

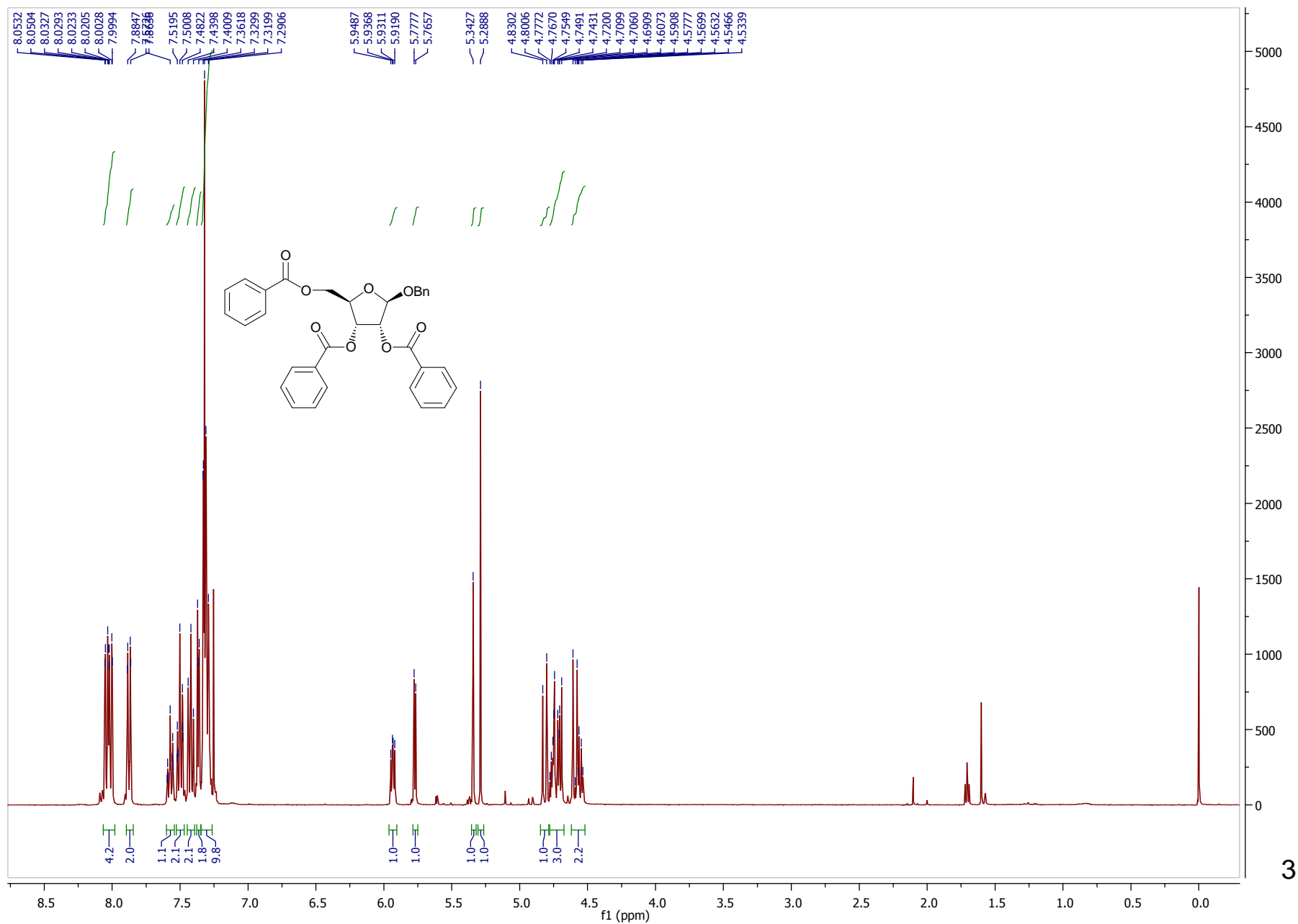
Electronic Supplementary Information

¹H-NMR and ¹³C-NMR spectra of all new compounds are provided below

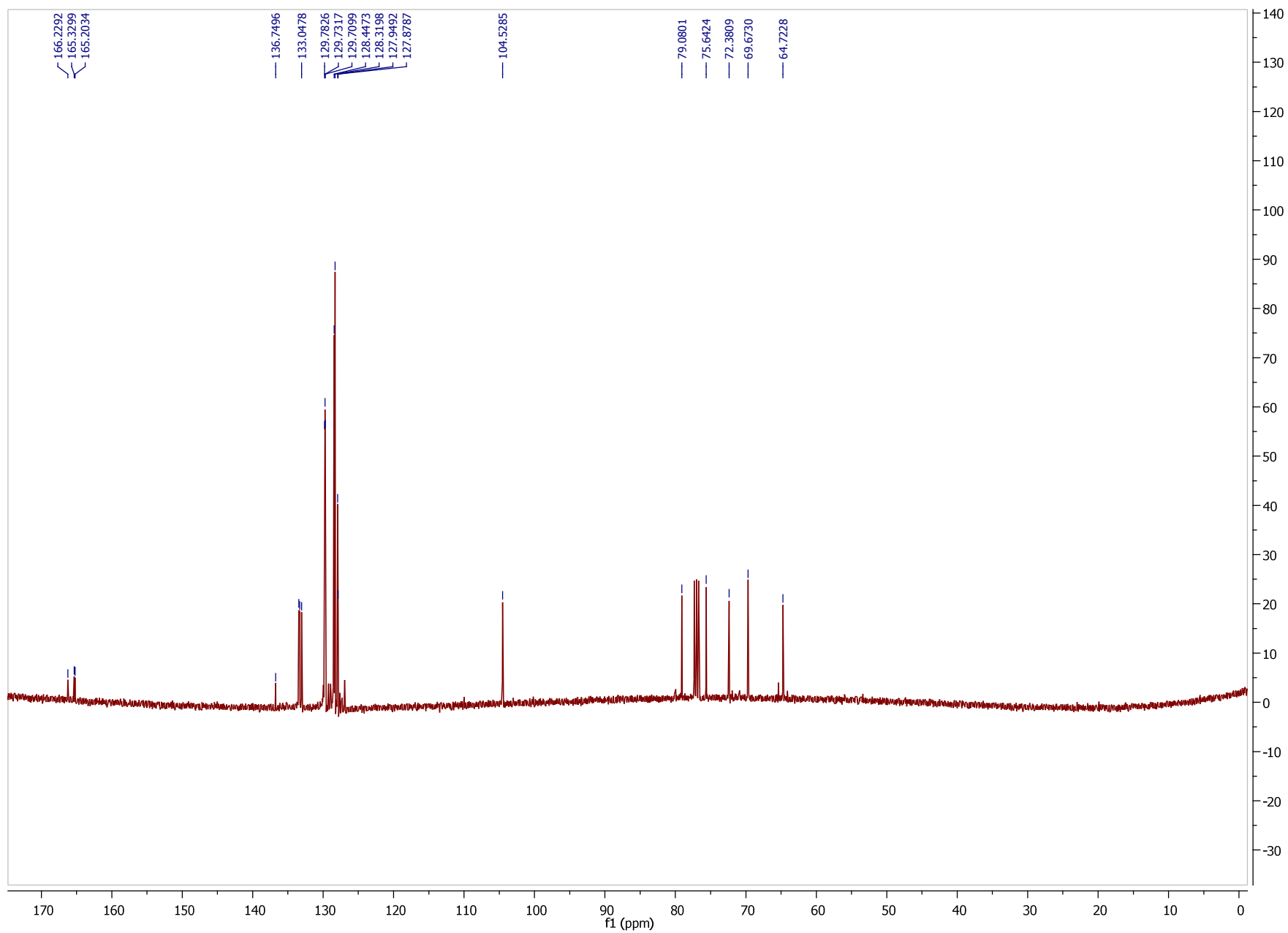
¹ H-NMR spectrum of 2,3,5-tri-O-benzoyl-1-O-benzyl-β-D-ribofuranoside 2	p.3
¹³ C-NMR spectrum of 2,3,5-tri-O-benzoyl-1-O-benzyl-β-D-ribofuranoside 2	p.4
¹ H-NMR spectrum of 1-O-benzyl-β-D-ribofuranoside 3	p.5
¹³ C-NMR spectrum of 1-O-benzyl-β-D-ribofuranoside 3	p.6
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¹³ C-NMR spectrum of 1-O-benzyl-2,3-O-bis(methylcarbonate)-β-D-ribofuranoside 7a	p.20
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¹³ C-NMR spectrum of 1-O-benzyl-2,3-O-bis(ethylcarbonate)-β-D-ribofuranoside 7b	p.22
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¹ H-NMR spectrum of 5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(methylcarbonate)-β-D-ribofuranoside 9a	p.25
¹³ C-NMR spectrum of 5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(methylcarbonate)-β-D-ribofuranoside 9a	p.26
¹ H-NMR spectrum of 5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(ethylcarbonate)-β-D-ribofuranoside 9b	p.27
¹³ C-NMR spectrum of 5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(ethylcarbonate)-β-D-ribofuranoside 9b	p.28
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¹³ C-NMR spectrum of 5-O-dibenzylphosphate-2,3-O-carbonate-β-D-ribofuranose 9d	p.32
¹ H-NMR spectrum of 5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-methylcarbonate-α-D-ribofuranoside 10a	p.33
¹³ C-NMR spectrum of 5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-methylcarbonate-α-D-ribofuranoside 10a	p.34
¹ H-NMR spectrum of 5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-ethylcarbonate-α-D-ribofuranoside 10b	p.35
¹³ C-NMR spectrum of 5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-ethylcarbonate-α-D-ribofuranoside 10b	p.36
¹ H-NMR spectrum of 5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-isobutylcarbonate-α-D-ribofuranoside 10c	p.37
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¹³ C-NMR spectrum of 5-O-phosphate-1-O-benzyl-2,3-O-bis(methylcarbonate)-β-D-ribofuranoside 12a	p.40
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¹³ C-NMR spectrum of 5-O-phosphate-1,2-O-carbonate-3-O-methylcarbonate-β-D-ribofuranoside 15a	p.44
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¹³ C-NMR spectrum of 5-O-phosphate-1,2-O-carbonate-3-O-isobutylcarbonate-β-D-ribofuranoside 15c	p.48
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¹³ C-NMR spectrum of 1',2'-O-carbonate-3'-O-methylcarbonate-ADP-ribofuranoside 16a	p.54
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¹³ C-NMR spectrum of 1',2'-O-carbonate-3'-O-isobutylcarbonate-ADP-ribofuranoside 16c	p.58
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¹³ C-NMR spectrum of 1'-O-benzyl-2',3'-O-bis(ethylcarbonate)-ADP-ribofuranoside 17b	p.60

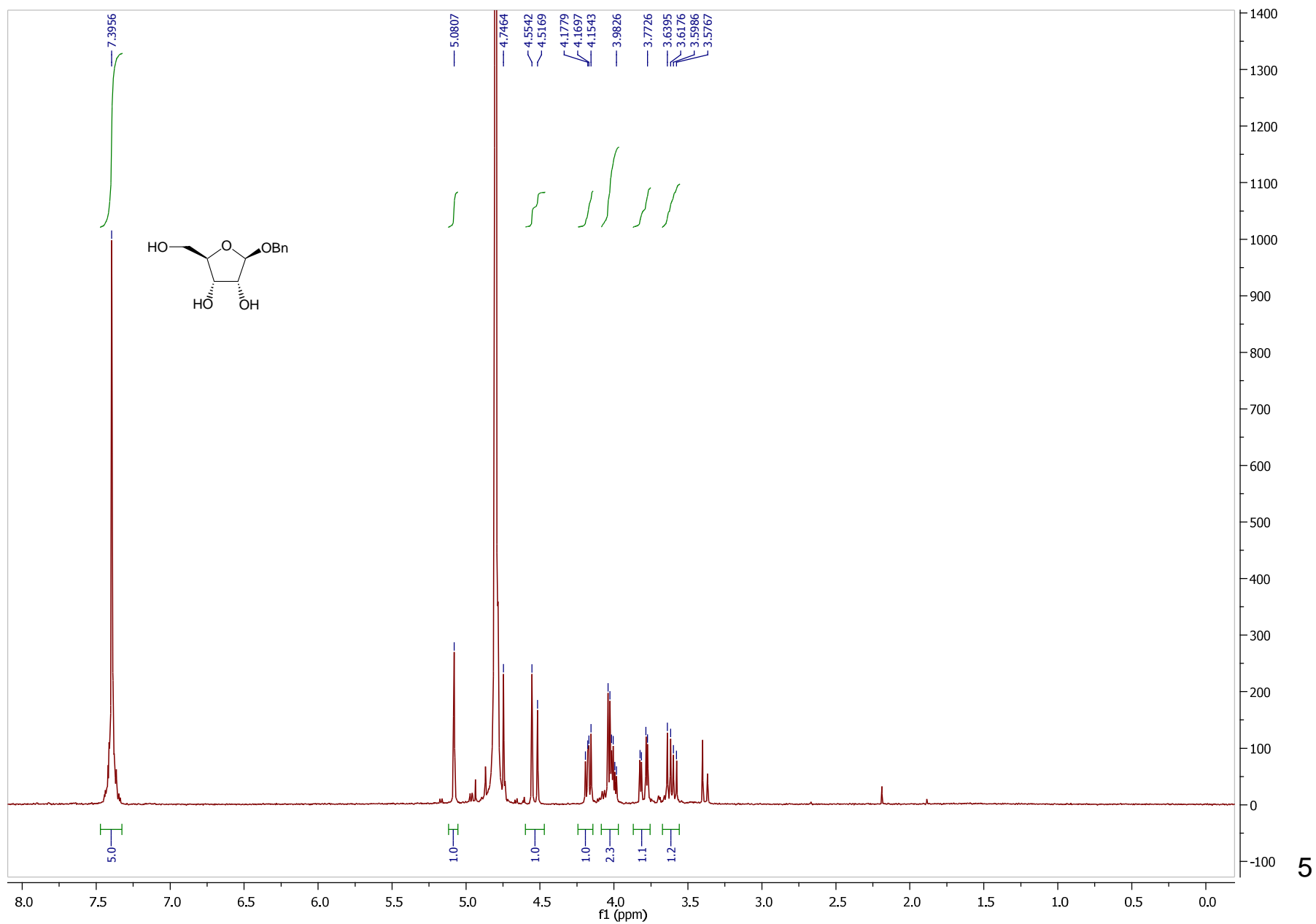
2,3,5-tri-O-benzoyl-1-O-benzyl-β-D-ribofuranoside 2: ¹H-NMR



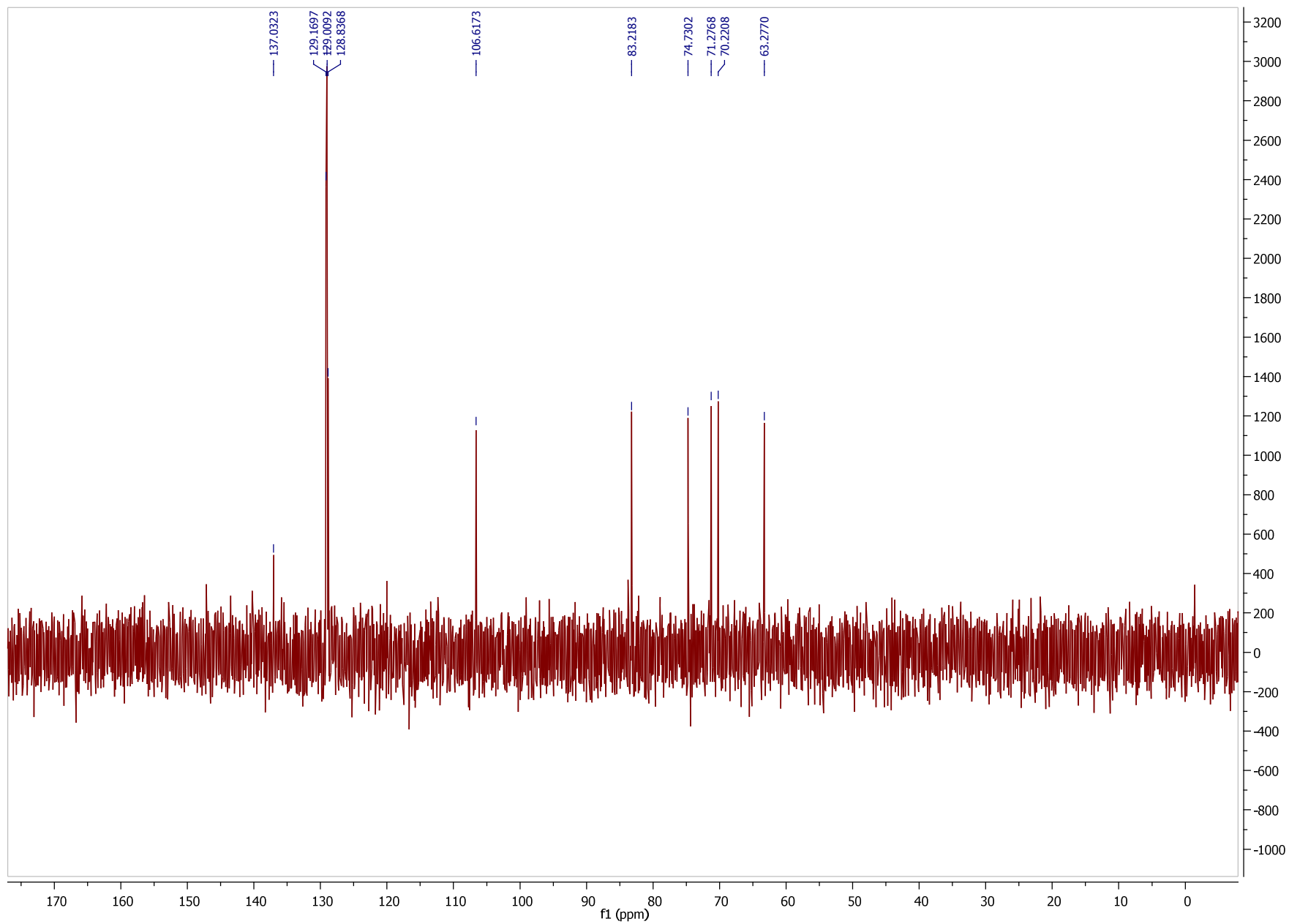
2,3,5-tri-O-benzoyl-1-O-benzyl-β-D-ribofuranoside 2: ¹³C-NMR



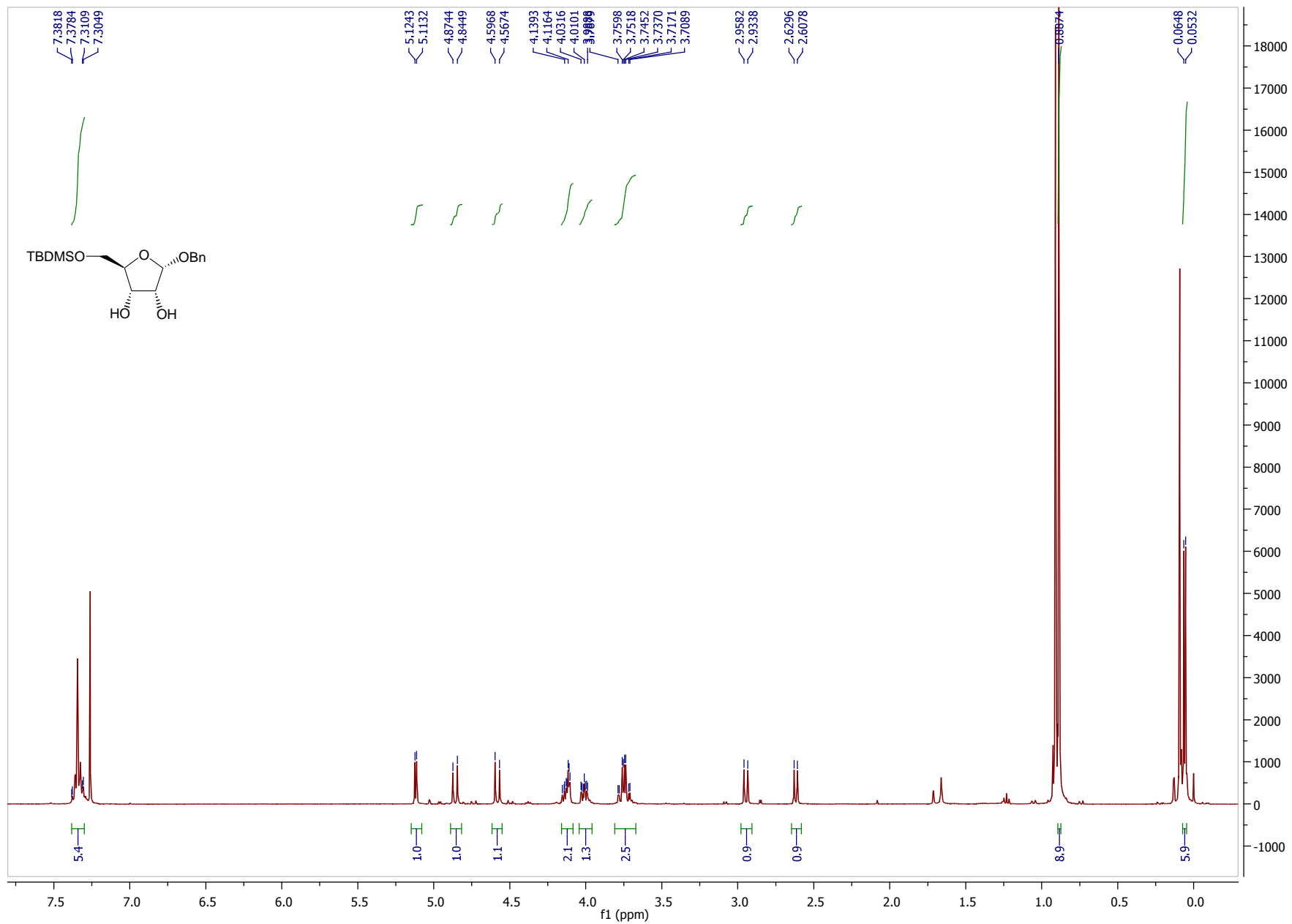
1-O-benzyl- β -D-ribofuranoside **3**: $^1\text{H-NMR}$



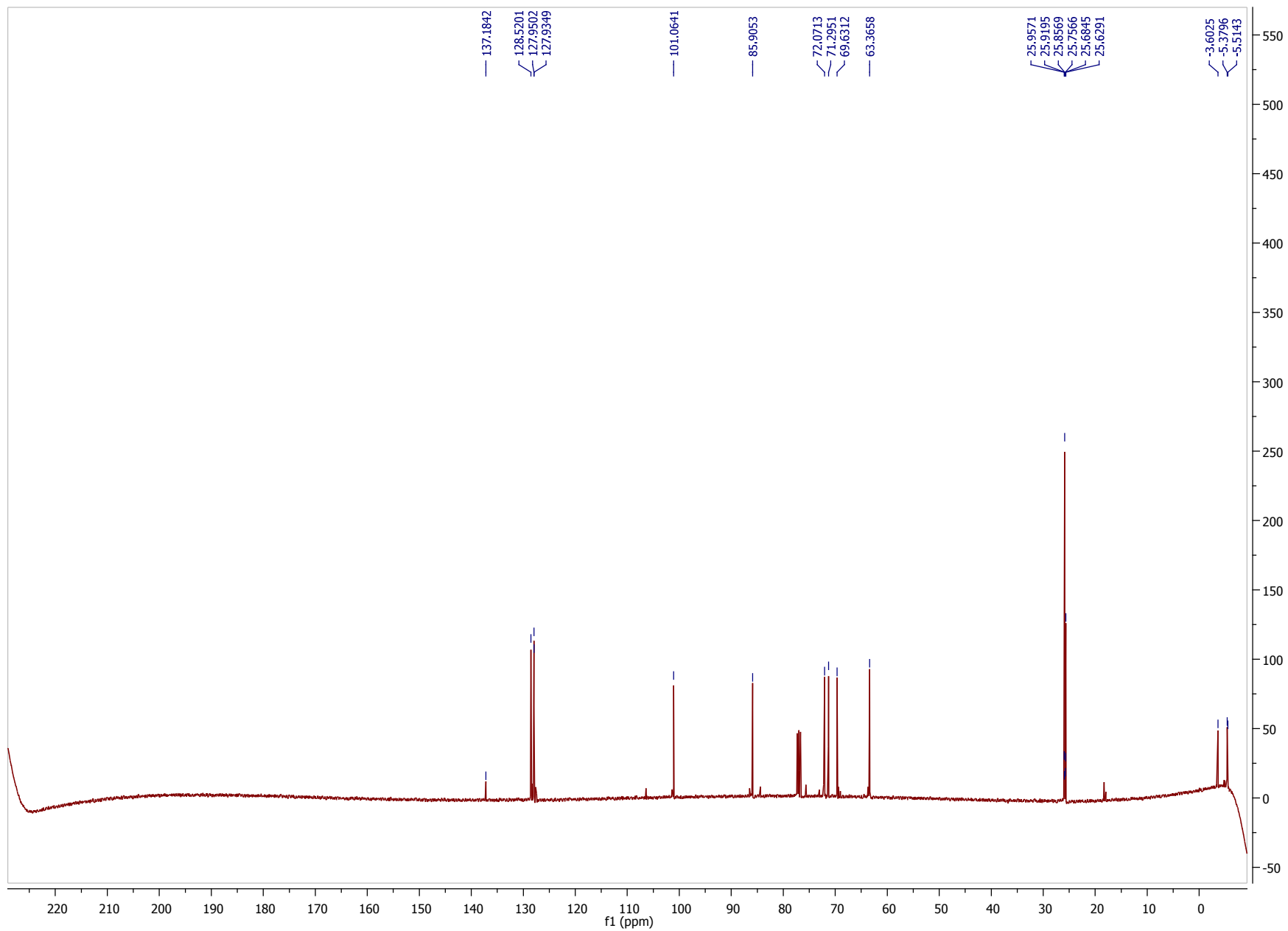
1-O-benzyl-β-D-ribofuranoside 3: ¹³C-NMR



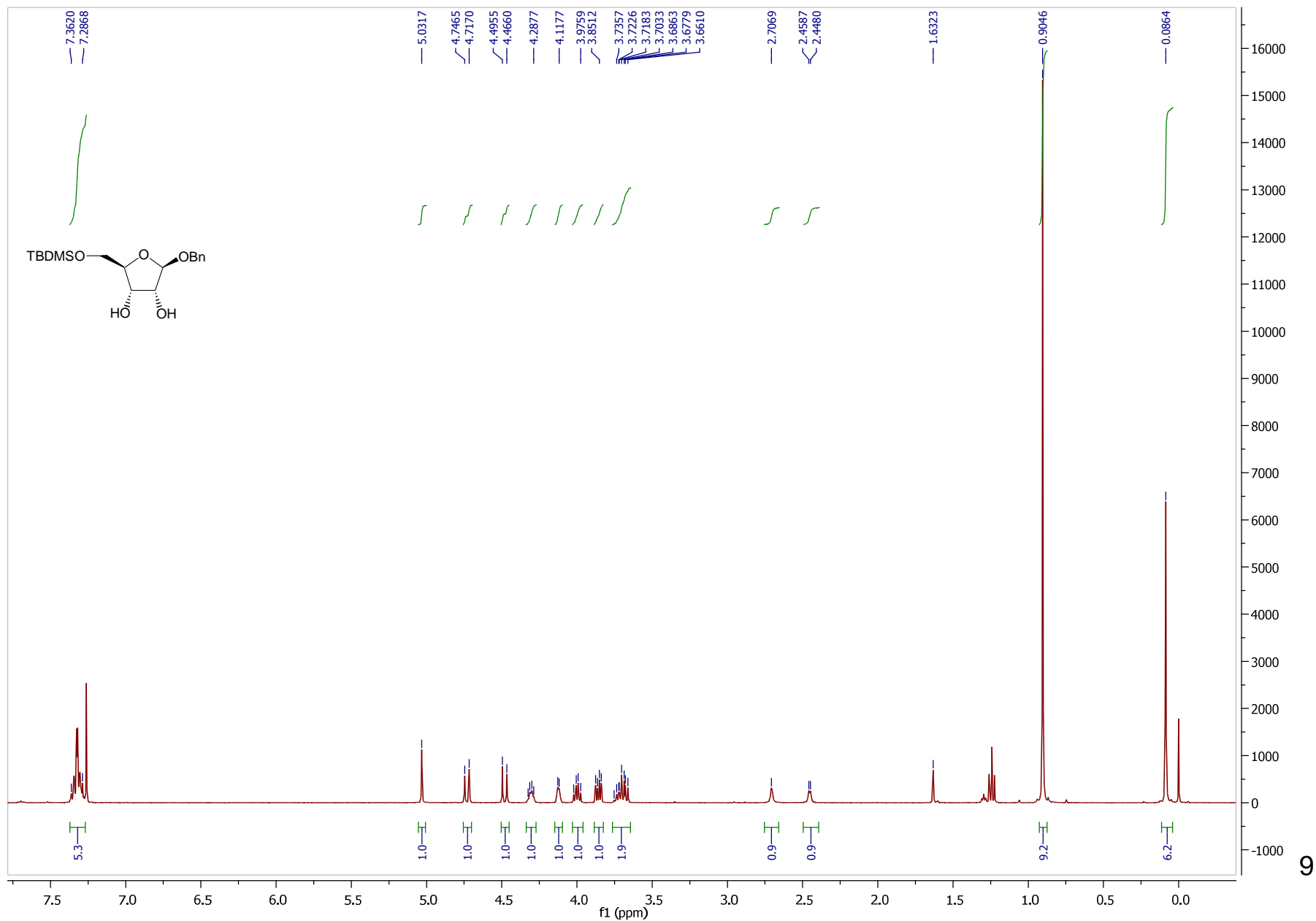
1-O-benzyl-5-O-tert-butylidimethylsilyl-β-D-ribofuranoside **4α**: ¹H-NMR



