Supporting Information

Engineering an Antibiotic to Fight Cancer: Optimization of the Novobiocin Scaffold to Produce Anti-Proliferative Agents

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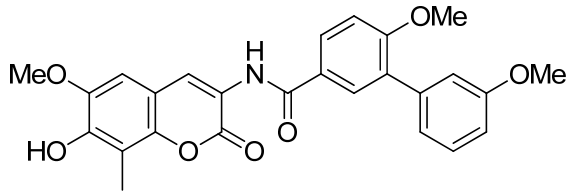
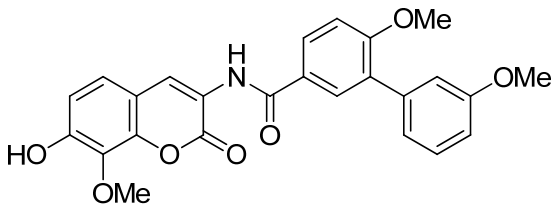
General. The purity of all compounds was determined to be >95% as determined by ^{1}H and ^{13}C NMRR spectra, unless otherwise noted. The most active 15 compounds were further verified for >95% purity based on HPLC analyses.

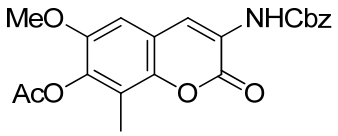


N-(7-hydroxy-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxy-[1,1'-biphenyl]-3-carboxamide (6b): A solution of **10b** (174 mg, 0.35 mmol) in methanol (3.5 mL) at rt was treated with triethylamine (0.35 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 10:1, CH_2Cl_2:acetone) to afford **1b** as a yellow amorphous solid (158 g, 99%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.79 (s, 1H), 8.71 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.89 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.14–7.06 (m, 3H), 6.94–6.92 (m, 1H), 6.81 (s, 1H), 6.11 (s, 1H), 3.96 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 2.37 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 159.9, 159.7, 159.5, 146.2, 144.5, 144.2, 138.8, 131.1, 130.1, 129.3, 128.3, 126.3, 124.7, 122.2, 122.0, 115.4, 113.3, 112.3, 111.9, 111.1, 104.5, 56.5, 56.0, 55.5, 8.3; IR (film) ν_{max} 3408, 2980, 2843, 2359, 2341, 1636, 1533, 1356, 1244, 1015, 918; HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{26}H_{24}NO_7$, 462.1553; found, 462.1529.

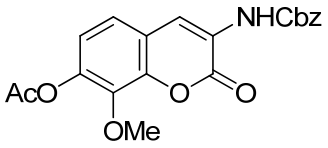


N-(7-hydroxy-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxy-[1,1'-biphenyl]-3-carboxamide (6c): A solution of **12c** (63 mg, 0.13 mmol) in methanol (1.3 mL) at rt was treated

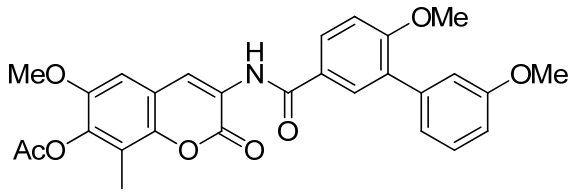
with triethylamine (0.13 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 10:1, CH_2Cl_2:acetone) to afford **6c** as a yellow amorphous solid (57 mg, 99%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.82 (s, 1H), 8.66 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.88 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.19 (d, J = 8.5 Hz, 1H), 7.13–7.07 (m, 3H), 6.97–6.92 (m, 2H), 6.03 (bs, 1H), 4.13 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.0, 159.5, 158.7, 150.4, 143.1, 138.7, 133.7, 131.2, 130.1, 129.4, 128.3, 126.1, 124.8, 123.3, 122.1, 121.7, 115.4, 114.1, 113.3, 113.1, 111.2, 62.1, 56.1, 55.5; IR (film) ν_{max} 3348, 3038, 2970, 2847, 2093, 1643, 1014, 795; HRMS (ESI$^+$) *m/z*: [M + H$^+$] calcd for $C_{25}H_{22}NO_7$, 448.1396; found, 448.1381.



3-(((benzyloxy)carbonyl)amino)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl acetate (8b): A solution of **7b**[1] (195 mg, 0.55 mmol) in anhydrous pyridine (3.0 mL) was treated with acetic anhydride (1.0 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 100:1, CH_2Cl_2:acetone) to afford **8b** as a colorless amorphous solid (216 mg, 99%): ^{1}H NMR ($(CD_3)_2CO$, 400 MHz) δ 8.31 (s, 1H), 8.22 (bs, 1H), 7.48 (d, *J* = 8.0 Hz, 2H), 7.42–7.33 (m, 3H), 7.25 (s, 1H), 5.26 (s, 2H), 3.89 (s, 3H), 2.33 (s, 3H), 2.22 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 168.6, 158.5, 153.2, 148.8, 142.6, 139.7, 135.6, 128.8 (2C), 128.7, 128.4 (2C), 124.0, 121.3, 120.6, 117.6, 106.2, 67.7, 56.3, 20.5, 9.3; IR (film) ν_{max} 3306, 2924, 2853, 1759, 1703, 1531, 1393, 1205, 1088, 1026, 914, 764, 698; HRMS (ESI$^+$) *m/z*: [M + H$^+$] calcd for $C_{21}H_{20}NO_7$, 398.1240; found, 398.1258.



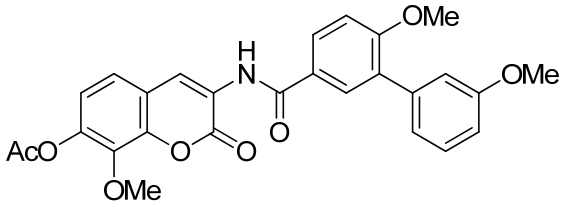
3-(((benzyloxy)carbonyl)amino)-8-methoxy-2-oxo-2H-chromen-7-yl acetate (8c): A solution of **7c**[1] (60 mg, 0.18 mmol) in anhydrous pyridine (2.25 mL) was treated with acetic anhydride (0.75 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **8c** as a colorless amorphous solid (67 mg, 99%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.29 (s, 1H), 7.59 (s, 1H), 7.42–7.34 (m, 5H), 7.18 (d, J = 8.5 Hz, 1H), 7.00 (d, J = 8.5 Hz, 1H), 5.23 (s, 2H), 4.01 (s, 3H), 2.36 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 168.9, 157.6, 153.2, 144.0, 143.5, 139.5, 135.5, 128.8 (2C), 128.7, 128.4 (2C), 123.8, 121.8, 121.2, 119.8, 119.2, 67.8, 61.8, 20.8; IR (film) ν_{max} 3409, 3352, 3312, 3088, 3038, 2945, 2837, 2359, 2332, 1765, 1710, 1533, 1383, 1366, 1238, 1202, 1045, 698; HRMS (ESI$^+$) *m/z*: [M + Na$^+$] calcd for $C_{20}H_{17}NNaO_7$, 406.0903; found, 406.0928.



3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl acetate (12b): Palladium on carbon (10%, 43 mg) was added to **8b** (216 mg, 0.54 mmol) in anhydrous THF (3.6 mL) and the solution was placed under an atmosphere of H_2. After 12 h, the solution was filtered through SiO_2 (40:1, CH_2Cl_2:acetone) and the eluent was concentrated to afford a yellow solid, which was used without further purification (142 mg, 99%).

A solution of 3',6-dimethoxy-[1,1'-biphenyl]-3-carbonyl chloride[2] (130 mg, 0.47 mmol), in anhydrous THF (2.7 mL), was added to a solution of the amine (123 mg, 0.47 mmol) and

anhydrous triethylamine (0.13 mL, 0.94 mmol) in anhydrous THF (2.7 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **12b** as a colorless amorphous solid (129 mg, 55%): ^{1}H NMR (CD_2Cl_2, 400 MHz) δ 8.84 (s, 1H), 8.80 (s, 1H), 7.97 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.16–7.11 (m, 3H), 7.01 (s, 1H), 6.97–6.95 (m, 1H), 3.94 (s, 3H), 3.90 (s, 3H), 3.88 (s, 3H), 2.38 (s, 3H), 2.32 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 168.6, 165.8, 160.0, 159.5, 159.2, 148.9, 142.8, 140.0, 138.7, 131.2, 130.2, 129.3, 128.4, 126.0, 124.2, 123.3, 122.2, 120.6, 117.8, 115.4, 113.3, 111.2, 106.6, 56.4, 56.1, 55.5, 20.6, 9.3; IR (film) ν_{max} 3404, 2926, 2853, 1765, 1713, 1670, 1603, 1522, 1385, 1242, 1204, 1180, 1094, 1022, 571; HRMS (ESI$^+$) *m/z*: [M + H$^+$] calcd for $C_{28}H_{26}NO_8$, 504.1658; found, 504.1625.

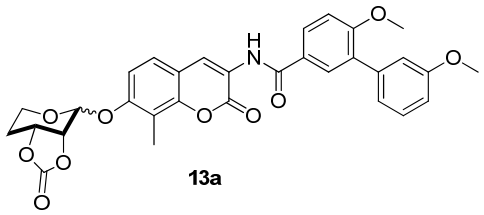


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl acetate (12c): Palladium on carbon (10%, 5 mg) was added to **8c** (25 mg, 0.065 mmol) in anhydrous THF (0.44 mL) and the solution was placed under an atmosphere of H_2. After 12 h, the solution was filtered through SiO_2 (40:1, CH_2Cl_2:acetone) and the eluent was concentrated to afford a yellow solid, which was used without further purification (16 mg, 99%).

A solution of 3',6-dimethoxy-[1,1'-biphenyl]-3-carbonyl chloride[2] (18 mg, 0.064 mmol), in anhydrous THF (0.37 mL), was added to a solution of the amine (16 mg, 0.064 mmol) and anhydrous triethylamine (18 μL, 0.13 mmol), dissolved in anhydrous THF (0.37 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **12c** as a colorless amorphous solid (16 mg, 50%): ^{1}H NMR ($CDCl_3$,

500 MHz) δ 8.83 (s, 1H), 8.75 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.89 (d, *J* = 2.5 Hz, 1H), 7.36 (t, *J* = 8.0 Hz, 1H), 7.26 (d, *J* = 8.0 Hz, 1H), 7.13–7.02 (m, 4H), 6.94–6.92 (m, 1H), 4.04 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 2.37 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 169.0, 165.8, 160.1, 159.5, 158.3, 144.3, 143.7, 139.6, 138.6, 131.3, 130.2, 129.4, 128.4, 125.9, 124.0, 123.2, 122.3, 122.1, 120.0, 119.4, 115.4, 113.3, 111.2, 61.8, 56.0, 55.5, 20.9; IR (film) ν_{max} 3398, 3097, 2993, 2926, 2853, 2357, 2339, 1765, 1666, 1599, 1520, 1456, 1362, 1244, 1202, 1078, 1022, 905, 802, 734; HRMS (ESI$^+$) *m/z*: [M + 2H$^+$] calcd for $C_{27}H_{25}NO_8$, 491.1580; found, 491.1537.

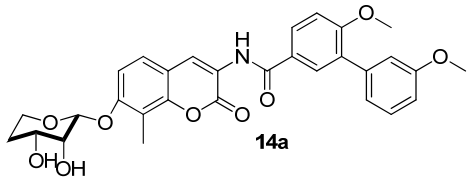
Representative procedure for Mitsunobu coupling with sugars:



13a

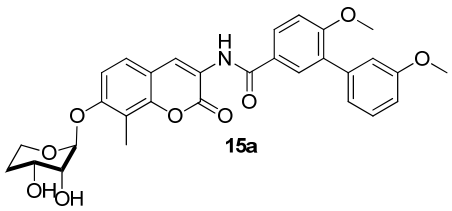
3',6-dimethoxy-N-(8-methyl-2-oxo-7-((3aR,7aR)-2-oxotetrahydro-3aH-[1,3]dioxolo[4,5-c]pyran-4-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (13a): Diisopropylazodicarboxylate (90 μL, 0.46 mmol) was added slowly to a solution of phenol **6** (100 mg, 0.23 mmol), sugar **F** (48 mg, 0.28 mmol) and triphenylphosphine (122 mg, 0.46 mmol) in THF (3 mL) at rt. The resulting reaction mixture was stirred at rt for 2 h, quenched with water and extracted with EtOAc (2 x 10 mL). The combined organic extracts were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4, filtered, and concentrated. The crude product was purified via column chromatography (SiO_2, 100:1, $CHCl_3$:MeOH) to afford compound **13a** (117 mg, 88%) as a mixture of diastereomers.

Representative procedure for cyclic carbonate hydrolysis:

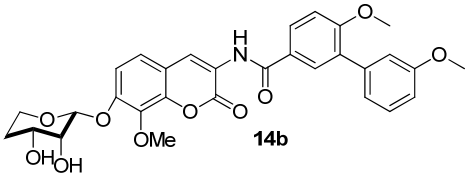


14a

N-(7-((2R,3R,4R)-3,4-dihydroxytetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (14a): A solution of **13a** (117 mg, 0.20 mmol) in THF:H_2O:MeOH (3:1:1, 2 mL) was treated with LiOH (26 mg, 0.61 mmol). The resulting reaction mixture was stirred at rt for 2 h, cooled to 0ºC, then acidified to pH ~4 with 5% aqueous HCl. The organic layer was separated and the aqueous layer was extracted with dichloromethane (3 x 20 mL). The combined organic layers were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The crude residue was purified via column chromatography (SiO_2, 100:5, CH_2Cl_2:MeOH) to yield diastereomers **14a** and **15a**. Compound **14a** (59 mg, 53%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (bs, 1H), 7.92 (dd, *J* = 2.3, 8.6 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 7.2 Hz, 1H), 7.36 (d, *J* = 8.0 Hz, 1H), 7.15 (d, *J* = 8.6 Hz, 1H), 7. 13 (d, *J* = 7.6 Hz, 1H), 7.09 (t, *J* = 2.4 Hz, 1H), 7.07 (d, *J* = 8.9 Hz, 1H), 6.94 (dd, *J* = 1.9, 7.6 Hz, 1H), 5.48 (d, *J* = 3.1 Hz, 1H), 4.14 (m, 1H), 4.03 (dt, *J* = 3.3, 11.7 Hz, 1H), 3.90 (s, 3H), 3.86 (s, 3H), 3.62 (dt, *J* = 3.7, 12.0 Hz, 1H), 2.77 (d, *J* = 9.3 Hz, 1H), 2.68 (d, *J* = 9.4 Hz, 1H), 2.40 (s, 3H), 2.02 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.5, 160.0, 159.4, 156.1, 149.0, 138.5, 131.1, 130.0, 129.2, 128.2, 126.0, 125.9, 123.8, 122.4, 122.0, 115.2, 113.2, 112.3, 111.0, 99.4, 77.2, 68.4, 67.8, 55.9, 55.6, 55.3, 31.0, 8.7; IR (film) ν_{max} 3303, 3288, 2921, 2851, 1705, 1672, 1604, 1526, 1504, 1485, 1367, 1240, 1132, 1074, 1051, 1024, 999 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^+] calcd for $C_{30}H_{29}NNaO_9$, 570.1740; found, 570.1744.

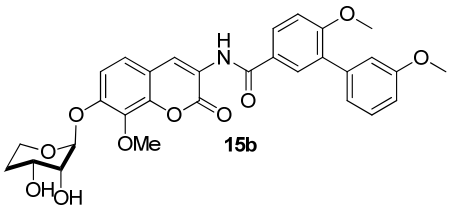


N-(7-((2S,3R,4R)-3,4-dihydroxytetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (15a): Compound **15a** (40 mg, 35%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.77 (s, 1H), 8.70 (s, 1H), 7.91 (dd, *J* = 2.4, 8.5 Hz, 1H), 7.89 (d, *J* = 2.3 Hz, 1H), 7.36 (t, *J* = 8.0 Hz, 1H), 7.31 (d, *J* = 8.6 Hz, 1H), 7.12 (dt, *J* = 1.5, 7.6 Hz, 1H), 7.09 (m, 2H), 7.06 (d, *J* = 8.6 Hz, 1H), 6.93 (ddd, *J* = 0.6, 2.5, 8.3 Hz, 1H), 5.52 (d, *J* = 4.0 Hz, 1H), 4.26 (m, 1H), 3.95 (t, *J* = 3.7 Hz, 1H), 3.89 (s, 3H), 3.85 (s, 3H), 3.84 (m, 1H), 3.79 (m, 1H), 2.79 (bs, 1H), 2.53 (bs, 1H), 2.33 (s, 3H), 1.97 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.5, 159.4, 155.8, 149.1, 138.7, 131.1, 130.1, 129.3, 128.3, 126.0, 125.9, 124.2, 122.2, 122.1, 115.4, 115.0, 114.7, 113.2, 112.4, 111.8, 111.1, 98.8, 77.4, 70.0, 66.3, 60.0, 56.0, 55.4, 29.8, 8.5; IR (film) ν_{max} 3400, 3387, 2954, 2924, 2851, 1713, 1668, 1605, 1526, 1504, 1481, 1367, 1265, 1242, 1205, 1078, 1051, 1033, 1002, 999 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_9$, calcd 570.1740; found, 570.1733.



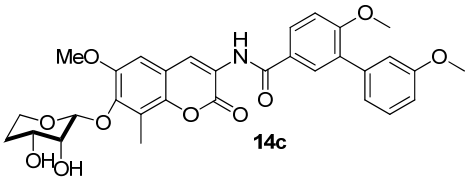
N-(7-((2R,3R,4R)-3,4-dihydroxytetrahydro-2H-pyran-2-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (14b): Compound **14b** (36 mg, 38%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.91 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.88 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 7.6 Hz, 1H), 7.23 (d, *J* = 8.8 Hz, 1H), 7.27 (d, *J* = 8.9 Hz, 1H), 7.12 (dt, *J* = 1.2, 7.9 Hz, 1H), 7.09 (m, 1H), 7.07 (d, *J* =

8.6 Hz, 1H), 6.93 (dd, *J* = 1.0, 2.9, 7.9 Hz, 1H), 5.40 (d, *J* = 4.8 Hz, 1H), 4.29 (m, 1H), 4.02 (s, 3H), 3.93 (m, 1H), 3.90 (s, 3H), 3.88 (m, 1H), 3.86 (s, 3H), 2.82 (bs, 1H), 2.38 (bs, 1H), 1.95 (m, 1H), 1.88 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 160.0, 159.4, 158.8, 150.9, 144.0, 138.6, 137.6, 131.1, 130.1, 129.3, 128.3, 125.9, 123.7, 122.8, 122.7, 122.1, 116.4, 115.4, 114.1, 113.3, 111.2, 100.5, 66.4, 62.1, 60.5, 56.0, 55.5, 29.8; IR (film) ν_{max} 3411, 3301, 2989, 2985, 1716, 1668, 1605, 1524, 1502, 1483, 1462, 1436, 1365, 1274, 1247, 1182, 1118, 1070, 997 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_{10}$, calcd 586.1689; found, 586.1683.



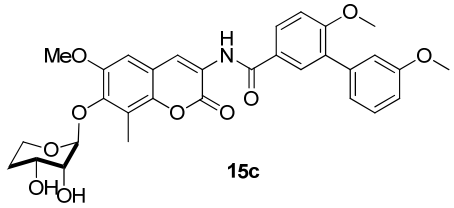
15b

N-(7-((2S,3R,4R)-3,4-dihydroxytetrahydro-2H-pyran-2-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (15b): Compound **15b** (21 mg, 22%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.70 (s, 1H), 7.87 (m, 2H), 7.35 (t, *J* = 7.7 Hz, 1H), 7.21 (d, *J* = 7.7 Hz, 1H), 7.00–7.15 (m, 4H), 6.92 (d, *J* = 7.9 Hz, 1H), 5.56 (s, 1H), 4.17 (m, 1H), 4.04 (s, 3H), 4.01 (m, 2H), 3.88 (s, 3H), 3.85 (s, 3H), 3.57 (d, *J* = 10.5 Hz, 1H), 3.42 (m, 1H), 1.99 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 160.0, 159.4, 158.5, 150.3, 143.8, 138.6, 137.3, 131.1, 130.1, 129.3, 128.3, 125.8, 123.6, 122.8, 122.1, 116.2, 115.3, 114.0, 113.2, 111.1, 99.6, 68.4, 67.7, 62.2, 56.0, 55.5, 55.4, 31.3; IR (film) ν_{max} 3400, 3386, 2935, 2896, 2839, 1707, 1670, 1605, 1521, 1500, 1367, 1274, 1245, 1120, 1081, 1054, 952 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_{10}$, calcd 586.1689; found, 586.1689.



14c

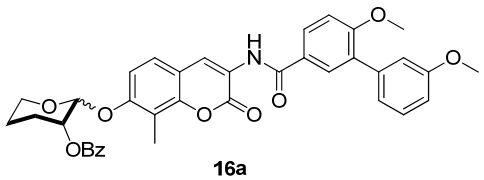
N-(7-((2R,3R,4R)-3,4-dihydroxytetrahydro-2H-pyran-2-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (14c): Compound **14c** (37 mg, 44%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.80 (s, 1H), 7.93 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.90 (d, *J* = 2.4 Hz, 1H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.13 (dt, *J* = 1.5, 7.6 Hz, 1H), 7.10 (t, *J* = 2.5 Hz, 1H), 7.08 (d, *J* = 8.8 Hz, 1H), 6.94 (ddd, *J* = 0.9, 2.7, 8.0 Hz, 1H), 6.89 (s, 1H), 5.03 (d, *J* = 6.9 Hz, 1H), 4.28 (m, 1H), 3.94 (s, 3H), 3.91 (s, 3H), 3.87 (s, 3H), 3.75–3.90 (m, 3H), 3.60 (bs, 1H), 2.64 (bs, 1H), 2.47 (s, 3H), 1.90 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.3, 159.2, 149.1, 146.0, 143.3, 138.5, 131.1, 130.0, 129.2, 128.2, 125.9, 123.6, 123.3, 122.1, 122.0, 116.3, 115.3, 113.1, 111.0, 106.3, 104.1, 71.8, 66.7, 61.1, 56.2, 55.9, 55.4, 30.1, 9.9; IR (film) ν_{max} 3401, 3363, 3001, 2952, 1701, 1670, 1605, 1589, 1501, 1423, 1367, 1230, 1191, 1110, 1053, 997 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{31}H_{31}NNaO_{10}$, calcd 600.1841; found, 600.1846.



15c

N-(7-((2S,3R,4R)-3,4-dihydroxytetrahydro-2H-pyran-2-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (15c): Compound **15c** (24 mg, 29%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.75 (s, 1H), 8.73 (s, 1H), 7.86–7.90 (m, 2H), 7.35 (t, *J* = 7.8 Hz, 1H), 7.11 (dt, *J* = 1.5, 8.0 Hz, 1H), 7.08 (t, *J* = 2.4 Hz, 1H), 7.03 (d, *J* = 9.6 Hz, 1H), 6.92 (ddd, *J* = 1.2, 8.7 Hz, 1H), 6.81 (s, 1H), 5.20

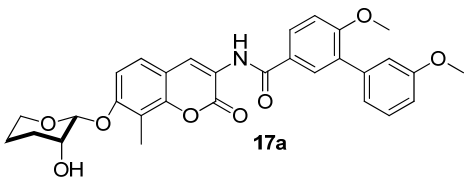
(d, J = 3.3 Hz, 1H), 4.35 (td, J = 3.1, 11.5 Hz, 1H), 4.09 (s, 1H), 3.93 (d, J = 6.5 Hz, 1H), 3.90 (s, 3H), 3.87 (s, 3H), 3.85 (s, 3H), 3.55 (dt, J = 4.4, 11.5 Hz, 1H), 3.19 (d, J = 5.2 Hz, 1H), 2.44 (s, 3H), 1.94 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.4, 159.1, 149.2, 146.1, 143.3, 138.6, 132.2, 132.1, 130.1, 129.2, 128.6, 128.3, 125.9, 123.6, 123.1, 116.2, 115.4, 113.1, 111.0, 106.3, 103.6, 69.2, 67.3, 56.8, 56.2, 55.9, 55.4, 30.6, 9.9; IR (film) ν_{max} 3400, 3377, 2952, 2867, 1711, 1670, 1605, 1587, 1500, 1427, 1369, 1227, 1138, 1120, 1054, 997 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{31}H_{31}NNaO_{10}$, calcd 600.1844; found, 600.1846.



16a

(R)-2-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yloxy)tetrahydro-2H-pyran-3-yl benzoate (16a): Compound **16a** was obtained as a colorless amorphous solid and carried on without further purification.

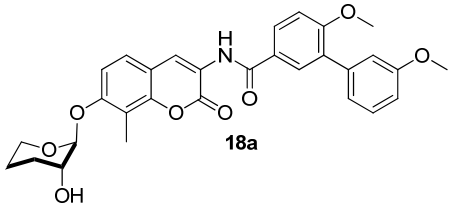
Sodium metal (20 mg, 0.86 mmol) was added to a solution of **16a** (110 mg, 0.17 mmol) in MeOH (5 mL) at 0 °C. The resulting reaction mixture was stirred for 5 min at 0 °C, then quenched with water and extracted with EtOAc (3 x 10 mL). The combined organic layers were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4 and concentrated. The residue was purified via column chromatography (SiO2, 100:1, CH_2Cl_2:MeOH) to afford **17a** and **18a** (62 mg, 64%) as a mixture diastereomers.



17a

N-(7-((2R,3R)-3-hydroxytetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (17a): Compound **17a** (35 mg, 36%) was obtained

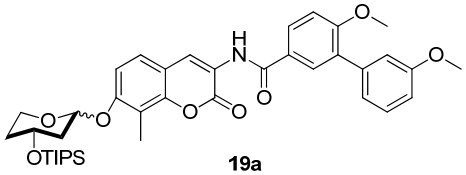
as an amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (bs, 1H), 7.92 (dd, *J* = 2.4, 8.6 Hz. 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 8.1 Hz, 1H), 7.36 (d, *J* = 8.8 Hz, 1H), 7.17 (d, *J* = 8.8 Hz, 1H), 7.13 (dt, *J* = 1.2, 7.8 Hz, 1H), 7.09 (m, 1H), 7.07 (d, *J* = 8.4 Hz, 1H), 6.94 (ddd, *J* = 0.9, 2.6, 8.3 Hz, 1H), 5.55 (d, *J* = 3.2 Hz, 1H), 3.90 (s, 3H), 3.86 (s, 3H), 3.70 (m, 1H), 3.61 (m, 1H), 2.41 (s, 3H), 2.06 (m, 1H), 1.91 (m, 2H), 1.80 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.5, 159.4, 156.0, 149.2, 138.7, 131.2, 130.1, 129.3, 128.3, 126.2, 126.0, 124.2, 122.3, 122.1, 115.4, 115.1, 114.7, 113.3, 112.2, 111.1, 97.6, 68.4, 60.5, 56.0, 55.5, 27.9, 24.2, 8.6; IR (film) ν_{max} 3402, 2935, 2879, 2851, 1705, 1670, 1605, 1527, 1500, 1367, 1242, 1207, 1180, 1126, 1068, 987, 970 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^{+}] calcd for $C_{30}H_{29}NNaO_8$, calcd 554.1791; found, 554.1788.



18a

N-(7-((2S,3R)-3-hydroxytetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (18a): Compound **18a** (27 mg, 28%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.71 (bs, 1H), 7.92 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.89 (d, *J* = 2.3 Hz, 1H), 7.37 (t, *J* = 7.9 Hz, 1H), 7.34 (d, *J* = 8.0 Hz, 1H), 7.08–7.14 (m, 3H) .7.07 (d, *J* = 8.8 Hz, 1H), 6.93 (ddd, *J* = 0.7, 2.6, 8.3 Hz, 1H), 5.16 (d, *J* = 4.6 Hz, 1H), 3.92 (m, 1H), 3.90 (s, 3H), 3.86 (s, 3H), 3.62 (m, 1H), 2.38 (s, 3H), 2.23 (m, 2H), 1.90 (m, 1H), 1.74 (m, 1H), 1.63 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.5, 159.4, 156.1, 149.2, 138.7, 131.2, 130.1, 129.3, 128.3, 126.2, 124.2, 122.3, 122.1, 115.4, 115.2, 114.7, 113.3, 112.1, 111.1, 100.4, 67.8, 63.4, 56.0, 55.5, 27.5, 22.1, 21.9, 8.6; IR (film) ν_{max}

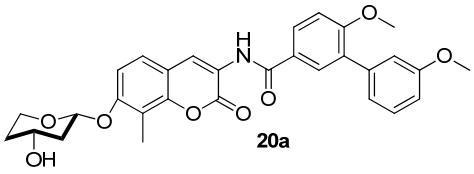
3404, 2923, 2845, 1711, 1670, 1606, 1526, 1502, 1369, 1242, 1205, 1178, 1115, 1057, 995, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^+] calcd for $C_{30}H_{29}NNaO_8$, calcd 554.1791; found, 554.1803.



19a

(R)-3',6-dimethoxy-N-(8-methyl-2-oxo-7-(4-(triisopropylsilyloxy)tetrahydro-2H-pyran-2-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (19a): Compound **19a** (158 mg, 78%) was obtained as a colorless amorphous solid and used without further purification.

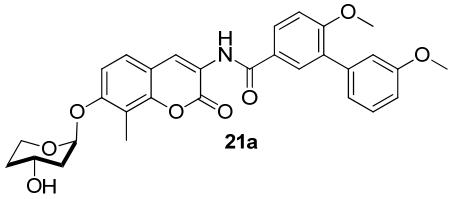
Tetrabutylammonium fluoride (0.5 mL, 0.50 mmol) was added dropwise to a solution of **19a** (158 mg, 0.23 mmol) in THF (4 mL) at rt. The resulting reaction mixture was stirred at rt for 1 h, then quenched with water and extracted with EtOAc (3 x 10 mL). The combined organic layers were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4 and concentrated. The residue was purified via column chromatography (SiO_2, 100:1, CH_2Cl_2:MeOH) to afford **20a** and **21a** (120 mg, 72%) as a mixture of diastereomers.



20a

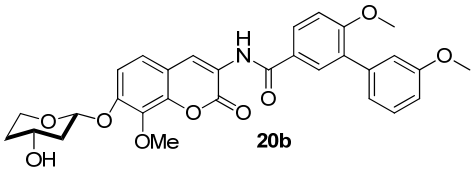
N-(7-((2R,4R)-4-hydroxytetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (20a): Compound **20a** (68 mg, 41%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.71 (s, 1H), 7.92 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 7.9 Hz, 1H), 7.34 (d, *J* = 8.7 Hz, 1H), 7.13 (d, *J* = 8.7 Hz, 1H), 7.12 (m, 1H), 7.09 (m, 1H), 7.07 (d, *J* = 8.6 Hz, 1H), 6.93 (ddd, *J* = 0.8, 2.6, 8.27 Hz, 1H), 5.77 (t, *J* = 2.8 Hz, 1H), 4.37 (m, 1H), 3.90 (s, 3H), 3.86 (s, 3H), 3.81 (d, *J* = 2.5 Hz, 1H), 3.80 (t, *J* = 2.1 Hz, 1H), 2.35 (s, 3H), 2.33 (m, 1H), 2.01 (m, 1H), 1.80 (m,

1H), 1.70 (m, 1H), 1.64 (bs, 1H): ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.6, 159.5, 156.1, 149.2, 138.7, 131.2, 130.1, 129.3, 128.3, 126.2, 125.8, 124.4, 122.1, 122.0, 115.4, 114.8, 114.3, 113.3, 111.7, 111.1, 96.8, 63.9, 59.8, 56.0, 55.5, 39.5, 34.9, 8.5; IR (film) ν_{max} 3477, 2967, 2923, 1713, 1668, 1606, 1525, 1502, 1369, 1242, 1205, 1178, 1114, 1057, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_8$, calcd 554.1791; found, 554.1794.



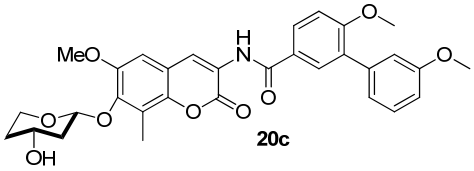
21a

N-(7-((2S,4R)-4-hydroxytetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (21a): Compound **21a** (52 mg, 31%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.71 (s, 1H), 7.92 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.36 (t, *J* = 7.9 Hz, 1H), 7.35 (d, *J* = 8.6 Hz, 1H), 7.14 (d, *J* = 8.7 Hz, 1H), 7.12 (m, 1H), 7.09 (m, 1H), 7.07 (d, *J* = 8.5 Hz, 1H), 6.93 (ddd, *J* = 0.8, 2.5, 8.5 Hz, 1H), 5.55 (t, *J* = 3.4 Hz, 1H,), 4.15 (m, 2H), 3.90 (s, 3H), 3.86 (s, 3H), 3.64 (dt, *J* = 4.4, 12.1 Hz, 1H), 2.86 (d, *J* = 6.4 Hz, 1H), 2.37 (s, 3H), 2.23 (dt, *J* = 3.6, 14.1 Hz, 1H), 2.10 (m, 1H), 1.99 (m, 1H), 1.77 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.5, 159.4, 156.2, 149.1, 138.7, 131.2, 130.1, 129.3, 128.3, 126.1, 125.9, 124.1, 122.3, 122.1, 115.4, 114.9, 114.7, 113.3, 112.0, 111.1, 97.6, 64.1, 57.3, 56.0, 55.5, 37.2, 32.7, 8.7; IR (film) ν_{max} 3443, 2964, 2923, 1712, 1667, 1606, 1525, 1502, 1370, 1247, 1205, 1178, 1114, 1057, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_8$, calcd 554.1791; found, 554.1800.



20b

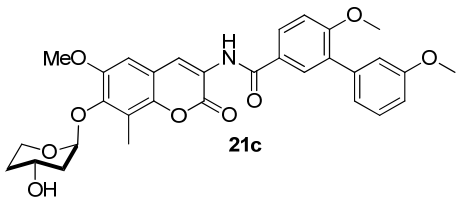
N-(7-((2R,4R)-4-hydroxytetrahydro-2H-pyran-2-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (20b): Compound **20b** (36 mg, 66%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, CDCl3) δ 8.68 (s, 1H), 8.59 (s, 1H), 7.78 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.75 (d, *J* = 2.4 Hz, 1H), 7.23 (t, *J* = 7.9 Hz, 1H), 7.10 (d, *J* = 8.8 Hz, 1H), 6.97 (m, 3H), 6.80 (dd, *J* = 2.2, 7.9 Hz, 1H), 5.58 (t, *J* = 3.0 Hz, 1H), 4.04 (bs, 1H), 3.98 (dt, *J* = 3.0, 11.9 Hz, 2H), 3.91 (s, 3H), 3.77 (s, 3H), 3.73 (s, 3H), 3.47 (dd, *J* = 3.1, 11.9 Hz, 1H), 2.04 (m, 1H), 1.86 (s, 1H), 1.67 (m, 2H). ^{1}H NMR (125 MHz, CDCl3) δ 165.7, 160.0, 159.5, 158.8, 150.1, 144.1, 138.7, 137.3, 131.2, 130.1, 129.3, 128.3, 126.0, 123.8, 122.8, 122.7, 122.1, 116.0, 115.4, 114.0, 138.8, 113.3, 111.2, 97.5, 63.5, 62.0, 56.6, 56.0, 55.5, 36.2, 32.4; IR (film) ν_{max} 3403, 2937, 2848, 1708, 1670, 1606, 1527, 1502, 1367, 1242, 1205, 1113, 1109, 1057, 996, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_9$, calcd 570.1740; found, 570.1733.



20c

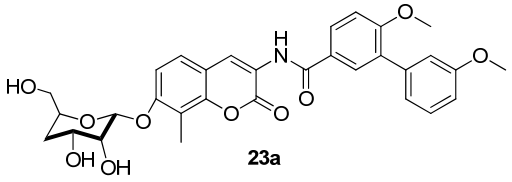
N-(7-((2R,4R)-4-hydroxytetrahydro-2H-pyran-2-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (20c): Compound **20c** (36 mg, 38%) was obtained as a colorless amorphous solid.^{1}H NMR (500 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.76 (s, 1H), 7.92 (dd, *J* = 2.5, 8.6 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 8.2 Hz, 1H), 7.12 (dt, *J* = 1.5, 7.61 Hz, 1H), 7.09 (t, *J* = 2.5 Hz, 1H), 7.07 (d, *J* = 8.5 Hz, 1H), 6.93 (ddd, *J* = 1.5, 2.5, 8.5 Hz, 1H), 6.86 (s, 1H), 5.33 (t, *J* = 3.5 Hz, 1H), 4.40 (m, 1H), 4.11 (m, 1H), 3.90 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 3.56 (dt, *J* = 4.8, 11.9 Hz, 1H), 2.99 (bs, 1H), 2.45 (s, 3H), 2.12–2.25 (m, 2H), 1.93 (m, 1H), 1.75 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 160.0, 159.5, 159.4, 150.1, 146.2, 143.4, 138.7, 131.2, 130.2, 129.4, 128.4, 126.1, 123.7, 123.5, 122.2, 121.0, 116.1, 115.4,

113.3, 111.2, 106.6, 101.9, 64.4, 58.3, 56.3, 56.1, 55.6, 37.5, 33.0, 10.1; IR (film) ν_{max} 3398, 2999, 2935, 2833, 1701, 1670, 1602, 1527, 1500, 1483, 1400, 1358, 1275, 1242, 1207, 1180, 1078, 1053, 1022, 916 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^+] calcd for $C_{31}H_{31}NNaO_9$, calcd 584.1897; found, 584.1899.



21c

N-(7-((2S,4R)-4-hydroxytetrahydro-2H-pyran-2-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (21c): Compound **21c** (29 mg, 29%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.75 (s, 1H), 7.92 (dd, *J* = 2.4, 8.5 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 7.7 Hz, 1H), 7.12 (dt, *J* = 1.5, 7.8 Hz, 1H), 7.09 (t, *J* = 2.7 Hz, 1H), 7.07 (d, *J* = 8.6 Hz, 1H), 6.93 (ddd, *J* = 1.2, 2.6, 8.6 Hz, 1H), 6.85 (s, 1H), 5.64 (t, *J* = 2.9 Hz, 1H), 4.35 (m, 1H), 4.13 (dt, *J* = 2.7, 11.1 Hz, 1H), 3.90 (s, 3H), 3.89 (s, 3H), 3.86 (s, 3H), 3.82 (dt, *J* = 3.6, 11.1 Hz, 1H), 2.46 (m, 1H), 2.42 (s, 3H), 2.02 (m, 1H), 1.77 (td, *J* = 3.5, 10.3 Hz, 1H), 1.67 (m, 1H), 1.59 (d, *J* = 4.5 Hz, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 160.0, 159.5, 159.5, 150.1, 146.5, 143.5, 138.7, 131.2, 130.1, 129.3, 128.3, 126.1, 123.8, 123.2, 122.1, 120.5, 115.7, 115.4, 113.3, 111.1, 106.7, 101.4, 63.9, 60.7, 56.2, 56.0, 55.5, 39.7, 34.9, 9.8; IR (film) ν_{max} 3401, 2992, 2847, 1709, 1670, 1605, 1527, 1501, 1367, 1242, 1205, 1182, 1113, 1057, 997, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^+] calcd for $C_{31}H_{31}NNaO_9$, calcd 584.1897; found, 584.1903.

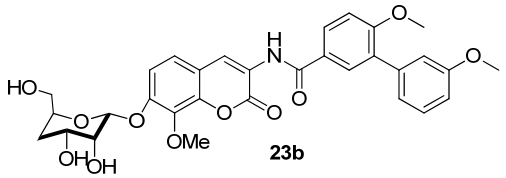


23a

N-(7-((2R,3R,4R,6S)-3,4-dihydroxy-6-(hydroxymethyl)tetrahydro-2H-pyran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (23a): Compound **22** (237 mg, 82%) was obtained as a colorless amorphous solid and used without further purification.

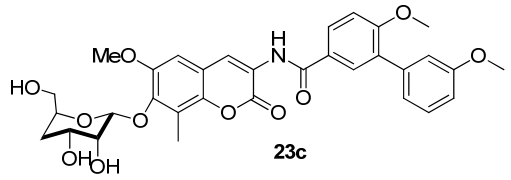
Pyridinium *p*-toluenesulfonate (16 mg, 0.16 mmol) was added to a solution of **22** (230 mg, 0.33 mmol) in methanol (4 mL) at rt. The reaction mixture was stirred at rt for 48 h, quenched with saturated sodium bicarbonate, then solvent was removed. The residue was diluted with water and extracted with ethyl acetate (3 x 5 mL), and then the combined organic layers were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4 and concentrated. The crude residue) was carried on to deprotection without further purification.

Palladium on carbon (10%, 30 mg) was added to the crude intermediate in ethanol (5 mL) and the solution was placed under an atmosphere of H_2. After 48 h, the solution was purified via column chromatography (SiO_2, 100:8, CH_2Cl_2:MeOH) to yield triol **23a** as a colorless amorphous solid (112 mg, 60%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.72 (s, 1H), 8.67 (s, 1H), 7.91 (d, *J* = 2.4 Hz, 1H), 7.89 (m, 1H), 7.35 (t, *J* = 7.6 Hz, 1H), 7.24 (d, *J* = 8.2 Hz, 1H), 7.07–7.14 (m, 3H), 7.04 (d, *J* = 8.8 Hz, 1H), 6.92 (ddd, *J* = 0.9, 2.7, 8.2 Hz, 1H), 5.57 (d, *J* = 3.6 Hz, 1H), 4.16 (m, 2H), 3.88 (s, 3H), 3.85 (s, 3H), 3.84 (m, 1H), 3.75 (m, 1H), 3.67 (d, *J* = 10.9 Hz, 1H), 3.55 (m, 1H), 3.26 (d, *J* = 8.7 Hz, 1H), 2.99 (d, *J* = 7.5 Hz, 1H), 2.32 (s, 3H), 1.90 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 160.0, 159.4, 159.3, 156.2, 149.0, 138.7, 131.1, 130.1, 129.3, 128.4, 126.0, 124.0, 122.4, 122.1, 115.5, 115.4, 115.1, 113.2, 112.4, 111.1, 99.3, 73.0, 68.0, 67.6, 65.0, 64.9, 56.0, 55.4, 33.7, 8.7; IR (film) ν_{max} 3398, 3352, 2923, 2871, 2852, 1708, 1629, 1605, 1577, 1527, 1500, 1483, 1431, 1369, 1245, 1207, 1124, 1076, 985 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{31}H_{31}NNaO_{10}$, calcd 600.1846; found, 600.1840.



23b

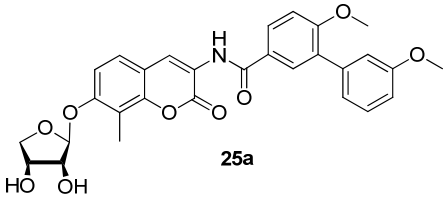
N-(7-((2R,3R,4R,6S)-3,4-dihydroxy-6-(hydroxymethyl)tetrahydro-2H-pyran-2-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (23b): Compound **23b** (26 mg, 57%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.72 (s, 1H), 8.65 (s, 1H), 7.83 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.81 (d, *J* = 2.4 Hz, 1H), 7.30 (t, *J* = 8.2 Hz, 1H), 7.16 (d, *J* = 8.9 Hz, 1H), 6.94–7.07 (d, *J* = 2.4, 8.9 Hz, 1H), 7.05 (dt, *J* = 1.7, 8.2 Hz, 1H), 7.02 (t, *J* = 2.6 Hz, 1H), 7.00 (d, *J* = 8.6 Hz, 1H), 6.86 (ddd, *J* = 0.9, 2.6, 8.3 Hz, 1H), 5.60 (d, *J* = 3.4 Hz, 1H), 4.16 (m, 1H), 4.09 (m, 1H), 3.98 (s, 3H), 3.82 (s, 3H), 3.79 (s, 3H), 3.72 (m, 1H), 3.60 (bs, 1H), 3.56 (t, *J* = 4.1 Hz, 1H), 3.50 (m, 1H), 3.27 (d, *J* = 9.5 Hz, 2H), 1.88 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.3, 158.4, 150.0, 143.7, 138.5, 137.5, 131.0, 130.0, 129.2, 128.3, 125.7, 123.5, 122.9, 122.8, 122.0, 116.4, 115.3, 114.0, 113.1, 111.0, 99.7, 68.0, 67.6, 65.1, 64.8, 61.8, 55.9, 55.4, 32.8; IR (film) ν_{max} 3402, 3390, 2937, 2837, 1714, 1670, 1605, 1527, 1502, 1483, 1461, 1367, 1274, 1246, 1207, 1180, 1081, 1051, 976 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{31}H_{31}NNaO_{11}$, calcd 616.1794; found, 616.1786.



23c

N-(7-((2R,3R,4R,6S)-3,4-dihydroxy-6-(hydroxymethyl)tetrahydro-2H-pyran-2-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (23c): Compound **23c** (33 mg, 63%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.70 (s, 1H), 8.69 (s, 1H), 7.84 (d, *J* = 2.4, 8.4 Hz, 2H), 7.82 (d, *J* = 2.4 Hz, 1H), 7.30 (t, *J* = 7.8 Hz, 1H), 7.05 (dt, *J* = 1.8, 8.2 Hz, 1H), 7.02 (t, *J* = 2.2 Hz, 1H), 6.96 (d, *J* = 7.8 Hz,

1H), 6.87 (dd, *J* = 2.7, 8.7 Hz, 1H), 6.79 (s, 1H), 5.25 (d, *J* = 4.1 Hz, 1H), 4.58 (m, 1H), 4.15 (m, 1H), 4.01 (d, *J* = 6.4 Hz, 1H), 3.87 (s, 3H), 3.82 (s, 3H), 3.79 (s, 3H), 3.70 (m, 2H), 3.56 (m, 1H), 3.08 (d, *J* = 6.3 Hz, 1H), 2.41 (s, 3H), 1.94 (m, 1H), 1.77 (m, 1H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.3, 159.0, 148.9, 146.2, 143.3, 138.5, 131.0, 130.0, 129.2, 128.3, 125.7, 123.7, 123.0, 122.0, 121.1, 116.3, 115.3, 113.1, 111.0, 106.3, 104.0, 68.7, 67.0, 65.6, 64.5, 56.1, 55.9, 55.4, 32.3, 10.0; IR (film) ν_{max} 3400, 3390, 2938, 2844, 1713, 1670, 1606, 1529, 1500, 1483, 1460, 1369, 1273, 1247, 1205, 1180, 1081, 1051, 976 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^+] calcd for $C_{32}H_{33}NNaO_{11}$, calcd 630.1951; found, 630.1953.

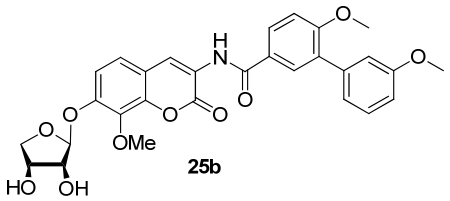


25a

N-(7-((2S)-3,4-dihydroxytetrahydrofuran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (25a): Compound **24a** (98 mg, 80%) was obtained as a colorless amorphous solid and used without further purification.

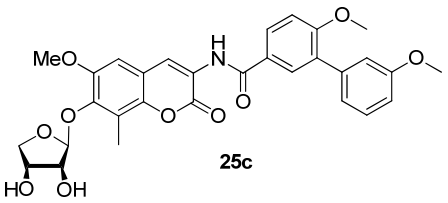
A solution of **24a** (90 mg, 0.16 mmol) in THF:H_2O:MeOH (3:1:1, 3 mL) was treated with LiOH (20 mg, 0.48 mmol), then stirred at rt for 2 h. The resulting reaction mixture was stirred at rt for 2 h, cooled to 0ºC, then acidified to pH ~4 with 5% aqueous HCl. The organic layer was separated and the aqueous layer was extracted with dichloromethane (3 x 20 mL). The combined organic layers were dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The crude residue was purified via column chromatography (SiO_2, 100:5, CH_2Cl_2:MeOH) to yield diol **25a** as a colorless amorphous solid (72 mg, 84%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.76 (s, 1H), 8.70 (s, 1H), 7.90 (dd, *J* = 2.4, 8.5 Hz, 1H), 7.88 (d, *J* = 2.3 Hz, 1H), 7.36 (t, *J* = 7.9 Hz, 1H), 7.30 (d, *J* = 8.6 Hz, 1H), 7.12 (dt, *J* = 1.2, 7.8 Hz, 1H), 7.09 (t, *J* = 2.4 Hz, 1H) 7.08 (d, *J* =

8.8 Hz, 1H), 7.06 (d, *J* = 8.8 Hz, 1H), 6.93 (dd, *J* = 2.4, 8.3 Hz, 1H), 5.68 (s, 1H), 4.59 (m, 1H), 4.46 (d, *J* = 4.7 Hz, 1H), 4.23 (dd, *J* = 5.0, 10.0 Hz, 1H), 4.00 (dd, *J* = 3.2, 10.0 Hz, 1H) 3.89 (s, 3H), 3.86 (s, 3H), 3.33 (bs, 1H), 2.88 (bs, 1H), 2.28 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.8, 159.4, 159.3, 156.0, 149.0, 138.6, 131.0, 129.9, 129.2, 128.2, 125.9, 125.7, 124.3, 122.0, 121.9, 115.3, 115.0, 114.3, 113.1, 111.9, 111.0, 106.5, 76.5, 73.2, 70.7, 55.9, 55.3, 8.4; IR (film) ν_{max} 3409, 3401, 2938, 2838, 1712, 1670, 1605, 1526, 1483, 1367, 1274, 1246, 1205, 1181, 1054, 1020, 972 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{29}H_{27}NNaO_9$, calcd 556.1584; found, 556.1692.



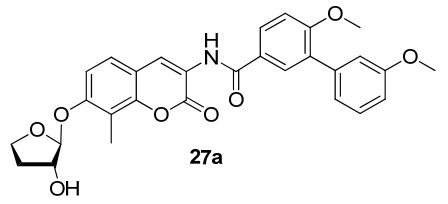
25b

N-(7-((2S)-3,4-dihydroxytetrahydrofuran-2-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (25b): Compound **25b** (39 mg, 68%) was obtained as a colorless amorphous solid.^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.73 (s, 1H), 7.92 (d, *J* = 8.8 Hz, 1H), 7.90 (s, 1H), 7.38 (t, *J* = 8.4 Hz, 1H), 7.28 (d, *J* = 9.2 Hz, 1H), 7.24 (s, 1H), 7.15 (t, *J* = 10.4 Hz, 1H), 7.11 (s, 1H), 7.08 (d, *J* = 8.2 Hz, 1H), 6.96 (d, *J* = 8.5 Hz, 1H), 5.67 (d, *J* = 4.1 Hz, 1H), 4.30 (m, 3H), 4.13 (d, *J* = 10.1 Hz, 1H), 4.07 (s, 3H), 3.91 (s, 3H), 3.88 (s, 3H), 3.52 (bs, 1H), 3.14 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.4, 158.5, 150.0, 143.7, 138.6, 138.0, 131.1, 130.0, 129.2, 128.2, 125.8, 123.5, 122.9, 122.7, 122.0, 116.5, 115.4, 115.3, 113.2, 111.1, 101.6, 74.7, 73.2, 69.4, 62.1, 55.9, 55.3; IR (film) ν_{max} 3479, 3406, 2938, 2837, 1713, 1670, 1605, 1525, 1481, 1367, 1274, 1244, 1207, 1180, 1053, 1020, 972 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{29}H_{27}NNaO_{10}$, calcd 572.1533; found, 572.1523.



25c

N-(7-((2S)-3,4-dihydroxytetrahydrofuran-2-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (25c): Compound **25c** (44 mg, 81%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.99 (s, 1H), 8.71 (s, 1H), 8.00 (dt, *J* = 2.3, 8.6 Hz, 1H), 7.94 (t, *J* = 2.3 Hz, 1H), 7.36 (t, *J* = 7.4 Hz, 1H), 7.27 (d, *J* = 8.8 Hz, 1H), 7.20 (s, 1H) , 7.14 (s, 1H), 7.14 (dt, *J* = 2.4, 10.4 Hz, 1H), 6.95 (dd, *J* = 2.4, 8.3 Hz, 1H), 5.66 (s, 1H), 4.65 (m, 1H), 4.33 (d, *J* = 4.5 Hz, 1H), 4.24 (m, 2H), 3.94 (s, 3H), 3.92 (s, 3H), 3.84 (s, 3H), 3.78 (dd, *J* = 5.2, 8.9 Hz, 1H), 2.29 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.9, 160.4, 159.3, 150.8, 145.8, 144.0, 139.9, 131.4, 130.8, 129.9, 129.3, 127.0, 124.4, 124.2, 124.1, 122.7, 121.3, 116.6, 116.2, 113.5, 112.3, 110.2, 107.9, 76.6, 73.7, 71.1, 56.5, 56.3, 55.5, 9.5; IR (film) ν_{max} 3400, 3375, 2937, 2840, 1707, 1670, 1602, 1577, 1526, 1500, 1483, 1458, 1382, 1242, 1207, 1180, 1095, 1081, 1022, 960 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{30}H_{29}NNaO_{10}$, calcd 586.1689; found, 586.1697.

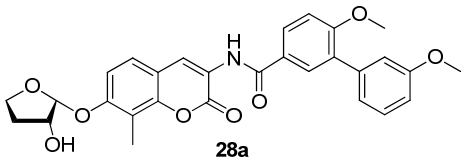


27a

N-(7-((2R)-3-hydroxytetrahydrofuran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (27a): Compound **26a** (144 mg, 88%) was obtained as a colorless amorphous solid and used without further purification.

TBAF (1.0 M in THF, 0.4 mL, 0.4 mmol) was added dropwise to a solution of **27a** (130 mg, 0.2 mmol) in THF (3 mL) at rt. The resulting mixture was stirred at rt for 1 h, quenched with

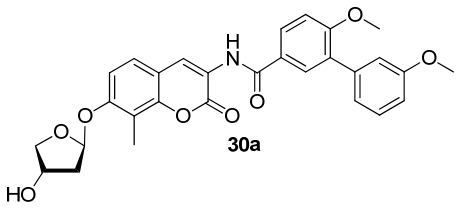
water and extracted with ethyl acetate (3 x 10 mL). The combined organic extracts were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The crude residue was purified via column chromatography (SiO_2, 100:1, CH_2Cl_2:MeOH) to yield **27a** and **28a** (97 mg, 74%) as a mixture of diastereomers in a 7:6 ratio, respectively. Compound **27a** (52 mg, 40%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, CDCl3) δ 8.80 (s, 1H), 8.72 (s, 1H), 7.93 (dd, *J* = 2.4, 8.5 Hz, 1H), 7.91 (d, *J* = 2.3 Hz, 1H), 7.39 (t, *J* = 7.9 Hz, 1H), 7.33 (d, *J* = 8.6 Hz, 1H), 7.13 (dt, *J* = 3.4, 4.0 Hz, 3H), 7.09 (d, *J* = 8.6 Hz, 1H), 6.95 (dd, *J* = 2.2, 7.9 Hz, 1H), 5.69 (s, 1H), 4.61 (t, *J* = 4.7 Hz, 1H), 4.25 (dd, *J* = 8.0, 16.0 Hz, 1H), 4.14 (td, *J* = 4.1, 8.9 Hz, 1H), 3.92 (s, 3H), 3.88 (s, 3H), 2.46 (dt, *J* = 6.8, 13.6 Hz, 1H), 2.29 (s, 3H), 2.24 (d, *J* = 5.3 Hz, 1H), 2.05 (m, 1H); ^{13}C NMR (125 MHz, CDCl3) δ 165.7, 159.9, 159.6, 159.5, 156.1, 149.2, 138.7, 131.2, 129.3, 128.3, 126.2, 125.8, 125.2, 124.4, 122.1, 122.1, 115.4, 115.2, 114.3, 113.3, 112.1, 111.2, 106.6, 76.1, 67.8, 56.0, 55.5, 32.5, 8.5; IR (film) ν_{max} 3404, 2951, 2939, 2902, 1712, 1670, 1649, 1629, 1605, 1527, 1502, 1481, 1369, 1265, 1207, 1105, 1065, 1033, 993, 962 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{29}H_{27}NNaO_8$, calcd 540.1634; found, 540.1622.



28a

N-(7-((2S)-3-hydroxytetrahydrofuran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (28a): Compound **28a** (45 mg, 34%) was obtained as a colorless amorphous solid.^{1}H NMR (500 MHz, $CDCl_3$) δ 8.77 (s, 1H), 8.70 (bs, 1H), 7.91 (dd, *J* = 2.4, 8.5 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.36 (t, *J* = 7.9 Hz, 1H), 7.30 (d, *J* = 8.7 Hz, 1H), 7.08–7.14 (m, 3H), 7.06 (d, *J* = 8.7 Hz, 1H), 6.93 (ddd, *J* = 0.9, 2.6, 8.4 Hz, 1H), 5.66 (s, 1H), 4.58 (t, *J* = 5.1 Hz, 1H), 4.24 (q, *J* = 8.2 Hz, 1H), 4.11 (dt, *J* = 4.3, 9.1 Hz, 1H), 3.89 (s, 3H),

3.86 (s, 3H), 2.43 (m, 1H), 2.28 (d, *J* = 4.1 Hz, *1H*), 2.26 (s, 3H), 2.02 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.6, 159.4, 156.0, 149.2, 138.7, 131.1, 130.0, 129.3, 128.3, 126.1, 125.8, 124.4, 122.1, 122.0, 115.4, 115.1, 114.3, 113.3, 112.1, 111.1, 106.5, 76.1, 67.8, 56.0, 55.5, 32.4, 8.5; IR (film) ν_{max} 3400, 2948, 2942, 2889, 1711, 1668, 1649, 1605, 1527, 1505, 1484, 1370, 1267, 1204, 1106, 1067, 1034, 993, 963 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{29}H_{27}NNaO_8$, calcd 540.1634; found, 540.1627.

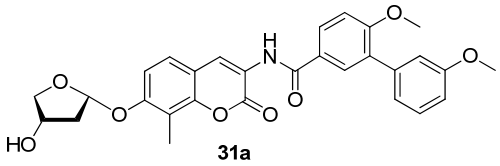


30a

N-(7-((2R)-4-hydroxytetrahydrofuran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (30a): Compound **29a** (160 mg, 82%) was obtained as a colorless amorphous solid and used without further purification.

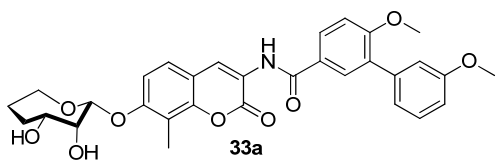
TBAF (1.0M in THF, 0.5 mL, 0.5 mmol) was added dropwise to solution of **29a** (157 mg, 0.25 mmol) in THF (4 mL) at rt. The reaction mixture was stirred at rt for 1 h, quenched with water and extracted with ethyl acetate (3 x 10 mL). The combined organic extracts were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4, filtered and concentrated. The crude residue was purified via column chromatography (SiO_2, 100:1, CH_2Cl_2:MeOH) to yield **30a** and **31a** (96 mg, 75%) as a mixture of diastereomers in a 4:3 ratio, respectively. Compound **30a** (55 mg, 43%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.71 (bs, 1H), 7.91 (dd, *J* = 2.4, 8.6 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.36 (t, *J* = 7.9 Hz, 1H), 7.35 (d, *J* = 8.6 Hz, 1H), 7.19 (d, *J* = 8.8 Hz, 1H), 7.12 (dt, *J* = 1.78, 8.0 Hz, 1H), 7.09 (t, *J* = 2.6 Hz, 1H), 7.1 (d, *J* = 8.8 Hz, 1H), 6.93 (ddd, *J* = 0.8, 2.6, 8.3 Hz, 1H), 6.03 (dd, *J* = 2.7, 5.6 Hz, 1H), 4.73 (m, 1H), 4.11 (dd, *J* = 4.3, 9.9 Hz, 1H), 3.95 (dt, *J* = 1.4, 9.9 Hz, 1H),

3.90 (s, 3H), 3.86 (s, 3H), 2.54 (ddd, *J* = 3.0, 6.3, 14.6 Hz, 1H), 2.41 (m, 1H), 2.30 (s, 3H), 2.29 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.4, 156.7, 149.2, 138.7, 131.1, 130.1, 129.3, 128.3, 126.2, 125.8, 125.2, 124.4, 122.1, 122.1, 115.4, 115.2, 114.4, 113.3, 112.4, 111.1, 102.9, 75.1, 71.6, 56.0, 55.5, 43.1, 8.5; IR (film) ν_{max} 3404, 2923, 2845, 1711, 1670, 1606, 1526, 1502, 1369, 1242, 1205, 1178, 1115, 1057, 995, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{29}H_{27}NNaO_8$, calcd 540.1634; found, 540.1629.



31a

N-(7-((2S)-4-hydroxytetrahydrofuran-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (31a): Compound **31a** (41 mg, 32%) was obtained as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.72 (bs, 1H), 7.91 (dd, *J* = 2.5, 8.6 Hz, 1H), 7.89 (d, *J* = 2.3 Hz, 1H), 7.36 (t, *J* = 7.9 Hz, 1H), 7.35 (d, *J* = 8.6 Hz, 1H), 7.16 (d, *J* = 8.6 Hz, 1H), 7.12 (dt, *J* = 1.5, 7.7 Hz, 1H), 7.09 (t, *J* = 2.6 Hz, 1H), 7.07 (d, *J* = 8.6 Hz, 1H), 6.93 (ddd, *J* = 0.8, 2.6, 8.4 Hz, 1H), 5.59 (d, *J* = 4.3 Hz, 1H), 4.47 (m, 1H), 4.18 (dt, *J* = 4.1, 8.9 Hz, 1H), 3.98 (q, *J* = 8.3 Hz, 1H), 3.89 (s, 3H), 3.86 (s, 3H), 2.45 (d, *J* = 9.8 Hz, 1H), 2.39 (m, 1H), 2.36 (s, 3H), 2.09 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.7, 159.9, 159.4, 153.9, 149.1, 138.7, 131.1, 130.1, 129.3, 128.3, 126.1, 125.9, 125.1, 124.1, 122.4, 122.1, 115.6, 115.4, 114.9, 113.2, 113.2, 111.1, 100.6, 73.0, 66.6, 56.0, 55.4, 31.7, 8.7; IR (film) ν_{max} 3400, 2925, 2845, 1707, 1670, 1605, 1527, 1500, 1367, 1242, 1205, 1180, 1113, 1077, 1034, 987, 974 cm^{-1}; HRMS (FAB) *m/z*: [M + Na$^+$] calcd for $C_{29}H_{27}NNaO_8$, calcd 540.1634; found, 540.1632.

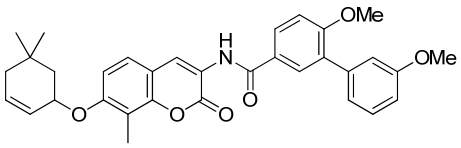


33a

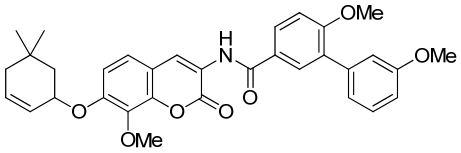
N-(7-((2R,3R,4R)-3,4-dihydroxyoxepan-2-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (33a): Compound **32a** (180 mg, 78%) was obtained as a colorless amorphous solid and used without further purification.

A solution of **32a** (172 mg, 0.29 mmol) in THF:H_2O:MeOH (3:1:1, 5 mL) was treated with LiOH (37 mg, 0.88 mmol) at rt. The reaction mixture stirred at rt for 2 h, cooled to 0ºC, then acidified to pH ~4 with 5% aqueous HCl. The organic layer was separated and the aqueous layer was extracted with dichloromethane (3 x 20 mL). The combined organic layers were washed with saturated sodium chloride solution, dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The crude residue was purified via column chromatography (SiO_2, 100:5, CH_2Cl_2:MeOH) to yield diol **33a** (118 mg, 68%) as a colorless amorphous solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.74 (s, 1H), 8.65 (s, 1H), 7.85 (dd, *J* = 2.5, 8.6 Hz, 1H), 7.82 (d, *J* = 2.6 Hz, 1H), 7.30 (t, *J* = 8.2 Hz, 1H), 7.29 (d, *J* = 9.0 Hz, 1H), 7.05 (dt, *J* = 1.2, 9.1 Hz, 1H), 7.03 (t, *J* = 2.4 Hz, 1H), 7.02 (d, *J* = 8.1 Hz, 1H), 6.99 (d, *J* = 8.8 Hz, 1H), 6.86 (ddd, *J* = 0.9, 2.7, 8.3 Hz, 1H), 5.39 (d, *J* = 2.7 Hz, 1H), 4.22 (m, 1H), 3.95 (dd, *J* = 3.1, 8.8 Hz, 2H), 3.83 (s, 3H), 3.79 (s, 3H), 3.58 (dd, *J* = 3.1, 10.5 Hz, 1H), 2.88 (d, *J* = 5.3 Hz, 1H), 2.32 (s, 3H), 2.20 (d, *J* = 6.5 Hz, 1H), 2.10 (m, 1H), 1.87 (m, 1H), 1.76 (m, 1H), 1.65 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.8, 159.3, 155.8, 149.0, 138.6, 131.1, 130.0, 129.2, 128.2, 126.0, 125.8, 123.9, 122.4, 122.0, 116.2, 115.6, 115.3, 114.9, 113.1, 112.7, 111.0, 98.8, 75.8, 71.5, 65.3, 55.9, 55.3, 29.9, 25.7, 8.7; IR (film) ν_{max} 3402, 3350, 2931, 2877, 2834, 1697, 1670, 1606, 1531, 1504, 1369, 1238, 1207, 1182, 1097, 1076, 995, 970 cm^{-1}; HRMS (FAB) *m/z*: [M + Na^+] calcd for $C_{31}H_{31}NO_9Na$, calcd 584.1897; found, 584.1884.

Representative procedure for Mitsunobu coupling with sugar mimics:

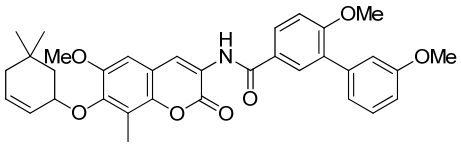


N-(7-(5,5-dimethylcyclohex-2-enyloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (40a). Diisopropylazodicarboxylate (231 mg, 1.14 mmol) was added to a solution of allylic alcohol **37** (72 mg, 0.57 mmol), phenol **6a** (247 mg, 0.57 mmol) and triphenylphosphine (299 mg, 1.14 mmol) in anhydrous THF (10 mL). After 2 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 100:1, CH_2Cl_2:acetone) to afford compound **40a** as a colorless amorphous solid (143 mg, 47 %). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.95–7.92 (m, 2H), 7.40–7.28 (m, 2H), 7.16–7.07 (m, 3H), 6.96–6.93 (m, 2H), 5.92–5.85 (m, 2H), 4.95 (m, 1H), 3.91 (s, 3H), 3.88 (s, 3H), 2.32 (s, 3H), 2.07–1.67 (m, 4H), 1.09 (s, 3H), 1.03 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.9, 159.7, 159.5, 157.9, 149.6, 138.8, 131.1, 130.5, 130.1, 129.3, 128.3, 126.3, 125.7, 125.0, 124.6, 122.2, 121.6, 115.4, 115.2, 113.32, 113.28, 111.1, 110.4, 73.0, 56.0, 55.5, 41.6, 39.2, 30.7, 30.5, 27.2, 8.5. IR (film) ν_{max} 3405, 3031, 2950, 2927, 2868, 1710, 1672, 1605, 1524, 1500, 1367, 1267, 1242, 1205, 1180, 1101, 1022 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{33}H_{34}NO_6$, 540.2386; found 540.2382.

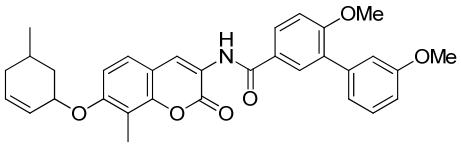


N-(7-(5,5-dimethylcyclohex-2-enyloxy)-8-methoxy-2-oxochromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (40b). Compound **40b** was obtianed as a white amorphorous solid (32 mg, 71%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.73 (s, 1H), 8.64 (s, 1H), 7.85–7.81 (m, 2H), 7.29 (t, *J* = 8.1 Hz, 1H), 7.14 (d, *J* = 8.7 Hz, 1H), 7.06–6.99 (m, 3H), 6.91 (d, *J* =

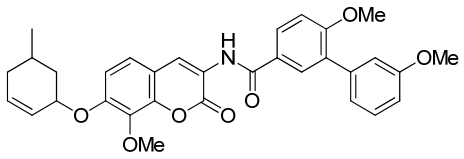
8.7 Hz, 1H), 6.87–6.85 (m, 1H), 5.83–5.75 (m, 2H), 4.89 (m, 1H), 3.91 (s, 3H), 3.83 (s, 3H), 3.79 (s, 3H), 1.96–1.61 (m, 4H), 0.99 (s, 3H), 0.93 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 159.0, 152.6, 144.3, 138.6, 137.4, 131.0, 130.4, 130.0, 129.2, 128.2, 126.0, 124.8, 124.0, 122.4, 122.1, 122.0, 115.2, 114.5, 113.2, 1112.8, 111.0, 74.0, 61.5, 55.9, 55.3, 41.4, 39.0, 30.9, 30.6, 26.7. IR (film) ν_{max} 3402, 3085, 3025, 2920, 2847, 1714, 1670, 1603, 1522, 1500, 1367, 1278, 1246, 1148, 1099, 1082, 1022 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{33}H_{33}NO_7Na$, 578.2155; found 578.2150.



N-(7-(5,5-dimethylcyclohex-2-enyloxy)-6-methoxy-8-methyl-2-oxochromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (40c). Compound **40c** was obtianed as a white amorphorous solid (73 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.75 (s, 1H), 7.95–7.90 (m, 2H), 7.36 (t, *J* = 8.2 Hz, 1H), 7.14–7.05 (m, 3H), 6.93 (d, *J* = 8.1 Hz 1H), 6.84 (s, 1H), 5.82–5.78 (m, 2H), 4.76 (m, 1H), 3.89 (s, 3H), 3.88 (s, 3H), 3.86 (s, 3H), 2.38 (s, 3H), 2.09–1.67 (m, 4H), 1.04 (s, 3H), 0.91 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.4, 159.3, 150.4, 147.8, 143.5, 138.6, 131.0, 130.0, 129.2, 129.0, 128.2, 126.6, 126.1, 123.8, 122.8, 122.0, 120.8, 115.3, 115.1, 113.1, 111.0, 106.5, 78.1, 56.0, 55.9, 55.3, 42.4, 39.1, 31.3, 30.9, 26.2, 9.9. IR (film) ν_{max} 3406, 3084, 3028, 2999, 2943, 2899, 2864, 1697, 1672, 1605, 1580, 1535, 1501, 1371, 1279, 1234, 1207, 1180, 1099, 1016 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{34}H_{35}NO_7Na$, 592.2311; found 592.2324.

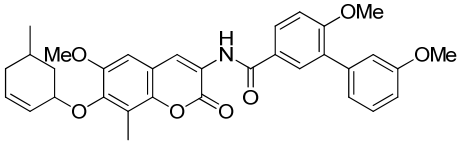


3',6-dimethoxy-N-(8-methyl-7-(5-methylcyclohex-2-enyloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (41a). Compound **41a** was obtianed as a white amorphorous solid (180 mg, 55%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.94–7.92 (m, 2H), 7.40–7.33 (m, 2H), 7.16–7.07 (m, 3H), 6.97–6.95 (m, 2H), 6.08–5.92 (m, 2H), 4.86 (m, 1H), 3.91 (s, 3H), 3.88 (s, 3H), 2.35 (s, 3H), 2.33–2.28 (m, 1H), 2.09–1.60 (m, 4H), 1.07 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.9, 159.7, 159.5, 157.8, 149.6, 138.8, 133.7, 131.1, 130.1, 129.3, 128.3, 126.3, 125.7, 124.6, 124.4, 122.1, 121.6, 115.4 (2C), 113.4, 113.3, 111.1, 110.8, 71.4, 56.0, 55.5, 36.6, 33.9, 24.1, 21.7, 8.6. IR (film) ν_{max} 3402, 3032, 2980, 2906, 2826, 1713, 1676, 1607, 1554, 1375, 1251, 1093 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{32}H_{32}NO_6$, 516.2230; found 526.2229.

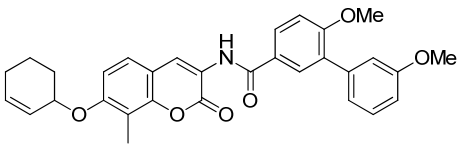


3',6-dimethoxy-N-(8-methoxy-7-(5-methylcyclohex-2-enyloxy)-2-oxochromen-3-yl)biphenyl-3-carboxamide (41b). Compound **41b** was obtianed as a white amorphorous solid (38 mg, 81%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.73 (s, 1H), 8.64 (s, 1H), 7.85–7.81 (m, 2H), 7.29 (t, J = 8.3 Hz, 1H), 7.13 (d, J = 8.2 Hz, 1H), 7.06–7.02 (m, 3H), 6.91 (d, J = 8.2 Hz, 1H), 6.87–6.85 (m, 1H), 6.01–5.99 (m 1H), 5.87–5.83 (m, 1H), 4.80 (m, 1H), 3.91 (s, 3H), 3.83 (s, 3H), 3.79 (s, 3H), 2.19–2.15 (m, 1H), 2.10–1.98 (m, 2H), 1.64–1.57 (m, 1H), 1.44–1.38 (m, 1H). 0.95 (d, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 159.0, 152.6, 144.2, 138.6, 137.6, 133.8, 131.0, 130.0, 129.2, 128.2, 126.0, 124.1, 124.0, 122.4, 122.05, 122.00, 115.2, 114.5, 113.2, 113.1, 111.0, 72.2, 61.5, 55.9, 55.3, 36.3, 33.8, 23.9, 12.5. IR (film) ν_{max} 3398, 3085, 3028, 2947, 2908, 2833, 1713, 1672, 1605, 1574, 1522, 1502, 1462, 1367, 1275, 11246, 1207,

1180, 1024 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{32}H_{31}NO_7Na$, 564.1999; found 564.1983.

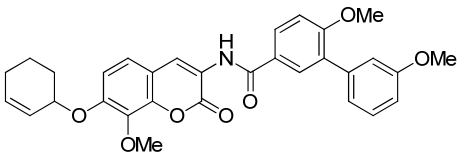


3',6-dimethoxy-N-(6-methoxy-8-methyl-7-(5-methylcyclohex-2-enyloxy)-2-oxochromen-3-yl)biphenyl-3-carboxamide (41c). Compound **41c** was obtianed as a white amorphorous solid (64 mg, 96%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.73 (s, 1H), 8.68 (s, 1H), 7.86–7.83 (m, 2H), 7.30 (t, *J* = 8.3 Hz, 1H), 7.07–6.99 (m, 3H), 6.87–6.85 (m, 1H), 6.78 (s, 1H), 5.95–5.91 (m, 1H), 5.80–5.74 (m, 1H), 4.67 (bs, 1H), 3.83 (s, 6H), 3.79 (s, 3H), 2.30 (s, 3H), 2.22–2.15 (m, 2H), 1.97–1.65 (m, 1H), 1.65–1.54 (m, 1H), 1.36–1.25 (m, 1H), 0.95 (d, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.8, 159.5, 159.3, 150.5, 147.6, 143.5, 138.6, 133.0, 131.0, 130.0, 129.2, 128.2, 126.1, 125.5, 123.9, 122.8, 122.0, 120.9, 115.2, 115.0, 113.1, 111.0, 106.5, 75.5, 56.0, 55.9, 55.3, 37.1, 34.0, 23.9, 21.7, 9.7. IR (film) ν_{max} 3408, 3084, 3028, 2943, 2899, 2867, 1697, 1672, 1605, 1580, 1531, 1501, 1371, 1234, 1207, 1178, 1099, 1016 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{33}H_{34}NO_7$, 556.2335; found 556.2325.

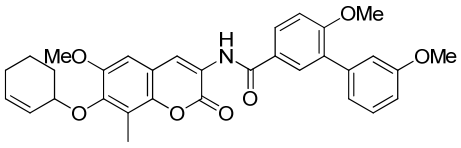


N-(7-(cyclohex-2-enyloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (42a). Compound **42a** was obtained as a colorless amorphous solid (103 mg, 56%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.95–7.92 (m, 2H), 7.40–7.28 (m, 2H), 7.16–7.07 (m, 3H), 6.97–6.93 (m, 2H), 6.03–5.90 (m, 2H), 4.88 (m, 1H), 3.91 (s, 3H), 3.88 (s, 3H), 2.33 (s, 3H), 2.30–2.24 (m, 2H), 2.06–1.90 (m, 3H), 1.81–1.72 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.9, 159.7, 159.5, 157.8, 149.6, 138.8, 132.8, 131.1, 130.1, 129.3,

128.3, 126.3, 126.0, 125.7, 124.6, 122.2, 121.6, 115.4, 115.3, 113.4, 113.3, 111.1, 110.8, 72.1, 56.0, 55.5, 28.7, 25.3, 19.1, 8.6. IR (film) ν_{max} 3404, 3041, 2934, 2835, 1709, 1670, 1605, 1526, 1502, 1369, 1267, 1244, 1205, 1180, 1101, 1022 cm^{-1}. HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{31}H_{30}NO_6$, 512.2073; found 512.2077.



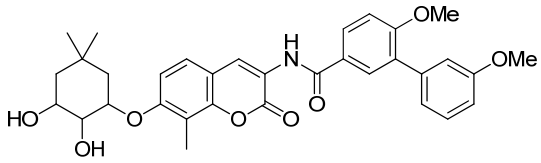
N-(7-(cyclohex-2-enyloxy)-8-methoxy-2-oxochromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (42b). Compound **42b** was obtianed as a white amorphorous solid (44 mg, 88%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.74 (s, 1H), 7.94–7.92 (m, 2H), 7.39 (t, *J* = 8.2 Hz, 1H), 7.22 (d, *J* = 8.3 Hz, 1H), 7.15–7.08 (m, 3H), 7.00–6.95 (m, 2H), 6.03–5.90 (m, 2H), 4.91 (m, 1H), 4.01 (s, 3H), 3.92 (s, 3H), 3.88 (s, 3H), 2.19–2.16 (m, 1H), 2.09–1.91 (m, 3H), 1.71–1.66 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.8, 159.3, 159.0, 152.5, 144.2, 138.6, 137.5, 132.9, 131.1, 130.0, 129.2, 128.2, 126.0, 125.6, 124.0, 122.4, 122.1, 122.0, 115.3, 114.6, 113.2 (2C), 111.0, 72.9, 61.5, 55.9, 55.3, 28.5, 25.1, 18.9. IR (film) ν_{max} 3398, 3083, 3025, 2949, 2918, 2906, 2870, 1713, 1672, 1603, 1574, 1522, 1502, 1462, 1366, 1277, 1248, 1207, 1145, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{31}H_{29}NO_7Na$ 550.1842; found 550.1844.



N-(7-(cyclohex-2-enyloxy)-6-methoxy-8-methyl-2-oxochromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (42c). Compound **42c** was obtianed as a white amorphorous solid (59 mg, 80%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.77 (s, 1H), 7.94–7.92 (m, 2H), 7.38 (t, J=7.9, 1H), 7.15–7.06 (m, 3H), 6.95 (d, J=8.1, 1H), 6.85 (s, 1H), 5.97–5.88

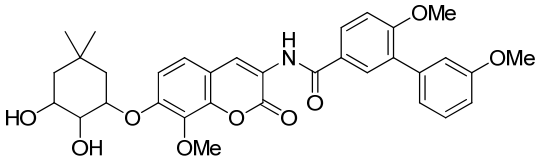
(m, 2H), 4.77 (bs, 1H), 3.91 (s, 6H), 3.87 (s, 3H), 2.40 (s, 3H), 2.19–2.15 (m, 1H), 2.04–1.81 (m, 4H), 1.66– 1.63(m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.4, 159.3, 150.5, 147.5, 143.5, 138.6, 131.9, 131.0, 130.0, 129.2, 128.2, 127.1, 126.1, 123.9, 122.8, 122.0, 120.9, 115.3, 115.0, 113.1, 111.0, 106.5, 76.1, 56.0, 55.9, 55.3, 29.2, 25.2, 19.0, 9.8. IR (film) ν_{max} 3403, 3086, 3021, 2935, 2867, 1709, 1670, 1603, 1580, 1524, 1501, 1383, 1242, 1207, 1180, 1094, 1051, 1022 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{32}H_{31}NO_7Na$, 564.1999; found 564.1990.

Representative procedure for olefin dihydroxylation:

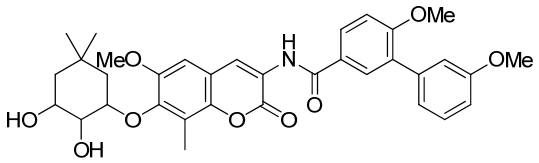


N-(7-((1R,2R,3R)-2,3-dihydroxy-5-methylcyclohexyloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (43a). A solution of **40a** (40 mg, 0.074 mmol) in acetone (3 mL) was treated with *N*-Methylmorpholine-*N*-oxide (17.6 mg, 0.15 mmol), followed by an aqueous solution of OsO_4 (4%, 47 μL). After 12 h, the solvent was removed and the residue was purified via column chromatography (SiO_2, 20:1, CH_2Cl_2:acetone) to afford compound **43a** as a white amorphorous solid (34 mg, 80%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.72 (s, 1H), 7.95–7.92 (m, 2H), 7.41–7.33 (m, 2H), 7.16–7.08 (m, 3H), 6.97–6.94 (m, 2H), 4.80–4.70 (m, 1H), 4.26 (m, 1H), 3.92 (s, 3H), 3.88 (s, 3H), 3.78–3.75 (m, 1H), 2.90 (bs, 1H), 2.50 (bs, 1H), 2.48 (s, 3H), 1.90–1.84 (m, 2H), 1.51–1.39 (m, 2H), 1.23 (s, 3H), 1.02 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.7, 160.0, 159.6, 159.5, 157.4, 149.5, 138.8, 131.2, 130.2, 129.4, 128.4, 126.2, 125.9, 124.5, 122.2, 121.8, 115.4, 115.2, 113.7, 113.3, 111.2, 110.5, 76.6, 74.2, 69.6, 56.1, 55.5, 41.8, 41.2, 32.2, 31.1, 29.3, 8.6. IR (film) ν_{max} 3485, 3402, 2928,

2891, 1710, 1664, 1605, 1531, 1495, 1404, 1371, 1353, 1258, 1095, 1045 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{33}H_{35}NO_8Na$, 596.2260; found 596.2263.

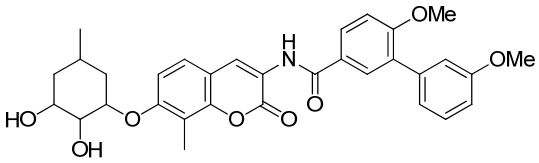


N-(7-(2,3-dihydroxy-5,5-dimethylcyclohexyloxy)-8-methoxy-2-oxochromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (43b). Compound **43b** was obtianed as a white amorphorous solid (28 mg, 82%). ^1H NMR (500 MHz, $CDCl_3$) δ 8.74 (s, 1H), 8.65 (s, 1H), 7.85 (dd, *J* = 8.6, 2.4, 1H), 7.82 (d, *J* =2.4 Hz, 1H), 7.30 (t, *J* = 7.9 Hz, 1H), 7.16 (d, *J* = 8.8 Hz, 1H), 7.06–7.04 (m, 1H), 7.02–7.01 (m, 2H), 6.90 (d, *J* = 8.8 Hz, 1H), 6.88–6.85 (m, 1H), 4.51–4.47 (m, 1H), 4.18–4.17 (m, 1H), 3.96 (s, 3H), 3.83 (s, 3H), 3.79 (s, 3H), 3.77–3.74 (m, 1H), 3.24 (bs, 1H), 2.37 (bs, 1H), 1.89–1.85 (m, 1H), 1.76–1.72 (m, 1H), 1.45–1.37 (m, 2H), 1.14 (s, 3H), 0.94 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.3, 158.7, 152.7, 144.1, 138.6, 137.8, 131.1, 130.0, 129.2, 128.2, 125.9, 123.7, 122.8, 122.5, 122.0, 115.5, 115.3, 114.4, 113.1, 111.0, 79.5, 74.8, 69.8, 61.9, 55.9, 55.3, 42.3, 41.6, 32.7, 32.3, 28.6. IR (film) ν_{max} 3480, 3407, 2930, 2870, 1713, 1670, 1605, 1524, 1502, 1461, 1367, 1277, 1244, 1207, 1180, 1049, 1035 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{33}H_{35}NO_9Na$, 612.2210; found 612.2203.

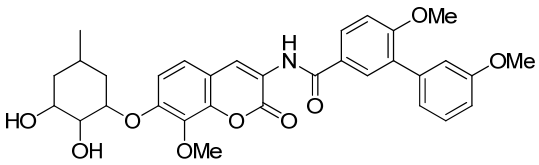


N-(7-(2,3-dihydroxy-5,5-dimethylcyclohexyloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (43c). Compound **43c** was obtianed as a white amorphorous solid (52 mg, 83%). ^1H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.77 (s, 1H), 7.94–7.90 (m, 2H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.14–7.04 (m, 3H), 6.96–6.93 (m 1H), 6.89 (s, 1H), 4.40–

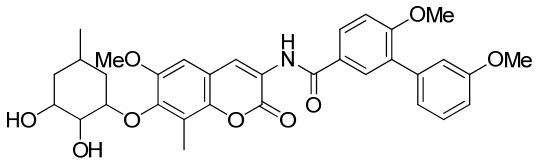
4.39 (m, 1H), 4.20 (m, 1H), 4.09 (s, 1H), 3.95 (s, 3H), 3.91 (s, 3H), 3.87 (s, 3H), 3.80–3.77 (m, 1H), 2.67 (s, 1H), 2.41 (s, 3H), 1.82–1.73 (m, 2H), 1.53–1.40 (m, 2H), 1.07 (S, 3H), 0.97 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.32, 159.26, 149.4, 146.9, 143.6, 138.6, 131.1, 130.0, 129.2, 128.2, 125.9, 123.5, 123.2, 122.0, 121.0, 115.5, 115.3, 113.1, 111.0, 106.5, 81.8, 75.8, 70.0, 56.1, 55.9, 55.3, 43.7, 41.3, 33.5, 32.3, 28.0, 10.0. IR (film) ν_{max} 3497, 3404, 2955, 2930, 2860, 1716, 1670, 1602, 1580, 1524, 1501, 1464, 1382, 1277, 1245, 1207, 1137, 1074 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{34}H_{37}NO_9Na$, 626.2366; found 626.2369.



N-(7-((1R,2R,3R)-2,3-dihydroxy-5-methylcyclohexyloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (44a). Compound **44a** was obtianed as a white amorphorous solid (21 mg, 79%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.70 (s, 1H), 7.93–7.89 (m, 2H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.32 (d, *J* = 8.0, 1H), 7.14–7.06 (m, 3H), 6.95–6.93 (m, 2H), 4.77–4.76 (m, 1H), 4.10–4.05 (m, 2H), 3.90 (s, 3H), 3.86 (s, 3H), 2.69 (bs, 1H), 2.29 (s, 3H), 2.11 (bs, 1H), 1.93–1.86 (m, 1H), 1.85–1.71 (m, 2H), 1.56–1.51 (m, 1H), 1.45–1.38 (m, 1H), 0.96 (d, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.7, 160.0, 159.7, 159.5, 156.8, 149.6, 138.8, 131.2, 130.2, 129.4, 128.4, 126.2, 125.9, 124.5, 122.2, 121.8, 115.5, 115.0, 113.6, 113.3, 111.2, 109.9, 76.2, 69.5, 69.0, 56.1, 55.5, 36.7, 32.4, 25.5, 21.9, 8.6. IR (film) ν_{max} 3471, 3407, 2950, 2927, 2869, 1713, 1681, 1605, 1526, 1495, 1404, 1371, 1353, 1259, 1076 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{32}H_{33}NO_8Na$, 582.2104; found 582.2097.

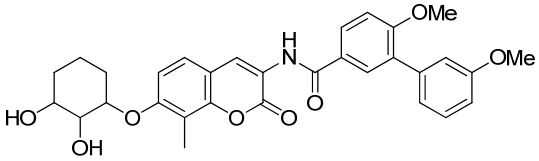


N-(7-(2,3-dihydroxy-5-methylcyclohexyloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (44b). Compound **44b** was obtianed as a white amorphorous solid (28 mg, 68%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.72 (s, 1H), 8.64 (s, 1H), 7.85–7.81 (m, 2H), 7.29 (t, *J* = 7.9 Hz, 1H), 7.30 (d, *J* = 8.8 Hz, 1H), 7.06–6.99 (m, 3H), 6.90–6.87 (m, 2H), 4.66–4.64 (m, 1H), 4.09–4.04 (m, 1H), 4.00–3.98 (m, 1H), 3.90 (s, 3H), 3.83 (s, 3H), 3.79 (s, 3H), 2.47 (bs, 1H), 1.89 (m, 1H), 1.77–1.67 (m, 2H), 1.51–1.54 (m, 1H), 1.39–1.31 (m, 1H), 0.92–0.90 (d, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.8, 159.3, 158.9, 151.86, 144.3, 138.6, 137.4, 131.1, 130.0, 129.2, 128.2, 125.9, 123.8, 122.6, 122.3, 122.0, 115.3, 114.9, 113.1, 112.8, 111.0, 77.6, 69.5, 68.7, 61.6, 55.9, 55.3, 36.4, 32.5, 25.3, 21.7. IR (film) ν_{max} 3462, 3404, 2930, 2868, 1713, 1670, 1605, 1576, 1524, 1502, 1462, 1367, 1277, 1246, 1207, 1180, 1049, 1024 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{32}H_{33}NO_9Na$, 598.2053; found 598.2053.

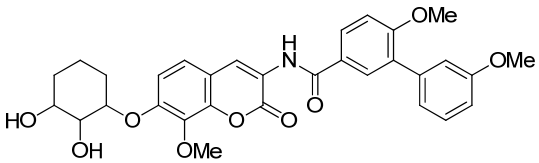


N-(7-(2,3-dihydroxy-5-methylcyclohexyloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (44c). Compound **44c** was obtianed as a white amorphorous solid (42 mg, 93%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.76 (s, 1H), 7.94–7.90 (m, 2H), 7.38 (t, *J* = 7.9 Hz, 1H), 7.14–7.09 (m, 3H), 6.95–6.93 (m, 1H), 6.86 (s, 1H), 4.48–4.45 (m, 1H), 4.24–4.22 (m, 1H), 4.06–4.05 (m, 1H), 3.91 (s, 3H), 3.90 (s, 3H), 3.87 (s, 3H), 2.56 (bs, 1H), 2.07–2.05 (m, 1H), 1.99 (bs, 1H), 1.83–1.75 (m, 2H), 1.52–1.44 (m, 2H). 1.02–1.01 (d, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.8, 160.0, 159.6, 159.5, 150.1, 147.7, 143.6, 138.8, 131.3, 130.2, 129.4, 128.4, 1126.2, 123.9, 123.2, 122.2, 120.3, 115.5, 115.4, 113.3, 111.2, 106.7, 82.1, 71.0, 69.2, 56.2, 56.1, 55.5, 36.6, 34.2, 26.0, 22.0, 9.9. IR (film) ν_{max} 3512, 3404,

2957, 2930, 2860, 1716, 1670, 1602, 1580, 1523, 1464, 1383, 1277, 1246, 1207, 1074 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{33}H_{35}NO_9Na$, 612.2210; found 612.2192.

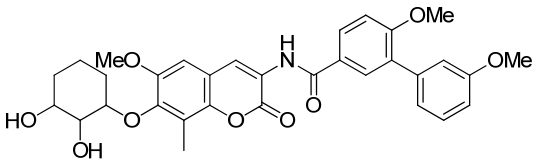


N-(7-((1R,2R,3R)-2,3-dihydroxycyclohexyloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (45a). Compound **45a** as a colorless amorphous solid (41 mg, 85%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.72 (s, 1H), 7.95–7.91 (m, 2H), 7.41–7.32 (m, 2H), 7.16–7.08 (m, 3H), 6.98–6.94 (m, 2H), 4.65–4.55 (m, 1H), 4.23–4,22 (m, 1H), 3.92 (s, 3H), 3.86 (s, 3H), 3.85 (m, 1H), 2.34 (s, 3H), 2.11–2.08 (m, 1H), 1.95–1.90 (m, 1H), 1.63–1.50 (m, 3H), 1.45–1.42 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.7, 160.0, 159.7, 159.6, 157.4, 149.5, 138.8, 131.3, 130.2, 129.4, 128.4, 126.3, 125.8, 124.4, 122.2, 122.0, 115.5 (2C), 114.0, 113.4, 111.24, 111.15, 78.5, 74.5, 69.7, 56.1, 55.5, 29.9, 28.6, 18.4, 8.6. IR (film) ν_{max} 3484, 3405, 2949, 2843, 1707, 1639, 1601, 1547, 1531, 1454, 1377, 1274, 1265, 1051, 1014 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{32}NO_8$, 546.2128; found 546.2127.

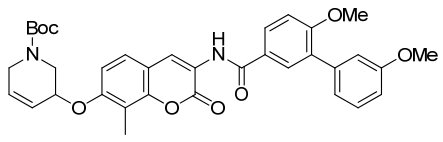


N-(7-(2,3-dihydroxycyclohexyloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (45b). Compound **45b** was obtianed as a white amorphorous solid (41 mg, 87%). ^1H NMR (500 MHz, $CDCl_3$) δ 8.72 (s, 1H), 8.64 (s, 1H), 7.85–7.81 (m, 2H), 7.29 (t, *J* = 8.0 Hz, 1H), 7.14 (d, *J* = 8.0 Hz, 1H), 7.06–6.99 (m, 3H), 6.94 (d, J = 8.0 Hz, 1H), 6.87–6.86 (m, 1H), 4.32 (m, 1H), 4.14 (m, 1H), 3.96 (s, 3H), 3.83 (s, 3H), 3.79 (s, 3H), 3.73–3.71 (m, 1H), 3.35 (bs, 1H), 2.41 (bs, 1H), 2.10 (m, 1H), 1.85 (m, 1H), 1.67 (m, 1H),

1.56 (m, 1H), 1.50–1.40 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.9, 159.3, 158.7, 152.7, 144.0, 138.5, 137.8, 131.1, 130.0, 129.2, 128.2, 125.9, 123.7, 122.7, 122.5, 122.0, 115.6, 115.3, 114.9, 113.1, 111.0, 81.5, 74.8, 69.6, 61.9, 55.9, 55.8, 55.3, 29.6, 18.3. IR (film) ν_{max} 3458, 3407, 2930, 2858, 1709, 1668, 1603, 1524, 1501, 1367, 1267, 1244, 1101, 1076, 1018 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{31}H_{31}NO_9Na$, 584.1897; found 584.1904.

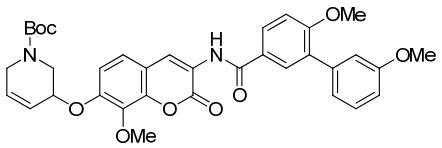


N-(7-(2,3-dihydroxycyclohexyloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (45c). Compound **45c** was obtianed as a white amorphorous solid (39 mg, 78%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.70 (s, 1H), 8.67 (s, 1H), 7.84–7.81 (m, 2H), 7.29 (t, *J* =7.9 Hz, 1H), 7.06–7.01 (m, 2H), 6.99 (d, *J* = 8.5 Hz, 1H), 6.84–6.84 (m, 1H), 6.77 (s, 1H), 4.14–4.12 (m, 1H), 4.12–4.10 (m, 1H) 3.96 (bs, 1H), 3.85 (s, 3H), 3.82 (s, 3H), 3.78 (s, 3H), 3.73–3.71 (dd, *J* = 8.9, 2.9 Hz, 1H), 2.63 (bs, 1H), 2.30 (s, 3H), 1.88–1.83 (m, 2H), 1.55–1.39 (m, 4H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.6, 159.8, 159.3, 159.2, 149.4, 146.7, 143.4, 138.6, 131.0, 130.0, 129.2, 128.2, 125.9, 123.4, 123.2, 122.0, 121.1, 115.5, 115.3, 113.1, 111.0, 106.3, 83.7, 75.6, 69.4, 56.0, 55.9, 55.3, 30.5, 29.4, 18.4, 9.9. IR (film) ν_{max} 3463, 3408, 2937, 2860, 1717, 1672, 1601, 1524, 1502, 1383, 1339, 1236, 1205, 1182, 1051 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{32}H_{33}NO_9Na$, 598.2053; found 598.2054.

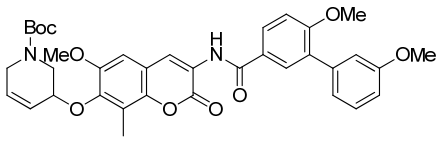


Tert-butyl 5-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yloxy)-5,6-dihydropyridine-1(2H)-carboxylate (47a). Compound **47a** was obtained as a light

yellow amorphous solid (1.57 g, 79%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.72 (s, 1H), 7.94–7.90 (m, 2H), 7.40–7.36 (m, 2H), 7.14–6.93 (m, 3H), 6.96–6.94 (m, 2H), 6.02–5.80 (m, 2H), 4.87 (m, 1H), 4.20–3.99 (m, 2H), 3.91 (s, 3H), 3.87 (s, 3H), 3.77–3.42 (m, 2H), 2.32 (s, 3H), 1.49 (s, 3H), 1.41 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.5, 159.3, 156.9, 154.6, 149.4, 138.6, 131.0, 130.0, 129.2, 128.8, 128.2, 126.1, 125.6, 125.3, 124.4, 124.2, 122.0, 121.8, 115.2, 113.8, 113.1, 111.0, 110.1, 80.2, 70.0, 69.5, 55.9, 55.3, 44.9, 43.7, 43.0, 28.4, 22.0, 21.8, 8.4. IR (film) ν_{max} 3400, 3067, 2976, 2935, 2837, 1705, 1670, 1605, 1526, 1500, 1367, 1244, 1205, 1180, 1103, 1024 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{35}H_{37}N_2O_8$, 613.2550; found, 613.2533.

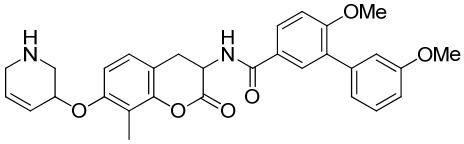


Tert-Butyl 5-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yloxy)-5,6-dihydropyridine-1(2H)-carboxylate (47b). Compound **47b** was obtained as a light yellow amorphorous solid (236 mg, 74%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.70 (s, 1H), 7.93–7.89 (m, 2H), 7.37 (t, J = 8.0 Hz, 1H), 7.23 (d, J = 8.4 Hz, 1H), 7.14–7.07 (m, 3H), 6.95–6.93 (m, 1H), 6.03–5.98 (m, 2H), 4.89 (m, 1H), 4.11–4.01 (m, 1H), 3.99 (s, 3H), 3.98–3.95 (m, 1H), 3.91 (s, 3H), 3.87 (s, 3H), 3.84–3.72 (m, 2H), 1.48–1.46 (m, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.8, 159.3, 158.8, 154.6, 151.8, 144.2, 138.6, 137.7, 131.1, 130.0, 129.2, 129.0, 128.2, 126.0, 125.0, 124.3, 123.8, 122.4, 122.0, 115.2, 113.7, 113.4, 113.1, 111.0, 80.3, 70.9, 70.0, 61.5, 55.9, 55.3, 43.6, 28.4. IR (KBr) ν_{max} 3425, 3070, 2959, 2930, 2872, 2860, 1728, 1693, 1680, 1600, 1462, 1381, 1273, 1122, 1072 cm^{-1}. HRMS (ESI^{+}) m/z: [M + Na^{+}] calcd for $C_{35}H_{36}N_2O_9Na$, 651.2318; found, 651.2321.



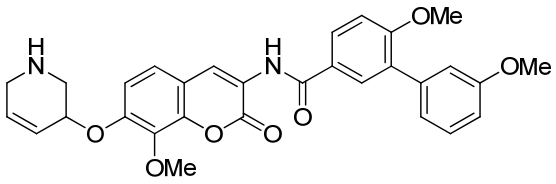
Tert-butyl 5-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yloxy)-5,6-dihydropyridine-1(2H)-carboxylate (47c). Compound **47c** was obtained as a light yellow amorphorous solid (154 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.76 (s, 1H), 7.94–7.90 (m, 2H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.13 (d, *J* = 7.6 Hz, 1H), 7.10–7.07 (m, 2H), 6.94 (dd, *J* = 8.2, 2.4 Hz, 1H), 6.86 (s, 1H), 5.95–5.83 (m 2H), 4.85 (m, 1H), 4.06–3.96 (m, 1H), 3.92 (s, 3H), 3.92 (s, 3H), 3.87 (s, 3H), 2.36 (s, 3H), 1.47 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.8, 159.3 (2C), 154.9, 150.1, 146.7, 143.4, 138.6, 131.0, 130.0, 129.2, 128.2, 127.4, 126.0, 125.1, 123.6, 123.0, 122.0, 120.8, 115.3, 113.1, 111.0, 106.4. 80.1, 73.4, 56.0, 55.9, 55.3, 28.4, 21.7, 9.4. IR (KBr) ν_{max} 3398, 3090, 3074, 2964, 2931, 2849, 2837, 1701, 1676, 1664, 1603, 1521, 1483, 1413, 1242, 1170 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{36}H_{38}N_2O_9Na$, 665.2475; found, 665.2468.

Representative procedure for Boc deprotection:

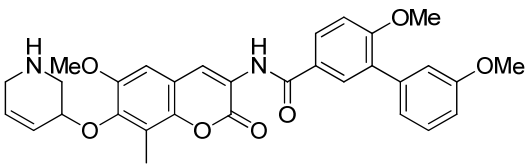


3',6-dimethoxy-N-(8-methyl-2-oxo-7-(1,2,3,6-tetrahydropyridin-3-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (48a): A solution of compound **48a** (470 mg, 0.78 mmol) in methylene chloride (20 mL) was treated with TFA (2 mL). The solution was stirred at rt overnight and concentrated to dryness, then the residue was purified via column chromatography (SiO_2, 10:1, CH_2Cl_2:MeOH) to afford compound **48a** as a white amorphorous solid (349 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.77 (s, 1H), 8.72 (s, 1H), 7.92–7.90 (m, 2H), 7.38–7.29

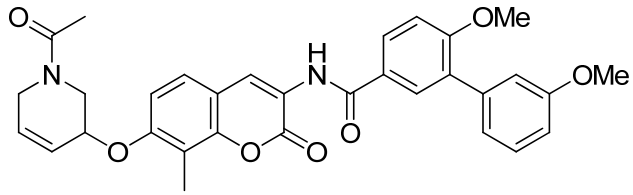
(m, 2H), 7.14–7.04 (m, 3H), 6.94–6.88 (m, 2H), 6.10–5.99 (m, 2H), 4.70 (m, 1H), 3.88 (s, 3H), 3.86 (s, 3H), 3.46–3.31 (m, 2H), 2.32 (m, 2H), 2.32 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.4, 159.7, 159.4, 159.3, 157.2, 149.4, 138.6, 133.3, 130.9, 130.0, 129.2, 128.2, 126.1, 125.6, 124.4, 124.2, 122.0, 121.7, 115.3, 115.1, 113.6, 113.1, 111.0, 110.5, 69.4, 55.9, 55.3, 47.7, 44.8, 8.5. IR (film) ν_{max} 3400, 3083, 3008, 2968, 2837, 1703, 1668, 1601, 1523, 1504, 1367, 1201, 1132, 1105 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{30}H_{29}N_2O_6$, 513.2026; found, 513.2024.



3',6-dimethoxy-N-(8-methoxy-2-oxo-7-(1,2,3,6-tetrahydropyridin-3-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (48b). Compound **48b** was obtained as a white amorphorous solid (61 mg, 81%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.73 (s, 1H), 7.94–7.91 (m, 2H), 7.38 (t, *J* =7.9 Hz, 1H), 7.22 (d, *J* = 8.7 Hz, 1H), 7.14–7.07 (m, 3H), 6.98 (d, *J* = 8.7 Hz, 1H), 6.94 (dd, *J* = 8.3, 2.1 Hz, 1H), 6.14–6.04 (m, 2H), 5.06 (m, 1H), 4.01 (s, 3H), 3.88 (s, 3H), 3.84 (s, 3H), 3.84–3.72 (m, 2H), 3.60 (m, 1H), 3,48 (m, 1H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.5, 159.9, 159.3, 158.4, 150.6, 144.0, 138.6, 138.3, 131.0, 130.0, 129.2, 128.2, 126.0, 125.8, 124.9, 123.3, 122.9, 122.7, 122.0, 116.5, 115.5, 115.3, 113.1, 111.0, 68.3, 61.9, 55.9, 55.2, 44.7, 41.7. IR (KBr) ν_{max} 3404, 2956, 2849, 1677, 1608, 1527, 1458, 1439, 1369, 1205, 1140 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{30}H_{29}N_2O_7$, 529.1975; found, 529.1979.



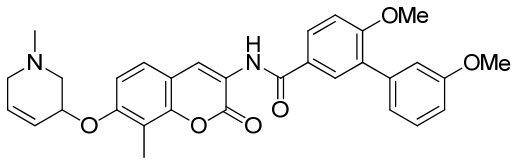
3',6-dimethoxy-N-(6-methoxy-8-methyl-2-oxo-7-(1,2,3,6-tetrahydropyridin-3-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (48c). Compound **48c** was obtained as a light brown amorphorous solid (371 mg, 79%). ^{1}H NMR (400 MHz, DMSO-d_6) 9.64 (s, 1H), 9.06 (s, 1H), 8.00–7.92 (m, 2H), 7.39–7.33 (m, 2H), 7.24 (d, J = 8.0 Hz, 1H), 7.12–7.10 (m, 2H), 6.96 (d, J =8.0 Hz, 1H), 6.17–6.05 (m, 2H), 4.72 (m, 1H), 3.89 (s, 3H), 3.86 (s, 3H), 3.80 (s, 3H), 3.73-3.69 (m, 2H), 3.45–3.42 (m, 2H), 2.32 (s, 3H). ^{13}C NMR (100 MHz, DMSO-d_6) δ 165.6, 159.6, 159.4, 158.5, 149.7, 146.5, 143.8, 139.1, 130.5, 129.9, 129.6 (2C), 127.8, 126.1, 126.0, 125.5, 123.5, 122.2, 119.8, 115.8, 115.7, 113.0, 112.0, 108.0, 71.2, 56.6, 56.3, 55.6, 45.0, 41.7, 9.8. IR (KBr) ν_{max} 3418, 3004, 2984, 2841, 1685, 1664, 1604, 1529, 1433, 1381, 1242, 1138 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{31}H_{31}N_2O_7$, 543.2131; found, 543.2130.



N-(7-(1-acetyl-1,2,3,6-tetrahydropyridin-3-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (50a). A solution of compound **48a** (45 mg, 0.088 mmol) in pyridine (3 mL) was treated with acetic anhydride (1 mL) and stirred at rt for 2 h. After 2 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 4:1, CH_2Cl_2:acetone) to afford compound **50a** as a white amorphorous solid (43 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.94–7.91 (m, 2H), 7.39–7.29 (m, 2H), 7.15–7.08 (m, 3H), 7.00–6.92 (m, 2H), 6.12–5.96 (m, 2H), 4.91–4.89 (m, 1H), 4.51–4.34 (m, 1H), 4.09–4.03 (m, 1H), 3.93–3.90 (m, 1H), 3.91 (s, 3H), 3.87 (s, 3H), 3.76–3.51 (m, 1H), 2.30 (3H), 2.17 (3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.0, 165.69, 165.65, 160.00, 159.95, 159.6, 159.5, 157.0, 156.6, 149.6, 149.5, 138.79, 138.77, 131.22, 131.19, 130.9, 130.1, 129.3, 128.3, 127.5, 126.8,

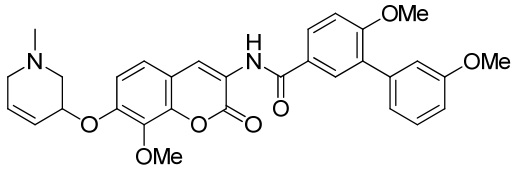
126.3, 126.2, 125.89, 125.85, 124.4, 124.1, 123.6, 122.2, 122.1, 115.6, 115.5, 115.46, 115.41, 114.21, 114.17, 113.33, 113.30, 111.2, 111.0, 110.2, 70.1, 69.6, 56.1, 55.5, 47.9, 45.7, 42.5, 41.9, 21.9, 21.4, 8.54, 8.51. IR (film) ν_{max} 3409, 3049, 2933, 2839, 1712, 1686, 1628, 1605, 1526, 1433, 1373, 1246, 1136, 1097, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{32}H_{30}N_2O_7Na$, 577.1950; found, 577.1947.

Representative procedure for synthesis of compounds 51a–c.

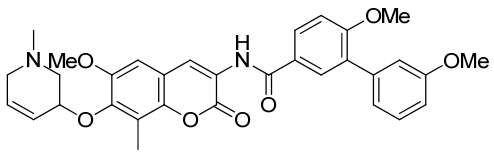


3',6-dimethoxy-N-(8-methyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-3-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (51a). A solution of compound **49a** (249 mg, 0.49 mmol) in THF (3 mL) was treated with potassium carbonate (132 mg, 0.97 mmol) at 0°C, followed by methyl iodide (30 μL, 0.49 mmol). The reaction was quenched with saturated ammonium chloride solution, and extracted with methylene chloride (2 x 30 mL). The combined organic layers were dried over magnesium sulfate, concentrated to dryness and purified via column chromatography (SiO_2, 10:1, CH_2Cl_2:MeOH) to afford compound **51a** as a light brown amorphorous solid (84 mg, 33%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.73 (s, 1H), 7.95–7.92 (m, 2H), 7.41–7.35 (m, 2H), 7.16–7.08 (m, 3H), 6.95 (m, 2H), 6.04–5.94 (m, 2H), 4.99 (m, 1H), 3.92 (s, 3H), 3.88 (s, 3H), 3.09–2.98 (m, 3H), 2.67–2.63 (m, 1H), 2.44 (s, 3H), 2.36 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.9, 159.7, 159.5, 157.6, 149.6, 138.8, 131.2, 130.2, 130.1, 129.3, 128.3, 126.2, 125.8, 124.5, 124.4, 122.2, 121.9, 115.6, 115.4, 113.8, 113.3, 111.2, 110.9, 72.3, 56.8, 56.0, 55.5, 54.4, 45.8, 8.6. IR (film) ν_{max} 3404, 3090, 3049, 2935, 2839, 1697,

1662, 1634, 1606, 1524, 1500, 1369, 1236, 1097, 1018 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{31}N_2O_6$, 527.2182; found, 527.2178.

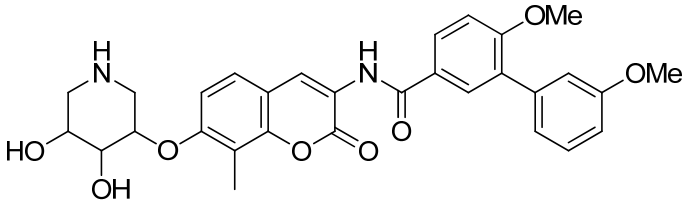


3',6-dimethoxy-N-(8-methoxy-7-(1-methyl-1,2,3,6-tetrahydropyridin-3-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (51b). Compound **51b** was obtained a light brown amorphous solid (68 mg, 30%). ^1H NMR (500 MHz, MeOD) δ 8.58 (s, 1H), 7.90 (d, *J* = 8.2 Hz, 1H),7.83 (s, 1H), 7.32–7.28 (m, 2H), 7.16–7.14 (m, 2H), 7.07–7.05 (m, 2H), 6.90 (m, 1H), 6.26–6.13 (m, 2H), 5.14 (m, 1H), 3.97 (s, 3H), 3.95–3.93 (m, 1H), 3.87 (s, 3H), 3.82 (s, 3H), 3.80–3.73 (m, 2H), 3.61–3.58 (m, 1H), 3.02 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 158.8, 152.2, 144.2, 138.6, 137.8, 131.0, 130.1, 130.0, 129.2, 128.2, 125.9, 124.2, 123.8, 122.4, 122.3, 122.0, 115.3, 115.1, 113.8, 113.1, 111.0, 72.9, 61.5, 56.4, 55.9, 55.3, 54.1, 45.5. IR (KBr) ν_{max} 3404, 2954, 2845, 1689, 1643, 1607, 1573, 1529, 1502, 1277, 1205, 1140, 1099, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{31}N_2O_7$, 543.2131; found 543.2126.

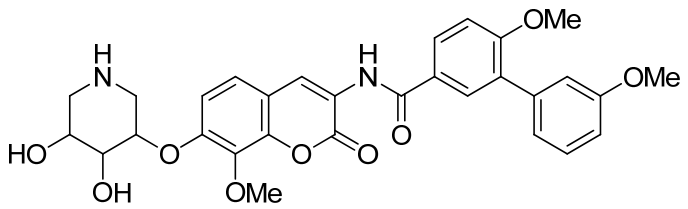


3',6-dimethoxy-N-(6-methoxy-8-methyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-3-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (51c). Compound **51c** was obtained a light brown amorphous solid (59 mg, 21%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.78 (s, 1H), 7.96–7.92 (m, 2H), 7.39 (t, *J* =8.0 Hz, 1H), 7.16–7.08 (m, 3H), 6.95 (dd, *J* = 8.0, 2.3 Hz, 2H), 6.87 (s, 1H), 6.00–5.97 (m, 2H), 4.78 (m, 1H), 3.92 (s, 3H), 3.92 (s, 3H), 3.88 (s, 3H), 3.09 (d, *J* = 7.0 Hz, 1H), 2.92 (d, *J* = 7.0 Hz, 1H), 2.77–2.70 (m, 2H), 2.44 (s, 3H), 2.41 (s, 3H). ^{13}C NMR

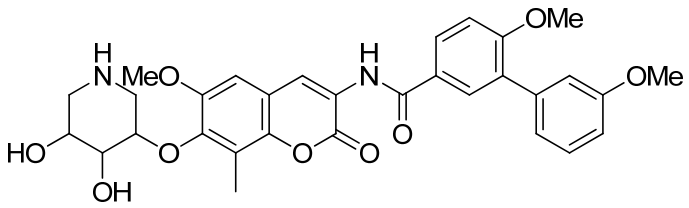
(100 MHz, $CDCl_3$) δ 165.6, 159.8, 159.4, 159.3, 150.3, 147.5, 143.5, 138.6, 131.1, 130.0, 129.7, 129.2, 128.2, 126.0, 125.3, 123.8, 123.0, 122.0, 121.0, 115.3 (2C), 113.1, 111.0, 106.4, 76.0, 57.1, 56.0, 55.9, 55.3, 54.4, 45.8, 9.6. IR (KBr) ν_{max} 3403, 3112, 3072, 2954, 2929, 2854, 1716, 1649, 1605, 1502, 1458, 1366, 1248, 1207, 1180, 1086 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{32}H_{33}N_2O_7$, 557.2288; found, 527.2300.



N-(7-(4,5-dihydroxypiperidin-3-yloxy)-8-methyl-2-oxochromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (52a). Compound **52a** was obtained as a colorless amorphorous solid (32 mg, 53%). ^1H NMR (400 MHz, DMSO-d_6) δ 9.66 (s, 1H), 8.48 (s, 1H), 8.01 (dd, *J* = 8.6, 2.3 Hz , 1H), 7.93 (d, *J* =2.3 , 1H), 7.56 (d, *J* = 8.7 Hz , 1H), 7.37 (t, *J* = 7.8 Hz , 1H), 7.26 (d, *J* = 8.8 Hz, 1H), 7.18 (d, *J* = 8.8, 1H), 7.13–7.10 (m, 2H), 6.97–6.95 (m, 1H), 4.96 (d, *J* = 5.2 , 1H), 4.61 (d, *J* = 4.2, 1H), 4.45–4.41 (m, 1H), 3.87 (s, 3H), 3.81 (s, 3H), 3.73 (bs, 1H), 3.68 (bs, 1H), 3.08–3.04 (m, 1H), 2.76–2.72 (m, 1H), 2.60–2.57 (m, 1H), 2.48–2.44 (m, 1H), 2.24 (s, 3H). ^{13}C NMR (100 MHz, DMSO-d_6) δ 165.6, 159.6, 159.4, 158.8, 158.6, 150.1, 139.2, 130.4, 129.92, 129.85, 129.7, 129.6, 126.5, 126.3, 122.2, 121.5, 115.7, 113.9, 113.1, 113.0, 112.0, 111.3, 77.9, 72.1, 69.2, 56.4, 55.6, 49.5, 47.1, 8.6. IR (film) ν_{max} 3317 (broad), 2950, 2918, 2849, 1705, 1674, 1607, 1541, 1533, 1375, 1253, 1204, 1136, 1103 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{31}N_2O_8$, 547.2080; found, 547.2083.

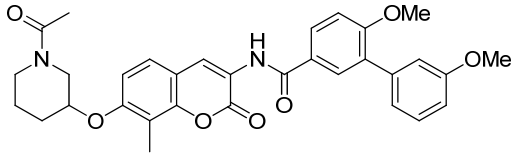


N-(7-(4,5-dihydroxypiperidin-3-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (52b). Compound **52b** was obtained as a colorless amorphorous solid (48 mg, 92%). ^{1}H NMR (500 MHz, DMSO-d_6) δ 9.68 (s, 1H), 8.48 (s, 1H), 7.99 (dd, *J* = 8.6, 2.4 Hz, 1H), 7.92 (d, J = 2.4 Hz, 1H), 7.37 (t, *J* = 7.9 Hz, 1H), 7.23 (t, J = 9.0 Hz, 1H), 7.12–7.09 (m 2H), 6.96–6.94 (m, 1H), 5.02 (s, 1H), 4.76 (s, 1H), 4.48–4.44 (m, 1H), 3.89 (s, 3H), 3.86 (s, 3H), 3.77 (s, 3H), 3.72 (m, 1H), 3.70–3.69 (m, 1H), 3.17–3.09 (m, 2H), 2.81–2.77 (m, 1H), 2.66–2.63 (m, 1H). ^{13}C NMR (125 MHz, DMSO-d_6) δ 165.2, 159.2, 159.0, 157.9, 153.2, 144.5, 138.7, 136.0, 130.0, 129.4, 129.20, 129.16 (2C), 125.8, 122.8, 121.7, 121.6, 115.3, 113.7, 112.6, 112.5, 111.6, 77.5, 71.6, 68.7, 60.9, 55.9, 55.1, 48.9, 46.5. IR (KBr) ν_{max} 3417 (broad), 2947, 2846, 1682, 1645, 1602, 1519, 1434, 1389, 1206, 1141 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{30}H_{31}N_2O_9$, 563.2030; found, 563.2029.

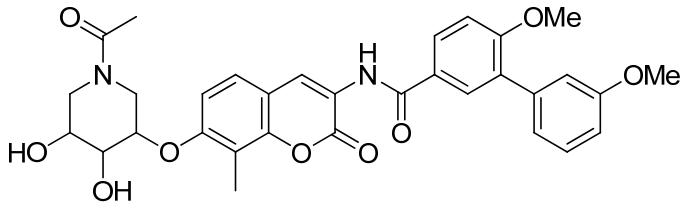


N-(7-(4,5-dihydroxypiperidin-3-yloxy)-6,8-dimethoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (52c). Compound **52c** was obtained as a colorless amorphorous solid (42 mg, 59%). ^{1}H NMR (500 MHz, DMSO-d_6) δ 9.65 (s, 1H), 8.53 (s, 1H), 7.99 (dd, *J* = 8.6, 2.4 Hz, 1H), 7.92 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 7.8 Hz, 1H), 7.28 (s, 1H), 7.26 (d, *J* = 7.8 Hz, 1H), 7.12–7.09 (m 2H), 6.96–6.94 (m, 1H), 4.16 (m, 1H), 3.87 (s, 6H), 3.80 (m,1H), 3.76 (s, 3H), 3.75 (m, 1H), 3.04–3.01 (m, 1H), 2.78–2.74 (m, 1H), 2.70–2.65 (m, 2H), 2.32 (s, 3H). ^{13}C NMR (125 MHz, DMSO-d_6) δ 165.1, 159.1, 158.9, 158.1, 149.3, 147.4, 143.6, 138.6, 130.0, 129.4, 129.1 (2C), 128.1, 125.7, 122.5, 121.7, 119.0, 115.2, 114.4, 112.5, 111.5, 107.3, 80.7, 71.5, 67.5, 56.1, 55.9, 55.1, 47.8, 45.9, 9.3. IR (KBr) ν_{max} 3402 (broad), 2974, 2939,

2835, 1666, 1631, 1604, 1523, 1502, 1462, 1429, 1366, 1267, 1244, 1091, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{33}N_2O_9$, 577.2186; found, 577.2180.

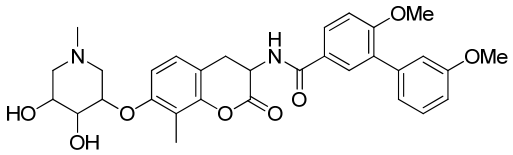


N-(7-(1-acetylpiperidin-3-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (53a). Palladium on carbon (10%, 5 mg) was added to **50** (36 mg, 0.07 mmol) in anhydrous THF (3 mL) and the solution was placed under an atmosphere of H_2. After 12 h, the solution was filtered through SiO_2 (40:1, CH_2Cl_2:acetone) and the eluent was concentrated to afford **53a** as a colorless amorphous solid (32 mg, 89%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.72 (s, 1H), 7.94-7.90 (m, 2H), 7.40-7.34 (m, 2H), 7.15-7.07 (m, 3H), 6.99-6.86 (m, 2H), 4.60-4.30 (m, 1H), 4.25-3.95 (m, 1H), 3.91 (s, 3H), 3.87 (s, 3H), 3.76-3.39 (m, 3H), 2.32-2.04 (3H), 1.98-1.82 (m, 3H), 1.70-1.50 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.5, 169.4, 165.5 (2C), 159.8, 159.7, 159.5, 159.4, 159.3, 156.7, 156.1, 149.5, 149.4, 138.6 (2C), 131.0, 130.0, 129.2, 128.2, 126.1, 126.0, 125.7, 124.3, 124.0, 122.0, 121.7, 115.4, 115.3, 115.2, 113.8, 113.7, 113.2, 113.1, 111.0, 110.5, 109.8, 72.0, 71.4, 55.9, 55.3, 50.3, 46.6, 45.5, 42.0, 30.0, 28.8, 23.3, 21.5, 21.4, 21.2, 8.3. IR (film) ν_{max} 3406, 2934, 2835, 1701, 1666, 1628, 1539, 1369, 1234, 1093, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{32}H_{32}N_2O_7$, 557.2288; found 557.2291.

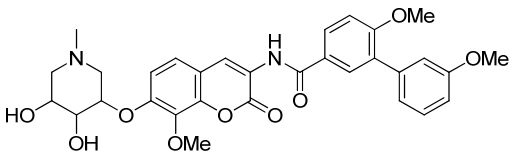


N-(7-(1-acetyl-4,5-dihydroxypiperidin-3-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (54a). Compound **54a** was obtained as a white

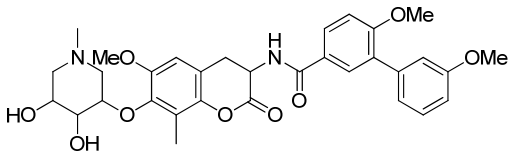
amorphorous solid (22 mg, 81%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.71–8.67 (m, 2H), 7.92–7.87 (M, 2H), 7.37–7.36 (t, J=8.0, 1H), 7.31–7.25 (m, 1H), 7.25–7.04 (m, 3H), 6.95–6.92 (m, 1H), 4.66–3.97 (m, 4H), 3.90–3.85 (m, 6H), 3.79–2.82 (m, 3H), 2.26–2.01 (m, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.6, 170.4, 165.7, 160.0, 159.5, 159.3, 157.1, 156.1, 149.4, 149.3, 138.8, 131.2, 130.2, 129.4, 128.4, 126.2, 126.0, 124.4, 123.9, 122.2, 121.9, 115.5, 115.1, 114.9, 114.3, 114.1, 113.3, 111.2, 110.6, 109.6, 74.6, 73.3, 69.5, 68.4, 65.9, 56.1, 55.5, 49.8, 45.9, 43.2, 43.1, 21.6, 21.5, 8.5, 8.4. IR (film) ν_{max} 3400, 3365 (broad), 2931, 2839, 1712, 1628, 1607, 1526, 1502, 1369, 1267, 1244, 1105, 1034 cm^{-1}. HRMS (ESI^{+}) m/z: [M + Na^{+}] calcd for $C_{32}H_{32}N_2O_9Na$, 611.2005; found, 611.2011.



N-(7-(4,5-dihydroxy-1-methylpiperidin-3-yloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (55a). Compound **55a** was obtained as light brown amorphorous solid (27 mg, 60%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.72 (s, 1H), 7.95–7.92 (m, 2H), 7.41–7.33 (m, 2H), 7.16–7.05 (m, 4H), 6.97–6.95 (m, 1H), 4.61 (m, 1H), 4.10 (m, 1H), 3.92 (s, 3H), 3.88 (s, 3H), 3.78–3.76 (m, 1H), 3.11–2.99 (m, 2H), 2.40 (s, 3H), 2.35 (s, 3H), 2.12–2.08 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.4, 159.3, 157.4, 149.3, 138.6, 131.0, 130.0, 129.2, 128.2, 126.0, 125.7, 124.2, 122.0, 121.9, 115.5, 115.3, 114.0, 113.2, 111.2, 111.0, 73.5, 68.6, 59.1, 57.0, 55.9, 55.3, 45.5, 8.4. IR (film) ν_{max} 3402, 2927, 2852, 1707, 1653, 1605, 1526, 1502, 1369, 1267, 1242, 1207, 1107 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{31}H_{33}N_2O_8$, 561.2237; found, 561.2239.

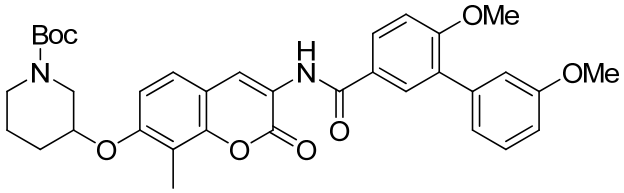


N-(7-(4,5-dihydroxy-1-methylpiperidin-3-yloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (55b). Compound **55b** was obtained as a light brown amorphorous solid (9.8 mg, 39%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.74 (s, 1H), 7.95–7.91 (m, 2H), 7.39 (t, *J* = 8.7 Hz, 1H), 7.24 (d, *J* = 8.7 Hz, 1H), 7.15–7.08 (m, 3H), 6.96 (dd, *J* = 8.7, 2.2 Hz, 1H), 4.48 (m, 1H), 4.10 (m, 1H), 4.06 (s, 3H), 3.92 (s, 3H), 3.89 (s, 3H), 3.79–3.78 (m, 1H), 3.16–3.14 (m, 1H), 3.02–2.99 (m, 1H), 2.37 (s, 3H), 2.33 (t, J = 12.2 Hz, 1H), 2.18 (t, J = 12.2 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.5, 159.9, 159.4, 158.7, 152.6, 145.2, 144.1, 138.6, 138.0, 131.1, 130.0, 129.2, 128.2, 125.9, 123.6, 122.7, 122.0, 115.9, 115.3, 115.0, 113.2, 111.1, 79.3, 76.1, 68.6, 62.0, 59.0, 57.4, 55.9, 55.3, 45.5. IR (KBr) ν_{max} 3410 (broad), 2927, 2870, 2835, 1710, 1664, 1603, 1524, 1502, 1460, 1366, 1275, 1244, 1086 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{31}H_{33}N_2O_9$, 577.2186; found, 577.2180.

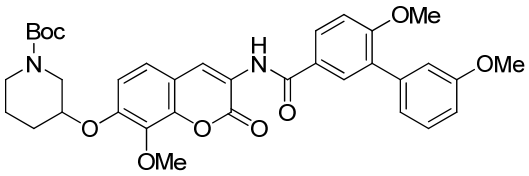


N-(7-(4,5-dihydroxy-1-methylpiperidin-3-yloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (55c). Compound **55c** was obtained as light brown amorphorous solid (38 mg, 61%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.78 (s, 1H), 7.95–7.92 (m, 2H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.16–7.08 (m, 3H), 6.96 (dd, *J* = 8.0, 2.1 Hz, 1H), 6.89 (s, 1H), 4.40 (m, 1H), 4.08 (m, 1H), 3.95 (s, 3H), 3.92 (s, 3H), 3.88 (s, 3H), 3.79 (m, 1H), 2.97 (m, 2H), 2.41 (s, 3H), 2.33 (s, 3H), 2.25–2.16 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.9, 159.34, 159.25, 149.3, 146.7, 143.4, 138.6, 131.1, 130.0, 129.2, 128.2, 126.0,

123.5, 123.3, 122.0, 120.8, 115.7, 115.3, 113.1, 111.0, 106.4, 80.7, 77.2, 68.4, 58.7, 58.0, 56.1, 55.9, 55.3, 45.7, 9.6. IR (KBr) ν_{max} 3405 (broad), 2959, 2930, 2854, 1682, 1647, 1605, 1439, 1385, 1207, 1138, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{32}H_{35}N_2O_9$, 591.2342; found, 591.2326.

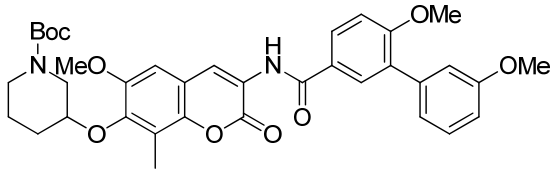


Tert-butyl 3-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yloxy)piperidine-1-carboxylate (56a). Compound **56a** was obtained as a light brown amorphorous solid (643 mg, 67%). ^1H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.69 (s, 1H), 7.95-7.91 (m, 2H) 741–7.35 (m, 2H), 7.16–7.08 (m, 3H), 6.97–6.94 (m, 2H), 4.42 (m, 1H), 3.892 (s, 3H), 3.88 (s, 3H), 3.74–3.40 (m, 4H), 2.33 (s, 3H), 2.07–1.92 (m, 3H), 1.62–1.58 (m, 1H), 1.48 (bs, 3H), 1.28 (bs, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.5, 159.3, 156.8, 154.7, 149.4, 138.6, 131.0, 130.0, 129.2, 128.2, 126.1, 125.6, 124.3, 122.0, 121.7, 115.2, 115.0, 113.6, 113.2, 111.0, 109.9, 79.8, 77.3, 71.5, 55.9, 55.3, 47.3, 29.9, 28.3, 21.7, 8.3. IR (film) ν_{max} 3403, 2980, 2937, 1707, 1653, 1676, 1605, 1524, 1502, 1464, 1367, 1242, 1178, 1109, 1041 cm^{-1}. HRMS (ESI^+) m/z: [M + Na^+] calcd for $C_{35}H_{38}N_2O_8Na$, 637.2526; found, 637.2524.

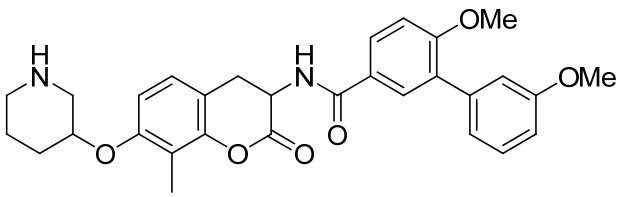


Tert-butyl 3-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yloxy)piperidine-1-carboxylate (56b). Compound **56b** was obtained as a light

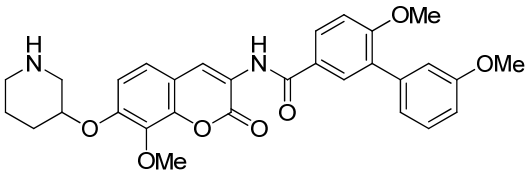
brown amorphorous solid (174 mg, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.72 (s, 1H), 7.92–7.89 (m, 2H), 7.36 (t, *J* = 8.0 Hz, 1H), 7.21 (d, J = 8.0 Hz, 1H), 7.13–6.99 (m, 3H), 6.97–6.91 (m, 2H), 4.38 (m, 1H), 3.98 (s, 3H), 3.89 (s, 3H), 3.85 (s, 3H), 3.85–3.39 (m, 4H), 2.05 (m, 1H), 1.88 (m, 2H), 1.56 (m, 1H), 1.41 (bs, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 158.9, 154.7, 151.7, 144.2, 138.6, 137.4, 131.0, 130.0, 129.2, 128.2, 125.9, 123.8, 122.3, 122.0, 115.2, 114.9, 113.1, 113.0, 112.8, 111.0, 79.8, 72.9, 61.5, 55.9, 55.3, 47.7, 43.8, 30.9, 29.9, 28.4. IR (KBr) ν_{max} 3407, 2943, 2837, 1676, 1630, 1605, 1521, 1431, 1205, 1136 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{35}H_{39}N_2O_9$, 631.2656; found 631.2661.



Tert-butyl 3-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yloxy)piperidine-1-carboxylate (56c). Compound **56c** was obtained as a light brown amorphorous solid (135 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.76 (s, 1H), 7.93–7.91 (m, 2H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.14–7.06 (m, 3H), 6.94 (m, 1H), 6.85 (s, 1H), 4.32 (m, 1H), 3.94 (s, 6H), 3.86 (s, 3H), 3.82–3.59 (m, 2H), 3.21 (m, 2H), 2.38 (s, 3H), 2.06–1.77 (m, 3H), 1.51–1.48 (m, 1H), 1.42 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 154.8, 150.1, 146.5, 143.5, 138.6, 131.0, 130.0, 129.2, 128.2, 126.1, 123.7, 123.0, 122.9, 122.0, 120.6, 115.3, 115.2, 113.1, 111.0, 106.5, 79.6, 76.4, 56.0, 55.9, 55.3, 30.9, 30.6, 29.3, 28.4, 21.7, 9.4. IR (KBr) ν_{max} 3402, 3333, 2976, 2931, 2868, 1713, 1680, 1632, 1604, 1529, 1425, 13666, 1232, 1201, 1167, 1095 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{36}H_{40}N_2O_9Na$, 667.2632; found, 667.2629.

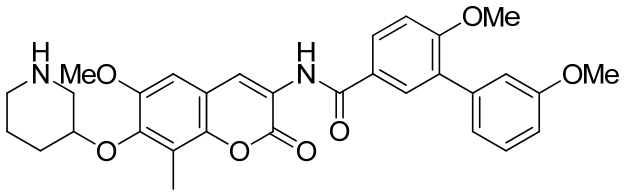


3',6-dimethoxy-N-(8-methyl-2-oxo-7-(piperidin-3-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (57a). Compound **57a** was obtained as white amorphorous solid (23 mg, 79%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.68 (s, 1H), 8.64 (s, 1H), 7.86–7.84 (m, 2H), 7.33–7.30 (m, 2H), 7.09–6.88 (m, 5H), 4.50 (bs, 1H), 4.06–3.90 (m, 2H), 3.83 (s, 3H), 3.81 (s, 3H), 3.63–3.50 (m, 4H), 2.20 (s, 3H), 1.41 (bs, 3H), 1.22 (bs, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.9, 159.4, 159.3, 155.6, 149.3, 138.7, 131.0, 130.1, 129.3, 128.3, 126.0, 125.8, 123.8, 122.3, 122.2, 115.6, 115.4, 114.4, 113.2, 111.1, 110.3, 69.3, 56.0, 55.4, 46.8, 43.8, 28.0, 19.5, 8.7. IR (film) ν_{max} 3404, 2939, 2837,1709, 1670, 1607, 1526, 1502, 1369, 1269, 1242, 1103, 1031 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{31}N_2O_6$, 515.2182; found, 515.2186.

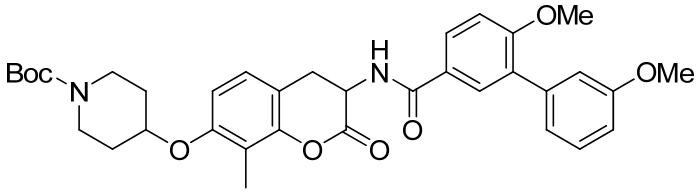


3',6-dimethoxy-N-(8-methoxy-2-oxo-7-(piperidin-3-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (57b). Compound **57b** was obtained as white amorphorous solid (93 mg, 84%). ^{1}H NMR (400 MHz, MeOD) δ 8.37 (s, 1H), 7.69–7.66 (m, 2H), 7.21 (t, J = 8.0 Hz, 1H), 7.05 (d, J = 8.0 Hz, 1H), 6.96–6.82 (m, 4H), 6.82 (dd, J = 8.2 Hz, 2.3, 1H), 4.66 (m, 1H), 3.85 (s, 3H), 3.76 (s, 3H), 3.74 (s, 3H), 3.42–3.37 (m, 2H), 3.23–3.19 (m, 2H), 2.15–2.10 (m, 2H), 2.02–1.98 (m, 2H). ^{13}C NMR (100 MHz, MeOD) δ 164.5, 158.4, 158.0, 156.8, 149.3, 142.8, 137.3, 136.3, 129.0, 128.5, 127.3, 126.8, 124.1, 123.2, 121.4, 121.0, 120.3, 114.5, 113.8, 113.0, 111.0, 109.6, 69.9, 59.6, 53.6, 53.1, 45.1, 42.3, 24.8, 16.6. IR (KBr) ν_{max} 3400, 2980, 2948, 2843, 1693, 1634,

1607, 1571, 1531, 1504, 1371, 1207, 1140, 1101 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{31}N_2O_7$, 531.2131; found, 531.2129.

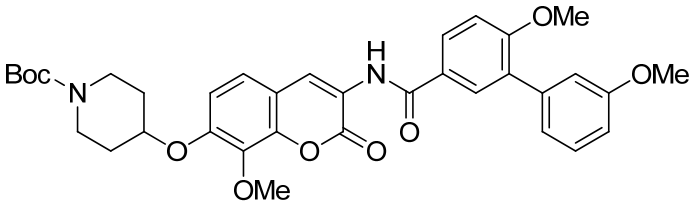


3',6-dimethoxy-N-(6-methoxy-8-methyl-2-oxo-7-(piperidin-3-yloxy)-2H-chromen-3-yl)-[1,1'-biphenyl]-3-carboxamide (57c). Compound **57c** was obtained as white amorphorous solid (83 mg, 73%). ^1H NMR (400 MHz, DMSO-d_6) δ 9.65 (s, 1H), 8.56 (s, 1H), 8.99 (dd, J = 8.4, 1.6 Hz, 1H), 7.92 (s, 1H), 7.39–7.33 (m, 2H), 7.25 (d, J =9.1 Hz, 1H), 7.12–7.10 (m, 2H), 6.95 (d, J = 8.4 Hz, 1H), 4.36 (m, 1H), 3.87 (s, 3H), 3.86 (s, 3H), 3.80 (s, 3H), 3.36–3.10 (m, 4H), 2.31 (s, 3H), 2.01–1.68 (m, 4H). ^{13}C NMR (100 MHz, DMSO-d_6) δ 165.6, 159.6, 159.4, 158.5, 149.8, 146.4, 143.8, 139.1, 130.5, 129.9, 129.6, 127.9, 126.1, 123.5, 122.2, 119.7, 118.8, 115.7, 115.68, 113.0, 112.0, 108.0, 75.0, 56.6, 56.4, 55.6, 46.9, 43.4, 28.2, 19.5, 9.7. IR (KBr) ν_{max} 3398, 2976, 2867, 1677, 1642, 1460, 1535, 1502, 1205, 1142 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{33}N_2O_7$, 545.2288; found, 545.2282.

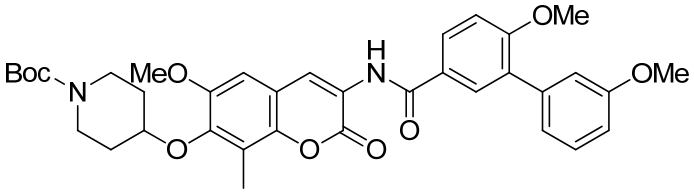


Tert-butyl 4-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yloxy)piperidine-1-carboxylate (58a). Compound **58a** was obtained a light brown amorphorous solid (220 mg, 72%). ^1H NMR (400 MHz, $CDCl_3$) δ ($CDCl_3$) 8.77 (s, 1H), 8.70 (s, 1H), 7.91–7.89 (m, 2H), 7.38–7.28 (m, 2H), 7.14–7.04 (m, 3H), 6.94–6.86 (m, 2H), 4.60 (m, 1H), 3.89 (s, 3H), 3.86 (s, 3H), 3.67–3.63 (m, 2H), 3.47–3.46 (m, 2H), 2.33 (s, 3H), 1.93–1.81

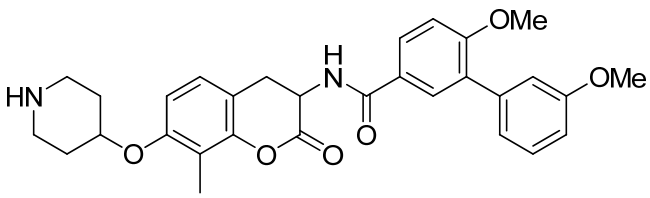
(m, 4H), 1.49 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.5, 159.4, 156.7, 154.9, 149.5, 138.7, 131.0, 130.0, 129.2, 128.2, 126.1, 125.7, 124.2, 122.1, 121.8, 115.33, 115.29, 113.6, 113.2, 111.1, 110.5, 79.8, 72.8, 56.0, 55.4, 30.6, 28.5, 22.0, 21.8, 8.4. IR (film) ν_{max} 3400, 2980, 2864, 1717, 1699, 1683, 1635, 1558, 1521, 1386, 1244, 1105 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{35}H_{38}N_2O_8Na$, 637.2526; found, 637.2523.



Tert-butyl 4-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-8-methoxy-2-oxochromen-7-yloxy)piperidine-1-carboxylate (58b). Compound **58b** was obtained as a light brown amorphorous solid (156 mg, 85%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.73 (s, 1H), 7.93–7.90 (m, 2H), 7.37 (t, J = 8.0 Hz, 1H), 7.22 (d, J = 8.7 Hz, 1H), 7.14–7.07 (m, 3H), 6.96–6.93 (m, 2H), 4.61–4.58 (m, 1H), 4.01 (s, 3H), 3.91 (s, 3H), 3.87 (s, 3H), 3.77–3.72 (m, 2H), 3.42 (m, 2H), 2.00–1.96 (m, 2H), 1.85–1.82 (m, 2H), 1.49 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 158.8, 154.8, 151.7, 144.3, 138.6, 137.8, 131.0, 130.0, 129.2, 128.2, 125.9, 123.7, 122.4, 122.3, 122.0, 115.3, 115.1, 113.6, 113.1, 111.0, 79.7, 74.5, 61.5, 55.9, 55.3, 53.5, 30.7, 28.4, 21.7. IR (KBr) ν_{max} 3404, 2978, 2935, 1701, 1637, 1605, 1521, 1431, 1389, 1373, 1232, 1207, 1180, 1086 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{35}H_{39}N_2O_9$, 631.2656; found, 631.2652.

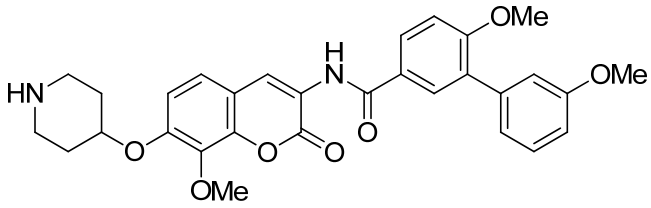


Tert-butyl 4-(3-(3',6-dimethoxybiphenyl-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxochromen-7-yloxy)piperidine-1-carboxylate (58c). Compound **58c** was obtained as a light brown amorphorous solid (120 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.76 (s, 1H), 8.75 (s, 1H), 7.92–7.89 (m, 2H), 7.36 (t, J = 8.0 Hz, 1H), 7.13–7.04 (m, 3H), 6.94–6.91 (m, 1H), 6.83 (s, 1H), 4.37–4.33 (m, 1H), 3.88 (s, 6H), 3.86 (s, 3H), 3.90–3.86 (m, 2H), 3.11–3.06 (m, 2H), 2.37 (s, 3H), 1.90 (m, 2H), 1.75–1.71 (m, 2H), 1.48 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.32, 159.28, 154.8, 150.3, 146.7, 143.4, 138.6, 131.0, 130.0, 129.2, 128.2, 126.0, 123.6, 123.0, 122.0, 120.6, 115.28, 115.23, 113.1, 111.0, 106.5, 79.6 78.6, 56.0, 55.9, 55.3, 31.7 (2C), 28.5, 21.7 (2C), 9.7. IR (KBr) ν_{max} 3404, 2939, 2860, 1697, 1674, 1636, 1605, 1522, 1500, 1382, 1242, 1207, 1176, 1026 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{36}H_{41}N_2O_9$, 645.2812; found, 645.2810.

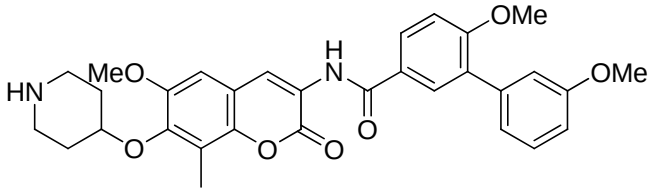


3',6-dimethoxy-N-(8-methyl-2-oxo-7-(piperidin-4-yloxy)-2H-chromen-3-yl)biphenyl-3-carboxamide (59a). Compound **59a** was obtained as a white amorphorous solid (41 mg, 68%). ^{1}H NMR (400 MHz, $CDCl_3$) δ ($CDCl_3$) 8.82 (s, 1H), 8.73 (s, 1H), 7.95–7.91 (m, 2H), 7.41–7.35 (m, 2H), 7.15–7.08 (m, 3H), 6.95 (d, *J* = 4.0 Hz, 1H), 6.88 (d, *J* =4.8 Hz, 1H), 4.66 (m, 1H), 3.92 (s, 3H), 3.88 (s, 3H), 3.27 (m, 2H), 3.04 (m, 2H), 2.38 (s, 3H), 2.19–2.16 (m, 2H), 1.99 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ ($CDCl_3$) 165.7, 160.0, 159.6, 159.5, 156.5, 149.6, 138.8, 131.2, 130.2, 129.4, 128.4, 126.2, 125.8, 124.3, 122.2, 122.1, 115.5, 115.4, 113.9, 113.3, 111.2, 110.5, 71.5, 56.1, 55.5, 42.0 (2C), 29.8 (2C), 8.6. IR (film) ν_{max} 3400, 2933, 2833, 1699, 1668, 1601,

1522, 1499, 1366, 1236, 1204, 1134, 1101, 1028 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{31}N_2O_6$, 515.2182; found, 515.2189.

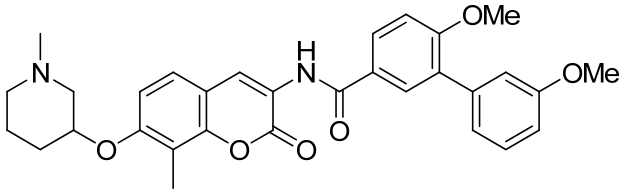


3',6-dimethoxy-N-(8-methoxy-2-oxo-7-(piperidin-4-yloxy)chromen-3-yl)biphenyl-3-carboxamide (59b). Compound **59b** was obtained as a white amorphorous solid (145 mg, 93%). ^1H NMR (500 MHz, $CDCl_3$) δ 8.37 (s, 1H), 7.69–7.66 (m, 2H), 7.21 (t, *J* = 8.5 Hz, 1H), 7.05 (d, *J* = 8.0 Hz, 1H), 6.96–6.92 (m, 4H), 6.82–6.80 (m, 1H), 4.66 (m, 1H), 3.85 (s, 3H), 3.76 (s, 3H), 3.74 (s, 3H), 3.42–3.37 (m, 2H), 3.23–3.19 (m, 2H), 2.15–2.10 (m, 2H), 2.02–1.98 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 167.1, 161.2, 160.8, 159.7, 152.4, 145.6, 140.1, 138.8, 131.7, 131.3, 130.1, 129.5, 126.8, 126.1, 124.1, 123.5, 123.1, 116.6, 116.5, 114.8, 113.8, 112.3, 72.1, 62.1, 56.4, 55.9, 41.8, 28.5. IR (KBr) ν_{max} 3414, 2966, 2927, 1680, 1632, 1610, 1410, 1371, 1277, 1205, 1142 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{31}N_2O_7$, 531.2131; found, 531.2120.

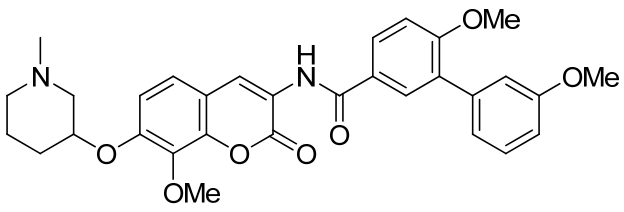


3',6-dimethoxy-N-(6-methoxy-8-methyl-2-oxo-7-(piperidin-4-yloxy)-2H-chromen-3-yl)-[1,1'-biphenyl]-3-carboxamide (59c). Compound **59c** was obtained as a white amorphorous solid (74 mg, 88%). ^1H NMR (400 MHz, $CDCl_3$) δ (DMSO-d_6) 9.66 (s, 1H), 8.54 (s, 1H), 7.99 (d, *J* = 8.0 Hz, 1H), 7.92 (s, 1H), 7.37 (t, *J* =8.0 Hz, 1H), 7.31 (s, 1H), 7.25 (d, *J* = 8.0 Hz, 1H), 7.12–7.10 (m, 2H), 6.96 (d, *J* = 8.0 Hz, 1H), 4.38 (m, 1H), 3.86 (s, 3H), 3.85 (s, 3H), 3.80 (s,

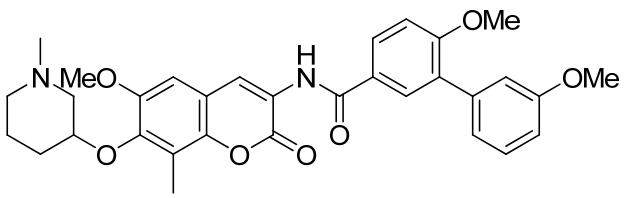
3H), 3.31 (m, 2H), 3.06 (m, 2H), 2.28 (s, 3H), 2.04 (m, 2H), 1.89 (m, 2H). ^{13}C NMR (100 MHz, DMSO-d_6) δ 165.6, 159.6, 159.4, 158.2, 150.1, 146.5, 143.9, 139.1, 130.5, 129.9, 129.6, 128.3, 126.1, 123.3, 122.2, 119.7, 119.0, 115.7, 115.4, 113.0, 112.0, 107.9, 75.6, 56.6, 56.4, 49.0, 41.3, 28.7, 9.7. IR (KBr) ν_{max} 3400, 2970, 2849, 1678, 1632, 1605, 1433, 1385, 1205, 1138, 1026 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{31}H_{33}N_2O_7$, 545.2288; found, 545.2288.



3',6-dimethoxy-N-(8-methyl-7-(1-methylpiperidin-3-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (60a). Compound **60a** was obtained as a light brown amorphorous solid (35 mg, 41%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.72 (s, 1H), 7.96–7.91 (m, 2H), 7.41–7.34 (m, 2H), 7.15–7.08 (m, 3H), 6.98–6.94 (m, 2H), 4.47 (m, 1H), 3.92 (s, 3H), 3.88 (s, 3H), 3.09–3.07 (m, 1H), 2.76–2.74 (m, 1H), 2.36 (s, 3H), 2.34 (s, 3H), 2.20–2.07 (m, 2H), 1.90–1.86 (m, 1H), 1.72–1.64 (m, 2H), 1.54–1.50 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.4, 159.8, 159.5, 159.3, 157.3, 149.4, 138.6, 131.0, 130.0, 129.2, 128.1, 126.1, 125.6, 124.3, 122.0, 121.6, 115.3, 115.2, 113.5, 113.1, 111.0, 110.9, 74.2, 59.9, 55.9, 55.4, 55.3, 46.3, 29.8, 23.3, 8.4. IR (film) ν_{max} 3406. 2939, 2839, 1705, 1674, 1605, 1526, 1502, 1367, 1269, 1242, 1205, 1182, 1138, 1105, 1036 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{31}H_{33}N_2O_6$, 529.2339; found, 529.2335.

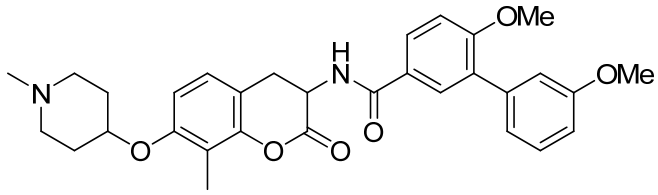


3',6-dimethoxy-N-(8-methoxy-7-(1-methylpiperidin-3-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (60b). Compound **60b** was obtained a light brown amorphorous solid (16 mg, 52%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.94–7.90 (m, 2H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.21 (d, *J* = 8.7 Hz, 1H), 7.15–7.07 (m, 3H), 6.98 (d, *J* = 8.7 Hz, 1H), 6.95 (dd, *J* = 8.0, 2.4 Hz, 1H), 4.48 (m, 1H), 4.01 (s, 3H), 3.91 (s, 3H), 3.87 (s, 3H), 3.06 (d, *J* = 10.0 Hz, 1H), 2.71 (d, *J* = 10.0 Hz, 1H), 2.34 (s, 3H), 2.10 (t, *J* = 9.7 Hz, 1H), 2.13–2.06 (m, 2H), 1.89–1.69 (m, 1H), 1.69–1.66 (m, 1H), 1.55–1.52 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.3, 158.9, 152.1, 144.2, 138.6, 137.6, 131.1, 130.0, 129.2, 128.2, 126.0, 123.9, 122.4, 122.2, 122.0, 115.3, 114.8, 113.3, 113.2, 111.0, 74.9, 61.5, 59.8, 55.9, 55.3 (2C), 46.3, 29.6, 23.2. IR (KBr) ν_{max} 3407, 2939, 2870, 2850, 1711, 1673, 1605, 1529, 1367, 1244, 1278, 1090 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{31}H_{33}N_2O_7$, 545.2288; found, 545.2298.

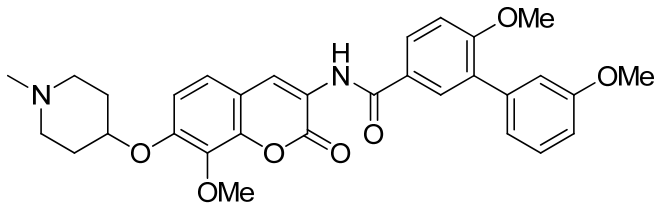


3',6-dimethoxy-N-(6-methoxy-8-methyl-7-(1-methylpiperidin-3-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (60c). Compound **60c** was obtained a light brown amorphorous solid (47 mg, 60 %). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.77 (s, 1H), 7.95–7.91 (m, 2H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.15–7.08 (m, 3H), 6.95 (dd, *J* = 8.0, 2.4 Hz, 1H), 6.85 (s, 1H), 4.35 (m, 1H), 3.92 (s, 3H), 3.90 (s, 3H), 3.88 (s, 3H), 3.00 (d, *J* = 8.0 hz, 1H), 2.69 (d, J = 8.0 Hz, 1H), 2.41 (s, 3H), 2.34 (s, 3H), 2.24 (t, *J* = 8.0 Hz, 1H), 2.09–2.01 (m, 3H), 1.88–1.85 (m, 1H), 1.63–1.49 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 159.8, 159.4, 159.3, 150.4, 147.0, 143.4, 138.6, 131.1, 130.0, 129.2, 128.2, 126.1, 123.8, 122.9, 122.0, 120.8, 115.3, 115.2, 113.1, 111.0, 106.3, 78.2, 60.5, 56.0, 55.9, 55.4, 55.3, 46.4, 30.3, 23.4, 9.6. IR (KBr) ν_{max}

3408, 2978, 2934, 2874, 2858, 1713, 1633, 1603, 1520, 1467, 1373, 1288, 1226, 1203, 1105 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{32}H_{35}N_2O_7$, 559.2444; found, 559.2446.

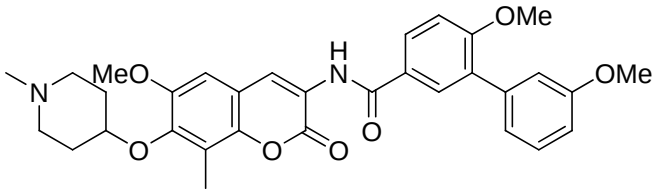


3',6-dimethoxy-N-(8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (61a). Compound **61a** was obtained a light brown amorphorous solid (56 mg, 46 %). ^1H NMR (400 MHz, $CDCl_3$) δ 8.76 (s, 1H), 8.67 (s, 1H), 7.92–7.86 (m, 2H), 7.36–7.33 (m, 2H), 7.11–7.08 (m, 3H), 6.93–6.89 (m, 2H), 4.54 (m, 1H), 3.89 (s, 3H), 3.84 (s, 3H), 2.80–2.76 (m, 2H), 2.57 (m, 2H), 2.41 (s, 3H), 2.33 (s, 3H), 2.19–2.12 (m, 2H), 1.97–1.95 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.1, 159.7, 159.4, 159.3, 157.0, 149.4, 138.9, 130.8, 130.8, 129.8, 128.1, 126.1, 125.5, 123.9, 121.9, 121.7, 115.3, 115.0, 113.2, 112.8, 111.0, 110.5, 73.1, 55.8, 55.3, 52.5, 46.0 (2C), 30.9 (2C), 8.1. IR (film) ν_{max} 3406, 2939, 2839, 1705, 1674, 1605, 1526, 1502, 1367, 1242, 1205, 1182, 1138, 1105, 1036 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{33}N_2O_6$, 529.2339; found, 529.2334.

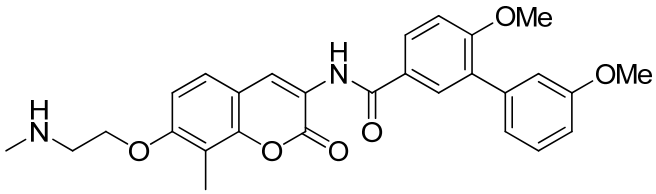


3',6-dimethoxy-N-(8-methoxy-7-((1-methylpiperidin-4-yl)oxy)-2-oxo-2H-chromen-3-yl)-[1,1'-biphenyl]-3-carboxamide (61b). Compound **61b** was obtained a light brown amorphorous solid (47 mg, 66 %). ^1H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.74 (s, 1H), 7.94–7.88 (m, 2H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.28 (d, *J* = 8.0 Hz, 1H), 7.14–7.08 (m, 3H), 6.98–6.94 (m, 2H). 4.78 (m,1H), 4.03 (s, 3H), 3.92 (s, 3H), 3.87 (s, 3H), 3.56–3.53 (m, 2H), 3.35–3.30 (m, 2H), 2.92

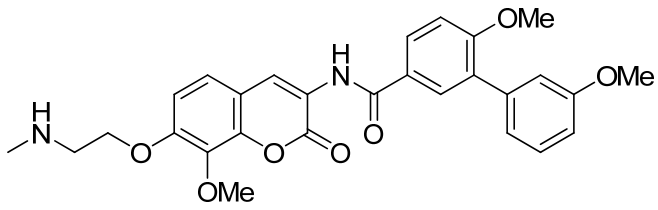
(s, 3H), 2.38–2.20 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.9, 160.0, 159.3, 158.5, 150.4, 144.3, 138.5, 138.2, 131.1, 130.0, 129.2, 128.3, 125.6, 123.7, 123.1, 122.8, 122.0, 116.2, 115.3, 114.3, 113.1, 111.1, 68.8, 61.8, 55.9, 55.3, 49.9 (2C), 44.1, 27.2 (2C). IR (KBr) ν_{max} 406, 2941, 2928, 2853, 1713, 1666, 1605, 1526, 1502, 1462, 1367, 1277, 1244, 1207, 1086, 1045 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{31}H_{33}N_2O_7$, 545.2288; found, 545.2281.



3',6-dimethoxy-N-(6-methoxy-8-methyl-7-((1-methylpiperidin-4-yl)oxy)-2-oxo-2H-chromen-3-yl)-[1,1'-biphenyl]-3-carboxamide (61c). Compound **61c** was obtained a light brown amorphorous solid (43 mg, 74%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.77 (s, 1H), 7.95–7.91 (m, 2H), 7.38 (t, *J* = 8.0 Hz, 1H0, 7.15–7.08 (m, 3H), 6.95 (dd, *J* = 8.0, 2.4 Hz, 1H), 6.86 (s, 1H), 4.30 (m, 1H), 3.90 (s, 3H), 3.88 (s, 3H), 3.86 (s, 3H), 2.97 (m, 2H), 2.52–2.46 (m, 5H), 2.40 (s, 3H), 2.11 (m, 2H), 2.00 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.8, 159.33, 159.31, 150.2, 146.8, 143.5, 138.6, 131.1, 130.0, 129.2, 128.2, 126.0, 123.6, 123.1, 122.0, 120.6, 115.34, 115.28, 113.1, 111.0, 106.5, 77.3, 56.0, 55.9, 55.3, 52.4 (2C), 45.3, 30.8 (2C), 9.7. IR (KBr) ν_{max} 3404, 2937, 2841, 1718, 1649, 1602, 1577, 1477, 1465, 1371, 1249, 1207, 1180, 1138, 1083 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{32}H_{35}N_2O_7$, 559.2444; found, 559.2448.

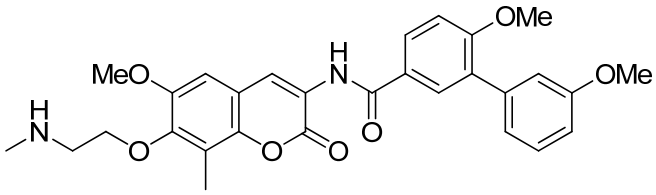


3',6-dimethoxy-N-(8-methyl-7-(2-(methylamino)ethoxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (64a). Compound **64a** was obtained after acidic deprotetion of **63a** as a light brown amorphous solid (174 mg, 65% over 2 steps). ^{1}HNMR (400 MHz, CD_3OD) δ 8.61 (s, 1H), 7.93 (dd, *J* = 8.6, 2.2 Hz, 1H), 7.87 (d, *J* = 2.2 Hz, 1H), 7.45 (d, *J* = 8.6 Hz, 1H), 7.32 (t, *J* = 8.2 Hz, 1H), 7.19 (d, *J* = 8.6 Hz, 1H), 7.09–7.05 (m, 3H), 6.91 (dd, *J* = 8.2, 1.5 Hz, 1H), 4.38 (t, *J* = 8.0 Hz, 2H), 3.89 (s, 3H), 3.83 (s, 3H), 3.53 (t, *J* = 8.0 Hz, 2H), 2.85 (s, 3H), 2.35 (s, 3H). ^{13}C NMR (100 MHz, DMSO-d_6) δ 165.3, 159.3, 159.1, 158.4, 157.7, 149.7, 138.8, 130.1, 129.6, 129.5, 129.3, 126.4, 125.9, 121.9, 121.5, 118.8, 115.8, 115.4, 113.2, 113.0, 111.7, 109.2, 65.3, 56.0, 55.2, 48.0, 33.7, 8.1. IR (KBr) ν_{max} 3433 (broad), 2924, 2851, 1691, 1652, 1601, 1462, 1382, 1209, 1145, 1020 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{28}H_{29}N_2O_6$, 489.2026; found, 489.2020.

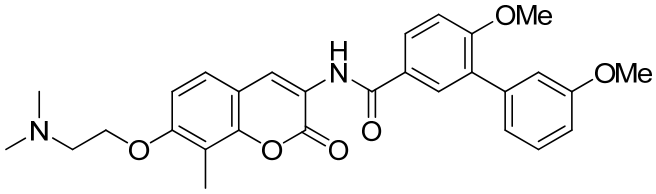


3',6-dimethoxy-N-(8-methoxy-7-(2-(methylamino)ethoxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (64b). Compound **64b** was obtained after acidic deprotetion of **63b** as a light yellow amorphous solid (112 mg, 89% over 2 steps). ^{1}HNMR (400 MHz, CD_3OD) δ 8.59 (s, 1H), 7.90 (dd, *J* = 8.6, 2.4 Hz, 1H), 7.85 (d, *J* = 2.4 Hz, 1H), 7.32–7.29 (m, 2H), 7.16 (d, *J* = 8.6 Hz, 1H), 7.10 (d, *J* = 8.8 Hz, 1H), 7.07–7.06 (m, 2H), 6.91–6.89 (m, 1H), 4.40 (t, *J* = 4.9 Hz, 2H), 3.98 (s, 3H), 3.87 (s, 3H), 3.82 (s, 3H), 3.52 (t, *J* = 4.9 Hz, 2H), 2.85 (s, 3H). ^{13}CNMR (100 MHz, CD_3OD) δ 168.0, 161.5, 161.0, 159.9, 153.7, 145.8, 140.3, 138.0, 132.2, 131.4, 130.2, 129.8, 127.2, 127.0, 124.4, 123.9, 123.1, 117.0, 116.5, 113.9, 113.1, 112.5, 66.7, 62.4, 56.5, 55.9, 49.6, 34.2. IR (KBr) ν_{max} 3402 (broad), 2926, 2851, 1702, 1678, 1601, 1479, 1383,

1248, 1209, 1146, 1099, 1020 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{28}H_{29}N_2O_7$, 505.1975; found, 505.1977.

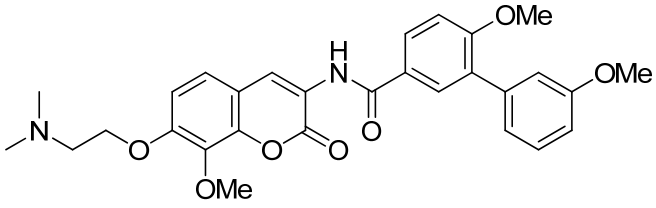


3',6-dimethoxy-N-(6-methoxy-8-methyl-7-(2-(methylamino)ethoxy)-2-oxo-2H-chromen-3-yl)biphenyl-3-carboxamide (64c). Compound **64c** was obtained after acidic deprotetion of **63c** as a light yellow amorphous solid (59 mg, 47% over 2 steps). ^{1}HNMR (400 MHz, CD_3OD) δ 8.53 (s, 1H), 7.84–7.79 (m, 2H), 6.98 (t, *J* = 8.0 Hz, 1H), 6.78–6.74 (m, 3H), 6.59 (s, 1H), 6.58 (dd, *J* = 8.0, 1.5 Hz, 1H), 3.89 (t, *J* = 4.5 Hz, 2H), 3.56 (s, 3H), 3.11 (t, *J* = 4.5 Hz, 2H), 3.05 (s, 3H), 3.01 (s, 3H), 2.53 (s, 3H), 1.98 (s, 3H). ^{13}CNMR **(**100 MHz, CD_3OD) δ 170.0, 163.8, 163.3, 162.7, 153.7, 150.4, 147.0, 142.6, 134.4, 133.7, 132.6, 132.1, 129.4, 128.6, 127.0, 125.5, 123.7, 120.0, 119.0, 116.2, 114.8, 110.6, 71.3, 59.1, 58.8, 58.3, 52.8, 36.3, 11.4. IR (KBr) ν_{max} 3450 (broad), 2924, 2845, 1708, 1678, 1602, 1464, 1383, 1277, 1209, 1146, 1020 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{29}H_{31}N_2O_7$, 519.2131; found, 519.2128.

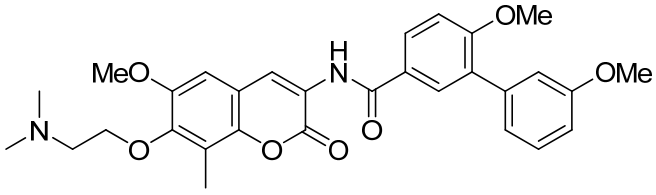


N-(7-(2-(dimethylamino)ethoxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (65a). Compound **65a** was obtained as colorless amorphous solid (52 mg, 66%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.70 (s, 1H), 7.93–7.89 (m, 2H), 7.39–7.34 (m, 2H), 7.14–7.06 (m, 3H), 6.94 (dd, *J* = 8.2, 2.4 Hz, 1H), 6.88 (d, *J* = 8.7, 1H), 4.17 (t, *J* = 5.8 Hz, 2H), 3.90 (s, 3H), 3.86 (s, 3H), 2.81 (t, *J* = 5.8 Hz, 2H), 2.38 (s,

6H), 2.34 (s, 3H). ^{13}CNMR (100 MHz, CDCl3) δ 165.5, 159.8, 159.6, 159.3, 158.3, 149.2, 138.6, 131.0, 130.0, 129.2, 128.2, 126.1, 125.7, 124.4, 122.0, 121.6, 115.2, 114.2, 113.5, 113.2, 11.0, 108.9, 67.5, 58.3, 55.9, 55.3, 46.2, 8.4. IR (KBr) ν_{max} 3406, 2926, 2851, 1709, 1667, 1605, 1582, 1500, 1441, 1367, 1269, 1246, 1207, 1180, 1140, 1113 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{29}H_{31}N_2O_6$, 503.2182; found, 503.2181.

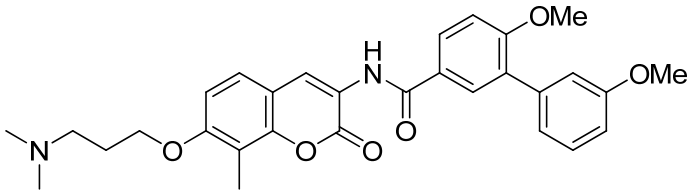


N-(7-(2-(dimethylamino)ethoxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (65b). Compound **65b** was obtained as a light yellow amorphous solid (47 mg, 70%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.71(s, 1H), 7.93–7.89 (m, 2H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.22 (d, *J* = 8.8 Hz, 1H), 7.13–7.06 (m, 3H), 6.95–6.92 (m, 2H), 4.21 (t, *J* = 5.9 Hz, 2H), 4.00 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 2.82 (t, *J* = 5.9 Hz, 2H), 2.38 (s, 6H). ^{13}CNMR (100 MHz, CDCl3) δ 165.5, 159.8, 159.3, 158.9, 153.3, 144.0, 138.6, 136.7, 131.1, 130.0, 129.2, 128.2, 126.0, 123.9, 122.5, 122.1, 122.0, 115.3, 114.7, 113.2, 111.2, 111.0, 68.0, 61.6, 58.1, 55.9, 55.3, 46.0. IR (KBr) ν_{max} 3404, 2928, 2853, 1693, 1648, 1605, 1479, 1367, 1248, 1207, 1113, 1032, 1022 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{29}H_{31}N_2O_7$, 519.2131; found, 519.2135.

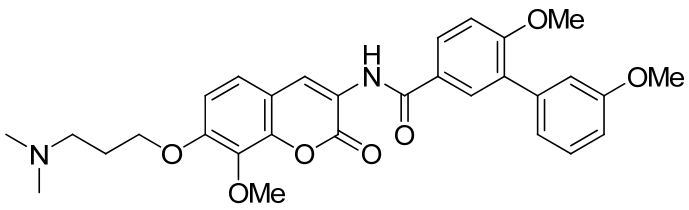


N-(7-(2-(dimethylamino)ethoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (65c). Compound **65c** was obtained as a white amorphous

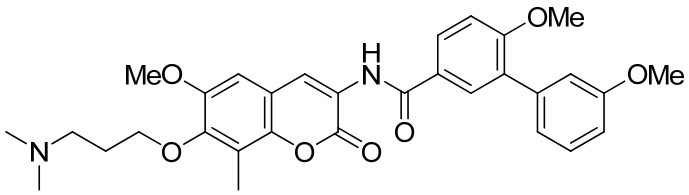
solid (41 mg, 64%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.77 (s, 1H), 7.94–7.91 (m, 2H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.15–7.08 (m, 3H), 6.96–6.94 (m, 1H), 6.86 (s, 1H), 4.15 (t, *J* = 5.7 Hz, 2H), 3.91 (s, 6H), 3.88 (s, 3H), 2.83 (t, *J* = 5.7 Hz, 2H), 2.47 (s, 3H), 2.45 (s, 3H), 2.41 (s, 3H). ^{13}CNMR (100 MHz, CDCl3) δ 165.5, 159.8, 159.4 (2C), 150.3, 148.1, 143.4, 138.6, 131.1, 130.0, 129.2, 128.2, 126.0, 123.7, 123.1, 122.0, 120.4, 115.5, 115.3, 113.1, 111.0, 106.5, 70.5, 59.0, 56.0, 55.9, 55.3, 45.6, 9.0. IR (KBr) ν_{max} 3398, 2954, 2847, 1706, 1674, 1605, 1582, 1529, 1502, 1468, 1381, 1246, 1207, 1144, 1022 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{30}H_{33}N_2O_7$, 533.2288; found, 533.2291.



N-(7-(3-(dimethylamino)propoxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (66a). Compound **66a** was obtained as a light brown amorphous solid (65 mg, 70%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.71 (s, 1H), 7.95–7.91 (m, 2H), 7.40–7.34 (m, 2H), 7.15–7.08 (m, 3H), 6.95 (dd, *J* = 8.2, 2.0 Hz, 1H), 6.89 (d, *J* = 8.7 Hz, 1H), 4.14 (t, *J* = 6.2 Hz, 2H), 3.92 (s, 3H), 3.88 (s, 3H), 2.61 (t, *J* = 6.2 Hz, 2H), 2.37 (s, 6H), 2.34 (s, 3H), 2.11–2.06 (m, 2H). ^{13}CNMR (100 MHz, CDCl3) δ 165.5, 159.8, 159.6, 159.3, 158.4, 149.2, 138.6, 131.0, 130.0, 129.2, 128.2, 126.1, 125.7, 124.5, 122.0, 121.5, 115.2, 114.1, 113.4, 113.2, 111.0, 108.9, 66.8, 56.3, 55.9, 55.3, 45.3, 27.2, 8.2. IR (KBr) ν_{max} 3400, 2924, 2854, 1708, 1670, 1607, 1528, 1367, 1242, 1205, 1111, 1022 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{30}H_{33}N_2O_6$, 517.2339; found, 517.2342.

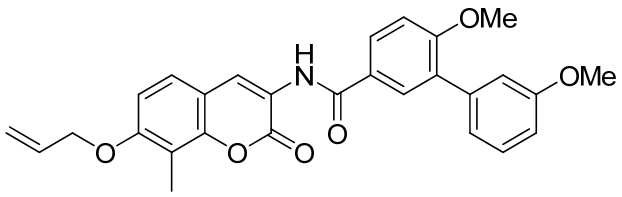


N-(7-(3-(dimethylamino)propoxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (66b). Compound **66b** was obtained as a light yellow amorphous solid (36 mg, 72%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.70 (s, 1H), 7.92–7.88 (m, 2H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.22 (d, *J* = 8.0 Hz, 1H), 7.13–7.06 (m, 3H), 6.94–6.90 (m, 2H), 4.17 (t, *J* = 6.2 Hz, 2H), 4.02 (s, 3H), 3.92 (s, 3H), 3.86 (s, 3H), 2.65 (t, *J* = 6.2 Hz, 2H), 2.39 (s, 6H), 2.12 (m, 2H). ^{13}CNMR (100 MHz, CDCl3) δ 165.5, 159.8, 159.4, 158.9, 153.4, 144.0, 138.6, 136.5, 131.1, 130.0, 129.2, 128.2, 126.0, 124.0, 122.6, 122.1, 122.0, 115.3, 114.6, 113.2, 111.0, 111.95, 67.5, 61.5, 56.1, 55.9, 55.3, 45.1, 27.0. IR (KBr) ν_{max} 3404, 2941, 2837, 1709, 1666, 1602, 1582, 1501, 1462, 1379, 1244, 1207, 1180, 1093 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{30}H_{33}N_2O_7$, 533.2288; found, 533.2291.

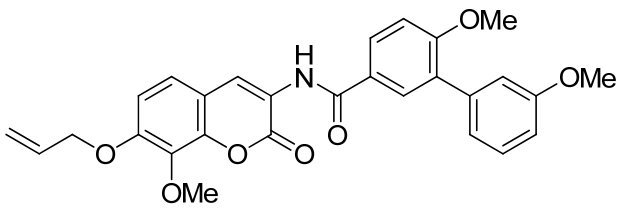


N-(7-(3-(dimethylamino)propoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (66c). Compound **66c** was obtained as a white amorphous solid (57 mg, 76%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.75 (s, 1H), 7.92–7.90 (m, 2H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.14–7.06 (m, 3H), 6.95–6.92 (m, 1H), 6.84 (s, 1H), 4.06 (t, *J* = 6.2 Hz, 2H), 3.90 (s, 3H), 3.89 (s, 3H), 3.87 (s, 3H), 2.74 (t, *J* = 6.2 Hz, 2H), 2.44 (s, 6H), 2.39 (s, 3H), 2.11–2.05 (m, 2H). ^{13}CNMR (100 MHz, CDCl3) δ 165.5, 159.8, 159.3, 158.30, 158.29 150.3, 148.0, 143.3, 138.6, 131.0, 130.0, 129.2, 126.0, 123.7, 123.1, 122.0, 120.3, 115.5, 115.3, 113.1,

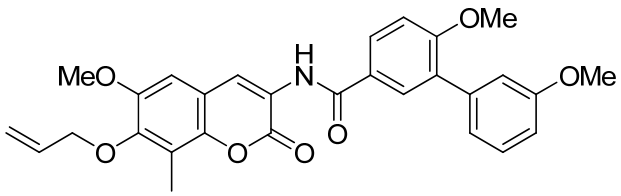
111.0, 106.5, 71.3, 56.3, 56.0, 55.9, 55.3, 44.9, 27.7, 9.0. IR (KBr) ν_{max} 3404, 2941, 2837, 1709, 1672, 1603, 1582, 1526, 1501, 1464, 1377, 1242, 1205, 1093, 1034 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{35}N_2O_7$, 547.2444; found, 547.2449.



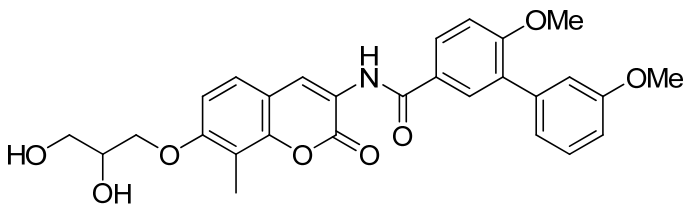
N-(7-(allyloxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (67a). A solution of compound **6a** (149 mg, 0.35 mmol) in THF (5 mL) was treated with potassium carbonate (238 mg, 1.73 mmol) and allylbromide (84 mg, 0.69 mmol). The resulting mixture was refluxed for 8 h, quenched with aqueous ammonium chloride and extracted with ethyl acetate (3 x 50 mL). The combined organic layers were washed with water and saturated sodium chloride solution, dried over anhydrous magnesium sulfate and concentrated to dryness. The residue was purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to give compound **67a** as a white amorphous solid (144 mg, 88%). ^1H NMR (500 MHz, $CDCl_3$) δ 8.77 (s, 1H), 8.70 (s, 1H), 7.92–7.90 (m, 2H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.32 (d, *J* = 8.0 Hz, 1H), 7.16–7.12 (m, 2H), 7.06 (d, *J* = 8.0 Hz, 1H), 6.95 (dd, *J* = 8.0 Hz, 1.5, 1H), 6.85 (d, *J* = 8.0 Hz, 1H), 6.61–6.04 (m, 1H), 5.47 (dd, *J* = 7.1, 1.5 Hz, 1H), 5.33 (dt, *J* = 10.2, 1.1 Hz, 1H), 4.61 (d, *J* = 5.0 Hz, 2H), 3.90 (s, 3H), 3.88 (s, 3H), 2.35 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.3, 159.7, 159.5, 159.4, 158.0, 149.2, 138.6, 132.8, 131.0, 130.0, 129.2, 128.1, 126.1, 125.6, 124.2, 122.0, 121.6, 117.6, 115.3, 114.3, 113.5, 113.1, 111.0, 109.2, 69.3, 55.9, 55.3, 8.2. IR (KBr) ν_{max} 3400, 3085, 3025, 2939, 2835, 1711, 1672, 1605, 1524, 1502, 1462, 1367, 1281, 1246, 1207, 1180, 1103, 1022 cm^{-1}. HRMS (ESI^+) m/z calcd for [M+Na^+] $C_{28}H_{24}NO_6Na$, 494.1580; found, 494.1583.



