Supporting Information

Mechanochemical Decarbonylative Transformation of Amide Group to OCF_3 and CF_3 Functionalities under Ruthenium Catalysis.

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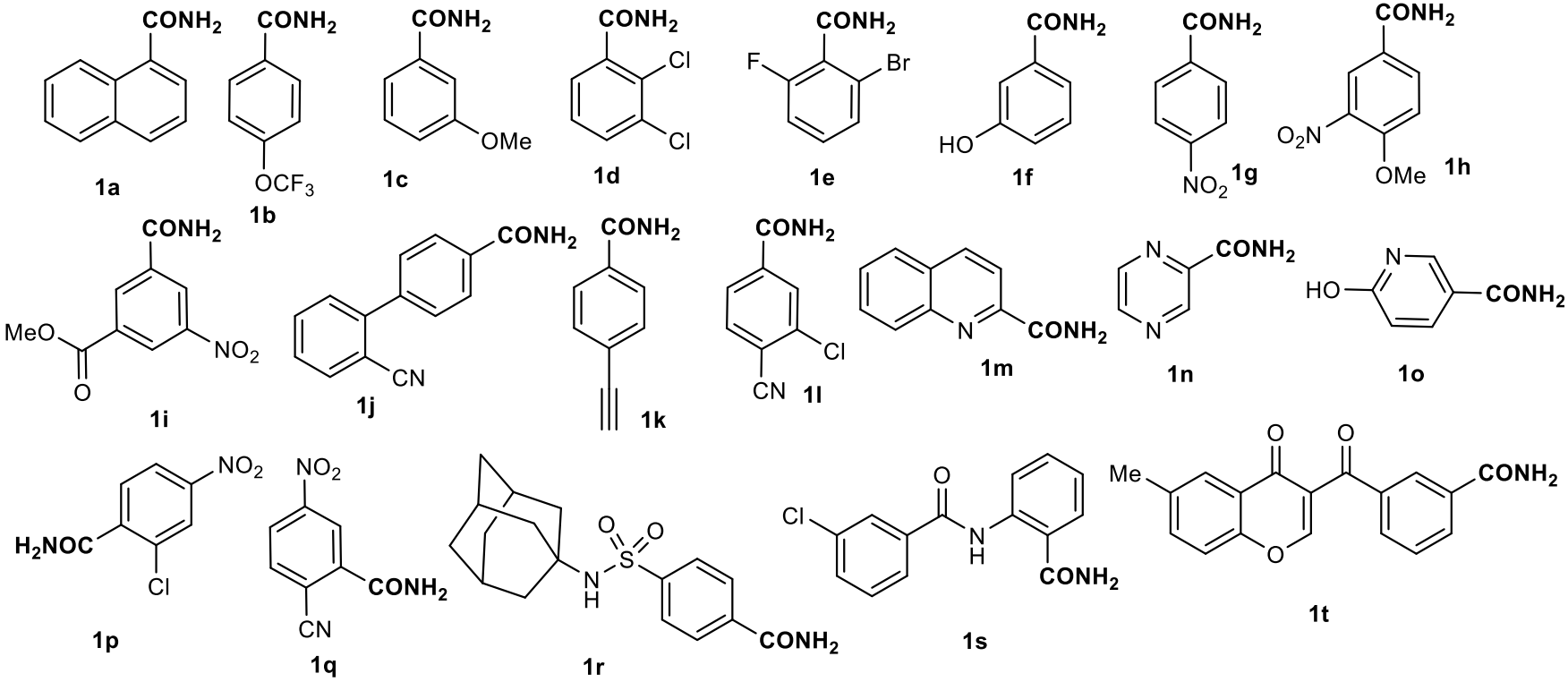
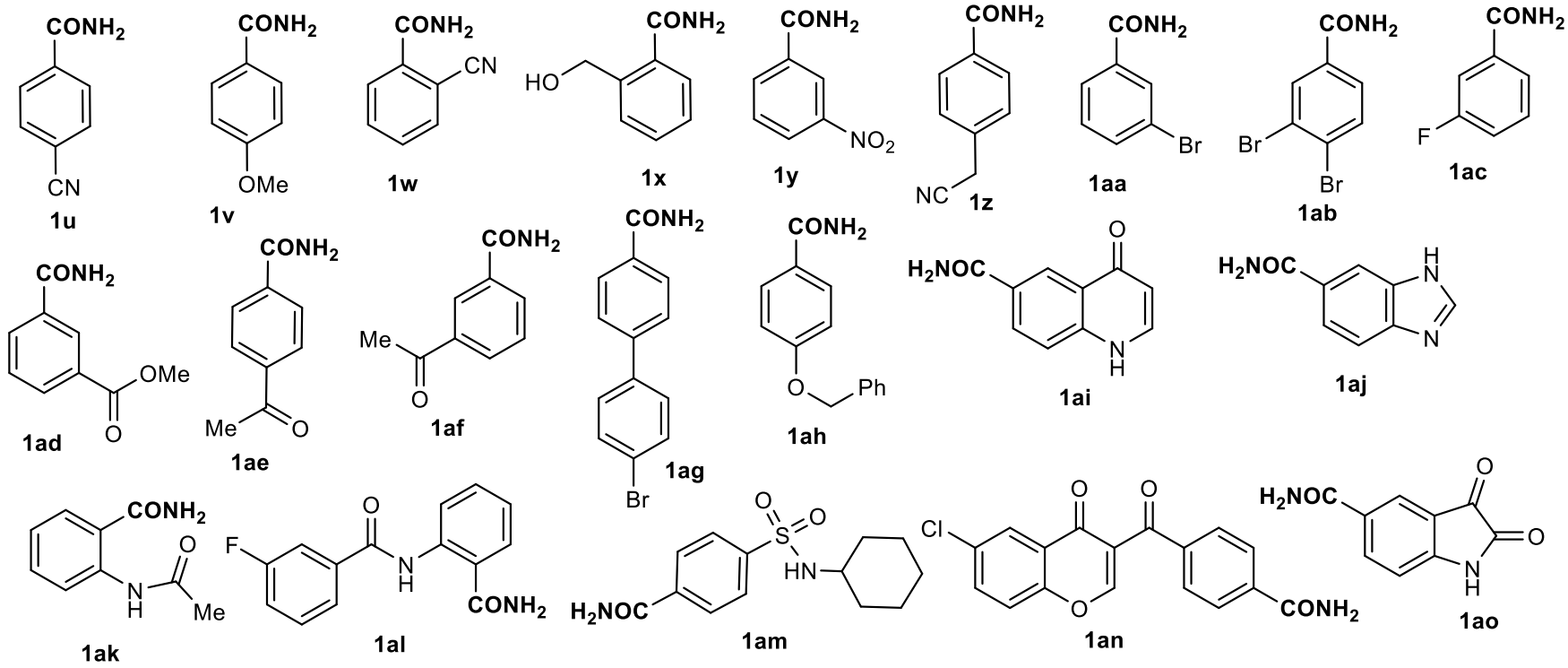
(A) Experimental Section.

Commercially available starting materials, reagents, catalysts, anhydrous and degassed solvents were used without further purification. Flash column chromatography was performed with Merck Silica gel 60 (230-400 mesh). The solvents for column chromatography were distilled before the use. Thin layer chromatography was carried out using Merck TLC Silica gel 60 F_{254} and visualized by short-wavelength ultraviolet light or by treatment with potassium permanganate ($KMnO_4$) stain. ^{1}H, ^{13}C and ^{19}F NMR spectra were recorded on a Bruker 400 and 600 MHz at 20℃. All ^{1}H NMR spectra are reported in parts per million (ppm) downfield of TMS and were measured relative to the signals for $CHCl_3$ (7.26 ppm) and DMSO (2.50 ppm). All $^{13}C\{^{1}H\}$ and $^{19}F\{^{1}H\}$ NMR spectra were reported in ppm relative to residual $CHCl_3$ (77.00 ppm) or DMSO (39.70 ppm) and were obtained with ^{1}H decoupling. Coupling constants, *J*, are reported in Hertz (Hz). Gas chromatographic analyses was performed on Gas Chromatograph Mass Spectrometer GCMS-QP2010 Ultra instrument. Mechanochemical synthesis was performed using the Retsch MM400 mill Liquid chemicals were dosed using gas tight micro syringes. Isolation of obtained compounds was achieved by column chromatography on Silica gel. All commercially available compounds were purchased from appropriate vendors.

(A-1) Scope of reagents used



Scheme S1. List of amide substrates used for trifluoromethylation.



Scheme S2. List of amide substrates used for trifluoromethoxylation.

(A-2) Reaction procedures with optimised reaction conditions.

***Synthesis of trifluoromethyl arenes*.**

General procedure for the in-solution attempts:

Inside a glovebox, starting amide (1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.) were weighed and placed successively into an Ace Pressure Tube equipped with a magnetic stir bar. Finally, 10 mL of an appropriate solvent was added inside the glovebox, then the reaction vessel was capped with a stopper. Subsequently, the Pressure Tube was taken out of

the glovebox and heated at appropriate temperature for 24 hours. Upon completion, the reaction mixture was cooled to room temperature and analysed by TLC and GS MS. Finally, the reaction mixture was concentrated under vacuum, the formed crude was washed with water, filtrated and dried. The residue was subjected to preparative column chromatography on Silica gel using hexane/ethyl acetate mixtures.

General procedure for the solid-state reaction:

Inside a glovebox, a stainless steel 5 mL grinding vessel equipped with four balls (stainless steel, ⌽=5 mm) was loaded consecutively with an appropriate amide (1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.) and 0.1 mL of 1,4-dioxane. Lastly, CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.) was added and the reaction vessel was properly sealed. The reaction vessel was installed on the ball mill and the content was pulverized at 30Hz for 90 minutes. After completion of the reaction, the content of the vessel was directly subjected to flash chromatography on silica gel to isolate the desired compound using gradient elution.

<u>Synthesis of aryl trifluoromethyl ethers</u>.

General procedure for the in-solution attempts:

Inside a glovebox, a starting amide (1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), 1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethanolate (**3**) (318 mg, 1.5 mmol, 1.5 equiv.) $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.) were weighed and placed successively into an Ace Pressure Tube equipped with a magnetic stir bar. Finally, 10 mL of an appropriate solvent were added inside the glovebox, then the reaction vessel was capped with a stopper. Subsequently, the Pressure Tube was taken out of the glovebox and heated at appropriate temperature for 24 hours. Upon completion, the reaction mixture was cooled to room temperature and analysed by TLC and GS MS. Finally, the reaction mixture was concentrated under vacuum, the formed crude was washed with water, filtrated and dried. The residue was subjected to preparative column chromatography on Silica gel using hexane/ethyl acetate mixtures.

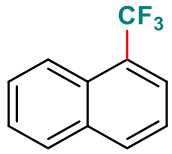
General procedure for the solid-state reaction:

Inside a glovebox, a stainless steel 5 mL grinding vessel equipped with four balls (stainless steel, ⌽=5 mm) was loaded consecutively with an appropriate amide (1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.) and 0.1 mL of 1,4-dioxane. Lastly, freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.) was added and the reaction vessel was properly sealed. The reaction vessel was installed on the ball mill and the contents were pulverized at 30Hz for 90 minutes. After

completion of the reaction, the content of the vessel was directly subjected to flash chromatography on silica gel to isolate the desired compound using gradient elution.

(B) Characterization of products.

1-(trifluoromethyl)naphthalene 2a



The title compound was prepared starting from amide **1a** (171 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2a** (164 mg, 0.84 mmol, 84%).

Colourless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.50 (t, 1H, ^3J = 7.8 Hz, CH_{Ar}), 7.55 – 7.65 (m, 2H, CH_{Ar}), 7.86 (d, 1H, ^3J = 7.3 Hz, CH_{Ar}), 7.92 (dd, 1H, ^3J = 7.5 Hz, ^4J = 1.1 Hz, CH_{Ar}), 8.02 (d, 1H, ^3J = 8.3 Hz, CH_{Ar}), 8.2 (dd, 1H, ^3J = 8.4 Hz, ^4J = 0.8 Hz, CH_{Ar}).

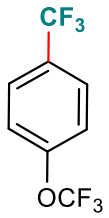
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 124.2, 124.3 (q, $J_{C\text{-}F}$ = 2.3 Hz), 124.7 (q, $J_{C\text{-}F}$ = 6.0 Hz), 124.8 (q, $^1J_{C\text{-}F}$ = 274.0 Hz,), 126.0, 126.6, 127.6, 128.8, 129.0, 133.7, 133.9.

^{19}F NMR (376 MHz, $CDCl_3$): δ -59.74 (s, 3F, CF_3).

MS (GC, 70eV): m/z (%) = 196 (M+, 100), 177 (16), 146 (31).

Anal. calcd. for $C_{11}H_7F$: C, 67.35; H, 3.60. Found: C, 67.49; H, 3.53.

***1-(trifluoromethoxy)-4-(trifluoromethyl)benzene* 2b**



The title compound was prepared starting from amide **1b** (205 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2b** (174 mg, 0.85 mmol, 85%).

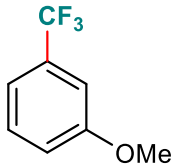
Colourless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.33 (d, 2H, ^3J = 8.5 Hz, CH_{Ar}), 7.68 (d, 2H, ^3J = 8.7 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 120.3 (q, $^1J_{C\text{-}F}$ = 259.0 Hz, OCF_3), 120.9, 123.6 (q, $^1J_{C\text{-}F}$ = 272.0 Hz, CF_3), 127.3 (q, $J_{C\text{-}F}$ = 3.7 Hz), 129.1 (q, $J_{C\text{-}F}$ = 33.8 Hz), 151.6.

^{19}F NMR (376 MHz, $CDCl_3$): δ -62.55 (S, 3F, CF_3), -57.92 (S, 3F, OCF_3).

Anal. calcd. for $C_8H_4F_6O$: C, 41.76; H, 1.75. Found: C, 41.92; H, 1.69.

***1-methoxy-3-(trifluoromethyl)benzene* 2c**

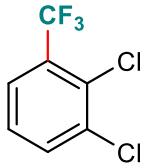


The title compound was prepared starting from amide **1c** (151 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2c** (146 mg, 0.83 mmol, 83%).

Colourless liquid. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 3.90 (s, 3H, OCH_3), 7.13 (dd, 1H, ^3J = 8.4 Hz, ^4J = 2.5 Hz, CH_{Ar}), 7.19 (d, 1H, ^4J = 2.6 Hz, CH_{Ar}), 7.27 (s, 1H, CH_{Ar}), 7.44 (t, 1H, ^3J = 8.0 Hz, CH_{Ar}).

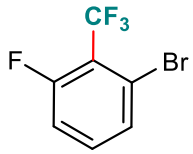
$^{13}C\{^{1}H\}$ NMR (151 MHz, CDCl3): δ 55.4, 110.8 (q, $J_{C\text{-}F}$ = 3.0 Hz), 117.3 (q, $J_{C\text{-}F}$ = 4.5 Hz), 117.5, 124.0 (q, $^{1}J_{C\text{-}F}$ = 273.3 Hz), 129.9, 131.8 (q, $J_{C\text{-}F}$ = 31.7 Hz), 159.7.
^{19}F NMR (564 MHz, CDCl3) δ -62.8 (s, 3F, CF3).
Anal. calcd. for $C_8H_7F_3O$: C, 54.55; H, 4.01. Found: C, 54.51; H, 3.92.

***1,2-dichloro-3-(trifluoromethyl)benzene* 2d**



The title compound was prepared starting from amide **1d** (190 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2d** (195 mg, 0.91 mmol, 91%).
Colourless liquid. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 7.33 (t, 1H, ^{3}J = 8.0 Hz, CH_{Ar}), 7.65 (m, 2H, CH_{Ar}).
$^{13}C\{^{1}H\}$ NMR (151 MHz, $CDCl_3$): δ 122.4 (q, $^{1}J_{C\text{-}F}$ = 273.3 Hz), 125.8 (q, $J_{C\text{-}F}$ = 6.0 Hz), 127.2, 130.4 (q, $J_{C\text{-}F}$ = 31.7 Hz), 131.0, 133.7, 135.3.
^{19}F NMR (564 MHz, $CDCl_3$) δ -63.0 (s, 3F, CF_3).
MS (GC, 70eV): m/z (%) = 214 (M+, 100), 216 (64), 197 (13), 195 (17), 181 (18), 179 (52).
Anal. calcd. for $C_7H_3F_3Cl_2O$: C, 39.11; H, 1.41. Found: C, 39.23; H, 1.52.

***1-bromo-3-fluoro-2-(trifluoromethyl)benzene* 2e**



The title compound was prepared starting from amide **1e** (218 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-

dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2e** (194 mg, 0.80 mmol, 80%).

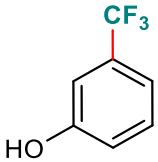
Colourless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.15 (dd, 1H, ^3J = 11.1 Hz, ^4J = 8.4 Hz, CH_{Ar}), 7.35 (td, 1H, ^3J = 8.2 Hz, ^4J = 5.3 Hz, CH_{Ar}), 7.52 (d, 1H, ^3J = 8.1 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 116.5 (d, $J_{C\text{-}F}$ = 23.6 Hz), 118.6 (qd, $J_{C\text{-}F}$ = 32.3 Hz, $J_{C\text{-}F}$ = 12.0 Hz), 121.1, 122.1 (qd, $^1J_{C\text{-}F}$ = 274.6 Hz, $J_{C\text{-}F}$ = 2.5 Hz), 130.9 (d, $J_{C\text{-}F}$ = 3.6 Hz), 133.7 (d, $J_{C\text{-}F}$ = 10.2 Hz), 160.8 (d, $^1J_{C\text{-}F}$ = 261.2 Hz).

^{19}F NMR (376 MHz, $CDCl_3$): δ -107.9 (qdd, 1F, J = 31.7 Hz, J = 11.0 Hz, J = 5.1 Hz, CF), -56.6 (d, 3F, J = 31.7 Hz, CF_3).

Anal. calcd. for $C_7H_3F_4Br$: C, 34.60; H, 1.24. Found: C, 34.49; H, 1.11.

***3-(trifluoromethyl)phenol* 2f**



The title compound was prepared starting from amide **1f** (218 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2f** (125 mg, 0.77 mmol, 77%).

Yellowish liquid. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 5.05 (s, 1H, OH), 7.00 (dd, 1H, ^3J = 8.2 Hz, ^4J = 2.6 Hz, CH_{Ar}), 7.08 (s, 1H, CH_{Ar}), 7.20 (d, 1H, J = 7.7 Hz, CH_{Ar}), 7.35 (t, 1H, ^3J = 7.9 Hz, CH_{Ar}).

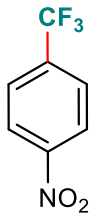
^{13}C{^{1}H} NMR (151 MHz, $CDCl_3$): δ 112.3 (q, $J_{C\text{-}F}$ = 3.0 Hz), 117.6 (q, $J_{C\text{-}F}$ = 3.0 Hz), 118.8, 123.7 (q, $^1J_{C\text{-}F}$ = 271.8 Hz), 130.2, 132.1 (q, $J_{C\text{-}F}$ = 31.7 Hz), 155.6.

^{19}F NMR (564 MHz, $CDCl_3$): δ -62.8 (s, 3F, CF_3).

MS (GC, 70eV): m/z (%) = 162 (M+, 100), 143 (32), 114 (20).

Anal. calcd. for $C_7H_5F_3O$: C, 51.86; H, 3.11. Found: C, 51.96; H, 3.23.

***1-nitro-4-(trifluoromethyl)benzene* 2g**



The title compound was prepared starting from amide **1g** (166 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2g** (153 mg, 0.80 mmol, 80%).

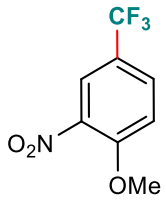
Yellowish solid, mp 39 °C. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.85 (d, 2H, ^3J = 8.7 Hz, CH_{Ar}), 8.37 (d, 2H, ^3J = 8.6 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 123.0 (q, $^1J_{C\text{-}F}$ = 272.8 Hz), 124.1, 124.8, 126.8 (q, $J_{C\text{-}F}$ = 3.7 Hz), 136.2 (q, $J_{C\text{-}F}$ = 33.7 Hz), 138.7, 150.1.

^{19}F NMR (376 MHz, $CDCl_3$): δ -63.24 (s, 3F, $-CF_3$).

Anal. calcd. for $C_7H_4F_3NO_2$: C, 43.99; H, 2.11; N, 7.33. Found: C, 44.06; H, 2.17; N, 7.25.

***1-methoxy-2-nitro-4-(trifluoromethyl)benzene* 2h**

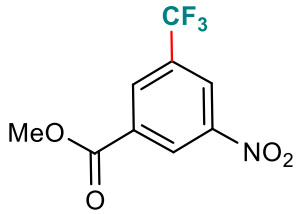


The title compound was prepared starting from amide **1h** (196 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2h** (181 mg, 0.82 mmol, 82%).

Yellow solid, mp 48-49 °C. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 4.03 (s, 3H, OCH_3), 7.21 (d, 1H, ^3J = 8.8 Hz, CH_{Ar}), 7.80 (dd, 1H, ^3J = 8.8 Hz, ^4J = 2.4 Hz, CH_{Ar}), 8.11 (d, 1H, ^4J = 2.5 Hz, CH_{Ar}).

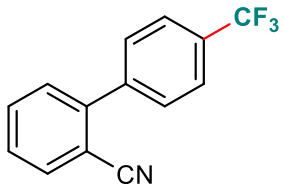
$^{13}C\{^1H\}$ NMR (151 MHz, $CDCl_3$): δ 57.0, 114.0, 122.9 (q, J_{C-F} = 34.7 Hz), 123.3 (q, $^1J_{C-F}$ = 271.8 Hz), 123.4 (q, J_{C-F} = 3.0 Hz), 131.1 (q, J_{C-F} = 3.0 Hz), 139.4, 155.4.
^{19}F NMR (564 MHz, $CDCl_3$): δ -62.0 (s, 3F, CF_3).
MS (GC, 70eV): m/z (%) = 221 (M+, 44), 202 (26), 191 (62), 174 (100), 161 (40), 1610 (66), 145 (88), 141 (18), 132 (39), 126 (32).
Anal. calcd. for $C_8H_6F_3NO_3$: C, 43.45; H, 2.73; N, 6.33. Found: C, 43.61; H, 2.80; N, 6.36.

***methyl 3-nitro-5-(trifluoromethyl)benzoate* 2i**



The title compound was prepared starting from amide **1i** (224 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2i** (206 mg, 0.83 mmol, 83%).
Pale white solid, mp 35-37 °C. **^1H NMR** (400 MHz, $CDCl_3$): δ 4.04 (s, 3H, OCH_3), 8.63 (s, 1H, CH_{Ar}), 8.68 (s, 1H, CH_{Ar}), 9.05 (s, 1H, CH_{Ar}).
$^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 53.3, 122.4 (q, $^1J_{C-F}$ = 273.4 Hz), 124.4 (q, J_{C-F} = 3.7 Hz), 127.5, 131.9 (q, J_{C-F} = 3.5 Hz), 132.8 (q, J_{C-F} = 34.7 Hz), 133.2, 148.5, 163.7.
^{19}F NMR (376 MHz, $CDCl_3$): δ -62.96 (s, 3F, CF_3).
Anal. calcd. for $C_9H_6F_3NO_4$: C, 43.39; H, 2.43; N, 5.62. Found: C, 43.29; H, 2.52; N, 5.70.

***4'-(trifluoromethyl)-[1,1'-biphenyl]-2-carbonitrile* 2j**



The title compound was prepared starting from amide **1j** (222 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2j** (220 mg, 0.89 mmol, 89%).

White solid, mp 103-104 °C. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.47 – 7.52 (m, 2H, CH_{Ar}), 77.66 – 7.70 (m, 3H, CH_{Ar}), 7.73 – 7.75 (m, 2H, CH_{Ar}), 7.78 (dd, 1H, ^3J = 7.8 Hz, ^4J = 0.8 Hz, CH_{Ar}).

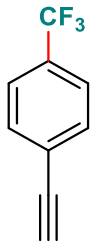
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 111.3, 118.2, 124.0 (q, $^1J_{C\text{-}F}$ = 272.7 Hz), 125.7 (q, $J_{C\text{-}F}$ = 3.7 Hz), 128.4, 130.0, 130.8 (q, $J_{C\text{-}F}$ = 32.5 Hz), 133.1, 133.9, 141.7, 143.8.

^{19}F NMR (376 MHz, $CDCl_3$): δ -62.65 (s, 3F, CF_3).

MS (GC, 70eV): m/z (%) = 247 (M+, 100).

Anal. calcd. for $C_{14}H_8F_3N$: C, 68.02; H, 3.26; N, 5.67. Found: C, 68.13; H, 3.33; N, 5.51.

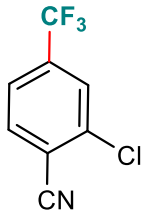
***1-ethynyl-4-(trifluoromethyl)benzene* 2k**



The title compound was prepared starting from amide **1k** (145 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2k** (220 mg, 0.63 mmol, 63%).

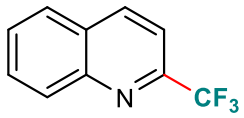
Colorless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 3.19 (s, 1H, CH), 7.59 (br s, 4H, CH_{Ar}).
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 77.7, 80.3, 121.9 (q, $^{1}J_{C\text{-}F}$ = 272.6 Hz), 123.3 (q, $J_{C\text{-}F}$ = 3.8 Hz), 124.0 (d, $J_{C\text{-}F}$ = 1.2 Hz), 128.6 (q, $J_{C\text{-}F}$ = 32.8 Hz), 130.5.
^{19}F NMR (376 MHz, $CDCl_3$): δ -63.0 (S, 3F, CF_3).
Anal. calcd. for $C_9H_5F_3$: C, 63.54; H, 2.96. Found: C, 63.42; H, 3.01.

***2-chloro-4-(trifluoromethyl)benzonitrile* 2l**



The title compound was prepared starting from amide **1l** (180 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2l** (185 mg, 0.90 mmol, 90%).
White solid, mp 83-84 °C. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.66 (d, 1H, ^{3}J = 8.2 Hz, CH_{Ar}), 7.80 (s, 1H, CH_{Ar}), 7.84 (d, 1H, ^{3}J = 8.1 Hz, CH_{Ar}).
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 114.7, 117.0, 121.0 (q, $^{1}J_{C\text{-}F}$ = 273.6 Hz), 124.1 (q, $J_{C\text{-}F}$ = 3.6), 127.2 (q, $J_{C\text{-}F}$ = 3.8), 134.6, 135.7 (q, $J_{C\text{-}F}$ = 34.2), 137.8.
^{19}F NMR (376 MHz, $CDCl_3$): δ -63.64 (s, 3F, CF_3).
MS (GC, 70eV): m/z (%) = 205 (M+, 100), 186 (23), 170 (34).
Anal. calcd. for $C_8H_3F_3ClN$: C, 46.74; H, 1.47; N, 6.81. Found: C, 46.61; H, 1.52; N, 6.95.

***2-(trifluoromethyl)quinoline* 2m**



The title compound was prepared starting from amide **1m** (172 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2m** (155 mg, 0.79 mmol, 79%).

White solid, mp 60-61 °C. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.67 (ddd, 1H, ^3J = 8.1 Hz, ^4J =6.8 Hz, J =1.2 Hz, CH_{Ar}), 7.73 (d, 1H, ^3J = 8.5 Hz, CH_{Ar}), 7.81 (ddd, 1H, ^3J = 8.5 Hz, ^4J = 6.9 Hz, J =1.5 Hz, CH_{Ar}), 7.89 (d, 1H, ^3J = 8.1, 1.4 Hz, CH_{Ar}), 8.22 (d, 1H, ^3J = 8.5, 1.1 Hz, CH_{Ar}), 8.34 (d, 1H, ^3J = 8.5 Hz, CH_{Ar}).

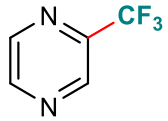
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 116.8 (d, J_{C-F} = 2.10 Hz), 121.6 (q, $^1J_{C-F}$ = 275.1 Hz), 127.7, 128.6, 128.9, 130.1, 130.8, 138.1, 147.2, 147.9 (q, J_{C-F} = 34.6 Hz).

^{19}F NMR (376 MHz, $CDCl_3$): δ -67.5 (s, 3F, CF_3).

MS (GC, 70eV): m/z (%) = 197 (M+, 100), 128 (77), 101 (16).

Anal. calcd. for $C_{10}H_6F_3N$: C, 60.92; H, 3.07; N, 7.10. Found: C, 61.04; H, 3.19; N, 6.98.

***2-(trifluoromethyl)pyrazine* 2n**



The title compound was prepared starting from amide **1n** (180 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2n** (185 mg, 0.71 mmol, 71%).

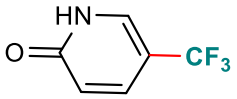
Colorless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 8.73 (s, 1H, CH_{Ar}), 8.83 (d, 1H, J = 2.3 Hz, CH_{Ar}), 7.73 (s, 1H, CH_{Ar}),

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 121.0 (q, $^1J_{C-F}$ = 272.8 Hz), 141.9 (q, J_{C-F} = 3.3 Hz), 144.1 (q, J_{C-F} = 35.5 Hz), 144.4, 147.8.

^{19}F NMR (376 MHz, $CDCl_3$): δ -67.85 (s, 3F, CF_3).

Anal. calcd. for $C_5H_3F_3N_2$: C, 40.55; H, 2.04; N, 18.92. Found: C, 40.45; H, 1.96; N, 19.03.

***5-(trifluoromethyl)pyridin-2-ol* 2o**



The title compound was prepared starting from amide **1o** (138 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4o** (106 mg, 0.65 mmol, 65%).

White solid, mp 145-146 °C. **^{1}H NMR (400 MHz, DMSO-d_6):** δ 6.51 (d, 1H, ^3J = 9.7 Hz, CH_{Ar}), 7.66 (dd, 1H, J = 9.7, 2.8 Hz, CH_{Ar}), 7.95 (q, 1H, J = 1.6 Hz, CH_{Ar}), 12.22 (s, 1H, -OH).

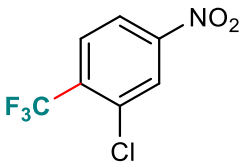
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 107.8 (q, $J_{C\text{-}F}$ = 34.4 Hz), 121.4, 124.5 (q, $^1J_{C\text{-}F}$ = 269.1 Hz), 136.7, 162.7.

^{19}F{^{1}H} NMR (376 MHz, $CDCl_3$): δ – 55.99 (s, 3F, CF_3).

MS (GC, 70eV): m/z (%) = 163 (M+, 100), 144 (23), 135 (65), 116 (56).

Anal. calcd. for $C_6H_4F_3ON$: C, 44.19; H, 2.47; N, 8.59. Found: C, 43.98; H, 2.23; N, 8.68.

***2-chloro-4-nitro-1-(trifluoromethyl)benzene* 2p**



The title compound was prepared starting from amide **1p** (200 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2p** (182 mg, 0.81 mmol, 81%).

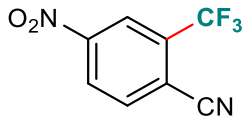
Colourless liquid. **^{1}H NMR (500 MHz, DMSO-d_6):** δ 8.08 (d, 1H, ^1J = 8.6 Hz, CH_{Ar}), 8.28 (d, 1H, ^1J = 8.6 Hz, CH_{Ar}), 8.43 (s, 1H, CH_{Ar}).

^{13}C{^{1}H} NMR (125 MHz, DMSO-d_6): δ 122.4 (q, $^1J_{C\text{-}F}$ = 274.1 Hz), 123.2, 126.7, 130.1 (q, $J_{C\text{-}F}$ = 5.2 Hz), 132.2 (q, $J_{C\text{-}F}$ = 31.6 Hz), 132.7, 150.7.

HRMS (TOF MS ES$^-$) m/z: [M - H]$^+$: Calcd for $C_7H_3F_3O_2NCl$ (M-H) 224.9802. Found 224.9804.

Anal. calcd. for $C_7H_3F_3O_2NCl$: C, 37.28; H, 1.34; N, 6.21. Found: C, 37.39; H, 1.48; N, 6.09.

***4-nitro-2-(trifluoromethyl)benzonitrile* 2q**



The title compound was prepared starting from amide **1q** (191 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2q** (166 mg, 0.77 mmol, 77%).

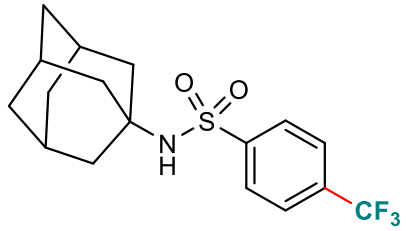
Yellowish solid, mp 52-53 °C. **^{1}H NMR (500 MHz, $CDCl_3$):** δ 8.13 (d, 1H, ^3J = 8.4 Hz, CH_{Ar}), 8.57 (dd, 1H, ^3J = 8.5 Hz, ^4J = 2.2 Hz, CH_{Ar}), 8.65 (d, 1H, ^4J = 2.3 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$): δ 113.7, 115.8, 121.3 (q, $^1J_{C\text{-}F}$ = 274.5 Hz), 122.2 (q, $J_{C\text{-}F}$ = 4.7 Hz), 127.2, 134.8 (q, $J_{C\text{-}F}$ = 33.8 Hz), 136.5, 149.7.

MS (GC, 70eV): m/z (%) = 216 (M+, 40), 186 (32), 170 (100), 150 (14), 143 (14), 120 (19), 100 (17).

Anal. calcd. for $C_8H_3F_3O_2N_2$: C, 44.46; H, 1.40; N, 12.96. Found: C, 44.60; H, 1.19; N, 13.09.

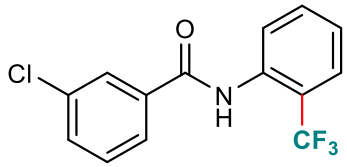
***N-((1s,3s)-adamantan-1-yl)-4-(trifluoromethyl)benzenesulfonamide* 2r**



The title compound was prepared starting from amide **1r** (334 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2r** (320 mg, 0.89 mmol, 89%).

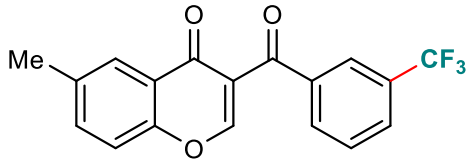
White solid, mp 135 °C. **^{1}H NMR (500 MHz, DMSO-d_6):** δ 1.42 – 1.49 (m, 6H, CH), 1.65 (d, 6H, ^{1}J = 3.0 Hz, CH), 1.87 (s, 3H, CH), 7.81 (s, 1H, NH), 7.92 (d, 2H, ^{1}J = 8.3 Hz, CH_{Ar}), 8.01 (d, 2H, ^{1}J = 8.2 Hz, CH_{Ar}).
^{13}C{^{1}H} NMR (125 MHz, DMSO-d_6): δ 29.3, 35.9, 42.9, 54.6, 124.1 (q, $^{1}J_{C\text{-}F}$ = 272.2 Hz), 126.8, 127.5, 132.1 (q, $J_{C\text{-}F}$ = 32.2 Hz), 149.3.
MS (GC, 70eV): m/z (%) = 359 (M+, 45), 302 (55), 145 (26), 132 (20), 93 (100).
Anal. calcd. for $C_{17}H_{20}F_3O_2SN$: C, 56.81; H, 5.61; N, 3.90. Found: C, 56.63; H, 5.49; N, 4.03.

***3-chloro-N-(2-(trifluoromethyl)phenyl)benzamide* 2s**



The title compound was prepared starting from amide **1s** (274 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2s** (212 mg, 0.71 mmol, 71%).
White solid, mp 166-167 °C. **^{1}H NMR (400 MHz, $CDCl_3$):** δ 7.28 (t, 1H, ^{1}J = 7.7 Hz, CH_{Ar}), 7.44 (t, 1H, ^{1}J = 7.8 Hz, CH_{Ar}), 7.55 (d,1H, ^{1}J = 8.0 Hz, CH_{Ar}), 7.61 (t, 1H, ^{1}J = 7.9 Hz, CH_{Ar}), 7.66 (d, 1H, ^{1}J = 8.0 Hz, CH_{Ar}), 7.70 (d, 1H, ^{1}J = 7.7 Hz, CH_{Ar}), 7.88 (s, 1H, CH_{Ar}), 8.17 (s, 1H, NH), 8.33 (d, 1H, ^{1}J = 8.3 Hz, CH_{Ar}).
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 120.6 (q, $J_{C\text{-}F}$ = 29.6 Hz), 124.2 (q, $^{1}J_{C\text{-}F}$ = 272.7 Hz), 124.5, 124.7, 124.9, 126.2 (q, $J_{C\text{-}F}$ = 5.3 Hz), 127.7, 130.3, 132.4, 133.1, 135.1, 135.3, 136.1, 164.2.
^{19}F{^{1}H} NMR (376 MHz, $CDCl_3$): δ – 60.38 (s, 3F, CF_3).
MS (GC, 70eV): m/z (%) = 299 (M+, 36), 139 (100), 111 (34).
Anal. calcd. for $C_{14}H_9ClF_3ON$: C, 56.11; H, 3.03; N, 4.67. Found: C, 56.32; H, 2.97; N, 4.79.

***6-methyl-3-(3-(trifluoromethyl)benzoyl)-4H-chromen-4-one* 2t**



The title compound was prepared starting from amide **1t** (327 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **2t** (272 mg, 0.74 mmol, 74%).

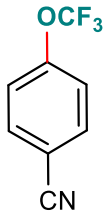
White solid, mp 157-158 °C. **^{1}H NMR (500 MHz, $CDCl_3$):** δ 2.47 (s, 3H, CH_3), 7.45 (d, 1H, ^1J = 8.6 Hz, CH_{Ar}), 7.56 (dd, 1H, ^1J = 8.4 Hz, J = 2.1 Hz, CH_{Ar}), 7.59 (d, 1H, ^1J = 7.8 Hz, CH_{Ar}), 7.82 (d, 1H, ^1J = 7.8 Hz, CH_{Ar}), 7.97 (d, 1H, ^1J = 7.8 Hz, CH_{Ar}), 8.01 (d, 1H, J = 1.0 Hz, CH_{Ar}), 8.10 (s, 1H, CH_{Ar}), 8.36 (s, 1H, CH_{Ar}).

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$): δ 21.0, 118.2, 123.7 (q, $^1J_{C\text{-}F}$ = 272.3 Hz), 124.3, 124.6, 125.8, 126.2 (q, $J_{C\text{-}F}$ = 3.9 Hz), 128.9, 129.7 (q, $J_{C\text{-}F}$ = 3.1 Hz), 131.0 (q, $J_{C\text{-}F}$ = 32.9 Hz), 132.9, 135.9, 136.6, 137.9, 154.4, 159.6, 174.7, 191.1.

MS (GC, 70eV): m/z (%) = 368 (M+, 58), 303 (100), 283 (23), 254 (21), 207 (28), 189 (70), 128 (26), 154 (49), 126 (13).

Anal. calcd. for $C_{17}H_8ClF_3O_4$: C, 55.38; H, 2.19. Found: C, 55.16; H, 2.32.

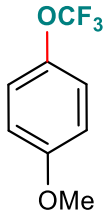
***4-(trifluoromethoxy)benzonitrile* 4a**



The title compound was prepared starting from amide **1u** (146 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4a** (153 mg, 0.82 mmol, 82%).

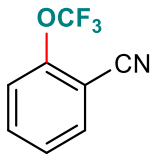
Colorless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.33 (d, 2H, ^{3}J = 8.4 Hz, CH_{Ar}), 7.73 (dt, 2H, ^{3}J = 8.8 Hz, ^{4}J = 2.3 Hz, CH_{Ar}).
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 110.9, 117.6, 120.2 (q, $^{1}J_{C\text{-}F}$ = 259.8 Hz), 121.2, 134.2, 152.2.
^{19}F NMR (376 MHz, $CDCl_3$): δ -57.83 (S, 3F, OCF_3).
MS (GC, 70eV): m/z (%) = 187 (M+, 100), 90 (19).
Anal. calcd. for $C_8H_4F_3NO$: C, 51.35; H, 2.15; N, 7.49. Found: C, 51.39; H, 2.07; N, 7.56.

***1-methoxy-4-(trifluoromethoxy)benzene* 4b**



The title compound was prepared starting from amide **1v** (151 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4b** (153 mg, 0.80 mmol, 80%).
Colorless liquid. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 3.92 (s, 3H, OCH_3). 7.00 (d, 2H, ^{3}J = 8.6 Hz, CH_{Ar}), 7.27 (d, 2H, ^{3}J = 8.6 Hz, CH_{Ar}).
^{13}C{^{1}H} NMR (151 MHz, CDCl3): δ 158.3, 142.9, 122.6, 120.8 (q, $^{1}J_{C\text{-}F}$ = 255.2 Hz), 114.8, 55.7.
^{19}F{^{1}H} NMR (564 MHz, $CDCl_3$): δ -58.50 (s, 3F, OCF_3).
Anal. calcd. for $C_8H_7F_3O_2$: C, 50.01; H, 3.67. Found: C, 49.96; H, 3.77.

***2-(trifluoromethoxy)benzonitrile* 4c**



The title compound was prepared starting from amide **1w** (146 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4c** (142 mg, 0.76 mmol, 76%).

Colorless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.43 (t, 2H, ^3J = 7.7 Hz, CH_{Ar}), 7.67 (td, 1H, ^3J = 8.0 Hz, ^4J = 1.7 Hz, CH_{Ar}), 7.73 (dd, 1H, ^3J = 7.7 Hz, ^4J = 7.7 Hz, CH_{Ar}).

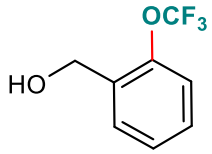
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 107.3, 114.3, 120.2 (q, $^1J_{C\text{-}F}$ = 260.4 Hz), 121.2, 127.2, 134.1, 134.4, 150.0.

^{19}F{^{1}H} NMR (376 MHz, $CDCl_3$): δ -57.89 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 187 (M+, 100), 102 (14).

Anal. calcd. for $C_8H_7F_3ON$: C, 51.35; H, 2.15; N, 7.49. Found: C, 51.46; H, 2.03; N, 7.55.

***(2-(trifluoromethoxy)phenyl)methanol* 4d**



The title compound was prepared starting from amide **1x** (151 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4d** (150 mg, 0.78 mmol, 78%).

Colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 2.30 (br s, 1H, OH), 4.73 (d, 2H, ^3J = 5.8 Hz, CH_2), 7.20 – 7.23 (m, 1H, CH_{Ar}), 7.27 – 7.33 (m, 2H, CH_{Ar}), 7.50 – 7.53 (m, 1H, CH_{Ar}).

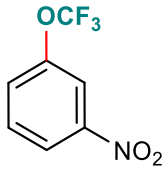
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 59.7, 120.4, 120.6 (q, $^1J_{C\text{-}F}$ = 257.5 Hz), 127.0, 128.8, 129.1, 133.3, 146.7.

^{19}F NMR (376 MHz, $CDCl_3$): δ -57.40 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 187 (M+, 100), 102 (14).

Anal. calcd. for $C_8H_7F_3ON$: C, 51.35; H, 2.15; N, 7.49. Found: C, 51.46; H, 2.03; N, 7.55.

***1-nitro-3-(trifluoromethoxy)benzene* 4e**



The title compound was prepared starting from amide **1y** (166 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4e** (190 mg, 0.92 mmol, 92%).

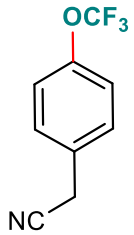
Yellowish liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.58 (d, 1H, ^3J = 8.25 Hz, CH_{Ar}), 7.64 (t, 1H, ^3J = 8.2 Hz, CH_{Ar}), 8.11 (s, 1H, CH_{Ar}), 8.20 (dt, 1H, ^3J = 8.1 Hz, ^4J = 1.5 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 116.4, 120.1 (q, $^1J_{C\text{-}F}$ = 259.6 Hz), 121.7, 126.9, 130.7, 149.0, 149.4.

^{19}F NMR (376 MHz, $CDCl_3$): δ -58.18 (s, 3F, OCF_3).

Anal. calcd. for $C_7H_4F_3O_3N$: C, 40.60; H, 1.95; N, 6.76. Found: C, 40.69; H, 1.88; N, 6.83.

***2-(4-(trifluoromethoxy)phenyl)acetonitrile* 4f**



The title compound was prepared starting from amide **1z** (160 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-

dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4f** (168 mg, 0.84 mmol, 84%).

Yellowish liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 3.76 (s, 2H, CH_2), 7.24 (d, 2H, ^{3}J = 8.4 Hz, CH_{Ar}), 7.38 (d, 2H, ^{3}J = 8.5 Hz, CH_{Ar}).

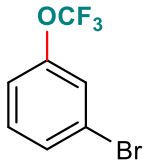
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 23.1, 117.3, 120.2 (q, $^{1}J_{C\text{-}F}$ = 257.8 Hz), 121.7, 128.6, 129.5, 149.0.

^{19}F NMR (376 MHz, $CDCl_3$): δ -57.99 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 201 (M+, 100), 132 (19), 115 (38).

Anal. calcd. for $C_9H_6F_3ON$: C, 53.74; H, 3.01; N, 6.96. Found: C, 53.66; H, 3.12; N, 7.03.

***1-bromo-3-(trifluoromethoxy)benzene* 4g**



The title compound was prepared starting from amide **1aa** (200 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4g** (168 mg, 0.84 mmol, 84%).

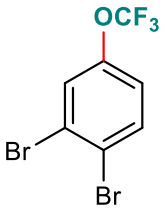
Colorless liquid. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 7.16 – 7.17 (m, 1H, CH_{Ar}), 7.26 (t, 1H, ^{3}J = 8.2 Hz, CH_{Ar}), 7.39 (s, 1H, CH_{Ar}), 7.43 – 7.44 (m, 1H, CH_{Ar}).

^{13}C NMR{^{1}H} (151 MHz, $CDCl_3$): δ 149.8, 131.0, 130.2, 124.6, 122.9, 120.5 (q, $^{1}J_{C\text{-}F}$ = 258.2 Hz), 119.8.

^{19}F NMR (564 MHz, $CDCl_3$): δ -58.0 (s, 3F, OCF_3).

Anal. calcd. for $C_7H_4F_3OBr$: C, 34.89; H, 1.67. Found: C, 35.01; H, 1.81.

***1,2-dibromo-4-(trifluoromethoxy)benzene* 4h**



The title compound was prepared starting from amide **1ab** (279 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4h** (271 mg, 0.85 mmol, 85%).

Yellowish liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.06 (dd, 1H, ^3J = 8.8 Hz, ^4J = 2.8 Hz, CH_{Ar}), 7.51 (d, 1H, ^4J = 2.7 Hz, CH_{Ar}), 7.64 (d, 1H, ^3J = 8.8 Hz, CH_{Ar}).

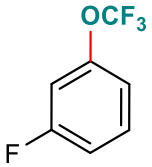
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 120.2 (q, $^1J_{C\text{-}F}$ = 259.1 Hz), 121.2, 123.0, 125.5, 126.3, 134.3, 148.2.

^{19}F NMR (376 MHz, $CDCl_3$): δ -58.17 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 320 (M+, 100), 318 (53), 250 (21), 225 (16), 223 (34).

Anal. calcd. for $C_7H_3F_3OBr_2$: C, 26.28; H, 0.95. Found: C, 26.33; H, 1.04.

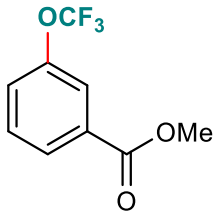
***1-fluoro-3-(trifluoromethoxy)benzene* 4i**



The title compound was prepared starting from amide **1ac** (139 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4i** (168 mg, 0.81 mmol, 81%).

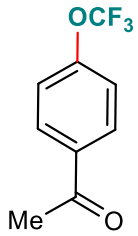
Colorless liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 6.96 (d, 1H, ^{3}J = 9.3 Hz, CH_{Ar}), 7.00 – 7.04 (m, 2H, CH_{Ar}), 7.36 (dq, 1H, ^{3}J = 8.3 Hz, ^{4}J = 1.8 Hz, CH_{Ar}).
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 109.0 (d, $J_{C\text{-}F}$ = 28.0 Hz), 113.9 (d, $J_{C\text{-}F}$ = 21.7 Hz), 116.5 (d, $J_{C\text{-}F}$ = 2.8 Hz), 120.3 (q, $^{1}J_{C\text{-}F}$ = 257.3 Hz), 130.6 (d, $J_{C\text{-}F}$ = 8.8 Hz), 149.9 (m), 162.9 (d, $^{1}J_{C\text{-}F}$ = 247.2 Hz).
^{19}F NMR (376 MHz, $CDCl_3$): δ -109.86 (s, 1F, CF), -58.07 (s, 3F, OCF_3).
Anal. calcd. for $C_7H_4F_4O$: C, 46.68; H, 2.24. Found: C, 46.81; H, 2.29.

***methyl 3-(trifluoromethoxy)benzoate* 4j**



The title compound was prepared starting from amide **1ad** (179 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4j** (199 mg, 0.87 mmol, 87%).
Colorless liquid. **^{1}H NMR** (600 MHz, $CDCl_3$): δ 3.73 (s, 3H, OCH_3), 7.20 (d, 1H, ^{3}J = 8.4 Hz, CH_{Ar}), 7.27 (t, 1H, ^{3}J = 8.4 Hz, CH_{Ar}), 7.67 (s, 1H, CH_{Ar}), 7.77 (d, 1H, ^{3}J = 7.8 Hz, CH_{Ar}).
^{13}C NMR{^{1}H} (151 MHz, $CDCl_3$): δ 52.6, 120.5 (q, $^{1}J_{C\text{-}F}$ = 258.2 Hz), 122.2, 125.5, 128.1, 130.0, 132.3, 149.4, 165.8.
^{19}F NMR (376 MHz, $CDCl_3$): δ -58.0 (s, 3F, OCF_3).
MS (GC, 70eV): m/z (%) = 220 (M+, 33), 189 (100), 161 (27).
Anal. calcd. for $C_9H_7F_3O_3$: C, 49.10; H, 3.21. Found: C, 49.22; H, 3.06.

***1-(4-(trifluoromethoxy)phenyl)ethan-1-one* 4k**



The title compound was prepared starting from amide **1ae** (163 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4k** (183 mg, 0.90 mmol, 90%).

Yellowish liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 2.61 (s, 3H, CH_3), 7.29 (d, 2H, ^3J = 7.8 Hz, CH_{Ar}), 8.01 (dt, 2H, ^3J = 8.8 Hz, ^4J = 2.4 Hz, CH_{Ar}).

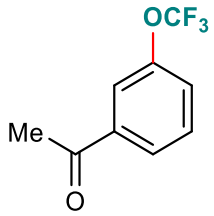
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 26.5, 120.3 (q, $^1J_{C\text{-}F}$ = 258.7 Hz), 120.4, 130.3, 135.4, 152.6, 196.4.

^{19}F NMR (376 MHz, $CDCl_3$): δ -63.0 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 204 (M+, 21), 189 (100), 161 (20).

Anal. calcd. for $C_9H_7F_3O_2$: C, 52.95; H, 3.46. Found: C, 53.09; H, 3.56.

***1-(3-(trifluoromethoxy)phenyl)ethan-1-one* 4l**



The title compound was prepared starting from amide **1af** (163 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.).

The purification was accomplished by column chromatography on silica gel to provide the desired product **4l** (180 mg, 0.89 mmol, 89%).

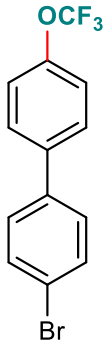
Yellowish liquid. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 2.6 (s, 3H, CH_3), 7.42 (dt, 1H, ^{3}J = 8.2 Hz, ^{4}J = 1.1 Hz, CH_{Ar}), 7.52 (t, 1H, ^{3}J = 7.9 Hz, CH_{Ar}), 7.80 (s, 1H, CH_{Ar}), 7.89 (d, 1H, ^{3}J = 7.7 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 26.5, 120.4 (q, $^{1}J_{C\text{-}F}$ = 257.85 Hz), 120.5, 125.4, 126.6, 130.1, 138.9, 149.5, 196.4.

^{19}F NMR (376 MHz, $CDCl_3$): δ -57.98 (s, 3F, OCF_3).

Anal. calcd. for $C_9H_7F_3O_2$: C, 52.95; H, 3.46. Found: C, 52.81; H, 3.51.

***4-bromo-4'-(trifluoromethoxy)-1,1'-biphenyl* 4m**



The title compound was prepared starting from amide **1ag** (276 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4m** (288 mg, 0.91 mmol, 91%).

White solid, mp 57-58 °C. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 7.25 (d, 2H, ^{3}J = 8.1 Hz, CH_{Ar}), 7.37 (dt, 2H, ^{3}J = 8.6 Hz, ^{4}J = 2.5 Hz, CH_{Ar}), 7.52 (m, 4H, CH_{Ar}).

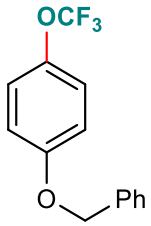
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 120.6 (q, $^{1}J_{C\text{-}F}$ = 255.7 Hz), 121.4, 121.8, 128.3, 128.7, 132.1, 138.7, 148.9 (q, $J_{C\text{-}F}$ = 1.7 Hz).

^{19}F NMR (376 MHz, $CDCl_3$): δ -57.80 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 316 (M+, 100), 318 (98), 249 (17), 247 (18), 221 (18), 219 (18), 139 (33).

Anal. calcd. for $C_{13}H_8F_3OBr$: C, 49.24; H, 2.54. Found: C, 49.33; H, 2.43.

***1-(benzyloxy)-4-(trifluoromethoxy)benzene* 4n**



The title compound was prepared starting from amide **1ah** (227 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4n** (249 mg, 0.93 mmol, 93%).

White solid mp 52-53 °C. **^{1}H NMR** (400 MHz, $CDCl_3$): δ 5.03 (s, 2H, CH_2), 6.93 (dt, 2H, ^3J = 9.2 Hz, ^4J = 2.3 Hz, CH_{Ar}), 7.12 (d, 2H, ^3J = 8.5 Hz, CH_{Ar}), 7.30 – 7.42 (m, 5H, CH_{Ar}).

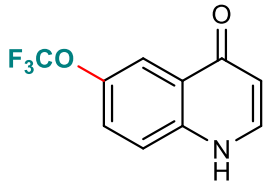
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 70.5, 115.7, 120.6 (q, $^1J_{C\text{-}F}$ = 254.5 Hz), 122.4, 127.5, 128.2, 128.7, 136.6, 142.9 (qt, $J_{C\text{-}F}$ = 1.8 Hz), 157.3.

^{19}F NMR (376 MHz, $CDCl_3$): δ -58.34 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 268 (M+, 15), 91 (100), 249 (17).

Anal. calcd. for $C_{14}H_{11}F_3O_2$: C, 62.69; H, 4.13. Found: C, 62.78; H, 4.01.

***6-(trifluoromethoxy)quinolin-4(1H)-one* 4o**



The title compound was prepared starting from amide **1ai** (188 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4o** (181 mg, 0.79 mmol, 79%).

White solid, mp 233-234 °C. **^{1}H NMR** (400 MHz, DMSO-d_6): δ 6.11 (d, 1H, ^3J = 7.4 Hz, CH_{Ar}), 7.65 – 7.73 (m, 2H, CH_{Ar}), 7.95 (s, 1H, CH_{Ar}), 8.01 (d, 1H, ^3J = 7.4 Hz, CH_{Ar}), 12.0 (br s, 1H, NH).

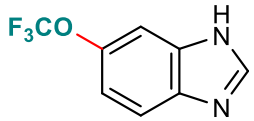
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 109.0, 116.4, 120.6 (q, $^1J_{C\text{-}F}$ = 256.3 Hz), 121.6, 125.8, 126.8, 139.2, 140.6, 144.4, 176.4.

^{19}F NMR (376 MHz, DMSO-d_6): δ -57.16 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 229 (M+, 100), 91 (100), 201 (18), 160 (18), 132 (47), 104 (21).

Anal. calcd. for $C_{10}H_6F_3NO_2$: C, 52.41; H, 2.64; N, 6.11. Found: C, 52.52; H, 2.49; N, 6.19.

***6-(trifluoromethoxy)-1H-benzo[d]imidazole* 4p**



The title compound was prepared starting from amide **1aj** (161 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and freshly prepared salt **3** (1-methyl-1,4-diazabicyclo[2.2.2]octan-1-ium trifluoromethoxide) (318 mg, 1.5 mmol, 1.5 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4p** (151 mg, 0.75 mmol, 75%).

Brown solid, mp 99-100 °C. **^{1}H NMR** (400 MHz, DMSO-d_6): δ 7.20 (dd, 1H, ^3J = 8.7 Hz, ^4J = 1.0 Hz, CH_{Ar}), 7.61 (s, 1H, CH_{Ar}), 7.69 (d, 1H, ^3J = 8.7 Hz, CH_{Ar}), 7.37 (s, 1H, CH_{Ar}), 12.72 (s, 1H, NH).

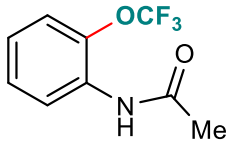
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 109.2, 116.0, 120.8 (q, $^1J_{C\text{-}F}$ = 253.4 Hz), 144.0, 144.6, 163.5.

^{19}F NMR (376 MHz, DMSO-d_6): δ 57.09 (s, 3F, OCF_3).

MS (GC, 70eV): m/z (%) = 229 (M+, 100), 91 (100), 201 (18), 160 (18), 132 (47), 104 (21).

Anal. calcd. for $C_8H_5F_3N_2O$: C, 47.54; H, 2.49; N, 13.86. Found: C, 47.62; H, 2.59; N, 13.69.

N-(2-(trifluoromethoxy)phenyl)acetamide **4q**



The title compound was prepared starting from amide **1ak** (178 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4q** (164 mg, 0.75 mmol, 75%).

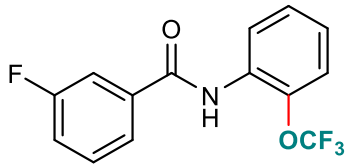
White solid, mp 68-69 °C. **^{1}H NMR (400 MHz, $CDCl_3$):** δ 2.23 (s, 3H, CH_3), 7.09 (t, 1H, ^3J = 8.0 Hz, CH_{Ar}), 7.23 – 7.29 (m, 2H, CH_{Ar}), 7.48 (s, 1H, -NH), 8.37 (d, 1H, ^3J = 8.3 Hz, CH_{Ar}).

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ 24.7, 120.3, 120.6 (q, $^1J_{C\text{-}F}$ = 257.2 Hz), 122.1, 124.2, 127.5, 130.5, 138.1, 168.3.

MS (GC, 70eV): m/z (%) = 219 (M+, 30), 177 (100), 137 (17), 108 (39).

Anal. calcd. for $C_9H_8F_3O_2N$: C, 49.32; H, 3.68; N, 6.39. Found: C, 49.12; H, 3.45; N, 6.51.

3-fluoro-N-(2-(trifluoromethoxy)phenyl)benzamide **4r**

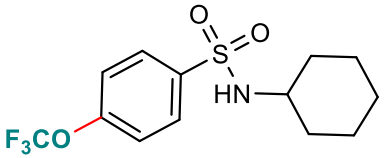


The title compound was prepared starting from amide **1al** (258 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4r** (203 mg, 0.68 mmol, 68%).

White solid, mp 128 °C. **^{1}H NMR (400 MHz, $CDCl_3$):** δ 7.17 (t, 1H, ^3J = 7.9 Hz, CH_{Ar}), 7.26 – 7.37 (m, 3H, CH_{Ar}), 7.49 (td, 1H, ^3J = 7.9 Hz, ^4J =5.4 Hz, CH_{Ar}), 7.61 (d, 2H, ^3J = 7.7 Hz, CH_{Ar}), 8.16 (s, 1H, -NH), 8.53 (d, 1H, ^3J = 8.3 Hz, CH_{Ar}).

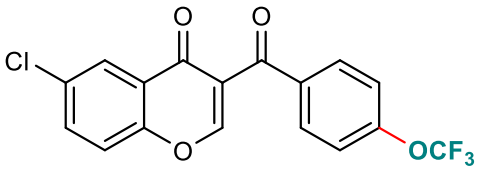
$^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 114.7 (d, J_{C-F} = 23.1 Hz), 119.3 (d, J_{C-F} = 21.3 Hz), 120.5, 120.6 (q, $^1J_{C-F}$ =259.8 Hz), 122.0, 122.2 (d, J_{C-F} = 3.0 Hz), 124.7, 127.7, 130.4, 130.7(d, J_{C-F} = 8.0 Hz), 136.8 (d, J_{C-F} = 6.8 Hz), 138.5 (d, J_{C-F} = 1.0 Hz), 162.9 (d, $^1J_{C-F}$ = 248.6 Hz), 164.0 (d, J_{C-F} = 2.8 Hz).
$^{19}F\{^1H\}$ NMR (376 MHz, $CDCl_3$): δ -110.87 (m, 1F, CF), -57.10 (s, 3F, OCF_3).
MS (GC, 70eV): m/z (%) = 323 (M+, 44),
Anal. calcd. for $C_{14}H_9F_4O_2N$: C, 56.20; H, 3.03; N, 4.68. Found: C, 56.01; H, 3.21; N, 4.79.

***N-cyclohexyl-4-(trifluoromethoxy)benzenesulfonamide* 4s**



The title compound was prepared starting from amide **1am** (282 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4s** (193 mg, 0.83 mmol, 83%).
White solid, mp 66-67 ºC. **^1H NMR (500 MHz, DMSO-d_6):** δ 0.96 – 1.00 (m, 1H, Cy), 1.04 – 1.10 (m, 4H, Cy), 1.37 – 1.40 (m, 1H, Cy), 1.51 – 1.53 (m, 4H, Cy), 2.92 (m, 1H, Cy), 7.53 (d, 2H, ^3J = 8.4 Hz, CH_{Ar}), 7.77 (s, 1H, -NH), 7.90 (dt, 2H, ^3J = 8.9 Hz, ^4J = 2.0 Hz, CH_{Ar}).
$^{13}C\{^1H\}$ NMR (125 MHz, DMSO-d_6): δ 24.7, 25.2, 33.7, 52.6, 120.3 (q, $^1J_{C-F}$ =257.1 Hz), 121.8, 129.2, 141.8, 151.0.
MS (GC, 70eV): m/z (%) = 323 (M+, 44), 293 (11), 278 (99), 225 (100), 203 (10), 161 (94), 98 (71).
Anal. calcd. for $C_{13}H_{16}F_3OSN$: C, 48.29; H, 4.99; N, 4.33. Found: C, 48.06; H, 5.09; N, 4.12.

