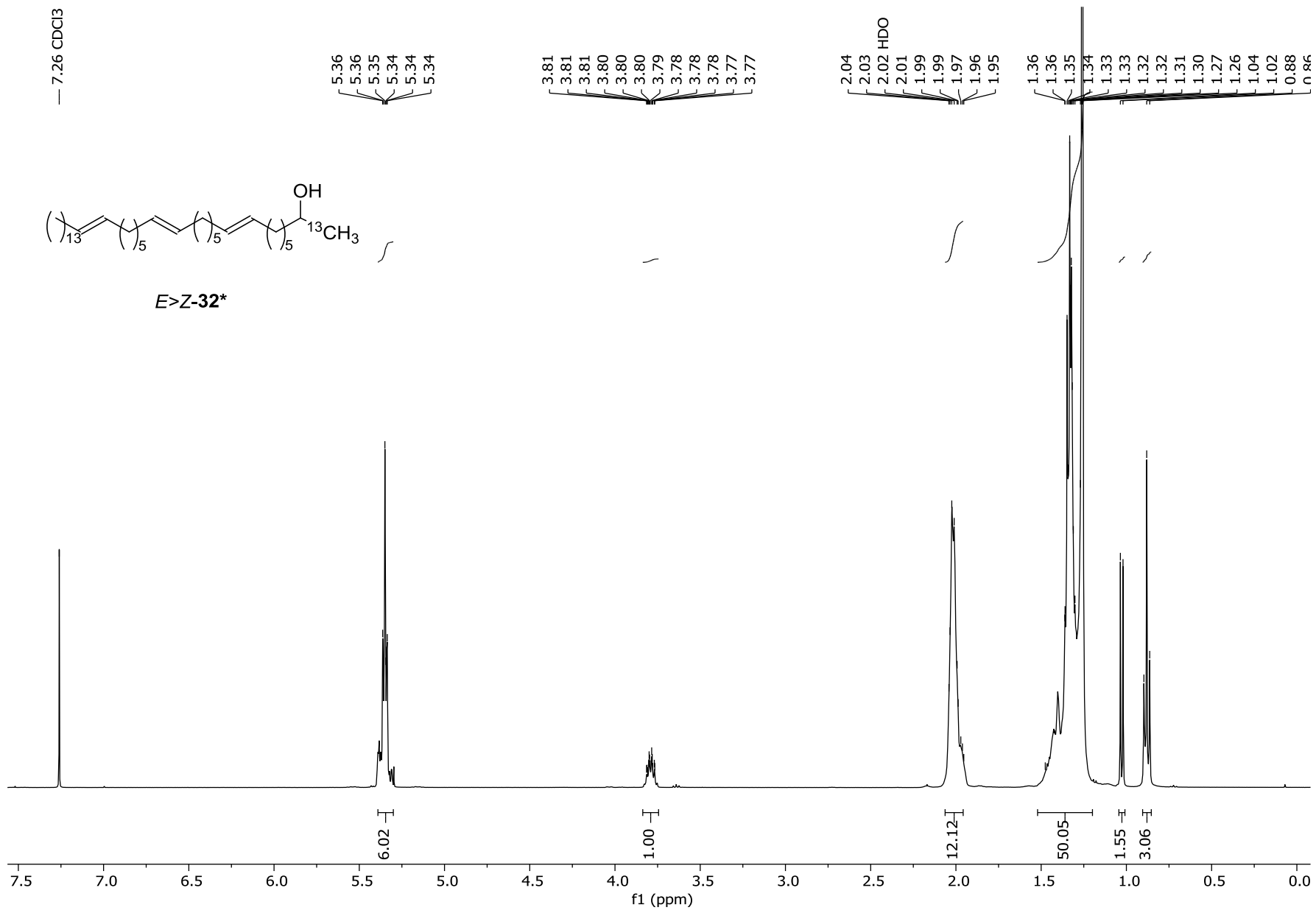
002) C37-3 - Isotope cluster#1 RT: 5.51
T: + c EI SIM ms [504.47-555.47]

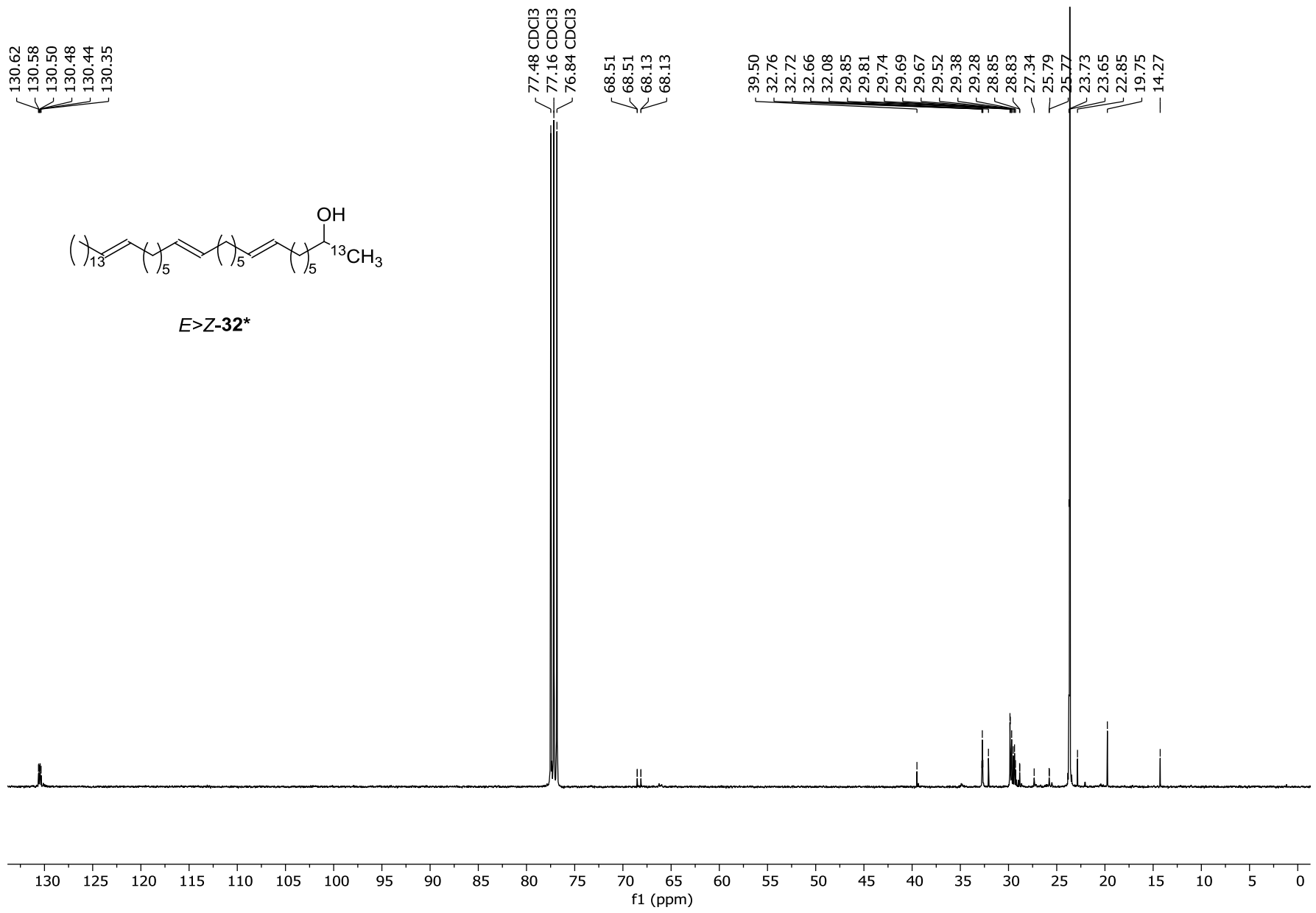
m/z	Intensity	Relative
528.5265	36.0	100.00
529.5298	29.0	80.56
530.5332	26.0	72.22

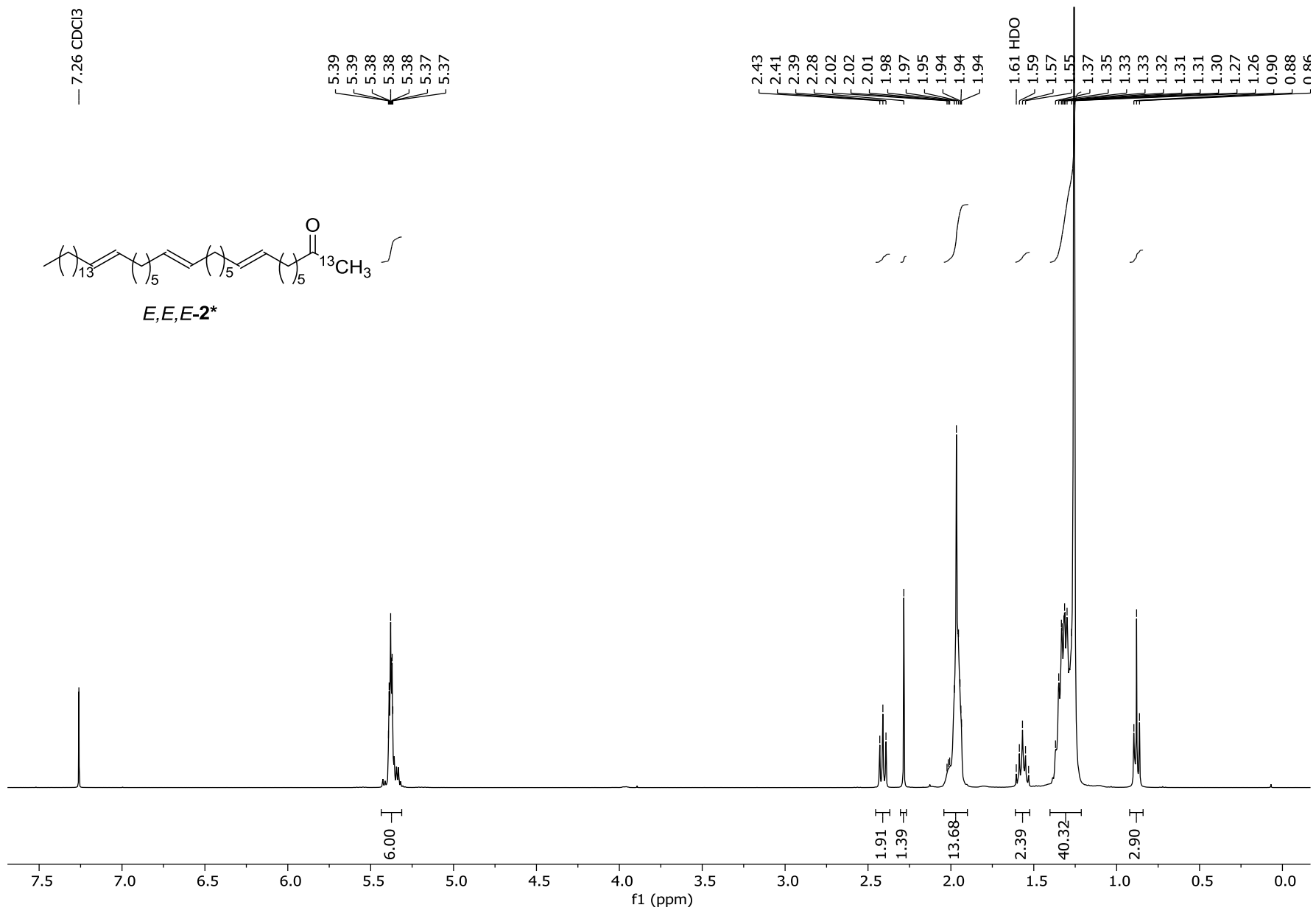


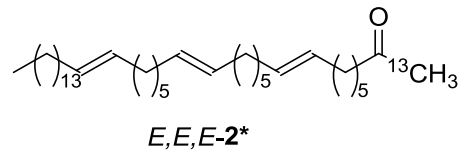












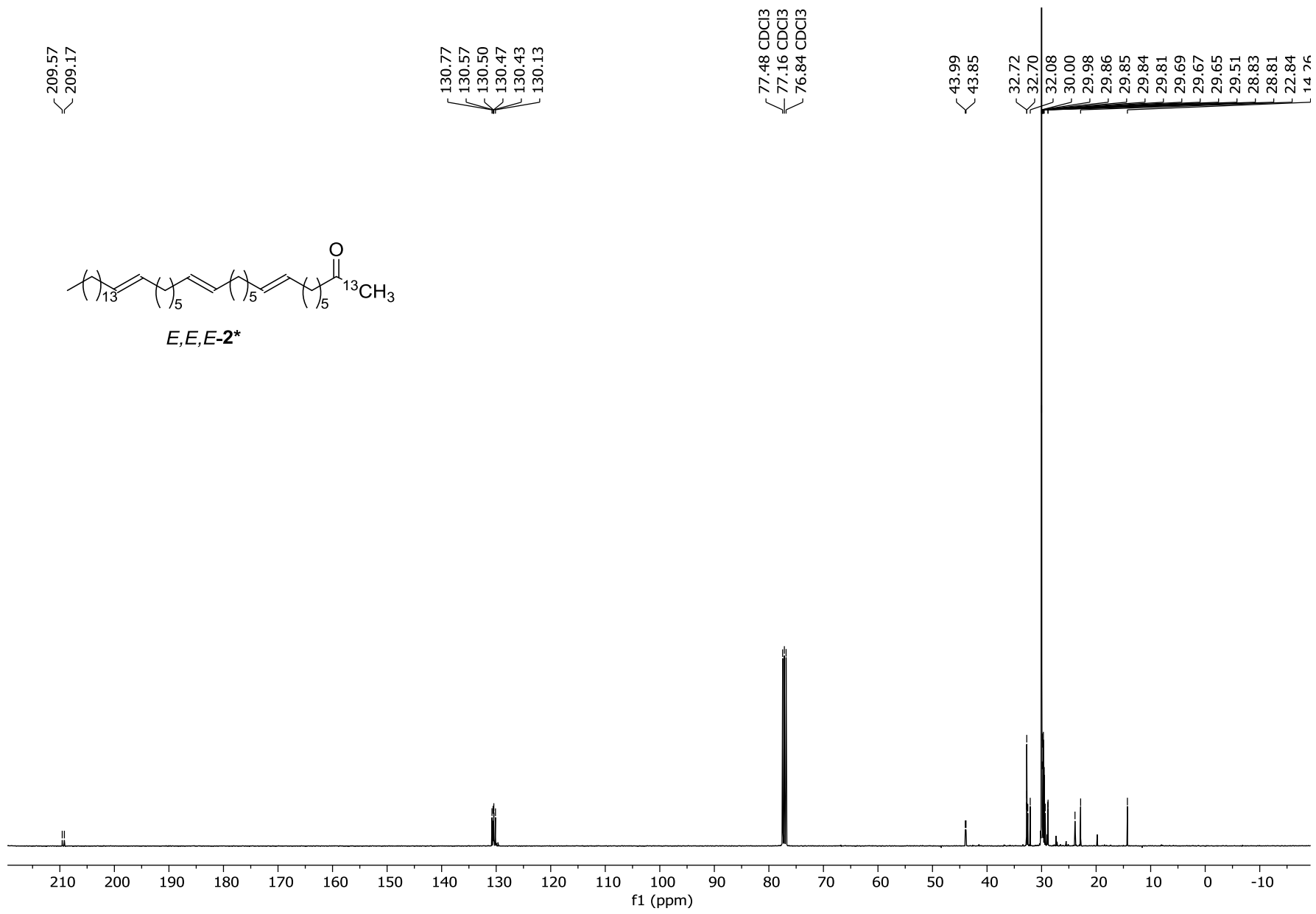
209.57
209.17

130.77
130.57
130.50
130.47
130.43
130.13

77.48 CDCl3
77.16 CDCl3
76.84 CDCl3

43.99
43.85

32.72
32.70
32.08
30.00
29.98
29.86
29.85
29.84
29.81
29.69
29.67
29.65
29.51
28.83
28.81
22.84
14.76