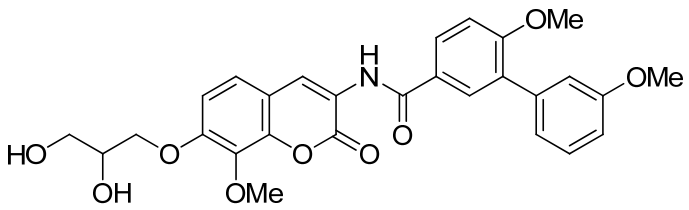
N-(7-(allyloxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (67b). A solution of compound **6b** (61 mg, 0.14 mmol) in DMF (5 mL) was treated with sodium hydride (60%, 8.4 mg, 0.21 mmol) and allylbromide (34 mg, 0.28 mmol). The resulting mixture was refluxed for 8 h, quenched with aqueous ammonium chloride and extracted with ethyl acetate (3 x 50 mL). The combined organic layers were washed with water and saturated sodium chloride solution, dried over anhydrous magnesium sulfate and concentrated to dryness. The residue was purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford compound **67b** as a white amorphous solid (57 mg, 84%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.81 (s, 1H), 8.72 (s, 1H), 7.92 (dd, *J* = 8.6, 2.4 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.32 (d, *J* = 8.6 Hz, 1H), 7.13 (td, *J* = 7.6, 1.0 Hz, 1H), 7.10–7.08 (m, 1H), 7.07 (d, *J* = 8.6 Hz, 1H), 6.95–6.92 (m, 2H), 6.13–6.05 (m, 1H), 5.46 (dd, *J* = 7.2, 1.5 Hz, 1H), 5.34 (dt, *J* = 5.0, 1.1 Hz, 1H), 4.69 (dd, *J* = 5.0, 1.0 Hz, 2H), 4.02 (s, 1H), 3.91 (s, 3H), 3.87 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.8, 160.0, 159.5, 159.1, 153.2, 144.2, 138.8, 136.8, 132.8, 131.3, 130.2, 129.4, 128.4, 126.2, 124.2, 122.7, 122.4, 122.2, 118.5, 115.5, 114.9, 113.4, 111.5, 111.2, 70.3, 61.8, 56.1, 55.5. IR (KBr) ν_{max} 3400, 3084, 3000, 2937, 2835, 1713, 1672, 1607, 1526, 1502, 1462, 1367, 1283, 1245, 1207, 1103, 1022 cm^{-1}. HRMS (ESI$^+$) m/z calcd for [M+Na$^+$] $C_{28}H_{25}NO_7Na$, 510.1529; found, 510.1521.



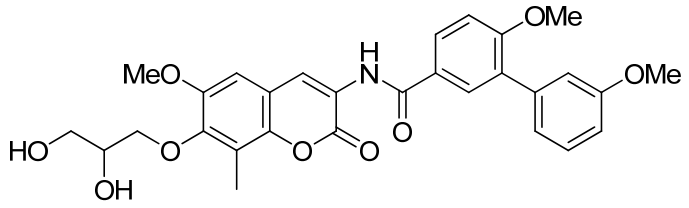
N-(7-(allyloxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (67c). Compound **67c** was obtained as a white amorphous solid (34 mg, 76%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.77 (s, 1H), 8.74 (s, 1H), 7.90 (dd, *J* = 10.8, 2.3 Hz, 1H), 7.88 (d, *J* = 2.3Hz, 1H), 7.34 (t, *J* = 10.8 Hz, 1H), 7.11 (d, *J* = 7.6 Hz, 1H), 7.08 (s, 1H), 7.05 (d, *J* = 8.5, Hz, 1H), 6.92 (d, *J* = 8.5, 1H), 6.83 (s, 1H), 6.12–6.04 (m, 1H), 5.35 (d, *J* = 7.2, 1.5 Hz, 1H), 5.23 (d, *J* = 10.3 Hz, 1H), 4.54 (dd, *J* = 6.0, 1.0 Hz, 2H), 3.89 (s, 1H), 3.88 (s, 3H), 3.84 (s, 3H), 2.37 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.8, 160.0, 159.6, 159.5, 150.6, 148.0, 143.5, 138.8, 134.0, 131.2, 130.2, 129.4, 128.4, 126.2, 123.9, 123.2, 122.2, 120.8, 118.4, 115.7, 115.5, 113.3, 111.2, 106.7, 74.4, 56.2, 56.1, 55.5, 9.4. IR (KBr) ν_{max} 3402, 3084, 3002, 2939, 2835, 1713, 1670, 1605, 1526, 1502, 1462, 1367, 1283, 1246, 1207,1103, 1022 cm^{-1}. HRMS (ESI$^+$) m/z calcd for [M+Na$^+$] $C_{29}H_{27}NO_7Na$, 524.1685; found, 524.1684.



***N*-(7-(2,3-Dihydroxypropoxy)-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (68a).** Compound **68a** was obtained as a white amorphous powder (58 mg, 90%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.82 (s, 1H), 8.72 (s, 1H), 7.95–7.91 (m, 2H), 7.41–7.36 (m, 2H), 7.16–7.08 (m, 3H), 6.97–6.90 (m, 2H), 4.22–4.16 (m, 3H), 3.99 (s, 3H), 3.92 (s, 3H), 3.91–3.81 (2H), 2.59 (s, 1H), 2.36 (s, 3H), 2.02 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.6, 159.5, 159.4, 158.9, 158.8, 150.0, 139.2, 130.4, 129.8, 129.6, 129.5, 129.3, 126.7, 126.2, 122.2, 121.5, 115.7, 113.1, 113.0 (2C), 112.0, 109.6, 70.9, 70.4, 63.1, 56.4, 55.6, 8.4. IR (KBr) ν_{max} 3256 (broad), 3030, 2980, 2939, 1735, 1691, 1526, 1382, 1256, 1178, 1109, 1051, 1020 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{28}H_{27}NO_8Na$, 528.1634; found, 528.1630.

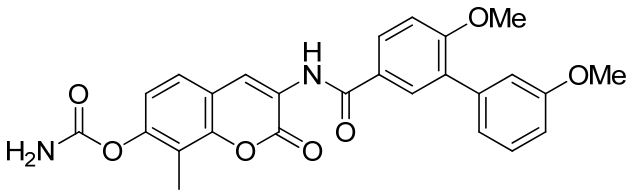


N-(7-(2,3-dihydroxypropoxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (68b). Compound **68b** was obtained as a white amorphous powder (26 mg, 74%). ^{1}H NMR (500 MHz, DMSO-d_6) δ 9.68 (s, 1H), 8.48 (s, 1H), 7.99 (dd, *J* = 8.6, 2.3 Hz, 1H), 7.92 (d, *J* = 2.3 Hz, 1H), 7.45 (d, *J* = 8.8 Hz, 1H), 7.37 (t, *J* = 7.9 Hz, 1H), 7.26 (d, J = 8.6, 1H), 7.12 (t, J = 8.8 Hz, 1H), 7.10 (d, J = 2.6 Hz, 1H), 6.96 (dd, J= 8.3, 2.1 Hz, 1H), 5.05 (bs, 1H), 4.73 (t, *J* = 5.7 Hz, 1H), 4.15 (dd, J = 10.0, 4.1 Hz, 1H), 4.04 (dd, J = 10.0, 2.2 Hz, 1H), 3.87 (s, 3H), 3.86 (s, 3H), 3.79 (s, 3H), 3.50 (t, *J* = 5.6 Hz, 2H). ^{13}C NMR (125 MHz, DMSO-d_6) δ 165.1, 159.1, 158.9, 157.9, 153.6, 144.2, 138.7, 135.3, 130.0, 129.3, 129.2, 129.1 (2C), 125.7, 122.9, 121.7, 121.5, 115.2, 113.6, 112.5, 111.5, 110.8. 70.7, 69.8, 62.6, 60.8, 55.9, 55.1. IR (KBr) ν_{max} 3294 (broad), 2982, 2937, 1711, 1678, 1538, 1502, 1468, 1375, 1232, 1109, 1047, 1020 cm^{-1}. HRMS (ESI^{+}) m/z: [M + Na^{+}] calcd for $C_{28}H_{27}NO_9Na$, 544.1583; found, 544.1581.

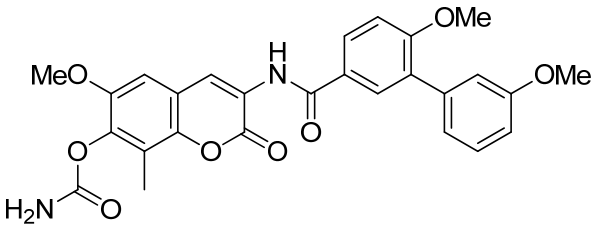


N-(7-(2,3-dihydroxypropoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-3',6-dimethoxybiphenyl-3-carboxamide (68c). Compound **68c** was obtained as a white amorphous powder (18 mg, 67%). ^{1}H NMR (500 MHz, DMSO-d_6) δ 9.65 (s, 1H), 8.54 (s, 1H), 8.00 (dd, *J* = 8.7, 2.4 Hz, 1H), 7.91 (d, *J* = 2.4 Hz, 1H), 7.37 (t, *J* = 7.9 Hz, 1H), 7.29 (s, 1H), 7.26 (d, *J* = 8.8 Hz, 1H), 7.12–7.09 (m, 2H), 6.96 (dd, *J* = 8.6, 2.6 Hz, 1H), 4.89 (s, OH, 1H), 4.62 (t, *J* = 5.7 Hz,

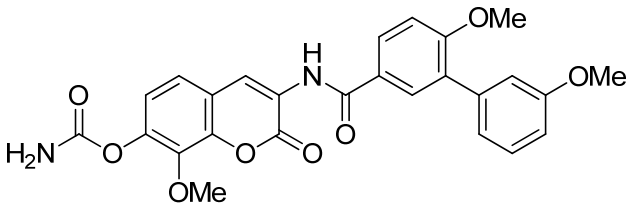
1H), 4.05 (dd, *J* = 10.0, 4.2, 1H), 3.98–3.92 (m, 1H), 3.86 (s, 3H), 3.85 (s, 3H), 3.80 (s, 3H), 3.79–3.74 (m, 1H), 3.44 (t, *J* = 5.6 Hz, 2H). 2.31 (s, 3H). ^{13}C NMR (125 MHz, DMSO-d_6) δ 165.2, 159.1, 159.0, 158.2, 149.6, 148.1, 143.5, 138.7, 130.0, 129.4, 129.1 (2C), 128.1, 125.7, 122.6, 121.7, 119.0, 115.2, 114.6, 112.6, 111.6, 107.6, 75.0, 70.7, 62.9, 56.1, 55.9, 55.1, 8.8. IR (KBr) ν_{max} 3284 (broad), 2980, 2842, 1709, 1694, 1524, 1483, 1375, 1251, 1178, 1146, 1109, 1051, 1020 cm^{-1}. HRMS (ESI$^+$) m/z: [M + Na$^+$] calcd for $C_{29}H_{29}NO_9Na$, 558.1740; found, 558.1733.



3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yl carbamate (69a): A solution of sulfurisocyanatidic chloride (6.0 μL, 0.070 mmol), dissolved in anhydrous CH_2Cl_2 (0.20 mL), was slowly added to **6a**[3] (30 mg, 0.070 mmol) in anhydrous CH_2Cl_2 (1.20 mL) at rt. After 2 h, the solvent was removed and the residue was stirred with cold H_2O overnight. The solid was collected by filtration, washing with H_2O, and thoroughly dried to afford **69a** as a yellow amorphous solid (19 mg, 56%): ^{1}H NMR (DMSO-d_6, 500 MHz) δ 9.77 (s, 1H), 8.59 (s, 1H), 8.01 (dd, *J* = 9.0, 2.5 Hz, 1H), 7.93 (d, *J* = 2.5 Hz, 1H), 7.62 (d, *J* = 8.5 Hz, 1H), 7.43 (bs, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.27 (d, *J* = 9.0 Hz, 1H), 7.14–7.09 (m, 4H), 6.97–6.94 (m, 1H), 3.87 (s, 3H), 3.80 (s, 3H), 2.21 (s, 3H); ^{13}C NMR (DMSO-d_6, 125 MHz) δ 168.5, 165.3, 159.2, 159.0, 154.2, 149.1, 138.7, 136.7, 130.1, 129.4, 129.3, 129.2, 127.9, 125.7, 125.6, 123.2, 121.8, 119.8, 118.4, 116.6, 115.3, 112.6, 111.6, 56.0, 55.2, 8.7; IR (film) ν_{max} 3053, 2986, 2305, 1713, 1603, 1522, 1421, 1367, 1265, 897, 748; HRMS (ESI$^+$) *m/z*: [M + 2H$^+$] calcd for $C_{26}H_{24}N_2O_7$, 476.1584; found, 476.1514.

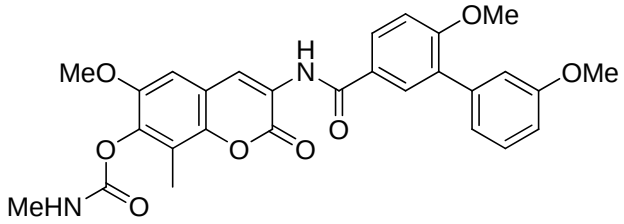


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl carbamate (69b): A solution of sulfurisocyanatidic chloride (3.8 μL, 0.043 mmol), dissolved in anhydrous CH_2Cl_2 (0.12 mL), was slowly added to **6b** (20 mg, 0.043 mmol) in anhydrous CH_2Cl_2 (0.75 mL) at rt. After 2 h, the solvent was removed and the residue was stirred with cold H_2O overnight. The solid was collected by filtration, washing with H_2O, and thoroughly dried to afford **69b** as a yellow amorphous solid (11 mg, 50%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.81 (s, 1H), 8.78 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.90 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.14–7.07 (m, 4H), 6.95–6.93 (m, 1H), 6.91 (s, 1H), 3.90 (s, 6H), 3.86 (s, 3H), 2.36 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.8, 160.0, 159.5, 159.2, 153.8, 149.6, 142.8, 139.7, 138.7, 131.2, 130.2, 129.3, 128.4, 126,1, 124.1, 123.3, 122.1, 121.3, 117.8, 115.4, 113.3, 111.1, 106.6, 56.5, 56.0, 55.5, 9.2; IR (film) ν_{max} 3053, 2986, 2684, 2305, 1421, 1265, 895, 750, 706; HRMS (ESI$^+$) *m/z*: [M + 2H$^+$] calcd for $C_{27}H_{26}N_2O_8$, 506.1689; found, 506.1637.



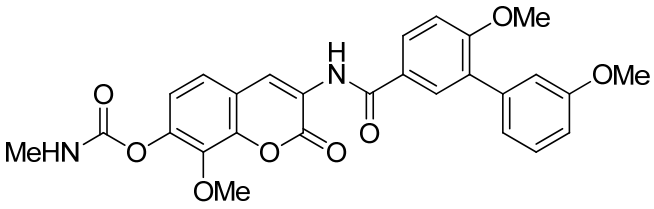
3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl carbamate (69c): A solution of sulfurisocyanatidic chloride (11 μL, 0.13 mmol), dissolved in anhydrous CH_2Cl_2 (0.4 mL), was slowly added to **6c** (30 mg, 0.066 mmol) in anhydrous CH_2Cl_2 (1.6 mL) at rt. After 2 h, the solvent was removed and the residue was stirred with cold H_2O

overnight. The solid was collected by filtration, washing with H_2O, and thoroughly dried to afford **69c** as a colorless amorphous solid (22 mg, 68%): ^{1}H NMR (DMSO-d_6, 500 MHz) δ 9.78 (s, 1H), 8.58 (s, 1H), 8.01 (dd, J = 8.5, 2.5 Hz, 1H), 7.93 (d, J = 2.5 Hz, 1H), 7.49 (d, J = 8.5 Hz, 1H), 7.46 (bs, 1H), 7.37 (t, J = 8.0 Hz, 1H), 7.27 (d, J = 8.5 Hz, 1H), 7.16–7.10 (m, 4H), 6.97–6.94 (m, 1H), 3.91 (s, 3H), 3.87 (s, 3H), 3.80 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.8, 160.1, 159.5, 158.4, 154.1, 144.3, 143.7, 140.0, 138.7, 131.3, 130.1, 129.3, 128.4, 125.9, 123.9, 123.2, 122.2, 122.1, 120.3, 119.3, 115.4, 113.3, 111.2, 62.0, 56.1, 55.5; IR (film) ν_{max} 3406, 3271, 3053, 2986, 2359, 2339, 1715, 1672, 1603, 1531, 1502, 1366, 1265, 1082, 897, 737, 704; HRMS (ESI$^+$) *m/z*: [M + H$^+$] calcd for $C_{26}H_{23}N_2O_8$, 491.1454; found, 491.1432.

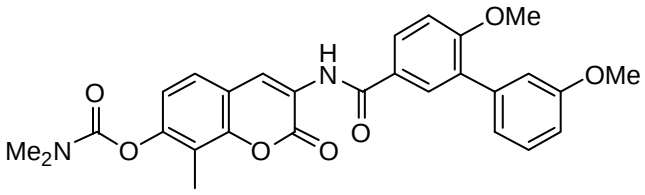


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl methylcarbamate (70b): A solution of **6b** (20 mg, 0.043 mmol) in anhydrous pyridine (2.1 mL) was treated with methylcarbamic chloride (4.4 mg). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **70b** as a yellow amorphous solid (21 mg, 95%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.79 (s, 1H), 8.71 (s, 1H), 7.92 (dd, J = 8.5, 2.5 Hz, 1H), 7.89 (d, J = 2.5 Hz, 1H), 7.37 (t, J = 8.0 Hz, 1H), 7.13–7.06 (m, 3H), 6.95–6.92 (m, 1H), 6.81 (s, 1H), 6.11 (s, 1H), 3.96 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 3.37 (s, 3H), 2.37 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 159.9, 159.7, 159.4, 146.1, 144.5, 144.2, 138.7 (2C), 131.1, 130.1, 129.3, 128.3, 126.3, 124.7, 122.1, 122.0, 115.4, 113.3, 112.2, 111.9, 111.1, 105.0, 56.4, 56.0, 55.5, 29.6, 8.3; IR (film) ν_{max} 3053, 2986,

2685, 2359, 2341, 2307, 1684, 1421, 1265, 1022, 897, 746, 704; HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{28}H_{27}N_2O_8$, 519.1767; found, 519.1839.

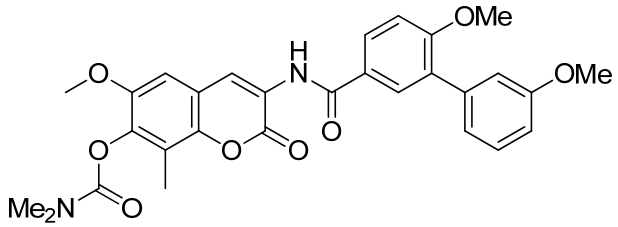


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl methylcarbamate (70c): A solution of **6c** (33 mg, 0.074 mmol) in anhydrous pyridine (3.5 mL) was treated with methylcarbamic chloride (7.4 mg). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **70c** as a yellow amorphous solid (34 mg, 90%): ^1H NMR ($CDCl_3$, 500 MHz) δ 8.81 (s, 1H), 8.65 (bs, 1H), 7.97 (bs, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.88 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.18 (d, *J* = 8.5 Hz, 1H), 7.13–7.07 (m, 3H), 6.96 (d, *J* = 8.5 Hz, 1H), 6.95–6.93 (m, 1H), 4.12 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.0, 159.5, 158.7, 150.4, 143.1, 141.6, 138.7, 133.7, 131.2, 130.1, 129.3, 128.3, 126.1, 124.8, 123.3, 122.1, 121.7, 115.4, 114.1, 113.3, 113.1, 111.2, 62.1, 56.0, 55.5, 29.9; IR (film) ν_{max} 3030, 2851, 2284, 1693, 1668, 1599, 1520, 1495, 1487, 1371, 1342, 1231, 1161, 1078, 964, 901, 856, 795; HRMS (ESI^+) *m/z*: [M + Na^+] calcd for $C_{27}H_{24}N_2NaO_8$, 527.1430; found, 527.1403.



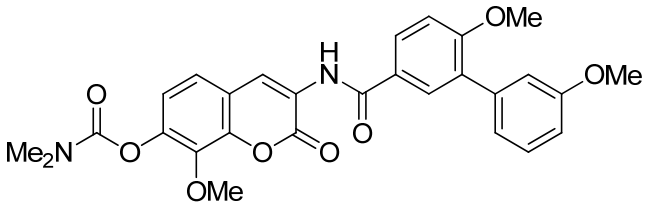
3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yl dimethylcarbamate (71a): A solution of **6a** (30 mg, 0.070 mmol) in pyridine (3.0 mL) at rt was

treated with dimethylcarbamyl chloride (1.0 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **71a** as a colorless amorphous solid (31 mg, 89%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.84 (s, 1H), 8.75 (s, 1H), 7.93 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.90 (d, *J* = 2.0 Hz, 1H), 7.40–7.35 (m, 2H), 7.14–7.07 (m, 4H), 6.95–6.92 (m, 1H), 3.91 (s, 3H), 3.86 (s, 3H), 3.17 (s, 3H), 3.05 (s, 3H), 2.34 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.8, 160.0, 159.5, 159.3, 154.2, 151.0, 148.9, 138.7, 131.2, 130.1, 129.3, 128.4, 126.1, 125.5, 123.6, 123.5, 122.2, 119.9, 119.3, 117.4, 115.4, 113.3, 111.2, 56.1. 55.5, 37.0, 36.7, 9.1; IR (film) ν_{max} 3053, 2986, 2305, 1724, 1421, 1265, 1163, 895, 746, 706; HRMS (ESI$^+$) *m/z*: [M + 2H$^+$] calcd for $C_{28}H_{28}N_2O_7$, 504.1897; found, 504.1822.

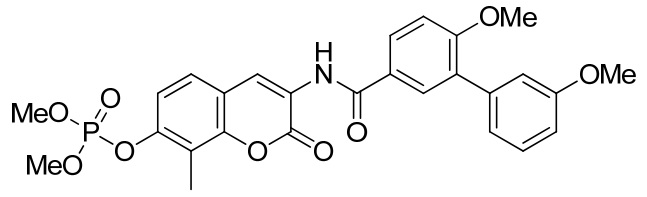


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl dimethylcarbamate (71b): A solution of **6b** (25 mg, 0.054 mmol) in pyridine (2.25 mL) at rt was treated with dimethylcarbamyl chloride (0.75 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **71b** as a yellow amorphous solid (25 mg, 85%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.81 (s, 1H), 8.77 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.90 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.14–7.07 (m, 3H), 6.95–6.92 (m, 1H), 6.89 (s, 1H), 3.90 (s, 3H), 3.88 (s, 3H), 3.86 (s, 3H), 3.18 (s, 3H), 3.04 (s, 3H), 2.34 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.0, 159.5, 159.3, 154.0, 149.7, 143.0, 140.8, 138.7, 131.2, 130.2, 129.3, 128.4, 126.1, 123.9, 123.6, 122.2, 121.1, 117.3, 115.4, 113.3, 111.1, 106.5, 56.5, 56.0, 55.5, 37.1, 36.8, 9.3; IR (film) ν_{max} 3053,

2986, 2305, 1724, 1713, 1672, 1603, 1522, 1501, 1421, 1383, 1267, 1163, 897, 739, 704; HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{29}H_{29}N_2O_8$, 533.1924; found, 533.1841.

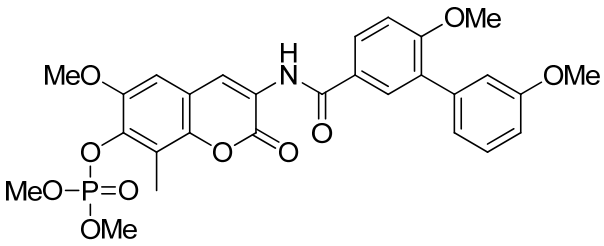


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl dimethylcarbamate (71c): A solution of **6c** (25 mg, 0.056 mmol) in pyridine (2.25 mL) at rt was treated with dimethylcarbamyl chloride (0.75 mL). After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **71c** as a colorless amorphous solid (19 mg, 65%): ^1H NMR ($CDCl_3$, 500 MHz) δ 8.84 (s, 1H), 8.74 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.90 (d, *J* = 2.5 Hz, 1H), 7.38–7.35 (m, 2H), 7.13–7.07 (m, 4H), 6.95–6.93 (m, 1H), 4.05 (s, 3H), 3.91 (s, 3H), 3.86 (s, 3H), 3.16 (s, 3H), 3.05 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.8, 160.0, 158.6, 156.5, 153.0, 149.9, 145.5, 144.0, 142.6, 140.0, 135.6, 130.1, 129.3, 128.4 (2C), 126.0, 123.5, 122.1, 120.5, 118.9, 115.4, 113.3, 111.2, 61.9, 56.0, 55.5, 36.8 (2C); IR (film) ν_{max} 3053, 2986, 2930, 2685, 2305, 1603, 1421, 1265, 1157, 1024, 895, 737, 704; HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{28}H_{27}N_2O_8$, 519.1767; found, 519.1750.



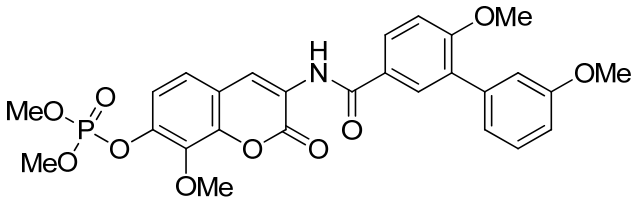
3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methyl-2-oxo-2H-chromen-7-yl dimethyl phosphate (72a): Dimethyl phosphorochloridate (6.3 μL, 0.058 mmol) was slowly added to **6a** (25 mg, 0.058 mmol) and 4-dimethylaminopyridine (7.1 mg, 0.058 mmol) in

anhydrous CH_2Cl_2 (1.2 mL) at rt. After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1 → 10:1 CH_2Cl_2:acetone) to afford **72a** as a colorless amorphous solid (17 mg, 54%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.83 (s, 1H), 8.74 (s, 1H), 7.93 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.89 (d, *J* = 2.0 Hz, 1H), 7.39–7.36 (m, 2H), 7.32 (d, *J* = 9.0 Hz, 1H), 7.13–7.07 (m, 3H), 6.95–6.93 (m, 1H), 3.92 (s, 3H), 3.91 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 2.44 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.0, 159.5, 159.1, 149.9, 149.8, 149.0, 138.7, 131.2, 130.1, 129.3, 128.4, 125.9, 125.8, 123.5, 123.3, 122.1, 118.1, 117.2, 115.4, 113.3, 111.2, 56.0, 55.5, 55.3 (2C), 9.0; IR (film) ν_{max} 3404, 3053, 2986, 2930, 2854, 2305, 1715, 1674, 1605, 1522, 1501, 1421, 1366, 1265, 1055, 897, 725, 704; HRMS (ESI$^+$) *m/z*: [M + 2H$^+$] calcd for $C_{27}H_{28}NO_9P$, 541.1502; found, 541.1454.

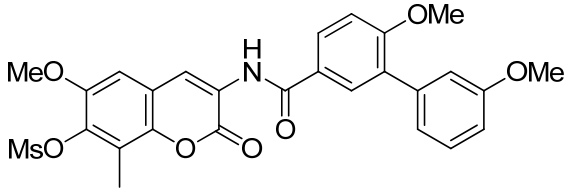


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl dimethyl phosphate (72b): Dimethyl phosphorochloridate (7.0 μL, 0.065 mmol) was slowly added to **6b** (30 mg, 0.065 mmol) and 4-dimethylaminopyridine (8 mg, 0.065 mmol) in anhydrous CH_2Cl_2 (1.3 mL) at rt. After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1 → 10:1 CH_2Cl_2:acetone) to afford **72b** as a colorless amorphous solid (14 mg, 41%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.79 (s, 1H), 8.77 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.89 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.13–7.06 (m, 3H), 6.94–6.92 (m, 1H), 6.90 (s, 1H), 3.95 (s, 3H), 3.93 (s, 3H), 3.93 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 2.46 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.8, 160.0, 159.5, 159.2, 148.9 (2C), 138.7,

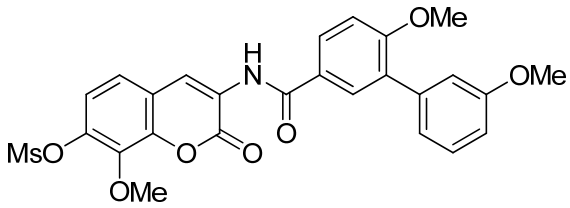
131.2, 130.2, 129.3, 128.4, 126.0, 124.0, 123.2, 122.1, 120.4, 117.1 (2C), 115.4, 113.3, 111.1, 106.9, 56.5, 56.0, 55.5, 55.3, 55.2, 9.7; IR (film) ν_{max} 3053, 2986, 2685, 2305, 1713, 1522, 1501, 1421, 1385, 1265, 897, 746, 704; HRMS (ESI^+) *m/z*: [M + Na^+] calcd for $C_{28}H_{28}NNaO_{10}P$, 592.1349; found, 592.1341.



3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl dimethyl phosphate (72c): Dimethyl phosphorochloridate (4.0 μL, 0.038 mmol) was slowly added to **6c** (17 mg, 0.038 mmol) and 4-dimethylaminopyridine (5 mg, 0.038 mmol) in anhydrous CH_2Cl_2 (0.8 mL) at rt. After 12 h, the solvent was removed and the residue purified via column chromatography (SiO_2, 40:1) to afford **72c** as a yellow amorphous solid (6.0 mg, 30%): ^1H NMR ($CDCl_3$, 500 MHz) δ 8.82 (s, 1H) 8.74 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.88 (d, *J* = 2.5 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.29 (dd, *J* = 8.5, 1.0 Hz, 1H), 7.25–7.23 (m, 1H), 7.13–7.07 (m, 3H), 6.95–6.93 (m, 1H) 4.09 (s, 3H), 3.94 (s, 3H), 3.92 (s, 3H), 3.91 (s, 3H), 3.86 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.1, 159.5, 158.4, 144.4, 144.0, 138.6, 131.3, 130.1, 129.3, 128.4, 125.8, 123.8, 123.1, 122.4, 122.1, 118.6, 118.5, 118.4, 115.4, 113.3, 111.2, 62.2, 56.0, 55.5, 55.3 (2C); IR (film) ν_{max} 3053, 2959, 2928, 2854, 2361, 2307, 1718, 1674, 1605, 1522, 1501, 1462, 1366, 1265, 1207, 1180, 1038, 1024, 916, 858, 735, 704; HRMS (ESI^+) *m/z*: [M + Na^+] calcd for $C_{27}H_{26}NNaO_{10}P$, 578.1192; found, 578.1147.

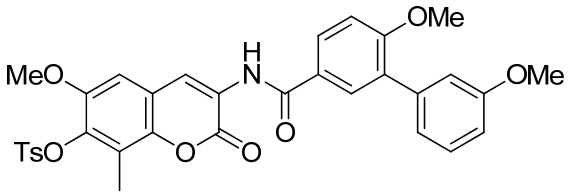


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl methanesulfonate (73b): Methanesulfonyl chloride (10 μL, 0.13 mmol) was added to **6b** (15 mg, 0.033 mmol) in anhydrous pyridine (0.20 mL) at 0° C. The resulting solution was warmed to rt and stirred overnight, then diluted with H_2O. The desired product was extracted with EtOAc (3 × 10 mL); combined organic fractions were dried (Na_2SO_4), filtered, and concentrated. The residue was purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **73b** as a yellow amorphous solid (13 mg, 97%): ^{1}H NMR (DMSO-d_6, 500 MHz) δ 9.77 (s, 1H), 8.64 (s, 1H), 8.01 (dd, J = 8.5, 2.5 Hz, 1H), 7.92 (d, J = 2.5 Hz, 1H), 7.49 (s, 1H), 7.37 (t, J = 8.0 Hz, 1H), 7.27 (d, J = 9.0 Hz, 1H), 7.12–7.10 (m, 2H), 6.97–6.95 (m, 1H), 3.91 (s, 3H), 3.87 (s, 3H), 3.80 (s, 3H), 3.54 (s, 3H), 2.36 (s, 3H); ^{13}C NMR (DMSO-d_6, 125 MHz) δ 165.4, 159.3, 159.0, 157.7, 149.2, 148.9, 139.1, 138.7, 130.1, 129.3, 129.2, 128.9, 126.2, 124.6, 121.8, 121.2, 118.1, 115.3 (2C), 112.6, 111.5, 108.0, 55.1 (2C), 54.8, 29.1, 10.0; IR (film) ν_{max} 3053, 2986, 2928, 2685, 2305, 1717, 1601, 1421, 1383, 1265, 1153, 895, 737, 704; HRMS (ESI$^+$) *m/z*: [M + H$^+$] calcd for $C_{27}H_{26}NO_9S$, 540.1328; found, 540.1395.



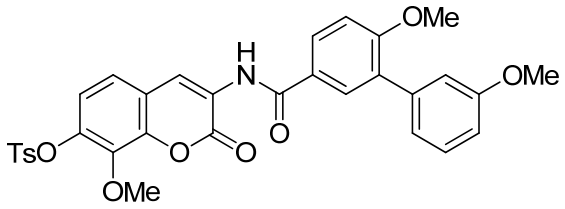
3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl methanesulfonate (73c): Methanesulfonyl chloride (17 μL, 0.22 mmol) was added to **6b** (25 mg, 0.056 mmol) in anhydrous pyridine (0.40 mL) at 0° C. The resulting solution was warmed to rt and stirred overnight, then diluted with H_2O. The desired product was extracted with EtOAc (3 × 10 mL); combined organic fractions were dried (Na_2SO_4), filtered, and concentrated. The residue was purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **73c** as a

yellow amorphous solid (29 mg, 99%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.80 (s, 1H), 8.73 (s, 1H), 7.88 (dd, *J* = 8.5, 2.0 Hz, 1H), 7.85 (d, *J* = 2.5 Hz, 1H), 7.34 (t, *J* = 8.0 Hz, 1H), 7.26–7.23 (m, 2H), 7.09–7.04 (m, 3H), 6.91–6.89 (m, 1H), 4.09 (s, 3H), 3.87 (s, 3H), 3.83 (s, 3H), 3.23 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.2, 159.5, 158.0, 143.6, 142.4, 140.0, 138.6, 131.2, 130.1, 129.3, 128.4, 125.7, 124.6, 122.5 (2C), 122.1, 121.1, 120.6, 115.4, 113.2, 111.2, 62.6, 56.0, 55.4, 38.6; IR (film) ν_{max} 2928, 2359, 2341, 1720, 1676, 1603, 1521, 1501, 1464, 1364, 1242, 1180, 1078, 970, 860; HRMS (ESI$^+$) *m/z*: [M + H$^+$] calcd for $C_{26}H_{24}NO_9S$, 526.1172; found, 526.1179.

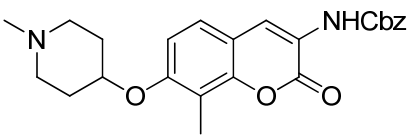


3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-6-methoxy-8-methyl-2-oxo-2H-chromen-7-yl 4-methylbenzenesulfonate (74b): 4-methylbenzene-1-sulfonyl chloride (50 μL, 0.26 mmol) was added to **6b** (30 mg, 0.065 mmol) in anhydrous pyridine (0.40 mL) at 0° C. The resulting solution was warmed to rt and stirred overnight, then diluted with H_2O (10 mL). The desired product was extracted with EtOAc (3 × 10 mL); combined organic fractions were dried (Na_2SO_4), filtered, and concentrated. The residue was purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **74b** as a yellow amorphous solid (39 mg, 98%): ^{1}H NMR ($CDCl_3$, 500 MHz) δ 8.79 (s, 1H), 8.78 (s, 1H), 7.92 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.89 (d, *J* = 2.5 Hz, 1H), 7.86 (d, *J* = 8.5 Hz, 1H), 7.39–7.36 (m, 3H), 7.13–7.07 (m, 3H), 6.95–6.93 (m, 1H), 6.81 (s, 1H), 3.91 (s, 3H), 3.86 (s, 3H), 3.59 (s, 3H), 2.49 (s, 3H), 2.37 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.8, 160.0, 159.4, 159.0, 149.8, 145.3, 142.6, 138.7, 138.6, 134.3, 131.2, 130.2, 129.7 (2C), 129.3, 128.5 (2C), 128.4, 125.8, 124.6, 123.0, 122.7, 122.1, 118.6, 115.4,

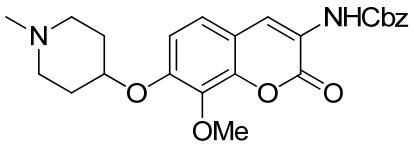
113.2, 111.1, 106.6, 56.0, 55.9, 55.4, 21.9, 10.4; IR (film) ν_{max} 3053, 2986, 2685, 2305, 1713, 1601, 1421, 1383, 1265, 1163, 895, 739, 706; HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{33}H_{30}NO_9S$, 616.1641; found, 616.1676.



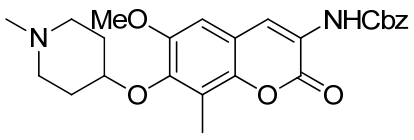
3-(3',6-dimethoxy-[1,1'-biphenyl]-3-ylcarboxamido)-8-methoxy-2-oxo-2H-chromen-7-yl 4-methylbenzenesulfonate (74c): 4-methylbenzene-1-sulfonyl chloride (43 μL, 0.22 mmol) was added to **6c** (25 mg, 0.056 mmol) in anhydrous pyridine (0.40 mL) at 0° C. The resulting solution was warmed to rt and stirred overnight, then diluted with H_2O (10 mL). The desired product was extracted with EtOAc (3 × 10 mL); combined organic fractions were dried (Na_2SO_4), filtered, and concentrated. The residue was purified via column chromatography (SiO_2, 40:1, CH_2Cl_2:acetone) to afford **74c** as a colorless amorphous solid (33 mg, 99%): ^1H NMR ($CDCl_3$, 500 MHz) δ 8.80 (s, 1H), 8.74 (s, 1H), 7.91 (dd, *J* = 8.5, 2.5 Hz, 1H), 7.88 (d, *J* = 2.5 Hz, 1H), 7.81–7.79 (m, 2H), 7.38–7.34 (m, 3H), 7.19 (d, J = 8.5 Hz, 1H), 7.12–7.07 (m, 4H), 6.95–6.92 (m, 1H), 3.91 (s, 3H), 3.90 (s, 3H), 3.86 (s, 3H), 2.47 (s, 3H); ^{13}C NMR ($CDCl_3$, 125 MHz) δ 165.7, 160.2, 159.5, 158.1, 145.9, 143.5, 142.6, 140.5, 138.6, 132.9, 131.3, 130.1, 130.0 (2C), 129.3, 128.6 (2C), 128.4, 125.7, 124.4, 122.7, 122.1, 121.9, 120.5, 120.2, 115.4, 113.3, 111.2, 62.1, 56.0, 55.5, 21.9; IR (film) ν_{max} 3053, 2927, 2359, 2341, 1720, 1676, 1603, 1522, 1501, 1462, 1364, 1265, 1178, 1078, 1007, 858, 818, 737, 706; HRMS (ESI^+) *m/z*: [M + H^+] calcd for $C_{32}H_{28}NO_9S$, 602.1485; found, 602.1494.



Benzyl 8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-ylcarbamate (75a). Compound **75a** was obtained as a white amorphorous solid (60 mg, 58%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.25 (s, 1H), 7.55 (s, 1H), 7.40–7.34 (m, 5H), 7.24 (d, *J* = 8.0 Hz, 1H), 6.84 (d, *J* = 8.0 Hz, 1H), 5.22 (s, 2H), 4.48 (m, 1H), 2.71 (m, 2H), 2.52–2.49 (m, 2H), 2.38 (s. 3H), 2.11–2.07 (m, 2H), 1.98–1.89 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 158.8, 156.5, 153.2, 149.2, 135.6, 128.7, 128.5, 128.2, 125.1, 122.2, 121.4, 115.2, 113.0, 110.4, 72.4, 67.4, 52.0 (2C), 46.0, 30.3 (2C), 8.4. IR (film) ν_{max} 3406, 3319, 2939, 2849, 2791, 1711, 1609, 1524, 1366, 1271, 1227, 1204, 1103, 1038, 1024 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{24}H_{27}N_2O_5$, 423.1920; found 423.1920.

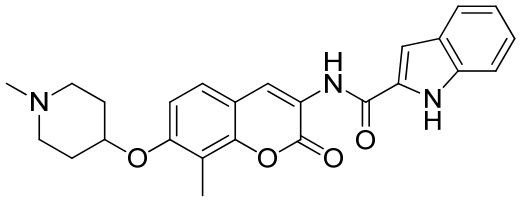


Benzyl 8-methoxy-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-ylcarbamate (75b). Compound **75b** was obtained as light brown oil (63 mg, 89%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.25 (s, 1H), 7.58 (s, 1H), 7.40–7.34 (m, 5H), 7.13 (d, *J* = 8.0 Hz, 1H), 6.90 (d, *J* = 8.0 Hz, 1H), 5.22 (s, 2H), 4.46 (m, 1H), 3.98 (s, 3H), 2.80–2.77 (m, 2H), 2.51–2.40 (m, 2H), 2.39 (s, 3H), 2.12–2.08 (m, 2H), 1.98–1.88 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 158.2, 153.2, 151.5, 144.0, 137.8, 135.6, 128.7, 128.5, 128.2, 122.1, 122.0, 121.8, 114.8, 113.5, 72.3, 67.5, 61.5, 52.1 (2C), 45.8, 30.4 (2C). IR (film) ν_{max} 3406, 3331, 2974, 2941, 2893, 1720, 1703, 1607, 1553, 1502, 1462, 1367, 1240, 1070. cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{24}H_{27}N_2O_6$, 439.1869; found 439.1867.



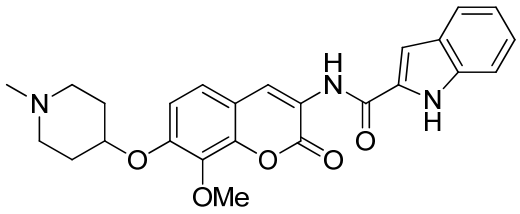
Benzyl 6-methoxy-8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-ylcarbamate (75c). Compound **75c** was obtained as light brown oil (134 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.25 (s, 1H), 7.59 (s, 1H), 7.42–7.35 (m, 5H), 6.77 (s, 1H), 5.23 (s, 2H), 4.23–4.22 (m, 1H), 3.86 (s, 3H), 2.85–2.82 (m, 2H), 2.36 (s, 3H), 2.33 (s, 2H), 2.28–2.20 (m, 2H), 2.01–1.97 (m, 2H), 1.93–1.86 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 158.9, 153.4, 150.5, 146.8, 143.4, 135.7, 128.9, 128.7, 128.4, 122.9, 121.9, 120.9, 115.2, 106.3, 78.1, 67.7, 56.2, 53.3 (2C), 46.1, 31.8 (2C), 9.9. IR (film) ν_{max} 3404, 3312, 2937, 2864, 1710, 1693, 1609, 1529, 1466, 1385, 1367, 1288, 1240, 1211, 1109, 1078, 1031 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{25}H_{29}N_2O_6$, 435.2026; found, 453.2021.

Representative procedure for the preparation of compounds 77, 78, 81 and 82:



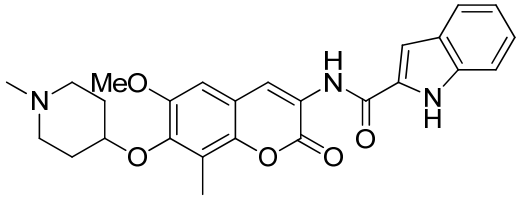
N-(8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)-1H-indole-2-carboxamide (78a). Compound **75a** (60 mg, 0.14 mmol) and Pd/C mixture were suspended in THF (2 mL) and stirred under hydrogen overnight. The mixture was filtered and the filtrate was concentrated and dried under vacuum for 2 h. The residue was dissolved in methylene chloride (2 mL) and treated with freshly prepared indole carboxylic chloride (25.5 mg, 0.14 mmol) and pyridine (0.1 mL). The resulting mixture was stirred at rt for 2 h, then purified via column chromatography (SiO_2, CH_2Cl_2:MeOH, 10:1) to yield compound **78a** (31 mg, 51%). ^{1}HMNR (500 MHz, CD_3CD-$CDCl_3$) δ 8.50 (s, 1H), 7.48 (d, J = 8.1 Hz, 1H), 7.29 (d, J = 8.2 Hz, 1H), 7.16 (d, J = 8.6 Hz, 1H), 7.09 (t, J = 8.1 Hz, 1H), 7.00 (s, 1H),), 6.92 (t, J = 7.9 Hz, 1H), 6.72 (d,

J = 8.7 Hz, 1H), 4.54 (m, 1H), 2.53 (m, 2H), 2.35 (m, 2H), 2.18 (s, 3H), 2.13 (s, 3H), 1.85 (m, 2H), 1.75 (m, 2H). ^{13}C MNR (125 MHz, CD_3CD-$CDCl_3$) δ 160.5, 159.4, 156.7, 149.4, 137.3, 129.8, 127.2, 125.6, 125.3, 124.8, 122.0, 120.9, 120.5, 114.9, 113.2, 112.0, 110.4, 104.6, 77.4, 51.5 (2C), 45.3, 29.7 (2C), 7.9. IR (film) ν_{max} 3391, 3292, 2958, 2851, 1709, 1643, 1605, 1537, 1385, 1263, 1236, 1211, 1107, 1036, 731 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{25}H_{26}N_3O_4$, 432.1923; found 432.1927. This material was determined to be 100% pure (Retention time = 8.37 min) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

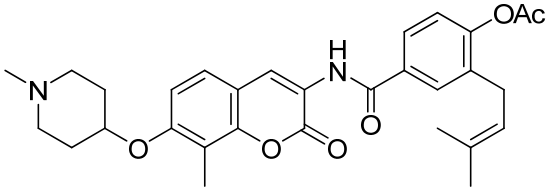


N-(8-methoxy-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)-1H-indole-2-carboxamide (78b). Compound **78b** was obtained as a light brown amorphous solid (28 mg, 38%). ^{1}H MNR (500 MHz $CDCl_3$/MeOD) δ 8.66 (s, 1H), 7.63 (d, *J* = 8.0 Hz, 1H), 7.41 (d, *J* = 8.3 Hz, 1H), 7.24 (t, *J* = 8.2 Hz, 1H), 7.16 (d, *J* = 8.8 Hz, 1H), 7.13 (s, 1H), 7.09 (t, *J* = 8.0 Hz, 1H), 6.88 (d, *J* = 8.8 Hz, 1H), 4.45 (m, 1H), 3.93 (s, 3H), 2.71 (m, 2H), 2.45 (m, 2H), 2.32 (s, 3H), 2.15–2.11 (m, 2H), 2.00–1.91 (m, 2H). ^{13}C MNR (125 MHz $CDCl_3$/MeOD) δ 160.4, 158.7, 151.75, 144.2, 137.5, 137.2, 129.7, 127.4, 125.2, 124.3, 122.5, 122.3, 121.7, 120.8, 114.7, 113.4, 112.1, 104.7, 77.3, 61.5, 51.7 (2C), 45.6, 29.6 (2C). IR (film) ν_{max} 3390, 3312, 3292, 2928, 2851, 1711, 1653, 1607, 1535, 1383, 1264, 1236, 1211, 1107, 1036, 738 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{25}H_{26}N_3O_5$, 448.1873; found 448.1886. This material was determined to be 99% pure (Retention time = 9.04) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting

with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

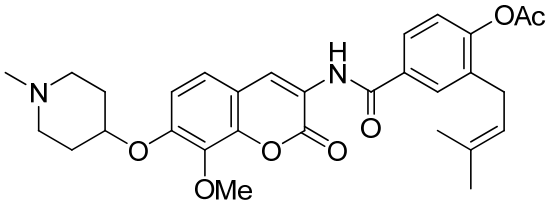


N-(6-methoxy-8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)-1H-indole-2-carboxamide (78c). Compound **78c** was obtained as a light brown amorphous solid (19 mg, 53%). ^{1}H MNR (500 MHz DMSO-d_6) 11.91 (s, 1H), 9.56 (s, 1H), 8.55 (s, 1H), 7.67 (d, J = 8.1 Hz, 1H), 7.48 (d, J = 8.2 Hz, 1H), 7.42 (s, 1H), 7.30 (s, 1H), 7.25 (t, J = 8.1 Hz, 1H), 7.08 (t, J = 7.7 Hz, 1H), 4.24–4.21 (m, 1H), 3.85 (s, 3H), 2.86 (m, 2H), 2.33 (s, 3H), 2.50 (m, 2H), 2.29 (s, 3H), 1.92–1.90 (m, 2H), 1.79–1.77 (m, 2H). ^{13}CMNR (125 MHz DMSO-d_6) δ 160.0, 158.0, 149.7, 146.4, 143.5, 137.1, 130.3, 127.6, 126.9, 124.3, 122.3, 122.0, 120.1, 119.2, 114.6, 112.4, 107.4, 105.1, 77.1, 56.9, 52.1 (2C), 44.7, 30.7 (2C), 9.4. IR (film) ν_{max} 3379, 3312, 2924, 2851, 1713, 1659, 1582, 1543, 1468, 1392, 1292, 1136, 1084, 1036 739 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{24}H_{26}N_3O_5$, 462.2029; found 462.2032. This material was determined to be 99% pure (Retention time = 8.70) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.



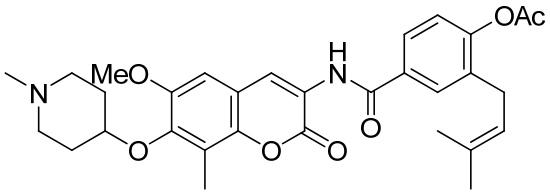
4-(8-Methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-ylcarbamoyl)-2-(3-methylbut-2-enyl)phenyl acetate (79a). Compound **79a** was obtained as white amorphous solid

(76 mg, 73%). ^{1}H NMR (500MHz, $CDCl_3$), δ 8.79 (s, 1H), 8.71 (s, 1H), 7.81 (d, *J* = 2.1 Hz, 1H), 7.77 (dd, *J* = 8.3 Hz, 2.1, 1H), 7.34(d, *J* = 8.6 Hz, 1H), 7.18 (d, *J* = 8.3 Hz, 1H), 6.89 (d, *J* = 8.6 Hz, 1H), 5.25 (m, 1H), 4.52 (m, 1H), 3.33 (d, *J* = 7.2 Hz, 2H), 2.76–2.70 (m, 2H), 2.55–2.45 (m, 2H), 2.40 (s, 3H), 2.35 (s, 6H), 2.15–2.09 (m, 2H), 1.97–1.92 (m, 2H), 1.78 (s, 3H), 1.74 (s, 3H). ^{13}C NMR δ(125MHz, $CDCl_3$) 169.1, 165.6, 159.6, 157.1, 152.3, 149.7, 134.8, 134.5, 131.8, 129.5, 126.1, 125.8, 124.8, 123.1, 121.7, 120.8, 115.4, 113.5, 110.6, 77.4, 52.3 (2C), 46.2, 30.5 (2C), 29.0, 25.9, 21.1, 18.1, 8.6. IR (film) ν_{max} 3400, 3087, 2922, 2851, 1765, 1711, 1672, 1607, 1526, 1493, 1369, 1248, 1202, 1175, 1099, 1040 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{35}N_2O_6$, 519.2495; found, 519.2485. This material was determined to be 95% pure (Retention time = 14.3) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.



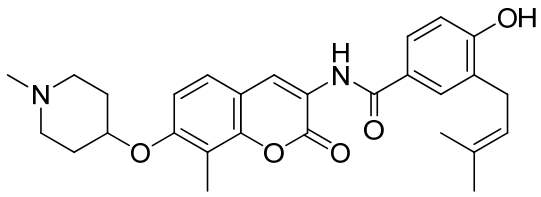
4-(8-methoxy-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-ylcarbamoyl)-2-(3-methylbut-2-enyl)phenyl acetate (79b). Compound **79b** was obtained as white amorphous solid (85 mg, 61%). ^{1}H NMR (500MHz, $CDCl_3$) δ 8.70 (s, 1H), 8.64 (s, 1H), 7.72 (d, *J* = 2.2 Hz, 1H), 7.68 (dd, *J* = 8.3, 2.3 Hz, 1H), 7.14 (d, *J* = 8.5 Hz, 2H), 7.10 (d, *J* = 8.4 Hz, 1H), 6.86 (d, *J* = 8.6 Hz, 1H), 5.15 (m, 1H), 4.49 (m, 1H), 3.93 (s, 3H), 3.24 (d, *J* = 7.2 Hz, 2H), 2.90–2.85 (m, 2H), 2.68–2.65 (m, 2H), 2.46 (s, 3H), 2.26 (s, 3H), 2.19–2.16 (m, 2H), 1.98–1.94(m, 2H), 1.69 (s, 3H), 1.65 (s, 3H). ^{13}C NMR (125MHz, $CDCl_3$) δ169.0, 165.6, 158.8, 152.3, 151.6, 144.4, 137.9, 134.8, 134.4, 131.5, 129.5, 126.0, 124.1, 123.1, 122.8, 122.4, 120.7, 115.2, 113.8, 72.1, 61.7,

51.5 (2C), 45.3, 29.5 (2C), 28.9, 25.8, 21.0, 18.0. IR (film) ν_{max} 3406, 3084, 2962, 2937, 2831, 1731, 1711, 1666, 1604, 1529, 1502, 1462, 1366, 1258, 1178, 1103, 1036 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{30}H_{35}N_2O_7$, 535.2444; found, 535.2442.

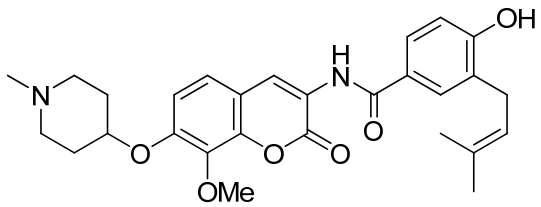


4-(6-methoxy-8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-ylcarbamoyl)-2-(3-methylbut-2-enyl)phenyl acetate (79c). Compound **79c** was obtained as white amorphous solid (81mg, 70%). ^1H NMR (500MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.75 (s, 1H), 7.81 (d, *J* = 2.2 Hz, 1H), 7.77 (dd, *J* = 8.3, 2.3 Hz, 1H), 7.19 (d, *J* = 8.5 Hz, 2H), 6.85 (s, 1H), 5.25 (m, 1H), 4.32 (m, 1H), 3.89 (s, 3H), 3.32 (d, *J* = 7.2 Hz, 2H), 3.07–3.04 (m, 2H), 2.82–2.65 (m, 2H), 2.54 (s, 3H), 2.39 (s, 3H), 2.35 (s, 3H), 2.19–2.16 (m, 2H), 2.11–2.02 (m, 2H), 1.77 (s, 3H), 1.74 (s, 3H). ^{13}C NMR (125MHz, $CDCl_3$) δ 169.2, 165.8, 159.4, 152.4, 150.4, 147.1, 143.8, 134.9, 134.6, 131.7, 129.6, 126.2, 124.1, 123.2, 120.9, 120.8, 115.5, 106.8, 77.5, 56.3, 52.3 (2C), 45.3, 30.6 (2C), 29.1, 26.0, 21.1, 18.1, 10.0. IR (film) ν_{max} 3404, 3086, 2935, 2852, 1721, 1711, 1672, 1605, 1529, 1383, 1250, 1177, 1085, 1034 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{31}H_{37}N_2O_7$, 549.2601; found, 549.2604. This material was determined to be 98% pure (Retention time = 13.9) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

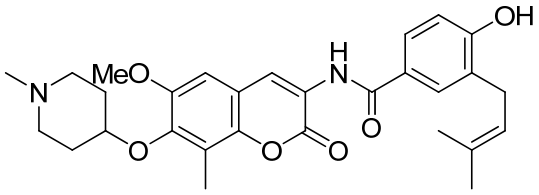
Representative procedure for the preparation of compounds 80 and 84:



4-Hydroxy-N-(8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)-3-(3-methylbut-2-enyl)benzamide (80a). Compound **79a** (52 mg, 0.1 mmol) was dissolved in 10% triethylamine/methanol (3 mL). The solution was stirred at rt overnight and concentrated. The residue was purified via column chromatography (SiO_2, CH_2Cl_2:MeOH, 10:1) to afford **80a** as a white amorphous solid (37 mg, 73%). ^{1}H NMR (500MHz, DMSO-d_6) δ 9.22 (s, 1H), 8.47 (s, 1H), 7.68–7.66 (m, 2H), 7.53 (d, J = 8.7 Hz, 1H), 7.11 (d, J = 8.9 Hz, 1H), 6.90 (d, J = 8.7 Hz, 1H), 5.30 (m, 1H), 4.57 (m, 1H), 3.27 (d, J = 7.3 Hz, 2H), 2.62–2.54 (m, 2H), 2.34–2.28 (m, 2H), 2.22 (s, 3H), 2.21 (s, 3H), 1.96–1.92 (m, 2H), 1.76–1.72(m, 2H), 1.71 (s, 3H), 1.69 (s, 3H). ^{13}C NMR (125MHz, DMSO-d_6) δ165.3, 158.8, 158.4, 156.6, 149.5, 131.9, 129.2, 127.8, 127.7, 126.8, 126.0, 124.0, 122.3, 121.3, 114.6, 113.4, 112.7, 110.8, 72.1, 51.8 (2C), 45.7, 30.2 (2C), 27.9, 25.6, 17.7, 8.2. IR (film) ν_{max} 3421, 3081, 2938, 2856, 1703, 1666, 1601, 1528, 1504, 1366, 1248, 1178, 1150, 1094, 1040 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{28}H_{33}N_2O_5$, 477.2389; found, 477.2397. This material was determined to be 98% pure (Retention time = 13.5) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

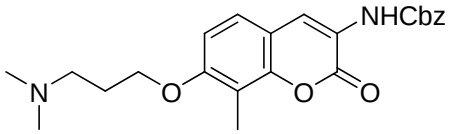


4-hydroxy-N-(8-methoxy-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)-3-(3-methylbut-2-enyl)benzamide (80b). Compound **80b** was obtained as white amorphous solid (24 mg, 75%). ^{1}H NMR (500MHz, $CDCl_3$) δ 9.26 (s, 1H), 8.49 (s, 1H), 7.68–7.66 (m, 2H), 7.42 (d, *J* = 8.4 Hz, 1H), 7.18 (d, *J* = 9.0 Hz, 1H), 6.91 (d, *J* = 8.9 Hz, 1H), 5.30 (m, 1H), 4.58 (m, 1H), 3.88 (s, 3H), 3.27 (d, *J* = 7.2 Hz, 2H), 2.76–2.69 (m, 2H), 2.48–2.39 (m, 2H), 2.32 (s, 3H), 2.04–1.95 (m, 2H), 1.83–1.74 (m, 2H), 1.71 (s, 3H), 1.69 (s, 3H). ^{13}C NMR (125MHz, $CDCl_3$) δ165.3, 158.8, 157.9, 151.5, 144.3, 136.3, 131.9, 129.2, 127.7, 127.4, 126.9, 123.9, 122.8, 122.3, 121.9, 114.6, 114.0, 112.7, 72.7, 60.9, 51.7 (2C), 45.1, 29.9 (2C), 27.9, 25.5, 17.7. IR (film) ν_{max} 3406, 3317 (broad), 3086, 3053, 2941, 2833, 1711, 1666, 1605, 1527, 1502, 1460, 1365, 1265, 1178, 1080, 1034, 739 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{28}H_{33}N_2O_6$, 493.2339; found; 493.2337.

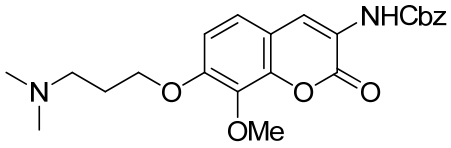


4-hydroxy-N-(6-methoxy-8-methyl-7-(1-methylpiperidin-4-yloxy)-2-oxo-2H-chromen-3-yl)-3-(3-methylbut-2-enyl)benzamide (80c). Compound **80c** was obtained as white amorphous solid (21mg, 81%). ^{1}H NMR (500MHz, DMSO-d_6) δ 10.2 (s, 1H), 9.23 (s, 1H), 8.54 (s, 1H), 7.68–7.66 (m, 2H), 7.28 (s, 1H), 6.92 (d, *J* = 9.0 Hz, 1H), 5.30 (m, 1H), 4.21 (m, 1H), 3.85 (s, 3H), 3.35–3.30 (m, 2H), 3.28 (d, *J* = 7.2 Hz, 2H), 2.90–2.81 (m, 2H),2.32–2.29 (m, 2H), 2.28 (s, 3H), 2.25 (s, 3H), 1.93–1.88 (m, 2H), 1.78–1.71 (m, 2H), 1.71 (s, 3H), 1.70 (s, 3H). ^{13}C NMR (125MHz, DMSO-d_6) δ 165.4, 158.9, 158.3, 149.8, 146.2, 143.3, 131.9, 129.2, 127.7, 126.9, 126.5, 123.9, 122.8, 122.3, 119.2, 114.8, 114.6, 107.4, 77.3, 56.1, 52.2 (2C), 44.8, 30.8 (2C), 27.9, 25.5, 17.7, 9.4. IR (film) ν_{max} 3406, 3088, 3045, 2931, 2853, 1709, 1657, 1601, 1529, 1500,

1381, 1250, 1178, 1086, 1034 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{29}H_{35}N_2O_6$, 507.2495; found, 507.2494. This material was determined to be 99% pure (Retention time = 13.2) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

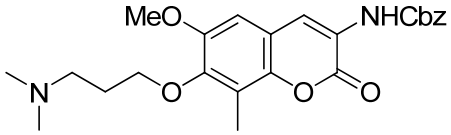


Benzyl 7-(3-(dimethylamino)propoxy)-8-methyl-2-oxo-2H-chromen-3-yl carbamate (81a). Compound **81a** was obtained as colorless oil (670 mg, 72%). ^1H NMR (400MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.45 (s, 1H), 7.29–7.23 (m, 5H), 7.11 (d, *J* = 8.6 Hz, 1H), 6.70 (d, *J* = 8.6 Hz, 1H), 5.10 (s, 2H), 3.97 (t, *J* = 5.8 Hz, 2H), 2.46 (t, *J* = 5.8 Hz, 2H), 2.22 (s, 6H), 2.17 (s, 3H), 1.93 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.0, 158.2, 153.3, 149.0, 135.8, 128.8 (2C), 128.6, 128.4 (2C), 125.3, 122.5, 121.4, 114.0, 113.3, 108.9, 67.5, 66.8, 56.4, 45.4 (2C), 27.4, 8.2. IR (film) ν_{max} 3404, 3323, 2978, 2943, 2816, 2768, 1713, 1610, 1524, 1381, 1366, 1273, 1227, 1204, 1109, 1022 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{23}H_{26}N_2O_5$, 411.1920; found, 411.1918.

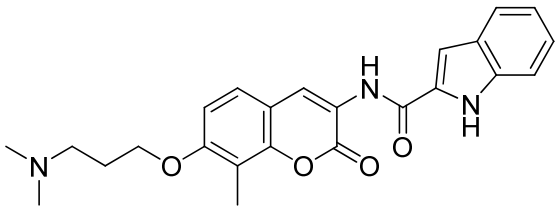


Benzyl 7-(3-(dimethylamino)propoxy)-8-methoxy-2-oxo-2H-chromen-3-ylcarbamate (81b). Compound **81b** was obtained as a brown white amorphous foam (39 mg, 92%). ^1H NMR (400MHz, $CDCl_3$): δ 8.25 (s, 1H), 7.55 (s, 1H), 7.41–7.30 (m, 5H), 7.14 (d, *J* = 8.4 Hz, 1H), 6.91 (d, *J* = 8.4 Hz, 1H), 5.23 (s, 2H), 4.16 (t, *J* = 5.8 Hz, 2H), 3.97 (s, 3H), 2.68 (t, *J* = 5.8 Hz, 2H), 2.41 (s, 6H), 2.13 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 158.3, 153.2, 153.0, 143.8, 136.4, 135.6, 128.7 (2C), 128.5, 128.2 (2C), 122.1, 121.93, 121.86, 114.4, 110.9, 67.5, 67.4, 61.5, 56.1,

45.0 (2C), 26.9. IR (film) ν_{max} 3406, 3310, 2937, 2813, 2766, 1697, 1631, 1608, 1537, 1271, 1229, 1213, 1113, 1024. cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{23}H_{27}N_2O_6$, 427.1869; found, 427.1861.

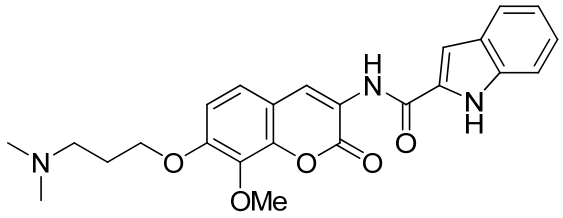


Benzyl 7-(3-(dimethylamino)propoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-ylcarbamate (81c). Compound **81c** was obtained as a white amorphous solid (77 mg, 60%). ^1H NMR (400MHz, $CDCl_3$): δ 8.20 (s, 1H), 7.62 (s, 1H), 7.37–7.31 (m, 5H), 6.72 (s, 1H), 5.19 (s, 2H), 4.01 (t, *J* = 5.7 Hz, 2H), 3.83 (s, 3H), 2.55 (t, *J* = 5.7 Hz, 2H), 2.32 (s, 3H), 2.29 (s, 6H), 199–1.96 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 158.7, 153.1, 150.2, 147.9, 143.0, 135.6, 128.6 (2C), 128.5, 128.2 (2C), 122.8, 121.7, 120.2, 115.2, 106.1, 71.6, 67.4, 56.4, 55.9, 45.3 (2C), 28.3, 8.9. IR (film) ν_{max} 3404, 3313, 2953, 2820, 2770, 1709, 1524, 1464, 1389, 1298, 1229, 1204, 1090, 1024 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{24}H_{29}N_2O_6$, 441.2026; found, 441.2018.

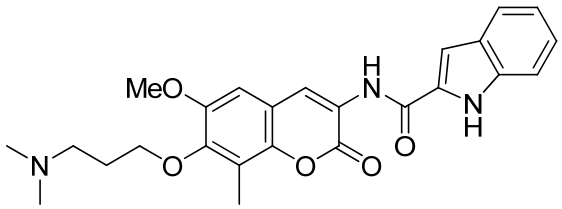


N-(7-(3-(dimethylamino)propoxy)-8-methyl-2-oxo-2H-chromen-3-yl)-1H-indole-2-carboxamide (82a). Compound **82a** was obtained a brown amorphous solid (21 mg, 36%). ^1H NMR (500 MHz,DMSO-d_6) δ 11.89 (s, 1H), 9.60 (s, 1H), 8.49 (s, 1H), 7.68 (d, *J* = 8.0 Hz, 1H), 7.60 (d, *J* = 8.7 Hz, 1H), 7.48 (d, *J* = 8.4 Hz, 1H), 7.42 (s, 1H), 7.25 (t, *J* = 8.0 Hz, 1H), 7.11–7.07 (m, 2H), 4.14 (t, *J* = 6.2 Hz, 2H), 2.62 (m, 2H), 2.32 (s, 6H), 2.24 (s, 3H), 2.00–1.90 (m, 2H). ^{13}C NMR (125 MHz,DMSO-d_6) δ 160.0, 158.22, 158.19, 149.5, 137.1, 130.5, 129.3, 127.0,

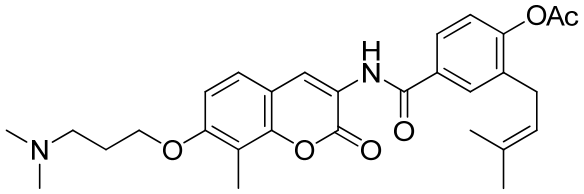
126.3, 124.2, 122.0, 120.8, 120.1, 112.7, 112.49, 112.46, 109.2, 105.0, 66.5, 55.2, 44.4 (2C), 26.1, 8.0. IR (film) ν_{max} 3375, 3319, 2926, 2854, 1711, 1649, 1580, 1535, 1412, 1390, 1327, 1265, 1111, 1063, 789 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{24}H_{26}N_3O_4$, 420.1923; found, 420.1920. This material was determined to be 100% pure (Retention time = 12.1) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.



N-(7-(3-(dimethylamino)propoxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-1H-indole-2-carboxamide (82b). Compound **82b** was obtained a brown amorphous solid (28 mg, 70%). ^1H NMR (500 MHz, $CDCl_3$-CD_3OD) δ 8.50 (s, 1H), 7.47 (m, 1H), 7.28 (m, 1H), 7.11–7.04 (m, 2H), 7.00 (s, 1H), 6.94–6.91 (m, 1H), 6.79–6.76 (m, 1H), 3.95 (t, *J* = 4.7 Hz, 2H), 3.78 (s, 3H), 2.52 (m, 2H), 2.23 (s, 3H), 2.22 (s, 3H), 1.92–1.88 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3/CD_3OD$) δ 164.5, 162.7, 157.3, 147.9, 141.4, 140.0, 133.8, 131.3, 128.9, 128.8, 126.8, 126.1, 125.5, 124.6, 118.4, 116.1, 114.8, 108.7, 71.1, 65.3, 59.9, 48.4 (2C), 30.4. IR (film) ν_{max} 3379, 3321, 2943, 2853, 1712, 1662, 1583, 1542, 1421, 1391, 1291, 1207, 1138, 1030 739 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{24}H_{26}N_3O_5$, 436.1873; found, 436.1867. This material was determined to be 100% pure (Retention time = 8.25) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

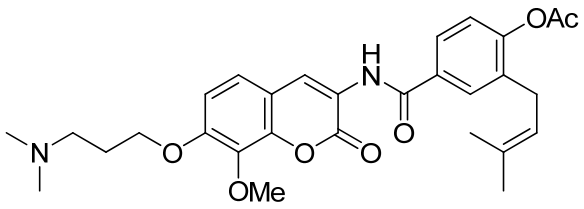


N-(7-(3-(dimethylamino)propoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-1H-indole-2-carboxamide (82c). Compound **82c** was obtained a brown amorphous solid (41 mg, 83%). ^{1}H NMR (500 MHz, $CDCl_3$-CD_3OD) δ 8.37 (s, 1H), 7.34 (d, *J* = 8.0 Hz, 1H), 7.17 (d, *J* = 8.0 Hz, 1H), 6.97 (t, *J* = 8.0 Hz, 1H), 6.89 (s, 1H), 6.81 (t, *J* = 8.0 Hz, 1H), 6.60 (s, 1H). 3.74 (t, *J* = 5.6 Hz, 2H), 3.60 (s, 3H), 2.67 (t, *J* = 5.6 Hz, 2H), 2.29 (s, 6H), 1.80 (s, 3H), 1.80 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3$/CD_3OD) δ 164.5, 163.1, 154.1, 151.7, 147.2, 141.4, 133.8, 131.3, 128.8, 128.4, 126.5, 125.9, 124.4, 123.9, 119.5, 116.0, 110.5, 108.6, 74.7, 60.1, 59.6, 47.7 (2C), 30.6, 12.3. IR (film) ν_{max} 3381, 3315, 2943, 2833, 1722, 1657, 1543, 1467, 1394, 1292, 1086, 1030 739 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{25}H_{28}N_3O_5$, 450.2029; found, 450.2031. This material was determined to be 96% pure (Retention time = 7.92) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.



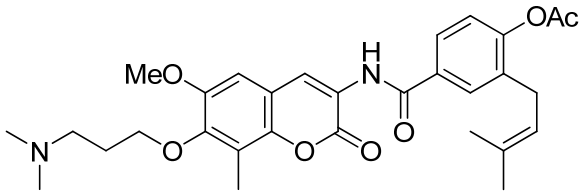
4-(7-(3-(Dimethylamino)propoxy)-8-methyl-2-oxo-2H-chromen-3-ylcarbamoyl)-2-(3-methylbut-2-enyl)phenyl acetate (83a). Compound **83a** was obtained as a white amorphous solid (79 mg, 77%). ^{1}H NMR (500MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.70 (s, 1H), 7.81 (s, 1H), 7.77(d, *J* = 8.3 Hz, 1H), 7.34 (d, *J* = 8.6 Hz, 1H), 7.18 (d, *J* = 8.3 Hz, 1H), 6.88 (d, *J* = 8.6 Hz,

1H), 5.25 (m, 1H), 4.15 (t, *J* = 6.0 Hz, 2H), 3.32 (d, *J* = 7.2 Hz, 2H), 2.77 (t, *J* = 7.4 Hz, 2H), 2.49 (s, 6H), 2.35 (s, 3H), 2.33 (s, 3H), 2.17 (m, 2H), 1.77 (s, 3H), 1.73 (s, 3H). ^{13}C NMR (125MHz, $CDCl_3$) δ 169.1, 165.6, 159.7, 158.4, 152.3, 149.4, 134.8, 134.5, 131.8, 129.6, 126.09, 126.05, 124.9, 123.1, 121.7, 120.9, 114.3, 113.6, 109.1, 66.7, 56.4, 45.0 (2C), 29.0, 26.8, 26.0, 21.1, 18.2, 8.4. IR (film) ν_{max} 3400, 3086, 3054, 2922, 2851, 1765, 1711, 1672, 1607, 1526, 1493, 1369, 1248, 1202, 1175, 1099, 1040 cm^{-1}. HRMS (ESI$^+$) m/z: [M + H$^+$] calcd for $C_{29}H_{35}N_2O_6$, 507.2495; found, 507.2501. This material was determined to be 100% pure (Retention time = 10.0) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

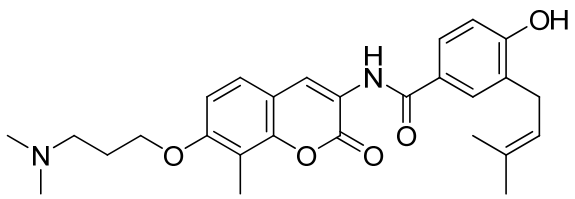


4-(7-(3-(dimethylamino)propoxy)-8-methoxy-2-oxo-2H-chromen-3-ylcarbamoyl)-2-(3-methylbut-2-enyl)phenyl acetate (83b). Compound **83b** was obtained as white amorphous solid (48 mg, 54%). ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.79 (s, 1H), 8.70 (s, 1H), 7.80 (d, *J* = 2.3 Hz, 1H), 7.76 (dd, *J* = 8.4 Hz, 2.3 Hz, 1H), 7.22 (d, *J* = 8.8 Hz, 1H), 7.18 (d, *J* = 8.4 Hz, 1H), 6.95 (d, *J* = 8.8 Hz, 1H), 5.24 (m, 1H), 4.17 (t, *J* = 6.3 Hz, 2H), 3.99 (s, 3H), 3.32 (d, *J* = 7.2 Hz, 2H), 2.66 (t, *J* = 7.2 Hz, 2H), 2.40 (s, 6H), 2.37 (s, 3H), 2.12 (m, 2H), 1.77 (s, 3H), 1.73 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 169.1, 165.7, 159.1, 153.7, 152.3, 144.3, 136.6, 134.9, 134.5, 131.7, 129.6, 126.1, 124.5, 123.1, 122.9, 122.1, 120.8, 114.6, 111.1, 67.6, 61.8, 56.3, 45.3 (2C), 29.0, 27.1, 25.9, 21.1, 18.2. IR (film) ν_{max} 3408, 3084, 3024, 2937, 2858, 1711, 1666, 1605, 1529,

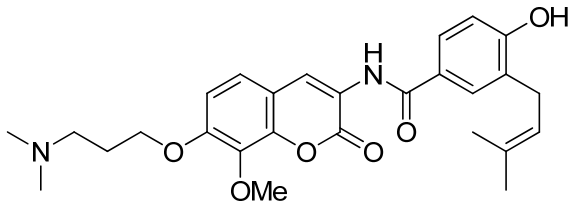
1502, 1462, 1367, 1259, 1178, 1105, 1082, 1034 cm^{-1}. HRMS (ESI^+) m/z calcd for [$M+H^+$] $C_{29}H_{35}NO_7$, 523.2444; found, 523.2450.



4-(7-(3-(dimethylamino)propoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-ylcarbamoyl)-2-(3-methylbut-2-enyl)phenyl acetate (83c). Compound **83c** was obtained as white amorphous solid (81 mg, 70%). ^1H NMR (500 MHz, $CDCl_3$) δ 8.78 (s, 1H), 8.75 (s, 1H), 7.81 (d, *J* = 2.2 Hz, 1H), 7.77 (dd, *J* = 8.4, 2.2 Hz, 1H), 7.18 (d, *J* = 8.4 Hz, 1H), 6.84 (s, 1H), 5.24 (m, 1H), 4.06 (t, *J* = 6.1 Hz, 2H), 3.90 (s, 3H), 3.32 (d, *J* = 7.2 Hz, 2H), 2.89 (t, *J* = 7.5 Hz, 2H), 2.55 (s, 6H), 2.37 (s, 3H), 2.35 (s, 3H), 2.15 (m, 2H), 1.77 (s, 3H), 1.73 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$) δ 169.1, 165.7, 159.5, 152.3, 150.4, 148.1, 143.6, 134.9, 134.5, 131.7, 129.6, 126.1, 124.1, 123.17, 123.14, 120.8, 120.6, 115.7, 106.7, 71.1, 56.5, 56.2, 44.7 (2C), 29.0, 27.4, 25.9, 21.1, 18.2, 9.2. IR (film) ν_{max} 3404, 3082, 2935, 2854, 1765, 1711, 1672, 1605, 1527, 1492, 1382, 1249, 1177, 1088, 1034 cm^{-1}. HRMS (ESI^+) m/z calcd for [$M+H^+$] $C_{30}H_{37}NO_7$, 537.2601; found, 537.2595. This material was determined to be 99% pure (Retention time = 10.8) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

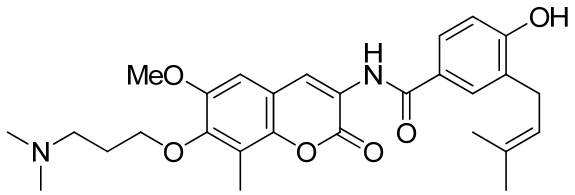


N-(7-(3-(Dimethylamino)propoxy)-8-methyl-2-oxo-2H-chromen-3-yl)-4-hydroxy-3-(3-methylbut-2-enyl)benzamide (84a). Compound **84a** was obtained as a white, amorphous solid (22 mg, 69%). ^{1}H NMR (500MHz, DMSO-d_6) δ 10.19 (s, 1H), 9.24 (s, 1H), 8.47 (s, 1H), 7.68–7.66 (m, 2H), 7.56 (d, J = 8.7 Hz, 1H), 7.07 (d, J = 8.7 Hz, 1H), 6.89 (d, J = 8.7 Hz, 1H), 5.31 (m, 1H), 4.13 (t, J = 6.2 Hz, 2H), 3.27 (d, J = 7.2 Hz, 2H), 2.47 (t, J = 6.9 Hz, 2H), 2.22 (s, 6H), 2.21 (s, 3H), 1.92 (m, 2H), 1.71 (s, 3H), 1.70 (s, 3H). ^{13}C NMR (125MHz, DMSO-d_6) δ 165.3, 158.7, 158.4, 158.1, 149.3, 131.8, 129.2, 128.1, 127.6, 126.8, 126.1, 124.0, 122.3, 121.2, 114.5, 112.7, 112.4, 109.1, 66.6, 55.5, 45.0 (2C), 27.9, 26.6, 25.5, 17.7, 7.9. IR (film) ν_{max} 3408, 2961, 2928, 1709, 1666, 1607, 1529, 1504, 1367, 1256, 1178, 1109 cm^{-1}. HRMS (ESI^{+}) m/z: [M + H^{+}] calcd for $C_{27}H_{33}N_2O_5$, 465.2389; found, 465.2388. This material was determined to be 100% pure (Retention time = 9.83) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.



N-(7-(3-(dimethylamino)propoxy)-8-methoxy-2-oxo-2H-chromen-3-yl)-4-hydroxy-3-(3-methylbut-2-enyl)benzamide (84b). Compound **84b** was obtained as a white amorphous solid (16 mg, 79%). ^{1}H NMR (500MHz, DMSO-d_6) δ 10.23 (bs, 1H), 9.27 (s, 1H), 8.48 (s, 1H), 7.68–7.66 (m, 2H), 7.44 (d, J = 8.9 Hz, 1H), 7.13 (d, J = 8.8 Hz, 1H), 6.91 (d, J = 8.8 Hz, 1H), 5.30 (m, 1H), 4.16 (t, J = 6.2 Hz, 2H), 3.87 (s, 3H), 3.27 (d, J = 7.2 Hz, 2H), 2.62 (m, 2H), 2.31 (s, 6H), 1.76 (s, 3H), 1.70 (s, 3H). ^{13}C NMR (125MHz, DMSO-d_6) δ 165.4, 158.8, 158.0, 153.1, 144.1, 135.3, 131.9, 129.3, 127.7, 126.9, 123.9, 122.9, 122.3 (2C), 121.8, 114.6, 113.8, 110.9,

66.9, 60.9, 55.2, 44.5 (2C), 27.9, 26.1, 25.5, 17.7. IR (film) ν_{max} 3410, 3319, 3086, 2960, 2878, 1711, 1666, 1605, 1529, 1504, 1462, 1367, 1259, 1178, 1105, 1084 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{27}H_{33}N_2O_6$, 481.2339; found, 481.2338. This material was determined to be 100% pure (Retention time = 9.11) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2% H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.



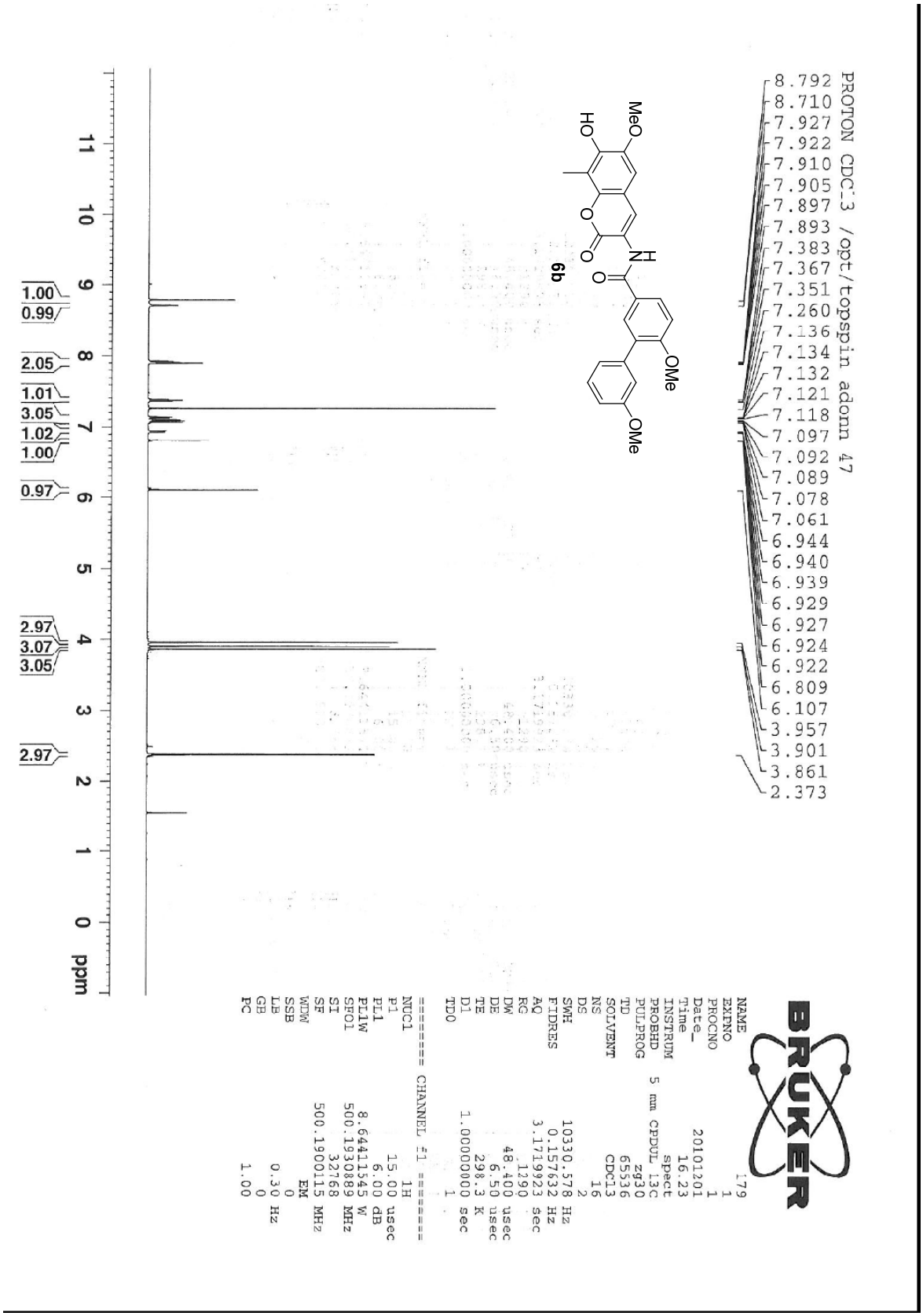
N-(7-(3-(dimethylamino)propoxy)-6-methoxy-8-methyl-2-oxo-2H-chromen-3-yl)-4-hydroxy-3-(3-methylbut-2-enyl)benzamide (84c). Compound **84c** was obtained as a white amorphous solid (23 mg, 58%). ^1H NMR (500MHz, DMSO-d_6) δ 10.25 (bs, 1H), 9.22 (s, 1H), 8.54 (s, 1H), 7.67–7.66 (m, 2H), 7.27 (s, 1H), 6.92 (dd, J = 6.5, 2.4 Hz, 1H), 5.30 (m, 1H), 3.98 (t, J = 6.3 Hz, 2H), 3.85 (s, 3H), 3.27 (d, J = 7.2 Hz, 2H), 2.56 (t, J = 7.1 Hz, 2H), 2.27 (s, 3H), 2.26 (s, 6H), 1.89 (m, 2H), 1.71 (s, 3H), 1.70 (s, 3H). ^{13}C NMR (125MHz, DMSO-d_6) δ 165.3, 158.9, 158.3, 149.7, 147.5, 143.2, 131.9, 129.1, 127.7, 126.9, 126.4, 123.9, 122.9, 122.3, 118.9, 114.9, 114.6, 107.5, 70.9, 56.0, 55.4, 44.6 (2C), 27.9, 27.3, 25.5, 17.7, 8.7. IR (film) ν_{max} 3406, 3082 (broad), 2962, 2856, 1709, 1670, 1603, 1526, 1502, 1378, 1257, 1176, 1090, 1043, 758 cm^{-1}. HRMS (ESI^+) m/z: [M + H^+] calcd for $C_{28}H_{35}N_2O_6$, 495.2495; found, 495.2498. This material was determined to be 100% pure (Retention time = 8.48) by HPLC (ZORBAX Eclipse Plus 4.6 x 150 mm column eluting with 70% H_2O (0.2% H_3PO_4)/30% MeCN → 52% H_2O (0.2%

H_3PO_4)/48% MeCN → 95% H_2O (0.2% H_3PO_4)/5% MeCN → 70% H_2O (0.2% H_3PO_4)/30% MeCN, flow rate 1.0 mL/min.

Anti-proliferation assays. Cells were maintained in a 1:1 mixture of Advanced DMEM/F12 (Gibco) supplemented with non-essential amino acids, L-glutamine (2 mM), streptomycin (500 μg/mL), penicillin (100 units/mL), and 10% FBS. Cells were grown to confluence in a humidified atmosphere (37° C, 5% CO_2), seeded (2000/well, 100 μL) in 96-well plates, and allowed to attach overnight. Compound or GDA at varying concentrations in DMSO (1% DMSO final concentration) was added, and cells were returned to the incubator for 72 h. At 72 h, the number of viable cells was determined using an MTS/PMS cell proliferation kit (Promega) per the manufacturer's instructions. Cells incubated in 1% DMSO were used at 100% proliferation, and values were adjusted accordingly. IC_{50} values were calculated from separate experiments performed in triplicate using GraphPad Prism.

Western blot Analyses. MCF-7 cells were cultured as described above and treated with various concentrations of drug, GDA in DMSO (1% DMSO final concentration), or vehicle (DMSO) for 24 h. Cells were harvested in cold PBS and lysed in RIPA lysis buffer containing 1 mM PMSF, 2 mM sodium orthovanadate, and protease inhibitors on ice for 1 h. Lysates were clarified at 14000g for 10 min at 4° C. Protein concentrations were determined using the Pierce BCA protein assay kit per the manufacturer's instructions. Equal amounts of protein (20 μg) were electrophoresed under reducing conditions, transferred to a nitrocellulose membrane, and immunoblotted with the corresponding specific antibodies. Membranes were incubated with an

appropriate horseradish peroxidase-labeled secondary antibody, developed with a chemiluminescent substrate, and visualized.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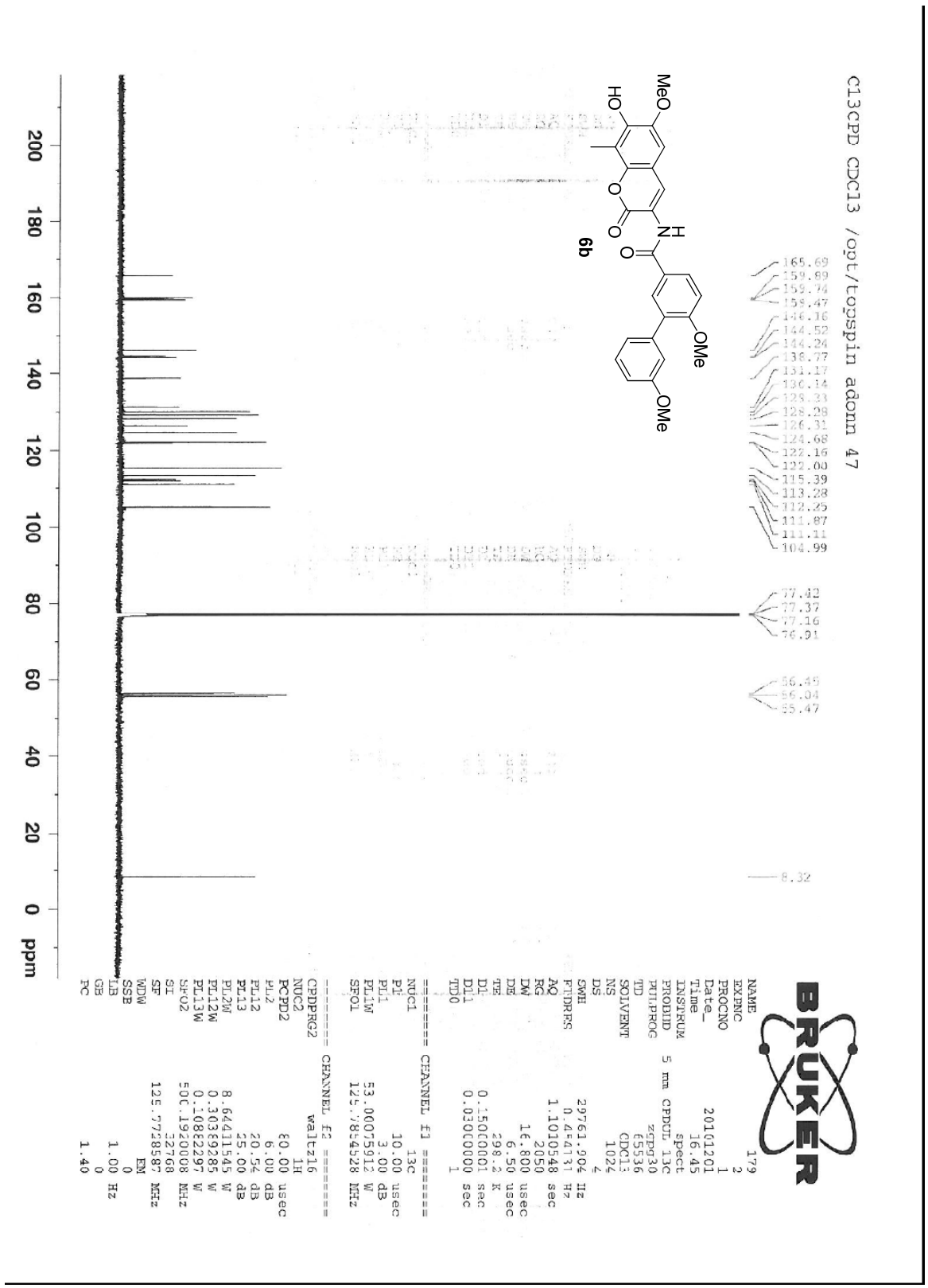
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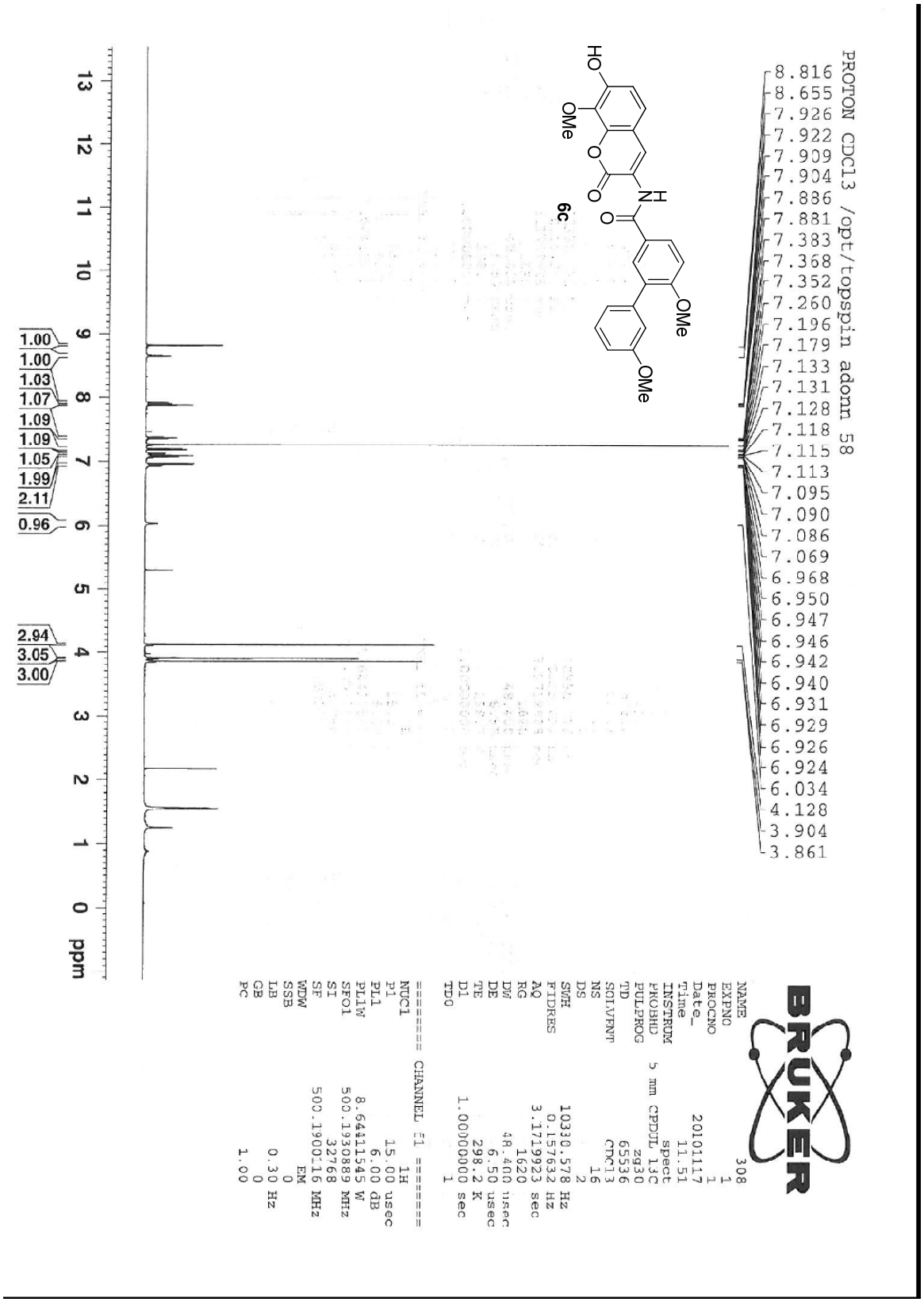
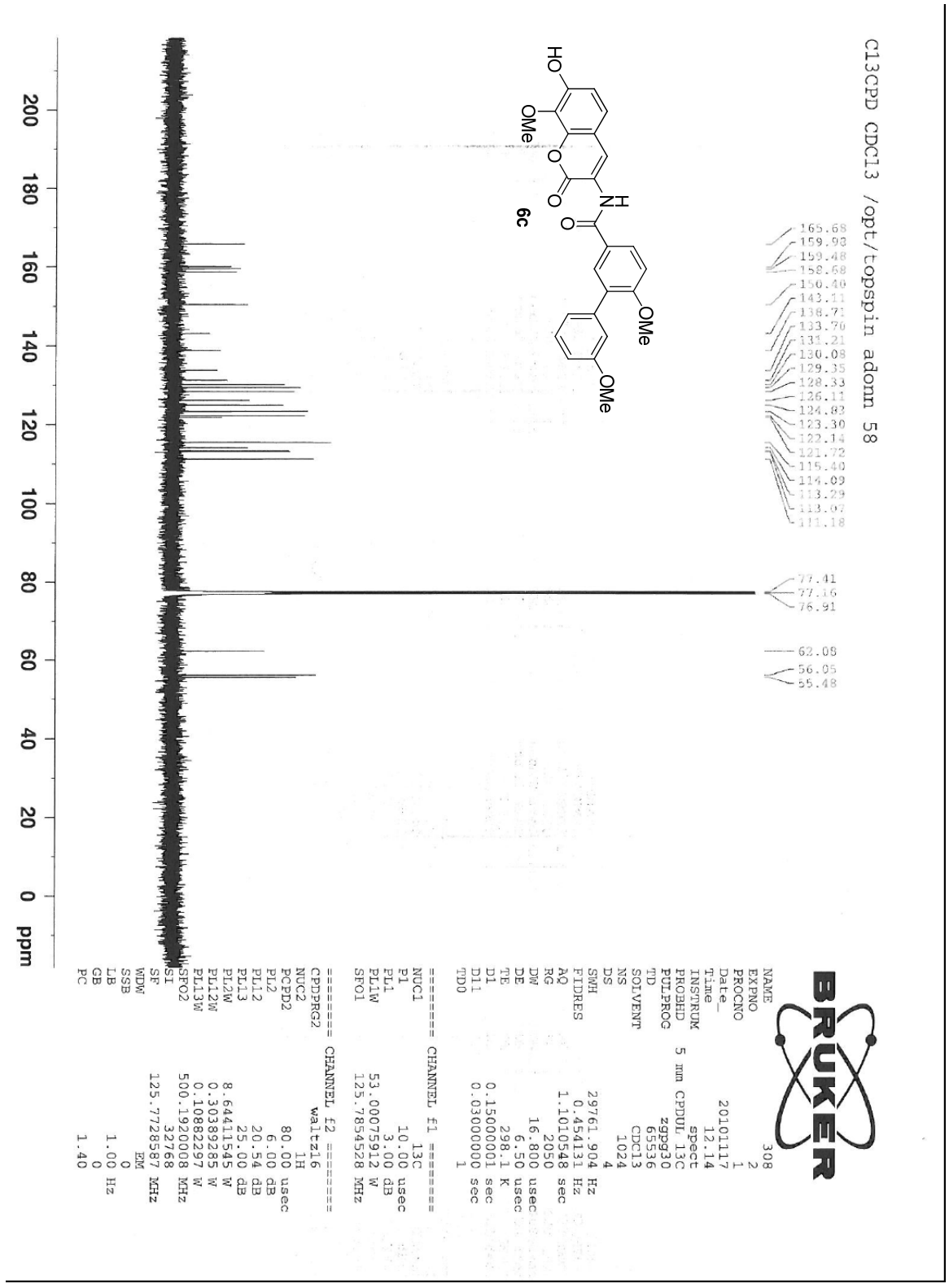
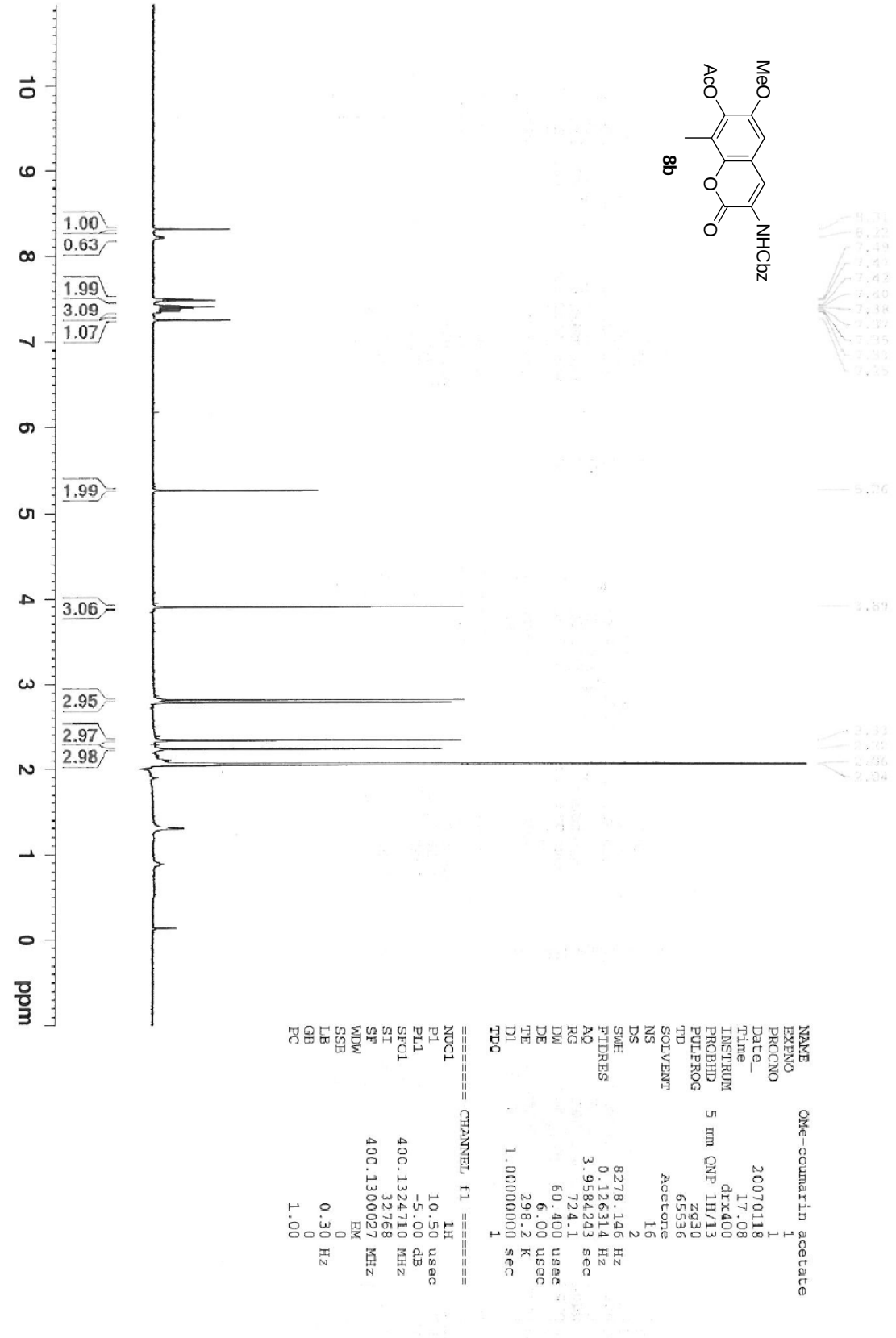
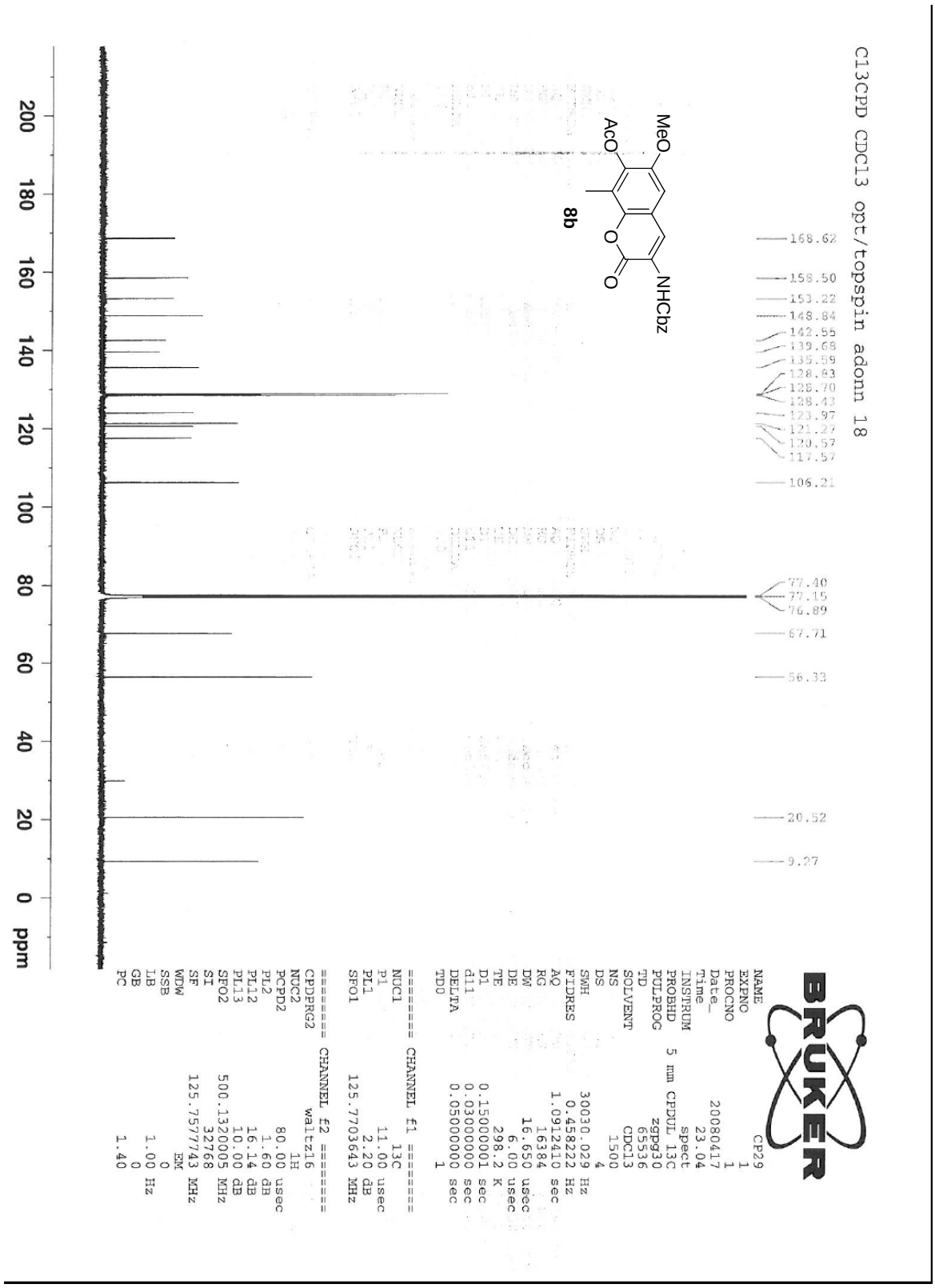
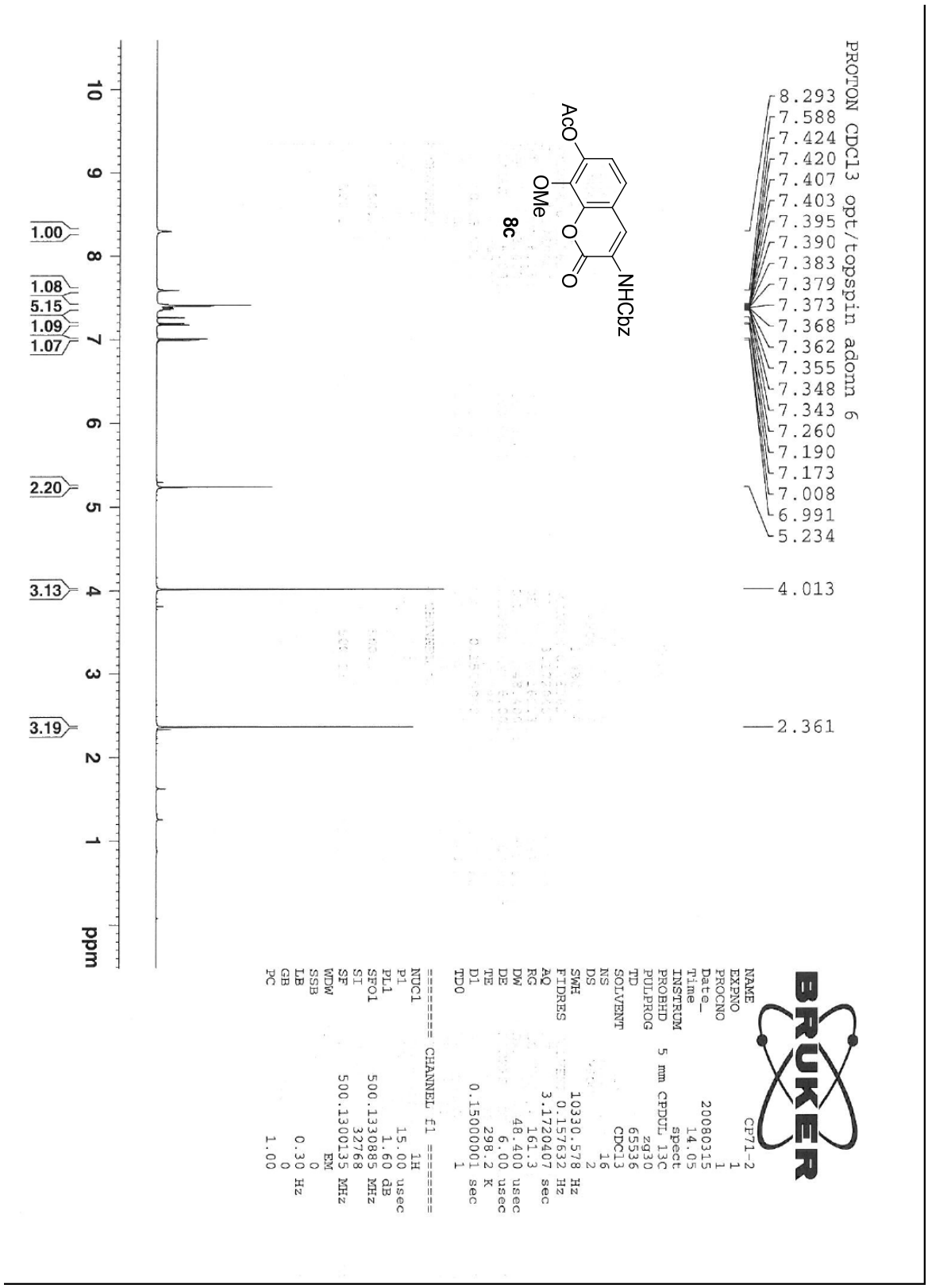
TD0 1
======== CHANNEL f1 ========
NUC1 13c
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854928 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728587 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

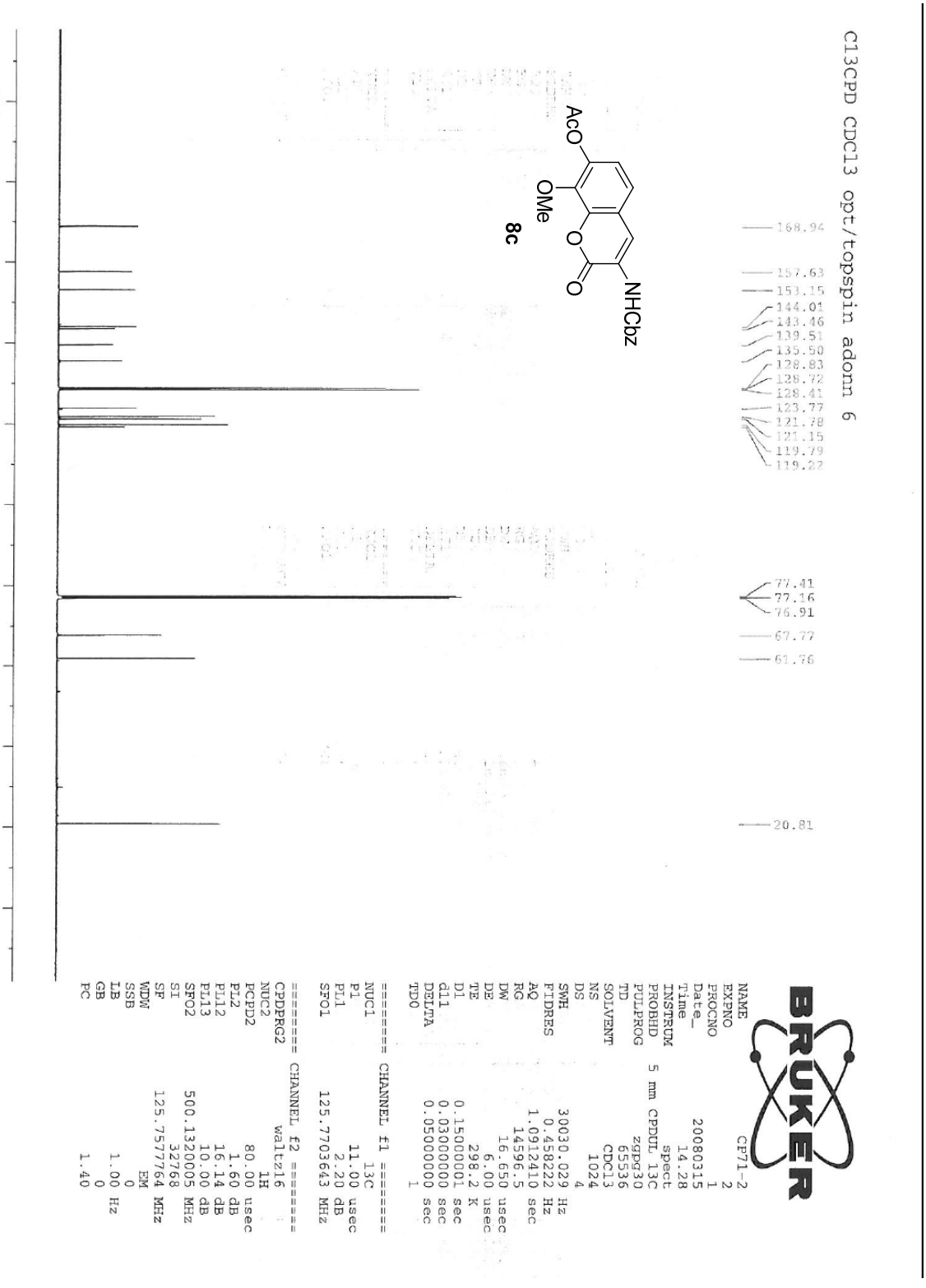

PROTON CDCl3 /opt/topspin adonn 58
8.816
8.655
7.926
7.922
7.909
7.904
7.886
7.881
7.383
7.368
7.352
7.260
7.196
7.179
7.133
7.131
7.128
7.118
7.115
7.113
7.095
7.090
7.086
7.069
6.968
6.950
6.947
6.946
6.942
6.940
6.931
6.929
6.926
6.924
6.034
4.128
3.904
3.861
HO
OMe
O
O
O
N
H
O
OMe
OMe
6c
1.00
1.00
1.03
1.07
1.09
1.09
1.05
1.99
2.11
0.96
2.94
3.05
3.00
13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm
BRUKER
NAME 308
EXPNO 1
PROCNO 1
Date_ 20101117
Time 11.51
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64111545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900116 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

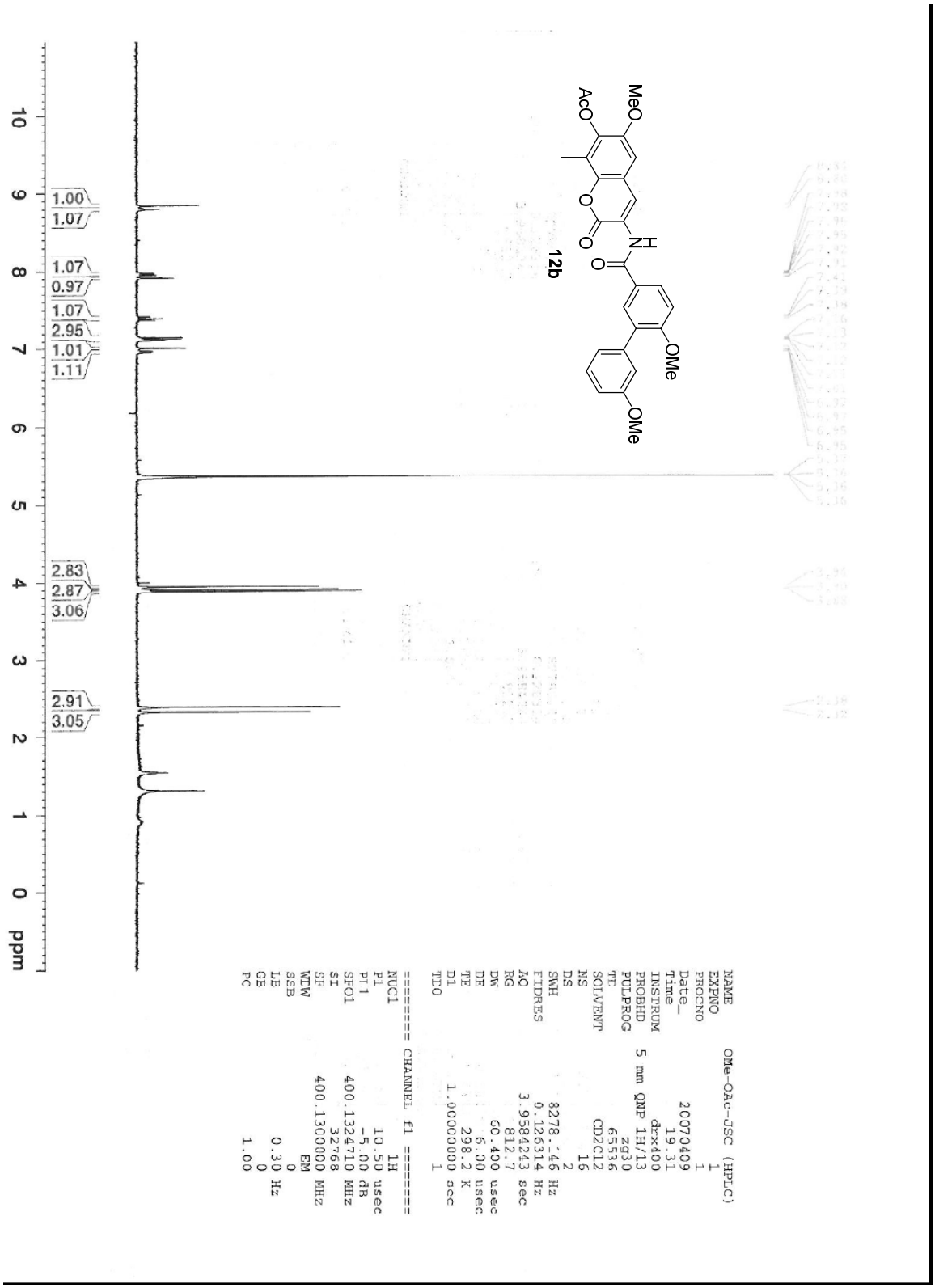

C13CPD CDC13 /opt/topspin adonn 58
HO
OMe
O
O
O
N
H
O
OMe
OMe
6c
165.68
159.93
159.48
158.68
150.40
143.11
138.71
133.70
131.21
130.08
129.35
128.33
126.11
124.82
123.30
122.14
121.72
115.40
114.09
113.29
113.07
111.18
77.41
77.16
76.91
62.08
56.05
55.48
BRUKER
NAME 308
EXPNO 2
PROCNO 1
Date_ 20101117
Time 12.14
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.1 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728587 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
0
ppm

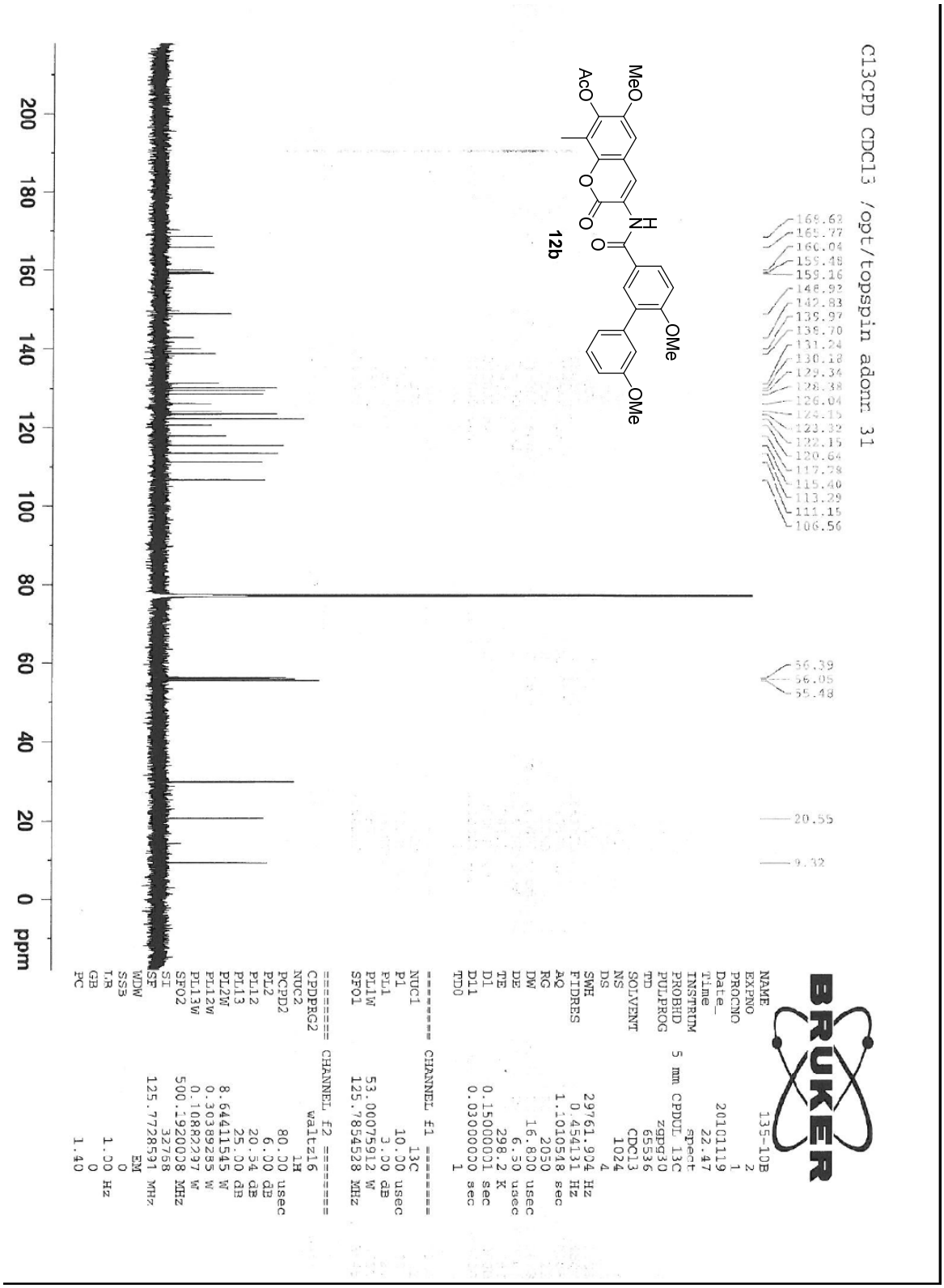

MeO
AcO
NHCbz
O
O
8b
1.00
0.63
1.99
3.09
1.07
1.99
3.06
2.95
2.97
2.98
10 9 8 7 6 5 4 3 2 1 0 ppm
NAME OMe-coumarin acetate
EXPNO 1
PROCNO 1
Date_ 20070118
Time 17.08
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT Acetone
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 724.1
DW 60.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TDC 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300027 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

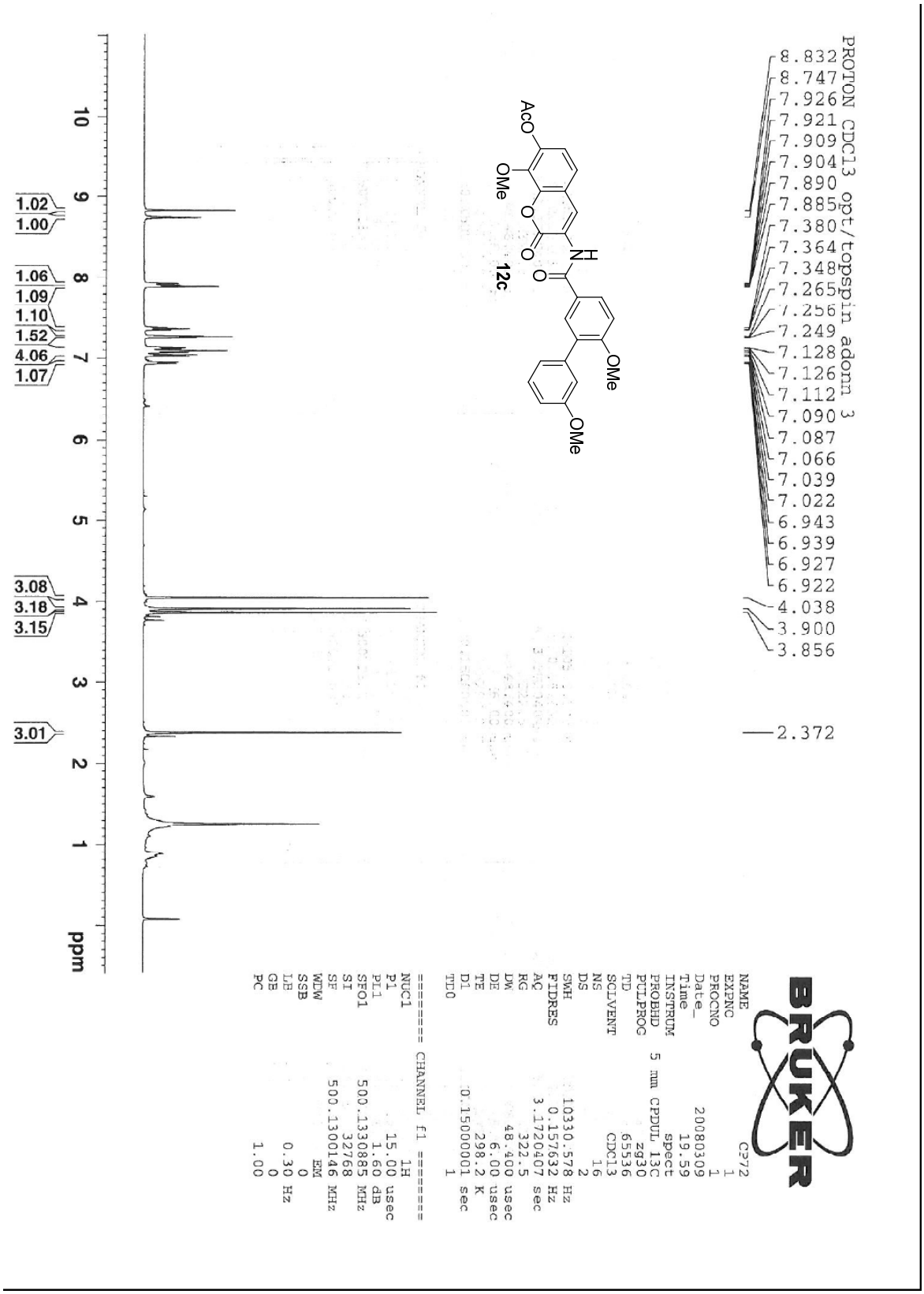

C13CPD CDC13 opt/topspin adonn 18
MeO
AcO
NHCbz
O
O
O
8b
168.62
158.50
153.22
148.84
142.55
139.68
135.59
128.83
128.70
128.43
123.97
121.27
120.57
117.57
106.21
77.40
77.15
76.89
67.71
56.33
20.52
9.27
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME CP29
EXPNO 1
PROCNO 1
Date_ 20080417
Time 23.04
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1500
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 16384
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.00 usec
PL1 2.20 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 1.60 dB
PL12 16.14 dB
PL13 10.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577743 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

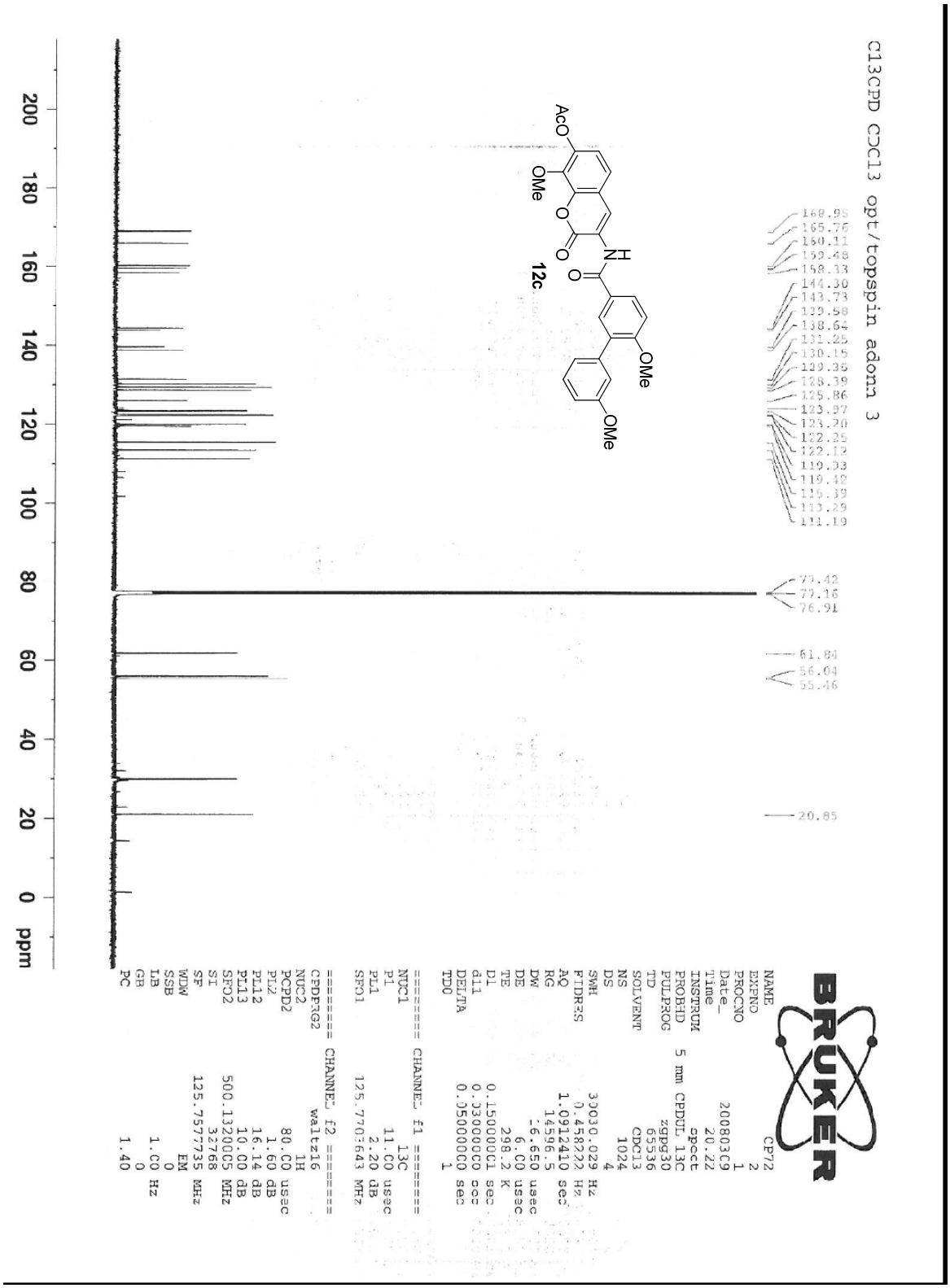

PROTON CDCl3 opt/topspin adonn 6
8.293
7.588
7.424
7.420
7.407
7.403
7.395
7.390
7.383
7.379
7.373
7.368
7.362
7.355
7.348
7.343
7.260
7.190
7.173
7.008
6.991
5.234
4.013
2.361
AcO
OMe
NHCbz
8c
1.00
1.08
5.15
1.09
1.07
2.20
3.13
3.19
10 9 8 7 6 5 4 3 2 1 ppm
NAME CP71-2
EXPNO 1
PROCNO 1
Date_ 20080315
Time 14.05
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 161.3
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 1.60 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300135 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

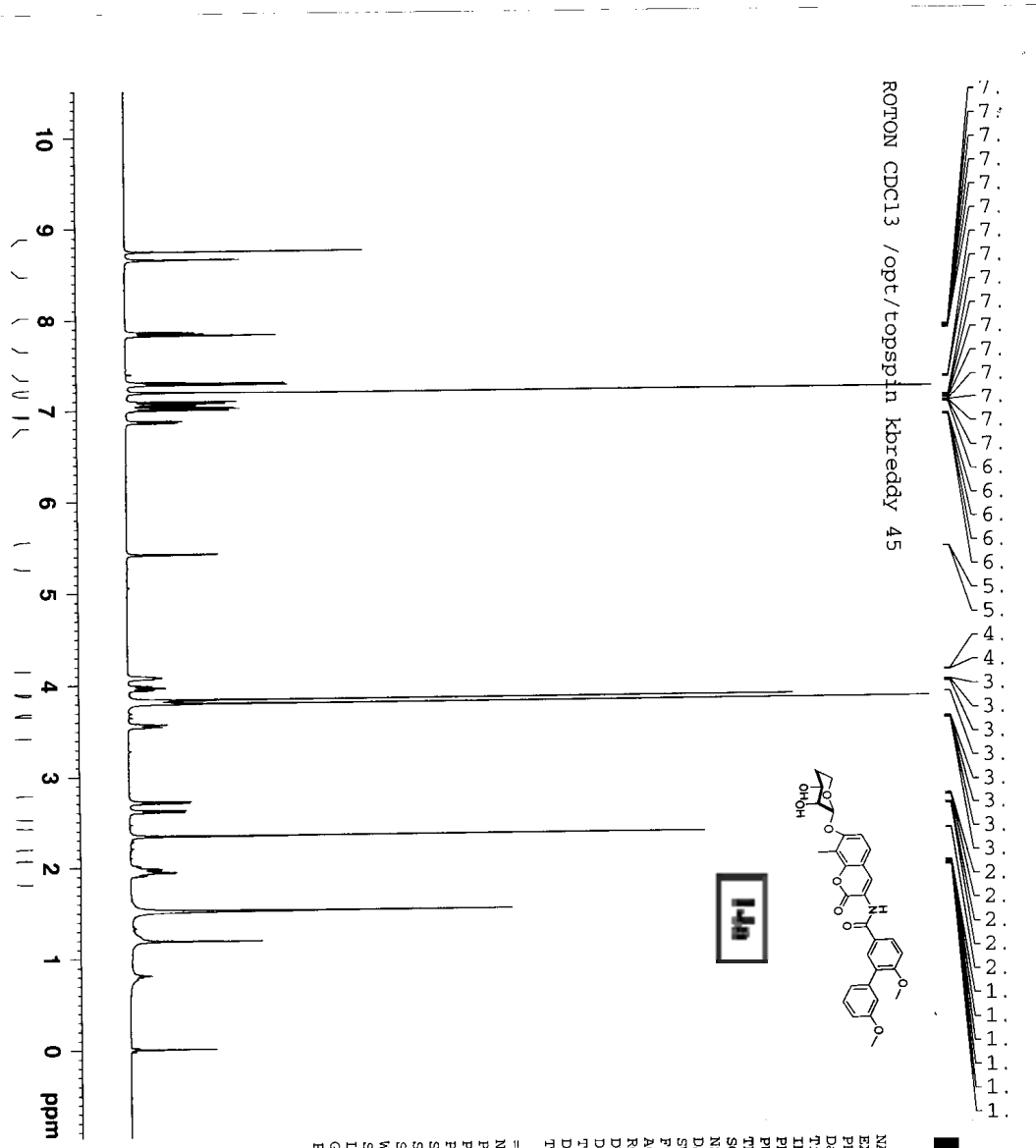

C13CPD CDC13 opt/topspin adonn 6
168.94
157.63
153.15
144.01
143.46
139.51
135.50
128.83
128.72
128.41
123.77
121.78
121.15
119.79
119.27
77.41
77.16
76.91
67.77
61.76
20.81
AcO
OMe
NHCbz
8c
NAME CP71-2
EXPNO 2
PROCNO 1
Date_ 20080315
Time 14.28
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 1024
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 14596.5
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 13C
P1 11.00 usec
PL1 2.20 dB
SFO1 125.7703643 MHz
========== CHANNEL f2 ==========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 1.60 dB
PL12 16.14 dB
PL13 10.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577764 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

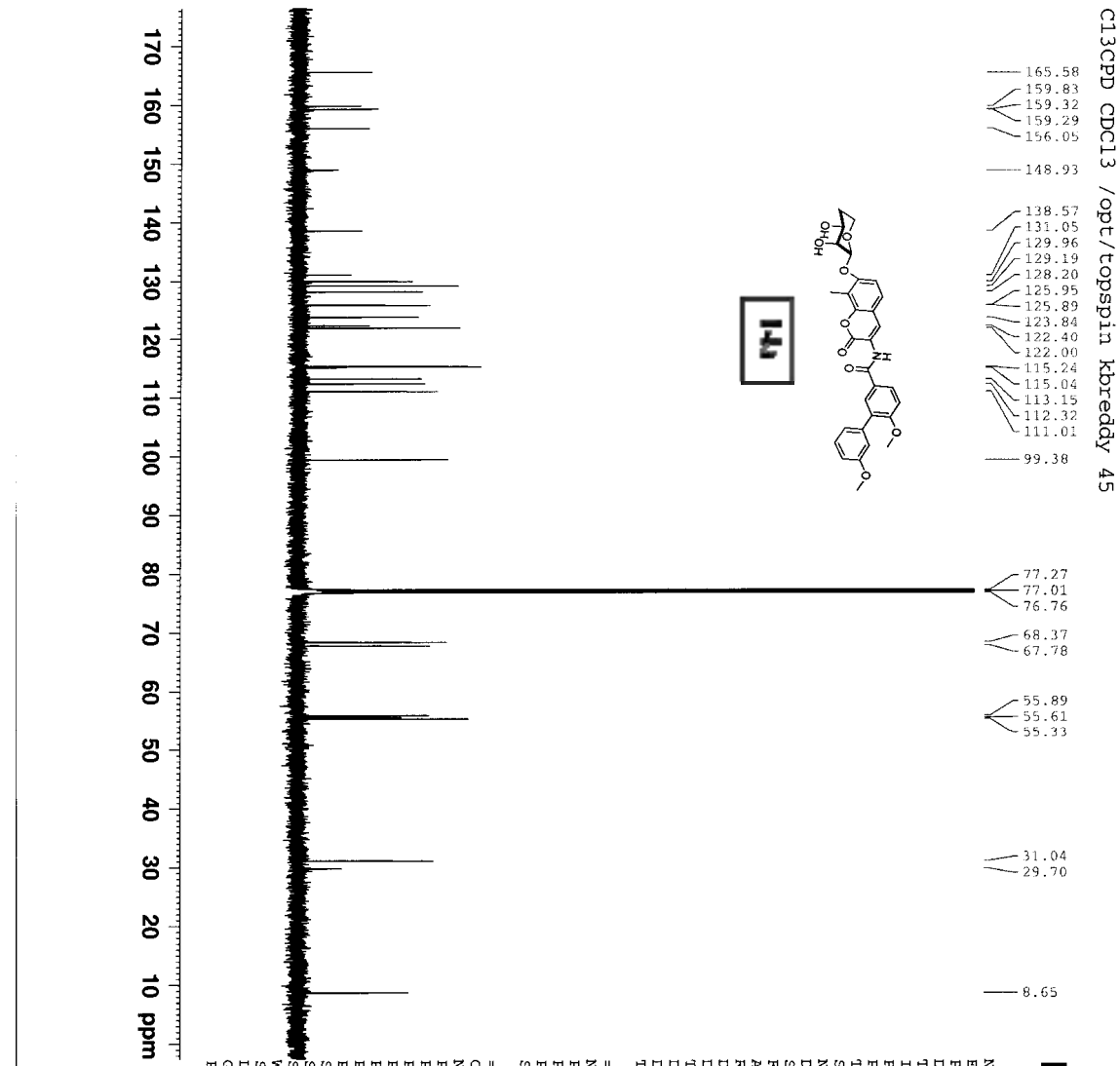

MeO
AcO
OMe
OMe
12b
1.00
1.07
1.07
0.97
1.07
2.95
1.01
1.11
2.83
2.87
3.06
2.91
3.05
10
9
8
7
6
5
4
3
2
1
0
ppm
NAME OMe-OAc-JSC (HPLC)
EXPNO 1
PROCNO 1
Date_ 20070409
Time 19.31
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CD2Cl2
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 812.7
DW 60.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

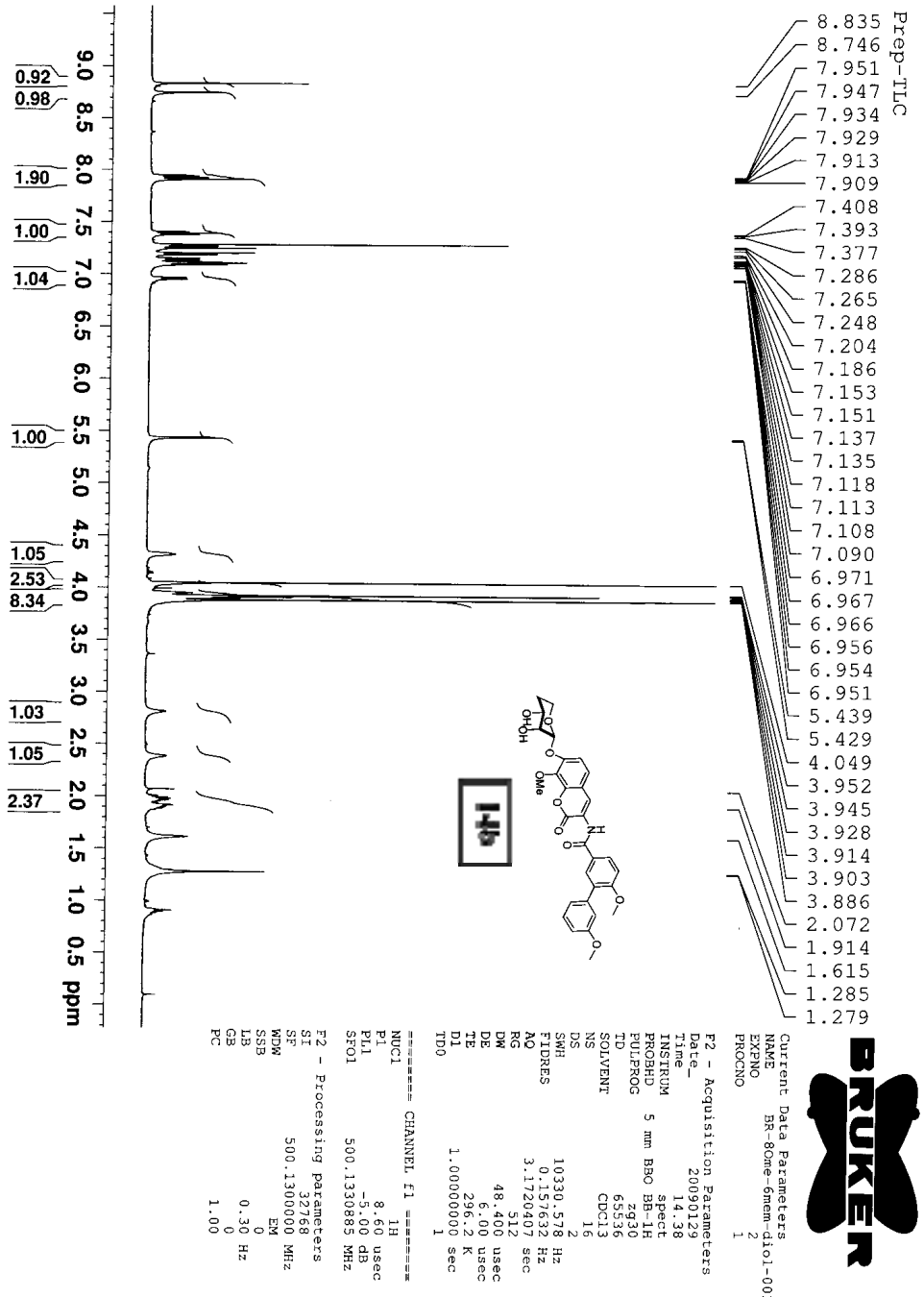

C13CPD CDCl3 /opt/topspin adonn 31
MeO
AcO
OMe
OMe
12b
169.62
165.77
160.04
159.48
159.16
148.92
142.83
139.97
138.70
131.24
130.18
129.34
128.38
126.04
123.32
122.15
120.64
117.28
115.40
113.29
111.15
106.56
56.39
56.05
55.48
20.55
9.32
NAME 135-10B
EXPNO 2
PROCNO 1
Date_ 20101119
Time 22.47
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.34 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728591 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

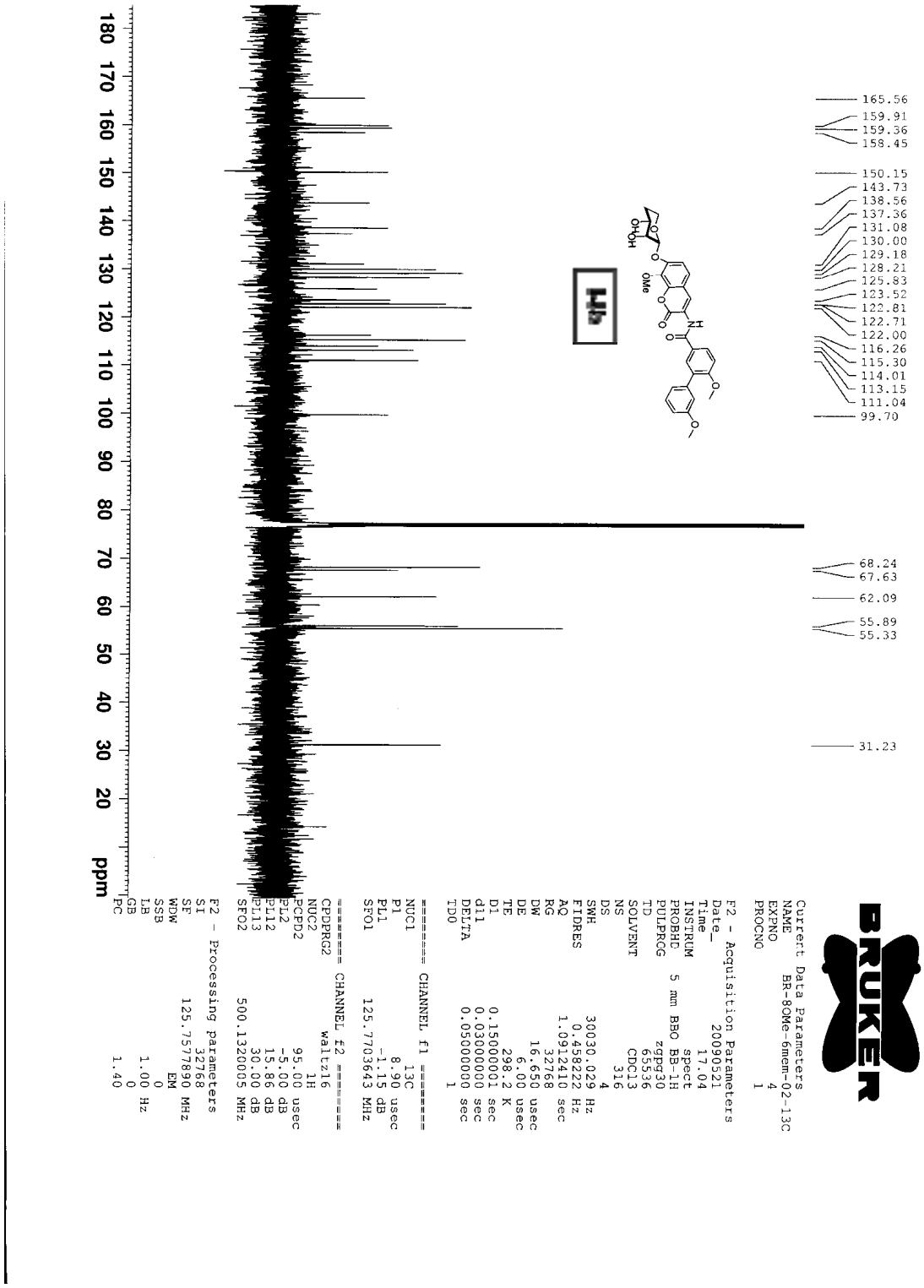

PROTON CDCl3 opt/topspin adonn 3
8.832
8.747
7.926
7.921
7.909
7.904
7.890
7.885
7.380
7.364
7.348
7.265
7.256
7.249
7.128
7.126
7.112
7.090
7.087
7.066
7.039
7.022
6.943
6.939
6.927
6.922
4.038
3.900
3.856
2.372
AcO
OMe
O
O
H
N
O
OMe
OMe
12c
1.02
1.00
1.06
1.09
1.10
1.52
4.06
1.07
3.08
3.18
3.15
3.01
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME C272
EXPNO 1
PROCNO 1
Date_ 20080309
Time 19.59
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 322.5
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
TD0 1
========== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 1.60 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300146 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

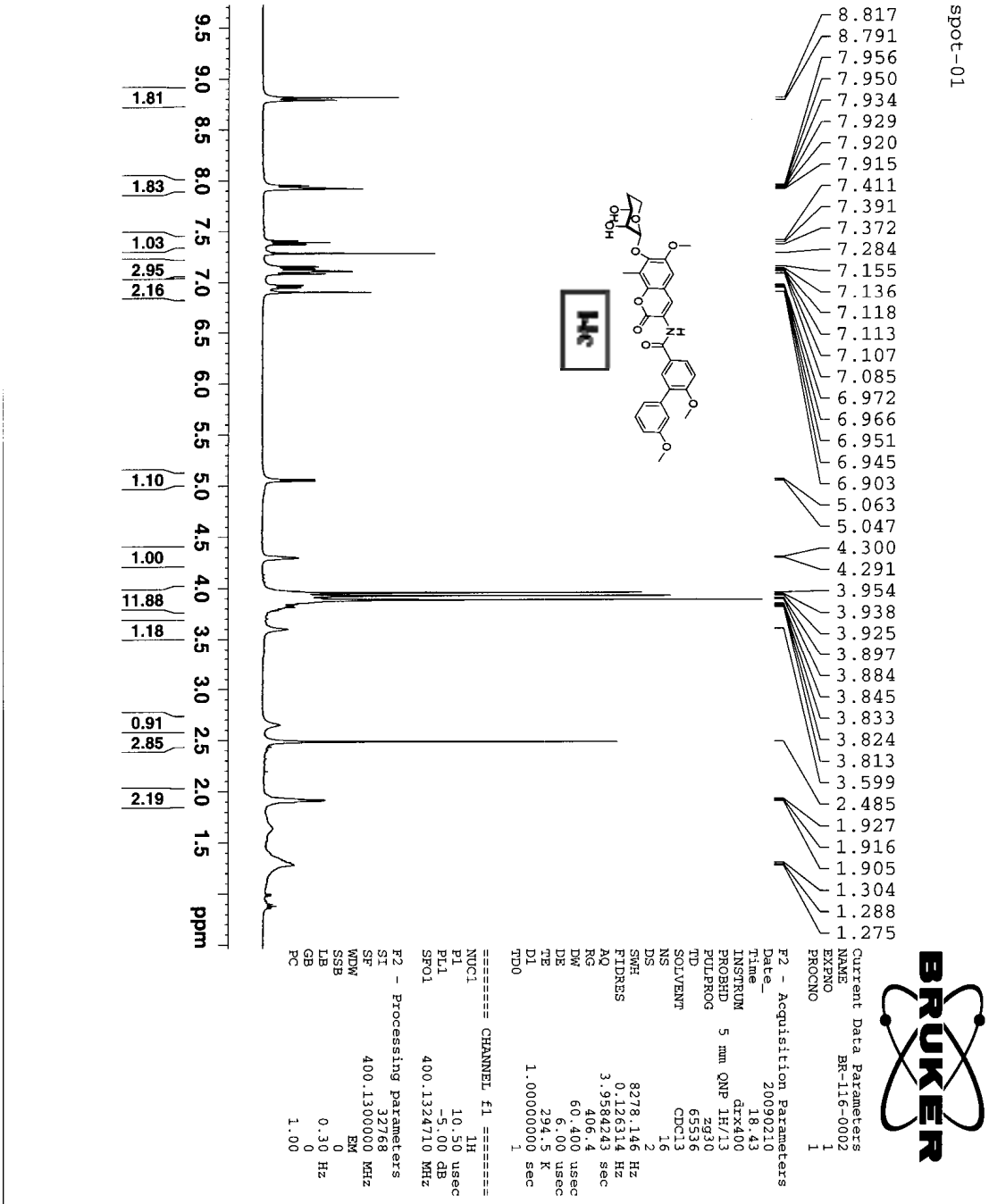

C13CPD CDCl3 opt/topspin adonn 3
AcO
OMe
OMe
OMe
12c
160.95
165.76
160.11
159.48
158.33
144.30
143.73
139.58
138.64
131.25
130.15
129.39
128.39
125.86
123.97
123.20
122.25
122.12
119.53
119.42
115.39
113.29
111.19
77.42
77.16
76.91
61.84
56.04
55.46
20.85
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME CP72
EXPNO 2
PROCNO 1
Date_ 20080309
Time 20.22
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 14596.5
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.00 usec
PL1 2.20 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 1.60 dB
PL12 16.14 dB
PL13 10.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577735 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

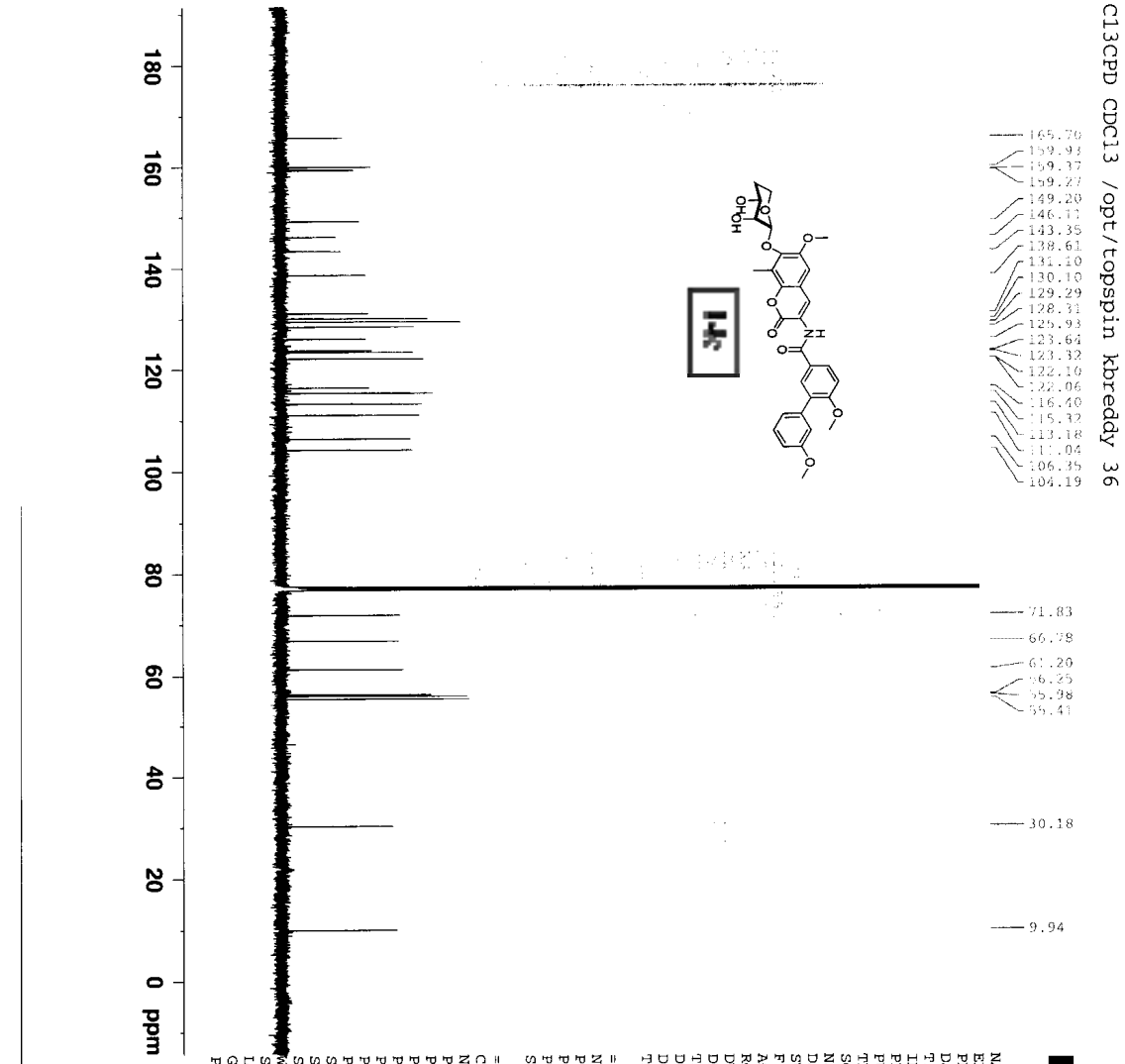

ROTON CDCl3 /opt/topspin kbreddy 45
BRUKER
NAME BR-Fin-01
EXPNO 1
PROCNO 1
Date_ 20081013
Time 12.53
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900395 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm

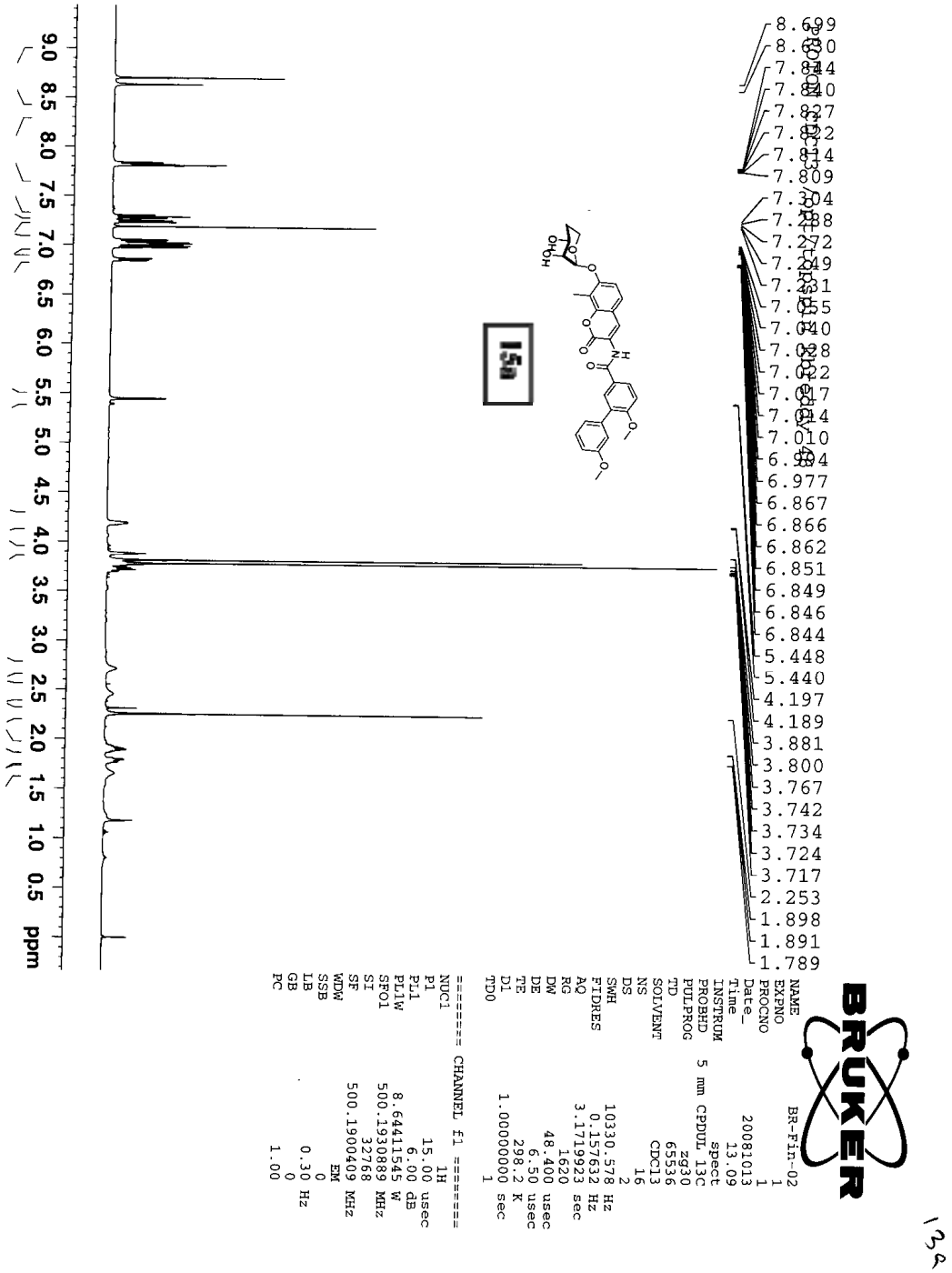

C13CPD CDCl3 /opt/topspin kbreddy 45
165.58
159.83
159.32
159.29
156.05
148.93
138.57
131.05
129.96
129.19
128.20
125.95
125.89
123.84
122.40
122.00
115.24
115.04
113.15
112.32
111.01
99.38
77.27
77.01
76.76
68.37
67.78
55.89
55.61
55.33
31.04
29.70
8.65
BRUKER
NAME BR-Fin-01
EXPNO 2
PROCNO 1
Date_ 20081013
Time 13.05
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

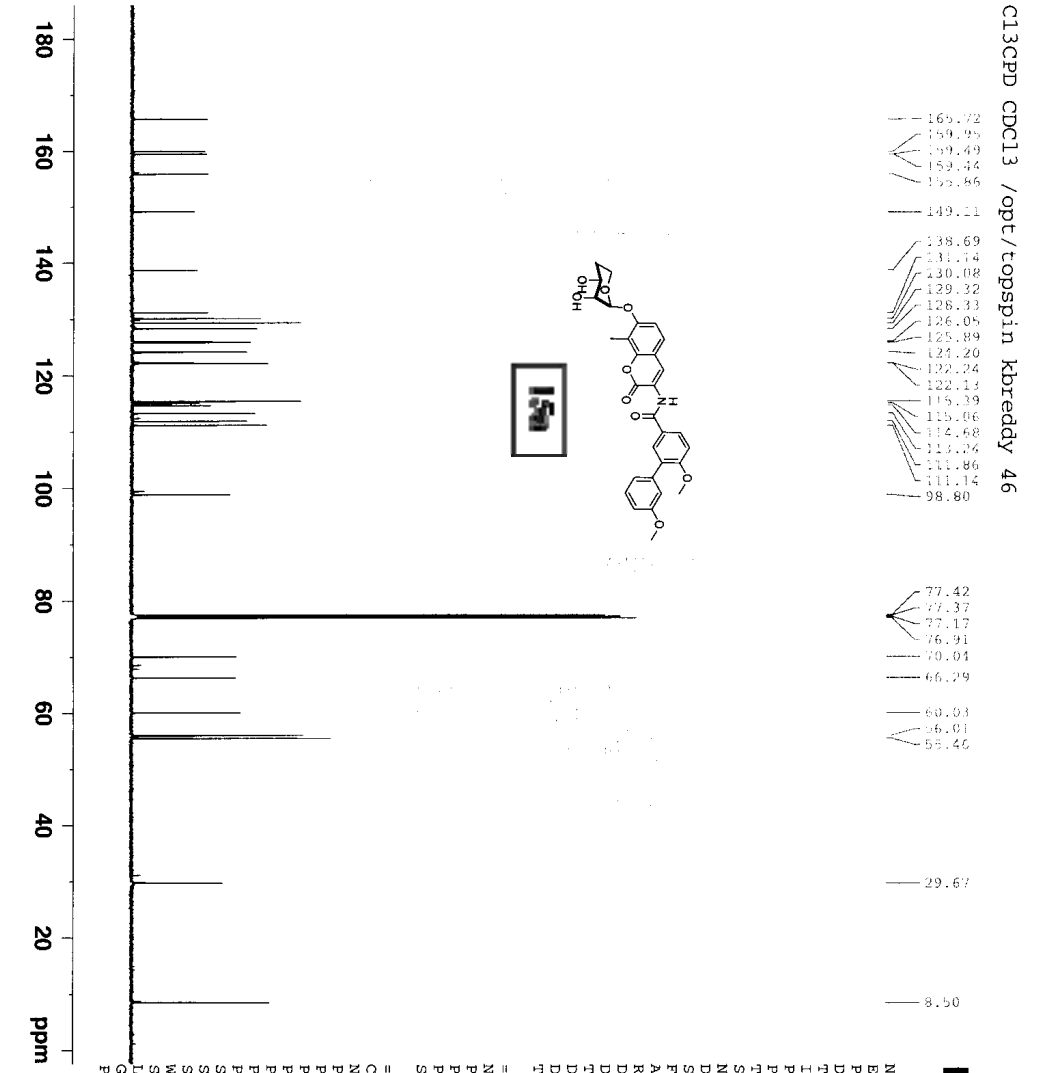

Prep-TLC
8.835
8.746
7.951
7.947
7.934
7.929
7.913
7.909
7.408
7.393
7.377
7.286
7.265
7.248
7.204
7.186
7.153
7.151
7.137
7.135
7.118
7.113
7.108
7.090
6.971
6.967
6.966
6.956
6.954
6.951
5.439
5.429
4.049
3.952
3.945
3.928
3.914
3.903
3.886
2.072
1.914
1.615
1.285
1.279
Current Data Parameters
NAME BR-8Ome-6mem-diol-001
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090129
Time 14.38
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 512
DW 48.400 usec
DE 6.00 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
F2 - Processing parameters
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.92
0.98
1.90
1.00
1.04
1.00
1.05
2.53
8.34
1.03
1.05
2.37
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
OMe
1-4b

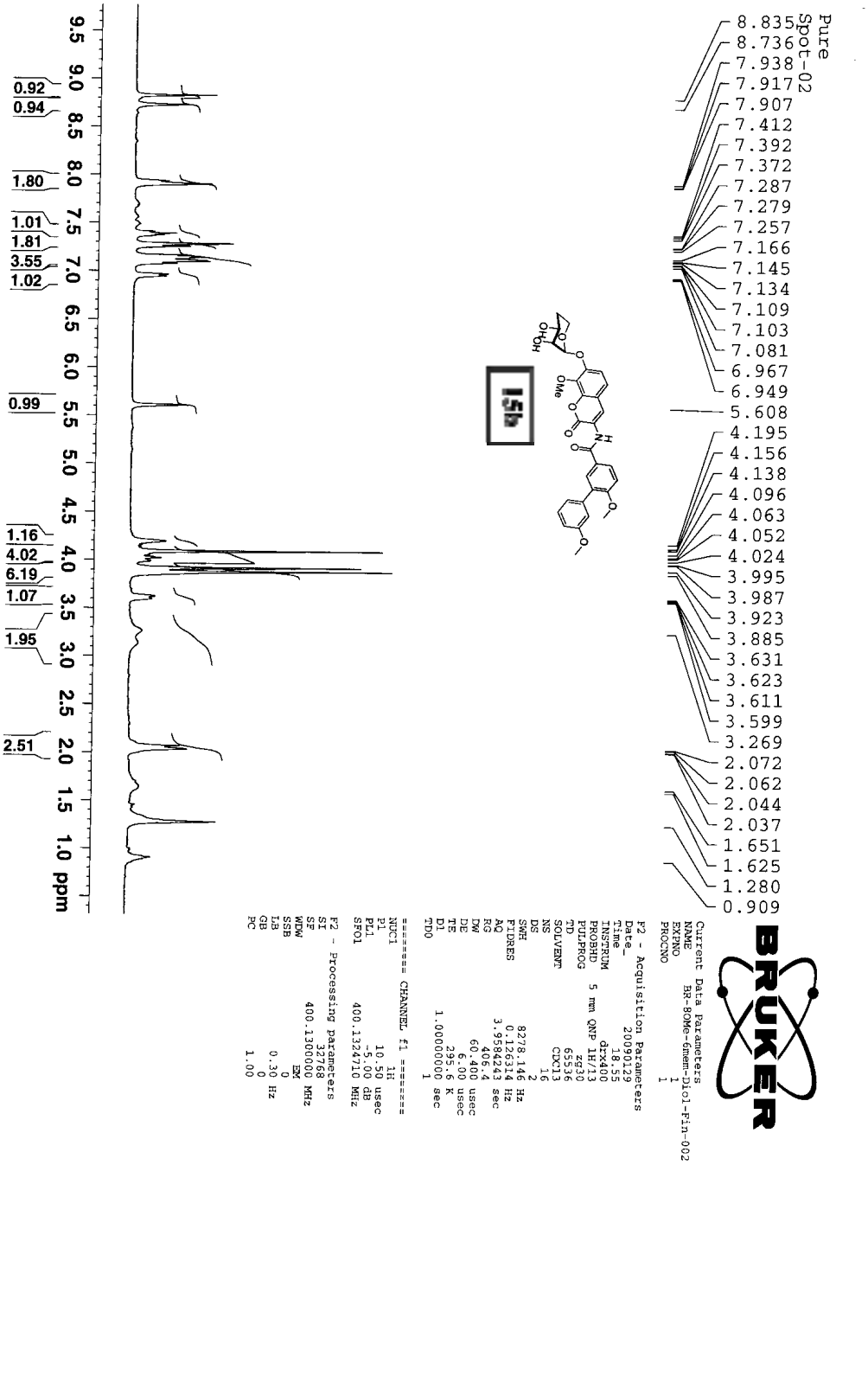

165.56
159.91
159.36
158.45
150.15
143.73
138.56
137.36
131.08
130.00
129.18
128.21
125.83
123.52
122.81
122.71
122.00
116.26
115.30
114.01
113.15
111.04
99.70
68.24
67.63
62.09
55.89
55.33
31.23
OMe
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm
BRUKER
Current Data Parameters
NAME BR-8OMe-6mem-02-13C
EXPNO 4
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090521
Time_ 17.04
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 316
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 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

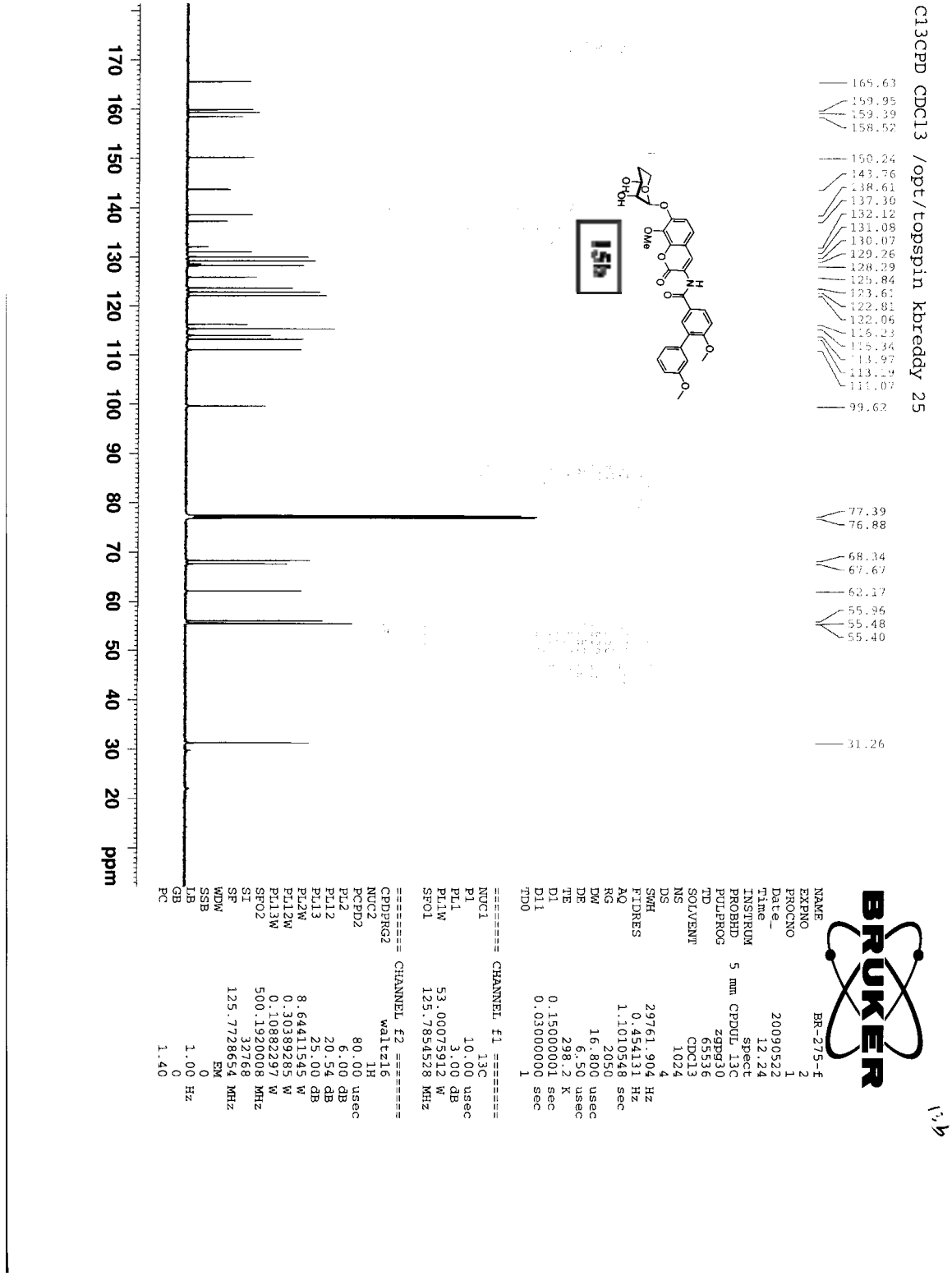

spot-01
8.817
8.791
7.956
7.950
7.934
7.929
7.920
7.915
7.411
7.391
7.372
7.284
7.155
7.136
7.118
7.113
7.107
7.085
6.972
6.966
6.951
6.945
6.903
5.063
5.047
4.300
4.291
3.954
3.938
3.925
3.897
3.884
3.845
3.833
3.824
3.813
3.599
2.485
1.927
1.916
1.905
1.304
1.288
1.275
Current Data Parameters
NAME BR-116-0002
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090210
Time_ 18.43
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 406.4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.81
1.83
1.03
2.95
2.16
1.10
1.00
11.88
1.18
0.91
2.85
2.19
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 ppm

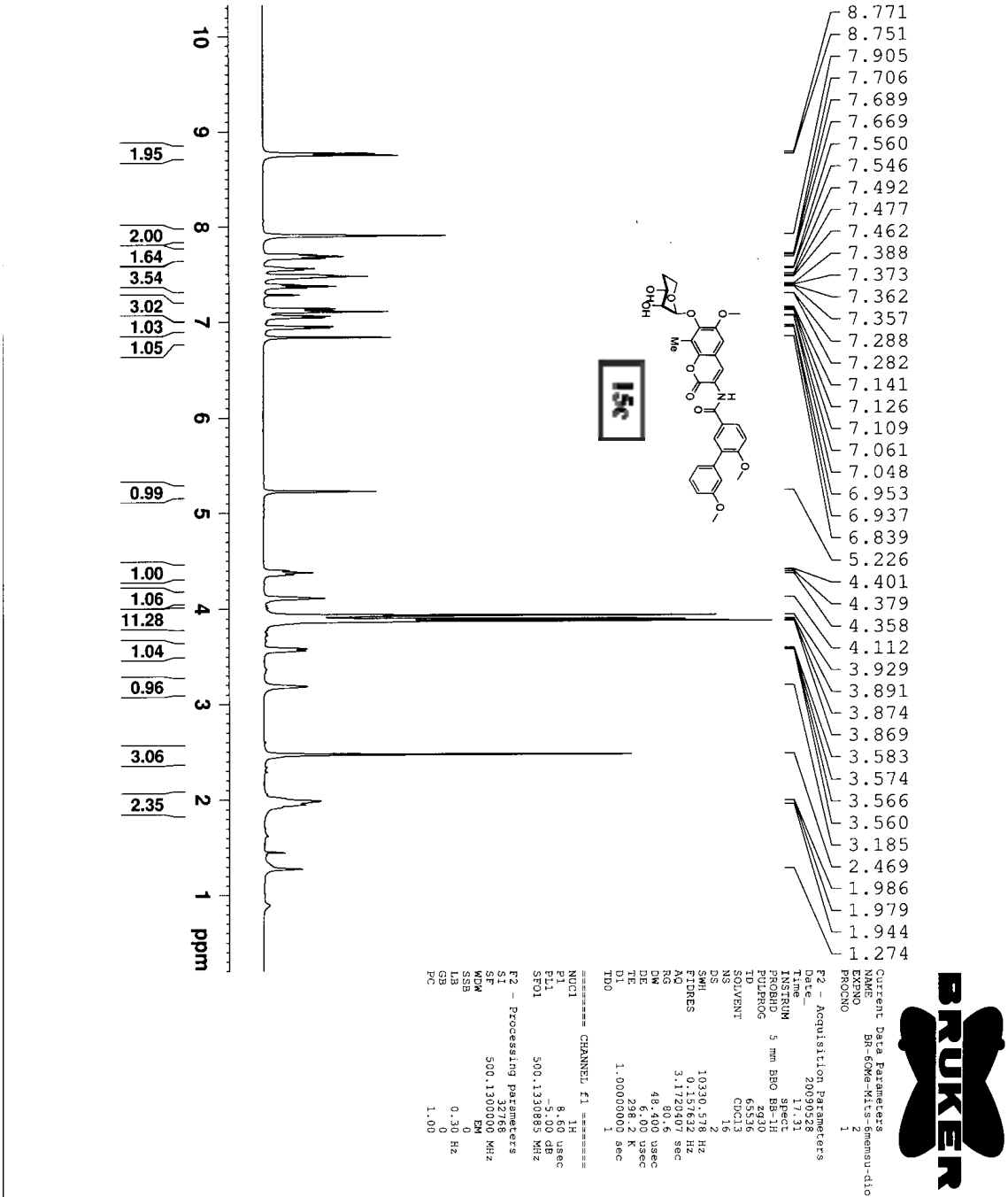

C13CPD CDCl3 /opt/topspin kbready 36
BRUKER
NAME BR-118-01
EXPNO 2
PROCNO 1
Date_ 20090216
Time 14.21
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 292.4 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728672 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
165.70
159.93
159.37
159.27
149.28
146.11
143.35
138.61
131.10
130.10
129.29
128.31
126.93
123.64
123.32
122.10
122.06
116.40
115.32
113.18
111.04
106.35
104.19
71.83
66.78
61.20
56.25
55.98
55.41
30.18
9.94
180
160
140
120
100
80
60
40
20
0
ppm

