

Supporting Information

Synthesis of Substituted Quinolines via Allylic Amination and Intramolecular Heck-Coupling

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General information:

All the reagents were commercial grade and purified according to the established procedures. Organic extracts were dried over anhydrous magnesium sulphate. Solvents were removed in a rotary evaporator under reduced pressure. Silica gel (60-120 mesh size) was used for the column chromatography. Reactions were monitored by TLC on silica gel 60 F₂₅₄ (0.25mm). NMR spectra were recorded in CDCl₃ with tetramethylsilane (TMS) as the internal standard for ^1H NMR (400 MHz) and for ^{13}C NMR (100 MHz). IR spectra were recorded on JASCO 480-plus instrument. GC-MS analysis carried out on an Agilent GC-MS (7890A – 5975C VL MSD) system.

General Procedure for the Preparation of Aza Baylis-Hillman Adducts and Allyl Amines: To the solution of $\text{FeCl}_2 \cdot 4\text{H}_2\text{O}$ (10 mg, 0.05 mmol), Olefin (1.50 mmol) in dioxane (5 mL), was added the phenylhydroxylamine (0.5 mmol) solution slowly in dioxane (5 mL) via syringe pump over 4 hours at 40 °C (70 °C for styrenes). Reactions were allowed to continue for two more hours to get complete consumption of phenylhydroxylamine. After that the mixture was filtered through celite and the filtrate was concentrated to dryness. The crude product was purified over a short column of silica gel (hexane/ethylacetate eluents) to give the corresponding ABH adduct/Allylamine which was then directly analyzed by GC-MS, NMR and IR analysis.

General Procedure for the Intramolecular Heck-coupling of Aza Baylis-Hillman Adducts and Allyl Amines: ABH adduct/Allylamine (0.25 mmol), tetrabutyl ammoniumiodide (TBAI) (0.25 mmol) and $\text{Pd}(\text{OAc})_2$ (0.025 mmol) were combined in a round-bottom flask. DMF (4 mL) was added to the same flask and kept for heating on a sand bath at 90 °C for 6-12 hours while stirring. Once the reaction is completed (monitored by TLC and GC-MS), the mixture was filtered through celite and the filtrate was concentrated to dryness. The crude product was purified over a short column of silica gel (hexane/ethylacetate eluents) to isolate substituted quinolines which were then directly analyzed by GC-MS, NMR and IR analysis.

Spectral data:

TABLE 1:

Methyl 2-((2-iodophenylamino)methyl)acrylate (1a): ^1H NMR (400 MHz, CDCl_3): δ 3.79 (s, 3H), 4.09 (d, 2H, $J = 6.4$ Hz), 4.58 (brs, 1H), 5.72 (s, 1H), 6.28 (s, 1H), 6.41-6.47 (m, 2H), 7.15 (t, 1H, $J = 7.6$ Hz), 7.68 (d, 1H, $J = 7.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 44.9, 52.2, 85.7, 111.2, 119.2, 126.1, 129.6, 136.7, 139.3, 146.6, 166.8; IR (KBr): 3399, 3065, 2996, 2949, 1716, 1636, 1590, 1507, 1453, 1321, 1267, 1154, 1084, 1004, 949, 816, 744 cm^{-1} .

Ethyl 3-(2-iodophenylamino)-2-methylenebutanoate (1b): Confirmed the products by comparing our previous data (Reported in our previous publication: S. Murru, A. A. Gallo, R. S. Srivastava, *J. Org. Chem.* 2012, **77**, 7119)

Benzyl 3-(2-iodophenylamino)-2-methylenebutanoate (1c): ^1H NMR (400 MHz, CDCl_3): δ 1.47 (d, 3H, $J = 6.4$ Hz), 4.45 (brs, 1H), 4.49 (t, 1H, $J = 6.4$ Hz), 5.25 (s, 2H), 5.73 (s, 1H), 6.24 (s, 1H), 6.37-6.44 (m, 2H), 7.12 (t, 1H, $J = 7.6$ Hz), 7.33-7.38 (m, 5H), 7.64 (d,

1H, $J = 8.0$ Hz; ^{13}C NMR (100 MHz, CDCl_3): δ 22.2, 50.3, 66.8, 85.7, 112.0, 119.1, 125.1, 128.3, 128.4, 128.8, 129.5, 135.9, 139.1, 141.9, 145.7, 166.3; IR (KBr): 3394, 3065, 2932, 1726, 1634, 1589, 1505, 1318, 1176, 1081, 819, 744 cm^{-1} .

Methyl 3-(2-iodophenylamino)-2-methylenepentanoate (1d): ^1H NMR (400 MHz, CDCl_3): δ 1.03 (t, 3H, $J = 7.2$ Hz), 1.65-1.71 (m, 1H), 1.86-1.91 (m, 1H), 3.80 (s, 3H), 4.29 (t, 1H, $J = 7.2$ Hz), 4.50 (d, 1H, $J = 7.2$ Hz), 5.68 (s, 1H), 6.22 (s, 1H), 6.37 – 6.43 (m, 2H), 7.13 (t, 1H, $J = 8.0$ Hz), 7.64 (d, 1H, $J = 7.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 10.8, 28.7, 52.1, 56.2, 85.8, 111.8, 118.9, 125.6, 129.5, 139.1, 140.5, 146.0, 167.1; IR (KBr): 3398, 3063, 2992, 1718, 1635, 1592, 1437, 1370, 1266, 1004, 951, 849, 744 cm^{-1} .

4-(2-iodophenylamino)-3-methylenepentan-2-one (1e): ^1H NMR (400 MHz, CDCl_3): δ 2.03 (d, 3H, $J = 7.2$ Hz), 2.34 (s, 3H), 4.02 (s, 2H), 4.35 (brs, 1H), 6.43 (t, 1H, $J = 8.0$ Hz), 6.94 (t, 1H, $J = 7.6$ Hz), 7.20 (t, 1H, $J = 8.8$ Hz), 7.64 (d, 1H, $J = 7.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 15.1, 25.6, 38.8, 85.8, 111.0, 118.9, 129.3, 139.1, 139.7, 142.3, 147.2, 199.0; IR (KBr): 3403, 3068, 2992, 1692, 1632, 1588, 1456, 1267, 1152, 1089, 952, 817, 742 cm^{-1} .

2-Iodo-N-(2-phenylallyl)benzenamine (1f): ^1H NMR (400 MHz, CDCl_3): δ 4.21 (d, 2H, $J = 4.8$ Hz), 4.51 (brs, 1H), 5.30 (s, 1H), 5.48 (s, 1H), 6.45 (t, 1H, $J = 7.6$ Hz), 6.57 (d, 1H, $J = 8.0$ Hz), 7.19 (t, 1H, $J = 7.2$ Hz), 7.31-7.38 (m, 3H), 7.44 (d, 2H, $J = 8.0$ Hz), 7.66 (d, 1H, $J = 8.0$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 48.2, 85.5, 111.1, 113.6, 119.0, 126.3, 128.1, 128.7, 129.6, 139.1, 139.4, 144.1, 147.1; IR (KBr): 3400, 3055, 1590, 1506, 1453, 1321, 1004, 905, 778, 742, 705 cm^{-1} .

2-Iodo-N-(2-p-tolylallyl)benzenamine (1g): ^1H NMR (400 MHz, CDCl_3): δ 2.36 (s, 3H), 4.18 (d, 2H, $J = 5.6$ Hz), 4.50 (brs, 1H), 5.24 (s, 1H), 5.45 (s, 1H), 6.44 (t, 1H, $J = 8.0$ Hz), 6.55 (d, 1H, $J = 8.0$ Hz), 7.17 (m, 3H), 7.34 (d, 2H, $J = 8.0$ Hz), 7.65 (d, 1H, $J = 8.0$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 21.3, 48.2, 85.5, 111.1, 112.8, 118.9, 126.1, 129.4, 129.6, 136.5, 138.0, 139.1, 143.8, 147.1; IR (KBr): 3399, 2918, 1590, 1506, 1453, 1321, 1073, 1004, 901, 822, 741 cm^{-1} .

N-(2-(4-chlorophenyl)allyl)-2-iodobenzenamine (1h): ^1H NMR (400 MHz, CDCl_3): δ 4.16 (d, 2H, $J = 6.0$ Hz), 4.45 (brs, 1H), 5.31 (s, 1H), 5.46 (s, 1H), 6.45 (t, 1H, $J = 7.6$ Hz), 6.54 (d, 1H, $J = 8.4$ Hz), 7.18 (t, 1H, $J = 6.8$ Hz), 7.31 (d, 2H, $J = 8.8$ Hz), 7.35 (d, 2H, $J = 8.8$

Hz), 7.64 (d, 1H, $J = 8.0$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 48.2, 85.6, 111.1, 114.3, 119.2, 127.6, 128.9, 129.6, 134.0, 137.8, 139.2, 143.1, 146.9; IR (KBr): 3400, 3065, 2917, 1632, 1590, 1492, 1321, 1093, 1005, 833, 741 cm^{-1} .

N-(2-(4-fluorophenyl)allyl)-2-iodobenzenamine (1i): ^1H NMR (400 MHz, CDCl_3): δ 4.15 (d, 2H, $J = 5.6$ Hz), 4.46 (brs, 1H), 5.28 (s, 1H), 5.42 (s, 1H), 6.45 (t, 1H, $J = 8.0$ Hz), 6.55 (d, 1H, $J = 8.0$ Hz), 7.01-7.05 (m, 2H), 7.18 (t, 1H, $J = 8.0$ Hz), 7.37 – 7.41 (m, 2H), 7.64 (d, 1H, $J = 8.0$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 48.4, 85.6, 111.1, 113.7, 115.5, 115.7, 119.1, 127.9, 128.0, 129.6, 135.3, 135.4, 139.2, 143.1, 146.9, 161.5, 163.9; IR (KBr): 3401, 3065, 2921, 2856, 1631, 1590, 1507, 1453, 1321, 1233, 1161, 1005, 906, 837, 742, 647 cm^{-1} .

2-Iodo-N-(4-methyl-2-methylenepent-3-enyl)benzenamine (1j): ^1H NMR (400 MHz, CDCl_3): δ 1.78 (s, 3H), 1.81 (s, 3H), 3.76 (d, 2H, $J = 5.6$ Hz), 4.40 (brs, 1H), 4.94 (s, 1H), 5.19 (s, 1H), 5.63 (s, 1H), 6.42 (t, 1H, $J = 7.6$ Hz), 6.50 (d, 1H, $J = 8.4$ Hz), 7.17 (t, 1H, $J = 7.2$ Hz), 7.64 (d, 1H, $J = 7.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 19.8, 26.9, 49.9, 85.5, 111.2, 113.8, 118.8, 123.6, 129.5, 137.7, 139.1, 142.4, 147.3; IR (KBr): 3399, 3066, 2967, 2926, 1590, 1505, 1453, 1318, 1004, 900, 741 cm^{-1} .

2-iodo-N-((E)-7-methyl-3-methyleneocta-4,6-dien-2-yl)benzenamine (1k): ^1H NMR (400 MHz, CDCl_3): δ 1.49 (d, 3H, $J = 6.8$ Hz), 1.80 (s, 3H), 1.83 (s, 3H), 4.21 (brs, 1H), 4.35 (brs, 1H), 5.03 (s, 1H), 5.09 (s, 1H), 5.88 (d, 1H, $J = 10.8$ Hz), 6.15 (d, 1H, $J = 15.6$ Hz), 6.34 – 6.41 (m, 2H), 6.59 (dd, 1H, $J_1 = 15.6$ Hz, $J_2 = 10.8$ Hz), 7.10 (t, 1H, $J = 7.2$ Hz), 7.62 (d, 1H, $J = 7.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 18.8, 22.6, 26.4, 50.9, 85.4, 111.9, 113.1, 118.7, 125.3, 125.7, 129.4, 129.9, 137.0, 139.0, 146.3, 147.6; IR (KBr): 2988, 2956, 2931, 1586, 1507, 1460, 1343, 1011 cm^{-1} .

TABLE 2:

Ethyl 3-(2-bromophenylamino)-2-methylenebutanoate (2b): Confirmed the products by comparing our previous data (Reported in our previous publication: S. Murru, A. A. Gallo, R. S. Srivastava, *J. Org. Chem.* 2012, **77**, 7119)

Ethyl 3-(2,5-dibromophenylamino)-2-methylenebutanoate (3b): ^1H NMR (400 MHz, CDCl_3): δ 1.34 (t, 3H, $J = 7.6$ Hz), 1.46 (d, 3H, $J = 6.8$ Hz), 4.27 (q, 2H, $J = 7.6$ Hz), 4.41 (t, 1H, $J = 6.8$ Hz), 4.66 (d, 1H, $J = 7.2$ Hz), 5.69 (s, 1H), 6.22 (s, 1H), 6.56 (s, 1H), 6.67 (d,

1H, $J = 8.4$ Hz), 7.17 (d, 1H, $J = 8.4$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 14.4, 22.1, 50.2, 61.2, 108.4, 115.2, 120.9, 122.4, 124.8, 133.5, 141.6, 144.7, 166.3; IR (KBr): 3415, 3073, 2982, 1712, 1598, 1505, 1285, 1106, 743 cm^{-1} .

Ethyl 3-(2-bromo-5-(trifluoromethyl)phenylamino)-2-methylenebutanoate (4b): ^1H NMR (400 MHz, CDCl_3): δ 1.12 (t, 3H, $J = 7.2$ Hz), 1.40 (d, 3H, $J = 6.8$ Hz), 3.94 (q, 2H, $J = 7.2$ Hz), 4.20 (t, 1H, $J = 6.4$ Hz), 4.75 (q, 1H, $J = 7.2$ Hz), 5.77 (s, 1H), 6.40 (s, 1H), 7.16 (d, 1H, $J = 8.4$ Hz), 7.59 (d, 1H, $J = 8.4$ Hz), 7.65 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.1, 23.3, 59.3, 61.1, 119.7, 122.5, 128.6, 129.0, 131.1, 133.7, 138.5, 150.5, 167.1; IR (KBr): 3408, 3070, 2981, 2933, 1715, 1594, 1323, 1282, 1107, 741 cm^{-1} .

Ethyl 3-(2-iodo-4-methylphenylamino)-2-methylenebutanoate (5b): ^1H NMR (400 MHz, CDCl_3): δ 1.31 (t, 3H, $J = 6.8$ Hz), 1.43 (d, 3H, $J = 6.8$ Hz), 2.16 (s, 3H), 4.24 (q, 2H, $J = 7.2$ Hz), 4.29 (brs, 1H), 4.42 (t, 1H, $J = 6.8$ Hz), 5.66 (s, 1H), 6.16 (s, 1H), 6.28 (d, 1H, $J = 8.8$ Hz), 6.93 (dd, 1H, $J_1 = 8.4$ Hz, $J_2 = 1.6$ Hz), 7.47 (t, 1H, $J = 1.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 14.4, 19.9, 22.2, 50.5, 61.0, 85.7, 111.9, 124.4, 128.4, 130.1, 139.4, 142.3, 143.7, 166.7; IR (KBr): 3389, 3062, 2968, 1715, 1589, 1506, 1266, 1099, 1003, 742 cm^{-1} .

Ethyl 3-(2-iodo-3,5-dimethylphenylamino)-2-methylenebutanoate (6b): ^1H NMR (400 MHz, CDCl_3): δ 1.31 (t, 3H, $J = 7.2$ Hz), 1.44 (d, 3H, $J = 6.4$ Hz), 2.17 (s, 3H), 2.36 (s, 3H), 4.25 (q, 2H, $J = 7.2$ Hz), 4.44 (t, 1H, $J = 6.0$ Hz), 4.56 (d, 1H, $J = 6.8$ Hz), 5.67 (s, 1H), 6.01 (s, 1H), 6.17 (s, 1H), 6.45 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.4, 21.4, 22.3, 29.6, 50.5, 60.9, 89.1, 110.0, 120.2, 124.3, 138.6, 141.9, 142.3, 145.8, 166.6; IR (KBr): 3386, 3060, 2968, 1715, 1586, 1265, 1098, 743 cm^{-1} .

Ethyl 3-(2-bromopyridin-3-ylamino)-2-methylenebutanoate (7b): ^1H NMR (400 MHz, CDCl_3): δ 1.32 (m, 3H), 1.50 (d, 3H, $J = 6.4$ Hz), 4.27 (q, 2H, $J = 7.2$ Hz), 4.42 (t, 1H, $J = 6.8$ Hz), 4.71 (d, 1H, $J = 6.4$ Hz), 5.70 (s, 1H), 6.22 (s, 1H), 6.67 (d, 1H, $J = 8.0$ Hz), 7.05 (dd, 1H, $J^1 = 8.0$ Hz, $J^2 = 4.4$ Hz), 7.68 (d, 1H, $J = 4.4$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 14.2, 21.9, 49.7, 61.0, 118.5, 123.6, 124.5, 130.3, 137.4, 140.7, 141.2, 166.0; IR (KBr): 3408, 3061, 2980, 2934, 1713, 1579, 1487, 1378, 1284, 1264, 1181, 1133, 1106, 1042, 956, 789 cm^{-1} .

TABLE 3:

Methyl quinoline-3-carboxylate (1a'): ^1H NMR (400 MHz, CDCl_3): δ 4.02 (s, 3H), 7.63 (t, 1H, $J = 7.2$ Hz), 7.83 (t, 1H, $J = 7.2$ Hz), 7.94 (d, 1H, $J = 8.0$ Hz), 8.16 (d, 1H, $J = 8.0$ Hz), 8.86 (s, 1H), 9.45 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 52.5, 123.0, 126.8, 127.5, 129.1, 129.5, 131.9, 138.8, 149.8, 150.0, 165.9; IR (KBr): 2954, 2915, 1726, 1621, 1564, 1440, 1272, 1128, 1054, 805, 762 cm^{-1} .

Ethyl 2-methylquinoline-3-carboxylate (1b', 2b'): ^1H NMR (400 MHz, CDCl_3): δ 1.45 (t, 3H, $J = 7.2$ Hz), 3.00 (s, 3H), 4.44 (q, 2H, $J = 7.2$ Hz), 7.26 (s, 1H), 7.54 (t, 1H, $J = 6.8$ Hz), 7.76 – 7.80 (m, 1H), 7.87 (d, 1H, $J = 8.0$ Hz), 8.04 (d, 1H, $J = 8.0$ Hz), 8.74 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.3, 25.7, 61.4, 123.9, 125.7, 126.5, 128.4, 128.5, 131.7, 139.9, 148.6, 158.5, 166.5; IR (KBr): 3062, 2963, 2926, 2852, 1725, 1620, 1562, 1423, 1258, 1199, 1062 cm^{-1} .

Benzyl 2-methylquinoline-3-carboxylate (1c'): ^1H NMR (400 MHz, CDCl_3): δ 2.98 (s, 3H), 5.40 (s, 2H), 7.38 – 7.45 (m, 3H), 7.49 – 7.55 (m, 3H), 7.78 (t, 1H, $J_1 = 7.6$ Hz, $J_2 = 1.6$ Hz), 7.85 (d, 1H, $J = 8.4$ Hz), 8.04 (1H, d, $J = 8.4$ Hz), 8.77 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 26.0, 67.4, 123.7, 125.9, 126.7, 128.6, 128.7, 128.75, 128.9, 131.2, 132.0, 135.9, 140.3, 148.9, 158.8, 166.5; IR (KBr): 3062, 2972, 2928, 1724, 1619, 1563, 1455, 1422, 1240, 1126, 1055, 788, 750 cm^{-1} .

Methyl 2-ethylquinoline-3-carboxylate (1d'): ^1H NMR (400 MHz, CDCl_3): δ 1.37 (t, 3H, $J = 7.2$ Hz), 3.34 (q, 2H, $J = 7.2$ Hz), 3.97 (s, 3H), 7.52 (t, 1H, $J = 7.6$ Hz), 7.77 (t, 1H, $J = 7.6$ Hz), 7.82 (d, 1H, $J = 7.6$ Hz), 8.00 (d, 1H, $J = 8.4$ Hz), 8.70 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.1, 31.2, 52.6, 123.5, 125.8, 126.7, 128.6, 128.9, 131.8, 140.2, 148.9, 163.2, 167.2; IR (KBr): 2951, 2919, 2874, 1725, 1620, 1563, 1437, 1273, 1252, 1201, 1127, 1069, 803, 754 cm^{-1} .

1-(2-Methylquinolin-3-yl)ethanone (1e'): ^1H NMR (400 MHz, CDCl_3): δ 2.69 (s, 3H), 2.88 (s, 3H), 7.52 (t, 1H, $J = 7.6$ Hz), 7.73 – 7.78 (m, 1H), 7.82 (d, 1H, $J = 8.0$ Hz), 8.00 (d, 1H, $J = 8.4$ Hz), 8.44 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 25.9, 29.4, 125.8, 126.9, 128.5, 128.8, 131.3, 131.9, 138.4, 148.5, 157.8, 200.1; IR (KBr): 2965, 2920, 1680, 1618, 1561, 1418, 1253, 1196, 1029, 926, 862, 781, $750, 691\text{ cm}^{-1}$.

3-Phenylquinoline (1f'): ^1H NMR (400 MHz, CDCl_3): δ 7.44 (t, 1H, $J = 7.2$ Hz), 7.51 – 7.61 (m, 3H), 7.71 – 7.74 (m, 3H), 7.89 (d, 1H, $J = 8.0$ Hz), 8.15 (d, 1H, $J = 8.8$ Hz), 8.31 (d, 1H, $J = 2.0$ Hz), 9.19 (d, 1H, $J = 2.0$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 126.4, 127.2, 127.7, 128.2, 128.3, 129.0, 129.4, 129.45, 129.6, 131.1, 133.5, 138.1, 150.2; IR (KBr): 2963, 2926, 1725, 1493, 1459, 1262, 1074, 1025, 902, 787, 761, 697 cm^{-1} .

3-p-Tolylquinoline (1g'): ^1H NMR (400 MHz, CDCl_3): δ 2.43 (s, 3H), 7.04 (d, 1H, $J = 8.0$ Hz), 7.08 (d, 1H, $J = 8.0$ Hz), 7.25 (s, 1H), 7.32 (d, 2H, $J = 7.6$ Hz), 7.56 (t, 1H, $J = 7.6$ Hz), 7.61 (d, 2H, $J = 7.6$ Hz), 7.70 (t, 1H, $J = 7.6$ Hz), 7.87 (d, 1H, $J = 8.4$ Hz), 8.11 (d, 1H, $J = 6.8$ Hz), 8.28 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 21.4, 121.6, 122.8, 126.3, 126.8, 127.1, 127.5, 128.1, 129.4, 129.7, 130.1, 133.0, 138.3, 150.2; IR (KBr): 3015, 2969, 2921, 1667, 1540, 1456, 1261, 815, 751 cm^{-1} .

3-(4-Chlorophenyl)quinoline (1h'): ^1H NMR (400 MHz, CDCl_3): δ 7.49 (d, 2H, $J = 8.8$ Hz), 7.58 (t, 1H, $J = 7.6$ Hz), 7.62 (d, 2H, $J = 8.8$ Hz), 7.70 – 7.75 (m, 1H), 7.87 (d, 1H, $J = 8.4$ Hz), 8.13 (d, 1H, $J = 8.4$ Hz), 8.27 (s, 1H), 9.12 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 127.5, 128.1, 128.2, 128.9, 129.4, 129.6, 129.9, 132.9, 133.5, 134.6, 136.5, 147.5, 149.6; IR (KBr): 3052, 2925, 1604, 1512, 1231, 1161, 833, 752 cm^{-1} .

3-(4-Fluorophenyl)quinoline (1i'): ^1H NMR (400 MHz, CDCl_3): δ 7.20 – 7.26 (m, 2H), 7.59 (t, 1H, $J = 7.6$ Hz), 7.66 – 7.69 (m, 2H), 7.33 (t, 1H, $J = 7.6$ Hz), 7.88 (d, 1H, $J = 8.0$ Hz), 8.14 (d, 1H, $J = 8.0$ Hz), 8.27 (s, 1H), 9.14 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 116.3, 116.5, 127.3, 128.0, 128.1, 128.2, 128.3, 128.4, 128.5, 128.7, 134.3, 147.5, 149.9, 161.9, 164.4; IR (KBr): 3048, 2925, 1604, 1512, 1341, 1231, 1161, 954, 910, 833, 785, 752 cm^{-1} .

1,2-dihydro-3-(2-methylprop-1-enyl)quinoline (1j'): ^1H NMR (400 MHz, CDCl_3): δ 1.75 (s, 3H), 1.77 (s, 3H), 3.46 (d, 2H, $J = 7.2$ Hz), 5.46 (t, 1H, $J = 2.0$ Hz), 6.96 (s, 1H), 7.12 (t, 1H, $J = 6.8$ Hz), 7.18 (t, 1H, $J = 6.8$ Hz), 7.35 (d, 1H, $J = 8.0$ Hz), 7.59 (d, 1H, $J = 8.0$ Hz), 7.92 (brs, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 24.1, 25.7, 68.1, 111.0, 116.2, 119.0, 119.1, 121.1, 121.9, 123.0, 128.8, 131.9, 136.5; IR (KBr): 3414, 2962, 2925, 1716, 1455, 1262, 1079, 789, 740 cm^{-1} .

2-methyl-3-((E)-4-methylpenta-1,3-dienyl)quinoline (1k'): ^1H NMR (400 MHz, CDCl_3): δ 1.89 (s, 3H), 1.92 (s, 3H), 2.76 (s, 3H), 6.15 (d, 1H, $J = 8.4$ Hz), 6.68 (d, 1H, $J = 15.2$ Hz), 7.02 (d, 1H, $J_1 = 15.2$ Hz, $J_2 = 11.2$ Hz), 7.46 (t, 1H, $J = 7.6$ Hz), 7.61 (t, 1H, $J = 7.6$ Hz), 7.77 (d, 1H, $J = 7.6$ Hz), 7.97 (d, 1H, $J = 8.4$ Hz), 8.15 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 24.1, 26.5, 29.9, 125.5, 125.7, 126.1, 127.6, 127.65, 128.5, 129.0, 129.4, 130.9, 131.5, 138.5, 146.9, 157.6; IR (KBr): 2961, 2924, 2854, 1725, 1685, 1617, 1490, 1461, 1377, 1261, 1101, 799, 752 cm^{-1} .

Ethyl 7-bromo-2-methylquinoline-3-carboxylate (3b'): ^1H NMR (400 MHz, CDCl_3): δ 1.46 (t, 3H, $J = 7.2$ Hz), 2.98 (s, 3H), 4.45 (q, 2H, $J = 7.2$ Hz), 7.64 (d, 1H, $J = 8.8$ Hz), 7.73 (d, 1H, $J = 8.8$ Hz), 8.24 (s, 1H), 8.70 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.5, 25.9, 61.7, 124.5, 124.6, 126.3, 129.8, 130.4, 131.3, 139.8, 149.3, 159.9, 166.5; IR (KBr): 2963, 2916, 1727, 1614, 1477, 1262, 1177, 1062, 803 cm^{-1} .

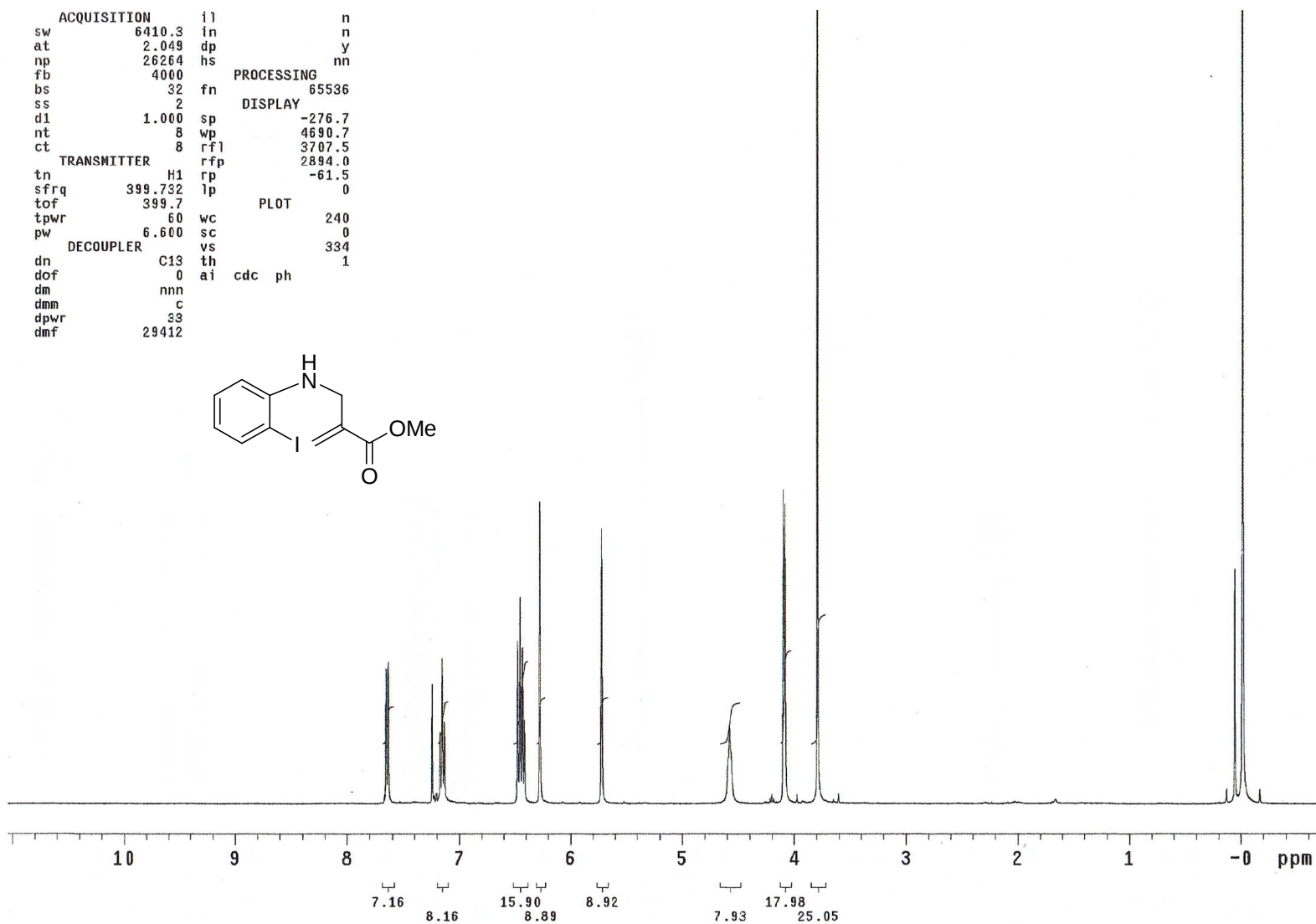
Ethyl 7-(trifluoromethyl)-2-methylquinoline-3-carboxylate (4b'): ^1H NMR (400 MHz, CDCl_3): δ 1.45 (t, 3H, $J = 7.2$ Hz), 2.98 (s, 3H), 4.44 (q, 2H, $J = 7.2$ Hz), 7.67 (d, 1H, $J = 8.4$ Hz), 7.95 (d, 1H, $J = 8.4$ Hz), 8.32 (s, 1H), 8.72 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.4, 25.8, 61.9, 122.2, 122.3, 122.35, 126.0, 126.6, 126.65, 127.4, 129.7, 139.5, 147.7, 160.1, 166.2; IR (KBr): 2982, 2934, 2875, 1730, 1603, 1563, 1447, 1431, 1347, 1324, 1283, 1191, 1130, 1058, 934, 819 cm^{-1} .

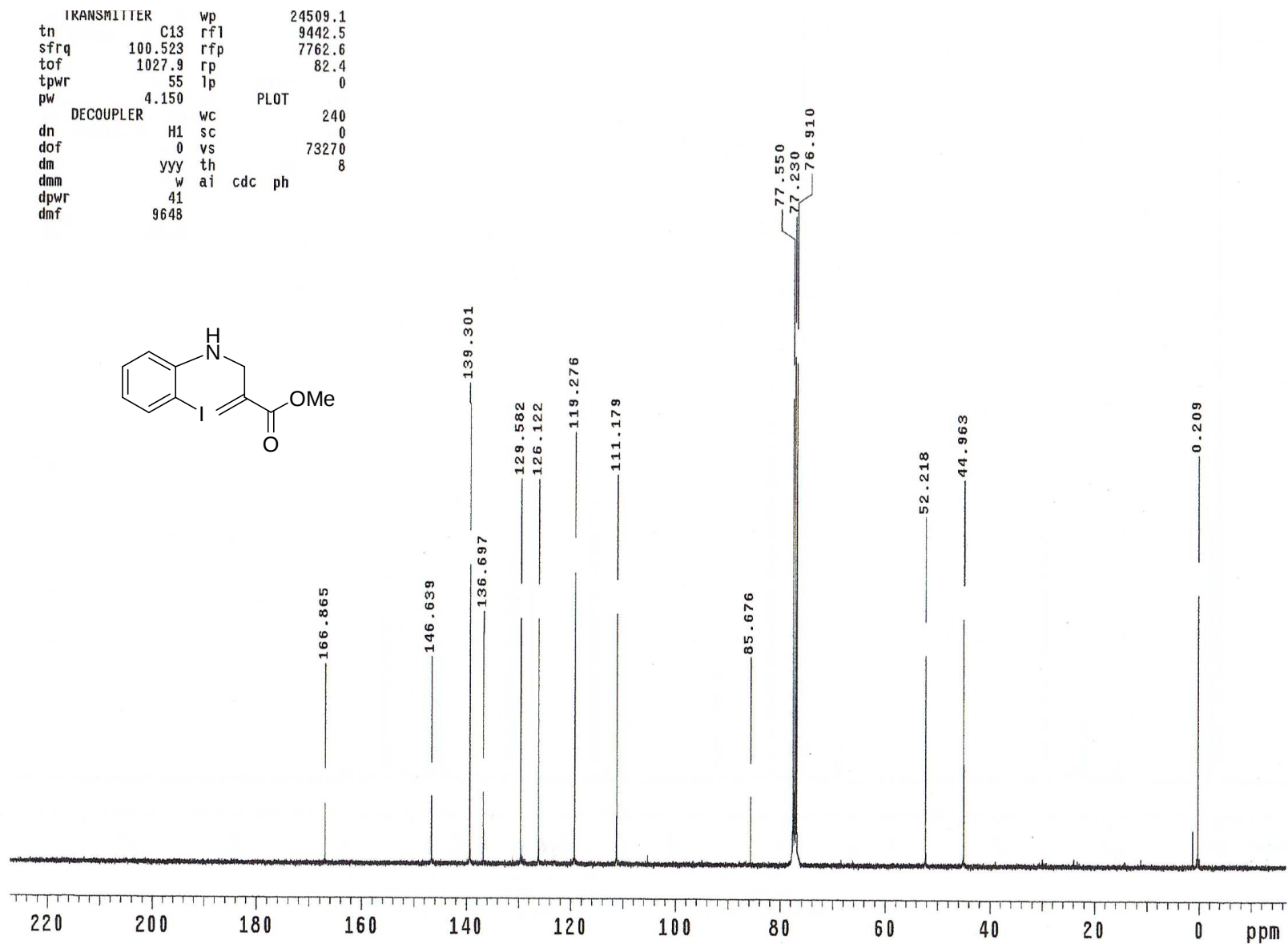
Ethyl 2,6-dimethylquinoline-3-carboxylate (5b'): ^1H NMR (400 MHz, CDCl_3): δ 1.42 (t, 3H, $J = 7.2$ Hz), 2.51 (s, 3H), 2.94 (s, 3H), 4.41 (q, 2H, $J = 7.2$ Hz), 7.58 (d, 1H, $J = 8.0$ Hz), 7.59 (s, 1H), 7.90 (d, 1H, $J = 8.4$ Hz), 8.62 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.5, 21.7, 25.8, 61.5, 126.0, 127.4, 128.3, 129.5, 134.1, 136.6, 139.5, 147.4, 157.7, 166.9; IR (KBr): 2977, 2915, 1720, 1594, 1566, 1277, 1239, 1215, 1069, 828, 778 cm^{-1} .