***6-chloro-3-(4-(trifluoromethoxy)benzoyl)-4H-chromen-4-one* 4t**



The title compound was prepared starting from amide **1an** (327 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4t** (272 mg, 0.74 mmol, 74%).

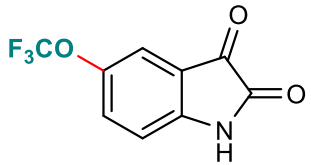
White solid, mp 157-158 °C. **^{1}H NMR (500 MHz, $CDCl_3$):** δ 7.28 (d, 2H, ^3J = 8.4 Hz, CH_{Ar}), 7.53 (d, 1H, ^3J = 8.8 Hz, CH_{Ar}), 7.70 (d, 1H, ^3J = 8.8 Hz, CH_{Ar}), 7.89 (d, 2H, ^3J = 8.3 Hz, CH_{Ar}), 8.20 (s, 1H, CH_{Ar}), 8.34 (s, 1H, CH_{Ar}).

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$): δ 120.1, 120.2, 120.3 (q, $^1J_{C\text{-}F}$ =259.3 Hz), 124.8, 125.9, 131.7, 132.5, 134.9, 135.1, 153.0, 154.4, 159.3, 173.6, 190.0.

MS (GC, 70eV): m/z (%) = 368 (M+, 58), 303 (100), 283 (23), 254 (21), 207 (28), 189 (70), 128 (26), 154 (49), 126 (13).

Anal. calcd. for $C_{17}H_8ClF_3O_4$: C, 55.38; H, 2.19. Found: C, 55.16; H, 2.32.

***5-(trifluoromethoxy)indoline-2,3-dione* 4u**



The title compound was prepared starting from amide **1ao** (190 mg, 1.0 mmol, 1.0 equiv.), pyrylium tetrafluoroborate (185 mg, 1.1 mmol, 1.1 equiv.), $BaTiO_3$ (700 mg, 3.0 mmol, 3.0 equiv.), ruthenium(III) acetylacetonate (8 mg, 0.02 mmol, 0.02 equiv.), 0.1 mL of 1,4-dioxane and CF_3SiMe_3 (185 mg, 1.3 mmol, 1.3 equiv.). The purification was accomplished by column chromatography on silica gel to provide the desired product **4u** (196 mg, 0.85 mmol, 85%).

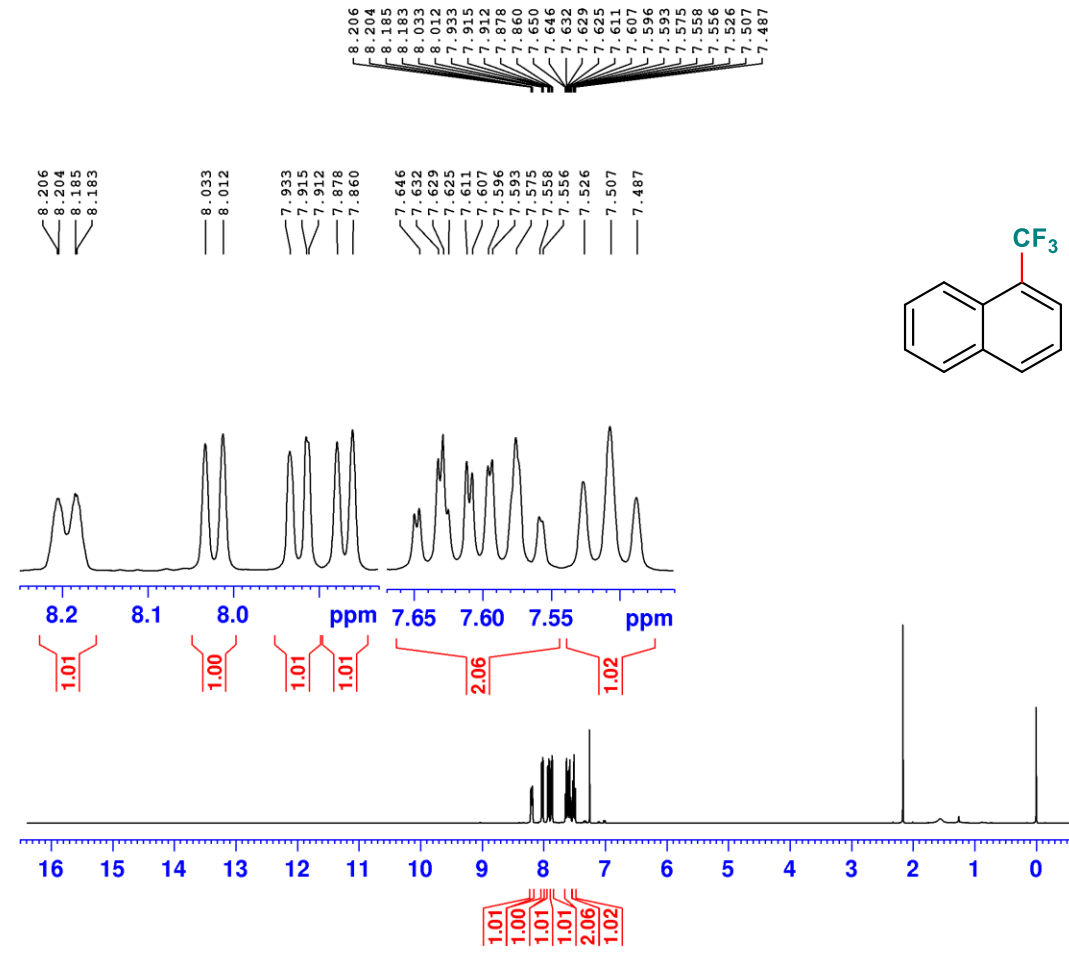
Yellow solid, mp 170-171 °C. **^{1}H NMR (500 MHz, DMSO-d_6):** δ 6.95 (d, 1H, ^3J = 8.5 Hz, CH_{Ar}), 7.47 (d, 1H, ^4J = 2.6 Hz, CH_{Ar}), 7.54 (dd, 1H, ^3J = 8.5 Hz, ^4J = 2.5 Hz, CH_{Ar}), 11.16 (s, 1H, -NH).

^{13}C{^{1}H} NMR (125 MHz, DMSO-d_6): δ 113.9, 118.2, 119.1, 120.6 (q, $^1J_{C\text{-}F}$ =256.2 Hz), 131.3, 143.9, 149.9, 159.9, 183.8.

Anal. calcd. for $C_9H_4F_3O_3N$: C, 46.77; H, 1.74; N, 6.06. Found: C, 46.88; H, 1.58; N, 5.91.

(C) Copies ^{1}H and ^{13}C NMR spectra.

^{1}H NMR of Compound **2a**

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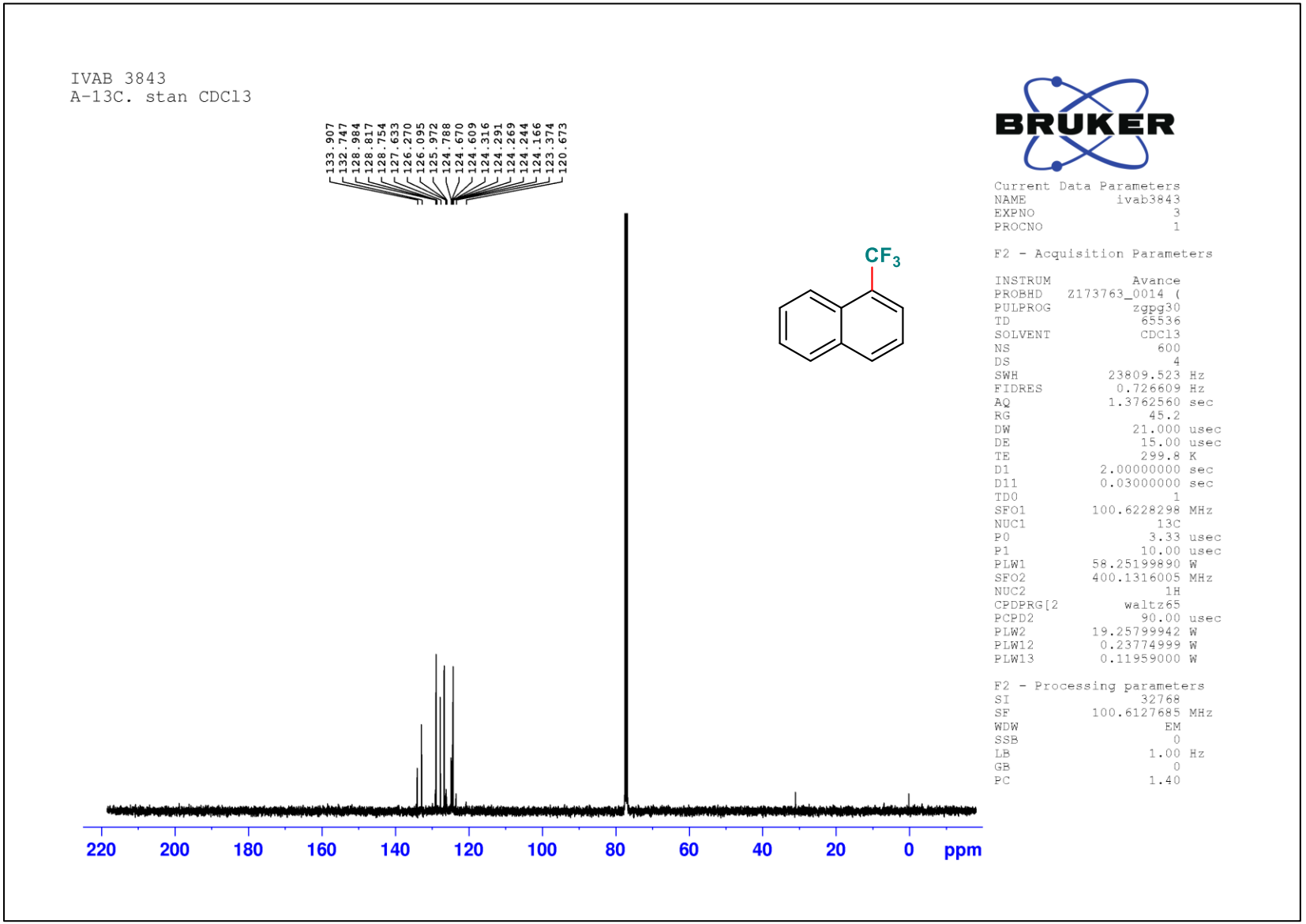
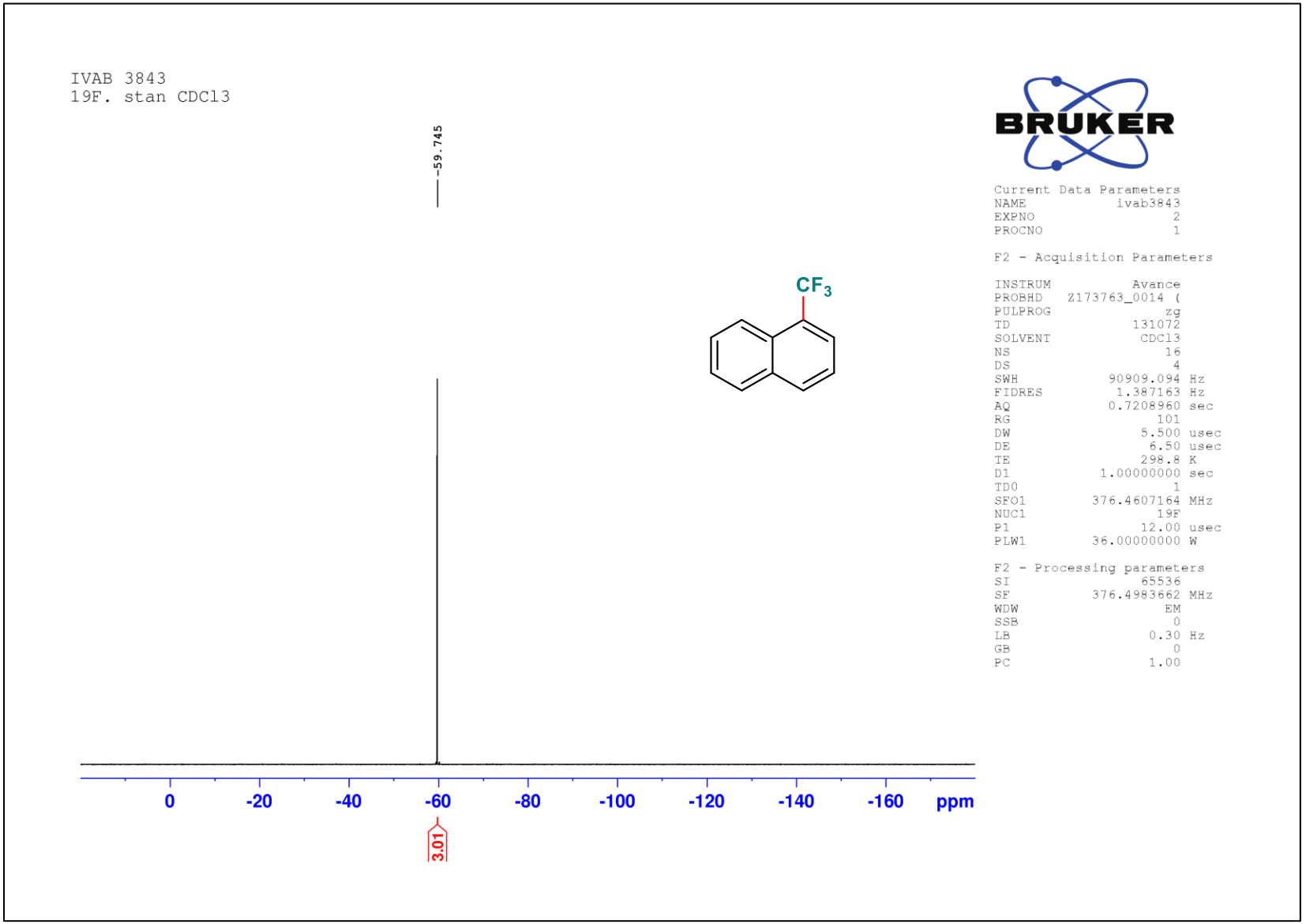
^{13}C NMR of Compound **2a**



^{19}F NMR of Compound **2a**

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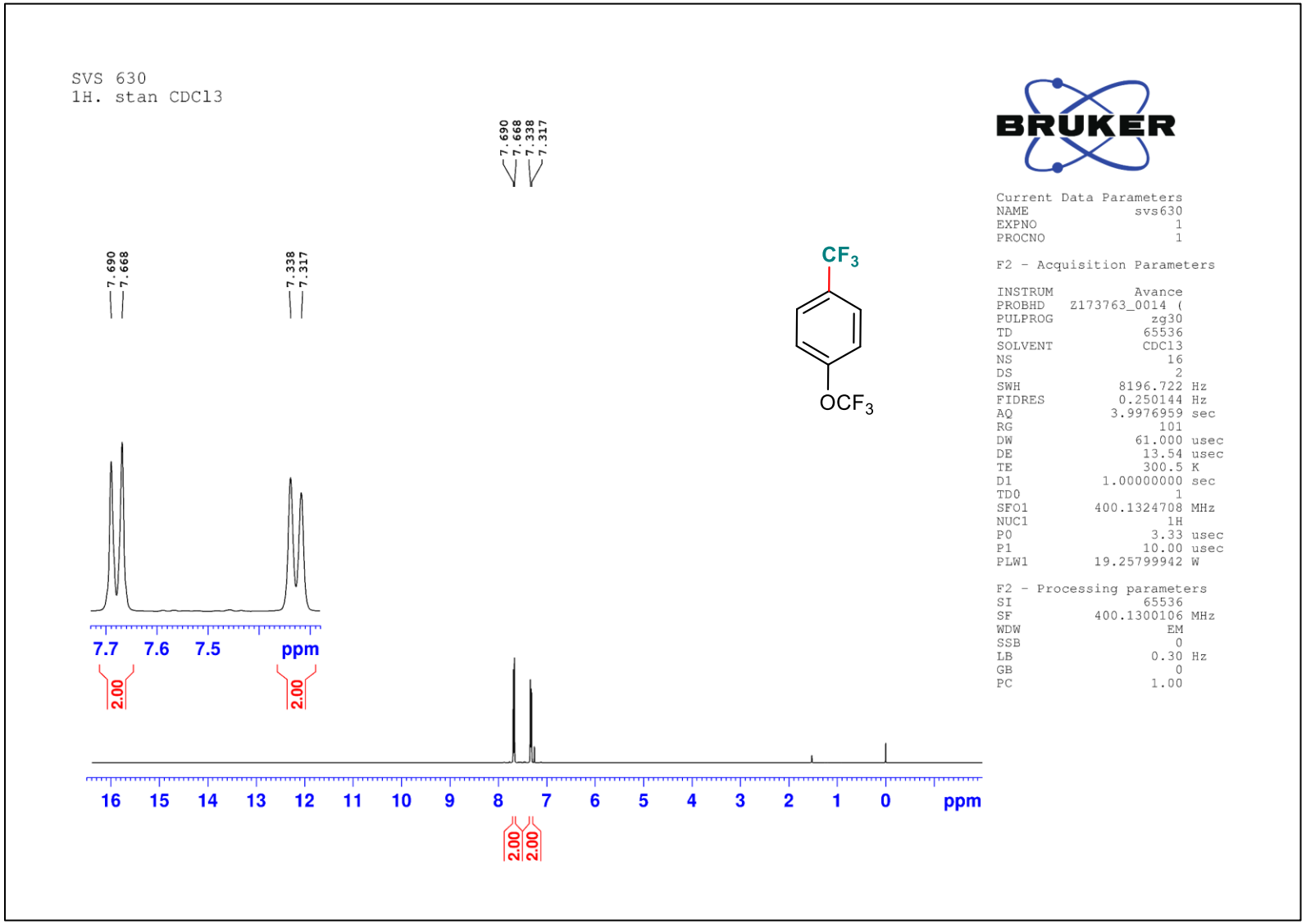
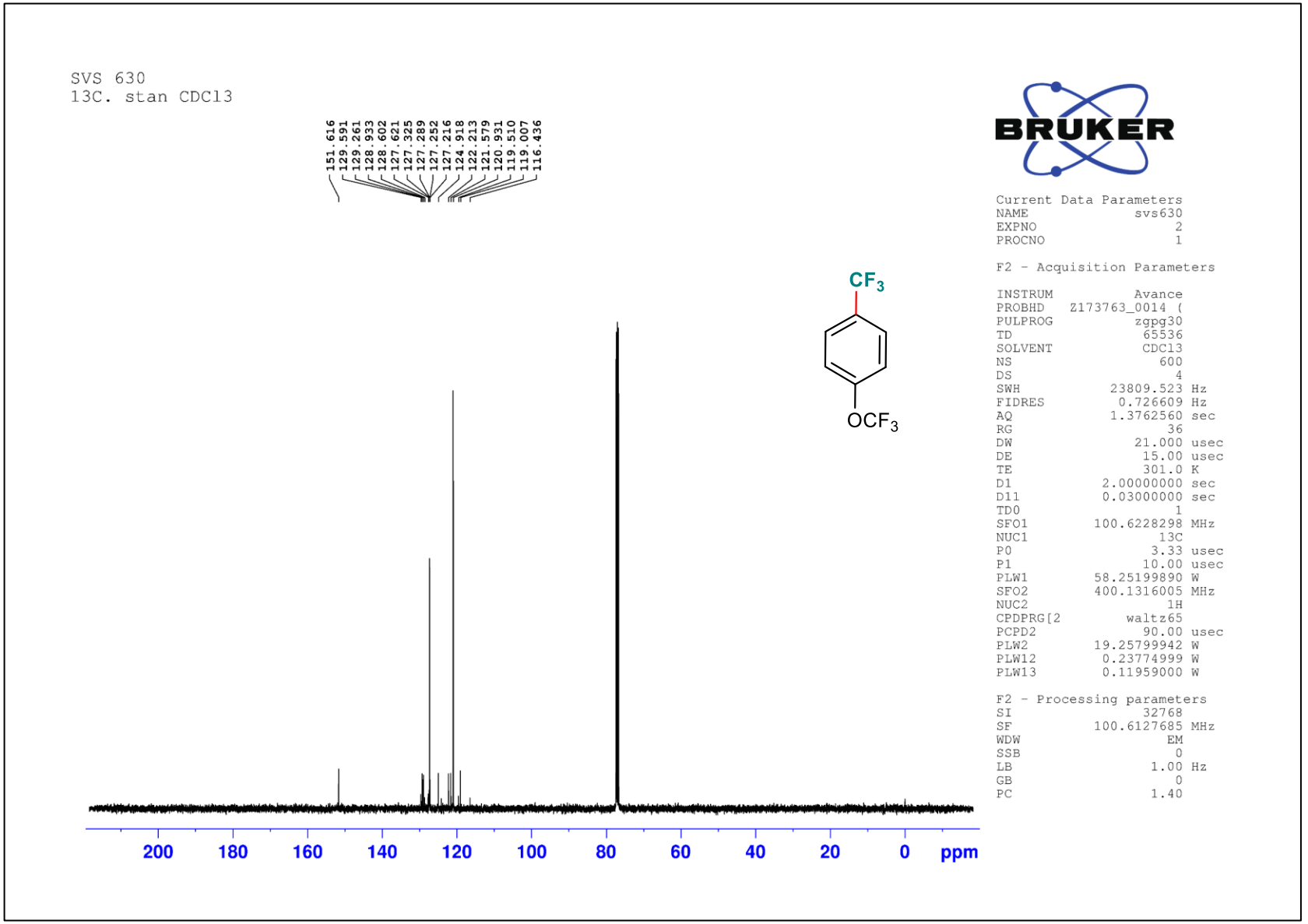
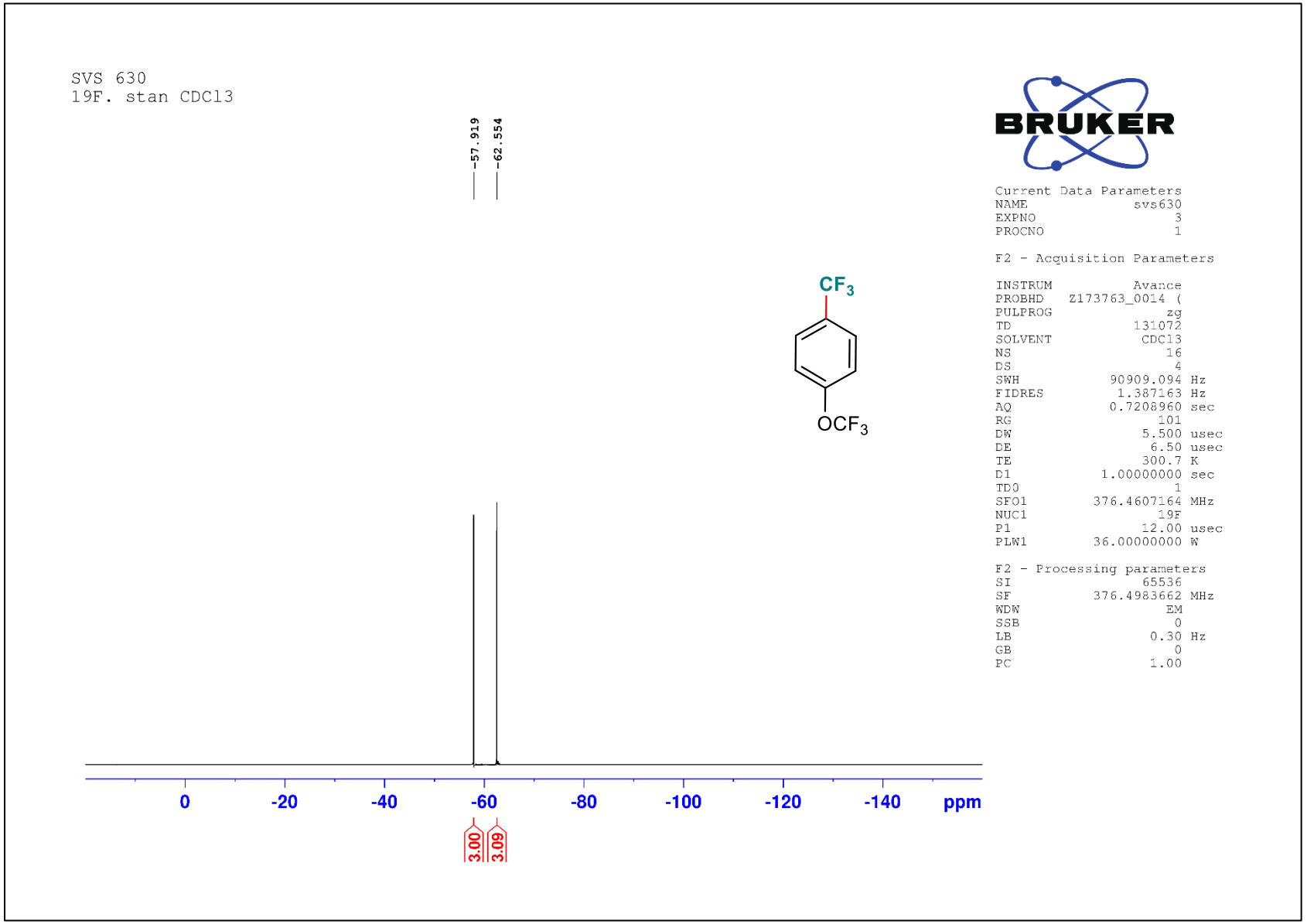
^{1}H NMR of Compound **2b**



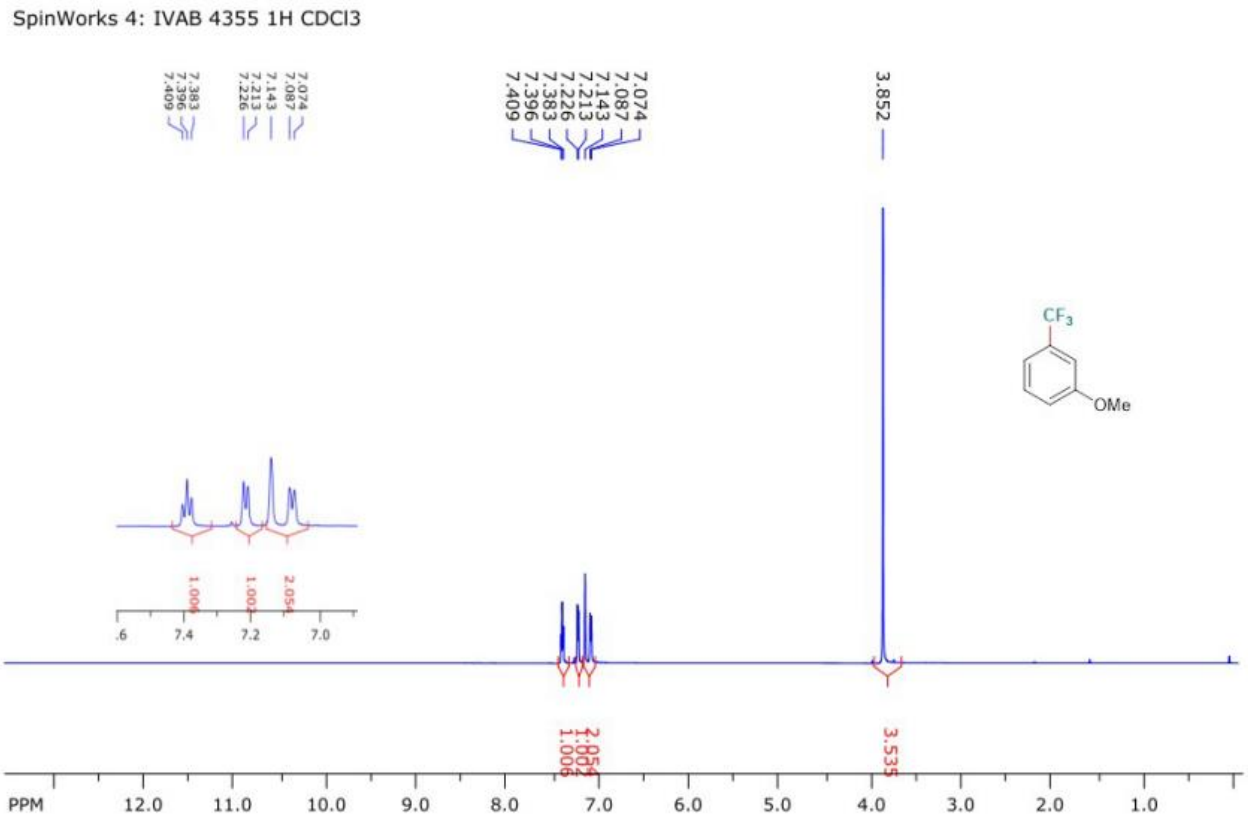
^{13}C NMR of Compound **2b**



^{19}F NMR of Compound **2b**



^{1}H NMR of Compound **2c**



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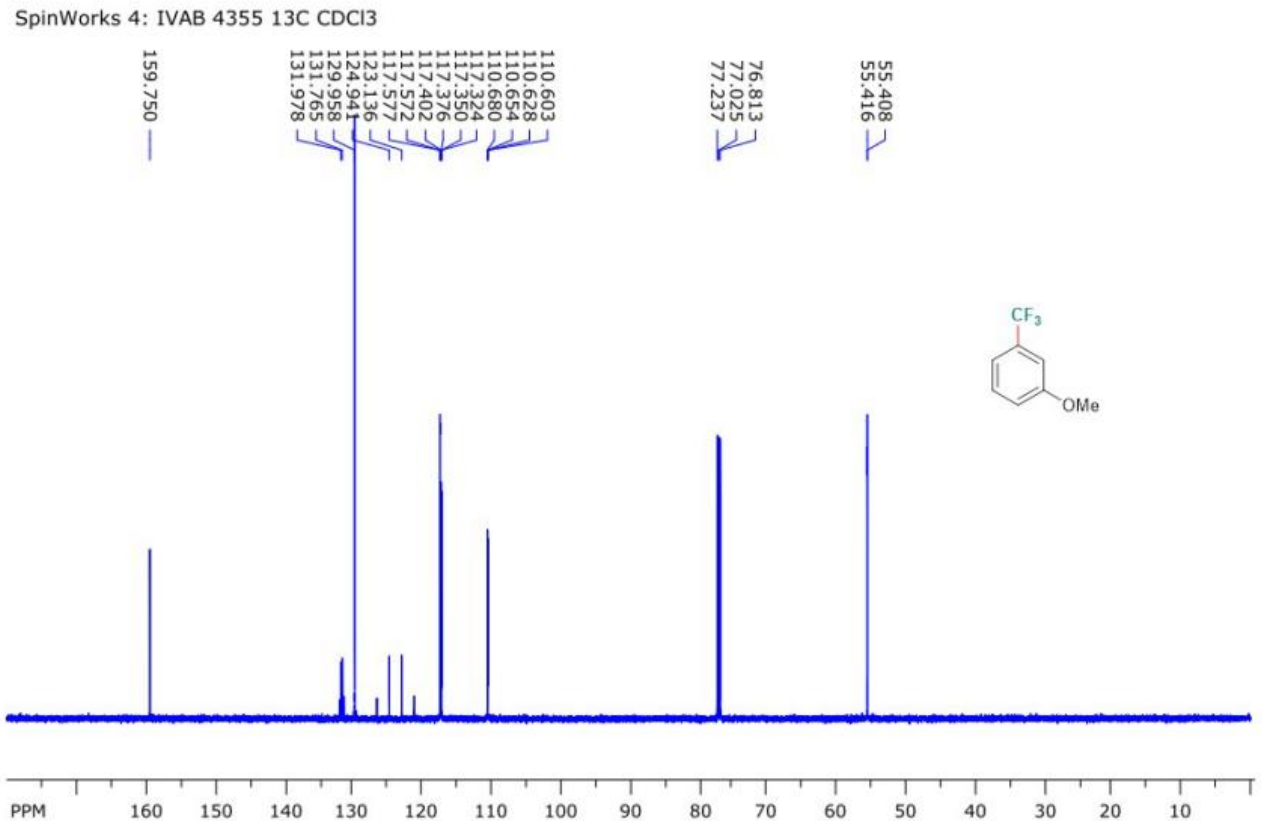
number of scans: 16

^{13}C NMR of Compound **2c**



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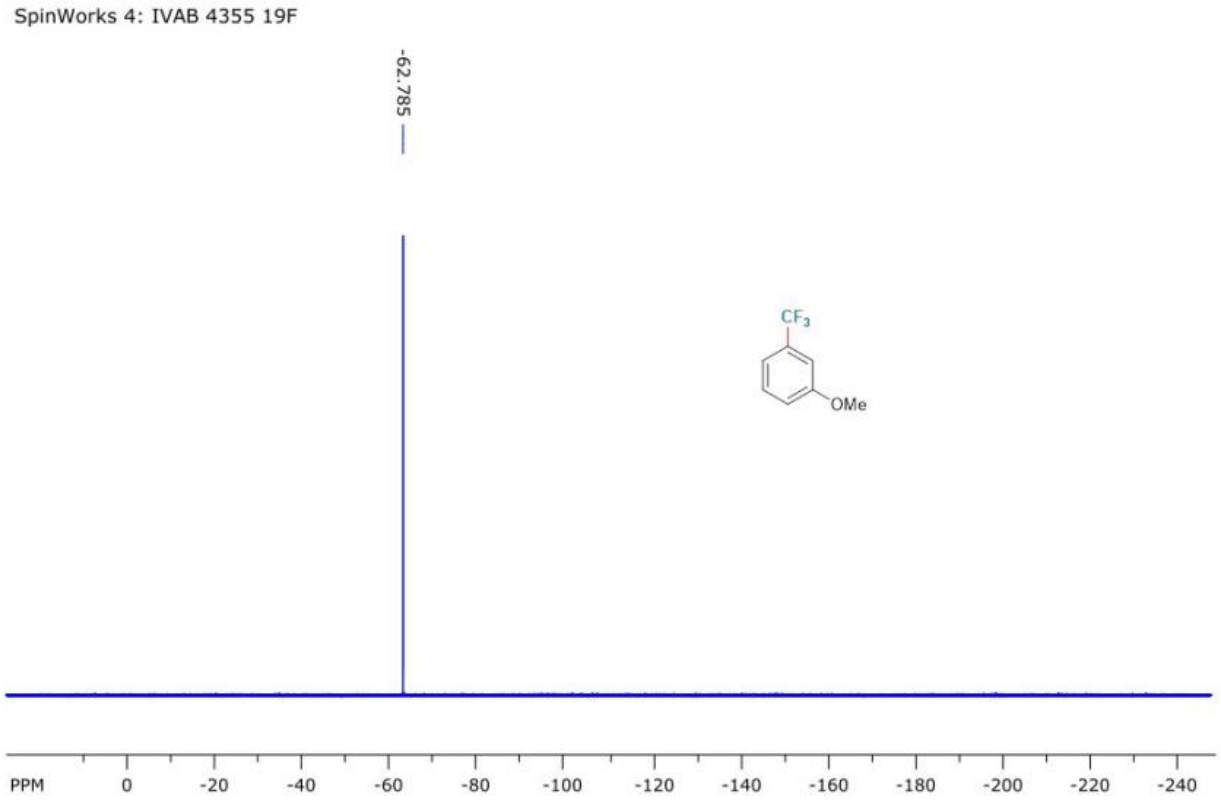
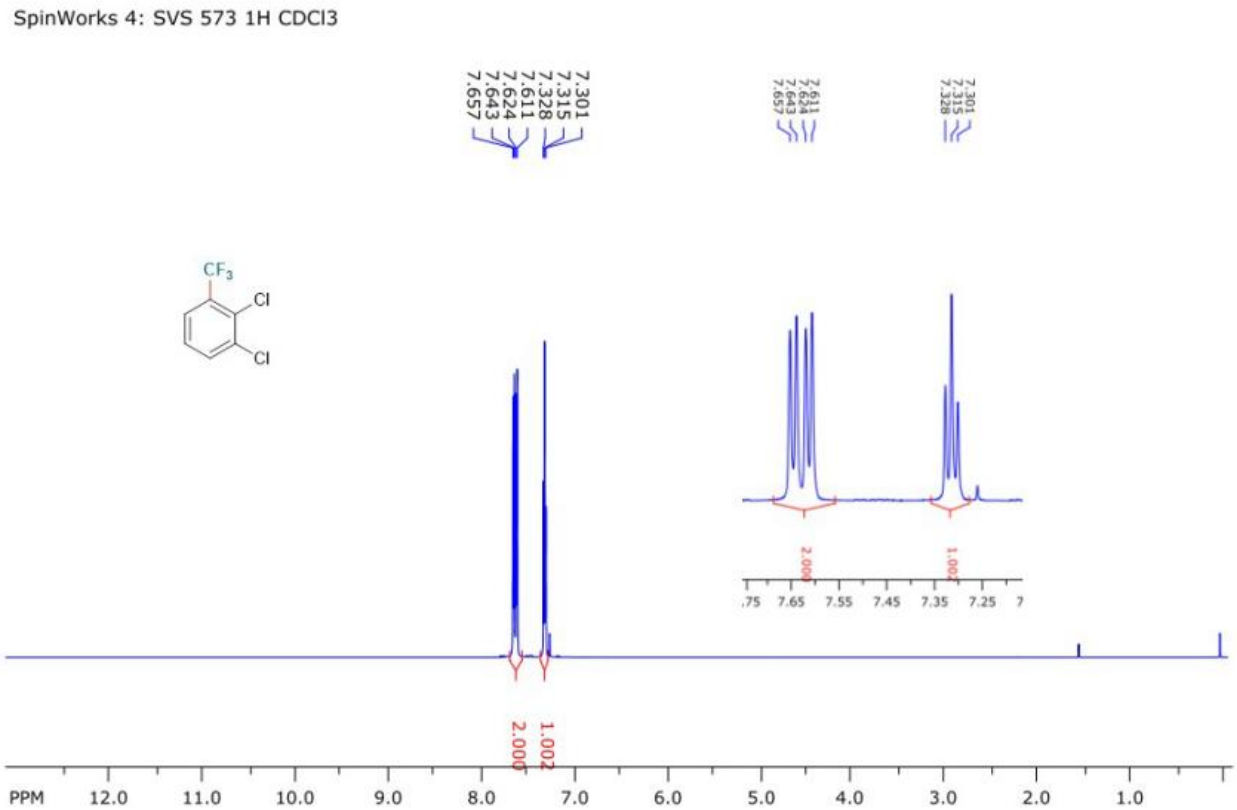
^{19}F NMR of Compound **2c**



^{1}H NMR of Compound **2d**[1]



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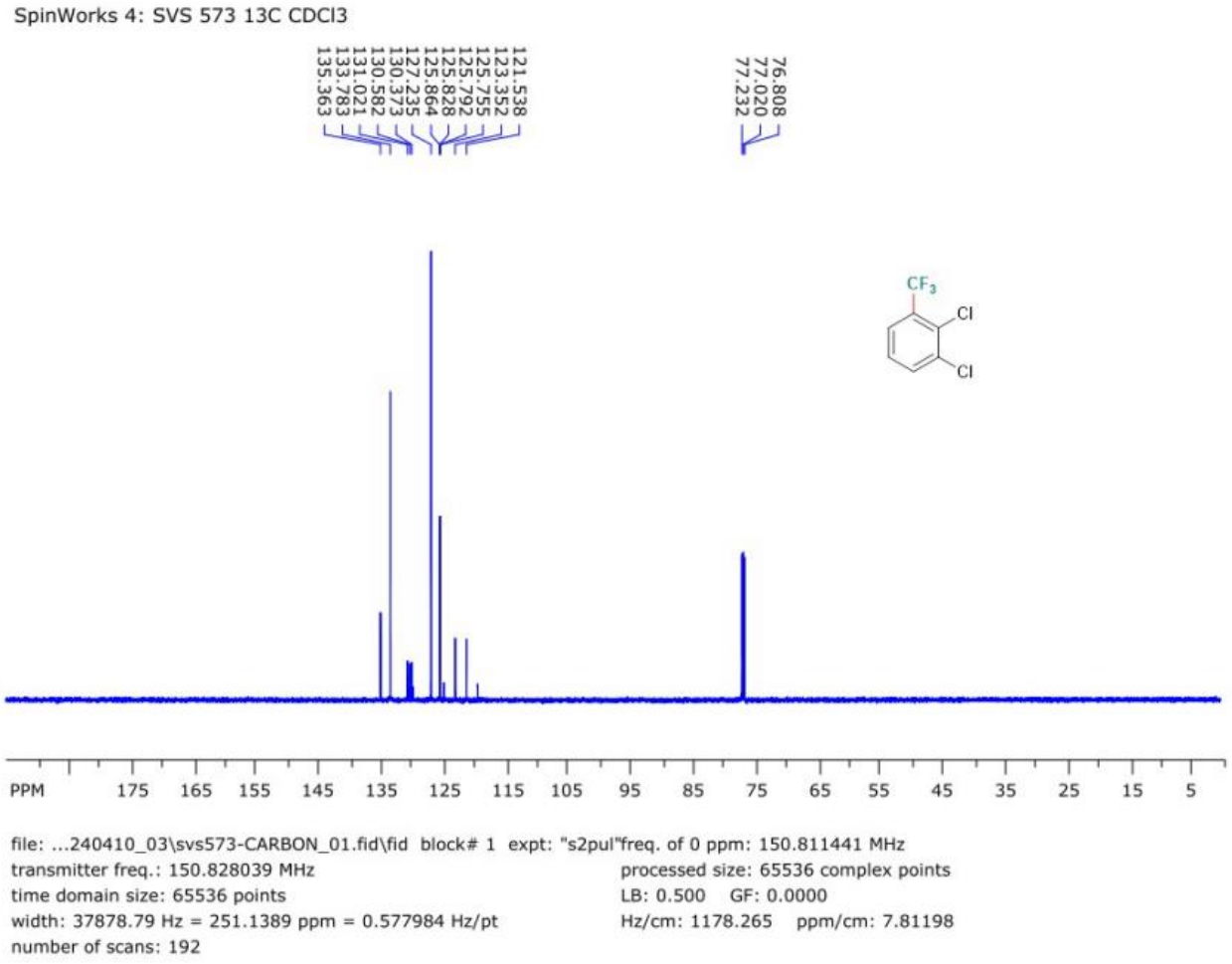
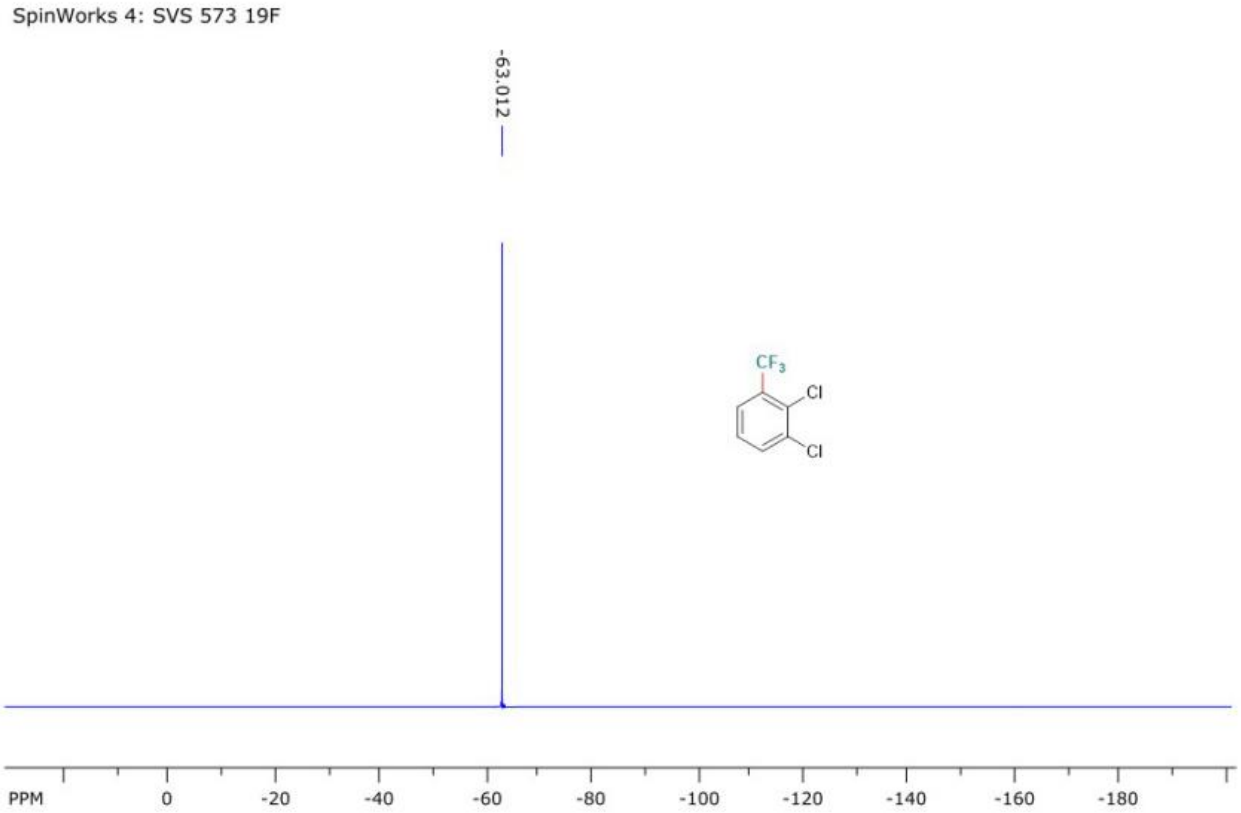
number of scans: 16

^{13}C NMR of Compound **2d**



^{19}F NMR of Compound **2d**



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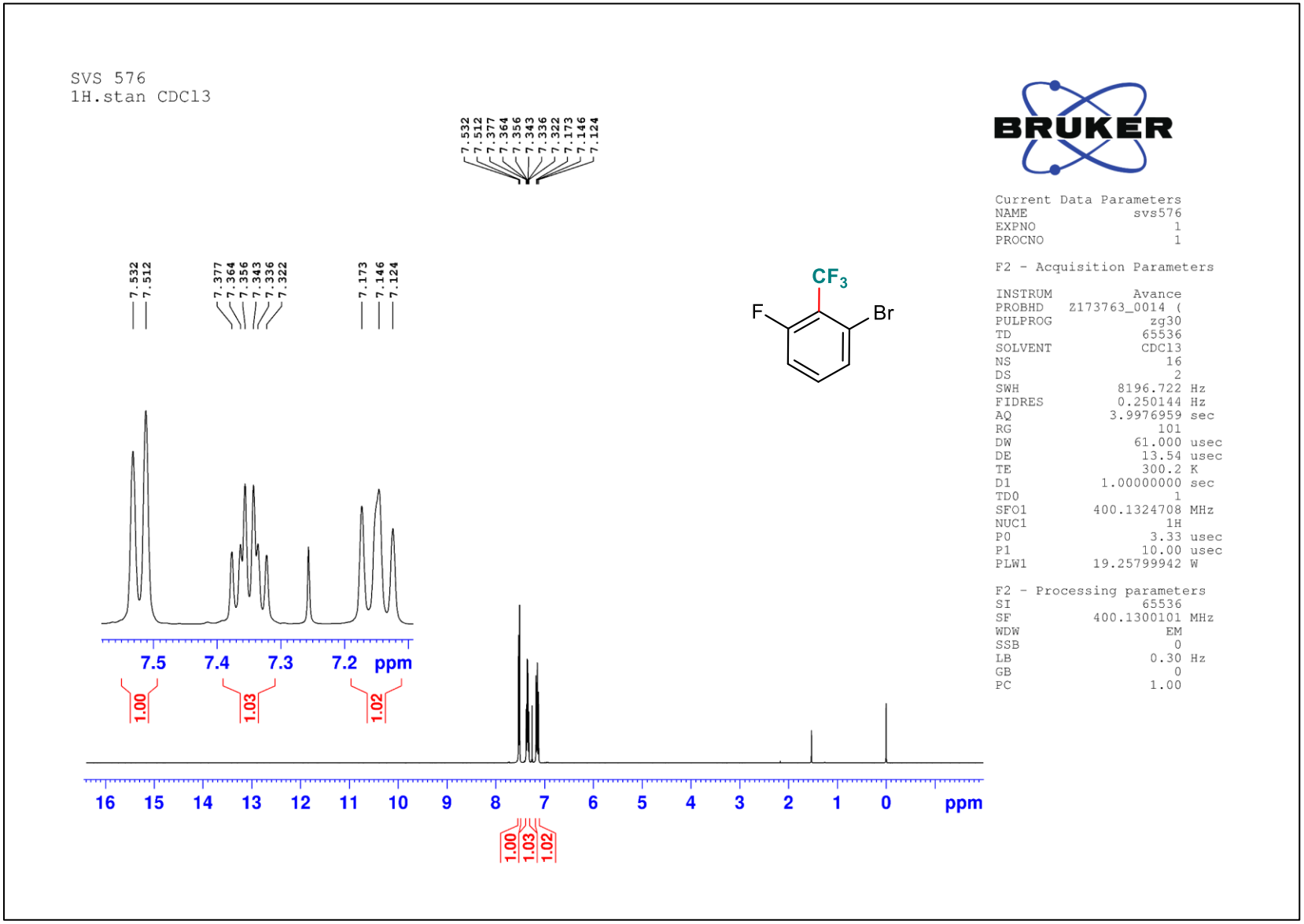
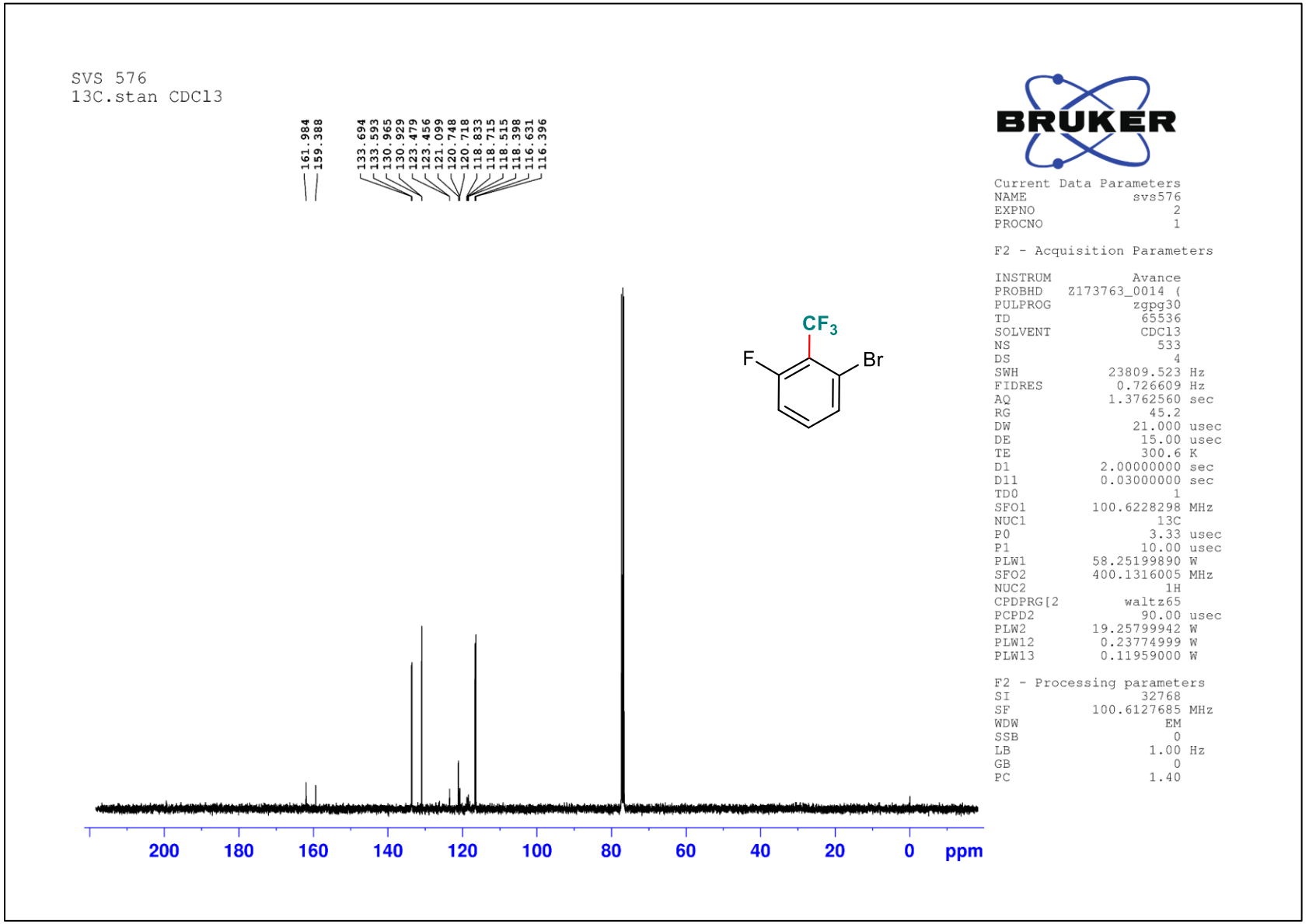
number of scans: 16

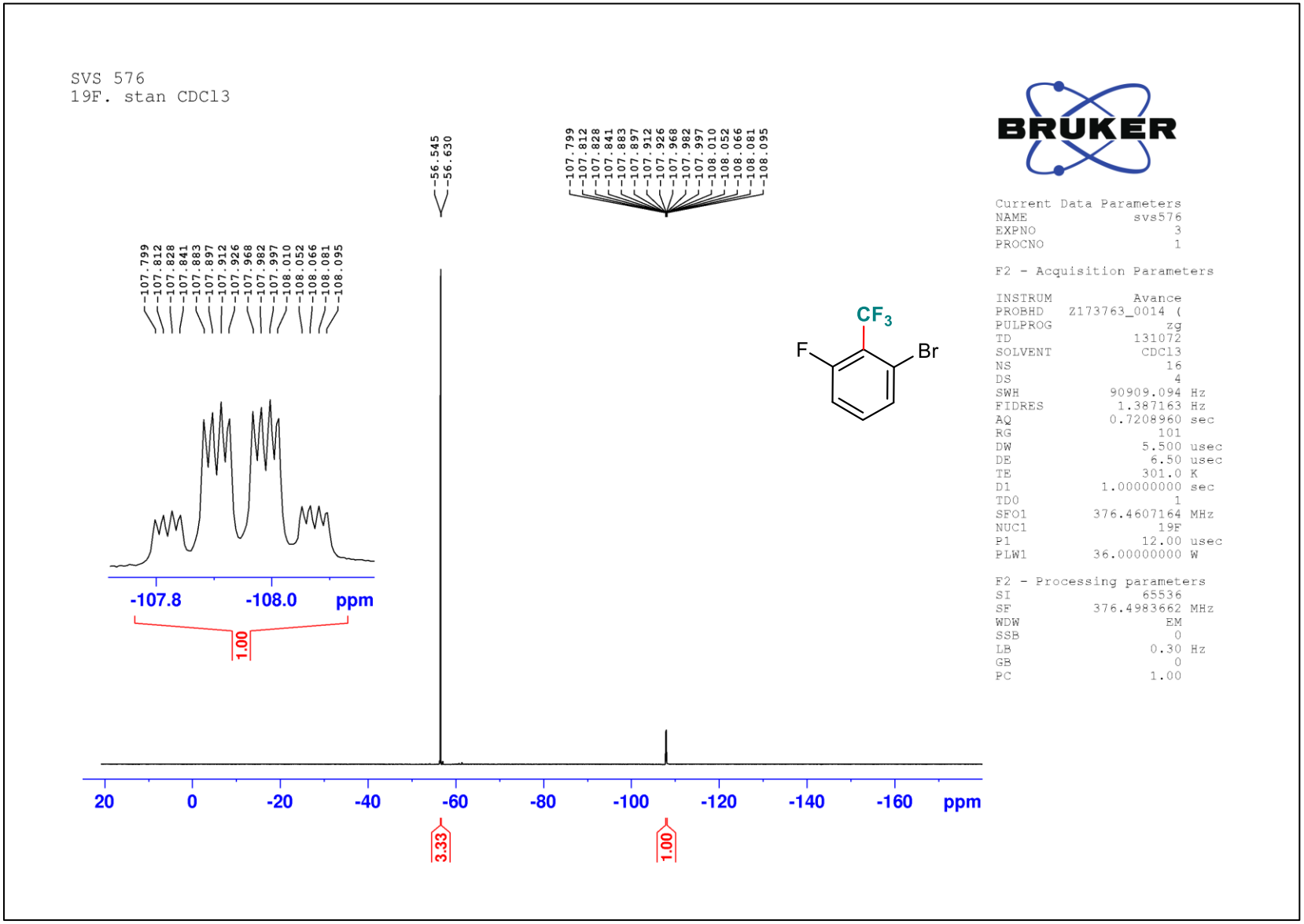
^{1}H NMR of Compound **2e**



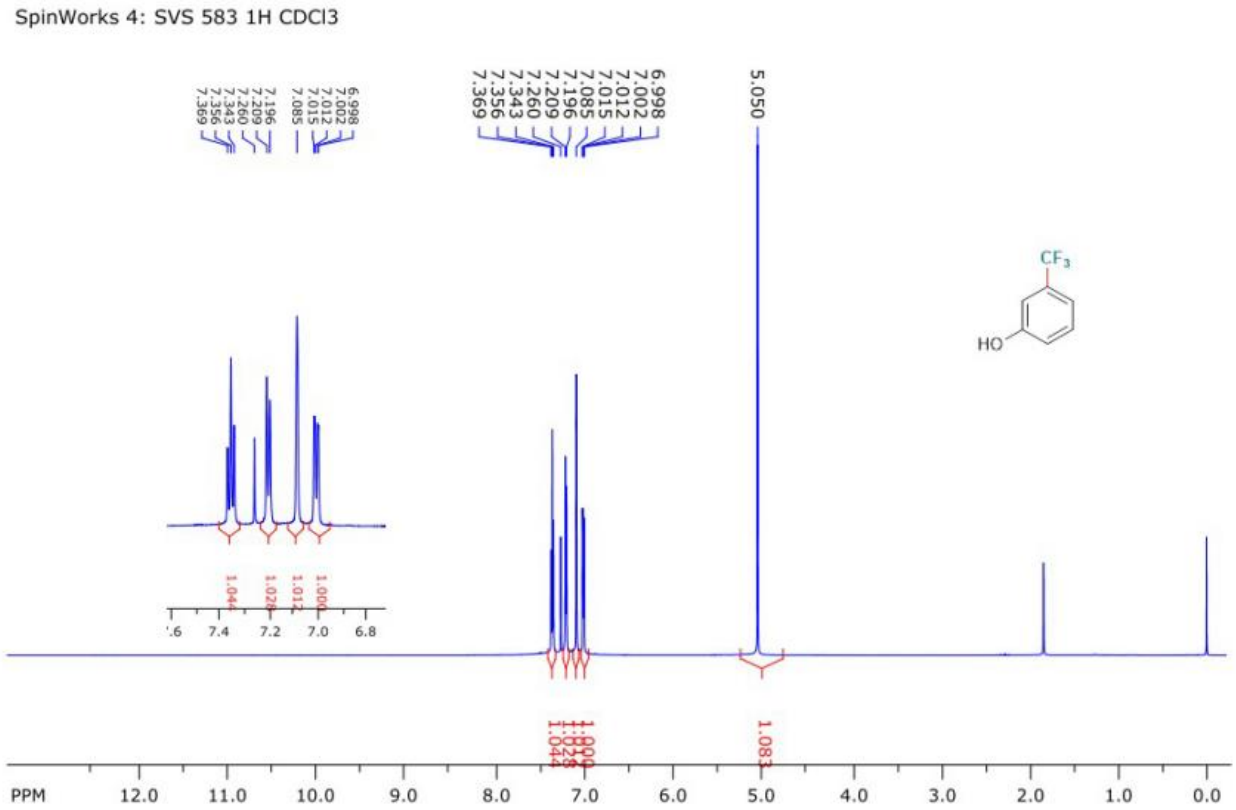
^{13}C NMR of Compound **2e**



^{19}F NMR of Compound **2e**

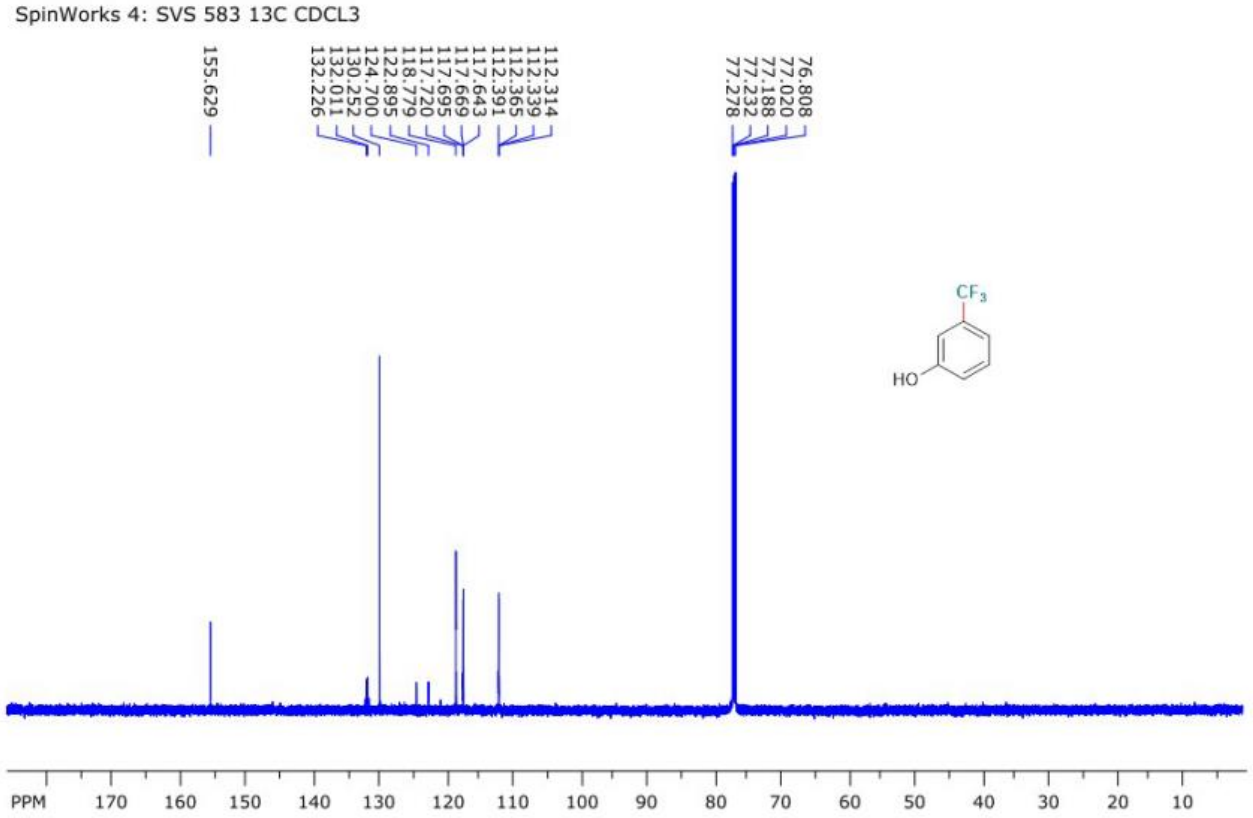


^{1}H NMR of Compound **2f**



file: ...240410_01\svs583-PROTON_01.fid\fid block# 1 expt: "s2pul"freq. of 0 ppm: 599.766672 MHz
transmitter freq.: 599.770272 MHz processed size: 65536 complex points
time domain size: 76924 points LB: 0.300 GF: 0.0000
width: 9615.38 Hz = 16.0318 ppm = 0.124999 Hz/pt Hz/cm: 328.880 ppm/cm: 0.54834
number of scans: 16