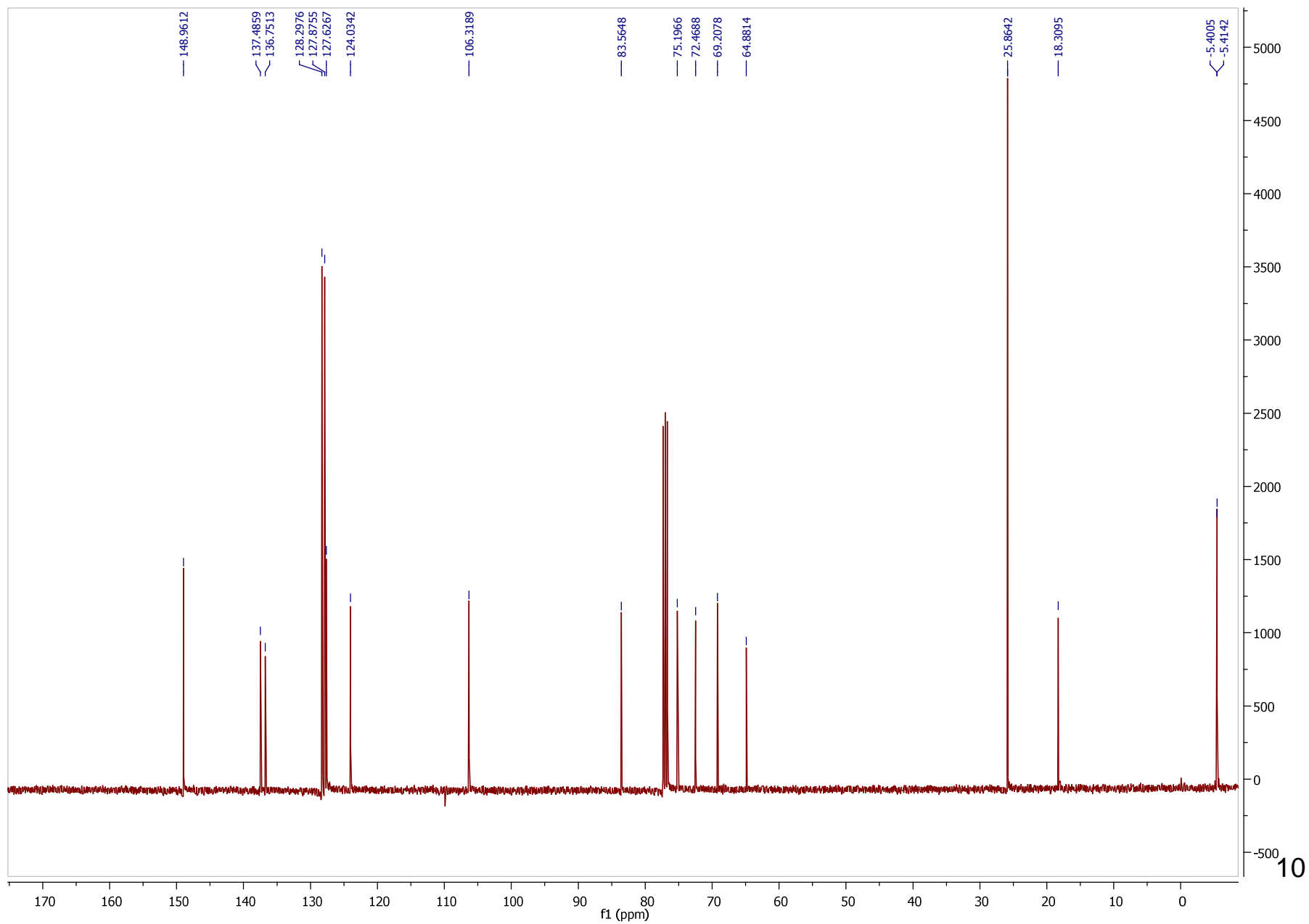
1-O-benzyl-5-O-tert-butyltrimethylsilyl-β-D-ribofuranoside 4α: ¹³C-NMR



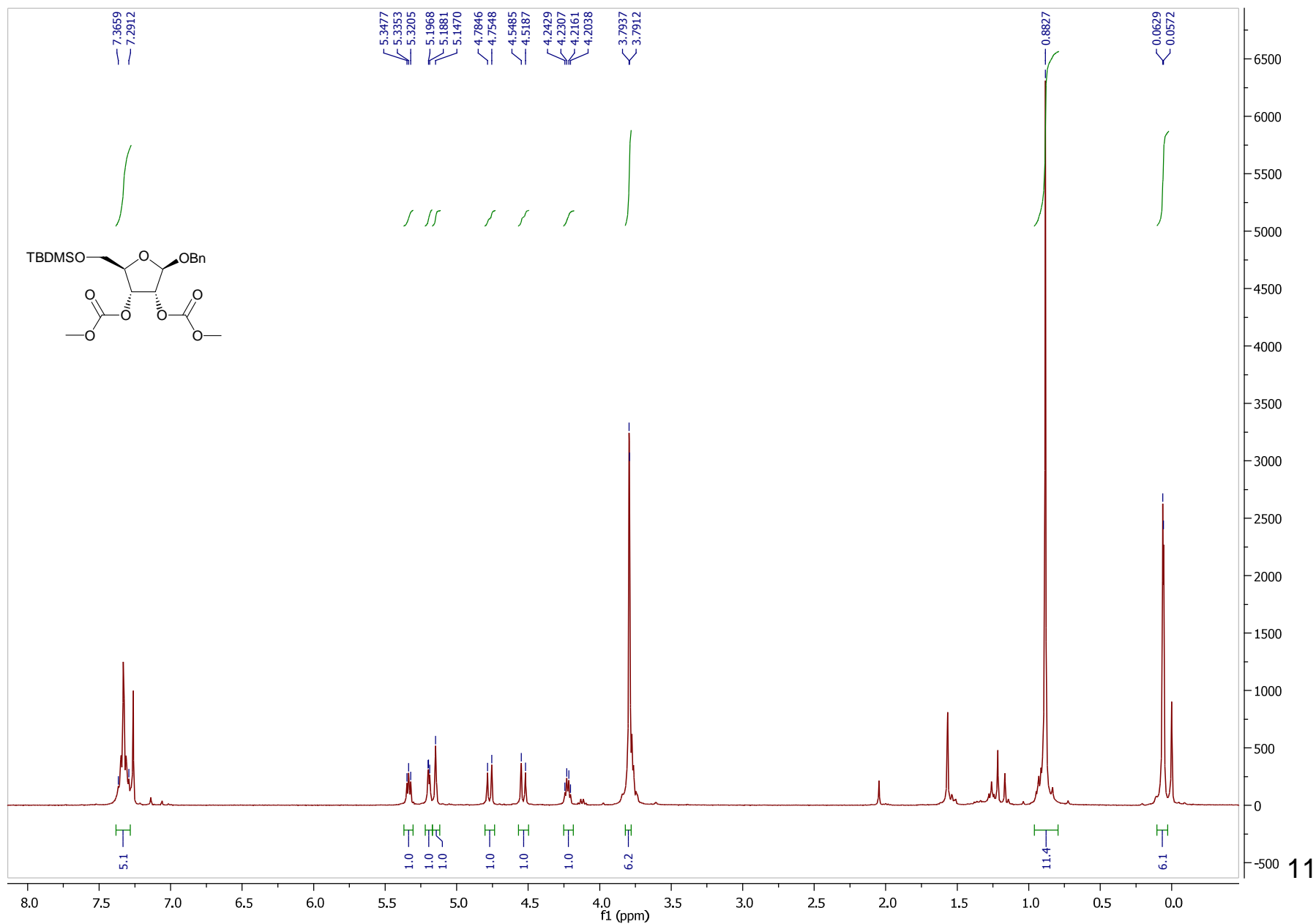
1-O-benzyl-5-O-tert-butylidimethylsilyl- β -D-ribofuranoside **4b**: $^1\text{H-NMR}$



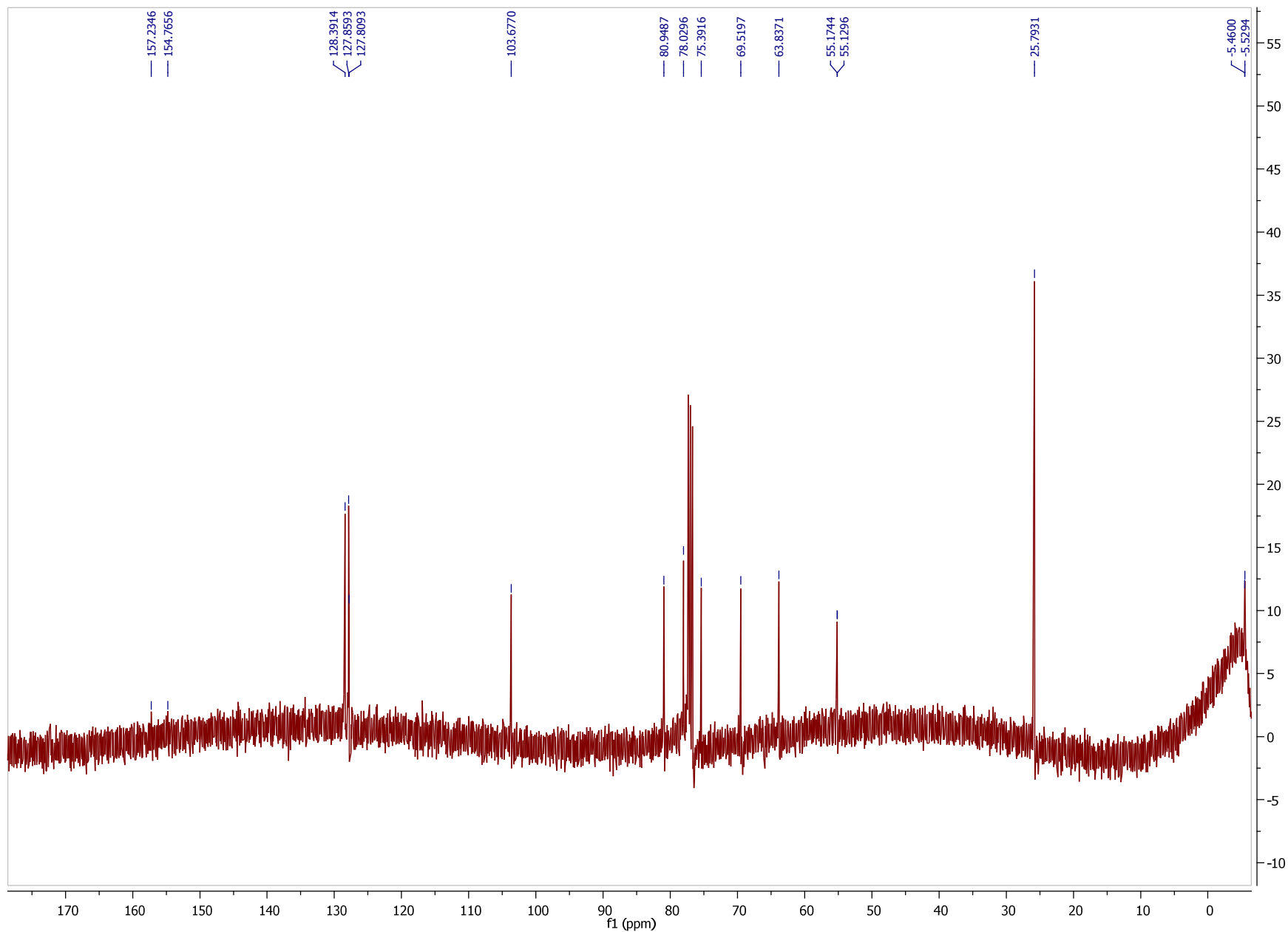
*1-O-benzyl-5-O-tert-butyl*dimethylsilyl- β -D-ribofuranoside **4 β** : ^{13}C -NMR



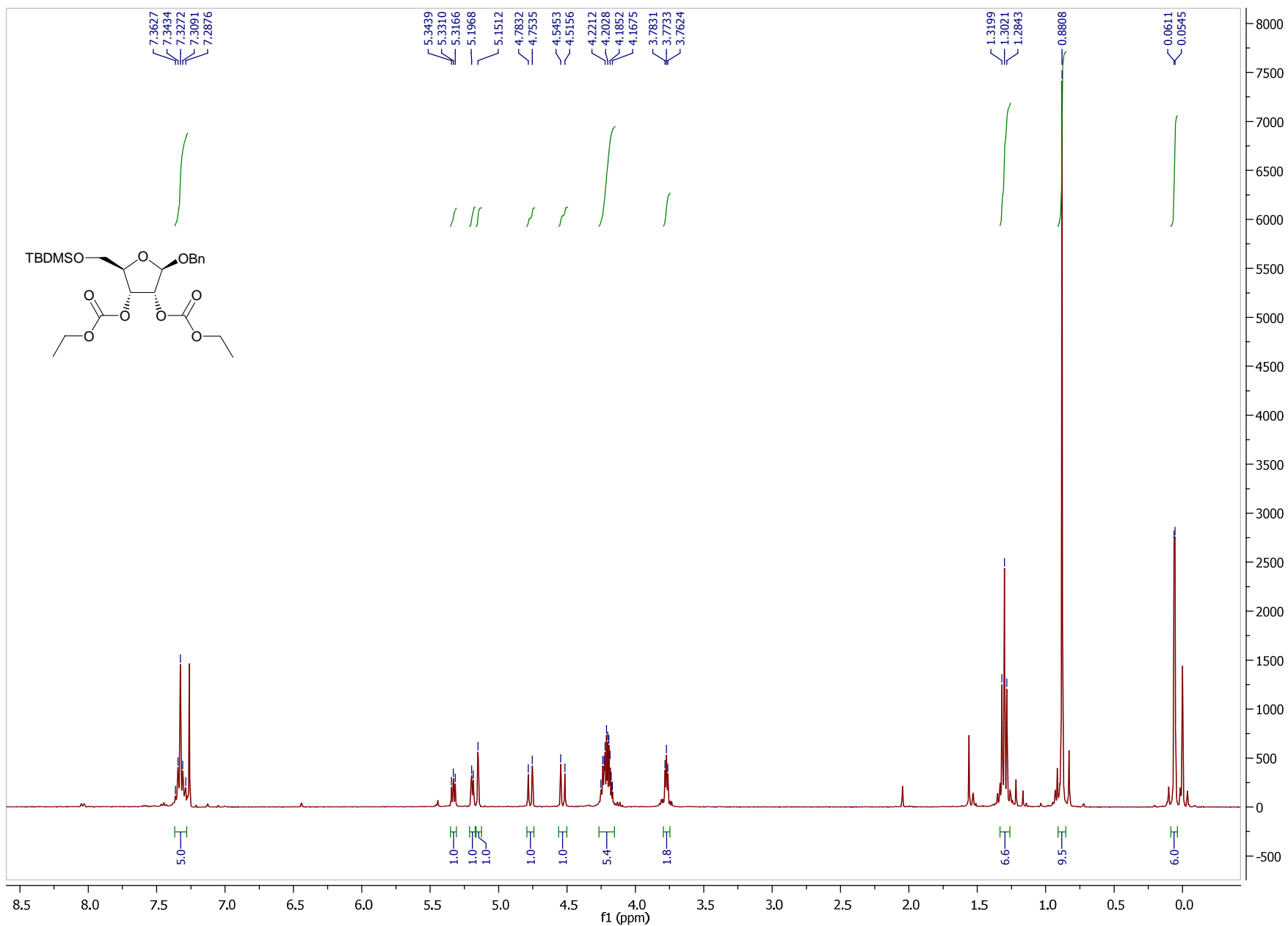
1-O-benzyl-2,3-O-bis(methylcarbonate)-5-O-tert-butyltrimethylsilyl-β-D-ribofuranoside **5a**: ¹H-NMR



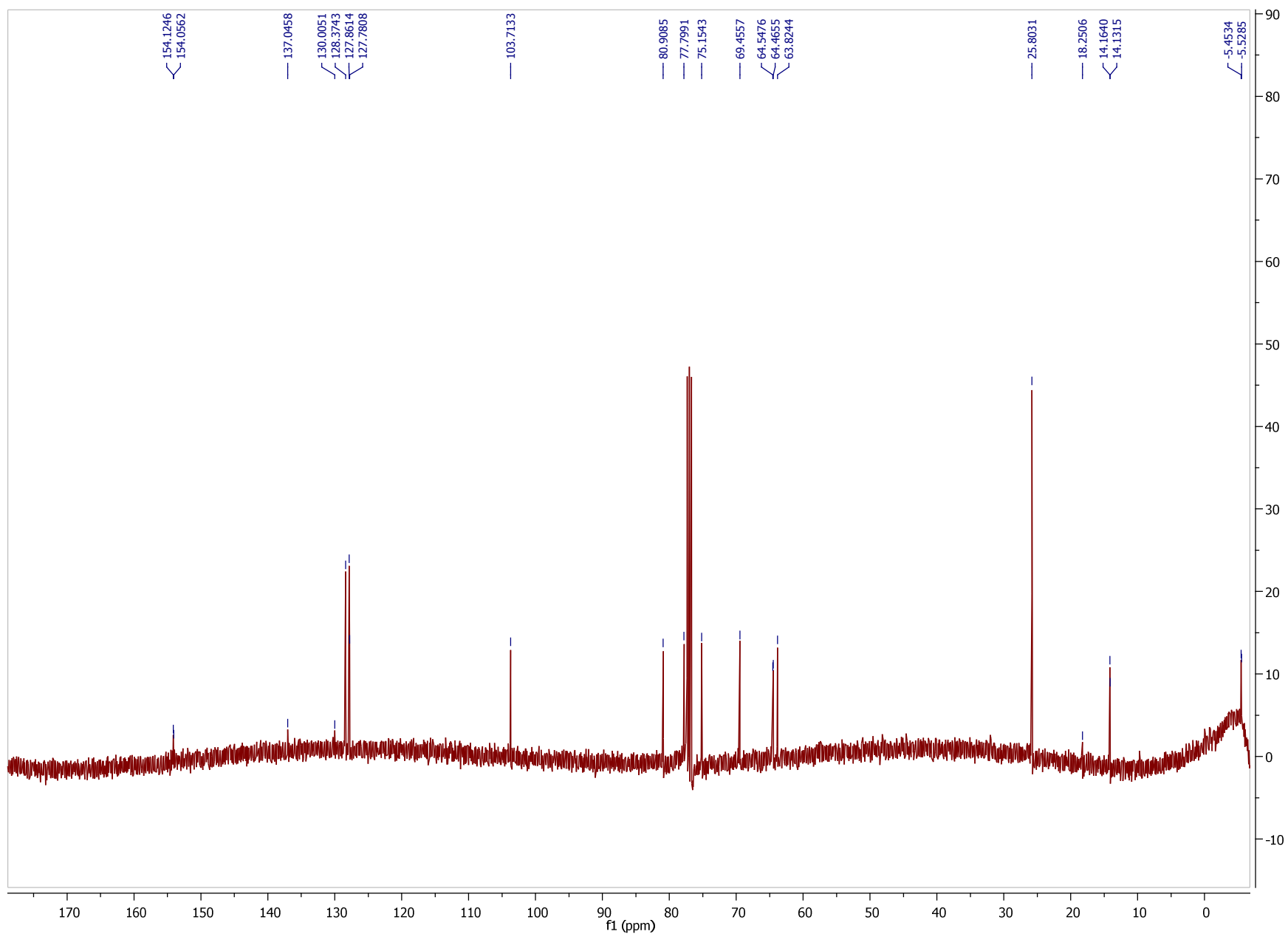
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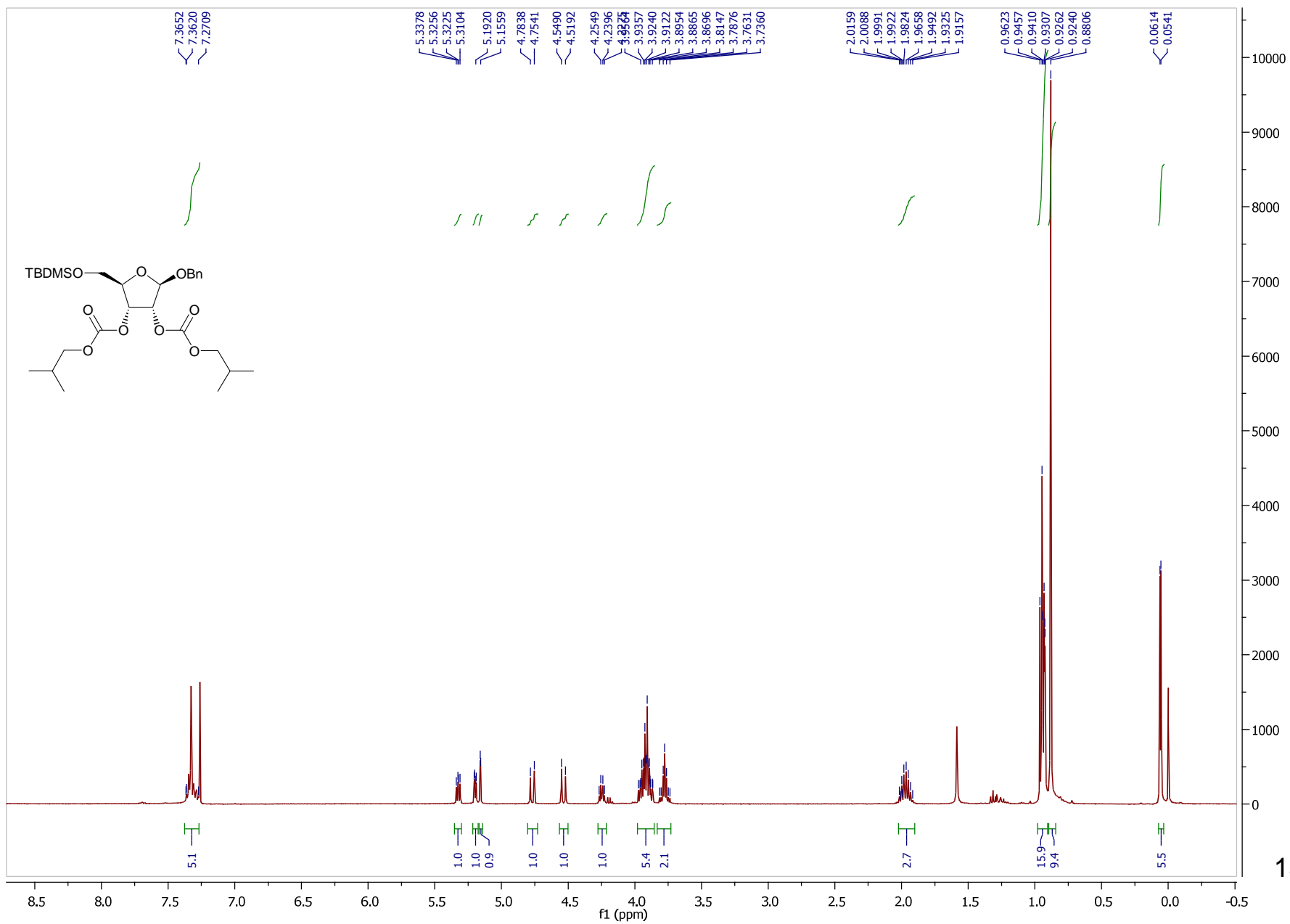
1-O-benzyl-2,3-O-bis(ethylcarbonate)-5-O-tert-butylidimethylsilyl-β-D-ribofuranoside **5b**: ¹H-NMR



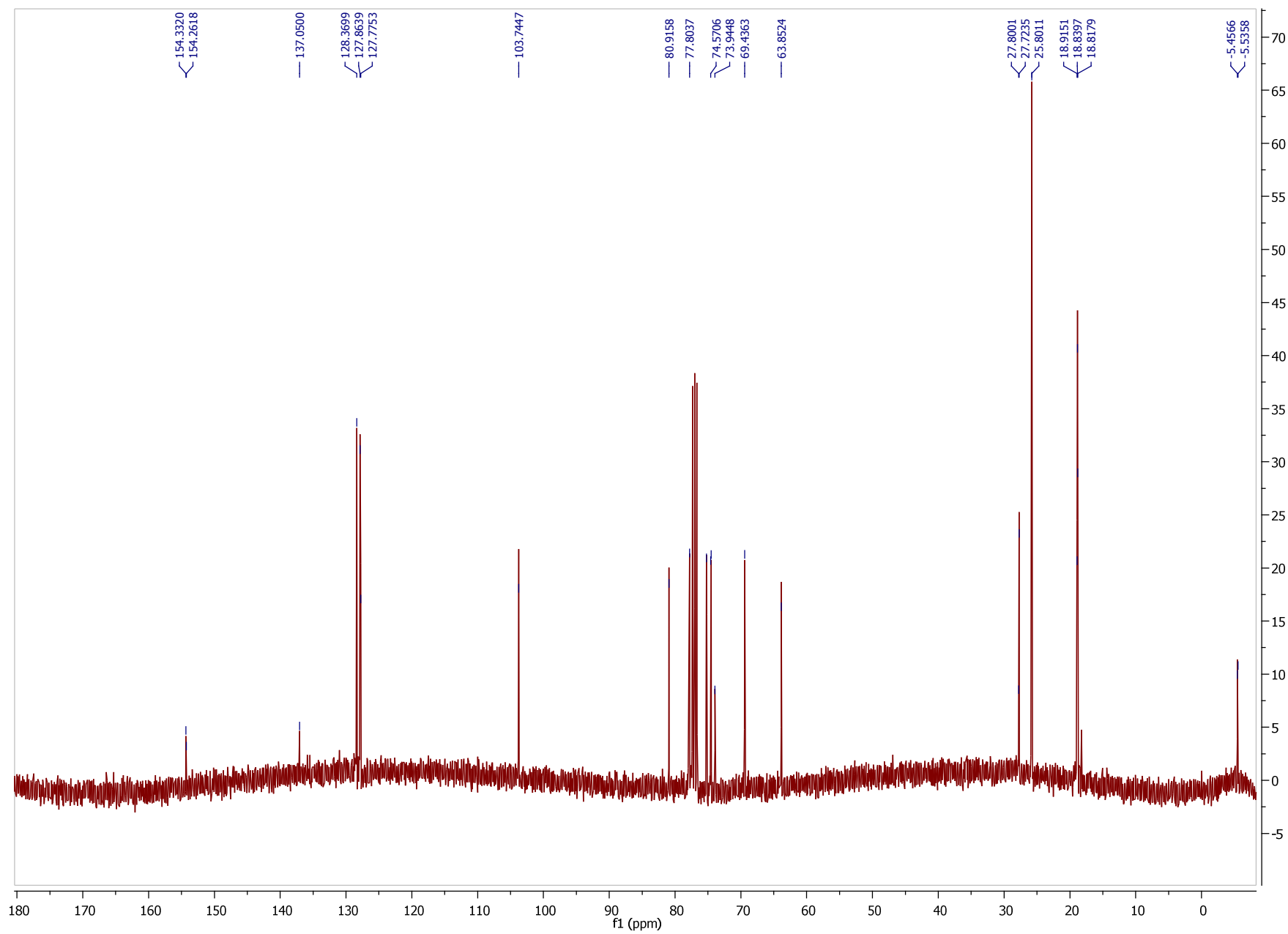
1-O-benzyl-2,3-O-bis(ethylcarbonate)-5-O-tert-butyltrimethylsilyl- β -D-ribofuranoside **5b**: ^{13}C -NMR



