

Supporting Information:

Transition-Metal-Free Synthesis of Oxindoles by Potassium *tert*-Butoxide-Promoted Intramolecular α -Arylation

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1. General Information:

All commercial reagents and solvents were used with high purities and without further purification. Dry DMF, dry DMSO and KO*t*-Bu (98%+)¹ were purchased from Acros Chemicals. CH₂Cl₂ was distilled over CaH₂ under an argon atmosphere, THF was dried by distillation over Solvona (sodium on molecular sieves) in the presence of benzophenone under an argon atmosphere; solvents for work-up and column chromatography were distilled before use. For all intramolecular arylations new glassware and plastic spatulas were used, and all reactions were performed under an argon atmosphere. Analytical thin layer chromatography (TLC) was performed on Macherey-Nagel precoated silica gel 60 UV₂₅₄ plates and visualization was achieved by using UV light (254 nm). For flash column chromatography silica gel from Acros Chemicals (35-70 μm , 60 Å) was used. ^1H NMR, ^{13}C NMR and ^{19}F spectra were recorded either on a Varian Mercury 300 (300 MHz, 75 MHz and accordingly 282 MHz), on a Varian VNMRs 400 (400 MHz, 100 MHz and accordingly 376 MHz) or on a Varian VNMRs 600 (600 MHz, 151 MHz and accordingly 564 MHz). All chemical shifts are reported in parts per million (ppm) referenced to the appropriate solvent peak for ^1H and ^{13}C NMR spectra or TMS as internal standard and spin-spin coupling constants (*J*) were given in Hz. Mass spectra were recorded on a Finnigan SSQ 7000 spectrometer and HRMS spectra on a Finnigan MAT 95 spectrometer (ESI). IR spectra were carried out on a Perkin Elmer Spectrum 100 FT-IR spectrometer. The elemental analyses were performed on an Elementar Vario EL instrument. Melting points were measured on Büchi melting point apparatus and are uncorrected.

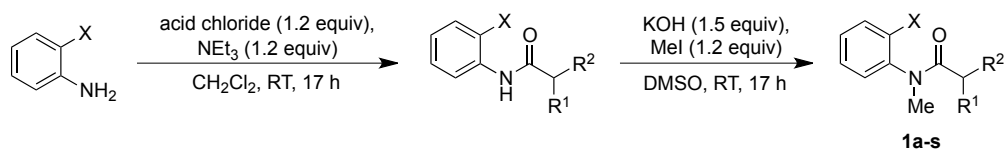
¹ KO*t*-Bu (with 99.99% purity from Aldrich) was also tested for the intramolecular α -arylation and no difference in yield was observed.

2. Experimental Section:

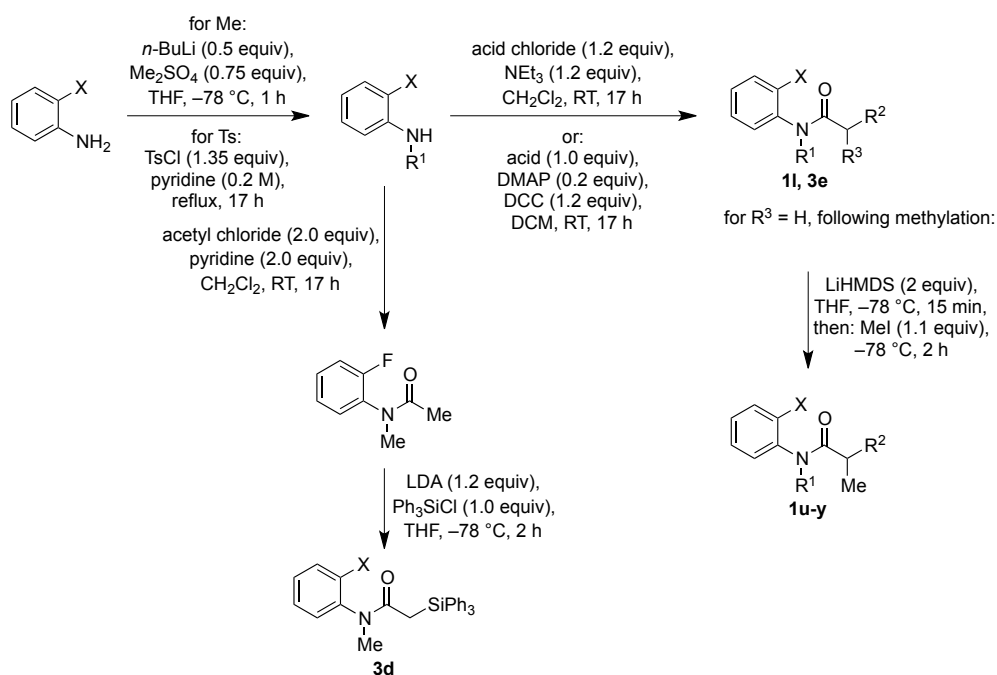
2.1. Preparation of starting material:

The syntheses of the substituted anilides **1a-y** and **3a-f** were performed *via* route A, route B, route C or route D.

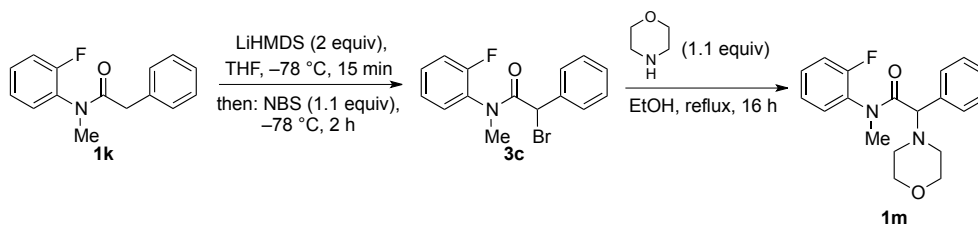
Route A:



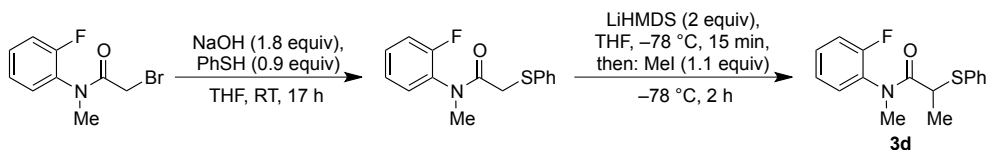
Route B:



Route C:



Route D:

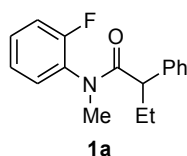


2.1.1. General procedure and characterization of compounds prepared *via* Route A:

General procedure 1: Syntheses of the anilides: To a solution of the 2-haloaniline (20 mmol, 1.0 equiv) in dry CH₂Cl₂ (40 mL) was added NEt₃ (24 mmol, 1.2 equiv) at room temperature. After 5 min the acid chloride (24 mmol, 1.2 equiv) was slowly added and the resulting mixture was stirred for 17 hours at ambient temperature. Then, the reaction mixture was quenched with saturated NH₄Cl solution (50 mL) and the two phases were separated. The aqueous phase was extracted with CH₂Cl₂ (3 x 20 mL) and the combined organic layers were washed with brine (1 x 50 mL), dried over MgSO₄ and concentrated under reduced pressure. The crude product was dried at high vacuum over night and used in the next step without further purification.

To a mixture of KOH (15 mmol, 1.5 equiv) in dry DMSO (8 mL) was added a solution of the precedent prepared 2-haloamide (10 mmol, 1.0 equiv) in dry DMSO (15 mL) at room temperature.² The resulting mixture was stirred for 1.5 hours. Then, MeI (12 mmol, 1.2 equiv) was added and stirring was continued for further 17 hours at ambient temperature. Next, water (20 mL) and ethyl acetate (15 mL) were added and the two layers were separated. The aqueous phase was extracted with ethyl acetate (2 x 20 mL), the combined organic layers were washed with brine (1 x 30 mL), dried over MgSO₄ and concentrated under reduced pressure. The product was purified with silica gel chromatography (*n*-pentane/ethyl acetate) to yield the corresponding anilides **1a-s**.

N-(2-Fluorophenyl)-*N*-methyl-2-phenylbutanamide (**1a**)



The product was prepared following the general procedure 1 and obtained as a colorless oil (82% over two steps according to 2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 10:1).

¹H NMR (400 MHz, CDCl₃, *syn/anti* mixture 1:0.62 with *M* = major isomer and *m* = minor isomer): δ = 7.38-7.31 (m, 2H, CH-Ar, *M* + *m*), 7.28 (dd, *J* = 7.4, 1.8 Hz, 0.5H, CH-Ar, *m*), 7.24-7.14 (m, 6.3H, CH-Ar, *M* + *m*), 7.05-6.96 (m, 3.6H, CH-Ar, *M* + *m*), 6.92-6.89 (m, 1H, CH-Ar, *M*), 6.73 (ddd, *J* = 7.9, 7.9, 1.7 Hz, 1H, CH-Ar, *M*), 3.36 (dd, *J* = 7.4, 7.4 Hz, 0.6H, CH, *m*), 3.21 (s, 3H, NCH₃, *M*), 3.20 (s, 1.9H, NCH₃, *m*), 2.15-2.05 (m, 1.9H, CH₂, *M* + *m*), 1.75-1.59 (m, 1.8H, CH₂, *M* + *m*), 0.80 (t, *J* = 7.3 Hz, 5H, CH₂CH₃, *M* + *m*).

¹³C NMR (100 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.7 (qC, CO, *M* + *m*), 158.9 (d, *J* = 251.7 Hz, qC, CF, *m*), 158.2 (d, *J* = 249.5 Hz, qC, CF, *M*), 140.0 (d, *J* = 89.3 Hz, qC, CN, *M* + *m*), 131.5 (qC, C-Ar, *m*), 131.4 (qC, C-Ar, *M*), 130.9 (CH-Ar, *M*) 130.5 (CH-Ar, *m*), 130.1 (d, *J* = 6.1 Hz, CH-ArF, *m*), 129.9 (d, *J* = 7.5 Hz, CH-ArF, *M*), 128.5 (CH-Ar, *M*), 128.3 (CH-Ar, *m*), 128.11 (CH-Ar, *M*), 128.05 (CH-Ar, *m*), 126.91 (CH-Ar, *M*), 126.89 (CH-Ar, *m*), 125.0 (d, *J* = 3.9 Hz, CH-ArF, *m*), 124.8 (d, *J* = 3.9 Hz, CH-ArF, *M*), 117.1 (d, *J* = 20.1 Hz, CH-ArF, *m*), 116.9 (d, *J* = 20.0 Hz, CH-ArF, *M*), 51.5 (CH, *M*), 51.2 (CH, *m*), 36.9 (NCH₃, *M*), 36.8 (NCH₃, *m*), 28.5 (CH₂, *M*), 28.0 (CH₂, *m*), 12.5 (CH₂CH₃, *m*), 12.4 (CH₂CH₃, *M*).

¹⁹F NMR (282 MHz, CDCl₃ *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -119.5 (*m*), -121.6 (*M*).

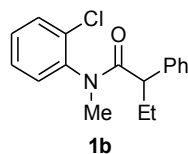
IR (neat): ν = 2964, 2923, 1664, 1501, 1456, 1381, 1128, 1095, 763, 700 cm⁻¹.

MS (EI): *m/z* (%) = 272 ([M+H]⁺, 5), 271 ([M]⁺, 271), 152 (19), 146 (14), 126 (7), 91 (125), 124 (20), 119 (24), 118 (6), 117 (5), 92 (8), 91 (100), 90 (9), 78 (6), 77 (26).

² The reaction conditions were slightly modified from a previous published protocol: Curran, D. P.; Yu, H.; Liu, H. *Tetrahedron* **1994**, *50*, 7343.

HRMS (ESI, MeOH) ($C_{17}H_{18}NOF$): calcd 271.1367, found 271.1367 ($\Delta = -0.02$ ppm).

***N*-(2-Chlorophenyl)-*N*-methyl-2-phenylbutanamide (1b)**



The product was prepared following the general procedure 1 and obtained as a colorless oil (83% over two steps according to 2-chloroaniline) after column chromatography (*n*-pentane/ethyl acetate 15:1).

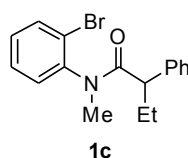
1H NMR (300 MHz, $CDCl_3$, *syn/anti* mixture 1:0.39 with *M* = major isomer and *m* = minor isomer): δ = 7.53 (dd, J = 7.9, 1.3 Hz, 1H, CH-Ar, *M*), 7.39-7.30 (m, 2.3H, CH-Ar, *M* + *m*), 7.28 (dd, J = 1.6, 0.5 Hz, 0.3H, CH-Ar, *m*), 7.26 (d, J = 0.6 Hz, 0.4H, CH-Ar, *m*), 7.21-7.15 (m, 3.8H, CH-Ar, *M* + *m*), 7.13-7.08 (m, 1H, CH-Ar, *M*), 6.97-6.92 (m, 2.6H, CH-Ar, *M* + *m*), 6.63 (dd, J = 7.8, 1.6 Hz, 1H, CH-Ar, *M*), 3.25 (t, J = 7.5 Hz, 0.4H, CH, *m*), 3.18 (d, J = 0.5 Hz, 1.1H, NCH_3 , *m*), 3.17 (d, J = 0.5 Hz, 3H, NCH_3 , *M*), 3.03 (t, J = 7.0 Hz, 1H, CH, *M*), 2.17-2.01 (m, 1.5H, CH_2 , *M* + *m*), 1.76-1.67 (m, 1.5H, CH_2 , *M* + *m*), 0.83-0.75 (m, 4.2H, CH_3 , *M* + *m*).

^{13}C NMR (75 MHz, $CDCl_3$, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.5 (qC, CO, *m*), 173.3 (qC, CO, *M*), 141.1 (qC, C-Ar, *m*), 140.9 (qC, C-Ar, *m*), 140.4 (qC, C-Ar, *M*), 139.3 (qC, C-Ar, *M*), 134.3 (qC, C-Ar, *m*), 133.1 (qC, C-Ar, *M*), 131.2 (CH-Ar, *M*), 130.9 (CH-Ar, *m*), 130.60 (CH-Ar, *m*), 130.55 (CH-Ar, *M*), 129.7 (CH-Ar, *M* + *m*), 128.47 (CH-Ar, *M*), 128.43 (CH-Ar, *m*), 128.27 (CH-Ar, *M*), 128.11 (CH-Ar, *M*), 128.07 (CH-Ar, *m*), 127.8 (CH-Ar, *m*), 126.9 (CH-Ar, *M* + *m*), 52.0 (CH, *M*), 51.2 (CH, *m*), 36.2 (NCH_3 , *M*), 36.1 (NCH_3 , *m*), 28.6 (CH_2 , *M*), 28.2 (CH_2 , *m*), 12.7 (CH_2CH_3 , *M*), 12.5 (CH_2CH_3 , *m*).

MS (EI): m/z (%) = 288 ($[M+H]^+$, 8), 287 ($[M]^+$, 2), 253 (21), 252 (100), 170 (9), 169 (3), 168 (24), 143 (8), 142 (5), 141 (30), 140 (8), 119 (18), 91 (49).

The spectral data are in accordance with those reported in the literature.³

***N*-(2-Bromophenyl)-*N*-methyl-2-phenylbutanamide (1c)**



The product was prepared following the general procedure 1 and obtained as a colorless oil (79% over two steps according to 2-bromoaniline) after column chromatography (*n*-pentane/ethyl acetate 15:1).

1H NMR (400 MHz, $CDCl_3$, *syn/anti* mixture 1:0.37 with *M* = major isomer and *m* = minor isomer): δ = 7.71 (dd, J = 8.0, 1.4 Hz, 1H, CH-Ar, *M*), 7.57 (dd, J = 8.0, 1.4 Hz, 0.3H, CH-Ar, *m*), 7.43 (ddd, J = 7.7, 7.7, 1.4 Hz, 0.4H, CH-Ar, *m*), 7.33 (dd, J = 7.8, 1.7 Hz, 0.4H, CH-Ar, *m*), 7.28-7.24 (m, 1H, CH-Ar, *M*), 7.22-7.16 (m, 5H, CH-Ar, *M* + *m*), 7.15-7.11 (m, 1.3H, CH-Ar, *M* + *m*), 6.99-6.96 (m, 0.8H, CH-Ar, *m*), 6.94-6.92 (m, 2H, CH-Ar, *M*), 6.60 (dd, J = 7.8, 1.7 Hz, 1H, CH-Ar, *M*), 3.24 (dd, J = 7.4, 7.4 Hz, 0.4H, CH, *m*), 3.19 (s, 1.2H, NCH_3 , *m*), 3.16 (s, 3H, NCH_3 , *M*), 3.02 (dd, J = 7.4, 7.4 Hz, 1H, CH, *M*), 2.16-2.02 (m, 1.6H, CH_2 , *M* + *m*), 1.77-1.61 (m, 1.9H, CH_2 , *M* + *m*), 0.82 (t, J = 7.4 Hz, 3H, CH_2CH_3 , *M*), 0.78 (t, J = 7.4 Hz, 1.3H, CH_2CH_3 , *m*).

^{13}C NMR (100 MHz, $CDCl_3$, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.4 (qC, CO, *m*), 173.2 (qC, CO, *M*), 142.8 (qC, C-Ar, *m*), 142.4 (qC, C-Ar, *M*), 140.4 (qC, C-Ar, *M*), 139.3 (qC, C-Ar, *m*), 134.2 (CH-Ar), 133.7 (CH-Ar), 131.4 (CH-Ar), 130.7 (CH-Ar), 129.9 (CH-Ar), 128.8 (CH-Ar), 128.7 (CH-Ar), 128.5 (CH-Ar), 128.3 (CH-Ar), 128.2 (CH-Ar), 126.93 (CH-Ar), 126.88 (CH-Ar), 124.6 (qC, C-Ar, *m*), 123.7 (qC, C-Ar, *M*), 52.2 (CH, *M*), 51.2 (CH, *m*), 36.3 (NCH_3 , *M* + *m*), 28.6 (CH_2 , *M*), 28.4 (CH_2 , *m*), 12.8 (CH_2CH_3 , *M*), 12.6 (CH_2CH_3 , *m*).

³ Ackermann, L.; Vicente, R.; Hofmann, N. *Org. Lett.* **2009**, *11*, 4274.

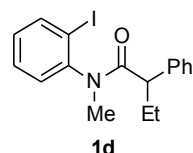
IR (neat): ν = 2964, 1663, 1583, 1477, 1376, 1130, 765 cm^{-1} .

MS (EI): m/z (%) = 334 (1), 332 ($[\text{M}]^+$, 1), 253 (22), 252 (100), 214 (13), 212 (13), 187 (11), 186 (4), 185 (11), 184 (5), 119 (20), 91 (49), 90 (5), 77 (10).

Elemental analysis calcd for $\text{C}_{17}\text{H}_{18}\text{BrNO}$: C 61.46, H 5.46, N 4.22, found: C 61.38, H 5.27, N 4.60.

The spectral data are in accordance with those reported in the literature.⁴

***N*-(2-Iodophenyl)-*N*-methyl-2-phenylbutanamide (1d)**



The product was prepared following the general procedure 1 and obtained as a pale yellow oil (77% over two steps according to 2-iodoaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

^1H NMR (400 MHz, CDCl_3 , *syn/anti* mixture 1:0.4 with *M* = major isomer and *m* = minor isomer): δ = 7.95 (dd, J = 7.8, 1.5 Hz, 1H, CH-Ar, *M*), 7.85 (dd, J = 8.0, 1.5 Hz, 0.3H, CH-Ar, *m*), 7.47 (ddd, J = 7.5, 7.5, 1.2 Hz, 0.4H, CH-Ar, *m*), 7.32 (dd, J = 7.8, 1.6 Hz, 0.4H, CH-Ar, *m*), 7.20-7.16 (m, 4.3H, CH-Ar, *M* + *m*), 7.15-7.09 (m, 1.3H, CH-Ar, *M* + *m*), 7.07-7.03 (m, 1H, CH-Ar, *M*), 7.02-6.98 (m, 1H, CH-Ar, *M*), 6.92-6.89 (m, 2H, CH-Ar, *M* + *m*), 6.53 (dd, J = 7.7, 1.7 Hz, 1H, CH-Ar, *M*), 3.28-3.19 (m, 1.5H, NCH_3 : *m*, CH: *m*), 3.13 (s, 3H, NCH_3 , *M*), 2.98 (t, J = 7.4 Hz, 1H, CH, *M*), 2.20-2.02 (m, 1.6H, CH_2 , *M* + *m*), 1.78-1.62 (m, 1.7H, CH_2 , *M* + *m*), 0.84 (t, J = 7.4 Hz, 3H, CH_2CH_3 , *M*), 0.77 (t, J = 7.4 Hz, 1.1H, CH_2CH_3 , *m*).

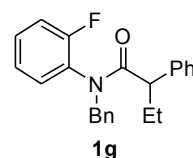
^{13}C NMR (100 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.3 (qC, CO, *m*), 173.0 (qC, CO, *M*), 146.2 (qC, C-Ar, *m*), 145.6 (qC, C-Ar, *M*), 140.5 (CH-Ar, *m*), 140.3 (qC, C-Ar, *M*), 140.0 (CH-Ar, *M*), 139.4 (qC, C-Ar, *m*), 130.6 (CH-Ar)*, 129.9 (CH-Ar)*, 129.7 (CH-Ar)*, 129.4 (CH-Ar)*, 129.0 (CH-Ar)*, 128.44 (CH-Ar, *M*), 128.39 (CH-Ar, *m*), 128.2 (CH-Ar, *M*), 127.0 (CH-Ar, *m*), 126.9 (CH-Ar, *M*), 100.5 (qC, C-Ar, *m*), 100.2 (qC, C-Ar, *M*), 52.5 (CH, *M*), 51.2 (CH, *m*), 36.5 (NCH_3 , *m*), 36.4 (NCH_3 , *M*), 28.7 (CH_2 , *M*), 28.6 (CH_2 , *m*), 13.0 (CH_2CH_3 , *M*), 12.6 (CH_2CH_3 , *m*). * In this case, an exact assignment of the signal was impossible.

IR (neat): ν = 2921, 1660, 1465, 1379, 760, 725 cm^{-1} .

MS (EI): m/z (%) = 381 (1), 380 ($[\text{M}+\text{H}]^+$, 8), 260 (31), 253 (22), 252 (100), 233 (35), 223 (11), 146 (12), 133 (16), 119 (32), 118 (5), 117 (10), 105 (14), 104 (13), 92 (6), 91 (65), 77 (11).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{19}\text{NOI}$): calcd 380.0506, found 380.0505 (Δ = -0.12 ppm).

***N*-Benzyl-*N*-(2-fluorophenyl)-2-phenylbutanamide (1g)**



The product was prepared following the general procedure 1 by using benzyl bromide (1.2 equiv) as alkylation reagent and obtained as a colorless oil (80% over two steps according to 2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

^1H NMR (400 MHz, CDCl_3 , *syn/anti* mixture 1:0.57 with *M* = major isomer and *m* = minor isomer; spectra contains traces of starting material): δ = 7.38-7.36 (m, 1.5H, CH-Ar, *M* + *m*), 7.32 (m, 1.6H, CH-Ar, *M* + *m*), 7.24-7.22 (m, 1.7H, CH-Ar, *M* + *m*), 7.20-7.14 (m, 9H, CH-Ar, *M* + *m*), 7.13-7.02 (m, 3.5H, CH-Ar, *M* + *m*), 7.00-6.95 (m, 4H, CH-Ar, *M* + *m*), 6.90-6.84 (m, 1.5H, CH-Ar, *M* + *m*), 6.36 (ddd, J = 7.8, 7.8, 1.7 Hz, 1H, CH-Ar, *M*), 5.58 (d, J = 14.4 Hz, 0.6H, NCH_2 , *m*), 5.19 (d, J = 14.4 Hz,

⁴ Arao, T.; Sato, K.; Kondo, K.; Aoyama, T. *Chem. Pharm. Bull.* **2006**, *54*, 1576.

^1H NMR (CDCl_3 , M), 4.52 (d, $J = 14.4$ Hz, 1H, NCH_2 , M), 4.06 (d, $J = 14.4$ Hz, 0.6H, NCH_2 , m), 3.33 (t, $J = 7.3$ Hz, 0.6H, CH, m), 3.20 (t, $J = 7.4$ Hz, 1H, CH, M), 2.21-2.09 (m, 1.7H, CHCH_2 , $M + m$), 1.77-1.62 (m, 2H, CHCH_2 , $M + m$), 0.84 (t, $J = 7.3$ Hz, 1.8H, CH_2CH_3 , m), 0.81 (t, $J = 7.4$ Hz, 3H, CH_2CH_3 , M).

^{13}C NMR (100 MHz, CDCl_3 , *syn/anti* mixture with M = major isomer and m = minor isomer; spectra contains traces of starting material): $\delta = 173.6$ (qC, CO, m), 173.5 (qC, CO, M), 158.3 (d, $J = 249.8$ Hz, qC, CF, $M + m$), 139.6 (qC, C-Ar, M), 139.4 (qC, C-Ar, m), 137.5 (qC, C-Ar, m), 137.4 (qC, C-Ar, M), 131.9 (CH-Ar, m), 131.8 (CH-Ar, M), 130.2 (d, $J = 8.1$ Hz, CH-ArF, m), 130.0 (d, $J = 7.8$ Hz, CH-ArF, M), 129.6 (d, $J = 12.6$ Hz, qC, CN, M), 129.5 (d, $J = 12.7$ Hz, qC, CN, m), 129.3 (CH-Ar, m), 129.1 (CH-Ar, M), 128.9 (CH-Ar, m), 128.5 (CH-Ar, M), 128.41 (CH-Ar, M), 128.37 (CH-Ar, m), 128.11 (CH-Ar, m), 128.09 (CH-Ar, M), 127.6 (CH-Ar, m), 127.5 (CH-Ar, M), 127.0 (CH-Ar, m), 126.9 (CH-Ar, M), 124.53 (d, $J = 4.1$ Hz, CH-ArF, m), 124.45 (d, $J = 4.0$ Hz, CH-ArF, M), 117.0 (d, $J = 20.1$ Hz, CH-ArF, m), 116.6 (d, $J = 20.2$ Hz, CH-ArF, M), 52.5 (NCH_2 , M), 52.3 (NCH_2 , m), 51.9 (CH, M), 51.4 (CH, m), 28.5 (CHCH_2 , M), 28.3 (CHCH_2 , m), 12.6 (CH_2CH_3 , m), 12.5 (CH_2CH_3 , M).

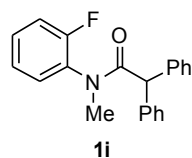
^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with M = major isomer and m = minor isomer; spectra contains traces of starting material): $\delta = -118.7$ (m), -120.6 (M).

IR (neat): $\nu = 3026, 2966, 1661, 1500, 1453, 1225, 755, 700\text{ cm}^{-1}$.

MS (EI): m/z (%) = 349 (1), 348 ($[\text{M}+\text{H}]^+$, 11), 347 ($[\text{M}]^+$, 38), 202 (5), 201 (31), 167 (18), 119 (22), 92 (8), 91 (100).

HRMS (ESI, MeOH) ($\text{C}_{23}\text{H}_{23}\text{NOF}$): calcd 348.1758, found 348.1758 ($\Delta = -0.03$ ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2,2-diphenylacetamide (1i)**



The product was prepared following the general procedure 1 and obtained as a pale yellow solid (49% over two steps according to 2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 10:1).

Mp.: 91-92 °C

^1H NMR (400 MHz, CDCl_3): $\delta = 7.38$ -7.33 (m, 1H, CH-Ar), 7.30-7.17 (m, 9H, CH-Ar), 7.15-7.07 (m, 3H, CH-Ar), 6.96 (ddd, $J = 7.8, 7.8, 1.7$ Hz, 1H, CH-Ar), 4.88 (s, 1H, CH), 3.28 (s, 3H, CH_3).

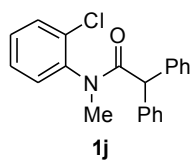
^{13}C NMR (100 MHz, CDCl_3): $\delta = 172.3$ (qC, CO), 158.3 (d, $J = 250.5$ Hz, qC, CF), 139.7 (qC, C-Ar), 139.2 (qC, C-Ar), 131.4 (d, $J = 13.1$ Hz, qC, C-ArF), 130.4 (CH-Ar), 130.3 (d, $J = 7.7$ Hz, CH-ArF), 129.05 (CH-Ar), 129.00 (CH-Ar), 128.7 (CH-Ar), 128.4 (CH-Ar), 127.2 (CH-Ar), 127.0 (CH-Ar), 125.0 (d, $J = 3.9$ Hz, CH-ArF), 117.1 (d, $J = 19.9$ Hz, CH-ArF), 54.9 (CH), 37.0 (CH_3).

^{19}F NMR (376 MHz, CDCl_3): $\delta = -120.7$.

IR (neat): $\nu = 3027, 1660, 1494, 1452, 1372, 1098, 766, 738, 697\text{ cm}^{-1}$.

MS (EI): m/z (%) = 321, 320 ($[\text{M}+\text{H}]^+$, 21), 319 ($[\text{M}]^+$, 67), 318 (3), 194 (25), 168 (13), 167 (85), 166 (22), 165 (52), 153 (10), 152 (100), 125 (40), 124 (23), 77 (19).

Elemental analysis calcd for $\text{C}_{21}\text{H}_{18}\text{FNO}$: C 78.98, H 5.68, N 4.39, found: C 78.50, H 5.66, N 4.23.

***N*-(2-Chlorophenyl)-*N*-methyl-2,2-diphenylacetamide (1j)**

The product was prepared following the general procedure 1 and obtained as a white solid (88% over two steps according to 2-chloroaniline) after column chromatography (*n*-pentane/ethyl acetate 10:1).

Mp.: 89-90.5 °C

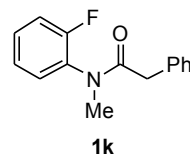
¹H NMR (400 MHz, CDCl₃): δ = 7.52 (dd, *J* = 8.0, 1.4 Hz, 1H, CH-Ar), 7.31 (ddd, *J* = 8.0, 7.5, 1.6 Hz, 1H, CH-Ar), 7.28-7.21 (m, 5H, CH-Ar), 7.20-7.12 (m, 6H, CH-Ar), 6.82 (dd, *J* = 7.9, 1.6 Hz, 1H, CH-Ar), 4.70 (s, 1H, CH), 3.24 (s, 3H, CH₃).

¹³C NMR (100 MHz, CDCl₃): δ = 172.0 (qC, CO), 141.0 (qC, C-Ar), 139.8 (qC, C-Ar), 139.1 (qC, C-Ar), 133.2 (qC, C-Ar), 130.79 (CH-Ar), 130.76 (CH-Ar), 129.9 (CH-Ar), 129.3 (CH-Ar), 129.0 (CH-Ar), 128.7 (CH-Ar), 128.3 (CH-Ar), 128.0 (CH-Ar), 127.2 (CH-Ar), 127.0 (CH-Ar), 55.3 (CH), 36.3 (CH₃).

IR (neat): ν = 3028, 1658, 1479, 1372, 1126, 772, 739, 691 cm⁻¹.

MS (EI): *m/z* (%) = 338 (3), 337 (3), 336 ([M+H]⁺, 9), 335 ([M]⁺, 3), 301 (19), 300 (71), 194 (6), 170 (32), 169 (12), 168 (99), 167 (100), 166 (28), 165 (62), 164 (8), 153 (8), 152 (32), 142 (7), 141 (11), 140 (18), 139 (6), 115 (6), 77 (13).

Elemental analysis calcd for C₂₁H₁₈ClNO: C 75.11, H 5.40, N 4.17, found: C 75.16, H 5.65, N 4.08.

***N*-(2-Fluorophenyl)-*N*-methyl-2-phenylacetamide (1k)**

The product was prepared following the general procedure 1 and obtained as a pale yellow solid (70% over two steps according 2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1 to 8:1).

Mp.: 55-56 °C

¹H NMR (400 MHz, CDCl₃): δ = 7.38-7.32 (m, 1H, CH-Ar), 7.26-7.11 (m, 6H, CH-Ar), 7.03-7.01 (m, 2H, CH-Ar), 3.49 (d, *J* = 14.7 Hz, 1H, CH₂), 3.42 (d, *J* = 14.7 Hz, 1H, CH₂).

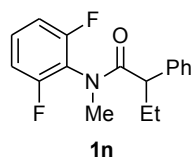
¹³C NMR (100 MHz, CDCl₃): δ = 171.5 (qC, CO), 158.3 (d, *J* = 254.4 Hz, qC, CF), 135.2 (qC, C-Ar), 131.7 (d, *J* = 17.5 Hz, qC, CN), 130.2 (CH-Ar), 130.1 (d, *J* = 8.0 Hz, CH-ArF), 129.2 (CH-Ar), 128.5 (CH-Ar), 126.8 (CH-Ar), 125.2 (d, *J* = 3.9 Hz, CH-ArF), 117.1 (d, *J* = 20.1 Hz, CH-ArF), 41.1 (CH₂), 36.9 (CH₃).

¹⁹F NMR (282 MHz, CDCl₃): δ = -122.1.

IR (neat): ν = 3028, 1660, 1497, 1375, 1270, 1213, 1127, 1096, 765, 724 cm⁻¹.

MS (EI): *m/z* (%) = 244 ([M+H]⁺, 5), 243 ([M]⁺, 21), 126 (8), 125 (100), 124 (22), 91 (40), 65 (10).

Elemental analysis calcd for C₁₅H₁₄FNO: C 74.06, H 5.80, N 5.76, found: C 73.99, H 5.65, N 5.66.

***N*-(2,6-Difluorophenyl)-*N*-methyl-2-phenylbutanamide (1n)**

The product was prepared following the general procedure 1 and obtained as a colorless oil (76% over two steps according to 2,6-difluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

^1H NMR (400 MHz, CDCl_3 , spectra contains traces of the minor *syn*- or *anti*-isomer): δ = 7.36-7.27 (m, 1H, CH-Ar), 7.18-7.14 (m, 3H, CH-Ar), 7.05 (dddd, J = 8.7, 8.7, 1.4, 1.4 Hz, 1H, CH-Ar), 6.90-6.87 (m, 2H, CH-Ar), 6.78 (dddd, J = 8.7, 8.7, 1.4, 1.4 Hz, 1H, CH-Ar), 3.17 (s, 3H, NCH_3), 2.19-2.04 (m, 1H, CH_2), 1.74-1.62 (m, 1H, CH_2), 0.81 (t, J = 7.3 Hz, 3H, CH_2CH_3).

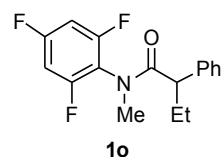
^{13}C NMR (100 MHz, CDCl_3): δ = 173.7 (qC, CO), 159.6 (d, J = 244.4 Hz, qC, CF), 159.0 (d, J = 246.8 Hz, qC, CF), 139.6 (qC, C-Ar), 129.8 (dd, J = 9.8, 9.8 Hz, CH-ArF), 128.6 (d, J = 67.6 Hz, qC, CN), 128.4 (CH-Ar), 127.8 (CH-Ar), 127.0 (CH-Ar), 112.5 (dd, J = 20.3, 3.5 Hz, CH-ArF), 112.2 (dd, J = 38.9, 3.7 Hz, CH-ArF), 51.8 (CH), 36.1 (NCH_3), 28.1 (CH_2), 12.4 (CH_2CH_3).

^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -116.8 (*M*), -117.8 (*m*), -118.7 (*m*), -119.2 (*M*).

IR (neat): ν = 2967, 1672, 1500, 1474, 1374, 1241, 1005, 791 cm^{-1} .

MS (EI): m/z (%) = 291 (2), 290 ($[\text{M}+\text{H}]^+$, 18), 289 ($[\text{M}]^+$, 75), 288 (3), 261 (15), 232 (10), 170 (21), 146 (57), 143 (48), 142 (22), 120 (7), 119 (46), 118 (7), 117 (8), 95 (12), 92 (8), 91 (100), 90 (5).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{17}\text{NOF}_2$): calcd 289.1273, found 289.1272 (Δ = -0.11 ppm).

***N*-Methyl-2-phenyl-*N*-(2,4,6-trifluorophenyl)butanamide (1o)**

The product was prepared following the general procedure 1 and obtained as a colorless oil (66% over two steps according to 2,4,6-trifluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

^1H NMR (400 MHz, CDCl_3 , spectra contains traces of the minor *syn*- or *anti*-isomer): δ = 7.19-7.16 (m, 3H, CH-Ar), 6.92-6.87 (m, 2H, CH-Ar), 6.83 (dddd, J = 11.3, 11.3, 2.2, 2.2 Hz, 1H, CH-Ar), 6.53 (dddd, J = 11.3, 11.3, 2.2, 2.2 Hz, 1H, CH-Ar), 3.17-3.12 (m, 4H, NCH_3 + CH), 2.17-2.04 (m, 1H, CH_2), 1.72-1.61 (m, 1H, CH_2), 0.81 (t, J = 7.4 Hz, CH_2CH_3).

^{13}C NMR (100 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.7 (qC, CO, *M*), 173.5 (qC, CO, *m*), 162.0 (ddd, J = 252.0, 14.6, 14.6 Hz, qC, CF, *M* + *m*), 159.9 (ddd, J = 254.8, 15.3, 6.3 Hz, qC, CF, *M* + *m*), 159.2 (ddd, J = 251.5, 15.1, 6.5 Hz, qC, CF, *M* + *m*), 139.4 (qC, C-Ar, *M*), 139.3 (qC, C-Ar, *m*), 129.0 (CH-Ar, *m*), 128.5 (CH-Ar, *M*), 128.2 (CH-Ar, *m*), 127.7 (CH-Ar, *M*), 127.3 (CH-Ar, *m*), 127.1 (CH-Ar, *M*), 101.3 (ddd, J = 25.0, 21.2, 4.0 Hz, CH-ArF, *M* + *m*), 101.1 (ddd, J = 25.9, 21.7, 4.0 Hz, CH-ArF, *M* + *m*), 51.9 (CH, *M*), 51.31 (CH, *m*), 37.8 (NCH_3 , *m*), 36.2 (NCH_3 , *M*), 28.4 (CH_2 , *m*), 28.1 (CH_2 , *M*), 12.5 (CH_2CH_3 , *m*), 12.4 (CH_2CH_3 , *M*).

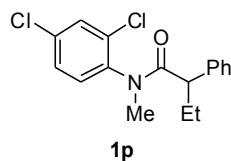
^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -106.1 (*M*), -108.6 (*m*), -113.1 (*M*), -114.6 (*m*), 115.5 (*m*), 115.9 (*M*).

IR (neat): ν = 3065, 2967, 1674, 1604, 1511, 1451, 1127, 1037, 843, 700 cm^{-1} .

MS (EI): m/z (%) = 308 ($[\text{M}+\text{H}]^+$, 3), 307 ($[\text{M}]^+$, 18), 188 (5), 161 (13), 160 (14), 147 (4), 146 (32), 120 (7), 119 (39), 118 (4), 117 (6), 92 (7), 91 (100).

Elemental analysis calcd for C₁₇H₁₆F₃NO: C 66.44, H 5.25, N 4.56, found: C 66.53, H 5.04, N 4.94.

***N*-(2,4-Dichlorophenyl)-*N*-methyl-2-phenylbutanamide (1p)**



The product was prepared following the general procedure 1 and obtained as colorless oil (77% over two steps according to 2,4-dichloroaniline) after column chromatography (*n*-pentane/ethyl acetate 30:1 to 20:1).

¹H NMR (400 MHz, CDCl₃, *syn/anti* mixture 1:0.44 with *M* = major isomer and *m* = minor isomer): δ = 7.55 (d, *J* = 2.3 Hz, 1H, CH-Ar, *M*), 7.38-7.35 (m, 1H, CH-Ar, *M*), 7.28-7.26 (m, 1H, CH-Ar, *m*), 7.21-7.17 (m, 4.5H, CH-Ar, *M* + *m*), 7.08 (dd, *J* = 8.4, 2.3 Hz, 1H, CH-Ar, *M*), 6.97-6.93 (m, 3H, CH-Ar, *M* + *m*), 6.54 (d, *J* = 8.4 Hz, 1H, CH-Ar, *M*), 3.22 (dd, *J* = 7.5, 7.5 Hz, 0.4H, CH, *m*), 3.15 (s, 1.3H, NCH₃, *m*), 3.14 (s, 3H, NCH₃, *M*), 3.00 (dd, *J* = 8.0, 6.8 Hz, 1H, CH, *M*), 2.14-2.02 (m, 2H, CH₂, *M* + *m*), 1.77-1.59 (m, 2H, CH₂, *M* + *m*), 0.81 (t, *J* = 7.4 Hz, 3H, CH₂CH₃, *M*), 0.78 (t, *J* = 7.4 Hz, 2H, CH₂CH₃, *m*).

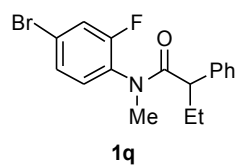
¹³C NMR (100 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.3 (qC, CO, *m*), 173.2 (qC, CO, *M*), 140.2 (qC, C-Ar, *M*), 139.9 (qC, C-Ar, *m*), 139.6 (qC, C-Ar, *M*), 139.1 (qC, C-Ar, *m*), 135.3 (qC, C-Ar, *m*), 134.90 (qC, C-Ar, *M*), 134.86 (qC, C-Ar, *M*), 134.0 (qC, C-Ar, *m*), 132.0 (CH-Ar, *M*), 131.4 (CH-Ar, *m*), 130.7 (CH-Ar, *m*), 130.4 (CH-Ar, *M*), 128.6 (CH-Ar, *M*), 128.41 (CH-Ar, *m*), 128.40 (CH-Ar, *m*), 128.35 (CH-Ar, *M*), 128.08 (CH-Ar, *m*), 128.03 (CH-Ar, *M*), 127.0 (CH-Ar, *M* + *m*), 52.2 (CH, *M*), 51.4 (CH, *m*), 36.2 (NCH₃, *M*), 36.1 (NCH₃, *m*), 28.6 (CH₂, *M*), 28.2 (CH₂, *m*), 12.7 (CH₂CH₃, *M*), 12.5 (CH₂CH₃, *m*).

IR (neat): ν = 2964, 1668, 1481, 1376, 1132, 1099, 830, 700 cm⁻¹.

MS (EI): *m/z* (%) = 323 ([M+H]⁺, 2), 322 ([M]⁺, 1), 321 (2), 288 (14), 287 (8), 286 (41), 204 (5), 202 (8), 177 (14), 176 (6), 175 (22), 174 (8), 146 (12), 120 (5), 119 (50), 118 (4), 92 (8), 91 (100).

HRMS (ESI, MeOH) (C₁₇H₁₈NOCl₂): calcd 322.0760, found 322.0760 (Δ = 0.07 ppm).

***N*-(4-Bromo-2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (1q)**



The product was prepared following the general procedure 1 and obtained as a colorless oil (89% over two steps according to 4-bromo-2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 15:1).

¹H NMR (400 MHz, CDCl₃, *syn/anti* mixture 1:0.57 with *M* = major isomer and *m* = minor isomer): δ = 7.43-7.35 (m, 1.7H, CH-Ar, *M* + *m*), 7.24-7.13 (m, 6.8H, CH-Ar, *M* + *m*), 7.02-7.00 (m, 2H, CH-Ar, *M*), 6.92-6.89 (m, 1H, CH-Ar, *M*), 6.57 (dd, *J* = 8.3, 8.3 Hz, 1H, CH-Ar, *M*), 3.31 (dd, *J* = 7.4, 7.4 Hz, 0.6H, CH, *m*), 3.17-3.13 (m, 6H, NCH₃: *M* + *m*/CH: *M*), 2.14-2.03 (m, 1.8H, CH₂, *M* + *m*), 1.74-1.61 (m, CH₂, 2H, *M* + *m*), 0.80 (t, *J* = 7.4 Hz, CH₂CH₃, *M* + *m*).

¹³C NMR (75 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.4 (qC, CO, *M* + *m*), 160.2 (d, *J* = 256.2 Hz, qC, CF, *m*), 158.0 (d, *J* = 254.4 Hz, qC, CF, *M*), 140.2 (qC, C-Ar, *M*), 139.2 (qC, C-Ar, *m*), 131.9 (CH-Ar, *M*), 131.5 (CH-Ar, *m*), 130.7 (d, *J* = 12.5 Hz, qC, C-ArF, *M* + *m*), 128.6 (CH-Ar, *M*), 128.43 (CH-Ar, *m*), 128.35 (CH-Ar, *m*), 128.2 (d, *J* = 3.8 Hz, CH-ArF, *M*), 128.00 (CH-Ar, *M*), 127.96 (CH-Ar, *m*), 127.1 (CH-Ar, *M*), 127.0 (CH-Ar, *m*), 122.4 (d, *J* = 8.2 Hz, qC, C-ArF, *m*), 122.3 (d, *J* = 8.8 Hz, qC, C-ArF, *M*), 120.8 (d, *J* = 11.4 Hz, CH-ArF, *m*), 120.6 (d, *J* = 11.4 Hz, CH-ArF, *M*), 51.6 (CH, *M*), 51.4 (CH, *m*), 36.8 (NCH₃, *M*), 36.7 (NCH₃, *m*), 28.5 (CH₂CH₃, *M*), 28.0 (CH₂CH₃, *m*), 12.5 (CH₂CH₃, *m*), 12.4 (CH₂CH₃, *M*).

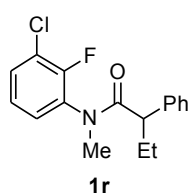
^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): $\delta = -115.9$ (t, $J = 8.4$ Hz, *m*), -118.3 (t, $J = 8.4$ Hz, *M*).

IR (neat): $\nu = 2965, 2930, 1667, 1494, 1376, 1134, 1102, 866, 701\text{ cm}^{-1}$.

MS (EI): m/z (%) = 352 (9), 351 (31), 350 ($[\text{M}+\text{H}]^+$, 10), 349 ($[\text{M}]^+$, 28), 232 (6), 230 (6), 206 (5), 205 (65), 204 (16), 203 (68), 202 (14), 146 (29), 120 (5), 119 (52), 118 (7), 117 (8), 92 (8), 91 (100), 90 (7), 89 (5), 77 (7).

Elemental analysis calcd for $\text{C}_{17}\text{H}_{17}\text{BrFNO}$: C 58.30, H 4.89, N 4.00, found: C 58.15, H 5.05, N 4.35.

***N*-(3-Chloro-2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (1r)**



The product was prepared following the general procedure 1 and obtained as a colorless oil (89% over two steps according to 3-chloro-2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

^1H NMR (300 MHz, CDCl_3 , *syn/anti* mixture 1:0.62 with *M* = major isomer and *m* = minor isomer): $\delta = 7.44\text{--}7.34$ (m, 2H, CH-Ar, *M* + *m*), $7.21\text{--}7.14$ (m, 6H, CH-Ar, *M* + *m*), $7.01\text{--}6.93$ (m, 3H, CH-Ar, *M* + *m*), $6.84\text{--}6.81$ (m, 1H, CH-Ar, *M*), $6.63\text{--}6.58$ (m, 1H, CH-Ar, *M*), 3.29 (dd, $J = 7.5, 7.5$ Hz, CH, *m*), $3.20\text{--}3.12$ (m, 6.7 H, NCH_3 : *M* + *m*/CH: *M*), $2.17\text{--}2.03$ (m, 2H, CH_2 , *M* + *m*), $1.77\text{--}1.60$ (m, 2.7H, CH_2 *M* + *m*), $0.84\text{--}0.76$ (m, 5H, CH_2CH_3 , *M* + *m*).

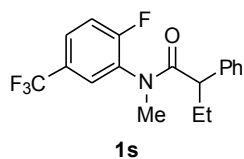
^{13}C NMR (100 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): $\delta = 173.4$ (qC, CO, *M* + *m*), 154.3 (d, $J = 251.3$ Hz, qC, CF, *M* + *m*), 140.2 (qC, C-Ar, *M*), 139.1 (qC, C-Ar, *m*), 132.8 (d, $J = 5.7$ Hz, qC, C-ArF, *m*), 132.7 (d, $J = 7.3$ Hz, qC, C-ArF, *M*), 130.6 (CH-Ar, *M* + *m*), 129.2 (CH-Ar, *M*), 128.7 (CH-Ar, *m*), 128.6 (CH-Ar, *M*), 128.5 (CH-Ar, *m*), 128.0 (CH-Ar, *M*), 127.8 (CH-Ar, *m*), 127.0 (d, $J = 3.6$ Hz, CH-ArF, *M* + *m*), 124.80 (d, $J = 5.8$ Hz, CH-ArF, *m*), 124.75 (d, $J = 5.7$ Hz, CH-ArF, *M*), 122.8 (d, $J = 16.7$ Hz, qC, C-ArF, *m*), 122.4 (d, $J = 16.7$ Hz, qC, C-ArF, *M*), 51.7 (CH, *M*), 51.6 (CH, *m*), 36.9 (NCH_3 , *M*), 36.8 (NCH_3 , *m*), 28.6 (CH_2 , *M*), 27.8 (CH_2 , *m*), 12.4 (CH_2CH_3 , *M* + *m*).

^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): $\delta = -120.0$ (*m*), -122.6 (*M*).

IR (neat): $\nu = 2966, 1667, 1479, 1376, 759, 731, 700\text{ cm}^{-1}$.

MS (EI): m/z (%) = 308 (2), 307 (11), 306 ($[\text{M}+\text{H}]^+$, 8), 305 ($[\text{M}]^+$, 31), 186 (13), 161 (12), 160 (6), 159 (41), 158 (11), 147 (10), 146 (89), 120 (6), 119 (57), 118 (7), 117 (7), 92 (8), 91 (100), 90 (5).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{18}\text{NOClF}$): calcd 306.1056, found 306.1055 ($\Delta = -0.09$ ppm).

***N*-(2-Fluoro-5-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylbutanamide (1s)**

The product was prepared following the general procedure 1 and obtained as a colorless oil (91% over two steps according to 2-fluoro-5-(trifluoromethyl)-aniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

¹H NMR (400 MHz, CDCl₃, *syn/anti* mixture 1:0.43 with *M* = major isomer and *m* = minor isomer): δ = 7.66-7.59 (m, 1.7H, CH-Ar), 7.35 (dd, *J* = 9.0, 9.0 Hz, 1.4H, CH-Ar), 7.20-7.14 (m, 4H, CH-Ar), 7.05 (dd, *J* = 8.7, 8.7 Hz, 0.4H, CH-Ar, *m*), 6.93-6.83 (m, 3.6H, CH-Ar), 3.28-3.21 (m, 5H, NCH₃; *M* + *m*, CH: *m*), 3.07 (t, *J* = 7.4 Hz, CH, *M*), 2.16-2.06 (m, CH₂, 1.6H, *M* + *m*), 1.74-1.59 (m, 1.7H, CH₂, *M* + *m*), 0.89-0.78 (m, 4.3H, CH₂CH₃, *M* + *m*).

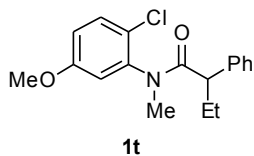
¹³C NMR (100 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.3 (qC, CO, *M* + *m*), 160.8 (d, *J* = 257.1 Hz, qC, CF, *m*), 160.1 (d, *J* = 254.8 Hz, qC, CF, *M*), 139.9 (qC, C-Ar, *M*), 139.1 (qC, C-Ar, *m*), 131.9 (d, *J* = 13.2 Hz, qC, C-ArF, *M* + *m*), 128.9 (CH-Ar)*, 128.8 (CH-Ar)*, 128.5 (CH-Ar)*, 128.1 (CH-Ar)*, 127.87 (CH-Ar)*, 127.80 (CH-Ar)*, 127.2 (CH-Ar)*, 127.0 (CH-Ar)*, 123.1 (q, *J* = 271.7 Hz, qC, CF₃, *M* + *m*), 117.8 (d, *J* = 19.6 Hz, CH-ArF, *M*), 117.6 (d, *J* = 21.2 Hz, CH-ArF, *m*), 52.1 (CH, *M*), 51.7 (CH, *m*), 36.8 (NCH₃, *M*), 36.7 (NCH₃, *m*), 28.4 (CH₂, *M*), 28.0 (CH₂, *m*), 12.4 (CH₂CH₃, *M* + *m*). *In this case, an exact assignment of the signals was impossible.

¹⁹F NMR (282 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -62.0 (CF₃, *m*), -62.4 (CF₃, *M*), -112.8 (CF, *m*), -115.8 (CF, *M*).

IR (neat): ν = 2968, 1671, 1513, 1435, 1372, 1265, 1170, 1131 cm⁻¹.

MS (EI): *m/z* (%) = 340 ([M+H]⁺, 11), 339 ([M]⁺, 39), 311 (7), 193 (11), 192 (12), 147 (8), 146 (73), 145 (9), 120 (8), 119 (79), 118 (9), 117 (8), 192 (8), 91 (100).

HRMS (ESI, MeOH) (C₁₈H₁₈NOF₄): calcd 340.1319, found 340.1317 (Δ = -0.66 ppm).

***N*-(2-Chloro-5-methoxyphenyl)-*N*-methyl-2-phenylbutanamide (1t)**

The product was prepared following the general procedure 1 and obtained as a colorless oil (54% over two steps according to 2-chloro-5-methoxyaniline) after column chromatography (*n*-pentane/ethyl acetate 20:1).

¹H NMR (300 MHz, CDCl₃, *syn/anti* mixture 1:0.40 with *M* = major isomer and *m* = minor isomer): δ = 7.40-7.35 (m, 1H, CH-Ar, *M* + *m*), 7.28-7.22 (m, 1.4H, CH-Ar, *M* + *m*), 7.21-7.15 (m, 3.7H, CH-Ar, *M* + *m*), 7.01-6.96 (m, 2.6H, CH-Ar, *M* + *m*), 6.87-6.81 (m, 1.4H, CH-Ar, *M* + *m*), 6.08-6.05 (m, 1H, CH-Ar, *M*), 3.86-3.84 (m, 0.9 H, OCH₃, *m*), 3.46-3.44 (m, 3H, OCH₃, *M*), 3.17-3.15 (m, 3H, NCH₃, *M* + *m*), 3.09 (dd, *J* = 6.5 Hz, 1H, CH, *M*), 2.18-2.03 (m, 1.5H, CH₂, *M* + *m*), 1.77-1.56 (m, 2H, CH₂, *M* + *m*), 0.85-0.78 (m, 4H, CH₂CH₃, *M* + *m*).

¹³C NMR (75 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.2 (qC, CO, *M* + *m*), 159.2 (qC, C-Ar, *m*), 158.8 (qC, C-Ar, *M*), 141.3 (qC, C-Ar, *m*), 140.9 (qC, C-Ar, *M*), 131.2 (CH-Ar, *m*), 130.8 (CH-Ar, *M*), 128.5 (CH-Ar, *M* + *m*), 128.3 (CH-Ar, *m*), 128.2 (CH-Ar, *M*), 126.9 (CH-Ar, *M* + *m*), 124.0 (qC, C-Ar, *M* + *m*), 116.9 (CH-Ar, *M* + *m*), 116.0 (CH-Ar, *m*), 115.3 (CH-Ar, *M*), 56.0 (OCH₃, *m*), 55.5 (OCH₃, *M*), 52.2 (CH, *M*), 51.1 (CH, *m*), 36.1 (NCH₃, *M* + *m*), 28.6 (CH₂, *M*), 28.3 (CH₂, *m*), 12.7 (CH₂CH₃, *M*), 12.6 (CH₂CH₃, *m*).

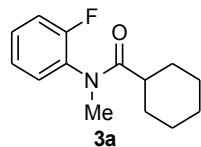
IR (neat): ν = 2964, 1633, 1593, 1481, 1419, 1374, 1295, 1228, 1128, 1028 cm⁻¹.

MS (EI): m/z (%) = 318 ($[M+H]^+$, 8), 283 (19), 282 (100), 281 (4), 198 (9), 173 (4), 171 (14), 119 (7), 91 (28).

HRMS (ESI, MeOH) ($C_{18}H_{21}NO_2Cl$): calcd 318.1255, found 318.1255 ($\Delta = -0.04$ ppm).

***N*-(2-Fluorophenyl)-*N*-methylcyclohexanecarboxamide (3a)**

The product was prepared following the general procedure 1 and obtained as a colorless oil (89% over two steps according to 2-fluoroaniline) after column chromatography (*n*-pentane/ethyl acetate 10:1).



1H NMR (400 MHz, $CDCl_3$): δ = 7.37 (m, 1H, CH-Ar), 7.24-7.16 (m, 3H, CH-Ar), 3.20 (s, 3H, CH_3), 2.09 (dddd, J = 11.6, 11.6, 3.0, 3.0 Hz, 1H, *c*-hexylCH), 1.67-1.62 (m, 4H, *c*-hexyl CH_2), 1.56-1.45 (m, 3H, *c*-hexyl CH_2), 1.23-1.12 (m, 1H, *c*-hexyl CH_2), 1.02-0.89 (m, 2H, *c*-hexyl CH_2).

^{13}C NMR (100 MHz, $CDCl_3$): δ = 176.8 (qC, CO), 158.4 (d, J = 249.8 Hz, qC, CF), 131.9 (d, J = 13.1 Hz, qC, CN), 129.9 (CH-Ar), 129.8 (CH-Ar), 125.2 (d, J = 3.9 Hz, CH-Ar), 117.1 (d, J = 20.1 Hz, CH-Ar), 41.7 (CH_3), 36.7 (CH), 29.8 (CH_2), 29.3 (CH_2), 25.80 (CH_2), 25.77 (CH_2), 25.72 (CH_2).

^{19}F NMR (282 MHz, $CDCl_3$): δ = -121.6.

IR (neat): ν = 2932, 2856, 1663, 1502, 1386, 1098, 764 cm^{-1} .

MS (EI): m/z (%) = 236 ($[M+H]^+$, 3), 235 ($[M]^+$, 6), 126 (9), 125 (100), 124 (15), 83 (27), 77 (7), 55 (21).

Elemental analysis calcd for $C_{14}H_{18}FNO$: C 71.46, H 7.71, N 5.95, found: C 71.15, H 7.66, N 6.31.

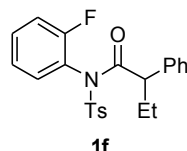
2.1.2. General procedure and characterization of compounds prepared *via* Route B:

2-Fluoro-*N*-methylaniline was prepared according to the literature procedure.⁵

N-(2-Fluorophenyl)-4-methylbenzenesulfonamide was prepared according to the literature procedure.⁶

***N*-(2-Fluorophenyl)-2-phenyl-*N*-tosylbutanamide (1f)**

Synthesis using the acid chloride: To a solution of the *N*-tosylated 2-fluoroaniline (1.0 g, 3.8 mmol, 1.0 equiv) in dry CH_2Cl_2 (15 mL) was added NEt_3 (0.4 mL, 0.5 g, 4.5 mmol, 1.2 equiv) at room temperature. After 5 min 2-phenylbutyryl chloride (0.8 mL, 0.8 g, 5.4 mmol, 1.2 equiv) was slowly added and the resulting mixture was stirred for 17 hours at ambient temperature. Then, the reaction mixture was quenched with saturated NH_4Cl solution (20 mL) and the two phases were separated. The aqueous phase was extracted with CH_2Cl_2 (3 x 10 mL) and the combined organic layers were washed with brine (1 x 10 mL), dried over $MgSO_4$ and concentrated under reduced pressure. The product was purified with column chromatography using *n*-pentane/ethyl acetate (8:1) and obtained as a white solid⁷ (1.5 g, 3.5 mmol, 93%).



⁵ For the literature procedure for the synthesis of 2-iodo-*N*-methylaniline, see: Larock, P. C.; Harrison, L. W. *J. Am. Chem. Soc.* **1984**, *106*, 4218; here, *n*-BuLi was used instead of MeLi.

⁶ For the literature procedure for the synthesis of 4-methyl-*N*-phenylbenzenesulfonamide, see: Gonz  lez-G  mez, A.; Dom  nguez, G.; P  rez-Castells, J. *Eur. J. Org. Chem.* **2009**, 5057.

Mp.: 88-89 °C

¹H NMR (400 MHz, CDCl₃, *syn/anti* mixture 1:0.45 with *M* = major isomer and *m* = minor isomer): δ = 7.95 (d, *J* = 7.6 Hz, 2.8H, CH-Ar), 7.49-7.43 (m, 1.8H, CH-Ar), 7.34-7.30 (m, 3.9H, CH-Ar), 7.23-7.11 (m, 5H, CH-Ar), 7.03-6.94 (m, 1.5H, CH-Ar), 6.75-6.69 (m, 4H, CH-Ar), 3.23 (br.s, 0.45H, CH, *m*), 3.10-3.06 (m, 1H, CH, *M*), 2.46 (s, 4.6H, ArCH₃, *M* + *m*), 2.02-1.91 (m, 1.6H, CH₂, *M* + *m*), 1.60-1.49 (m, 1.6H, CH₂, *M* + *m*), 0.69-0.66 (m, 4.7H, CH₂CH₃, *M* + *m*).

¹³C NMR (100 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 172.6 (qC, CO, *M* + *m*), 159.0 (d, *J* = 249.1 Hz, qC, CF, *M* + *m*), 145.1 (qC, C-Ar)*, 144.3 (qC, C-Ar)*, 138.0 (qC, C-Ar)*, 136.2 (qC, C-Ar)*, 133.7 (CH-Ar)*, 132.2 (d, *J* = 7.5 Hz, CH-ArF)*, 129.8 (CH-Ar)*, 129.4 (CH-Ar)*, 128.8 (CH-Ar)*, 128.7 (CH-Ar)*, 128.2 (CH-Ar)*, 127.9 (CH-Ar)*, 127.4 (CH-Ar)*, 127.3 (CH-Ar)*, 126.3 (d, *J* = 7.5 Hz, CH-ArF)*, 124.9 (d, *J* = 3.8 Hz, CH-ArF)*, 124.8 (CH-Ar)*, 123.4 (CH-Ar)*, 116.7 (d, *J* = 20.6 Hz, CH-ArF)*, 115.6 (d, *J* = 19.6 Hz, CH-ArF)*, 53.8 (CH, *M*), 53.2 (CH, *m*), 28.0 (CH₂, *M*), 26.6 (CH₂, *m*), 21.9 (ArCH₃, *M*), 21.7 (ArCH₃, *m*), 12.3 (CH₂CH₃, *m*), 12.0 (CH₂CH₃, *M*). *In this case, an exact assignment of the signal was impossible.

¹⁹F NMR (282 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -114.9 (*m*), -118.7 (*M*).

IR (neat): ν = 2967, 1711, 1497, 1360, 1161, 1092, 810, 755, 700, 573 cm⁻¹.

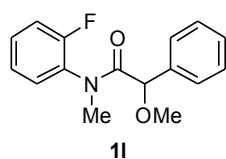
MS (EI): *m/z* (%) = 413, 412 ([M+H]⁺, 34), 411 ([M]⁺, 13), 347 (15), 266 (16), 265 (100), 256 (14), 241 (12), 240 (78), 155 (44), 146 (12), 119 (32), 118 (6), 91 (75).

HRMS (ESI, MeOH) (C₂₃H₂₃NO₃FS): calcd 412.1377, found 412.1377 (Δ = -0.14 ppm).

General procedure 2: syntheses using the carboxylic acid: In a 100 mL round-bottom flask equipped with a stirring bar was added the carboxylic acid (1.5 mmol, 1.0 equiv), the 2-fluoro-*N*-methylaniline (1.5 mmol, 1.0 equiv), DMAP (0.3 mmol, 0.2 equiv) and CH₂Cl₂ (7.5 mL). The solution was then cooled at 0 °C, and DCC (1.8 mmol, 1.2 equiv) in CH₂Cl₂ (7.5 mL) was added dropwise in 5 min. The reaction mixture was stirred overnight at room temperature, then filtered and evaporated under reduced pressure. The crude residue was purified by flash chromatography (*n*-pentane/ethyl acetate) yielding the expected amide as a pure compound.

General procedure 3: α -Methylation of the amides: A dry and argon flushed 10 mL Schlenk-tube equipped with a stirring bar and a septum was charged with the amide (1.0 mmol, 1.0 equiv) and THF (3 mL). The reaction mixture was cooled at -78 °C, and LiHMDS (c = 1 M in THF, 2 mL, 2.0 mmol, 2.0 equiv) was added dropwise. The solution was stirred 15 min at -78 °C and MeI (1.1 mmol, 1.1 equiv) was added dropwise at this temperature. After 2 hours stirring at -78 °C, the reaction was quenched with a 1 N aqueous HCl solution (10 mL), and extracted with ethyl acetate (3 x 15 mL). The combined organic layers were washed with brine (15 mL), then dried with MgSO₄, filtered, and concentrated under reduced pressure. The crude residue was purified by flash chromatography (*n*-pentane/ethyl acetate) yielding the expected α -methylated amide as a pure compound.

⁷ The white solid changed color to deep purple after storing for several weeks.

***N*-(2-Fluorophenyl)-2-methoxy-*N*-methyl-2-phenylacetamid (1l)**

The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the title compound (81%) as a colorless oil.

¹H NMR (300 MHz, CDCl₃, *syn/anti* mixture 1:0.81 with *M* = major isomer and *m* = minor isomer): δ = 7.39-7.33 (m, 2.2H, CH-Ar, *M* + *m*), 7.32-7.20 (m, CH-Ar, *M* + *m*), 7.07-6.95 (m, 5.8H, CH-Ar, *M* + *m*), 6.69 (dd, *J* = 8.7, 8.7 Hz, 1H, CH-Ar, *M*), 4.70 (s, 0.8H, CH, *m*), 4.53 (s, 1H, CH, *M*), 3.32 (s, 3H, OCH₃, *M*), 3.24 (s, 2.2H, OCH₃, *m*), 3.24 (s, 3H, NCH₃, *M*), 3.22 (s, 2.7H, NCH₃, *m*).

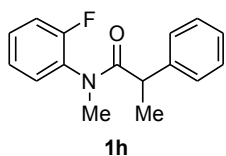
¹³C NMR (100 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 170.4 (qC, CO, *M*), 170.1 (qC, CO, *m*), 158.7 (d, *J* = 251.7 Hz, qC, CF, *m*), 157.9 (d, *J* = 249.9 Hz, qC, CF, *M*), 136.1 (d, *J* = 65.7 Hz, qC, CN, *M* + *m*), 130.9 (CH-Ar, *m*), 130.4 (CH-Ar, *M*), 130.3 (CH-Ar, *M*), 130.2 (CH-Ar, *m*), 128.7 (CH-Ar, *m*), 128.6 (CH-Ar, *M*), 128.5 (CH-Ar, *m*), 128.4 (CH-Ar, *M*), 128.2 (CH-Ar, *m*), 127.9 (CH-Ar, *M*), 125.1 (d, *J* = 4.0 Hz, CH-ArF, *M*), 125.1 (d, *J* = 4.0 Hz, CH-ArF, *m*), 117.1 (d, *J* = 20.5 Hz, CH-ArF, *M*), 116.9 (d, *J* = 21.1 Hz, CH-ArF, *m*), 81.3 (CHPh, *M* + *m*), 57.4 (OCH₃, *m*), 57.04 (OCH₃, *M*), 37.3 (NCH₃, *M*), 36.9 (NCH₃, *m*).

¹⁹F NMR (376 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -119.5 (*m*), -121.6 (*M*).

IR (neat): ν = 2931, 1672, 1499, 1377, 1097, 756 cm⁻¹.

MS (EI): *m/z* (%) = 273 ([M]⁺, 2), 243 (5), 122 (10), 121 (100), 91 (8), 77 (17).

HRMS (ESI, MeOH) (C₁₆H₁₆FNO₂Na): calcd 296.1057, found 296.1058 (Δ = 0.24 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-phenylpropanamide (1h)**

The product was prepared following the general procedure 3, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the title compound (81%) as a colorless oil.

¹H NMR (300 MHz, CDCl₃, *syn/anti* mixture 1:0.66 with *M* = major isomer and *m* = minor isomer): δ = 7.36-7.27 (m, 2.6H, CH-Ar, *M* + *m*), 7.23-7.13 (m, 6.6H, CH-Ar, *M* + *m*), 7.03-6.98 (m, 3H, CH-Ar, *M* + *m*), 6.95-6.89 (m, 1.7H, CH-Ar, *M* + *m*), 6.73 (ddd, *J* = 7.9, 7.9, 1.6 Hz, 1H, CH-Ar, *M*), 3.66 (q, *J* = 6.9 Hz, 0.7H, CH, *m*), 3.51 (q, *J* = 6.8 Hz, 1H, CH, *M*), 3.21 (s, 3H, NCH₃, *M*), 3.20 (s, 1.8H, NCH₃, *m*), 1.40 (d, *J* = 6.9 Hz, 5.1H, CHCH₃, *M* + *m*).

¹³C NMR (75 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 174.3 (qC, CO, *M* + *m*), 158.6 (d, *J* = 251.6 Hz, qC, CF, *m*), 158.2 (d, *J* = 249.3 Hz, qC, CF, *M*), 141.9 (qC, C-Ar, *M*), 141.0 (qC, C-Ar, *m*), 131.3 (d, *J* = 13.0 Hz, qC, CN, *M* + *m*), 130.7 (CH-Ar, *M*), 130.1 (d, *J* = 7.0 Hz, CH-ArF, *m*), 130.0 (CH-Ar, *m*), 129.9 (d, *J* = 7.7 Hz, CH-ArF, *M*), 128.6 (CH-Ar, *M*), 128.4 (CH-Ar, *m*), 127.51 (CH-Ar, *M*), 127.47 (CH-Ar, *m*), 126.83 (CH-Ar, *M*), 126.75 (CH-Ar, *m*), 124.94 (d, *J* = 3.7 Hz, CH-ArF, *m*), 124.88 (CH-ArF, *M*), 117.1 (CH-ArF, *m*), 116.8 (d, *J* = 19.8 Hz, CH-ArF, *M*), 43.6 (CH, *M*), 43.5 (CH, *m*), 37.1 (NCH₃, *M*), 36.8 (NCH₃, *m*), 20.4 (CHCH₃, *M*), 20.1 (CHCH₃, *m*).

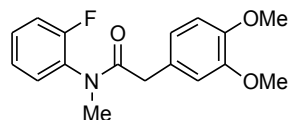
¹⁹F NMR (282 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -119.4 (*m*), -122.2 (*M*).

IR (neat): ν = 2977, 2934, 1663, 1499, 1455, 1373, 760, 699 cm^{-1} .

MS (EI): m/z (%) = 258 ($[\text{M}+\text{H}]^+$, 7), 257 ($[\text{M}]^+$, 30), 152 (29), 132 (7), 126 (7), 125 (100), 124 (19), 106 (6), 105 (68), 104 (6), 103 (10), 79 (12), 77 (24).

HRMS (ESI, MeOH) ($\text{C}_{16}\text{H}_{16}\text{NOFNa}$): calcd 280.1108, found 280.1101 (Δ = -2.51 ppm).

2-(3,4-Dimethoxyphenyl)-*N*-(2-fluorophenyl)-*N*-methylacetamide



The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 8:2 to 7:3) yielding the title compound (82%) as a colorless oil.

^1H NMR (300 MHz, CDCl_3): δ = 7.39-7.32 (m, 1H, CH-Ar), 7.20-7.12 (m, 3H, CH-Ar), 6.71 (d, J = 8.2 Hz, 1H, CH-ArOMe), 6.58 (d, J = 1.9 Hz, 1H, CH-ArOMe), 6.51 (dd, J = 8.2, 1.9 Hz, 1H, CH-ArOMe), 3.83 (s, 3H, OCH_3), 3.80 (s, 3H, OCH_3), 3.44 (d, J = 15.0 Hz, 1H, CH_2), 3.35 (d, J = 15.0 Hz, 1H, CH_2), 3.24 (s, 3H, NCH_3).

^{13}C NMR (75 MHz, CDCl_3): δ = 171.6 (qC, CO), 158.2 (d, J = 250.3 Hz, qC, CF), 148.8 (qC, C-Ar), 147.9 (qC, C-Ar), 131.5 (d, J = 13.0 Hz, qC, CN), 130.2 (CH-Ar), 130.0 (d, J = 7.8 Hz, CH-ArF), 127.6 (qC, C-Ar), 125.1 (d, J = 4.0 Hz, CH-ArF), 121.2 (CH-Ar), 117.0 (d, J = 20.0 Hz, CH-ArF), 112.3 (CH-Ar), 111.1 (CH-Ar), 56.0 (OCH_3), 55.8 (OCH_3), 40.6 (CH_2), 36.9 (NCH_3).

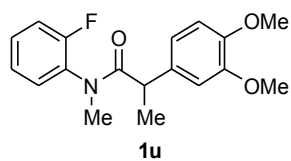
^{19}F NMR (282 MHz, CDCl_3): δ = -121.0.

IR (neat): ν = 2938, 1658, 1505, 1452, 1371, 1234, 1139, 1027, 766 cm^{-1} .

MS (EI): m/z (%) = 305 (1), 304 ($[\text{M}+\text{H}]^+$, 11), 303 ($[\text{M}]^+$, 54), 179 (5), 178 (42), 163 (7), 152 (28), 151 (100), 125 (12), 124 (12), 107 (12), 106 (5), 105 (5).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{18}\text{FNO}_3\text{Na}$): calcd 326.1163, found 326.1163 (Δ = -0.07 ppm).

2-(3,4-Dimethoxyphenyl)-*N*-(2-fluorophenyl)-*N*-methylpropanamide (1u)



The product was prepared following the general procedure 3, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 8:2 to 7:3) yielding the title compound (68%) as a white solid.

Mp.: 84-85 $^{\circ}\text{C}$

^1H NMR (300 MHz, CDCl_3 , *syn/anti* mixture 1:0.72 with *M* = major isomer and *m* = minor isomer): δ = 7.37-7.29 (m, 2H, CH-Ar, *M* + *m*), 7.25-7.18 (m, 1.6H, CH-Ar, *M* + *m*), 7.05-6.96 (m, 1.6H, CH-Ar, *M* + *m*), 6.77 (ddd, J = 7.9, 7.9, 1.6 Hz, 1H, CH-Ar, *M*), 6.71-6.67 (m, 1.6H, CH-Ar, *M* + *m*), 6.54 (d, J = 1.9 Hz, 1H, CH-Ar, *M*), 6.49 (dd, J = 8.2, 2.0 Hz, 1H, CH-Ar, *M*), 6.46-6.42 (m, 1H, CH-Ar, *M*), 3.84 (s, 3H, OCH_3 , *M*), 3.82 (s, 1.9H, OCH_3 , *m*), 3.78 (s, 3H, OCH_3 , *M*), 3.76 (s, 1.7H, OCH_3 , *m*), 3.61 (q, J = 6.9 Hz, 0.7H, CH, *m*), 3.44 (q, J = 6.9 Hz, 1H, CH, *M*), 3.21 (s, 3H, NCH_3 , *M*), 3.20 (s, 2.1H, NCH_3 , *m*), 1.39 (d, J = 6.9 Hz, 5H, CHCH_3 , *M* + *m*).