Ethyl 2,5,7-trimethylquinoline-3-carboxylate (6b'): ^1H NMR (400 MHz, CDCl_3): δ 1.45 (t, 3H, $J = 7.2$ Hz), 2.50 (s, 3H), 2.67 (s, 3H), 2.96 (s, 3H), 4.43 (q, 2H, $J = 7.2$ Hz), 7.18 (s, 1H), 7.65 (s, 1H), 8.82 (s, 1H); ^{13}C NMR (100 MHz, CDCl_3): δ 14.6, 18.6, 22.2, 25.9, 61.5, 122.7, 123.5, 126.0, 129.5, 135.4, 136.4, 142.2, 149.5, 158.1, 167.2; IR (KBr): 2978, 2927, 1720, 1620, 1600, 1566, 1444, 1380, 1269, 1226, 1086, 1056, 857, 778 cm^{-1} .

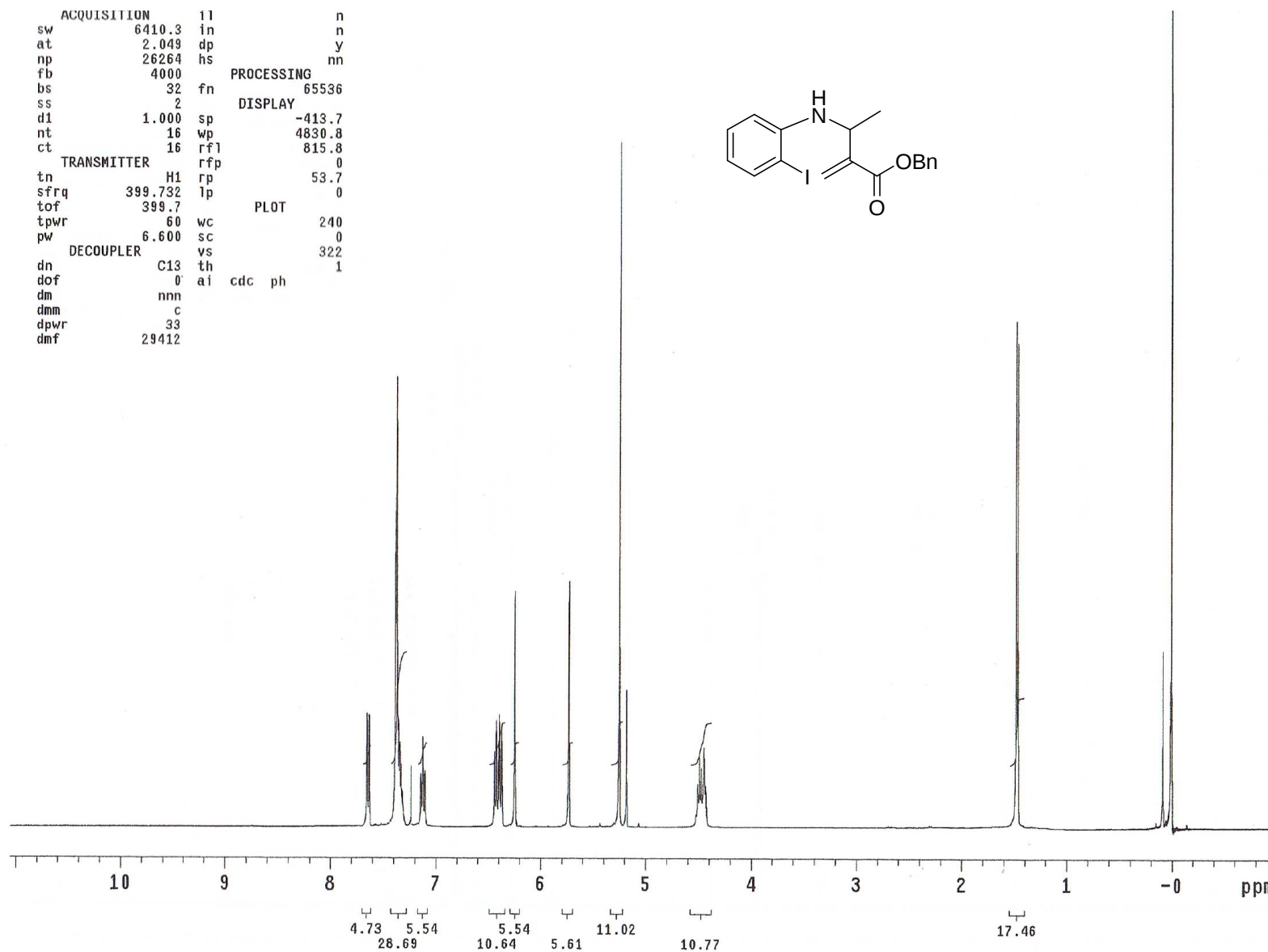
Ethyl 2-methyl-1,5-naphthyridine-3-carboxylate (7b'): ^1H NMR (400 MHz, CDCl_3): δ 1.41 (t, 3H, $J = 7.2$ Hz), 2.98 (s, 3H), 4.42 (q, 2H, $J = 7.2$ Hz), 7.64 (dd, 1H, $J^1 = 8.4$ Hz, $J^2 = 4.0$ Hz), 8.29 (d, 1H, $J = 8.4$ Hz), 8.89 (s, 1H), 8.95 (d, 1H, $J = 3.6$ Hz); ^{13}C NMR (100 MHz, CDCl_3): δ 14.4, 25.6, 61.9, 126.1, 127.4, 136.5, 140.6, 142.1, 144.6, 151.5, 159.7, 166.2; IR (KBr): 2982, 2928, 1725, 1588, 1472, 1263, 1204, 1125, 1065, 934, 832, 784 cm^{-1} .

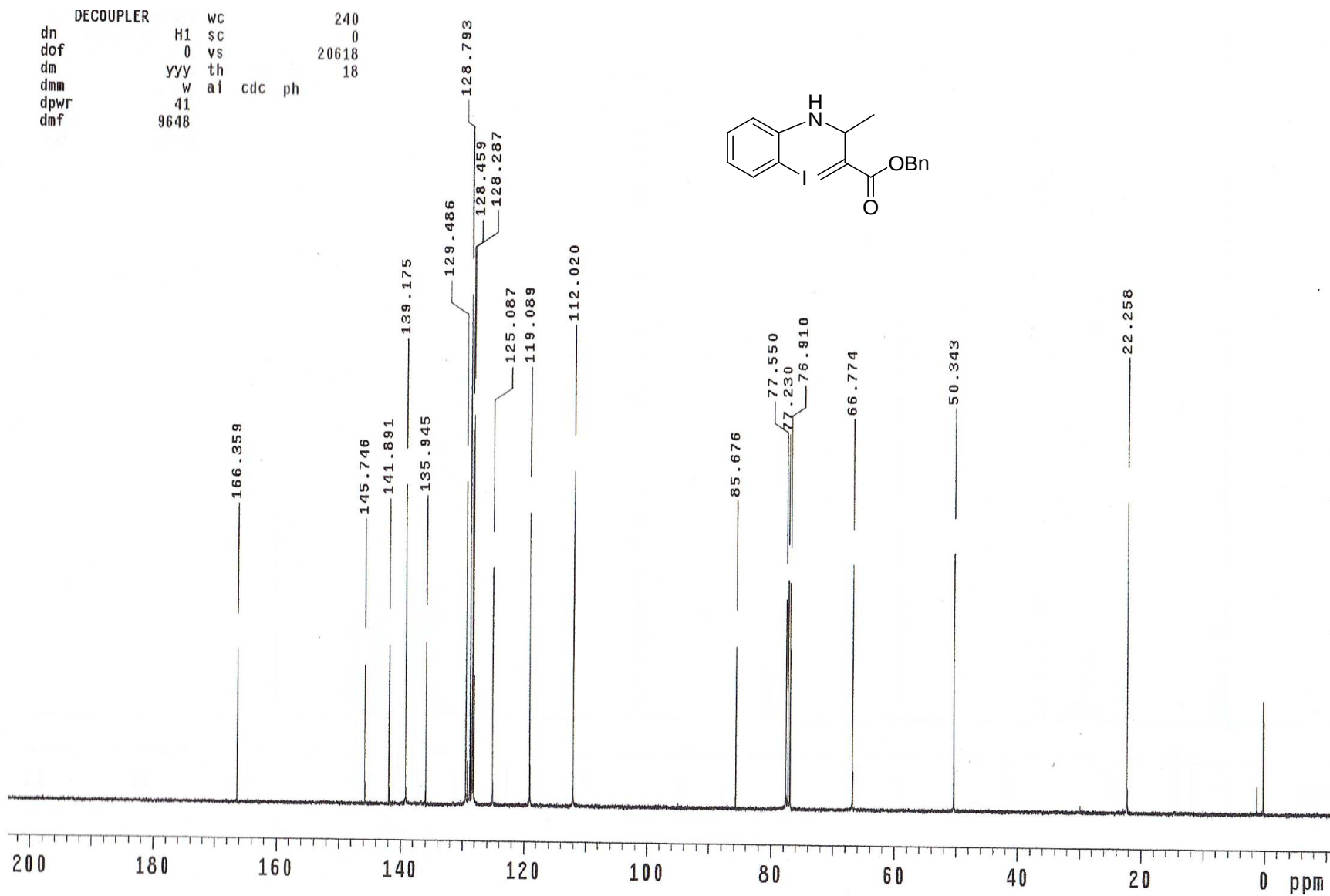
Spectra

Methyl 2-((2-iodophenylamino)methyl)acrylate (1a): ^1H NMR (400 MHz, CDCl_3)

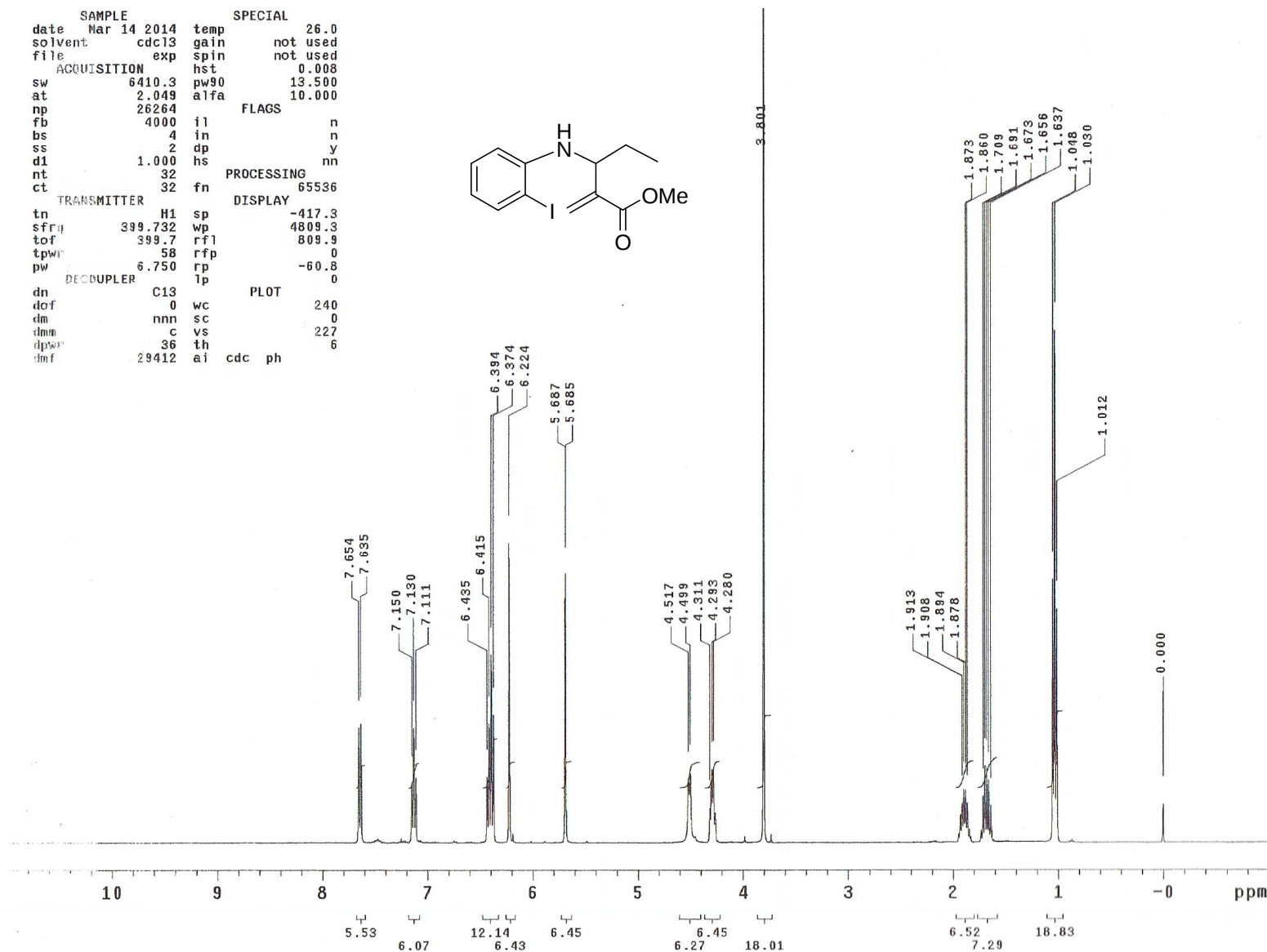
Methyl 2-((2-iodophenylamino)methyl)acrylate (1a): ^1H NMR (400 MHz, CDCl_3)

Benzyl 3-(2-iodophenylamino)-2-methylenebutanoate (1c): ^1H NMR (400 MHz, CDCl_3)



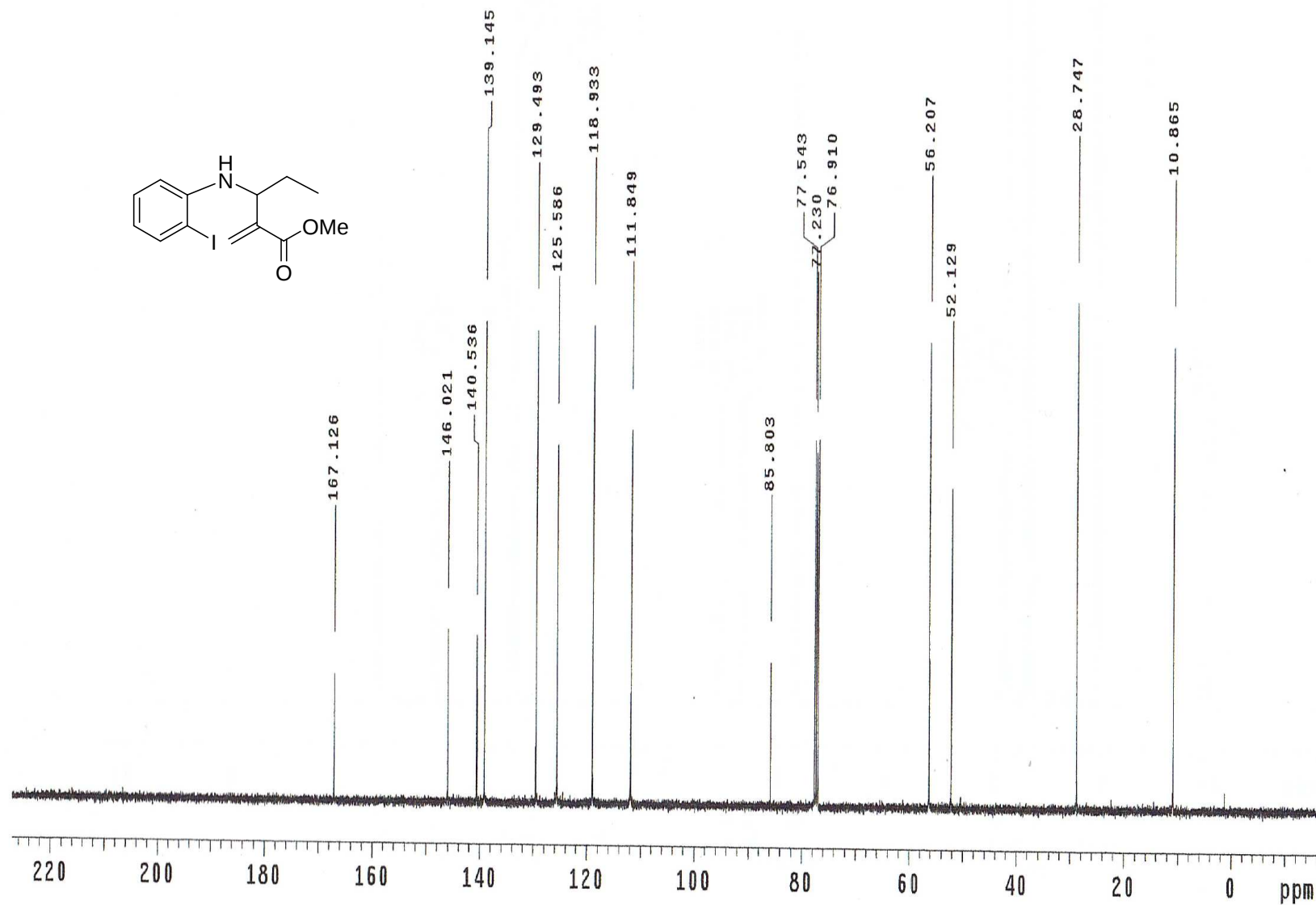
Benzyl 3-(2-iodophenylamino)-2-methylenebutanoate (1c): ^{13}C NMR (100 MHz, CDCl_3)

Methyl 3-(2-iodophenylamino)-2-methylenepentanoate (1d): ^1H NMR (400 MHz, CDCl_3)



Methyl 3-(2-iodophenylamino)-2-methylenepentanoate (1d): ^{13}C NMR (100 MHz, CDCl_3)

at cdc ph

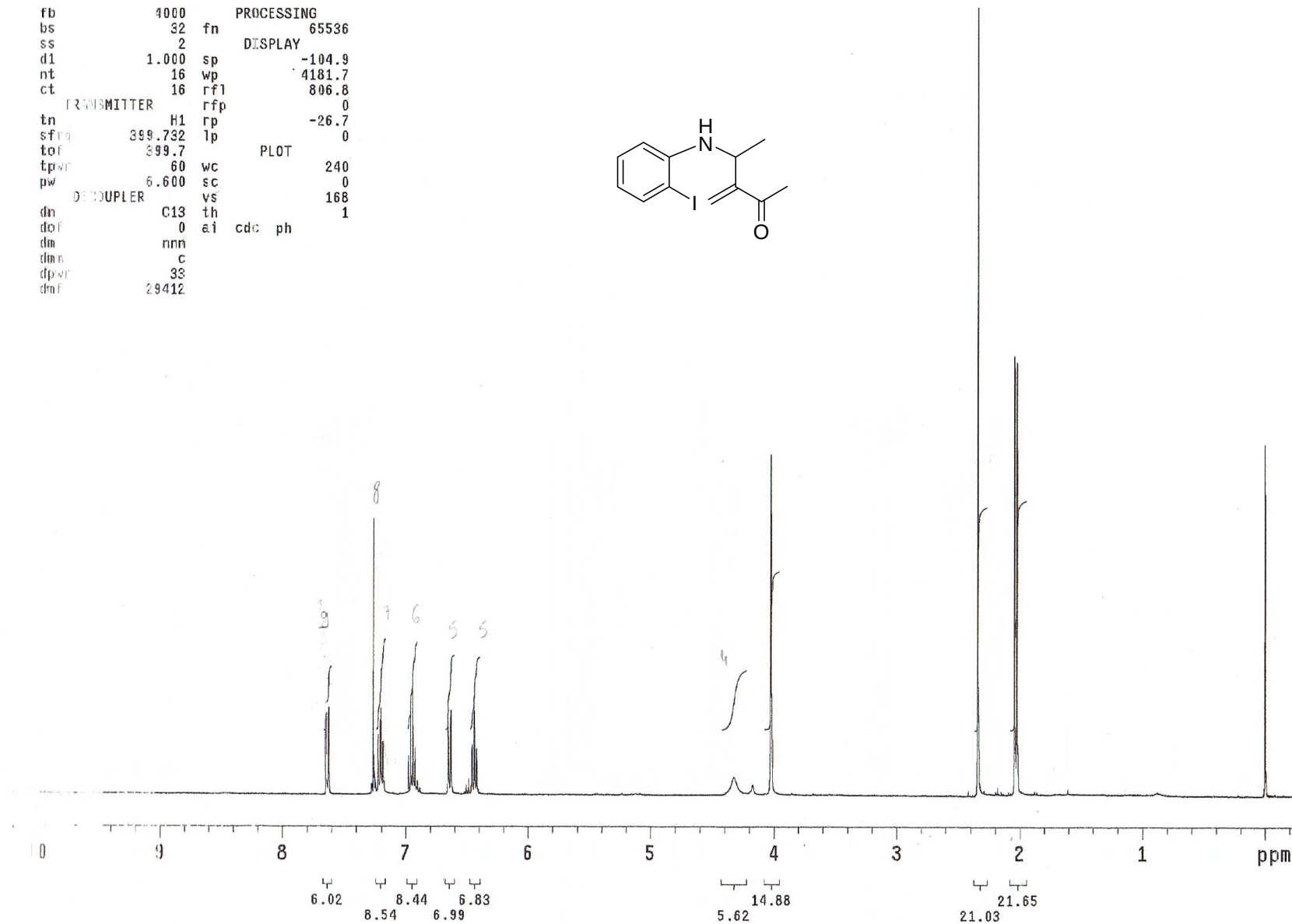
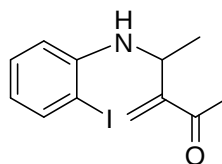


4-(2-iodophenylamino)-3-methylenepentan-2-one (1e): ^1H NMR (400 MHz, CDCl_3)

```

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ss      2      DISPLAY
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nt      16      wp      4181.7
ct      16      rfl      806.8
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tn      H1      rp      -26.7
sfreq    399.732 lp      0
tof      399.7    PLOT
tpwr     60      wc      240
pw      6.600    sc      0
          DECOUPLER vs      168
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dof      0      ai      cdc ph
dm      nnn
dnn      c
dprf     33
dnf      29412

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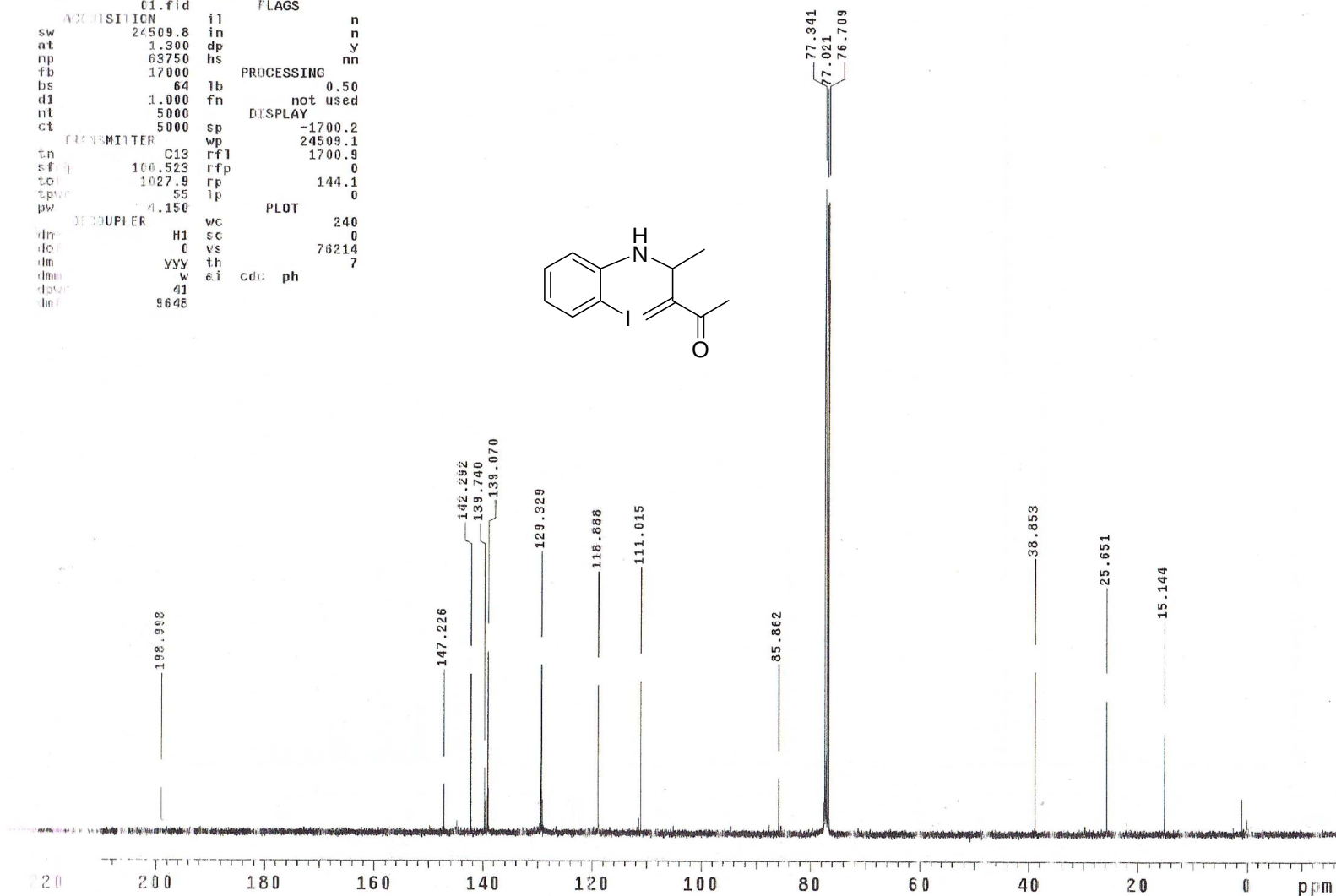
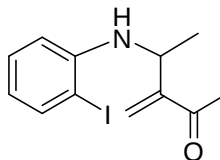


4-(2-iodophenylamino)-3-methylenepentan-2-one (1e): ^{13}C NMR (100 MHz, CDCl_3)

```

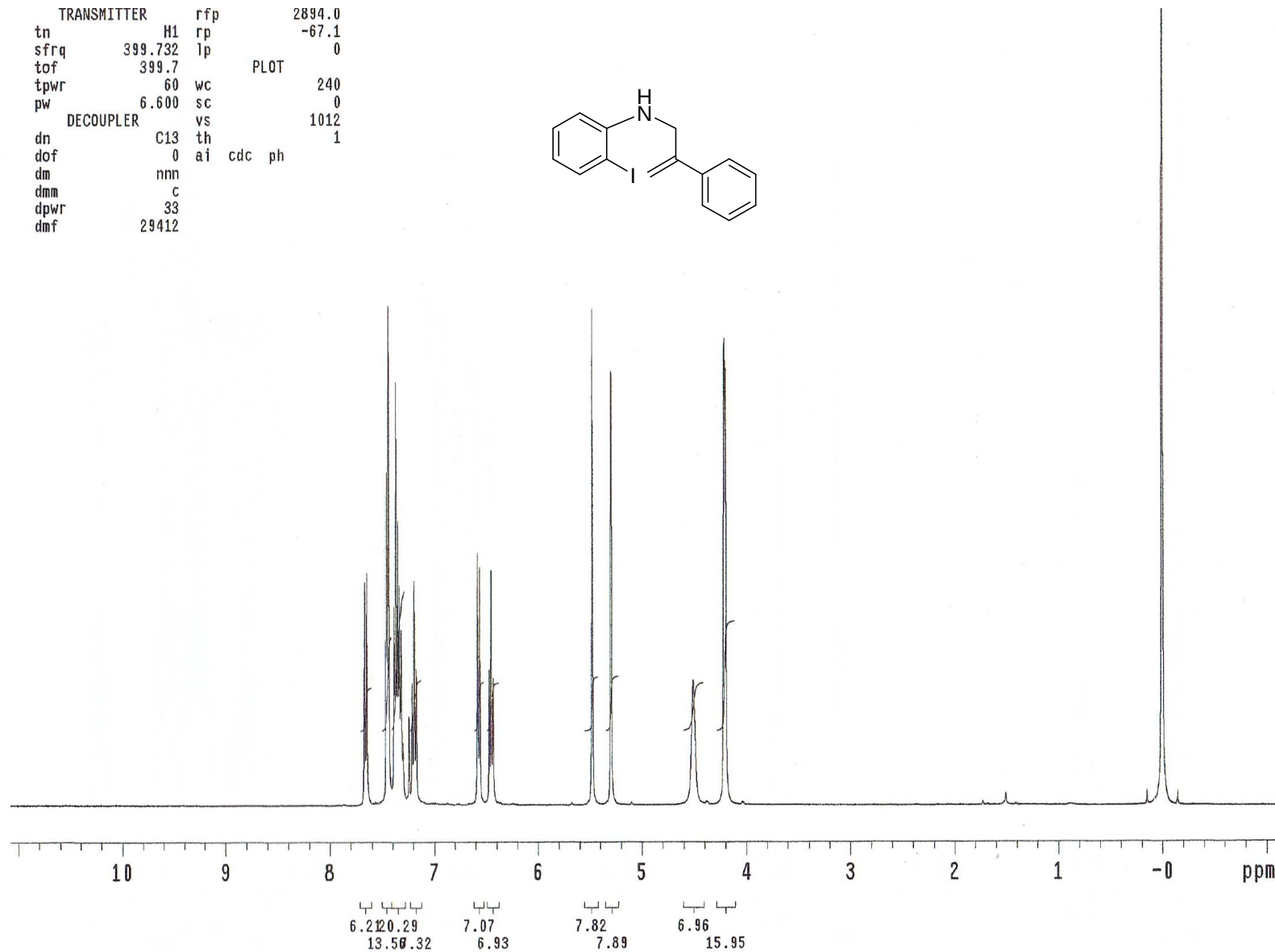
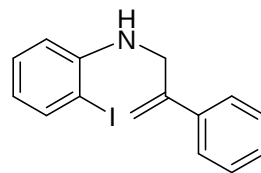
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solvent cdc13 gain       30
file /home/gallo/v spin    not used
nmr sys date/auto_2 hst     0.008
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19:00:1502, Carbon_ alfa    10.000
01.fid          FLAGS      n
ACQUISITION     il         n
sw 24509.8 in          n
at 1.300 dp           y
np 63750 hs          nn
fb 17000
bs 64 lb PROCESSING 0.50
d1 1.000 fn not used
nt 5000 DISPLAY
ct 5000 sp -1700.2
PRISMILLER      wp 24509.1
tn C13 rfl 1700.9
sf 100.523 rfp 0
to 1027.9 rpp 144.1
tpw 55 lp 0
pw 4.150 PLOT
DECOUPLER       vc 240
dm H1 sc 0
dof 0 vs 76214
dm yy th 7
dmm w ai cdc ph
dwc 41
dmf 9648

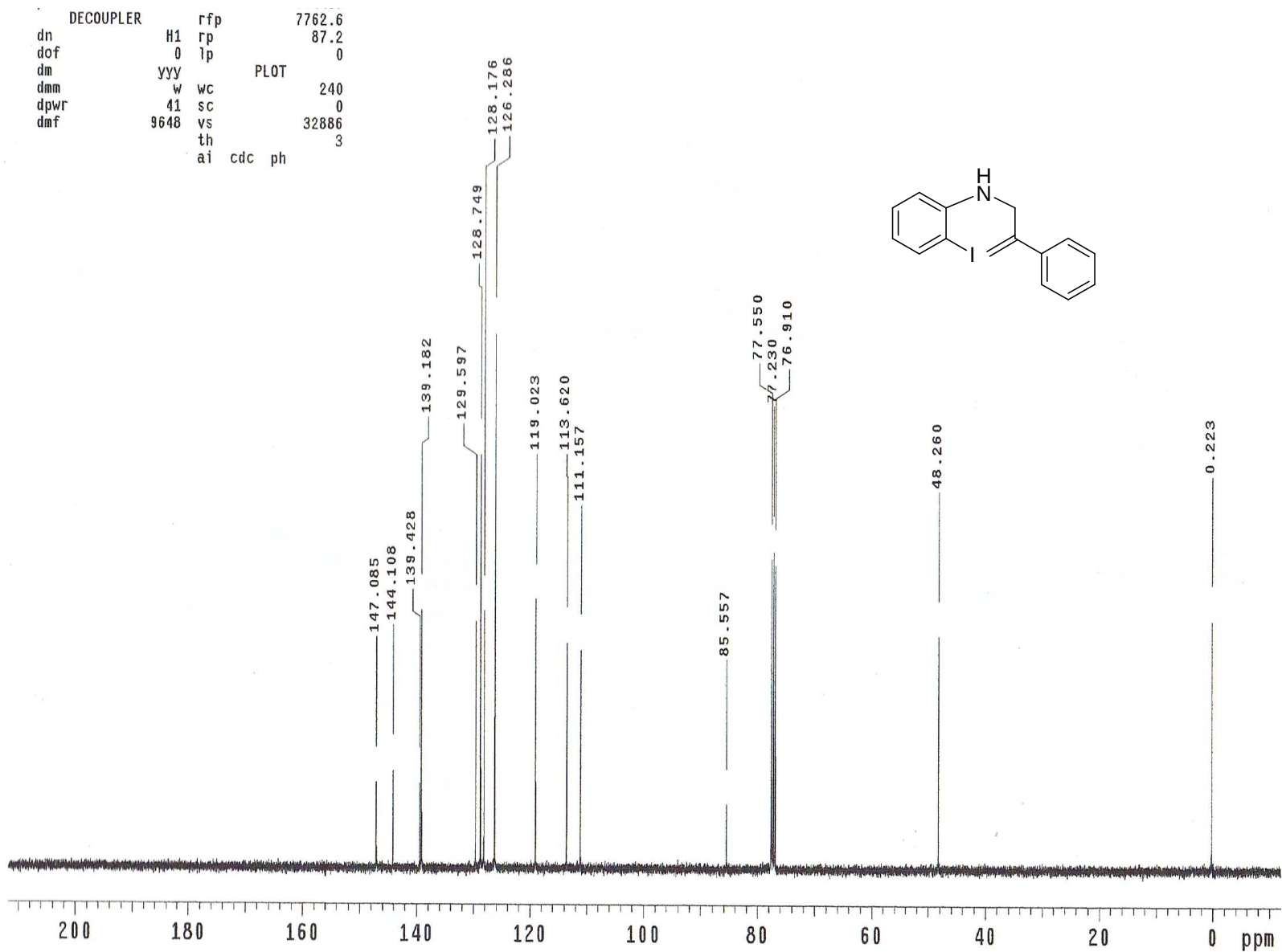
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2-Iodo-N-(2-phenylallyl)benzenamine (1f): ^1H NMR (400 MHz, CDCl_3)