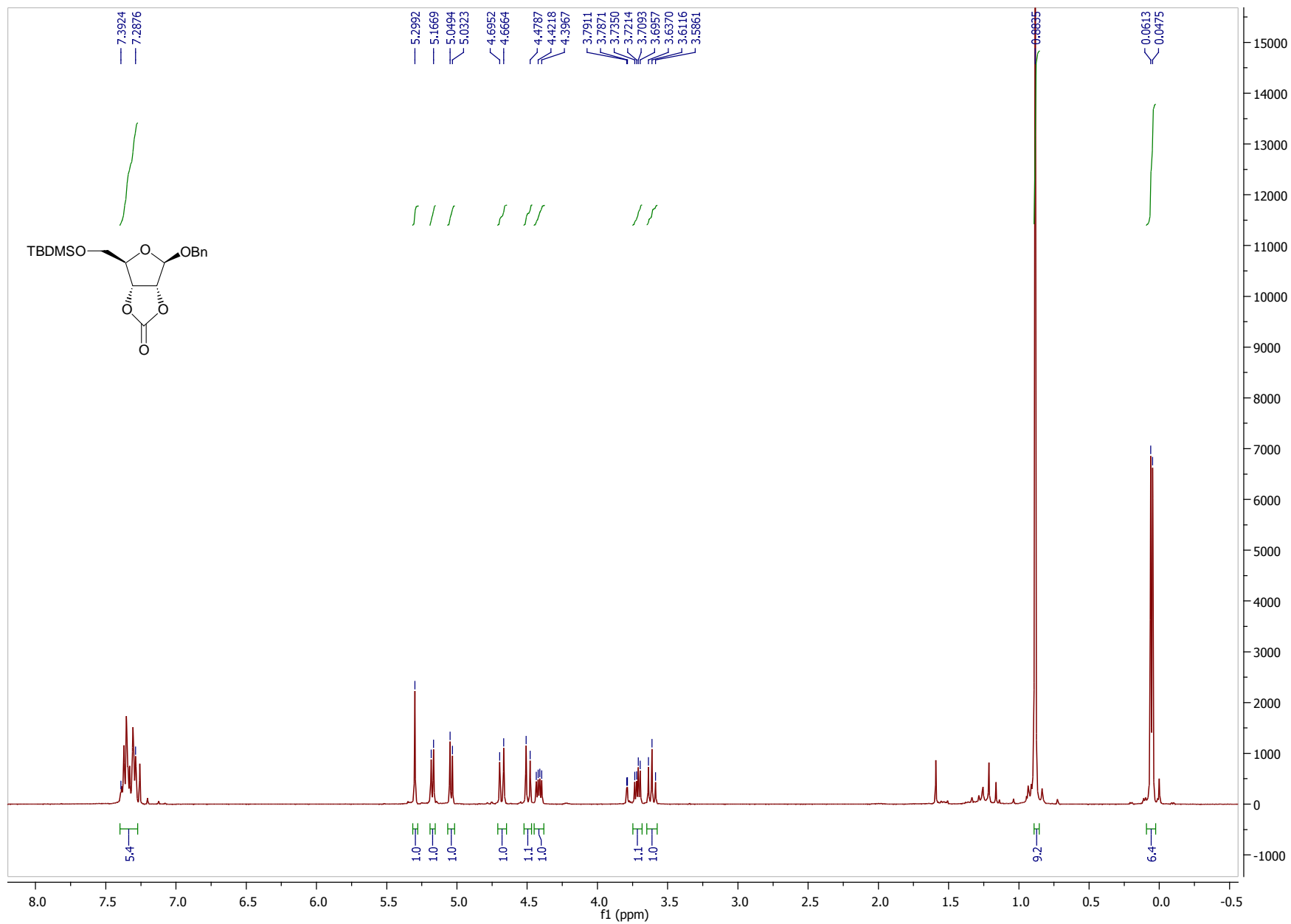
1-O-benzyl-2,3-O-bis(isobutylcarbonate)-5-O-tert-butylidimethylsilyl-β-D-ribofuranoside **5c**: ¹H-NMR



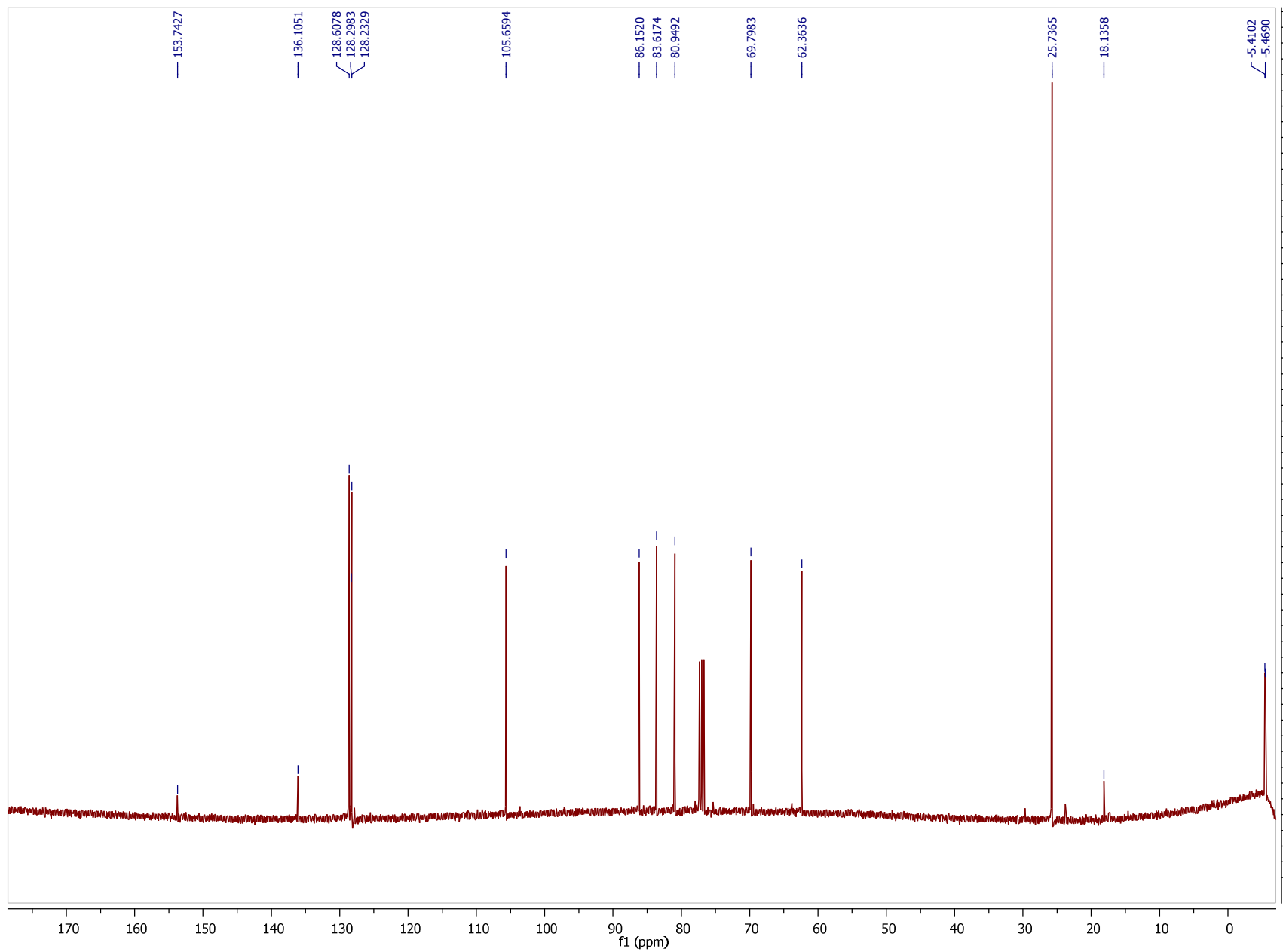
1-O-benzyl-2,3-O-bis(isobutylcarbonate)-5-O-tert-butyltrimethylsilyl-β-D-ribofuranoside **5c**: ¹³C-NMR



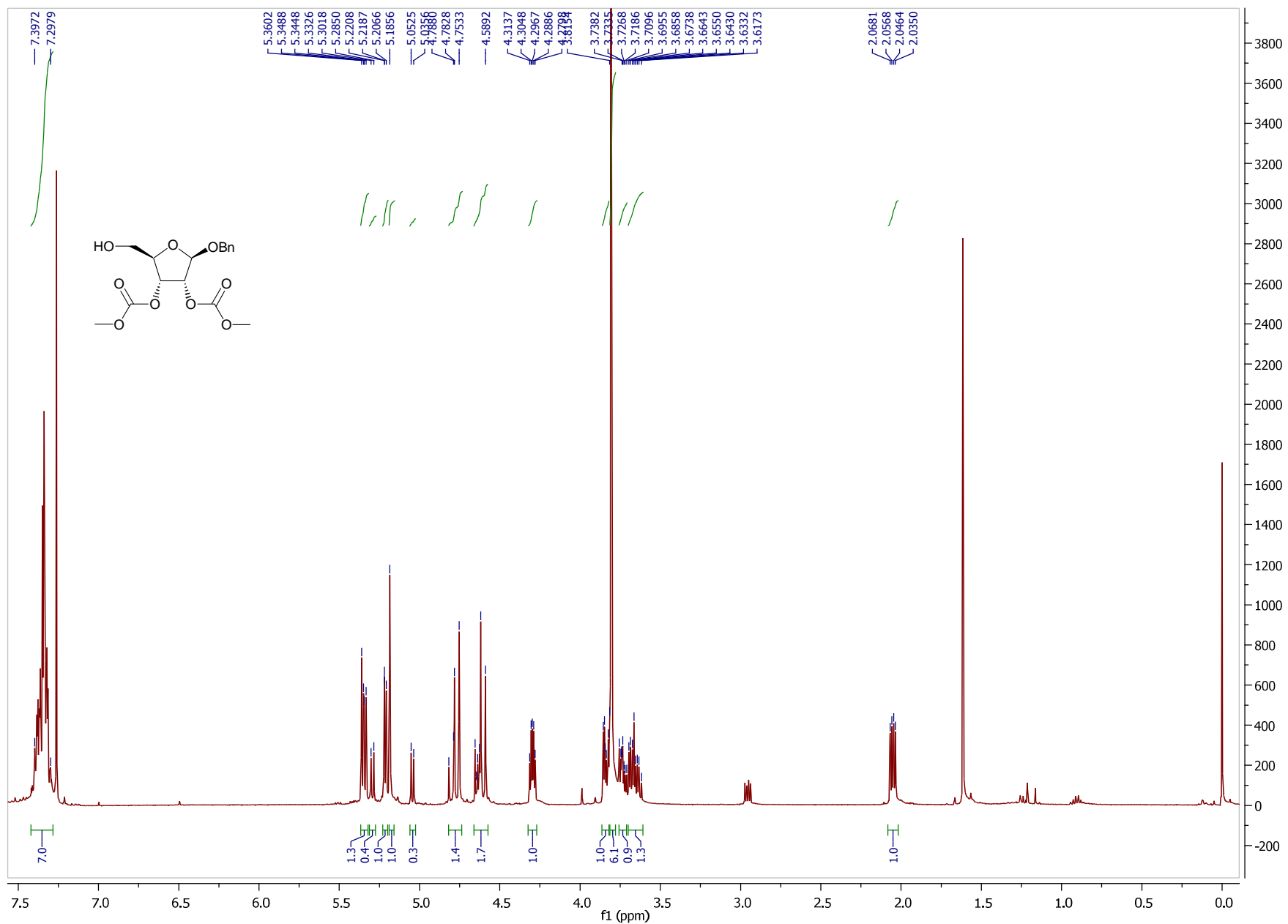
1-O-benzyl-2,3-O-carbonate-5-O-tert-butyl(dimethyl)silyl- β -D-ribofuranoside **5d**: $^1\text{H-NMR}$



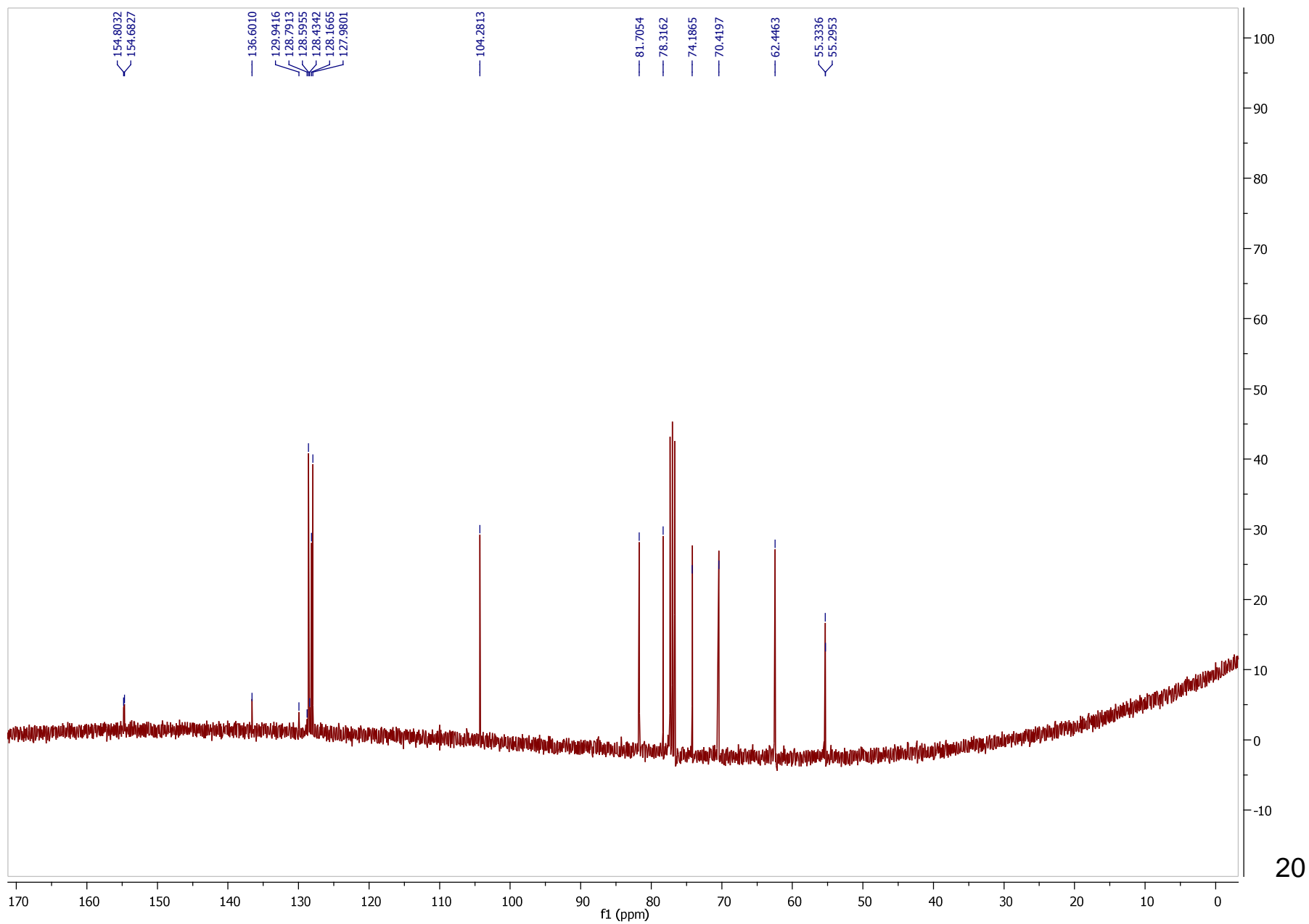
1-O-benzyl-2,3-O-carbonate-5-O-tert-butyltrimethylsilyl- β -D-ribofuranoside **5d**: ^{13}C -NMR



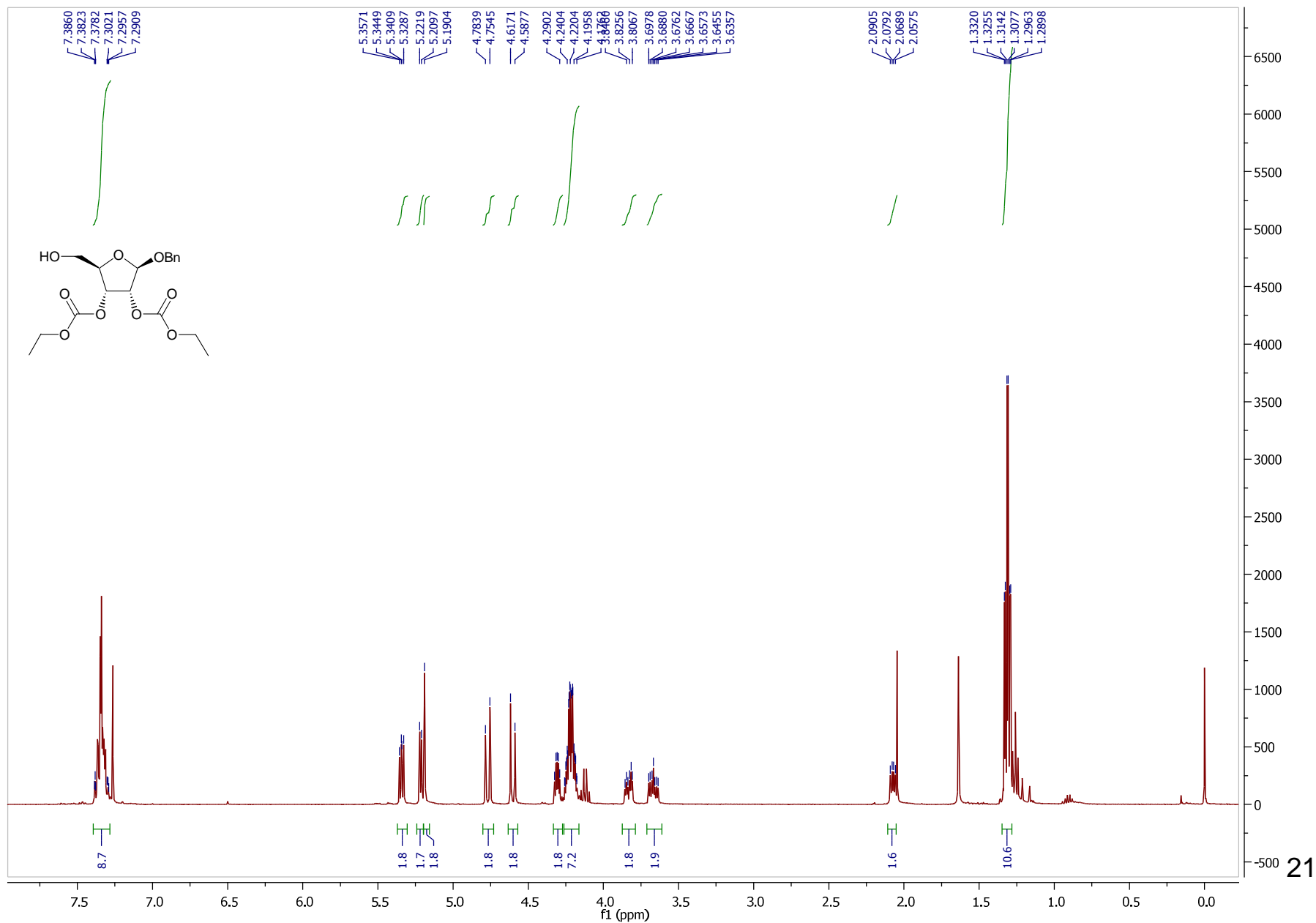
1-O-benzyl-2,3-O-bis(methylcarbonate)- β -D-ribofuranoside **7a**: $^1\text{H-NMR}$



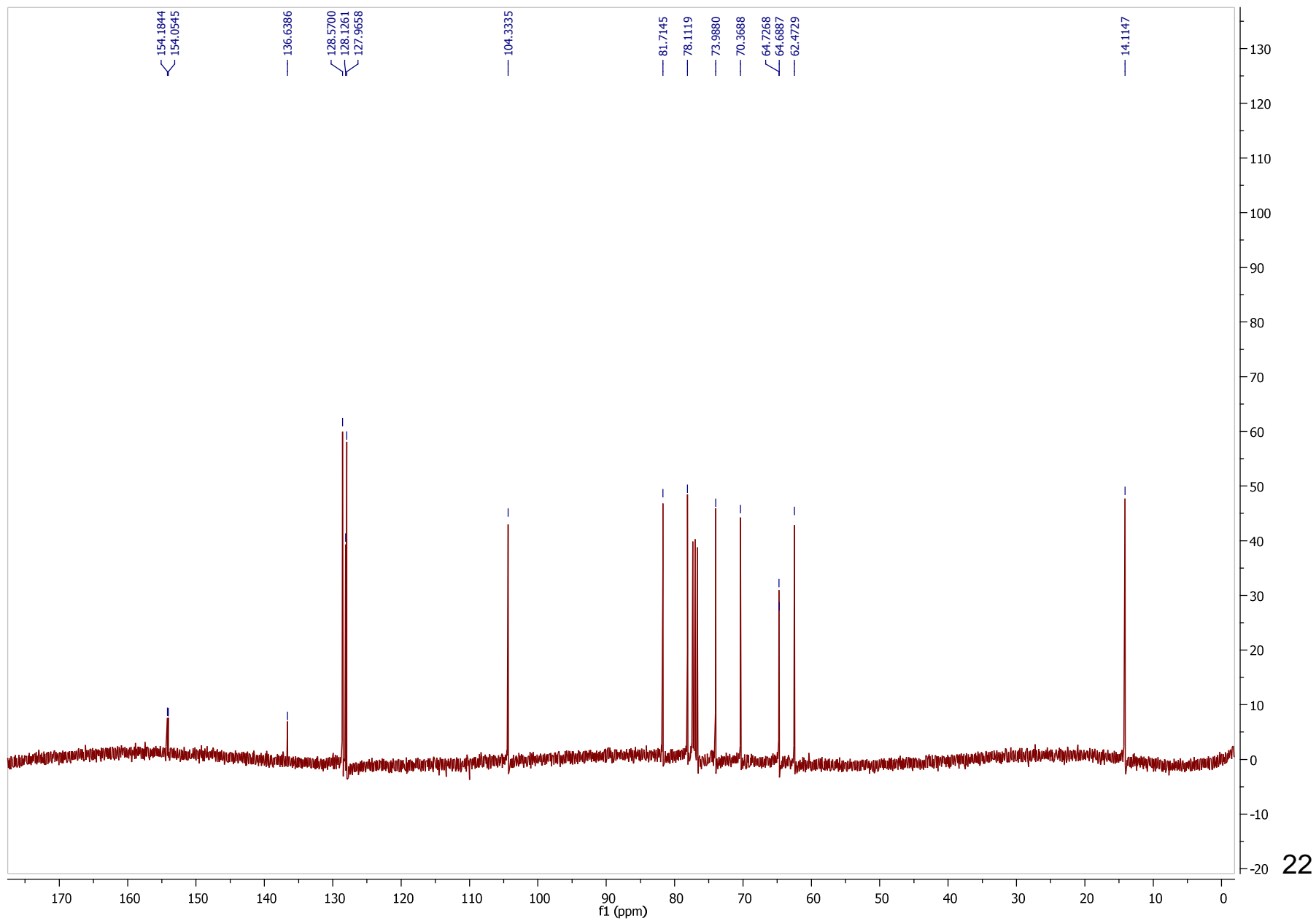
1-O-benzyl-2,3-O-bis(methylcarbonate)- β -D-ribofuranoside **7a**: ^{13}C -NMR



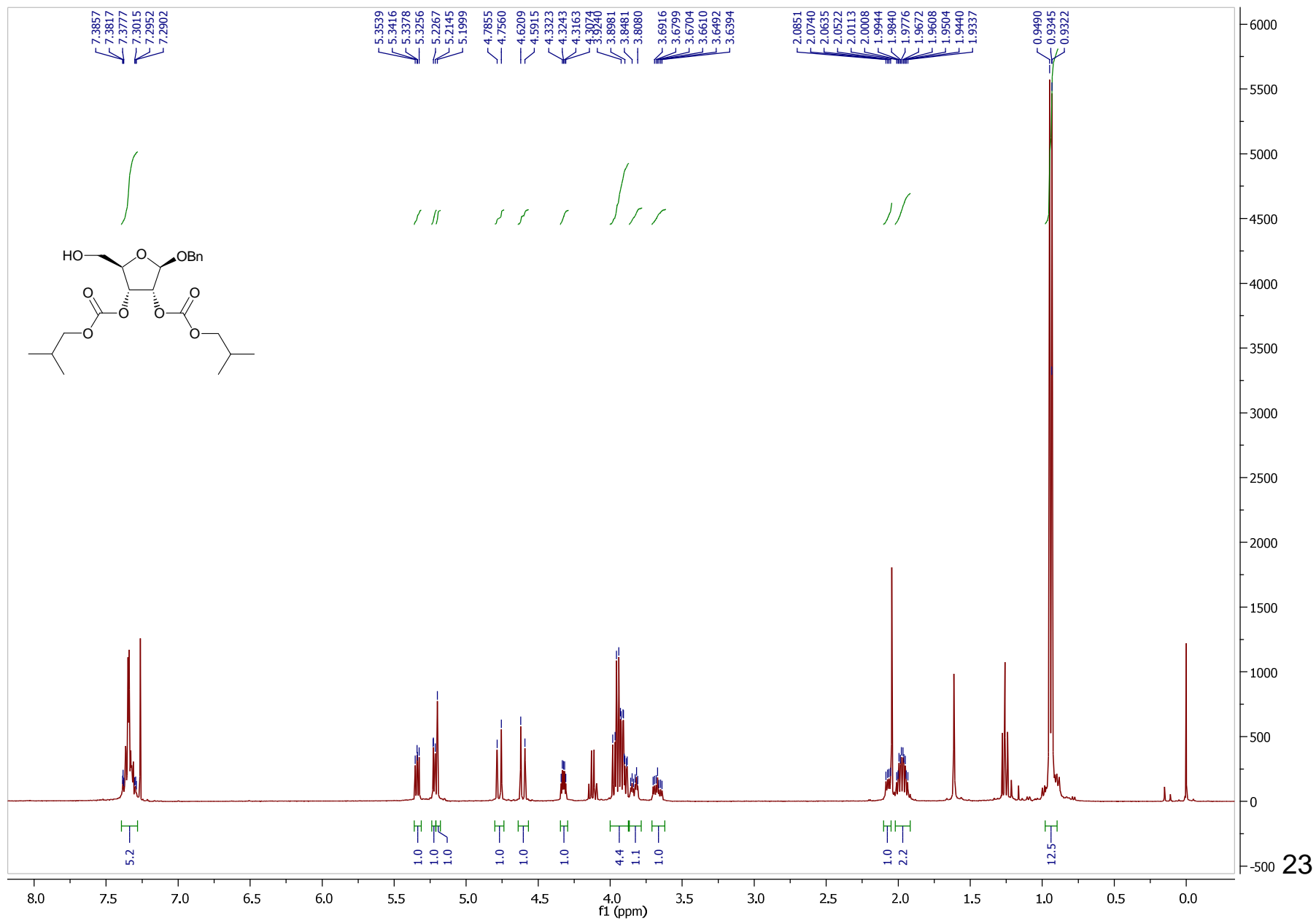
1-O-benzyl-2,3-O-bis(ethylcarbonate)- β -D-ribofuranoside **7b**: $^1\text{H-NMR}$