^{13}C NMR (75 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 174.5 (qC, CO, *M* + *m*), 158.7 (d, J = 251.8 Hz, CF, *m*), 158.2 (d, J = 249.6 Hz, CF, *M*), 148.9 (qC, C-Ar, *M*), 148.7 (qC, C-Ar, *m*), 147.9 (qC, C-Ar, *M* + *m*), 134.5 (qC, C-Ar, *M*), 133.6 (qC, C-Ar, *m*), 131.5 (d, J = 1.5 Hz, qC, CN, *M*), 131.3 (d, J = 2.4 Hz, qC, CN, *m*), 130.8 (CH-Ar, *M*), 130.1 (CH-Ar, *M* + *m*), 129.91 (CH-Ar, *m*), 129.87 (CH-Ar, *M*), 129.77 (CH-Ar, *m*), 124.9 (d, J = 3.9 Hz, CH-Ar, *m*),

124.8 (d, $J = 3.9$ Hz, CH-Ar, M), 119.53 (CH-Ar, M), 119.48 (CH-Ar, m), 117.3 (d, $J = 19.9$ Hz, CH-Ar, m), 116.8 (d, $J = 20.1$ Hz, CH-Ar, M), 111.1 (d, $J = 3.5$ Hz, CH-Ar, M), 110.6 (d, $J = 4.8$ Hz, CH-Ar, m), 56.0 (OCH₃), 55.9 (OCH₃), 55.8 (OCH₃), 43.1 (CH, M), 43.0 (CH, m), 37.0 (NCH₃, M), 36.7 (NCH₃, m), 20.5 (CHCH₃, M), 20.0 (CHCH₃, m).

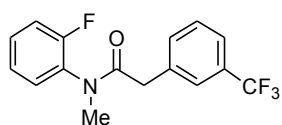
¹⁹F NMR (282 MHz, CDCl₃, *syn/anti* mixture with M = major isomer and m = minor isomer): $\delta = -119.1$ (m), -120.1 (M).

IR (KBr): $\nu = 2976, 2937, 1656, 1501, 1454, 1372, 1234, 1135, 1021, 771$ cm⁻¹.

MS (EI): m/z (%) = 319 (1), 318 ([M+H]⁺, 7), 317 ([M]⁺, 35), 166 (12), 165 (100), 164 (6), 150 (6).

HRMS (ESI, MeOH) (C₁₈H₂₁FNO₃): calcd 318.1500, found 318.1494 ($\Delta = -1.85$ ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-(2-(3-trifluoromethyl)phenyl)acetamide**



The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 8:2) yielding the title compound (56%) as a colorless oil.

¹H NMR (300 MHz, CDCl₃): $\delta = 7.40$ (d, $J = 7.5$ Hz, 1H, CH-Ar), 7.36-7.23 (m, 3H, CH-Ar), 7.17-7.08 (m, 4H, CH-Ar), 3.50 (d, $J = 15.1$ Hz, 1H, CH₂), 3.43 (d, $J = 15.1$ Hz, 1H, CH₂), 3.20 (s, 3H, CH₃).

¹³C NMR (75 MHz, CDCl₃): $\delta = 170.5$ (qC, CO), 158.1 (d, $J = 250.21$ Hz, qC, CF), 135.9 (qC, C-Ar), 132.7 (CH-Ar), 131.1 (d, $J = 13.0$ Hz, qC, CN), 130.8 (qC, C-Ar), 130.4 (d, $J = 7.8$ Hz, CH-ArF), 129.9 (CH-Ar), 124.1 (q, $J = 272.3$ Hz, qC, CF₃), 128.8 (CH-Ar), 126.0 (q, $J = 7.8$ Hz, CH-ArCF₃), 125.3 (d, $J = 4.0$ Hz, CH-ArF), 123.6 (q, $J = 3.8$ Hz, CH-ArCF₃), 117.1 (d, $J = 20.0$ Hz, CH-ArF), 40.7 (CH₂), 36.8 (CH₃).

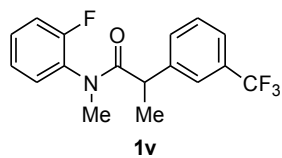
¹⁹F NMR (282 MHz, CDCl₃): $\delta = -62.7$ (CF₃), -121.4 (CF).

IR (neat): $\nu = 2941, 2321, 2103, 1739, 1664, 1499, 1373, 1327, 1118, 764$ cm⁻¹.

MS (EI): m/z (%) = 312 ([M+H]⁺, 1), 311 ([M]⁺, 5), 159 (22), 152 (10), 126 (8), 125 (100), 124 (32), 109 (14), 77 (20).

HRMS (ESI, MeOH) (C₁₆H₁₄F₄NO): calcd 312.1006, found 312.1006 ($\Delta = -0.14$ ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-[2-(3-trifluoromethyl)phenyl]propanamide (1v)**



The product was prepared following the general procedure 3, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (64%) as a colorless oil.

¹H NMR (300 MHz, CDCl₃, *syn/anti* mixture 1:0.84 with M = major isomer and m = minor isomer): $\delta = 7.36$ -7.31 (m, 2.1H, CH-Ar, $M + m$), 7.28-7.19 (m, 5.5H, CH-Ar, $M + m$), 7.17-7.11 (m, 2.6H, CH-Ar, $M + m$), 7.03 (s, 1H, CH-Ar, M), 6.96-6.91 (m, 1.8H, CH-Ar, $M + m$), 6.87-6.81 (m, 0.8H, CH-Ar, m), 6.61 (ddd, $J = 7.8, 7.8, 1.6$ Hz, 1H, CH-Ar, M), 3.64 (q, $J = 6.9$ Hz, 0.8H, CH, m), 3.50 (q, $J = 6.9$ Hz, 1H, CH, M), 3.13 (s, 3H, NCH₃, M), 3.12 (s, 2.3H, NCH₃, m), 1.34/1.33 (d + d, $J = 6.9, 6.9$ Hz, 5.6H, CHCH₃, $M + m$).

^{13}C NMR (75 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.6 (qC, CO, *M*), 173.5 (qC, CO, *m*), 158.5 (d, J = 251.7 Hz, qC, CF, *m*), 158.1 (d, J = 249.3 Hz, qC, CF, *M*), 142.8 (qC, C-Ar, *M*), 142.0 (qC, C-Ar, *m*), 131.1 (d, J = 5.2 Hz, qC, CN, *m*), 130.9 (d, J = 5.5 Hz, qC, CN, *M*), 130.8 (CH-Ar, *M*), 130.44 (CH-Ar, *m*), 130.35 (CH-Ar, *M*), 130.3 (CH-Ar, *m*), 130.2 (CH-Ar, *m*), 129.9 (CH-Ar, *M*), 129.1 (CH-Ar, *M*), 129.0 (CH-Ar, *m*), 125.1 (q, J = 4.1 Hz, CH-ArCF₃, *M* + *m*), 124.3 (q, J = 272.5 Hz, qC, CF₃, *M* + *m*), 124.61 (m, CH-ArCF₃, *M* + *m*), 123.7 (m, CH-ArCF₃, *M* + *m*), 117.1 (d, J = 20.0 Hz, CH-ArF, *m*), 117.0 (d, J = 20.0 Hz, CH-ArF, *M*), 43.51 (CH, *M* + *m*), 37.1 (NCH₃, *M*), 36.8 (NCH₃, *m*), 20.2 (CHCH₃, *M*), 12.0 (CHCH₃, *m*).

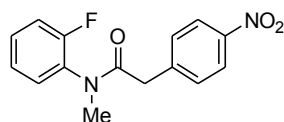
^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -62.7 (CF₃, *M*), -62.7 (CF₃, *m*), -119.9 (CF, *m*), -122.2 (CF, *M*).

IR (neat): ν = 2975, 2928, 1659, 1495, 1373, 759 cm^{-1} .

MS (EI): m/z (%) = 327 (3), 326 ($[\text{M}+\text{H}]^+$, 19), 325 ($[\text{M}]^+$, 43), 173 (21), 153 (16), 152 (56), 133 (15), 127 (5), 126 (9), 125 (100), 124 (25), 77 (10).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{16}\text{F}_4\text{NO}$): calcd 326.1163, found 326.1162 (Δ = -0.13 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-nitrophenyl)acetamide**



The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 8:2 to 7:3) yielding the title compound (90%) as a slightly yellow solid.

Mp.: 77.0-79.0 $^{\circ}\text{C}$

^1H NMR (300 MHz, CDCl_3): δ = 8.12-8.08 (m, 2H, CH-Ar), 7.44-7.37 (m, 1H, CH-Ar), 7.25-7.17 (m, 5H, CH-Ar), 3.57 (d, J = 15.2 Hz, 1H, CH₂), 3.51 (d, J = 15.2 Hz, 1H, CH₂), 3.26 (s, 3H, CH₃).

^{13}C NMR (75 MHz, CDCl_3): δ = 169.9 (qC, CO), 158.2 (d, J = 250.31 Hz, qC, CF), 147.1 (qC, C-Ar), 142.7 (qC, C-Ar), 131.2 (d, J = 12.9 Hz, qC, CN), 130.6 (d, J = 7.8 Hz, CH-ArF), 130.3 (CH-Ar), 129.9 (CH-Ar), 125.5 (d, J = 4.0 Hz, CH-ArF), 123.7 (CH-Ar), 117.3 (d, J = 19.9 Hz, CH-ArF), 40.7 (CH₂), 37.0 (CH₃).

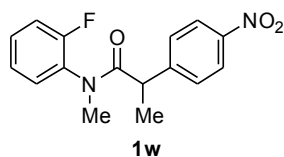
^{19}F NMR (282 MHz, CDCl_3): δ = -121.2.

IR (KBr): ν = 2929, 1660, 1499, 1422, 1369, 1266, 1218, 763 cm^{-1} .

MS (EI): m/z (%) = 290 (1), 289 ($[\text{M}+\text{H}]^+$, 6), 288 ($[\text{M}]^+$, 28), 152 (17), 136 (4), 126 (8), 125 (100), 124 (34), 78 (6), 77 (11).

HRMS (ESI, MeOH) ($\text{C}_{15}\text{H}_{13}\text{FN}_2\text{O}_3\text{Na}$): calcd 311.0802, found 311.0797 (Δ = -1.61 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-nitrophenyl)propanamide (1w)**



The product was prepared following the general procedure 3 slightly modified. After the addition of MeI, the reaction was stirred 2 h at -78 $^{\circ}\text{C}$ then 2 h at 0 $^{\circ}\text{C}$. After classic work-up described in the general procedure, the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the title compound (23%) as a yellow solid.

Mp.: 74.5-75.5 °C

¹H NMR (300 MHz, CDCl₃, *syn/anti* mixture 1:0.88 with *M* = major isomer and *m* = minor isomer): δ = 8.06-8.00 (m, 3H, CH-Ar, *M*), 7.40-7.20 (m, 4.7H, CH-Ar, *M* + *m*), 7.19-7.15 (m, 2H, CH-Ar, *M*), 7.12-7.09 (m, 2H, CH-Ar, *M*), 7.06-7.02 (m, 0.8H, CH-Ar, *m*), 7.01-6.94 (m, 0.8H, CH-Ar, *m*), 6.74 (ddd, *J* = 7.8, 7.8, 1.7 Hz, 0.9H, CH-Ar, *m*), 3.75 (q, *J* = 6.9 Hz, 0.9H, CH, *m*), 3.63 (q, *J* = 7.0 Hz, 1H, CH, *M*), 3.21 (s, 3H, NCH₃, *M*), 3.19 (s, 2.4H, NCH₃, *m*), 1.42 (d, *J* = 6.9 Hz, 2.8H, CHCH₃, *m*), 1.41 (d, *J* = 6.9 Hz, 3H, CHCH₃, *M*).

¹³C NMR (75 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 173.00 (qC, CO, *m*), 172.95 (qC, CO, *M*), 158.4 (d, *J* = 251.5 Hz, qC, CF, *M*), 158.1 (d, *J* = 249.8 Hz, qC, CF, *m*), 149.3 (qC, C-Ar, *M*), 148.6 (qC, C-Ar, *m*), 147.0 (qC, C-Ar, *M*), 146.9 (qC, C-Ar, *m*), 131.0 (d, *J* = 3.2 Hz, qC, CN, *m*), 130.8 (d, *J* = 3.0 Hz, qC, CN, *M*), 130.6 (d, *J* = 7.9 Hz, CH-ArF, *m*), 130.4 (d, *J* = 7.8 Hz, CH-ArF, *M*), 130.2 (CH-Ar, *M*), 129.98 (CH-Ar, *m*), 128.4 (CH-Ar, *M* + *m*), 125.4 (d, *J* = 4.0 Hz, CH-ArF, *m*), 125.2 (d, *J* = 4.0 Hz, CH-ArF, *M*), 123.8 (CH-Ar, *M*), 123.7 (CH-Ar, *m*), 117.3 (d, *J* = 1.3 Hz, CH-ArF, *M*), 117.1 (d, *J* = 1.4 Hz, CH-ArF, *m*), 43.4 (CH, *M* + *m*), 37.2 (NCH₃, *M*), 37.0 (NCH₃, *m*), 20.3 (CHCH₃, *M*), 20.0 (CHCH₃, *m*).

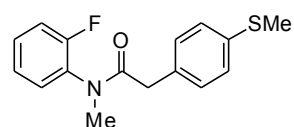
¹⁹F NMR (282 MHz, CDCl₃, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -120.0 (*m*), -121.8 (*M*).

IR (KBr): ν = 2942, 2318, 2104, 2048, 1975, 1740, 1655, 1505, 1341, 1214, 1098, 763, 700 cm⁻¹.

MS (EI): *m/z* (%) = 304 (2), 303 ([M+H]⁺, 11), 302 ([M]⁺, 43), 153 (5), 152 (54), 150 (15), 126 (8), 125 (100), 124 (28), 104 (9), 78 (6), 77 (11).

HRMS (ESI, MeOH) (C₁₆H₁₆FN₂O₃): calcd 303.1140, found 303.1140 (Δ = 0.11 ppm).

N-(2-Fluorophenyl)-*N*-methyl-2-(4-methylthiophenyl)acetamide



The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 8:2) yielding the title compound (72%) as a yellow oil.

¹H NMR (300 MHz, CDCl₃): δ = 7.28-7.19 (m, 1H, CH-Ar), 7.09-7.00 (m, 5H, CH-Ar), 6.84 (d, *J* = 8.2 Hz, 1H, CH-Ar), 3.33 (d, *J* = 14.8 Hz, 1H, CH₂), 3.26 (d, *J* = 14.8 Hz, 1H, CH₂), 3.12 (s, 3H, NCH₃), 2.31 (s, 3H, SCH₃).

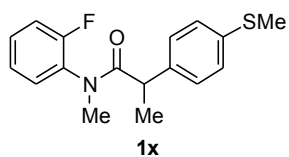
¹³C NMR (75 MHz, CDCl₃): δ = 171.0 (qC, CO), 158.0 (d, *J* = 250.1 Hz, qC, CF), 136.5 (qC, C-Ar), 131.8 (qC, C-Ar), 131.2 (d, *J* = 13.0 Hz, qC, CN), 129.97 (d, *J* = 7.8 Hz, CH-ArF), 129.86 (CH-Ar), 129.5 (CH-Ar), 126.7 (CH-Ar), 125.0 (d, *J* = 4.0 Hz, CH-ArF), 116.9 (d, *J* = 20.0 Hz, CH-ArF), 40.1 (CH₂), 36.6 (NCH₃), 15.9 (SCH₃).

¹⁹F NMR (282 MHz, CDCl₃): δ = -121.2.

IR (neat): ν = 2924, 1661, 1497, 1371, 1217, 1094, 762 cm⁻¹.

MS (EI): *m/z* (%) = 291 (2), 290 ([M+H]⁺, 5), 289 ([M]⁺, 24), 165 (4), 164 (40), 153 (4), 152 (40), 139 (5), 138 (10), 137 (100), 136 (5), 135 (7), 125 (40), 124 (28), 123 (4), 122 (35), 121 (18), 78 (11), 77 (20).

HRMS (ESI, MeOH) (C₁₆H₁₇FNOS): calcd 290.1009, found 290.1010 (Δ = 0.35 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-methylthiophenyl)propanamide (1x)**

The product was prepared following the general procedure 3, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (71%) as an orange oil.

^1H NMR (300 MHz, CDCl_3 , *syn/anti* mixture 1:0.65 with *M* = major isomer and *m* = minor isomer): δ = 7.28-8.18 (m, 2.5H, CH-Ar, *M* + *m*), 7.15-7.08 (m, 1.9H, CH-Ar, *M* + *m*), 7.02-6.89 (m, 5H, CH-Ar, *M* + *m*), 6.87-6.82 (m, 2.1H, CH-Ar, *M* + *m*), 6.76 (d, J = 8.3 Hz, 1H, CH-Ar, *M*), 6.69 (ddd, J = 7.9, 7.9, 1.6 Hz, 1H, *M*), 3.54 (q, J = 6.9 Hz, 0.7H, CH, *m*), 3.38 (q, J = 6.9 Hz, 1H, CH, *M*), 3.11 (s, 3H, NCH_3 , *M*), 3.10 (s, 2H, NCH_3 , *m*), 2.35 (s, 3H, SCH_3 , *M*), 2.33 (s, 1.7H, SCH_3 , *m*), 1.29 (d, J = 6.9 Hz, 4.7H, CHCH_3 , *M* + *m*).

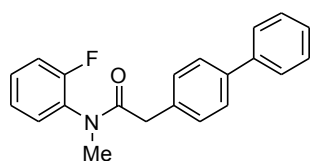
^{13}C NMR (75 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 174.1 (qC, CO, *M* + *m*), 158.6 (d, J = 251.8 Hz, qC, CF, *m*), 158.0 (d, J = 249.3 Hz, qC, CF, *M*), 138.7 (qC, C-Ar, *M*), 138.0 (qC, C-Ar, *m*), 136.7 (qC, C-Ar, *M*), 136.5 (qC, C-Ar, *m*), 131.2 (d, J = 13.0 Hz, qC, CN, *M* + *m*), 130.5 (CH-Ar, *M*), 130.1 (d, J = 7.8 Hz, CH-ArF, *m*), 129.90 (d, J = 7.7 Hz, CH-ArF, *M*), 129.89 (CH-Ar, *m*), 128.0 (CH-Ar, *M*), 127.9 (CH-Ar, *m*), 126.8 (CH-Ar, *M* + *m*), 124.93 (d, J = 4.7 Hz, CH-ArF, *M*), 124.87 (d, J = 4.3 Hz, CH-ArF, *m*), 117.0 (d, J = 18.9 Hz, CH-ArF, *M*), 116.8 (d, J = 28.7 Hz, CH-ArF, *m*), 42.9 (CH, *M*), 42.8 (CH, *m*), 36.9 (NCH_3 , *M*), 36.8 (NCH_3 , *m*), 20.3 (CHCH_3 , *M*), 19.9 (CHCH_3 , *m*), 16.1 (SCH_3 , *m*), 16.0 (SCH_3 , *M*).

^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -119.4 (*m*), -122.1 (*M*).

IR (neat): ν = 2980, 2937, 1664, 1500, 1325, 1162, 1122, 761 cm^{-1} .

MS (EI): m/z (%) = 305 (1), 304 ($[\text{M}+\text{H}]^+$, 2), 303 ($[\text{M}]^+$, 10), 153 (6), 152 (24), 151 (100), 150 (7), 137 (6), 136 (17), 135 (14), 125 (6), 124 (14), 105 (5), 104 (18), 103 (11), 91 (13), 78 (7), 77 (22).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{19}\text{FNOS}$): calcd 304.1166, found 304.1162 (Δ = -1.15 ppm).

2-([1,1'-Biphenyl]-4-yl)-*N*-(2-fluorophenyl)-*N*-methylacetamide

The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the title compound (96%) as a slightly yellow oil.

^1H NMR (600 MHz, CDCl_3): δ = 7.58 (d, J = 7.2 Hz, 2H, CH-Ar), 7.48 (d, J = 8.2 Hz, 2H, CH-Ar), 7.43 (dd, J = 7.5, 7.5 Hz, 2H, CH-Ar), 7.39-7.33 (m, 2H, CH-Ar), 7.21-7.17 (m, 3H, CH-Ar), 7.14 (d, J = 8.1 Hz, 2H, CH-Ar), 3.55 (d, J = 15.0 Hz, 1H, CH_2), 3.49 (d, J = 15.0 Hz, 1H, CH_2), 3.28 (s, CH_3).

^{13}C NMR (151 MHz, CDCl_3): δ = 171.3 (qC, CO), 158.2 (d, J = 250.2 Hz, qC, CF), 141.0 (qC, C-Ar), 139.6 (qC, C-Ar), 134.2 (qC, C-Ar), 131.5 (d, J = 13.0 Hz, qC, CN), 130.10 (CH-Ar), 130.05 (CH-Ar), 129.6 (CH-Ar), 128.8 (CH-Ar), 127.2 (CH-Ar), 127.11 (CH-Ar), 127.08 (CH-Ar), 125.1 (d, J = 3.9 Hz, CH-ArF), 117.0 (d, J = 20.0 Hz, CH-ArF), 40.51 (CH), 36.83 (CH_3).

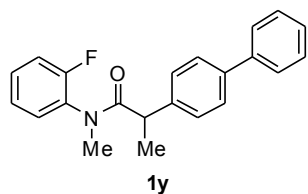
^{19}F NMR (564 MHz, CDCl_3): δ = -121.0.

IR (neat): ν = 3030, 2931, 2108, 1662, 1497, 1372, 755 cm^{-1} .

MS (EI): m/z (%) = 321 (3), 320 ($[M+H]^+$, 24), 319 ($[M]^+$, 89), 195 (9), 194 (56), 168 (10), 167 (70), 16 (14), 165 (48), 164 (5), 153 (6), 152 (57), 126 (8), 125 (100), 124 (27), 77 (12).

HRMS (ESI, MeOH) ($C_{21}H_{19}FNO$): calcd 320.1445, found 320.1446 ($\Delta = -0.14$ ppm).

2-([1,1'-Biphenyl]-4-yl)-*N*-(2-fluorophenyl)-*N*-methylpropanamide (1y)



The product was prepared following the general procedure 3, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (80%) as a colorless oil.

1H NMR (400 MHz, $CDCl_3$, *syn/anti* mixture 1:0.66 with *M* = major isomer and *m* = minor isomer): δ = 7.59-7.56 (m, 3.5H, CH-Ar, *M* + *m*), 7.48-7.40 (m, 7H, CH-Ar, *M* + *m*), 7.37-7.31 (m, 4H, CH-Ar, *M* + *m*), 7.25-7.21 (m, 1.8H, CH-Ar, *M* + *m*), 7.11 (d, J = 8.2 Hz, 2H, CH-Ar, *M*), 7.06-7.03 (m, 2.3H, CH-Ar, *M* + *m*), 7.01-6.96 (m, 0.7H, CH-Ar, *m*), 6.83 (ddd, J = 7.9, 7.9, 1.6 Hz, 1H, CH-Ar, *M*), 3.74 (q, J = 6.9 Hz, 0.7H, CH, *m*), 3.60 (q, J = 6.8 Hz, 1H, CH, *M*), 3.25 (s, 3H, NCH_3 , *M*), 3.24 (s, 2.1H, NCH_3 , *m*), 1.48/1.47 (d + d, J = 6.9, 6.8 Hz, 4.8H, $CHCH_3$, *M* + *m*).

^{13}C NMR (100 MHz, $CDCl_3$, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 174.3 (qC, CO, *M* + *m*), 158.6 (d, J = 251.6 Hz, qC, CF, *m*), 158.2 (d, J = 249.5 Hz, qC, CF, *M*), 141.0 (qC, C-Ar, *m*), 141.0 (qC, C-Ar, *M*), 140.9 (qC, C-Ar, *m*), 140.1 (qC, C-Ar, *M*), 139.7 (qC, C-Ar, *M*), 139.6 (qC, C-Ar, *m*), 131.3 (d, J = 13.0 Hz, qC, CN, *M* + *m*), 130.6 (CH-Ar, *M* + *m*), 130.1 (CH-Ar, *m*), 130.03 (CH-Ar, *M*), 129.95 (CH-Ar, *M*), 129.88 (CH-Ar, *m*), 128.85 (CH-Ar, *M*), 128.79 (CH-Ar, *m*), 127.93 (CH-Ar, *M*), 127.88 (CH-Ar, *m*), 127.3 (CH-Ar, *m*), 127.2 (CH-Ar, *M*), 127.08 (CH-Ar, *m*), 127.06 (CH-Ar, *M*), 125.0 (d, J = 4.4 Hz, CH-ArF, *M*), 124.9 (d, J = 4.3 Hz, CH-ArF, *m*), 117.1 (d, J = 20.0 Hz, CH-ArF, *m*), 116.9 (d, J = 20.1 Hz, CH-ArF, *M*), 43.2 (CH, *M*), 43.1 (CH, *m*), 37.1 (NCH_3 , *M*), 36.8 (NCH_3 , *m*), 20.3 ($CHCH_3$, *M*), 20.0 ($CHCH_3$, *m*).

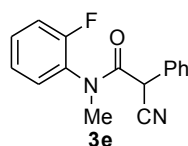
^{19}F NMR (282 MHz, $CDCl_3$, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -119.2 (*m*), -122.0 (*M*).

IR (neat): ν = 3033, 2977, 2935, 1661, 1495, 1373, 754, 697 cm^{-1} .

MS (EI): m/z (%) = 335 (4), 334 ($[M+H]^+$, 23), 333 ($[M]^+$, 81), 209 (7), 208 (42), 182 (18), 181 (100), 180 (16), 179 (10), 178 (9), 167 (4), 166 (22), 165 (24), 152 (32), 125 (11).

HRMS (ESI, MeOH) ($C_{22}H_{21}FNO$): calcd 334.1602, found 334.1601 ($\Delta = -0.12$ ppm).

2-Cyano-*N*-(2-fluorophenyl)-*N*-methyl-2-phenylacetamide (3e)



The product was prepared following the general procedure 3, using BrCN (1.0 mmol, 1.0 equiv) as alkylation reagent and stirring for 2 hours at room temperature before work-up. The purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (84%) as a pale yellow oil.

1H NMR (300 MHz, $CDCl_3$, *syn/anti* mixture 1:0.73 with *M* = major isomer and *m* = minor isomer): δ = 7.50-7.39 (m, 3H, CH-Ar, *M* + *m*), 7.37-7.27 (m, 10H, CH-Ar, *M* + *m*), 7.16-7.06 (m, 2H, CH-Ar, *M*), 6.82 (ddd, J = 7.8, 7.8, 1.6 Hz, 0.8H, CH-Ar, *m*), 5.32 (s, 0.7H, CH, *m*), 5.29 (s, 3H, CH, *M*), 3.27 (s, 2.5H, CH_3 , *m*), 3.26 (s, 3H, CH_3 , *M*).

^{13}C NMR (75 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 176.7 (qC, CO, *M*), 167.5 (qC, CO, *m*), 158.1 (d, J = 251.3 Hz, qC, CF, *M*), 157.9 (d, J = 251.6 Hz, qC, CF, *m*), 136.8 (qC, C-Ar, *m*), 136.0 (qC, C-Ar, *M*), 130.9 (d, J = 7.7 Hz, CH-ArF, *M*), 130.8 (d, J = 7.6 Hz, CH-ArF, *m*), 130.3 (d, J = 12.9 Hz, qC, CN, *M*), 130.17 (CH-Ar, *m*), 130.16 (d, J = 11.1 Hz, qC, CN, *m*), 129.5 (CH-Ar, *M*), 129.07 (CH-Ar, *m*), 128.99 (CH-Ar, *M*), 128.8 (CH-Ar, *M* + *m*), 128.6 (CH-Ar, *m*), 128.5 (CH-Ar, *M*), 125.7 (d, J = 4.1 Hz, CH-ArF, *M*), 125.1 (d, J = 4.0 Hz, CH-ArF, *m*), 117.4 (d, J = 19.8 Hz, CH-ArF, *m*), 117.1 (d, J = 19.8 Hz, CH-ArF, *M*), 46.3 (CH, *m*), 46.0 (CH, *M*), 37.6 (CH_3 , *m*), 37.5 (CH_3 , *M*). 1 qC not detected.

^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -120.0 (*m*), -120.7 (*M*).

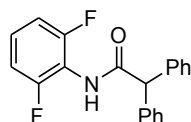
IR (neat): ν = 3029, 2939, 2322, 2101, 1672, 1498, 1372, 763, 706 cm^{-1} .

MS (EI): m/z (%) = 243 (17), 242 (100), 214 (23), 154 (18), 153 (4), 152 (41), 125 (17), 124 (20), 122 (6), 118 (16), 90 (25), 89 (17), 77 (14).

HRMS (ESI, MeOH) ($\text{C}_{15}\text{H}_{13}\text{FNO}$): calcd 242.0976, found 242.0979 (Δ = 1.28 ppm).

***N*-(2,6-Difluorophenyl)-2,2-diphenylacetamide**

The product was prepared following the general procedure 2, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 7:3) yielding the title compound (86%) as a white solid.



Mp.: 185-188 °C

^1H NMR (300 MHz, CDCl_3): δ = 7.39-7.27 (m, 10H, CH-Ar), 7.23-7.13 (m, 1H, CH-Ar), 6.95-6.87 (m, 3H, NH + CH-Ar), 5.18 (s, 1H, CH).

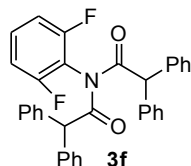
^{13}C NMR (75 MHz, CDCl_3): δ = 170.7 (qC, CO), 158.1 (dd, J = 250.7, 4.7 Hz, qC, CF), 139.1 (qC, C-Ar), 129.2 (CH-Ar), 129.1 (CH-Ar), 128.1 (dd, J = 10.0, 9.2 Hz, CH-ArF), 127.7 (CH-Ar), 114.0 (dd, J = 16.2, 16.2 Hz, qC, CN), 111.9 (m, CH-ArF), 59.3 (CH).

^{19}F NMR (282 MHz, CDCl_3): δ = -117.7.

IR (KBr): ν = 3256, 1674, 1520, 1463, 1170, 1020, 697 cm^{-1} .

MS (EI): m/z (%) = 324 ($[\text{M}+\text{H}]^+$, 2), 323 ($[\text{M}]^+$, 8), 195 (5), 194 (32), 169 (10), 168 (80), 167 (100), 166 (22), 165 (44), 153 (5), 152 (22), 128 (9).

HRMS (ESI, MeOH) ($\text{C}_{20}\text{H}_{15}\text{F}_2\text{NONa}$): calcd 346.1014, found 346.1012 (Δ = -0.64 ppm).



***N*-(2,6-Difluorophenyl)-*N*-(2,2-diphenylacetyl)-2,2-diphenylacetamide (3f)**

To a solution of *N*-(2,6-difluorophenyl)-2,2-diphenylacetamide (0.28 g, 0.87 mmol, 1.0 equiv) in pyridine (5 mL) was added diphenylacetyl chloride (0.31 g, 1.31 mmol, 1.5 equiv) at room temperature. Then, the reaction mixture was warmed to 50 °C and stirring was continued for further 17 hours at this temperature. The reaction mixture was quenched with saturated NH_4Cl solution (15 mL) and CH_2Cl_2 (20 mL) was added. The two phases were separated; the aqueous phase was extracted with CH_2Cl_2 (3 x 10 mL) and the combined organic layers were washed with a citric acid solution (10%, 3 x 10 mL) and brine (1 x 10 mL), dried over MgSO_4

and concentrated under reduced pressure. The product was purified with column chromatography using *n*-pentane/ethyl acetate (8:2 to 7:3) and obtained as a white solid (0.27 mg, 0.54 mmol, 62%).

Mp.: 47-50 °C

¹H NMR (300 MHz, CDCl₃): δ = 7.40-7.33 (m, 13H, CH-Ar), 7.17-7.14 (m, 8H, CH-Ar), 6.98-6.92 (m, 2H, CH-Ar), 5.86 (s, 2H, CH).

¹³C NMR (75 MHz, CDCl₃): δ = 174.0 (qC, CO), 159.1 (dd, *J* = 253.2, 3.9 Hz, qC, CF), 137.6 (qC, C-Ar), 131.2 (dd, *J* = 9.9, 9.9 Hz, CH-ArF), 129.2 (CH-Ar), 128.6 (CH-Ar), 127.4 (CH-Ar), 116.1 (dd, *J* = 16.8 Hz, qC, CN), 112.1 (dd, *J* = 20.5, 3.1 Hz, CH-ArF), 58.6 (CH).

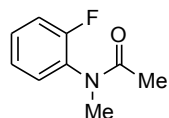
¹⁹F NMR (282 MHz, CDCl₃): δ = -116.5.

IR (KBr): ν = 3029, 1716, 1477, 1107, 697 cm⁻¹.

MS (EI): *m/z* (%) = 323 (10), 195 (13), 194 (100), 169 (9), 168 (70), 167 (97), 166 (45), 165 (74), 164 (6), 152 (21), 128 (5).

HRMS (ESI, MeOH) (C₃₄H₂₅F₂NO₂Na): calcd 540.1746, found 540.1757 (Δ = 0.23 ppm).

***N*-(2-Fluorophenyl)-*N*-methylacetamide**



To an ice-cold solution of 2-fluoro-*N*-methylaniline (0.90 g, 7.39 mmol, 1.0 equiv) in dry CH₂Cl₂ (20 mL) was added pyridine (1.21 mL, 1.20 g, 14.8 mmol, 2.0 equiv) and acetyl chloride (1.01 mL, 1.12 g, 14.8 mmol, 2.0 equiv). After 5 min the resulting mixture was allowed to warm to room temperature and stirred for 17 hours. Then, the reaction mixture was quenched with saturated NH₄Cl solution (20 mL) and the two phases were separated. The aqueous phase was extracted with CH₂Cl₂ (3 x 10 mL) and the combined organic layers were washed with brine (1 x 50 mL), dried over MgSO₄ and concentrated under reduced pressure. The purification was performed by flash chromatography (*n*-pentane/ethyl acetate 9:1 to 8:1) yielding the title compound (1.13 g, 6.76 mmol, 91%) as a yellow oil.

¹H NMR (300 MHz, CDCl₃): δ = 7.40-7.32 (m, 1H, CH-Ar), 7.30-7.16 (m, 3H, CH-Ar), 3.24 (s, 3H, NCH₃), 1.88 (s, 3H, CCH₃).

¹³C NMR (75 MHz, CDCl₃): δ = 170.9 (qC, CO), 158.1 (d, *J* = 250.0 Hz, qC, CF), 131.6 (d, *J* = 13.2 Hz, qC, CN), 129.9 (d, *J* = 7.8 Hz, CH-ArF), 129.6 (CH-ArF), 125.2 (d, *J* = 4.0 Hz, CH-ArF), 117.1 (d, *J* = 20.1 Hz, CH-ArF), 36.5 (NCH₃), 21.9 (CCH₃).

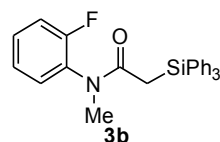
¹⁹F NMR (282 MHz, CDCl₃): δ = -212.8.

IR (neat): ν = 2938, 1662, 1499, 1374, 763 cm⁻¹.

MS (EI): *m/z* (%) = 168 ([M+H]⁺, 2), 167 ([M]⁺, 13), 126 (8), 125 (100), 124 (57), 95 (7), 77 (17).

HRMS (ESI, MeOH) (C₉H₁₁FNONa): calcd 168.0819, found 168.0819 (Δ = 0.01 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-(triphenylsilyl)acetamide (3b)**



A solution of diisopropyl amine (0.26 mL, 0.18 g, 1.82 mmol, 1.2 equiv) in dry THF (4 mL) was cooled to 0 °C and *n*BuLi (1.6 M in hexane, 1.14 mL, 1.82 mmol) was added. Then, the solution was cooled to -78 °C and *N*-(2-

fluorophenyl)-*N*-methylacetamide (0.25 g, 1.51 mmol, 1.0 equiv) in dry THF (3 mL) was added dropwise within 5 min. Then, triphenylsilyl chloride (0.39 mL, 0.44 g, 1.50 mmol, 1.0 equiv) was added, the reaction mixture was warmed to room temperature and stirring was continued for further two hours. The reaction was quenched with a 1 N aqueous HCl solution (10 mL), and extracted with ethyl acetate (3 x 15 mL). The combined organic layers were washed with brine (15 mL), then dried with MgSO₄, filtered, and concentrated under reduced pressure. The crude residue was purified by flash chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the expected α -silylated amide (0.25 g, 0.58 mmol, 38%) as a white solid.

Mp.: 123-125 °C

¹H NMR (400 MHz, CDCl₃): δ = 7.44-7.37 (m, 9H, CH-Ar), 7.34-7.30 (m, 6H, CH-Ar), 7.27-7.22 (m, 1H, CH-Ar), 7.09 (ddd, J = 9.7, 8.4, 1.3 Hz, 1H, CH-Ar), 6.95 (dd, J = 7.7, 7.7 Hz, 1H, CH-Ar), 6.28 (ddd, J = 7.7, 7.7, 1.7 Hz, 1H, CH-Ar), 3.06 (s, 3H, NCH₃), 2.65 (d, J = 13.6 Hz, 1H, CH₂), 2.50 (d, J = 13.6 Hz, 1H, CH₂).

¹³C NMR (100 MHz, CDCl₃): δ = 171.7 (qC, CO), 157.9 (d, J = 250.3 Hz, qC, CF), 136.0 (CH-Ar), 134.0 (qC, C-Ar), 132.5 (d, J = 12.7 Hz, qC, CN), 129.9 (CH-Ar), 129.8 (CH-Ar), 129.4 (d, J = 7.7 Hz, CH-ArF), 128.0 (CH-Ar), 125.0 (d, J = 4.0 Hz, CH-ArF), 116.9 (d, J = 20.0 Hz, CH-ArF), 36.7 (CH₃), 23.1 (CH₂).

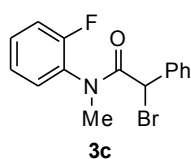
IR (KBr): ν = 3065, 2226, 2056, 1638, 1425, 1354, 1108, 732, 696 cm⁻¹.

MS (EI): m/z (%) = 350 (6), 349 (22), 348 (85), 261 (5), 260 (17), 259 (81), 181 (19), 126 (7), 125 (100), 124 (12).

HRMS (ESI, MeOH) (C₂₇H₂₄FNONaSi): calcd 448.1503, found 448.15078 (Δ = 0.94 ppm).

2.1.3. Procedures and characterization of compounds synthesized *via* Route C:

2-Bromo-*N*-(2-fluorophenyl)-*N*-methyl-2-phenylacetamide (3c)



α -Bromination: A dry and argon flushed 50 mL Schlenk-flask equipped with a stirring bar and a septum was charged with the amide (3.0 mmol, 1.0 equiv) and THF (9 mL). The reaction mixture was cooled at -78 °C, and LiHMDS (c = 1 M in THF, 6 mL, 6.0 mmol, 2.0 equiv) was added dropwise. The solution was stirred 15 min at -78 °C and NBS (588 mg, 3.3 mmol, 1.1 equiv) in THF (5 mL) was added

dropwise at this temperature. After 2 hours stirring at -78 °C, the reaction was quenched with a 1 N aqueous HCl solution (10 mL), and extracted with ethyl acetate (3 x 15 mL). The combined organic layers were washed with brine (15 mL), then dried with MgSO₄, filtered, and concentrated under reduced pressure. The crude residue was purified by flash chromatography (*n*-pentane/ethyl acetate 95:5 to 80:20) yielding 2-bromo-*N*-(2-fluorophenyl)-*N*-methyl-2-phenylacetamide (435 mg, 45%) as a yellow oil.

¹H NMR (400 MHz, CDCl₃, *syn/anti* mixture 1:0.75 with *M* = major isomer and *m* = minor isomer): δ = 7.43-7.35 (m, 3H, CH-Ar, *M* + *m*), 7.28-7.25 (m, 5.7H, CH-Ar, *M* + *m*), 7.22-7.19 (m, 4H, CH-Ar, *M* + *m*), 7.09-7.02 (m, 2H, CH-Ar, *M* + *m*), 6.76 (ddd, J = 7.7, 7.7, 1.3 Hz, 0.8H, CH-Ar, *m*), 5.29 (s, 1H, CH, *M*), 5.24 (s, 0.8H, CH, *m*), 3.26 (s, 2.5H, CH₃, *m*), 3.24 (s, 3H, CH₃, *M*).

^{13}C NMR (100 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 170.9 (qC, CO), 136.3 (d, J = 76.2 Hz, qC, CN), 131.0 (d, J = 7.9 Hz, CH-ArF, *M*), 130.8 (d, J = 7.9 Hz, CH-ArF, *m*), 130.5 (CH-Ar, *m*), 129.9 (CH-Ar, *M*), 129.2 (CH-Ar, *m*), 129.1 (CH-Ar, *M*), 128.9 (CH-Ar, *m*), 128.7 (CH-Ar, *M*), 128.3 (CH-Ar, *m*), 128.2 (CH-Ar, *M*), 125.6 (d, J = 3.8 Hz, CH-ArF, *M*), 125.2 (d, J = 4.1 Hz, CH-ArF, *m*), 117.4 (d, J = 19.7 Hz, CH-ArF, *m*), 117.3 (d, J = 19.7 Hz, CH-ArF, *M*), 57.8 (CH, *m*), 57.3 (CH, *M*), 37.8 (CH_3 , *m*), 37.5 (CH_3 , *M*). CF not detected.

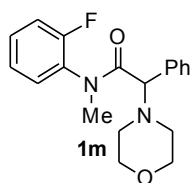
^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -120.03 (*m*), -120.68 (*M*).

IR (neat): ν = 3029, 2941, 1673, 1499, 1371, 762, 699 cm^{-1} .

MS (EI): m/z (%) = 324 (3), 322 ($[\text{M}]^+$, 3), 243 (19), 242 (100), 214 (18), 164 (17), 153 (11), 152 (48), 125 (23), 124 (17), 118 (13), 90 (14).

HRMS (ESI, MeOH) ($\text{C}_{15}\text{H}_{13}\text{FNOBrNa}$): calcd 344.0057, found 344.0056 (Δ = -0.28 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-morpholin-2-phenylacetamid (1m)**



α -Amination: In a 10 mL round-bottom flask equipped with a stirring bar, a reflux condenser and an argon inlet was added the α -bromo amide prepared precendently (386 mg, 1.2 mmol, 1.0 equiv), morpholine (115 mg, 1.32 mmol, 1.1 equiv) and ethanol (3 mL). The solution was then warmed at reflux during 16 hours, then cooled and quenched with a saturated NaHCO_3 solution (10 mL) and extracted with ethyl acetate (3 x 15 mL). The combined organic layers were washed with brine (15 mL), then dried with MgSO_4 , filtered, and concentrated under reduced pressure. The crude residue was purified by flash chromatography (*n*-pentane/ethyl acetate 8:2) yielding *N*-(2-fluorophenyl)-*N*-methyl-2-morpholino-2-phenylacetamide (228 mg, 58%) as a colorless oil.

^1H NMR (300 MHz, CDCl_3 , *syn/anti* mixture 1:0.51 with *M* = major isomer and *m* = minor isomer): δ = 7.43-7.32 (m, 2.2H, CH-Ar, *M* + *m*), 7.30-7.21 (m, 6H, CH-Ar, *M* + *m*), 7.19-7.15 (m, 2H, CH-Ar, *M* + *m*), 7.11-7.05 (m, 2H, CH-Ar, *M*), 7.04-6.98 (m, 0.6H, CH-Ar, *m*), 6.74 (ddd, J = 7.8, 7.8, 1.7 Hz, CH-Ar, *M*), 3.94 (s, 0.5H, CH, *m*), 3.70-3.65 (m, 7.5H, CH: *M*, CH_2 : *M* + *m*), 3.20 (s, NCH_3 , *M* + *m*), 2.45-2.35 (m, 4H, CH_2 , *M* + *m*), 2.31-2.21 (m, 2H, CH_2 , *M* + *m*).

^{13}C NMR (75 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 170.7 (qC, CO, *M*), 170.5 (qC, CO, *m*), 158.5 (d, J = 252.1 Hz, qC, CF, *m*), 157.6 (d, J = 249.6 Hz, qC, CF, *M*), 135.5 (qC, C-Ar, *M*), 134.7 (qC, C-Ar, *m*), 130.80 (qC, C-Ar, *M*), 130.77 (qC, C-Ar, *m*), 130.66 (CH-Ar, *M*), 130.5 (CH-Ar, *m*), 130.33 (d, J = 7.8 Hz, CH-ArF, *M*), 130.27 (d, J = 7.7 Hz, CH-ArF, *m*), 129.5 (CH-Ar, *M*), 129.2 (CH-Ar, *m*), 128.4 (CH-Ar, *M*), 128.3 (CH-Ar, *m*), 128.19 (CH-Ar, *M*), 128.16 (CH-Ar, *m*), 125.0 (d, J = 4.0 Hz, CH-ArF, *m*), 124.9 (d, J = 4.0 Hz, CH-ArF, *M*), 117.1 (d, J = 19.8 Hz, CH-ArF, *m*), 116.9 (d, J = 20.0 Hz, CH-ArF, *M*), 71.6 (CH, *M*), 71.2 (CH, *m*), 66.91 (CH_2 , *m*), 66.87 (CH_2 , *M*), 51.80 (CH_2 , *m*), 51.75 (CH_2 , *M*), 37.0 (CH_3 , *M*), 36.8 (CH_3 , *m*).

^{19}F NMR (282 MHz, CDCl_3 , *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -119.3 (*m*), -121.0 (*M*).

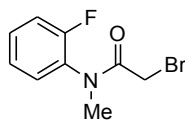
IR (neat): ν = 2956, 2854, 1667, 1499, 1266, 1113, 749, 702 cm^{-1} .

MS (EI): m/z (%) = 328 ($[\text{M}]^+$, 1), 177 (12), 176 (100), 105 (7), 91 (9), 90 (2).

HRMS (ESI, MeOH) ($\text{C}_{19}\text{H}_{21}\text{FN}_2\text{O}_2\text{Na}$): calcd 351.1479, found 351.1475 (Δ = -1.33 ppm).

2.1.4. Procedures and characterization of compounds synthesized *via* Route D:

2-Bromo-*N*-(2-fluorophenyl)-*N*-methylacetamide



Synthesis using the acid bromide: To a solution of 2-fluoro-*N*-methylaniline (1.50 g, 12.0 mmol, 1.0 equiv) in dry CH₂Cl₂ (50 mL) was added 2-bromoacetyl bromide (1.25 mL, 2.90 g, 14.4 mmol, 1.2 equiv) dropwise at –10 °C. The reaction mixture was stirred for 10 min at this temperature, then allowed to warm to room temperature and stirring was continued for further 17 hours at ambient temperature. Then, a saturated NH₄Cl solution (50 mL) and CH₂Cl₂ (15 mL) were added and the two layers were separated. The aqueous phase was extracted with CH₂Cl₂ (2 x 20 mL), the combined organic layers were washed with brine (1 x 30 mL), dried over MgSO₄ and concentrated under reduced pressure. The product was purified with silica gel chromatography (*n*-pentane/ethyl acetate 8:1 to 5:1) to yield 2-bromo-*N*-(2-fluorophenyl)-*N*-methylacetamide (2.85 g, 11.6 mmol, 86%) as a colorless oil.

¹H NMR (400 MHz, CDCl₃): δ = 7.43-7.33 (m, 2H, CH-Ar), 7.25-7.19 (m, 2H, CH-Ar), 3.72 (d, *J* = 11.2 Hz, 1H, CH₂), 3.63 (d, *J* = 11.2 Hz, 1H, CH₂), 3.28 (s, 3H, CH₃).

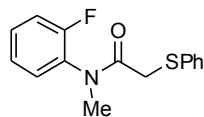
¹³C NMR (100 MHz, CDCl₃): δ = 167.2 (qC, CO), 158.0 (d, *J* = 250.9 Hz, qC, CF), 130.8 (d, *J* = 7.8 Hz, CH-ArF), 130.5 (d, *J* = 12.9 Hz, qC, CN), 129.6 (CH-ArF), 125.5 (d, *J* = 4.0 Hz, CH-ArF), 117.4 (d, *J* = 19.9 Hz, CH-ArF), 37.5 (CH₃), 26.5 (CH₂).

¹⁹F NMR (376 MHz, CDCl₃): δ = –120.9.

IR (neat): ν = 3049, 2947, 1672, 1502, 1377, 1221, 765 cm^{–1}.

HRMS (ESI, MeOH) (C₉H₁₀FNObBr): calcd 245.9924, found 245.9926 (*Δ* = 0.48 ppm).

N-(2-Fluorophenyl)-*N*-methyl-2-(phenylthio)acetamide



Synthesis of the α-thioamide: To NaOH (0.33 g, 8.17 mmol, 1.8 equiv) in dry THF (20 mL) was added thiophenol (0.50 g, 4.54 mmol, 1.0 equiv) and the solution was stirred for 15 min at room temperature. Then, 2-bromo-*N*-(2-fluorophenyl)-*N*-methylacetamide (1.14 g, 4.63 mmol, 1.02 equiv) in THF (2 mL) was added and stirring was continued for further 17 hours at ambient temperature. The reaction mixture was quenched with water (20 mL) and Et₂O (10 mL) was added. The aqueous phase was extracted with Et₂O (3 x 10 mL), the combined organic layers were washed with brine (1 x 20 mL), dried over Na₂SO₄ and concentrated under reduced pressure. The product was purified with silica gel chromatography (*n*-pentane/ethyl acetate 8:1) to yield *N*-(2-Fluorophenyl)-*N*-methyl-2-(phenylthio)acetamide (1.06 g, 3.85 mmol, 85%) as a colorless oil.

¹H NMR (400 MHz, CDCl₃): δ = 7.37-7.31 (m, 3H, CH-Ar), 7.26-7.22 (m, 2H, CH-Ar), 7.21-7.14 (m, 4H, CH-Ar), 3.52 (d, *J* = 1.2 Hz, 2H, CH₂), 3.25 (s, 3H, CH₃).

¹³C NMR (100 MHz, CDCl₃): δ = 169.0 (qC, CO), 158.1 (d, *J* = 250.5 Hz, qC, CF), 135.7 (qC, C-Ar), 131.0 (d, *J* = 13.0 Hz, qC, CN), 130.3 (d, *J* = 7.8 Hz, CH-ArF), 130.2 (CH-Ar), 129.9 (CH-Ar), 129.1 (CH-Ar), 126.9 (CH-Ar), 125.4 (d, *J* = 4.0 Hz, CH-ArF), 117.2 (d, *J* = 19.9 Hz, CH-ArF), 37.2 (CH₂ + CH₃).

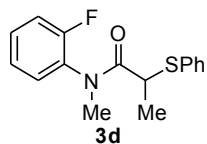
¹⁹F NMR (376 MHz, CDCl₃): δ = –120.2.

IR (neat): ν = 2920, 1668, 1501, 1372, 745 cm^{–1}.

MS (EI): m/z (%) = 277 (15), 276 ($[M]^+$, 47), 275 (92), 182 (12), 152 (38), 138 (14), 126 (10), 125 (100), 124 (18), 123 (23), 109 (10), 77 (14).

HRMS (ESI, MeOH) ($C_{15}H_{15}FNOS$): calcd 276.0853, found 276.0853 (Δ = 0.04 ppm).

***N*-(2-Fluorophenyl)-*N*-methyl-2-(phenylthio)propanamide (3d)**



The product was prepared following the general procedure 3, and the purification was performed by flash chromatography (*n*-pentane/ethyl acetate 10:1) yielding the title compound (85%) as a yellow oil.

1H NMR (400 MHz, $CDCl_3$, *syn/anti* mixture 1:0.44 with *M* = major isomer and *m* = minor isomer): δ = 7.32-7.19 (m, 8.6H, CH-Ar, *M* + *m*), 7.17-7.10 (m, 2.6H, CH-Ar, *M* + *m*), 7.03 (dd, J = 7.9, 7.9 Hz, 1H, CH-Ar, *M*), 6.79 (ddd, J = 7.9, 7.9, 1.7 Hz, 1H, CH-Ar, *M*), 3.73 (q, J = 6.8 Hz, 0.44H, CH, *m*), 3.63 (qd, J = 6.8, 1.0 Hz, 1H, CH, *M*), 3.24 (s, 1.4H, NCH_3 , *m*), 3.20 (s, 3H, NCH_3 , *M*), 1.41 (d, J = 6.8 Hz, 1.7H, $CHCH_3$, *m*), 1.42 (d, J = 6.8 Hz, 3H, $CHCH_3$, *M*).

^{13}C NMR (100 MHz, $CDCl_3$, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = 172.6 (qC, CO, *M*), 172.2 (qC, CO, *m*), 158.4 (d, J = 252.1 Hz, qC, CF, *m*), 158.0 (d, J = 249.3 Hz, qC, CF, *M*), 134.3 (CH-Ar, *M*), 133.7 (CH-Ar, *m*), 133.4 (qC, C-Ar, *M*), 133.3 (qC, C-Ar, *m*), 131.1 (d, J = 8.5 Hz, qC, CN, *M*), 131.0 (d, J = 9.6 Hz, qC, CN, *m*), 130.2 (d, J = 7.8 Hz, CH-ArF, *m*), 130.1 (CH-ArF, *M*), 130.0 (d, J = 7.8 Hz, CH-ArF, *M*), 129.6 (CH-Ar, *m*), 129.0 (CH-Ar, *M*), 128.9 (CH-Ar, *M*), 128.4 (CH-Ar, *M*), 128.1 (CH-Ar, *m*), 125.2 (d, J = 3.9 Hz, CH-ArF, *M*), 125.0 (d, J = 3.9 Hz, CH-ArF, *m*), 117.5 (d, J = 19.8 Hz, CH-ArF, *m*), 116.8 (d, J = 20.1 Hz, CH-ArF, *M*), 44.11 (CH, *M*), 44.06 (CH, *m*), 37.2 (NCH_3 , *M*), 36.9 (NCH_3 , *m*), 18.8 ($CHCH_3$, *m*), 18.3 ($CHCH_3$, *M*).

^{19}F NMR (367 MHz, $CDCl_3$, *syn/anti* mixture with *M* = major isomer and *m* = minor isomer): δ = -118.0 (*m*), -122.4 (*M*).

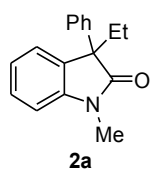
IR (neat): ν = 2925, 1666, 1501, 1378, 754 cm^{-1} .

MS (EI): m/z (%) = 290 ($[M+H]^+$, 1), 289 ($[M]^+$, 7), 152 (23), 138 (8), 137 (100), 136 (5), 135 (12), 125 (50), 124 (28), 123 (9), 122 (15), 110 (6), 109 (60), 103 (12), 95 (11), 78 (7), 77 (53), 65 (19).

HRMS (ESI, MeOH) ($C_{16}H_{17}FNOS$): calcd 290.1009, found 290.1010 (Δ = 0.35 ppm).

2.2. Oxindole syntheses:

General procedure 4: intramolecular cyclizations: The anilide (150 mg, 1.0 equiv) and KOt -Bu (1.2 - 3.0 equiv) were placed in a sealable tube equipped with a magnetic stir bar. The tube was covered with a rubber septum, an argon atmosphere was established and dry DMF (2 mL) was added by syringe. The septum was replaced by a teflon-coated screw cap and the reaction mixture was stirred for 16-24 hours at 80 °C. Then, the resulting mixture was cooled to ambient temperature and H_2O (2 mL) and ethyl acetate (8 mL) were added. The two phases were separated and the aqueous layer was extracted with ethyl acetate (3 x 4 mL). The combined organic phases were washed with brine (1 x 10 mL), dried with Na_2SO_4 , filtrated and concentrated under reduced pressure. The product was purified by column chromatography (*n*-pentane/ethyl acetate).

3-Ethyl-1-methyl-3-phenylindolin-2-one (2a)

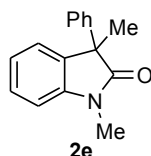
Prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (**1a**), *N*-(2-chlorophenyl)-*N*-methyl-2-phenylbutanamide (**1b**), *N*-(2-bromophenyl)-*N*-methyl-2-phenylbutanamide (**1c**), *N*-(2-iodophenyl)-*N*-methyl-2-phenylbutanamide (**1d**) according to the general procedure 4. Prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (**1a**), using 1.5 equiv of KO*t*-Bu and stirring the solution for 24 h at 80 °C yielded the product (83%) as a white solid after column chromatography (*n*-pentane/ethyl acetate 10:1).

¹H NMR (400 MHz, CDCl₃): δ = 7.36-7.33 (m, 2H, CH-Ar), 7.30 (dd, *J* = 7.7, 1.3 Hz, 1H, CH-Ar), 7.28-7.23 (m, 2H, CH-Ar), 7.22-7.18 (m, 2H, CH-Ar), 7.10 (ddd, *J* = 7.0, 7.0, 1.0 Hz, 1H, CH-Ar), 6.88 (d, *J* = 7.7 Hz, 1H, CH-Ar), 3.20 (s, 3H, NCH₃), 2.41 (dq, *J* = 13.5, 7.3 Hz, 1H, CH₂), 2.21 (dq, *J* = 13.5, 7.3 Hz, 1H, CH₂), 0.66 (t, *J* = 7.3 Hz, 3H, CH₂CH₃).

¹³C NMR (100 MHz, CDCl₃): δ = 178.8 (qC, CO), 144.3 (qC, C-Ar), 140.4 (qC, C-Ar), 132.3 (qC, C-Ar), 128.7 (CH-Ar), 128.3 (CH-Ar), 127.4 (CH-Ar), 127.2 (CH-Ar), 125.0 (CH-Ar), 122.7 (CH-Ar), 108.4 (CH-Ar), 57.5 (qC, CCH₂Ph), 31.1 (CH₂), 26.5 (NCH₃), 9.2 (CH₂CH₃).

MS (EI): *m/z* (%) = 253 (1), 252 ([M+H]⁺, 15), 251 ([M]⁺, 67), 223 (30), 222 (100), 207 (10), 194 (10), 193 (6), 165 (10), 152 (7).

The spectral data are in accordance with those reported in the literature.³

1,3-Dimethyl-3-phenylindolin-2-one (2e)

The product was prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-phenylpropanamide (**1h**) according to the general procedure 4, using 2.0 equiv of KO*t*-Bu and stirring the solution for 24 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (77%) as a slightly yellow oil.

¹H NMR (300 MHz, CDCl₃): δ = 7.34-7.27 (m, 5H, CH-Ar), 7.26-7.22 (m, 1H, CH-Ar), 7.20-7.17 (m, 1H, CH-Ar), 7.11-7.06 (m, 1H, CH-Ar), 6.91 (d, *J* = 7.7 Hz, 1H, CH-Ar), 3.23 (s, 3H, NCH₃), 1.79 (s, 3H, CCH₃).

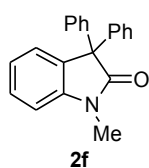
¹³C NMR (75 MHz, CDCl₃): δ = 179.6 (qC, CO), 143.4 (qC, C-Ar), 141.0 (qC, C-Ar), 135.0 (qC, C-Ar), 128.7 (CH-Ar), 128.3 (CH-Ar), 127.4 (CH-Ar), 126.8 (CH-Ar), 124.3 (CH-Ar), 122.9 (CH-Ar), 108.5 (CH-Ar), 52.3 (qC, CCH₃), 26.6 (NCH₃), 23.9 (CCH₃).

IR (neat): ν = 2970, 2933, 1711, 1608, 1467, 1369, 1345, 750, 696 cm⁻¹.

MS (EI): *m/z* (%) = 239 (2), 238 ([M+H]⁺, 17), 237 ([M]⁺, 100), 223 (13), 222 (80), 208 (8), 207 (6), 194 (17), 193 (7), 165 (12), 152 (9), 77 (10).

HRMS (ESI, MeOH) (C₁₆H₁₅NONa): calcd 260.1046, found 260.1046 (Δ = -0.14 ppm).

The spectral data are in accordance with those reported in the literature.³

1-Methyl-3,3-diphenylindolin-2-one (2f)

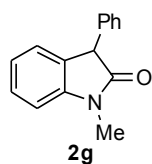
Prepared from *N*-(2-fluorophenyl)-*N*-methyl-2,2-diphenylacetamide (**1i**) and *N*-(2-chlorophenyl)-*N*-methyl-2,2-diphenylacetamide (**1j**) according to the general procedure 4. Prepared from *N*-(2-fluorophenyl)-*N*-methyl-2,2-diphenylacetamide (**1i**), using 1.5 equiv of KO*t*-Bu and stirring the solution for 16 h at 80 °C yielded the product (91%) as a white solid after column chromatography (*n*-pentane/ethyl acetate 10:1).

¹H NMR (400 MHz, CDCl₃): δ = 7.32-7.22 (m, 12 H, CH-Ar), 7.08 (ddd, *J* = 7.6, 7.6, 0.9 Hz, 1H, CH-Ar), 6.92 (d, *J* = 7.8 Hz, 1H, CH-Ar), 3.29 (s, 3H, CH₃).

¹³C NMR (100 MHz, CDCl₃): δ = 177.7 (qC, CO), 143.3 (qC, C-Ar), 142.1 (qC, C-Ar), 133.1 (qC, C-Ar), 128.63 (CH-Ar), 128.61 (CH-Ar), 128.5 (CH-Ar), 127.5 (CH-Ar), 126.3 (CH-Ar), 122.0 (CH-Ar), 108.7 (CH-Ar), 62.7 (qC, CPh₂), 26.9 (CH₃).

MS (EI): *m/z* (%) = 301 (3), 300 ([M+H]⁺, 23), 299 ([M]⁺, 100), 298 (13), 271 (7), 270 (30), 222 (13), 194 (16), 167 (11), 166 (5), 165 (11), 152 (12).

The spectral data are in accordance with those reported in literature.⁸

1-Methyl-3-phenylindolin-2-one (2g)

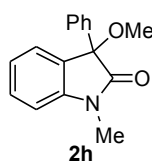
The product was prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-phenylacetamide (**1k**) according to the general procedure 4, using 0.9 equiv of KO*t*-Bu and stirring the solution for 24 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (61%) as a white solid.

¹H NMR (300 MHz, CDCl₃): δ = 7.35-7.28 (m, 4H, CH-Ar), 7.22-7.16 (m, 3H, CH-Ar), 7.07 (ddd, *J* = 7.5, 7.5, 0.9 Hz, 1H, CH-Ar), 6.90 (d, *J* = 7.8 Hz, 1H, CH-Ar), 4.61 (s, 1H, CH), 3.26 (s, 3H, CH₃).

¹³C NMR (75 MHz, CDCl₃): δ = 176.2 (qC, CO), 144.7 (qC, C-Ar), 136.8 (qC, C-Ar), 129.5 (qC, C-Ar), 129.1 (CH-Ar), 128.6 (2 x CH-Ar), 127.7 (CH-Ar), 125.3 (CH-Ar), 122.9 (CH-Ar), 108.4 (CH-Ar), 52.2 (CH), 26.7 (CH₃).

MS (EI): *m/z* (%) = 224 ([M+H]⁺, 4), 224 ([M]⁺, 25), 195 (13), 194 (100), 180 (9), 179 (26), 166 (9), 165 (38), 164 (6), 153 (11), 152 (43), 151 (8), 150 (23), 126 (11), 125 (84), 124 (17), 123 (17), 122 (7).

The spectral data are in accordance with those reported in the literature.³

3-Methoxy-1-methyl-3-phenylindolin-2-one (2h)

The product was prepared from *N*-(2-fluorophenyl)-2-methoxy-*N*-methyl-2-phenylacetamide (**1l**) according to the general procedure 4, using 1.5 equiv of KO*t*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (35%) as a white solid.

Mp.: 81.5-83.5 °C (Lit.³ 77-79 °C)

⁸ Klumpp, D. A.; Yeung, K. Y.; Prakash, G. K. S.; Olah, G. A.; *J. Org. Chem.* **1998**, *63*, 4481.

^1H NMR (400 MHz, CDCl_3): δ = 7.43-7.36 (m, 3H, CH-Ar), 7.33-7.27 (m, 4H, CH-Ar), 7.14 (ddd, J = 7.5, 7.5, 1.0 Hz, 1H, CH-Ar), 6.93 (d, J = 7.8 Hz, 1H, CH-Ar), 3.24 (s, 3H, OCH_3), 3.23 (s, 3H, NCH_3).

^{13}C NMR (100 MHz, CDCl_3): δ = 175.4 (qC, CO), 144.7 (qC, C-Ar), 138.8 (qC, C-Ar), 130.3 (CH-Ar), 128.60 (CH-Ar), 128.58 (CH-Ar), 128.2 (qC, C-Ar), 126.5 (CH-Ar), 125.9 (CH-Ar), 123.5 (CH-Ar), 108.7 (CH-Ar), 84.1 (qC, COCH_3), 53.3 (OCH_3), 26.6 (NCH_3).

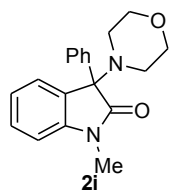
IR (KBr): ν = 2929, 1714, 1606, 1463, 1344, 1084, 983, 757, 720, 696 cm^{-1} .

MS (EI): m/z (%) = 255 (1), 254 ($[\text{M}+\text{H}]^+$, 13), 253 ($[\text{M}]^+$, 83), 225 (9), 224 (53), 223 (89), 222 (100), 210 (20), 209 (19), 195 (12), 194 (45), 167 (6), 166 (6), 165 (17), 152 (17), 151 (7), 105 (21), 104 (6), 77 (20).

HRMS (ESI, MeOH) ($\text{C}_{16}\text{H}_{15}\text{NO}_2\text{Na}$): calcd 276.0995, found 276.0996 (Δ = 0.18 ppm).

The spectral data are in accordance with those reported in the literature.³

1-Methyl-3-morpholin-3-phenylindolin-2-one (2i)



The product was prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-morpholino-2-phenylacetamide (**1m**) according to the general procedure 4, using 1.5 equiv of *KOt*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 8:2 to 7:3) yielding the title compound (29%) as a white solid.

Mp.: 125-128 °C

^1H NMR (300 MHz, CDCl_3): δ = 7.57-7.54 (m, 2H, CH-Ar), 7.34-7.24 (m, 5H, CH-Ar), 7.08 (ddd, J = 7.7, 7.7, 1.0 Hz, 1H, CH-Ar), 6.86 (d, J = 7.7 Hz, 1H, CH-Ar), 3.74-3.63 (m, 4H, CH_2), 3.23 (s, 3H, NCH_3), 2.64-2.52 (m, 4H, CH_2).

^{13}C NMR (75 MHz, CDCl_3): δ = 175.7 (qC, CO), 143.7 (qC, C-Ar), 138.5 (qC, C-Ar), 129.2 (CH-Ar), 128.9 (qC, C-Ar), 128.8 (CH-Ar), 128.2 (CH-Ar), 127.9 (CH-Ar), 126.0 (CH-Ar), 122.9 (CH-Ar), 108.5 (CH-Ar), 74.3 (qC, CPh), 67.7 (CH_2), 47.8 (CH_2), 26.3 (NCH_3).

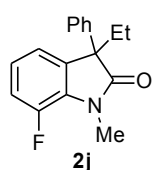
IR (KBr): ν = 2946, 2858, 2831, 1714, 1604, 1465, 1362, 1112, 759, 697 cm^{-1} .

MS (EI): m/z (%) = 309 ($[\text{M}+\text{H}]^+$, 3), 308 ($[\text{M}]^+$, 6), 224 (17), 223 (100), 222 (26), 194 (17), 193 (5), 165 (11), 86 (17).

HRMS (ESI, MeOH) ($\text{C}_{19}\text{H}_{21}\text{N}_2\text{O}_2$): calcd 309.1598, found 309.1597 (Δ = -0.27 ppm).

The spectral data are in accordance with those reported in the literature.⁹

3-Ethyl-7-fluoro-1-methyl-3-phenylindolin-2-one (2j)



The product was prepared from *N*-(2,6-difluorophenyl)-*N*-methyl-2-phenylbutanamide (**1n**) according to the general procedure 4, using 1.5 equiv of *KOt*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 10:1) yielding the title compound (74%) as a white solid.

⁹ Marsden, S. P.; Watson, E. L.; Raw, S. A. *Org. Lett.* **2008**, *10*, 2905.

Mp.: 88.5-89 °C

^1H NMR (400 MHz, CDCl_3): δ = 7.32-7.21 (m, 5H, CH-Ar), 7.03-6.99 (m, 2H, CH-Ar), 6.97-6.94 (m, 1H, CH-Ar), 3.41 (d, J = 2.8 Hz, NCH_3), 2.42 (dq, J = 14.7, 7.3 Hz, 1H, CH_2), 2.18 (dq, J = 14.7, 7.3 Hz, 1H, CH_2), 0.65 (t, J = 7.3 Hz, 3H, CH_2CH_3).

^{13}C NMR (100 MHz, CDCl_3): δ = 178.4 (qC, CO), 148.1 (d, J = 243.6 Hz, qC, CF), 140.1 (qC, C-Ar), 135.3 (qC, C-Ar), 131.0 (d, J = 7.9 Hz, qC, C-ArF), 128.8 (CH-Ar), 127.6 (CH-Ar), 127.0 (CH-Ar), 123.2 (d, J = 6.3 Hz, CH-ArF), 120.8 (CH-Ar), 116.2 (d, J = 19.3 Hz, CH-ArF), 57.9 (CCH_2Ph), 31.2 (CH_2), 29.0 (d, J = 5.8 Hz, NCH_3), 9.2 (CH_2CH_3).

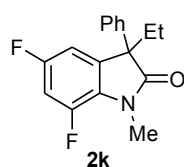
^{19}F NMR (282 MHz, CDCl_3): δ = -136.5.

IR (KBr): ν = 2969, 2934, 1709, 1480, 1368, 1319, 1233, 1102, 773, 725 cm^{-1} .

MS (EI): m/z (%) = 270 ($[\text{M}+\text{H}]^+$, 14), 269 ($[\text{M}]^+$, 73), 242 (5), 241 (37), 240 (100), 225 (13), 212 (16), 211 (7), 182 (11), 165 (7).

Elemental analysis calcd for $\text{C}_{17}\text{H}_{16}\text{FNO}$: C 75.82, H 5.99, N 5.20, found: C 75.61, H 6.01, N 5.11.

3-Ethyl-5,7-difluoro-1-methyl-3-phenylindolin-2-one (2k)



The product was prepared from *N*-methyl-2-phenyl-*N*-(2,4,6-trifluorophenyl)butanamide (**1o**) according to the general procedure 4, using 1.2 equiv of *KOt*-Bu and stirring for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 20:1) yielding the title compound (73%) as a colorless syrup.

^1H NMR (400 MHz, CDCl_3): δ = 7.30-7.27 (m, 4H, CH-Ar), 7.25-7.22 (m, 1H, CH-Ar), 6.82 (ddd, J = 11.5, 9.2, 2.4 Hz, 1H, CH-ArF), 6.76 (ddd, J = 7.4, 2.4, 1.0 Hz, 1H, CH-ArF), 3.41 (d, J = 2.8 Hz, 3H, NCH_3), 2.45 (dq, J = 14.6, 7.4 Hz, 1H, CH_2), 2.18 (dq, J = 14.6, 7.4 Hz, 1H, CH_2), 0.69 (t, J = 7.4 Hz, 3H, CH_2CH_3).

^{13}C NMR (100 MHz, CDCl_3): δ = 178.1 (qC, CO), 158.6 (dd, J = 244.2, 9.9 Hz, qC, CF), 147.2 (dd, J = 246.7, 11.7 Hz, qC, CF), 139.5 (qC, 2 x C-Ar), 136.3 (dd, J = 8.9, 4.2 Hz, qC, CN), 128.9 (CH-Ar), 127.8 (CH-Ar), 126.9 (CH-Ar), 108.7 (dd, J = 24.1, 3.8 Hz, CH-ArF), 104.3 (dd, J = 26.9, 23.4 Hz, CH-ArF), 58.3 (qC, CCH_2Ph), 31.0 (CH_2), 28.9 (d, J = 5.6 Hz, NCH_3), 9.1 (CH_2CH_3).

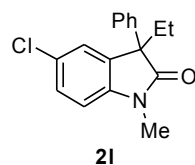
^{19}F NMR (376 MHz, CDCl_3): δ = -117.4 (ddd, J = 9.0, 9.0, 1.4 Hz), -133.2 (d, J = 11.3 Hz).

IR (CHCl_3): ν = 2970, 2932, 1722, 1493, 1116, 731, 702 cm^{-1} .

MS (EI): m/z (%) = 288 ($[\text{M}+\text{H}]^+$, 17), 287 ($[\text{M}]^+$, 89), 260 (5), 259 (40), 258 (100), 230 (16), 159 (16).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{16}\text{F}_2\text{NO}$): calcd 288.1195, found 288.1194 (Δ = -0.23 ppm).

5-Chloro-3-ethyl-1-methyl-3-phenylindolin-2-one (2l)



The product was prepared from *N*-(2,4-dichlorophenyl)-*N*-methyl-2-phenylbutanamide (**1p**) according to the general procedure 4, using 2.0 equiv of *KOt*-Bu and stirring the solution for 24 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 10:1) yielding the title

compound (47%) as a pale yellow solid.

Mp.: 97-98 °C

^1H NMR (400 MHz, CDCl_3): δ = 7.34-7.28 (m, 5H, CH-Ar), 7.27-7.23 (m, 1H), 7.20 (d, J = 2.1 Hz, 1H, CH-Ar), 6.83 (d, J = 8.3 Hz, 1H, CH-Ar), 3.22 (s, 3H, NCH_3), 2.44 (dq, J = 13.5, 7.3 Hz, 1H, CH_2), 2.22 (dq, J = 13.4, 7.3 Hz, 1H, CH_2), 0.69 (t, J = 7.3 Hz, 3H, CH_2CH_3).

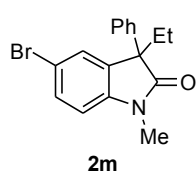
^{13}C NMR (75 MHz, CDCl_3): δ = 178.3 (qC, CO), 142.9 (qC, C-Ar), 139.7 (qC, C-Ar), 134.1 (qC, C-Ar), 128.9 (CH-Ar), 128.3 (CH-Ar), 128.2 (qC, C-Ar), 127.7 (CH-Ar), 127.0 (CH-Ar), 125.3 (CH-Ar), 109.3 (CH-Ar), 57.8 (qC, CCH_2Ph), 30.9 (CH_2), 26.7 (NCH_3), 9.2 (CH_2CH_3).

