Supporting Information

A metal-free one-pot cascade synthesis of highly functionalized biaryl-2-carbaldehydes†

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General experimental methods:

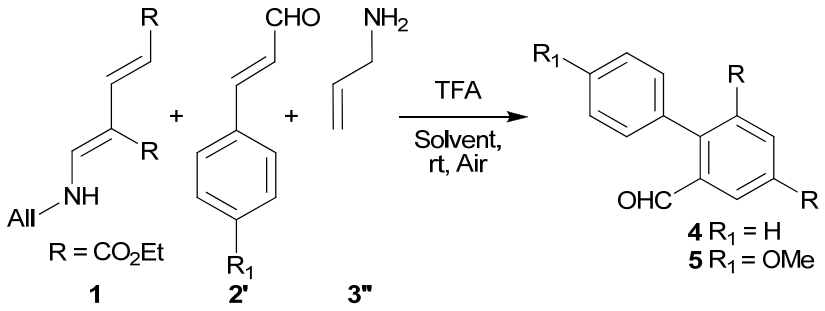
All the solvents were used without distillation and all biaryl syntheses were carried out at room temperature under inert-free aerobic atmosphere. Silica gel G-60 F_{254} aluminum TLC plates were used to monitor the reactions with short wavelength ultraviolet light to visualize the spots. Flash column chromatography was performed on silica gel 230-400 mesh. ^{1}H and ^{13}C NMR spectra were recorded at 500 and 125 MHz, respectively. Chemical shifts are given in ppm using solvent residual peak of chloroform δ 7.26 ppm as reference, and coupling constants in Hz. ESI- HRMS analysis was recorded using electrospray ionization with ions given in m/z.

General procedure for synthesis of cinnamaldehydes: Cinnamaldehydes were synthesized by following a known procedure employing Wittig reaction.[1] To a 50 mL round bottom flask equipped with a magnetic bar were added toluene (10 mL), pertinent aromatic aldehyde (1.5 mmol), (triphenylphosphoranylidene)acetaldehyde (Wittig reagent) (500 mg, 1 mmol) and the resulting mixture was stirred at 85 $^{\circ}C$ for overnight. After complete consumption of the Wittig reagent as indicated on TLC, the reaction mixture was concentrated and subjected to flash column chromatography. The product was eluted with DCM/hexane solvent system to afford the desired cinnamaldehyde.

Procedure for synthesis of biaryl 4: To a solution of dienaminodiester **1** (31 mg, 1 eq) in $CHCl_3$/MeCN (1:1) were added cinnamaldehyde (46.20 μL, 3 eq), allyl amine (27.5 μL, 3 eq) and TFA (28.0 μL, 3 eq) in a sequential manner at room temperature. After immediate addition of TFA, the reaction mixture appears intense red in color indicating the formation of trienamine. After complete consumption of compound **1** as visualized on TLC, the reaction mixture was quenched with saturated aqueous $NaHCO_3$ (10 mL) and extracted with DCM (1 x 10 mL). The organic layer was dried over anhydrous $MgSO_4$, concentrated and the crude mixture was subjected to flash column chromatography by eluting with DCM/hexane solvent system to afford

the desired biaryl **4** (24 mg, 60%). This general procedure was followed for the synthesis of the remaining biaryls.

Optimization of reaction conditions:



S.No	Ratio[a] TFA:2':3"	Solvent[b]	R_1	Yield[c]
1	1:1:1	MeCN/DCM (1:2)	H	29%
2	3:2:2	MeOH	H	27%
3	3:2:2	THF	H	26%
4	3:2:2	toluene	H	32%
5	3:2:2	MeCN/toluene (1:1)	H	44%
6	3:3:3	DMF	H	25%
7	3:3:3	DMSO	OMe	trace
8	3:3:3	DME	OMe	nd
9	3:3:3	DMA	OMe	nd
10	3:3:3	MeCN/MeOH(1:1)	OMe	38%
11	2:1.5:2	MeCN/DCM (1:2)	H	31%
12	3:1.5:3	MeCN/DCM (1:2)	H	46%
13	3:1.5:3	MeCN/DCM (1:3)	H	43%
14	2:1.2:1.4	MeCN/DCM (1:1)	H	31%

[a]equivalents of TFA, **2'** and **3"** respectively, [b]undistilled solvents, [c]isolated yields,

DMA = dimethylacetamide, DME = dimethoxyethane, nd = not detected

Diethyl-2-nitro-6-oxo-6H-benzo[c]chromene-8,10-dicarboxylate (8): To a solution of benzopyrone **7o** (14 mg, 1 eq) in DCM (1.5 mL) was added Dess-Martin periodinane (46 mg, 3 eq) at room temperature. After complete consumption of **7o** as indicated on TLC, the reaction mixture was quenched with saturated aqueous $NaHCO_3$ (6 mL) and extracted with DCM (10 mL × 2). The organic layer was dried over anhydrous Na_2SO_4, concentrated and purified by flash column chromatography (DCM/hexane 1:1) to afford the desired dibenzopyranone **8** (14 mg) in a quantitative yield: ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.46 (m, 6H), 4.49 (q, 2H, *J* = 7.0), 4.63 (q, 2H, *J* = 7.0), 7.56 (d, 1H, *J* = 9.0), 8.42 (dd, 1H, *J* = 9.0, 2.0), 8.61 (s, 1H), 8.83 (d, 1H, *J* = 2.0), 9.17 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.9, 14.1, 62.3, 63.4, 116.6, 119.3, 119.8, 122.8, 123.2, 126.6, 131.3, 131.9, 133.8, 136.0, 143.9, 155.3, 158.5, 163.8, 168.2; ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{19}NO_9Na$ calcd for m/z 440.0957, found 440.0962.

Diethyl-4-(4,6-bis(ethoxycarbonyl)biphenyl-2-yl)-1-p-tolyl-1,4-dihydropyridine-3,5-dicarboxylate (9): To a solution of biaryl-2-carbaldehyde **4** (24 mg, 1 eq) in MeCN (1.5 mL) were added ethyl 3-(allylamino)acrylate (23 mg, 2 eq), *p*-toluidine (8 mg, 1 eq) and TFA (5.68 μL, 1 eq) in a sequential manner at room temperature. After complete consumption of biaryl **4** as indicated on TLC, the reaction mixture was quenched with saturated aqueous $NaHCO_3$ (5 mL) and extracted with EtOAc (10 mL × 2). The organic layer was dried over anhydrous Na_2SO_4, concentrated and purified by flash column chromatography (hexane/DCM 2:1) to produce the desired 1,4-DHP **9** (19 mg, 42%): ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.89 (t, 3H, *J* = 7.0), 1.15 (t, 6H, *J* = 7.0), 1.39 (t, 3H, *J* = 7.0), 2.38 (s, 3H), 3.89 (q, 2H, *J* = 7.0), 4.05 (m, 4H), 4.39 (q, 2H, *J* = 7.0), 5.24 (s, 1H), 7.03 (d, 2H, *J* = 8.5), 7.22 (d, 2H, *J* = 8.5), 7.29 (s, 1H), 7.32 (t, 2H, *J* = 7.5), 7.36 (s, 2H), 7.45 (d, 2H, *J* = 7.5), 8.19 (s, 1H), 8.32 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.6, 14.2, 14.3, 20.8, 29.6, 60.1, 61.0, 61.1, 110.2, 120.7, 126.8, 127.2, 128.1, 129.0, 130.1,

130.3, 134.9, 136.2, 136.9, 138.2, 140.4, 144.7, 165.8, 166.6, 168.8; ESI-HRMS $[M+Na]^+$ $C_{36}H_{37}NO_8Na$ calcd for m/z 634.2416, found 634.2425.

Diethyl-2-(4,6-bis(ethoxycarbonyl)biphenyl-2-yl)-1-*p*-tolyl-1,2-dihydropyridine-3,5-dicarboxylate (10): To a solution of biaryl-2-carbaldehyde **4** (24.3 mg, 1.2 eq) in MeCN (2 mL) were added dienaminodiester **1** (15.7 mg, 1 eq), *p*-toluidine (8 mg, 1.2 eq) and TFA (5 µL, 1 eq) in a sequential order at room temperature under aerobic atmosphere. After complete consumption of dienaminodiester **1** as observed on TLC, the reaction mixture was quenched with saturated aqueous $NaHCO_3$ (8 mL) and extracted with EtOAc (15 mL × 2). The organic layer was dried over anhydrous Na_2SO_4, concentrated, and the crude mixture was subjected to flash column chromatography (hexane/DCM/EtOAc 4:2:0.2) to afford the desired 1,2-DHP **10** (19 mg, 50%): ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.77 (t, 3H, *J* = 7.0), 1.31 (m, 6H), 1.39 (t, 3H, *J* = 7.0), 2.31 (s, 3H), 3.80 (m, 2H), 4.20 (m, 4H), 4.40 (q, 2H, *J* = 7.0), 5.76 (d, 1H, *J* = 7.5), 6.25 (s, 1H), 6.47 (d, 2H, *J* = 8.0), 6.80 (t, 1H, *J* = 7.5), 6.88 (d, 2H, *J* = 8.0), 7.20 (t, 1H, *J* = 7.5), 7.35 (t, 1H, *J* = 7.5), 7.47 (s, 1H), 7.80 (d, 1H, *J* = 7.5), 7.98 (s, 1H), 8.27 (d, 1H, *J* = 1.5), 8.61 (d, 1H, *J* = 1.5); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.4, 13.6, 14.3, 14.5, 22.6, 58.2, 59.8, 60.3, 61.0, 61.1, 115.4, 125.1, 126.9, 127.1, 127.2, 128.9, 129.5, 130.0, 130.1, 130.2, 130.7, 133.7, 133.8, 136.9, 137.3, 140.1, 141.3, 143.3, 165.4, 165.5, 165.7, 168.4; ESI-HRMS $[M+Na]^+$ $C_{36}H_{37}NO_8Na$ calcd for m/z 634.2416, found 634.2421.

Diethyl-9-phenyl-9H-fluorene-2,4-dicarboxylate (11): To a solution of biaryl-2-carbaldehyde **4** (11 mg, 1 eq) in THF (1 mL) was added phenylmagnesium bromide (3M in ether, 56.2 µL, 5 eq) at 0 °C under argon atmosphere. The reaction was allowed to attain room temperature slowly and after complete consumption of biaryl **4** as indicated on TLC, the reaction mixture was quenched with water (15 mL), 1M HCl (5 mL), and then extracted with EtOAc (10

mL × 2). The solvent was evaporated and the crude residue was directly treated with catalytic amount of *p*-TsOH in toluene (1.5 mL) under reflux conditions. After complete consumption of starting material as indicated on TLC, the reaction mixture was quenched with saturated aqueous $NaHCO_3$ (5 mL) and extracted with EtOAc (10 mL × 2). The organic layer was dried over anhydrous Na_2SO_4, concentrated and purified by flash column chromatography (hexane/DCM 4:1.5) to afford the desired fluorene **11** (13.6 mg) in a quantitative yield: ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.37 (t, 3H, *J* = 7.0), 1.49 (t, 3H, *J* = 7.0), 4.30 (m, 2H), 4.55 (q, 2H, *J* = 7.0), 5.06 (s, 1H), 7.06 (d, 2H, *J* = 6.5), 7.25 (m, 3H), 7.31 (m, 2H), 7.40 (m, 1H), 8.04 (s, 1H), 8.42 (d, 1H, *J* = 7.5), 8.46 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 14.3, 54.1, 61.3, 61.6, 125.2, 125.5, 126.8, 127.2, 127.5, 128.4, 128.6, 128.9, 129.1, 130.7, 138.4, 140.3, 144.1, 149.8, 149.9, 165.9, 167.7; ESI-HRMS $[M+1]^+$ $C_{25}H_{23}O_4$ calcd for m/z 387.1596, found 387.1587.

Diethyl-6-(di(1H-indol-3-yl)methyl)biphenyl-2,4-dicarboxylate (12): Catalytic amount of *p*-TsOH was added to a stirred solution of biaryl-2-carbaldehyde **4** (23.1 mg, 1 eq) and indole (16.5 mg, 2 eq) in ethanol (3 mL). The reaction mixture was kept at reflux temperature and stirred overnight. After complete consumption of biaryl **4** as indicated on TLC, the reaction mixture was quenched with saturated aqueous $NaHCO_3$ (2 x 5 mL) and extracted with EtOAc (10 mL × 2). The organic layer was dried over anhydrous Na_2SO_4, concentrated, and the crude mixture was subjected to flash column chromatography (hexane/DCM/EtOAc 4:2:1) to afford the desired BIM **12** (30.0 mg, 79%): ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.91 (t, 3H, *J* = 7.0), 1.36 (t, 3H, *J* = 7.0), 4.00 (q, 2H, *J* = 7.0), 4.36 (q, 2H, *J* = 7.0), 5.68 (s, 1H), 6.35 (s, 2H), 6.93 (t, 2H, *J* = 7.0), 7.06 (d, 2H, *J* = 8.0), 7.13 (m, 4H), 7.24 (m, 5H), 8.00 (s, 2H), 8.16 (d, 1H, *J* = 1.5), 8.31 (d, 1H, *J* = 1.5); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.6, 14.2, 36.3, 61.1, 61.5, 111.1, 118.9, 119.5,

121.7, 124.2, 126.5, 127.5, 127.8, 128.1, 128.5, 129.2, 132.6, 133.3, 136.7, 138.6, 144.0, 145.1, 166.5, 168.4; ESI-HRMS $[M+Na]^+$ $C_{35}H_{30}O_4N_2Na$ calcd for m/z 565.2103, found 565.2104.

Spectral data of Trienamine A & A', Biaryl B', 4-6 &7a-7r

Diethyl 2-(4-nitrostyryl)-1-*p*-tolyl-1,2-dihyropyridine-3,5-dicarboxylate (Trienamine A):

^1H NMR ($CDCl_3$) δ 1.25 (t, 3H, *J* = 7.0), 1.37 (t, 3H, *J* = 7.0), 2.28 (s, 3H), 4.16 (m, 2H), 4.30 (q, 2H, *J* = 7.0), 5.11 (s, 1H), 6.55 (d, 1H, *J* = 13.5), 6.74 (d, 2H, *J* = 8.0), 7.08 (d, 2H, *J* = 8.0), 7.23 (d, 1H, *J* = 13.5), 7.57 (s, 1H), 7.61 (d, 2H, *J* = 8.5), 7.72 (s, 1H), 8.14 (d, 2H, *J* = 8.5); ^{13}C NMR ($CDCl_3$) δ 13.8, 14.2, 14.3, 14.4, 20.6, 21.0, 29.6, 40.7, 60.5, 60.6, 61.6, 61.8, 112.9, 114.9, 115.7, 120.8, 123.3, 123.6, 124.1, 128.5, 129.8, 130.2, 130.3, 132.5, 132.9, 133.5, 135.7, 136.9, 139.5, 143.3, 147.0, 150.3,155.0, 165.7, 166.4; ESI-HRMS $[M+Na]^+$ $C_{26}H_{26}N_2O_6Na$ calcd for m/z 485.1688, found 485.1698.

Dimethyl 6-(4-nitrophenyl)-5-((prop-2-ynylamino)methylene)cyclohexa-1,3-diene-1,3-dicarboxylate (Trienamine A'):

^1H NMR ($CDCl_3$) δ 2.35 (app t, 1H), 3.67 (s, 3H), 3.81 (s, 3H), 3.90 (m, 2H), 4.78 (m, 1H), 4.93 (s, 1H), 6.82 (d, 1H, *J* = 13.5), 7.50 (s, 1H), 7.52 (d, 2H, *J* = 9.0), 7.68 (s, 1H), 8.09 (d, 2H, *J* = 8.5); ^{13}C NMR ($CDCl_3$) δ 37.5, 40.5, 51.6, 74.1, 77.9, 111.2, 113.2, 122.6, 123.9, 128.5, 132.8, 144.2, 146.9, 147.2, 150.3, 166.2, 166.9.

Dimethyl 6-formyl-4'-nitrobiphenyl-2,4-dicarboxylate (Biaryl B'):

^1H NMR ($CDCl_3$) δ 3.71 (s, 3H), 4.02 (s, 3H), 7.47 (d, 2H, *J* = 8.5), 8.34 (d, 2H, *J* = 8.5), 8.80 (d, 1H, *J* = 1.5), 8.84 (d, 1H, *J* = 1.5), 9.71 (s, 1H); ^{13}C NMR ($CDCl_3$) δ 52.6, 52.9, 123.2, 123.3, 130.1, 131.2, 132.0, 132.2, 135.0, 135.8, 142.4, 146.7, 147.9, 164.8, 165.5, 189.1.

Diethyl 6-formyl-biphenyl-2,4-dicarboxylate (4): Yield: 24.0 mg (60%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 0.98 (t, 3H, *J* = 7.0), 1.44 (t, 3H, *J* = 7.0), 4.07 (q, 2H, *J* = 7.0), 4.45 (q, 2H, *J* = 7.0), 7.28 (m, 2H), 7.46 (m, 3H), 8.68 (d, 1H, *J* = 2.0), 8.74 (d, 1H, *J* = 1.5), 9.77 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.6, 14.3, 61.5, 61.7, 128.1, 128.5, 129.3, 130.4, 130.9, 133.8, 134.9, 135.0, 135.2, 148.6, 164.8, 166.7, 190.8. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{22}O_6Na$ calcd for m/z 381.1314, found 381.1318.

Diethyl 6-formyl-4'-methoxybiphenyl-2,4-dicarboxylate (5): Yield: 32.8 mg (55%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.06 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 3.87 (s, 3H), 4.12 (q, 2H, *J* = 7.0), 4.44 (q, 2H, *J* = 7.0), 6.98 (d, 2H, *J* = 8.5), 7.19 (d, 2H, *J* = 9.0), 8.63 (d, 1H, *J* = 1.5), 8.71 (d, 1H, *J* = 2.0), 9.80 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.8, 14.3, 55.3, 61.5, 61.7, 113.6, 127.1, 130.1, 130.7, 130.8, 134.1, 134.7, 135.3, 148.3, 159.9, 164.8, 166.9, 191.0. ESI-HRMS $[M+MeOH+Na]^+$ $C_{21}H_{24}O_7Na$ calcd for m/z 411.1419, found 411.1422.

Diethyl 6-formyl-4'-nitrobiphenyl-2,4-dicarboxylate (6): Yield: 25.0 mg (50%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.11 (t, 3H, *J* = 7.0), 1.46 (t, 3H, *J* = 7.0), 4.14 (q, 2H, *J* = 7.0), 4.47 (q, 2H, *J* = 7.0), 7.48 (d, 2H, *J* = 8.5), 8.34 (d, 2H, *J* = 8.5), 8.78 (s, 1H), 8.81 (s, 1H), 9.72 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.8, 14.2, 61.9, 62.0, 123.3, 130.2, 131.6, 132.0, 132.6, 134.9, 135.7, 142.6, 146.2, 147.8, 164.4, 165.3, 189.3. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{21}NO_8Na$ calcd for m/z 426.1164, found 426.1171.

Diethyl 6-formyl-4'-methylbiphenyl-2,4-dicarboxylate (7a): Yield: 40.0 mg (60%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.03 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 2.43 (s, 3H), 4.10 (q, 2H, *J* = 7.0), 4.44 (m, 2H), 7.16 (d, 2H, *J* = 8.0), 7.27 (bs, 2H), 8.65 (d, 1H, *J* = 2.0), 8.72 (d, 1H, *J* = 1.5), 9.78 (s,1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.6, 14.3, 21.2, 29.6, 61.5, 61.7, 128.8,

129.3, 130.2, 130.8, 132.0, 133.9, 134.7, 135.1, 138.5, 148.8, 164.8, 166.7, 190.9. ESI-HRMS $[M+MeOH+Na]^+$ $C_{21}H_{24}O_6Na$ calcd for m/z 395.1470, found 395.1471.

Diethyl 6-formyl-4'-chlorobiphenyl-2,4-dicarboxylate (7b): Yield: 29 mg (63%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.07 (t, 3H, *J* = 7.0), 1.44 (t, 3H, *J* = 7.0), 4.12 (q, 2H, *J* = 7.0), 4.46 (q, 2H, *J* = 7.0), 7.24 (d, 2H, *J* = 8.5), 7.46 (d, 2H, *J* = 8.5), 8.70 (d, 1H, *J* = 1.5), 8.74 (d, 1H, *J* = 2.0), 9.76 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.3, 61.7, 61.8, 128.4, 130.6, 130.8, 131.2, 133.5, 133.7, 134.8, 135.1, 135.2, 147.3, 164.6, 166.2, 190.2. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{21}ClO_6Na$ calcd for m/z 415.0924, found 415.0929.

Diethyl 6-formyl-4'-bromobiphenyl-2,4-dicarboxylate (7c): Yield: 88.5 mg (84%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.07 (t, 3H, *J* = 7.0), 1.44 (t, 3H, *J* = 7.0), 4.11 (q, 2H, *J* = 7.0), 4.46 (q, 2H, *J* = 7.0), 7.16 (d, 2H, *J* = 8.5), 7.60 (d, 2H, *J* = 8.5), 8.71 (s, 1H), 8.74 (d, 1H, *J* = 2.0), 9.76 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.3, 61.7, 61.8, 123.0, 130.8, 130.9, 131.2, 131.3, 133.4, 134.2, 135.0, 135.2, 147.3, 164.6, 166.2, 190.2. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{21}BrO_6Na$ calcd for m/z 459.0419, found 459.0417.

Diethyl 6-formyl-4'-cyanobiphenyl-2,4-dicarboxylate (7d): Yield: 38.6 mg (86%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.08 (t, 3H, *J* = 7.0), 1.45 (t, 3H, *J* = 7.0), 4.13 (q, 2H, *J* = 7.0), 4.48 (q, 2H, *J* = 7.0), 7.43 (d, 2H, *J* = 8.0), 7.78 (d, 2H, *J* = 8.0), 8.77 (d, 1H, *J* = 1.5), 8.79 (d, 1H, *J* = 2.0), 9.70 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.2, 61.8, 62.0, 112.5, 118.2, 130.0, 131.4, 131.8, 132.7, 134.8, 135.6, 140.6, 146.5, 164.4, 165.5, 189.4. ESI-HRMS $[M+MeOH+Na]^+$ $C_{21}H_{21}NO_6Na$ calcd for m/z 406.1266, found 406.1271.

Diethyl 4',6-diformylbiphenyl-2,4-dicarboxylate (7e): Yield: 20.6 mg (56%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.05 (t, 3H, *J* = 7.0), 1.45 (t, 3H, *J* = 7.0), 4.11 (q, 2H, *J* = 7.0), 4.47 (q, 2H, *J* = 7.0), 7.48 (d, 2H, *J* = 8.0), 8.01 (d, 1H, *J* = 8.5), 8.78 (s, 2H), 9.73 (s, 1H), 10.12

(s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.3, 61.7, 61.9, 129.3, 130.0, 131.2, 131.5, 132.9, 134.9, 135.5, 136.1, 141.9, 147.3, 164.5, 165.8, 189.8, 191.4. ESI-HRMS $[M+2MeOH+Na]^+$ $C_{22}H_{26}O_8Na$ calcd for m/z 441.1525, found 441.1520.

Diethyl 6-formyl-2'-bromobiphenyl-2,4-dicarboxylate (7f): Yield: 47.4 mg (74%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.05 (t, 3H, *J* = 7.0), 1.44 (t, 3H, *J* = 7.0), 4.11 (m, 2H), 4.47 (q, 2H, *J* = 7.0), 7.23 (dd, 1H, *J* = 7.5, 1.0), 7.34 (m, 1H), 7.42 (m, 1H), 7.69 (dd, 1H, *J* = 8.0, 0.5), 8.80 (d, 1H, *J* = 1.5), 8.86 (d, 1H, *J* = 2.0), 9.66 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.6, 14.3, 61.5, 61.8, 123.3, 127.1, 130.0, 130.6, 131.1, 131.5, 132.4, 132.6, 134.9, 135.9, 136.8, 147.3, 164.6, 165.3, 190.0. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{21}BrO_6Na$ calcd for m/z 459.0419, found 459.0426.

Diethyl 6-formyl-2'-ethynylbiphenyl-2,4-dicarboxylate (7g): Yield: 30.7 mg (69%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.04 (t, 3H, *J* = 7.0), 1.45 (t, 3H, *J* = 7.0), 2.94 (s, 1H), 4.11 (q, 2H, *J* = 7.0), 4.46 (q, 2H, *J* = 7.0), 7.25 (m, 1H), 7.46 (m, 2H), 7.64 (m, 2H), 8.80 (s, 1H), 8.83 (s, 1H), 9.70 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.6, 14.3, 61.4, 61.7, 81.3, 82.1, 122.1, 128.4, 128.5, 129.4, 130.8, 131.2, 132.5, 133.1, 135.2, 135.6, 138.7, 147.4, 164.8, 165.8, 190.2. ESI-HRMS $[M+MeOH+Na]^+$ $C_{22}H_{22}O_6Na$ calcd for m/z 405.1314, found 405.1310.

Diethyl 6-formyl-3',5'-dimethoxybiphenyl-2,4-dicarboxylate (7h): Yield: 50.0 mg (67%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.06 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 3.80 (s, 6H), 4.13 (q, 2H, *J* = 7.0), 4.44 (q, 2H, *J* = 7.0), 6.42 (d, 2H, *J* = 2.0), 6.54 (d, 1H, *J* = 2.0), 8.64 (d, 1H, *J* = 2.0), 8.72 (d, 1H, *J* = 1.5), 9.81 (s,1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.3, 55.4, 61.5, 61.7, 100.3, 105.5, 107.9, 130.4, 130.6, 133.6, 134.7, 134.9, 137.0, 148.3, 160.5, 164.7, 166.6, 190.8. ESI-HRMS $[M+MeOH+Na]^+$ $C_{22}H_{26}O_8Na$ calcd for m/z 441.1525, found 441.1520.

Diethyl 6-formyl-5'-bromo-2'-methoxybiphenyl-2,4-dicarboxylate (7i): Yield: 60.2 mg (85%) ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.09 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 3.71 (s, 3H), 4.15 (m, 2H), 4.46 (q, 2H, *J* = 7.0), 6.86 (d, 1H, *J* = 9.0), 7.24 (d, 1H, *J* = 2.0), 7.55 (dd, 1H, *J* = 2.0, 9.0), 8.75 (s, 2H), 9.73 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.8, 14.3, 55.8, 61.5, 61.7, 112.1, 112.8, 126.3, 130.8, 131.0, 132.9, 133.0, 133.5, 135.0, 135.5, 143.8, 155.7, 164.7, 166.0, 190.5. ESI-HRMS $[M+MeOH+Na]^+$ $C_{21}H_{23}BrO_7Na$ calcd for m/z 489.0524, found 489.0535.

Diethyl 6-formyl-4'-chloro-2'-fluorobiphenyl-2,4-dicarboxylate (7j): Yield: 21.2 mg (68%) ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.15 (t, 3H, *J* = 7.0), 1.45 (t, 3H, *J* = 7.0), 4.18 (q, 2H, *J* = 7.0), 4.46 (q, 2H, *J* = 7.0), 7.15 (t, 1H, *J* = 7.0), 7.26 (m, 2H), 8.78 (d, 1H, *J* = 2.0), 8.83 (d, 1H, *J* = 2.0), 9.79 (d, 1H, *J* = 1.0); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.3, 61.8, 61.9, 116.2, 116.4, 124.5, 131.5, 131.7, 131.9, 133.2, 135.3, 135.8, 141.2, 160.3, 164.5, 165.4, 189.3. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{20}ClFO_6Na$ calcd for m/z 433.0830, found 433.0831.

Diethyl 6-formyl-2',6'-difluorobiphenyl-2,4-dicarboxylate (7k): Yield: 53 mg (68%) ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.15 (t, 3H, *J* = 7.0), 1.45 (t, 3H, *J* = 7.0), 4.21 (q, 2H, *J* = 7.0), 4.47 (q, 2H, *J* = 7.0), 7.04 (m, 2H), 7.47 (m, 1H), 8.83 (d, 1H, *J* = 2.0), 8.93 (d, 1H, *J* = 2.0), 9.83 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.7, 14.3, 30.9, 61.7, 61.9, 111.1-111.3, 112.6, 130.9, 131.0, 131.1, 131.8, 132.2, 133.1, 135.4, 136.0, 136.2, 158.7, 160.7, 164.5, 165.0, 189.5. ESI-HRMS $[M+MeOH+Na]^+$ $C_{20}H_{20}F_2O_6Na$ calcd for m/z 417.1125, found 417.1114.

Diethyl 6-formyl-3'-bromo-4'-hydroxy-5'-methoxybiphenyl-2,4-dicarboxylate (7l): Yield: 19 mg (38%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.11 (t, 3H, *J* = 7.0), 1.44 (t, 3H, *J* = 7.0), 3.89 (s, 3H), 4.16 (q, 2H, *J* = 7.0), 4.46 (q, 2H, *J* = 7.0), 6.12 (bs, 1H), 6.73 (s, 1H), 7.04 (s, 1H), 7.26 (s, 1H), 8.64 (s, 1H), 8.71 (s, 1H), 9.83 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.8, 14.2, 56.5, 61.7, 108.2,

111.3, 125.6, 127.5, 130.6, 130.9, 134.0, 134.8, 135.2, 143.5, 146.7, 164.6, 166.4, 190.5. ESI-HRMS $[M+MeOH+Na]^+$ $C_{21}H_{23}BrO_8Na$ calcd for m/z 505.0474, found 505.0470.

Diethyl 4-(5-bromothiophene-2-yl)-5-formylisophthalate (7m): Yield: 54 mg (49%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.19 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 4.23 (q, 2H, *J* = 7.0), 4.46 (q, 2H, *J* = 7.0), 6.83 (d, 1H, *J* = 3.5), 7.11 (d, 1H, *J* = 3.0), 8.65 (s, 1H), 8.71 (s, 1H), 9.98 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.8, 14.2, 61.9, 114.7, 130.0, 130.2, 130.9, 131.6, 134.8, 134.9, 136.3, 139.4, 164.4, 166.0, 189.8. ESI-HRMS $[M+MeOH+Na]^+$ $C_{18}H_{19}BrO_6SNa$ calcd for m/z 464.9983, found 464.9978.

Diethyl 4-(5-iodofuran-2-yl)-5-formylisophthalate (7n): Yield: 38.0 mg (55%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.26 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 4.28 (q, 2H, *J* = 7.0), 4.44 (q, 2H, *J* = 7.0), 6.52 (d, 1H, *J* = 3.5), 6.76 (d, 1H, *J* = 3.0), 8.63 (d, 1H, *J* = 1.5), 8.71 (d, 1H, *J* = 1.5), 10.06 (s, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 14.1, 14.2, 24.6, 36.6, 61.9, 62.1, 90.5, 116.9, 122.2, 131.2, 131.4, 134.0, 134.6, 134.9, 135.0, 151.4, 162,4, 166.5, 189.9. ESI-HRMS $[M+MeOH+Na]^+$ $C_{18}H_{19}IO_7Na$ calcd for m/z 497.0073, found 497.0072.

Diethyl 6-hydroxy-2-nitro-6H-benzo[c]chromene-8,10-dicarboxylate (7o): Yield: 36.6 mg (68%)

^1H NMR (500 MHz, $CDCl_3$) δ 1.36 (t, 3H, *J* = 7.0), 1.43 (t, 3H, *J* = 7.0), 3.85 (d, 1H, *J* = 5.0), 4.44 (m, 3H), 4.55 (m, 1H), 6.52 (d, 1H, *J* = 4.5), 7.28 (s, 1H), 8.20 (d, 1H, *J* = 1.0), 8.25 (dd, 1H, *J* = 9.0, 2.5), 8.34 (d, 1H, *J* = 1.5), 8.52 (d, 1H, *J* = 2.5); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.9, 14.2, 61.8, 62.7, 93.1, 119.8, 119.9, 120.7, 123.2, 126.0, 128.6, 129.2, 130.4, 130.6, 131.5, 133.5, 142.4, 156.8, 164.7, 168.7. ESI-HRMS $[M+Na]^+$ $C_{19}H_{17}NO_8Na$ calcd for m/z 410.0851, found 410.0848.

Diethyl 4-bromo-6-hydroxy-2-methoxy-6H-benzo[c]chromene-8,10-dicarboxylate (7p): Yield: 18.4 mg (77%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.34 (t, 3H, *J* = 7.0), 1.41 (t, 3H, *J* = 7.0), 3.49 (bs, 1H), 3.93 (s, 3H), 4.41 (m, 4H), 6.48 (s, 1H), 7.08 (s, 1H), 7.26 (s, 1H), 8.17 (d, 1H, *J* = 1.5), 8.28 (d, 1H, *J* = 1.5); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.9, 14.2, 30.9, 56.4, 61.6, 62.3, 92.8, 114.0, 116.1, 121.6, 121.9, 129.1, 129.9, 130.3, 131.2, 133.9, 140.2, 150.7, 164.9, 169.2. ESI-HRMS $[M+Na]^+$ $C_{20}H_{19}BrO_7Na$ calcd for m/z 473.0211, found 473.0206.

Diethyl 2,6-dimethoxy-6H-benzo[c]chromene-8,10-dicarboxylate (7q): Yield: 20 mg (60%)

^{1}H NMR (500 MHz, $CDCl_3$) δ 1.32 (t, 3H, *J* = 7.0), 1.42 (t, 3H, *J* = 7.0), 3.52 (s, 3H), 3.78 (s, 3H), 4.40 (m, 4H), 5.88 (s, 1H), 6.94 (dd, 1H, *J* = 9.0, 3.5), 7.07 (d, 1H, *J* = 3.0), 7.12 (d, 1H, *J* = 9.0), 8.10 (d, 1H, *J* = 1.5), 8.25 (d, 1H, *J* = 1.5); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.9, 14.3, 30.9, 55.7, 61.4, 62.0, 98.7, 111.9, 117.2, 119.3, 120.6, 129.2, 129.3, 130.0, 131.1, 131.5, 133.4, 145.3, 154.5, 165.1, 169.5. ESI-HRMS $[M+Na]^+$ $C_{21}H_{22}O_7Na$ calcd for m/z 409.1263, found 409.1260.

Diethyl 6-butoxy-2-methoxy-6H-benzo[c]chromene-8,10-dicarboxylate (7r): Yield: 15.2 mg (66%)

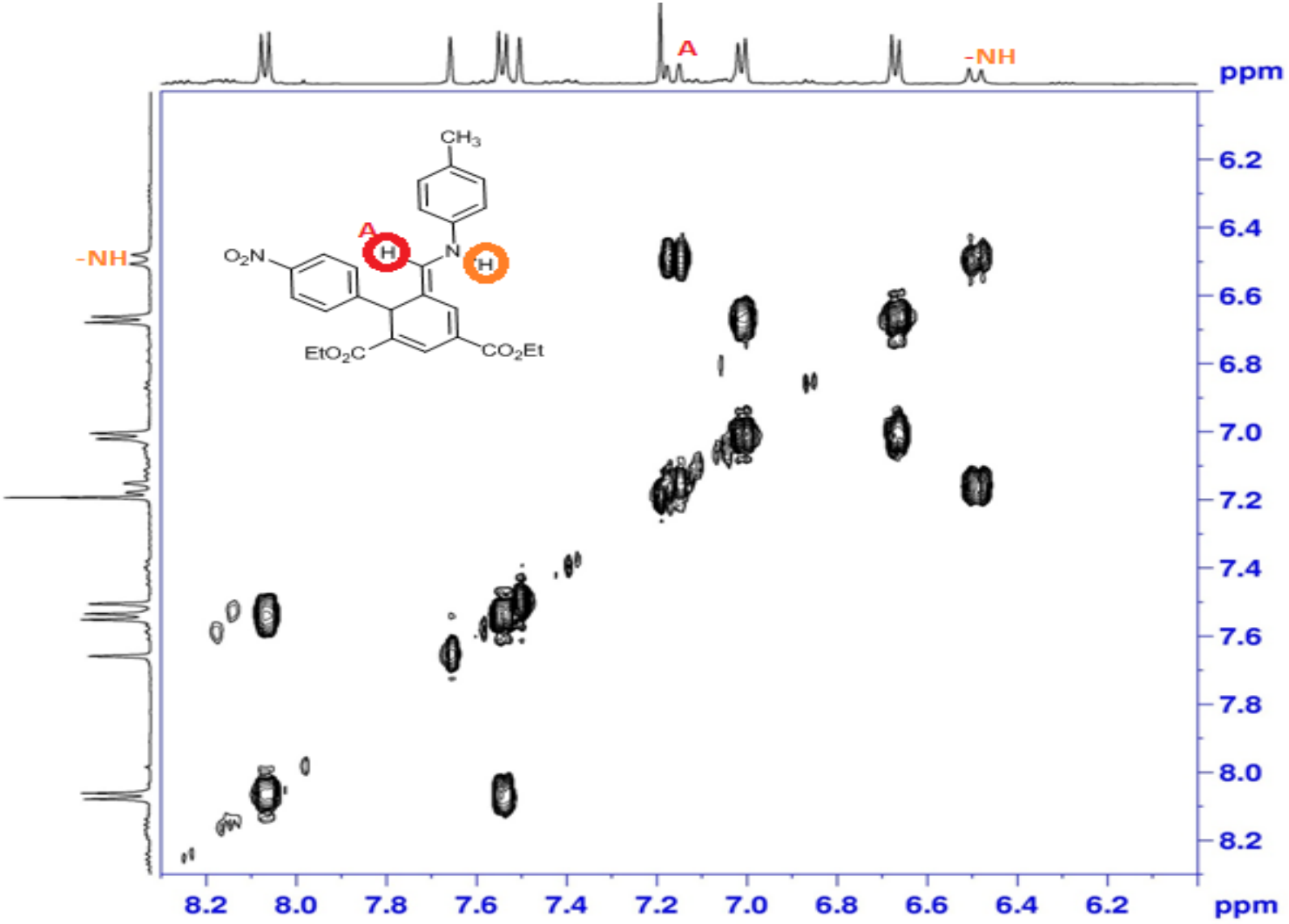
^{1}H NMR (500 MHz, $CDCl_3$) δ 0.84 (t, 3H, *J* = 7.0), 1.25 (m, 3H), 1.32 (t, 3H, *J* = 7.0), 1.42 (t, 3H, *J* = 7.0), 1.51 (m, 2H), 3.70 (m, 1H), 3.78 (s, 3H), 3.84 (m, 1H), 4.42 (m, 4H), 5.96 (s, 1H), 6.92 (dd, 1H, *J* = 9.0, 3.0), 7.06 (m, 2H), 8.08 (d, 1H, *J* = 1.5), 8.23 (d, 1H, *J* = 1.5); ^{13}C NMR (125 MHz, $CDCl_3$) δ 13.9, 14.3, 19.1, 22.6, 29.6, 31.3, 55.7, 61.4, 61.9, 68.5, 97.7, 111.8, 117.1, 119.3, 120.6, 129.1, 129.2, 130.0, 130.9, 131.6, 133.7, 145.6, 154.3, 165.2, 169.6. ESI-HRMS $[M+Na]^+$ $C_{24}H_{28}O_7Na$ calcd for m/z 451.1732, found 451.1732.

References:

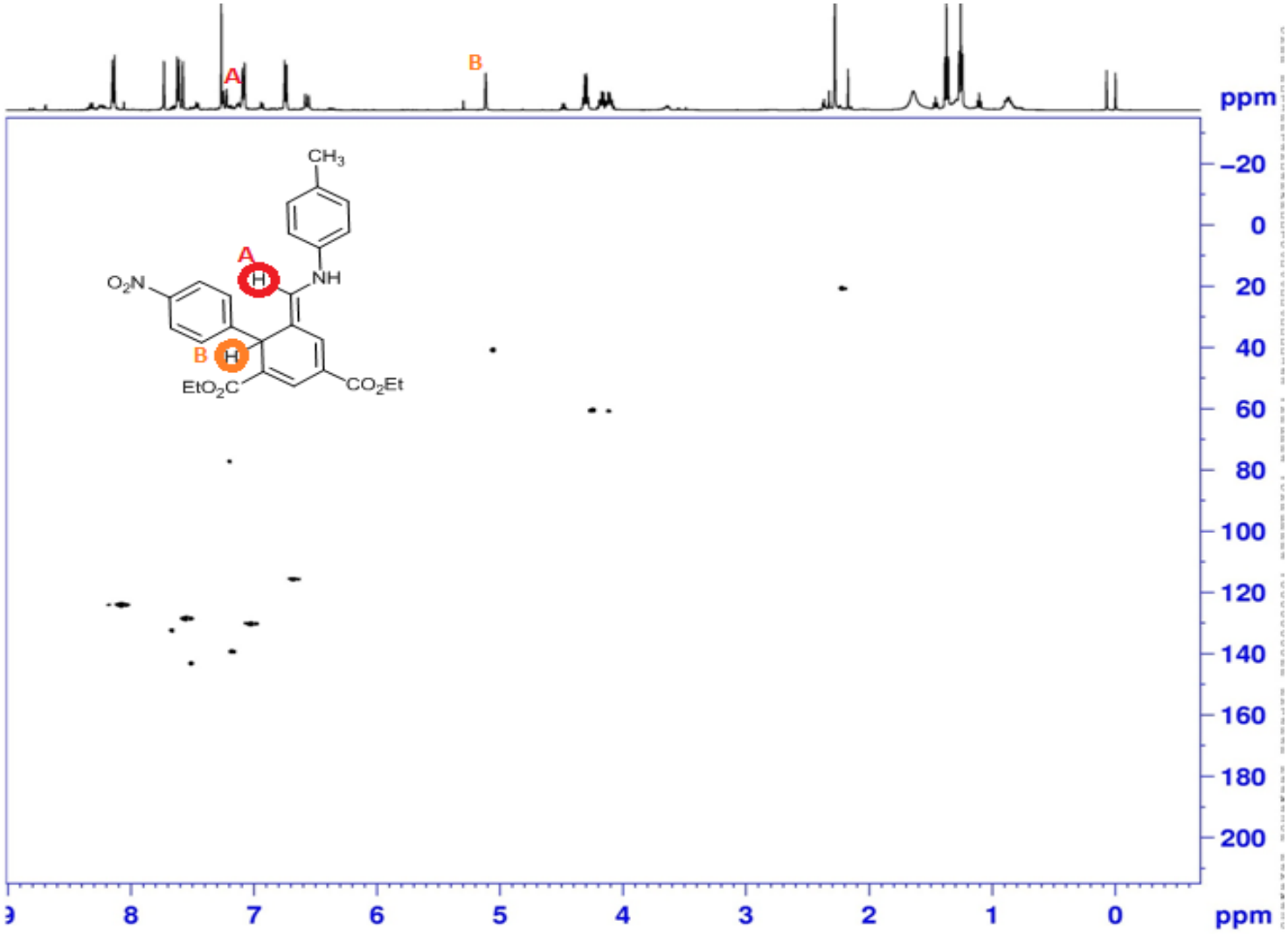
1. J. Kulhnek, S. Bures, O. Pytela, T. Mikysek and J. Ludvk, *Chem. Asian J.* 2011, **6,** 1604–1612.