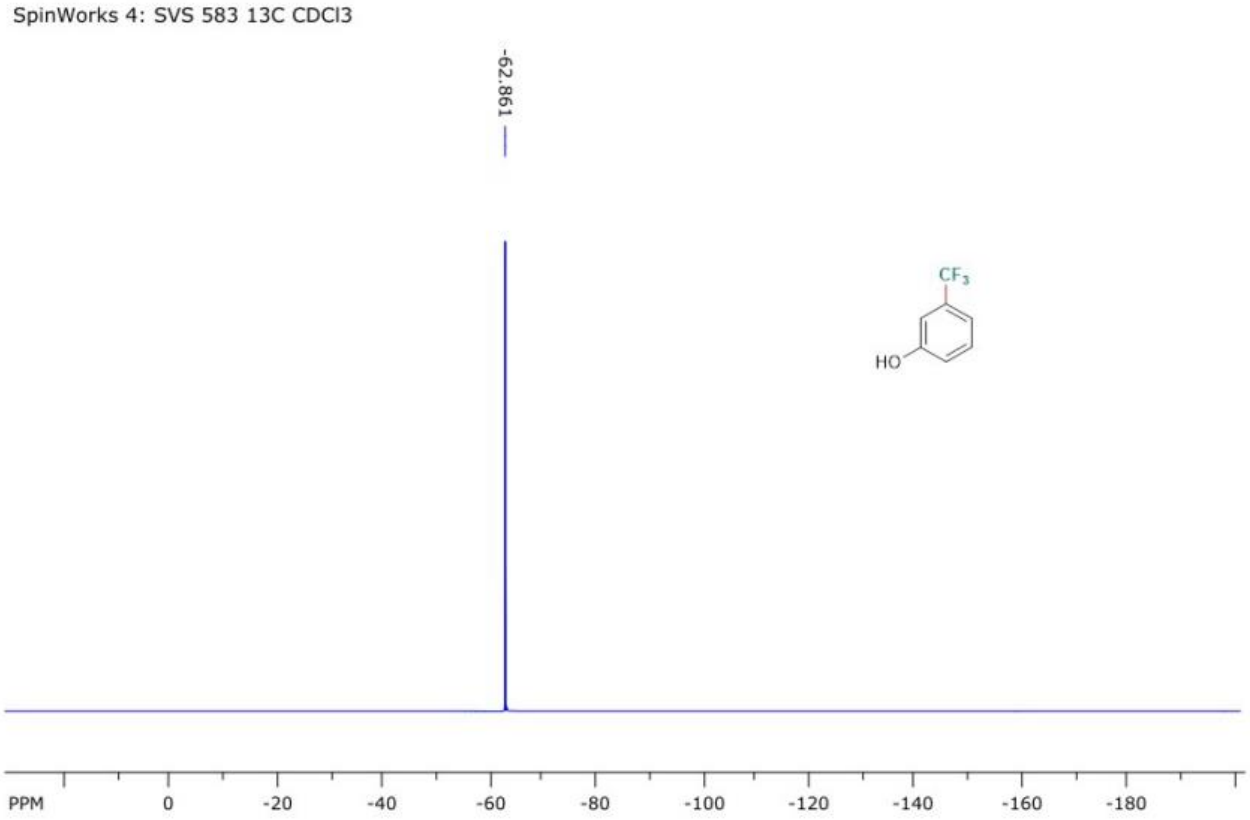
^{13}C NMR of Compound **2f**



file: ...240410_03\svs583-CARBON_01.fid\fid block# 1 expt: "s2pul"freq. of 0 ppm: 150.811444 MHz
transmitter freq.: 150.828039 MHz processed size: 65536 complex points
time domain size: 65536 points LB: 0.500 GF: 0.0000
width: 37878.79 Hz = 251.1389 ppm = 0.577984 Hz/pt Hz/cm: 1117.927 ppm/cm: 7.41193
number of scans: 576

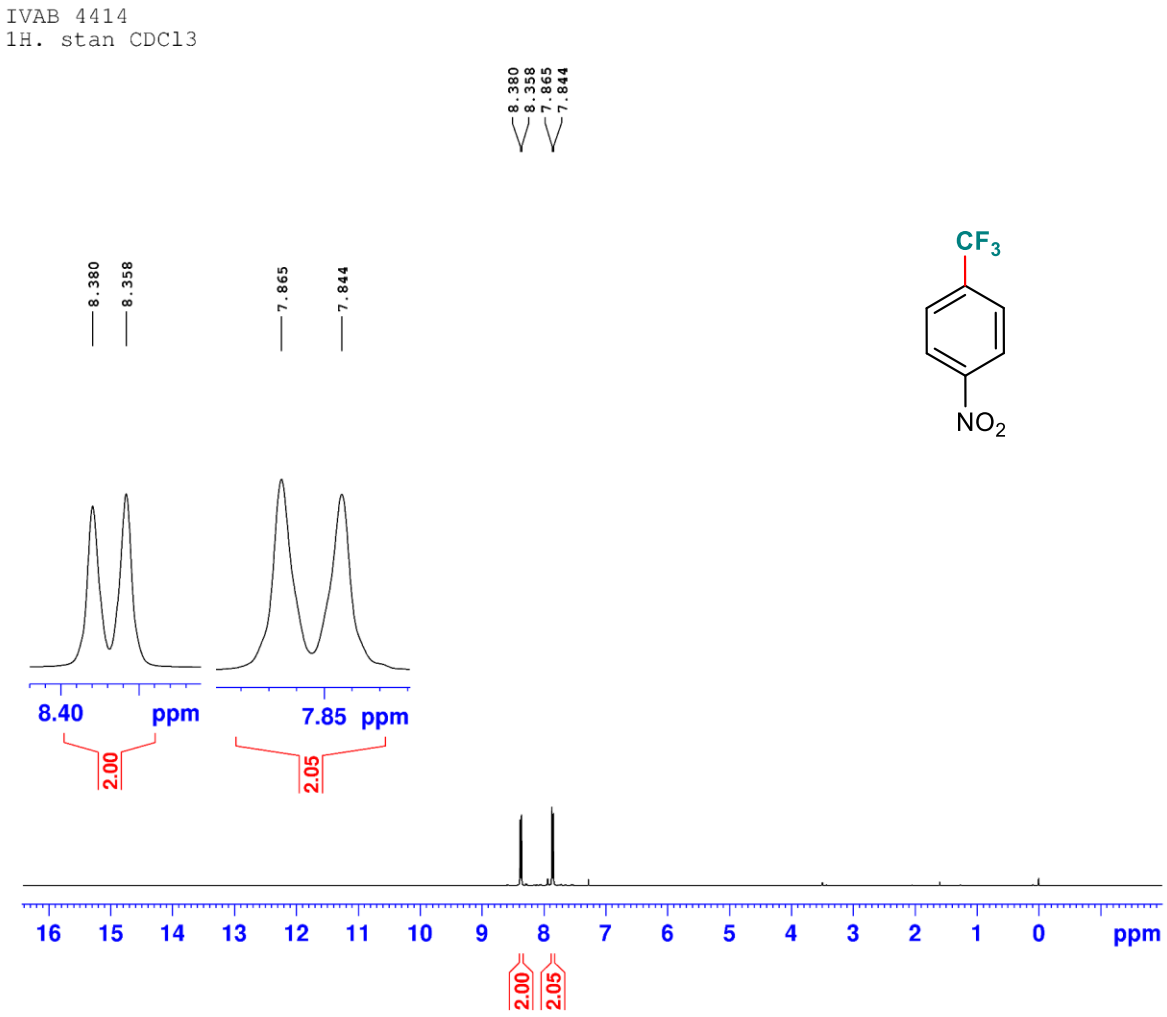
^{19}F

NMR of Compound **2f**



file: ...0410_02\svs583-FLUORINE_01.fid\fid block# 1 expt: "s2pul" freq. of 0 ppm: 564.344520 MHz
transmitter freq.: 564.296551 MHz processed size: 262144 complex points
time domain size: 262144 points LB: 1.500 GF: 0.0000
width: 131578.95 Hz = 233.1734 ppm = 0.501934 Hz/pt Hz/cm: 5263.158 ppm/cm: 9.32694
number of scans: 16

^{1}H NMR of Compound **2g**



BRUKER

Current Data Parameters
NAME ivab4414
EXPNO 1
PROCNO 1

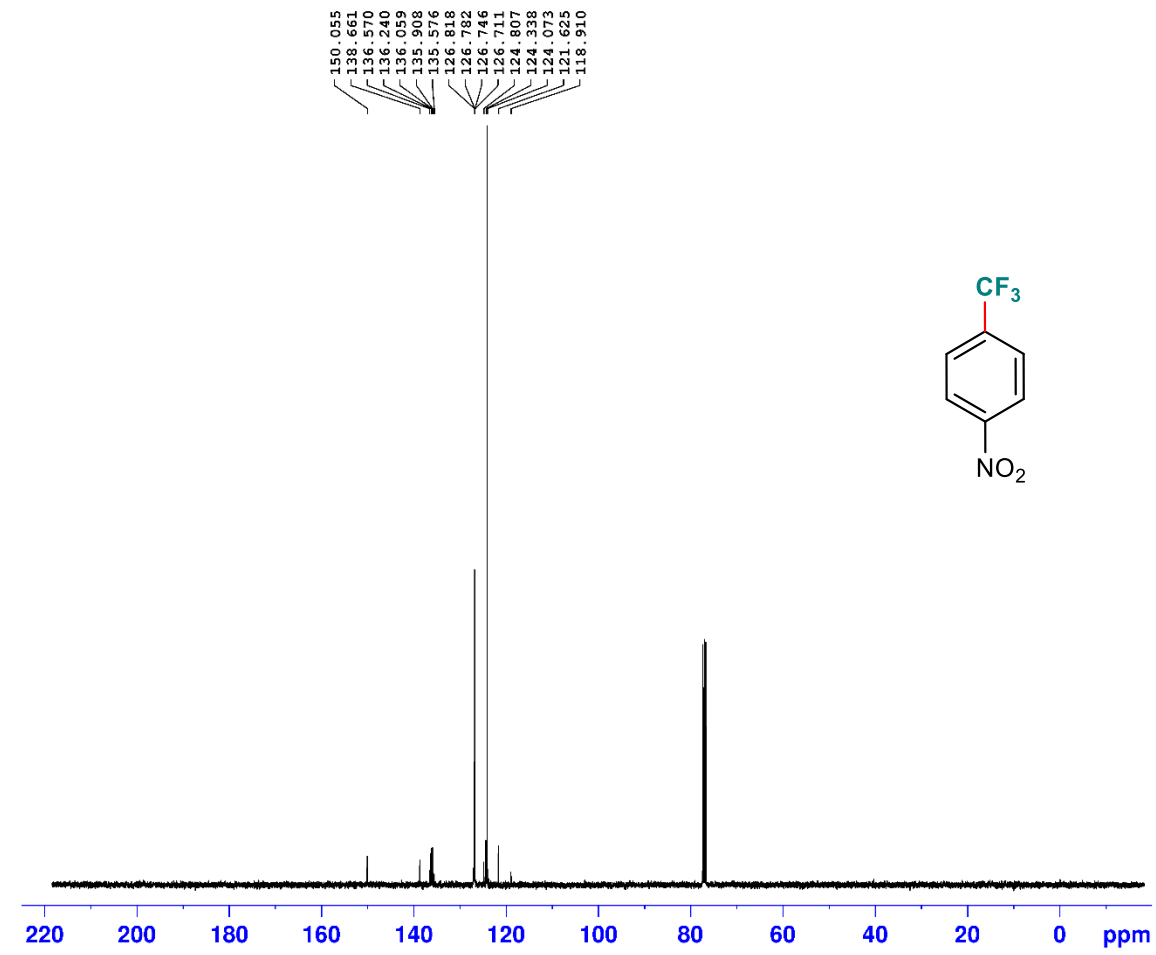
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

F2 - Processing parameters

SI	65536
SF	400.1300030 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **2g**



BRUKER

Current Data Parameters
NAME ivab4414
EXPNO 2
PROCNO 1

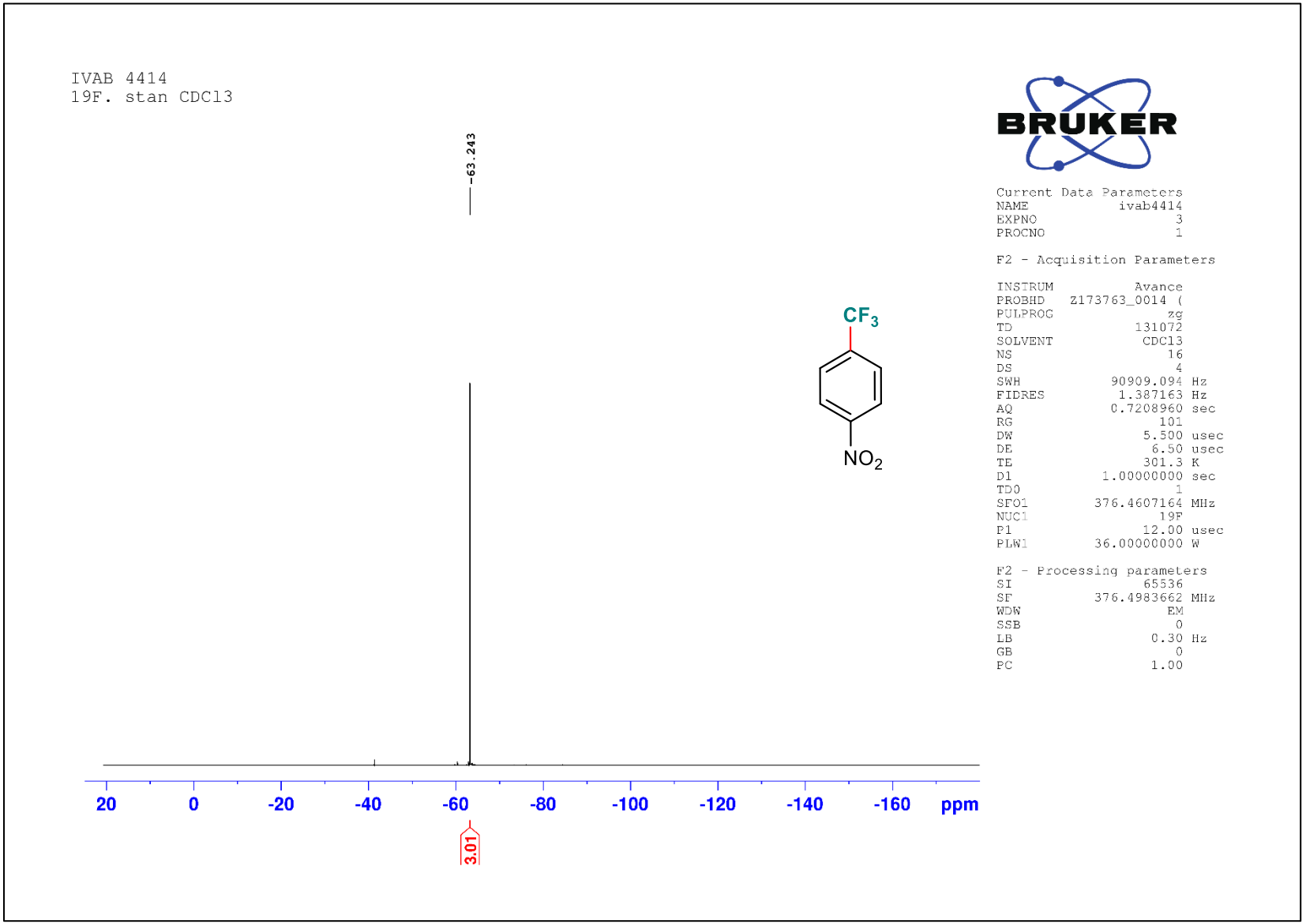
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	263
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	36
DW	21.000 usec
DE	15.00 usec
TE	301.6 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

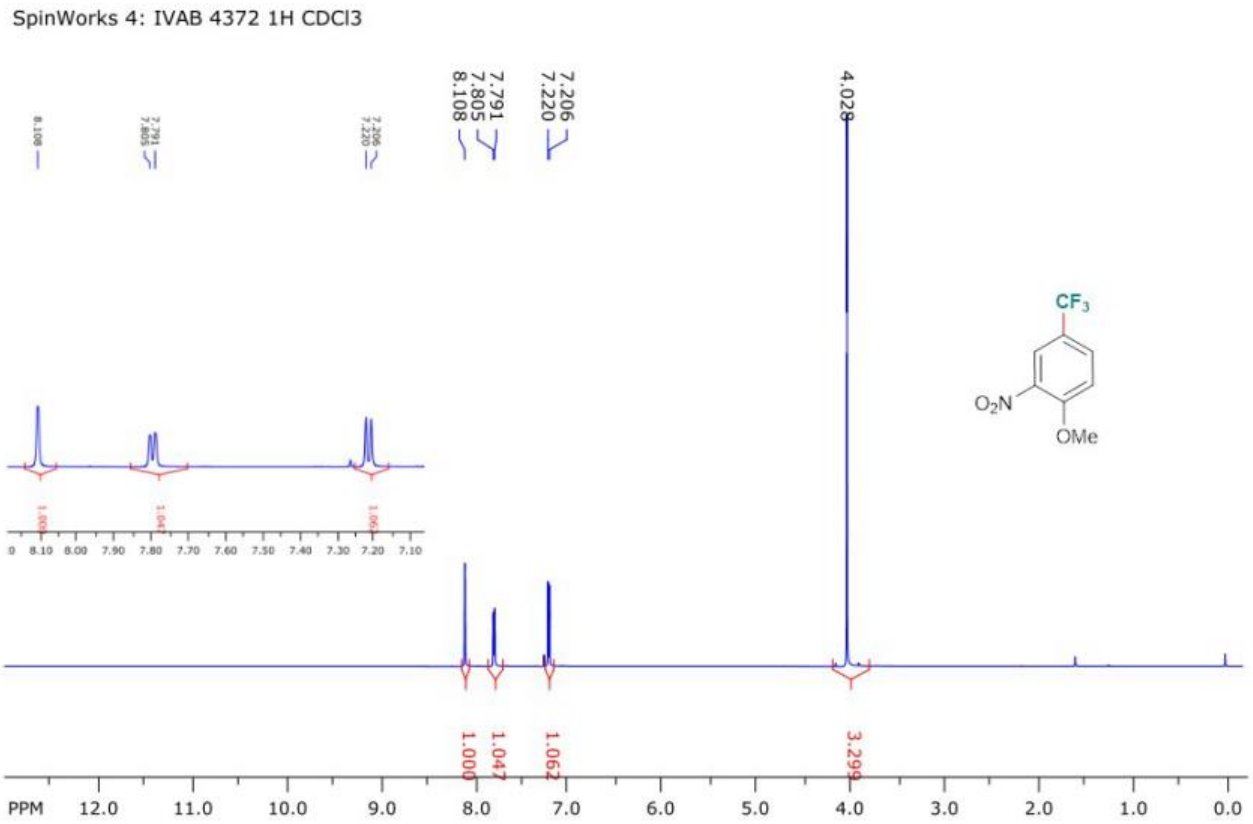
F2 - Processing parameters

SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

^{19}F NMR of Compound **2g**

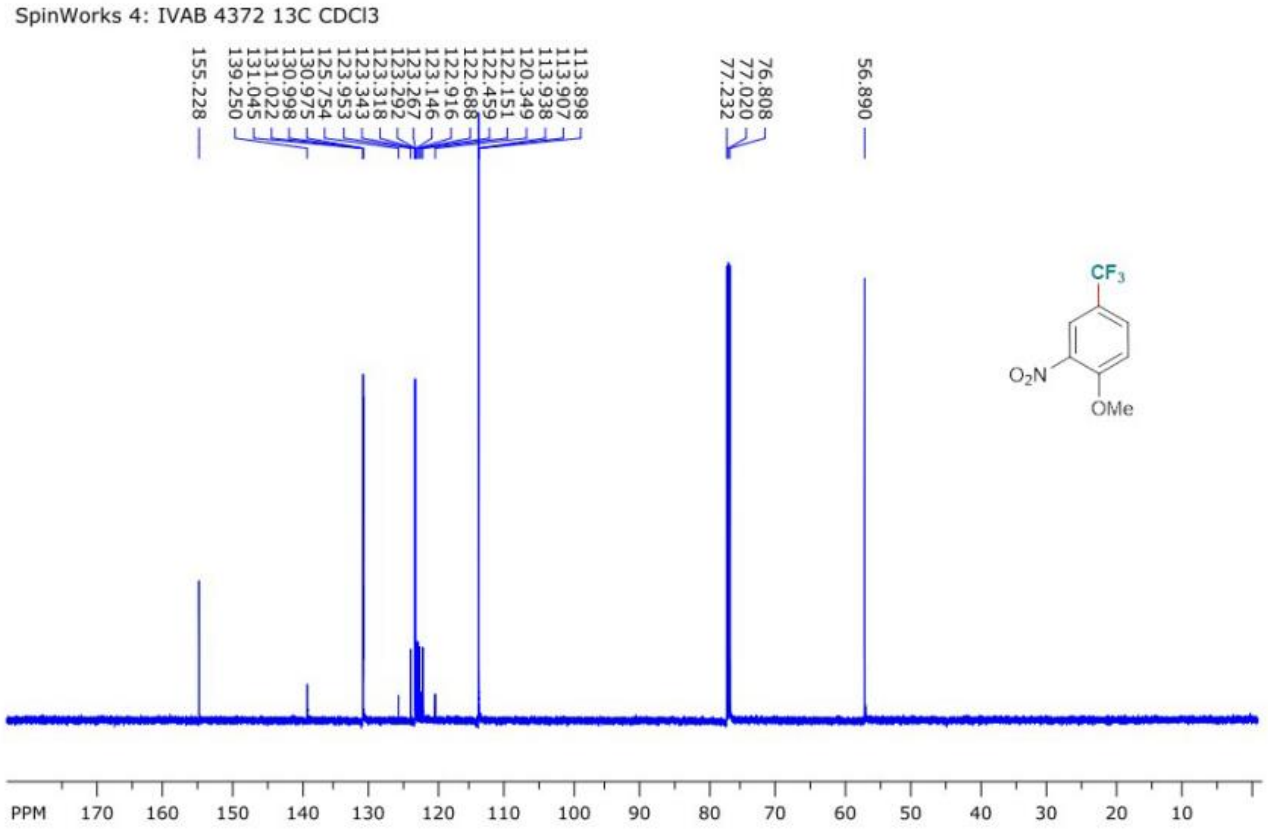


^{1}H NMR of Compound **2h**



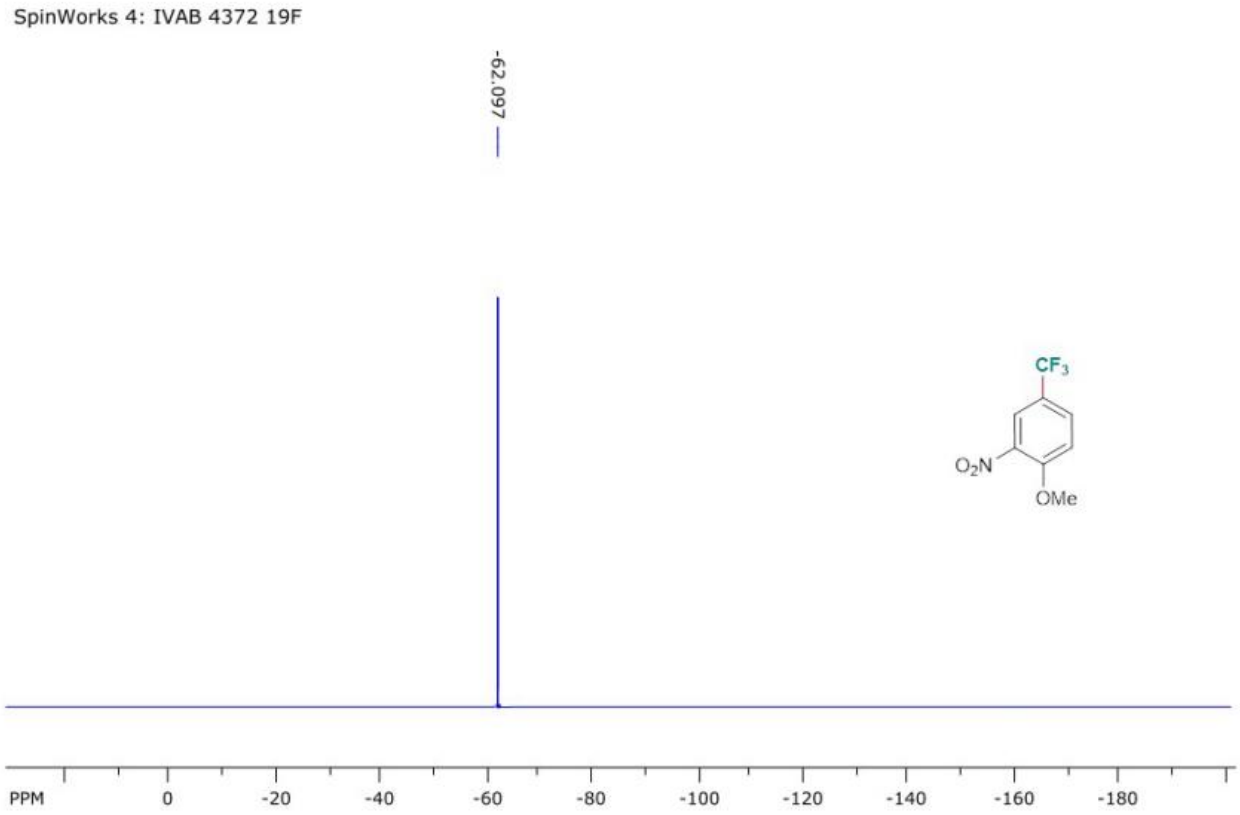
file: ...0409_01\ivab4372-PROTON_01.fid\fid block# 1 expt: "s2pul" freq. of 0 ppm: 599.766670 MHz
transmitter freq.: 599.770272 MHz processed size: 65536 complex points
time domain size: 76924 points LB: 0.300 GF: 0.0000
width: 9615.38 Hz = 16.0318 ppm = 0.124999 Hz/pt Hz/cm: 317.393 ppm/cm: 0.52919
number of scans: 16

^{13}C NMR of Compound **2h**

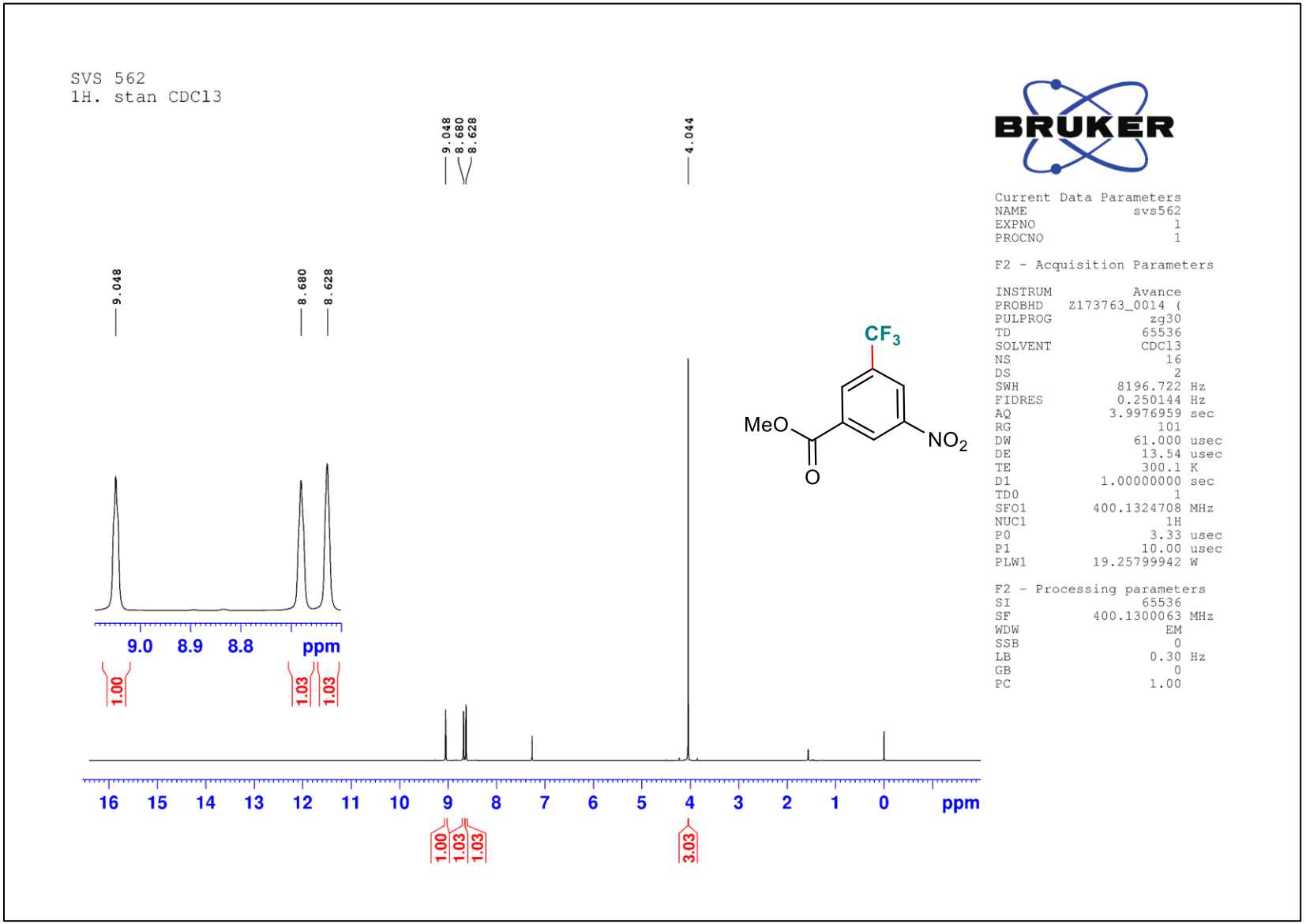


file: ...0409_02\ivab4372-CARBON_01.fid\fid block# 1 expt: "s2pul"freq. of 0 ppm: 150.811446 MHz
transmitter freq.: 150.828039 MHz
processed size: 65536 complex points
time domain size: 65536 points
LB: 0.500 GF: 0.0000
width: 37878.79 Hz = 251.1389 ppm = 0.577984 Hz/pt
Hz/cm: 1114.575 ppm/cm: 7.38971
number of scans: 512

^{19}F NMR of Compound **2h**



^{1}H NMR of Compound **2i**



Current Data Parameters
NAME svs562
EXPNO 1
PROCNO 1

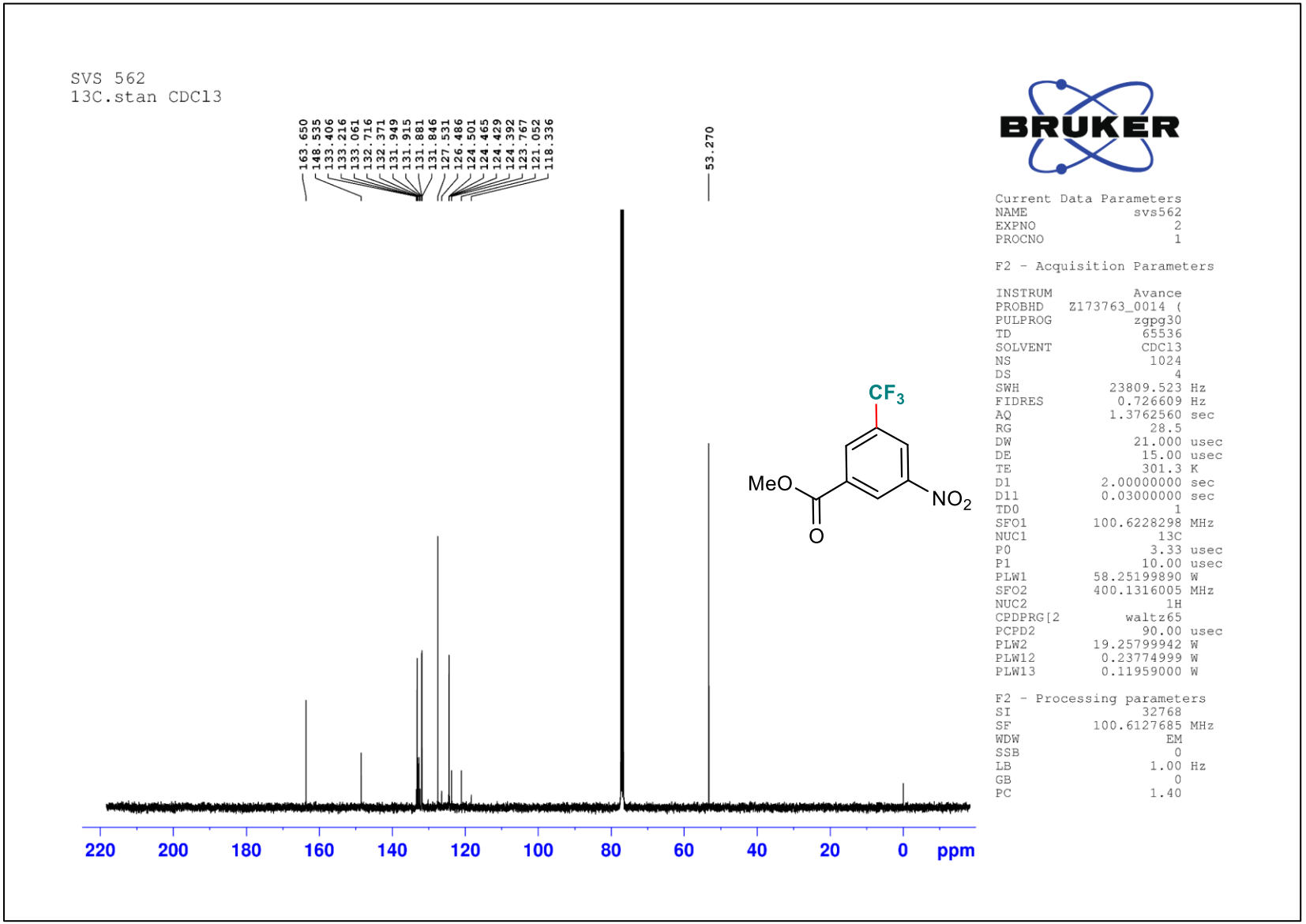
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	300.1 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

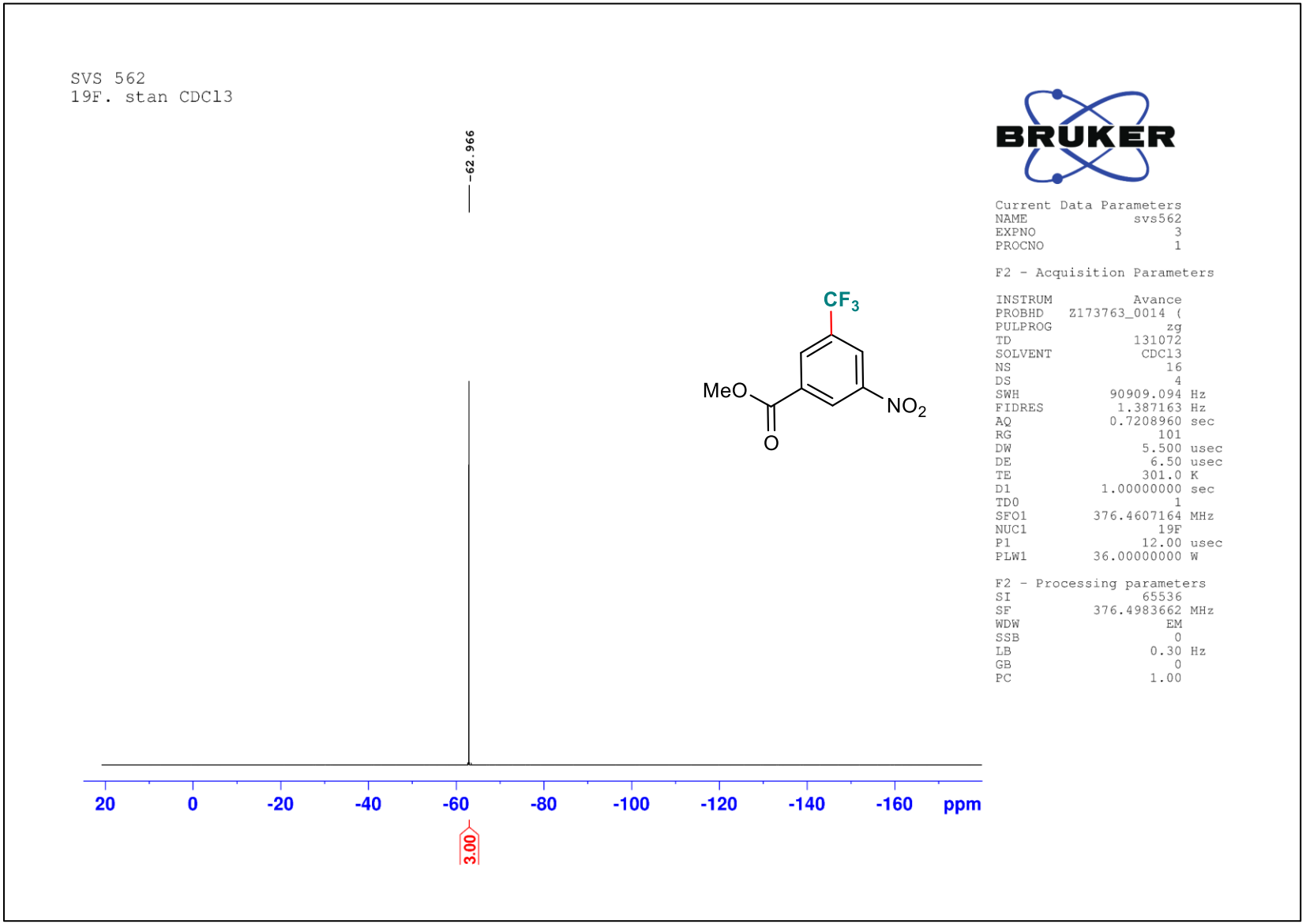
F2 - Processing parameters

SI	65536
SF	400.1300063 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

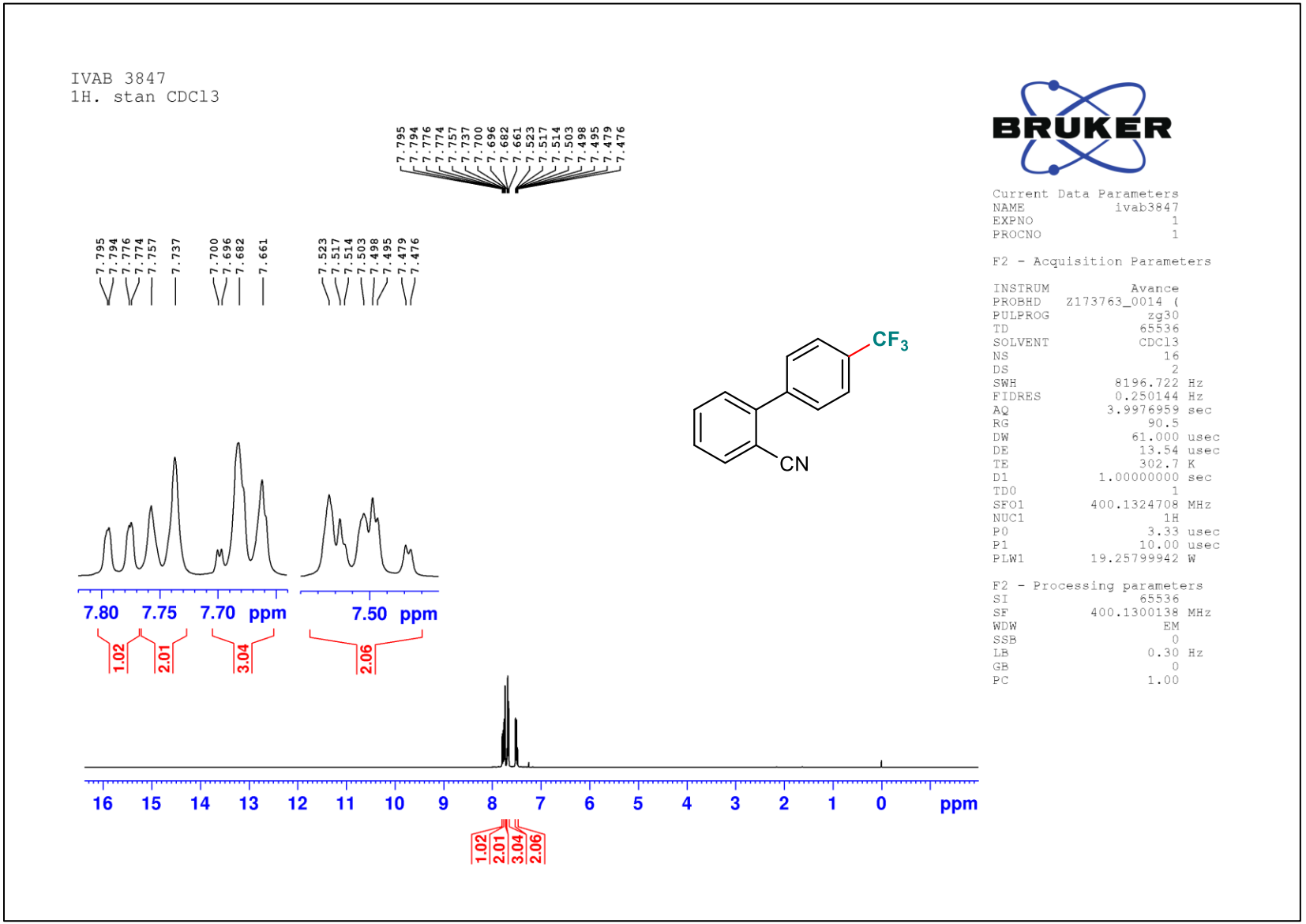
^{13}C NMR of Compound **2i**



^{19}F NMR of Compound **2i**



^{1}H NMR of Compound **2j**




```
Current Data Parameters
NAME                  ivab3847
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters

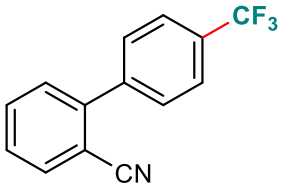
INSTRUM                 Avance
PROBHD    Z173763_0014 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                  8196.722 Hz
FIDRES               0.250144 Hz
AQ                   3.9976959 sec
RG                        90.5
DW                      61.000 usec
DE                      13.54 usec
TE                      302.7 K
D1                   1.00000000 sec
TD0                         1
SFO1               400.1324708 MHz
NUC1                       1H
P0                      3.33 usec
P1                      10.00 usec
PLW1               19.25799942 W

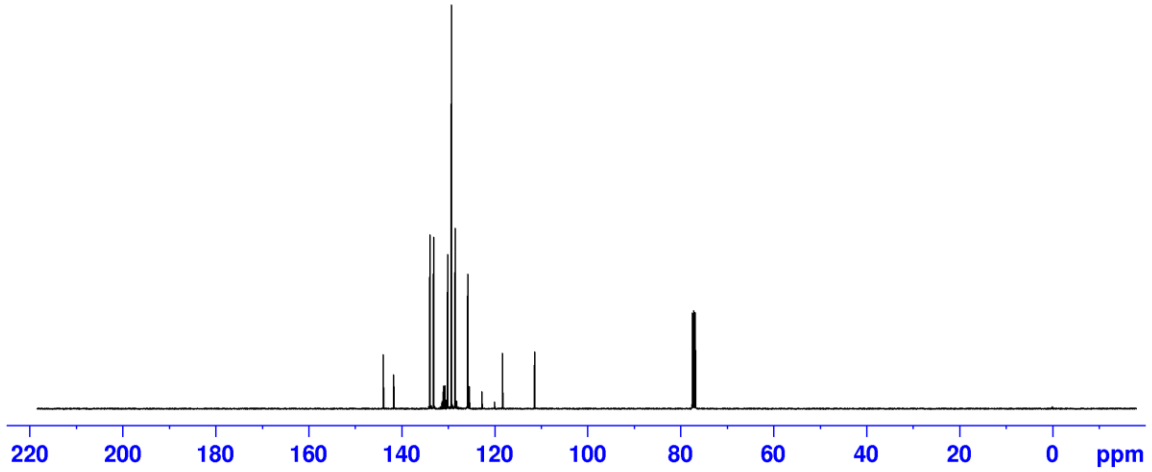
F2 - Processing parameters
SI                      65536
SF                 400.1300138 MHz
WDW                        EM
SSB                         0
LB                       0.30 Hz
GB                          0
PC                       1.00
```

^{13}C NMR of Compound **2j**

IVAB 3847
A-13C. stan CDCl3

143.878
141.672
133.862
133.092
131.280
130.955
130.630
130.044
129.238
128.430
128.089
125.785
125.748
125.711
125.672
125.382
122.676
119.971
118.245
111.347





Current Data Parameters
NAME ivab3847
EXPNO 3
PROCNO 1

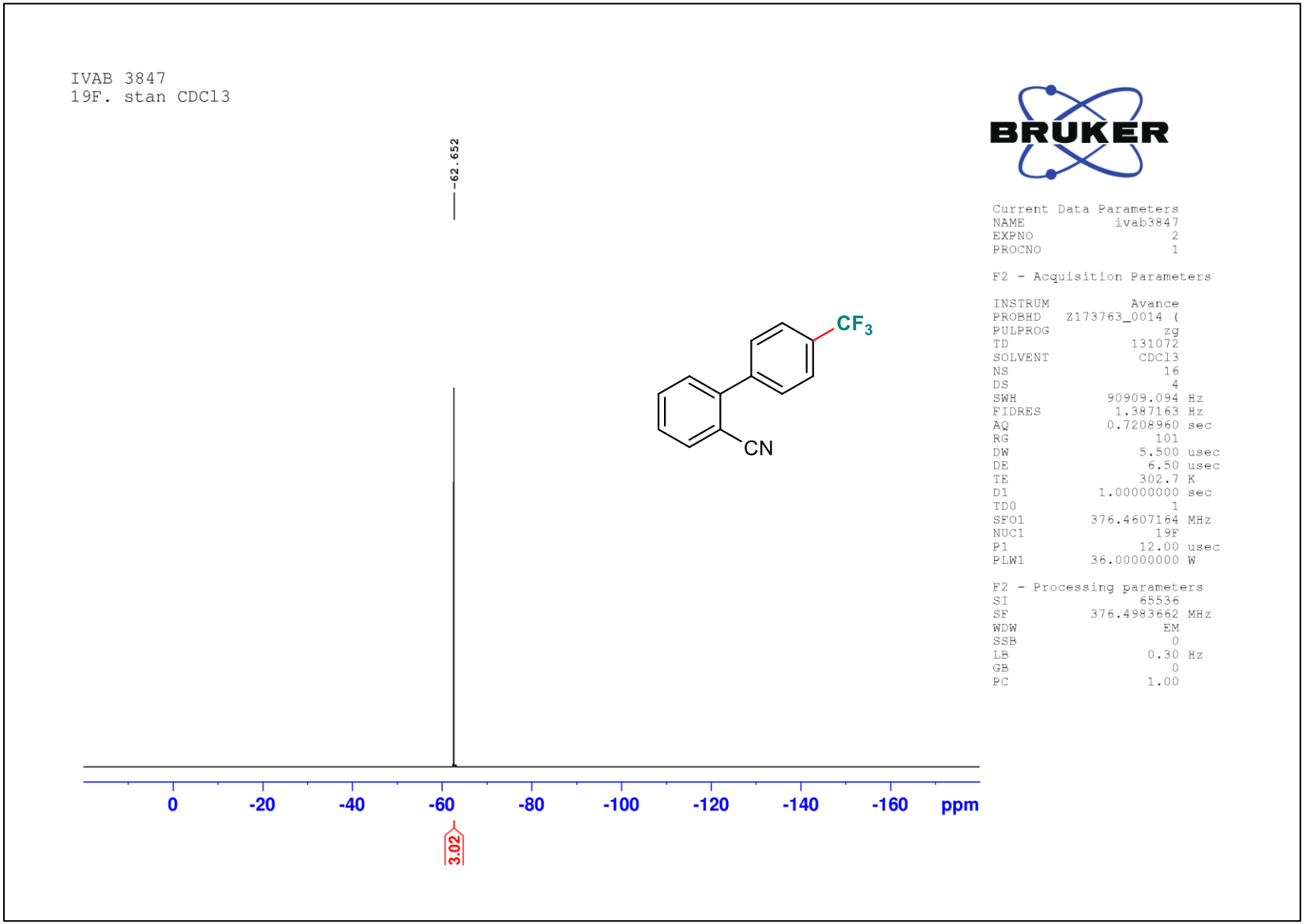
F2 - Acquisition Parameters

INSTRUM	Avance	
PROBHD	Z173763_0014 (	
PULPROG	zgpg30	
TD	65536	
SOLVENT	CDCl3	
NS	800	
DS	4	
SWH	23809.523	Hz
FIDRES	0.726609	Hz
AQ	1.3762560	sec
RG	28.5	
DW	21.000	usec
DE	15.00	usec
TE	303.0	K
D1	2.00000000	sec
D11	0.03000000	sec
TD0	1	
SFO1	100.6228298	MHz
NUC1	13C	
P0	3.33	usec
P1	10.00	usec
PLW1	58.25199890	W
SFO2	400.1316005	MHz
NUC2	1H	
CPDPRG[2	waltz65	
PCPD2	90.00	usec
PLW2	19.25799942	W
PLW12	0.23774999	W
PLW13	0.11959000	W

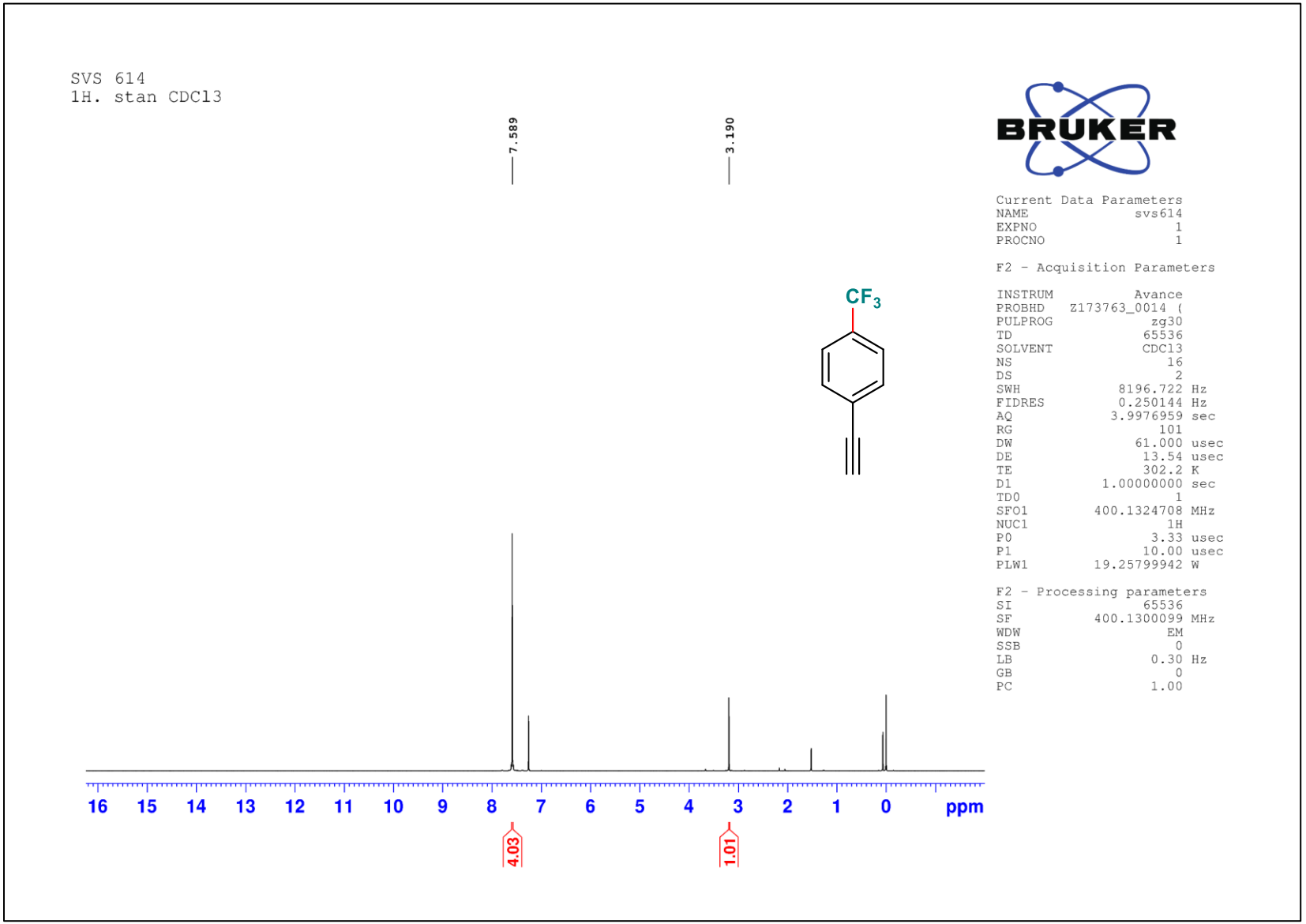
F2 - Processing parameters

SI	32768	
SF	100.6127685	MHz
WDW	EM	
SSB	0	
LB	1.00	Hz
GB	0	
PC	1.40	

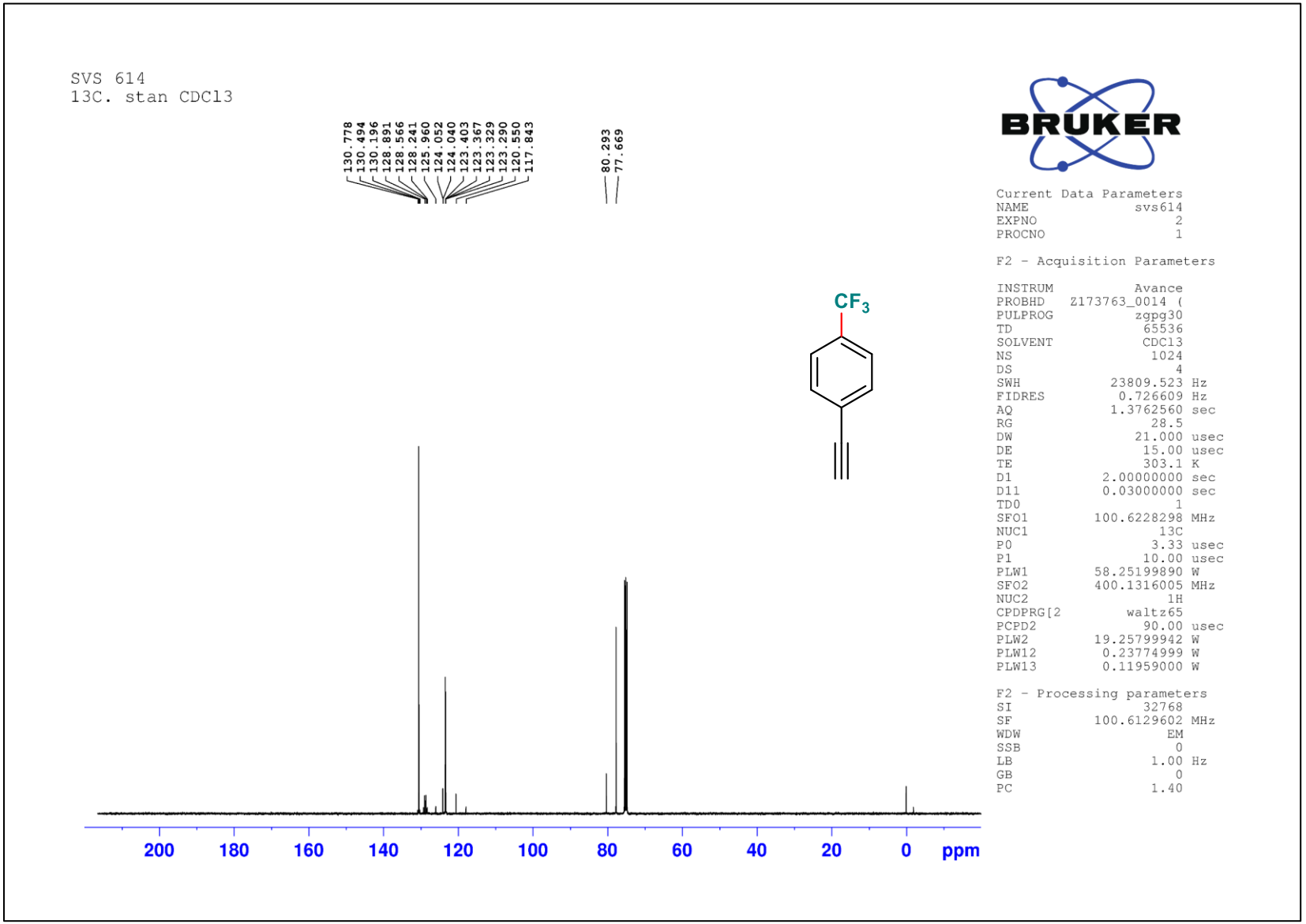
^{19}F NMR of Compound **2j**



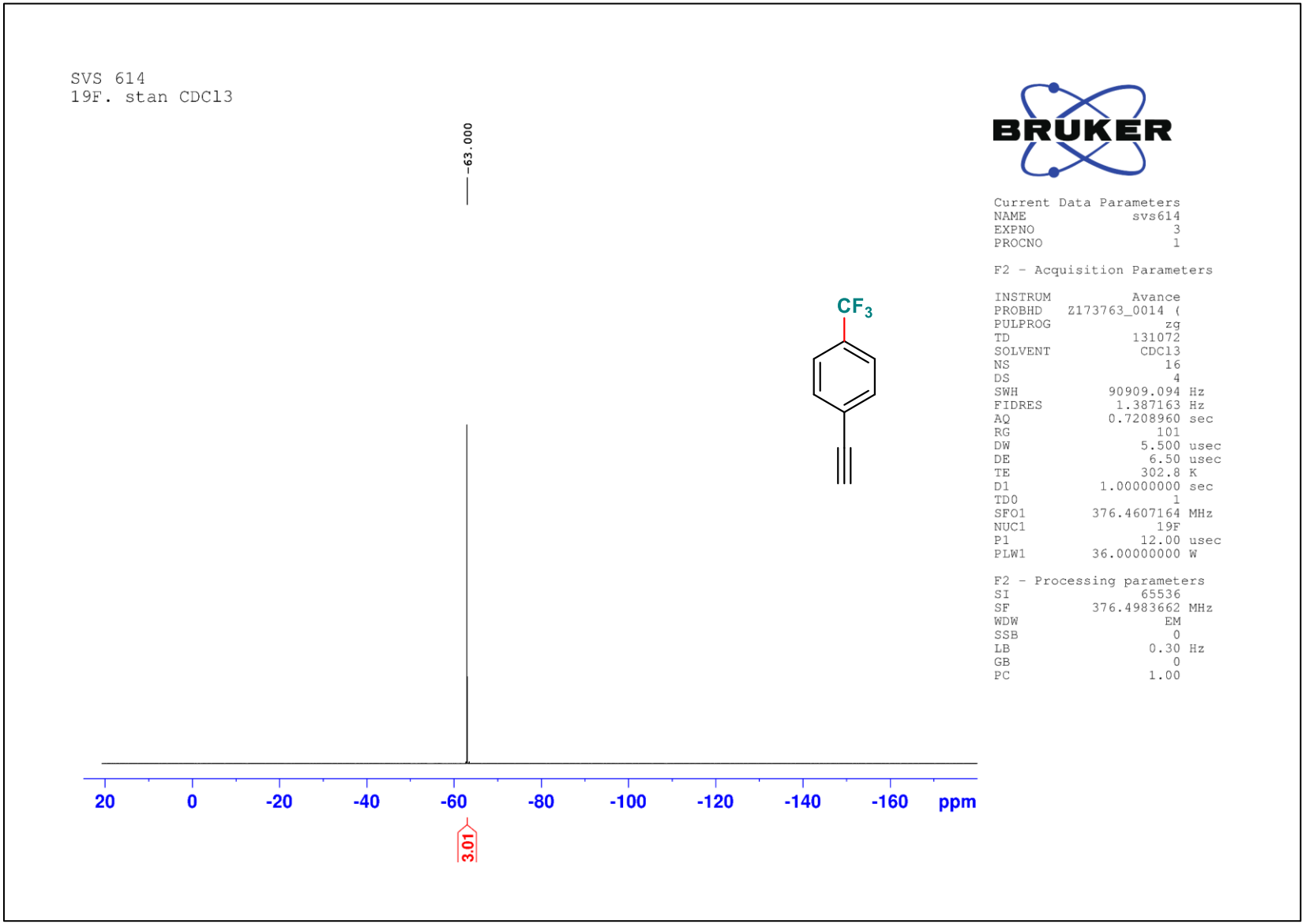
^{1}H NMR of Compound **2k**



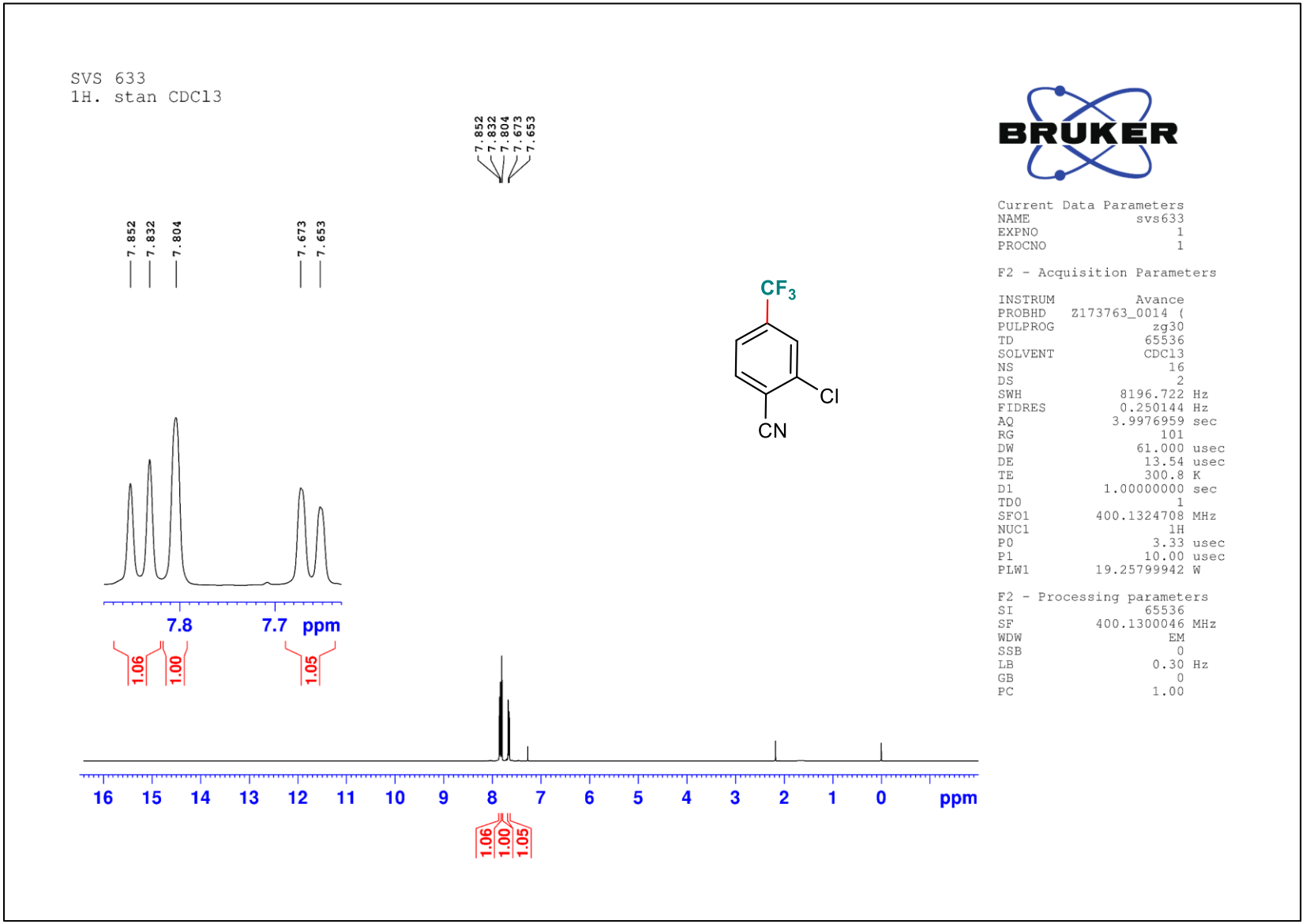
^{13}C NMR of Compound **2k**



^{19}F NMR of Compound **2k**



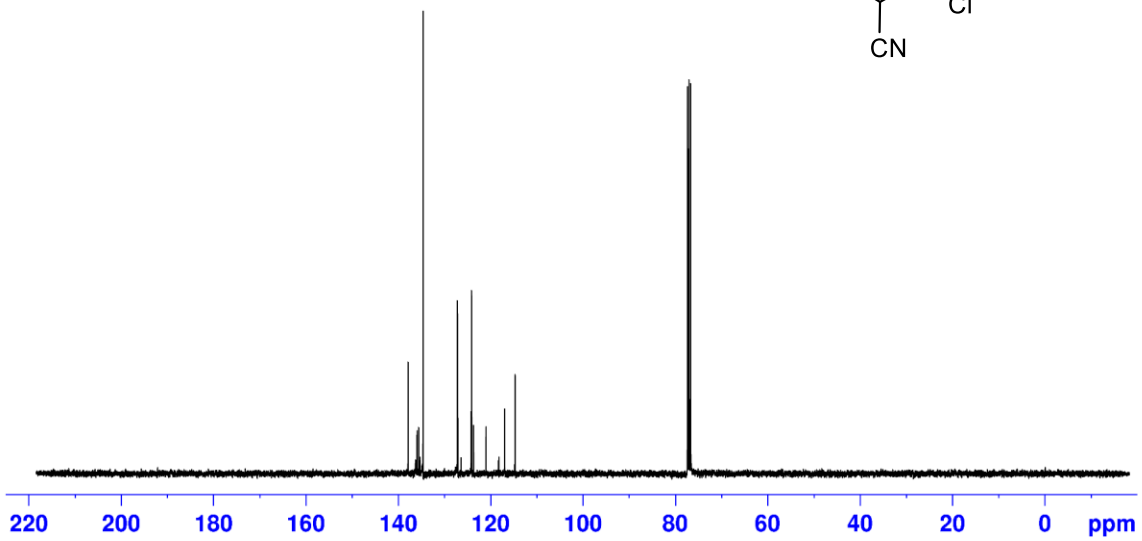
^{1}H NMR of Compound **2l**



^{13}C NMR of Compound **2l**

SVS 633
13C. stan CDCl3

137.839
136.246
135.908
135.570
135.232
134.605
127.207
127.171
127.132
127.095
126.395
124.168
124.133
124.097
124.062
123.676
120.956
118.239
116.966
114.704