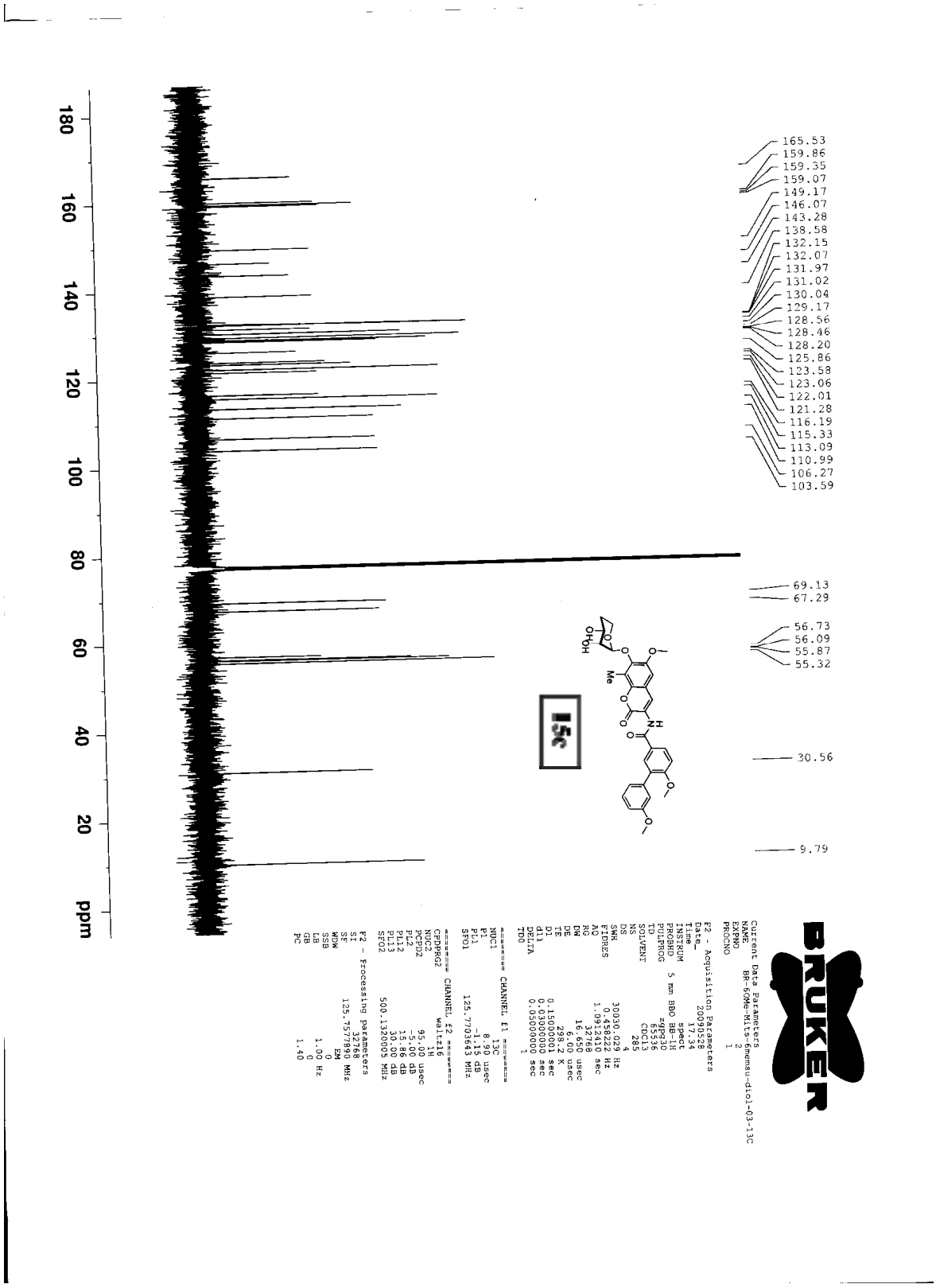

8.699
8.690
7.844
7.840
7.827
7.822
7.814
7.809
7.304
7.288
7.272
7.249
7.231
7.225
7.210
7.208
7.202
7.197
7.194
7.010
6.994
6.977
6.867
6.866
6.862
6.851
6.849
6.846
6.844
5.448
5.440
4.197
4.189
3.881
3.800
3.767
3.742
3.734
3.724
3.717
2.253
1.898
1.891
1.789
15a
BRUKER
BR-Fin-02
NAME
EXPNO 1
PROCNO 1
Date_ 20081013
Time 13.09
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900409 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm

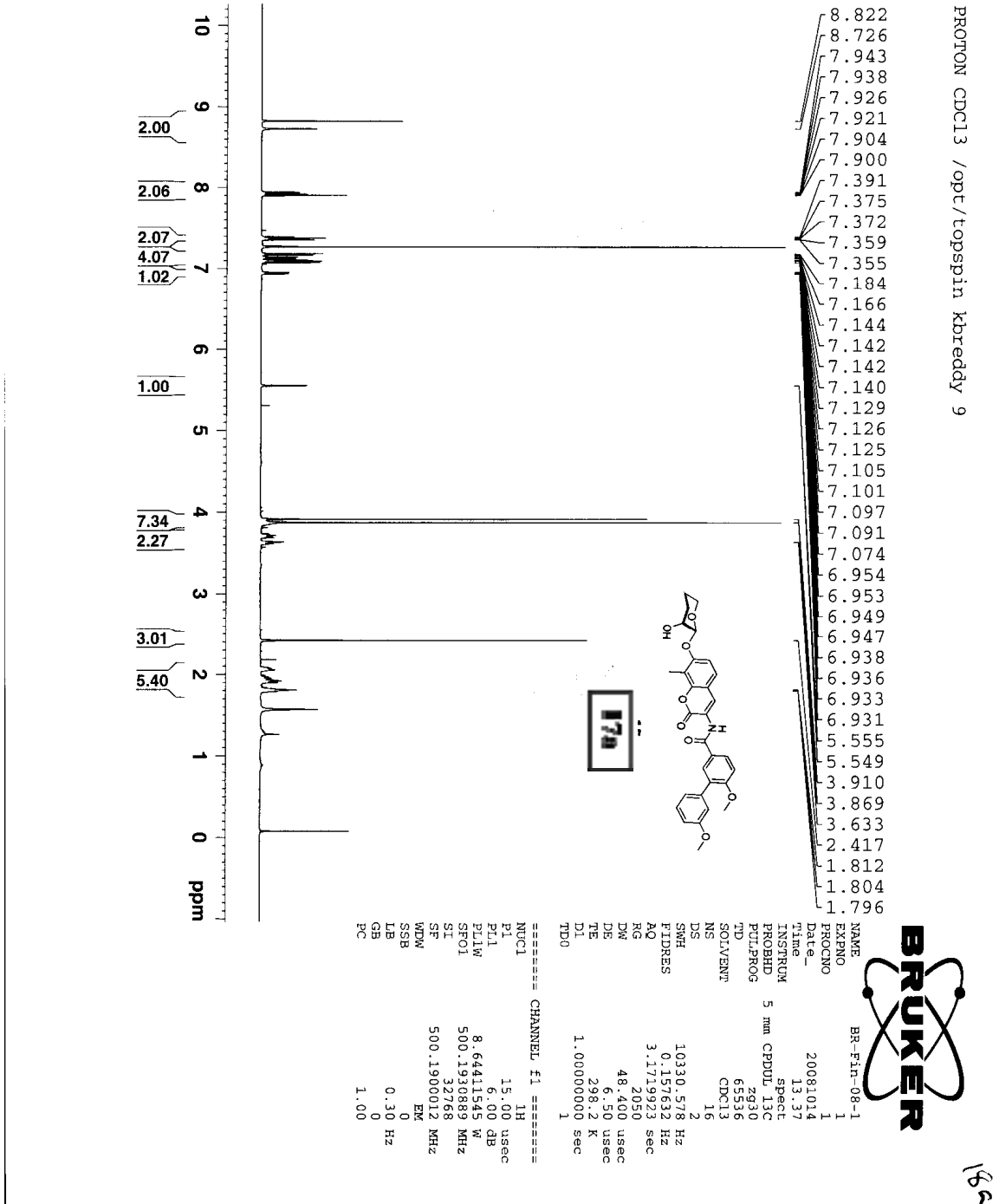

C13CPD CDCl3 /opt/topspin kbreddy 46
165.72
159.95
159.49
159.44
149.11
138.69
131.14
130.08
129.32
128.33
126.05
125.89
121.20
122.24
122.13
115.39
115.06
114.68
111.24
111.86
111.14
98.80
77.42
77.37
77.17
76.91
70.04
66.09
60.03
56.01
55.46
29.67
8.50
15
NAME BR-Fin-02
EXPNO 2
PROCNO 1
Date_ 20081013
Time_ 13.26
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728598 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

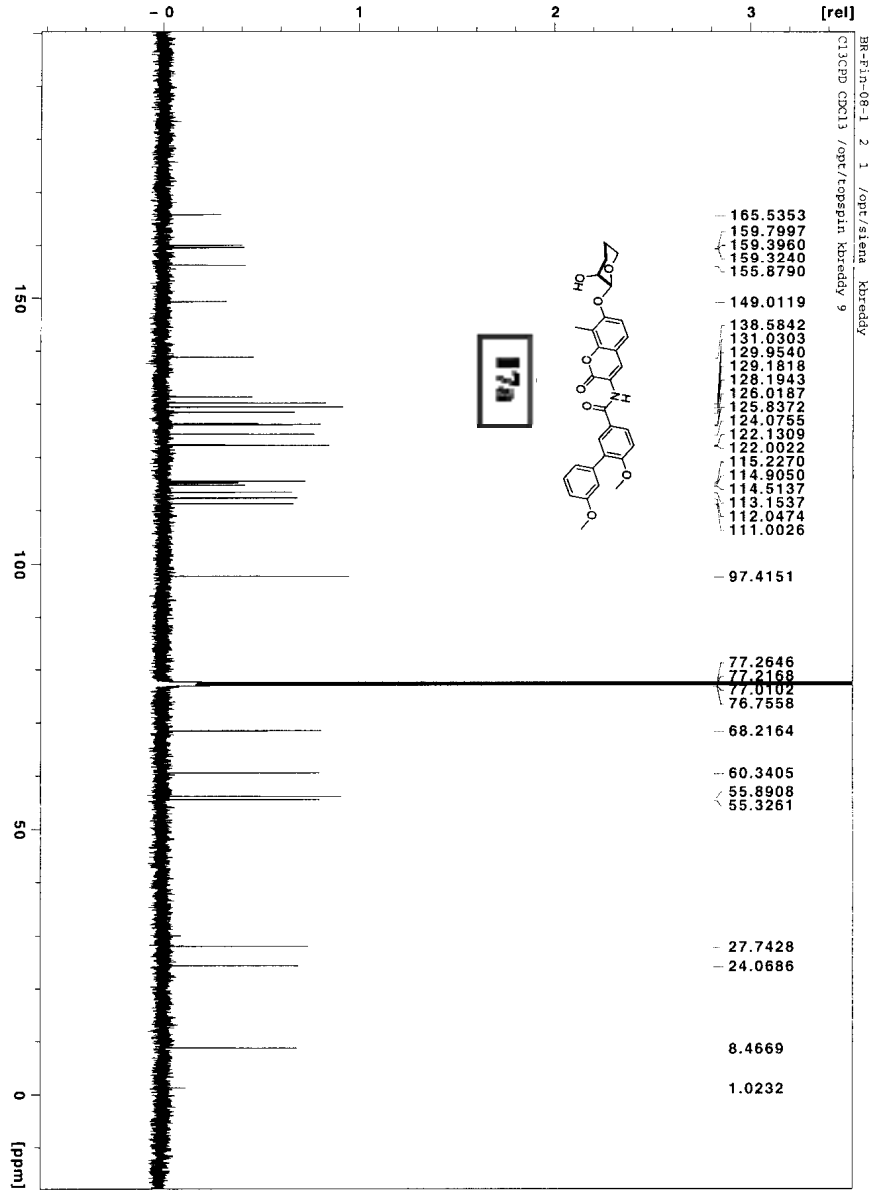

Pure
Spot-02
8.835
8.736
7.938
7.917
7.907
7.412
7.392
7.372
7.287
7.279
7.257
7.166
7.145
7.134
7.109
7.103
7.081
6.967
6.949
5.608
4.195
4.156
4.138
4.096
4.063
4.052
4.024
3.995
3.987
3.923
3.885
3.631
3.623
3.611
3.599
3.269
2.072
2.062
2.044
2.037
1.651
1.625
1.280
0.909
15b
0.92
0.94
1.80
1.01
1.81
3.55
1.02
0.99
1.16
4.02
6.19
1.07
1.95
2.51
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
Current Data Parameters
NAME BR-BOMe-6mem-Diol-Fin-002
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090129
Time 18.55
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 406.4
DW 60.400 usec
DE 6.00 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

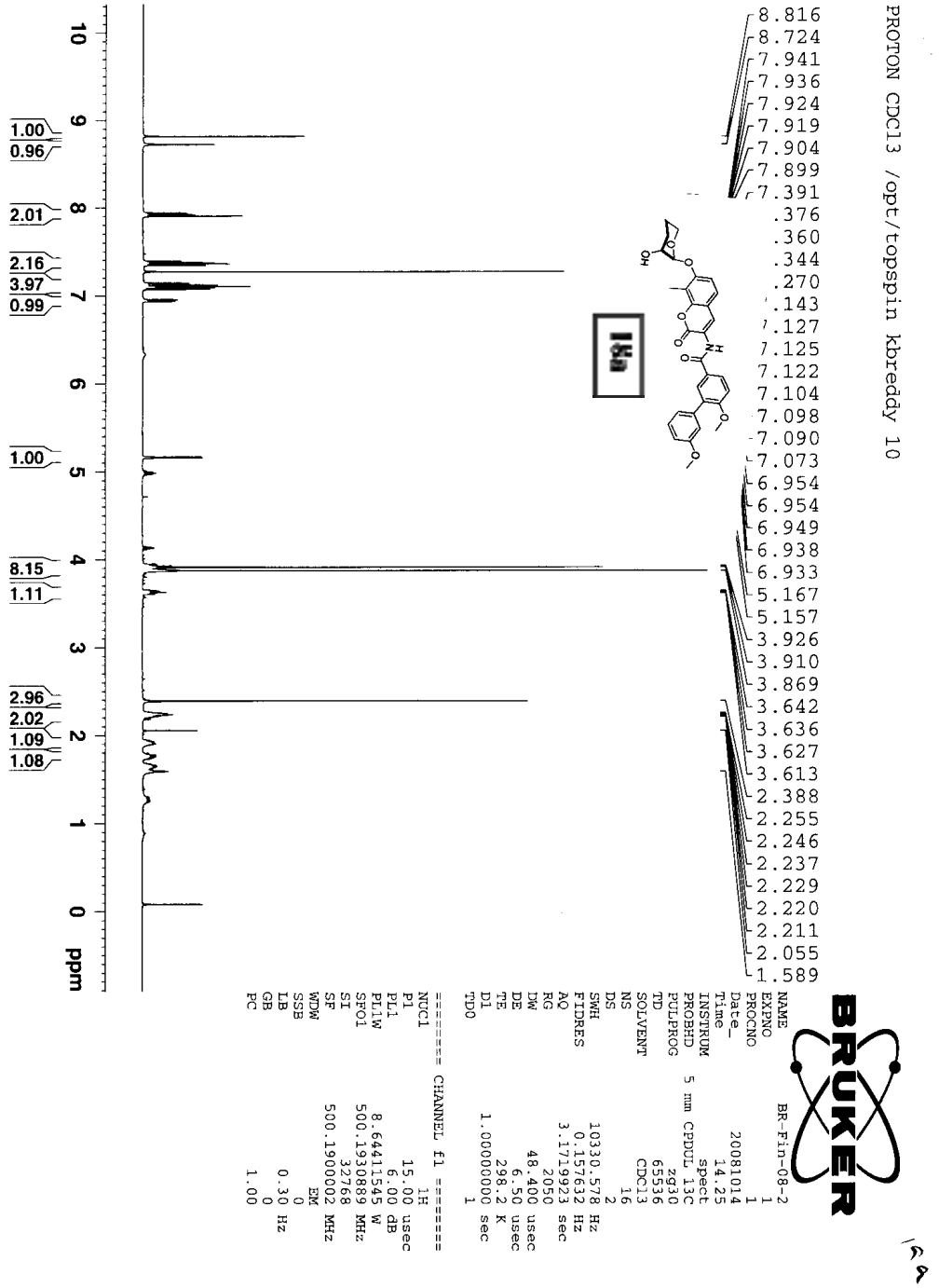

C13CPD CDCl3 /opt/topspin kbreddy 25
165.63
159.95
159.39
158.52
150.24
143.76
138.61
137.30
132.12
131.08
130.07
129.26
128.29
125.84
123.61
122.81
122.06
116.23
115.34
113.97
113.17
111.07
99.62
77.39
76.88
68.34
67.67
62.17
55.96
55.48
55.40
31.26
15b
OMe
BRUKER
NAME BR-275-f
EXPNO 2
PROCNO 1
Date_ 20090522
Time 12.24
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728654 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm


8.771
8.751
7.905
7.706
7.689
7.669
7.560
7.546
7.492
7.477
7.462
7.388
7.373
7.362
7.357
7.288
7.282
7.141
7.126
7.109
7.061
7.048
6.953
6.937
6.839
5.226
4.401
4.379
4.358
4.112
3.929
3.891
3.874
3.869
3.583
3.574
3.566
3.560
3.185
2.469
1.986
1.979
1.944
1.274
1.95
2.00
1.64
3.54
3.02
1.03
1.05
0.99
1.00
1.06
11.28
1.04
0.96
3.06
2.35
10
9
8
7
6
5
4
3
2
1
ppm
15c
Me
Current Data Parameters
NAME BR-6OMe-MIts-6mensu-diol-03
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090528
Time 17.31
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 80.6
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
F2 - Processing parameters
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
BRUKER


165.53
159.86
159.35
159.07
149.17
146.07
143.28
138.58
132.15
132.07
131.97
131.02
130.04
129.17
128.56
128.46
128.20
125.86
123.58
123.06
122.01
121.28
116.19
115.33
113.09
110.99
106.27
103.59
69.13
67.29
56.73
56.09
55.87
55.32
30.56
9.79
15c
Me
Current Data Parameters
NAME BR-60Me-Mits-6memsu-diol-03-13c
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090528
Time 17.34
INSTRUM spect
PROBHD 5 mm BBO BBF-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 285
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D11 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.00 dB
PL13 30.00 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
180
160
140
120
100
80
60
40
20
ppm


PROTON CDCl3 /opt/topspin kbreddy 9
8.822
8.726
7.943
7.938
7.926
7.921
7.904
7.900
7.391
7.375
7.372
7.359
7.355
7.184
7.166
7.144
7.142
7.142
7.140
7.129
7.126
7.125
7.105
7.101
7.097
7.091
7.074
6.954
6.953
6.949
6.947
6.938
6.936
6.933
6.931
5.555
5.549
3.910
3.869
3.633
2.417
1.812
1.804
1.796
17a
2.00
2.06
2.07
4.07
1.02
1.00
7.34
2.27
3.01
5.40
ppm
NAME BR-Fin-08-1
EXPNO 1
PROCNO 1
Date_ 20081014
Time 13.37
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900012 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


– 0
1
2
3
[rel]
BR-Fin-08-1 2 1 /opt/siena Kbready
C13CPD CDCl3 /opt/topspin Kbready 9
165.5353
159.7997
159.3960
159.3240
155.8790
149.0119
138.5842
131.0303
129.9540
129.1818
128.1943
126.0187
125.8372
124.0755
122.1309
122.0022
115.2270
114.9050
114.5137
113.1537
112.0474
111.0026
97.4151
77.2646
77.2168
77.0102
76.7558
68.2164
60.3405
55.8908
55.3261
27.7428
24.0686
8.4669
1.0232
17a
150
100
50
0
[ppm]


PROTON CDCl3 /opt/topspin kbreddy 10
8.816
8.724
7.941
7.936
7.924
7.919
7.904
7.899
7.391
.376
.360
.344
.270
.143
.127
7.125
7.122
7.104
7.098
7.090
7.073
6.954
6.954
6.949
6.938
6.933
5.167
5.157
3.926
3.910
3.869
3.642
3.636
3.627
3.613
2.388
2.255
2.246
2.237
2.229
2.220
2.211
2.055
1.589
1.00
0.96
2.01
2.16
3.97
0.99
1.00
8.15
1.11
2.96
2.02
1.09
1.08
10 9 8 7 6 5 4 3 2 1 0 ppm
NAME BR-Fin-08-2
EXPNO 1
PROCNO 1
Date_ 20081014
Time 14.25
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SPO1 500.1930889 MHz
SI 32768
SF 500.1900002 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
BRUKER

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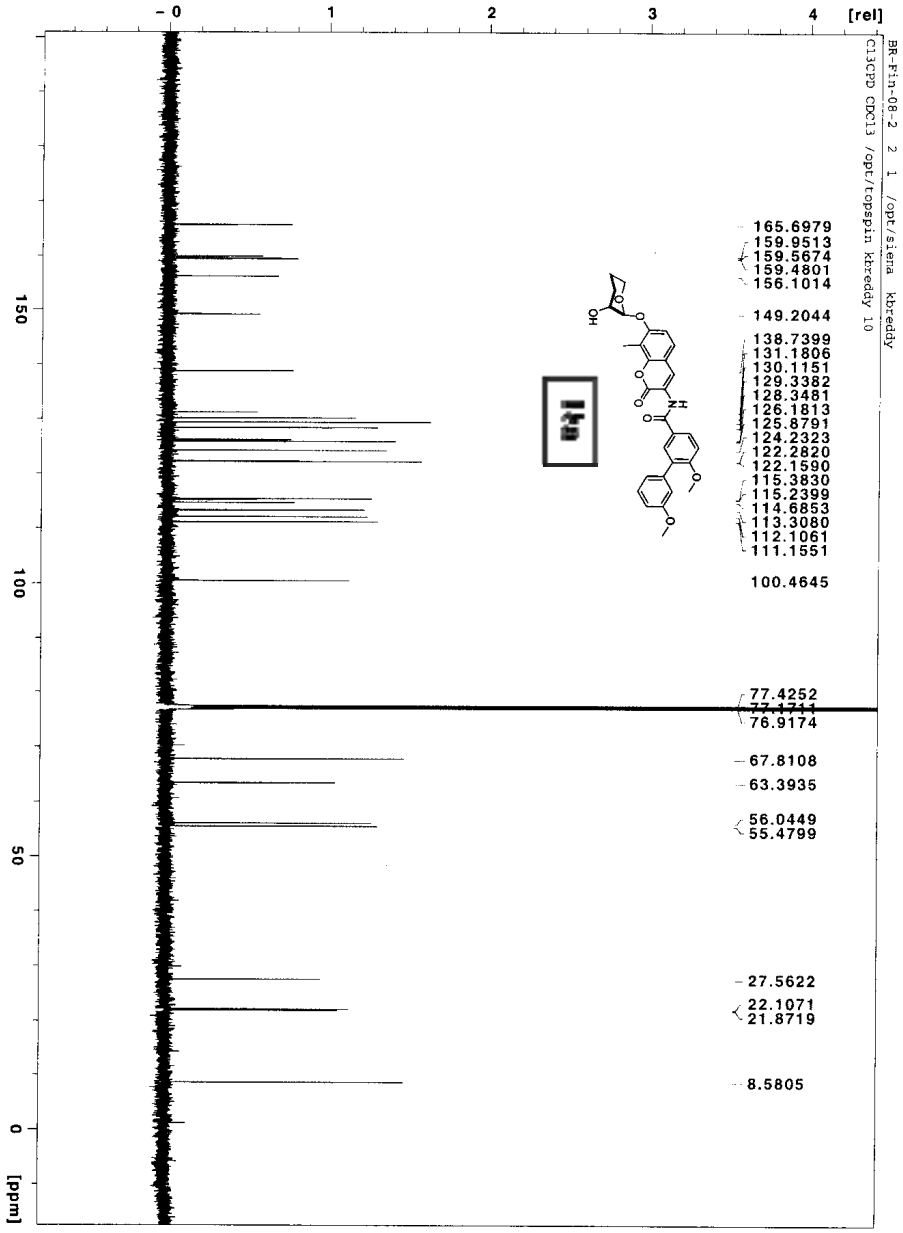
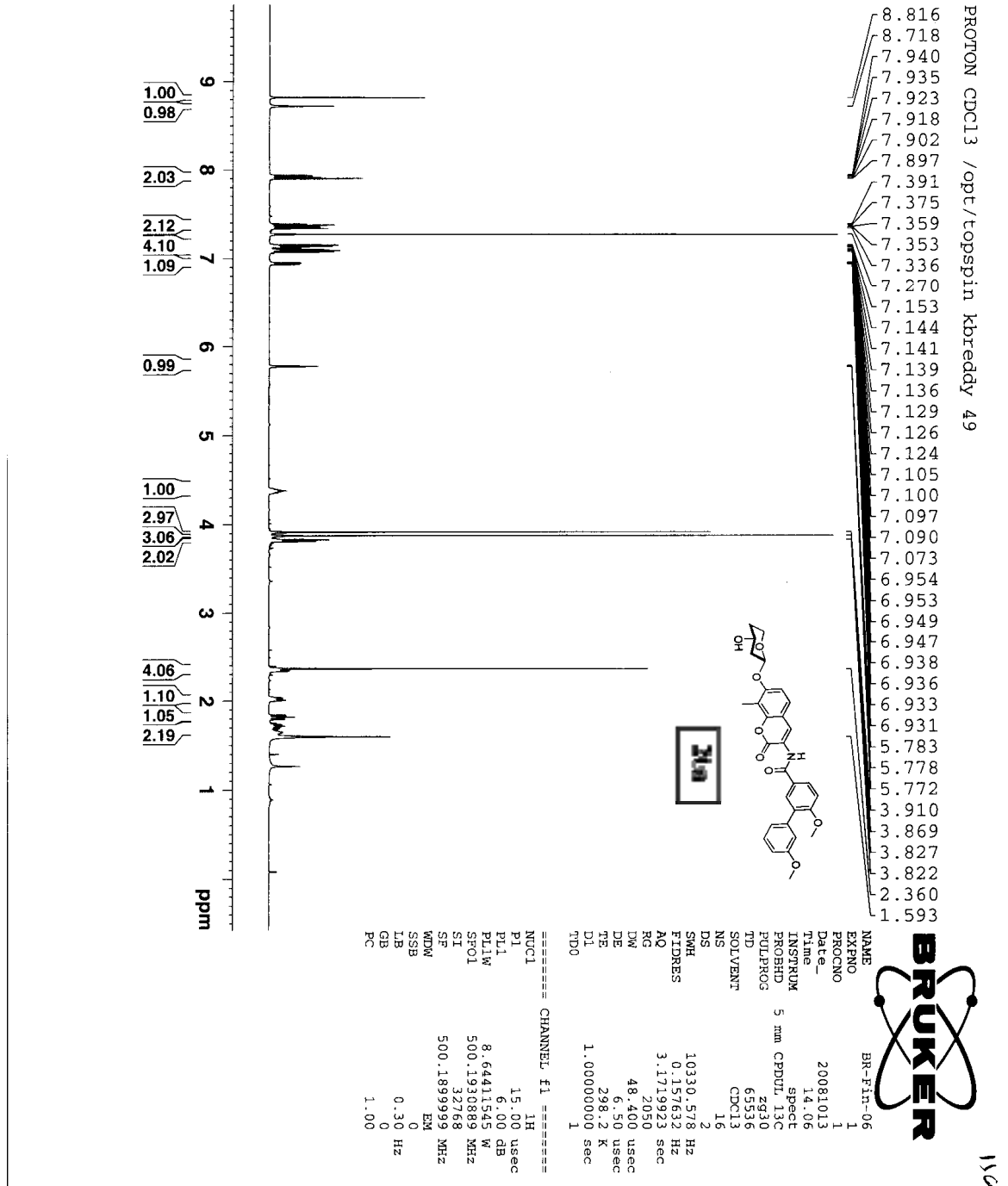
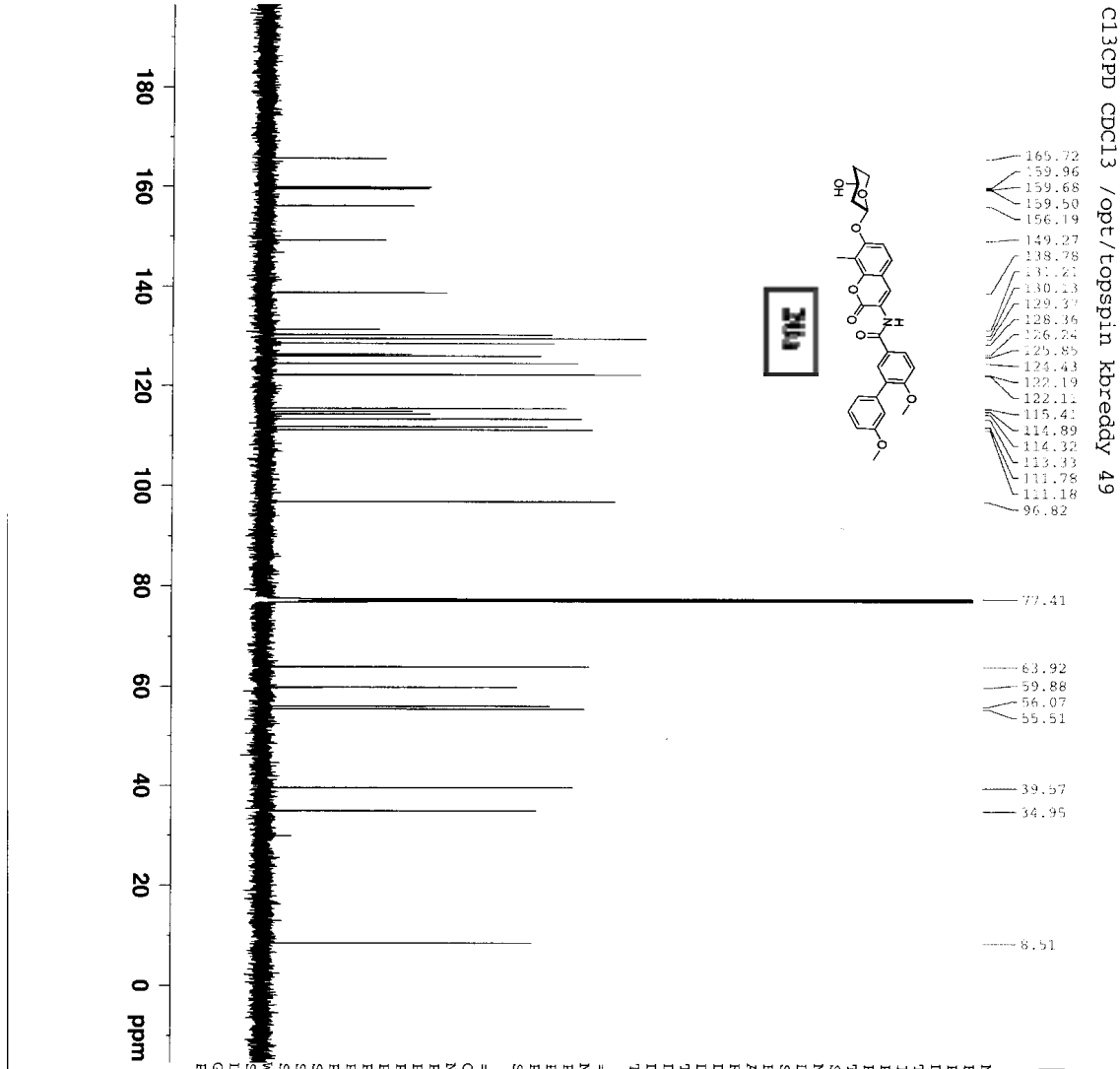
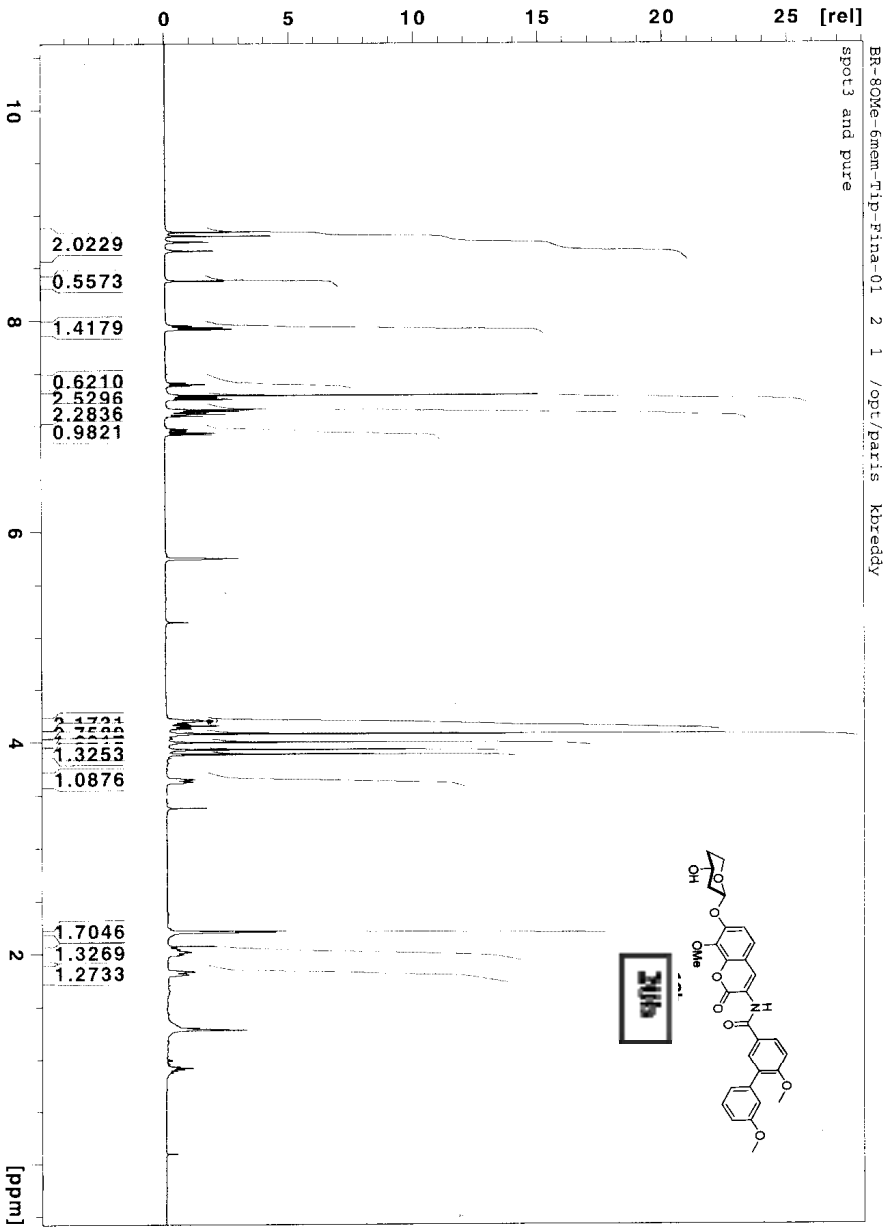
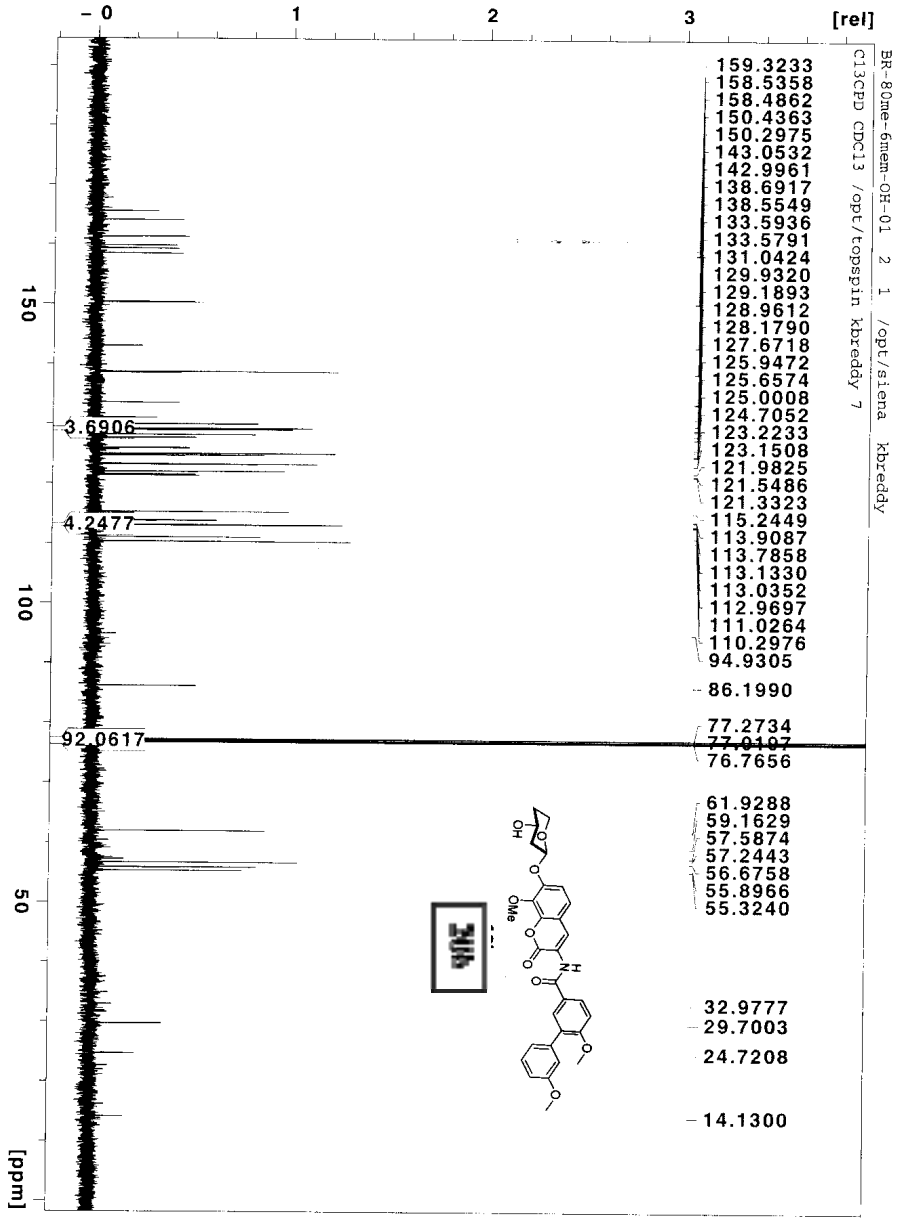
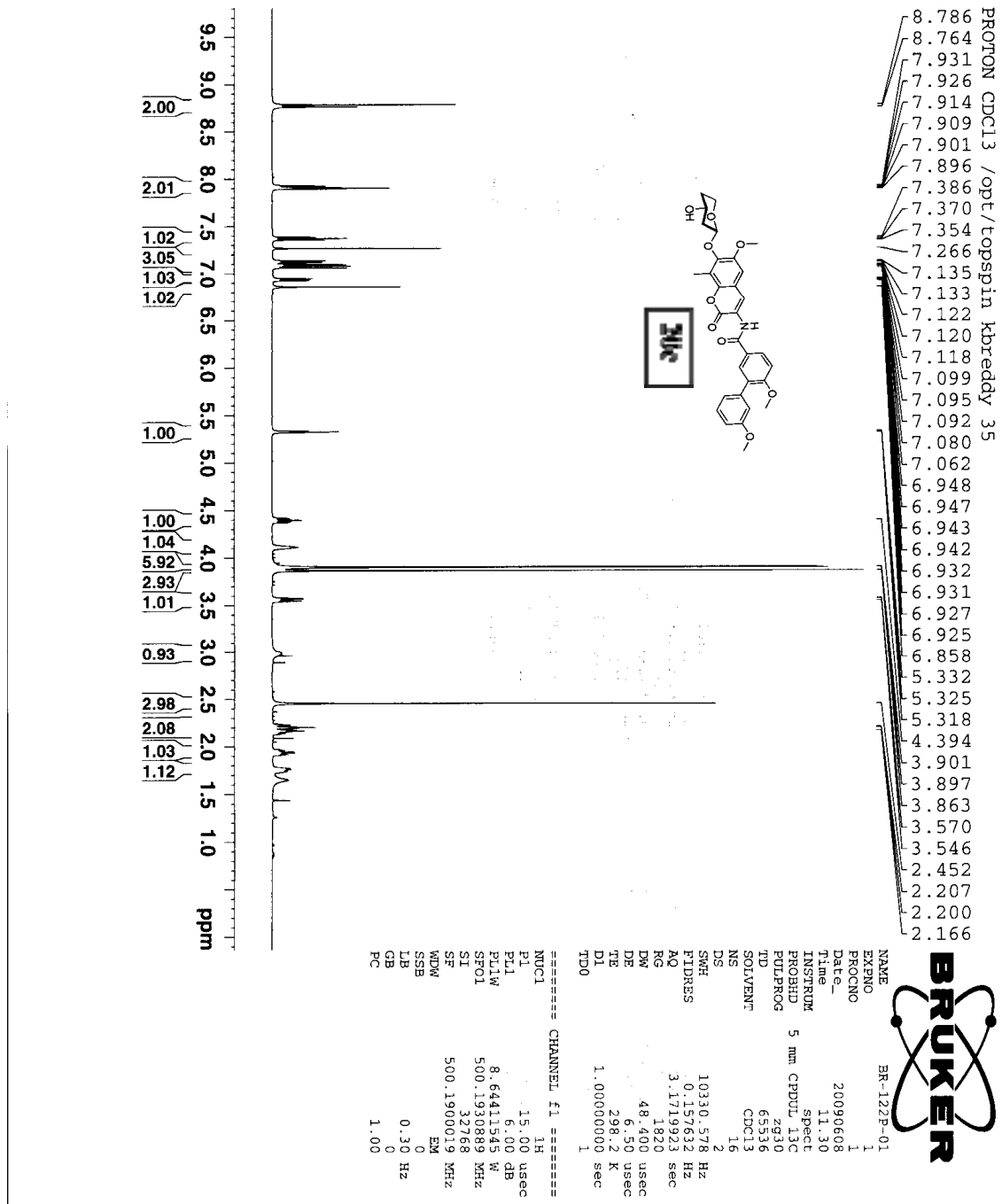

– 0
1
2
3
4
[rel]
150
100
50
0
[ppm]
BR-Fin-08-2 2 1 /opt/siena kbreddy
C13CPD CDCl3 /opt/topspin kbreddy 10
165.6979
159.9513
159.5674
159.4801
156.1014
149.2044
138.7399
131.1806
130.1151
129.3382
128.3481
126.1813
125.8791
124.2323
122.2820
122.1590
115.3830
115.2399
114.6853
113.3080
112.1061
111.1551
100.4645
77.4252
76.9174
67.8108
63.3935
56.0449
55.4799
27.5622
22.1071
21.8719
8.5805
15b

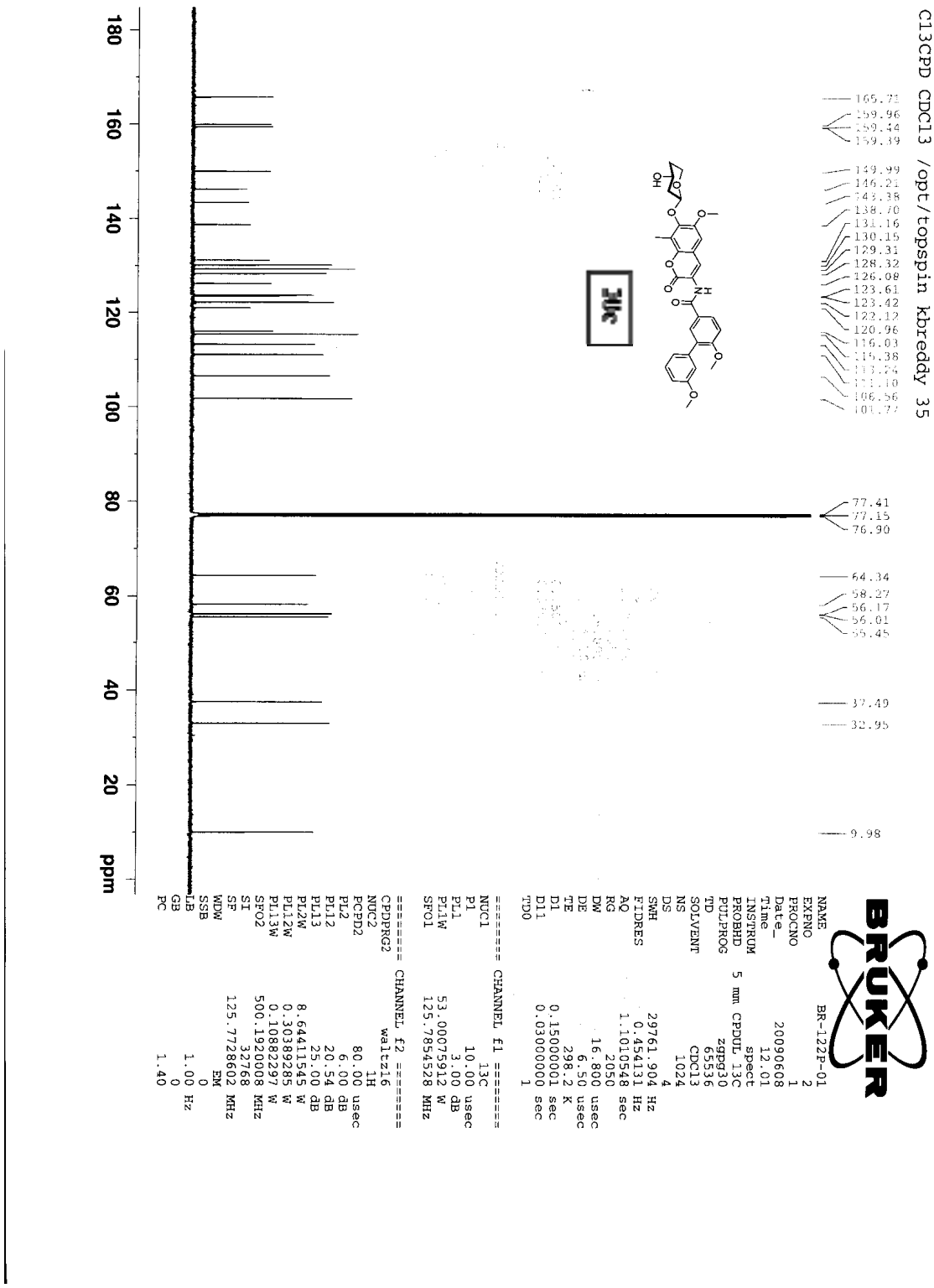

PROTON CDCl3 /opt/topspin kbreddy 49
8.816
8.718
7.940
7.935
7.923
7.918
7.902
7.897
7.391
7.375
7.359
7.353
7.336
7.270
7.153
7.144
7.141
7.139
7.136
7.129
7.126
7.124
7.105
7.100
7.097
7.090
7.073
6.954
6.953
6.949
6.947
6.938
6.936
6.933
6.931
5.783
5.778
5.772
3.910
3.869
3.827
3.822
2.360
1.593
1.00
0.98
2.03
2.12
4.10
1.09
0.99
1.00
2.97
3.06
2.02
4.06
1.10
1.05
2.19
9
8
7
6
5
4
3
2
1
ppm
NAME BR-Fin-06
EXPNO 1
PROCNO 1
Date_ 20081013
Time 14.06
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899999 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
BRUKER

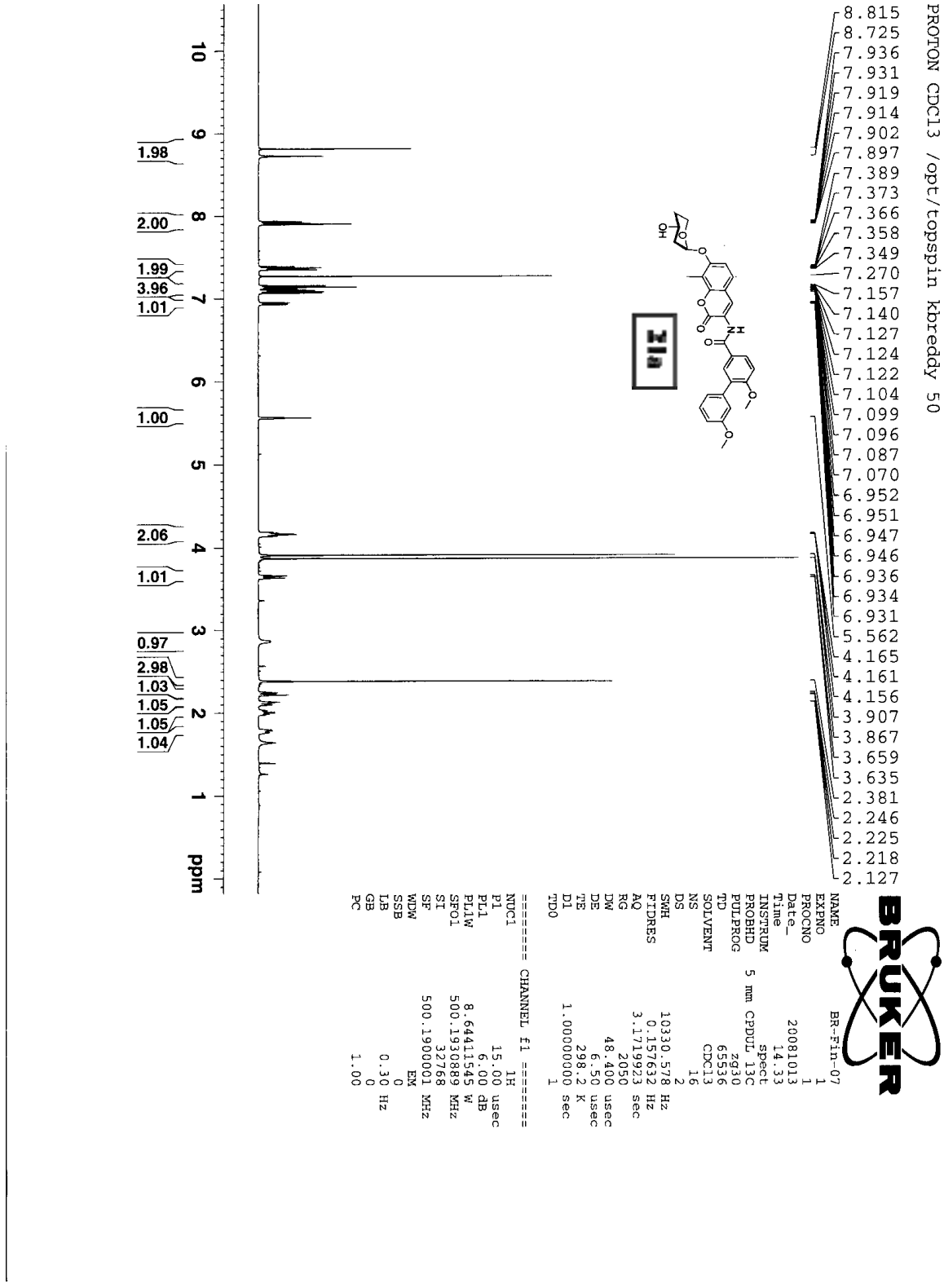

C13CPD CDCl3 /opt/topspin kbreddy 49
165.72
159.96
159.68
159.50
156.19
149.27
138.78
131.21
130.23
129.37
128.36
126.24
125.85
124.43
122.19
122.11
115.41
114.89
114.32
113.33
111.78
111.18
96.82
77.41
63.92
59.88
56.07
55.51
39.57
34.95
8.51
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME BR-Fin-06
EXPNO 2
PROCNO 1
Date_ 20081013
Time 14.29
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728527 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

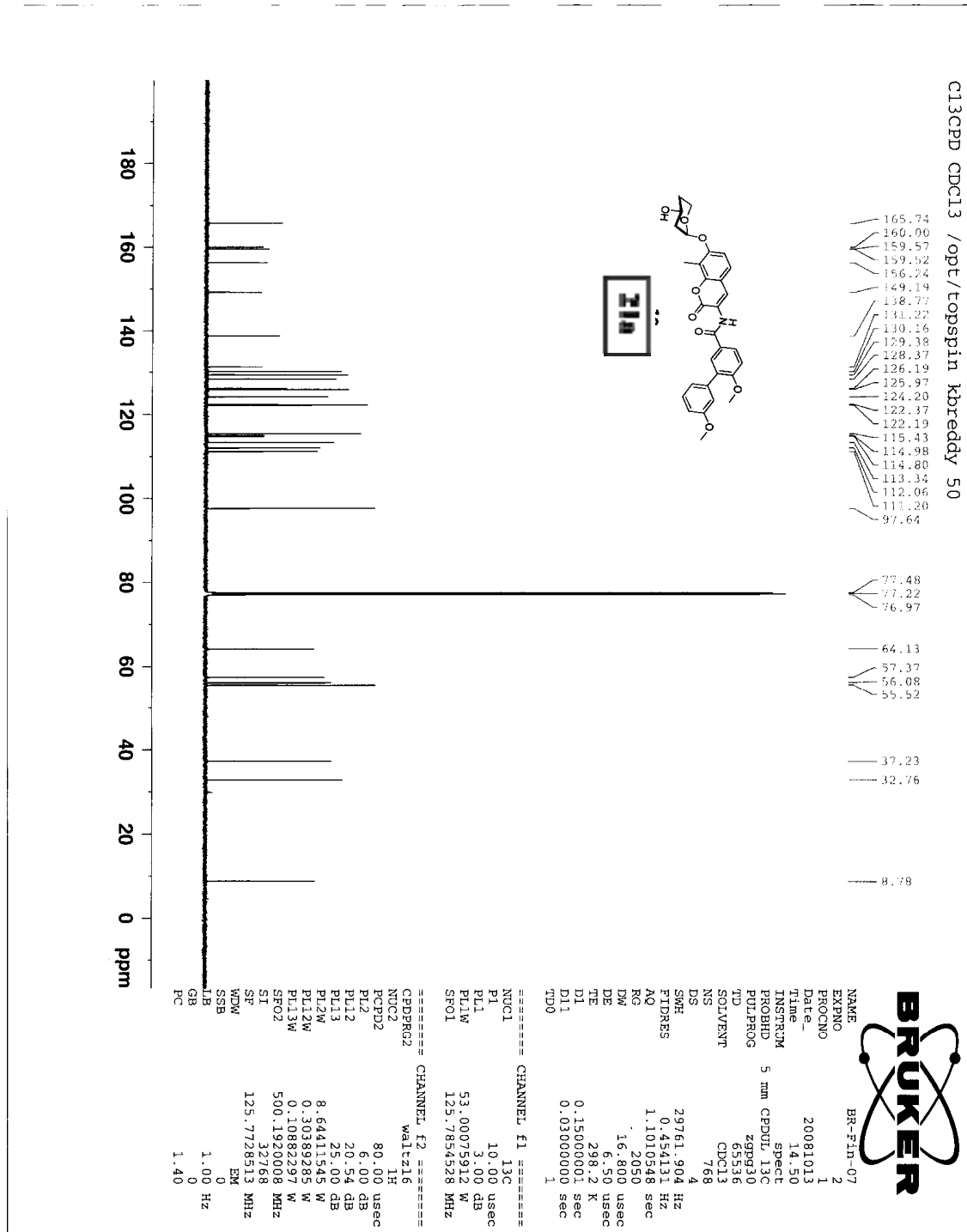

0
5
10
15
20
25
[rel]
BR-8OMe-6mem-Tip-Fina-01 2 1 /opt/paris kbreddy
spot3 and pure
10
8
6
4
2
[ppm]
2.0229
0.5573
1.4179
0.6210
2.5296
2.2836
0.9821
1.3253
1.0876
1.7046
1.3269
1.2733
OH
OMe
NH

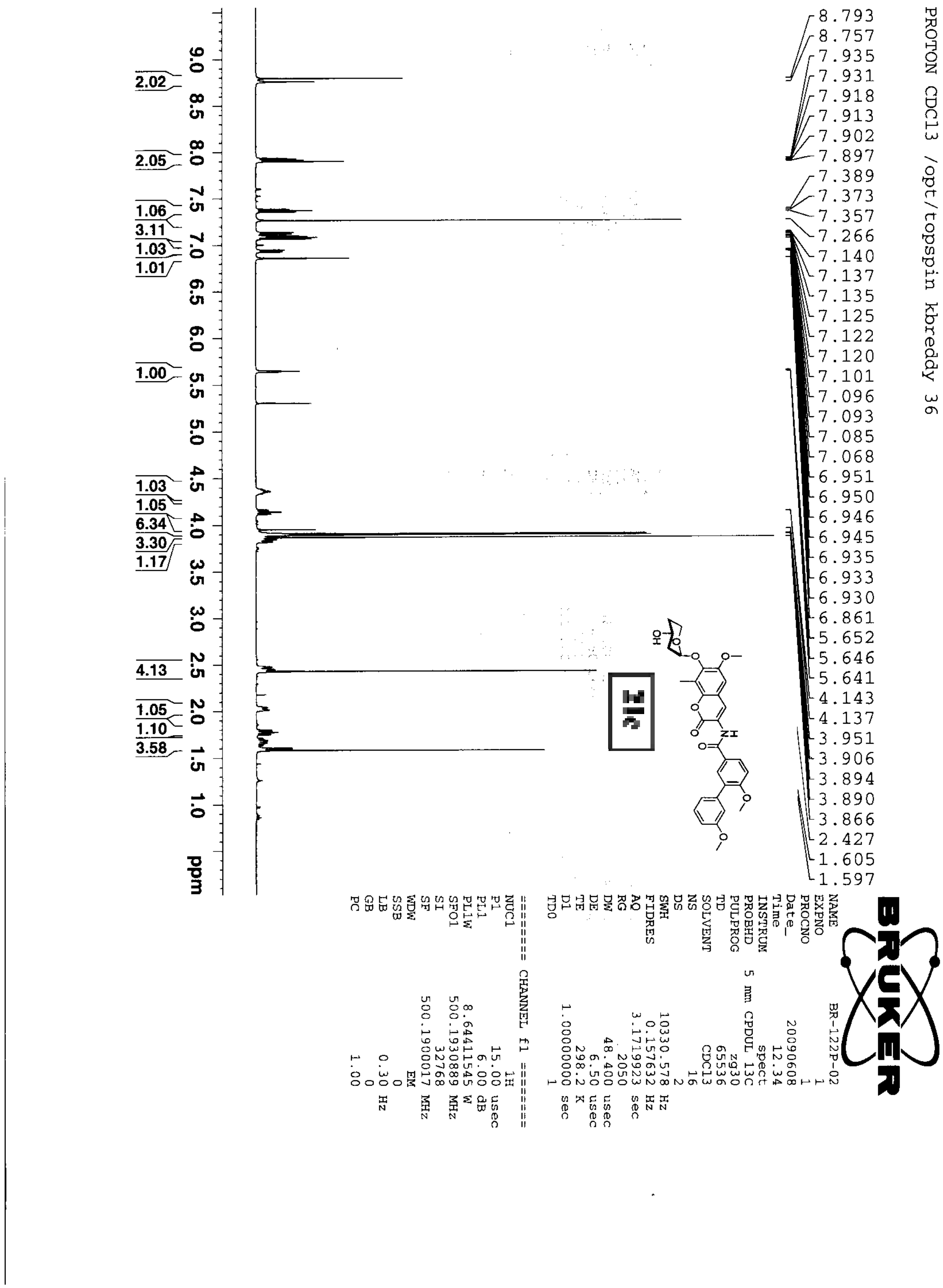

BR-8Ome-6mem-OH-01 2 1 /opt/siena kbreddy
C13CPD CDCl3 /opt/topspin kbreddy 7
159.3233
158.5358
158.4862
150.4363
150.2975
143.0532
142.9961
138.6917
138.5549
133.5936
133.5791
131.0424
129.9320
129.1893
128.9612
128.1790
127.6718
125.9472
125.6574
125.0008
124.7052
123.2233
123.1508
121.9825
121.5486
121.3323
115.2449
113.9087
113.7858
113.1330
113.0352
112.9697
111.0264
110.2976
94.9305
86.1990
77.2734
77.0107
76.7656
61.9288
59.1629
57.5874
57.2443
56.6758
55.8966
55.3240
32.9777
29.7003
24.7208
14.1300
3.6906
4.2477
92.0617
OH
OMe
NH
[rel]
[ppm]

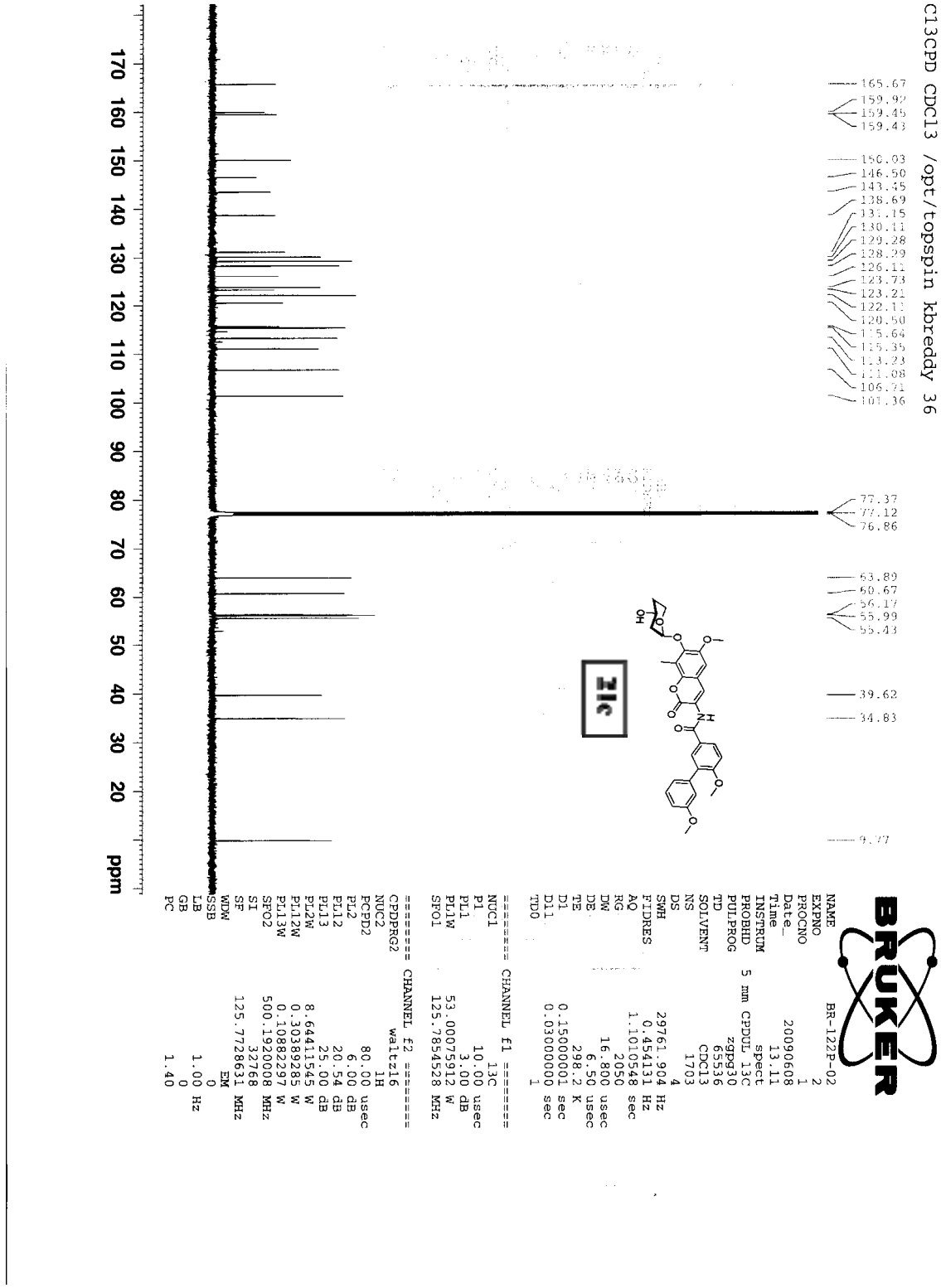

PROTON CDCl3 /opt/topspin kbreddy 35
8.786
8.764
7.931
7.926
7.914
7.909
7.901
7.896
7.386
7.370
7.354
7.266
7.135
7.133
7.122
7.120
7.118
7.099
7.095
7.092
7.080
7.062
6.948
6.947
6.943
6.942
6.932
6.931
6.927
6.925
6.858
5.332
5.325
5.318
4.394
3.901
3.897
3.863
3.570
3.546
2.452
2.207
2.200
2.166
NAME BR-I22P-01
EXPNO 1
PROCNO 1
Date_ 20090608
Time 11.30
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1820
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900019 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.00
2.01
1.02
3.05
1.03
1.02
1.00
1.00
1.04
5.92
2.93
1.01
0.93
2.98
2.08
1.03
1.12
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm

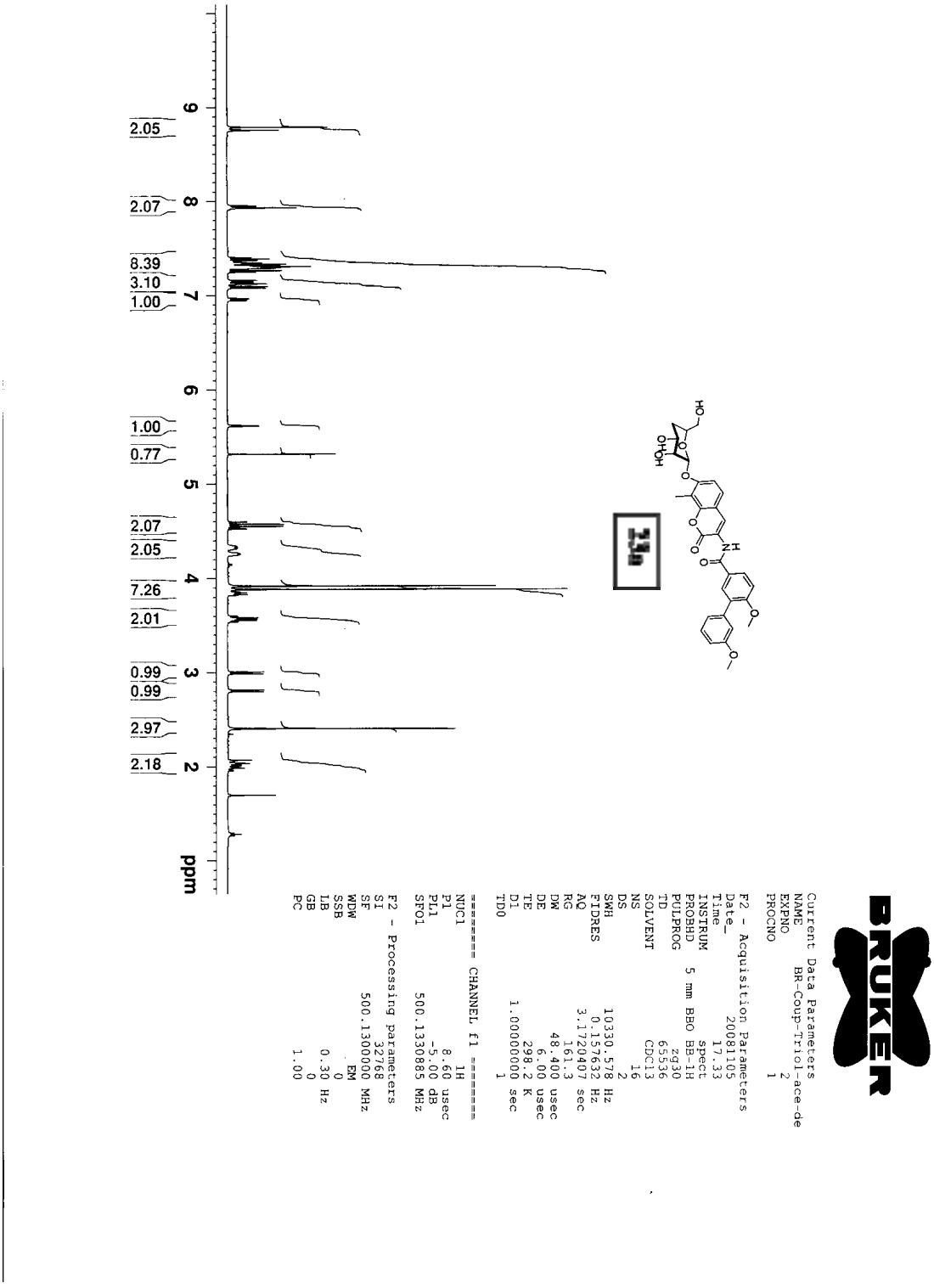

C13CPD CDCl3 /opt/topspin kbreddy 35
165.71
159.96
159.44
159.39
149.99
146.21
143.38
138.70
131.16
130.15
129.31
128.32
126.08
123.61
123.42
122.12
120.96
116.03
77.41
77.15
76.90
64.34
58.27
56.17
56.01
55.45
37.49
32.95
9.98
30c
NAME BR-122P-01
EXPNO 2
PROCNO 1
Date_ 20090608
Time 12.01
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728602 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

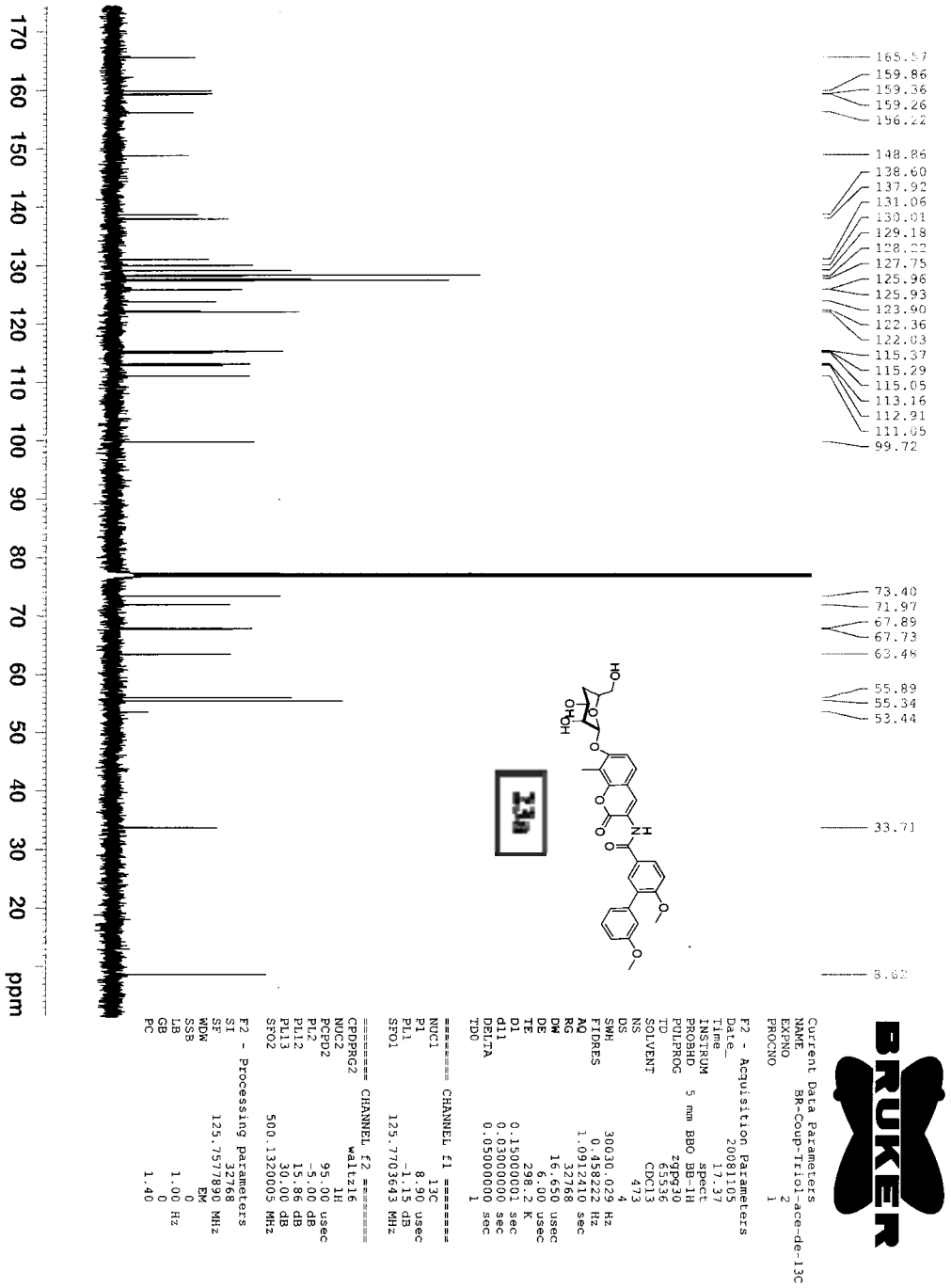

PROTON CDCl3 /opt/topspin kbreddy 50
8.815
8.725
7.936
7.931
7.919
7.914
7.902
7.897
7.389
7.373
7.366
7.358
7.349
7.270
7.157
7.140
7.127
7.124
7.122
7.104
7.099
7.096
7.087
7.070
6.952
6.951
6.947
6.946
6.936
6.934
6.931
5.562
4.165
4.161
4.156
3.907
3.867
3.659
3.635
2.381
2.246
2.225
2.218
2.127
21a
1.98
2.00
1.99
3.96
1.01
1.00
2.06
1.01
0.97
2.98
1.03
1.05
1.05
1.04
10
9
8
7
6
5
4
3
2
1
ppm
NAME BR-Fin-07
EXPNO 1
PROCNO 1
Date_ 20081013
Time 14.33
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900001 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

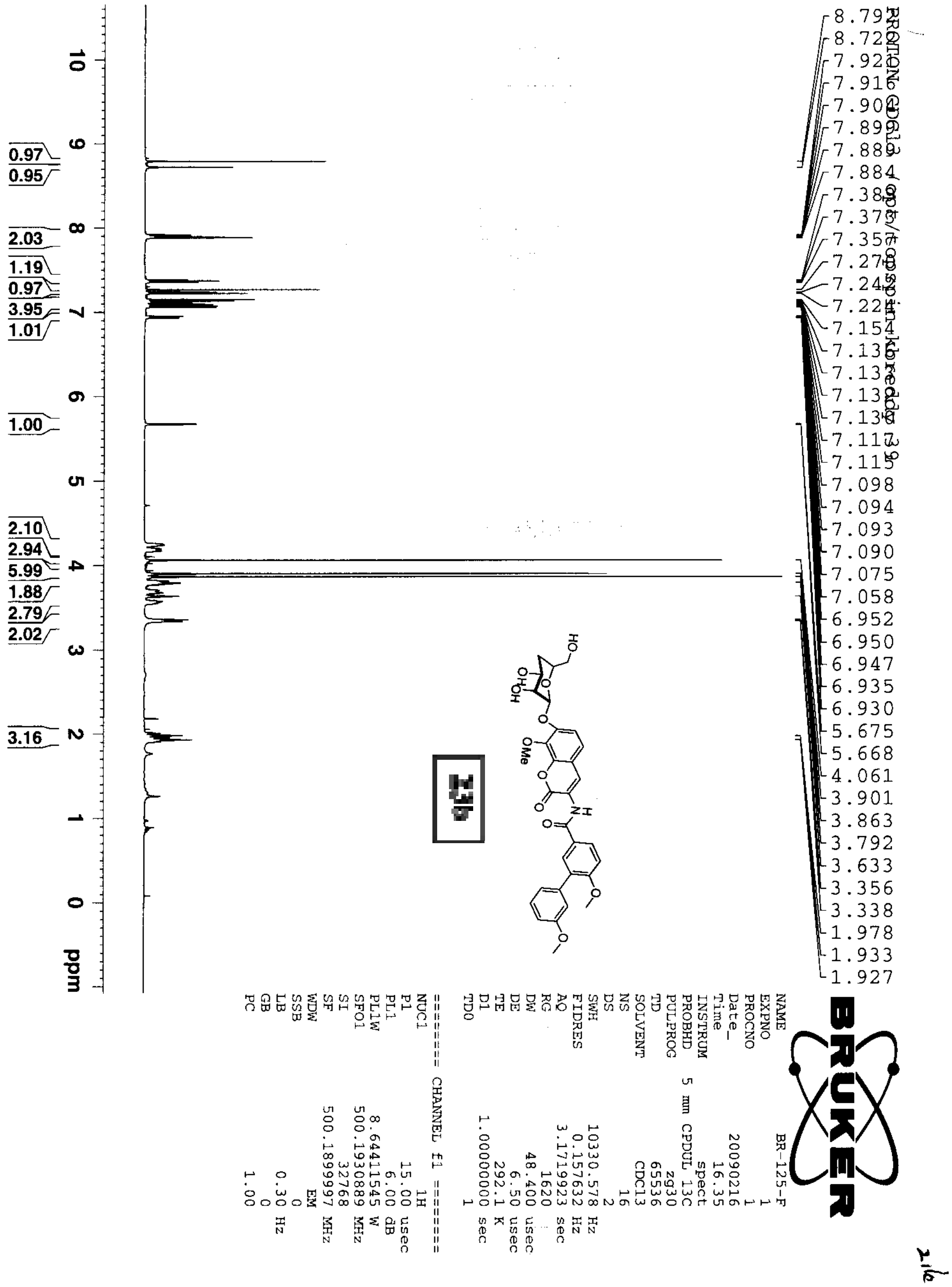

C13CPD CDC13 /opt/topspin kbreddy 50
21o
165.74
160.00
159.57
159.52
156.24
149.19
138.77
131.22
130.16
129.38
128.37
126.19
125.97
124.20
122.37
122.19
115.43
114.98
114.80
113.34
112.06
111.20
97.64
77.48
77.22
76.97
64.13
57.37
56.08
55.52
37.23
32.76
8.78
180
160
140
120
100
80
60
40
20
0
ppm
NAME BR-Fin-07
EXPNO 2
PROCNO 1
Date_ 20081013
Time 14.50
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728513 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

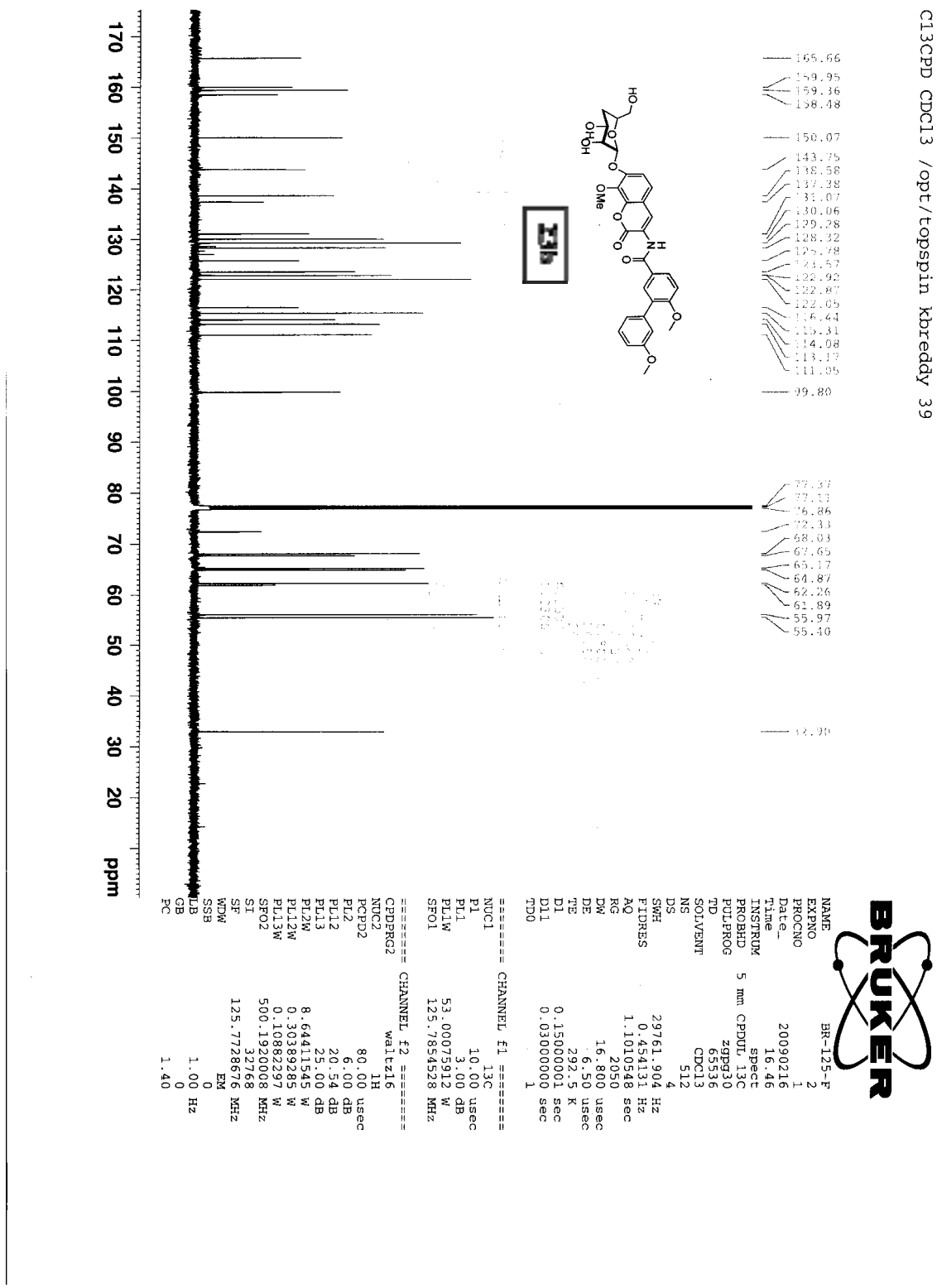

PROTON CDCl3 /opt/topspin kbreddy 36
8.793
8.757
7.935
7.931
7.918
7.913
7.902
7.897
7.389
7.373
7.357
7.266
7.140
7.137
7.135
7.125
7.122
7.120
7.101
7.096
7.093
7.085
7.068
6.951
6.950
6.946
6.945
6.935
6.933
6.930
6.861
5.652
5.646
5.641
4.143
4.137
3.951
3.906
3.894
3.890
3.866
2.427
1.605
1.597
31c
OH
NAME BR-122P-02
EXPNO 1
PROCNO 1
Date_ 20090608
Time 12.34
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900017 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.02
2.05
1.06
3.11
1.03
1.01
1.00
1.03
1.05
6.34
3.30
1.17
4.13
1.05
1.10
3.58
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
ppm

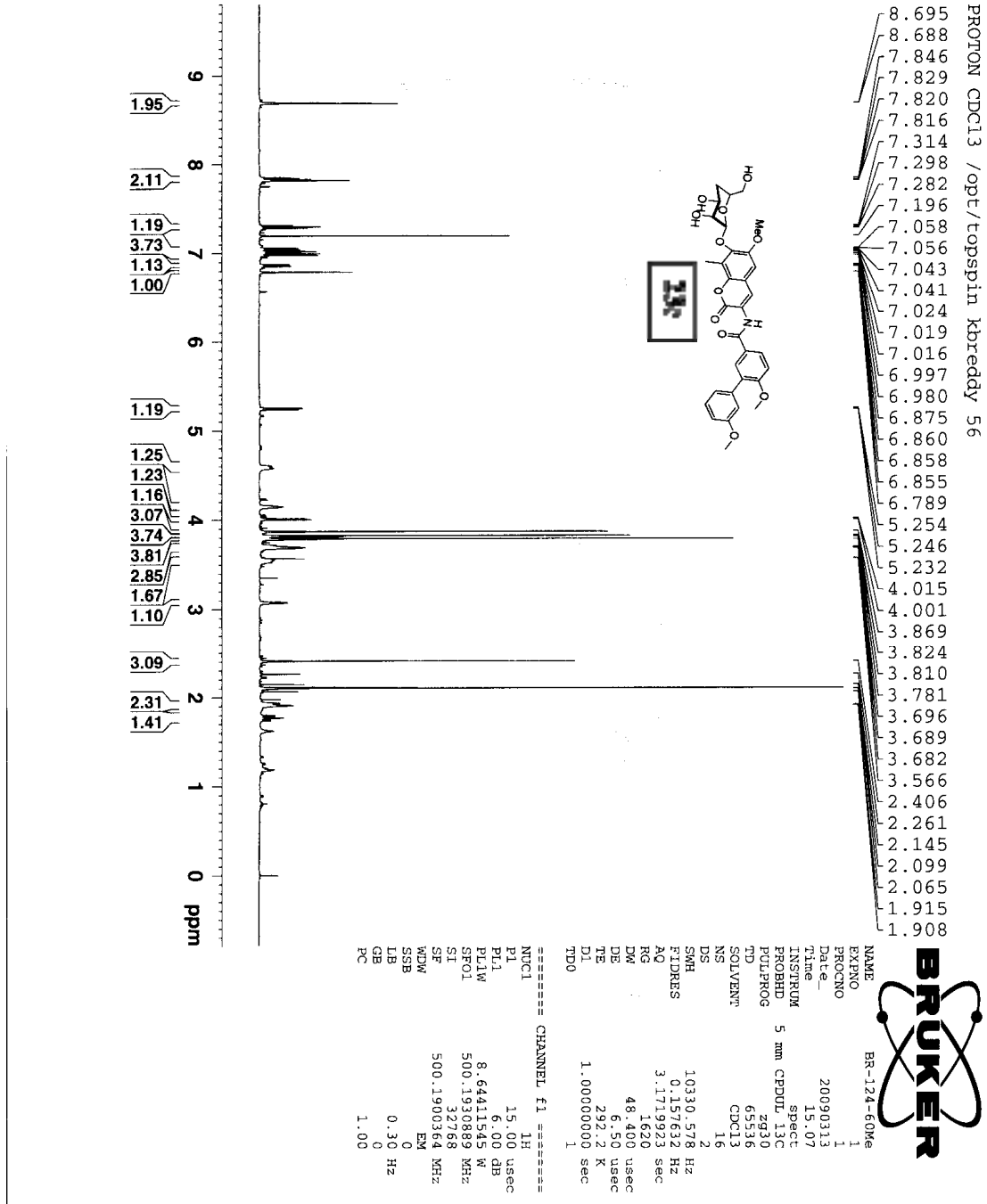

C13CPD CDC13 /opt/topspin kbreddy 36
BRUKER
NAME BR-122P-02
EXPNO 2
PROCNO 1
Date_ 20090608
Time 13.11
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1703
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728631 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
165.67
159.92
159.45
159.43
150.03
146.50
143.45
138.69
131.15
130.11
129.28
128.29
126.11
123.73
123.21
122.11
120.50
115.64
115.35
113.23
111.08
106.71
101.36
77.37
77.12
76.86
63.89
60.67
56.17
55.99
55.43
39.62
34.83
9.77
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm

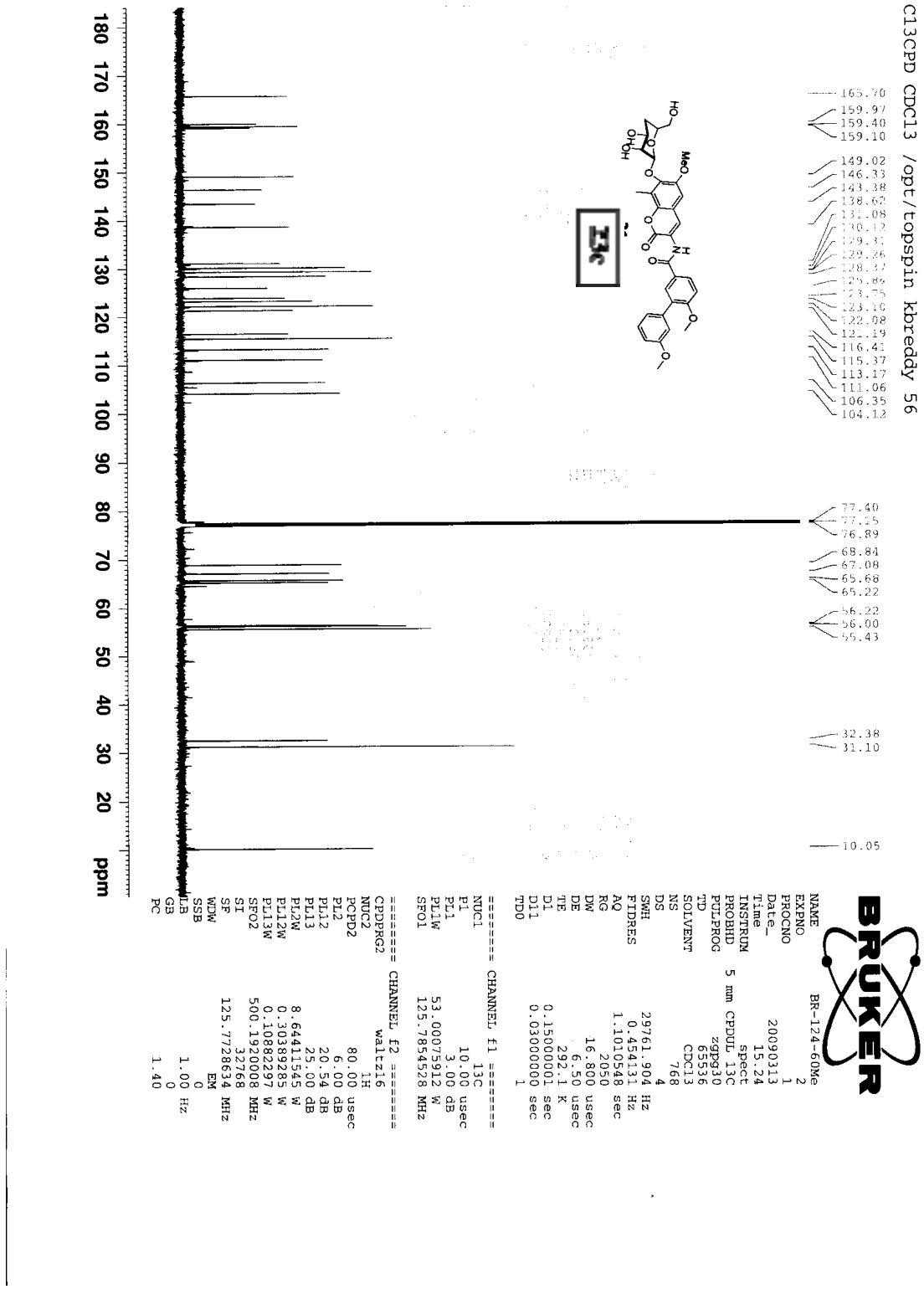

2.05
2.07
8.39
3.10
1.00
1.00
0.77
2.07
2.05
7.26
2.01
0.99
0.99
2.97
2.18
9
8
7
6
5
4
3
2
ppm
19b
BRUKER
Current Data Parameters
NAME BR-Coup-Triol-ace-de
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20081105
Time 17.33
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 161.3
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
F2 - Processing parameters
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

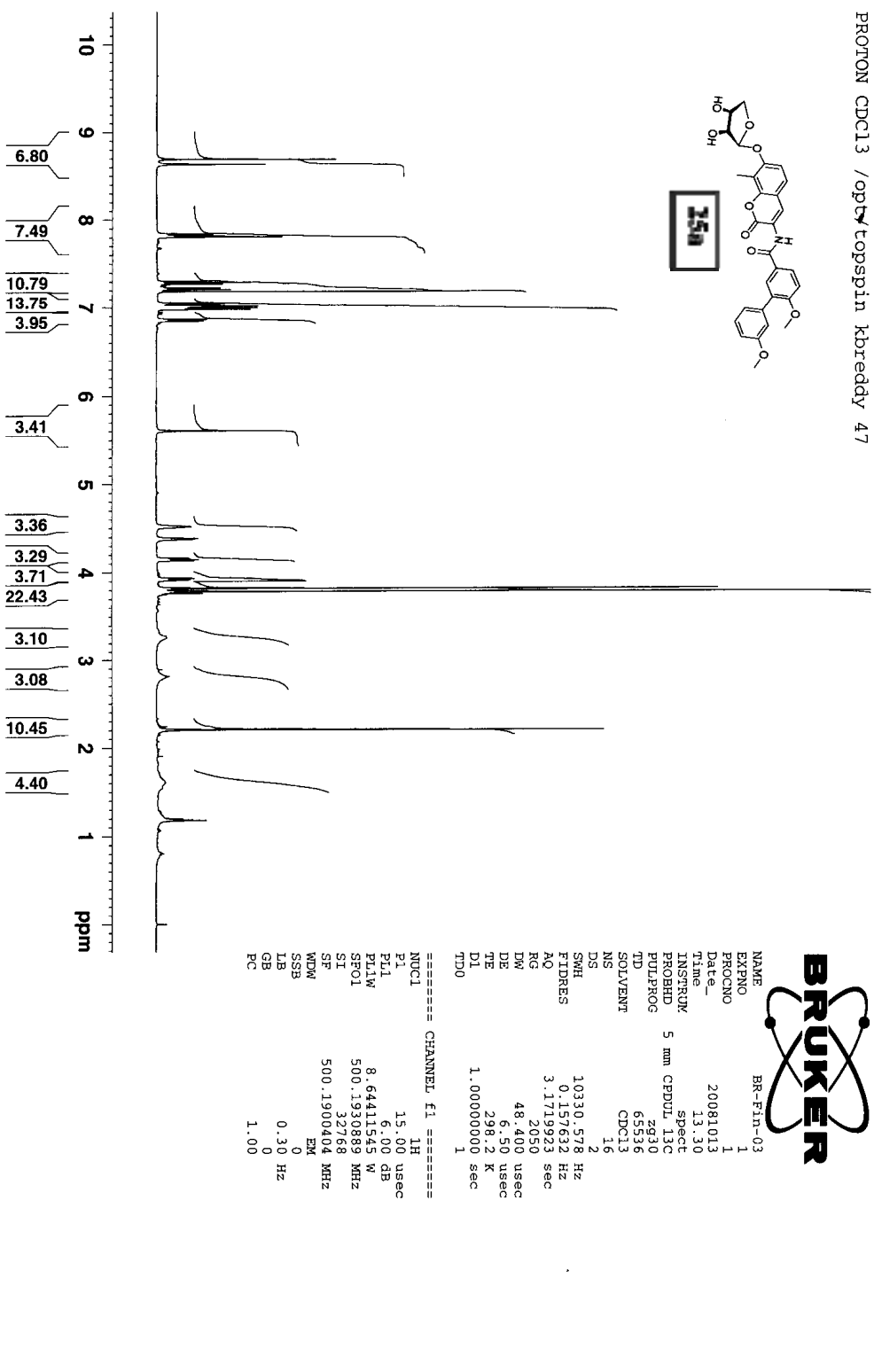

165.57
159.86
159.36
159.26
156.22
148.86
138.60
137.92
131.06
130.01
129.18
128.22
127.75
125.96
125.93
123.90
122.36
122.03
115.37
115.29
115.05
113.16
112.91
111.05
99.72
73.40
71.97
67.89
67.73
63.48
55.89
55.34
53.44
33.71
3.62
23a
Current Data Parameters
NAME BR-Coup-Triol-ace-de-13C
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20081105
TIme 17.37
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 473
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 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
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm

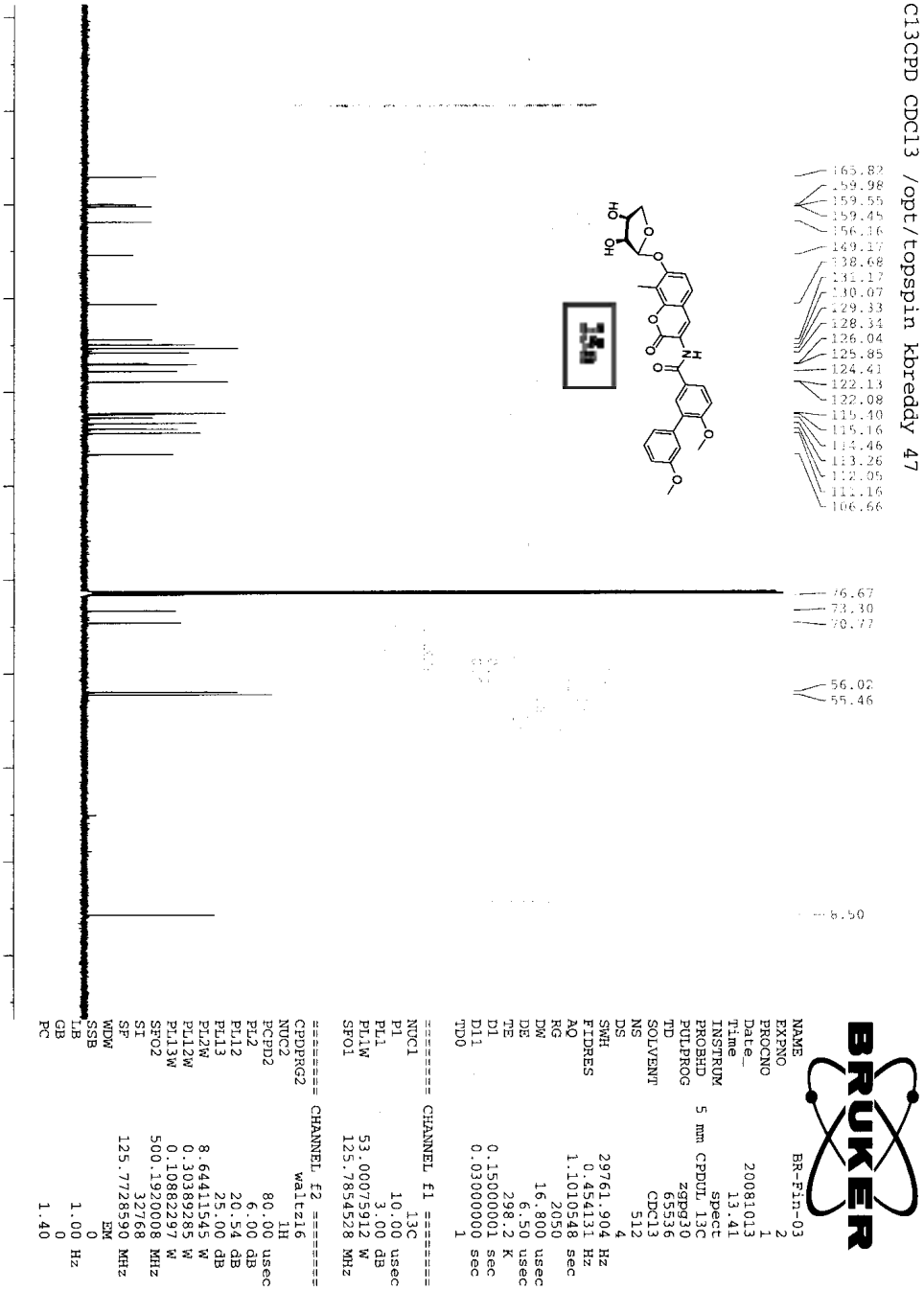

33b
NAME BR-125-F
EXPNO 1
PROCNO 1
Date_ 20090216
Time 16.35
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 292.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899997 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm

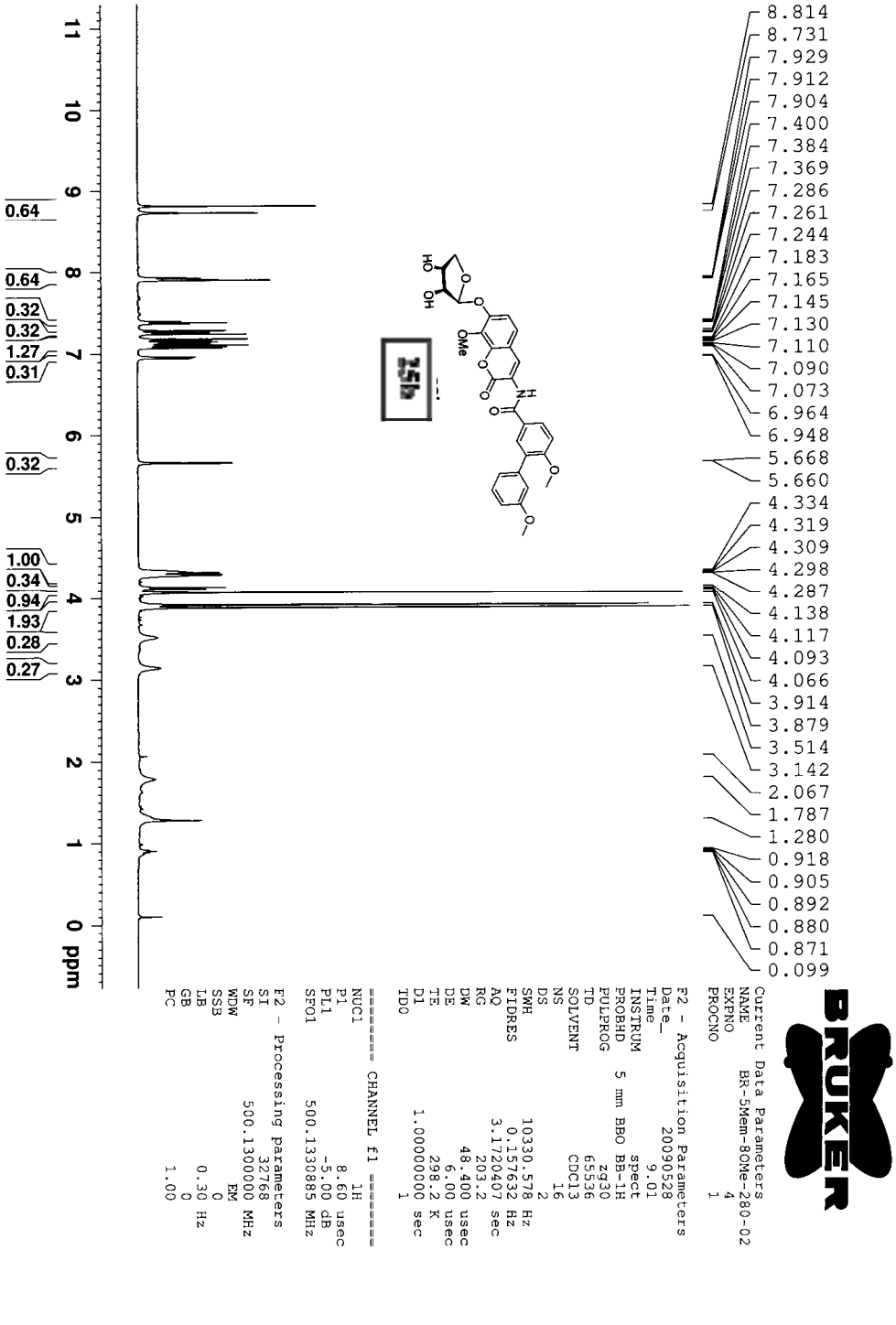

C13CPD CDCl3 /opt/topspin kbreddy 39
BRUKER
Z3b
ppm

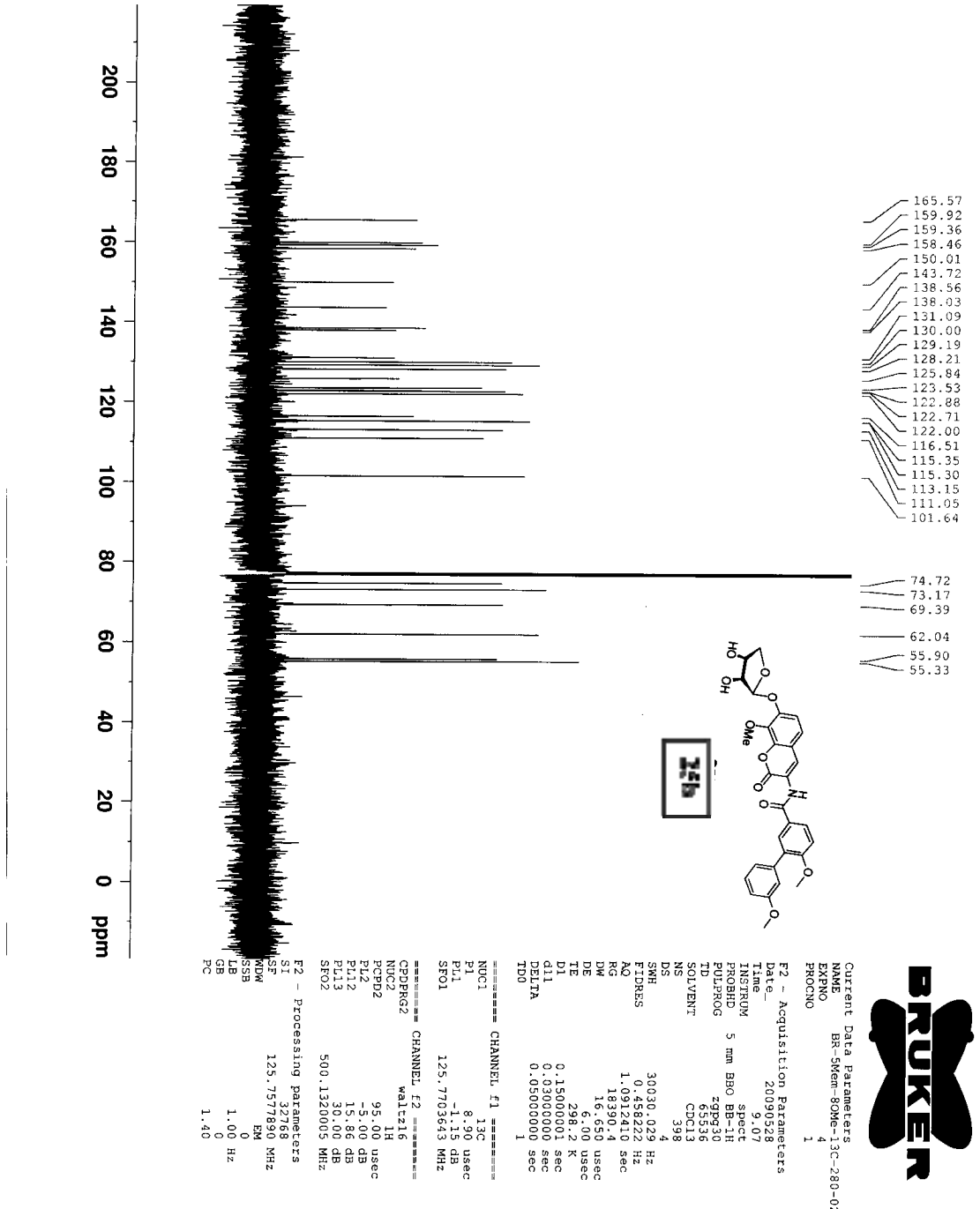

PROTON CDCl3 /opt/topspin kbreddy 56
8.695
8.688
7.846
7.829
7.820
7.816
7.314
7.298
7.282
7.196
7.058
7.056
7.043
7.041
7.024
7.019
7.016
6.997
6.980
6.875
6.860
6.858
6.855
6.789
5.254
5.246
5.232
4.015
4.001
3.869
3.824
3.810
3.781
3.696
3.689
3.682
3.566
2.406
2.261
2.145
2.099
2.065
1.915
1.908
1.95
2.11
1.19
3.73
1.13
1.00
1.19
1.25
1.23
1.16
3.07
3.74
3.81
2.85
1.67
1.10
3.09
2.31
1.41
9
8
7
6
5
4
3
2
1
0
ppm
MeO
HO
OH
OH
1g
NAME BR-124-6OMe
EXPNO 1
PROCNO 1
Date_ 20090313
Time 15.07
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.17719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 292.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900364 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

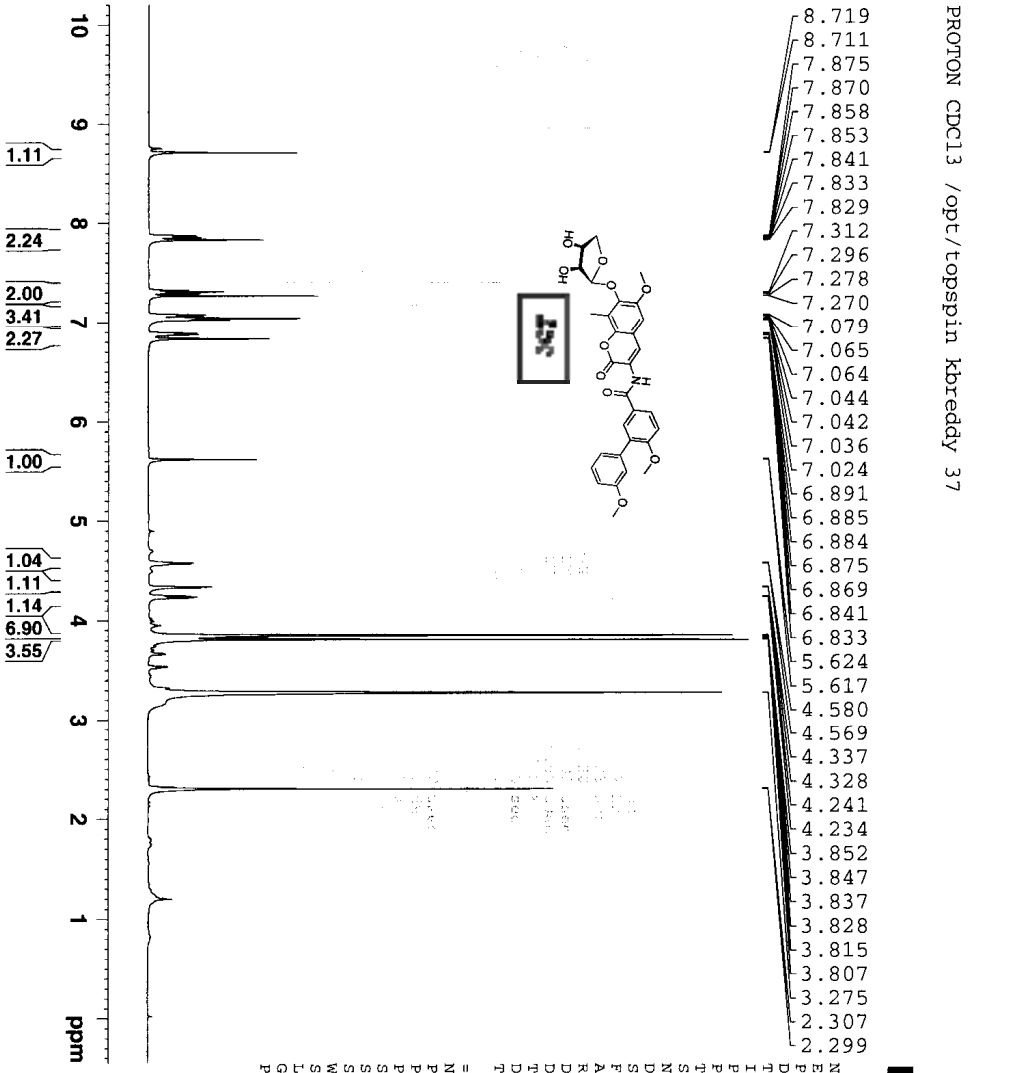

C13CPD CDCl3 /opt/topspin kbreddy 56
165.70
159.97
159.40
159.10
149.02
146.33
143.38
138.62
131.08
130.12
129.81
129.26
128.32
123.16
122.08
121.19
116.41
115.37
113.17
111.06
106.35
104.12
77.40
77.15
76.89
68.84
67.08
65.68
65.22
56.22
56.00
55.43
32.38
31.10
10.05
MeO
13c
BRUKER
BR-124-60Me
NAME 2
EXPNO 1
PROCNO 20090313
Date_ 15.24
Time spect
INSTRUM 5 mm CPDUL 13C
PROBHD zgpg30
PULPROG 65536
TD CDCl3
SOLVENT 768
NS 4
DS 29761.904 Hz
SWH 0.454131 Hz
FIDRES 1.10310548 sec
AQ 2050
RG 16.800 usec
DW 6.50 usec
DE 292.1 K
TE 0.15000001 sec
D1 0.03000000 sec
D11 1
TD0
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728634 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm

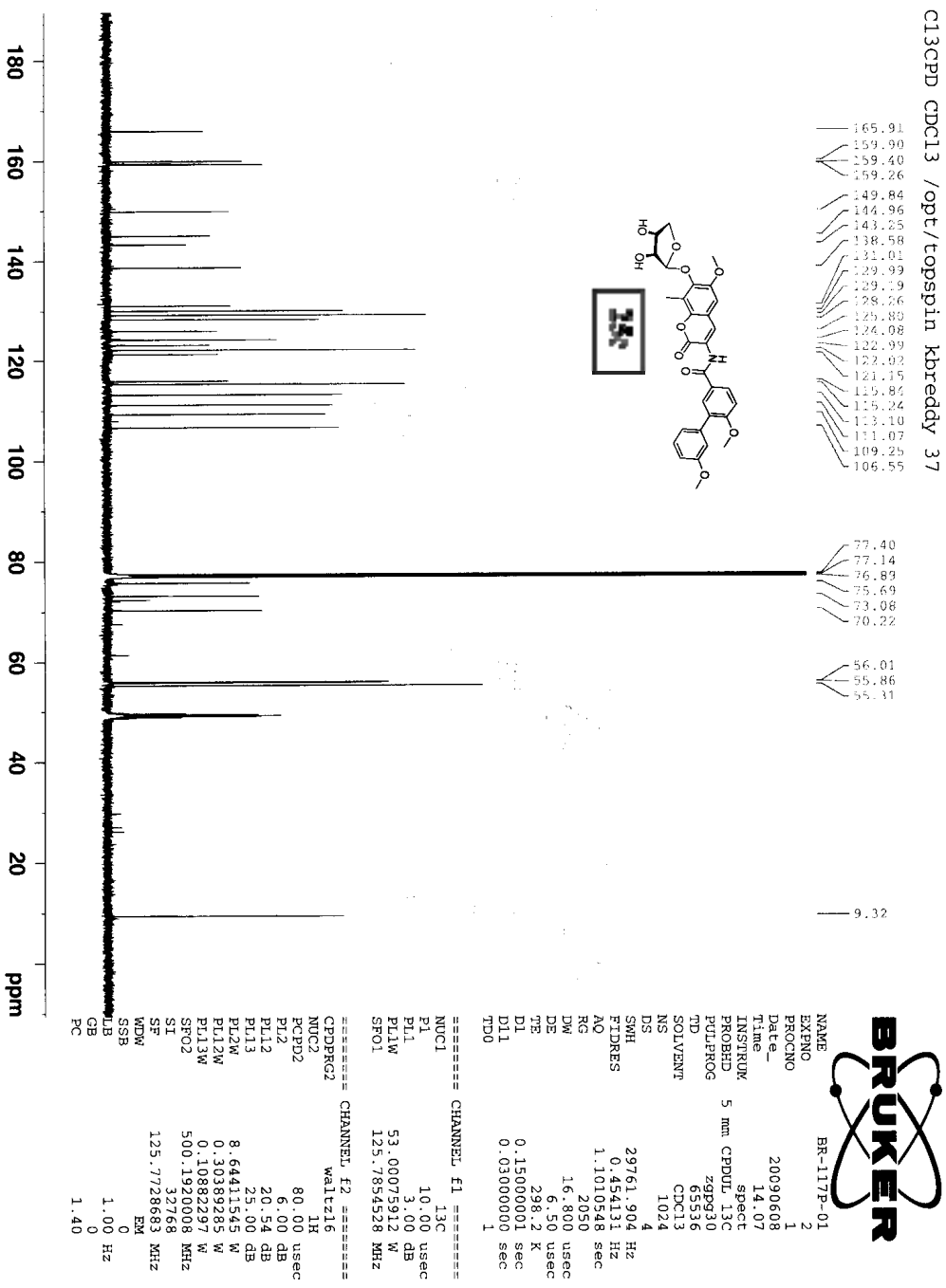

PROTON CDC13 /opt/topspin kbreddy 47
BRUKER
NAME BR-Fin-03
EXPNO 1
PROCNO 1
Date_ 20081013
Time 13.30
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900404 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
15b
6.80
7.49
10.79
13.75
3.95
3.41
3.36
3.29
3.71
22.43
3.10
3.08
10.45
4.40
10
9
8
7
6
5
4
3
2
1
ppm

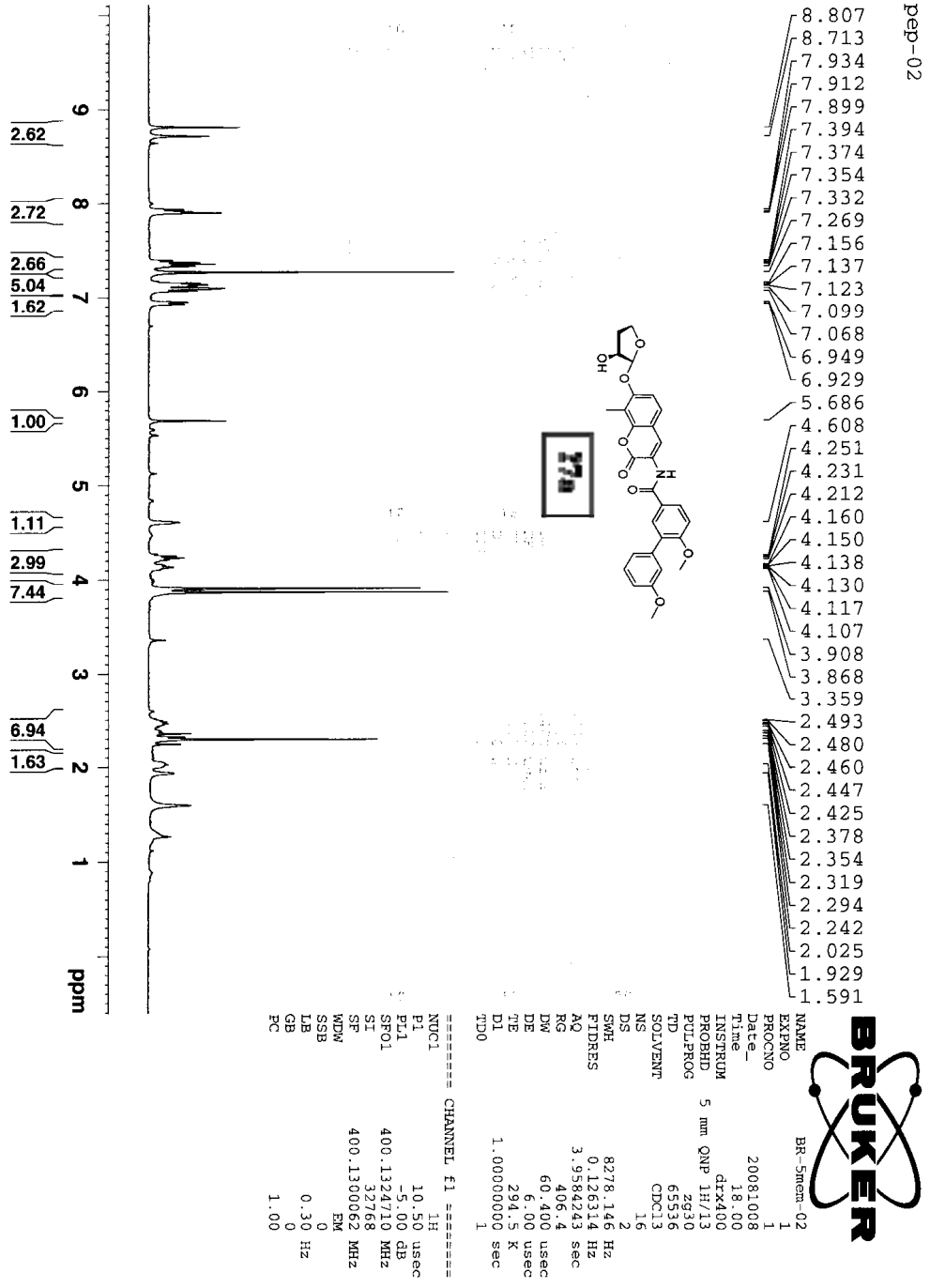

C13CPD CDCl3 /opt/topspin kbreddy 47
165.82
159.98
159.55
159.45
156.16
149.17
138.68
131.17
130.07
129.33
128.34
126.04
125.85
124.41
122.13
122.08
116.10
115.16
114.46
113.26
112.05
111.16
106.66
76.67
73.30
70.77
56.02
55.46
8.50
15g
NAME BR-Fin-03
EXPNO 2
PROCNO 1
Date_ 20081013
Time 13.41
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728590 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180 160 140 120 100 80 60 40 20 0 ppm

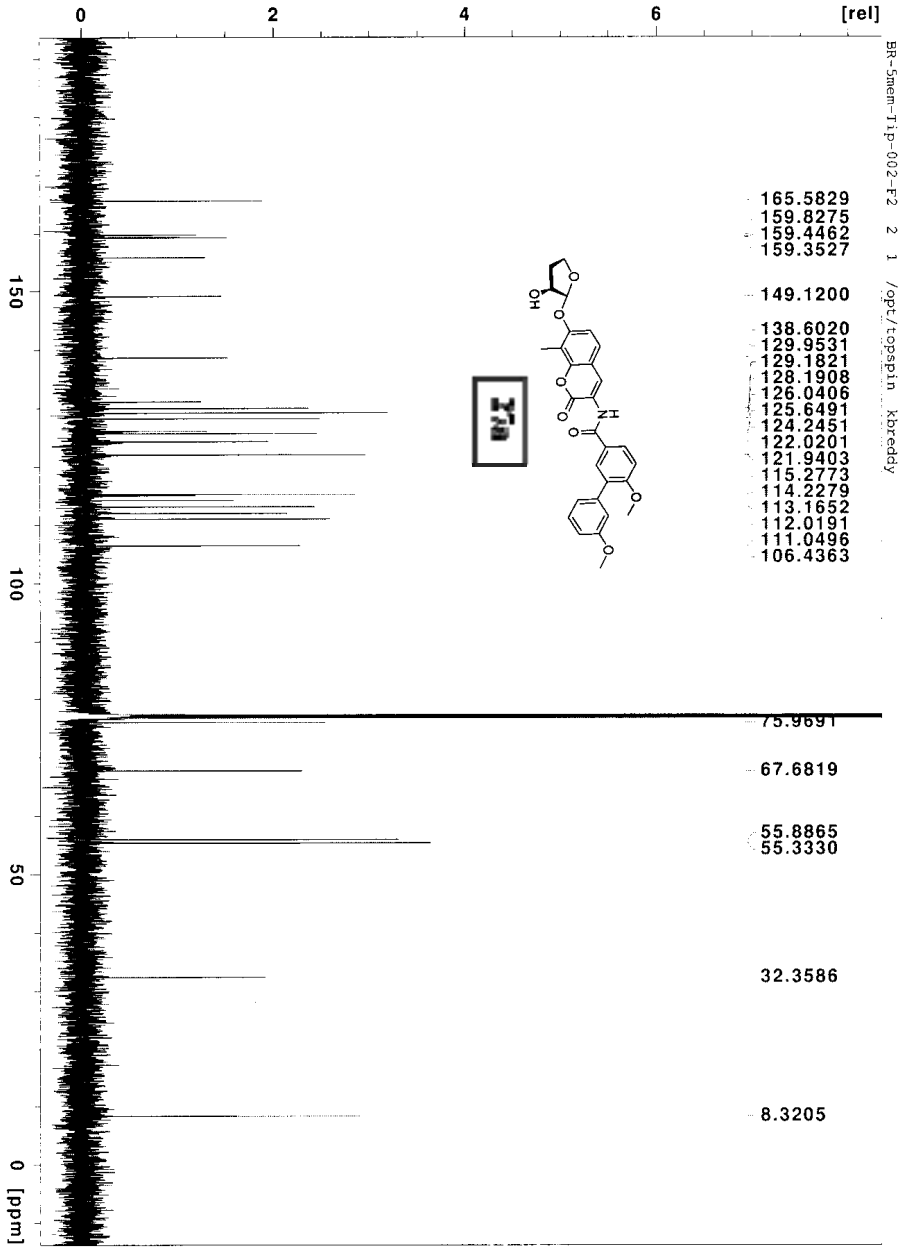

8.814
8.731
7.929
7.912
7.904
7.400
7.384
7.369
7.286
7.261
7.244
7.183
7.165
7.145
7.130
7.110
7.090
7.073
6.964
6.948
5.668
5.660
4.334
4.319
4.309
4.298
4.287
4.138
4.117
4.093
4.066
3.914
3.879
3.514
3.142
2.067
1.787
1.280
0.918
0.905
0.892
0.880
0.871
0.099
25b
OMe
HO
OH
0.64
0.64
0.32
0.32
1.27
0.31
0.32
1.00
0.34
0.94
1.93
0.28
0.27
11 10 9 8 7 6 5 4 3 2 1 0 ppm
Current Data Parameters
NAME BR-5Mem-8OMe-280-02
EXPNO 4
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090528
Time_ 9.01
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 203.2
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
F2 - Processing parameters
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

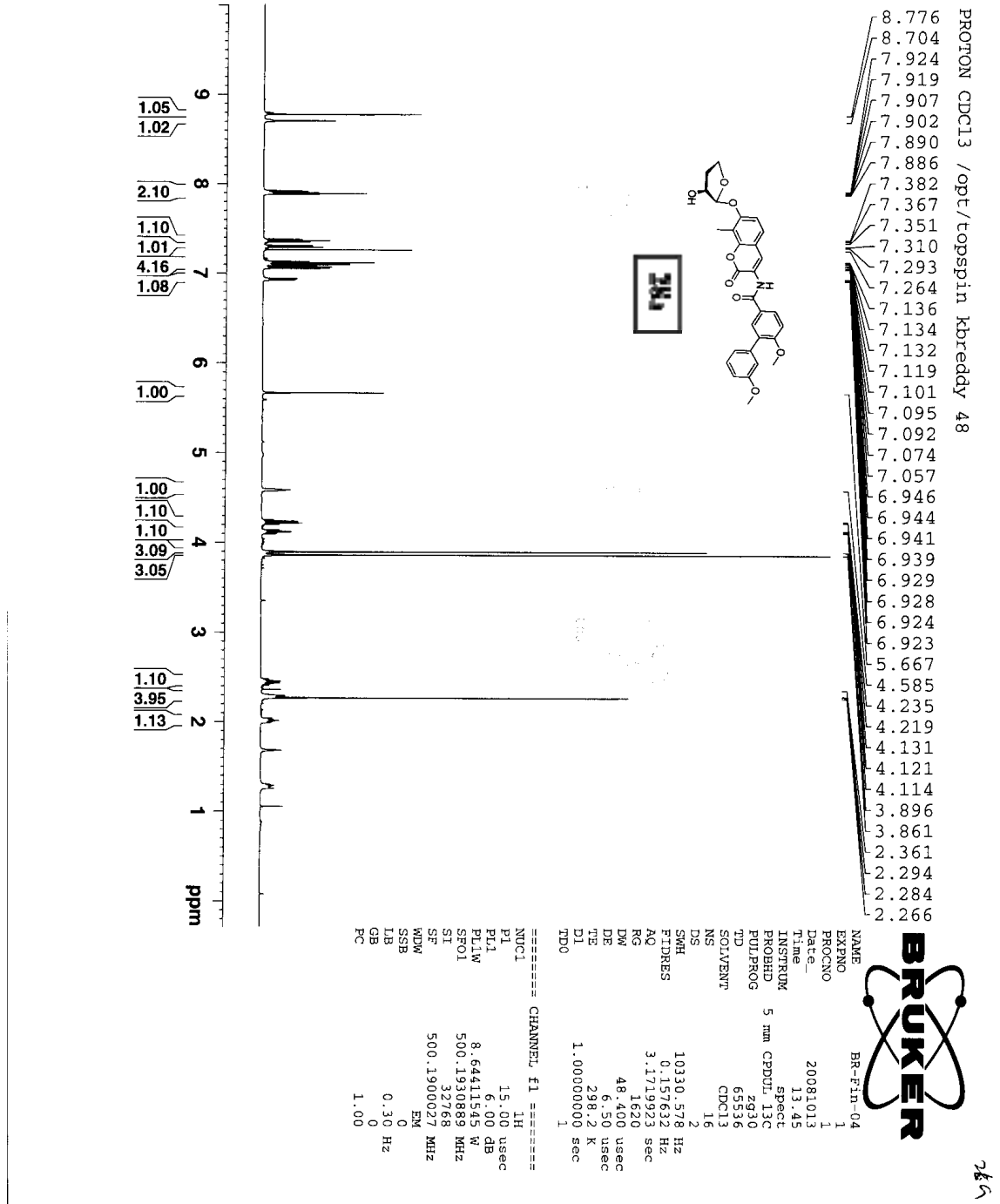

165.57
159.92
159.36
158.46
150.01
143.72
138.56
138.03
131.09
130.00
129.19
128.21
125.84
123.53
122.88
122.71
122.00
116.51
115.35
115.30
113.15
111.05
101.64
74.72
73.17
69.39
62.04
55.90
55.33
OMe
HO
OH
25b
200
180
160
140
120
100
80
60
40
20
0
ppm
Current Data Parameters
NAME BR-5Mem-8OMe-13C-280-02
EXPNO 4
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090528
Time 9.07
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 398
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 18390.4
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 5.00 dB
PL12 15.86 dB
PL13 30.00 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

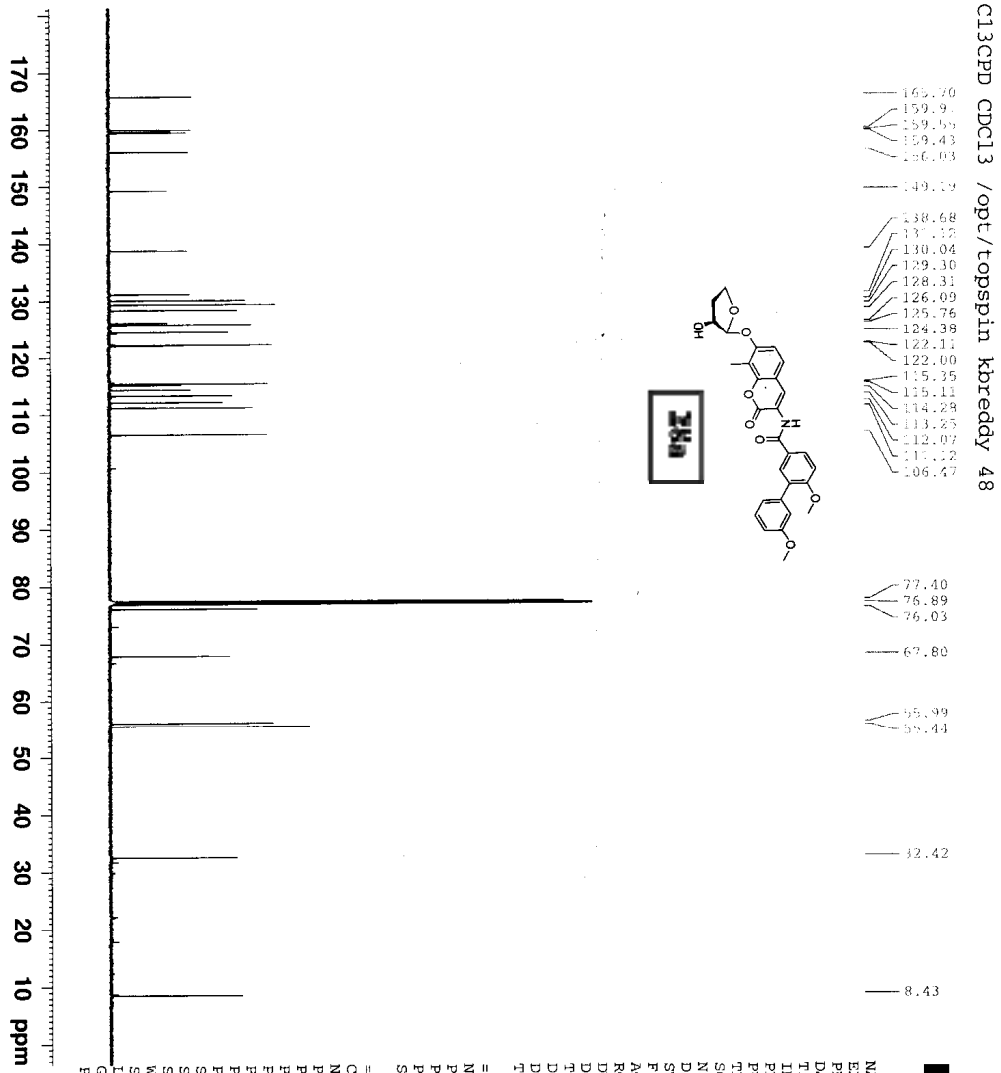

PROTON CDCl3 /opt/topspin kbreddy 37
8.719
8.711
7.875
7.870
7.858
7.853
7.841
7.833
7.829
7.312
7.296
7.278
7.270
7.079
7.065
7.064
7.044
7.042
7.036
7.024
6.891
6.885
6.884
6.875
6.869
6.841
6.833
5.624
5.617
4.580
4.569
4.337
4.328
4.241
4.234
3.852
3.847
3.837
3.828
3.815
3.807
3.275
2.307
2.299
1.11
2.24
2.00
3.41
2.27
1.00
1.04
1.11
1.14
6.90
3.55
10
9
8
7
6
5
4
3
2
1
ppm
NAME ER-117P-01
EXPNO 1
PROCNO 1
Date_ 20090608
Time 13.45
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1820
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899988 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


C13CPD CDCl3 /opt/topspin kbreddy 37
165.91
159.90
159.40
159.26
149.84
144.96
143.25
138.58
131.01
129.99
129.19
128.26
125.80
124.08
122.99
122.02
121.15
115.84
115.24
113.10
111.07
109.25
106.55
77.40
77.14
76.89
75.69
73.08
70.22
56.01
55.86
55.31
9.32
15g
BRUKER
NAME BR-117P-01
EXPNO 2
PROCNO 1
Date_ 20090608
Time 14.07
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728683 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm


pep-02
8.807
8.713
7.934
7.912
7.899
7.394
7.374
7.354
7.332
7.269
7.156
7.137
7.123
7.099
7.068
6.949
6.929
5.686
4.608
4.251
4.231
4.212
4.160
4.150
4.138
4.130
4.117
4.107
3.908
3.868
3.359
2.493
2.480
2.460
2.447
2.425
2.378
2.354
2.319
2.294
2.242
2.025
1.929
1.591
2.62
2.72
2.66
5.04
1.62
1.00
1.11
2.99
7.44
6.94
1.63
ppm
NAME BR-5mem-02
EXPNO 1
PROCNO 1
Date_ 20081008
Time 18.00
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 406.4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300062 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


0
2
4
6
[rel]
150
100
50
0
[ppm]
BR-5mem-Tip-002-F2 2 1 /opt/topspin kbreddy
165.5829
159.8275
159.4462
159.3527
149.1200
138.6020
129.9531
129.1821
128.1908
126.0406
125.6491
124.2451
122.0201
121.9403
115.2773
114.2279
113.1652
112.0191
111.0496
106.4363
75.9691
67.6819
55.8865
55.3330
32.3586
8.3205


PROTON CDCl3 /opt/topspin kbreddy 48
8.776
8.704
7.924
7.919
7.907
7.902
7.890
7.886
7.382
7.367
7.351
7.310
7.293
7.264
7.136
7.134
7.132
7.119
7.101
7.095
7.092
7.074
7.057
6.946
6.944
6.941
6.939
6.929
6.928
6.924
6.923
5.667
4.585
4.235
4.219
4.131
4.121
4.114
3.896
3.861
2.361
2.294
2.284
2.266
NAME BR-Fin-04
EXPNO 1
PROCNO 1
Date_ 20081013
Time 13.45
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900027 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.05
1.02
2.10
1.10
1.01
4.16
1.08
1.00
1.00
1.10
1.10
3.09
3.05
1.10
3.95
1.13
9
8
7
6
5
4
3
2
1
ppm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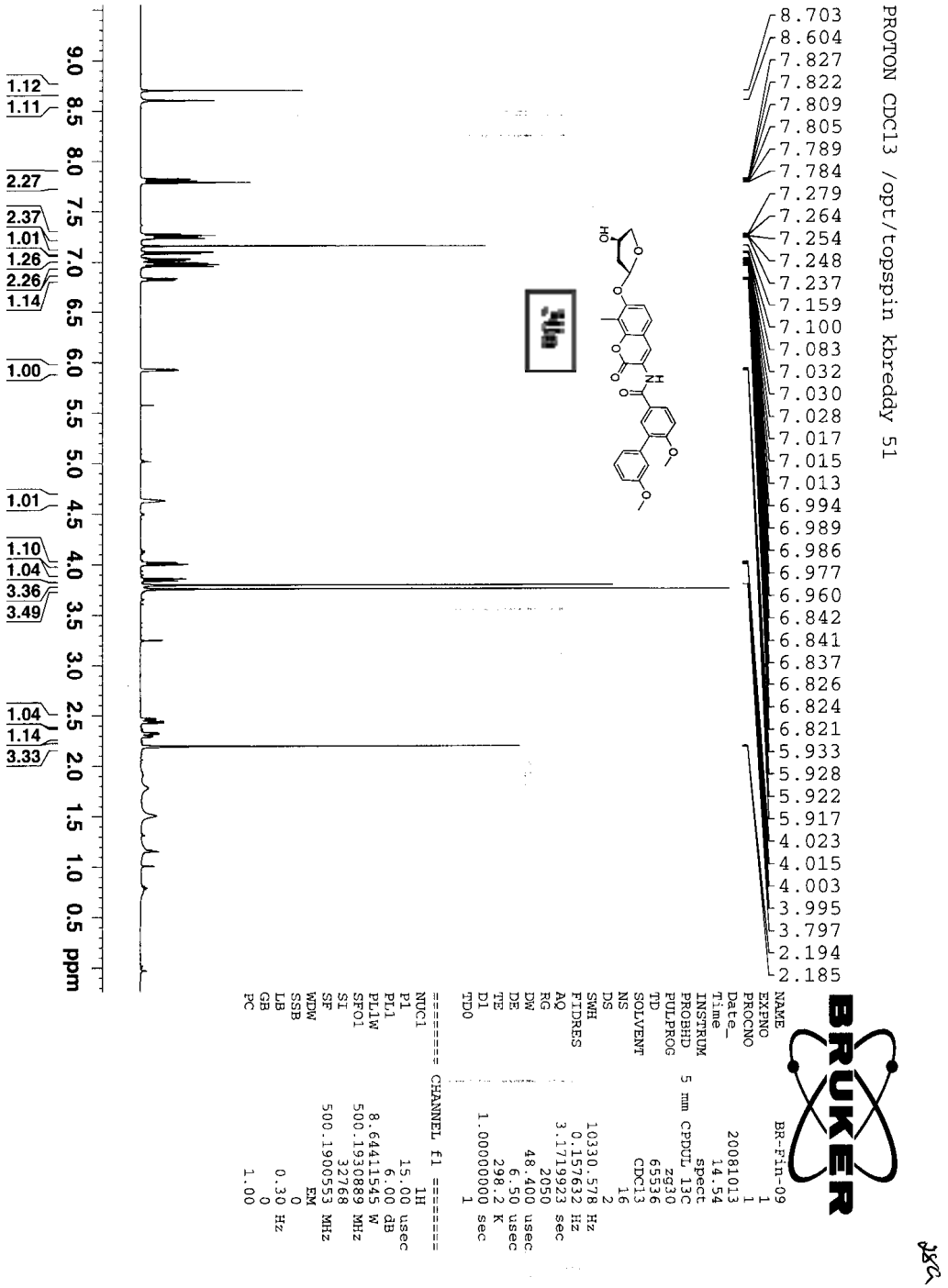
BRUKER
NAME BR-Pin-04
EXPNO 2
PROCNO 1
Date_ 20081013
Time 14.02
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728623 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
165.70
159.9
159.43
149.59
138.68
130.04
129.30
128.31
126.09
125.76
124.38
122.11
122.00
115.35
115.11
77.40
76.89
76.03
67.80
55.99
55.44
32.42
8.43
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


PROTON CDCl3 /opt/topspin kbreddy 51
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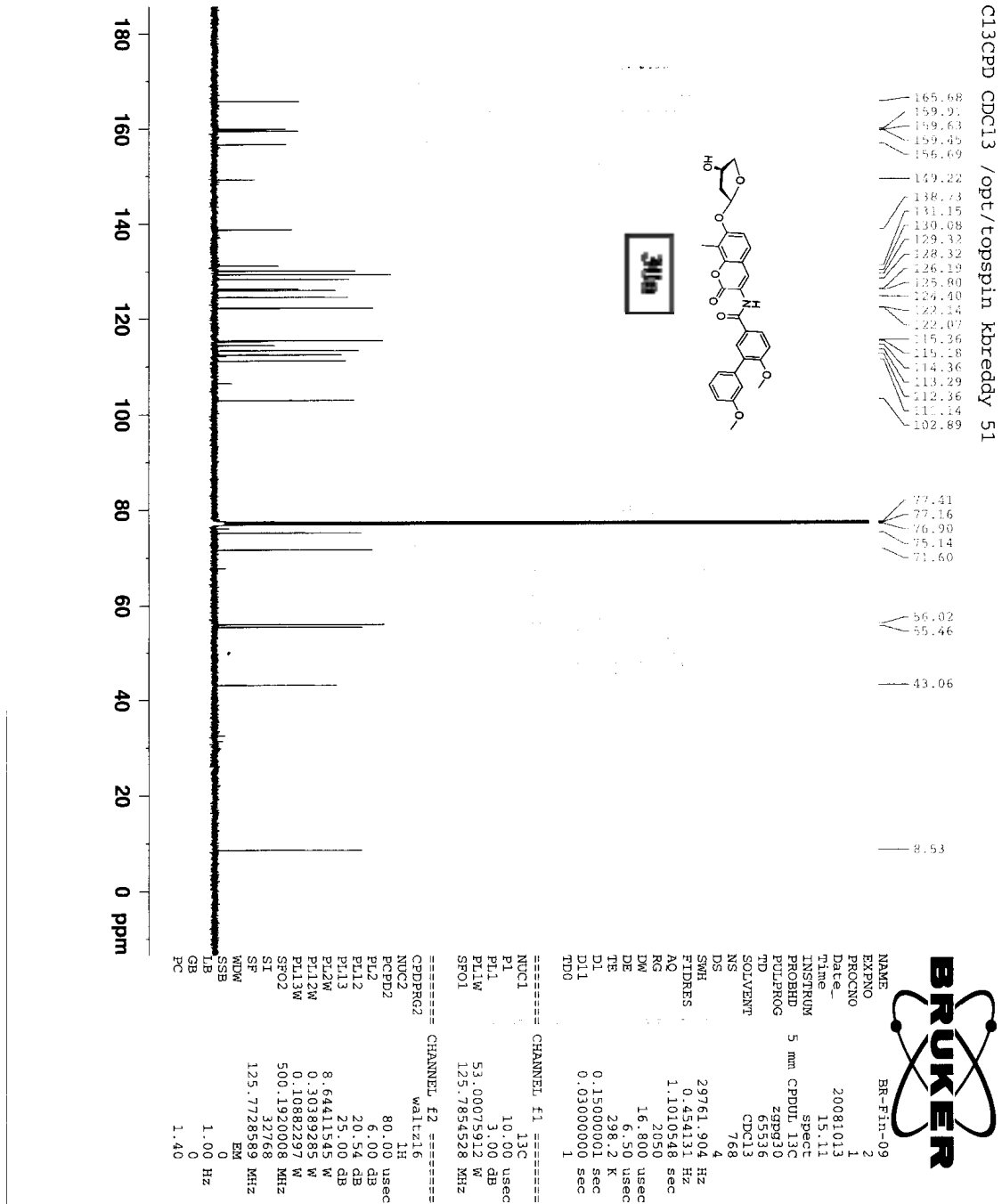
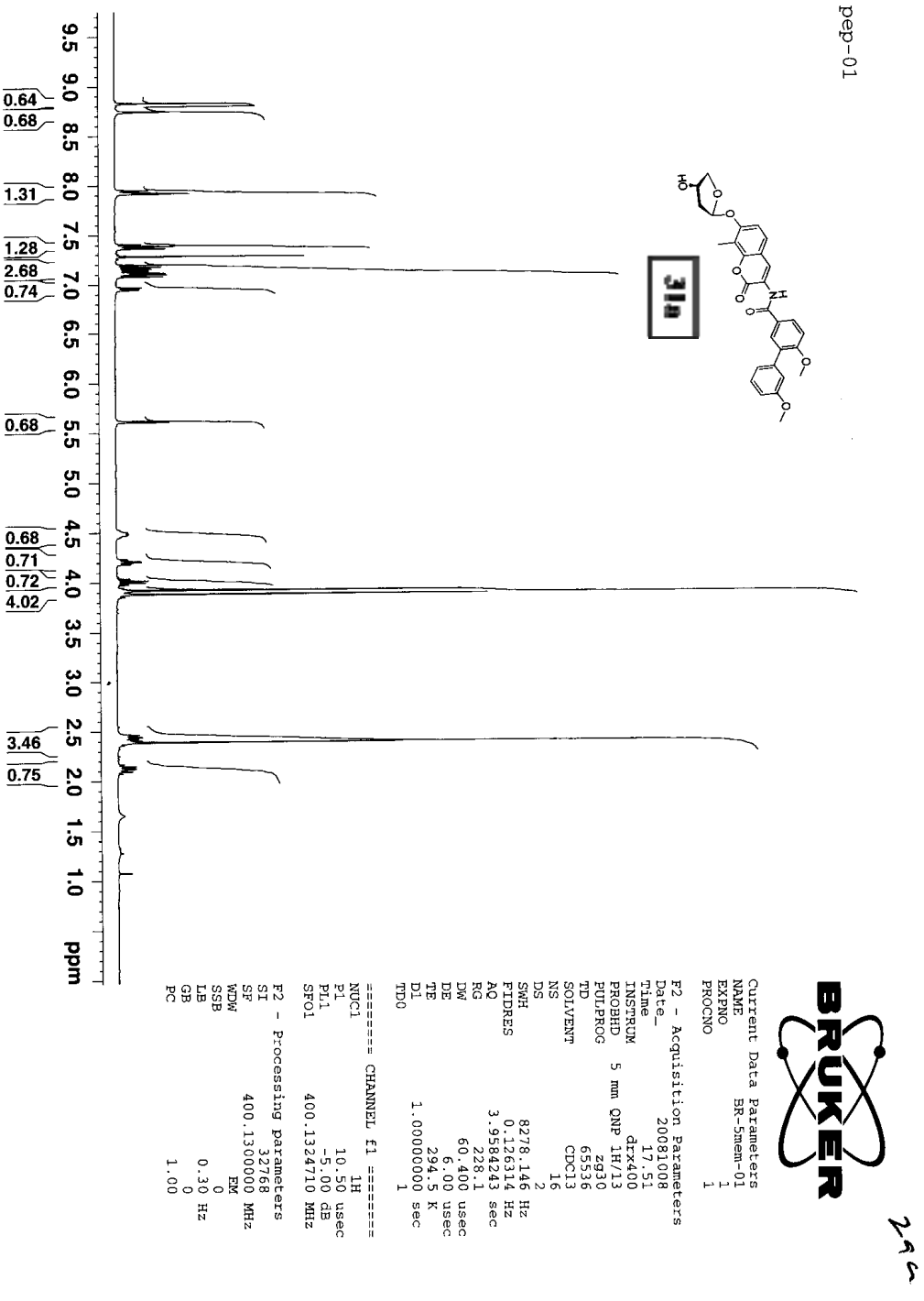
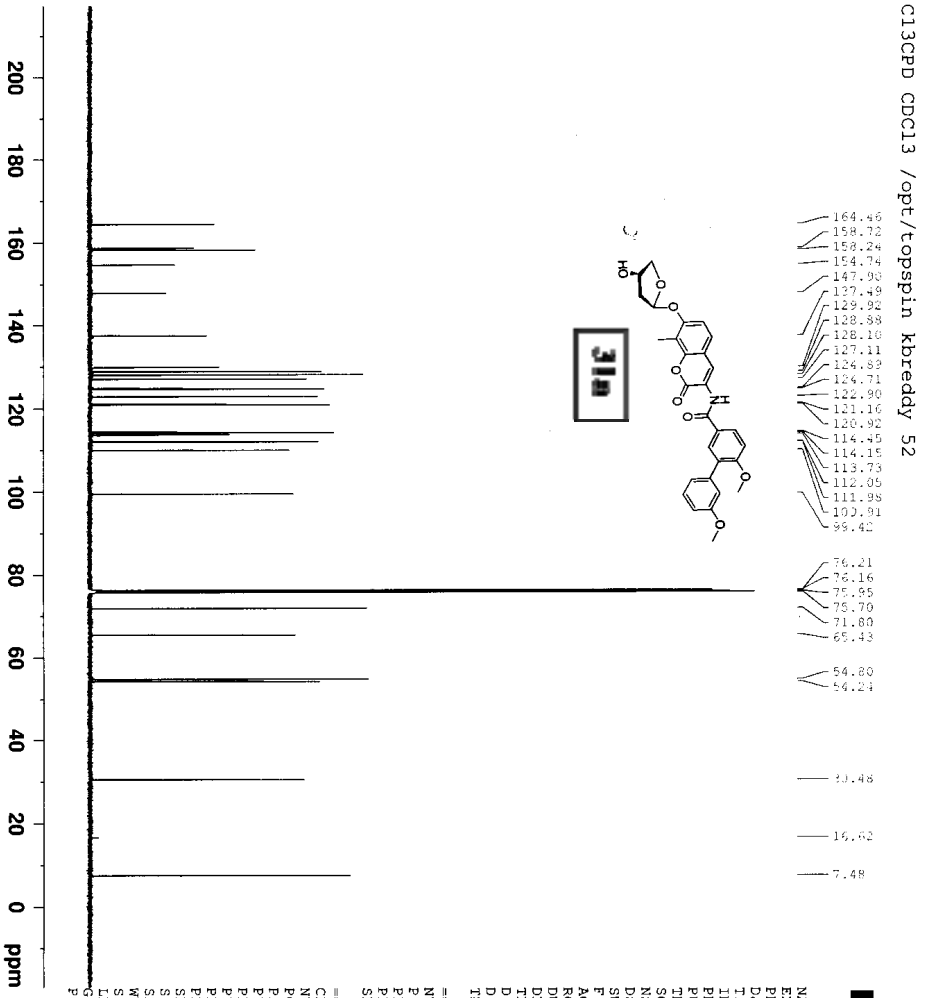
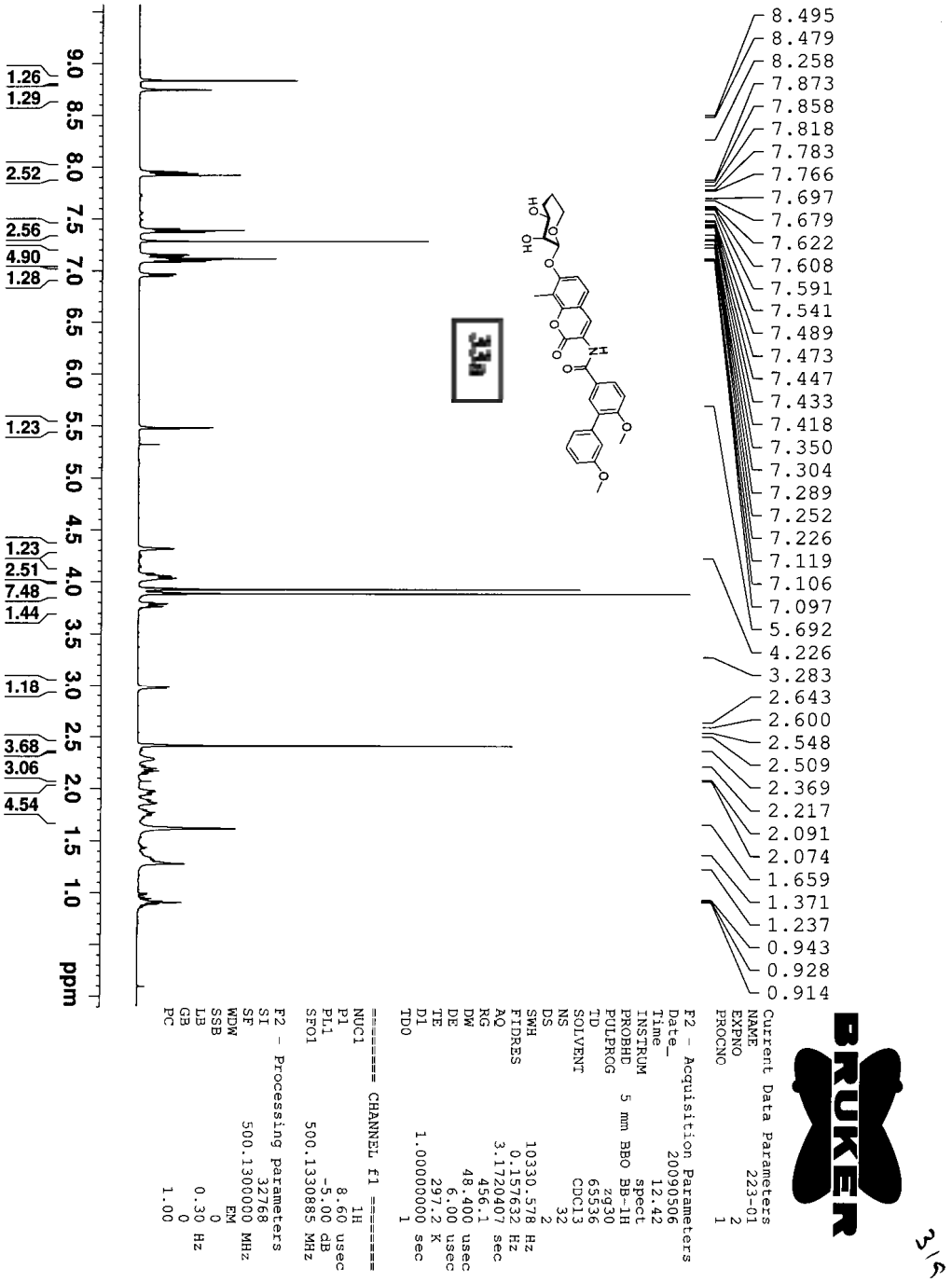
8.604
7.827
7.822
7.809
7.805
7.789
7.784
7.279
7.264
7.254
7.248
7.237
7.159
7.100
7.083
7.032
7.030
7.028
7.017
7.015
7.013
6.994
6.989
6.986
6.977
6.960
6.842
6.841
6.837
6.826
6.824
6.821
5.933
5.928
5.922
5.917
4.023
4.015
4.003
3.995
3.797
2.194
2.185
NAME BR-Pin-09
EXPNO 1
PROCNO 1
Date_ 20081013
Time 14.54
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLW1 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900553 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.12
1.11
2.27
2.37
1.01
1.26
2.26
1.14
1.00
1.01
1.10
1.04
3.36
3.49
1.04
1.14
3.33
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm

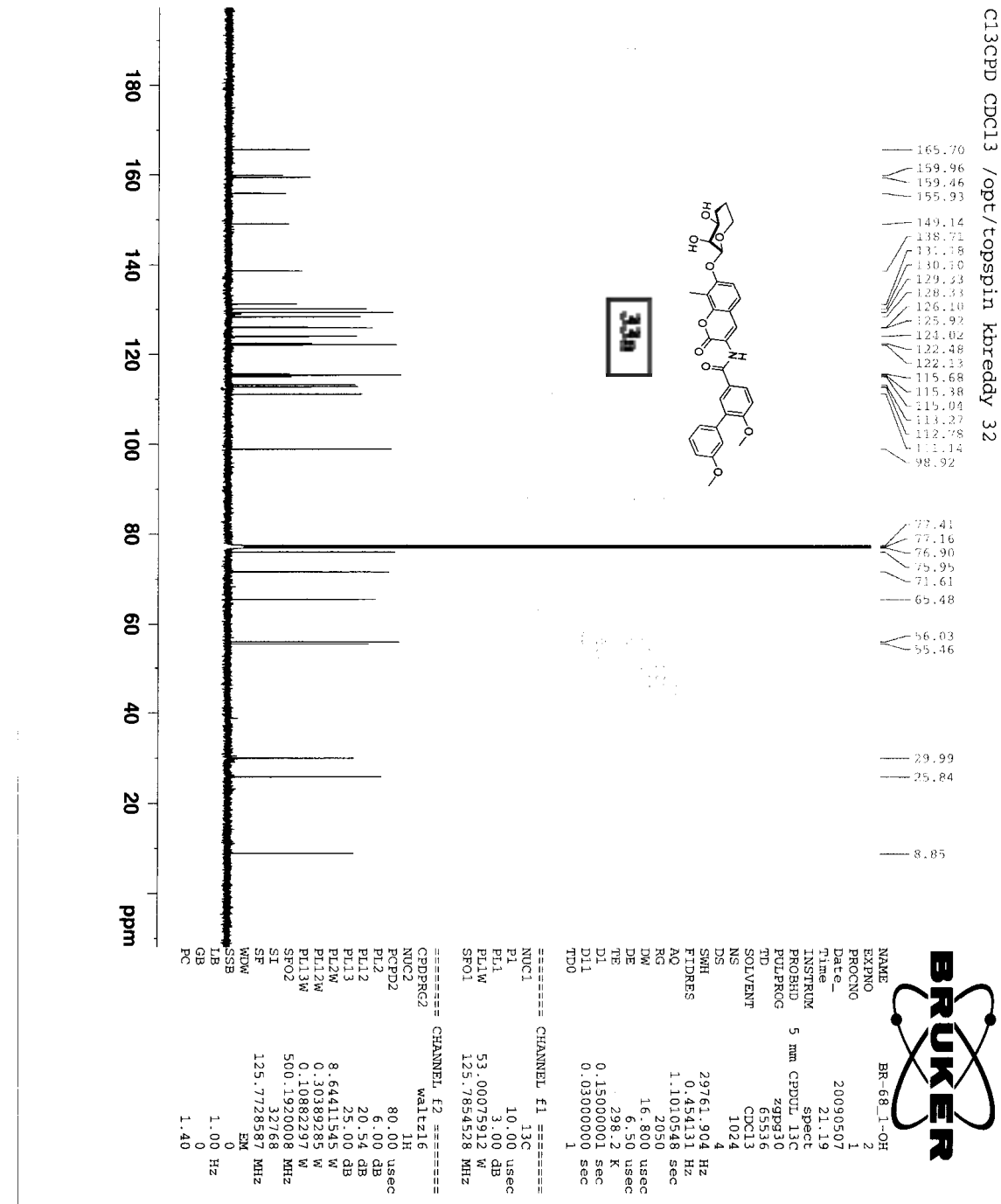

C13CPD CDCl3 /opt/topspin kbreddy 51
3ila
165.68
159.63
159.45
156.69
149.22
138.73
131.15
130.08
129.32
128.32
126.19
125.80
124.40
122.14
122.07
115.36
115.18
114.36
113.29
112.36
102.89
77.41
77.16
76.90
75.14
71.60
56.02
55.46
43.06
8.53
180
160
140
120
100
80
60
40
20
0 ppm
BRUKER
NAME BR-Fin-09
EXPNO 2
PROCNO 1
Date_ 20081013
Time 15.11
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728589 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

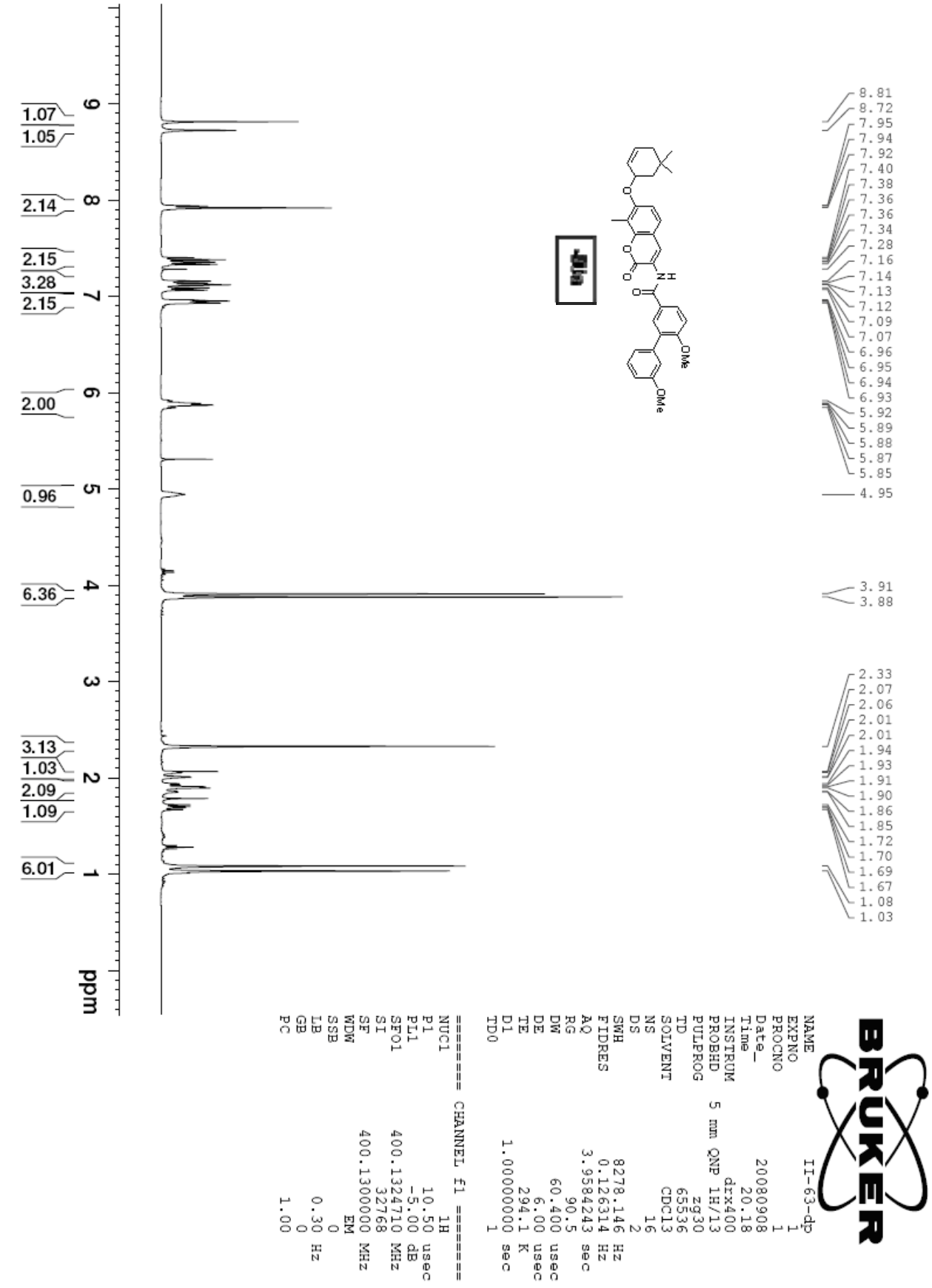

pep-01
31a
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
0.64
0.68
1.31
1.28
2.68
0.74
0.68
0.68
0.71
0.72
4.02
3.46
0.75
BRUKER
Current Data Parameters
NAME SR-5mem-01
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20081008
Time 17.51
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 228.1
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

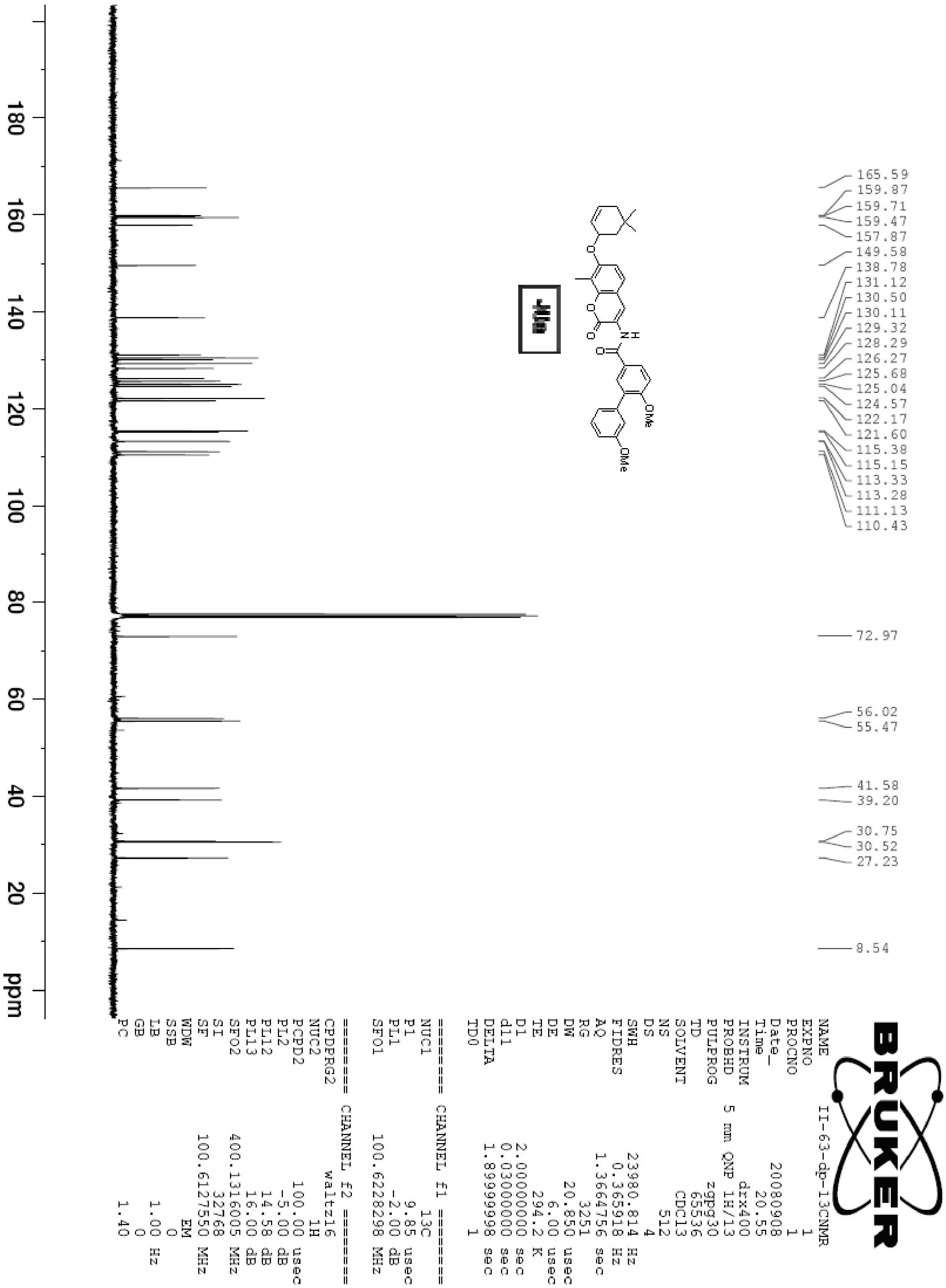

C13CPD CDCl3 /opt/topspin kbreddy 52
31a
164.46
158.72
158.24
154.74
147.90
137.49
129.92
128.88
128.10
127.11
124.89
124.71
122.90
121.16
120.92
114.45
114.19
113.73
112.05
111.98
100.91
98.42
76.21
76.16
75.95
75.70
71.80
69.43
54.80
54.24
30.46
16.62
7.48
BRUKER
NAME BR-Fin-10
EXPNO 2
PROCNO 1
Date_ 20081013
Time 15.32
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.10110548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 3.15000001 sec
D11 3.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7730125 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

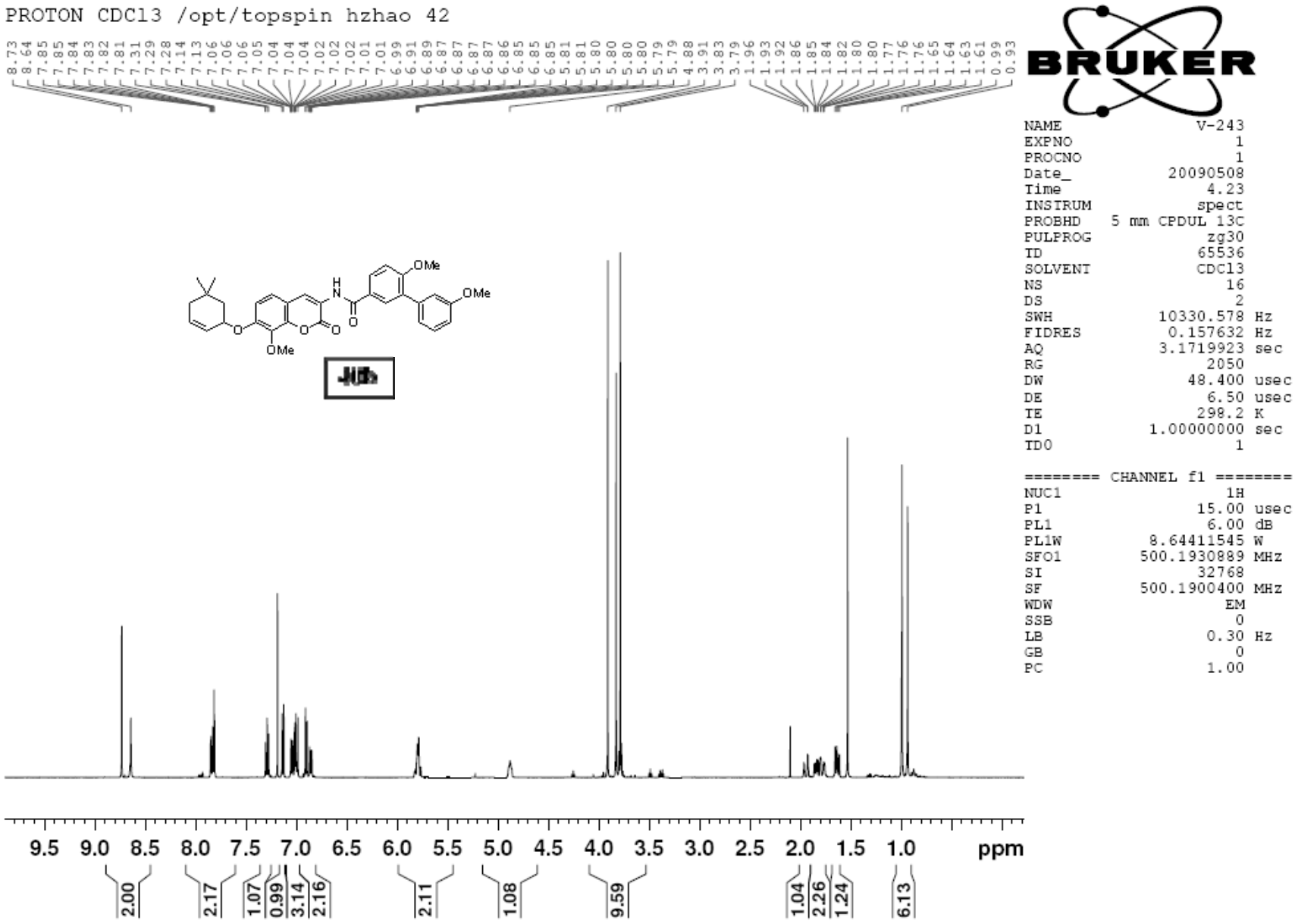
29a

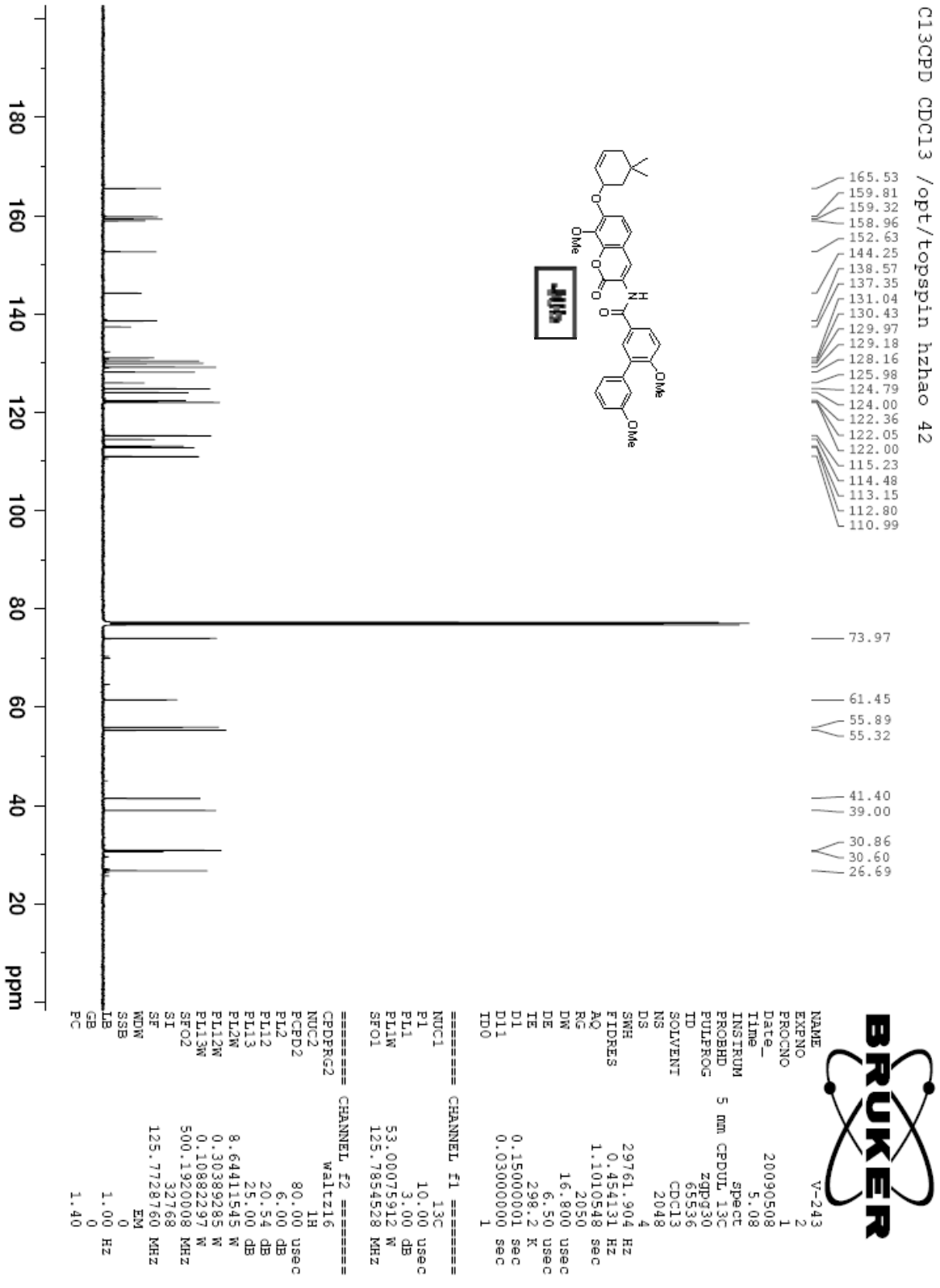

8.495
8.479
8.258
7.873
7.858
7.818
7.783
7.766
7.697
7.679
7.622
7.608
7.591
7.541
7.489
7.473
7.447
7.433
7.418
7.350
7.304
7.289
7.252
7.226
7.119
7.106
7.097
5.692
4.226
3.283
2.643
2.600
2.548
2.509
2.369
2.217
2.091
2.074
1.659
1.371
1.237
0.943
0.928
0.914
33a
1.26
1.29
2.52
2.56
4.90
1.28
1.23
1.23
2.51
7.48
1.44
1.18
3.68
3.06
4.54
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
Current Data Parameters
NAME 223-01
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20090506
Time 12.42
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 32
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 456.1
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
F2 - Processing parameters
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

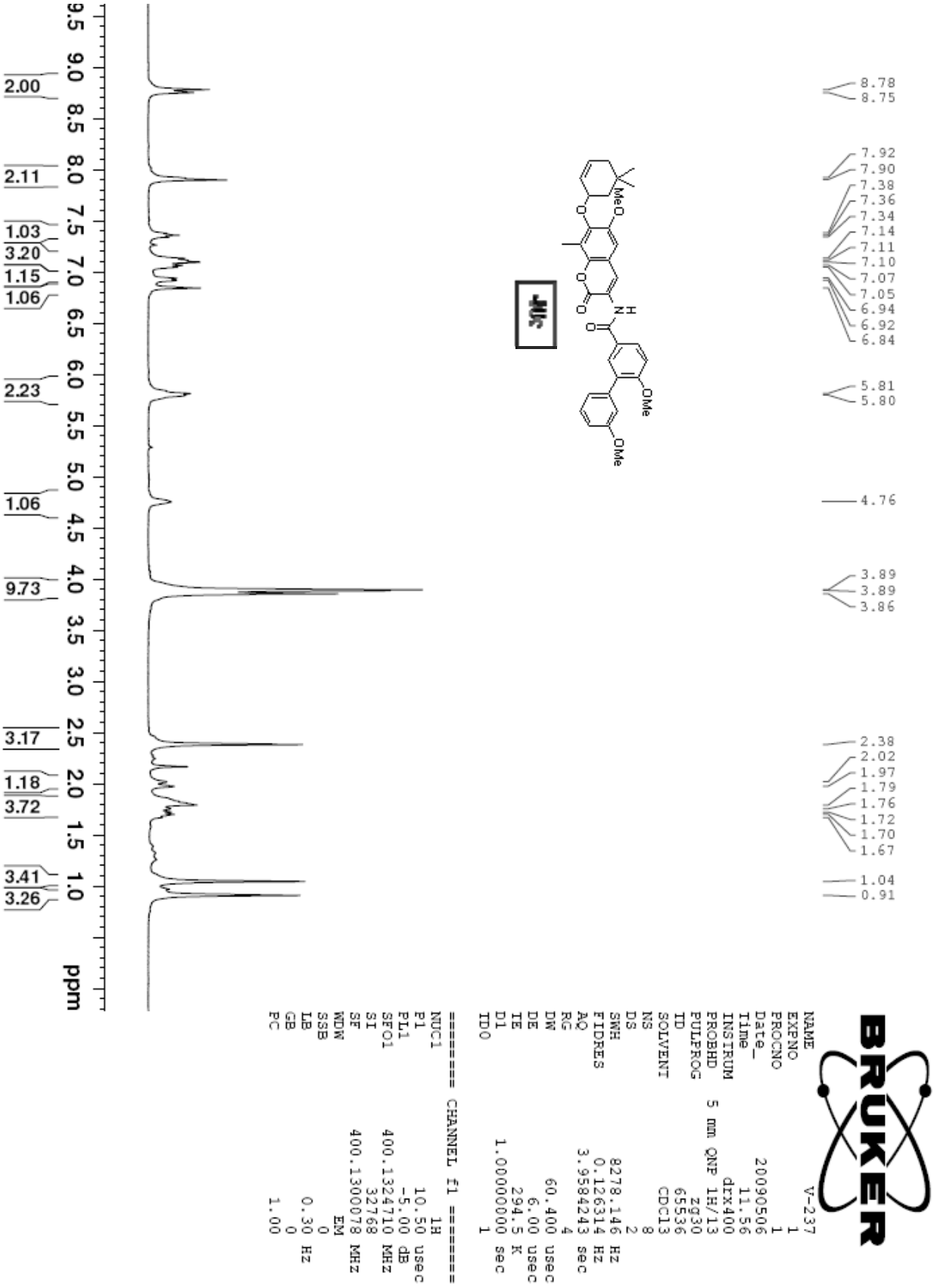

C13CPD CDCl3 /opt/topspin kbreddy 32
165.70
159.96
159.46
155.93
149.14
138.71
131.18
130.10
129.63
128.33
126.10
125.92
124.02
122.48
122.13
115.68
115.38
115.04
113.27
112.78
111.14
98.92
77.41
77.16
76.90
75.95
71.61
65.48
56.03
55.46
29.99
25.84
8.85
33n
BRUKER
NAME BR-68_1-OH
EXPNO 2
PROCNO 1
Date_ 20090507
Time 21.19
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728587 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