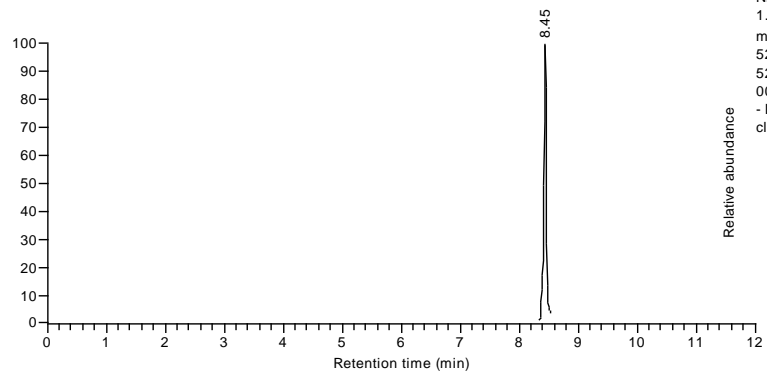


002) 13C37-3 - Isotope cluster
Alkenones C37

10/07/2019 16.38.19

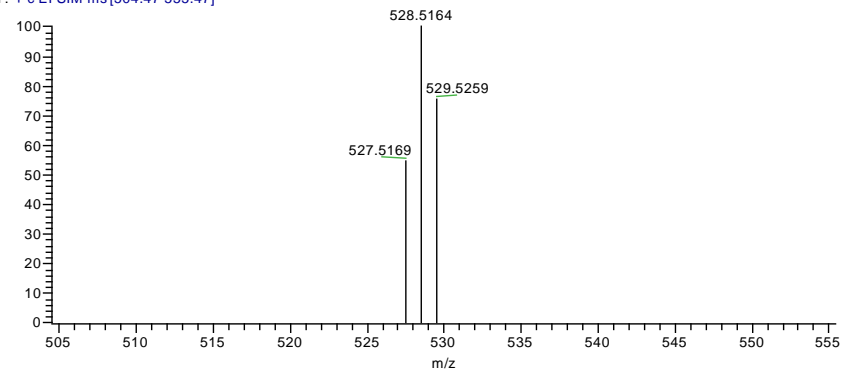
Standard - C37:3*

RT: 0.00 - 12.02 SM: 7G

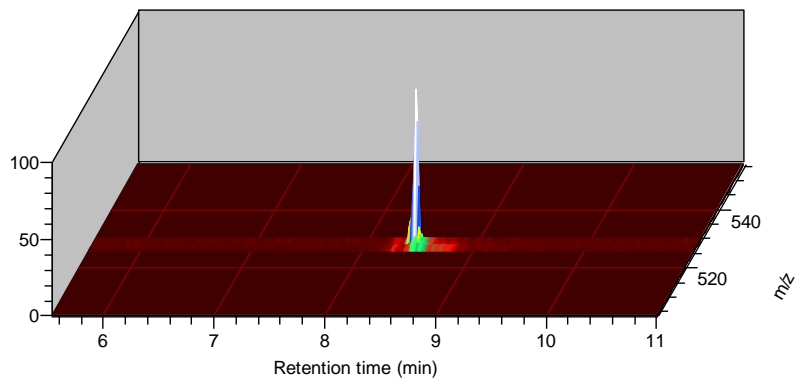


NL:
1.55E4
m/z=
529.4927-
529.5457 MS
002) 13C37-3
- Isotope
cluster

002) 13C37-3 - Isotope cluster #1 RT: 5.53 AV: 1 NL: 3.30E1
T: + c EI SIM ms [504.47-555.47]

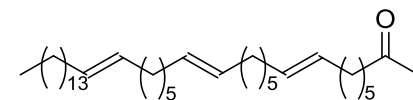


002) 13C37-3 - Isotope cluster RT: 5.53 - 11.01 Mass: 504.47 - 555.47 NL: 1.94E4

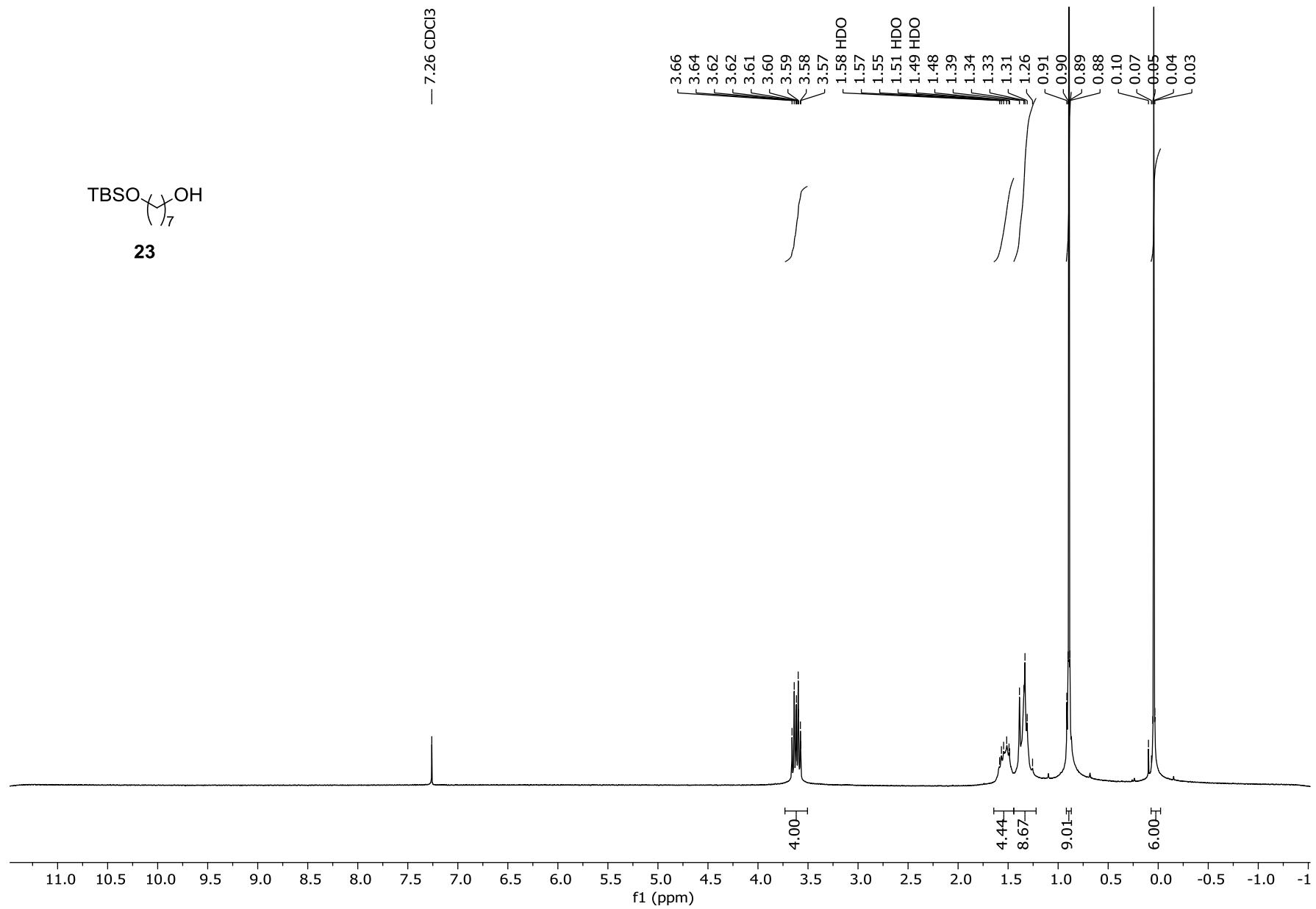
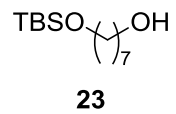


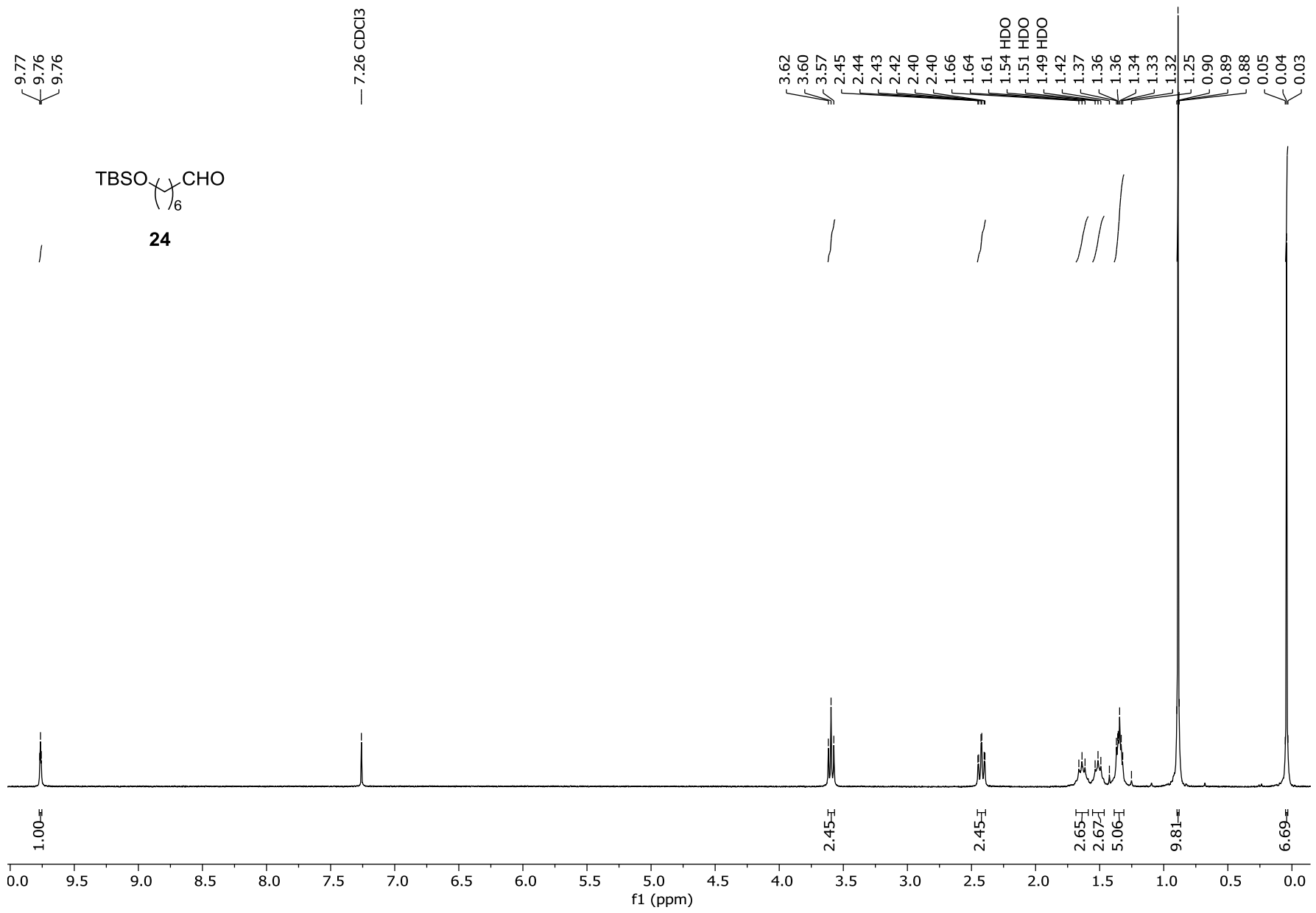
002) 13C37-3 - Isotope cluster #1 RT: 5.53
T: + c EI SIM ms [504.47-555.47]