Current Data Parameters
NAME svs633
EXPNO 2
PROCNO 1

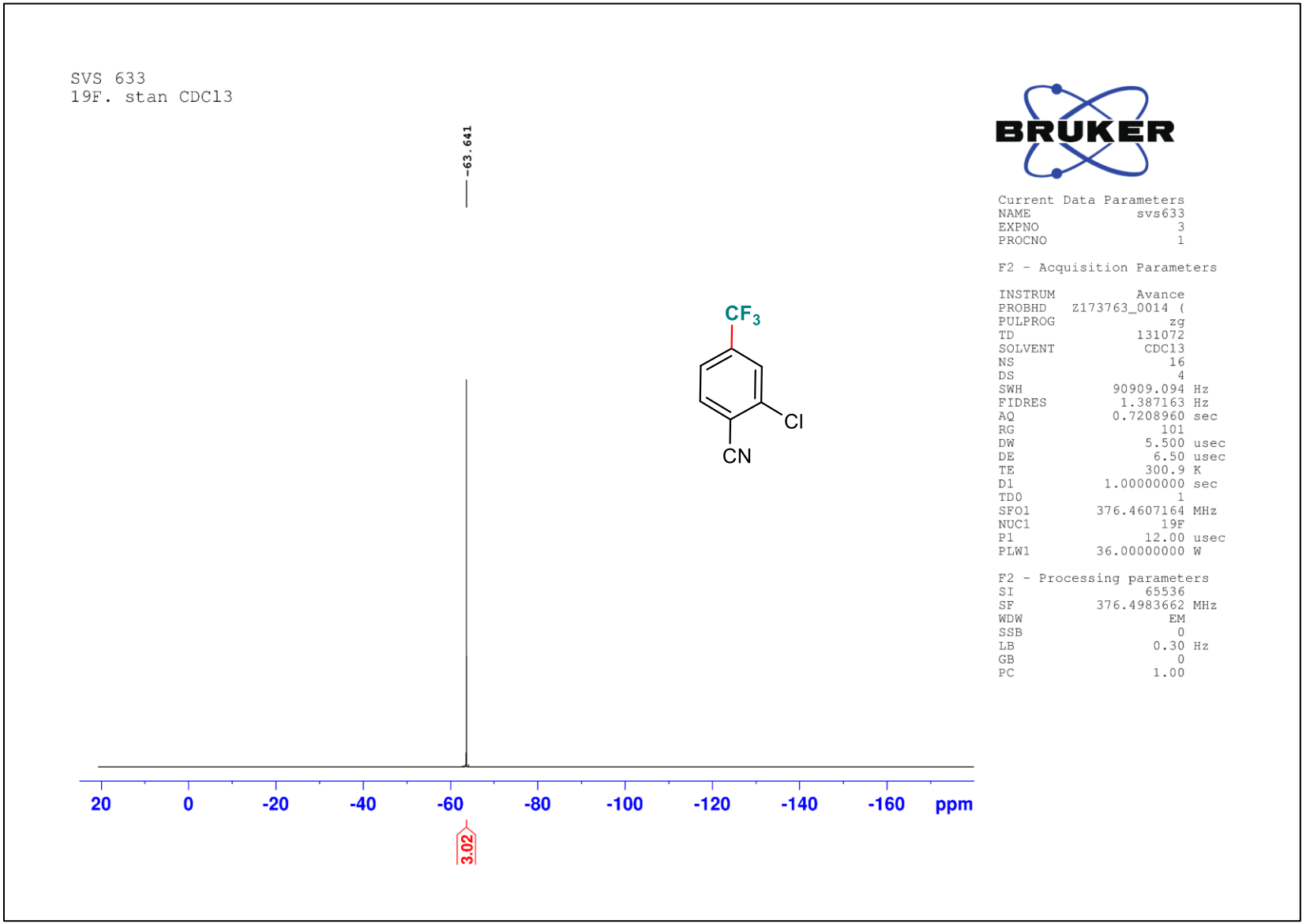
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	500
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	36
DW	21.000 usec
DE	15.00 usec
TE	301.2 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

F2 - Processing parameters

SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

^{19}F NMR of Compound **2l**



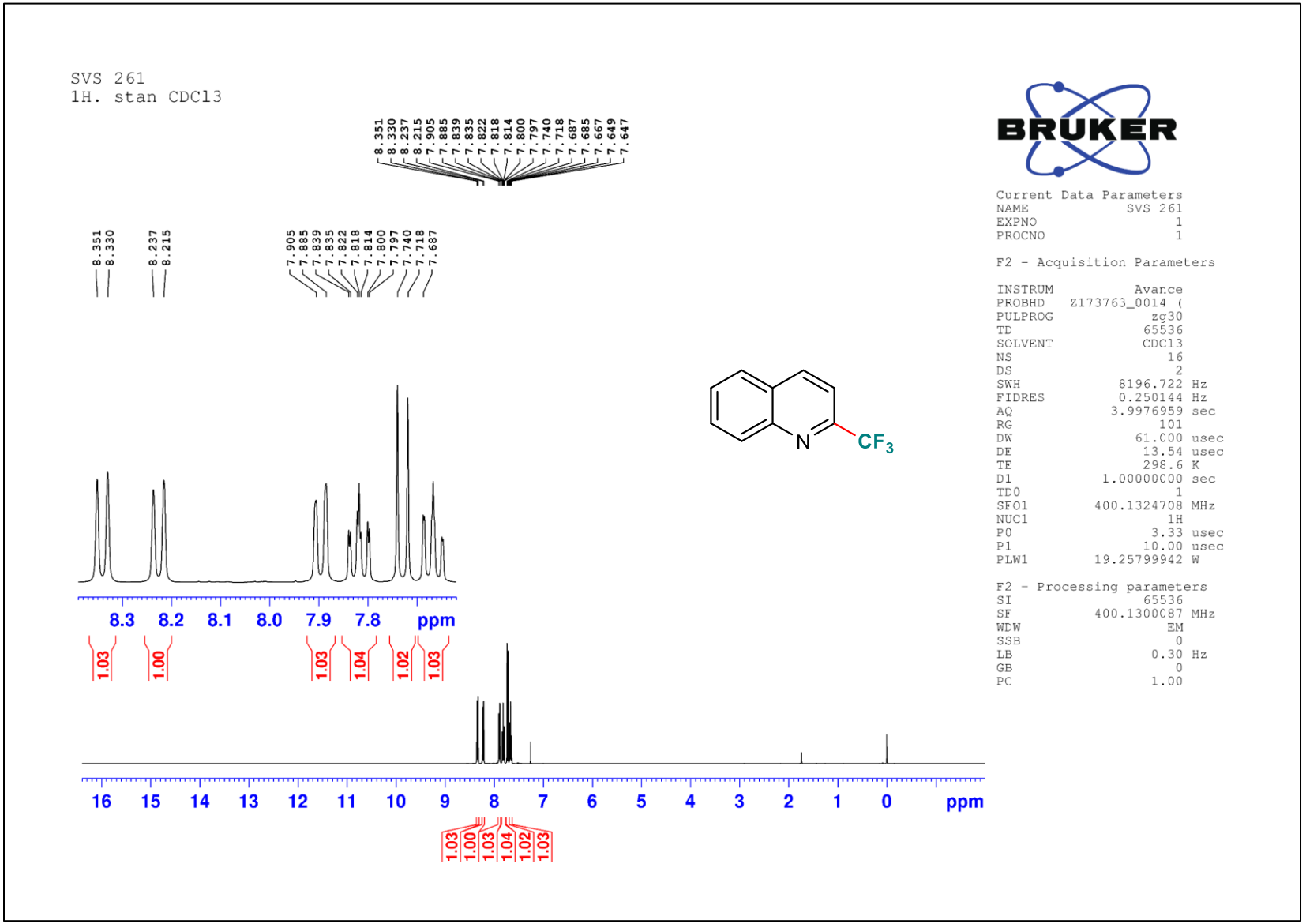

```
Current Data Parameters
NAME                 svs633
EXPNO                     3
PROCNO                    1

F2 - Acquisition Parameters

INSTRUM                Avance
PROBHD    Z173763_0014 (
PULPROG                   zg
TD                    131072
SOLVENT                CDCl3
NS                        16
DS                         4
SWH                90909.094 Hz
FIDRES              1.387163 Hz
AQ                  0.7208960 sec
RG                      101
DW                    5.500 usec
DE                    6.50 usec
TE                    300.9 K
D1                 1.00000000 sec
TD0                       1
SFO1              376.4607164 MHz
NUC1                     19F
P1                    12.00 usec
PLW1              36.00000000 W

F2 - Processing parameters
SI                        65536
SF                376.4983662 MHz
WDW                       EM
SSB                        0
LB                      0.30 Hz
GB                         0
PC                      1.00
```

^{1}H NMR of Compound **2m**



BRUKER

Current Data Parameters

NAME	SVS 261
EXPNO	1
PROCNO	1

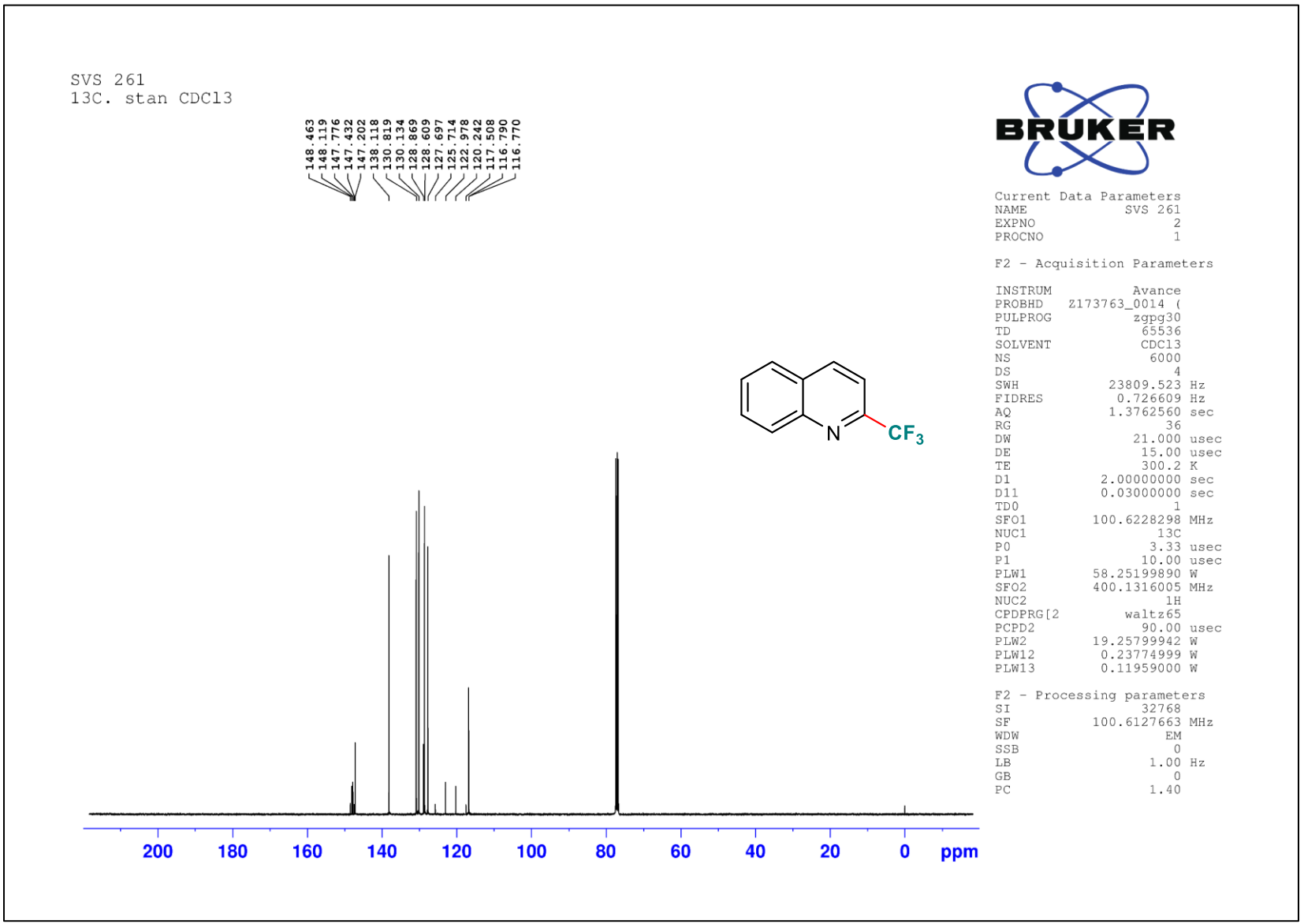
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	298.6 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

F2 - Processing parameters

SI	65536
SF	400.1300087 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **2m**



Current Data Parameters

NAME	SVS 261
EXPNO	2
PROCNO	1

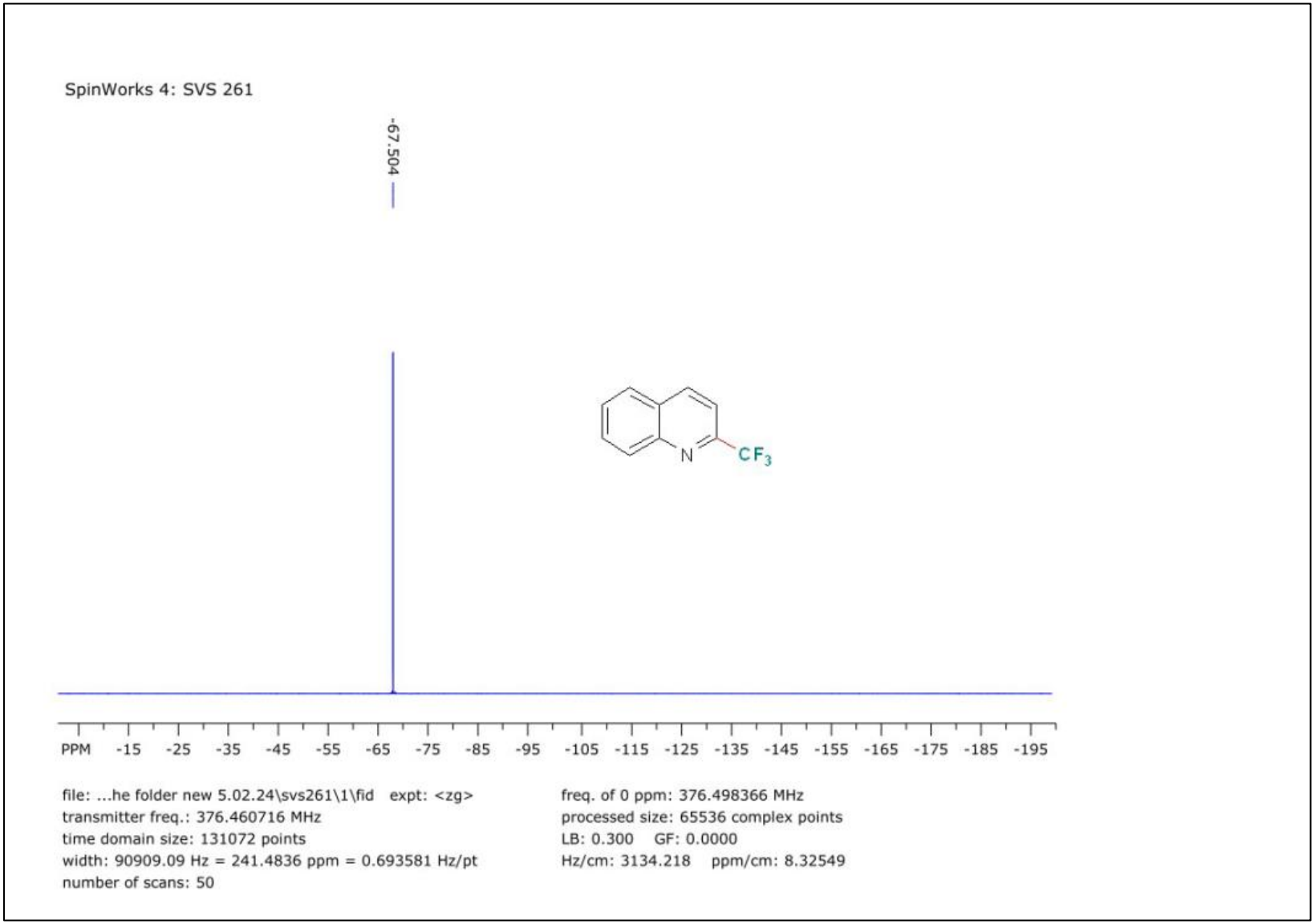
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	6000
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	36
DW	21.000 usec
DE	15.00 usec
TE	300.2 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

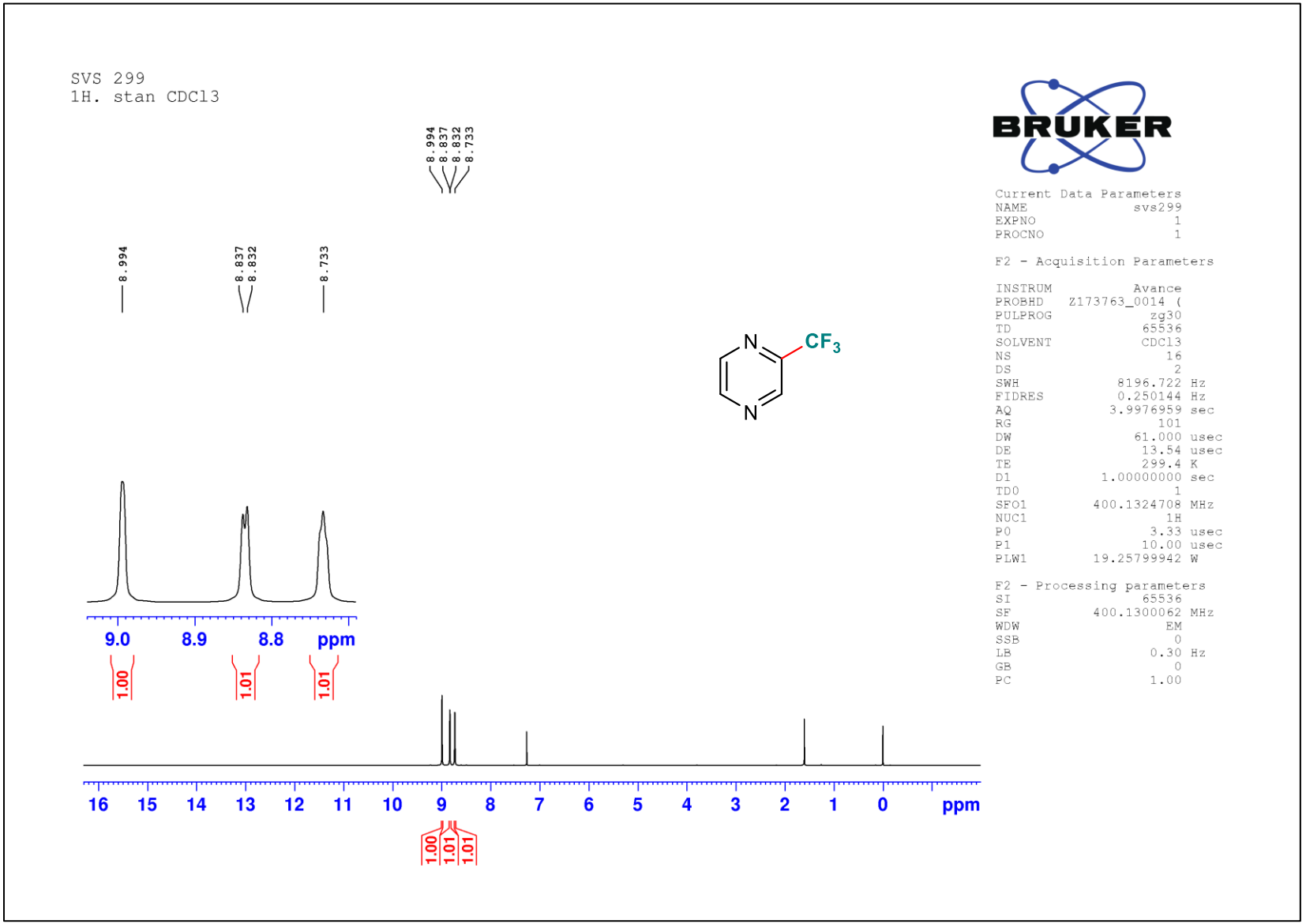
F2 - Processing parameters

SI	32768
SF	100.6127663 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

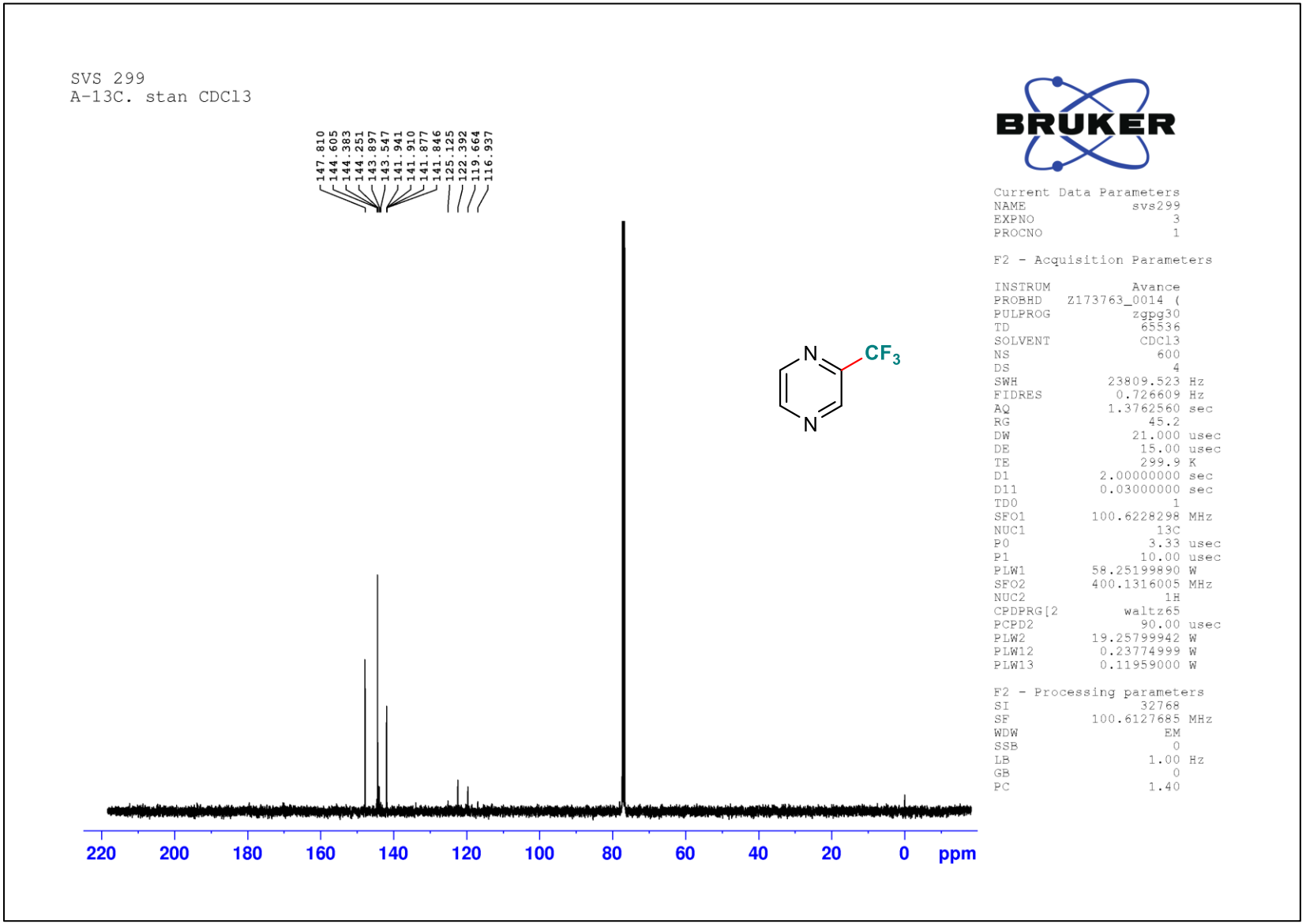
^{19}F NMR of Compound **2m**



^{1}H NMR of Compound **2n**

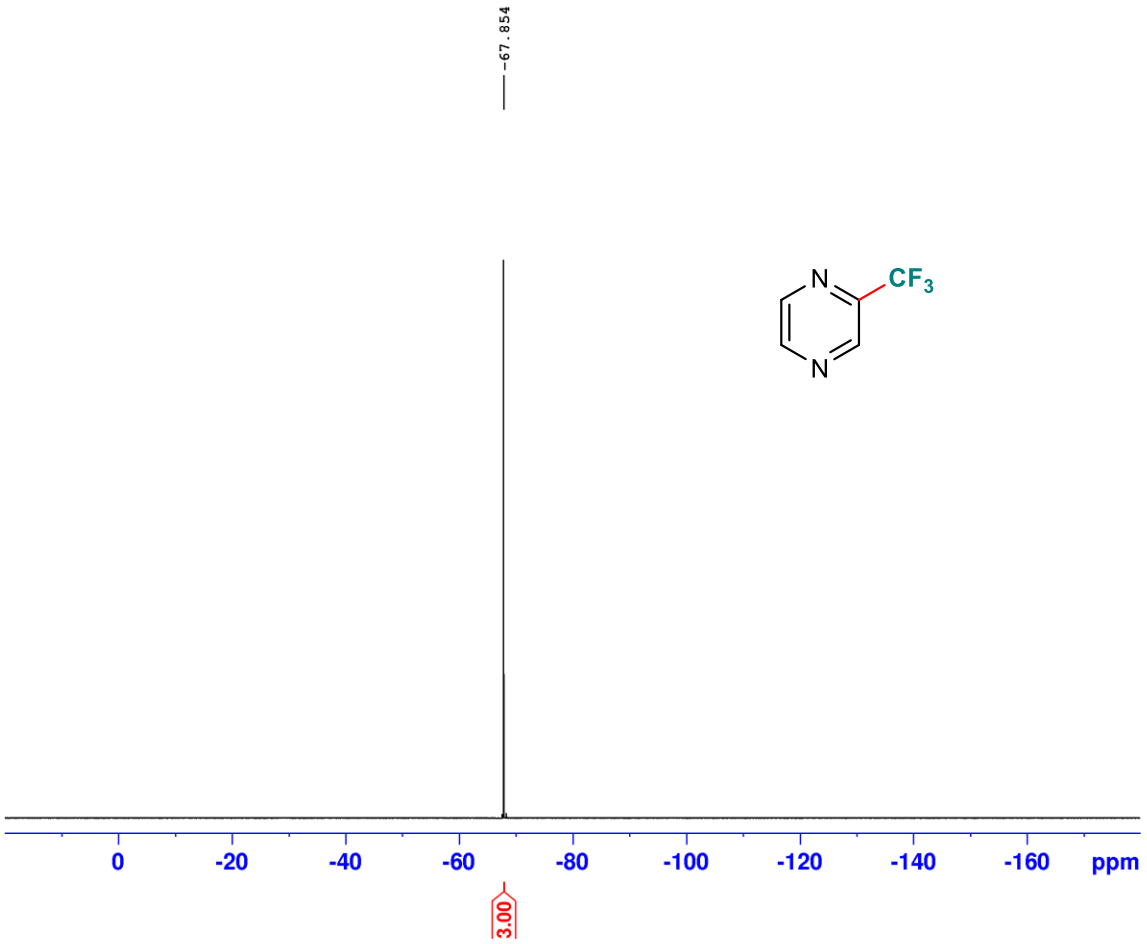


^{13}C NMR of Compound **2n**



^{19}F NMR of Compound **2n**

SVS 299
19F. stan CDCl3



Current Data Parameters
NAME svs299
EXPNO 2
PROCNO 1

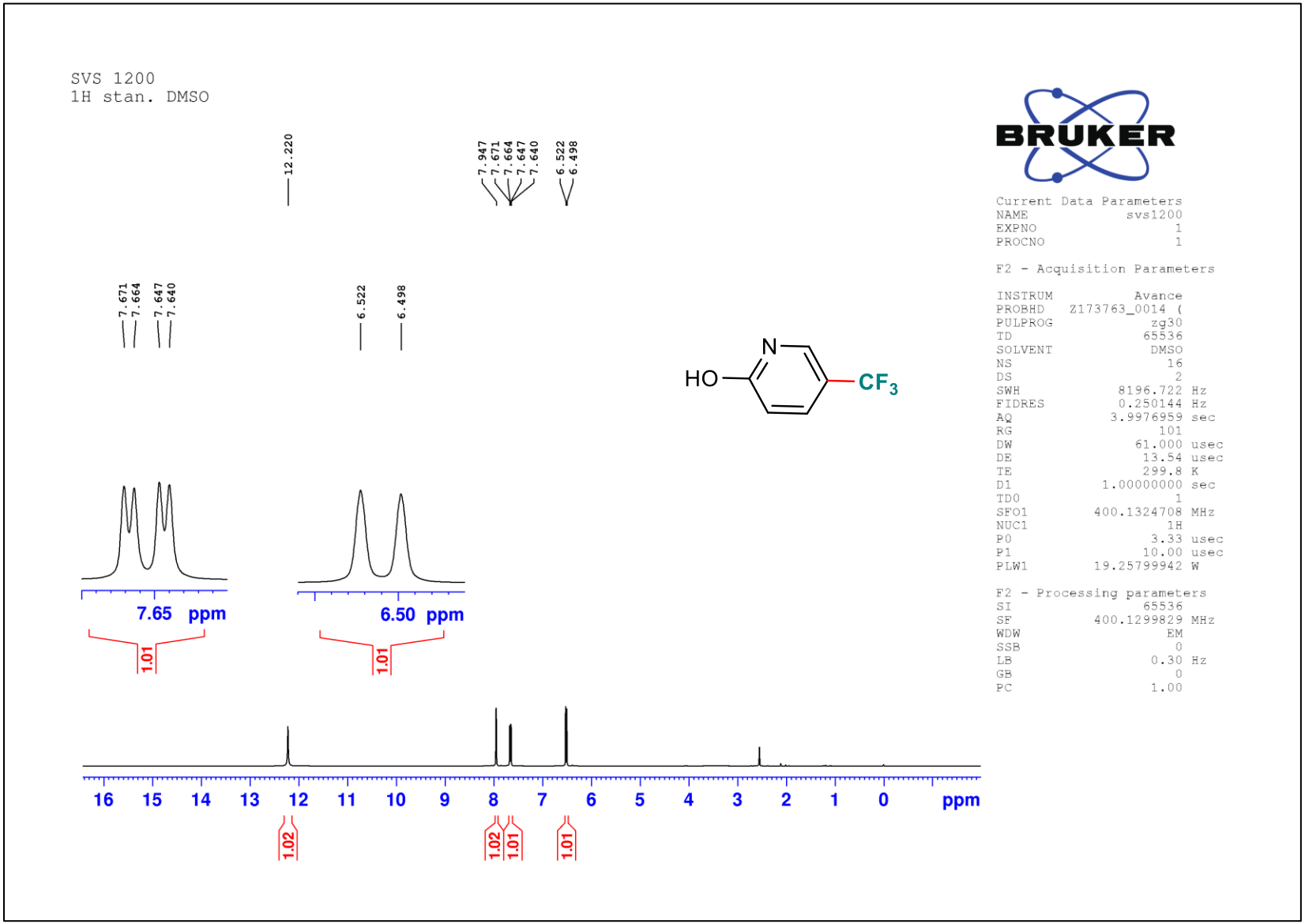
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7208960 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	299.4 K
D1	1.00000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
PLW1	36.00000000 W

F2 - Processing parameters

SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{1}H NMR of Compound **2o**



Current Data Parameters

NAME	svs1200
EXPNO	1
PROCNO	1

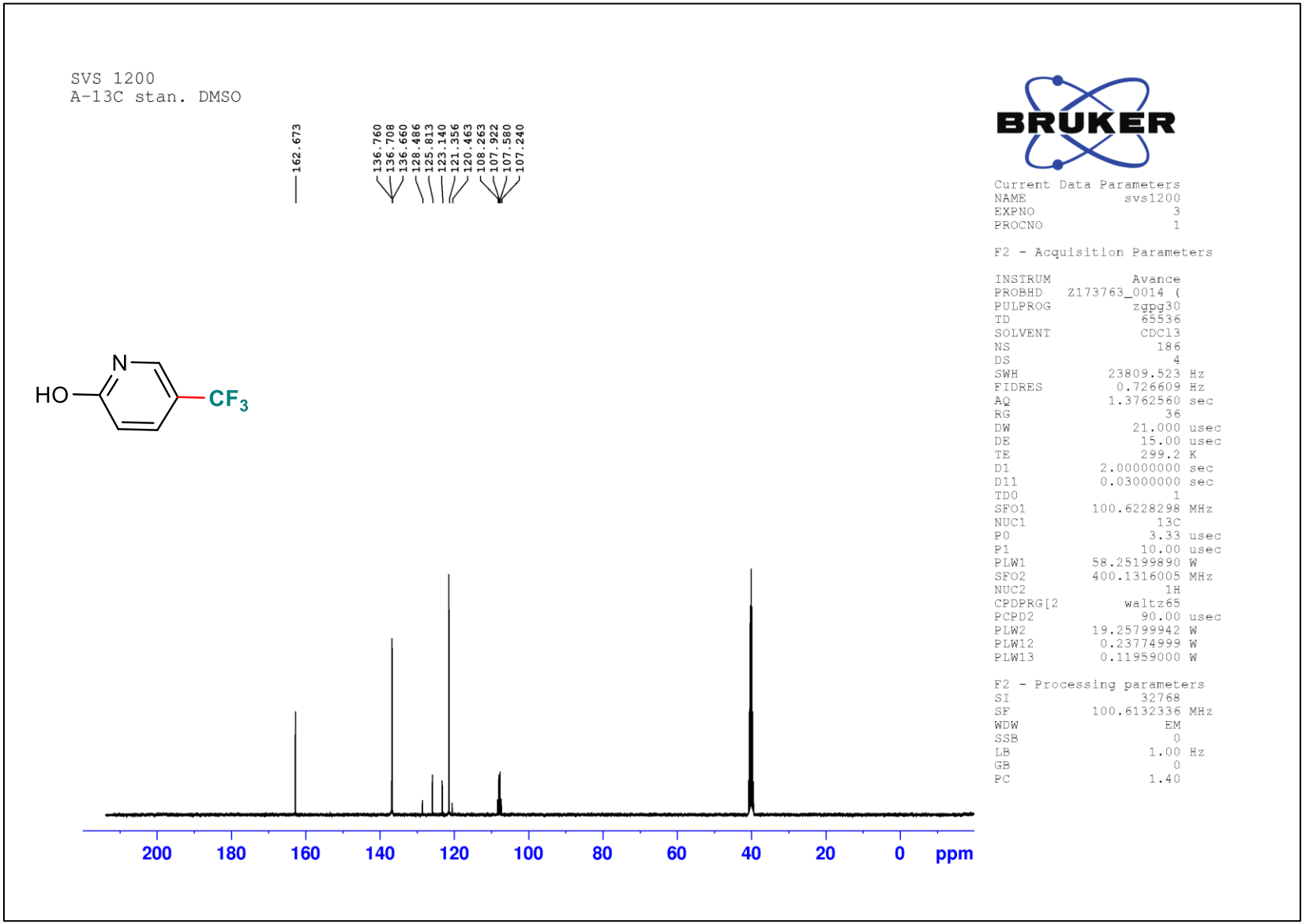
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	299.8 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

F2 - Processing parameters

SI	65536
SF	400.1299829 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **2o**



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Current Data Parameters
NAME svs1200
EXPNO 3
PROCNO 1

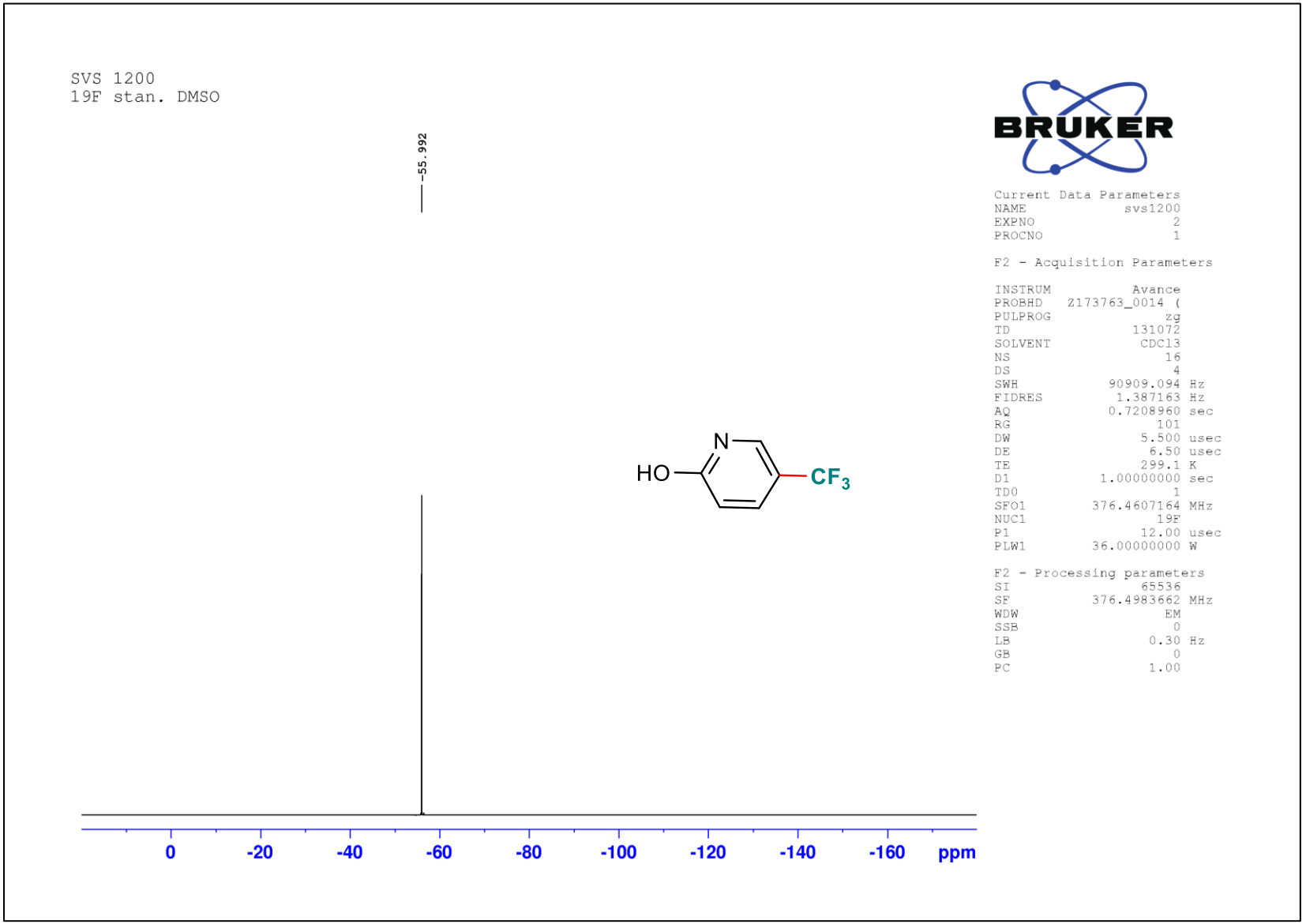
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	186
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	36
DW	21.000 usec
DE	15.00 usec
TE	299.2 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

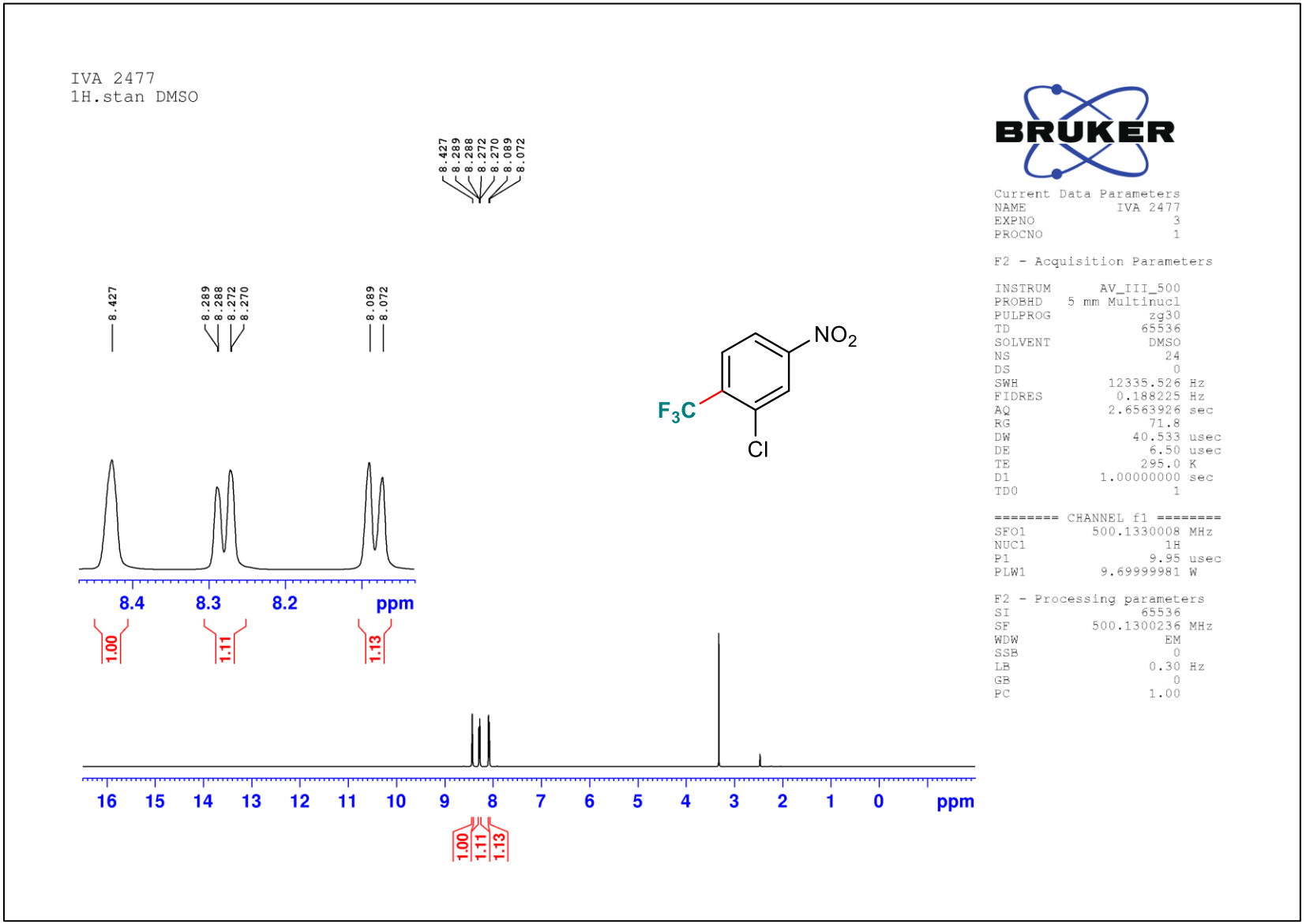
F2 - Processing parameters

SI	32768
SF	100.6132336 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

^{19}F NMR of Compound **2o**



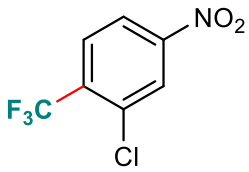
^{1}H NMR of Compound **2p**

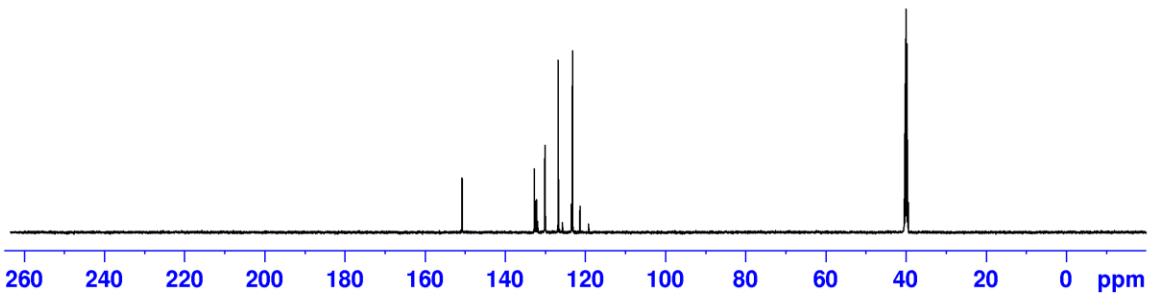


^{13}C NMR of Compound **2p**

IVA 2477
A-13C.stan DMSO

150.731
132.713
132.608
132.356
132.105
131.853
130.058
130.017
126.741
125.658
123.481
123.167
121.304
119.126





Current Data Parameters
NAME IVA 2477
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters

INSTRUM	AV_III_500
PROBHD	5 mm Multinucl
PULPROG	zgpg30
TD	65536
SOLVENT	DMSO
NS	512
DS	0
SWH	36057.691 Hz
FIDRES	0.550197 Hz
AQ	0.9087659 sec
RG	2050
DW	13.867 usec
DE	6.50 usec
TE	295.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1

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

SFO1	125.7728788 MHz
NUC1	13C
P1	11.00 usec
PLW1	160.00000000 W

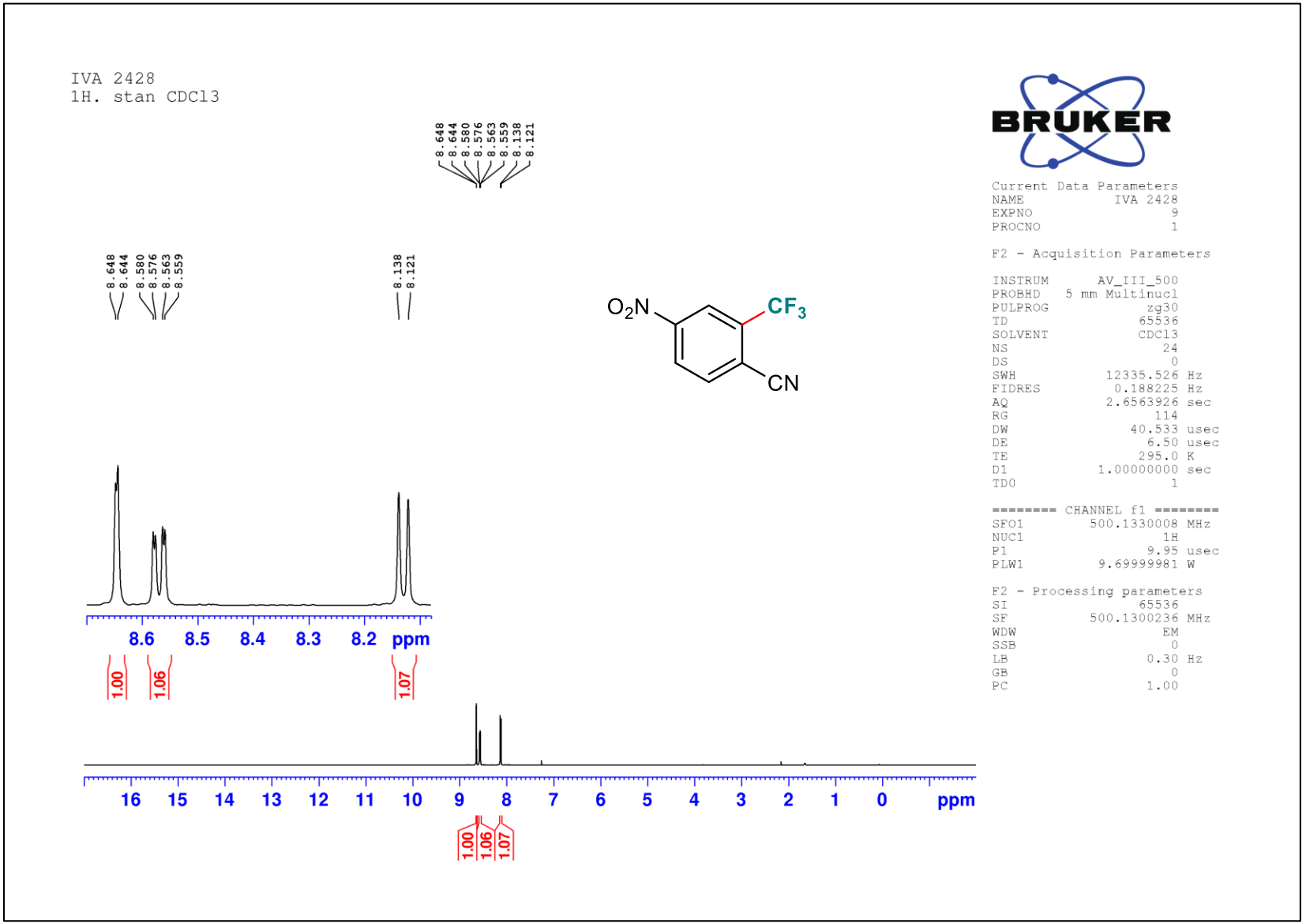
======== CHANNEL f2 ========

SFO2	500.1324005 MHz
NUC2	1H
CPDPRG[2	waltz16
PCPD2	100.00 usec
PLW2	10.00000000 W
PLW12	0.09900300 W
PLW13	0.09900300 W

F2 - Processing parameters

SI	32768
SF	125.7577890 MHz
WDW	EM
SSB	0
LB	2.00 Hz
GB	0
PC	1.40

^{1}H NMR of Compound **2q**



Current Data Parameters
NAME IVA 2428
EXPNO 9
PROCNO 1

F2 - Acquisition Parameters

INSTRUM	AV_III_500
PROBHD	5 mm Multinucl
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	24
DS	0
SWH	12335.526 Hz
FIDRES	0.188225 Hz
AQ	2.6563926 sec
RG	114
DW	40.533 usec
DE	6.50 usec
TE	295.0 K
D1	1.00000000 sec
TD0	1

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

SFO1	500.1330008 MHz
NUC1	1H
P1	9.95 usec
PLW1	9.69999981 W

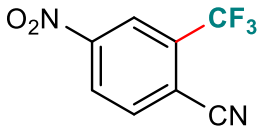
F2 - Processing parameters

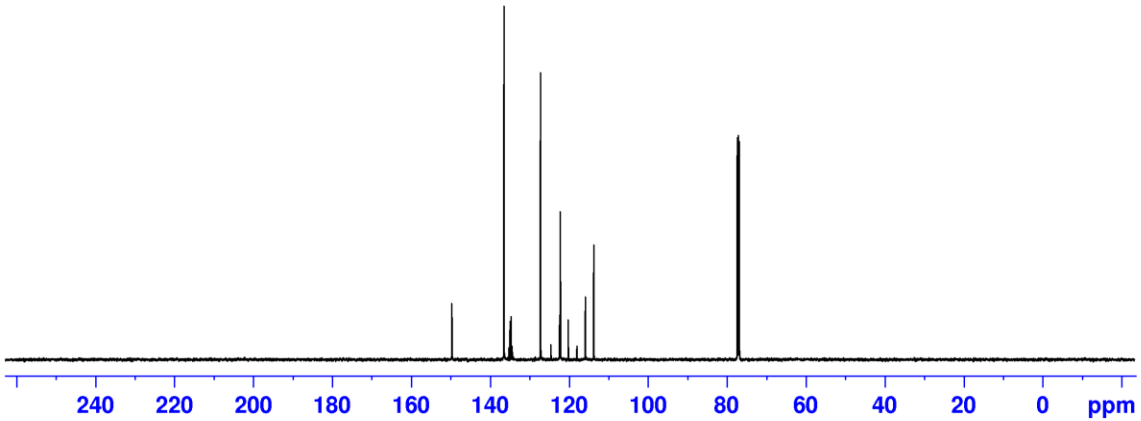
SI	65536
SF	500.1300236 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **2q**

IVA 2428
A-13C. stan CDCl3

149.658
136.471
135.191
134.916
134.643
134.370
127.200
124.545
122.359
122.259
122.221
122.183
122.147
120.177
117.992
115.836
113.687





Current Data Parameters
NAME IVA 2428
EXPNO 10
PROCNO 1

F2 - Acquisition Parameters

INSTRUM	AV_III_500
PROBHD	5 mm Multinucl
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1024
DS	0
SWH	36057.691 Hz
FIDRES	0.550197 Hz
AQ	0.9087659 sec
RG	2050
DW	13.867 usec
DE	6.50 usec
TE	295.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	2

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

SFO1	125.7728788 MHz
NUC1	13C
P1	11.00 usec
PLW1	160.00000000 W

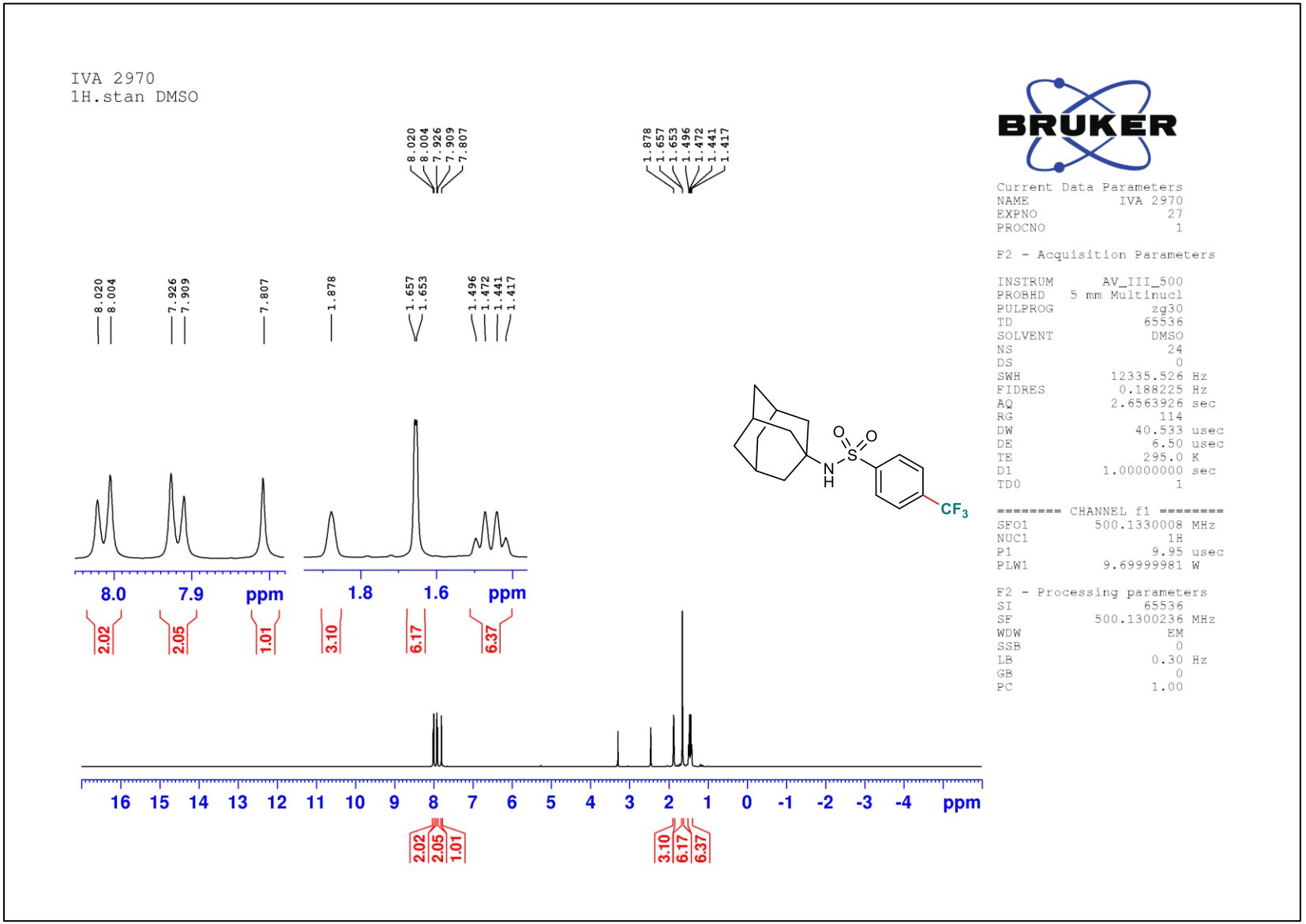
======== CHANNEL f2 ========

SFO2	500.1324005 MHz
NUC2	1H
CPDPRG[2	waltz16
PCPD2	100.00 usec
PLW2	10.00000000 W
PLW12	0.09900300 W
PLW13	0.09900300 W