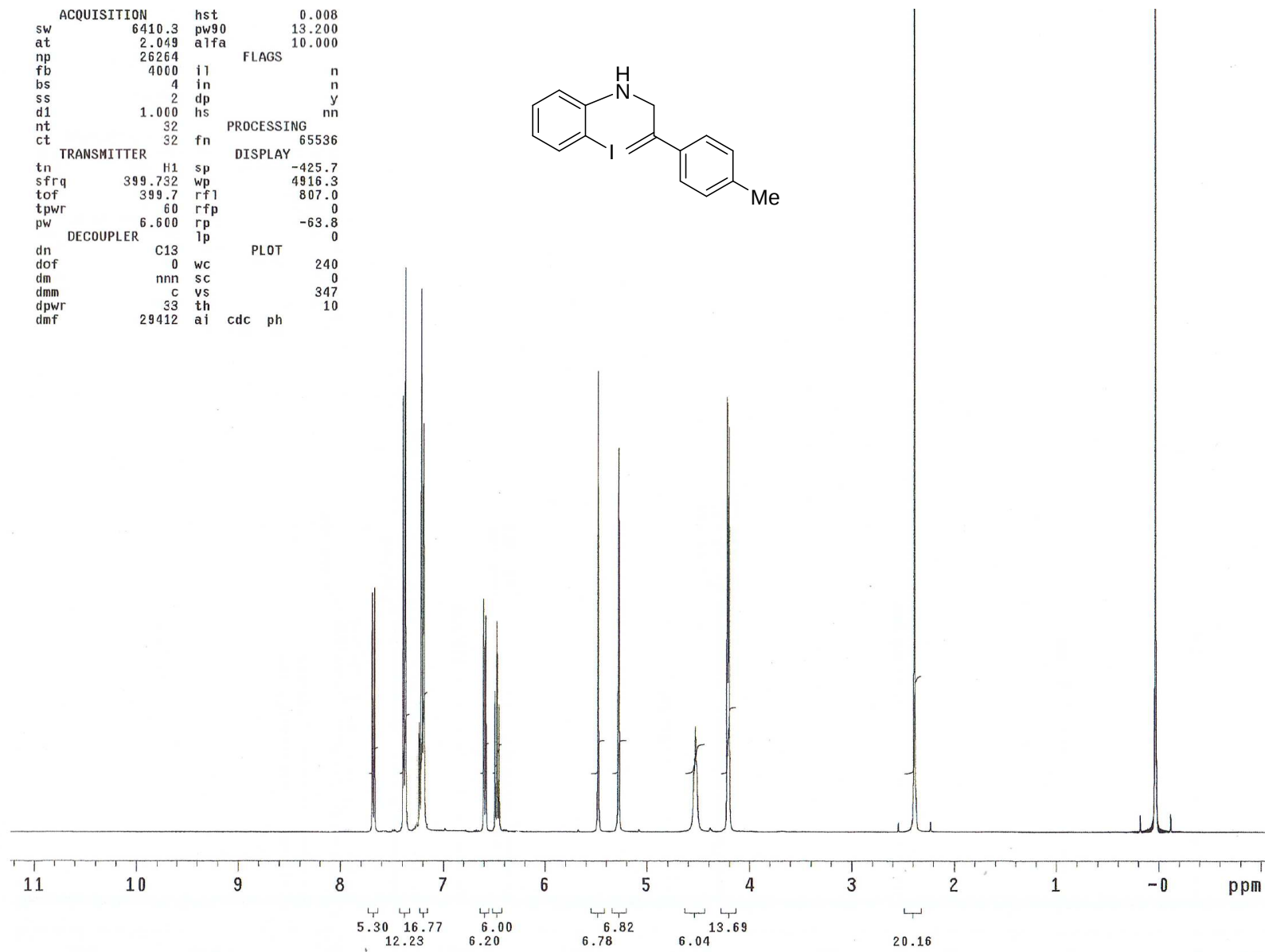
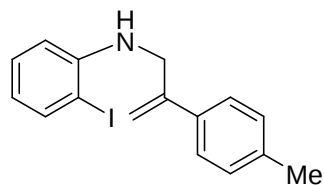
TRANSMITTER rfp 2894.0
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 DECOUPLER C13 vs 1012
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 dof 0 ai cdc ph
 dm nnn
 dmm c
 dpwr 33
 dmf 29412



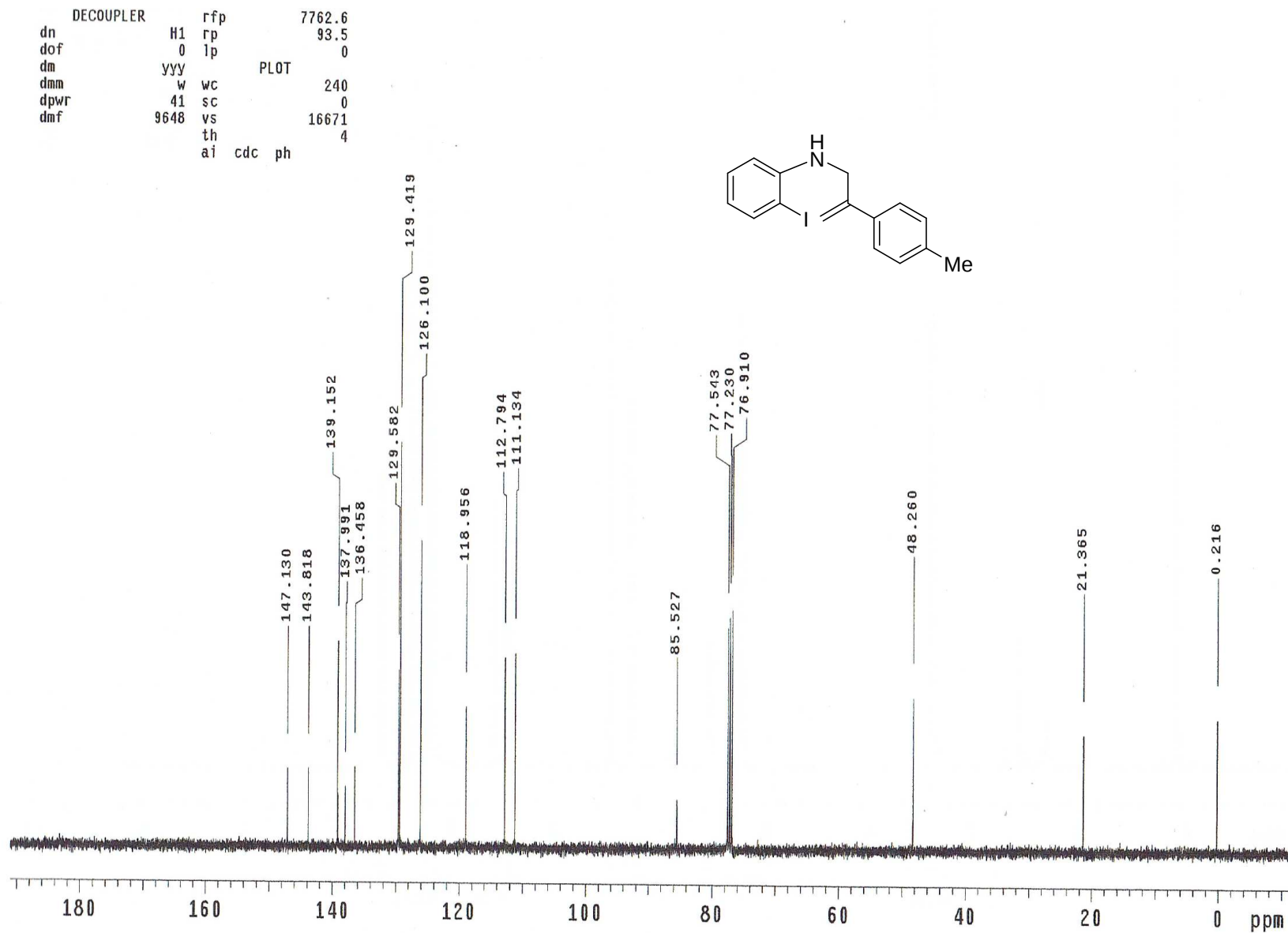
2-Iodo-N-(2-phenylallyl)benzenamine (1f): ^{13}C NMR (100 MHz, CDCl_3)

2-Iodo-N-(2-p-tolylallyl)benzenamine (1g): ^1H NMR (400 MHz, CDCl_3)

ACQUISITION		hst	0.008
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np	26264	FLAGS	
fb	4000	il	n
bs	4	in	n
ss	2	dp	y
d1	1.000	hs	nn
nt	32	PROCESSING	
ct	32	fn	65536
TRANSMITTER		DISPLAY	
tn	H1	sp	-425.7
sfrq	399.732	wp	4916.3
tof	399.7	rfl	807.0
tpwr	60	rfp	0
pw	6.600	rp	-63.8
DECOUPLER		lp	0
dn	C13	PLOT	
dof	0	wc	240
dm	nnn	sc	0
dmm	c	vs	347
dpwr	33	th	10
dmf	29412	ai	cdc ph

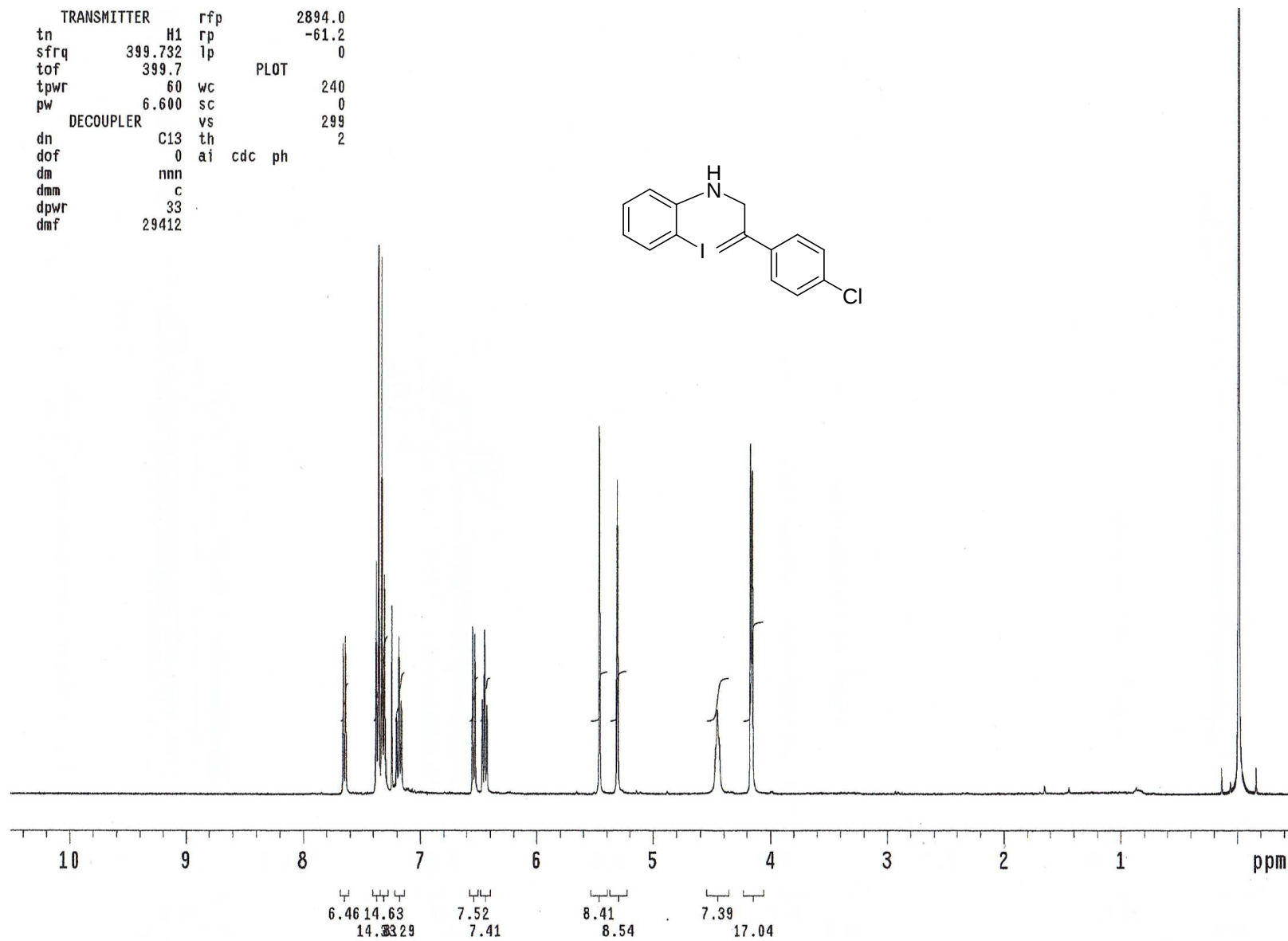
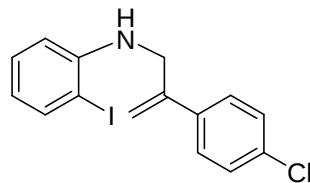


2-Iodo-N-(2-p-tolylallyl)benzenamine (1g): ^{13}C NMR (100 MHz, CDCl_3)



N-(2-(4-chlorophenyl)allyl)-2-iodobenzenamine (1h): ^1H NMR (400 MHz, CDCl_3)

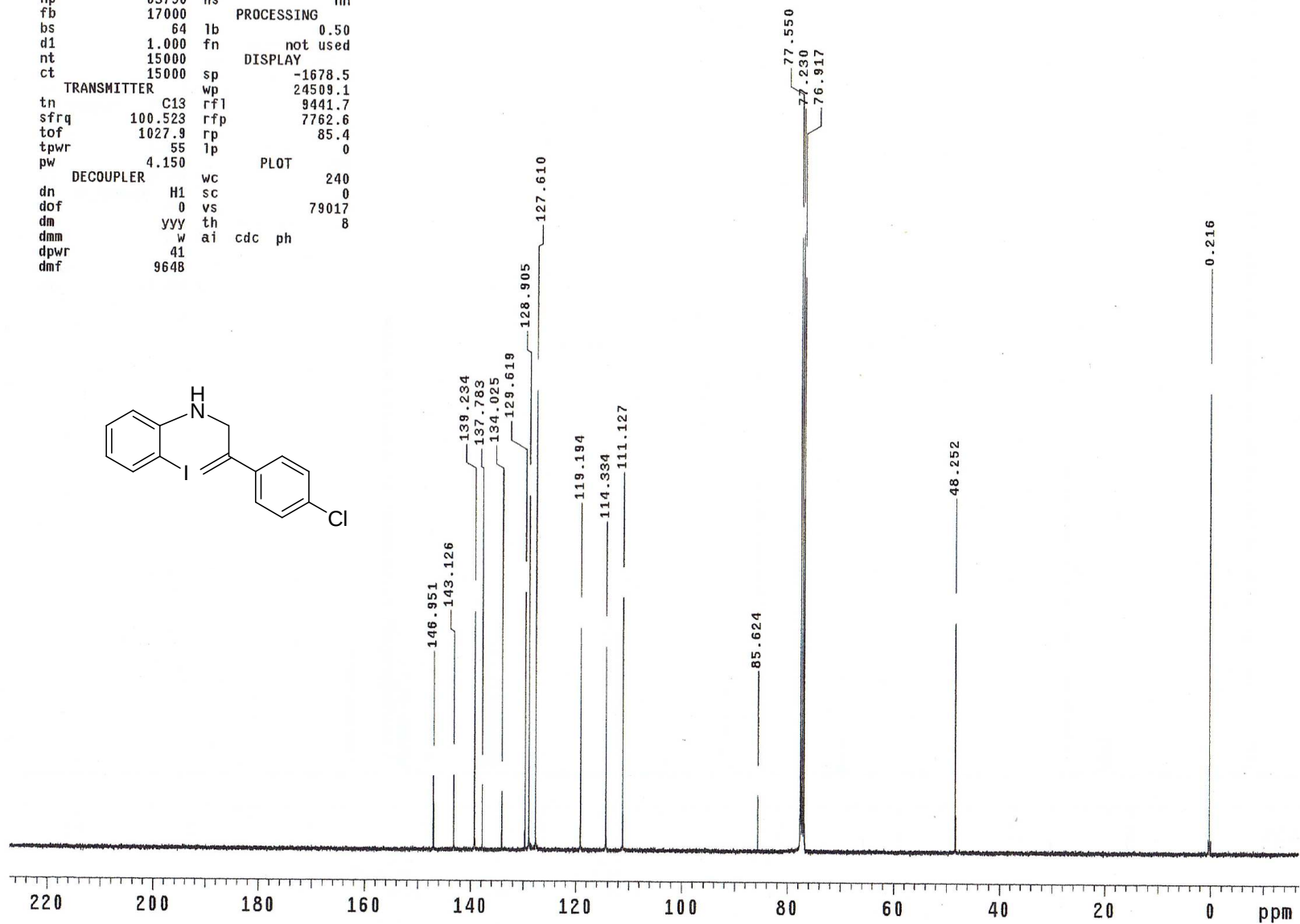
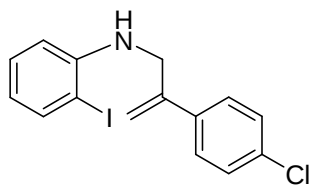
TRANSMITTER rfp 2894.0
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 sfrq 399.732 lp 0
 tof 399.7 PLOT
 tpwr 60 wc 240
 pw 6.600 sc 0
 DECOUPLER vs 299
 dn C13 th 2
 dof 0 ai cdc ph
 dm nnn
 dnm c
 dpwr 33
 dmf 29412



N-(2-(4-chlorophenyl)allyl)-2-iodobenzenamine (1h): ^{13}C NMR (100 MHz, CDCl_3)

```

np      63750  hs      nn
fb      17000  PROCESSING
bs      64    lb      0.50
d1      1.000  fn      not used
nt      15000  DISPLAY
ct      15000  sp      -1678.5
          TRANSMITTER wp      24509.1
tn      C13   rfl      9441.7
sfrq    100.523 rfp      7762.6
tof     1027.9 rp       85.4
tpwr    55    lp       0
pw      4.150  PLOT
          DECOUPLER wc      240
dn      H1    sc      0
dof     0    vs      79017
dm      yy   th      8
dmm     w    ai      cdc ph
dpwr    41
dmf     9648
  
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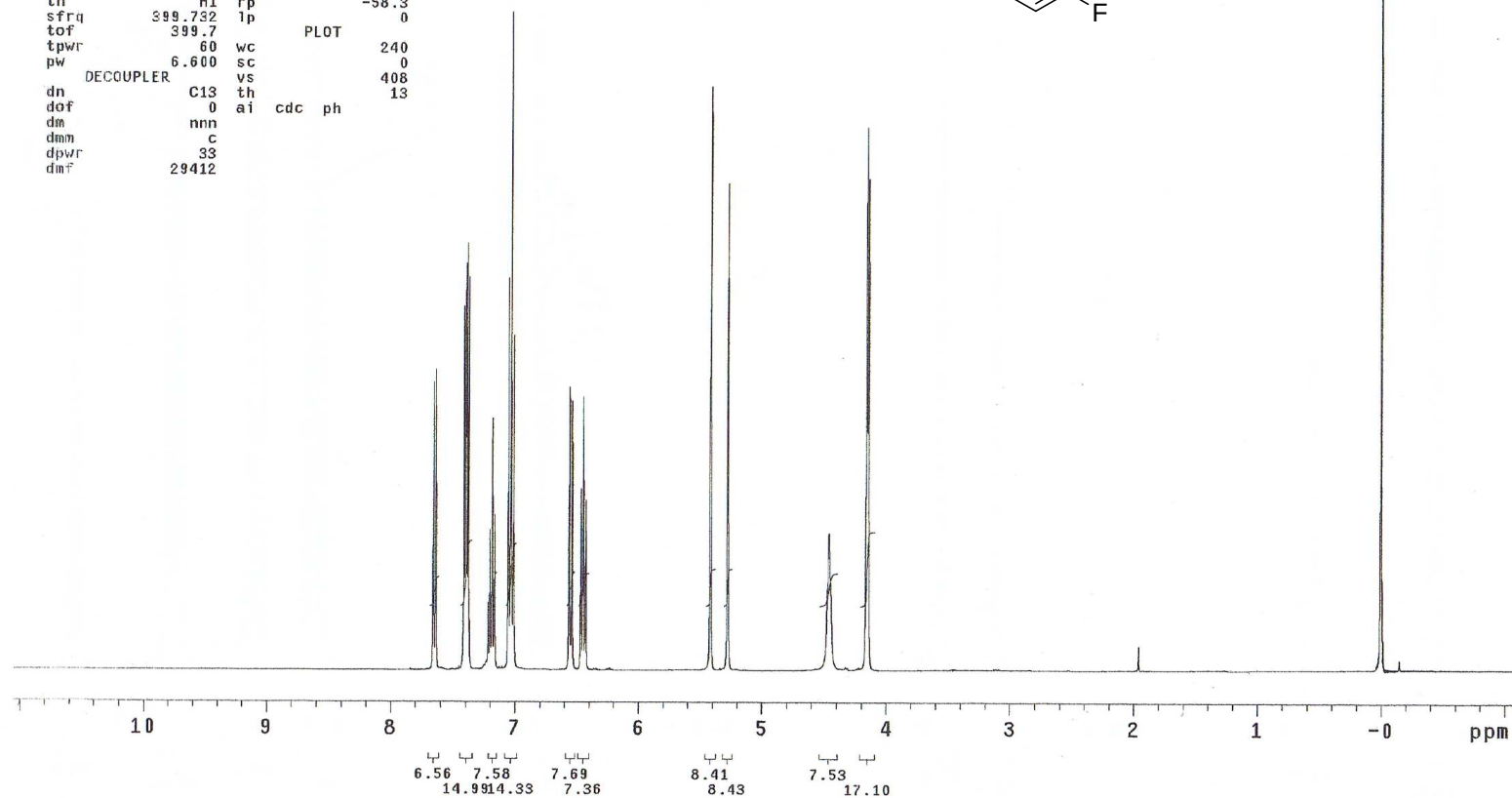
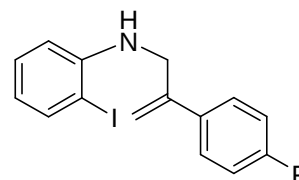


N-(2-(4-fluorophenyl)allyl)-2-iodobenzenamine (1i): ^1H NMR (400 MHz, CDCl_3)

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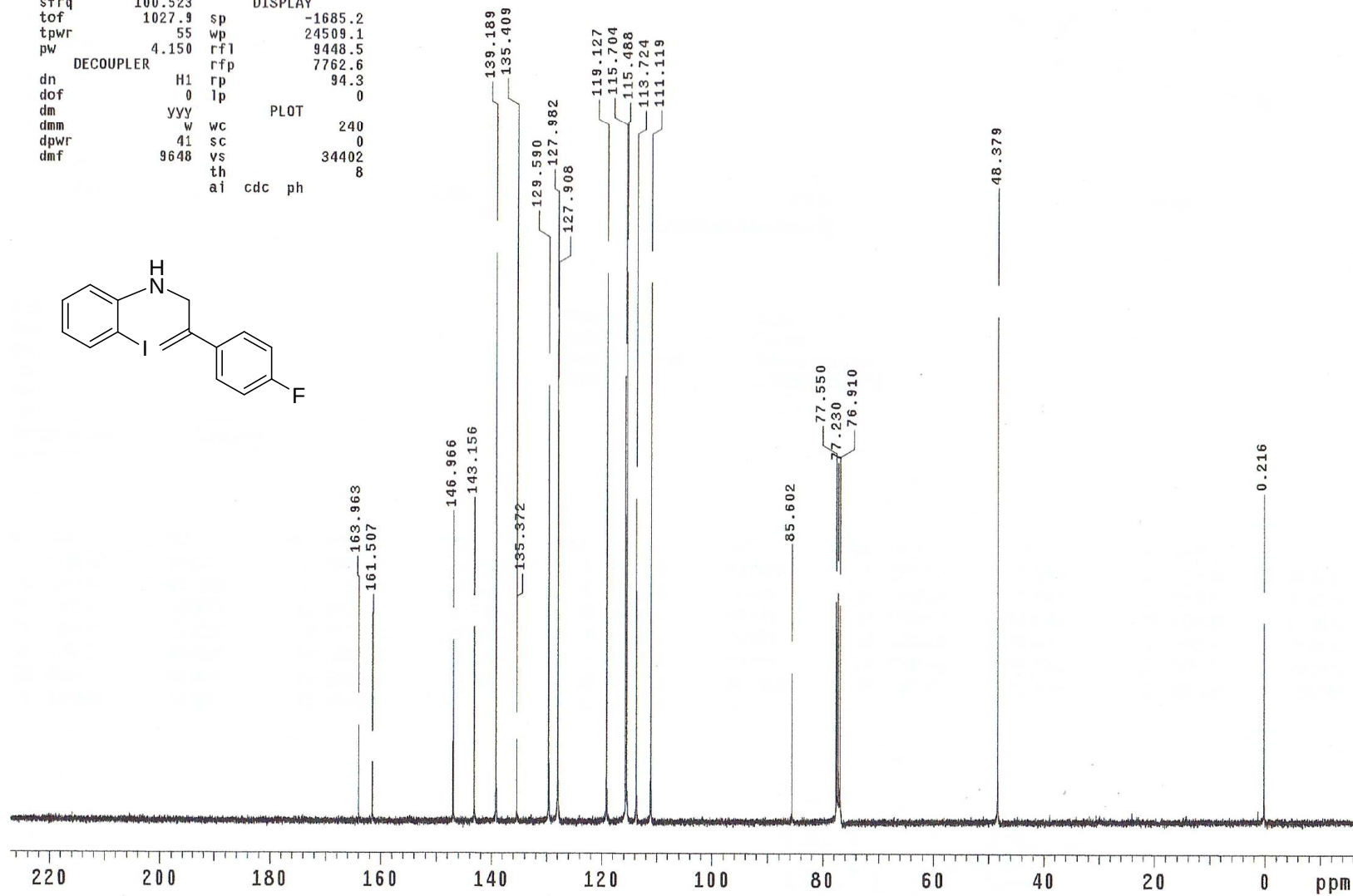
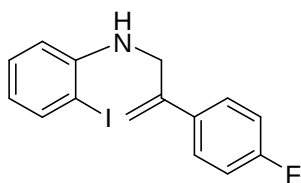
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file   /home/gallo/v~ spin    not used
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014.01.14/s_201403~ pw90     13.200
28_0M-2902/Proton~ alfa     10.000
01.fid
ACQUISITION
sw      6410.3      il      n
at      2.049      in      n
np      26264      dp      y
fb      4000       hs      nn
bs      32         fn      65536
ss      2          PROCESSING
d1      1.000      sp      -437.8
nt      32         wp      4854.6
ct      32         rf1     823.0
TRANSMITTER
tn      H1         rfp     0
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tpwr     60       wc      240
pw      6.600     sc      0
DECOUPLER
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dm      nnn       ai      cdc ph
dmm      C
dpwr     33
dmr     29412

```



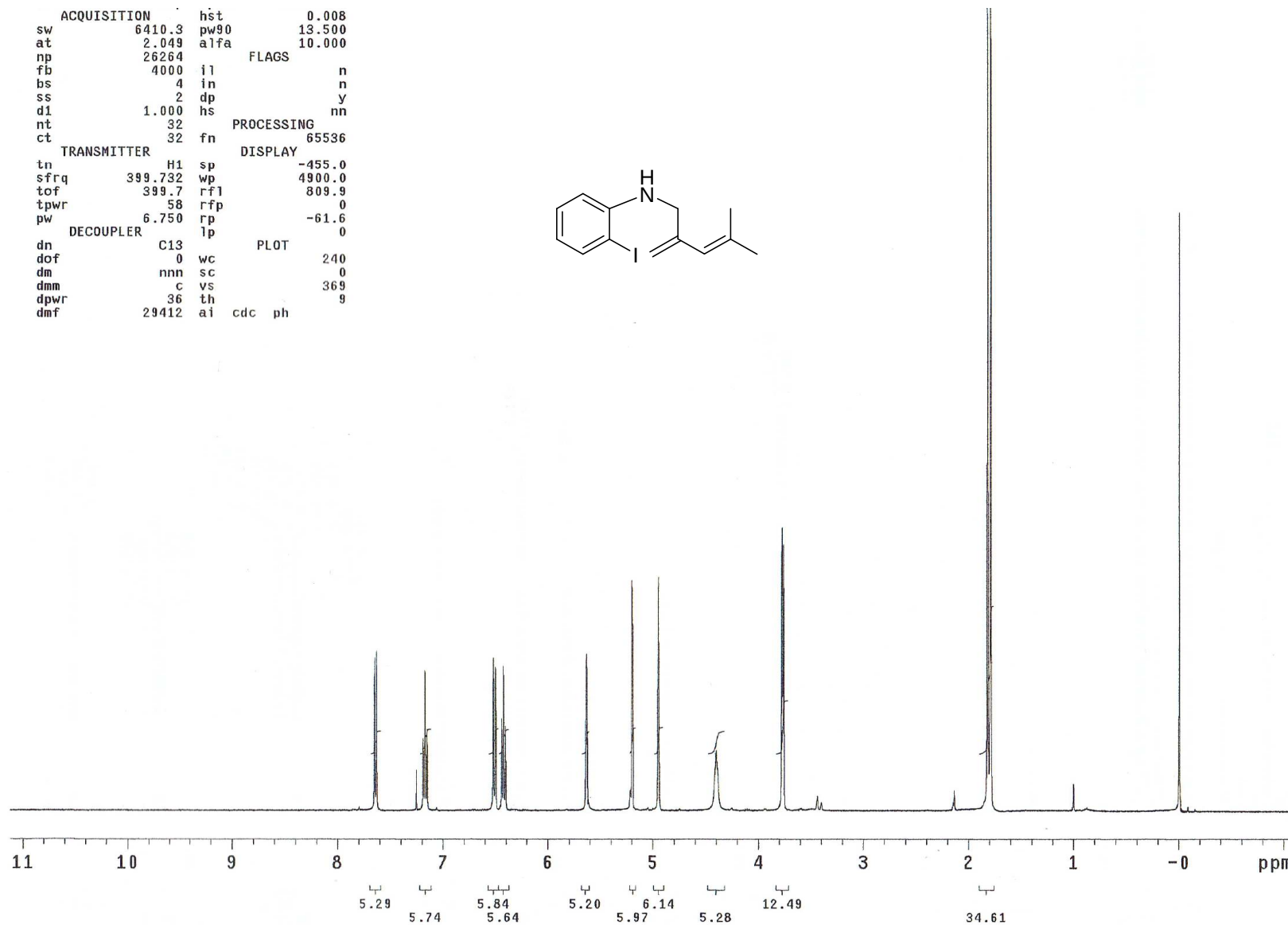
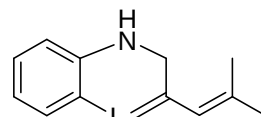
N-(2-(4-fluorophenyl)allyl)-2-iodobenzenamine (1i): ^{13}C NMR (100 MHz, CDCl_3)

TRANSMITTER	lb	0.50
tn	C13	fn not used
sfrq	100.523	DISPLAY
tof	1027.9	sp -1685.2
tpwr	55	wp 24509.1
pw	4.150	rfl 9448.5
DECOUPLER	rfl	7762.6
dn	H1	rp 94.3
dof	0	lp 0
dm	yyy	PLOT
dmm	w	wc 240
dpwr	41	sc 0
dmf	9648	vs 34402
	th	8
	ai	cdc ph

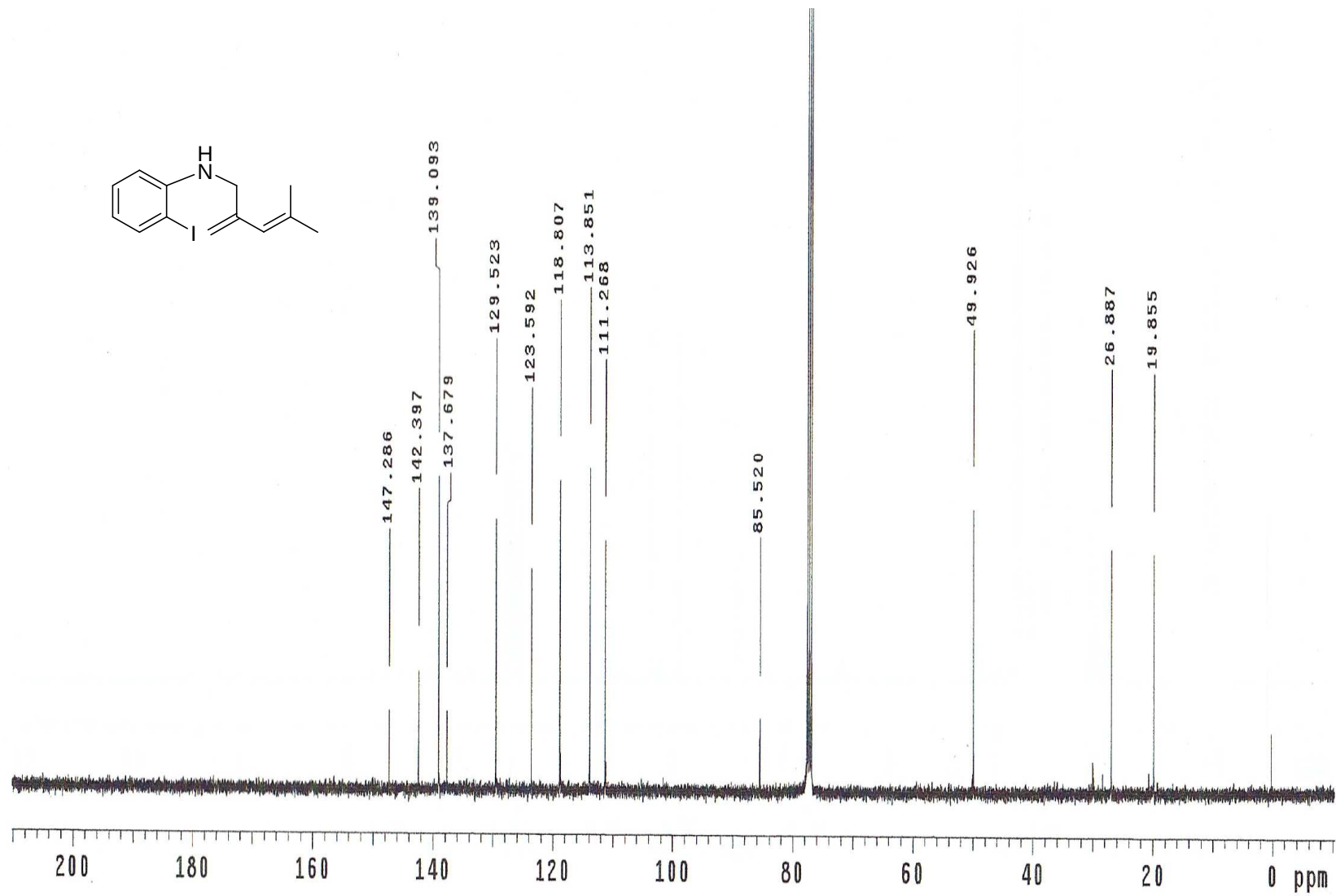


2-Iodo-N-(4-methyl-2-methylenepent-3-enyl)benzenamine (1j): ^1H NMR (400 MHz, CDCl_3)

ACQUISITION		hst	0.008
sw	6410.3	pw90	13.500
at	2.049	alfa	10.000
np	26264	FLAGS	
fb	4000	il	n
bs	4	in	n
ss	2	dp	y
d1	1.000	hs	nn
nt	32	PROCESSING	
ct	32	fn	65536
TRANSMITTER		DISPLAY	
tn	H1	sp	-455.0
sfrq	399.732	wp	4900.0
tof	399.7	rfl	809.9
tpwr	58	rfp	0
pw	6.750	rp	-61.6
DECOUPLER		lp	0
dn	C13	PLOT	
dof	0	wc	240
dm	nnn	sc	0
dmm	c	vs	369
dpwr	36	th	9
dmf	29412	ai	cdc ph