IR (KBr): ν = 2970, 2931, 1703, 1604, 1489, 1346, 1089, 819, 697 cm^{-1} .

MS (EI): m/z (%) = 288 (5), 287 (27), 286 ($[\text{M}+\text{H}]^+$, 19), 285 ($[\text{M}]^+$, 77), 259 (8), 258 (34), 257 (24), 256 (100), 222 (8), 221 (36), 193 (11), 192 (6), 166 (5), 165 (18).

Elemental analysis calcd for $\text{C}_{17}\text{H}_{16}\text{ClNO}$: C 71.45, H 5.64, N 4.90, found: C 71.36, H 5.73, N 4.80.

5-Bromo-3-ethyl-1-methyl-3-phenylindolin-2-one (2m)



The product was prepared from *N*-(4-bromo-2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (**1q**) according to the general procedure 4, using 1.5 equiv of $\text{KO}t\text{-Bu}$ and stirring the solution for 24 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 10:1) yielding the title compound (59%) as a white solid.

Mp.: 87.5-88 °C

^1H NMR (400 MHz, CDCl_3): δ = 7.46 (dd, J = 8.3, 2.0 Hz, 1H, CH-Ar), 7.35-7.29 (m, 5H, CH-Ar), 7.27-7.23 (m, 1H, CH-Ar), 6.79 (d, J = 8.3 Hz, CH-Ar), 3.21 (s, 3H, NCH_3), 2.43 (dq, J = 13.6, 7.4 Hz, 1H, CH_2), 2.22 (dq, J = 13.6, 7.4 Hz, 1H, CH_2), 0.69 (t, J = 7.4 Hz, 3H, CH_2CH_3).

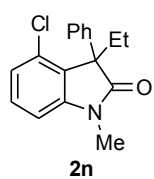
^{13}C NMR (100 MHz, CDCl_3): δ = 178.2 (qC, CO), 143.4 (qC, C-Ar), 139.7 (qC, C-Ar), 134.5 (qC, C-Ar), 131.2 (CH-Ar), 128.9 (CH-Ar), 128.0 (CH-Ar), 127.7 (CH-Ar), 127.0 (CH-Ar), 115.5 (qC, C-Ar), 109.8 (CH-Ar), 57.7 (qC, CCH_2Ph), 30.9 (CH_2), 26.6 (NCH_3), 9.2 (CH_2CH_3).

IR (KBr): ν = 2970, 1703, 1603, 1486, 1451, 1343, 1079, 817, 696 cm^{-1} .

MS (EI): m/z (%) = 332 (17), 331 ($[\text{M}+\text{H}]^+$, 83), 330 ($[\text{M}]^+$, 20), 329 (85), 303 (25), 302 (100), 301 (32), 300 (100), 222 (11), 221 (51), 220 (5), 193 (17), 192 (12), 166 (9), 165 (37), 164 (8), 119 (12), 115 (9), 91 (32).

Elemental analysis calcd for $\text{C}_{17}\text{H}_{16}\text{BrNO}$: C 61.83, H 4.88, N 4.24, found: C 61.75, H 4.90, N 3.95.

4-Chloro-3-ethyl-1-methyl-3-phenylindolin-2-one (2n)



The product was prepared from *N*-(3-chloro-2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (**1r**) according to the general procedure 4, using 2.0 equiv of $\text{KO}t\text{-Bu}$ and stirring the solution for 24 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 20:1) yielding the title compound (54%) as a white solid.

Mp.: 145.5-146.5 °C

^1H NMR (300 MHz, CDCl_3): δ = 7.29-7.17 (m, 6H, CH-Ar), 7.02 (dd, J = 8.5, 1.2 Hz, 1H, CH-Ar), 6.79 (dd, J = 7.8, 0.7 Hz, 1H, CH-Ar), 3.18 (s, 3H, NCH_3), 2.60 (q, J = 7.4 Hz, 2H, CH_2), 0.59 (t, J = 7.4 Hz, 3H, CH_2CH_3).

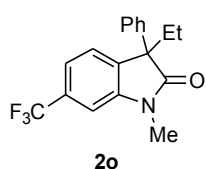
^{13}C NMR (75 MHz, CDCl_3): δ = 178.2 (qC, CO), 146.3 (qC, C-Ar), 138.6 (qC, C-Ar), 131.8 (qC, C-Ar), 129.8 (CH-Ar), 128.7 (CH-Ar), 127.8 (qC, C-Ar), 127.6 (CH-Ar), 126.9 (CH-Ar), 124.0 (CH-Ar), 106.7 (CH-Ar), 59.0 (qC, CCH_2Ph), 27.0 (CH_2), 26.8 (NCH_3), 9.4 (CH_2CH_3).

IR (KBr): ν = 2967, 2936, 1704, 1601, 1454, 1343, 1313, 1125, 1086, 776, 722, 695 cm^{-1} .

MS (EI): m/z (%) = 287 (32), 286 ($[\text{M}+\text{H}]^+$, 19), 285 ($[\text{M}]^+$, 100), 260 (28), 259 (43), 257 (95), 256 (89), 229 (10), 223 (20), 221 (95), 208 (5), 206 (8), 193 (14), 192 (11), 166 (10), 165 (38), 164 (11), 163 (8), 152 (14), 151 (12), 150 (9).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{17}\text{ClNO}$): calcd 286.0993, found 286.0994 (Δ = 0.18 ppm).

3-Ethyl-1-methyl-3-phenyl-6-(trifluoromethyl)indolin-2-one (2o)



The product was prepared from *N*-(2-fluoro-5-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylbutanamide (**1s**) according to the general procedure 4, using 2.0 equiv of $\text{KO}t\text{-Bu}$ and stirring the solution for 24 h at 80 $^\circ\text{C}$. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 20:1) yielding the title compound (77%) as a pale yellow solid.

Mp.: 69-71 $^\circ\text{C}$

^1H NMR (300 MHz, CDCl_3): δ = 7.36 (d, J = 7.7 Hz, 1H, CH-Ar), 7.29-7.18 (m, 6H, CH-Ar), 7.06 (s, 1H, CH-Ar), 3.22 (s, 1H, NCH_3), 2.41 (dq, J = 13.6, 7.3 Hz, 1H, CH_2), 2.21 (dq, J = 13.6, 7.3 Hz, 1H, CH_2), 0.64 (t, J = 7.3 Hz, 3H, CH_2CH_3).

^{13}C NMR (75 MHz, CDCl_3): δ = 178.5 (qC, CO), 150.6 (qC, CF_3), 144.9 (qC, C-Ar), 139.4 (qC, C-Ar), 136.3 (qC, C-Ar), 128.9 (CH-Ar), 127.8 (CH-Ar), 127.0 (CH-Ar), 125.1 (CH-Ar), 119.9 (CH-Ar), 105.1 (CH-Ar), 57.6 (qC, CCH_2Ph), 31.0 (CH_2), 26.7 (NCH_3), 9.2 (CH_2CH_3). CF_3 not detected.

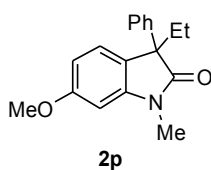
^{19}F NMR (282 MHz, CDCl_3): δ = -62.4.

IR (KBr): ν = 2966, 1713, 1623, 1455, 1318, 1156, 1117, 1056, 698, 668 cm^{-1} .

MS (EI): m/z (%) = 320 ($[\text{M}+\text{H}]^+$, 11), 319 ($[\text{M}]^+$, 55), 300 (4), 292 (6), 291 (37), 290 (100), 275 (8), 262 (11), 221 (13), 165 (12).

Elemental analysis calcd for $\text{C}_{18}\text{H}_{16}\text{NOF}_3$: C 67.70, H 5.05, N 4.39, found: C 68.09, H 5.10, N 4.40.

3-Ethyl-6-methoxy-1-methyl-3-phenylindolin-2-one (2p)



The product was prepared from *N*-(2-chloro-5-methoxyphenyl)-*N*-methyl-2-phenylbutanamide (**1t**) according to the general procedure 4, using 2.0 equiv of $\text{KO}t\text{-Bu}$ and stirring the solution for 24 h at 80 $^\circ\text{C}$. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 10:1) yielding the title compound (54%) as colorless oil.

^1H NMR (400 MHz, CDCl_3): δ = 7.38-7.35 (m, 2H, CH-Ar), 7.31-7.27 (m, 2H, CH-Ar), 7.32 (dddd, J = 6.1, 6.1, 1.4, 1.4 Hz, 1H, CH-Ar), 6.88-6.80 (m, 3H, CH-Ar), 3.80 (s, 3H, OCH_3), 3.21 (s, 3H,

NCH₃), 2.44 (dq, $J = 13.5, 7.3$ Hz, 1H, CH₂), 2.21 (dq, $J = 13.5, 7.3$ Hz, 1H, CH₂), 0.69 (t, $J = 7.3$ Hz, 3H, CH₂CH₃).

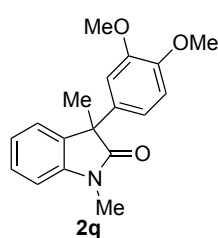
¹³C NMR (100 MHz, CDCl₃): $\delta = 178.4$ (qC, CO), 156.2 (qC, C-Ar), 140.4 (qC, C-Ar), 137.9 (qC, C-Ar), 133.7 (qC, C-Ar), 128.7 (CH-Ar), 127.4 (CH-Ar), 127.1 (CH-Ar), 112.44 (CH-Ar), 112.36 (CH-Ar), 108.6 (CH-Ar), 58.0 (qC, CCH₂Ph), 56.0 (OCH₃), 30.9 (CH₂), 26.4 (NCH₃), 9.2 (CH₂CH₃).

IR (KBr): $\nu = 2965, 2935, 1708, 1496, 1465$ cm⁻¹.

MS (EI): m/z (%) = 283 (2), 282 ([M+H]⁺, 20), 281 ([M]⁺, 100), 253 (21), 252 (89), 221 (7), 209 (9), 181 (7), 180 (11).

HRMS (ESI, MeOH) (C₁₈H₁₉NO₂): calcd 281.1410, found 281.1412 ($\Delta = 0.46$ ppm).

3-(3,4-Dimethoxyphenyl)-1,3-dimethylindolin-2-one (2q)



The product was prepared from 2-(3,4-dimethoxyphenyl)-*N*-(2-fluorophenyl)-*N*-methylpropanamide (**1u**) according to the general procedure 4, using 1.5 equiv of KO*t*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by after column chromatography (*n*-pentane/ethyl acetate 8:2 to 7:3) yielding the title compound (76%) as a slightly yellow oil.

¹H NMR (300 MHz, CDCl₃): $\delta = 7.32$ (ddd, $J = 7.6, 7.6, 1.2$ Hz, 1H, CH-Ar), 7.22 (dd, $J = 7.4, 1.4$ Hz, 1H, CH-Ar), 7.10 (ddd, $J = 7.5, 7.5, 0.8$ Hz, 1H, CH-Ar), 6.92-6.90 (m, 2H, CH-Ar), 6.83-6.74 (m, 2H, CH-Ar), 3.82 (s, 6H, OCH₃), 3.23 (s, 3H, NCH₃), 1.76 (s, 3H, CCH₃).

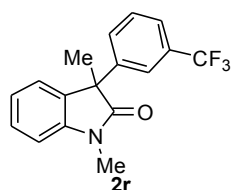
¹³C NMR (75 MHz, CDCl₃): $\delta = 179.6$ (qC, CO), 149.0 (qC, C-Ar), 148.4 (qC, C-Ar), 143.3 (qC, C-Ar), 134.7 (qC, C-Ar), 133.4 (qC, C-Ar), 128.2 (CH-Ar), 124.3 (CH-Ar), 122.8 (CH-Ar), 119.1 (CH-Ar), 111.0 (CH-Ar), 110.4 (CH-Ar), 108.4 (CH-Ar), 55.6 (OCH₃), 56.0 (OCH₃), 51.8 (qC, CCH₃), 26.6 (NCH₃), 24.4 (CCH₃).

IR (neat): $\nu = 3449, 2959, 2311, 2087, 1741, 1366, 1218$ cm⁻¹.

MS (EI): m/z (%) = 299 (3), 298 ([M+H]⁺, 16), 297 ([M]⁺, 92), 283 (19), 282 (100), 254 (5).

HRMS (ESI, MeOH) (C₁₈H₁₉NO₃Na): calcd 320.1257, found 320.1257 ($\Delta = -0.14$ ppm).

1,3-Dimethyl-3-[3-(trifluoromethyl)phenyl]indolin-2-one (2r)



The product was prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-[3-(trifluoromethyl)-phenyl]propanamide (**1v**) according to the general procedure 4, using 1.5 equiv of KO*t*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (86%) as a white solid.

Mp.: 104-105 °C

¹H NMR (300 MHz, CDCl₃): $\delta = 7.60$ (br.s, 1H, CH-Ar), 7.53-7.50 (m, 2H, CH-Ar), 7.44-7.41 (m, 1H, CH-Ar), 7.36 (ddd, $J = 7.4, 7.4, 1.5$ Hz, 1H, CH-Ar), 7.21-7.18 (m, 1H, CH-Ar), 7.15-7.11 (m, 1H, CH-Ar), 6.96 (d, $J = 8.1$ Hz, 1H, CH-Ar), 3.26 (s, 3H, CCH₃).

¹³C NMR (75 MHz, CDCl₃): $\delta = 178.9$ (qC, CO), 143.4 (qC, C-Ar), 142.0 (qC, C-Ar), 134.0 (qC, C-Ar), 132.0 (q, $J = 32.1$ Hz, CCF₃), 130.6 (CH-Ar), 124.2 (q, $J = 272.5$ Hz, CF₃), 129.2 (CH-Ar), 128.7

(CH-Ar), 124.34 (q, $J = 5.1$ Hz, CH-ArCF₃) 124.33 (CH-Ar), 123.6 (q, $J = 3.9$ Hz, CH-ArCF₃), 123.2 (CH-Ar), 108.8 (CH-Ar), 52.2 (qC, CCH₃), 26.7 (NCH₃), 24.2 (CCH₃).

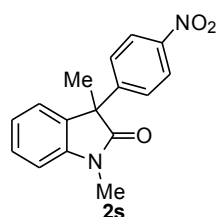
¹⁹F NMR (282 MHz, CDCl₃): $\delta = -62.5$.

IR (KBr): $\nu = 1700, 1608, 1323, 1117, 1063, 747$ cm⁻¹.

MS (EI): m/z (%) = 307 (2), 306 ([M+H]⁺, 21), 305 ([M]⁺, 100), 291 (18), 290 (96), 262 (8).

HRMS (ESI, MeOH) (C₁₇H₁₄NOF₃Na): calcd 328.0920, found 328.0920 ($\Delta = 0.03$ ppm).

1,3-Dimethyl-3-(4-nitrophenyl)indolin-2-one (2s)



The product was prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-(4-nitrophenyl)propanamide (**1w**) according to the general procedure 4, using 1.5 equiv of KO*t*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the title compound (29%) as a slightly beige solid.

Mp.: 172-174 °C (Lit.¹⁰ 175-176 °C)

¹H NMR (600 MHz, CDCl₃): $\delta = 8.15$ -8.13 (m, 2H, CH-Ar), 7.51-7.48 (m, 2H, CH-Ar), 7.38 (ddd, $J = 7.7, 7.7, 1.3$ Hz, 1H, CH-Ar), 7.18 (dd, $J = 7.4, 1.2$ Hz, 1H, CH-Ar), 7.14 (ddd, $J = 7.5, 7.5, 0.9$ Hz, 1H, CH-Ar), 6.96 (d, $J = 7.8$ Hz, 1H, CH-Ar), 3.26 (s, 3H, NCH₃), 1.82 (s, 3H, CCH₃).

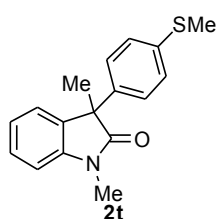
¹³C NMR (151 MHz, CDCl₃): $\delta = 178.3$ (qC, CO), 148.3 (qC, C-Ar), 147.3 (qC, C-Ar), 143.4 (qC, C-Ar), 133.6 (qC, C-Ar), 129.1 (CH-Ar), 128.1 (CH-Ar), 124.4 (CH-Ar), 123.9 (CH-Ar), 123.4 (CH-Ar), 109.0 (CH-Ar), 52.5 (qC, CCH₃), 26.9 (NCH₃), 24.2 (CCH₃).

IR (KBr): $\nu = 2929, 1699, 1605, 1511, 1339, 1092, 751, 697$ cm⁻¹.

MS (EI): m/z (%) = 284 (4), 283 ([M+H]⁺, 18), 282 ([M]⁺, 100), 268 (11), 267 (69), 221 (11), 206 (6), 193 (5), 192 (4), 160 (6).

HRMS (ESI, MeOH) (C₁₆H₁₄N₂O₃Na): calcd 305.0897, found 309.0897 ($\Delta = 0.09$ ppm).

1,3-Dimethyl-3-[4-(methylthio)phenyl]indolin-2-one (2t)



The product was prepared from *N*-(2-fluorophenyl)-*N*-methyl-2-(4-methylthiophenyl)propanamide (**1x**) according to the general procedure 4, using 1.5 equiv of KO*t*-Bu and stirring the solution for 16 h at 80 °C. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1 to 8:2) yielding the title compound (82%) as a white solid.

Mp.: 119-120 °C

¹H NMR (300 MHz, CDCl₃): $\delta = 7.22$ (ddd, $J = 7.6, 7.6, 1.4$ Hz, 1H, CH-Ar), 7.15-7.06 (m, 5H, CH-Ar), 6.99 (ddd, $J = 7.5, 7.5, 0.9$ Hz, 1H, CH-Ar), 6.81 (d, $J = 7.8$ Hz, 1H, CH-Ar), 3.12 (s, 3H, NCH₃), 2.32 (s, 3H, SCH₃), 1.66 (s, 3H, CCH₃).

¹⁰ Makosza, M. *Polish J. Chem.* **1978**, 52, 1173.

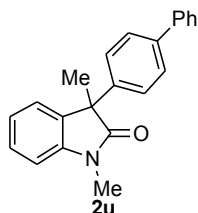
^{13}C NMR (75 MHz, CDCl_3): δ = 179.4 (qC, CO), 143.3 (qC, C-Ar), 137.8 (qC, C-Ar), 137.5 (qC, C-Ar), 134.6 (qC, C-Ar), 128.3 (CH-Ar), 127.2 (CH-Ar), 126.8 (CH-Ar), 124.2 (CH-Ar), 122.9 (CH-Ar), 108.5 (CH-Ar), 51.8 (qC, CCH_3), 26.6 (NCH_3), 23.8 (SCH_3), 15.9 (CCH_3).

IR (KBr): ν = 2986, 2934, 2007, 1703, 1610, 1329, 1127, 751 cm^{-1} .

MS (EI): m/z (%) = 284 ($[\text{M}+\text{H}]^+$, 1), 283 ($[\text{M}]^+$, 5), 268 (6), 87 (11), 85 (67), 84 (3), 83 (100), 47 (16).

HRMS (ESI, MeOH) ($\text{C}_{17}\text{H}_{18}\text{NOS}$): calcd 284.1104, found 284.1103 (Δ = -0.25 ppm).

3-(Biphenyl-4-yl)-1,3-dimethylindolin-2-one (2u)



The product was prepared from 2-(biphenyl-4-yl)-*N*-(2-fluorophenyl)-*N*-methylpropanamide (**1y**) according to the general procedure 4, using 2.0 equiv of $\text{KO}t\text{-Bu}$ and stirring the solution for 20 h at 80 $^\circ\text{C}$. The purification was performed by column chromatography (*n*-pentane/ethyl acetate 9:1) yielding the title compound (91%) as a slightly yellow sirup.

^1H NMR (600 MHz, CDCl_3): δ = 7.59-7.56 (m, 4H, CH-Ar), 7.46-7.43 (m, 4H, CH-Ar), 7.39-7.35 (m, 2H, CH-Ar), 7.28 (d, J = 7.3 Hz, 1H, CH-Ar), 7.16 (dd, J = 7.5, 7.5 Hz, 1H, CH-Ar), 6.96 (d, J = 7.9 Hz, 1H, CH-Ar), 3.29 (s, 3H, NCH_3), 1.87 (s, 3H, CCH_3).

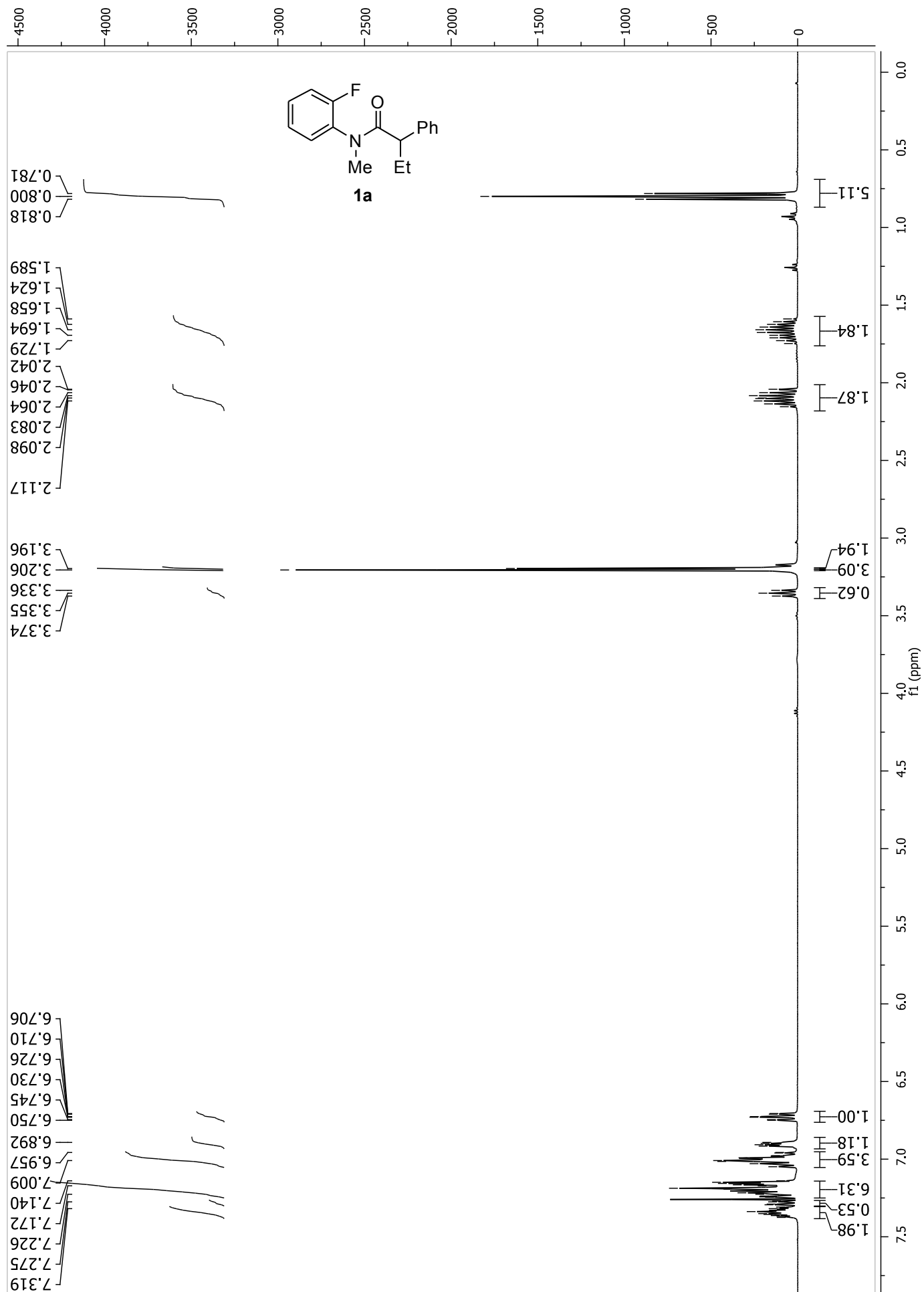
^{13}C NMR (155 MHz, CDCl_3): δ = 179.5 (qC, CO), 143.4 (qC, C-Ar), 140.8 (qC, C-Ar), 140.3 (qC, C-Ar), 140.0 (qC, C-Ar), 134.8 (qC, C-Ar), 128.9 (CH-Ar), 128.3 (CH-Ar), 127.4 (CH-Ar), 127.22 (CH-Ar), 127.18 (CH-Ar), 124.4 (CH-Ar), 123.0 (CH-Ar), 108.5 (CH-Ar), 52.1 (qC, CCH_3), 26.6 (NCH_3), 24.0 (CCH_3). 1 signal corresponding to a CH-Ar is overlaped.

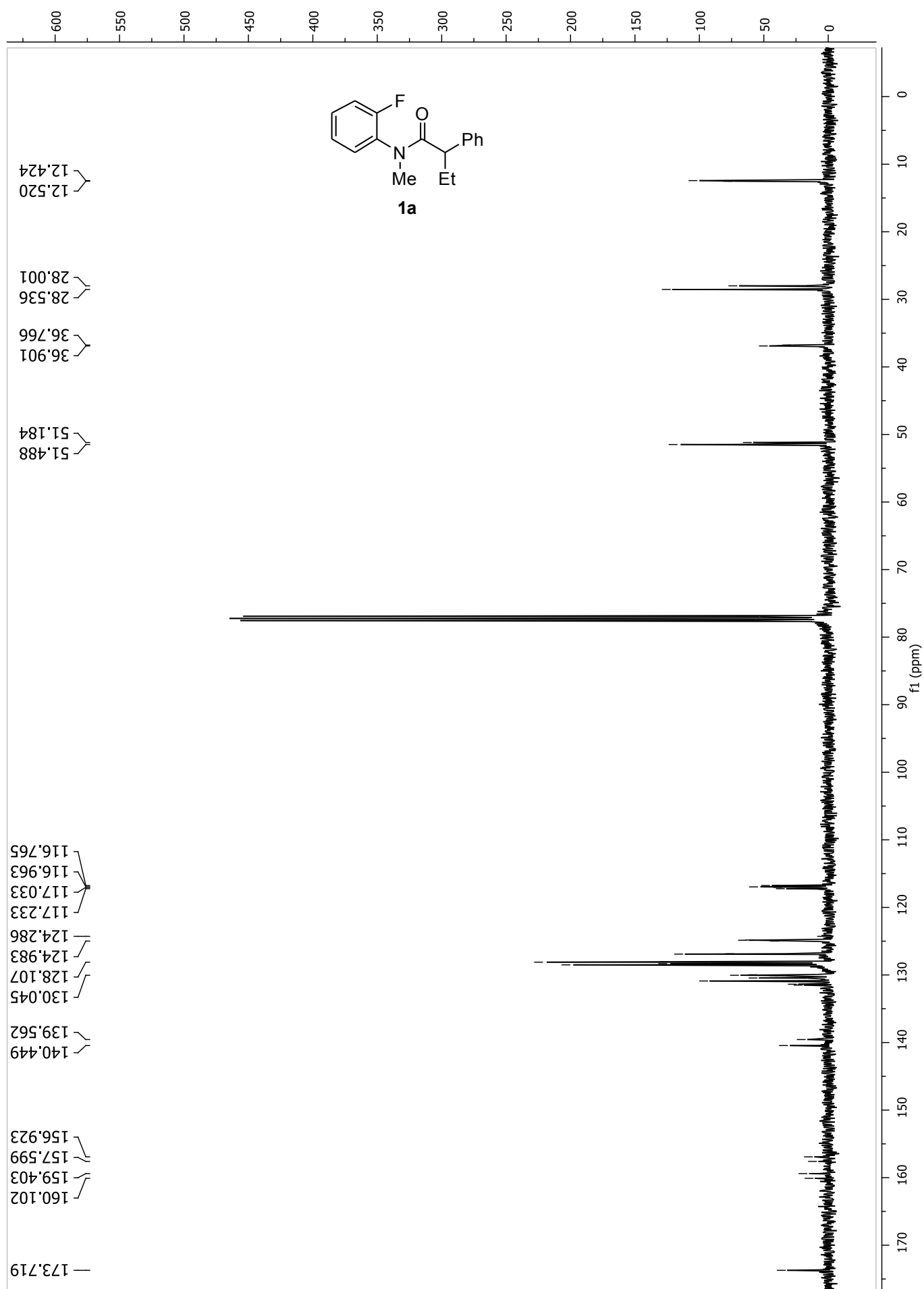
IR (CHCl_3): ν = 3051, 2970, 2931, 1709, 1607, 1479, 1344, 748, 693 cm^{-1} .

MS (EI): m/z (%) = 315 (4), 314 ($[\text{M}+\text{H}]^+$, 25), 313 ($[\text{M}]^+$, 96), 299 (26), 298 (100), 270 (12), 269 (5), 149 (10).

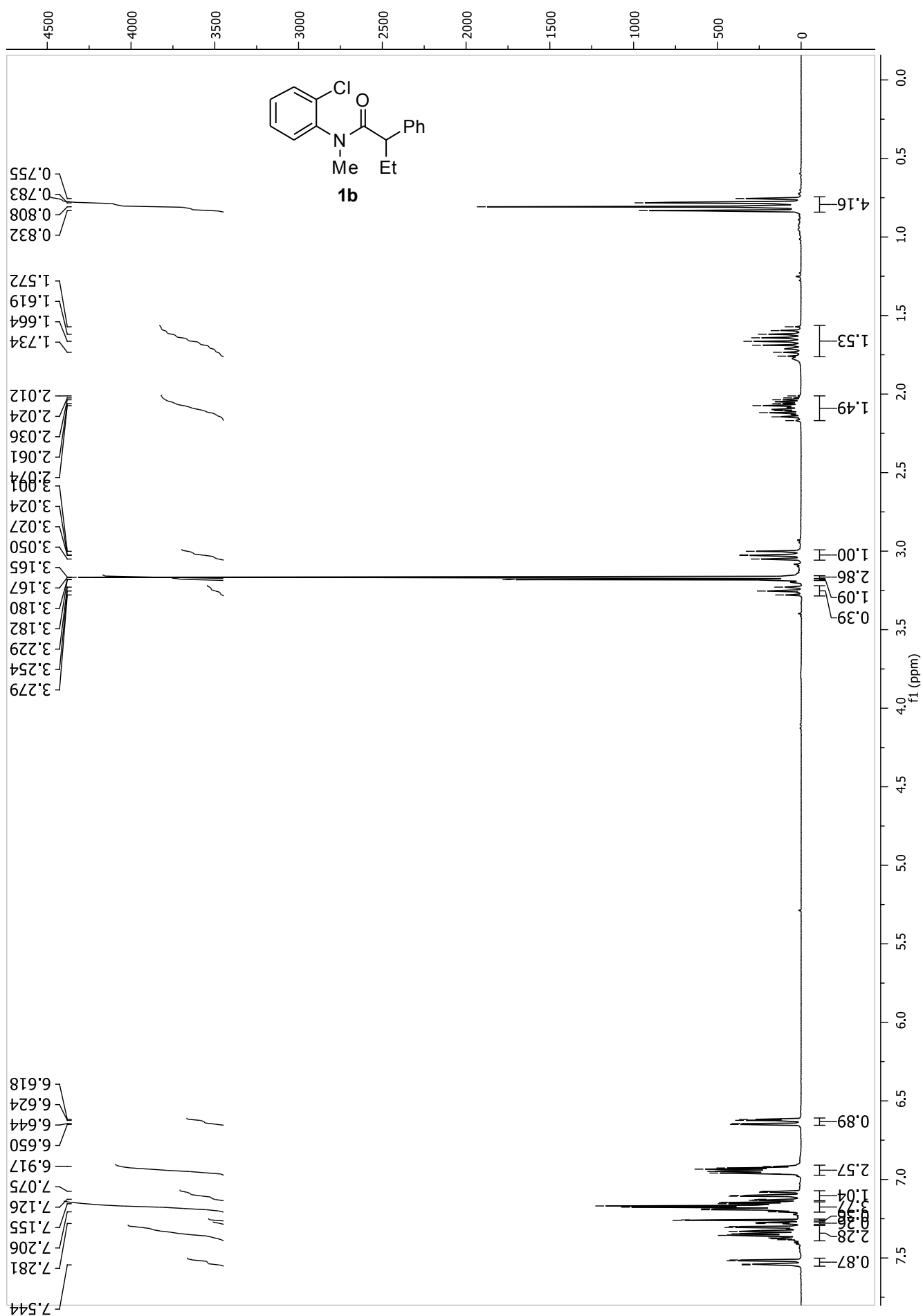
HRMS (ESI, MeOH) ($\text{C}_{22}\text{H}_{20}\text{NO}$): calcd 314.1539 found 314.1539 (Δ = -0.13 ppm).

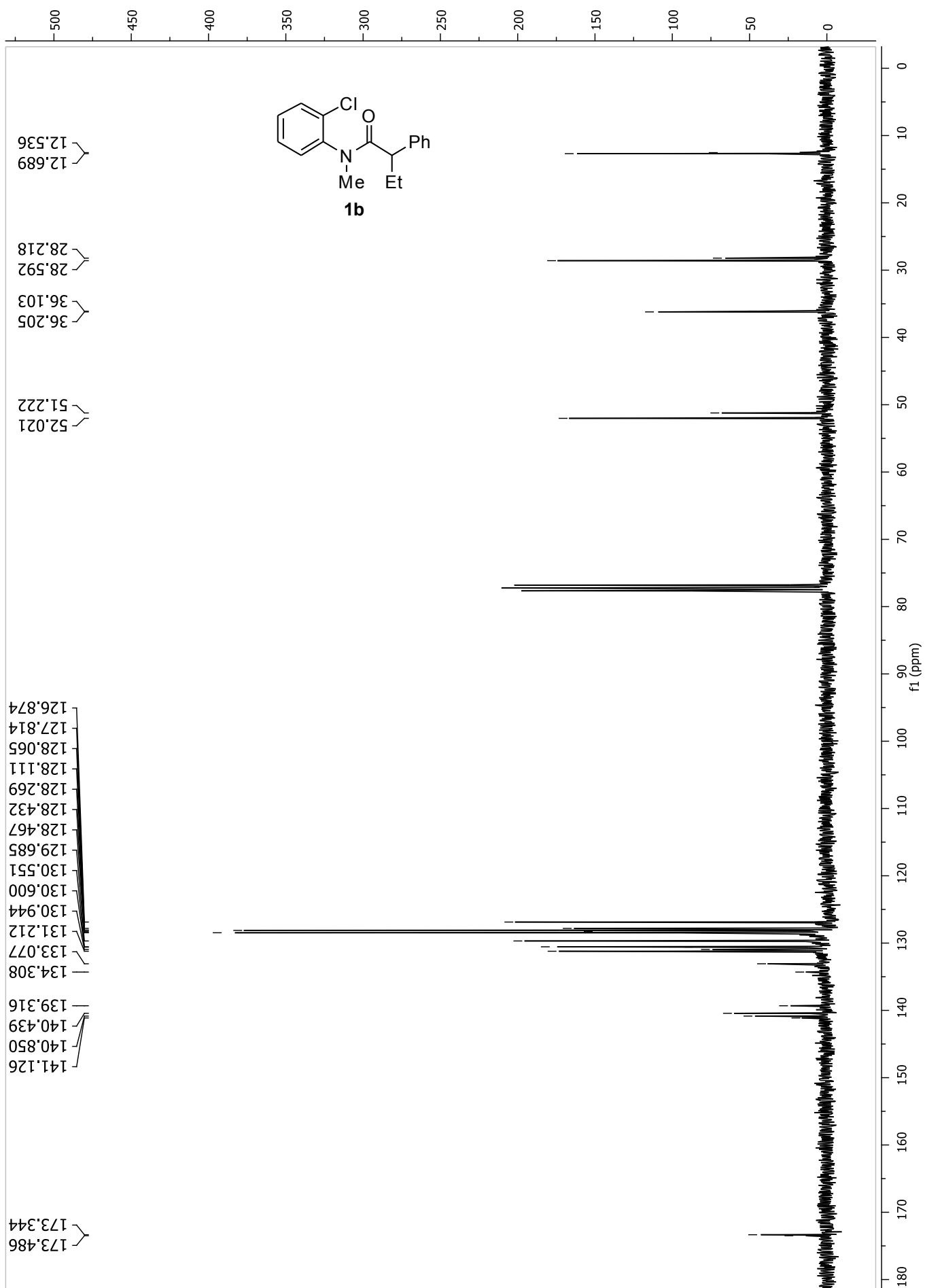
Copies of ^1H and ^{13}C NMR spectra

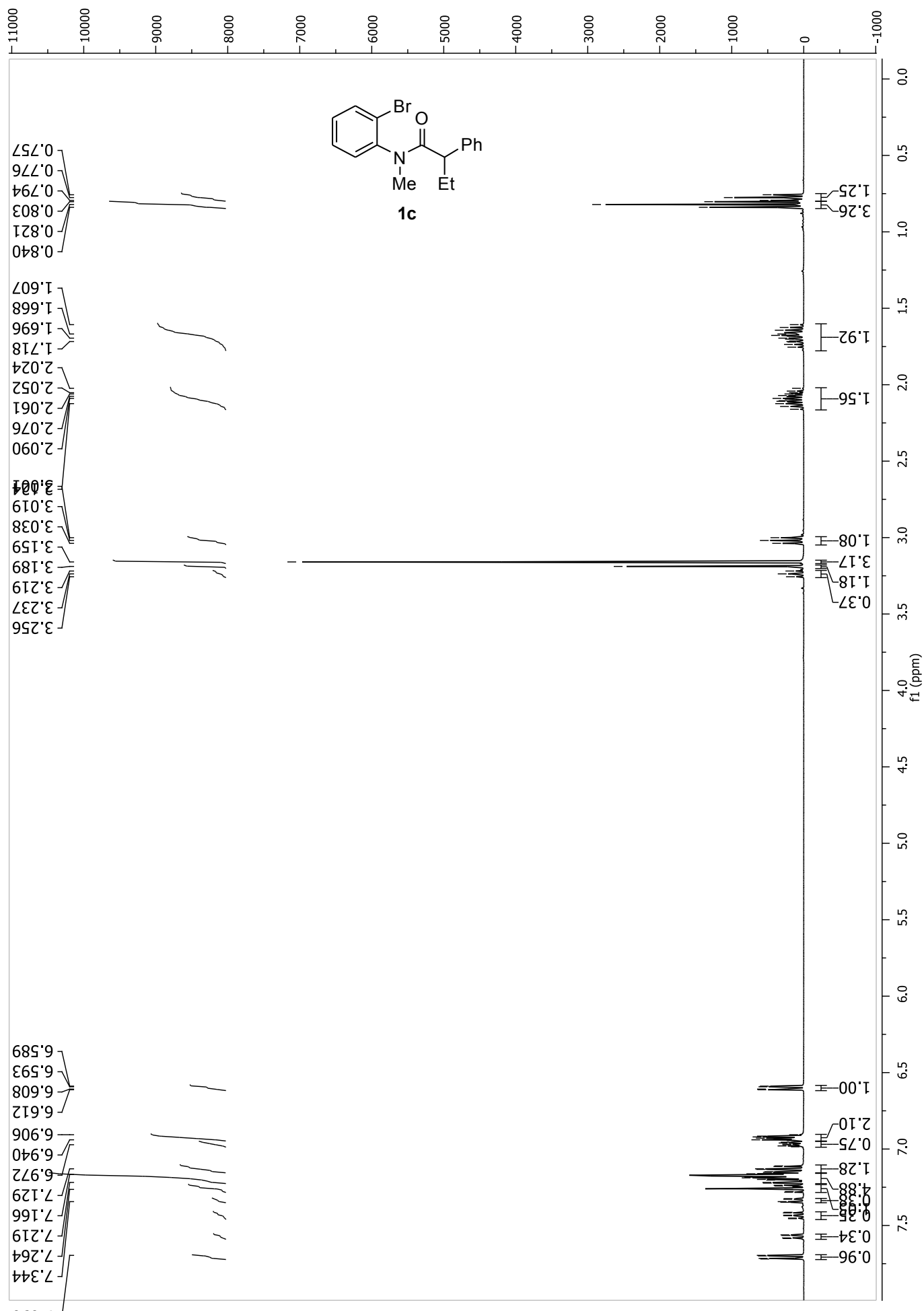
***N*-(2-Fluorophenyl)-*N*-methyl-2-phenylbutanamide (1a): ^1H NMR spectra:**

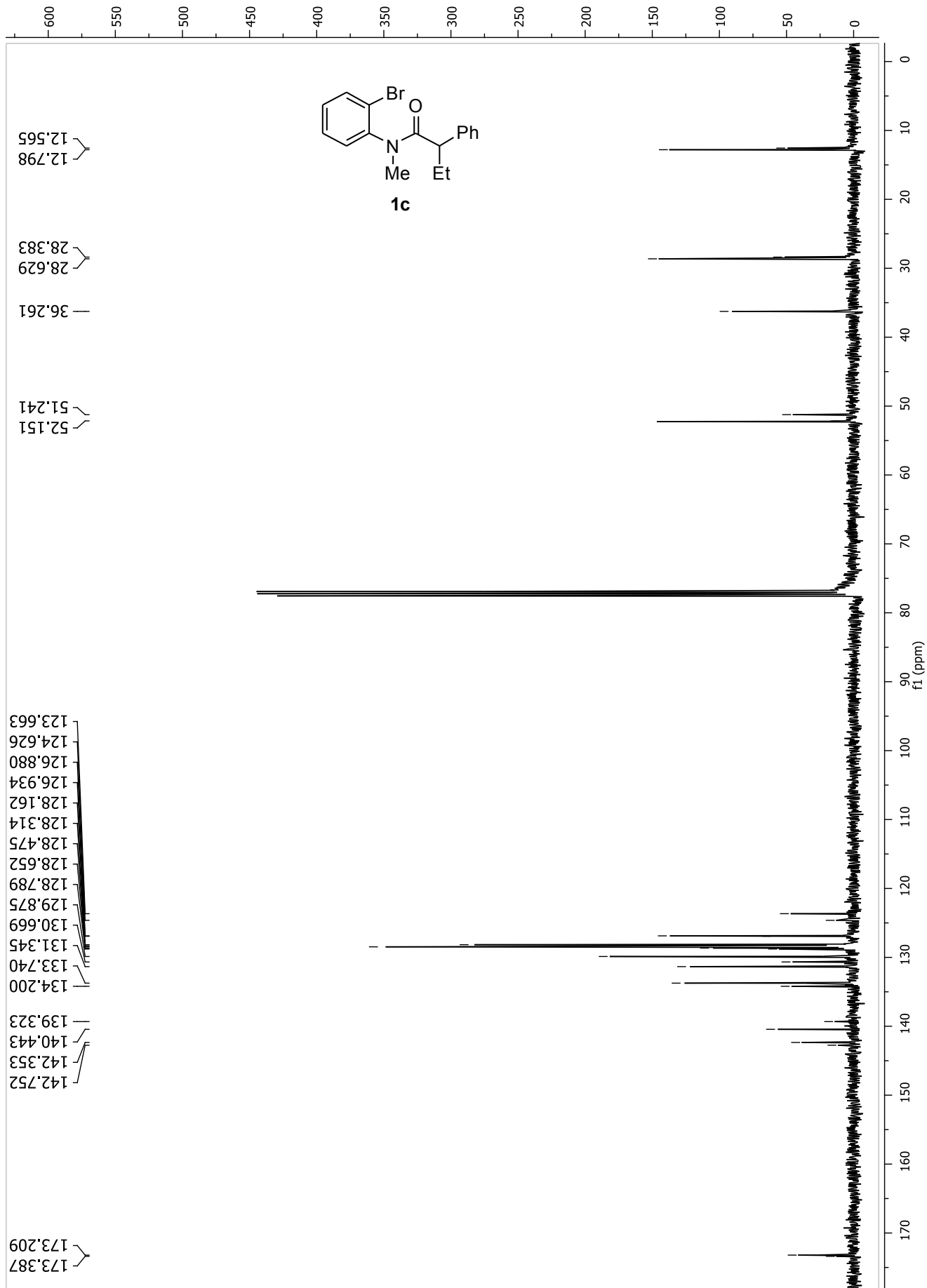
¹³C NMR spectra:

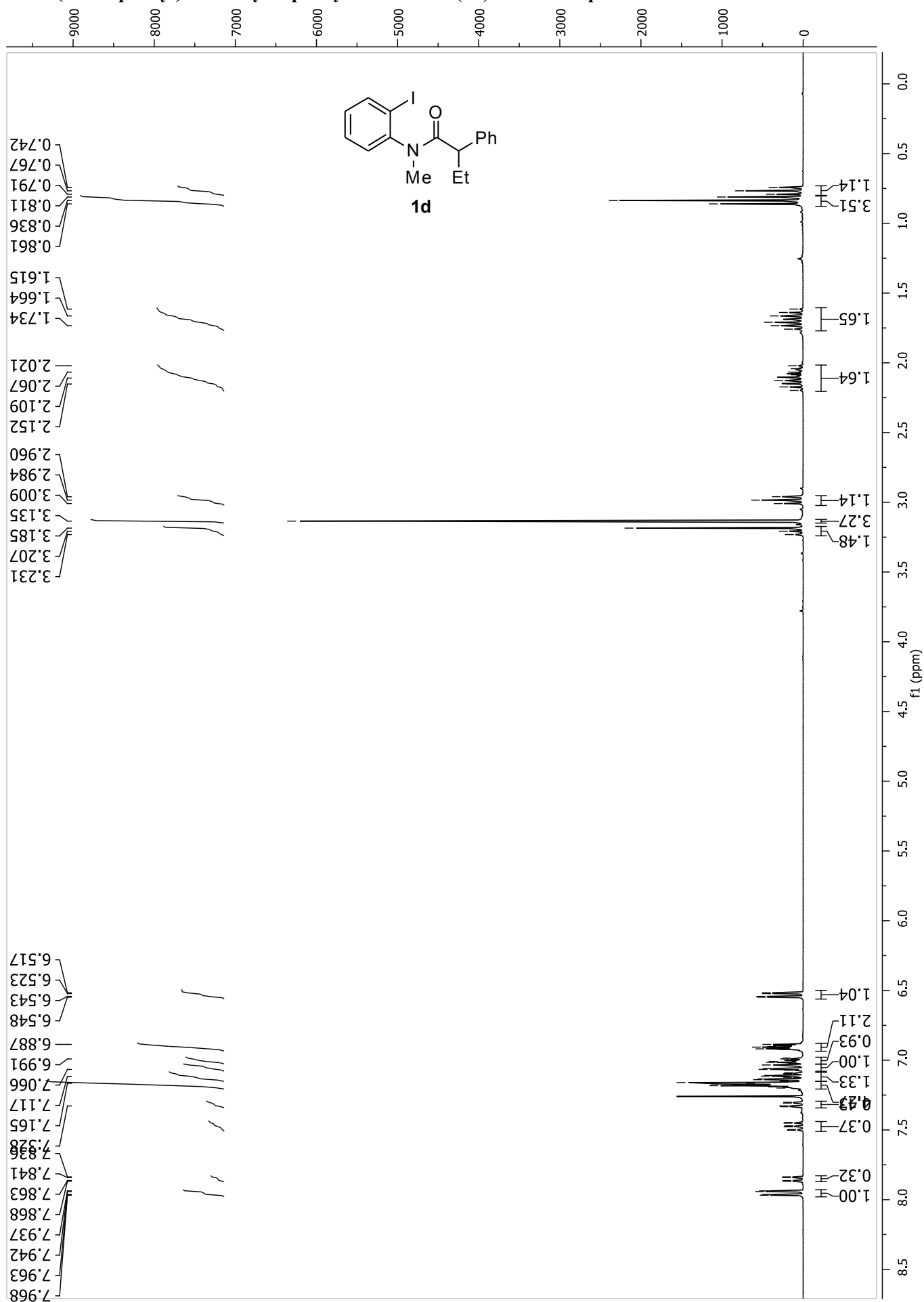
***N*-(2-Chlorophenyl)-*N*-methyl-2-phenylbutanamide (1b): ^1H NMR spectra:**

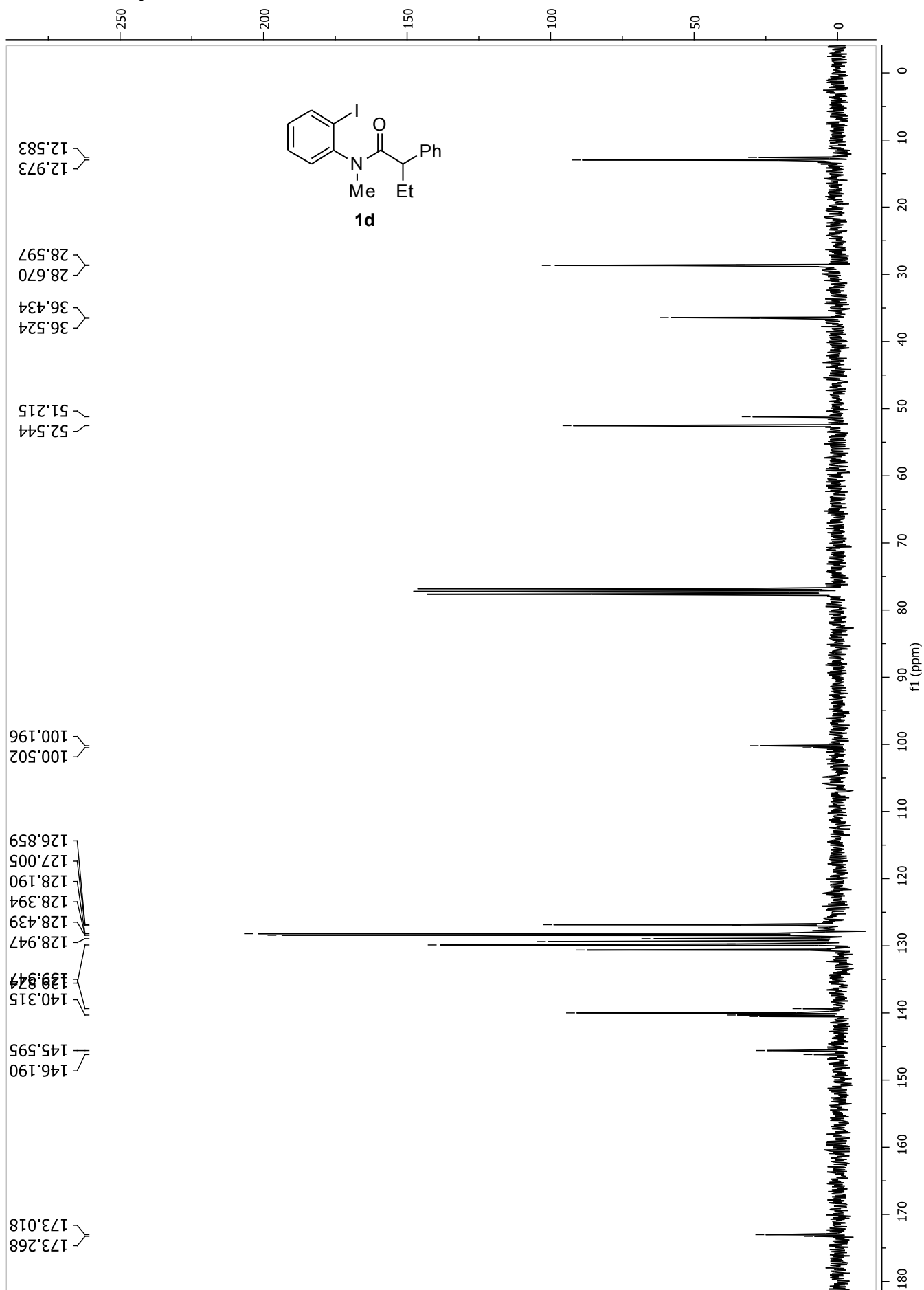


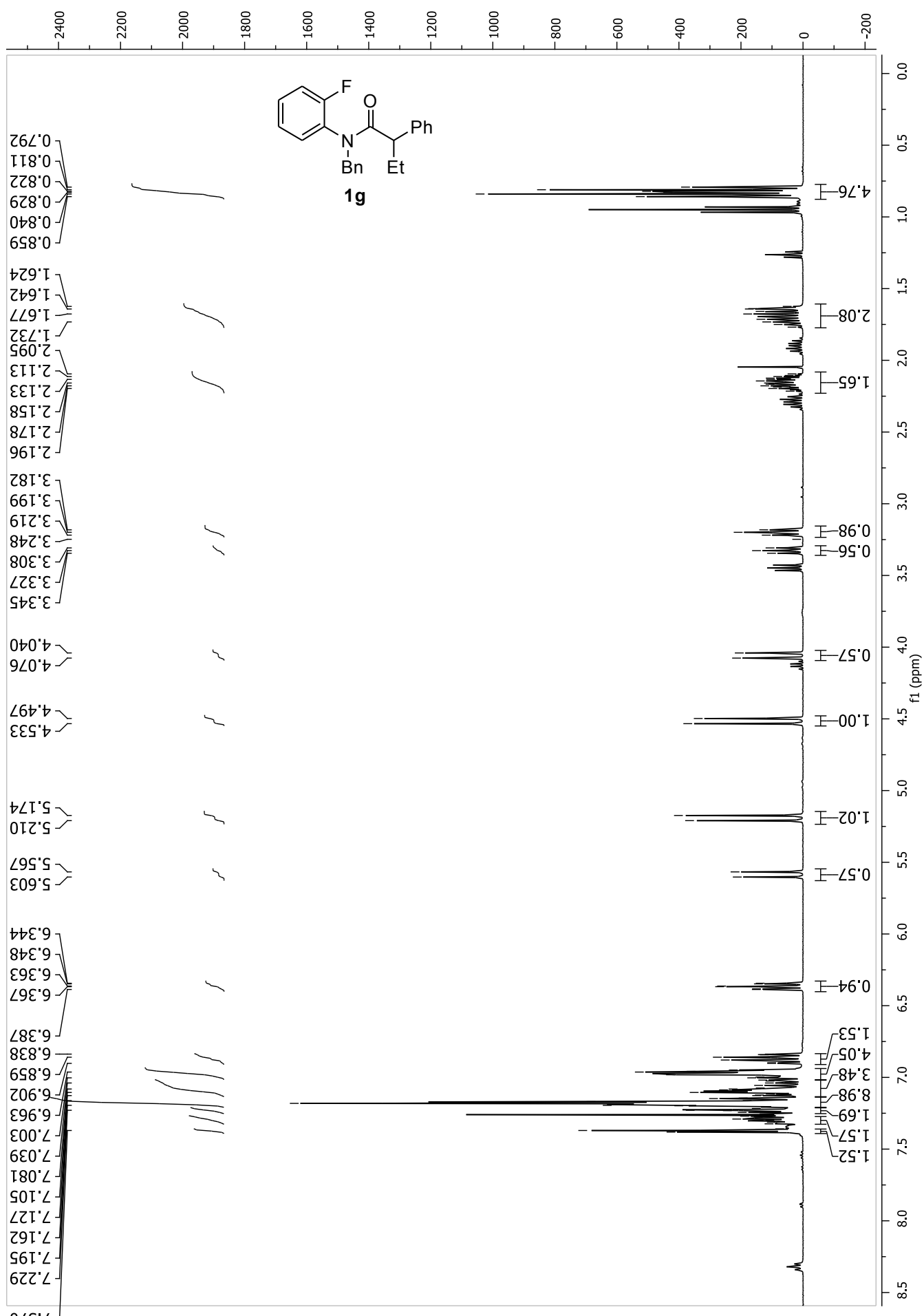
¹³C NMR spectra:

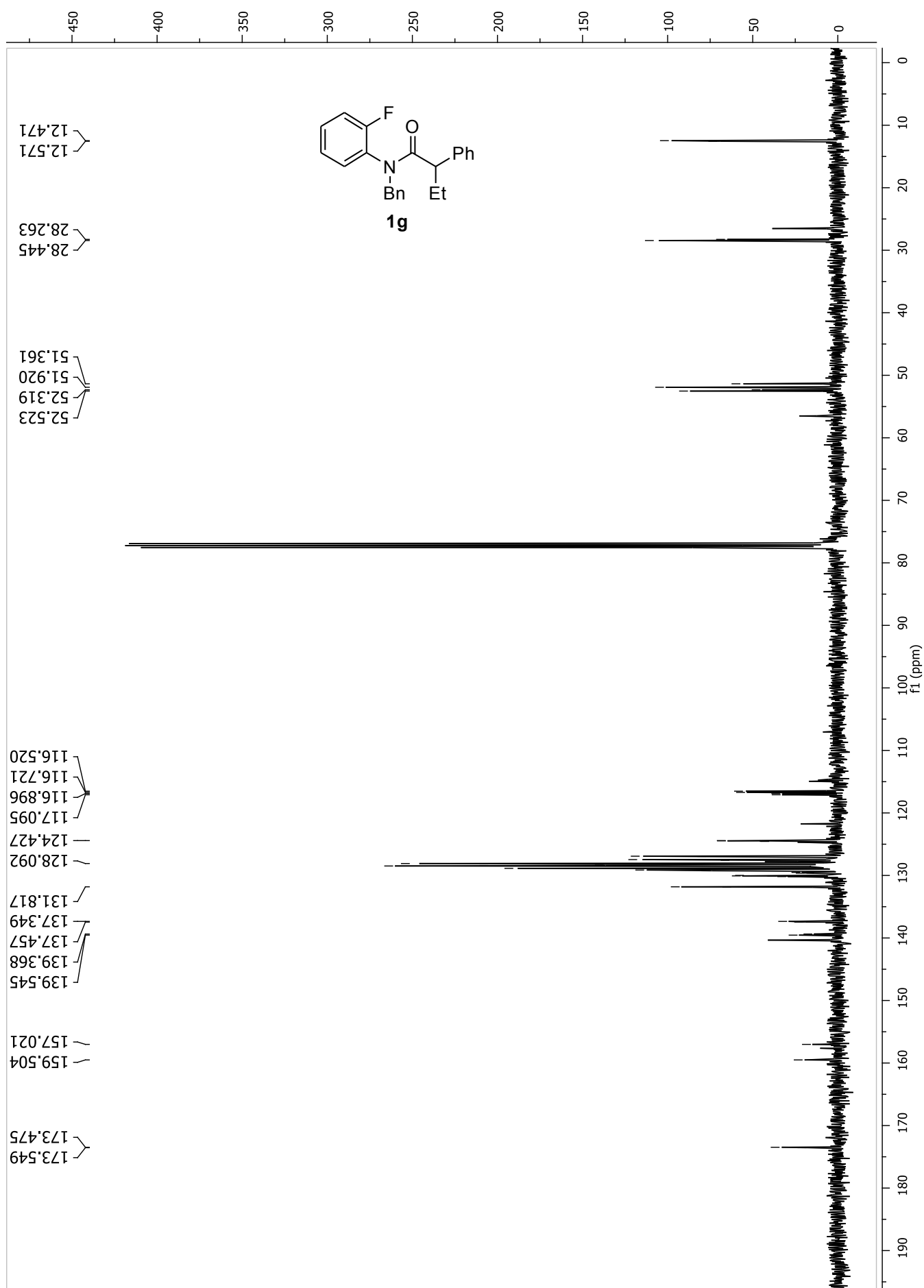
***N*-(2-Bromophenyl)-*N*-methyl-2-phenylbutanamide (1c): ^1H NMR spectra:**

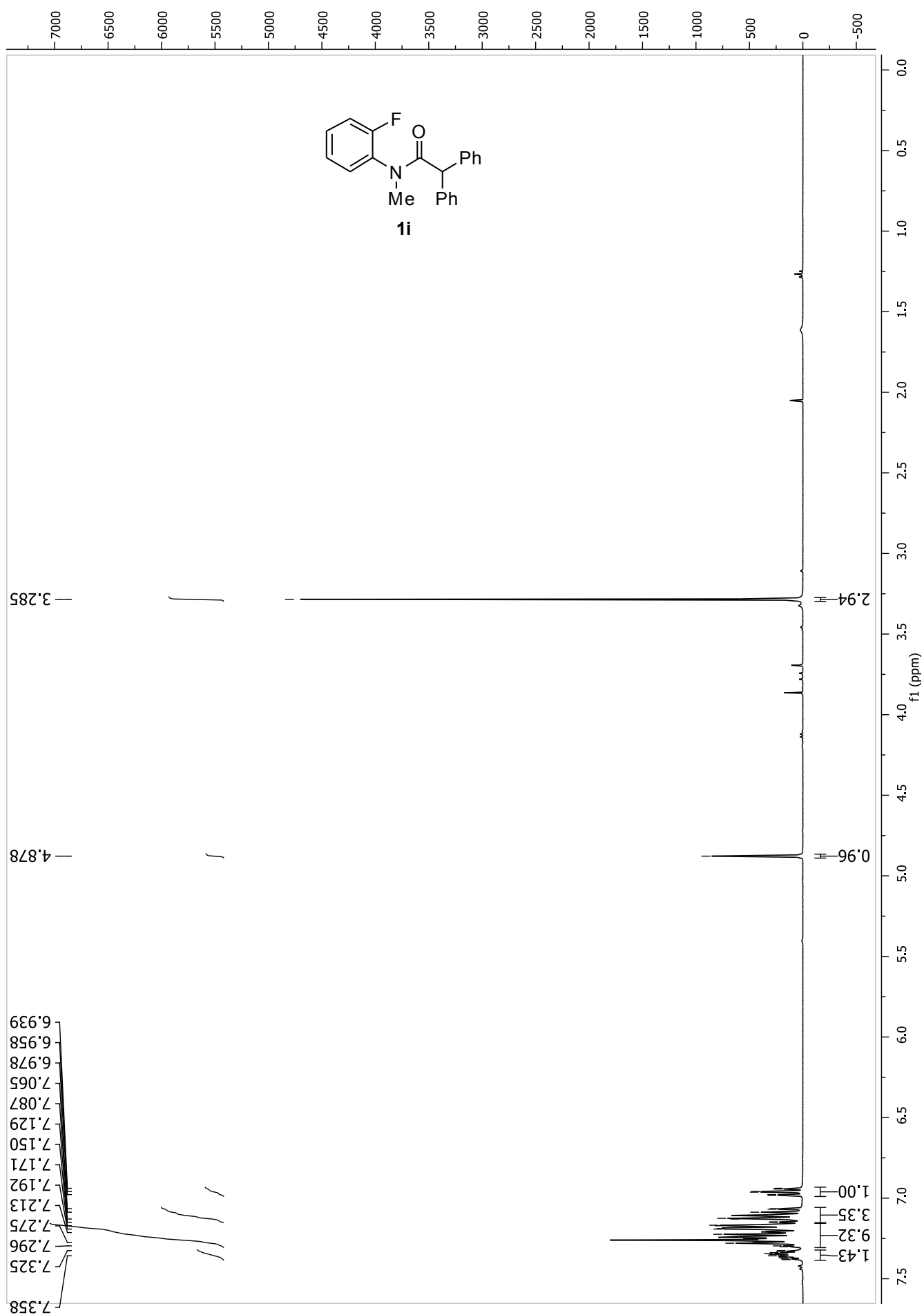
¹³C NMR spectra:

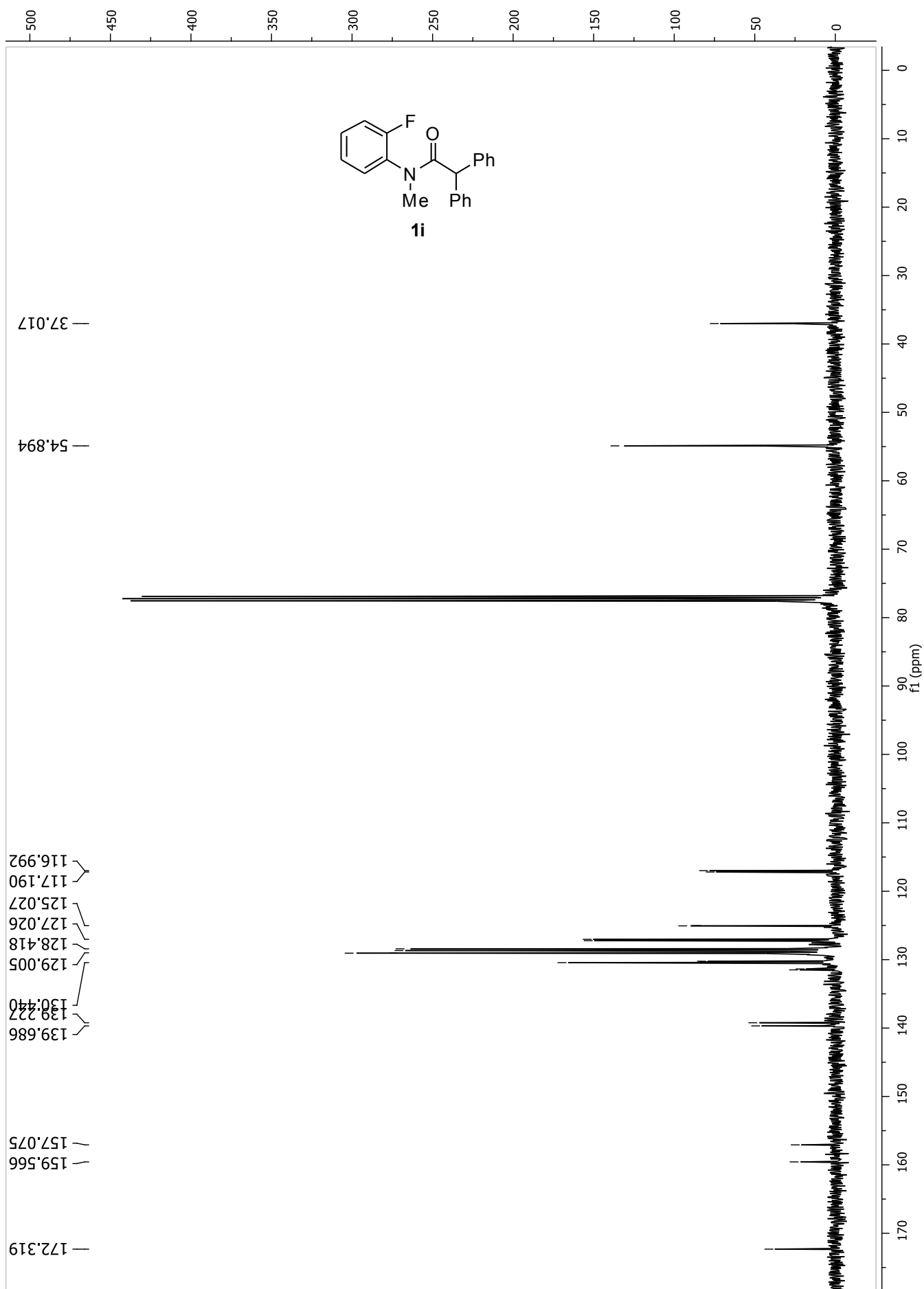
***N*-(2-Iodophenyl)-*N*-methyl-2-phenylbutanamide (1d): ¹H NMR spectra:**

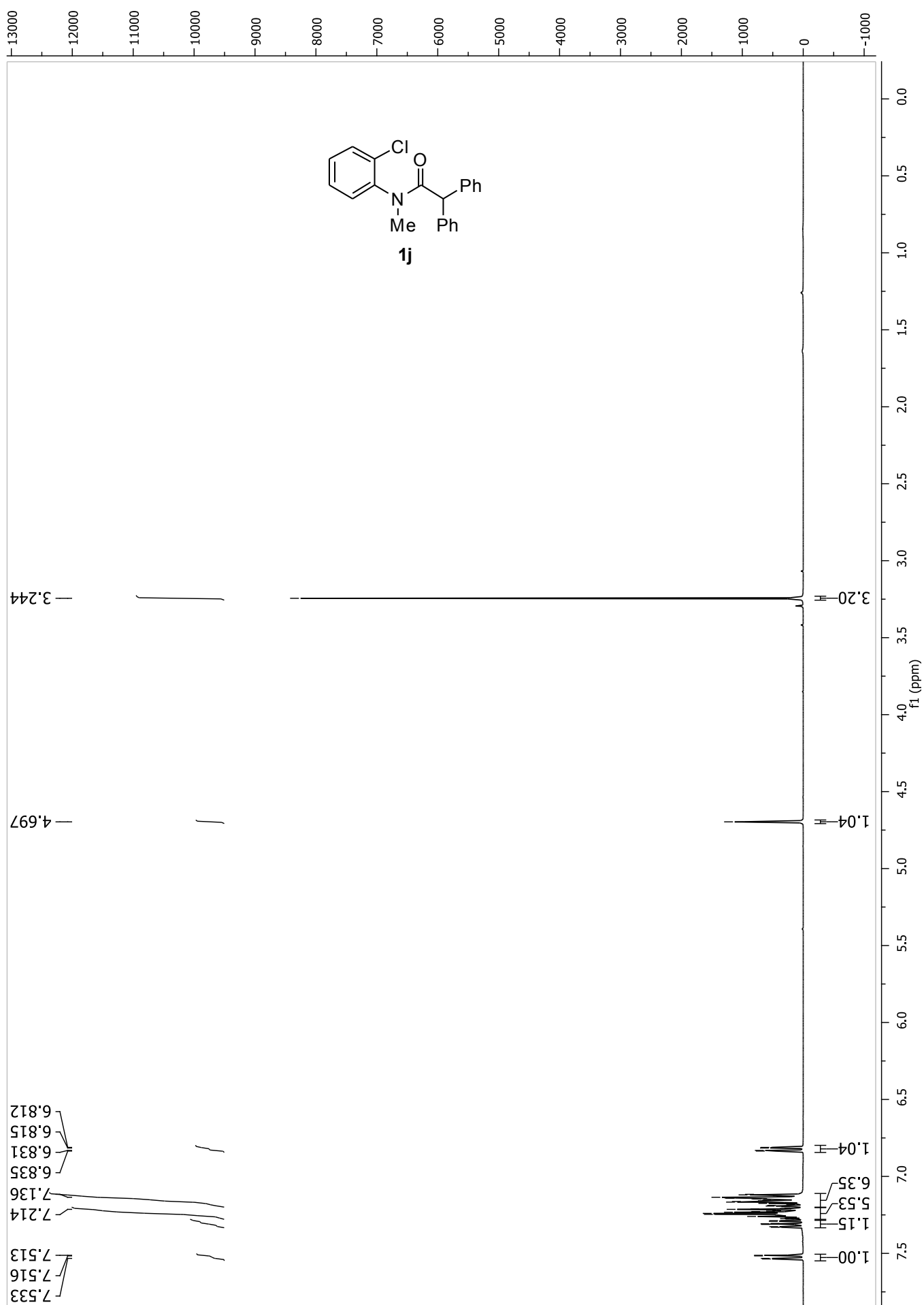
¹³C NMR spectra:

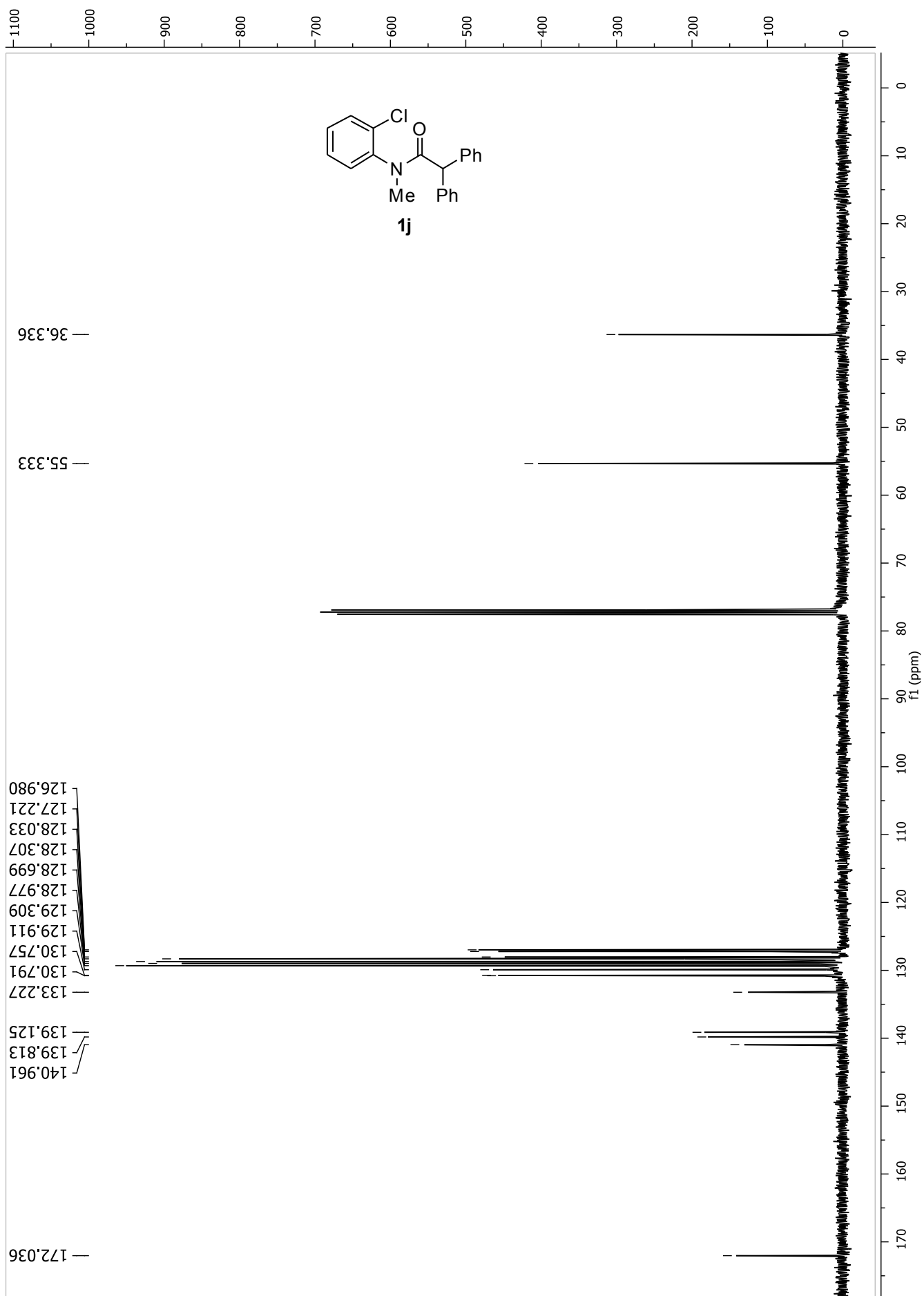
***N*-Benzyl-*N*-(2-fluorophenyl)-2-phenylbutanamide (1g): ^1H NMR spectra:**