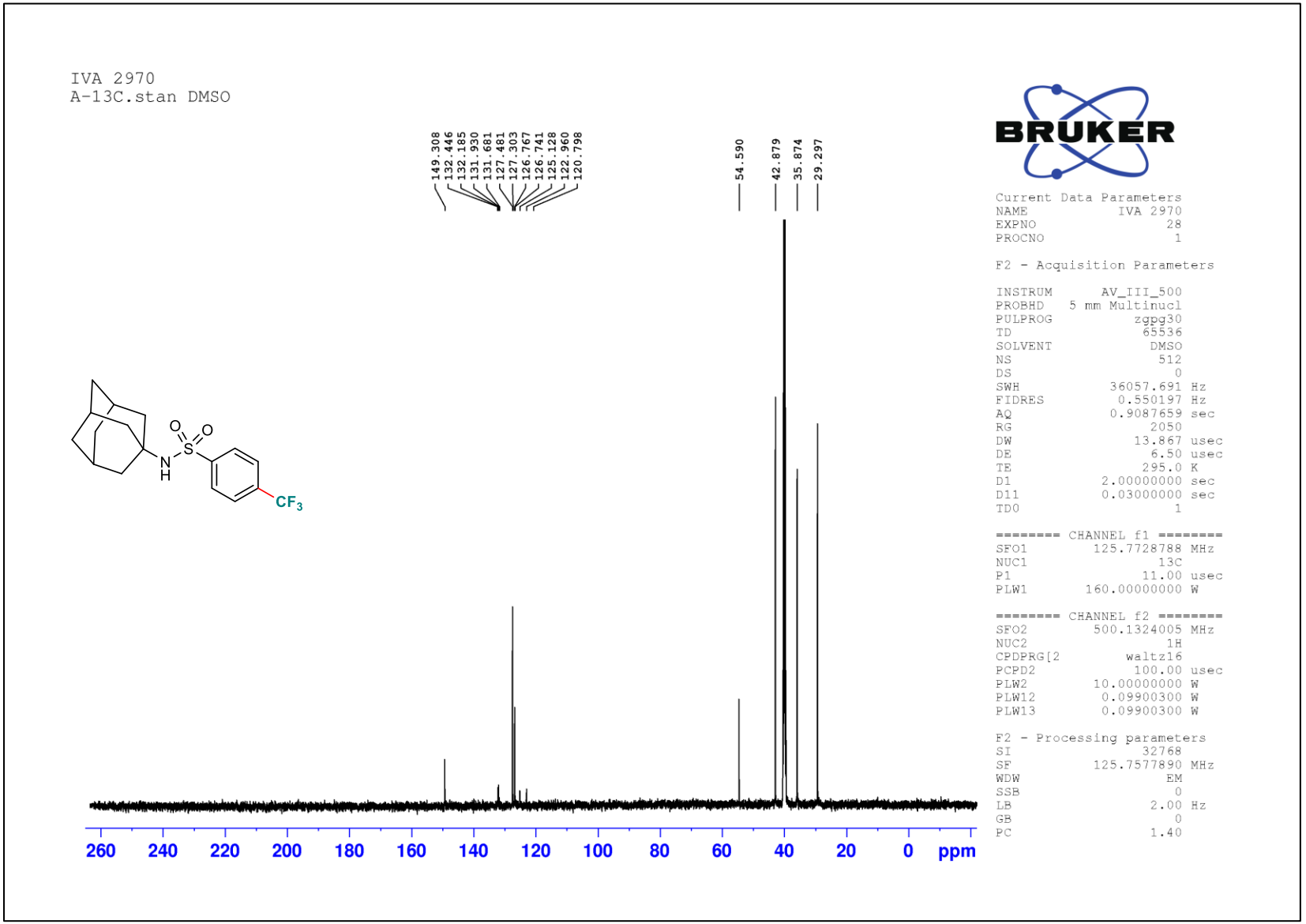
F2 - Processing parameters

SI	32768
SF	125.7577890 MHz
WDW	EM
SSB	0
LB	2.00 Hz
GB	0
PC	1.40

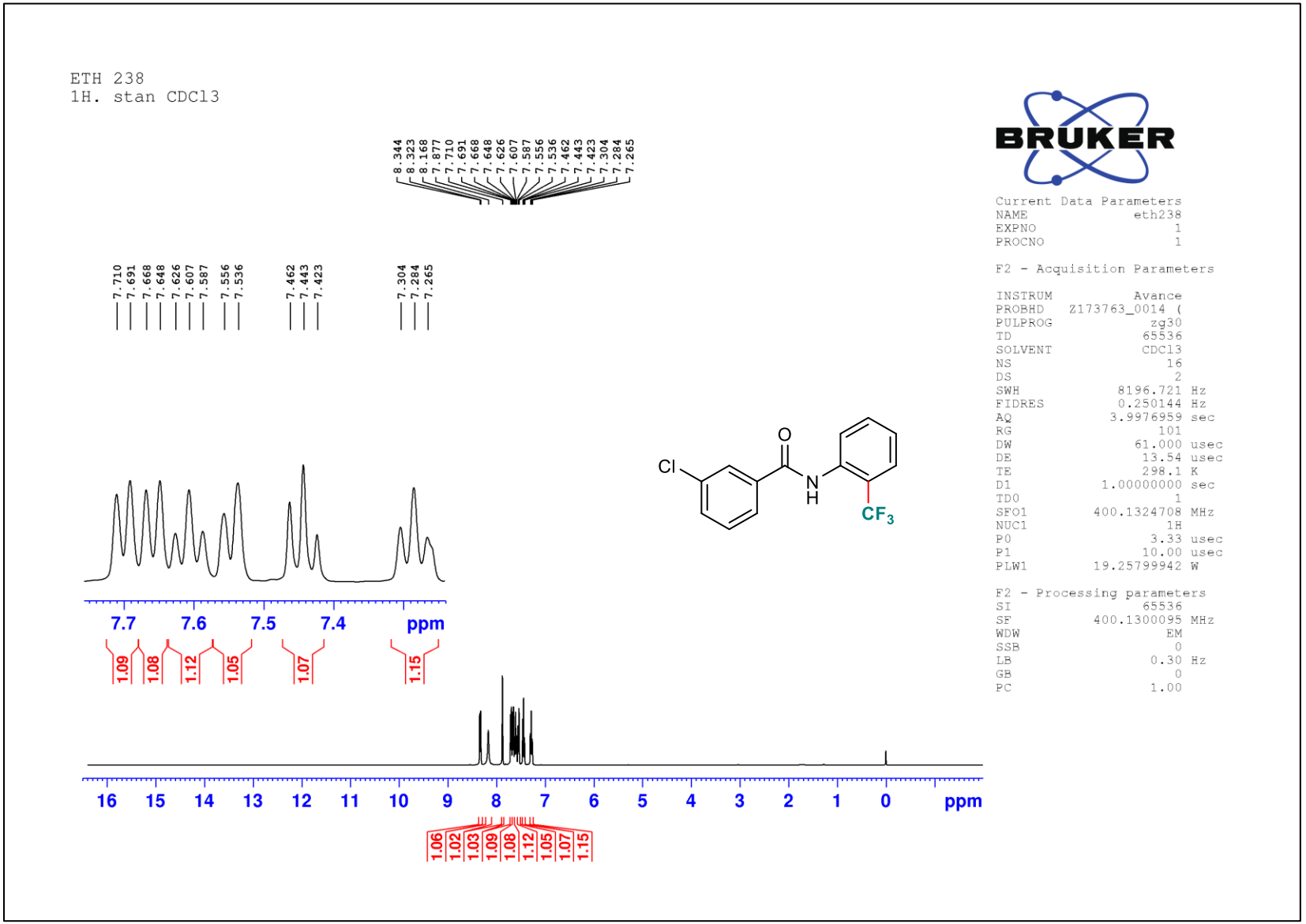
^{1}H NMR of Compound **2r**



^{13}C NMR of Compound **2r**



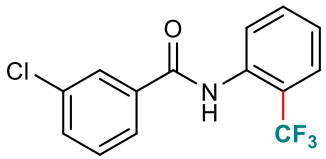
^{1}H NMR of Compound **2s**

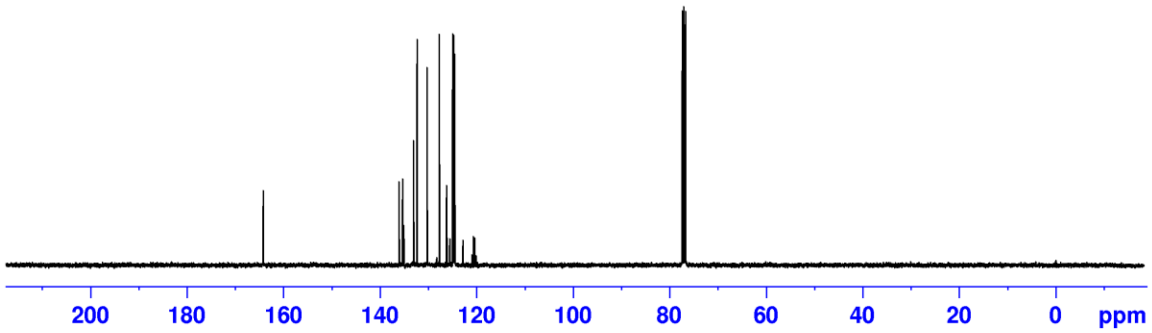


^{13}C NMR of Compound **2s**

ETH 238
A-13C. stan CDCl3

164.214
136.062
135.324
135.082
133.062
132.350
130.259
128.260
127.713
126.297
126.243
126.191
126.139
125.546
124.940
124.738
124.535
122.832
120.954
120.659
120.364
120.118
120.072





Current Data Parameters
NAME eth238
EXPNO 2
PROCNO 1

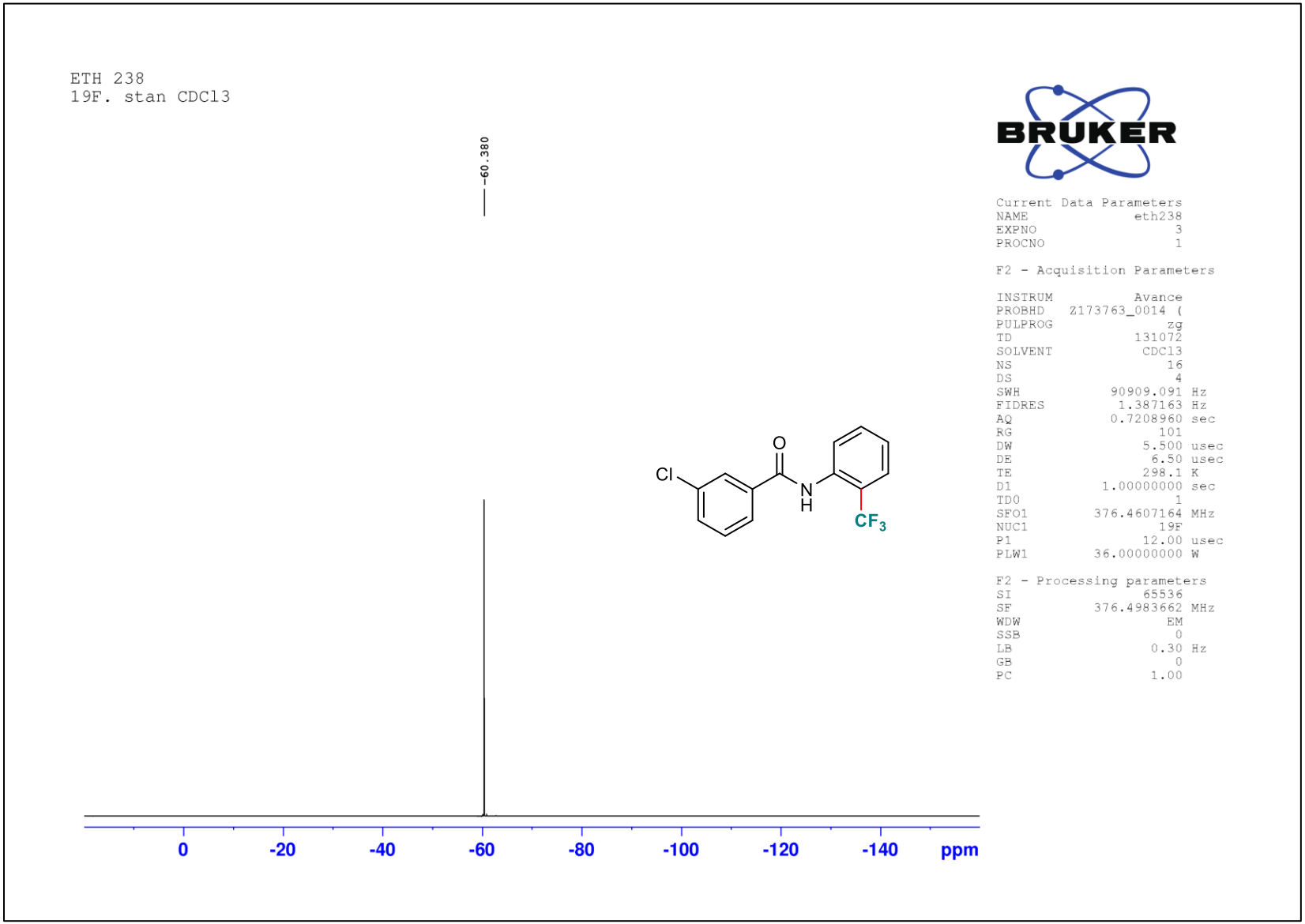
F2 - Acquisition Parameters

INSTRUM	Avance	
PROBHD	Z173763_0014 (	
PULPROG	zgpg30	
TD	65536	
SOLVENT	CDCl3	
NS	186	
DS	4	
SWH	23809.523	Hz
FIDRES	0.726609	Hz
AQ	1.3762560	sec
RG	36	
DW	21.000	usec
DE	15.00	usec
TE	299.2	K
D1	2.00000000	sec
D11	0.03000000	sec
TD0	1	
SFO1	100.6228298	MHz
NUC1	13C	
P0	3.33	usec
P1	10.00	usec
PLW1	58.25199890	W
SFO2	400.1316005	MHz
NUC2	1H	
CPDPRG[2	waltz65	
PCPD2	90.00	usec
PLW2	19.25799942	W
PLW12	0.23774999	W
PLW13	0.11959000	W

F2 - Processing parameters

SI	32768	
SF	100.6127685	MHz
WDW	EM	
SSB	0	
LB	1.00	Hz
GB	0	
PC	1.40	

^{19}F NMR of Compound **2s**



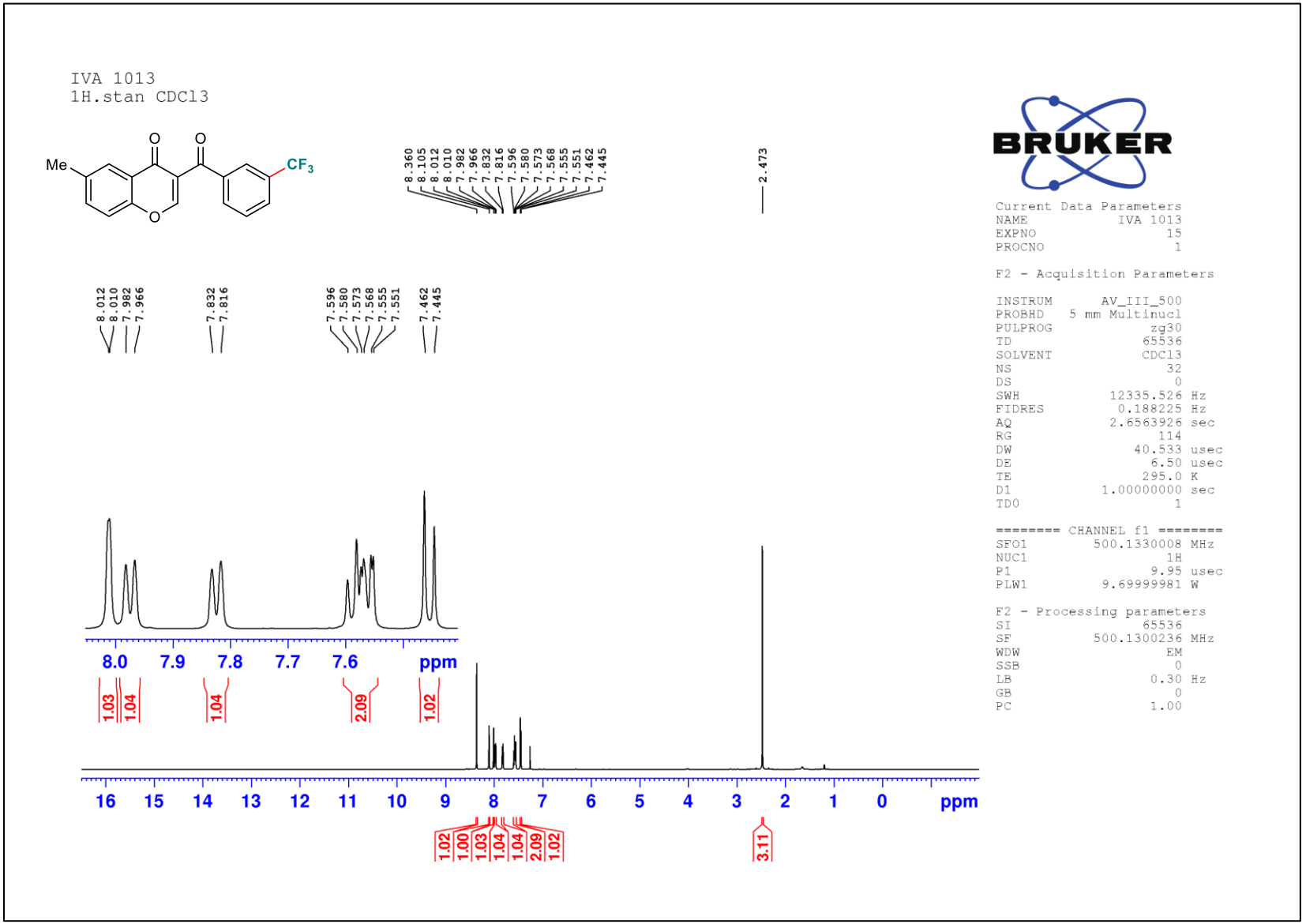

```
Current Data Parameters
NAME                 eth238
EXPNO                     3
PROCNO                    1

F2 - Acquisition Parameters

INSTRUM                Avance
PROBHD    Z173763_0014 (
PULPROG                   zg
TD                    131072
SOLVENT                CDCl3
NS                        16
DS                         4
SWH                90909.091 Hz
FIDRES              1.387163 Hz
AQ                  0.7208960 sec
RG                      101
DW                    5.500 usec
DE                    6.50 usec
TE                    298.1 K
D1                1.00000000 sec
TD0                       1
SFO1              376.4607164 MHz
NUC1                     19F
P1                   12.00 usec
PLW1             36.00000000 W

F2 - Processing parameters
SI                        65536
SF                376.4983662 MHz
WDW                       EM
SSB                        0
LB                    0.30 Hz
GB                         0
PC                    1.00
```

^{1}H NMR of Compound **2t**



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```
Current Data Parameters
NAME                  IVA 1013
EXPNO                       15
PROCNO                       1

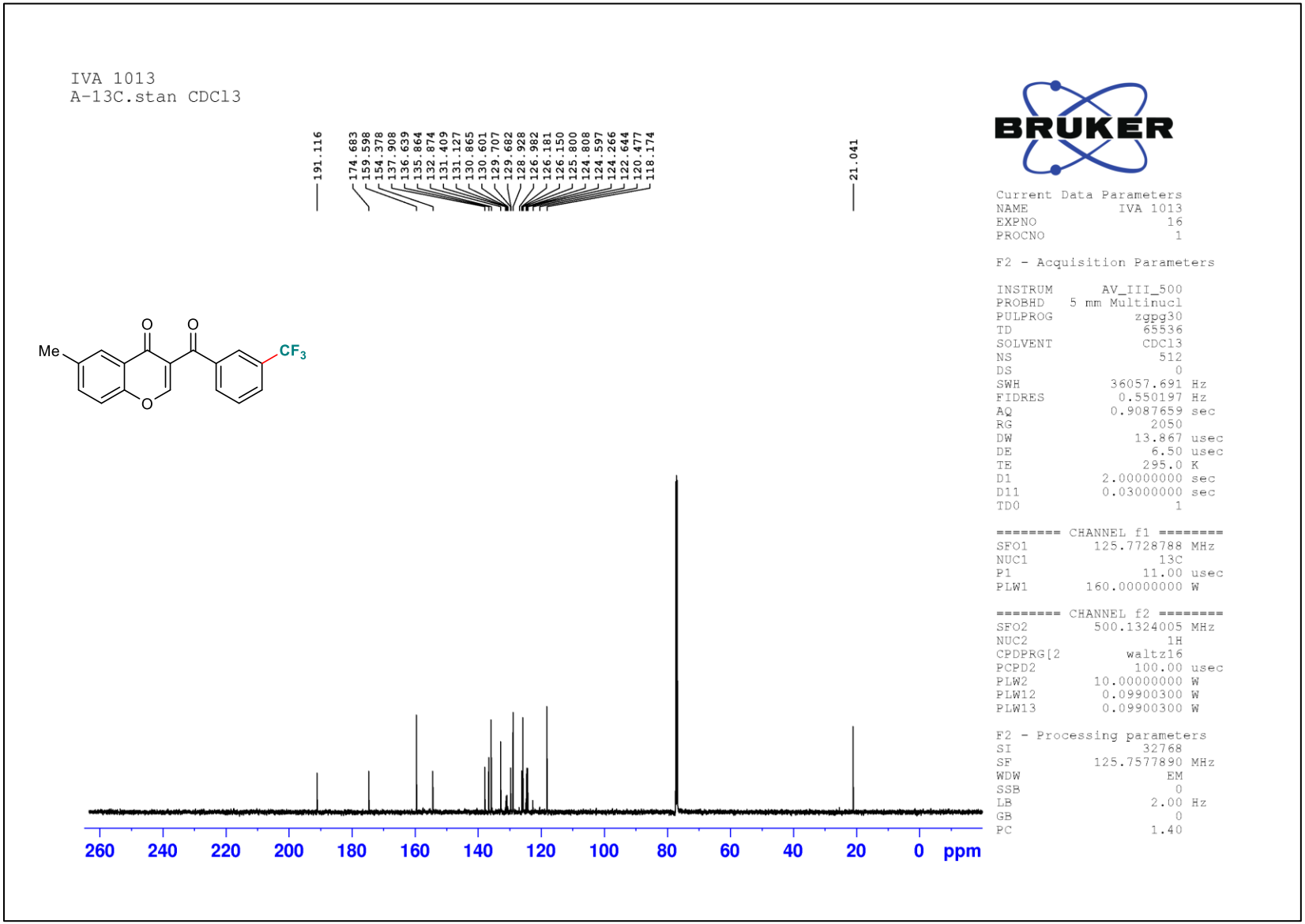
F2 - Acquisition Parameters

INSTRUM              AV_III_500
PROBHD    5 mm Multinucl
PULPROG                   zg30
TD                       65536
SOLVENT                  CDCl3
NS                          32
DS                           0
SWH                  12335.526 Hz
FIDRES                0.188225 Hz
AQ                    2.6563926 sec
RG                          114
DW                       40.533 usec
DE                        6.50 usec
TE                       295.0 K
D1                    1.00000000 sec
TD0                          1

======== CHANNEL f1 ========
SFO1                500.1330008 MHz
NUC1                        1H
P1                        9.95 usec
PLW1                 9.69999981 W

F2 - Processing parameters
SI                       65536
SF                  500.1300236 MHz
WDW                         EM
SSB                          0
LB                        0.30 Hz
GB                           0
PC                        1.00
```

^{13}C NMR of Compound **2t**




```
Current Data Parameters
NAME                  IVA 1013
EXPNO                       16
PROCNO                       1

F2 - Acquisition Parameters

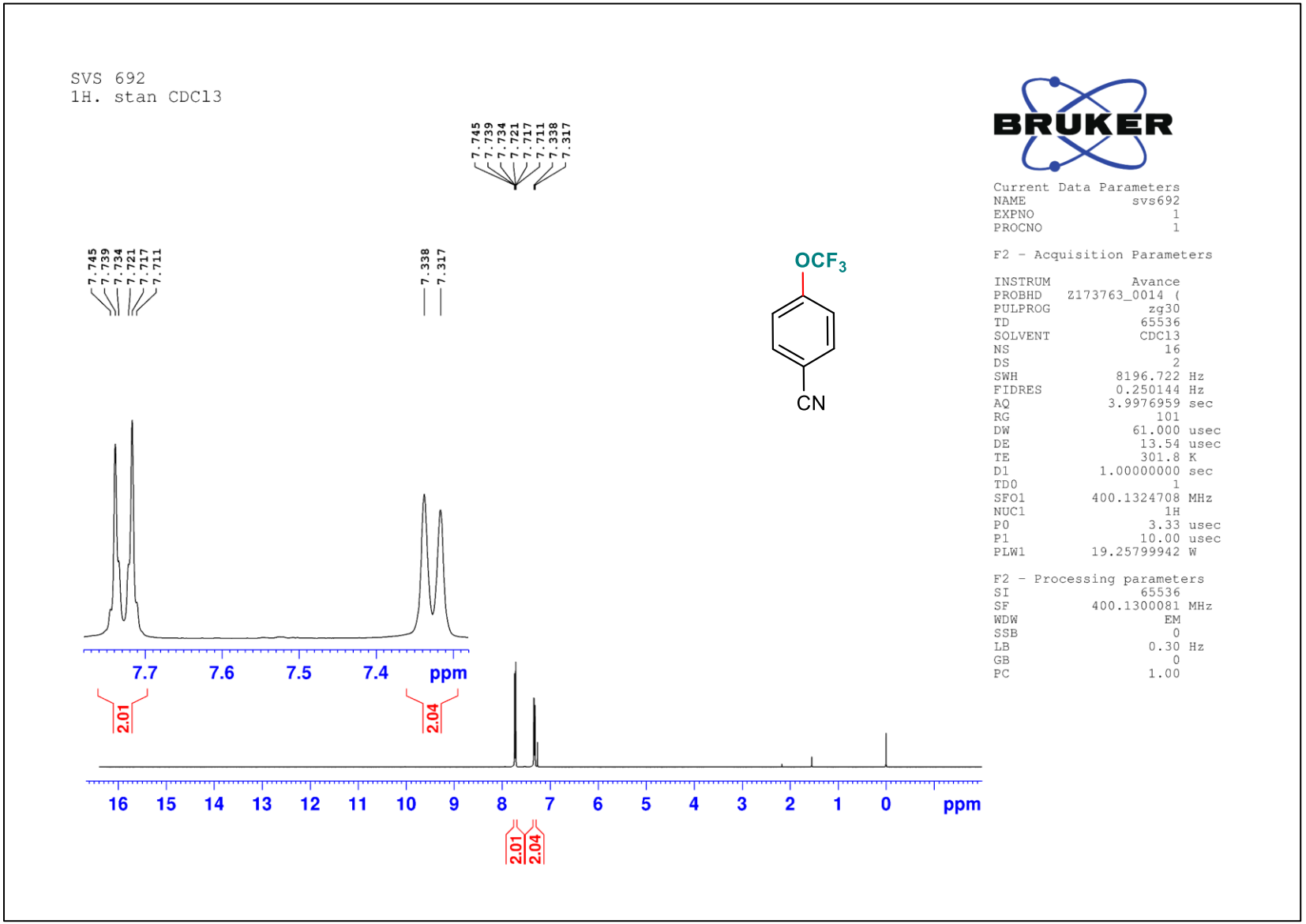
INSTRUM             AV_III_500
PROBHD    5 mm Multinucl
PULPROG                zgpg30
TD                          65536
SOLVENT                   CDCl3
NS                            512
DS                              0
SWH                  36057.691 Hz
FIDRES                0.550197 Hz
AQ                    0.9087659 sec
RG                         2050
DW                       13.867 usec
DE                        6.50 usec
TE                       295.0 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                             1

======== CHANNEL f1 ========
SFO1                125.7728788 MHz
NUC1                        13C
P1                       11.00 usec
PLW1               160.00000000 W

======== CHANNEL f2 ========
SFO2                500.1324005 MHz
NUC2                        1H
CPDPRG[2                waltz16
PCPD2                    100.00 usec
PLW2                10.00000000 W
PLW12                0.09900300 W
PLW13                0.09900300 W

F2 - Processing parameters
SI                          32768
SF                  125.7577890 MHz
WDW                            EM
SSB                             0
LB                        2.00 Hz
GB                              0
PC                        1.40
```

^{1}H NMR of Compound **4a**



Current Data Parameters

NAME	svs692
EXPNO	1
PROCNO	1

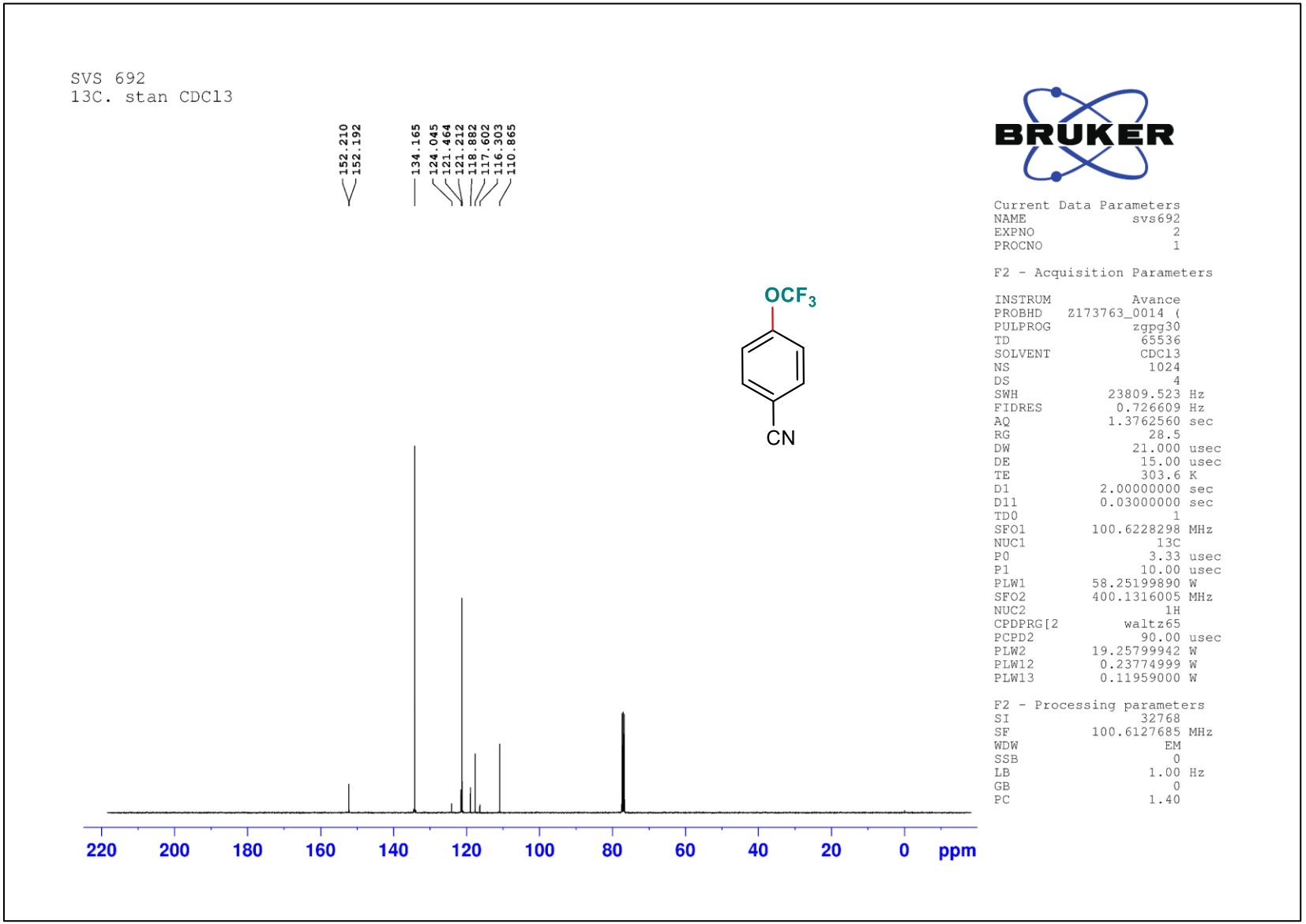
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	301.8 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

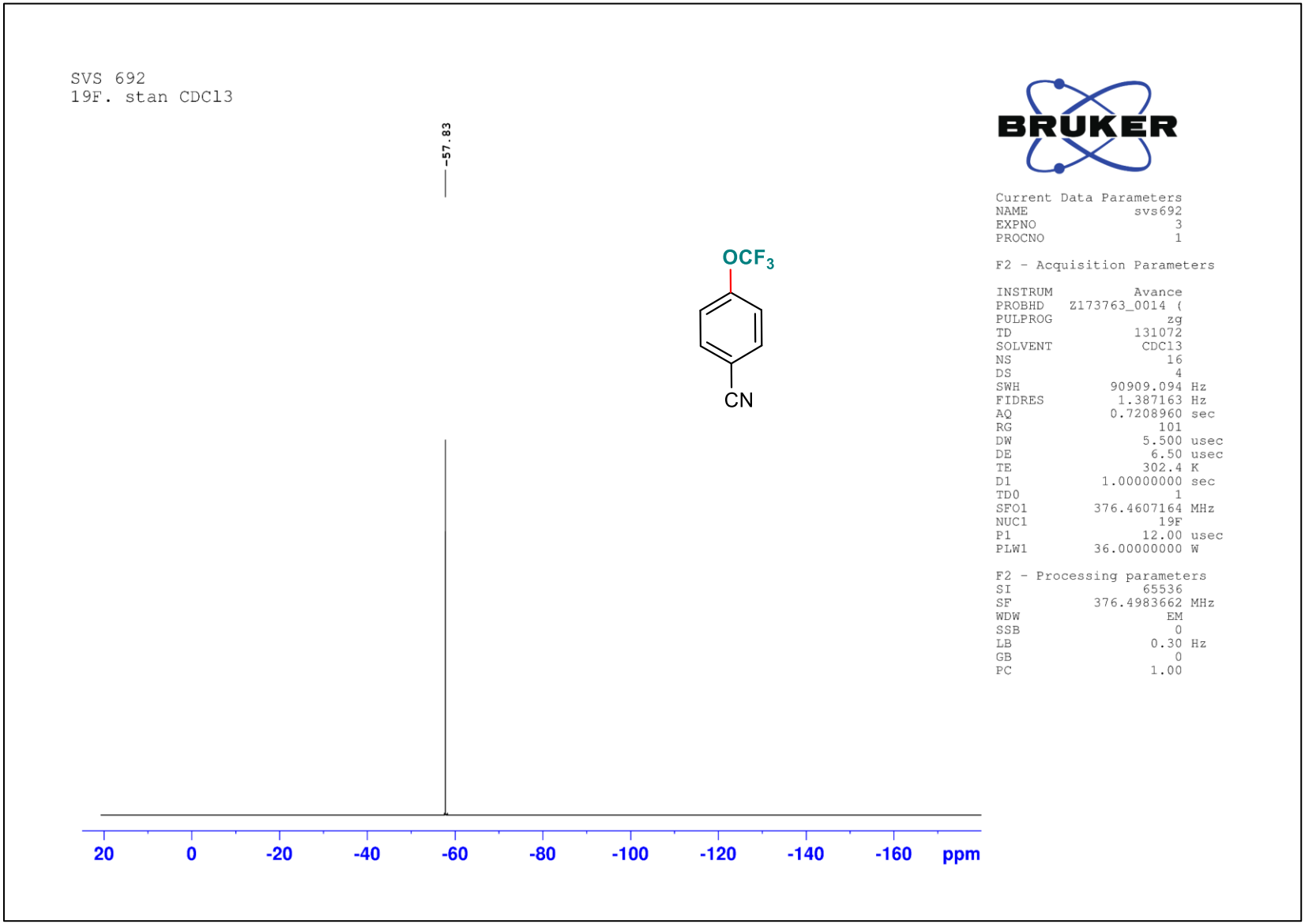
F2 - Processing parameters

SI	65536
SF	400.1300081 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

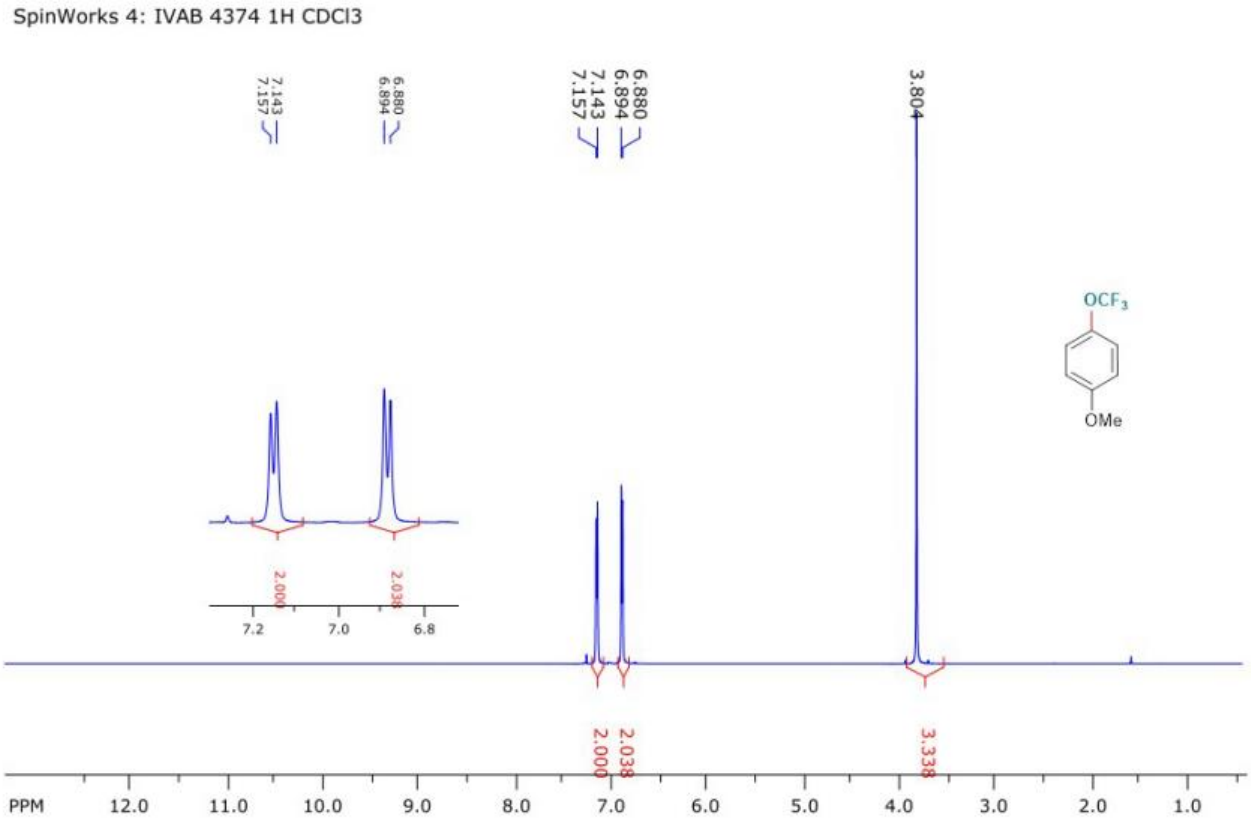
^{13}C NMR of Compound **4a**



^{19}F NMR of Compound **4a**

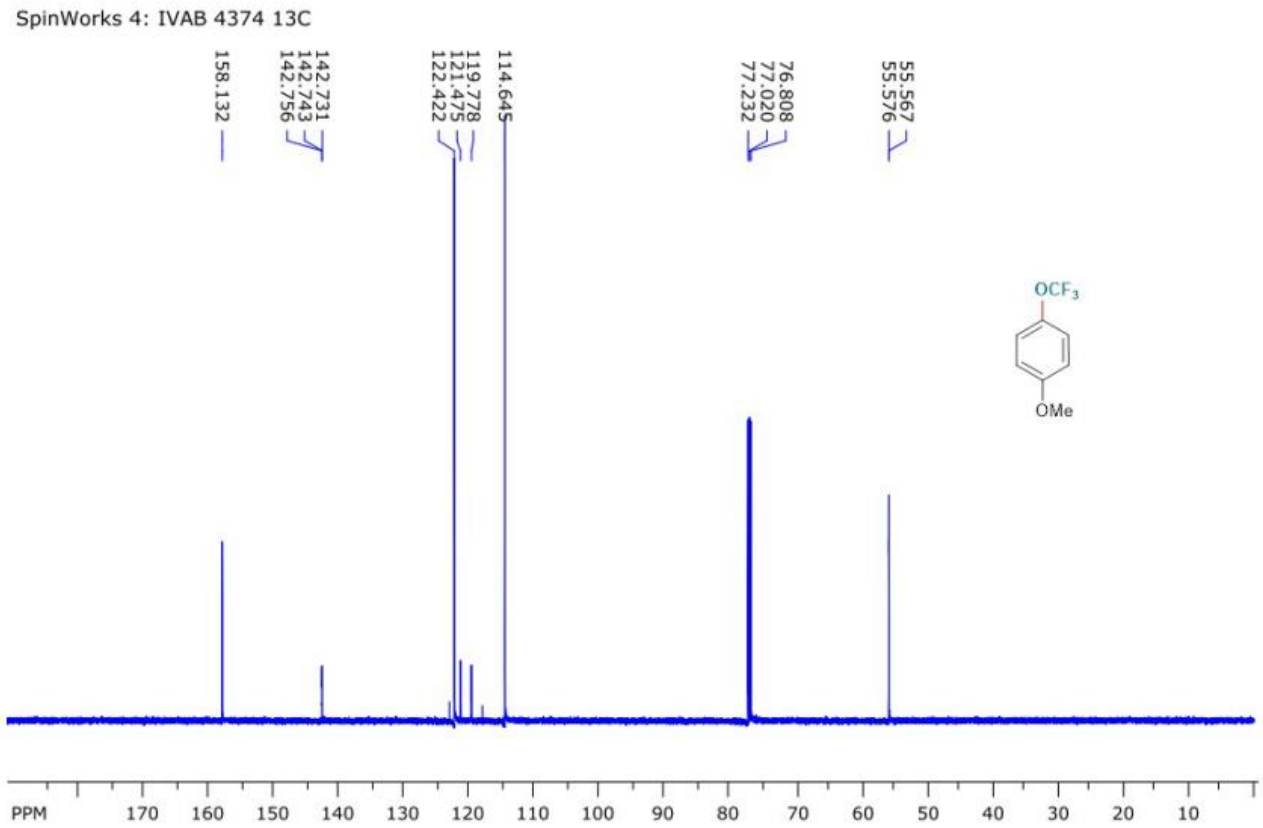


^{1}H NMR of Compound **4b**



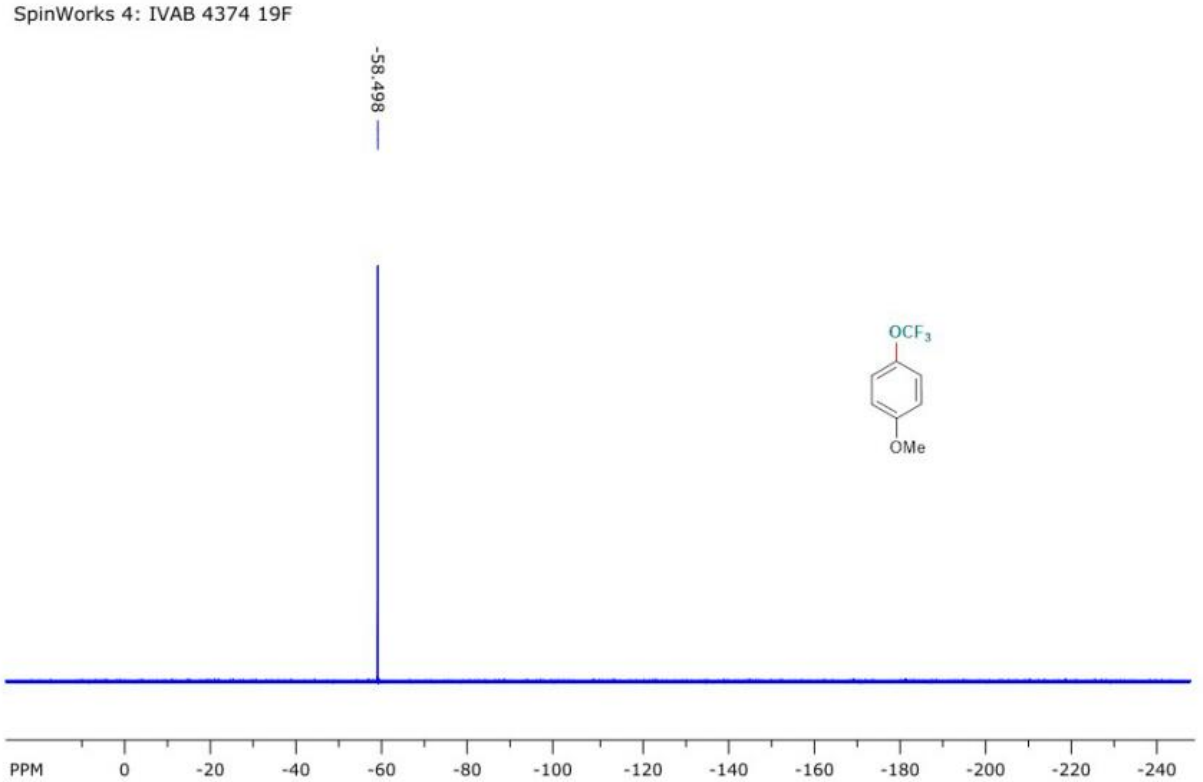
file: ...0418_01\ivab4374-PROTON_01.fid\fid block# 1 expt: "s2pul" freq. of 0 ppm: 599.766672 MHz
transmitter freq.: 599.770272 MHz processed size: 32768 complex points
time domain size: 57692 points LB: 1.500 GF: 0.0000
width: 9615.38 Hz = 16.0318 ppm = 0.166668 Hz/pt Hz/cm: 310.585 ppm/cm: 0.51784
number of scans: 16

^{13}C NMR of Compound **4b**

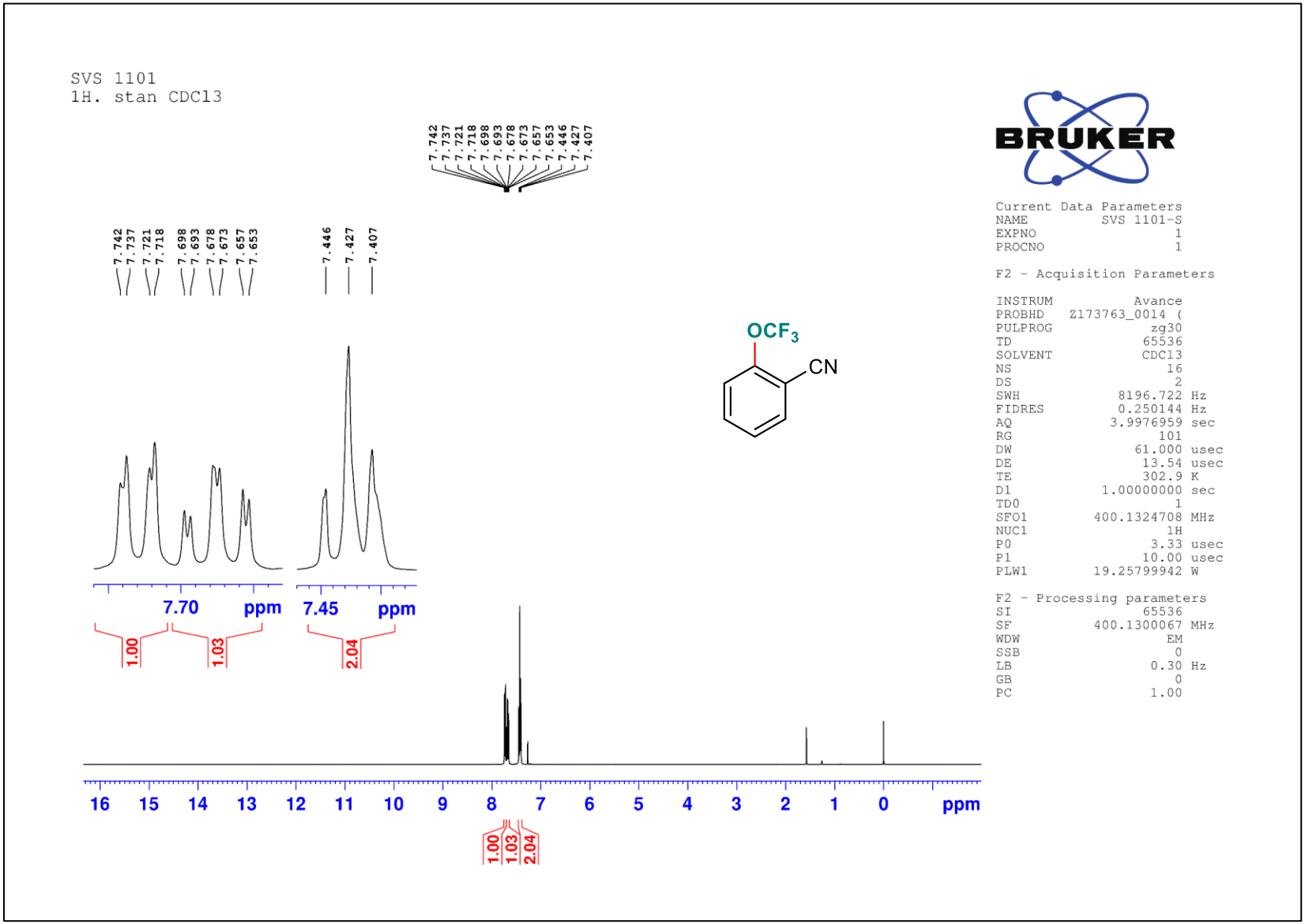


file: ...0418_01\ivab4374-CARBON_01.fid\fid block# 1 expt: "s2pul" freq. of 0 ppm: 150.811442 MHz
transmitter freq.: 150.828039 MHz processed size: 65536 complex points
time domain size: 65536 points LB: 0.500 GF: 0.0000
width: 37878.79 Hz = 251.1389 ppm = 0.577984 Hz/pt Hz/cm: 1156.476 ppm/cm: 7.66752
number of scans: 256

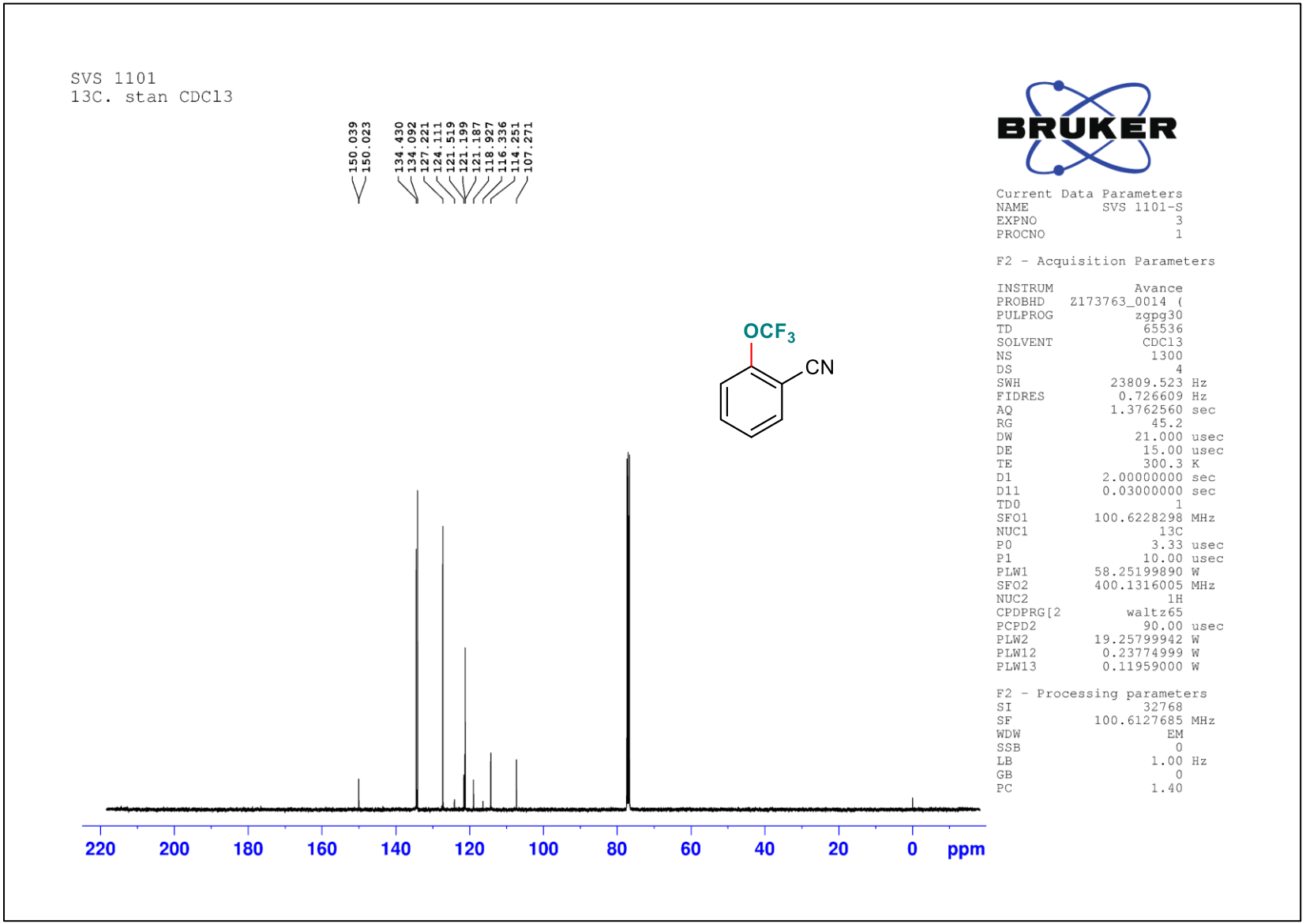
^{19}F NMR of Compound **4b**



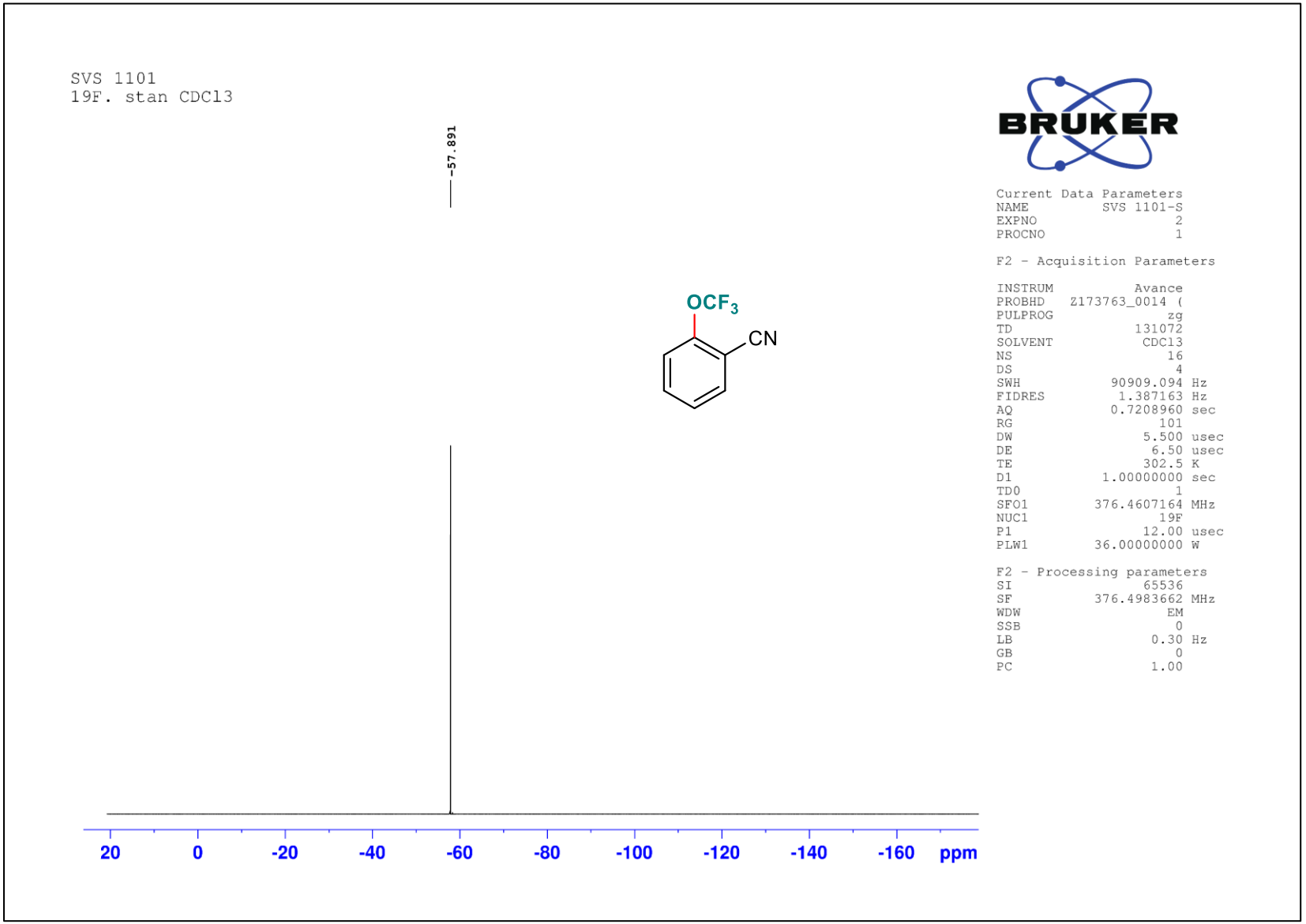
^{1}H NMR of Compound **4c**



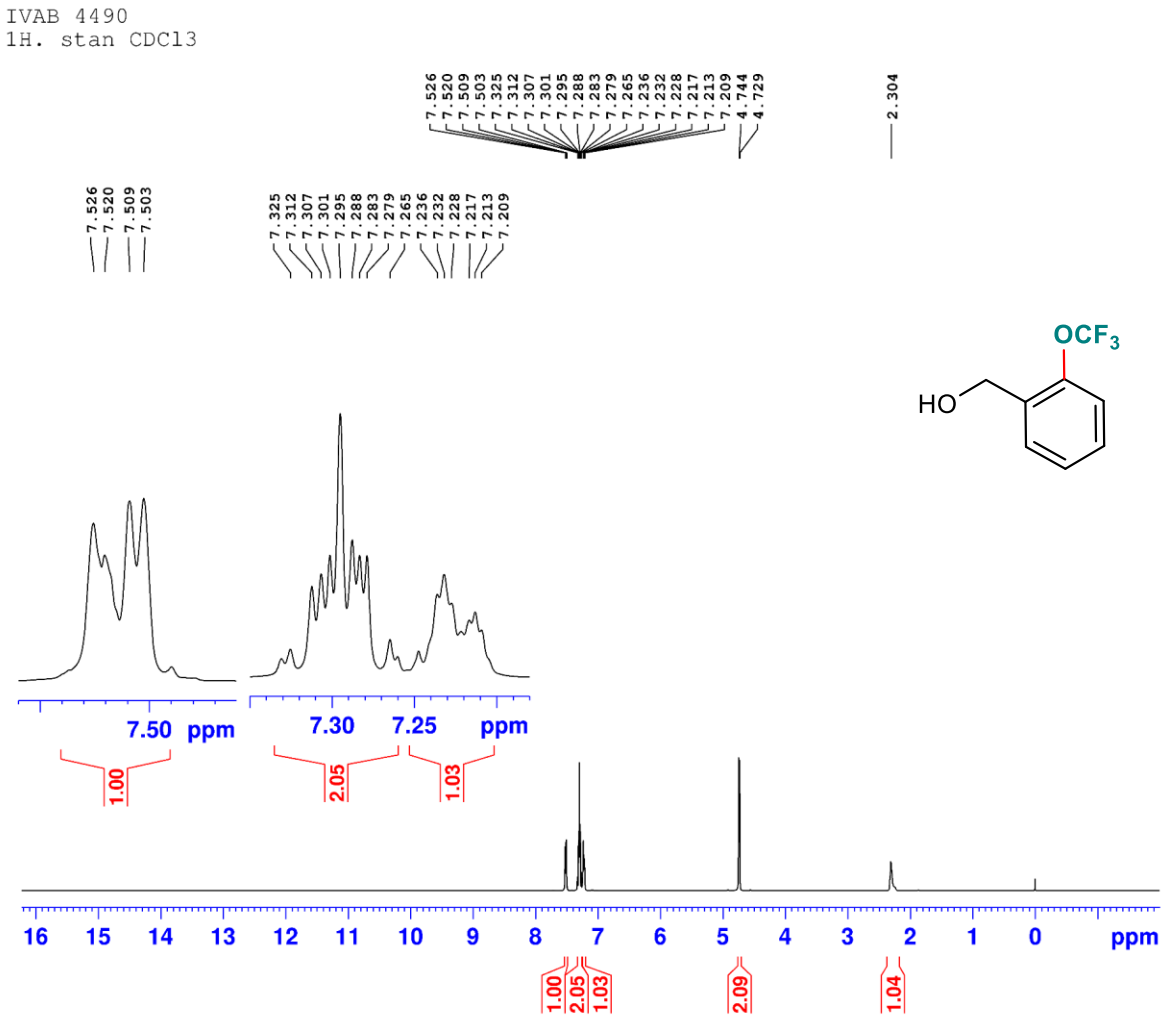
^{13}C NMR of Compound **4c**



^{19}F NMR of Compound **4c**



^{1}H NMR of Compound **4d**



BRUKER