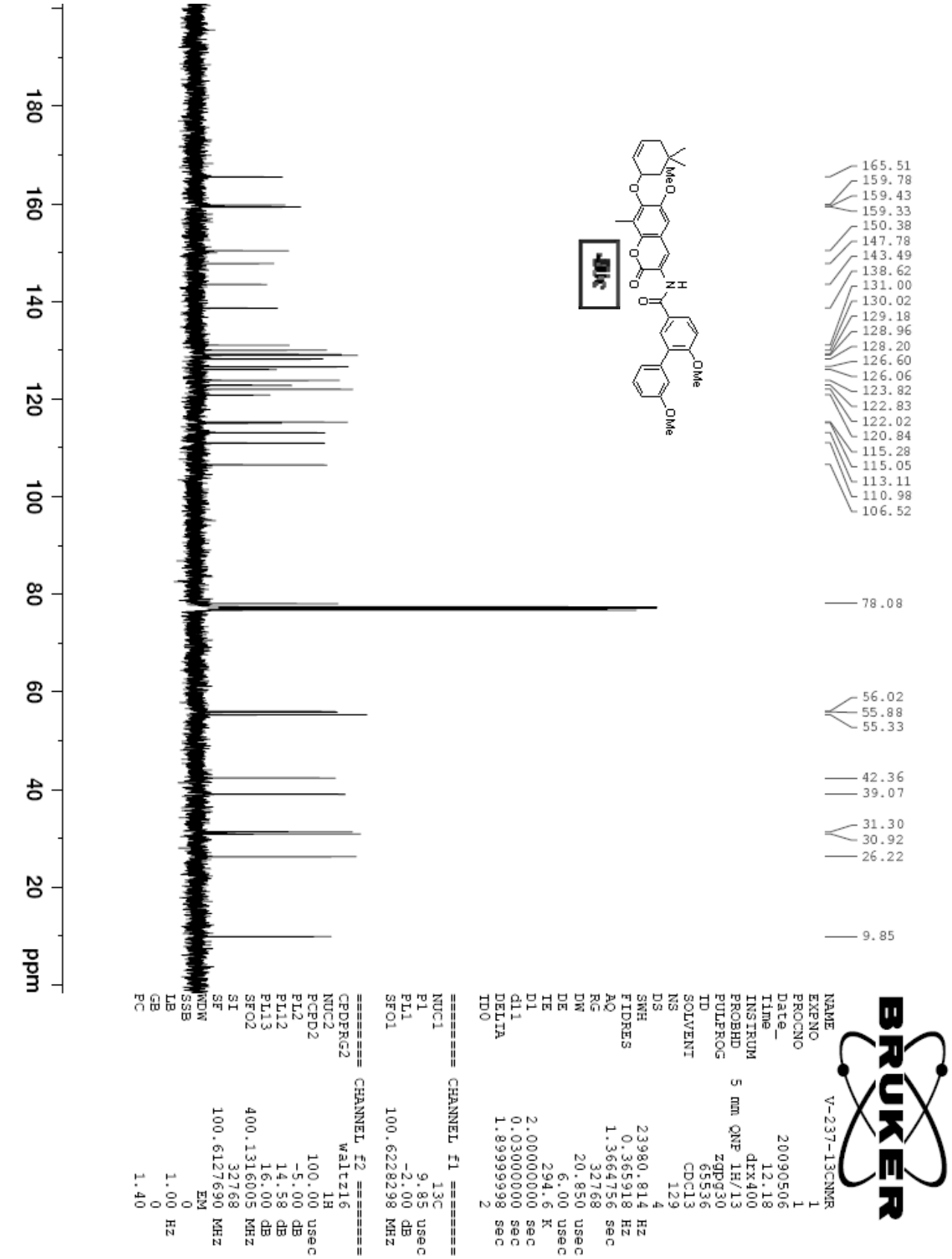

8.81
8.72
7.95
7.94
7.92
7.40
7.38
7.36
7.36
7.34
7.28
7.16
7.14
7.13
7.12
7.09
7.07
6.96
6.95
6.94
6.93
5.92
5.89
5.88
5.87
5.85
4.95
3.91
3.88
2.33
2.07
2.06
2.01
2.01
1.94
1.93
1.91
1.90
1.86
1.85
1.72
1.70
1.69
1.67
1.08
1.03
OMe
OMe
1.07
1.05
2.14
2.15
3.28
2.15
2.00
0.96
6.36
3.13
1.03
2.09
1.09
6.01
ppm
NAME II-63-dp
EXPNO 1
PROCNO 1
Date_ 20080908
Time_ 20.18
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 90.5
DW 60.400 usec
DE 6.00 usec
TE 294.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

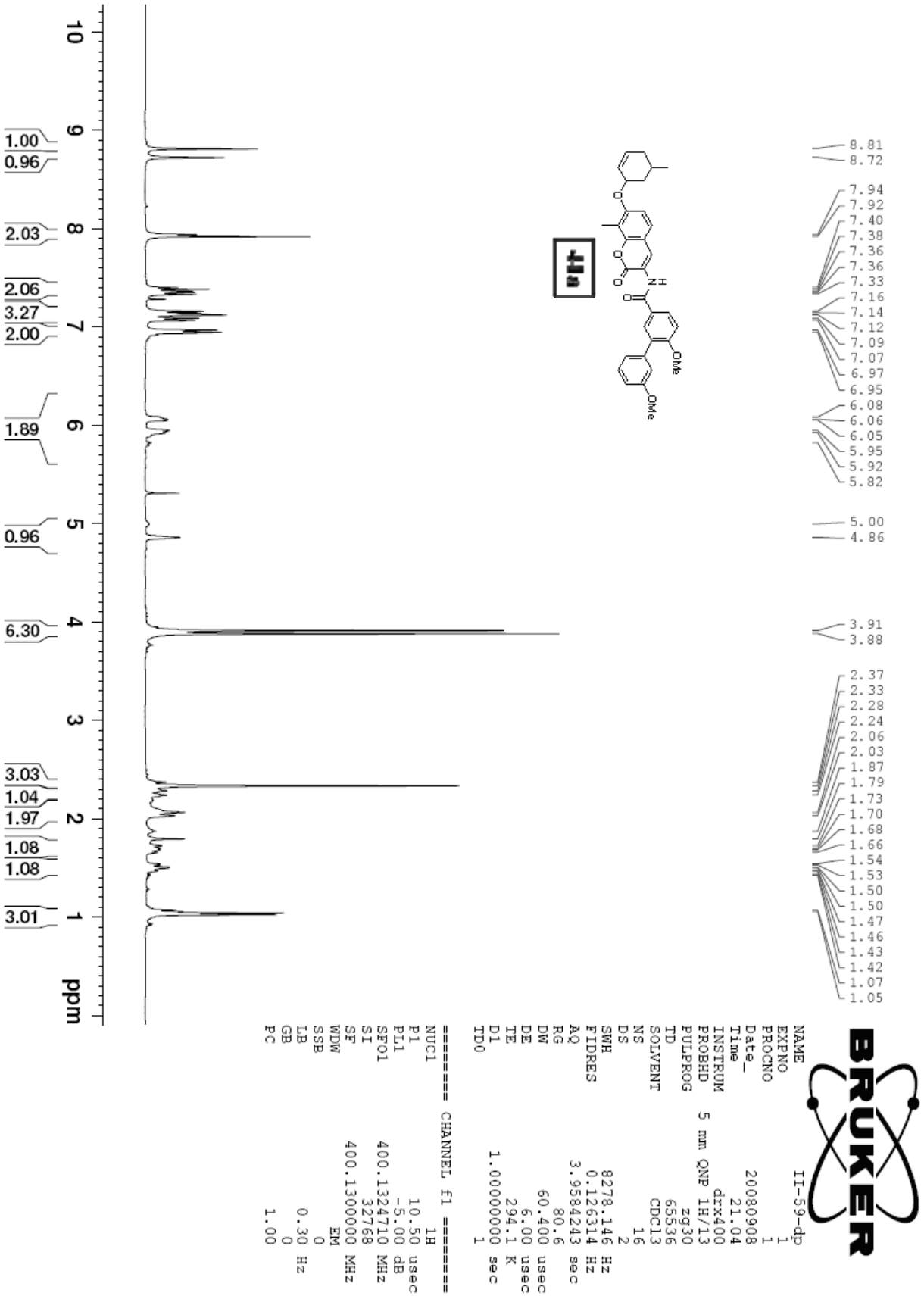

165.59
159.87
159.71
159.47
157.87
149.58
138.78
131.12
130.50
130.11
129.32
128.29
126.27
125.68
125.04
124.57
122.17
121.60
115.38
115.15
113.33
113.28
111.13
110.43
72.97
56.02
55.47
41.58
39.20
30.75
30.52
27.23
8.54
180
160
140
120
100
80
60
40
20
ppm
O
O
O
N
H
O
OMe
OMe
NAME II-63-dp-13CNMR
EXPNO 1
PROCNO 1
Date_ 20080908
Time 20.55
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 3251
DW 20.850 usec
DE 6.00 usec
TE 294.2 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127550 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

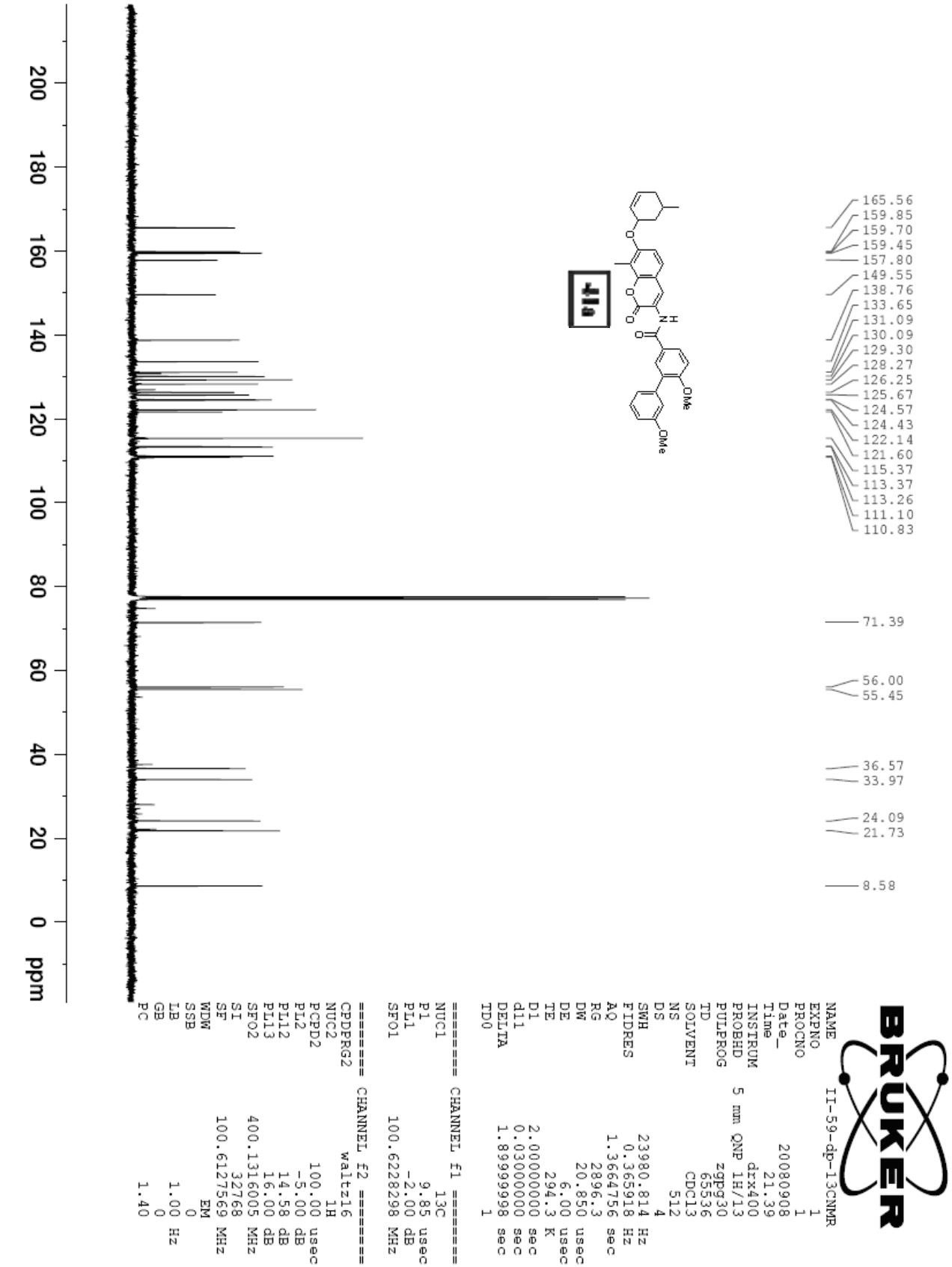

PROTON CDCl3 /opt/topspin hzhao 42
8.73 8.64 7.85 7.85 7.84 7.83 7.82 7.81 7.31 7.29 7.28 7.14 7.13 7.06 7.06 7.06 7.05 7.04 7.04 7.04 7.02 7.02 7.02 7.01 7.01 6.99 6.91 6.89 6.87 6.87 6.87 6.87 6.86 6.85 6.85 6.85 5.81 5.81 5.80 5.80 5.80 5.80 5.79 5.79 4.88 3.91 3.83 3.79 1.96 1.93 1.92 1.86 1.85 1.84 1.82 1.80 1.80 1.77 1.76 1.76 1.65 1.64 1.63 1.61 0.99 0.93
BRUKER
NAME V-243
EXPNO 1
PROCNO 1
Date_ 20090508
Time 4.23
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900400 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OMe
OMe
OMe
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.00 2.17 1.07 0.99 3.14 2.16 2.11 1.08 9.59 1.04 2.26 1.24 6.13

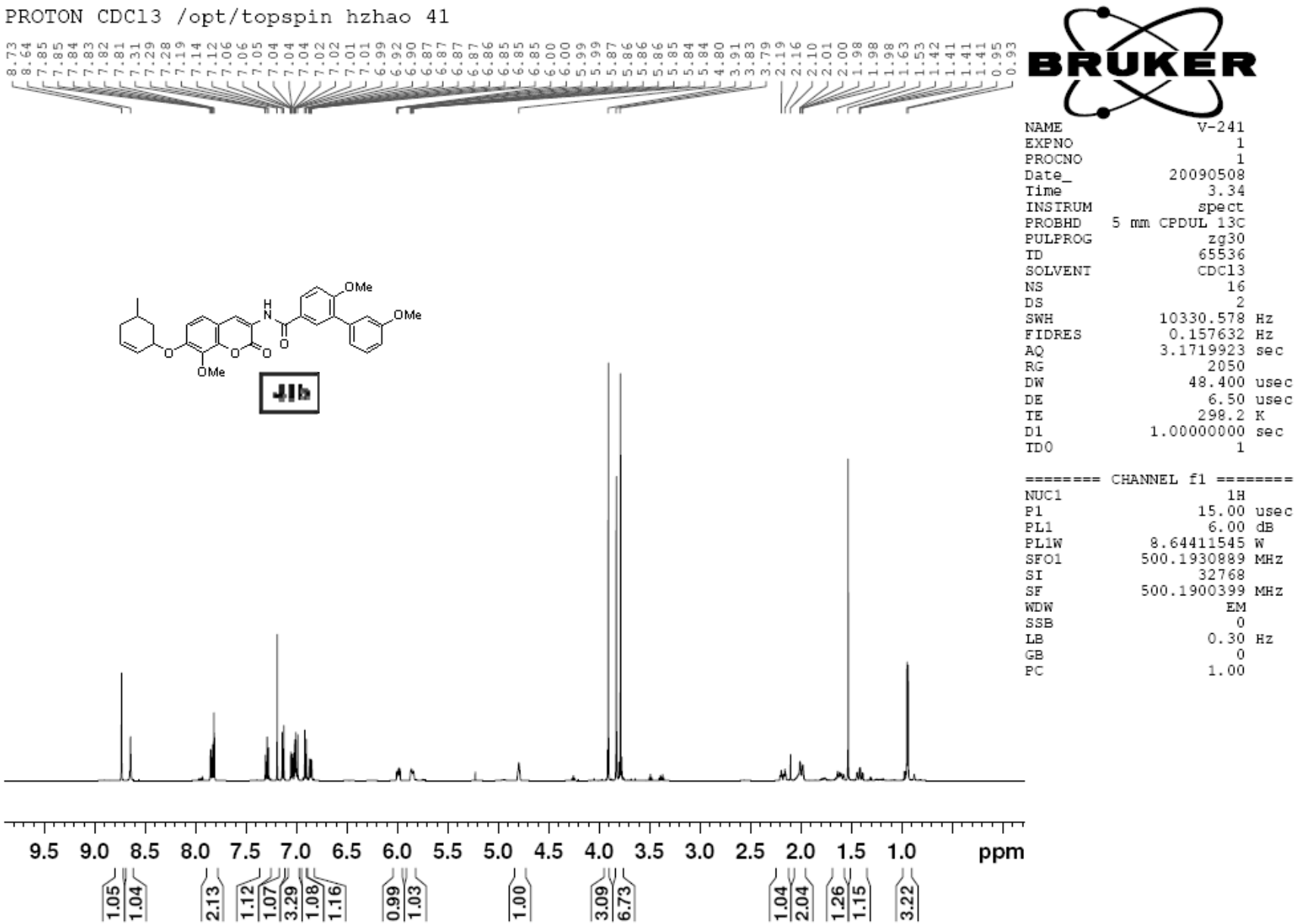

C13CPD CDCl3 /opt/topspin hzhao 42
165.53
159.81
159.32
158.96
152.63
144.25
138.57
137.35
131.04
130.43
129.97
129.18
128.16
125.98
124.79
124.00
122.36
122.05
122.00
115.23
114.48
113.15
112.80
110.99
73.97
61.45
55.89
55.32
41.40
39.00
30.86
30.60
26.69
OMe
OMe
OMe
NAME V-243
EXPNO 2
PROCNO 1
Date_ 20090508
Time 5.08
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

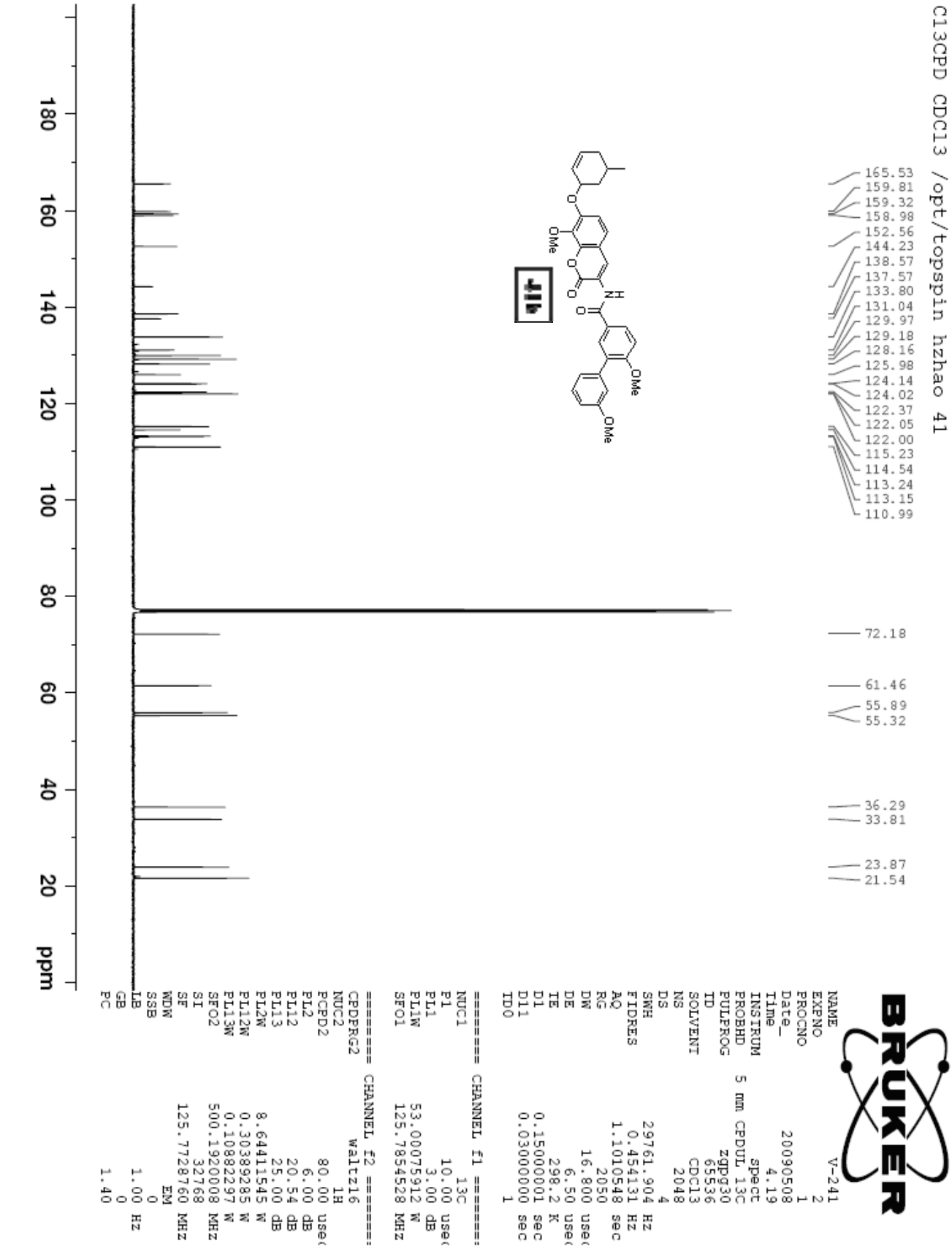

8.78
8.75
7.92
7.90
7.38
7.36
7.34
7.14
7.11
7.10
7.07
7.05
6.94
6.92
6.84
5.81
5.80
4.76
3.89
3.89
3.86
2.38
2.02
1.97
1.79
1.76
1.72
1.70
1.67
1.04
0.91
MeO
OMe
OMe
JMS
2.00
2.11
1.03
3.20
1.15
1.06
2.23
1.06
9.73
3.17
1.18
3.72
3.41
3.26
ppm
NAME V-237
EXPNO 1
PROCNO 1
Date_ 20090506
Time 11.56
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300078 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

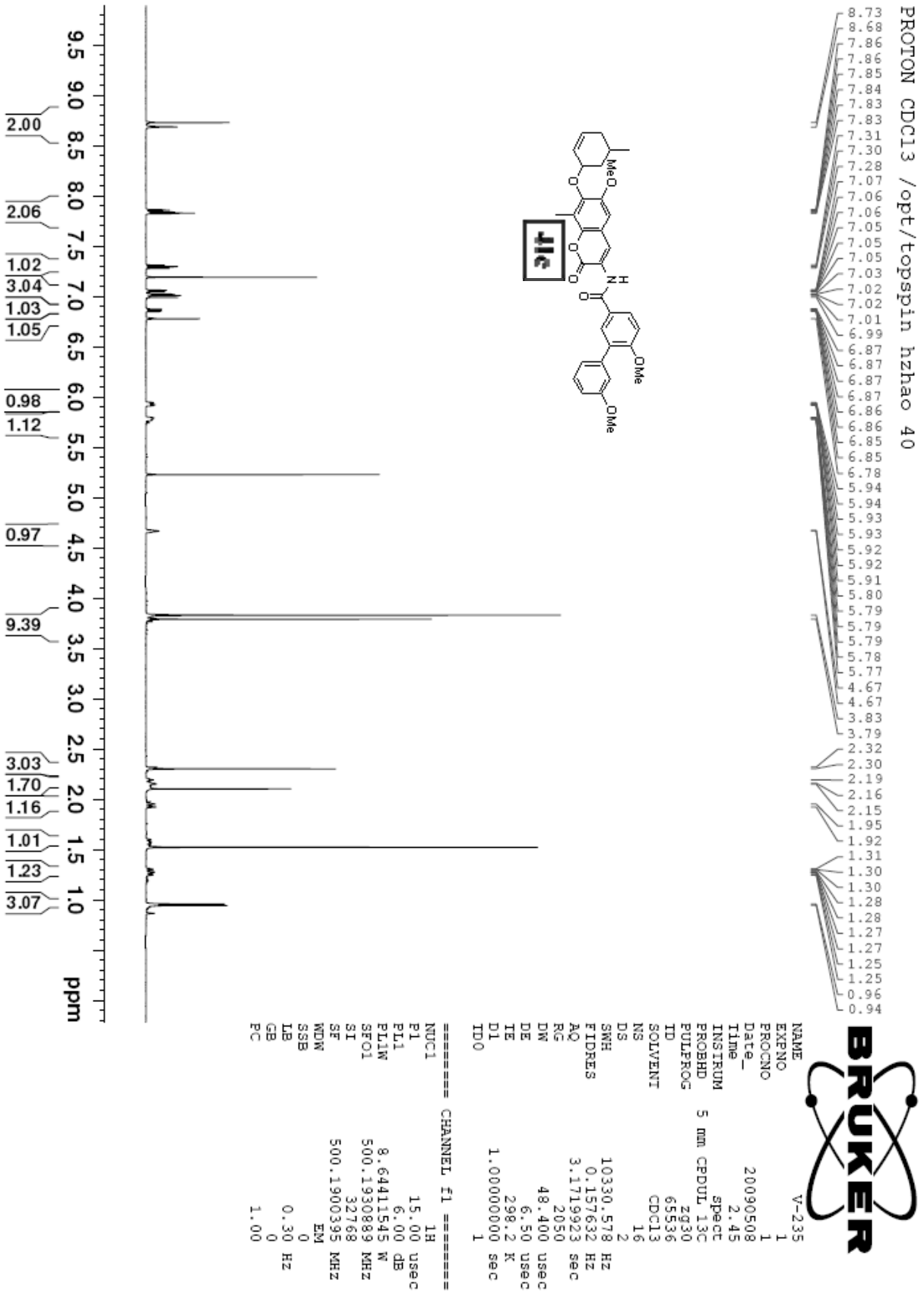

165.51
159.78
159.43
159.33
150.38
147.78
143.49
138.62
131.00
130.02
129.18
128.96
128.20
126.60
126.06
123.82
122.83
122.02
120.84
115.28
115.05
113.11
110.98
106.52
78.08
56.02
55.88
55.33
42.36
39.07
31.30
30.92
26.22
9.85
MeO
OMe
OMe
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-237-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090506
Time_ 12.18
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 129
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

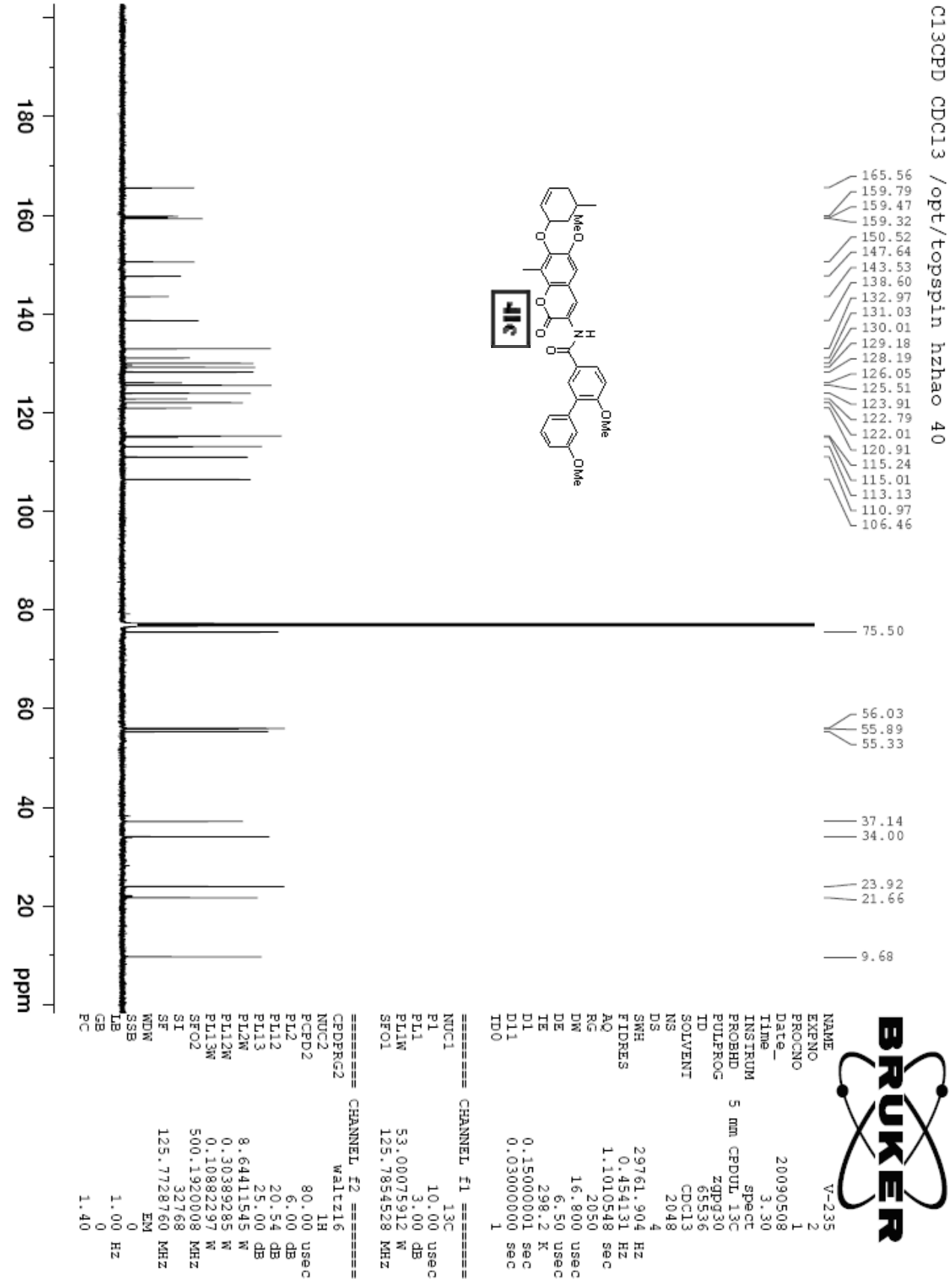

8.81
8.72
7.94
7.92
7.40
7.38
7.36
7.36
7.33
7.16
7.14
7.12
7.09
7.07
6.97
6.95
6.08
6.06
6.05
5.95
5.92
5.82
5.00
4.86
3.91
3.88
2.37
2.33
2.28
2.24
2.06
2.03
1.87
1.79
1.73
1.70
1.68
1.66
1.54
1.53
1.50
1.50
1.47
1.46
1.43
1.42
1.07
1.05
OMe
OMe
1.00
0.96
2.03
2.06
3.27
2.00
1.89
0.96
6.30
3.03
1.04
1.97
1.08
1.08
3.01
10
9
8
7
6
5
4
3
2
1
ppm
NAME II-59-dp
EXPNO 1
PROCNO 1
Date_ 20080908
Time 21.04
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 80.6
DW 60.400 usec
DE 6.00 usec
TE 294.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

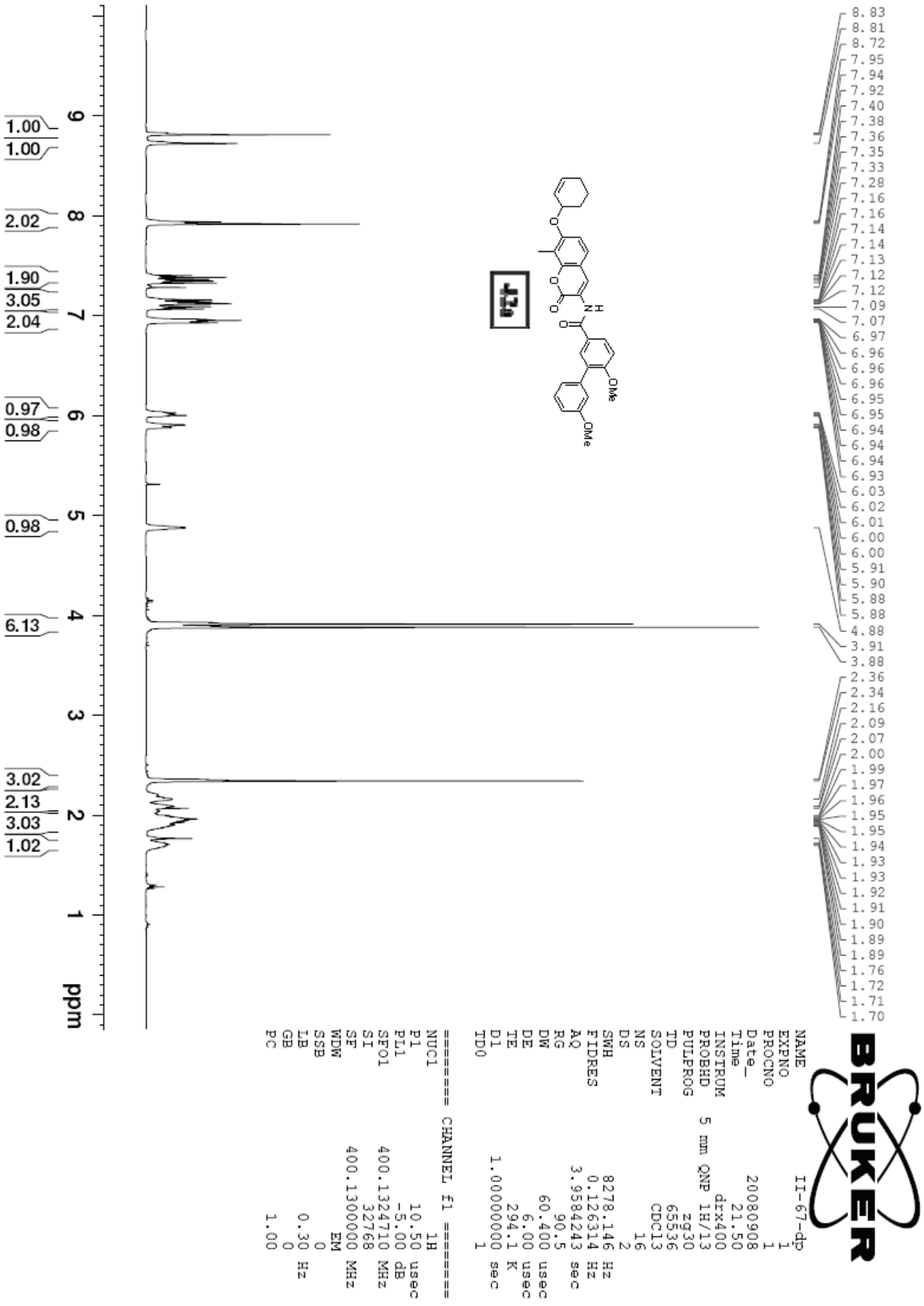

BRUKER
NAME ii-59-dp-13cNMR
EXPNO 1
PROCNO 1
Date_ 20080908
Time 21.39
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 2896.3
DW 20.850 usec
DE 6.00 usec
TE 294.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127569 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
165.56
159.85
159.70
159.45
157.80
149.55
138.76
133.65
131.09
130.09
129.30
128.27
126.25
125.67
124.57
124.43
122.14
121.60
115.37
113.37
113.26
111.10
110.83
71.39
56.00
55.45
36.57
33.97
24.09
21.73
8.58
+1a
OMe
OMe
200
180
160
140
120
100
80
60
40
20
0
ppm

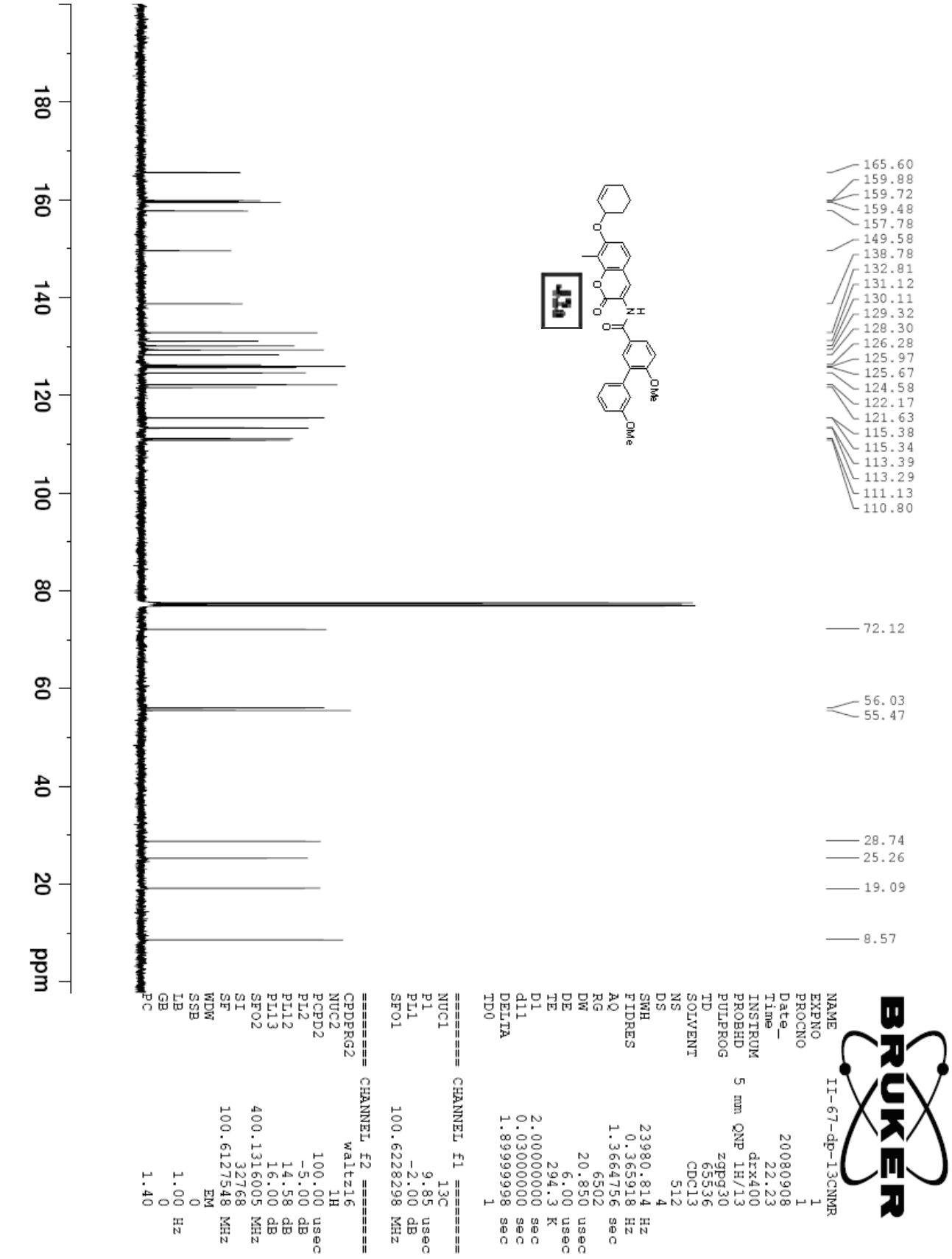

PROTON CDC13 /opt/topspin hzhao 41
8.73 8.64 7.85 7.85 7.84 7.83 7.82 7.81 7.31 7.29 7.28 7.19 7.14 7.12 7.06 7.06 7.05 7.04 7.04 7.04 7.02 7.02 7.01 7.01 6.99 6.92 6.90 6.87 6.87 6.87 6.87 6.86 6.85 6.85 6.85 6.00 6.00 5.99 5.99 5.87 5.86 5.86 5.85 5.84 5.84 4.80 3.91 3.83 3.79 2.19 2.16 2.10 2.01 2.00 1.98 1.98 1.63 1.53 1.42 1.41 1.41 1.41 0.95 0.93
BRUKER
NAME V-241
EXPNO 1
PROCNO 1
Date_ 20090508
Time 3.34
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900399 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OMe
OMe
OMe
H
N
O
O
O
O
4lb
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.05 1.04 2.13 1.12 1.07 3.29 1.08 1.16 0.99 1.03 1.00 3.09 6.73 1.04 2.04 1.26 1.15 3.22

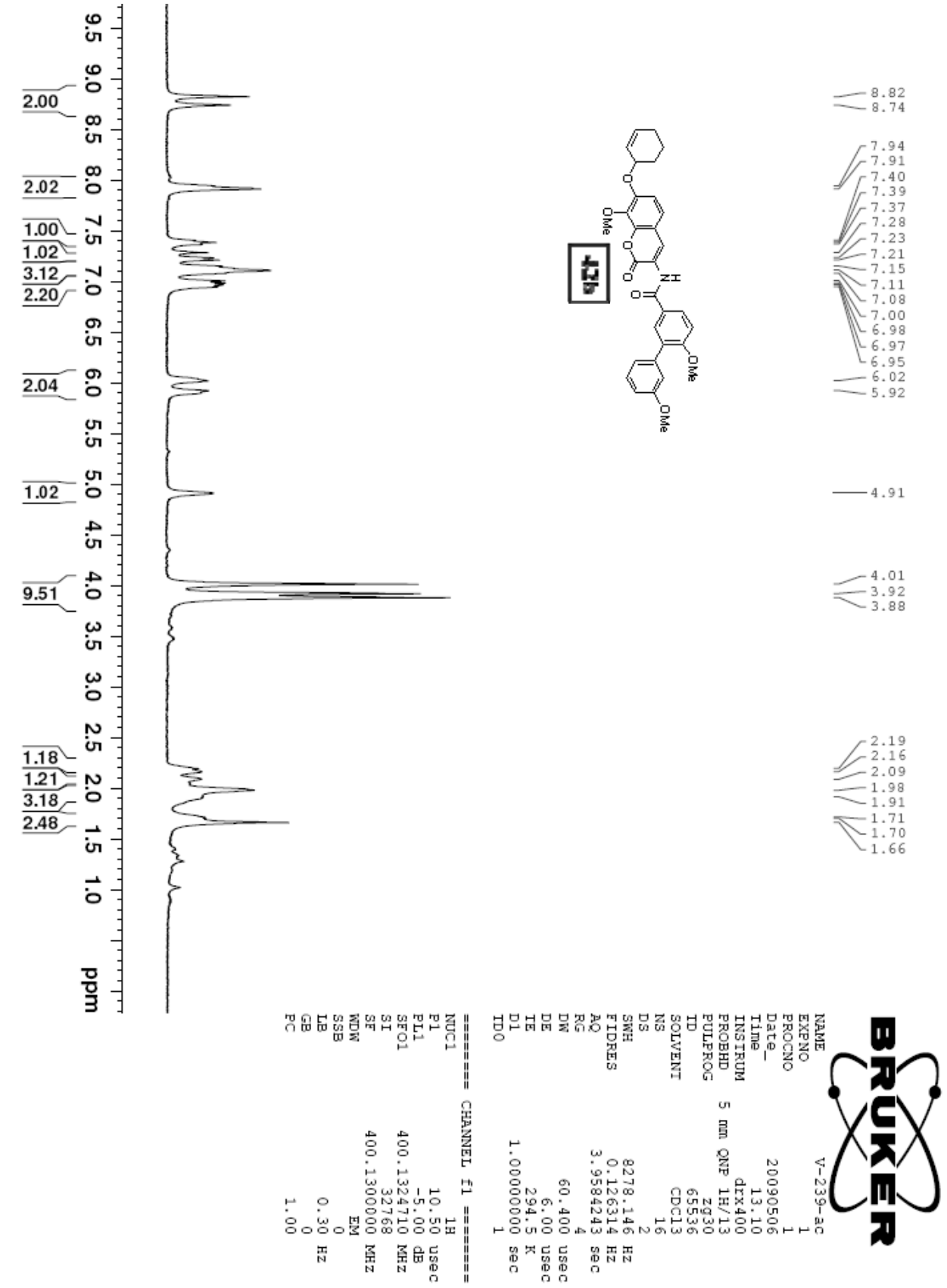

C13CPD CDC13 /opt/topspin hzhao 41
165.53
159.81
159.32
158.98
152.56
144.23
138.57
137.57
133.80
131.04
129.97
129.18
128.16
125.98
124.14
124.02
122.37
122.05
122.00
115.23
114.54
113.24
113.15
110.99
72.18
61.46
55.89
55.32
36.29
33.81
23.87
21.54
OMe
OMe
OMe
NAME V-241
EXPNO 2
PROCNO 1
Date_ 20090508
Time_ 4.19
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 use
DE 6.50 use
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 use
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 use
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

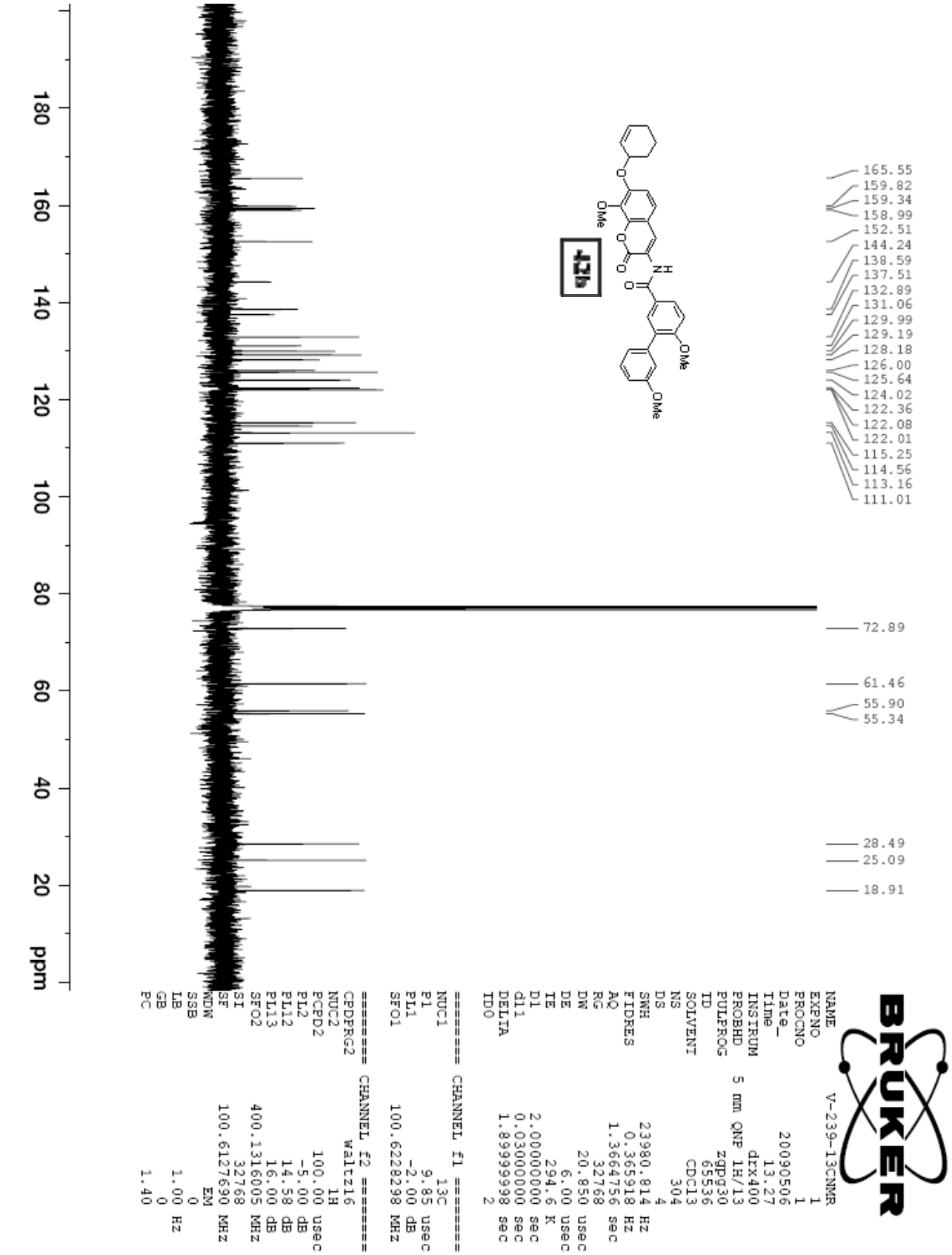

PROTON CDC13 /opt/topspin hzhao 40
8.73 8.68 7.86 7.86 7.85 7.84 7.83 7.83 7.31 7.30 7.28 7.07 7.06 7.06 7.05 7.05 7.05 7.03 7.02 7.02 7.01 6.99 6.87 6.87 6.87 6.87 6.86 6.86 6.85 6.85 6.78 5.94 5.94 5.93 5.93 5.92 5.92 5.91 5.80 5.79 5.79 5.79 5.78 5.77 4.67 4.67 3.83 3.79 2.32 2.30 2.19 2.16 2.15 1.95 1.92 1.31 1.30 1.30 1.28 1.28 1.27 1.27 1.25 1.25 0.96 0.94
MeO
OMe
OMe
3k
NAME V-235
EXPNO 1
PROCNO 1
Date_ 20090508
Time 2.45
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900395 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.00
2.06
1.02
3.04
1.03
1.05
0.98
1.12
0.97
9.39
3.03
1.70
1.16
1.01
1.23
3.07

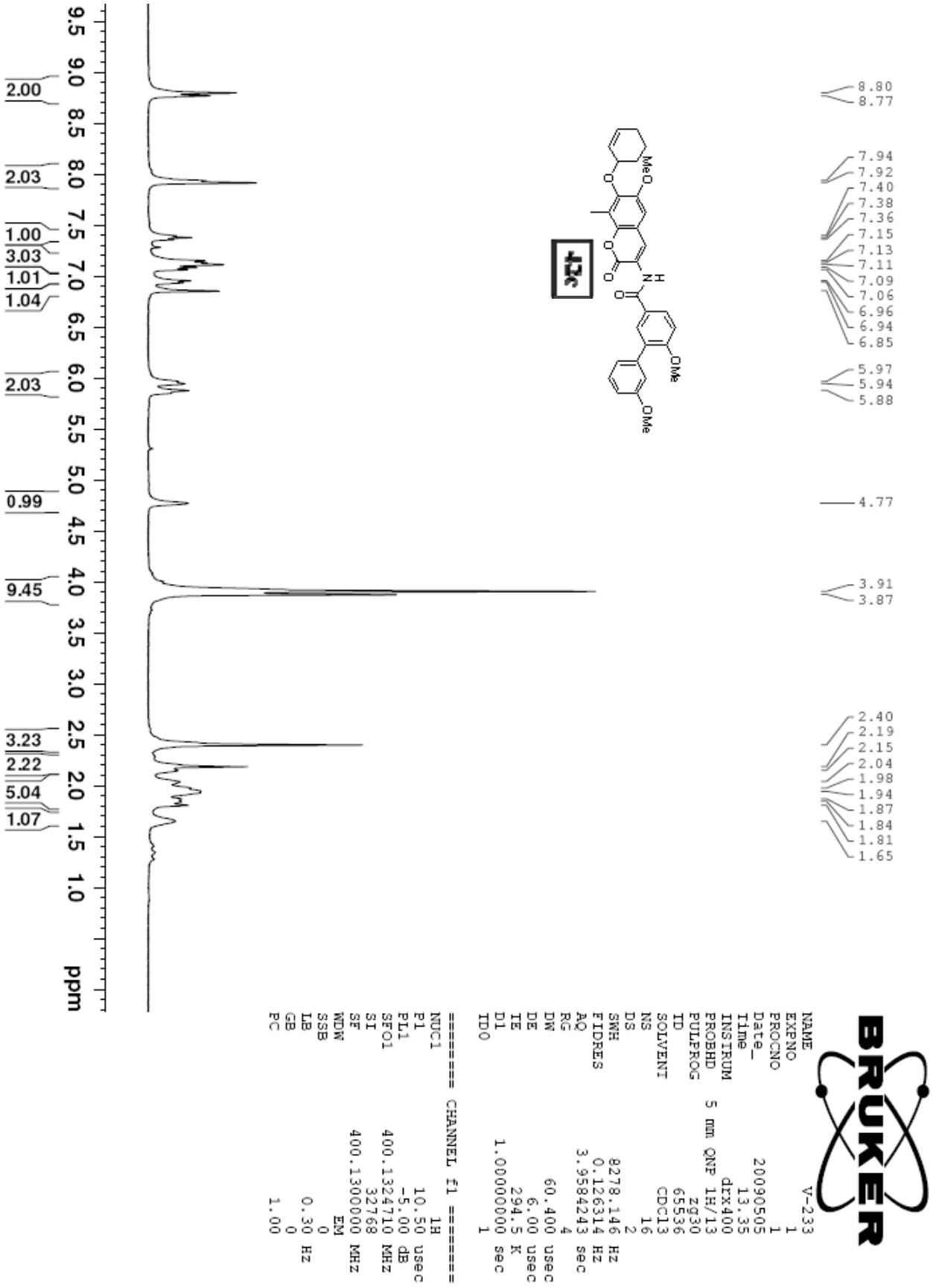

C13CPD CDC13 /opt/topspin hzhao 40
165.56
159.79
159.47
159.32
150.52
147.64
143.53
138.60
132.97
131.03
130.01
129.18
128.19
126.05
125.51
123.91
122.79
122.01
120.91
115.24
115.01
113.13
110.97
106.46
75.50
56.03
55.89
55.33
37.14
34.00
23.92
21.66
9.68
MeO
OMe
OMe
NAME V-235
EXPNO 2
PROCNO 1
Date_ 20090508
Time 3.30
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

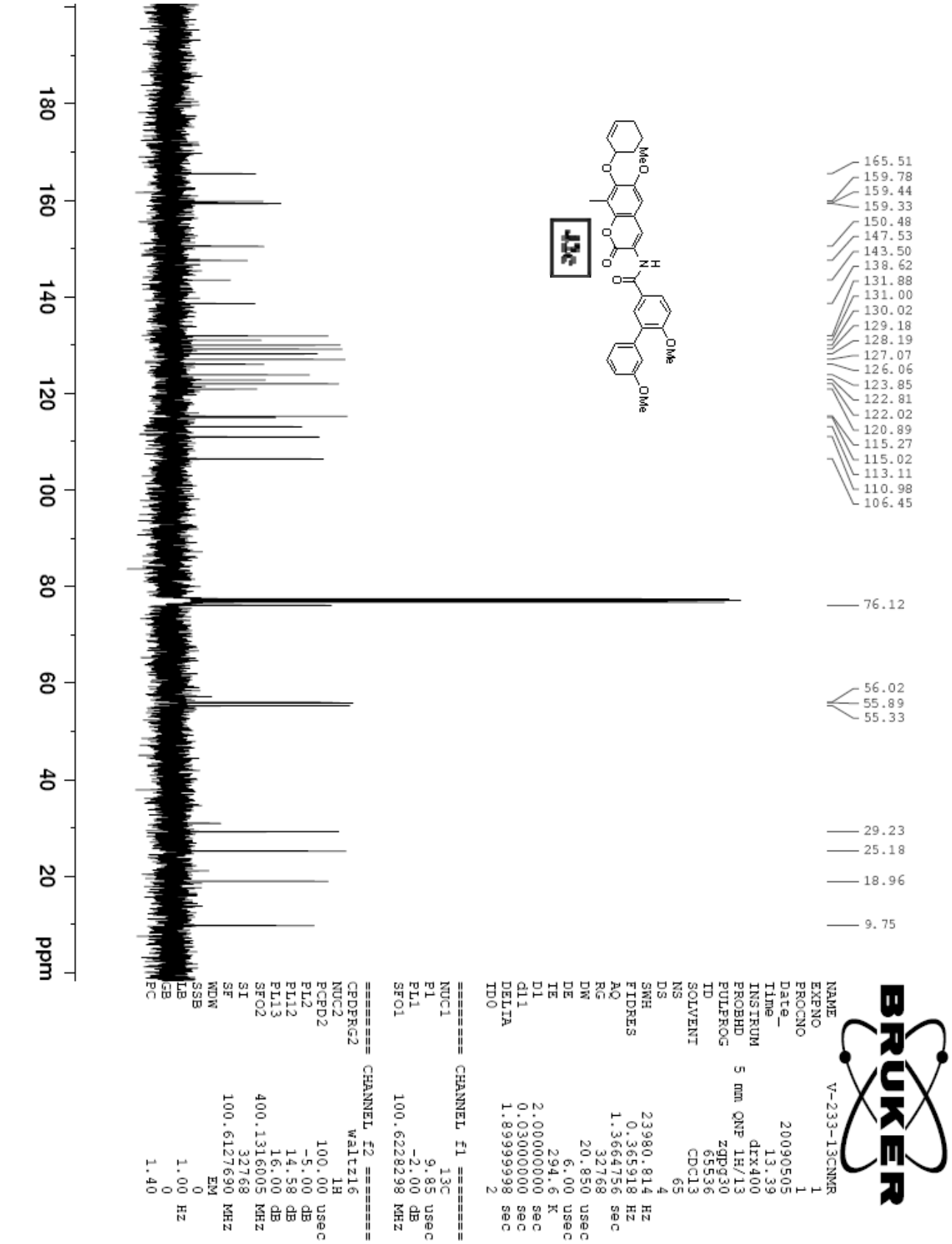

8.83
8.81
8.72
7.95
7.94
7.92
7.40
7.38
7.36
7.35
7.33
7.28
7.16
7.16
7.14
7.14
7.13
7.12
7.12
7.09
7.07
6.97
6.96
6.96
6.96
6.95
6.95
6.94
6.94
6.94
6.93
6.03
6.02
6.01
6.00
6.00
5.91
5.90
5.88
5.88
4.88
3.91
3.88
2.36
2.34
2.16
2.09
2.07
2.00
1.99
1.97
1.96
1.95
1.95
1.94
1.93
1.93
1.92
1.91
1.90
1.89
1.89
1.76
1.72
1.71
1.70
OMe
OMe
12g
1.00
1.00
2.02
1.90
3.05
2.04
0.97
0.98
0.98
6.13
3.02
2.13
3.03
1.02
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME II-67-dp
EXPNO 1
PROCNO 1
Date_ 20080908
Time 21.50
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 90.5
DW 60.400 usec
DE 6.00 usec
TE 294.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

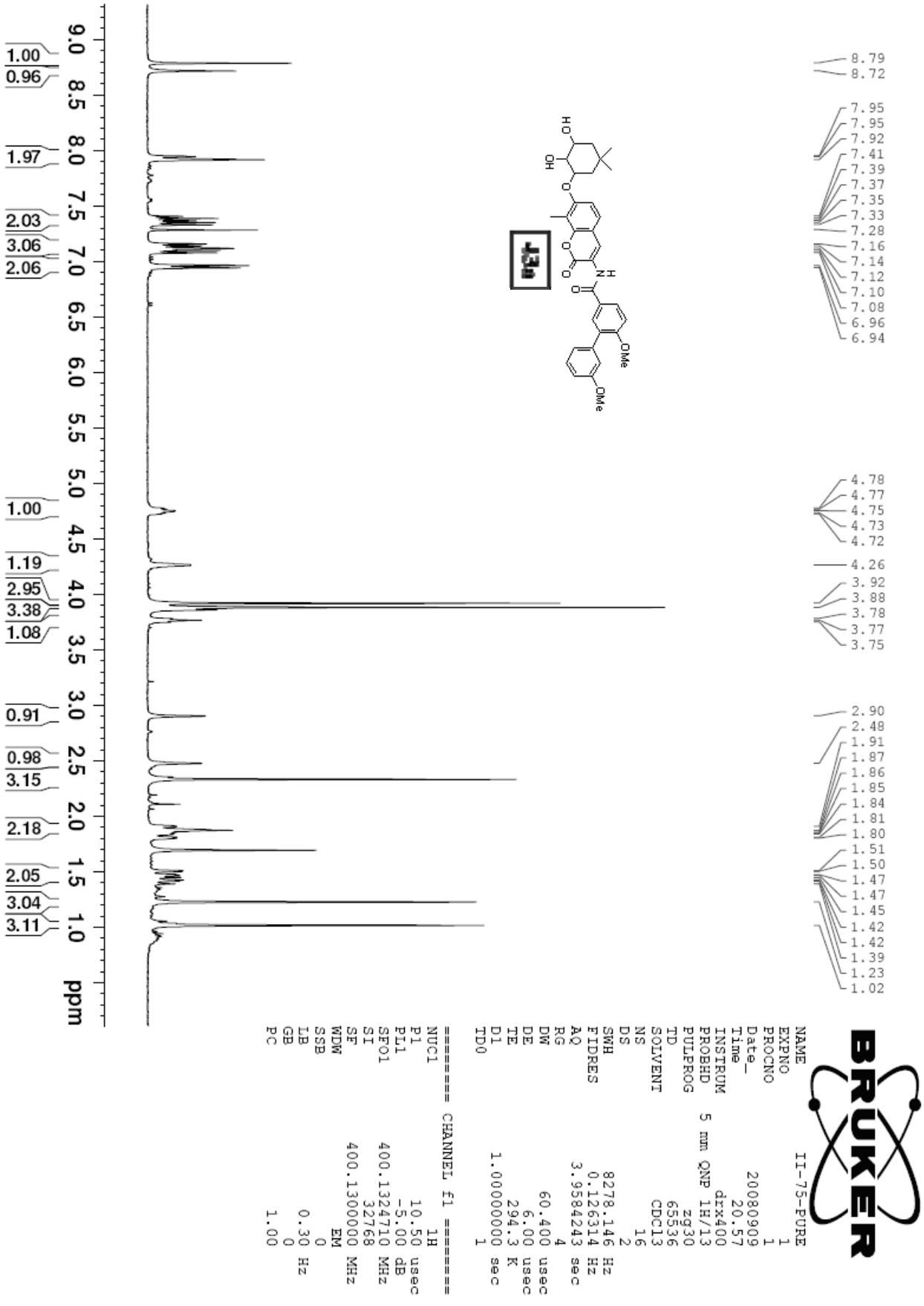

165.60
159.88
159.72
159.48
157.78
149.58
138.78
132.81
131.12
130.11
129.32
128.30
126.28
125.97
125.67
124.58
122.17
121.63
115.38
115.34
113.39
113.29
111.13
110.80
72.12
56.03
55.47
28.74
25.26
19.09
8.57
OMe
OMe
180
160
140
120
100
80
60
40
20
ppm
NAME II-67-dp-13CNMR
EXPNO 1
PROCNO 1
Date_ 20080908
Time 22.23
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 6502
DW 20.850 usec
DE 6.00 usec
TE 294.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127548 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

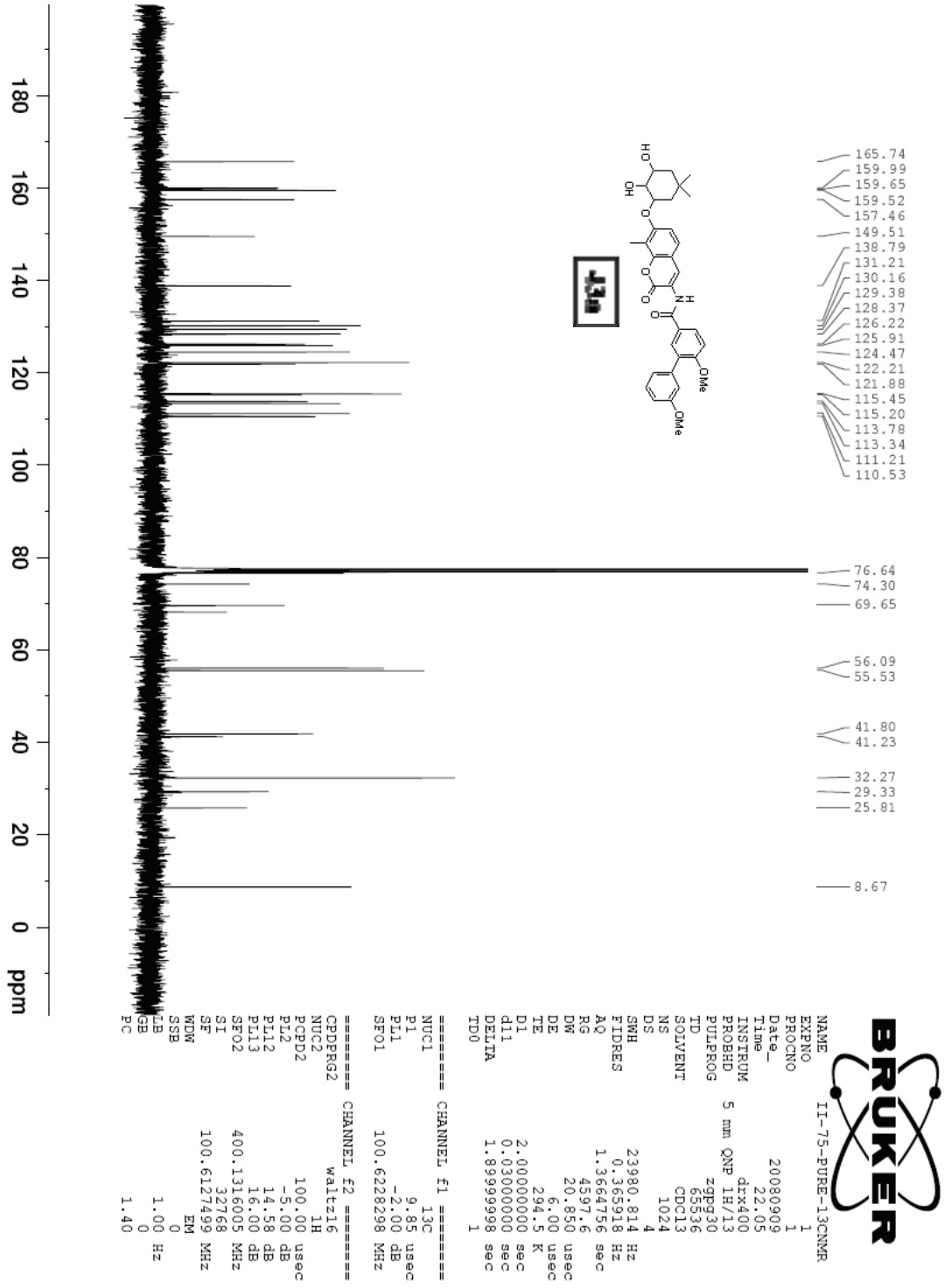

8.82
8.74
7.94
7.91
7.40
7.39
7.37
7.28
7.23
7.21
7.15
7.11
7.08
7.00
6.98
6.97
6.95
6.02
5.92
4.91
4.01
3.92
3.88
2.19
2.16
2.09
1.98
1.91
1.71
1.70
1.66
OMe
OMe
OMe
H
N
O
O
O
O
43b
2.00
2.02
1.00
1.02
3.12
2.20
2.04
1.02
9.51
1.18
1.21
3.18
2.48
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
BRUKER
NAME V-239-ac
EXPNO 1
PROCNO 1
Date_ 20090506
Time_ 13.10
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

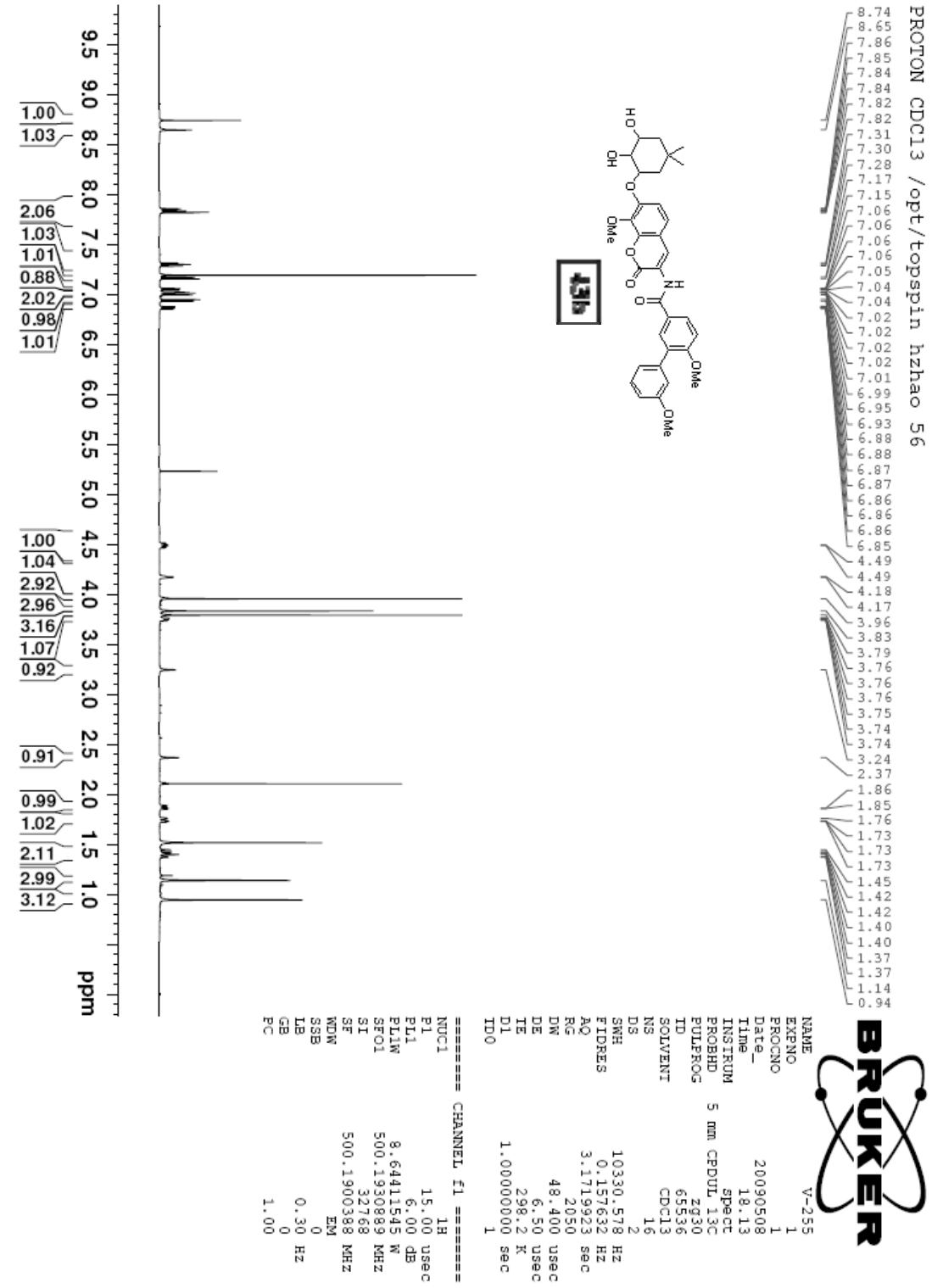

165.55
159.82
159.34
158.99
152.51
144.24
138.59
137.51
132.89
131.06
129.99
129.19
128.18
126.00
125.64
124.02
122.36
122.08
122.01
115.25
114.56
113.16
111.01
72.89
61.46
55.90
55.34
28.49
25.09
18.91
OMe
OMe
OMe
H
N
O
O
O
O
42b
180
160
140
120
100
80
60
40
20
ppm
BRUKER
V-239-13CNMR
NAME 1
EXPNO 1
PROCNO 1
Date_ 20090506
Time_ 13.27
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 304
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
========== CHANNEL f1 ==========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
========== CHANNEL f2 ==========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

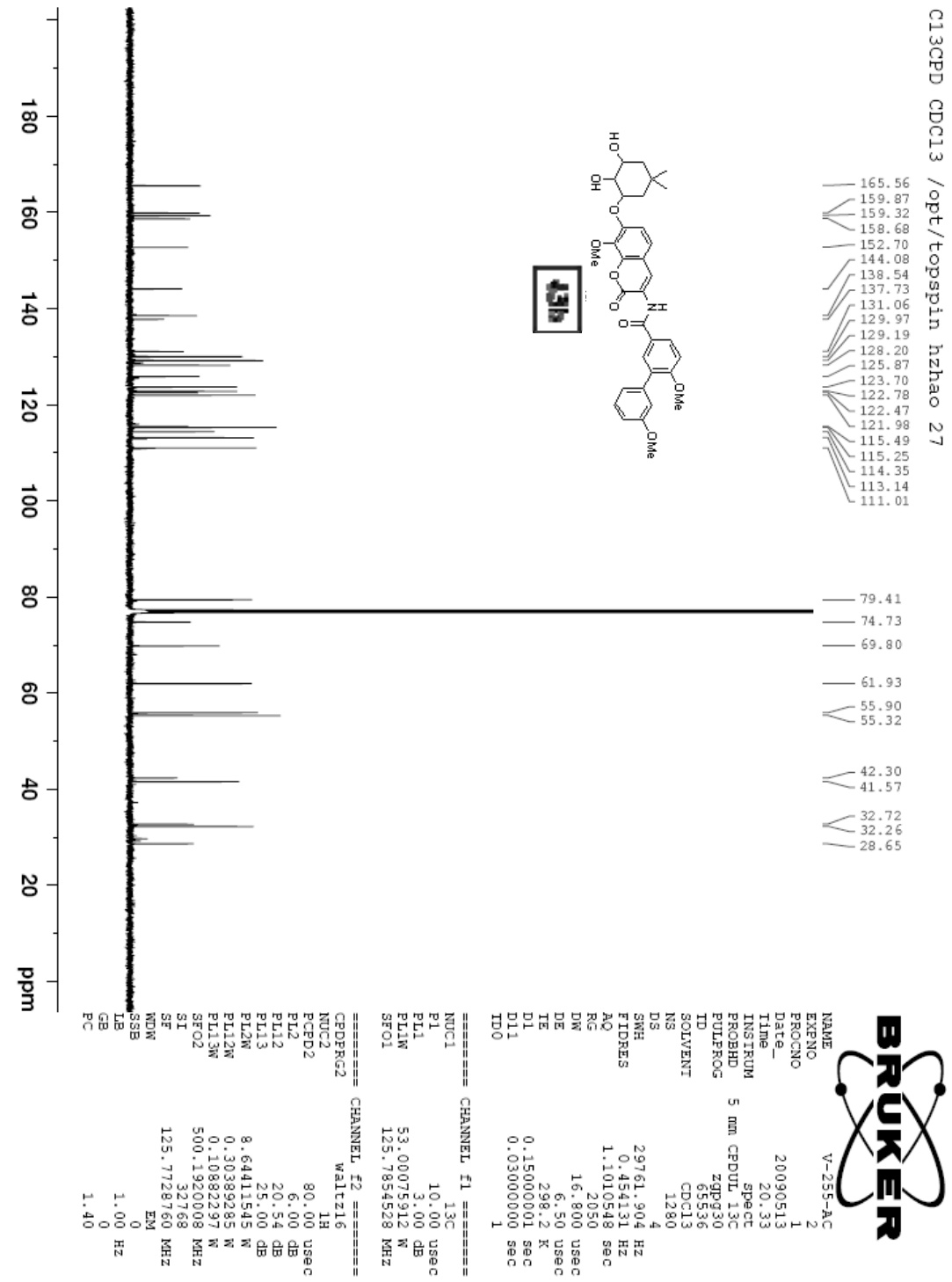

8.80
8.77
7.94
7.92
7.40
7.38
7.36
7.15
7.13
7.11
7.09
7.06
6.96
6.94
6.85
5.97
5.94
5.88
4.77
3.91
3.87
2.40
2.19
2.15
2.04
1.98
1.94
1.87
1.84
1.81
1.65
MeO
OMe
OMe
H
N
O
O
O
O
43c
2.00
2.03
1.00
3.03
1.01
1.04
2.03
0.99
9.45
3.23
2.22
5.04
1.07
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
BRUKER
NAME V-233
EXPNO 1
PROCNO 1
Date_ 20090505
Time_ 13.35
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
IDO 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

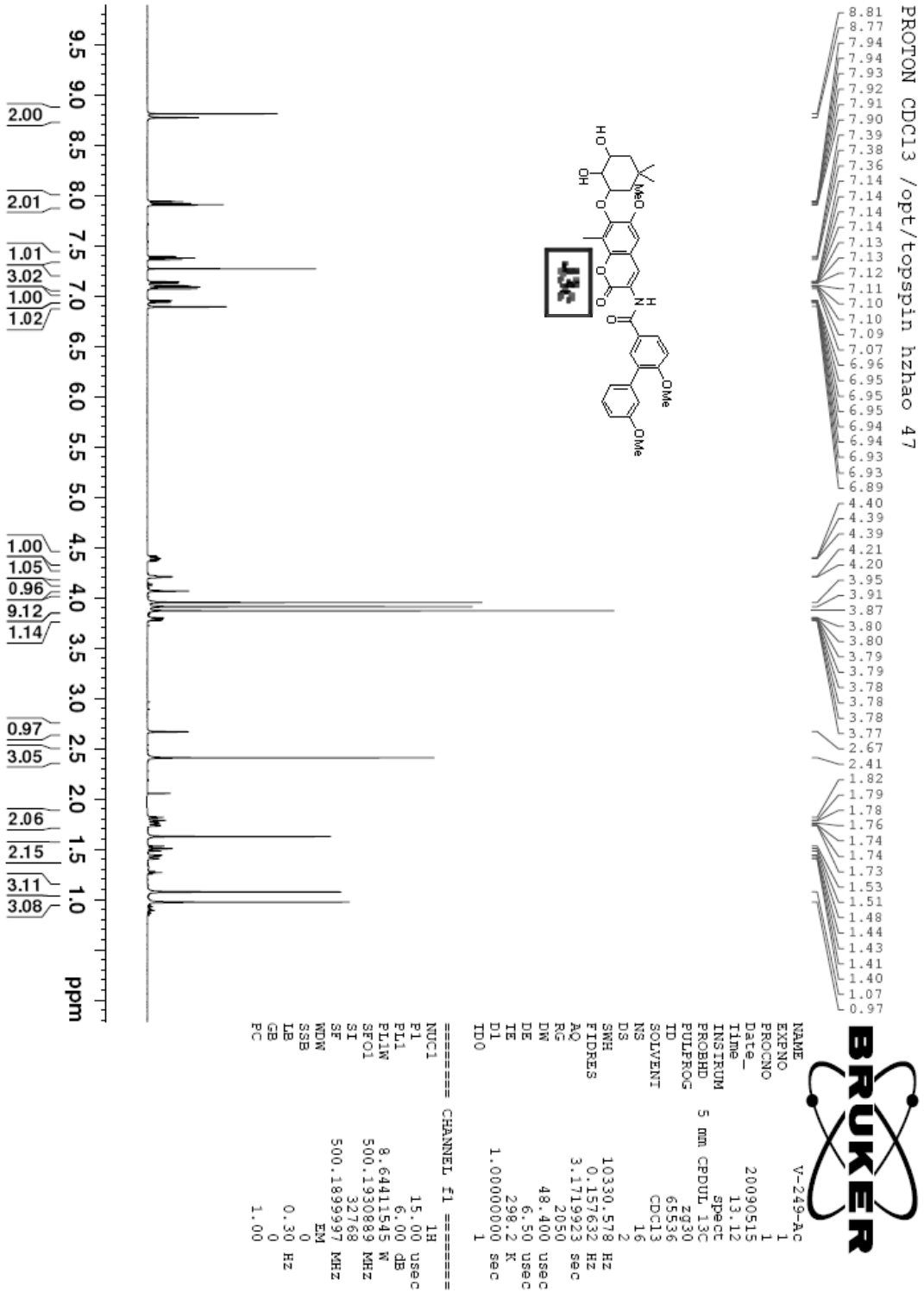

165.51
159.78
159.44
159.33
150.48
147.53
143.50
138.62
131.88
131.00
130.02
129.18
128.19
127.07
126.06
123.85
122.81
122.02
120.89
115.27
115.02
113.11
110.98
106.45
76.12
56.02
55.89
55.33
29.23
25.18
18.96
9.75
MeO
OMe
OMe
13C
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-233-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090505
Time 13.39
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 65
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.6 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

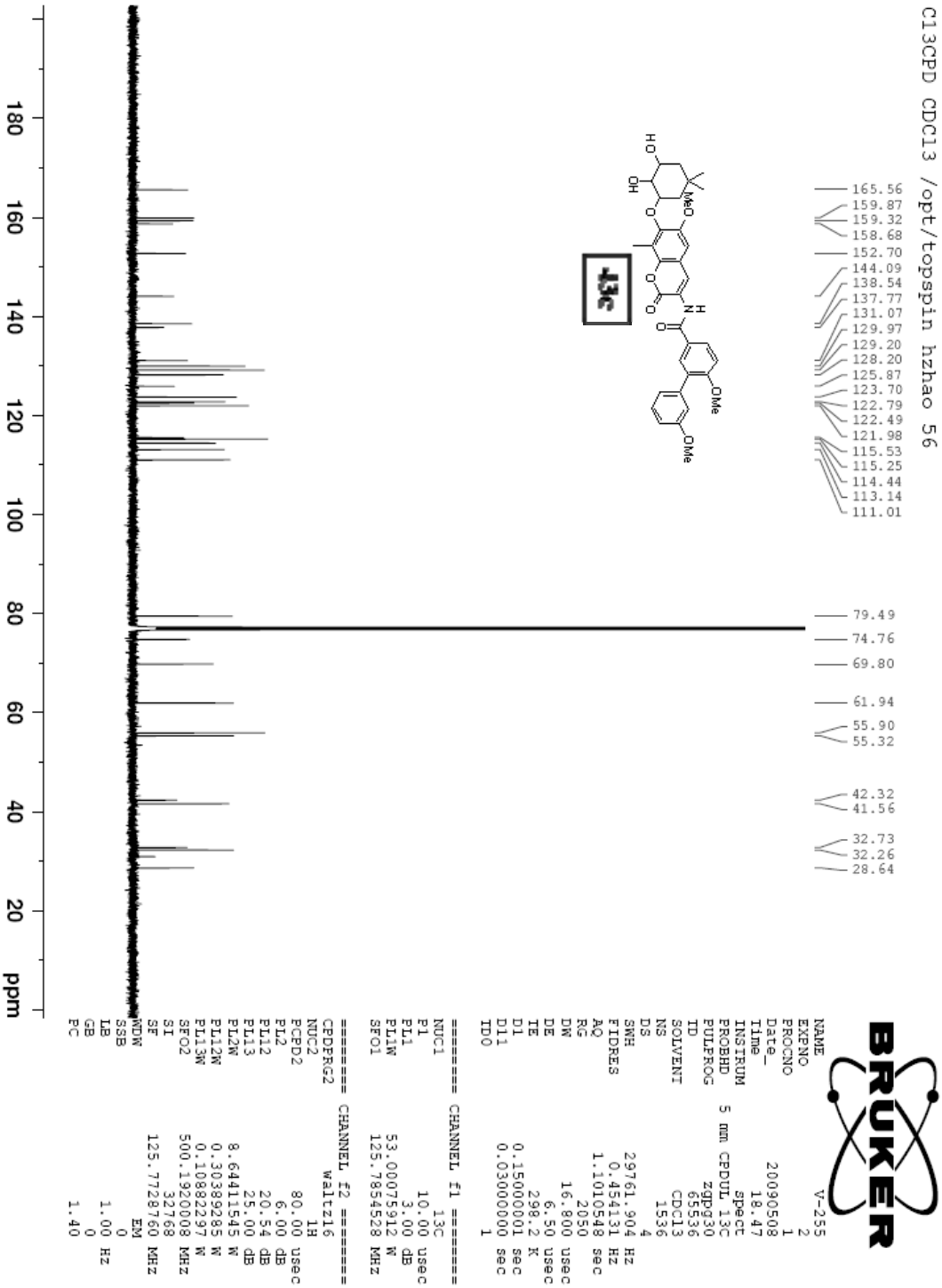

8.79
8.72
7.95
7.95
7.92
7.41
7.39
7.37
7.35
7.33
7.28
7.16
7.14
7.12
7.10
7.08
6.96
6.94
4.78
4.77
4.75
4.73
4.72
4.26
3.92
3.88
3.78
3.77
3.75
2.90
2.48
1.91
1.87
1.86
1.85
1.84
1.81
1.80
1.51
1.50
1.47
1.47
1.45
1.42
1.42
1.39
1.23
1.02
1.00
0.96
1.97
2.03
3.06
2.06
1.00
1.19
2.95
3.38
1.08
0.91
0.98
3.15
2.18
2.05
3.04
3.11
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
HO
OH
O
O
O
H
N
O
OMe
OMe
43m
BRUKER
NAME II-75-PURE
EXPNO 1
PROCNO 1
Date_ 20080909
Time 20.57
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

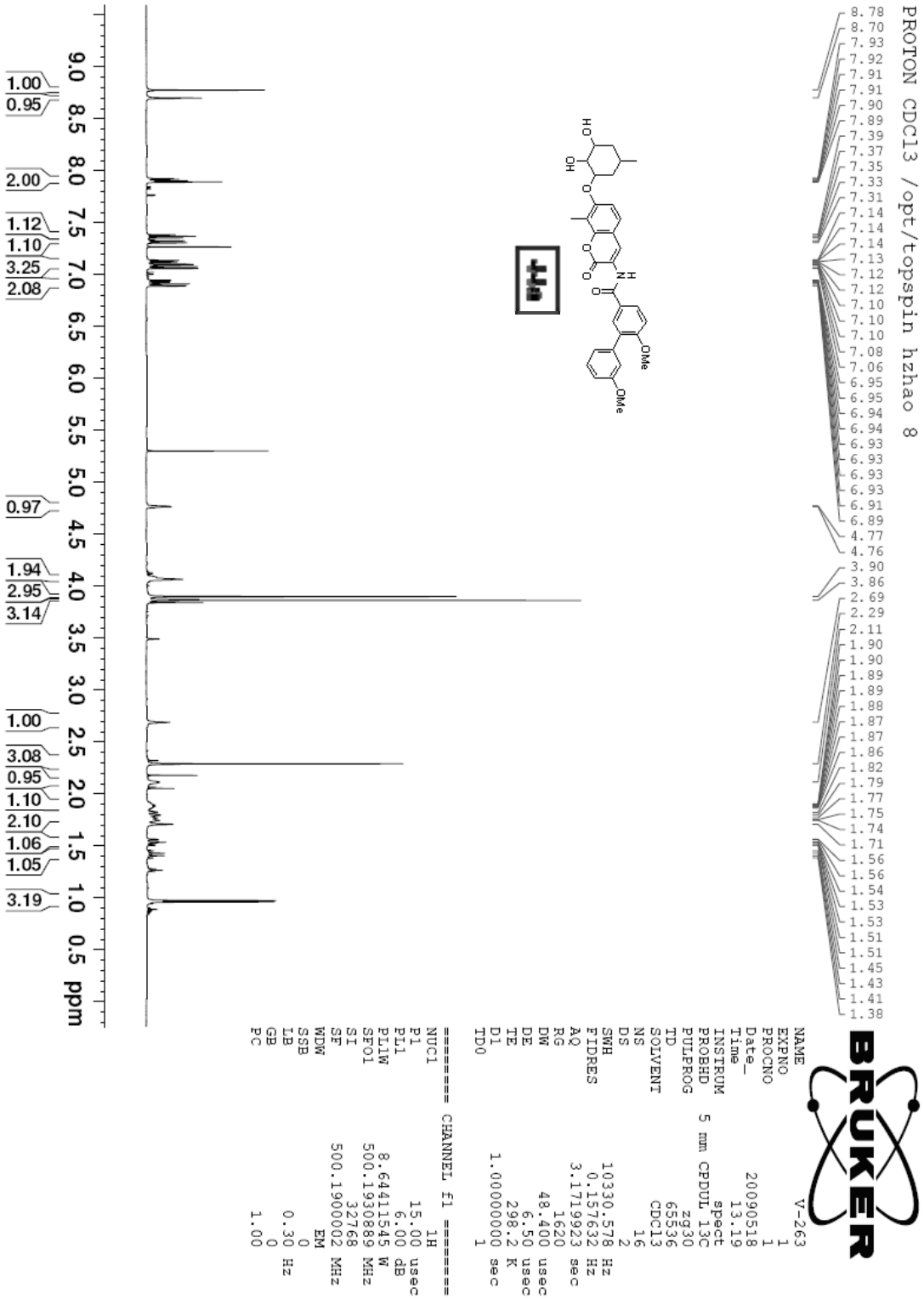

165.74
159.99
159.65
159.52
157.46
149.51
138.79
131.21
130.16
129.38
128.37
126.22
125.91
124.47
122.21
121.88
115.45
115.20
113.78
113.34
111.21
110.53
76.64
74.30
69.65
56.09
55.53
41.80
41.23
32.27
29.33
25.81
8.67
OMe
OMe
J3n
BRUKER
NAME II-75-PURE-13CNMR
EXPNO 1
PROCNO 1
Date_ 20080909
Time 22.05
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 4597.6
DW 20.850 usec
DE 6.00 usec
TE 294.5 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127499 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
0
ppm

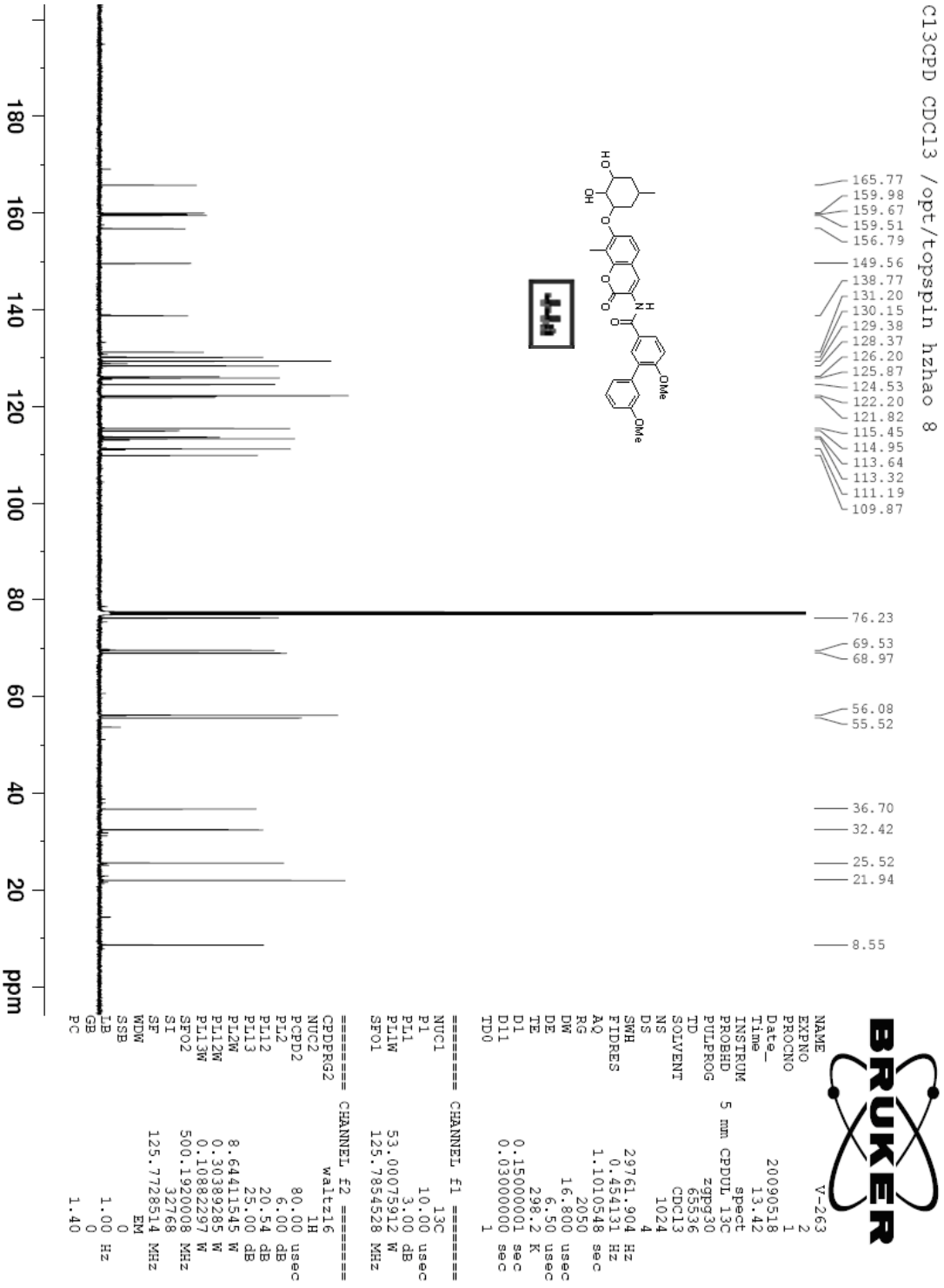

PROTON CDC13 /opt/topspin hzhao 56
8.74 8.65 7.86 7.85 7.84 7.84 7.82 7.82 7.31 7.30 7.28 7.17 7.15 7.06 7.06 7.06 7.06 7.05 7.04 7.04 7.02 7.02 7.02 7.02 7.01 6.99 6.95 6.93 6.88 6.88 6.87 6.87 6.86 6.86 6.86 6.85 4.49 4.49 4.18 4.17 3.96 3.83 3.79 3.76 3.76 3.76 3.75 3.74 3.74 3.24 2.37 1.86 1.85 1.76 1.73 1.73 1.73 1.45 1.42 1.42 1.40 1.40 1.37 1.37 1.14 0.94
43b
OMe
OMe
HO
OH
NAME V-255
EXPNO 1
PROCNO 1
Date_ 20090508
Time_ 18.13
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900388 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.00 1.03 2.06 1.03 1.01 0.88 2.02 0.98 1.01 1.00 1.04 2.92 2.96 3.16 1.07 0.92 0.91 0.99 1.02 2.11 2.99 3.12
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm

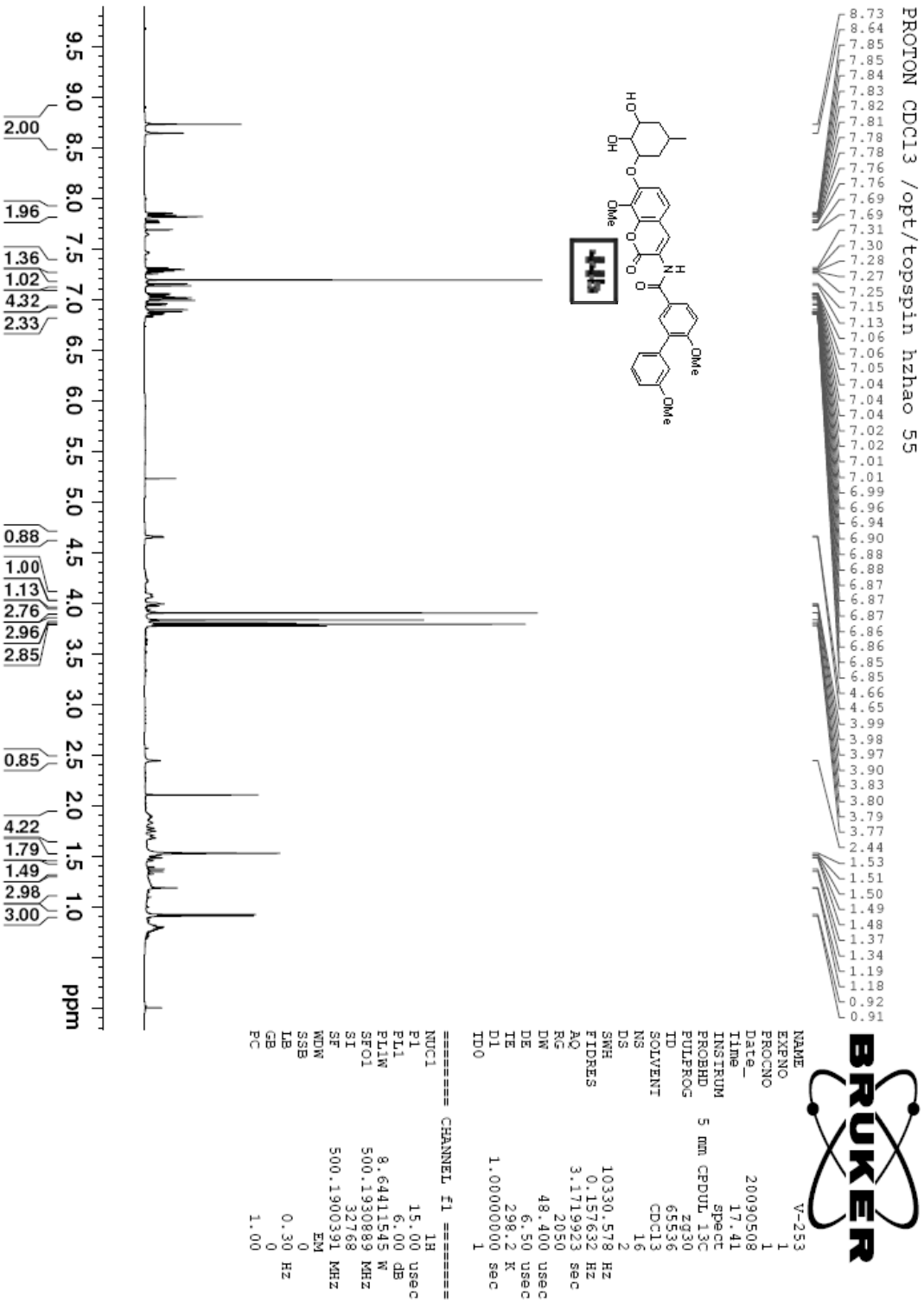

C13CPD CDC13 /opt/topspin hzhao 27
165.56
159.87
159.32
158.68
152.70
144.08
138.54
137.73
131.06
129.97
129.19
128.20
125.87
123.70
122.78
122.47
121.98
115.49
115.25
114.35
113.14
111.01
79.41
74.73
69.80
61.93
55.90
55.32
42.30
41.57
32.72
32.26
28.65
OMe
OMe
OMe
OH
HO
4b
BRUKER
NAME V-255-AC
EXPNO 2
PROCNO 1
Date_ 20090513
Time 20.33
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1280
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

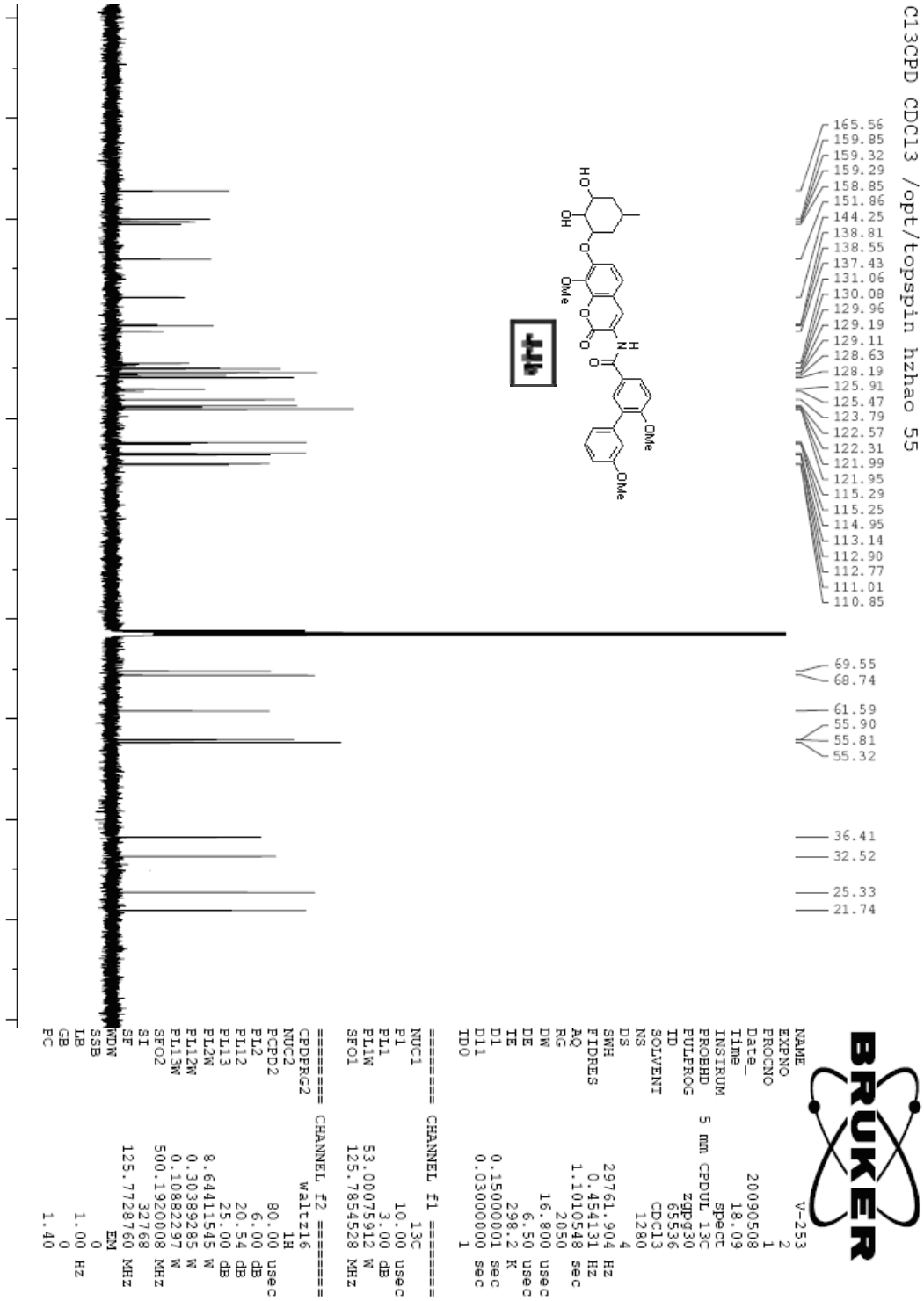

PROTON CDCl3 /opt/topspin hzhao 47
8.81
8.77
7.94
7.94
7.93
7.92
7.91
7.90
7.39
7.38
7.36
7.14
7.14
7.14
7.14
7.14
7.13
7.13
7.12
7.11
7.10
7.10
7.09
7.07
6.96
6.95
6.95
6.95
6.94
6.94
6.93
6.93
6.89
4.40
4.39
4.39
4.21
4.20
3.95
3.91
3.87
3.80
3.80
3.79
3.79
3.78
3.78
3.78
3.77
2.67
2.41
1.82
1.79
1.78
1.76
1.74
1.74
1.73
1.53
1.51
1.48
1.44
1.43
1.41
1.40
1.07
0.97
HO
OH
MeO
O
O
O
H
N
O
OMe
OMe
NAME V-249-Ac
EXPNO 1
PROCNO 1
Date_ 20090515
Time_ 13.12
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899997 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.00
2.01
1.01
3.02
1.00
1.02
1.00
1.05
0.96
9.12
1.14
0.97
3.05
2.06
2.15
3.11
3.08
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm

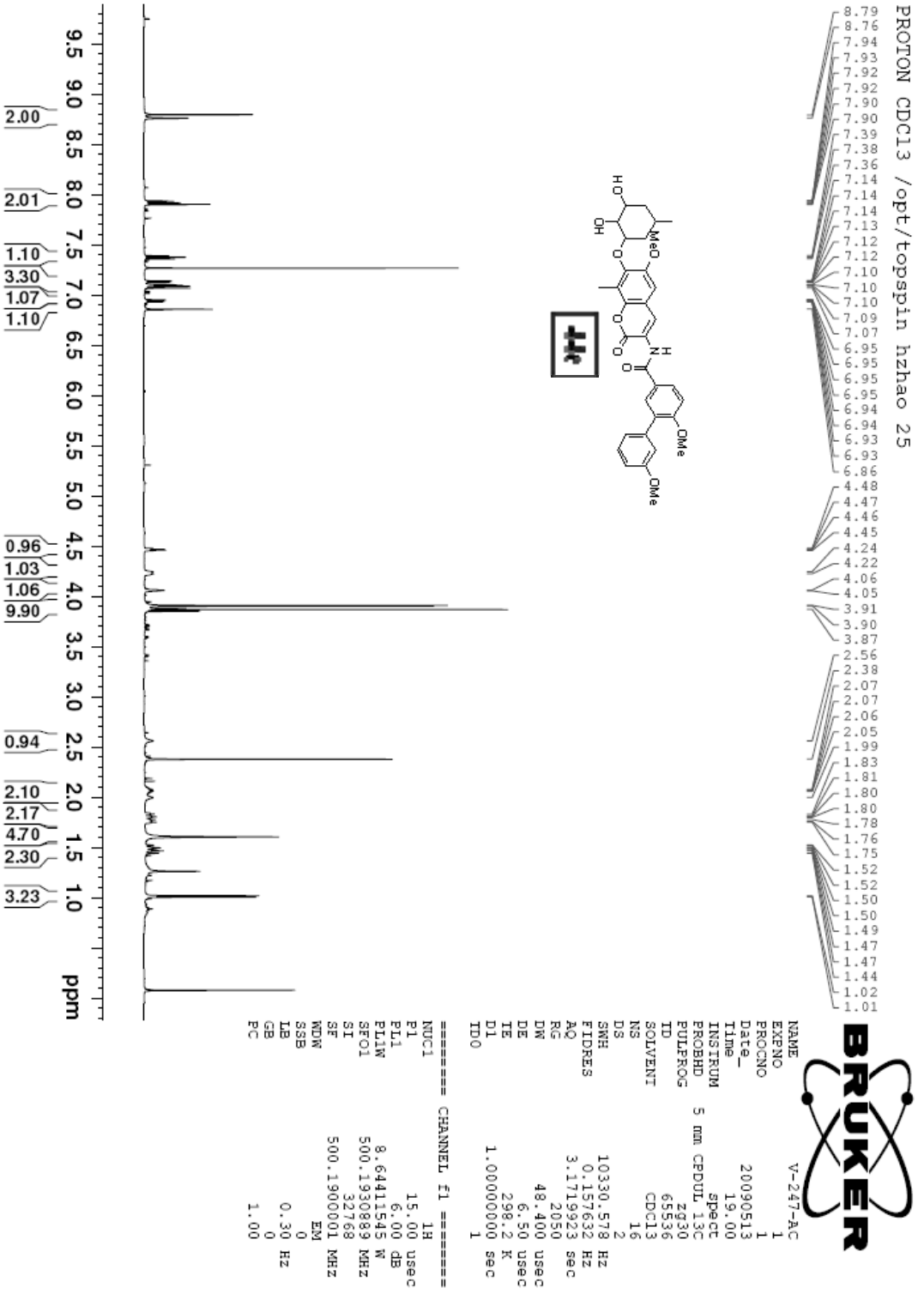

C13CPD CDCl3 /opt/topspin hzhao 56
165.56
159.87
159.32
158.68
152.70
144.09
138.54
137.77
131.07
129.97
129.20
128.20
125.87
123.70
122.79
122.49
121.98
115.53
115.25
114.44
113.14
111.01
79.49
74.76
69.80
61.94
55.90
55.32
42.32
41.56
32.73
32.26
28.64
HO
OH
MeO
O
O
O
O
H
N
O
OMe
OMe
13C
BRUKER
NAME V-255
EXPNO 2
PROCNO 1
Date_ 20090508
Time 18.47
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1536
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

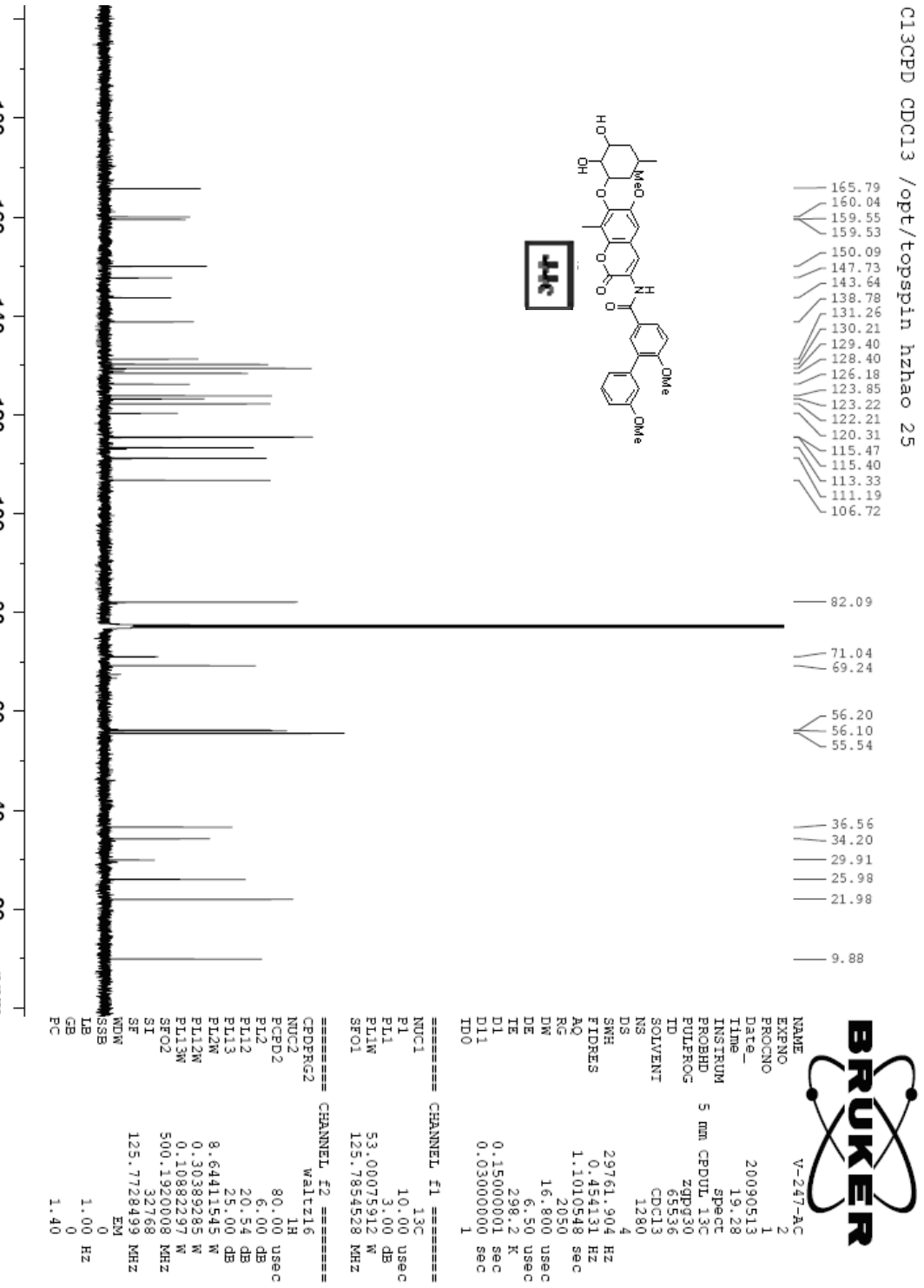

PROTON CDCl3 /opt/topspin hzhao 8
8.78
8.70
7.93
7.92
7.91
7.91
7.90
7.89
7.39
7.37
7.35
7.33
7.31
7.14
7.14
7.14
7.13
7.12
7.12
7.10
7.10
7.10
7.08
7.06
6.95
6.95
6.94
6.94
6.93
6.93
6.93
6.93
6.91
6.89
4.77
4.76
3.90
3.86
2.69
2.29
2.11
1.90
1.90
1.89
1.89
1.88
1.87
1.87
1.87
1.86
1.82
1.79
1.77
1.75
1.74
1.71
1.56
1.56
1.54
1.53
1.53
1.51
1.51
1.45
1.43
1.41
1.38
HO
OH
O
O
O
H
N
O
OMe
OMe
BRUKER
NAME V-263
EXPNO 1
PROCNO 1
Date_ 20090518
Time 13.19
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900002 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
0.95
2.00
1.12
1.10
3.25
2.08
0.97
1.94
2.95
3.14
1.00
3.08
0.95
1.10
2.10
1.06
1.05
3.19

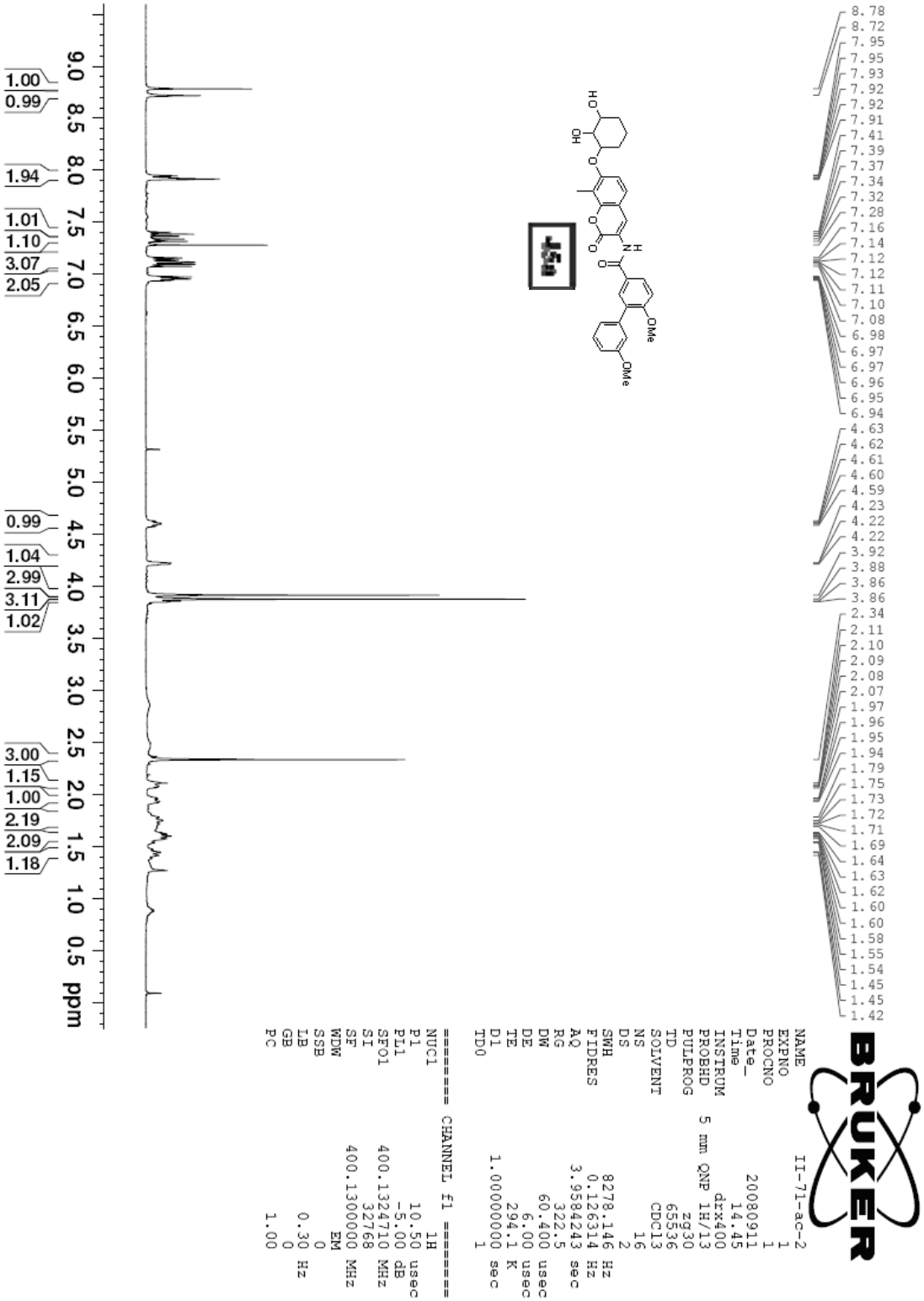

C13CPD CDCl3 /opt/topspin hzhao 8
165.77
159.98
159.67
159.51
156.79
149.56
138.77
131.20
130.15
129.38
128.37
126.20
125.87
124.53
122.20
121.82
115.45
114.95
113.64
113.32
111.19
109.87
76.23
69.53
68.97
56.08
55.52
36.70
32.42
25.52
21.94
8.55
HO
OH
OMe
OMe
ppm
180
160
140
120
100
80
60
40
20
BRUKER
NAME V-263
EXPNO 2
PROCNO 1
Date_ 20090518
Time_ 13.42
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728514 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

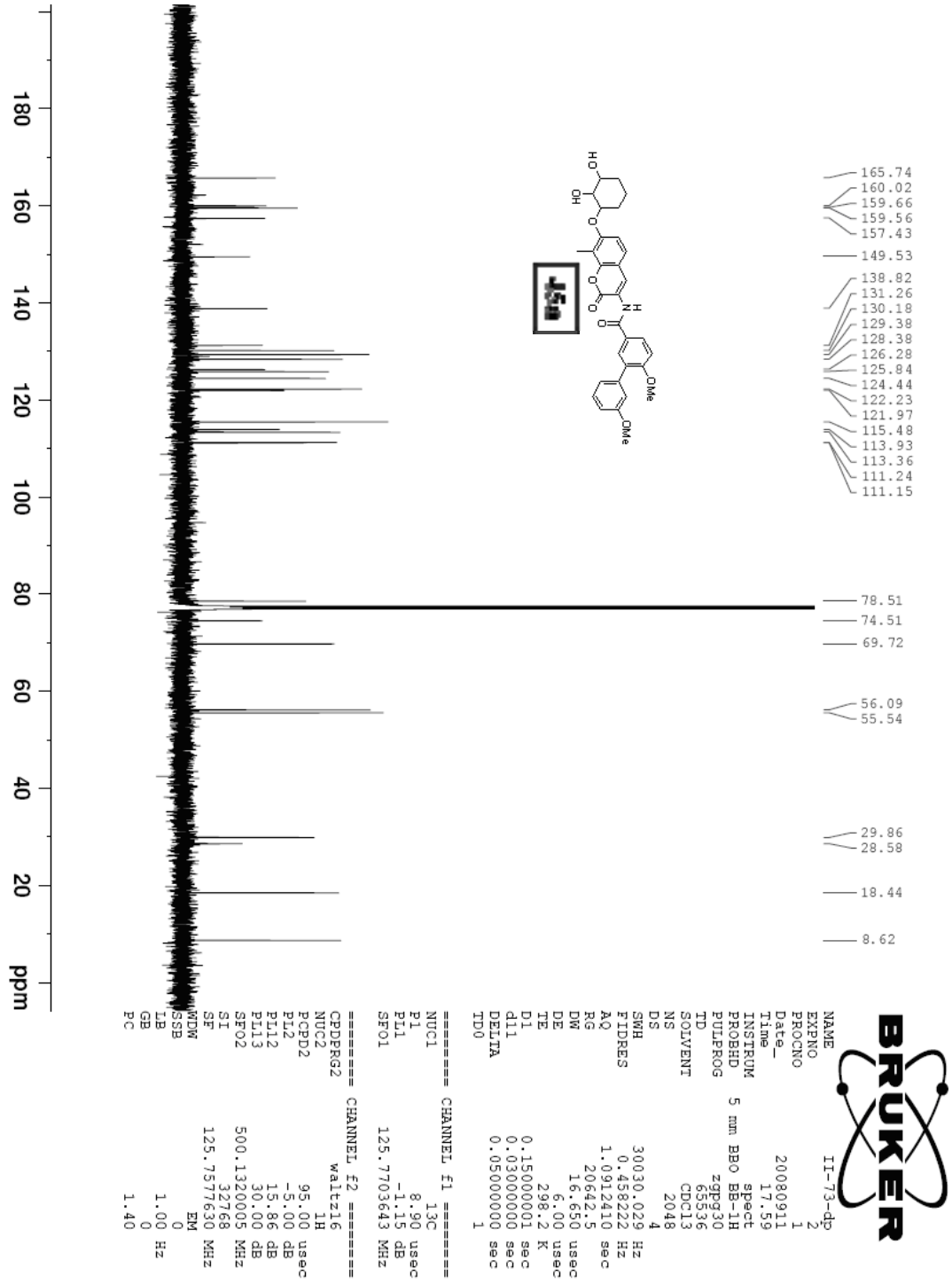

PROTON CDCl3 /opt/topspin hzhao 55
8.73
8.64
7.85
7.85
7.84
7.83
7.82
7.81
7.78
7.78
7.76
7.76
7.69
7.69
7.31
7.30
7.28
7.27
7.25
7.15
7.13
7.06
7.06
7.05
7.04
7.04
7.04
7.02
7.02
7.01
7.01
6.99
6.96
6.94
6.90
6.88
6.88
6.87
6.87
6.87
6.86
6.86
6.85
6.85
4.66
4.65
3.99
3.98
3.97
3.90
3.83
3.80
3.79
3.77
2.44
1.53
1.51
1.50
1.49
1.48
1.37
1.34
1.19
1.18
0.92
0.91
HO
OH
O
OMe
O
O
H
N
O
OMe
OMe
NAME V-253
EXPNO 1
PROCNO 1
Date_ 20090508
Time 17.41
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900391 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.00
1.96
1.36
1.02
4.32
2.33
0.88
1.00
1.13
2.76
2.96
2.85
0.85
4.22
1.79
1.49
2.98
3.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm

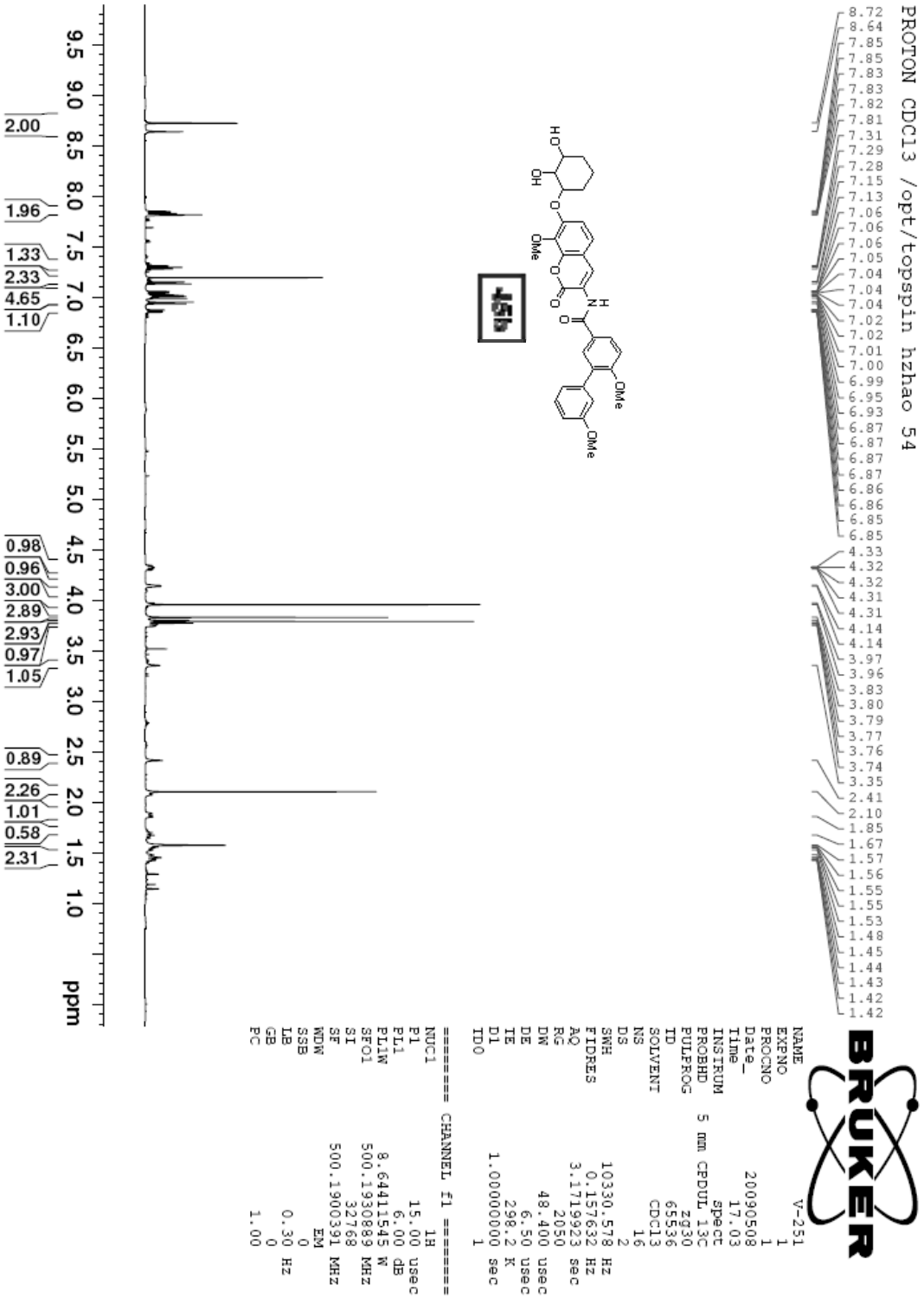

C13CPD CDCl3 /opt/topspin hzhao 55
165.56
159.85
159.32
159.29
158.85
151.86
144.25
138.81
138.55
137.43
131.06
130.08
129.96
129.19
129.11
128.63
128.19
125.91
125.47
123.79
122.57
122.31
121.99
121.95
115.29
115.25
114.95
113.14
112.90
112.77
111.01
110.85
69.55
68.74
61.59
55.90
55.81
55.32
36.41
32.52
25.33
21.74
OMe
OMe
OMe
OH
HO
NAME V-253
EXPNO 2
PROCNO 1
Date_ 20090508
Time 18.09
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1280
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

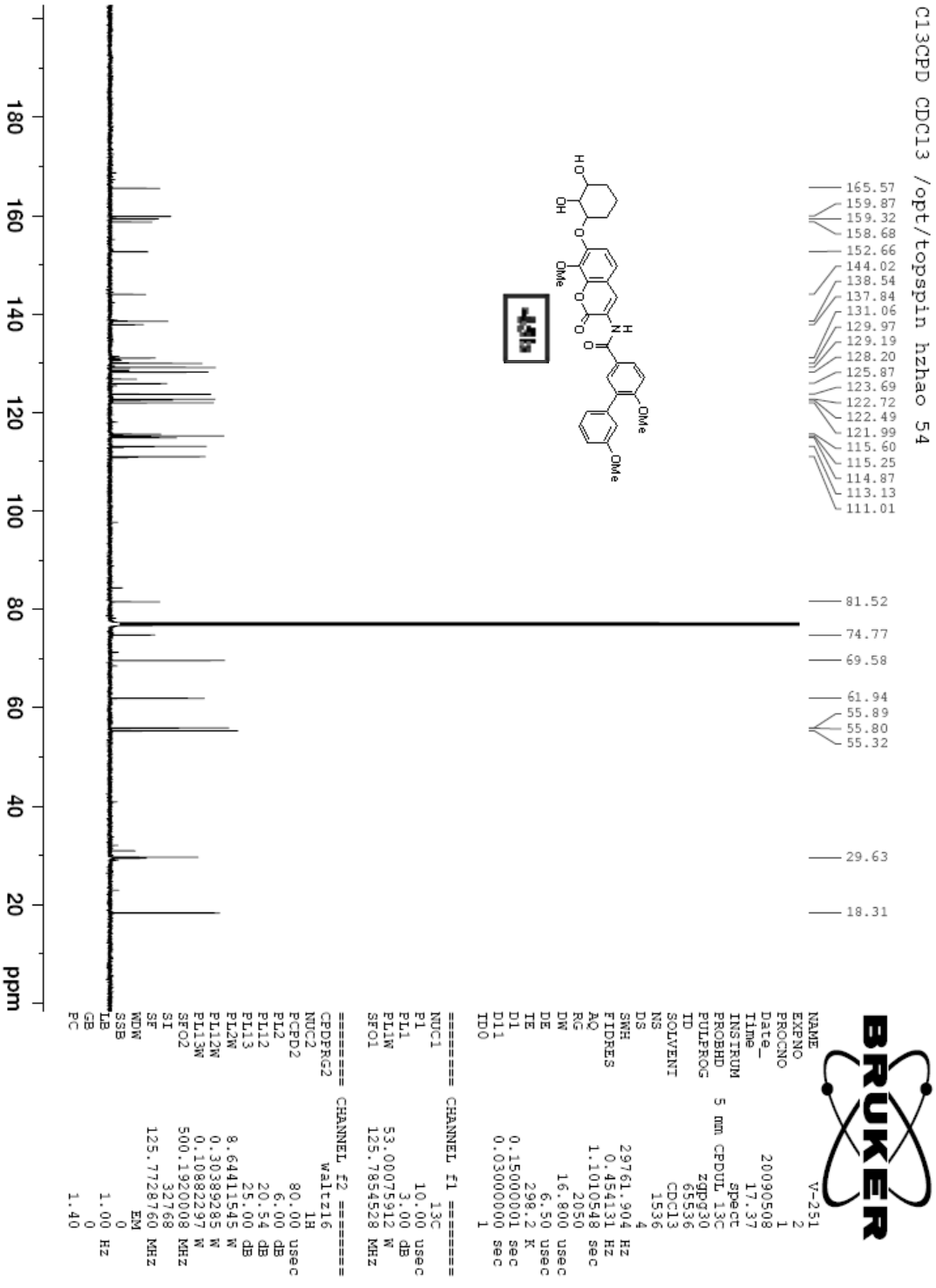

PROTON CDCl3 /opt/topspin hzhao 25
8.79 8.76 7.94 7.93 7.92 7.92 7.90 7.90 7.39 7.38 7.36 7.14 7.14 7.14 7.13 7.12 7.12 7.10 7.10 7.10 7.09 7.07 6.95 6.95 6.95 6.95 6.94 6.94 6.93 6.93 6.86
4.48 4.47 4.46 4.45 4.24 4.22 4.06 4.05 3.91 3.90 3.87
2.56 2.38 2.07 2.07 2.06 2.05 1.99 1.83 1.81 1.80 1.80 1.78 1.76 1.75 1.52 1.52 1.50 1.50 1.49 1.47 1.47 1.44 1.02 1.01
HO
OH
MeO
O
O
O
O
H
N
O
OMe
OMe
NAME V-247-AC
EXPNO 1
PROCNO 1
Date_ 20090513
Time 19.00
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900001 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
2.00
2.01
1.10
3.30
1.07
1.10
0.96
1.03
1.06
9.90
0.94
2.10
2.17
4.70
2.30
3.23

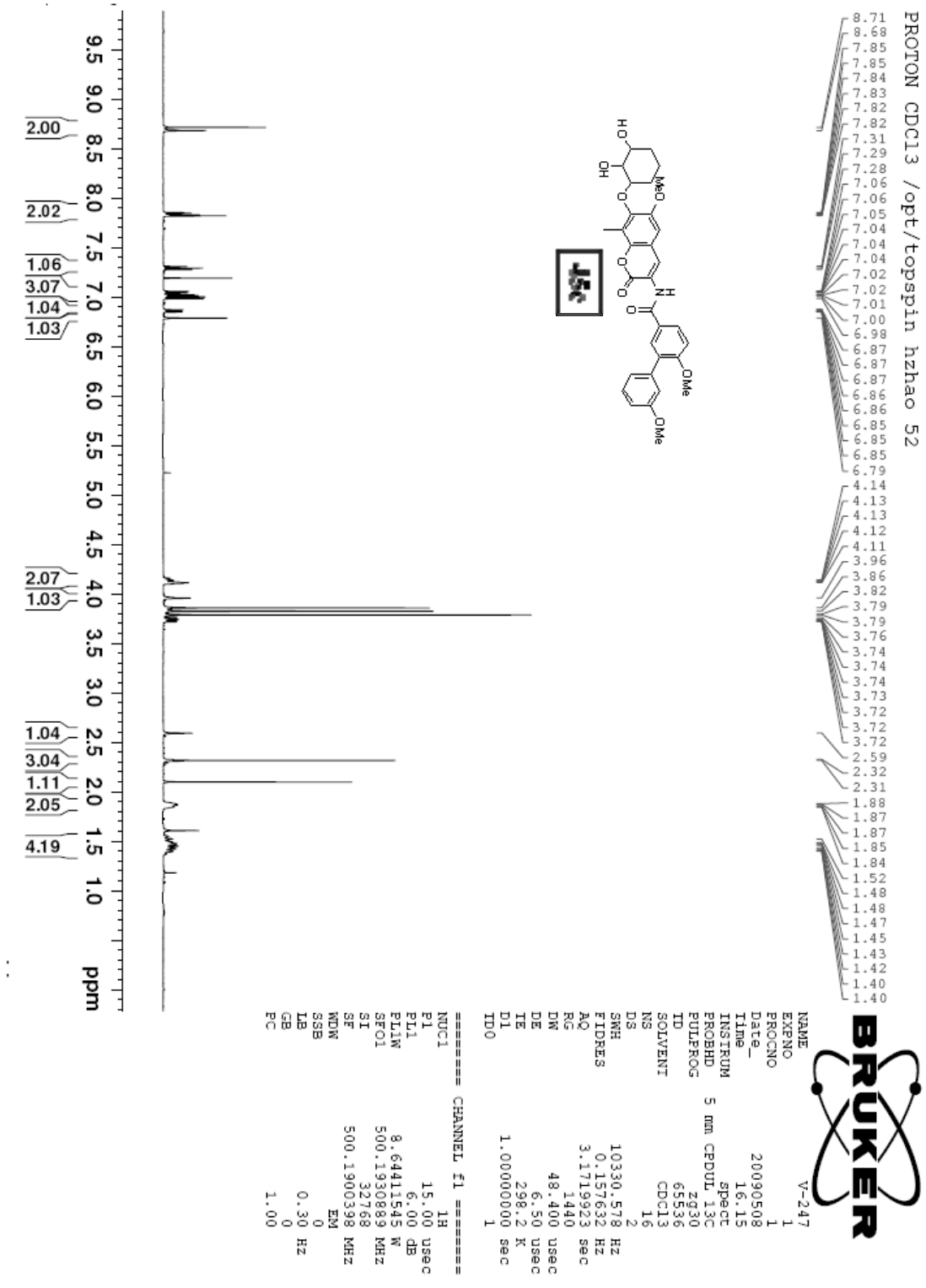

C13CPD CDCl3 /opt/topspin hzhao 25
165.79
160.04
159.55
159.53
150.09
147.73
143.64
138.78
131.26
130.21
129.40
128.40
126.18
123.85
123.22
122.21
120.31
115.47
115.40
113.33
111.19
106.72
82.09
71.04
69.24
56.20
56.10
55.54
36.56
34.20
29.91
25.98
21.98
9.88
HO
OH
MeO
O
O
O
H
N
O
OMe
OMe
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-247-AC
EXPNO 2
PROCNO 1
Date_ 20090513
Time 19.28
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1280
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728499 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

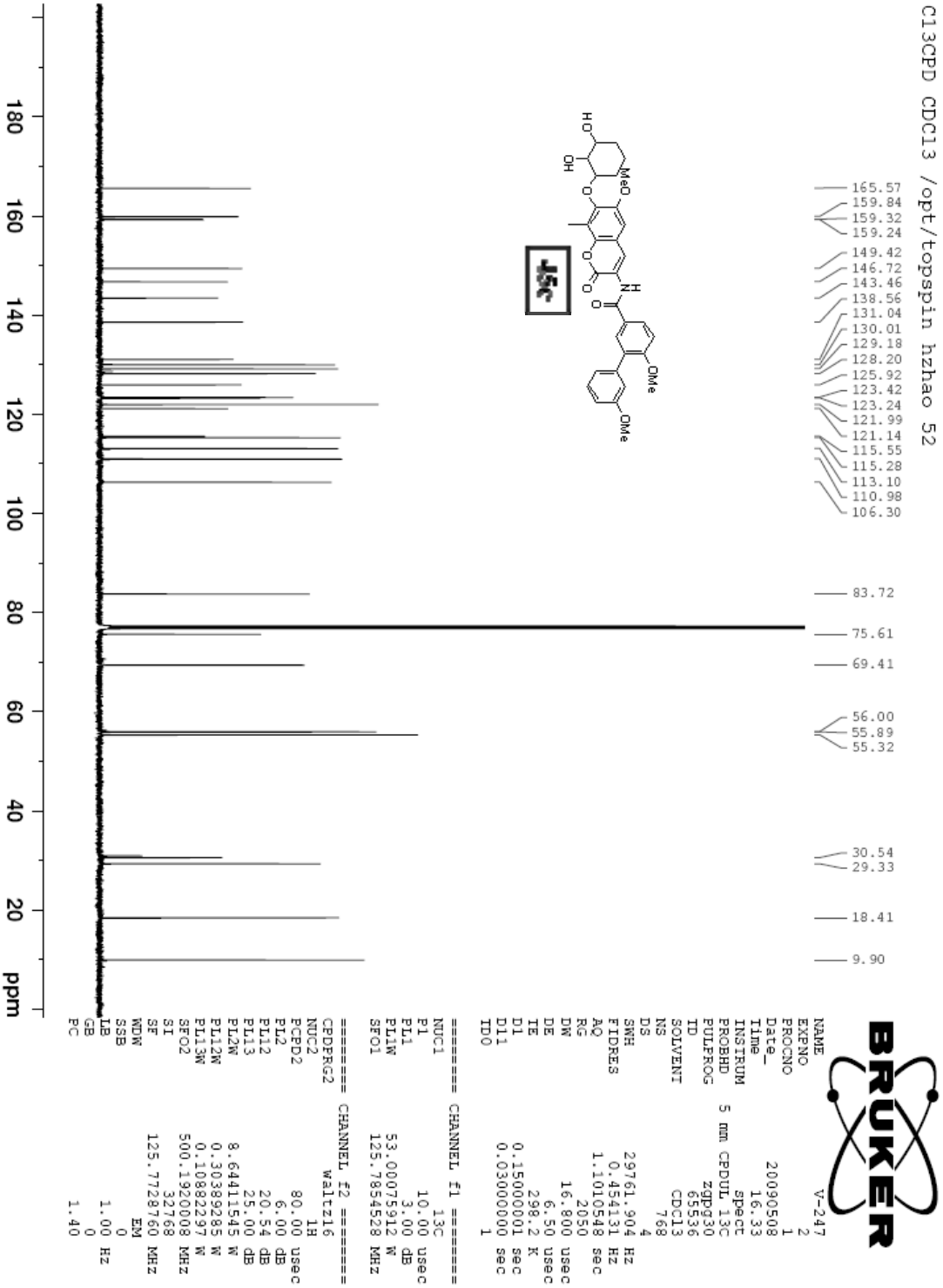

8.78
8.72
7.95
7.95
7.93
7.92
7.92
7.91
7.41
7.39
7.37
7.34
7.32
7.28
7.16
7.14
7.12
7.12
7.11
7.10
7.08
6.98
6.97
6.97
6.96
6.95
6.94
4.63
4.62
4.61
4.60
4.59
4.23
4.22
4.22
3.92
3.88
3.86
3.86
2.34
2.11
2.10
2.09
2.08
2.07
1.97
1.96
1.95
1.94
1.79
1.75
1.73
1.72
1.71
1.69
1.64
1.63
1.62
1.60
1.60
1.58
1.55
1.54
1.45
1.45
1.42
HO
OH
O
O
O
H
N
O
OMe
OMe
J5a
NAME II-71-ac-2
EXPNO 1
PROCNO 1
Date_ 20080911
Time 14.45
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.00 usec
TE 294.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
0.99
1.94
1.01
1.10
3.07
2.05
0.99
1.04
2.99
3.11
1.02
3.00
1.15
1.00
2.19
2.09
1.18


165.74
160.02
159.66
159.56
157.43
149.53
138.82
131.26
130.18
129.38
128.38
126.28
125.84
124.44
122.23
121.97
115.48
113.93
113.36
111.24
111.15
78.51
74.51
69.72
56.09
55.54
29.86
28.58
18.44
8.62
ppm
180
160
140
120
100
80
60
40
20
OMe
OMe
J5n
BRUKER
NAME II-73-dp
EXPNO 2
PROCNO 1
Date_ 20080911
Time 17.59
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 20642.5
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577630 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40


PROTON CDC13 /opt/topspin hzhao 54
45b
ppm
2.00
1.96
1.33
2.33
4.65
1.10
0.98
0.96
3.00
2.89
2.93
0.97
1.05
0.89
2.26
1.01
0.58
2.31
NAME V-251
EXPNO 1
PROCNO 1
Date_ 20090508
Time 17.03
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900391 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


C13CPD CDCl3 /opt/topspin hzhao 54
165.57
159.87
159.32
158.68
152.66
144.02
138.54
137.84
131.06
129.97
129.19
128.20
125.87
123.69
122.72
122.49
121.99
115.60
115.25
114.87
113.13
111.01
81.52
74.77
69.58
61.94
55.89
55.80
55.32
29.63
18.31
OMe
OMe
OMe
OH
HO
H
N
O
O
O
O
-45b
BRUKER
NAME V-251
EXPNO 2
PROCNO 1
Date_ 20090508
Time 17.37
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1536
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm


PROTON CDC13 /opt/topspin hzhao 52
8.71
8.68
7.85
7.85
7.84
7.83
7.82
7.82
7.31
7.29
7.28
7.06
7.06
7.05
7.04
7.04
7.04
7.02
7.02
7.01
7.00
6.98
6.87
6.87
6.87
6.86
6.86
6.85
6.85
6.85
6.79
4.14
4.13
4.13
4.12
4.11
3.96
3.86
3.82
3.79
3.79
3.76
3.74
3.74
3.74
3.73
3.72
3.72
3.72
3.72
2.59
2.32
2.31
1.88
1.87
1.87
1.85
1.84
1.52
1.48
1.48
1.48
1.47
1.45
1.43
1.42
1.40
1.40
HO
OH
MeO
O
O
O
H
N
O
OMe
OMe
15c
BRUKER
NAME V-247
EXPNO 1
PROCNO 1
Date_ 20090508
Time 16.15
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1440
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900398 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.00
2.02
1.06
3.07
1.04
1.03
2.07
1.03
1.04
3.04
1.11
2.05
4.19
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm


C13CPD CDC13 /opt/topspin hzhao 52
165.57
159.84
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159.24
149.42
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143.46
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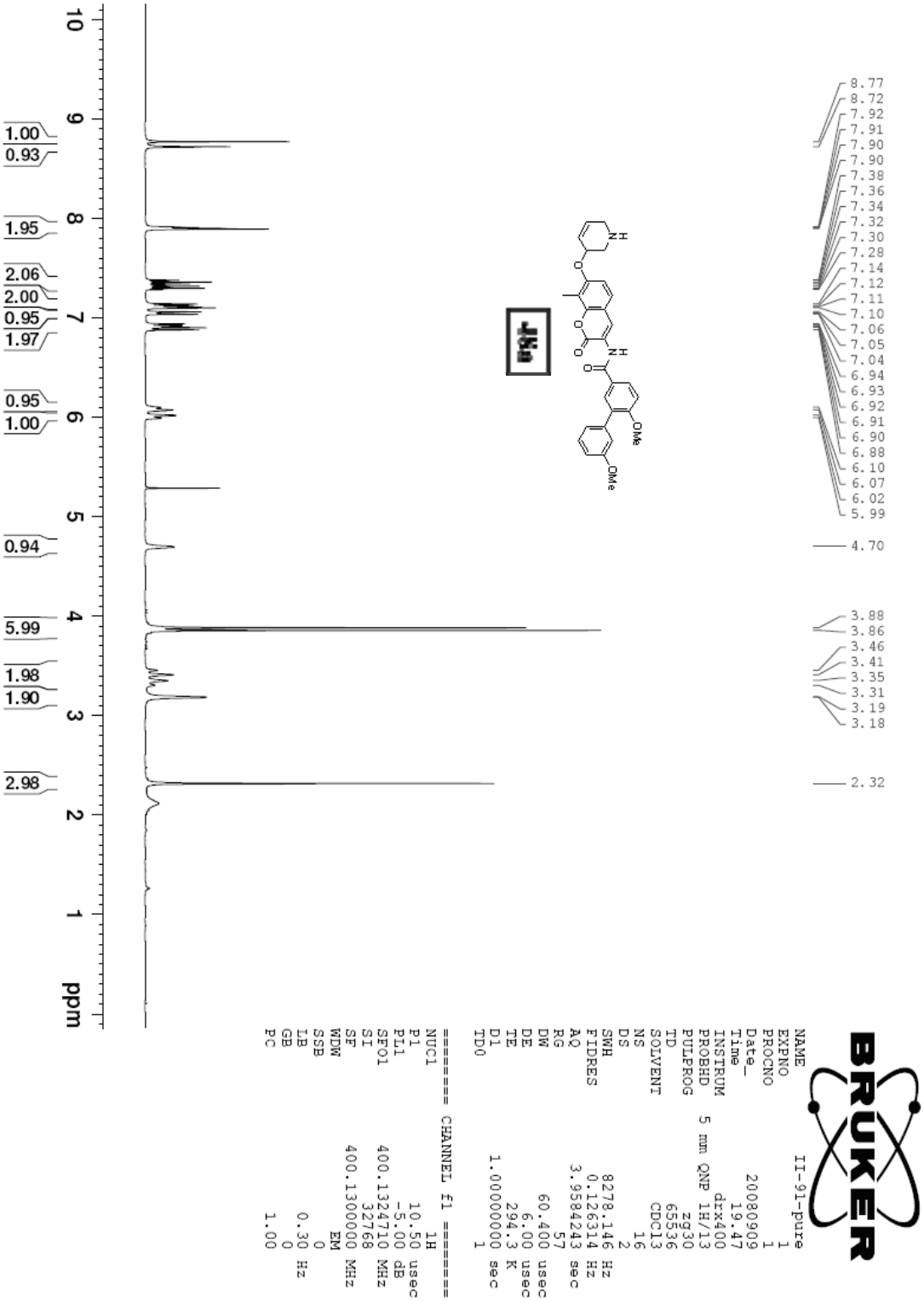
131.04
130.01
129.18
128.20
125.92
123.42
123.24
121.99
121.14
115.55
115.28
113.10
110.98
106.30
83.72
75.61
69.41
56.00
55.89
55.32
30.54
29.33
18.41
9.90
ppm
180
160
140
120
100
80
60
40
20
NAME V-247
EXPNO 2
PROCNO 1
Date_ 20090508
Time 16.33
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.78545528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.19200008 MHz
SI 32768
SF 125.77287760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40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8.72
7.92
7.91
7.90
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7.36
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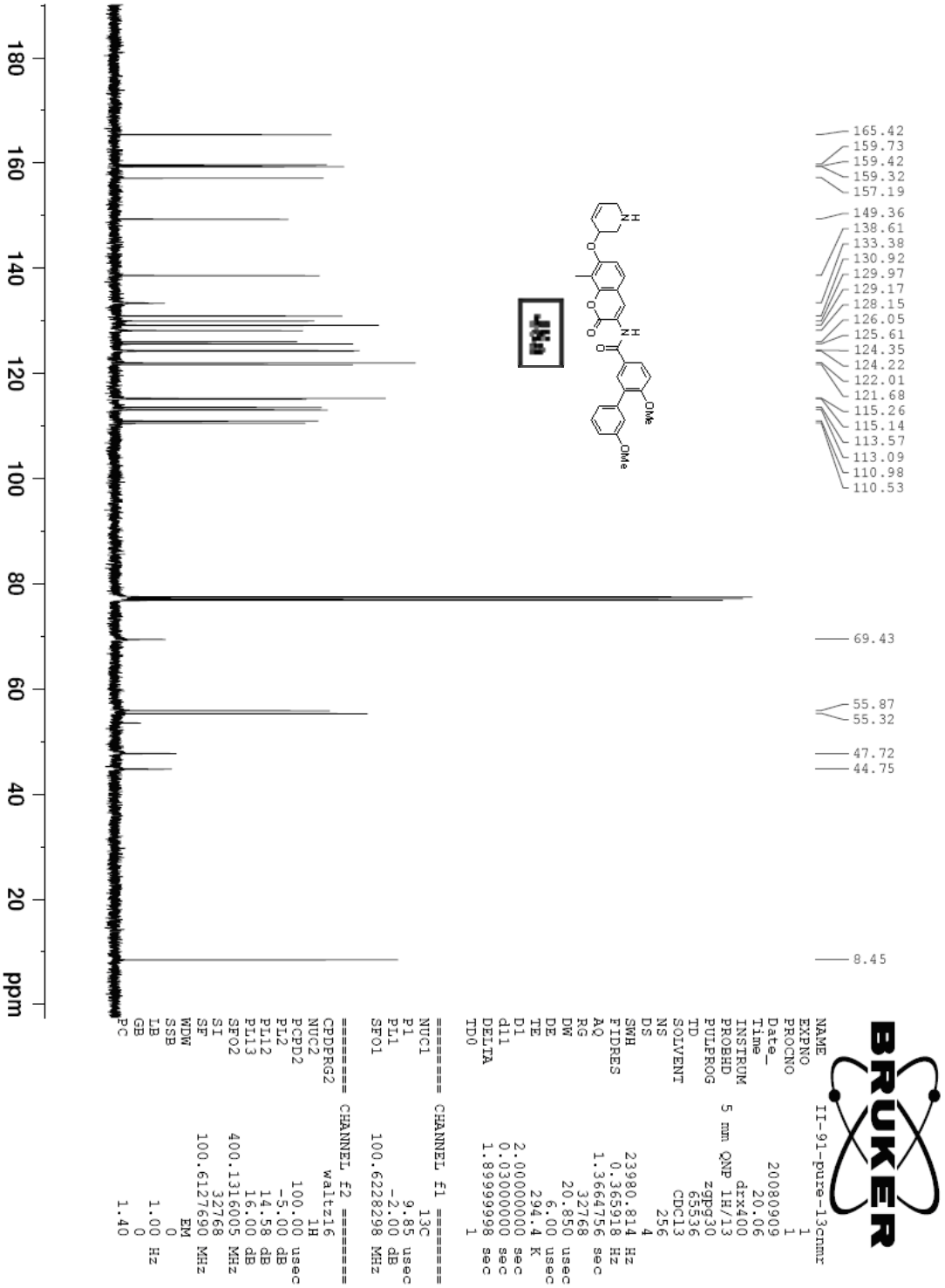
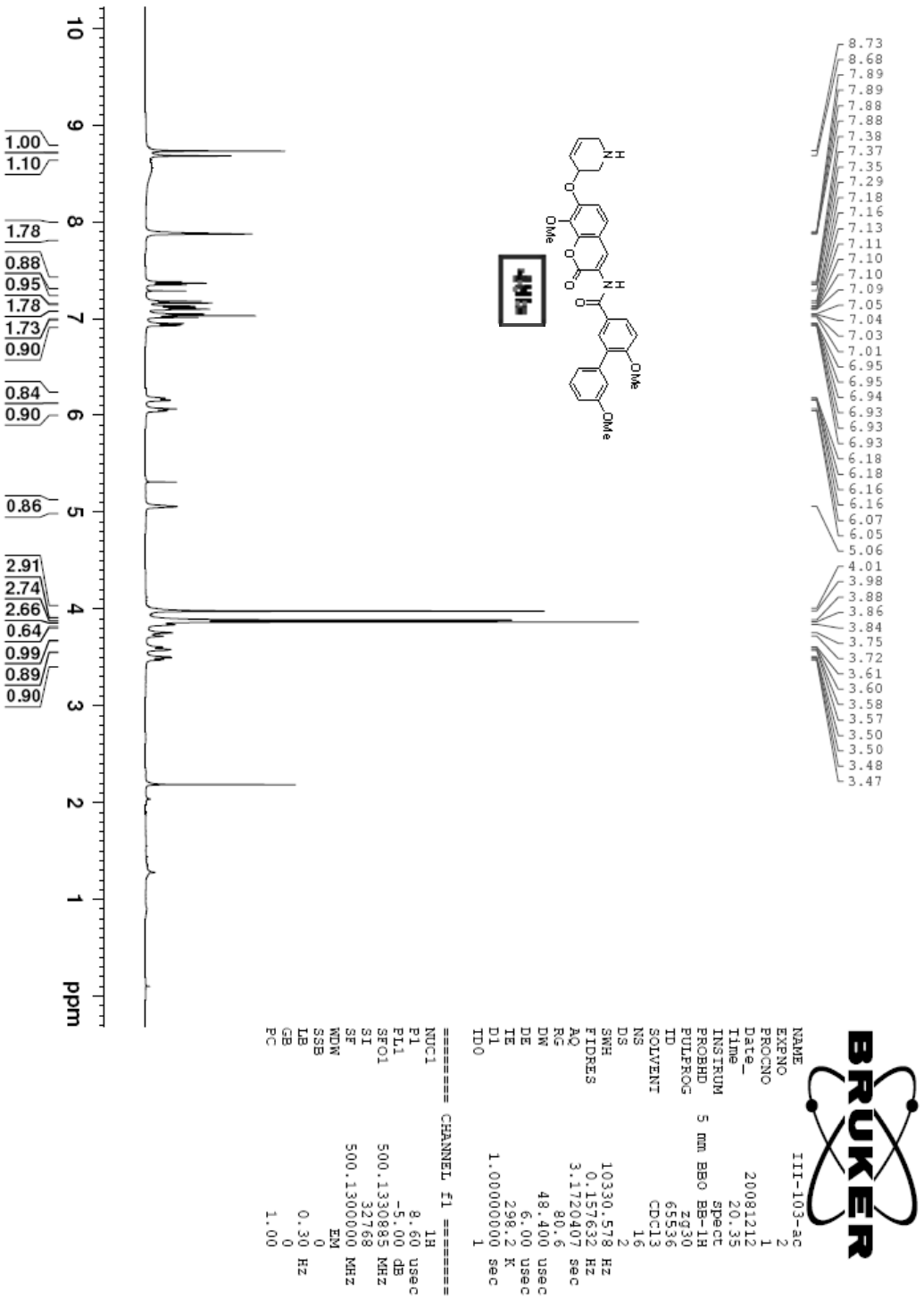
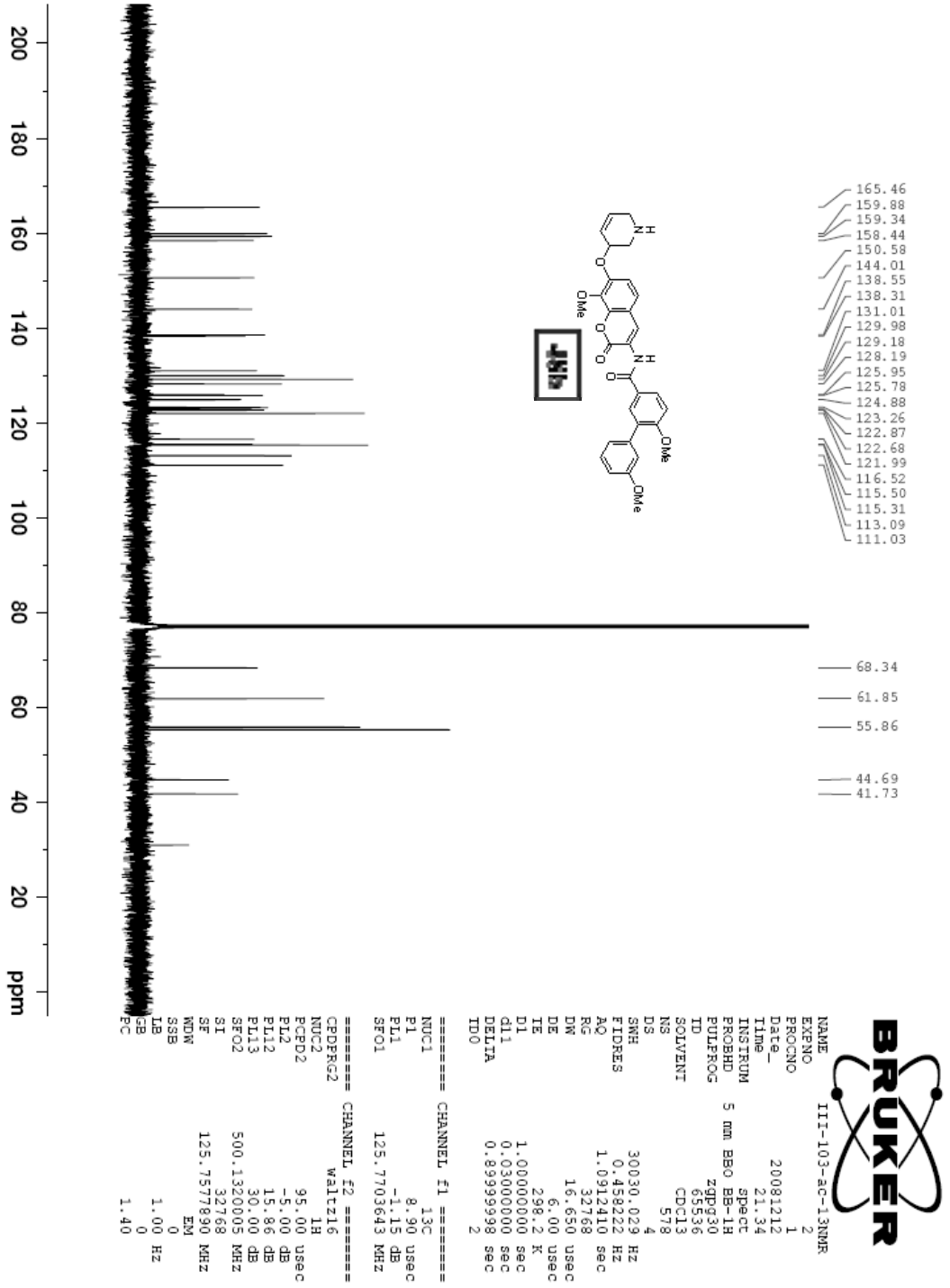
7.32
7.30
7.28
7.14
7.12
7.11
7.10
7.06
7.05
7.04
6.94
6.93
6.92
6.91
6.90
6.88
6.10
6.07
6.02
5.99
4.70
3.88
3.86
3.46
3.41
3.35
3.31
3.19
3.18
2.32
OMe
OMe
1.00
0.93
1.95
2.06
2.00
0.95
1.97
0.95
1.00
0.94
5.99
1.98
1.90
2.98
10
9
8
7
6
5
4
3
2
1
ppm
NAME II-91-pure
EXPNO 1
PROCNO 1
Date_ 20080909
Time_ 19.47
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.958424 sec
RG 57
DW 60.400 usec
DE 6.00 usec
TE 294.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


165.42
159.73
159.42
159.32
157.19
149.36
138.61
133.38
130.92
129.97
129.17
128.15
126.05
125.61
124.35
124.22
122.01
121.68
115.26
115.14
113.57
113.09
110.98
110.53
69.43
55.87
55.32
47.72
44.75
8.45
OMe
OMe
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME II-91-pure-13cnmr
EXPNO 1
PROCNO 1
Date_ 20080909
Time 20.06
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40


8.73
8.68
7.89
7.89
7.88
7.88
7.38
7.37
7.35
7.29
7.18
7.16
7.13
7.11
7.10
7.10
7.09
7.05
7.04
7.03
7.01
6.95
6.95
6.94
6.93
6.93
6.93
6.18
6.18
6.16
6.16
6.07
6.05
5.06
4.01
3.98
3.88
3.86
3.84
3.75
3.72
3.61
3.60
3.58
3.57
3.50
3.50
3.48
3.47
OMe
OMe
OMe
1.00
1.10
1.78
0.88
0.95
1.78
1.73
0.90
0.84
0.90
0.86
2.91
2.74
2.66
0.64
0.99
0.89
0.90
10 9 8 7 6 5 4 3 2 1 ppm
NAME III-103-ac
EXPNO 2
PROCNO 1
Date_ 20081212
Time 20.35
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 80.6
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00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159.88
159.34
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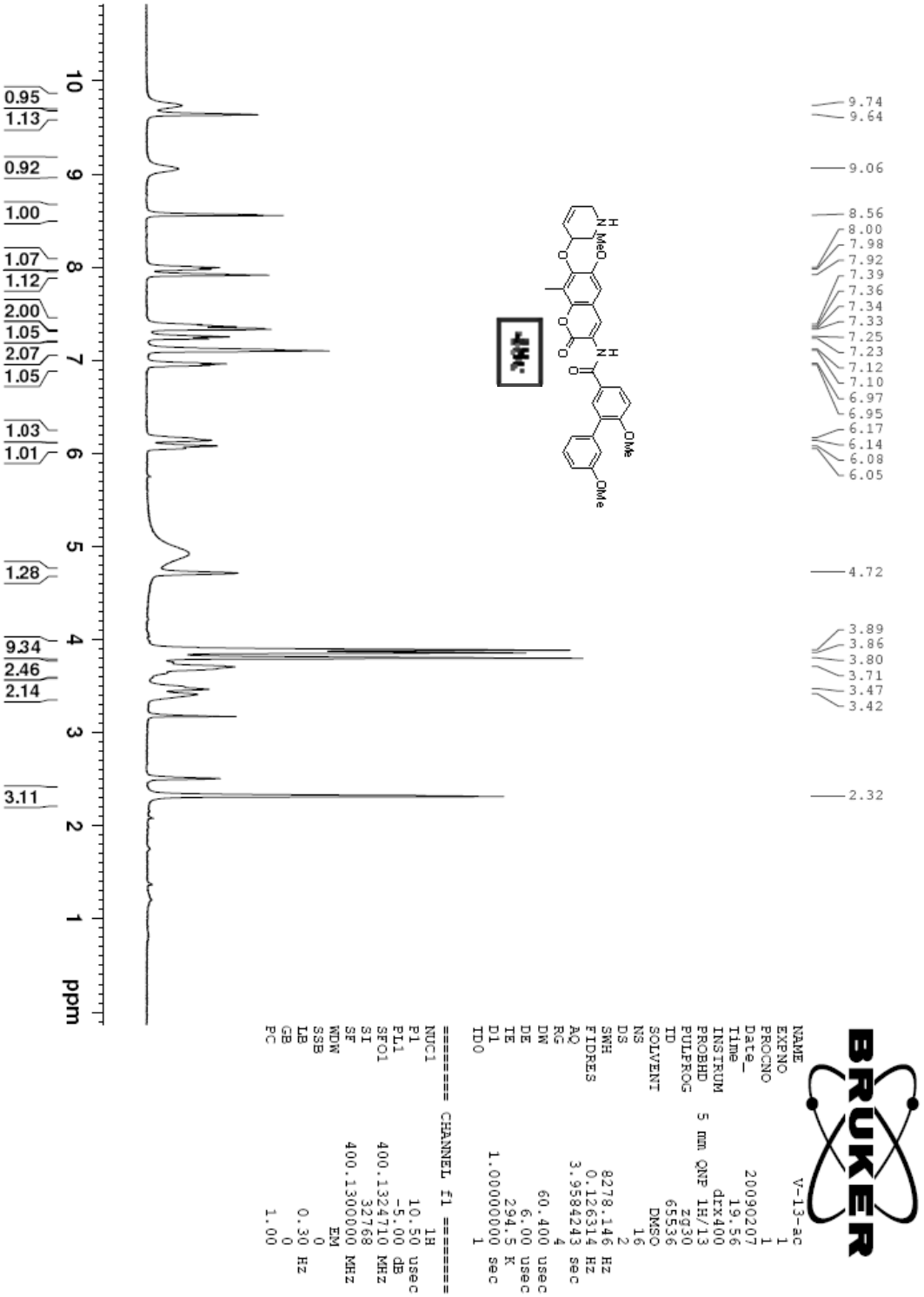
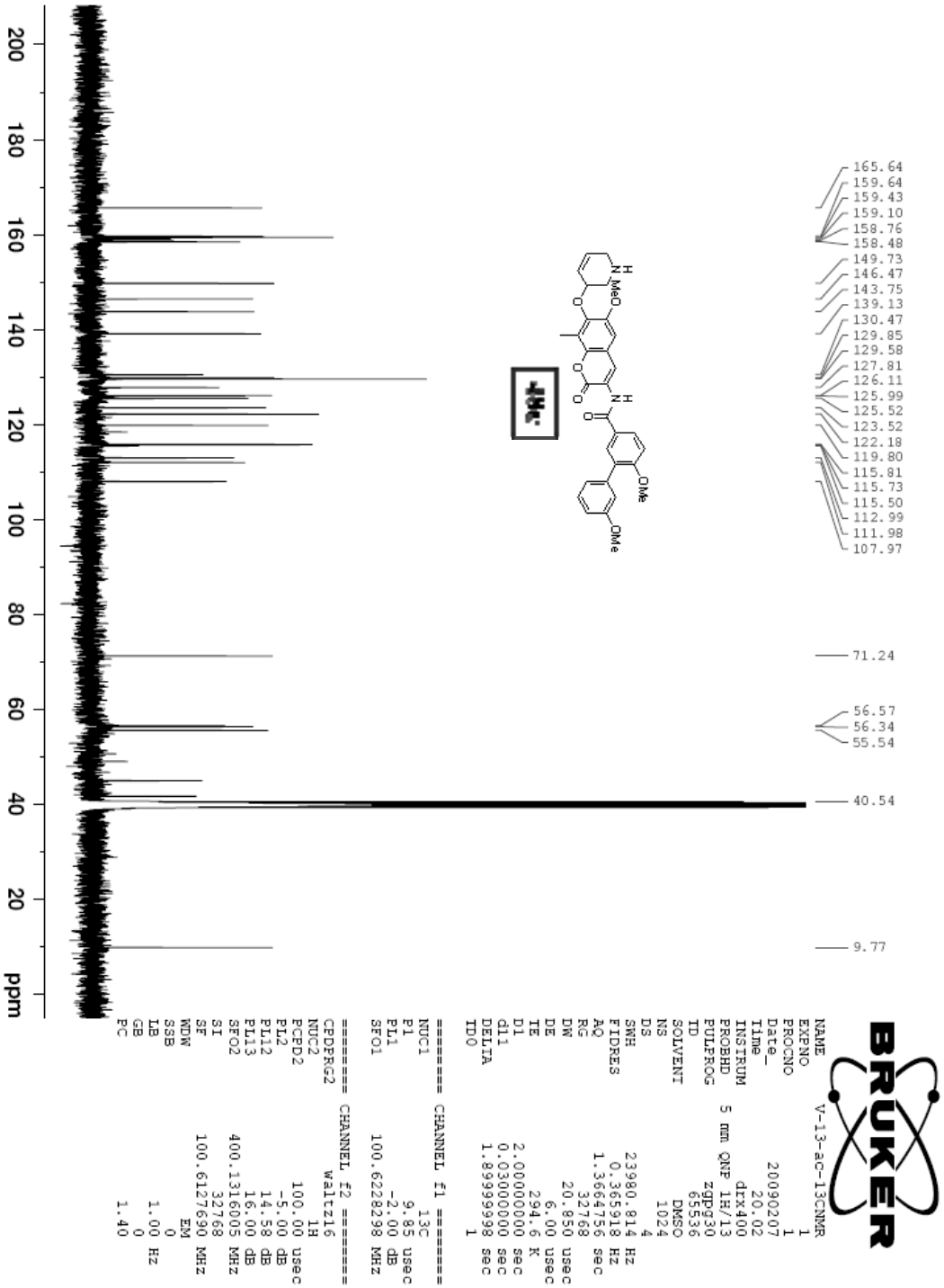
144.01
138.55
138.31
131.01
129.98
129.18
128.19
125.95
125.78
124.88
123.26
122.87
122.68
121.99
116.52
115.50
115.31
113.09
111.03
68.34
61.85
55.86
44.69
41.73
OMe
OMe
OMe
JNH
BRUKER
NAME III-103-ac-13NMR
EXPNO 2
PROCNO 1
Date_ 20081212
Time 21.34
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 578
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
d11 0.03000000 sec
DELTA 0.89999998 sec
ID0 2
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577890 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm


9.74
9.64
9.06
8.56
8.00
7.98
7.92
7.39
7.36
7.34
7.33
7.25
7.23
7.12
7.10
6.97
6.95
6.17
6.14
6.08
6.05
4.72
3.89
3.86
3.80
3.71
3.47
3.42
2.32
0.95
1.13
0.92
1.00
1.07
1.12
2.00
1.05
2.07
1.05
1.03
1.01
1.28
9.34
2.46
2.14
3.11
ppm
NAME V-13-ac
EXPNO 1
PROCNO 1
Date_ 20090207
Time 19.56
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00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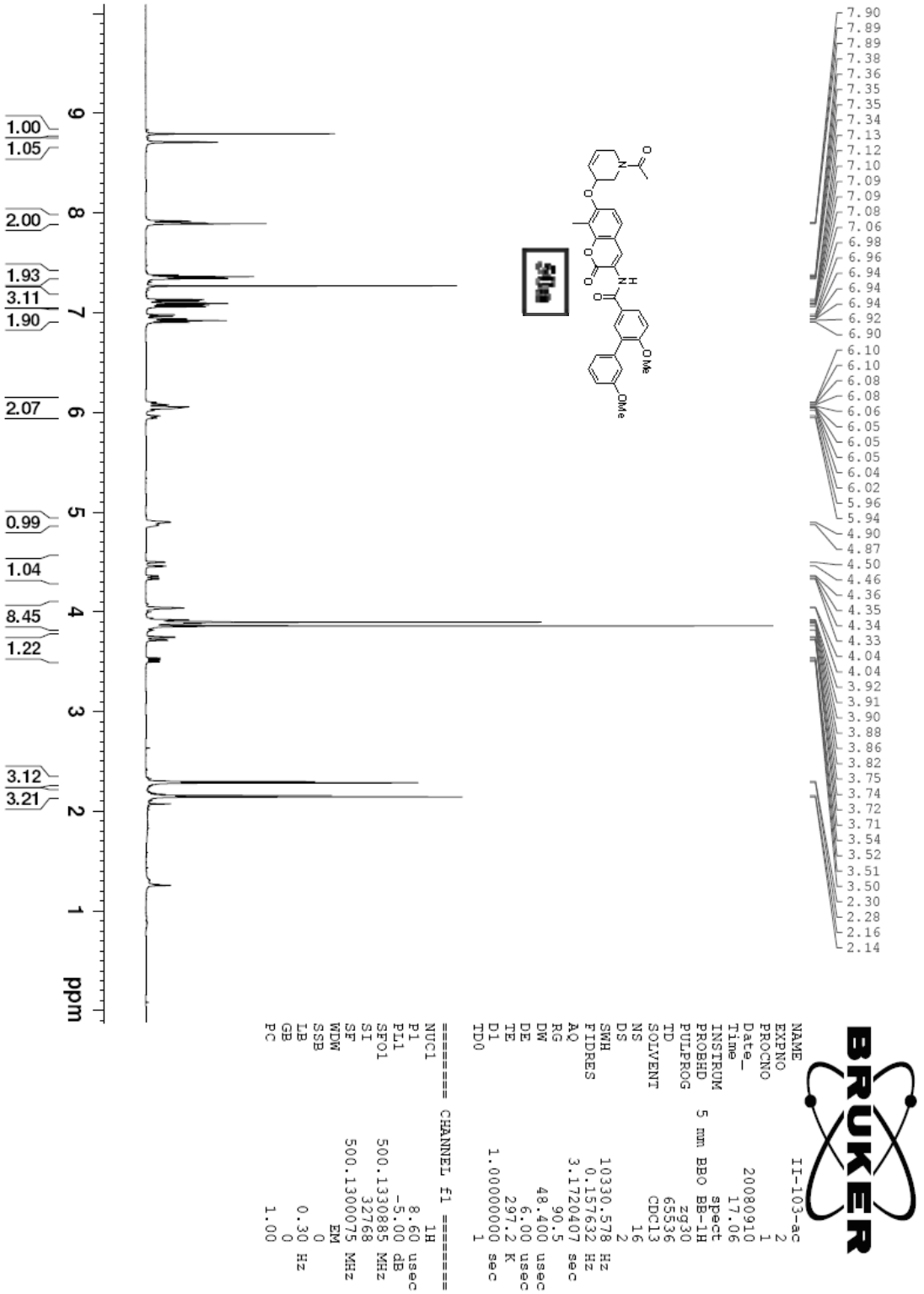
158.76
158.48
149.73
146.47
143.75
139.13
130.47
129.85
129.58
127.81
126.11
125.99
125.52
123.52
122.18
119.80
115.81
115.73
115.50
112.99
111.98
107.97
71.24
56.57
56.34
55.54
40.54
9.77
MeO
OMe
OMe
ppm
200
180
160
140
120
100
80
60
40
20
NAME V-13-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090207
Time 20.02
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1024
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.6 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40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7.89
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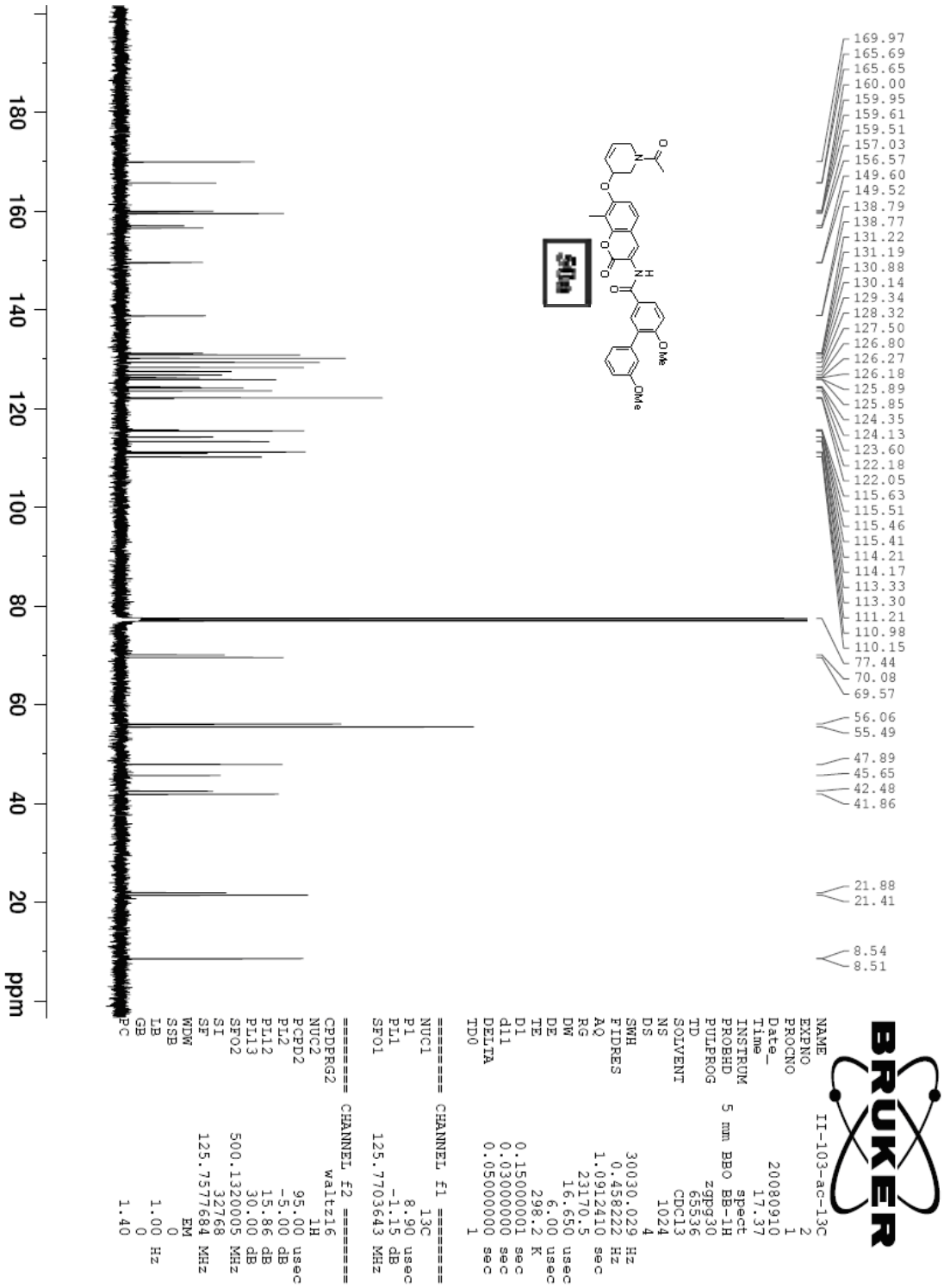
7.34
7.13
7.12
7.10
7.09
7.09
7.08
7.06
6.98
6.96
6.94
6.94
6.94
6.92
6.90
6.10
6.10
6.08
6.08
6.06
6.05
6.05
6.05
6.04
6.02
5.96
5.94
4.90
4.87
4.50
4.46
4.36
4.35
4.34
4.33
4.04
4.04
3.92
3.91
3.90
3.88
3.86
3.82
3.75
3.74
3.72
3.71
3.54
3.52
3.51
3.50
2.30
2.28
2.16
2.14
50a
OMe
OMe
1.00
1.05
2.00
1.93
3.11
1.90
2.07
0.99
1.04
8.45
1.22
3.12
3.21
9
8
7
6
5
4
3
2
1
ppm
NAME II-103-ac
EXPNO 2
PROCNO 1
Date_ 20080910
Time 17.06
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 90.5
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300075 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00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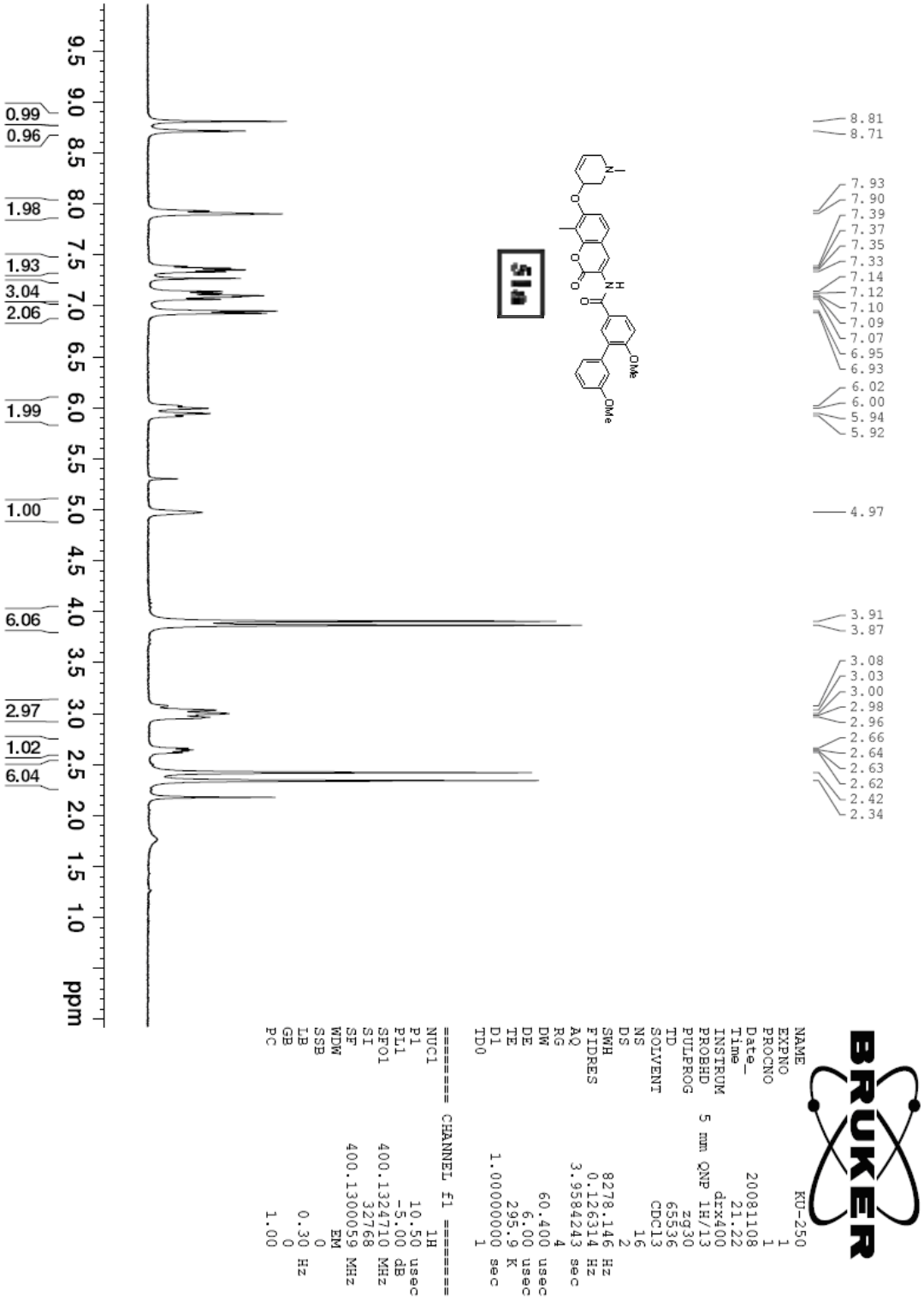
159.61
159.51
157.03
156.57
149.60
149.52
138.79
138.77
131.22
131.19
130.88
130.14
129.34
128.32
127.50
126.80
126.27
126.18
125.89
125.85
124.35
124.13
123.60
122.18
122.05
115.63
115.51
115.46
115.41
114.21
114.17
113.33
113.30
111.21
110.98
110.15
77.44
70.08
69.57
56.06
55.49
47.89
45.65
42.48
41.86
21.88
21.41
8.54
8.51
50a
OMe
OMe
BRUKER
NAME II-103-ac-13C
EXPNO 2
PROCNO 1
Date_ 20080910
Time_ 17.37
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 23170.5
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577684 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm


8.81
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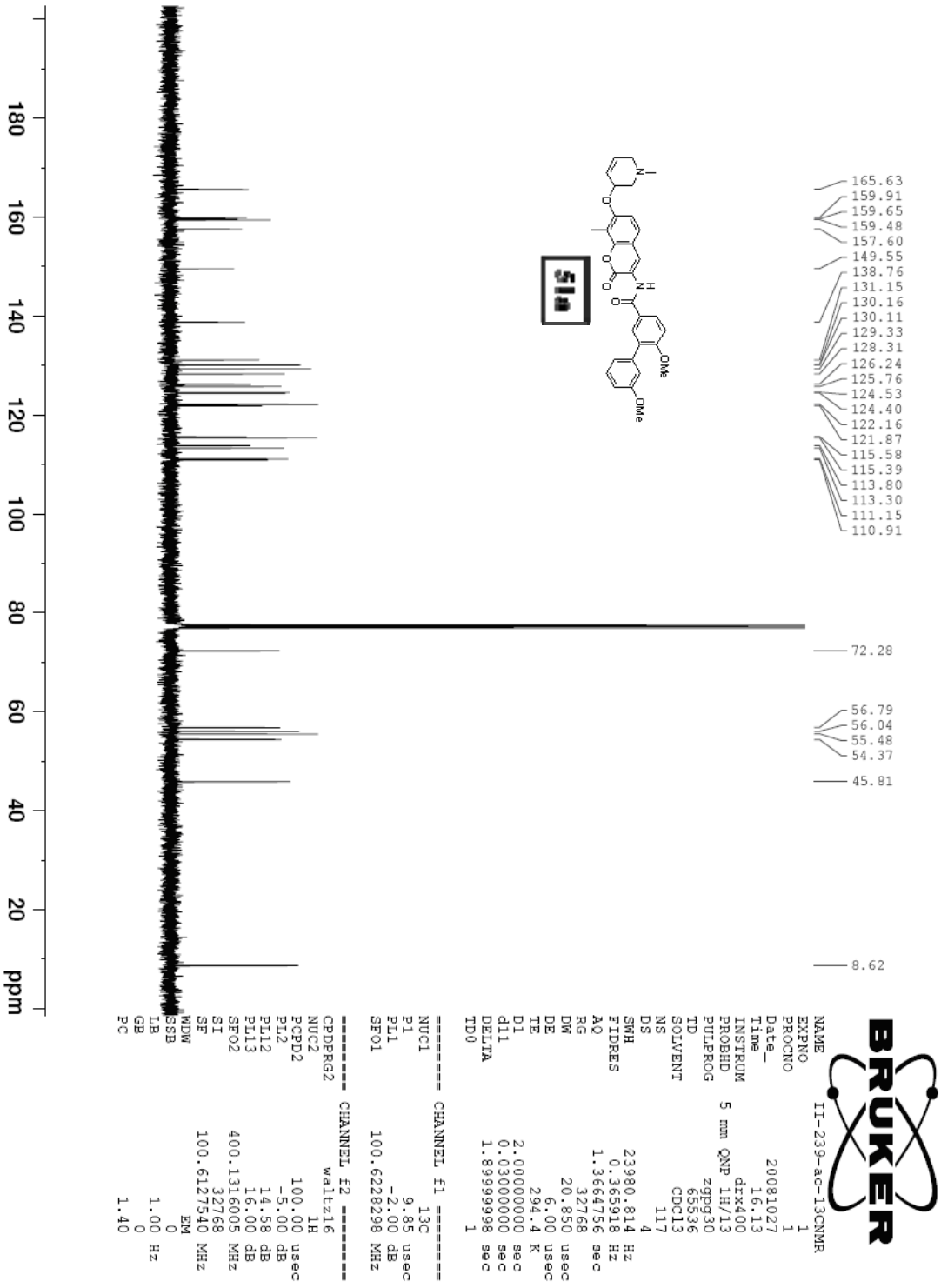
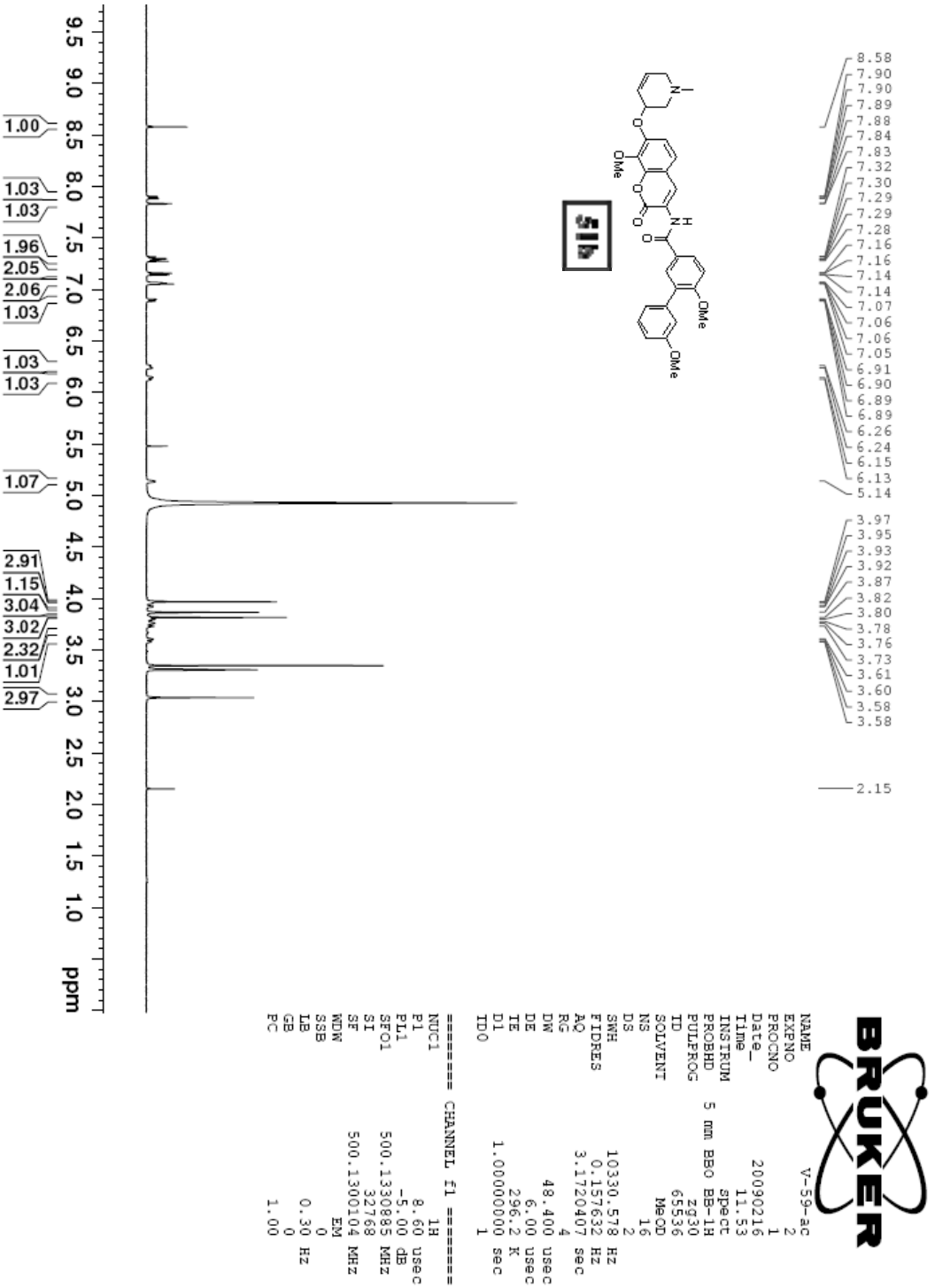
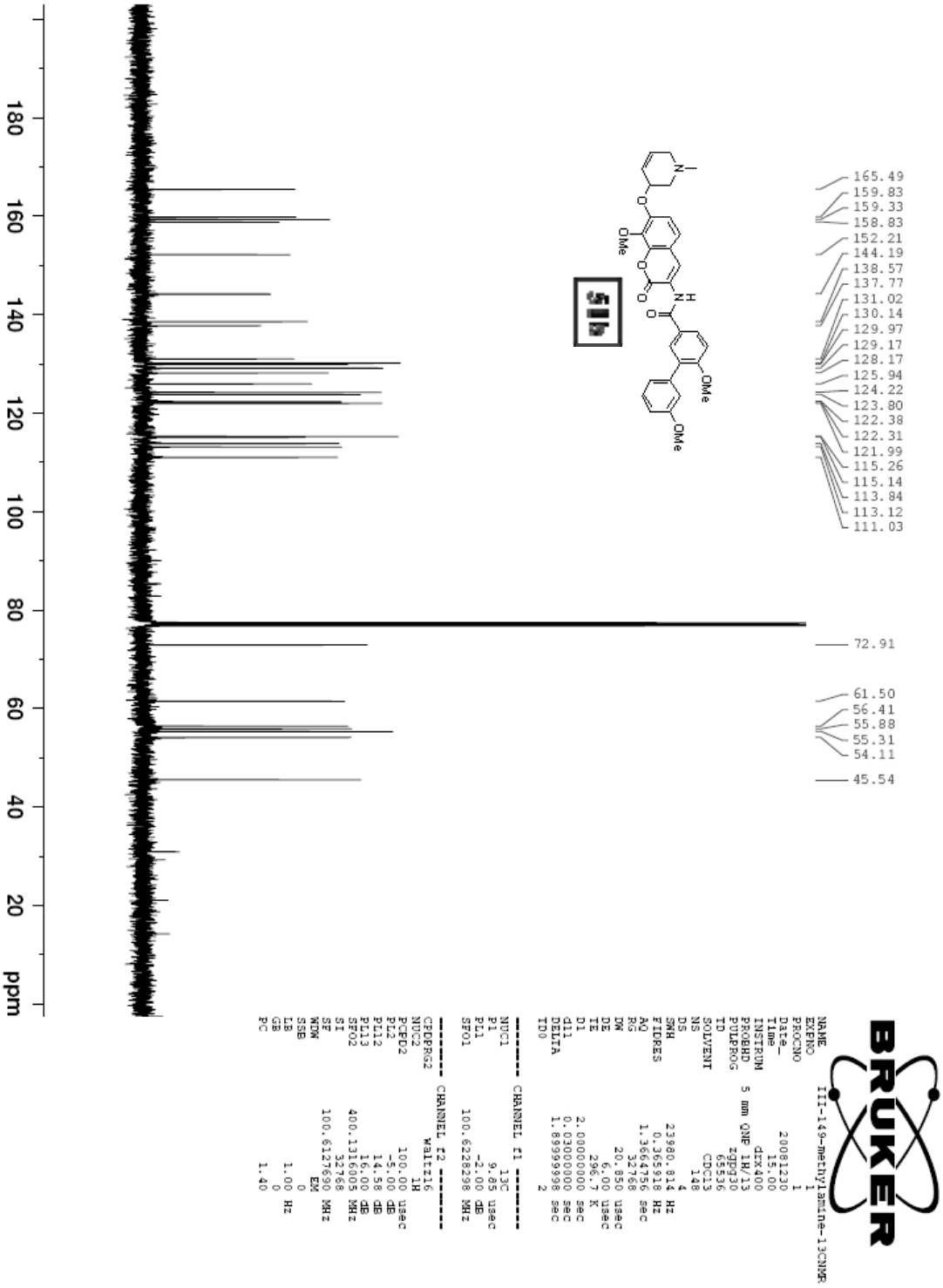
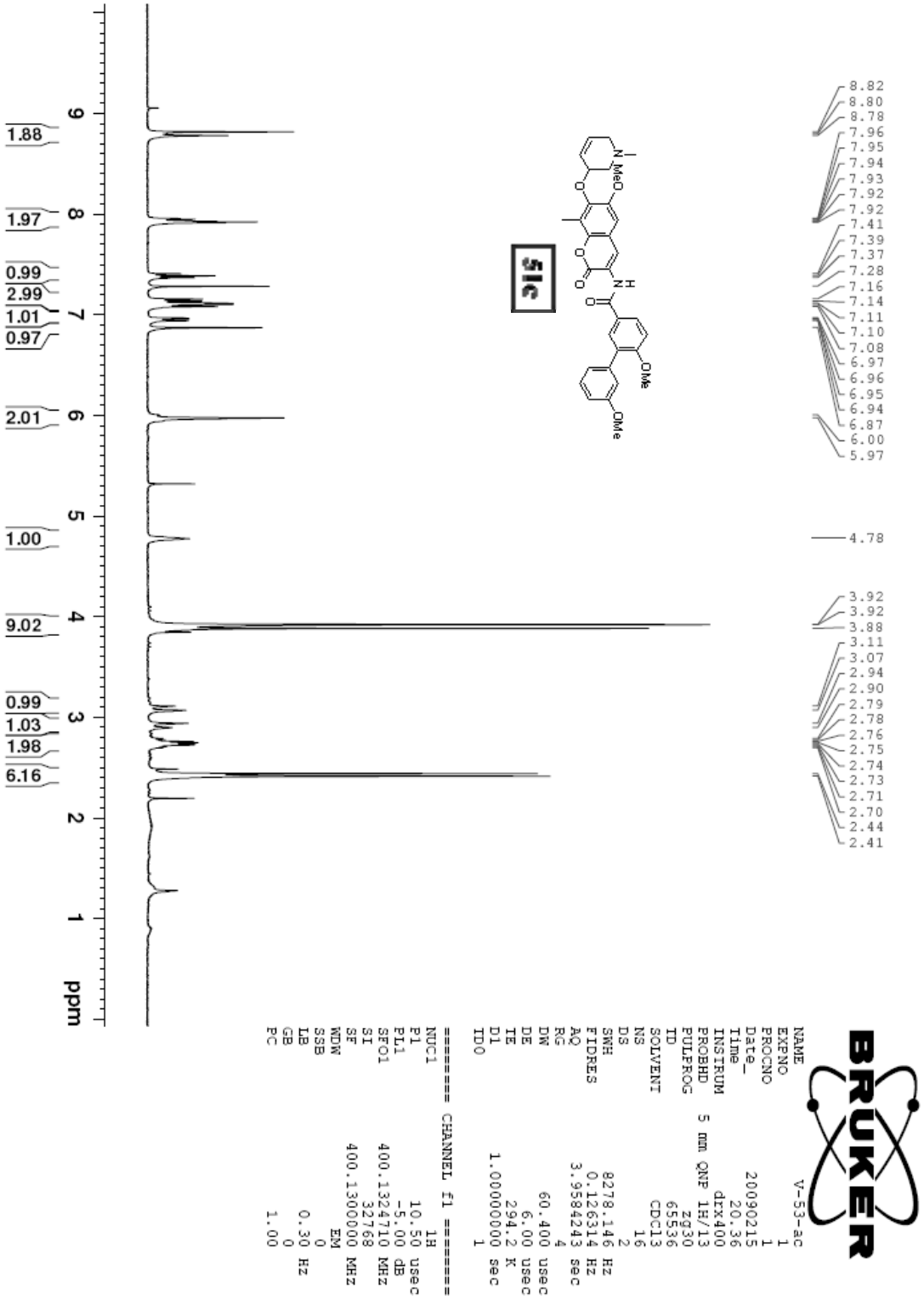
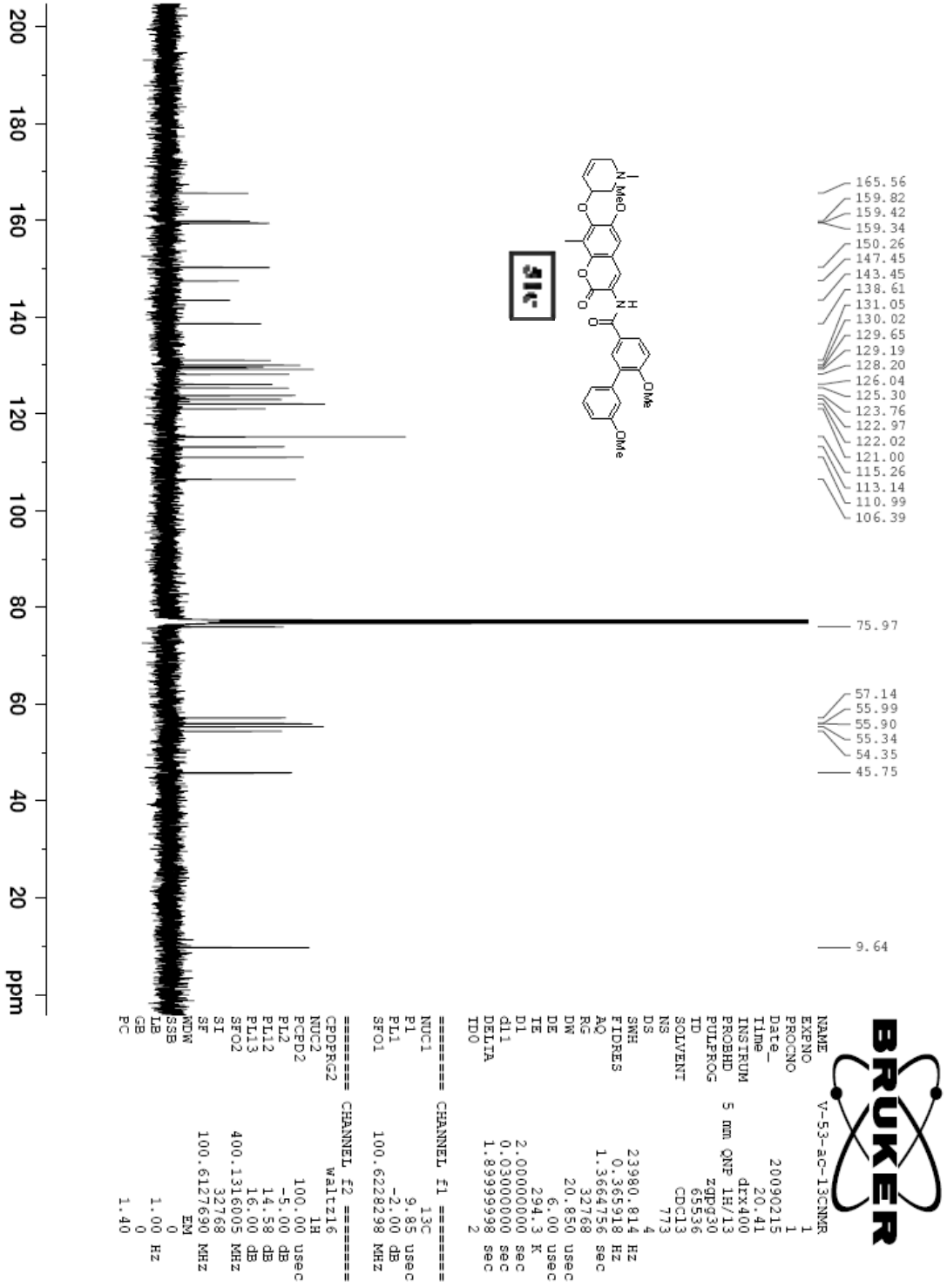
7.90
7.39
7.37
7.35
7.33
7.14
7.12
7.10
7.09
7.07
6.95
6.93
6.02
6.00
5.94
5.92
4.97
3.91
3.87
3.08
3.03
3.00
2.98
2.96
2.66
2.64
2.63
2.62
2.42
2.34
5la
0.99
0.96
1.98
1.93
3.04
2.06
1.99
1.00
6.06
2.97
1.02
6.04
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
BRUKER
NAME KU-250
EXPNO 1
PROCNO 1
Date_ 20081108
Time 21.22
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300059 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

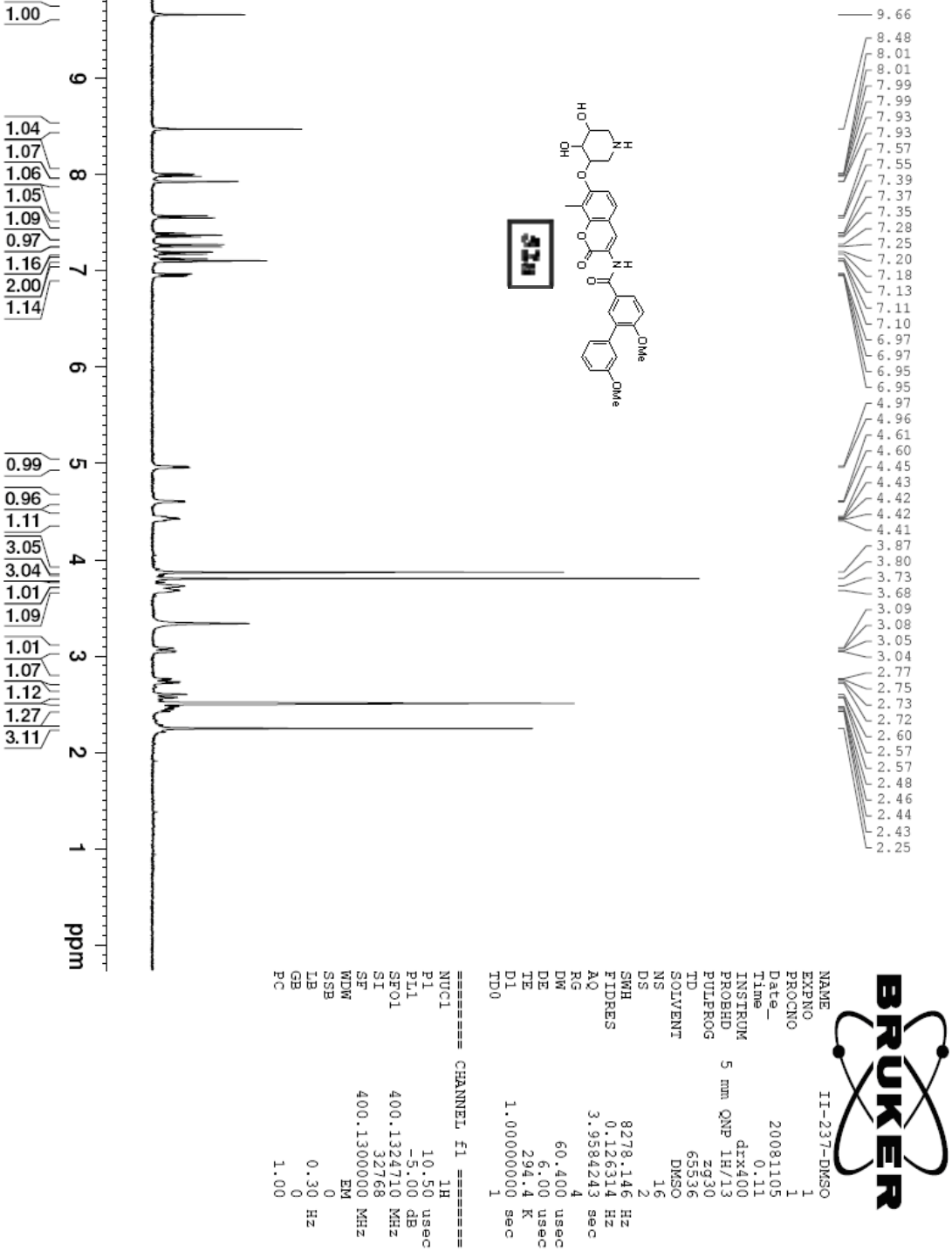

5la
OMe
OMe
165.63
159.91
159.65
159.48
157.60
149.55
138.76
131.15
130.16
130.11
129.33
128.31
126.24
125.76
124.53
124.40
122.16
121.87
115.58
115.39
113.80
113.30
111.15
110.91
72.28
56.79
56.04
55.48
54.37
45.81
8.62
180
160
140
120
100
80
60
40
20
ppm
BRUKER
II-239-ac-13CNMR
NAME
EXPNO 1
PROCNO 1
Date_ 20081027
Time 16.13
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 117
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127540 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

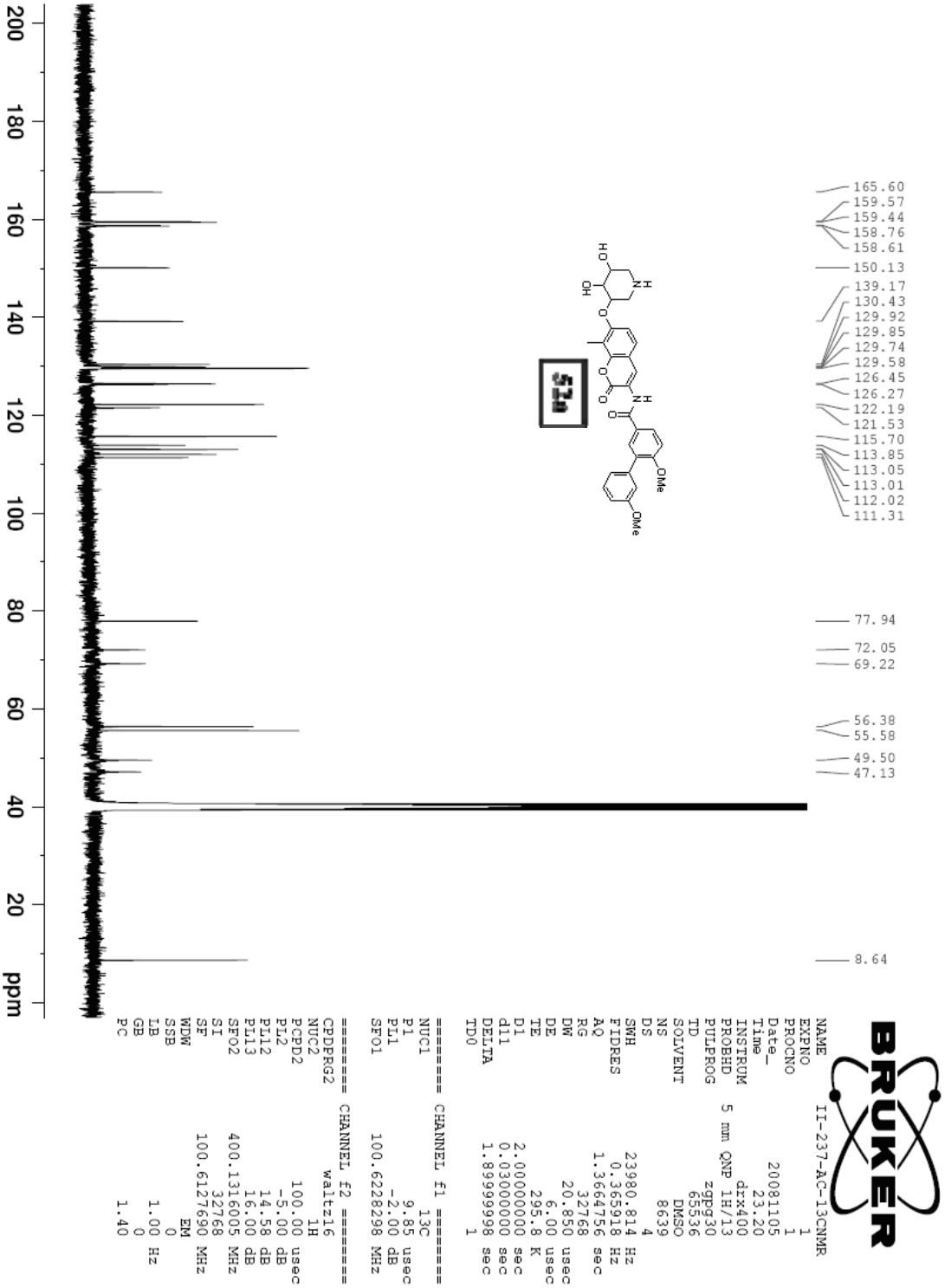

8.58
7.90
7.90
7.89
7.88
7.84
7.83
7.32
7.30
7.29
7.29
7.28
7.16
7.16
7.14
7.14
7.07
7.06
7.06
7.05
6.91
6.90
6.89
6.89
6.26
6.24
6.15
6.13
5.14
3.97
3.95
3.93
3.92
3.87
3.82
3.80
3.78
3.76
3.73
3.61
3.60
3.58
3.58
2.15
5lb
OMe
OMe
OMe
1.00
1.03
1.03
1.96
2.05
2.06
1.03
1.03
1.03
1.07
2.91
1.15
3.04
3.02
2.32
1.01
2.97
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
BRUKER
NAME V-59-ac
EXPNO 2
PROCNO 1
Date_ 20090216
Time 11.53
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 296.2 K
D1 1.00000000 sec
D0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300104 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

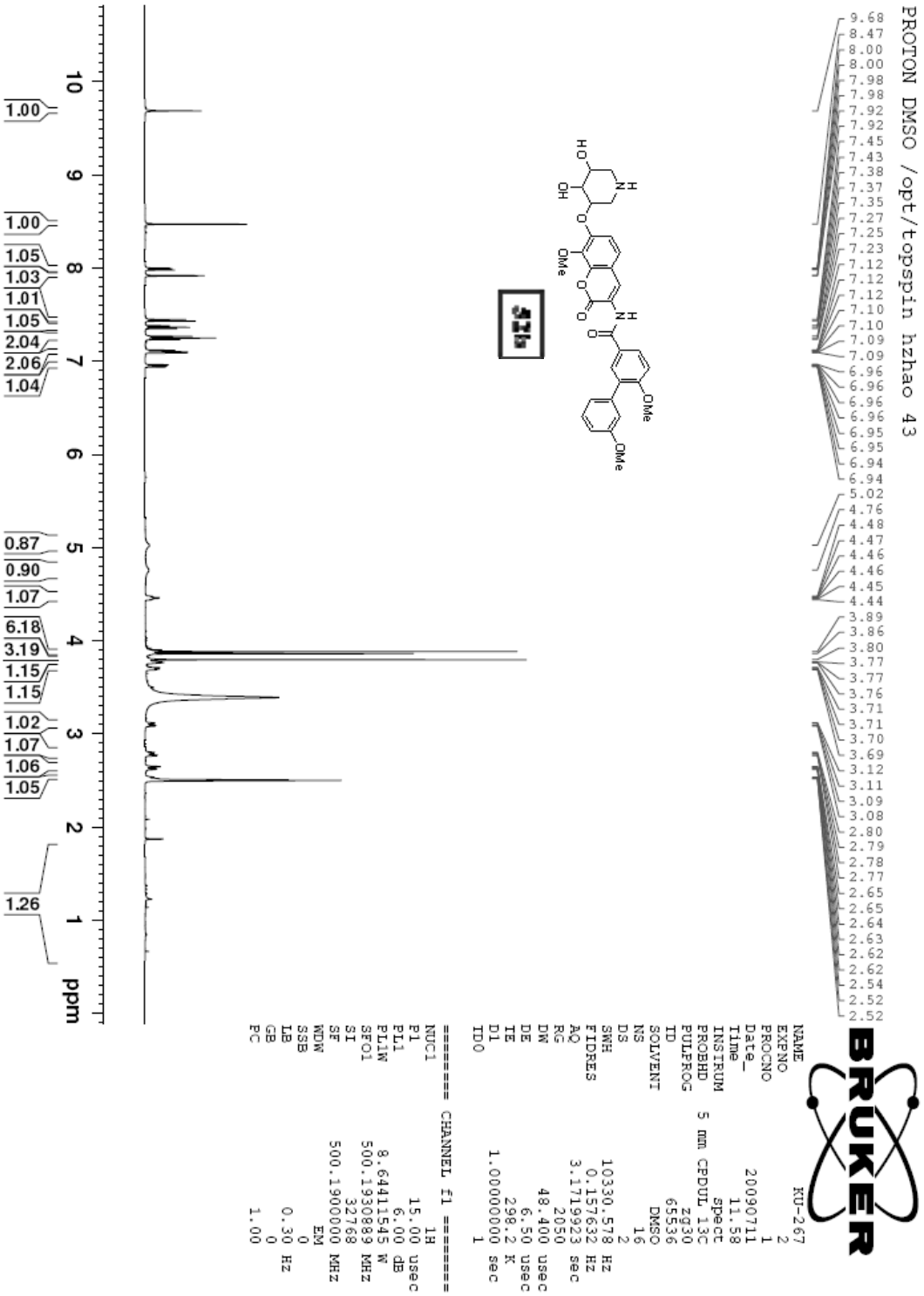

165.49
159.83
159.33
158.83
152.21
144.19
138.57
137.77
131.02
130.14
129.97
129.17
128.17
125.94
124.22
123.80
122.38
122.31
121.99
115.26
115.14
113.84
113.12
111.03
72.91
61.50
56.41
55.88
55.31
54.11
45.54
OMe
OMe
OMe
5lb
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME III-149-methylamine-13CNMR
EXPNO 1
PROCNO 1
Date_ 20081230
Time 15.00
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 140
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 296.7 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -2.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

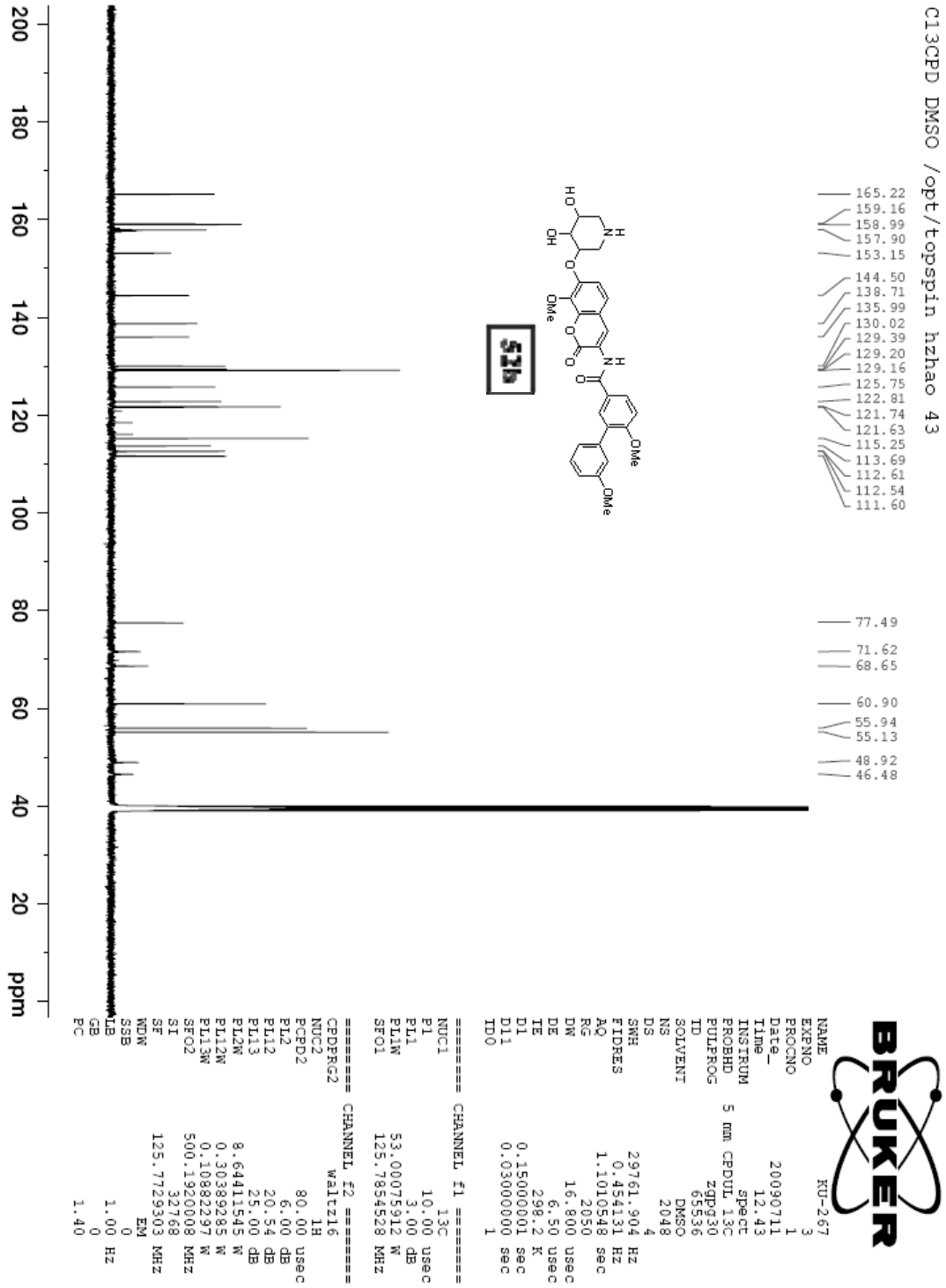

5ic
8.82
8.80
8.78
7.96
7.95
7.94
7.93
7.92
7.92
7.41
7.39
7.37
7.28
7.16
7.14
7.11
7.10
7.08
6.97
6.96
6.95
6.94
6.87
6.00
5.97
4.78
3.92
3.92
3.88
3.11
3.07
2.94
2.90
2.79
2.78
2.76
2.75
2.74
2.73
2.71
2.70
2.44
2.41
1.88
1.97
0.99
2.99
1.01
0.97
2.01
1.00
9.02
0.99
1.03
1.98
6.16
ppm
NAME V-53-ac
EXPNO 1
PROCNO 1
Date_ 20090215
Time 20.36
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.2 K
D1 1.00000000 sec
IDO 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

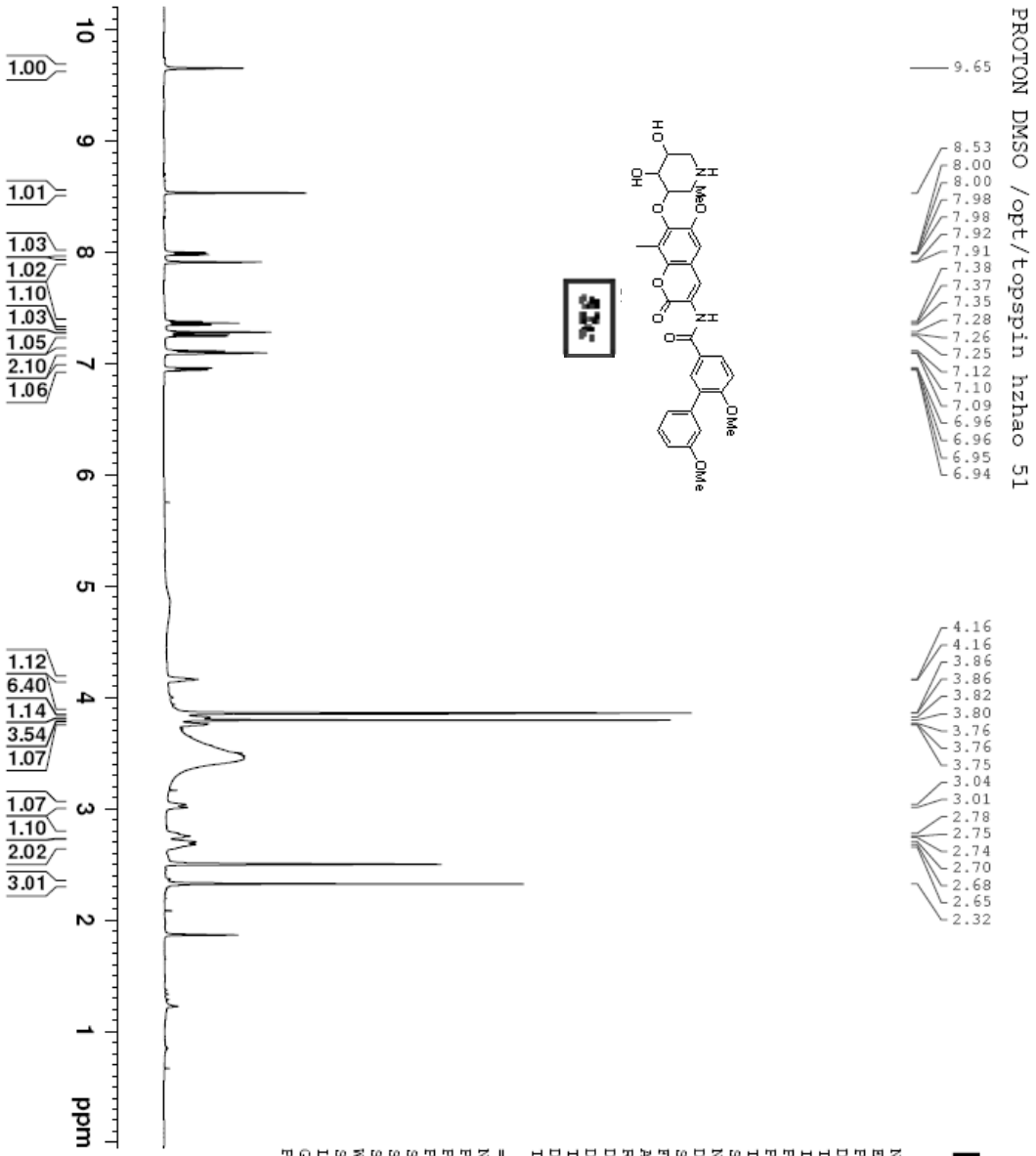

165.56
159.82
159.42
159.34
150.26
147.45
143.45
138.61
131.05
130.02
129.65
129.19
128.20
126.04
125.30
123.76
122.97
122.02
121.00
115.26
113.14
110.99
106.39
75.97
57.14
55.99
55.90
55.34
54.35
45.75
9.64
MeO
OMe
OMe
3lc
200
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-53-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090215
Time 20.41
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 773
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.3 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

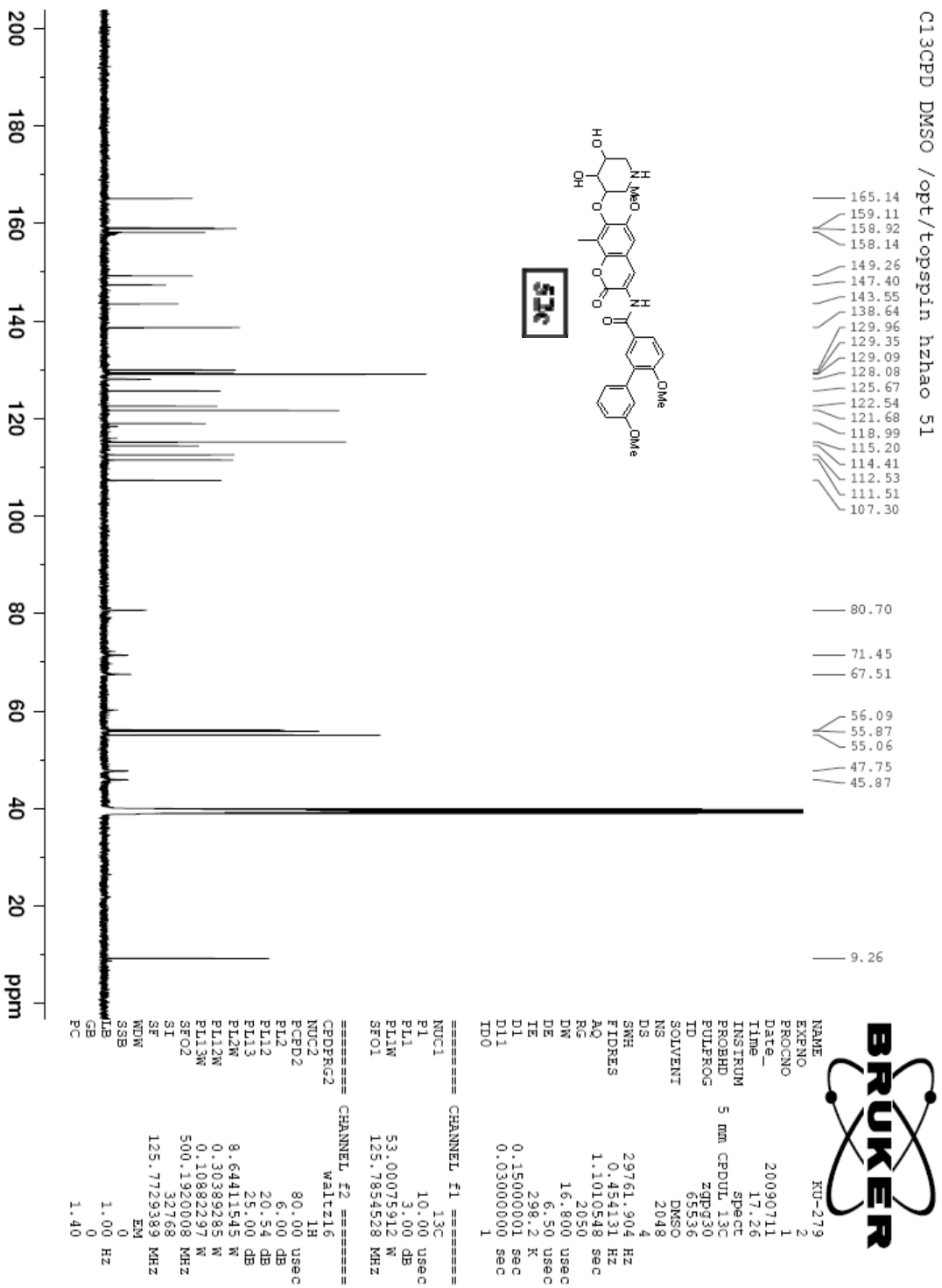

9.66
8.48
8.01
8.01
7.99
7.99
7.93
7.93
7.57
7.55
7.39
7.37
7.35
7.28
7.25
7.20
7.18
7.13
7.11
7.10
6.97
6.97
6.95
6.95
4.97
4.96
4.61
4.60
4.45
4.43
4.42
4.42
4.41
3.87
3.80
3.73
3.68
3.09
3.08
3.05
3.04
2.77
2.75
2.73
2.72
2.60
2.57
2.57
2.48
2.46
2.44
2.43
2.25
1.00
1.04
1.07
1.06
1.05
1.09
0.97
1.16
2.00
1.14
0.99
0.96
1.11
3.05
3.04
1.01
1.09
1.01
1.07
1.12
1.27
3.11
10
9
8
7
6
5
4
3
2
1
ppm
OMe
OMe
NAME II-237-DMSO
EXPNO 1
PROCNO 1
Date_ 20081105
Time 0.11
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

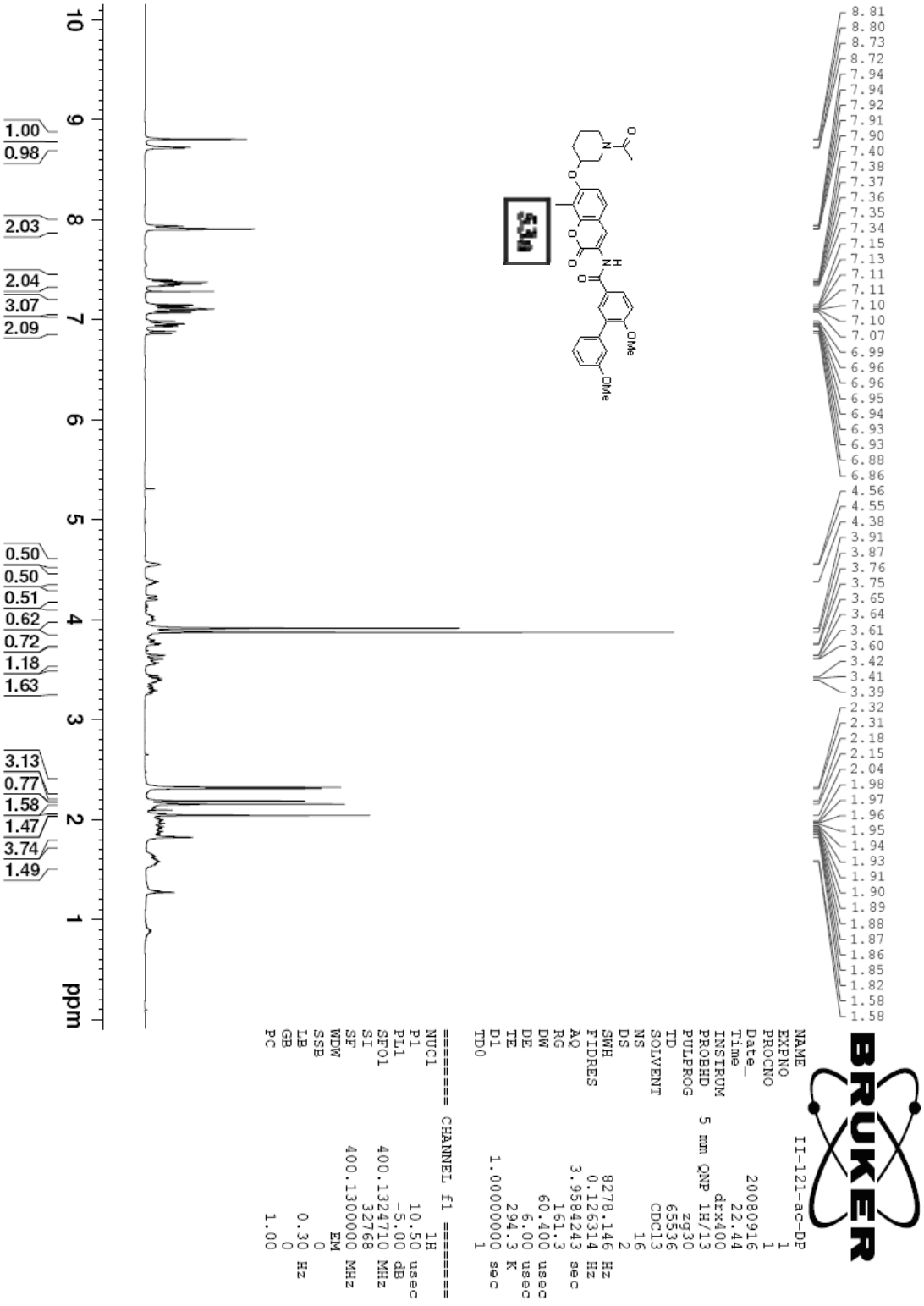

165.60
159.57
159.44
158.76
158.61
150.13
139.17
130.43
129.92
129.85
129.74
129.58
126.45
126.27
122.19
121.53
115.70
113.85
113.05
113.01
112.02
111.31
77.94
72.05
69.22
56.38
55.58
49.50
47.13
8.64
52a
OMe
OMe
200
180
160
140
120
100
80
60
40
20
ppm
NAME II-237-AC-13CNMR
EXPNO 1
PROCNO 1
Date_ 20081105
Time_ 23.20
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 8639
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 295.8 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

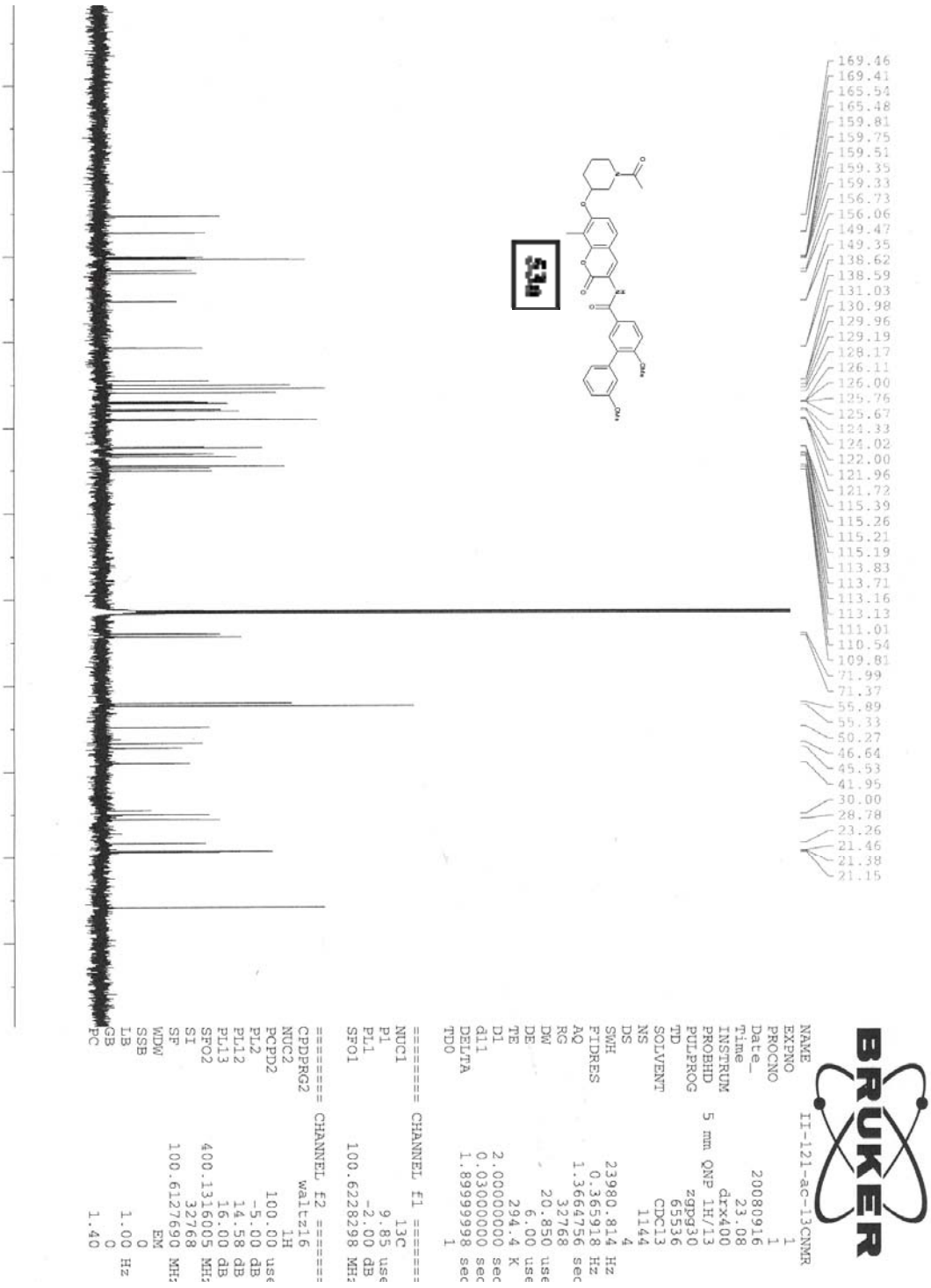

PROTON DMSO /opt/topspin hzhao 43
9.68
8.47
8.00
8.00
7.98
7.98
7.92
7.92
7.45
7.43
7.38
7.37
7.35
7.27
7.25
7.23
7.12
7.12
7.12
7.10
7.10
7.09
7.09
6.96
6.96
6.96
6.96
6.95
6.95
6.94
6.94
5.02
4.76
4.48
4.47
4.46
4.46
4.45
4.44
3.89
3.86
3.80
3.77
3.77
3.76
3.71
3.71
3.70
3.69
3.12
3.11
3.09
3.08
2.80
2.79
2.78
2.77
2.65
2.65
2.64
2.63
2.62
2.62
2.54
2.52
2.52
HO
OH
OMe
OMe
OMe
32b
1.00
1.00
1.05
1.03
1.01
1.05
2.04
2.06
1.04
0.87
0.90
1.07
6.18
3.19
1.15
1.15
1.02
1.07
1.06
1.05
1.26
10
9
8
7
6
5
4
3
2
1
ppm
NAME KU-267
EXPNO 2
PROCNO 1
Date_ 20090711
Time 11.58
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

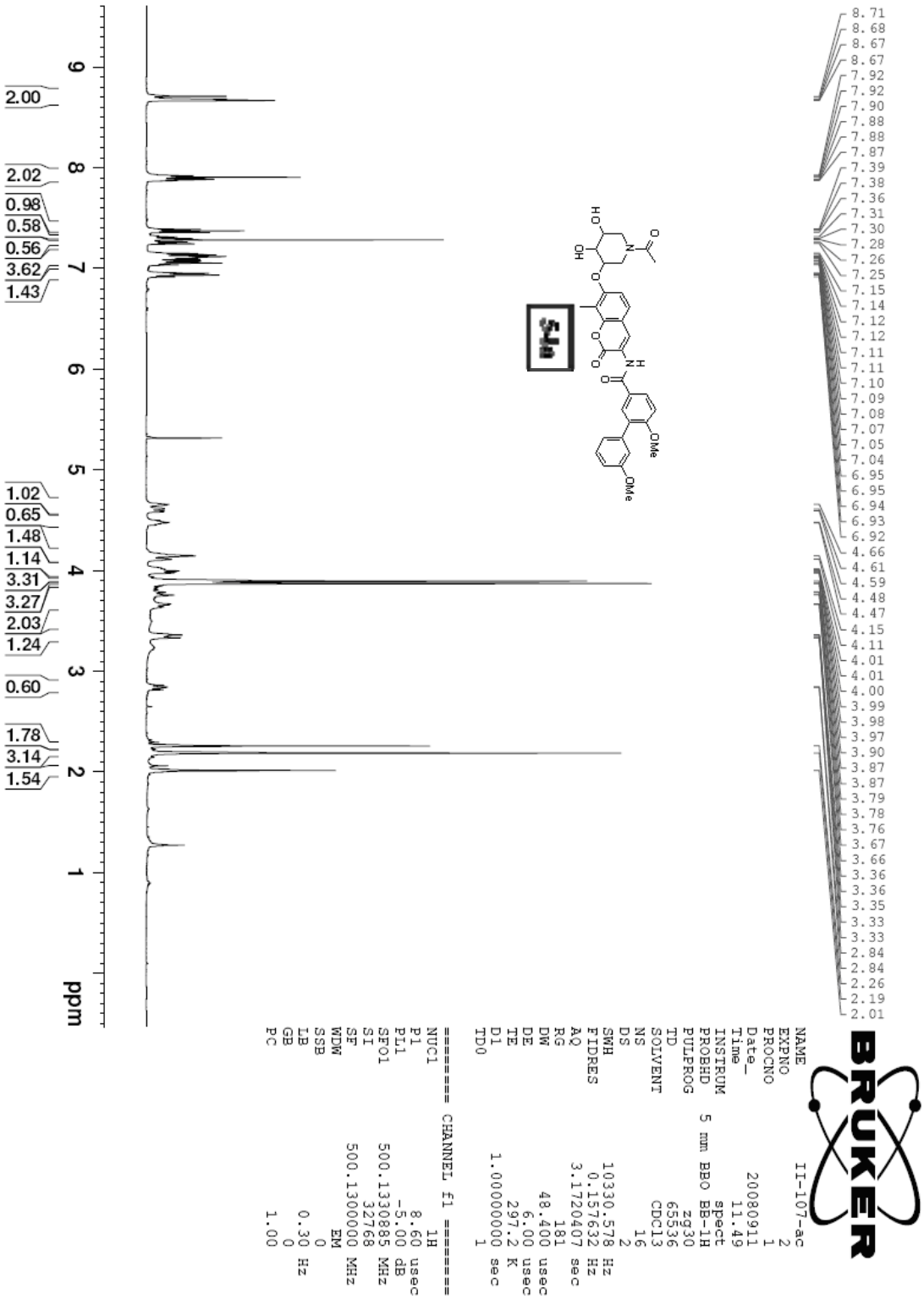

C13CPD DMSO /opt/topspin hzhao 43
165.22
159.16
158.99
157.90
153.15
144.50
138.71
135.99
130.02
129.39
129.20
129.16
125.75
122.81
121.74
121.63
115.25
113.69
112.61
112.54
111.60
77.49
71.62
68.65
60.90
55.94
55.13
48.92
46.48
52b
OMe
OMe
OMe
BRUKER
NAME KU-267
EXPNO 3
PROCNO 1
Date_ 20090711
Time 12.43
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729303 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

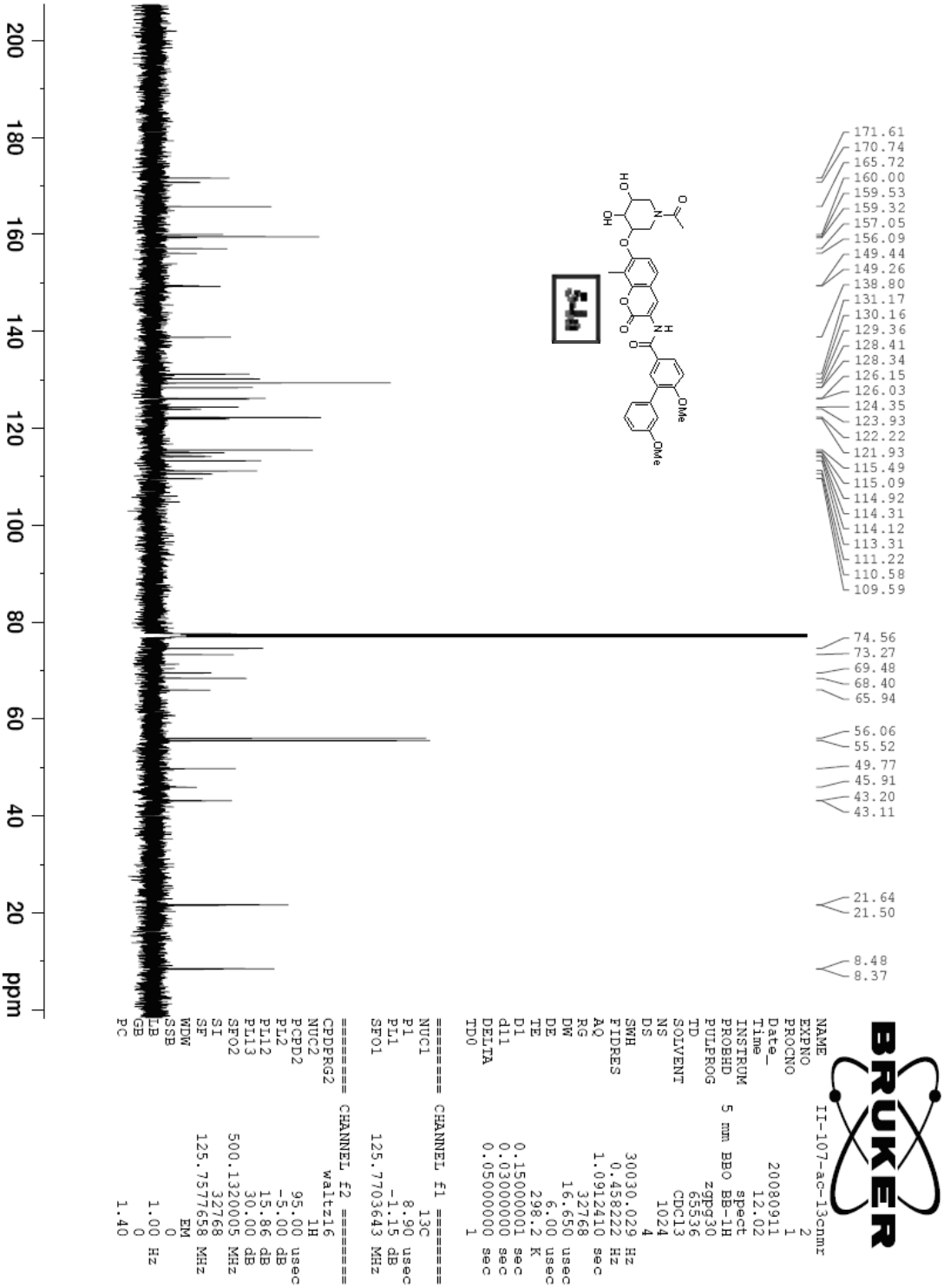

PROTON DMSO /opt/topspin hzhao 51
9.65
8.53
8.00
8.00
7.98
7.98
7.92
7.91
7.38
7.37
7.35
7.28
7.26
7.25
7.12
7.10
7.09
6.96
6.96
6.95
6.94
4.16
4.16
3.86
3.86
3.82
3.80
3.76
3.76
3.75
3.04
3.01
2.78
2.75
2.74
2.70
2.68
2.65
2.32
HO
OH
MeO
OMe
OMe
1.00
1.01
1.03
1.02
1.10
1.03
1.05
2.10
1.06
1.12
6.40
1.14
3.54
1.07
1.07
1.10
2.02
3.01
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME KU-279
EXPNO 1
PROCNO 1
Date_ 20090711
Time 16.41
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1440
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

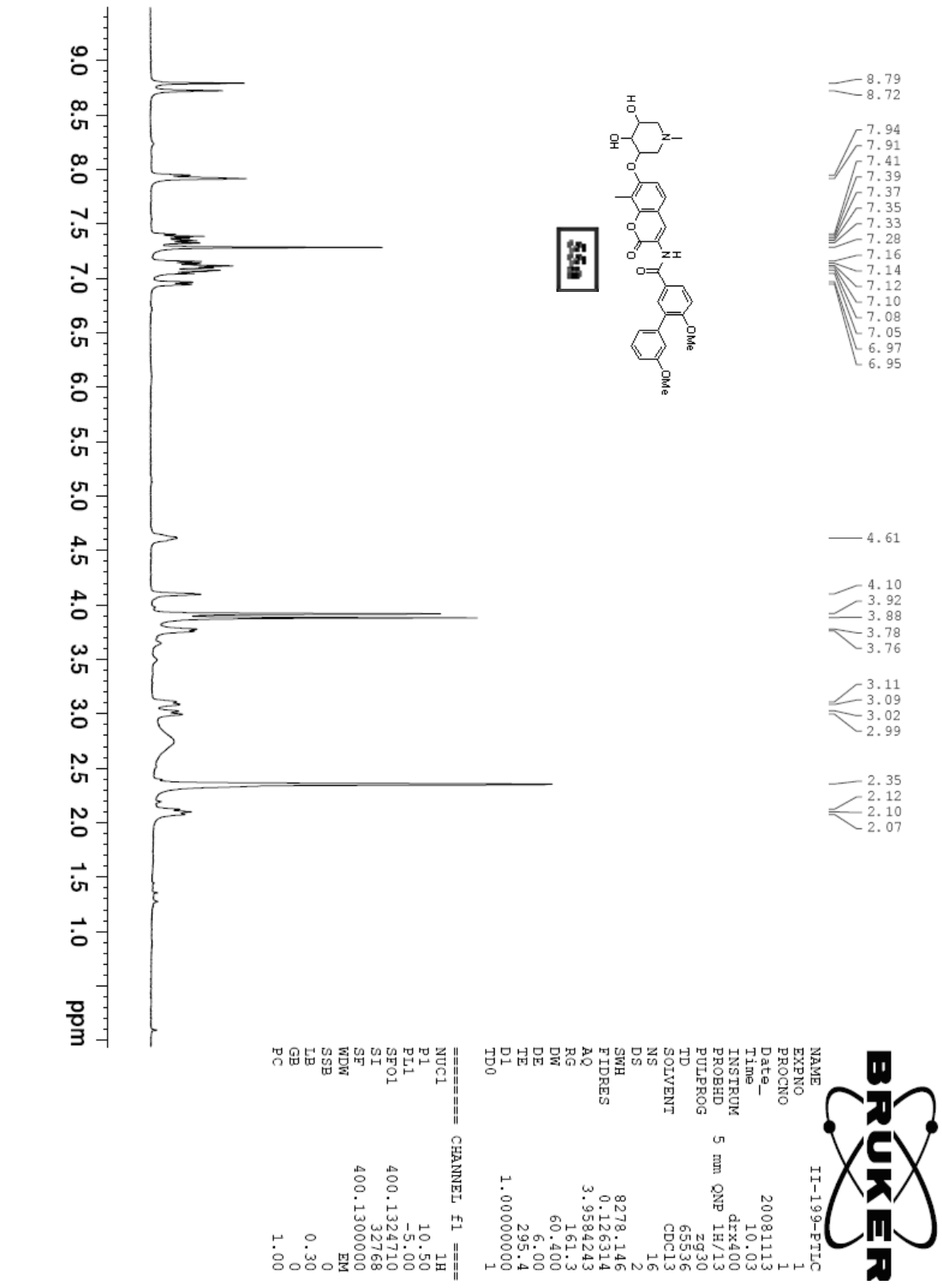

C13CPD DMSO /opt/topspin hzhao 51
165.14
159.11
158.92
158.14
149.26
147.40
143.55
138.64
129.96
129.35
129.09
128.08
125.67
122.54
121.68
118.99
115.20
114.41
112.53
111.51
107.30
80.70
71.45
67.51
56.09
55.87
55.06
47.75
45.87
9.26
51c
NAME KU-279
EXPNO 2
PROCNO 1
Date_ 20090711
Time 17.26
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729389 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

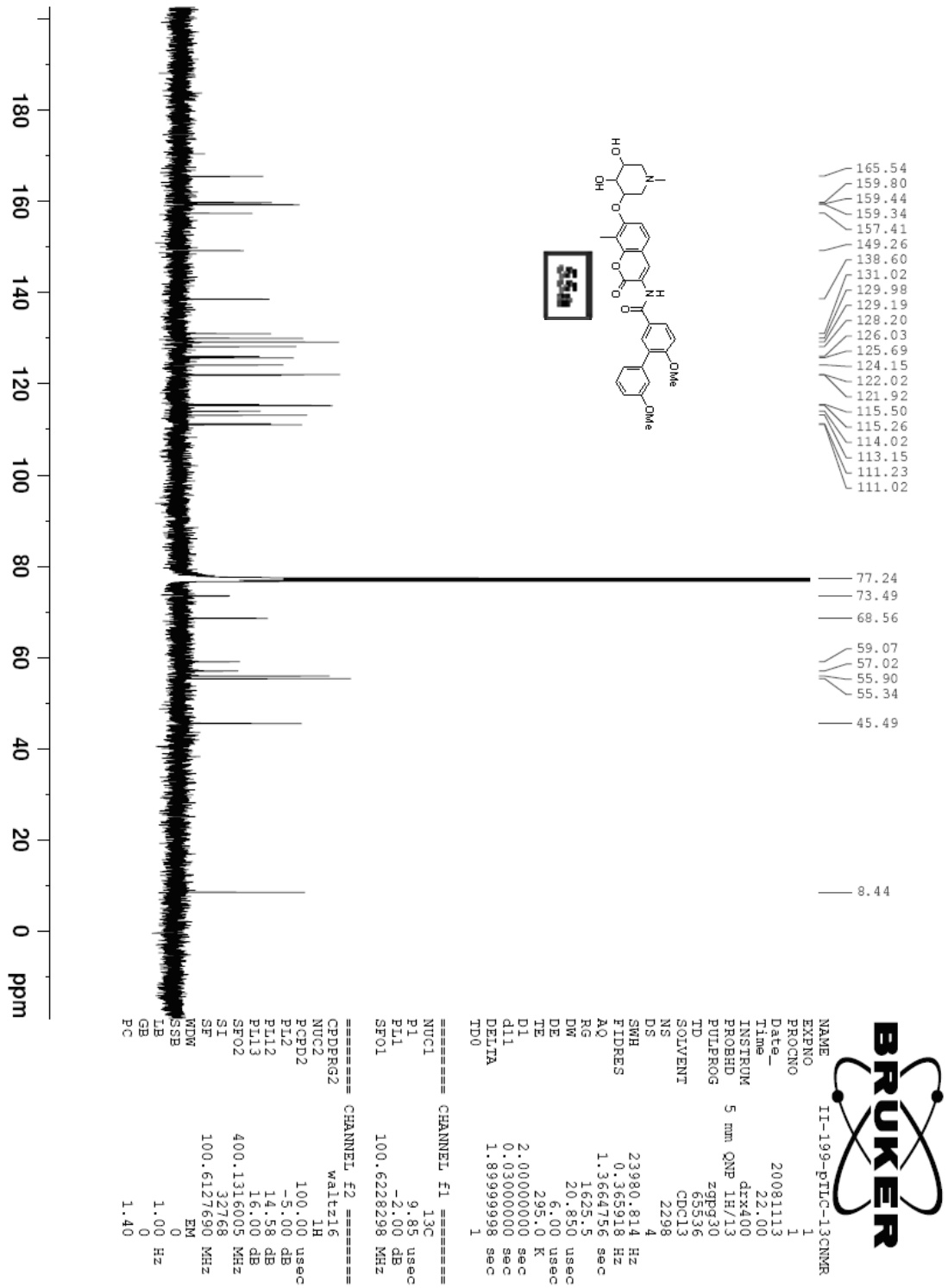

5-3n
1.00
0.98
2.03
2.04
3.07
2.09
0.50
0.50
0.51
0.62
0.72
1.18
1.63
3.13
0.77
1.58
1.47
3.74
1.49
10
9
8
7
6
5
4
3
2
1
ppm
8.81
8.80
8.73
8.72
7.94
7.94
7.92
7.91
7.90
7.40
7.38
7.37
7.36
7.35
7.34
7.15
7.13
7.11
7.11
7.10
7.10
7.07
6.99
6.96
6.96
6.95
6.94
6.93
6.93
6.88
6.86
4.56
4.55
4.38
3.91
3.87
3.76
3.75
3.65
3.64
3.61
3.60
3.42
3.41
3.39
2.32
2.31
2.18
2.15
2.04
1.98
1.97
1.96
1.95
1.94
1.93
1.91
1.90
1.89
1.88
1.87
1.86
1.85
1.82
1.58
1.58
NAME II-121-ac-DP
EXPNO 1
PROCNO 1
Date_ 20080916
Time 22.44
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 161.3
DW 60.400 usec
DE 6.00 usec
TE 294.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

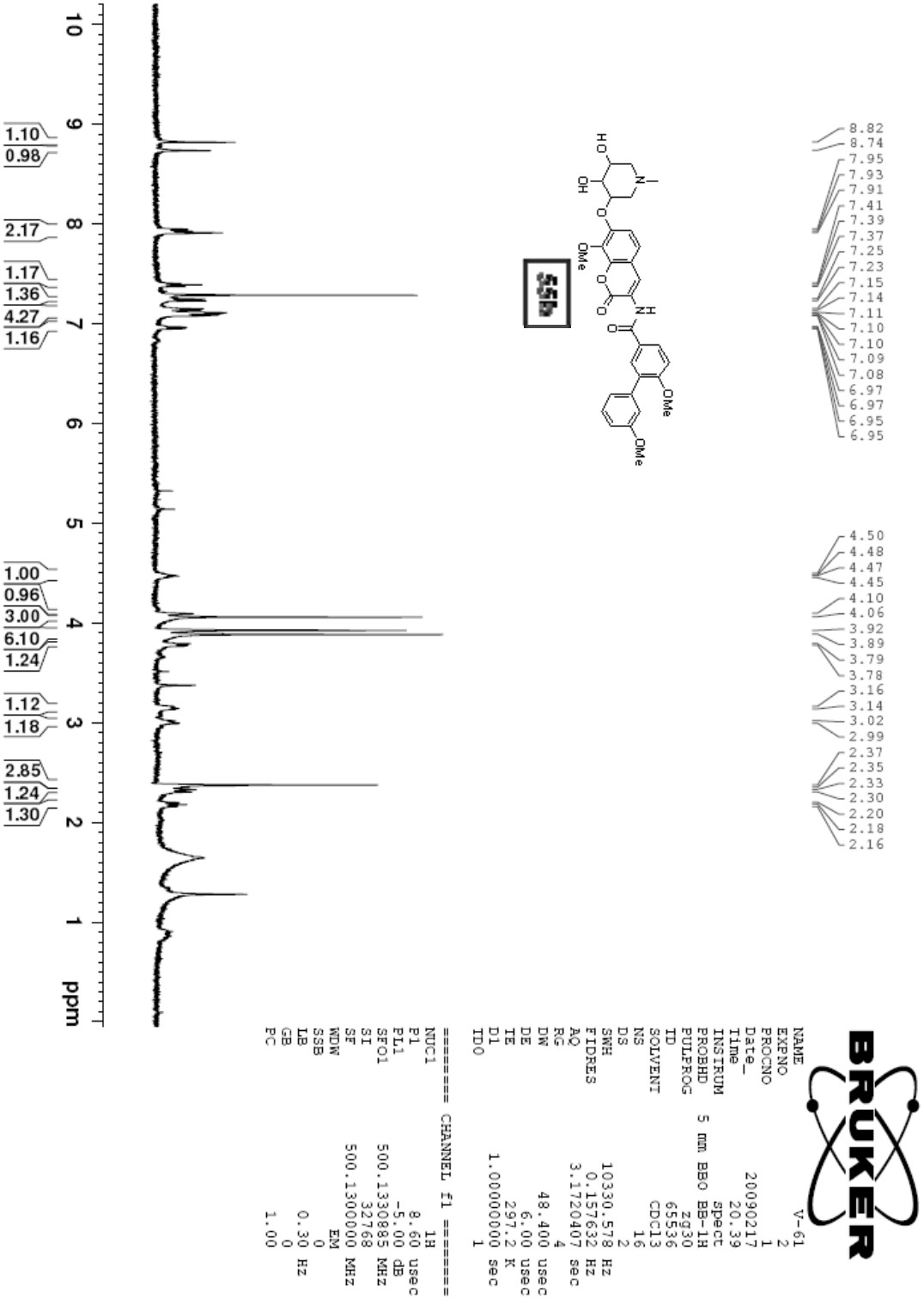

169.46
169.41
165.54
165.48
159.81
159.75
159.51
159.35
159.33
156.73
156.06
149.47
149.35
138.62
138.59
131.03
130.98
129.96
129.19
128.17
126.11
126.00
125.76
125.67
124.33
124.02
122.00
121.96
121.72
115.39
115.26
115.21
115.19
113.83
113.71
113.16
113.13
111.01
110.54
109.81
71.99
71.37
55.89
55.33
50.27
46.64
45.53
41.95
30.00
28.78
23.26
21.46
21.38
21.15
53g
BRUKER
NAME II-121-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20080916
Time 23.08
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1144
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 use
DE 6.00 use
TE 294.4 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
========== CHANNEL f1 ======
NUC1 13C
P1 9.85 use
PL1 -2.00 dB
SFO1 100.6228298 MHz
========== CHANNEL f2 ======
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 use
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

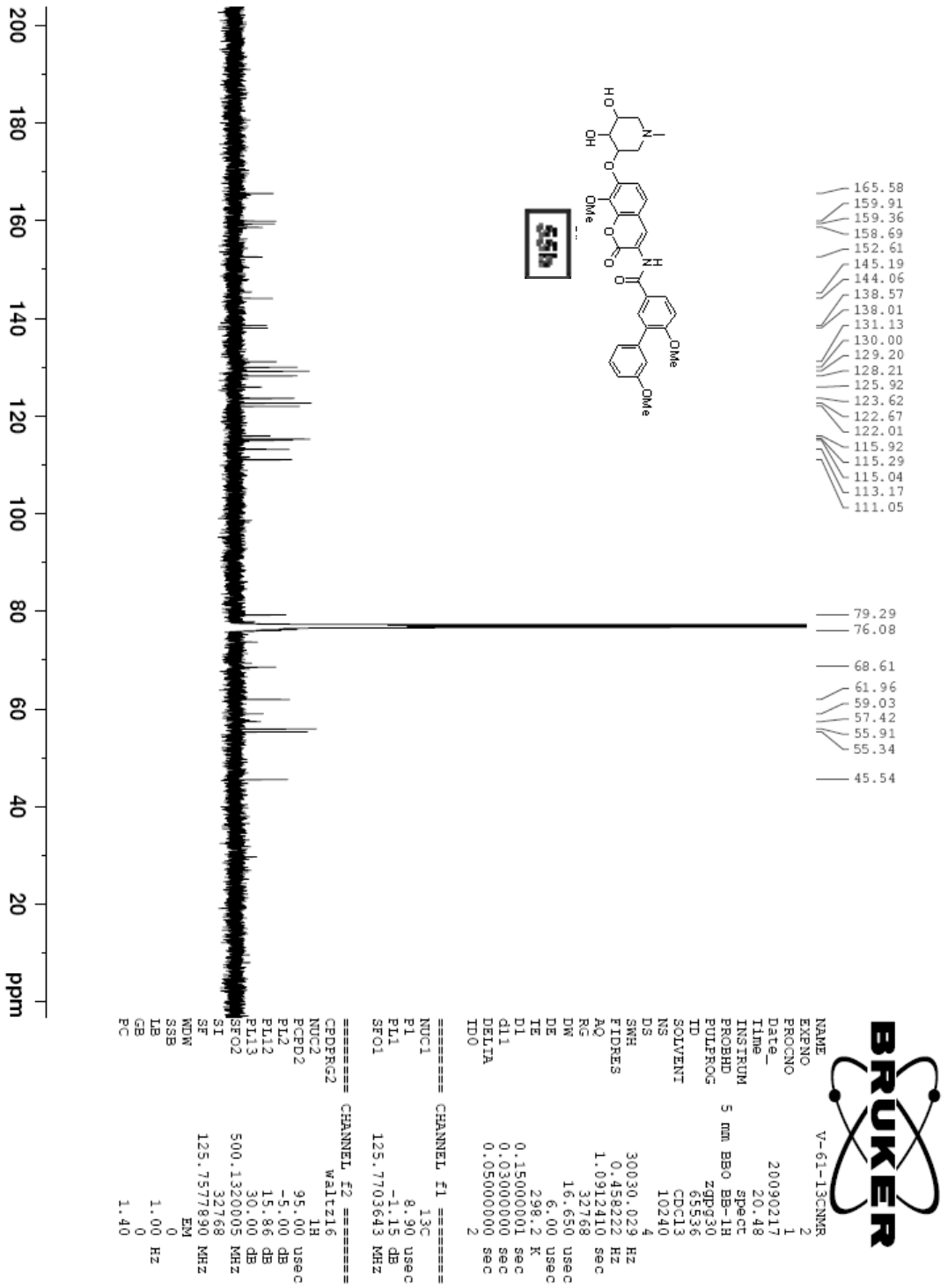

8.71
8.68
8.67
8.67
7.92
7.92
7.90
7.88
7.88
7.87
7.39
7.38
7.36
7.31
7.30
7.28
7.26
7.25
7.15
7.14
7.12
7.12
7.11
7.11
7.10
7.09
7.08
7.07
7.05
7.04
6.95
6.95
6.94
6.93
6.92
4.66
4.61
4.59
4.48
4.47
4.15
4.11
4.01
4.01
4.00
3.99
3.98
3.97
3.90
3.87
3.87
3.79
3.78
3.76
3.67
3.66
3.36
3.36
3.35
3.33
3.33
2.84
2.84
2.26
2.19
2.01
NAME II-107-ac
EXPNO 2
PROCNO 1
Date_ 20080911
Time 11.49
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 181
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.00
2.02
0.98
0.58
0.56
3.62
1.43
1.02
0.65
1.48
1.14
3.31
3.27
2.03
1.24
0.60
1.78
3.14
1.54
9
8
7
6
5
4
3
2
1
ppm
OMe
OMe

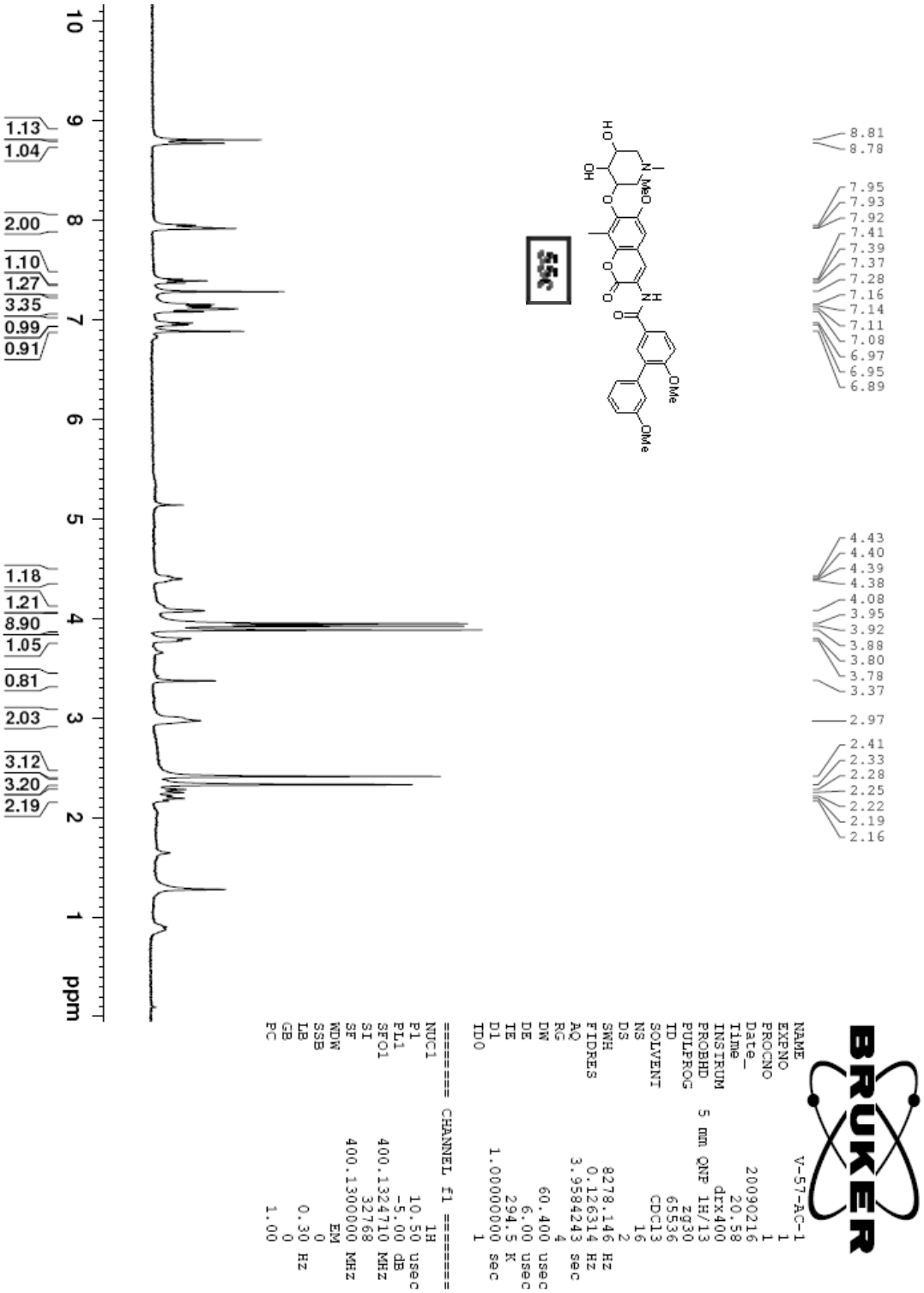

171.61
170.74
165.72
160.00
159.53
159.32
157.05
156.09
149.44
149.26
138.80
131.17
130.16
129.36
128.41
128.34
126.15
126.03
124.35
123.93
122.22
121.93
115.49
115.09
114.92
114.31
114.12
113.31
111.22
110.58
109.59
74.56
73.27
69.48
68.40
65.94
56.06
55.52
49.77
45.91
43.20
43.11
21.64
21.50
8.48
8.37
OMe
OMe
200
180
160
140
120
100
80
60
40
20
ppm
NAME II-107-ac-13cnmr
EXPNO 2
PROCNO 1
Date_ 20080911
Time 12.02
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577658 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

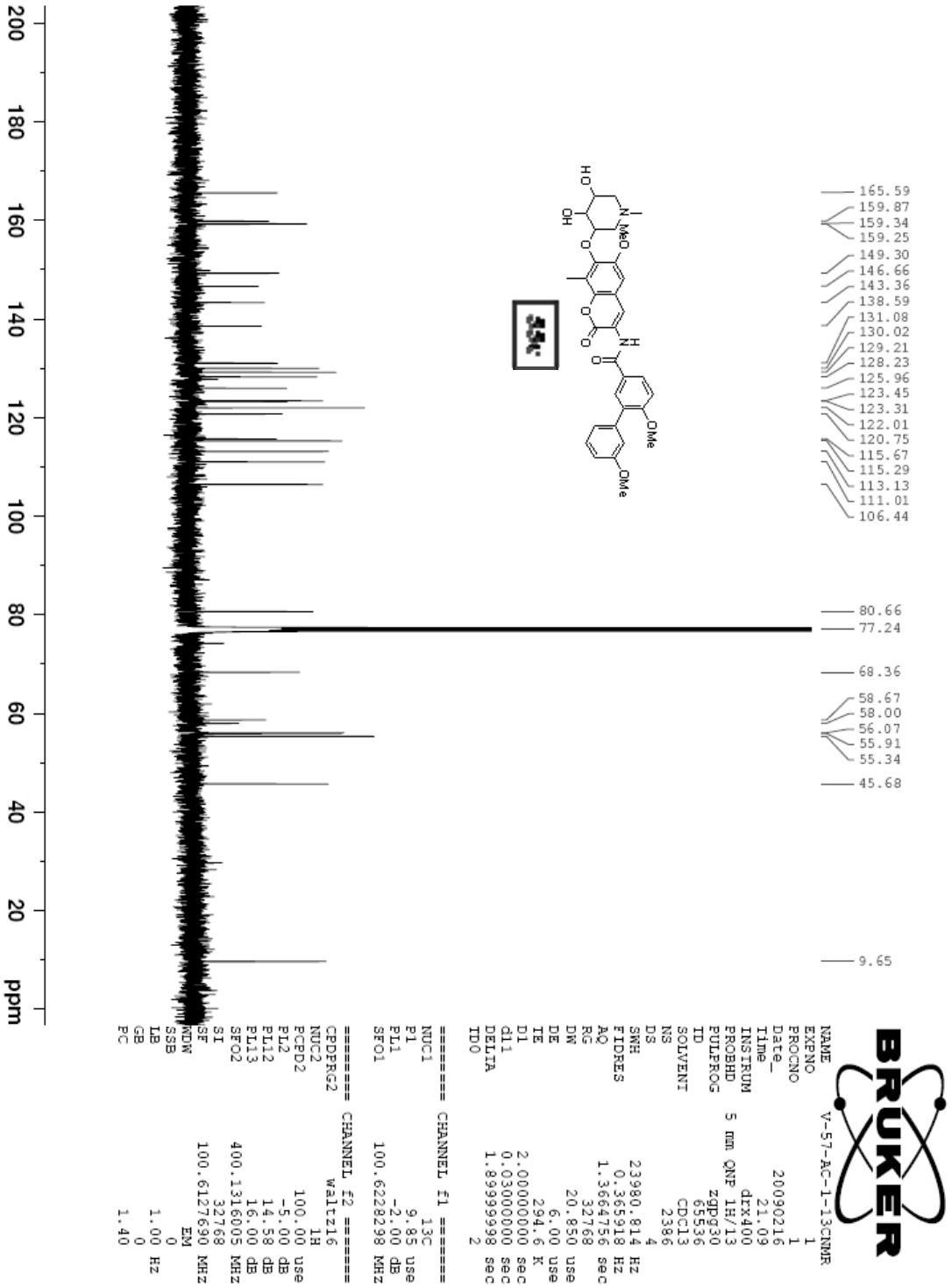

8.79
8.72
7.94
7.91
7.41
7.39
7.37
7.35
7.33
7.28
7.16
7.14
7.12
7.10
7.08
7.05
6.97
6.95
4.61
4.10
3.92
3.88
3.78
3.76
3.11
3.09
3.02
2.99
2.35
2.12
2.10
2.07
55a
OMe
OMe
HO
OH
N
O
O
O
N
H
O
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
BRUKER
NAME II-199-PTLC
EXPNO 1
PROCNO 1
Date_ 20081113
Time_ 10.03
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146
FIDRES 0.126314
AQ 3.9584243
RG 161.3
DW 60.400
DE 6.00
TE 295.4
D1 1.00000000
TD0 1
========== CHANNEL f1 ====
NUC1 1H
P1 10.50
PL1 -5.00
SFO1 400.1324710
SI 32768
SF 400.1300000
WDW EM
SSB 0
LB 0.30
GB 0
PC 1.00

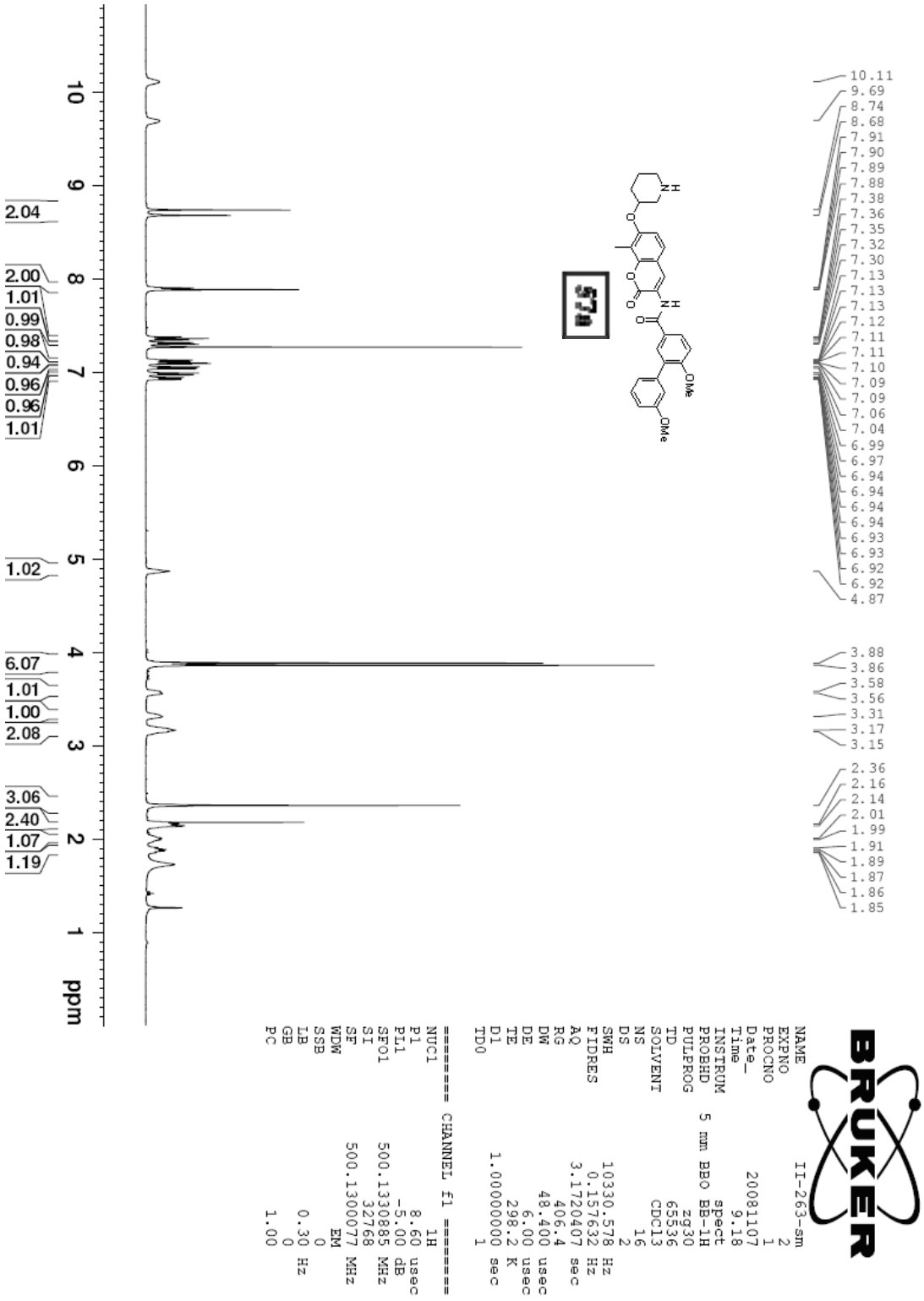

55a
165.54
159.80
159.44
159.34
157.41
149.26
138.60
131.02
129.98
129.19
128.20
126.03
125.69
124.15
122.02
121.92
115.50
115.26
114.02
113.15
111.23
111.02
77.24
73.49
68.56
59.07
57.02
55.90
55.34
45.49
8.44
180
160
140
120
100
80
60
40
20
0
ppm
NAME II-199-pTLC-13CNMR
EXPNO 1
PROCNO 1
Date_ 20081113
Time_ 22.00
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2298
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 1625.5
DW 20.850 usec
DE 6.00 usec
TE 295.0 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

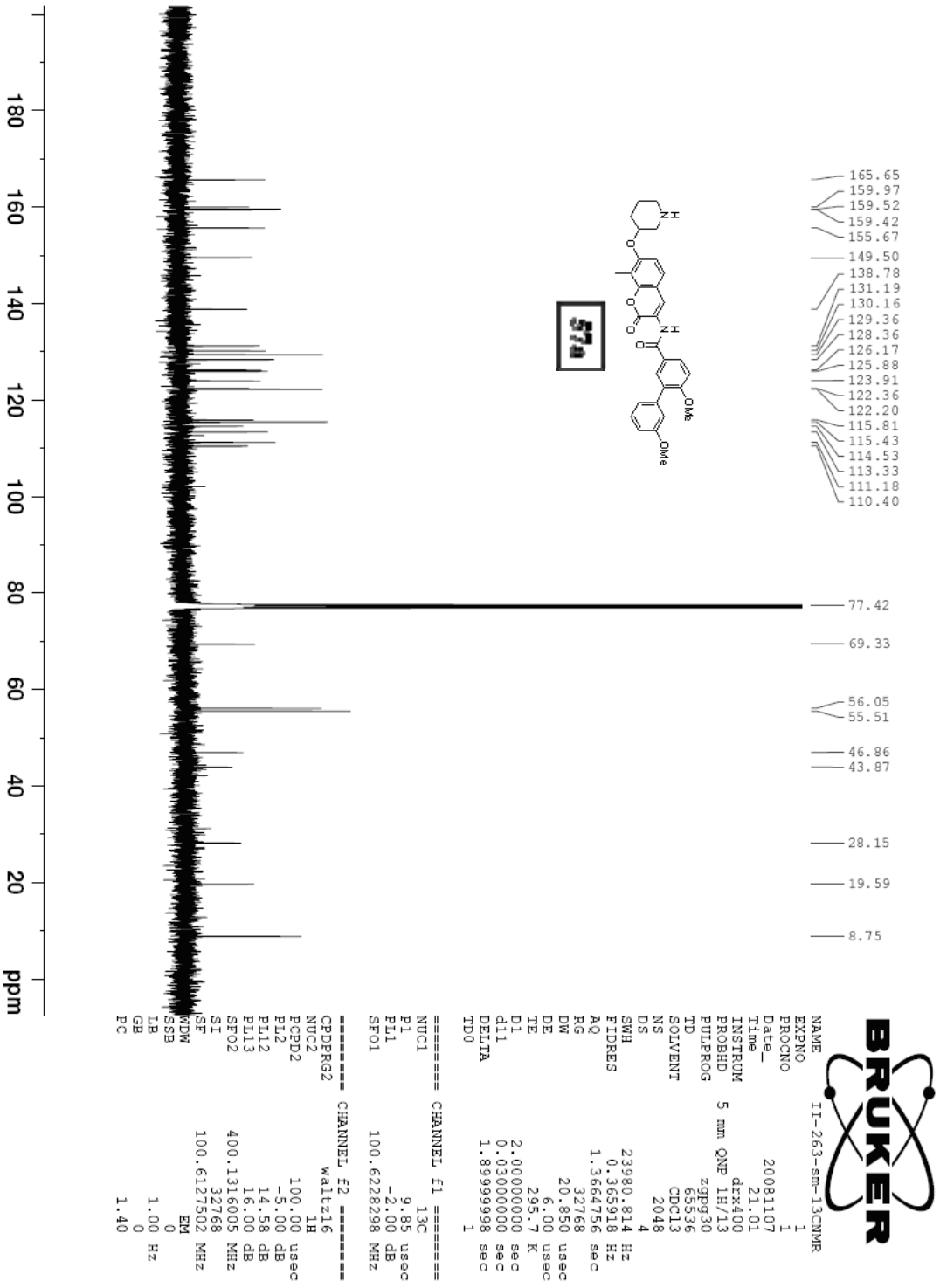

8.82
8.74
7.95
7.93
7.91
7.41
7.39
7.37
7.25
7.23
7.15
7.14
7.11
7.10
7.10
7.09
7.08
6.97
6.97
6.95
6.95
4.50
4.48
4.47
4.45
4.10
4.06
3.92
3.89
3.79
3.78
3.16
3.14
3.02
2.99
2.37
2.35
2.33
2.30
2.20
2.18
2.16
55b
OMe
OMe
1.10
0.98
2.17
1.17
1.36
4.27
1.16
1.00
0.96
3.00
6.10
1.24
1.12
1.18
2.85
1.24
1.30
10
9
8
7
6
5
4
3
2
1
ppm
NAME V-61
EXPNO 2
PROCNO 1
Date_ 20090217
Time_ 20.39
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

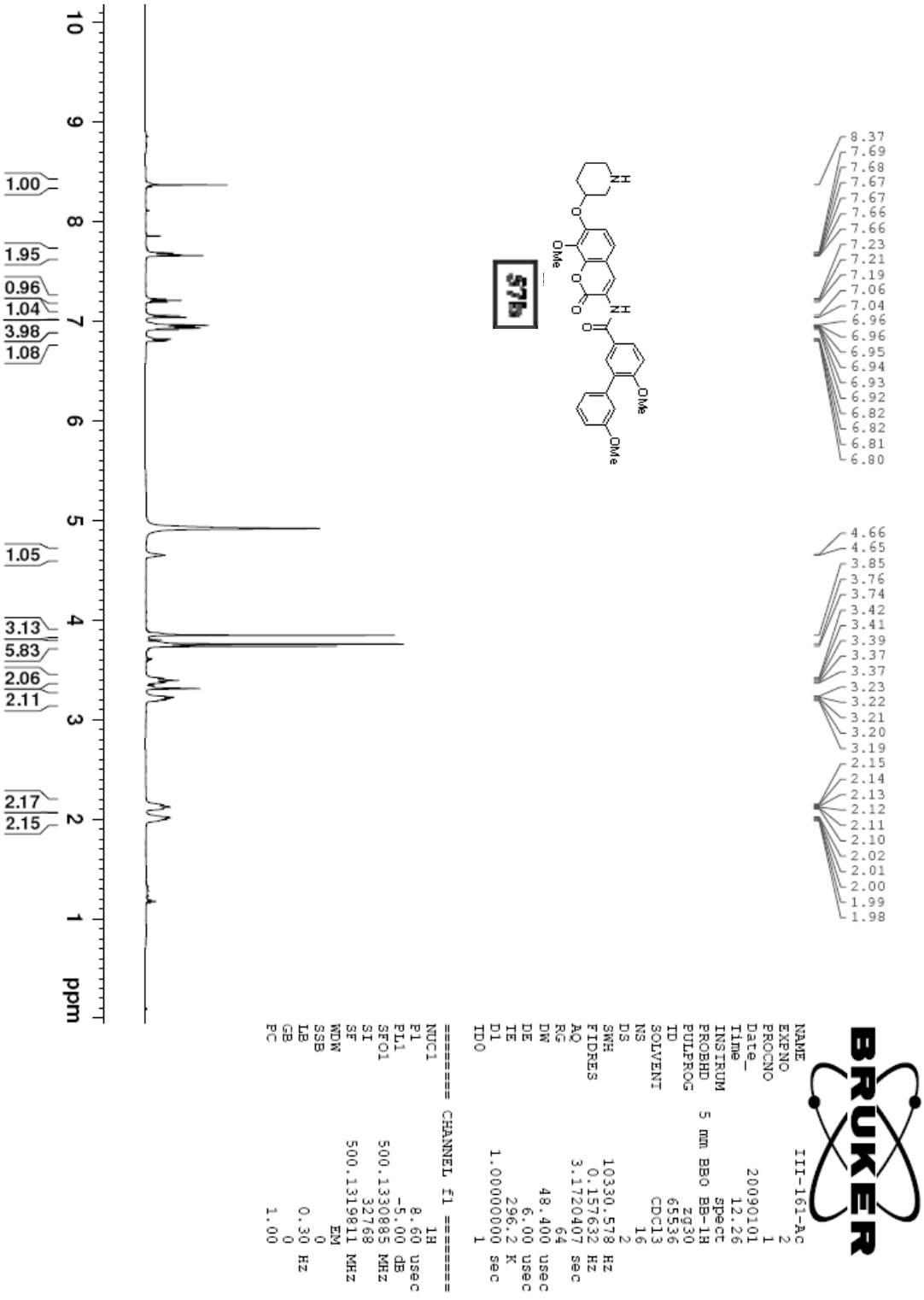

55b
165.58
159.91
159.36
158.69
152.61
145.19
144.06
138.57
138.01
131.13
130.00
129.20
128.21
125.92
123.62
122.67
122.01
115.92
115.29
115.04
113.17
111.05
79.29
76.08
68.61
61.96
59.03
57.42
55.91
55.34
45.54
200
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-61-13CNMR
EXPNO 2
PROCNO 1
Date_ 20090217
Time 20.48
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 10240
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577890 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

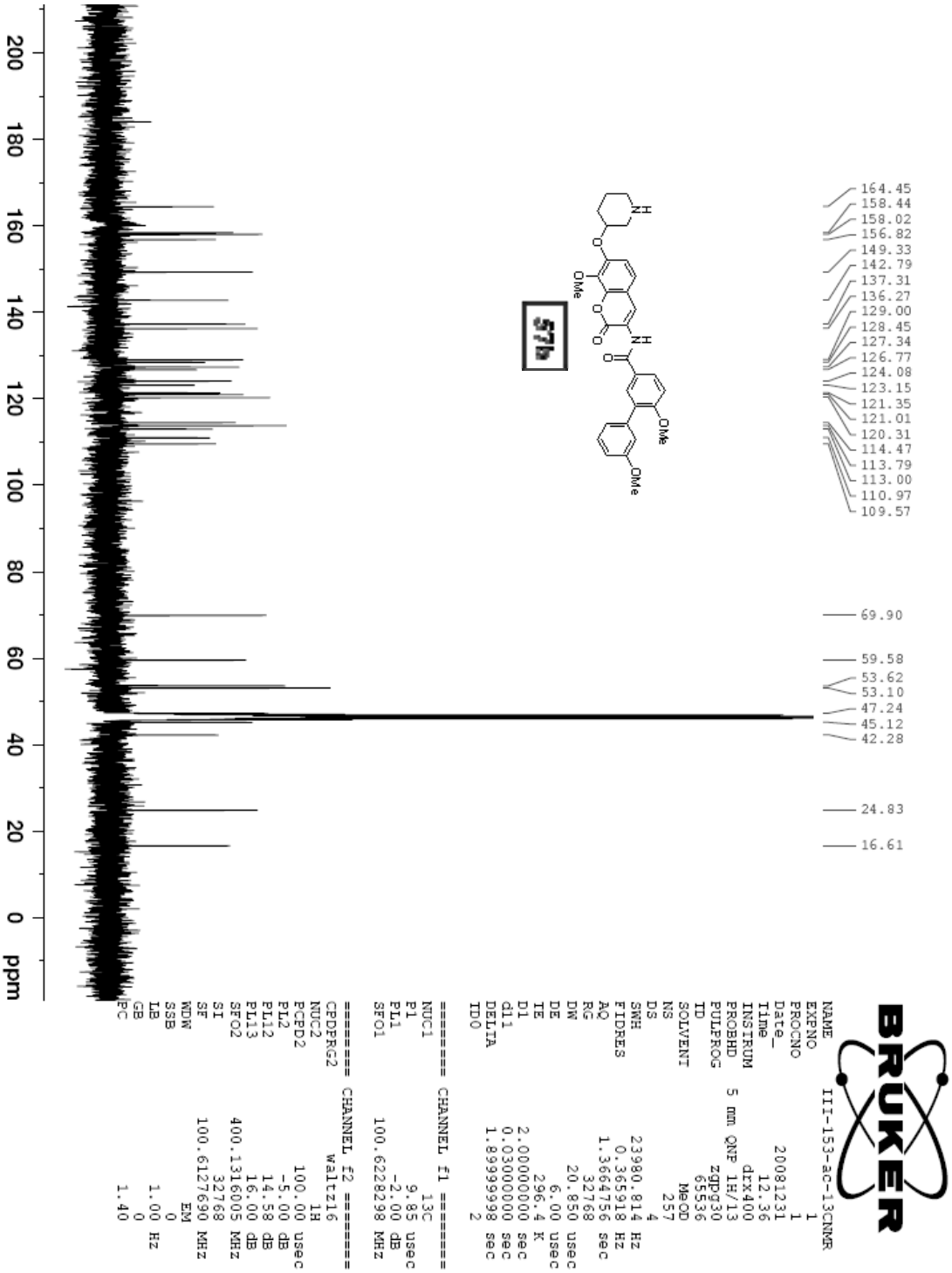

55c
8.81
8.78
7.95
7.93
7.92
7.41
7.39
7.37
7.28
7.16
7.14
7.11
7.08
6.97
6.95
6.89
4.43
4.40
4.39
4.38
4.08
3.95
3.92
3.88
3.80
3.78
3.37
2.97
2.41
2.33
2.28
2.25
2.22
2.19
2.16
1.13
1.04
2.00
1.10
1.27
3.35
0.99
0.91
1.18
1.21
8.90
1.05
0.81
2.03
3.12
3.20
2.19
10
9
8
7
6
5
4
3
2
1
ppm
NAME V-57-AC-1
EXPNO 1
PROCNO 1
Date_ 20090216
Time 20.58
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
PL1 400.1324710 MHz
SFO1 32768
SI 400.1300000 MHz
SF EM
WDW 0
SSB 0.30 Hz
LB 0
GB 1.00
PC

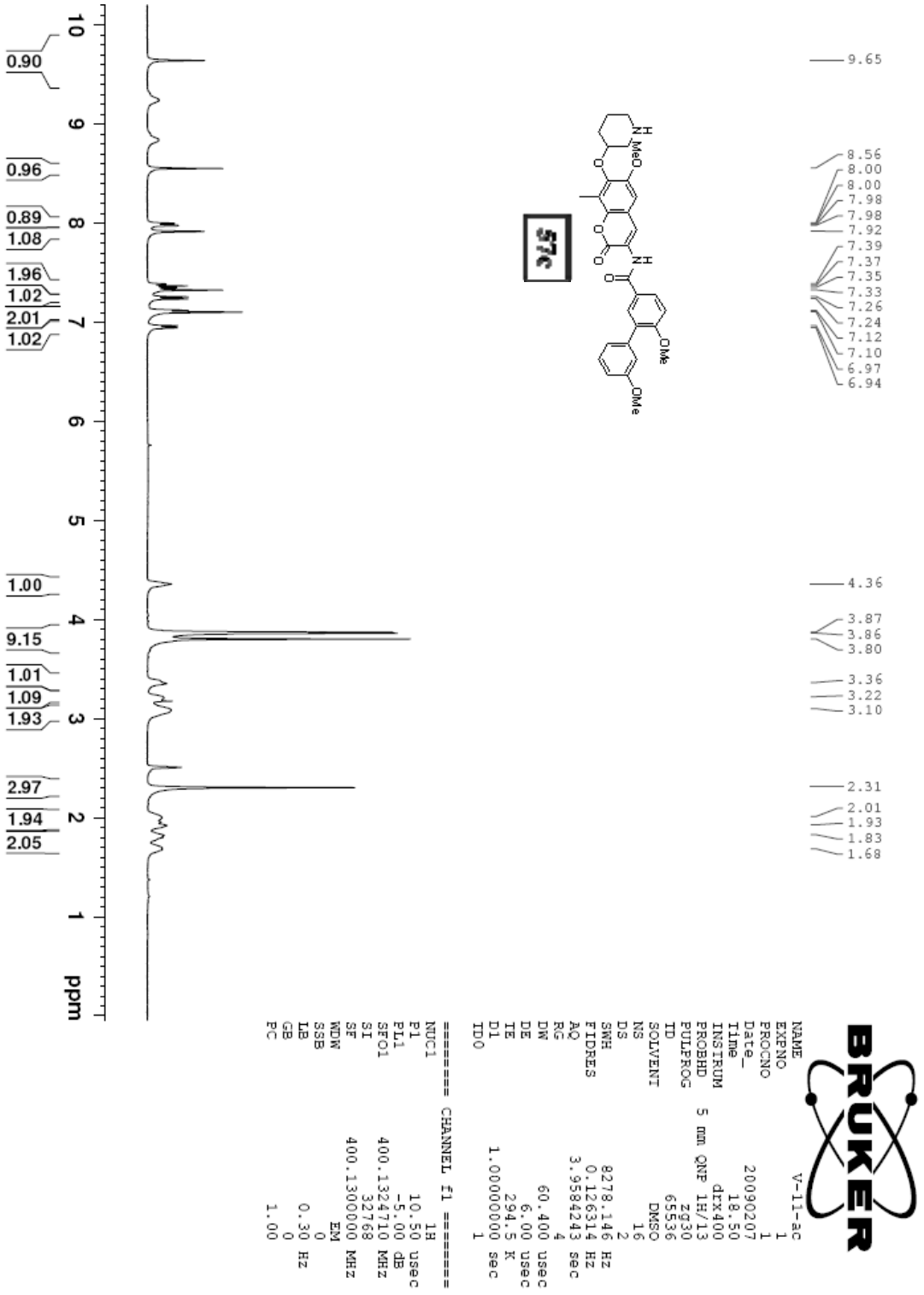

165.59
159.87
159.34
159.25
149.30
146.66
143.36
138.59
131.08
130.02
129.21
128.23
125.96
123.45
123.31
122.01
120.75
115.67
115.29
113.13
111.01
106.44
80.66
77.24
68.36
58.67
58.00
56.07
55.91
55.34
45.68
9.65
200
180
160
140
120
100
80
60
40
20
ppm
V-57-Ac-1-13CNMR
1
20090216
21.09
drx400
5 mm QNP 1H/13
zgpg30
65536
CDCl3
2386
4
23980.814 Hz
0.365918 Hz
1.3664756 sec
32768
20.850 use
6.00 use
294.6 K
2.00000000 sec
0.03000000 sec
1.89999998 sec
2
13C
9.85 use
-2.00 dB
100.6228298 MHz
waltz16
1H
100.00 use
-5.00 dB
14.58 dB
16.00 dB
400.1316005 MHz
32768
100.6127690 MHz
EM
0
1.00 Hz
0
1.40

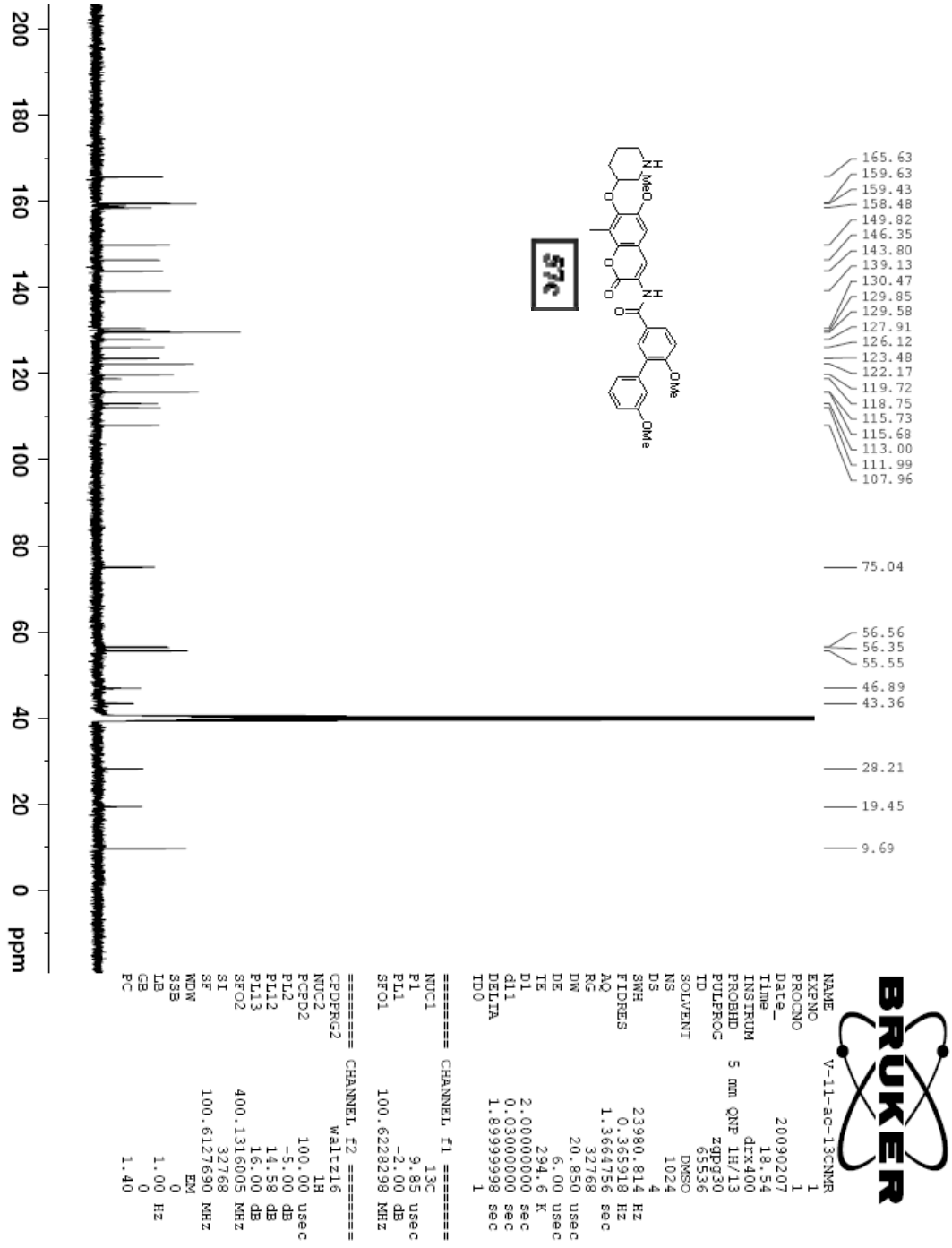

10.11
9.69
8.74
8.68
7.91
7.90
7.89
7.88
7.38
7.36
7.35
7.32
7.30
7.13
7.13
7.13
7.12
7.11
7.11
7.10
7.09
7.09
7.06
7.04
6.99
6.97
6.94
6.94
6.94
6.94
6.93
6.93
6.92
6.92
4.87
3.88
3.86
3.58
3.56
3.31
3.17
3.15
2.36
2.16
2.14
2.01
1.99
1.91
1.89
1.87
1.86
1.85
2.04
2.00
1.01
0.99
0.98
0.94
0.96
0.96
1.01
1.02
6.07
1.01
1.00
2.08
3.06
2.40
1.07
1.19
10
9
8
7
6
5
4
3
2
1
ppm
OMe
OMe
570
BRUKER
NAME II-263-sm
EXPNO 2
PROCNO 1
Date_ 20081107
Time 9.18
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 406.4
DW 48.400 usec
DE 6.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300077 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

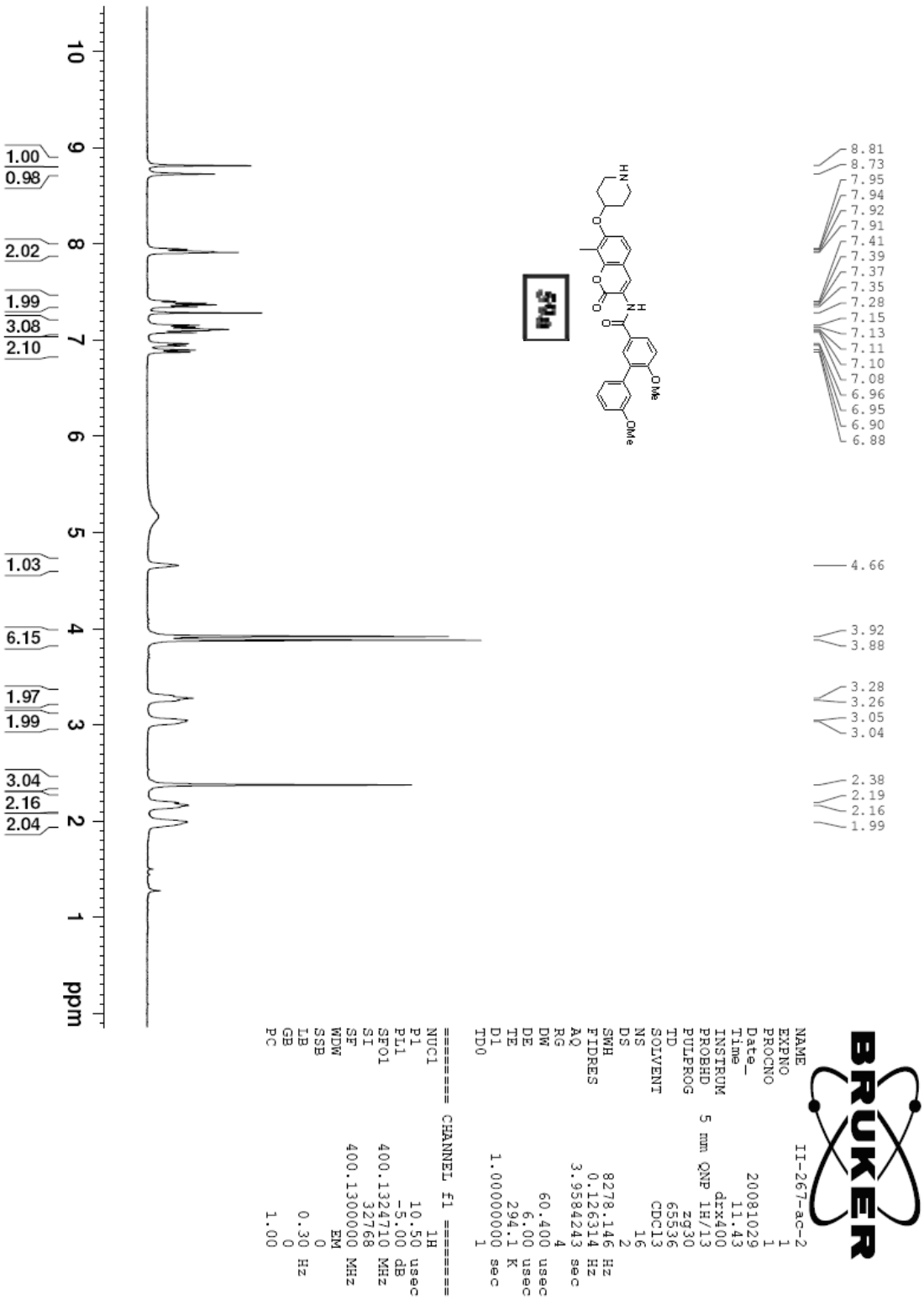

165.65
159.97
159.52
159.42
155.67
149.50
138.78
131.19
130.16
129.36
128.36
126.17
125.88
123.91
122.36
122.20
115.81
115.43
114.53
113.33
111.18
110.40
77.42
69.33
56.05
55.51
46.86
43.87
28.15
19.59
8.75
57a
OMe
OMe
ppm
180
160
140
120
100
80
60
40
20
BRUKER
NAME II-263-sm-13CNMR
EXPNO 1
PROCNO 1
Date_ 20081107
Time_ 21.01
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 295.7 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SF 100.6127502 MHz
SI 32768
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

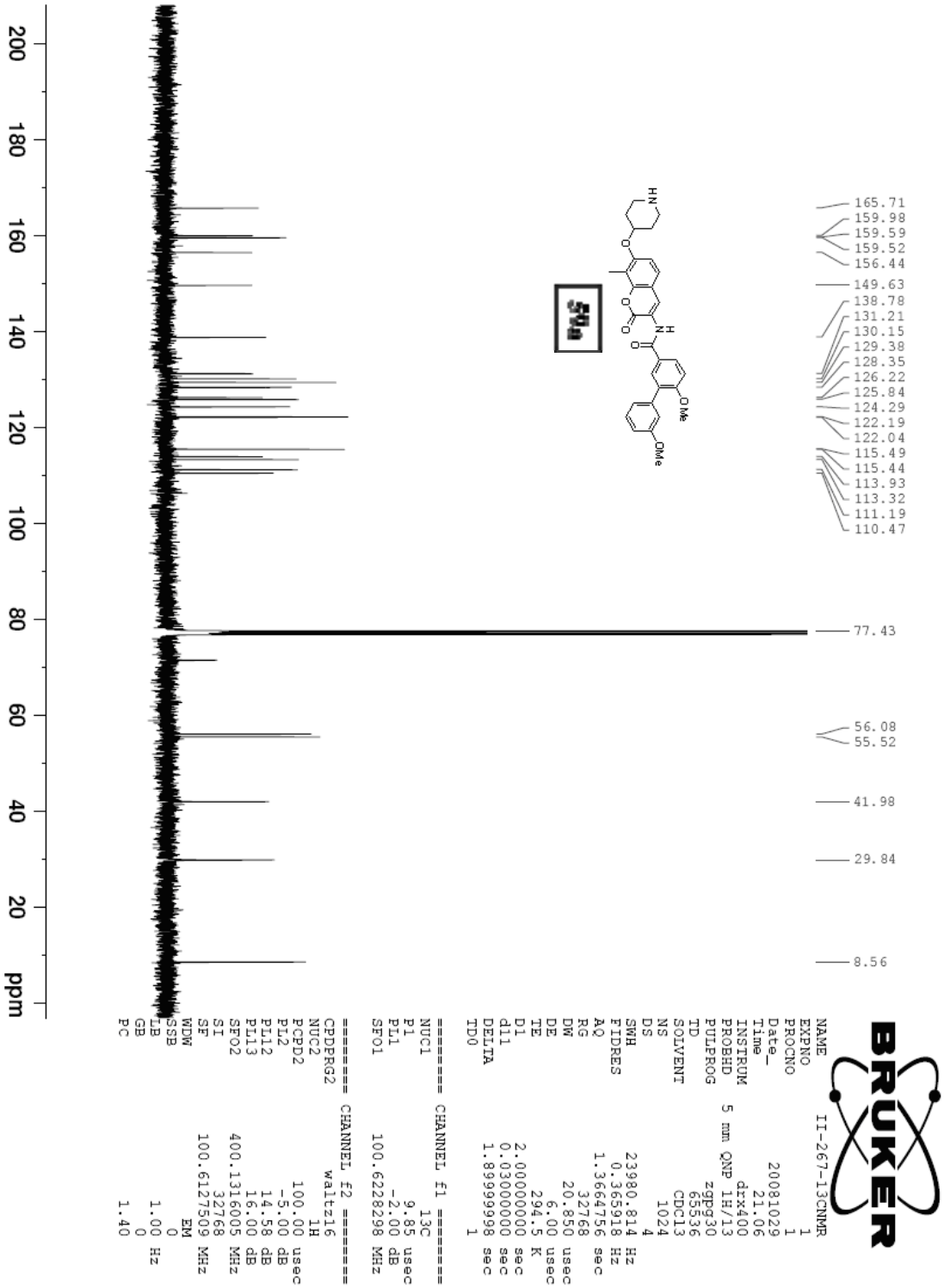

8.37
7.69
7.68
7.67
7.67
7.66
7.66
7.23
7.21
7.19
7.06
7.04
6.96
6.96
6.95
6.94
6.93
6.92
6.82
6.82
6.81
6.80
4.66
4.65
3.85
3.76
3.74
3.42
3.41
3.39
3.37
3.37
3.23
3.22
3.21
3.20
3.19
2.15
2.14
2.13
2.12
2.11
2.10
2.02
2.01
2.00
1.99
1.98
OMe
OMe
57b
1.00
1.95
0.96
1.04
3.98
1.08
1.05
3.13
5.83
2.06
2.11
2.17
2.15
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME III-161-Ac
EXPNO 2
PROCNO 1
Date_ 20090101
Time 12.26
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 64
DW 48.400 usec
DE 6.00 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1319811 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

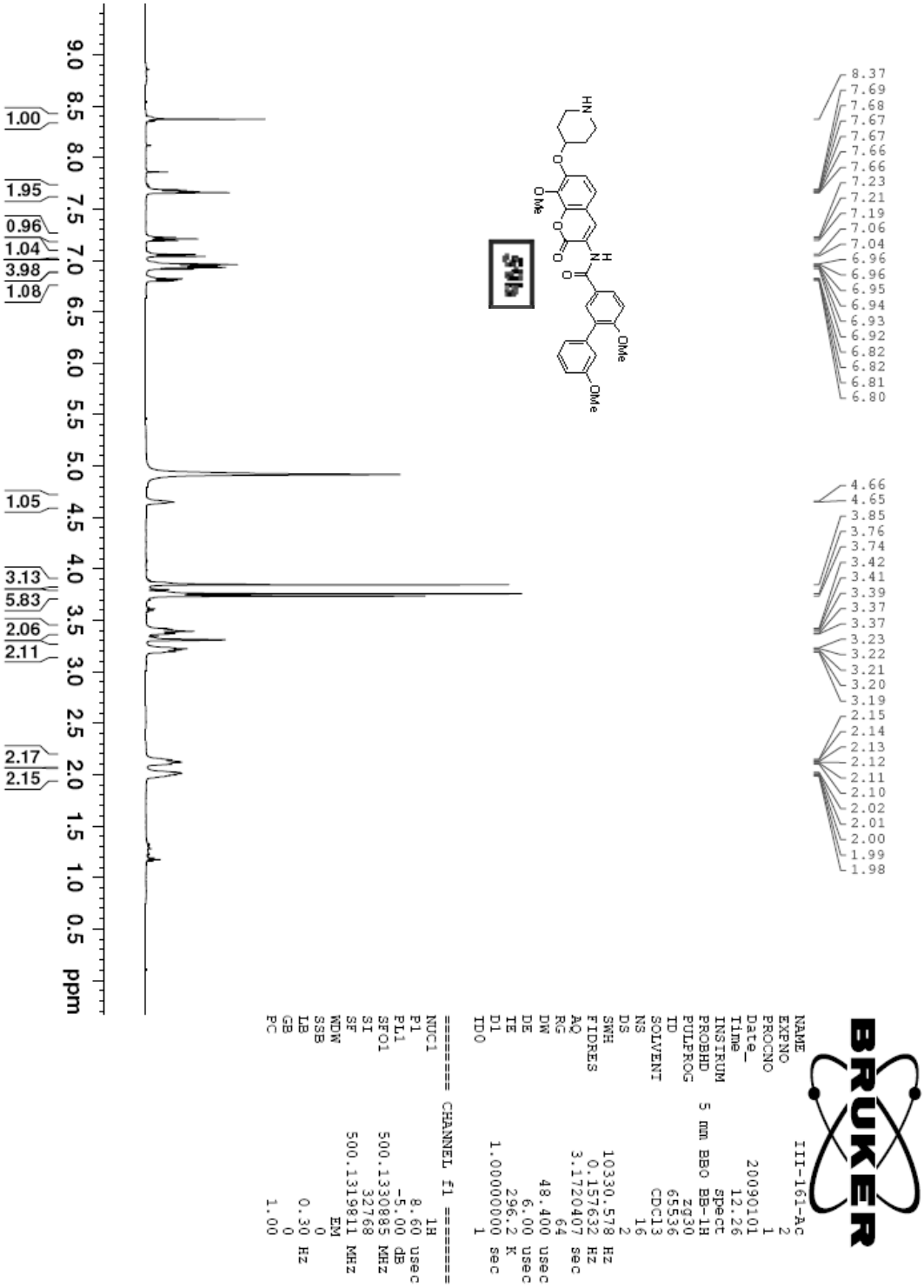

164.45
158.44
158.02
156.82
149.33
142.79
137.31
136.27
129.00
128.45
127.34
126.77
124.08
123.15
121.35
121.01
120.31
114.47
113.79
113.00
110.97
109.57
69.90
59.58
53.62
53.10
47.24
45.12
42.28
24.83
16.61
57b
OMe
OMe
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME III-153-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20081231
Time 12.36
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT MeOD
NS 257
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
ID0 2
======== CHANNEL f1 ========
NUC1 13c
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

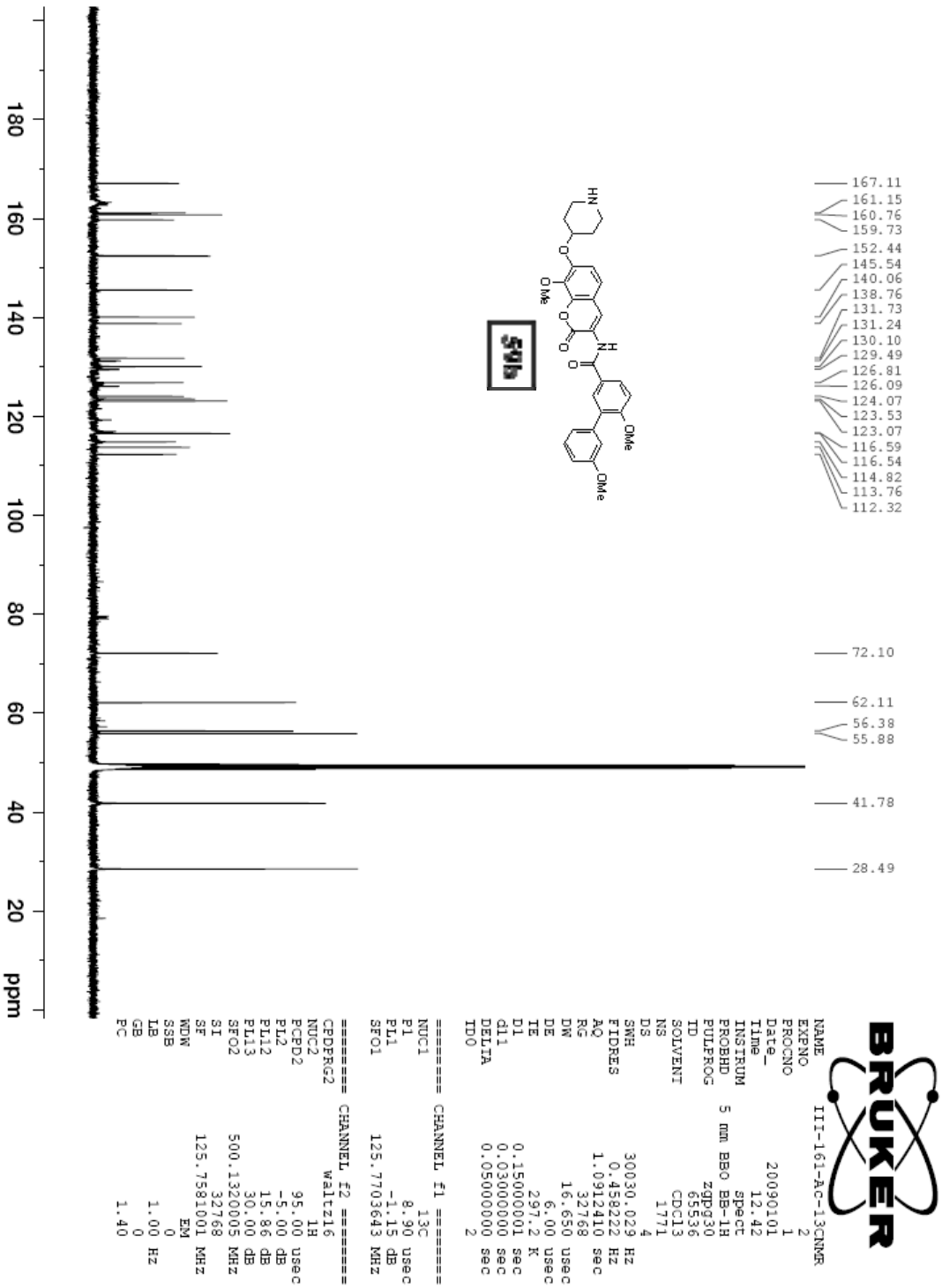

9.65
8.56
8.00
8.00
7.98
7.98
7.92
7.39
7.37
7.35
7.33
7.26
7.24
7.12
7.10
6.97
6.94
4.36
3.87
3.86
3.80
3.36
3.22
3.10
2.31
2.01
1.93
1.83
1.68
57c
0.90
0.96
0.89
1.08
1.96
1.02
2.01
1.02
1.00
9.15
1.01
1.09
1.93
2.97
1.94
2.05
10
9
8
7
6
5
4
3
2
1
ppm
NAME V-11-ac
EXPNO 1
PROCNO 1
Date_ 20090207
Time 18.50
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

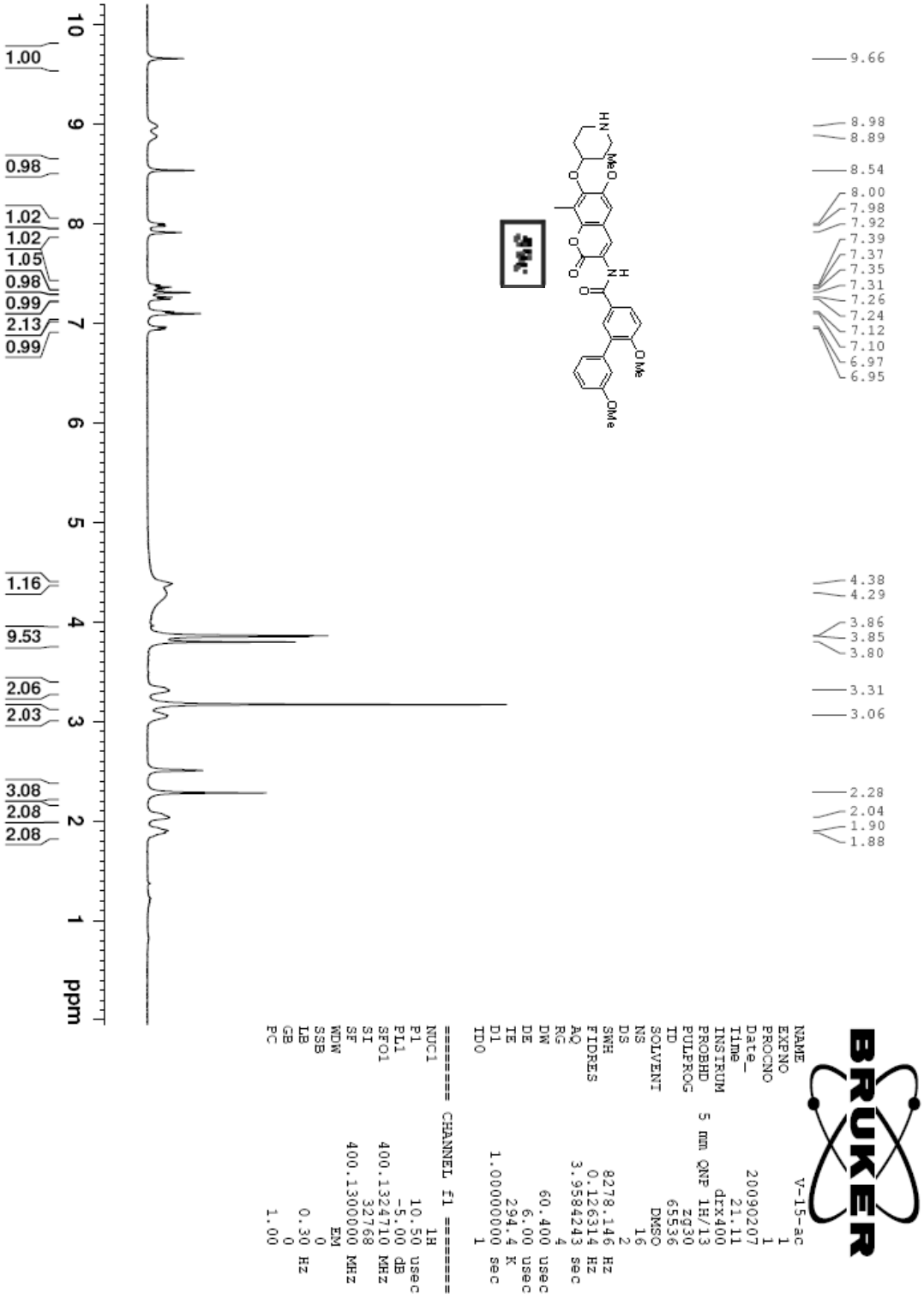

57c
MeO
OMe
OMe
165.63
159.63
159.43
158.48
149.82
146.35
143.80
139.13
130.47
129.85
129.58
127.91
126.12
123.48
122.17
119.72
118.75
115.73
115.68
113.00
111.99
107.96
75.04
56.56
56.35
55.55
46.89
43.36
28.21
19.45
9.69
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME v-11-ac-13cNMR
EXPNO 1
PROCNO 1
Date_ 20090207
Time 18.54
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1024
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

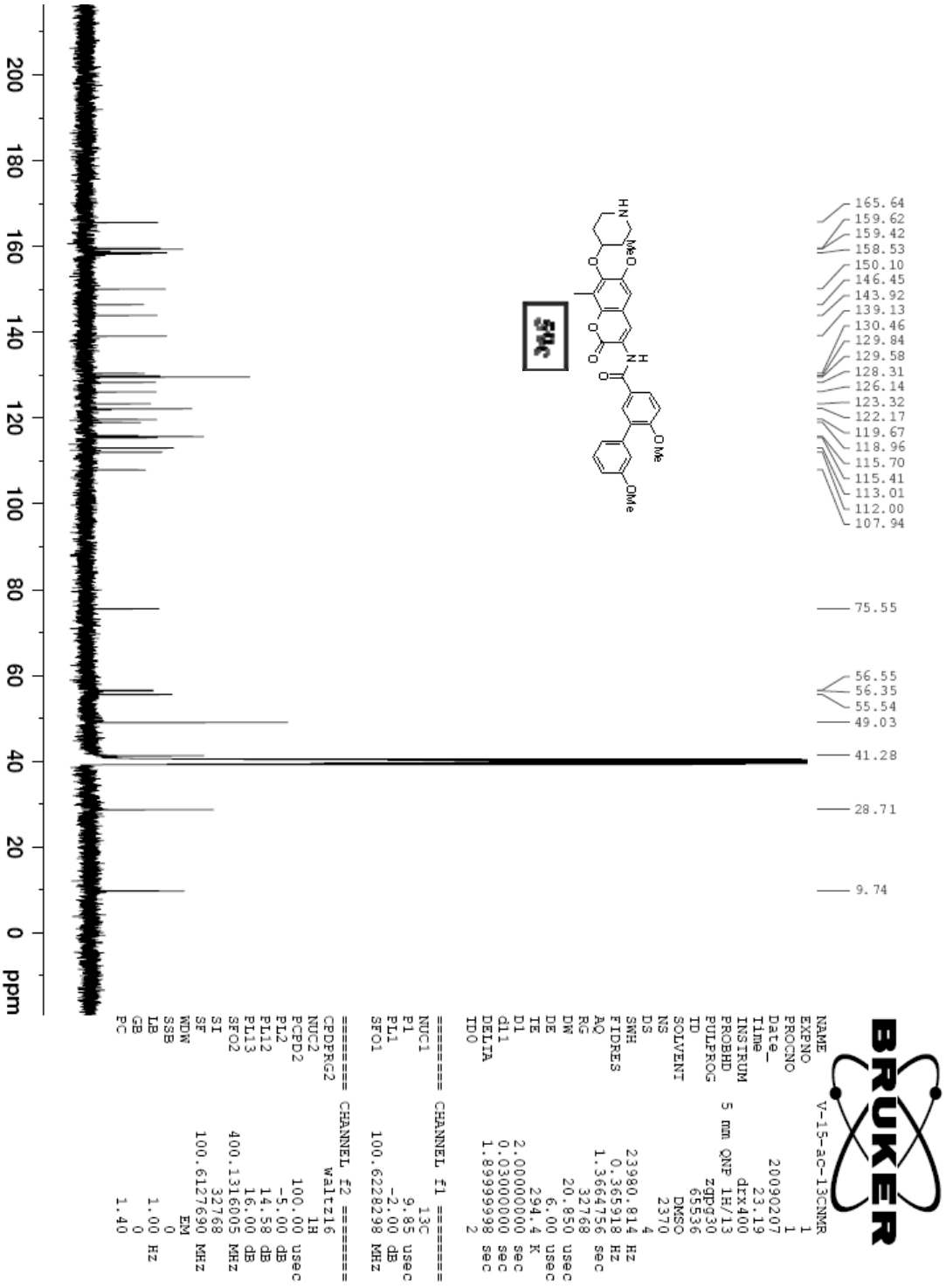

8.81
8.73
7.95
7.94
7.92
7.91
7.41
7.39
7.37
7.35
7.28
7.15
7.13
7.11
7.10
7.08
6.96
6.95
6.90
6.88
4.66
3.92
3.88
3.28
3.26
3.05
3.04
2.38
2.19
2.16
1.99
50a
1.00
0.98
2.02
1.99
3.08
2.10
1.03
6.15
1.97
1.99
3.04
2.16
2.04
10
9
8
7
6
5
4
3
2
1
ppm
NAME II-267-ac-2
EXPNO 1
PROCNO 1
Date_ 20081029
Time 11.43
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

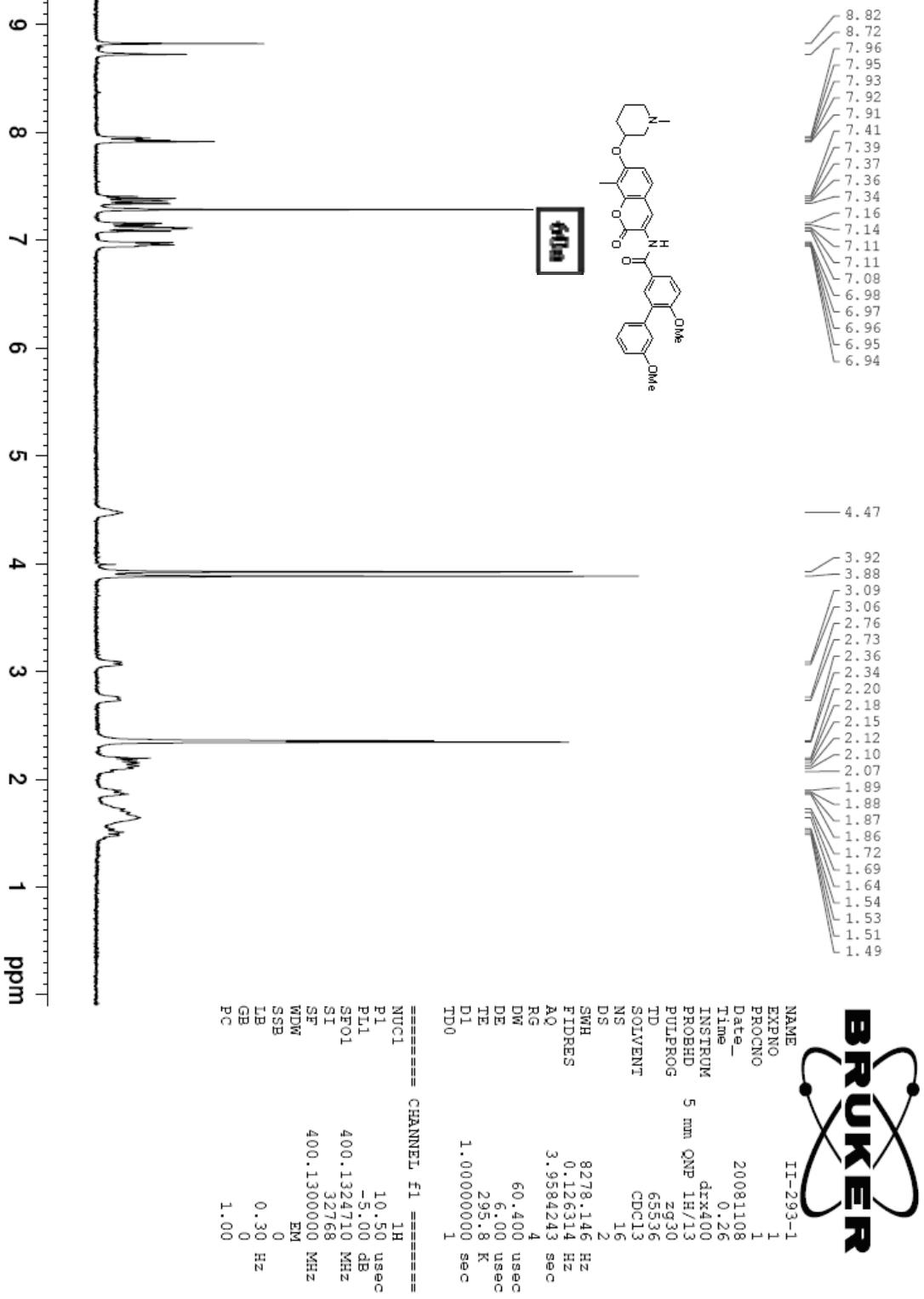

165.71
159.98
159.59
159.52
156.44
149.63
138.78
131.21
130.15
129.38
128.35
126.22
125.84
124.29
122.19
122.04
115.49
115.44
113.93
113.32
111.19
110.47
77.43
56.08
55.52
41.98
29.84
8.56
ppm
NAME II-267-13CNMR
EXPNO 1
PROCNO 1
Date_ 20081029
Time 21.06
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.5 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127509 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

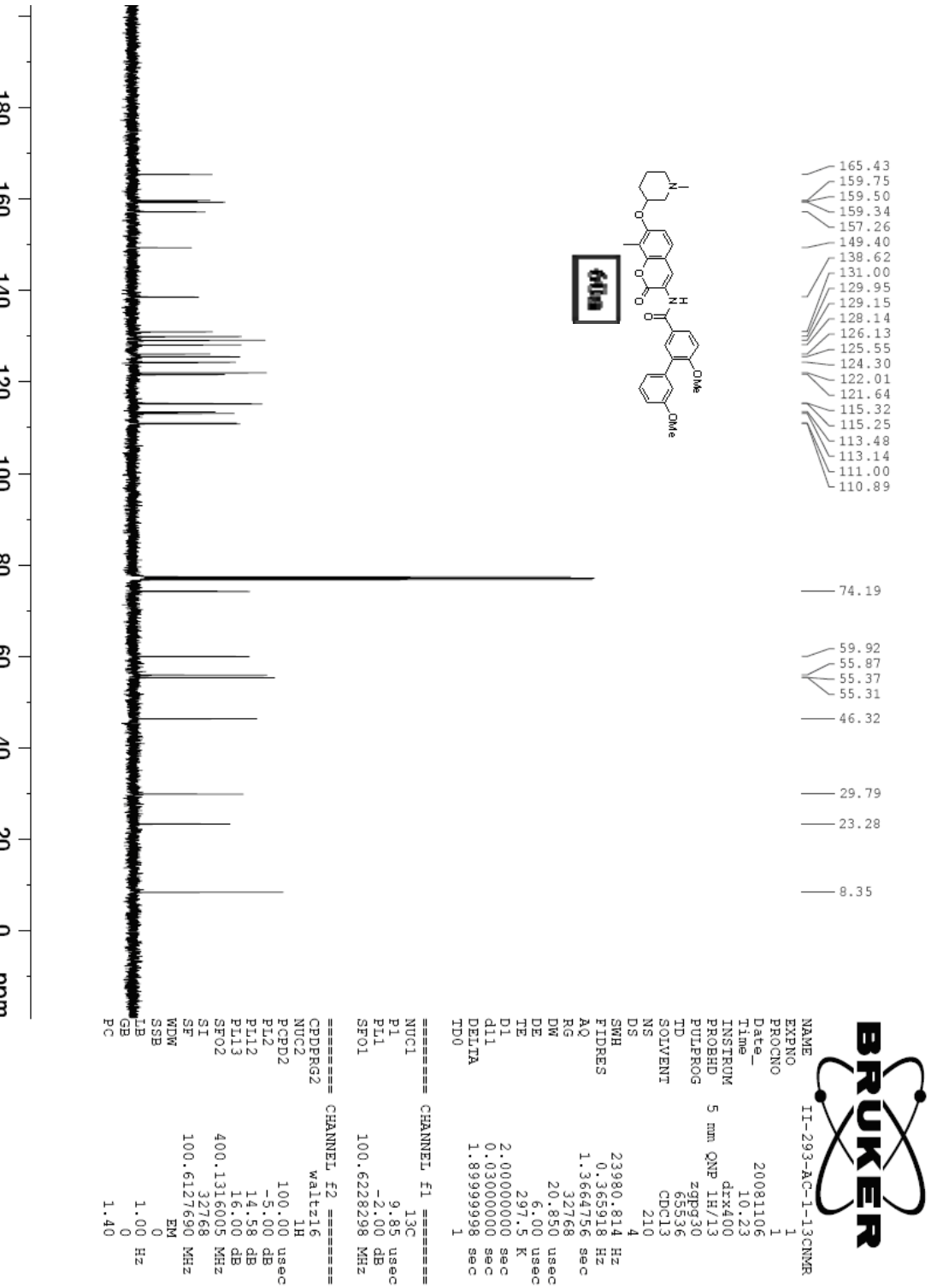

5gb
OMe
OMe
OMe
8.37
7.69
7.68
7.67
7.67
7.66
7.66
7.23
7.21
7.19
7.06
7.04
6.96
6.96
6.95
6.94
6.93
6.92
6.82
6.82
6.81
6.80
4.66
4.65
3.85
3.76
3.74
3.42
3.41
3.39
3.37
3.37
3.23
3.22
3.21
3.20
3.19
2.15
2.14
2.13
2.12
2.11
2.10
2.02
2.01
2.00
1.99
1.98
1.00
1.95
0.96
1.04
3.98
1.08
1.05
3.13
5.83
2.06
2.11
2.17
2.15
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
BRUKER
NAME III-161-Ac
EXPNO 2
PROCNO 1
Date_ 20090101
Time 12.26
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 64
DW 48.400 usec
DE 6.00 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1319611 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

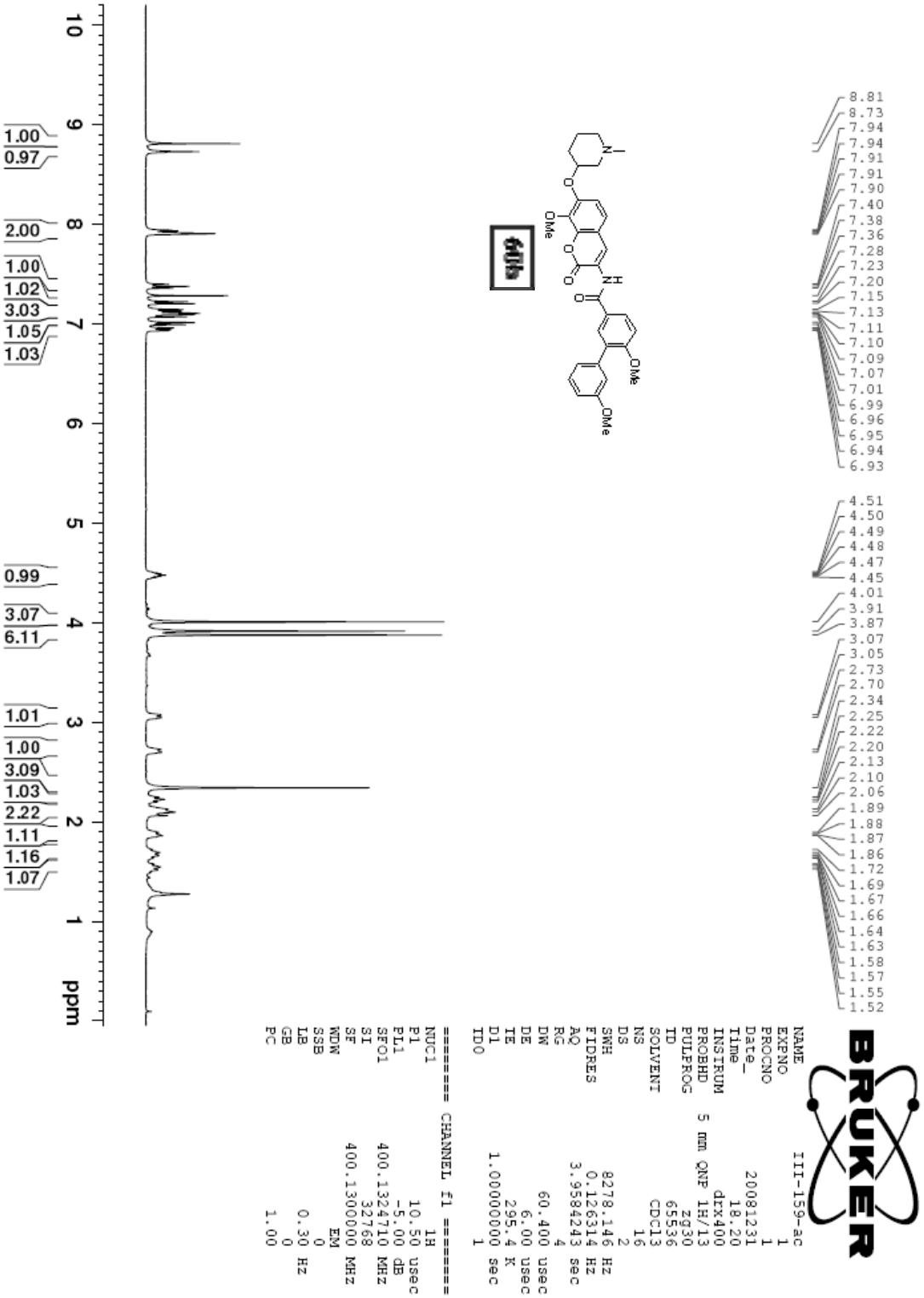

5ob
167.11
161.15
160.76
159.73
152.44
145.54
140.06
138.76
131.73
131.24
130.10
129.49
126.81
126.09
124.07
123.53
123.07
116.59
116.54
114.82
113.76
112.32
72.10
62.11
56.38
55.88
41.78
28.49
ppm
180
160
140
120
100
80
60
40
20
BRUKER
NAME III-161-AC-13CNMR
EXPNO 2
PROCNO 1
Date_ 20090101
Time_ 12.42
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1771
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 297.2 K
D1 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7581001 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

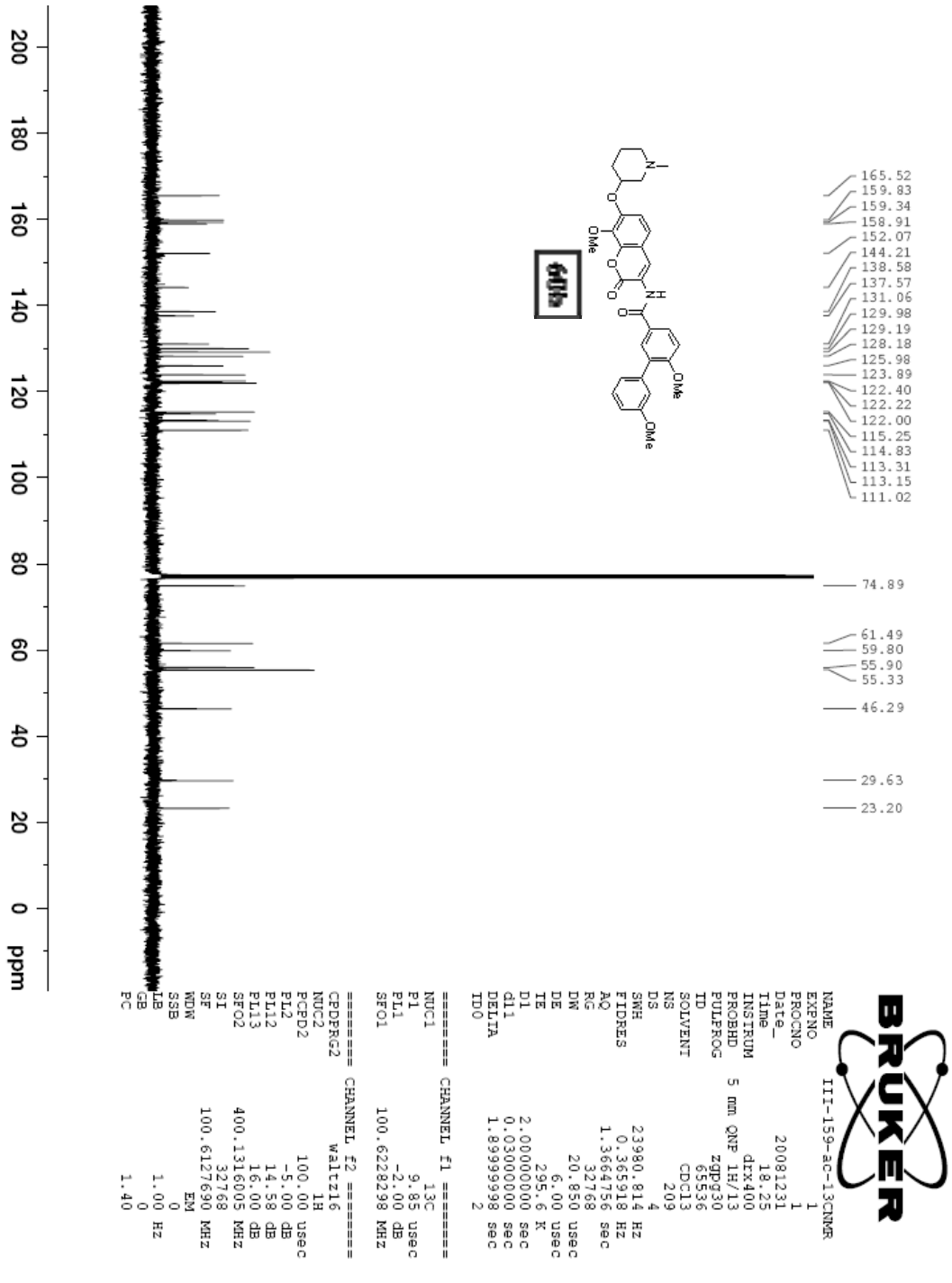

9.66
8.98
8.89
8.54
8.00
7.98
7.92
7.39
7.37
7.35
7.31
7.26
7.24
7.12
7.10
6.97
6.95
4.38
4.29
3.86
3.85
3.80
3.31
3.06
2.28
2.04
1.90
1.88
1.00
0.98
1.02
1.02
1.05
0.98
0.99
2.13
0.99
1.16
9.53
2.06
2.03
3.08
2.08
2.08
10
9
8
7
6
5
4
3
2
1
ppm
MeO
OMe
OMe
NAME V-15-ac
EXPNO 1
PROCNO 1
Date_ 20090207
Time 21.11
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
IE 294.4 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

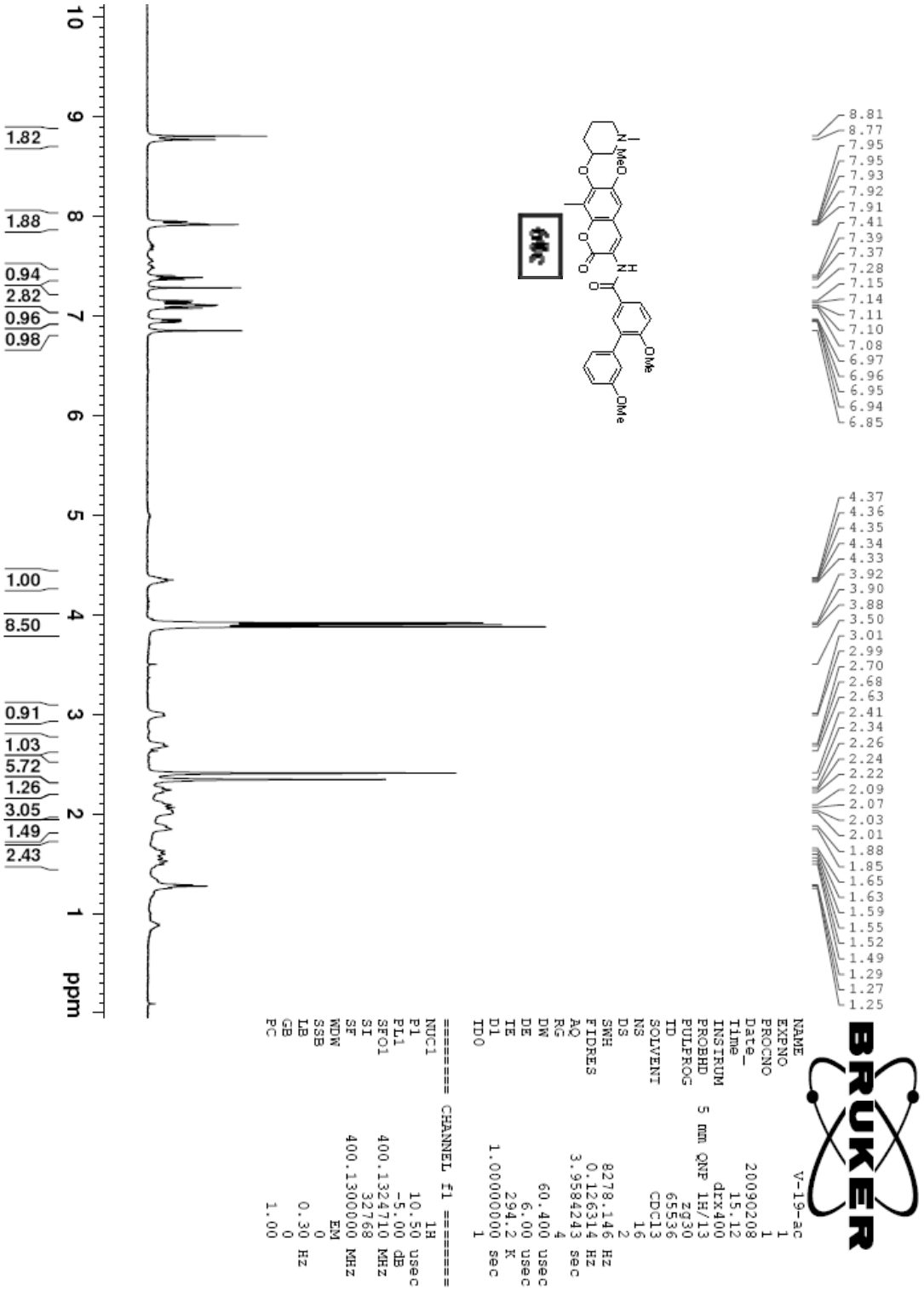

5ac
165.64
159.62
159.42
158.53
150.10
146.45
143.92
139.13
130.46
129.84
129.58
128.31
126.14
123.32
122.17
119.67
118.96
115.70
115.41
113.01
112.00
107.94
75.55
56.55
56.35
55.54
49.03
41.28
28.71
9.74
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME V-15-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090207
Time_ 23.19
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2370
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

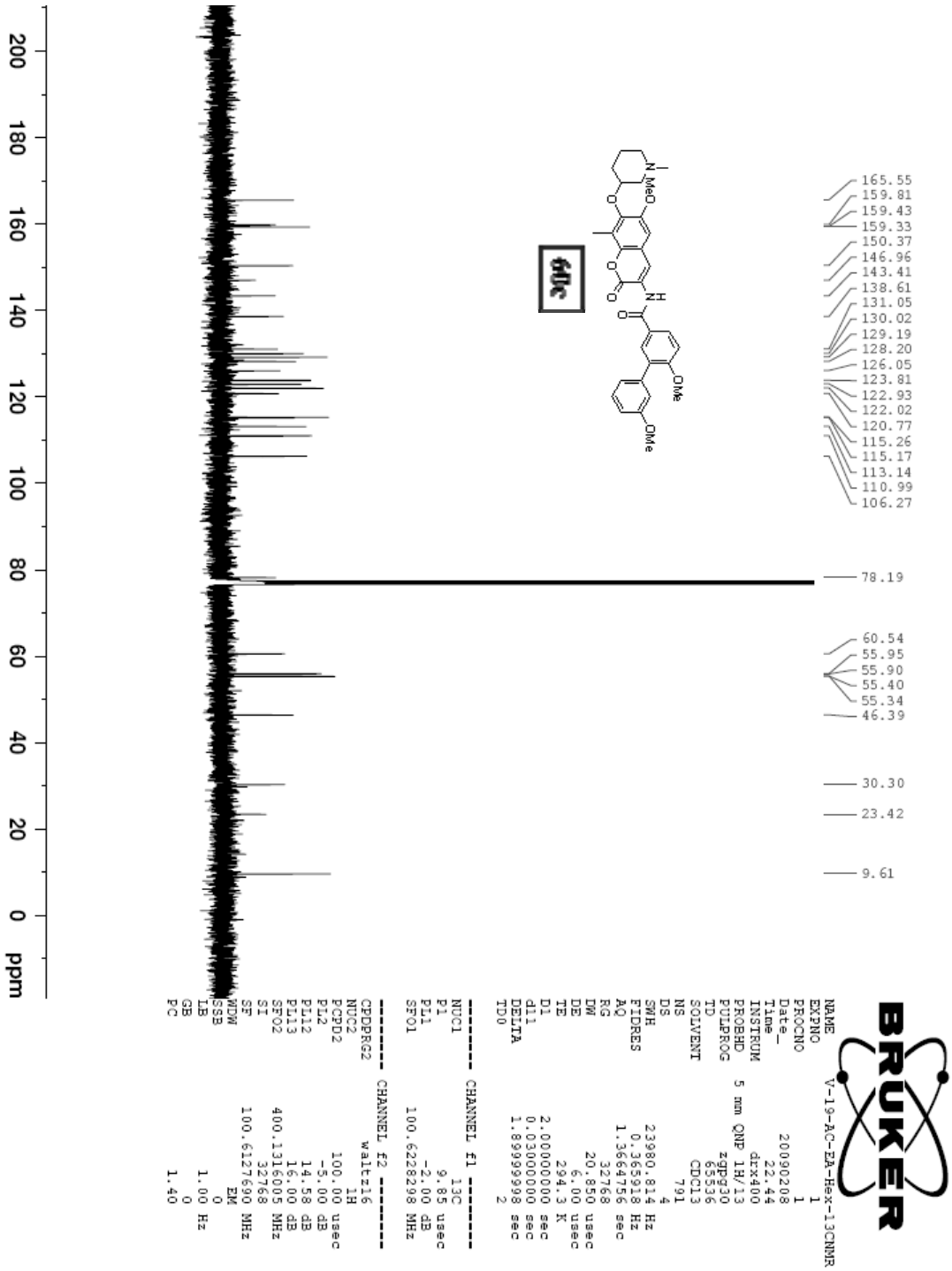

8.82
8.72
7.96
7.95
7.93
7.92
7.91
7.41
7.39
7.37
7.36
7.34
7.16
7.14
7.11
7.11
7.08
6.98
6.97
6.96
6.95
6.94
4.47
3.92
3.88
3.09
3.06
2.76
2.73
2.36
2.34
2.20
2.18
2.15
2.12
2.10
2.07
1.89
1.88
1.87
1.86
1.72
1.69
1.64
1.54
1.53
1.51
1.49
OMe
OMe
6fda
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME II-293-1
EXPNO 1
PROCNO 1
Date_ 20081108
Time 0.26
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

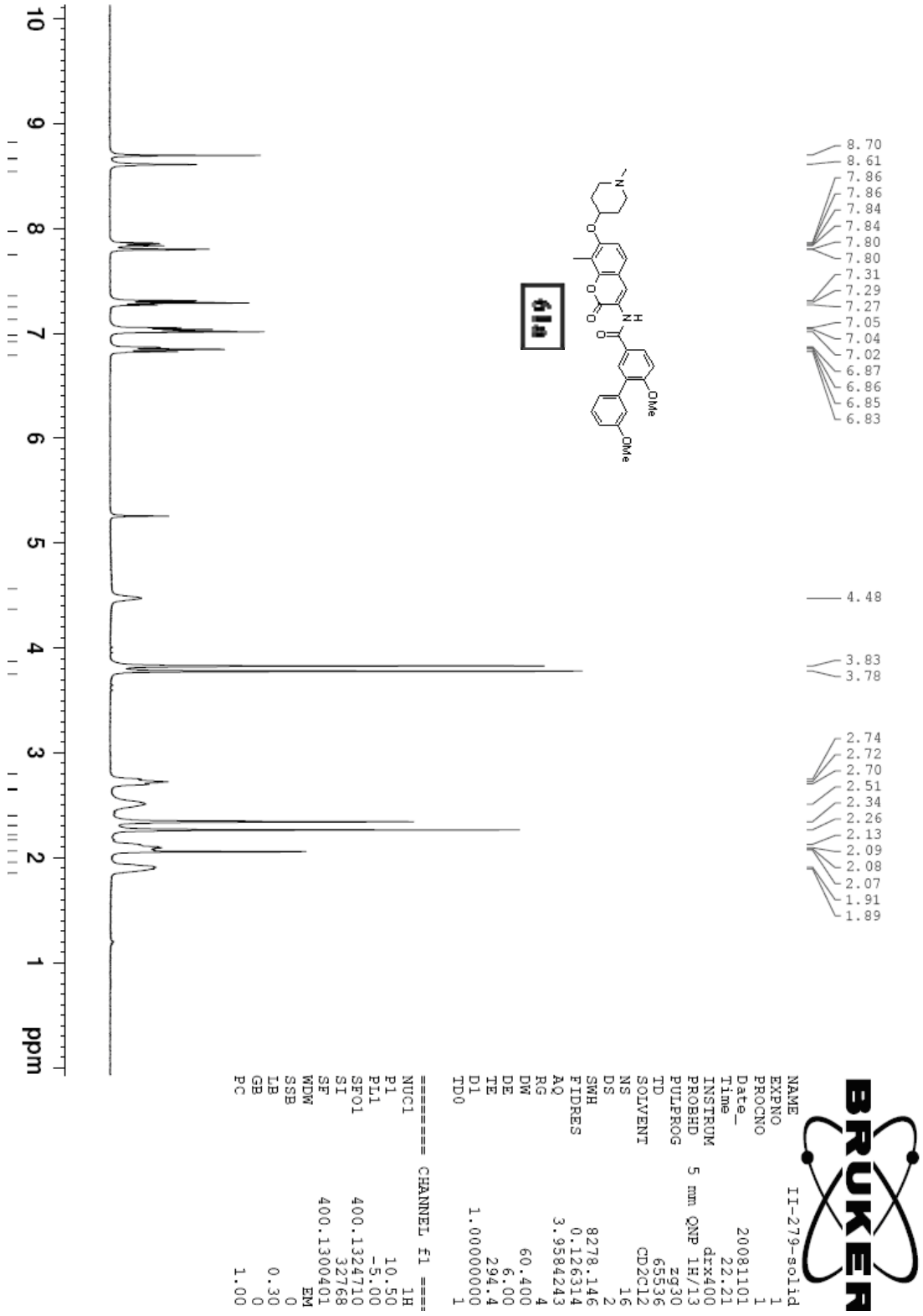

165.43
159.75
159.50
159.34
157.26
149.40
138.62
131.00
129.95
129.15
128.14
126.13
125.55
124.30
122.01
121.64
115.32
115.25
113.48
113.14
111.00
110.89
74.19
59.92
55.87
55.37
55.31
46.32
29.79
23.28
8.35
OMe
OMe
4da
BRUKER
II-293-AC-1-13CNMR
NAME
EXPNO 1
PROCNO 1
Date_ 20081106
Time_ 10.23
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 210
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 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 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
========== CHANNEL f2 ==========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
0
ppm

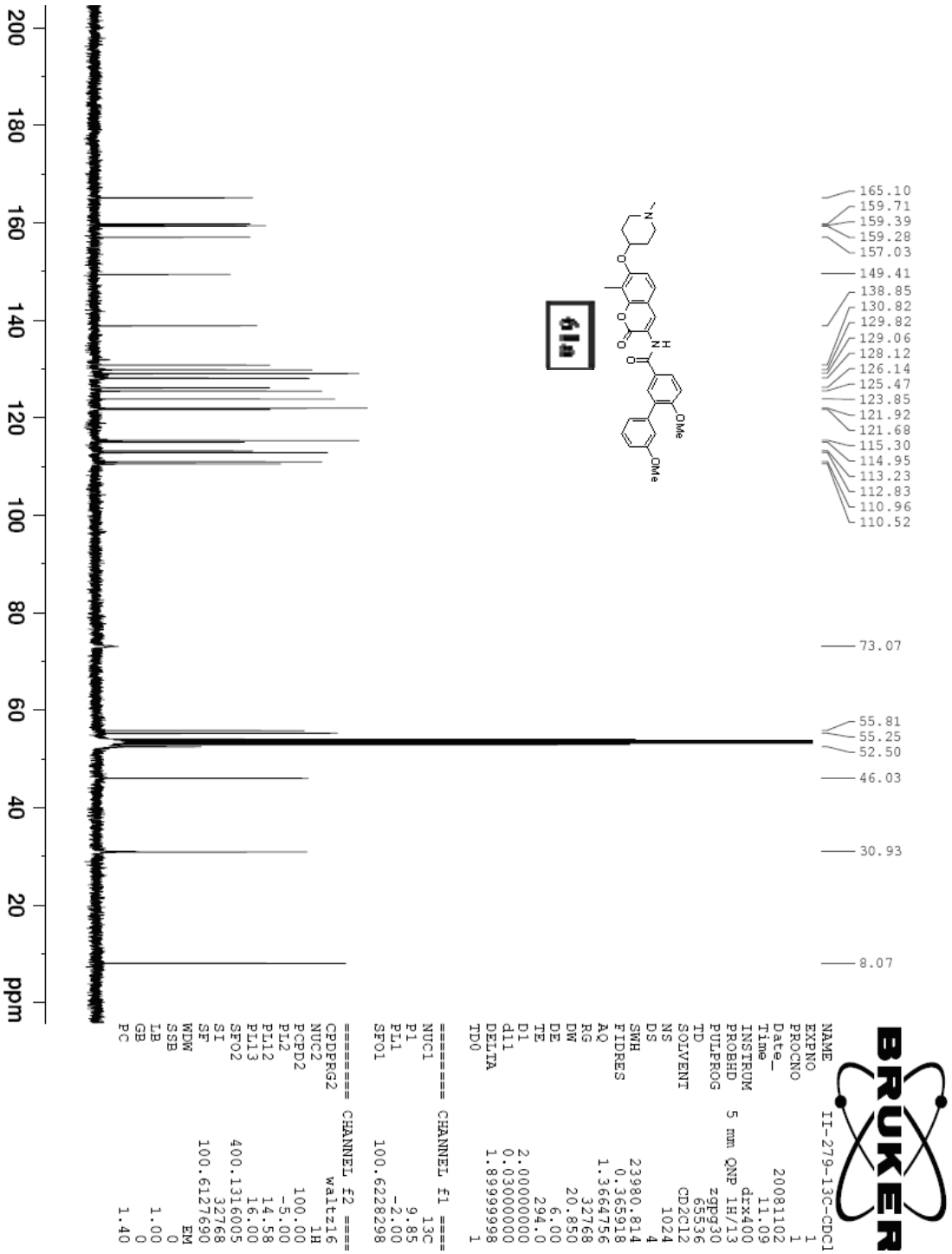

8.81
8.73
7.94
7.94
7.91
7.91
7.90
7.40
7.38
7.36
7.28
7.23
7.20
7.15
7.13
7.11
7.10
7.09
7.07
7.01
6.99
6.96
6.95
6.94
6.93
4.51
4.50
4.49
4.48
4.47
4.45
4.01
3.91
3.87
3.07
3.05
2.73
2.70
2.34
2.25
2.22
2.20
2.13
2.10
2.06
1.89
1.88
1.87
1.86
1.72
1.69
1.67
1.66
1.64
1.63
1.58
1.57
1.55
1.52
60b
OMe
OMe
NAME III-159-ac
EXPNO 1
PROCNO 1
Date_ 20081231
Time 18.20
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 295.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.00
0.97
2.00
1.00
1.02
3.03
1.05
1.03
0.99
3.07
6.11
1.01
1.00
3.09
1.03
2.22
1.11
1.16
1.07
10
9
8
7
6
5
4
3
2
1
ppm