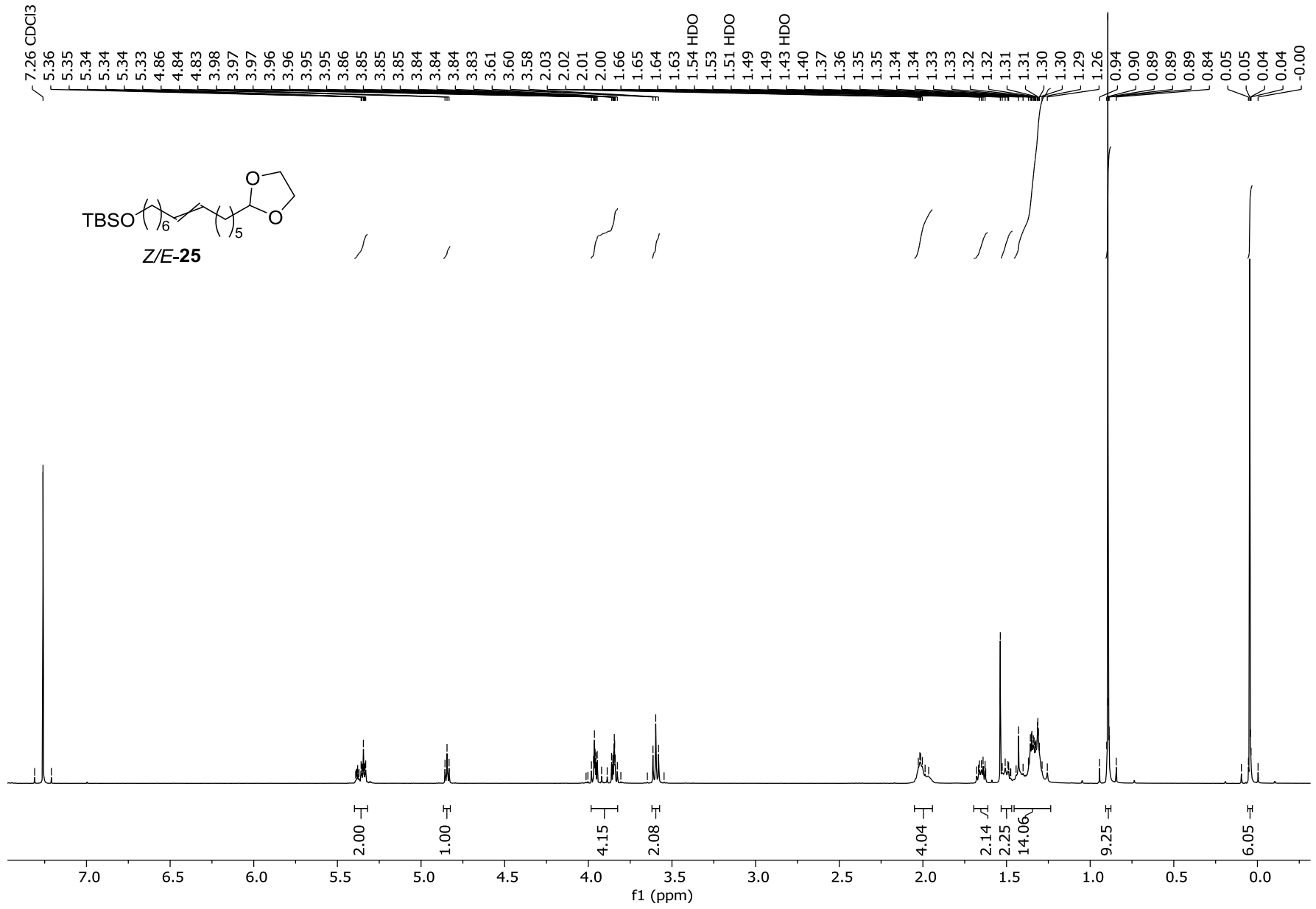
m/z	Intensity	Relative
527.5169	18.0	54.55
528.5164	33.0	100.00
529.5259	25.0	75.76

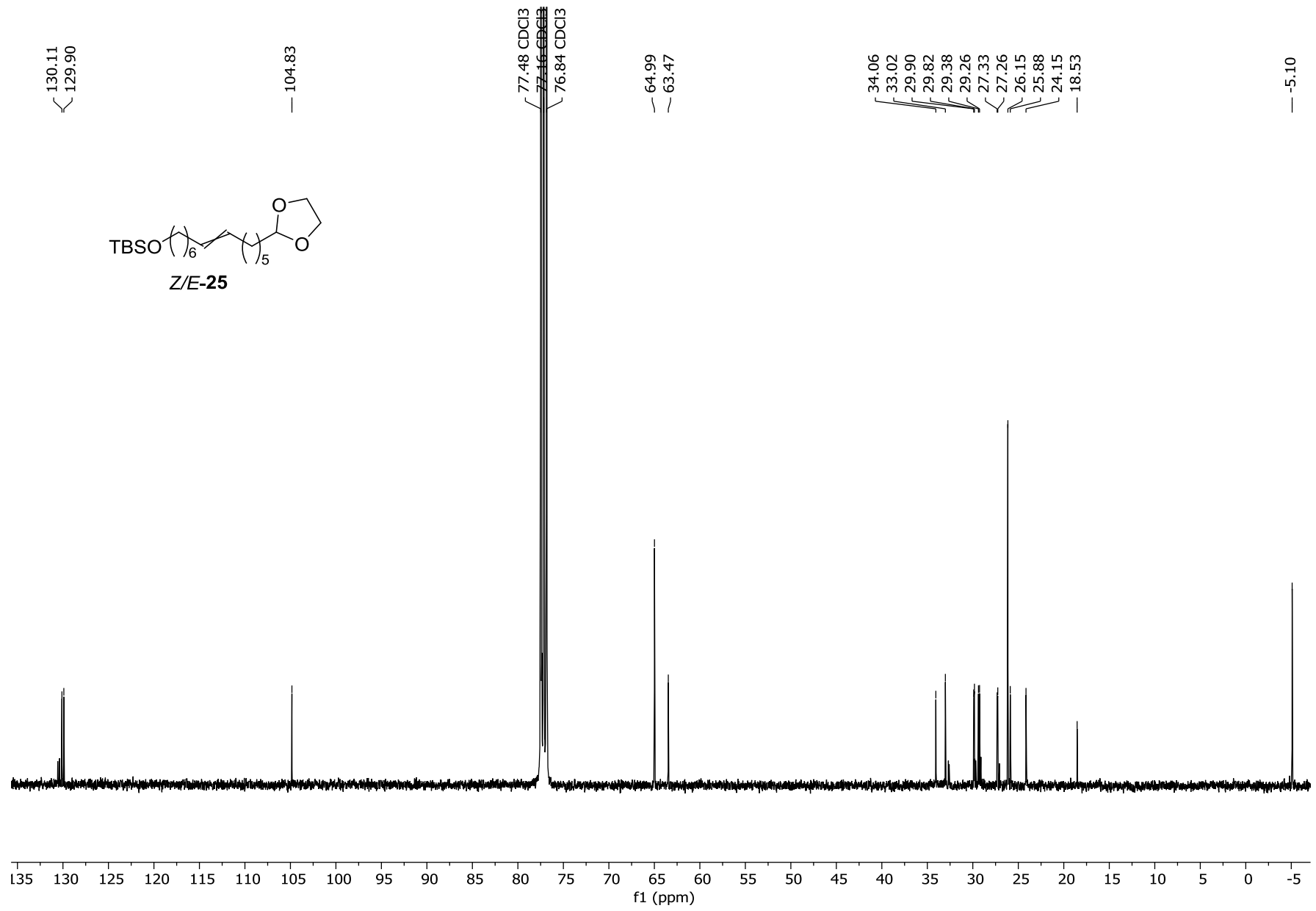


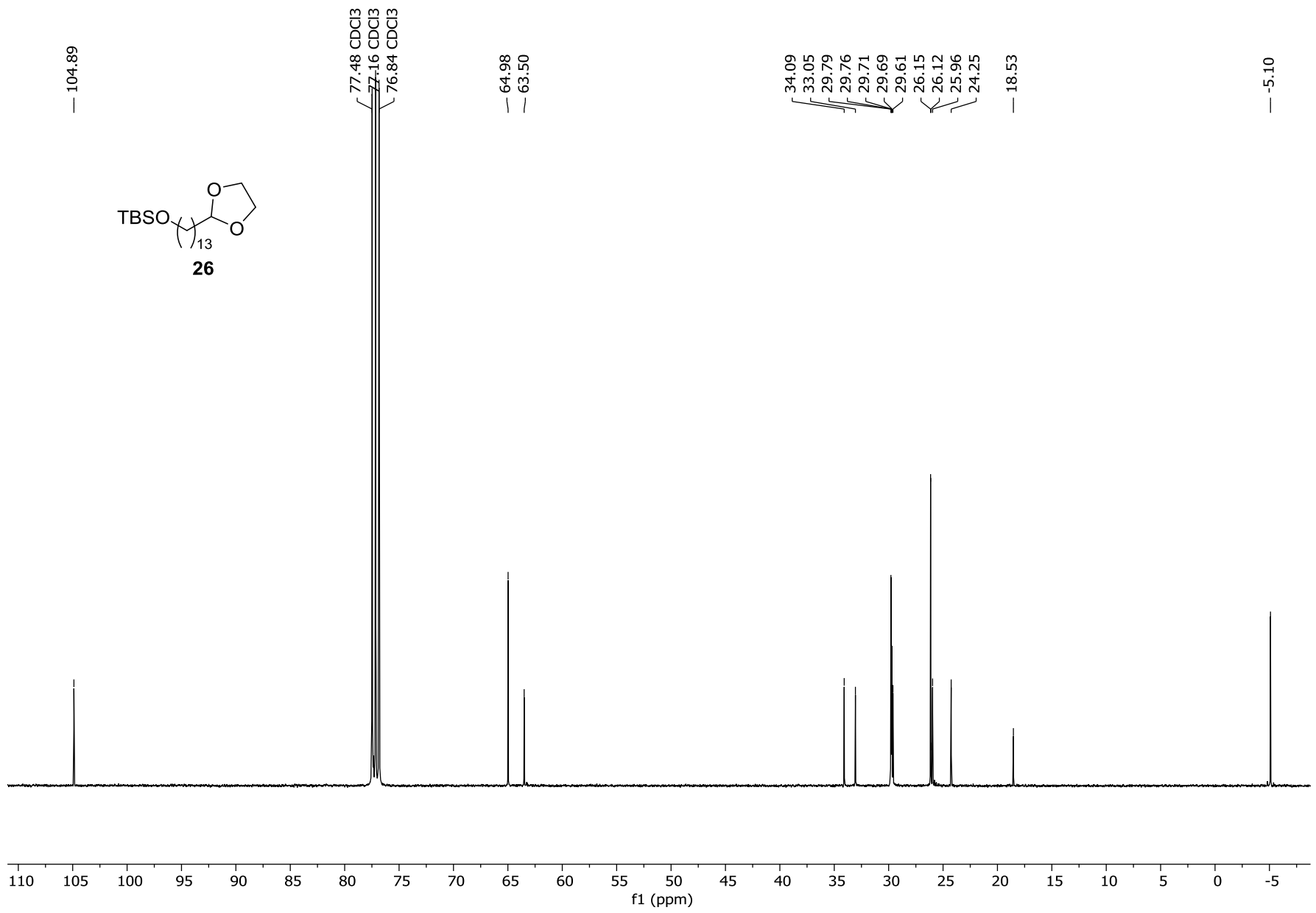
*E,E,E-2**



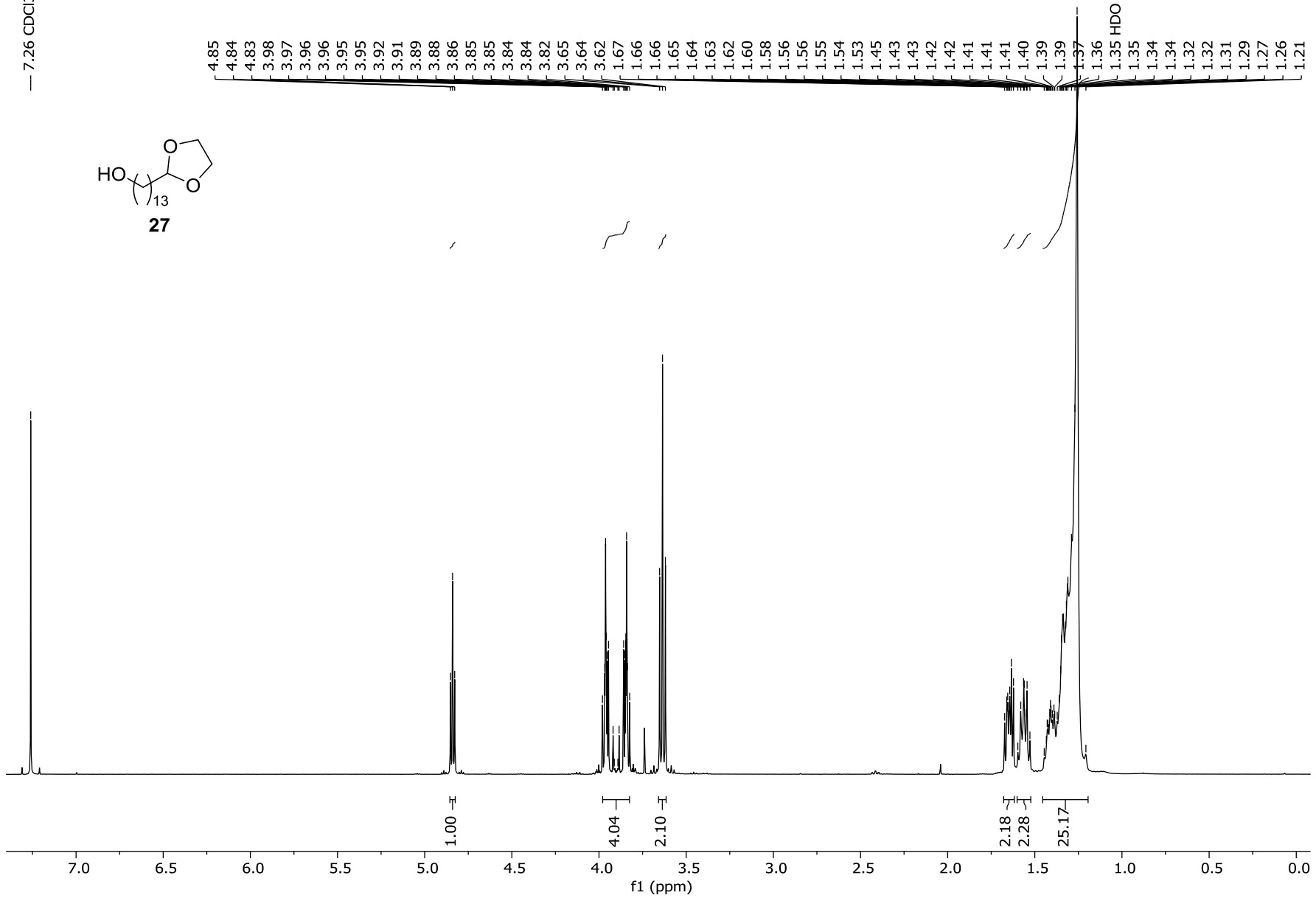
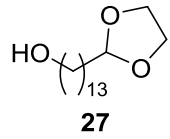