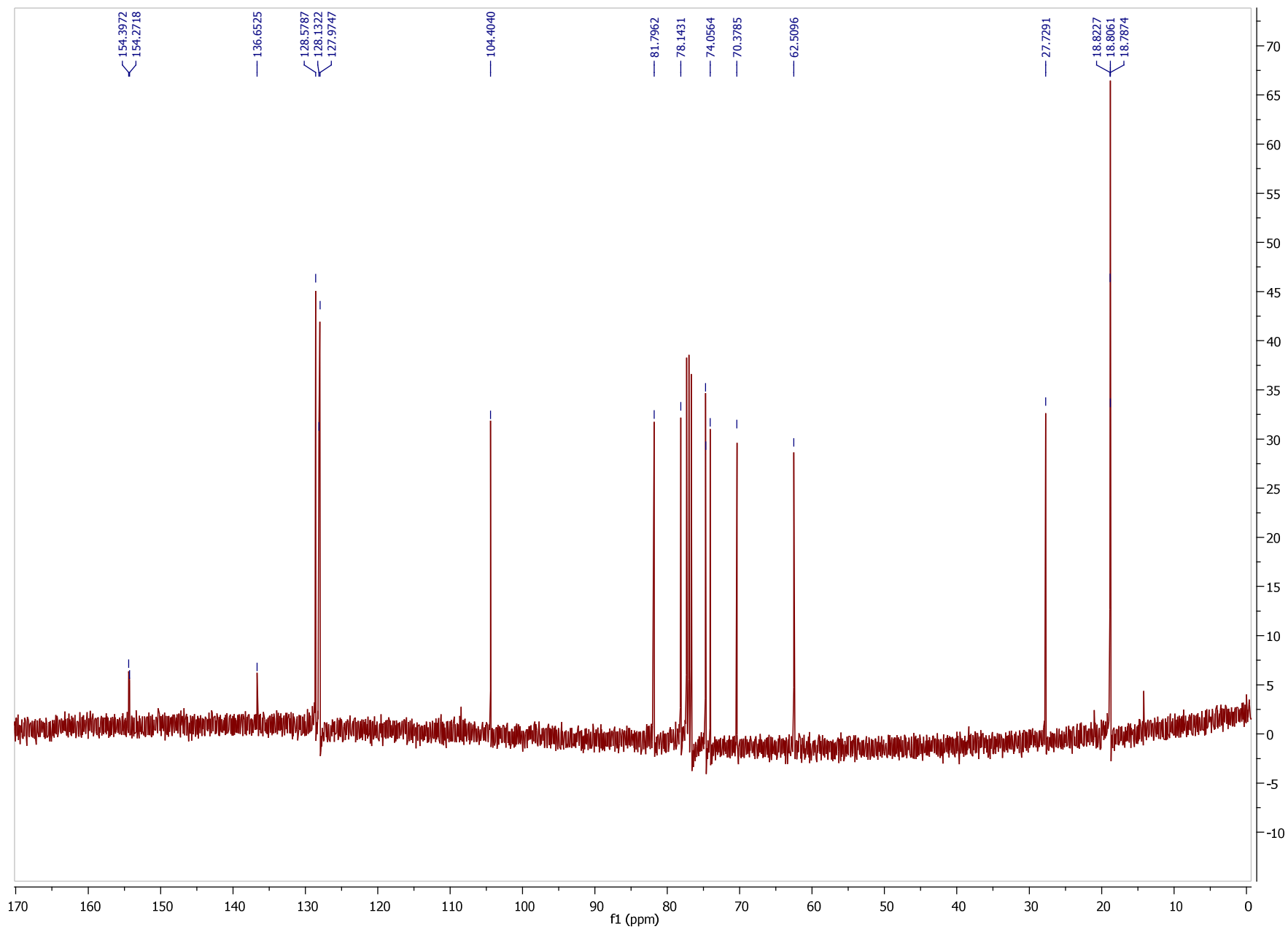
1-O-benzyl-2,3-O-bis(ethylcarbonate)-β-D-ribofuranoside 7b: ¹³C-NMR



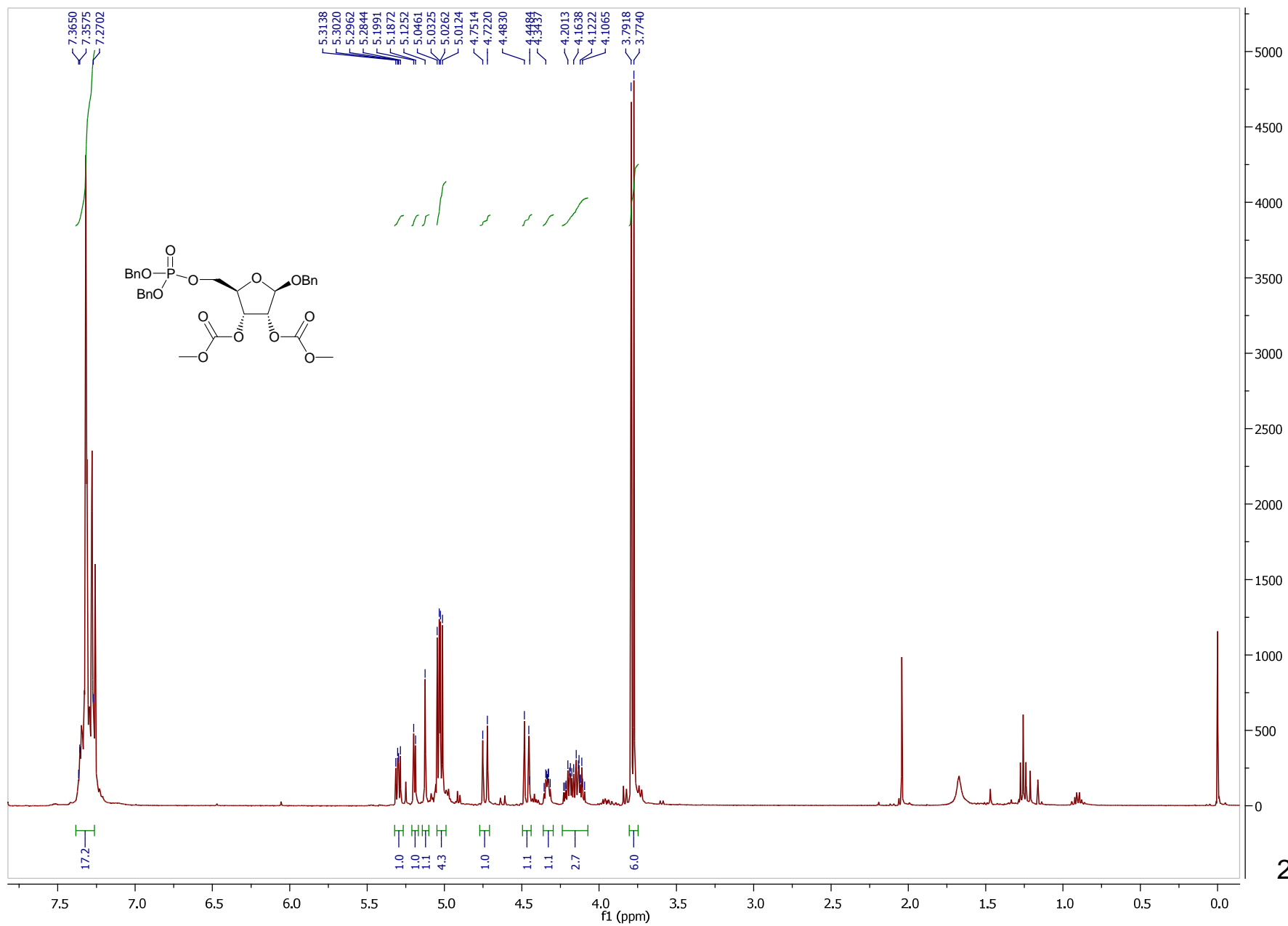
1-O-benzyl-2,3-O-bis(isobutylcarbonate)- β -D-ribofuranoside **7c**: $^1\text{H-NMR}$



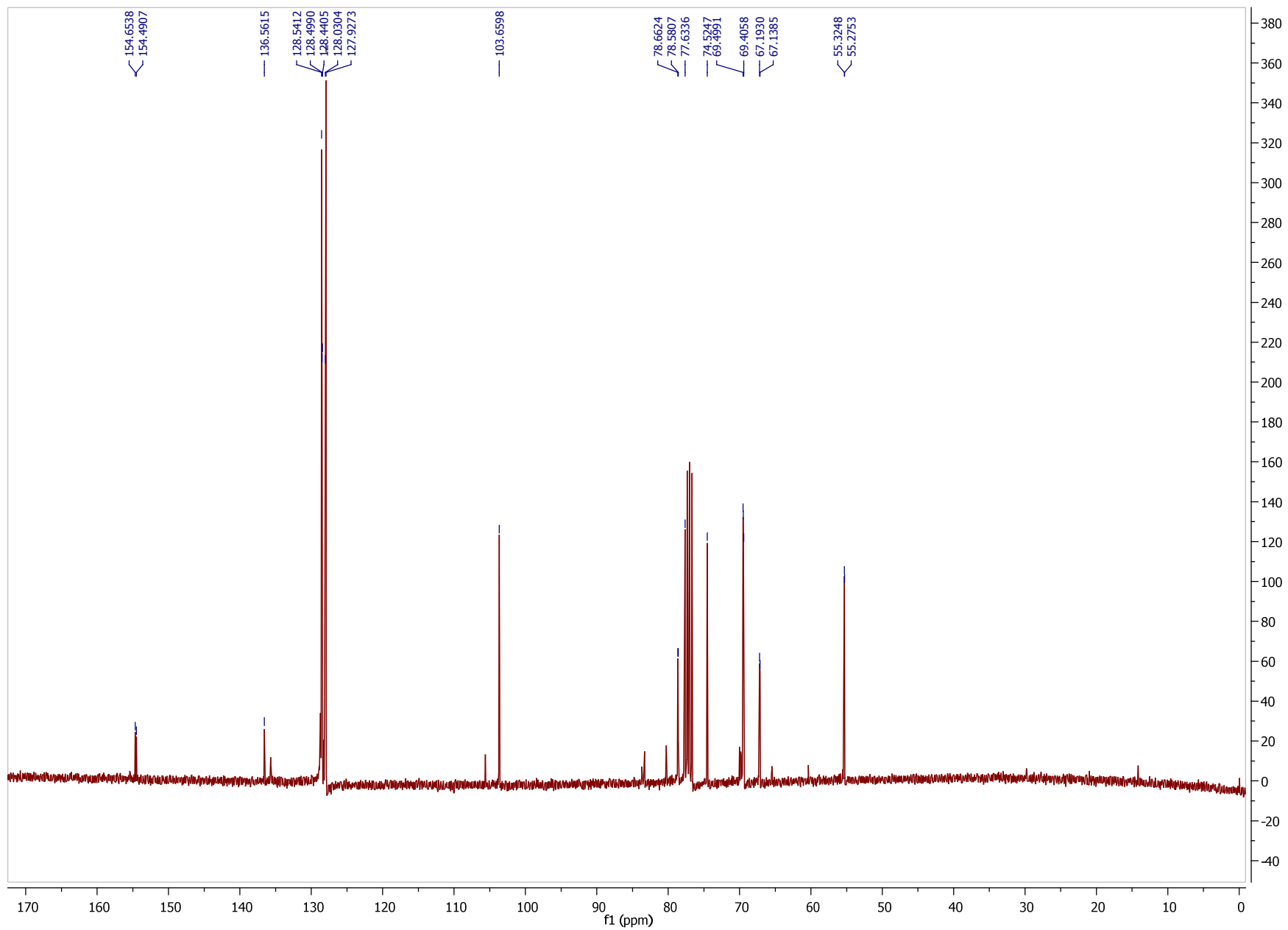
1-O-benzyl-2,3-O-bis(isobutylcarbonate)- β -D-ribofuranoside **7c**: ^{13}C -NMR



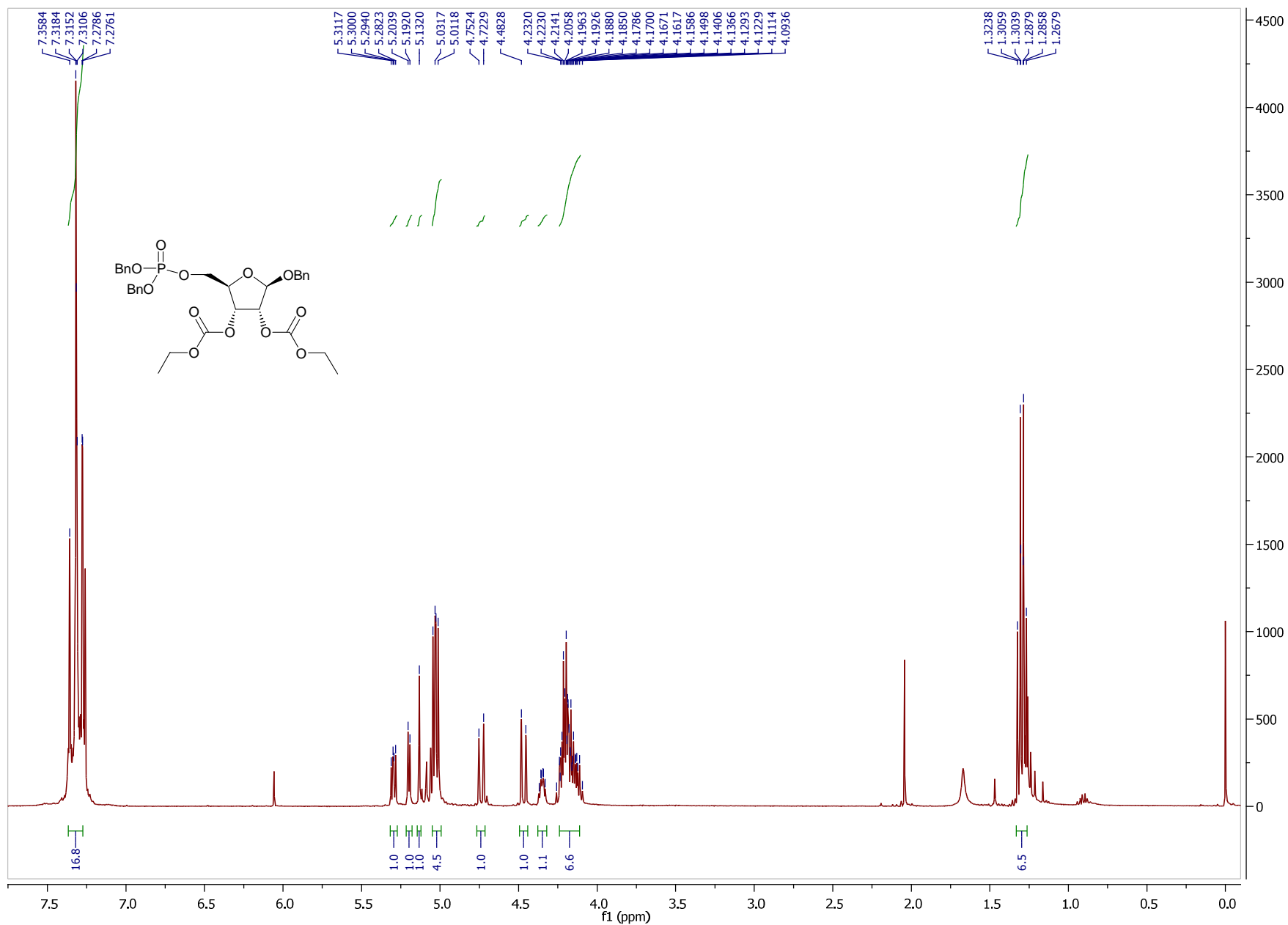
5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(methylcarbonate)- β -D-ribofuranoside **9a**: $^1\text{H-NMR}$



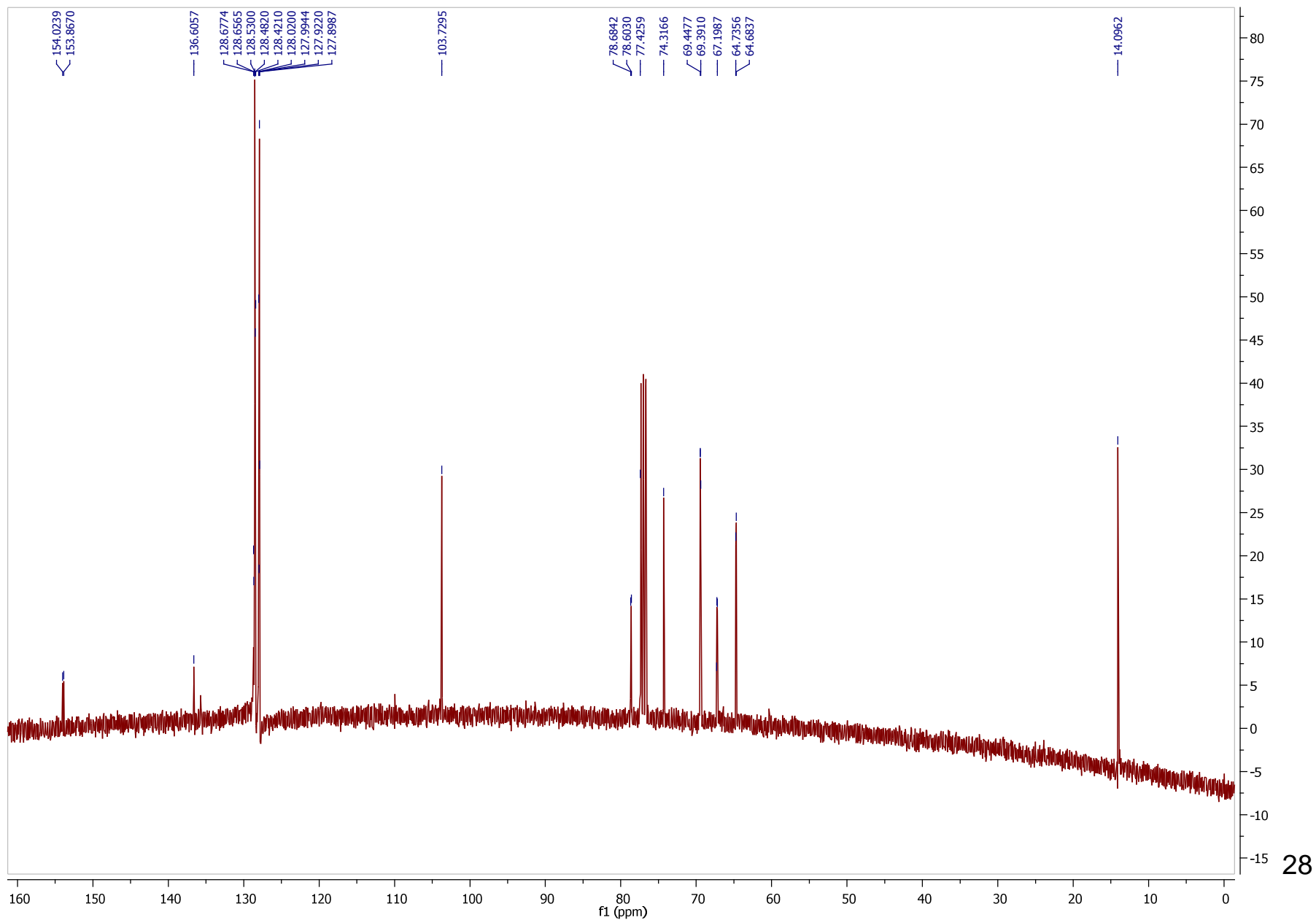
5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(methylcarbonate)- β -D-ribofuranoside **9a**: ^{13}C -NMR



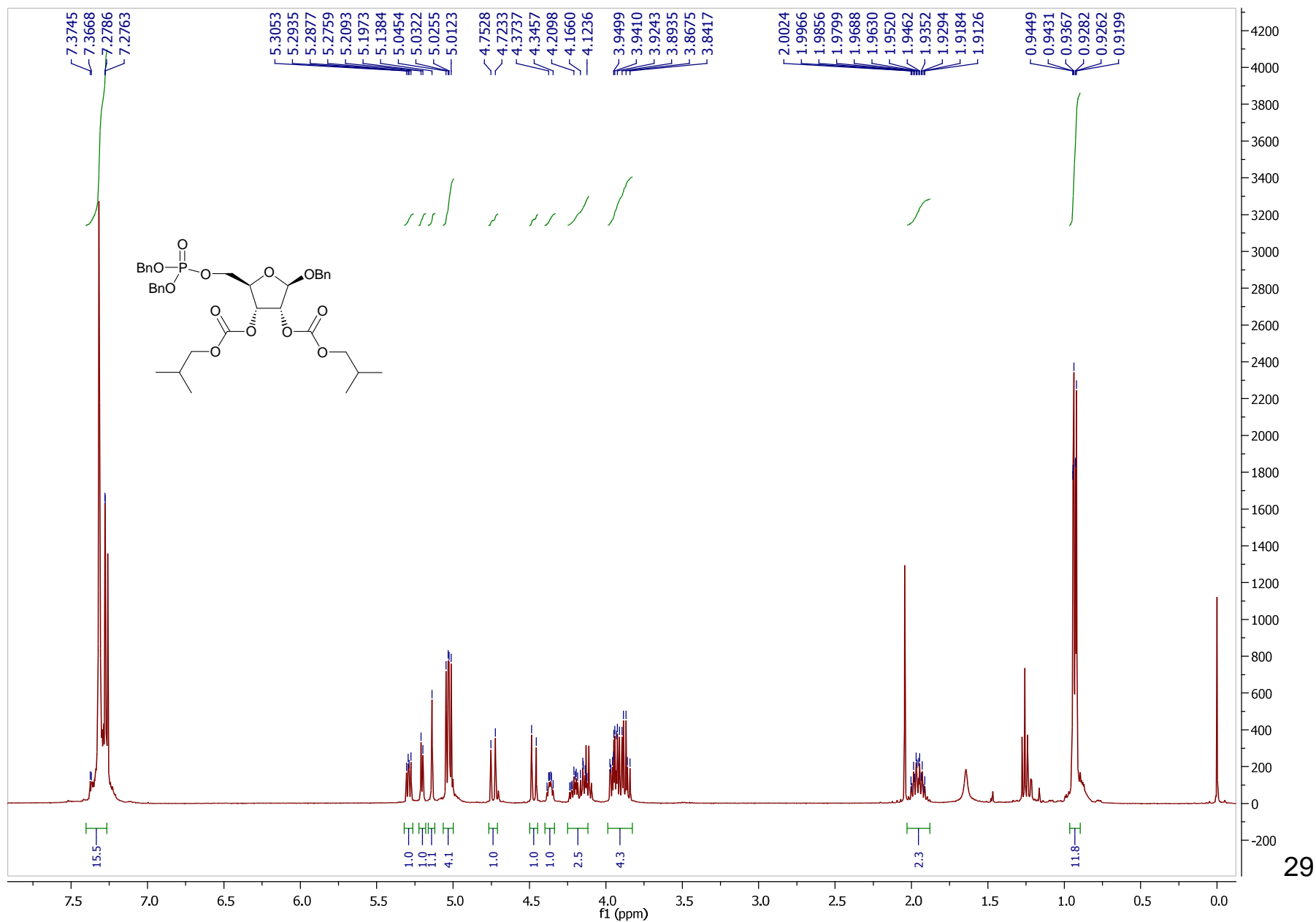
5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(ethylcarbonate)- β -D-ribofuranoside **9b**: $^1\text{H-NMR}$