```
Current Data Parameters
NAME            ivab4490
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters

INSTRUM             Avance
PROBHD    Z173763_0014 (
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8196.722 Hz
FIDRES           0.250144 Hz
AQ               3.9976959 sec
RG                    101
DW                 61.000 usec
DE                 13.54 usec
TE                 301.9 K
D1            1.00000000 sec
TD0                    1
SFO1          400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1          19.25799942 W

F2 - Processing parameters
SI                  65536
SF            400.1300136 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
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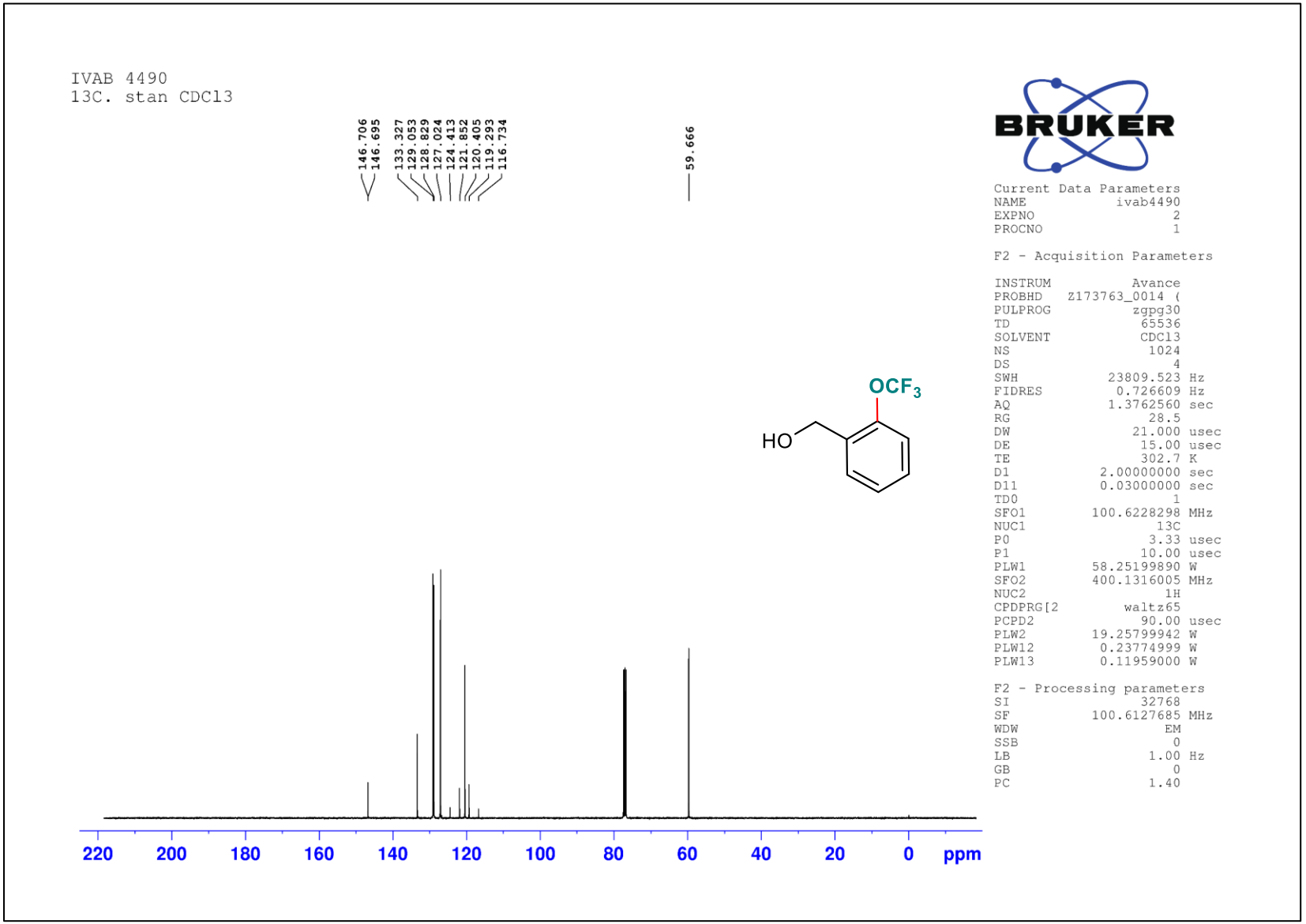
^{13}C NMR of Compound **4d**



Current Data Parameters

NAME	ivab4490
EXPNO	2
PROCNO	1

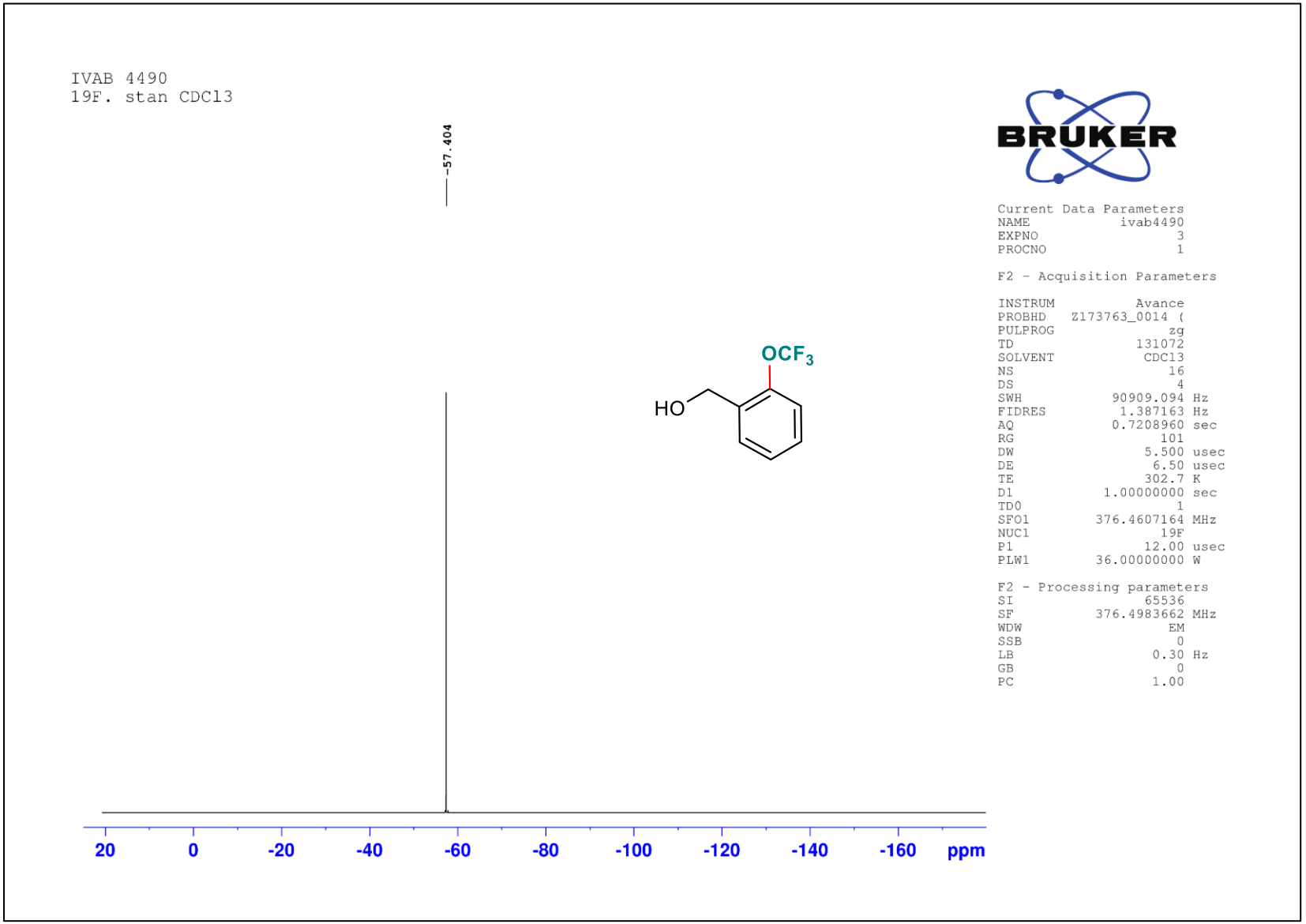
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1024
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	28.5
DW	21.000 usec
DE	15.00 usec
TE	302.7 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

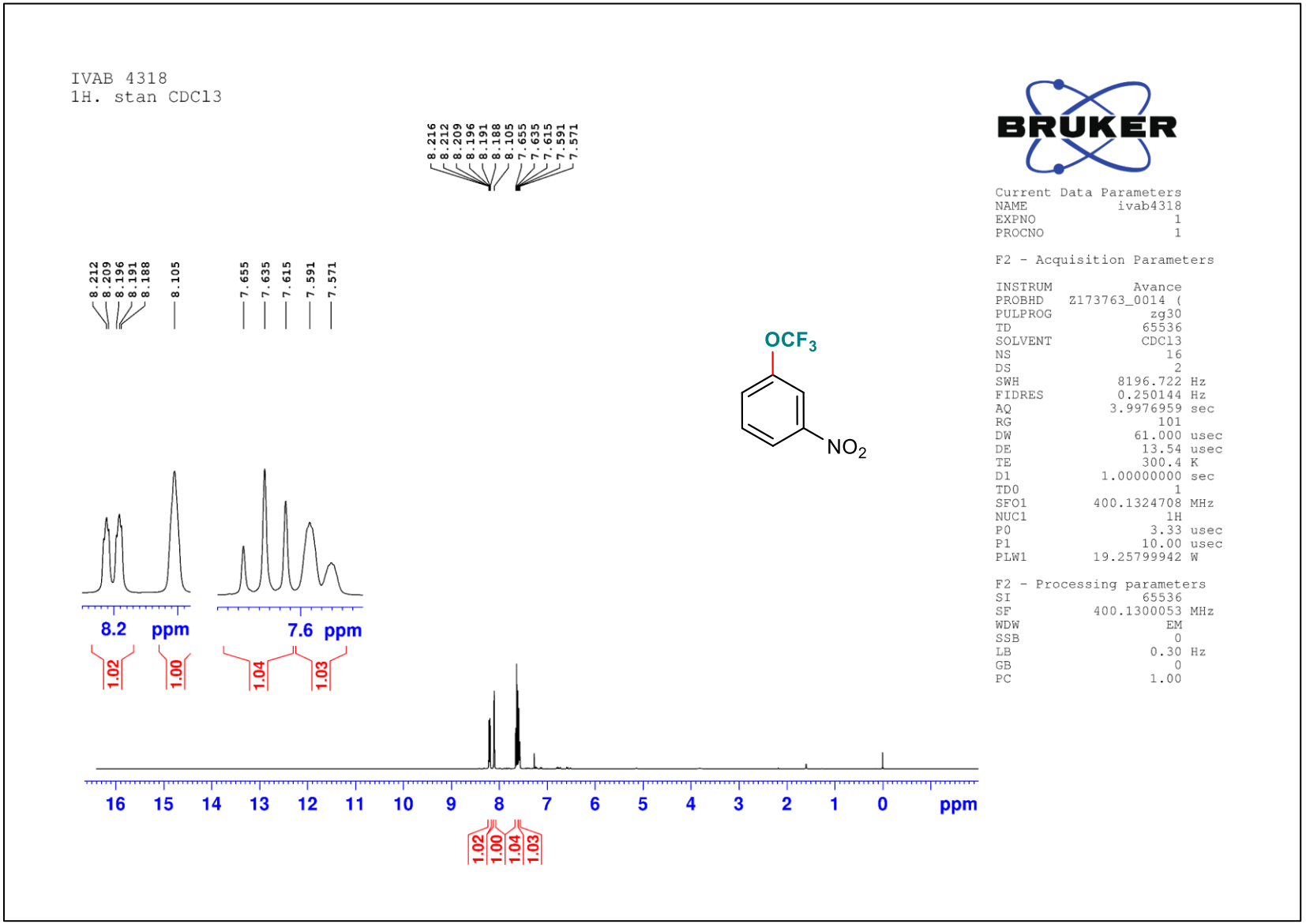
F2 - Processing parameters

SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

^{19}F NMR of Compound **4d**



^{1}H NMR of Compound **4e**



Current Data Parameters
NAME ivab4318
EXPNO 1
PROCNO 1

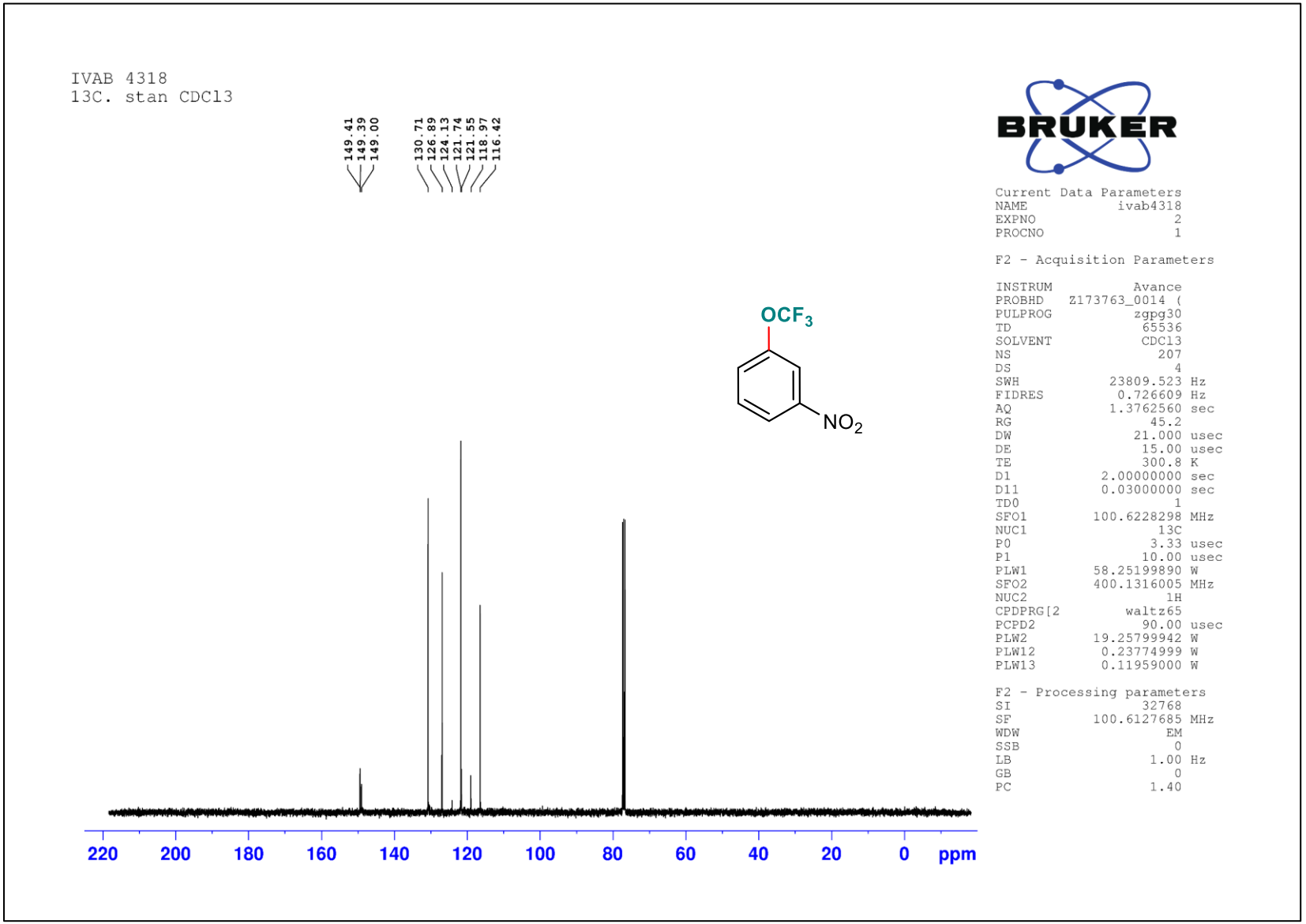
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	300.4 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

F2 - Processing parameters

SI	65536
SF	400.1300053 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **4e**



Current Data Parameters
NAME ivab4318
EXPNO 2
PROCNO 1

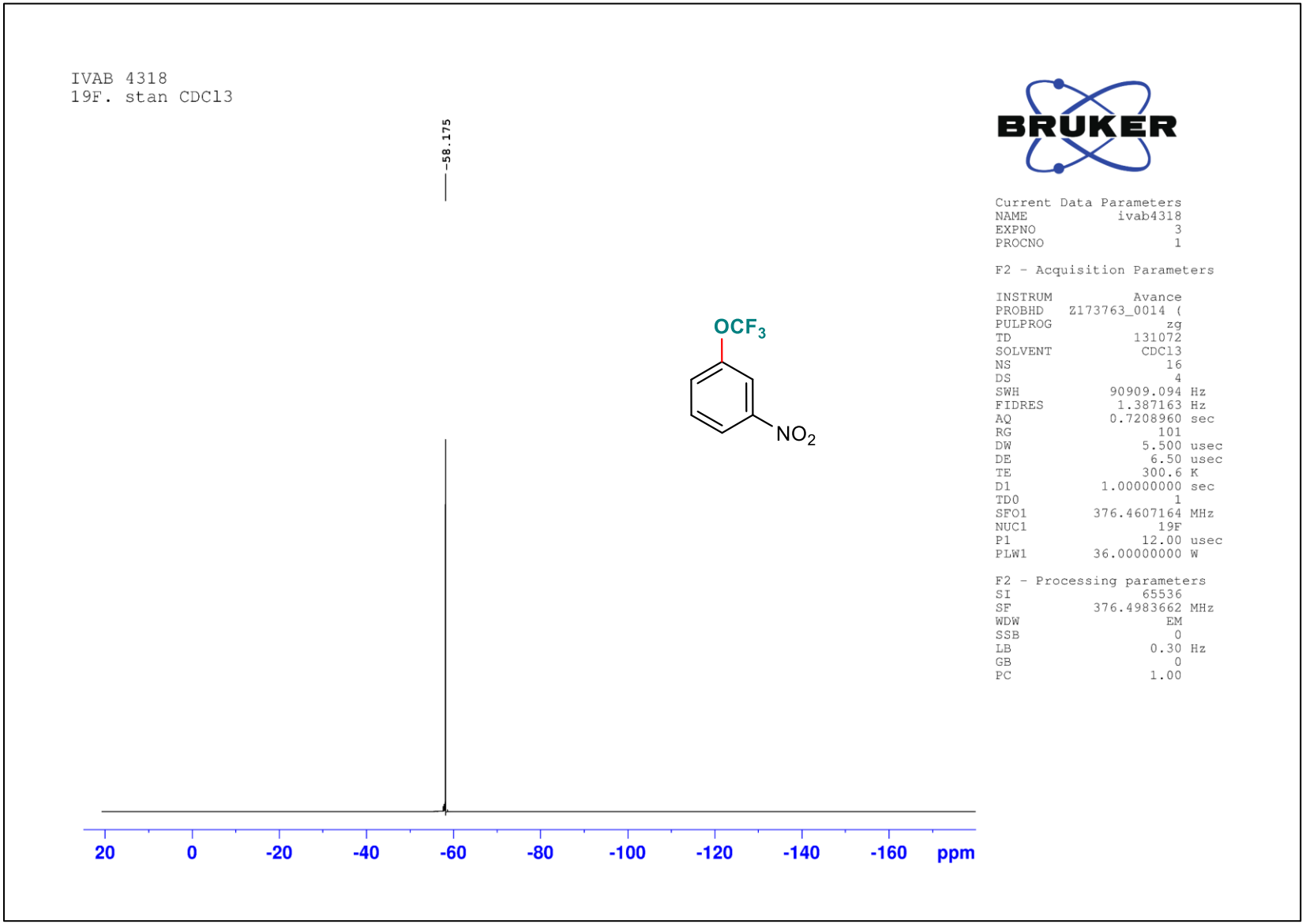
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	207
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	45.2
DW	21.000 usec
DE	15.00 usec
TE	300.8 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

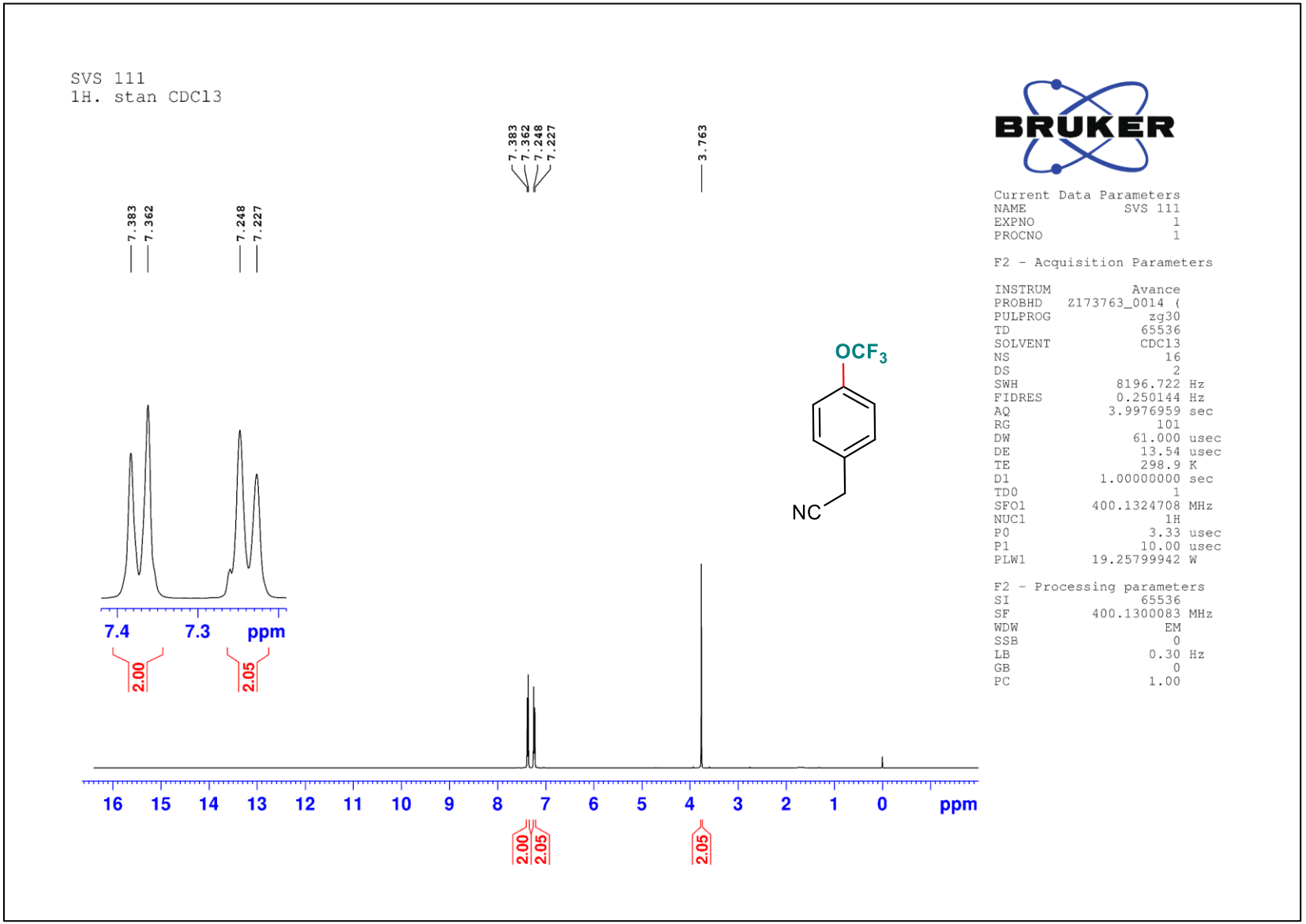
F2 - Processing parameters

SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

^{19}F NMR of Compound **4e**



^{1}H NMR of Compound **4f**



Current Data Parameters

NAME	SVS 111
EXPNO	1
PROCNO	1

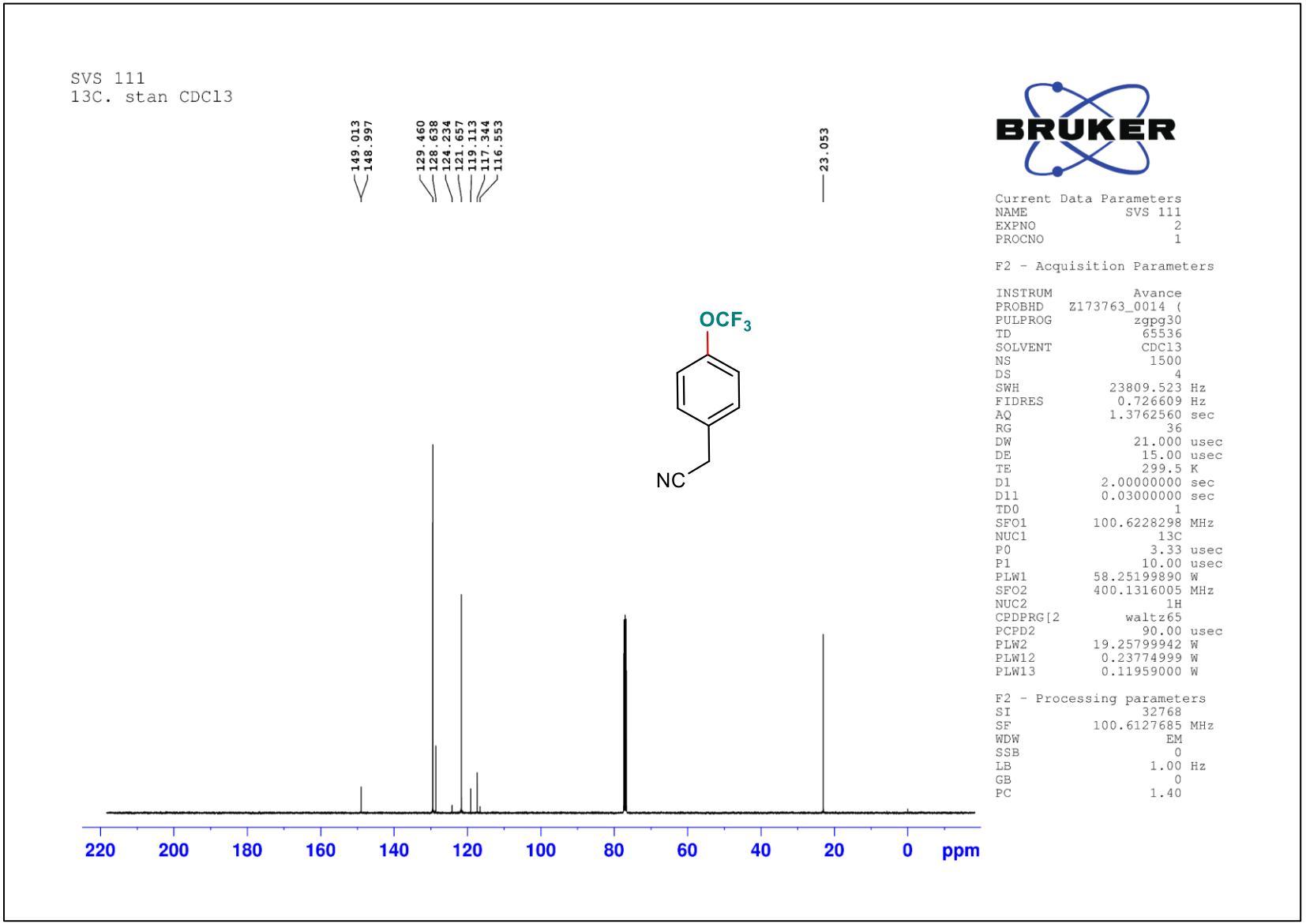
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	298.9 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

F2 - Processing parameters

SI	65536
SF	400.1300083 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **4f**

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Current Data Parameters
NAME                  SVS 111
EXPNO                       2
PROCNO                      1

F2 - Acquisition Parameters

INSTRUM                Avance
PROBHD    Z173763_0014 (
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                       1500
DS                          4
SWH                 23809.523 Hz
FIDRES               0.726609 Hz
AQ                   1.3762560 sec
RG                         36
DW                      21.000 usec
DE                      15.00 usec
TE                      299.5 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1               100.6228298 MHz
NUC1                       13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               58.25199890 W
SFO2               400.1316005 MHz
NUC2                       1H
CPDPRG[2                waltz65
PCPD2                    90.00 usec
PLW2               19.25799942 W
PLW12               0.23774999 W
PLW13               0.11959000 W

F2 - Processing parameters
SI                         32768
SF                 100.6127685 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40
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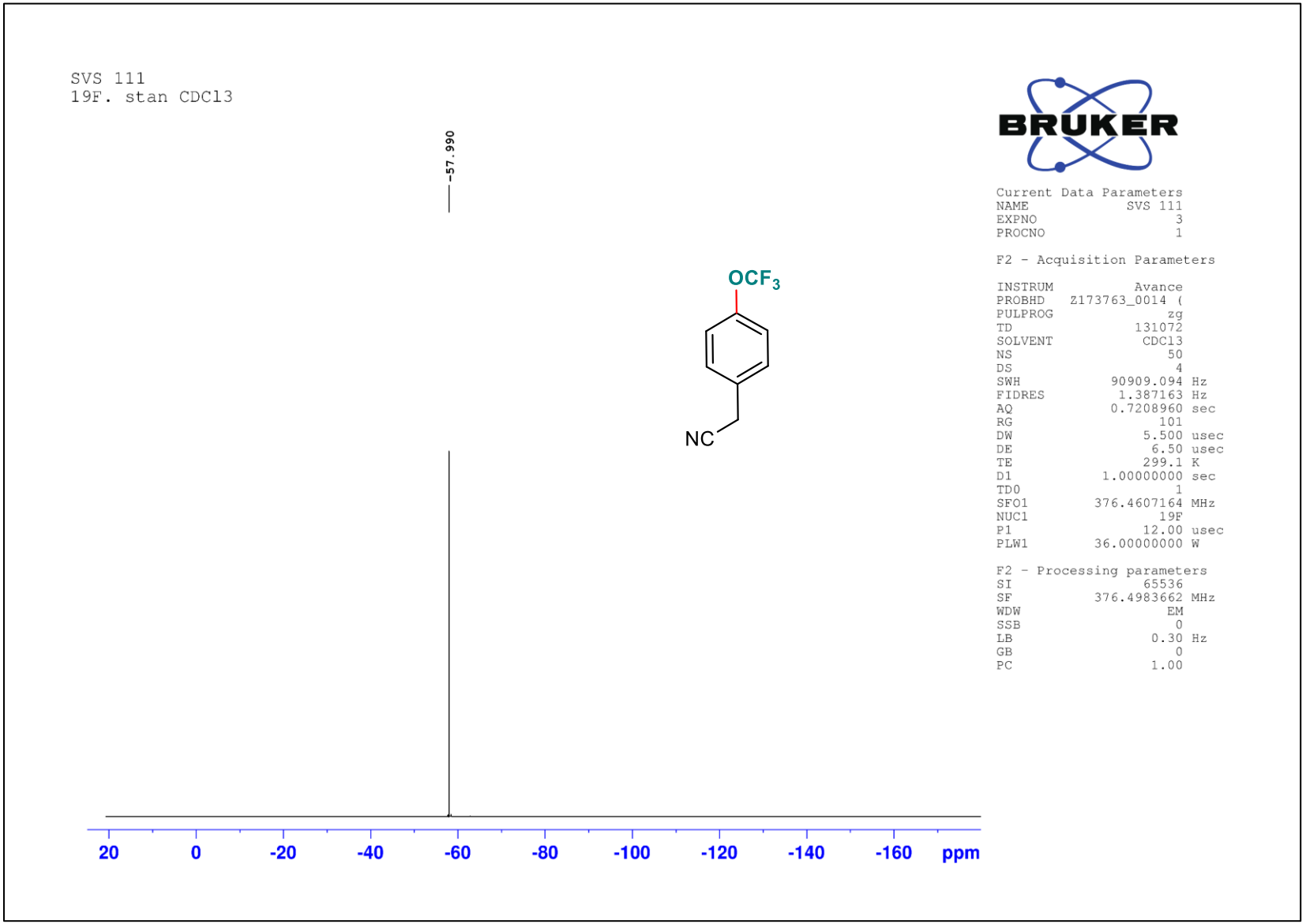
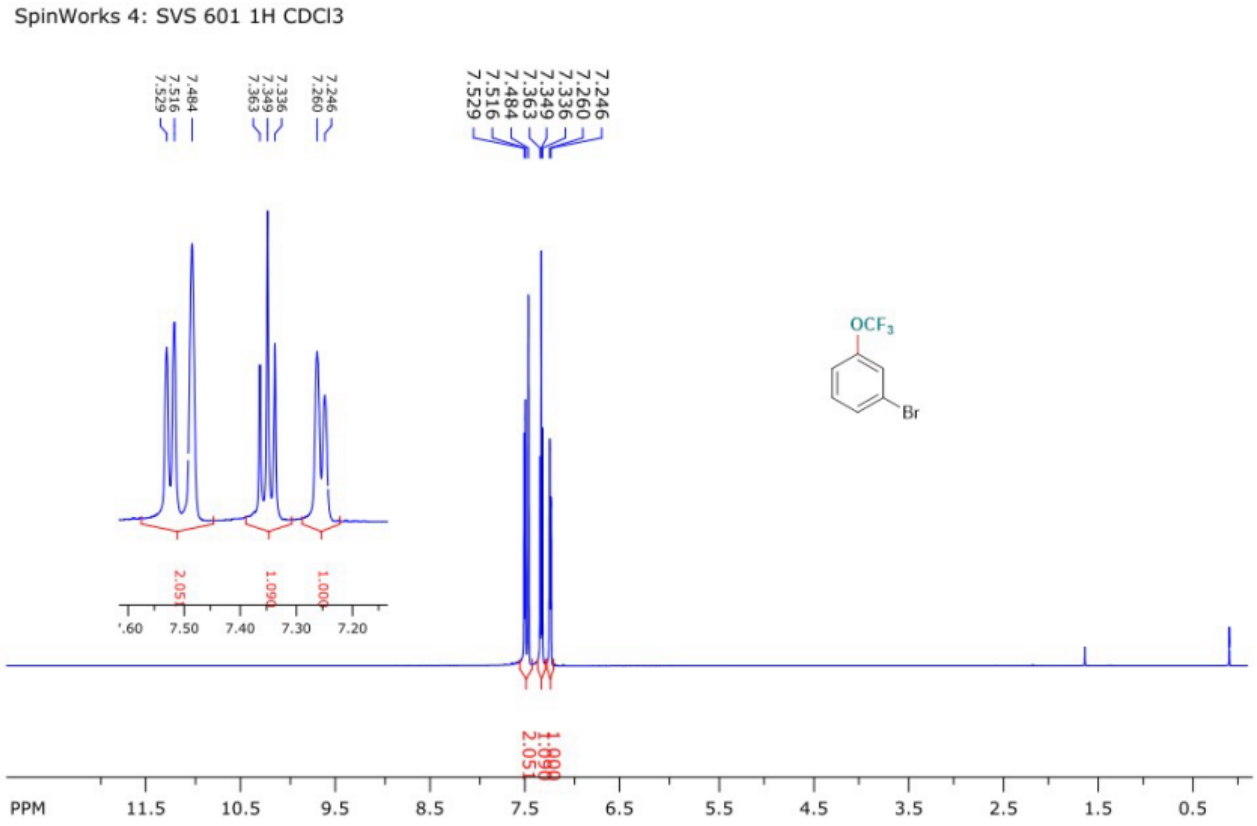
^{19}F NMR of Compound **4f**

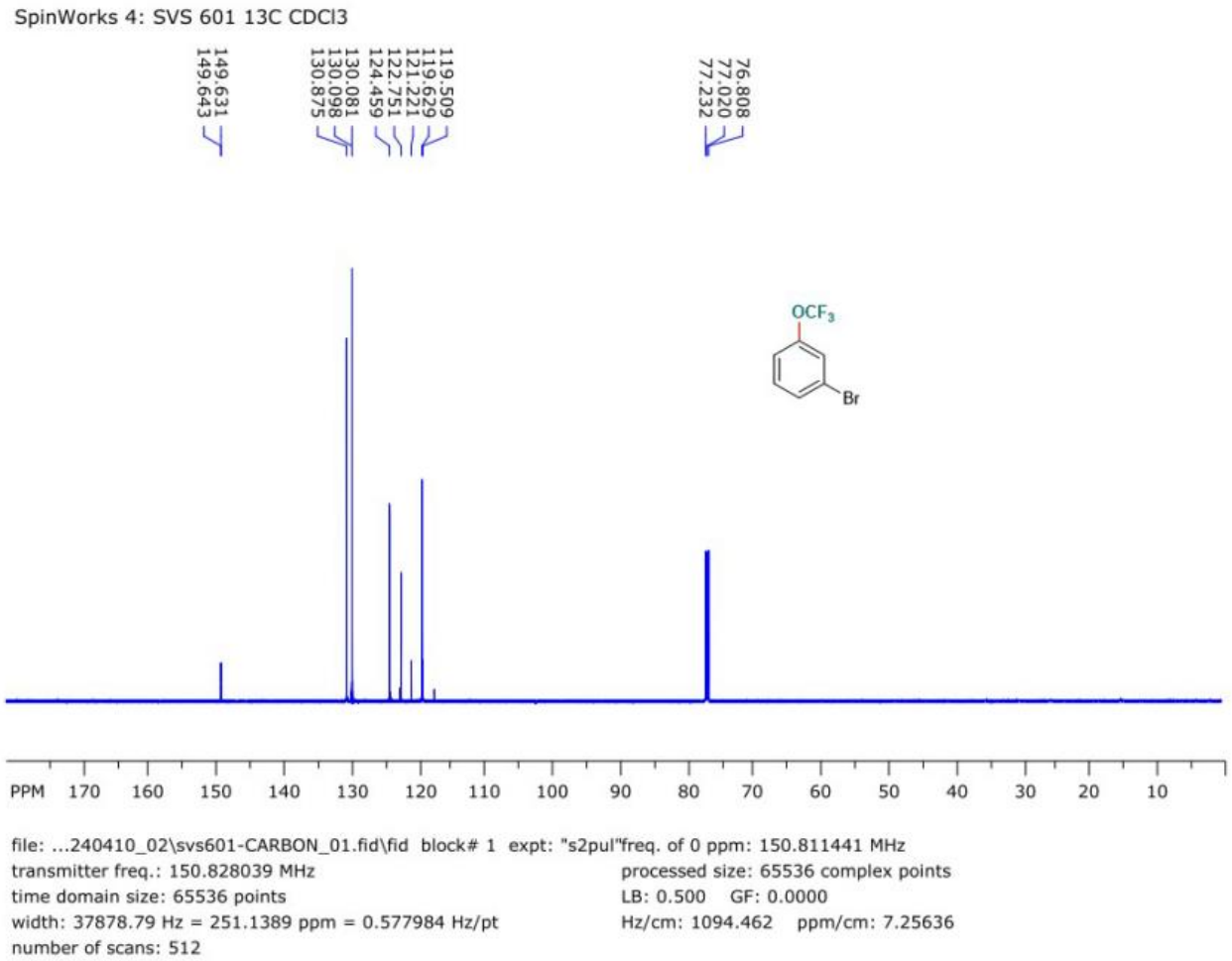


^{1}H NMR of Compound **4g**

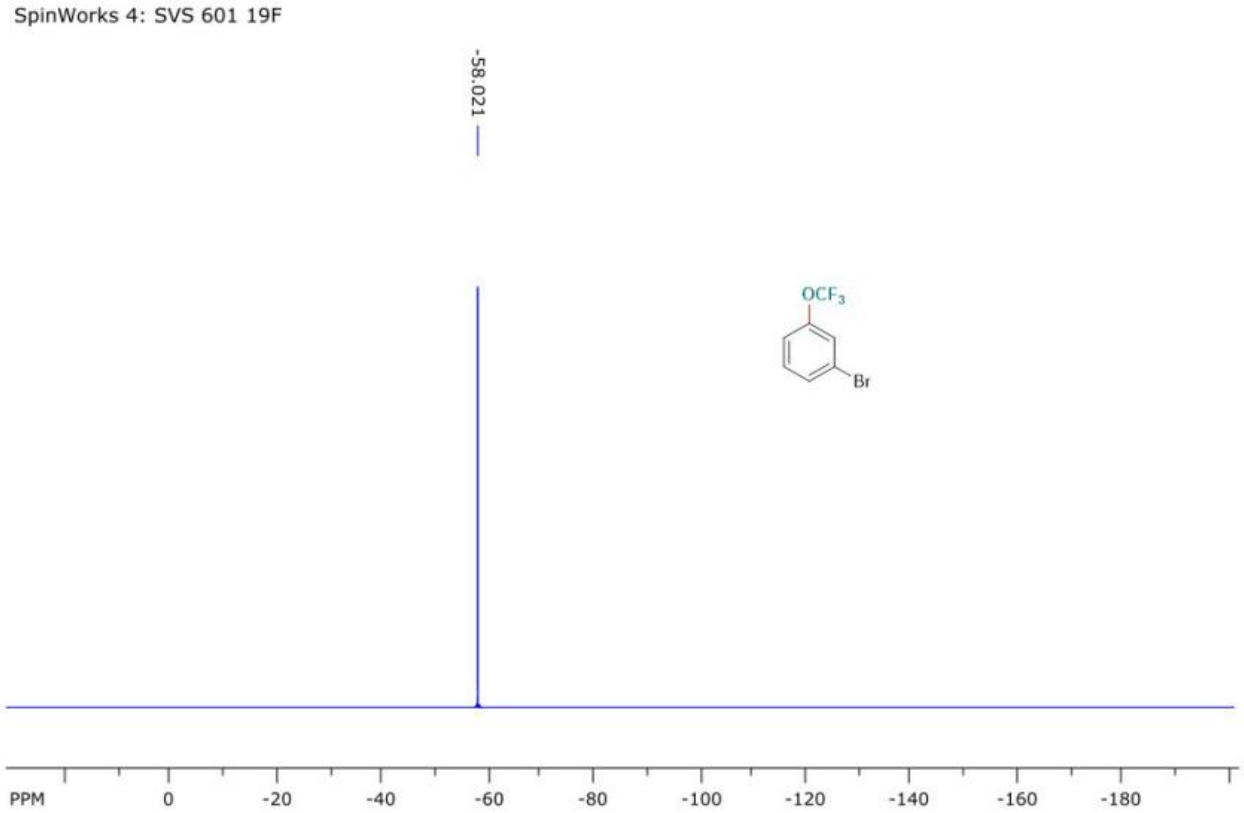


file: ...240410_01\svs601-PROTON_01.fid\fid block# 1 expt: "s2pul"freq. of 0 ppm: 599.766625 MHz
transmitter freq.: 599.770272 MHz processed size: 65536 complex points
time domain size: 76924 points LB: 0.300 GF: 0.0000
width: 9615.38 Hz = 16.0318 ppm = 0.124999 Hz/pt Hz/cm: 314.415 ppm/cm: 0.52422
number of scans: 16

^{13}C NMR of Compound **4g**

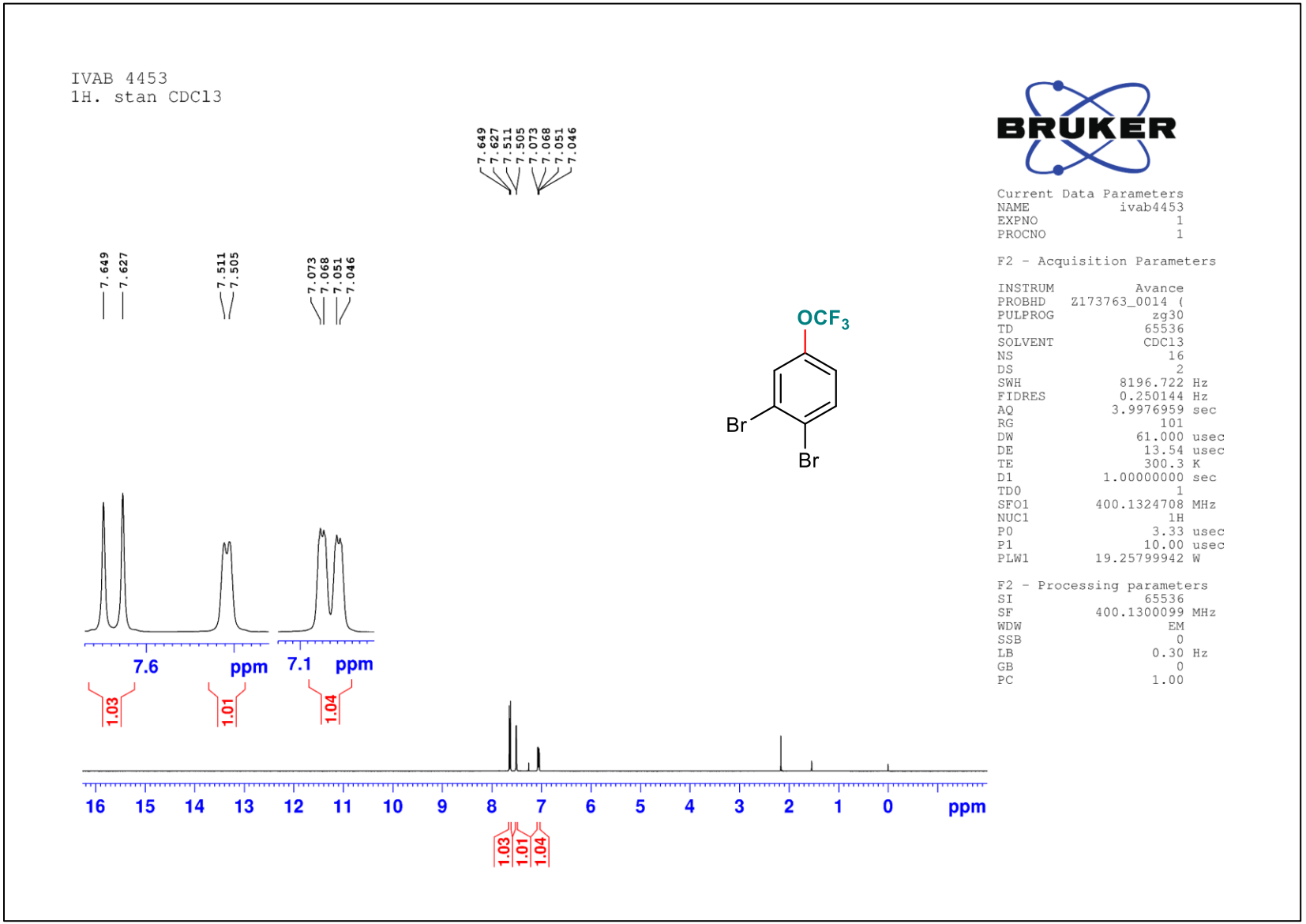


^{19}F NMR of Compound **4g**

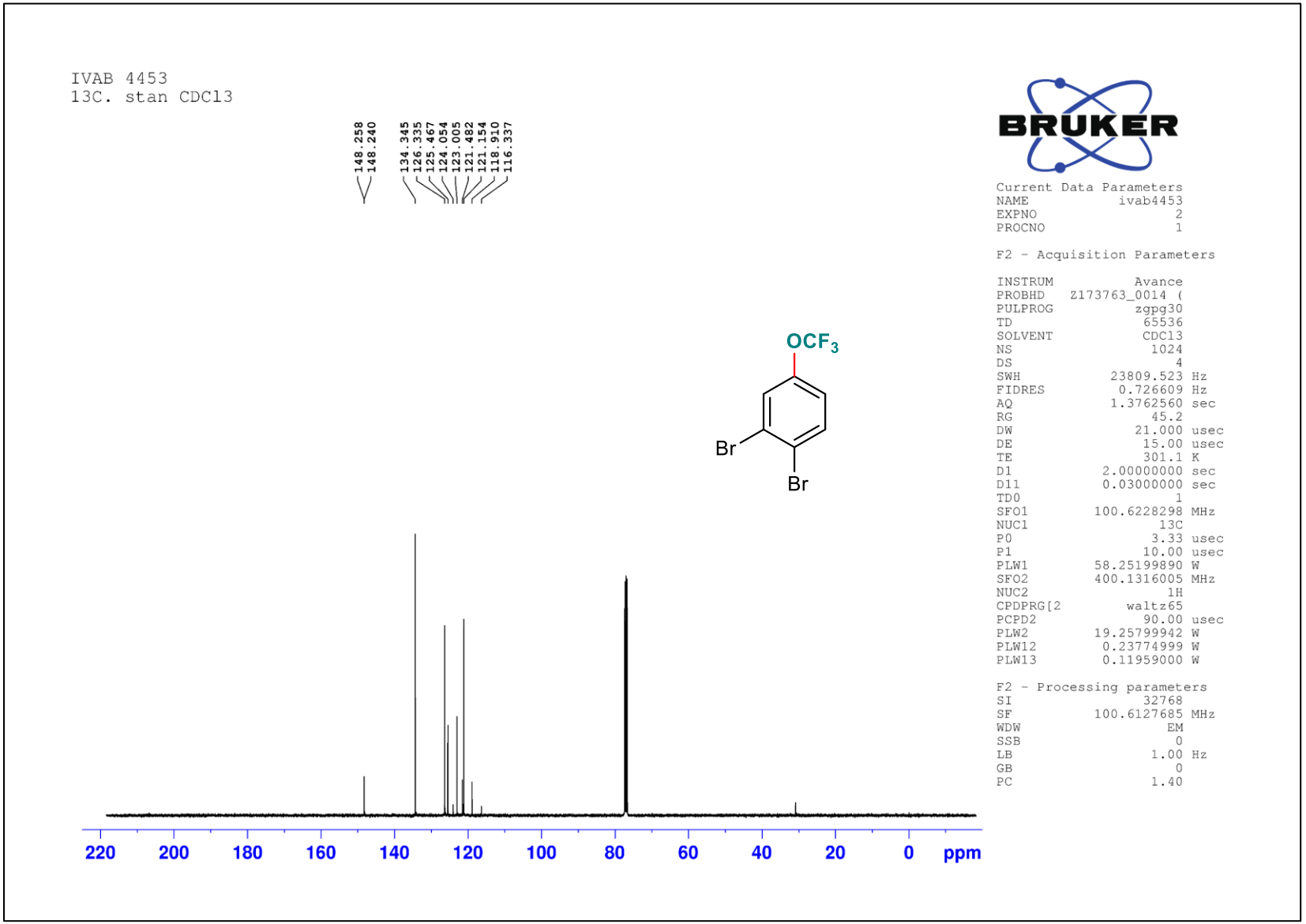


file: ...0410_03\svs601-FLUORINE_01.fid\fid block# 1 expt: "s2pul" freq. of 0 ppm: 564.344520 MHz
transmitter freq.: 564.296551 MHz processed size: 262144 complex points
time domain size: 262144 points LB: 1.500 GF: 0.0000
width: 131578.95 Hz = 233.1734 ppm = 0.501934 Hz/pt Hz/cm: 5263.158 ppm/cm: 9.32694
number of scans: 32

^{1}H NMR of Compound **4h**



^{13}C NMR of Compound **4h**



Current Data Parameters
NAME ivab4453
EXPNO 2
PROCNO 1

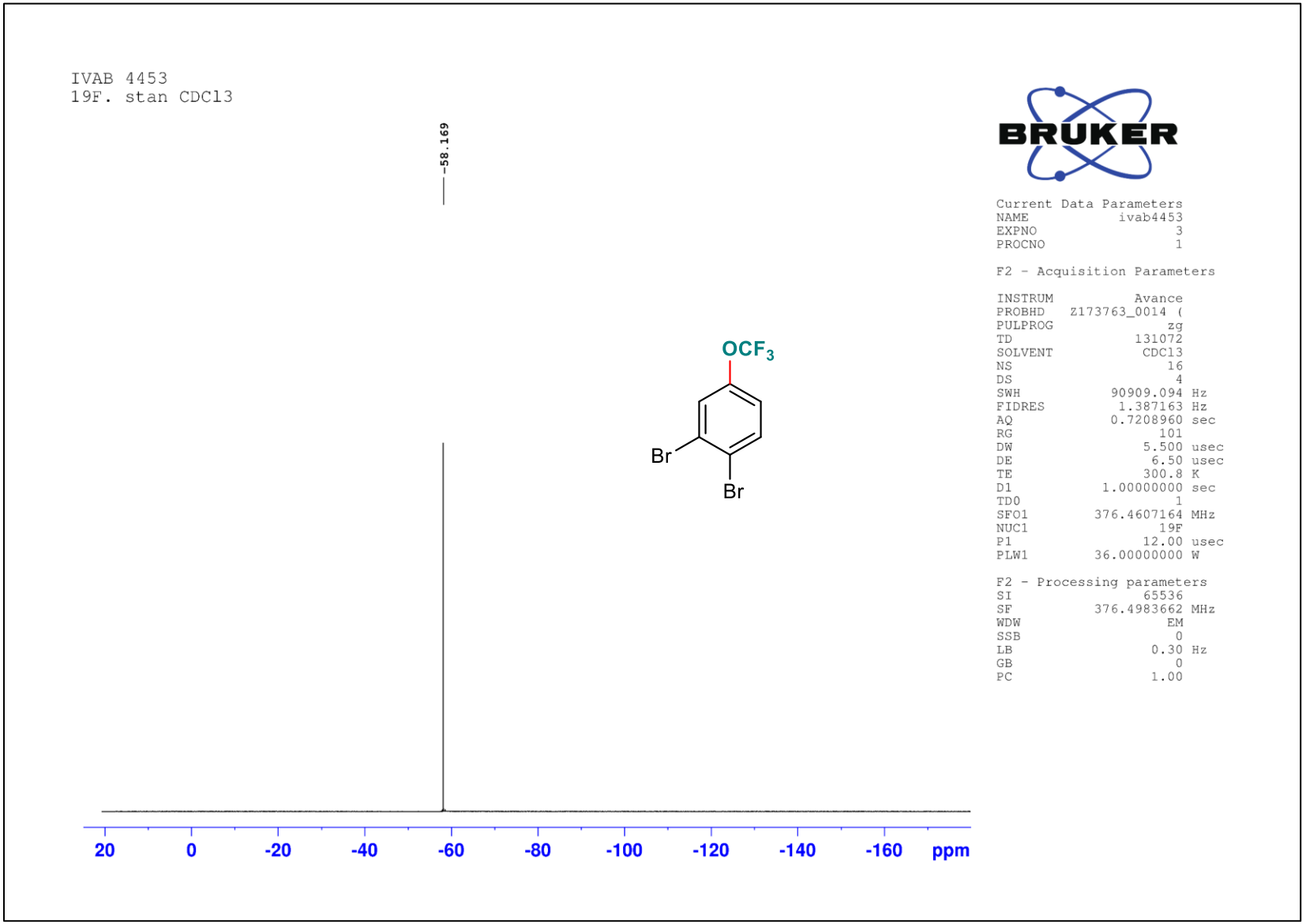
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1024
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	45.2
DW	21.000 usec
DE	15.00 usec
TE	301.1 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