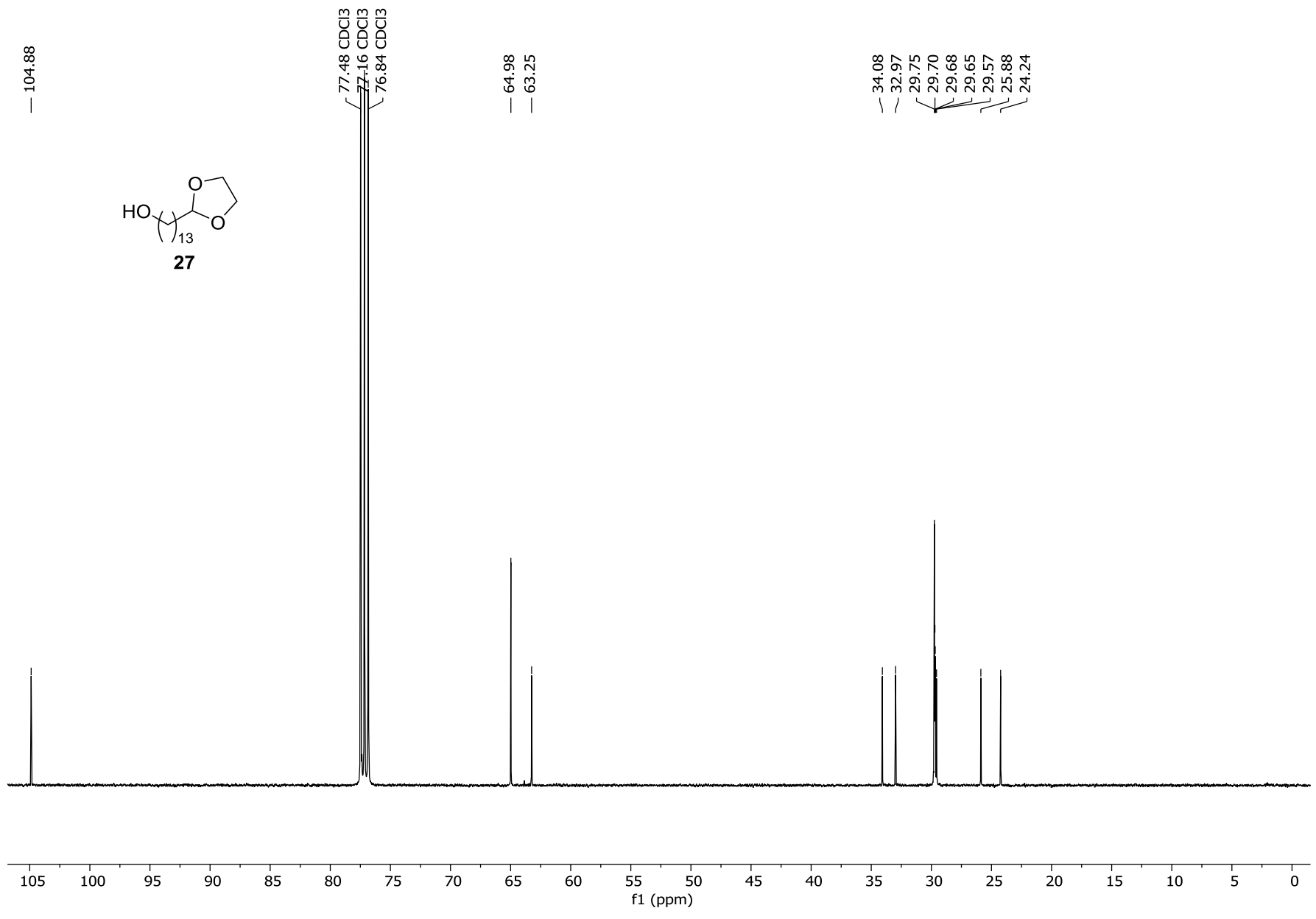


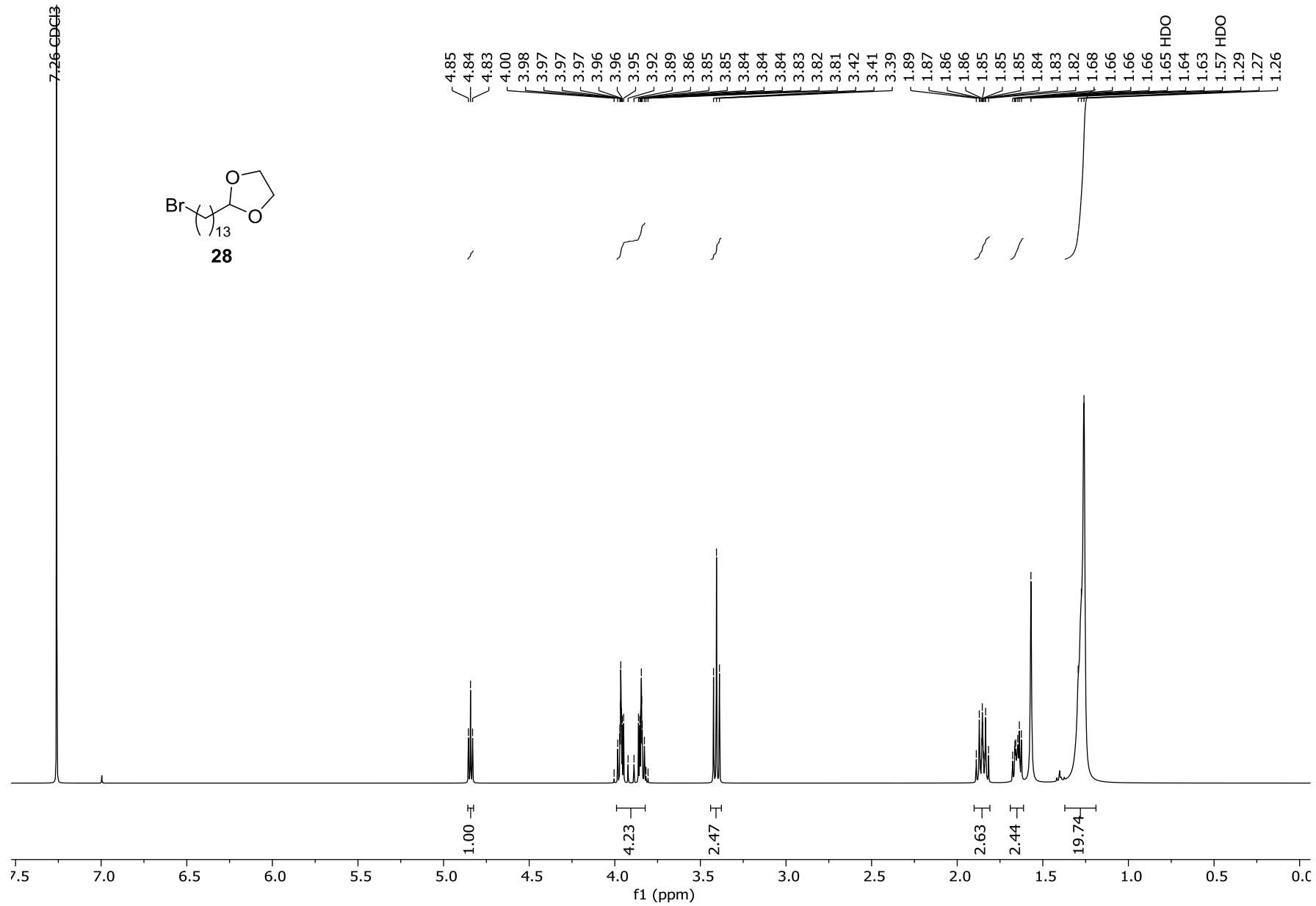


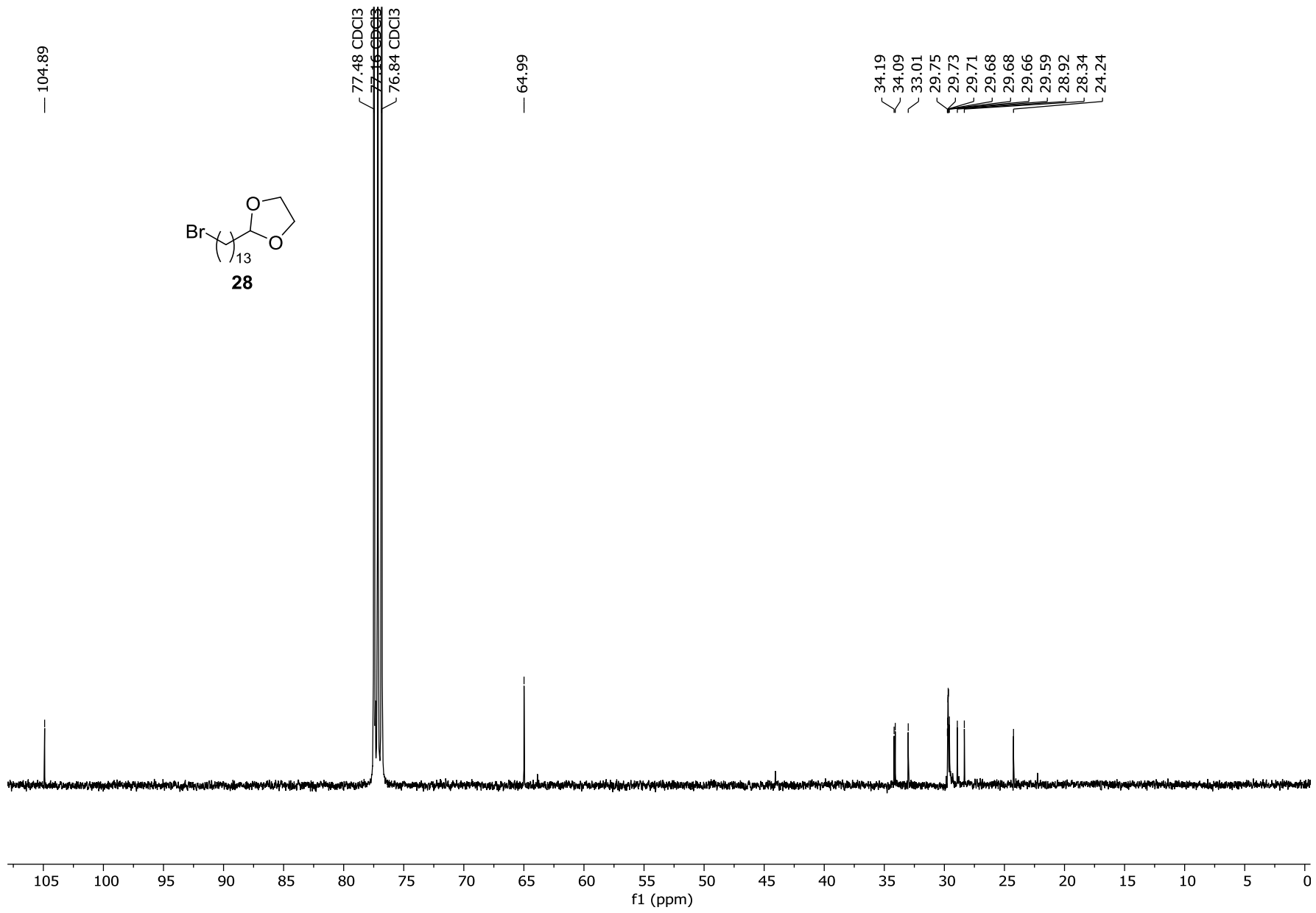


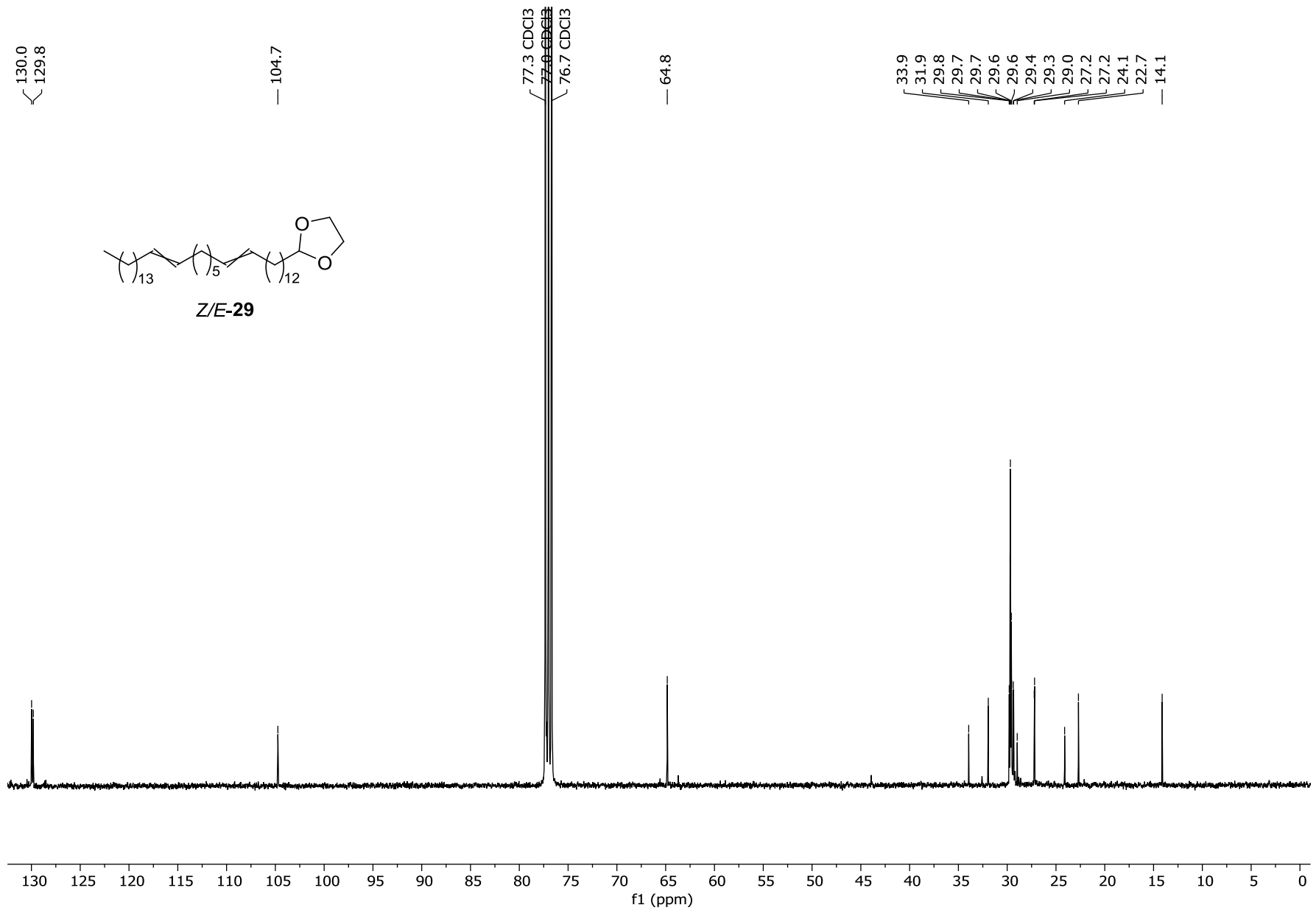
— 7.26 CDCl₃

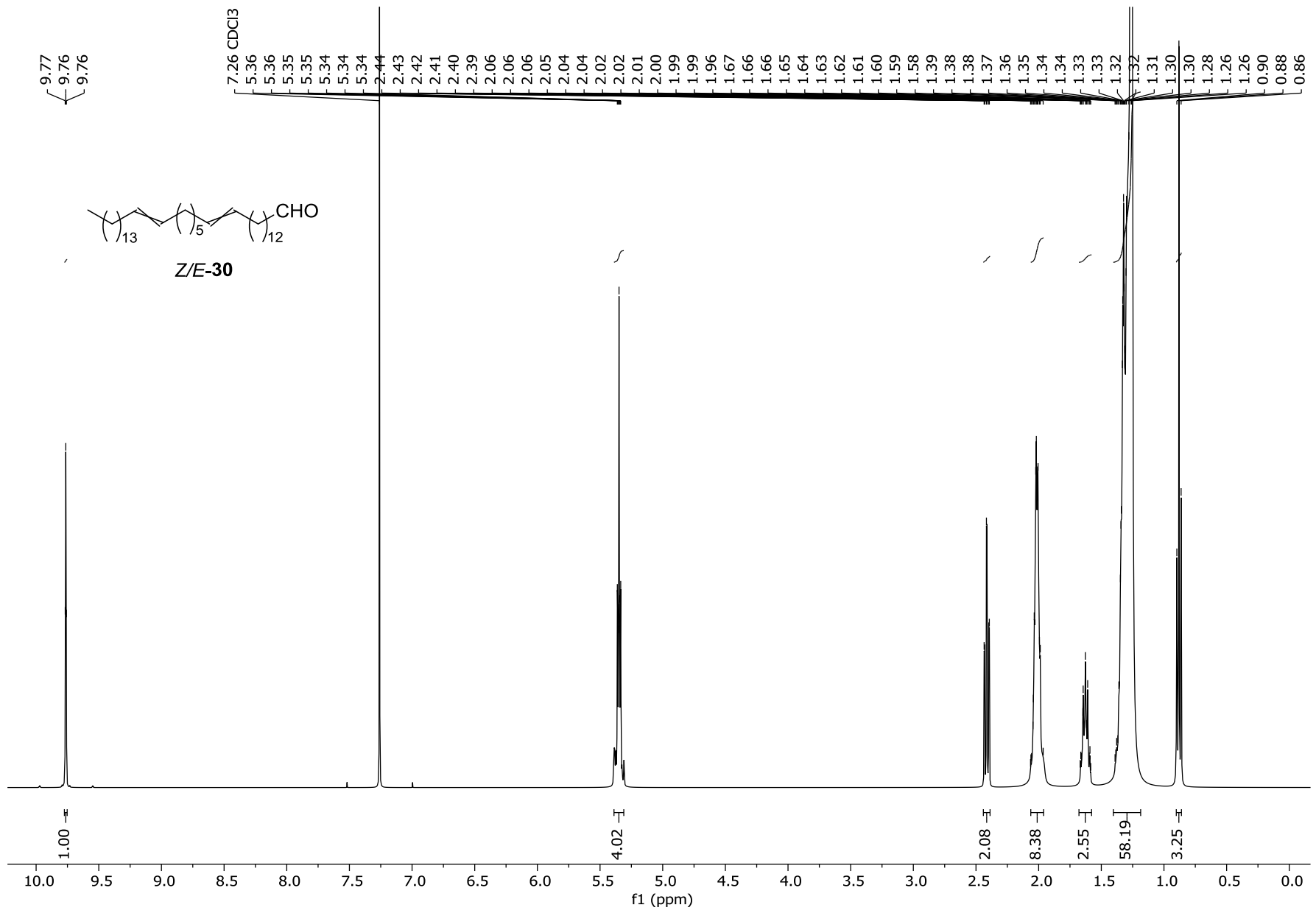


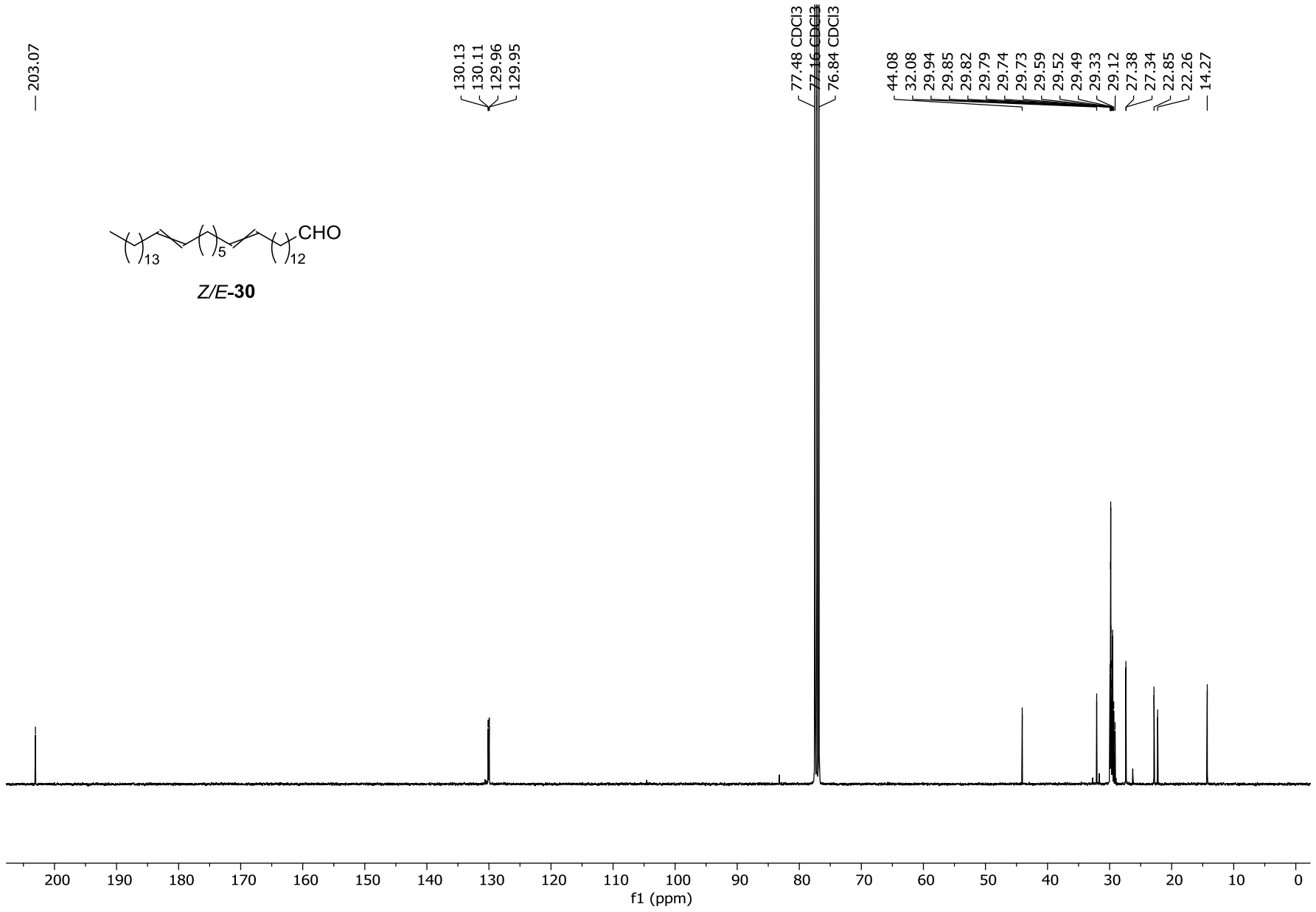


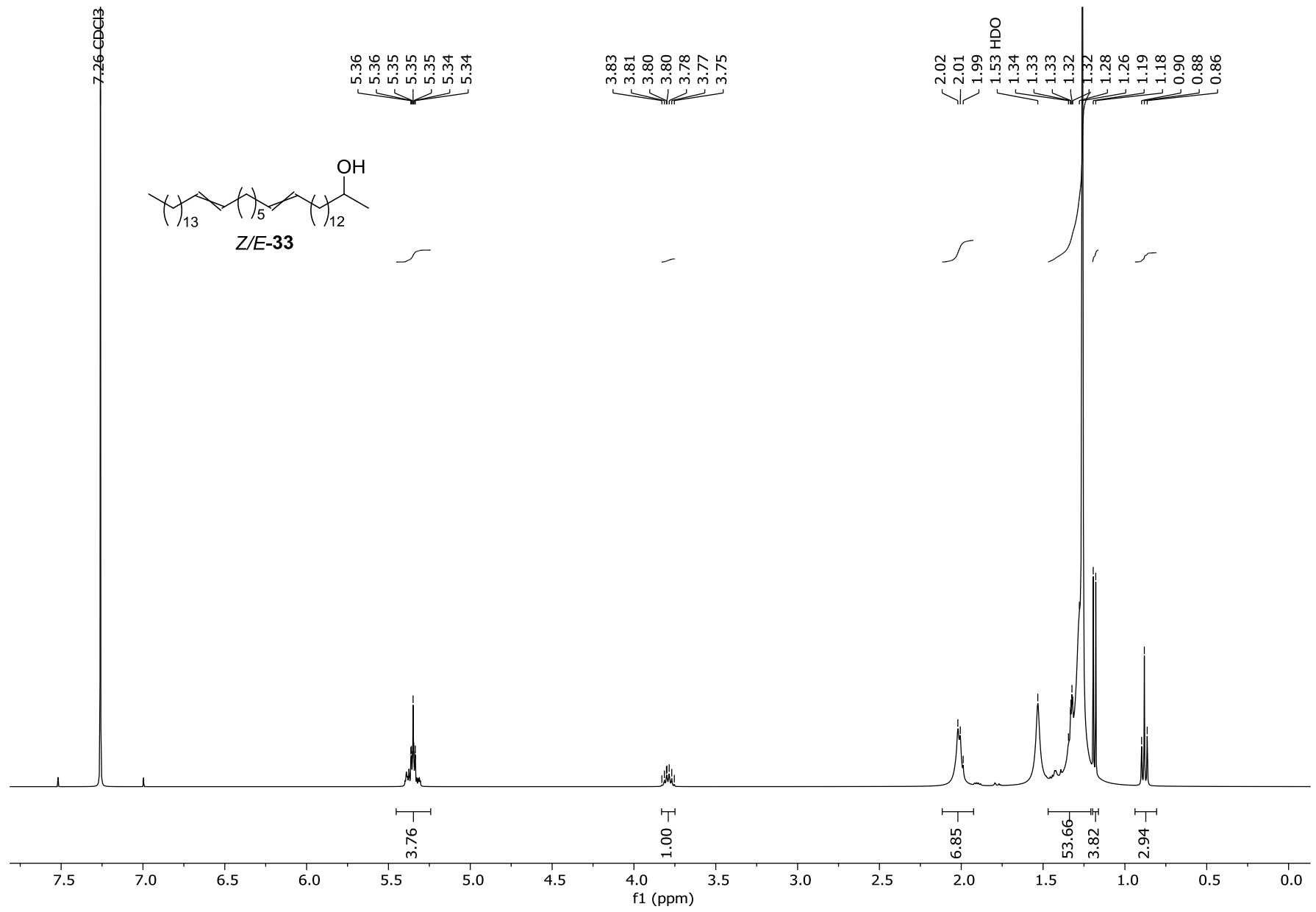


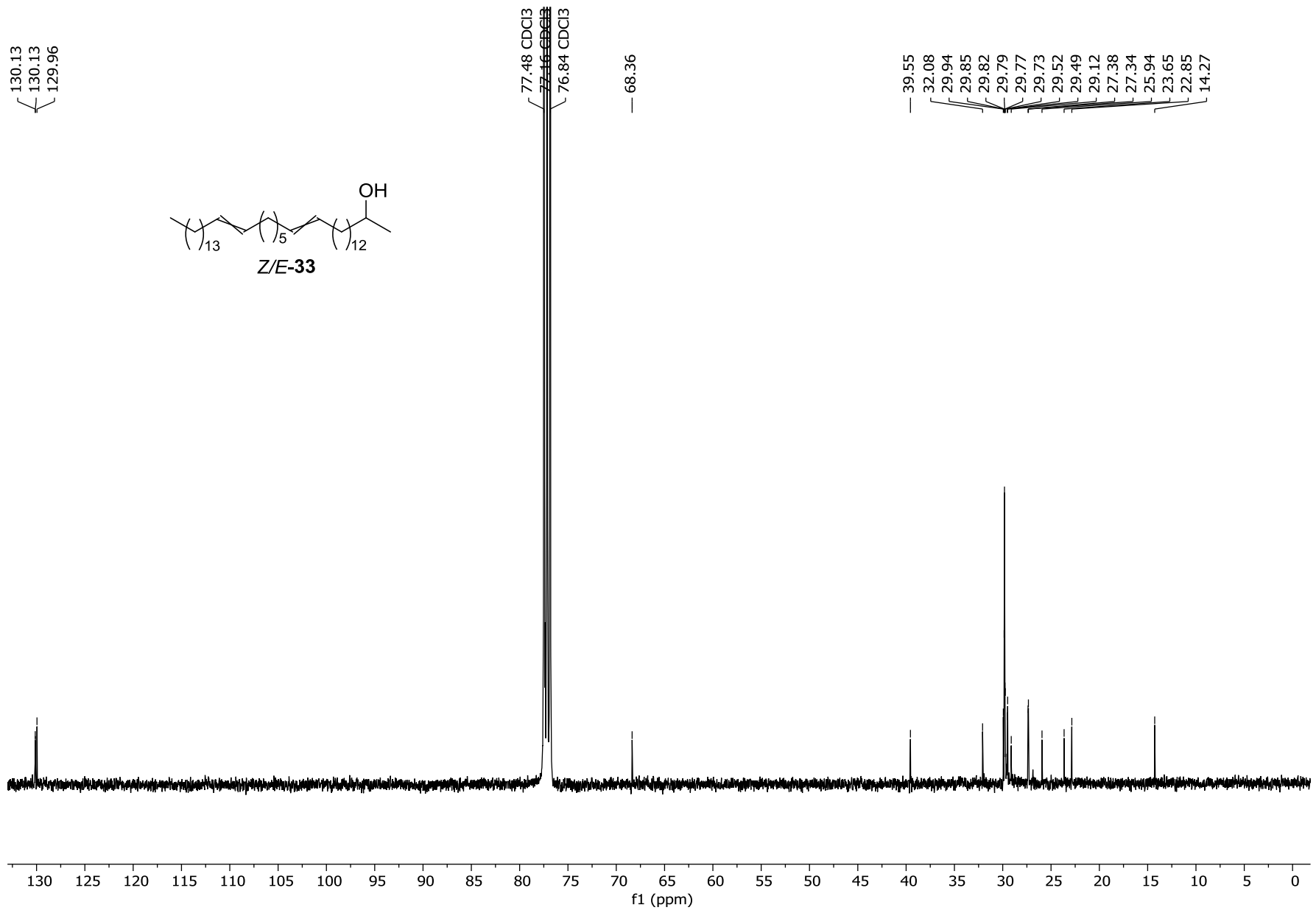


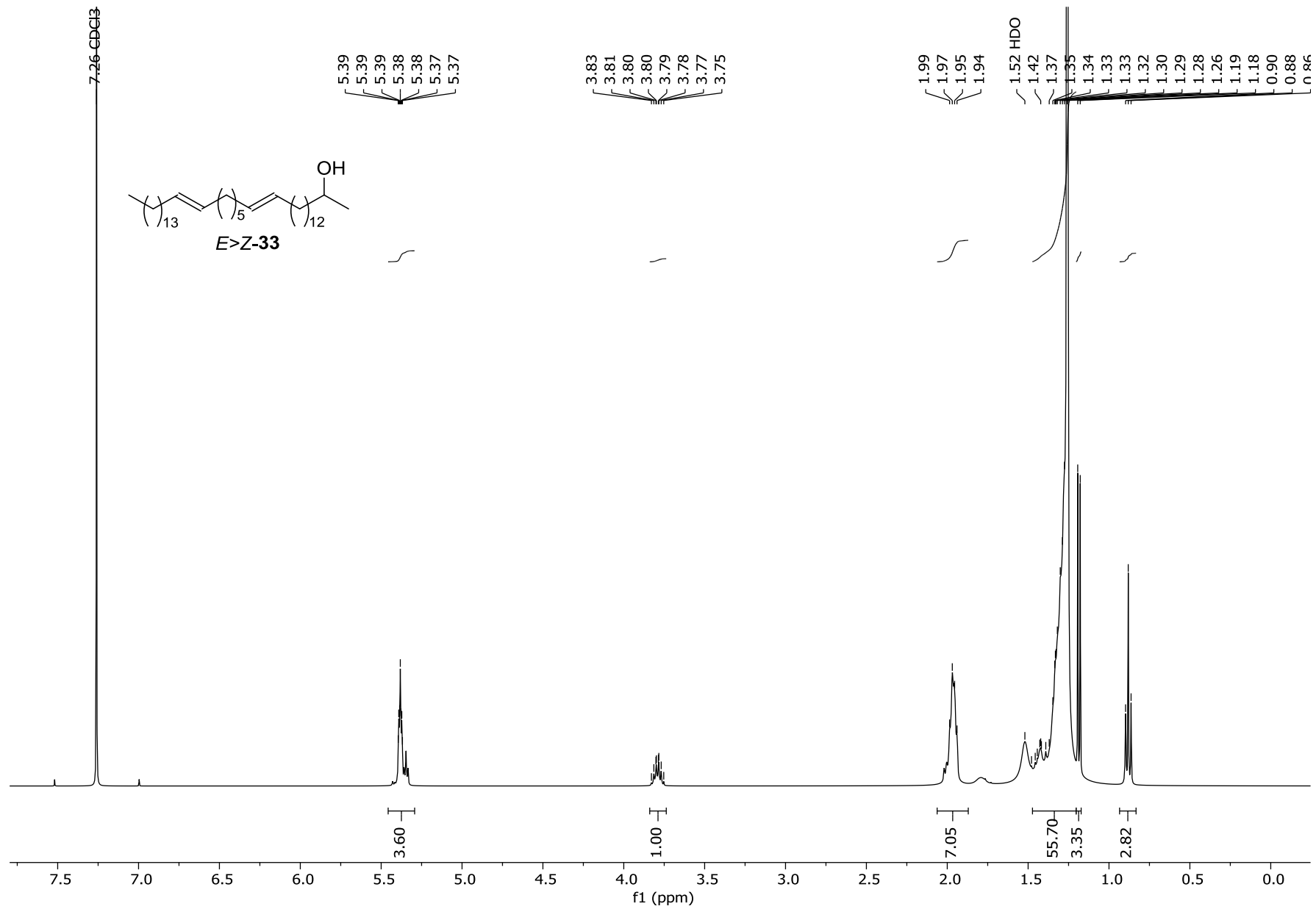