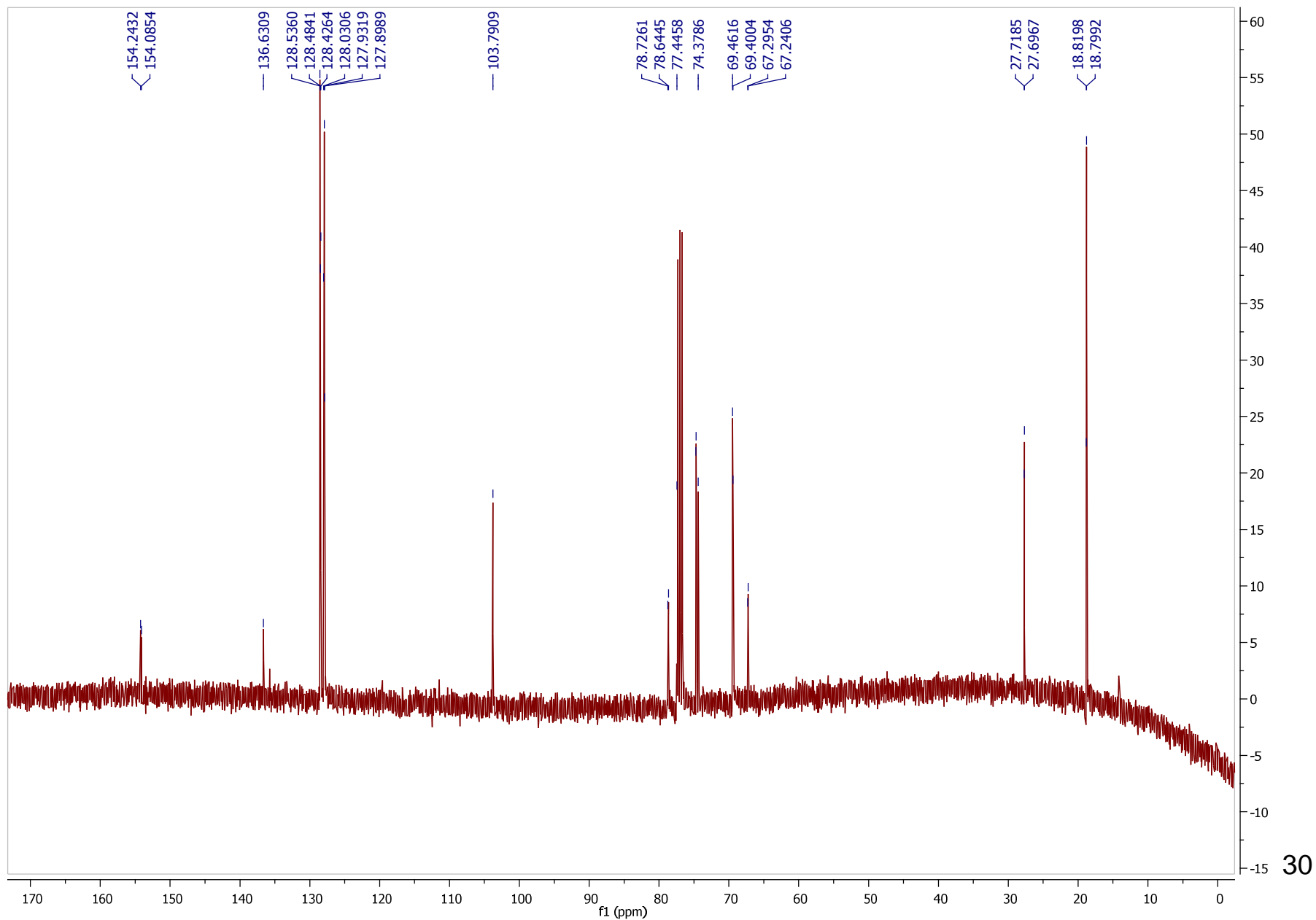
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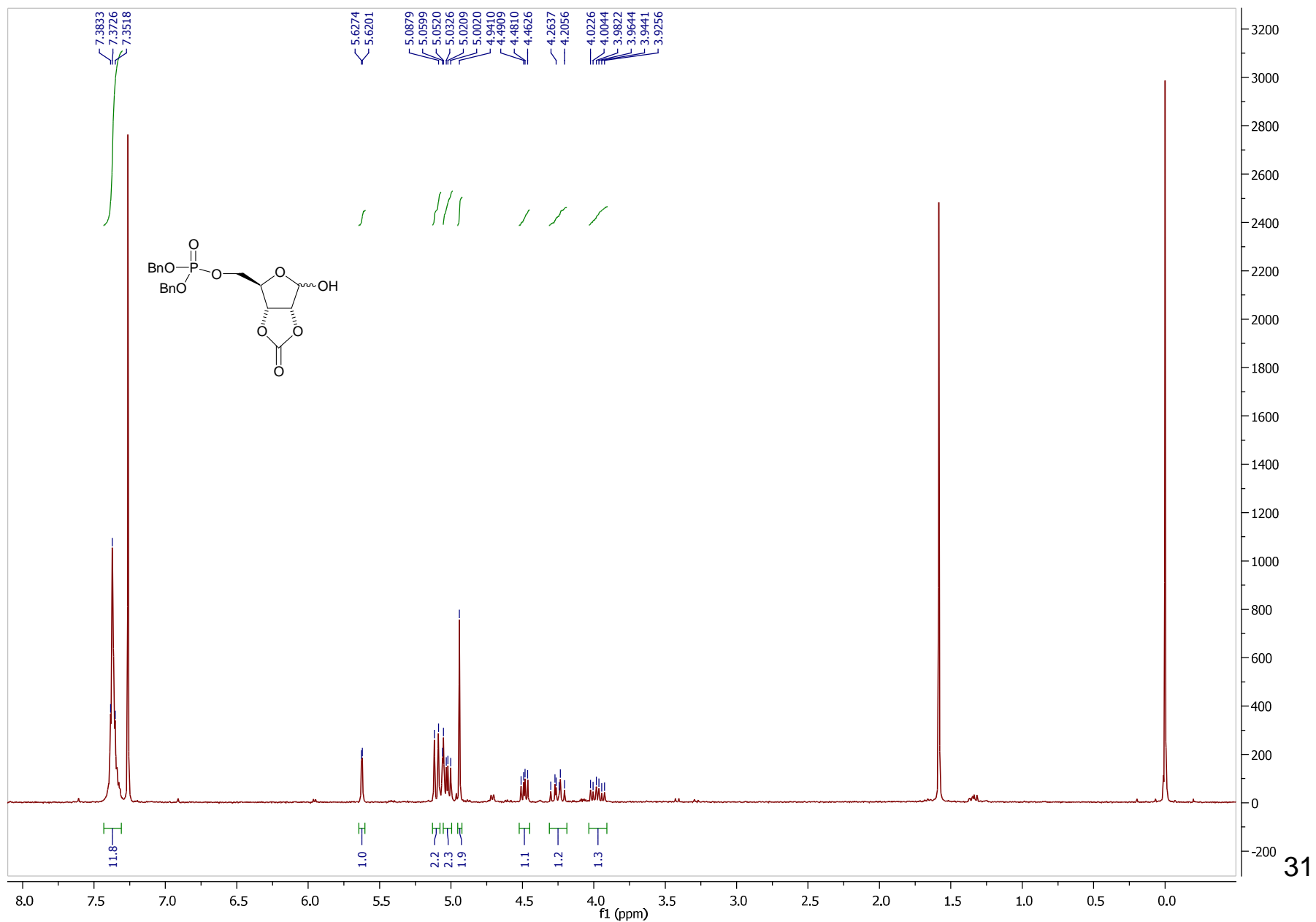
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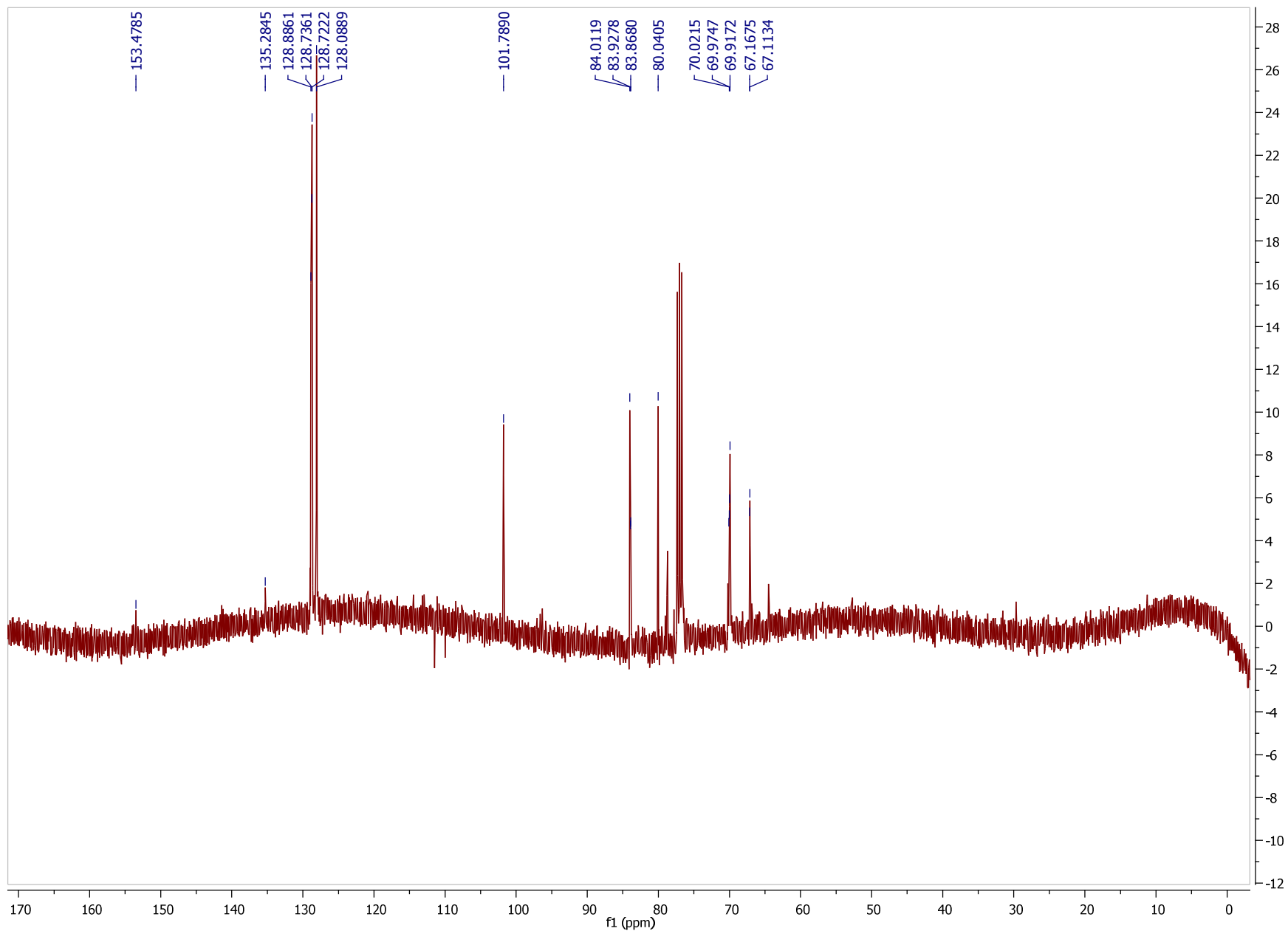
5-O-dibenzylphosphate-1-O-benzyl-2,3-O-bis(isobutylcarbonate)- β -D-ribofuranoside **9c**: $^1\text{H-NMR}$



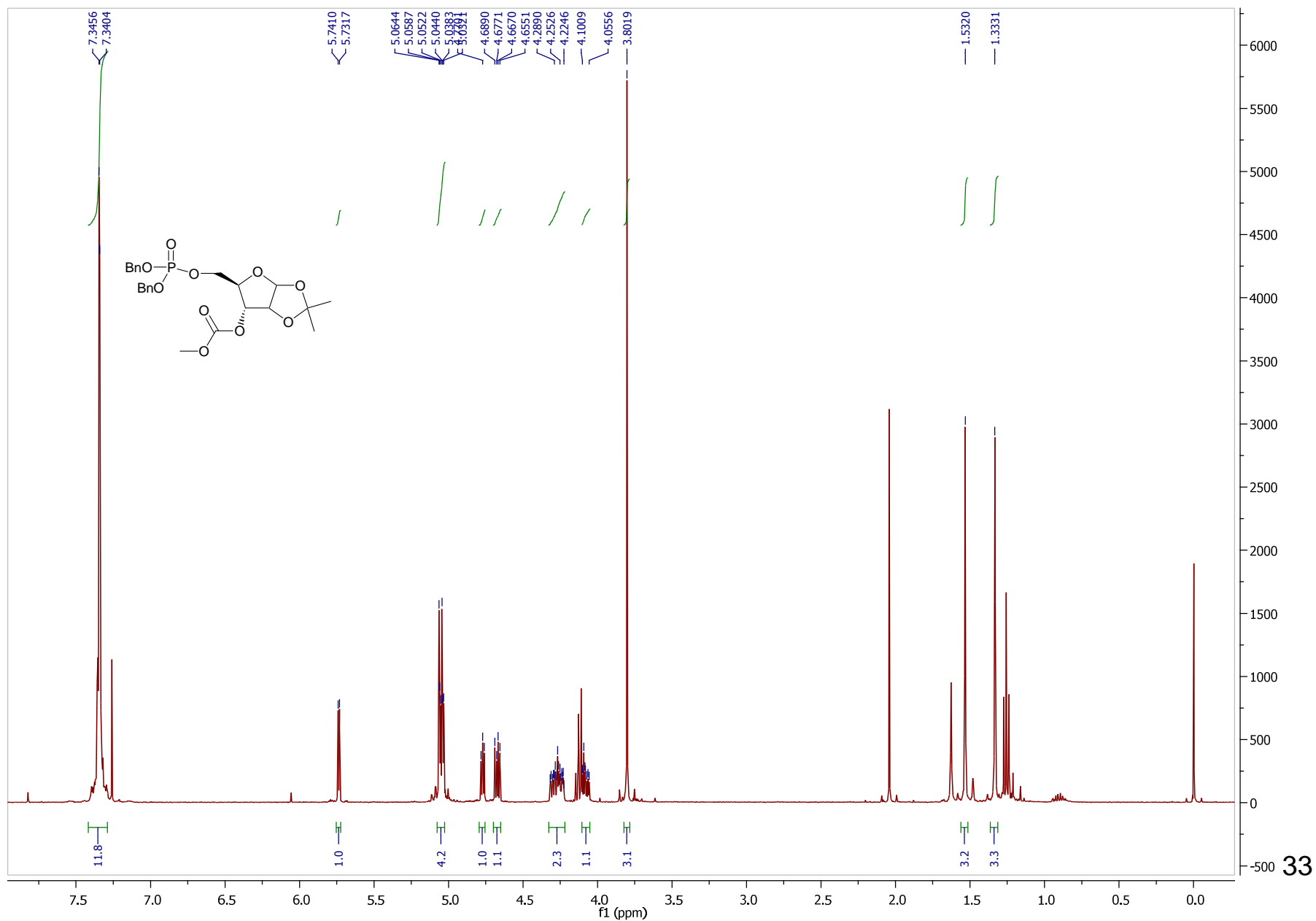
5-O-dibenzylphosphate-2,3-O-carbonate- β -D-ribofuranose **9d**: $^1\text{H-NMR}$



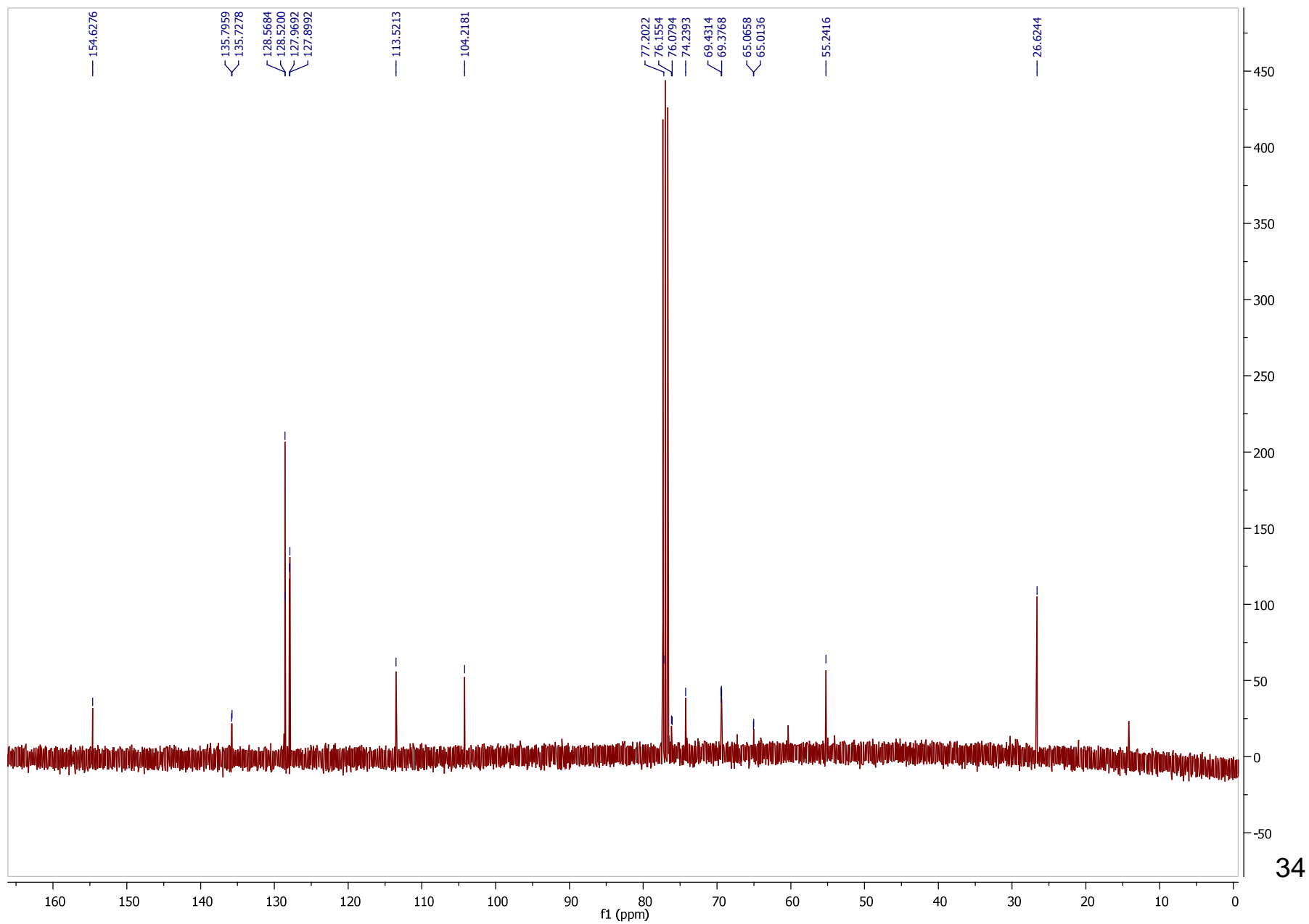
5-O-dibenzylphosphate-2,3-O-carbonate- β -D-ribofuranose **9d**: ^{13}C -NMR



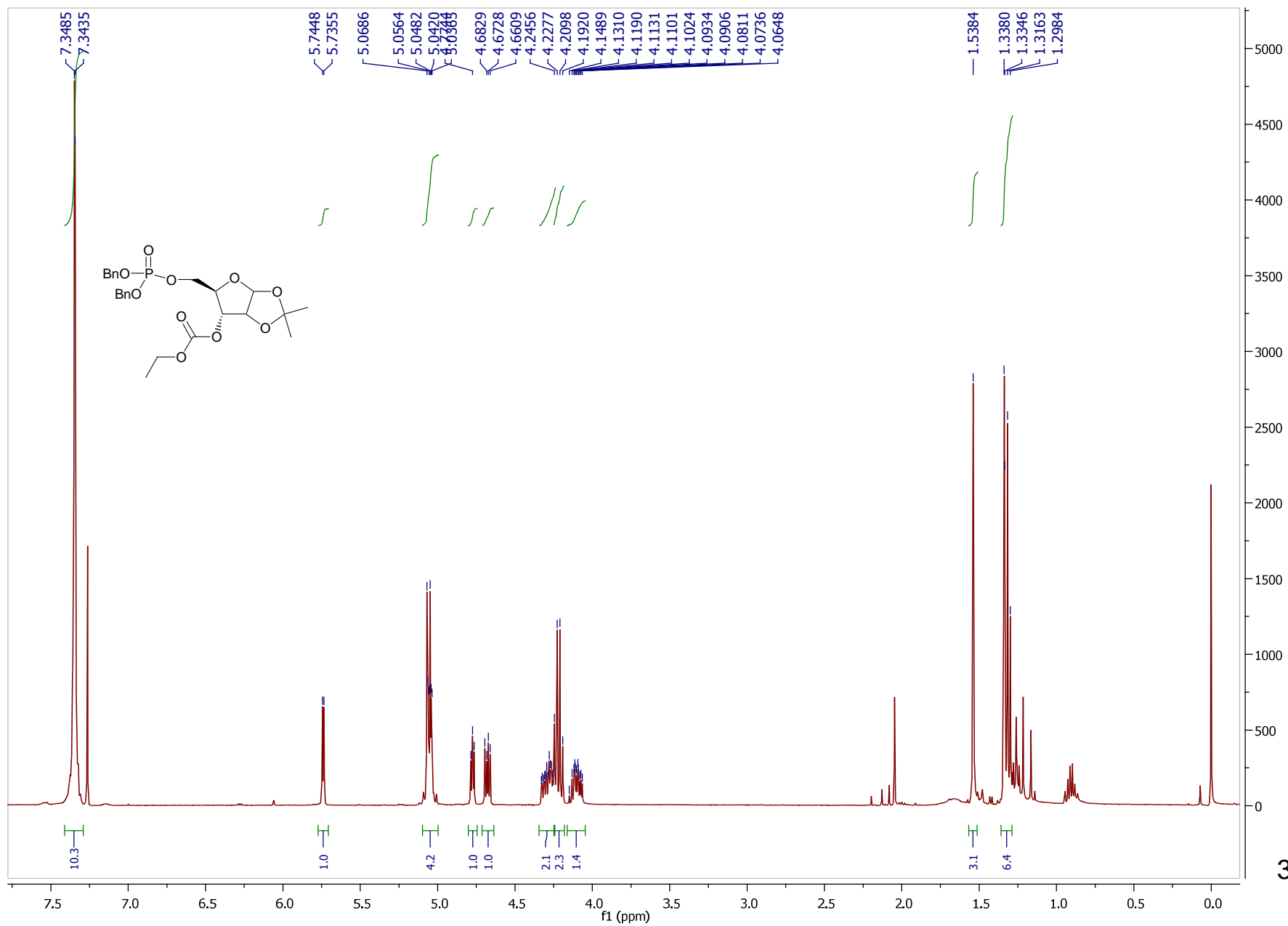
5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-methylcarbonate- α -D-ribofuranoside **10a**: $^1\text{H-NMR}$