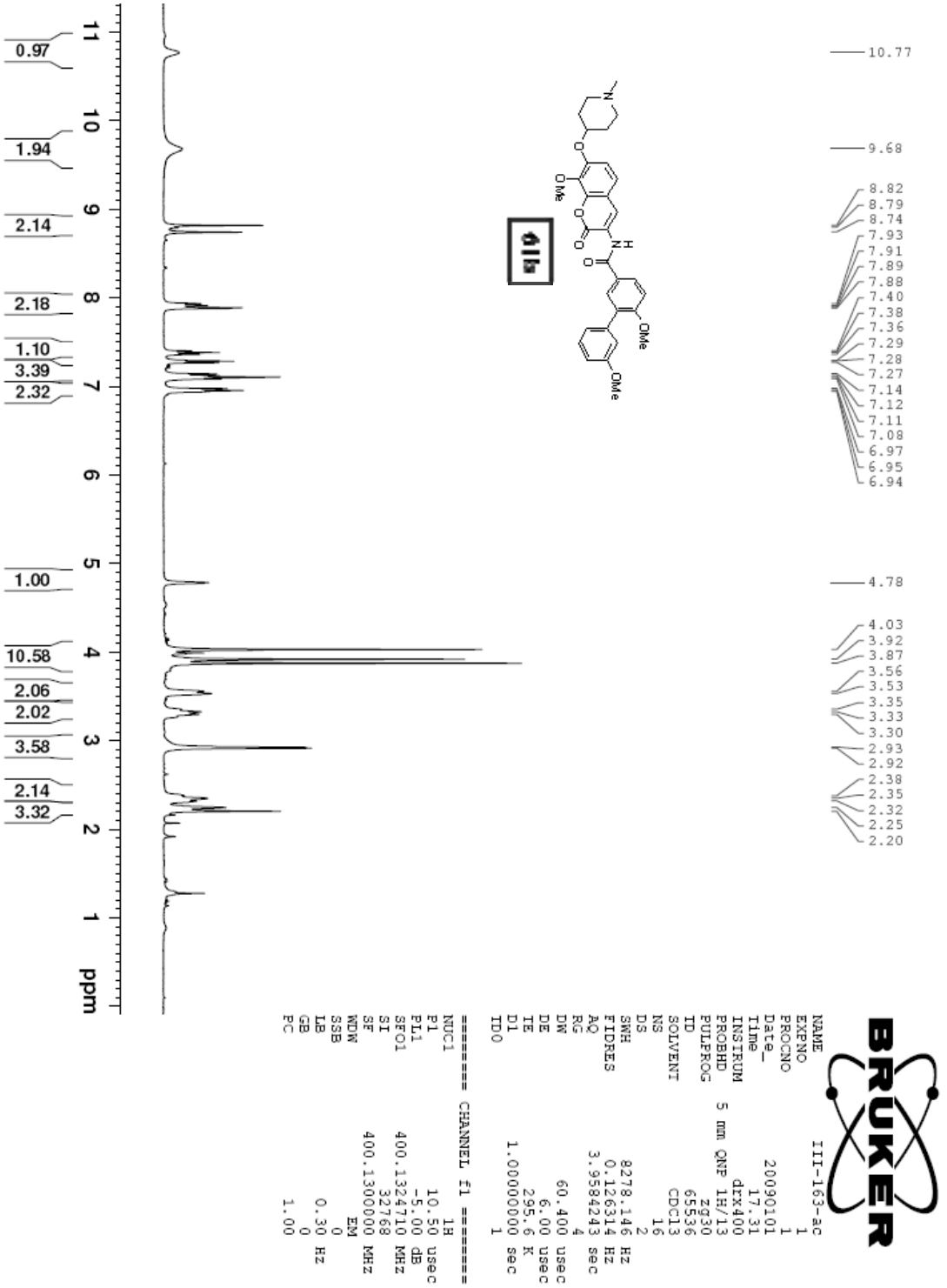

60b
OMe
OMe
OMe
165.52
159.83
159.34
158.91
152.07
144.21
138.58
137.57
131.06
129.98
129.19
128.18
125.98
123.89
122.40
122.22
122.00
115.25
114.83
113.31
113.15
111.02
74.89
61.49
59.80
55.90
55.33
46.29
29.63
23.20
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
III-159-ac-13CNMR
NAME 1
EXPNO 1
PROCNO 1
Date_ 20081231
Time_ 18.25
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 209
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 295.6 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13c
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

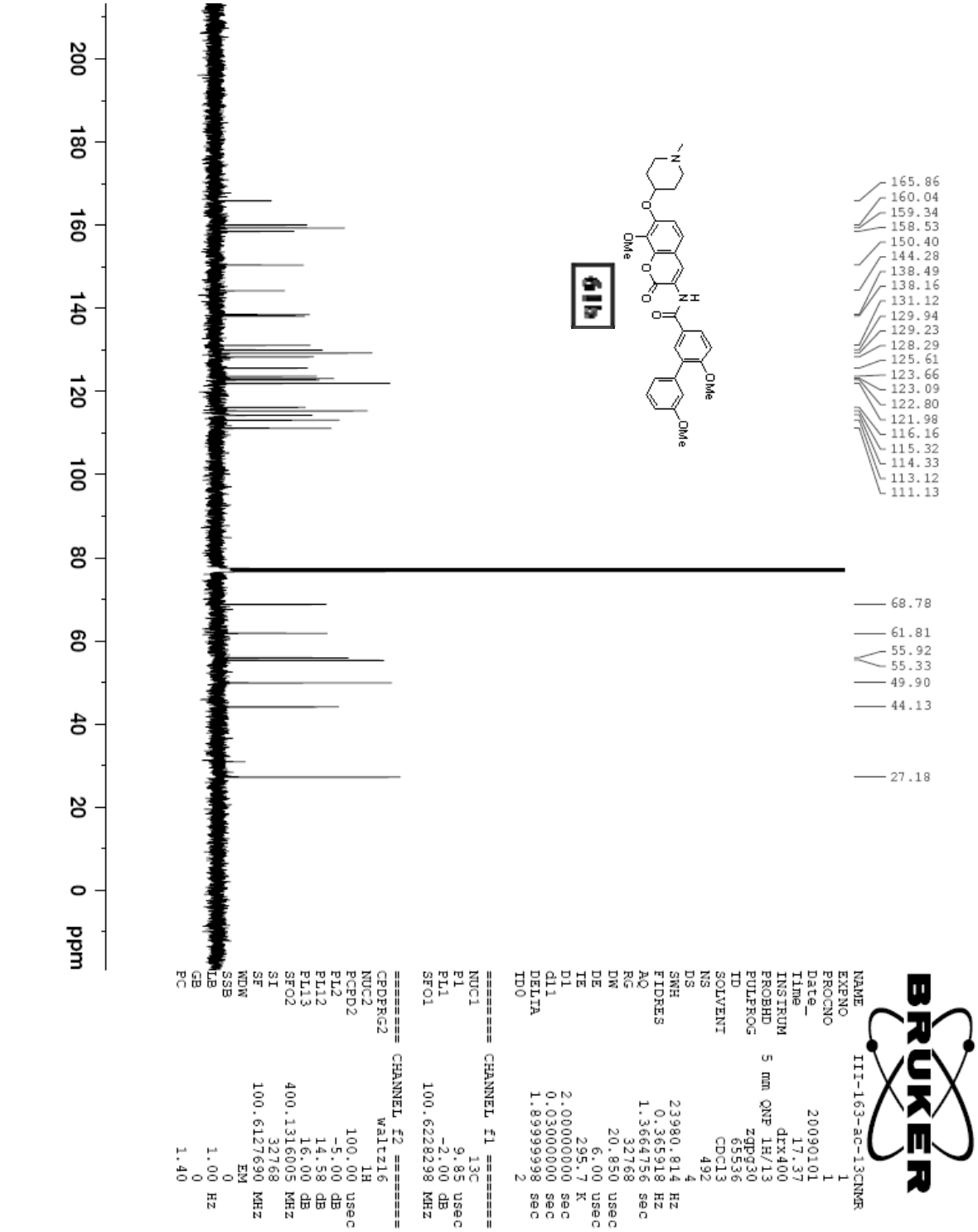

8.81
8.77
7.95
7.95
7.93
7.92
7.91
7.41
7.39
7.37
7.28
7.15
7.14
7.11
7.10
7.08
6.97
6.96
6.95
6.94
6.85
4.37
4.36
4.35
4.34
4.33
3.92
3.90
3.88
3.50
3.01
2.99
2.70
2.68
2.63
2.41
2.34
2.26
2.24
2.22
2.09
2.07
2.03
2.01
1.88
1.85
1.65
1.63
1.59
1.55
1.52
1.49
1.29
1.27
1.25
6dc
1.82
1.88
0.94
2.82
0.96
0.98
1.00
8.50
0.91
1.03
5.72
1.26
3.05
1.49
2.43
10
9
8
7
6
5
4
3
2
1
ppm
NAME V-19-ac
EXPNO 1
PROCNO 1
Date_ 20090208
Time_ 15.12
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

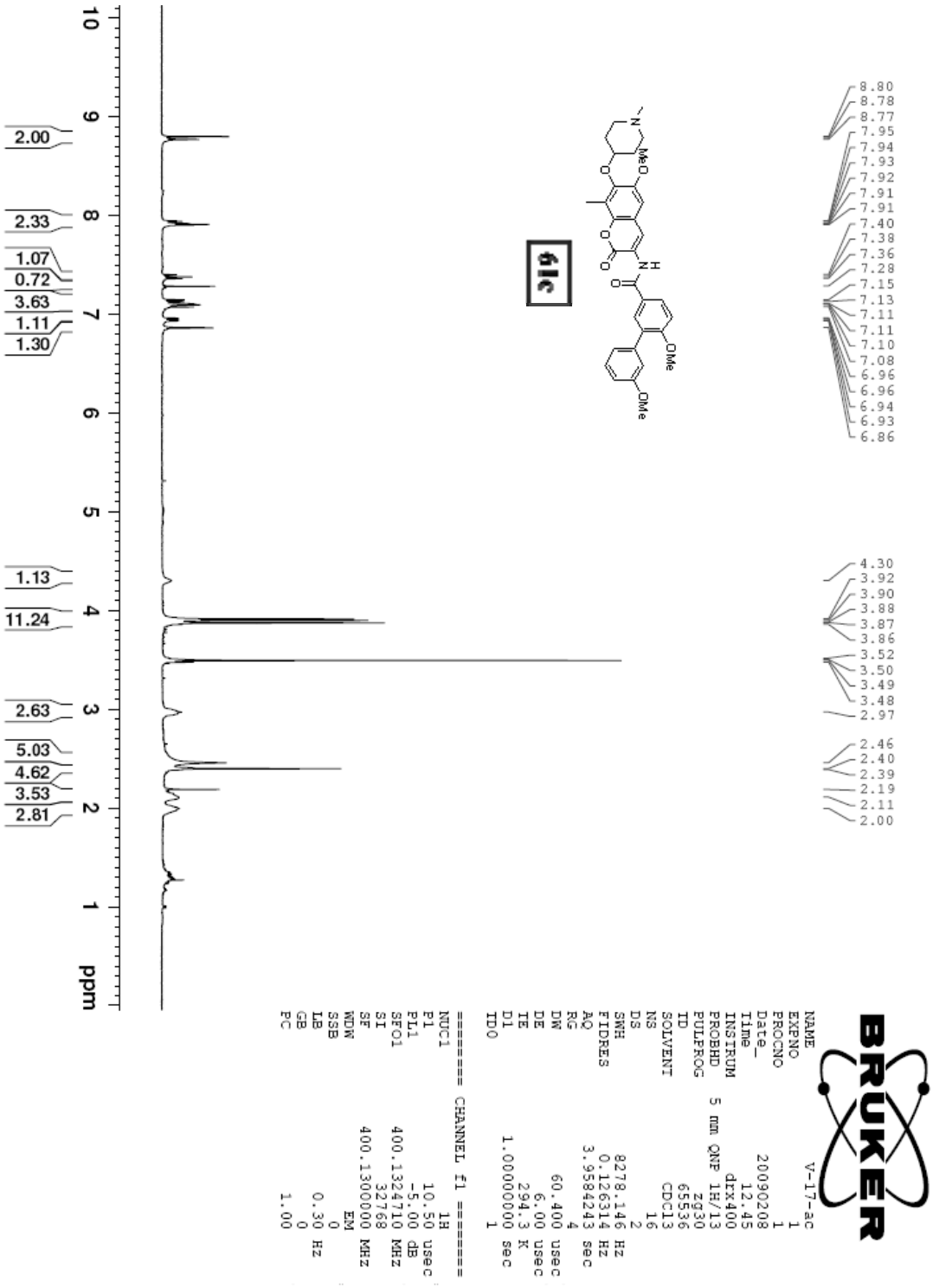

6dc
165.55
159.81
159.43
159.33
150.37
146.96
143.41
138.61
131.05
130.02
129.19
128.20
126.05
123.81
122.93
122.02
120.77
115.26
115.17
113.14
110.99
106.27
78.19
60.54
55.95
55.90
55.40
55.34
46.39
30.30
23.42
9.61
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
V-19-AC-EA-Hex-13CNMR
NAME 1
EXPNO 1
PROCNO 1
Date_ 20090208
Time_ 22.44
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 791
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
---------- CHANNEL f1 ----------
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
---------- CHANNEL f2 ----------
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

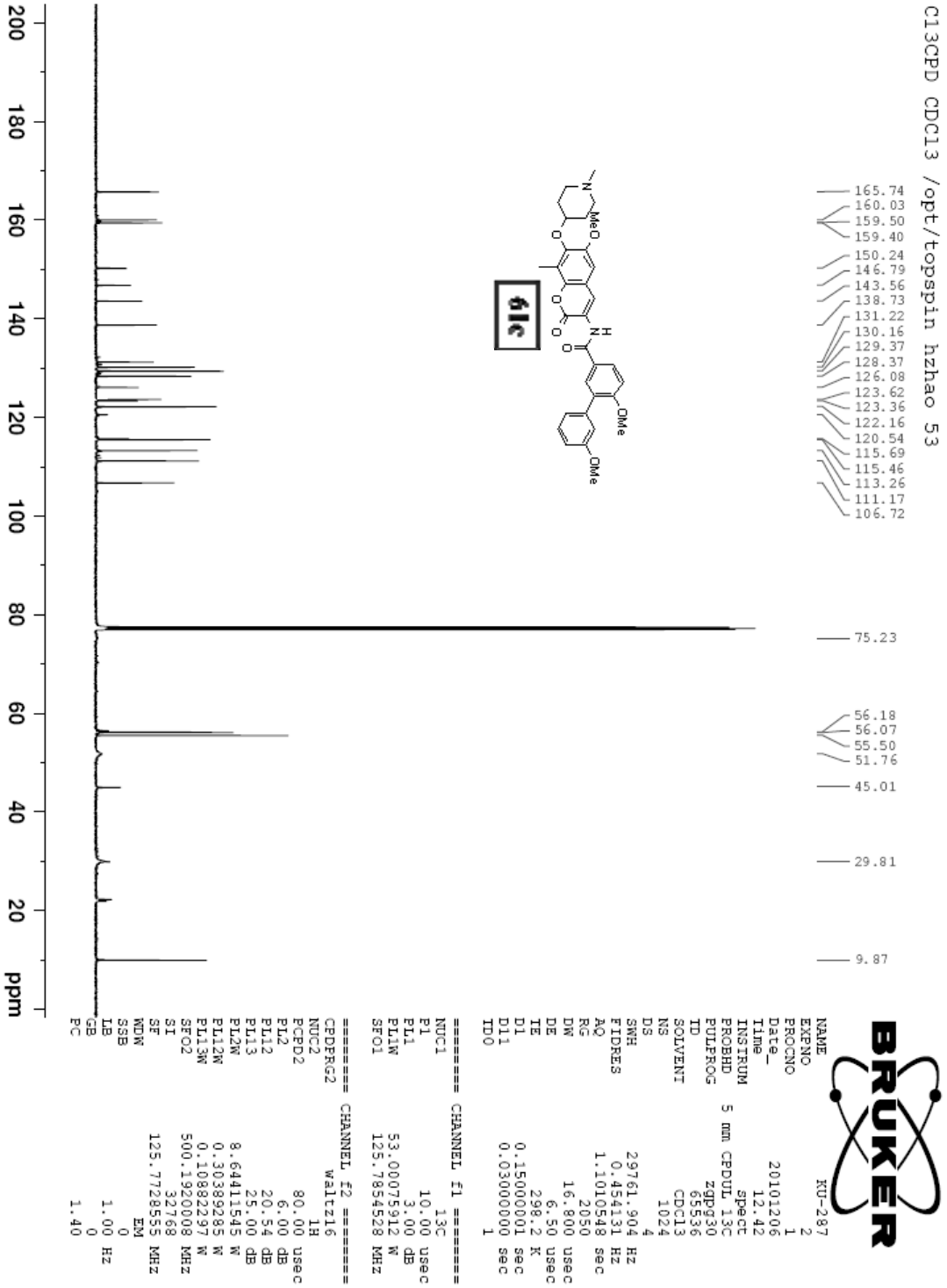

8.70
8.61
7.86
7.86
7.84
7.84
7.80
7.80
7.31
7.29
7.27
7.05
7.04
7.02
6.87
6.86
6.85
6.83
4.48
3.83
3.78
2.74
2.72
2.70
2.51
2.34
2.26
2.13
2.09
2.08
2.07
1.91
1.89
6la
OMe
OMe
BRUKER
NAME II-279-solid
EXPNO 1
PROCNO 1
Date_ 20081101
Time 22.21
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CD2Cl2
NS 16
DS 2
SWH 8278.146
FIDRES 0.126314
AQ 3.9584243
RG 4
DW 60.400
DE 6.00
TE 294.4
D1 1.00000000
TD0 1
======== CHANNEL f1 ====
NUC1 1H
P1 10.50
PL1 -5.00
SFO1 400.1324710
SI 32768
SF 400.1300401
WDW EM
SSB 0
LB 0.30
GB 0
PC 1.00
10
9
8
7
6
5
4
3
2
1
ppm

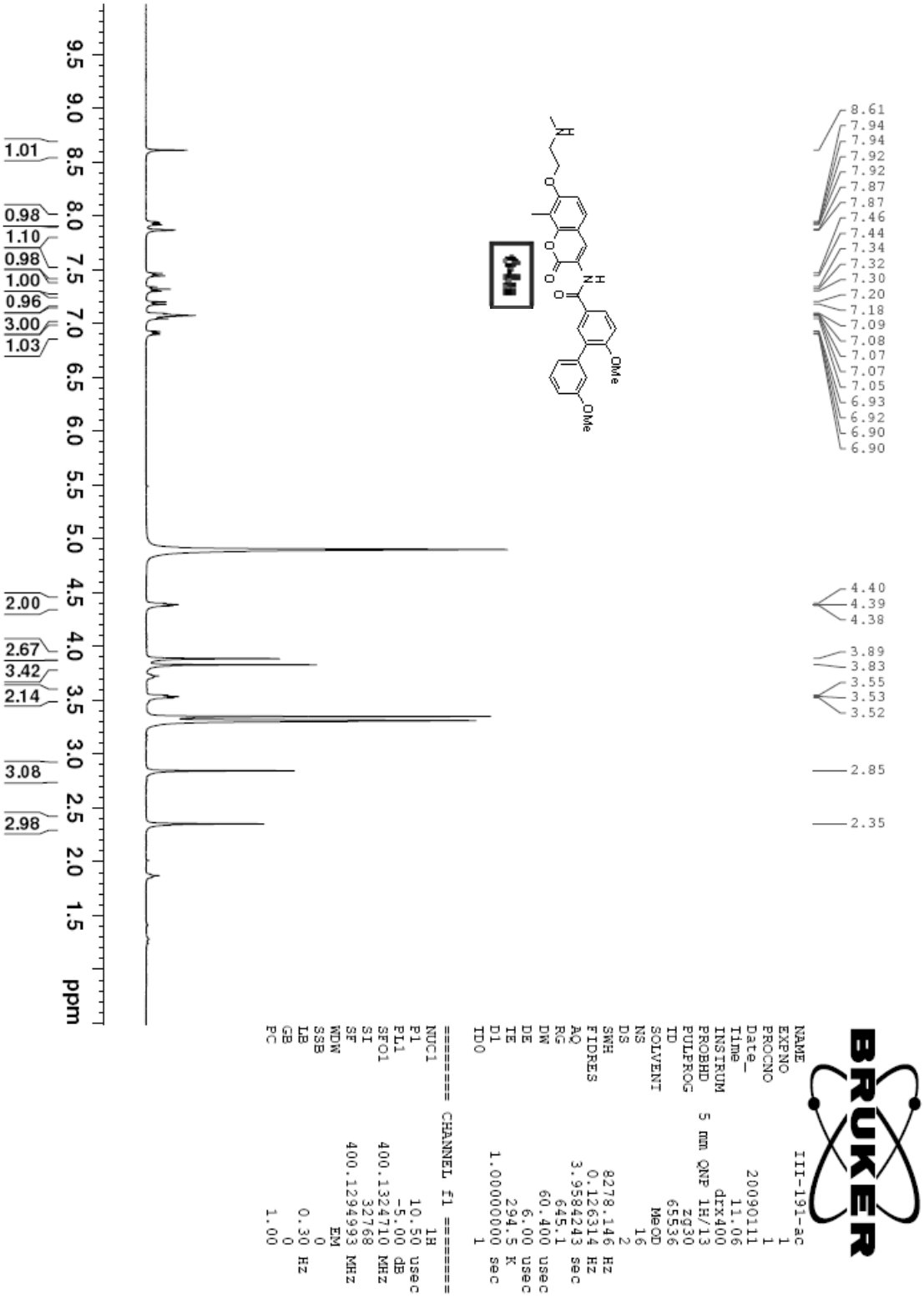

165.10
159.71
159.39
159.28
157.03
149.41
138.85
130.82
129.82
129.06
128.12
126.14
125.47
123.85
121.92
121.68
115.30
114.95
113.23
112.83
110.96
110.52
73.07
55.81
55.25
52.50
46.03
30.93
8.07
ppm
6la
OMe
OMe
BRUKER
NAME II-279-13C-CDCl
EXPNO 1
PROCNO 1
Date_ 20081102
Time_ 11.09
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CD2Cl2
NS 1024
DS 4
SWH 23980.814
FIDRES 0.365918
AQ 1.3664756
RG 32768
DW 20.850
DE 6.00
TE 294.0
D1 2.00000000
D11 0.03000000
DELTA 1.89999998
TD0 1
======== CHANNEL f1 ====
NUC1 13C
P1 9.85
PL1 -2.00
SFO1 100.6228298
======== CHANNEL f2 ====
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00
PL2 -5.00
PL12 14.58
PL13 16.00
SFO2 400.1316005
SI 32768
SF 100.6127690
WDW EM
SSB 0
LB 1.00
GB 0
PC 1.40

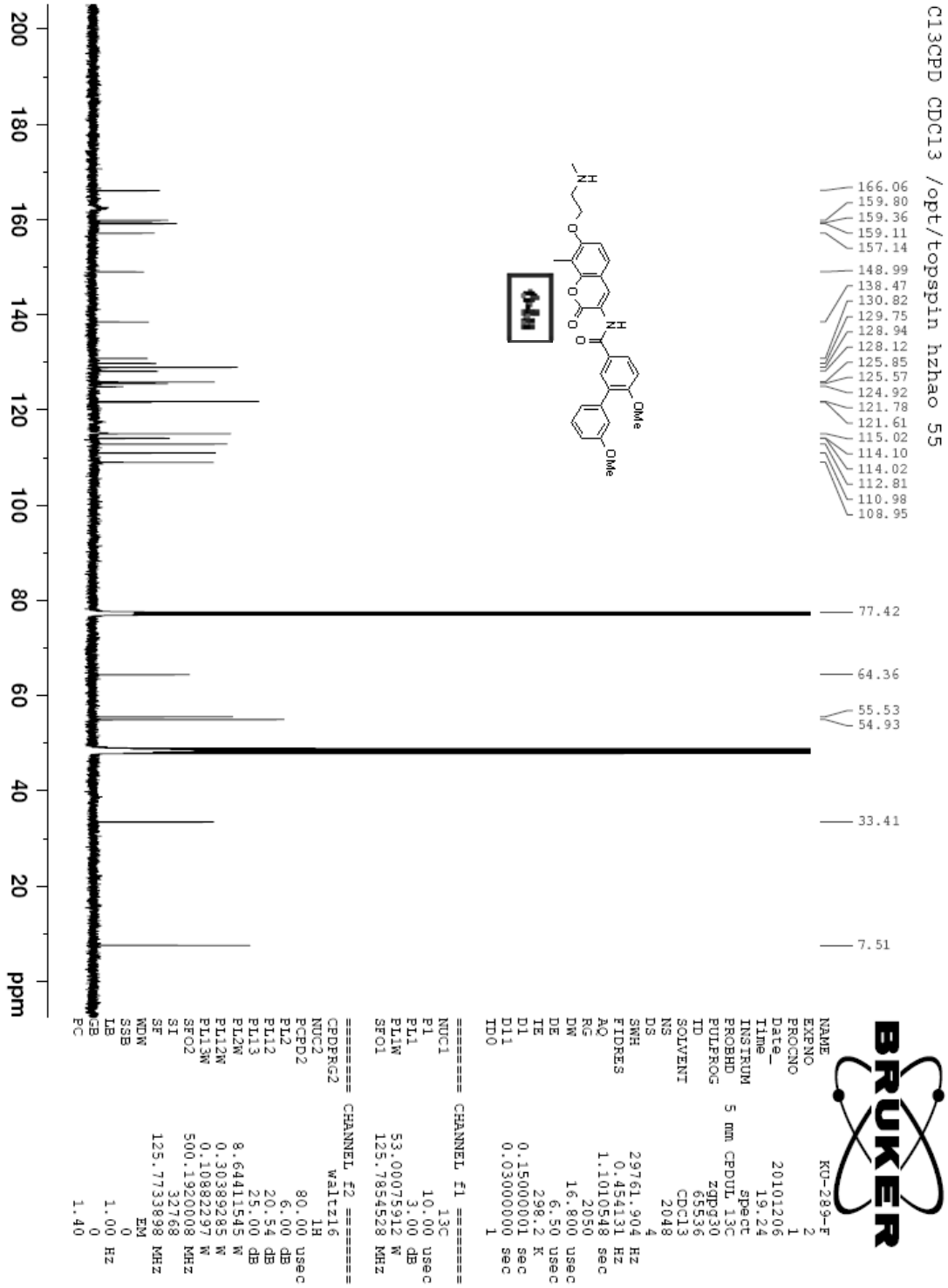

11
10
9
8
7
6
5
4
3
2
1
ppm
0.97
1.94
2.14
2.18
1.10
3.39
2.32
1.00
10.58
2.06
2.02
3.58
2.14
3.32
10.77
9.68
8.82
8.79
8.74
7.93
7.91
7.89
7.88
7.40
7.38
7.36
7.29
7.28
7.27
7.14
7.12
7.11
7.08
6.97
6.95
6.94
4.78
4.03
3.92
3.87
3.56
3.53
3.35
3.33
3.30
2.93
2.92
2.38
2.35
2.32
2.25
2.20
OMe
OMe
OMe
41b
BRUKER
NAME III-163-ac
EXPNO 1
PROCNO 1
Date_ 20090101
Time_ 17.31
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

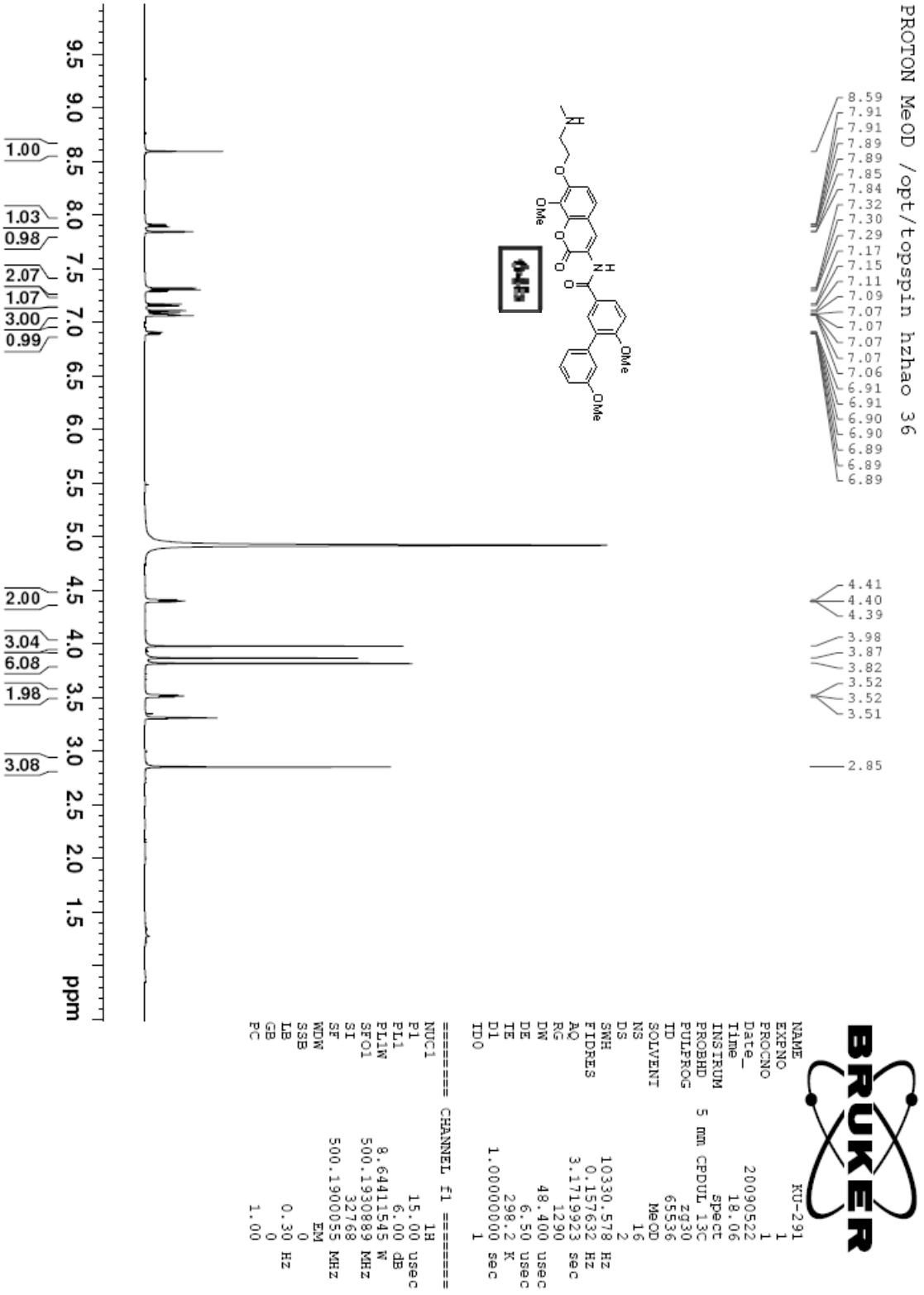

165.86
160.04
159.34
158.53
150.40
144.28
138.49
138.16
131.12
129.94
129.23
128.29
125.61
123.66
123.09
122.80
121.98
116.16
115.32
114.33
113.12
111.13
68.78
61.81
55.92
55.33
49.90
44.13
27.18
OMe
OMe
OMe
6lb
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME III-163-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090101
Time 17.37
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 492
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 295.7 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

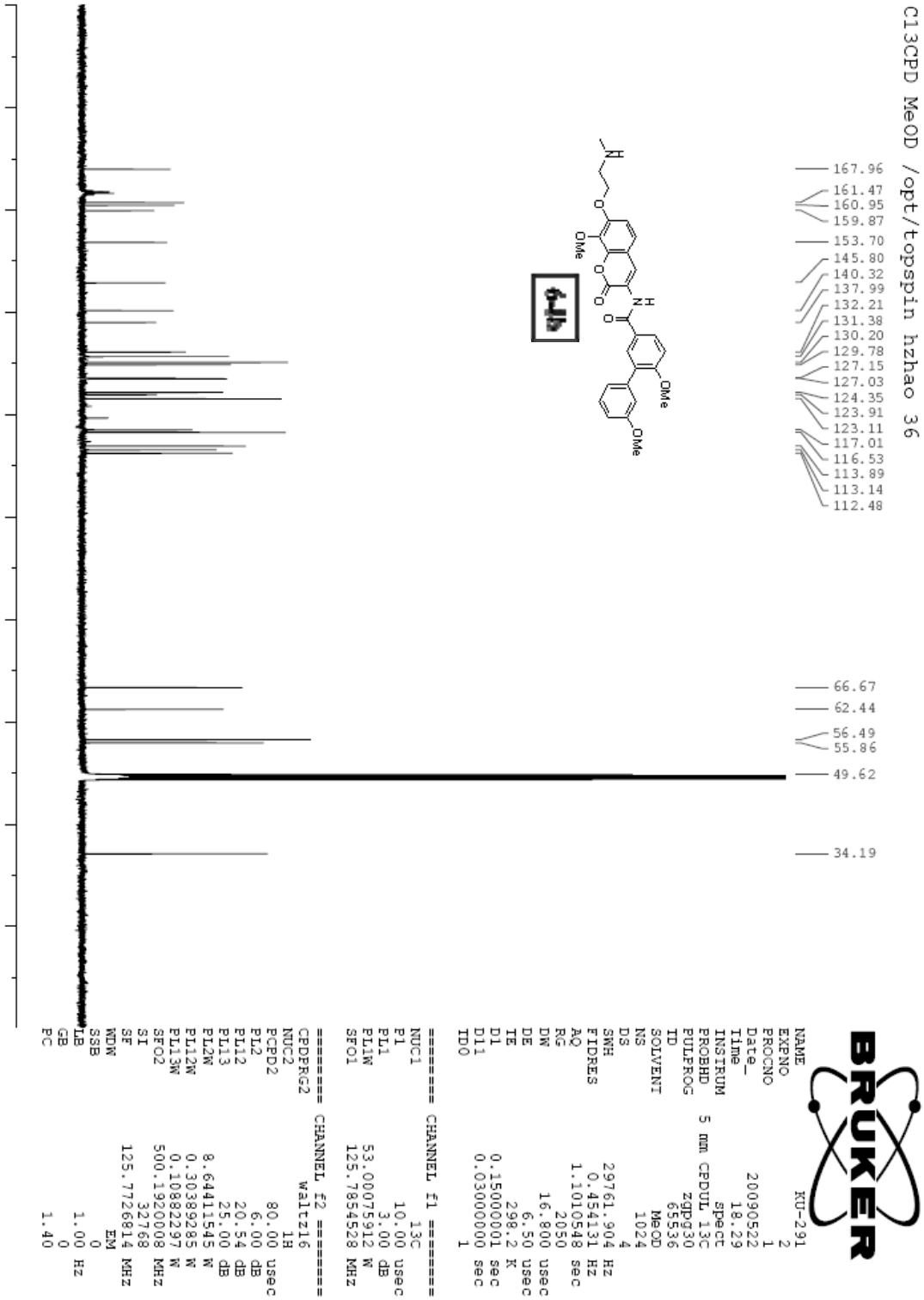

6ic
8.80
8.78
8.77
7.95
7.94
7.93
7.92
7.91
7.91
7.40
7.38
7.36
7.28
7.15
7.13
7.11
7.11
7.10
7.08
6.96
6.96
6.94
6.93
6.86
4.30
3.92
3.90
3.88
3.87
3.86
3.52
3.50
3.49
3.48
2.97
2.46
2.40
2.39
2.19
2.11
2.00
2.00
2.33
1.07
0.72
3.63
1.11
1.30
1.13
11.24
2.63
5.03
4.62
3.53
2.81
ppm
NAME V-17-ac
EXPNO 1
PROCNO 1
Date_ 20090208
Time_ 12.45
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

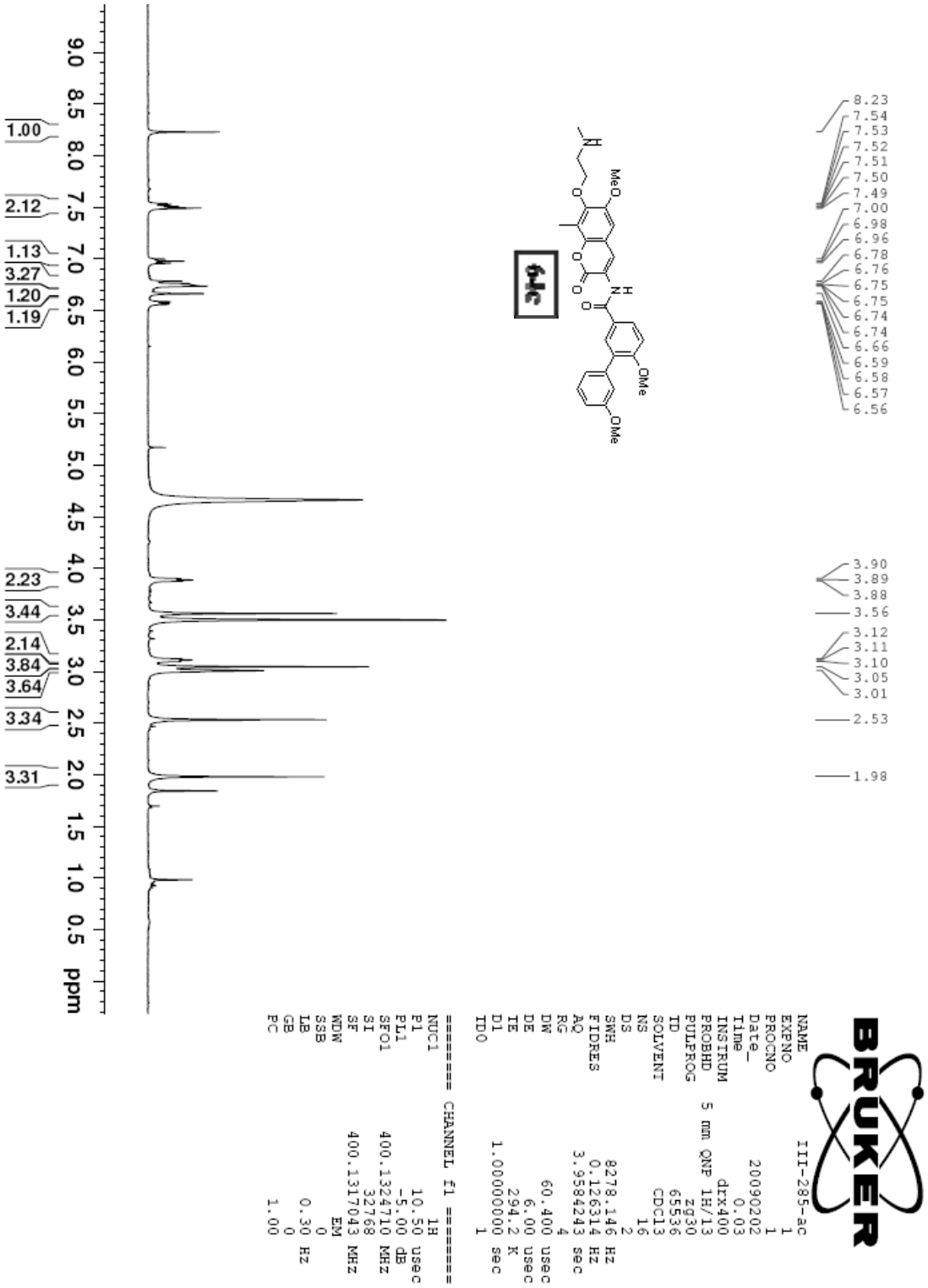

C13CPD CDCl3 /opt/topspin hzhao 53
165.74
160.03
159.50
159.40
150.24
146.79
143.56
138.73
131.22
130.16
129.37
128.37
126.08
123.62
123.36
122.16
120.54
115.69
115.46
113.26
111.17
106.72
75.23
56.18
56.07
55.50
51.76
45.01
29.81
9.87
6ic
MeO
OMe
OMe
BRUKER
NAME KU-287
EXPNO 2
PROCNO 1
Date_ 20101206
Time 12.42
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728555 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

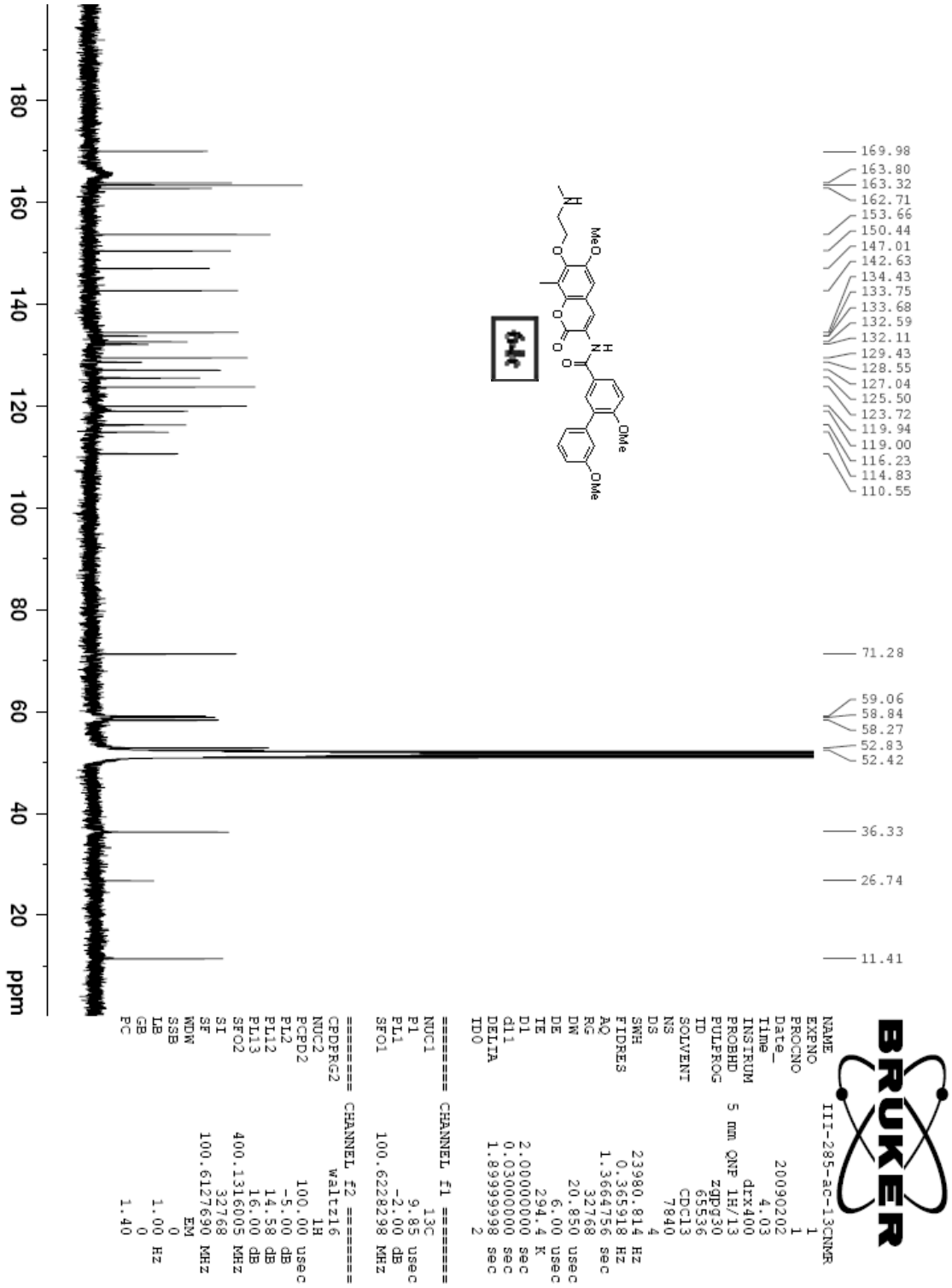

8.61
7.94
7.94
7.92
7.92
7.87
7.87
7.46
7.44
7.34
7.32
7.30
7.20
7.18
7.09
7.08
7.07
7.07
7.05
6.93
6.92
6.90
6.90
4.40
4.39
4.38
3.89
3.83
3.55
3.53
3.52
2.85
2.35
OMe
OMe
1.01
0.98
1.10
0.98
1.00
0.96
3.00
1.03
2.00
2.67
3.42
2.14
3.08
2.98
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 ppm
NAME III-191-ac
EXPNO 1
PROCNO 1
Date_ 20090111
Time_ 11.06
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 645.1
DW 60.400 usec
DE 6.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1294993 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

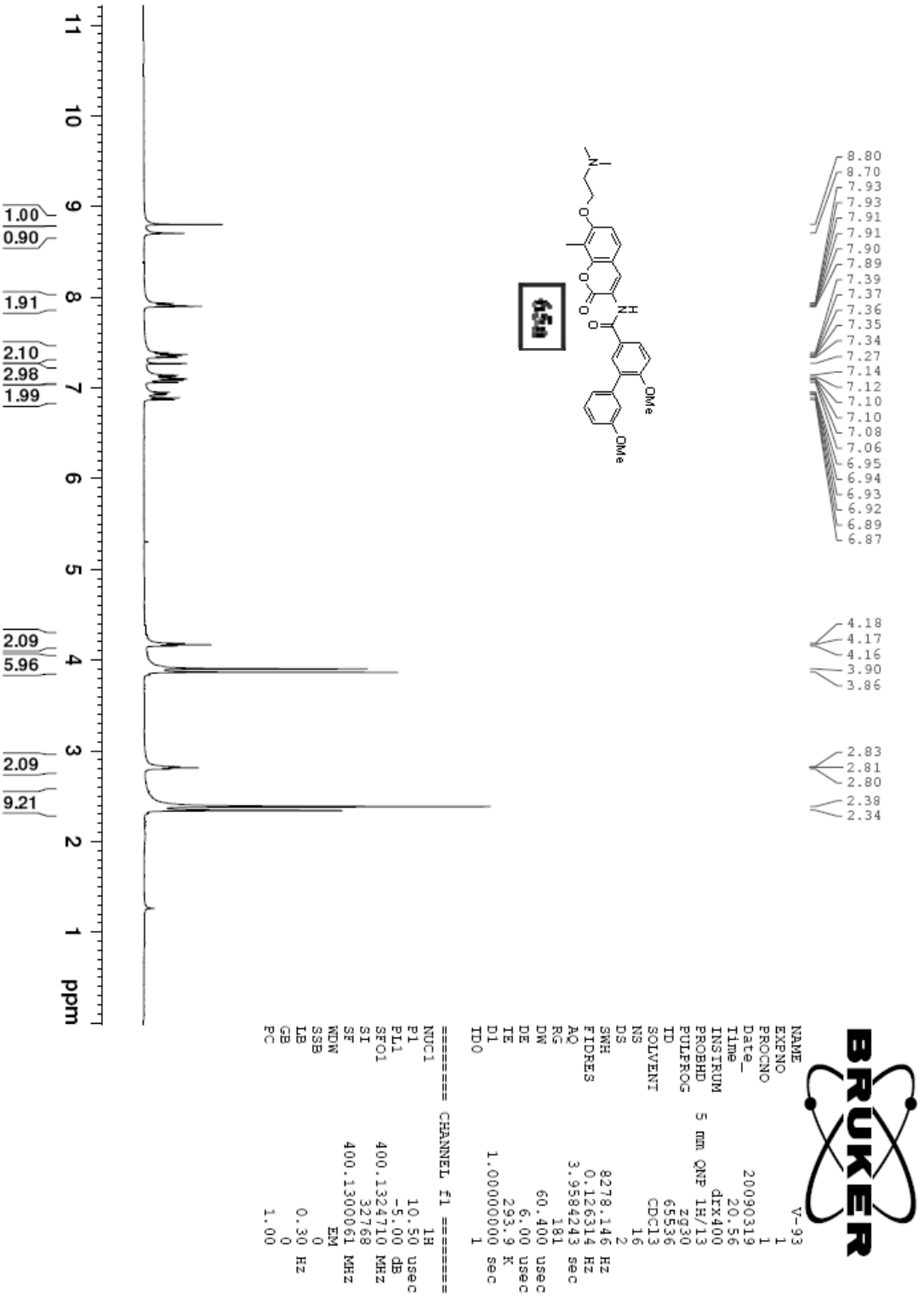

C13CPD CDCl3 /opt/topspin hzhao 55
166.06
159.80
159.36
159.11
157.14
148.99
138.47
130.82
129.75
128.94
128.12
125.85
125.57
124.92
121.78
121.61
115.02
114.10
114.02
112.81
110.98
108.95
77.42
64.36
55.53
54.93
33.41
7.51
OMe
OMe
ppm
200
180
160
140
120
100
80
60
40
20
BRUKER
NAME KU-289-F
EXPNO 2
PROCNO 1
Date_ 20101206
Time 19.24
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PLIW 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7733898 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

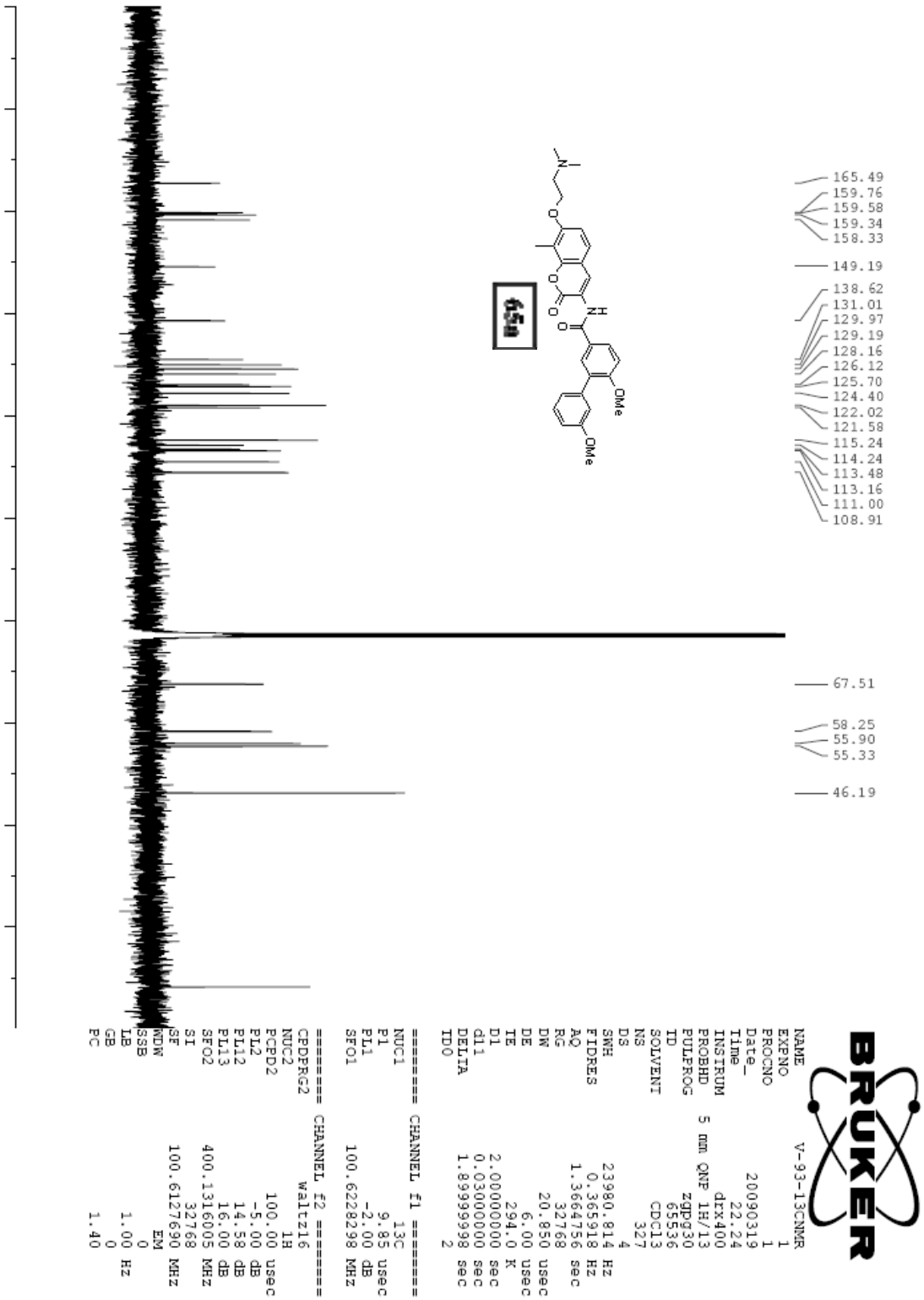

PROTON MeOD /opt/topspin hzhao 36
8.59
7.91
7.91
7.89
7.89
7.85
7.84
7.32
7.30
7.29
7.17
7.15
7.11
7.09
7.07
7.07
7.07
7.07
7.06
6.91
6.91
6.90
6.90
6.89
6.89
6.89
4.41
4.40
4.39
3.98
3.87
3.82
3.52
3.52
3.51
2.85
OMe
OMe
OMe
4-18a
1.00
1.03
0.98
2.07
1.07
3.00
0.99
2.00
3.04
6.08
1.98
3.08
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 ppm
NAME KU-291
EXPNO 1
PROCNO 1
Date_ 20090522
Time 18.06
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT MeOD
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1290
DW 48.400 usec
DE 6.50 usec
IE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900055 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

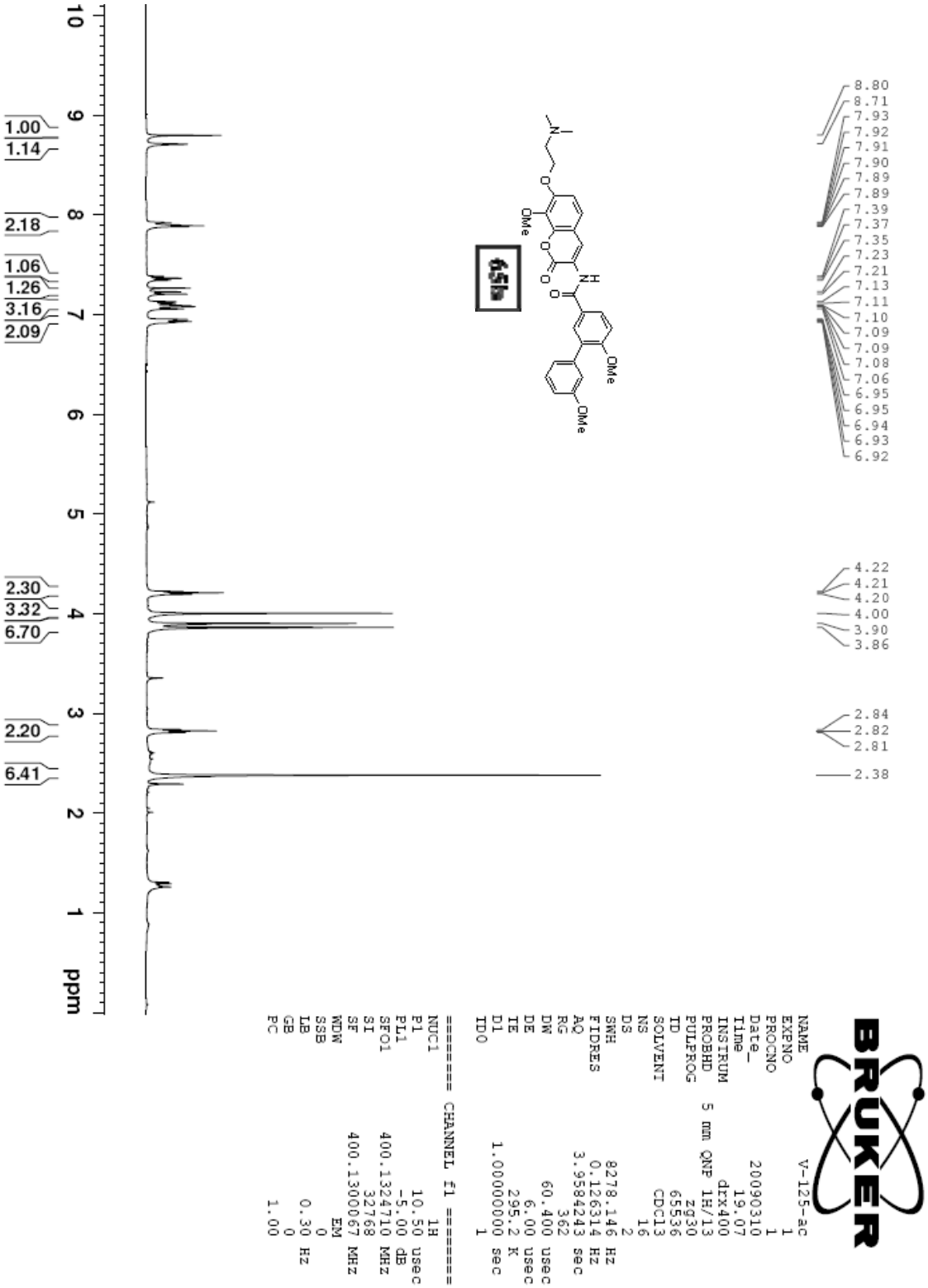

C13CPD MeOD /opt/topspin hzhao 36
167.96
161.47
160.95
159.87
153.70
145.80
140.32
137.99
132.21
131.38
130.20
129.78
127.15
127.03
124.35
123.91
123.11
117.01
116.53
113.89
113.14
112.48
66.67
62.44
56.49
55.86
49.62
34.19
OMe
OMe
OMe
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME KU-291
EXPNO 2
PROCNO 1
Date_ 20090522
Time 18.29
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT MeOD
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7726814 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

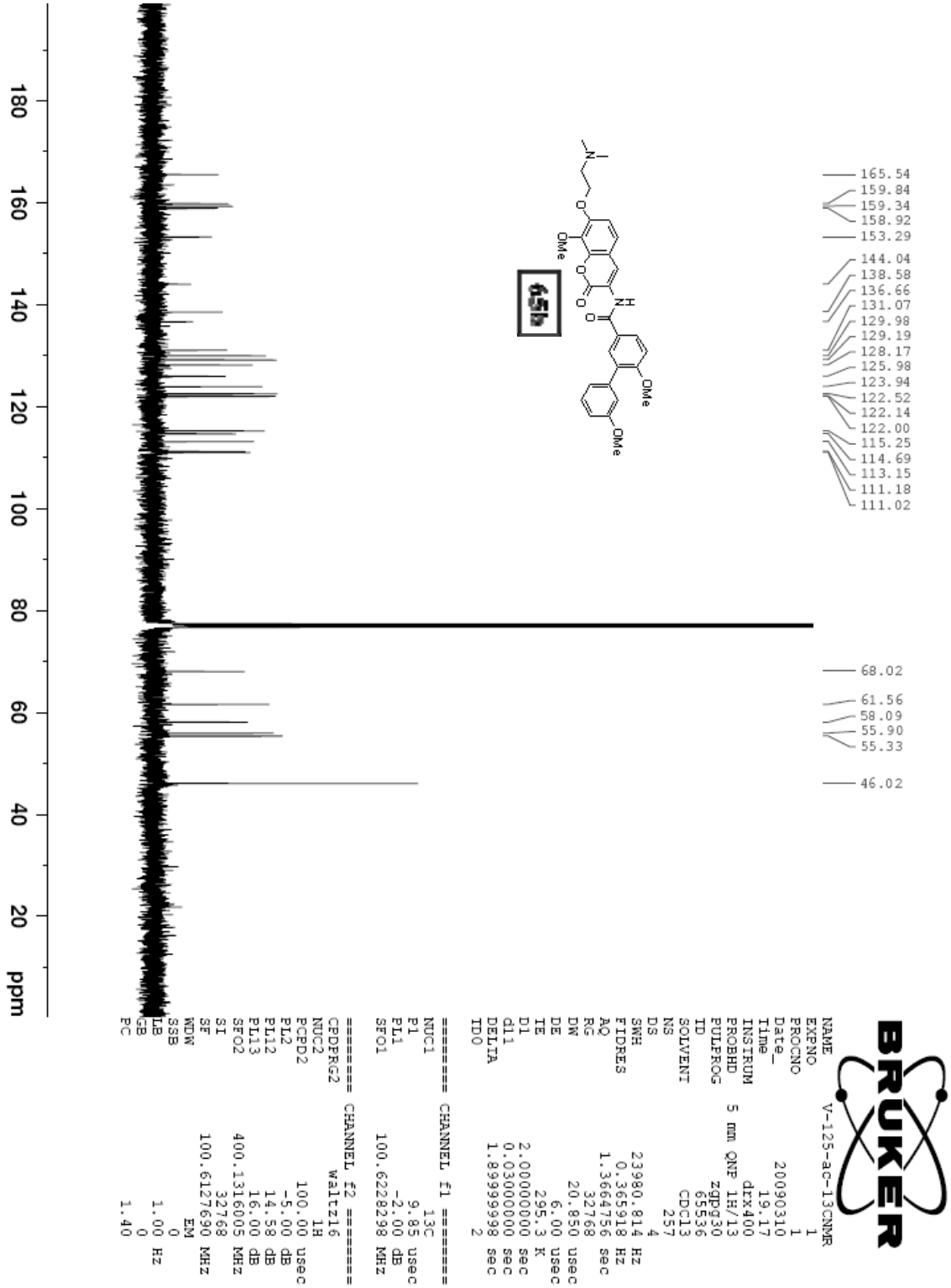

8.23
7.54
7.53
7.52
7.51
7.50
7.49
7.00
6.98
6.96
6.78
6.76
6.75
6.75
6.74
6.74
6.66
6.59
6.58
6.57
6.56
3.90
3.89
3.88
3.56
3.12
3.11
3.10
3.05
3.01
2.53
1.98
MeO
OMe
OMe
6dc
1.00
2.12
1.13
3.27
1.20
1.19
2.23
3.44
2.14
3.84
3.64
3.34
3.31
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
NAME III-285-ac
EXPNO 1
PROCNO 1
Date_ 20090202
Time 0.03
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1317043 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

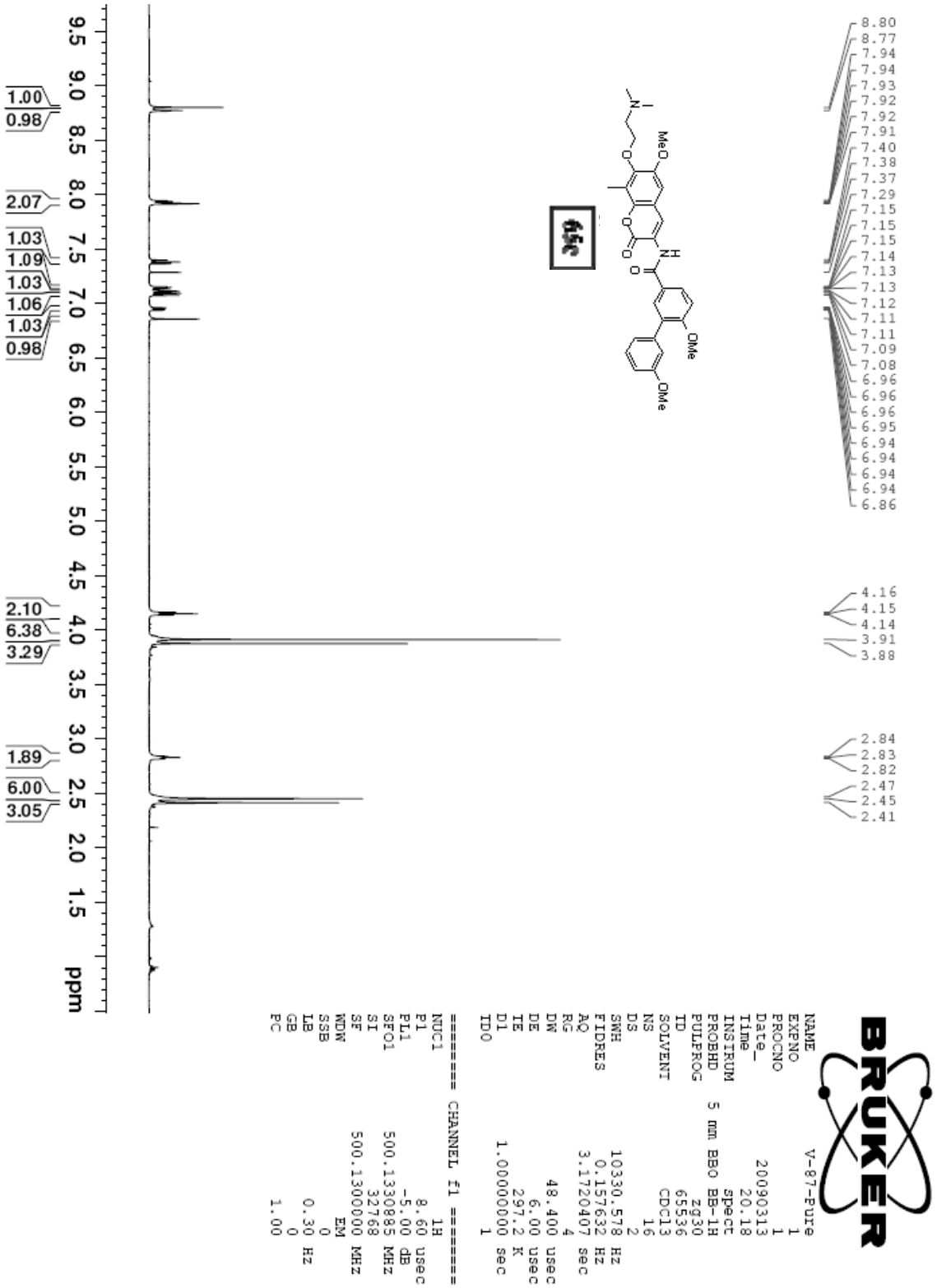

169.98
163.80
163.32
162.71
153.66
150.44
147.01
142.63
134.43
133.75
133.68
132.59
132.11
129.43
128.55
127.04
125.50
123.72
119.94
119.00
116.23
114.83
110.55
71.28
59.06
58.84
58.27
52.83
52.42
36.33
26.74
11.41
MeO
OMe
OMe
6dc
180
160
140
120
100
80
60
40
20
ppm
NAME III-285-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090202
Time_ 4.03
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 7840
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

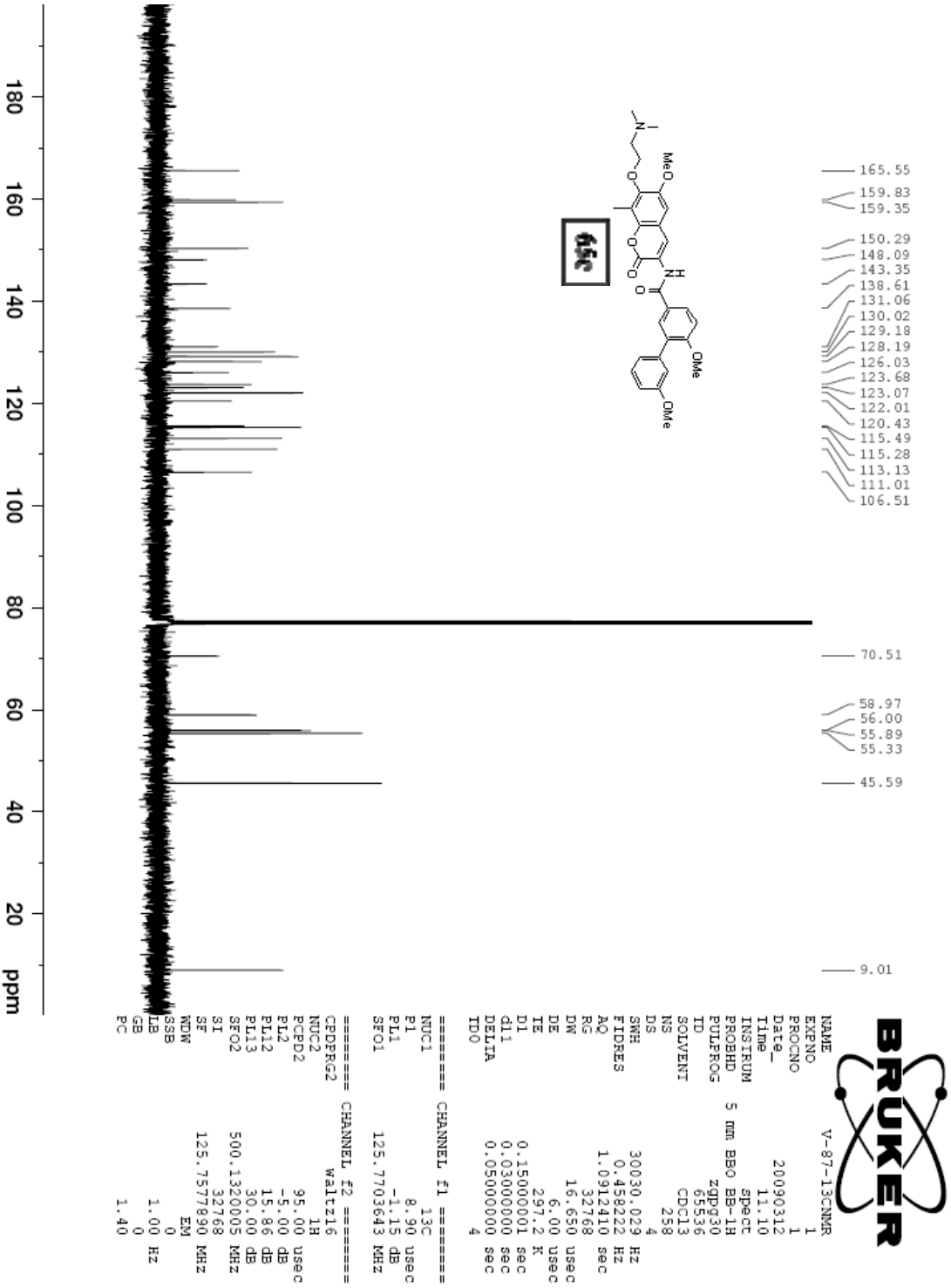

65g
OMe
OMe
8.80
8.70
7.93
7.93
7.91
7.91
7.90
7.89
7.39
7.37
7.36
7.35
7.34
7.27
7.14
7.12
7.10
7.10
7.08
7.06
6.95
6.94
6.93
6.92
6.89
6.87
4.18
4.17
4.16
3.90
3.86
2.83
2.81
2.80
2.38
2.34
1.00
0.90
1.91
2.10
2.98
1.99
2.09
5.96
2.09
9.21
ppm
NAME V-93
EXPNO 1
PROCNO 1
Date_ 20090319
Time 20.56
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 181
DW 60.400 usec
DE 6.00 usec
IE 293.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
PL1 400.1324710 MHz
SFO1 32768
SI 400.1300061 MHz
SF EM
WDW 0
SSB 0.30 Hz
LB 0
GB 1.00
PC

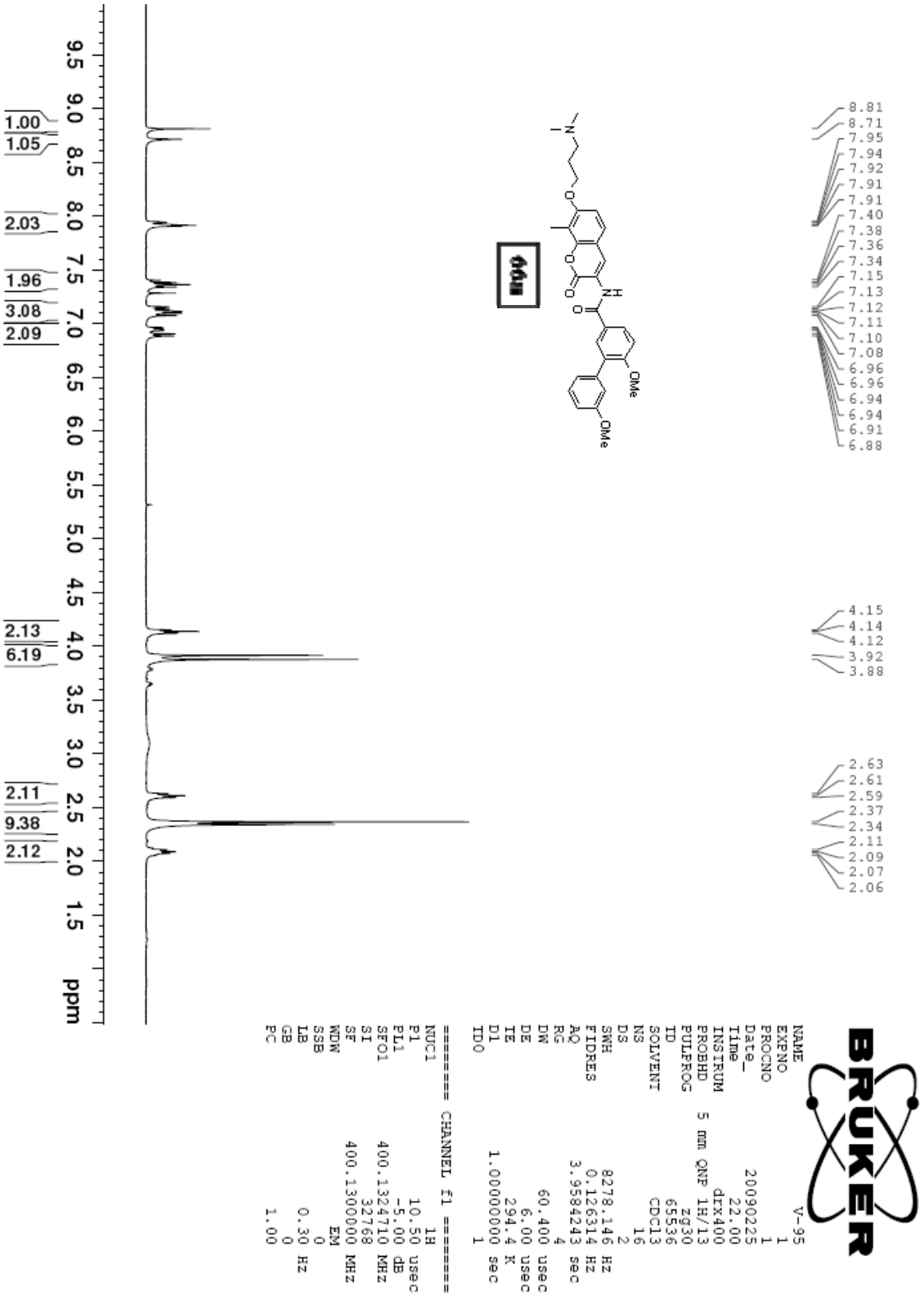

65n
OMe
OMe
165.49
159.76
159.58
159.34
158.33
149.19
138.62
131.01
129.97
129.19
128.16
126.12
125.70
124.40
122.02
121.58
115.24
114.24
113.48
113.16
111.00
108.91
67.51
58.25
55.90
55.33
46.19
180
160
140
120
100
80
60
40
20
ppm
BRUKER
V-93-13CNMR
NAME 1
EXPNO 1
PROCNO 1
Date_ 20090319
Time 22.24
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
ID 65536
SOLVENT CDCl3
NS 327
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
ID0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

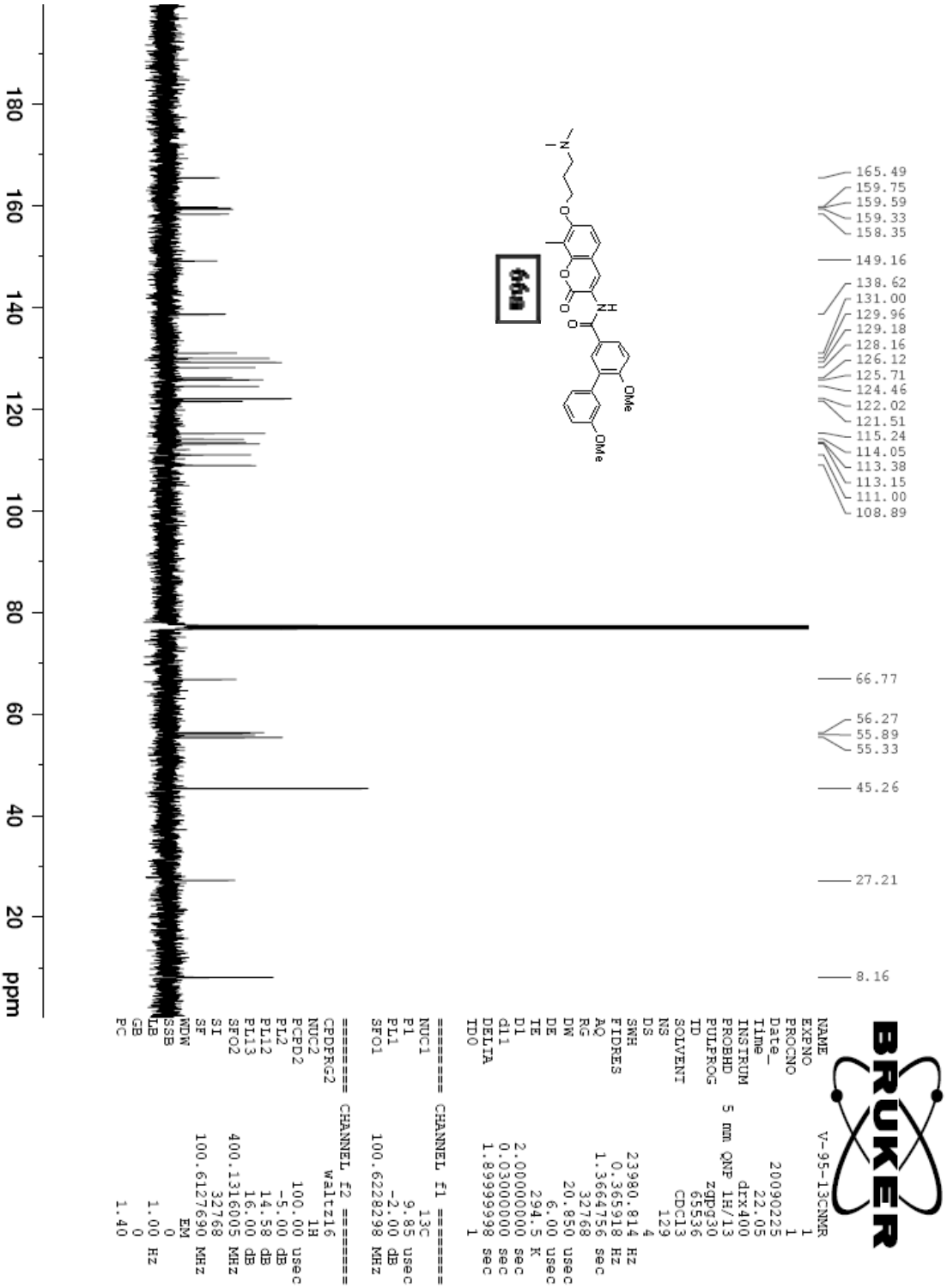

8.80
8.71
7.93
7.92
7.91
7.90
7.89
7.89
7.39
7.37
7.35
7.23
7.21
7.13
7.11
7.10
7.09
7.09
7.08
7.06
6.95
6.95
6.94
6.93
6.92
4.22
4.21
4.20
4.00
3.90
3.86
2.84
2.82
2.81
2.38
65b
OMe
OMe
OMe
1.00
1.14
2.18
1.06
1.26
3.16
2.09
2.30
3.32
6.70
2.20
6.41
10
9
8
7
6
5
4
3
2
1
ppm
NAME V-125-ac
EXPNO 1
PROCNO 1
Date_ 20090310
Time 19.07
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.00 usec
TE 295.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300067 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

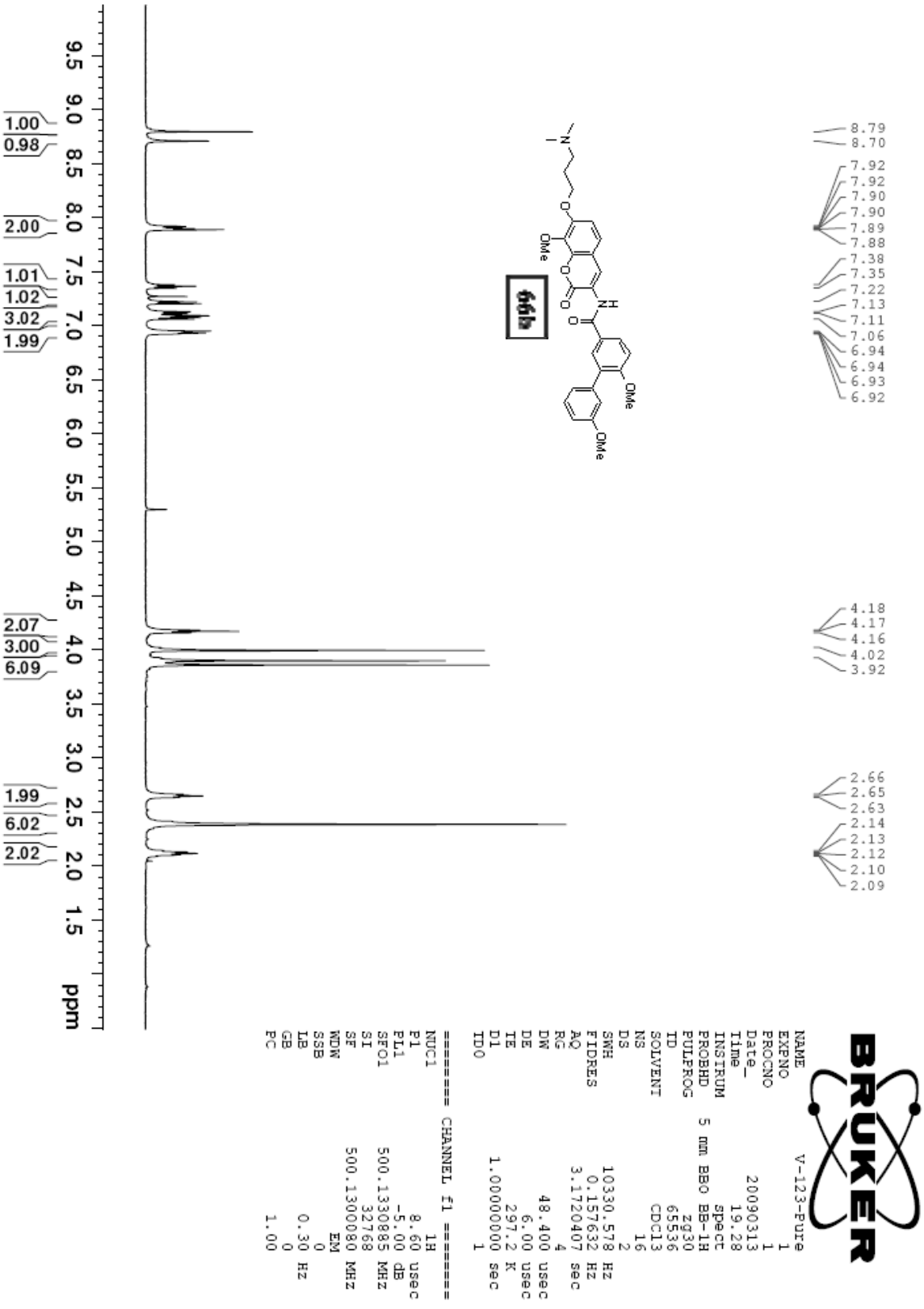

65b
OMe
OMe
OMe
165.54
159.84
159.34
158.92
153.29
144.04
138.58
136.66
131.07
129.98
129.19
128.17
125.98
123.94
122.52
122.14
122.00
115.25
114.69
113.15
111.18
111.02
68.02
61.56
58.09
55.90
55.33
46.02
180
160
140
120
100
80
60
40
20
ppm
BRUKER
V-125-ac-13CNMR
NAME 1
EXPNO 1
PROCNO 1
Date_ 20090310
Time 19.17
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 257
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 295.3 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13c
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

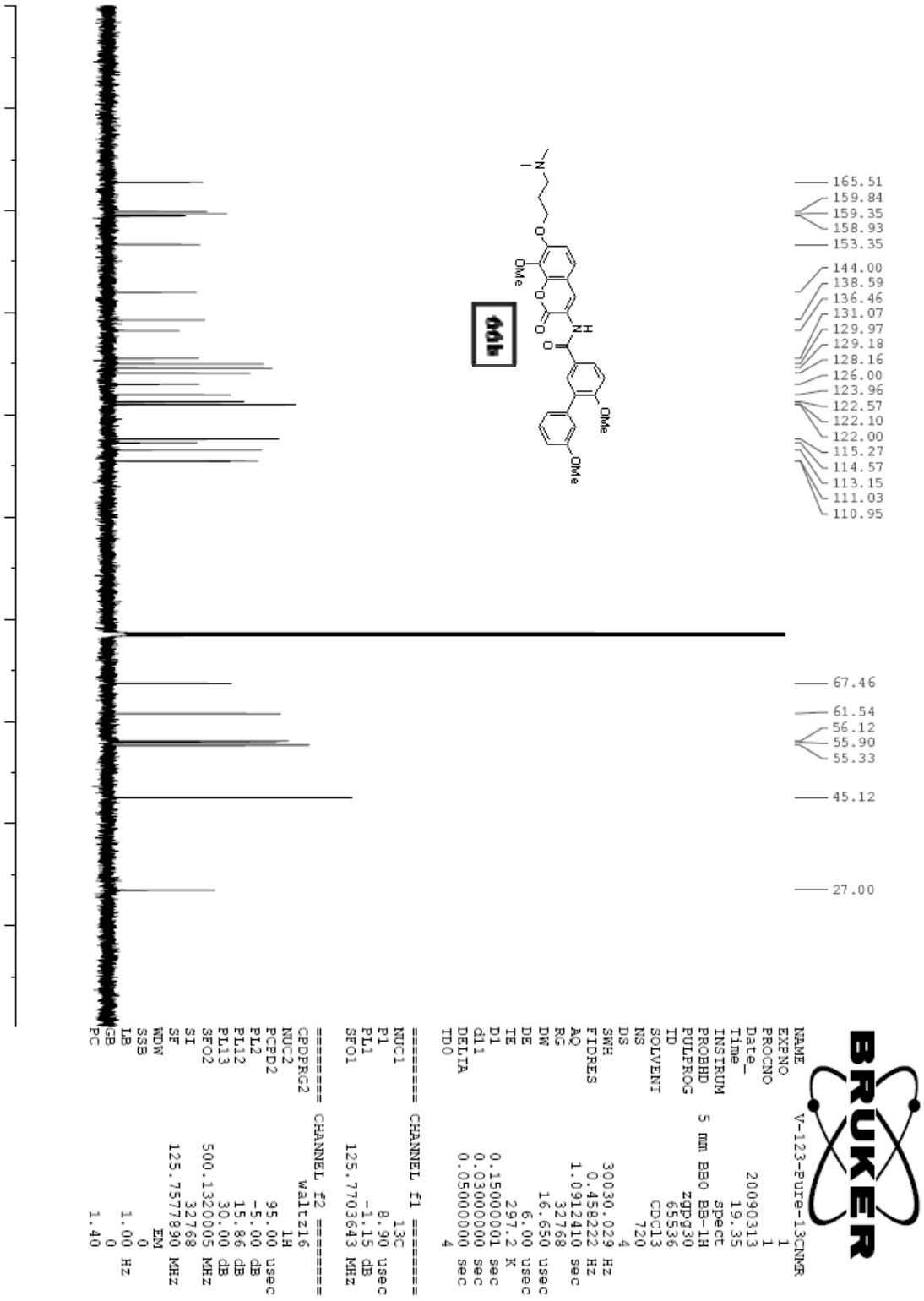

65c
MeO
OMe
OMe
8.80
8.77
7.94
7.94
7.93
7.92
7.92
7.91
7.40
7.38
7.37
7.29
7.15
7.15
7.15
7.14
7.13
7.13
7.12
7.11
7.11
7.09
7.08
6.96
6.96
6.96
6.95
6.94
6.94
6.94
6.94
6.86
4.16
4.15
4.14
3.91
3.88
2.84
2.83
2.82
2.47
2.45
2.41
1.00
0.98
2.07
1.03
1.09
1.03
1.06
1.03
0.98
2.10
6.38
3.29
1.89
6.00
3.05
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 ppm
BRUKER
NAME V-87-Pure
EXPNO 1
PROCNO 1
Date_ 20090313
Time_ 20.18
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

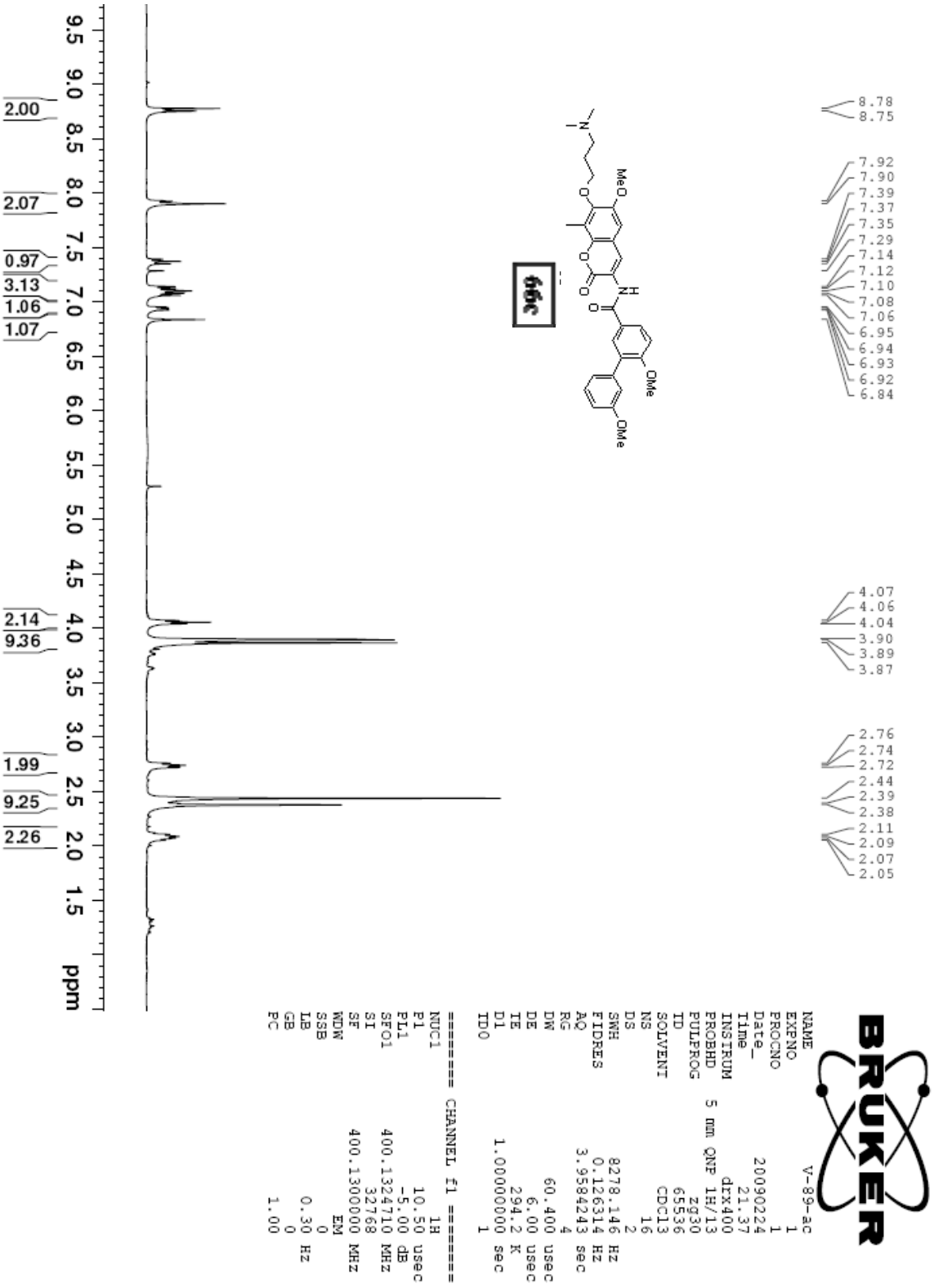

65c
MeO
OMe
OMe
165.55
159.83
159.35
150.29
148.09
143.35
138.61
131.06
130.02
129.18
128.19
126.03
123.68
123.07
122.01
120.43
115.49
115.28
113.13
111.01
106.51
70.51
58.97
56.00
55.89
55.33
45.59
9.01
BRUKER
NAME V-87-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090312
Time 11.10
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 258
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 297.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
TD0 4
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577890 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

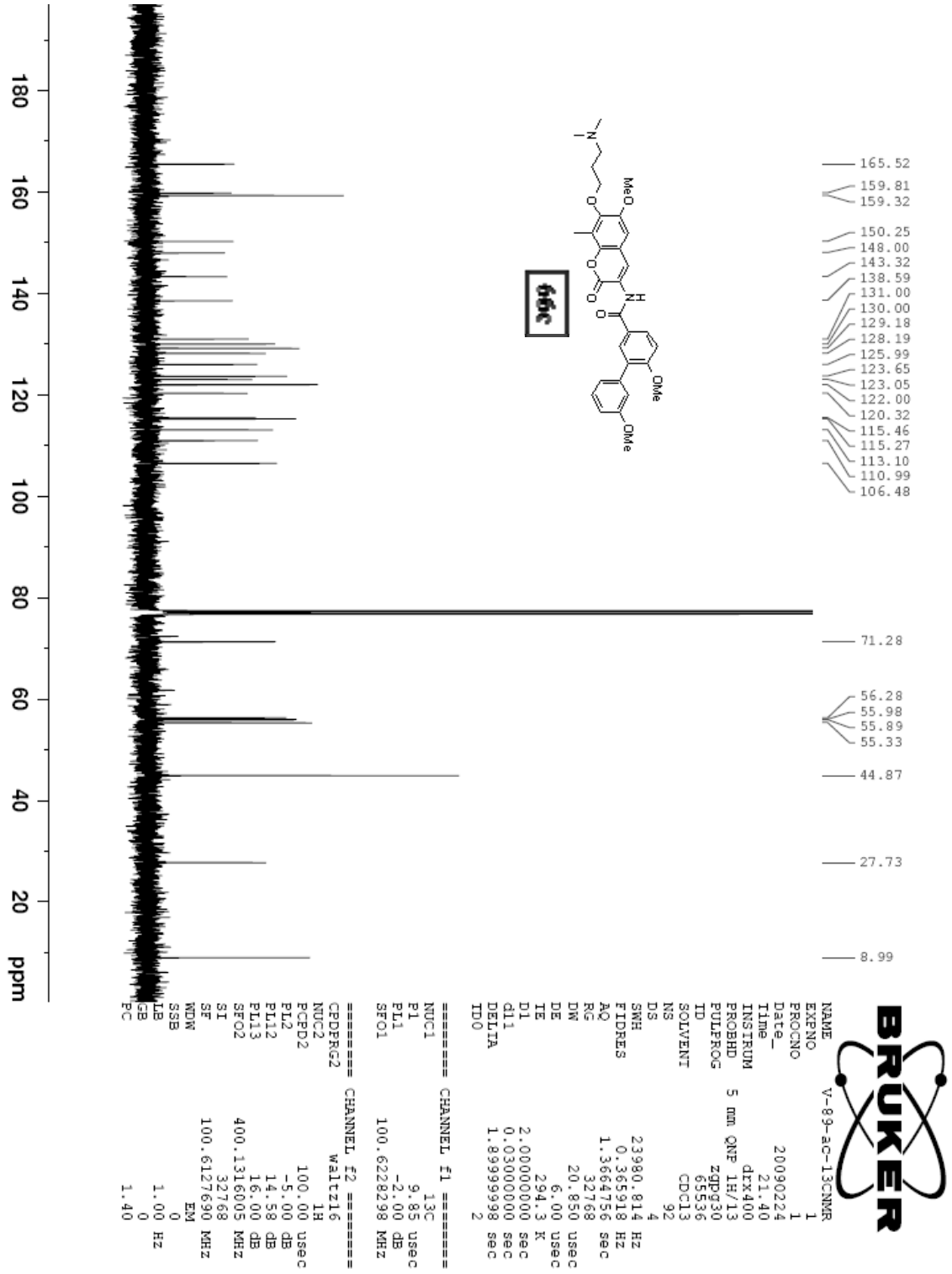

8.81
8.71
7.95
7.94
7.92
7.91
7.91
7.40
7.38
7.36
7.34
7.15
7.13
7.12
7.11
7.10
7.08
6.96
6.96
6.94
6.94
6.91
6.88
4.15
4.14
4.12
3.92
3.88
2.63
2.61
2.59
2.37
2.34
2.11
2.09
2.07
2.06
OMe
OMe
1.00
1.05
2.03
1.96
3.08
2.09
2.13
6.19
2.11
9.38
2.12
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 ppm
BRUKER
NAME V-95
EXPNO 1
PROCNO 1
Date_ 20090225
Time 22.00
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

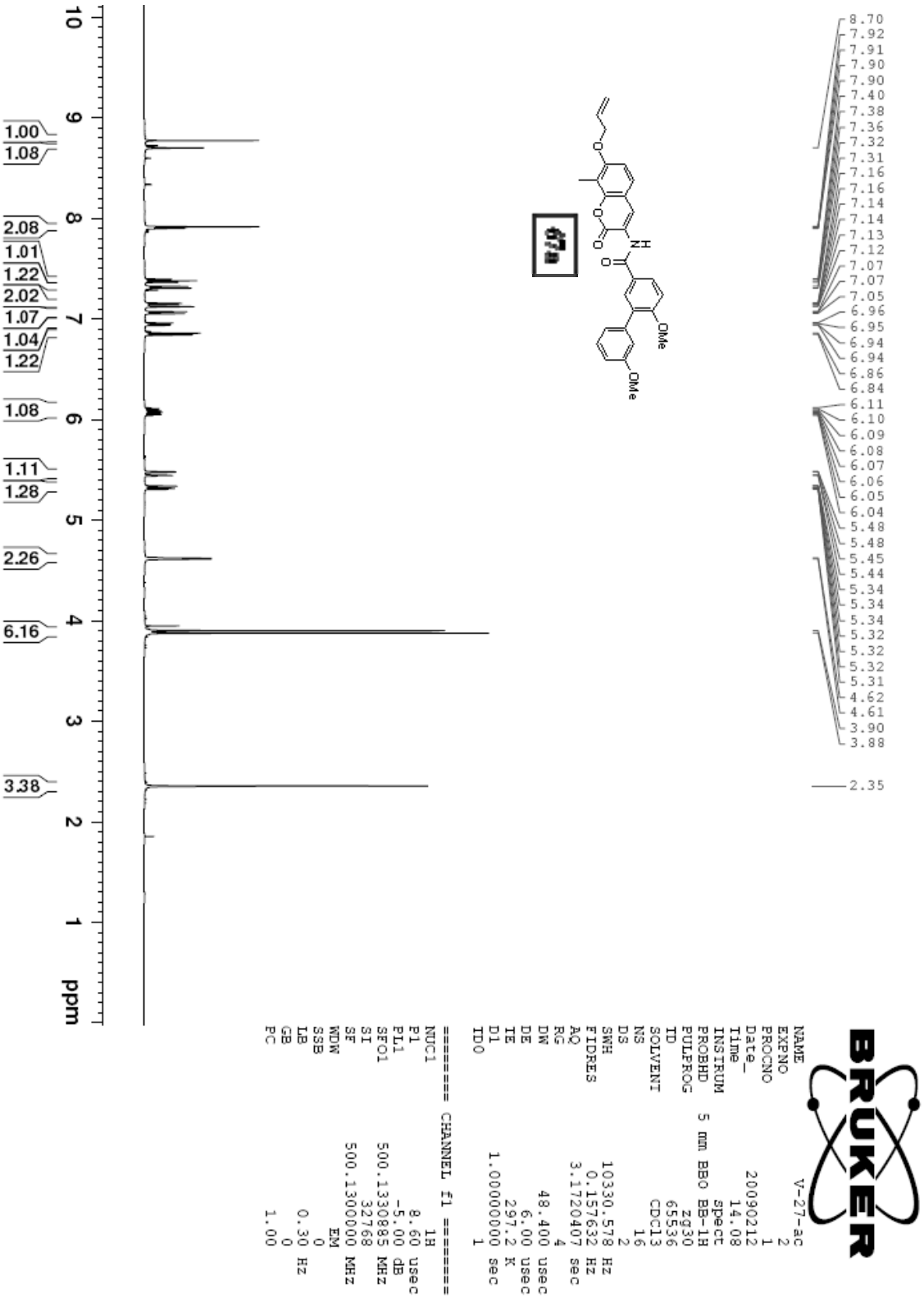

165.49
159.75
159.59
159.33
158.35
149.16
138.62
131.00
129.96
129.18
128.16
126.12
125.71
124.46
122.02
121.51
115.24
114.05
113.38
113.15
111.00
108.89
66.77
56.27
55.89
55.33
45.26
27.21
8.16
OMe
OMe
99a
BRUKER
NAME V-95-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090225
Time 22.05
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 128
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.5 K
D1 2.00000000 sec
D11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

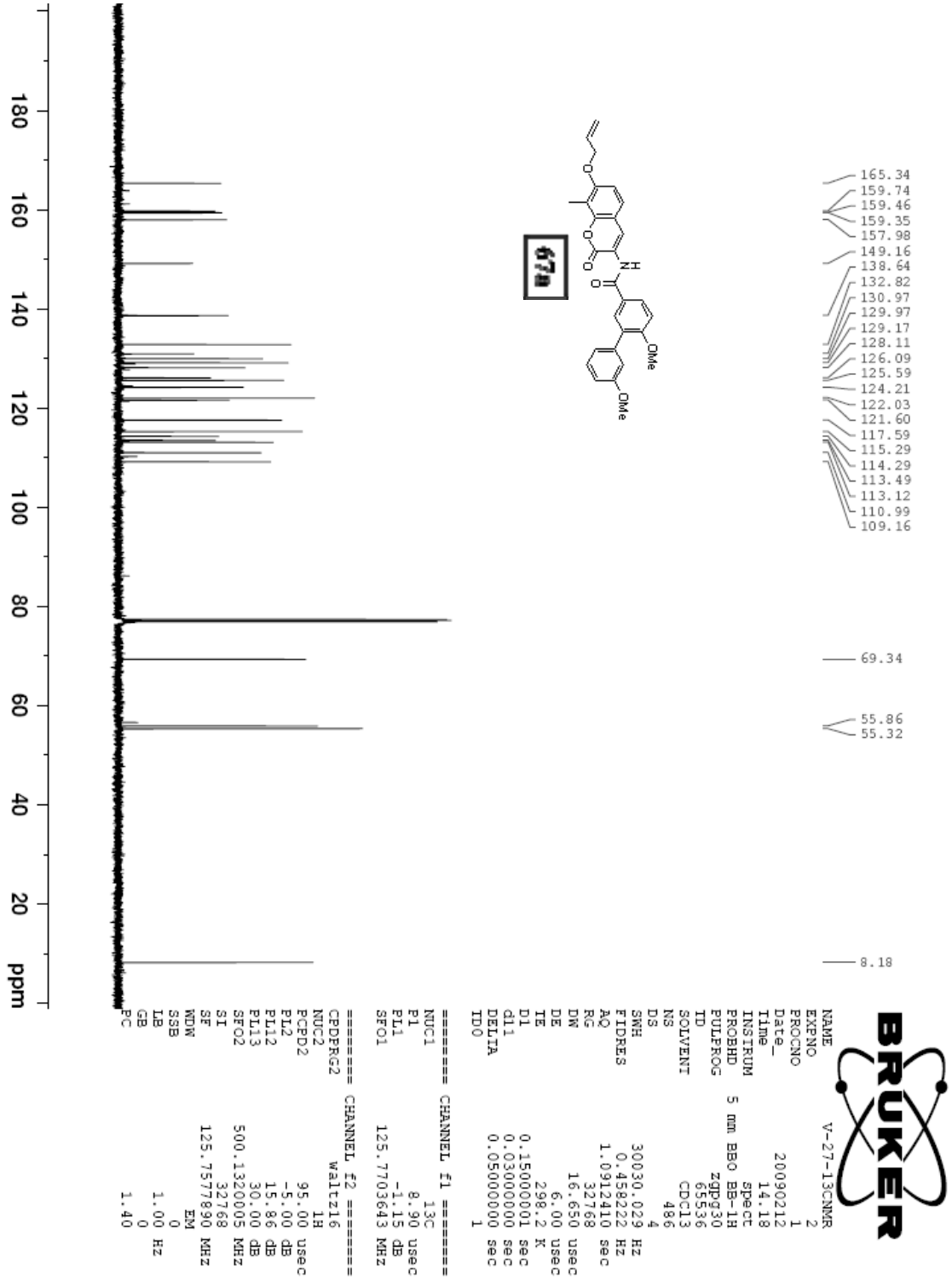

8.79
8.70
7.92
7.92
7.90
7.90
7.89
7.88
7.38
7.35
7.22
7.13
7.11
7.06
6.94
6.94
6.93
6.92
4.18
4.17
4.16
4.02
3.92
2.66
2.65
2.63
2.14
2.13
2.12
2.10
2.09
66b
OMe
OMe
OMe
1.00
0.98
2.00
1.01
1.02
3.02
1.99
2.07
3.00
6.09
1.99
6.02
2.02
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 ppm
BRUKER
NAME V-123-Pure
EXPNO 1
PROCNO 1
Date_ 20090313
Time 19.28
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300080 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

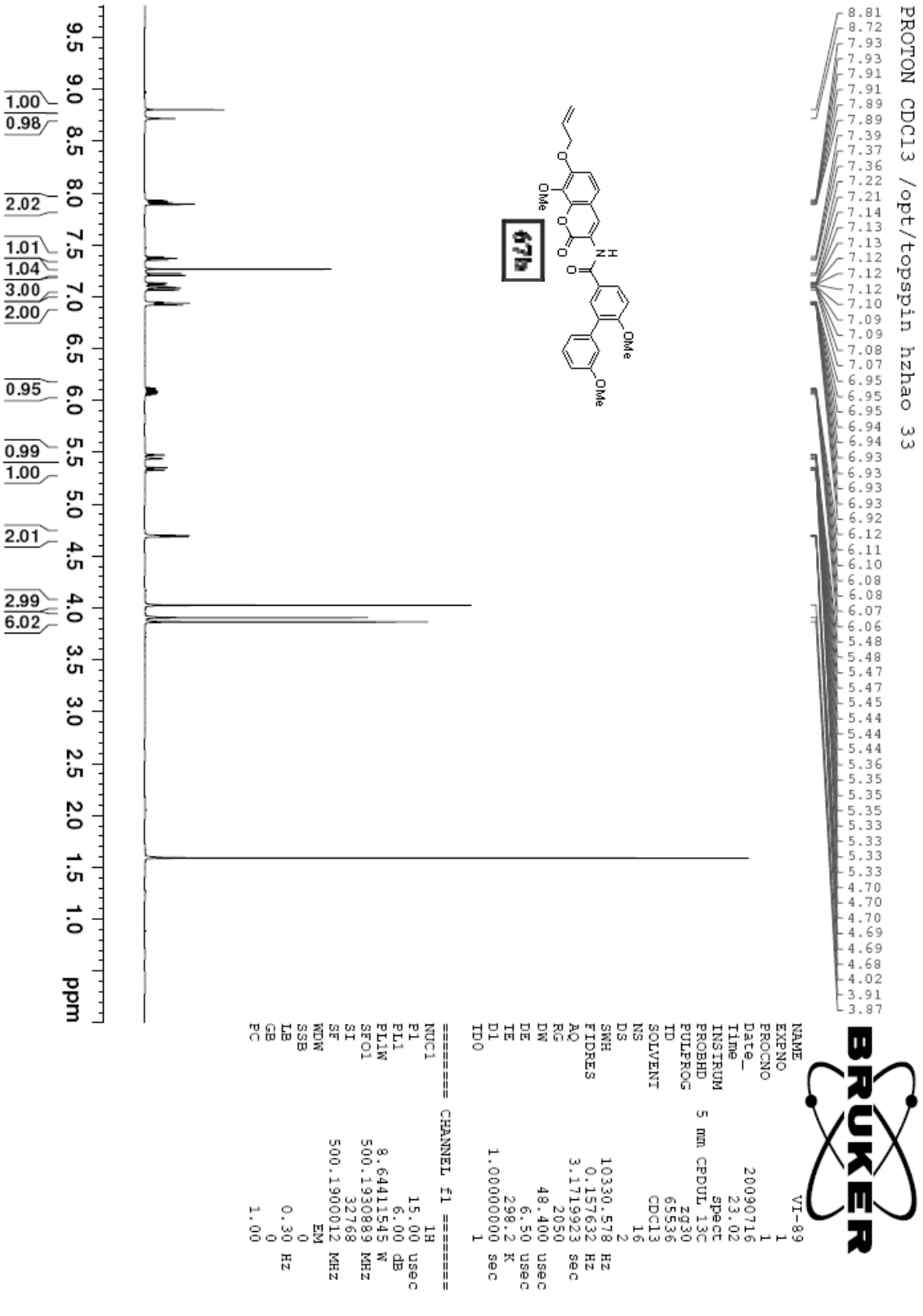

165.51
159.84
159.35
158.93
153.35
144.00
138.59
136.46
131.07
129.97
129.18
128.16
126.00
123.96
122.57
122.10
122.00
115.27
114.57
113.15
111.03
110.95
67.46
61.54
56.12
55.90
55.33
45.12
27.00
OMe
OMe
OMe
44b
180
160
140
120
100
80
60
40
20
ppm
BRUKER
V-123-Pure-13CNMR
NAME 1
EXPNO 1
PROCNO 1
Date_ 20090313
Time 19.35
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 720
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 297.2 K
D1 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
ID0 4
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577890 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

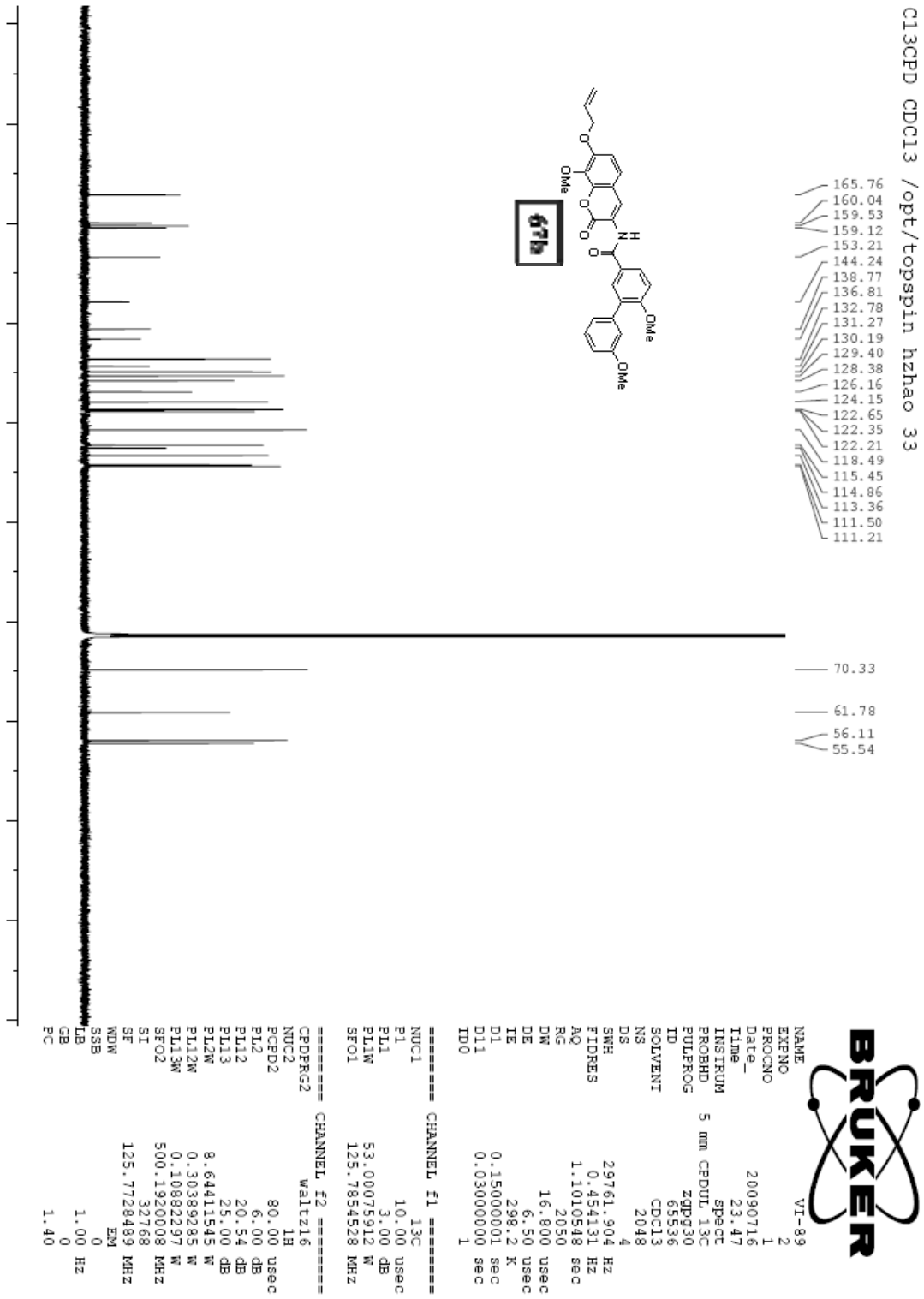

8.78
8.75
7.92
7.90
7.39
7.37
7.35
7.29
7.14
7.12
7.10
7.08
7.06
6.95
6.94
6.93
6.92
6.84
4.07
4.06
4.04
3.90
3.89
3.87
2.76
2.74
2.72
2.44
2.39
2.38
2.11
2.09
2.07
2.05
399
MeO
OMe
OMe
2.00
2.07
0.97
3.13
1.06
1.07
2.14
9.36
1.99
9.25
2.26
ppm
BRUKER
NAME V-89-ac
EXPNO 1
PROCNO 1
Date_ 20090224
Time 21.37
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

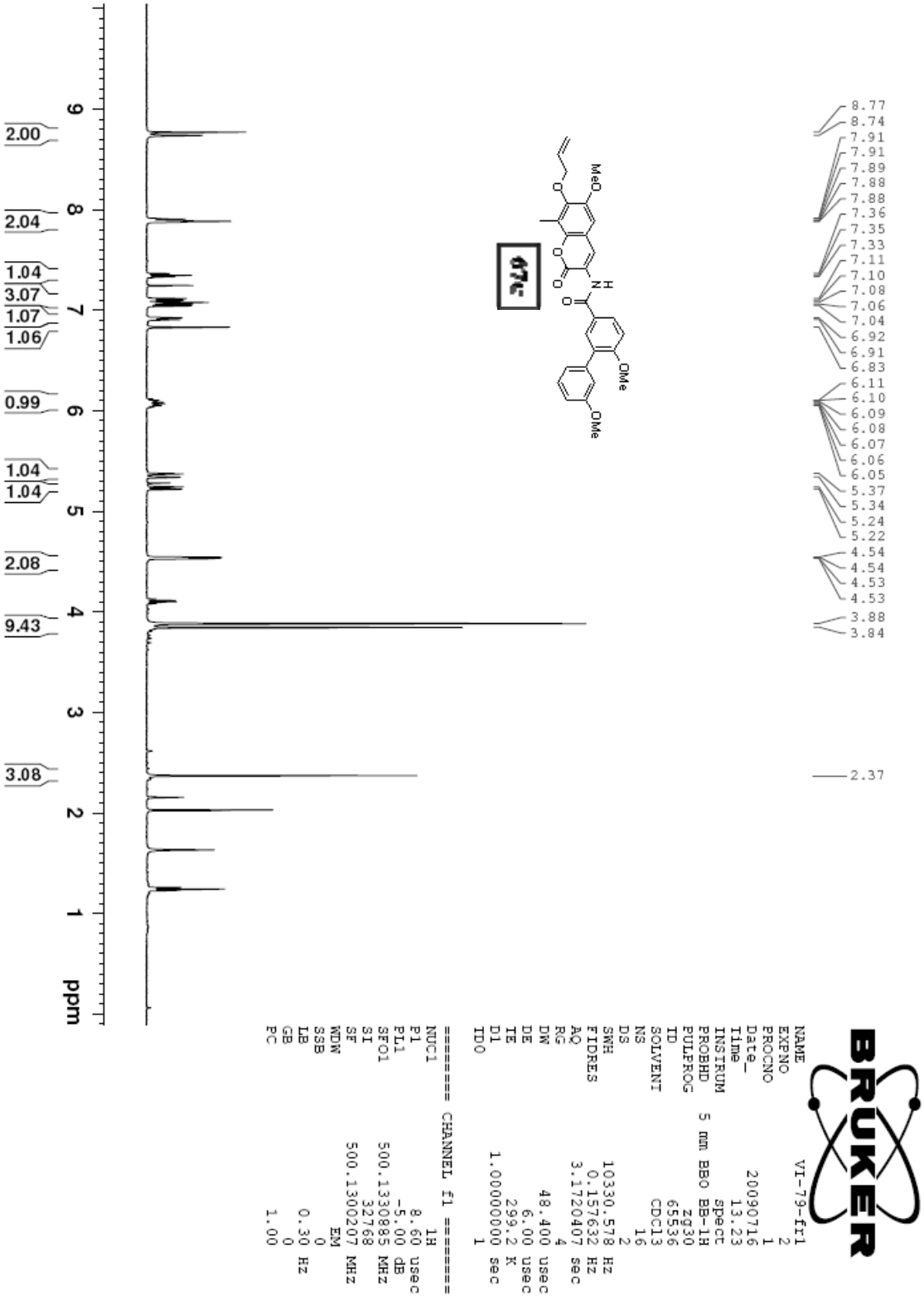

165.52
159.81
159.32
150.25
148.00
143.32
138.59
131.00
130.00
129.18
128.19
125.99
123.65
123.05
122.00
120.32
115.46
115.27
113.10
110.99
106.48
71.28
56.28
55.98
55.89
55.33
44.87
27.73
8.99
MeO
OMe
OMe
66c
ppm
NAME v-89-ac-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090224
Time_ 21.40
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 92
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

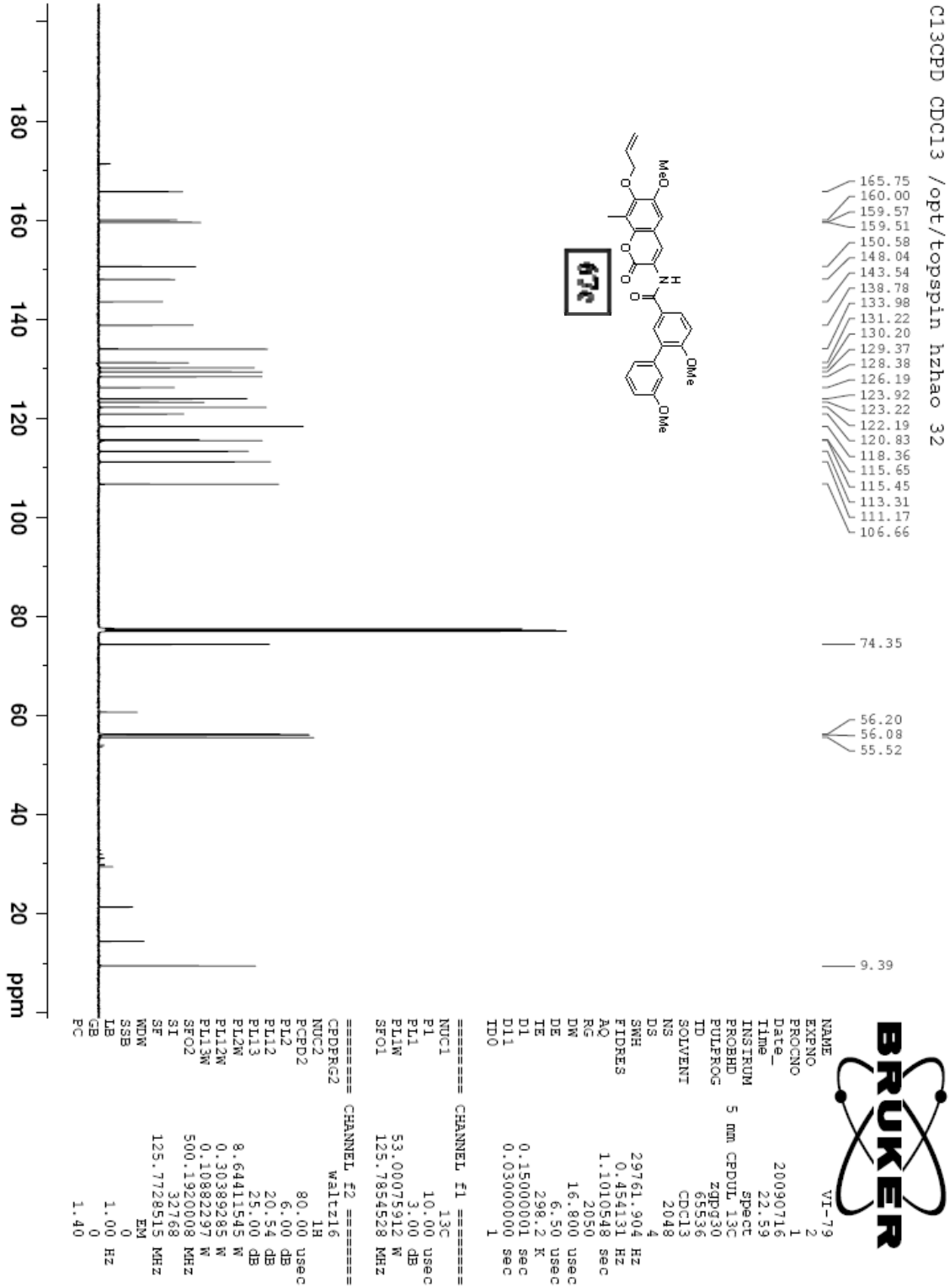

8.70
7.92
7.91
7.90
7.90
7.40
7.38
7.36
7.32
7.31
7.16
7.16
7.14
7.14
7.13
7.12
7.07
7.07
7.05
6.96
6.95
6.94
6.94
6.86
6.84
6.11
6.10
6.09
6.08
6.07
6.06
6.05
6.04
5.48
5.48
5.45
5.44
5.34
5.34
5.34
5.32
5.32
5.32
5.31
4.62
4.61
3.90
3.88
2.35
OMe
OMe
67a
1.00
1.08
2.08
1.01
1.22
2.02
1.07
1.04
1.22
1.08
1.11
1.28
2.26
6.16
3.38
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME V-27-ac
EXPNO 2
PROCNO 1
Date_ 20090212
Time_ 14.08
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
PL1 500.1330885 MHz
SFO1 32768
SI 500.1300000 MHz
SF EM
WDW 0
SSB 0.30 Hz
LB 0
GB 1.00
PC

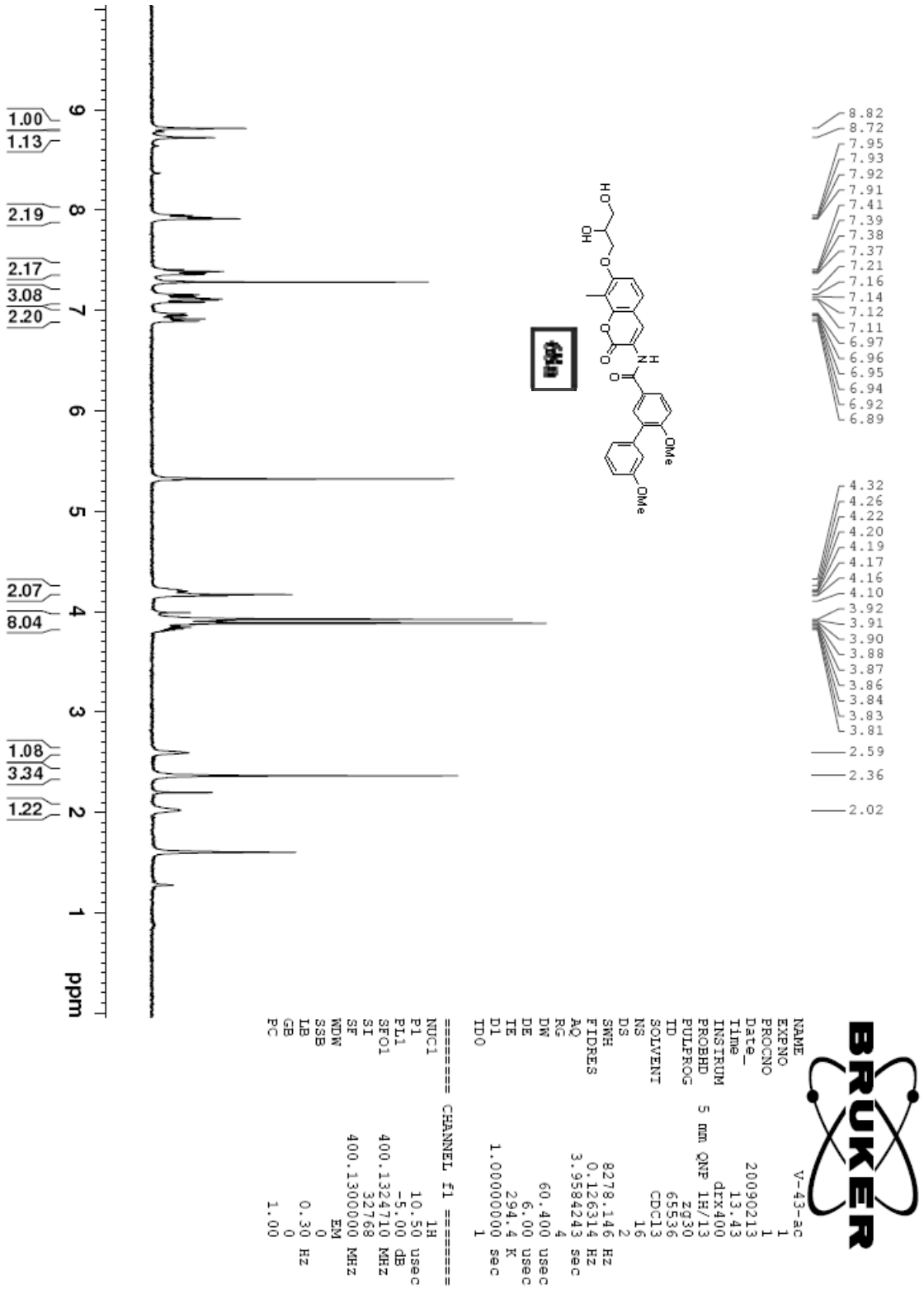

67a
OMe
OMe
165.34
159.74
159.46
159.35
157.98
149.16
138.64
132.82
130.97
129.97
129.17
128.11
126.09
125.59
124.21
122.03
121.60
117.59
115.29
114.29
113.49
113.12
110.99
109.16
69.34
55.86
55.32
8.18
BRUKER
NAME V-27-13CNMR
EXPNO 2
PROCNO 1
Date_ 20090212
Time 14.18
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 486
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
d11 0.03000000 sec
DELTA 0.05000000 sec
IDO 1
======== CHANNEL f1 ========
NUC1 13c
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577890 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

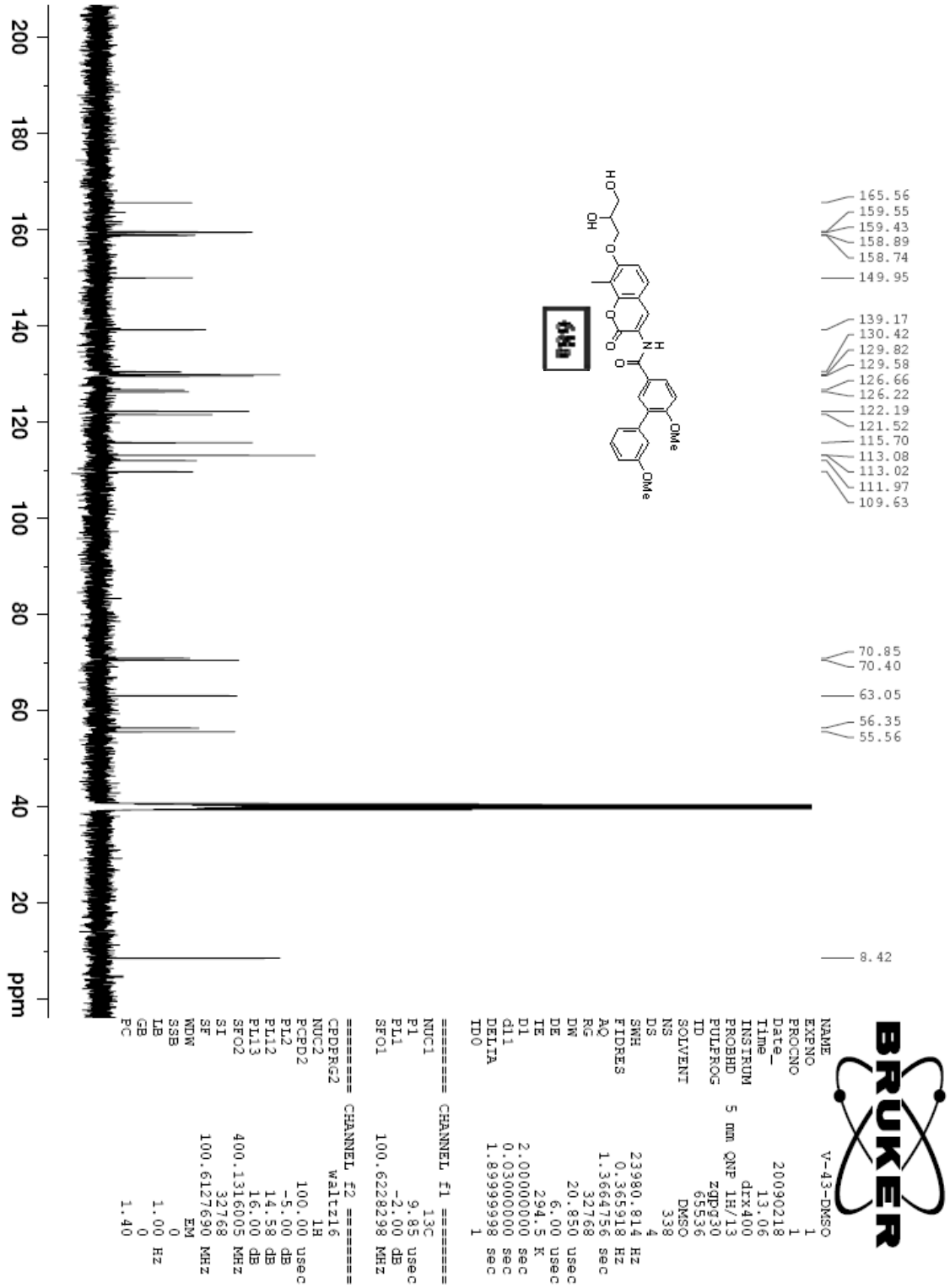

PROTON CDCl3 /opt/topspin hzhao 33
8.81
8.72
7.93
7.93
7.91
7.91
7.89
7.89
7.39
7.37
7.36
7.22
7.21
7.14
7.13
7.13
7.12
7.12
7.12
7.10
7.09
7.09
7.08
7.07
6.95
6.95
6.95
6.94
6.94
6.93
6.93
6.93
6.93
6.92
6.12
6.11
6.10
6.08
6.08
6.07
6.06
5.48
5.48
5.47
5.47
5.45
5.44
5.44
5.44
5.36
5.35
5.35
5.35
5.33
5.33
5.33
5.33
4.70
4.70
4.70
4.69
4.69
4.68
4.02
3.91
3.87
OMe
OMe
OMe
67b
1.00
0.98
2.02
1.01
1.04
3.00
2.00
0.95
0.99
1.00
2.01
2.99
6.02
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
NAME VI-89
EXPNO 1
PROCNO 1
Date_ 20090716
Time 23.02
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900012 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

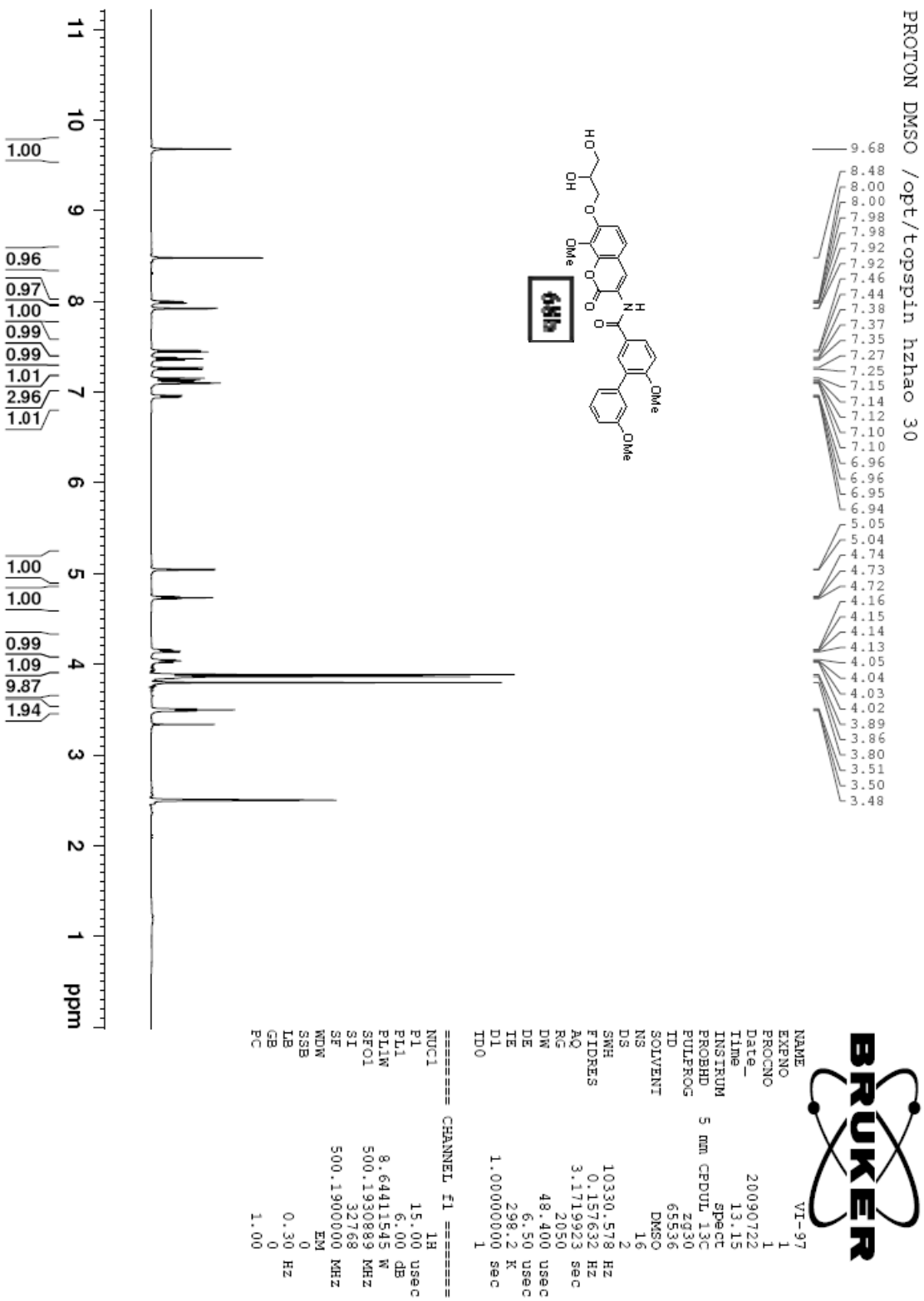

C13CPD CDC13 /opt/topspin hzhao 33
165.76
160.04
159.53
159.12
153.21
144.24
138.77
136.81
132.78
131.27
130.19
129.40
128.38
126.16
124.15
122.65
122.35
122.21
118.49
115.45
114.86
113.36
111.50
111.21
70.33
61.78
56.11
55.54
OMe
OMe
OMe
67b
180
160
140
120
100
80
60
40
20
ppm
NAME VI-89
EXPNO 2
PROCNO 1
Date_ 20090716
Time 23.47
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 20.54 dB
PL12 6.00 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728489 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

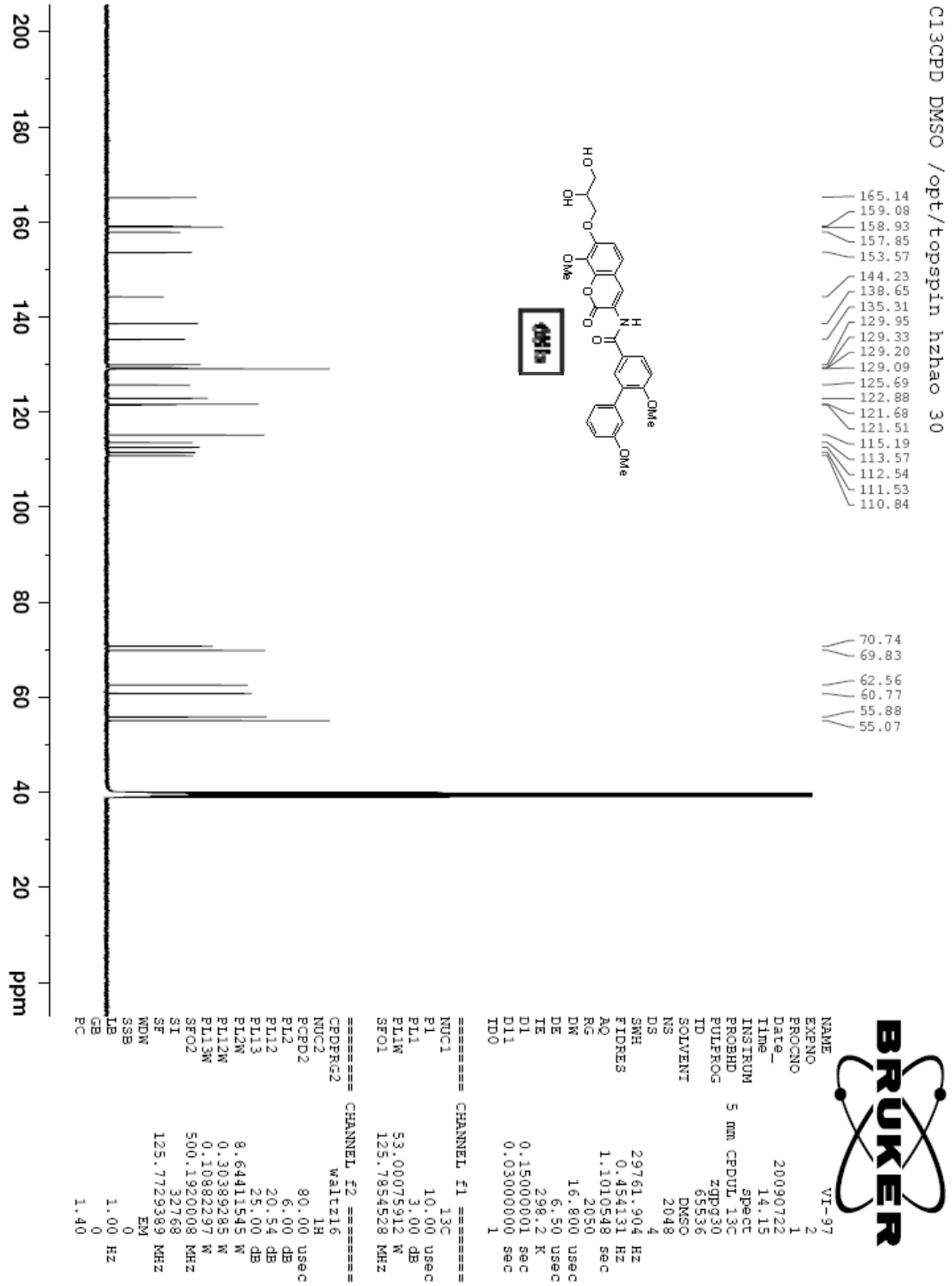

8.77
8.74
7.91
7.91
7.89
7.88
7.88
7.36
7.35
7.33
7.11
7.10
7.08
7.06
7.04
6.92
6.91
6.83
6.11
6.10
6.09
6.08
6.07
6.06
6.05
5.37
5.34
5.24
5.22
4.54
4.54
4.53
4.53
3.88
3.84
2.37
MeO
OMe
OMe
47%
2.00
2.04
1.04
3.07
1.07
1.06
0.99
1.04
1.04
2.08
9.43
3.08
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME VI-79-fr1
EXPNO 2
PROCNO 1
Date_ 20090716
Time 13.23
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 299.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300207 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

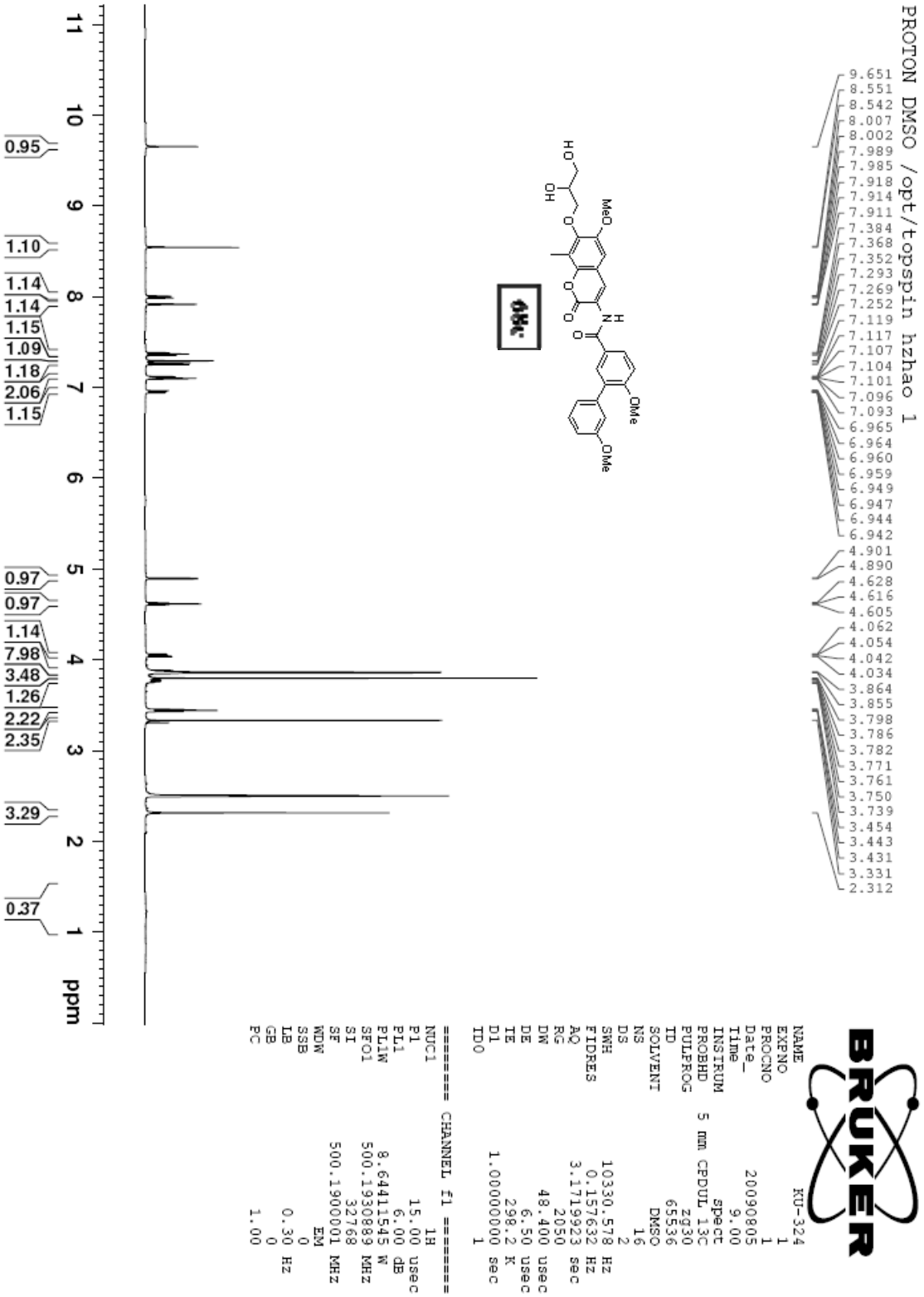

C13CPD CDC13 /opt/topspin hzhao 32
165.75
160.00
159.57
159.51
150.58
148.04
143.54
138.78
133.98
131.22
130.20
129.37
128.38
126.19
123.92
123.22
122.19
120.83
118.36
115.65
115.45
113.31
111.17
106.66
74.35
56.20
56.08
55.52
9.39
67e
MeO
OMe
OMe
BRUKER
NAME VI-79
EXPNO 2
PROCNO 1
Date_ 20090716
Time 22.59
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728515 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

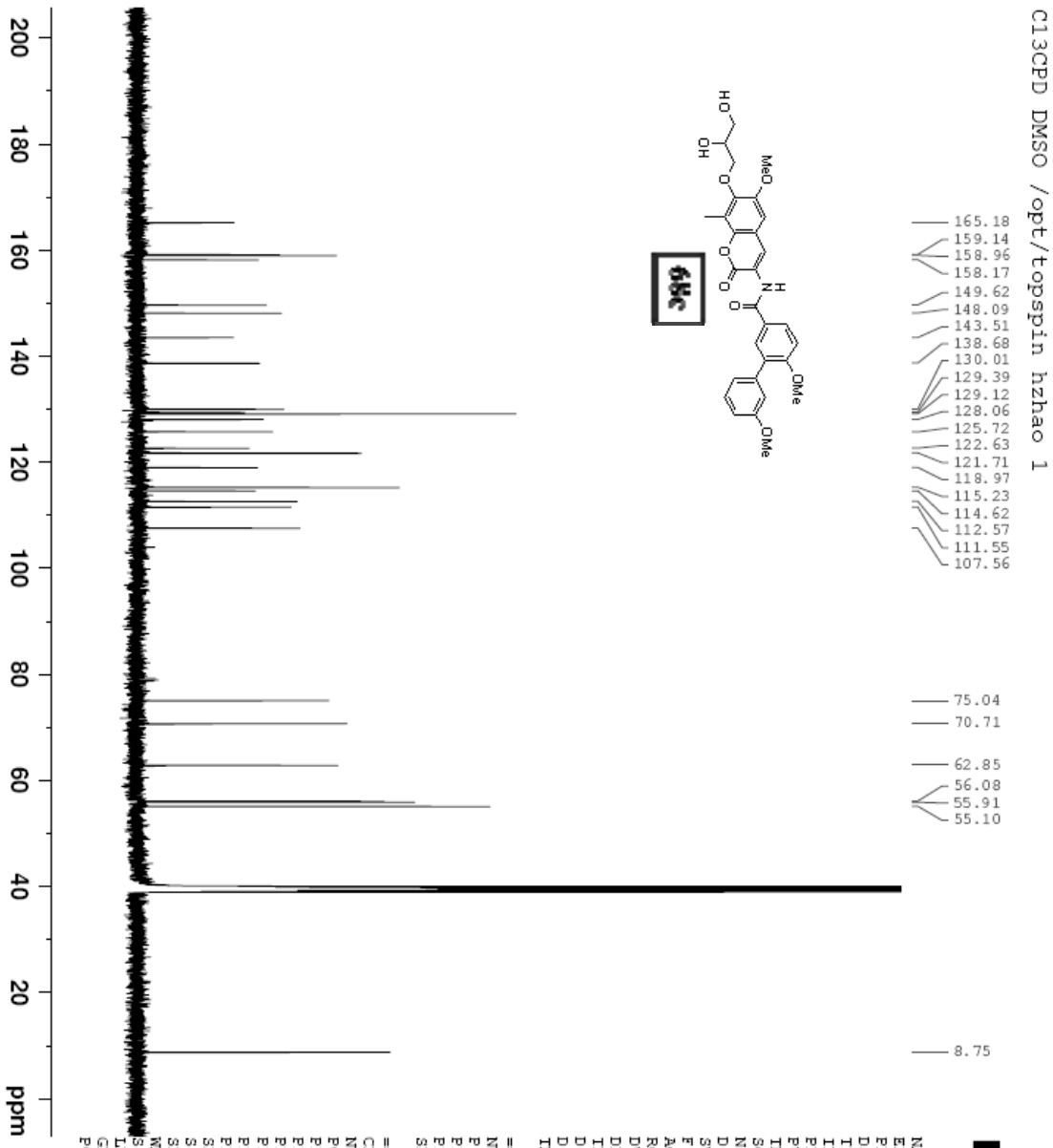

8.82
8.72
7.95
7.93
7.92
7.91
7.41
7.39
7.38
7.37
7.21
7.16
7.14
7.12
7.11
6.97
6.96
6.95
6.94
6.92
6.89
4.32
4.26
4.22
4.20
4.19
4.17
4.16
4.10
3.92
3.91
3.90
3.88
3.87
3.86
3.84
3.83
3.81
2.59
2.36
2.02
1.00
1.13
2.19
2.17
3.08
2.20
2.07
8.04
1.08
3.34
1.22
9
8
7
6
5
4
3
2
1
ppm
OMe
OMe
NAME V-43-ac
EXPNO 1
PROCNO 1
Date_ 20090213
Time 13.43
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

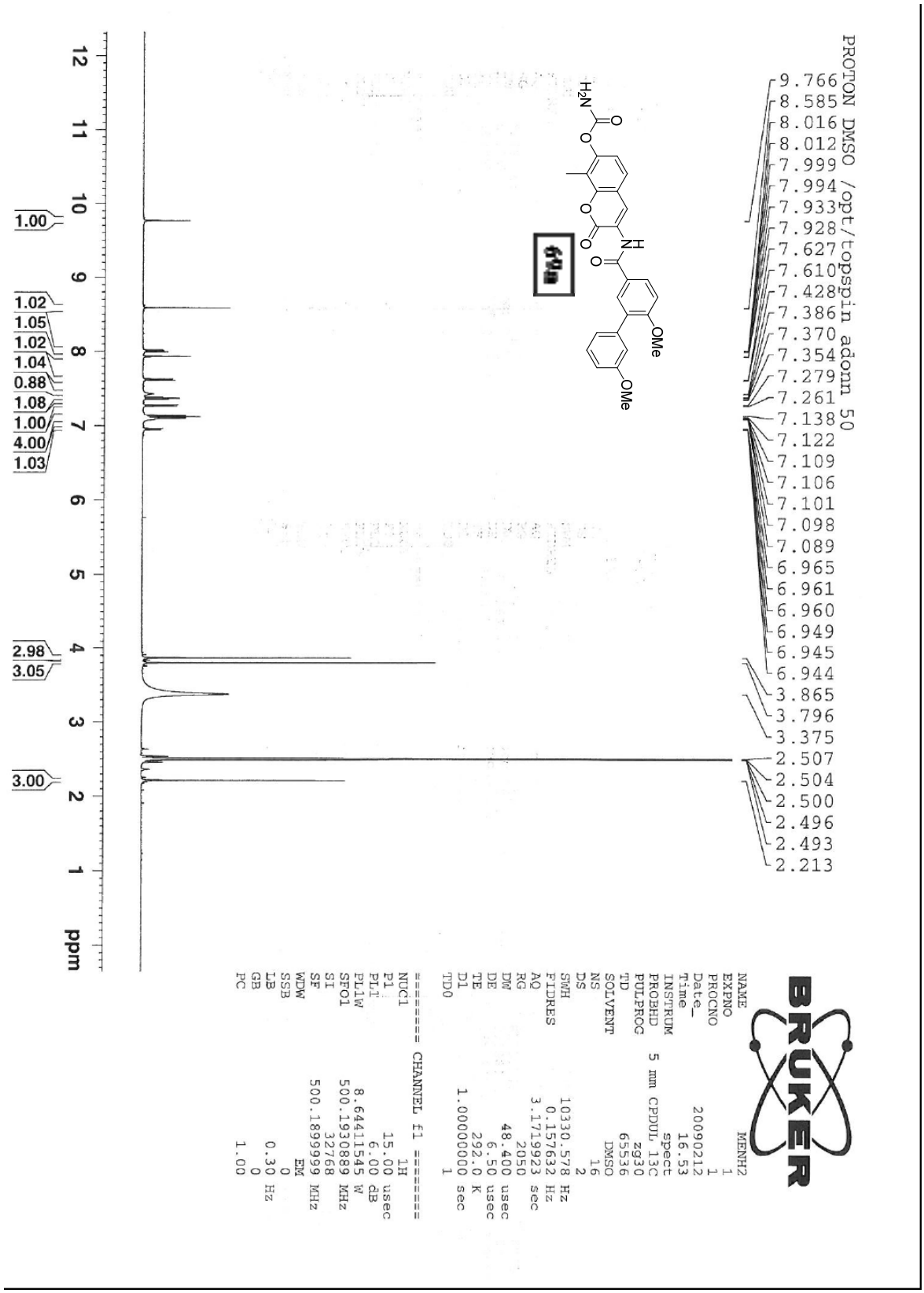

165.56
159.55
159.43
158.89
158.74
149.95
139.17
130.42
129.82
129.58
126.66
126.22
122.19
121.52
115.70
113.08
113.02
111.97
109.63
70.85
70.40
63.05
56.35
55.56
8.42
ppm
200
180
160
140
120
100
80
60
40
20
BRUKER
NAME V-43-DMSO
EXPNO 1
PROCNO 1
Date_ 20090218
Time 13.06
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 338
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.5 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

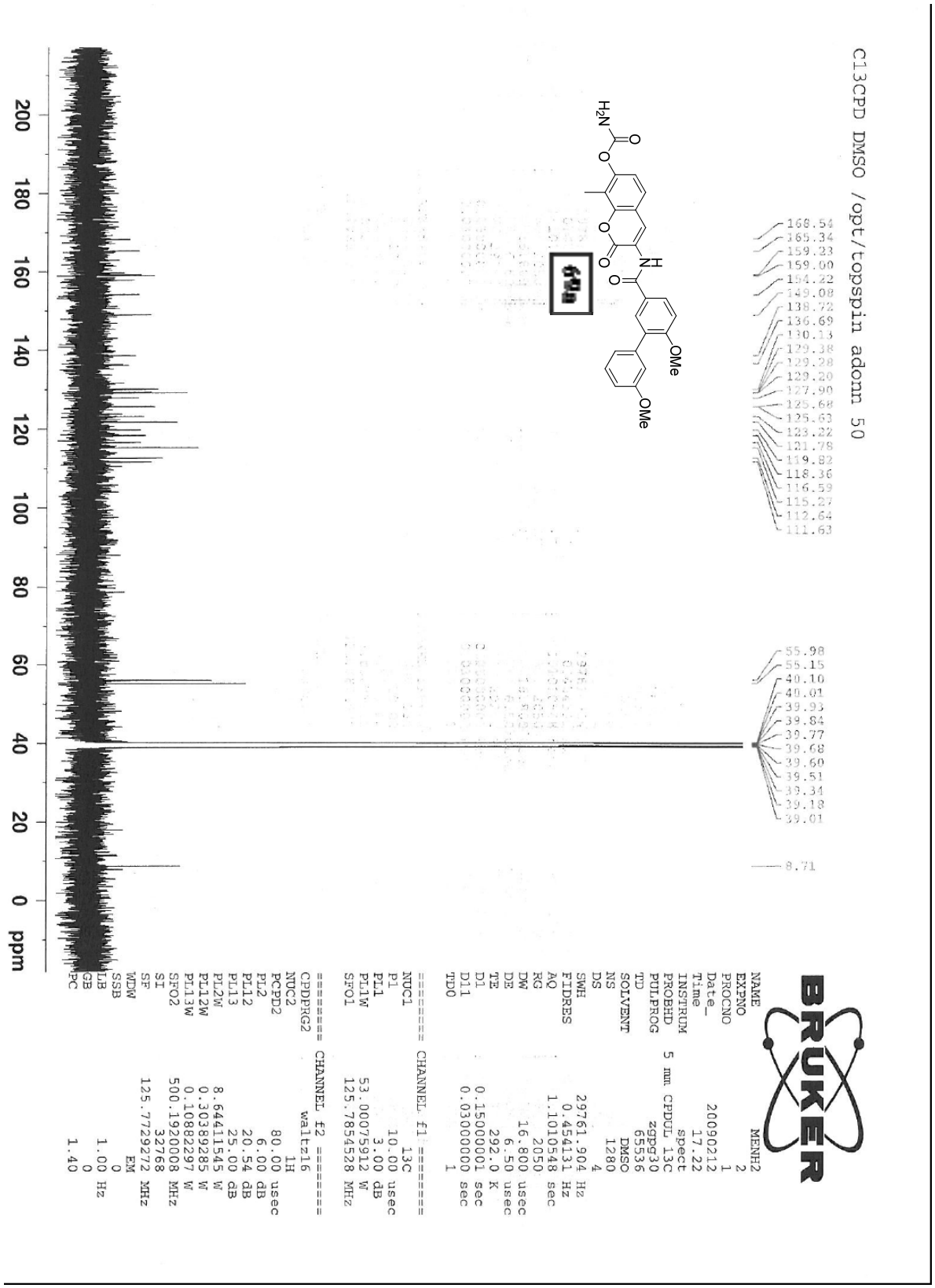

PROTON DMSO /opt/topspin hzhao 30
9.68
8.48
8.00
8.00
7.98
7.98
7.92
7.92
7.46
7.44
7.38
7.37
7.35
7.27
7.25
7.15
7.14
7.12
7.10
7.10
6.96
6.96
6.95
6.94
5.05
5.04
4.74
4.73
4.72
4.16
4.15
4.14
4.13
4.05
4.04
4.03
4.02
3.89
3.86
3.80
3.51
3.50
3.48
HO
OH
OMe
OMe
OMe
6Hb
1.00
0.96
0.97
1.00
0.99
0.99
1.01
2.96
1.01
1.00
1.00
0.99
1.09
9.87
1.94
11
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME VI-97
EXPNO 1
PROCNO 1
Date_ 20090722
Time 13.15
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

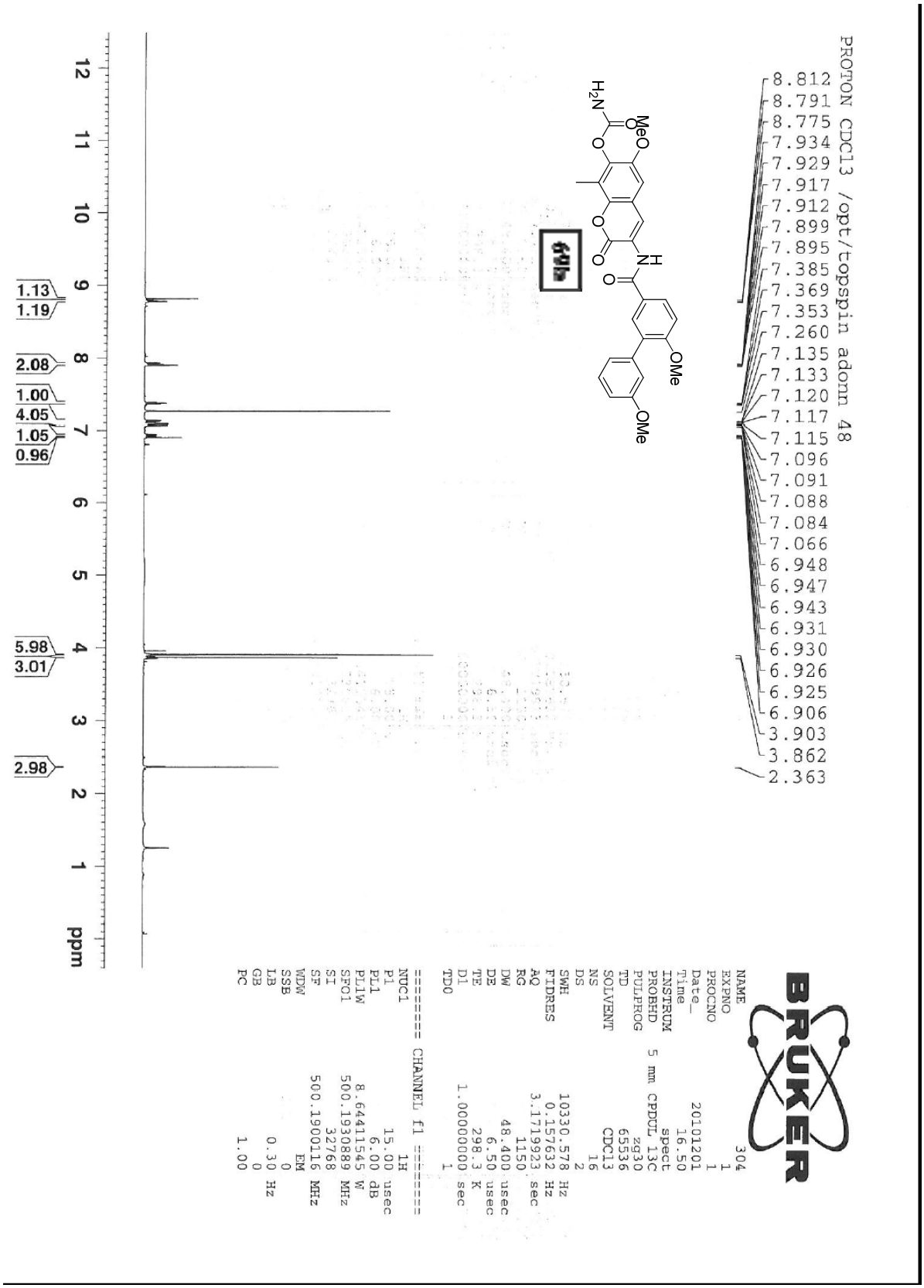

C13CPD DMSO /opt/topspin hzhao 30
165.14
159.08
158.93
157.85
153.57
144.23
138.65
135.31
129.95
129.33
129.20
129.09
125.69
122.88
121.68
121.51
115.19
113.57
112.54
111.53
110.84
70.74
69.83
62.56
60.77
55.88
55.07
OMe
OMe
OH
HO
ppm
200
180
160
140
120
100
80
60
40
20
BRUKER
NAME VI-97
EXPNO 2
PROCNO 1
Date_ 20090722
Time 14.15
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729389 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

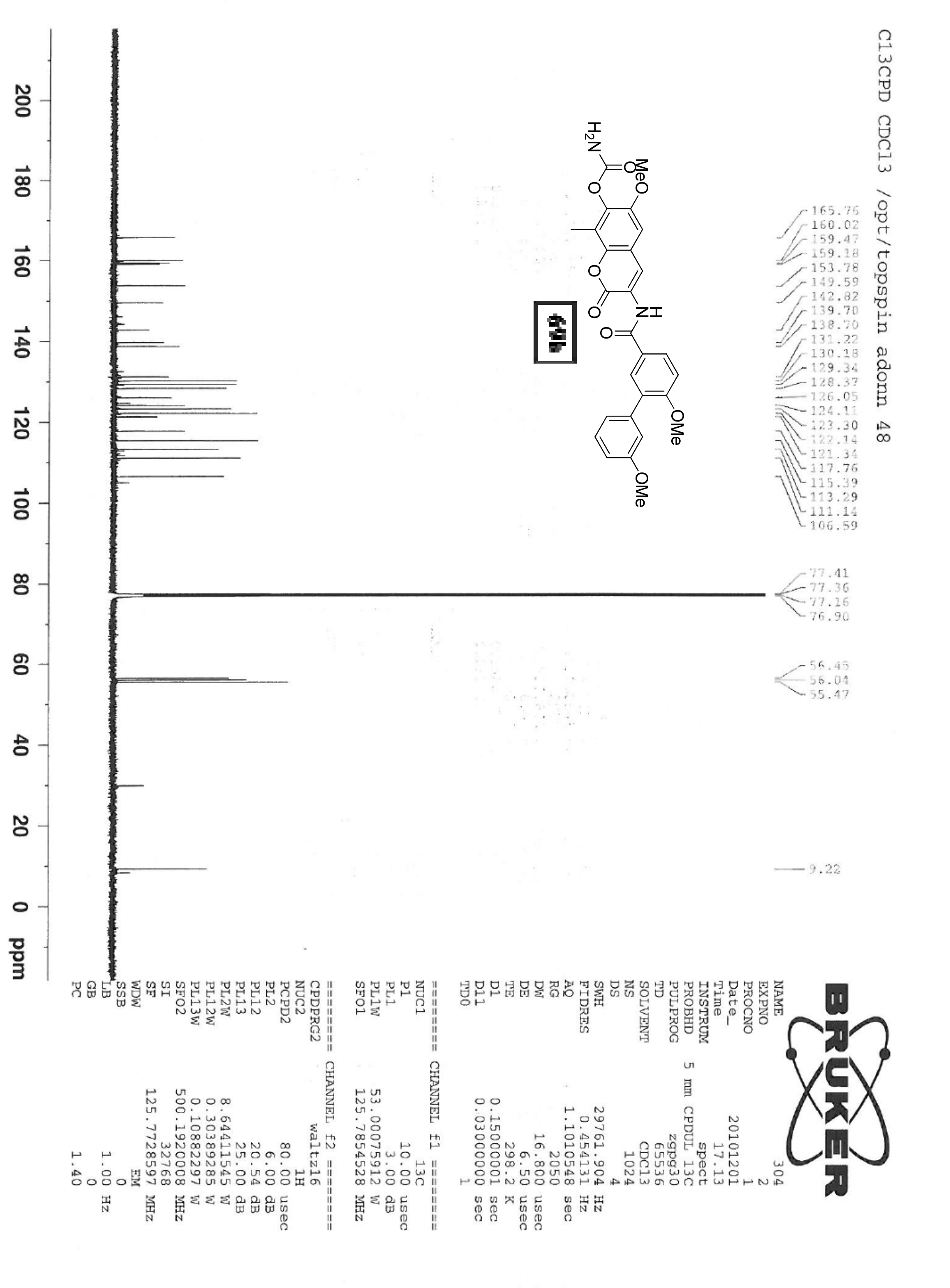

PROTON DMSO /opt/topspin hzhao 1
9.651
8.551
8.542
8.007
8.002
7.989
7.985
7.918
7.914
7.911
7.384
7.368
7.352
7.293
7.269
7.252
7.119
7.117
7.107
7.104
7.101
7.096
7.093
6.965
6.964
6.960
6.959
6.949
6.947
6.944
6.942
4.901
4.890
4.628
4.616
4.605
4.062
4.054
4.042
4.034
3.864
3.855
3.798
3.786
3.782
3.771
3.761
3.750
3.739
3.454
3.443
3.431
3.331
2.312
HO
OH
MeO
OMe
OMe
H
N
O
O
O
O
0.95
1.10
1.14
1.14
1.15
1.09
1.18
2.06
1.15
0.97
0.97
1.14
7.98
3.48
1.26
2.22
2.35
3.29
0.37
11
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME KU-324
EXPNO 1
PROCNO 1
Date_ 20090805
Time 9.00
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900001 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

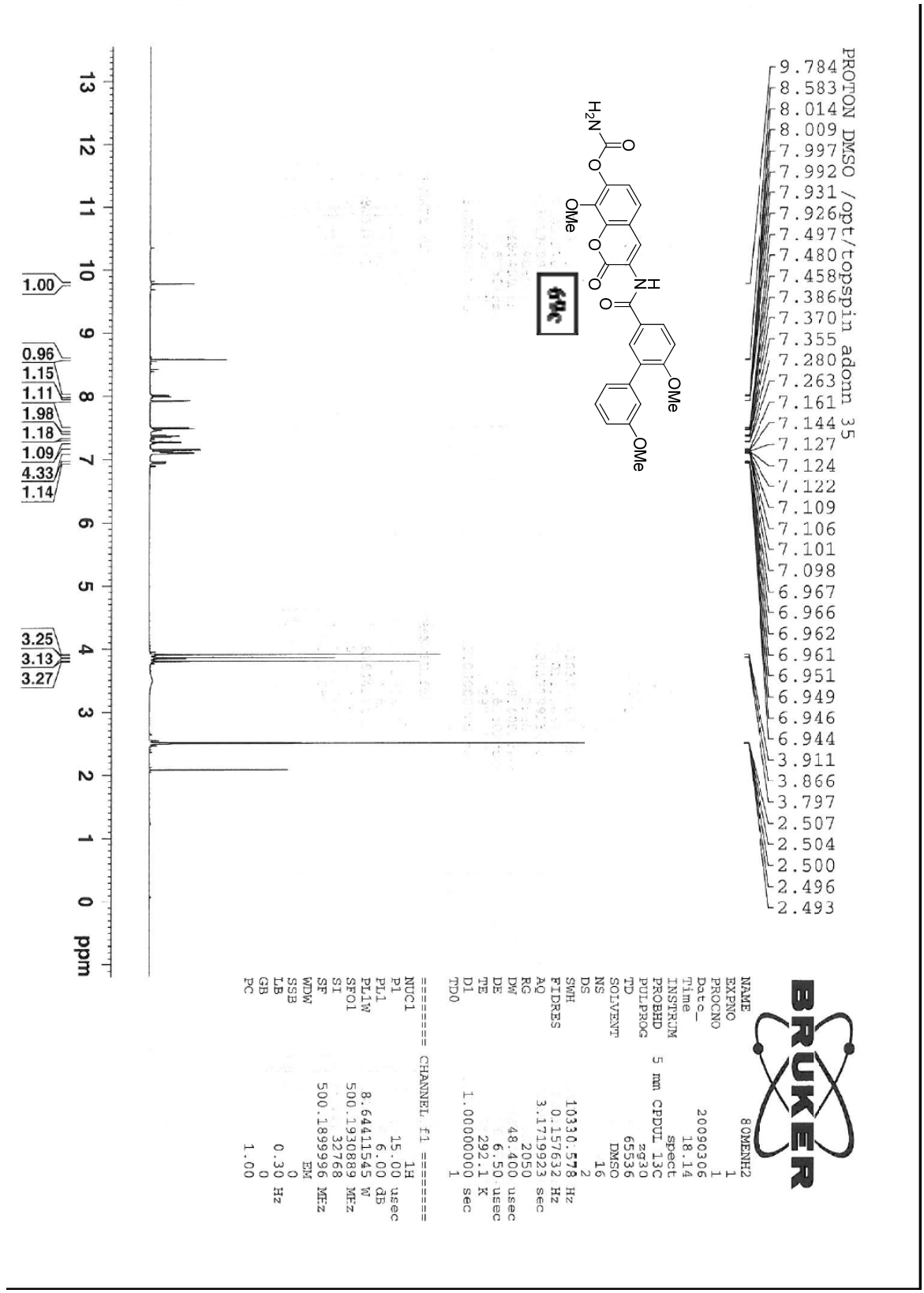

C13CPD DMSO /opt/topspin hzhao 1
6ibc
165.18
159.14
158.96
158.17
149.62
148.09
143.51
138.68
130.01
129.39
129.12
128.06
125.72
122.63
121.71
118.97
115.23
114.62
112.57
111.55
107.56
75.04
70.71
62.85
56.08
55.91
55.10
8.75
BRUKER
NAME KU-324
EXPNO 2
PROCNO 1
Date_ 20090805
Time 9.32
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1444
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.78545528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10892297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729351 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

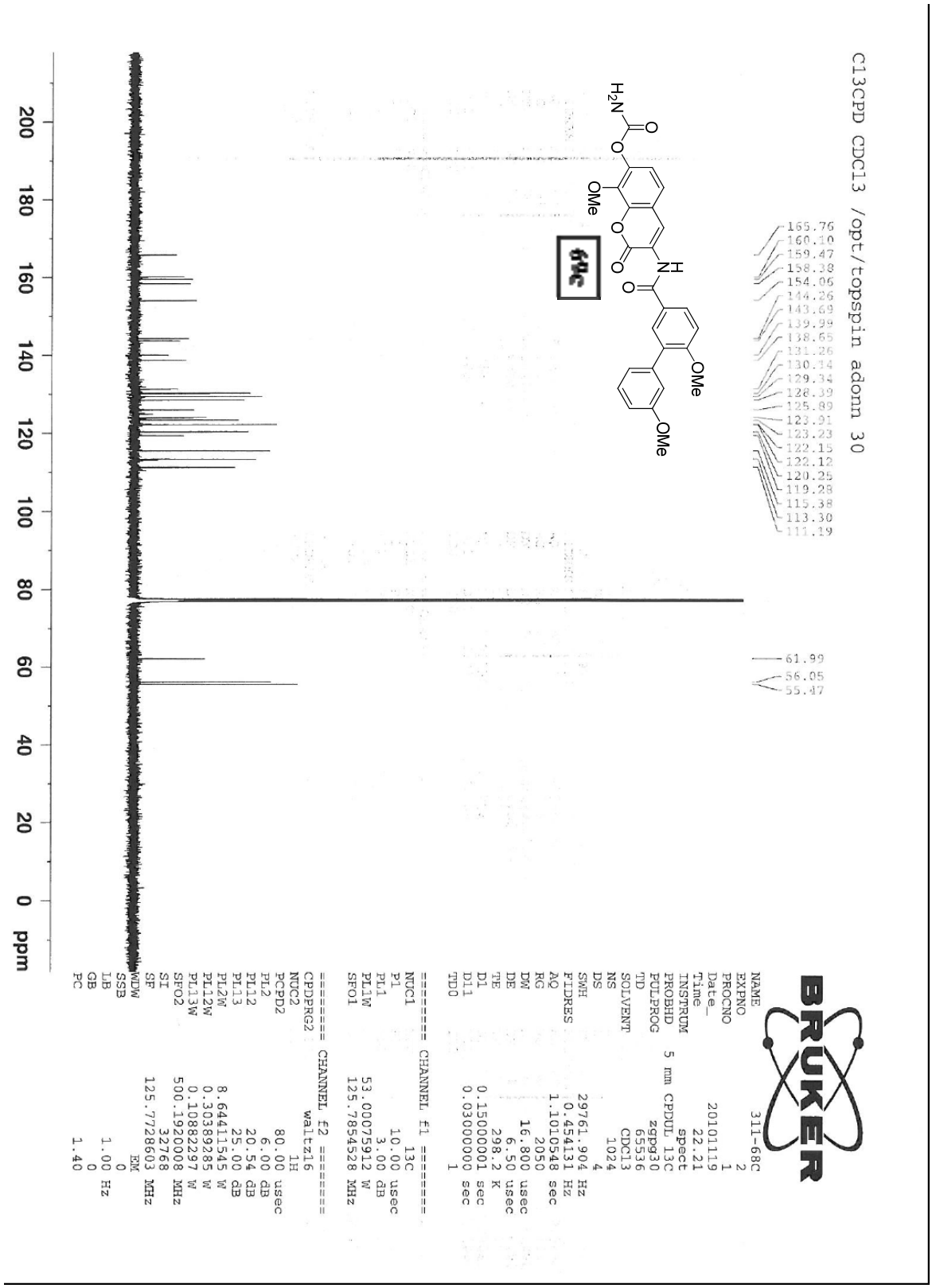

PROTON DMSO /opt/topspin adonn 50
9.766
8.585
8.016
8.012
7.999
7.994
7.933
7.928
7.627
7.610
7.428
7.386
7.370
7.354
7.279
7.261
7.138
7.122
7.109
7.106
7.101
7.098
7.089
6.965
6.961
6.960
6.949
6.945
6.944
3.865
3.796
3.375
2.507
2.504
2.500
2.496
2.493
2.213
OMe
OMe
69a
1.00
1.02
1.05
1.02
1.04
0.88
1.08
1.00
4.00
1.03
2.98
3.05
3.00
ppm
NAME MENH2
EXPNO 1
PROCNO 1
Date_ 20090212
Time 16.53
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 292.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899999 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

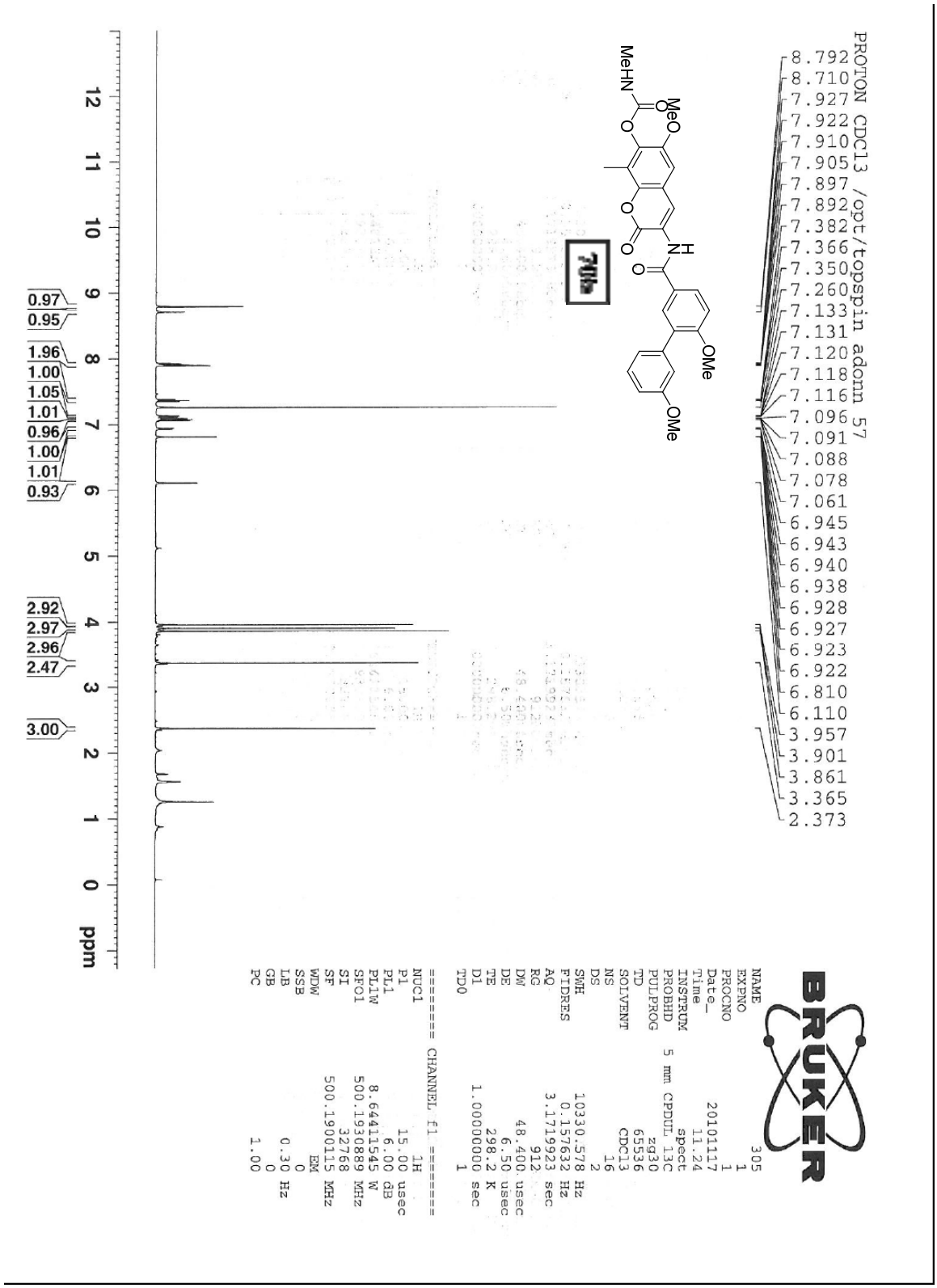

C13CPD DMSO /opt/topspin adonn 50
OMe
OMe
200
180
160
140
120
100
80
60
40
20
0
ppm