2-Iodo-N-(4-methyl-2-methylenepent-3-enyl)benzenamine (**1j**): ^{13}C NMR (100 MHz, CDCl_3)

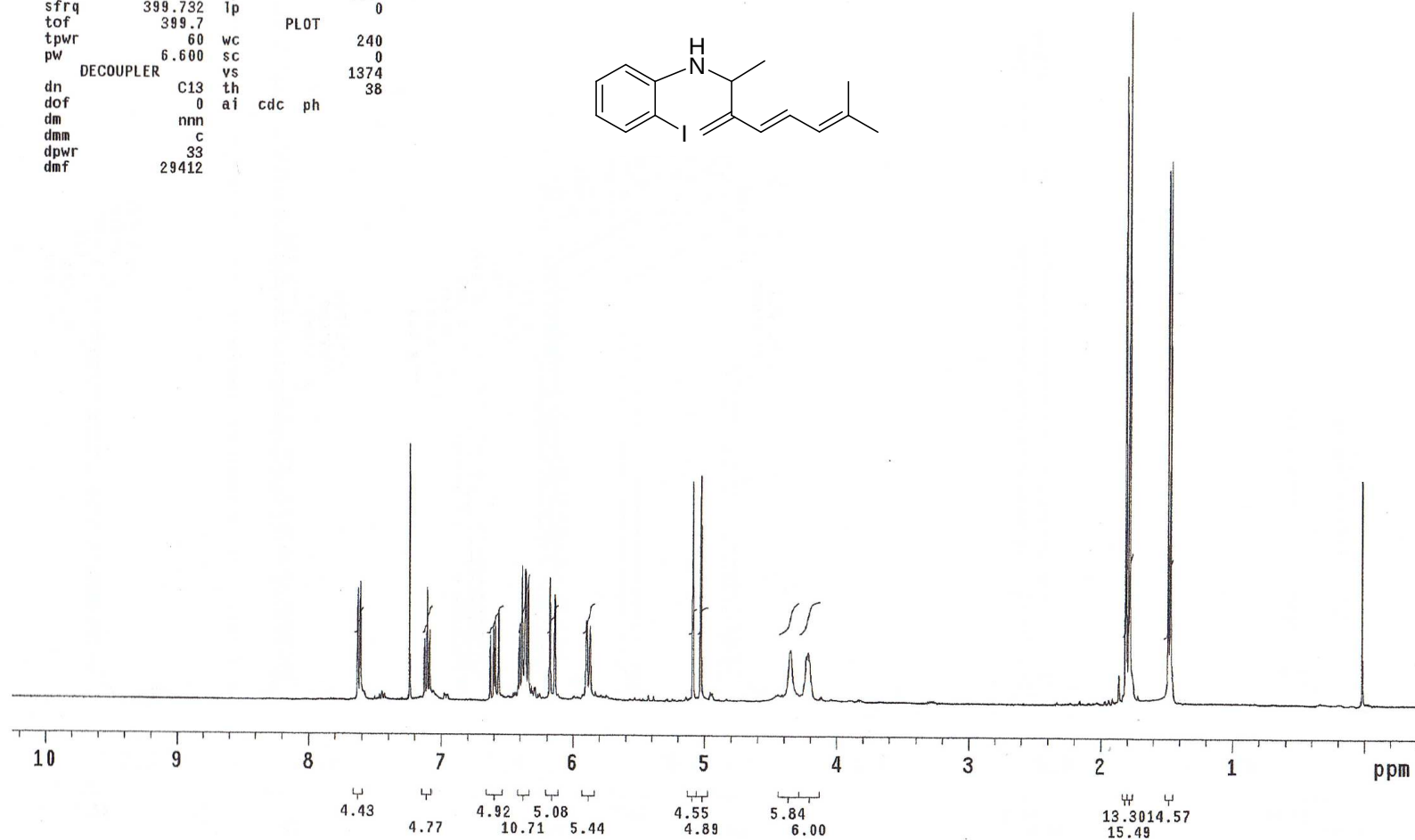
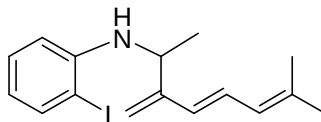


2-Iodo-N-((E)-7-methyl-3-methylenoocta-4,6-dien-2-yl)benzenamine (1k): ^1H NMR (400 MHz, CDCl_3)

```

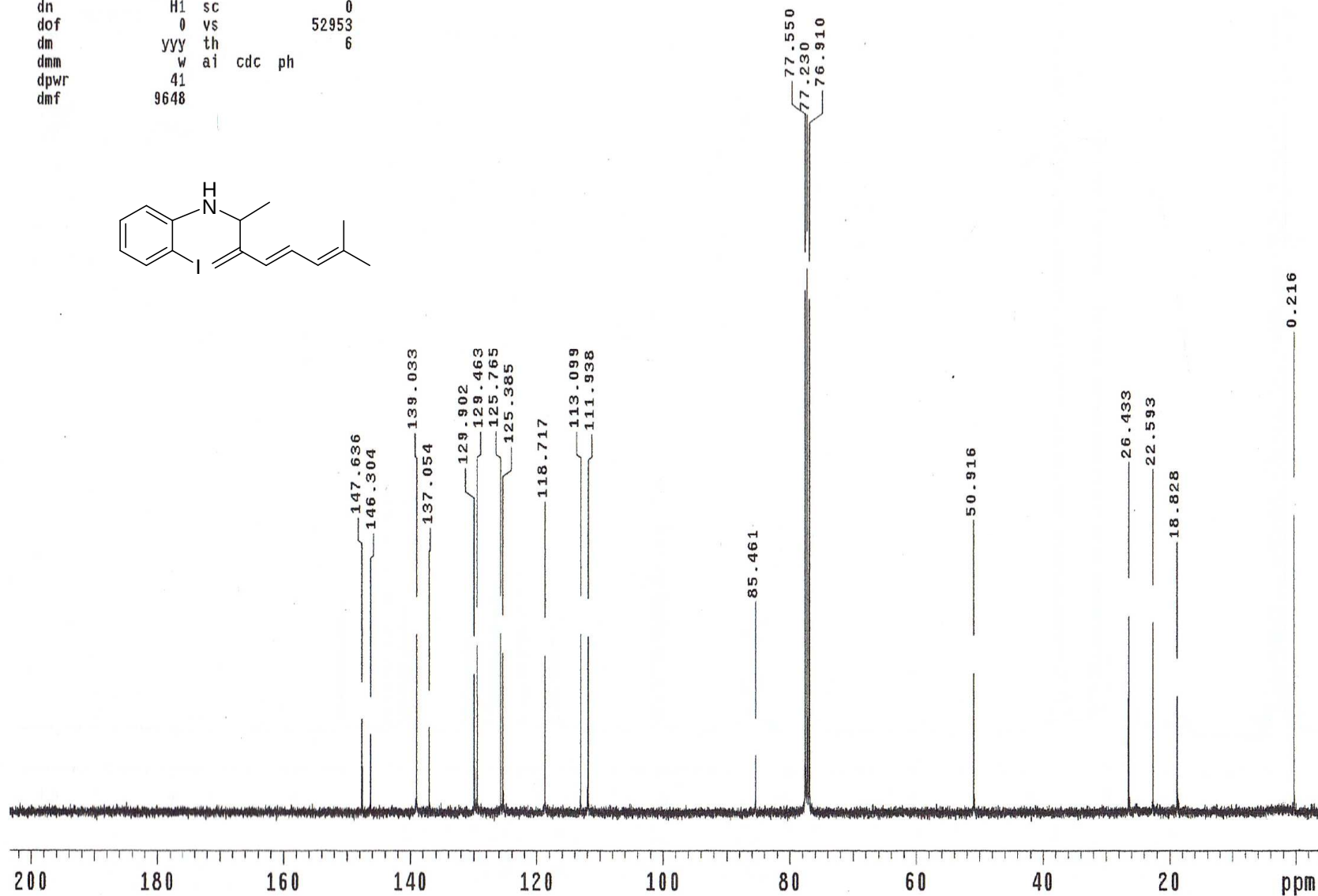
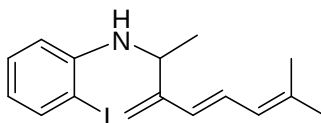
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bs      32      fn      65536
ss      2
d1      1.000    sp      -161.0
nt      32      wp      4259.0
ct      32      rfl     3709.8
TRANSMITTER      rfp     2894.0
tn      H1      rp      -44.9
sfrq     399.732 lp      0
tof      399.7
tpwr     60      wc      240
pw      6.600    sc      0
DECOUPLER      C13    th     1374
dn      0      ai cdc ph 38
dof      0
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dmm      c
dpwr     33
dmf     29412

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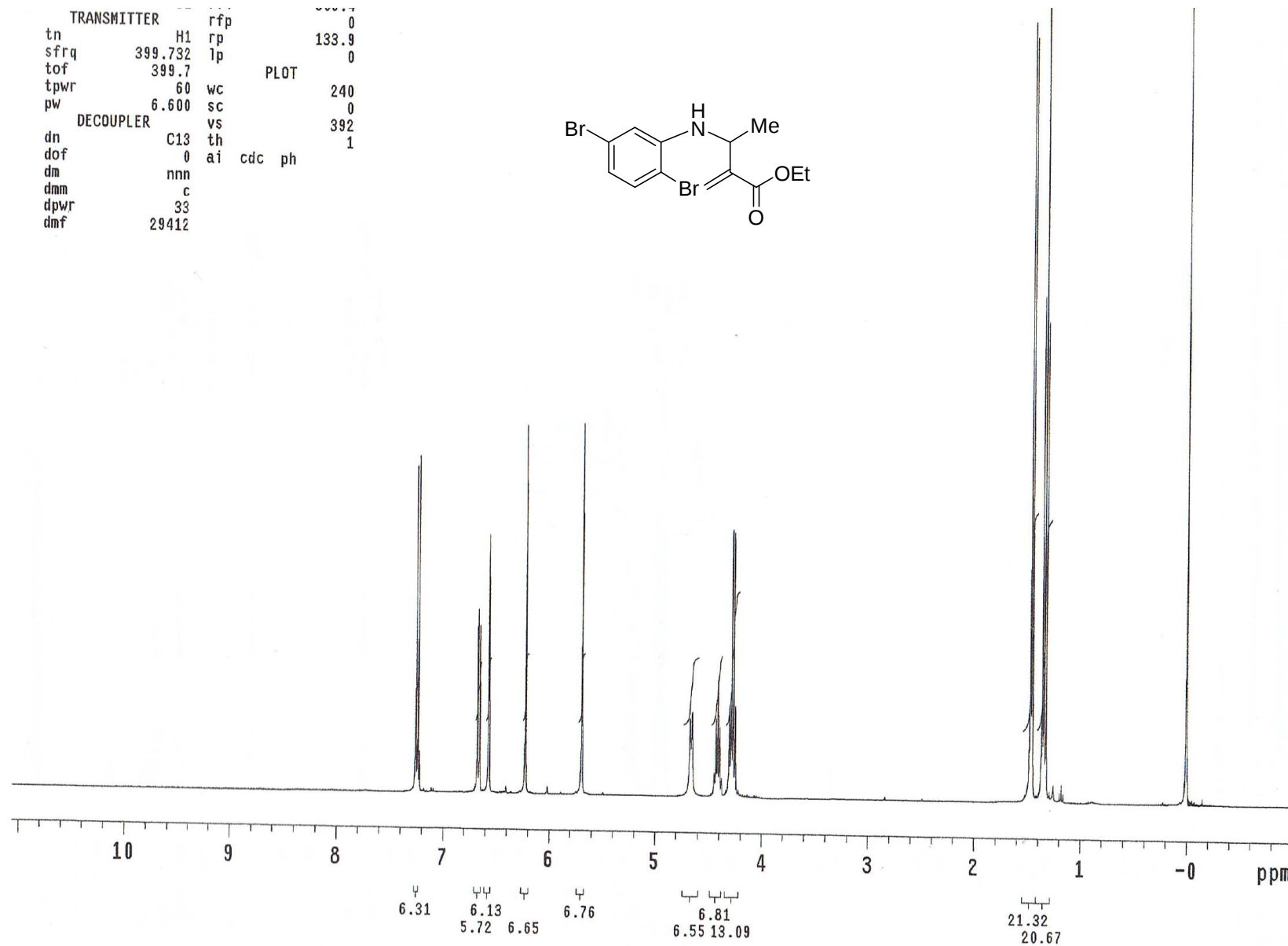
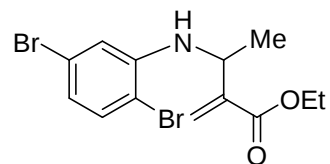
2-Iodo-N-((E)-7-methyl-3-methylenoocta-4,6-dien-2-yl)benzenamine (1k): ^{13}C NMR (100 MHz, CDCl_3)

DECOUPLER	wc	240
dn	H1	sc
dof	0	vs
dm	yyy	th
dmm	w	ai
dpwr	41	cdc
dmf	9648	ph

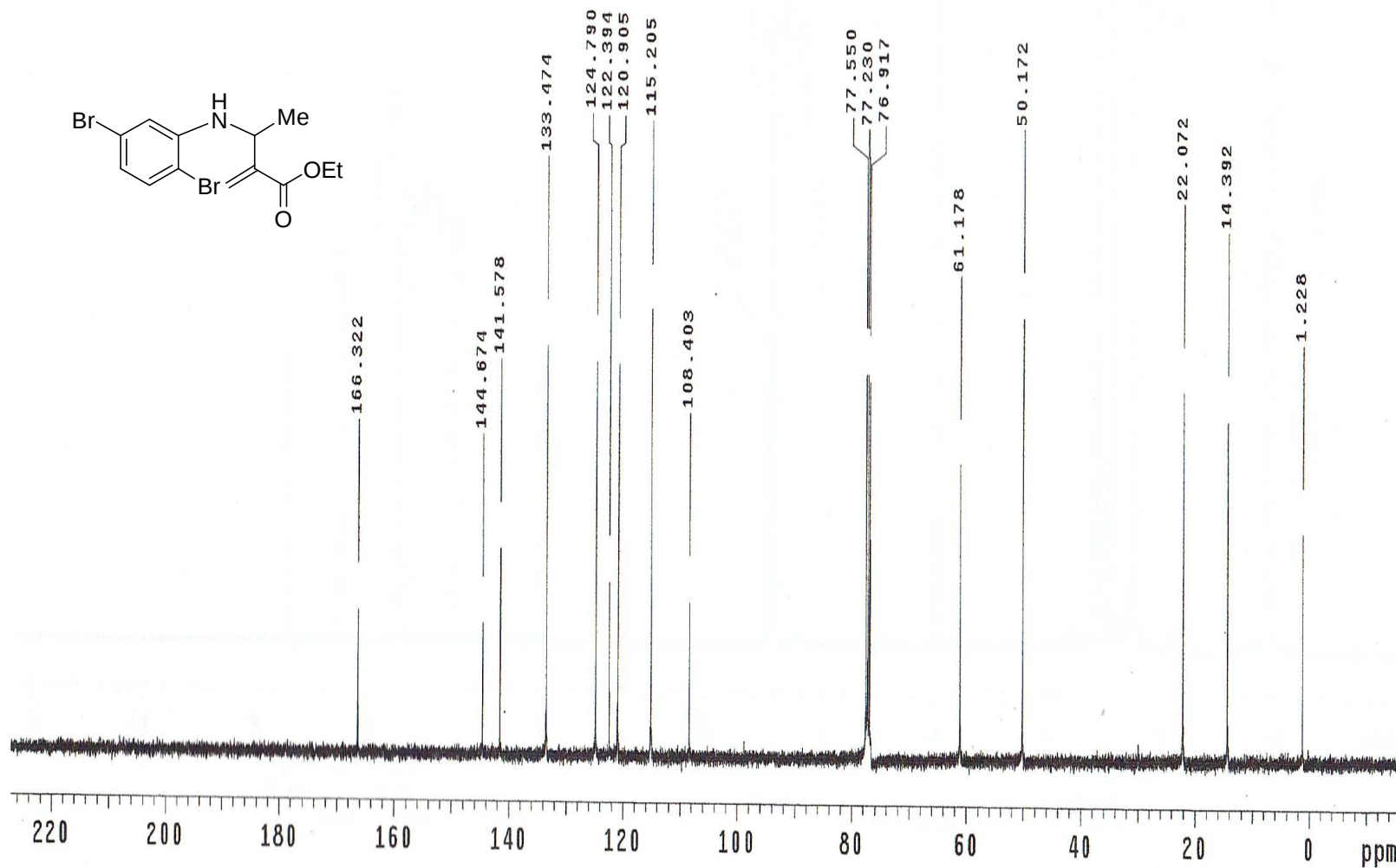


Ethyl 3-(2,5-dibromophenylamino)-2-methylenebutanoate (3b): ^1H NMR (400 MHz, CDCl_3)

TRANSMITTER
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 sfrq 399.732 rp 133.9
 tof 399.7 lp 0
 tpwr 60 wc PLOT 240
 pw 6.600 sc 0
 DECOUPLER C13 vs 392
 dn 0 ai cdc ph 1
 dof nnn
 dm c
 dmm
 dpwr 33
 dmf 29412



Ethyl 3-(2,5-dibromophenylamino)-2-methylenebutanoate (3b): ^{13}C NMR (100 MHz, CDCl_3)

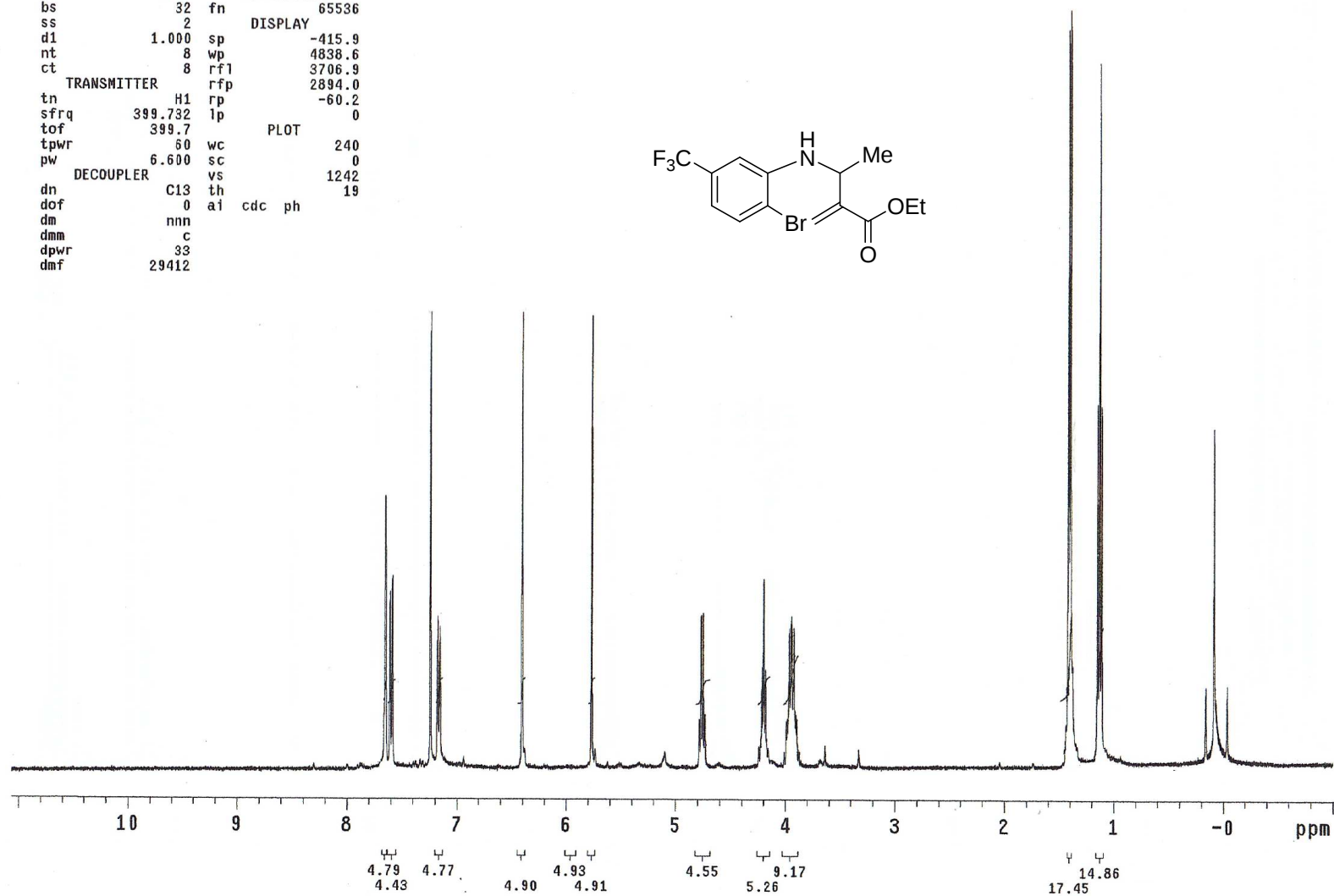
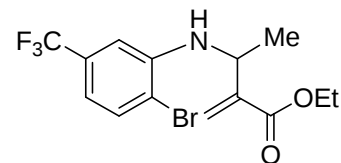


Ethyl 3-(2-bromo-5-(trifluoromethyl)phenylamino)-2-methylenebutanoate (4b): ^1H NMR (400 MHz, CDCl_3)

```

ACQUISITION      il      n
sw      6410.3    in      n
at      2.049    dp      y
np      26264    hs      nn
fb      4000
bs      32      fn      PROCESSING 65536
ss      2      DISPLAY
d1      1.000    sp      -415.9
nt      8      wp      4838.6
ct      8      rfl      3706.9
TRANSMITTER      rfp      2894.0
tn      H1      rp      -60.2
sfrq     399.732 lp      0
tof      399.7      PLOT
tpwr     60      wc      240
pw      6.600    sc      0
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dm      nnn
dmm      c
dpwr     33
dmf     29412

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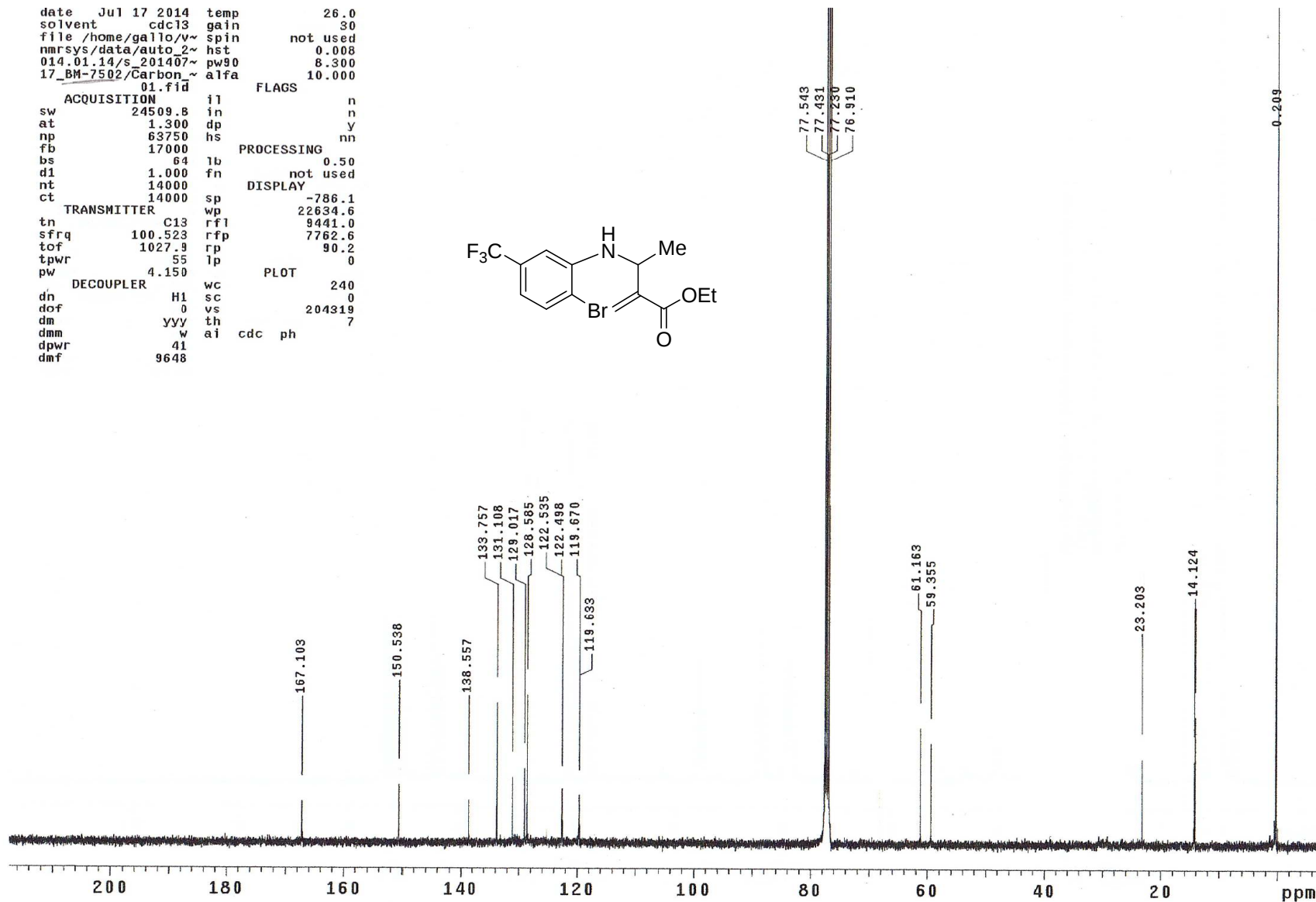
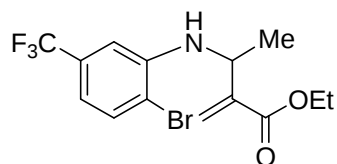


Ethyl 3-(2-bromo-5-(trifluoromethyl)phenylamino)-2-methylenebutanoate (4b): ^{13}C NMR (100 MHz, CDCl_3)

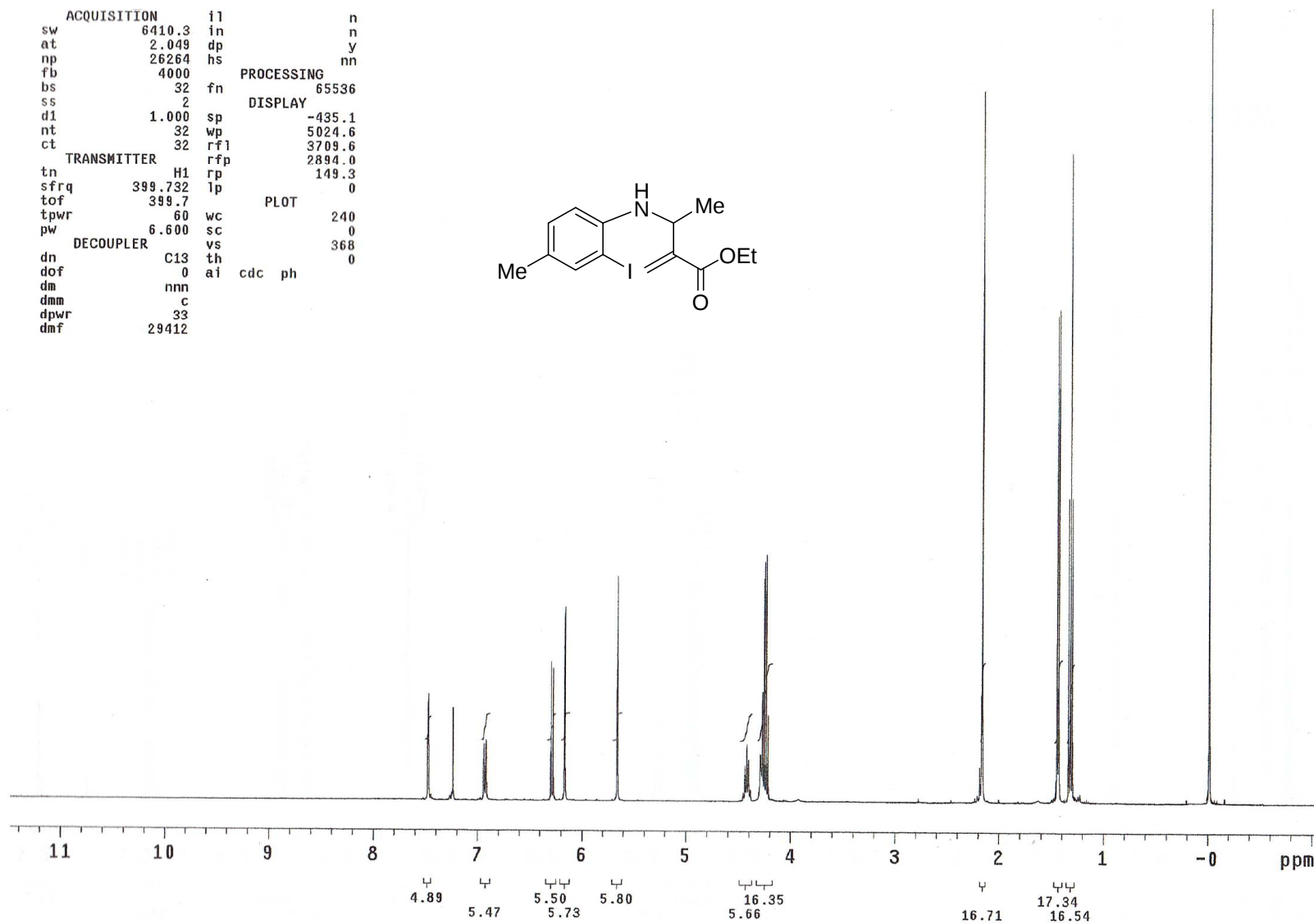
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17_BM-7502/Carbon~ alfa 10.000
01.fid
ACQUISITION il n
sw 24509.8 in n
at 1.300 dp y
np 63750 hs nn
fb 17000
bs 64 lb PROCESSING 0.50
d1 1.000 fn not used
nt 14000 DISPLAY
ct 14000 sp -786.1
TRANSMITTER wp 22634.6
tn C13 rfl 9441.0
sfrq 100.523 rfp 7762.6
tof 1027.9 rp 90.2
tpwr 55 lp 0
pw 4.150 PLOT
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dm yyy th 7
dmm w ai cdc ph
dpwr 41
dmf 9648

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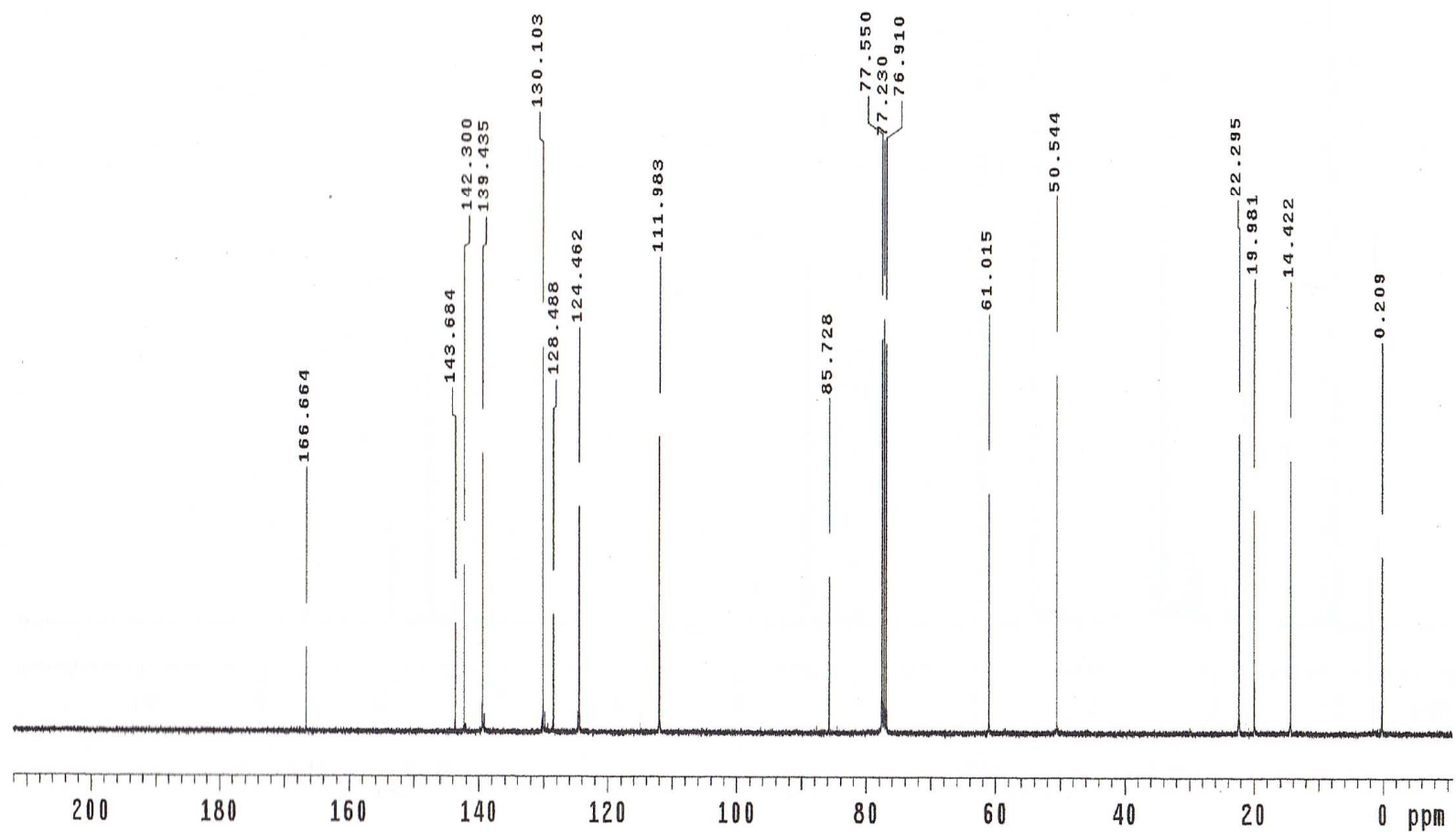
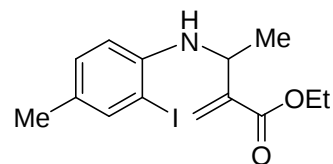


Ethyl 3-(2-iodo-4-methylphenylamino)-2-methylenebutanoate (5b): ^1H NMR (400 MHz, CDCl_3)