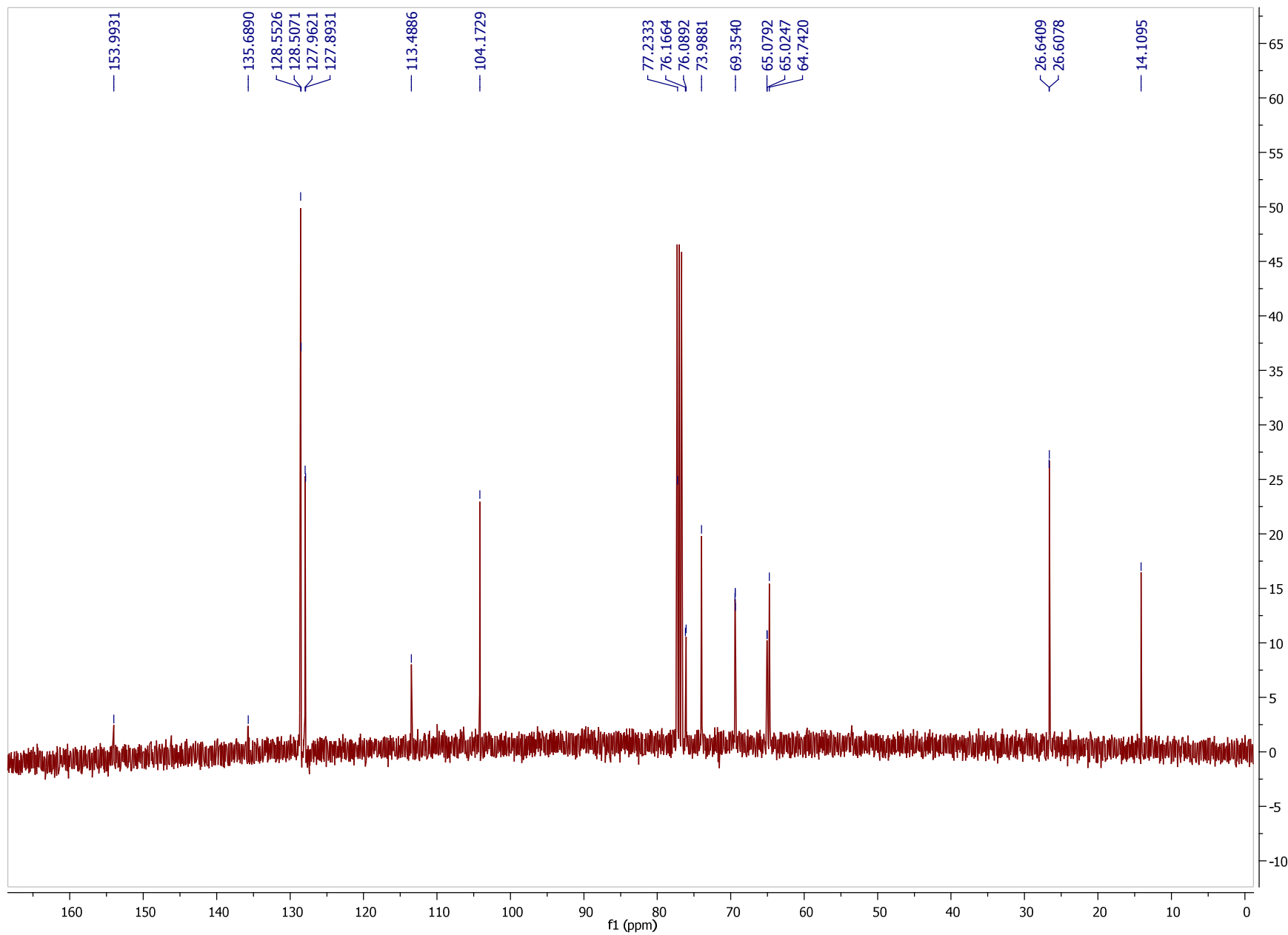
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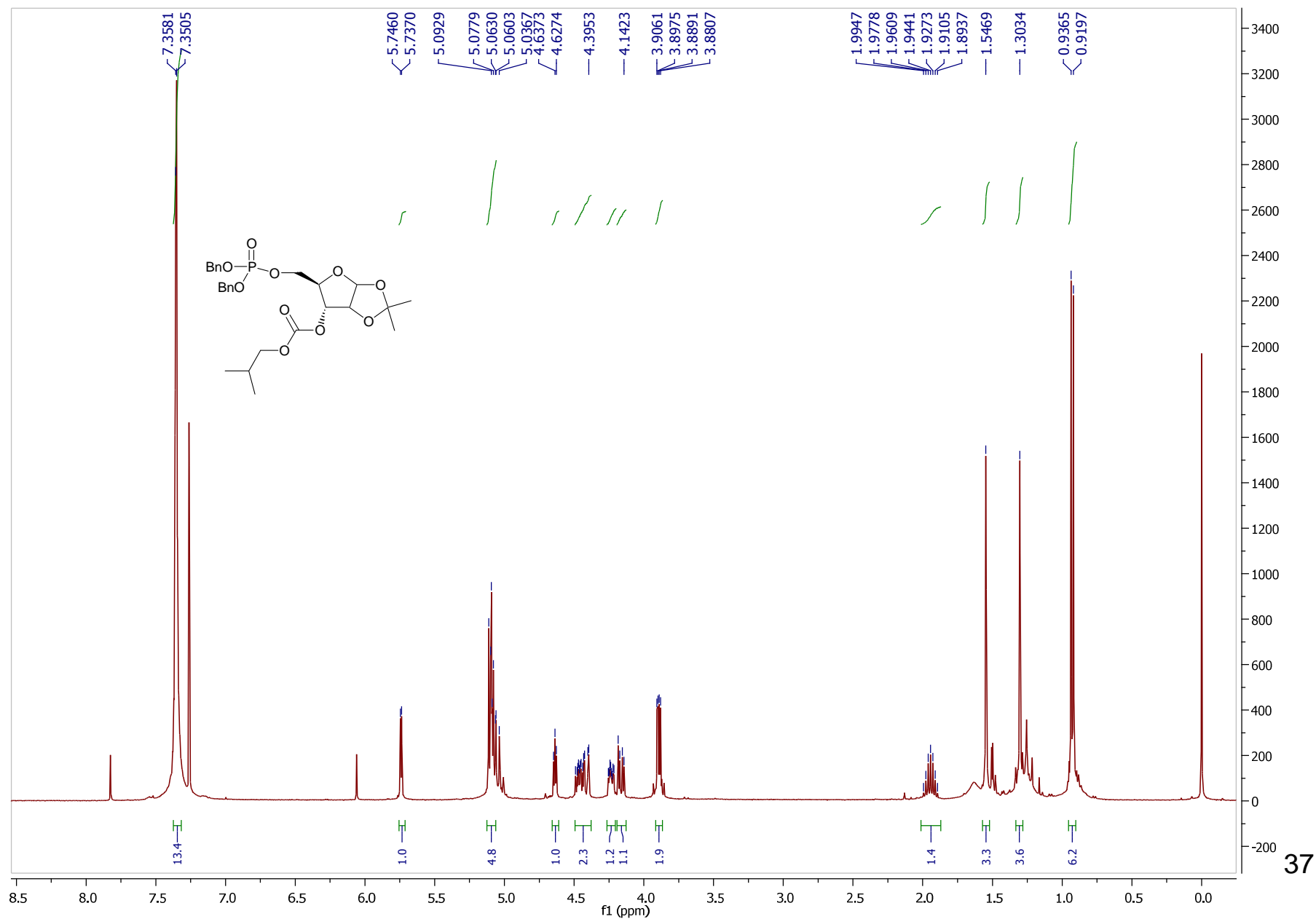
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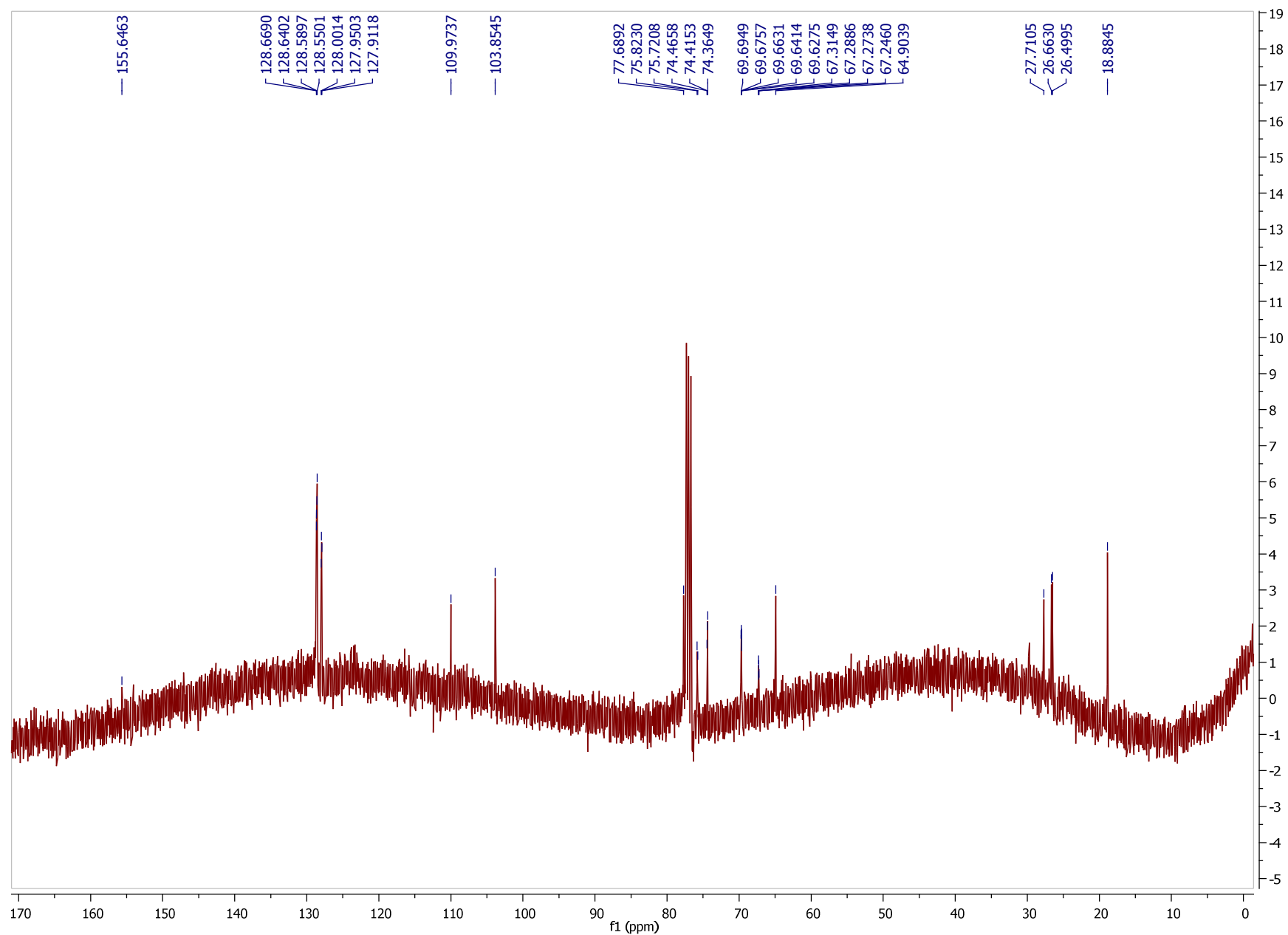
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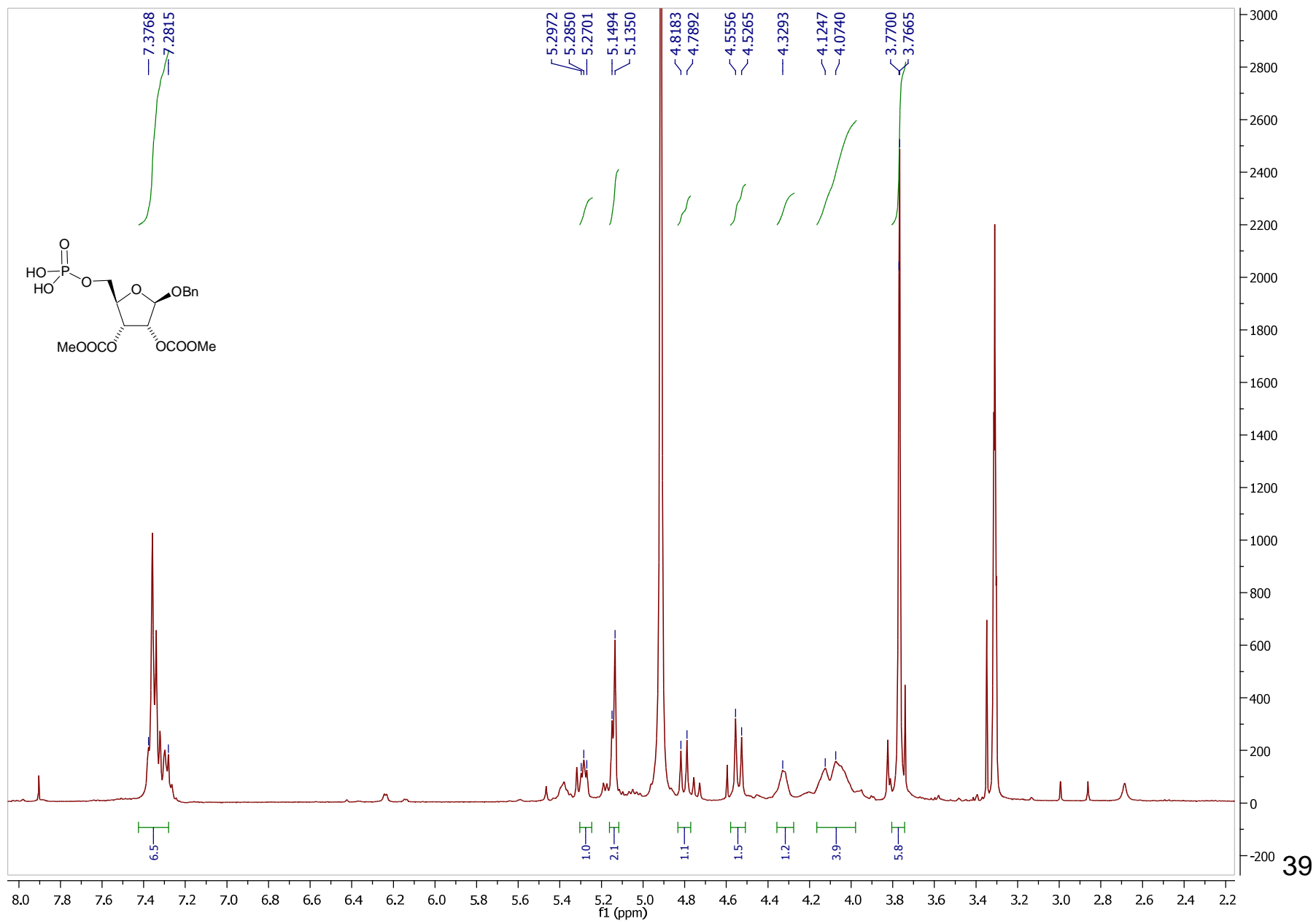
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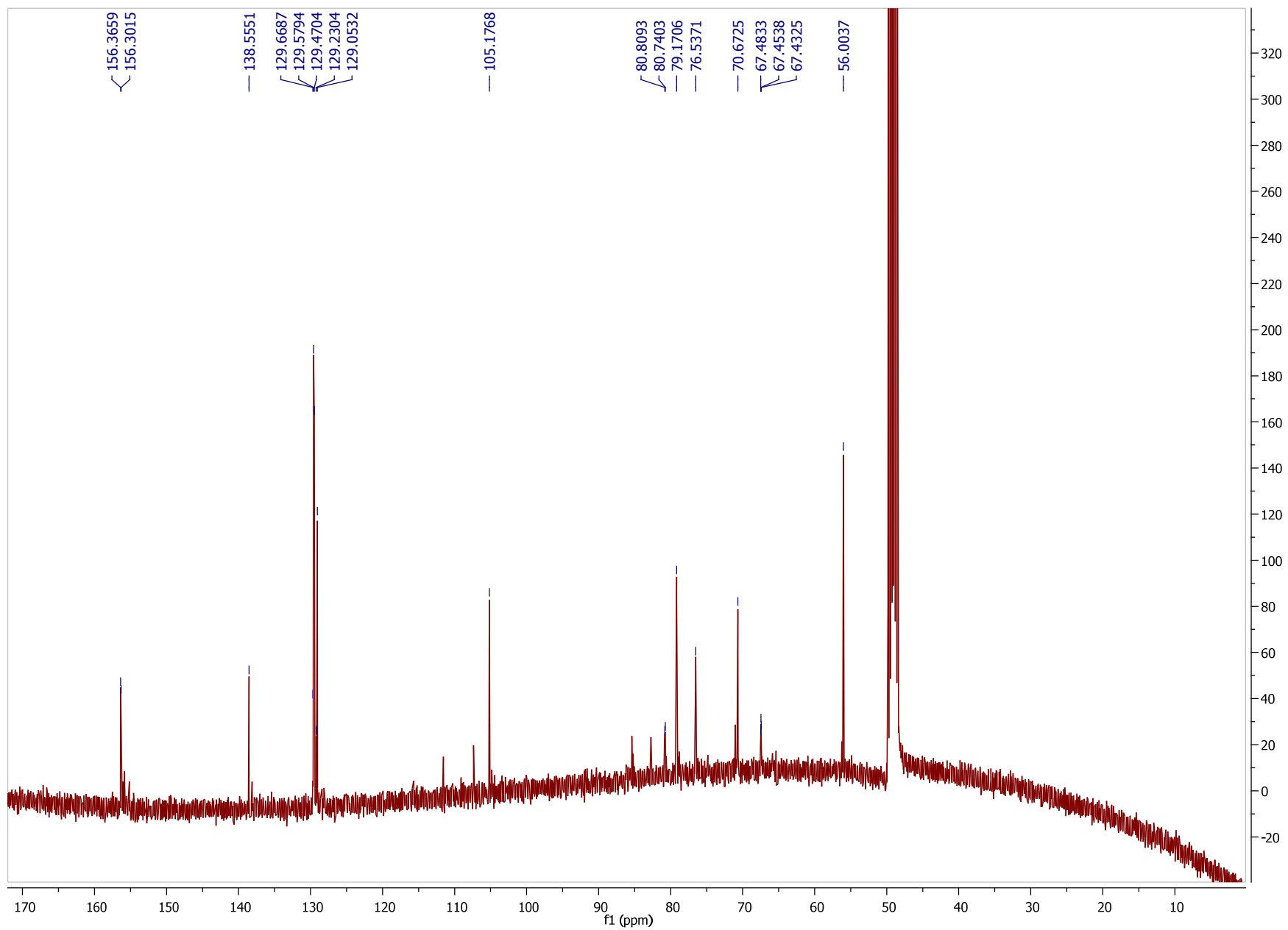
5-O-dibenzylphosphate-1,2-O-isopropylidene-3-O-isobutylcarbonate- α -D-ribofuranoside **10c**: ^{13}C -NMR



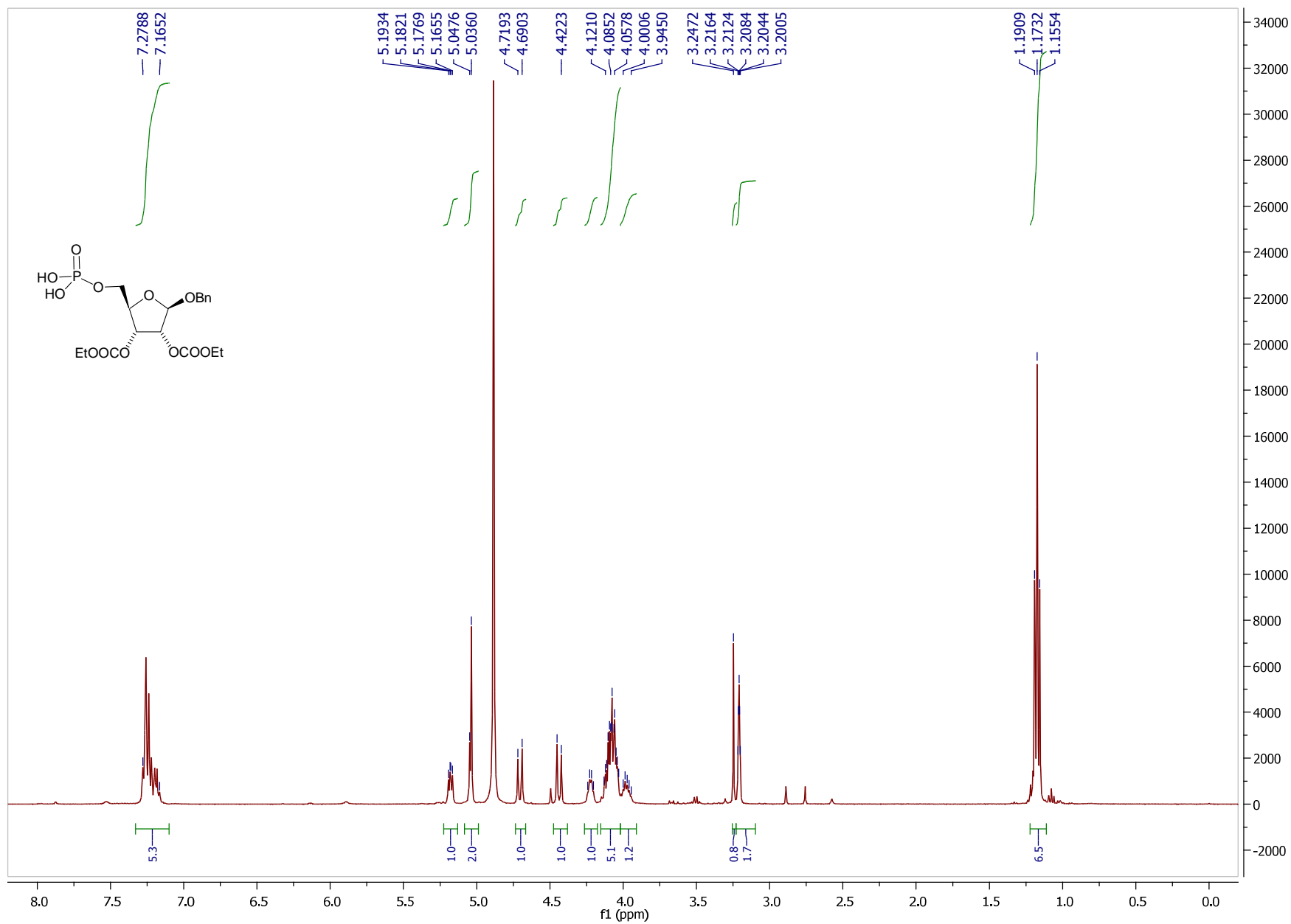
5-O-phosphate-1-O-benzyl-2,3-O-bis(methylcarbonate)- β -D-ribofuranoside **12a**: $^1\text{H-NMR}$



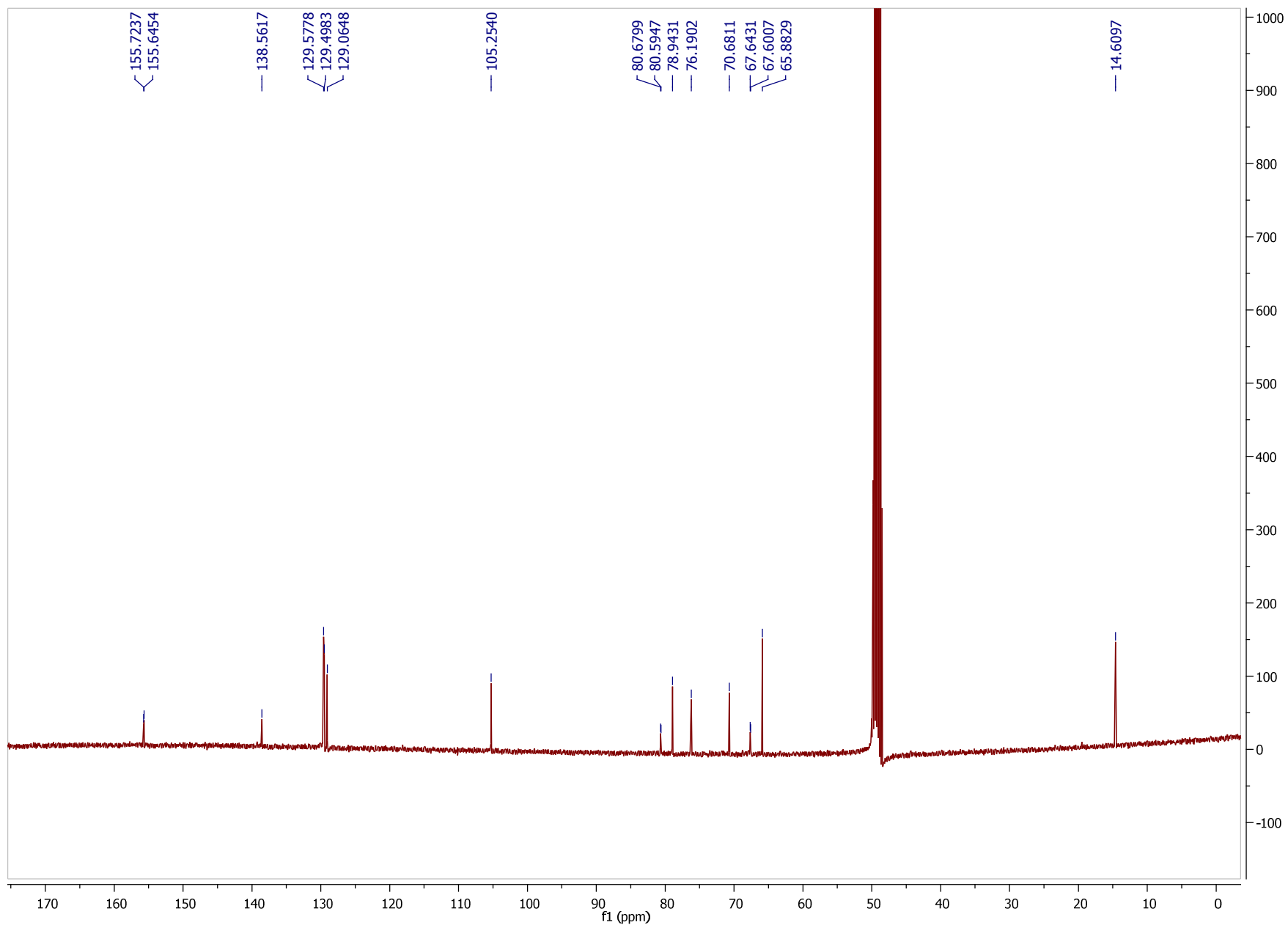
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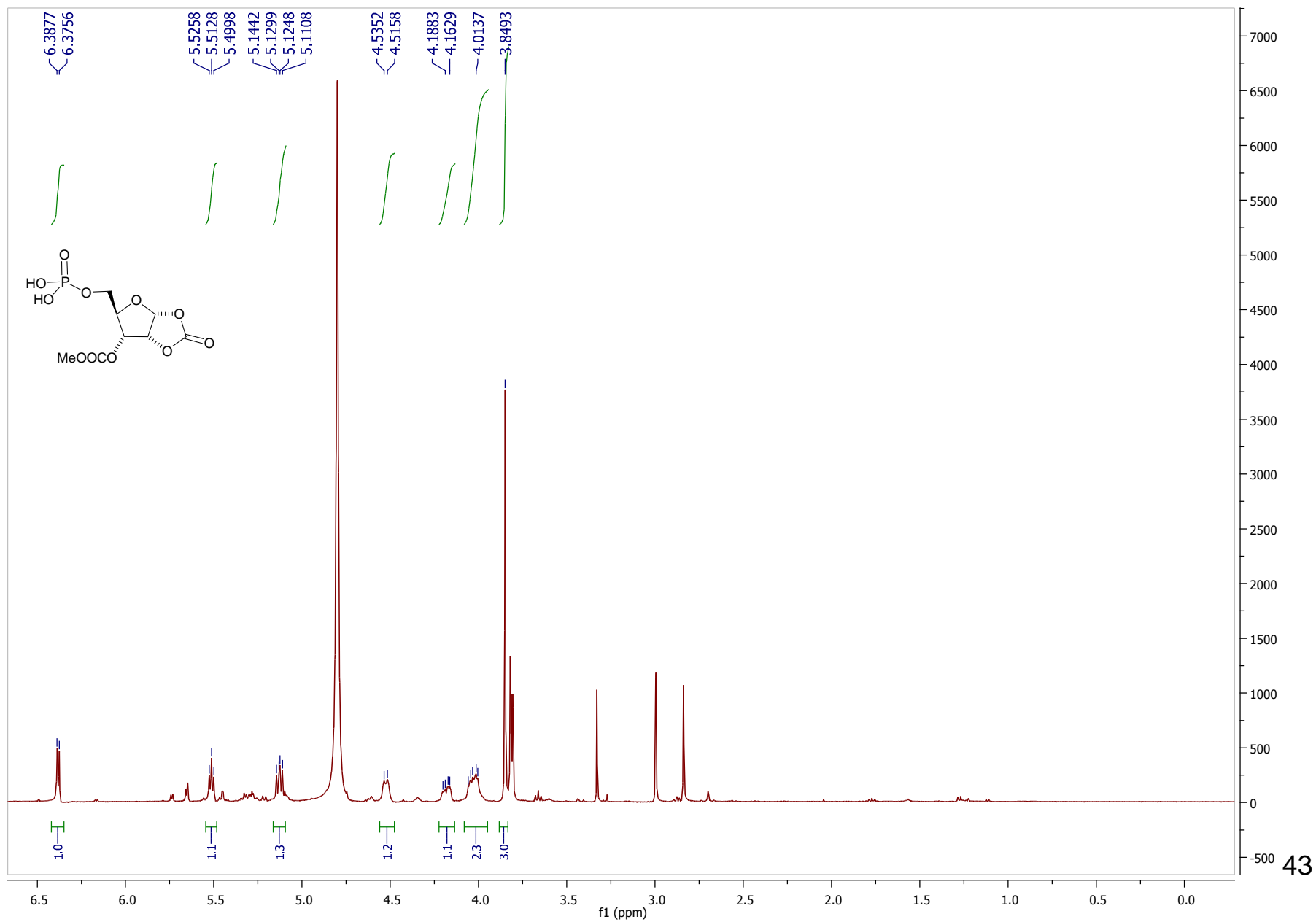
5-O-phosphate-1-O-benzyl-2,3-O-bis(ethylcarbonate)- β -D-ribofuranoside **12b**: $^1\text{H-NMR}$



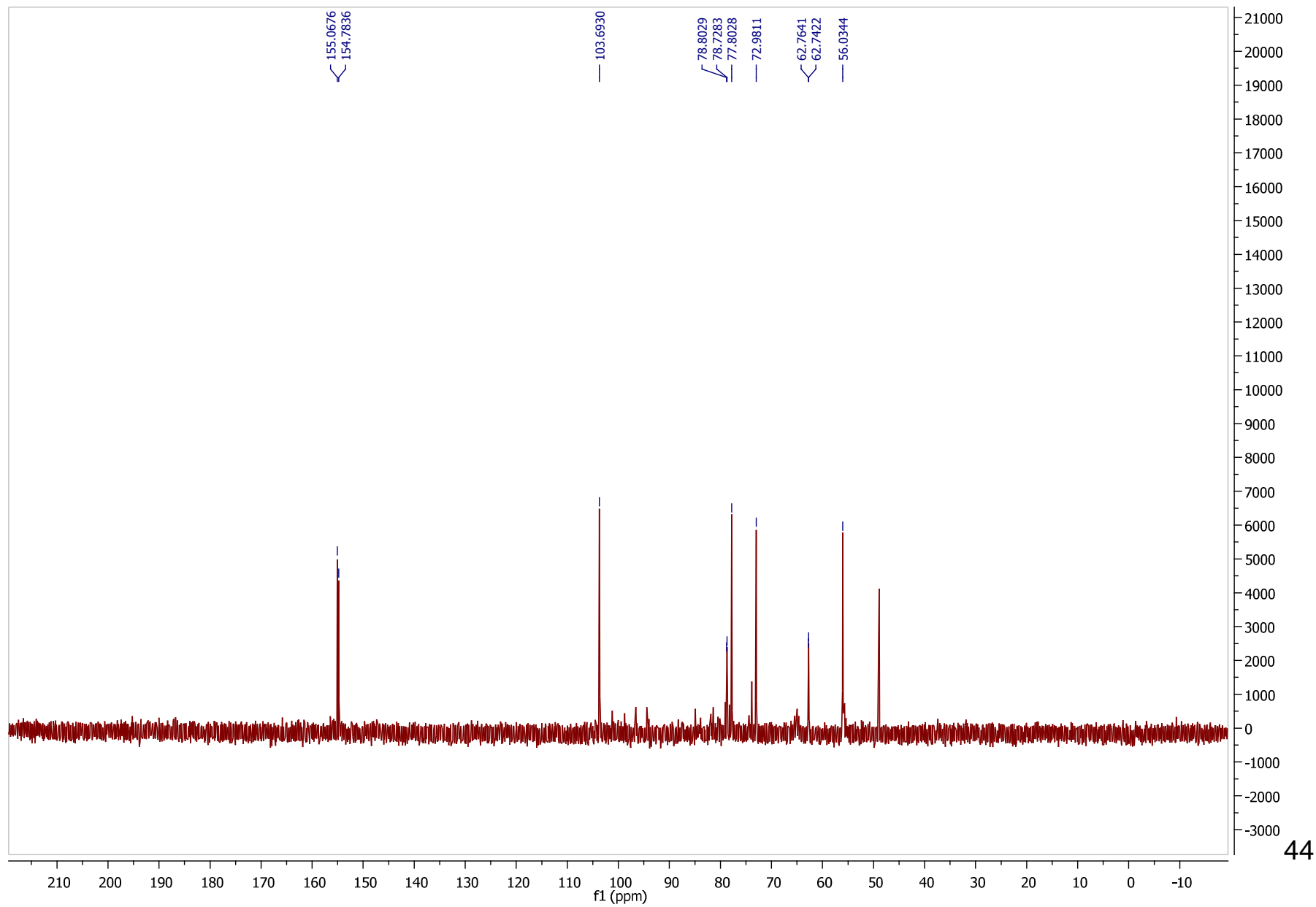
5-O-phosphate-1-O-benzyl-2,3-O-bis(ethylcarbonate)- β -D-ribofuranoside **12b**: ^{13}C -NMR



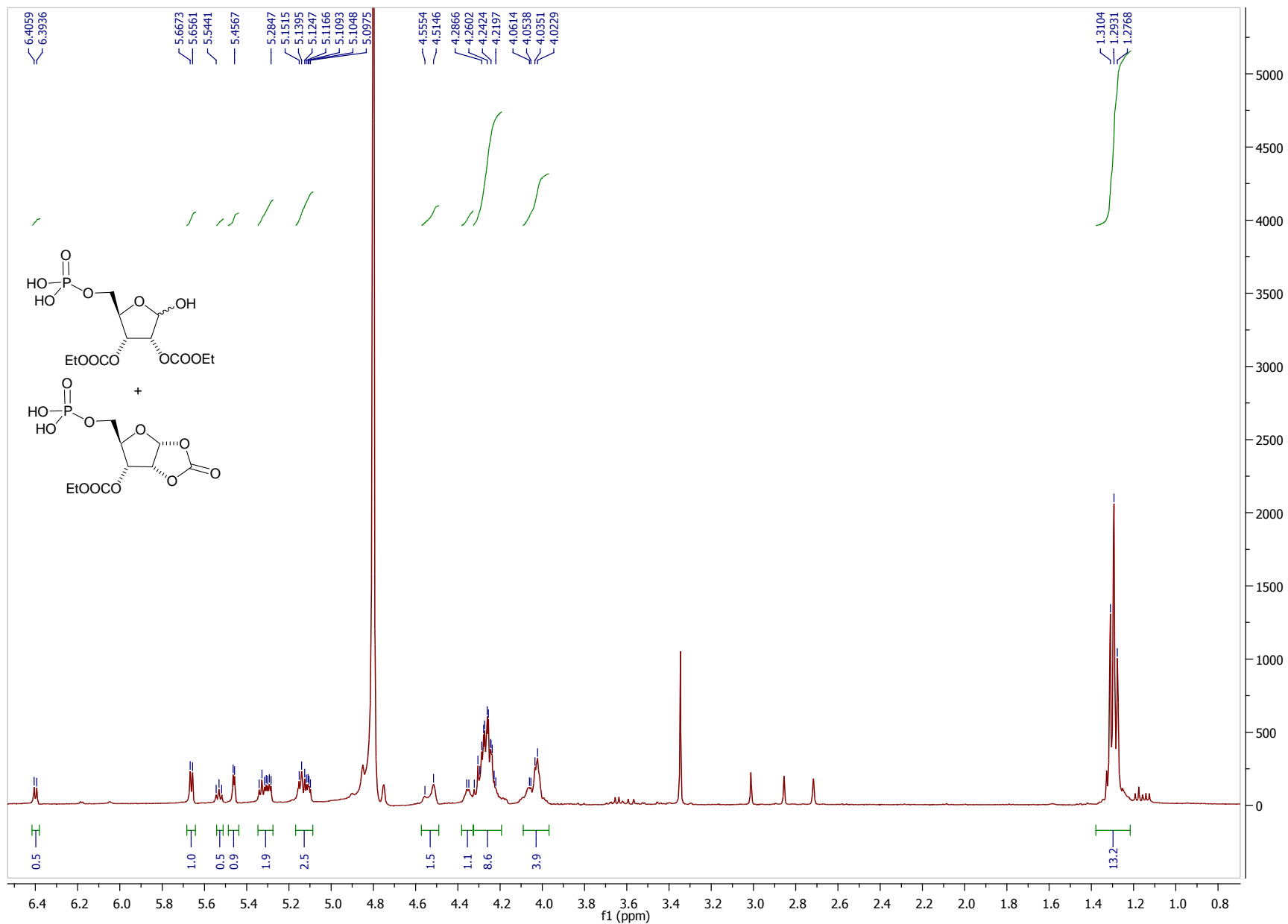
5-O-phosphate-1,2-O-carbonate-3-O-methylcarbonate- β -D-ribofuranoside **15a**: $^1\text{H-NMR}$