Structural evidence for Trienamine A and A' by 2D NMR experiments:

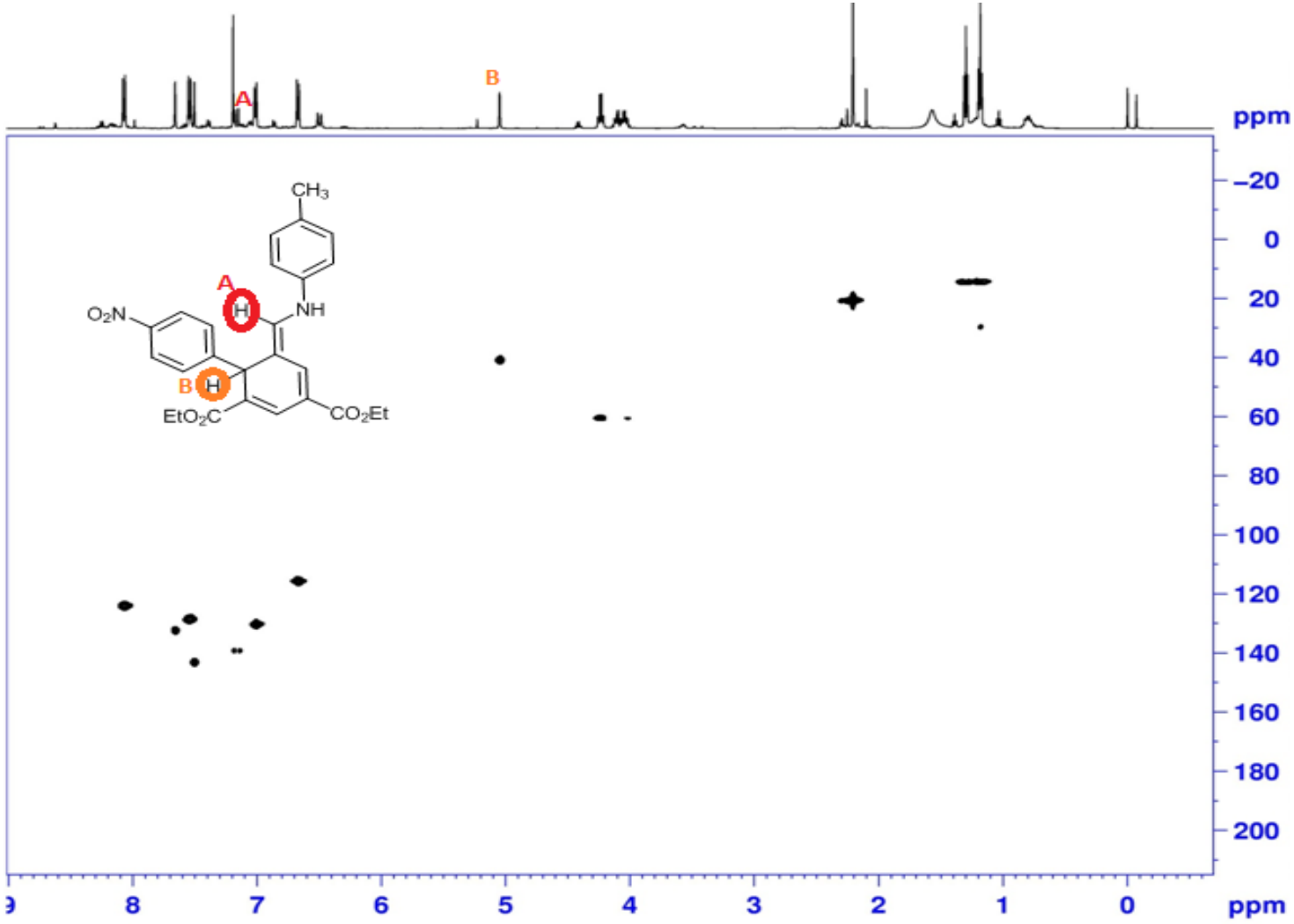
(A) COSY correlation for Trienamine A:



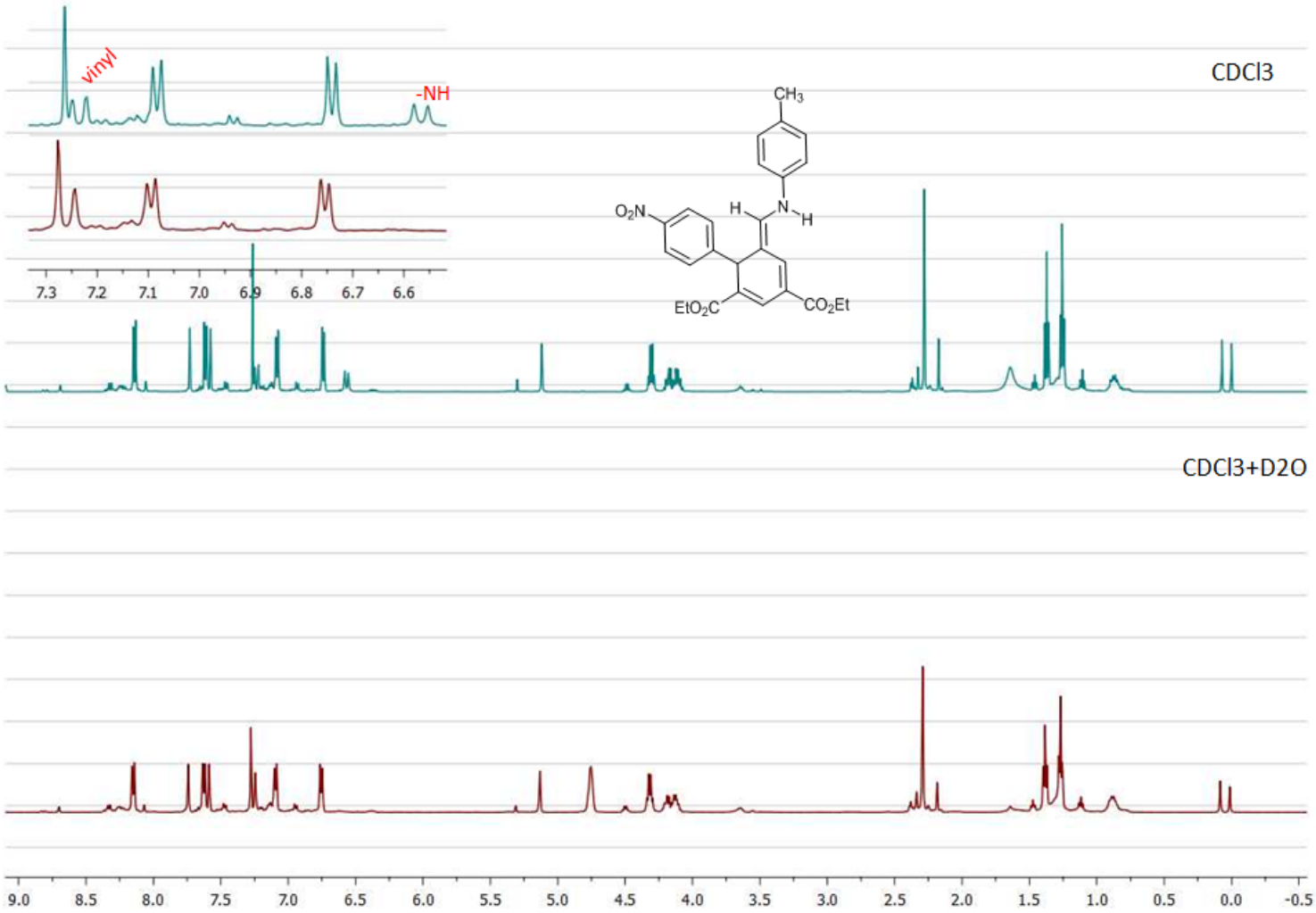
(B) HSQC correlation for Trienamine A with only one olefinic proton



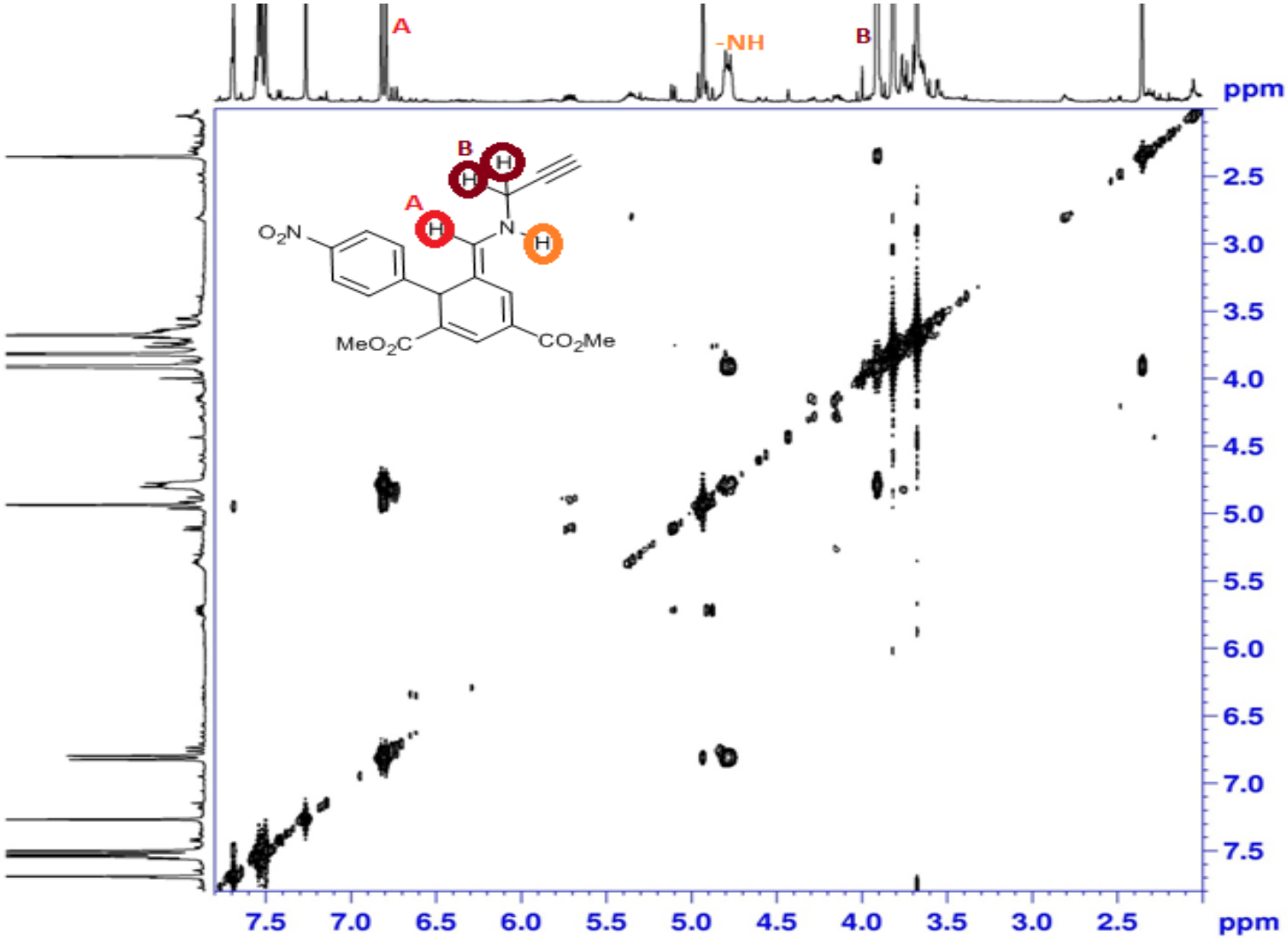
(C) HMQC correlation for Trienamine A with only one olefinic proton



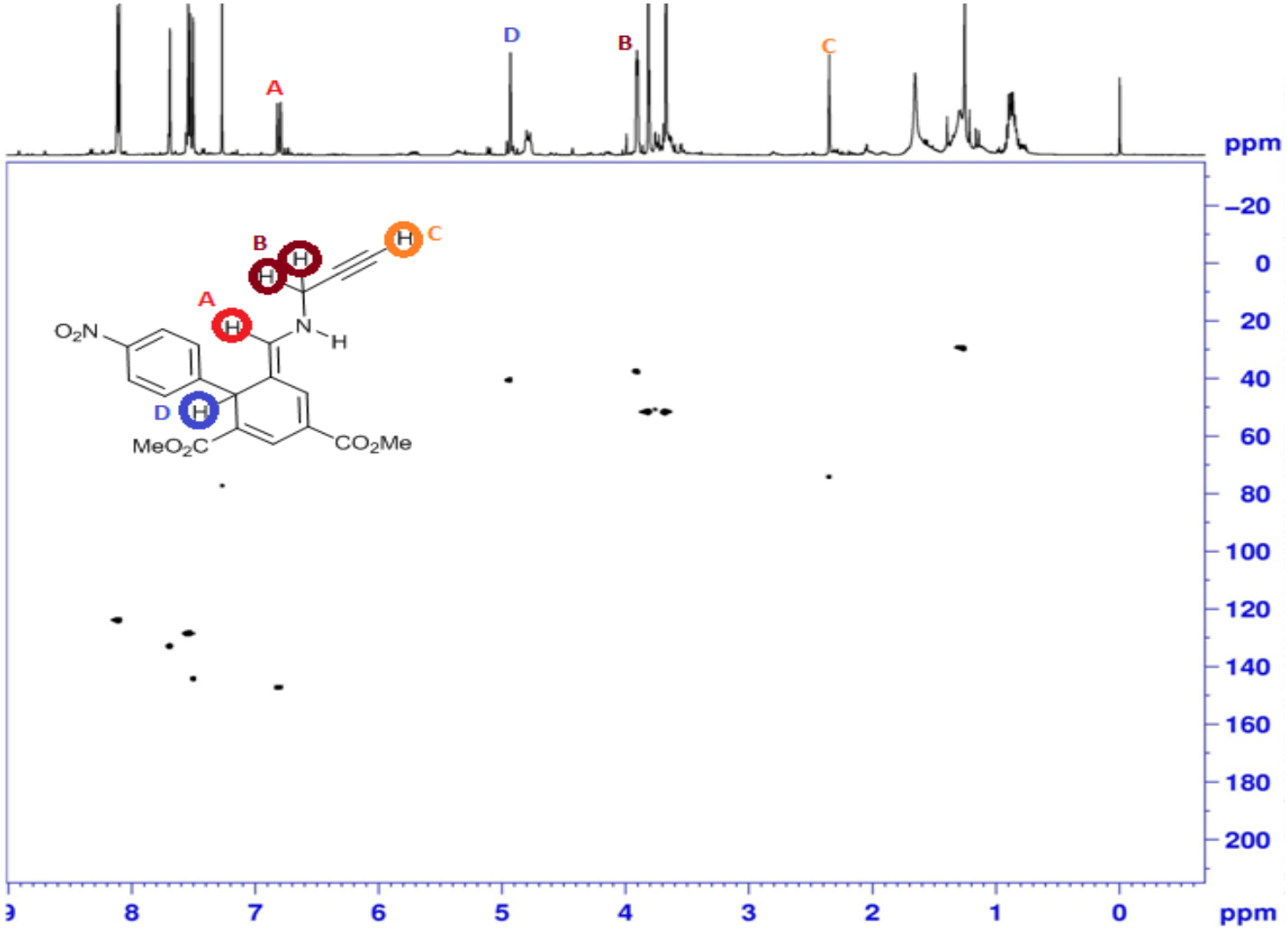
(D) -NH proton exchange experiment by addition of a drop of D_2O in $CDCl_3$ for Trienamine A:



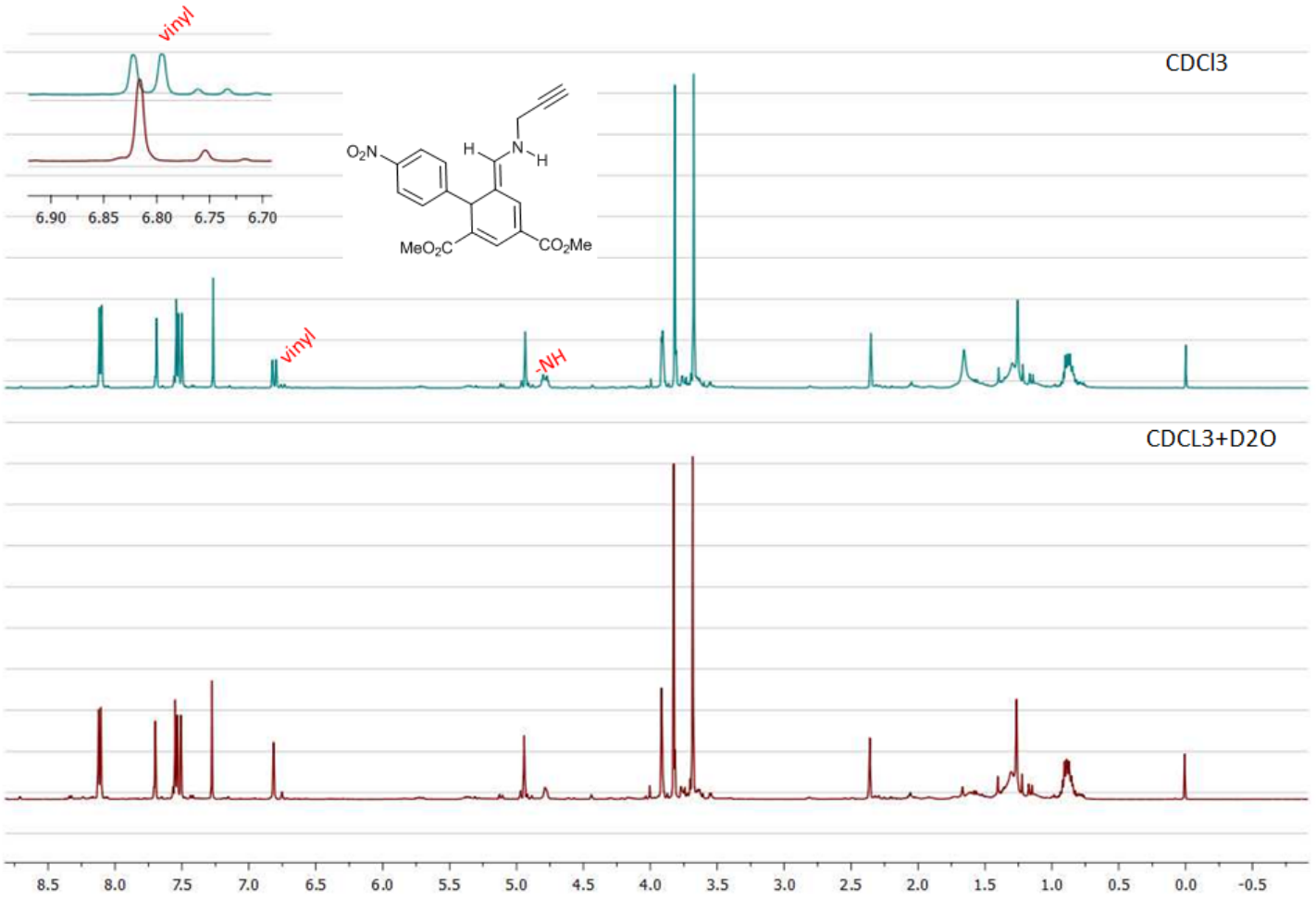
(a) COSY correlation for Trienamine A':



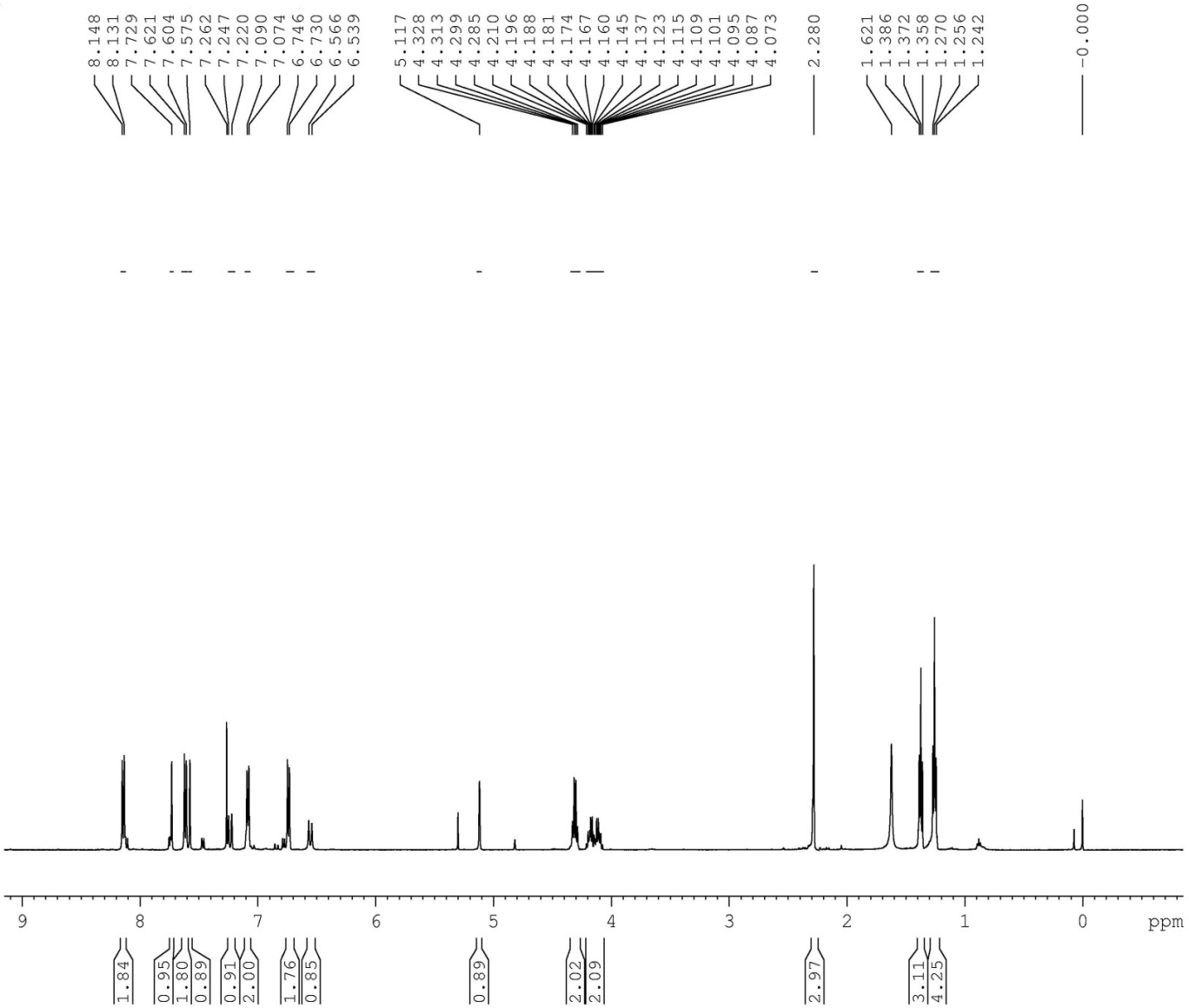
(b) HSQC correlation for Trienamine A' with only one olefinic proton



(c) NH proton exchange experiment by addition of a drop of D_2O in $CDCl_3$ for trienamine A':



^{1}H and ^{13}C NMR Copies of Trienamine A & A', Biaryl B', 4-6, 7a-7r & 8-12:

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F2 - Processing parameters
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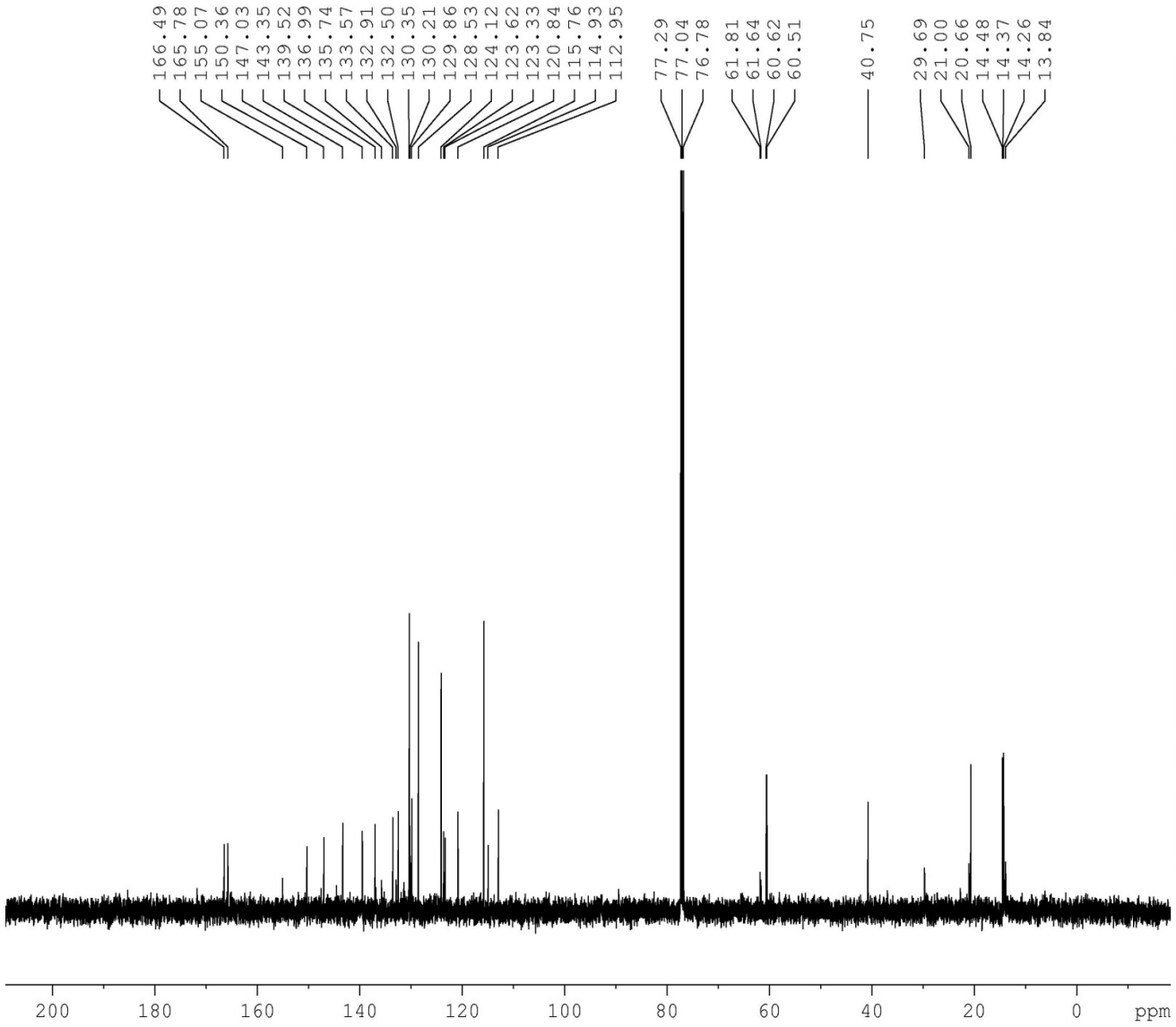


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TD0                        1

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PL13                 18.00 dB
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SFO2           500.1320005 MHz

F2 - Processing parameters
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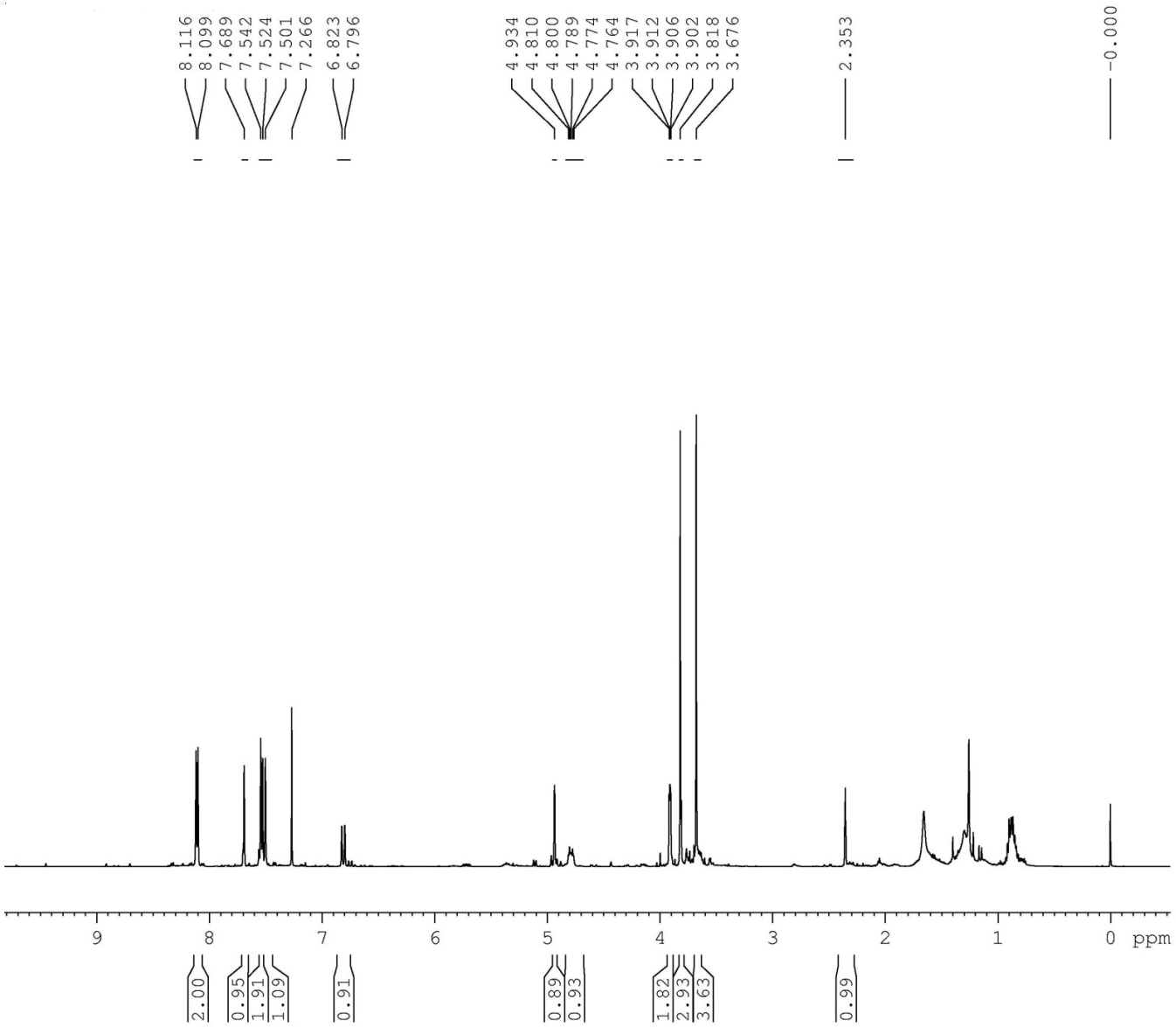


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TE                 296.6 K
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TD0                        1

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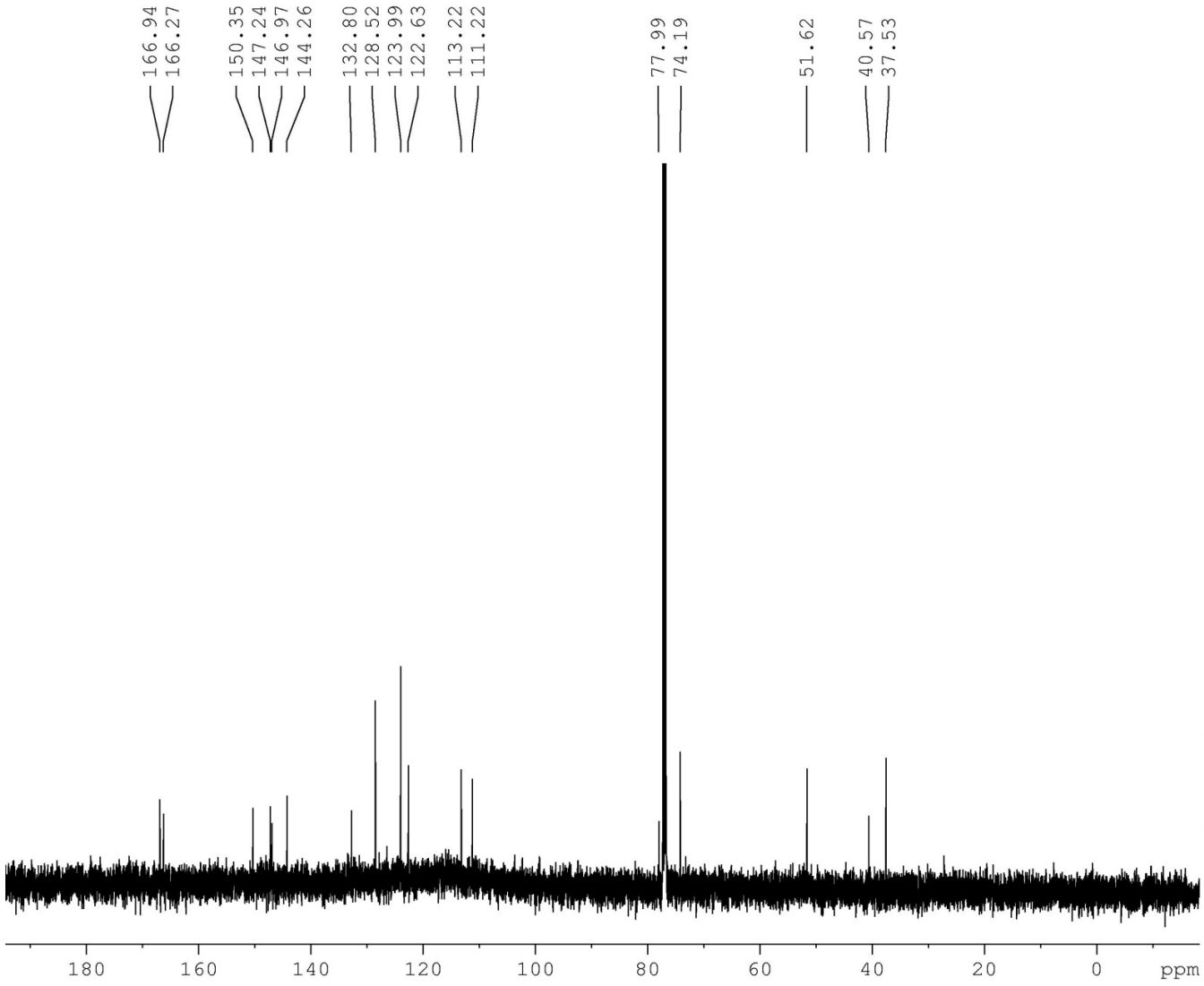


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TE                   297.5 K
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d11              0.03000000 sec
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TD0                       1

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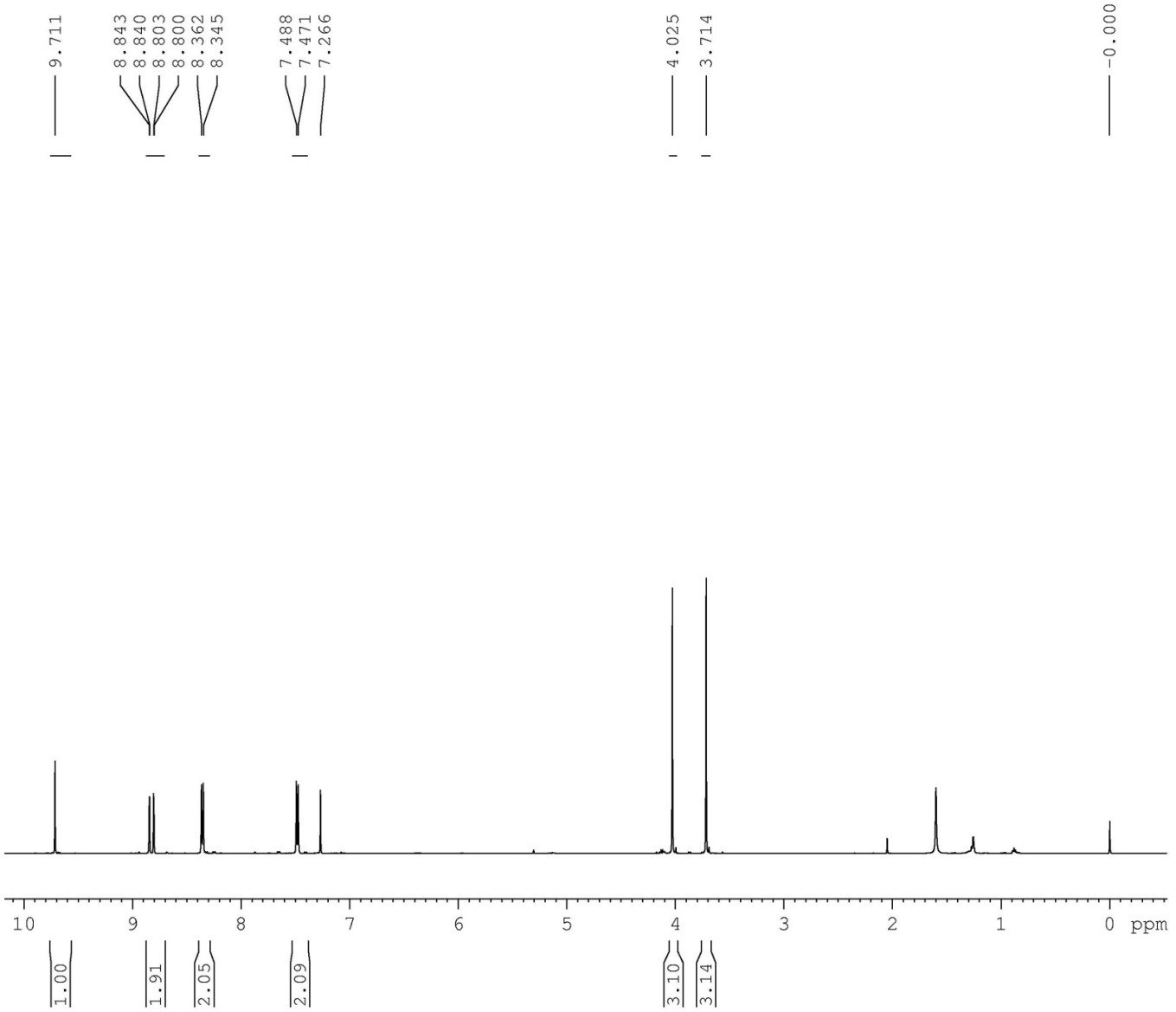


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TD0                        1

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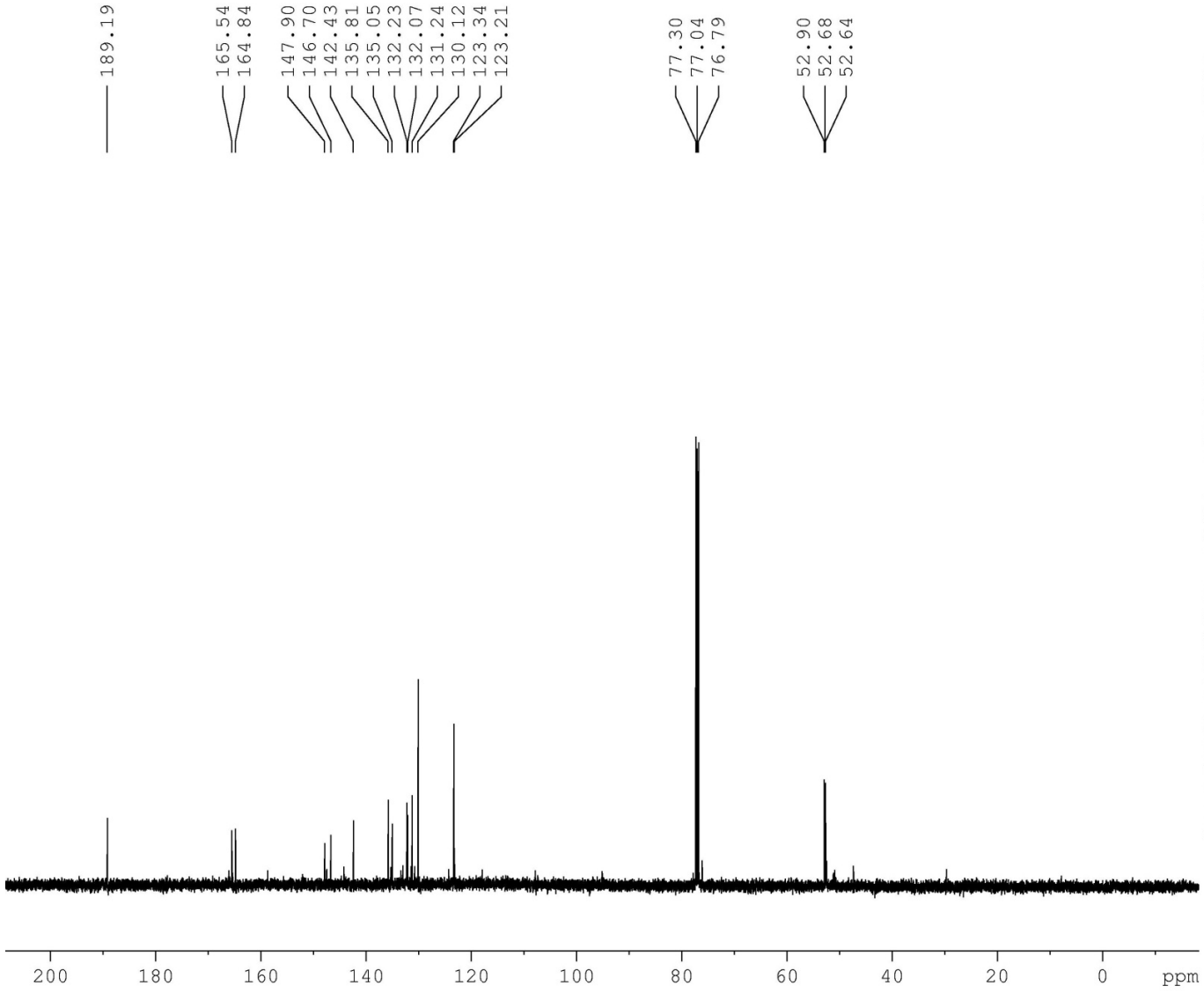