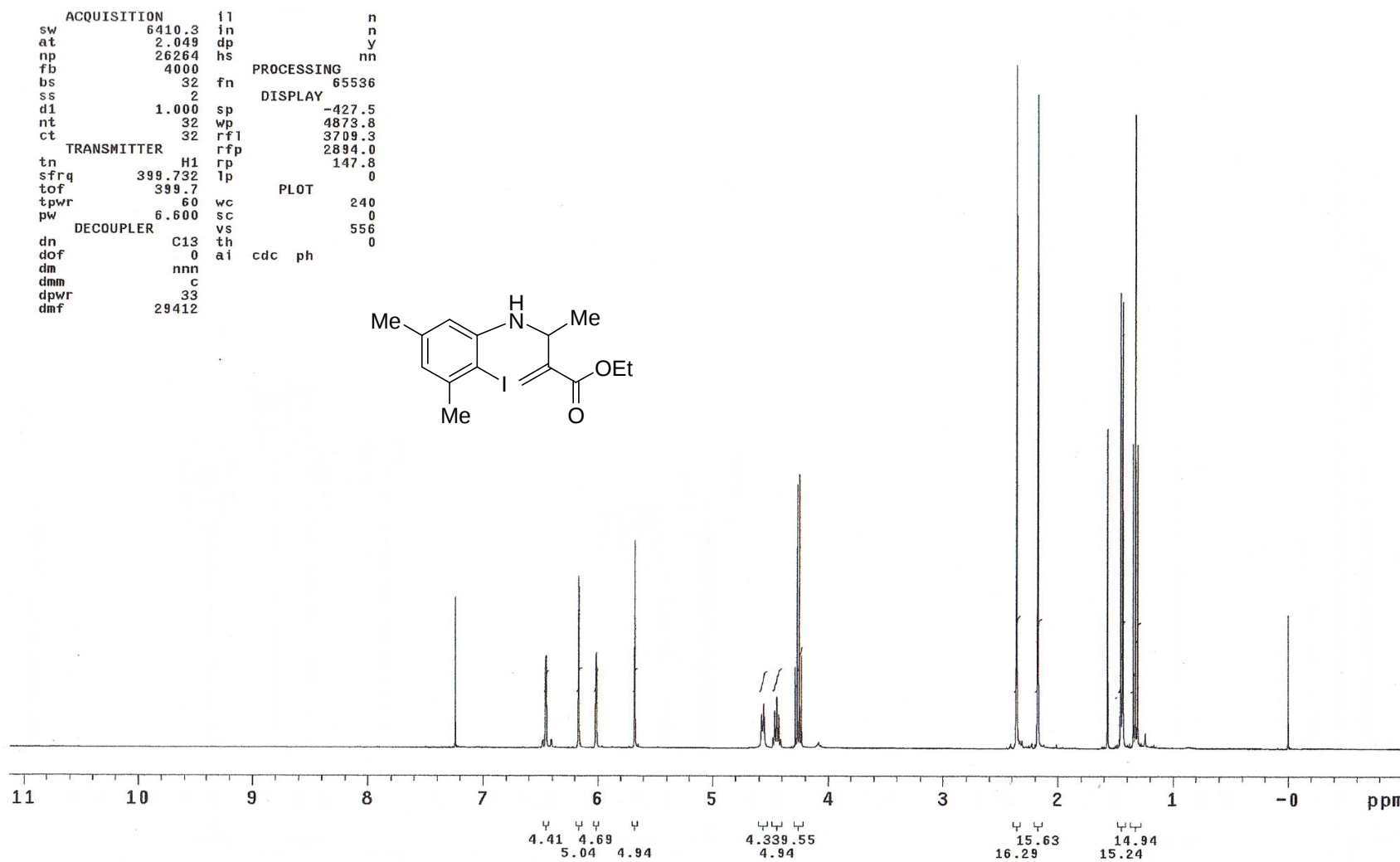


Ethyl 3-(2-iodo-4-methylphenylamino)-2-methylenebutanoate (5b): ^{13}C NMR (100 MHz, CDCl_3)

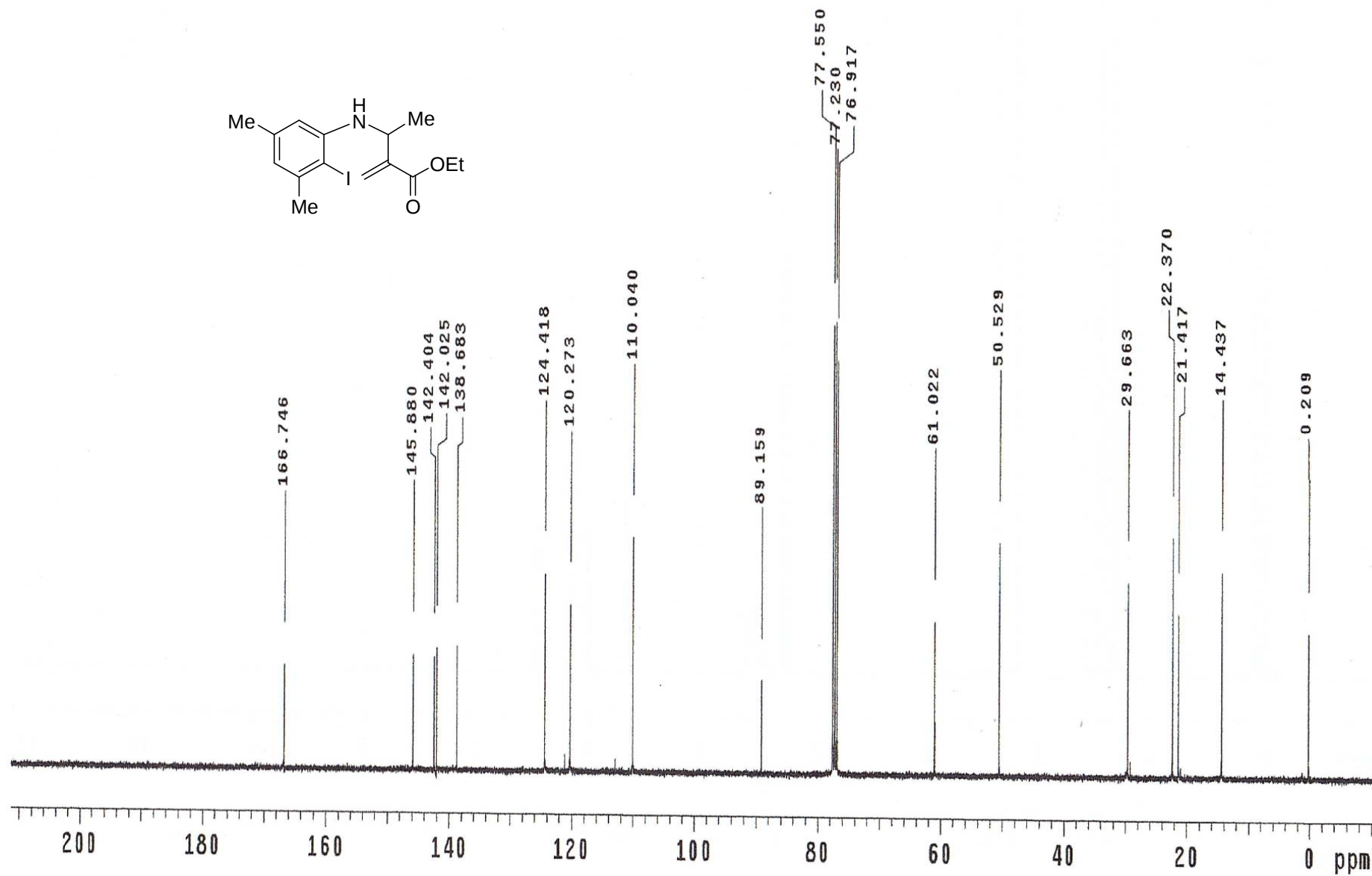
DECOUPLER		wc	240
dn	H1	sc	0
dof	0	vs	31563
dm	yyy	th	7
dmm	w	ai	cdc ph
dpwr	41		
dmf	9648		



Ethyl 3-(2-iodo-3,5-dimethylphenylamino)-2-methylenebutanoate (6b): ^1H NMR (400 MHz, CDCl_3)



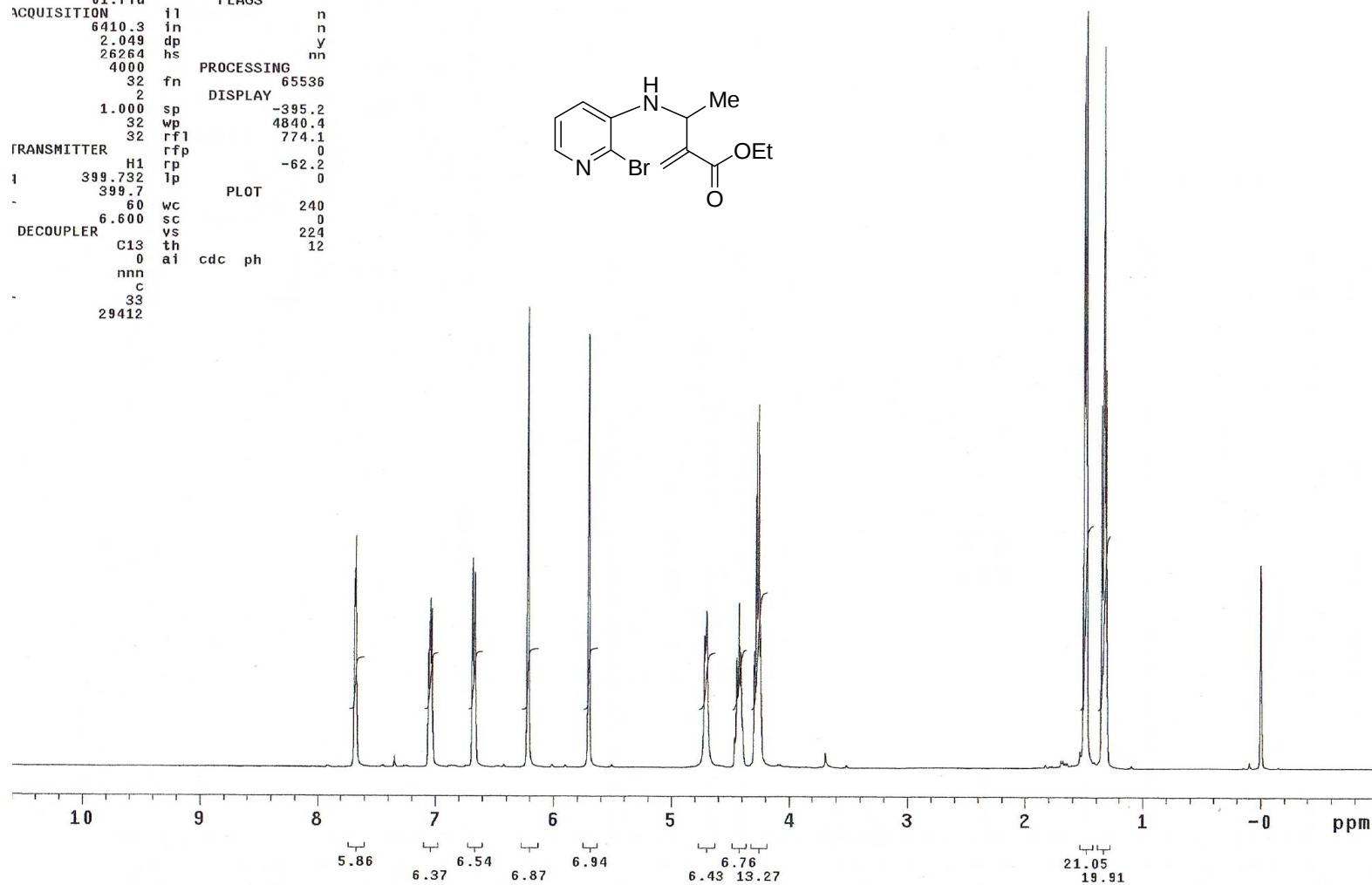
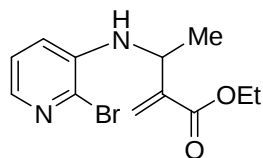
Ethyl 3-(2-iodo-3,5-dimethylphenylamino)-2-methylenebutanoate (6b): ^{13}C NMR (100 MHz, CDCl_3)

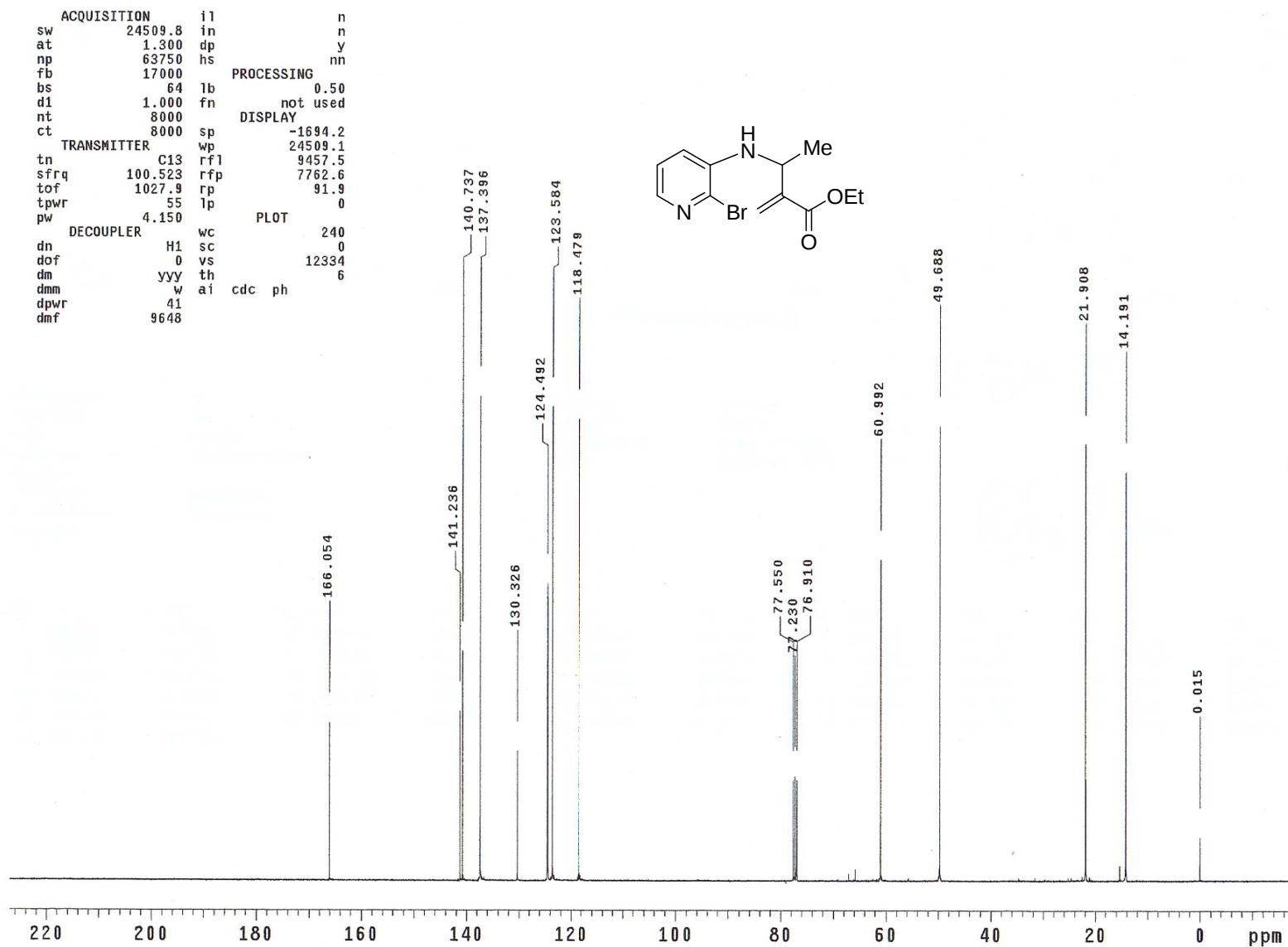


Ethyl 3-(2-bromopyridin-3-ylamino)-2-methylenebutanoate (7b): ^1H NMR (400 MHz, CDCl_3)

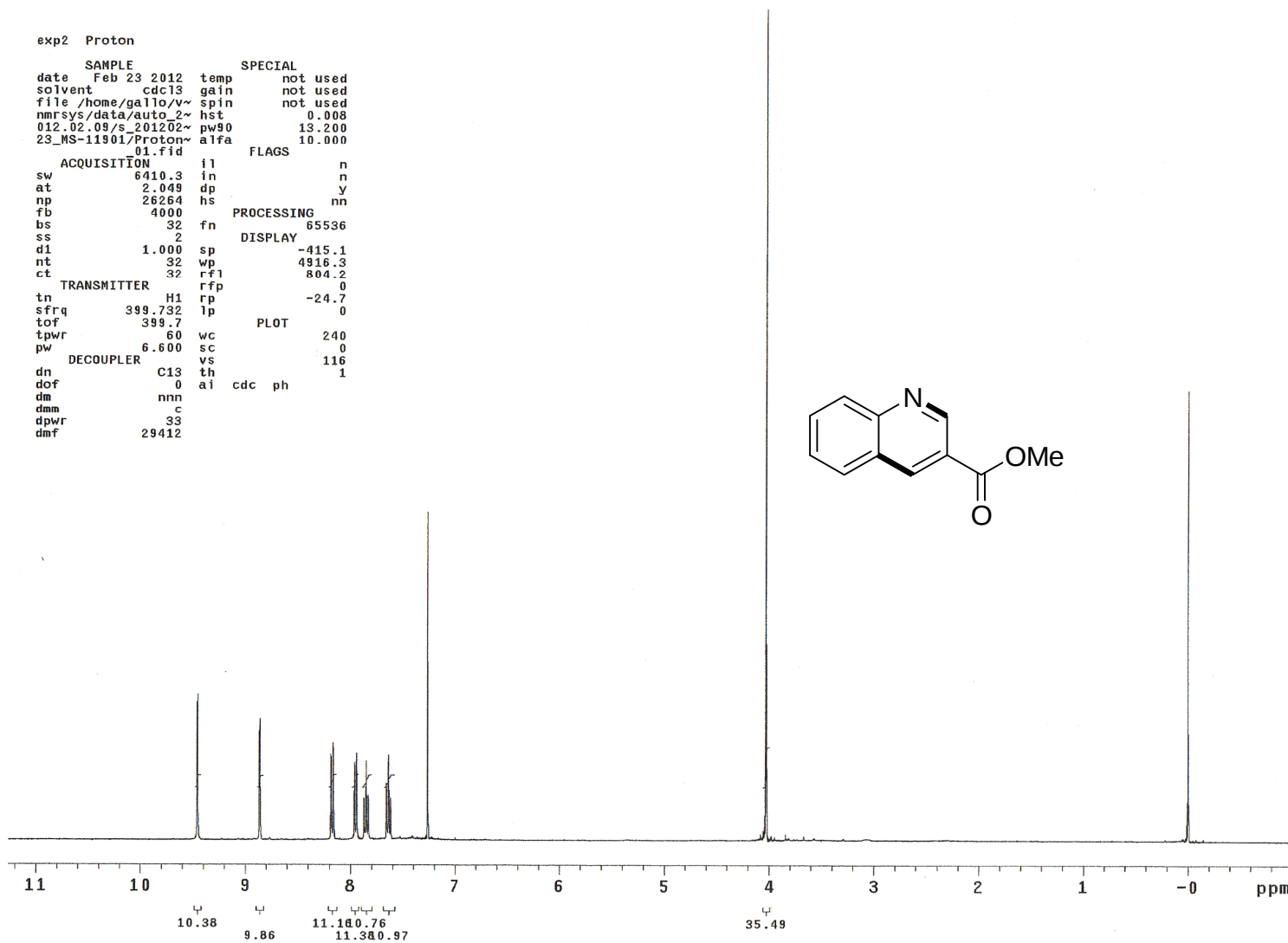
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sys/data/auto_2~ hst 0.008
.01.14/s_201409~ pw90 13.200
2BM-801/Proton~ alfa 10.000
01.fid

ACQUISITION
6410.3 il n
2.049 in n
26264 dp y
4000 hs nn
32 fn PROCESSING 65536
2
1.000 sp DISPLAY -395.2
32 wp 4840.4
32 rf1 774.1
TRANSMITTER H1 rfp 0
399.732 rp -62.2
399.7 lp 0
60 wc PLOT 240
6.600 sc 0
DECOUPLER C13 vs 224
0 ai cdc ph 12
nnn
c
33
29412



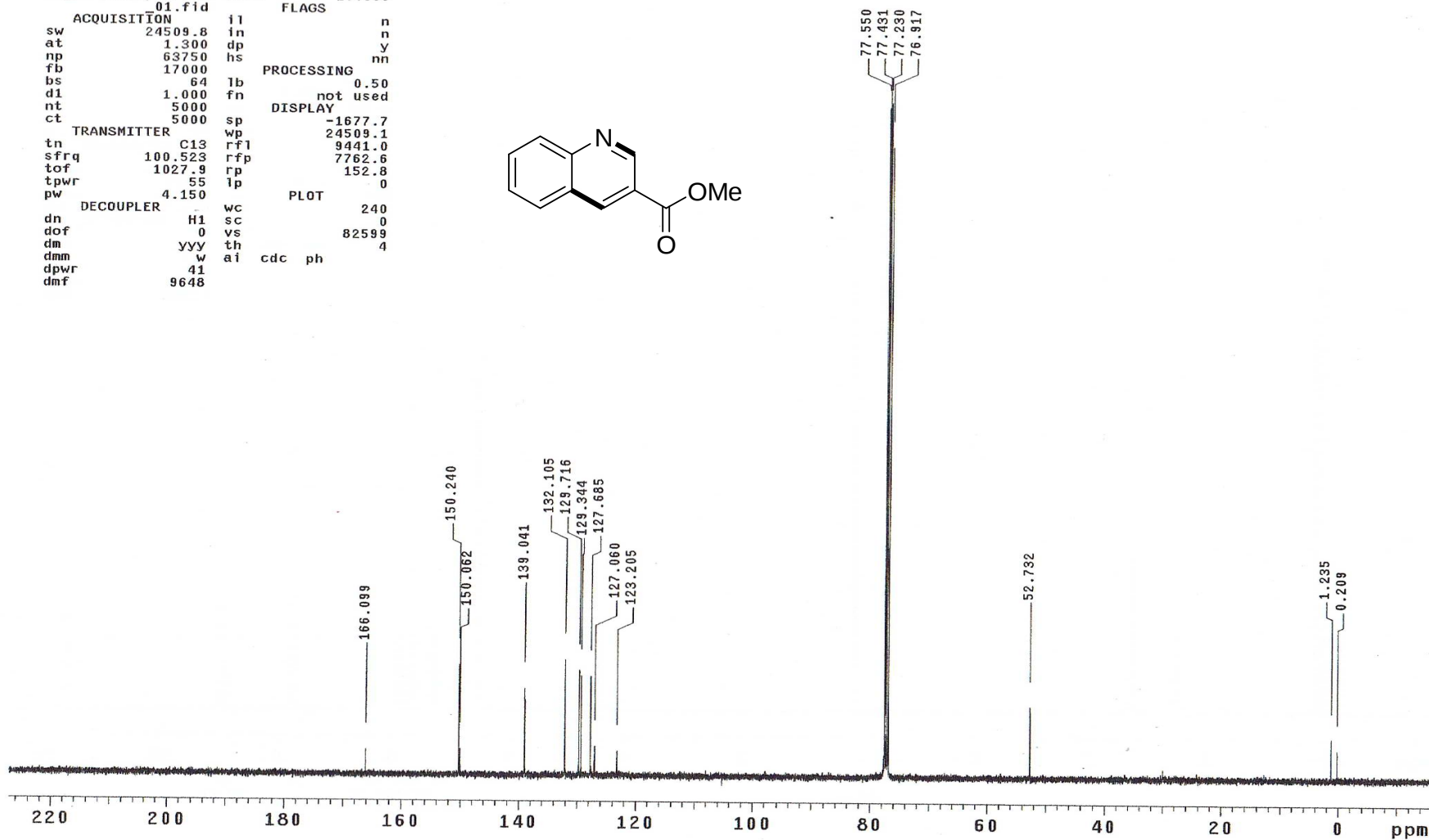
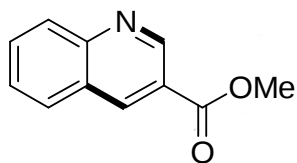
Ethyl 3-(2-bromopyridin-3-ylamino)-2-methylenebutanoate (7b): ^{13}C NMR (100 MHz, CDCl_3)

Methyl quinoline-3-carboxylate (1a'): ^1H NMR (400 MHz, CDCl_3)



Methyl quinoline-3-carboxylate (1a'): ^{13}C NMR (100 MHz, CDCl_3)

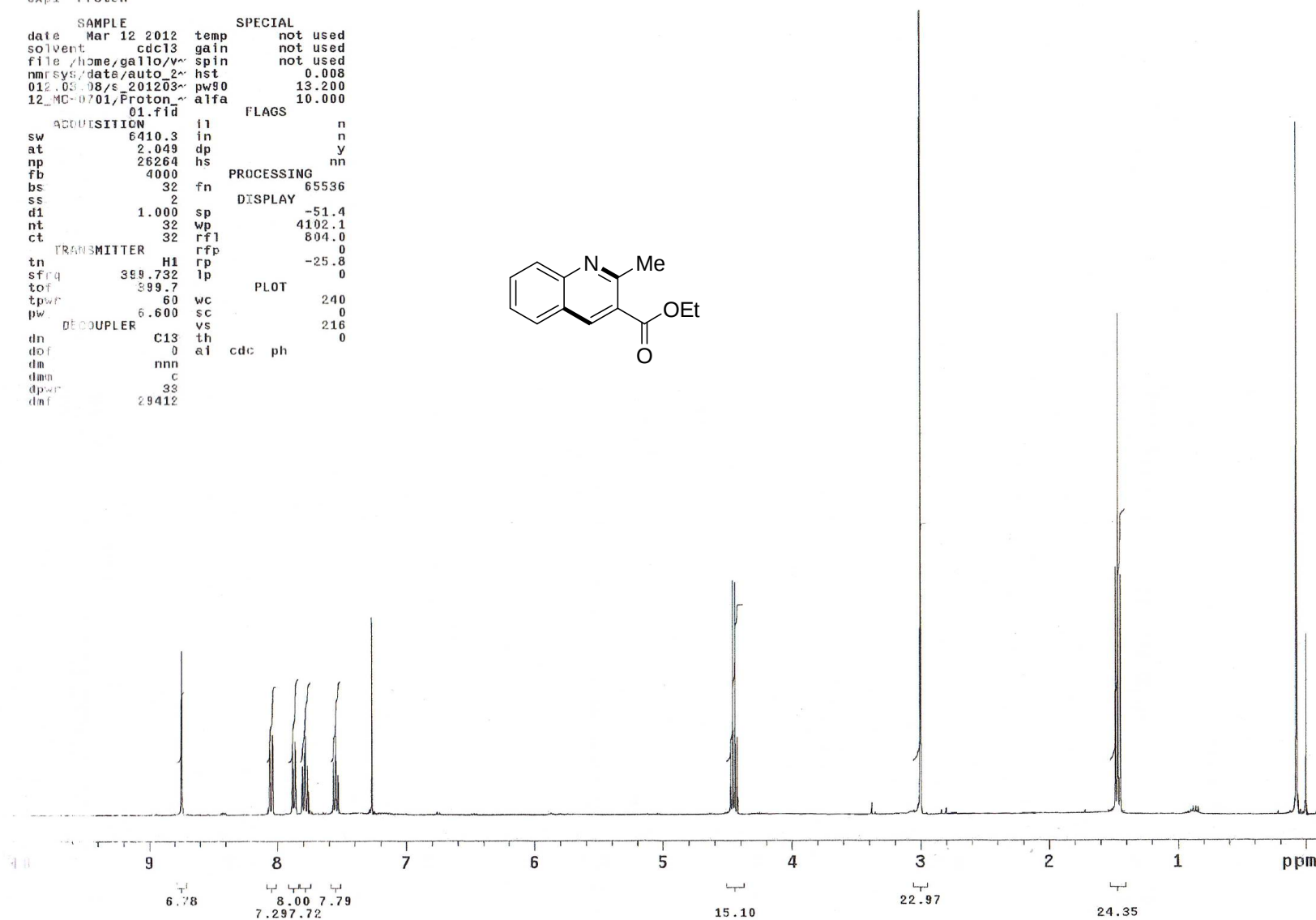
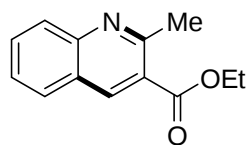
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date Feb 23 2012 temp SPECIAL
solvent cdc13 gain not used
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012.02.09/s_201202~ pw90 8.300
23_MS-11902/Carbon~ alfa 10.000
01.fid
ACQUISITION il n
sw 24509.8 in n
at 1.300 dp y
np 63750 hs nn
fb 17000
bs 64 lb
d1 1.000 fn not used
nt 5000
ct 5000 sp
TRANSMITTER C13 rfl -1677.7
tn 100.523 wp 24509.1
sfrq 1027.9 rfp 9441.0
tof 55 rfp 7762.6
tpwr 4.150 lp 152.8
pw 0
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dn H1 sc 0
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dm yyy th 4
dmm w ai cdc ph
dpwr 41
dmf 9648



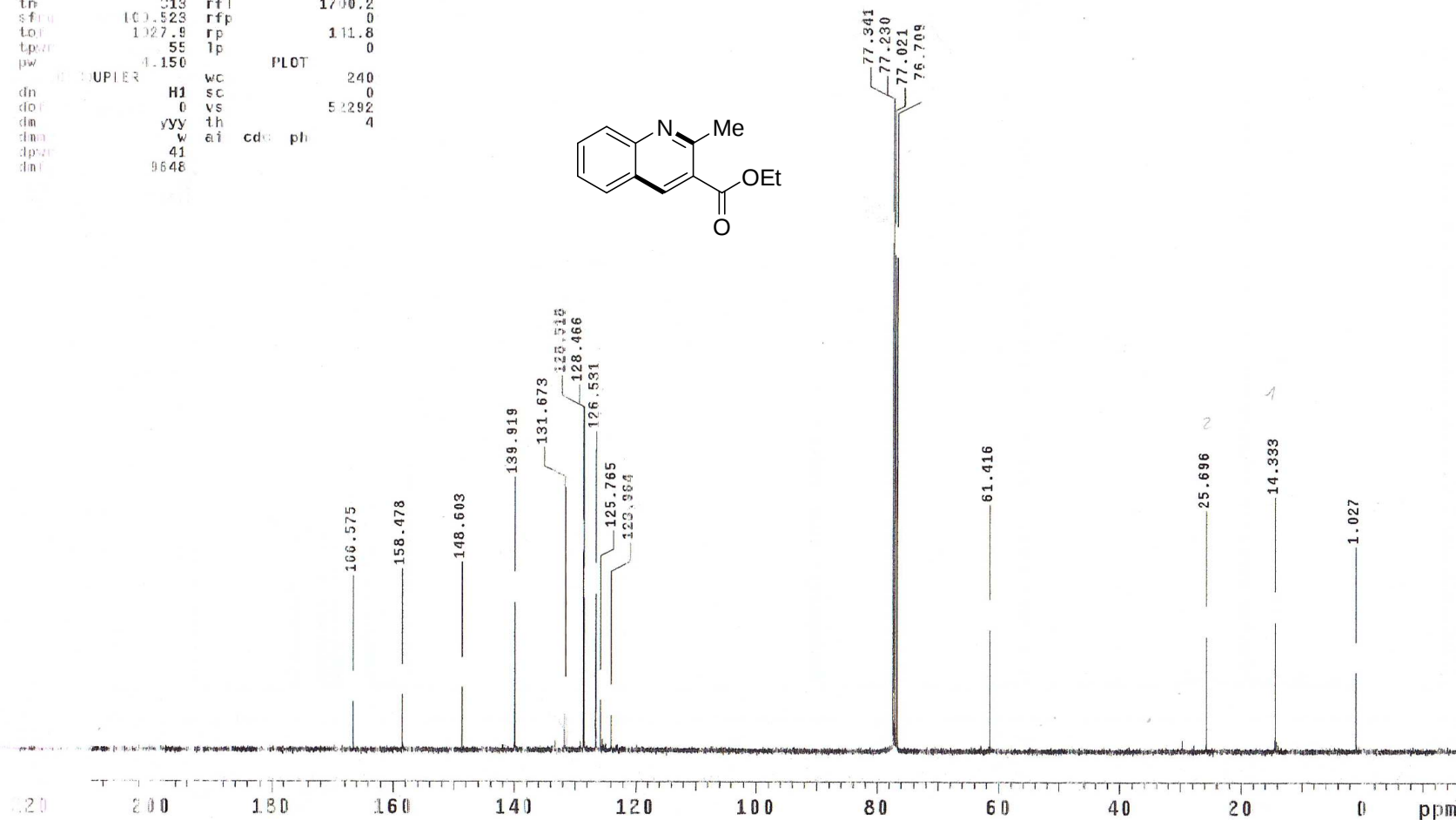
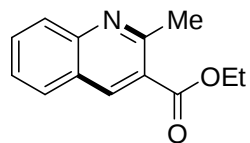
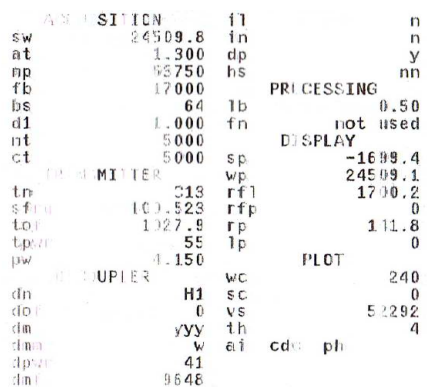
Ethyl 2-methylquinoline-3-carboxylate (1b', 2b'): ^1H NMR (400 MHz, CDCl_3)