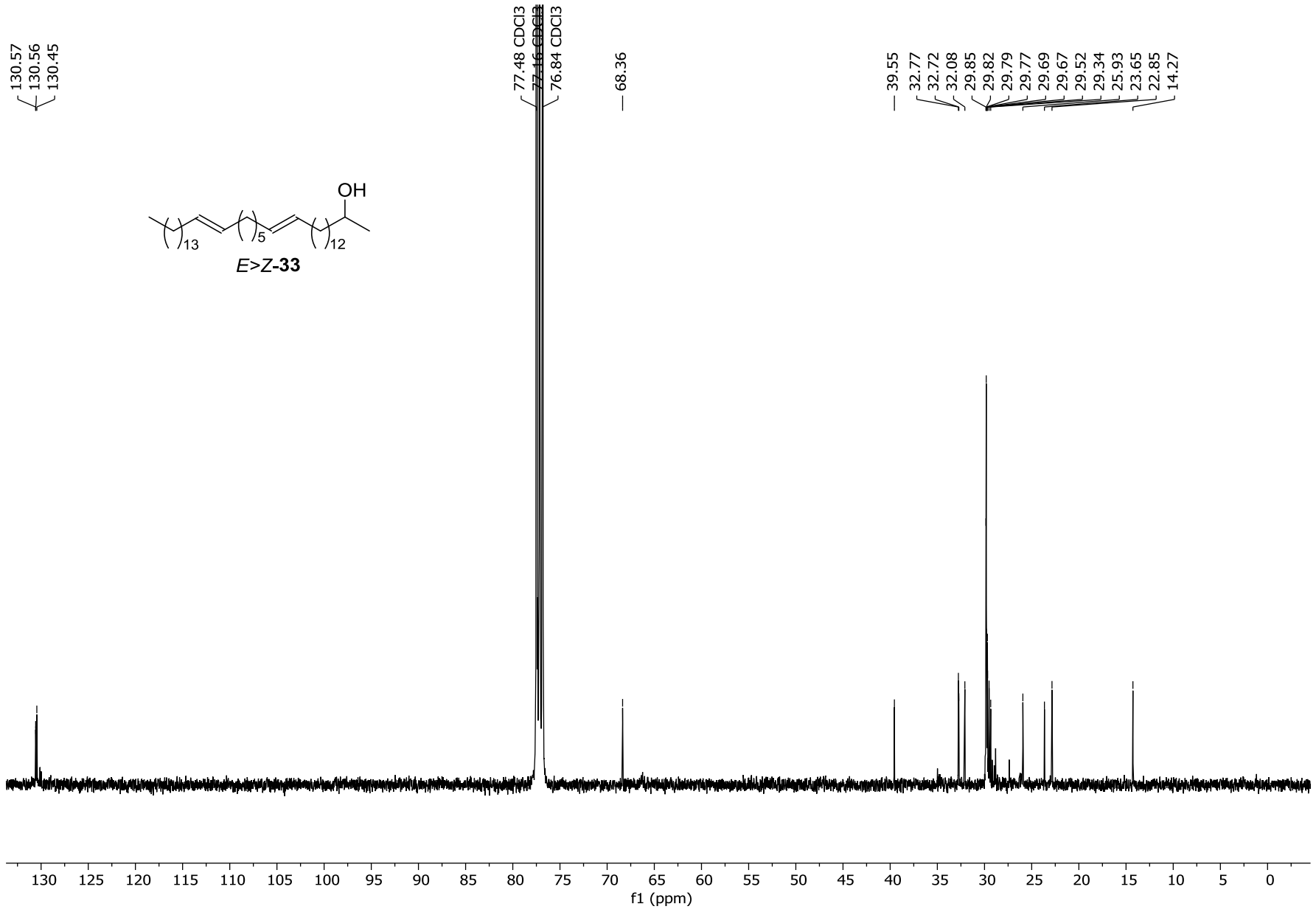


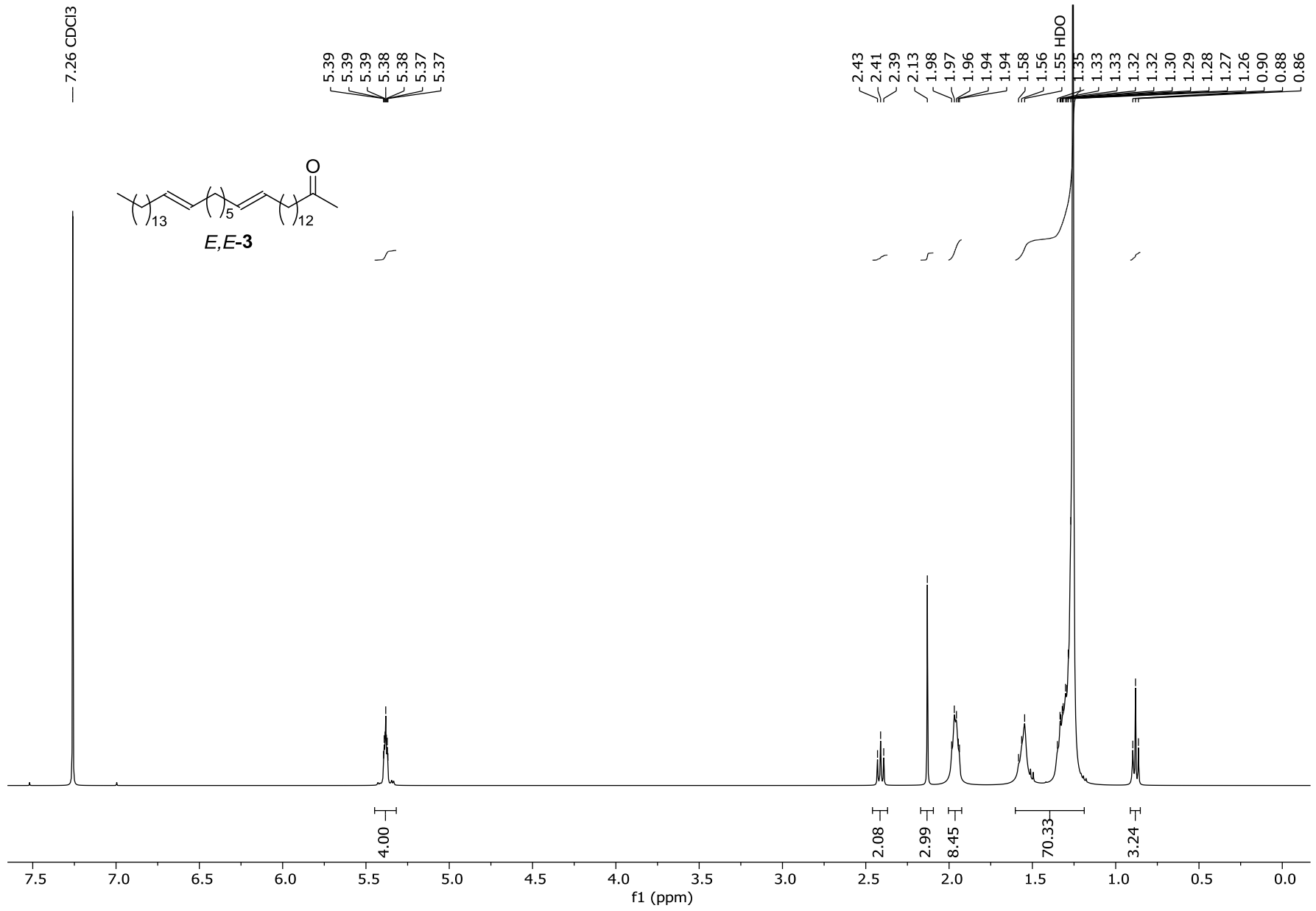




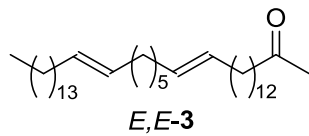








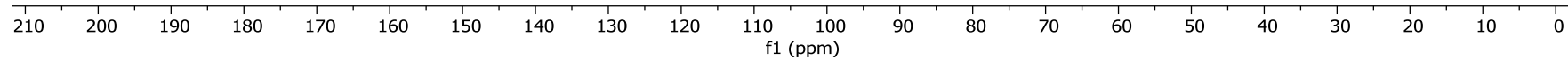
— 209.52



130.57
130.56
130.45

77.48 CDCl₃
77.16 CDCl₃
76.84 CDCl₃

43.99
32.77
32.72
32.08
31.07
29.99
29.85
29.82
29.79
29.76
29.68
29.63
29.56
29.52
29.34
28.83
24.05
22.85
— 14.27