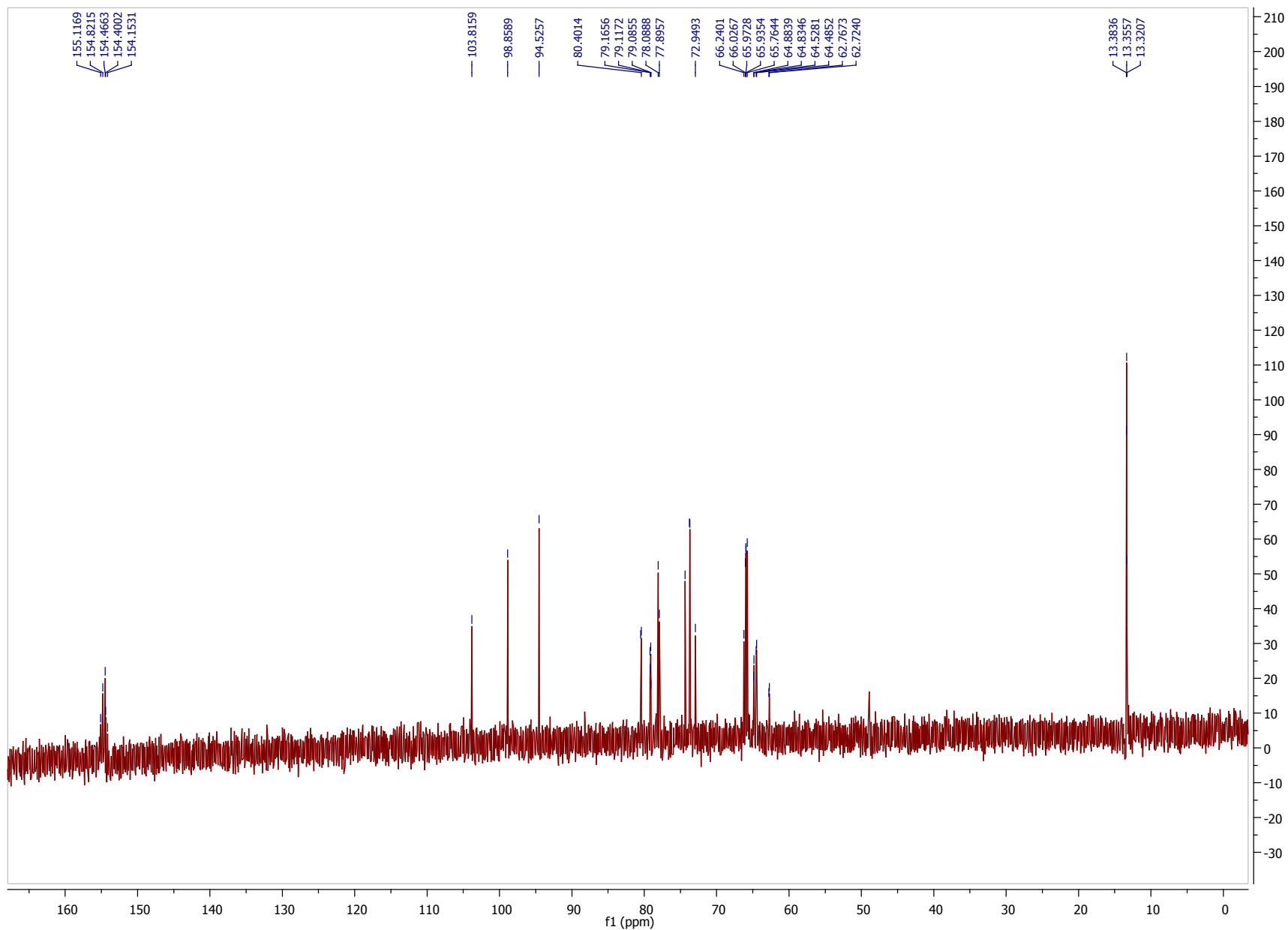
5-O-phosphate-1,2-O-carbonate-3-O-methylcarbonate- β -D-ribofuranoside **15a**: ^{13}C -NMR



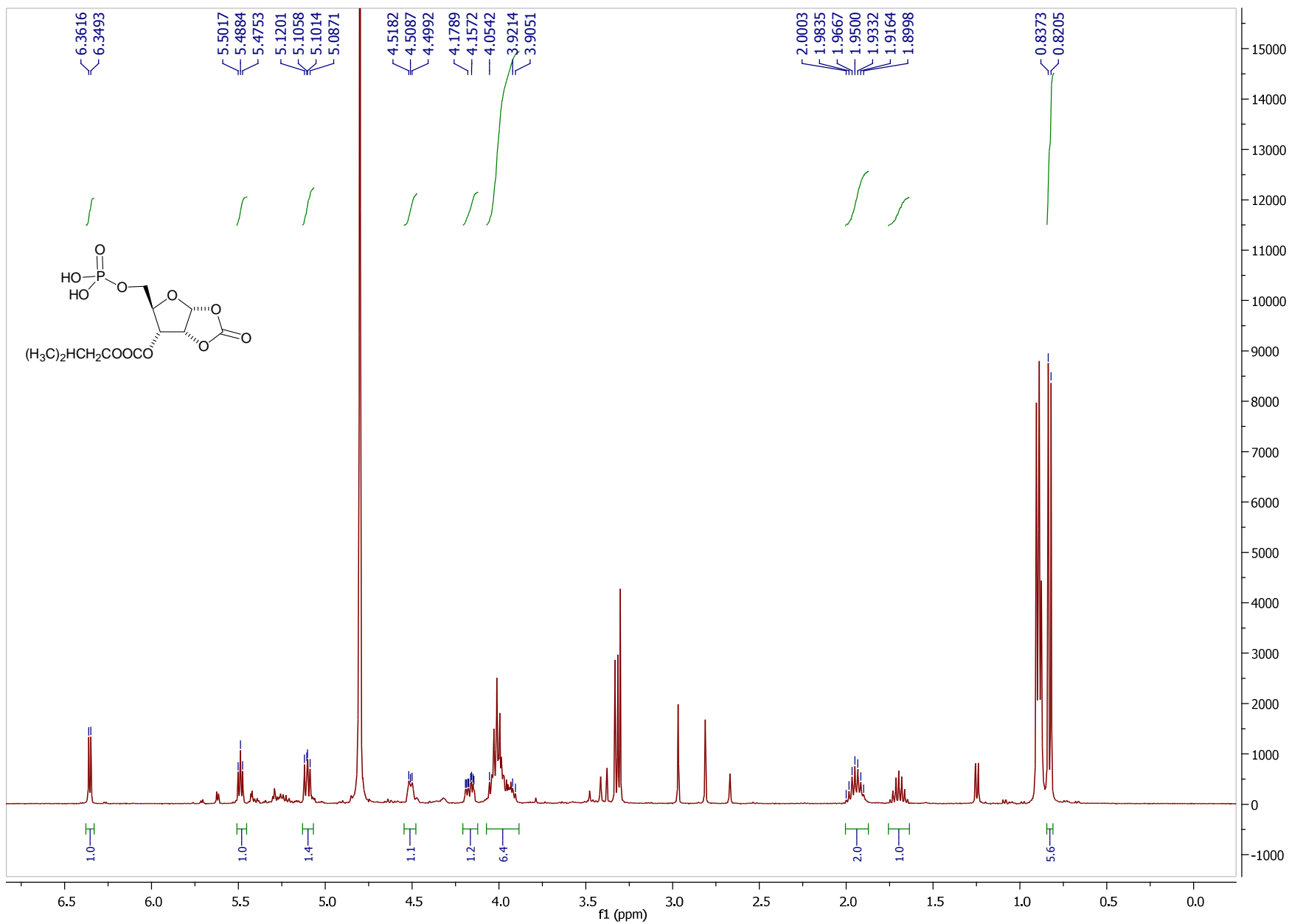
5-O-phosphate-2,3-O-bis(ethylcarbonate)-D-ribofuranoside **13b** in α - (A) and β - (B) form,
and 5-O-phosphate-1,2-O-carbonate-3-O-ethylcarbonate- β -D-ribofuranoside **15b**: $^1\text{H-NMR}$



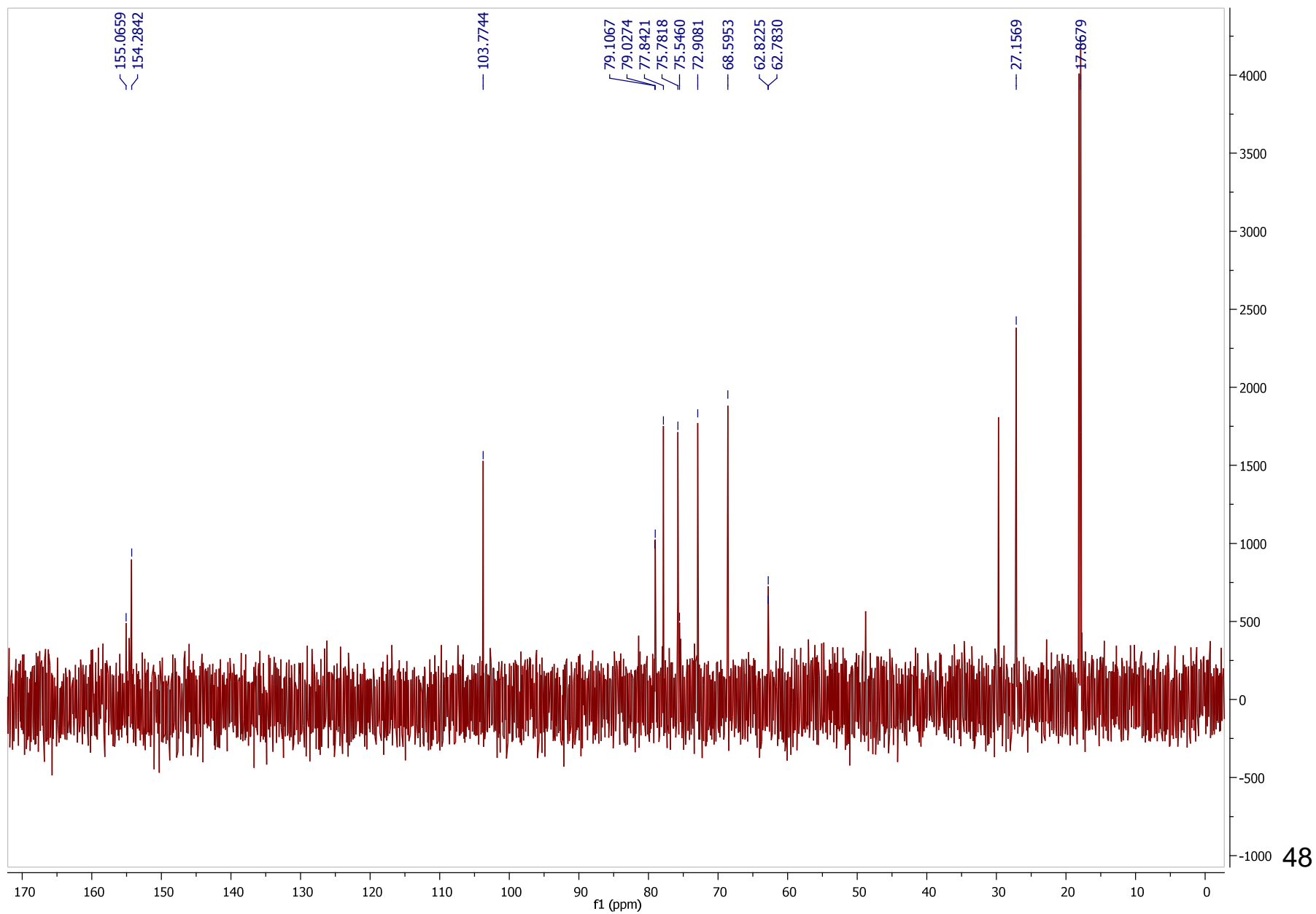
5-O-phosphate-2,3-O-bis(ethylcarbonate)-D-ribofuranoside 13b in α - (A) and β - (B) form,
and *5-O-phosphate-1,2-O-carbonate-3-O-ethylcarbonate- β -D-ribofuranoside 15b*: ^{13}C -NMR



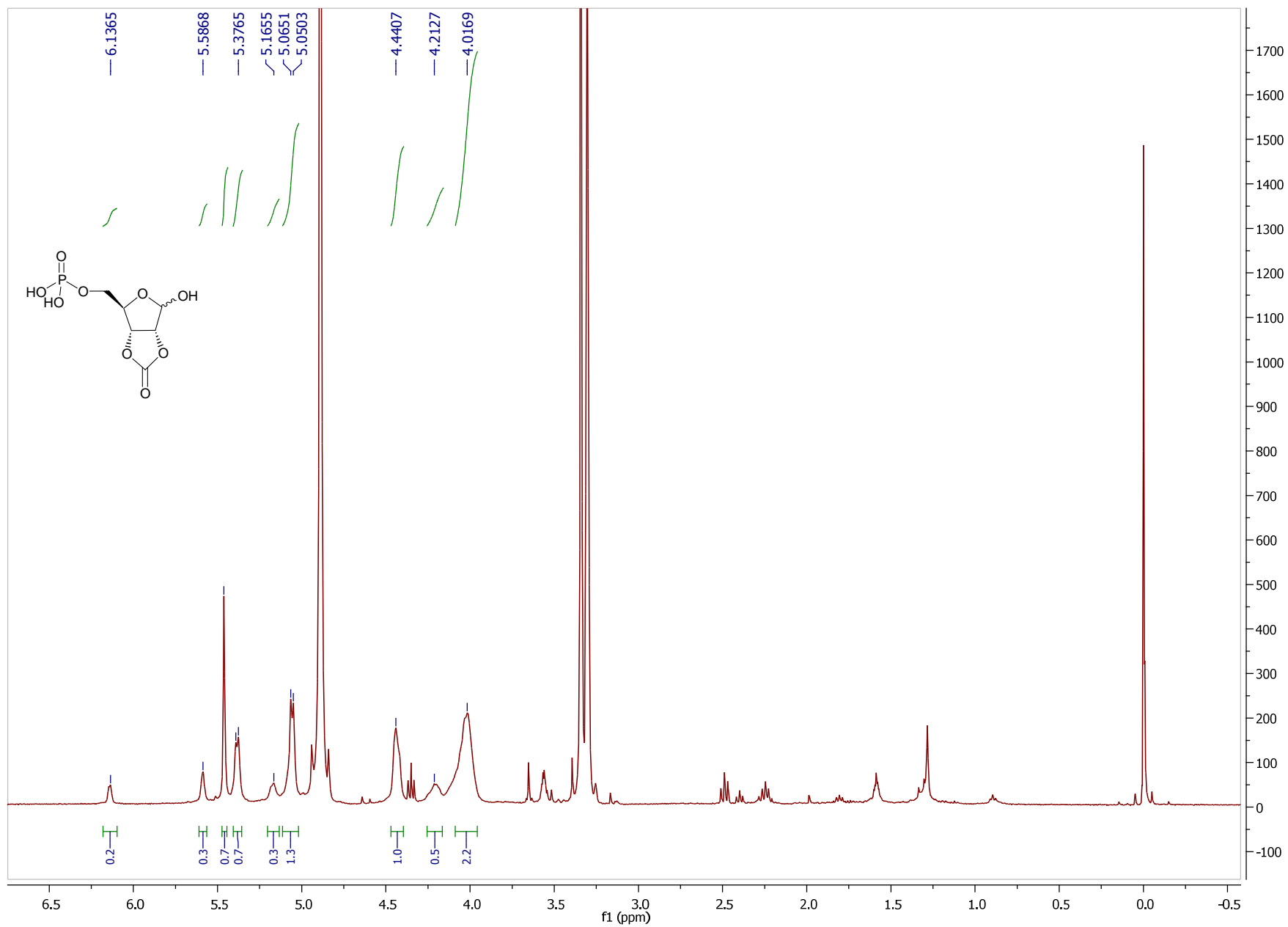
5-O-phosphate-1,2-O-carbonate-3-O-isobutylcarbonate-β-D-ribofuranoside **15c**: ¹H-NMR



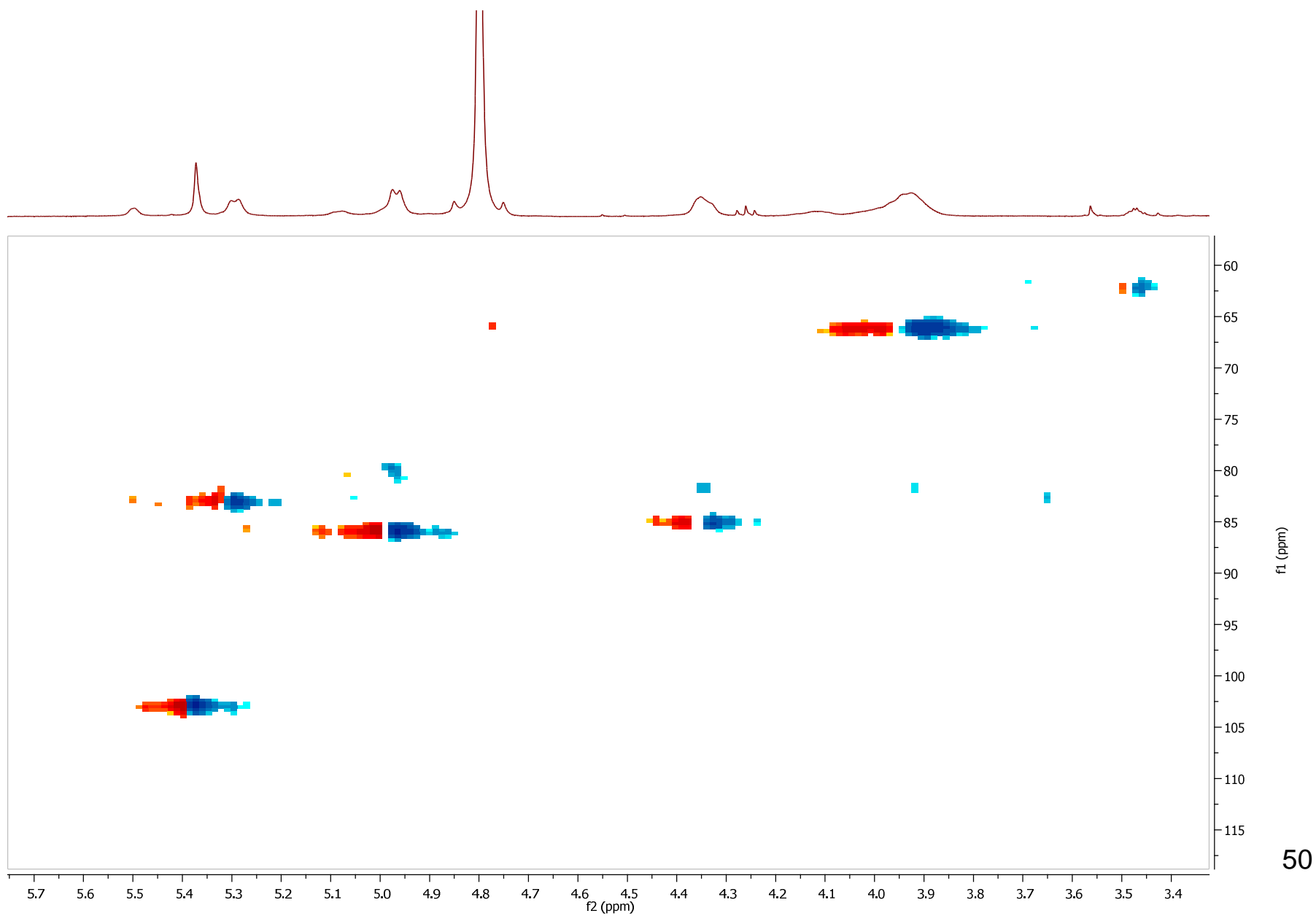
5-O-phosphate-1,2-O-carbonate-3-O-isobutylcarbonate- β -D-ribofuranoside **15c**: ^{13}C -NMR



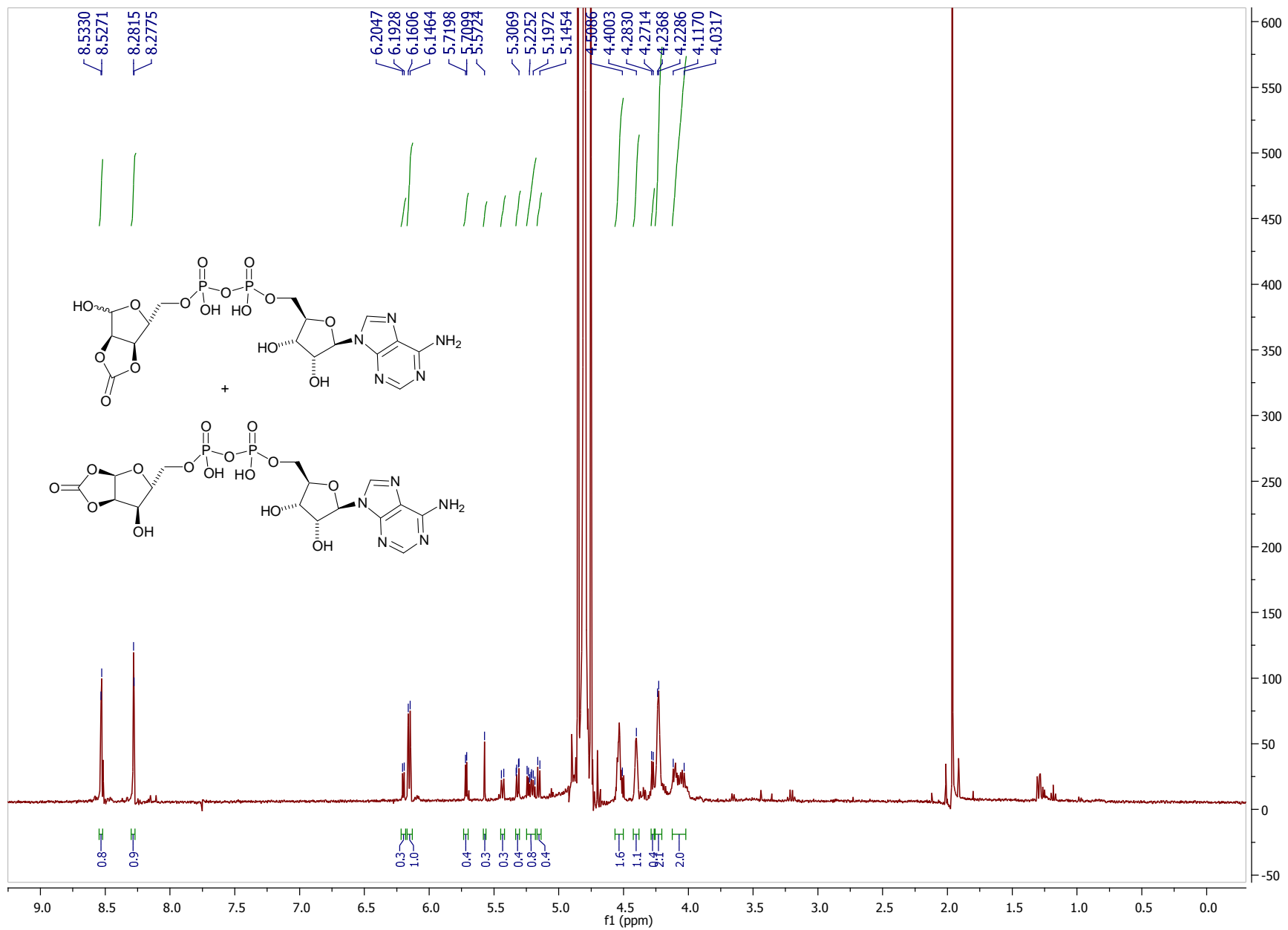
5-O-phosphate-2,3-O-carbonate- β -D-ribofuranose **11d**: $^1\text{H-NMR}$



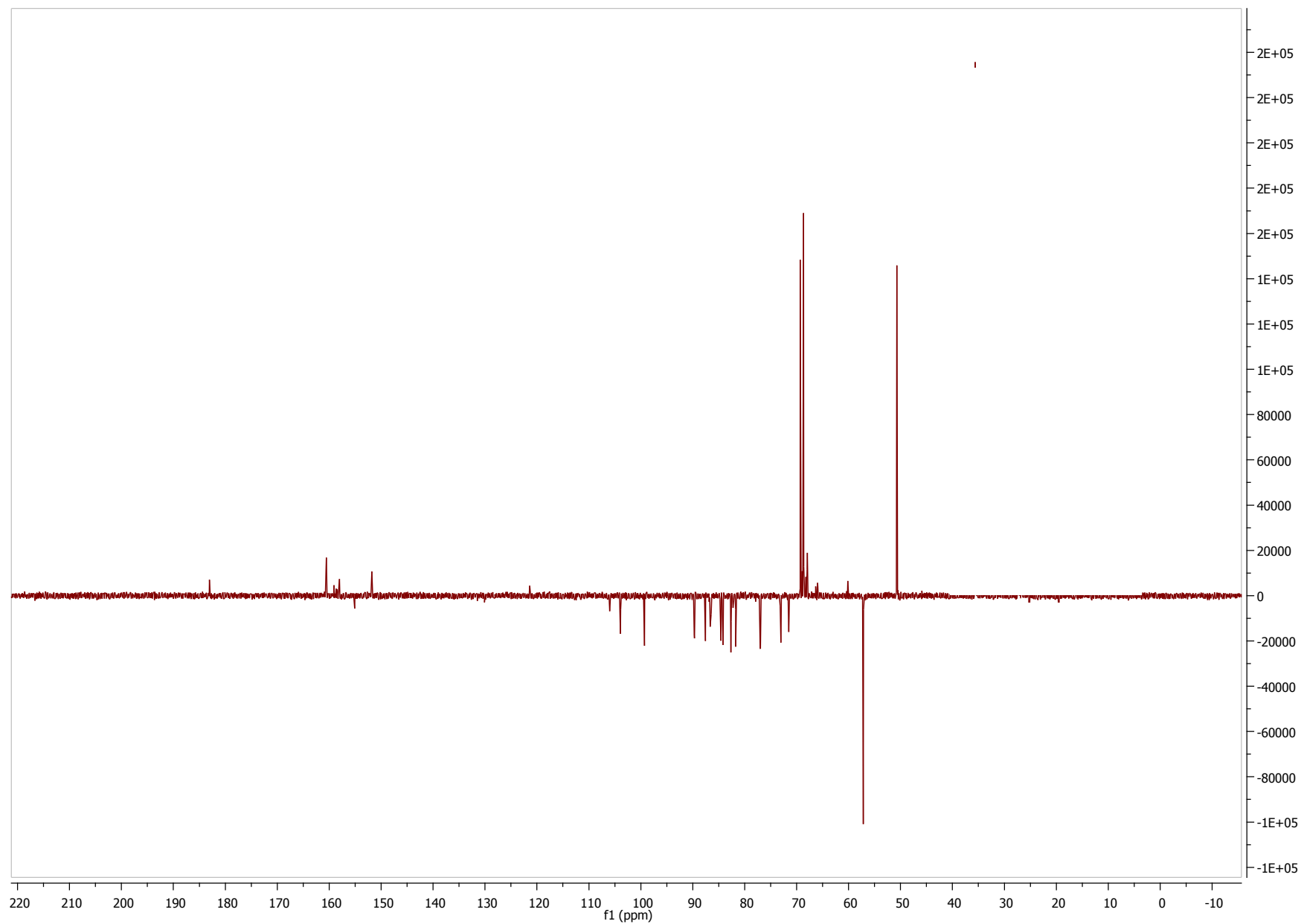
5-O-phosphate-2,3-O-carbonate- β -D-ribofuranose **11d**: HSQC