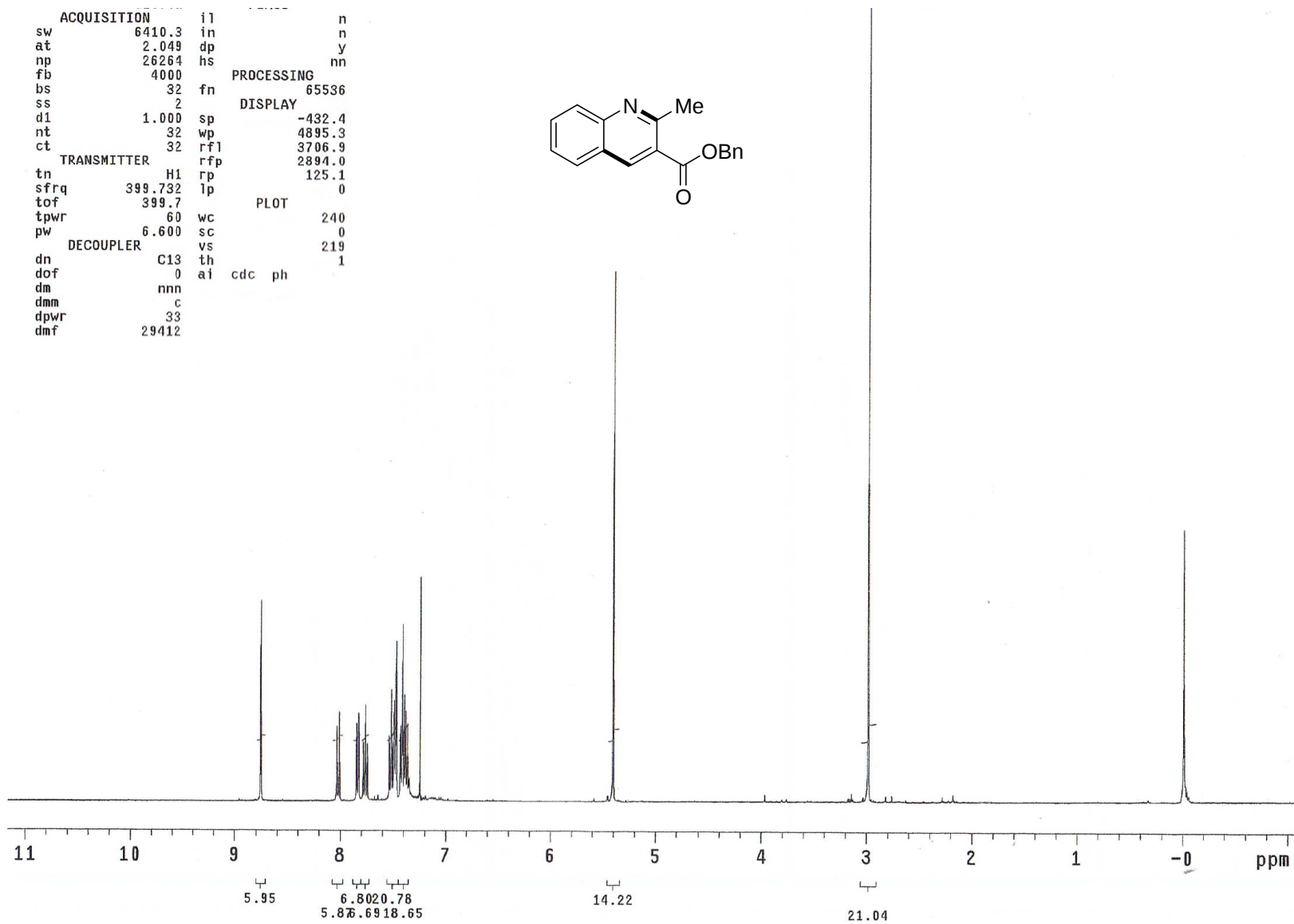
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  date Mar 12 2012 temp not used
  solvent cdc13 gain not used
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  012_09_08/s_201203~ pw90 13.200
  12_MC-0701/Proton~ alfa 10.000
  01.fid
  ACQUISITION i1 n
  sw 6410.3 in n
  at 2.049 dp y
  np 26264 hs nn
  fb 4000
  bs 32 fn 65536
  ss 2
  d1 1.000 sp -51.4
  nt 32 wp 4102.1
  ct 32 rfl 804.0
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  tn rf 0
  sfreq 399.732 lp 0
  tof 399.7
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  pw 6.600 sc 0
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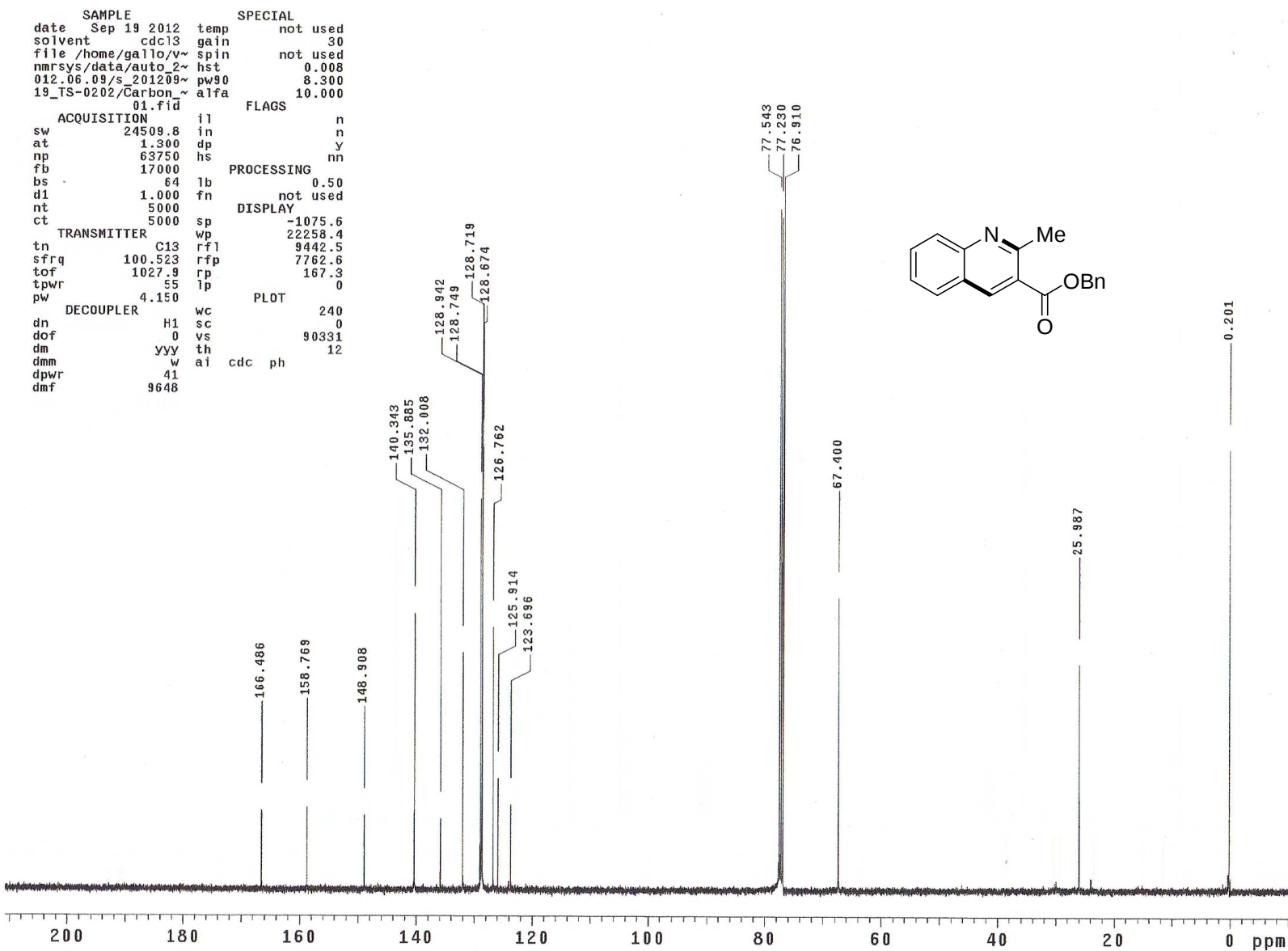


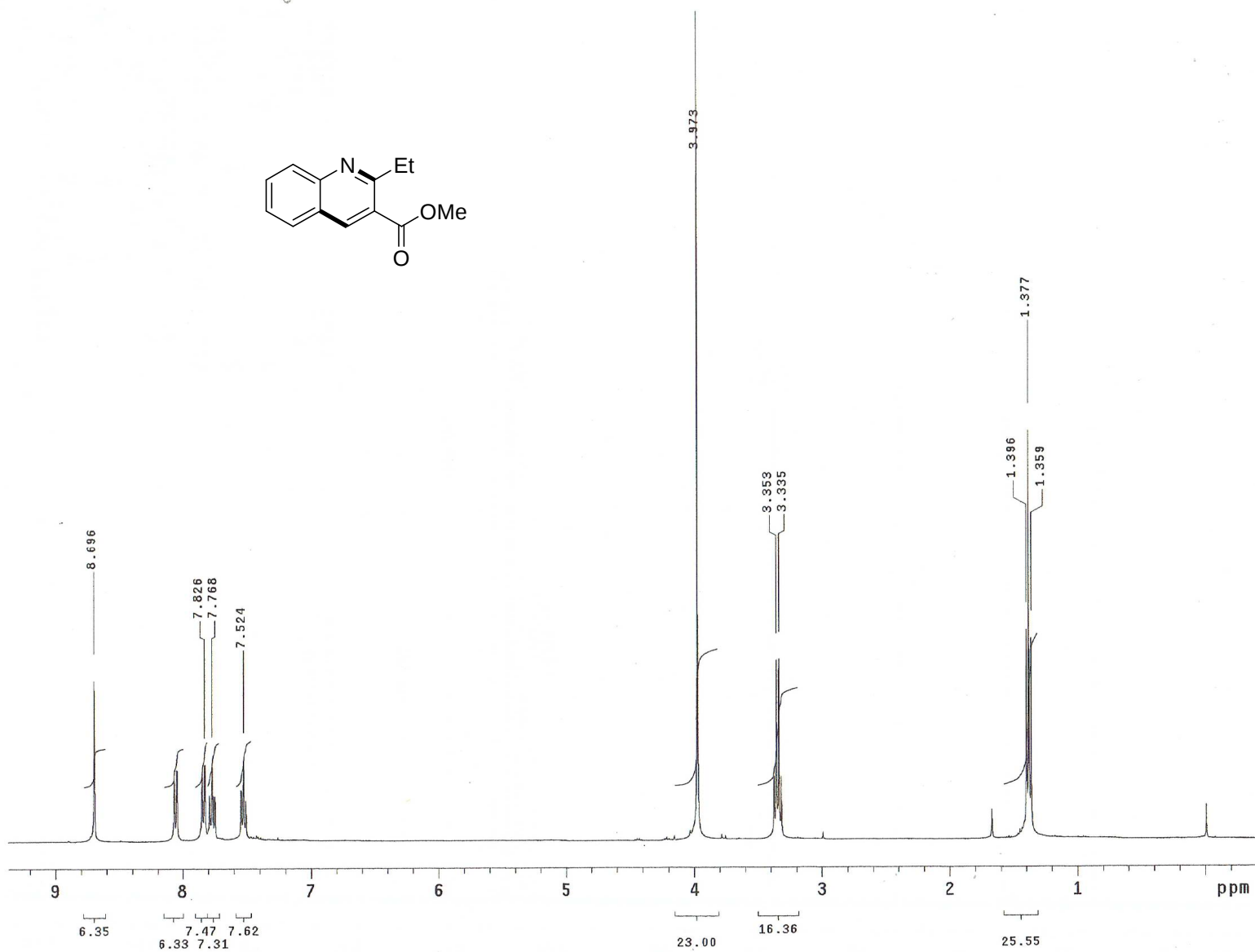
Ethyl 2-methylquinoline-3-carboxylate (1b', 2b'): ^{13}C NMR (100 MHz, CDCl_3)



Benzyl 2-methylquinoline-3-carboxylate (1c'): ^1H NMR (400 MHz, CDCl_3)

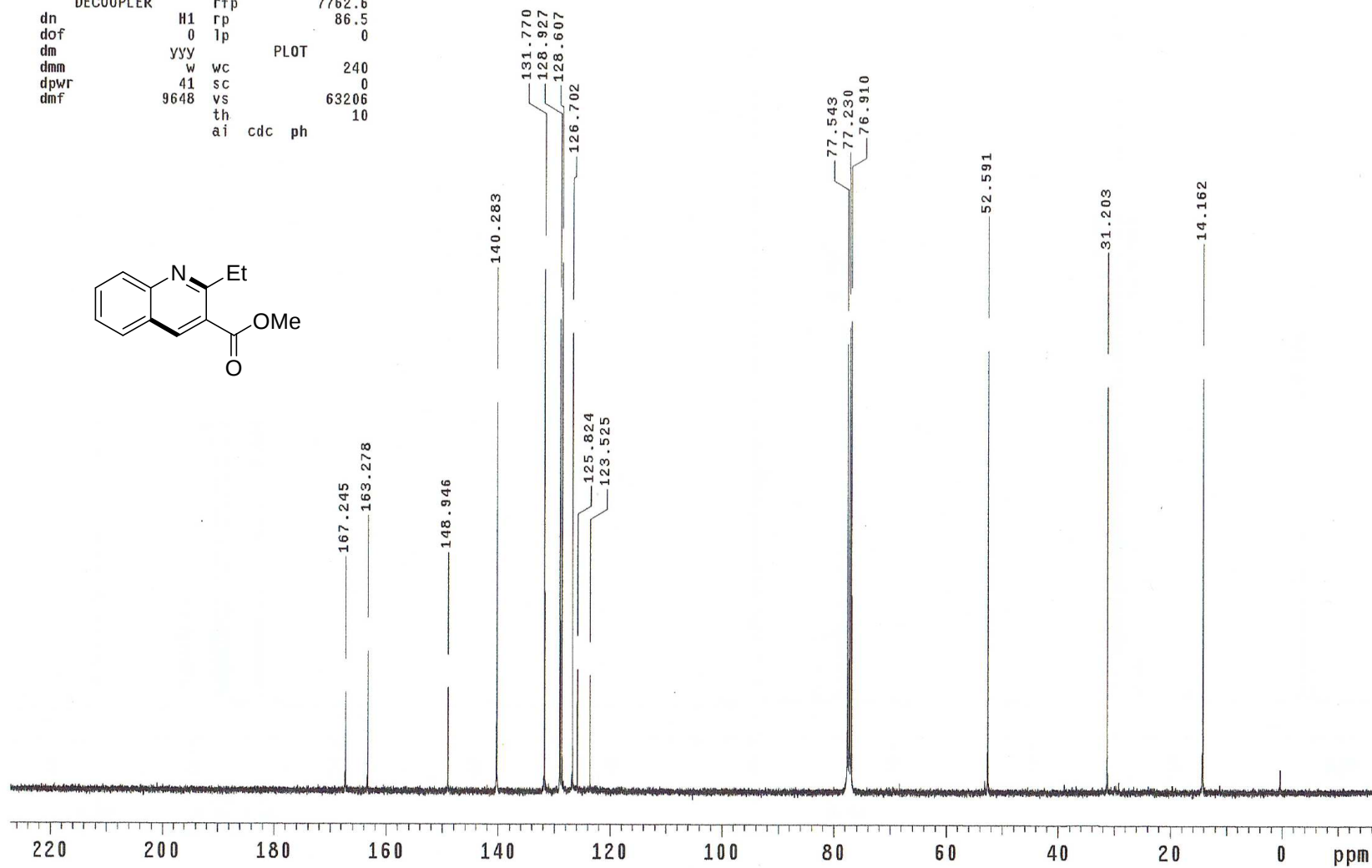
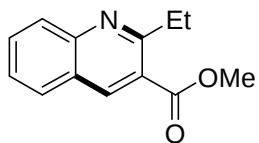
Benzyl 2-methylquinoline-3-carboxylate (1c'): ^{13}C NMR (100 MHz, CDCl_3)



Methyl 2-ethylquinoline-3-carboxylate (1d'): ^1H NMR (400 MHz, CDCl_3)

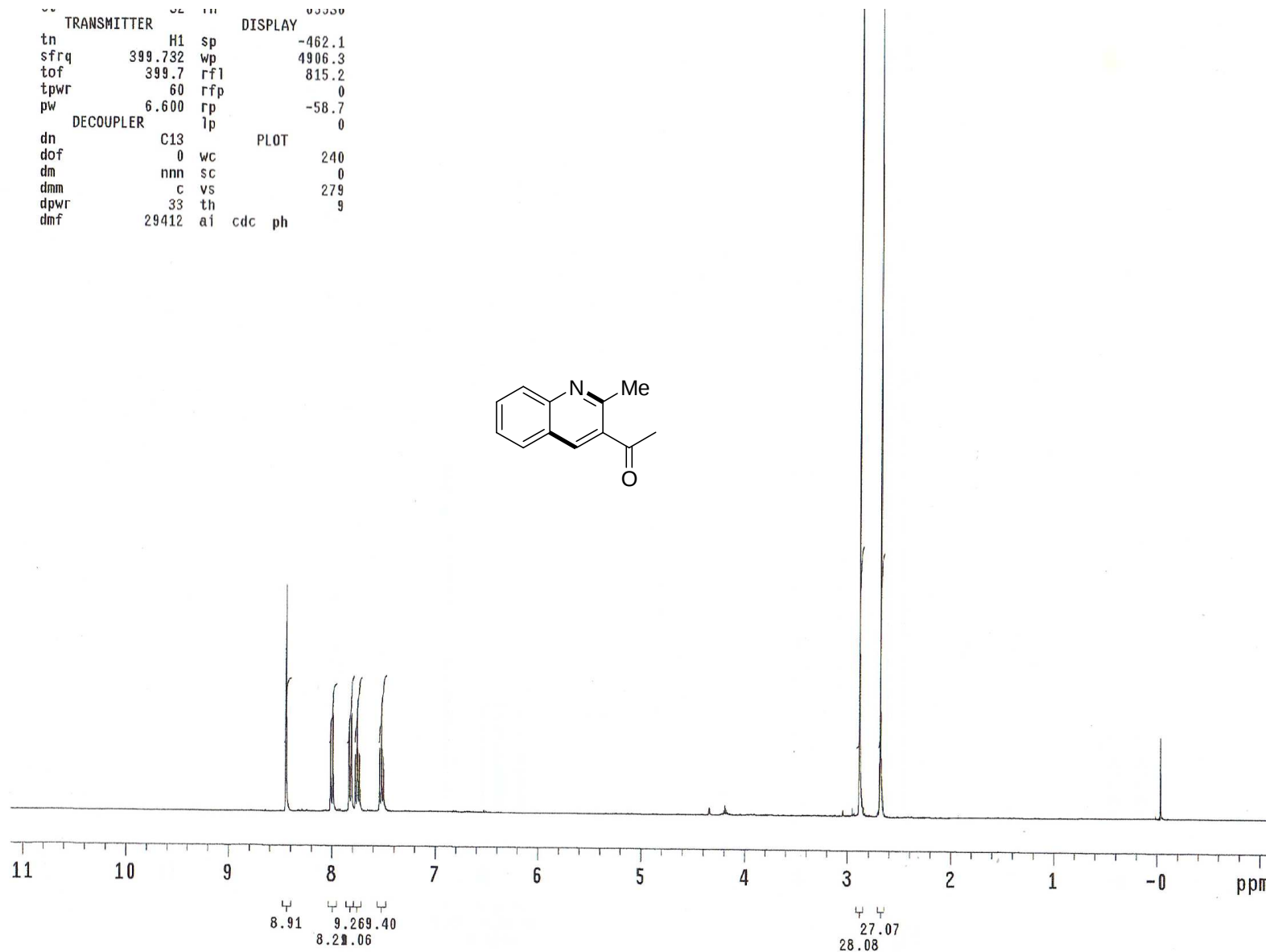
Methyl 2-ethylquinoline-3-carboxylate (1d'): ^{13}C NMR (100 MHz, CDCl_3)

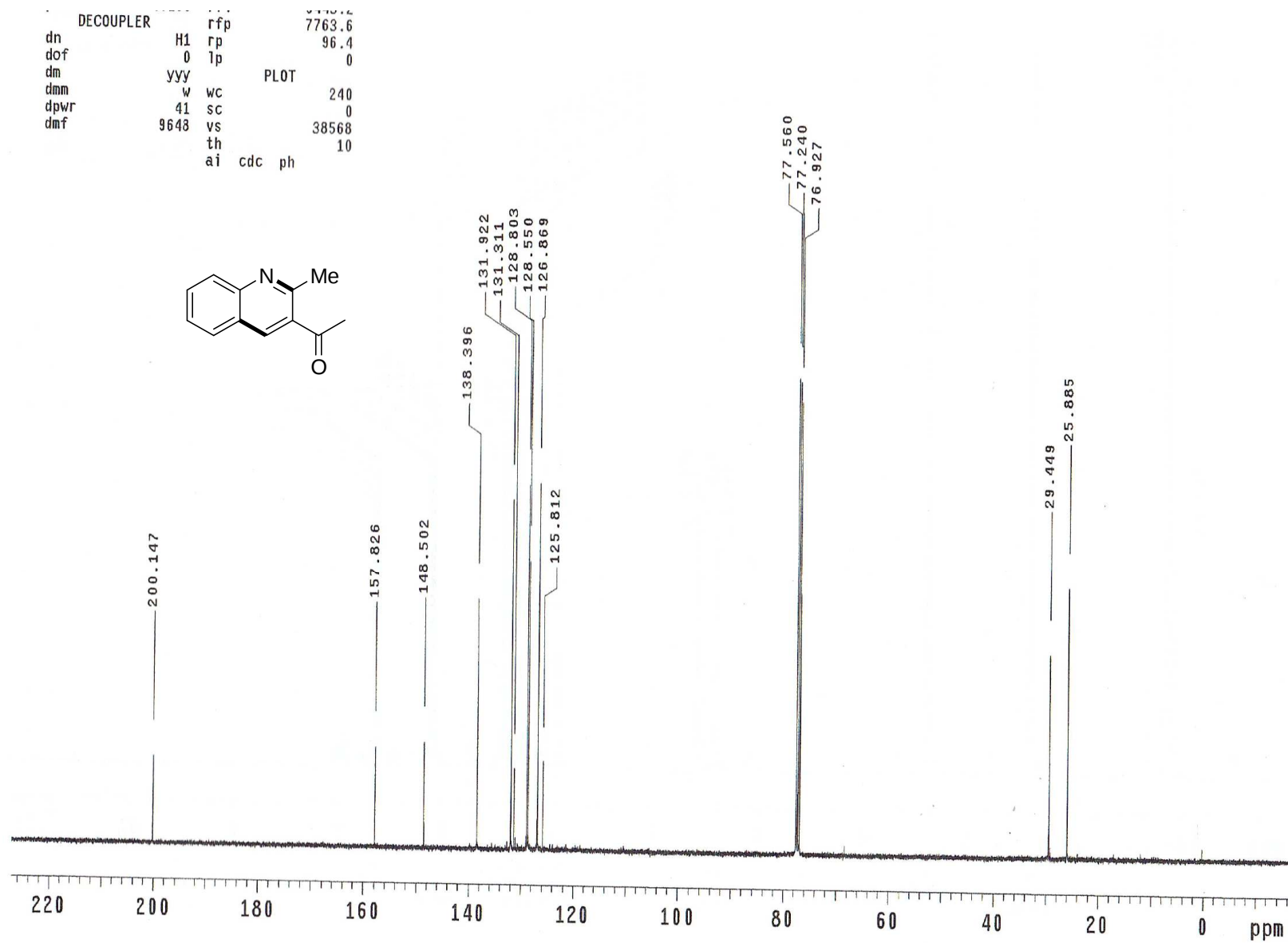
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tof	1027.9	sp -1680.7
tpwr	55	wp 24509.1
pw	4.150	rfl 9444.0
DECOUPLER	H1	rfp 7762.6
dn	0	rp 86.5
dof	0	lp 0
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dmm	w	wc 240
dpwr	41	sc 0
dmf	9648	vs 63206
	th	10
	ai	cdc ph



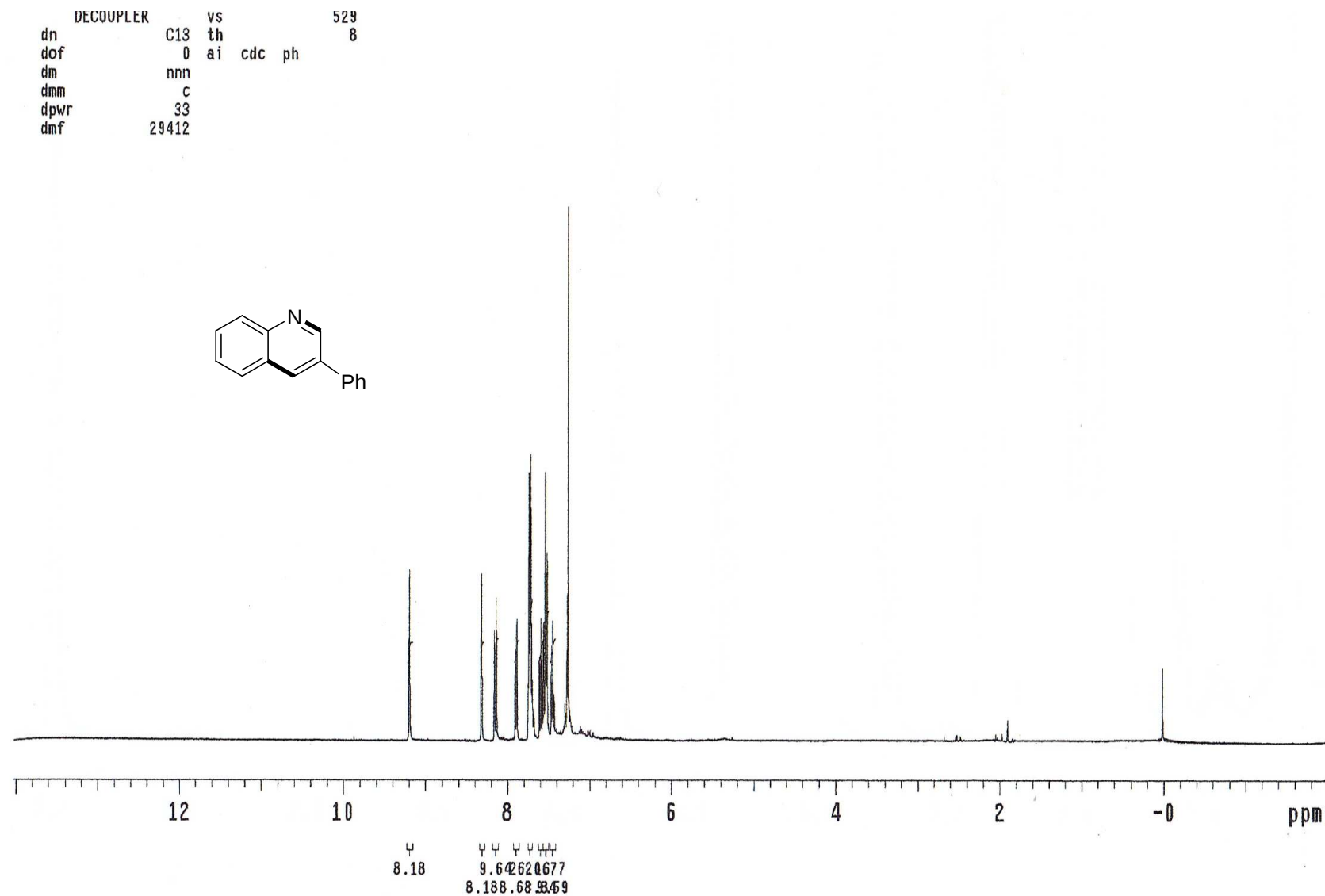
1-(2-methylquinolin-3-yl)ethanone (1e'): ^1H NMR (400 MHz, CDCl_3)

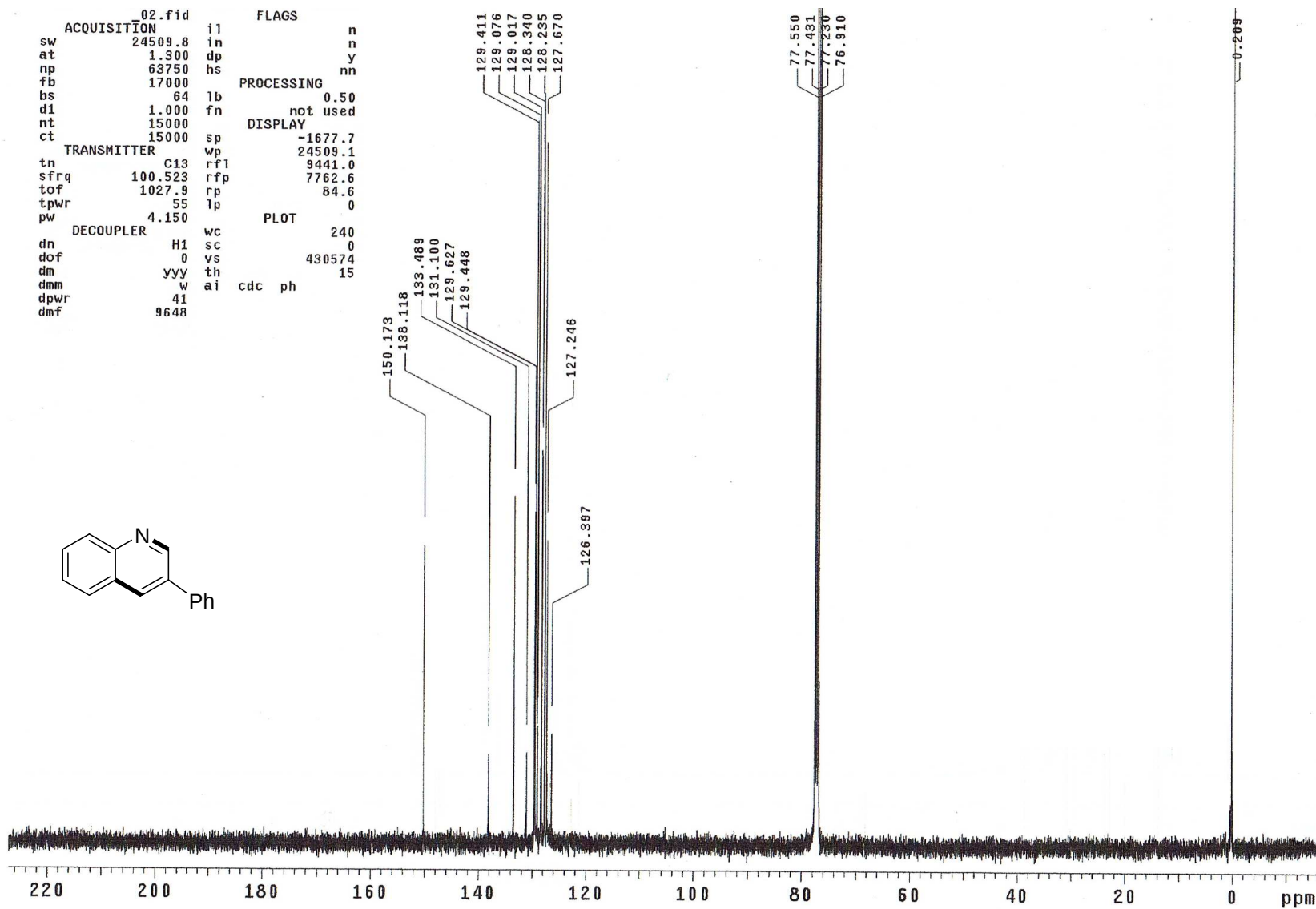
TRANSMITTER	H1	sp	-462.1
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tof	399.7	rfl	0
tpwr	60	rfl	-58.7
pw	6.600	lp	0
DECOUPLER	C13		
dn	0	wc	240
dof	nnn	sc	0
dm	c	vs	279
dmm	33	th	9
dpwr	29412	ai	cdc ph
dmf			



1-(2-methylquinolin-3-yl)ethanone (1e'): ^{13}C NMR (100 MHz, CDCl_3)

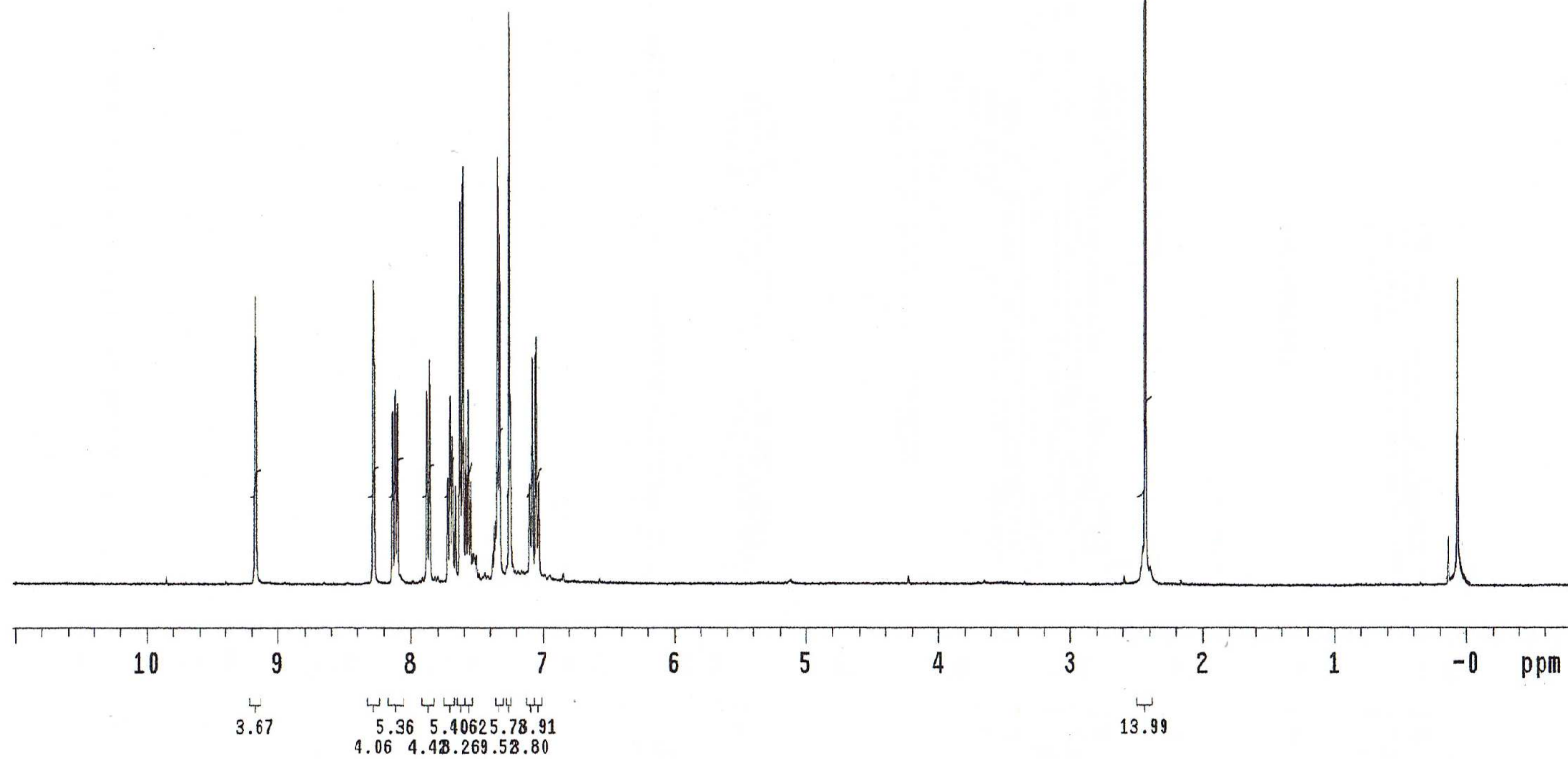
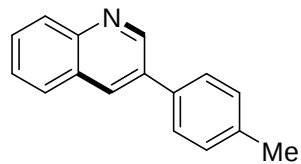
3-Phenylquinoline (1f'): ^1H NMR (400 MHz, CDCl_3)



3-Phenylquinoline (1f'): ^{13}C NMR (100 MHz, CDCl_3)