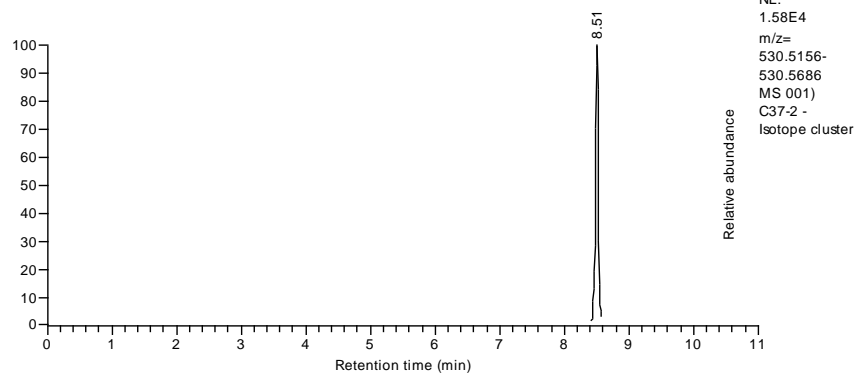


001) C37-2 - Isotope cluster
Alkenones C37

10/07/2019 14.41.26

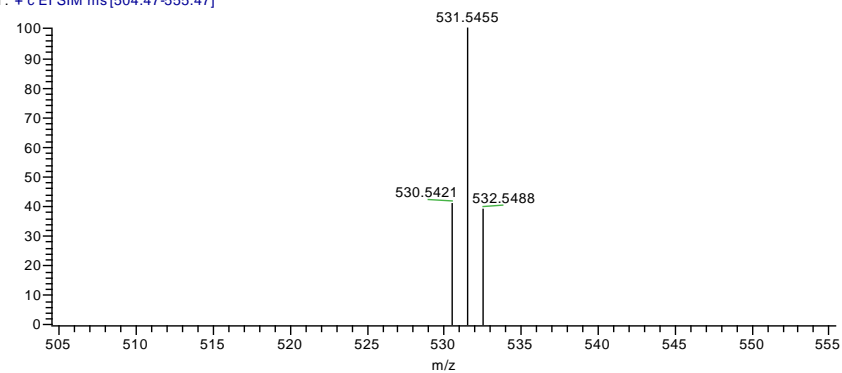
Standard - C37:2

RT: 0.00 - 11.01 SM: 7G

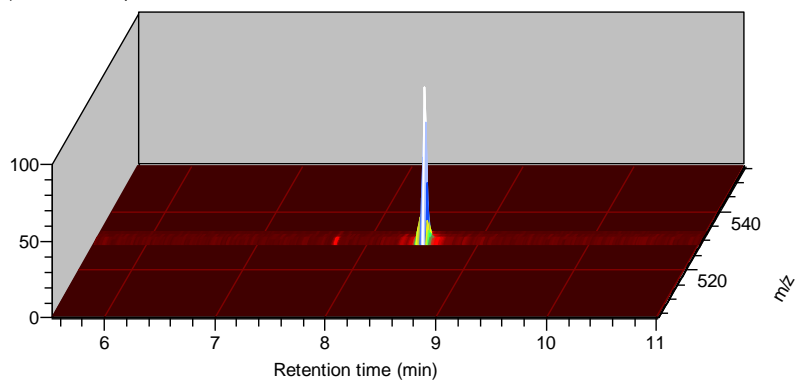


NL:
1.58E4
m/z=
530.5156-
530.5686
MS 001)
C37-2 -
Isotope cluster

001) C37-2 - Isotope cluster #1 RT: 5.52 AV: 1 NL: 5.10E1
T: + c EI SIM ms [504.47-555.47]