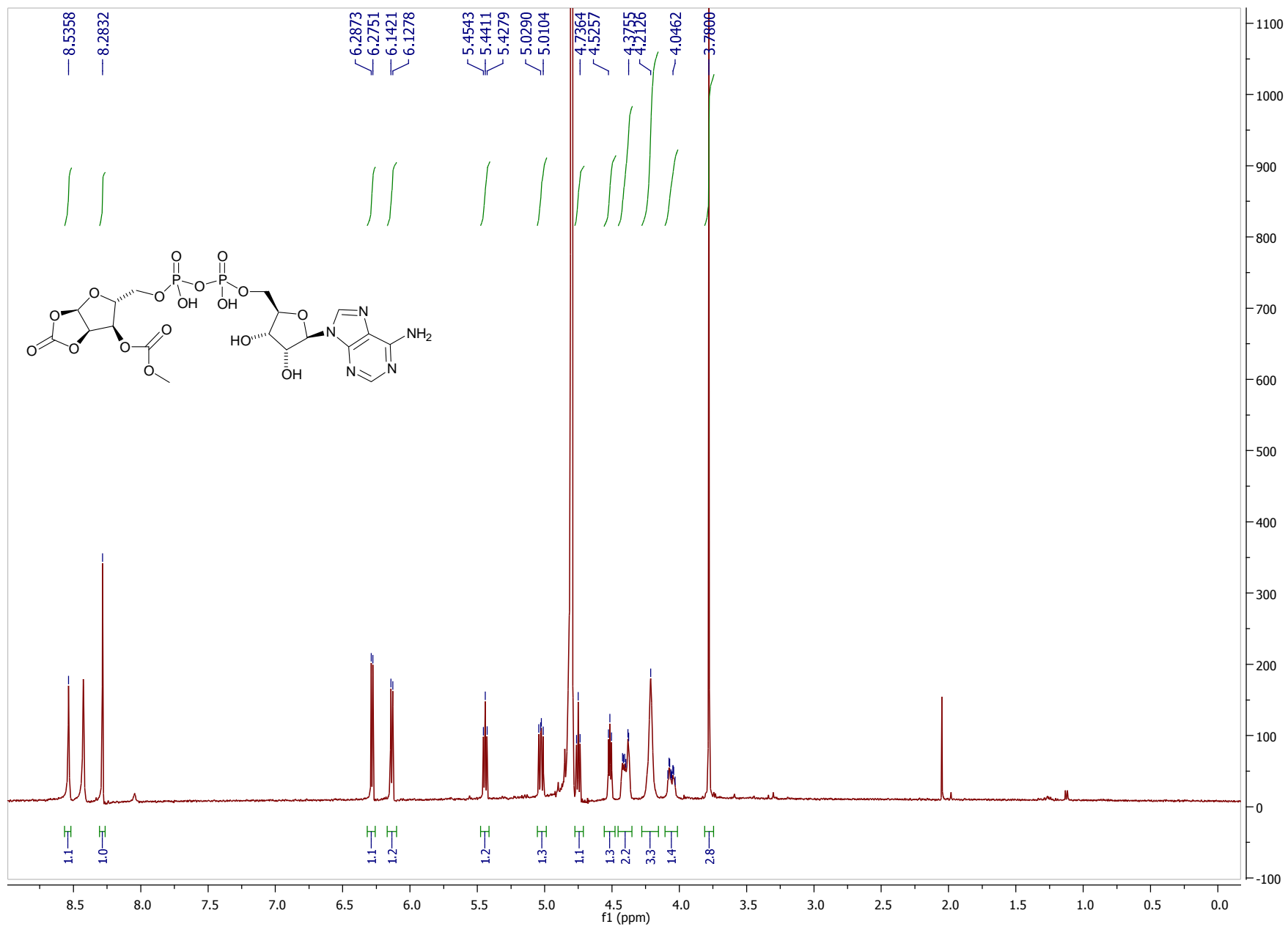
2',3'-O-carbonate-ADP-ribose **13d** (α - and β -anomers) + 1',2'-O-carbonate-ADP-ribose **13e**: $^1\text{H-NMR}$



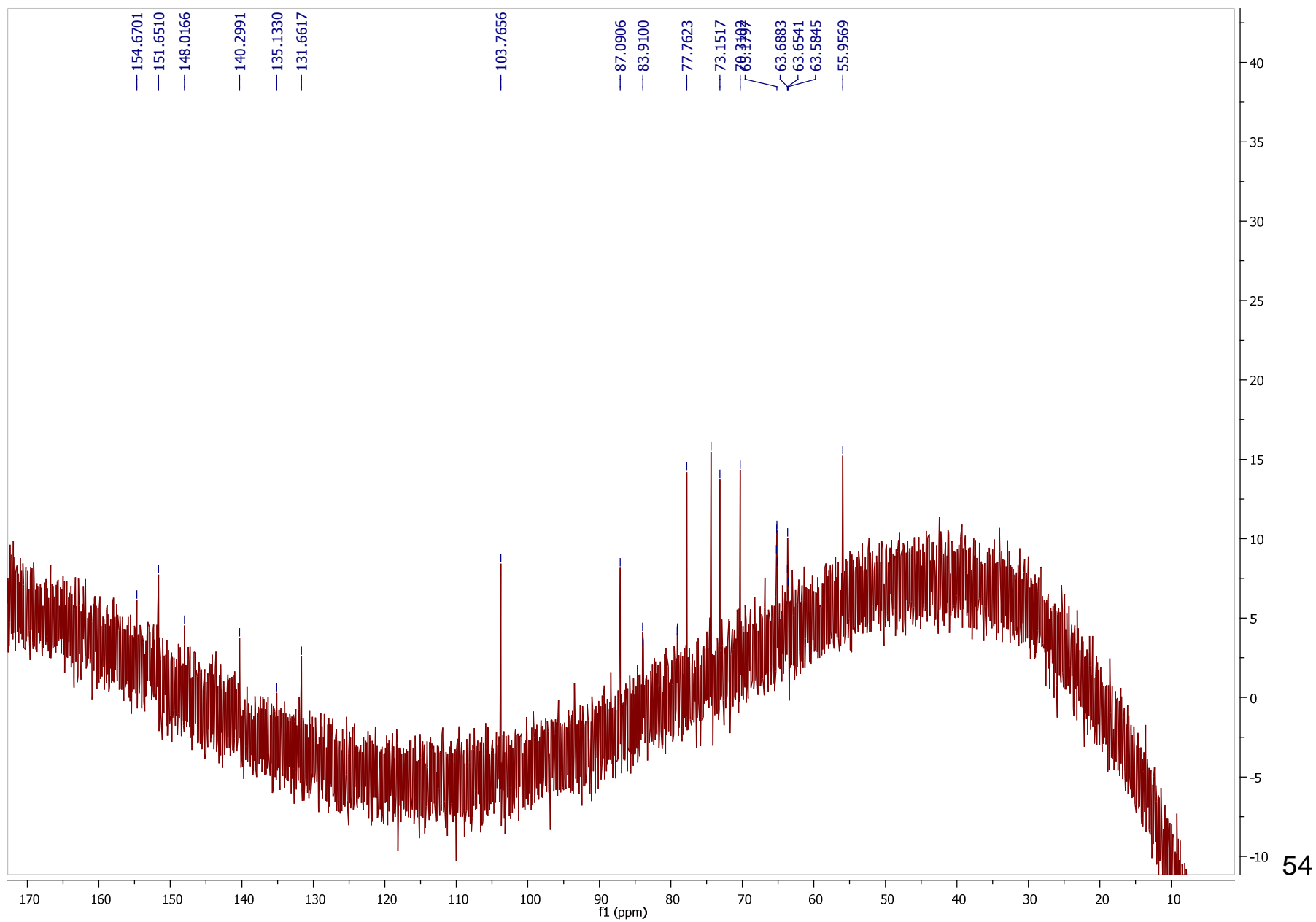
2',3'-O-carbonate-ADP-ribose 13d (α - and β -anomers) + *1',2'-O-carbonate-ADP-ribofuraside 13e*: ^{13}C -NMR



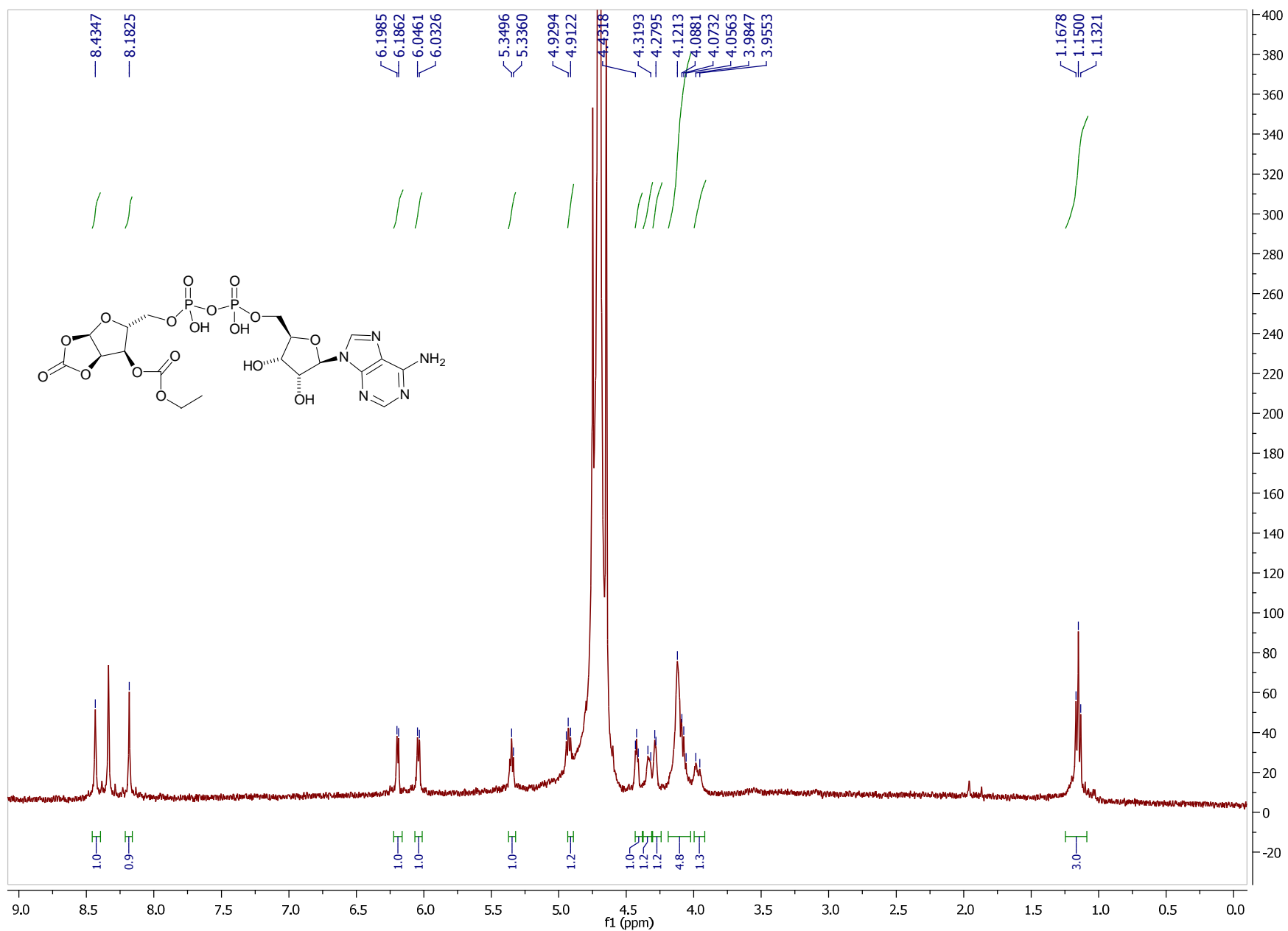
1',2'-O-carbonate-3'-O-methylcarbonate-ADP-ribofuranoside **16a**: ¹H-NMR



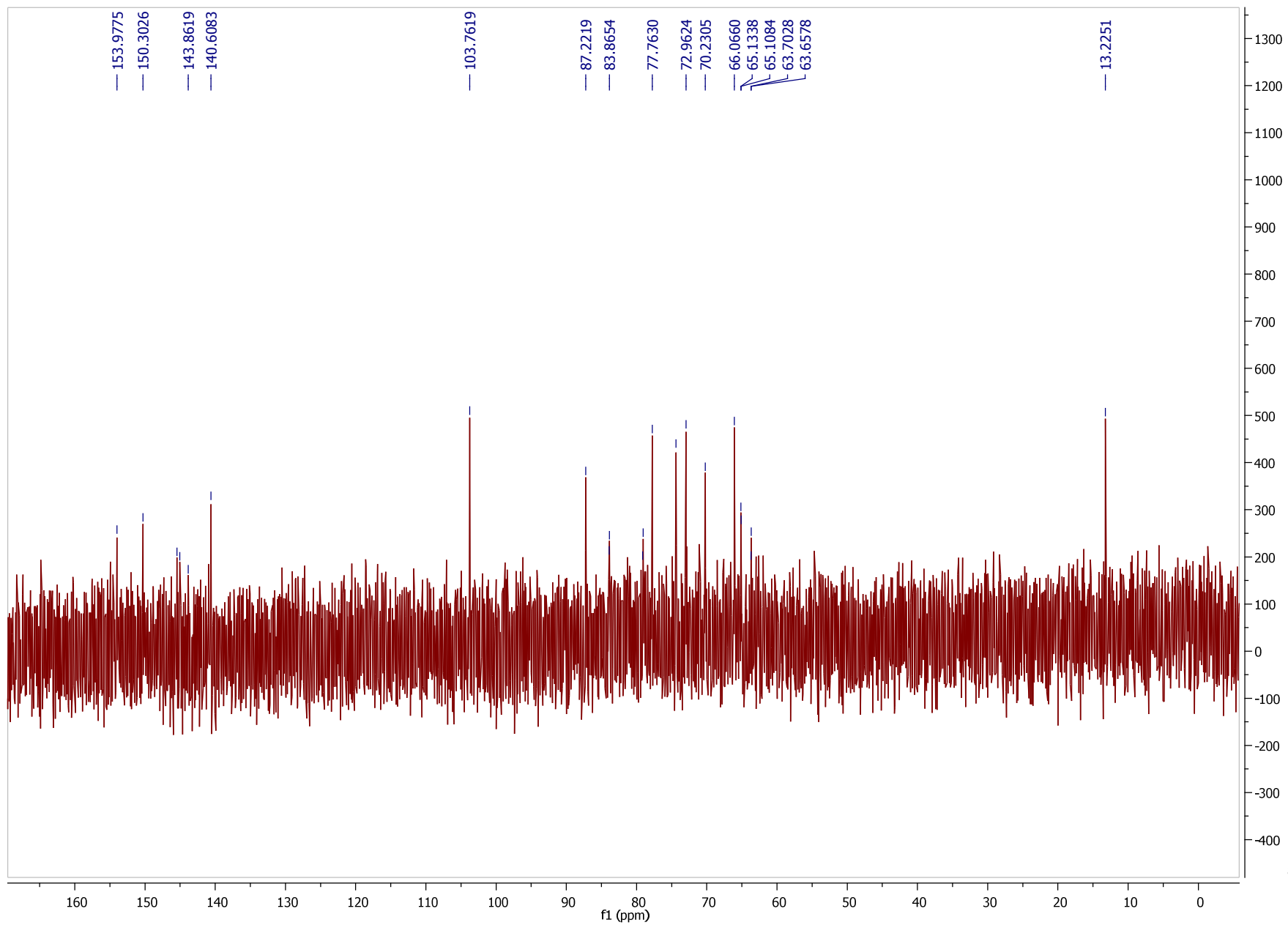
1',2'-O-carbonate-3'-O-methylcarbonate-ADP-ribofuranoside 16a: ^{13}C -NMR



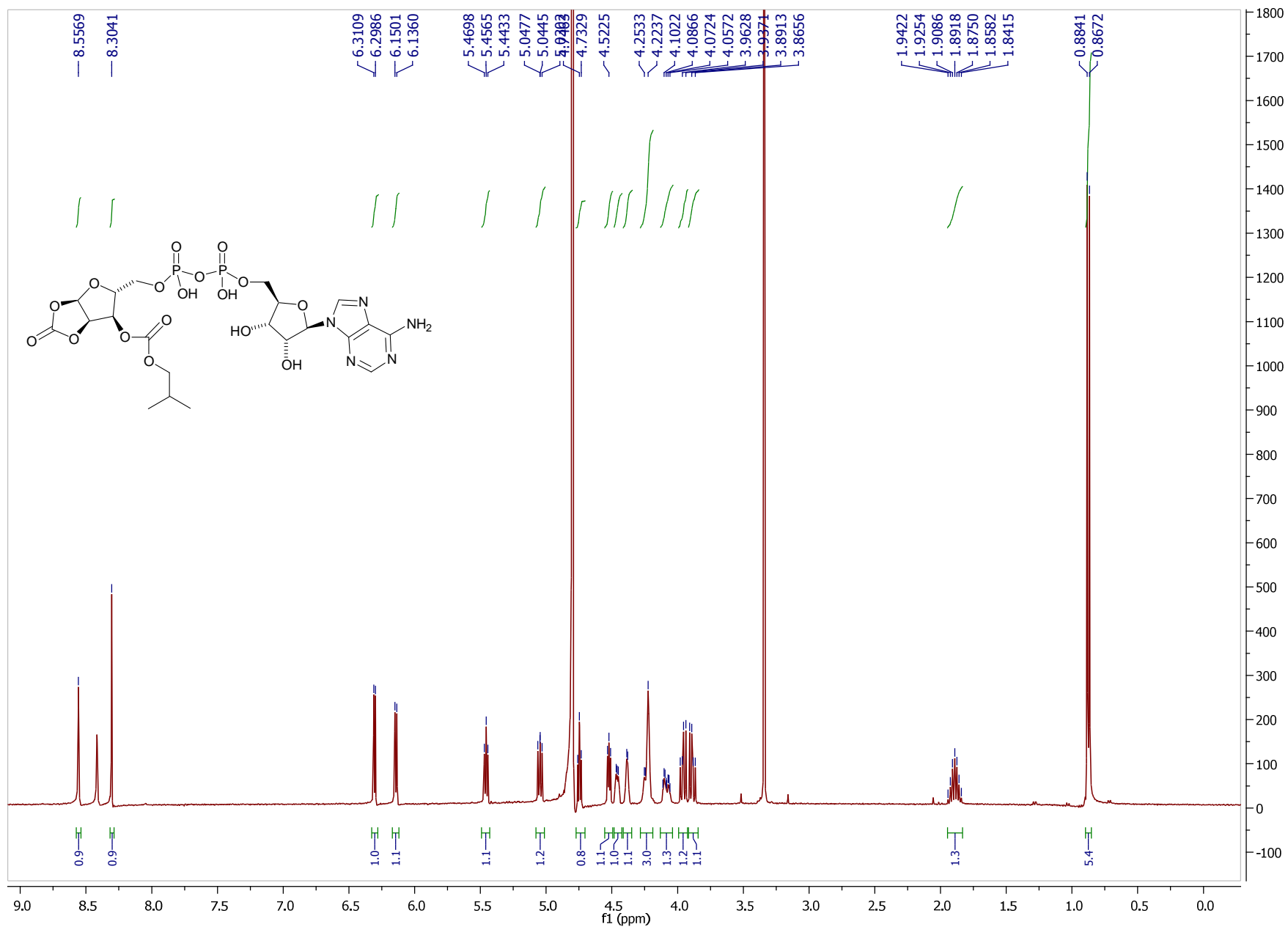
1',2'-O-carbonate-3'-O-ethylcarbonate-ADP-ribofuranoside 16b: ¹H-NMR



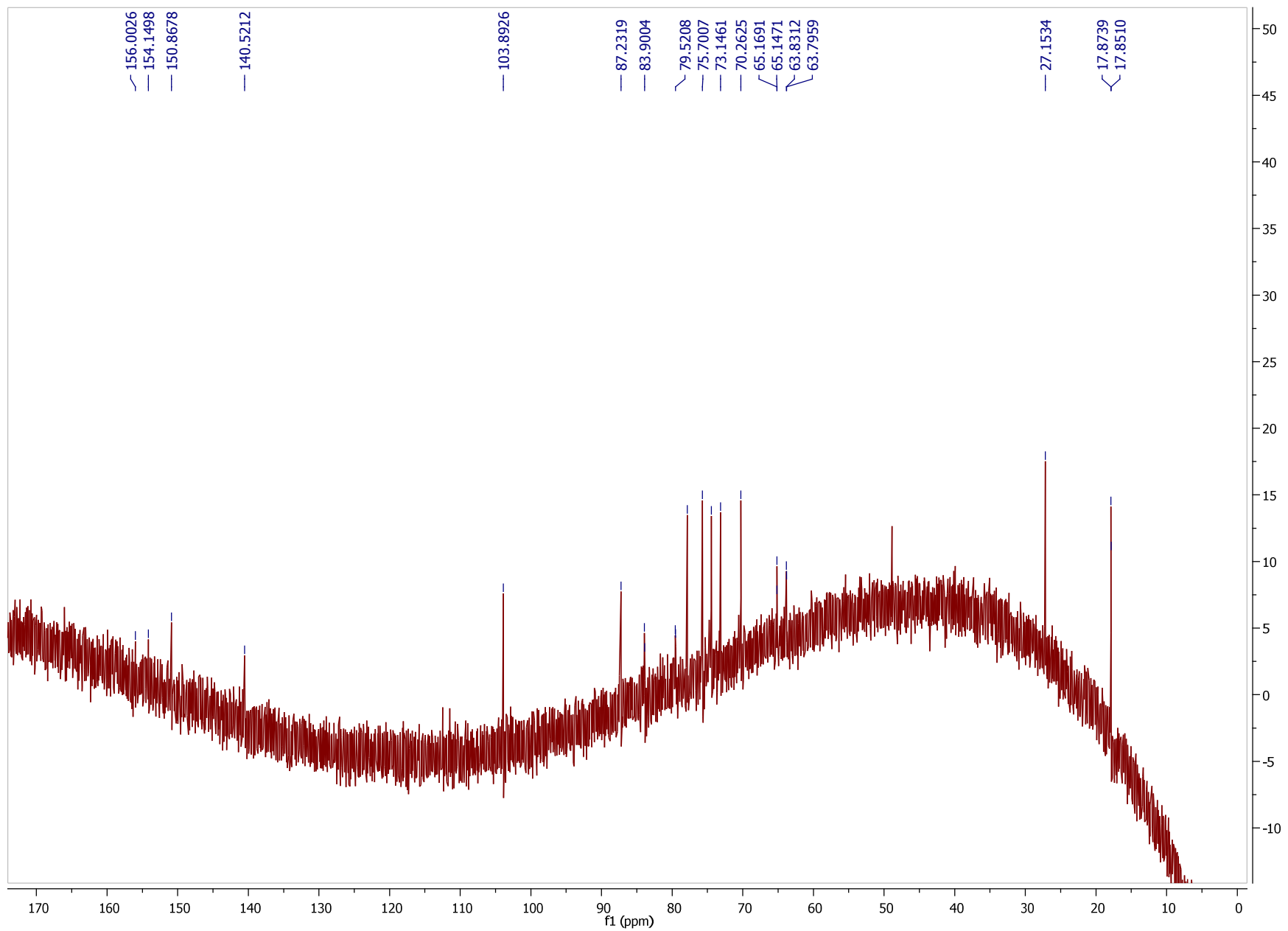
1',2'-O-carbonate-3'-O-ethylcarbonate-ADP-ribofuranoside 16b: ^{13}C -NMR



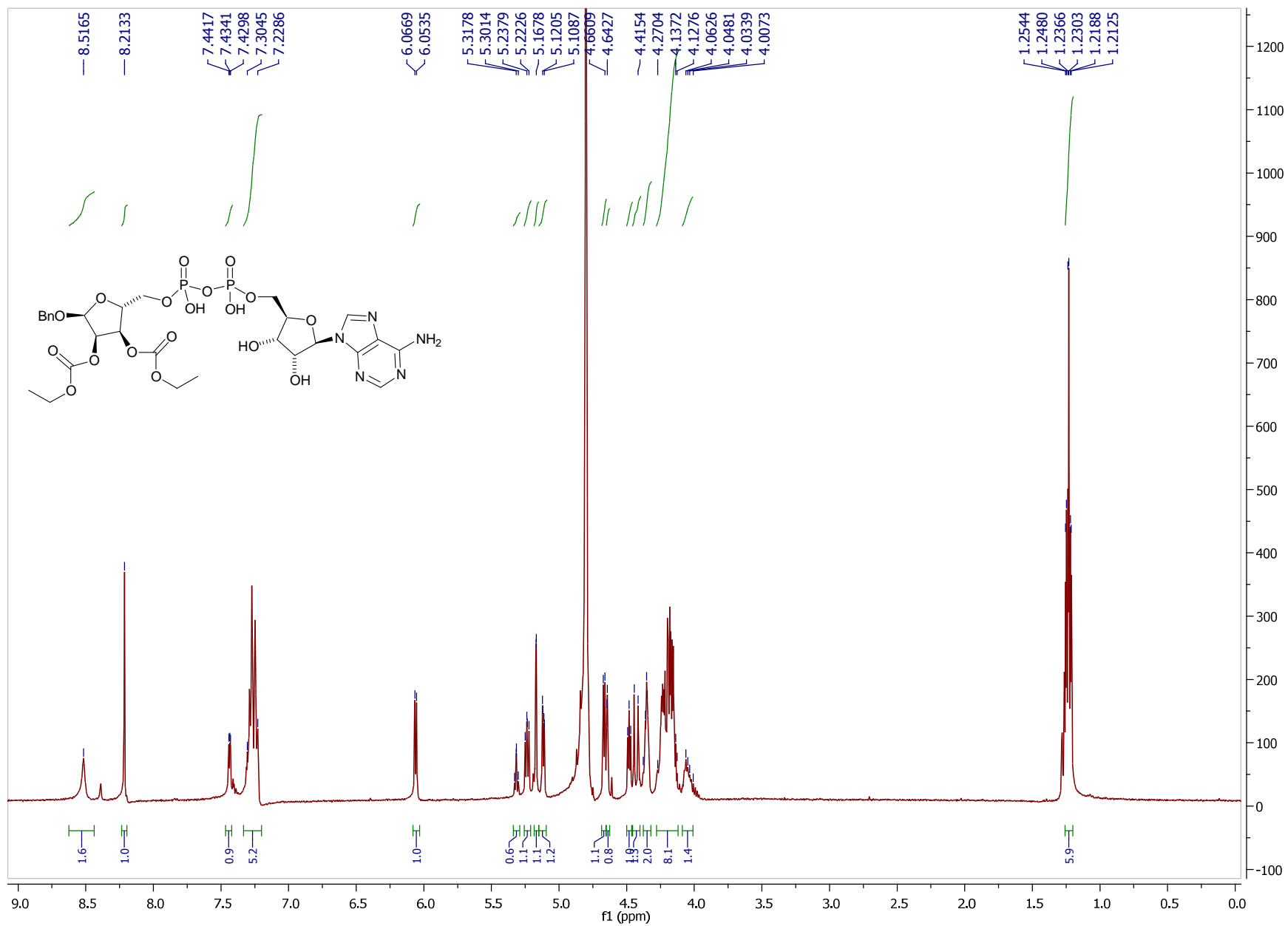
1',2'-O-carbonate-3'-O-isobutylcarbonate-ADP-ribofuranoside **16c**: ¹H-NMR



1',2'-O-carbonate-3'-O-isobutylcarbonate-ADP-ribofuranoside 16c: ^{13}C -NMR



1'-O-benzyl-2',3'-O-bis(ethylcarbonate)-ADP-ribofuranoside **17b**: ¹H-NMR



1'-O-benzyl-2',3'-O-bis(ethylcarbonate)-ADP-ribofuranoside 17b: ¹H-NMR