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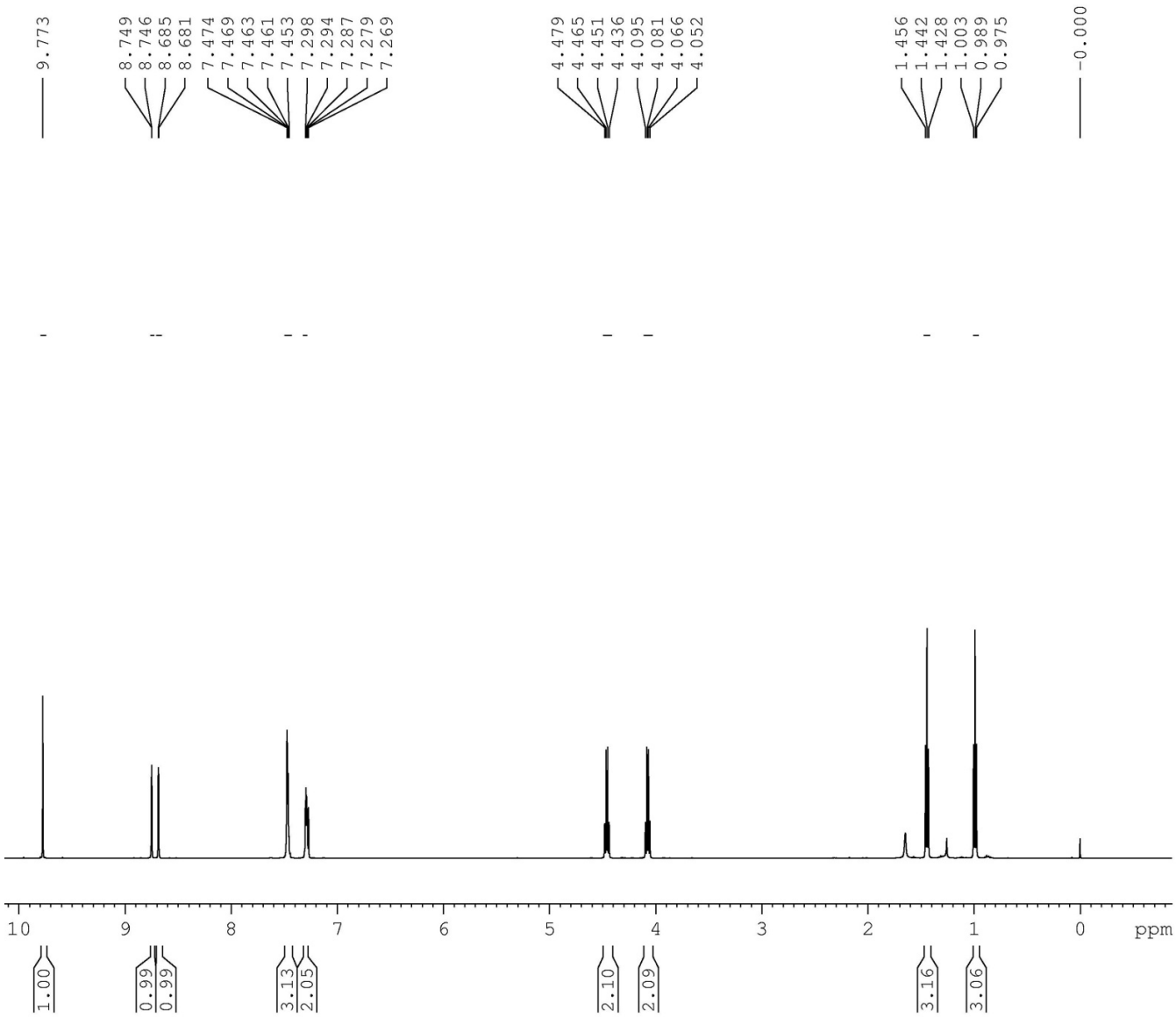
DS                           4
SWH                  29761.904 Hz
FIDRES                0.454131 Hz
AQ                    1.1010548 sec
RG                       32800
DW                      16.800 usec
DE                       6.00 usec
TE                       297.4 K
D1                   2.00000000 sec
d11                  0.03000000 sec
DELTA                1.89999998 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                       13C
P1                       12.40 usec
PL1                      -2.00 dB
SFO1               125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                    80.00 usec
PL12                     21.92 dB
PL13                    120.00 dB
PL2                       1.00 dB
SFO2               500.1320005 MHz

F2 - Processing parameters
SI                         32768
SF                 125.7577890 MHz
WDW                           EM
SSB                           0
LB                         1.00 Hz
GB                            0
PC                         1.40
```

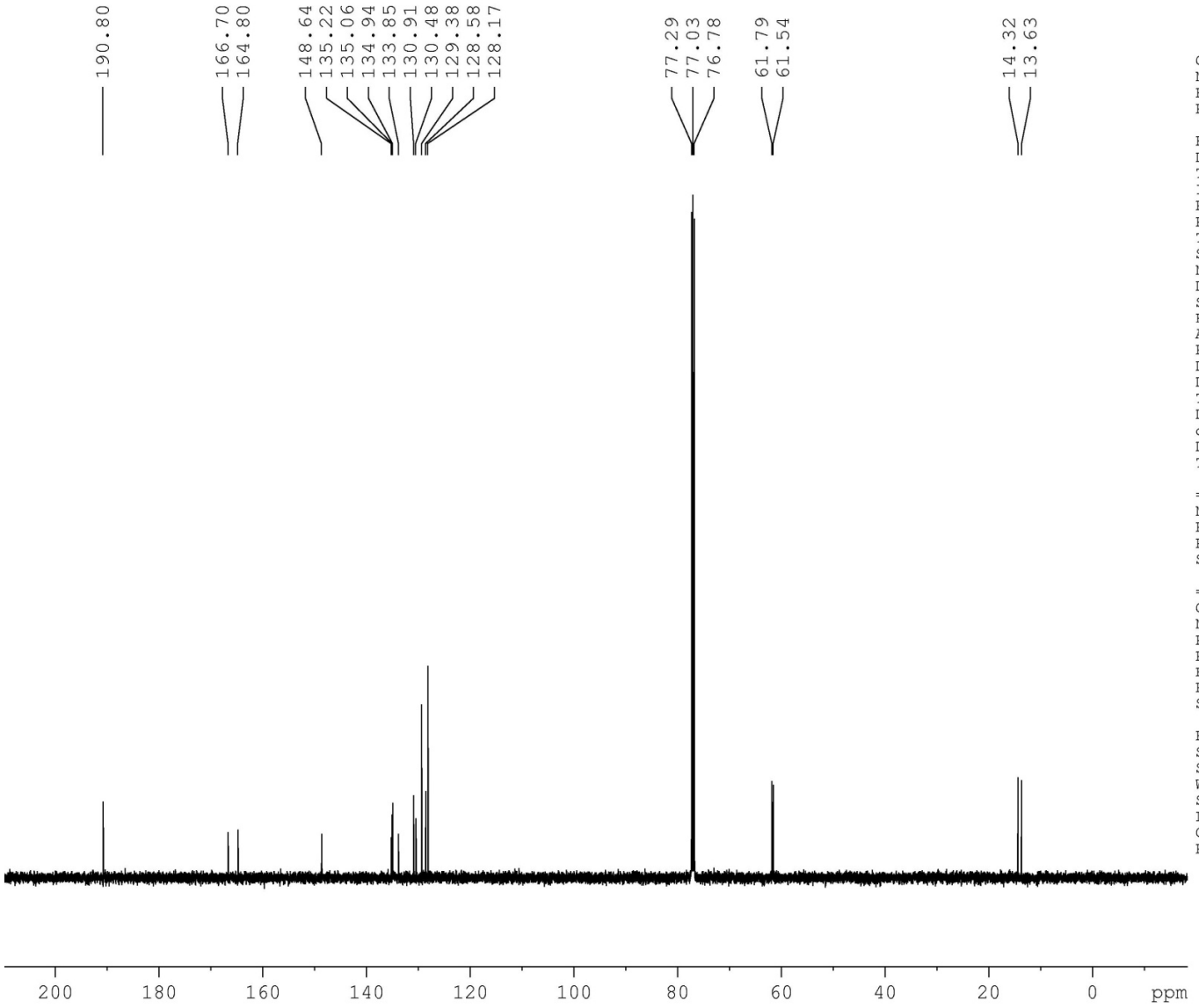



```
Current Data Parameters
NAME                  CS-400
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20130617
Time                  12.00
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                      203
DW                   48.400 us
DE                    6.00 us
TE                   296.6 K
D1              1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                      1H
P1                   12.00 us
PL1                   1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                    32768
SF            500.1300050 MH
WDW                      EM
SSB                       0
LB                   0.30 Hz
GB                        0
PC                    1.00
```



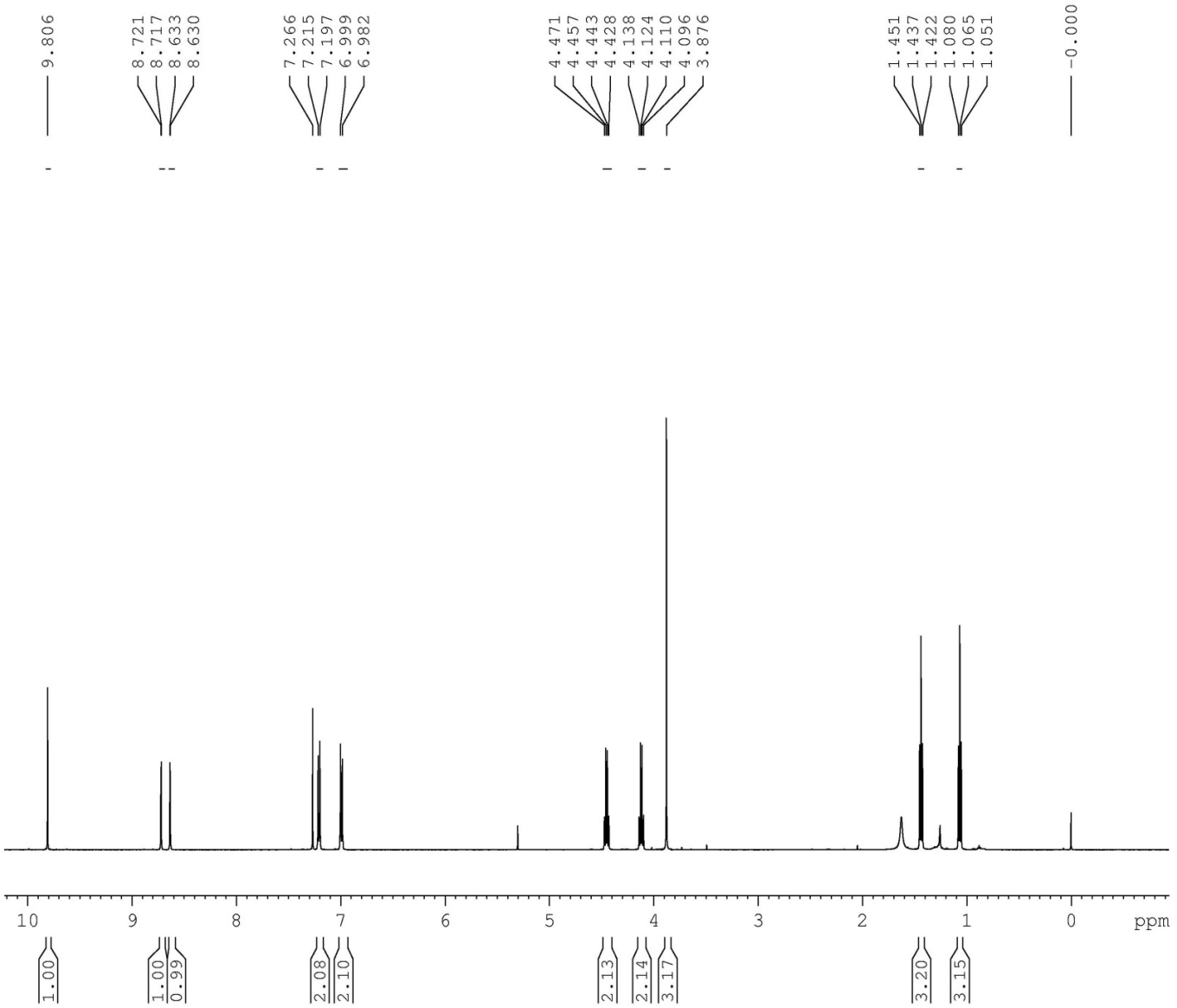

```
Current Data Parameters
NAME                  CS-400
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130617
Time                  12.19
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG               zgpg30
TD                     65536
SOLVENT                CDCl3
NS                       359
DS                         4
SWH               29761.904 Hz
FIDRES             0.454131 Hz
AQ                1.1010548 sec
RG                     32800
DW                    16.800 usec
DE                     6.00 usec
TE                    297.6 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                    13C
P1                    10.94 usec
PL1                    3.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                 80.00 usec
PL12                  17.48 dB
PL13                  18.00 dB
PL2                    1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF             125.7577890 MHz
WDW                       EM
SSB                        0
LB                     1.00 Hz
GB                         0
PC                     1.40
```

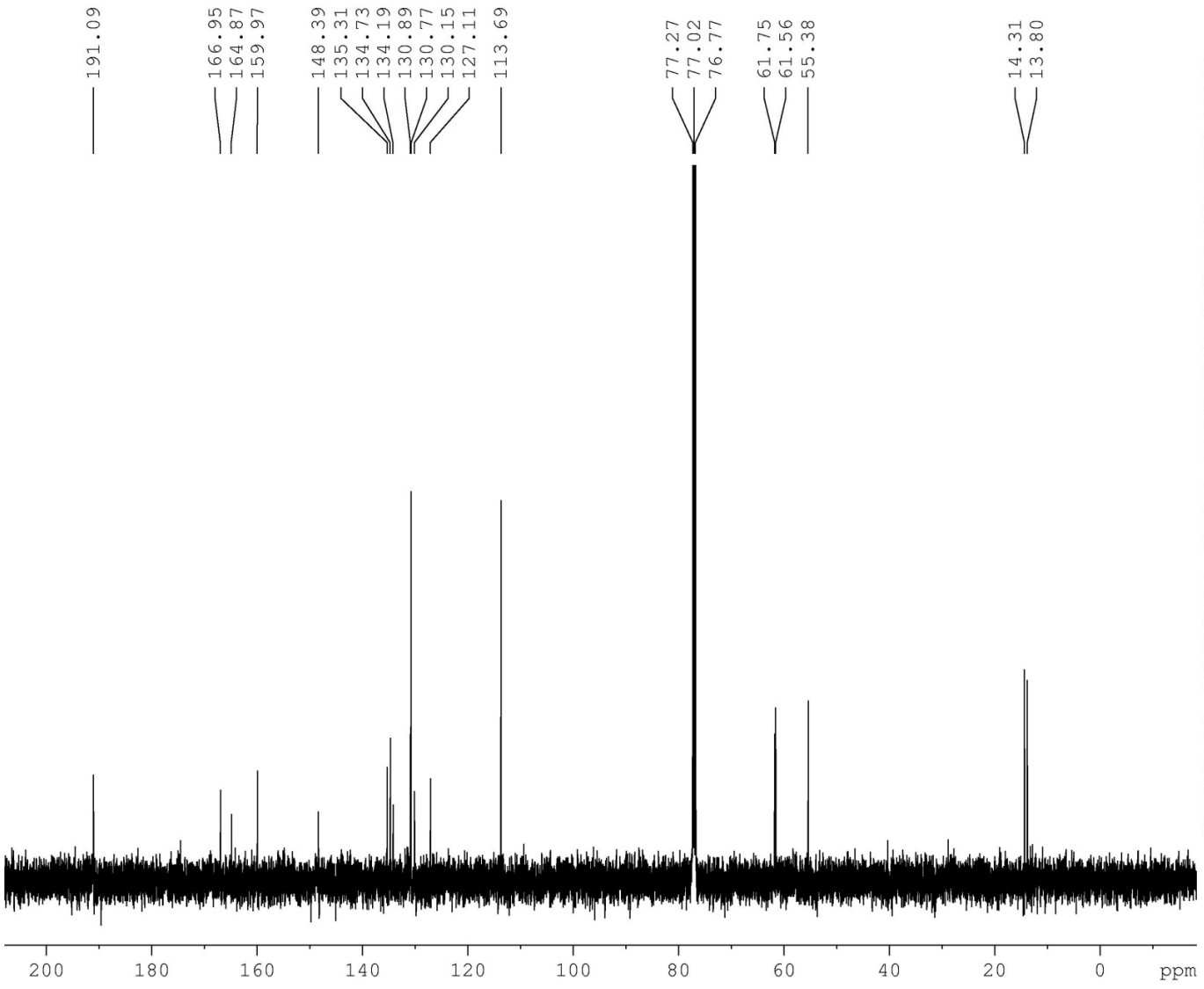



```
Current Data Parameters
NAME                  CS-401
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20130617
Time                  12.25
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ                3.1719923 se
RG                      322
DW                 48.400 us
DE                  6.00 us
TE                  296.8 K
D1              1.00000000 se
TD0                       1

======== CHANNEL f1 ======
NUC1                     1H
P1                  12.00 us
PL1                  1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                    32768
SF            500.1300063 MH
WDW                      EM
SSB                       0
LB                  0.30 Hz
GB                        0
PC                     1.00
```



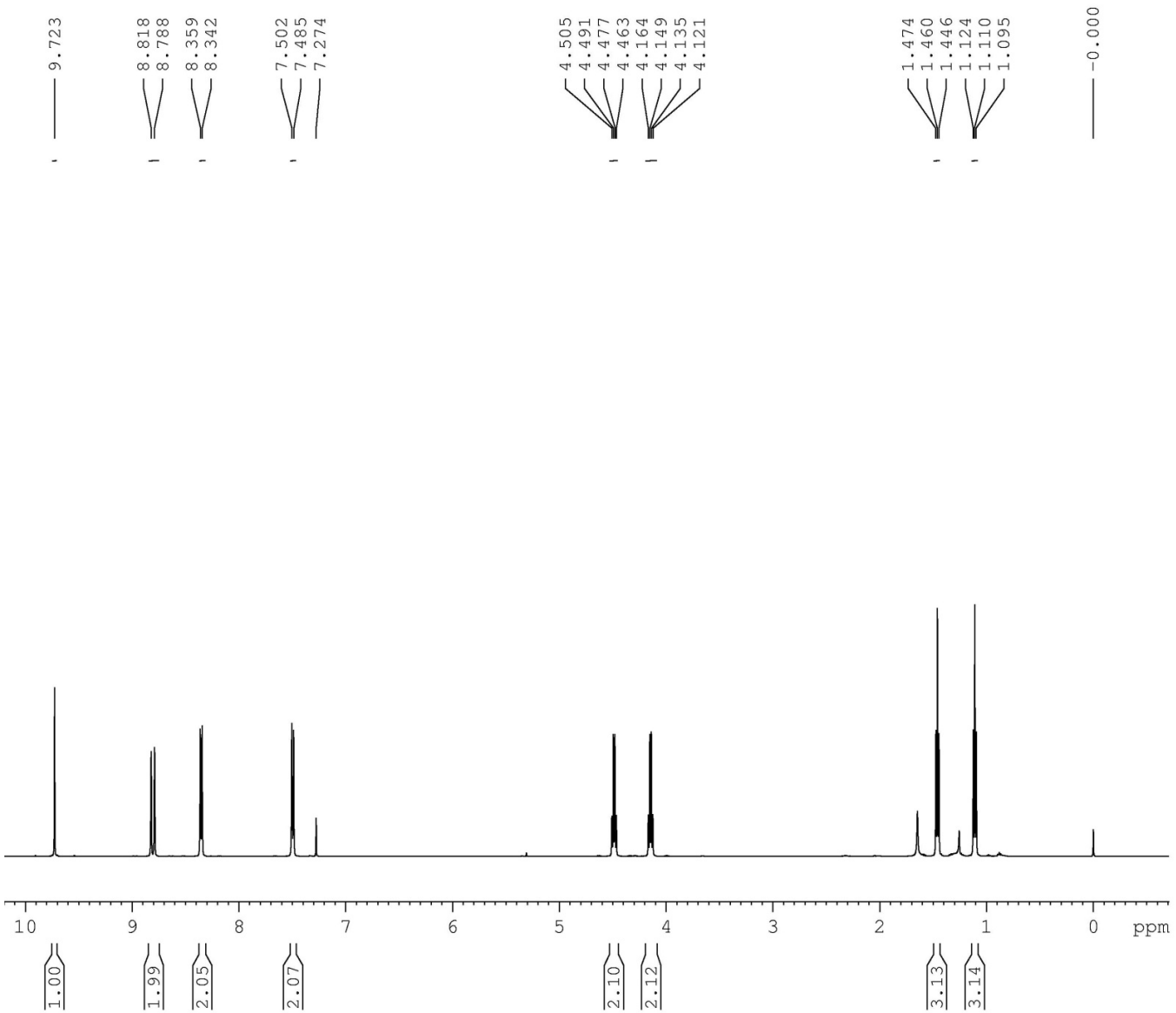

```
Current Data Parameters
NAME                  CS-401
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130617
Time                  12.46
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      400
DS                        4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                    32800
DW                 16.800 usec
DE                  6.00 usec
TE                  297.5 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                   10.94 usec
PL1                   3.00 dB
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 17.48 dB
PL13                 18.00 dB
PL2                   1.00 dB
SFO2          500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF            125.7577890 MHz
WDW                       EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                     1.40
```

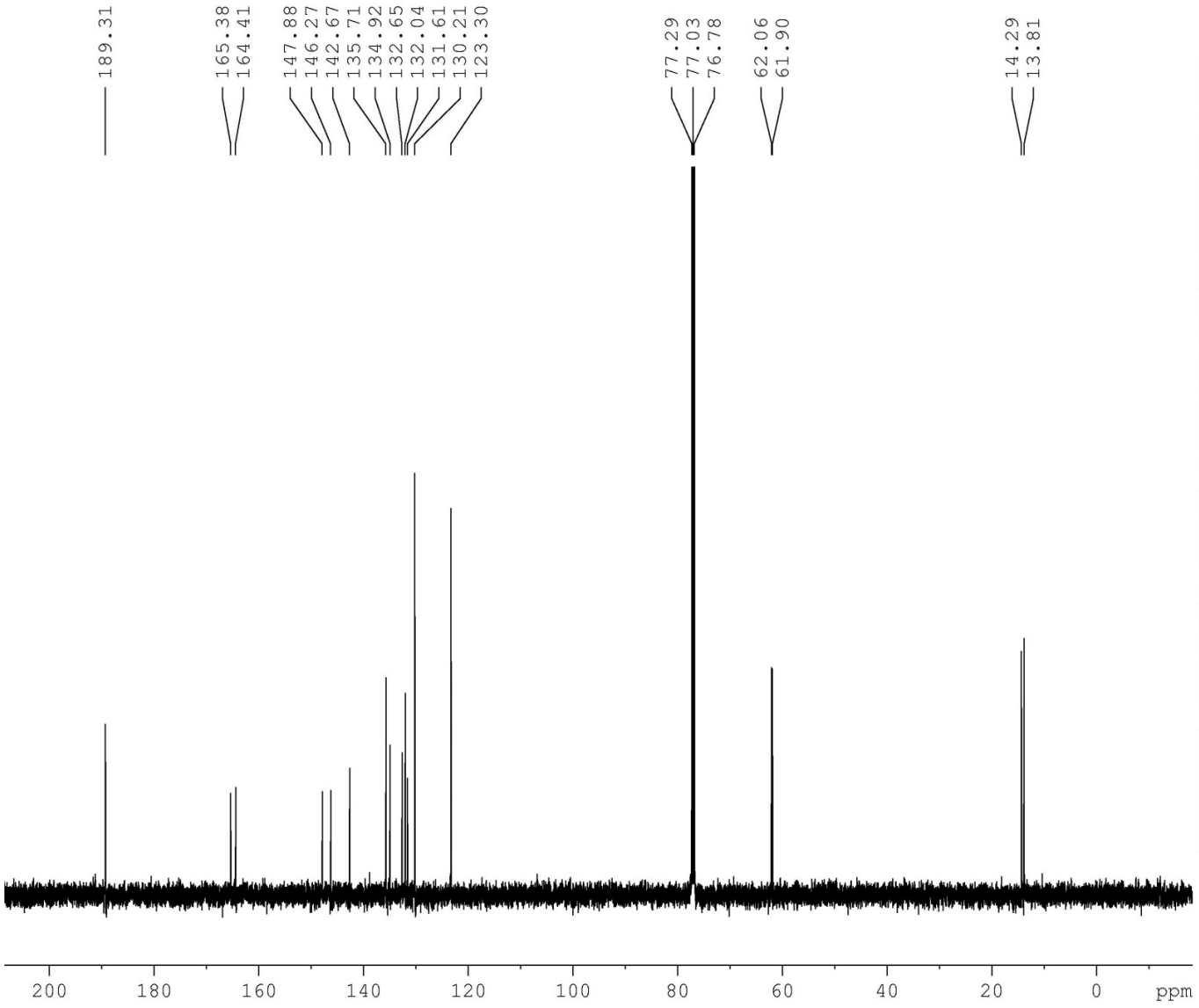



```
Current Data Parameters
NAME                  CS-387
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20130607
Time                   9.40
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG                zg30
TD                    65536
SOLVENT               CDC13
NS                       16
DS                        2
SWH             10330.578 Hz
FIDRES           0.157632 Hz
AQ               3.1719923 se
RG                      203
DW                 48.400 us
DE                  6.00 us
TE                 297.3 K
D1              1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                      1H
P1                  12.00 us
PL1                  1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                        32768
SF              500.1300010 MH
WDW                       EM
SSB                        0
LB                   0.30 Hz
GB                         0
PC                      1.00
```



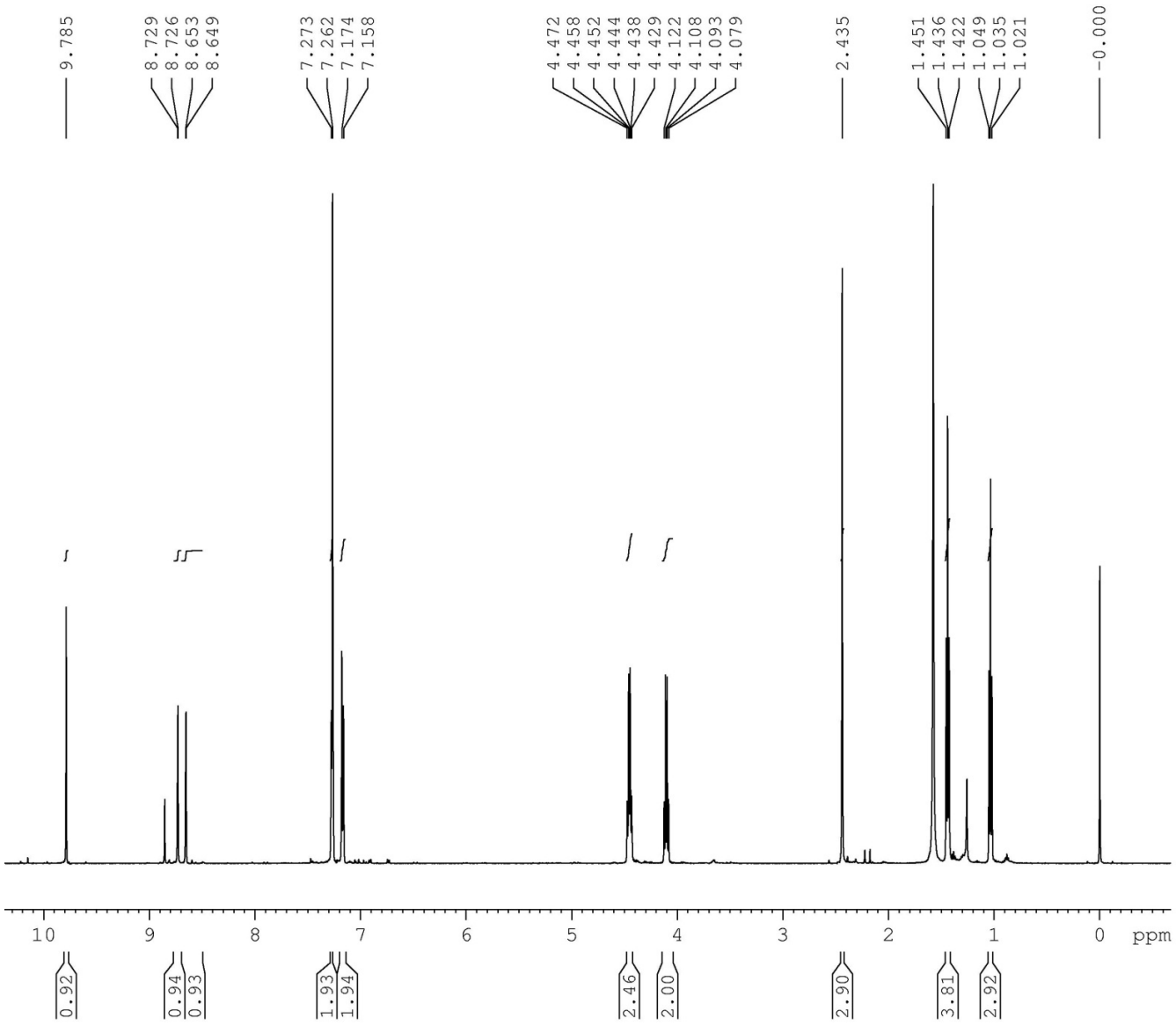

```
Current Data Parameters
NAME                  CS-387
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130607
Time                   9.57
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      296
DS                        4
SWH               29761.904 Hz
FIDRES             0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                   16.800 usec
DE                    6.00 usec
TE                   298.2 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    10.94 usec
PL1                    3.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 17.48 dB
PL13                 18.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF             125.7577890 MHz
WDW                       EM
SSB                        0
LB                     1.00 Hz
GB                         0
PC                     1.40
```

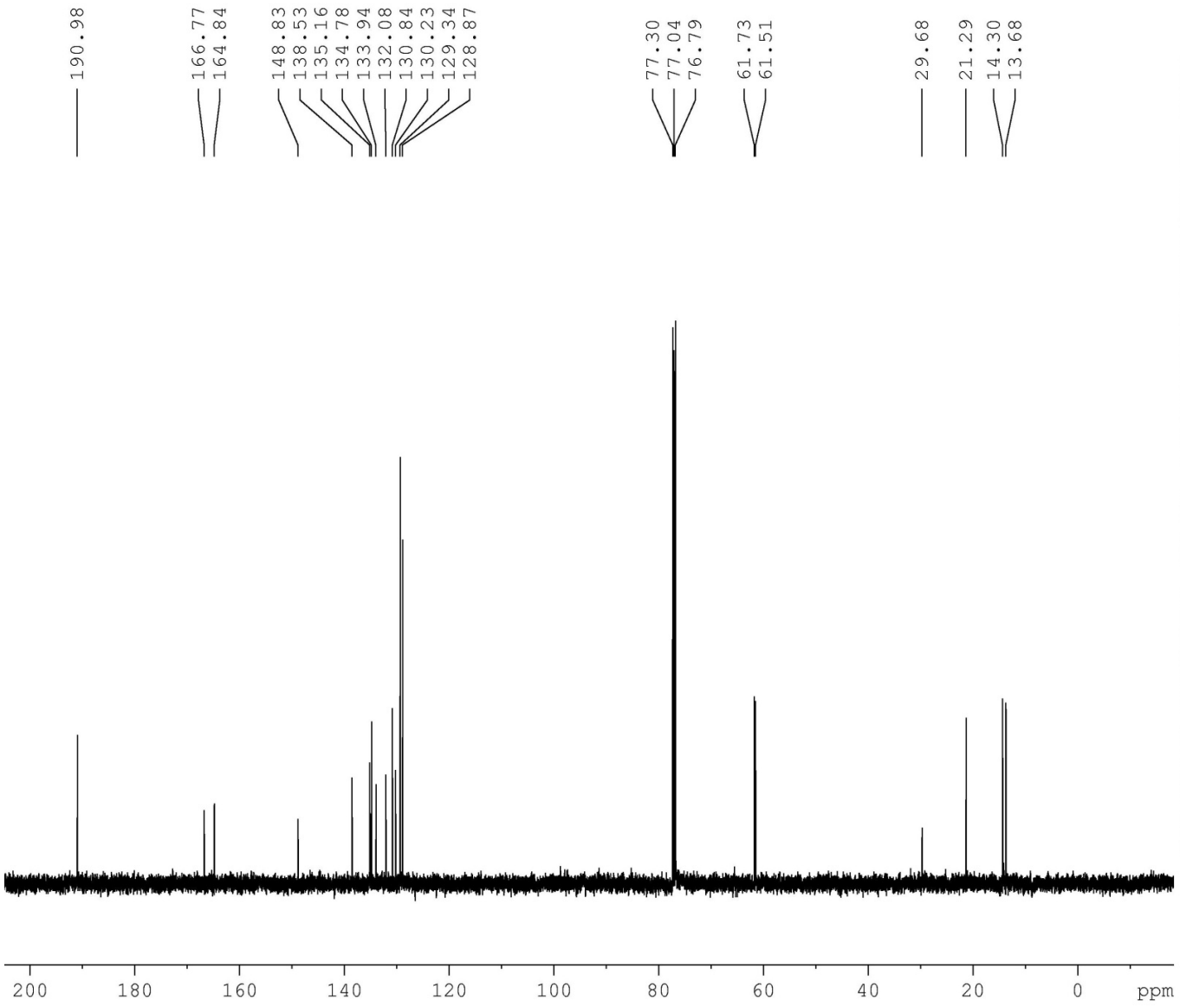



```
Current Data Parameters
NAME                  CS-873-4
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140812
Time                     15.13
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                3.1719923 se
RG                        406
DW                   48.400 us
DE                    6.00 us
TE                   297.6 K
D1                1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1            500.1330885 MH

F2 - Processing parameters
SI                       32768
SF              500.1300068 MH
WDW                         EM
SSB                          0
LB                    0.30 Hz
GB                           0
PC                        1.00
```



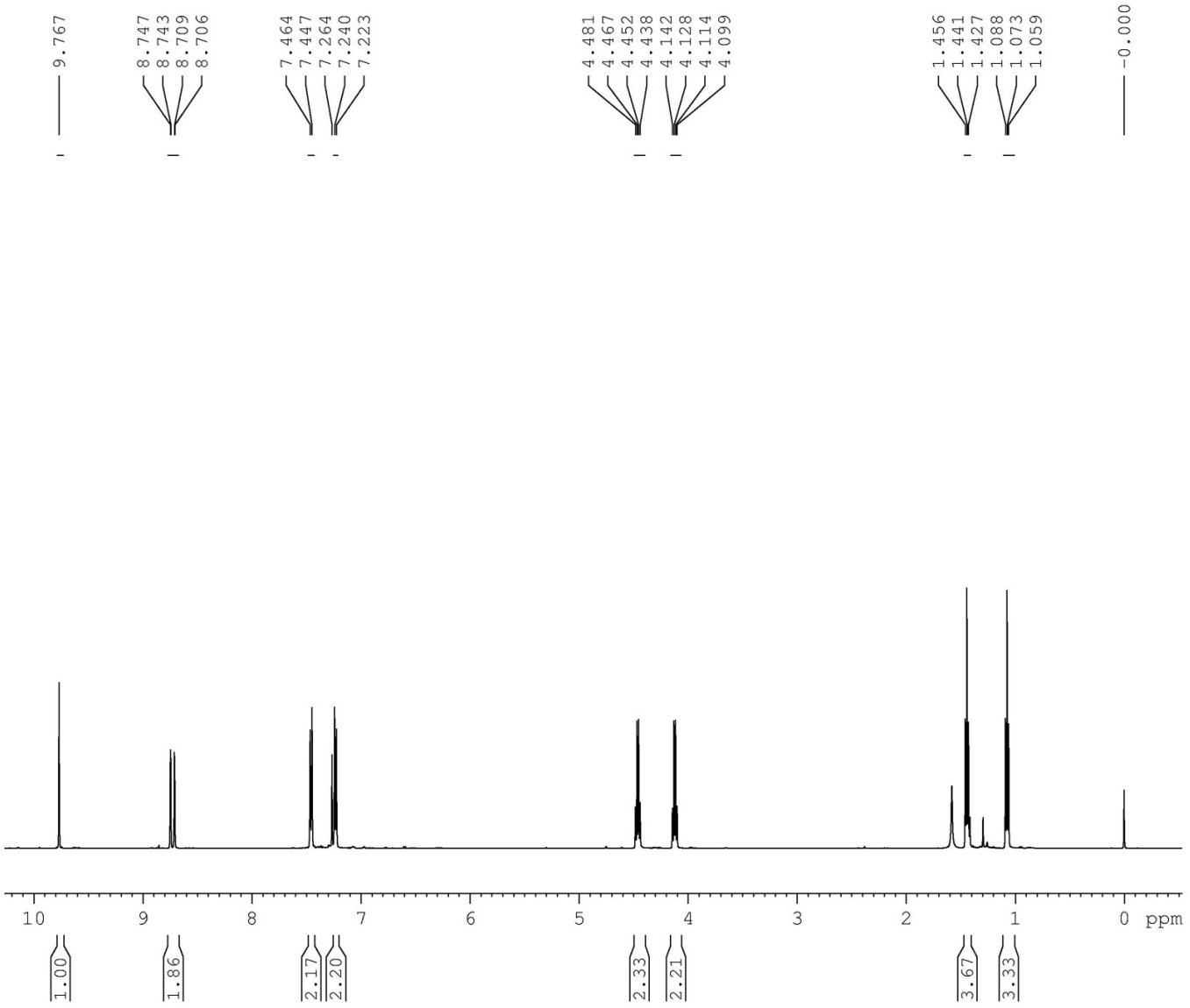

```
Current Data Parameters
NAME                  CS-467
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130729
Time                  15.47
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      222
DS                        4
SWH              29761.904 Hz
FIDRES            0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                   16.800 usec
DE                    6.00 usec
TE                   298.0 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    10.94 usec
PL1                    3.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 17.48 dB
PL13                 18.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                      32768
SF             125.7577890 MHz
WDW                        EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                    1.40
```

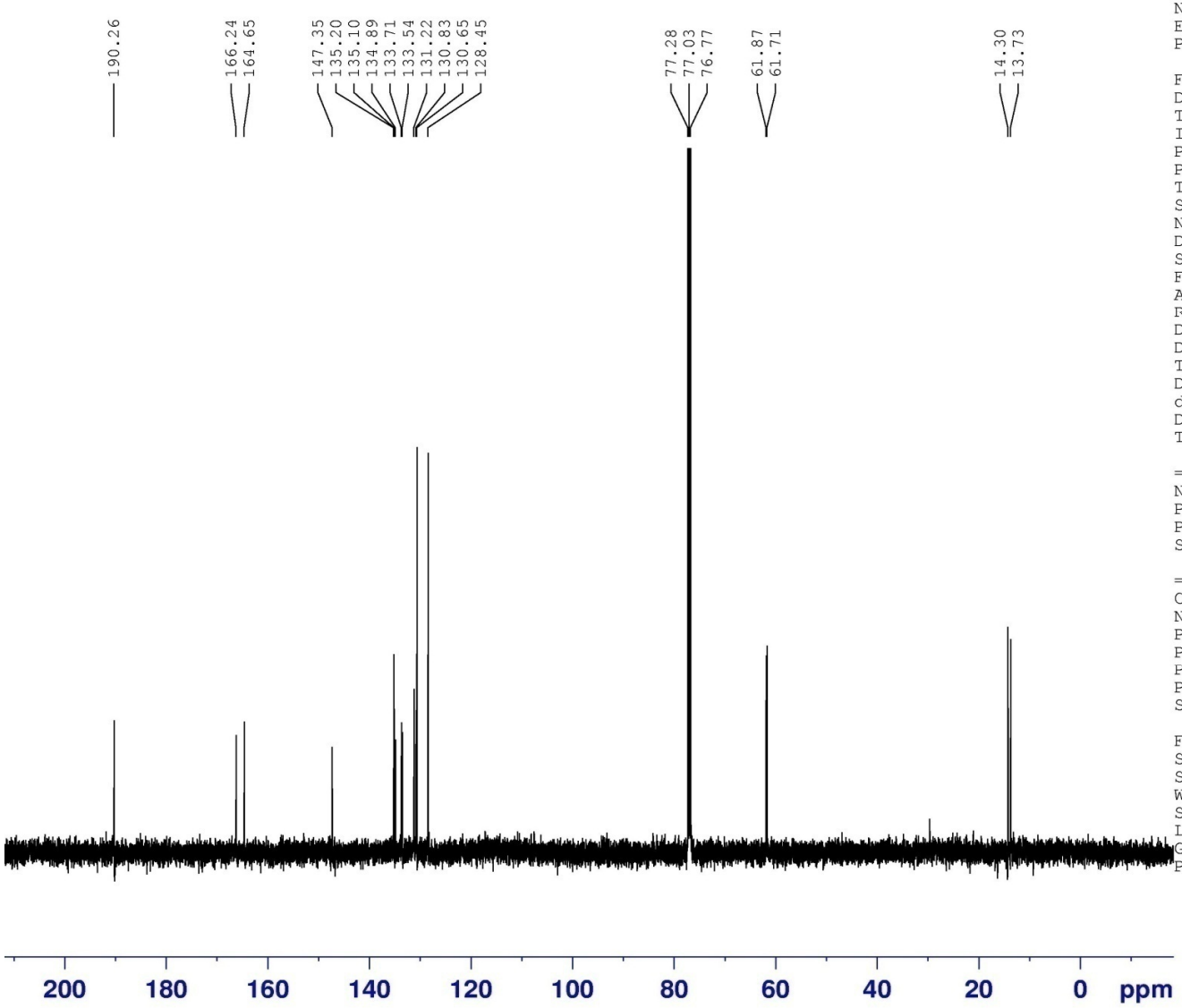



```
Current Data Parameters
NAME                  CS-859-H
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140731
Time                     17.53
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        256
DW                     48.400 us
DE                      6.00 us
TE                     298.4 K
D1                 1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1              500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300058 MH
WDW                         EM
SSB                          0
LB                    0.30 Hz
GB                           0
PC                        1.00
```



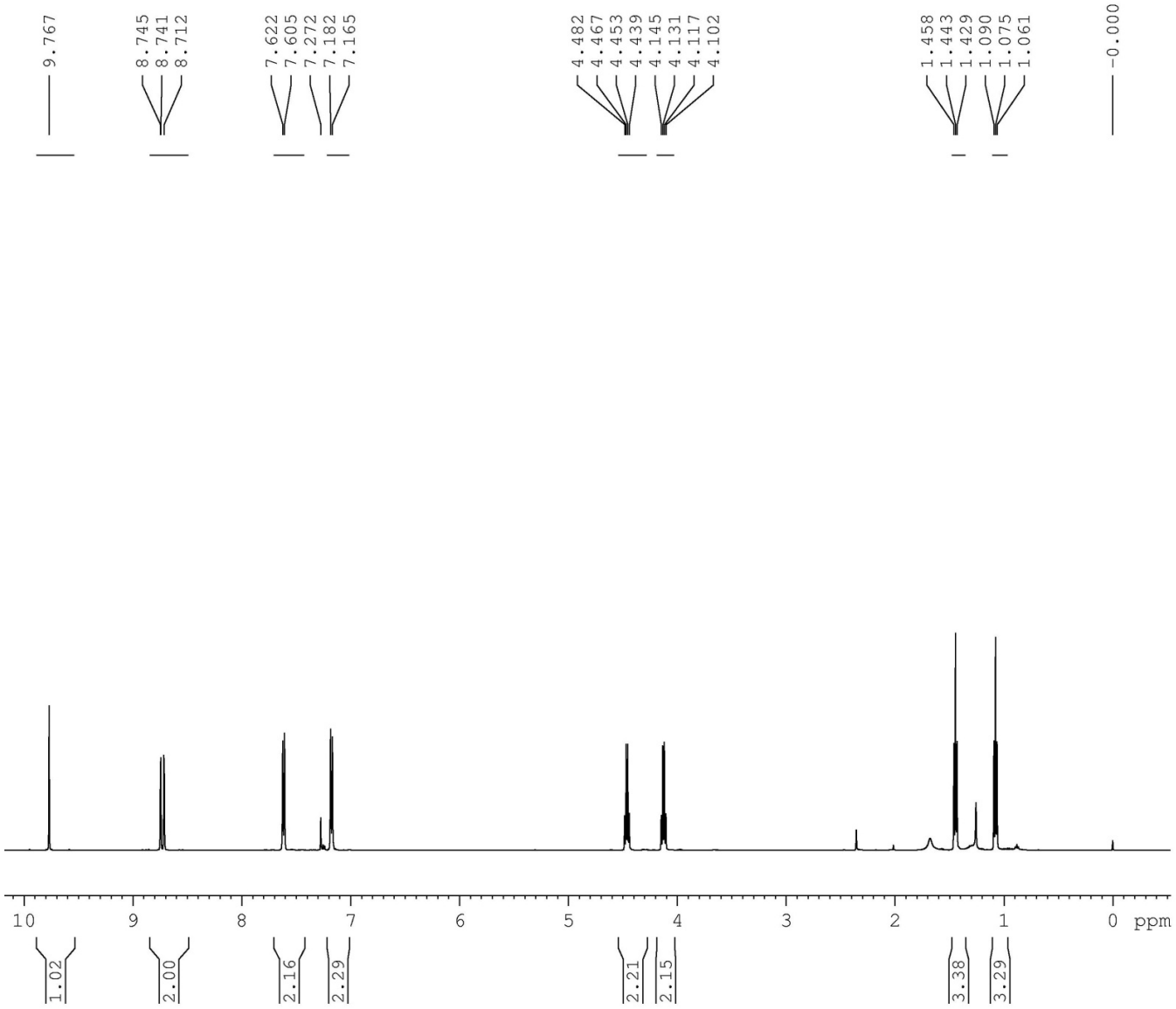

```
Current Data Parameters
NAME                  CS-530
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130917
Time                  19.21
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG               zgpg30
TD                     65536
SOLVENT                CDCl3
NS                       256
DS                         4
SWH               29761.904 Hz
FIDRES             0.454131 Hz
AQ                1.1010548 sec
RG                     32800
DW                  16.800 usec
DE                   6.00 usec
TE                   297.2 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                     13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                     1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                       32768
SF             125.7577890 MHz
WDW                         EM
SSB                          0
LB                    1.00 Hz
GB                           0
PC                    1.40
```

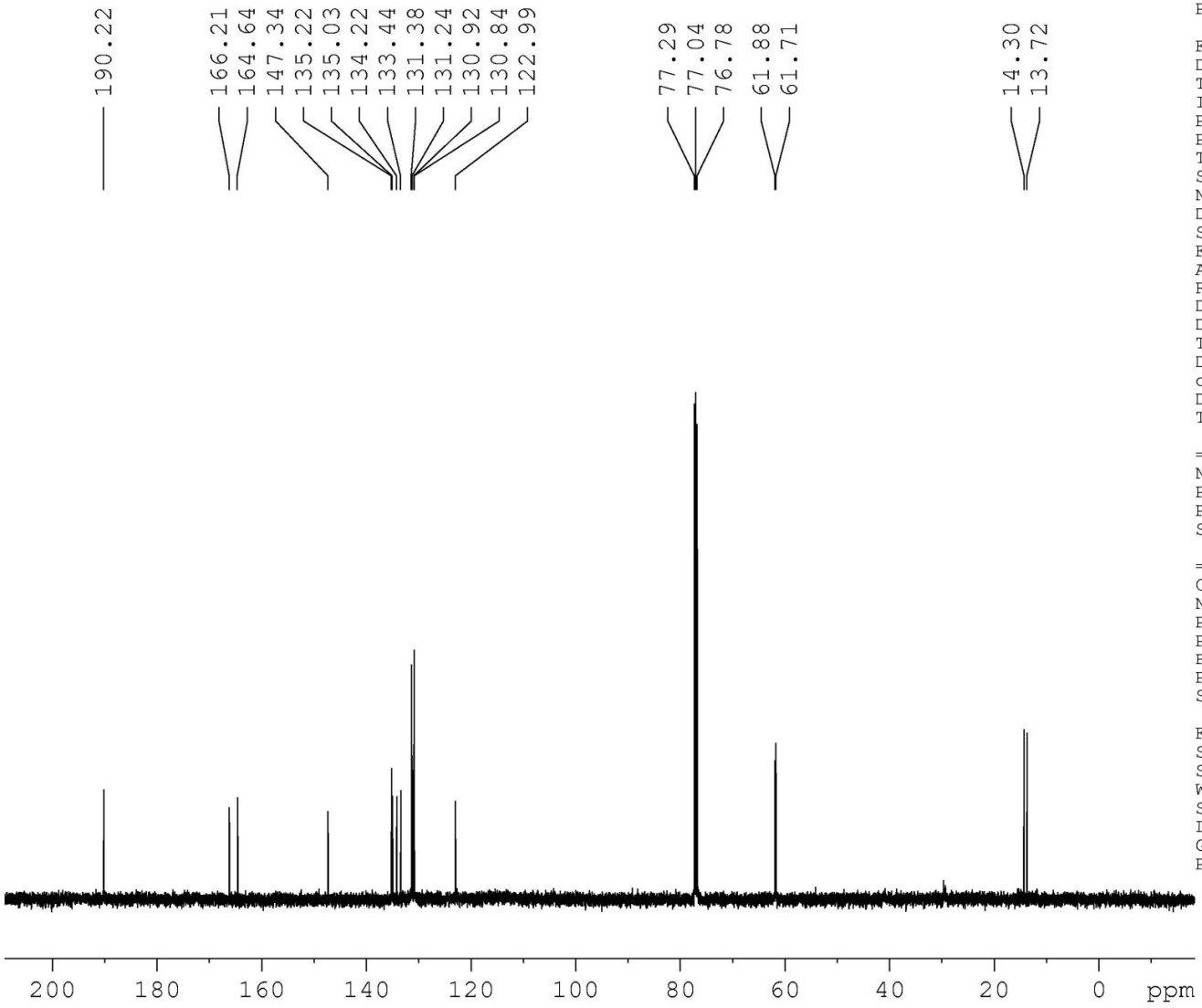



```
Current Data Parameters
NAME                  CS-834-D
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140725
Time                     10.29
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                       71.8
DW                     48.400 us
DE                      6.00 us
TE                     295.5 K
D1                1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1             500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300017 MH
WDW                         EM
SSB                          0
LB                    0.30 Hz
GB                           0
PC                        1.00
```



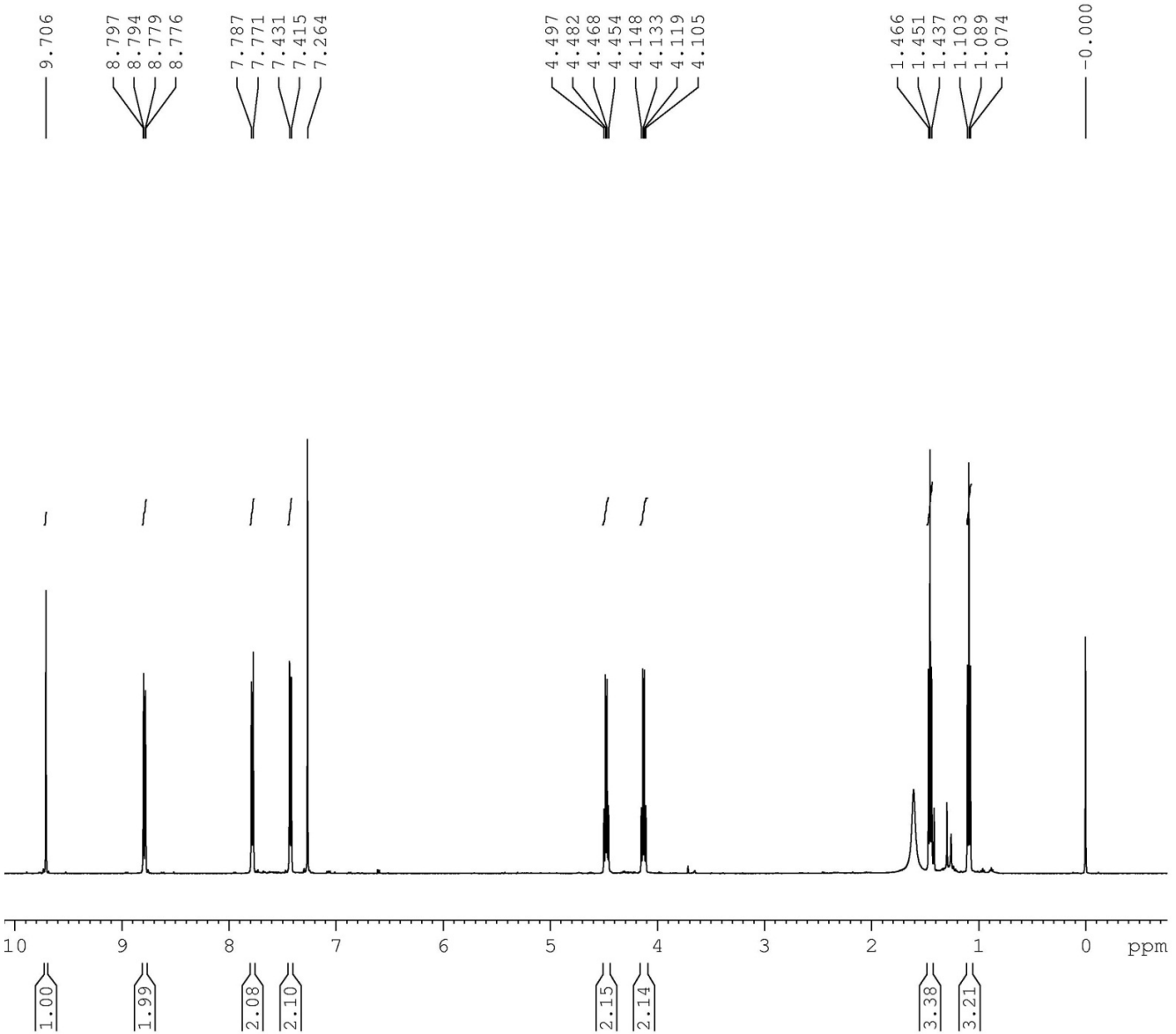

```
Current Data Parameters
NAME                  CS-535
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130924
Time                  12.55
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      256
DS                        4
SWH               29761.904 Hz
FIDRES             0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                   16.800 usec
DE                    6.00 usec
TE                   297.0 K
D1               2.00000000 sec
d11              0.03000000 sec
DELTA            1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                    1H
PCPD2                 80.00 usec
PL12                  21.92 dB
PL13                 120.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                      32768
SF             125.7577890 MHz
WDW                        EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                    1.40
```

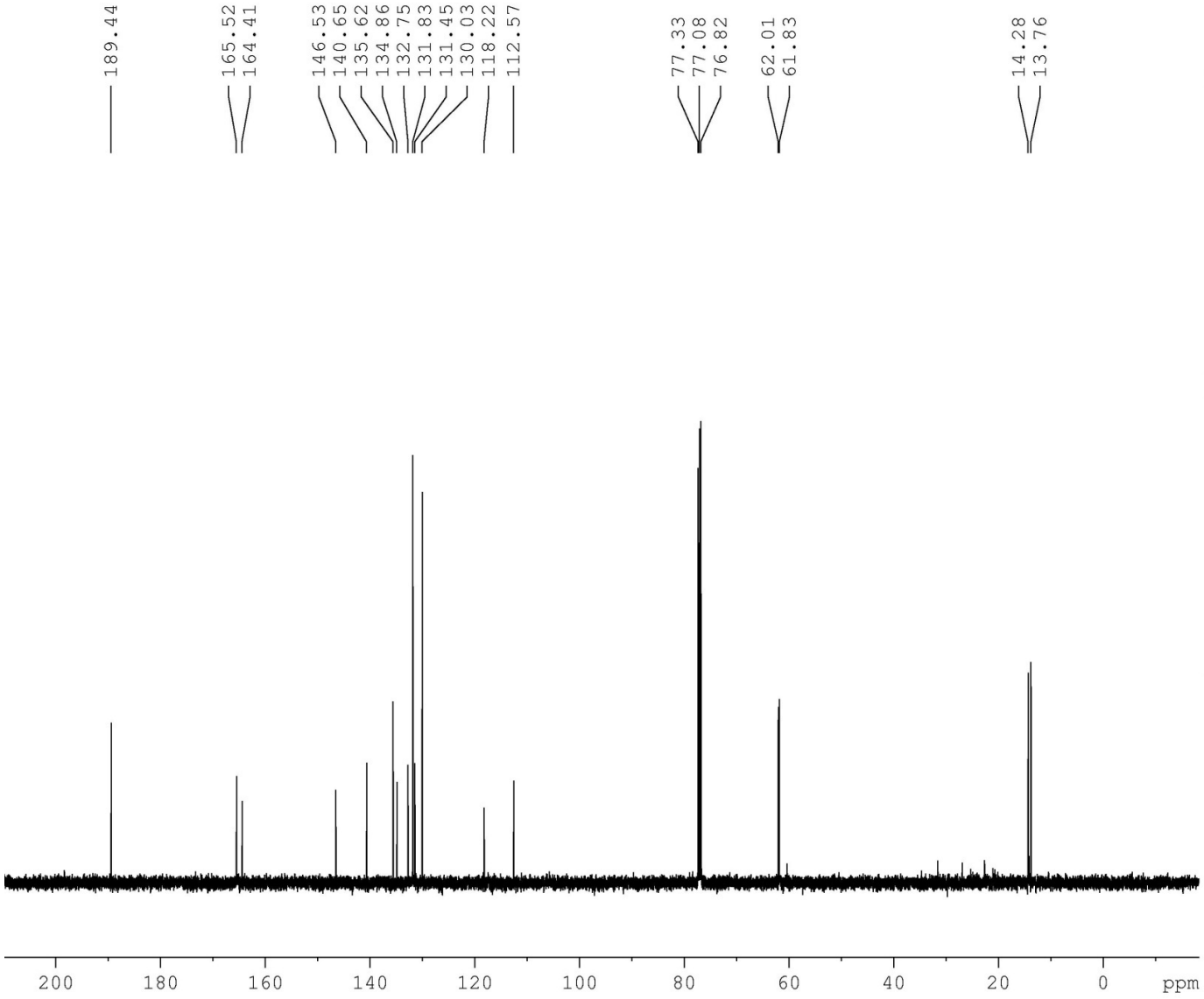



```
Current Data Parameters
NAME                  CS-848-H
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140728
Time                     13.27
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        362
DW                     48.400 us
DE                      6.00 us
TE                     296.6 K
D1                1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1              500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300059 MH
WDW                         EM
SSB                          0
LB                       0.30 Hz
GB                           0
PC                       1.00
```



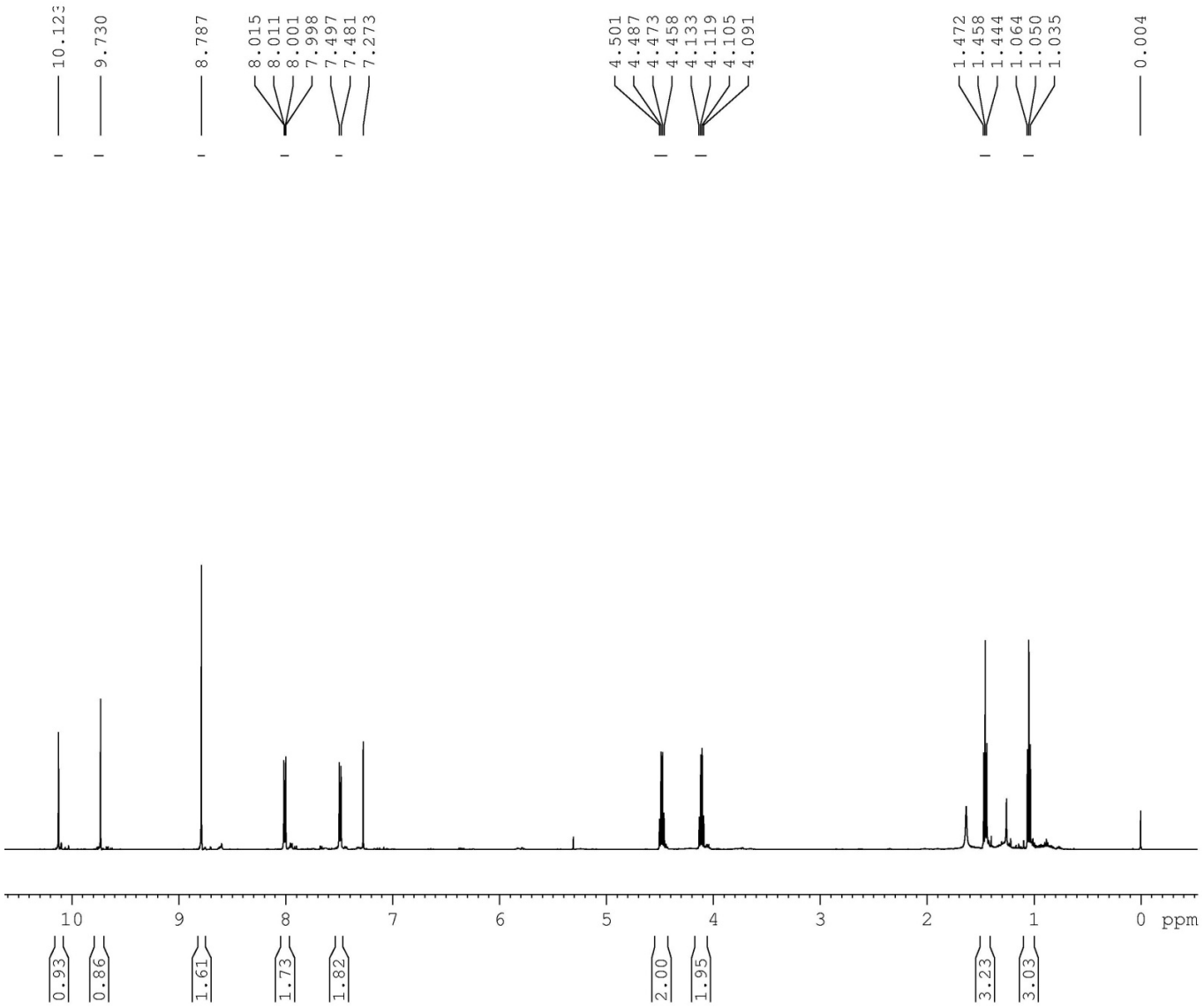

```
Current Data Parameters
NAME                  CS-428
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130709
Time                  15.44
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      120
DS                        4
SWH               29761.904 Hz
FIDRES                0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                   16.800 usec
DE                    6.00 usec
TE                   297.8 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                   10.94 usec
PL1                   3.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 17.48 dB
PL13                 18.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                      32768
SF             125.7577890 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

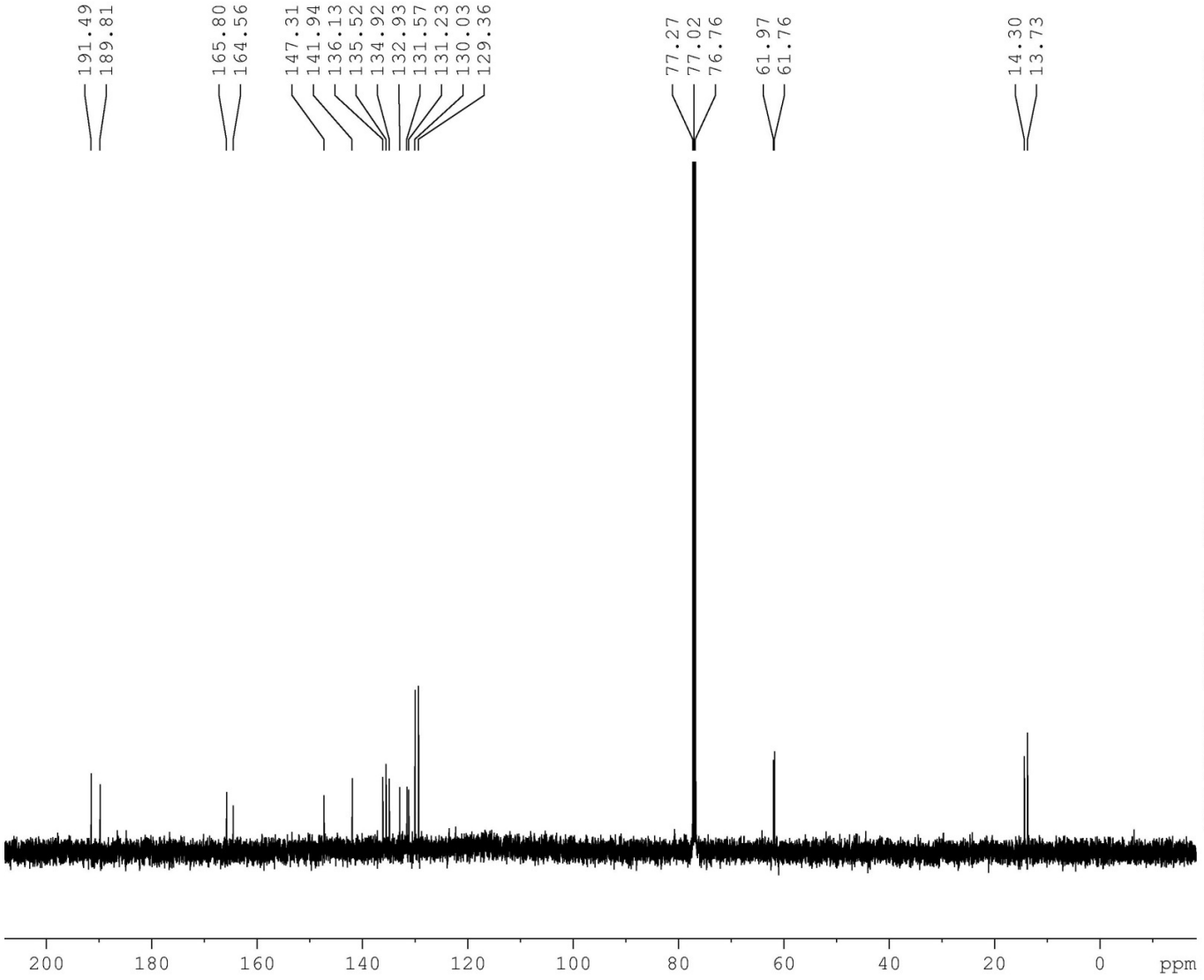



```
Current Data Parameters
NAME                  CS-562
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20131016
Time                  13.30
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                      114
DW                 48.400 us
DE                  6.00 us
TE                 296.7 K
D1              1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                      1H
P1                   7.20 us
PL1                  1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                     32768
SF            500.1300000 MH
WDW                       EM
SSB                        0
LB                   0.30 Hz
GB                         0
PC                    1.00
```



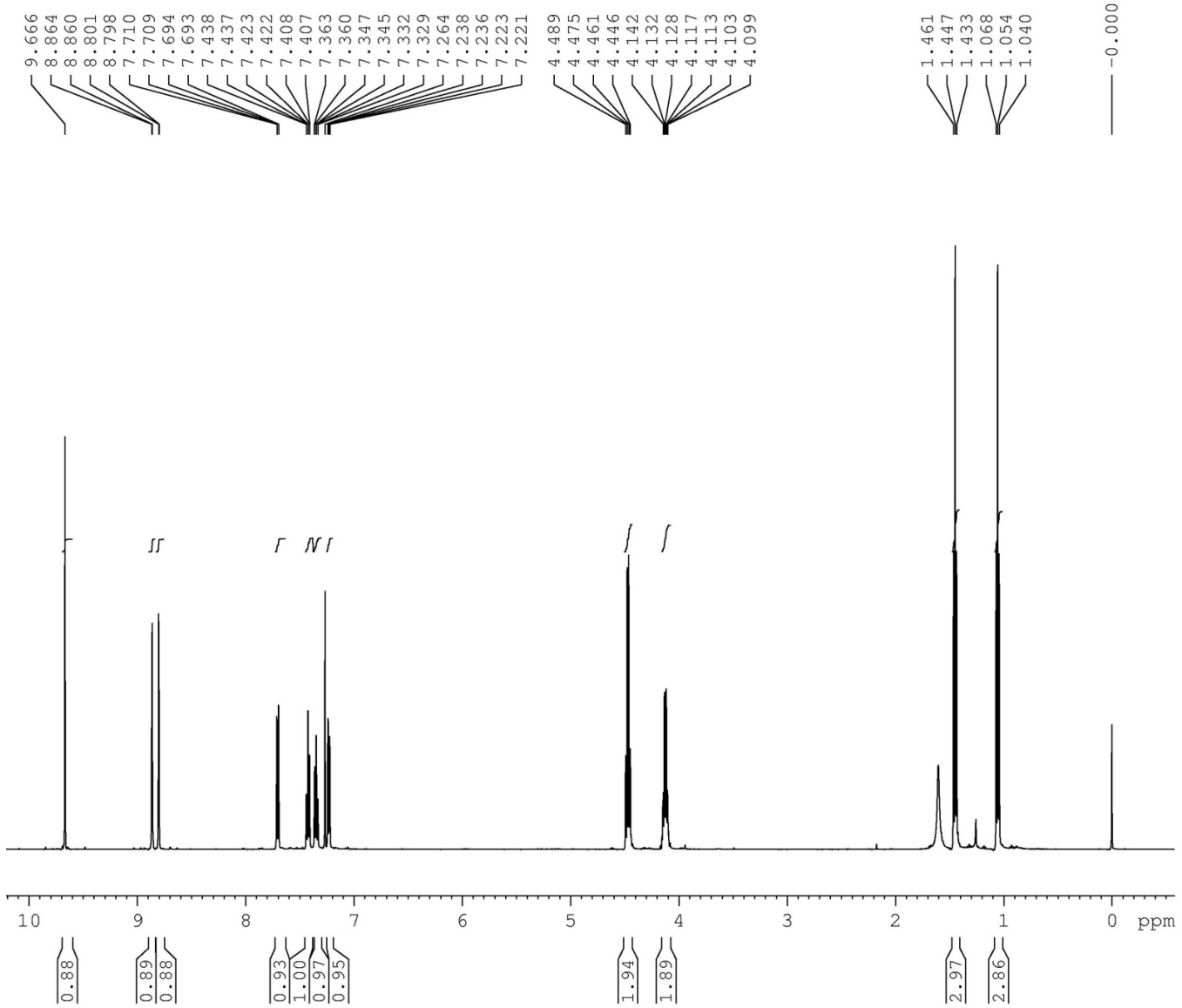

```
Current Data Parameters
NAME                  CS-562
EXPNO                      6
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131017
Time                  14.06
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     256
DS                       4
SWH              29761.904 Hz
FIDRES            0.454131 Hz
AQ                1.1010548 sec
RG                   32800
DW                  16.800 usec
DE                   6.00 usec
TE                  297.0 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2          500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF            125.7577890 MHz
WDW                       EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                    1.40
```

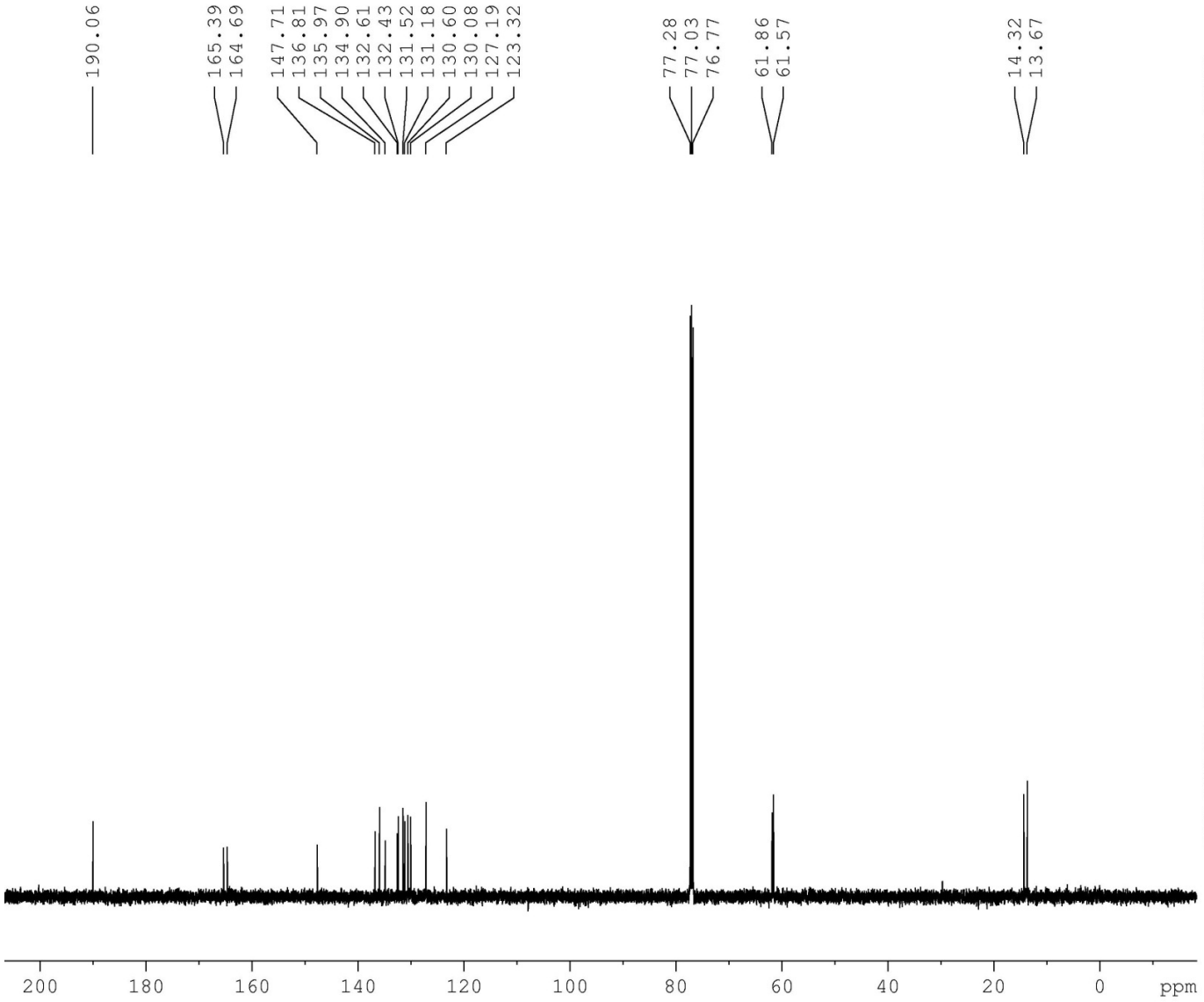



```
Current Data Parameters
NAME                  CS-872-4
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140812
Time                     17.44
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        287
DW                     48.400 us
DE                      6.00 us
TE                     297.8 K
D1                 1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1              500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300056 MH
WDW                         EM
SSB                          0
LB                        0.30 Hz
GB                           0
PC                        1.00
```



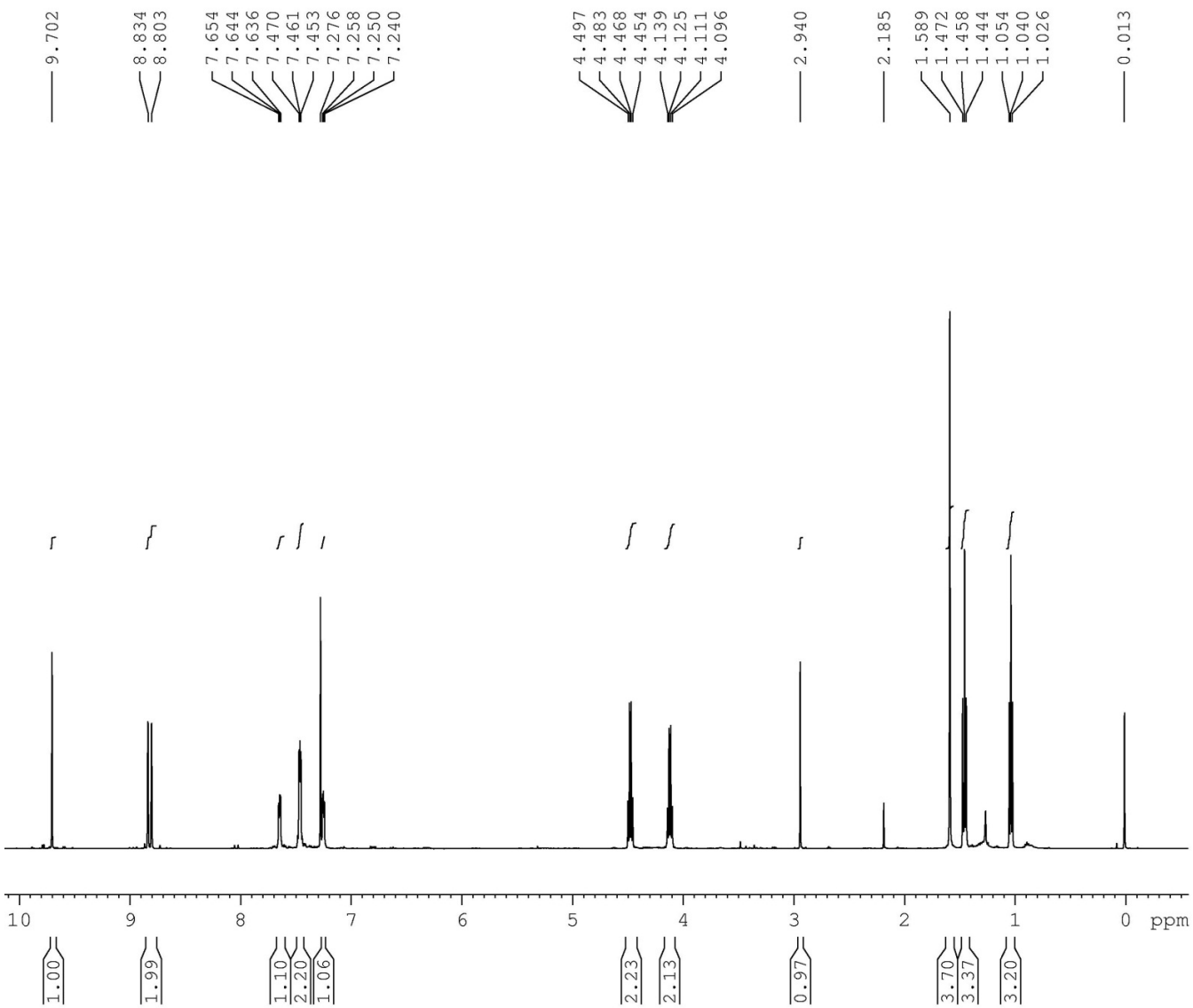

```
Current Data Parameters
NAME                  CS-600
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131115
Time                  11.30
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      272
DS                        4
SWH              29761.904 Hz
FIDRES            0.454131 Hz
AQ               1.1010548 sec
RG                    32800
DW                  16.800 usec
DE                   6.00 usec
TE                   297.0 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2          500.1320005 MHz

F2 - Processing parameters
SI                    32768
SF            125.7577890 MHz
WDW                      EM
SSB                       0
LB                    1.00 Hz
GB                        0
PC                    1.40
```

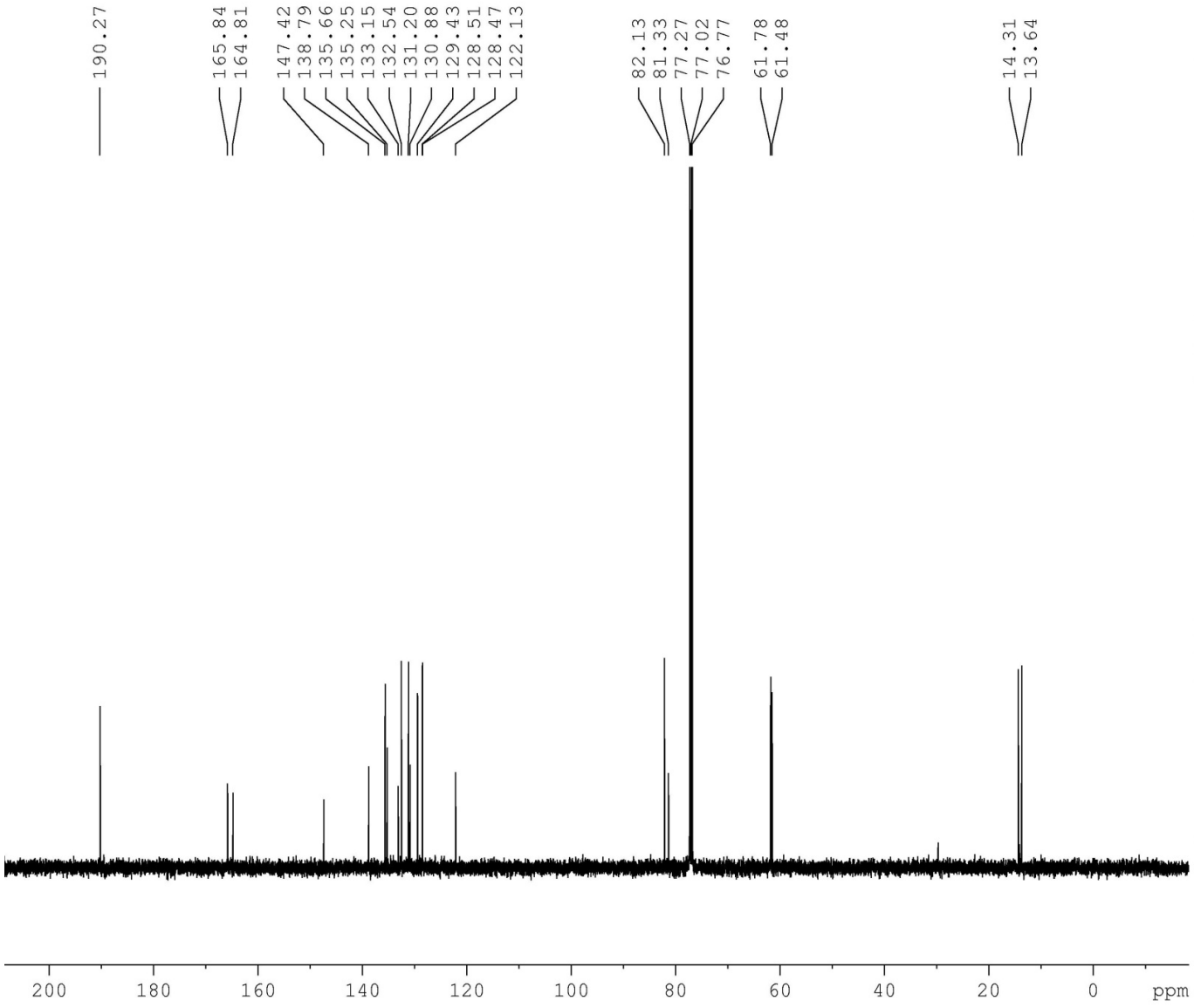



```
Current Data Parameters
NAME                  NAH-3-1
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameter
Date_              20140228
Time                  17.00
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                      406
DW                   48.400 us
DE                    6.00 us
TE                   298.5 K
D1              1.00000000 se
TD0                       1

======== CHANNEL f1 ======
NUC1                    1H
P1                   7.20 us
PL1                  1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                    32768
SF            500.1300000 MH
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```



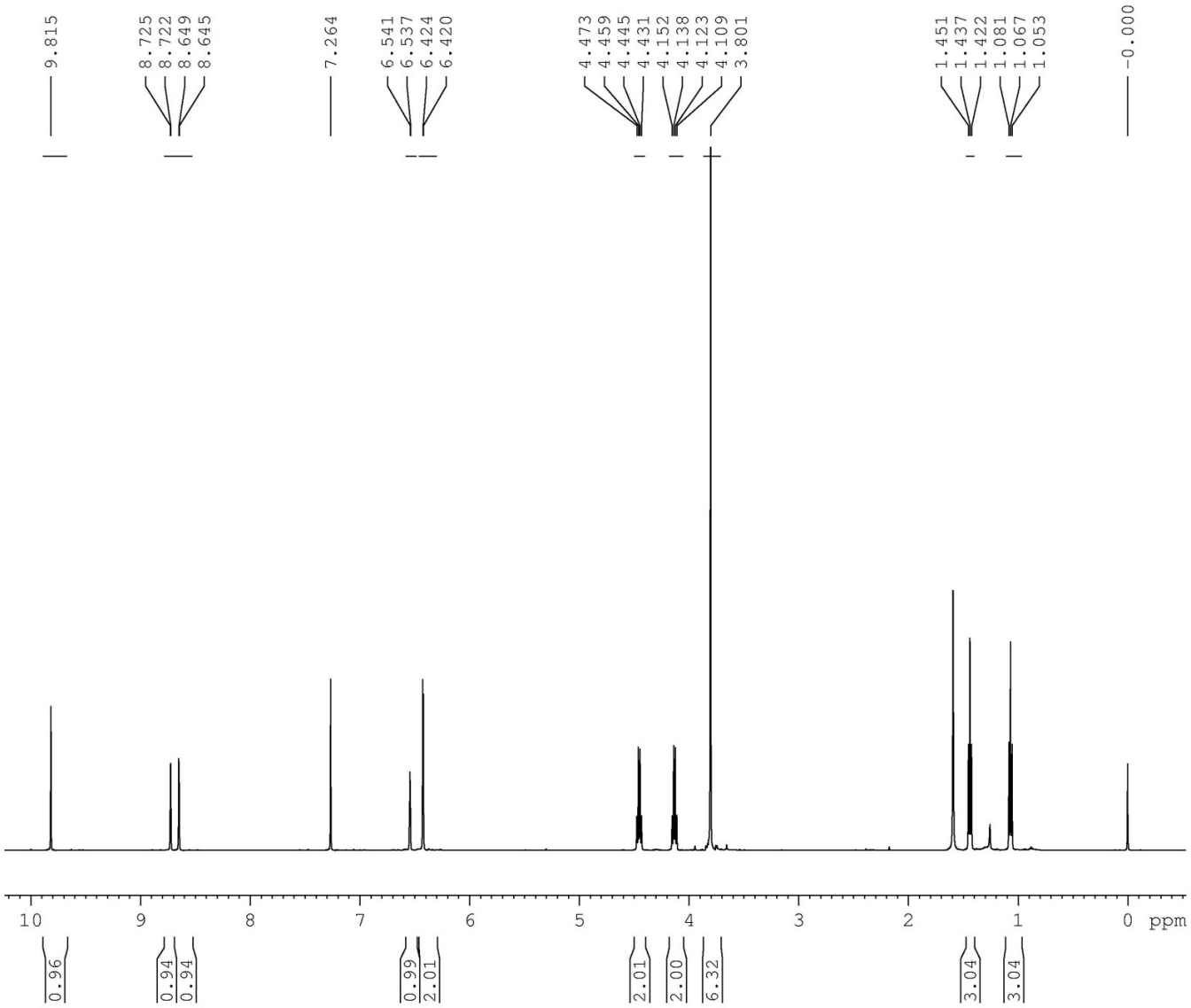