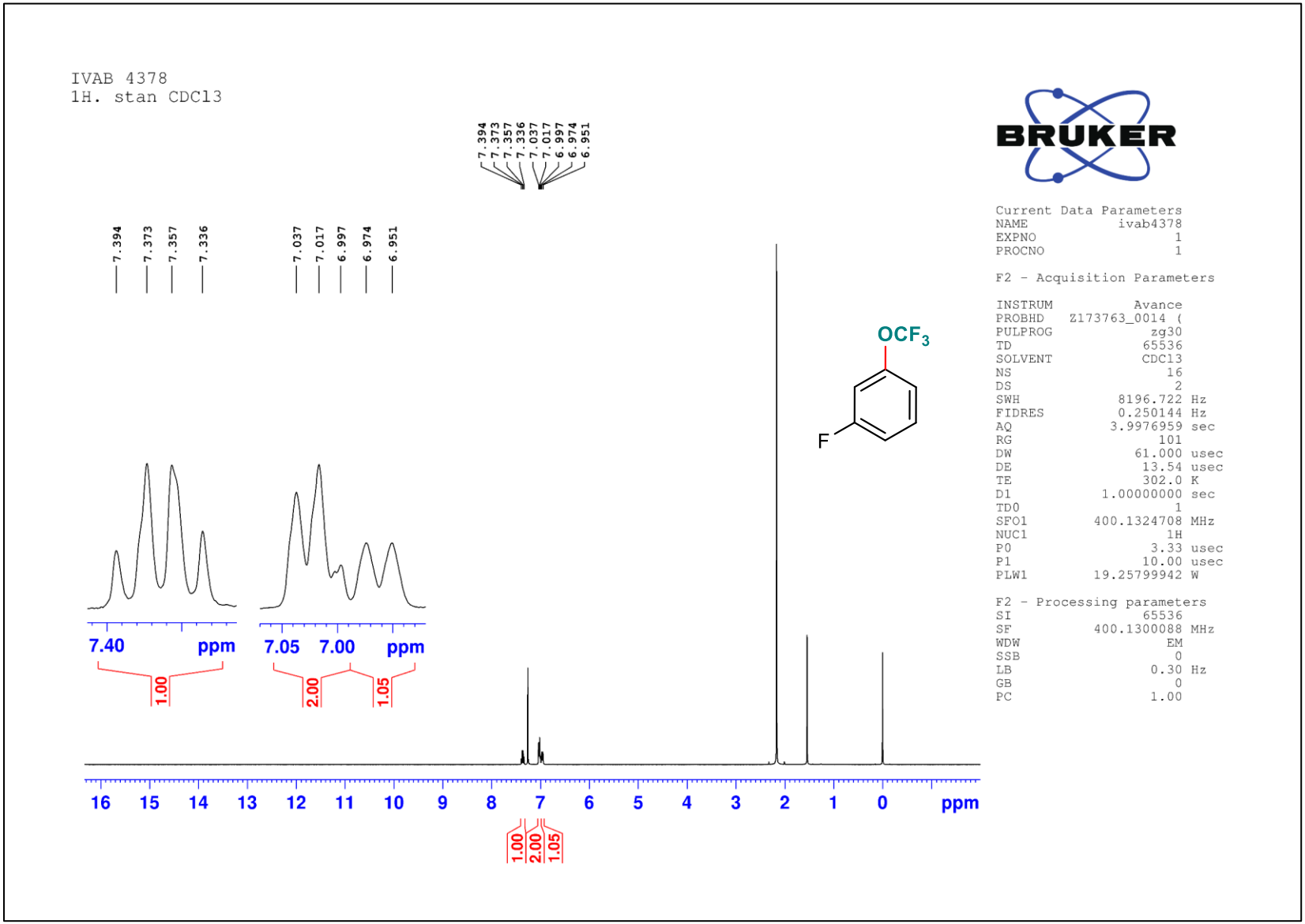
F2 - Processing parameters

SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

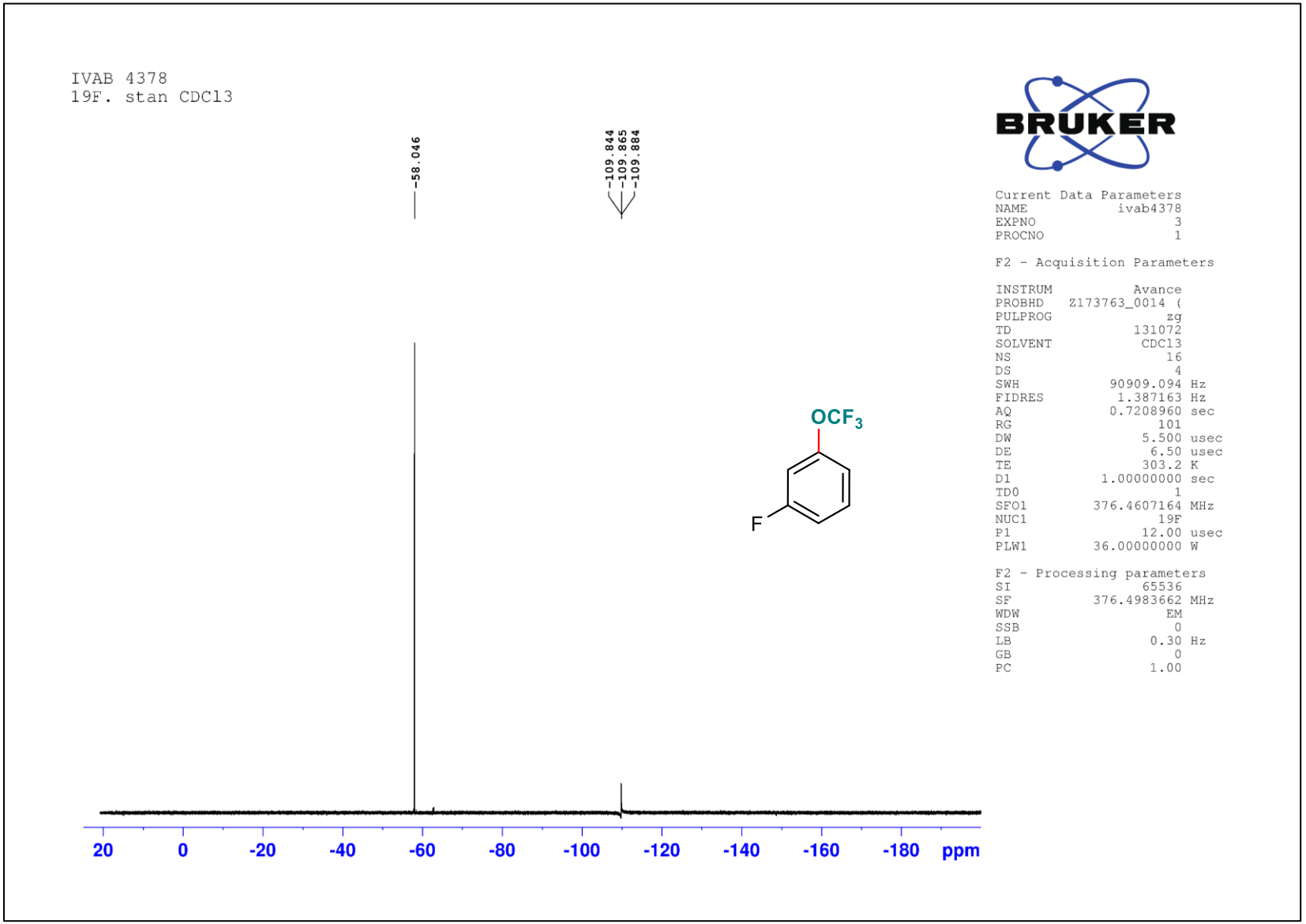
^{19}F NMR of Compound **4h**



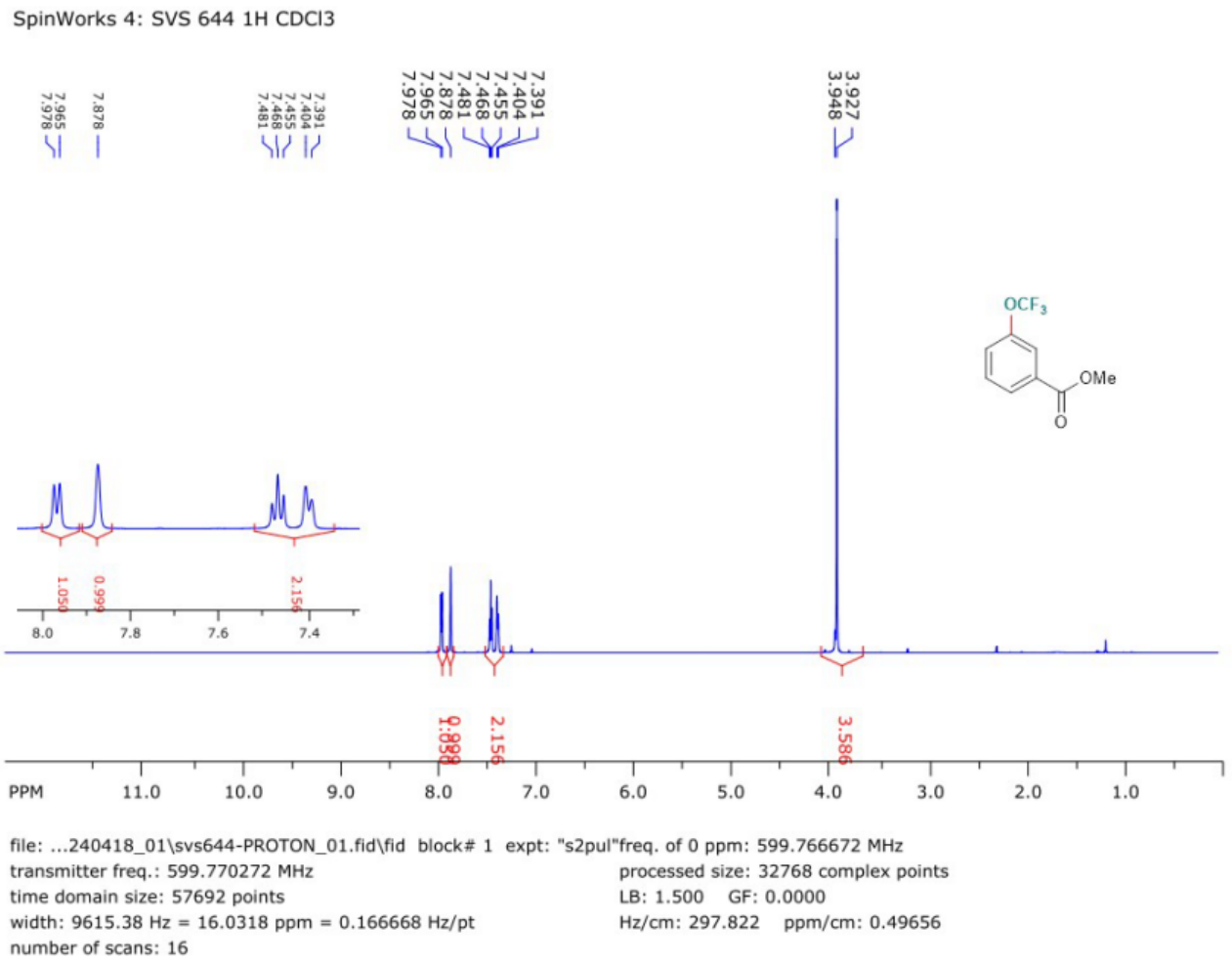
^{1}H NMR of Compound **4i**



^{19}F NMR of Compound **4i**

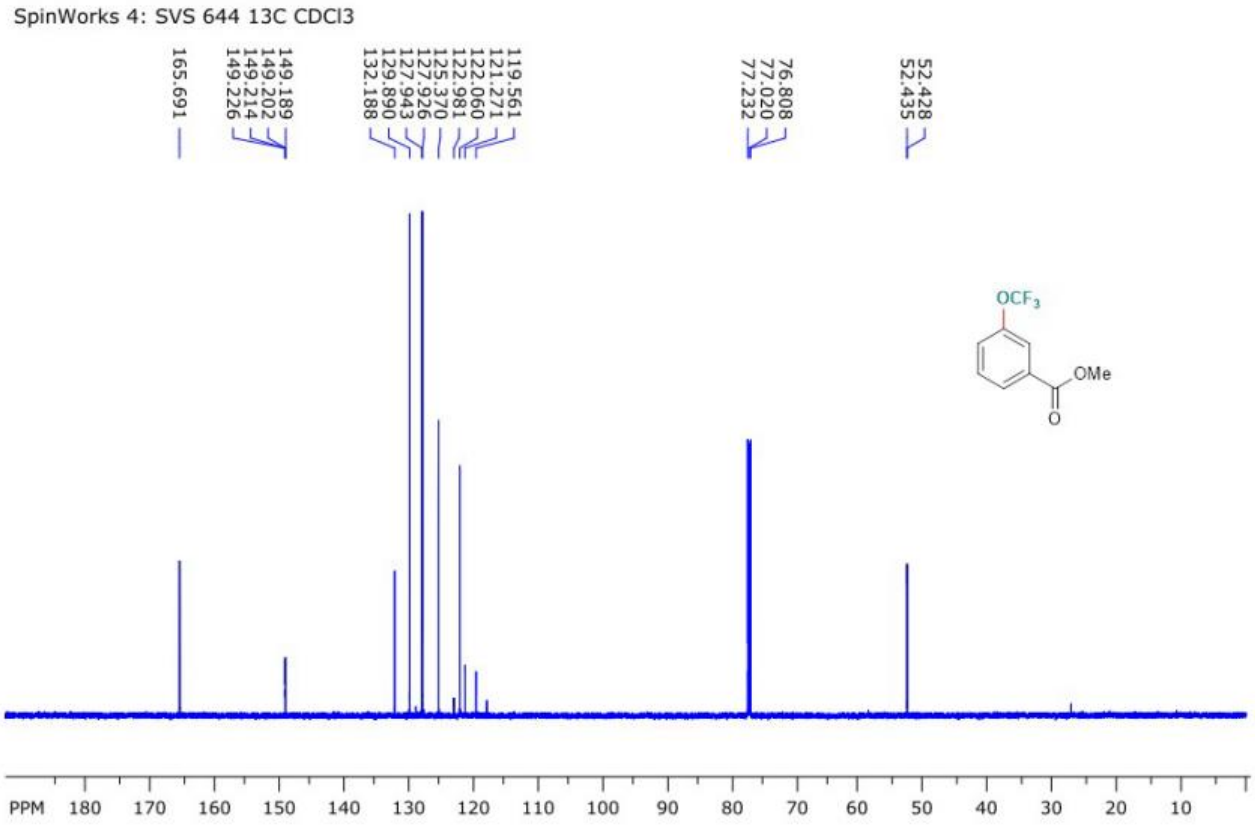


^{1}H NMR of Compound **4j**



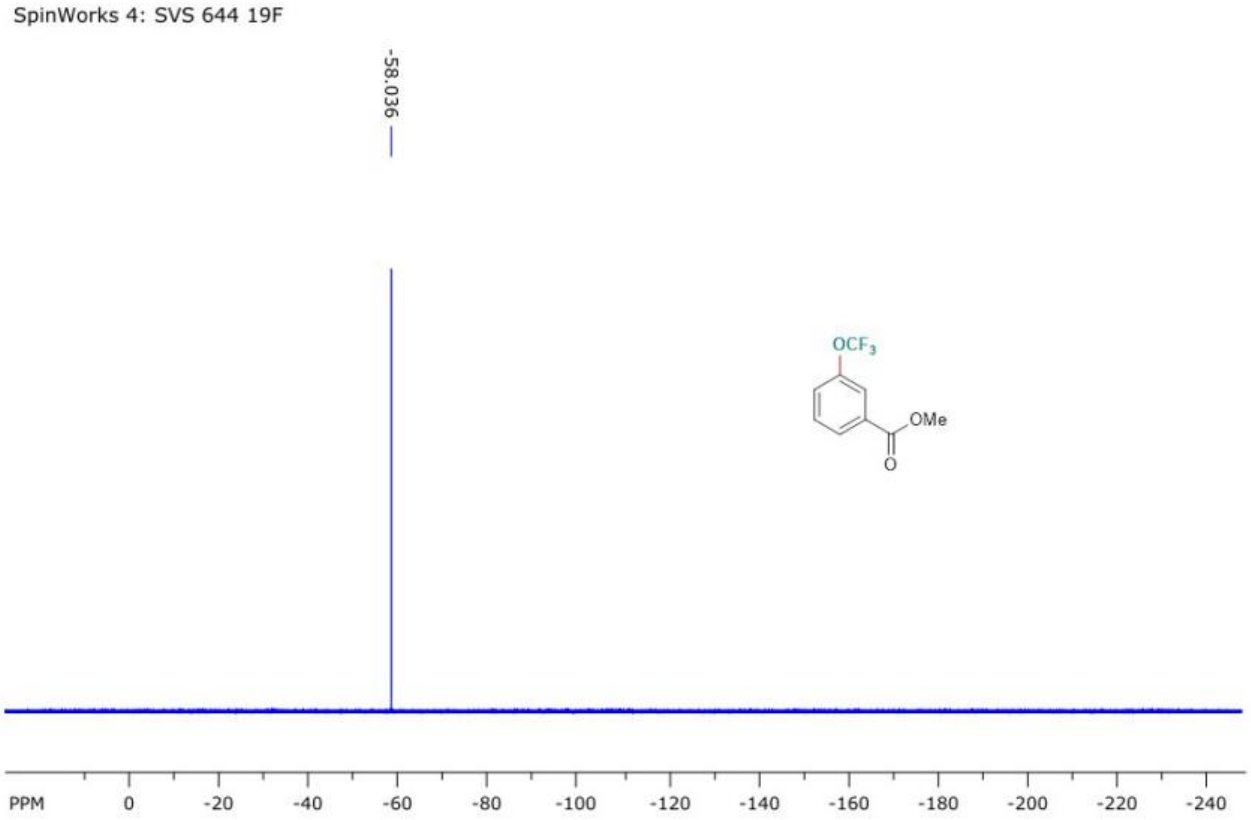
file: ...240418_01\svs644-PROTON_01.fid\fid block# 1 expt: "s2pul"freq. of 0 ppm: 599.766672 MHz
transmitter freq.: 599.770272 MHz
processed size: 32768 complex points
time domain size: 57692 points
LB: 1.500 GF: 0.0000
width: 9615.38 Hz = 16.0318 ppm = 0.166668 Hz/pt
Hz/cm: 297.822 ppm/cm: 0.49656
number of scans: 16

^{13}C NMR of Compound **4j**



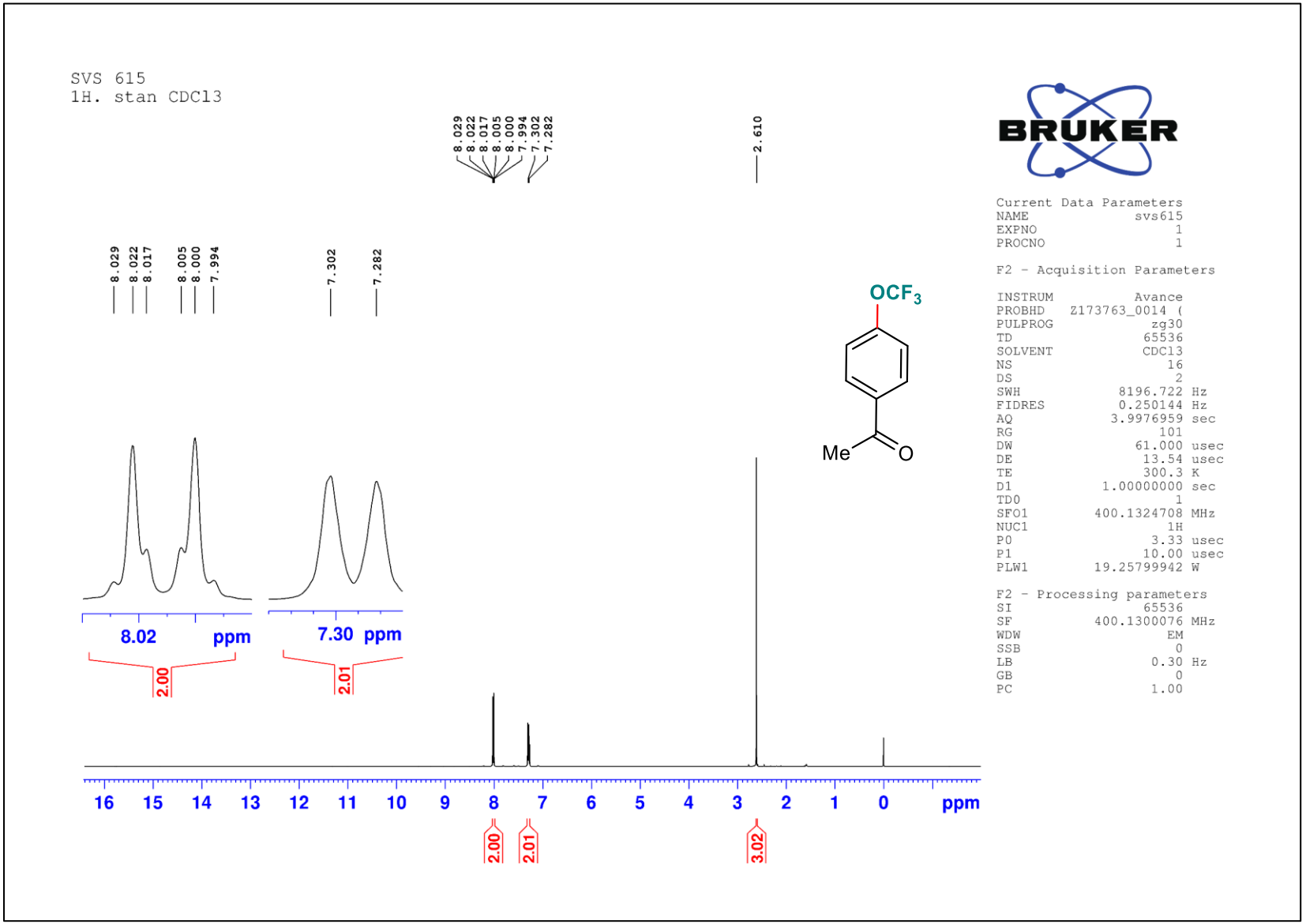
file: ...240418_01\svs644-CARBON_01.fid\fid block# 1 expt: "s2pul"freq. of 0 ppm: 150.811443 MHz
transmitter freq.: 150.828039 MHz
processed size: 65536 complex points
time domain size: 65536 points
LB: 0.500 GF: 0.0000
width: 37878.79 Hz = 251.1389 ppm = 0.577984 Hz/pt
Hz/cm: 1164.857 ppm/cm: 7.72308
number of scans: 256

^{19}F NMR of Compound **4j**

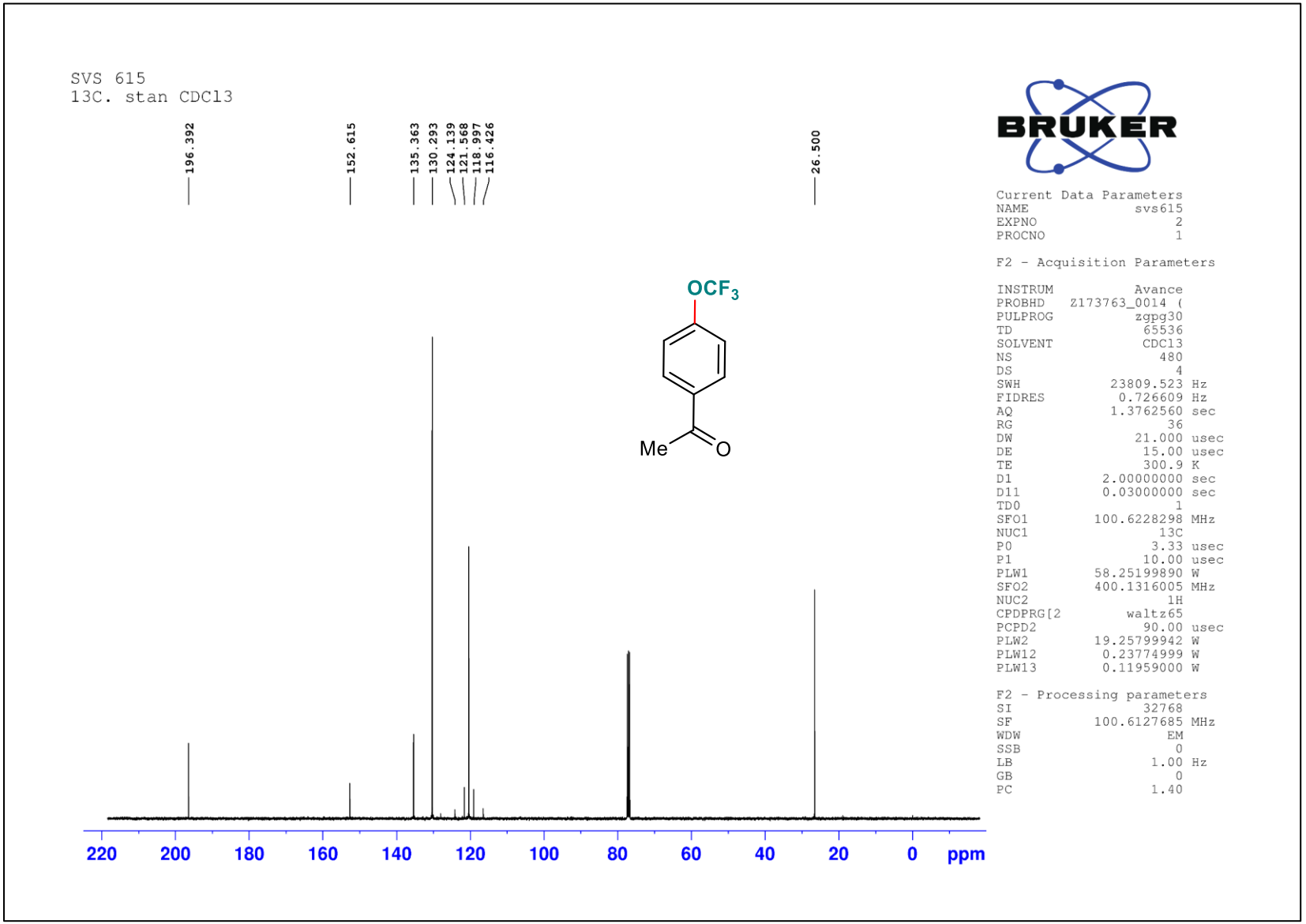


file: ...0418_01\svs644-FLUORINE_01.fid\fid block# 1 expt: "s2pul" freq. of 0 ppm: 564.344520 MHz
transmitter freq.: 564.282442 MHz processed size: 262144 complex points
time domain size: 262144 points LB: 1.500 GF: 0.0000
width: 156250.00 Hz = 276.9003 ppm = 0.596046 Hz/pt Hz/cm: 6250.000 ppm/cm: 11.07601
number of scans: 32

^{1}H NMR of Compound **4k**



^{13}C NMR of Compound **4k**

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Current Data Parameters
NAME                 svs615
EXPNO                     2
PROCNO                    1

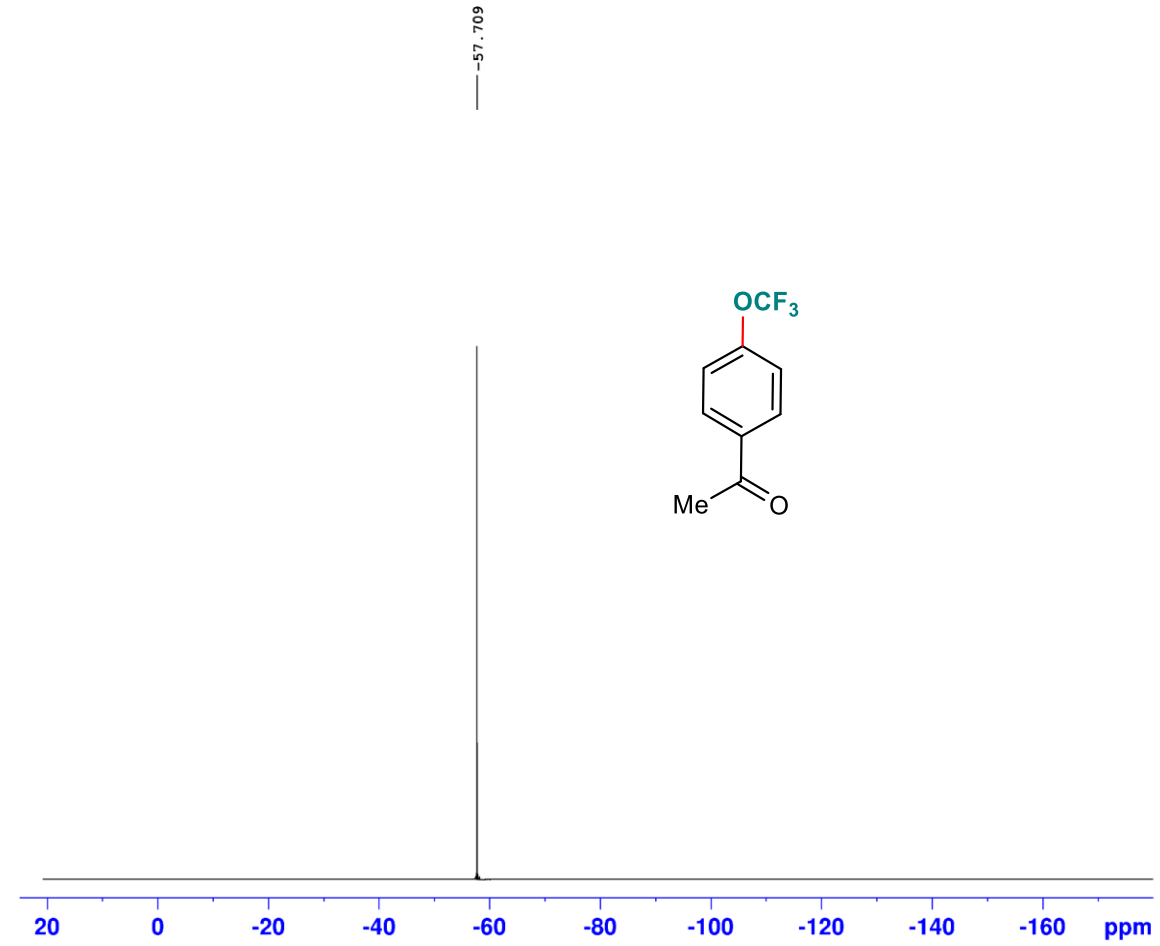
F2 - Acquisition Parameters

INSTRUM              Avance
PROBHD    Z173763_0014 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      480
DS                        4
SWH               23809.523 Hz
FIDRES             0.726609 Hz
AQ                 1.3762560 sec
RG                       36
DW                   21.000 usec
DE                   15.00 usec
TE                   300.9 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                       1
SFO1           100.6228298 MHz
NUC1                   13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           58.25199890 W
SFO2           400.1316005 MHz
NUC2                   1H
CPDPRG[2            waltz65
PCPD2                90.00 usec
PLW2           19.25799942 W
PLW12           0.23774999 W
PLW13           0.11959000 W

F2 - Processing parameters
SI                    32768
SF             100.6127685 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

^{19}F NMR of Compound **4k**

SVS 615
19F. stan CDCl3



Current Data Parameters
NAME svs615
EXPNO 3
PROCNO 1

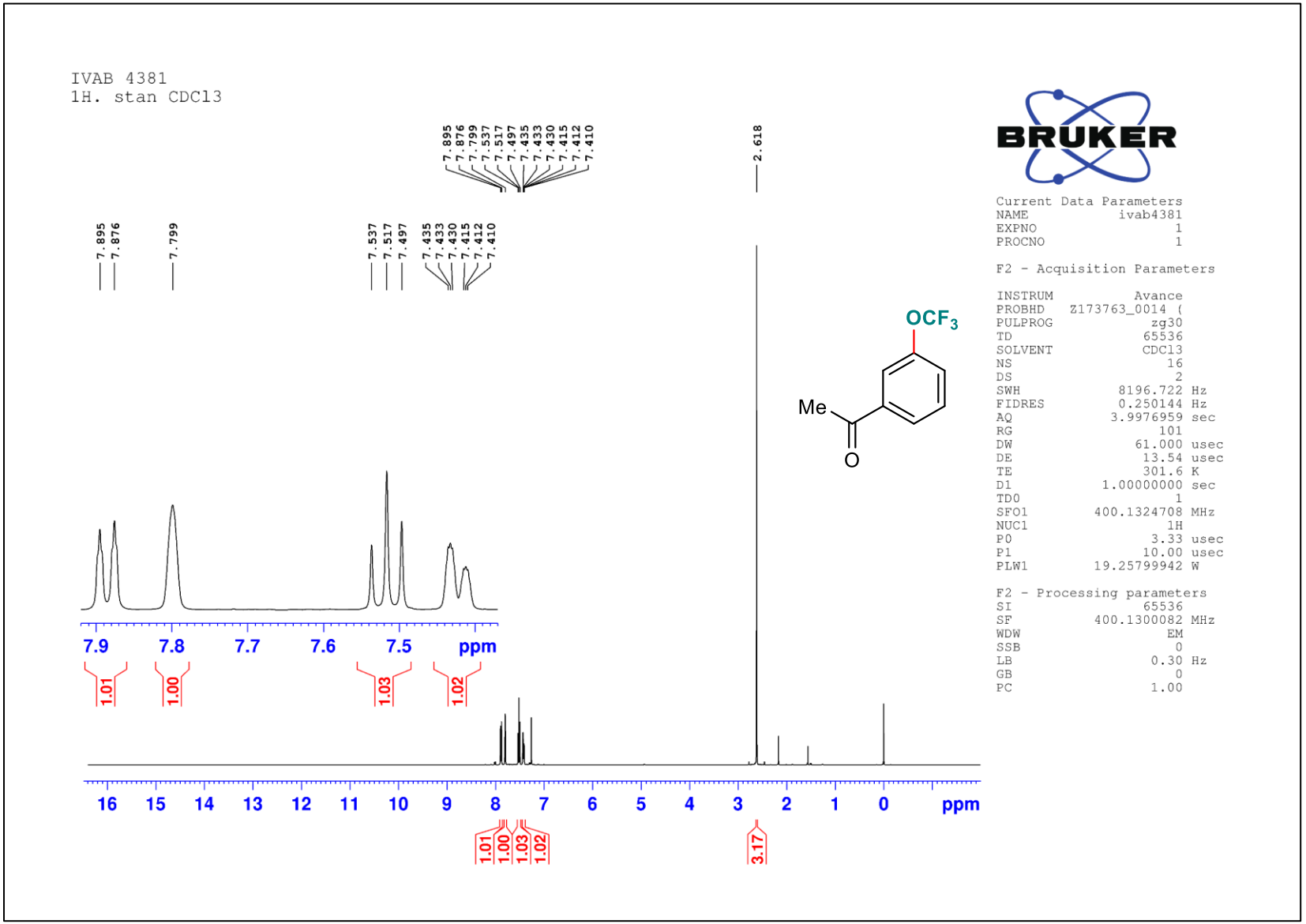
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7208960 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
PLW1	36.00000000 W

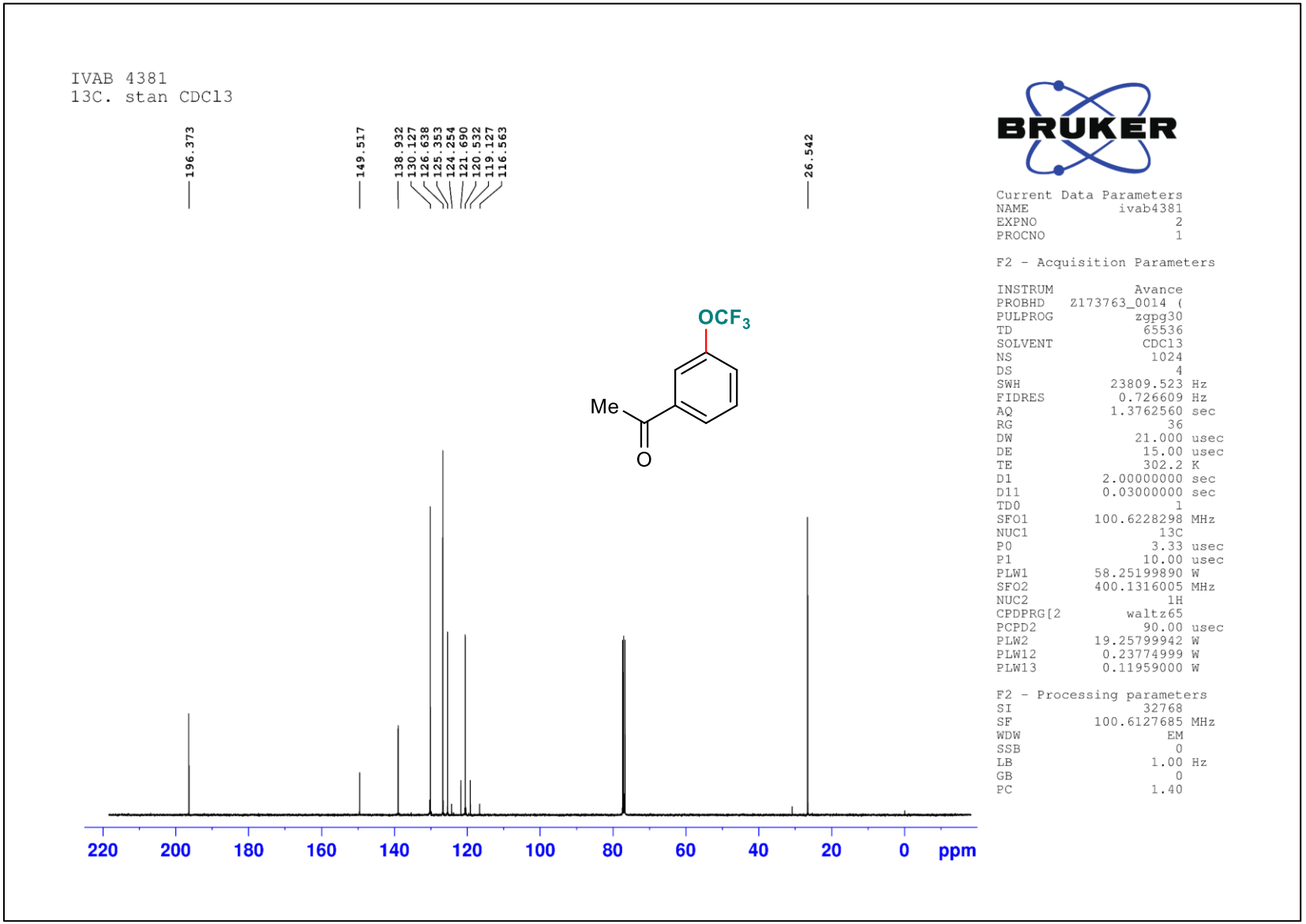
F2 - Processing parameters

SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{1}H NMR of Compound **4l**



^{13}C NMR of Compound **4l**



Current Data Parameters

NAME	ivab4381
EXPNO	2
PROCNO	1

F2 - Acquisition Parameters

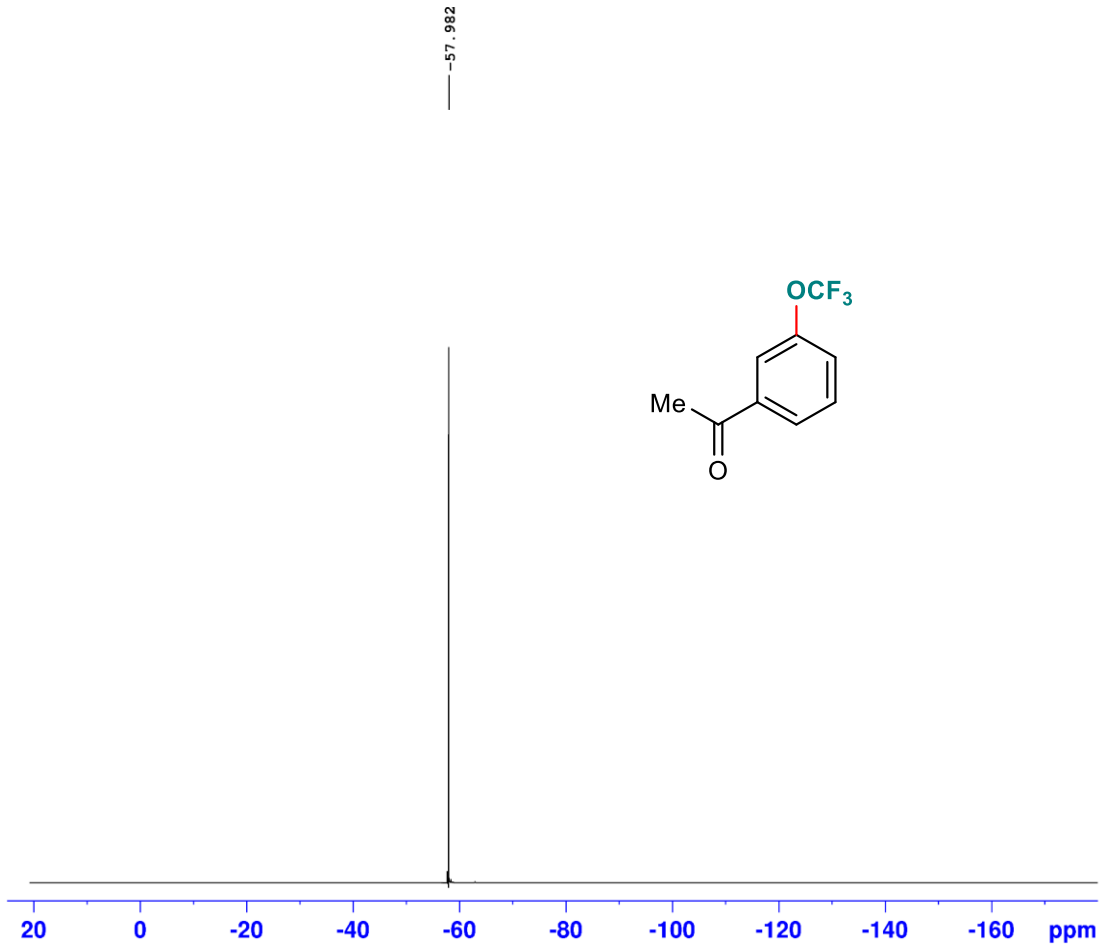
INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1024
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3762560 sec
RG	36
DW	21.000 usec
DE	15.00 usec
TE	302.2 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	3.33 usec
P1	10.00 usec
PLW1	58.25199890 W
SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz65
PCPD2	90.00 usec
PLW2	19.25799942 W
PLW12	0.23774999 W
PLW13	0.11959000 W

F2 - Processing parameters

SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

^{19}F NMR of Compound **4l**

IVAB 4381
19F. stan CDCl3



Current Data Parameters
NAME ivab4381
EXPNO 3
PROCNO 1

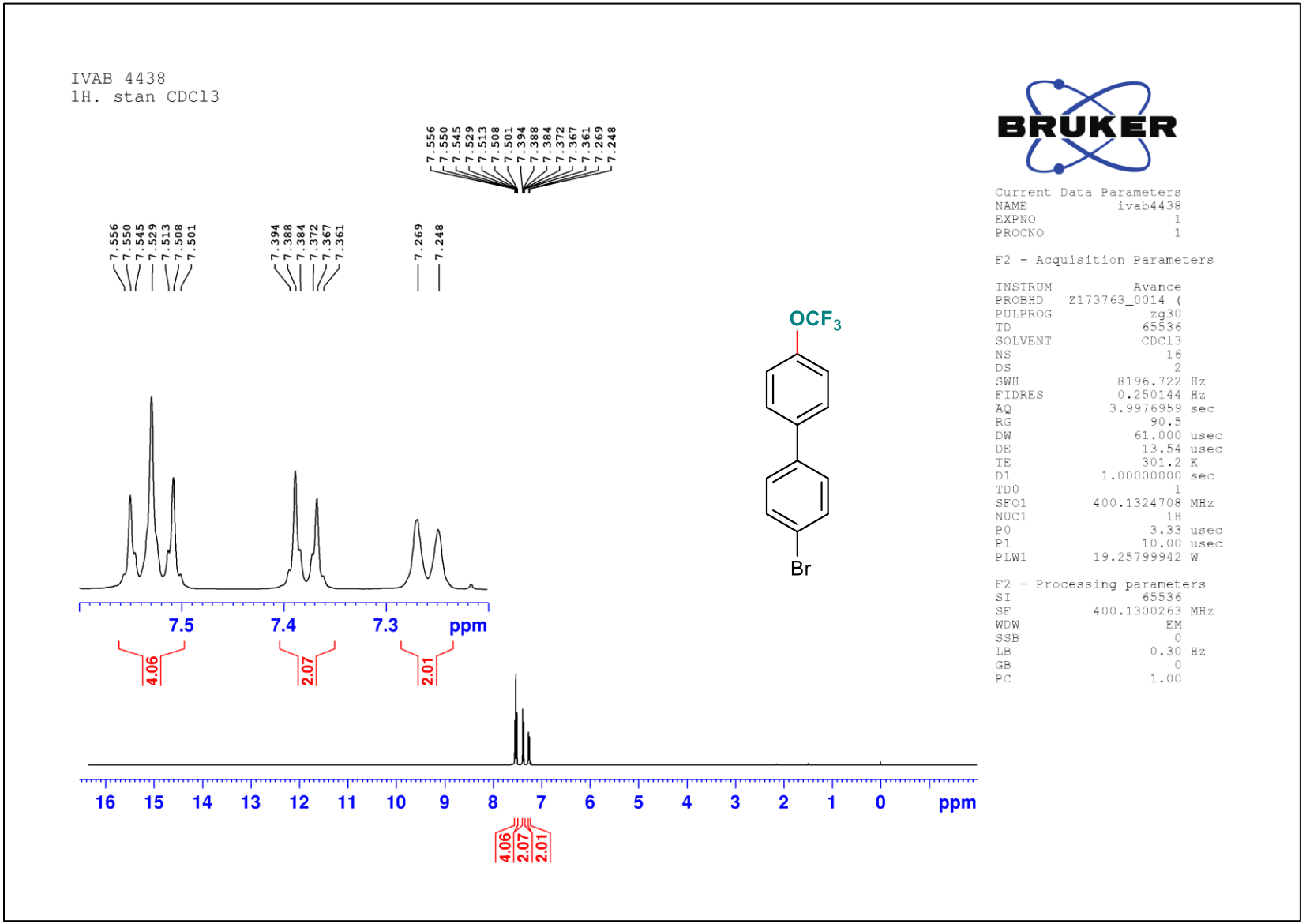
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7208960 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	301.2 K
D1	1.00000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
PLW1	36.00000000 W

F2 - Processing parameters

SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{1}H NMR of Compound **4m**

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Current Data Parameters
NAME            ivab4438
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters

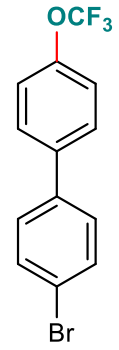
INSTRUM             Avance
PROBHD    Z173763_0014 (
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8196.722 Hz
FIDRES           0.250144 Hz
AQ               3.9976959 sec
RG                   90.5
DW                61.000 usec
DE                13.54 usec
TE                301.2 K
D1             1.00000000 sec
TD0                    1
SFO1          400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1          19.25799942 W

F2 - Processing parameters
SI                  65536
SF            400.1300263 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

^{13}C NMR of Compound **4m**

IVAB 4438
A-13C. stan CDCl3

148.969
148.953
148.936
148.919
138.744
132.052
128.674
128.302
124.385
122.060
121.828
121.354
119.271
116.714



Current Data Parameters
NAME ivab4438
EXPNO 3
PROCNO 1

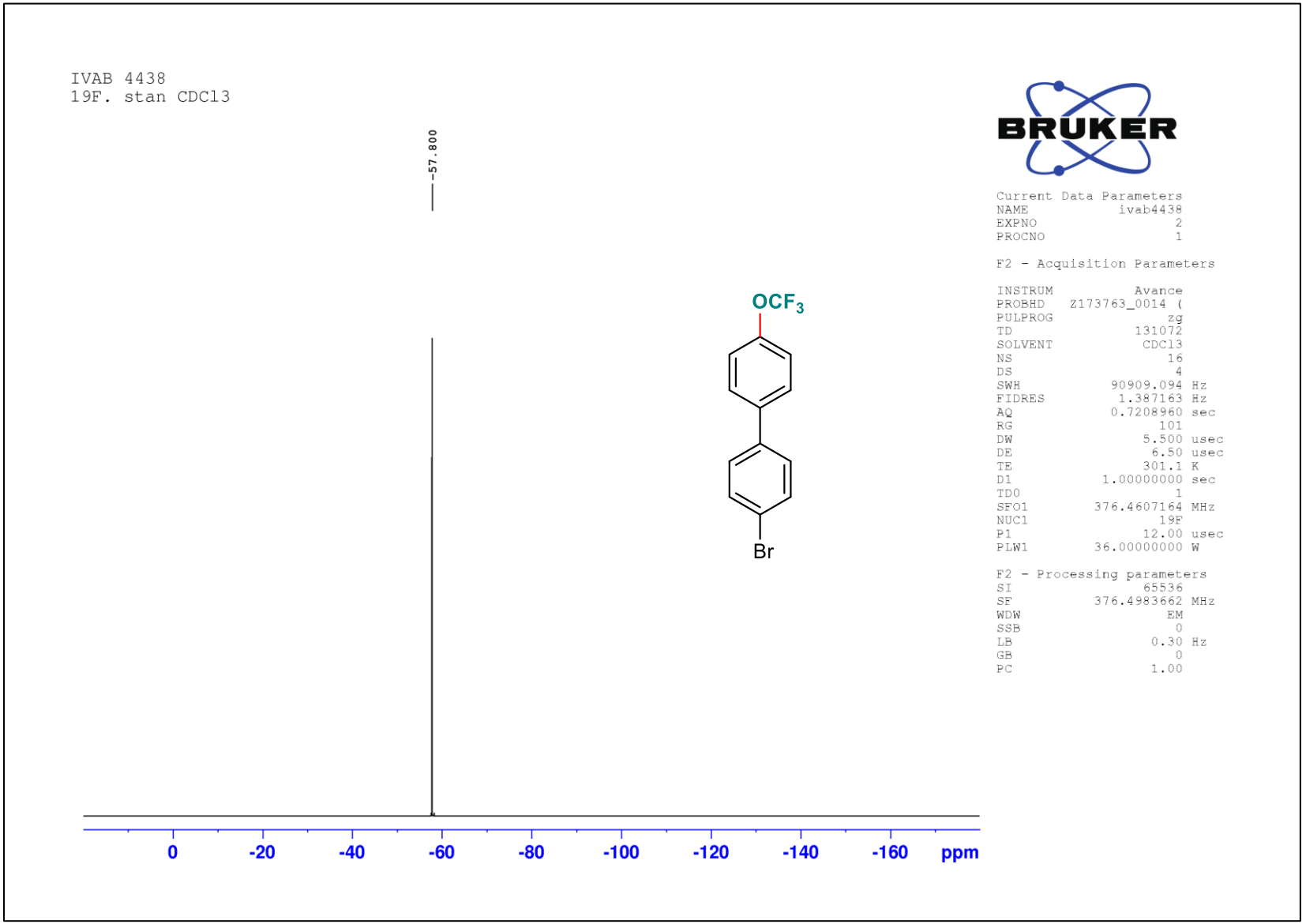
F2 - Acquisition Parameters

INSTRUM	Avance	
PROBHD	Z173763_0014 (	
PULPROG	zgpg30	
TD	65536	
SOLVENT	CDCl3	
NS	600	
DS	4	
SWH	23809.523	Hz
FIDRES	0.726609	Hz
AQ	1.3762560	sec
RG	36	
DW	21.000	usec
DE	15.00	usec
TE	300.9	K
D1	2.00000000	sec
D11	0.03000000	sec
TD0	1	
SFO1	100.6228298	MHz
NUC1	13C	
P0	3.33	usec
P1	10.00	usec
PLW1	58.25199890	W
SFO2	400.1316005	MHz
NUC2	1H	
CPDPRG[2	waltz65	
PCPD2	90.00	usec
PLW2	19.25799942	W
PLW12	0.23774999	W
PLW13	0.11959000	W

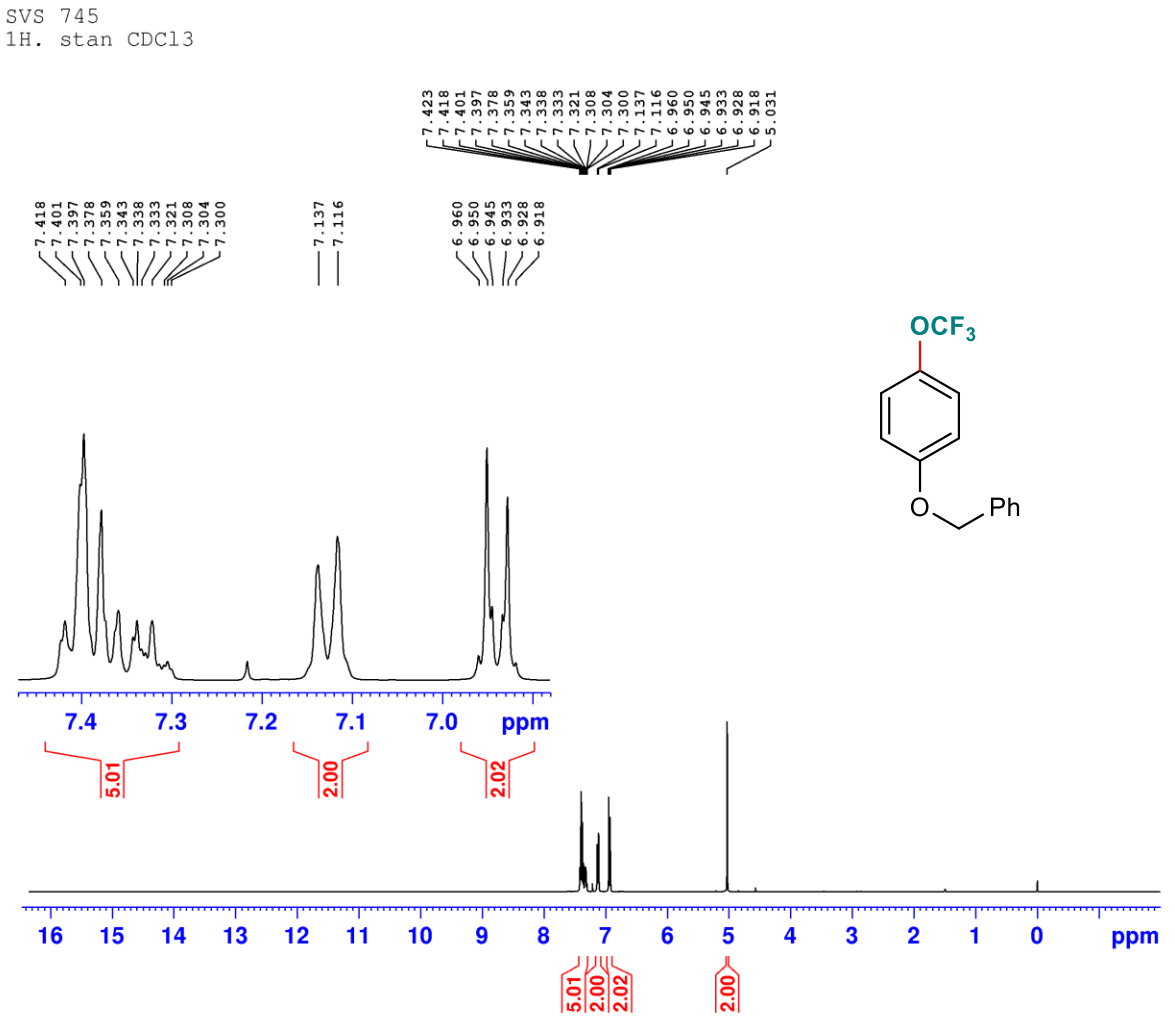
F2 - Processing parameters

SI	32768	
SF	100.6127685	MHz
WDW	EM	
SSB	0	
LB	1.00	Hz
GB	0	
PC	1.40	

^{19}F NMR of Compound **4m**



^{1}H NMR of Compound **4n**



BRUKER

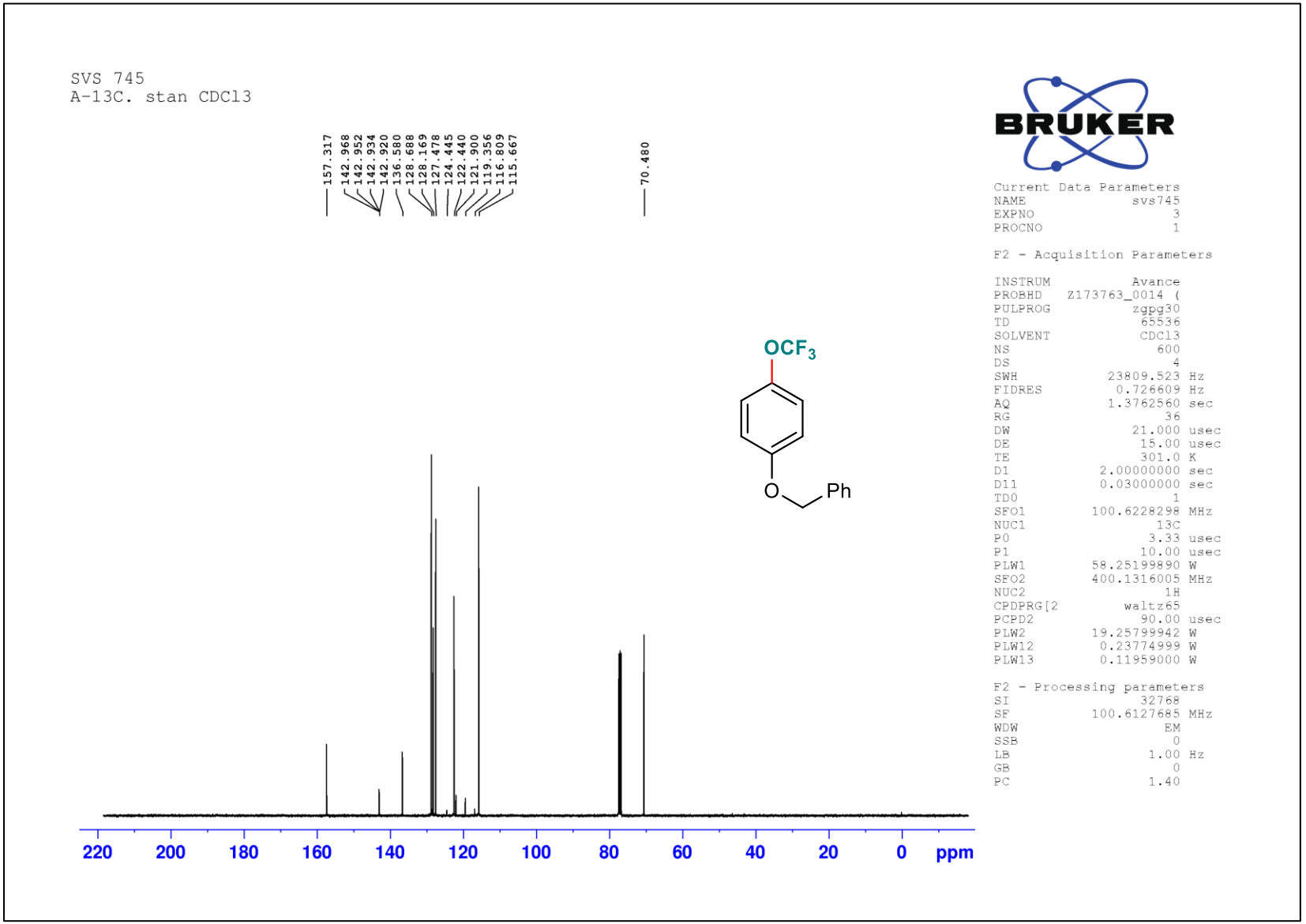
```
Current Data Parameters
NAME                 svs745
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters

INSTRUM                Avance
PROBHD    Z173763_0014 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8196.722 Hz
FIDRES              0.250144 Hz
AQ                  3.9976959 sec
RG                       101
DW                    61.000 usec
DE                    13.54 usec
TE                    300.5 K
D1                  1.00000000 sec
TD0                        1
SFO1              400.1324708 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1             19.25799942 W

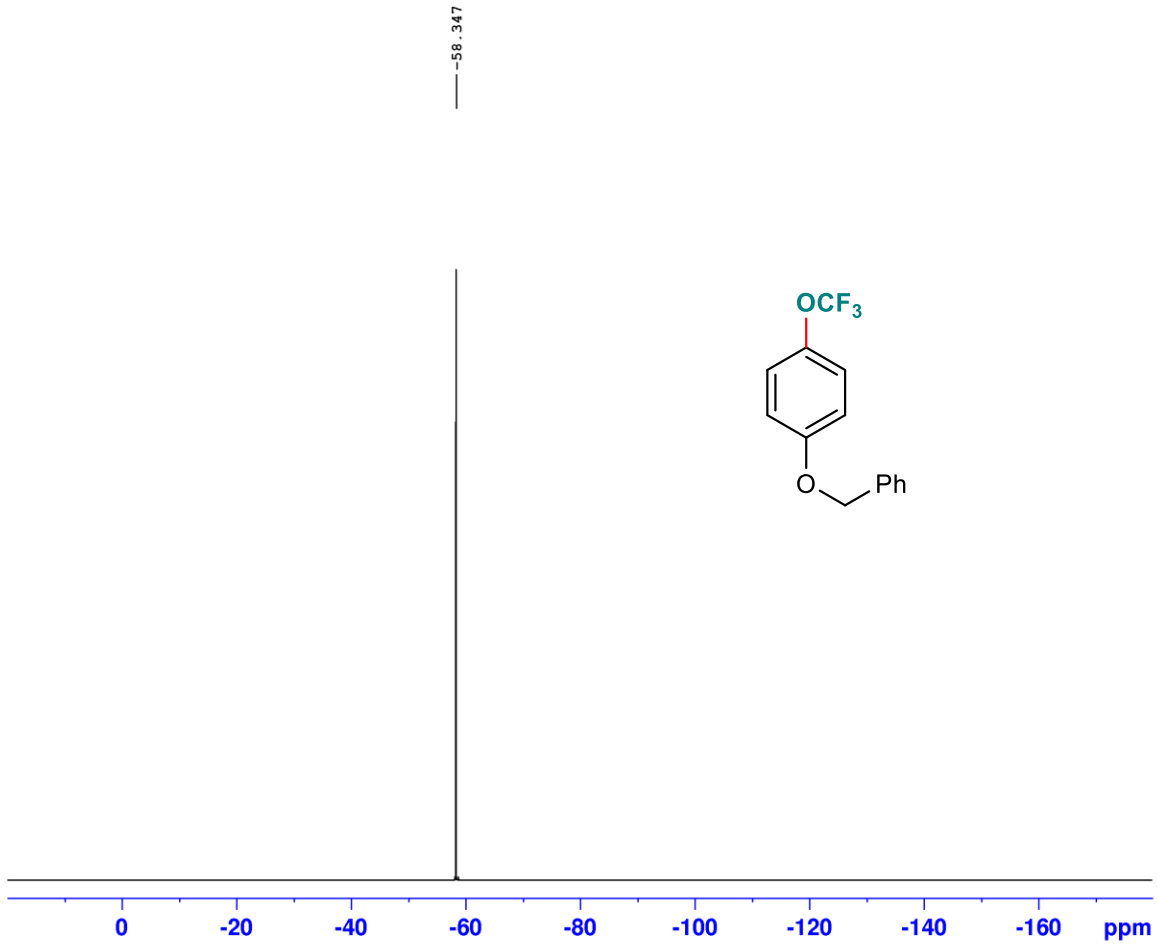
F2 - Processing parameters
SI                     65536
SF                400.1300263 MHz
WDW                       EM
SSB                        0
LB                    0.30 Hz
GB                         0
PC                     1.00
```

^{13}C NMR of Compound **4n**



^{19}F NMR of Compound **4n**

SVS 745
19F. stan CDCl3



Current Data Parameters
NAME svs745
EXPNO 2
PROCNO 1

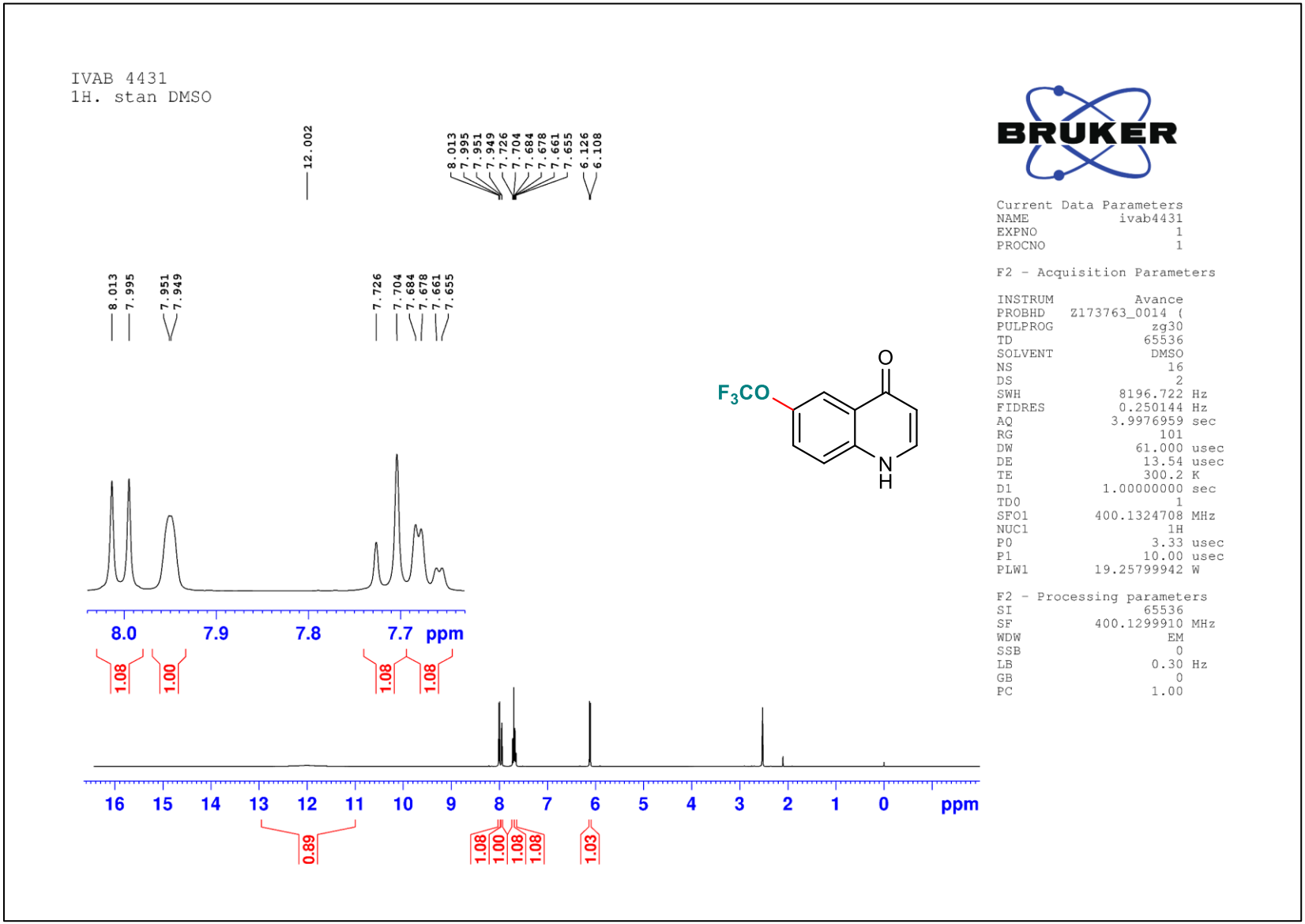
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7208960 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
PLW1	36.00000000 W