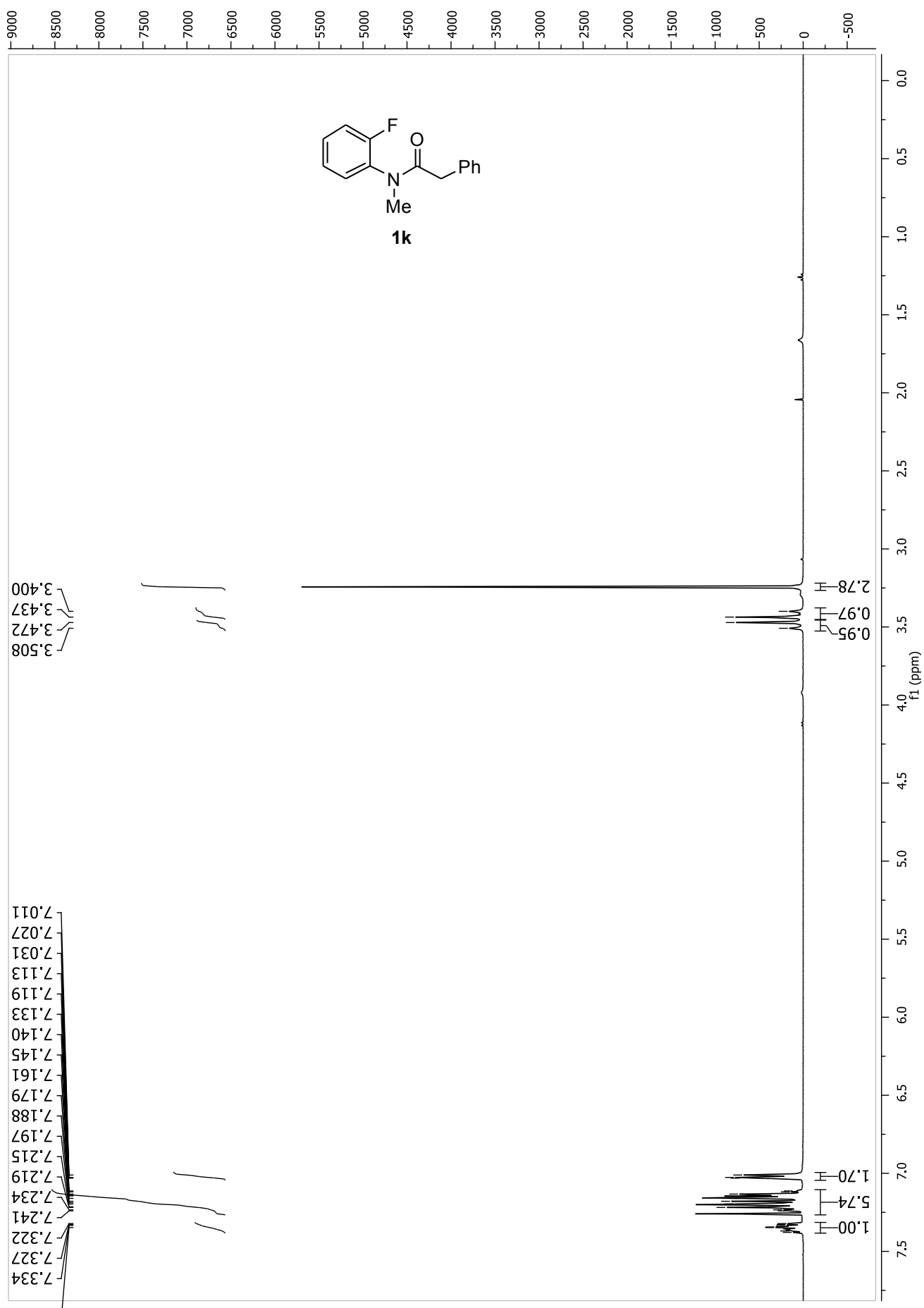
¹³C NMR spectra:

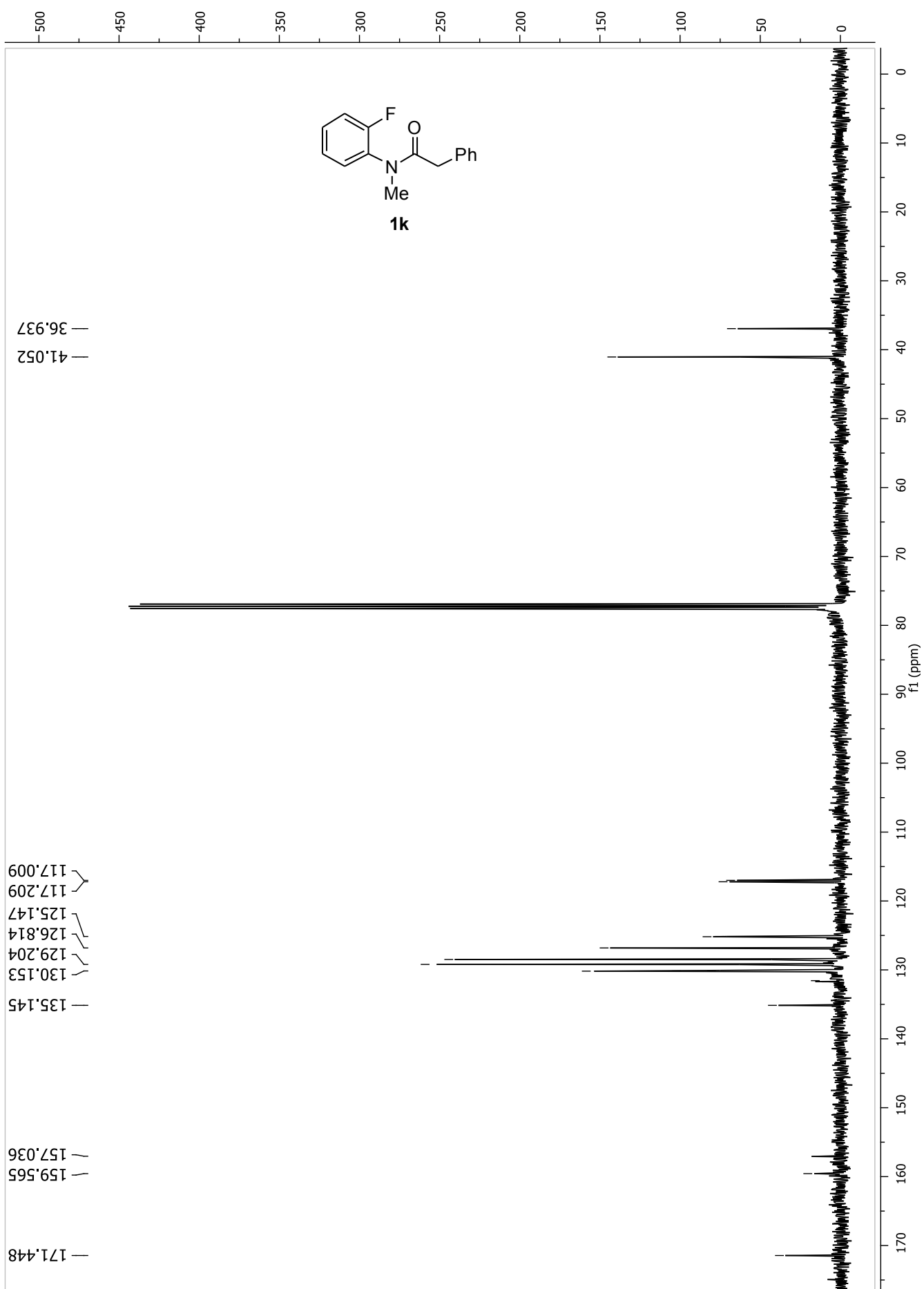
***N*-(2-Fluorophenyl)-*N*-methyl-2,2-diphenylacetamide (1i): ^1H NMR spectra:**

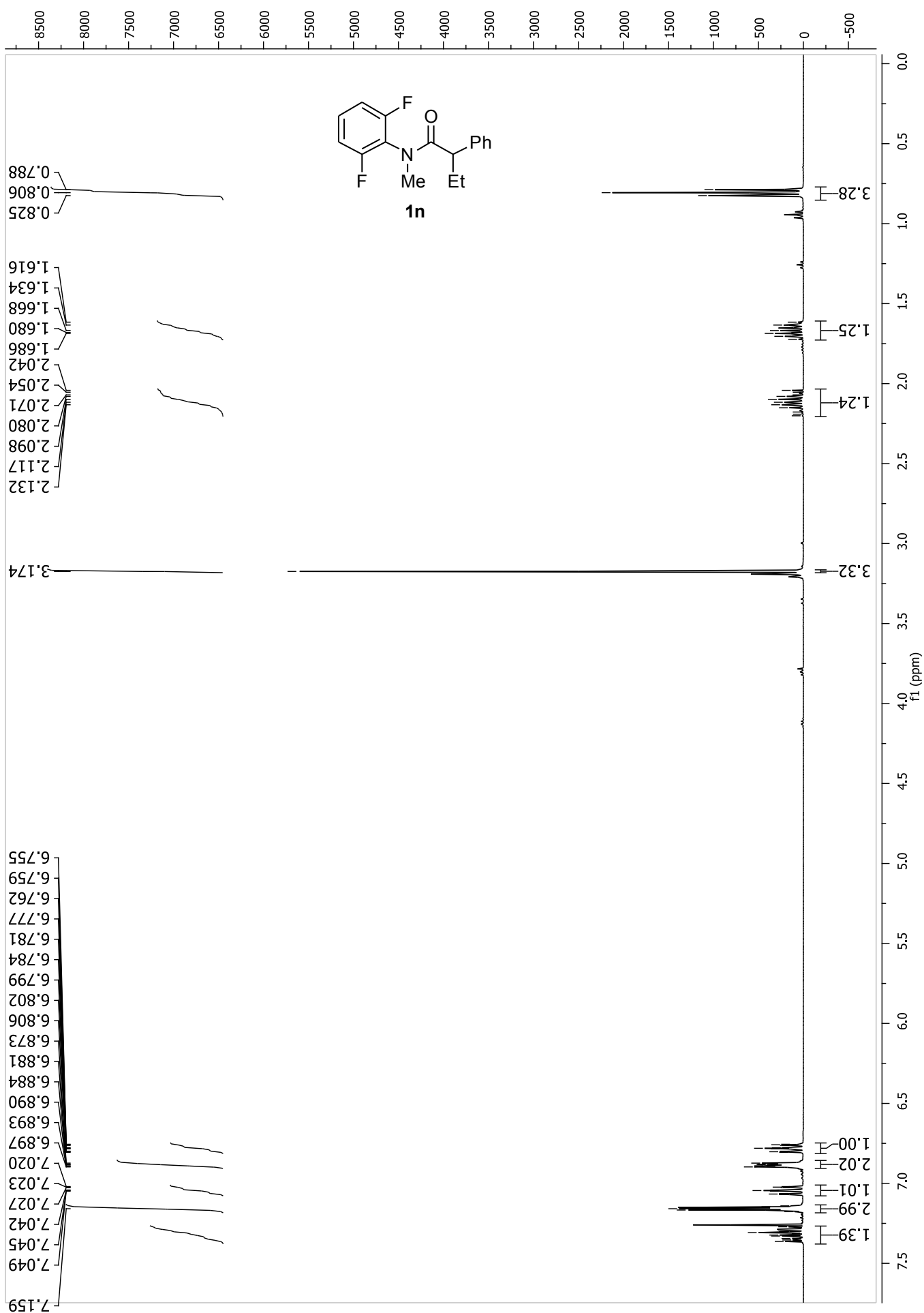
^{13}C NMR spectra:

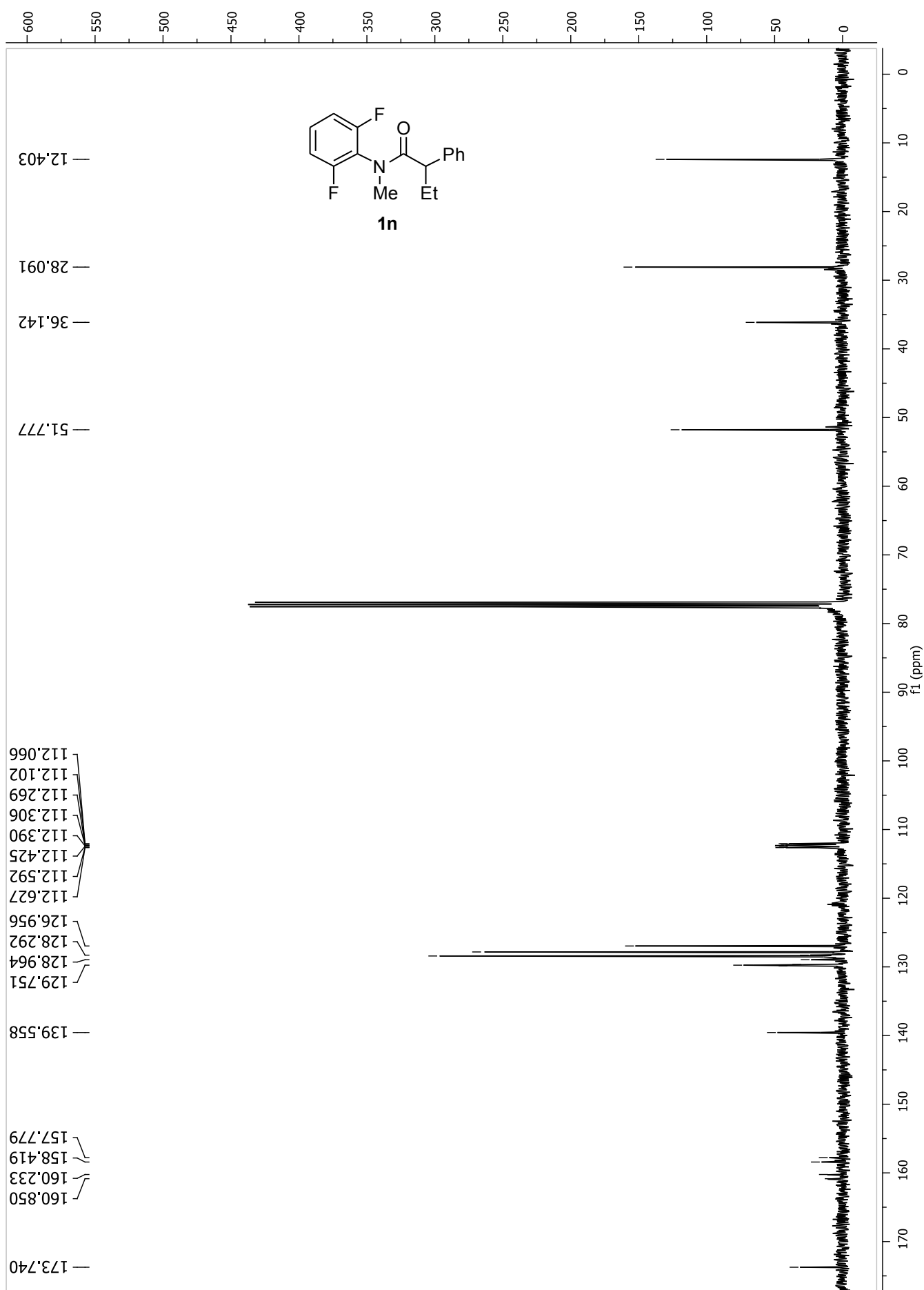
***N*-(2-Chlorophenyl)-*N*-methyl-2,2-diphenylacetamide (1j): ^1H NMR spectra:**

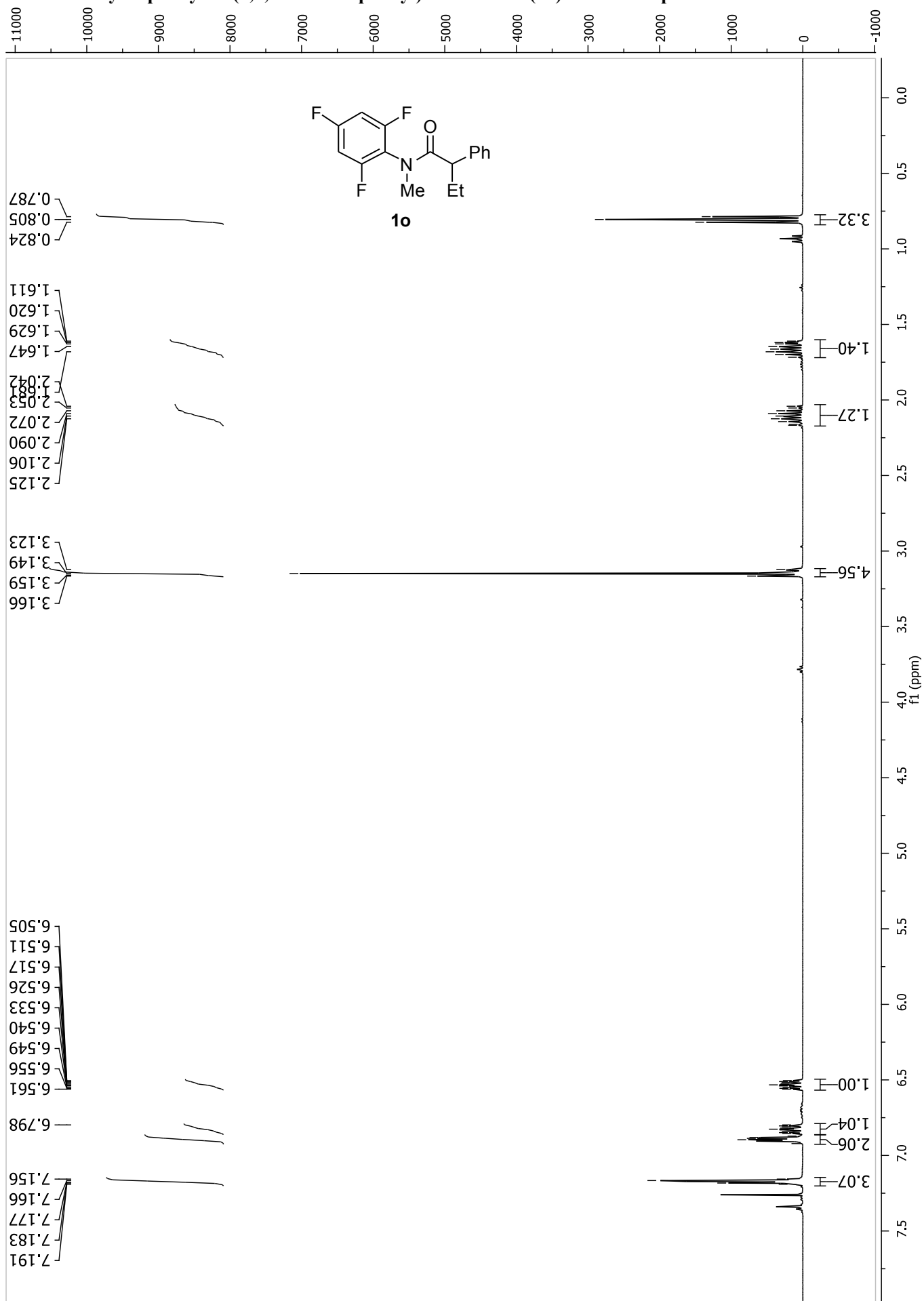
¹³C NMR spectra:

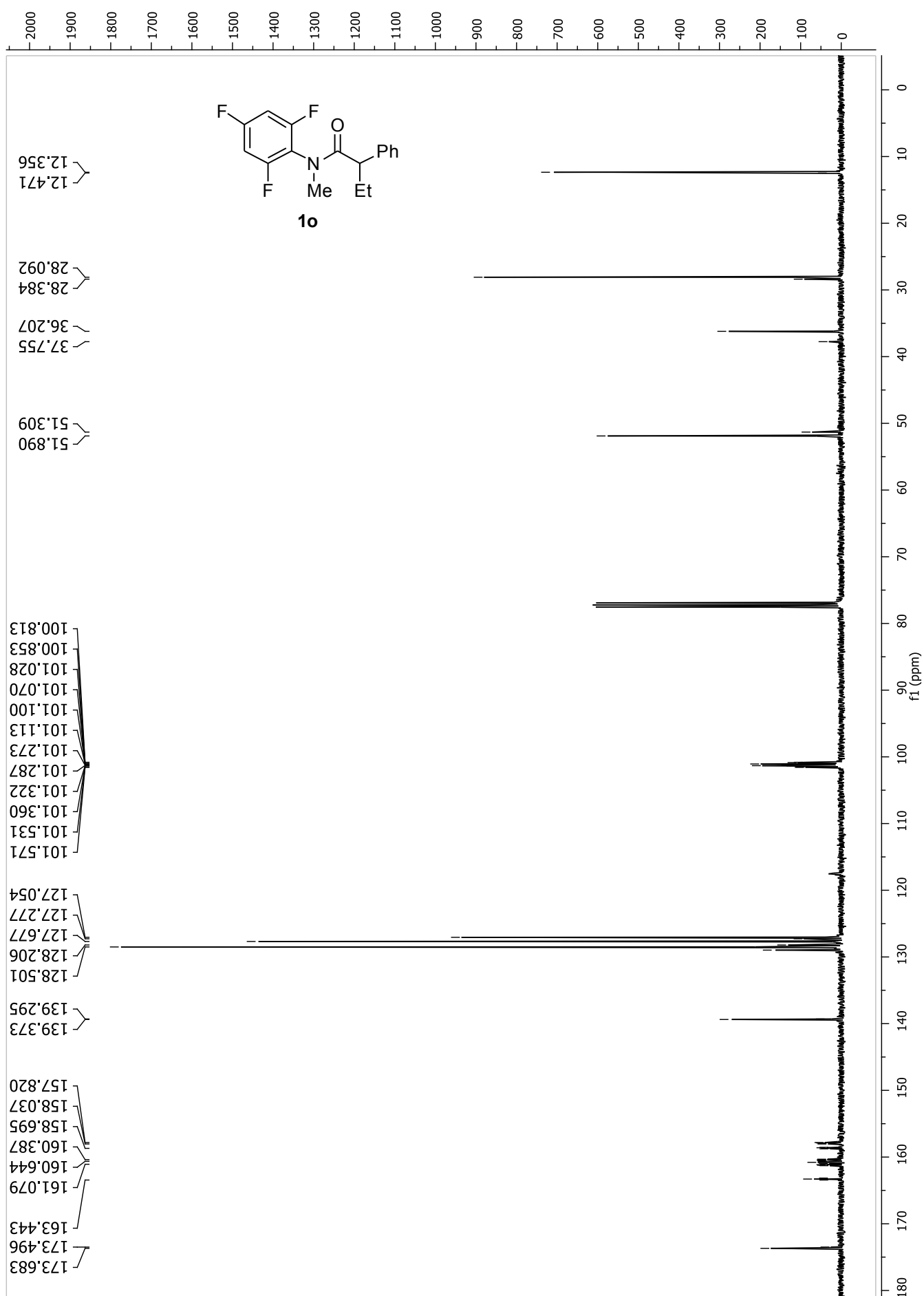
***N*-(2-Fluorophenyl)-*N*-methyl-2-phenylacetamide (1k): ^1H NMR spectra:**

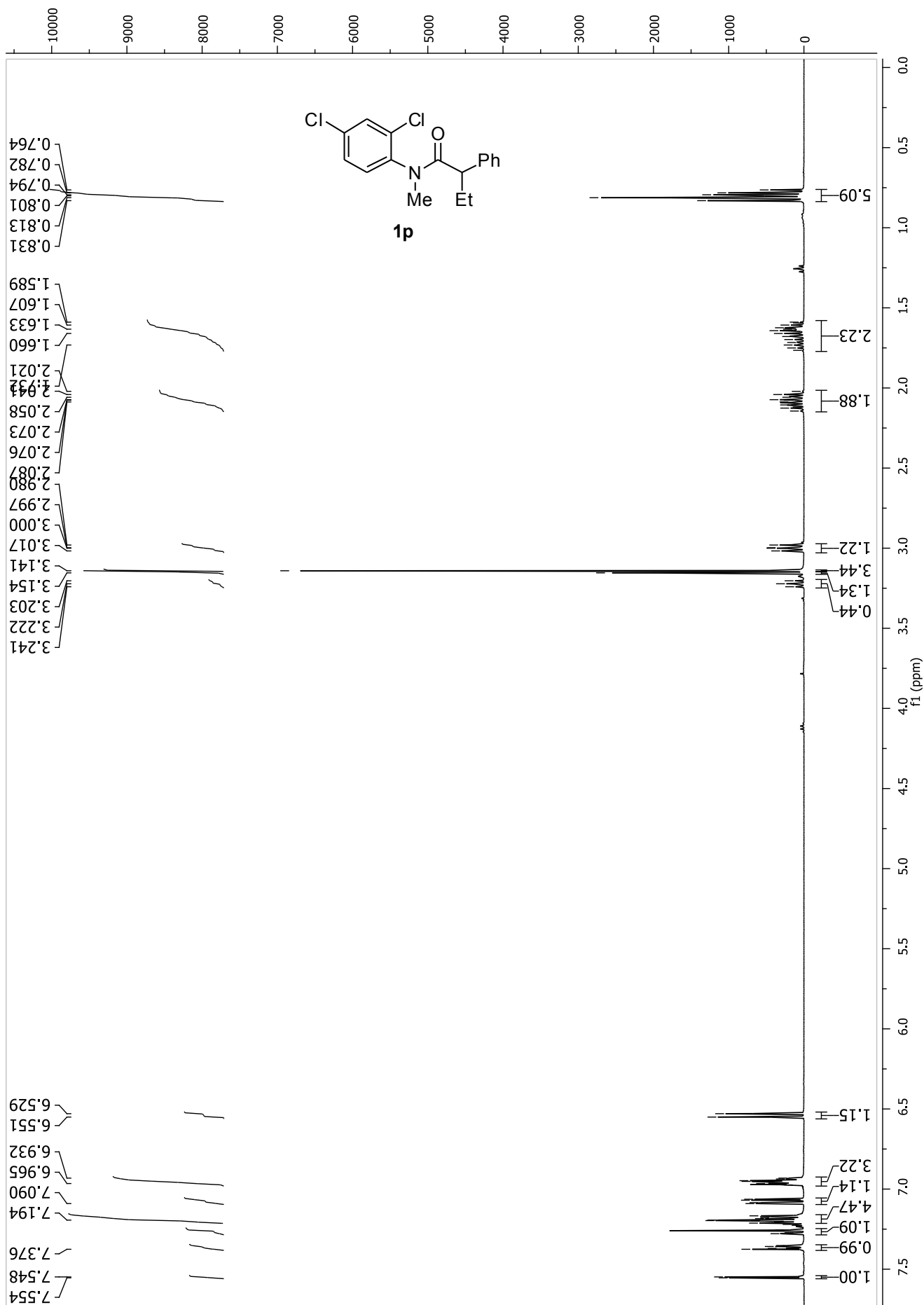
¹³C NMR spectra:

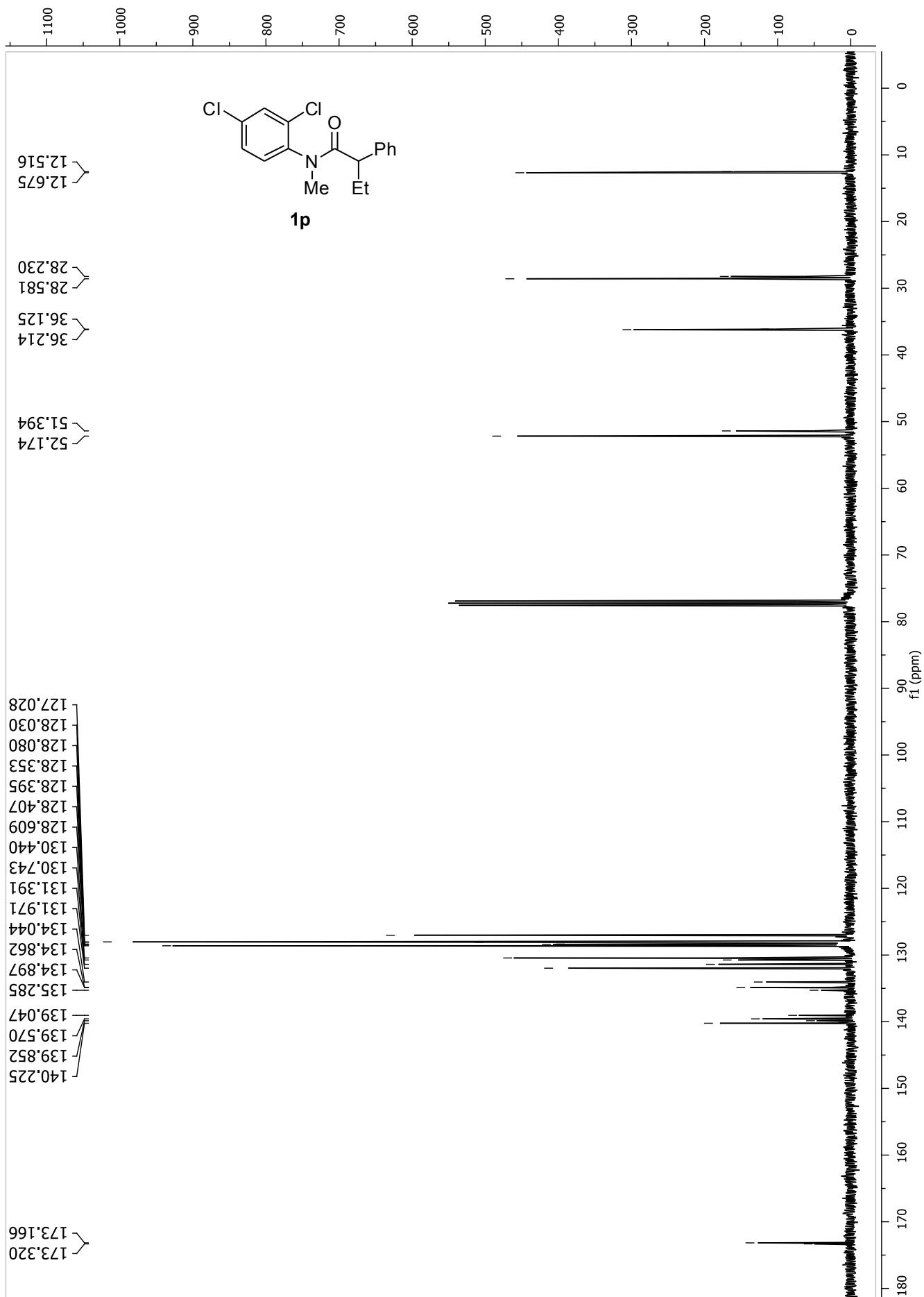
***N*-(2,6-Difluorophenyl)-*N*-methyl-2-phenylbutanamide (1n): ¹H NMR spectra:**

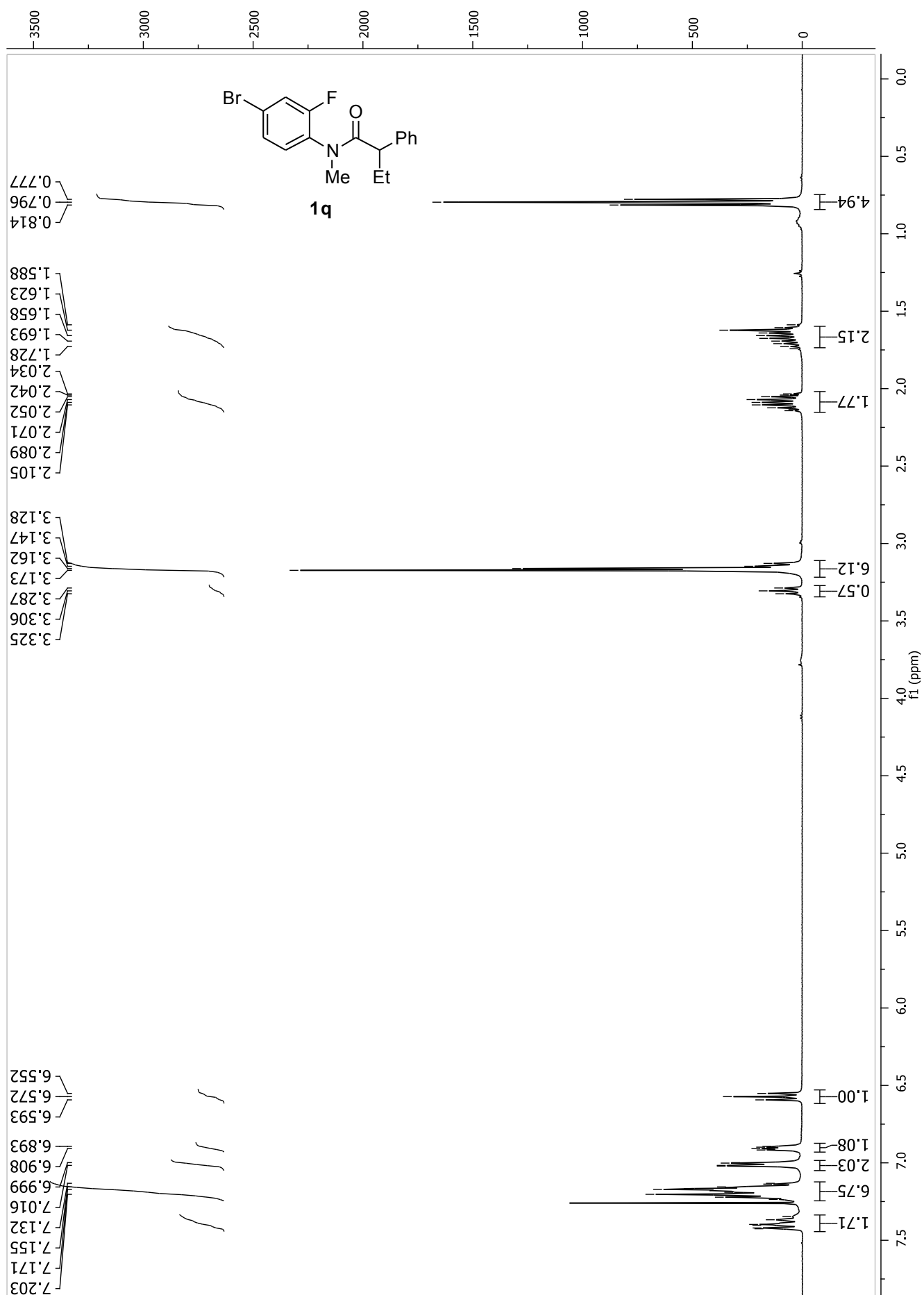
¹³C NMR spectra:

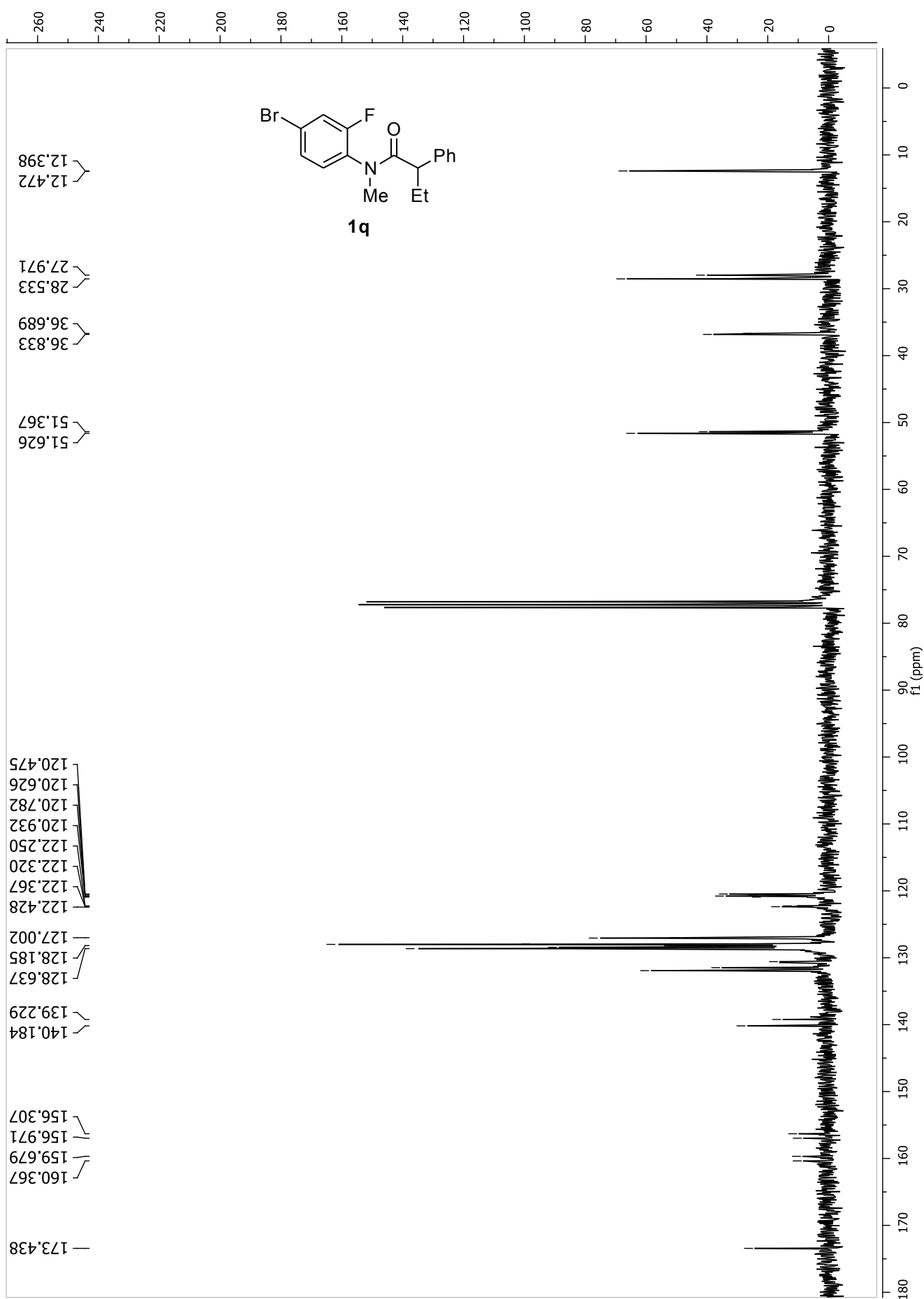
***N*-Methyl-2-phenyl-*N*-(2,4,6-trifluorophenyl)butanamide (1o): ¹H NMR spectra:**

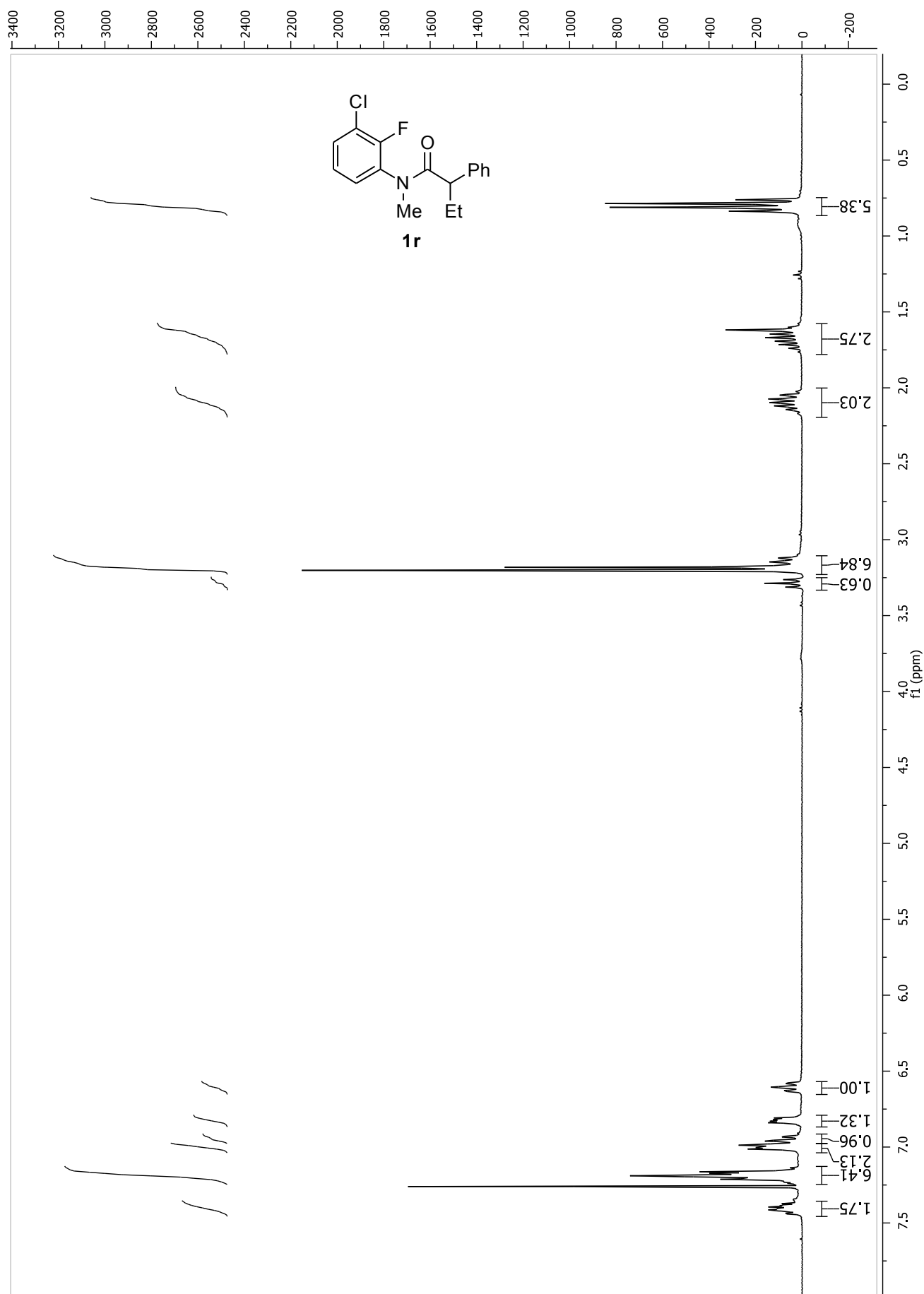
¹³C NMR spectra:

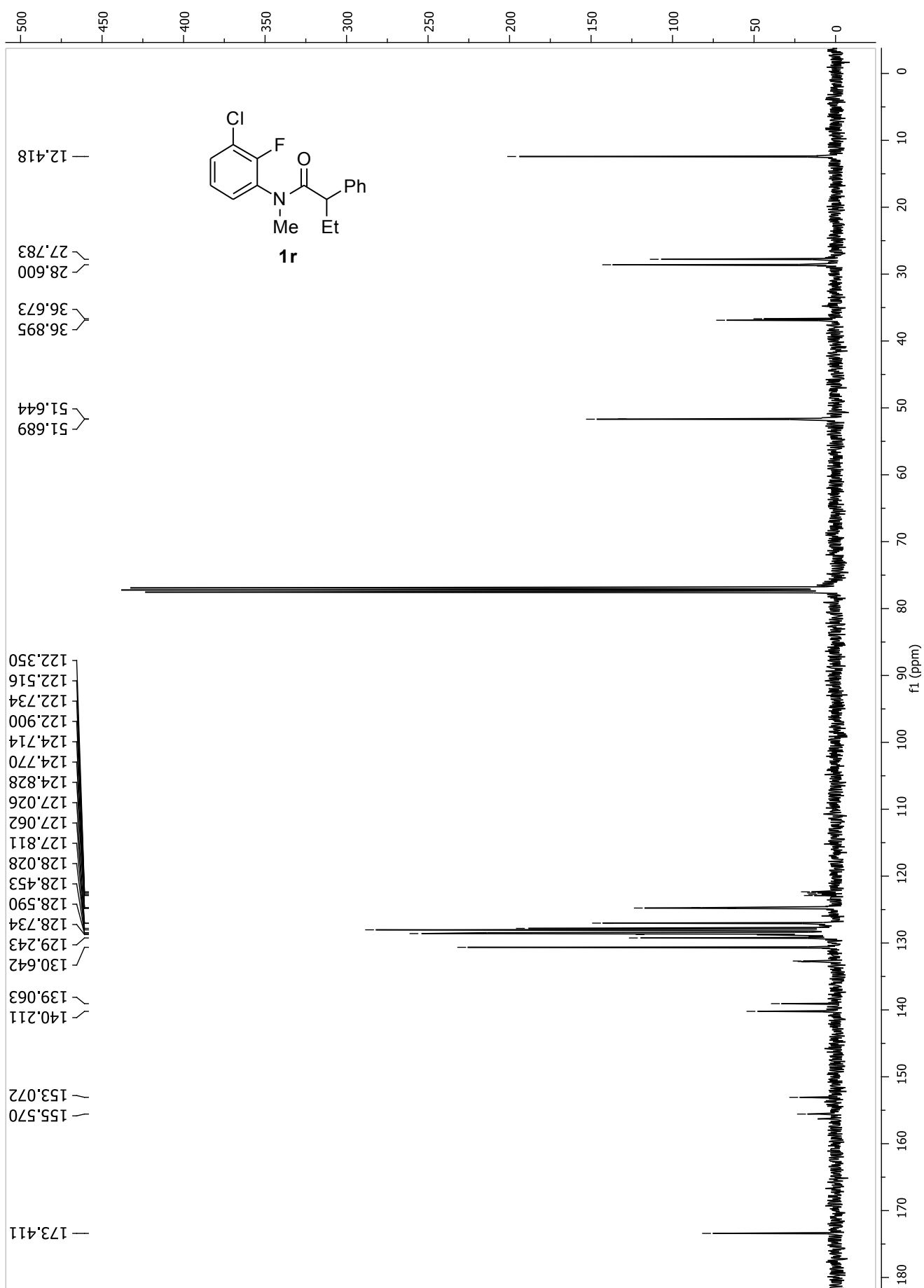
***N*-(2,4-Dichlorophenyl)-*N*-methyl-2-phenylbutanamide (1p): ¹HNMR spectra:**

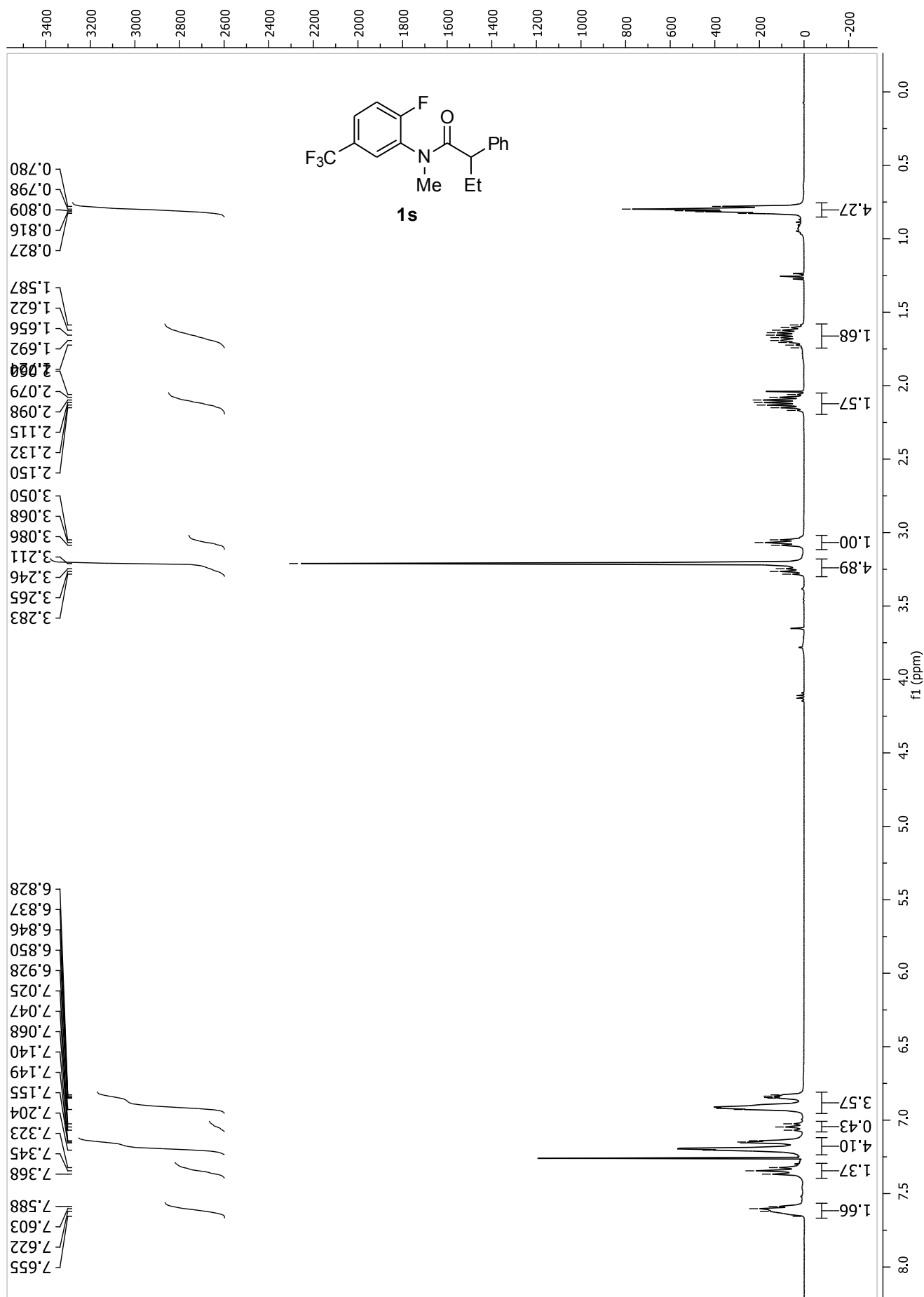
¹³C NMR spectra:

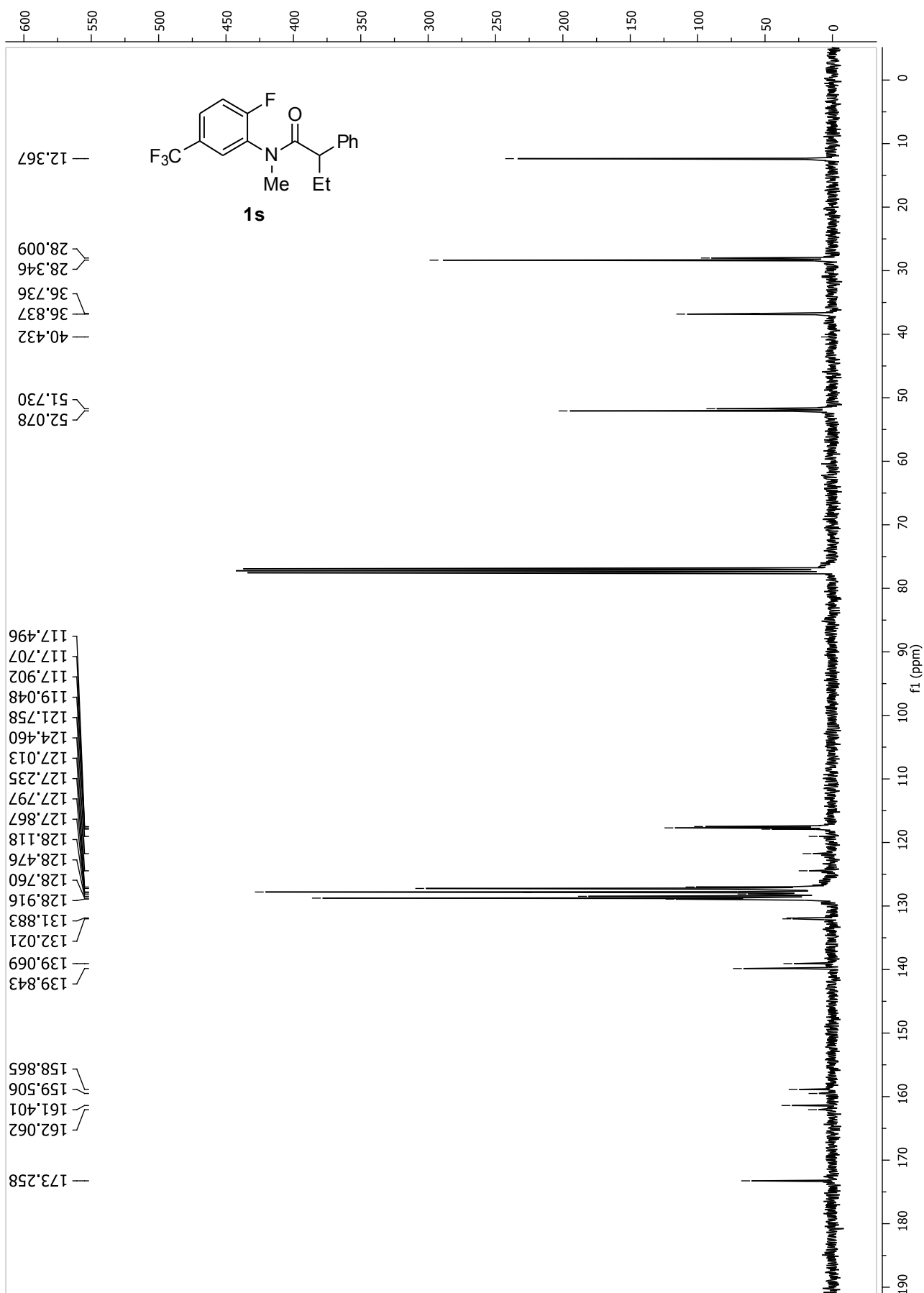
***N*-(4-Bromo-2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (1q): ^1H NMR spectra:**

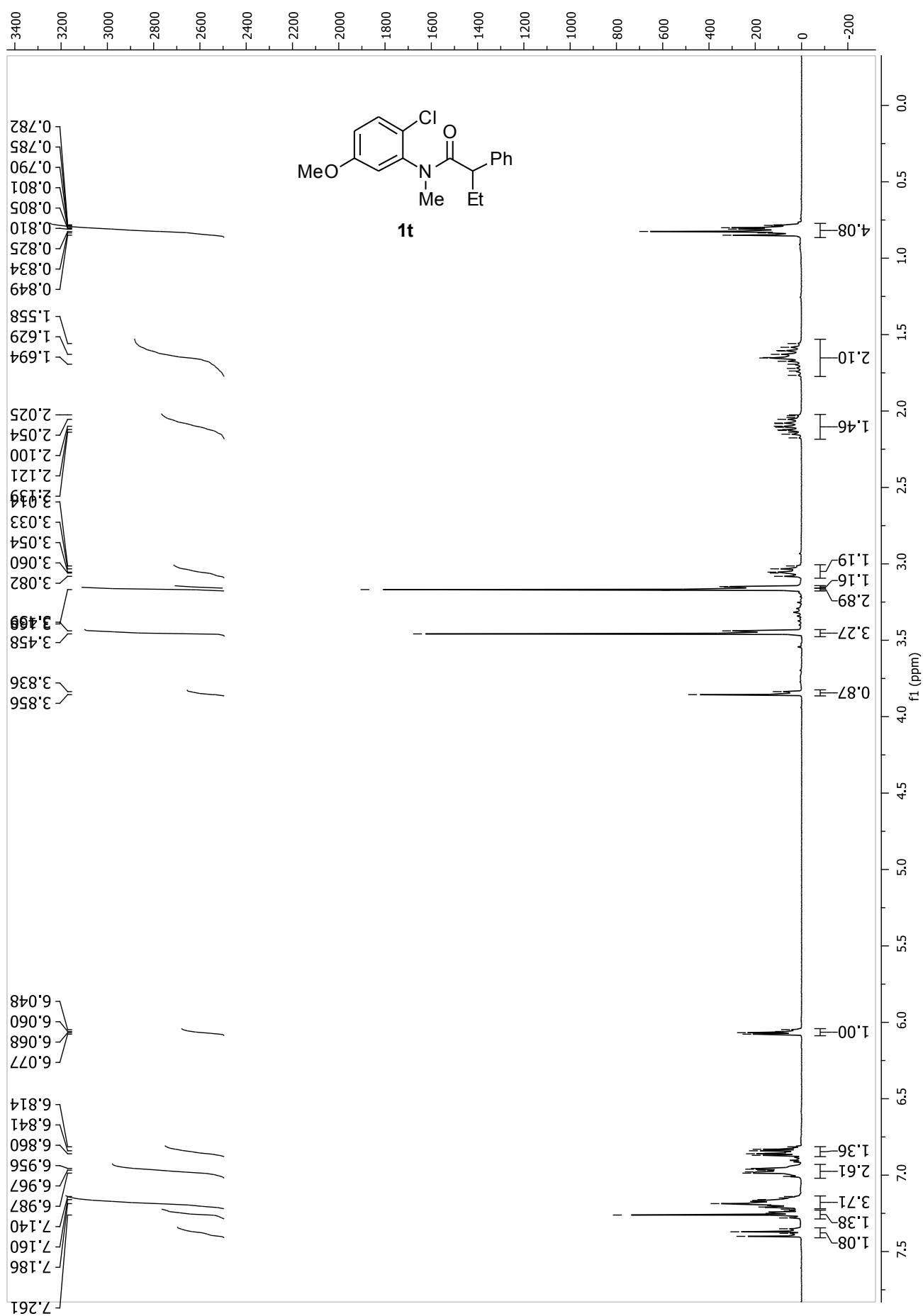
¹³C NMR spectra:

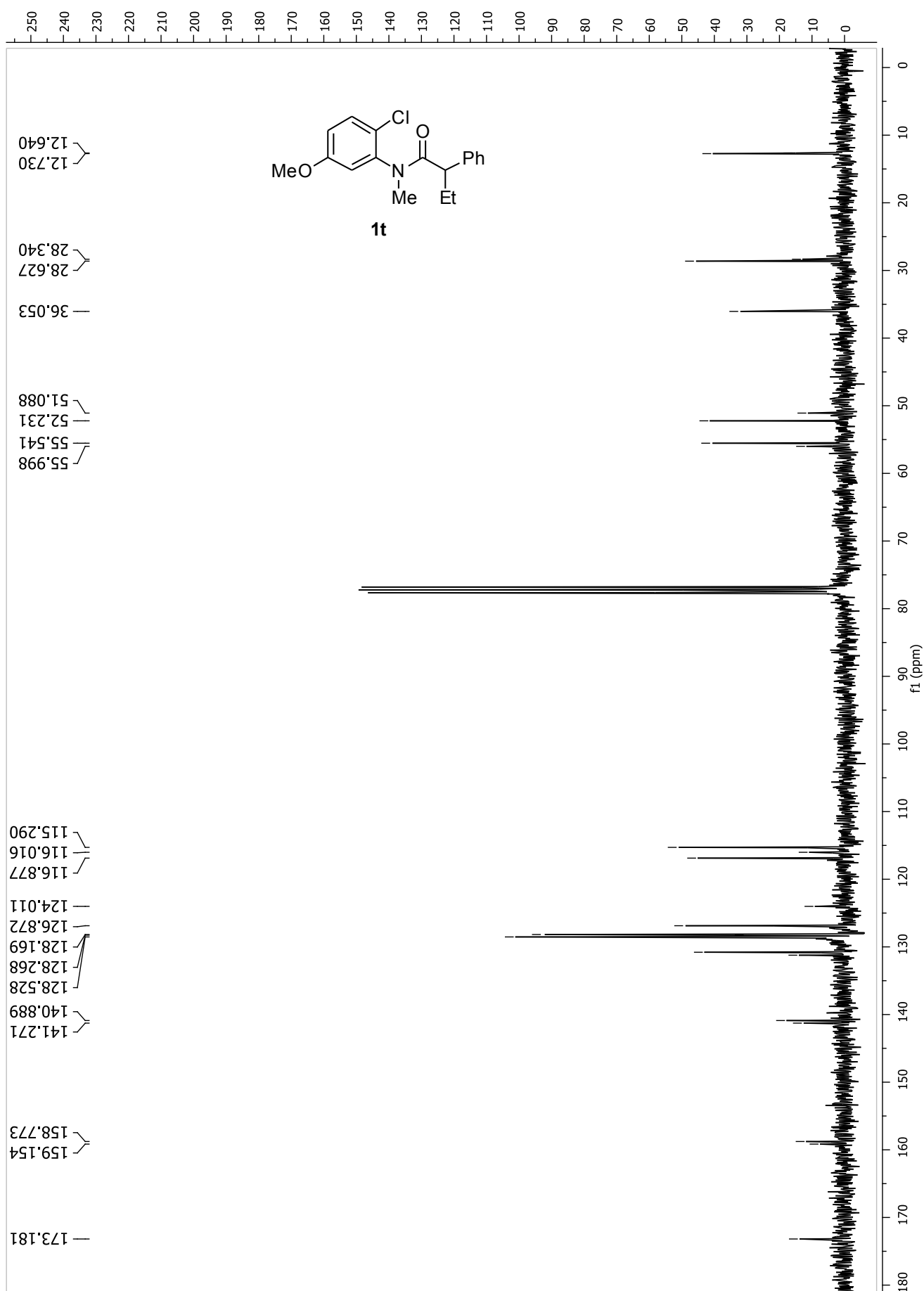
***N*-(3-Chloro-2-fluorophenyl)-*N*-methyl-2-phenylbutanamide (1r): ^1H NMR spectra:**

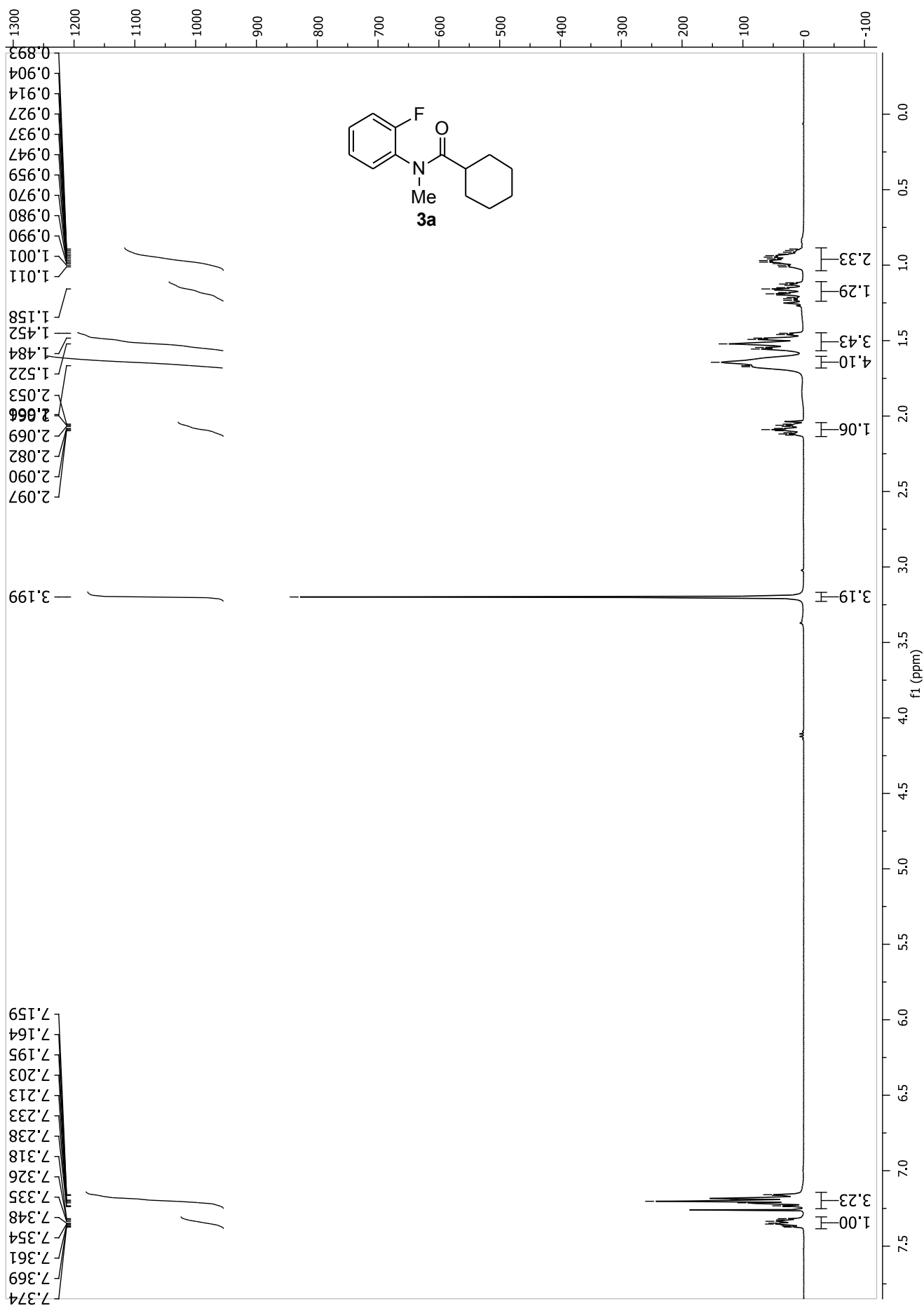
¹³C NMR spectra:

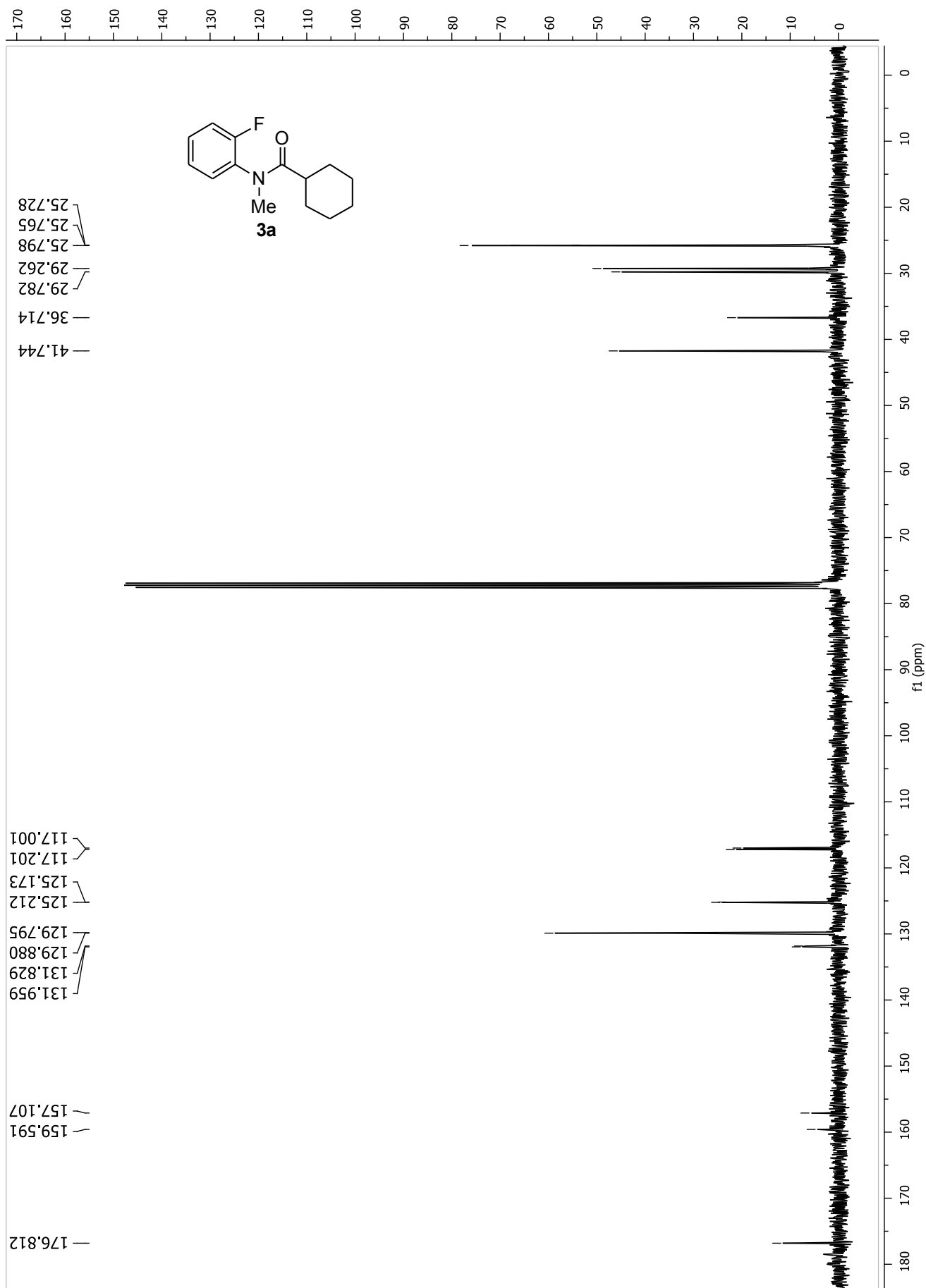
***N*-(2-Fluoro-5-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylbutanamide (1s): ¹H NMR spectra:**

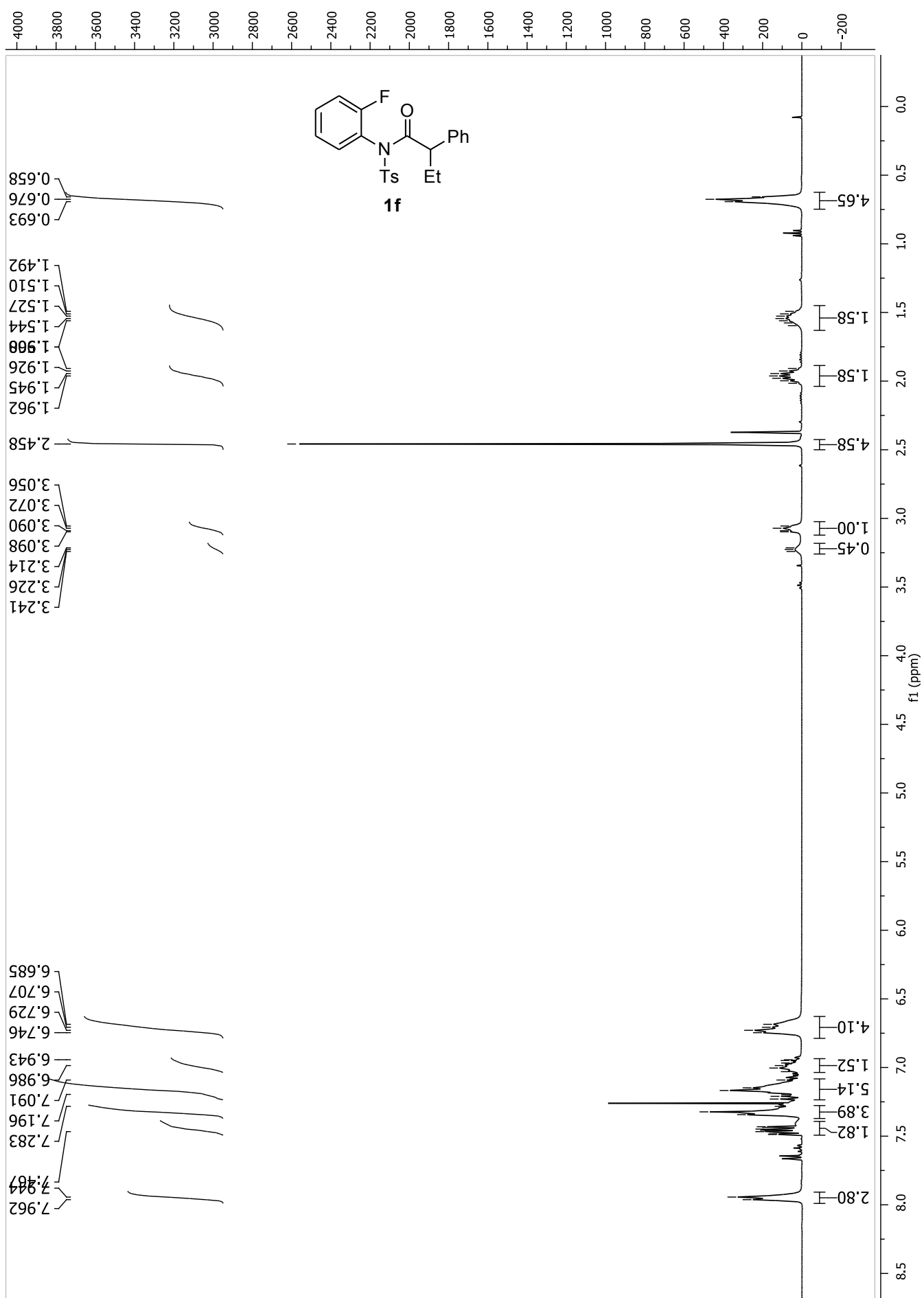
¹³C NMR spectra:

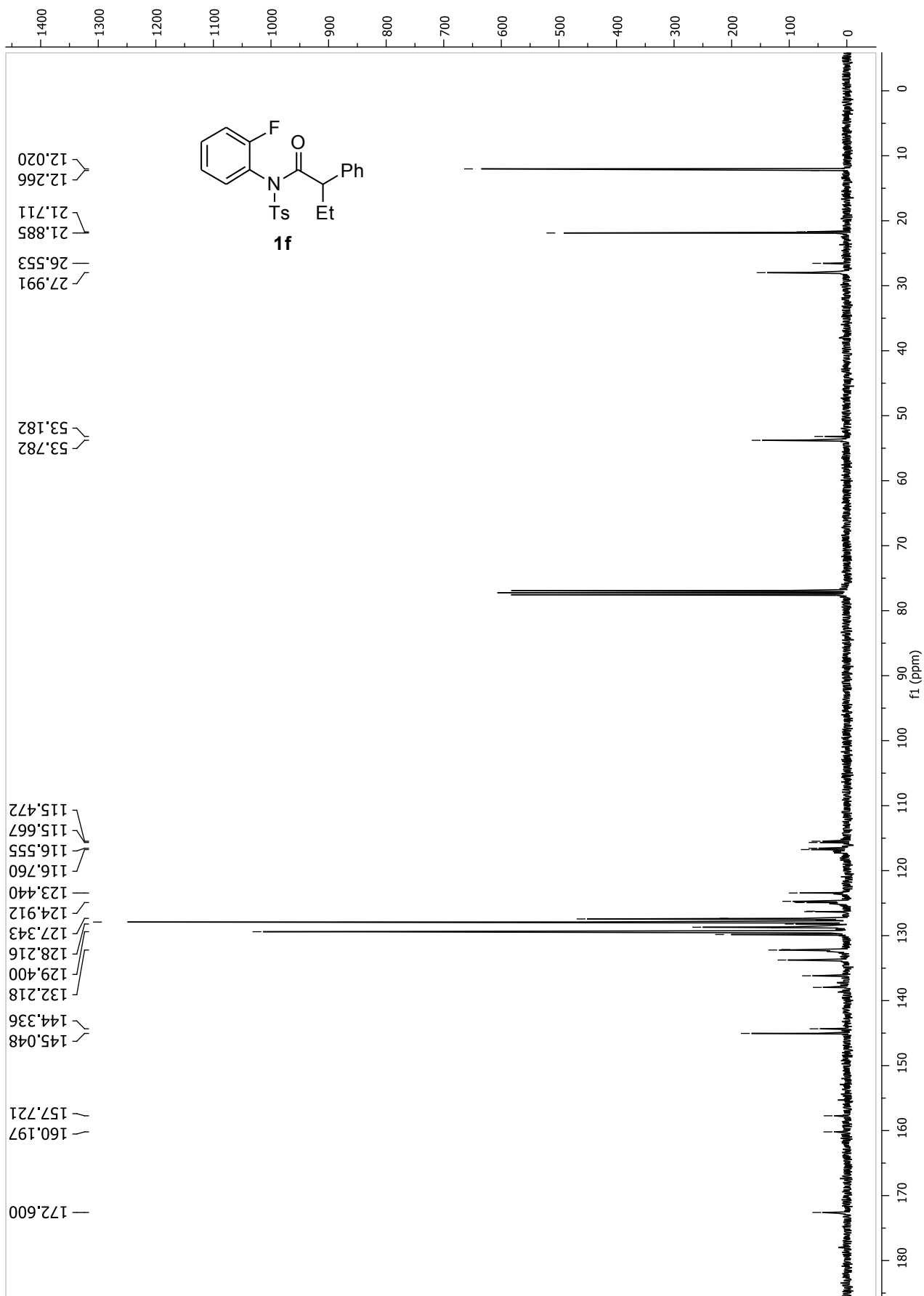
***N*-(2-Chloro-5-methoxyphenyl)-*N*-methyl-2-phenylbutanamide (1t): ¹H NMR spectra:**