```
Current Data Parameters
NAME                  CS-436
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20130716
Time                  16.34
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDC13
NS                      219
DS                        4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                    32800
DW                  16.800 usec
DE                   6.00 usec
TE                   299.9 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    10.94 usec
PL1                    3.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 17.48 dB
PL13                 18.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                      32768
SF             125.7577890 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40
```

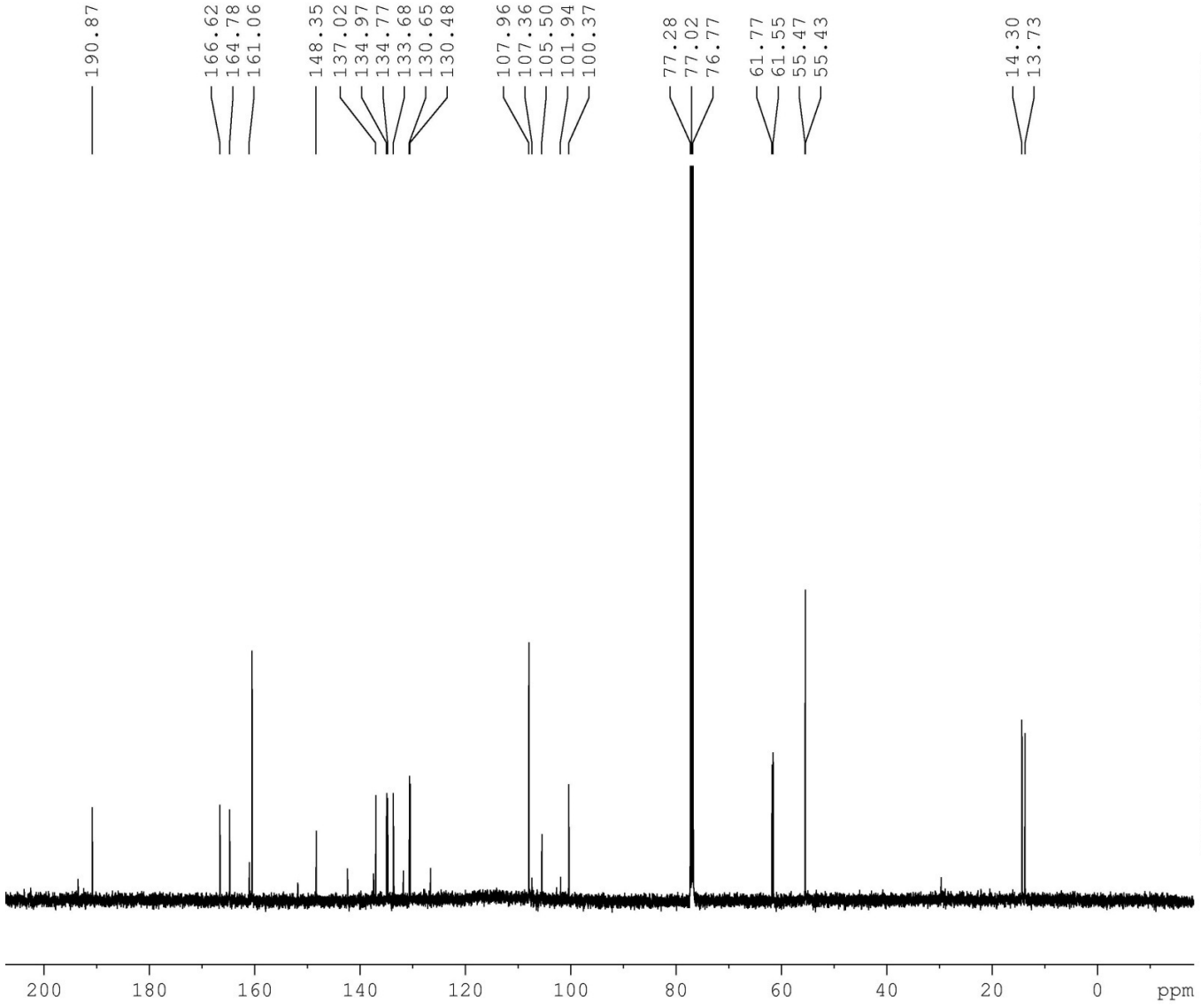



```
Current Data Parameters
NAME                  CS-851-1
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140730
Time                     14.00
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        287
DW                     48.400 us
DE                      6.00 us
TE                     297.2 K
D1                 1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1              500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300055 MH
WDW                         EM
SSB                          0
LB                       0.30 Hz
GB                           0
PC                       1.00
```



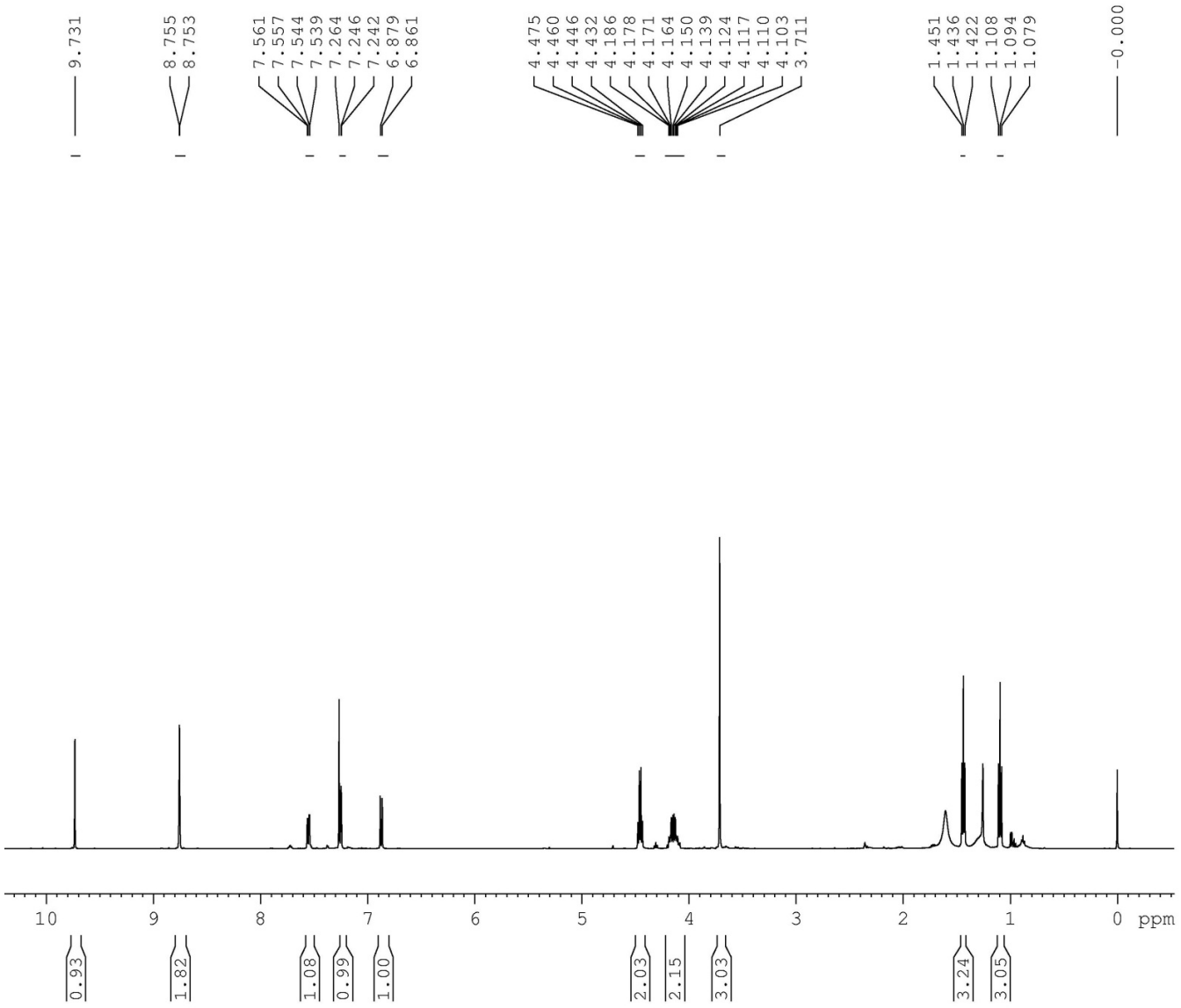

```
Current Data Parameters
NAME                  CS-556-1
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20131014
Time                     16.56
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                        1024
DS                           4
SWH                  29761.904 Hz
FIDRES                0.454131 Hz
AQ                   1.1010548 sec
RG                       32800
DW                      16.800 usec
DE                       6.00 usec
TE                       296.9 K
D1                  2.00000000 sec
d11                 0.03000000 sec
DELTA               1.89999998 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                       13C
P1                       12.40 usec
PL1                      -2.00 dB
SFO1               125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                    80.00 usec
PL12                     21.92 dB
PL13                    120.00 dB
PL2                       1.00 dB
SFO2               500.1320005 MHz

F2 - Processing parameters
SI                        32768
SF                 125.7577890 MHz
WDW                          EM
SSB                          0
LB                        1.00 Hz
GB                           0
PC                        1.40
```

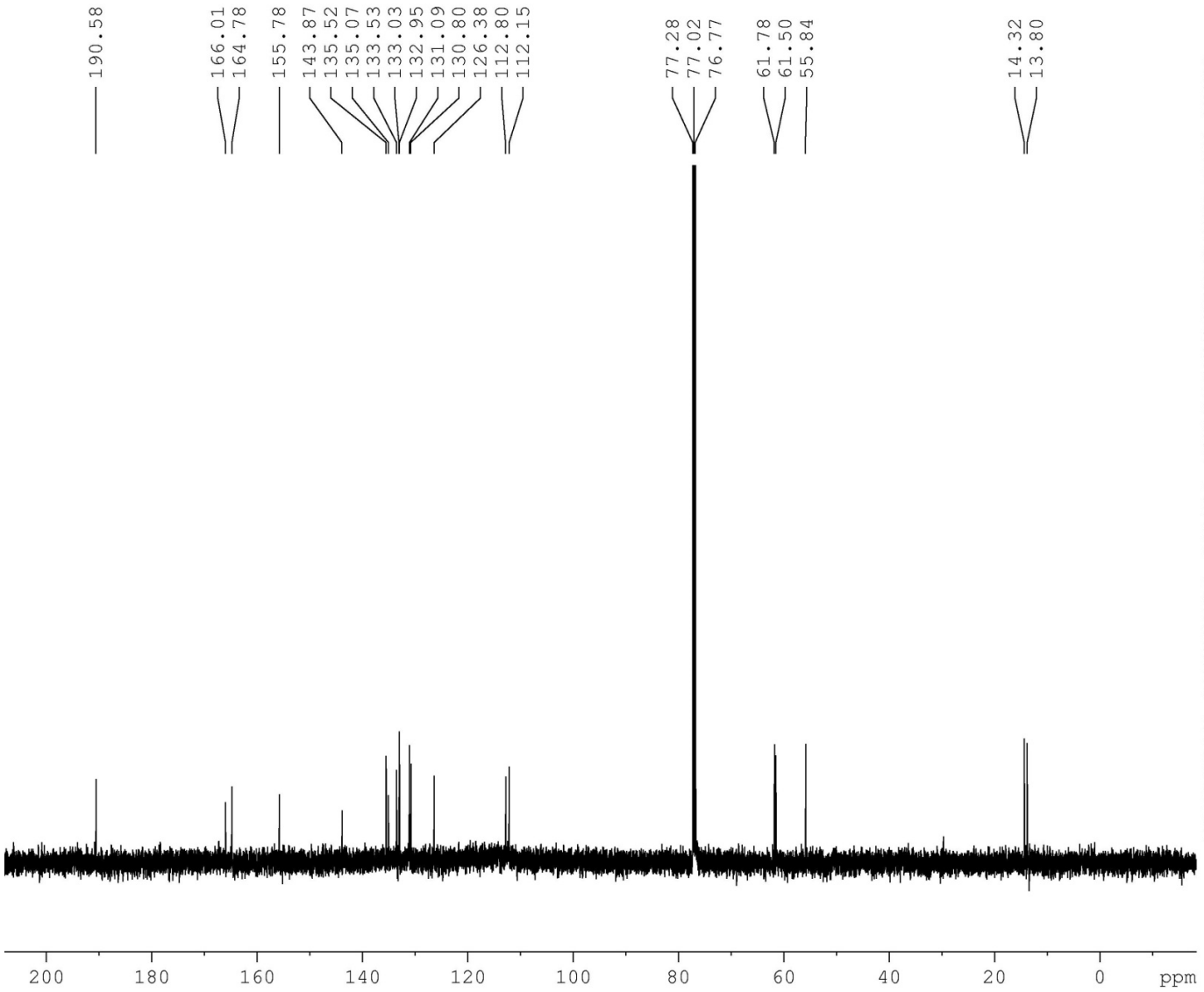



```
Current Data Parameters
NAME                  CS-838-D
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140725
Time                     10.40
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDC13
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        287
DW                     48.400 us
DE                      6.00 us
TE                     295.7 K
D1                 1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                      7.20 us
PL1                     1.00 dB
SFO1             500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300055 MH
WDW                         EM
SSB                          0
LB                      0.30 Hz
GB                           0
PC                        1.00
```



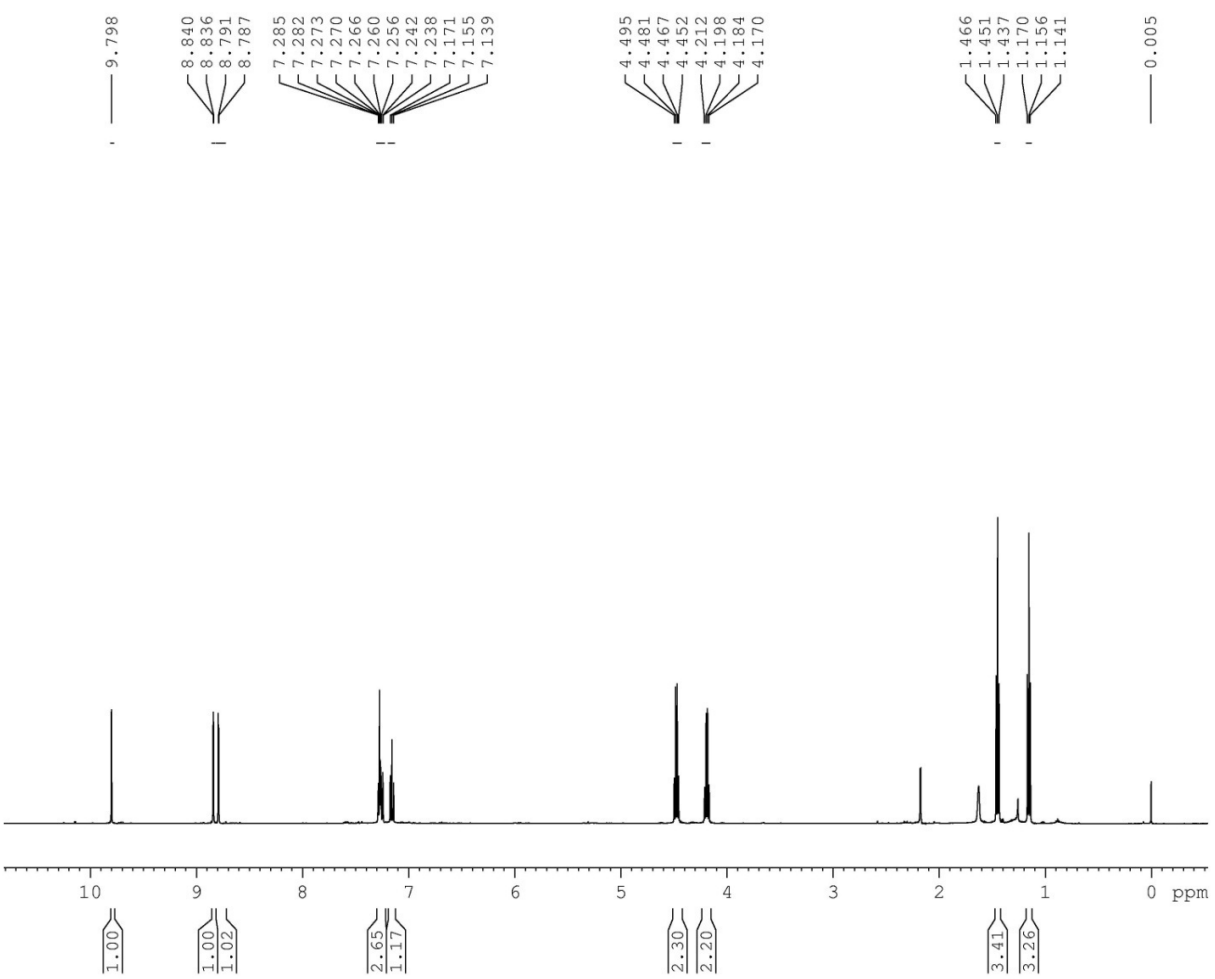

```
Current Data Parameters
NAME                  CS-558
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131015
Time                  12.30
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      256
DS                        4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                    32800
DW                 16.800 usec
DE                  6.00 usec
TE                  296.6 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                   12.40 usec
PL1                  -2.00 dB
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2          500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF            125.7577890 MHz
WDW                       EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                    1.40
```

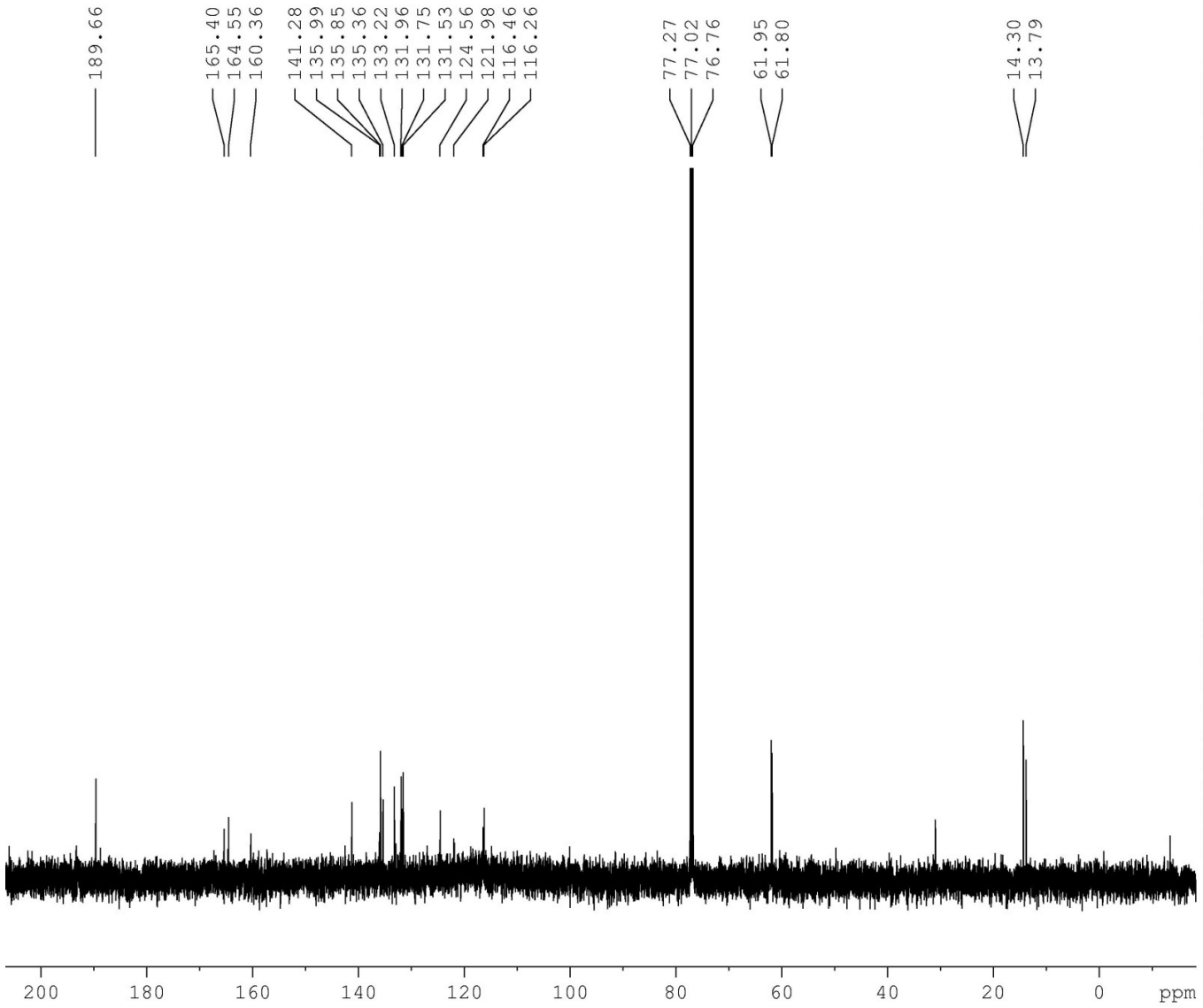



```
Current Data Parameters
NAME                  CS-573
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20131025
Time                  16.01
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                      114
DW                 48.400 us
DE                  6.00 us
TE                 296.8 K
D1              1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                      1H
P1                   7.20 us
PL1                  1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                     32768
SF            500.1300000 MH
WDW                       EM
SSB                        0
LB                   0.30 Hz
GB                         0
PC                    1.00
```



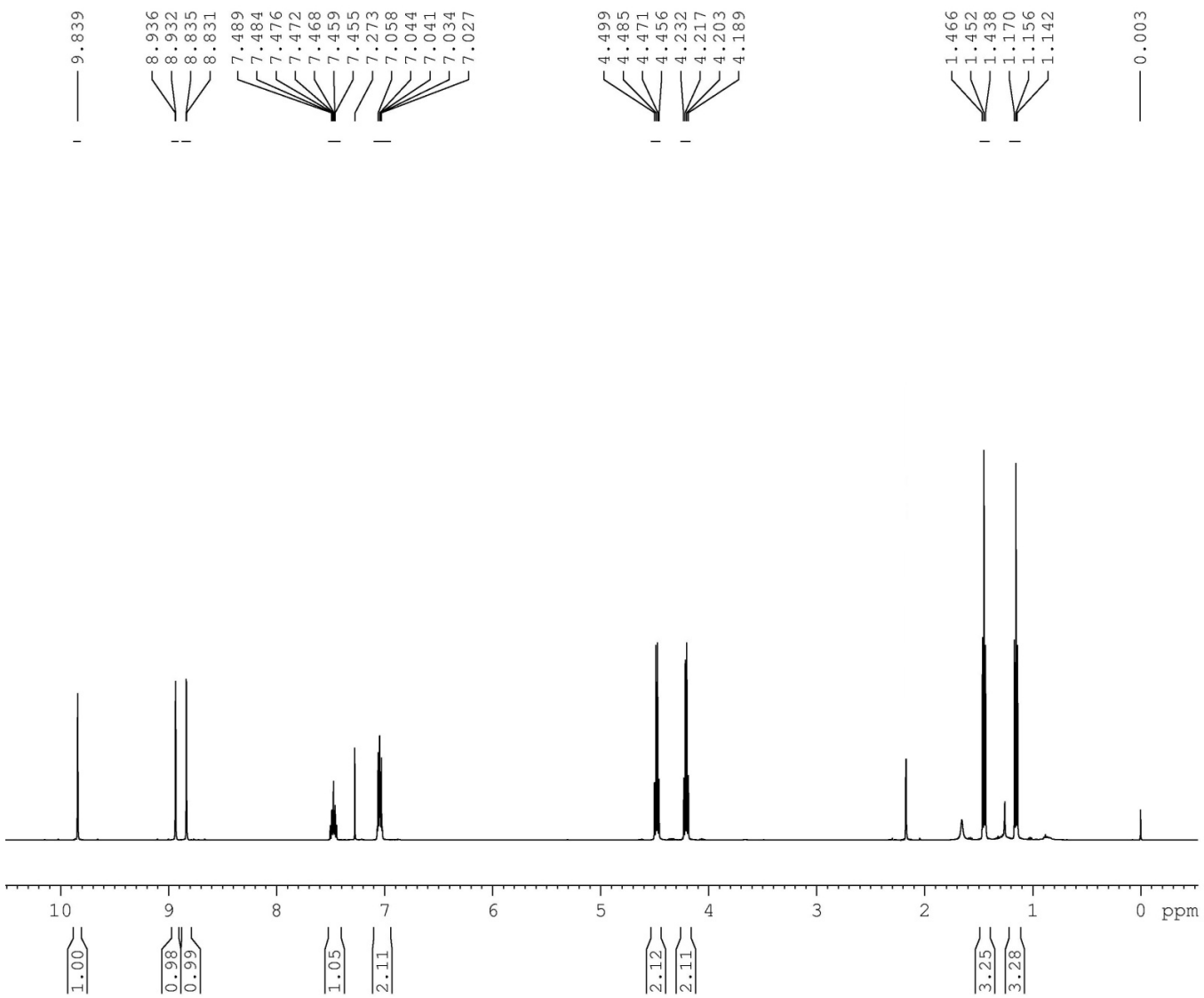

```
Current Data Parameters
NAME                  CS-573
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131025
Time                  16.09
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     256
DS                       4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                   32800
DW                  16.800 usec
DE                   6.00 usec
TE                   296.9 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2          500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF            125.7577890 MHz
WDW                       EM
SSB                        0
LB                      1.00 Hz
GB                         0
PC                      1.40
```

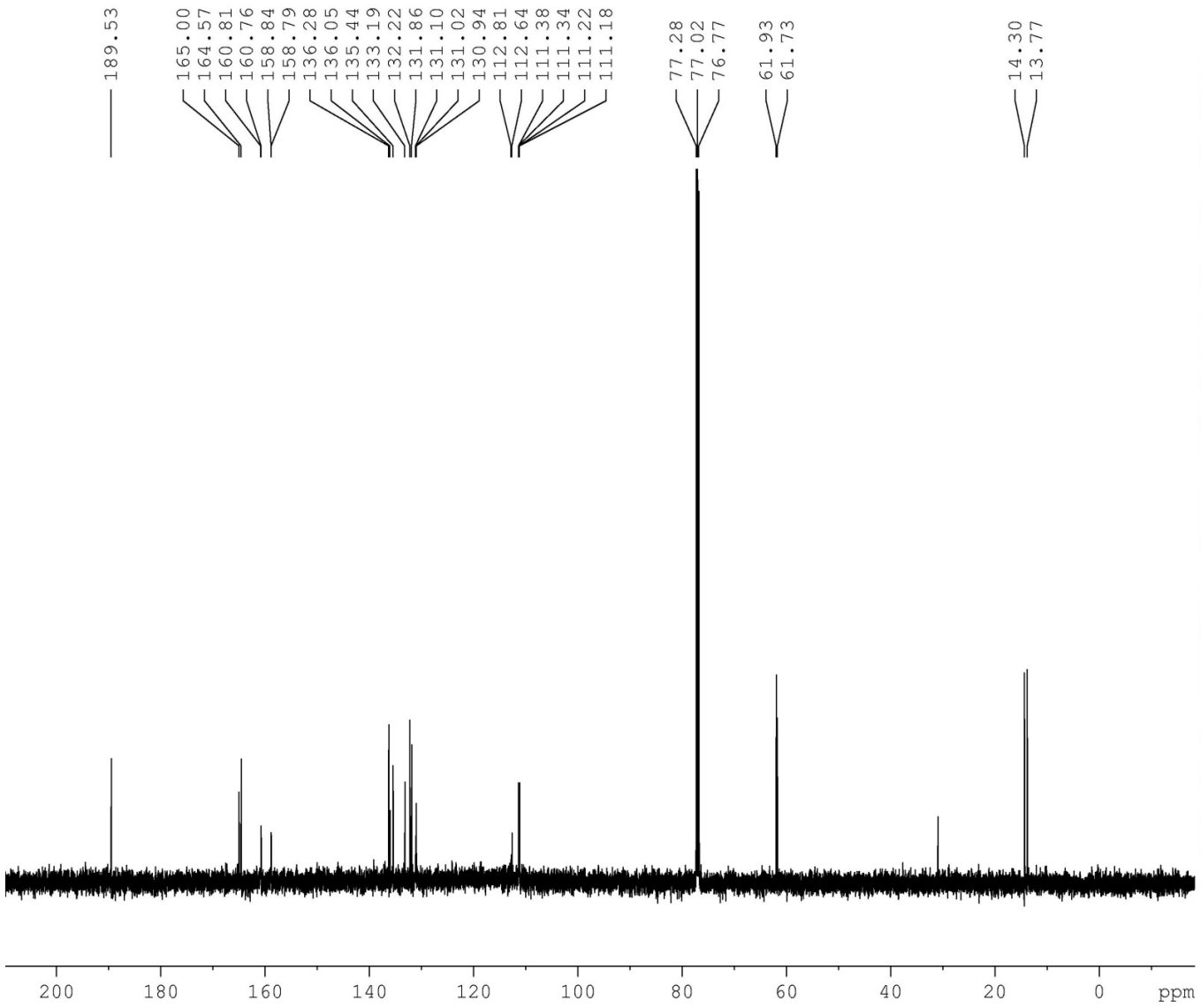



```
Current Data Parameters
NAME                  CS-572
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20131026
Time                  12.33
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ                3.1719923 se
RG                     90.5
DW                   48.400 us
DE                    6.00 us
TE                   296.6 K
D1              1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                    1H
P1                    7.20 us
PL1                   1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                     32768
SF            500.1300000 MH
WDW                       EM
SSB                        0
LB                    0.30 Hz
GB                         0
PC                      1.00
```



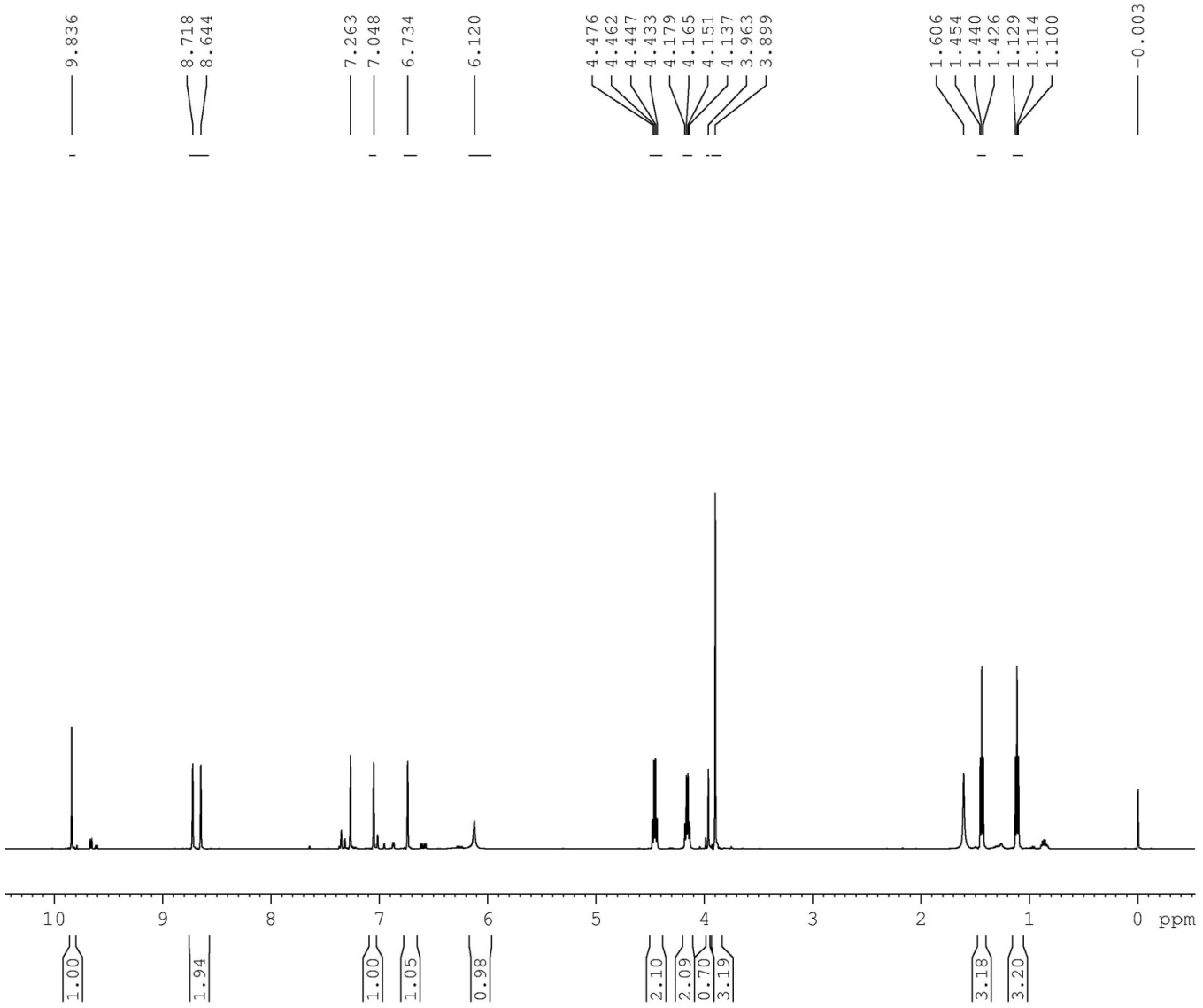

```
Current Data Parameters
NAME                  CS-572
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131026
Time                  12.45
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      206
DS                        4
SWH               29761.904 Hz
FIDRES            0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                   16.800 usec
DE                    6.00 usec
TE                   296.8 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                    32768
SF             125.7577890 MHz
WDW                      EM
SSB                       0
LB                    1.00 Hz
GB                        0
PC                    1.40
```

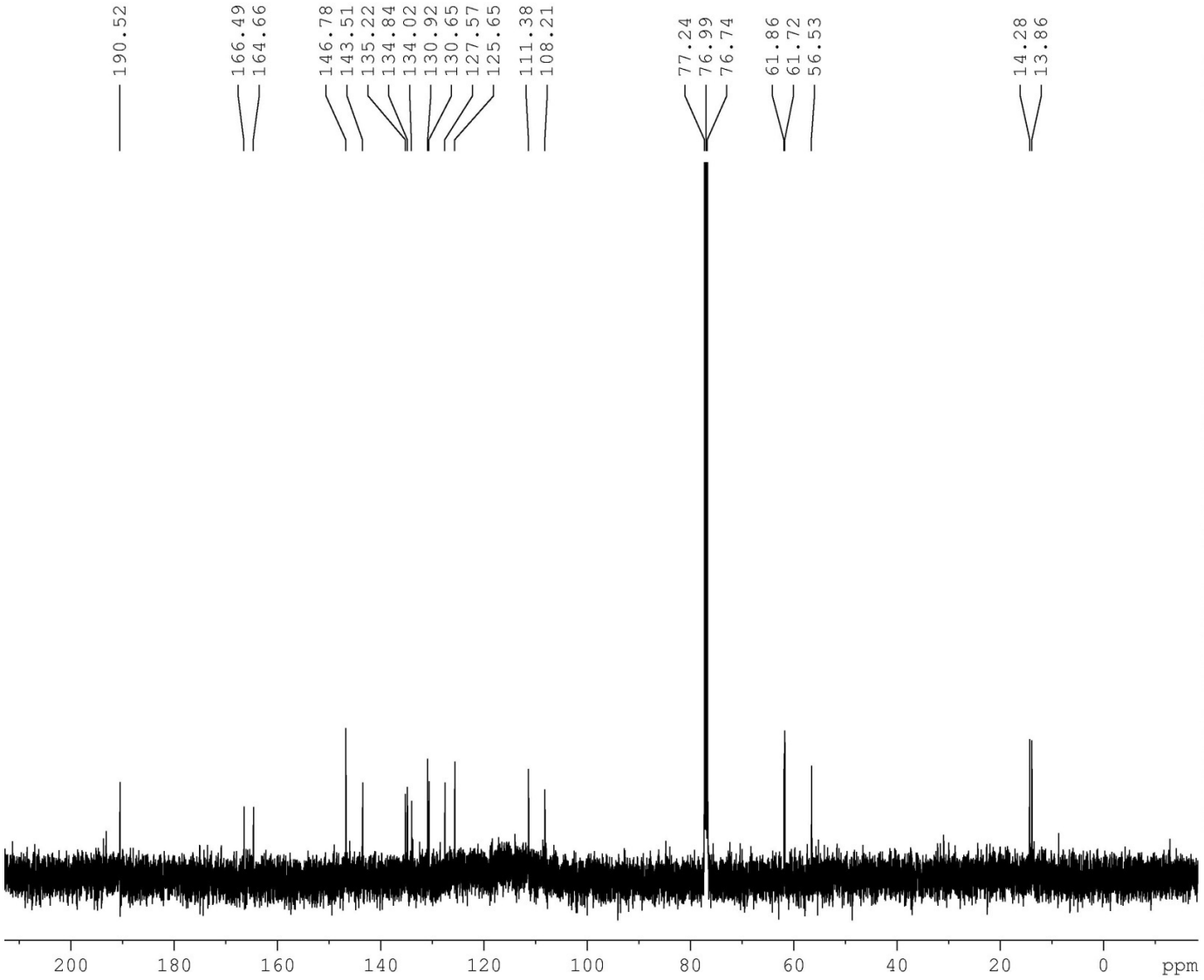



```
Current Data Parameters
NAME                  CS-630-3
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                20131206
Time                    18.18
INSTRUM                 spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES             0.157632 Hz
AQ                 3.1719923 se
RG                        228
DW                   48.400 us
DE                    6.00 us
TE                    297.3 K
D1                1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                       7.20 us
PL1                      1.00 dB
SFO1             500.1330885 MH

F2 - Processing parameters
SI                       32768
SF               500.1300000 MH
WDW                         EM
SSB                          0
LB                    0.30 Hz
GB                           0
PC                        1.00
```



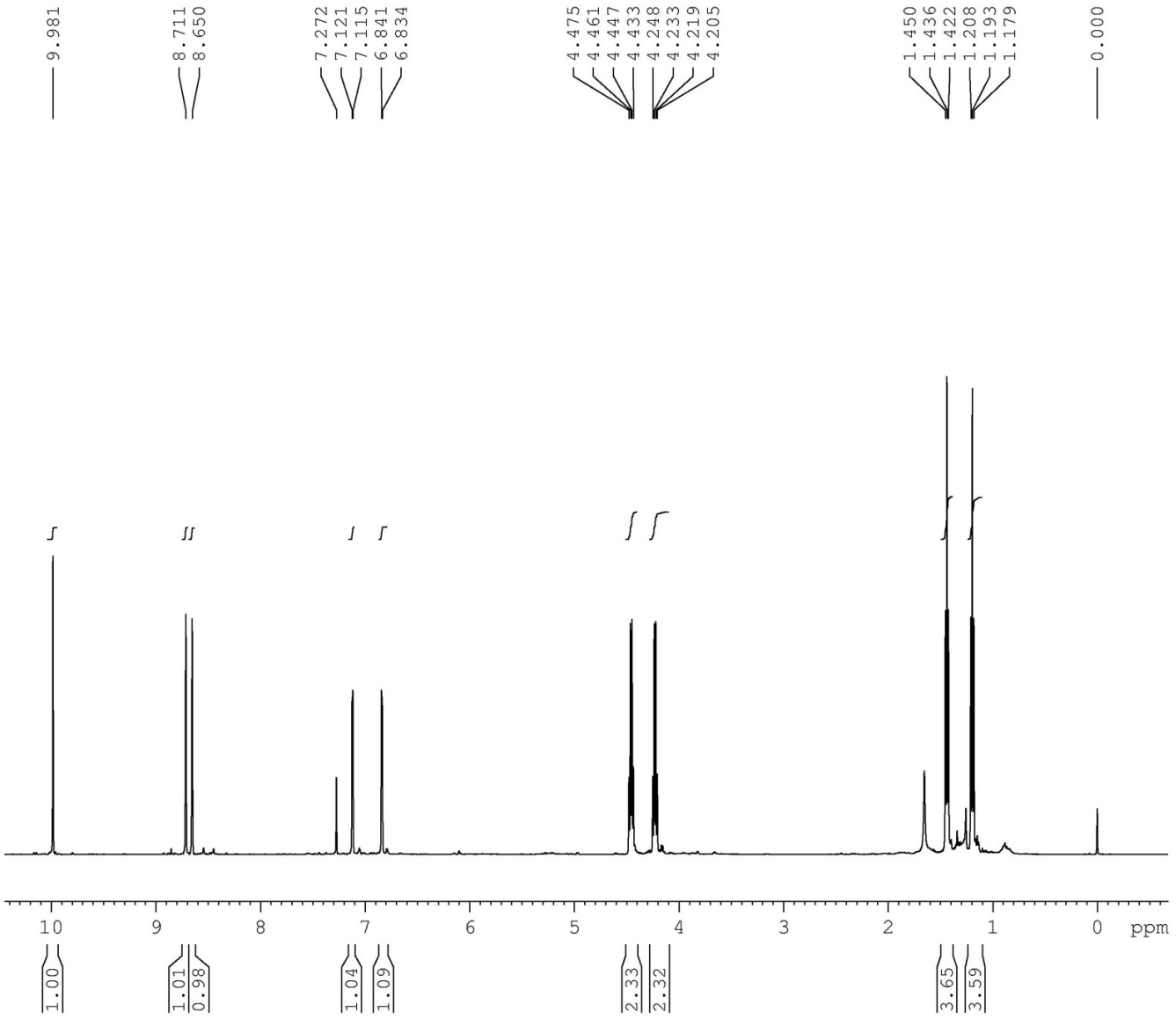