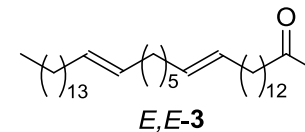


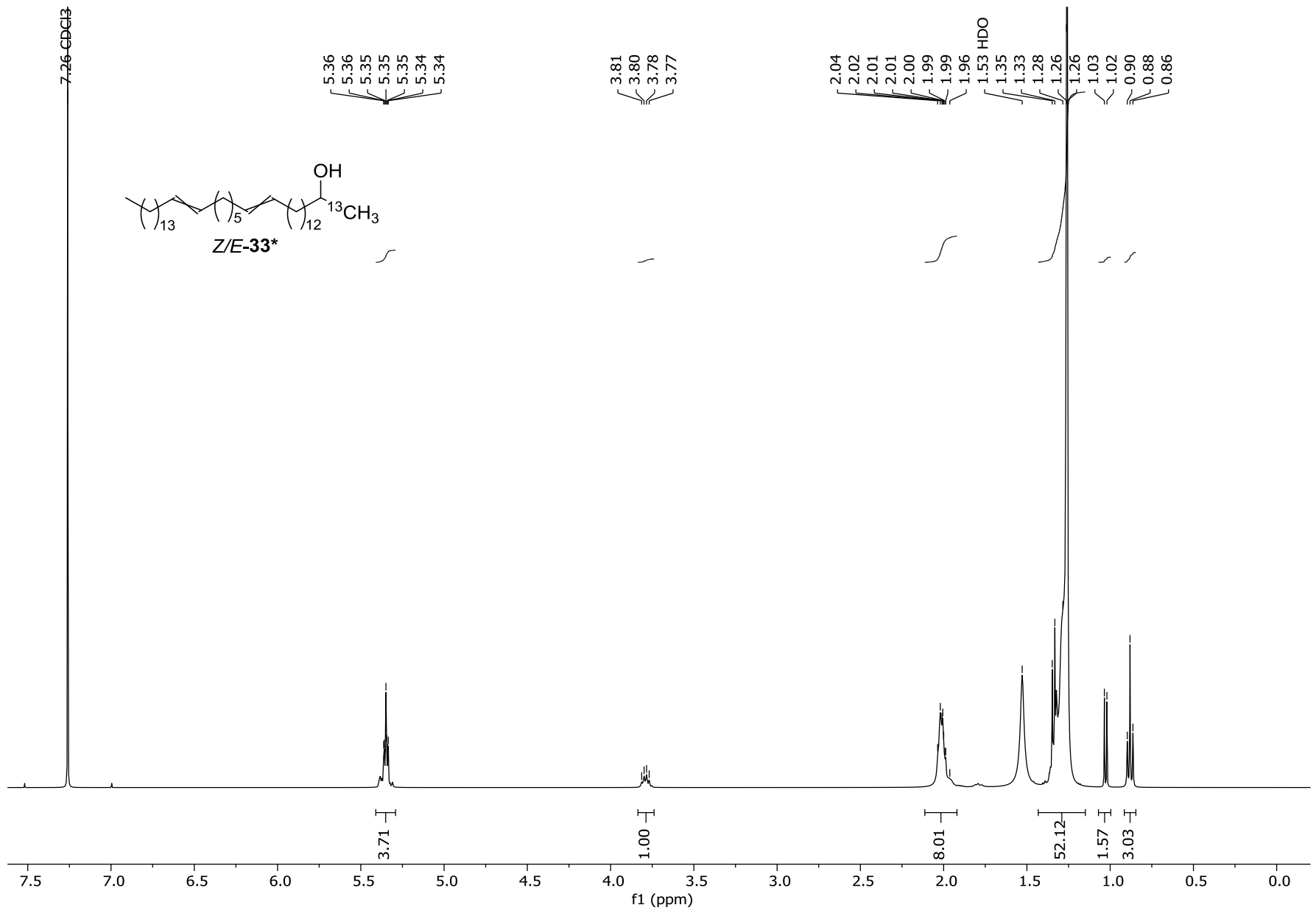
001) C37-2 - Isotope cluster RT: 5.52 - 11.01 Mass: 504.47 - 555.47 NL: 1.97E4

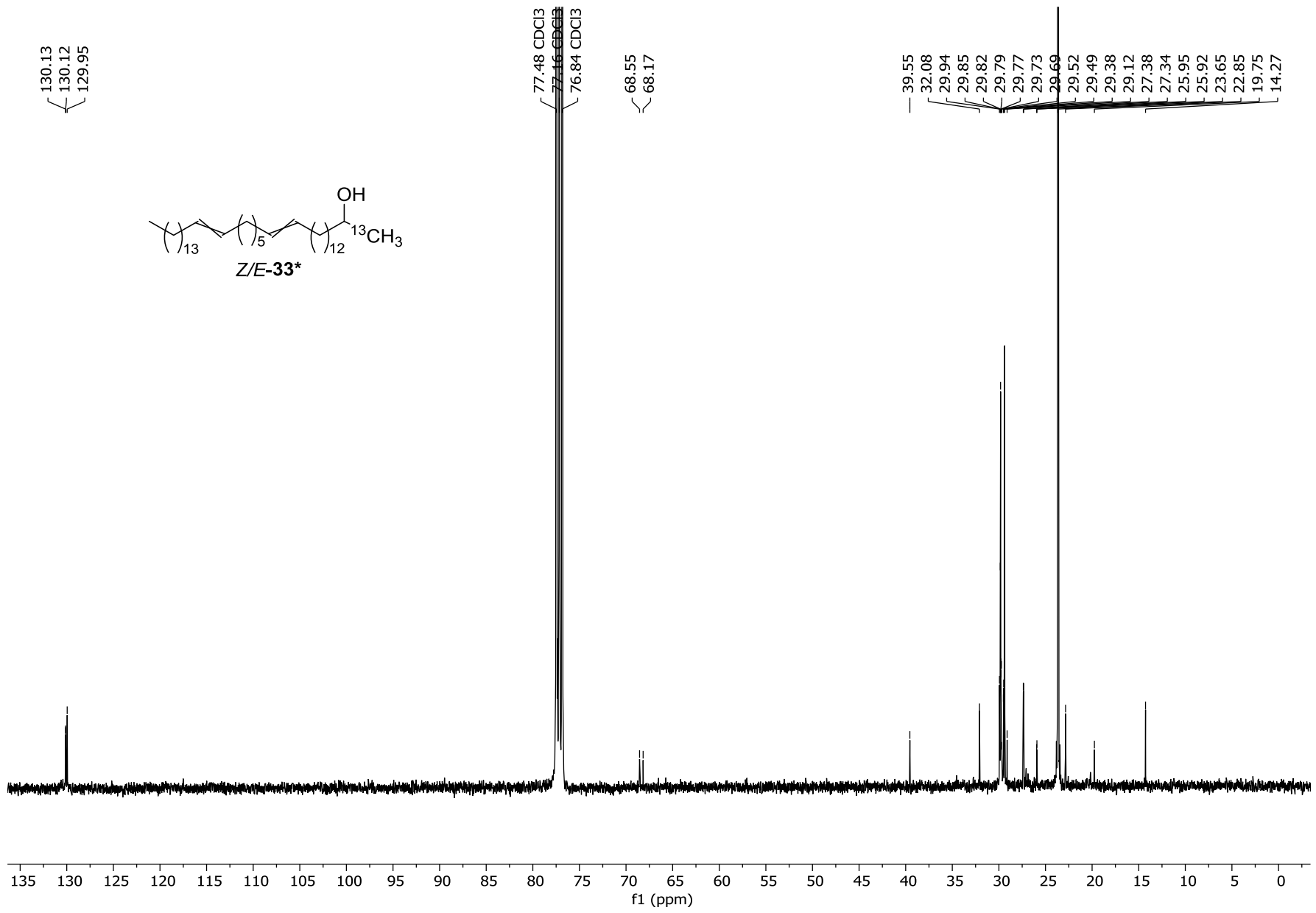


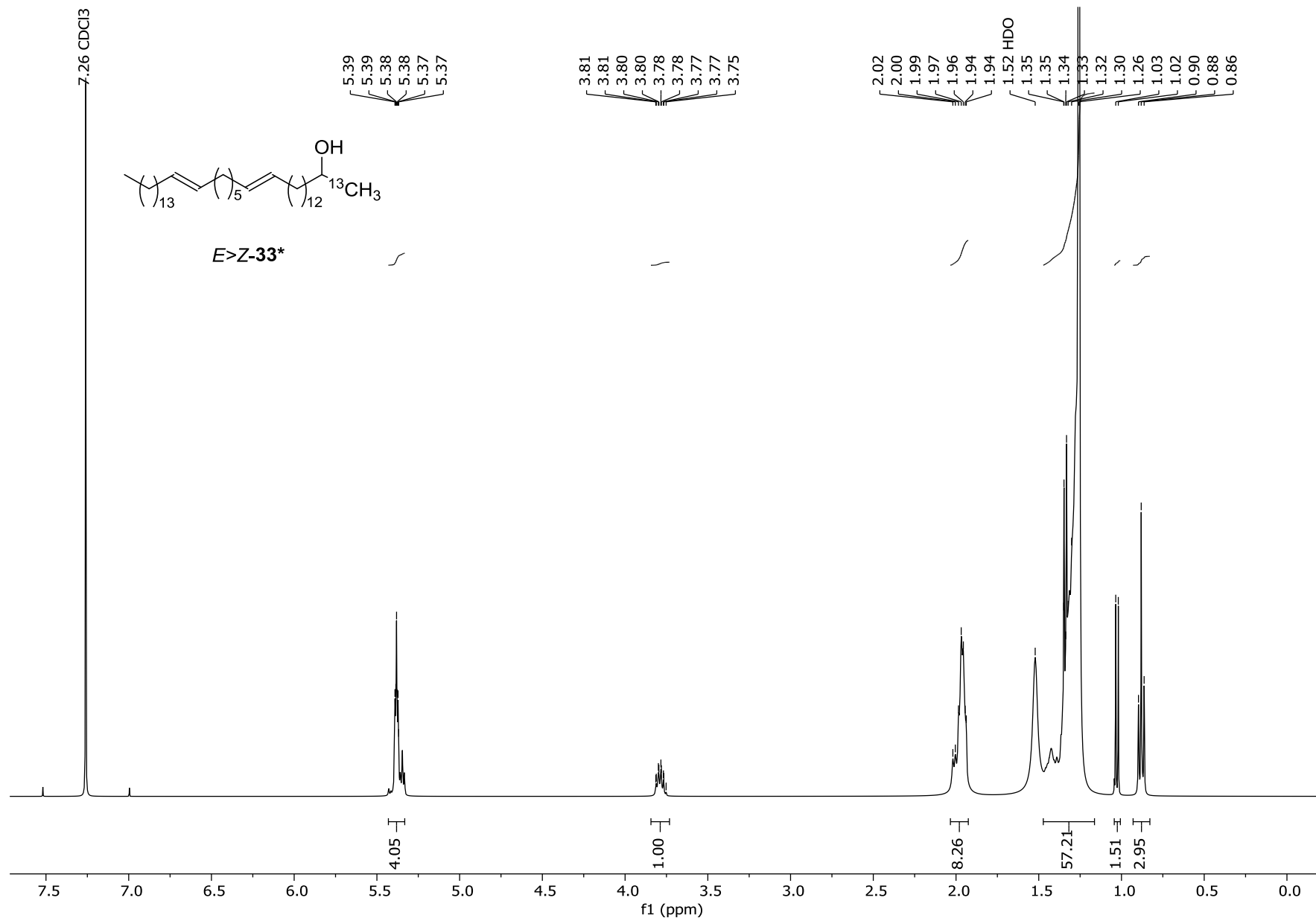
001) C37-2 - Isotope cluster#1 RT: 5.52
T: + c EI SIM ms [504.47-555.47]