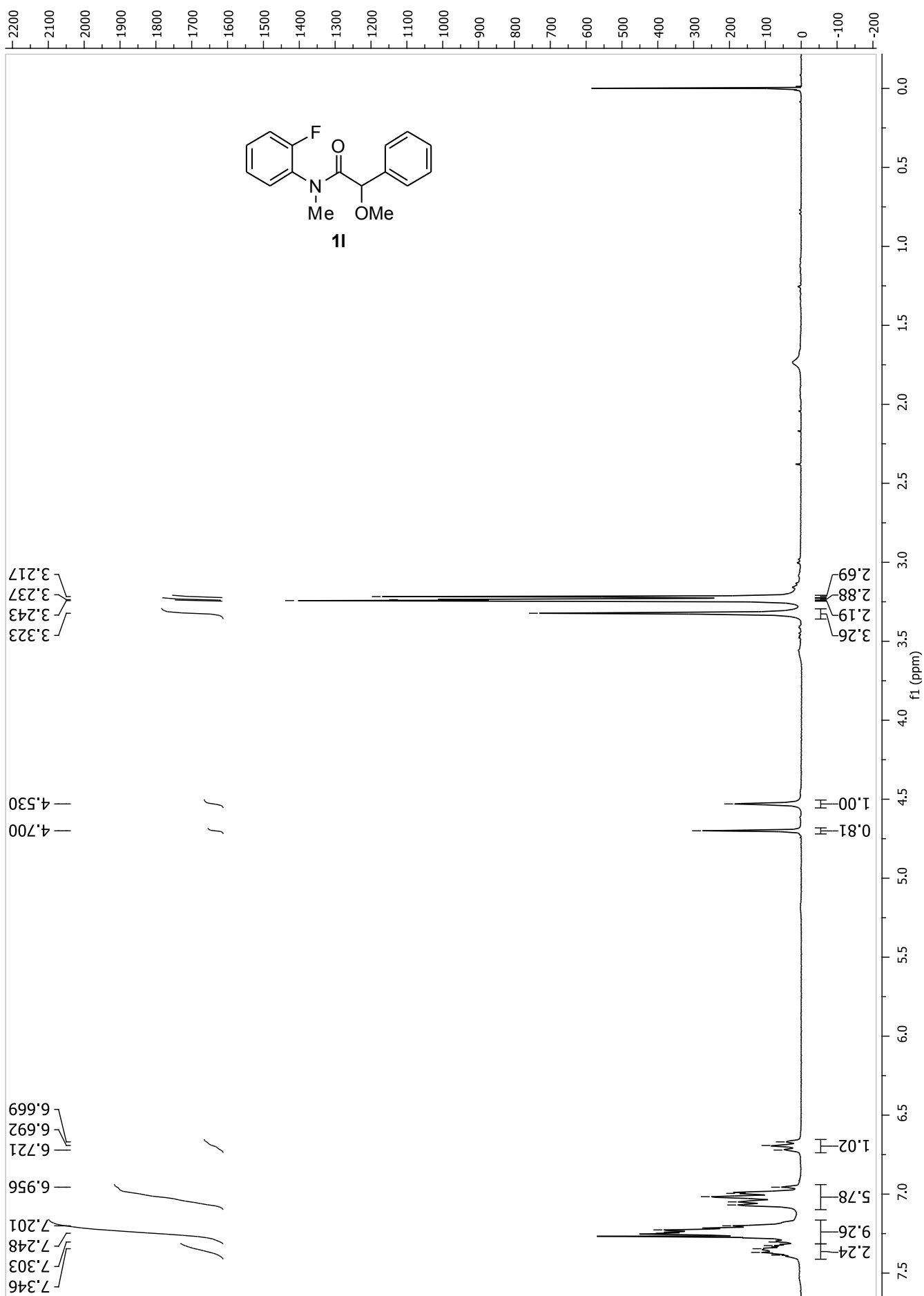
¹³C NMR spectra:

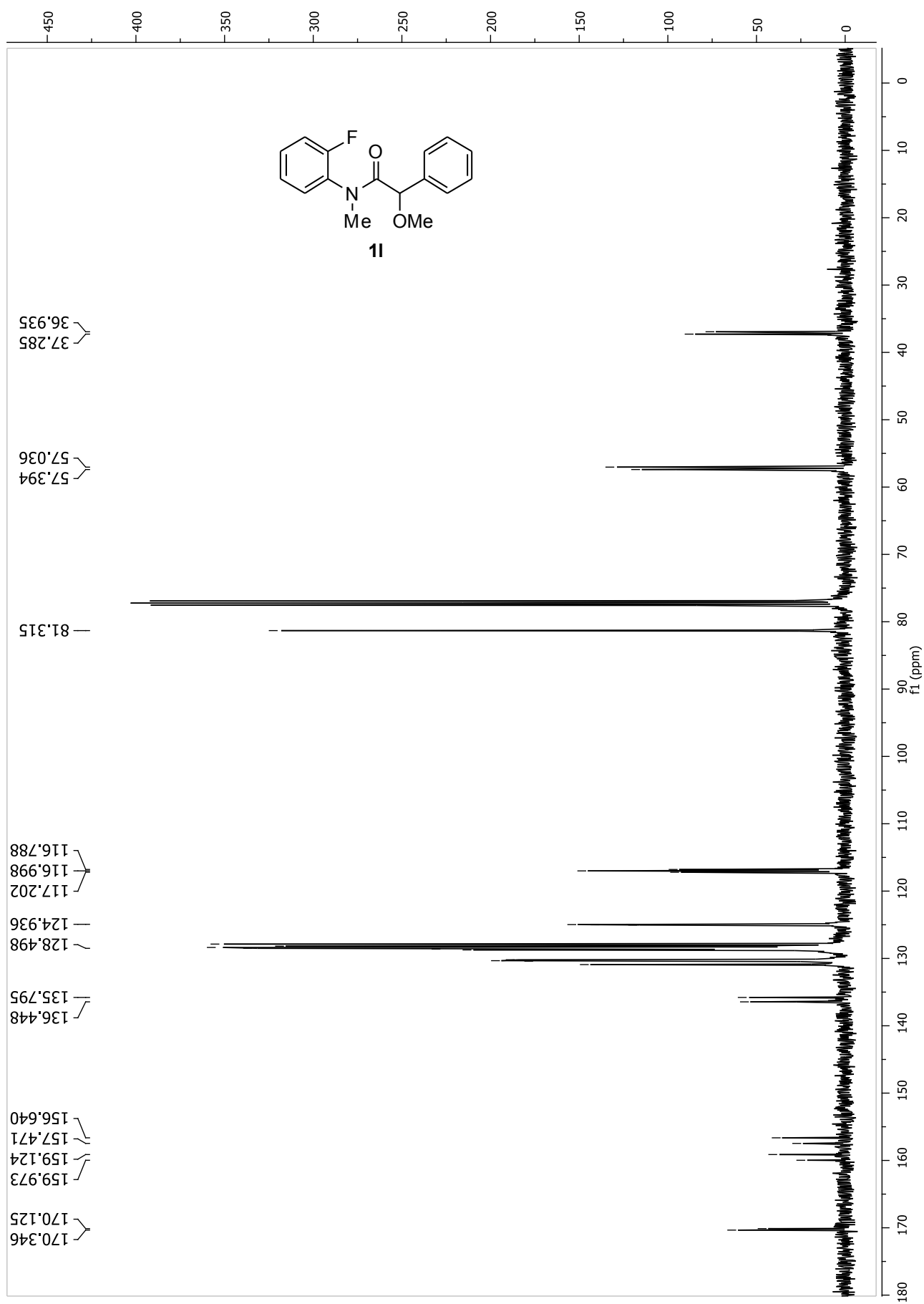
***N*-(2-Fluorophenyl)-*N*-methylcyclohexanecarboxamide (3a): ^1H NMR spectra:**

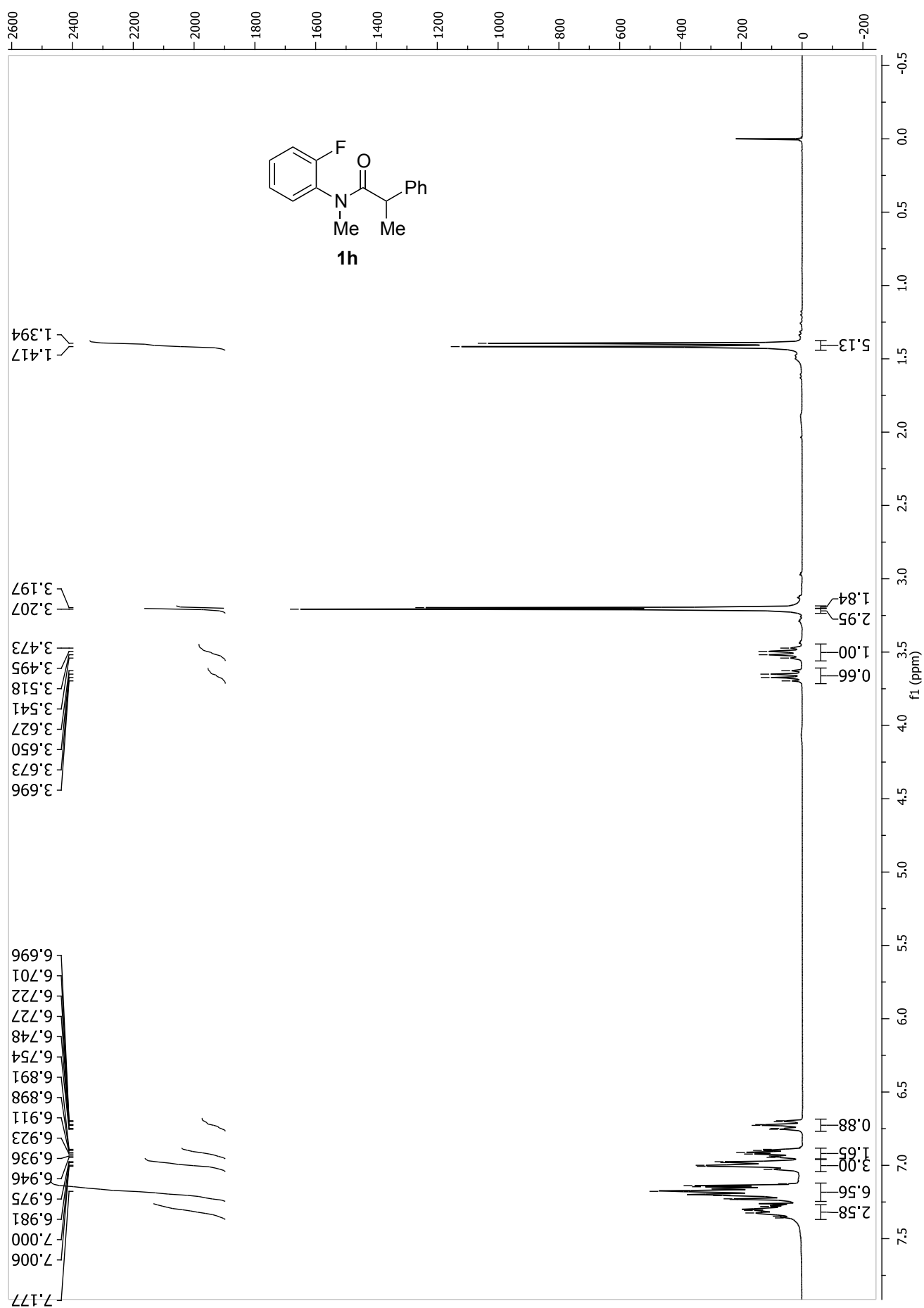
¹³C NMR spectra:

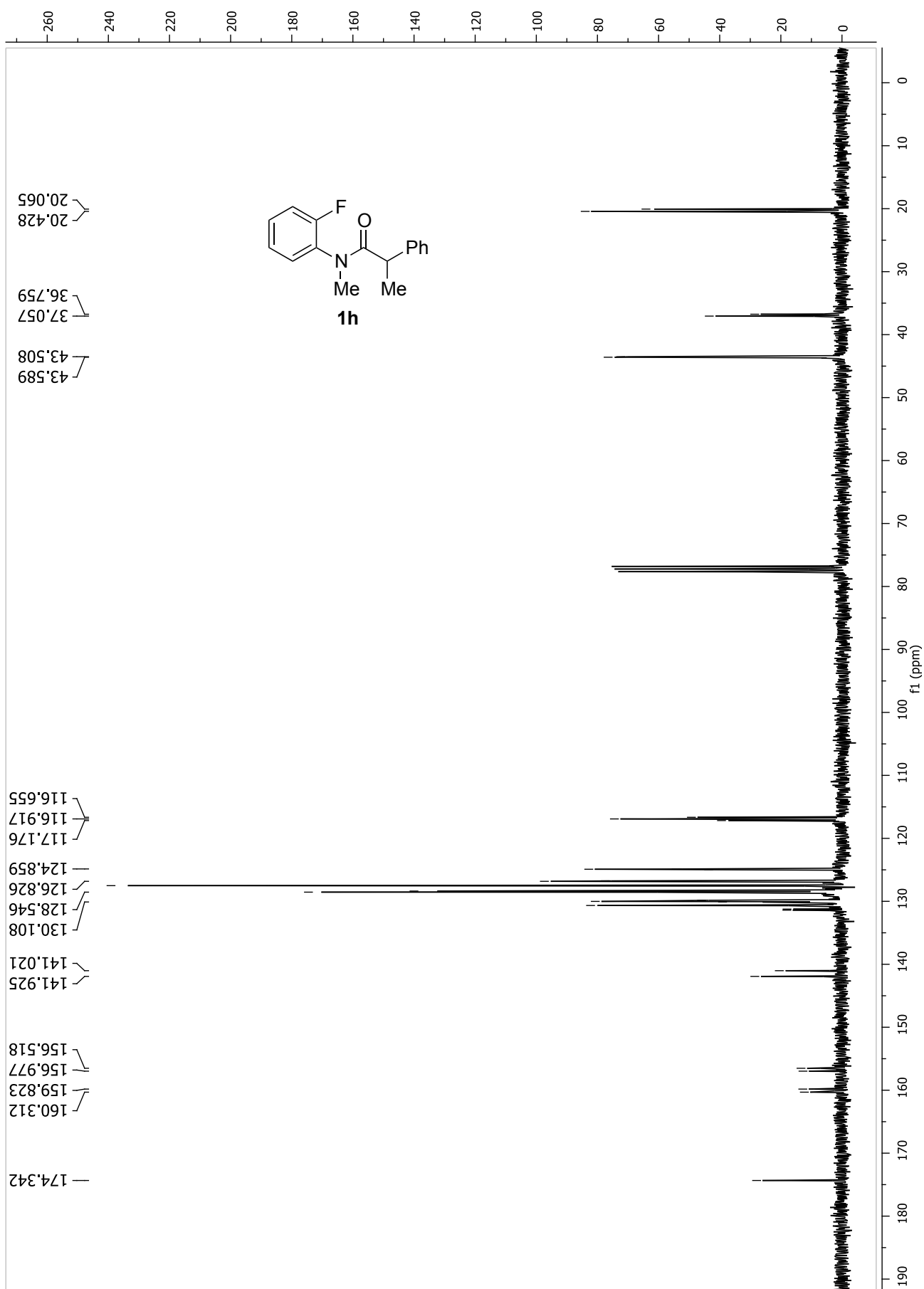
***N*-(2-Fluorophenyl)-2-phenyl-*N*-tosylbutanamide (1f): ¹H NMR spectra:**

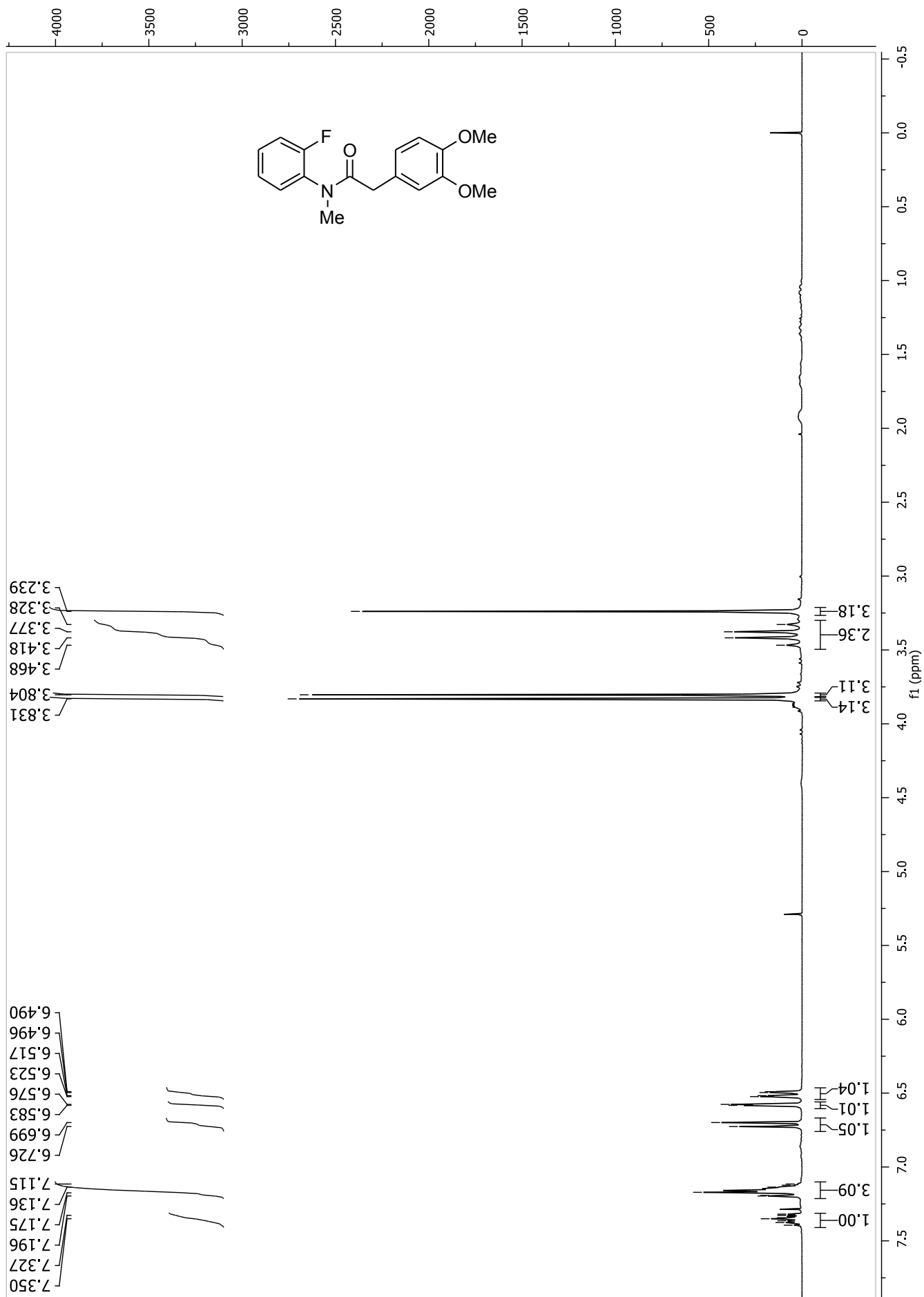
¹³C NMR spectra:

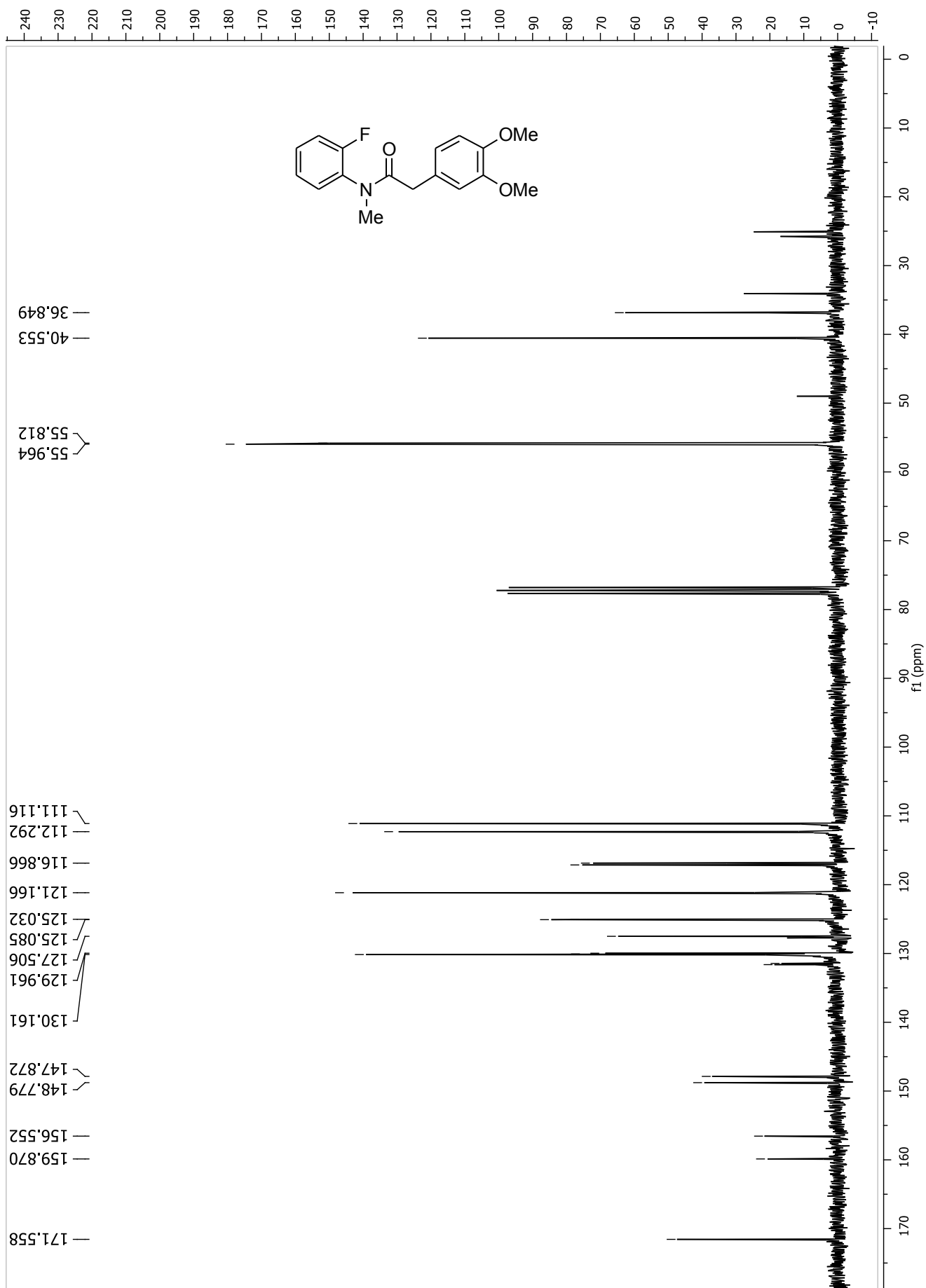
***N*-(2-Fluorophenyl)-2-methoxy-*N*-methyl-2-phenylacetamide (11): ^1H NMR spectra:**

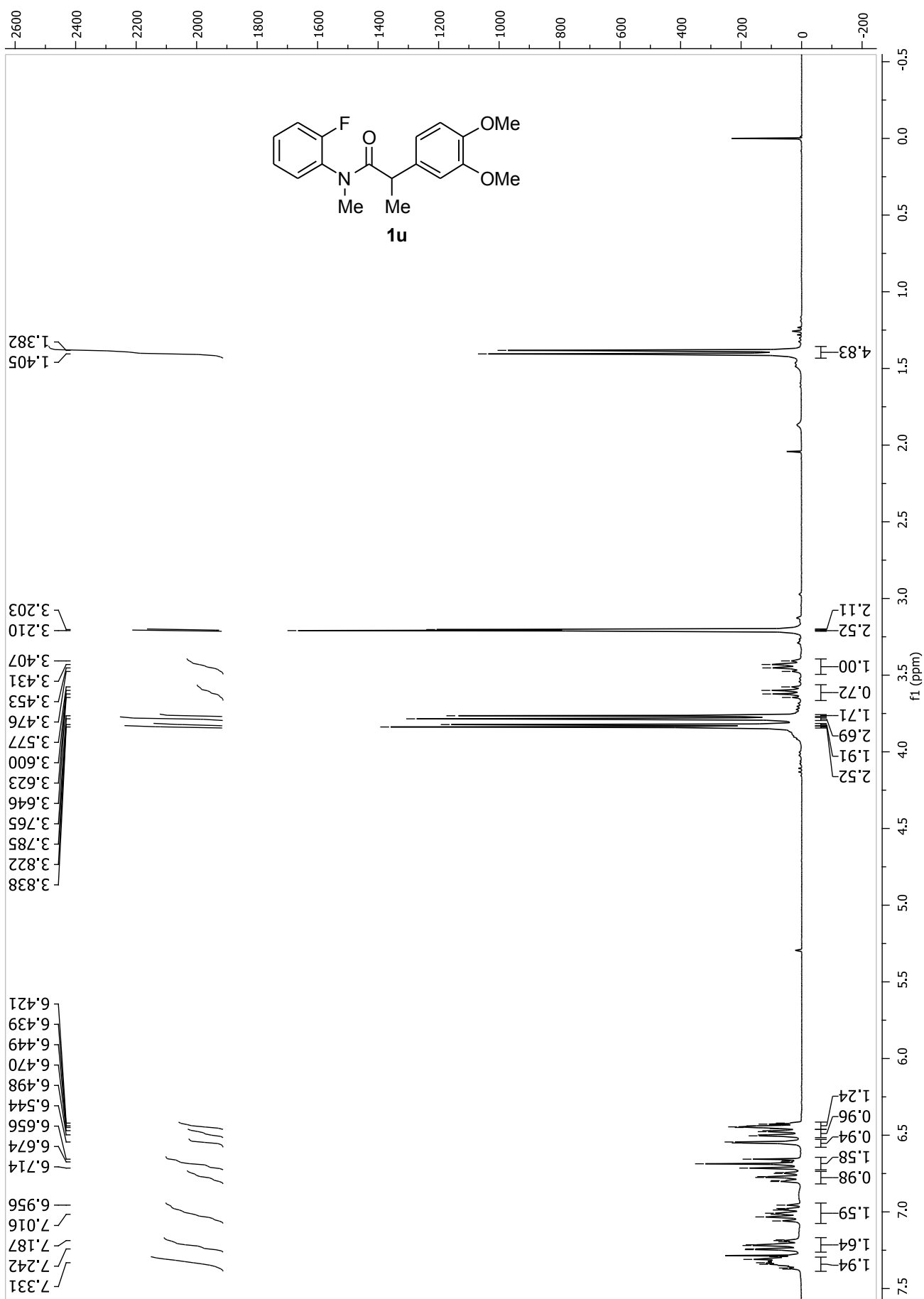
¹³C NMR spectra:

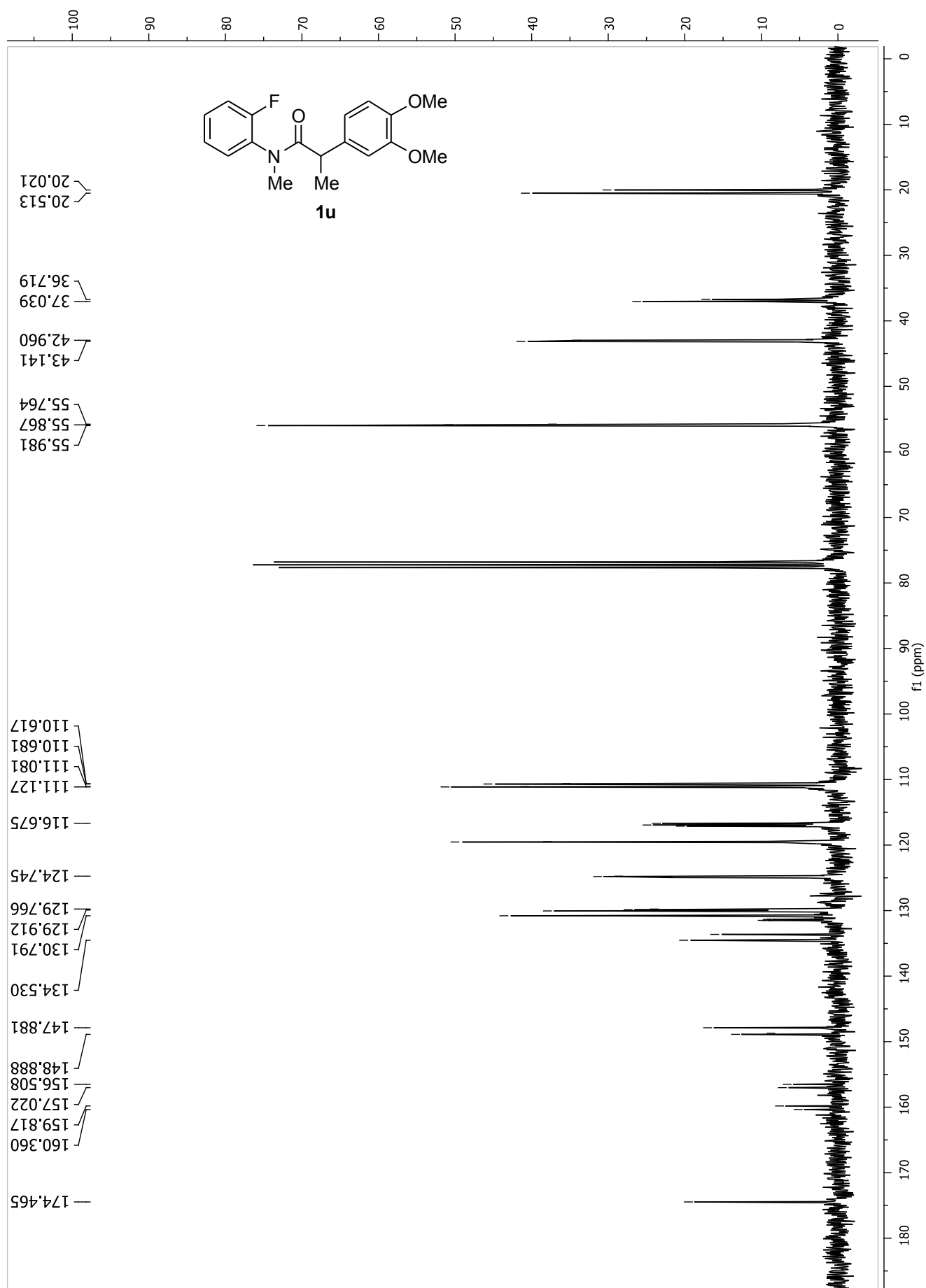
***N*-(2-Fluorophenyl)-*N*-methyl-2-phenylpropanamide (1h): ^1H NMR spectra:**

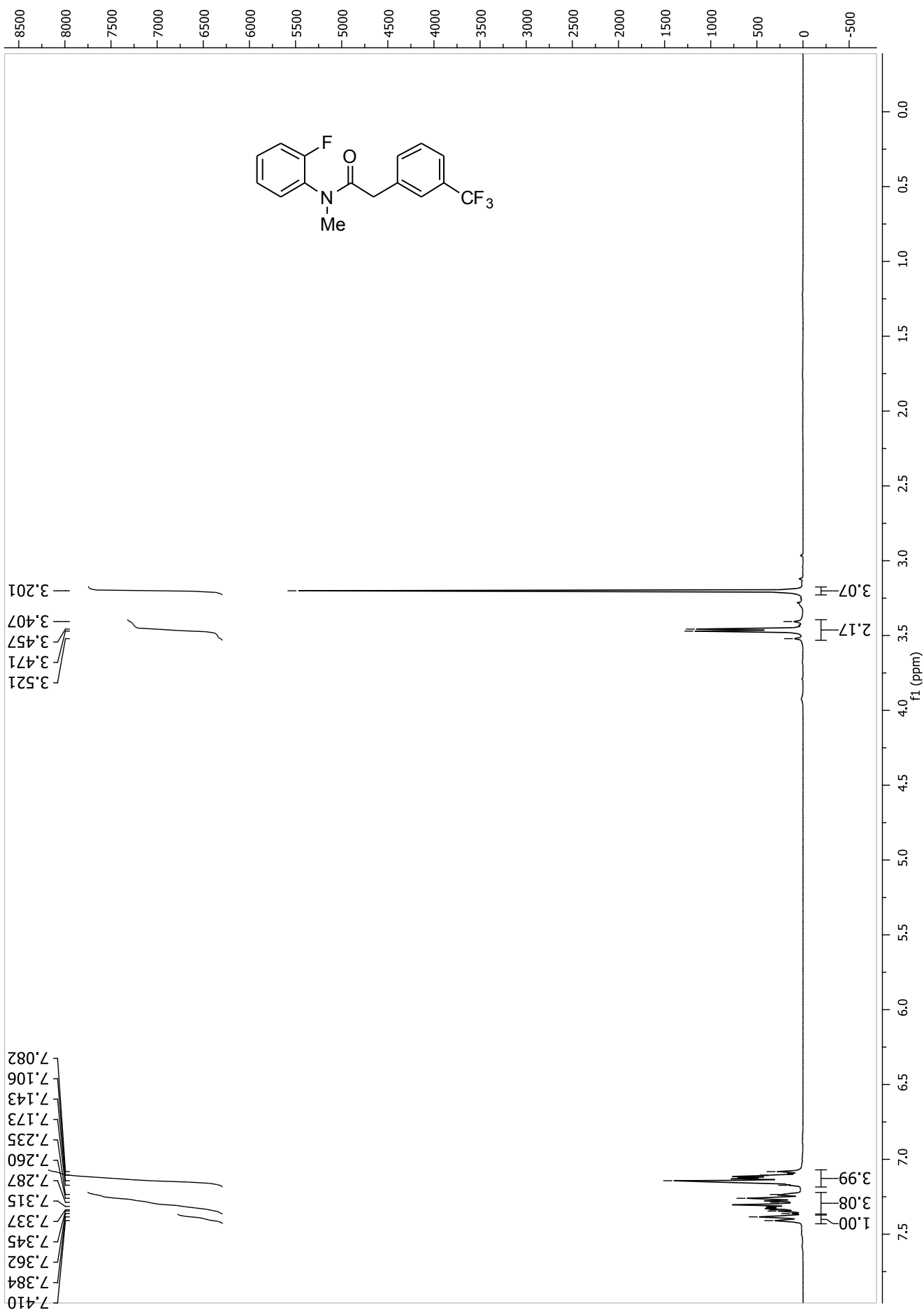
¹³C NMR spectra:

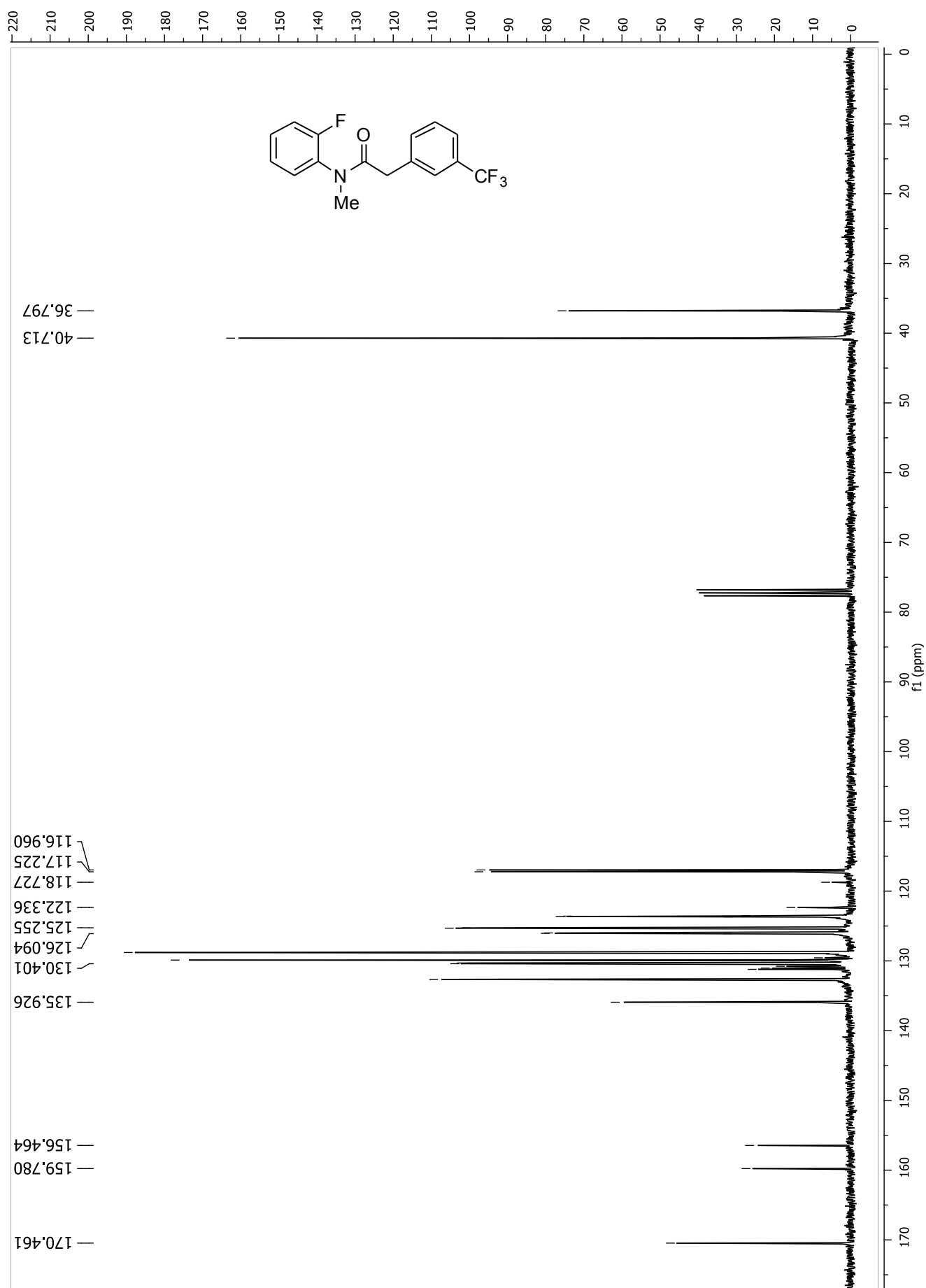
2-(3,4-Dimethoxyphenyl)-N-(2-fluorophenyl)-N-methylacetamide: ^1H NMR spectra:

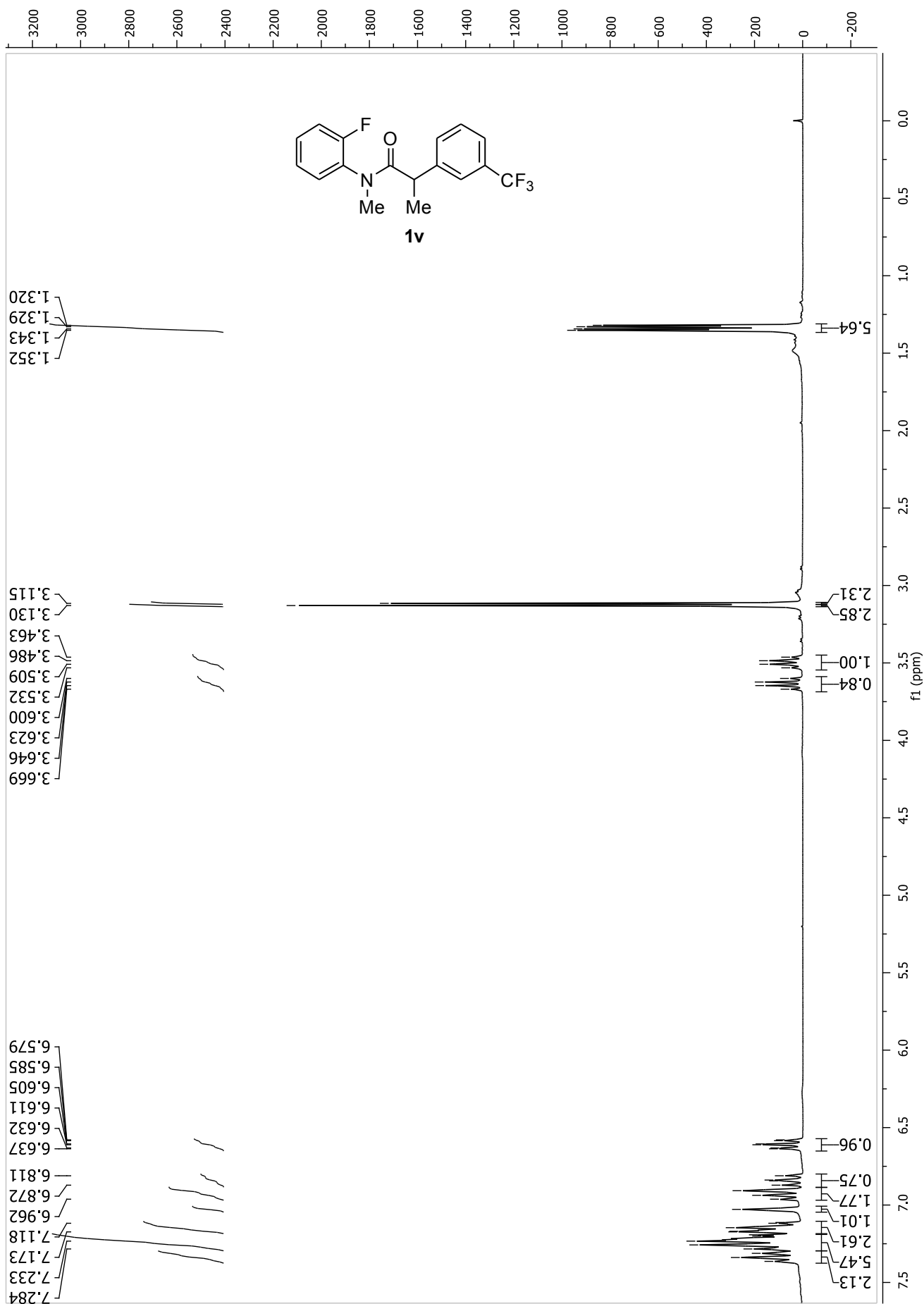
¹³C NMR spectra:

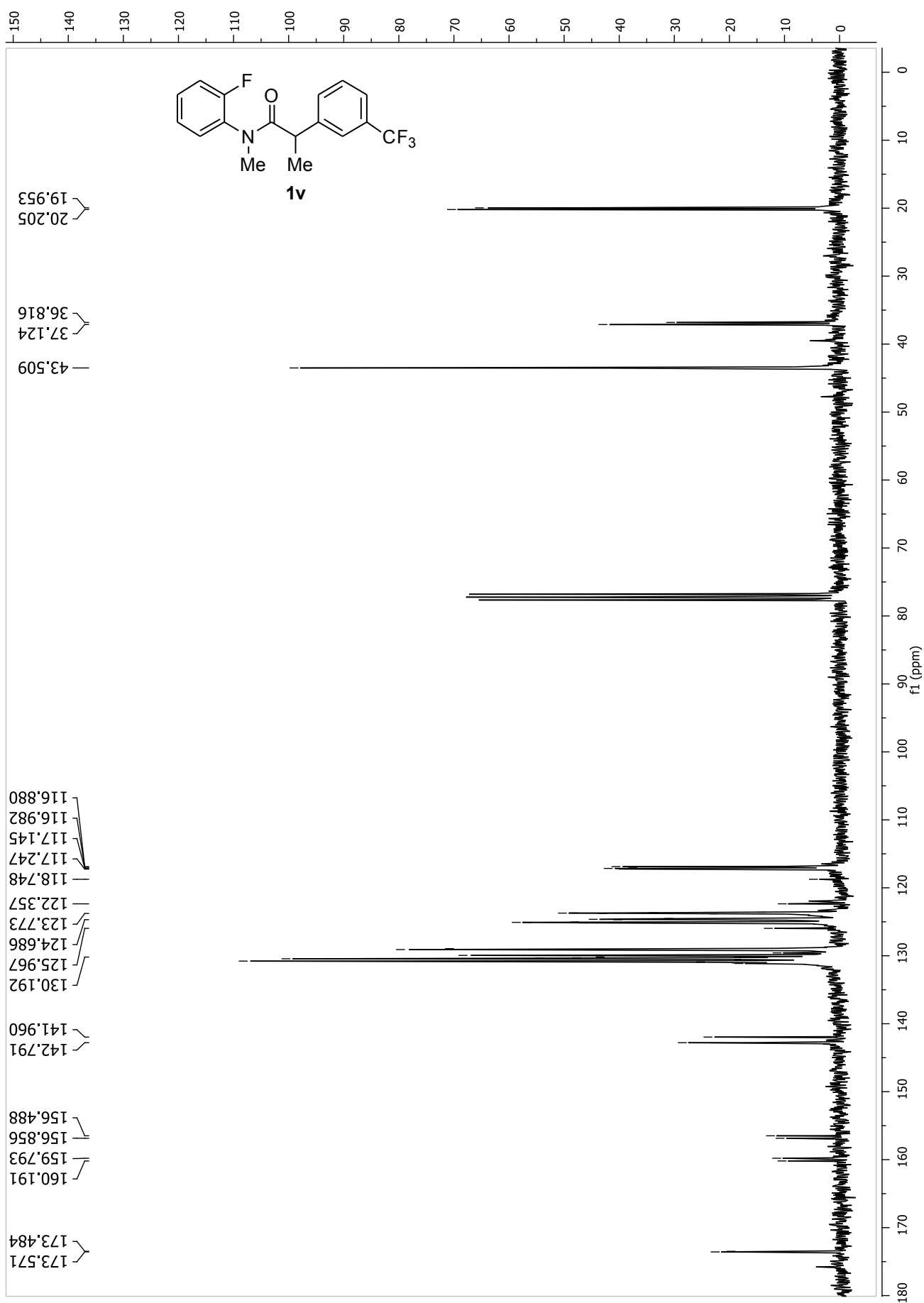
2-(3,4-Dimethoxyphenyl)-*N*-(2-fluorophenyl)-*N*-methylpropanamide (1u): ¹H NMR spectra:

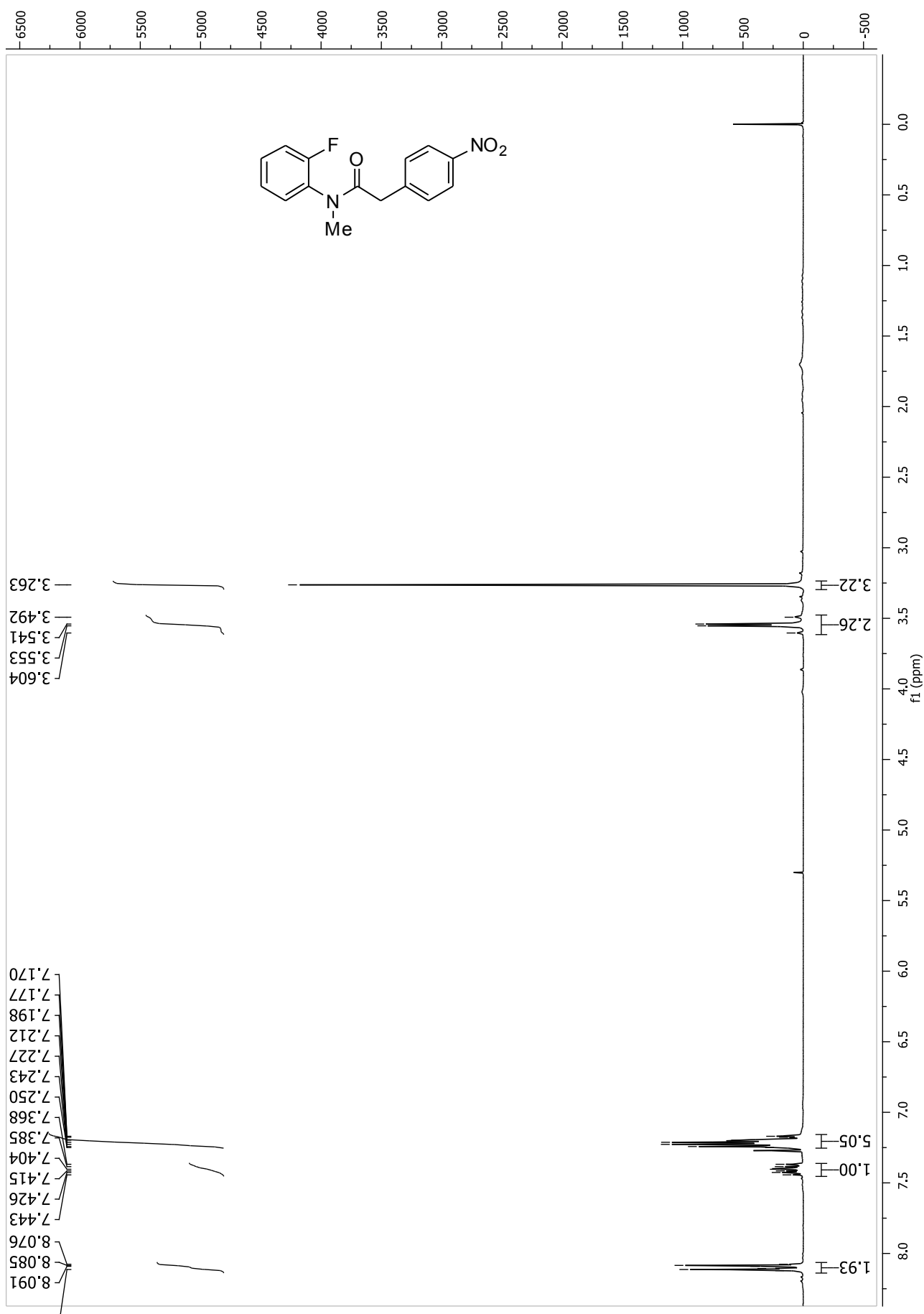
¹³C NMR spectra:

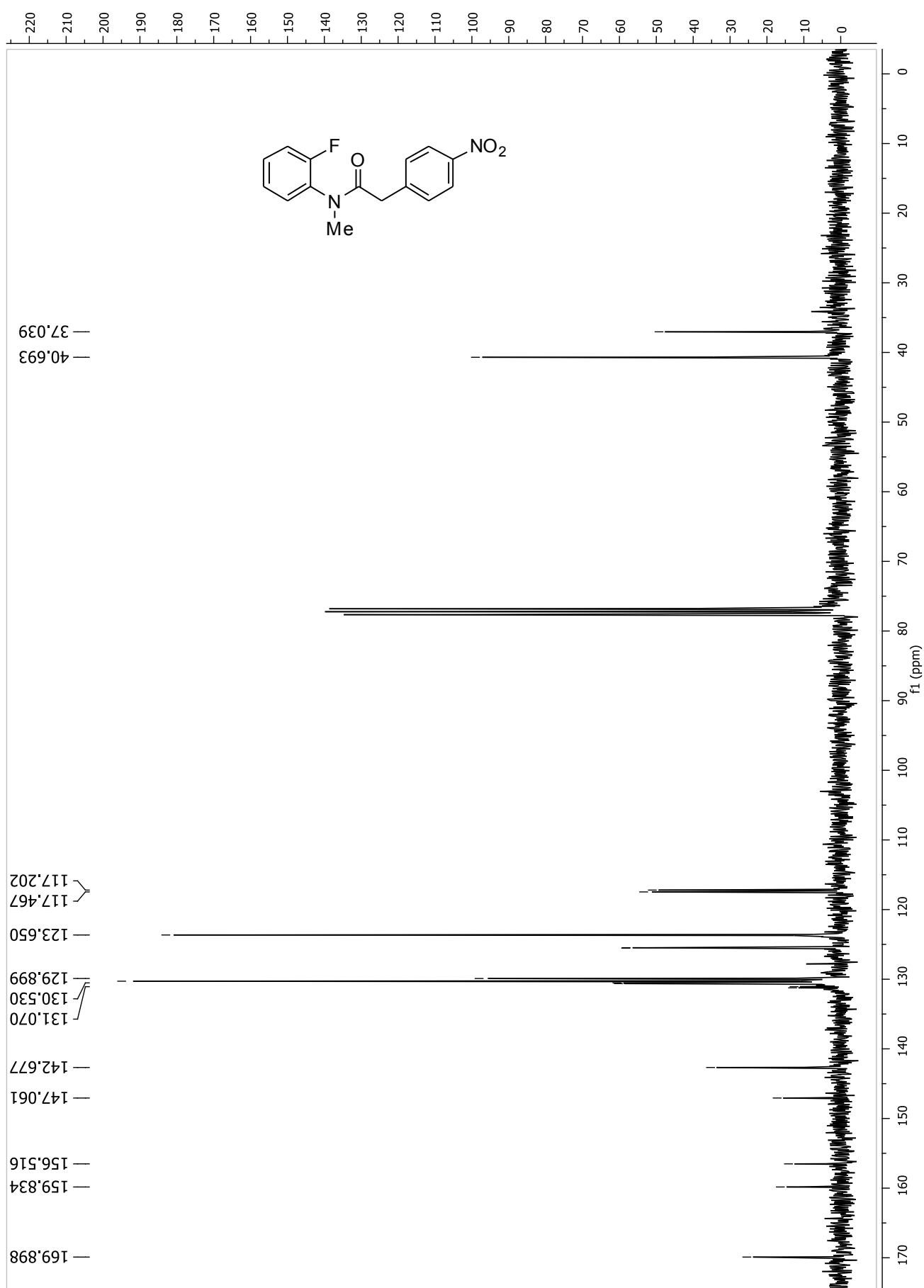
***N*-(2-Fluorophenyl)-*N*-methyl-2-(3-(trifluoromethyl)phenyl)acetamide: ¹H NMR spectra:**

¹³C NMR spectra:

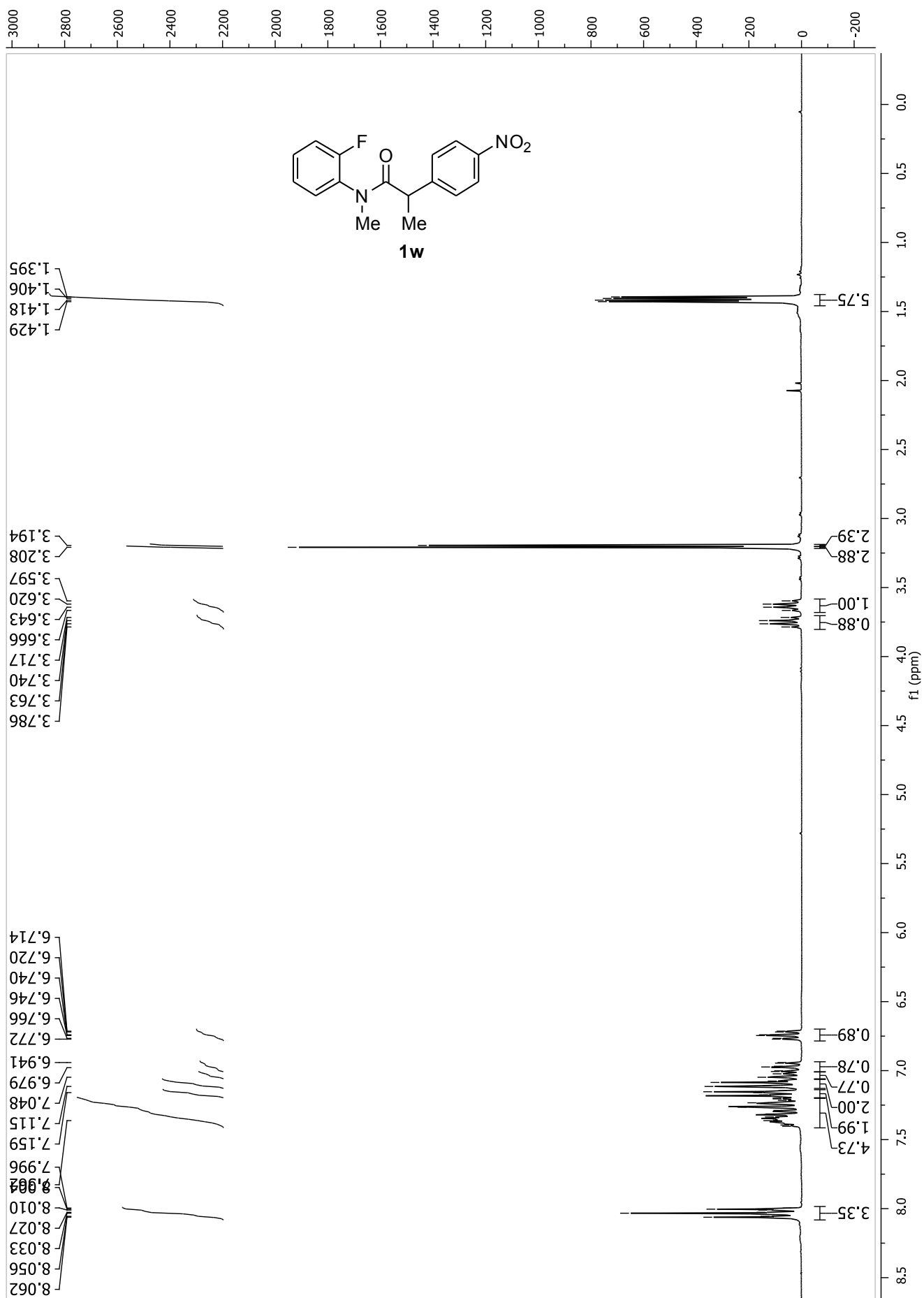
***N*-(2-Fluorophenyl)-*N*-methyl-2-(3-trifluoromethyl)phenyl)propanamide (1v): ¹H NMR spectra:**

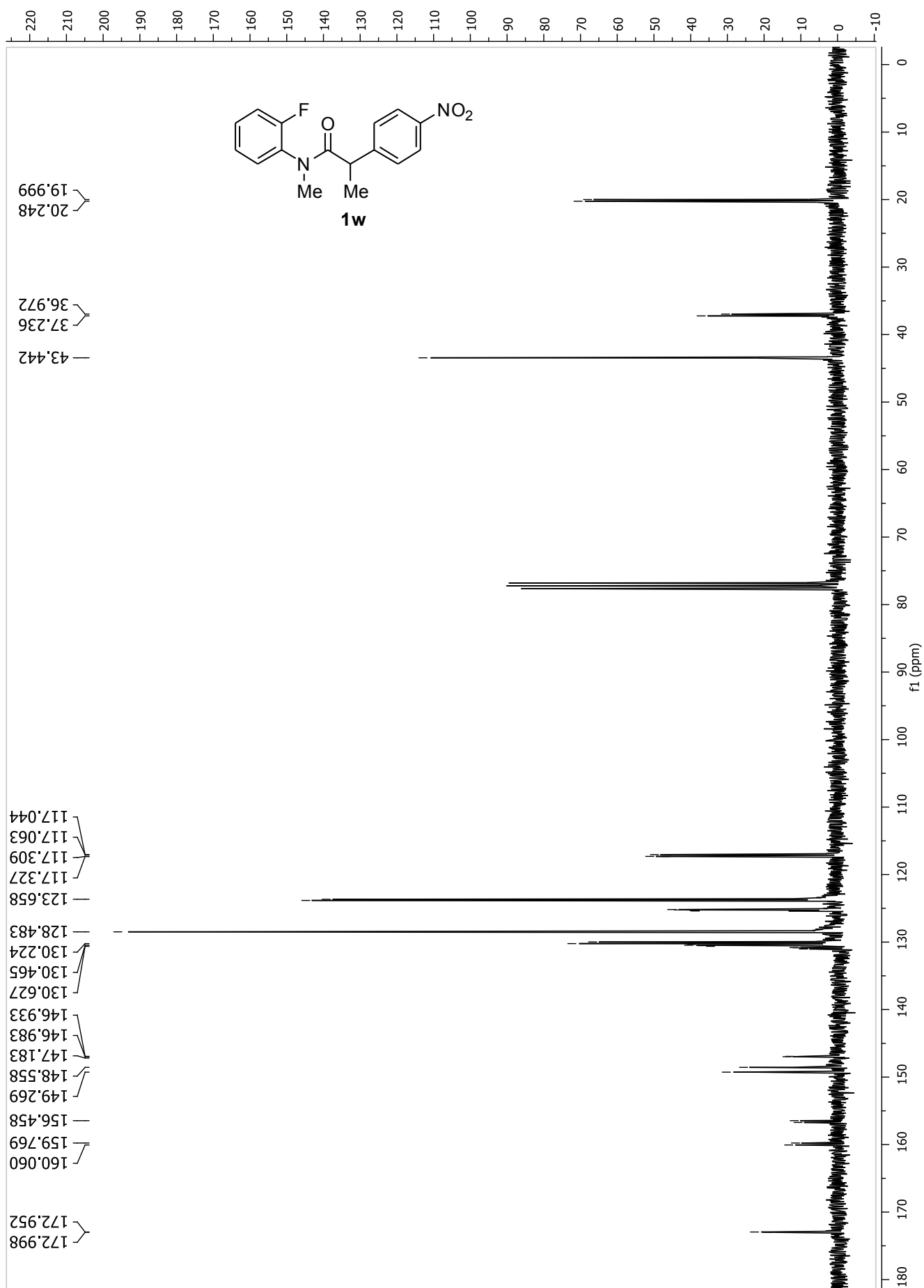
¹³C NMR spectra:

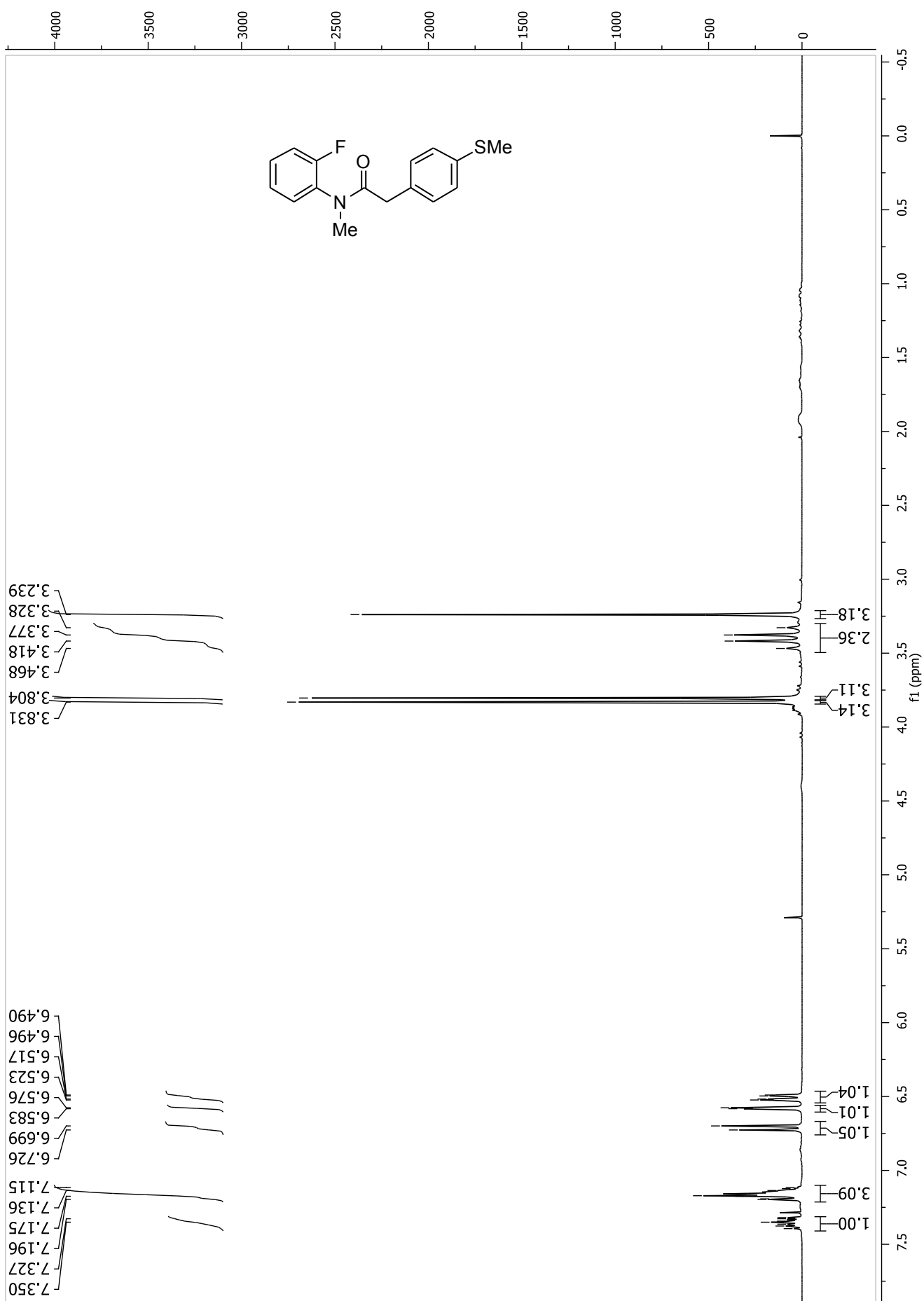
***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-nitrophenyl)acetamide: ¹H NMR spectra:**

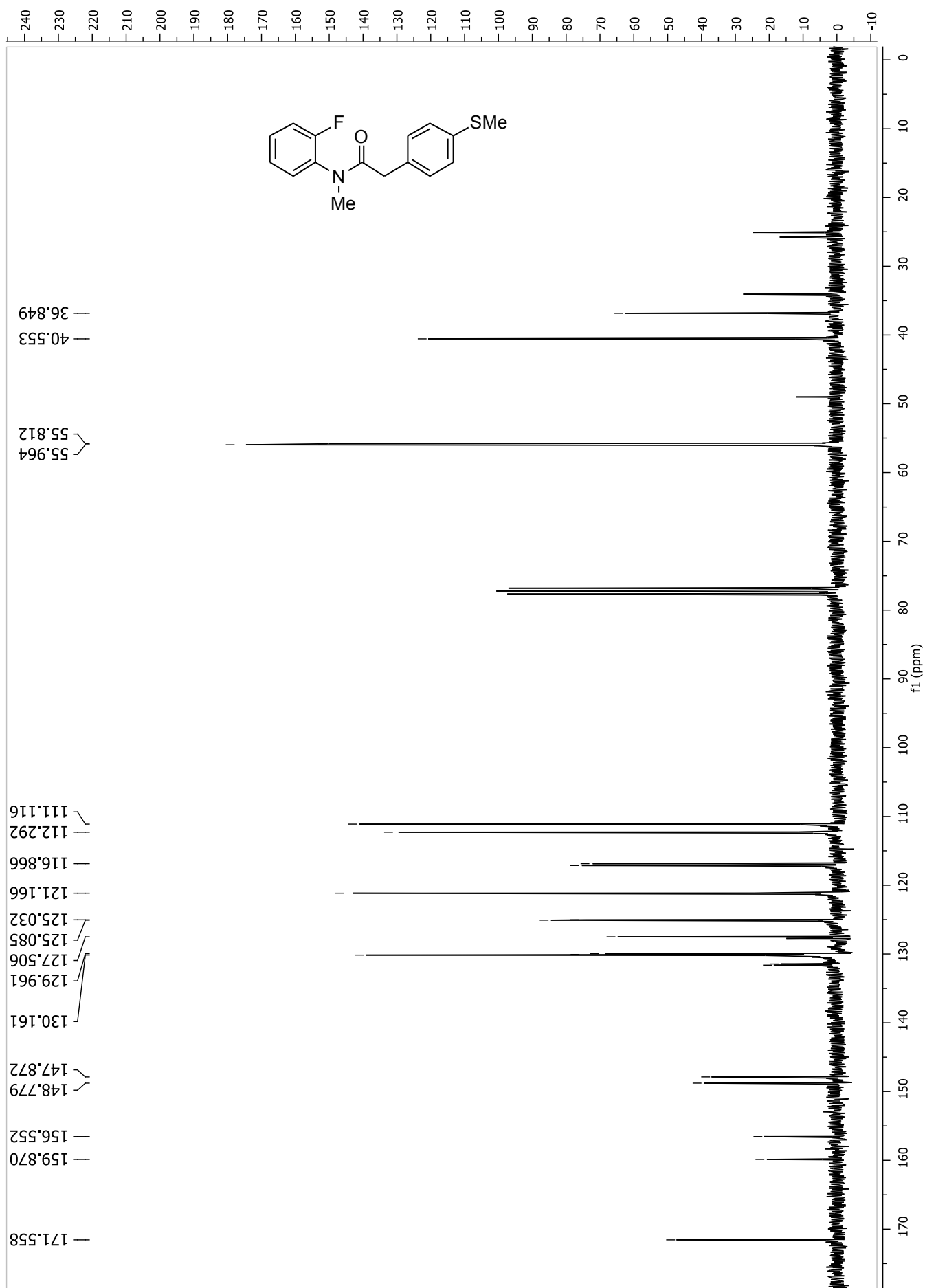
¹³C NMR spectra:

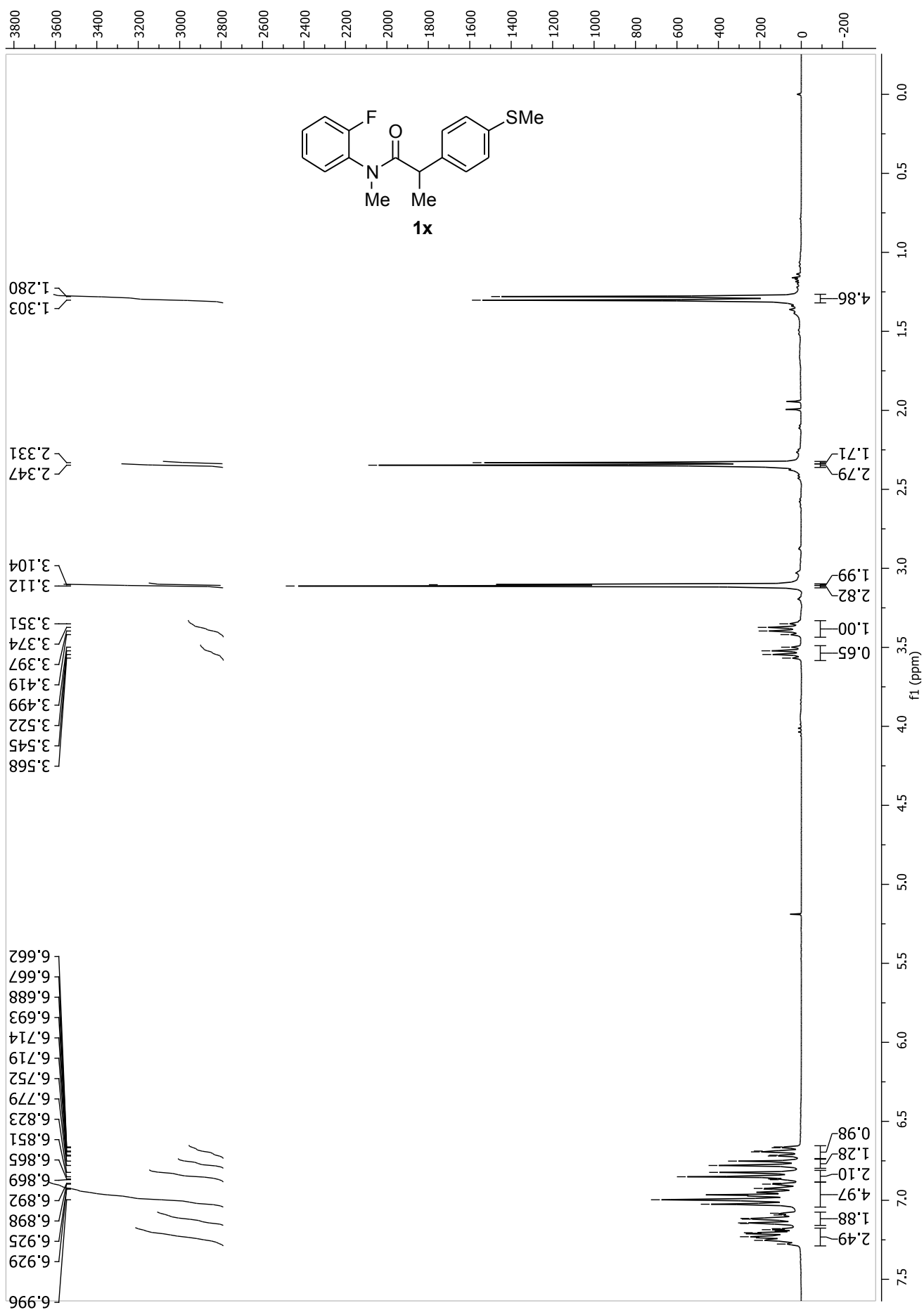
***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-nitrophenyl)propanamide (1w): ¹H NMR spectra:**