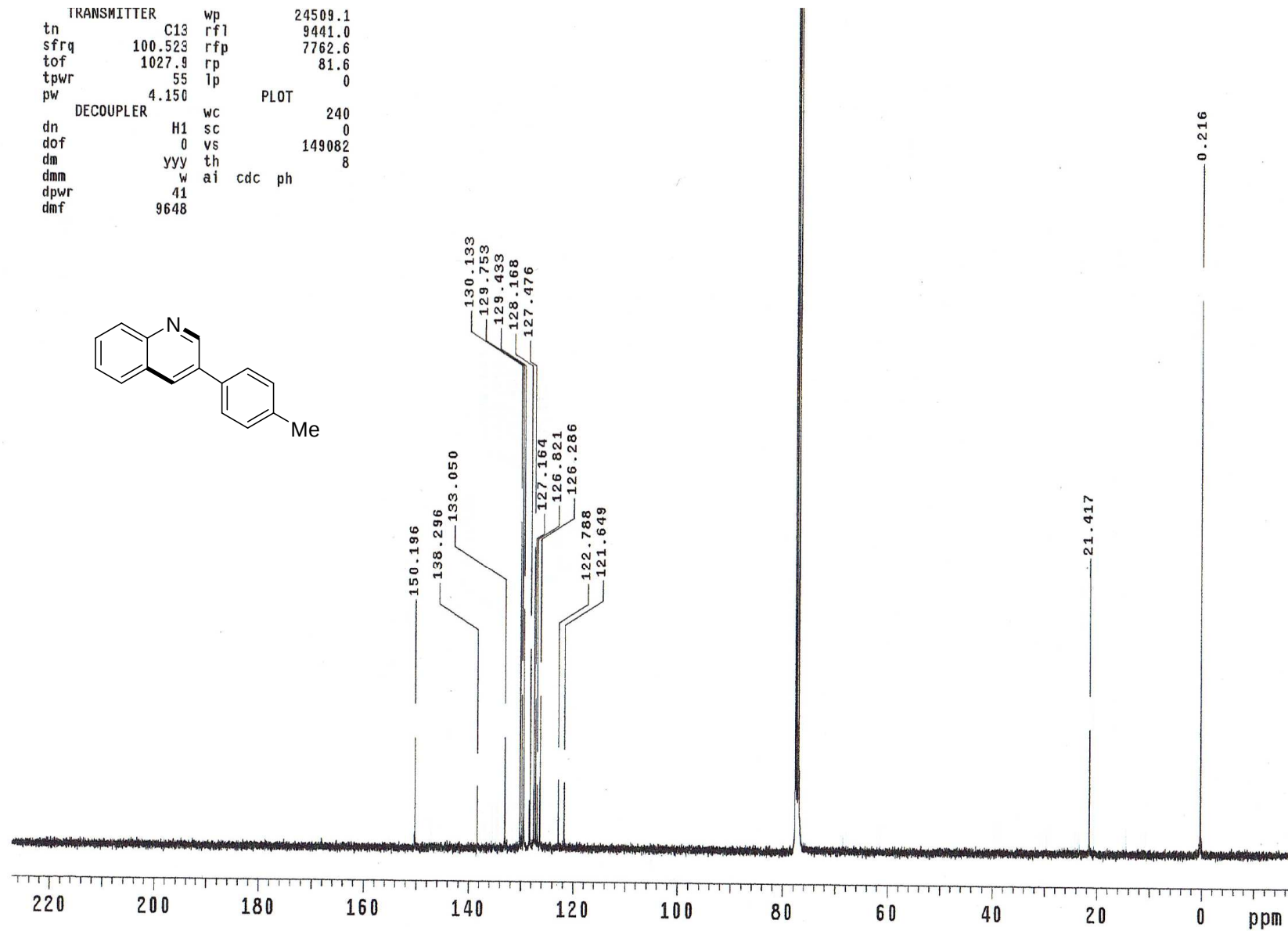
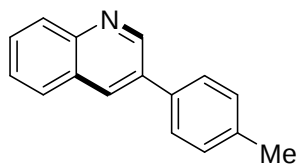
3-p-Tolylquinoline (1g'): ^1H NMR (400 MHz, CDCl_3)

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sfrq	399.732	lp
tof	399.7	PL0T
tpwr	60	wc
pw	6.600	sc
DECOUPLER	vs	630
dn	C13	th
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dm	nnn	cdc
dmm	c	ph
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dmi	29412	

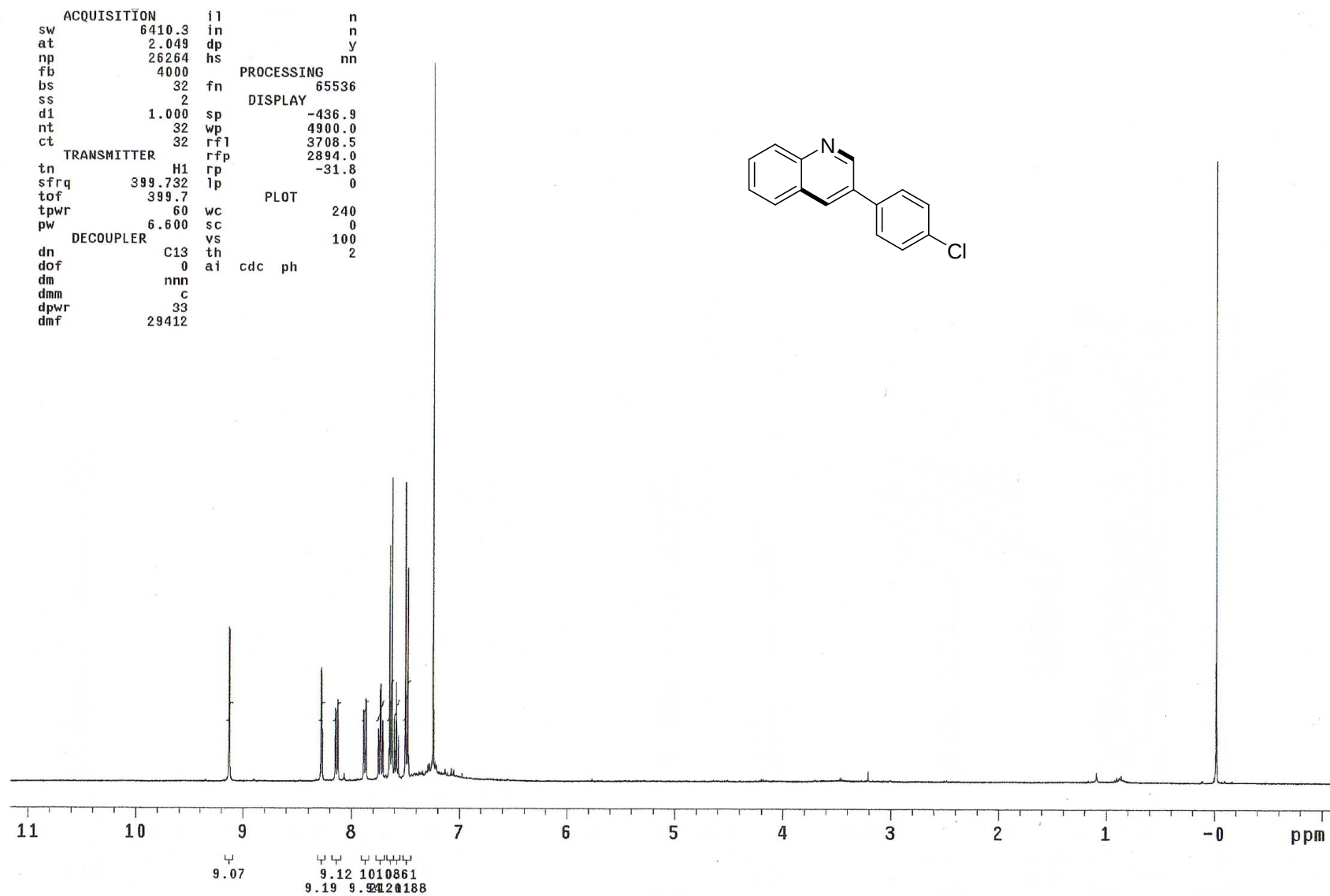


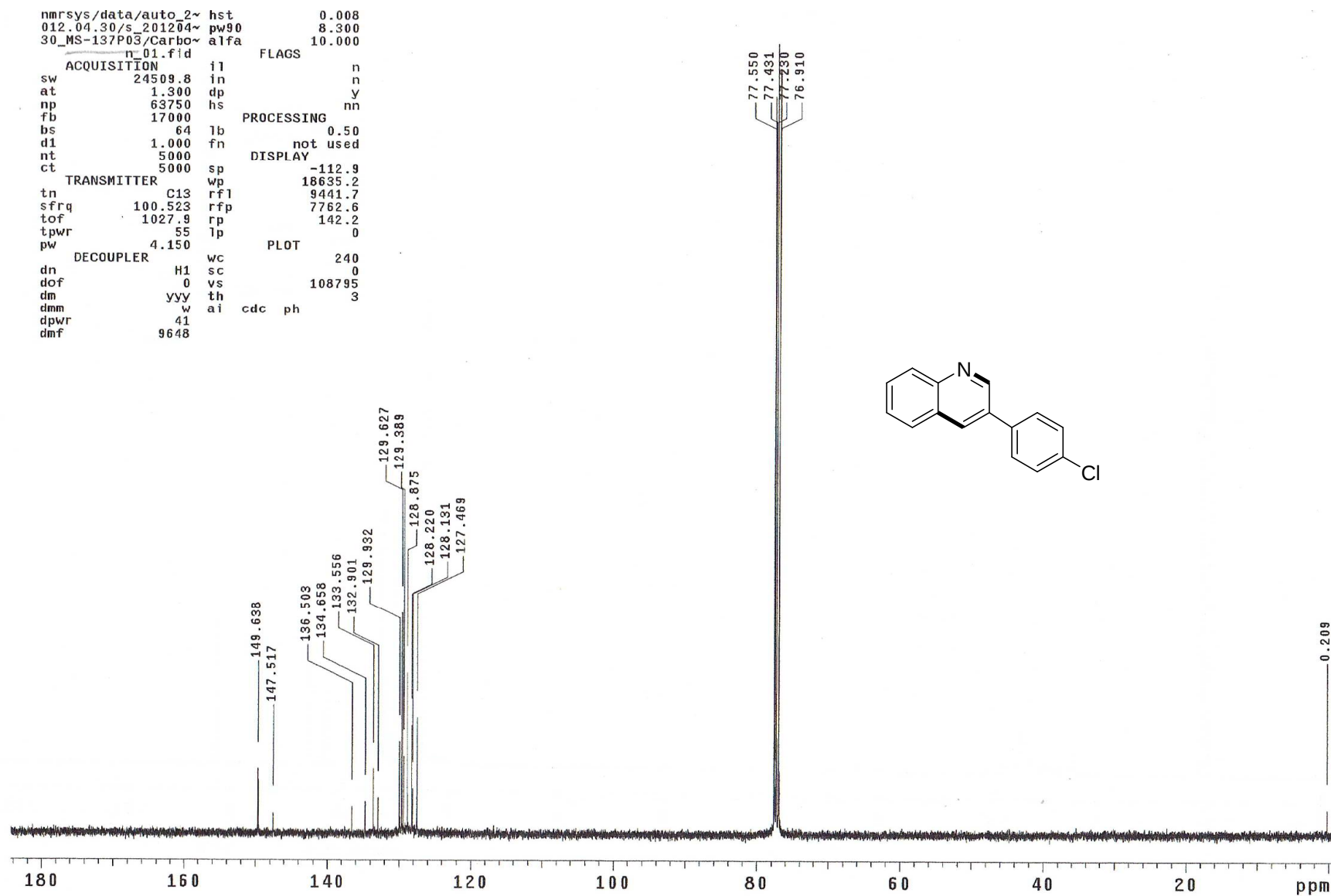
3-p-Tolylquinoline (1g'): ^{13}C NMR (100 MHz, CDCl_3)

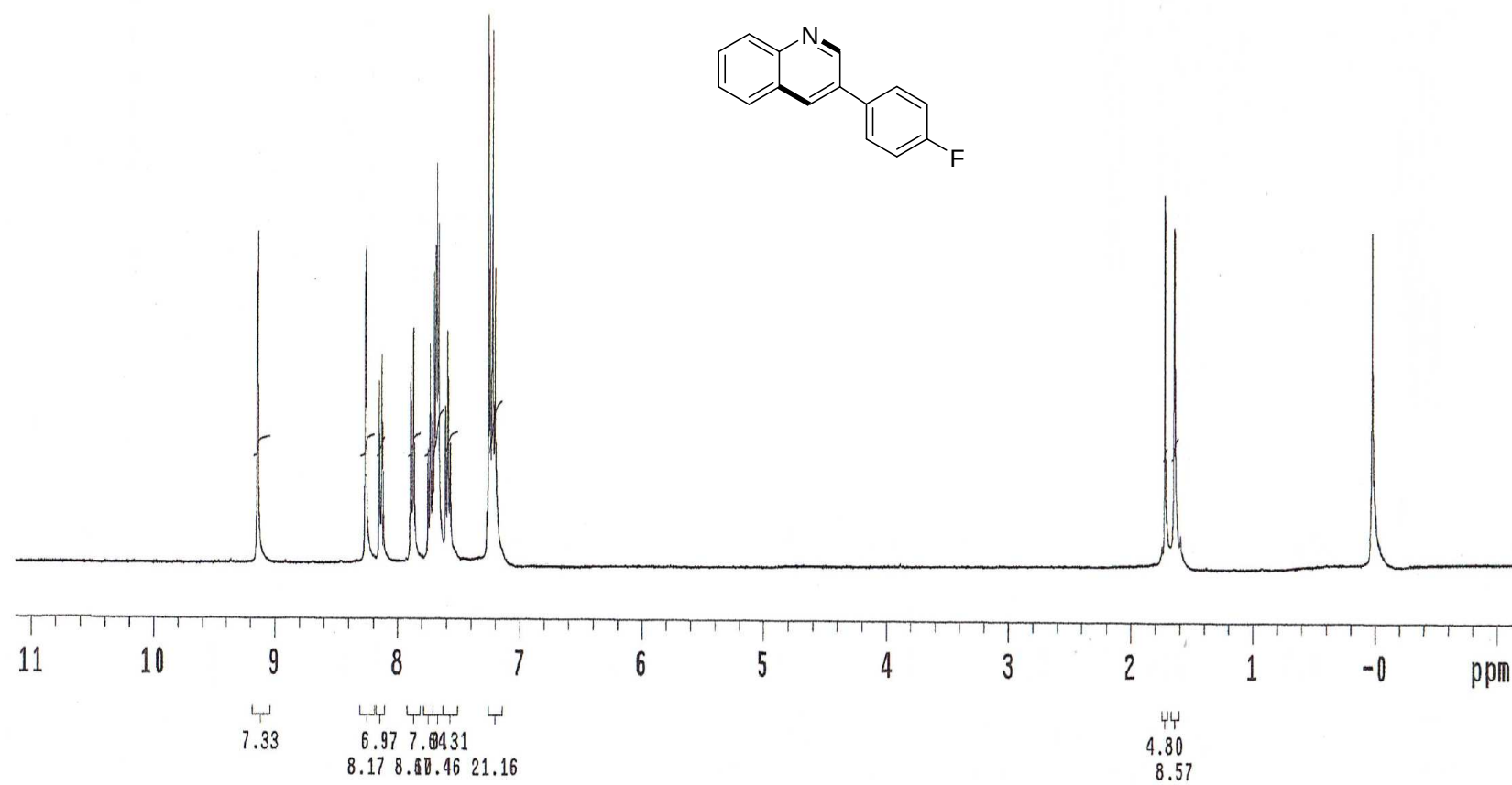
TRANSMITTER		wp	24509.1
tn	C13	rfl	9441.0
sfrq	100.523	rflp	7762.6
tof	1027.9	rp	81.6
tpwr	55	lp	0
pw	4.150	PLOT	
DECOUPLER		wc	240
dn	H1	sc	0
dof	0	vs	149082
dm	yyy	th	8
dmm	w	ai	cdc ph
dpwr	41		
dmf	9648		



3-(4-chlorophenyl)quinoline (1h'): ^1H NMR (400 MHz, CDCl_3)

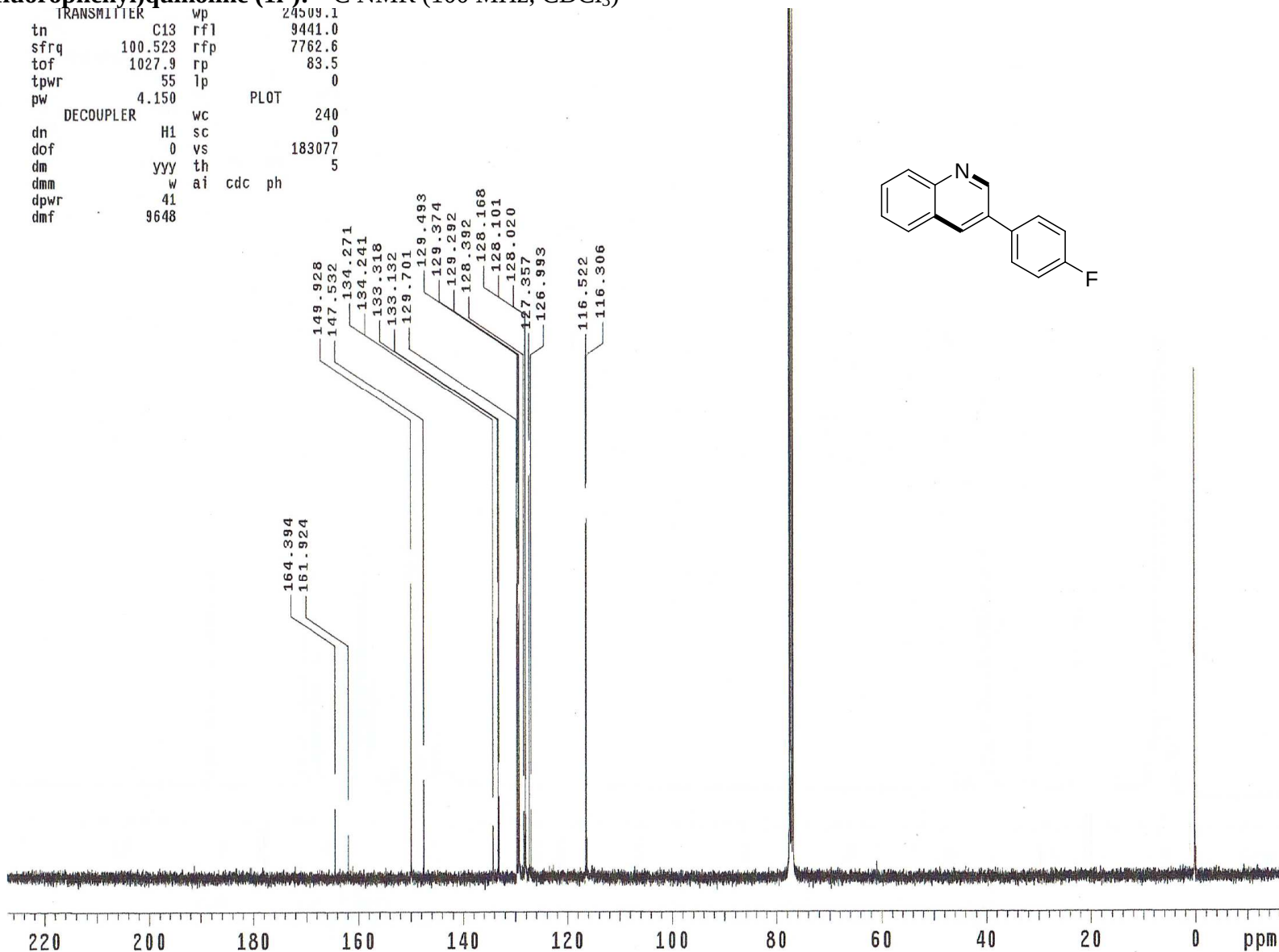


3-(4-chlorophenyl)quinoline (1h'): ^{13}C NMR (100 MHz, CDCl_3)

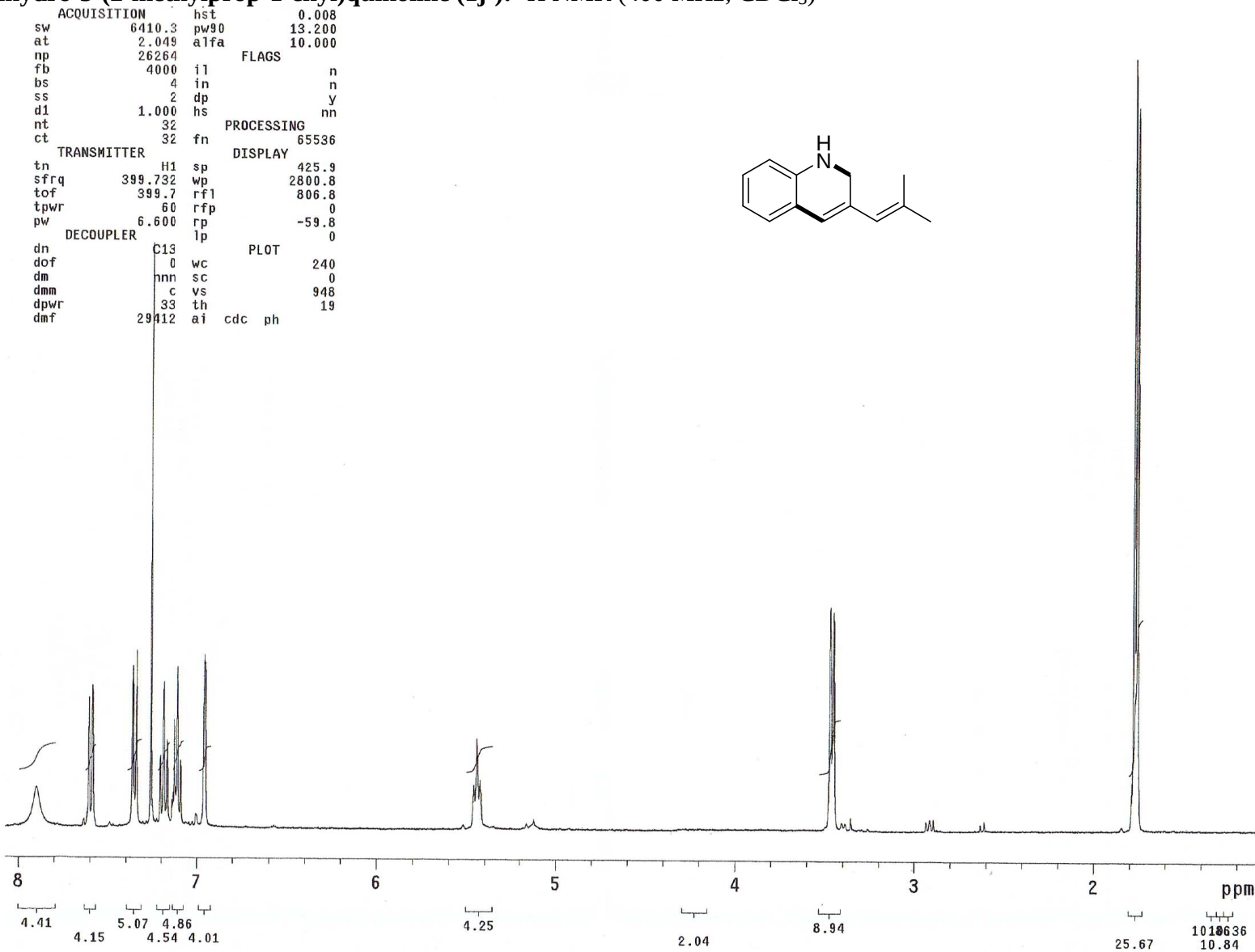
3-(4-fluorophenyl)quinoline (1i'): ^1H NMR (400 MHz, CDCl_3)

3-(4-fluorophenyl)quinoline (1i'): ^{13}C NMR (100 MHz, CDCl_3)

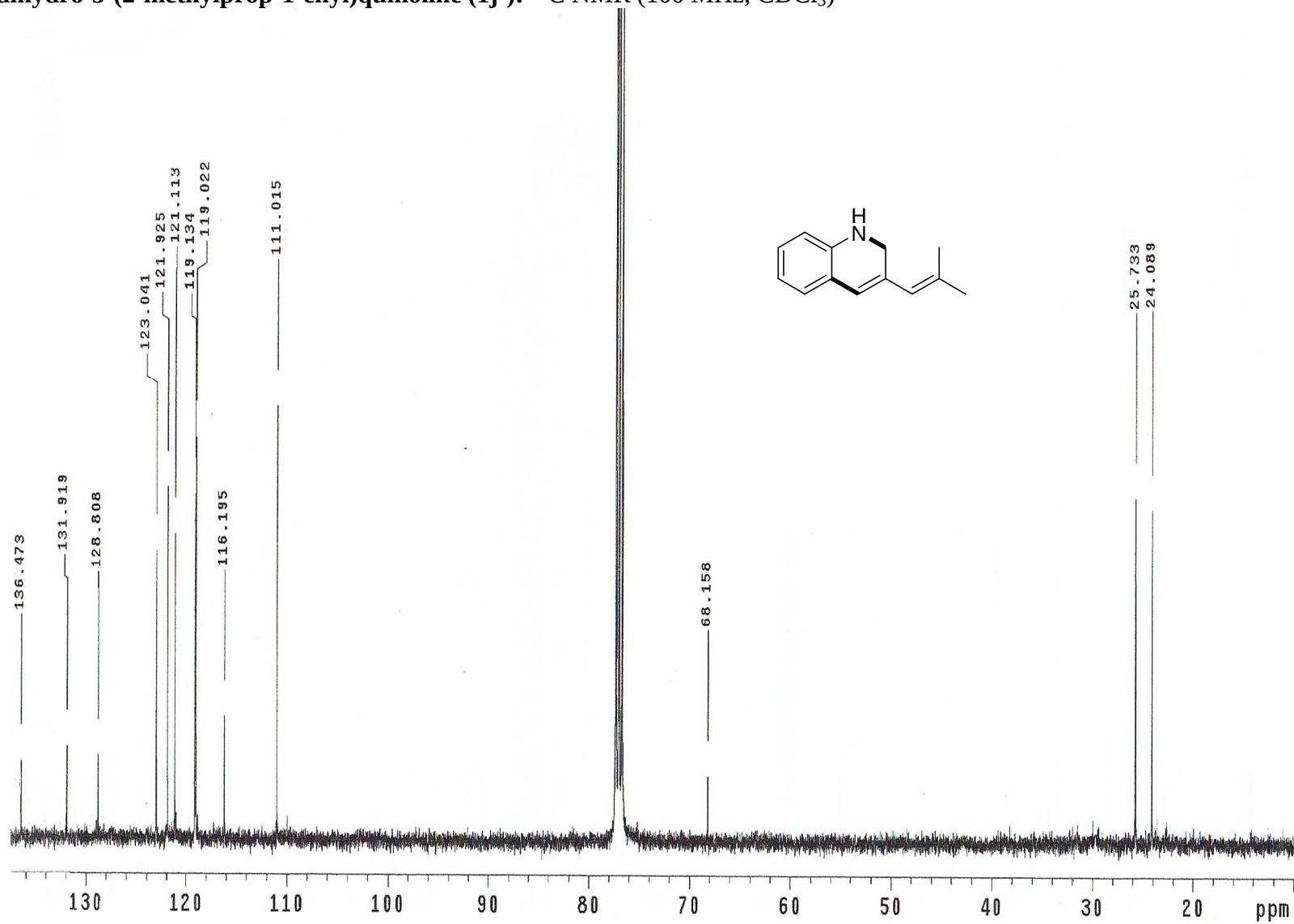
TRANSMITTER		wp	24509.1
tn	C13	rfl	9441.0
sfrq	100.523	rfp	7762.6
tof	1027.9	rp	83.5
tpwr	55	lp	0
pw	4.150	PLOT	
DECOUPLER		wc	240
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dmm	w	ai	cdc ph
dpwr	41		
dmf	9648		

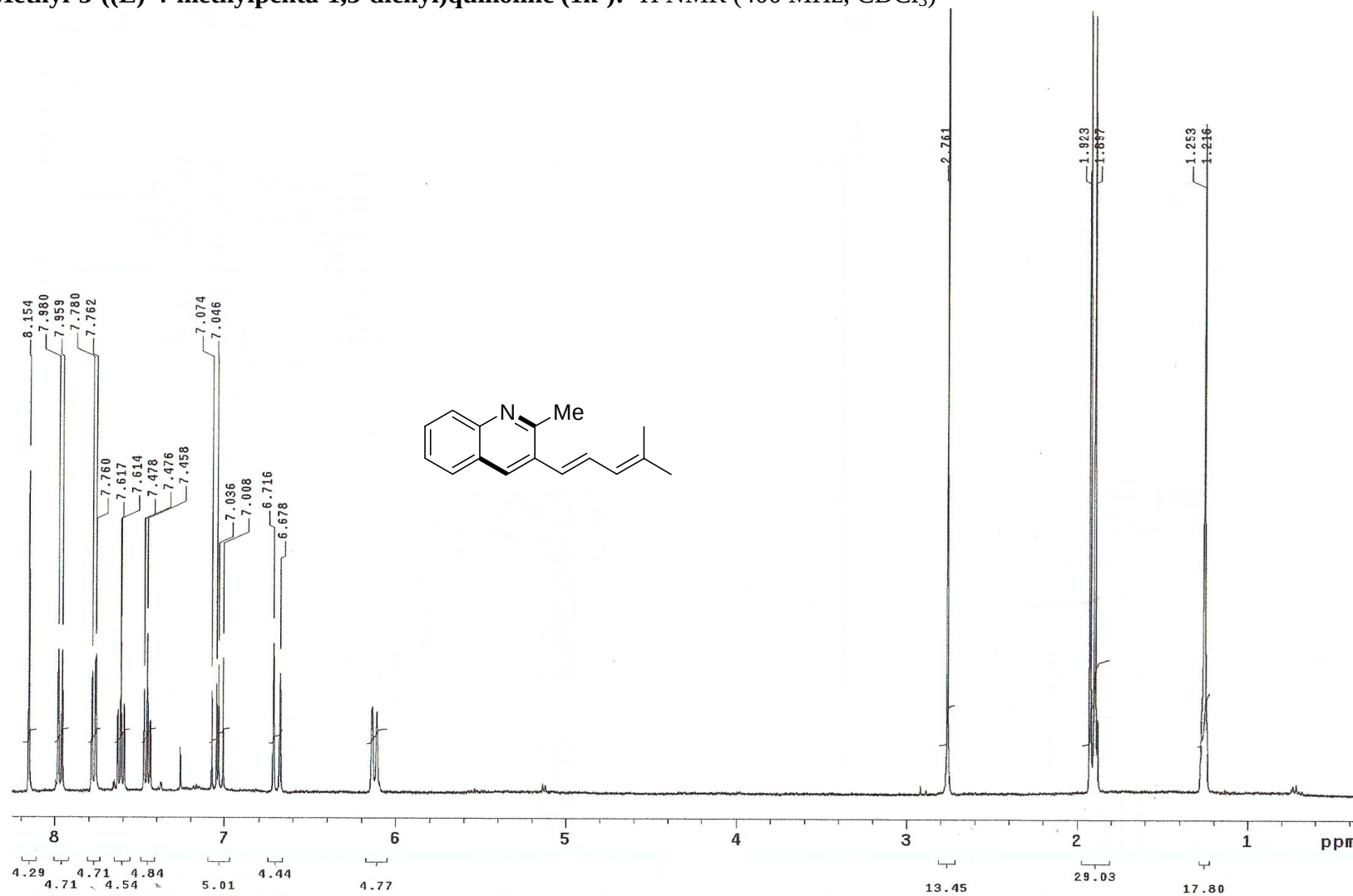


1,2-dihydro-3-(2-methylprop-1-enyl)quinoline (1j'): ^1H NMR (400 MHz, CDCl_3)



1,2-dihydro-3-(2-methylprop-1-enyl)quinoline (1j'): ^{13}C NMR (100 MHz, CDCl_3)



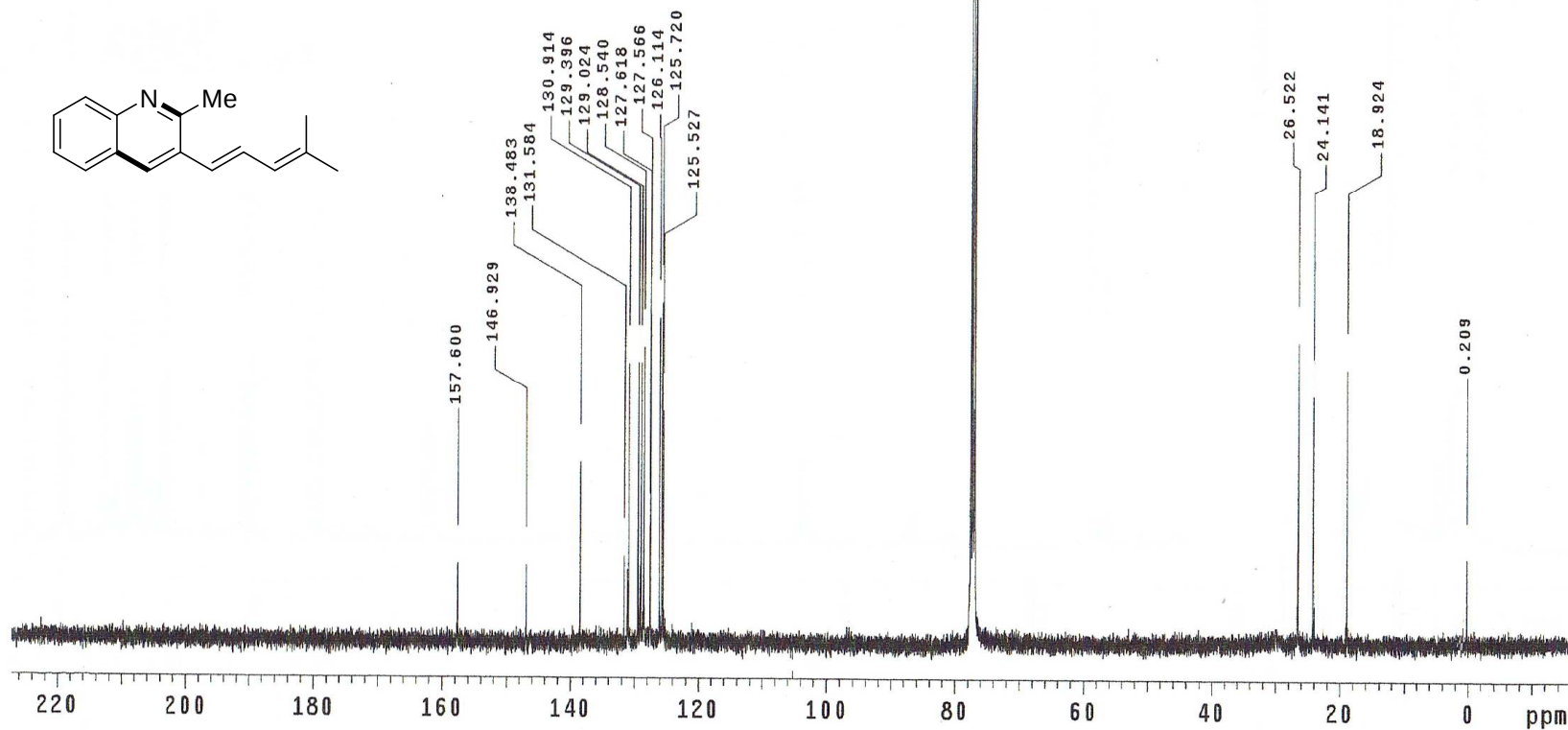
2-Methyl-3-((E)-4-methylpenta-1,3-dienyl)quinoline (1k'): ^1H NMR (400 MHz, CDCl_3)

2-Methyl-3-((E)-4-methylpenta-1,3-dienyl)quinoline (1k'): ^{13}C NMR (100 MHz, CDCl_3)