```
Current Data Parameters
NAME            CS-630-3
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20131207
Time               10.50
INSTRUM            spect
PROBHD   5 mm PABBI 1H/
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   860
DS                     4
SWH            29761.904 Hz
FIDRES          0.454131 Hz
AQ             1.1010548 sec
RG                 32800
DW                16.800 usec
DE                 6.00 usec
TE                295.9 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                 12.40 usec
PL1                -2.00 dB
SFO1         125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PL12               21.92 dB
PL13              120.00 dB
PL2                 1.00 dB
SFO2         500.1320005 MHz

F2 - Processing parameters
SI                 32768
SF           125.7577890 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

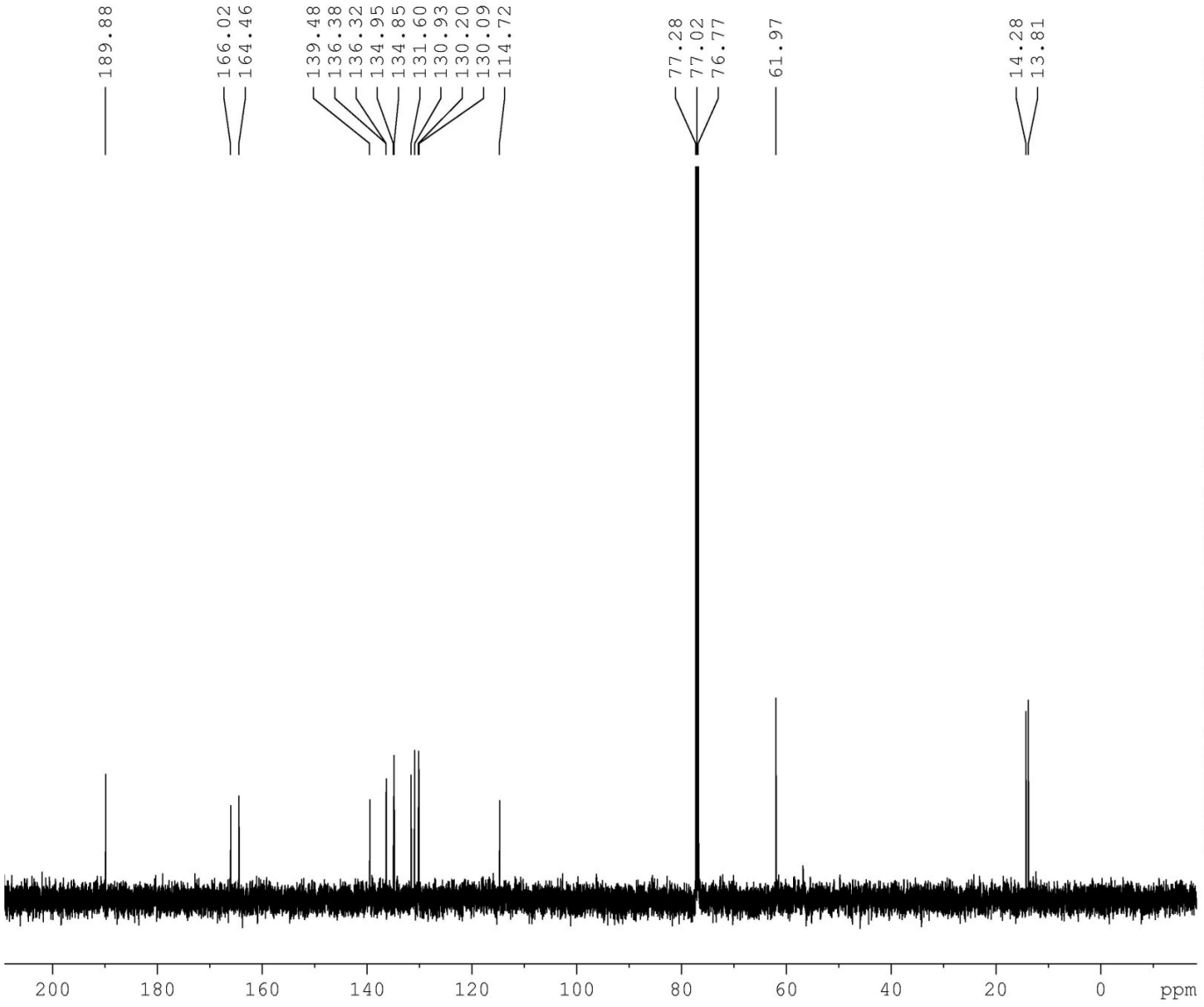



```
Current Data Parameters
NAME                  CS-539P
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameter
Date_                20130928
Time                    16.58
INSTRUM                 spect
PROBHD    5 mm PABBI 1H/
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                       90.5
DW                     48.400 us
DE                      6.00 us
TE                     297.0 K
D1                 1.00000000 se
TD0                         1

======== CHANNEL f1 ======
NUC1                       1H
P1                       7.20 us
PL1                      1.00 dB
SFO1            500.1330885 MH

F2 - Processing parameters
SI                      32768
SF                500.1300000 MH
WDW                        EM
SSB                         0
LB                       0.30 Hz
GB                          0
PC                       1.00
```



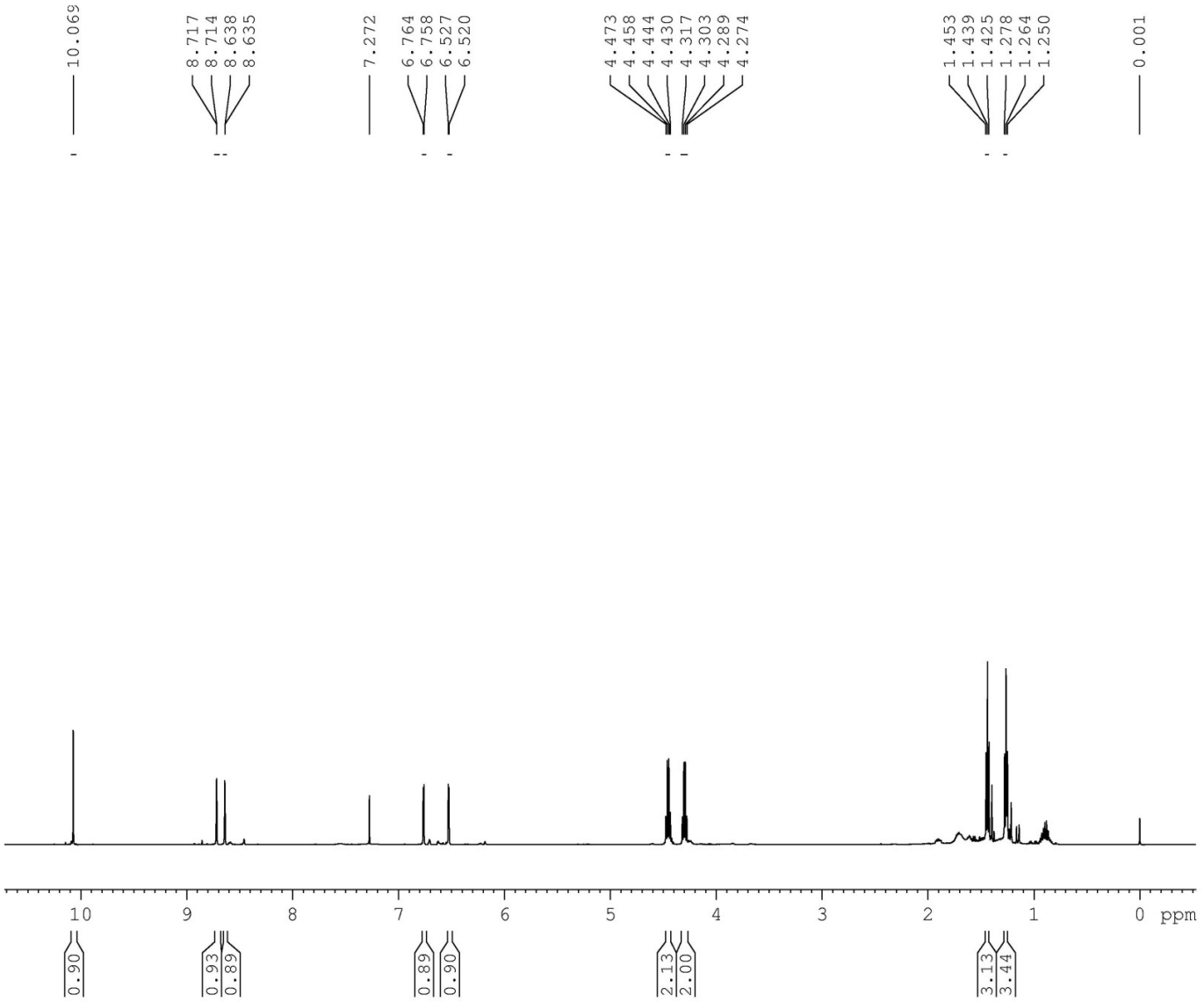

```
Current Data Parameters
NAME                  CS-539P
EXPNO                       2
PROCNO                      1

F2 - Acquisition Parameters
Date_              20130928
Time                  17.13
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      102
DS                        4
SWH               29761.904 Hz
FIDRES            0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                   16.800 usec
DE                    6.00 usec
TE                   297.1 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                      32768
SF             125.7577890 MHz
WDW                        EM
SSB                         0
LB                     1.00 Hz
GB                          0
PC                     1.40
```

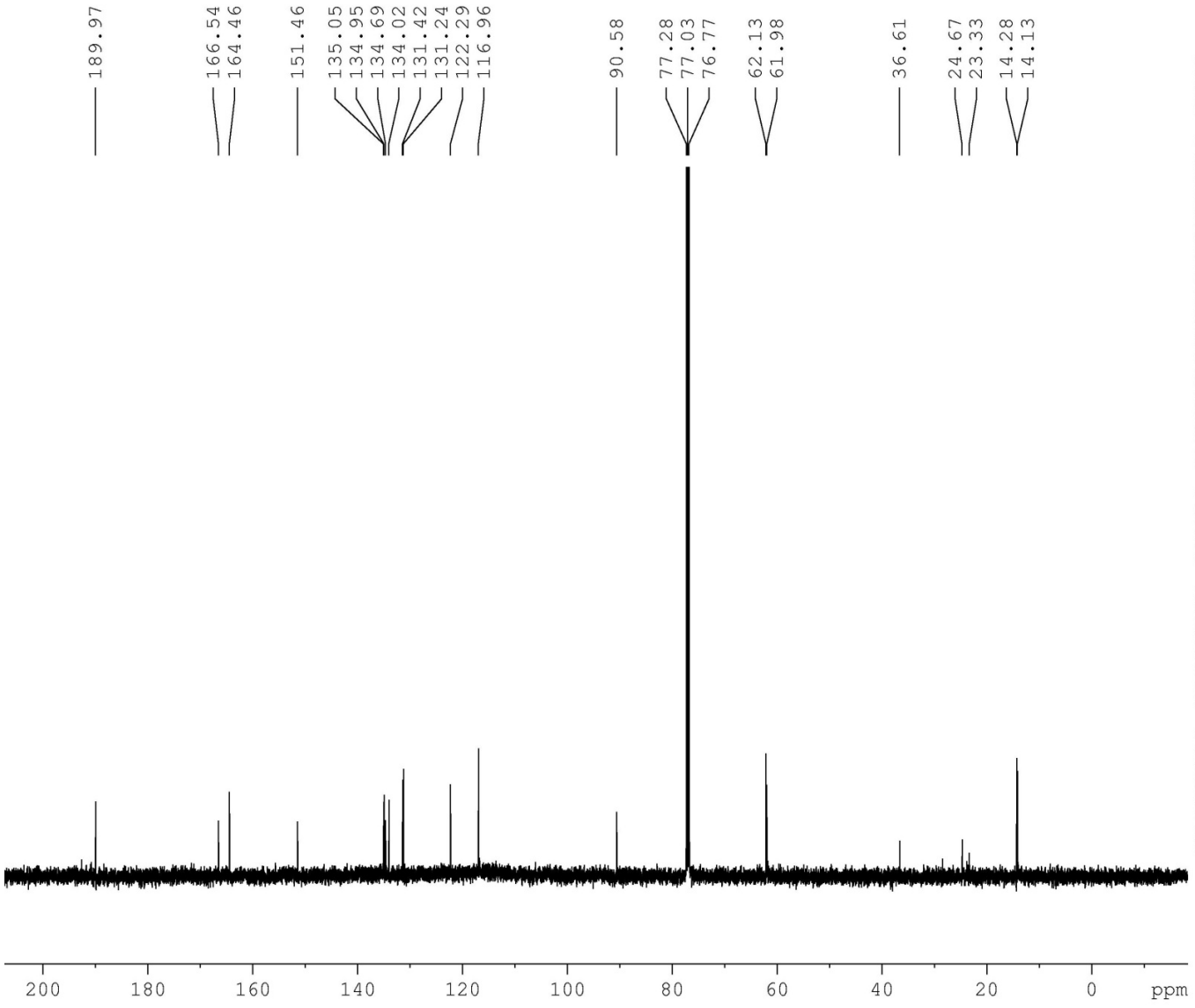



```
Current Data Parameters
NAME                  CS-543
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20131002
Time                  10.39
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                     90.5
DW                  48.400 us
DE                   6.00 us
TE                   295.7 K
D1             1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                      1H
P1                    7.20 us
PL1                   1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                     32768
SF            500.1300000 MH
WDW                       EM
SSB                        0
LB                    0.30 Hz
GB                         0
PC                      1.00
```



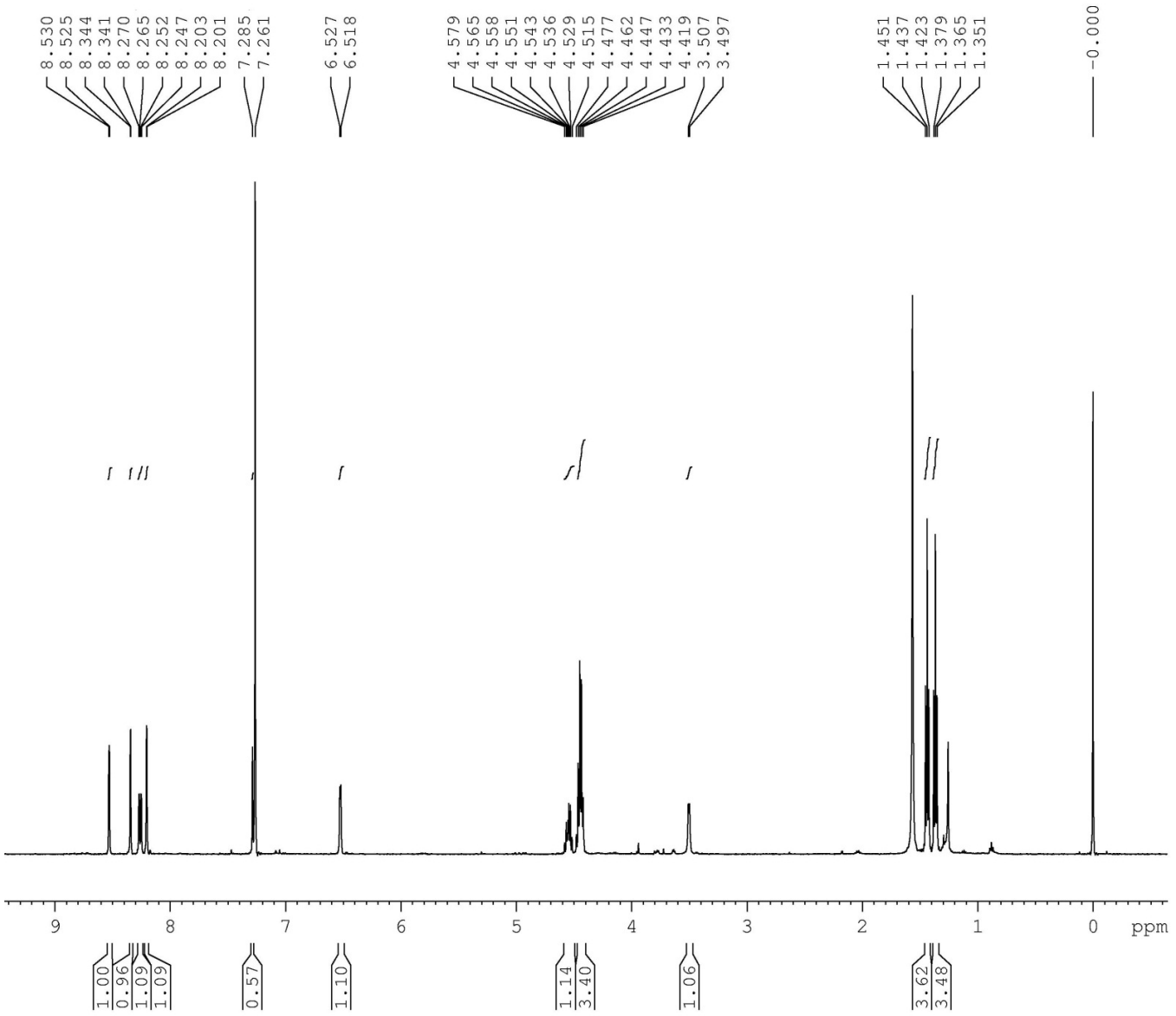

```
Current Data Parameters
NAME                  CS-543
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131002
Time                  11.00
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG              zgpg30
TD                    65536
SOLVENT               CDC13
NS                      382
DS                        4
SWH              29761.904 Hz
FIDRES            0.454131 Hz
AQ                1.1010548 sec
RG                    32800
DW                  16.800 usec
DE                   6.00 usec
TE                   296.0 K
D1               2.00000000 sec
d11              0.03000000 sec
DELTA            1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                     32768
SF             125.7577890 MHz
WDW                       EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                     1.40
```

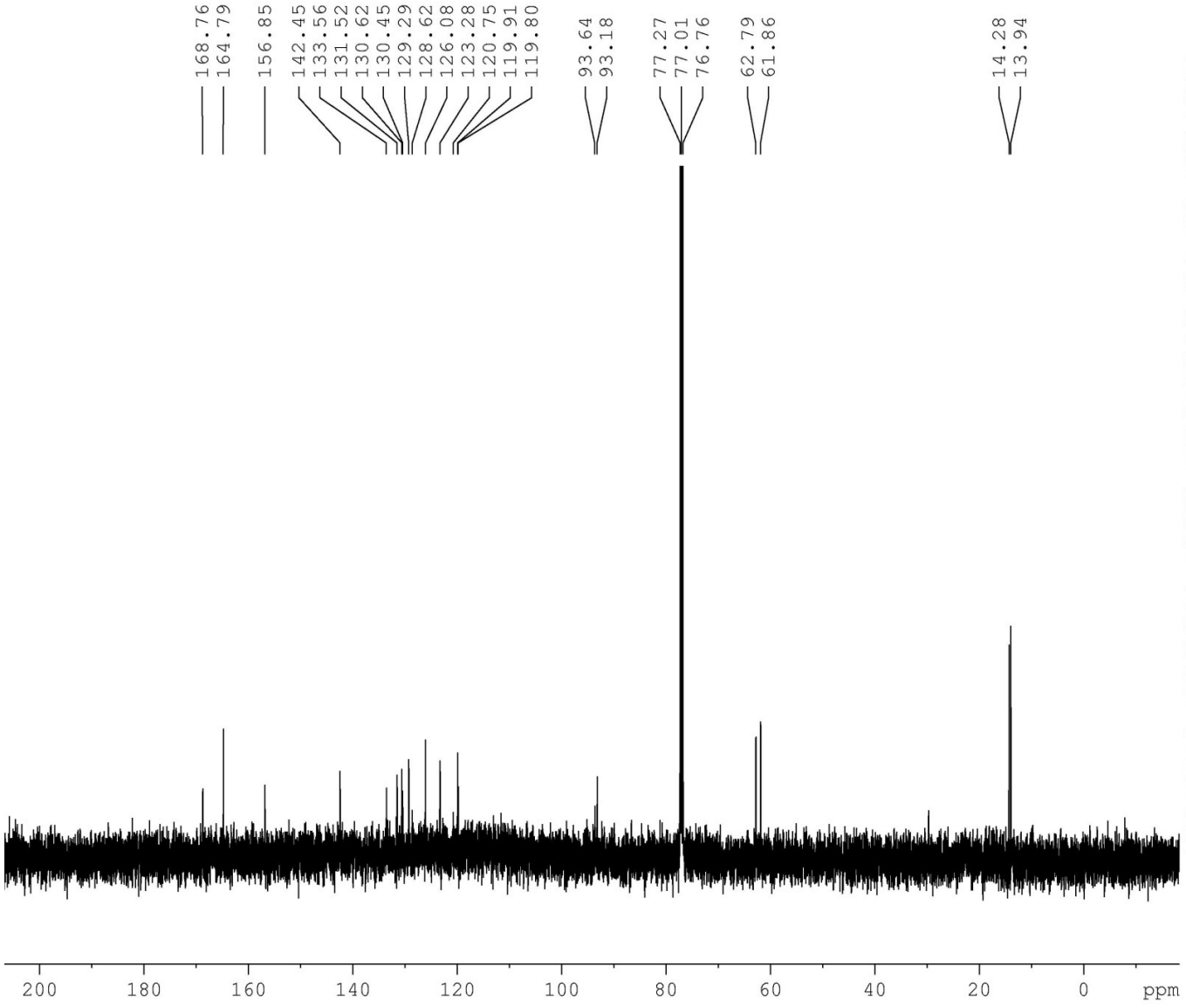



```
Current Data Parameters
NAME                  CS-853-H
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140731
Time                     17.59
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        575
DW                     48.400 us
DE                      6.00 us
TE                     298.3 K
D1                1.00000000 se
TD0                          1

======== CHANNEL f1 ======
NUC1                        1H
P1                      7.20 us
PL1                     1.00 dB
SFO1              500.1330885 MH

F2 - Processing parameters
SI                       32768
SF                500.1300071 MH
WDW                         EM
SSB                          0
LB                      0.30 Hz
GB                           0
PC                      1.00
```



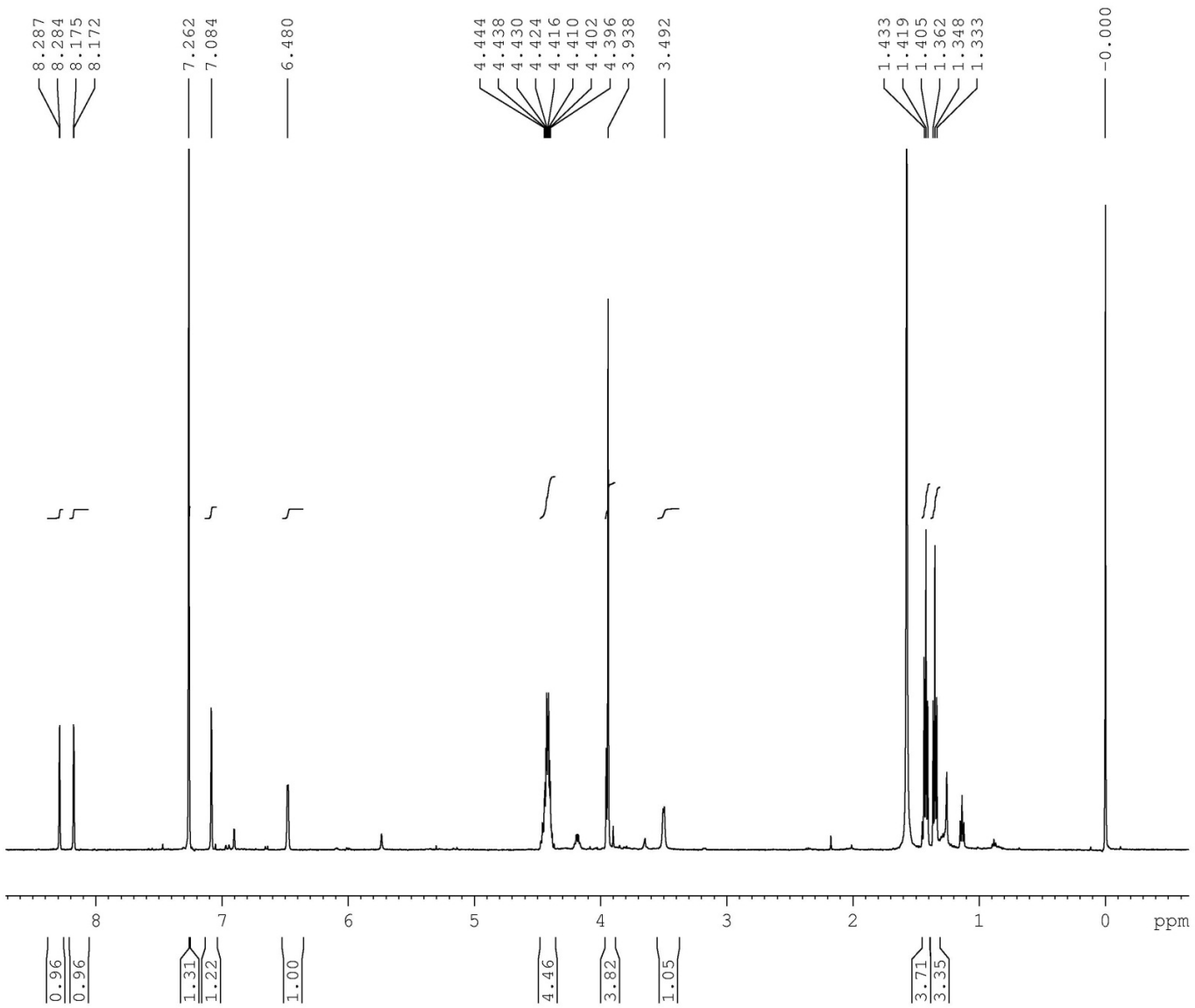

```
Current Data Parameters
NAME                  CS-578
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131030
Time                  13.05
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG               zgpg30
TD                     65536
SOLVENT               CDCl3
NS                       256
DS                         4
SWH               29761.904 Hz
FIDRES             0.454131 Hz
AQ                 1.1010548 sec
RG                     32800
DW                    16.800 usec
DE                     6.00 usec
TE                    297.6 K
D1                2.00000000 sec
d11               0.03000000 sec
DELTA             1.89999998 sec
TD0                        1

======== CHANNEL f1 ========
NUC1                     13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1            125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                     1H
PCPD2                 80.00 usec
PL12                  21.92 dB
PL13                 120.00 dB
PL2                    1.00 dB
SFO2            500.1320005 MHz

F2 - Processing parameters
SI                       32768
SF              125.7577890 MHz
WDW                         EM
SSB                         0
LB                     1.00 Hz
GB                          0
PC                     1.40
```



Current Data Parameters

NAME	CS-852-H
EXPNO	1
PROCNO	1

F2 - Acquisition Parameter

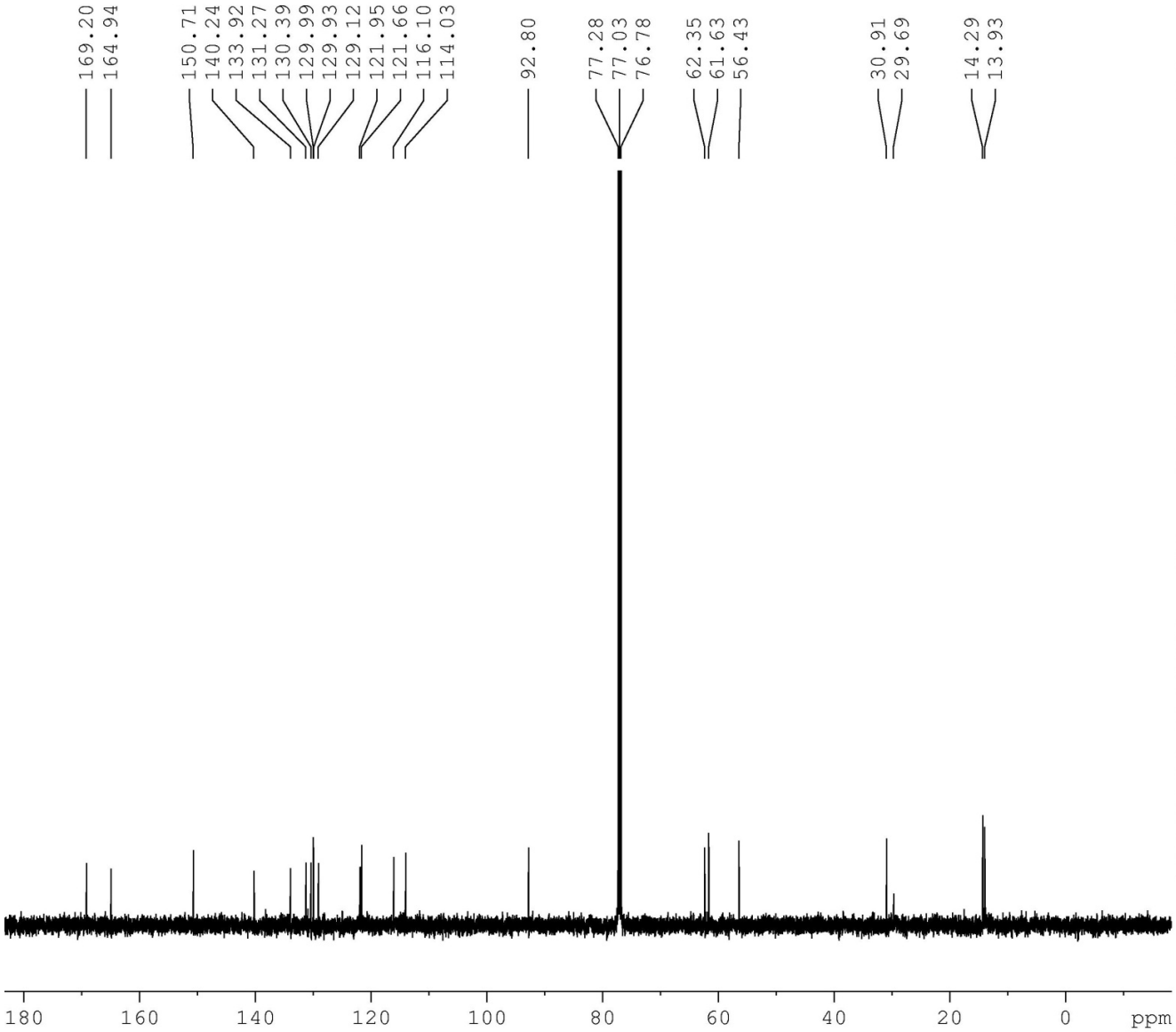
Date_	20140730
Time	20.12
INSTRUM	spect
PROBHD	5 mm PABBI 1H/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	10330.578 Hz
FIDRES	0.157632 Hz
AQ	3.1719923 se
RG	512
DW	48.400 us
DE	6.00 us
TE	297.4 K
D1	1.00000000 se
TD0	1

======== CHANNEL f1 ======

NUC1	1H
P1	7.20 us
PL1	1.00 dB
SFO1	500.1330885 MH

F2 - Processing parameters

SI	32768
SF	500.1300069 MH
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



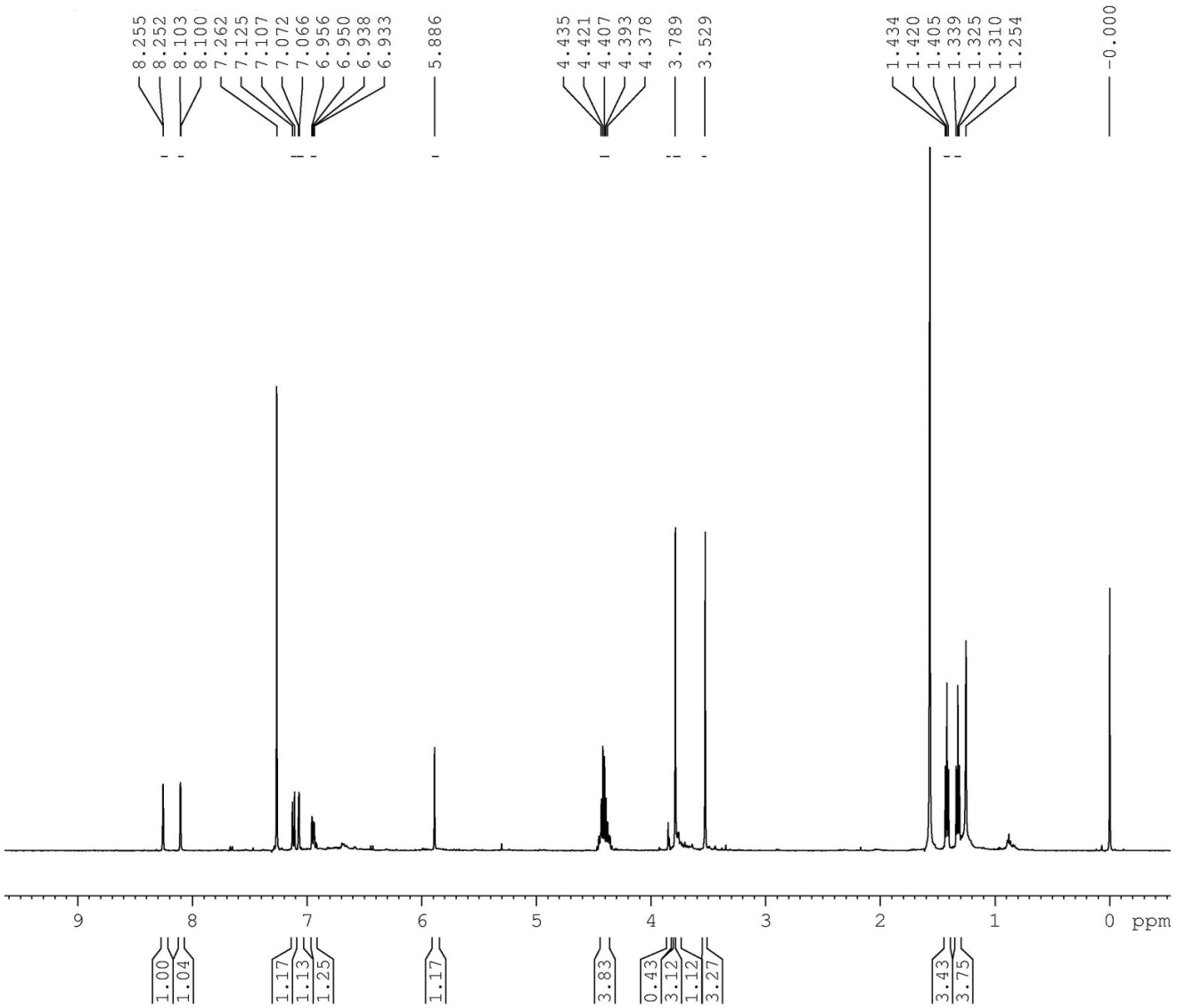

```
Current Data Parameters
NAME                  CS-636-L
EXPNO                        3
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20131220
Time                     17.04
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         456
DS                           4
SWH                29761.904 Hz
FIDRES             0.454131 Hz
AQ                 1.1010548 sec
RG                       32800
DW                    16.800 usec
DE                     6.00 usec
TE                     297.4 K
D1                2.00000000 sec
d11               0.03000000 sec
DELTA             1.89999998 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                       13C
P1                      12.40 usec
PL1                     -2.00 dB
SFO1              125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                   80.00 usec
PL12                    21.92 dB
PL13                   120.00 dB
PL2                      1.00 dB
SFO2              500.1320005 MHz

F2 - Processing parameters
SI                       32768
SF                125.7577890 MHz
WDW                         EM
SSB                          0
LB                      1.00 Hz
GB                           0
PC                       1.40
```

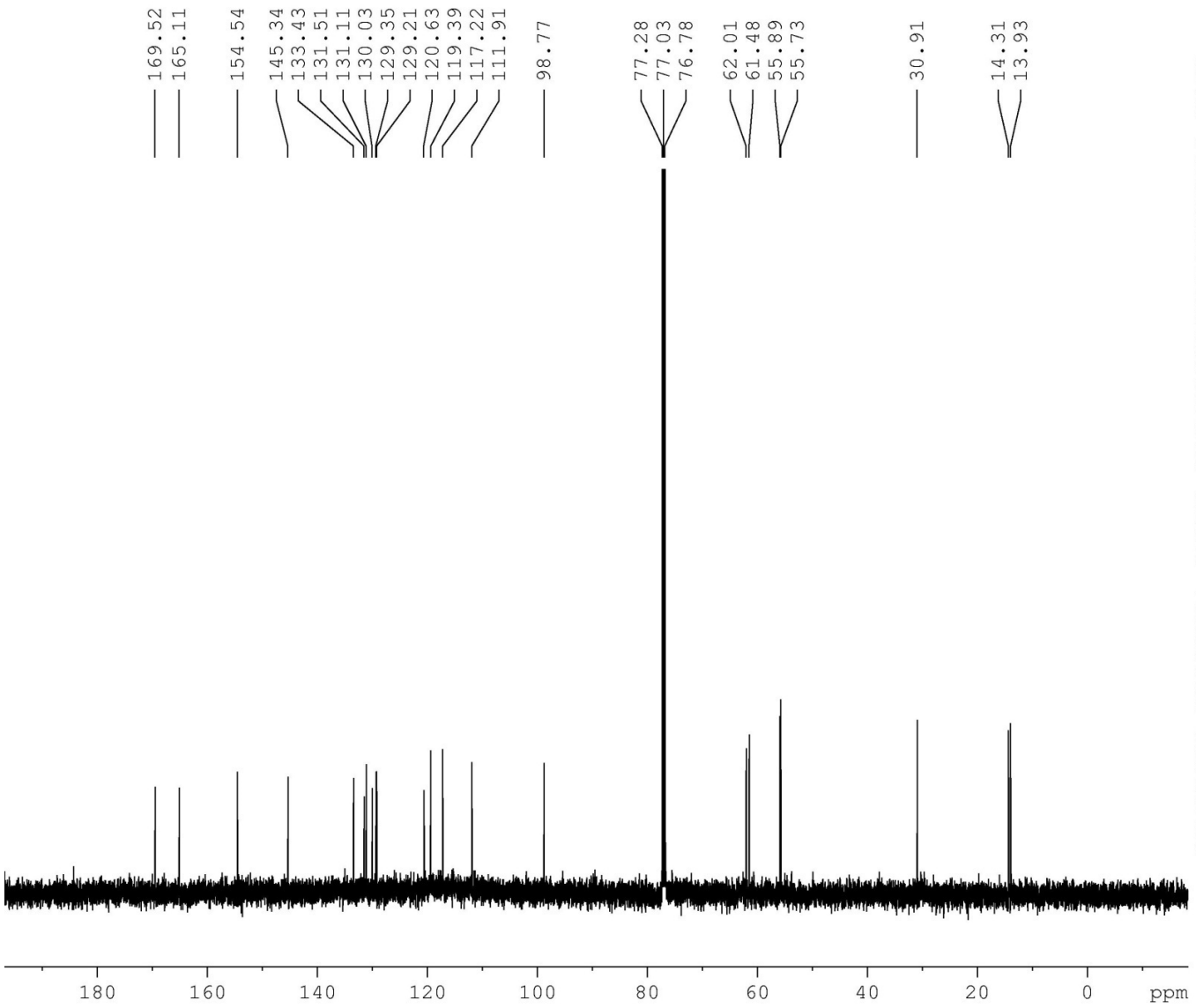



```
Current Data Parameters
NAME                  CS-MEOH-1
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameter
Date_                  20140819
Time                      11.49
INSTRUM                   spect
PROBHD    5 mm PABBI 1H/
PULPROG                    zg30
TD                        65536
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                 10330.578 Hz
FIDRES               0.157632 Hz
AQ                   3.1719923 se
RG                          456
DW                     48.400 us
DE                      6.00 us
TE                      296.9 K
D1                 1.00000000 se
TD0                           1

======== CHANNEL f1 ======
NUC1                         1H
P1                      7.20 us
PL1                     1.00 dB
SFO1               500.1330885 MH

F2 - Processing parameters
SI                        32768
SF                 500.1300070 MH
WDW                          EM
SSB                           0
LB                      0.30 Hz
GB                            0
PC                         1.00
```