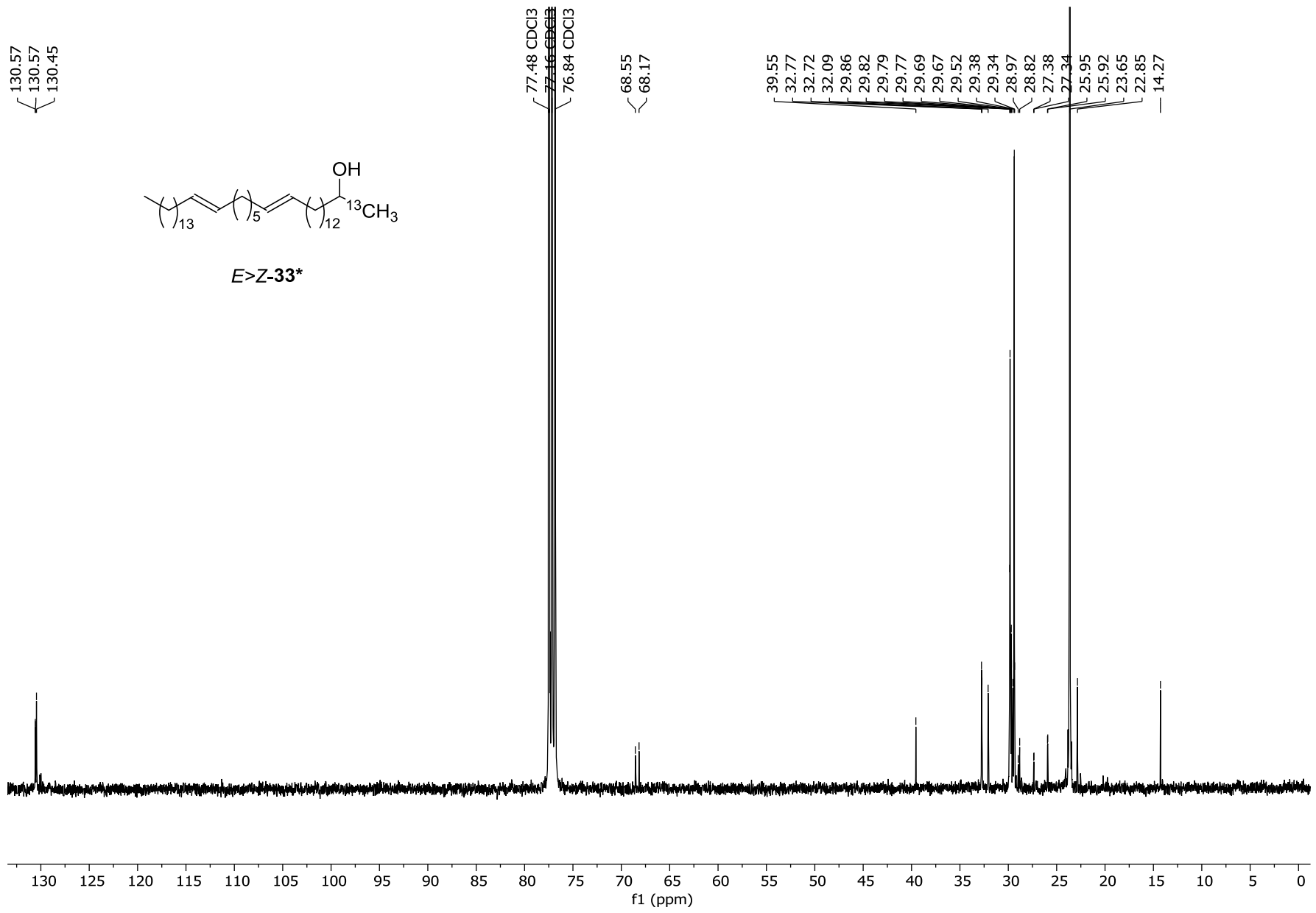
m/z	Intensity	Relative
530.5421	21.0	41.18
531.5455	51.0	100.00
532.5488	20.0	39.22



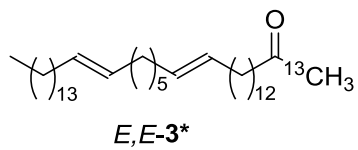






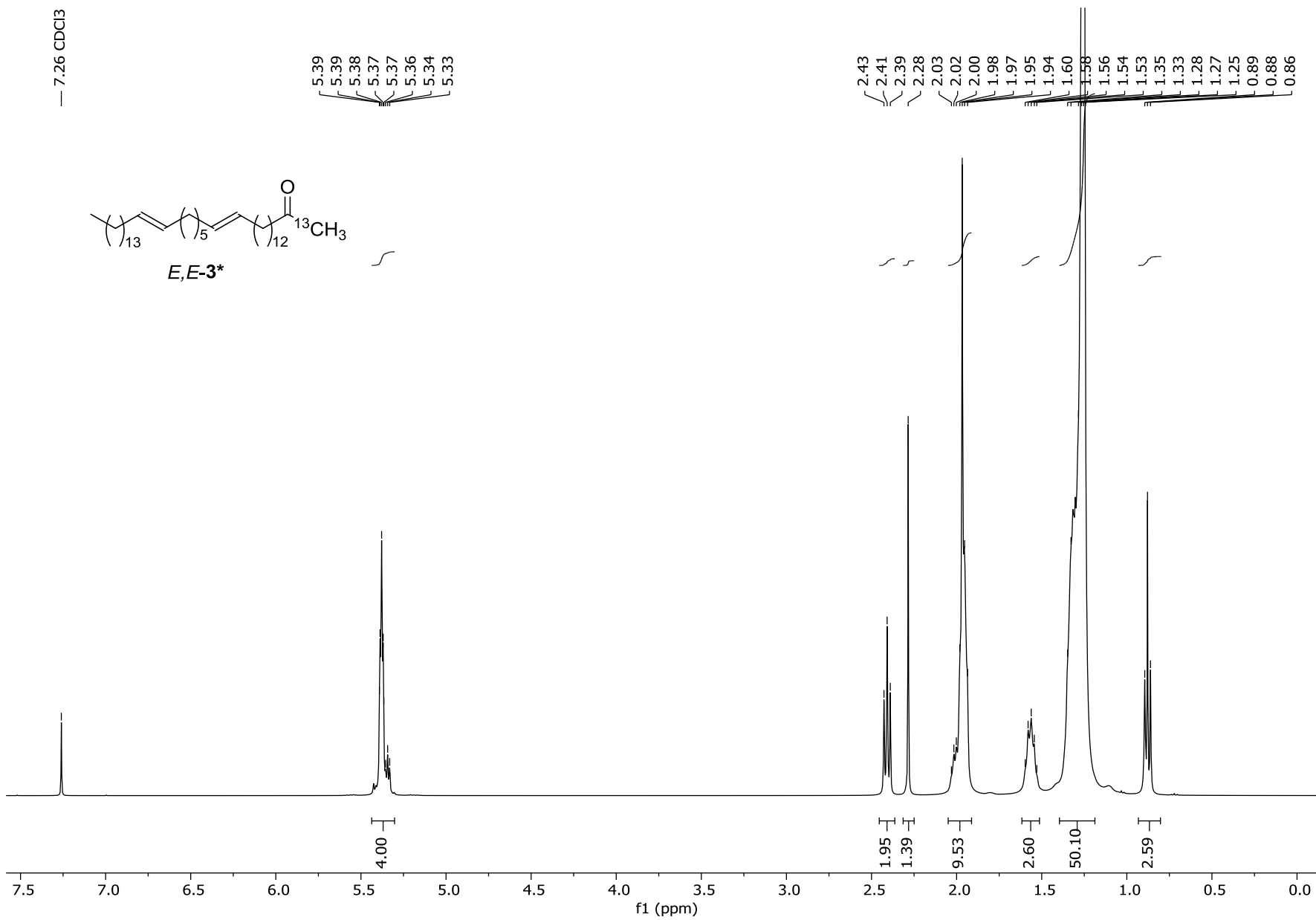


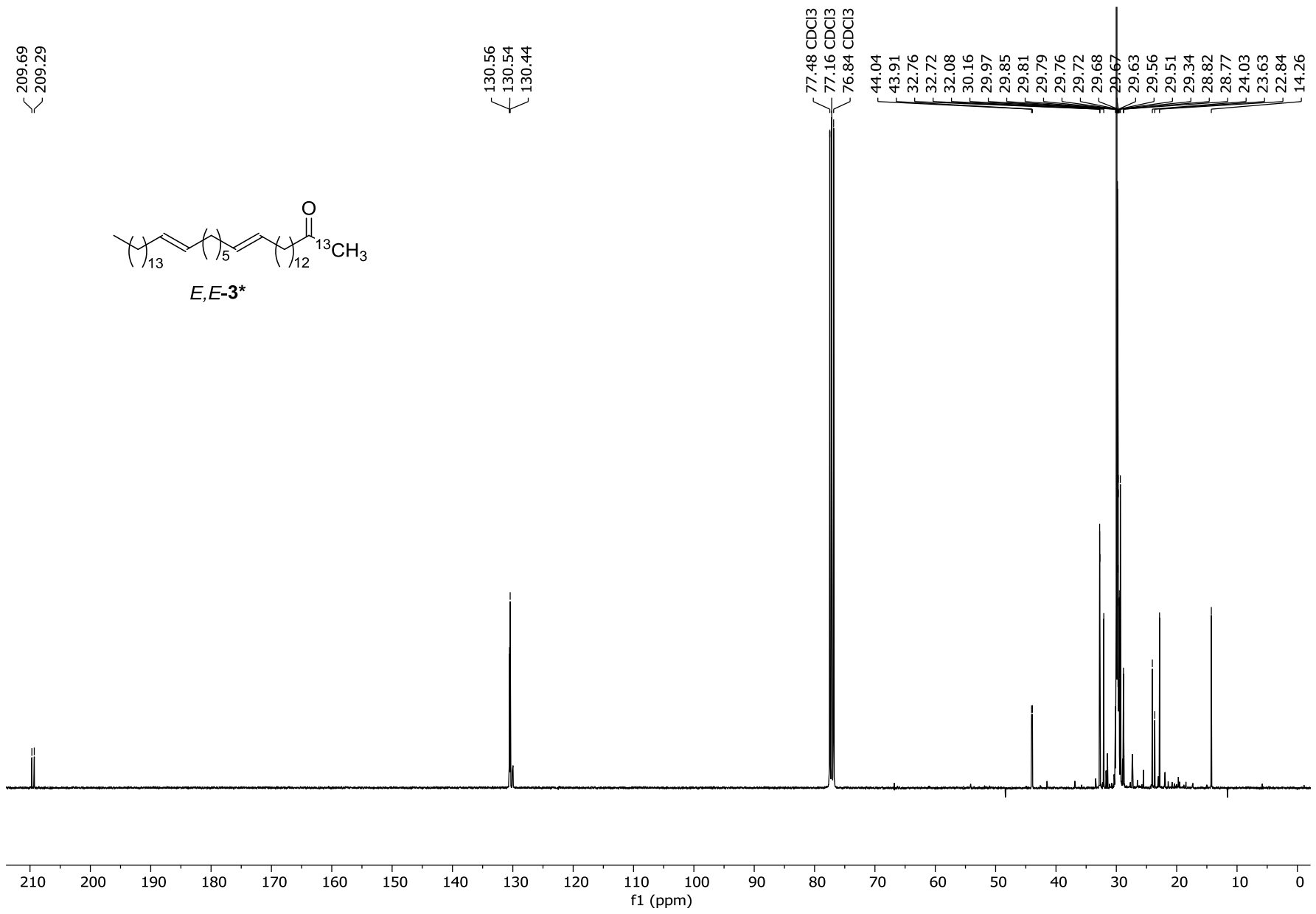
— 7.26 CDCl₃



5.39
5.39
5.38
5.37
5.37
5.36
5.34
5.33

2.43
2.41
2.39
2.28
2.03
2.02
2.00
1.98
1.97
1.95
1.94
1.60
1.58
1.56
1.54
1.53
1.35
1.33
1.28
1.27
1.25
0.89
0.88
0.86



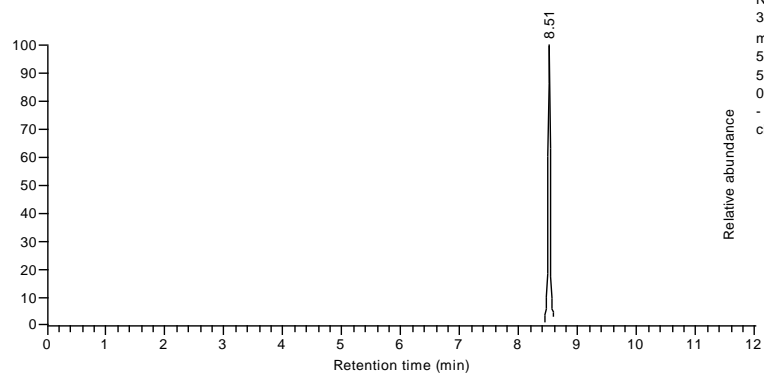


001) 13C37-2 - Isotope cluster
Alkenones C37

10/07/2019 17.03.52

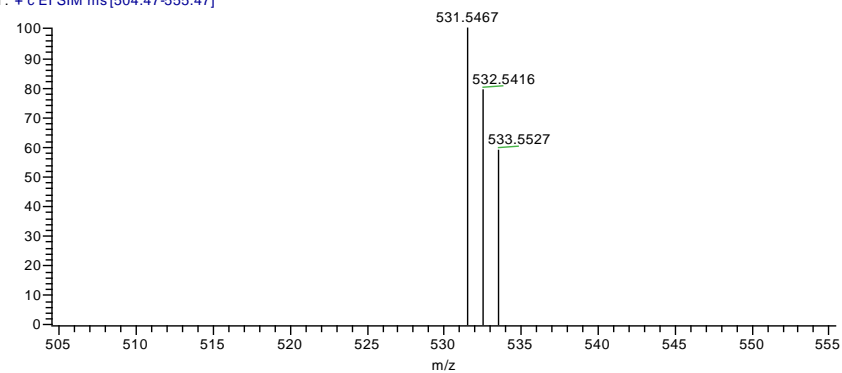
Standard - C37:2*

RT: 0.00 - 12.03 SM: 7G

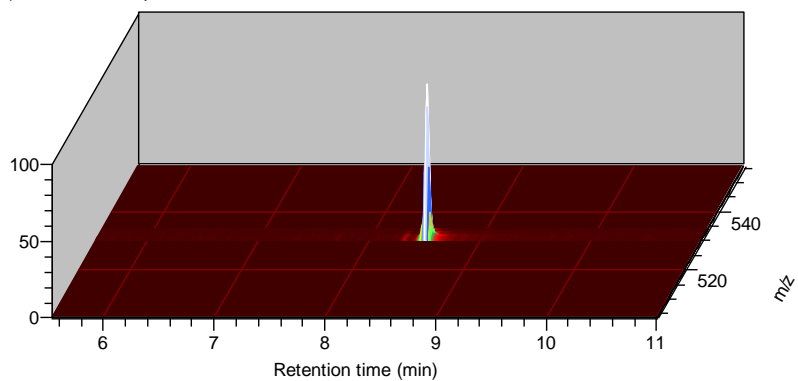


NL:
3.39E4
m/z=
531.5082-
531.5614 MS
001) 13C37-2
- Isotope
cluster

001) 13C37-2 - Isotope cluster #1 RT: 5.53 AV: 1 NL: 3.40E1
T: + c EI SIM ms [504.47-555.47]



001) 13C37-2 - Isotope cluster RT: 5.53 - 11.01 Mass: 504.47 - 555.47 NL: 4.28E4



001) 13C37-2 - Isotope cluster #1 RT: 5.53
T: + c EI SIM ms [504.47-555.47]

m/z	Intensity	Relative
531.5467	34.0	100.00
532.5416	27.0	79.41
533.5527	20.0	58.82