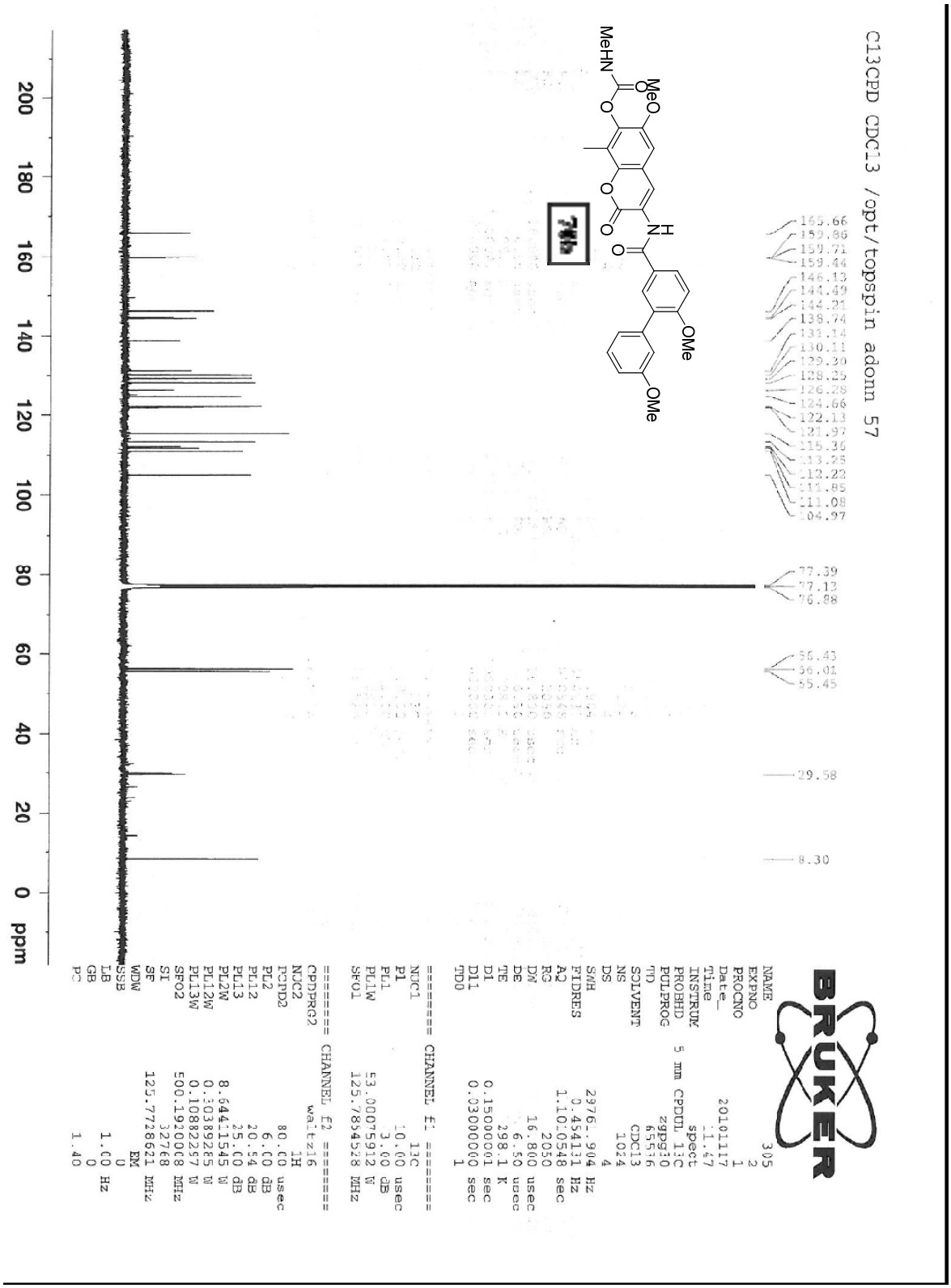

PROTON CDC13 /opt/topspin adonn 48
8.812
8.791
8.775
7.934
7.929
7.917
7.912
7.899
7.895
7.385
7.369
7.353
7.260
7.135
7.133
7.120
7.117
7.115
7.096
7.091
7.088
7.084
7.066
6.948
6.947
6.943
6.931
6.930
6.926
6.925
6.906
3.903
3.862
2.363
H2N
O
MeO
O
O
O
N
H
O
OMe
OMe
69b
BRUKER
NAME 304
EXPNO 1
PROCNO 1
Date_ 20101201
Time 16.50
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1150
DW 48.400 usec
DE 6.50 usec
TE 298.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900116 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.13
1.19
2.08
1.00
4.05
1.05
0.96
5.98
3.01
2.98
12
11
10
9
8
7
6
5
4
3
2
1
ppm

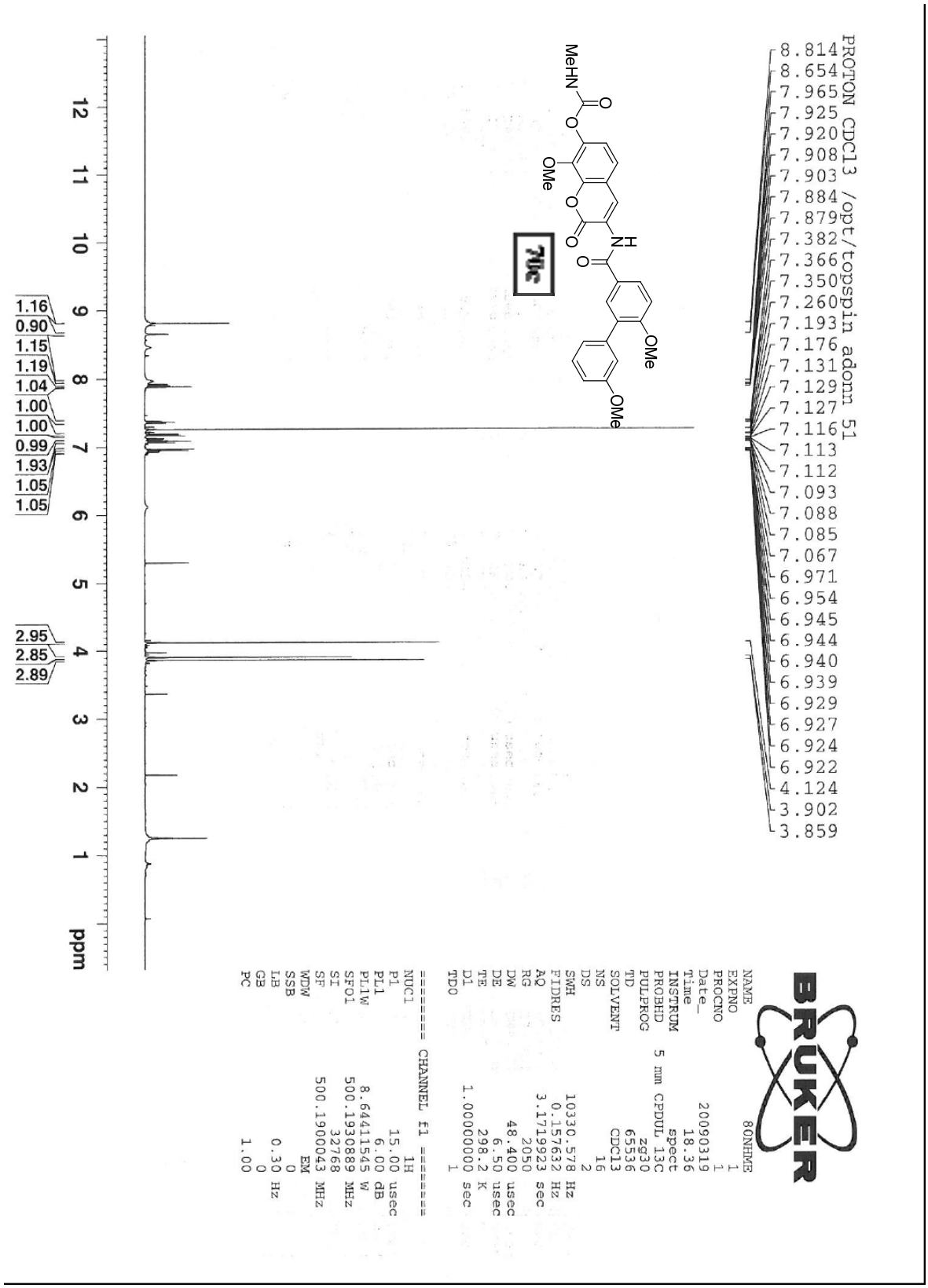

C13CPD CDCl3 /opt/topspin adonn 48
165.76
160.02
159.47
159.18
153.78
149.59
142.82
139.70
138.70
131.22
130.18
129.34
128.37
126.05
124.11
123.30
122.14
121.34
117.76
115.39
113.29
111.14
106.59
77.41
77.36
77.16
76.90
56.45
56.04
55.47
9.22
MeO
H2N
O
OMe
OMe
H
N
BRUKER
NAME 304
EXPNO 2
PROCNO 1
Date_ 20101201
Time 17.13
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.10882297 W
PL13W 0.30389285 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728597 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
0
ppm

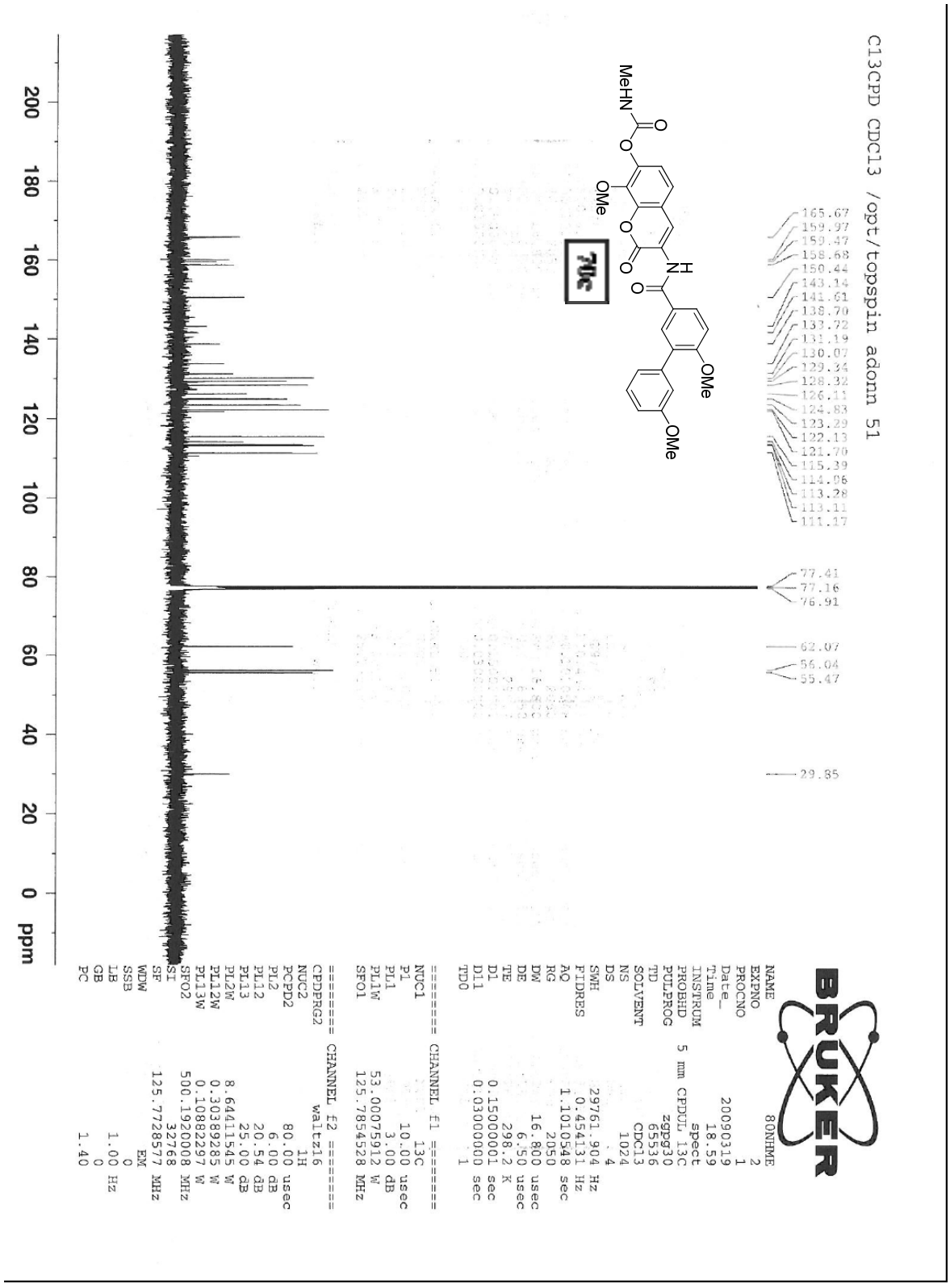

PROTON DMSO /opt/topspin adonn 35
9.784
8.583
8.014
8.009
7.997
7.992
7.931
7.926
7.497
7.480
7.458
7.386
7.370
7.355
7.280
7.263
7.161
7.144
7.127
7.124
7.122
7.109
7.106
7.101
7.098
6.967
6.966
6.962
6.961
6.951
6.949
6.946
6.944
3.911
3.866
3.797
2.507
2.504
2.500
2.496
2.493
OMe
OMe
OMe
1.00
0.96
1.15
1.11
1.98
1.18
1.09
4.33
1.14
3.25
3.13
3.27
ppm
NAME 8OMENH2
EXPNO 1
PROCNO 1
Date_ 20090306
Time 18.14
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 292.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899996 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


C13CPD CDC13 /opt/topspin adonn 30
165.76
160.14
159.47
158.38
154.06
144.26
143.69
139.98
138.65
131.26
130.14
129.34
128.39
125.89
123.91
123.23
122.15
122.12
120.25
119.28
115.38
113.30
111.19
61.99
56.05
55.47
OMe
OMe
OMe
NAME 311-68C
EXPNO 2
PROCNO 1
Date_ 20101119
Time 22.21
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728603 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

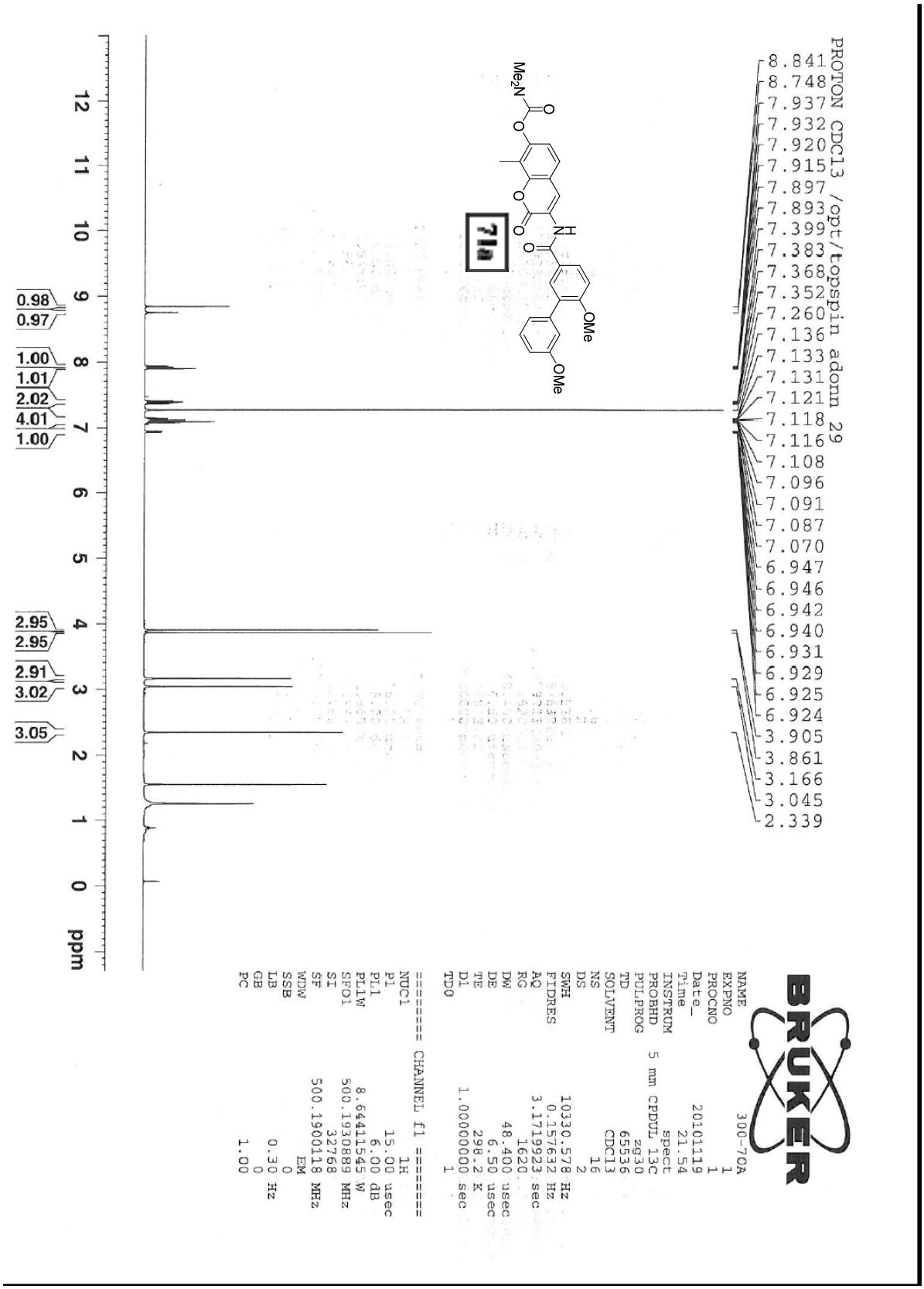

PROTON CDC13 /opt/topspin adonn 57
8.792
8.710
7.927
7.922
7.910
7.905
7.897
7.892
7.382
7.366
7.350
7.260
7.133
7.131
7.120
7.118
7.116
7.096
7.091
7.088
7.078
7.061
6.945
6.943
6.940
6.938
6.928
6.927
6.923
6.922
6.810
6.110
3.957
3.901
3.861
3.365
2.373
MeHN
MeO
OMe
OMe
70b
NAME 305
EXPNO 1
PROCNO 1
Date_ 20101117
Time 11.24
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 912
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900115 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.97
0.95
1.96
1.00
1.05
1.01
0.96
1.00
1.01
0.93
2.92
2.97
2.96
2.47
3.00
12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

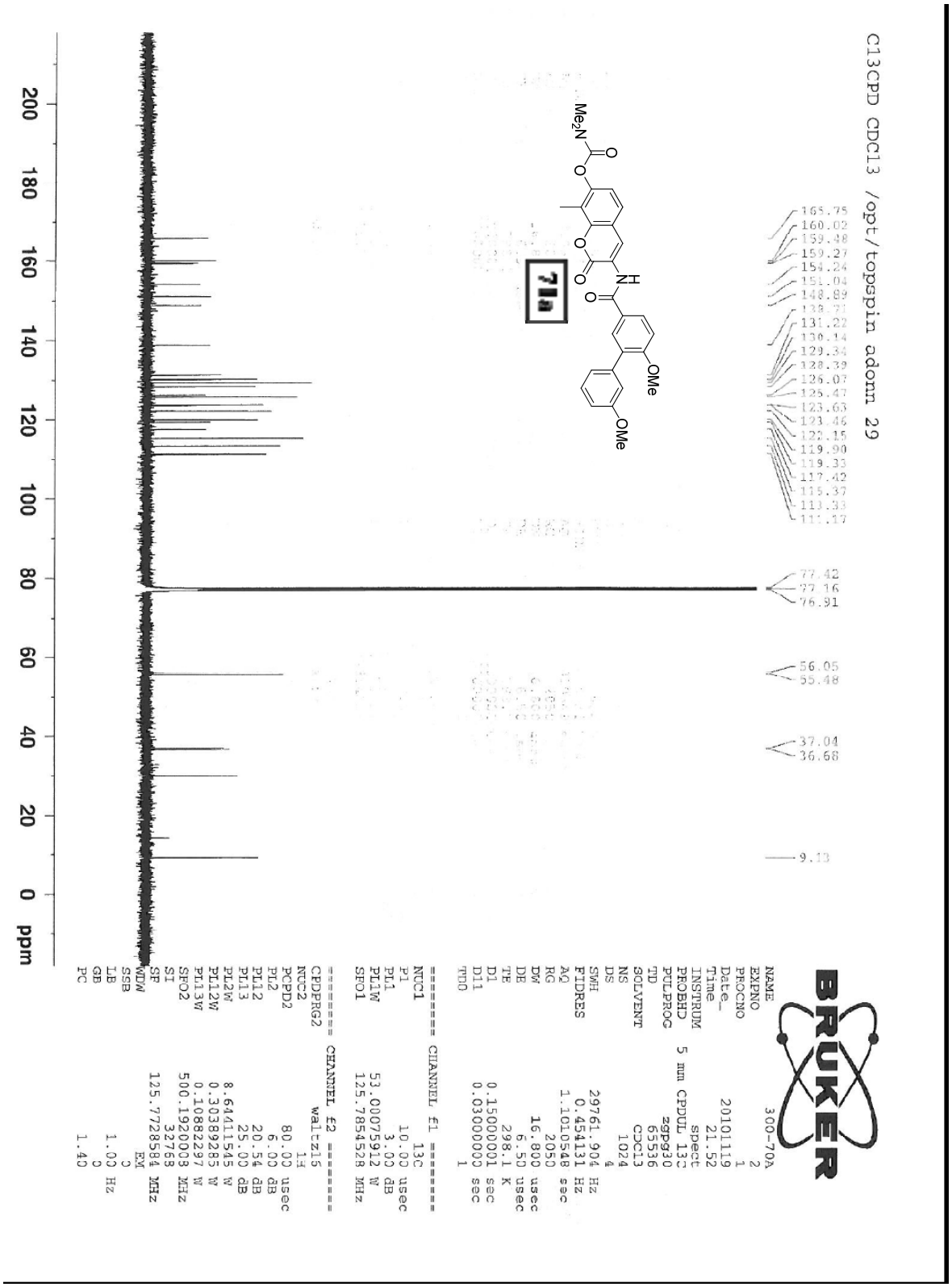

C13CPD CDC13 /opt/topspin adonn 57
MeHN
MeO
OMe
OMe
7kb
165.66
159.86
159.71
159.44
146.13
144.49
144.21
138.74
131.14
130.11
129.36
128.25
126.28
124.66
122.13
121.97
115.36
113.25
112.23
111.85
111.08
104.97
77.39
77.13
76.88
56.43
56.01
55.45
29.58
8.30
BRUKER
NAME 305
EXPNO 2
PROCNO 1
Date_ 20101117
Time 1.47
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 2976.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.1 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.10389265 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728621 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

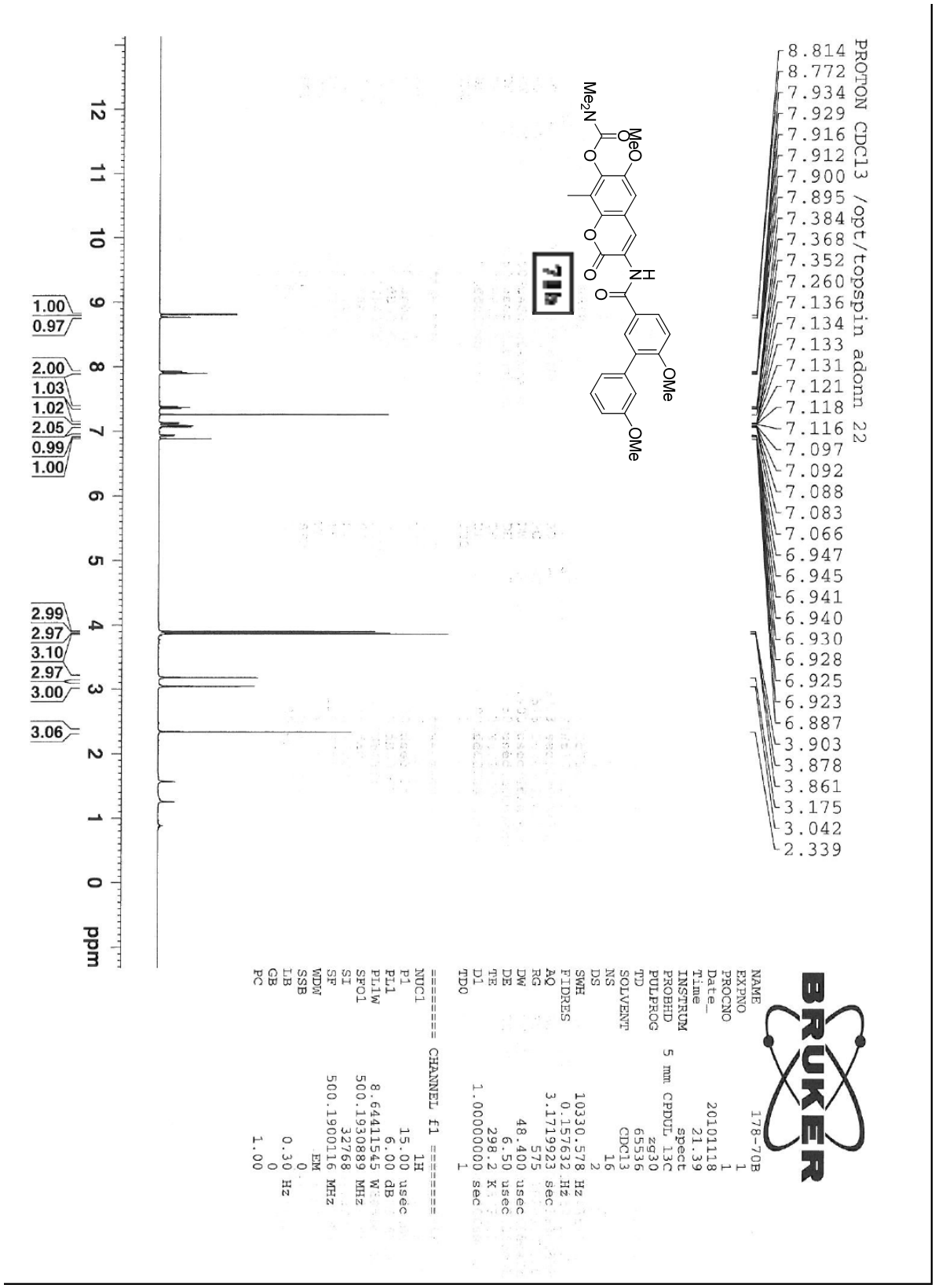

PROTON CDCl3 /opt/topspin adonn 51
8.814
8.654
7.965
7.925
7.920
7.908
7.903
7.884
7.879
7.382
7.366
7.350
7.260
7.193
7.176
7.131
7.129
7.127
7.116
7.113
7.112
7.093
7.088
7.085
7.067
6.971
6.954
6.945
6.944
6.940
6.939
6.929
6.927
6.924
6.922
4.124
3.902
3.859
MeHN
OMe
OMe
OMe
70c
1.16
0.90
1.15
1.19
1.04
1.00
1.00
0.99
1.93
1.05
1.05
2.95
2.85
2.89
12
11
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME 80NHME
EXPNO 1
PROCNO 1
Date_ 20090319
Time 18.36
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900043 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