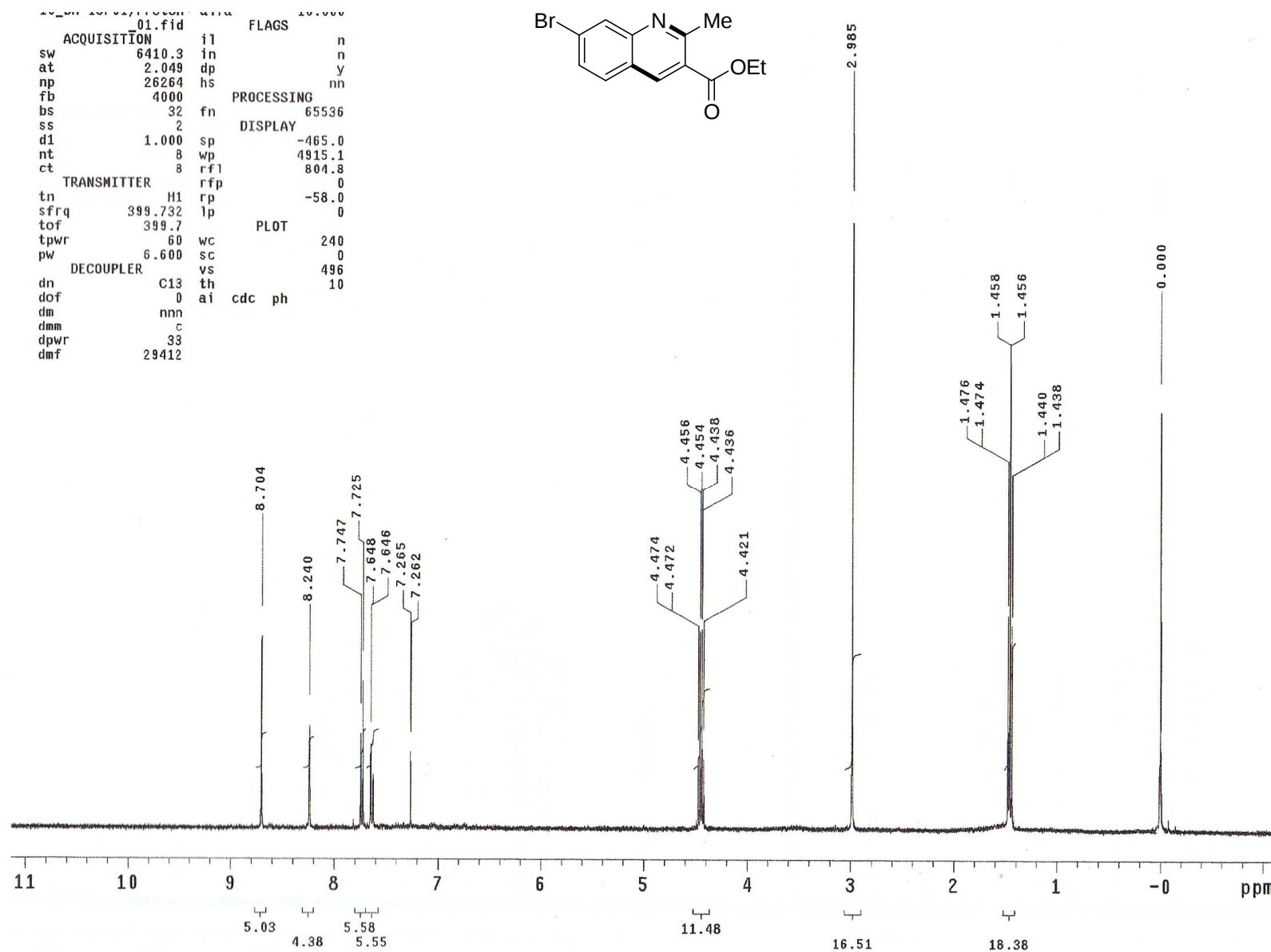
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TRANSMITTER 1b 0.50
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sfrq 100.523 DISPLAY
tof 1027.9 sp -1678.5
tpwr 55 wp 24509.1
pw 4.150 rfl 9441.7
DECOUPLER rfp 7762.6
dn H1 rp 83.6
dof 0 lp 0
dm yyy PLOT
dmm w wc 240
dpwr 41 sc 0
dmf 9648 vs 308788
th 9
ai cdc ph

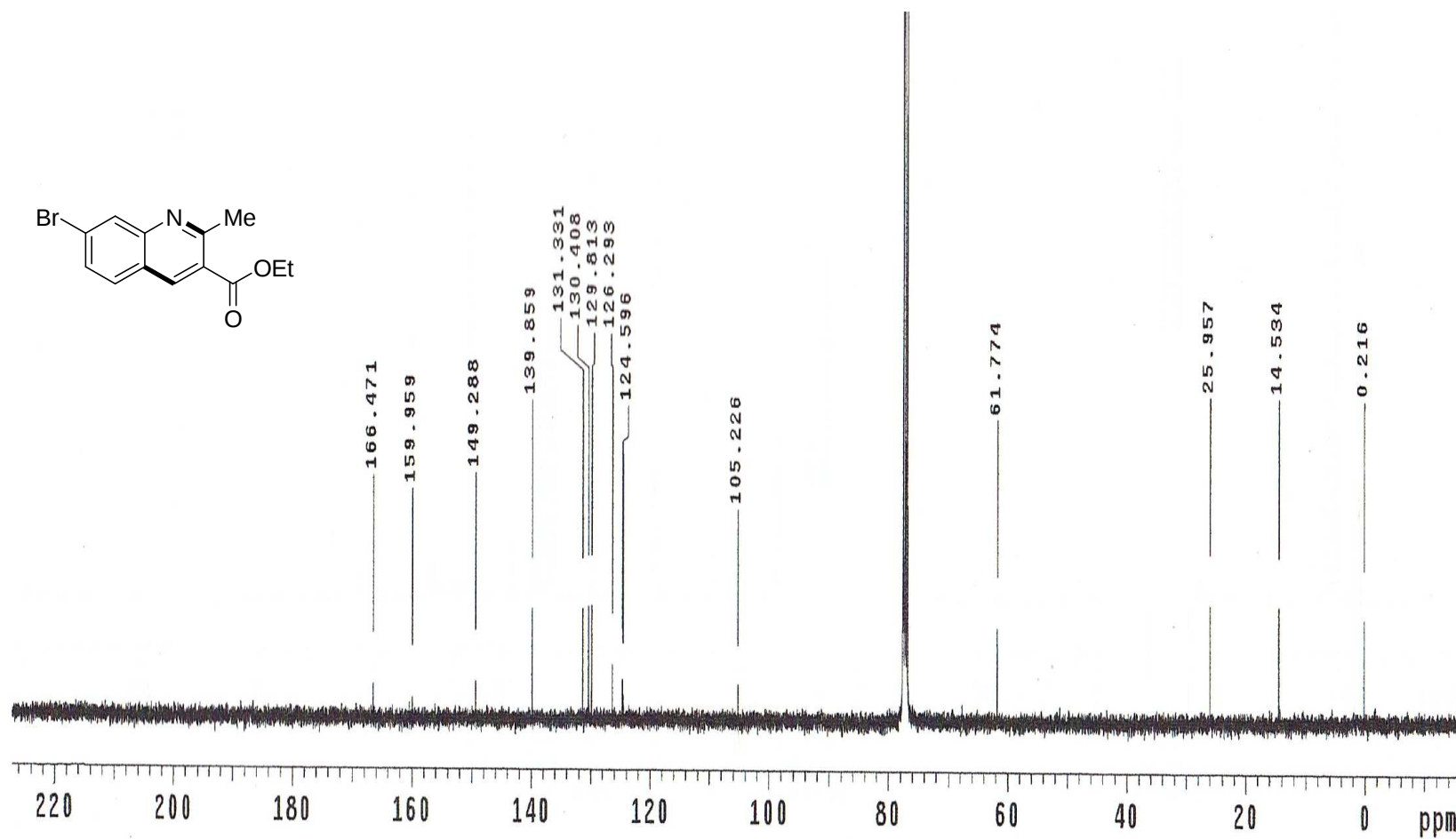
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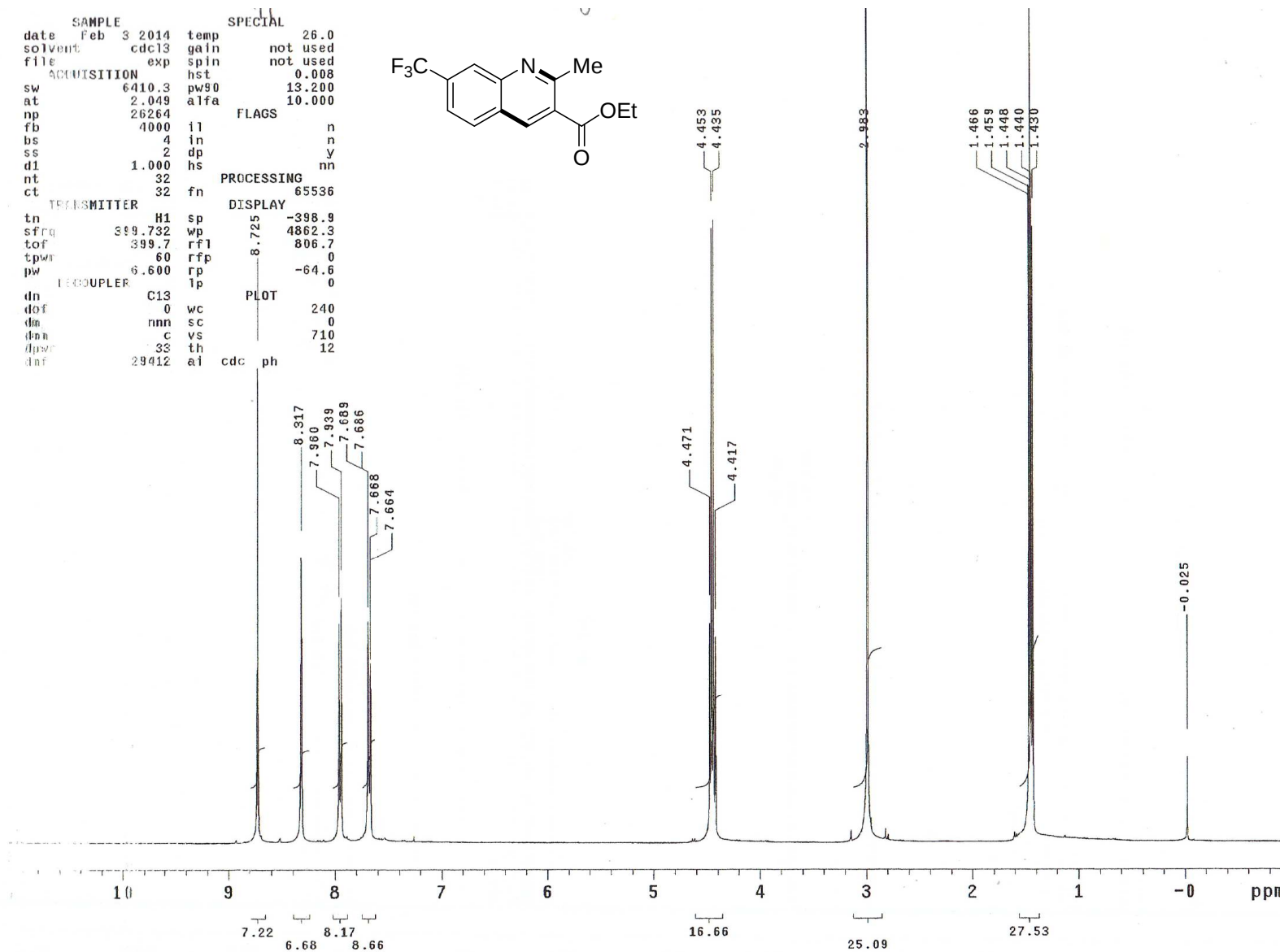
Ethyl 7-bromo-2-methylquinoline-3-carboxylate (3b'): ^1H NMR (400 MHz, CDCl_3)



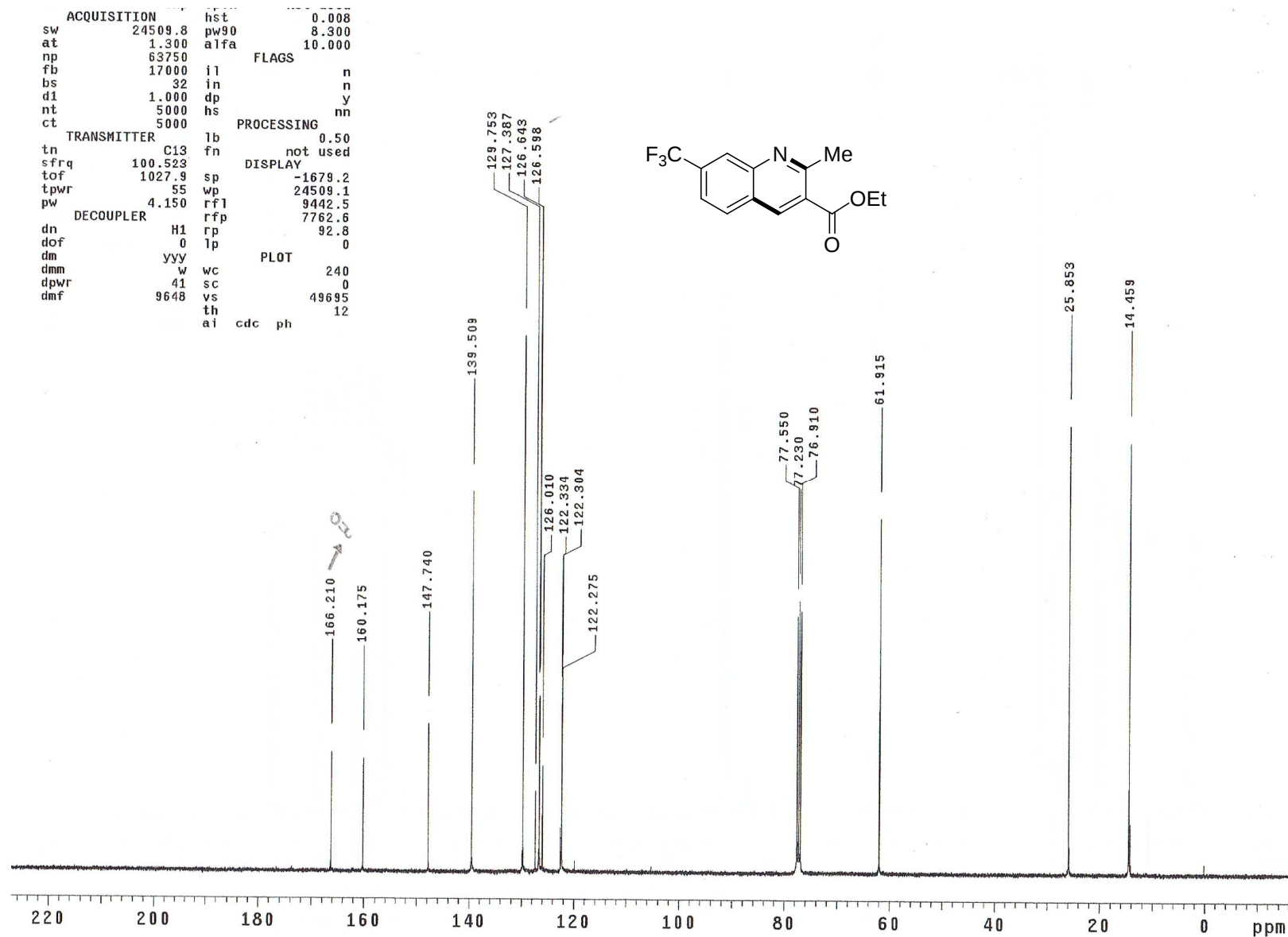
Ethyl 7-bromo-2-methylquinoline-3-carboxylate (**3b'**): ^{13}C NMR (100 MHz, CDCl_3)



Ethyl 7-(trifluoromethyl)-2-methylquinoline-3-carboxylate (4b'): ^1H NMR (400 MHz, CDCl_3)



Ethyl 7-(trifluoromethyl)-2-methylquinoline-3-carboxylate (4b'): ^{13}C NMR (100 MHz, CDCl_3)

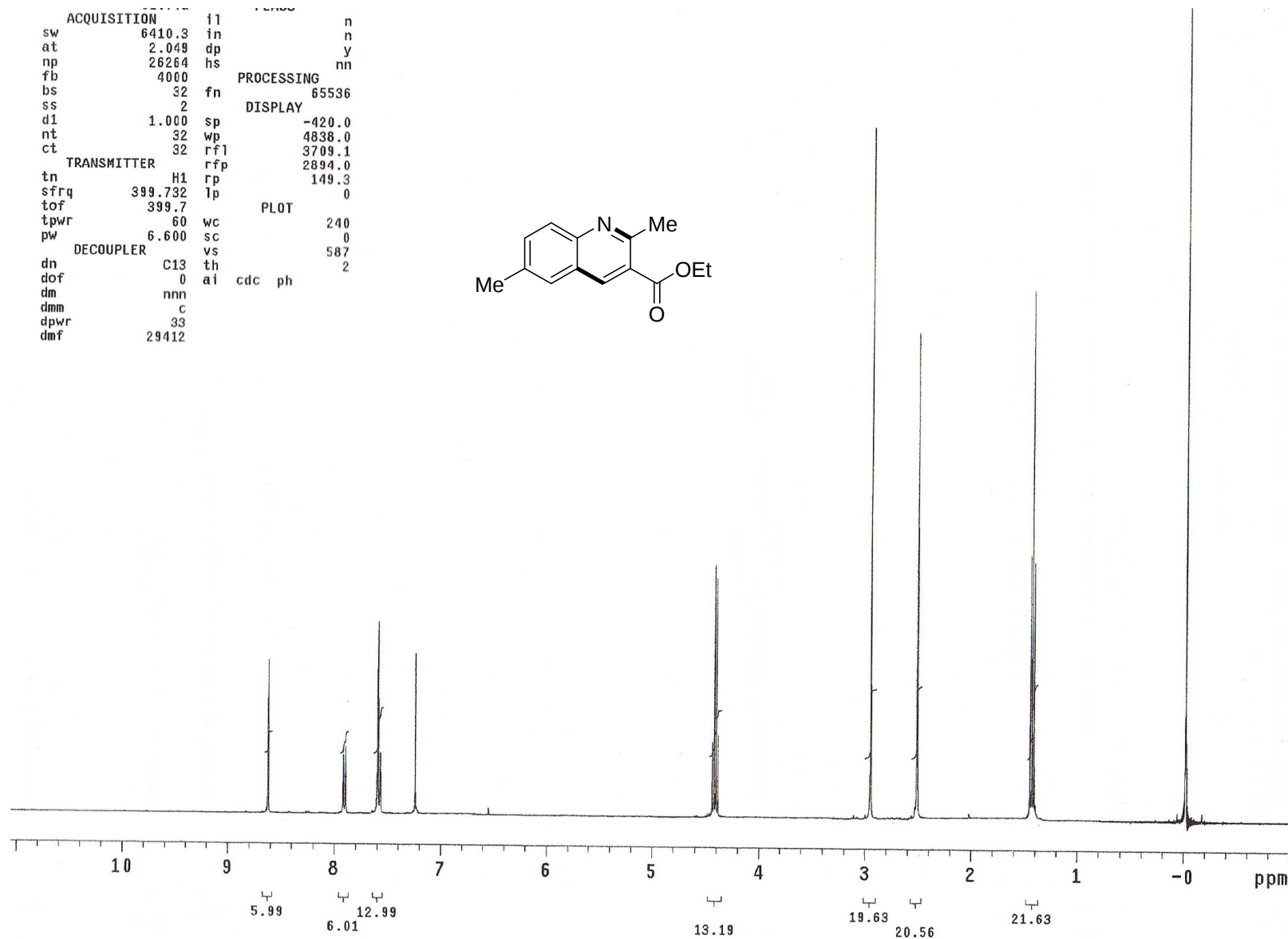
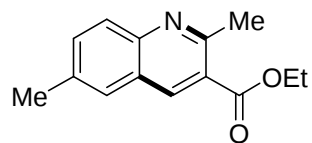


Ethyl 2,6-dimethylquinoline-3-carboxylate (5b'): ^1H NMR (400 MHz, CDCl_3)

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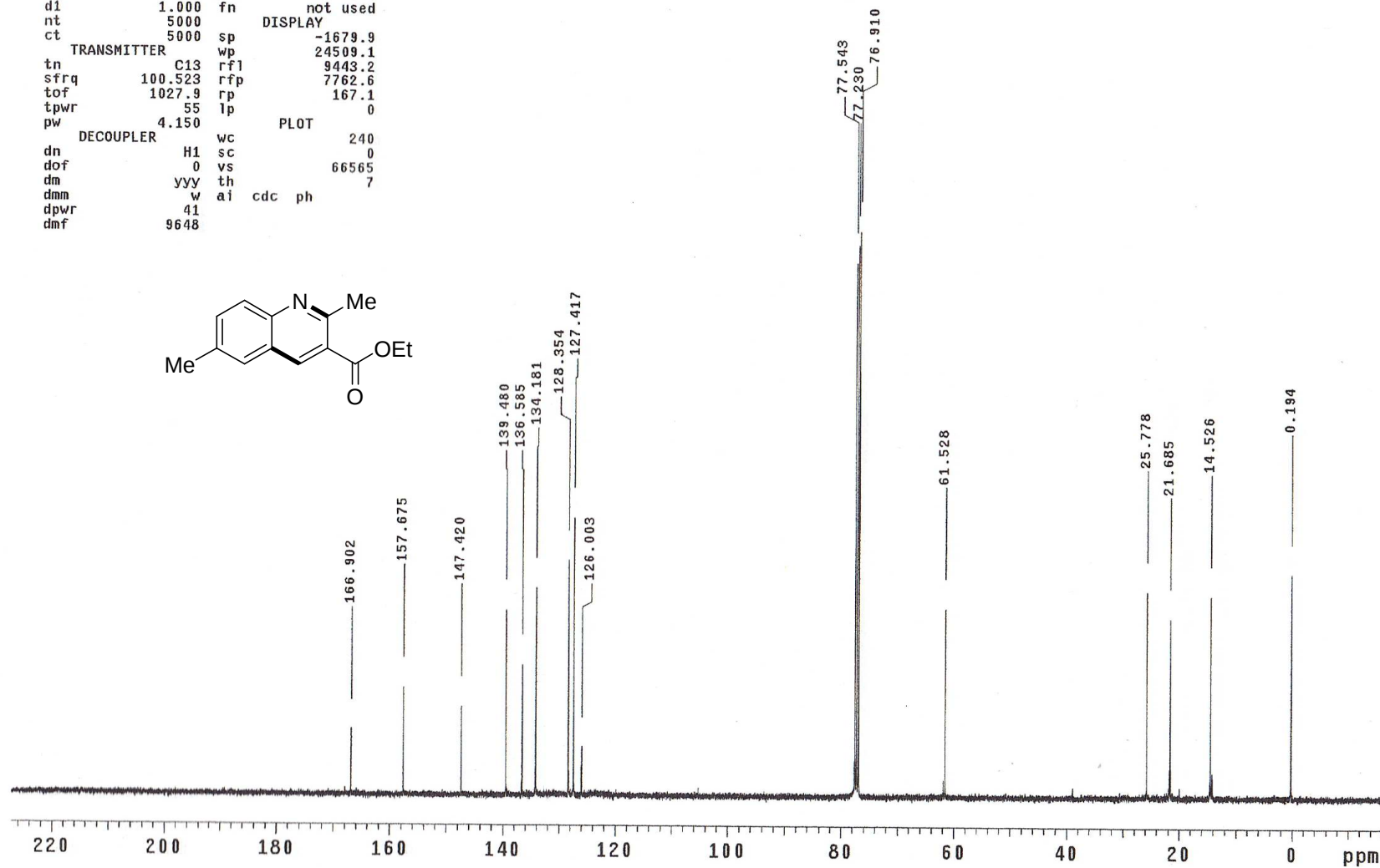
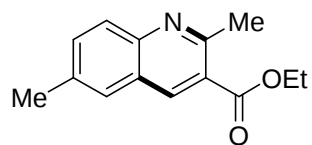
ACQUISITION      f1      n
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at      2.049     dp      y
np      26264    hs      nn
fb      4000
bs      32      fn      PROCESSING
ss      2      DISPLAY 65536
d1      1.000    sp      -420.0
nt      32      wp      4838.0
ct      32      rfl     3709.1
TRANSMITTER      rfp     2894.0
tn      H1      rp      149.3
sfrq     399.732 lp      0
tof     399.7    PLOT   240
tpwr     60      wc      0
pw      6.600    sc      0
DECOUPLER C13     vs     587
dn      0      th      2
dof      0      ai     cdc ph
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dmm      c
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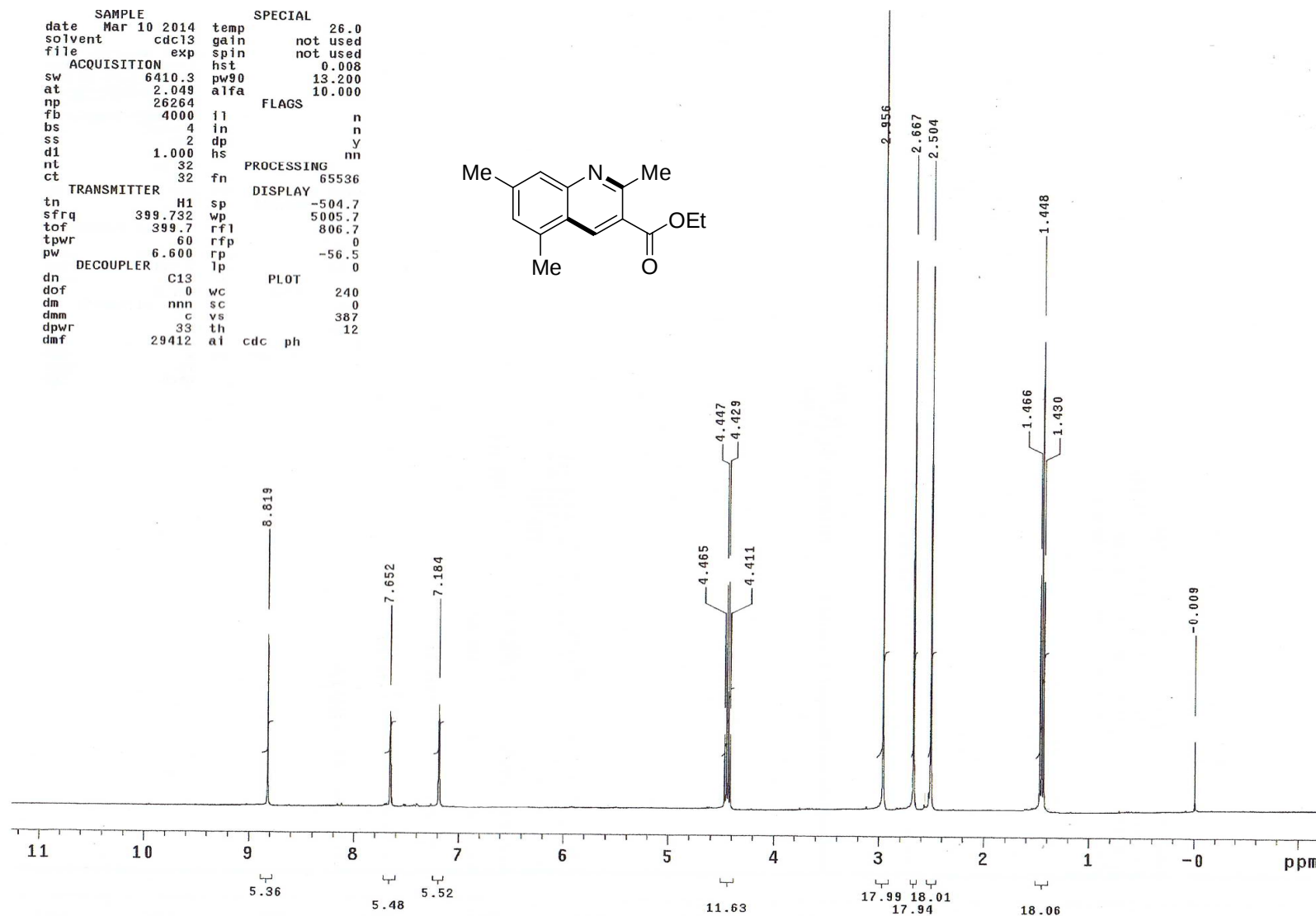


Ethyl 2,6-dimethylquinoline-3-carboxylate (5b'): ^{13}C NMR (100 MHz, CDCl_3)

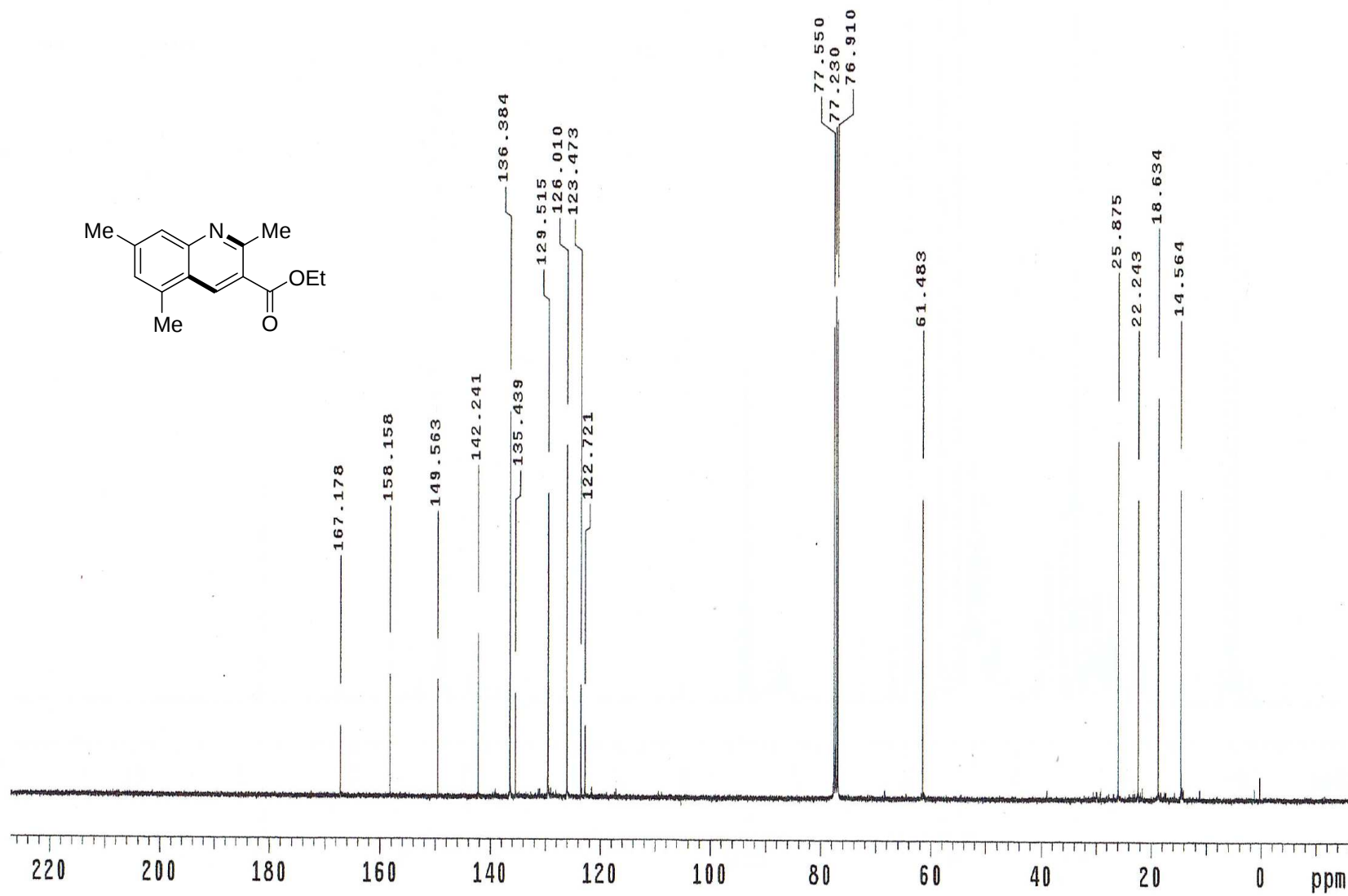
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at	1.300	dp	n
np	63750	hs	y
fb	17000	nn	
bs	64	lb	0.50
d1	1.000	fn	not used
nt	5000	PROCESSING	
ct	5000	sp	-1679.9
TRANSMITTER		wp	24509.1
tn	C13	rfl	9443.2
sfrq	100.523	rfl	7762.6
tof	1027.9	rp	167.1
tpwr	55	lp	0
pw	4.150	PLOT	
DECOUPLER		wc	240
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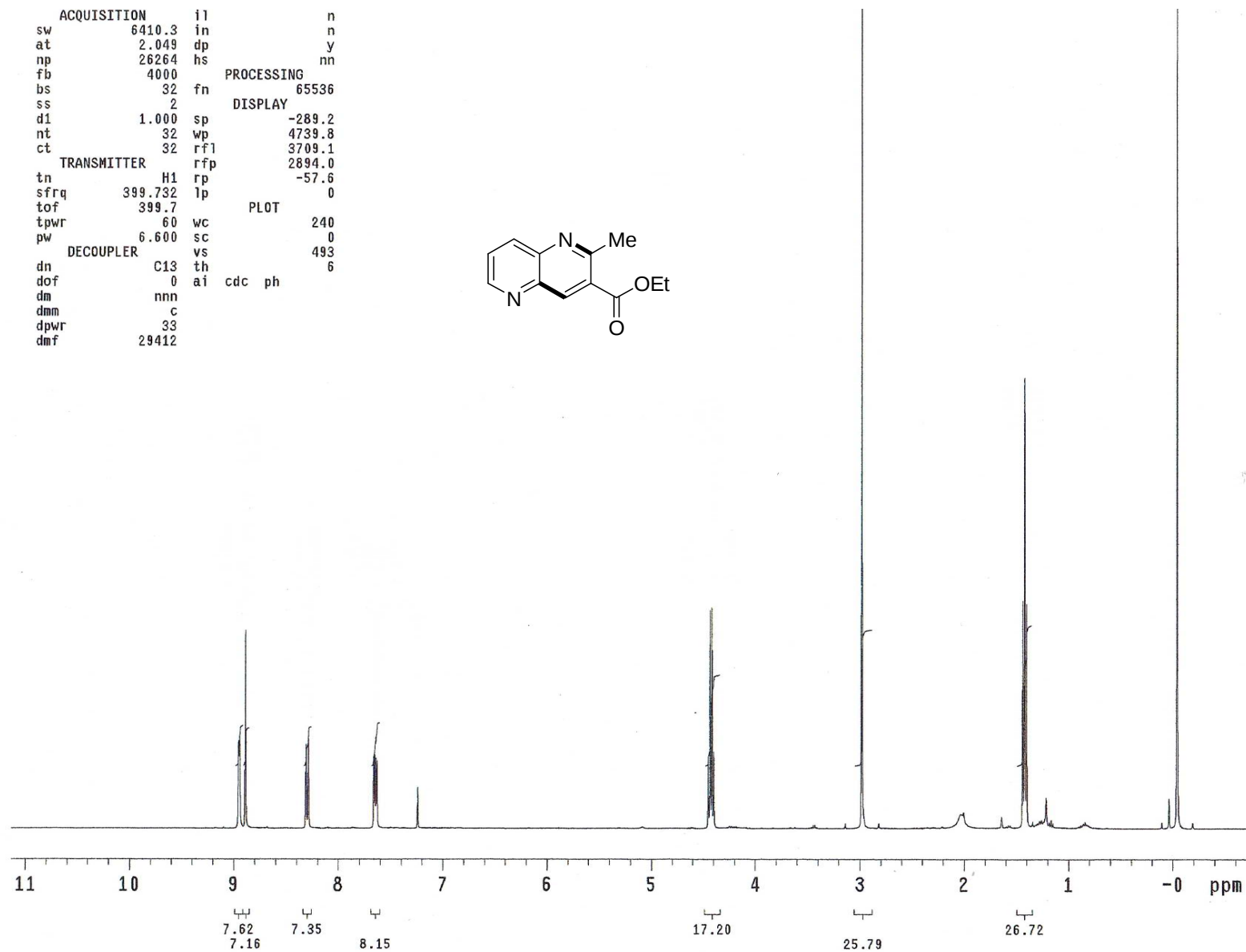


Ethyl 2,5,7-trimethylquinoline-3-carboxylate (6b'): ^1H NMR (400 MHz, CDCl_3)



Ethyl 2,5,7-trimethylquinoline-3-carboxylate (6b'): ^{13}C NMR (100 MHz, CDCl_3)



Ethyl 2-methyl-1,5-naphthyridine-3-carboxylate (7b'): ^1H NMR (400 MHz, CDCl_3)

Ethyl 2-methyl-1,5-naphthyridine-3-carboxylate (7b'): ^{13}C NMR (100 MHz, CDCl_3)