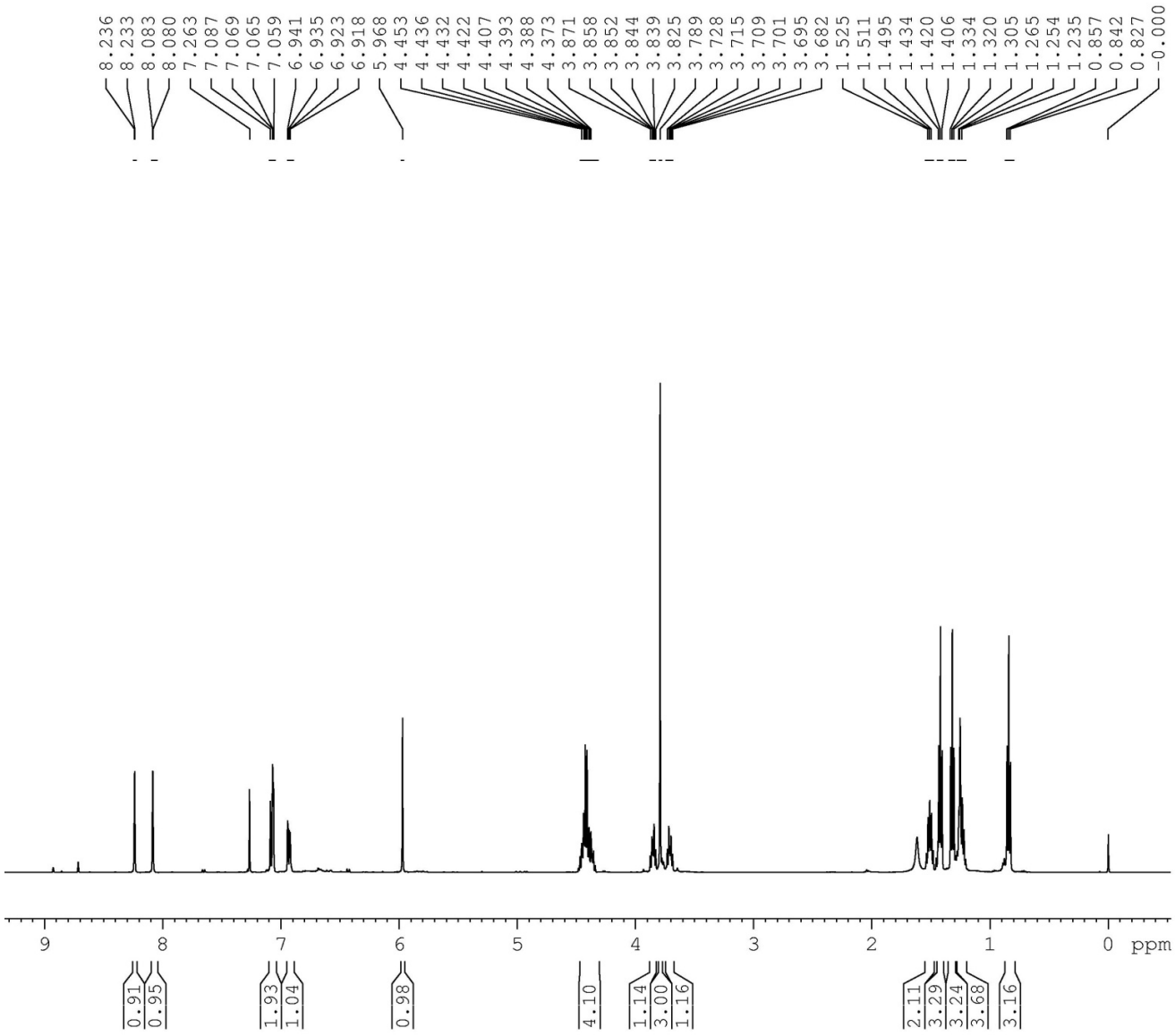

```
Current Data Parameters
NAME                  CS-584-2
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20131112
Time                     18.58
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         256
DS                           4
SWH                  29761.904 Hz
FIDRES                0.454131 Hz
AQ                   1.1010548 sec
RG                       32800
DW                      16.800 usec
DE                       6.00 usec
TE                       297.4 K
D1                 2.00000000 sec
d11                0.03000000 sec
DELTA              1.89999998 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                       13C
P1                       12.40 usec
PL1                      -2.00 dB
SFO1               125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                    80.00 usec
PL12                     21.92 dB
PL13                    120.00 dB
PL2                       1.00 dB
SFO2               500.1320005 MHz

F2 - Processing parameters
SI                         32768
SF                 125.7577890 MHz
WDW                           EM
SSB                           0
LB                        1.00 Hz
GB                            0
PC                        1.40
```

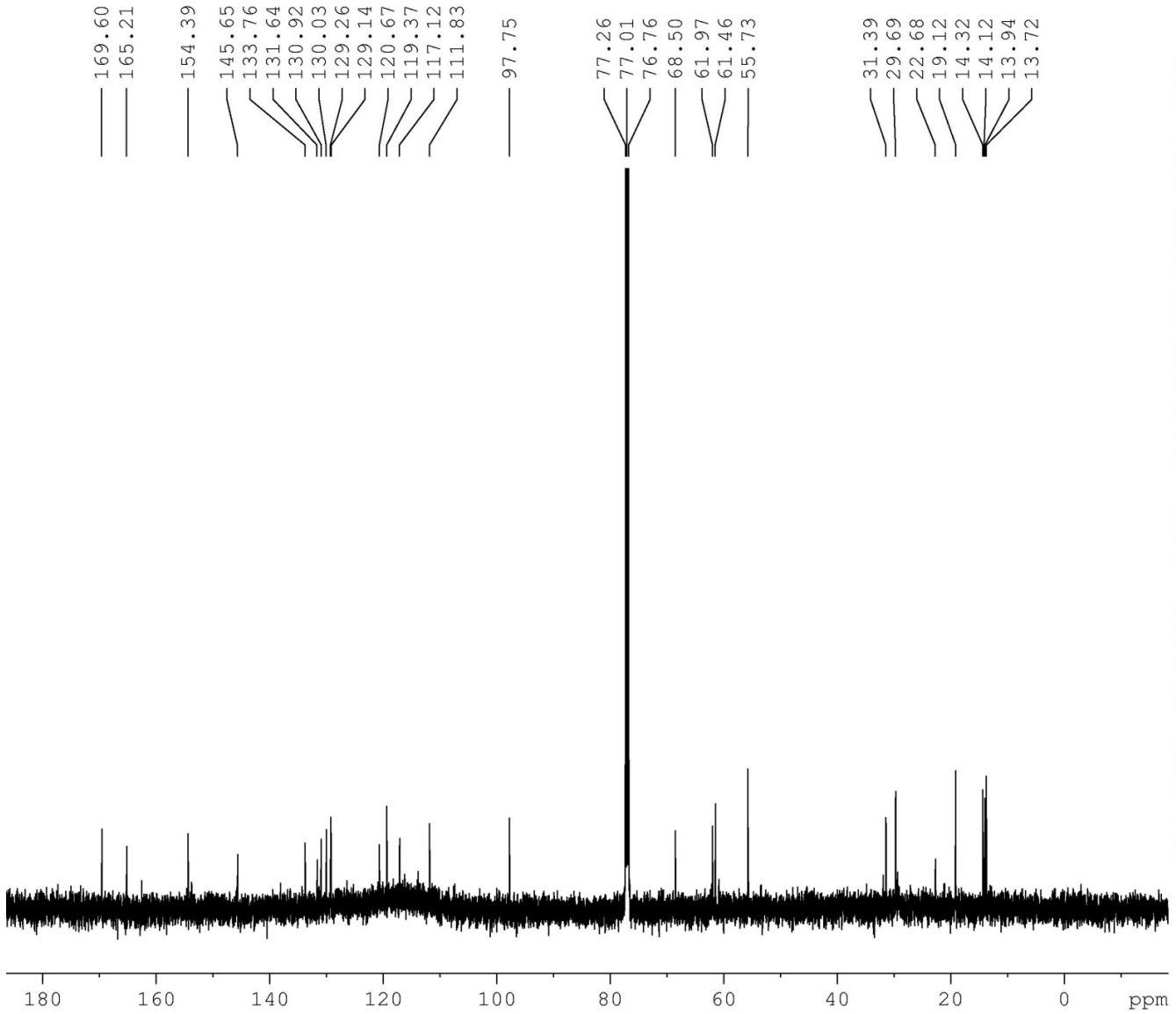



```
Current Data Parameters
NAME                  CS-BUOH
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameter
Date_              20140819
Time                  11.07
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                     80.6
DW                  48.400 us
DE                   6.00 us
TE                   296.5 K
D1              1.00000000 se
TD0                       1

======== CHANNEL f1 ======
NUC1                    1H
P1                   7.20 us
PL1                  1.00 dB
SFO1          500.1330885 MH

F2 - Processing parameters
SI                    32768
SF            500.1300063 MH
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```



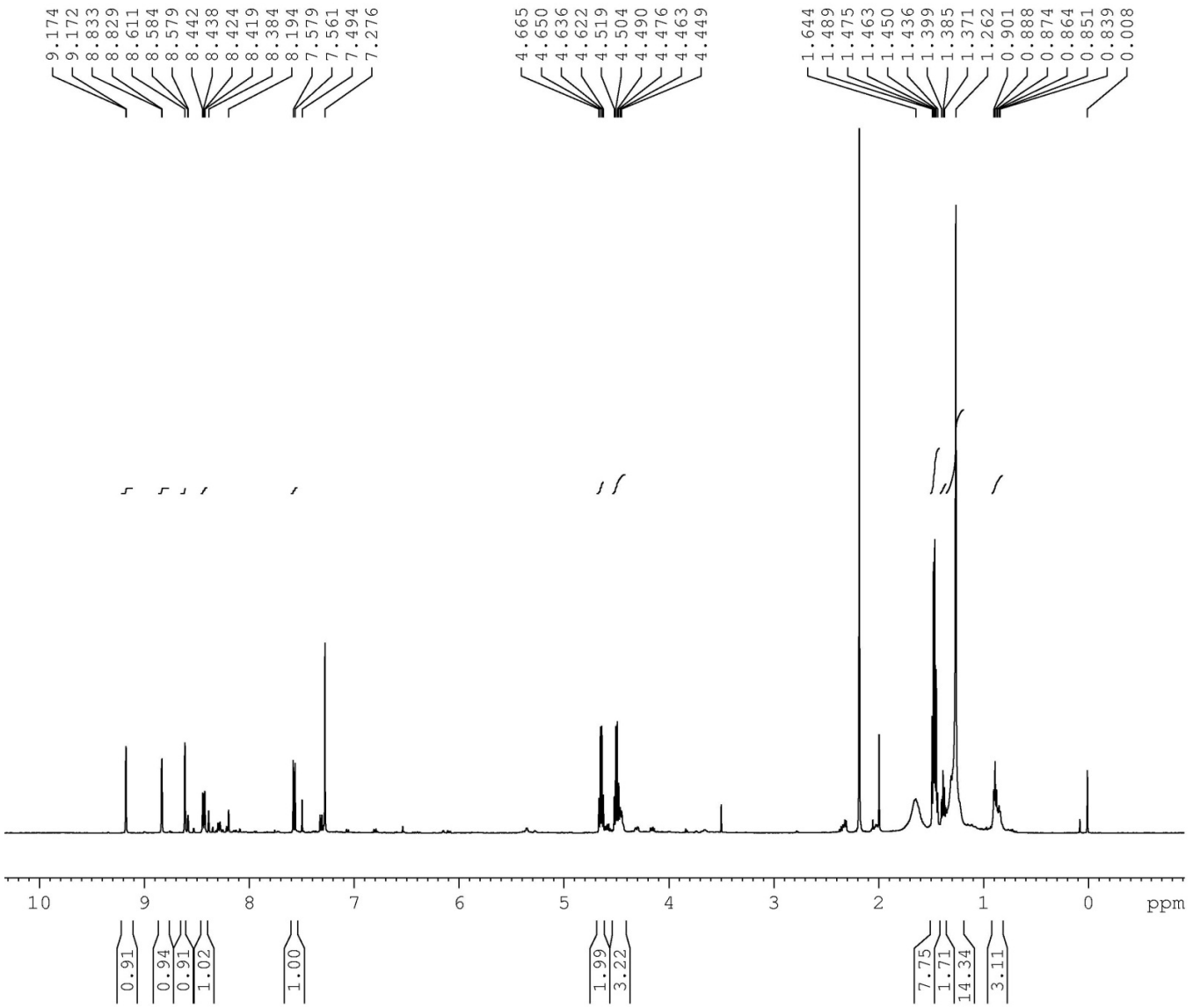

```
Current Data Parameters
NAME          CS-618-PP
EXPNO                 3
PROCNO                1

F2 - Acquisition Parameters
Date_          20131202
Time              11.40
INSTRUM           spect
PROBHD   5 mm PABBI 1H/
PULPROG         zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1495
DS                    4
SWH           29761.904 Hz
FIDRES         0.454131 Hz
AQ            1.1010548 sec
RG                32800
DW               16.800 usec
DE                6.00 usec
TE                296.3 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1                12.40 usec
PL1               -2.00 dB
SFO1        125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                1H
PCPD2             80.00 usec
PL12              21.92 dB
PL13             120.00 dB
PL2               1.00 dB
SFO2        500.1320005 MHz

F2 - Processing parameters
SI                32768
SF          125.7577890 MHz
WDW                EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

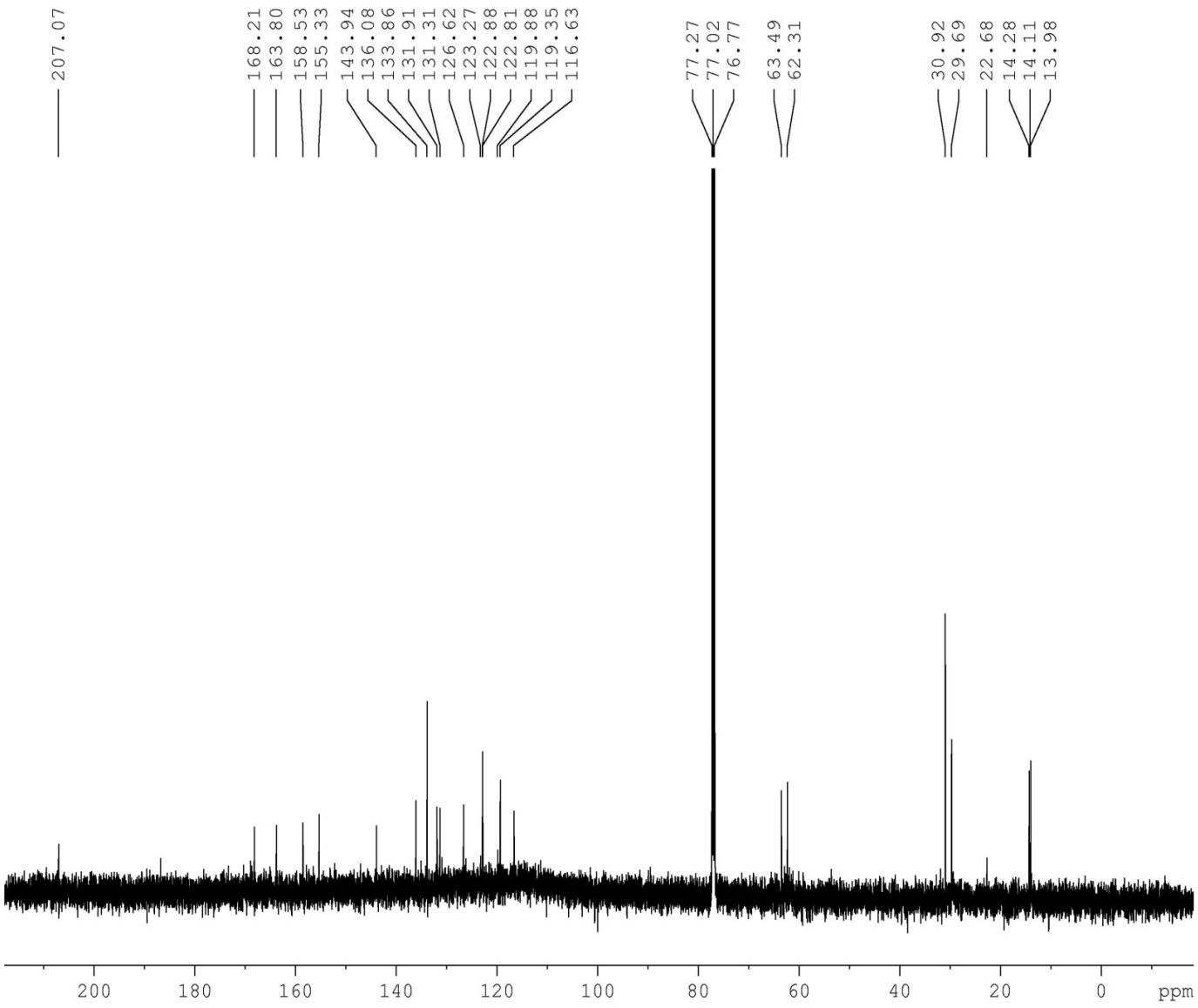



```
Current Data Parameters
NAME                  CS-649
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameter
Date_              20131219
Time                  11.39
INSTRUM               spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH              10330.578 Hz
FIDRES            0.157632 Hz
AQ               3.1719923 se
RG                      114
DW                   48.400 us
DE                    6.00 us
TE                   296.1 K
D1             1.00000000 se
TD0                        1

======== CHANNEL f1 ======
NUC1                      1H
P1                     7.20 us
PL1                    1.00 dB
SFO1           500.1330885 MH

F2 - Processing parameters
SI                        32768
SF             500.1300000 MH
WDW                       EM
SSB                        0
LB                      0.30 Hz
GB                         0
PC                      1.00
```



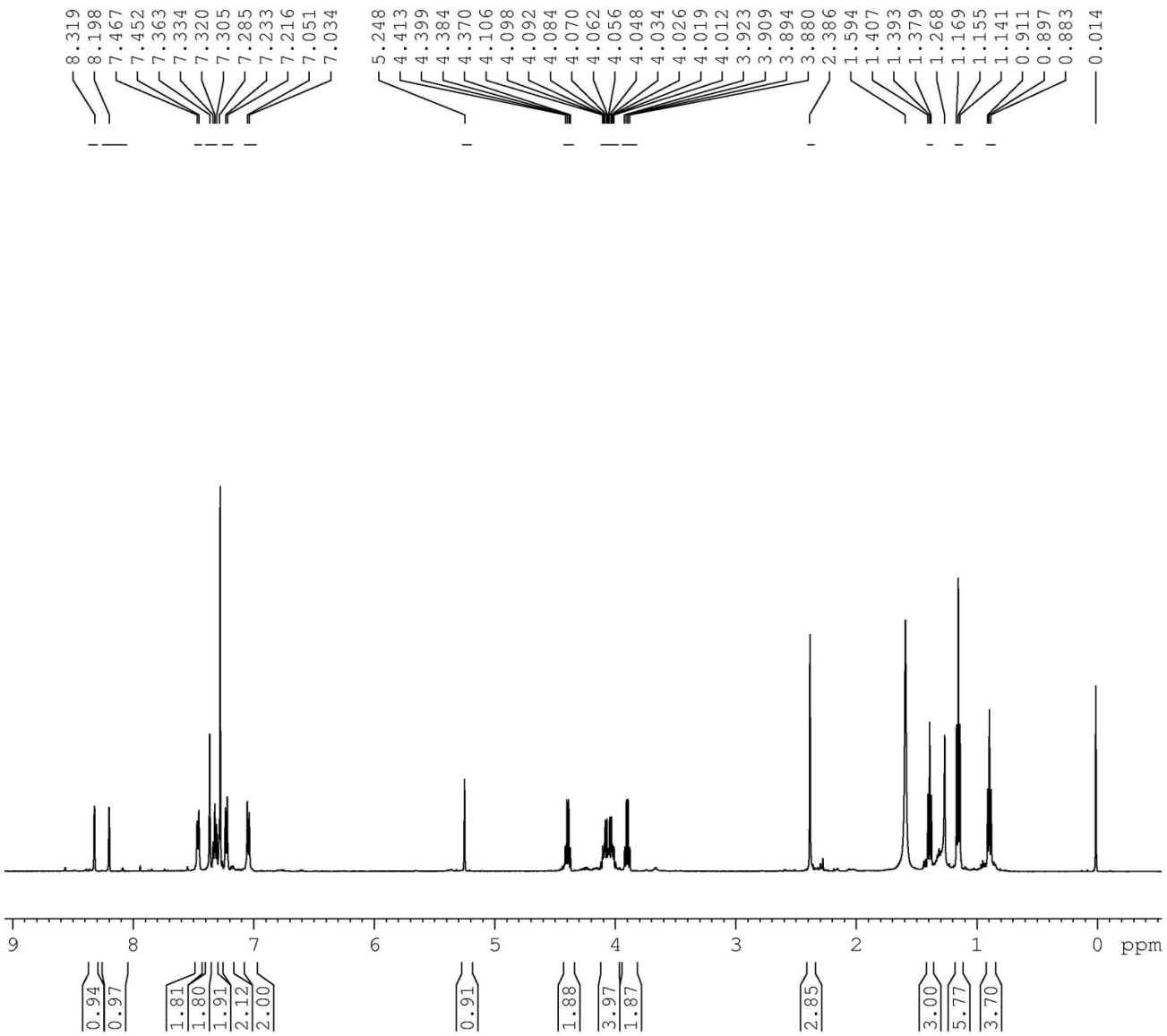

```
Current Data Parameters
NAME                  CS-649
EXPNO                      3
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131225
Time                  14.44
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      860
DS                        4
SWH              29761.904 Hz
FIDRES            0.454131 Hz
AQ               1.1010548 sec
RG                    32800
DW                  16.800 usec
DE                   6.00 usec
TE                   297.2 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1           125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2           500.1320005 MHz

F2 - Processing parameters
SI                      32768
SF             125.7577890 MHz
WDW                        EM
SSB                         0
LB                    1.00 Hz
GB                          0
PC                    1.40
```

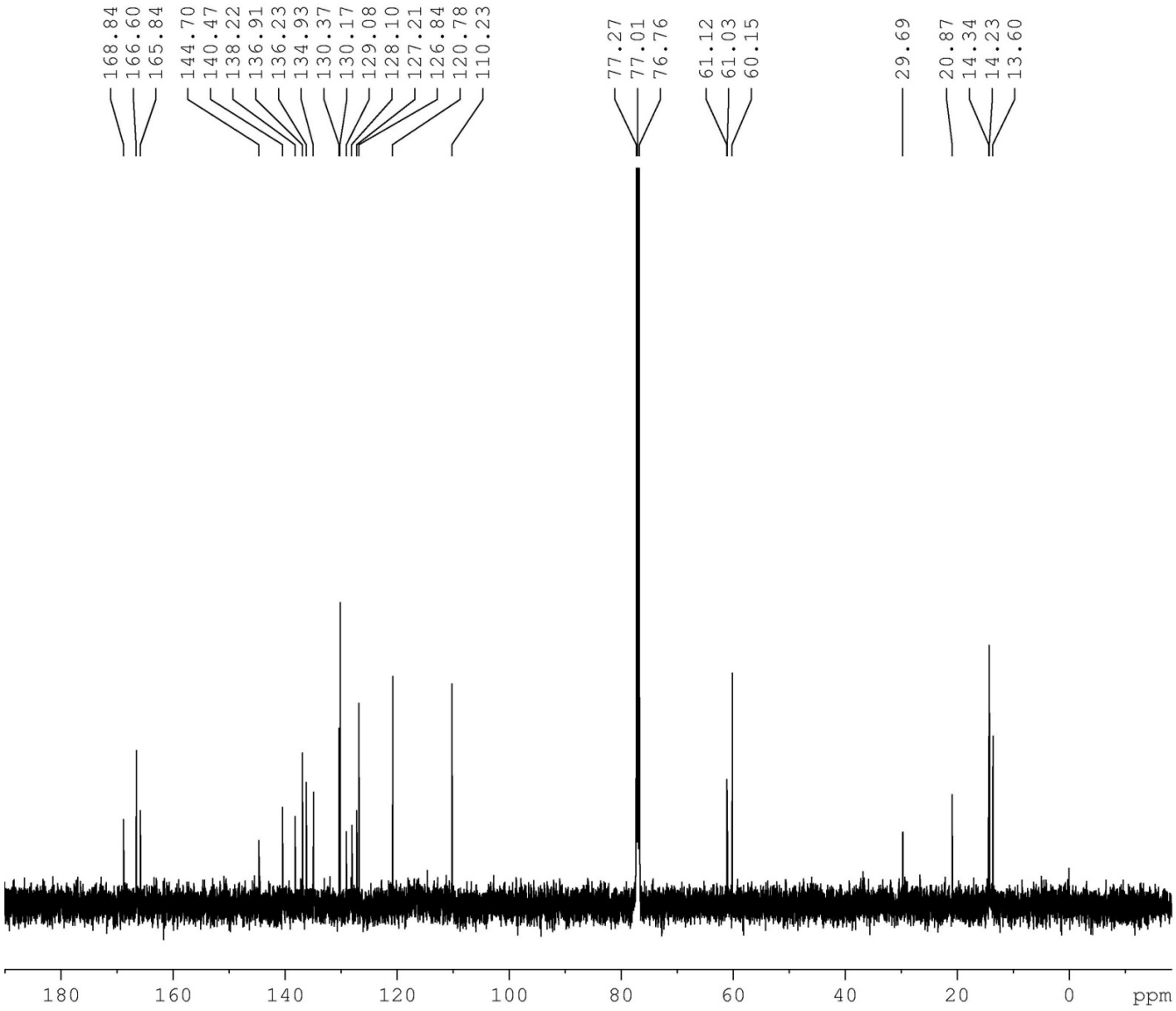



```
Current Data Parameters
NAME            CS-656-TB
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameter
Date_            20131226
Time                20.17
INSTRUM             spect
PROBHD   5 mm PABBI 1H/
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH           10330.578 Hz
FIDRES         0.157632 Hz
AQ            3.1719923 se
RG                   362
DW                48.400 us
DE                 6.00 us
TE                296.5 K
D1           1.00000000 se
TD0                    1

======== CHANNEL f1 ======
NUC1                  1H
P1                 7.20 us
PL1                1.00 dB
SFO1        500.1330885 MH

F2 - Processing parameters
SI                 32768
SF          500.1300000 MH
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                  1.00
```



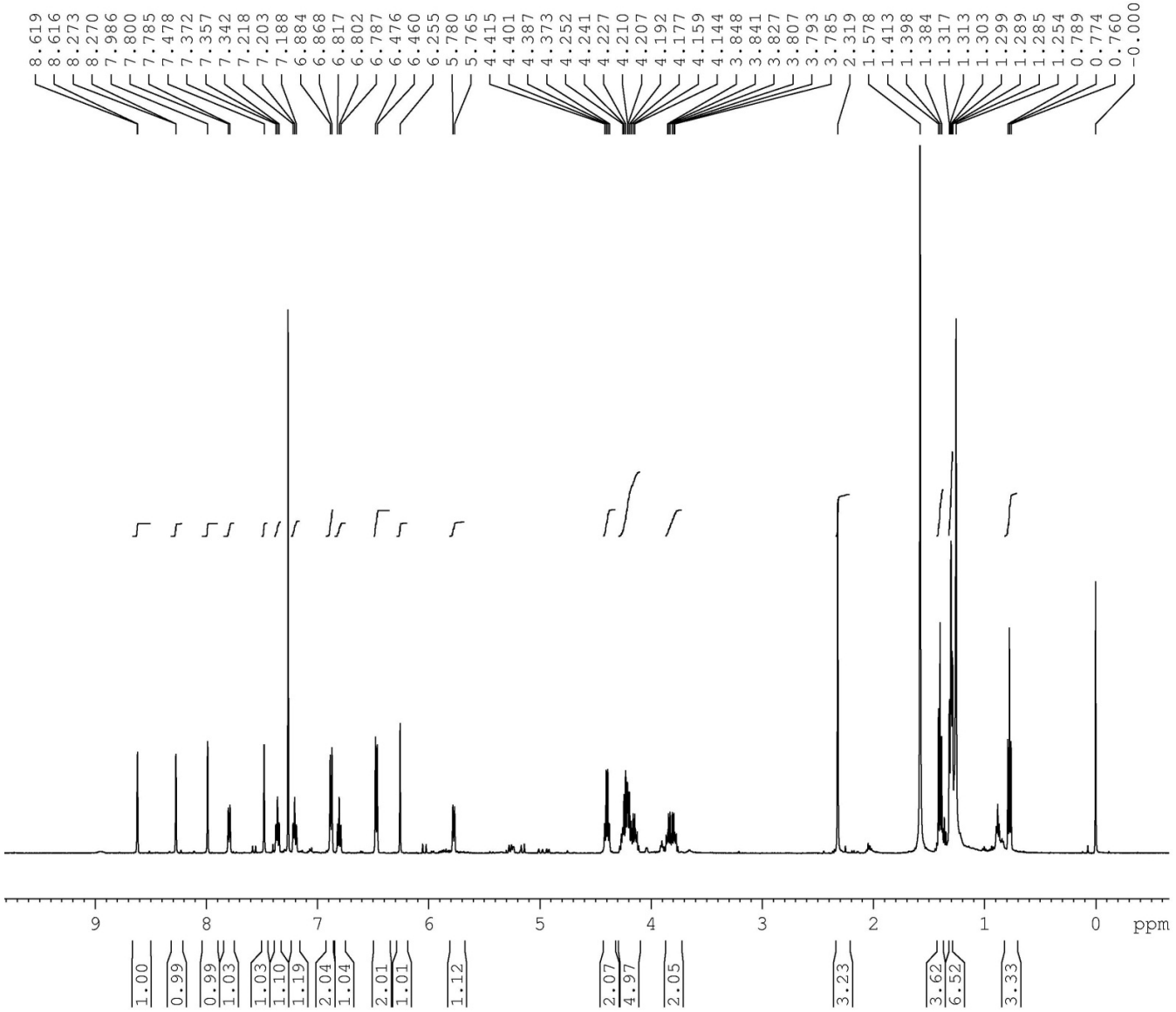

```
Current Data Parameters
NAME                  CS-656-TB
EXPNO                         3
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20131231
Time                      14.15
INSTRUM                   spect
PROBHD    5 mm PABBI 1H/
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                        2048
DS                           4
SWH                  29761.904 Hz
FIDRES                0.454131 Hz
AQ                    1.1010548 sec
RG                        32800
DW                       16.800 usec
DE                        6.00 usec
TE                       297.5 K
D1                   2.00000000 sec
d11                  0.03000000 sec
DELTA                1.89999998 sec
TD0                           1

======== CHANNEL f1 ========
NUC1                        13C
P1                        12.40 usec
PL1                       -2.00 dB
SFO1                125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2                 waltz16
NUC2                        1H
PCPD2                     80.00 usec
PL12                      21.92 dB
PL13                     120.00 dB
PL2                       1.00 dB
SFO2                500.1320005 MHz

F2 - Processing parameters
SI                        32768
SF                  125.7577890 MHz
WDW                          EM
SSB                           0
LB                        1.00 Hz
GB                            0
PC                        1.40
```

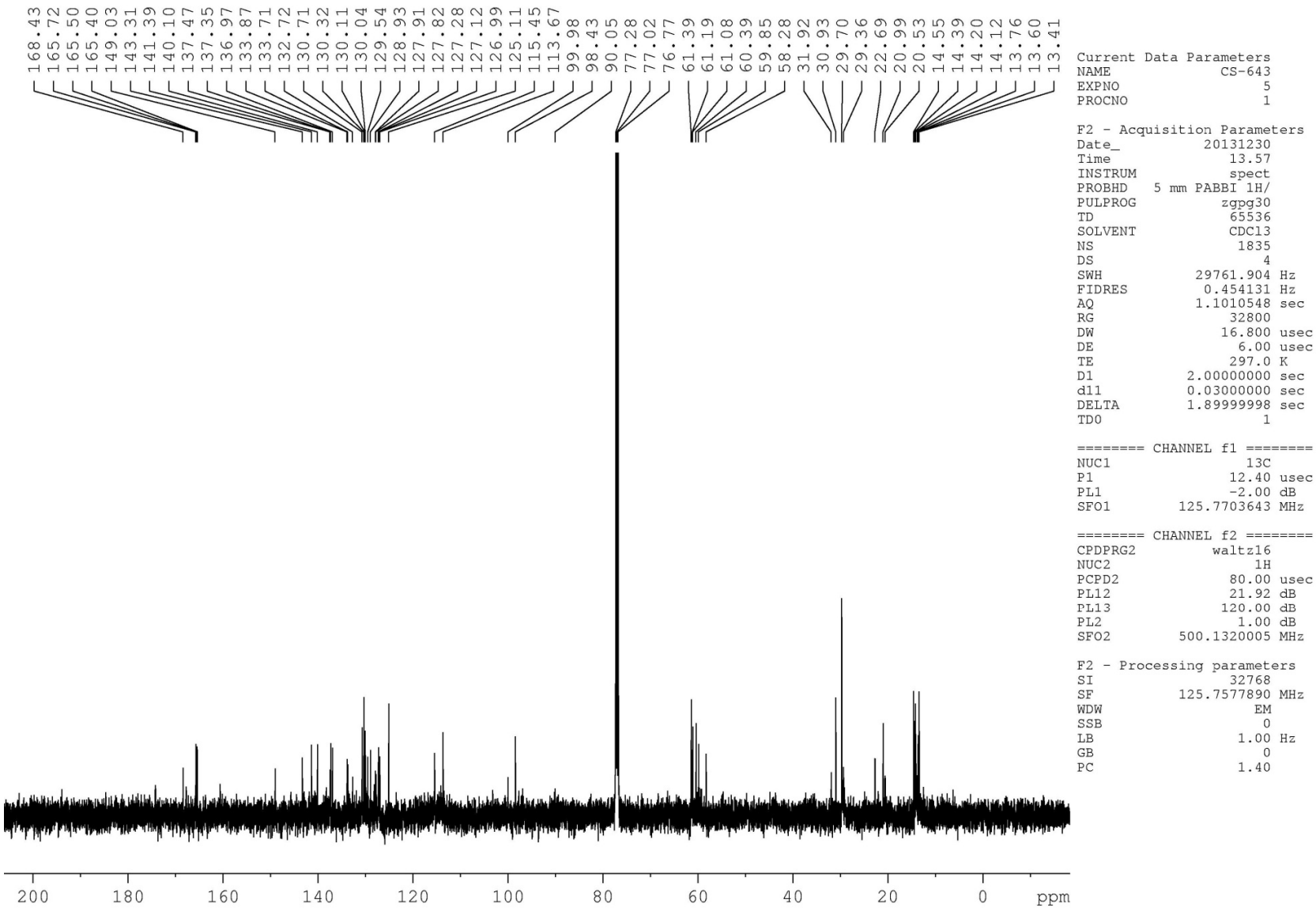



```
Current Data Parameters
NAME                 CS-DHP-3
EXPNO                       2
PROCNO                      1

F2 - Acquisition Parameter
Date_               20140822
Time                   16.19
INSTRUM                spect
PROBHD    5 mm PABBI 1H/
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               10330.578 Hz
FIDRES             0.157632 Hz
AQ                 3.1719923 se
RG                       362
DW                  48.400 us
DE                   6.00 us
TE                   297.7 K
D1               1.00000000 se
TD0                         1

======== CHANNEL f1 ======
NUC1                       1H
P1                    7.20 us
PL1                   1.00 dB
SFO1            500.1330885 MH

F2 - Processing parameters
SI                      32768
SF              500.1300068 MH
WDW                        EM
SSB                         0
LB                    0.30 Hz
GB                          0
PC                     1.00
```



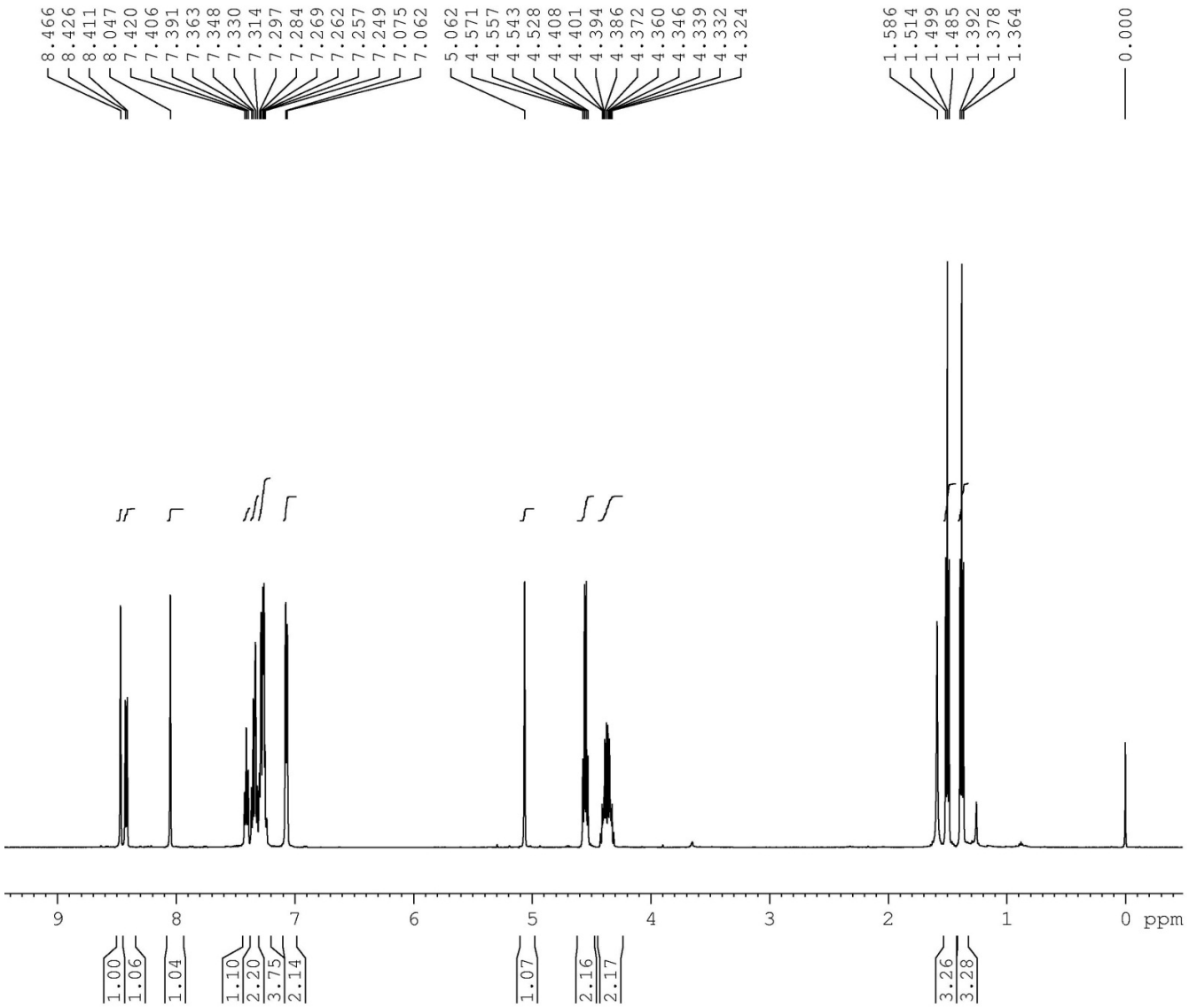

```
Current Data Parameters
NAME                  CS-643
EXPNO                      5
PROCNO                     1

F2 - Acquisition Parameters
Date_              20131230
Time                  13.57
INSTRUM               spect
PROBHD   5 mm PABBI 1H/
PULPROG              zgpg30
TD                    65536
SOLVENT               CDC13
NS                     1835
DS                        4
SWH              29761.904 Hz
FIDRES            0.454131 Hz
AQ               1.1010548 sec
RG                    32800
DW                  16.800 usec
DE                   6.00 usec
TE                   297.0 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    12.40 usec
PL1                   -2.00 dB
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL12                 21.92 dB
PL13                120.00 dB
PL2                   1.00 dB
SFO2          500.1320005 MHz

F2 - Processing parameters
SI                    32768
SF            125.7577890 MHz
WDW                      EM
SSB                       0
LB                    1.00 Hz
GB                        0
PC                    1.40
```

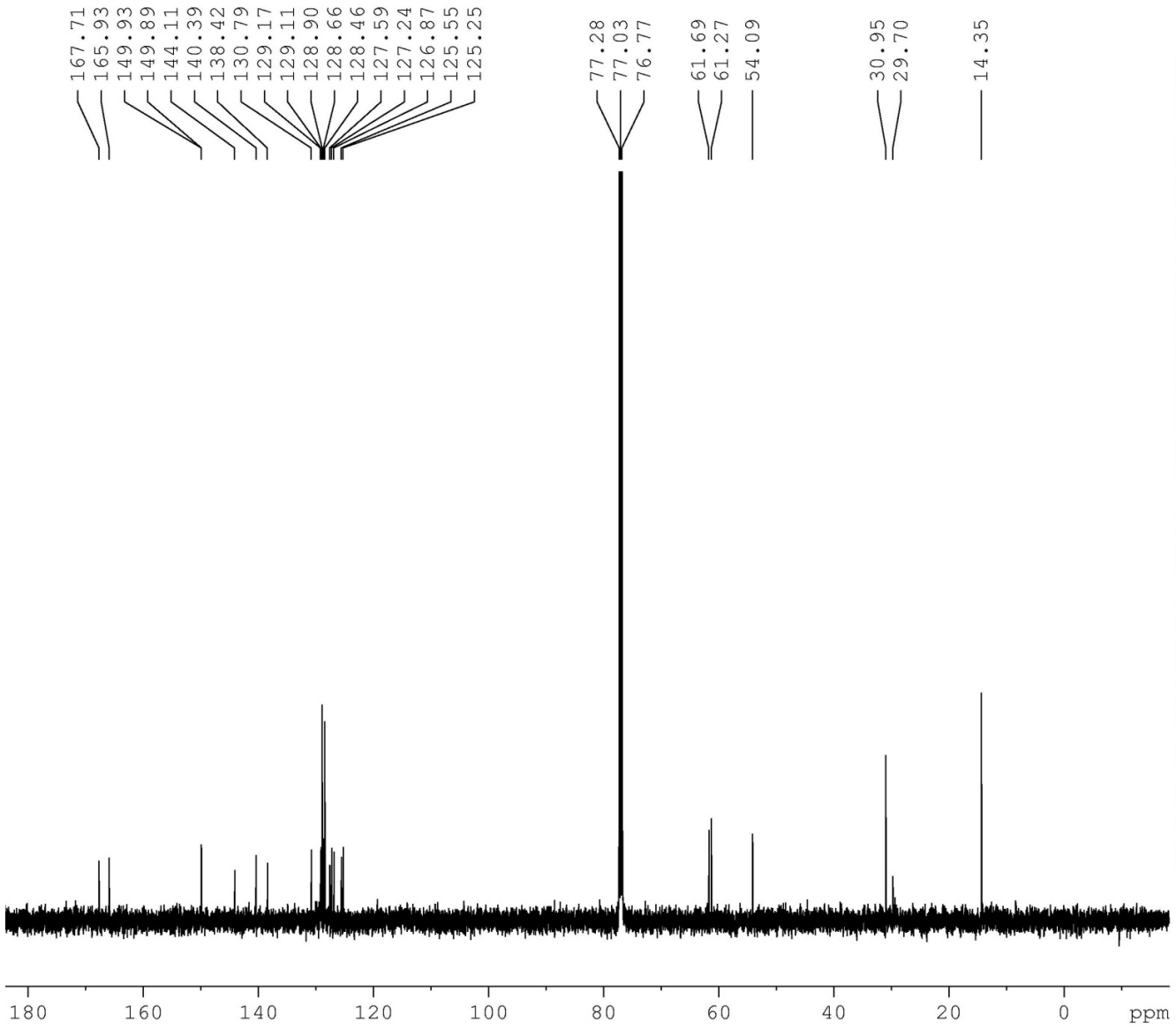



```
Current Data Parameters
NAME                  CS-887-1
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140820
Time                     19.12
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES             0.157632 Hz
AQ                 3.1719923 se
RG                        161
DW                   48.400 us
DE                    6.00 us
TE                    297.4 K
D1                 1.00000000 se
TD0                         1

======== CHANNEL f1 ======
NUC1                       1H
P1                      7.20 us
PL1                     1.00 dB
SFO1           500.1330885 MH

F2 - Processing parameters
SI                      32768
SF             500.1300093 MH
WDW                        EM
SSB                         0
LB                   0.30 Hz
GB                          0
PC                       1.00
```