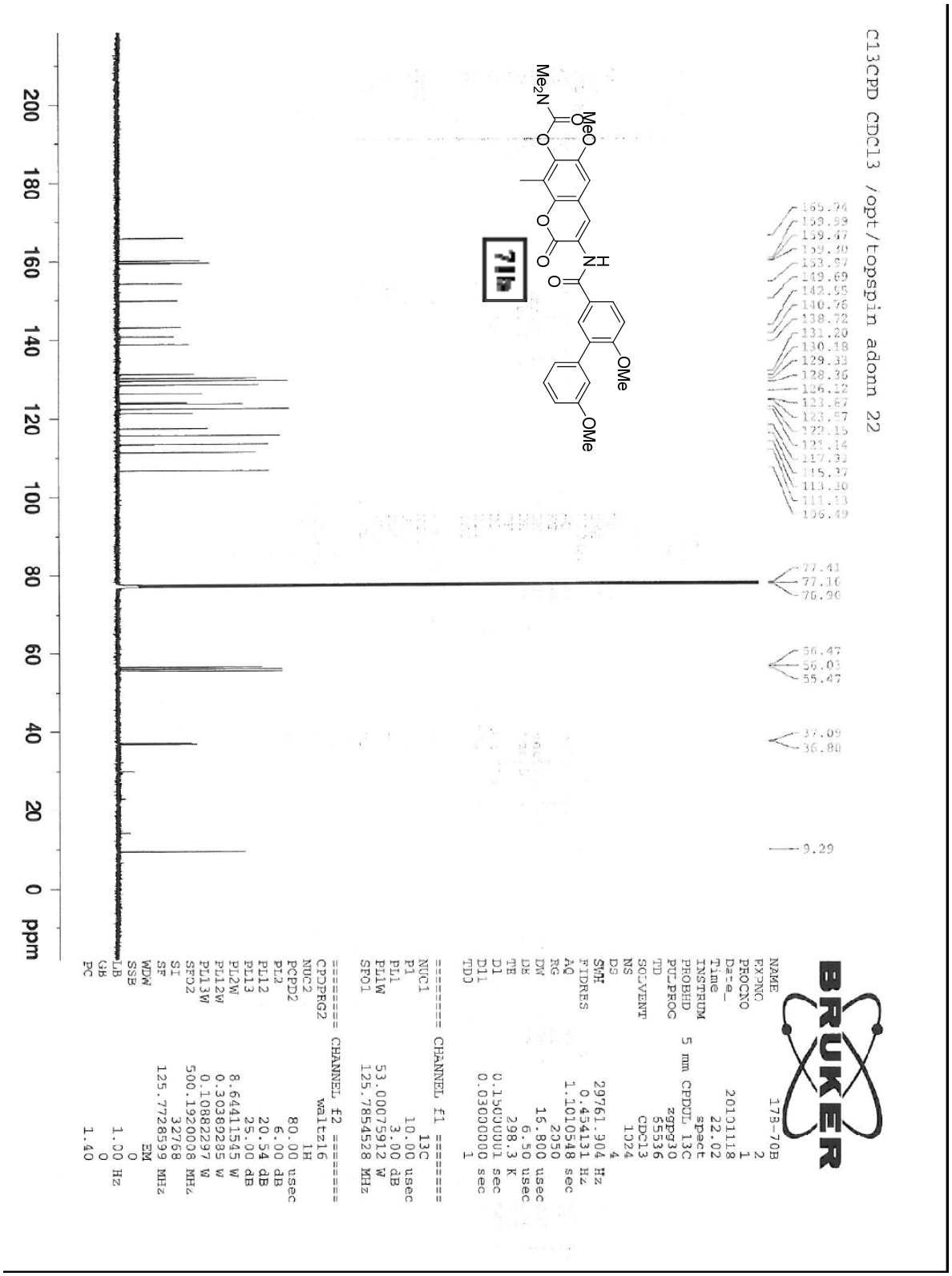


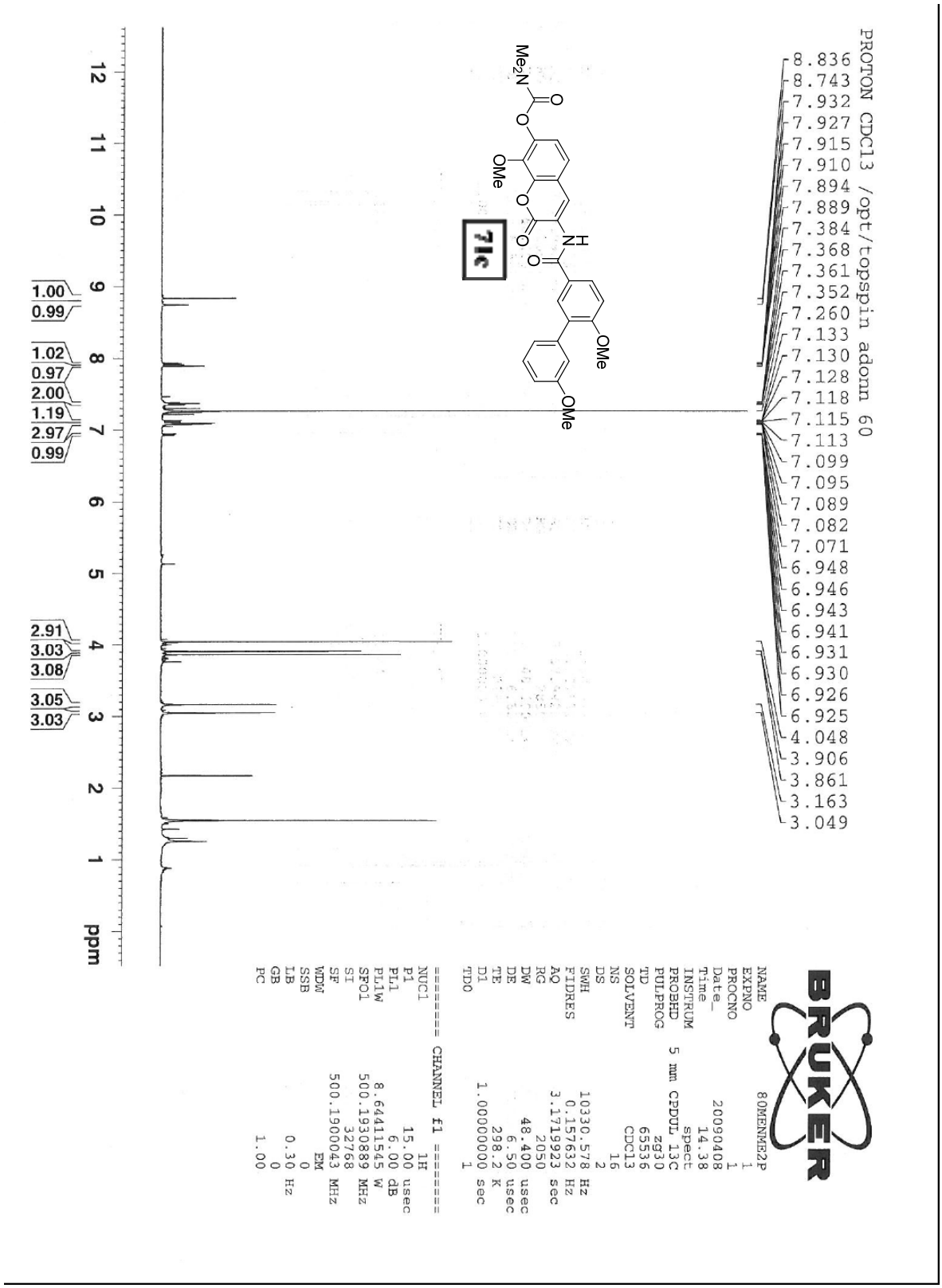

```
NAME                 80NHME
EXPNO                     2
PROCNO                    1
Date_              20090319
Time                 18.59
INSTRUM                spect
PROBHD     5 mm CPDUL 13C
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                    1024
DS                       4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                    2050
DW                 16.800 usec
DE                  6.50 usec
TE                 298.2 K
D1                 0.15000001 sec
D11                0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                   13C
P1                   10.00 usec
PL1                   3.00 dB
PL1W           53.00075912 W
SFO1           125.7854528 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2                   6.00 dB
PL12                 20.54 dB
PL13                 25.00 dB
PL2W           8.64411545 W
PL12W          0.30389285 W
PL13W          0.10882297 W
SFO2           500.1920008 MHz
SI                   32768
SF             125.7728577 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```

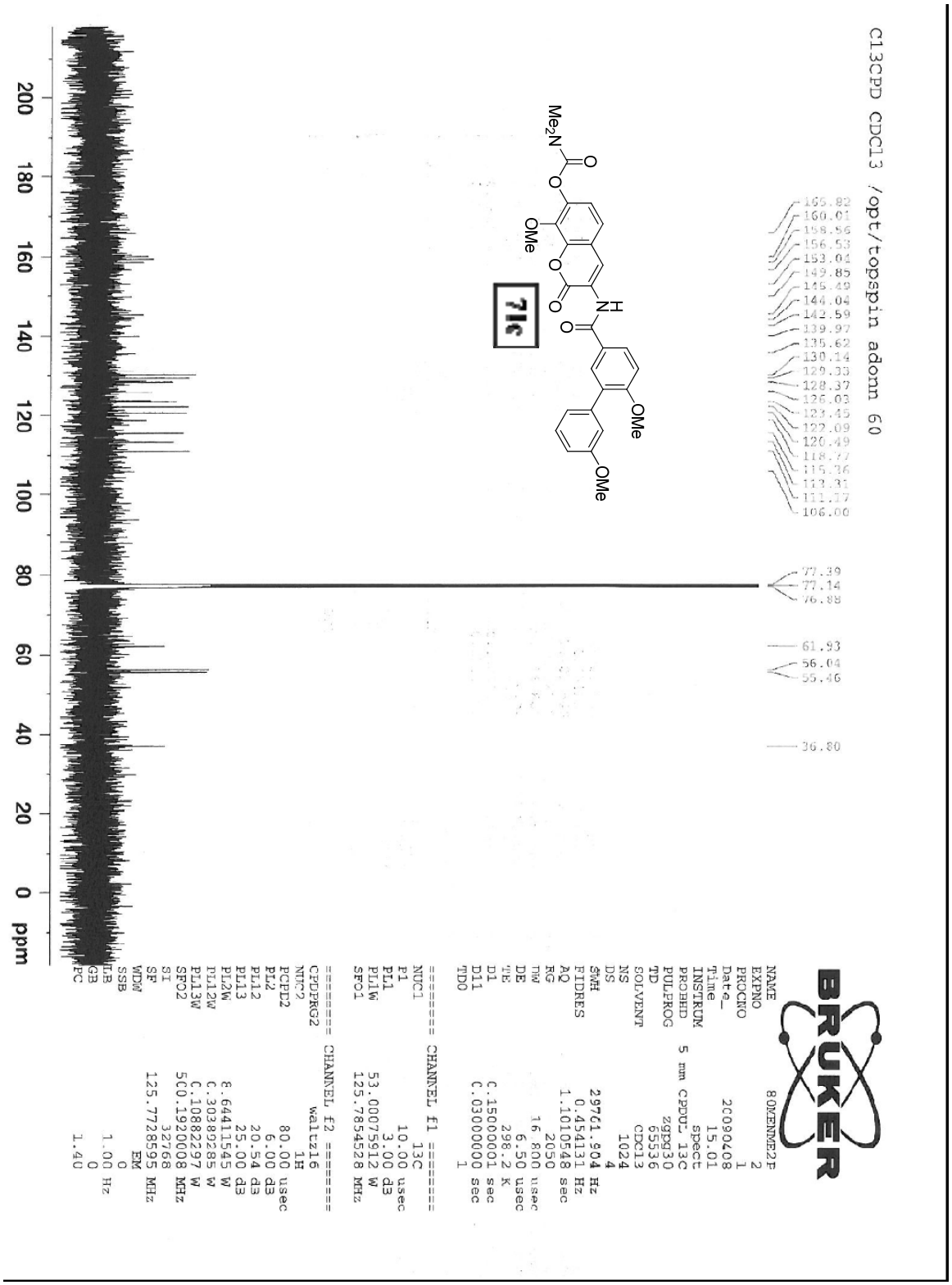

PROTON CDC13 /opt/topspin adonn 29
8.841
8.748
7.937
7.932
7.920
7.915
7.897
7.893
7.399
7.383
7.368
7.352
7.260
7.136
7.133
7.131
7.121
7.118
7.116
7.108
7.096
7.091
7.087
7.070
6.947
6.946
6.942
6.940
6.931
6.929
6.925
6.924
3.905
3.861
3.166
3.045
2.339
Me2N
OMe
OMe
7la
0.98
0.97
1.00
1.01
2.02
4.01
1.00
2.95
2.95
2.91
3.02
3.05
12 11 10 9 8 7 6 5 4 3 2 1 0 ppm
BRUKER
NAME 300-7OA
EXPNO 1
PROCNO 1
Date_ 20101119
Time 21.54
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900118 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

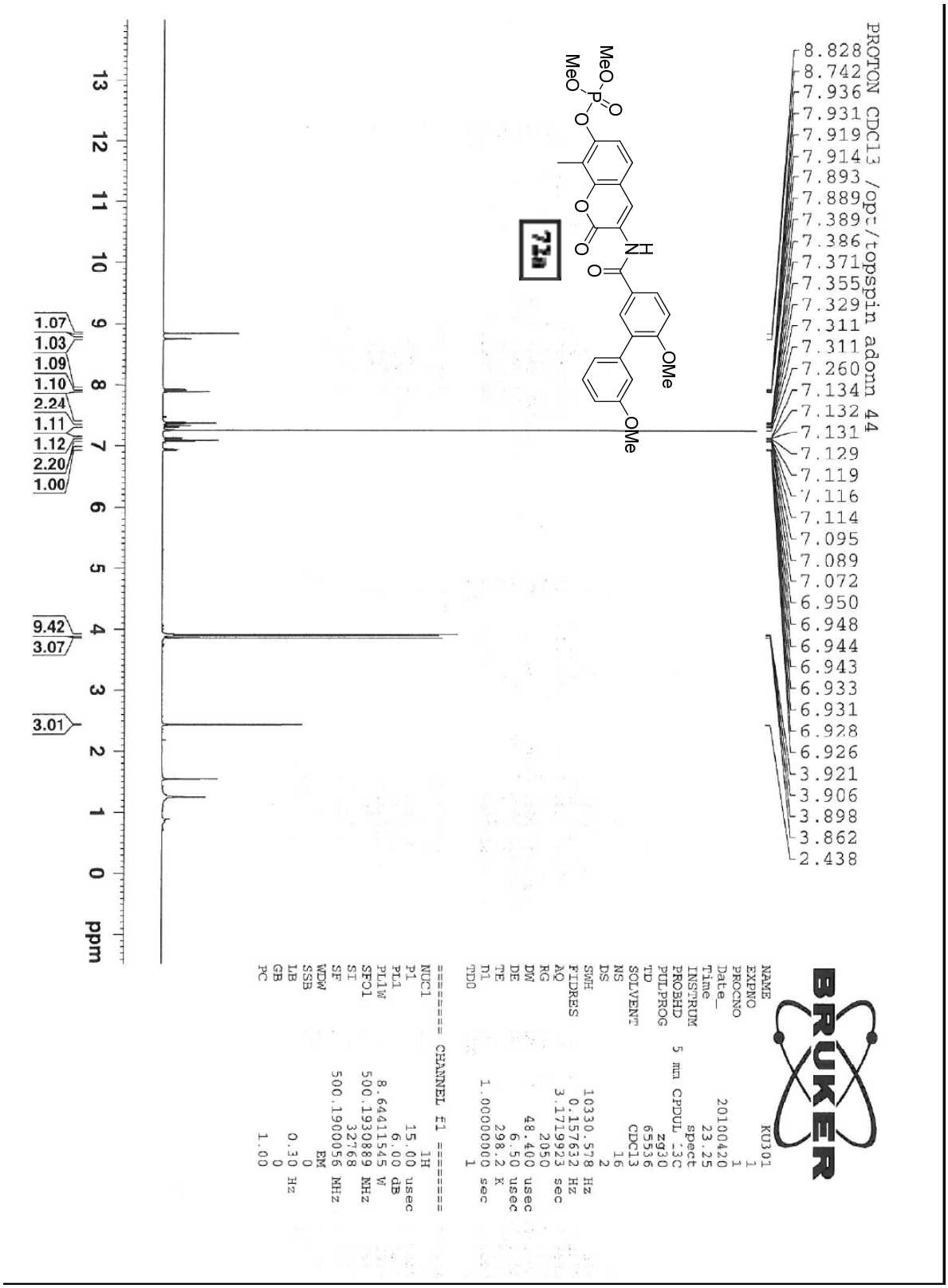

C13CPD CDCl3 /opt/topspin adonn 29
7la
Me2N
OMe
OMe
165.75
160.02
159.48
159.27
154.24
151.04
148.89
131.22
130.14
129.34
128.39
126.07
125.47
123.63
123.46
122.15
119.90
119.33
117.42
115.37
113.33
111.17
77.42
77.16
76.91
56.05
55.48
37.04
36.68
9.13
BRUKER
NAME 300-70A
EXPNO 2
PROCNO 1
Date_ 20101119
Time 21.52
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.1 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz15
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920003 MHz
SI 32768
SF 125.7728584 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
0
ppm

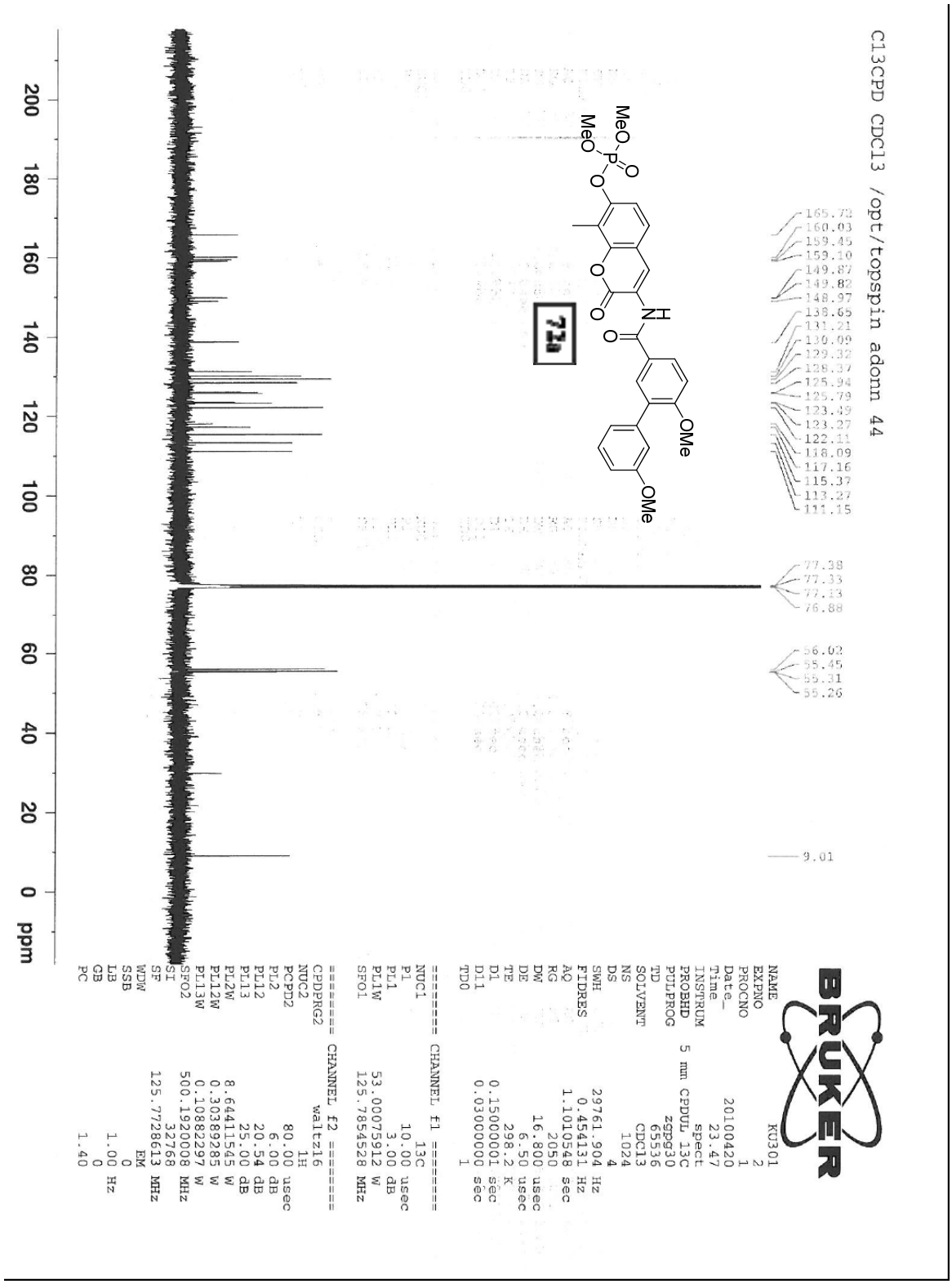

PROTON CDCl3 /opt/topspin adonn 22
8.814
8.772
7.934
7.929
7.916
7.912
7.900
7.895
7.384
7.368
7.352
7.260
7.136
7.134
7.133
7.131
7.121
7.118
7.116
7.097
7.092
7.088
7.083
7.066
6.947
6.945
6.941
6.940
6.930
6.928
6.925
6.923
6.887
3.903
3.878
3.861
3.175
3.042
2.339
Me2N
MeO
OMe
OMe
7lb
BRUKER
NAME 178-70B
EXPNO 1
PROCNO 1
Date_ 20101118
Time 21.39
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 575
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900116 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.00
0.97
2.00
1.03
1.02
2.05
0.99
1.00
2.99
2.97
3.10
2.97
3.00
3.06
12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

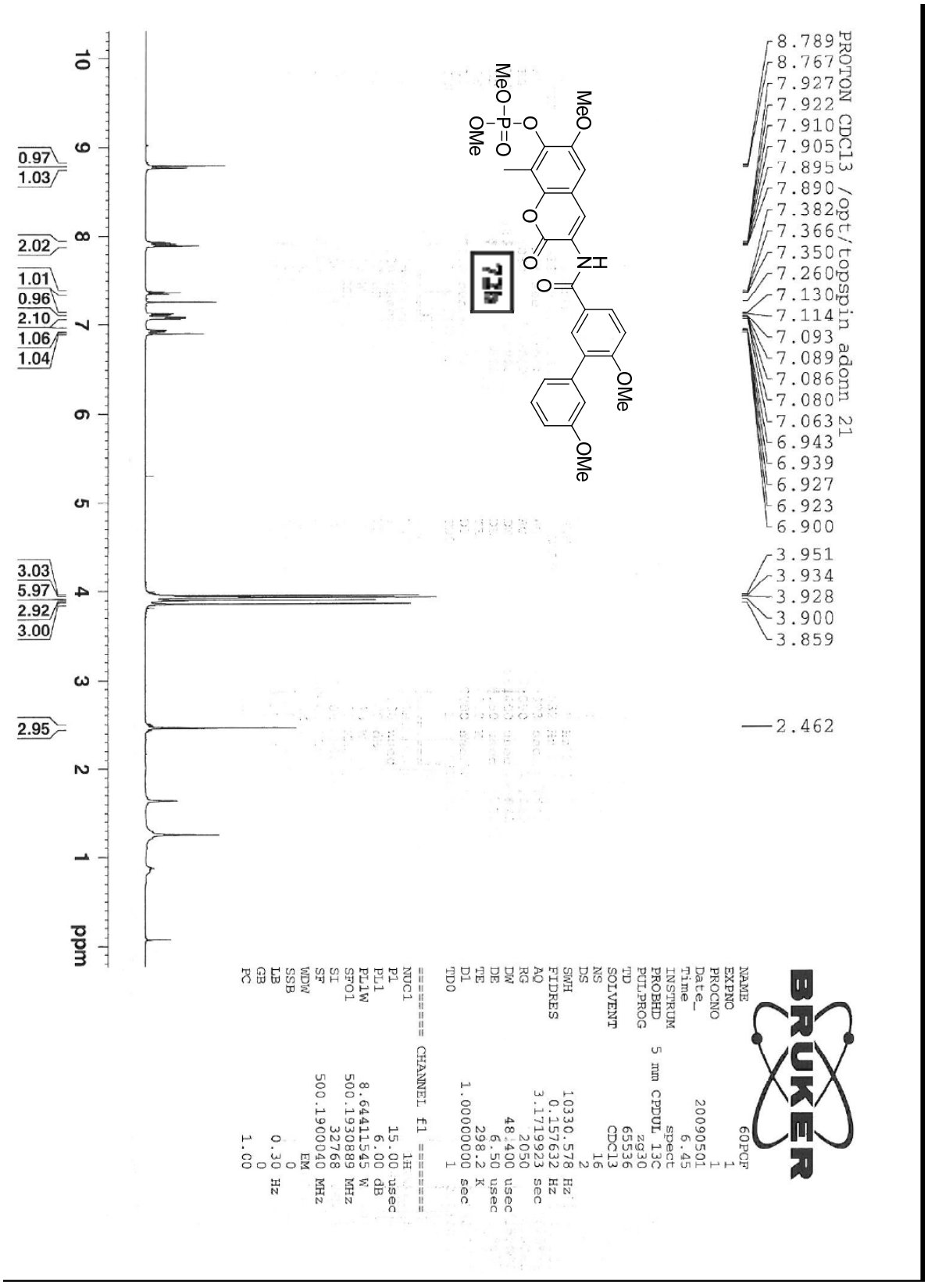

C13CPD CDCl3 /opt/topspin adonn 22
71b
Me2N
MeO
OMe
OMe
BRUKER
NAME 178-70B
EXPNO 2
PROCNO 1
Date_ 20131118
Time 22.02
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 55536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 15.800 usec
DE 6.50 usec
TE 298.3 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728599 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

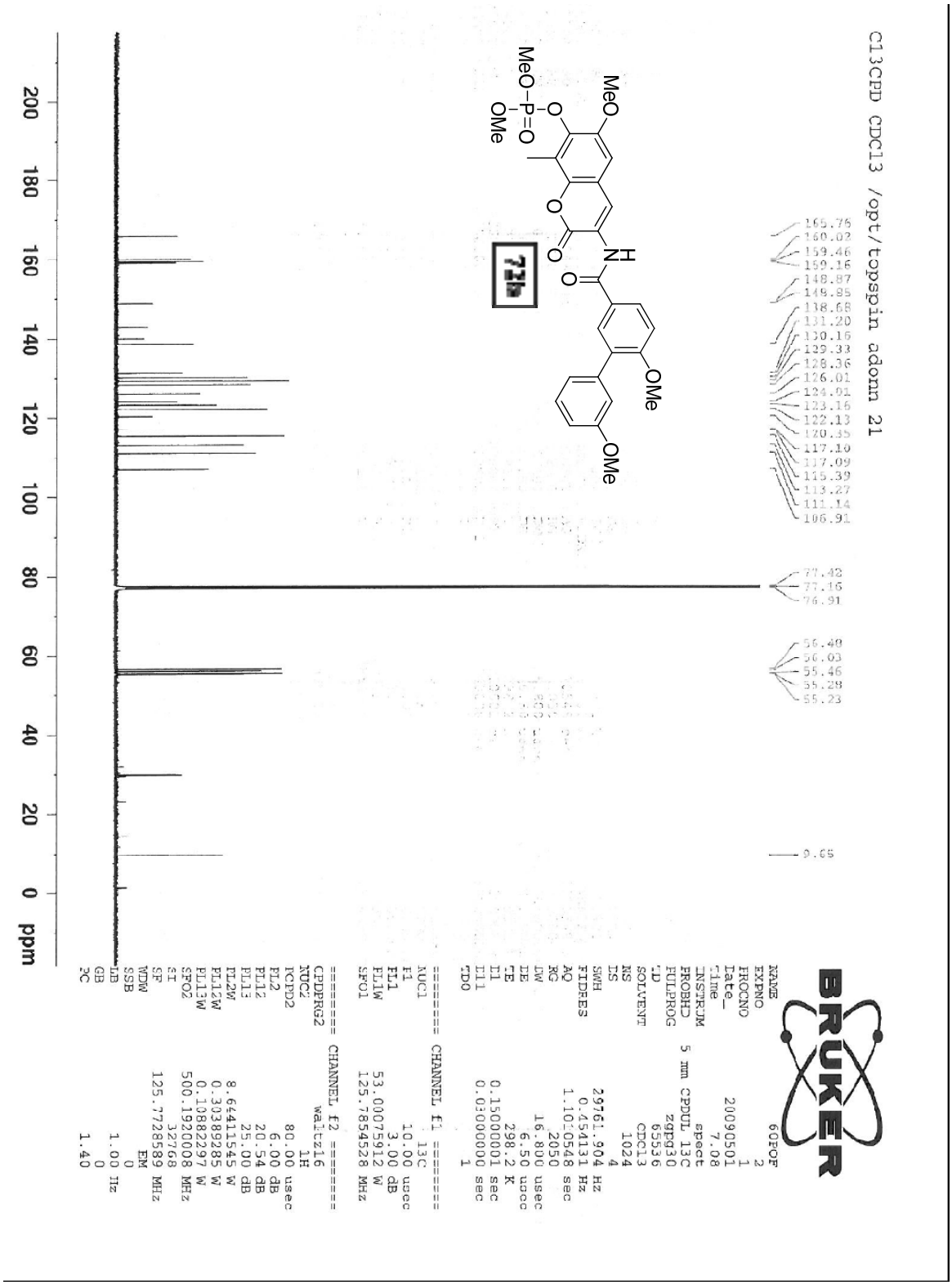

PROTON CDCl3 /opt/topspin adonn 60
8.836
8.743
7.932
7.927
7.915
7.910
7.894
7.889
7.384
7.368
7.361
7.352
7.260
7.133
7.130
7.128
7.118
7.115
7.113
7.099
7.095
7.089
7.082
7.071
6.948
6.946
6.943
6.941
6.931
6.930
6.926
6.925
4.048
3.906
3.861
3.163
3.049
Me2N
OMe
OMe
OMe
71c
1.00
0.99
1.02
0.97
2.00
1.19
2.97
0.99
2.91
3.03
3.08
3.05
3.03
ppm
NAME 80MENME2P
EXPNO 1
PROCNO 1
Date_ 20090408
Time 14.38
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900043 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

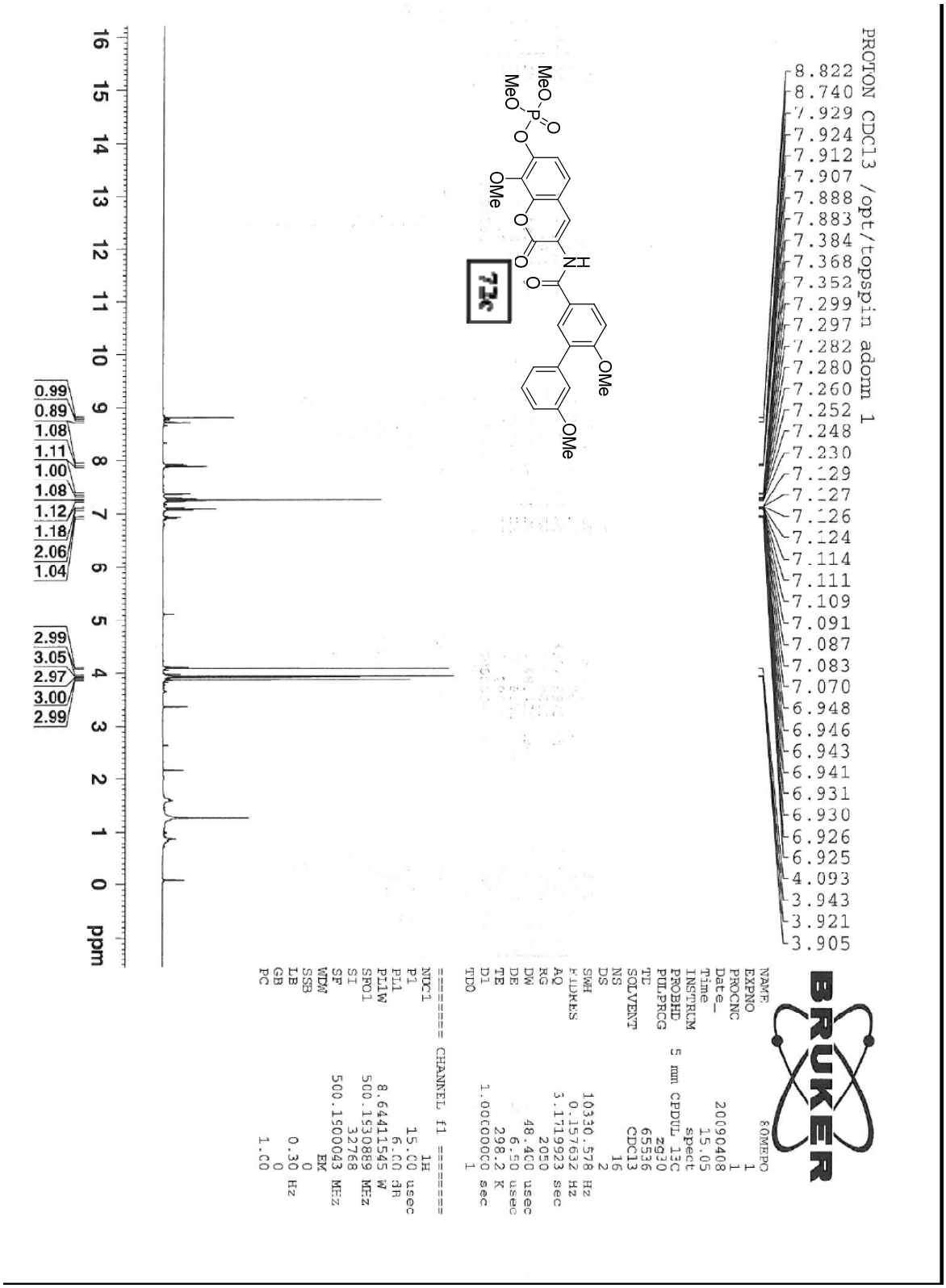

C13CPD CDCl3 /opt/topspin adonn 60
Me2N
O
O
OMe
O
O
H
N
O
OMe
OMe
71c
165.82
160.01
158.56
156.53
153.64
149.85
145.49
144.04
142.59
139.97
135.62
130.14
129.33
128.37
126.03
123.45
122.09
120.49
118.77
115.76
113.31
111.27
106.00
77.39
77.14
76.88
61.93
56.04
55.46
36.80
BRUKER
NAME 80XENME2F
EXPNO 2
PROCNO 1
Date_ 20090408
Time 15.01
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728595 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

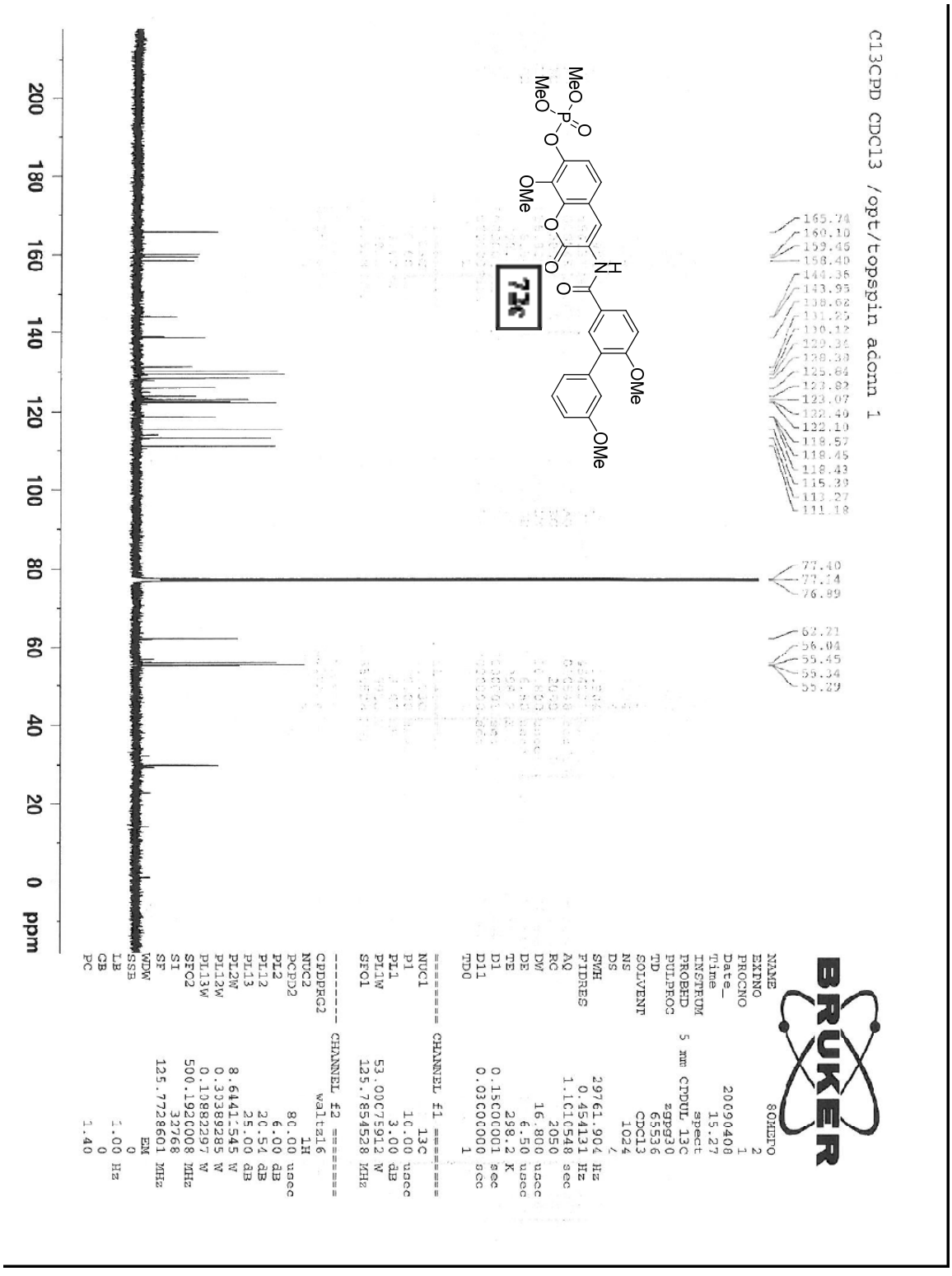

PROTON CDCl3 /opt/topspin adonn 44
8.828
8.742
7.936
7.931
7.919
7.914
7.893
7.889
7.389
7.386
7.371
7.355
7.329
7.311
7.311
7.260
7.134
7.132
7.131
7.129
7.119
7.116
7.114
7.095
7.089
7.072
6.950
6.948
6.944
6.943
6.933
6.931
6.928
6.926
3.921
3.906
3.898
3.862
2.438
MeO
MeO
O
P
O
O
O
O
H
N
O
OMe
OMe
72a
1.07
1.03
1.09
1.10
2.24
1.11
1.12
2.20
1.00
9.42
3.07
3.01
13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm
BRUKER
NAME KU301
EXPNO 1
PROCNO 1
Date_ 20100420
Time 23.25
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900056 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

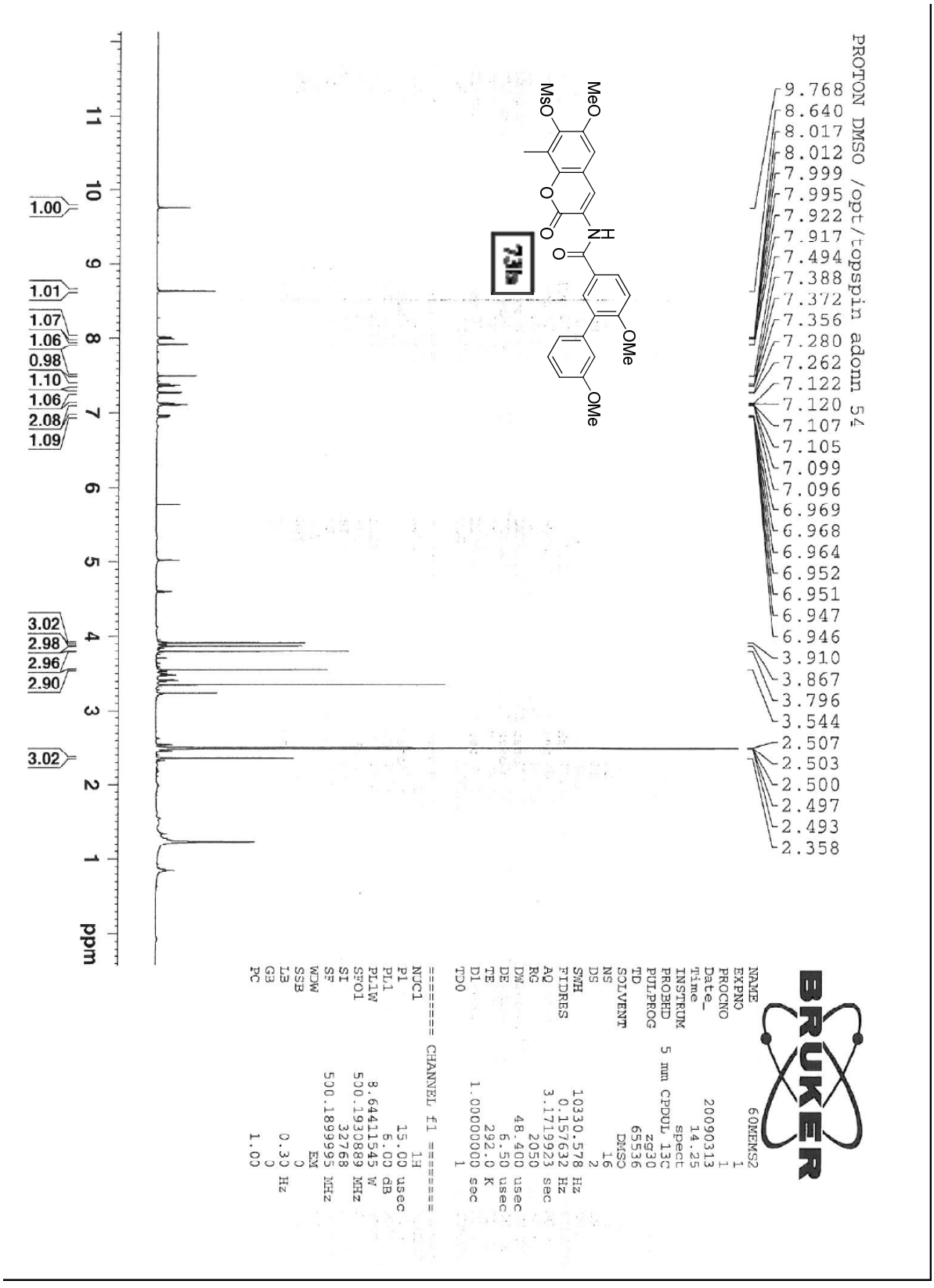

C13CPD CDCl3 /opt/topspin adonn 44
72a
MeO
MeO
OMe
OMe
165.72
160.03
159.45
159.10
149.87
149.82
148.97
138.65
131.21
130.09
129.32
128.37
125.94
125.79
123.49
123.27
122.11
118.09
117.16
115.37
113.27
111.15
77.38
77.33
77.13
76.88
56.02
55.45
55.31
55.26
9.01
NAME KU301
EXPNO 2
PROCNO 1
Date_ 20100420
Time 23.47
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728613 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

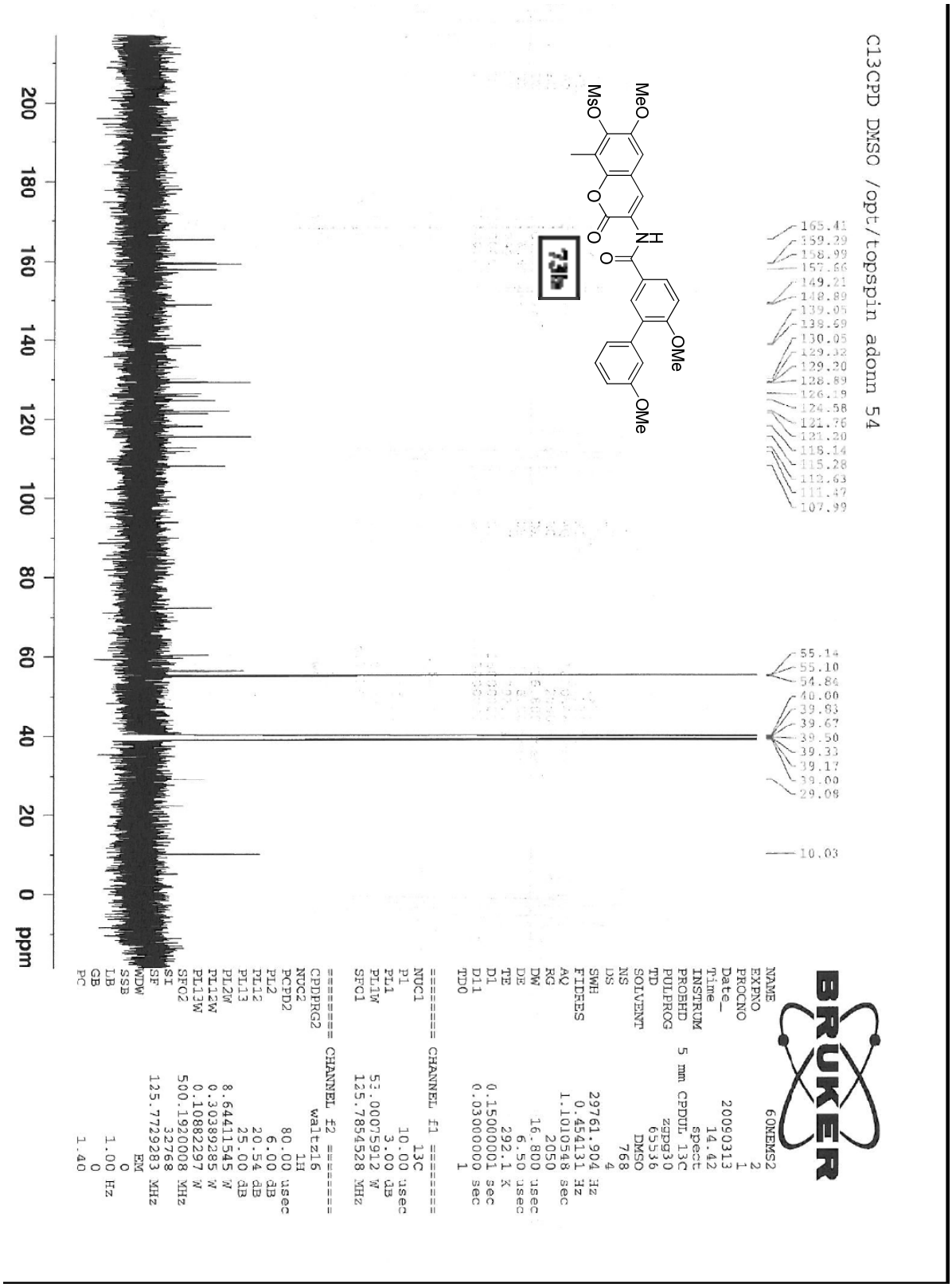

PROTON CDCl3 /opt/topspin adonn 21
8.789
8.767
7.927
7.922
7.910
7.905
7.895
7.890
7.382
7.366
7.350
7.260
7.130
7.114
7.093
7.089
7.086
7.080
7.063
6.943
6.939
6.927
6.923
6.900
3.951
3.934
3.928
3.900
3.859
2.462
MeO
MeO–P=O
OMe
OMe
OMe
73b
0.97
1.03
2.02
1.01
0.96
2.10
1.06
1.04
3.03
5.97
2.92
3.00
2.95
10
9
8
7
6
5
4
3
2
1
ppm
NAME 60PCF
EXPNO 1
PROCNO 1
Date_ 20090501
Time 6.45
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900040 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

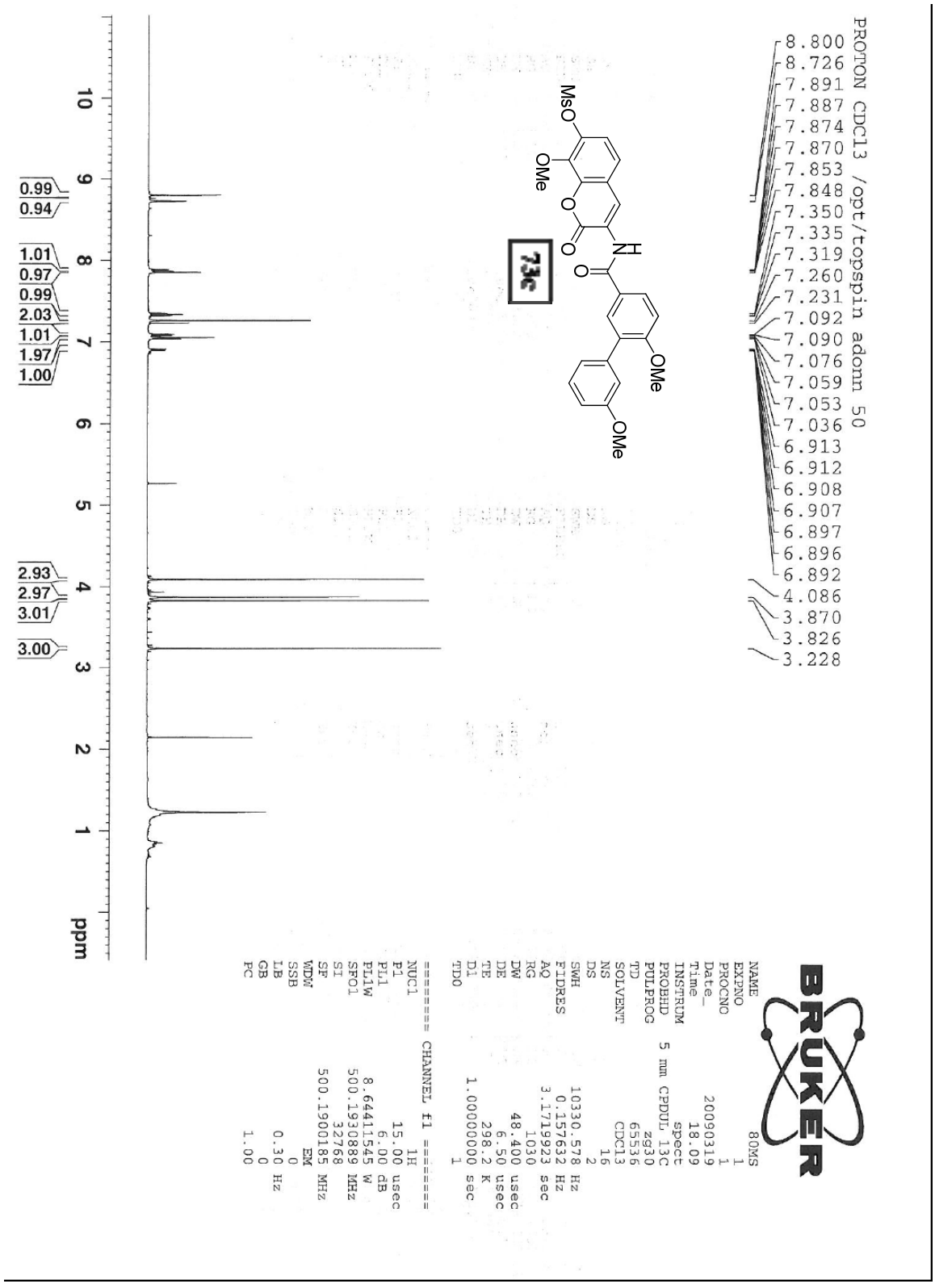

C13CPD CDCl3 /opt/topspin adonn 21
MeO
MeO–P=O
OMe
OMe
OMe
72b
165.76
160.02
159.46
159.15
148.87
148.85
138.68
131.20
130.16
129.38
128.36
126.01
124.01
123.16
122.13
120.35
117.10
117.09
115.39
113.27
111.14
106.91
77.42
77.16
76.91
56.49
56.03
55.46
55.28
55.23
9.65
BRUKER
NAME 60FOF
EXPNO 2
PROCNO 1
Date_ 20090501
Time 7.08
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728589 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

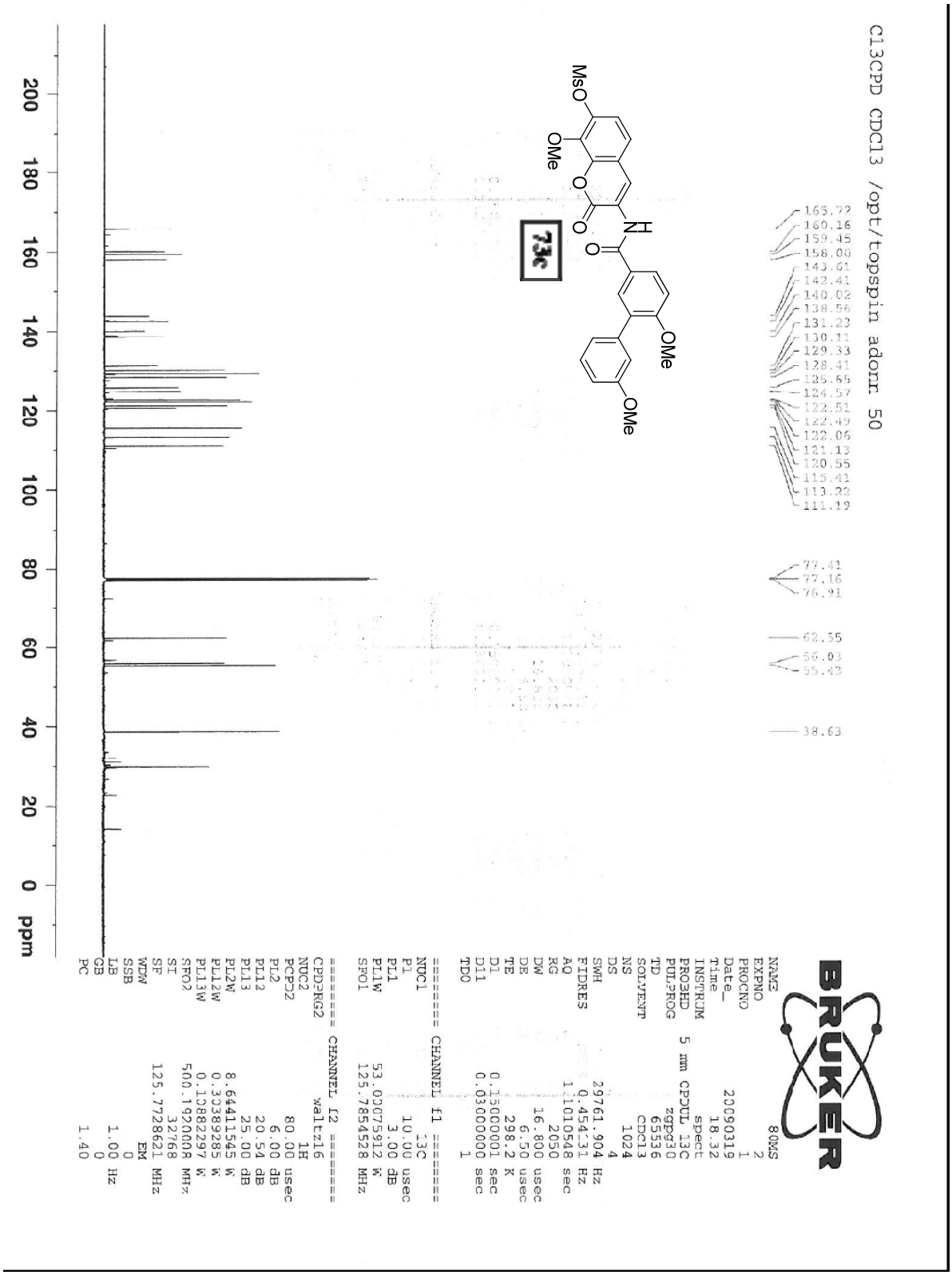

PROTON CDCl3 /opt/topspin adonn 1
8.822
8.740
7.929
7.924
7.912
7.907
7.888
7.883
7.384
7.368
7.352
7.299
7.297
7.282
7.280
7.260
7.252
7.248
7.230
7.129
7.127
7.126
7.124
7.114
7.111
7.109
7.091
7.087
7.083
7.070
6.948
6.946
6.943
6.941
6.931
6.930
6.926
6.925
4.093
3.943
3.921
3.905
MeO
MeO
OMe
OMe
OMe
H
N
O
O
O
O
O
O
P
72c
NAME 80MEPO
EXPNO 1
PROCNO 1
Date_ 20090408
Time 15.05
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1530889 MHz
SI 32768
SF 500.1500043 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.99
0.89
1.08
1.11
1.00
1.08
1.12
1.18
2.06
1.04
2.99
3.05
2.97
3.00
2.99
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

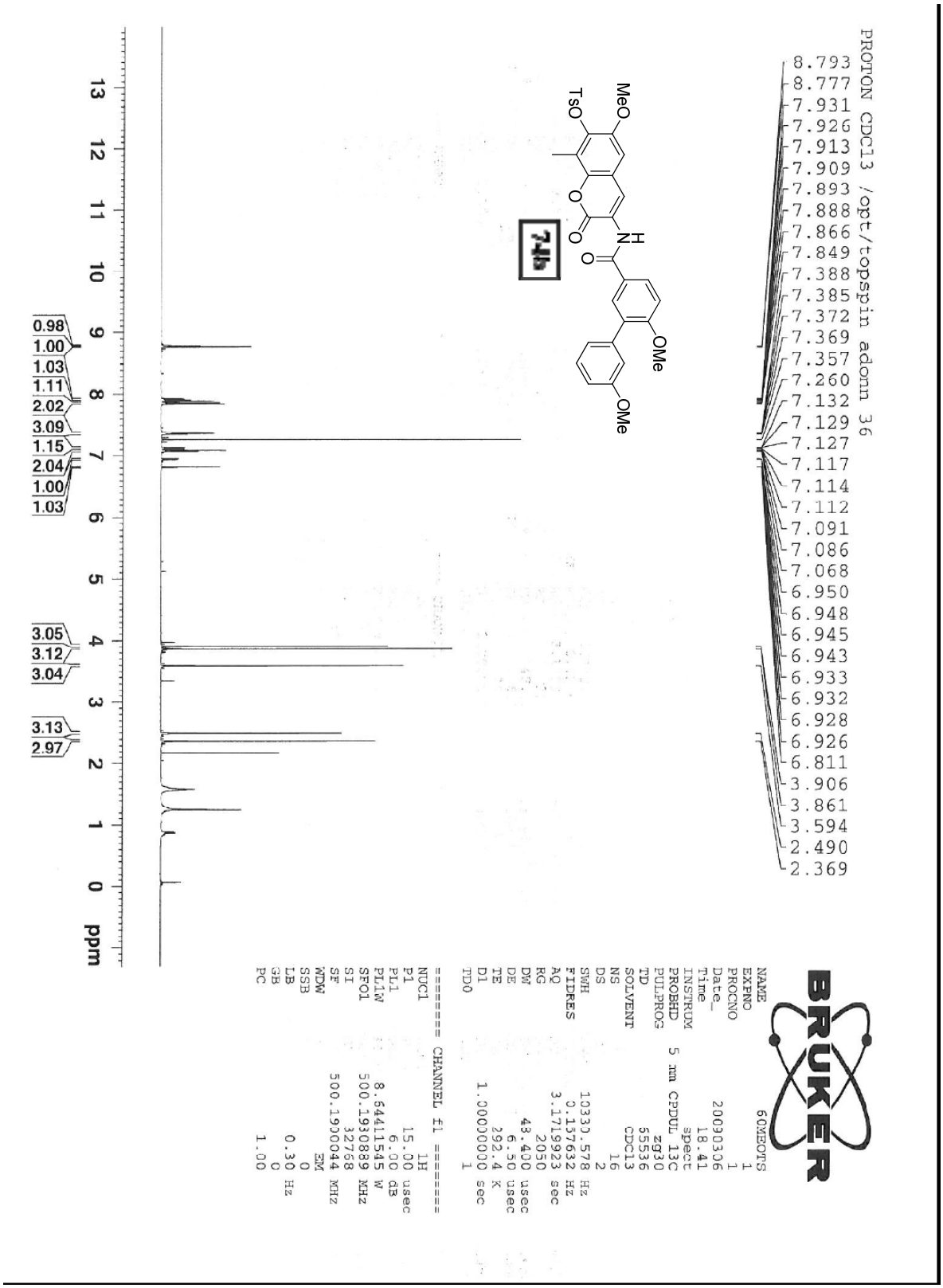

C13CPD CDCl3 /opt/topspin acomn 1
73c
OMe
OMe
MeO
MeO
OMe
BRUKER
NAME 80MEO
EXPNO 2
PROCNO 1
Date_ 20090408
Time 15.27
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 2
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.33389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728601 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
165.74
160.10
159.46
158.40
144.36
143.95
138.62
131.25
130.11
129.36
128.30
125.84
123.82
123.07
122.40
122.10
118.57
118.45
118.43
115.30
113.27
111.18
77.40
77.14
76.89
62.21
56.04
55.45
55.34
55.29
200
180
160
140
120
100
80
60
40
20
0
ppm

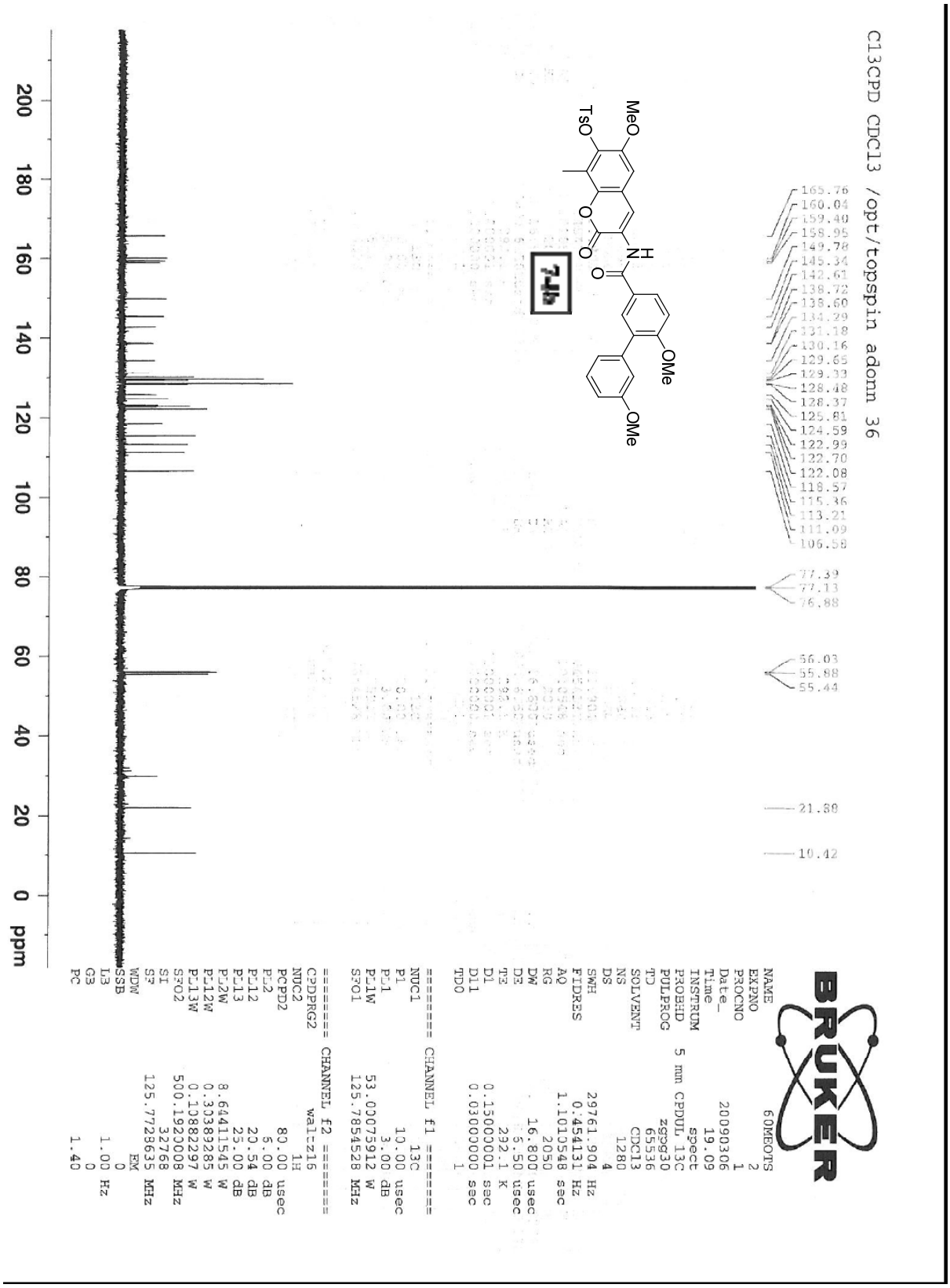

PROTON DMSO /opt/topspin adonn 54
9.768
8.640
8.017
8.012
7.999
7.995
7.922
7.917
7.494
7.388
7.372
7.356
7.280
7.262
7.122
7.120
7.107
7.105
7.099
7.096
6.969
6.968
6.964
6.952
6.951
6.947
6.946
3.910
3.867
3.796
3.544
2.507
2.503
2.500
2.497
2.493
2.358
MeO
MsO
O
O
H
N
O
OMe
OMe
73b
1.00
1.01
1.07
1.06
0.98
1.10
1.06
2.08
1.09
3.02
2.98
2.96
2.90
3.02
11
10
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME 60MEMS2
EXPNO 1
PROCNO 1
Date_ 20090313
Time 14.25
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 292.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899995 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

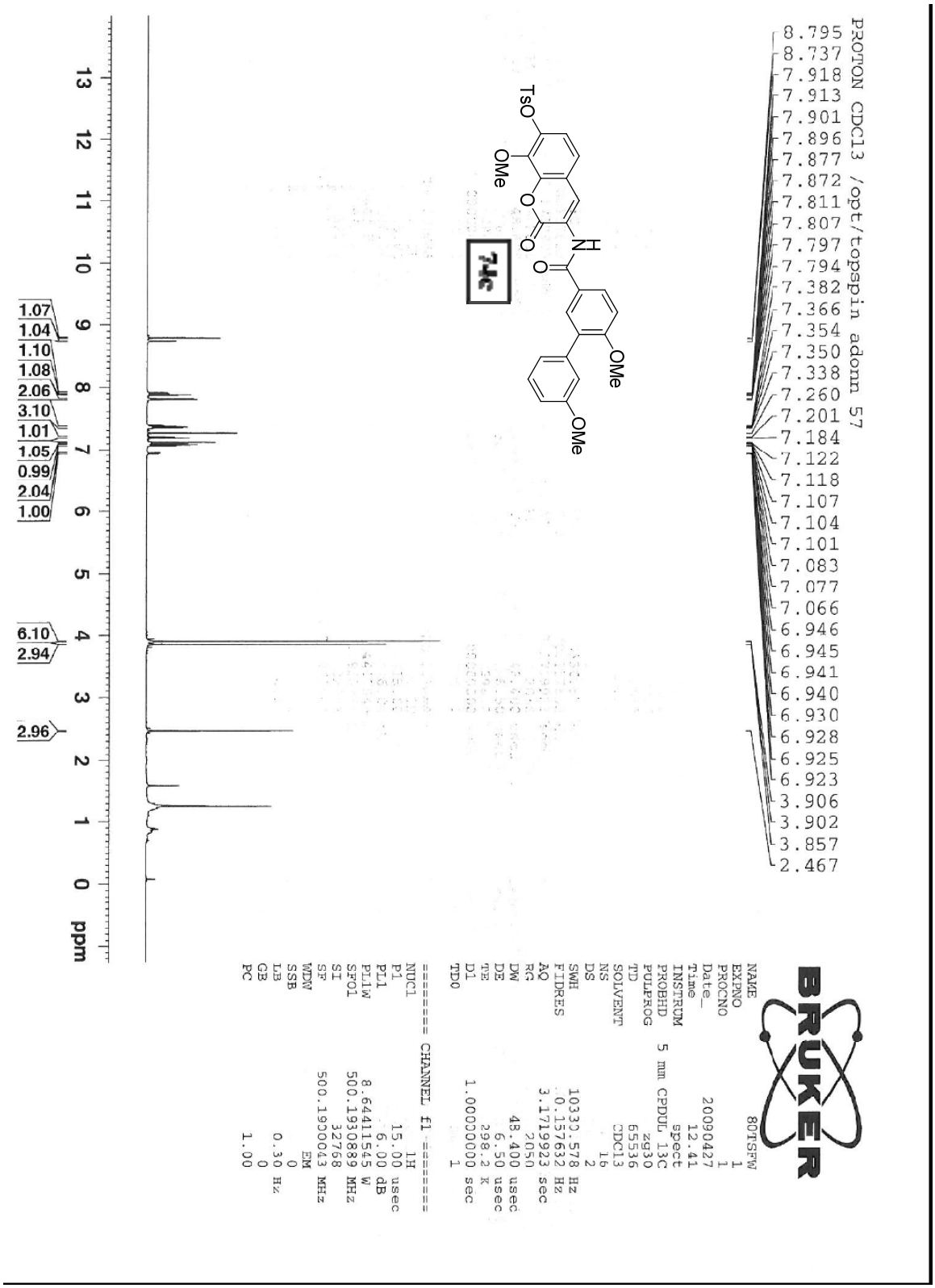

C13CPD DMSO /opt/topspin adonn 54
MeO
MsO
OMe
OMe
73b
165.41
159.29
158.99
157.66
149.21
140.89
139.05
138.69
130.05
129.32
129.20
128.89
126.19
124.58
121.76
121.20
116.14
115.28
112.63
111.47
107.99
55.14
55.10
54.86
40.00
39.83
39.67
39.50
39.33
39.17
39.00
29.09
10.03
200
180
160
140
120
100
80
60
40
20
0
ppm
NAME 60NEMS2
EXPNO 2
PROCNO 1
Date_ 20090313
Time 14.42
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 768
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 292.1 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729283 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

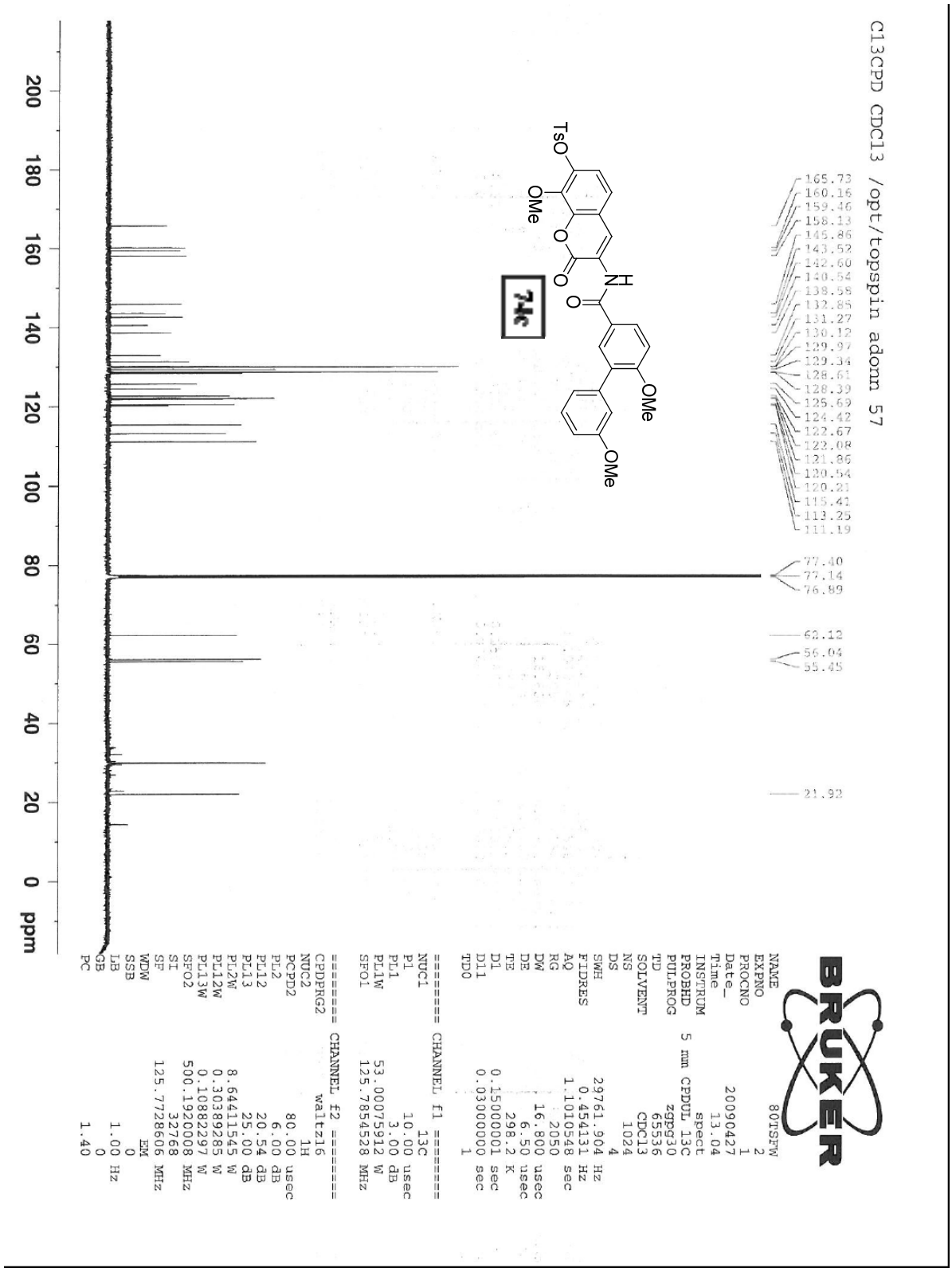

PROTON CDC13 /opt/topspin adonn 50
8.800
8.726
7.891
7.887
7.874
7.870
7.853
7.848
7.350
7.335
7.319
7.260
7.231
7.092
7.090
7.076
7.059
7.053
7.036
6.913
6.912
6.908
6.907
6.897
6.896
6.892
4.086
3.870
3.826
3.228
MsO
OMe
O
O
O
H
N
O
OMe
OMe
73c
BRUKER
NAME 80MS
EXPNO 1
PROCNO 1
Date_ 20090319
Time_ 18.09
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1030
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900185 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
0.99
0.94
1.01
0.97
0.99
2.03
1.01
1.97
1.00
2.93
2.97
3.01
3.00
10
9
8
7
6
5
4
3
2
1
ppm

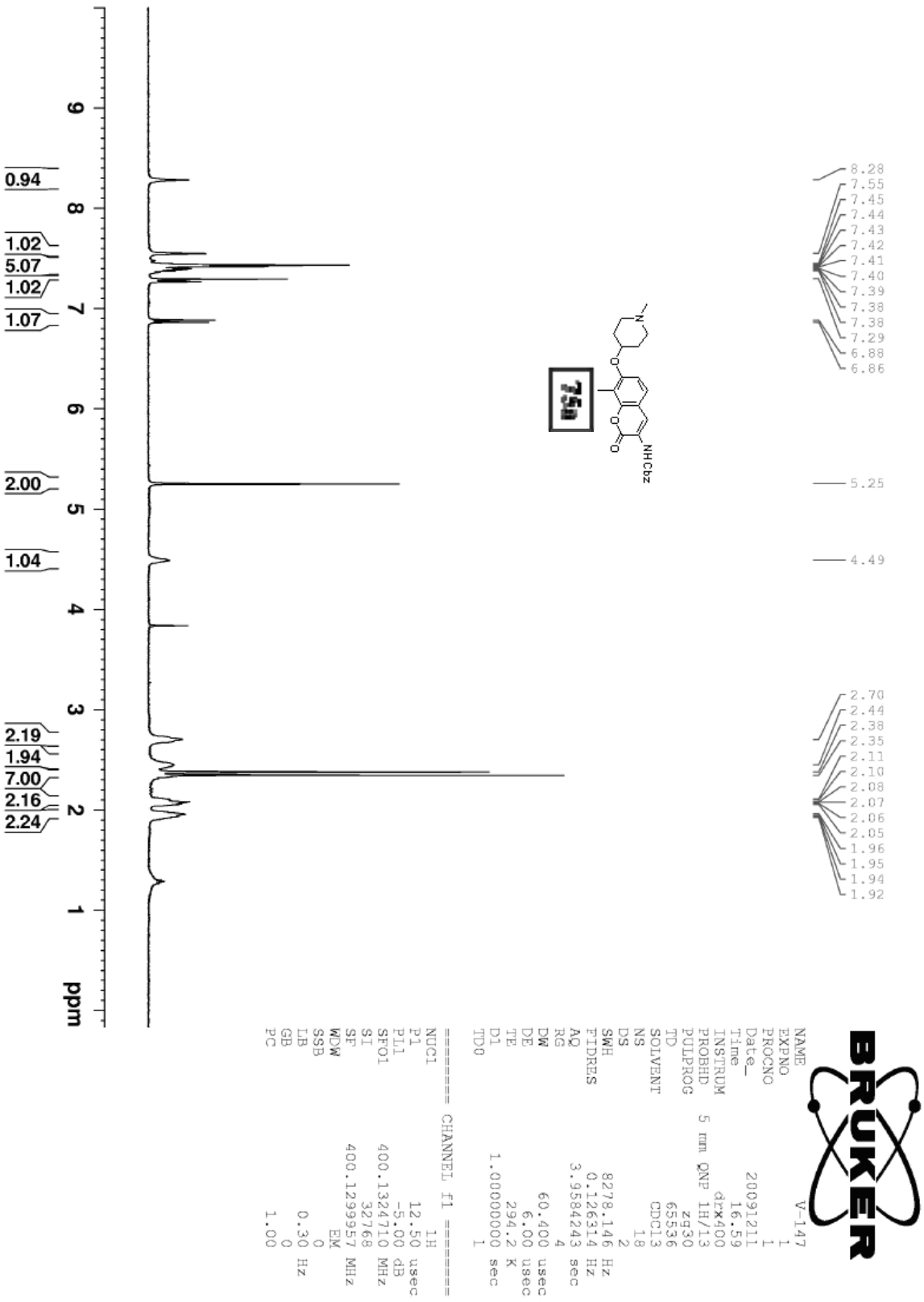

C13CPD CDCl3 /opt/topspin adonr 50
MsO
OMe
O
O
H
N
O
OMe
OMe
73c
165.72
160.16
159.45
158.08
143.61
142.41
140.02
138.56
131.23
130.11
129.33
128.41
125.65
124.57
122.51
122.49
122.05
121.13
120.56
115.41
113.22
111.19
77.41
77.16
76.91
62.55
56.03
55.43
38.63
BRUKER
NAME 80MS
EXPNO 2
PROCNO 1
Date_ 20090319
Time 18.32
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.03075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.33389285 W
PL13W 0.13882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728621 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
0
ppm

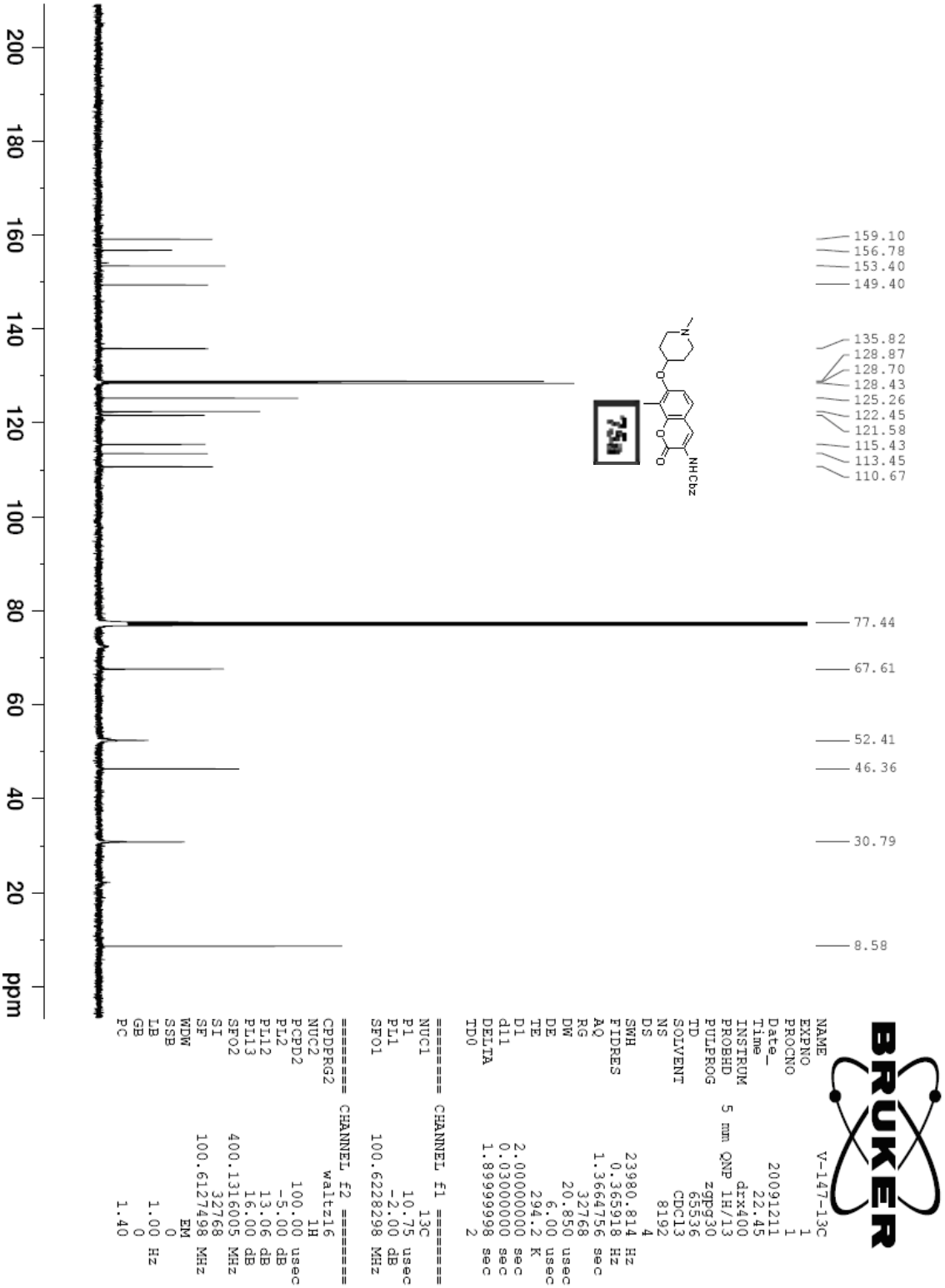

PROTON CDCl3 /opt/topspin adonn 36
8.793
8.777
7.931
7.926
7.913
7.909
7.893
7.888
7.866
7.849
7.388
7.385
7.372
7.369
7.357
7.260
7.132
7.129
7.127
7.117
7.114
7.112
7.091
7.086
7.068
6.950
6.948
6.945
6.943
6.933
6.932
6.928
6.926
6.811
3.906
3.861
3.594
2.490
2.369
MeO
TsO
OMe
OMe
7ab
0.98
1.00
1.03
1.11
2.02
3.09
1.15
2.04
1.00
1.03
3.05
3.12
3.04
3.13
2.97
13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm
NAME 60MEOTS
EXPNO 1
PROCNO 1
Date_ 20090306
Time 18.41
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 55536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 43.400 usec
DE 6.50 usec
TE 292.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLW1 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900044 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

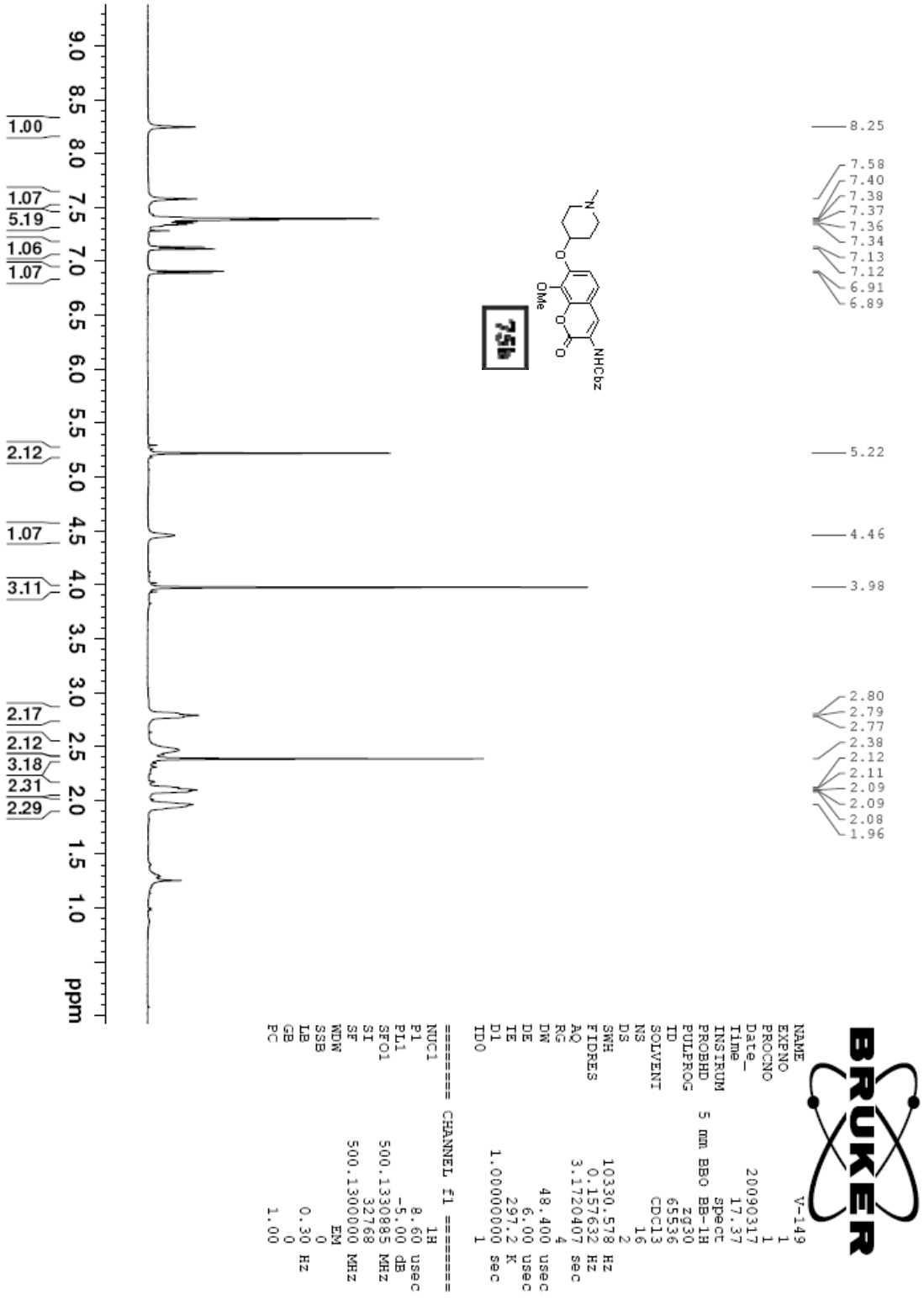

C13CPD CDCl3 /opt/topspin adonn 36
MeO
TsO
OMe
OMe
7-4b
165.76
160.04
159.40
158.95
149.78
145.34
142.61
138.73
138.60
134.29
131.18
130.16
129.65
129.33
128.48
128.37
125.81
124.59
122.99
122.70
122.08
118.57
115.36
113.21
111.09
106.58
77.39
77.13
76.88
56.03
55.88
55.44
21.80
10.42
BRUKER
NAME 60MEOTS
EXPNO 2
PROCNO 1
Date_ 20090306
Time 19.09
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1280
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1013548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 292.1 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 5.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.33389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728635 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

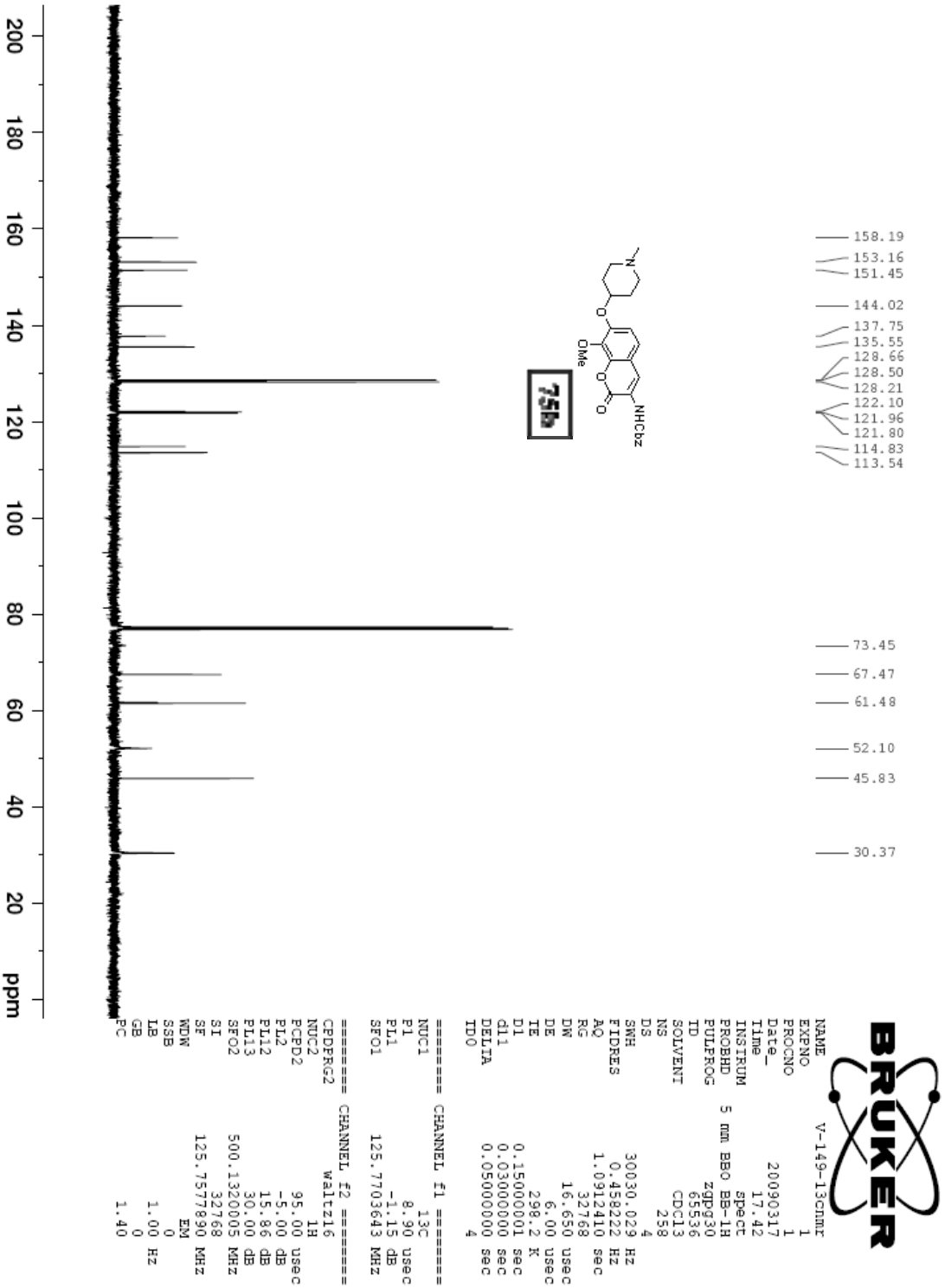

PROTON CDCl3 /opt/topspin adonn 57
8.795
8.737
7.918
7.913
7.901
7.896
7.877
7.872
7.811
7.807
7.797
7.794
7.382
7.366
7.354
7.350
7.338
7.260
7.201
7.184
7.122
7.118
7.107
7.104
7.101
7.083
7.077
7.066
6.946
6.945
6.941
6.940
6.930
6.928
6.925
6.923
3.906
3.902
3.857
2.467
TsO
OMe
O
O
N
H
O
OMe
OMe
74c
1.07
1.04
1.10
1.08
2.06
3.10
1.01
1.05
0.99
2.04
1.00
6.10
2.94
2.96
13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm
BRUKER
NAME 80TSFW
EXPNO 1
PROCNO 1
Date_ 20090427
Time 12.41
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900043 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

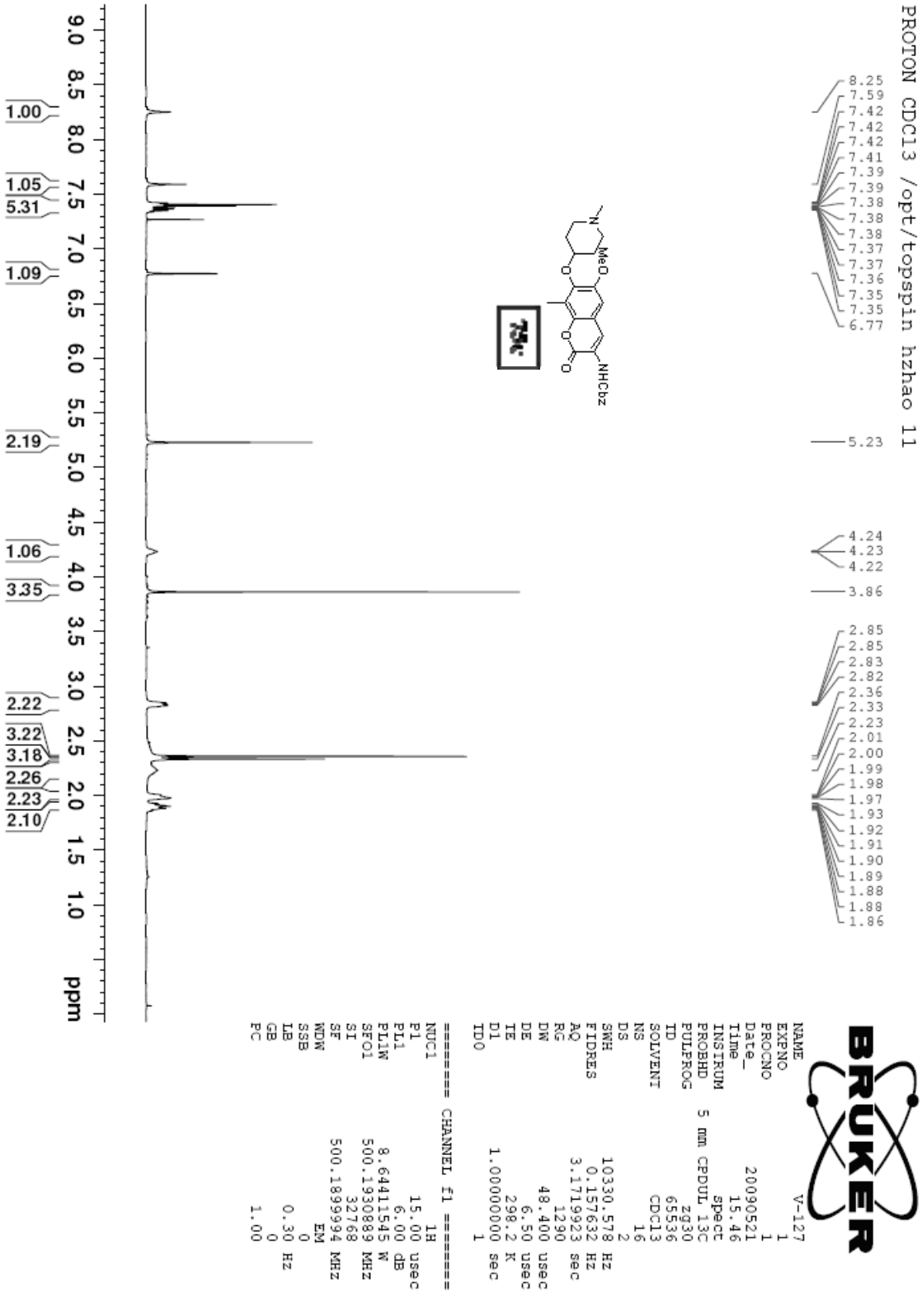

C13CPD CDC13 /opt/topspin adonn 57
TsO
OMe
OMe
OMe
74s
165.73
160.16
159.46
158.13
145.86
143.52
142.60
140.54
138.56
132.85
131.27
130.12
129.97
129.34
128.61
128.30
125.69
124.42
122.67
122.08
121.86
120.54
120.21
115.41
113.25
111.19
77.40
77.14
76.89
62.12
56.04
55.45
21.92
200
180
160
140
120
100
80
60
40
20
0
ppm

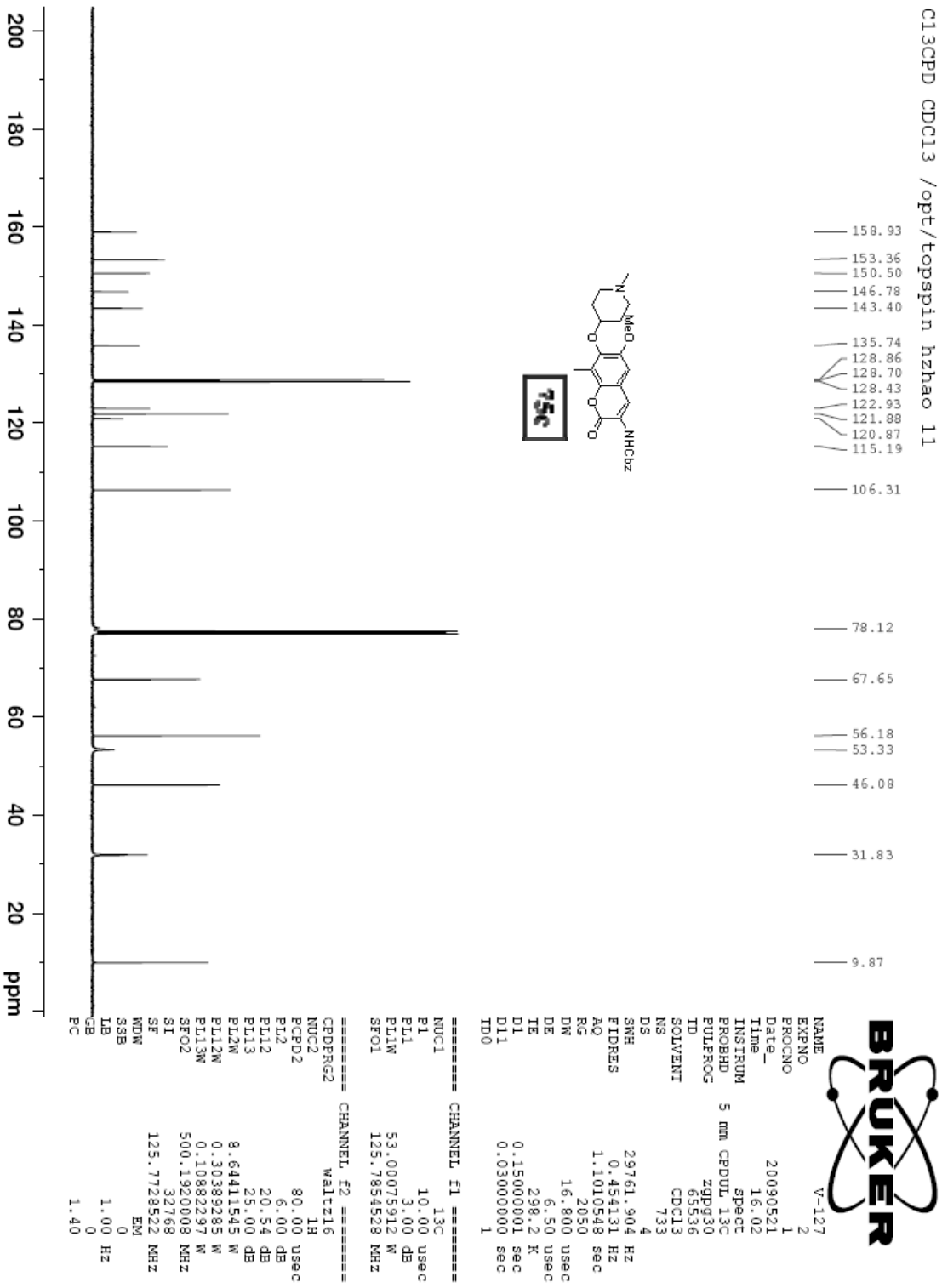

8.28
7.55
7.45
7.44
7.43
7.42
7.41
7.40
7.39
7.38
7.38
7.29
6.88
6.86
5.25
4.49
2.70
2.44
2.38
2.35
2.11
2.10
2.08
2.07
2.06
2.05
1.96
1.95
1.94
1.92
75a
NHCbz
0.94
1.02
5.07
1.02
1.07
2.00
1.04
2.19
1.94
7.00
2.16
2.24
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME V-147
EXPNO 1
PROCNO 1
Date_ 20091211
Time 16.59
INSTRUM dpx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1299957 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

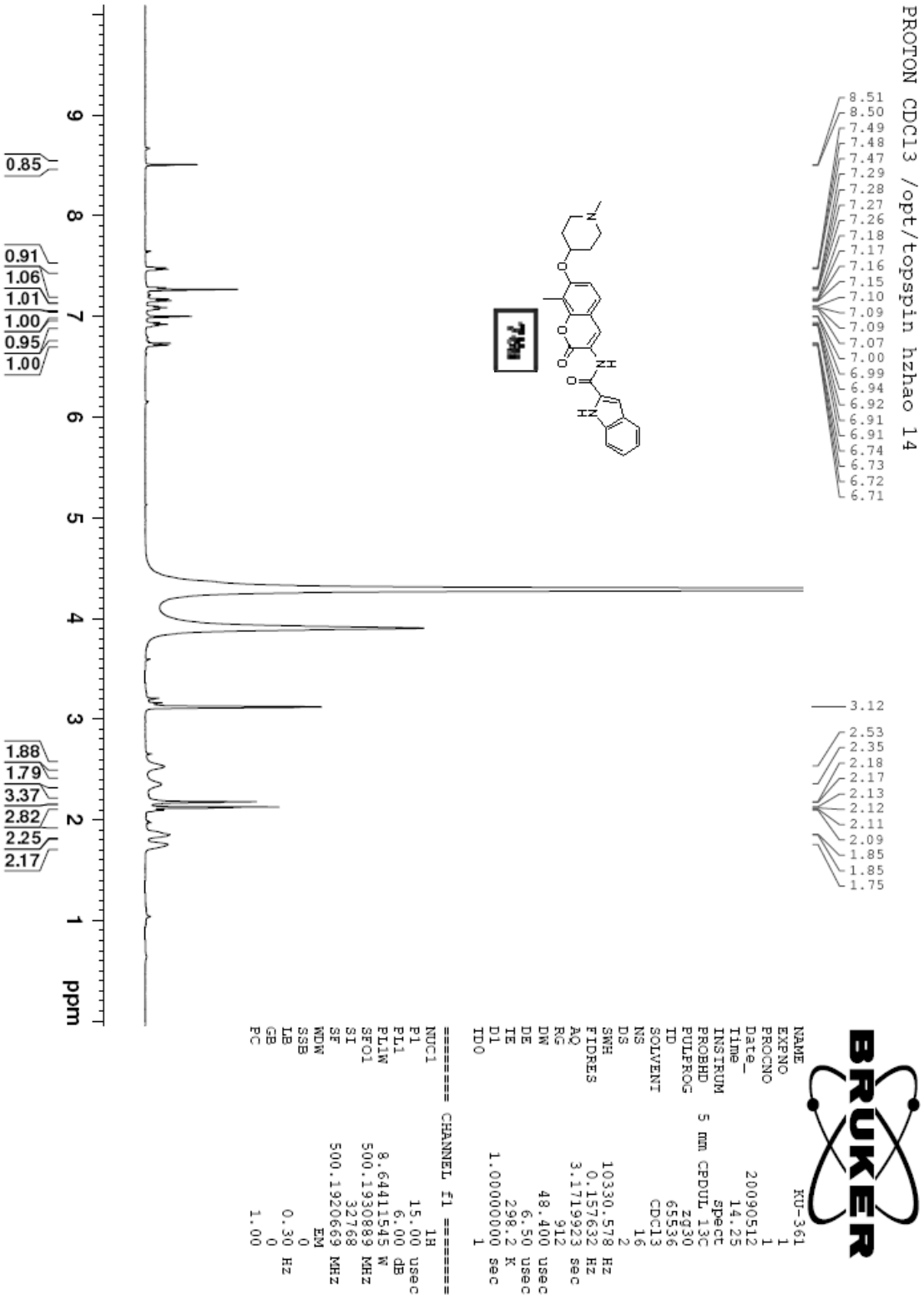

159.10
156.78
153.40
149.40
135.82
128.87
128.70
128.43
125.26
122.45
121.58
115.43
113.45
110.67
77.44
67.61
52.41
46.36
30.79
8.58
75a
NHCbz
ppm
200
180
160
140
120
100
80
60
40
20
BRUKER
NAME V-147-13C
EXPNO 1
PROCNO 1
Date_ 20091211
Time_ 22.45
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 8192
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.2 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 10.75 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 13.06 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127498 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

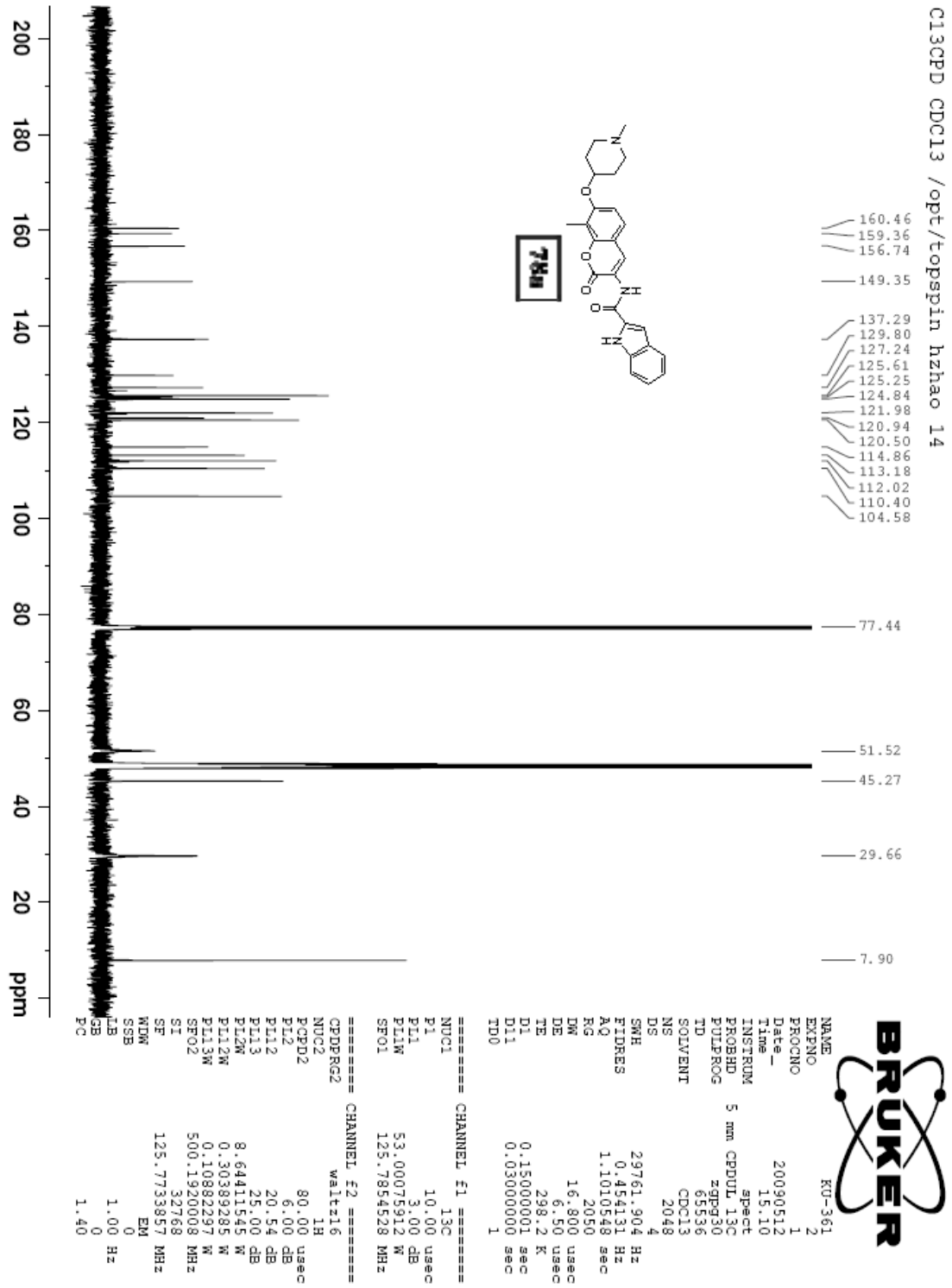

8.25
7.58
7.40
7.38
7.37
7.36
7.34
7.13
7.12
6.91
6.89
5.22
4.46
3.98
2.80
2.79
2.77
2.38
2.12
2.11
2.09
2.09
2.08
1.96
75b
OMe
NHCbz
1.00
1.07
5.19
1.06
1.07
2.12
1.07
3.11
2.17
2.12
3.18
2.31
2.29
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
NAME V-149
EXPNO 1
PROCNO 1
Date_ 20090317
Time 17.37
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 4
DW 48.400 usec
DE 6.00 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ========
NUC1 1H
P1 8.60 usec
PL1 -5.00 dB
SFO1 500.1330885 MHz
SI 32768
SF 500.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

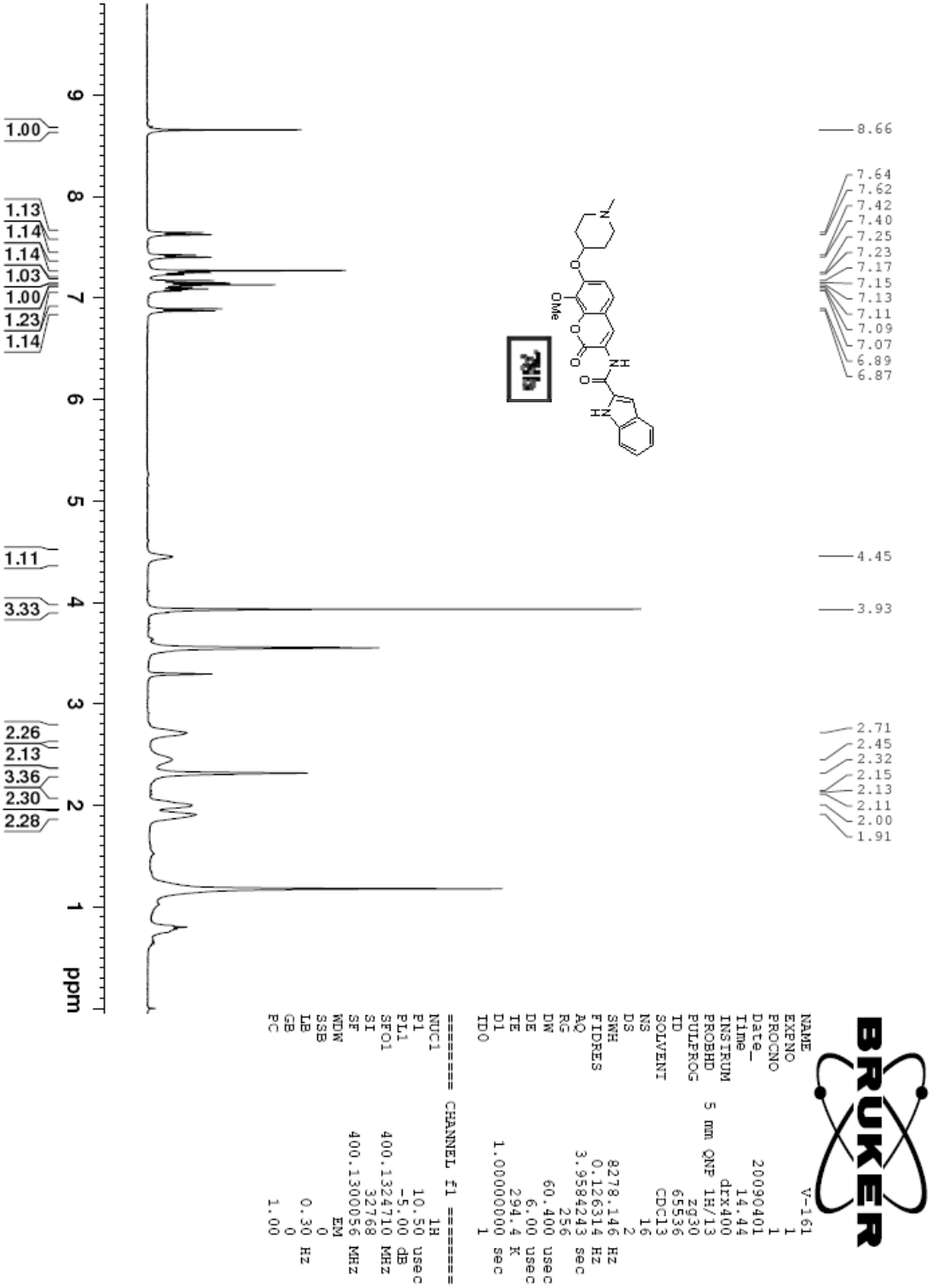

158.19
153.16
151.45
144.02
137.75
135.55
128.66
128.50
128.21
122.10
121.96
121.80
114.83
113.54
73.45
67.47
61.48
52.10
45.83
30.37
75b
OMe
NHCbz
O
N
200
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME v-149-13cnmr
EXPNO 1
PROCNO 1
Date_ 20090317
Time 17.42
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 258
DS 4
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 32768
DW 16.650 usec
DE 6.00 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
DELTA 0.05000000 sec
TD0 4
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PL1 -1.15 dB
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 95.00 usec
PL2 -5.00 dB
PL12 15.86 dB
PL13 30.00 dB
SFO2 500.1320005 MHz
SI 32768
SF 125.7577890 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

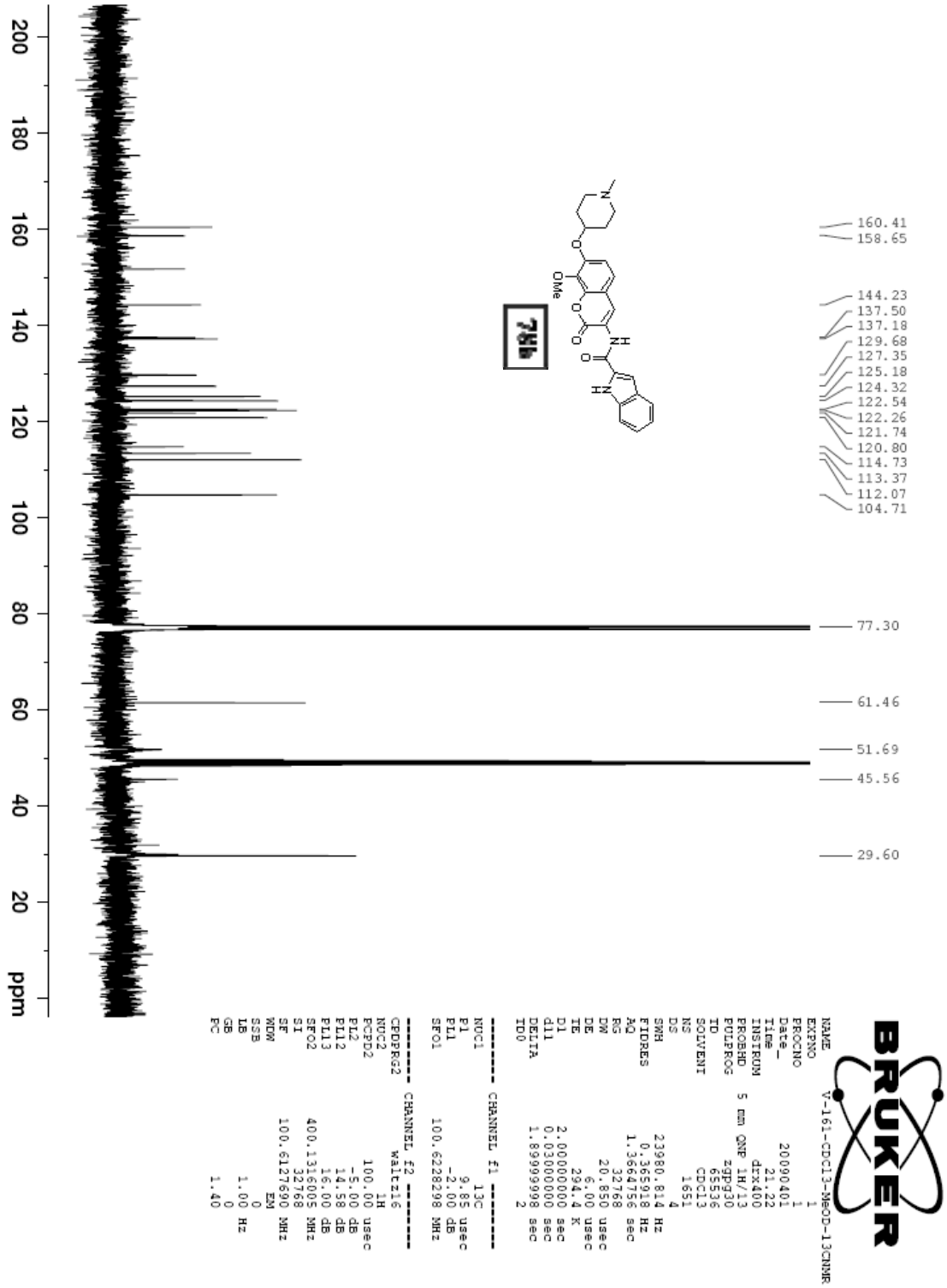

PROTON CDCl3 /opt/topspin hzhao 11
8.25
7.59
7.42
7.42
7.42
7.41
7.39
7.39
7.38
7.38
7.38
7.37
7.37
7.36
7.35
7.35
6.77
5.23
4.24
4.23
4.22
3.86
2.85
2.85
2.83
2.82
2.36
2.33
2.23
2.01
2.00
1.99
1.98
1.97
1.93
1.92
1.91
1.90
1.89
1.88
1.88
1.86
MeO
NHCbz
NAME V-127
EXPNO 1
PROCNO 1
Date_ 20090521
Time 15.46
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1290
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899994 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.00
1.05
5.31
1.09
2.19
1.06
3.35
2.22
3.22
3.18
2.26
2.23
2.10
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm

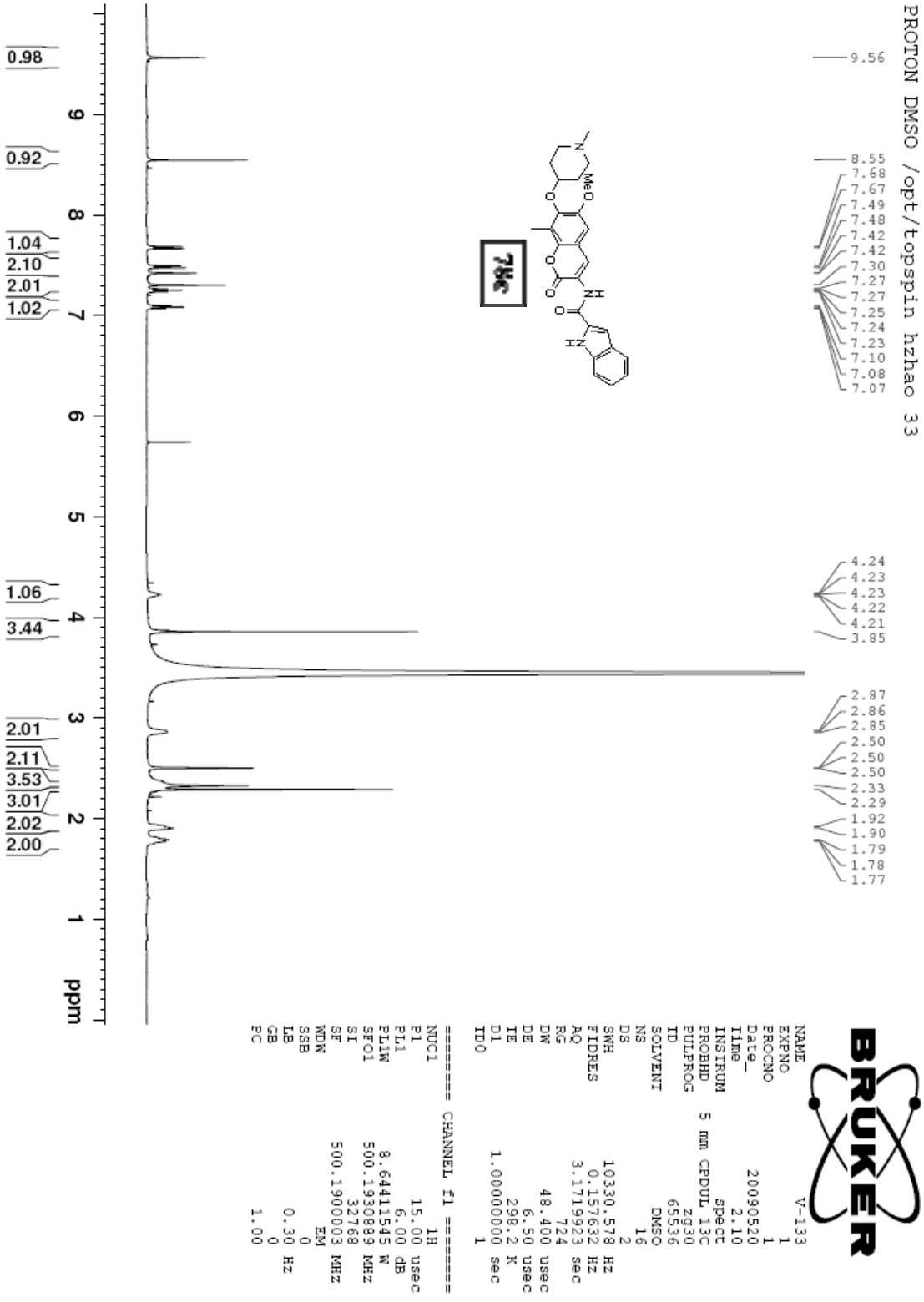

C13CPD CDCl3 /opt/topspin hzhao 11
158.93
153.36
150.50
146.78
143.40
135.74
128.86
128.70
128.43
122.93
121.88
120.87
115.19
106.31
78.12
67.65
56.18
53.33
46.08
31.83
9.87
MeO
NHCbz
75c
BRUKER
NAME V-127
EXPNO 2
PROCNO 1
Date_ 20090521
Time 16.02
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 733
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728522 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

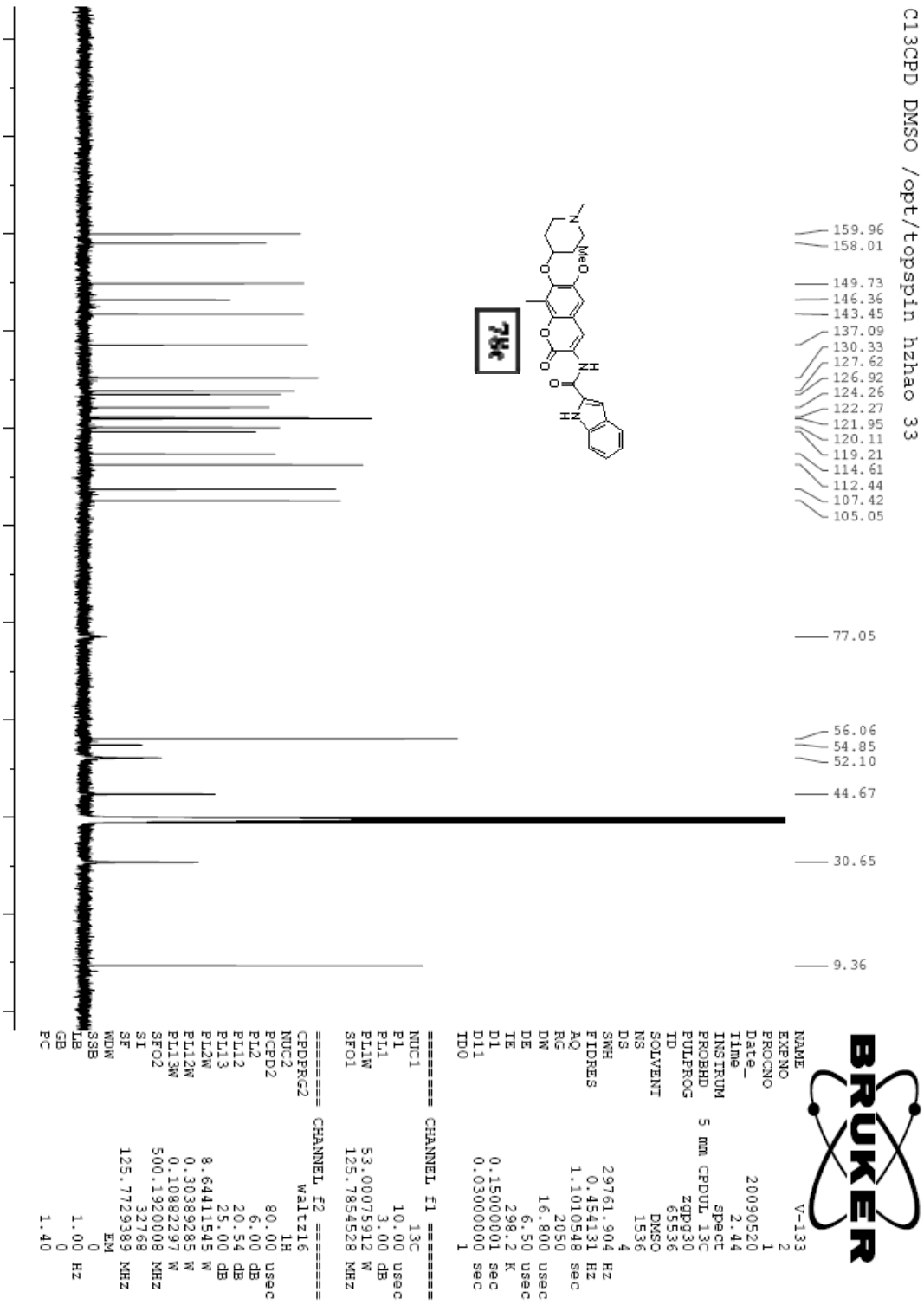

PROTON CDC13 /opt/topspin hzhao 14
8.51
8.50
7.49
7.48
7.47
7.29
7.28
7.27
7.26
7.18
7.17
7.16
7.15
7.10
7.09
7.09
7.07
7.00
6.99
6.94
6.92
6.91
6.91
6.74
6.73
6.72
6.71
3.12
2.53
2.35
2.18
2.17
2.13
2.12
2.11
2.09
1.85
1.85
1.75
0.85
0.91
1.06
1.01
1.00
0.95
1.00
1.88
1.79
3.37
2.82
2.25
2.17
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME KU-361
EXPNO 1
PROCNO 1
Date_ 20090512
Time 14.25
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 912
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
ID0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1920669 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

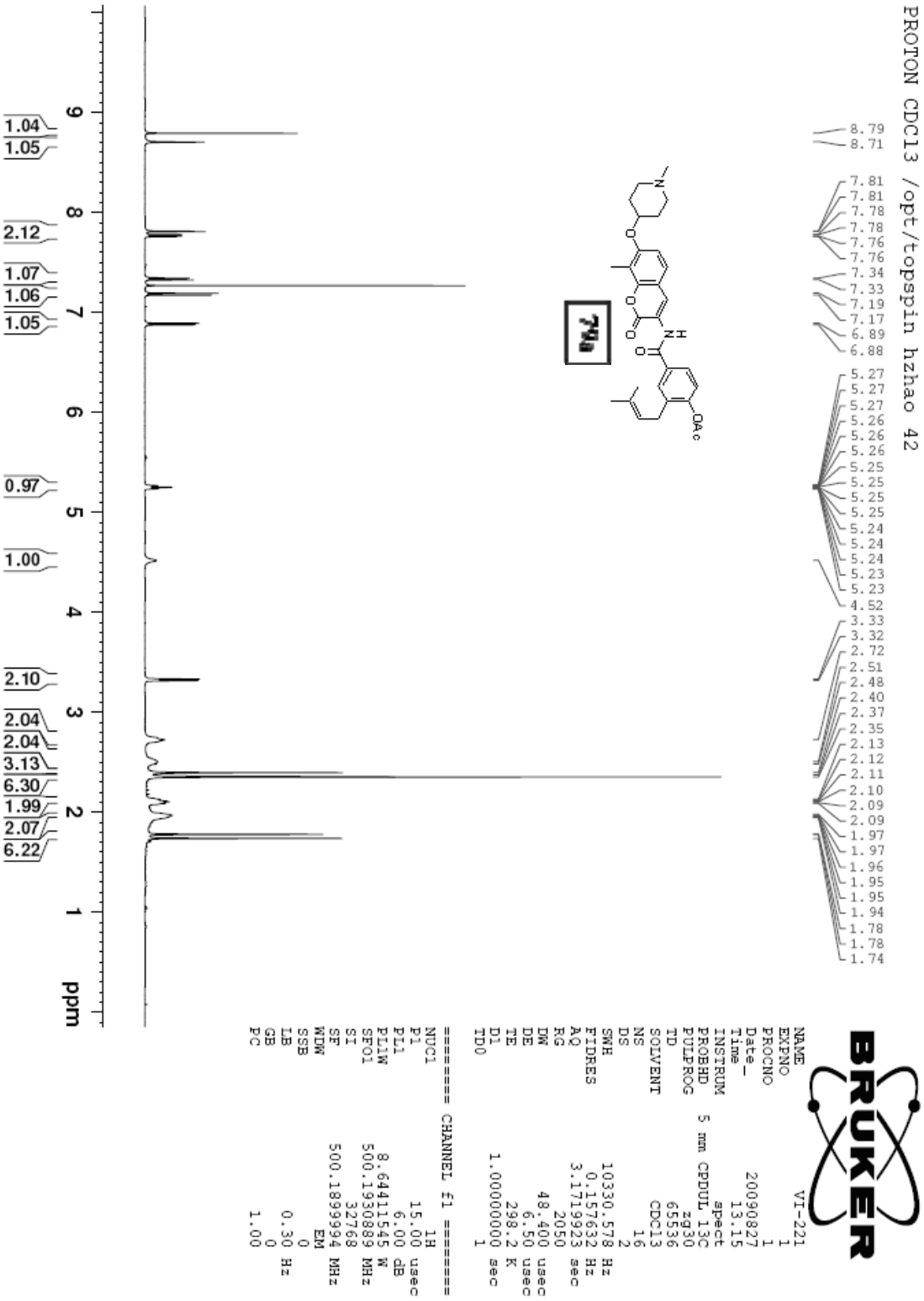

C13CPD CDCl3 /opt/topspin hzhao 14
7kn
160.46
159.36
156.74
149.35
137.29
129.80
127.24
125.61
125.25
124.84
121.98
120.94
120.50
114.86
113.18
112.02
110.40
104.58
77.44
51.52
45.27
29.66
7.90
ppm
200
180
160
140
120
100
80
60
40
20
BRUKER
NAME KO-361
EXPNO 2
PROCNO 1
Date_ 20090512
Time_ 15.10
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7733857 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

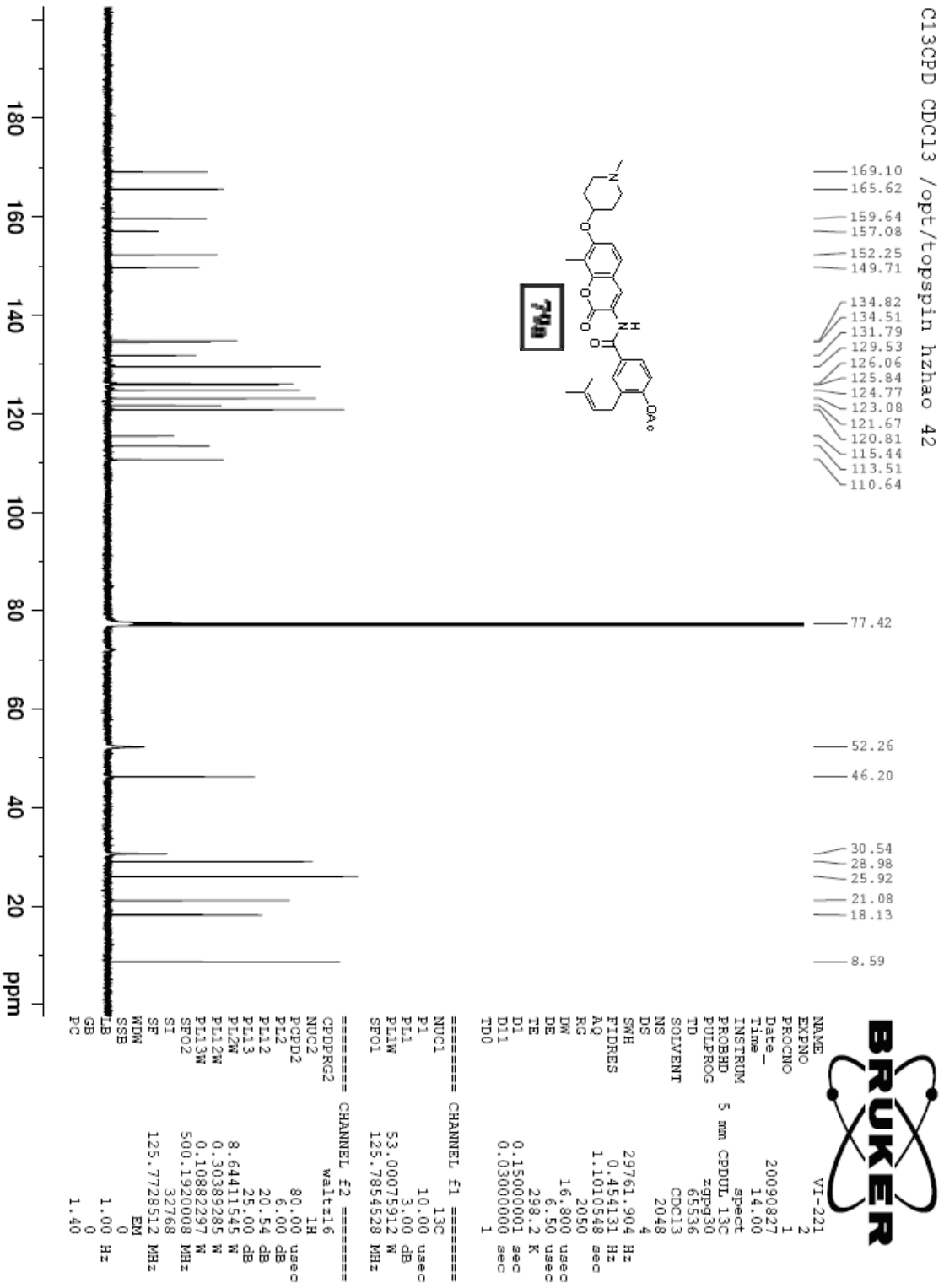

8.66
7.64
7.62
7.42
7.40
7.25
7.23
7.17
7.15
7.13
7.11
7.09
7.07
6.89
6.87
4.45
3.93
2.71
2.45
2.32
2.15
2.13
2.11
2.00
1.91
1.00
1.13
1.14
1.14
1.03
1.00
1.23
1.14
1.11
3.33
2.26
2.13
3.36
2.30
2.28
OMe
7ah
ppm
BRUKER
NAME V-161
EXPNO 1
PROCNO 1
Date_ 20090401
Time_ 14.44
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 256
DW 60.400 usec
DE 6.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300056 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

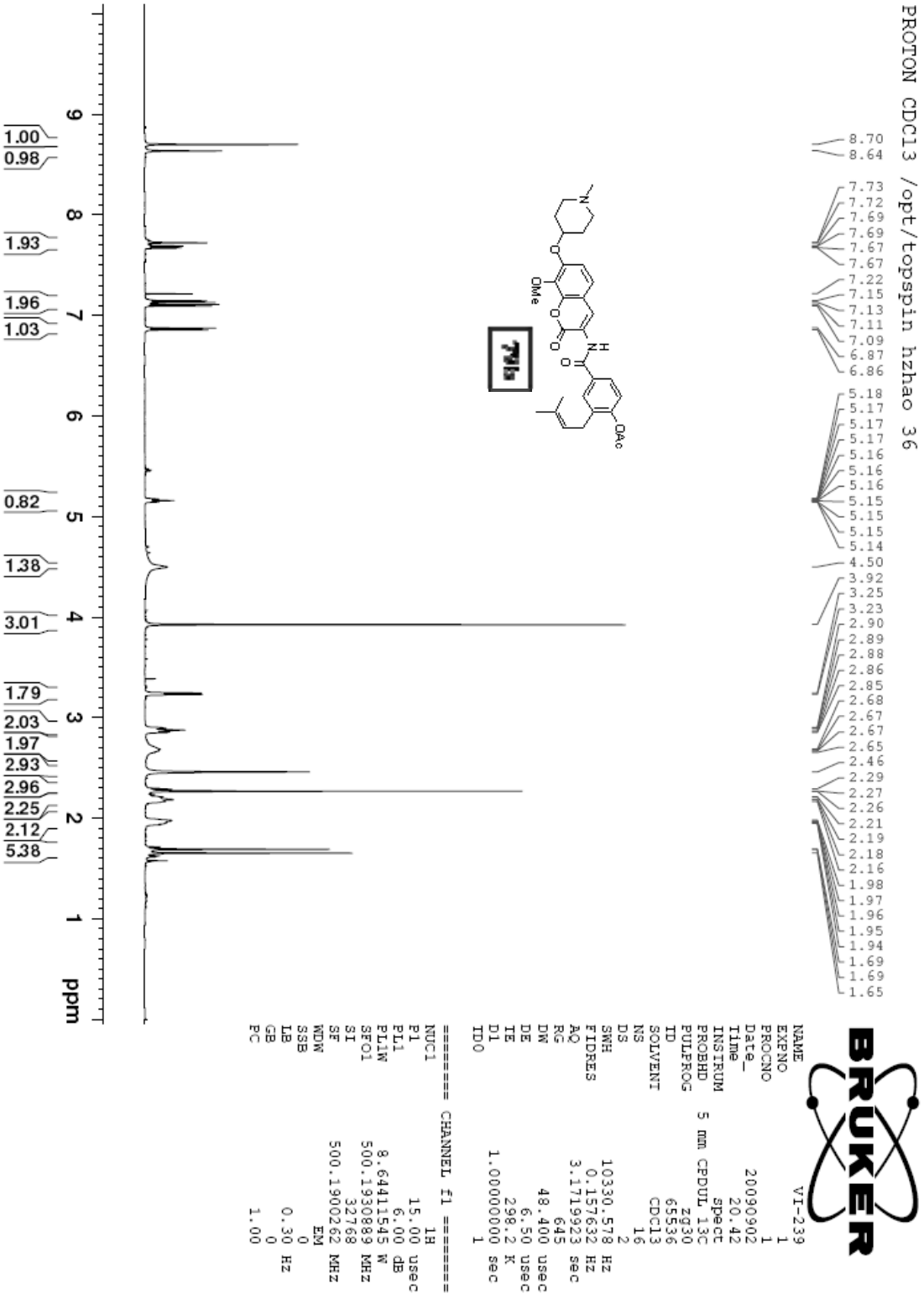

7sb
OMe
160.41
158.65
144.23
137.50
137.18
129.68
127.35
125.18
124.32
122.54
122.26
121.74
120.80
114.73
113.37
112.07
104.71
77.30
61.46
51.69
45.56
29.60
200
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-161-CDCl3-MeOD-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090401
Time 21.22
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1651
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
---------- CHANNEL f1 ----------
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
---------- CHANNEL f2 ----------
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

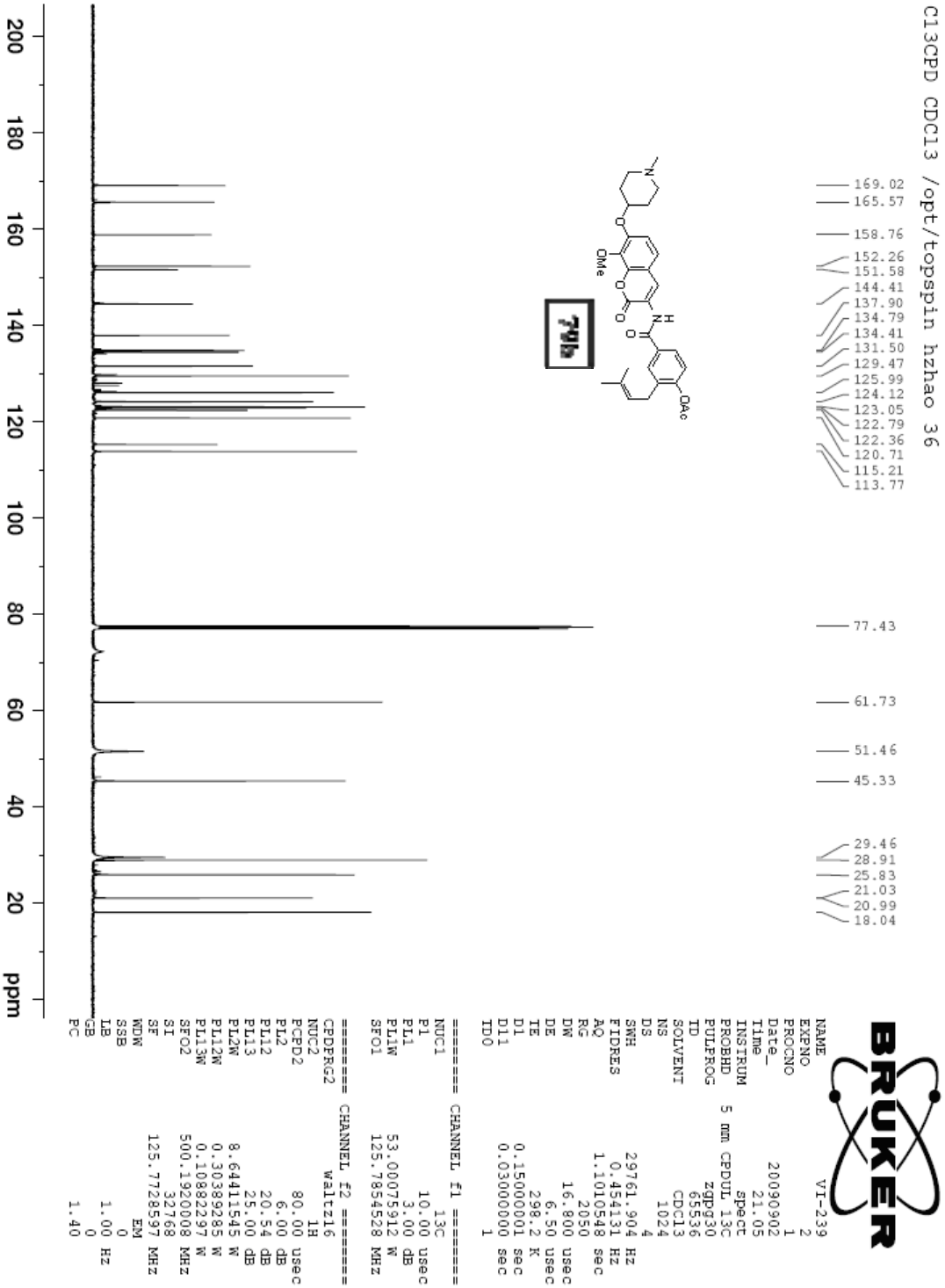

PROTON DMSO /opt/topspin hzhao 33
9.56
8.55
7.68
7.67
7.49
7.48
7.42
7.42
7.30
7.27
7.27
7.25
7.24
7.23
7.10
7.08
7.07
4.24
4.23
4.23
4.22
4.21
3.85
2.87
2.86
2.85
2.50
2.50
2.50
2.33
2.29
1.92
1.90
1.79
1.78
1.77
0.98
0.92
1.04
2.10
2.01
1.02
1.06
3.44
2.01
2.11
3.53
3.01
2.02
2.00
ppm
NAME V-133
EXPNO 1
PROCNO 1
Date_ 20090520
Time 2.10
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.17199223 sec
RG 724
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900003 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

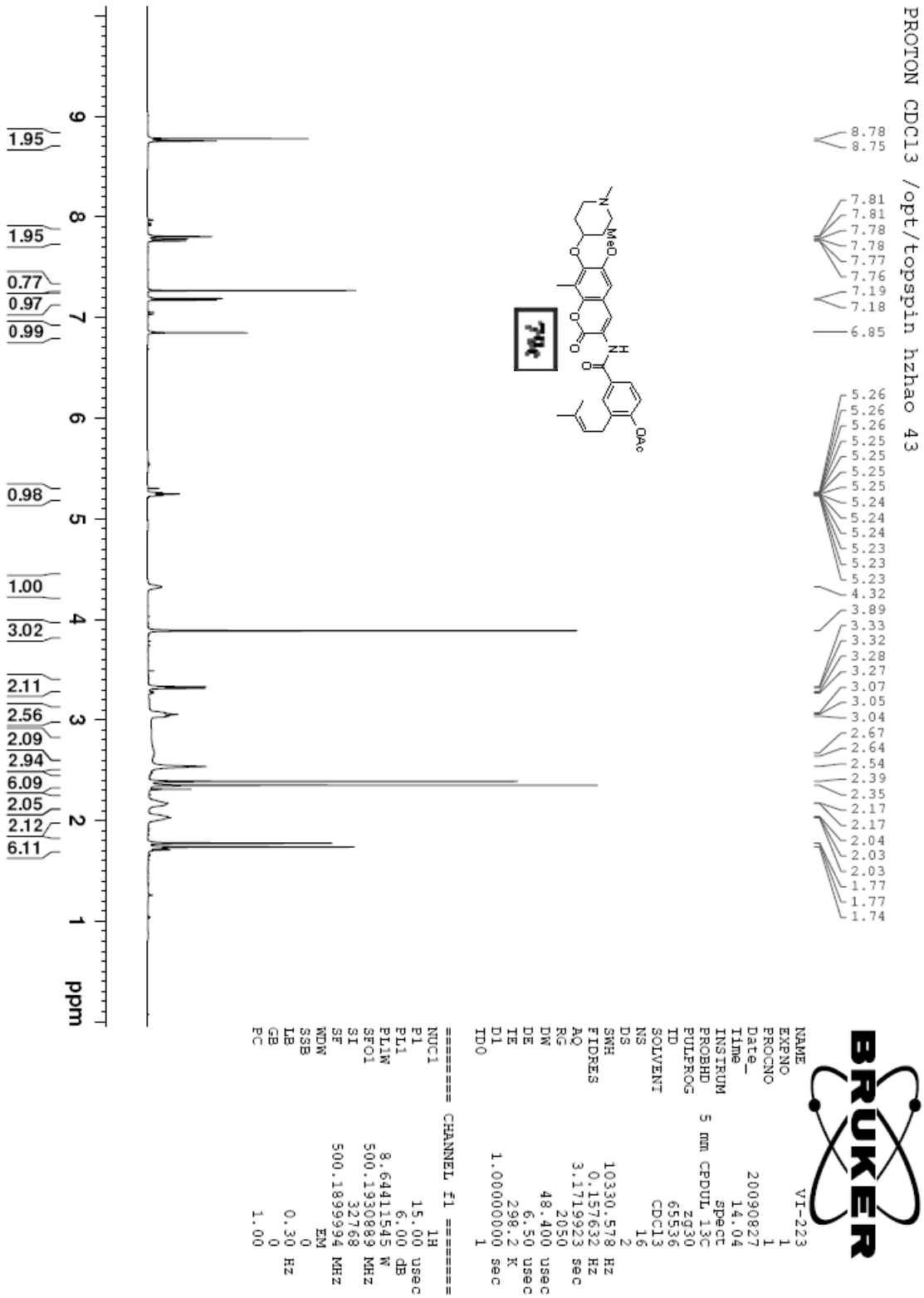

C13CPD DMSO /opt/topspin hzhao 33
159.96
158.01
149.73
146.36
143.45
137.09
130.33
127.62
126.92
124.26
122.27
121.95
120.11
119.21
114.61
112.44
107.42
105.05
77.05
56.06
54.85
52.10
44.67
30.65
9.36
MeO
78c
200
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-133
EXPNO 2
PROCNO 1
Date_ 20090520
Time_ 2.44
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1536
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729389 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

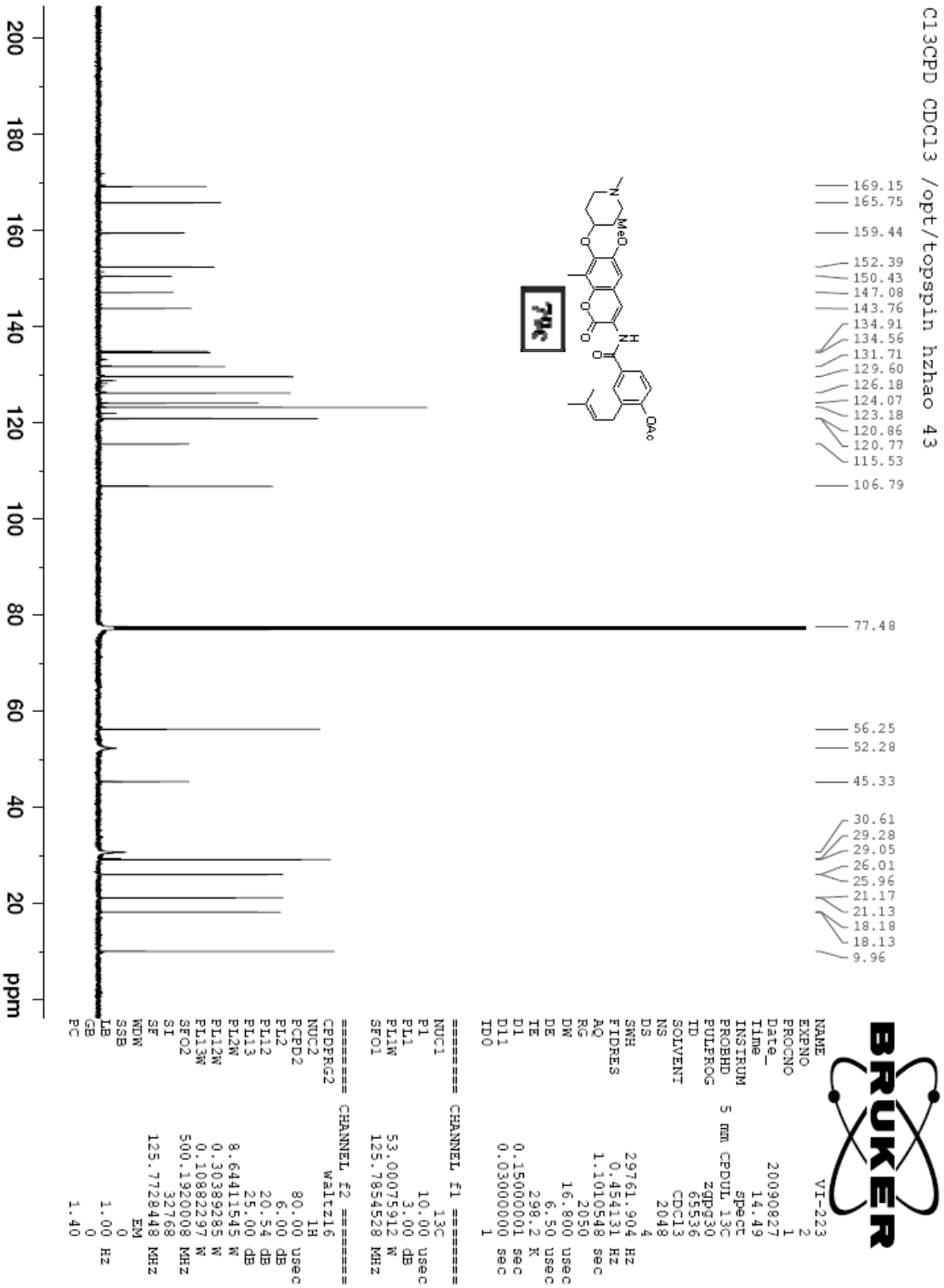

PROTON CDC13 /opt/topspin hzhao 42
8.79
8.71
7.81
7.81
7.78
7.78
7.76
7.76
7.34
7.33
7.19
7.17
6.89
6.88
5.27
5.27
5.27
5.26
5.26
5.26
5.25
5.25
5.25
5.25
5.24
5.24
5.24
5.23
5.23
4.52
3.33
3.32
2.72
2.51
2.48
2.40
2.37
2.35
2.13
2.12
2.11
2.10
2.09
2.09
1.97
1.97
1.96
1.95
1.95
1.94
1.78
1.78
1.74
7ka
OAc
1.04
1.05
2.12
1.07
1.06
1.05
0.97
1.00
2.10
2.04
2.04
3.13
6.30
1.99
2.07
6.22
9
8
7
6
5
4
3
2
1
ppm
NAME VI-221
EXPNO 1
PROCNO 1
Date_ 20090827
Time 13.15
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899994 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

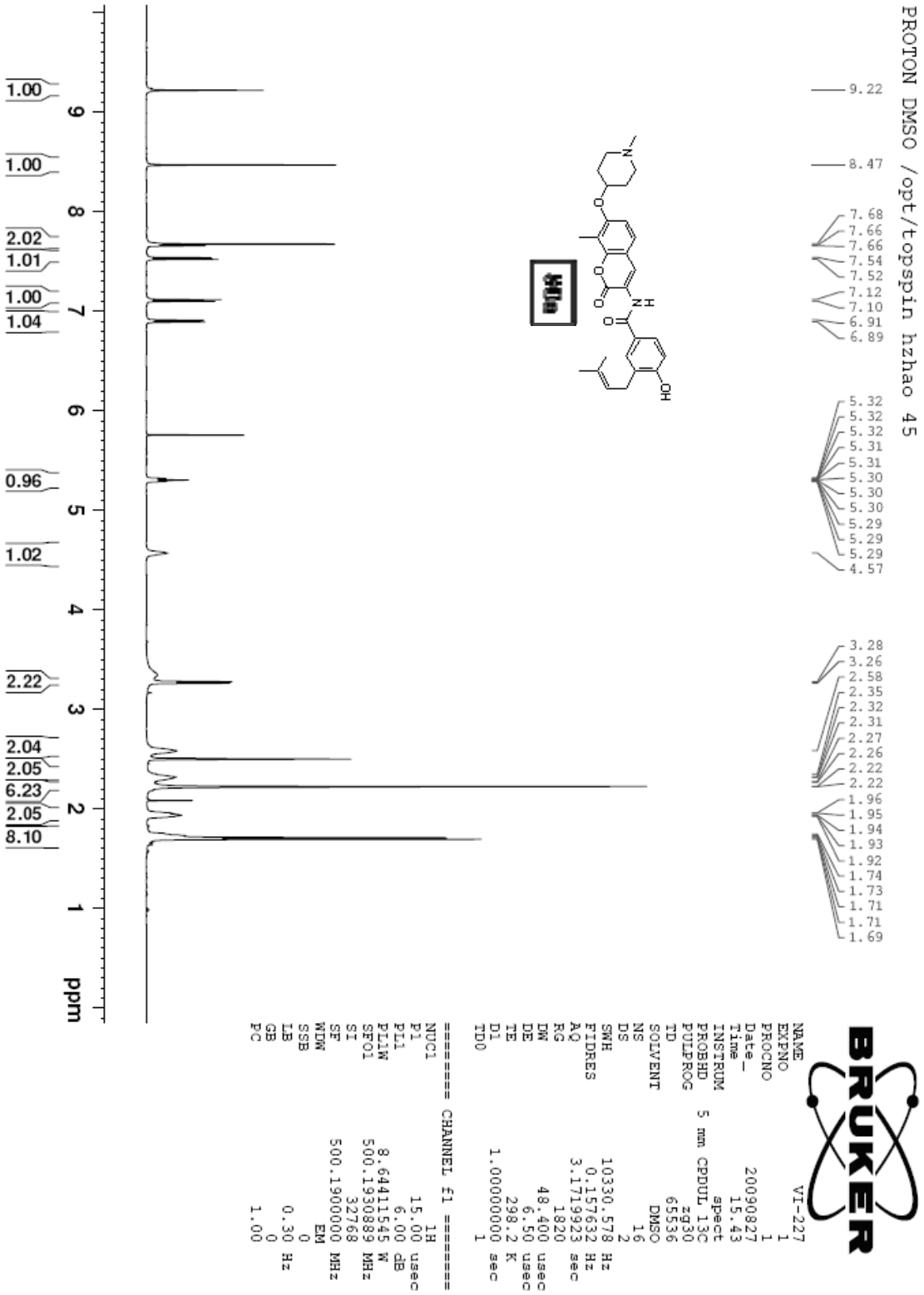

C13CPD CDC13 /opt/topspin hzhao 42
169.10
165.62
159.64
157.08
152.25
149.71
134.82
134.51
131.79
129.53
126.06
125.84
124.77
123.08
121.67
120.81
115.44
113.51
110.64
77.42
52.26
46.20
30.54
28.98
25.92
21.08
18.13
8.59
ppm
180
160
140
120
100
80
60
40
20
BRUKER
NAME VI-221
EXPNO 2
PROCNO 1
Date_ 20090827
Time_ 14.00
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
========== CHANNEL f2 ==========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728512 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

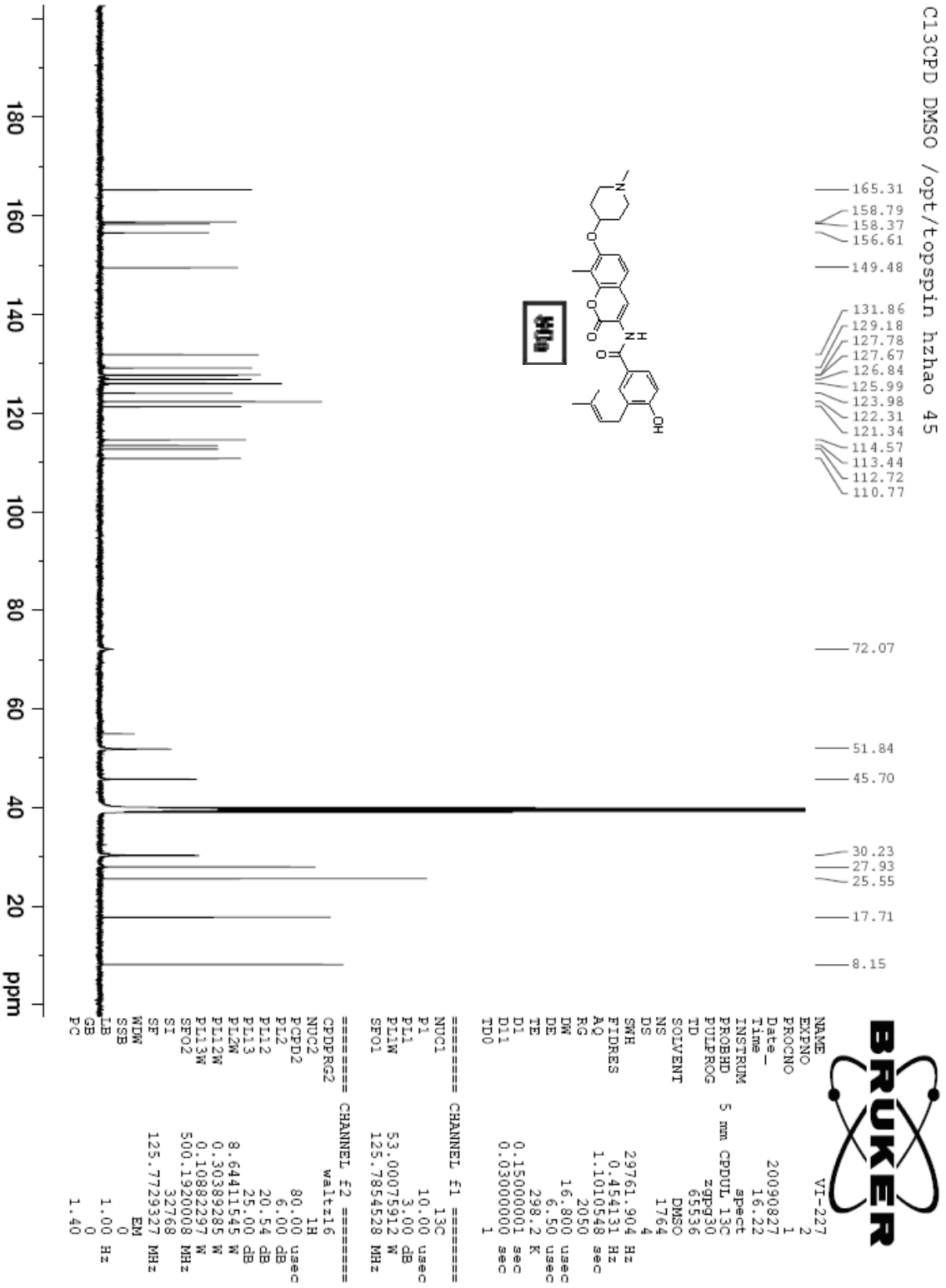

PROTON CDCl3 /opt/topspin hzhao 36
8.70
8.64
7.73
7.72
7.69
7.69
7.67
7.67
7.22
7.15
7.13
7.11
7.09
6.87
6.86
5.18
5.17
5.17
5.17
5.16
5.16
5.16
5.15
5.15
5.15
5.14
4.50
3.92
3.25
3.23
2.90
2.89
2.88
2.86
2.85
2.68
2.67
2.67
2.65
2.46
2.29
2.27
2.26
2.21
2.19
2.18
2.16
1.98
1.97
1.96
1.95
1.94
1.69
1.69
1.65
OMe
OAc
7b
1.00
0.98
1.93
1.96
1.03
0.82
1.38
3.01
1.79
2.03
1.97
2.93
2.96
2.25
2.12
5.38
9
8
7
6
5
4
3
2
1
ppm
NAME
EXPNO
PROCNO
Date_
Time
INSTRUM
PROBHD
PULPROG
TD
SOLVENT
NS
DS
SWH
FIDRES
AQ
RG
DW
DE
TE
D1
D0
VI-239
1
1
20090902
20.42
spect
5 mm CPDUL 13C
zg30
65536
CDCl3
16
2
10330.578 Hz
0.157632 Hz
3.1719923 sec
645
48.400 usec
6.50 usec
298.2 K
1.00000000 sec
1
======== CHANNEL f1 ========
NUC1
P1
PL1
PLW
SFO1
SI
SF
WDW
SSB
LB
GB
PC
1H
15.00 usec
6.00 dB
8.64411545 W
500.1930889 MHz
32768
500.1900262 MHz
EM
0
0.30 Hz
0
1.00

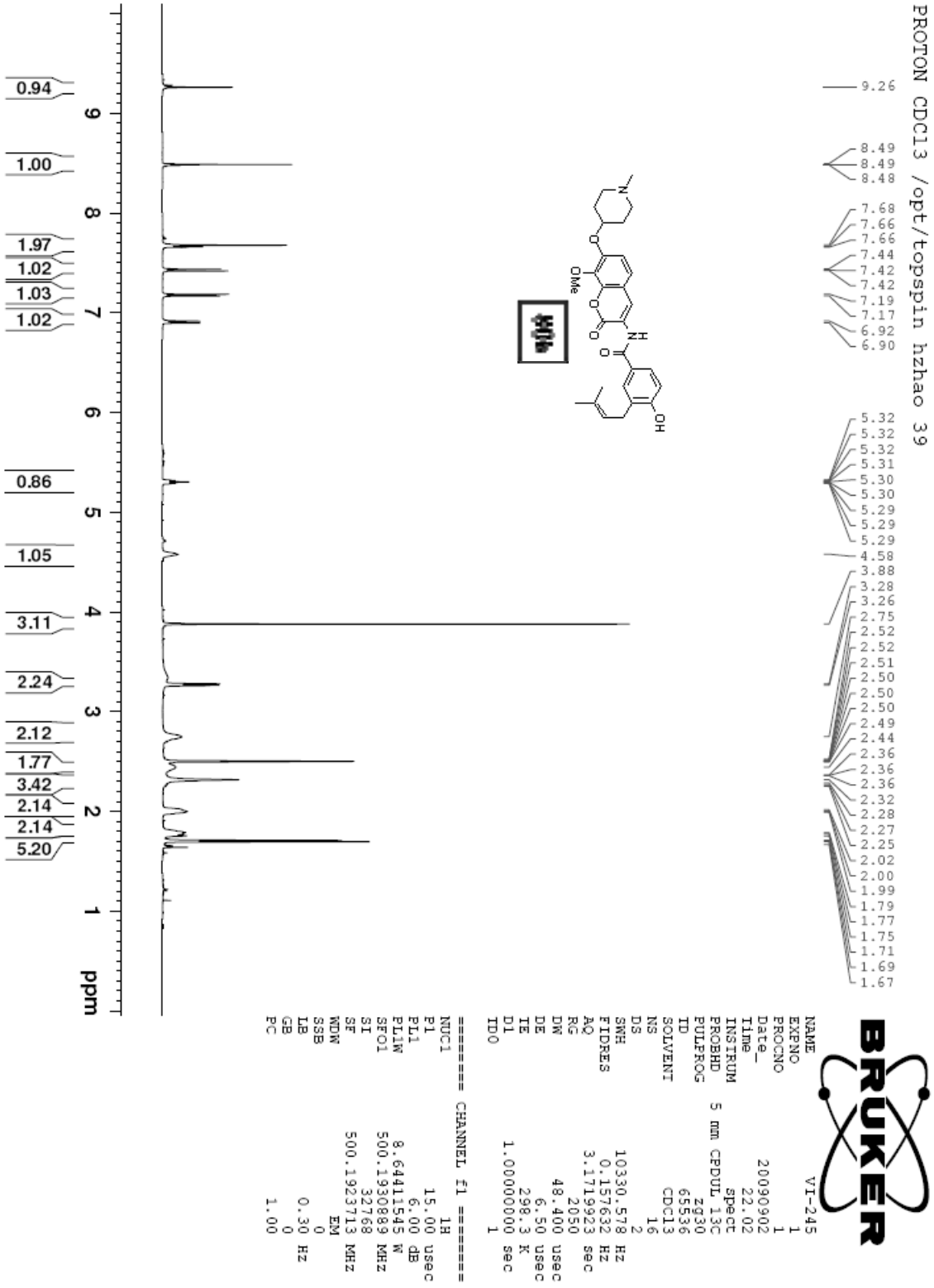

C13CPD CDC13 /opt/topspin hzhao 36
169.02
165.57
158.76
152.26
151.58
144.41
137.90
134.79
134.41
131.50
129.47
125.99
124.12
123.05
122.79
122.36
120.71
115.21
113.77
77.43
61.73
51.46
45.33
29.46
28.91
25.83
21.03
20.99
18.04
OMe
OAc
79b
BRUKER
NAME VI-239
EXPNO 2
PROCNO 1
Date_ 20090902
Time 21.05
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728597 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

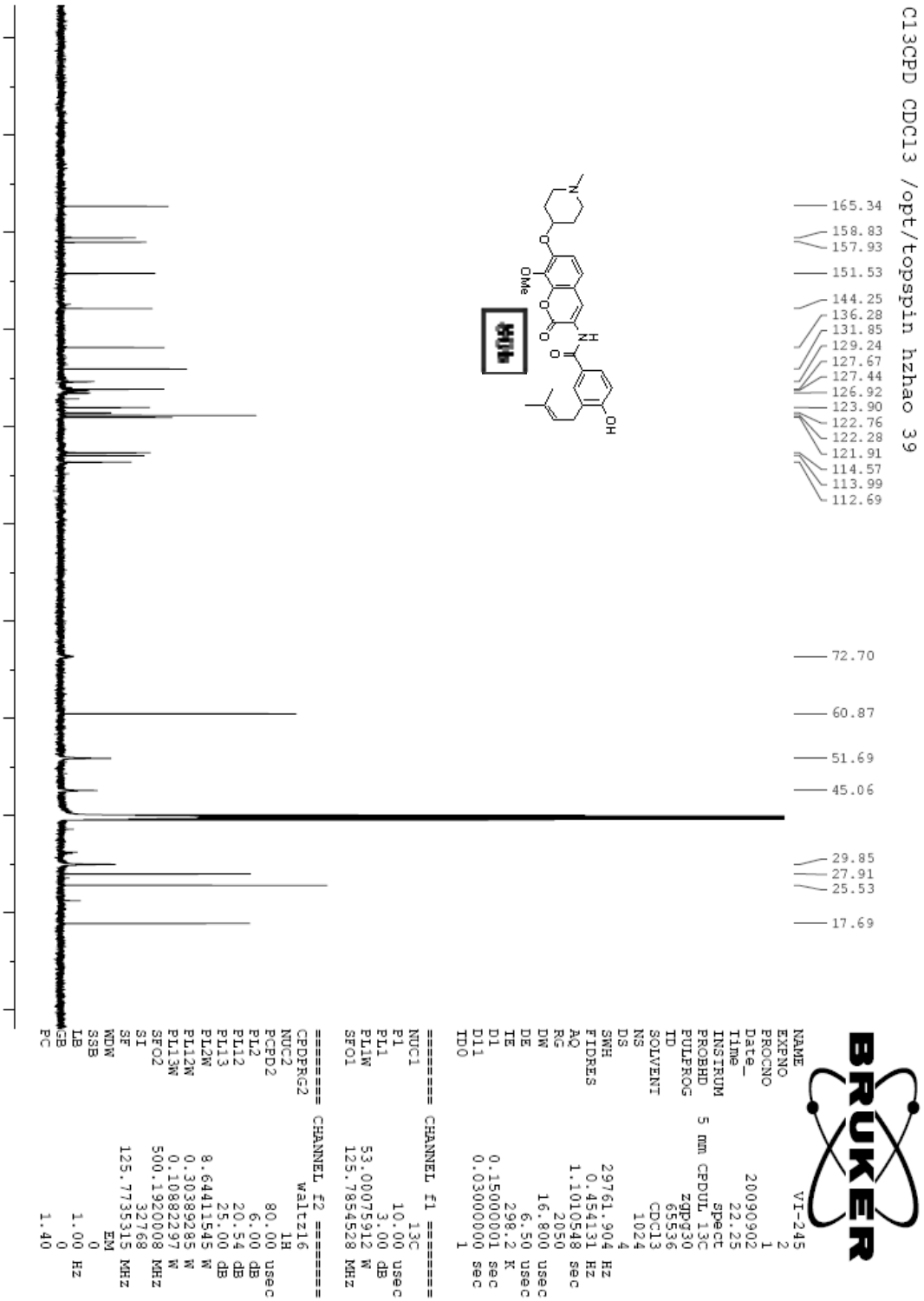

PROTON CDC13 /opt/topspin hzhao 43
8.78
8.75
7.81
7.81
7.78
7.78
7.77
7.76
7.19
7.18
6.85
5.26
5.26
5.26
5.25
5.25
5.25
5.25
5.24
5.24
5.24
5.23
5.23
5.23
4.32
3.89
3.33
3.32
3.28
3.27
3.07
3.05
3.04
2.67
2.64
2.54
2.39
2.35
2.17
2.17
2.04
2.03
2.03
1.77
1.77
1.74
MeO
OAc
7bk
1.95
1.95
0.77
0.97
0.99
0.98
1.00
3.02
2.11
2.56
2.09
2.94
6.09
2.05
2.12
6.11
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME VI-223
EXPNO 1
PROCNO 1
Date_ 20090827
Time 14.04
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899994 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

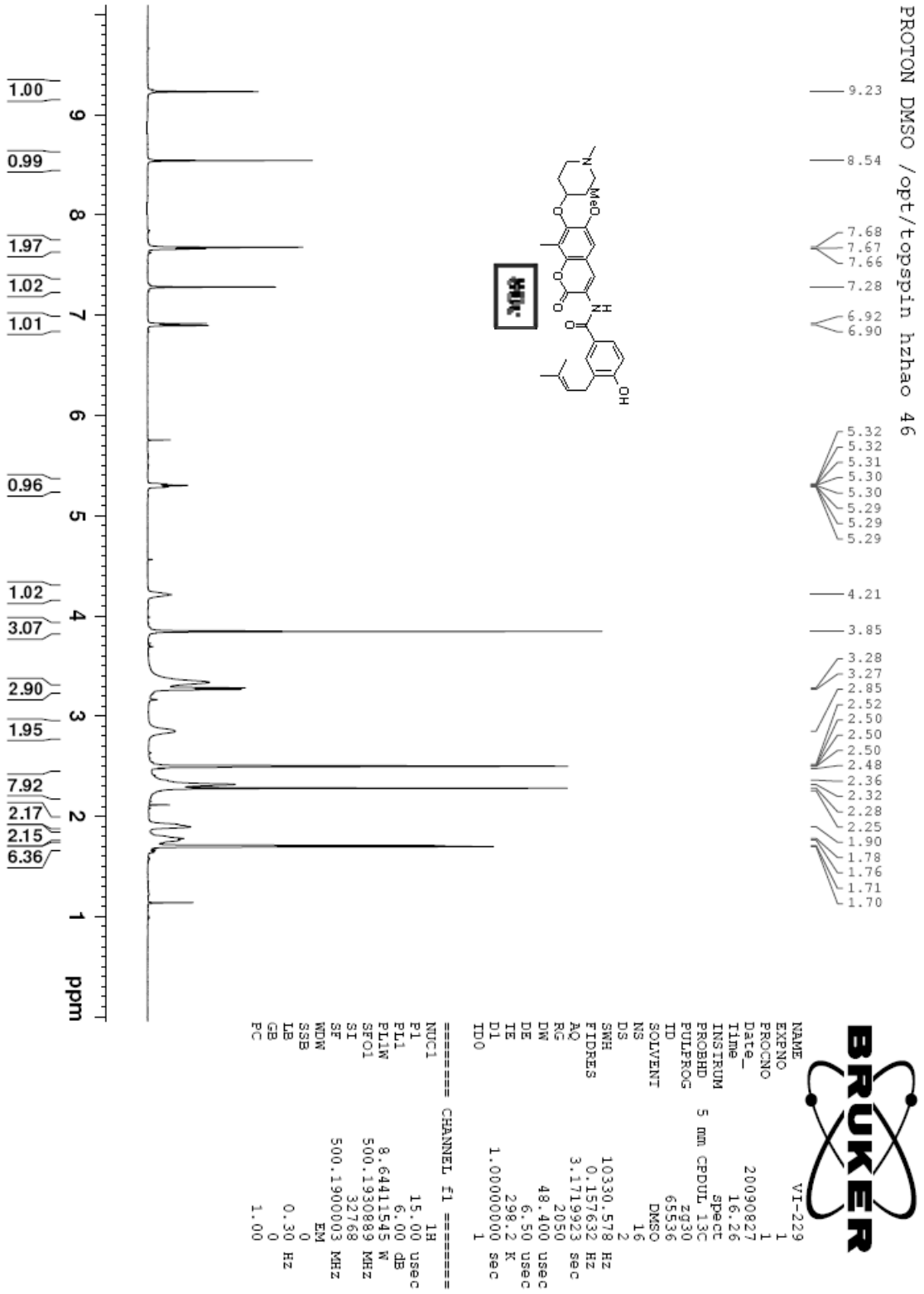

C13CPD CDC13 /opt/topspin hzhao 43
169.15
165.75
159.44
152.39
150.43
147.08
143.76
134.91
134.56
131.71
129.60
126.18
124.07
123.18
120.86
120.77
115.53
106.79
77.48
56.25
52.28
45.33
30.61
29.28
29.05
26.01
25.96
21.17
21.13
18.18
18.13
9.96
MeO
OAc
79%
BRUKER
NAME VI-223
EXPNO 2
PROCNO 1
Date_ 20090827
Time 14.49
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13c
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728448 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

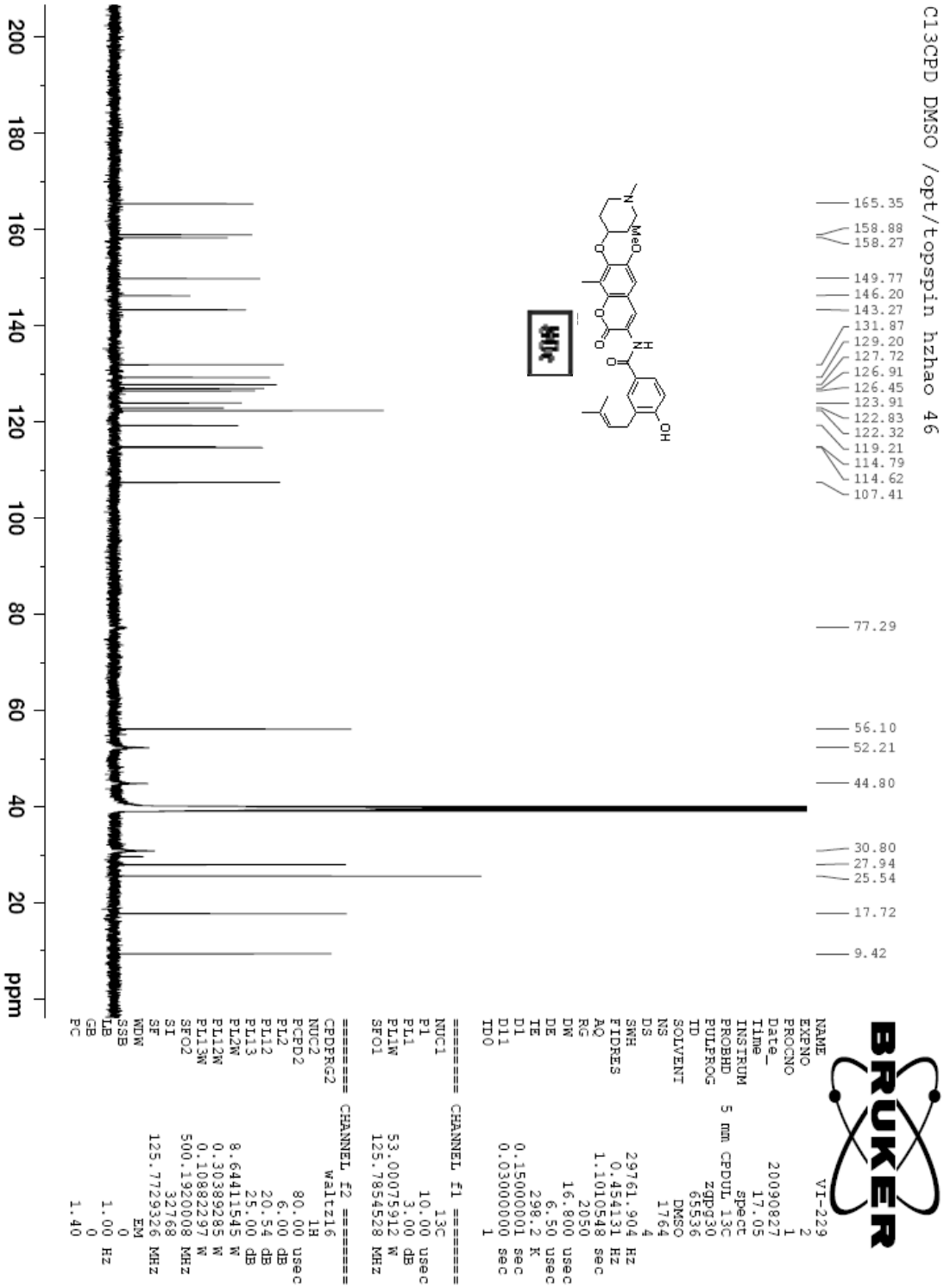

PROTON DMSO /opt/topspin hzhao 45
9.22
8.47
7.68
7.66
7.66
7.54
7.52
7.12
7.10
6.91
6.89
5.32
5.32
5.32
5.31
5.31
5.30
5.30
5.30
5.29
5.29
5.29
4.57
3.28
3.26
2.58
2.35
2.32
2.31
2.27
2.26
2.22
2.22
1.96
1.95
1.94
1.93
1.92
1.74
1.73
1.71
1.71
1.69
1.00
1.00
2.02
1.01
1.00
1.04
0.96
1.02
2.22
2.04
2.05
6.23
2.05
8.10
ppm
NAME VI-227
EXPNO 1
PROCNO 1
Date_ 20090827
Time 15.43
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1820
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

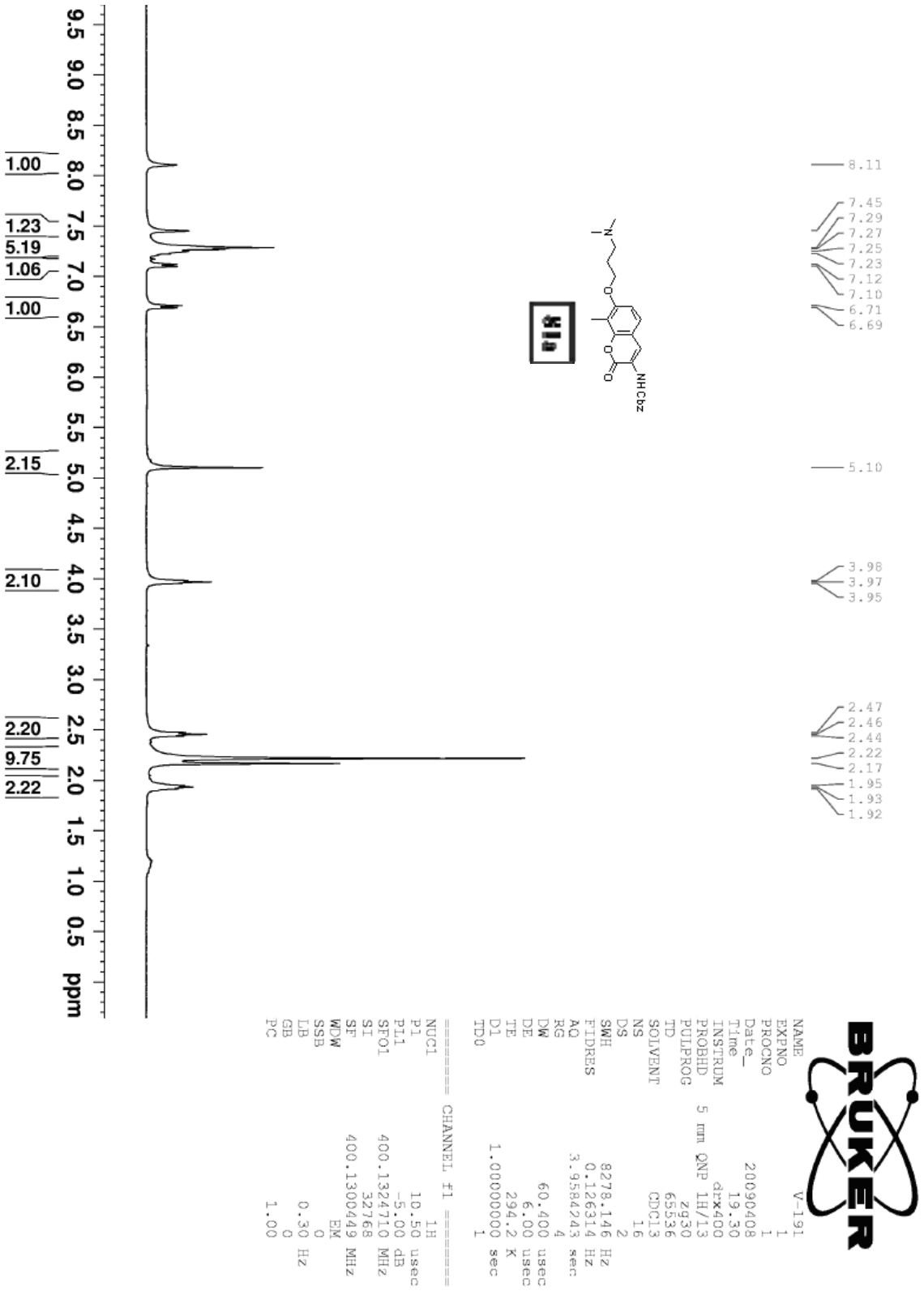

C13CPD DMSO /opt/topspin hzhao 45
165.31
158.79
158.37
156.61
149.48
131.86
129.18
127.78
127.67
126.84
125.99
123.98
122.31
121.34
114.57
113.44
112.72
110.77
72.07
51.84
45.70
30.23
27.93
25.55
17.71
8.15
OH
ppm
180
160
140
120
100
80
60
40
20
BRUKER
NAME VI-227
EXPNO 2
PROCNO 1
Date_ 20090827
Time 16.22
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1764
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729327 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

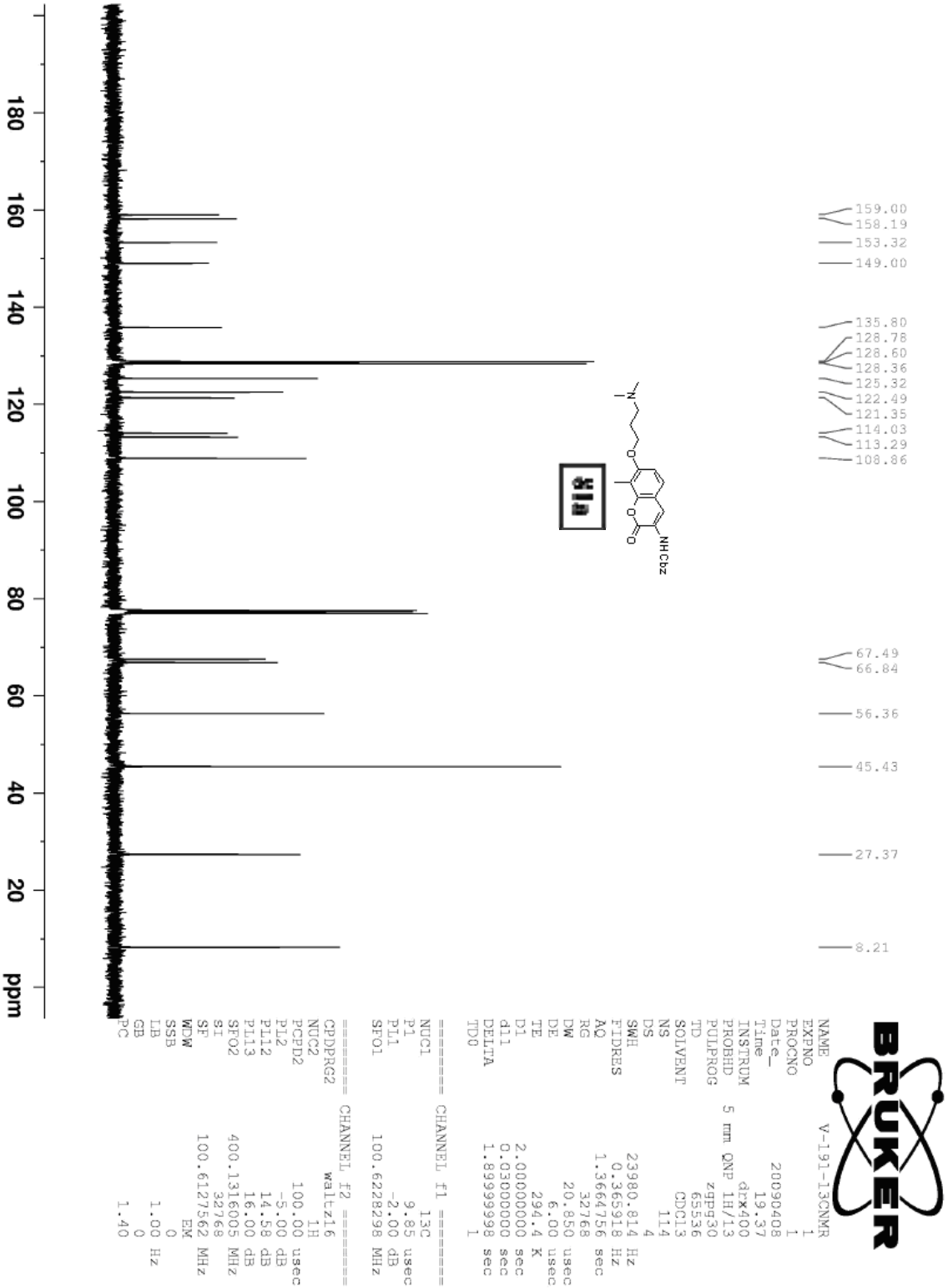

PROTON CDC13 /opt/topspin hzhao 39
9.26
8.49
8.49
8.48
7.68
7.66
7.66
7.44
7.42
7.42
7.19
7.17
6.92
6.90
5.32
5.32
5.32
5.31
5.30
5.30
5.29
5.29
5.29
4.58
3.88
3.28
3.26
2.75
2.52
2.52
2.51
2.50
2.50
2.50
2.49
2.44
2.36
2.36
2.36
2.32
2.28
2.27
2.25
2.02
2.00
1.99
1.79
1.77
1.75
1.71
1.69
1.67
OMe
OH
0.94
1.00
1.97
1.02
1.03
1.02
0.86
1.05
3.11
2.24
2.12
1.77
3.42
2.14
2.14
5.20
ppm
NAME VI-245
EXPNO 1
PROCNO 1
Date_ 20090902
Time_ 22.02
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1923713 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

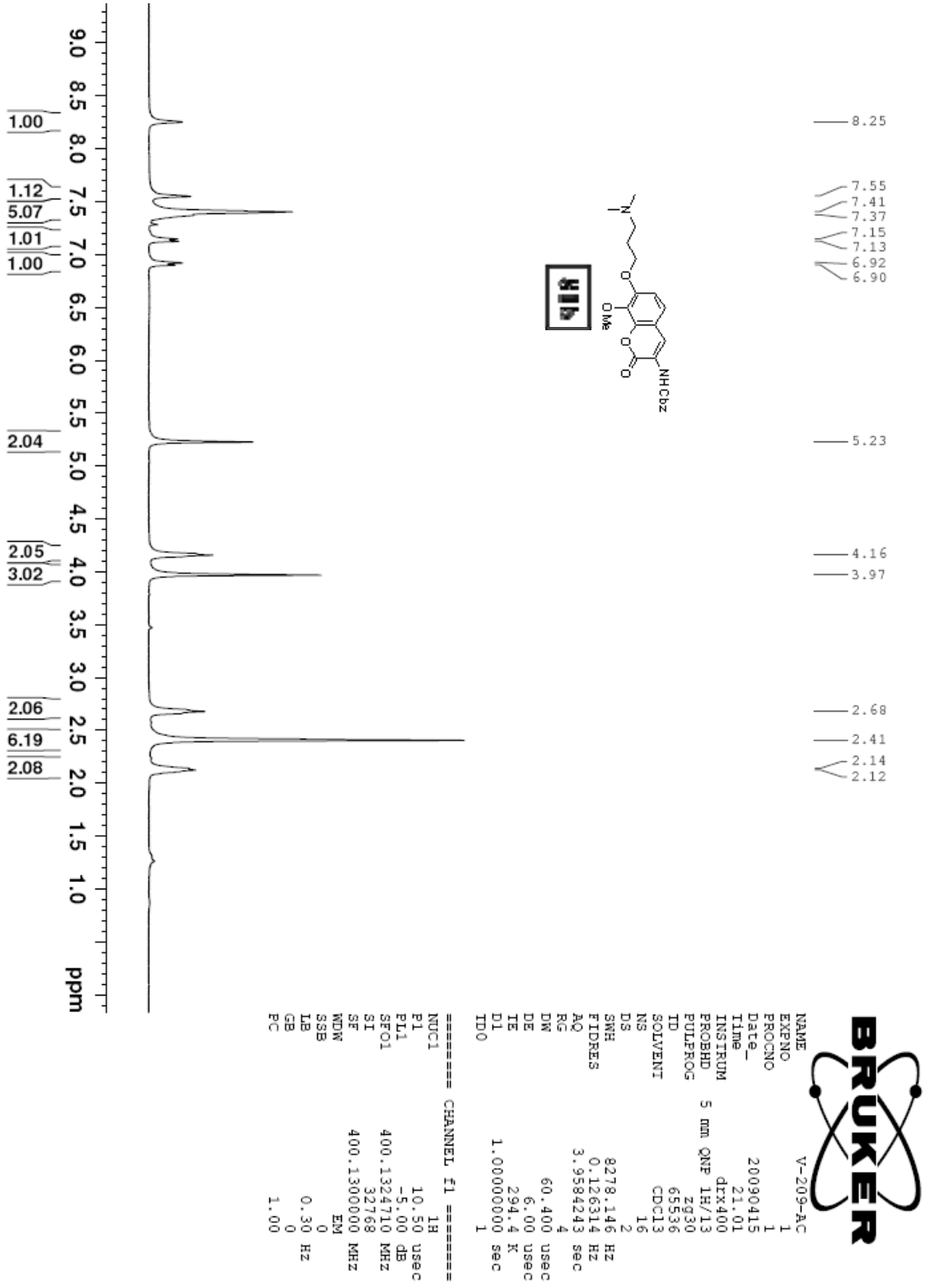

C13CPD CDCl3 /opt/topspin hzhao 39
165.34
158.83
157.93
151.53
144.25
136.28
131.85
129.24
127.67
127.44
126.92
123.90
122.76
122.28
121.91
114.57
113.99
112.69
72.70
60.87
51.69
45.06
29.85
27.91
25.53
17.69
OMe
OH
BRUKER
NAME VI-245
EXPNO 2
PROCNO 1
Date_ 20090902
Time 22.25
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7735315 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
ppm

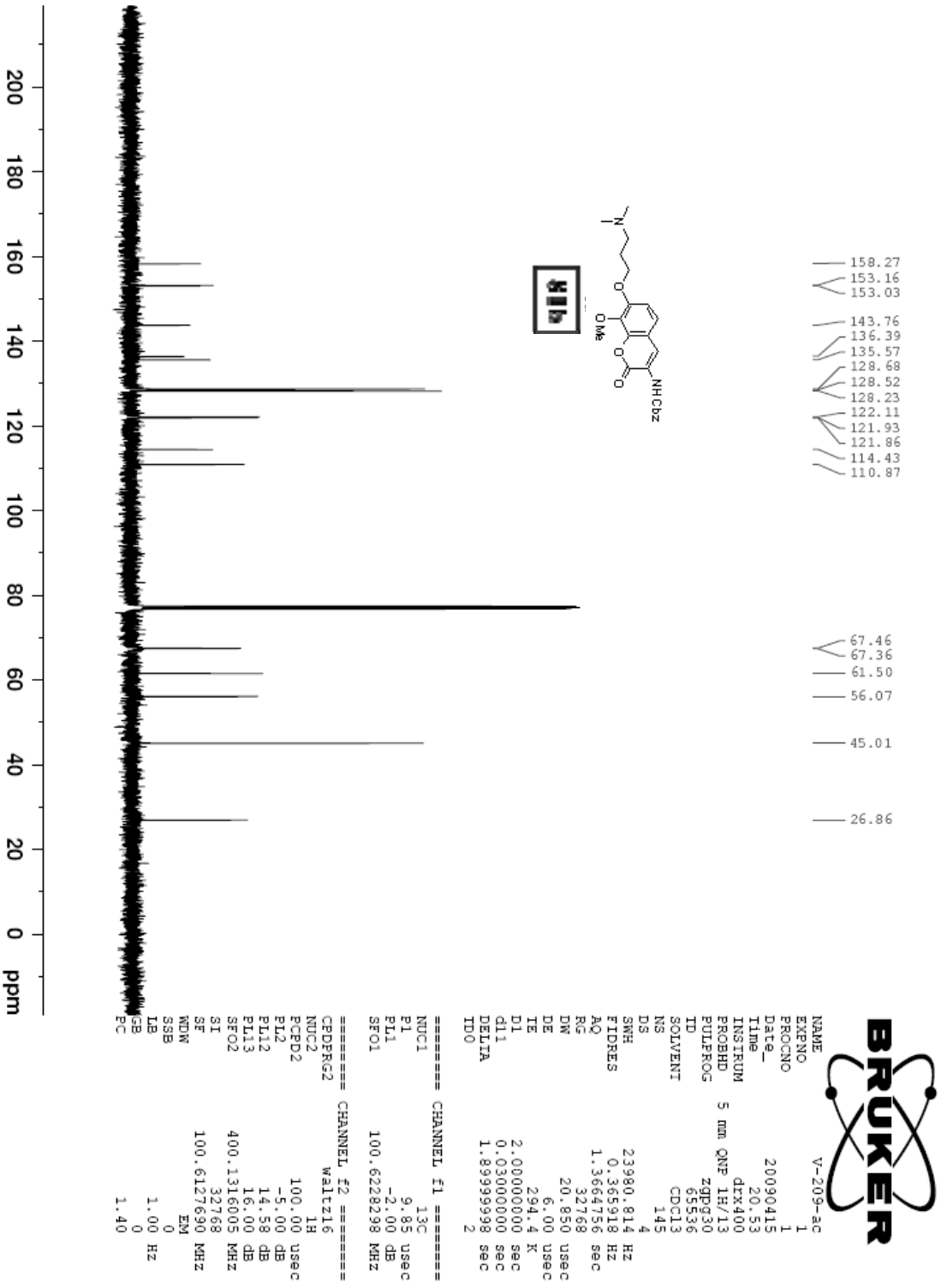

PROTON DMSO /opt/topspin hzhao 46
9.23
8.54
7.68
7.67
7.66
7.28
6.92
6.90
5.32
5.32
5.31
5.30
5.30
5.29
5.29
5.29
4.21
3.85
3.28
3.27
2.85
2.52
2.50
2.50
2.50
2.48
2.36
2.32
2.28
2.25
1.90
1.78
1.76
1.71
1.70
1.00
0.99
1.97
1.02
1.01
0.96
1.02
3.07
2.90
1.95
7.92
2.17
2.15
6.36
ppm
NAME VI-229
EXPNO 1
PROCNO 1
Date_ 20090827
Time 16.26
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900003 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

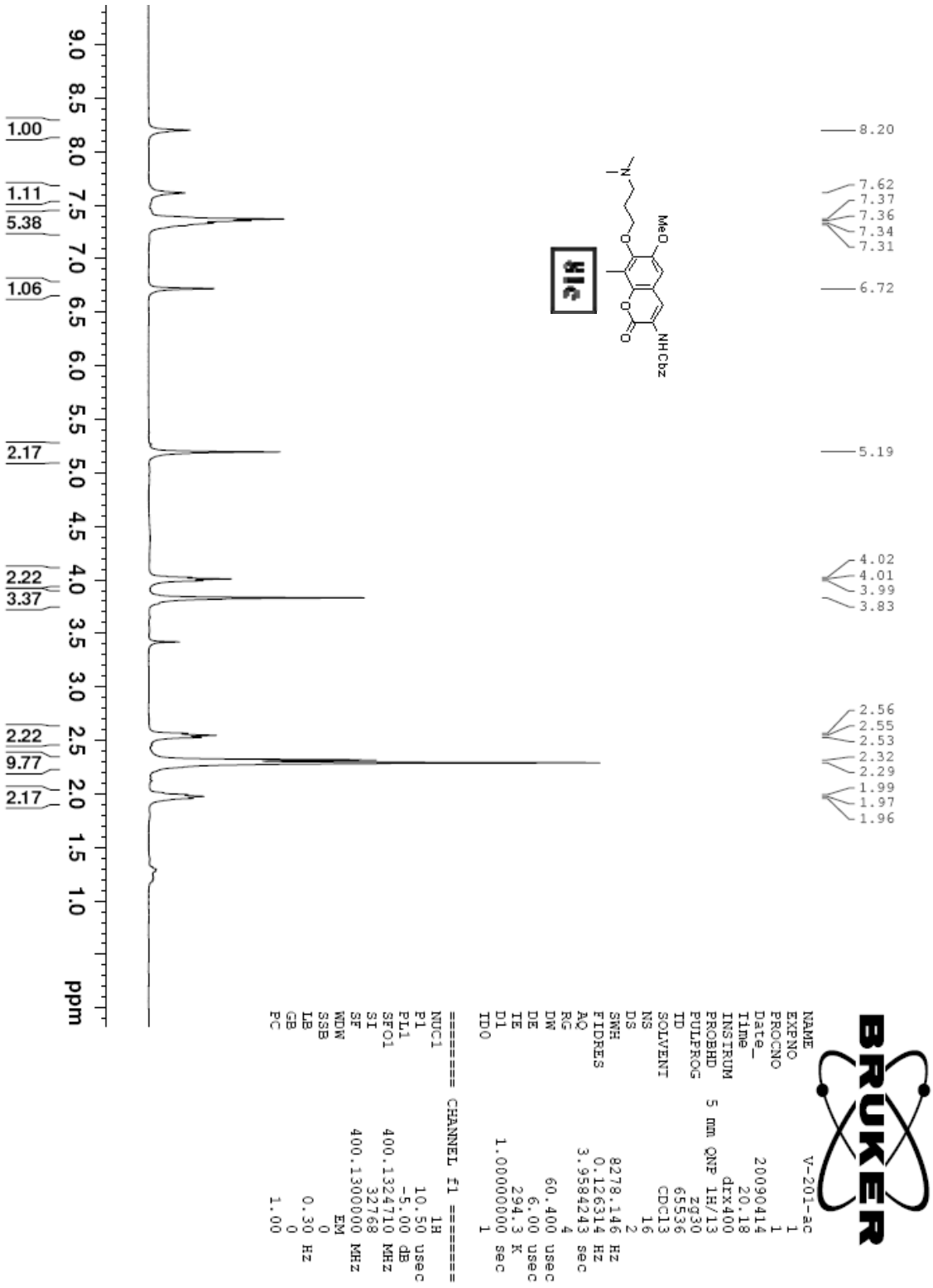

C13CPD DMSO /opt/topspin hzhao 46
165.35
158.88
158.27
149.77
146.20
143.27
131.87
129.20
127.72
126.91
126.45
123.91
122.83
122.32
119.21
114.79
114.62
107.41
77.29
56.10
52.21
44.80
30.80
27.94
25.54
17.72
9.42
MeO
OH
ppm
200
180
160
140
120
100
80
60
40
20
BRUKER
NAME VI-229
EXPNO 2
PROCNO 1
Date_ 20090827
Time 17.05
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1764
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7654528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729326 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

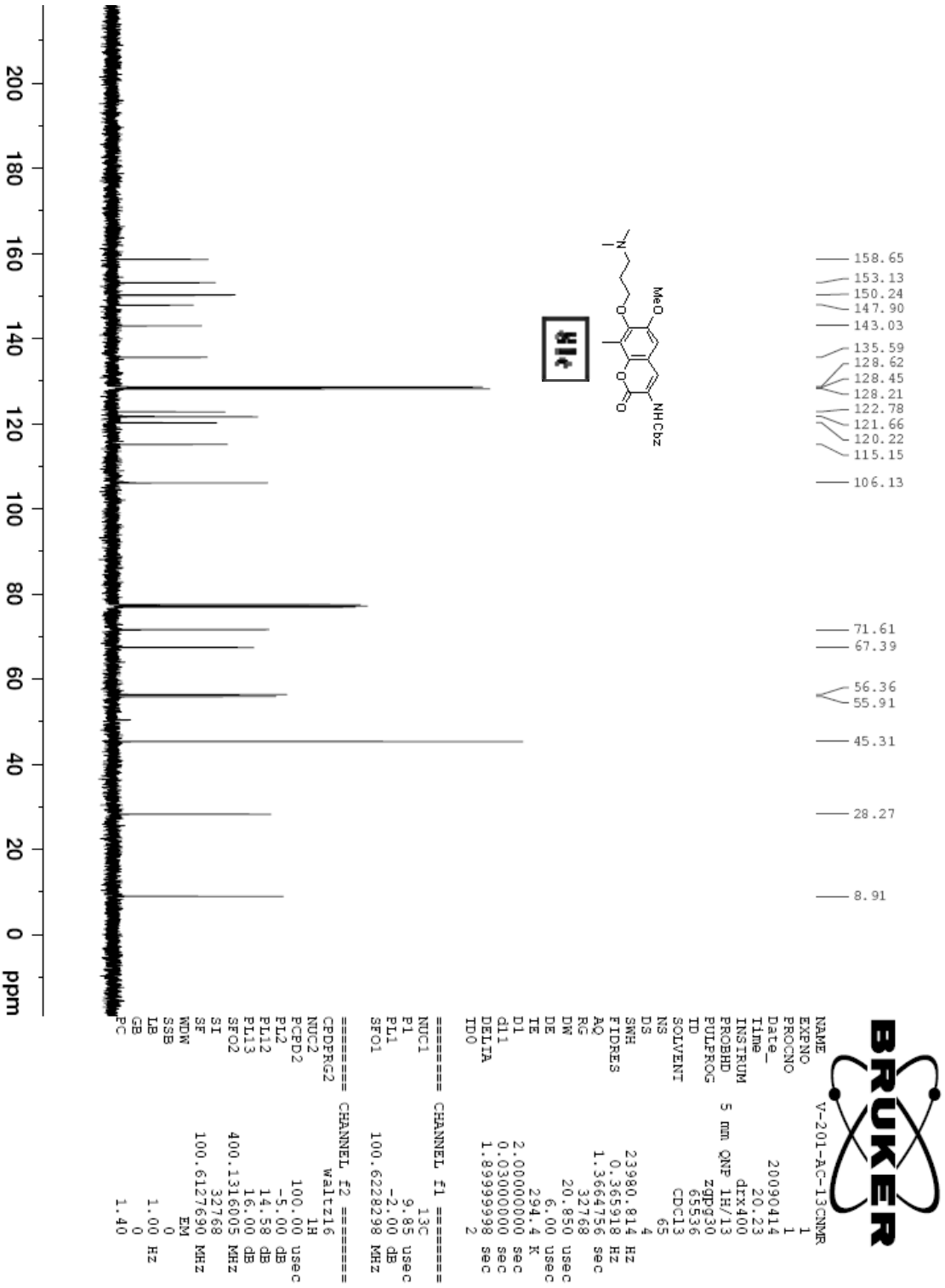

9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.23
5.19
1.06
1.00
2.15
2.10
2.20
9.75
2.22
8.11
7.45
7.29
7.27
7.25
7.23
7.12
7.10
6.71
6.69
5.10
3.98
3.97
3.95
2.47
2.46
2.44
2.22
2.17
1.95
1.93
1.92
NHCbz
BRUKER
NAME V-191
EXPNO 1
PROCNO 1
Date_ 20090408
Time 19.30
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300449 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

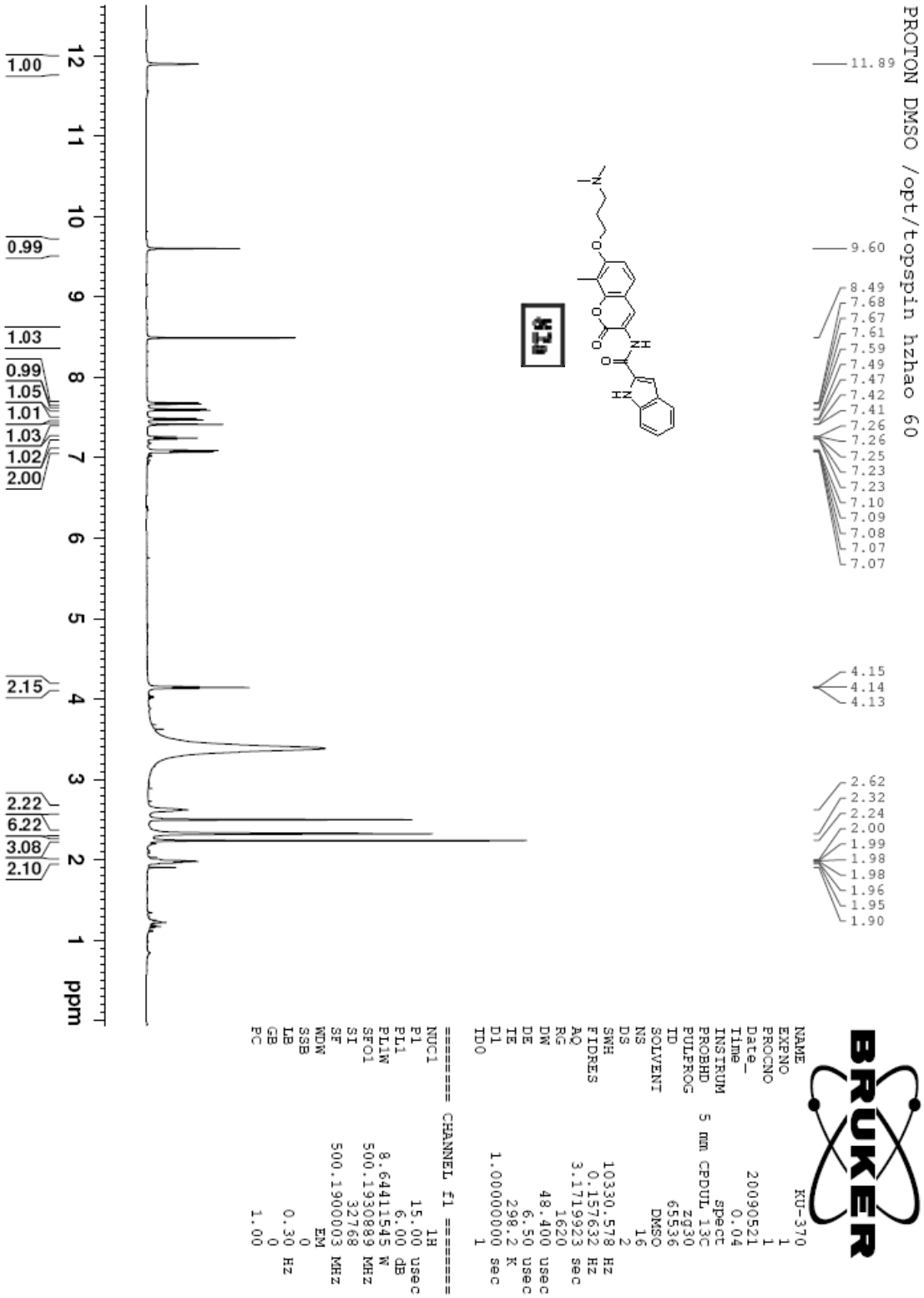

159.00
158.19
153.32
149.00
135.80
128.78
128.60
128.36
125.32
122.49
121.35
114.03
113.29
108.86
67.49
66.84
56.36
45.43
27.37
8.21
NHCbz
ppm
180
160
140
120
100
80
60
40
20
NAME V-191-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090408
Time 19.37
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 114
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1
CHANNEL f1
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
CHANNEL f2
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127562 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

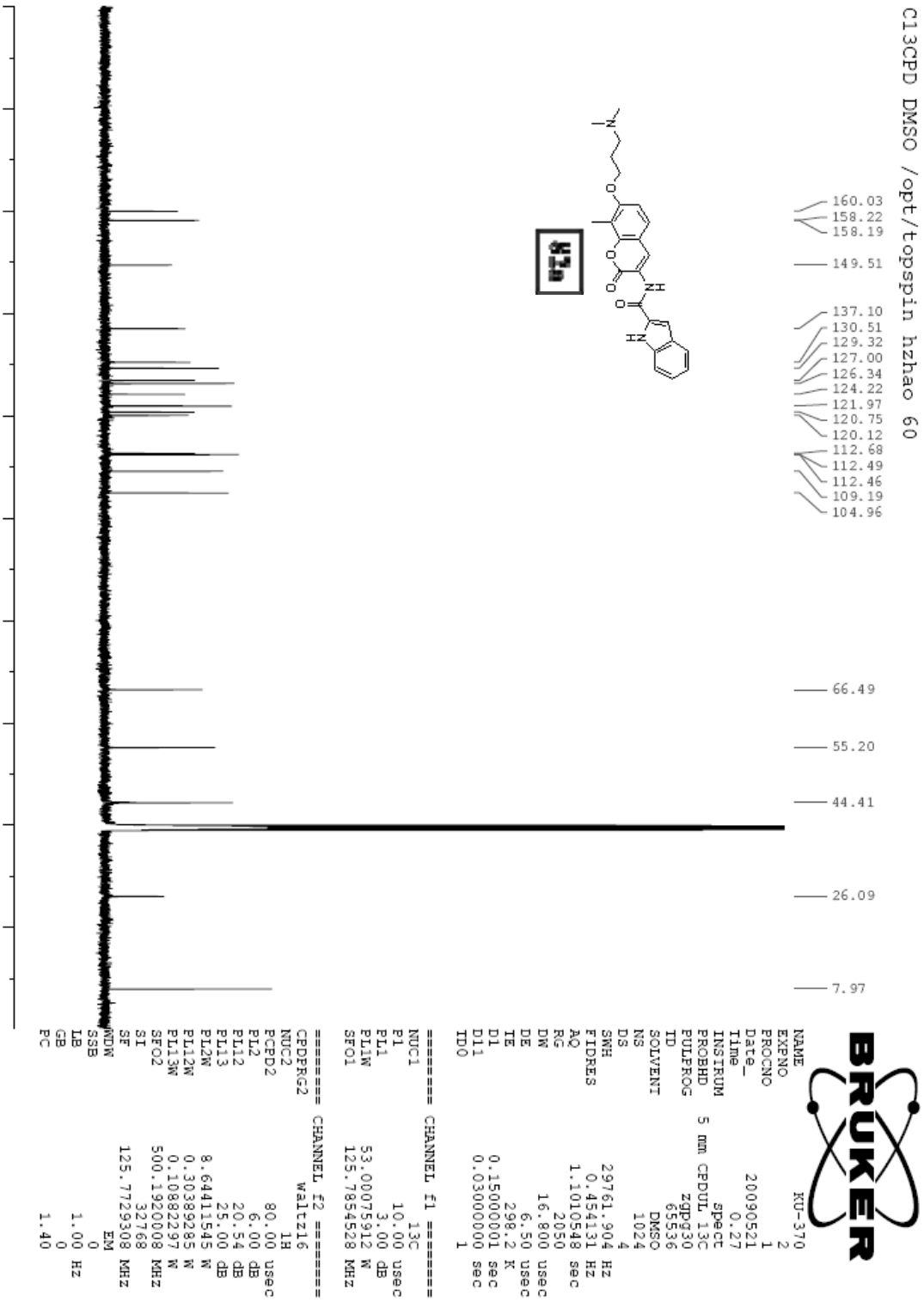

8.25
7.55
7.41
7.37
7.15
7.13
6.92
6.90
5.23
4.16
3.97
2.68
2.41
2.14
2.12
OMe
NHCbz
1.00
1.12
5.07
1.01
1.00
2.04
2.05
3.02
2.06
6.19
2.08
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
BRUKER
NAME V-209-AC
EXPNO 1
PROCNO 1
Date_ 20090415
Time 21.01
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

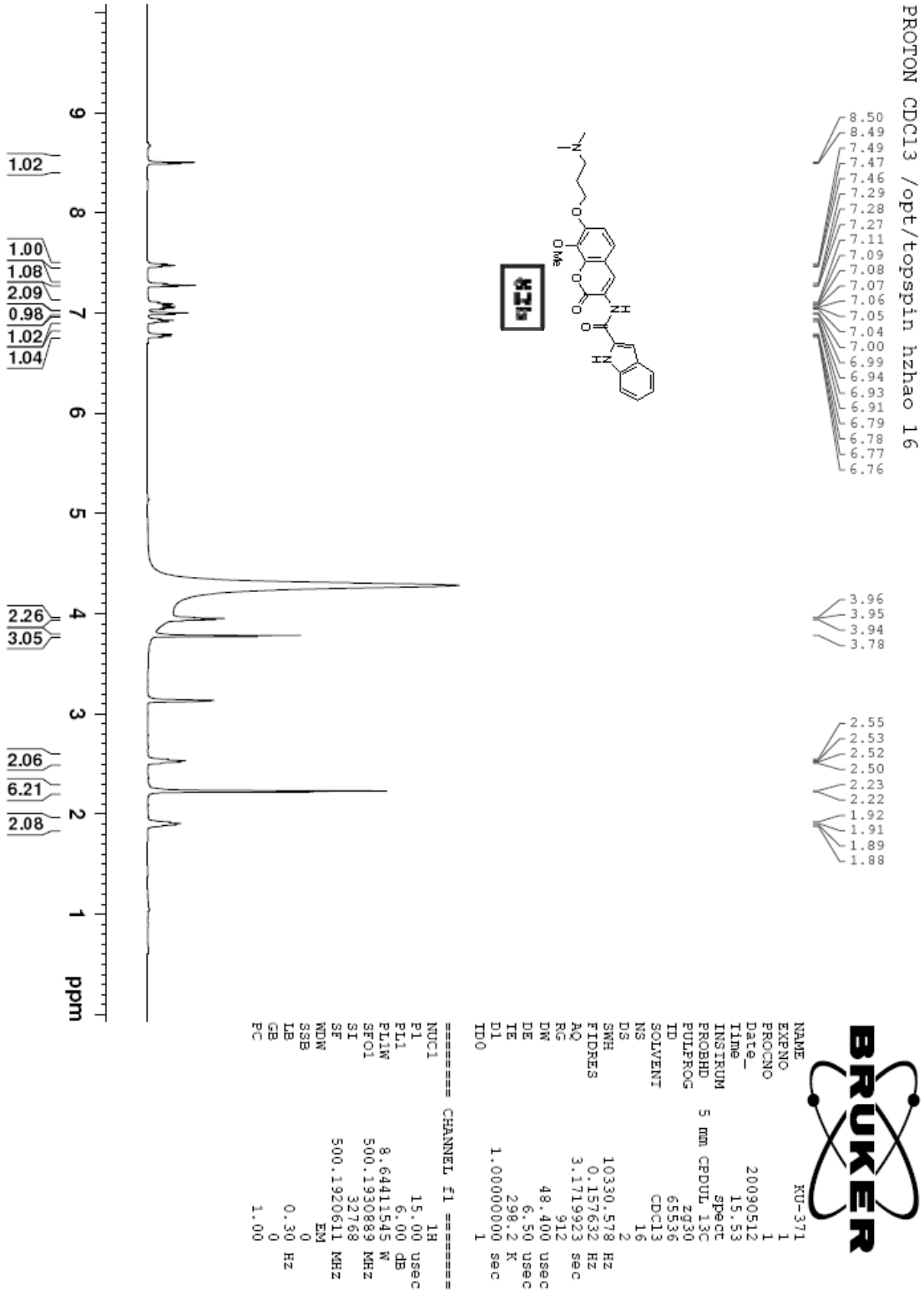

158.27
153.16
153.03
143.76
136.39
135.57
128.68
128.52
128.23
122.11
121.93
121.86
114.43
110.87
67.46
67.36
61.50
56.07
45.01
26.86
OMe
NHCbz
200
180
160
140
120
100
80
60
40
20
0
ppm

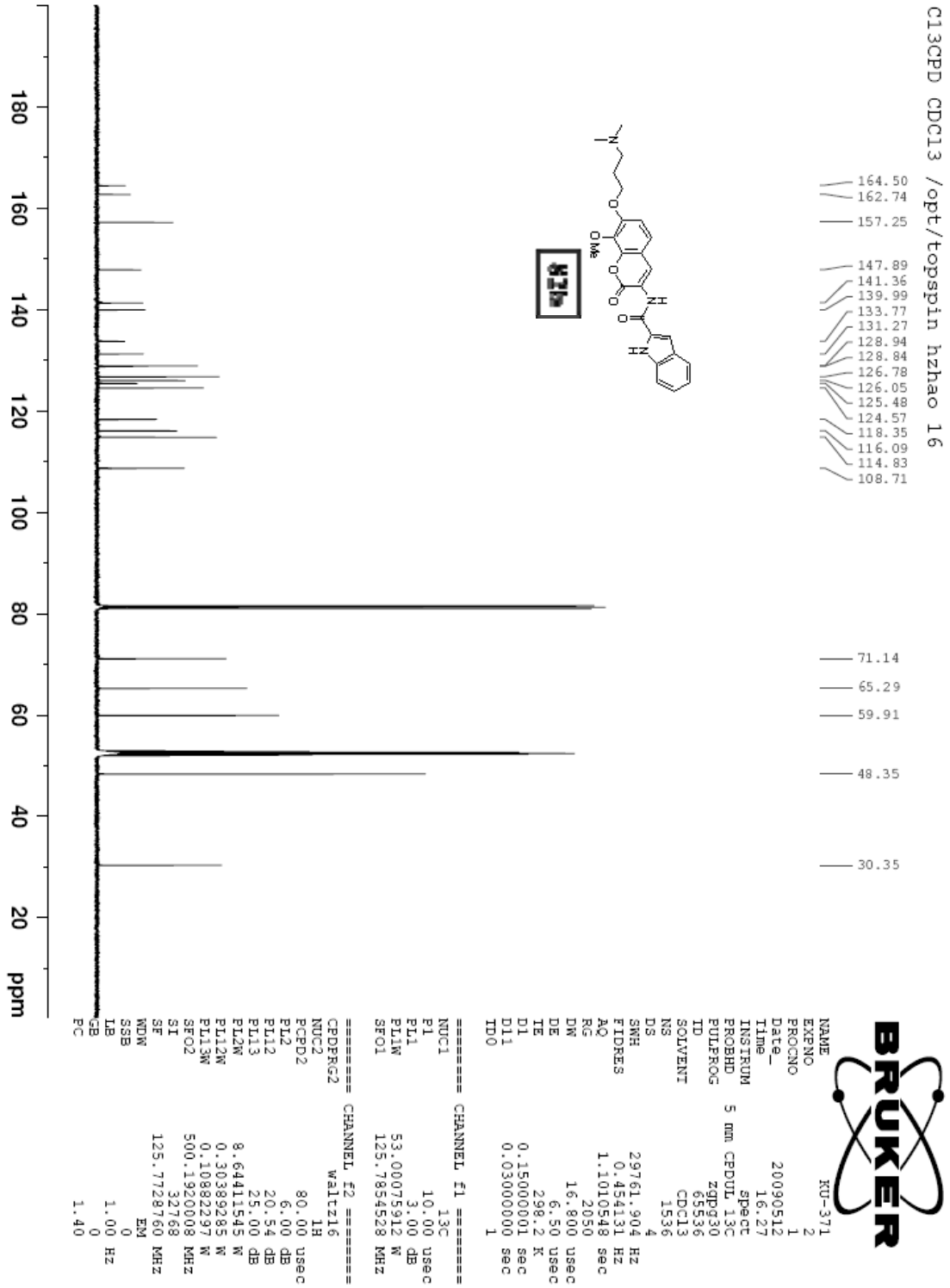

8.20
7.62
7.37
7.36
7.34
7.31
6.72
5.19
4.02
4.01
3.99
3.83
2.56
2.55
2.53
2.32
2.29
1.99
1.97
1.96
MeO
NHCbz
yle
1.00
1.11
5.38
1.06
2.17
2.22
3.37
2.22
9.77
2.17
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0
ppm
BRUKER
NAME V-201-ac
EXPNO 1
PROCNO 1
Date_ 20090414
Time_ 20.18
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 4
DW 60.400 usec
DE 6.00 usec
TE 294.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

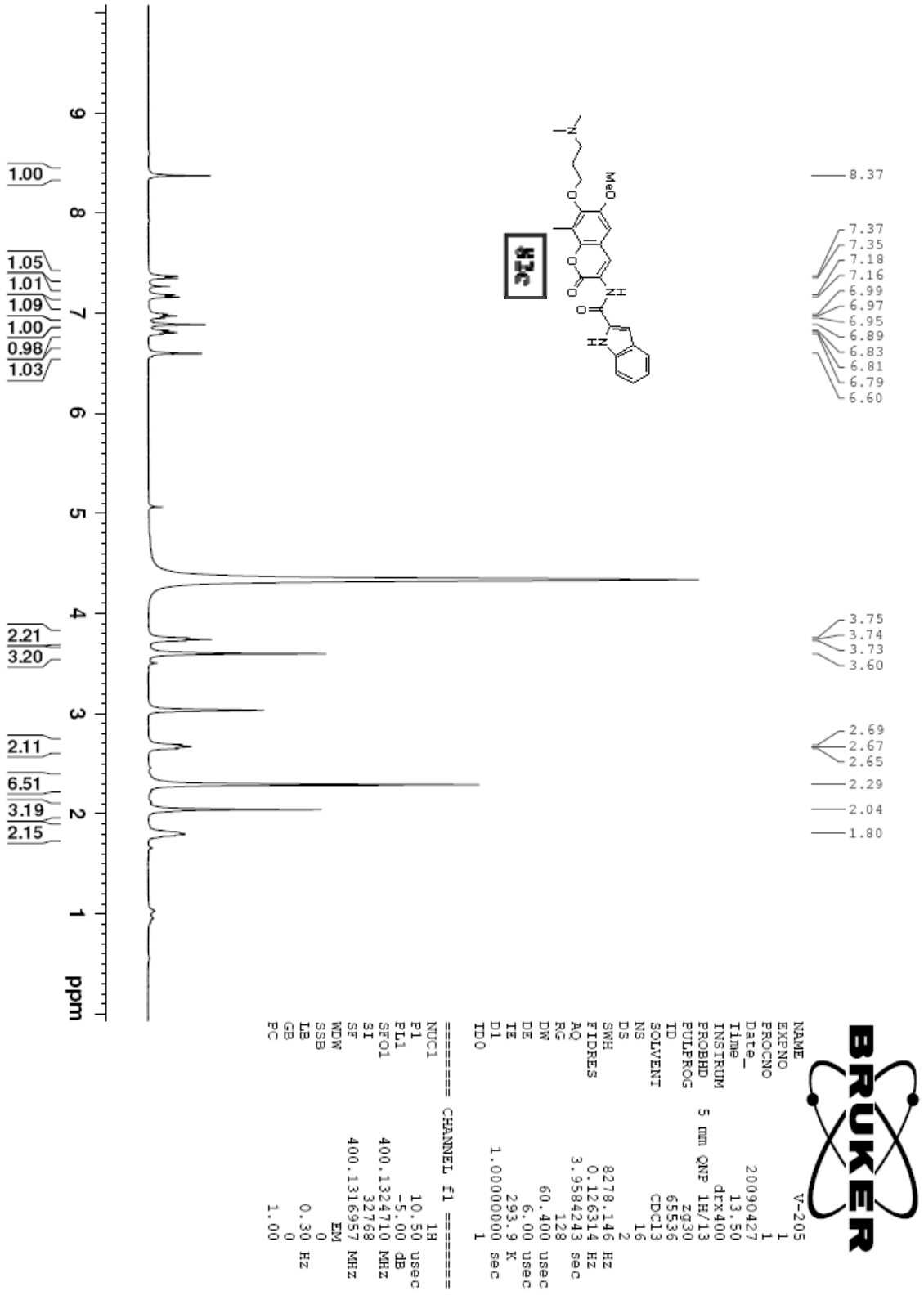

158.65
153.13
150.24
147.90
143.03
135.59
128.62
128.45
128.21
122.78
121.66
120.22
115.15
106.13
71.61
67.39
56.36
55.91
45.31
28.27
8.91
MeO
NHCbz
BRUKER
NAME V-201-AC-13CNMR
EXPNO 1
PROCNO 1
Date_ 20090414
Time 20.23
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 65
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 32768
DW 20.850 usec
DE 6.00 usec
TE 294.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 2
======== CHANNEL f1 ========
NUC1 13C
P1 9.85 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 -5.00 dB
PL12 14.58 dB
PL13 16.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200
180
160
140
120
100
80
60
40
20
0
ppm

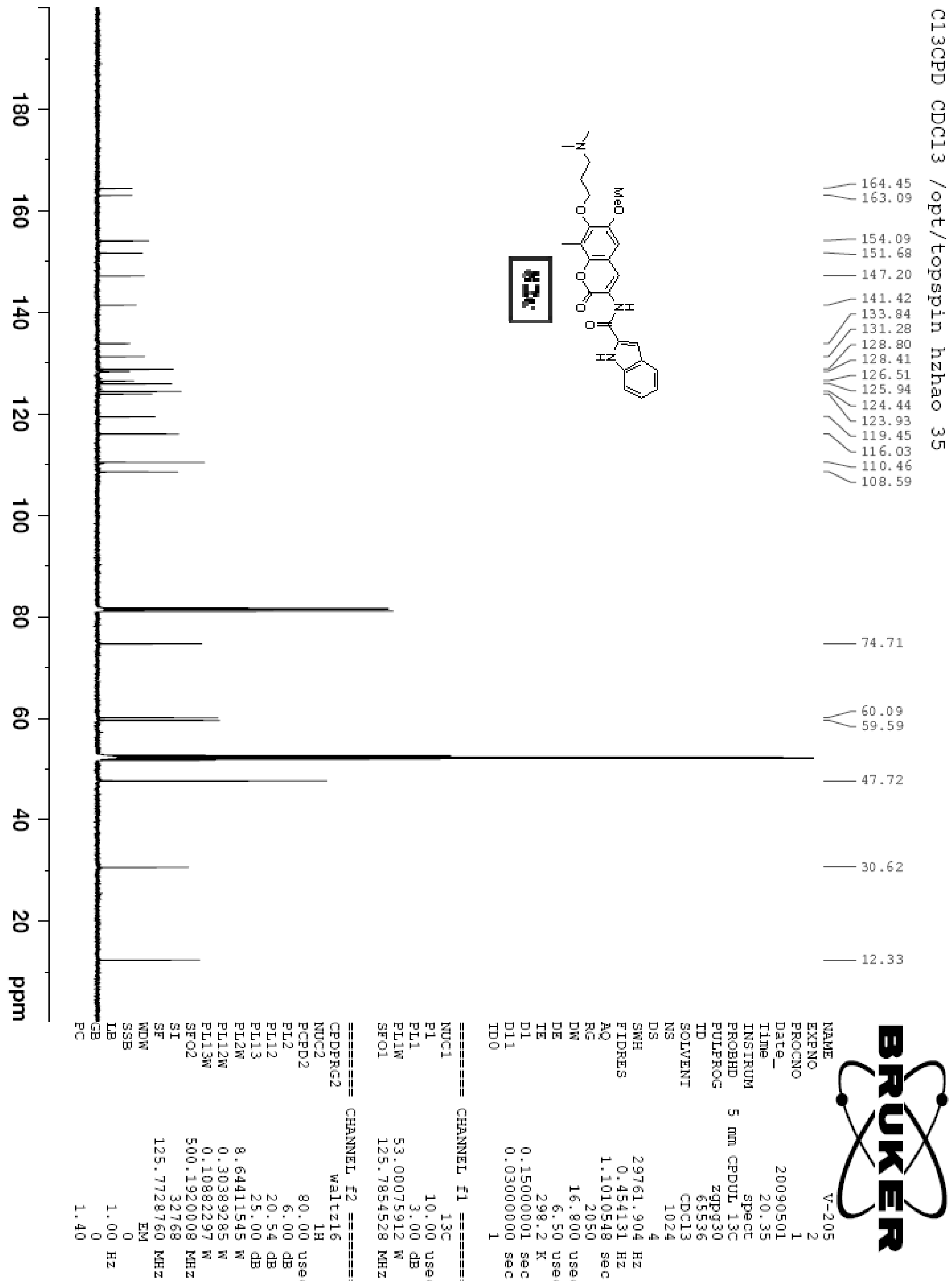

PROTON DMSO /opt/topspin hzhao 60
11.89
9.60
8.49
7.68
7.67
7.61
7.59
7.49
7.47
7.42
7.41
7.26
7.26
7.25
7.23
7.23
7.10
7.09
7.08
7.07
7.07
4.15
4.14
4.13
2.62
2.32
2.24
2.00
1.99
1.98
1.98
1.96
1.95
1.90
H20
1.00
0.99
1.03
0.99
1.05
1.01
1.03
1.02
2.00
2.15
2.22
6.22
3.08
2.10
12 11 10 9 8 7 6 5 4 3 2 1 ppm
NAME KU-370
EXPNO 1
PROCNO 1
Date_ 20090521
Time_ 0.04
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1620
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900003 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

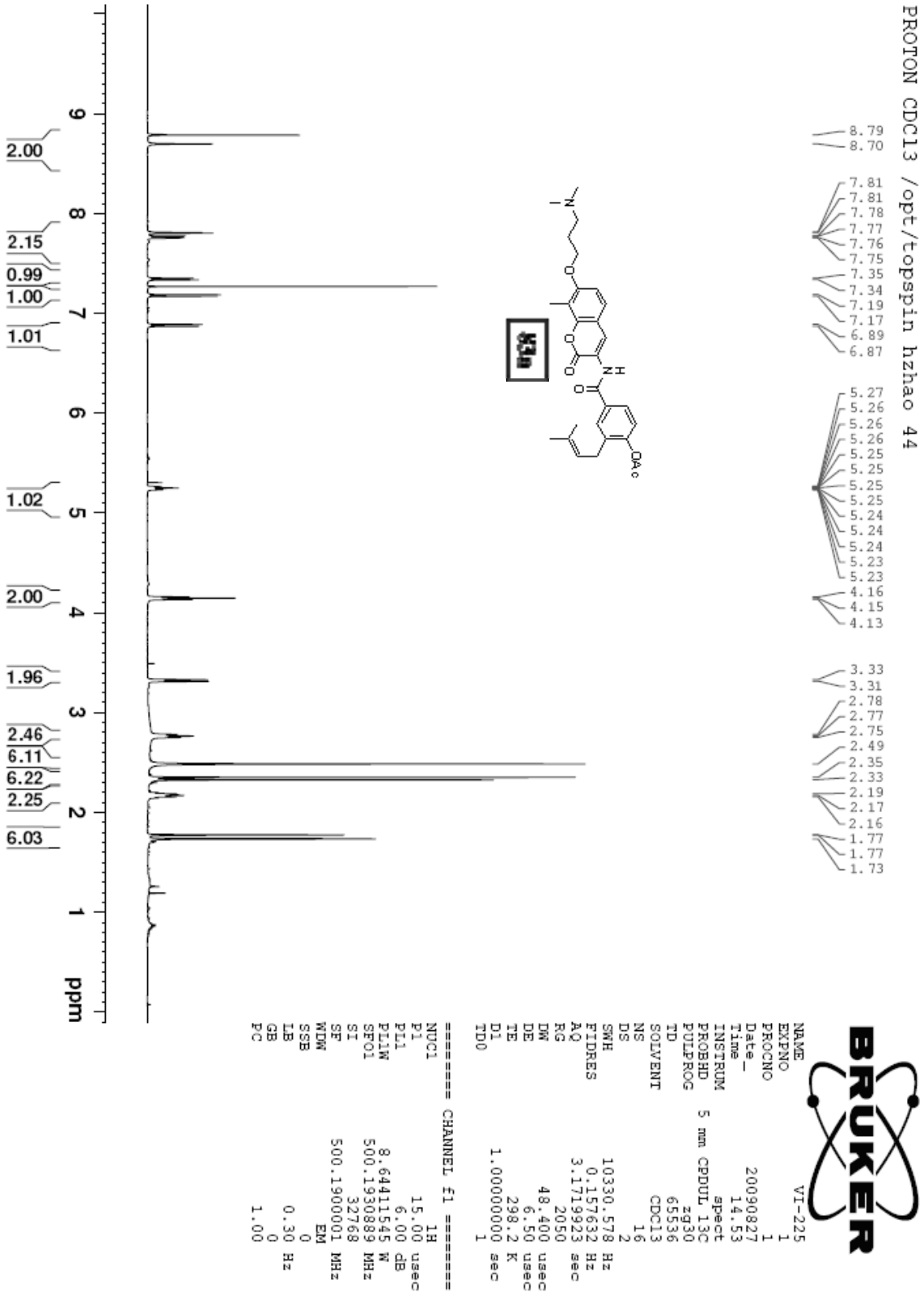

C13CPD DMSO /opt/topspin hzhao 60
160.03
158.22
158.19
149.51
137.10
130.51
129.32
127.00
126.34
124.22
121.97
120.75
120.12
112.68
112.49
112.46
109.19
104.96
66.49
55.20
44.41
26.09
7.97
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME KU-370
EXPNO 2
PROCNO 1
Date_ 20090521
Time_ 0.27
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729308 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

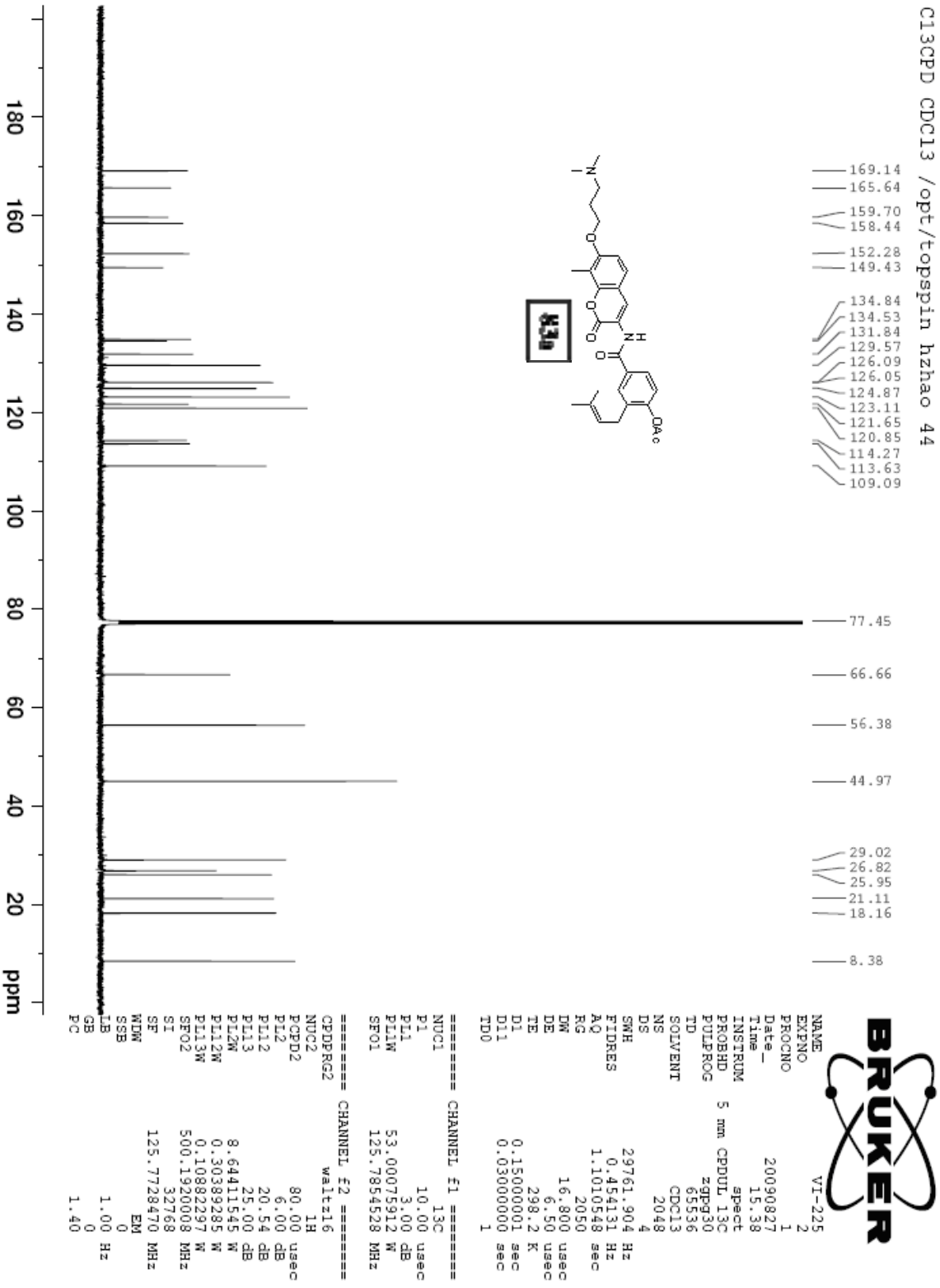

PROTON CDC13 /opt/topspin hzhao 16
8.50
8.49
7.49
7.47
7.46
7.29
7.28
7.27
7.11
7.09
7.08
7.07
7.06
7.05
7.04
7.00
6.99
6.94
6.93
6.91
6.79
6.78
6.77
6.76
3.96
3.95
3.94
3.78
2.55
2.53
2.52
2.50
2.23
2.22
1.92
1.91
1.89
1.88
OMe
HZh
1.02
1.00
1.08
2.09
0.98
1.02
1.04
2.26
3.05
2.06
6.21
2.08
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME KU-371
EXPNO 1
PROCNO 1
Date_ 20090512
Time_ 15.53
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 912
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1920611 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

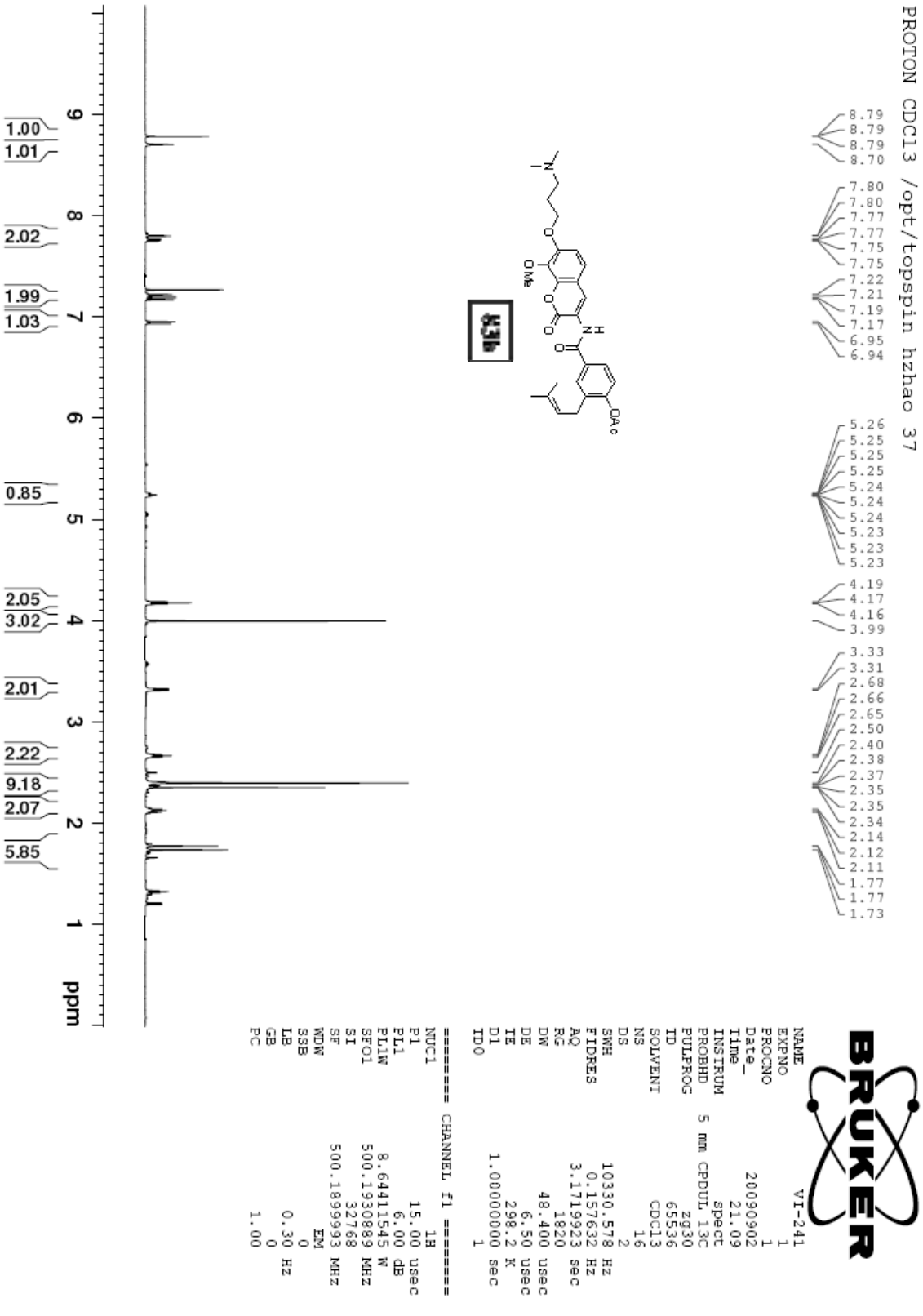

C13CPD CDC13 /opt/topspin hzhao 16
164.50
162.74
157.25
147.89
141.36
139.99
133.77
131.27
128.94
128.84
126.78
126.05
125.48
124.57
118.35
116.09
114.83
108.71
71.14
65.29
59.91
48.35
30.35
42b
OMe
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME KU-371
EXPNO 2
PROCNO 1
Date_ 20090512
Time_ 16.27
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1536
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.78545528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

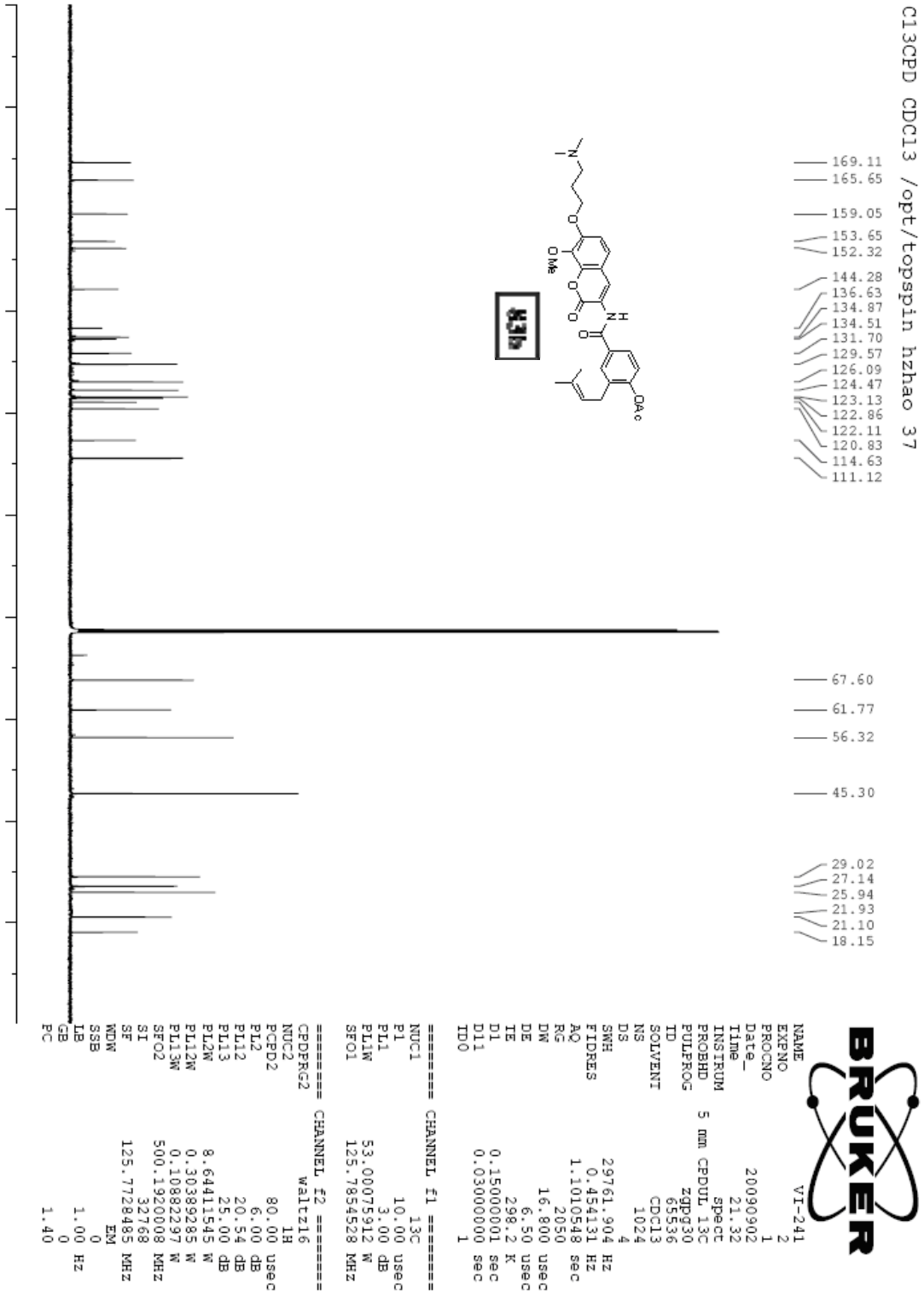

8.37
7.37
7.35
7.18
7.16
6.99
6.97
6.95
6.89
6.83
6.81
6.79
6.60
3.75
3.74
3.73
3.60
2.69
2.67
2.65
2.29
2.04
1.80
1.00
1.05
1.01
1.09
1.00
0.98
1.03
2.21
3.20
2.11
6.51
3.19
2.15
MeO
H
N
O
O
O
N
H
N
H
ppm
NAME V-205
EXPNO 1
PROCNO 1
Date_ 20090427
Time 13.50
INSTRUM drx400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 128
DW 60.400 usec
DE 6.00 usec
TE 293.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.50 usec
PL1 -5.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1316957 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

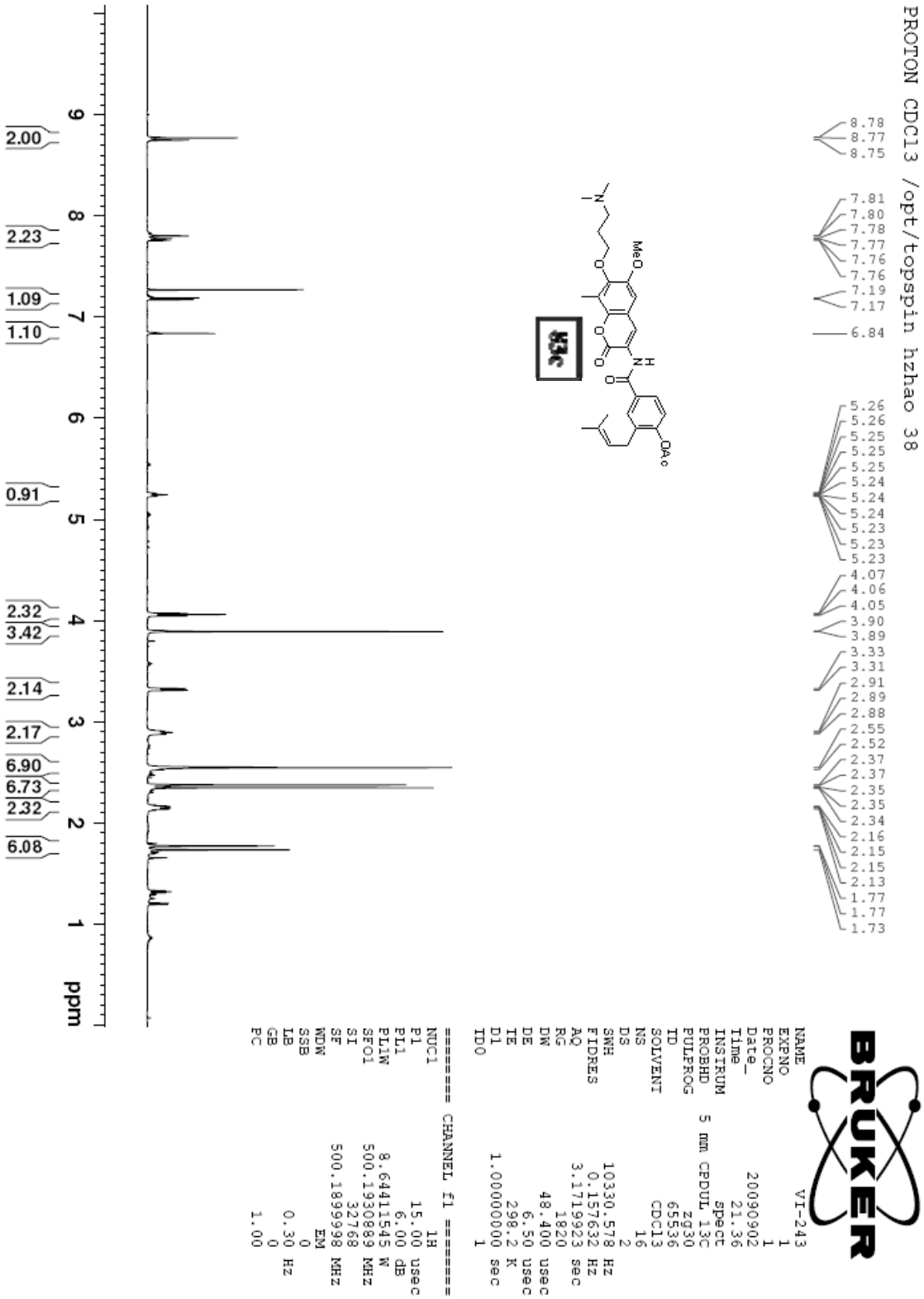

C13CPD CDCl3 /opt/topspin hzhao 35
164.45
163.09
154.09
151.68
147.20
141.42
133.84
131.28
128.80
128.41
126.51
125.94
124.44
123.93
119.45
116.03
110.46
108.59
74.71
60.09
59.59
47.72
30.62
12.33
MeO
180
160
140
120
100
80
60
40
20
ppm
BRUKER
NAME V-205
EXPNO 2
PROCNO 1
Date_ 20090501
Time 20.35
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728760 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

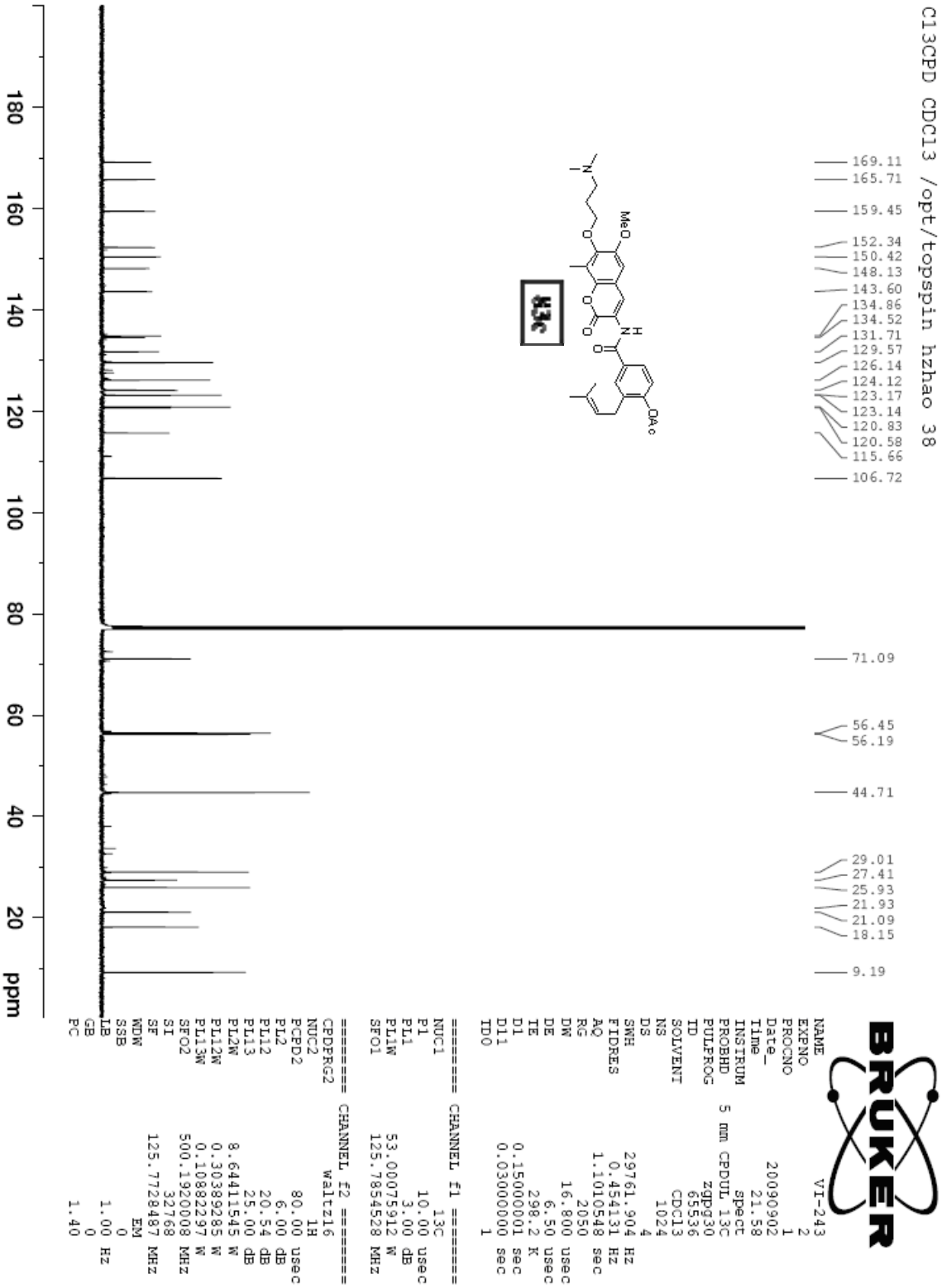

PROTON CDC13 /opt/topspin hzhao 44
8.79
8.70
7.81
7.81
7.78
7.77
7.76
7.75
7.35
7.34
7.19
7.17
6.89
6.87
5.27
5.26
5.26
5.26
5.26
5.25
5.25
5.25
5.25
5.25
5.24
5.24
5.24
5.23
5.23
4.16
4.15
4.13
3.33
3.31
2.78
2.77
2.75
2.49
2.35
2.33
2.19
2.17
2.16
1.77
1.77
1.73
OAc
2.00
2.15
0.99
1.00
1.01
1.02
2.00
1.96
2.46
6.11
6.22
2.25
6.03
9
8
7
6
5
4
3
2
1
ppm
NAME VI-225
EXPNO 1
PROCNO 1
Date_ 20090827
Time 14.53
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900001 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

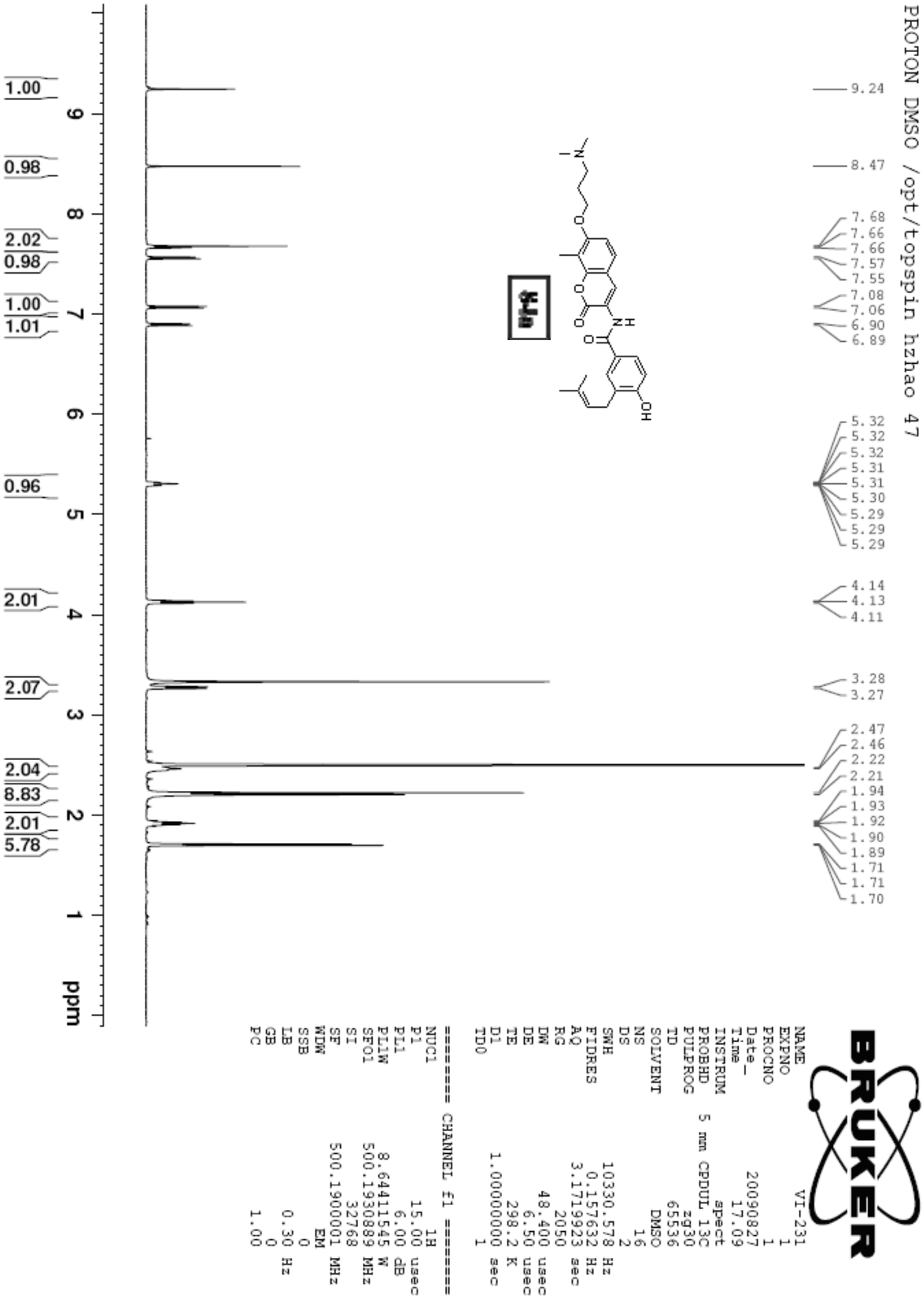

C13CPD CDC13 /opt/topspin hzhao 44
169.14
165.64
159.70
158.44
152.28
149.43
134.84
134.53
131.84
129.57
126.09
126.05
124.87
123.11
121.65
120.85
114.27
113.63
109.09
77.45
66.66
56.38
44.97
29.02
26.82
25.95
21.11
18.16
8.38
ppm
NAME VI-225
EXPNO 2
PROCNO 1
Date_ 20090827
Time 15.38
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
========== CHANNEL f2 ==========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728470 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

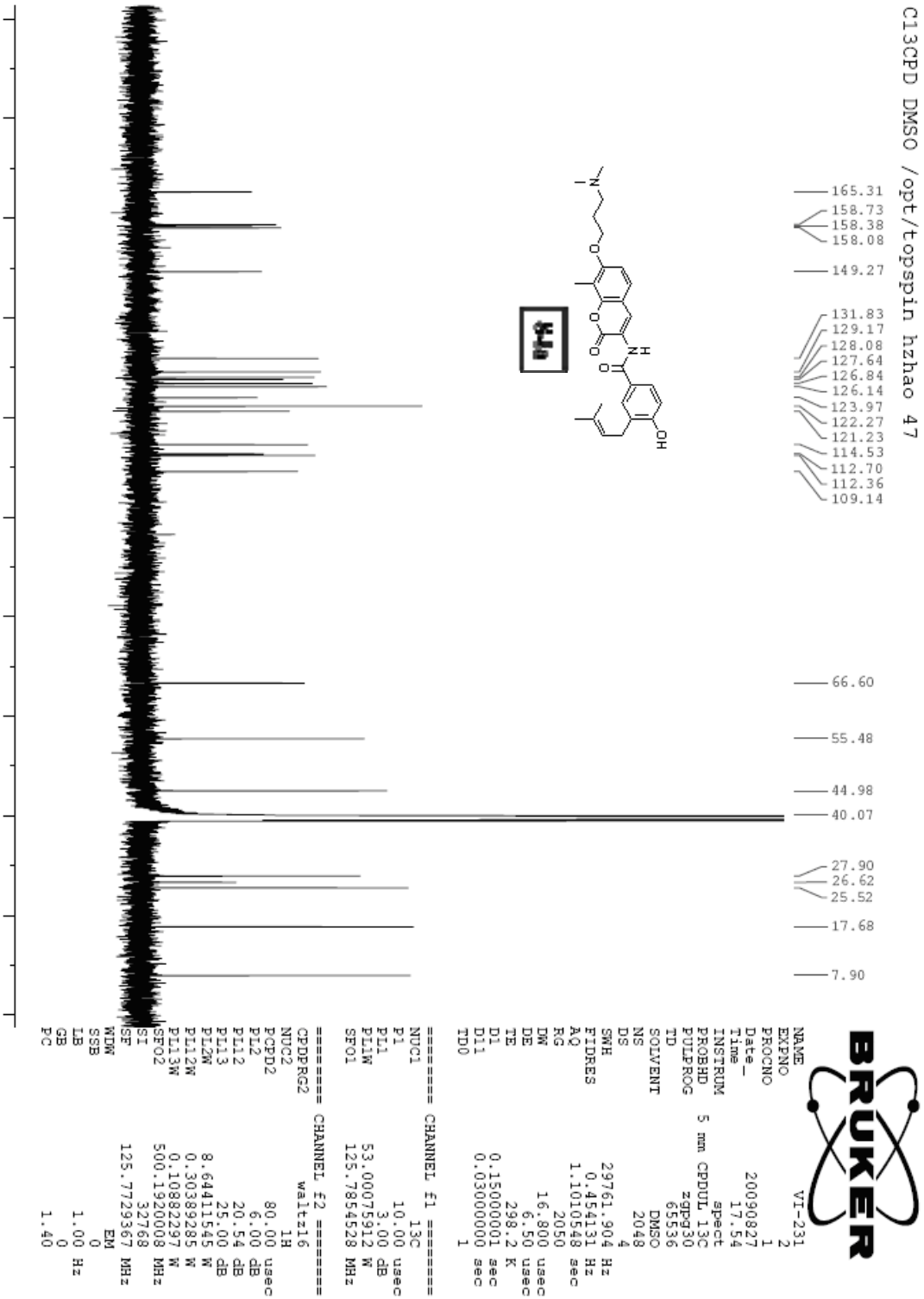

PROTON CDC13 /opt/topspin hzhao 37
8.79
8.79
8.79
8.70
7.80
7.80
7.77
7.77
7.75
7.75
7.22
7.21
7.19
7.17
6.95
6.94
5.26
5.25
5.25
5.25
5.24
5.24
5.24
5.24
5.23
5.23
5.23
4.19
4.17
4.16
3.99
3.33
3.31
2.68
2.66
2.65
2.50
2.40
2.38
2.37
2.35
2.35
2.34
2.14
2.12
2.11
1.77
1.77
1.73
OMe
OAc
H36
BRUKER
NAME VI-241
EXPNO 1
PROCNO 1
Date_ 20090902
Time 21.09
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1820
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLIW 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899993 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.00
1.01
2.02
1.99
1.03
0.85
2.05
3.02
2.01
2.22
9.18
2.07
5.85
9
8
7
6
5
4
3
2
1
ppm

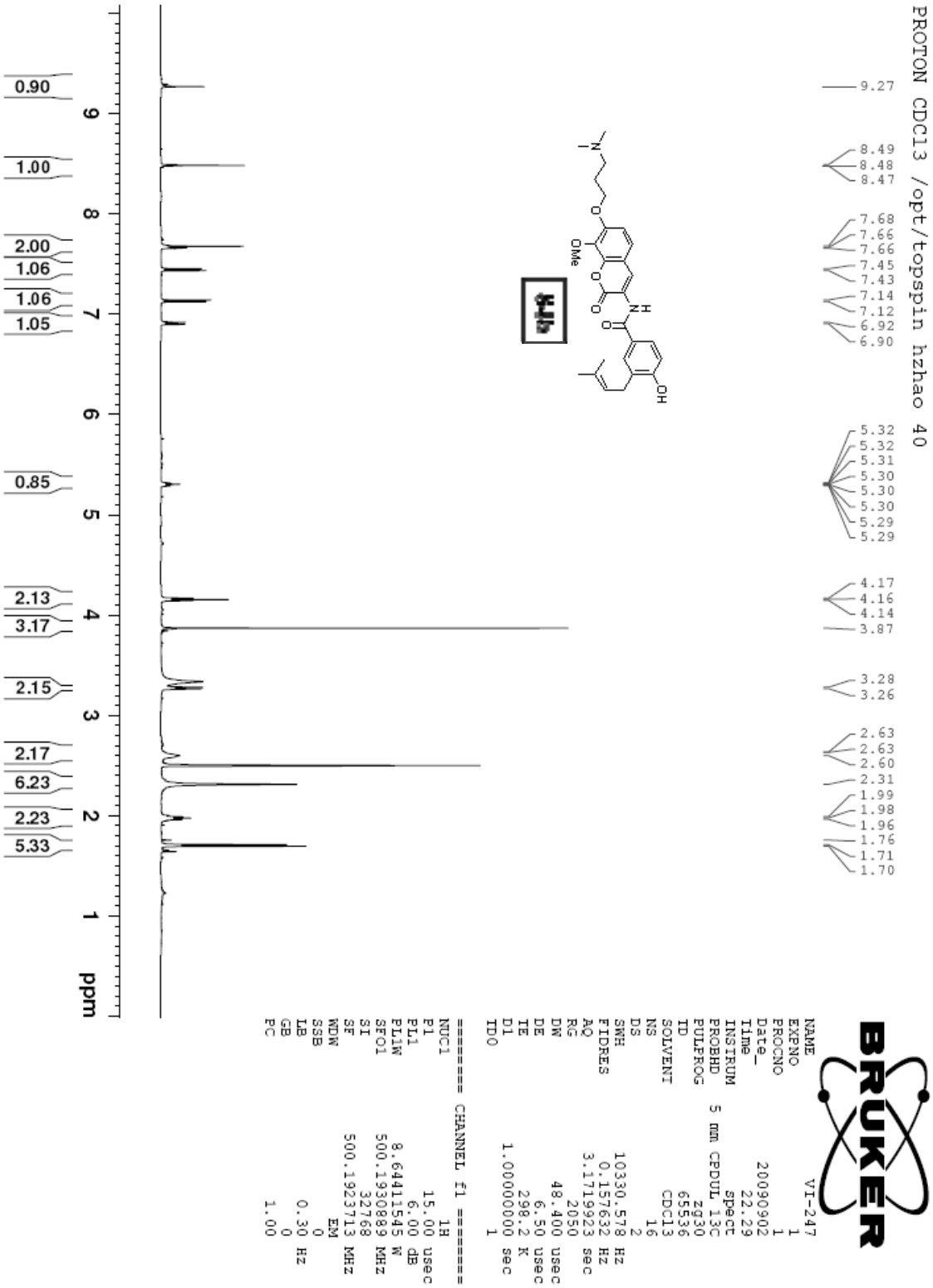

C13CPD CDCl3 /opt/topspin hzhao 37
169.11
165.65
159.05
153.65
152.32
144.28
136.63
134.87
134.51
131.70
129.57
126.09
124.47
123.13
122.86
122.11
120.83
114.63
111.12
67.60
61.77
56.32
45.30
29.02
27.14
25.94
21.93
21.10
18.15
OMe
OAc
43b
BRUKER
NAME VI-241
EXPNO 2
PROCNO 1
Date_ 20090902
Time 21.32
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
ID0 1
========== CHANNEL f1 ==========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
========== CHANNEL f2 ==========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728485 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

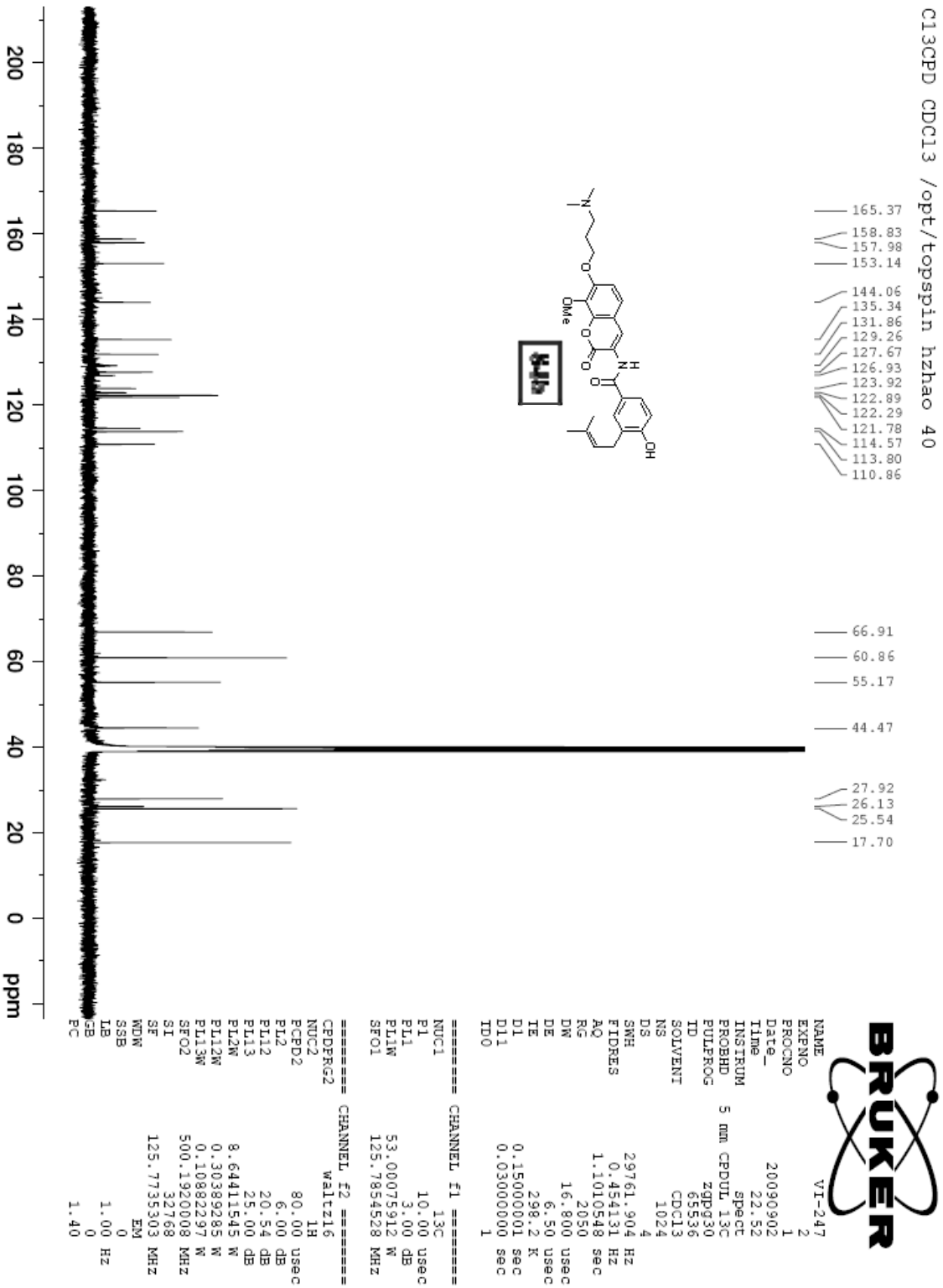

PROTON CDCl3 /opt/topspin hzhao 38
8.78
8.77
8.75
7.81
7.80
7.78
7.77
7.76
7.76
7.19
7.17
6.84
5.26
5.26
5.25
5.25
5.25
5.24
5.24
5.24
5.23
5.23
5.23
4.07
4.06
4.05
3.90
3.89
3.33
3.31
2.91
2.89
2.88
2.55
2.52
2.37
2.37
2.35
2.35
2.34
2.16
2.15
2.15
2.13
1.77
1.77
1.73
MeO
OAc
83c
NAME VI-243
EXPNO 1
PROCNO 1
Date_ 20090902
Time 21.36
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 1820
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1899998 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
2.00
2.23
1.09
1.10
0.91
2.32
3.42
2.14
2.17
6.90
6.73
2.32
6.08
9
8
7
6
5
4
3
2
1
ppm

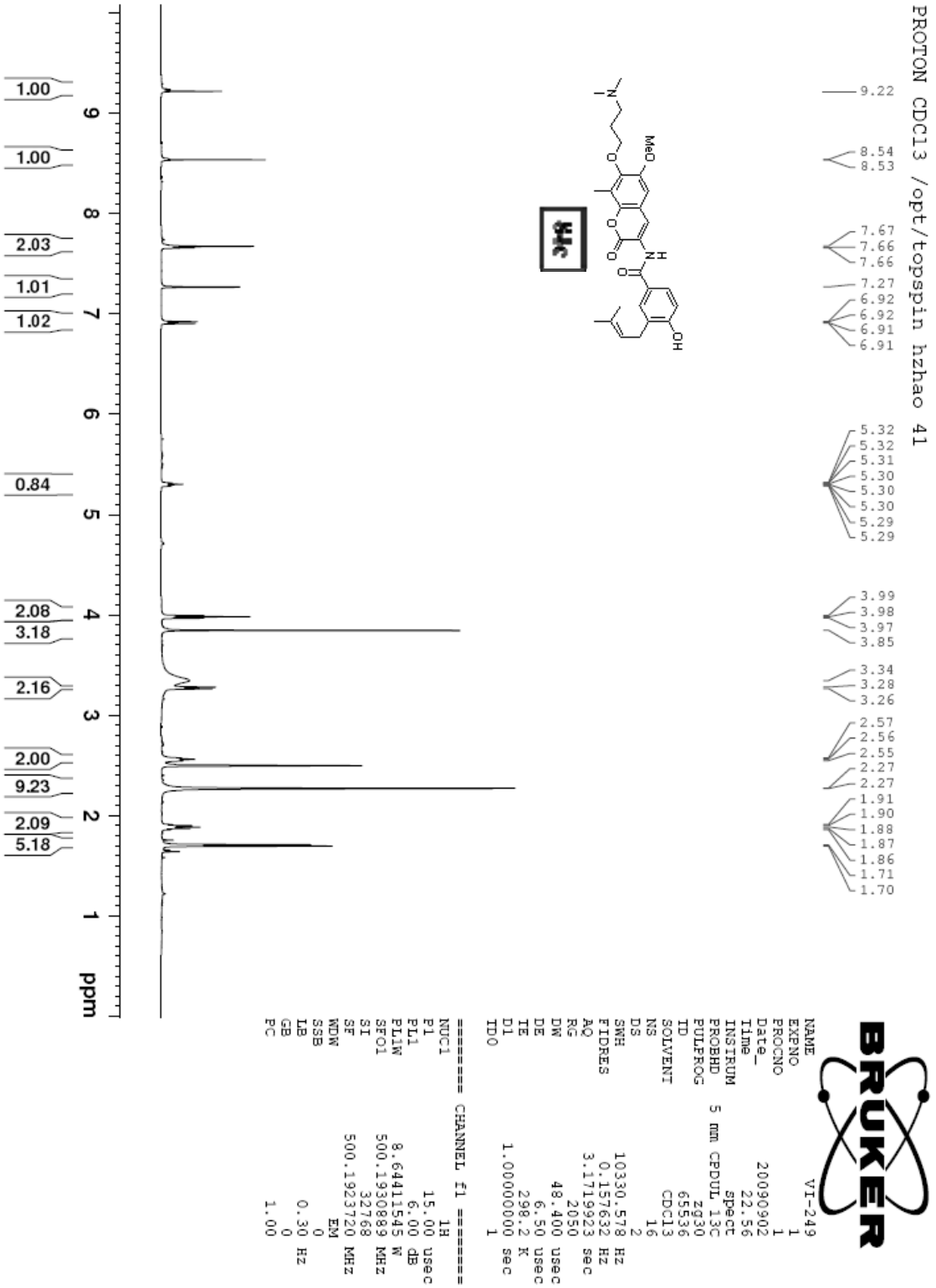

C13CPD CDC13 /opt/topspin hzhao 38
169.11
165.71
159.45
152.34
150.42
148.13
143.60
134.86
134.52
131.71
129.57
126.14
124.12
123.17
123.14
120.83
120.58
115.66
106.72
71.09
56.45
56.19
44.71
29.01
27.41
25.93
21.93
21.09
18.15
9.19
MeO
OAc
43c
ppm
180
160
140
120
100
80
60
40
20
BRUKER
VI-243
NAME
EXPNO 2
PROCNO 1
Date_ 20090902
Time_ 21.58
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7728487 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

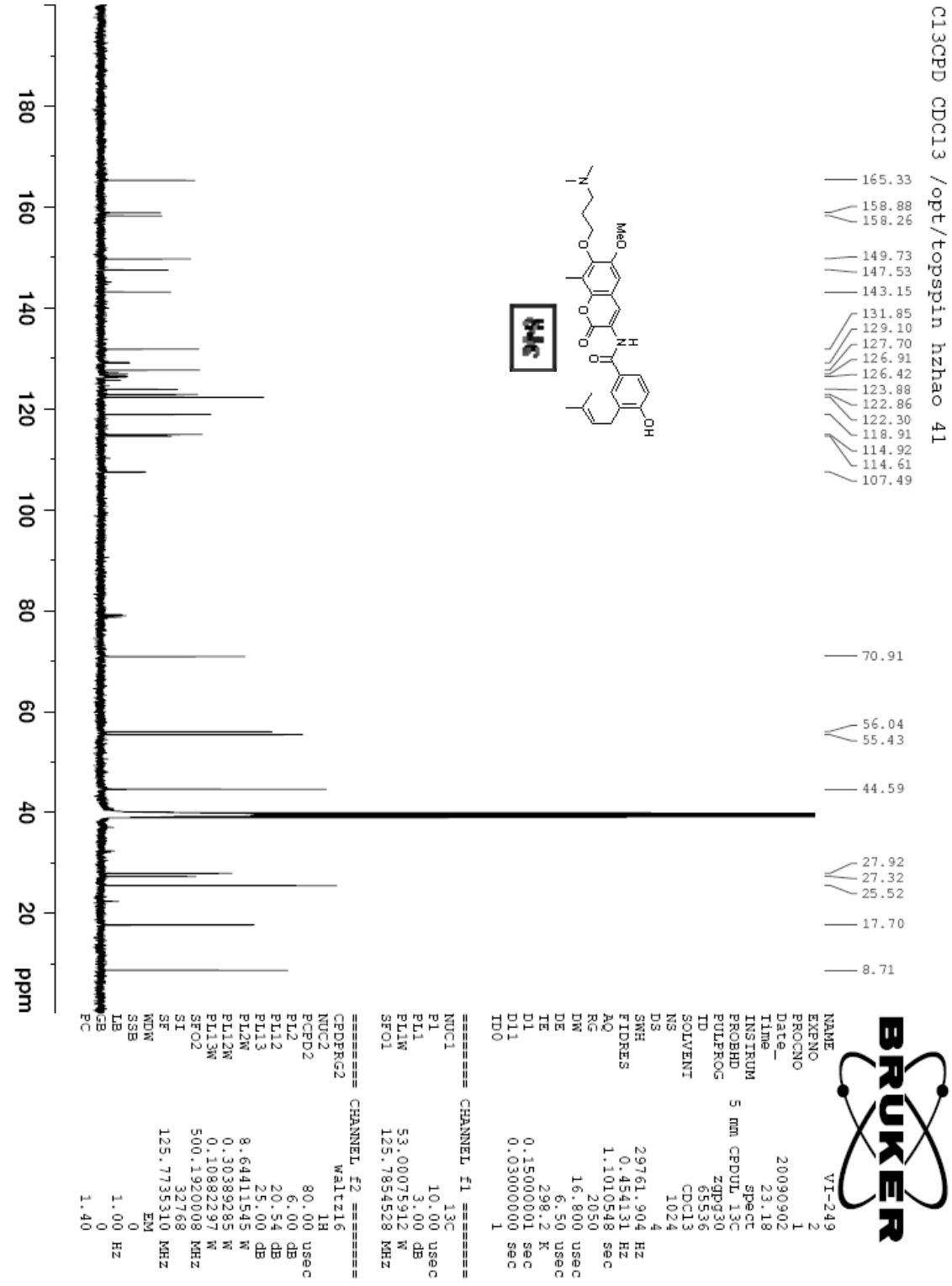

PROTON DMSO /opt/topspin hzhao 47
9.24
8.47
7.68
7.66
7.66
7.57
7.55
7.08
7.06
6.90
6.89
5.32
5.32
5.32
5.31
5.31
5.30
5.29
5.29
5.29
4.14
4.13
4.11
3.28
3.27
2.47
2.46
2.22
2.21
1.94
1.93
1.92
1.90
1.89
1.71
1.71
1.70
OH
1.00
0.98
2.02
0.98
1.00
1.01
0.96
2.01
2.07
2.04
8.83
2.01
5.78
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME VI-231
EXPNO 1
PROCNO 1
Date_ 20090827
Time 17.09
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
========== CHANNEL f1 ==========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PLW1 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1900001 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


C13CPD DMSO /opt/topspin hzhao 47
165.31
158.73
158.38
158.08
149.27
131.83
129.17
128.08
127.64
126.84
126.14
123.97
122.27
121.23
114.53
112.70
112.36
109.14
66.60
55.48
44.98
40.07
27.90
26.62
25.52
17.68
7.90
ppm
NAME VI-231
EXPNO 2
PROCNO 1
Date_ 20090827
Time 17.54
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2048
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7729367 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40


PROTON CDC13 /opt/topspin hzhao 40
9.27
8.49
8.48
8.47
7.68
7.66
7.66
7.45
7.43
7.14
7.12
6.92
6.90
5.32
5.32
5.31
5.30
5.30
5.30
5.29
5.29
4.17
4.16
4.14
3.87
3.28
3.26
2.63
2.63
2.60
2.31
1.99
1.98
1.96
1.76
1.71
1.70
OMe
OH
0.90
1.00
2.00
1.06
1.06
1.05
0.85
2.13
3.17
2.15
2.17
6.23
2.23
5.33
9
8
7
6
5
4
3
2
1
ppm
BRUKER
NAME VI-247
EXPNO 1
PROCNO 1
Date_ 20090902
Time_ 22.29
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1923713 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00


C13CPD CDC13 /opt/topspin hzhao 40
165.37
158.83
157.98
153.14
144.06
135.34
131.86
129.26
127.67
126.93
123.92
122.89
122.29
121.78
114.57
113.80
110.86
66.91
60.86
55.17
44.47
27.92
26.13
25.54
17.70
OMe
OH
BRUKER
NAME VI-247
EXPNO 2
PROCNO 1
Date_ 20090902
Time 22.52
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PL1W 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7735303 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm


PROTON CDCl3 /opt/topspin hzhao 41
9.22
8.54
8.53
7.67
7.66
7.66
7.27
6.92
6.92
6.91
6.91
5.32
5.32
5.31
5.30
5.30
5.30
5.29
5.29
3.99
3.98
3.97
3.85
3.34
3.28
3.26
2.57
2.56
2.55
2.27
2.27
1.91
1.90
1.88
1.87
1.86
1.71
1.70
MeO
OH
1.00
1.00
2.03
1.01
1.02
0.84
2.08
3.18
2.16
2.00
9.23
2.09
5.18
9
8
7
6
5
4
3
2
1
ppm
NAME VI-249
EXPNO 1
PROCNO 1
Date_ 20090902
Time 22.56
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 2050
DW 48.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 6.00 dB
PL1W 8.64411545 W
SFO1 500.1930889 MHz
SI 32768
SF 500.1923720 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

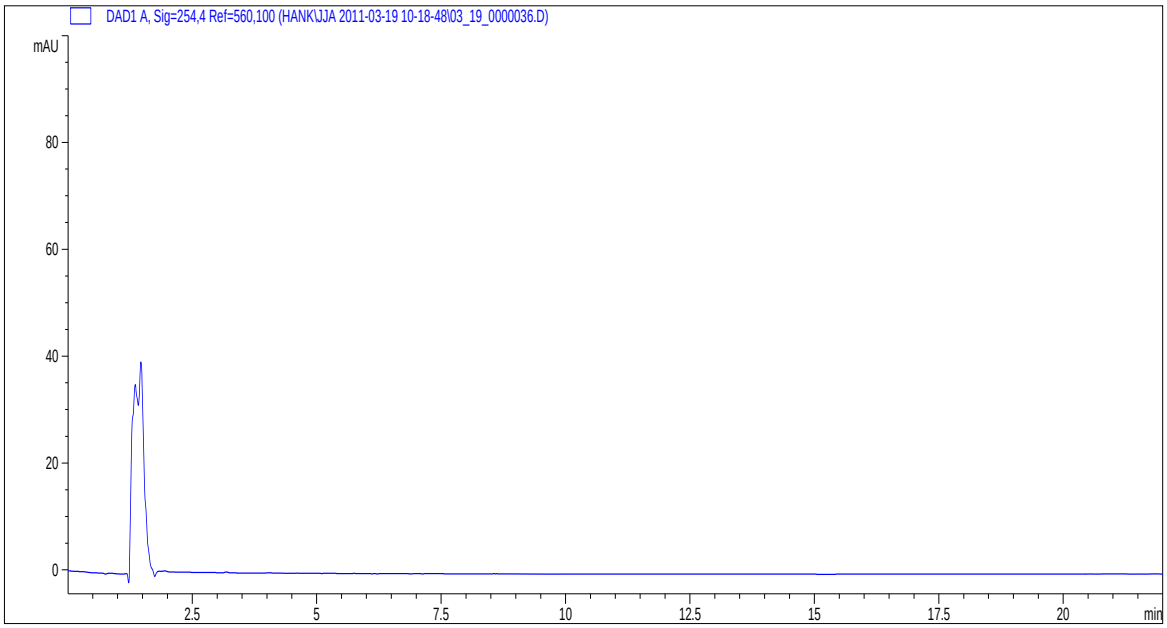

C13CPD CDCl3 /opt/topspin hzhao 41
165.33
158.88
158.26
149.73
147.53
143.15
131.85
129.10
127.70
126.91
126.42
123.88
122.86
122.30
118.91
114.92
114.61
107.49
70.91
56.04
55.43
44.59
27.92
27.32
25.52
17.70
8.71
MeO
OH
BRUKER
NAME VT-249
EXPNO 2
PROCNO 1
Date_ 20090902
Time 23.18
INSTRUM spect
PROBHD 5 mm CPDUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 298.2 K
D1 0.15000001 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
PL1 3.00 dB
PLIW 53.00075912 W
SFO1 125.7854528 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 6.00 dB
PL12 20.54 dB
PL13 25.00 dB
PL2W 8.64411545 W
PL12W 0.30389285 W
PL13W 0.10882297 W
SFO2 500.1920008 MHz
SI 32768
SF 125.7735310 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
180
160
140
120
100
80
60
40
20
ppm

Analytical reverse HPLC

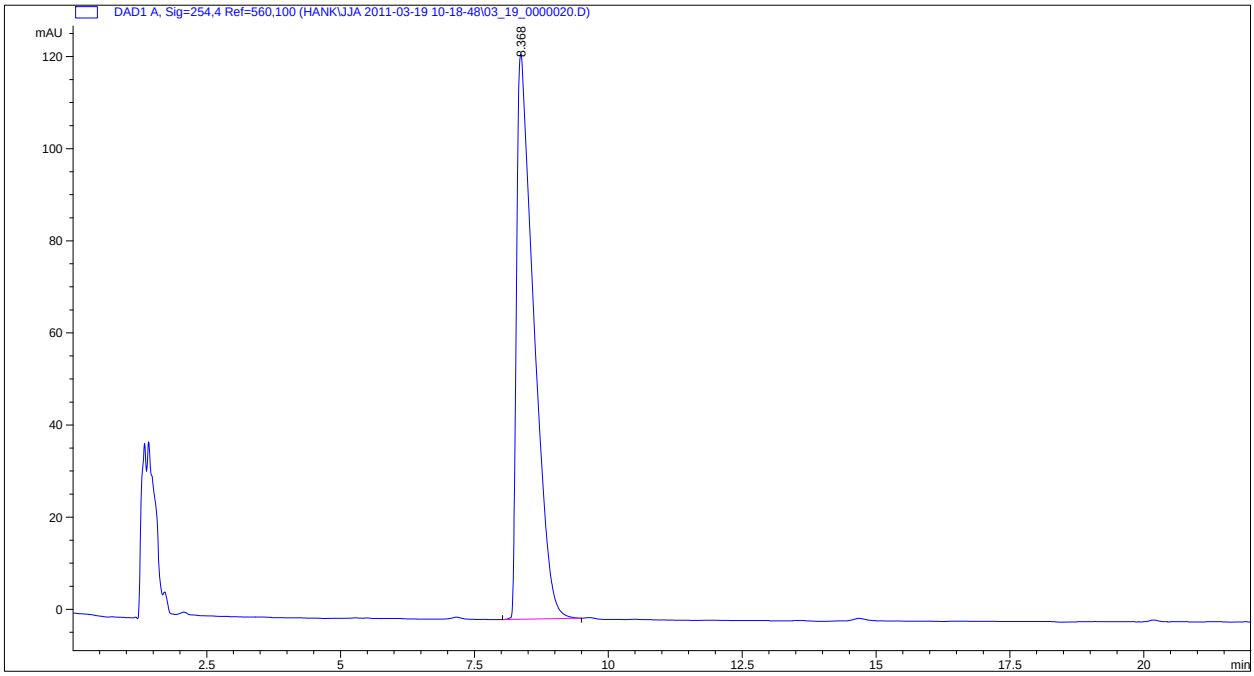
Instrument: Agilent 1260
Detector: Diode array detection
Wavelength: 254 nm
Column: ZORBAX Eclipse Plus (150 mm X 4.6 mm, 5μm)
Tempeture: 27 ^{o}C

Solvent system: **A**: H2O (0.2% H_3PO_4) **B**: acetonitrile
Flow rate: 1.0 mL/min

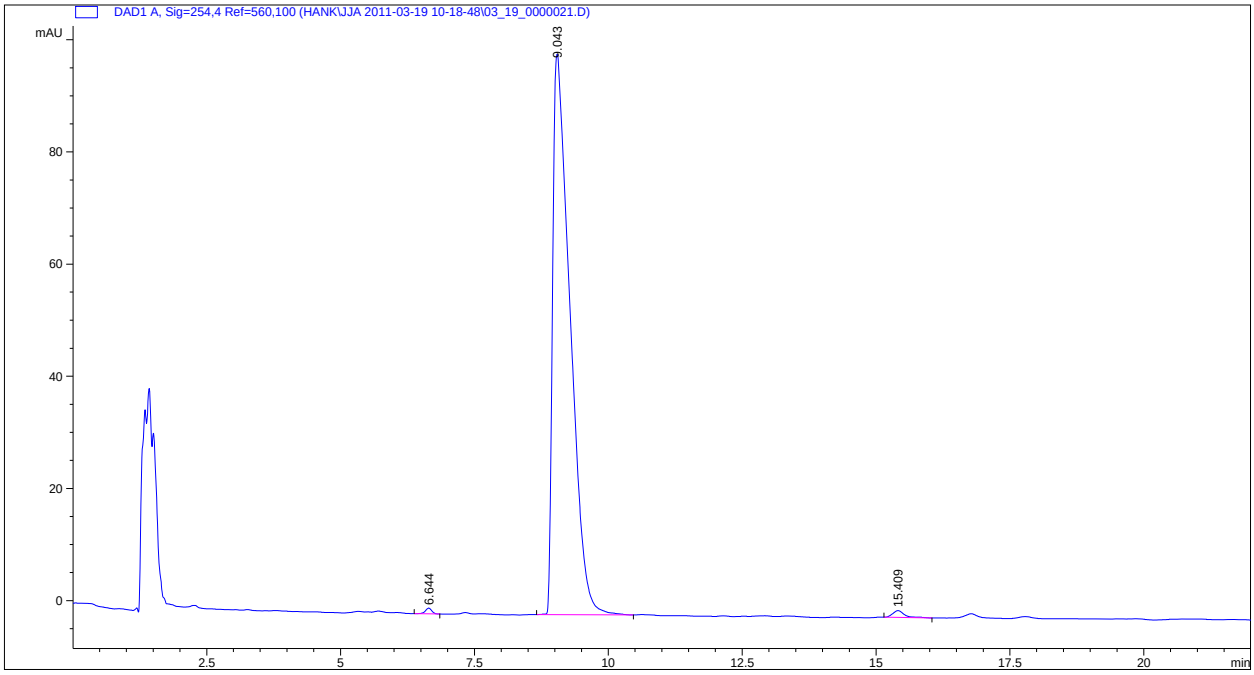
	A	**B**
0 min	70%	30%
18min	52%	48%
19min	95%	5%
22min	95%	5%
23min	70%	30%



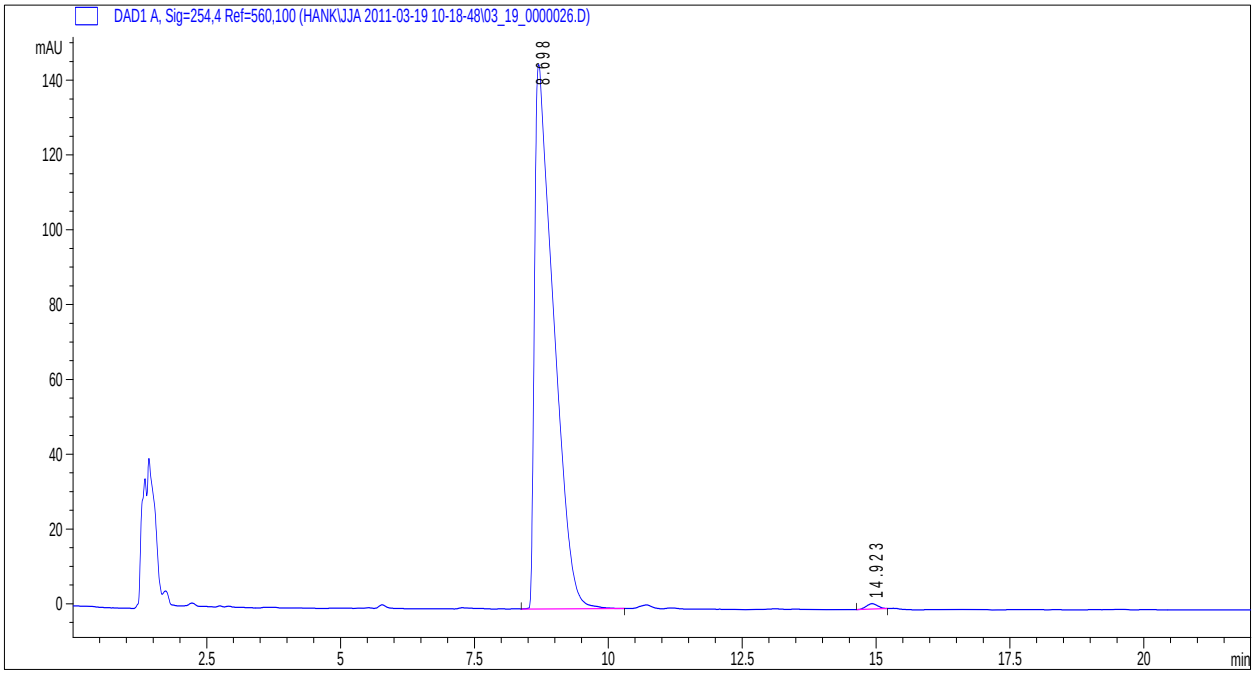
Analytical reverse-phase HPLC profile of Dimethylsulfoxide (DMSO) as background (used as solvent to dissolve the novobiocin analogues)



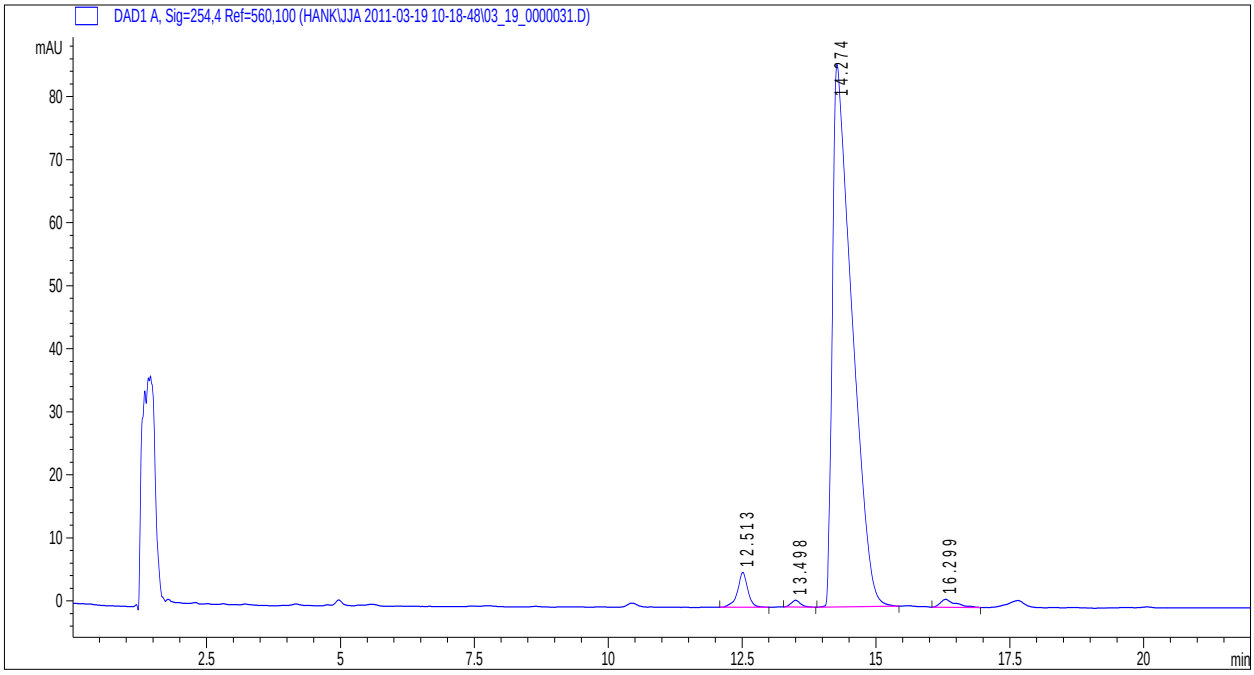
Analytical reverse-phase HPLC profile of compound **78a** prior to bioassay. Retention time = 8.37 min. Purity = 100%. Absorbance wavelength = 254 nm.



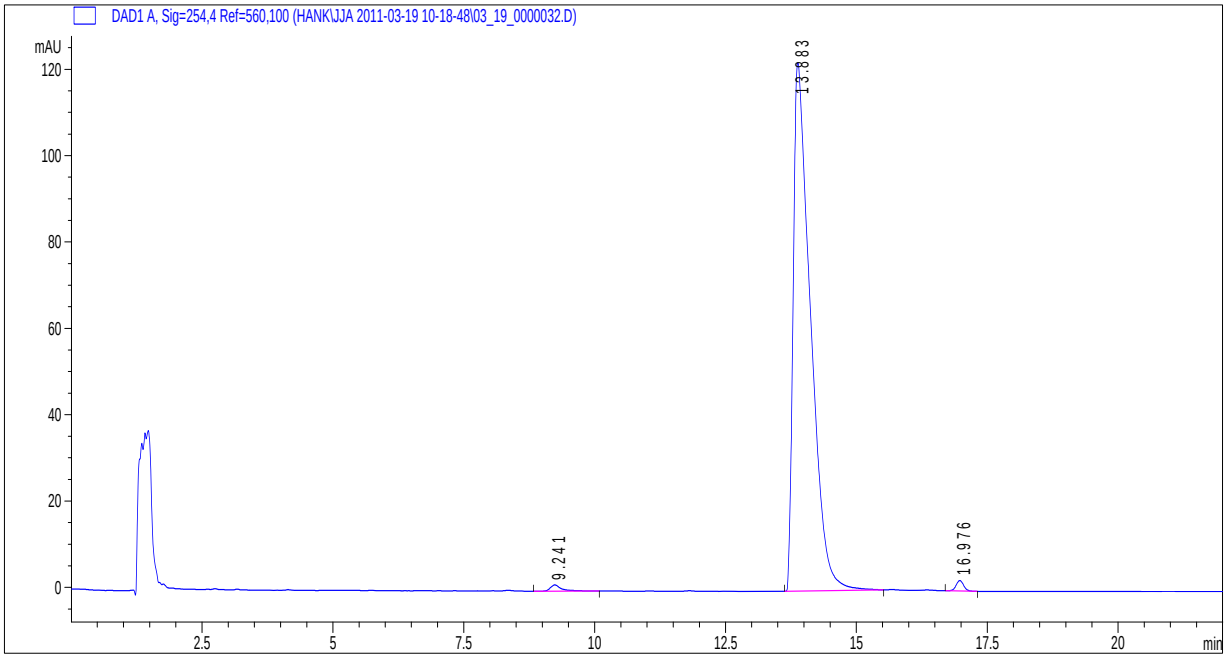
Analytical reverse-phase HPLC profile of compound **78b** prior to bioassay. Retention time = 9.04 min. Purity = 98.8%. Absorbance wavelength = 254 nm.



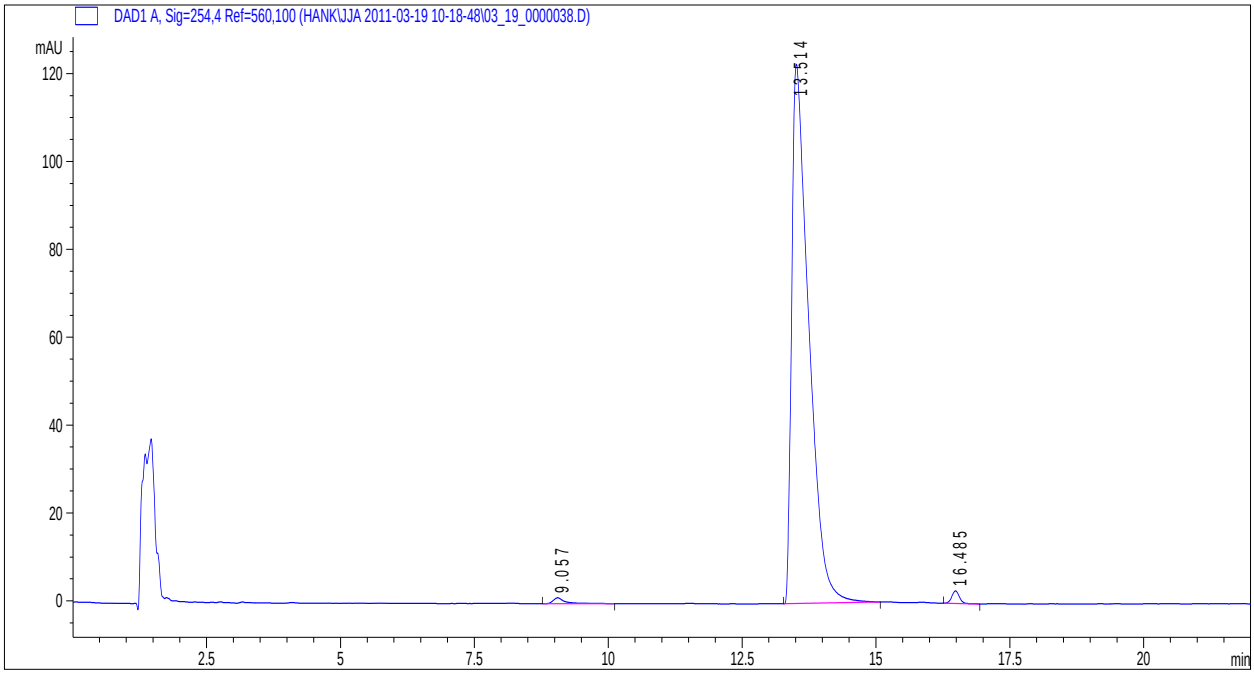
Analytical reverse-phase HPLC profile of compound **78c** prior to bioassay. Retention time = 8.70 min. Purity = 99.4%. Absorbance wavelength = 254 nm.



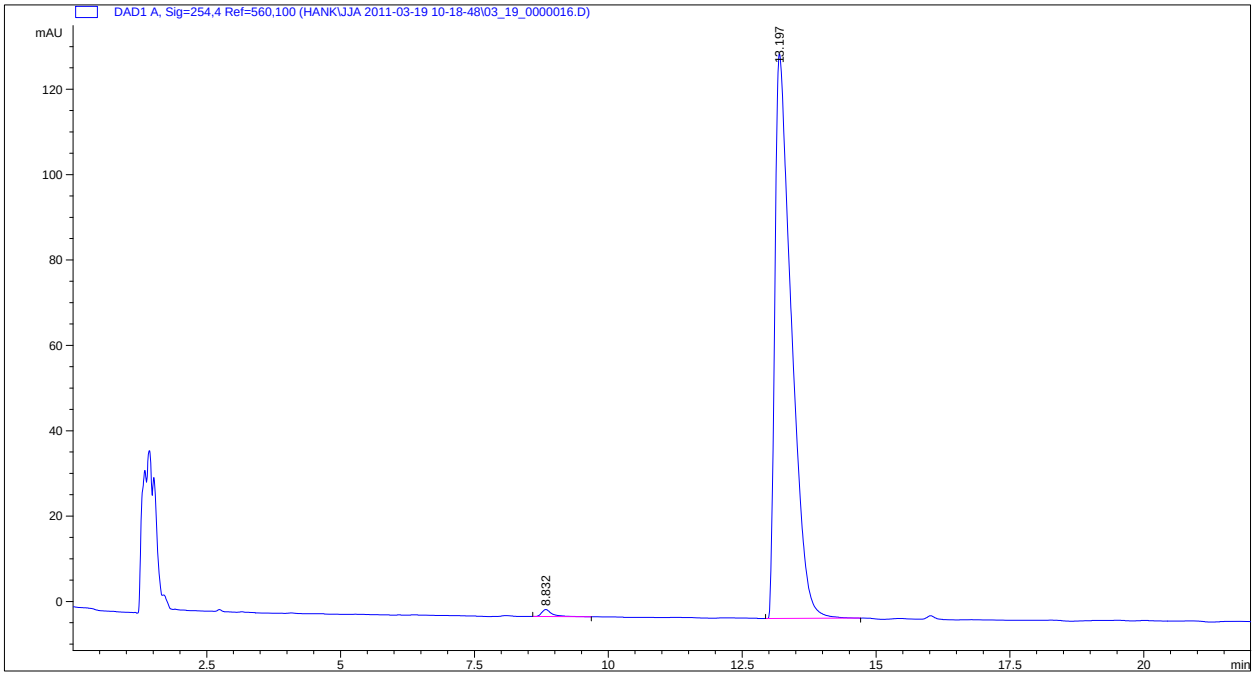
Analytical reverse-phase HPLC profile of compound **79a** prior to bioassay. Retention time = 14.3 min. Purity = 95.2%. Absorbance wavelength = 254 nm.



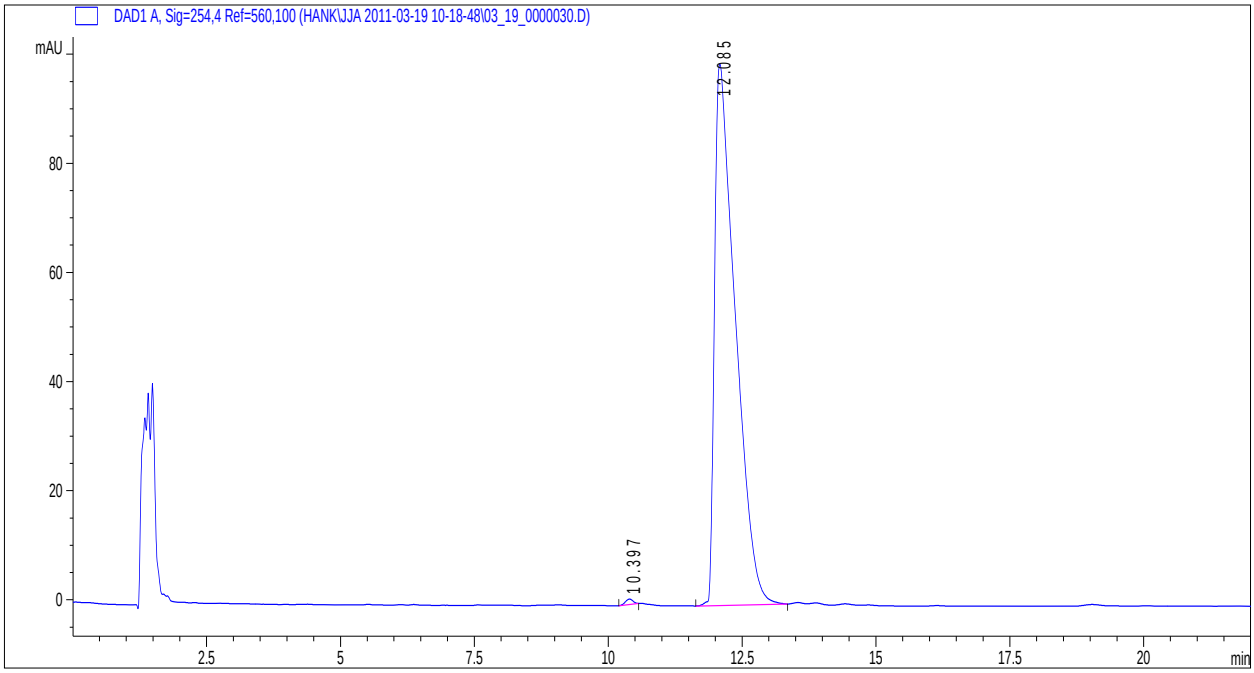
Analytical reverse-phase HPLC profile of compound **79c** prior to bioassay. Retention time = 13.9 min. Purity = 98.4%. Absorbance wavelength = 254 nm.



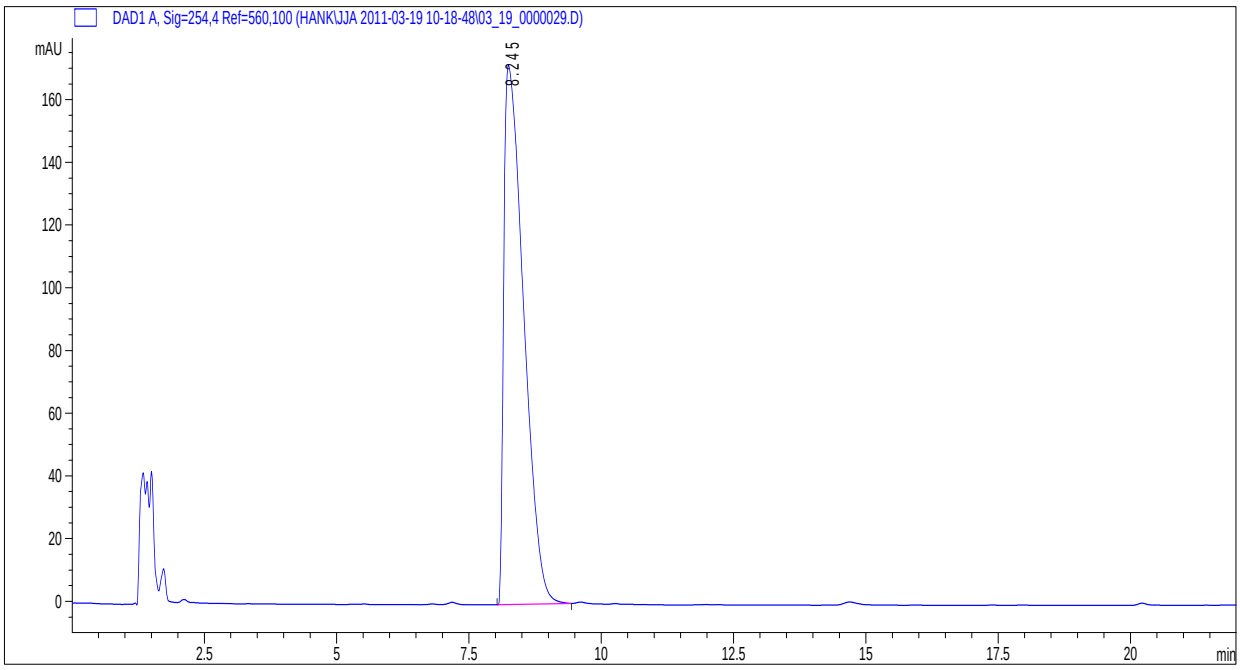
Analytical reverse-phase HPLC profile of compound **80a** prior to bioassay. Retention time = 13.5 mim. Purity = 98.2%. Absorbance wavelength = 254 nm.



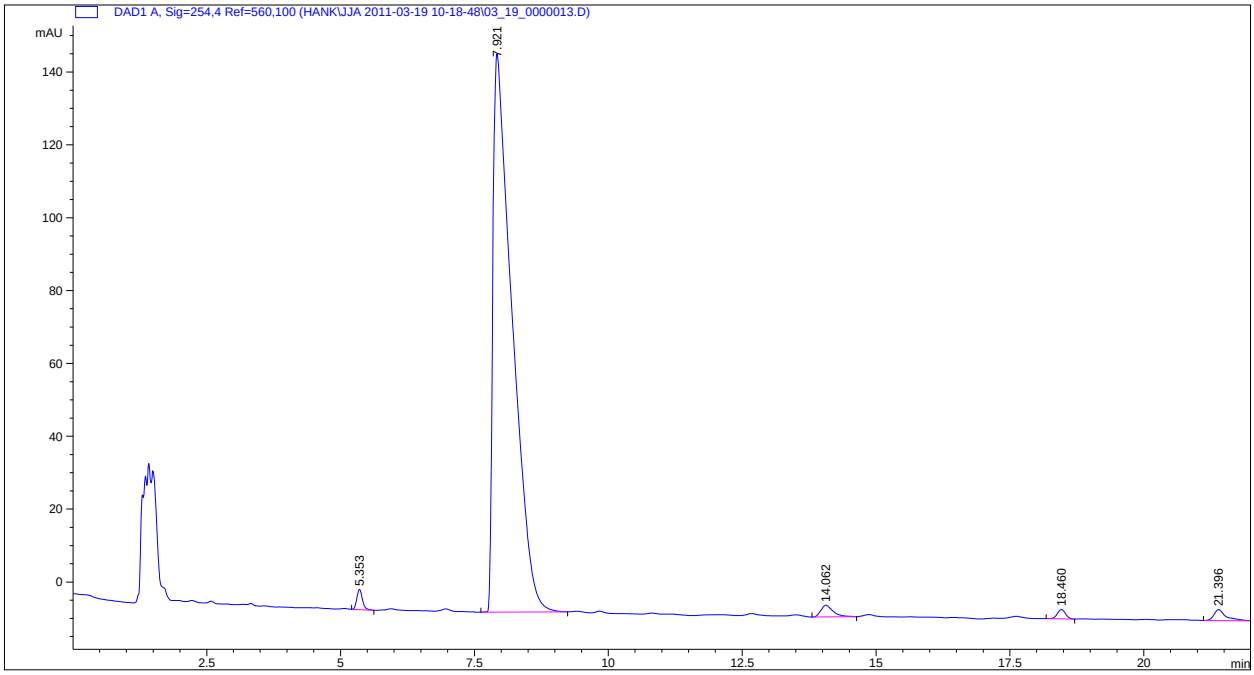
Analytical reverse-phase HPLC profile of compound **80c** prior to bioassay. Retention time = 13.2 min. Purity = 99.2%. Absorbance wavelength = 254 nm.



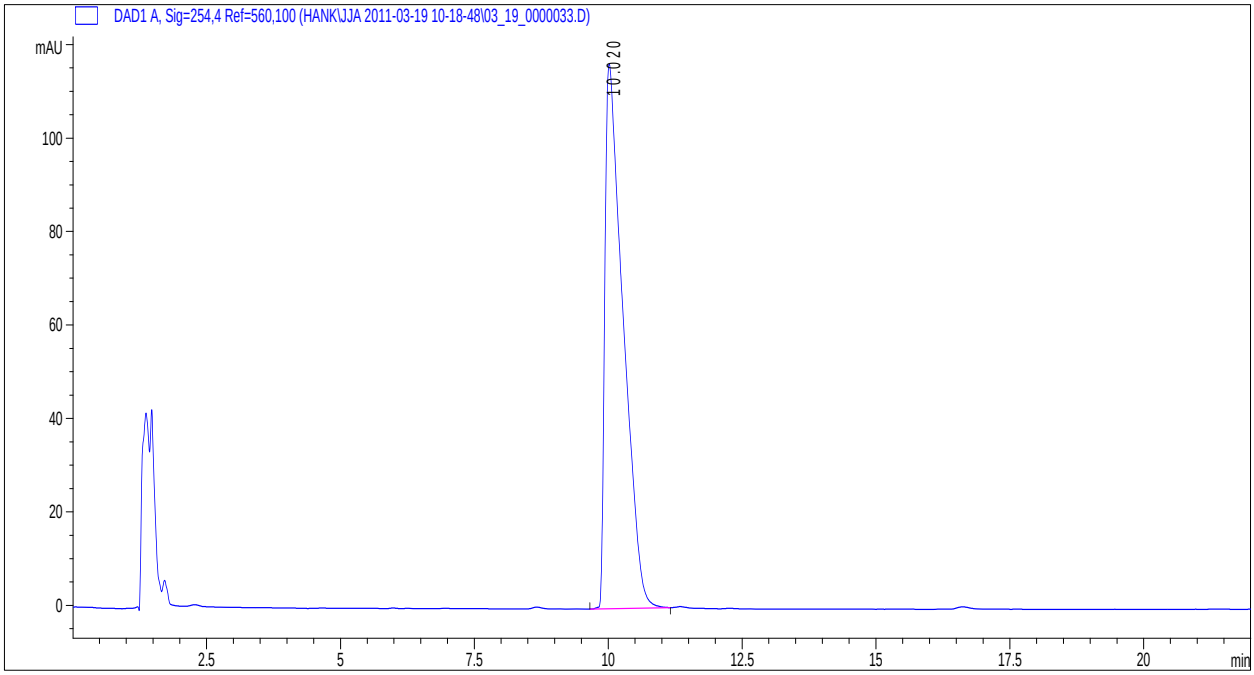
Analytical reverse-phase HPLC profile of compound **82a** prior to bioassay. Retention time = 12.1 min. Purity = 99.6%. Absorbance wavelength = 254 nm.



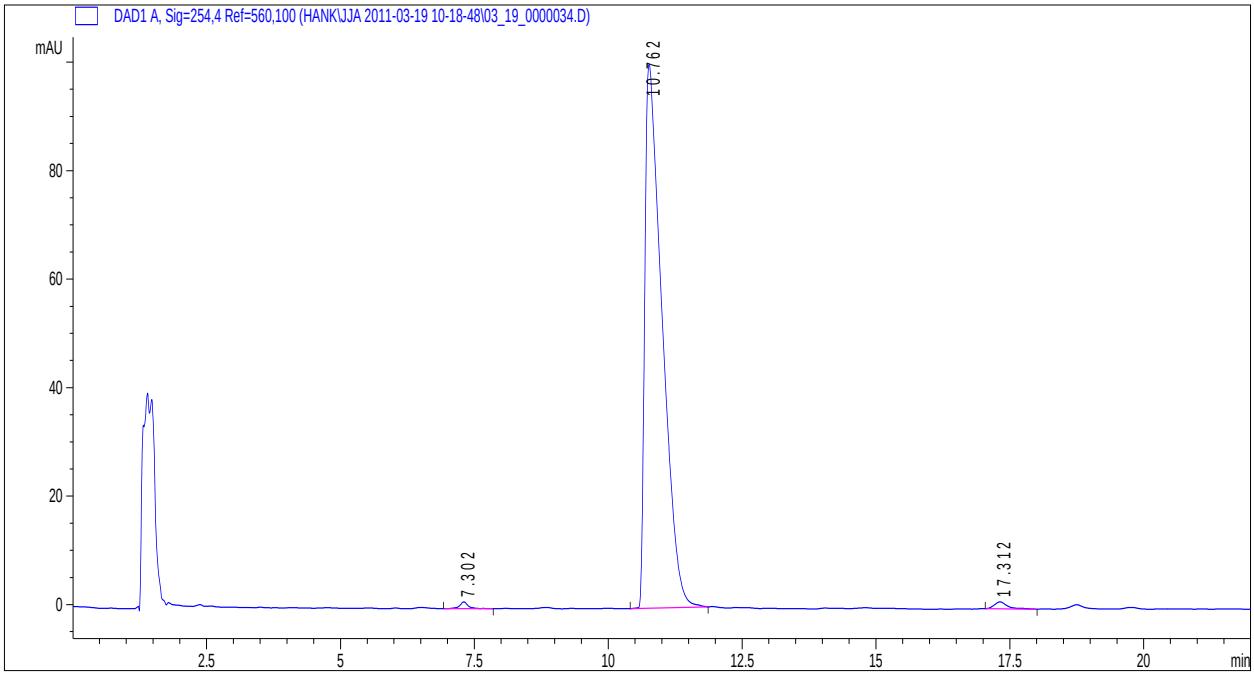
Analytical reverse-phase HPLC profile of compound **82b** prior to bioassay. Retention time = 8.25 min. Purity = 100%. Absorbance wavelength = 254 nm.



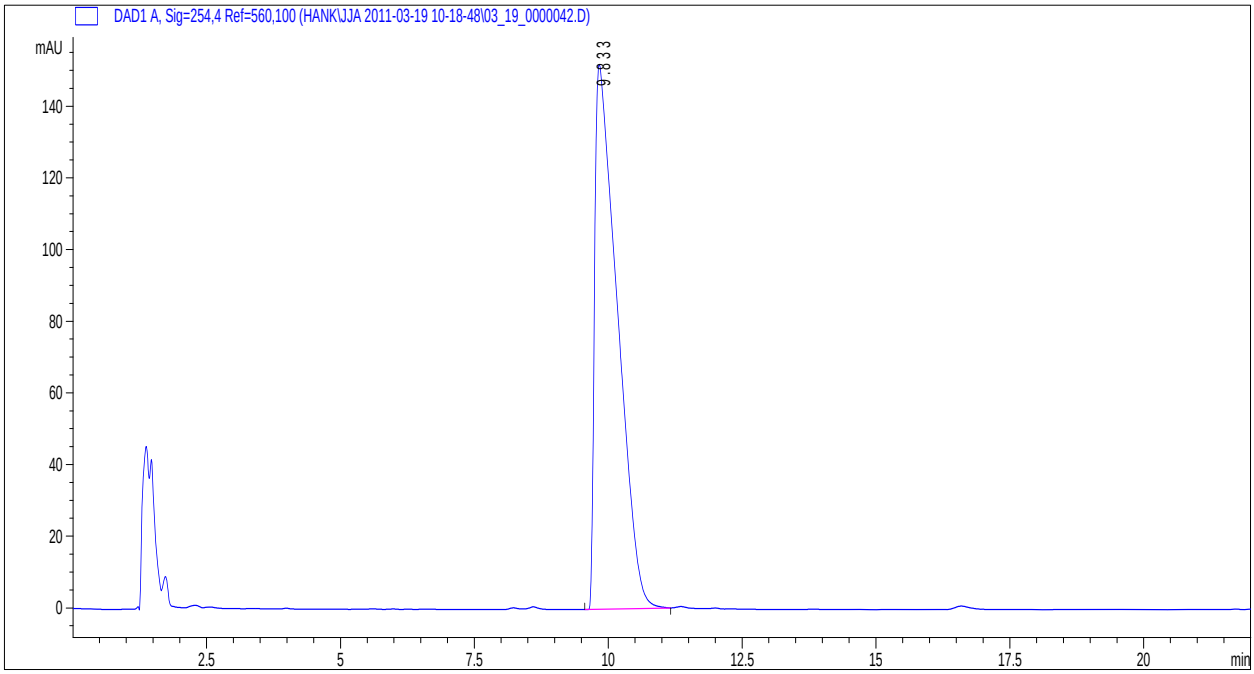
Analytical reverse-phase HPLC profile of compound **82c** prior to bioassay. Retention time = 7.92 min. Purity = 95.9%. Absorbance wavelength = 254 nm.



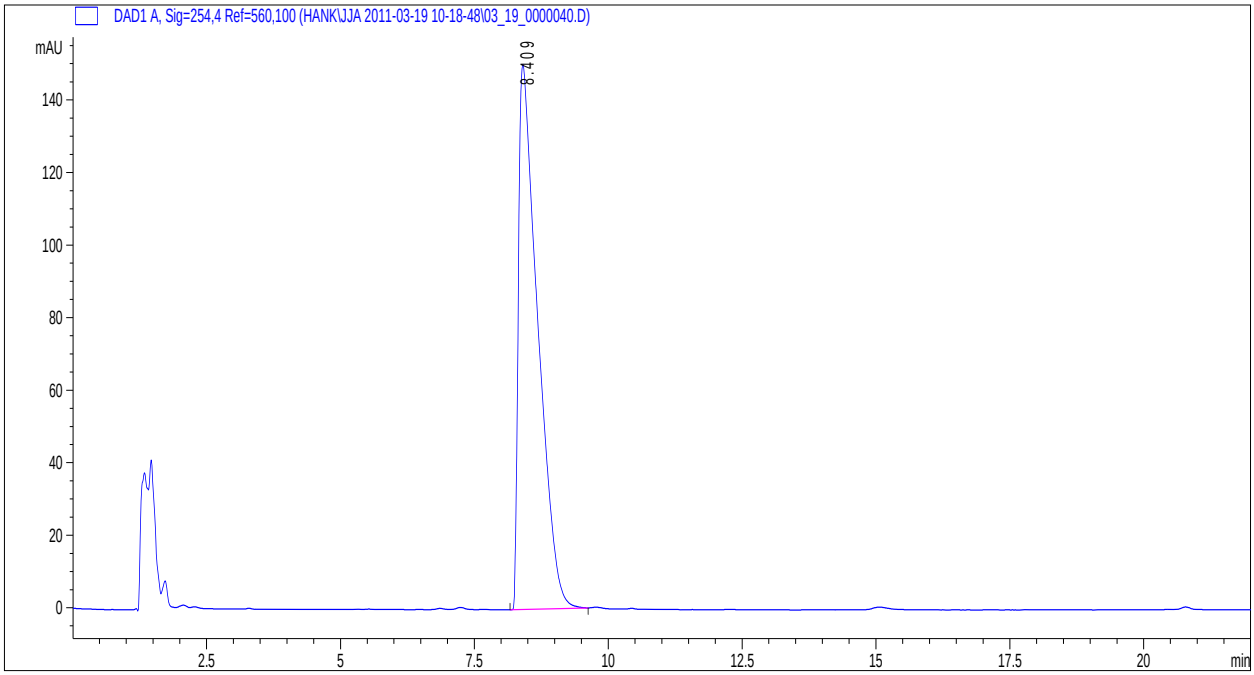
Analytical reverse-phase HPLC profile of compound **83a** prior to bioassay. Retention time = 10.0 mim. Purity = 100%. Absorbance wavelength = 254 nm.



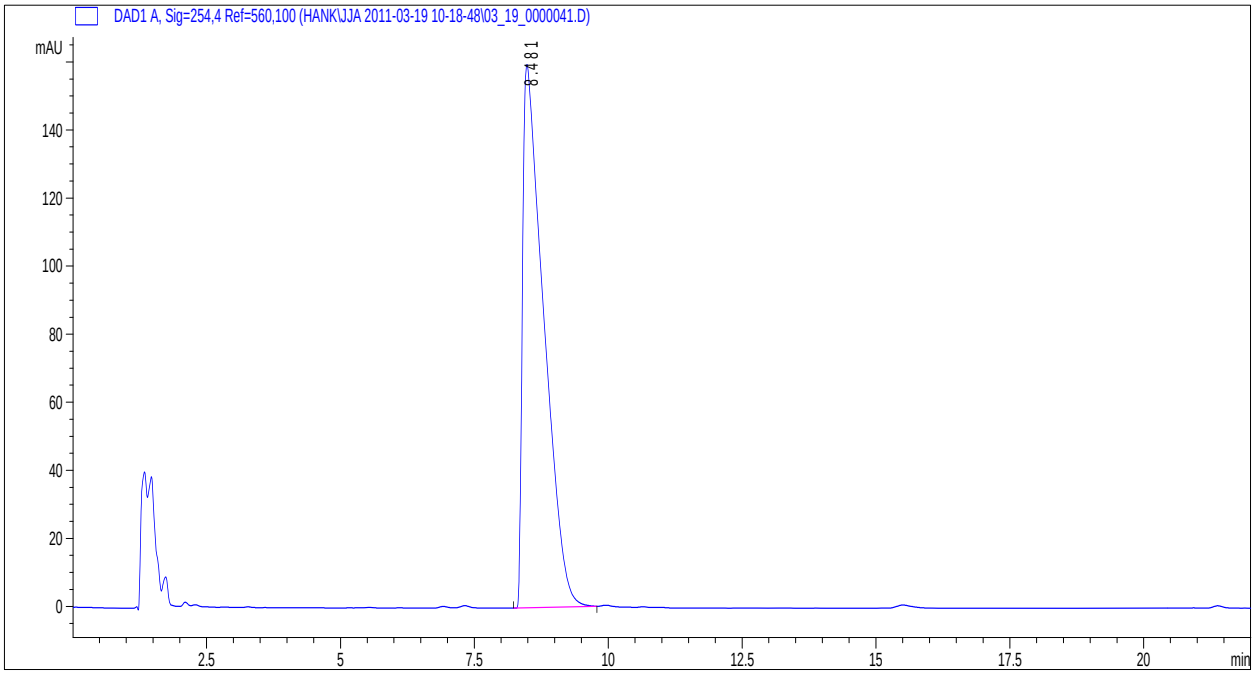
Analytical reverse-phase HPLC profile of compound **83c** prior to bioassay. Retention time = 10.8 mim. Purity = 98.5%. Absorbance wavelength = 254 nm.



Analytical reverse-phase HPLC profile of compound **84a** prior to bioassay. Retention time = 9.83 min. Purity = 100%. Absorbance wavelength = 254 nm.



Analytical reverse-phase HPLC profile of compound **84b** prior to bioassay. Retention time = 9.11 min. Purity = 100%. Absorbance wavelength = 254 nm.



Analytical reverse-phase HPLC profile of compound **84c** prior to bioassay. Retention time = 8.48 min. Purity = 100%. Absorbance wavelength = 254 nm.

1. Donnelly, A.; Blagg, B. S. Novobiocin and additional inhibitors of the Hsp90 C-terminal nucleotide-binding pocket. *Curr. Med. Chem.* **2008,** 15, 2702-2717.

2. Donnelly, A. C.; Mays, J. R.; Burlison, J. A.; Nelson, J. T.; Vielhauer, G.; Holzbeierlein, J.; Blagg, B. S. J. The design, synthesis, and evaluation of coumarin ring derivatives of the novobiocin scaffold that exhibit antiproliferative activity. *J. Org. Chem.* **2008,** 73, 8901-8920.

3. Burlison, J. A.; Avila, C.; Vielhauer, G.; Lubbers, D. J.; Holzbeierlein, J.; Blagg, B. S. J. Development of novobiocin analogues that manifest anti-proliferative activity against several cancer cell lines. *J. Org. Chem.* **2008,** 73, 2130-2137.