F2 - Processing parameters

SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{1}H NMR of Compound **4o**



BRUKER

Current Data Parameters
NAME ivab4431
EXPNO 1
PROCNO 1

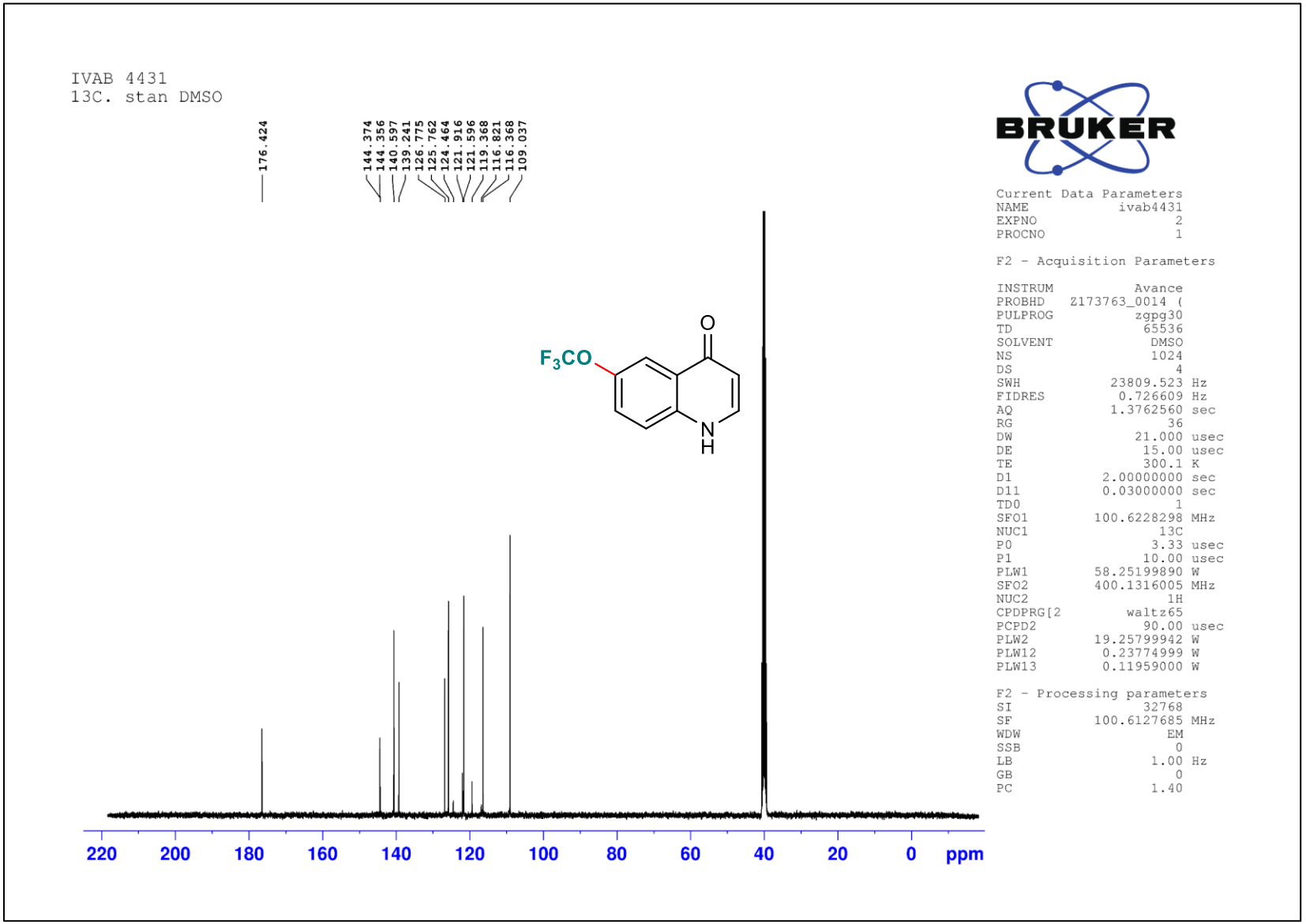
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	16
DS	2
SWH	8196.722 Hz
FIDRES	0.250144 Hz
AQ	3.9976959 sec
RG	101
DW	61.000 usec
DE	13.54 usec
TE	300.2 K
D1	1.00000000 sec
TD0	1
SFO1	400.1324708 MHz
NUC1	1H
P0	3.33 usec
P1	10.00 usec
PLW1	19.25799942 W

F2 - Processing parameters

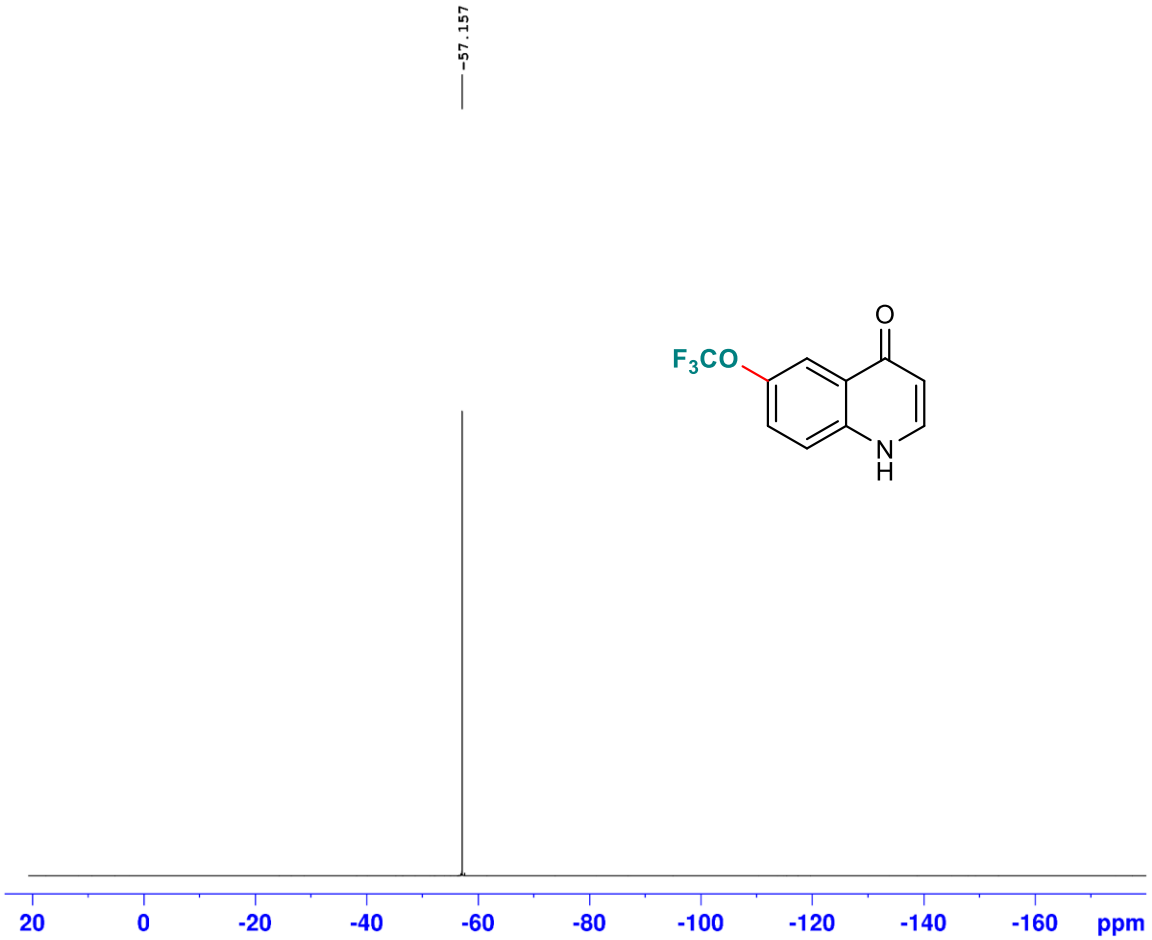
SI	65536
SF	400.1299910 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{13}C NMR of Compound **4o**



^{19}F NMR of Compound **4o**

IVAB 4431
19F. stan DMSO



Current Data Parameters
NAME ivab4431
EXPNO 3
PROCNO 1

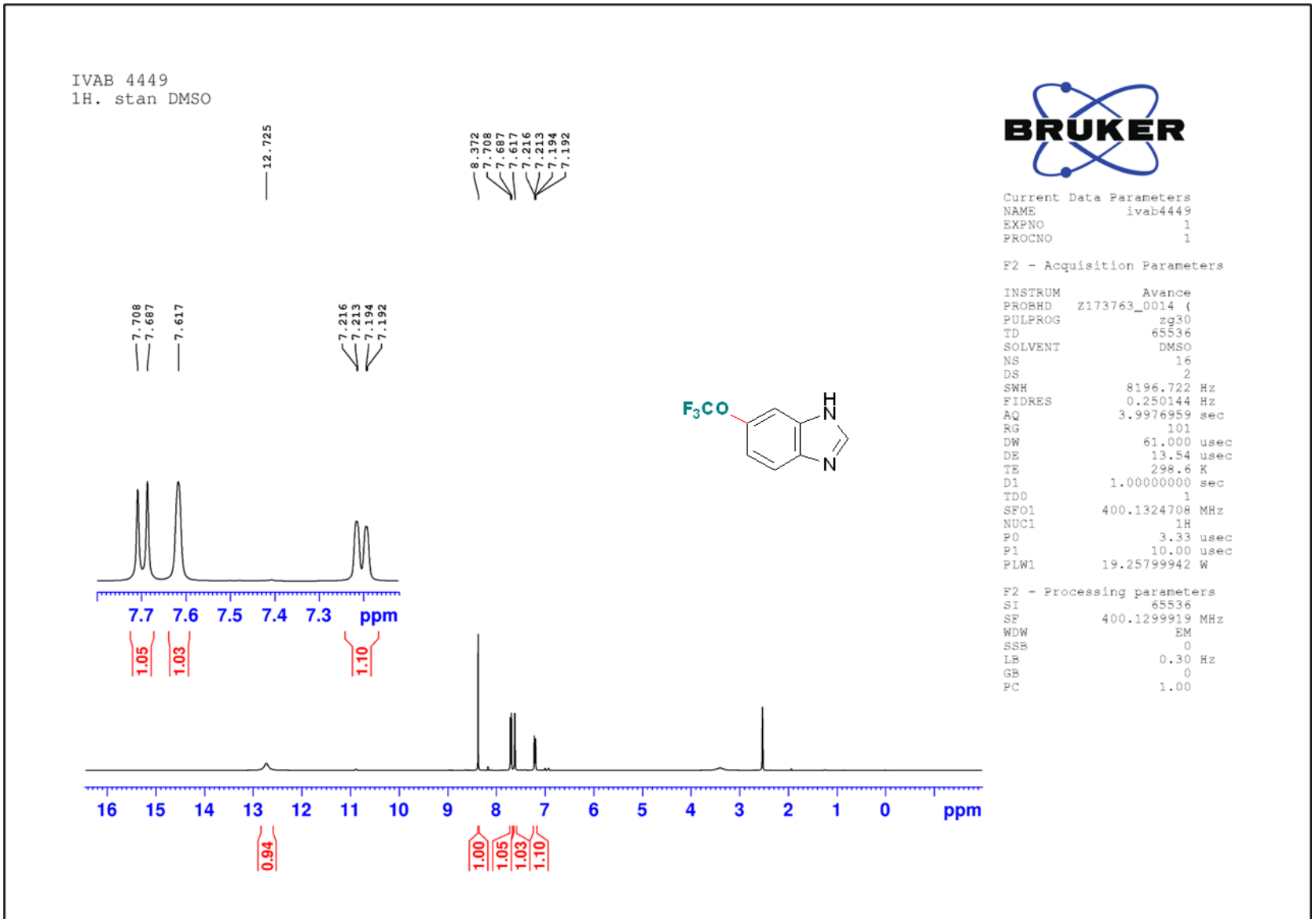
F2 - Acquisition Parameters

INSTRUM	Avance
PROBHD	Z173763_0014 (
PULPROG	zg
TD	131072
SOLVENT	DMSO
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7208960 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	299.8 K
D1	1.00000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
PLW1	36.00000000 W

F2 - Processing parameters

SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

^{1}H NMR of Compound **4p**



BRUKER

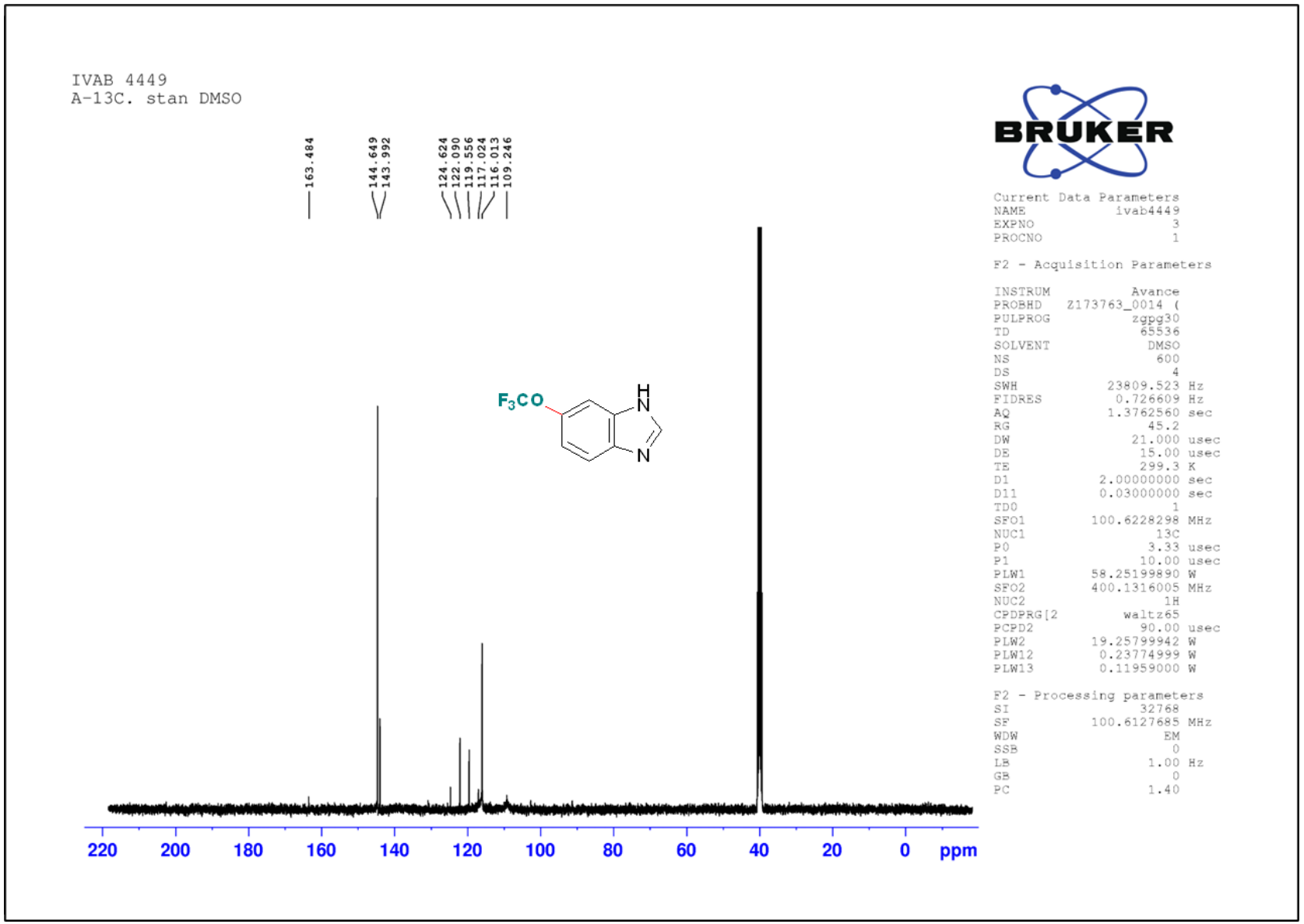
```
Current Data Parameters
NAME                  ivab4449
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters

INSTRUM                 Avance
PROBHD    Z173763_0014 (
PULPROG                   zg30
TD                       65536
SOLVENT                   DMSO
NS                          16
DS                           2
SWH                   8196.722 Hz
FIDRES                0.250144 Hz
AQ                    3.9976959 sec
RG                         101
DW                      61.000 usec
DE                      13.54 usec
TE                      298.6 K
D1                    1.00000000 sec
TD0                          1
SFO1                400.1324708 MHz
NUC1                         1H
P0                       3.33 usec
P1                      10.00 usec
PLW1                19.25799942 W

F2 - Processing parameters
SI                       65536
SF                  400.1299919 MHz
WDW                         EM
SSB                          0
LB                       0.30 Hz
GB                           0
PC                        1.00
```

^{13}C NMR of Compound **4p**



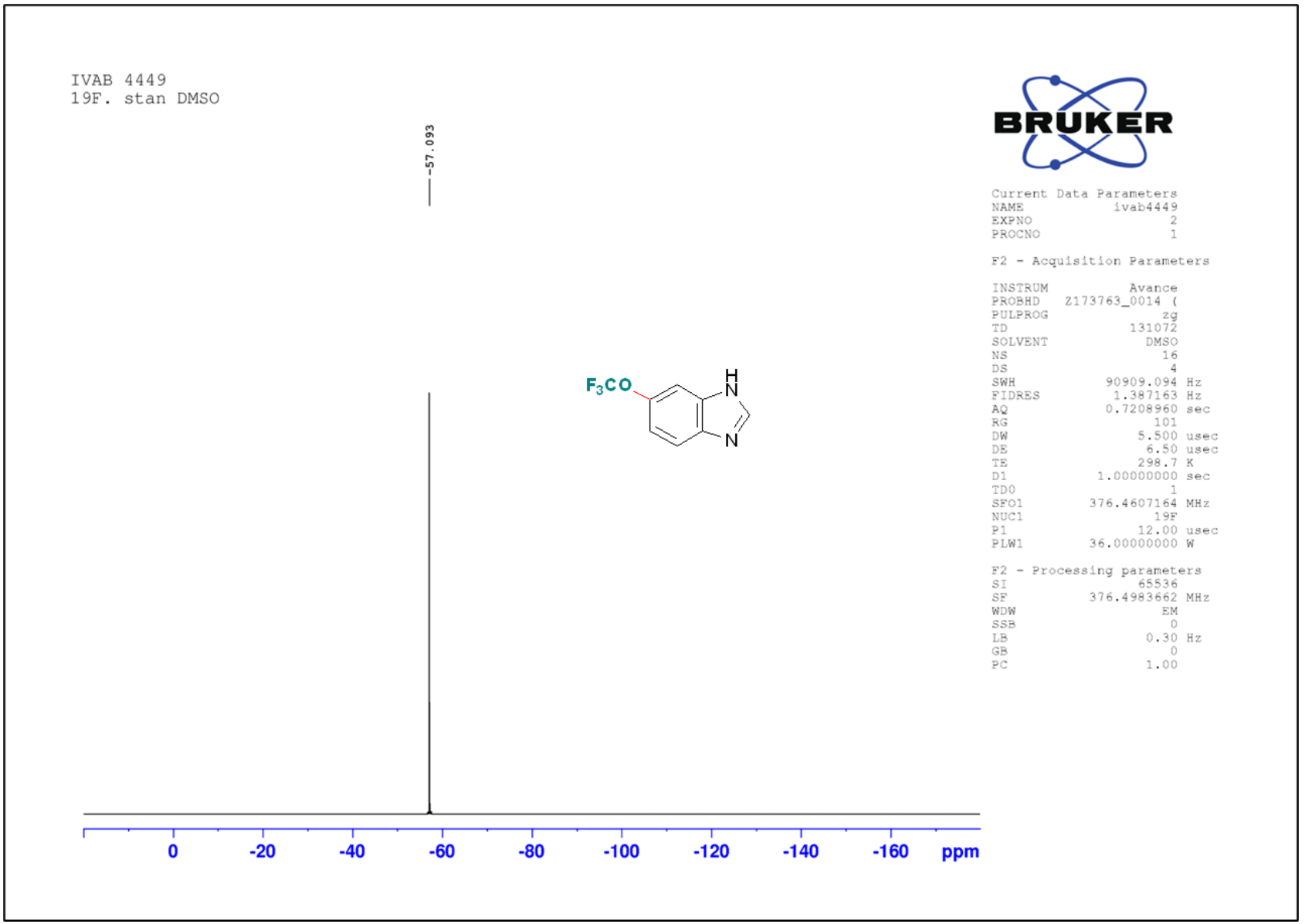

```
Current Data Parameters
NAME            ivab4449
EXPNO                  3
PROCNO                 1

F2 - Acquisition Parameters

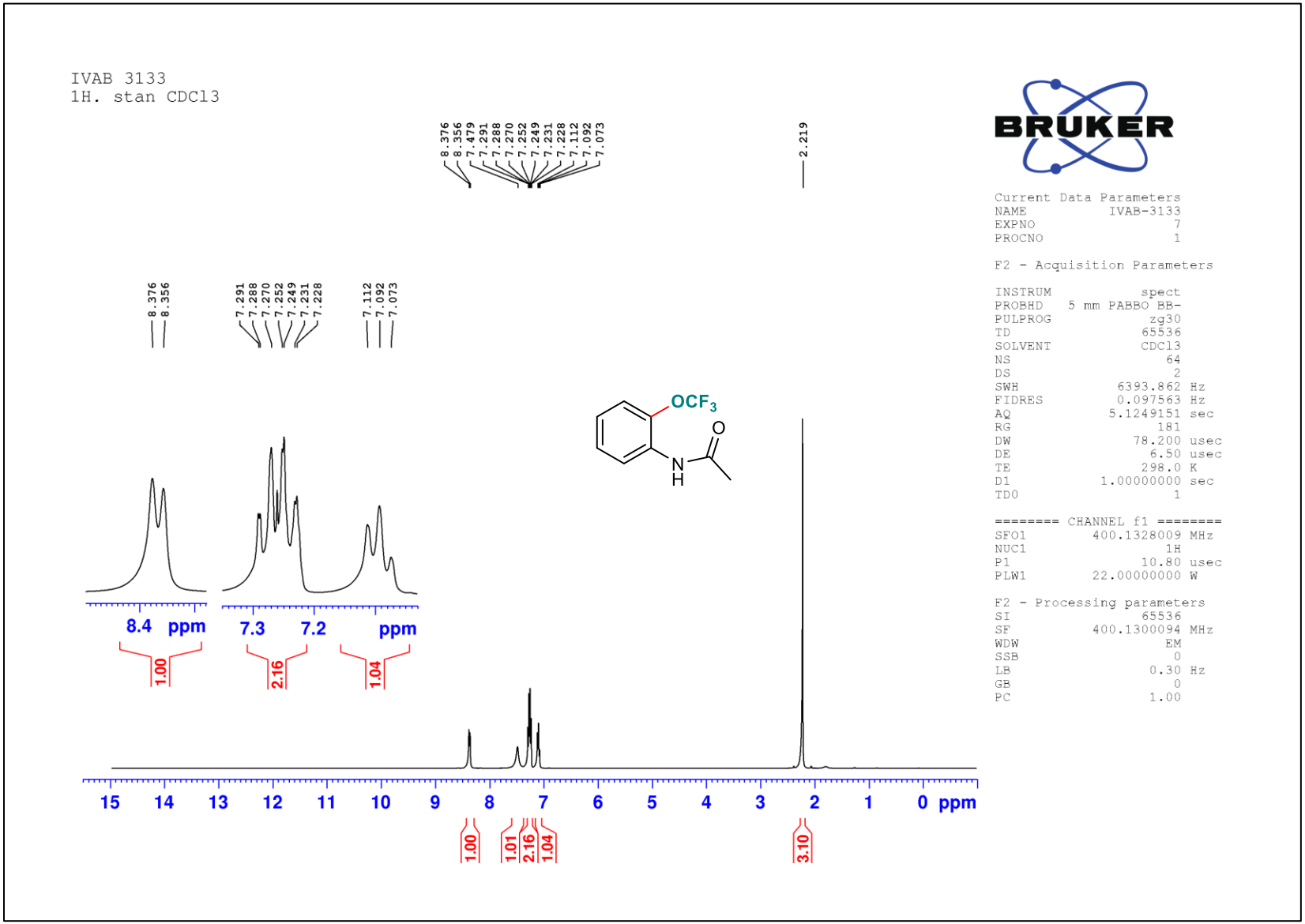
INSTRUM             Avance
PROBHD    Z173763_0014 (
PULPROG           zgpg30
TD                 65536
SOLVENT             DMSO
NS                   600
DS                     4
SWH            23809.523 Hz
FIDRES          0.726609 Hz
AQ              1.3762560 sec
RG                  45.2
DW                21.000 usec
DE                15.00 usec
TE                299.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1
SFO1         100.6228298 MHz
NUC1                 13C
P0                  3.33 usec
P1                 10.00 usec
PLW1         58.25199890 W
SFO2         400.1316005 MHz
NUC2                 1H
CPDPRG[2         waltz65
PCPD2             90.00 usec
PLW2         19.25799942 W
PLW12         0.23774999 W
PLW13         0.11959000 W

F2 - Processing parameters
SI                 32768
SF           100.6127685 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

^{19}F NMR of Compound **4p**



^{1}H NMR of Compound **4q**




```
Current Data Parameters
NAME            IVAB-3133
EXPNO                   7
PROCNO                  1

F2 - Acquisition Parameters

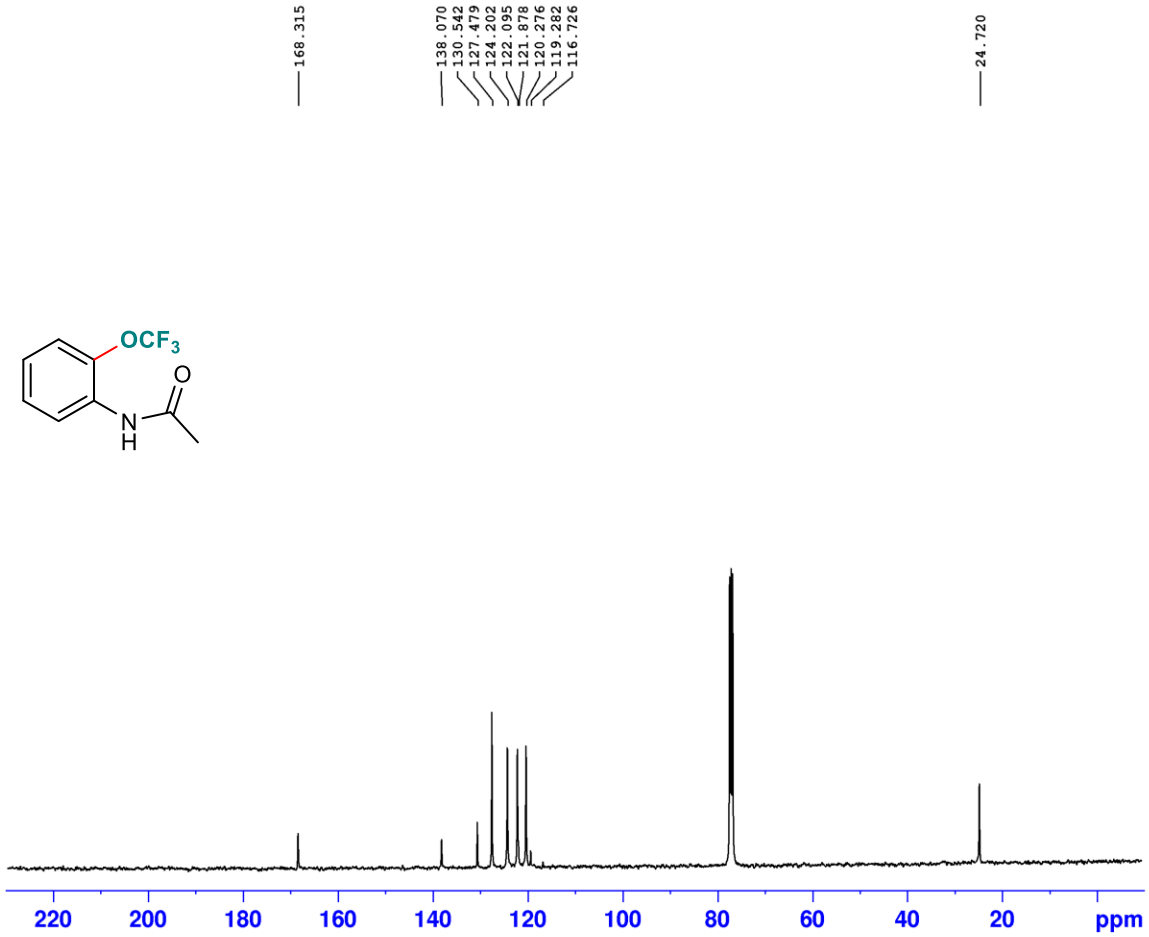
INSTRUM               spect
PROBHD    5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      64
DS                       2
SWH               6393.862 Hz
FIDRES            0.097563 Hz
AQ                5.1249151 sec
RG                     181
DW                  78.200 usec
DE                   6.50 usec
TE                  298.0 K
D1             1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1          400.1328009 MHz
NUC1                    1H
P1                   10.80 usec
PLW1          22.00000000 W

F2 - Processing parameters
SI                   65536
SF            400.1300094 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```

^{13}C NMR of Compound **4q**

IVAB 3133
A-13C. stan CDCl3



Current Data Parameters
NAME IVAB-3133
EXPNO 8
PROCNO 1

F2 - Acquisition Parameters

INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1238
DS	4
SWH	24038.461 Hz
FIDRES	0.366798 Hz
AQ	1.3631488 sec
RG	322
DW	20.800 usec
DE	6.50 usec
TE	300.0 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1

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

SFO1	100.6238364 MHz
NUC1	13C
P1	12.00 usec
PLW1	37.00000000 W

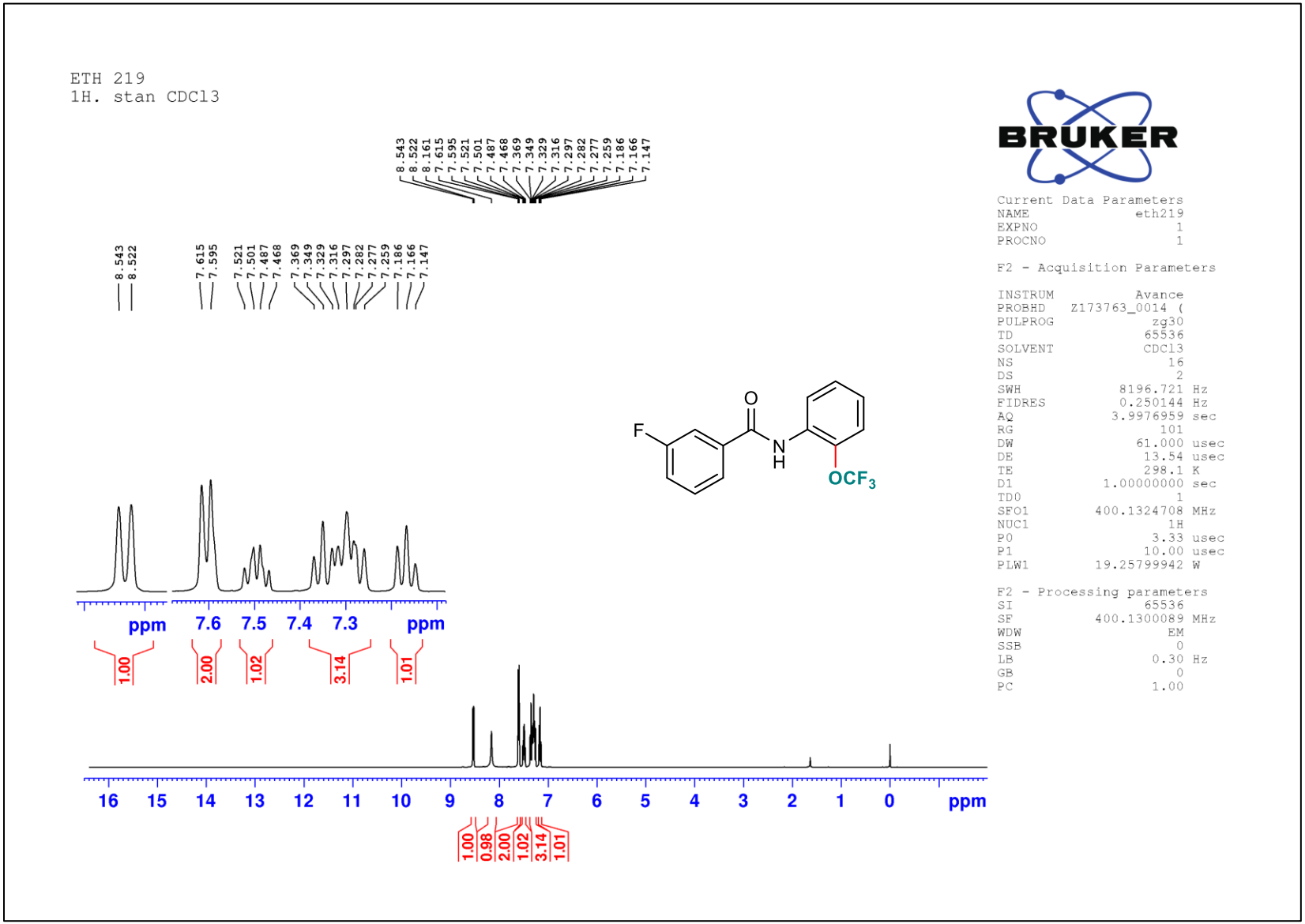
======== CHANNEL f2 ========

SFO2	400.1316005 MHz
NUC2	1H
CPDPRG[2	waltz16
PCPD2	90.00 usec
PLW2	22.00000000 W
PLW12	0.31680000 W
PLW13	0.15934999 W

F2 - Processing parameters

SI	32768
SF	100.6127690 MHz
WDW	EM
SSB	0
LB	10.00 Hz
GB	0
PC	1.40

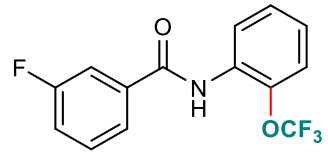
^{1}H NMR of Compound **4r**

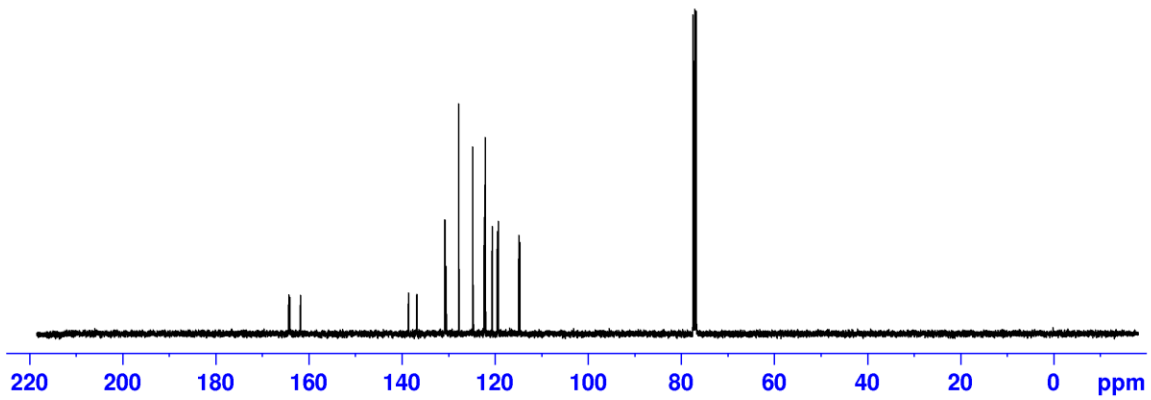


^{13}C NMR of Compound **4r**

ETH 219
A-13C. stan CDCl3

164.200
164.028
164.004
161.729
138.488
138.477
136.765
136.697
130.747
130.668
130.433
127.707
124.708
124.500
122.218
122.189
122.021
121.920
120.511
119.432
119.338
119.221
114.789
114.559





BRUKER

Current Data Parameters
NAME eth219
EXPNO 2
PROCNO 1

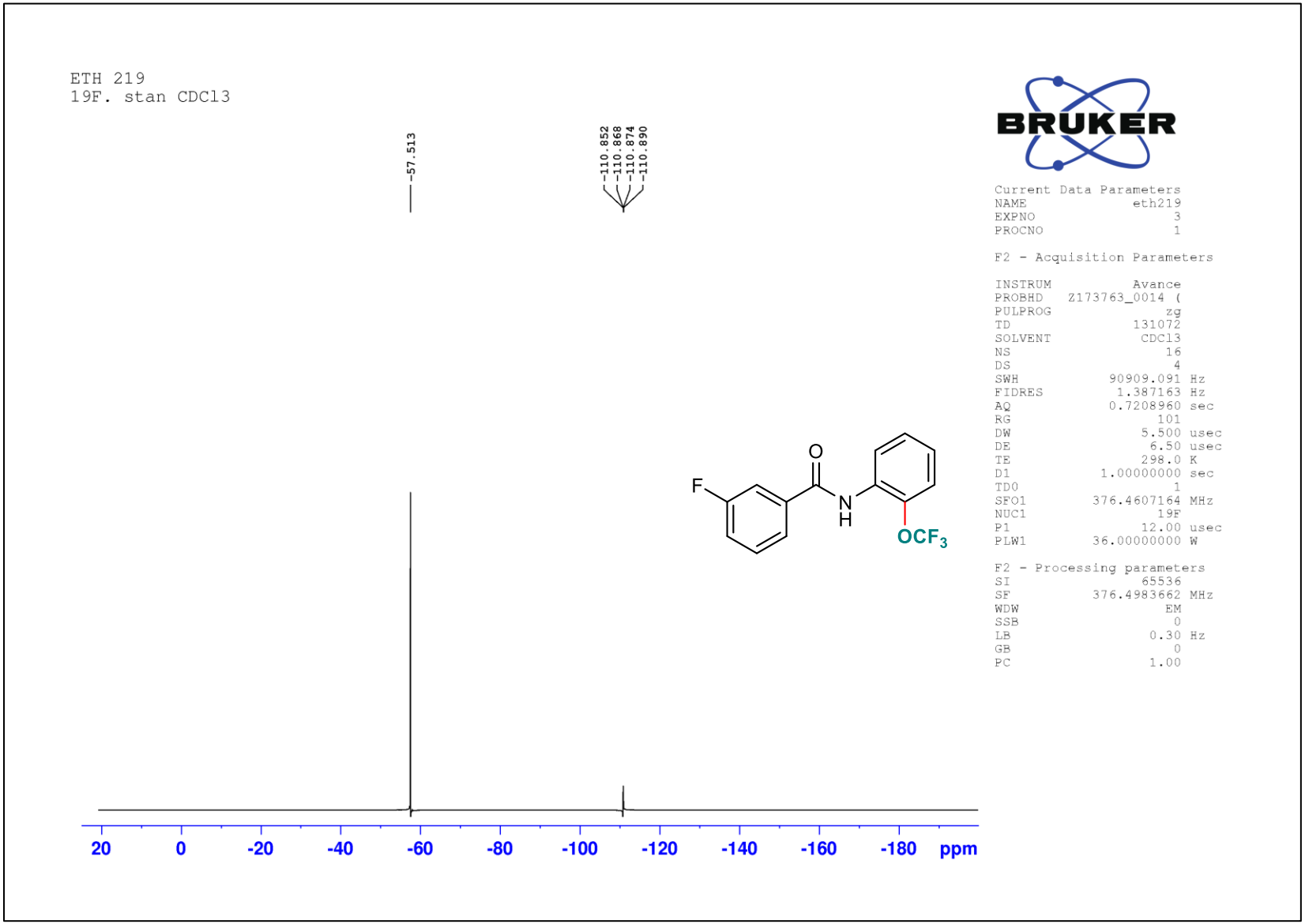
F2 - Acquisition Parameters

INSTRUM	Avance	
PROBHD	Z173763_0014 (	
PULPROG	zgpg30	
TD	65536	
SOLVENT	CDCl3	
NS	186	
DS	4	
SWH	23809.523	Hz
FIDRES	0.726609	Hz
AQ	1.3762560	sec
RG	36	
DW	21.000	usec
DE	15.00	usec
TE	299.2	K
D1	2.00000000	sec
D11	0.03000000	sec
TD0	1	
SFO1	100.6228298	MHz
NUC1	13C	
P0	3.33	usec
P1	10.00	usec
PLW1	58.25199890	W
SFO2	400.1316005	MHz
NUC2	1H	
CPDPRG[2	waltz65	
PCPD2	90.00	usec
PLW2	19.25799942	W
PLW12	0.23774999	W
PLW13	0.11959000	W

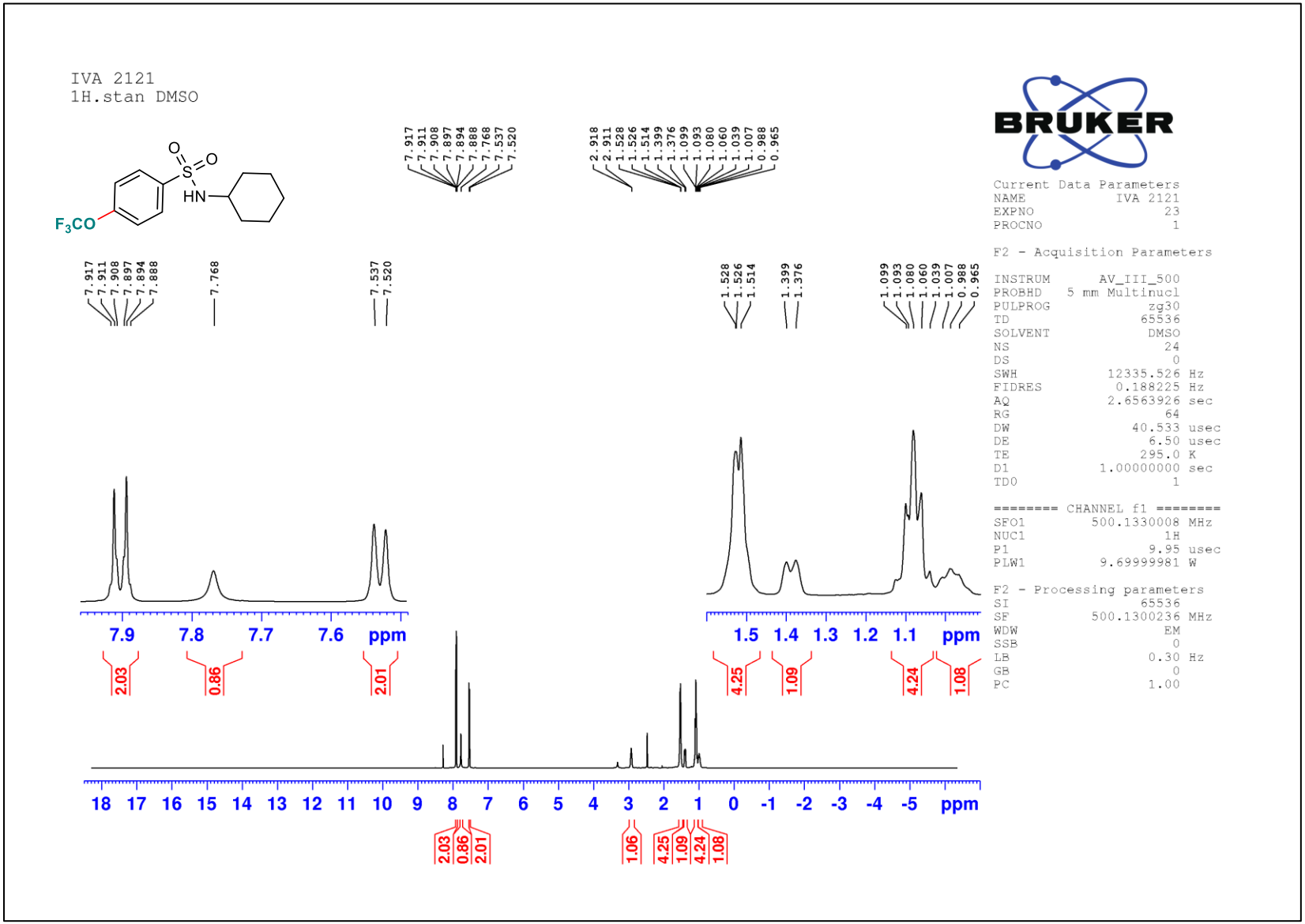
F2 - Processing parameters

SI	32768	
SF	100.6132336	MHz
WDW	EM	
SSB	0	
LB	1.00	Hz
GB	0	
PC	1.40	

^{19}F NMR of Compound **4r**



^{1}H NMR of Compound **4s**



BRUKER

Current Data Parameters
NAME IVA 2121
EXPNO 23
PROCNO 1

F2 - Acquisition Parameters

INSTRUM	AV_III_500
PROBHD	5 mm Multinucl
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	24
DS	0
SWH	12335.526 Hz
FIDRES	0.188225 Hz
AQ	2.6563926 sec
RG	64
DW	40.533 usec
DE	6.50 usec
TE	295.0 K
D1	1.00000000 sec
TD0	1

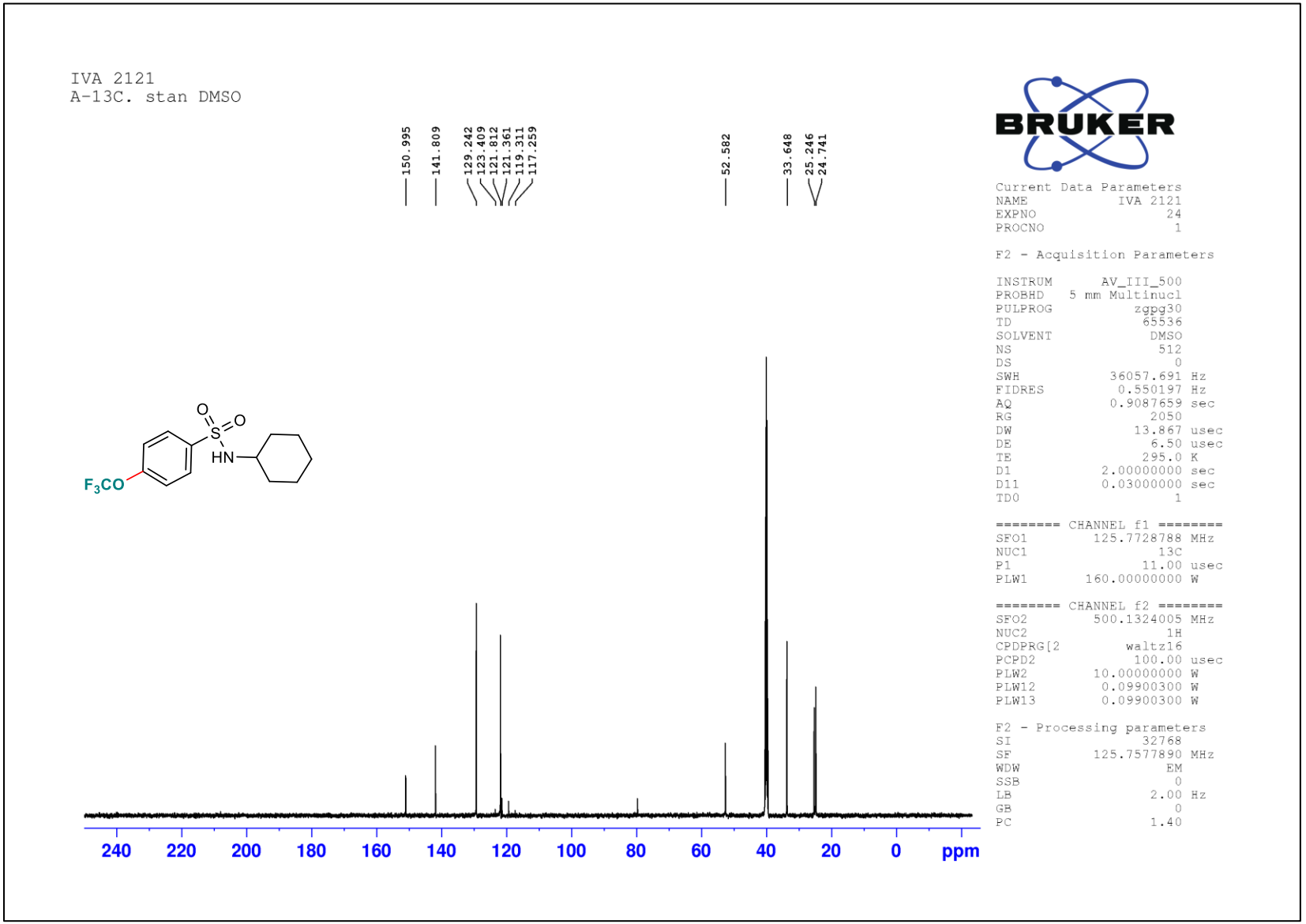
======== CHANNEL f1 ========

SFO1	500.1330008 MHz
NUC1	1H
P1	9.95 usec
PLW1	9.69999981 W

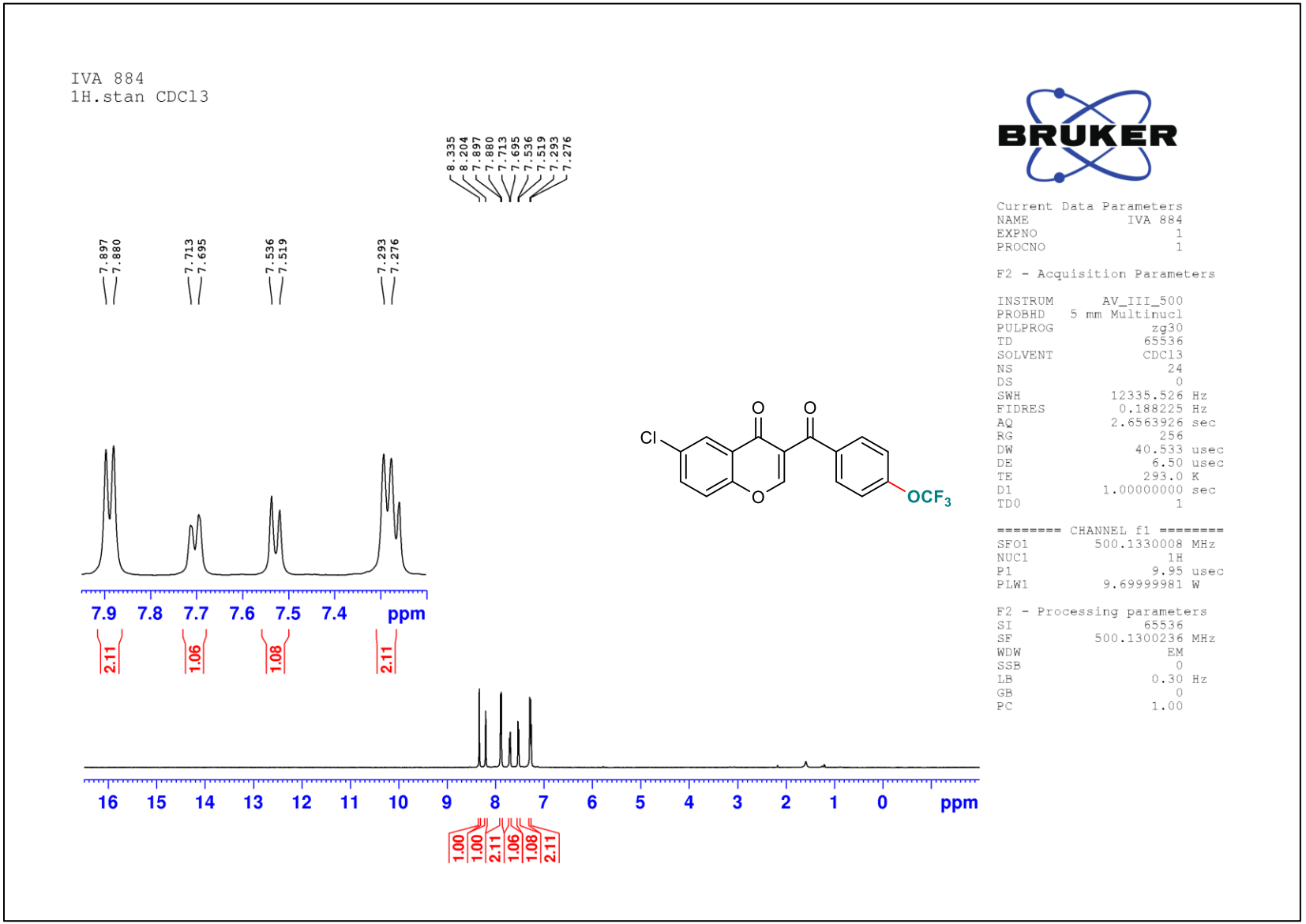
F2 - Processing parameters

SI	65536
SF	500.1300236 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

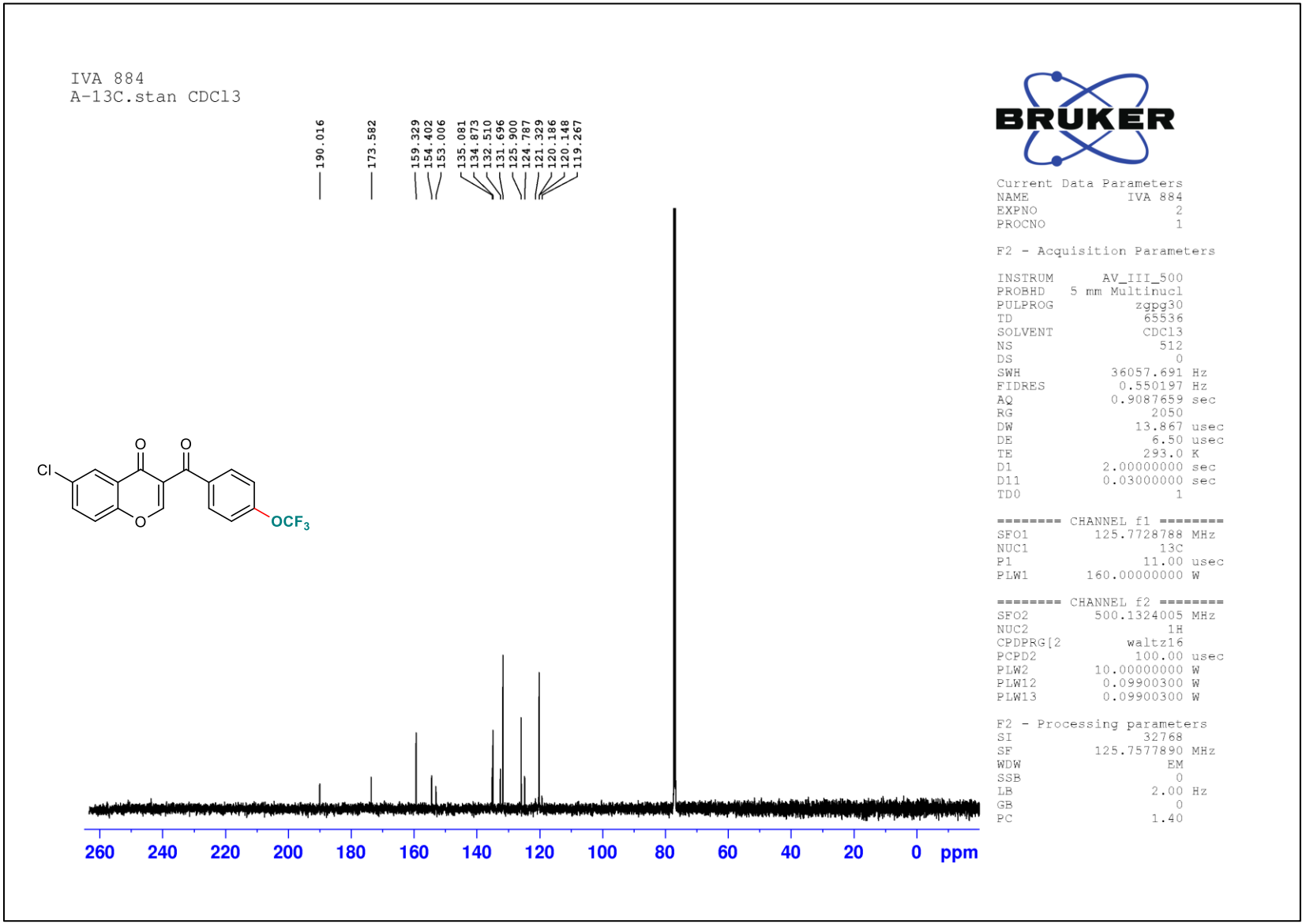
^{13}C NMR of Compound **4s**



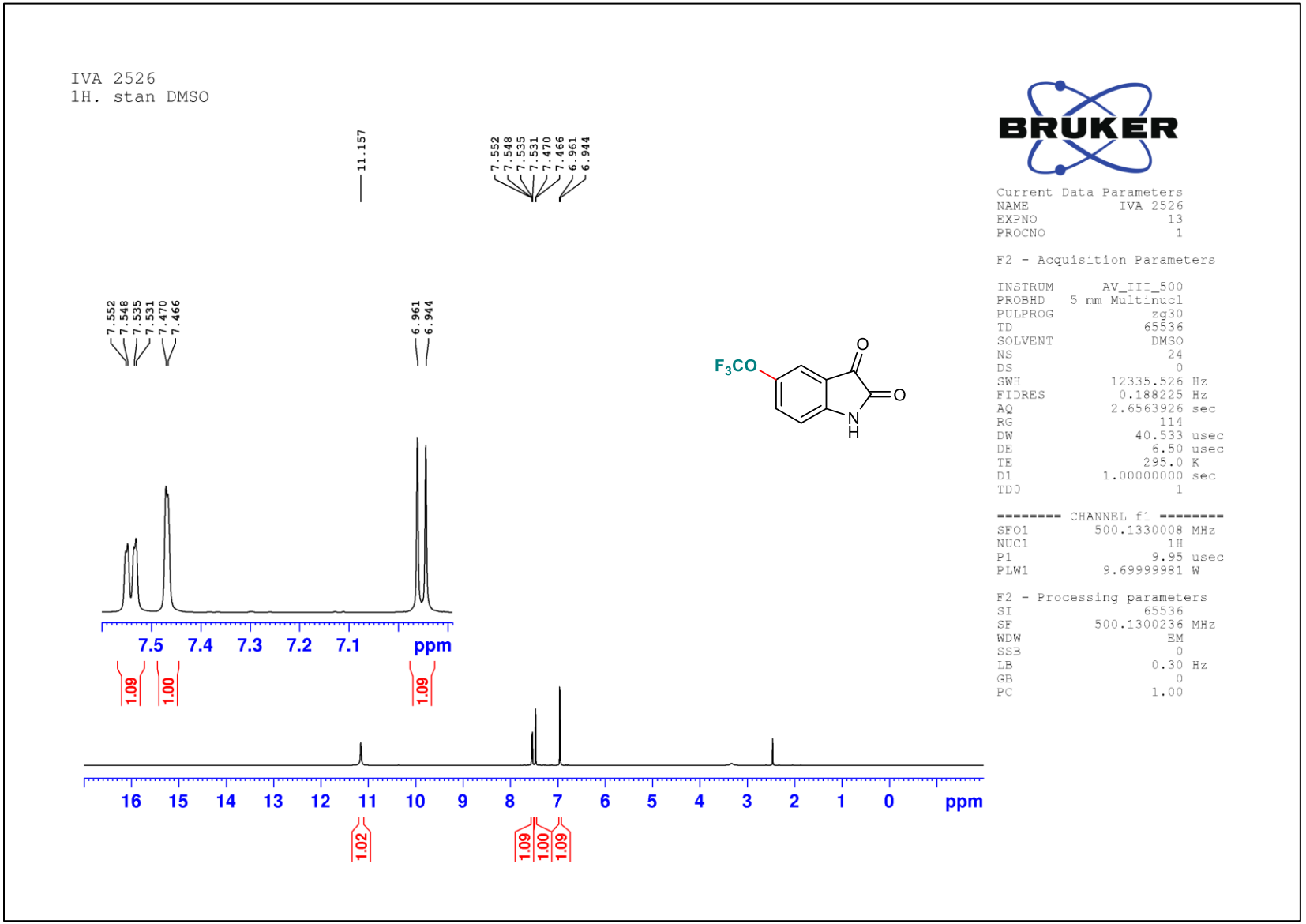
^{1}H NMR of Compound **4t**



^{13}C NMR of Compound **4t**



^{1}H NMR of Compound **4u**



Current Data Parameters
NAME IVA 2526
EXPNO 13
PROCNO 1

F2 - Acquisition Parameters

INSTRUM	AV_III_500	
PROBHD	5 mm Multinucl	
PULPROG	zg30	
TD	65536	
SOLVENT	DMSO	
NS	24	
DS	0	
SWH	12335.526	Hz
FIDRES	0.188225	Hz
AQ	2.6563926	sec
RG	114	
DW	40.533	usec
DE	6.50	usec
TE	295.0	K
D1	1.00000000	sec
TD0	1	

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

SFO1	500.1330008	MHz
NUC1	1H	
P1	9.95	usec
PLW1	9.69999981	W

F2 - Processing parameters

SI	65536	
SF	500.1300236	MHz
WDW	EM	
SSB	0	
LB	0.30	Hz
GB	0	
PC	1.00	

^{13}C NMR of Compound **4u**