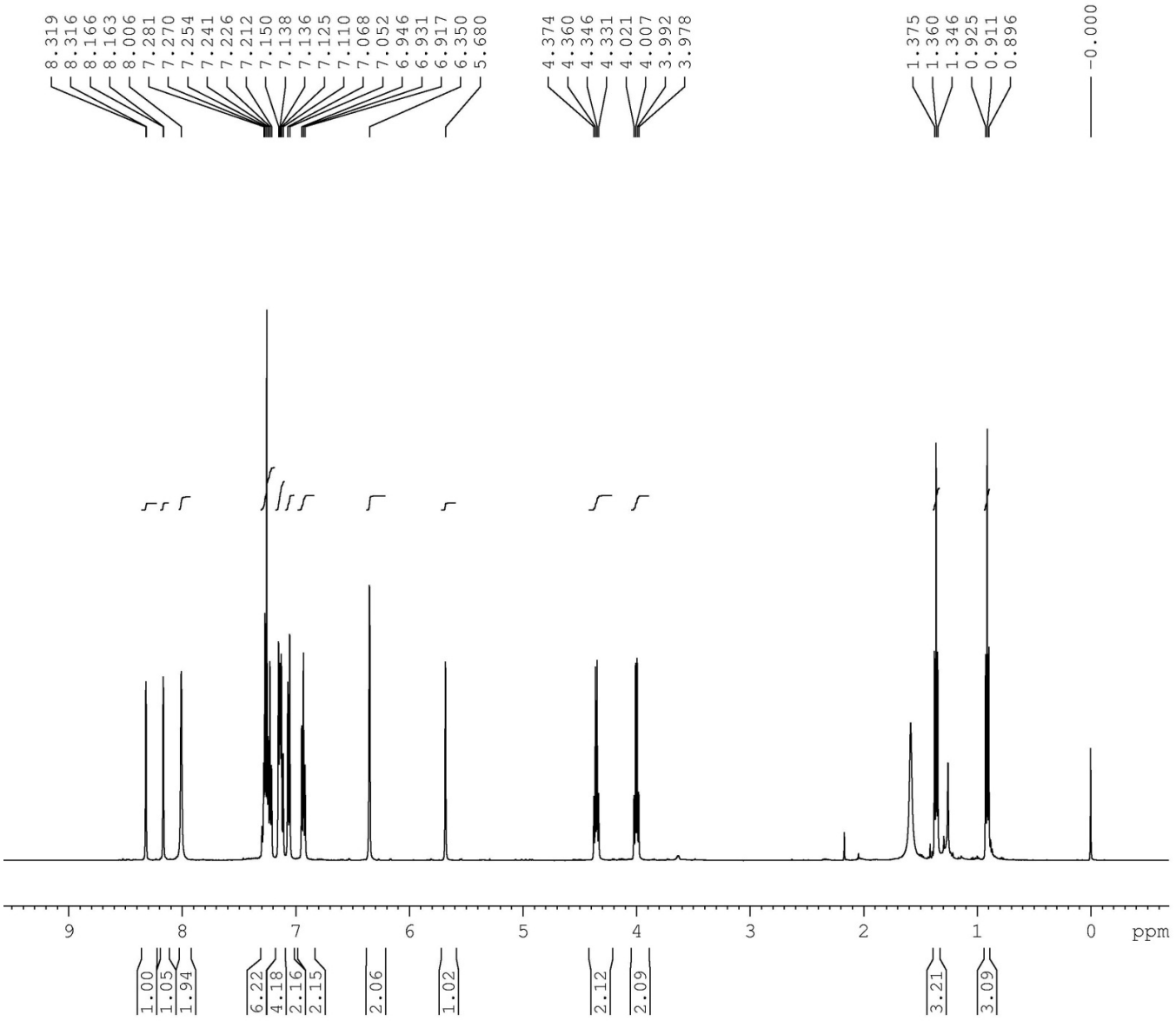

```
Current Data Parameters
NAME                  CS-64-8
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_                20131226
Time                    10.31
INSTRUM                 spect
PROBHD   5 mm PABBI 1H/
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         873
DS                           4
SWH                29761.904 Hz
FIDRES              0.454131 Hz
AQ                  1.1010548 sec
RG                       32800
DW                      16.800 usec
DE                       6.00 usec
TE                      295.6 K
D1                  2.00000000 sec
d11                 0.03000000 sec
DELTA               1.89999998 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                       13C
P1                      12.40 usec
PL1                     -2.00 dB
SFO1             125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                   80.00 usec
PL12                    21.92 dB
PL13                   120.00 dB
PL2                      1.00 dB
SFO2             500.1320005 MHz

F2 - Processing parameters
SI                       32768
SF               125.7577890 MHz
WDW                         EM
SSB                          0
LB                      1.00 Hz
GB                           0
PC                        1.40
```

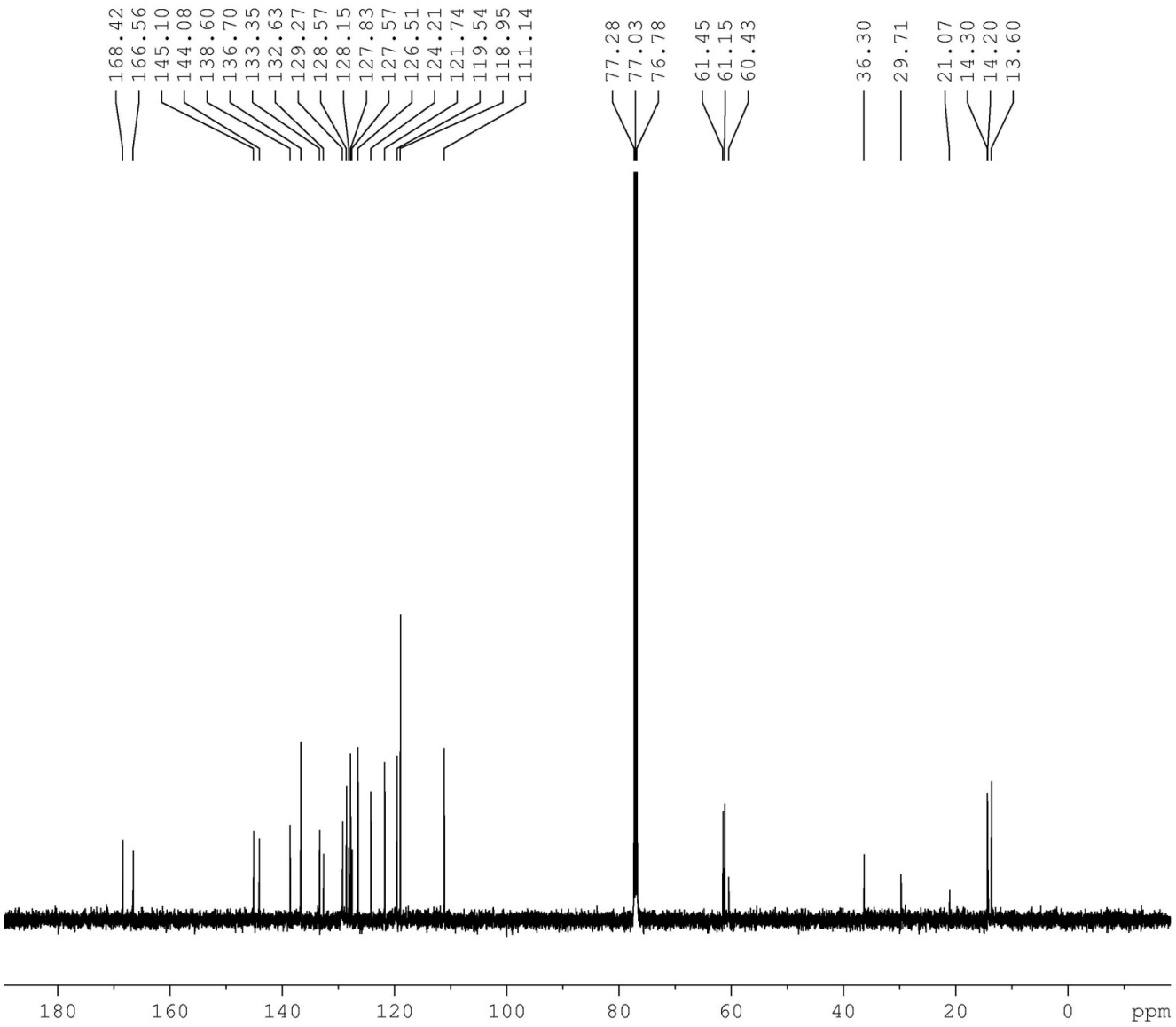



```
Current Data Parameters
NAME                  CS-BIM-1
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameter
Date_                 20140820
Time                     19.06
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                10330.578 Hz
FIDRES              0.157632 Hz
AQ                  3.1719923 se
RG                        228
DW                     48.400 us
DE                      6.00 us
TE                     297.4 K
D1                 1.00000000 se
TD0                         1

======== CHANNEL f1 ======
NUC1                       1H
P1                      7.20 us
PL1                     1.00 dB
SFO1              500.1330885 MH

F2 - Processing parameters
SI                      32768
SF                500.1300108 MH
WDW                        EM
SSB                         0
LB                     0.30 Hz
GB                          0
PC                      1.00
```




```
Current Data Parameters
NAME                  CS-657-B
EXPNO                        1
PROCNO                       1

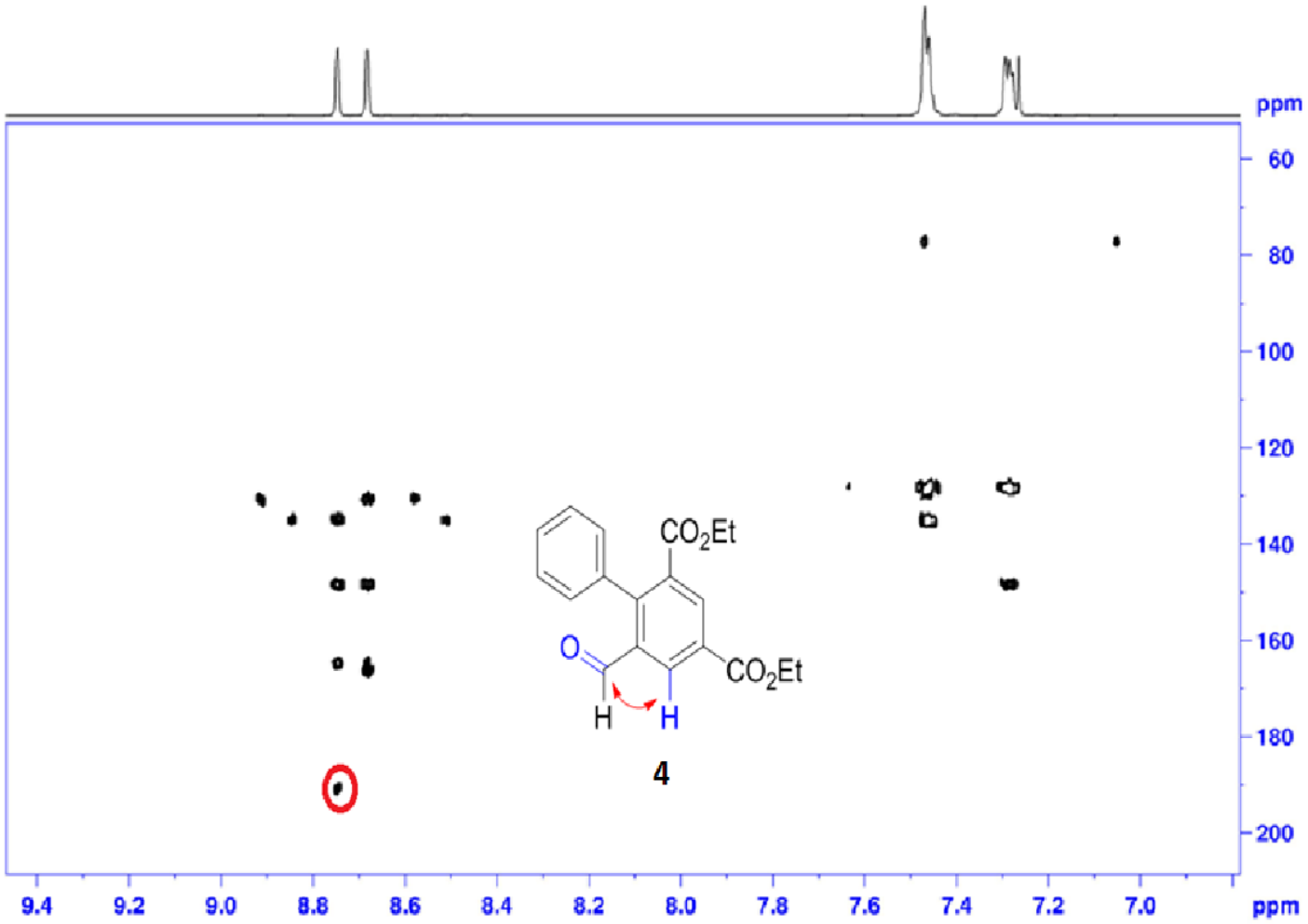
F2 - Acquisition Parameters
Date_                 20131227
Time                     14.22
INSTRUM                  spect
PROBHD    5 mm PABBI 1H/
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                       1711
DS                          4
SWH                29761.904 Hz
FIDRES              0.454131 Hz
AQ                1.1010548 sec
RG                      32800
DW                   16.800 usec
DE                    6.00 usec
TE                    297.1 K
D1                2.00000000 sec
d11               0.03000000 sec
DELTA             1.89999998 sec
TD0                          1

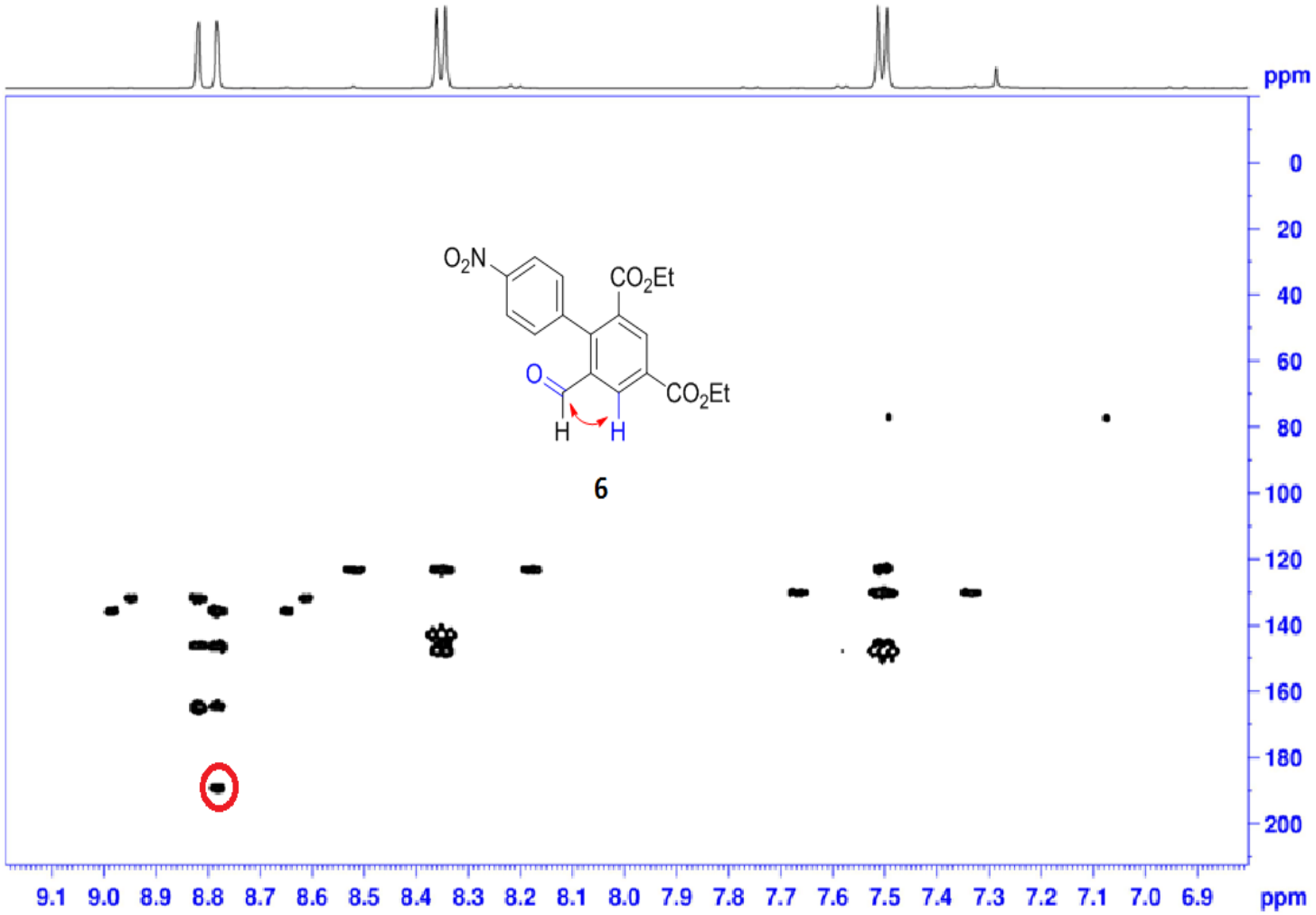
======== CHANNEL f1 ========
NUC1                      13C
P1                     12.40 usec
PL1                    -2.00 dB
SFO1             125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2               waltz16
NUC2                      1H
PCPD2                  80.00 usec
PL12                   21.92 dB
PL13                  120.00 dB
PL2                     1.00 dB
SFO2             500.1320005 MHz

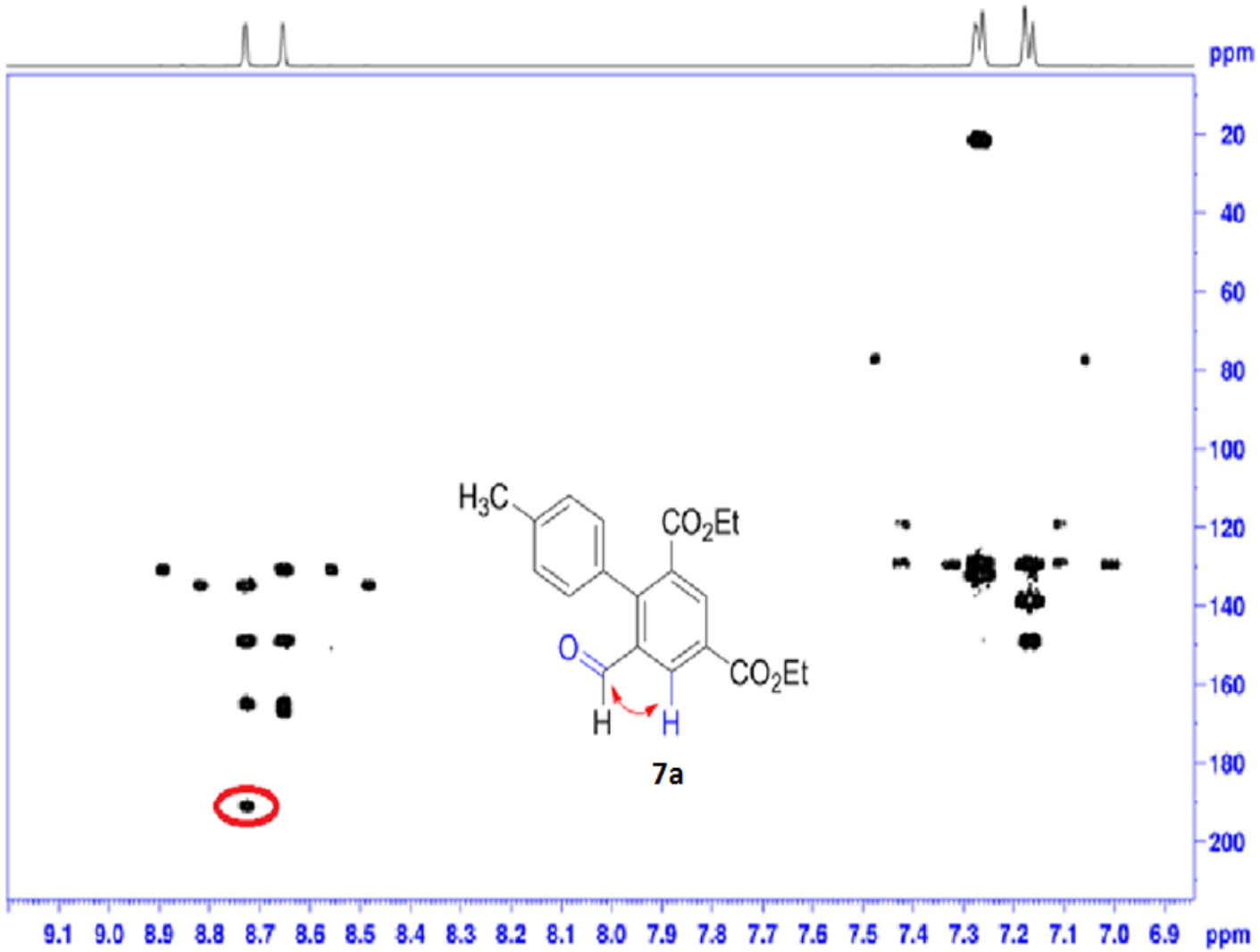
F2 - Processing parameters
SI                        32768
SF               125.7577890 MHz
WDW                          EM
SSB                          0
LB                      1.00 Hz
GB                           0
PC                        1.40
```

HMBC Spectra of 4, 6, 7a, 7e, 7g, 7l, 7m and 7q: Correlation between ortho H and carbonyl carbon is circled.

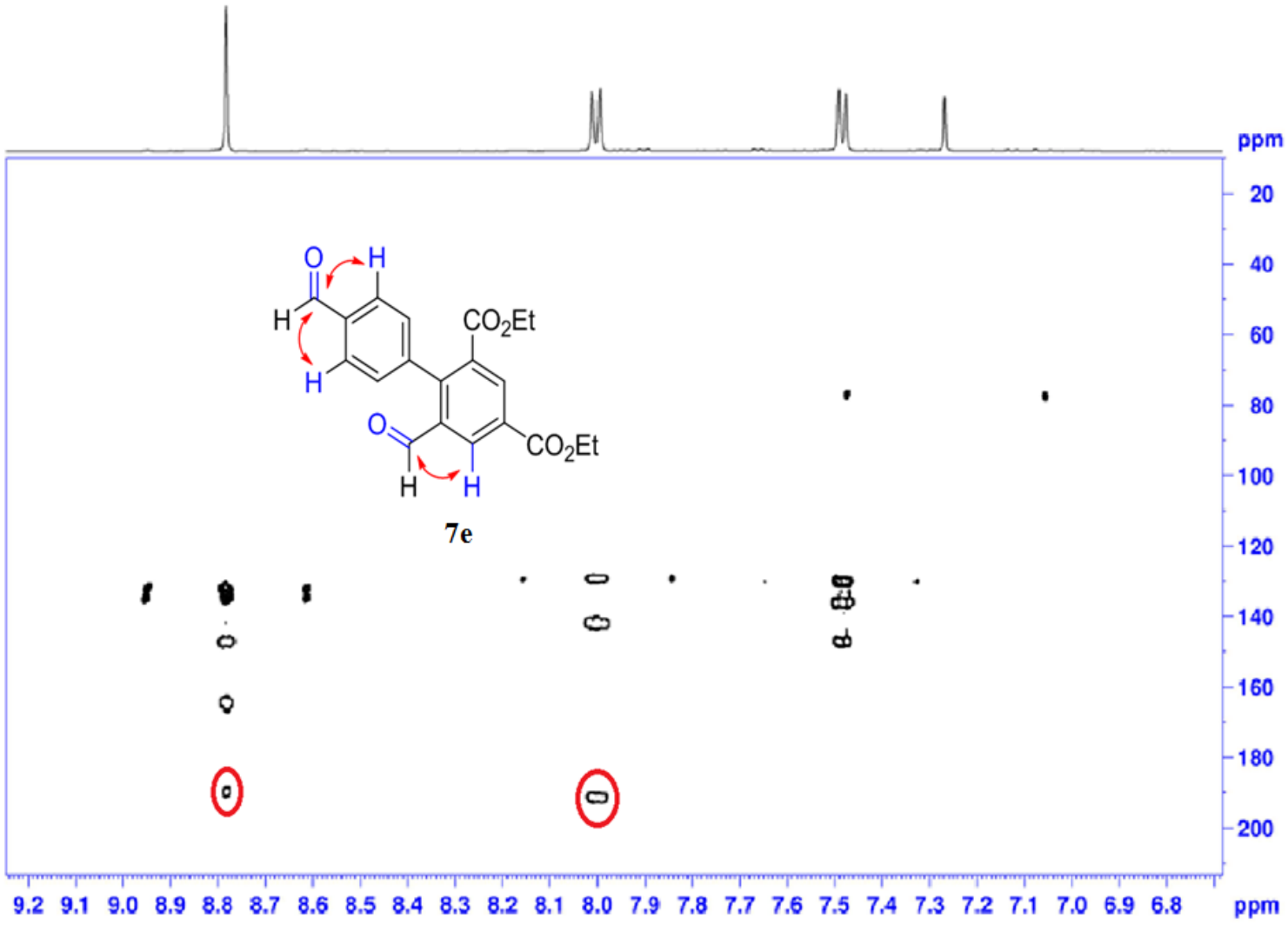



ppm
0
20
40
60
80
100
120
140
160
180
200
9.1 9.0 8.9 8.8 8.7 8.6 8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9
ppm
O2N
CO2Et
CO2Et
O
H
H

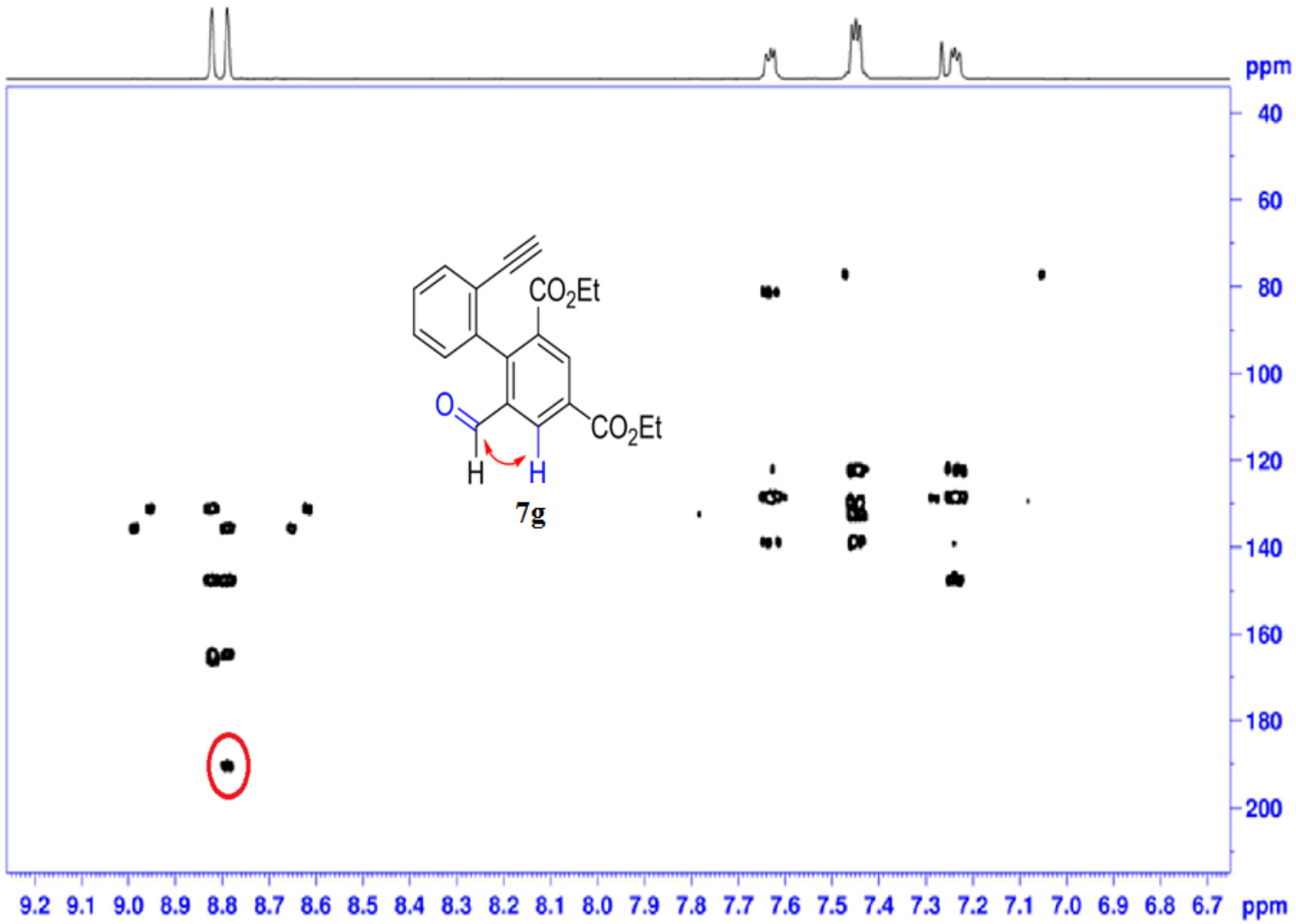
6

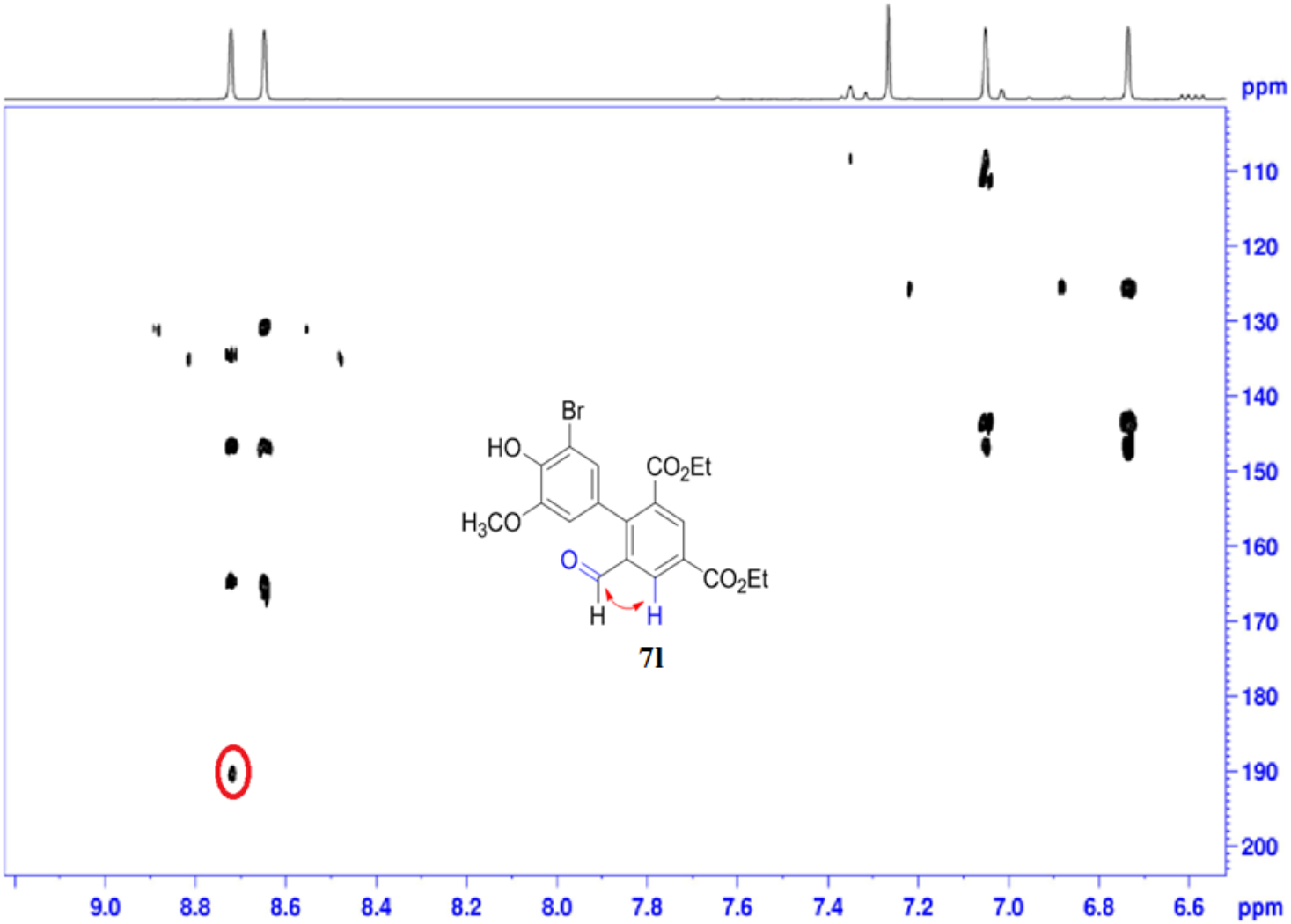

ppm
20
40
60
80
100
120
140
160
180
200
9.1 9.0 8.9 8.8 8.7 8.6 8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9
ppm
H3C
CO2Et
CO2Et
O
H
H

7a

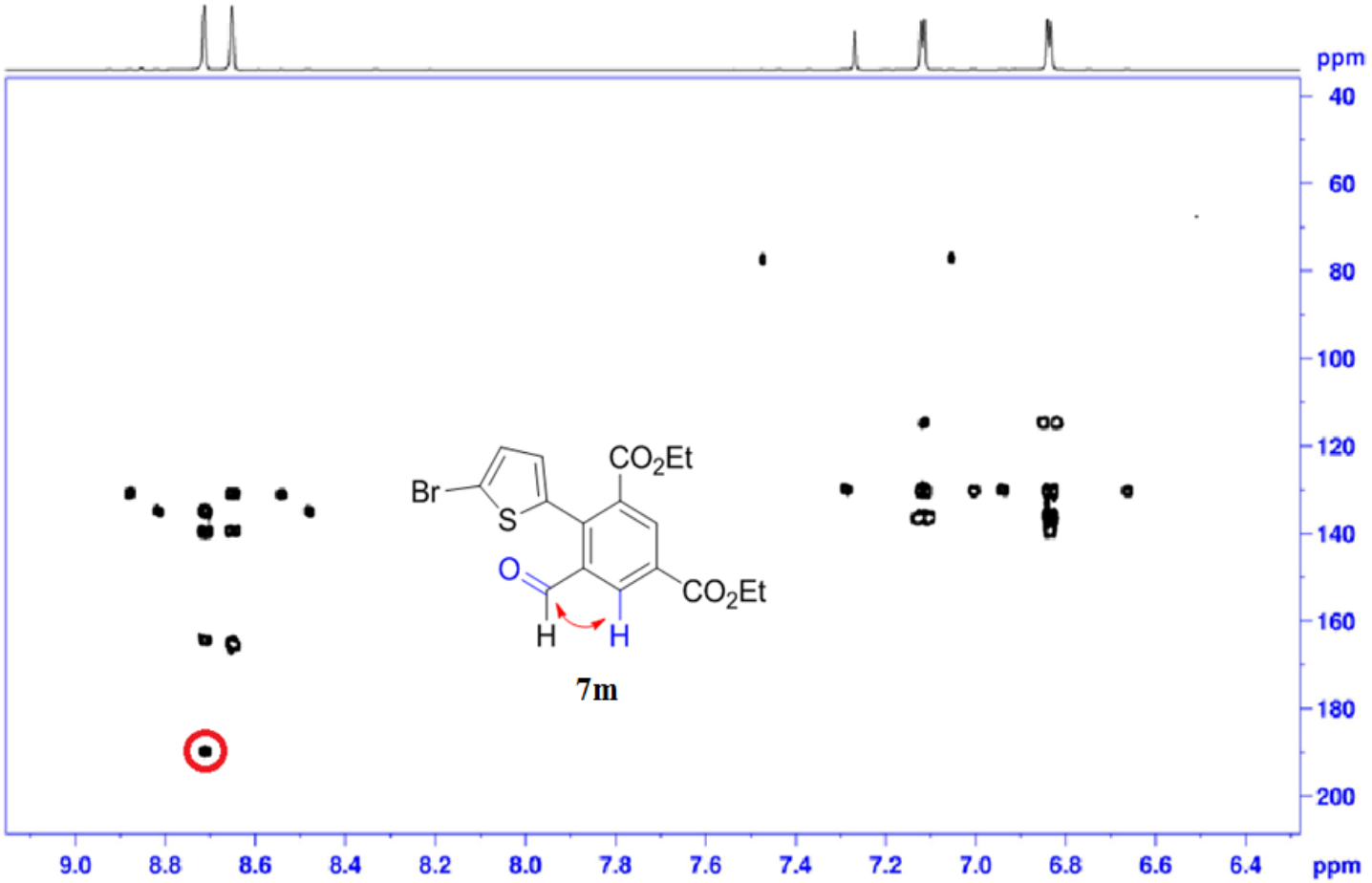

O
H
H
CO2Et
H
O
CO2Et
H
H
ppm
20
40
60
80
100
120
140
160
180
200
9.2 9.1 9.0 8.9 8.8 8.7 8.6 8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8
ppm

7e

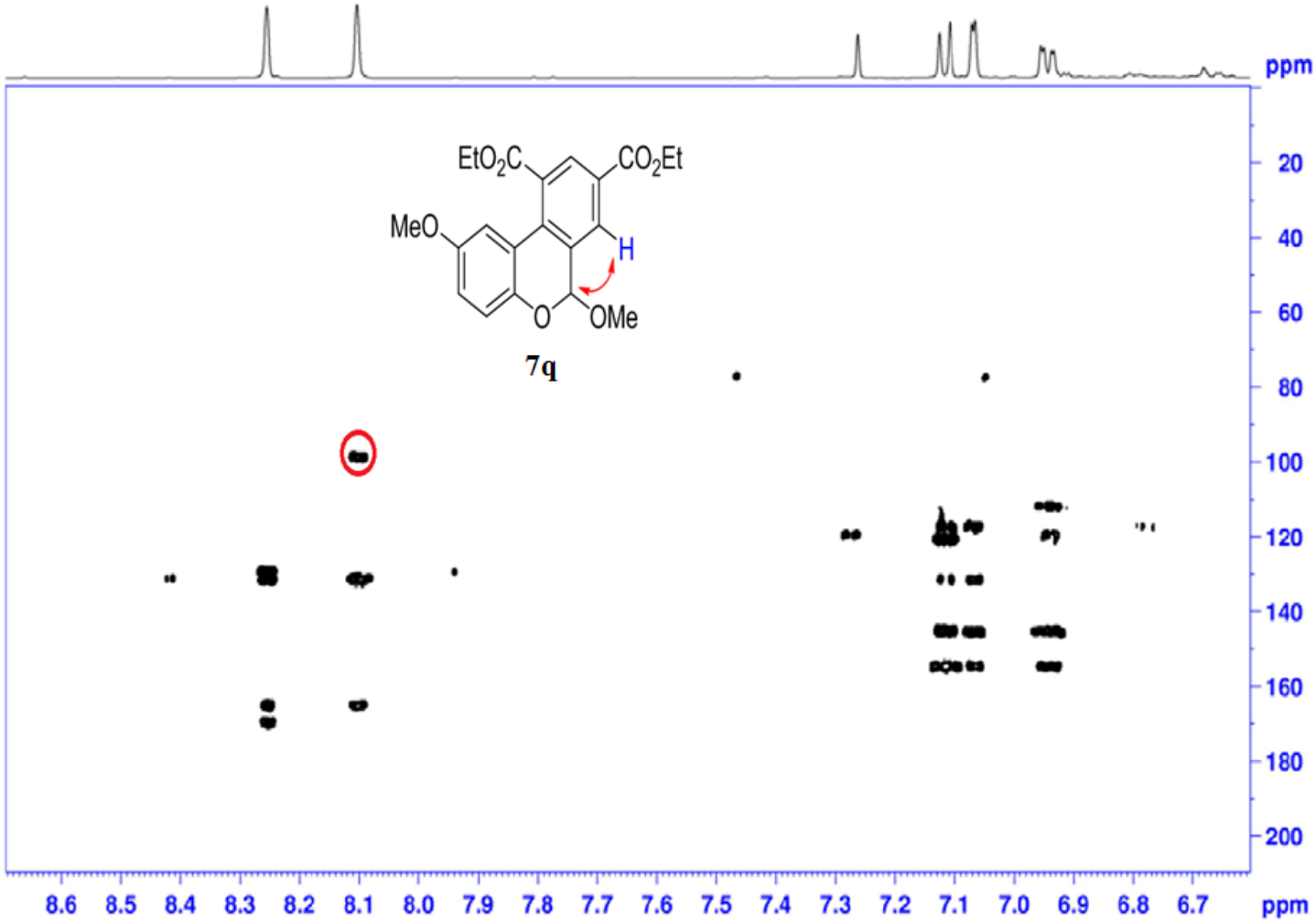

ppm
40
60
80
100
120
140
160
180
200
CO2Et
CO2Et
O
H
H
7g
9.2 9.1 9.0 8.9 8.8 8.7 8.6 8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 ppm


ppm
110
120
130
140
150
160
170
180
190
200
9.0
8.8
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
ppm
Br
HO
CO_2Et
H_3CO
O
CO_2Et
H
H

71


ppm
40
60
80
100
120
140
160
180
200
9.0
8.8
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
6.4
ppm
Br
S
CO2Et
CO2Et
O
H
H

7m


ppm
20
40
60
80
100
120
140
160
180
200
EtO2C
CO2Et
MeO
H
O
OMe
7q
8.6
8.5
8.4
8.3
8.2
8.1
8.0
7.9
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7.0
6.9
6.8
6.7
ppm