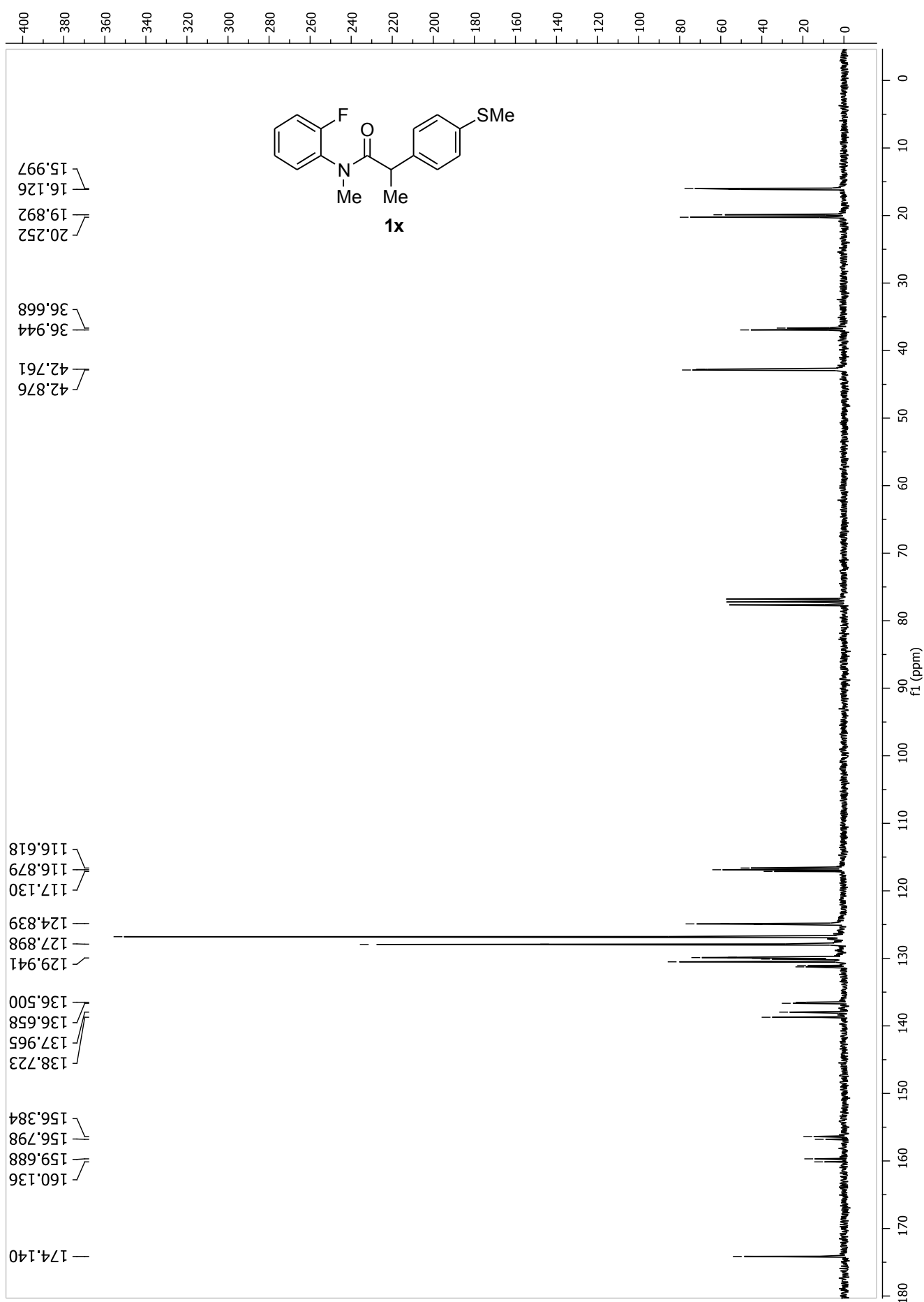


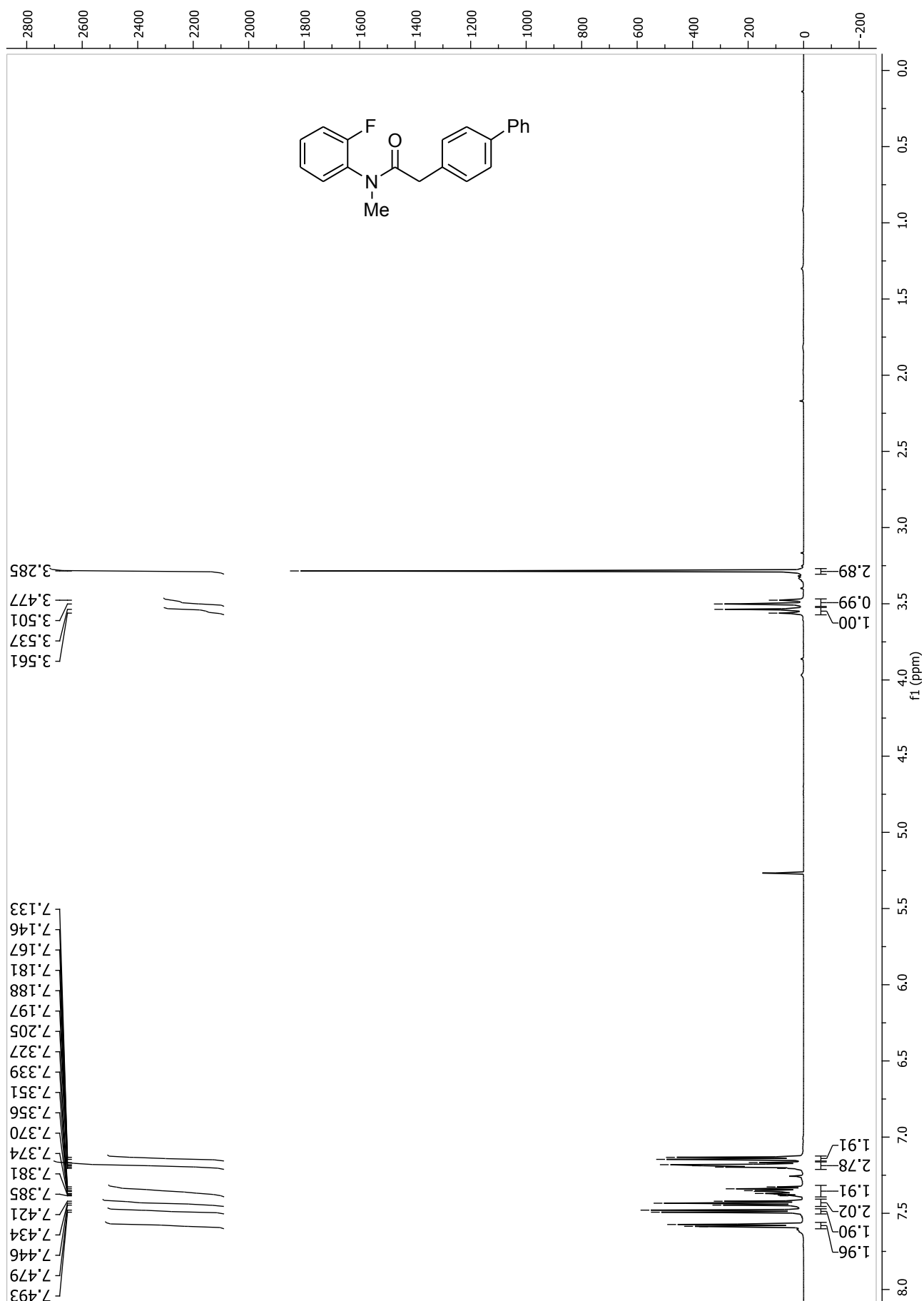
¹³C NMR spectra:

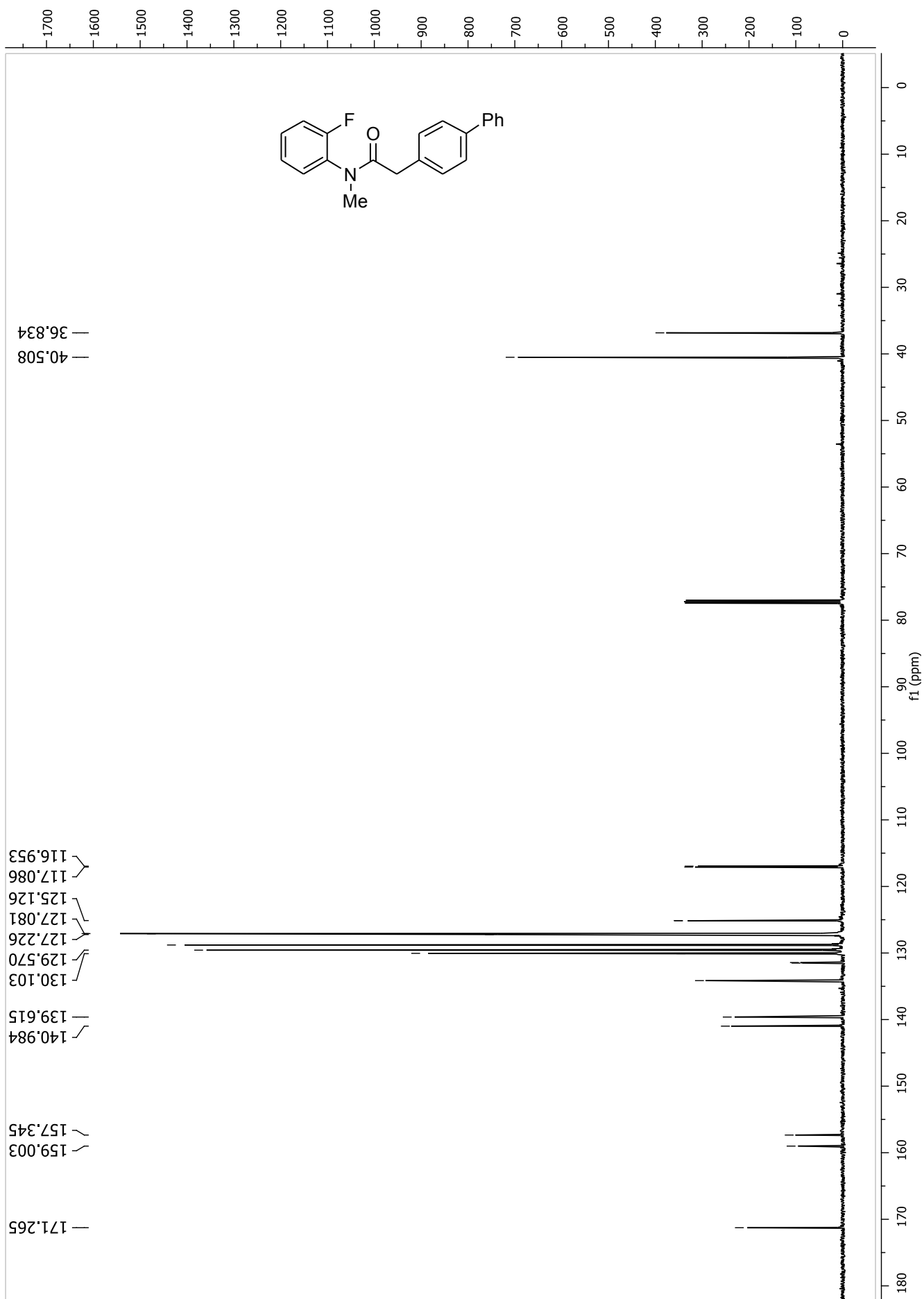
***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-methylthiophenyl)acetamide: ^1H NMR:**

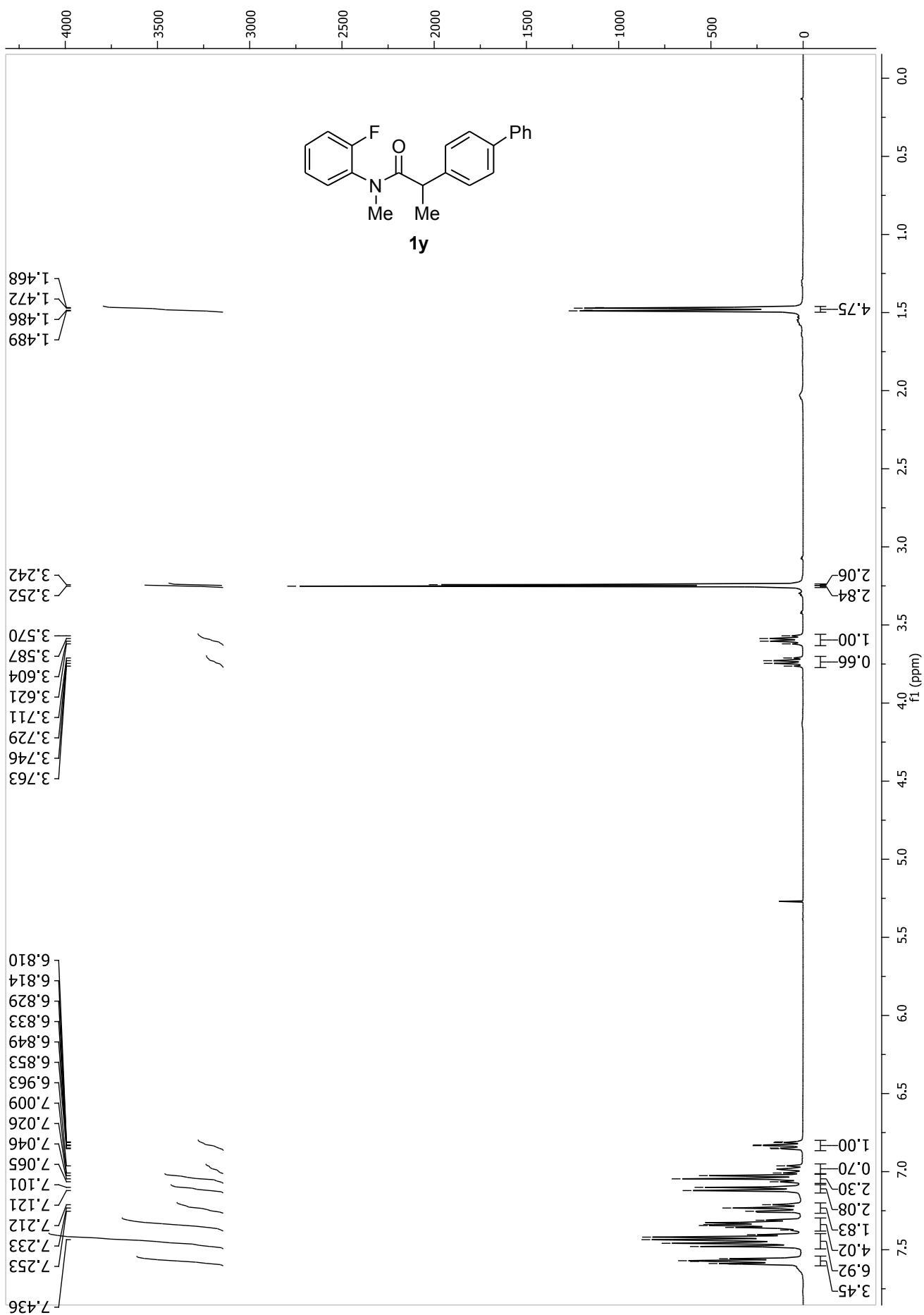
¹³C NMR spectra:

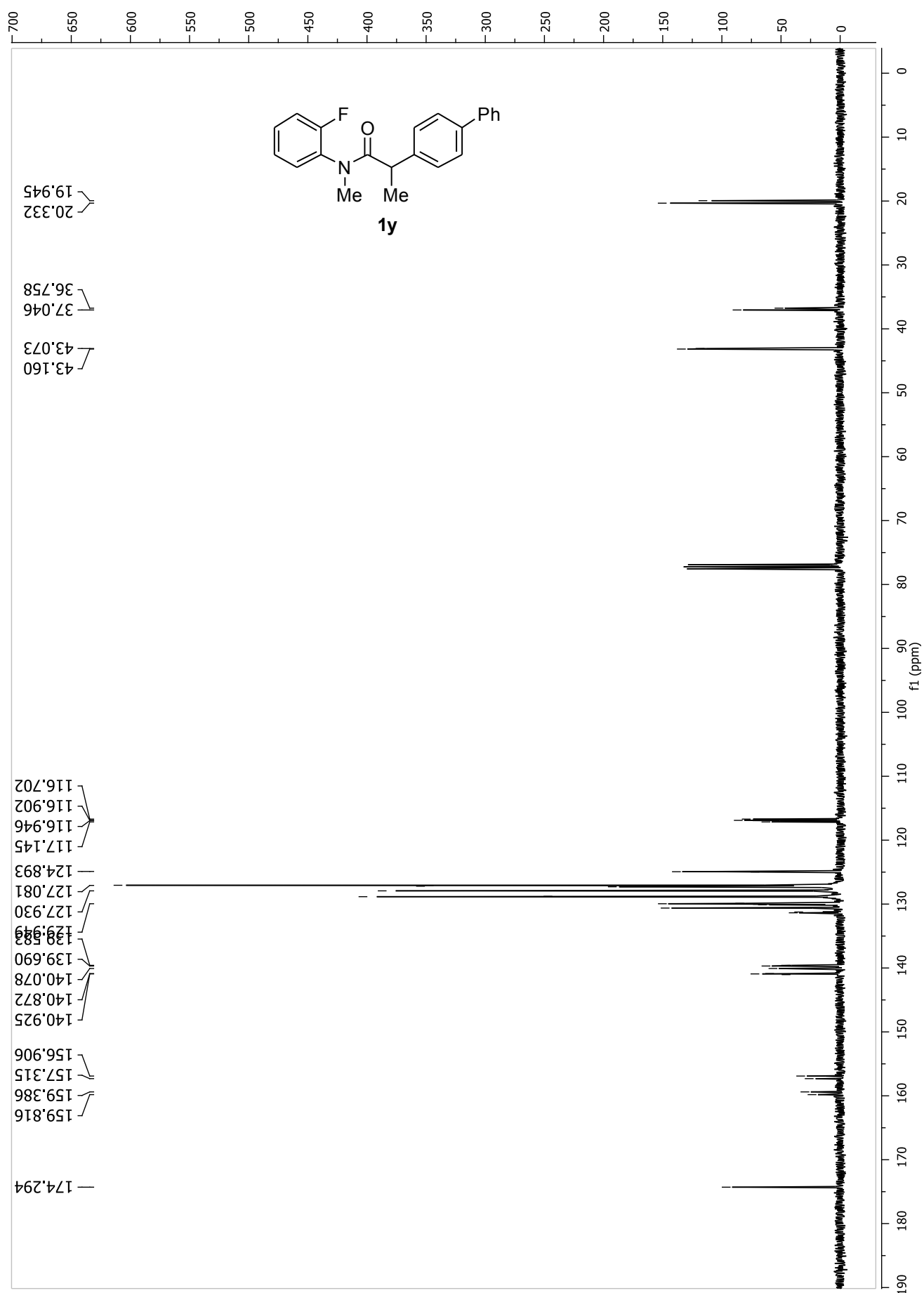
***N*-(2-Fluorophenyl)-*N*-methyl-2-(4-methylthiophenyl)propanamide (1x): ¹H NMR spectra:**

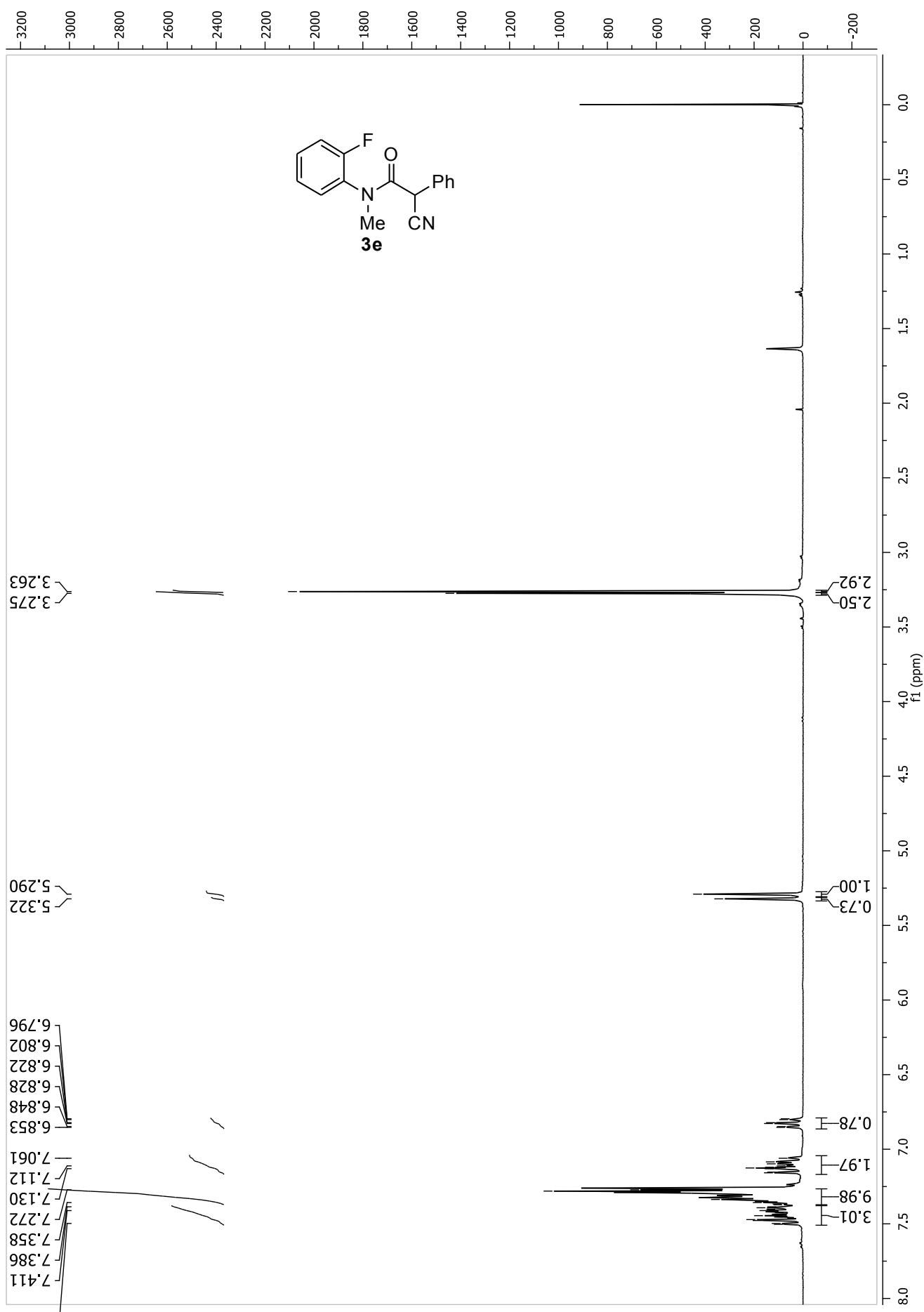
¹³C NMR spectra:

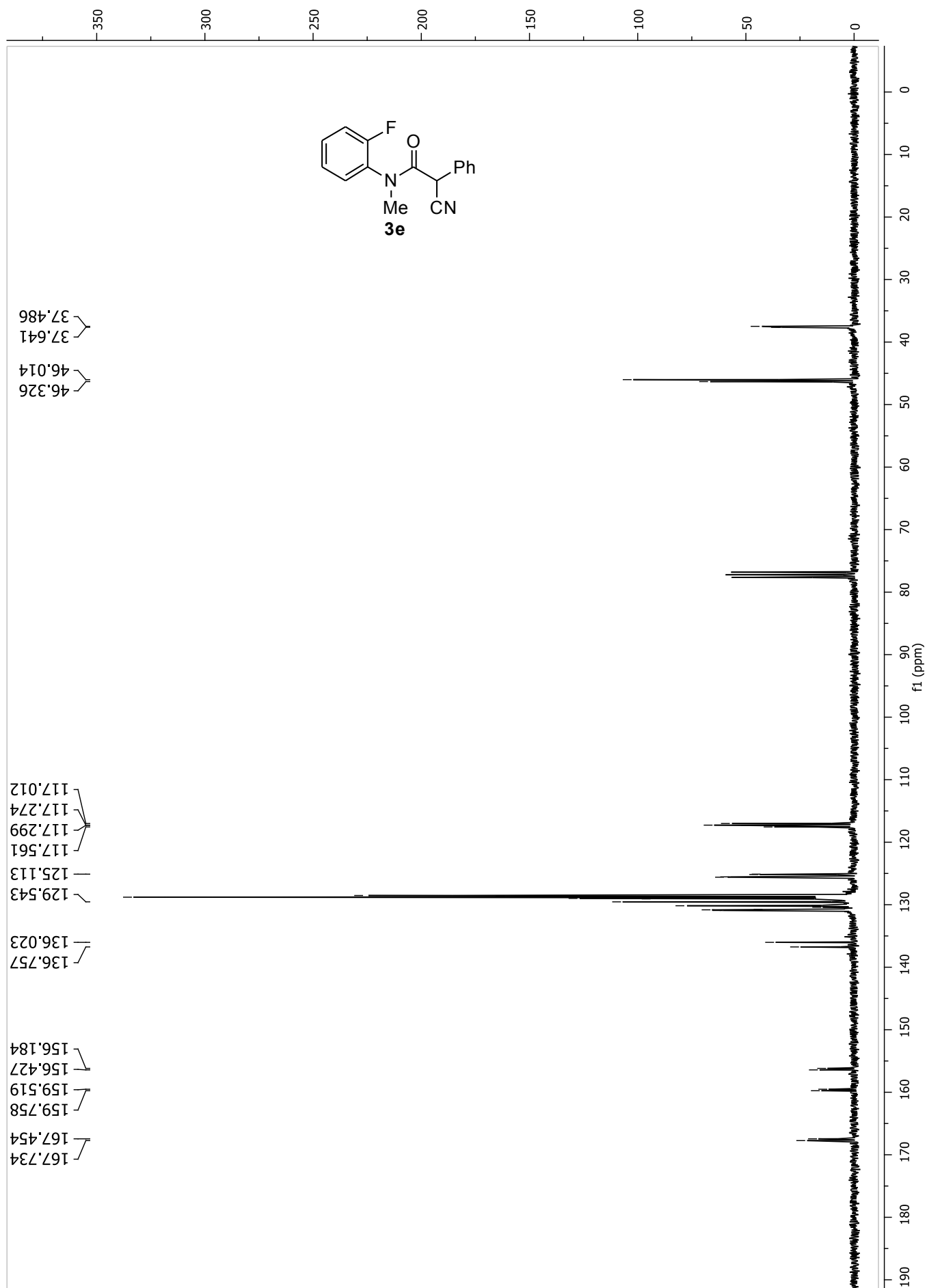
2-([1,1'-Biphenyl]-4-yl)-N-(2-fluorophenyl)-N-methylacetamide: ^1H NMR spectra:

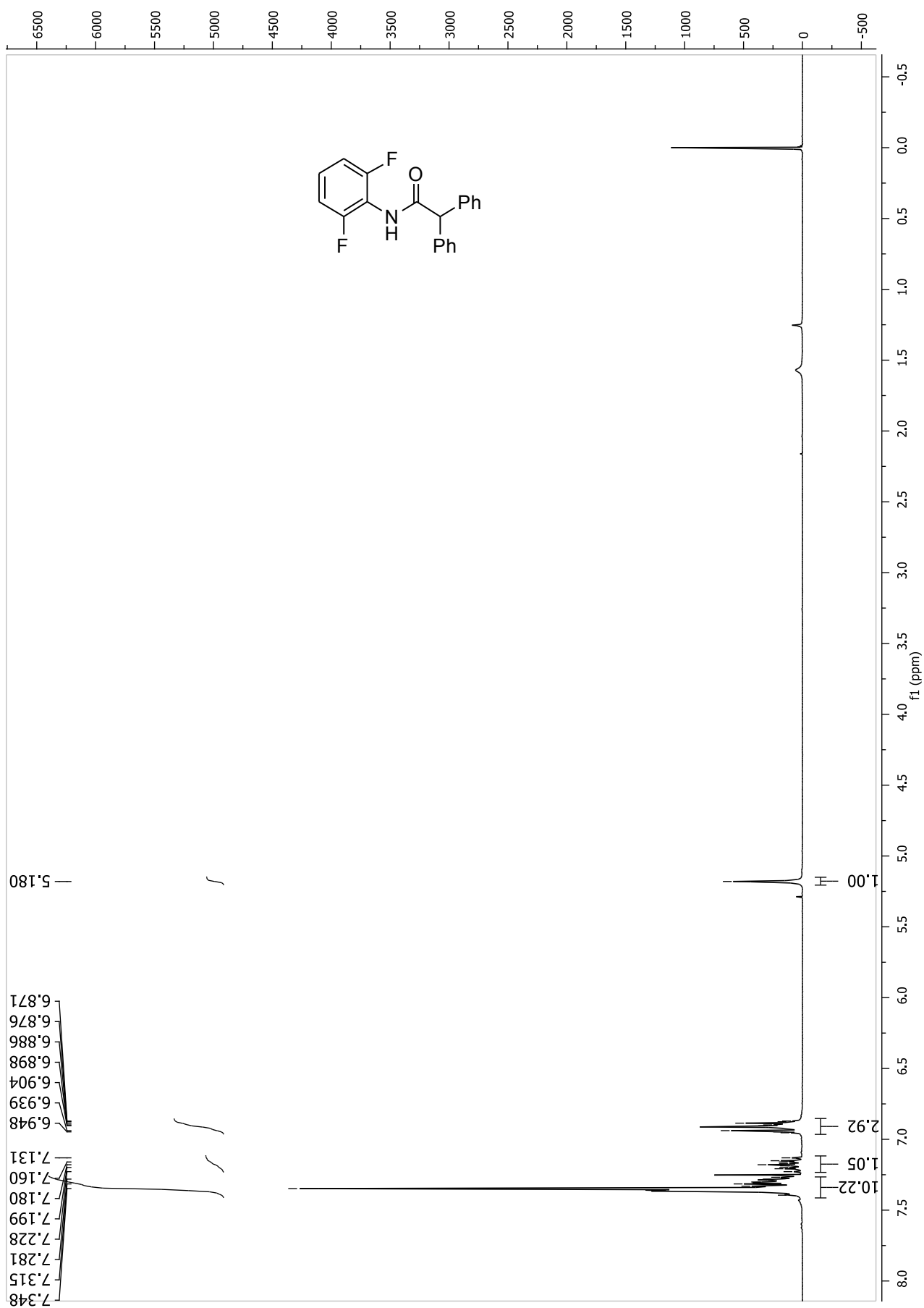
¹³C NMR spectra:

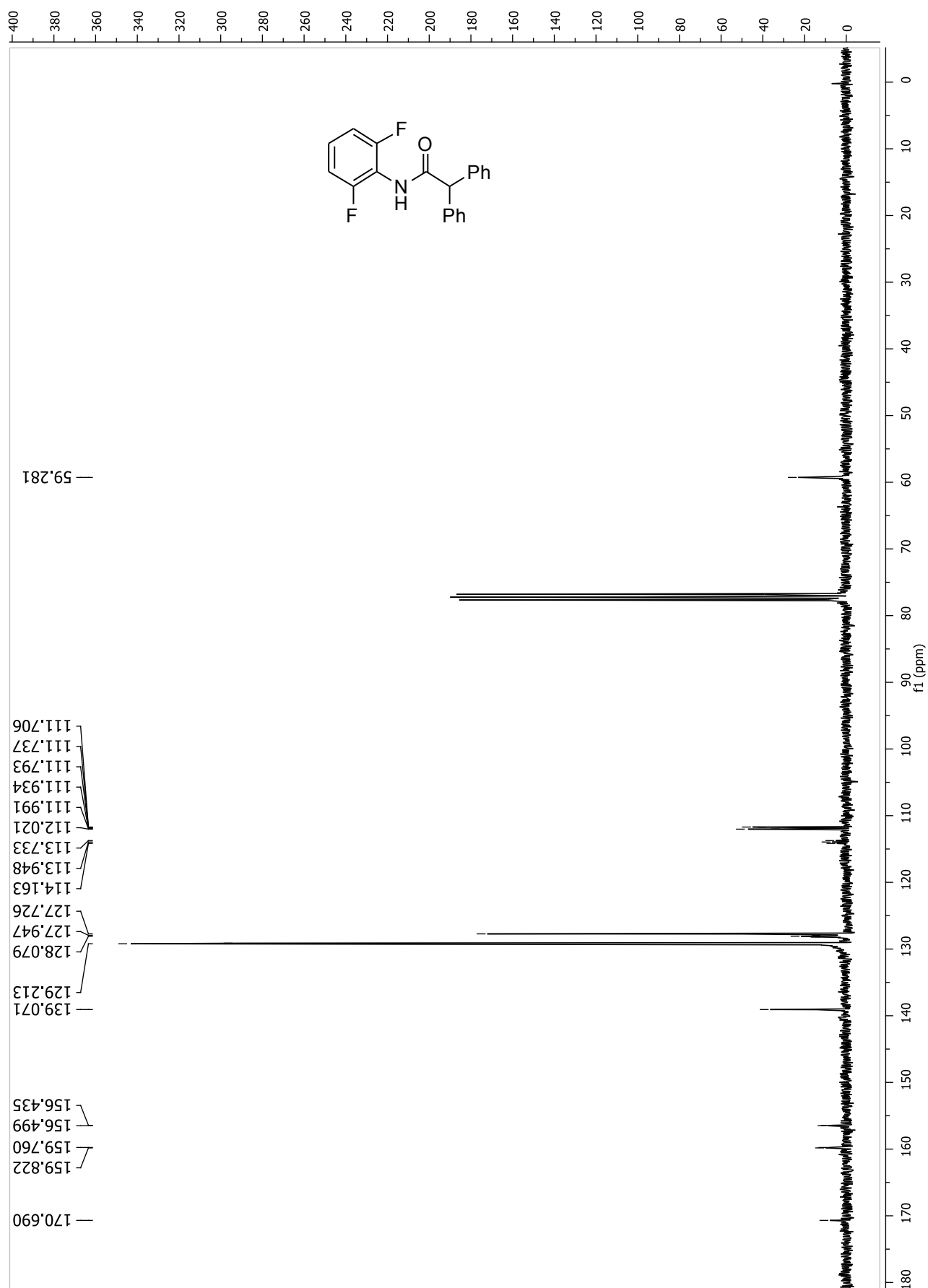
2-([1,1'-Biphenyl]-4-yl)-N-(2-fluorophenyl)-N-methylpropanamide (1y): ^1H NMR spectra:

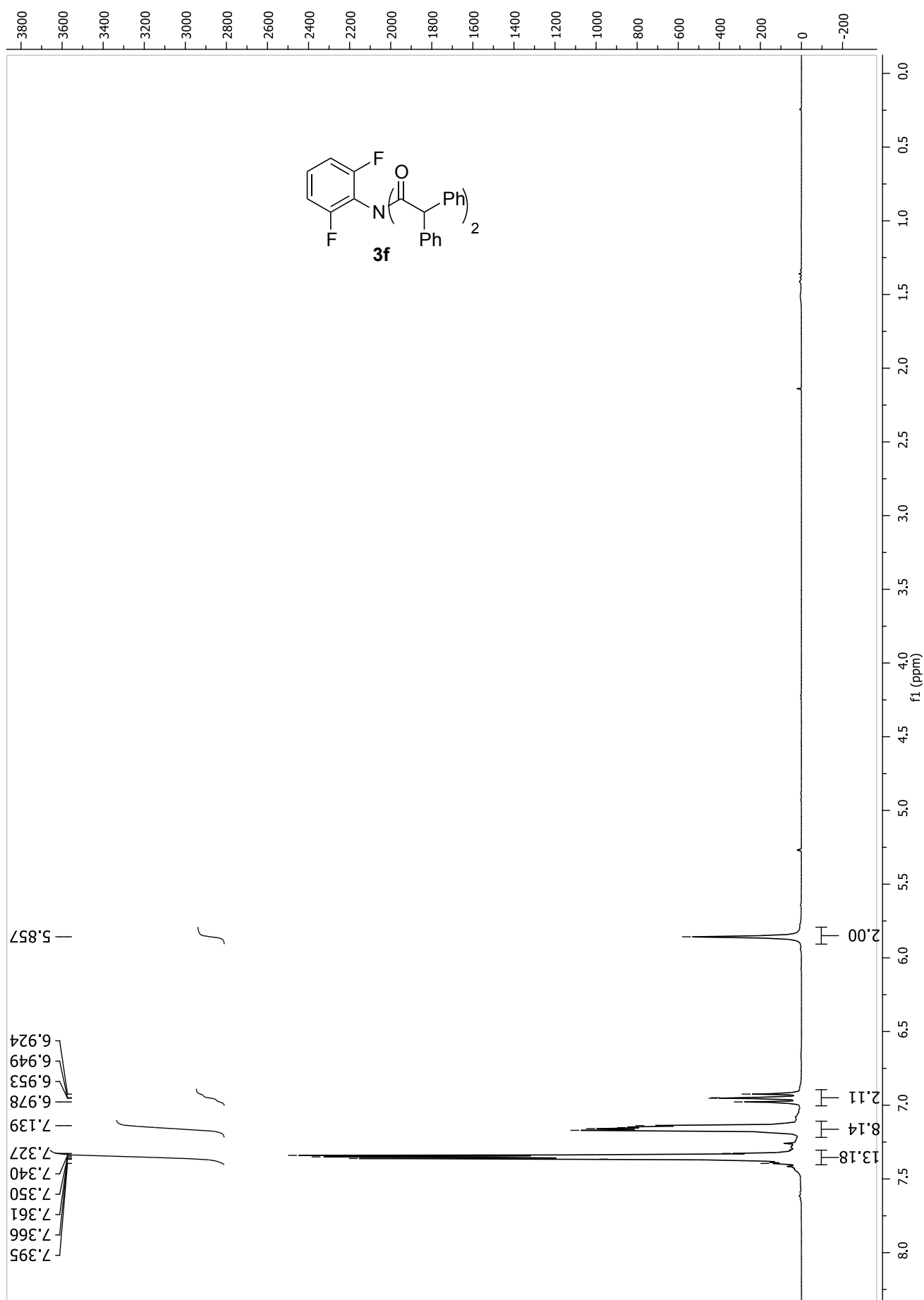
¹³C NMR spectra:

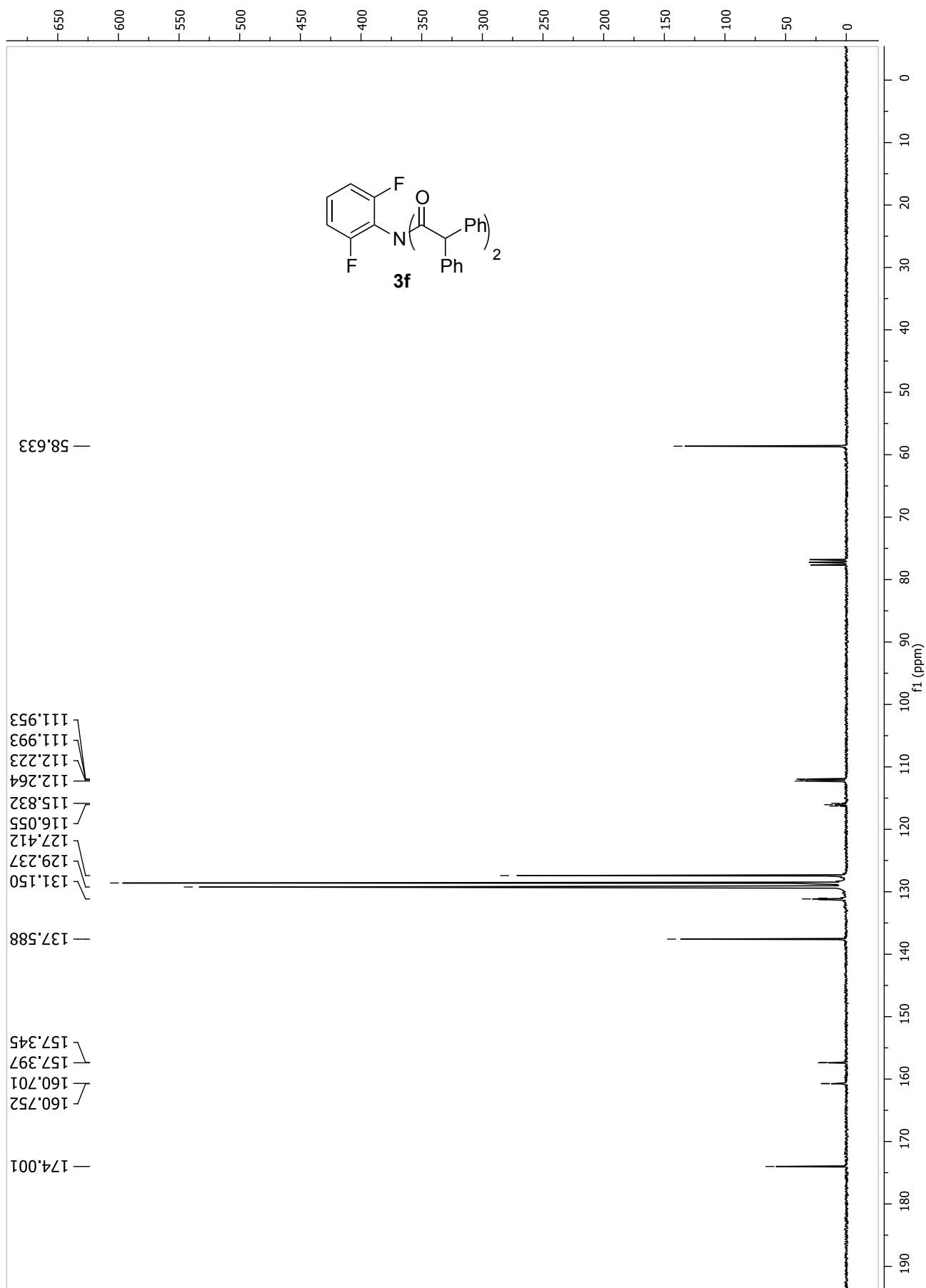
2-Cyano-N-(2-fluorophenyl)-N-methyl-2-phenylacetamide (3e): ^1H NMR spectra:

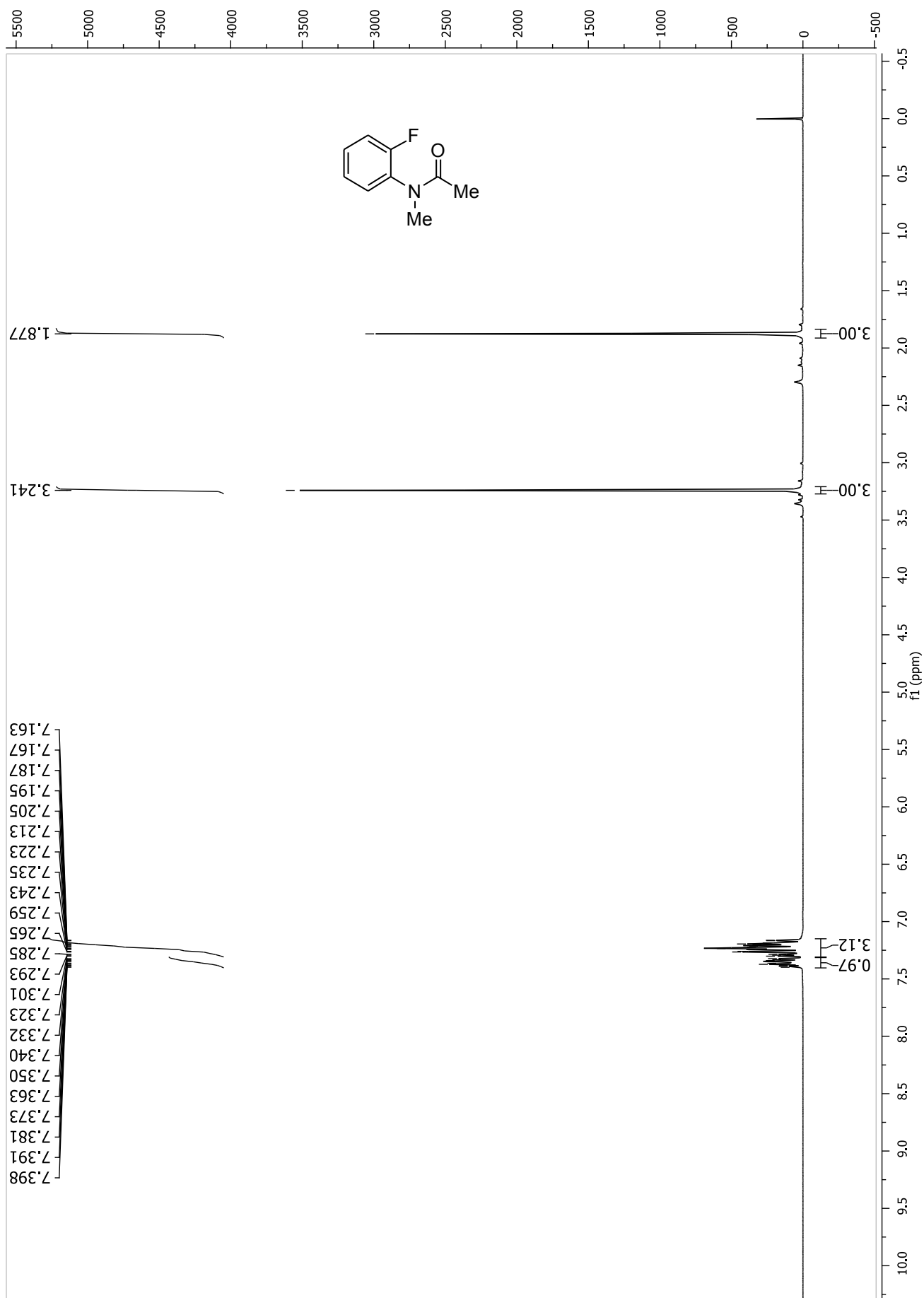
¹³C NMR spectra:

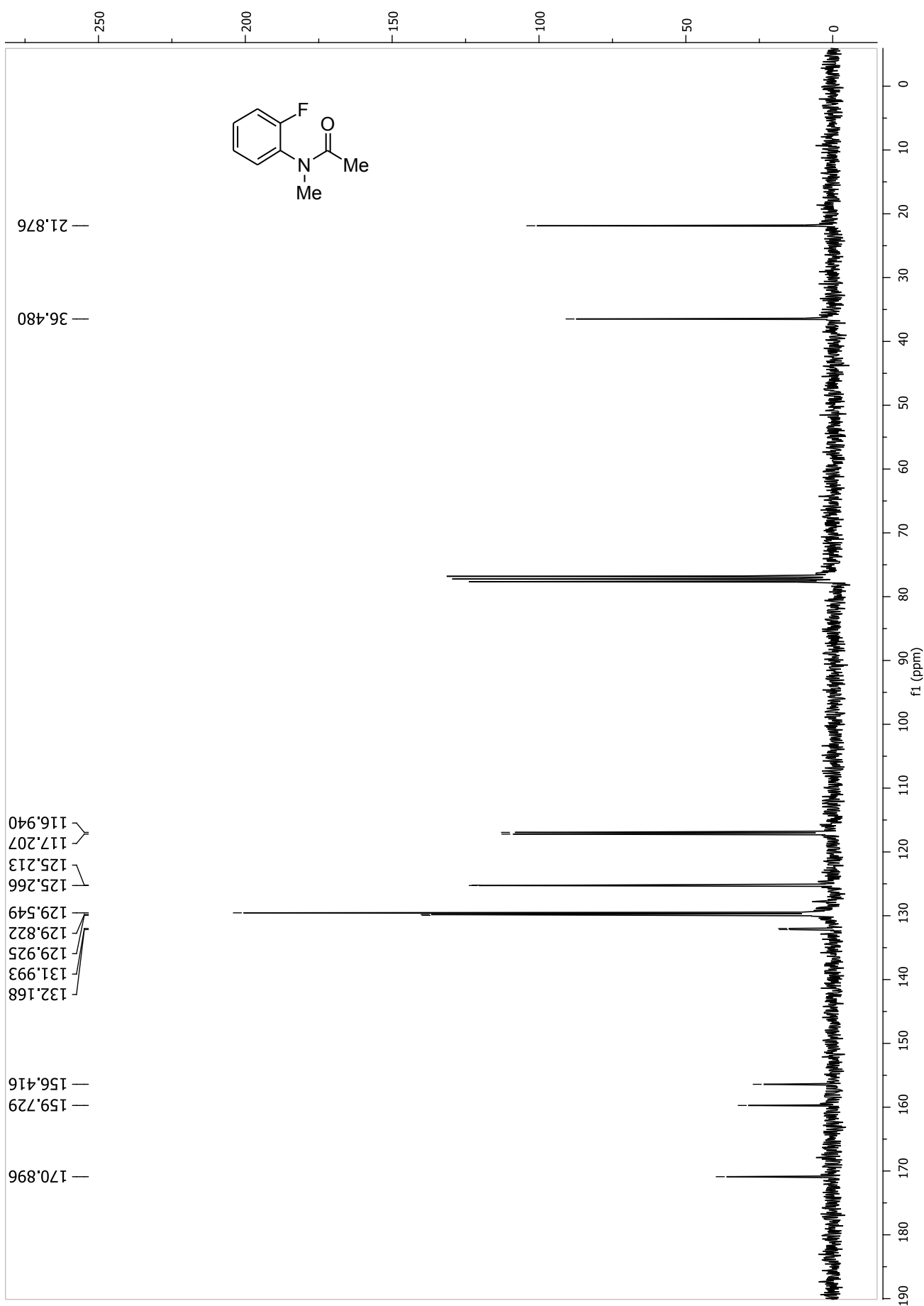
***N*-(2,6-Difluorophenyl)-2,2-diphenylacetamide: ¹H NMR spectra:**

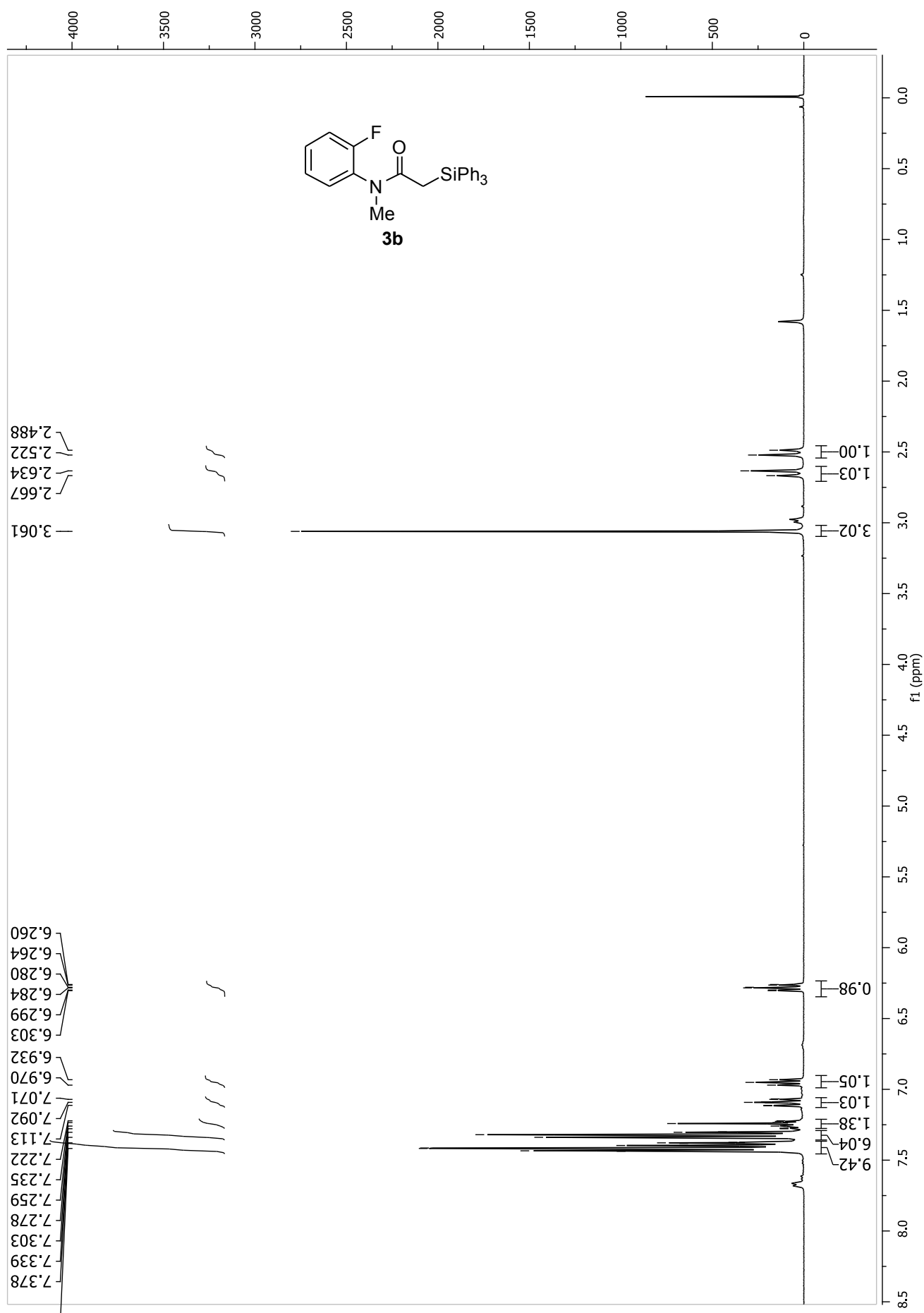
¹³C NMR spectra:

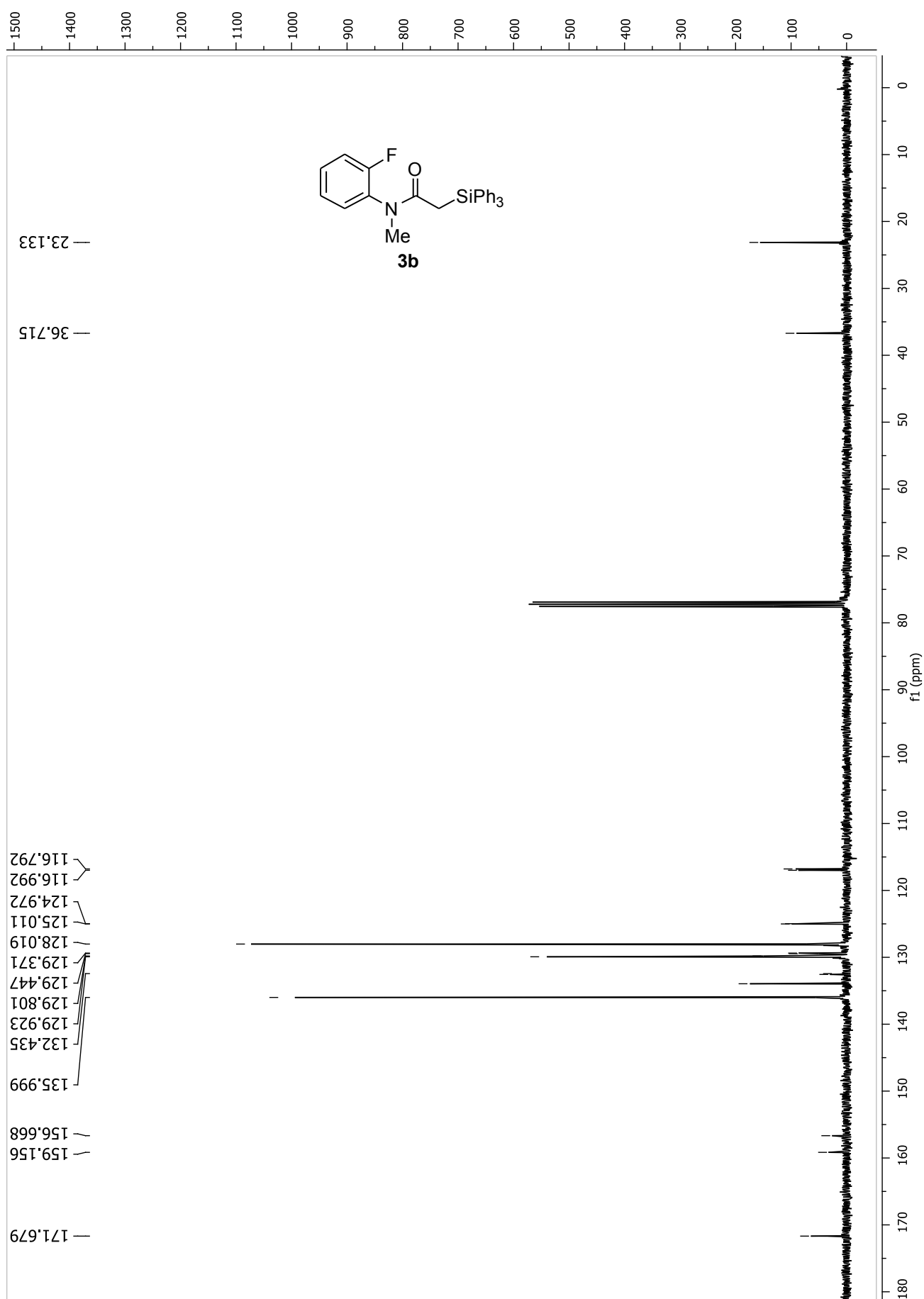
***N*-(2,6-Difluorophenyl)-*N*-(2,2-diphenylacetyl)-2,2-diphenylacetamide (3f): ¹H NMR spectra:**

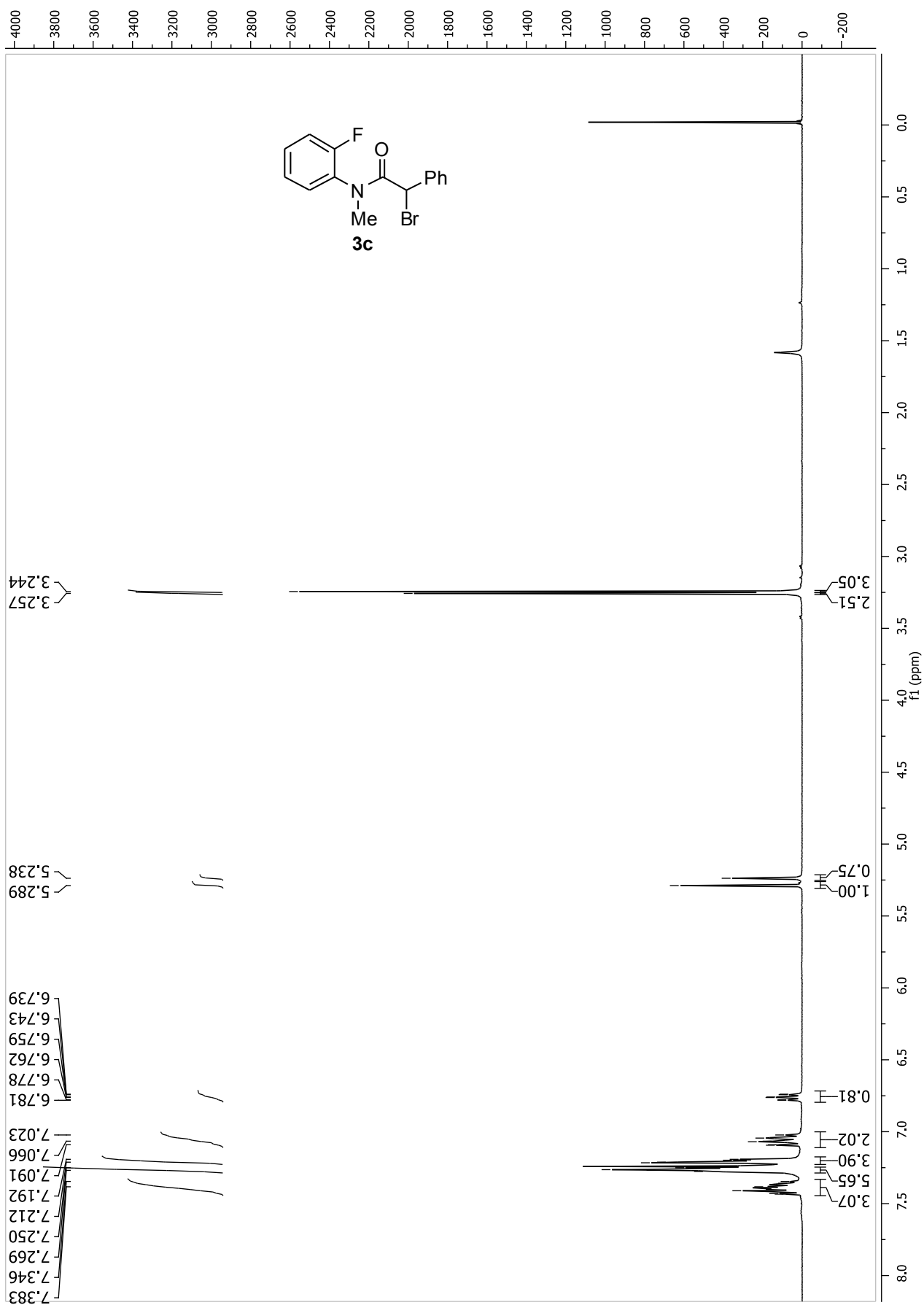
¹³C NMR spectra:

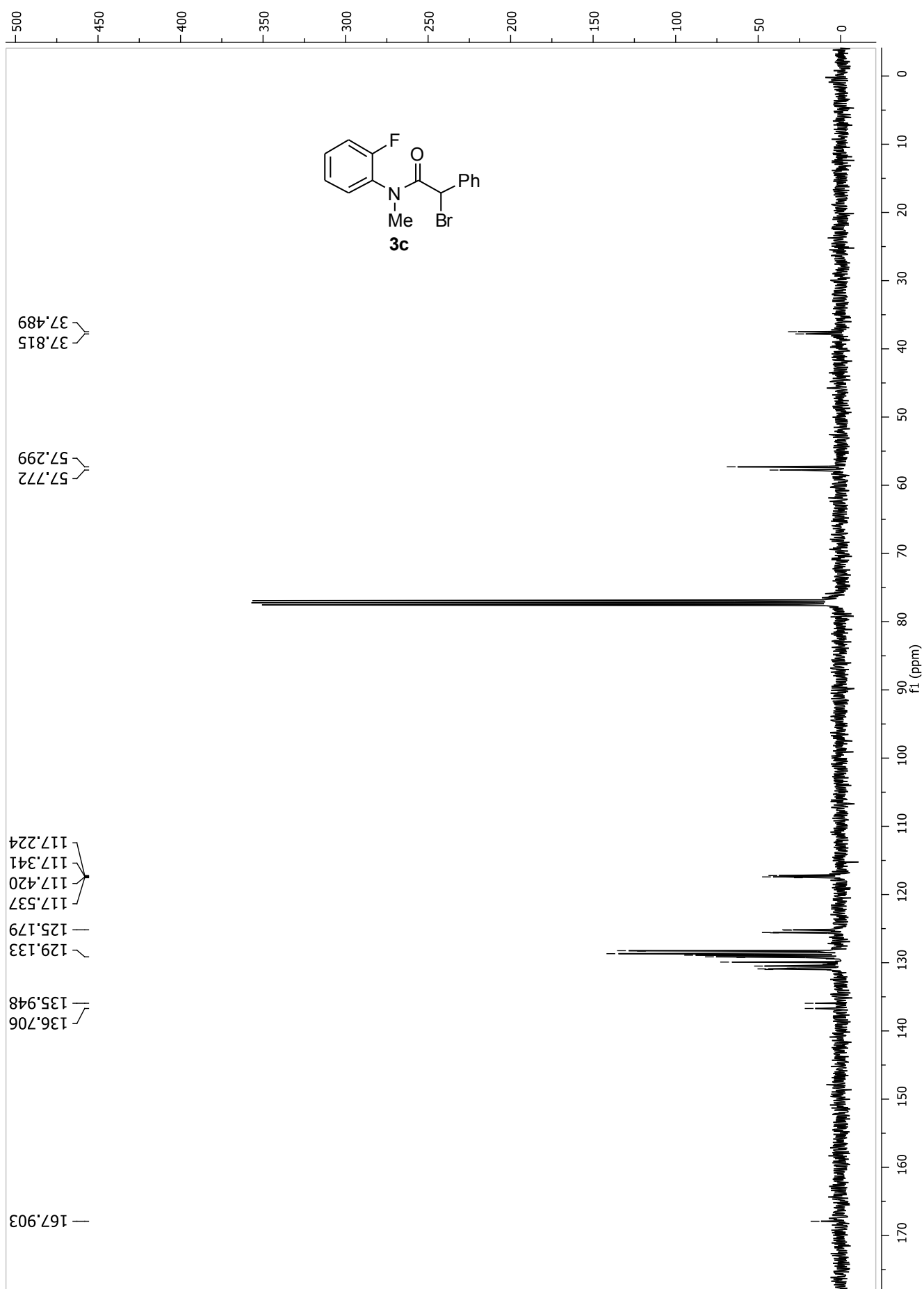
***N*-(2-Fluorophenyl)-*N*-methylacetamide: ^1H NMR spectra:**

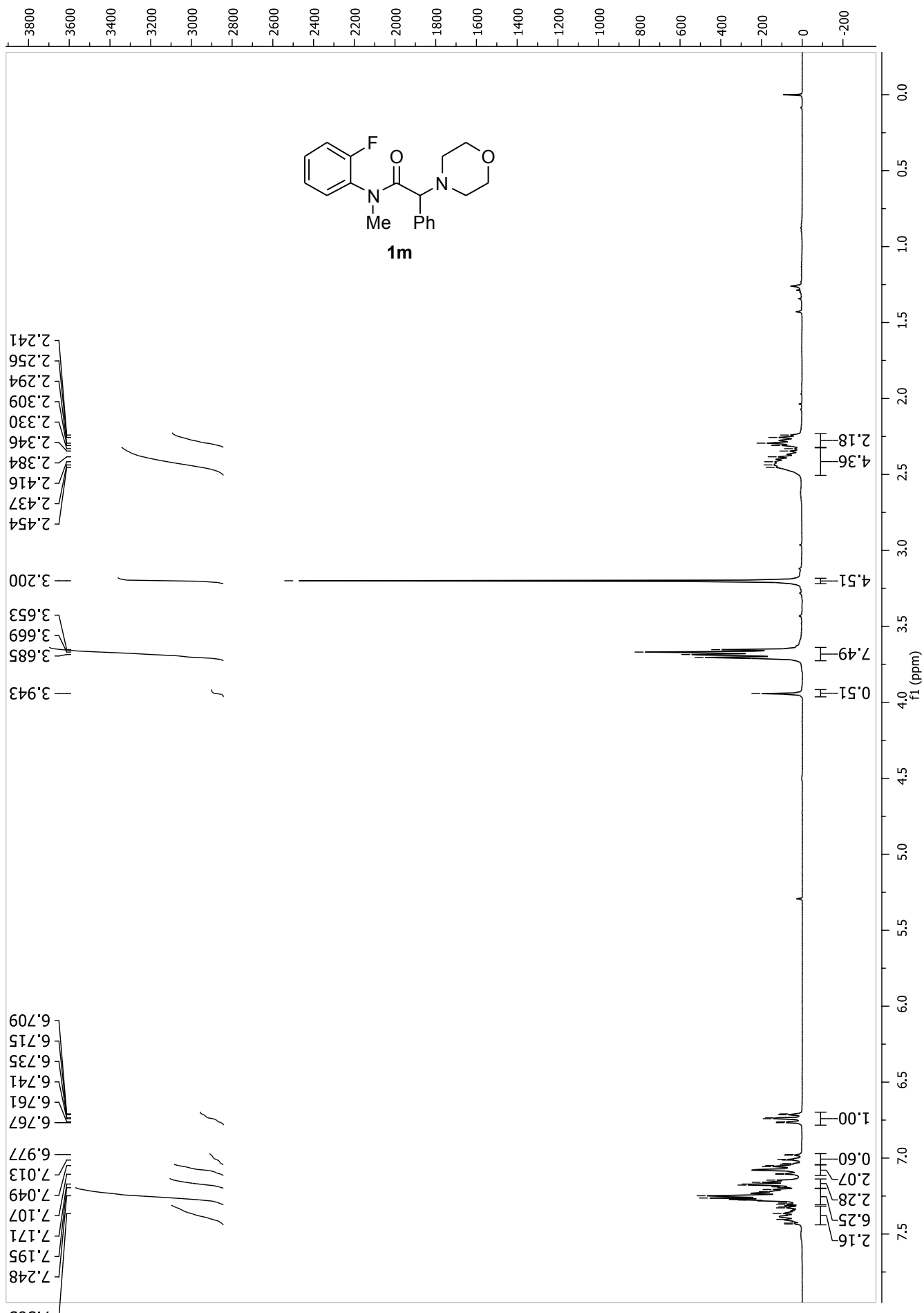
¹³C NMR spectra:

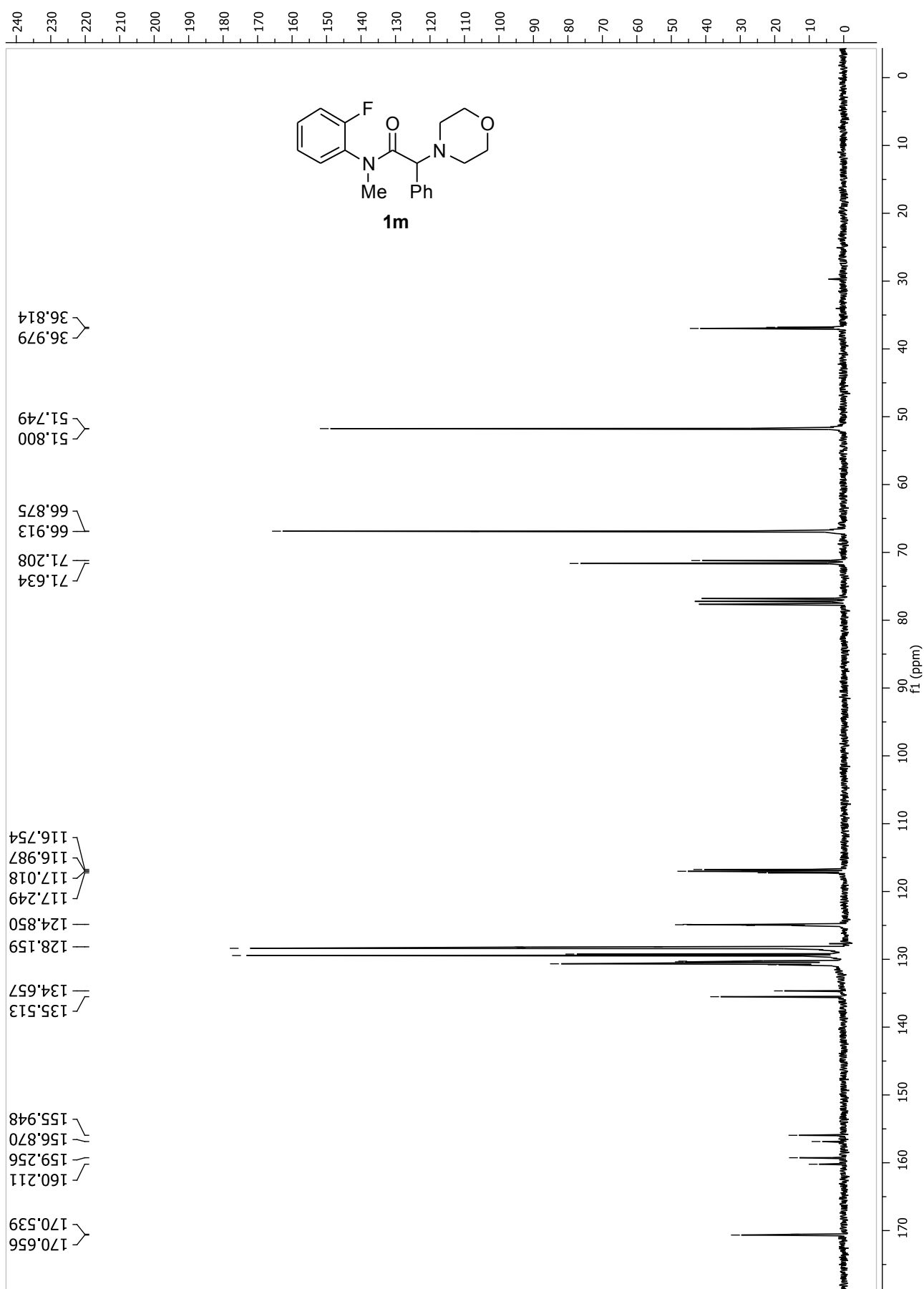
***N*-(2-Fluorophenyl)-*N*-methyl-2-(triphenylsilyl)acetamide (3b): ^1H NMR spectra:**

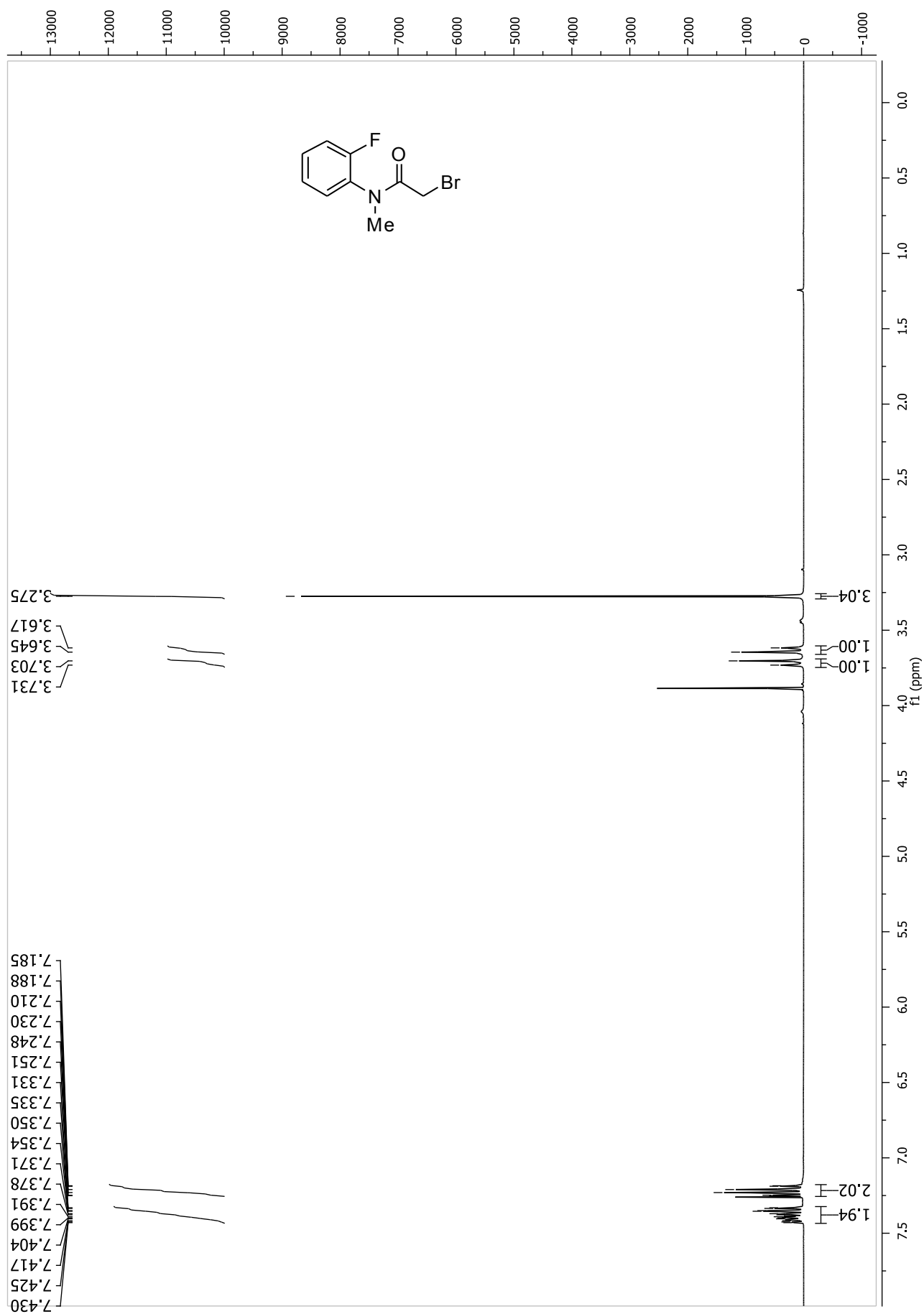
¹³C NMR spectra:

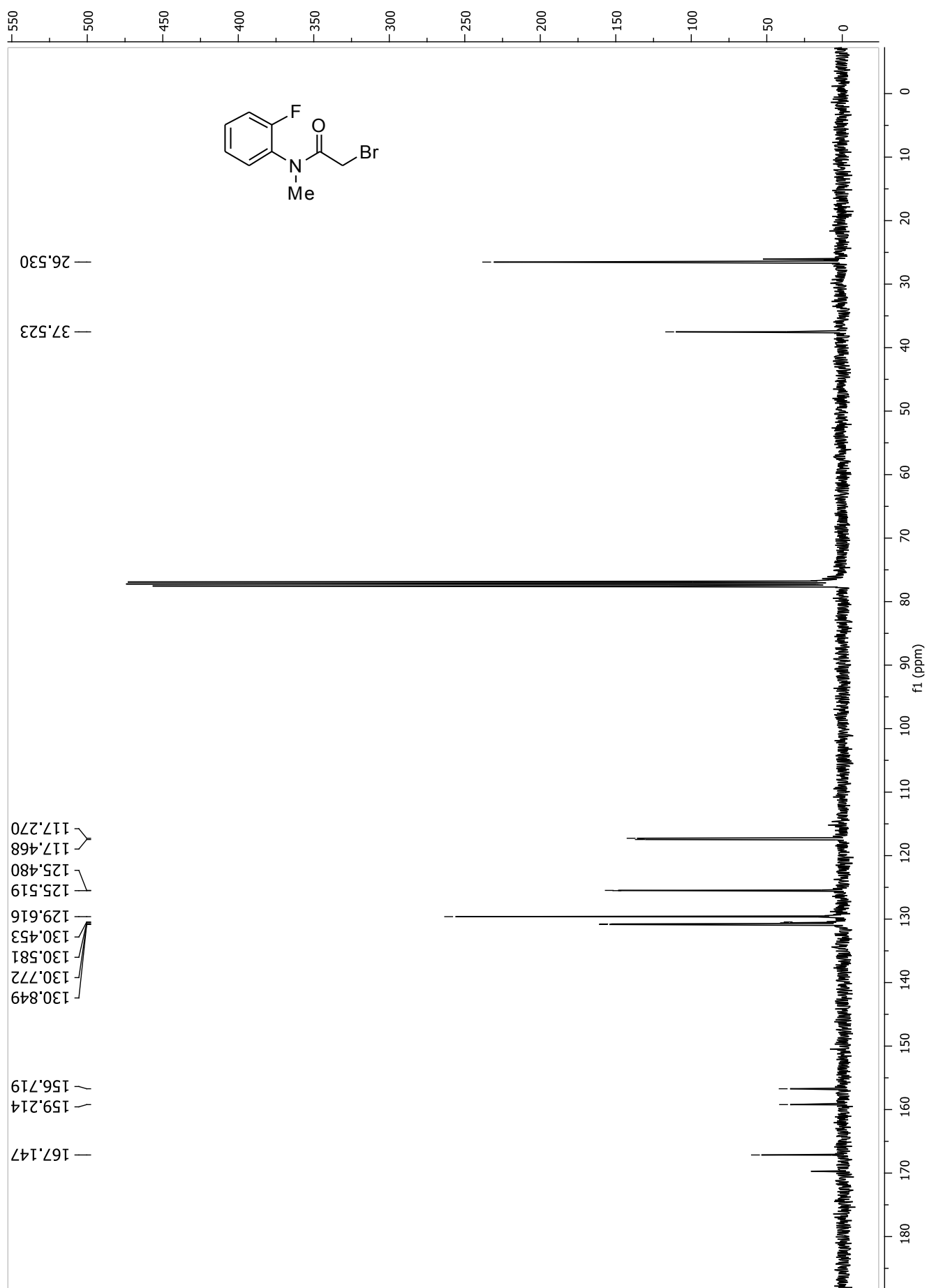
2-Bromo-*N*-(2-fluorophenyl)-*N*-methyl-2-phenylacetamide (3c): ^1H NMR spectra:

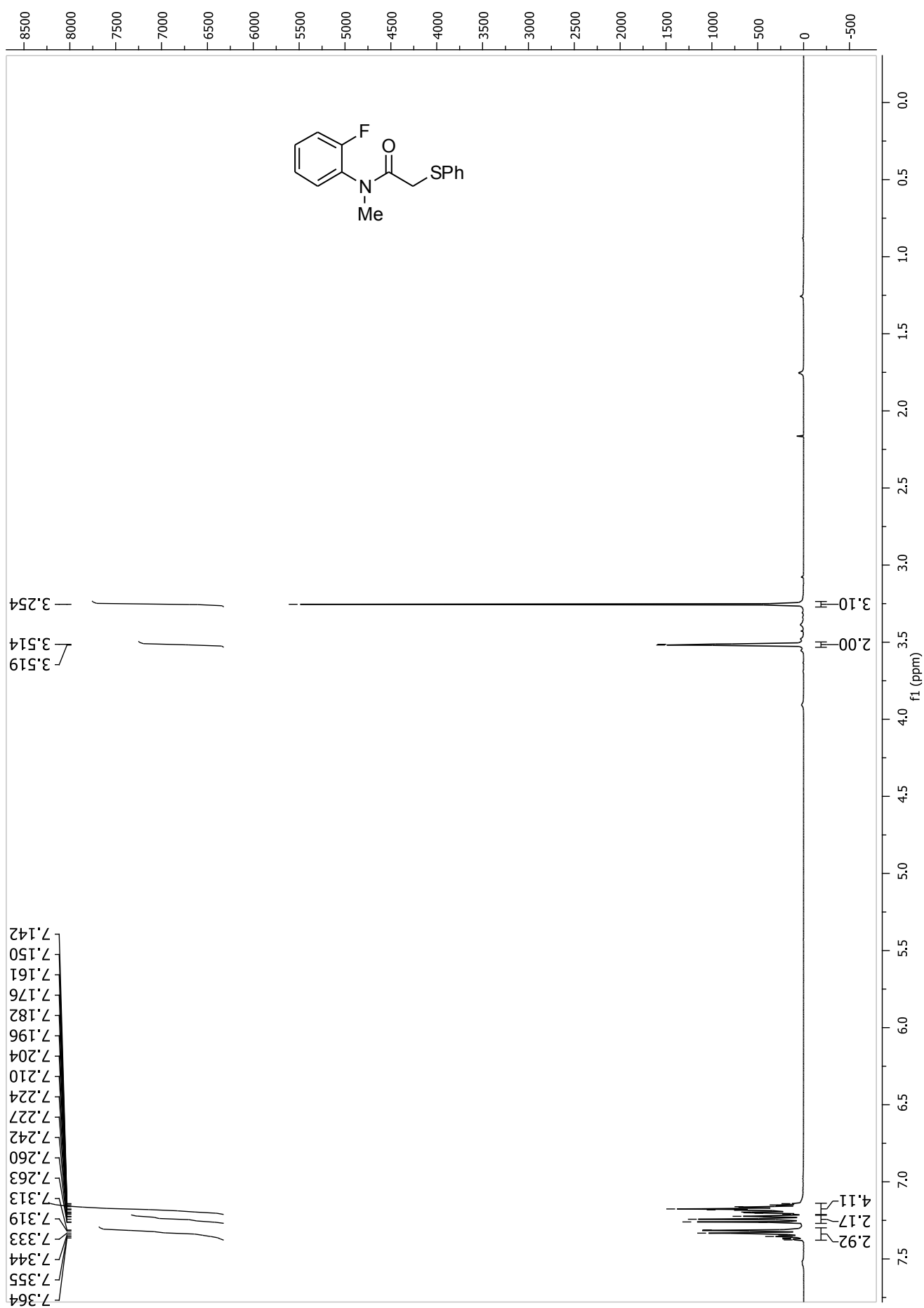
¹³C NMR spectra:

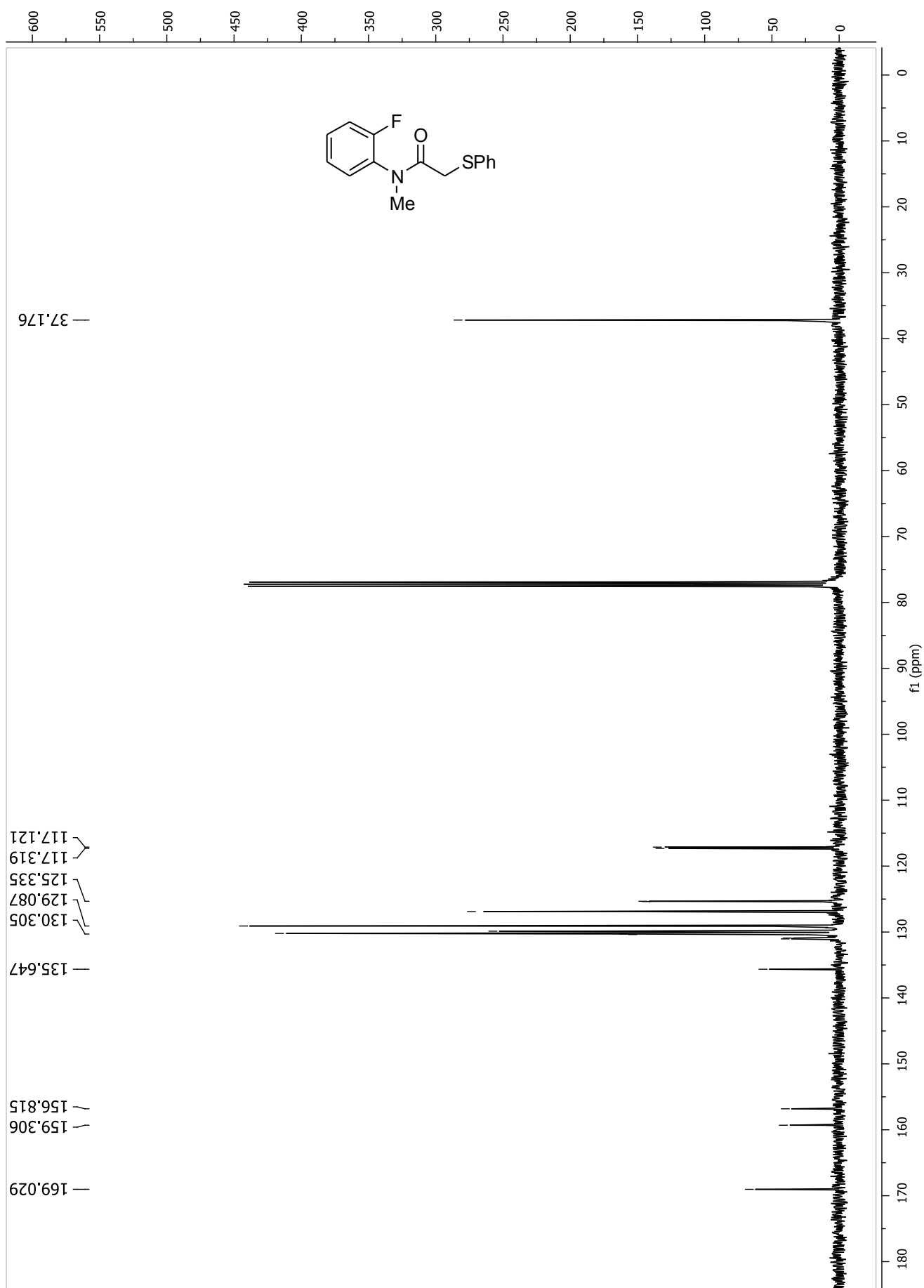
***N*-(2-Fluorophenyl)-*N*-methyl-2-morpholin-2-phenylacetamide (1m): ¹H NMR spectra:**

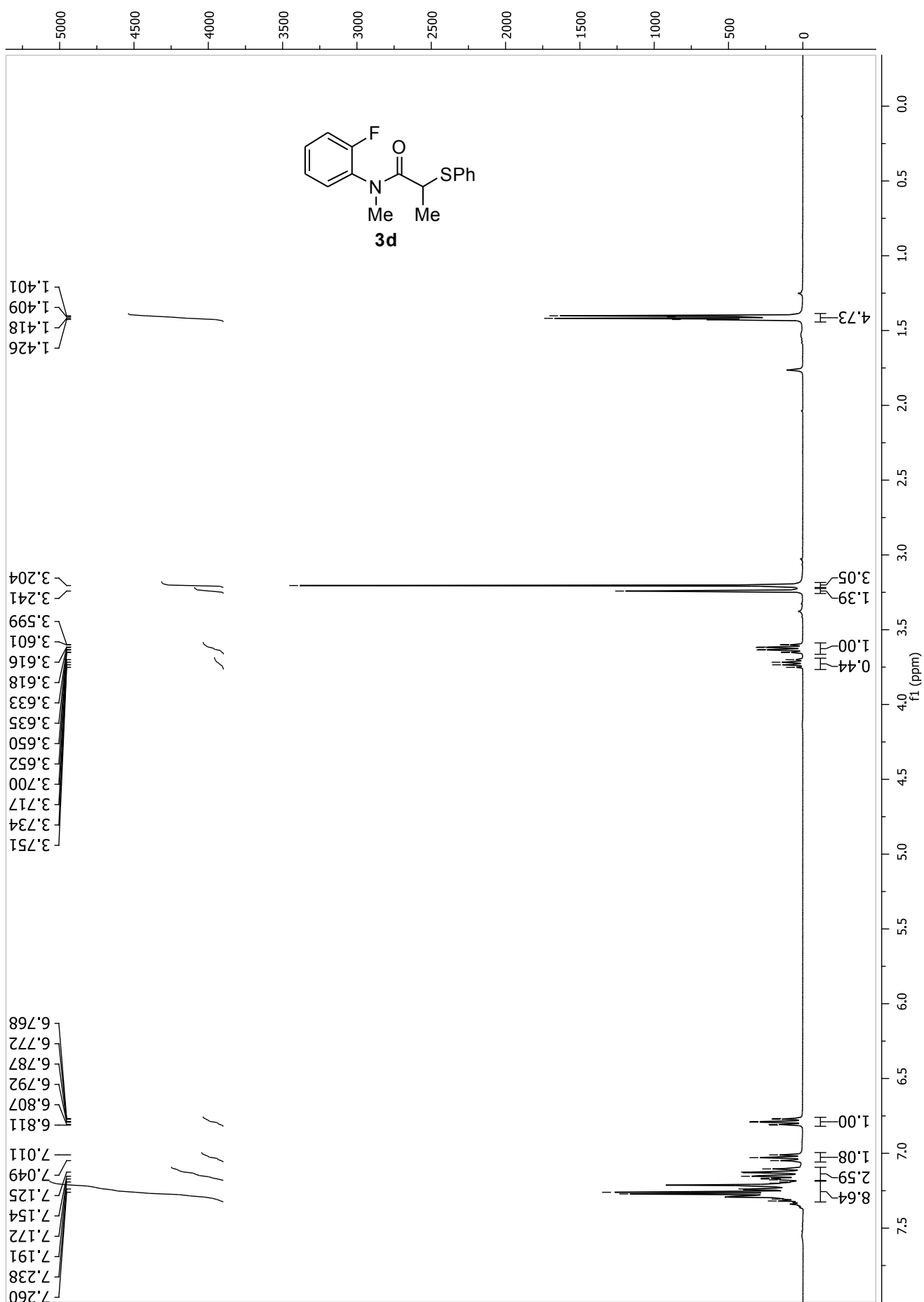
¹³C NMR spectra:

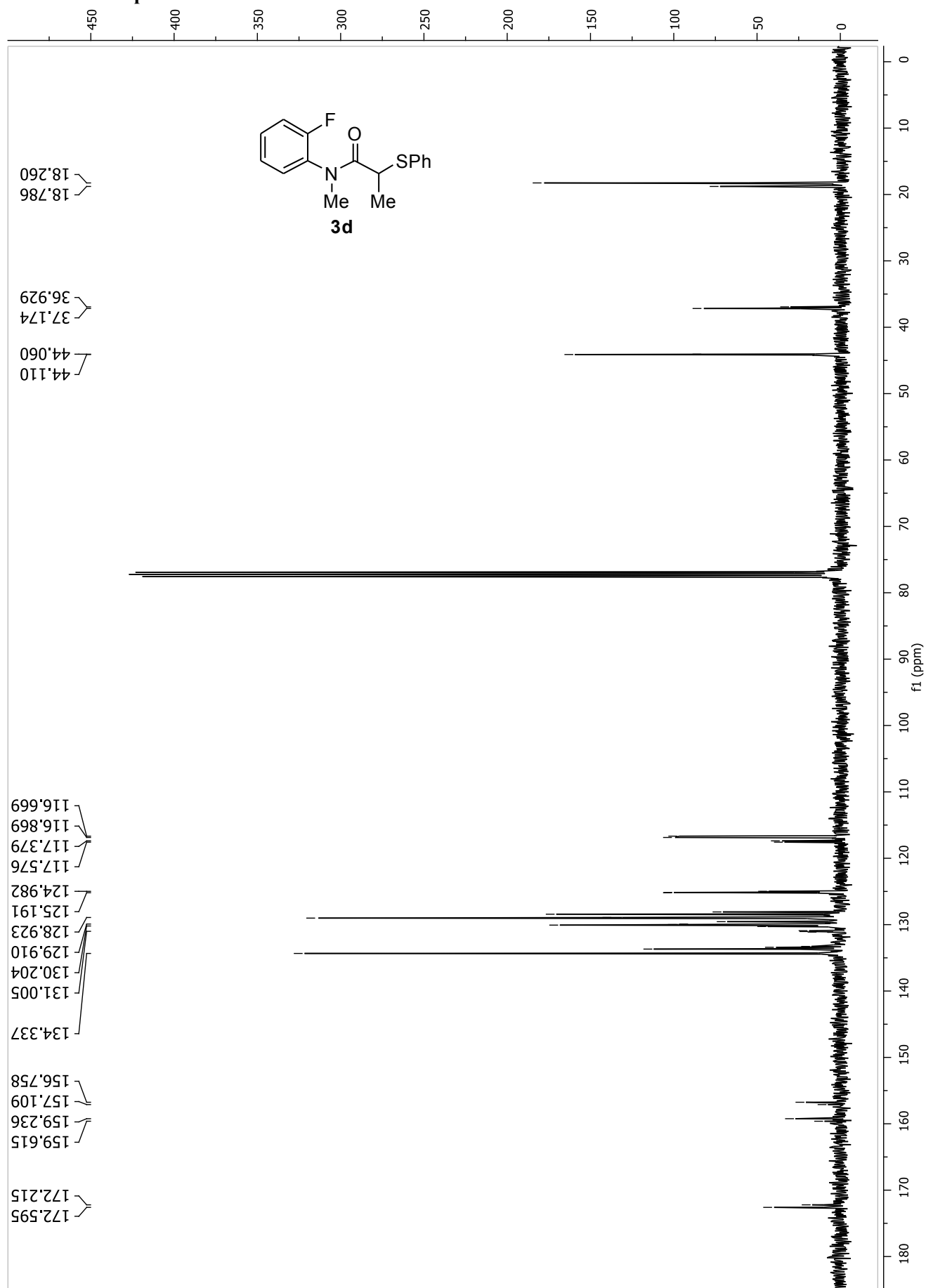
2-Bromo-*N*-(2-fluorophenyl)-*N*-methylacetamide: ^1H NMR spectra:

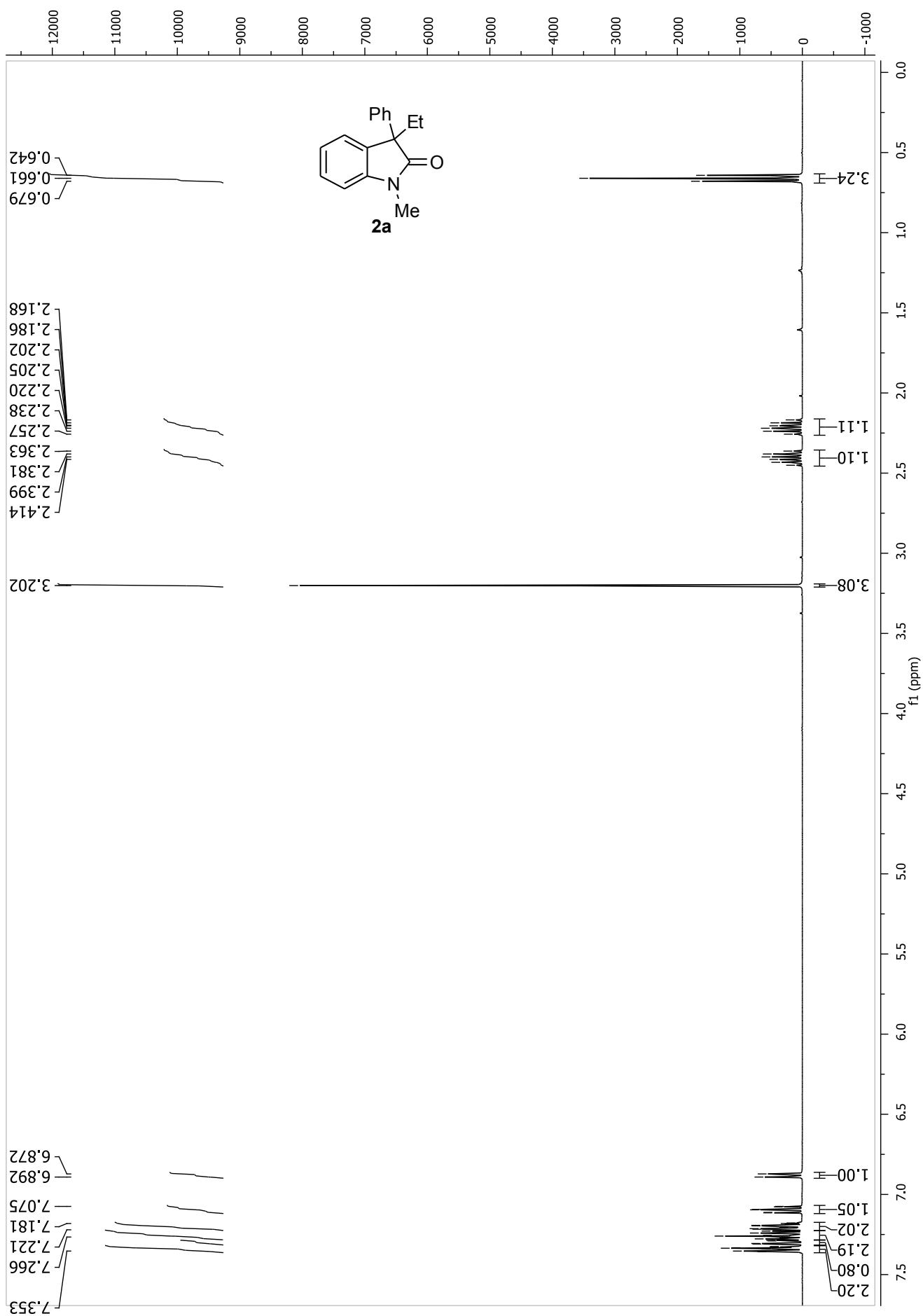
¹³C NMR spectra:

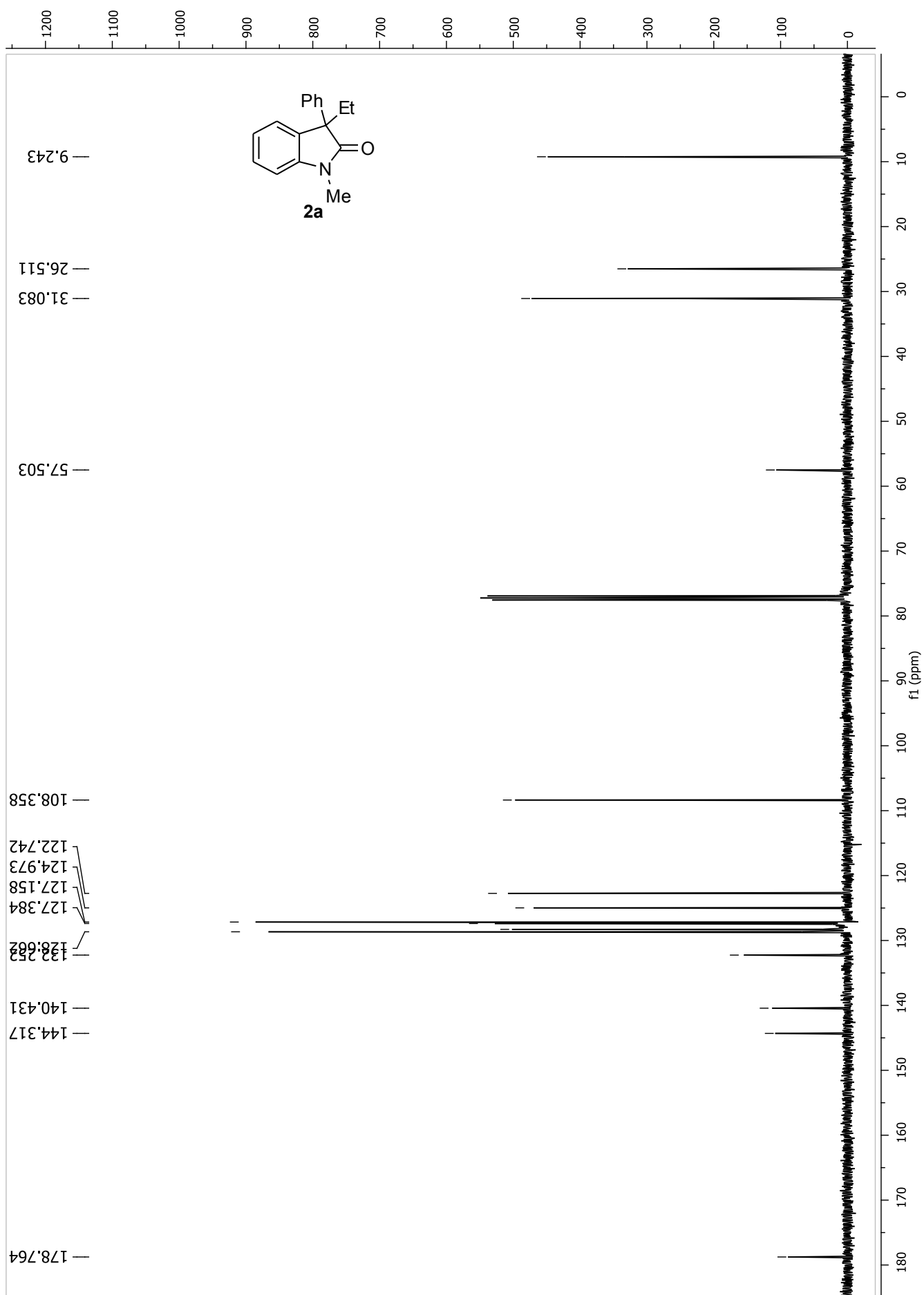
***N*-(2-Fluorophenyl)-*N*-methyl-2-(phenylthio)acetamide: ^1H NMR spectra:**

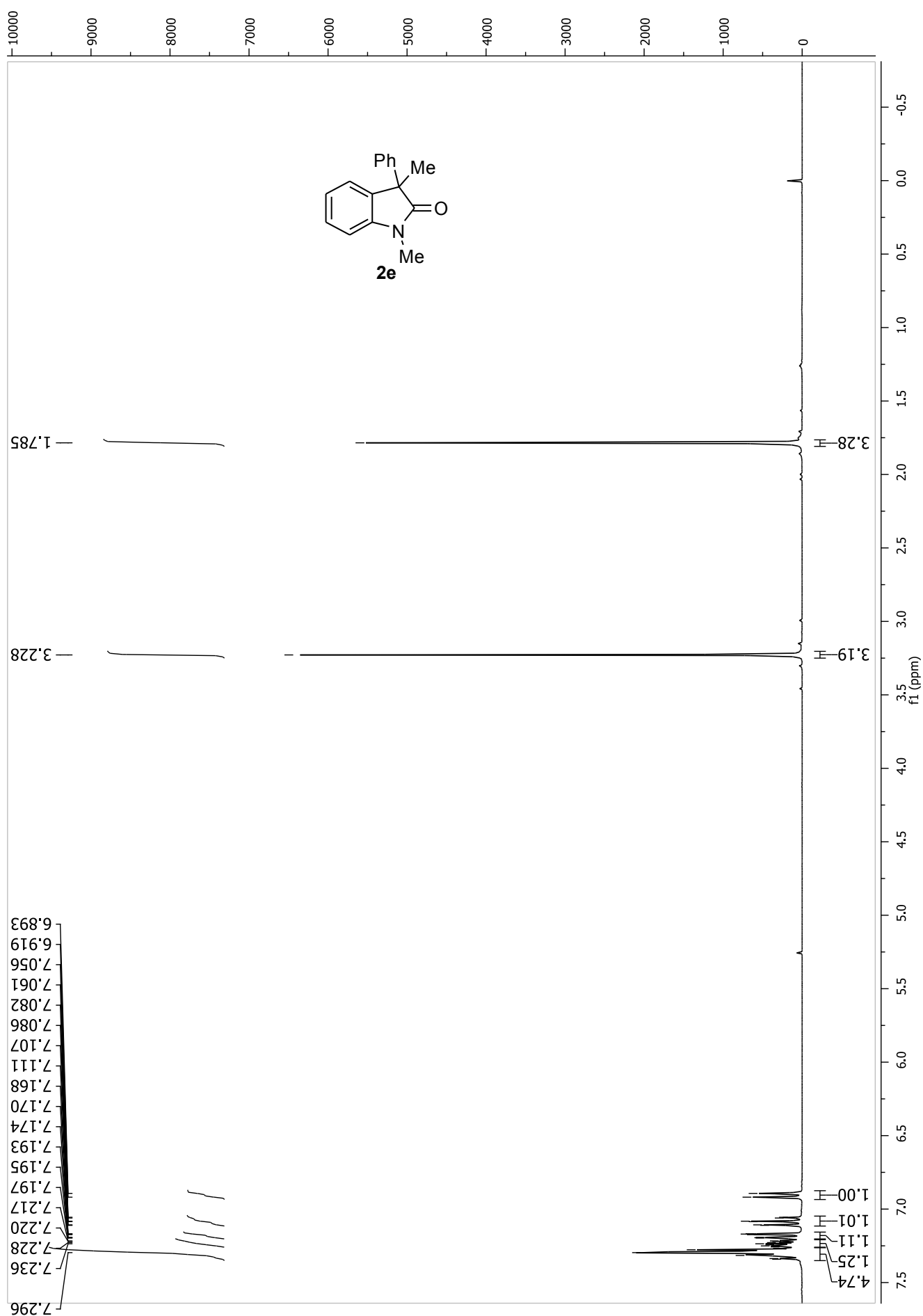
¹³C NMR spectra:

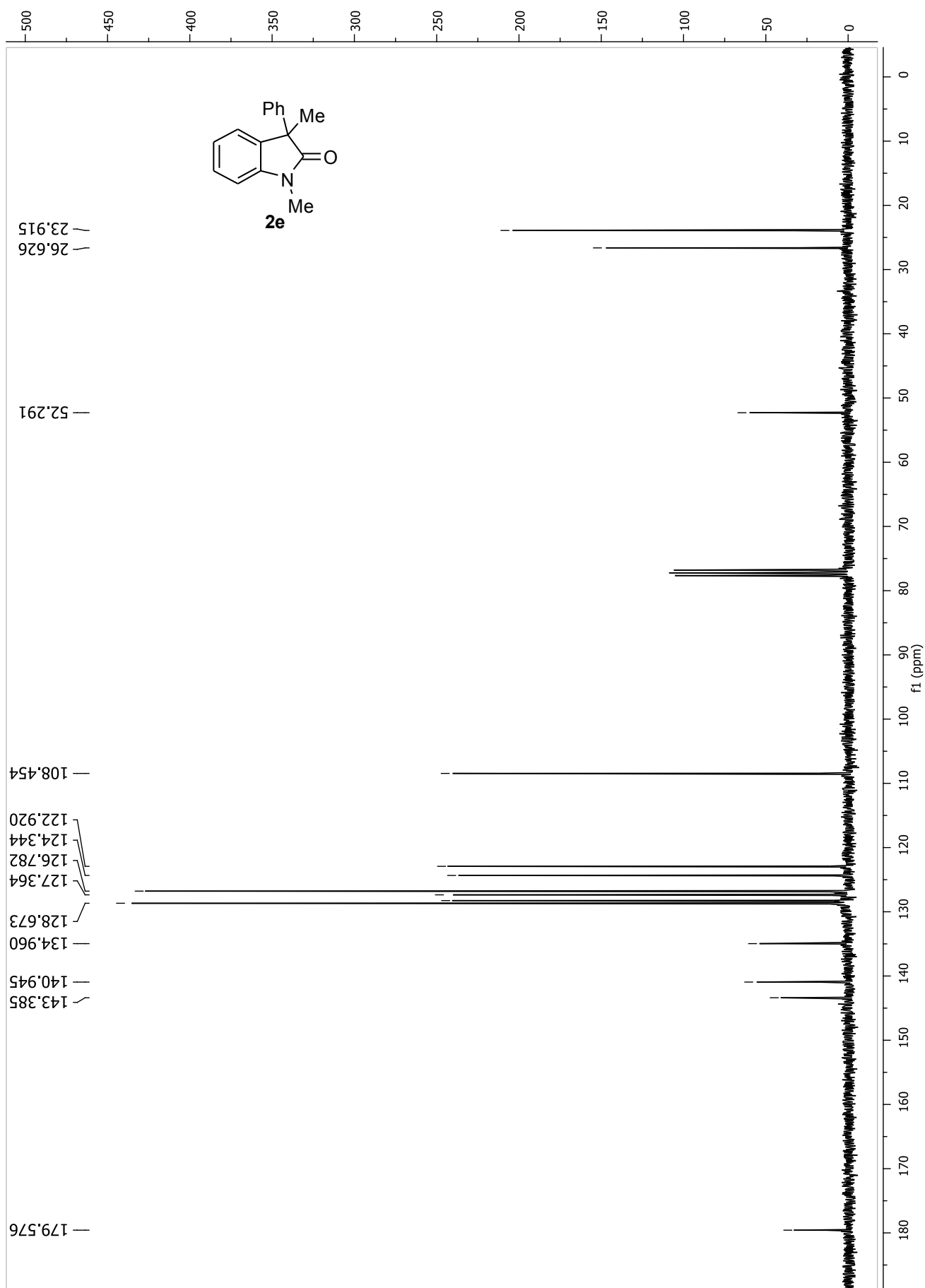
***N*-(2-Fluorophenyl)-*N*-methyl-2-(phenylthio)propanamide (3d): ^1H NMR spectra:**

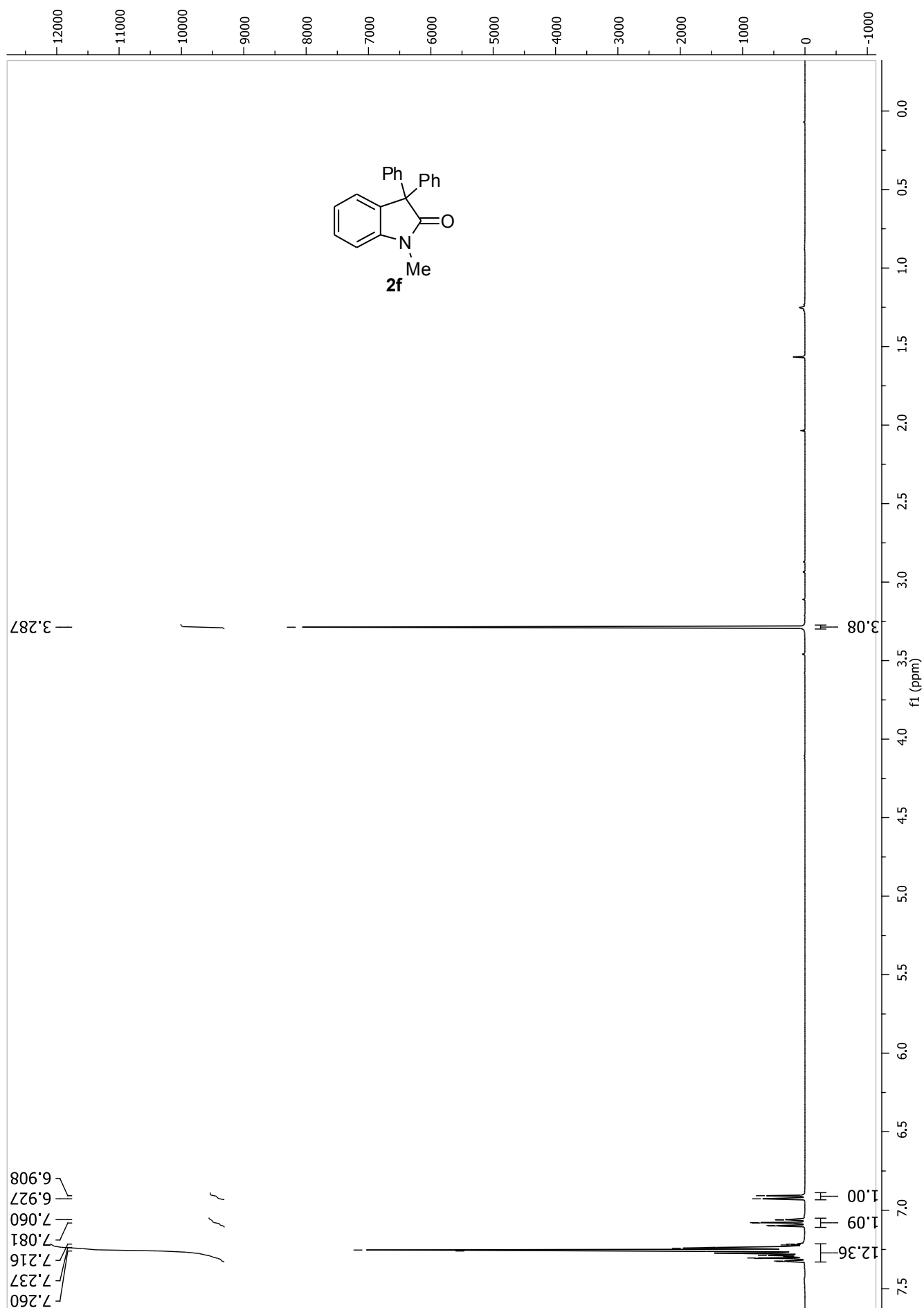
¹³C NMR spectra:

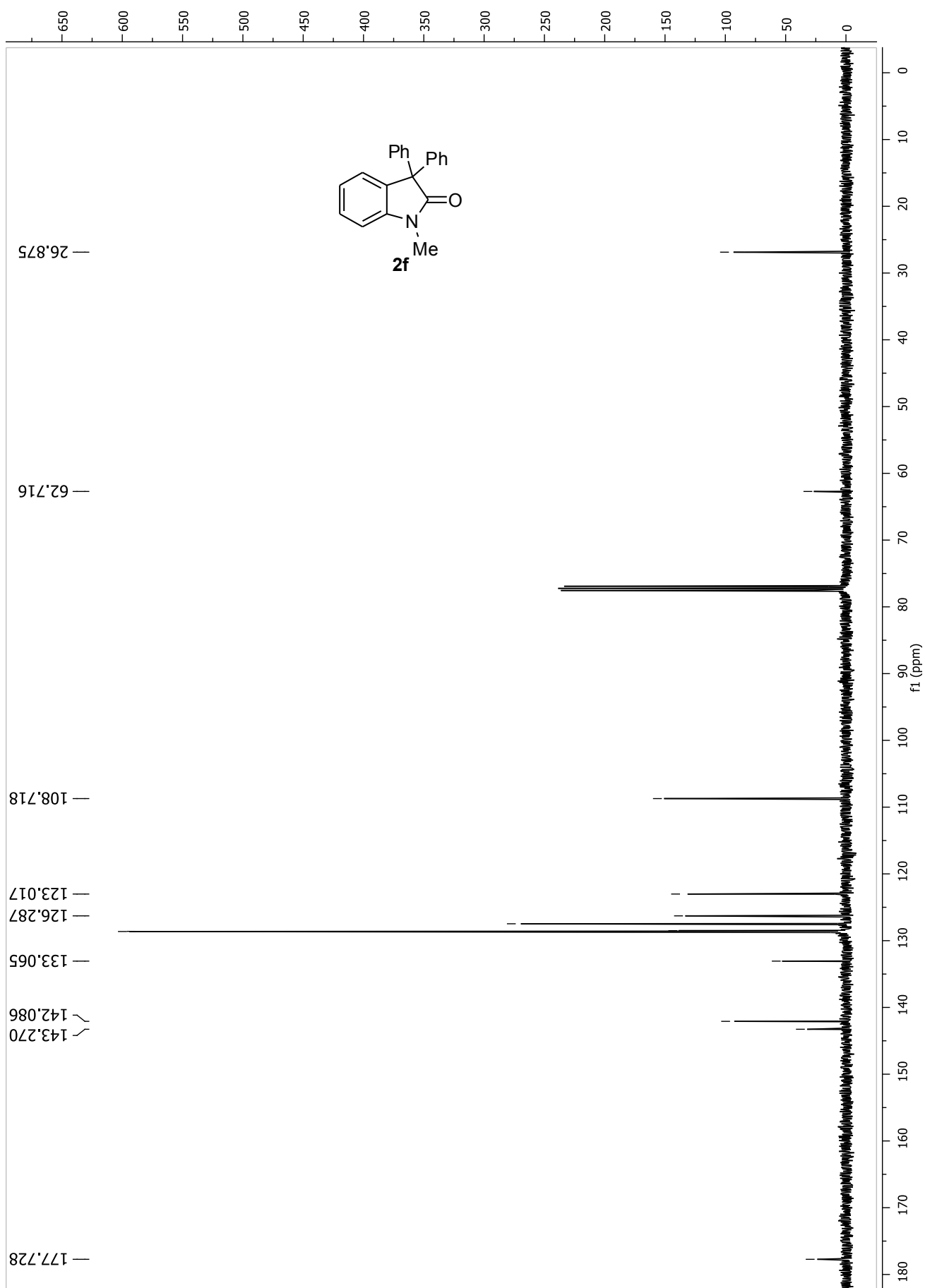
3-Ethyl-1-methyl-3-phenylindolin-2-one (2a): ^1H NMR spectra:

¹³C NMR spectra:

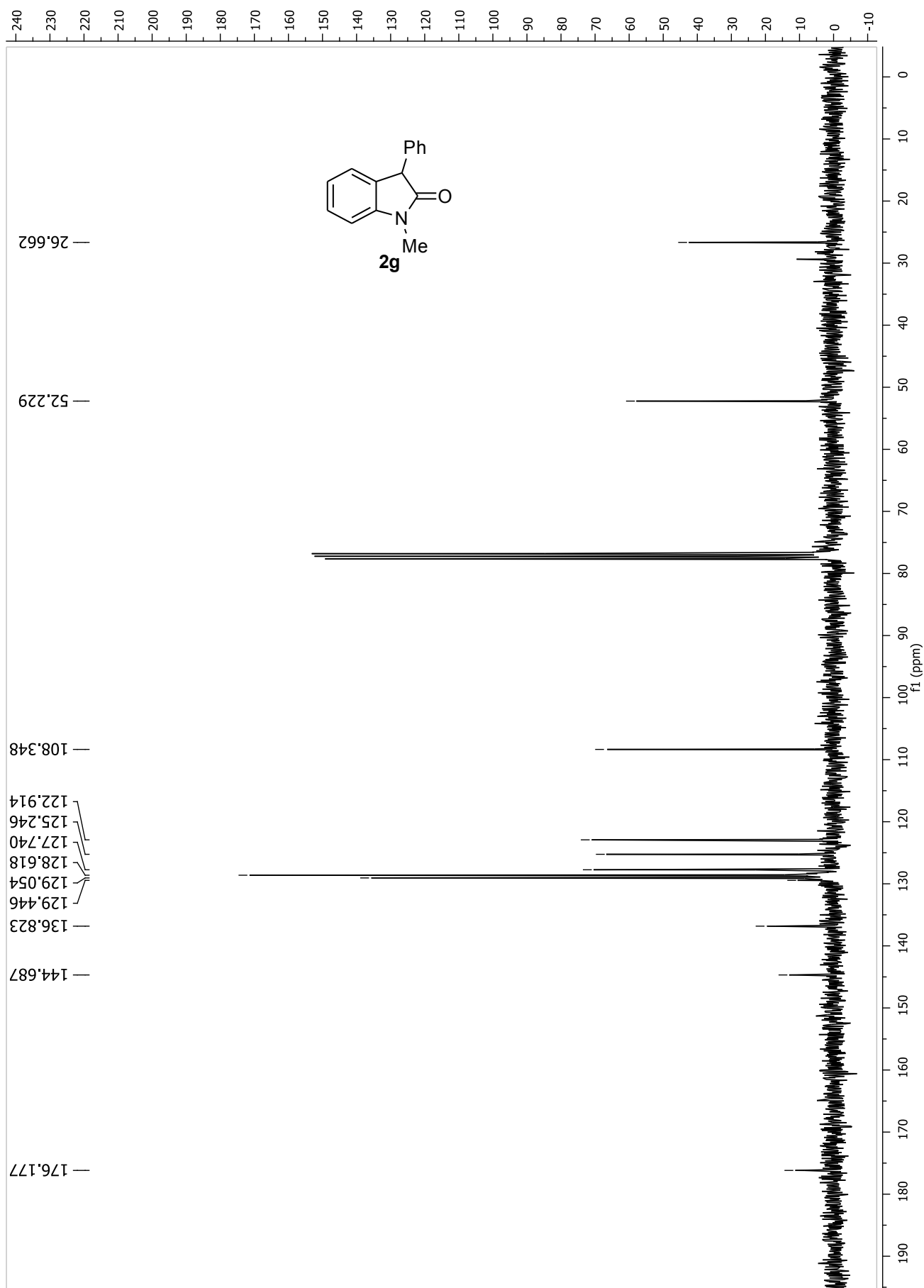
1,3-Dimethyl-3-phenylindolin-2-one (2e): ^1H NMR spectra:

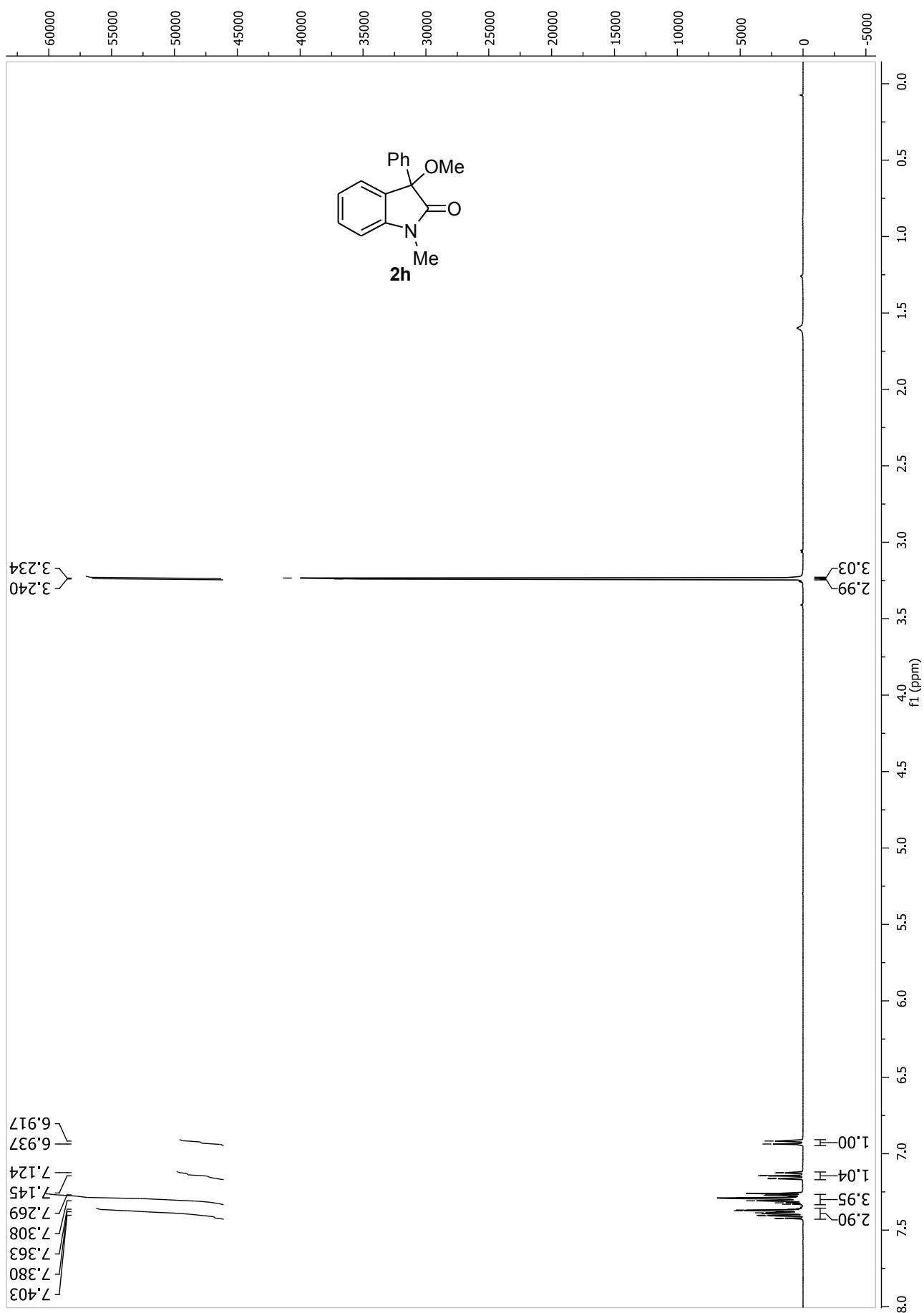
¹³C NMR spectra:

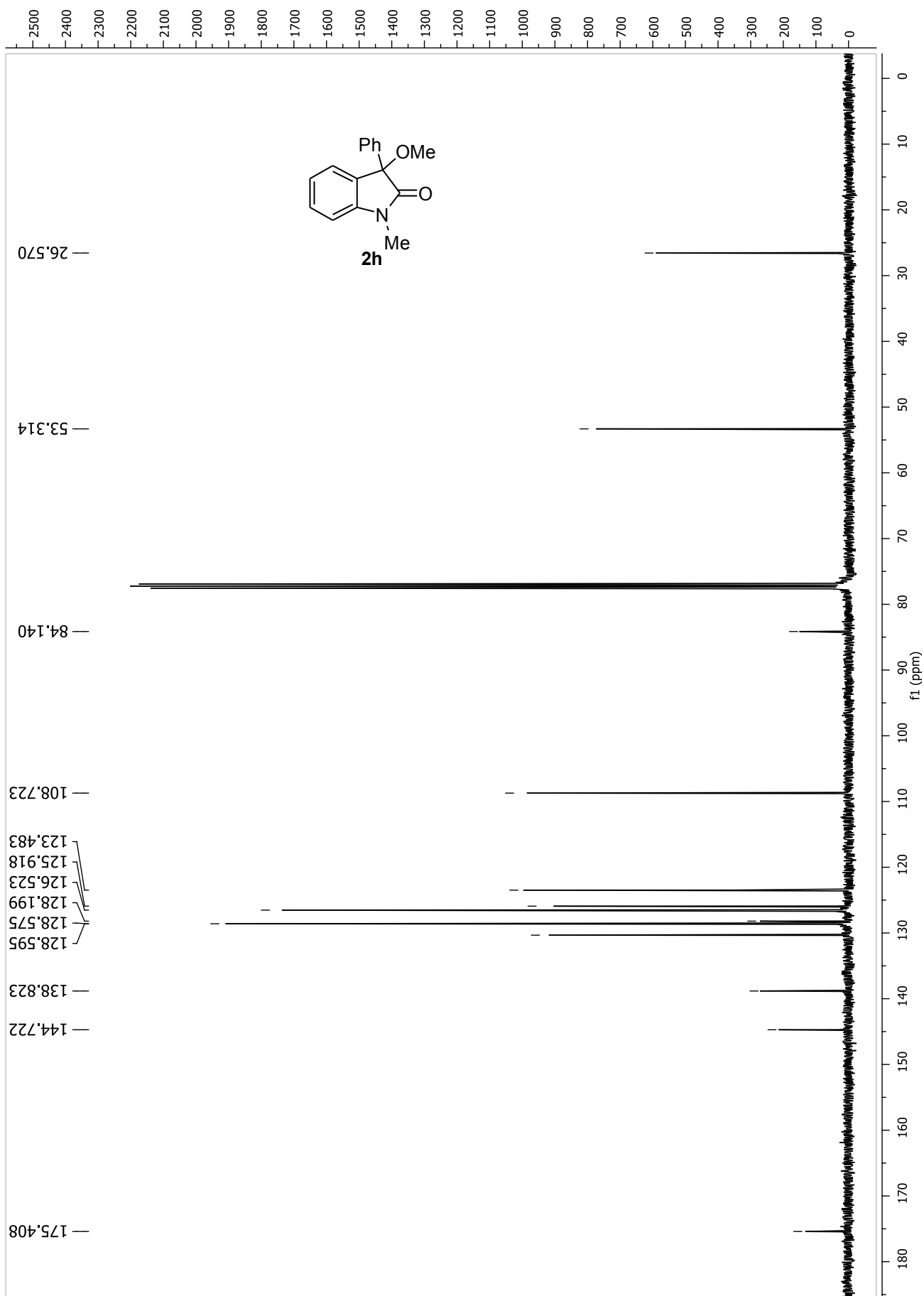
1-Methyl-3,3-diphenylindolin-2-one (2f): ^1H NMR spectra:

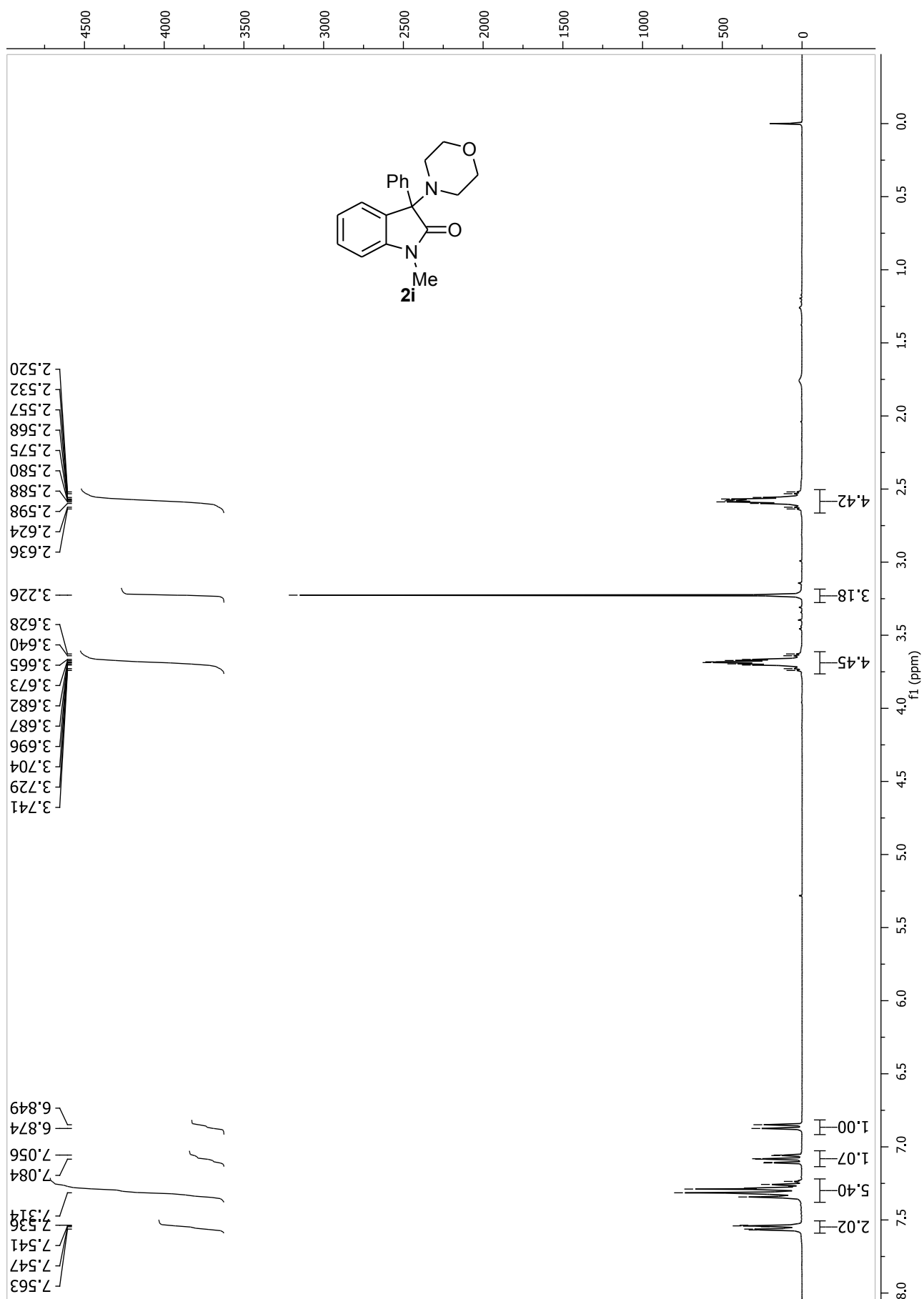
¹³C NMR spectra:

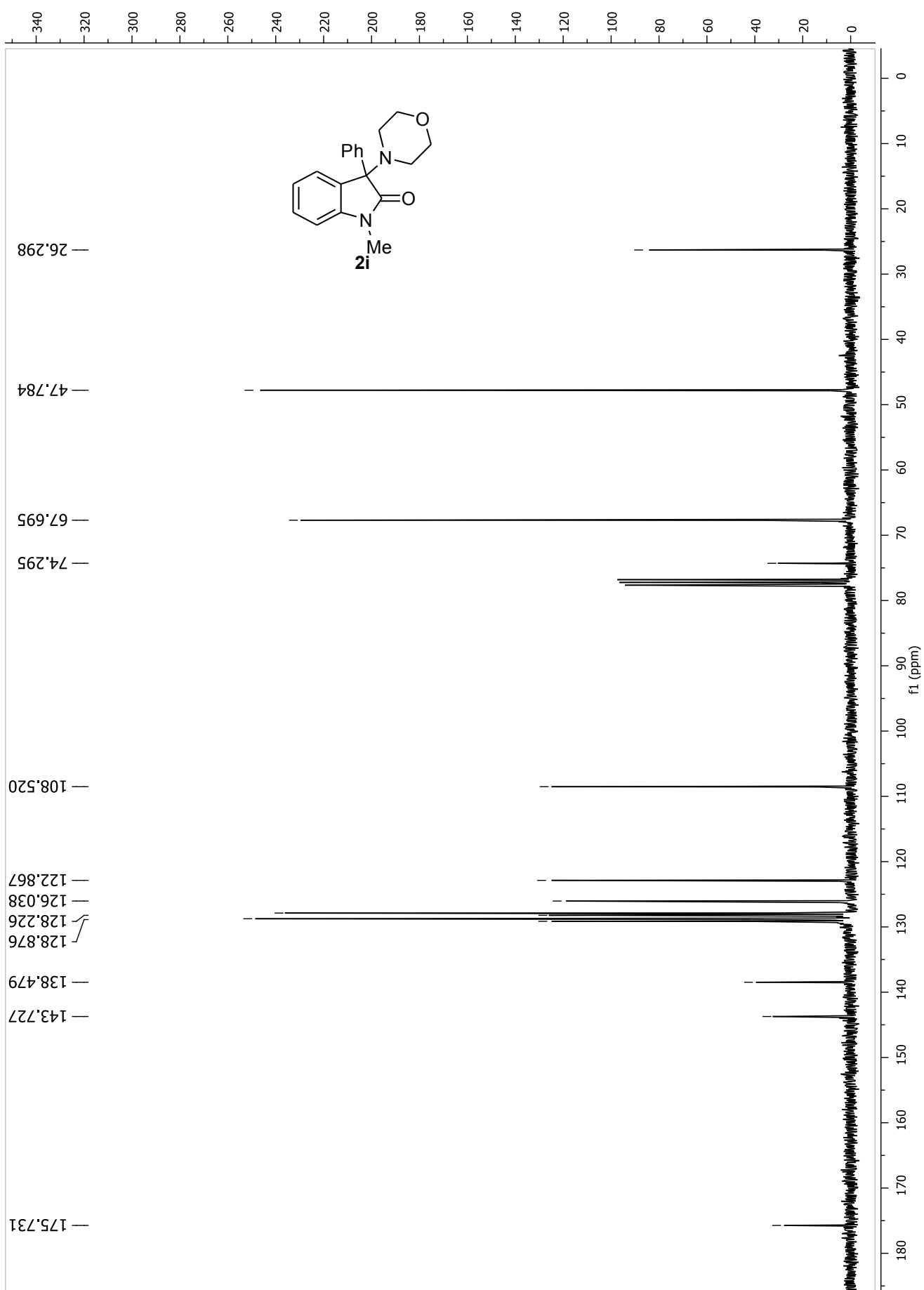
1-Methyl-3-phenylindolin-2-one (2g): ^1H NMR spectra:

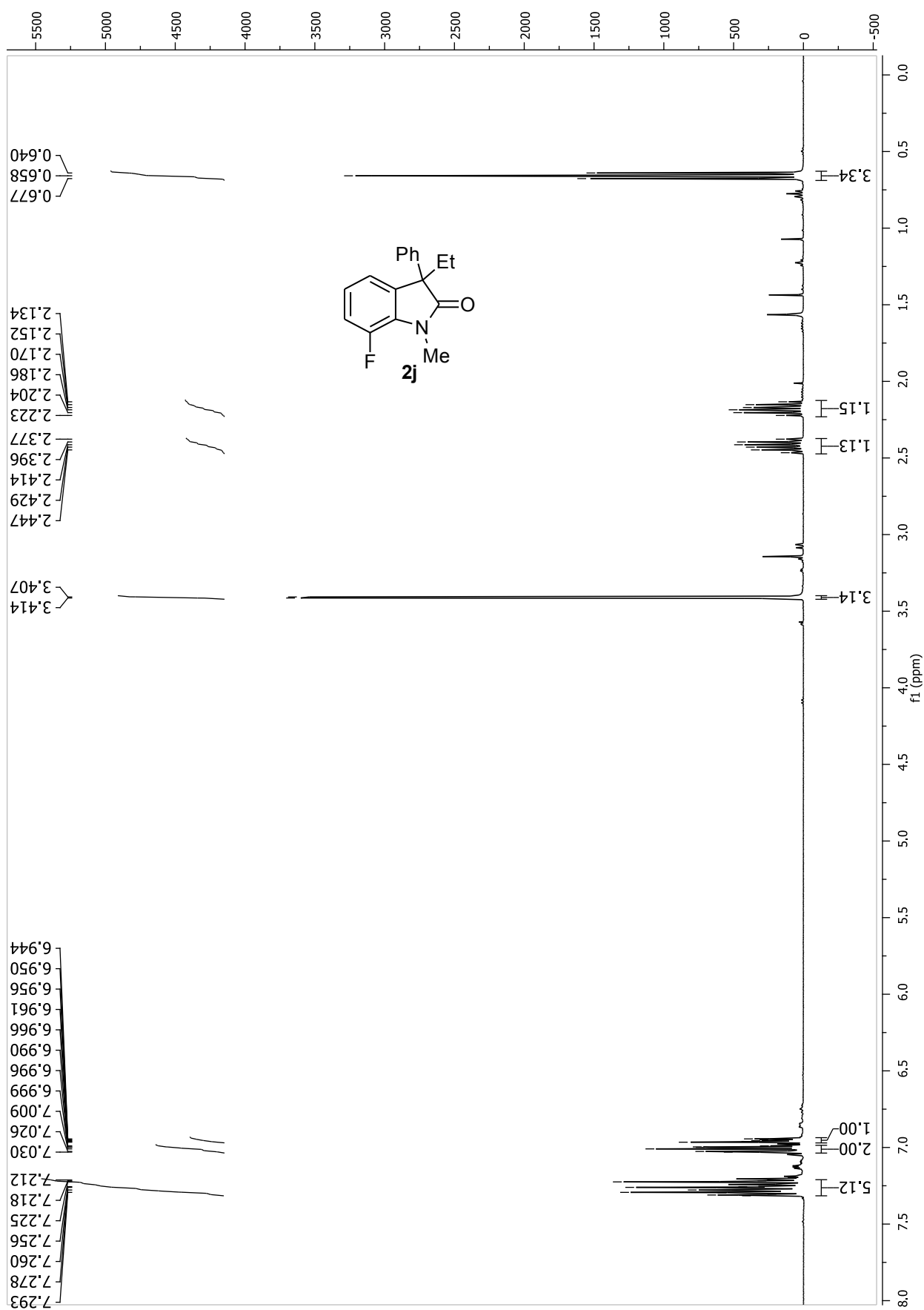
¹³C NMR spectra:

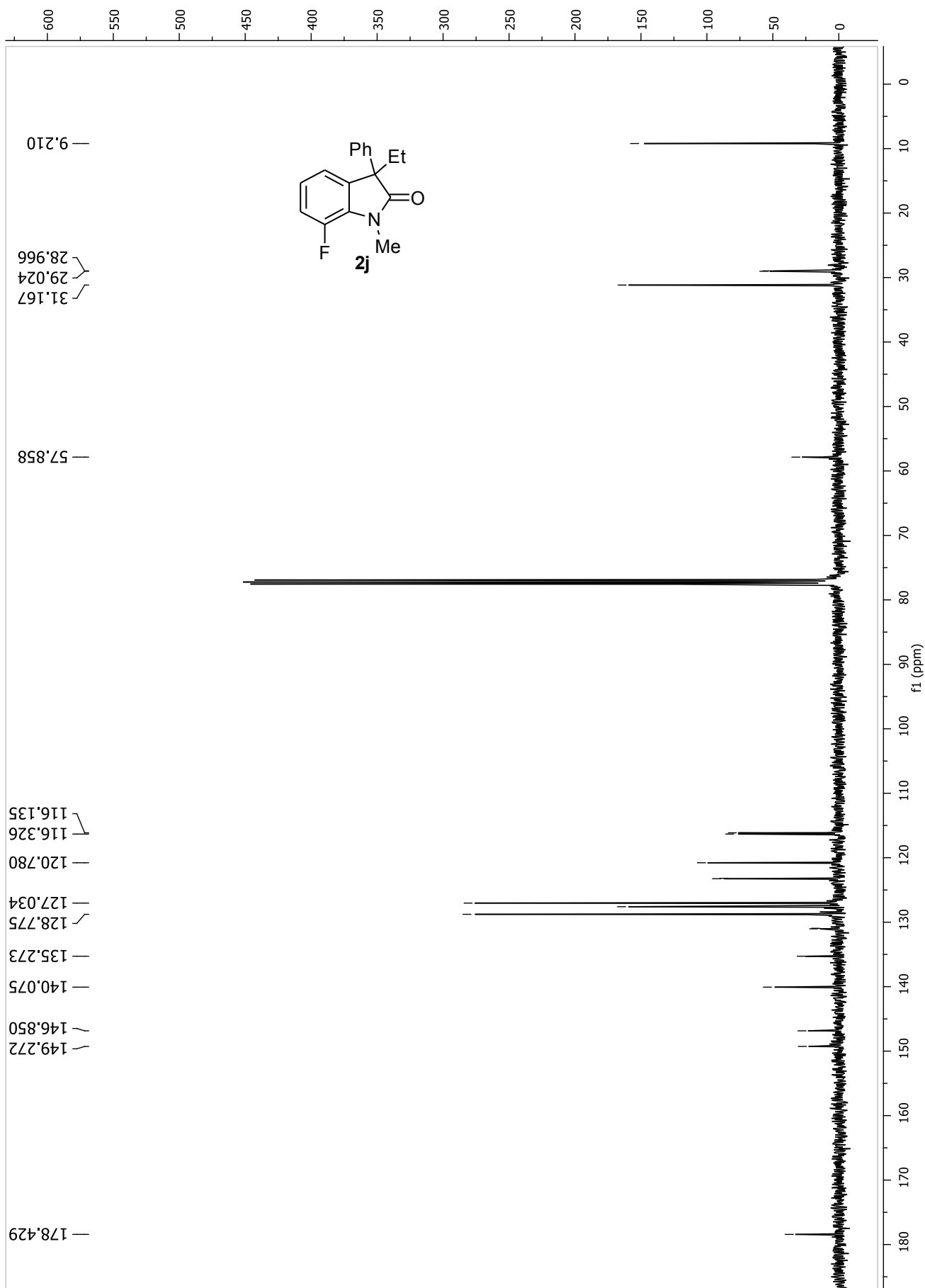
3-Methoxy-1-methyl-3-phenylindolin-2-one (2h): ^1H NMR spectra:

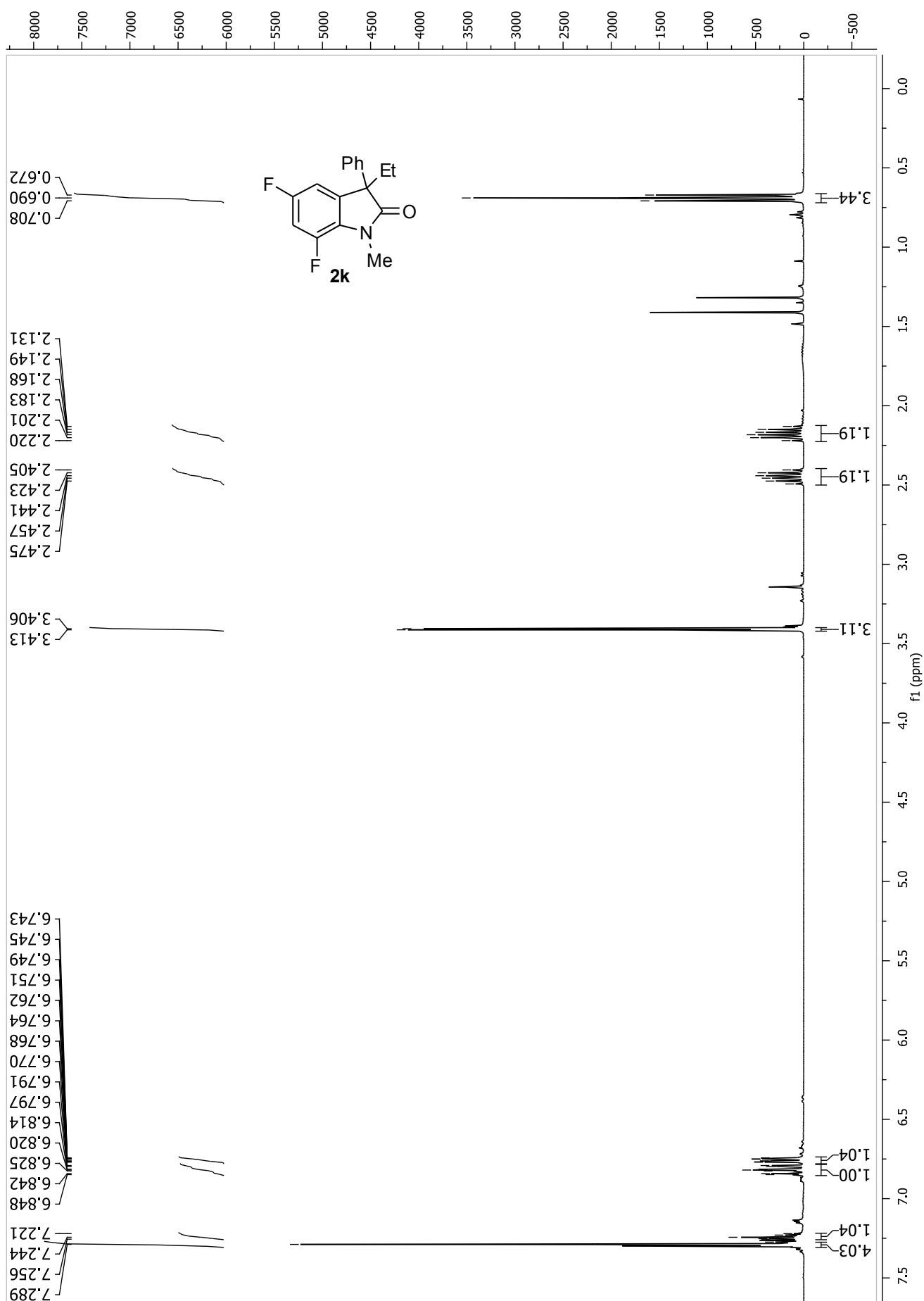
¹³C NMR spectra:

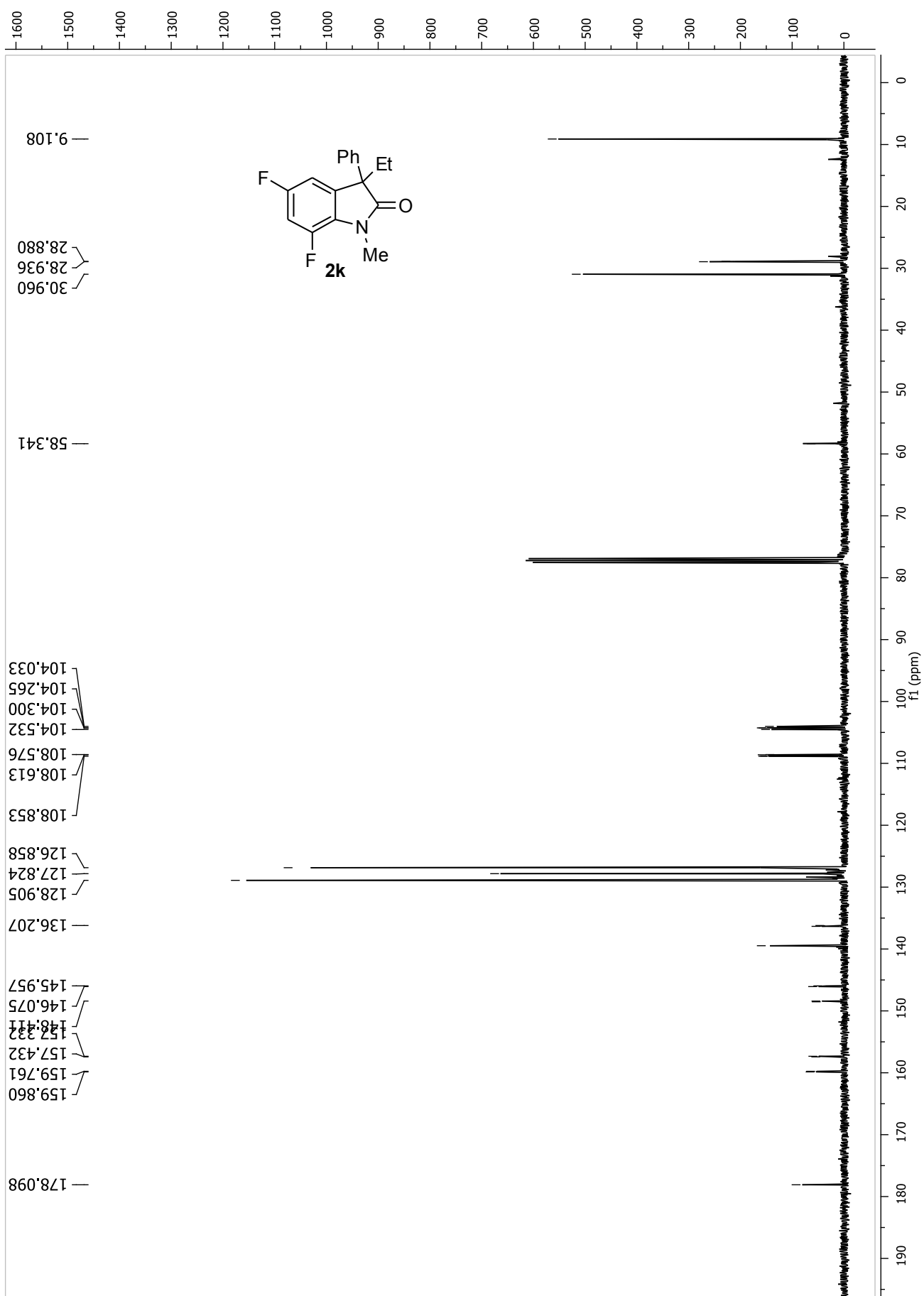
1-Methyl-3-morpholin-3-phenylindolin-2-one (2i): ^1H NMR spectra:

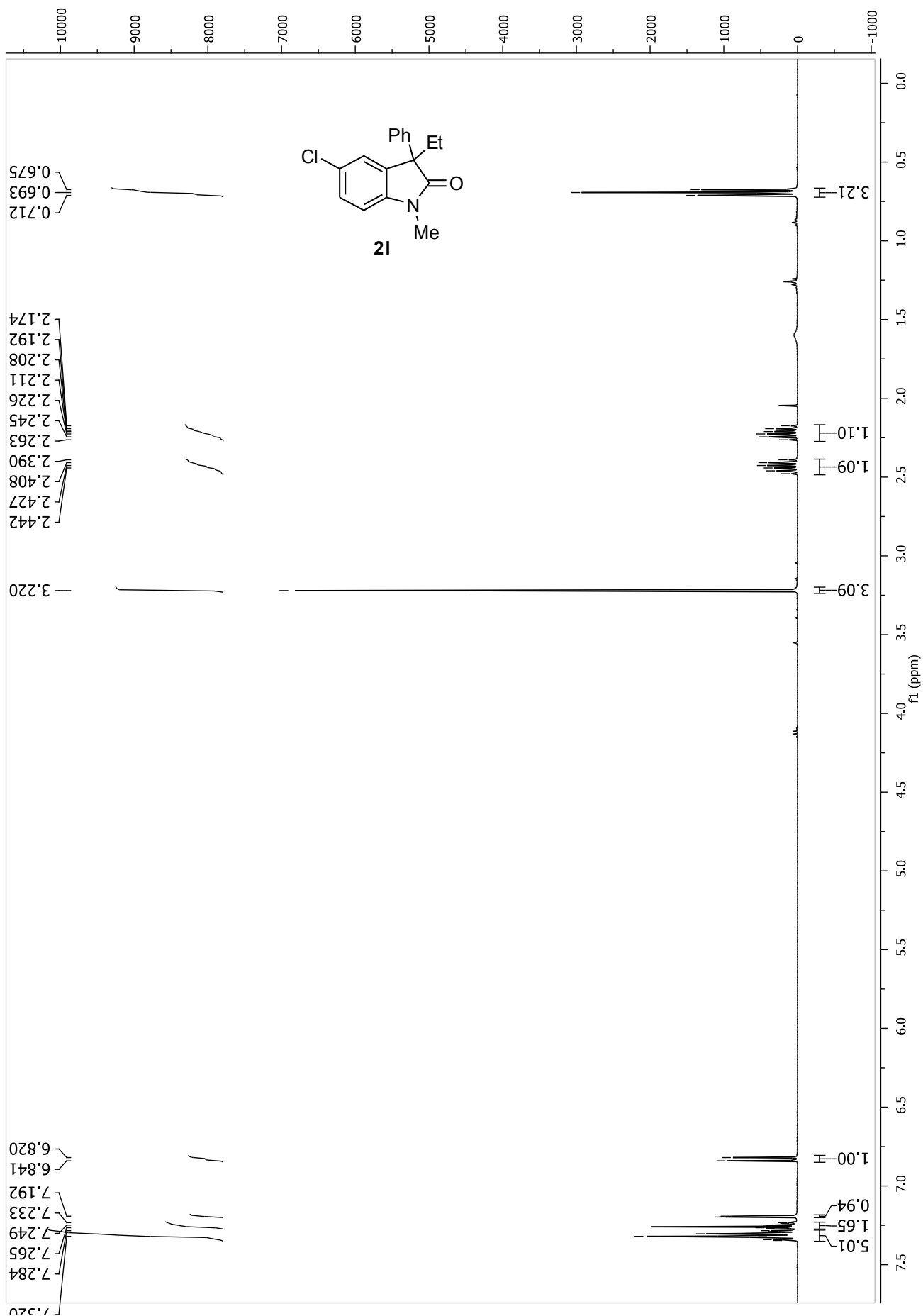
¹³C NMR spectra:

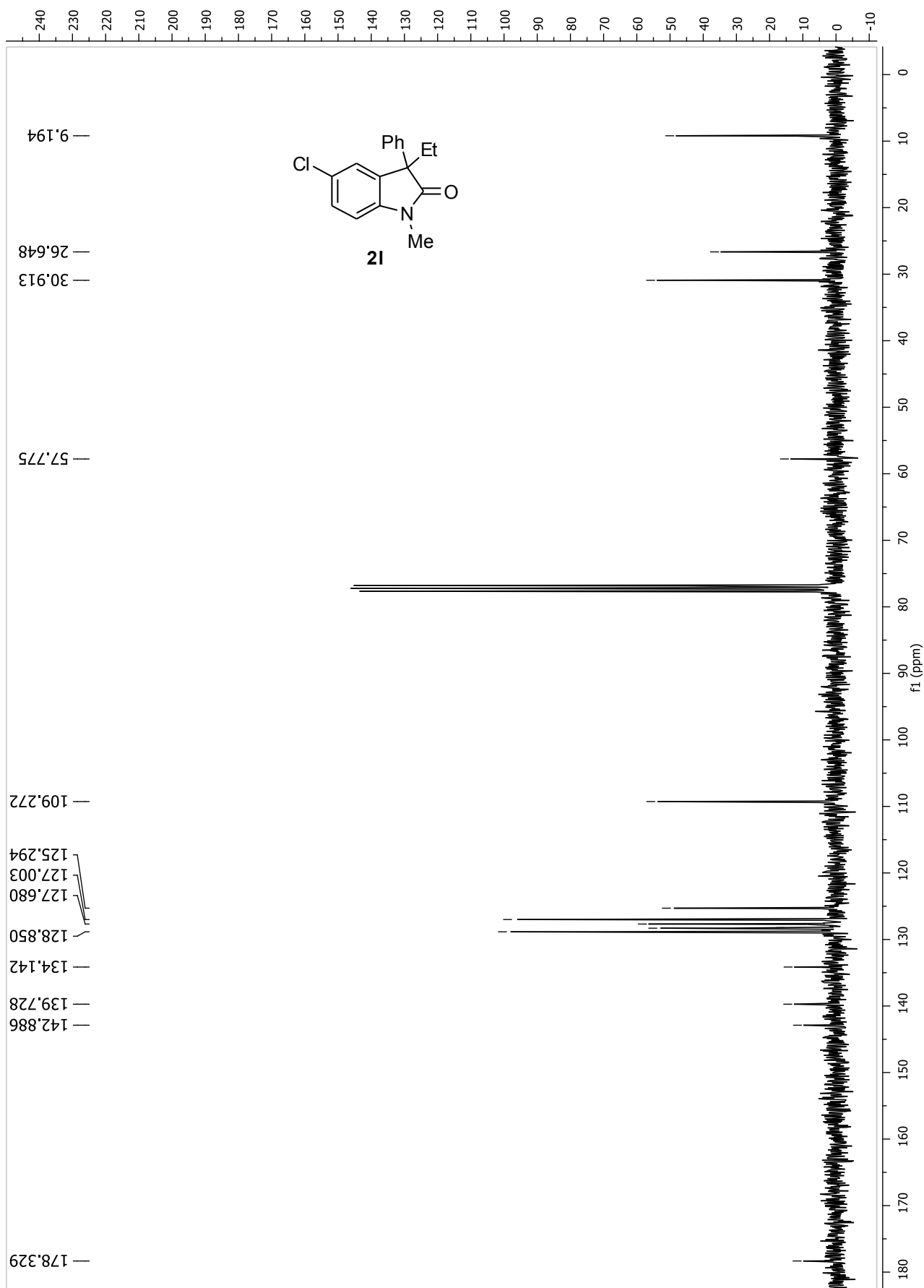
3-Ethyl-7-fluoro-1-methyl-3-phenylindolin-2-one (2j): ^1H NMR spectra:

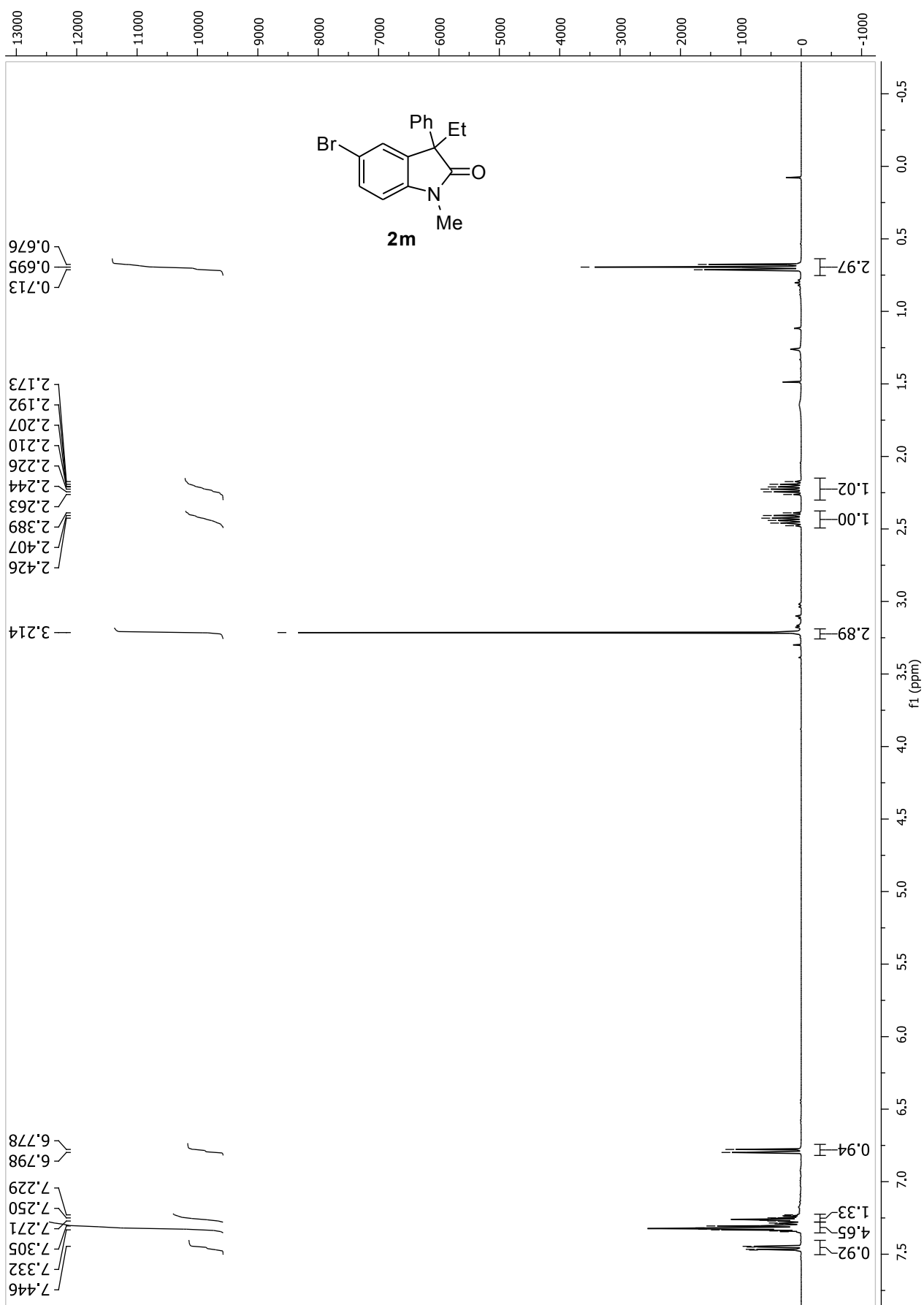
¹³C NMR spectra:

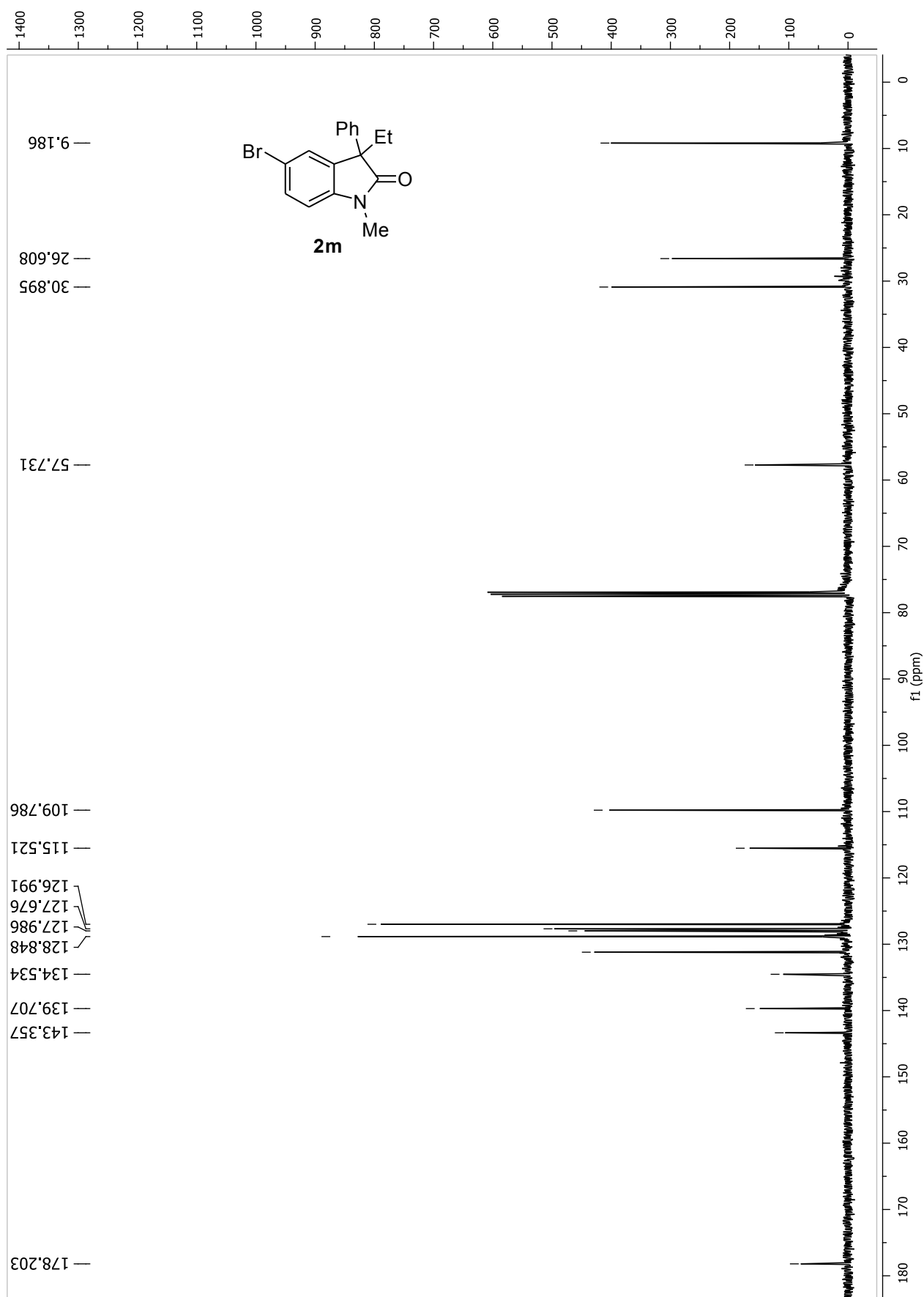
3-Ethyl-5,7-difluoro-1-methyl-3-phenylindolin-2-one (2k): ^1H NMR spectra:

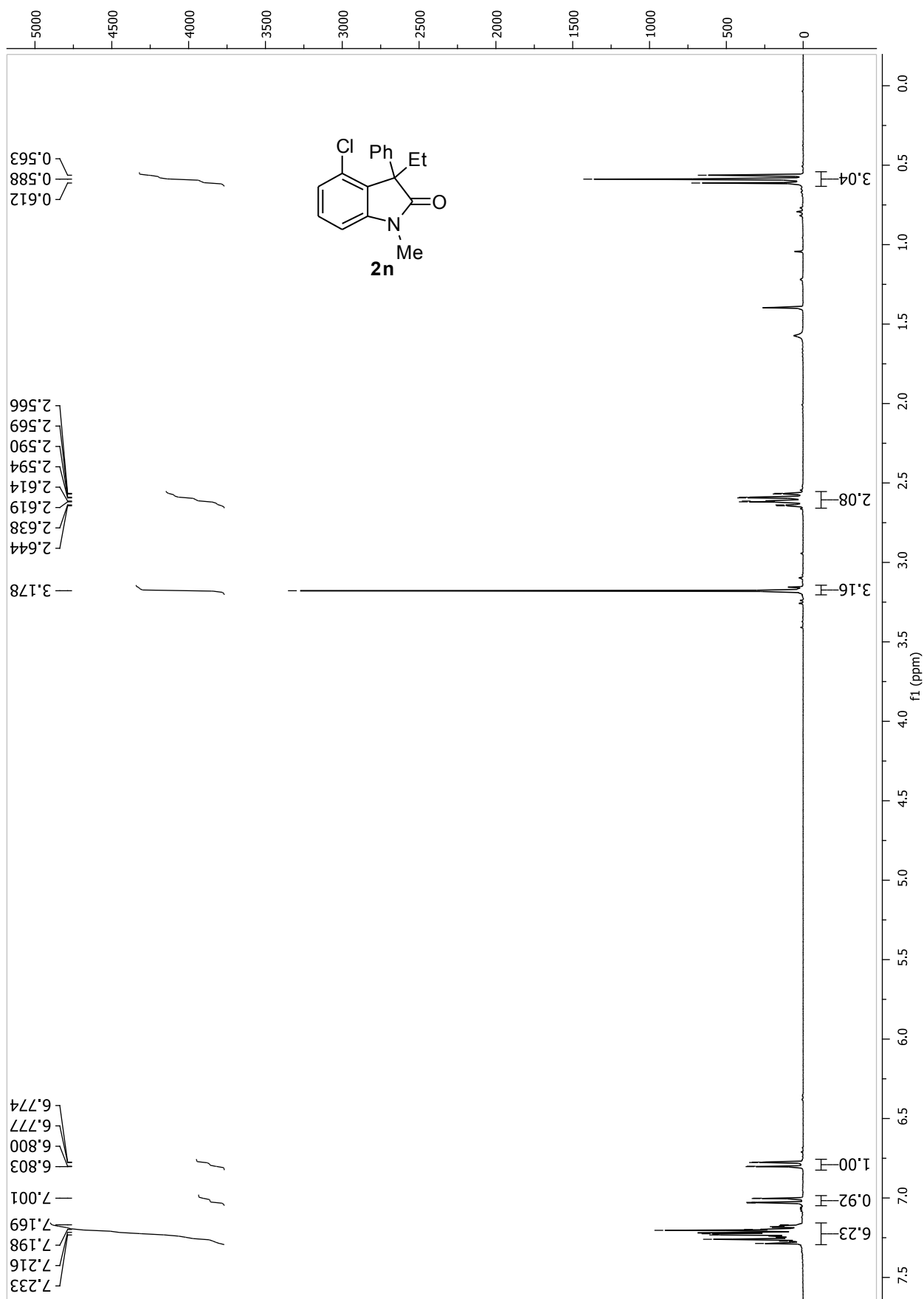
¹³C NMR spectra:

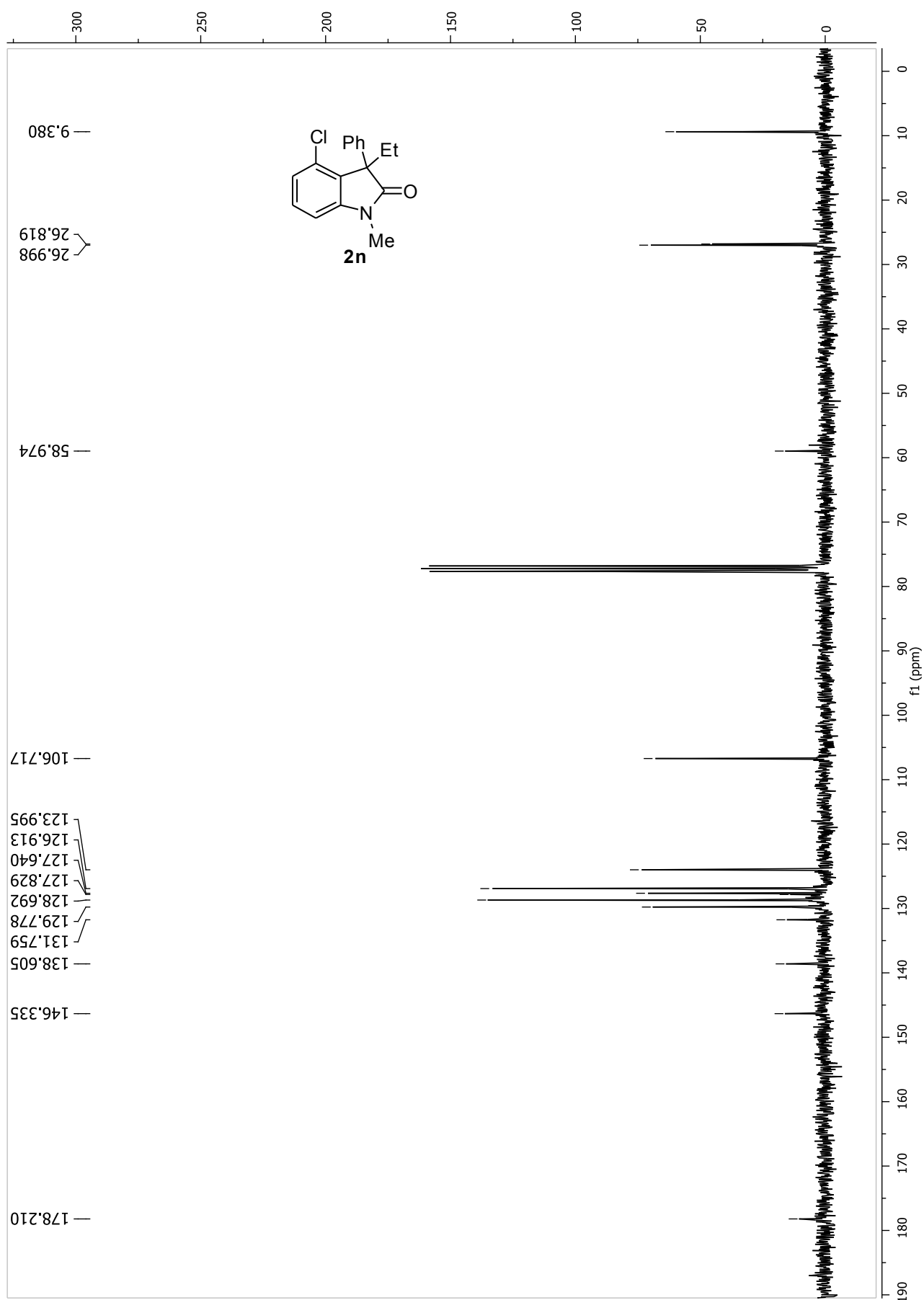
5-Chloro-3-ethyl-1-methyl-3-phenylindolin-2-one (2l): ^1H NMR spectra:

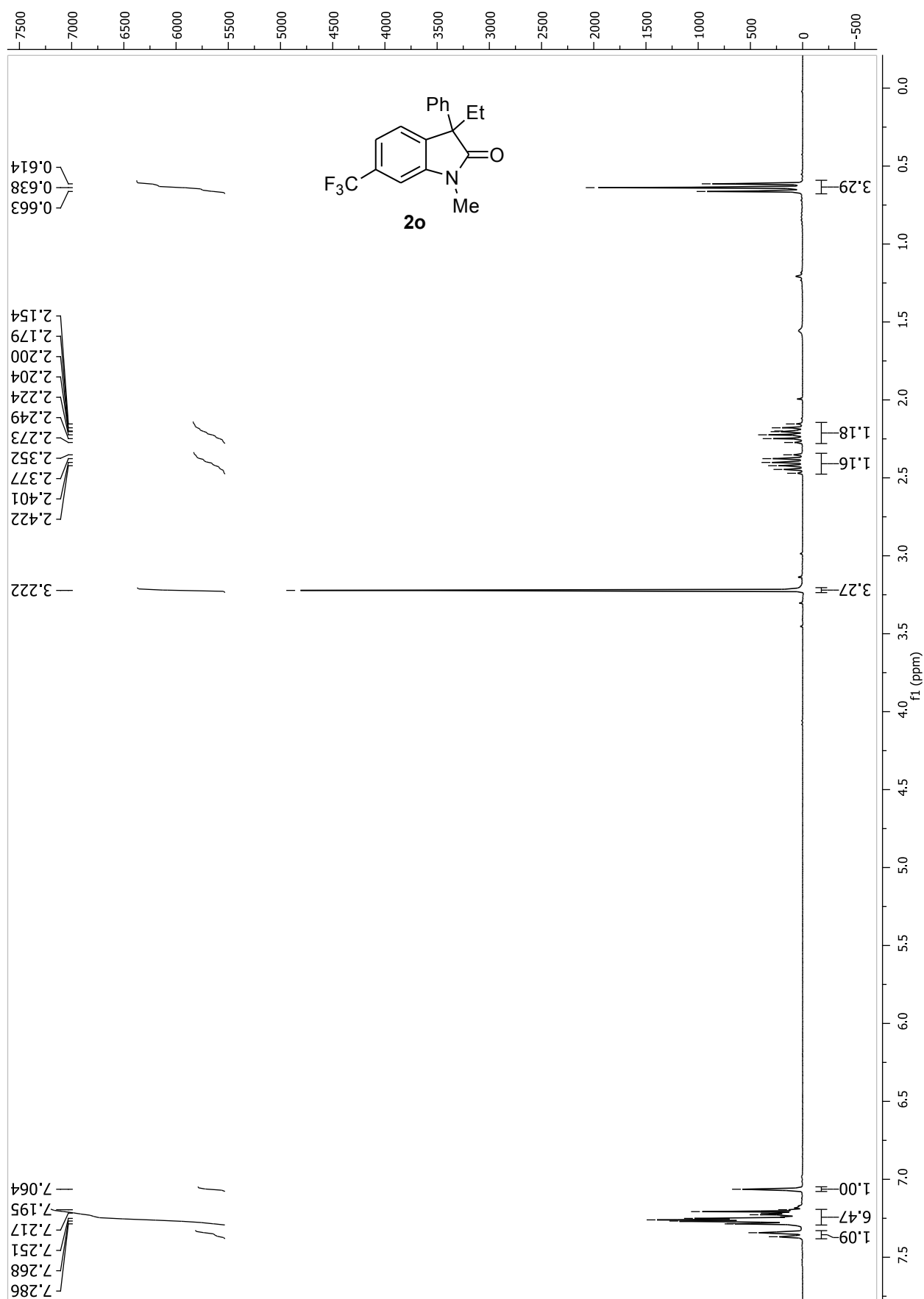
¹³C NMR spectra:

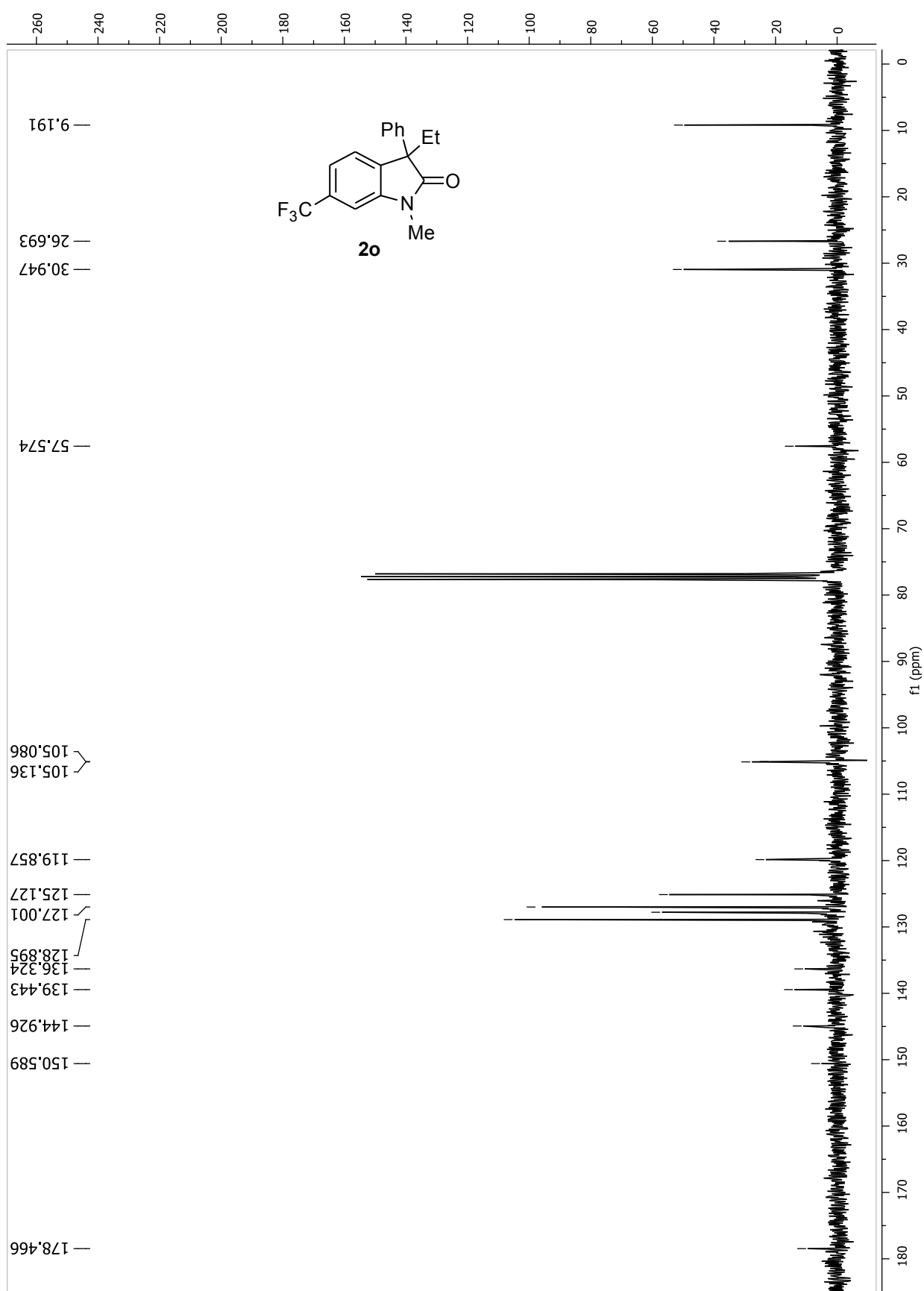
5-Bromo-3-ethyl-1-methyl-3-phenylindolin-2-one (2m): ^1H NMR spectra:

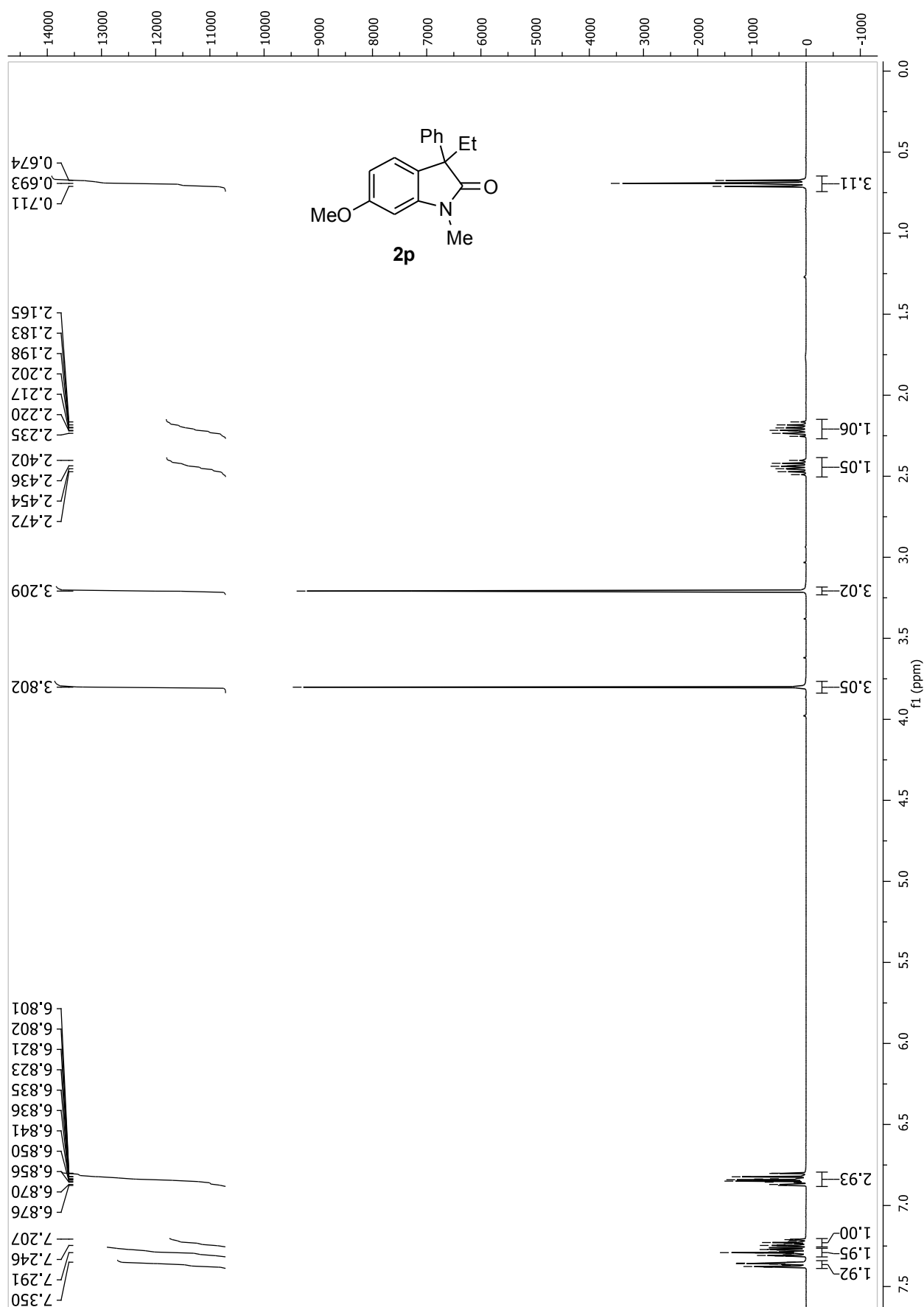
¹³C NMR spectra:

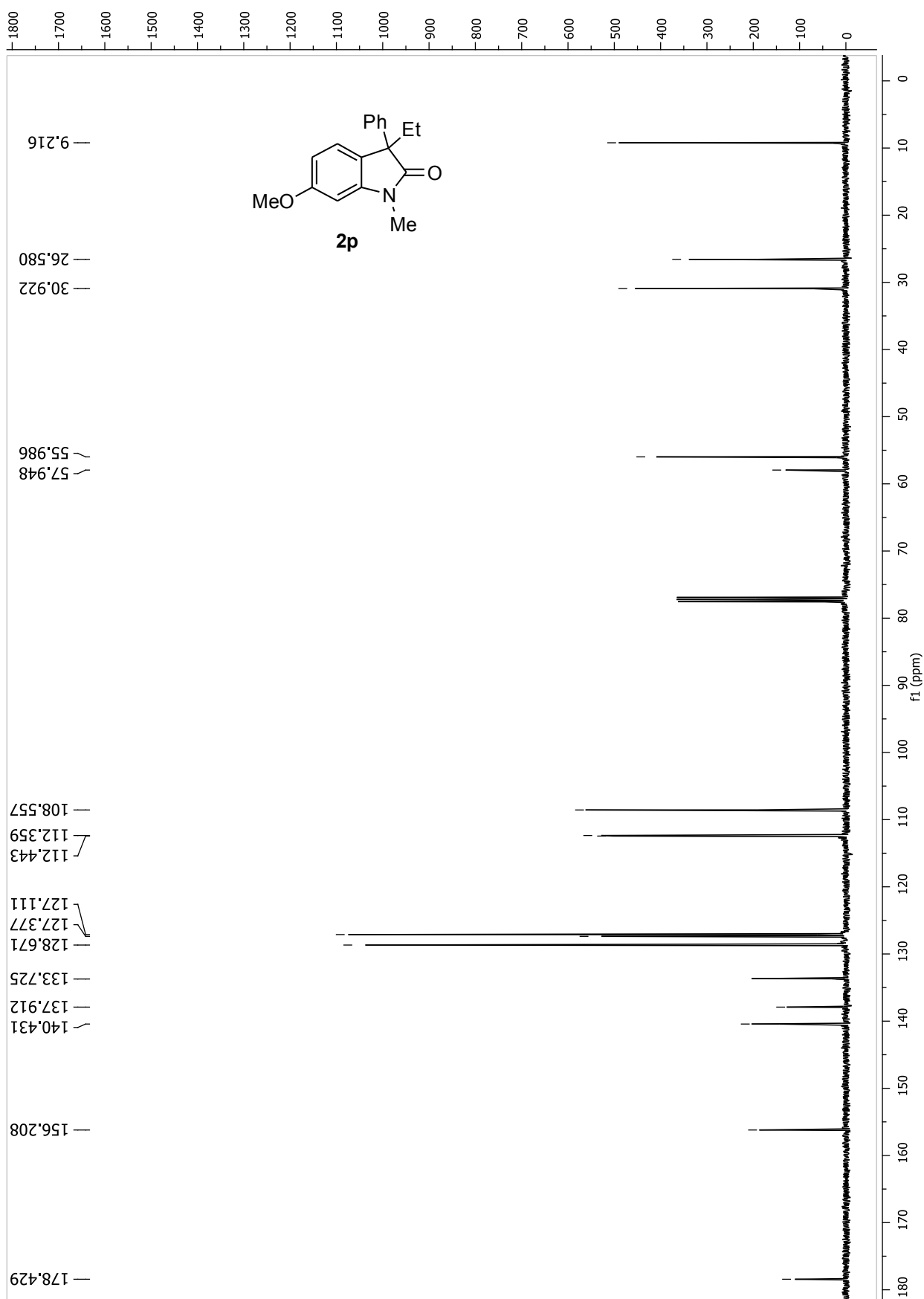
4-Chloro-3-ethyl-1-methyl-3-phenylindolin-2-one (2n): ^1H NMR spectra:

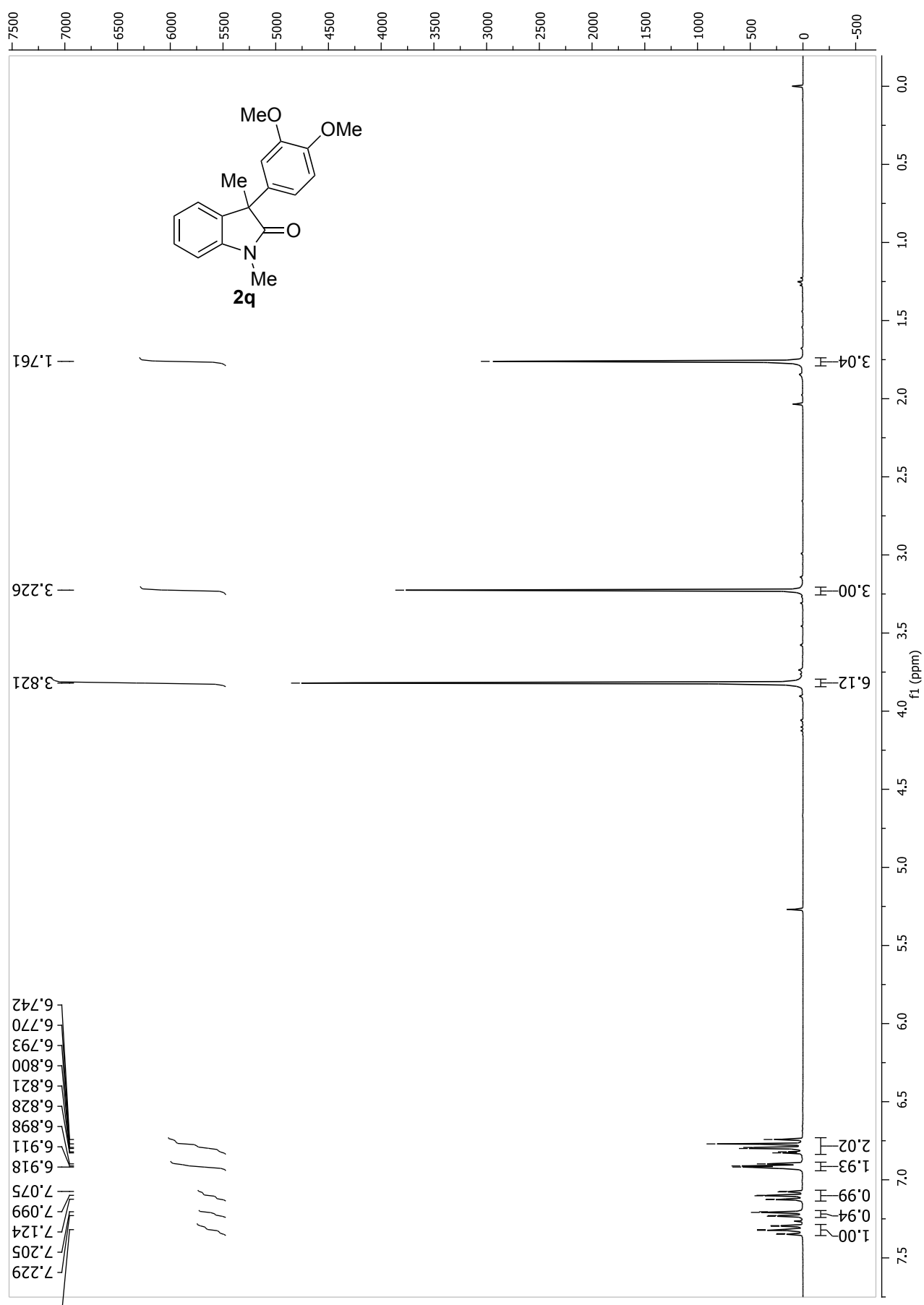
¹³C NMR spectra:

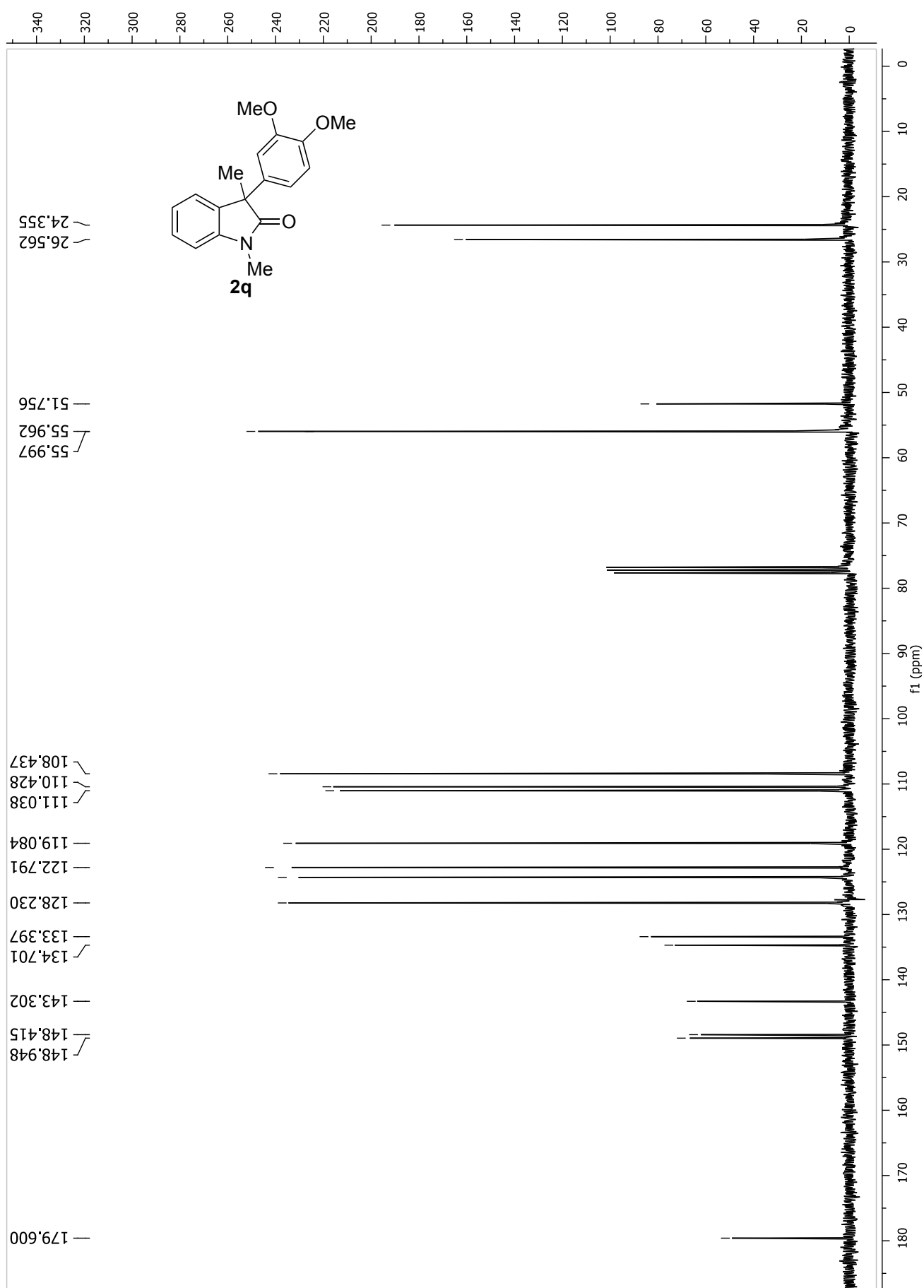
3-Ethyl-1-methyl-3-phenyl-6-(trifluoromethyl)indolin-2-one (2o): ^1H NMR spectra:

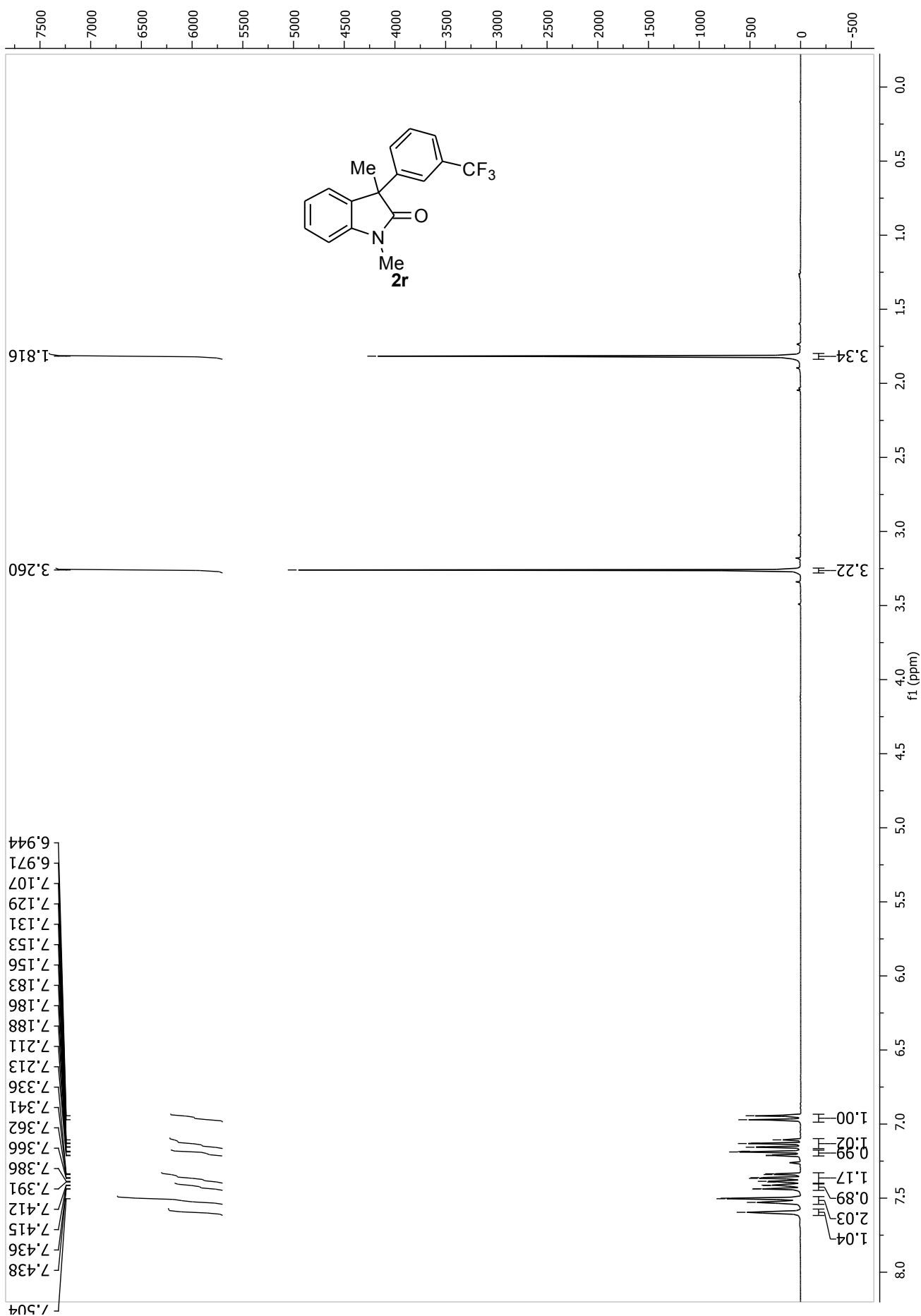
¹³C NMR spectra:

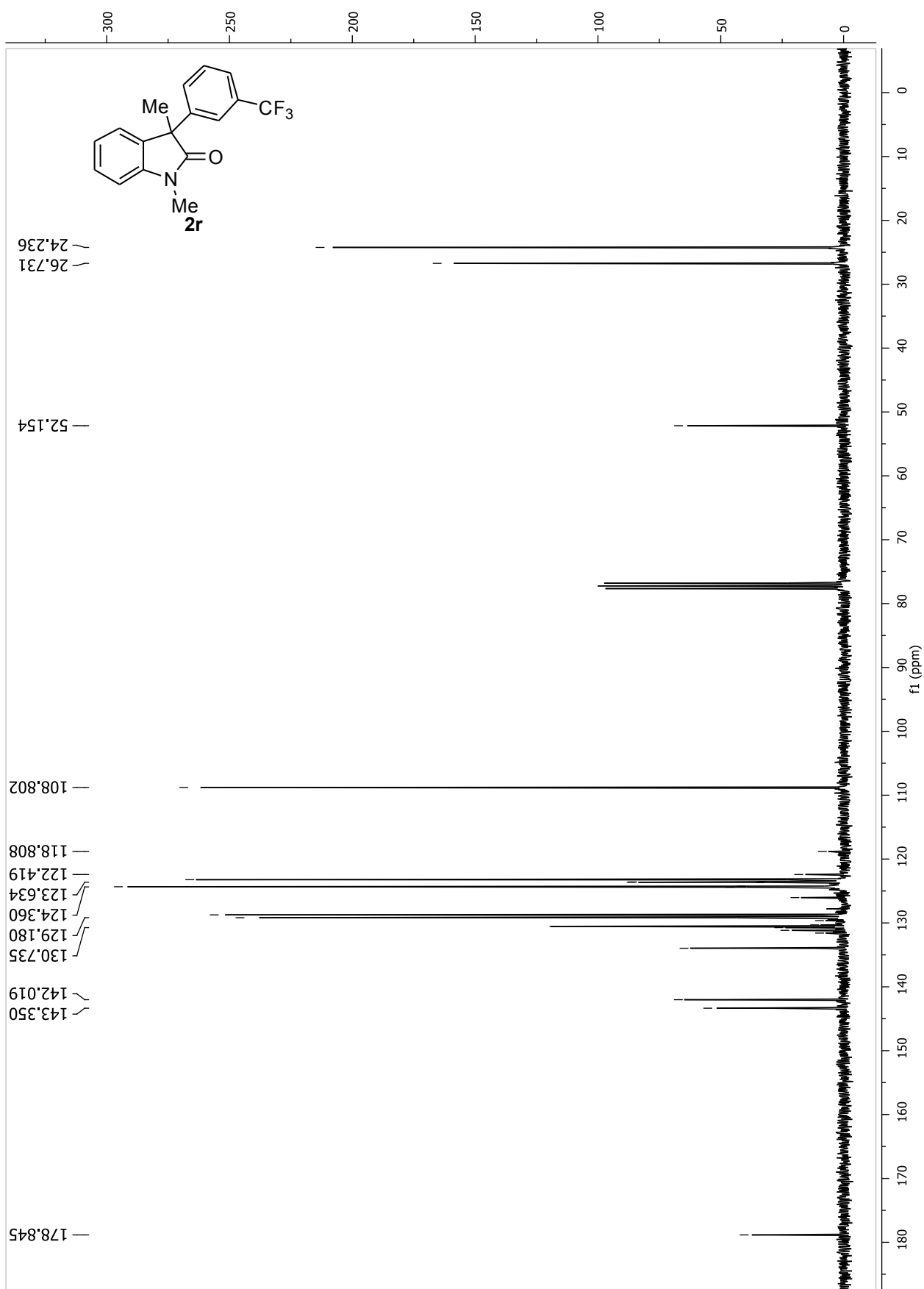
3-Ethyl-6-methoxy-1-methyl-3-phenylindolin-2-one (2p): ^1H NMR spectra:

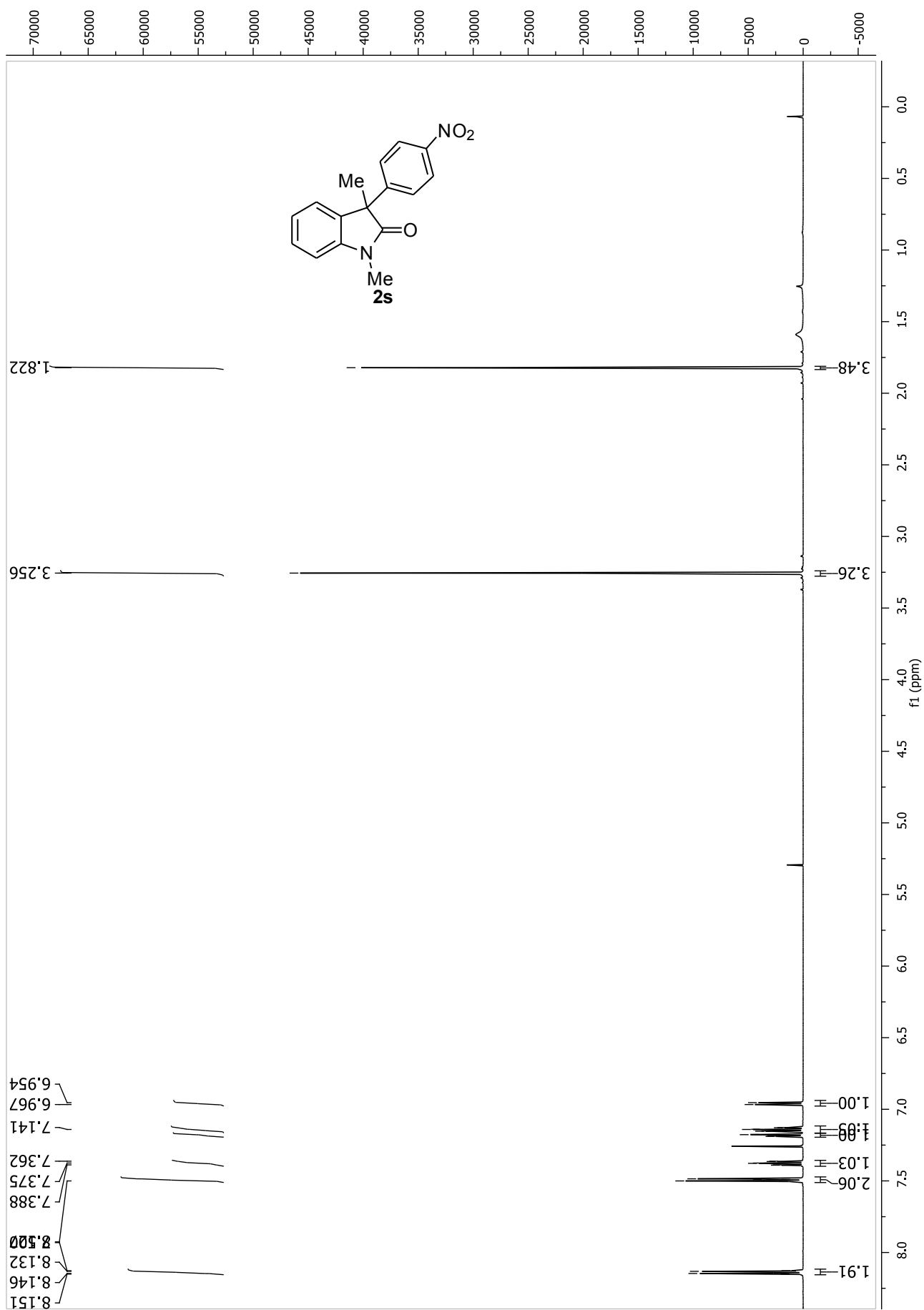
¹³C NMR spectra:

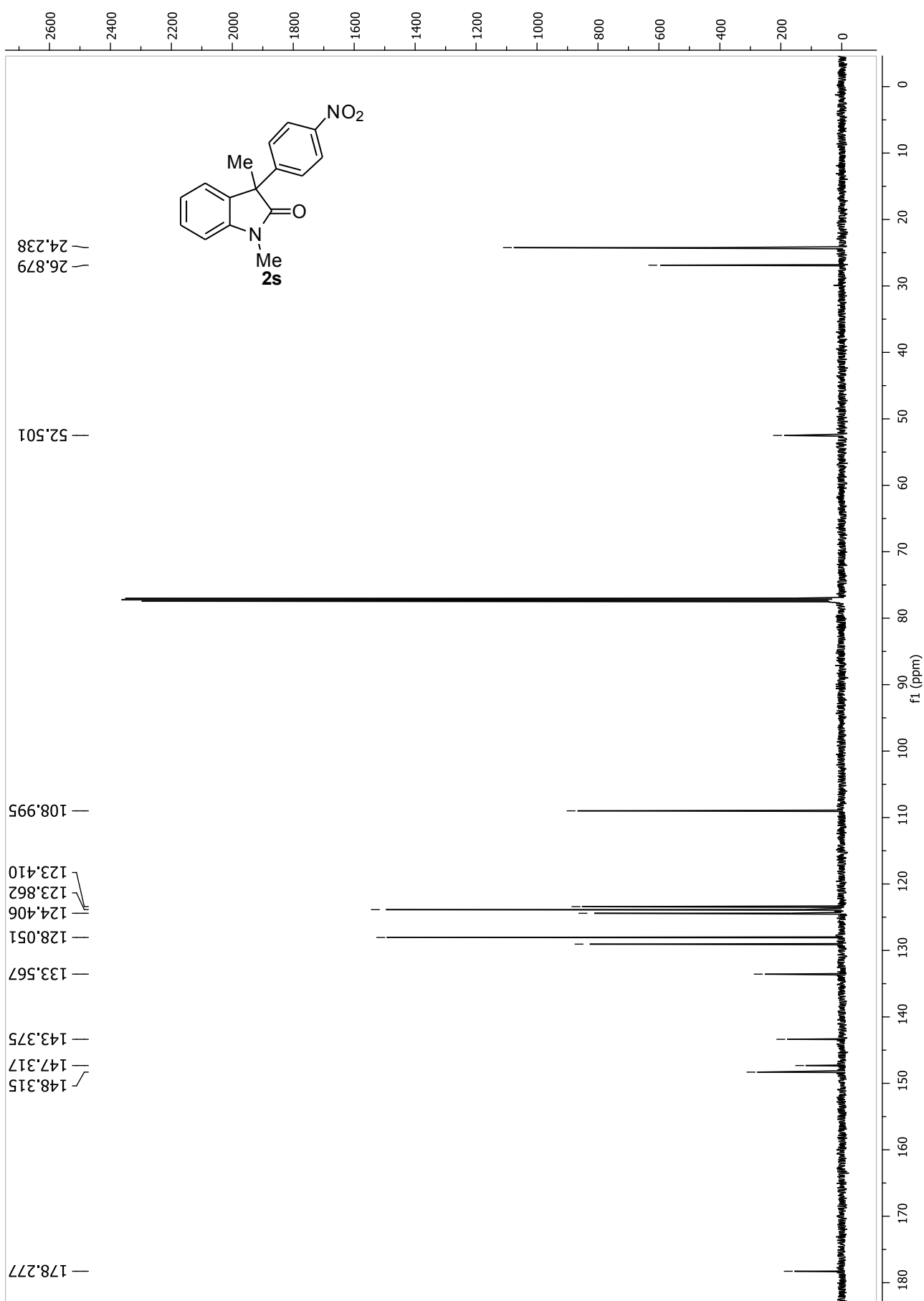
3-(3,4-Dimethoxyphenyl)-1,3-dimethylindolin-2-one (2q): ^1H NMR spectra:

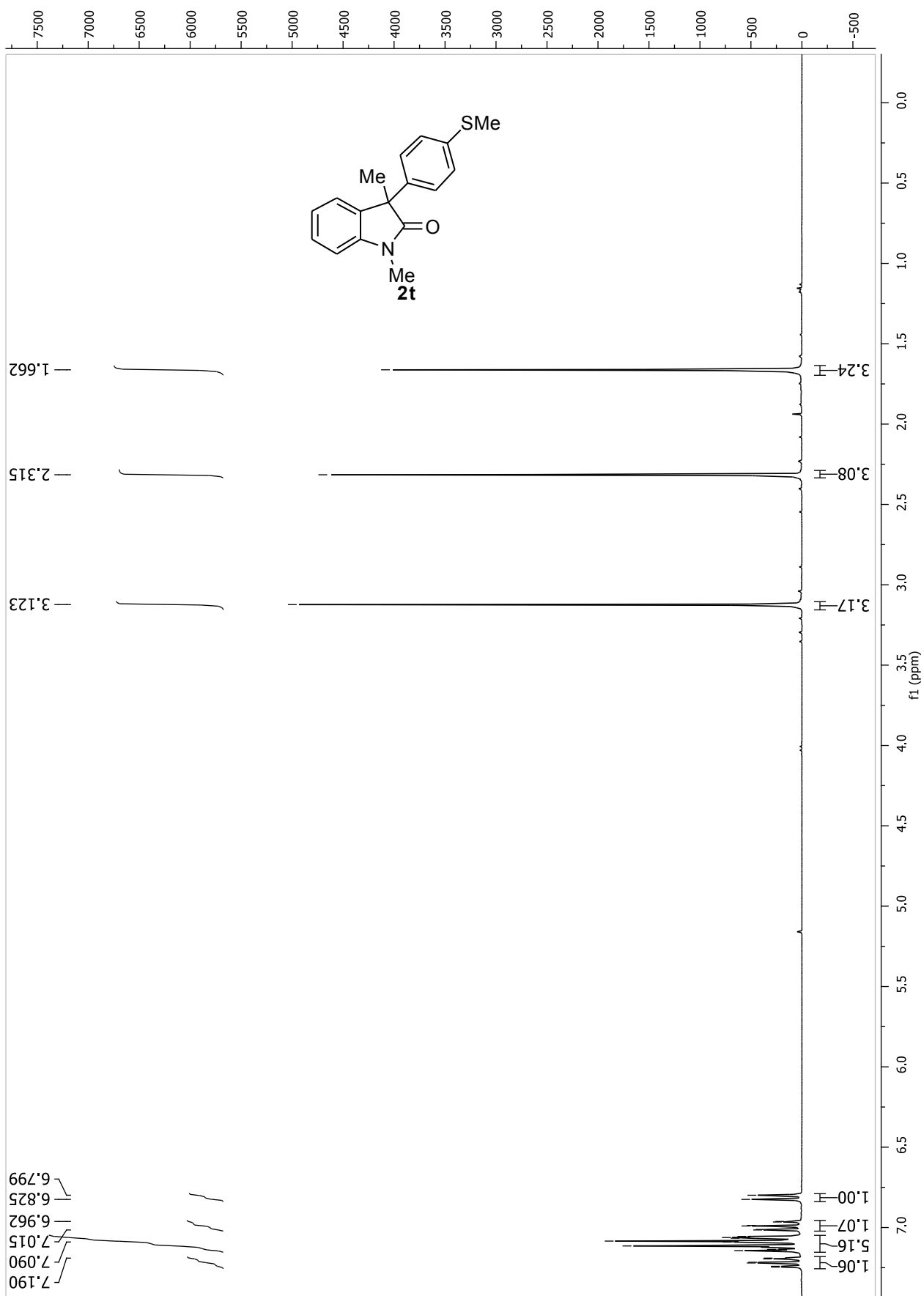
¹³C NMR spectra:

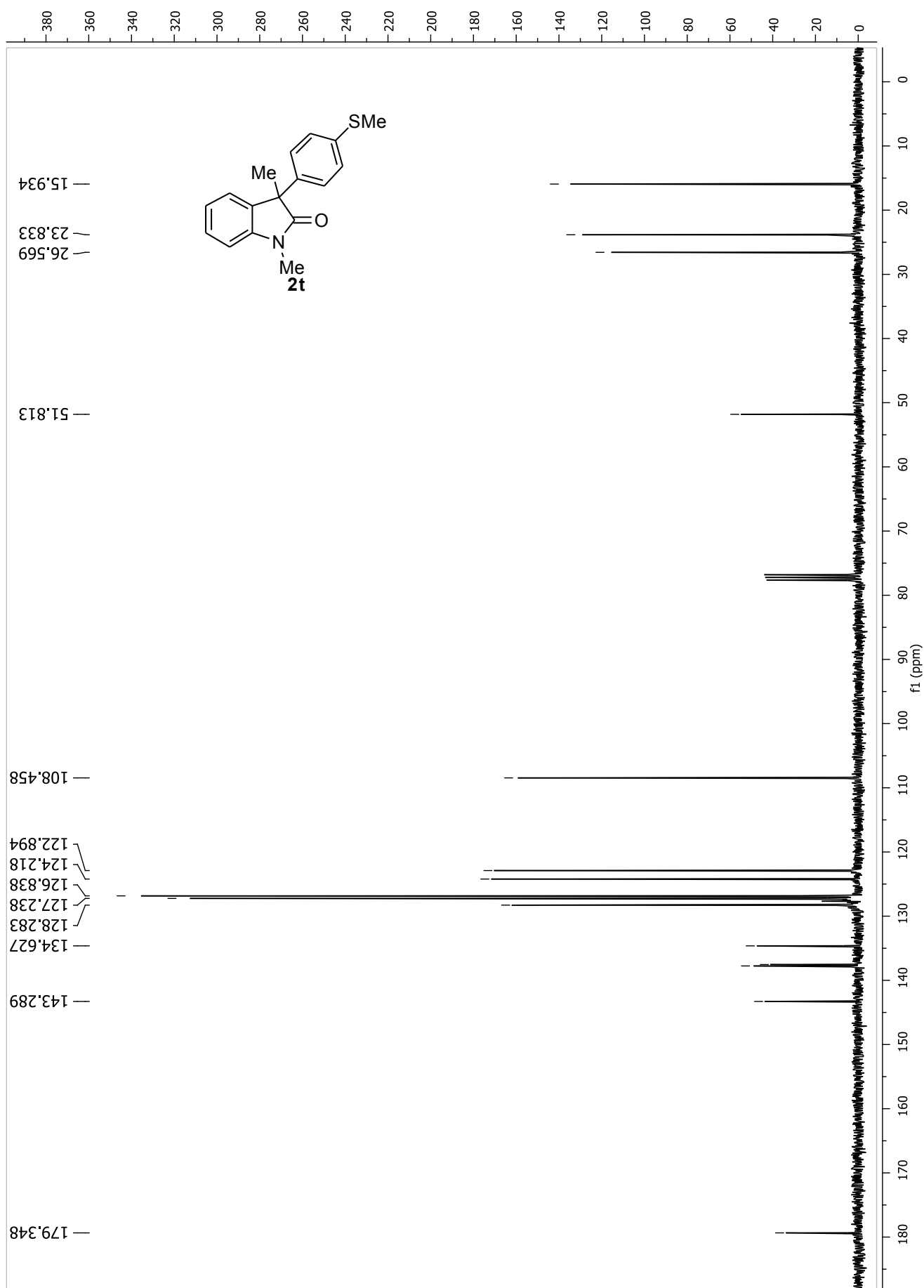
1,3-Dimethyl-3-[3-(trifluoromethyl)phenyl]indolin-2-one (2r): ^1H NMR spectra:

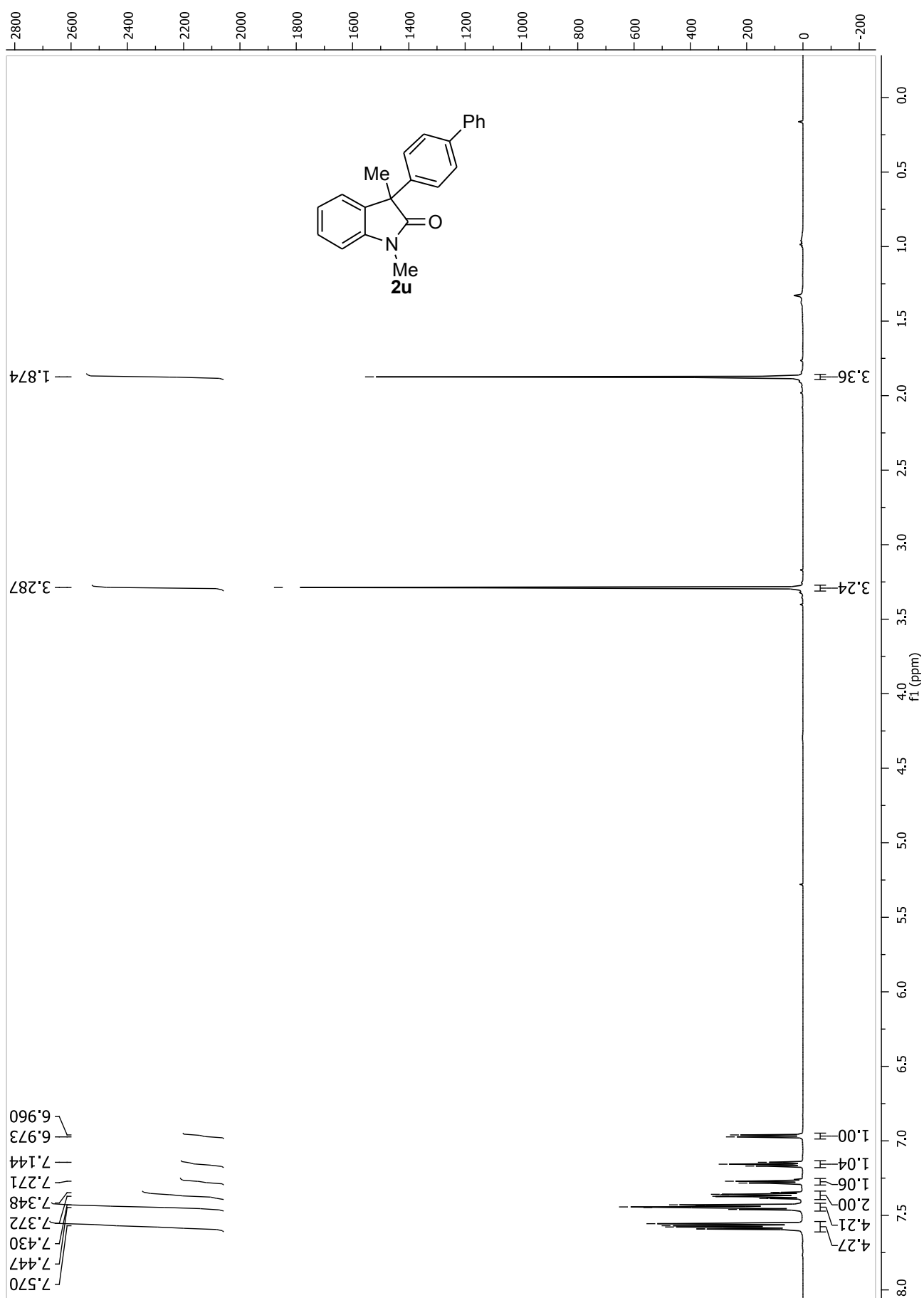
¹³C NMR spectra:

1,3-Dimethyl-3-(4-nitrophenyl)indolin-2-one (2s): ^1H NMR spectra:

¹³C NMR spectra:

1,3-Dimethyl-3-[4-(methylthio)phenyl]indolin-2-one (2t): ^1H NMR spectra:

¹³C NMR spectra:

3-(Biphenyl-4-yl)-1,3-dimethylindolin-2-one (2u): ^1H NMR spectra:

¹³C NMR spectra: