Supporting Information

N-Difluoromethylation of Aniline Derivatives with Difluorocarbene Precursors

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Table of contents

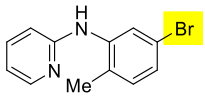
1. General Considerations

Unless otherwise noted, all reagents were purchased from commercial suppliers and used without purification. All reactions were performed in a resealable screw-capped Schlenk flask (approx. 20 mL volume) in the presence of Teflon coated magnetic stirrer bar (4 mm × 10 mm). Thin layer chromatography was performed on precoated silica gel 60 F_{254} plates. Silica gel (230-400 mesh) was used for column chromatography. ^{1}H NMR spectra were recorded on a 400 MHz spectrometer. Spectra were referenced internally to the residual proton resonance in $CDCl_3$ (δ 7.26 ppm), or with TMS (δ 0.00 ppm) as the internal standard. Chemical shifts (δ) were reported as part per million (ppm) in δ scale downfield from TMS. ^{13}C NMR spectra were recorded on a 100 MHz spectrometer and the spectra were referenced to $CDCl_3$ (δ = 77.16 ppm, the middle peak). ^{19}F NMR spectra were recorded on a 376 MHz spectrometer. Coupling constants (J) were reported in Hertz (Hz). High-resolution mass spectra (HRMS) were obtained on a ESI-QToF mass spectrometer which the ionization method is electrospray ionization (ESI) and the mass analyzer is a quadrupole time-of-flight mass analyzer. GC-MS analysis was conducted on a GCD system. Products described in GC yield were accorded to the authentic samples/dodecane calibration standard from GCFID system.

2. General procedures for synthesis of *N*-aryl-2-aminopyridines derivatives 1

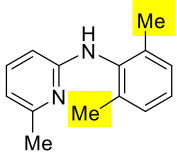
N-Aryl-2-aminopyridines were prepared according to the previously reported procedures.[1] CuI (2 mg, 1 mol%), amine (1.5 mmol), KO*t*-Bu (224 mg, 2.0 mmol), and solid aryl bromides (1.0 mmol) were added in a 10 mL flask equipped with a Teflon valve. The tube was evacuated and backfilled with nitrogen. Dioxane (1.5 mL), aryl bromides (1.0 mmol, if liquid) were added by syringe. The reaction mixture was allowed to stir at 160 °C for indicated time. The mixture was cooled to room temperature and extracted with ethyl acetate. The combined organic phase was washed with brine and dried over Na_2SO_4. The organic layers were collected, filtered and the solvent was removed under vacuum. The residue was purified by column chromatography on silica gel.

N-(5-Bromo-2-methylphenyl)pyridin-2-amine (compound 1p)



2-Bromopyridine (157 mg, 1.0 mmol) and 5-bromo-2-methylaniline (185 mg, 1.0 mmol) were used with the above general procedures heating at 160 °C for 7 h to give **1p** as white solid (209 mg, 80%); m.p. = 105-107 °C; ethyl acetate/hexane = 1:10, R_f =0.5; **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.20 (dd, *J* = 5.2, 1.2 Hz, 1H), 7.69 (d, *J* = 1.6 Hz, 1H), 7.53-7.49 (m, 1H), 7.16-7.13 (m, 1H), 7.09 (d, *J* = 8.0 Hz, 1H), 6.78-6.72 (m, 2H), 6.30 (s, 1H), 2.22 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 155.9, 148.7, 140.2, 138.0, 132.3, 128.9, 126.6, 124.2, 119.9, 115.6, 108.5, 17.8; **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{12}N_2Br$ 263.0184; Found 263.0182.

N-(2,6-Dimethylphenyl)-6-methylpyridin-2-amine (compound 1y)



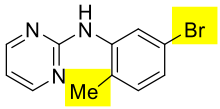
2-Bromo-6-methylpyridine (171 mg, 1.0 mmol) and 2,6-dimethylaniline (121 mg, 1.0 mmol) were used with the above general procedures heating at 160 °C for 7 h to give **1y** as white solid (159 mg, 75%); m.p. = 95-97 °C; ethyl acetate/hexane = 1:10, R_f =0.7; **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.25 (t, *J* = 7.8 Hz, 1H), 7.13 (s, 3H), 6.50 (d, *J* = 7.3 Hz, 1H), 6.05 (bs, 1H), 5.76 (d, *J* = 8.3 Hz, 1H), 2.43 (s, 3H), 2.23 (s, 6H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 157.4 (2C), 138.3, 137.0, 136.7, 128.7, 126.8, 113.2, 102.4, 24.4, 18.6; **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{14}H_{17}N_2$ 213.1392; Found

213.1388.

3. General procedures for synthesis of *N*-aryl-2-aminopyrimidines derivatives 3

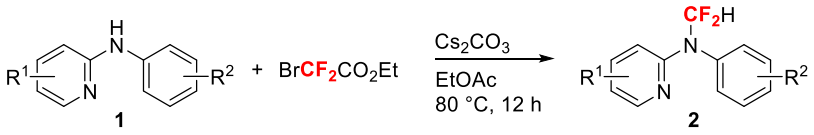
N-aryl-2-aminopyrimidines were prepared according to the previously reported procedures.[2] Aniline derivatives (7.5 mmol), 2-chloro-pyrimidine (0.57 g, 5.0 mmol) and acetic acid (5 mL) in 1,4-dioxane (13 mL) were added in an oven-dried flask. The reaction mixture was stirred at 110 °C for 9 h and monitored by TLC. Upon completion, the mixture was cooled to room temperature and extracted with dichloromethane. The combined organic phase was washed with brine and dried over Na_2SO_4. The organic layers were collected, filtered and the solvent was removed under vacuum. The residue was purified by column chromatography on silica gel. Recrystallization was carried out if needed.

_N_-(5-Bromo-2-methylphenyl)pyrimidin-2-amine (compound 3d)



5-Bromo-2-methylaniline (185 mg, 1.0 mmol), 2-chloro-pyrimidine (171 mg, 1.5 mmol), and acetic acid (90 mg, 1.5 mmol) in 1,4-dioxane (1.0 mL) were used with the above general procedures heating at 110 °C for 9 h to give **3d** as white solid (152 mg, 58%); m.p. = 131-132 °C; ethyl acetate/hexane = 1:5, R_f =0.3; **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.42 (d, J = 4.8 Hz, 2H), 8.32 (d, J = 1.9 Hz, 1H), 7.15-7.12 (m, 1H), 7.06-7.04 (d, J = 8.0 Hz, 1H), 7.00 (bs, 1H), 6.74 (t, J = 4.8 Hz, 1H), 2.27 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 160.2, 158.2, 138.8, 131.7, 126.9, 126.3, 123.9, 120.0, 113.1, 17.8; **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{11}H_{11}BrN_3$ 264.0136; Found 264.0132.

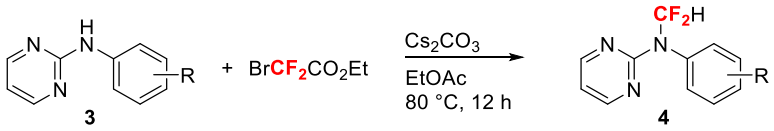
4. General procedures for *N*-difluoromethylation of *N*-aryl-2-aminopyridines



A sealed tube was charged with *N*-aryl-2-aminopyridines **1** (0.3 mmol), ethyl bromodifluoroacetate (0.39 mmol), Cs_2CO_3 (0.45 mmol), and ethyl acetate (1.0 mL). The reaction mixture was then placed into a preheated oil bath (80 °C) and stirred for 12 hours. After cooling to room temperature, the reaction mixture was diluted with ethyl acetate (10 mL) and filtered through a plug of celite. The filtrate was concentrated under reduced pressure and the crude products were purified by flash chromatography on silica gel (hexane /ethyl acetate) to

afford the corresponding products **2**.

5. General procedures for *N*-difluoromethylation of *N*-aryl-2-aminopyrimidines

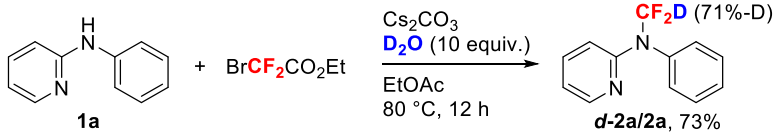


A sealed tube was charged with *N*-aryl-2-aminopyrimidines **3** (0.3 mmol), ethyl bromodifluoroacetate (0.45 mmol), Cs_2CO_3 (0.45 mmol), and ethyl acetate (1.0 mL). The reaction mixture was then placed into a preheated oil bath (80 °C) and stirred for 12 hours. After cooling to room temperature, the reaction mixture was diluted with ethyl acetate (10 mL) and filtered through a plug of celite. The filtrate was concentrated under reduced pressure and the crude products were purified by flash chromatography on neutral alumina (hexane /ethyl acetate) to afford the corresponding products **4**.

6. General procedures for large-scale synthesis of compound 2a and 2m

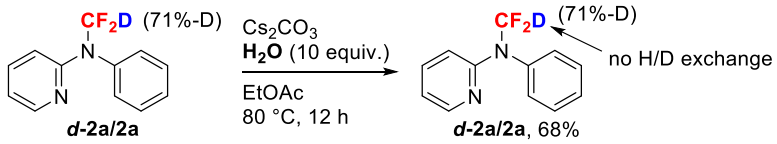
A sealed tube was charged with *N*-phenylpyridin-2-amine (**1a**) or *N*-(2,4-dichlorophenyl)pyridin-2-amine (**1m**) (10.0 mmol), ethyl bromodifluoroacetate (13 mmol, 2.64 g), Cs_2CO_3 (15 mmol, 4.89 g), and ethyl acetate (20 mL). The reaction mixture was then placed into a preheated oil bath (80 °C) and stirred for 12 hours. After cooling to room temperature, the reaction mixture was diluted with ethyl acetate (30 mL) and filtered through a plug of celite. The filtrate was concentrated under reduced pressure and the crude products were purified by flash chromatography on silica gel (hexane /ethyl acetate) to afford the corresponding products **2a** or **2m** in 94% (2.07 g) and 95% (2.75 g) respectivtely.

7. General procedures for deuterium-labelling experiments

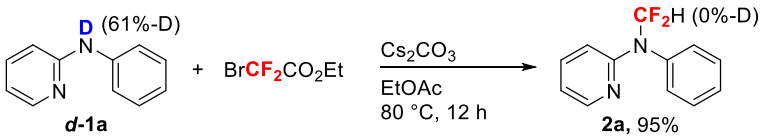


A sealed tube was charged with *N*-phenyl-2-aminopyridines (**1a**) (0.9 mmol), ethyl bromodifluoroacetate (1.17 mmol), Cs_2CO_3 (1.35 mmol), deuterium oxide (9.0 mmol) and ethyl acetate (4.0 mL). The reaction mixture was then placed into a preheated oil bath (80 °C) and stirred for 12 hours. After cooling to room temperature, the reaction mixture was diluted with

ethyl acetate (10 mL) and filtered through a plug of celite. The filtrate was concentrated under reduced pressure and the crude products were purified by flash chromatography on silica gel (hexane /ethyl acetate) to afford the corresponding product ***d*-2a/2a** in 73%.



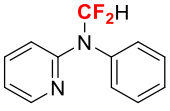
A sealed tube was charged with *N*-(difluoromethyl-*d*)-*N*-phenylpyridin-2-amine (***d*-2a/2a**) (0.3 mmol), Cs_2CO_3 (0.45 mmol), water (3.0 mmol) and ethyl acetate (1.0 mL). The reaction mixture was then placed into a preheated oil bath (80 °C) and stirred for 12 hours. After cooling to room temperature, the reaction mixture was diluted with ethyl acetate (10 mL) and filtered through a plug of celite. The filtrate was concentrated under reduced pressure and the crude products were purified by flash chromatography on silica gel (hexane /ethyl acetate) to afford the corresponding product ***d*-2a/2a** in 68%.



A sealed tube was charged with *N*-phenylpyridin-2-amine-*d* (***d*-1a**) (0.3 mmol), Cs_2CO_3 (0.45 mmol), water (3.0 mmol) and ethyl acetate (1.0 mL). The reaction mixture was then placed into a preheated oil bath (80 °C) and stirred for 12 hours. After cooling to room temperature, the reaction mixture was diluted with ethyl acetate (10 mL) and filtered through a plug of celite. The filtrate was concentrated under reduced pressure and the crude products were purified by flash chromatography on silica gel (hexane /ethyl acetate) to afford the corresponding product **2a** in 95% with 0%-*d*-content.

8. Characterization data for all compounds

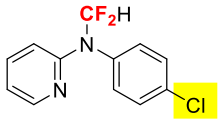
N-(Difluoromethyl)-*N*-phenylpyridin-2-amine (Product 2a)



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 97% yield (64 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.92 (t, J = 60.9 Hz, 1H), 7.37-7.34 (m, 2H), 7.27 (d, J = 7.4 Hz, 1H), 7.08 (t, J = 7.4 Hz, 1H), 6.92 (d, J = 7.8 Hz, 2H), 6.83-6.79 (m, 1H), 6.42 (d, J = 9.7 Hz, 1H), 5.89 (t, J = 6.8 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.3,

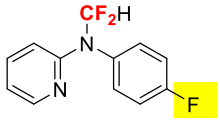
149.2, 135.6, 129.5, 129.0 (t, *J* = 3.7 Hz), 122.7, 122.0, 115.7, 108.1 (t, *J* = 248.7 Hz), 104.4; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{11}N_2F_2$ 221.0885; Found 221.0883.

_N_-(4-Chlorophenyl)-_N_-(difluoromethyl)pyridin-2-amine (product 2b)



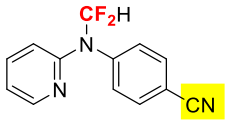
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 97% yield (74 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.82 (t, *J* = 60.9 Hz, 1H), 7.23-7.20 (m, 3H), 6.80-6.74 (m, 3H), 6.33 (d, *J* = 9.7 Hz, 1H), 5.86 (t, *J* = 6.7 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.5, 147.8, 136.1, 129.5, 129.1 (t, *J* = 3.8 Hz), 127.7, 123.4, 115.3, 108.0 (t, J = 249.1 Hz), 104.6; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.3 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{10}N_2F_2Cl$ 255.0495; Found 255.0493.

_N_-(Difluoromethyl)-_N_-(4-fluorophenyl)pyridin-2-amine (product 2c)



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 98% yield (64 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.85 (t, *J* = 60.9 Hz, 1H), 7.24 (d, *J* = 7.3 Hz, 1H), 6.99 (t, *J* = 8.6 Hz, 2H), 6.82-6.78 (m, 3H), 6.36 (d, *J* = 8.9 Hz, 1H), 5.87 (t, *J* = 6.8 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 160.2 (d, *J* = 238.8 Hz), 150.8, 145.3 (d, *J* = 2.5 Hz), 135.9, 129.1 (t, *J* = 3.8 Hz), 123.0 (d, *J* = 7.8 Hz), 116.0 (d, *J* = 22.0 Hz), 115.4, 108.1 (t, *J* = 248.8 Hz), 104.5; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.3 (s, 2F), -121.8 (s, 1F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{10}N_2F_3$ 239.0791; Found 239.0789.

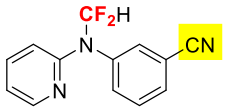
4-((Difluoromethyl)(pyridin-2-yl)amino)benzonitrile (product 2d)



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 96% yield (71 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.81 (t, *J* = 60.7 Hz, 1H), 7.54 (d, *J* = 8.4 Hz, 2H), 7.29 (d, *J* = 7.2 Hz, 1H), 6.94-6.90 (m, 3H), 6.37-6.34 (m, 1H), 5.99 (t, *J* = 6.7 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 153.8, 150.4, 137.2, 133.6, 129.4 (t, *J* = 3.9 Hz), 122.9, 119.6, 114.9, 108.0 (t, *J* = 254.3 Hz), 105.4; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.3 (s, 2F); **HRMS** (ESI-

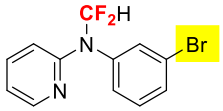
TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{10}N_3F_2$ 246.0837; Found 246.0835.

3-((Difluoromethyl)(pyridin-2-yl)amino)benzonitrile (product 2e)



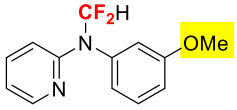
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 98% yield (71 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.83 (t, *J* = 60.8 Hz, 1H), 7.38 (t, *J* = 7.8 Hz, 1H), 7.30-7.27 (m, 2H), 7.13-7.07 (m, 2H), 6.93-6.89 (m, 1H), 6.33 (d, *J* = 9.7 Hz, 1H), 5.97 (t, *J* = 6.9 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.9, 150.1, 137.0, 130.4, 129.4 (t, *J* = 3.9 Hz), 127.1, 126.1, 125.6, 119.0, 114.8, 113.3, 108.0 (t, *J* = 249.8 Hz), 105.2; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.4 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{10}N_3F_2$ 246.0837; Found 246.0835.

***N*-(3-Bromophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2f)**



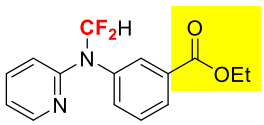
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 96% yield (86 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.81 (t, *J* = 60.8 Hz, 1H), 7.23 (d, *J* = 7.2 Hz, 1H), 7.16-7.13 (m, 2H), 7.02 (s, 1H), 6.84-6.76 (m, 2H), 6.35 (d, *J* = 9.7 Hz, 1H), 5.89 (t, *J* = 6.8 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.8, 150.6, 136.3, 130.8, 129.0 (t, *J* = 3.9 Hz), 125.6, 125.1, 122.9, 120.9, 115.4, 108.0 (t, *J* = 249.4 Hz), 104.8; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.3 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{10}N_2BrF_2$ 298.9990; Found 298.9987.

***N*-(Difluoromethyl)-*N*-(3-methoxyphenyl)pyridin-2-amine (product 2g)**



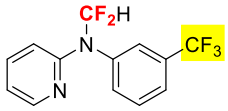
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.5) to afford a yellow sticky oil in 94% yield (71 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.86 (t, *J* = 60.8 Hz, 1H), 7.24-7.19 (m, 2H), 6.80-6.77 (m, 1H), 6.59 (dd, *J*. = 8.0, 1.6 Hz, 1H), 6.47-6.40 (m, 3H), 5.86 (t, *J* = 6.8 Hz, 1H), 3.79 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 160.9, 150.6, 150.3, 135.6, 130.2, 129.0 (t, *J* = 3.8 Hz), 115.9, 114.3, 108.7, 108.1 (t, *J* = 248.7 Hz), 107.5, 104.4, 55.3; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{13}ON_2F_2$ 251.0990; Found 251.0988.

Ethyl 3-((difluoromethyl)(pyridin-2-yl)amino)benzoate (product 2h)



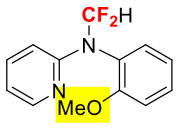
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.5) to afford a yellow sticky oil in 56% yield (49 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.86 (t, J = 60.9 Hz, 1H), 7.72-7.69 (m, 1H), 7.54-7.53 (m, 1H), 7.36 (t, J = 7.8 Hz, 1H), 7.26-7.25 (d, J = 6.4 Hz, 1H), 7.06-7.03 (m, 1H), 6.85-6.80 (m, 1H), 6.35 (d, J = 9.7 Hz, 1H), 5.90 (t, J = 6.8 Hz, 1H), 4.36 (q, J = 7.1 Hz, 2H), 1.38 (t, J = 7.1 Hz, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.8, 150.7, 149.4, 136.2, 131.9, 129.5, 129.2 (t, J = 3.8 Hz), 126.8, 123.9, 123.1, 115.4, 108.1 (t, J = 249.2 Hz), 104.7, 61.0, 14.5; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.3 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{15}H_{15}O_2N_2F_2$ 293.1096; Found 293.1092.

***N*-(Difluoromethyl)-*N*-(3-(trifluoromethyl)phenyl)pyridin-2-amine (product 2i)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 95% yield (82 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.86 (t, J = 60.8 Hz, 1H), 7.40 (t, J = 8.0 Hz, 1H), 7.29-7.26 (m, 2H), 7.13 (s, 1H), 7.03 (d, J = 8.0 Hz), 6.89-6.85 (m, 1H), 6.35 (d, J = 10.0 Hz, 1H), 5.94 (t, J = 6.4 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.9, 149.9, 136.6, 131.8 (q, J = 31.6 Hz), 130.0, 129.3 (t, J = 3.9 Hz), 125.7 (q, J = 270.7 Hz), 125.6, 119.3 (q, J = 3.8 Hz), 119.0 (q, J = 3.7 Hz), 115.2, 108.1 (t, J = 249.5 Hz), 104.9; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -62.7 (s, 3F), -104.4 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{10}N_2F_5$ 289.0759; Found 289.0755.

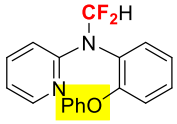
***N*-(Difluoromethyl)-*N*-(2-methoxyphenyl)pyridin-2-amine (product 2j)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.5) to afford a yellow sticky oil in 94% yield (71 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.97 (t, J = 61.0 Hz, 1H), 7.23 (d, J = 7.2 Hz, 1H), 7.04-7.00 (m, 1H), 6.94-6.90 (m, 2H), 6.86-6.84 (m, 1H), 6.77-6.73 (m, 1H), 6.18 (d, J = 9.6 Hz, 1H), 5.86 (t, J = 6.8 Hz, 1H), 3.78 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.5, 150.7, 138.1, 134.9, 128.7 (t, J = 3.8 Hz), 123.6, 123.3, 121.4, 116.6, 112.2, 108.2 (t, J = 248.7 Hz), 104.3, 55.8; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.1 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for

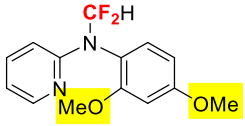
$C_{13}H_{13}ON_2F_2$ 251.0990; Found 251.0987.

***N*-(Difluoromethyl)-*N*-(2-phenoxyphenyl)pyridin-2-amine (product 2k)**



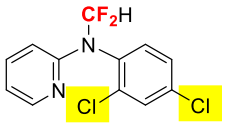
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.6) to afford a yellow sticky oil in 95% yield (89 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.30-7.14 (m, 3H), 7.13-7.08 (m, 3H), 7.04-6.99 (m, 1H), 6.97-6.93 (m, 2H), 6.80-6.75 (m, 3H), 6.26 (d, J = 9.6 Hz, 1H), 5.82 (t, J = 6.8 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 157.8, 150.3, 147.0, 140.7, 135.3, 129.3, 128.5 (t, J = 3.8 Hz), 125.3, 124.5, 123.6, 122.1 (2C), 116.7, 116.5, 107.9 (t, J = 249.4 Hz), 104.5; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -103.9 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{18}H_{15}ON_2F_2$ 313.1147; Found 313.1143.

***N*-(Difluoromethyl)-*N*-(2,4-dimethoxyphenyl)pyridin-2-amine (product 2l)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.5) to afford a yellow sticky oil in 90% yield (76 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.94 (t, J = 61.0 Hz, 1H), 7.21 (d, J = 7.3 Hz, 1H), 6.75-6.70 (m, 2H), 6.52-6.51 (m, 1H), 6.46-6.44 (m, 1H), 6.17 (d, J = 9.7 Hz, 1H), 5.82 (t, J = 6.7 Hz, 1H), 3.78 (s, 3H), 3.74 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 156.4, 152.1, 151.0, 134.6, 131.4, 128.6 (t, J = 3.8 Hz),123.1, 116.6, 108.1 (t, J = 248.5 Hz), 104.7, 104.1, 100.1, 55.7, 55.6; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.0 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{14}H_{15}O_2N_2F_2$ 281.1096; Found 281.1093.

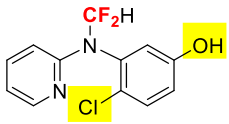
***N*-(2,4-Dichlorophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2m)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 96% yield (83 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.92 (t, J = 60.8 Hz, 1H), 7.40 (d, J = 1.6 Hz, 1H), 7.30 (d, J = 7.3 Hz, 1H), 7.16 (dd, J = 8.8, 2.4 Hz, 1H), 6.91-6.83 (m, 2H), 6.13 (d, J = 9.6 Hz, 1H), 5.97 (t, J = 6.8 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.9, 144.9, 136.5, 129.8, 129.0 (t, J = 3.9 Hz), 127.9 (2C), 127.7, 124.3, 115.5, 108.1 (t, J = 249.9 Hz), 105.1; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.3 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_9N_2Cl_2F_2$ 289.0105;

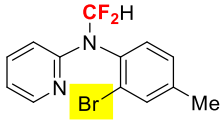
Found 289.0104.

4-Chloro-3-((difluoromethyl)(pyridin-2-yl)amino)phenol (product 2n)



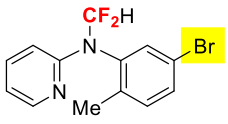
This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.4) to afford a yellow sticky oil in 94% yield (76 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.84 (t, J = 60.7 Hz, 1H), 7.30 (d, J = 7.2 Hz, 1H), 7.16 (d, J = 8.6 Hz, 1H), 6.90-6.85 (m, 1H), 6.44 (dd, J = 8.8, 2.8 Hz, 1H), 6.36 (d, J = 2.8, 1H), 6.14 (d, J = 9.6 Hz, 1H), 5.97 (t, J = 6.6 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 155.5, 151.2, 146.6, 136.4, 130.7, 128.9 (t, J = 3.9 Hz), 118.6, 116.1, 111.5, 110.7, 108.2 (t, J = 250.1 Hz), 105.2; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -103.9 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{10}ON_2ClF_2$ 271.0444; Found 271.0442.

***N*-(2-Bromo-4-methylphenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2o)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 98% yield (92 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.95 (t, J = 60.9 Hz, 1H), 7.41 (d, J = 0.8 Hz, 1H), 7.29 (d, J = 7.2 Hz, 1H), 7.06-7.03 (m, 1H), 6.85-6.80 (m, 2H), 6.79 (d, J = 9.7 Hz, 1H), 6.17 (d, J = 10.0 Hz, 1H), 5.91 (t, J = 6.6 Hz, 1H), 2.30 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.7, 144.7, 135.9, 133.7, 133.6, 129.1, 128.9 (t, J = 3.8 Hz), 122.9, 117.2, 115.8, 108.2 (t, J = 249.4 Hz), 104.7, 20.5; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.1 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{12}N_2BrF_2$ 313.0146; Found 313.0143.

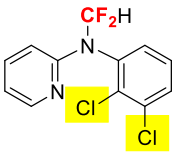
***N*-(5-Bromo-2-methylphenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2p)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 98% yield (92 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.90 (t, J = 61.0 Hz, 1H), 7.27-7.25 (m, 1H), 7.09-7.04 (m, 2H), 6.93 (s, 1H), 6.85-6.81 (m, 1H), 6.20 (d, J = 9.7 Hz, 1H), 5.90 (t, J = 6.6 Hz, 1H), 2.06 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 149.8, 149.1, 136.2, 132.0, 129.6, 129.0 (t, J = 3.9 Hz), 125.6, 123.9, 119.6, 115.4, 108.0 (t, J = 249.3 Hz), 104.6, 17.5; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.5 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{12}N_2BrF_2$ 313.0146; Found

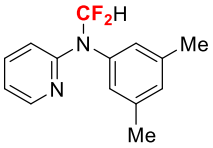
313.0144.

***N*-(2,3-Dichlorophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2q)**



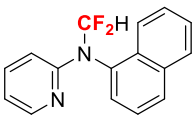
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 96% yield (83 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 (t, J = 60.8 Hz, 1H), 7.30 (d, J = 7.2 Hz, 1H), 7.15-7.08 (m, 2H), 6.91-6.86 (m, 1H), 6.84-6.79 (m, 1H), 6.14 (d, J = 9.6 Hz, 1H), 5.97 (t, J = 6.7 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.8, 148.1, 136.5, 133.7, 129.0 (t, J = 3.9 Hz), 127.6, 125.7, 124.3, 121.6, 115.6, 108.0 (t, J = 249.9 Hz), 105.1; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_9N_2Cl_2F_2$ 289.0105; Found 289.0103.

***N*-(Difluoromethyl)-*N*-(3,5-dimethylphenyl)pyridin-2-amine (product 2r)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 98% yield (73 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.87 (t, J = 61.0 Hz, 1H), 7.22 (d, J = 7.3 Hz, 1H), 6.79-6.75 (m, 1H), 6.70 (s, 1H), 6.51 (s, 2H), 6.41 (d, J = 9.7 Hz, 1H), 5.85 (t, J = 6.7 Hz, 1H), 2.30 (s, 6H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.1, 149.1, 139.1, 135.3, 128.9 (t, J = 3.7 Hz), 124.5, 119.6, 116.0, 108.1 (t, J = 248.6 Hz), 104.2, 21.4; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{14}H_{15}N_2F_2$ 249.1198; Found 249.1194.

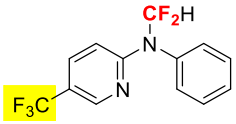
***N*-(Difluoromethyl)-*N*-(naphthalen-1-yl)pyridin-2-amine (product 2s)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 97% yield (79 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.14 (t, J = 61.0 Hz, 1H), 8.04 (d, J = 8.2 Hz, 1H), 7.88 (d, J = 8.0 Hz, 1H), 7.60 (d, J = 8.2 Hz, 1H), 7.54-7.44 (m, 3H), 7.33 (d, J = 7.3 Hz, 1H), 6.97 (d, J = 7.2 Hz, 1H), 6.75-6.71 (m, 1H), 6.30 (d, J = 9.7 Hz, 1H), 5.88 (t, J = 6.7 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.5, 145.7, 135.7, 134.9, 128.9 (t, J = 3.9 Hz), 128.5, 128.1, 126.4, 126.2, 125.3, 123.8, 122.8, 116.0, 115.8, 108.3 (t, J = 249.1 Hz), 104.5; **^{19}F NMR** (376 MHz,

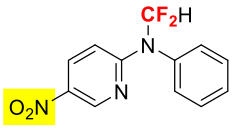
$CDCl_3$) δ -104.3 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{16}H_{13}N_2F_2$ 271.1041; Found 271.1037.

***N*-(Difluoromethyl)-*N*-phenyl-5-(trifluoromethyl)pyridin-2-amine (product 2t)**



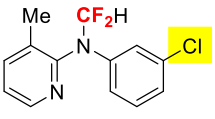
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.8) to afford a yellow sticky oil in 97% yield (84 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.87 (t, *J* = 60.6 Hz, 1H), 7.69 (s, 1H), 7.39-7.35 (m, 2H), 7.11 (t, *J* = 7.4 Hz, 1H), 6.89-6.85 (m, 3H), 6.50 (d, *J* = 10.4 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 148.7, 148.1, 130.5 (q, *J* = 2.0 Hz), 129.7, 129.6 (t, *J* = 4.2 Hz), 123.6, 121.9 (q, *J* = 267.7 Hz), 121.5, 116.8, 108.7 (q, *J* = 34.9 Hz), 107.9 (t, *J* = 251.6 Hz); **^{19}F NMR** (376 MHz, $CDCl_3$) δ -64.4 (s, 3F), -104.6 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{10}N_2F_5$ 289.0759; Found 289.0755.

***N*-(Difluoromethyl)-5-nitro-*N*-phenylpyridin-2-amine (product 2u)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.5) to afford a yellow sticky oil in 50% yield (40 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.62 (d, *J* = 2.8 Hz, 1H), 7.85 (t, *J* = 60.2 Hz, 1H), 7.50 (dd, *J* = 10.8, 2.8 Hz, 1H), 7.35(t, *J* = 7.6 Hz, 2H), 7.11 (t, *J* = 7.2 Hz, 1H), 6.85-6.83 (m, 2H), 6.44 (d, *J* = 10.4 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 147.8, 147.3, 133.2 (t, *J* = 4.2 Hz), 130.6, 129.8 (2C), 124.2, 121.0, 115.4, 107.8 (t, *J* = 254.7 Hz); **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.5 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{10}O_2N_3F_2$ 266.0736; Found 266.0732.

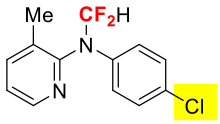
***N*-(3-Chlorophenyl)-*N*-(difluoromethyl)-3-methylpyridin-2-amine (product 2v)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 78% yield (63 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.80 (t, *J* = 61.2 Hz, 1H), 7.21 (d, *J* = 7.2 Hz, 1H), 7.10 (t, *J* = 7.9 Hz, 1H), 6.92-6.90 (m, 1H), 6.79 (t, *J* = 2.0 Hz, 1H), 6.72-6.66 (m, 2H), 5.91 (t, *J* = 6.9 Hz, 1H), 1.63 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.4, 147.6, 137.0, 133.9, 129.2, 127.3 (t, *J* = 4.3 Hz), 127.2, 121.4, 121.3, 119.6, 109.0 (t, *J* = 249.5 Hz), 104.6, 22.3;

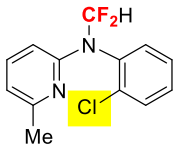
^{19}F NMR (376 MHz, $CDCl_3$) δ -103.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{12}N_2ClF_2$ 269.0652; Found 269.0648.

***N*-(4-Chlorophenyl)-*N*-(difluoromethyl)-3-methylpyridin-2-amine (product 2w)**



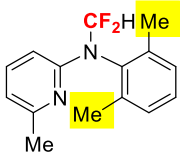
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 74% yield (59 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.80 (t, *J* = 61.2 Hz, 1H), 7.20 (d, *J* = 7.2 Hz, 1H), 7.17-7.13 (m, 2H), 6.72-6.67 (m, 3H), 5.88 (t, *J* = 6.9 Hz, 1H), 1.60 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 148.7, 147.6, 136.8, 128.2, 127.3 (t, *J* = 4.2 Hz), 127.2, 126.5, 122.5, 109.0 (t, *J* = 249.4 Hz), 104.5, 22.42; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -103.1 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{12}N_2ClF_2$ 269.0652; Found 269.0649.

***N*-(2-Chlorophenyl)-*N*-(difluoromethyl)-6-methylpyridin-2-amine (product 2x)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 98% yield (79 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.40 (t, *J* = 59.5 Hz, 1H), 7.39 (dd, *J* = 8.0, 1.3 Hz, 1H), 7.19 (td, *J* = 7.6, 1.3 Hz, 1H), 6.96 (td, *J* = 8.0, 1.2 Hz, 1H), 6.90 (dd, *J* = 7.6, 1.2 Hz, 1H), 6.72-6.68 (m, 1H), 6.01 (d, *J* = 9.2 Hz, 1H), 5.69 (d, *J* = 6.4 Hz, 1H), 2.46 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 153.1, 146.3, 142.8, 136.0, 130.1, 127.7, 126.9, 123.6, 123.6, 113.4, 110.4 (t, *J* = 250.4 Hz), 106.7, 19.5 (t, *J* = 6.8 Hz); **^{19}F NMR** (376 MHz, $CDCl_3$) δ -101.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{13}H_{12}N_2ClF_2$ 269.0652; Found 269.0649.

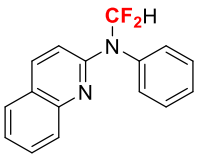
***N*-(Difluoromethyl)-*N*-(2,6-dimethylphenyl)-6-methylpyridin-2-amine (product 2y)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.8) to afford a yellow sticky oil in 95% yield (75 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.54 (t, *J* = 59.8 Hz, 1H), 7.06 (d, *J* = 7.4 Hz, 1H), 6.90 (t, *J* = 7.4 Hz, 1H), 6.62-6.58 (m, 1H), 5.77 (d, *J* = 9.6 Hz, 1H), 5.60 (d, *J* = 6.3 Hz, 1H), 2.46 (s, 3H), 2.09 (s, 6H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.2, 146.3, 142.7, 135.2,

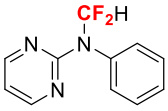
129.1, 128.1, 122.4, 113.3, 110.2 (t, *J* = 249.4 Hz), 105.8, 19.5 (t, *J* = 6.7 Hz), 18.1; **^{19}F NMR** (376 MHz, $CDCl_3$) *δ* -101.5 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{15}H_{17}N_2F_2$ 263.1354; Found 263.1351.

***N*-(Difluoromethyl)-*N*-phenylquinolin-2-amine (product 2z)**



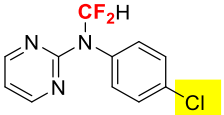
This compound was purified by column chromatography (ethyl acetate/hexane = 1:10, R_f =0.7) to afford a yellow sticky oil in 82% yield (66 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* 8.40 (t, *J* = 59.1 Hz, 1H), 7.78-7.76 (m, 1H), 7.44 (t, *J* = 7.6 Hz, 1H), 7.39-7.32 (m, 3H), 7.17-7.09 (m, 3H), 6.90 (d, *J* = 7.6 Hz, 2H), 6.46 (d, *J* = 9.9 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 150.3, 148.7, 136.4, 135.8, 130.5, 129.5, 128.7, 123.2, 123.0, 121.7, 121.0, 116.3 (t, *J* = 6.6 Hz), 115.2, 111.1 (t, *J* = 247.5 Hz); **^{19}F NMR** (376 MHz, $CDCl_3$) *δ* -106.0 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{16}H_{13}N_2F_2$ 271.1041; Found 271.1038.

***N*-(Difluoromethyl)-*N*-phenylpyrimidin-2-amine (product 4a)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.4) to afford a yellow sticky oil in 86% yield (57 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* 8.19-8.17 (m, 1H), 7.83-7.53 (m, 2H), 7.34-7.29 (m, 2H), 7.07-7.00 (m, 3H), 5.96-5.94 (q, *J* = 3.6 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 163.7, 147.2, 146.4, 138.4, 128.9, 123.3, 122.7, 108.6 (t, *J* = 252.5 Hz), 102.1; **^{19}F NMR** (376 MHz, $CDCl_3$) *δ* -104.0 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{11}H_{10}N_3F_2$ 222.0843; Found 222.0840.

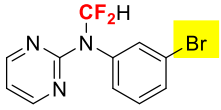
***N*-(4-Chlorophenyl)-*N*-(difluoromethyl)pyrimidin-2-amine (product 4b)**



This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.4) to afford a yellow sticky oil in 85% yield (65 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* 8.19 (t, *J* = 2.8 Hz, 1H), 7.64 (t, *J* = 60.6 Hz, 1H), 7.55 (dd, *J* = 7.2, 2.4 Hz, 1H), 7.26-7.23 (m, 2H), 7.02-6.97 (m, 2H), 6.00-5.98 (q, *J* = 3.6 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 163.9, 146.7, 145.8, 138.5 (t, *J* = 3.5 Hz),

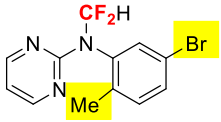
128.8, 128.4, 124.2, 108.6 (t, *J* = 252.5 Hz), 102.4; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.1 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{11}H_9ClN_3F_2$ 256.0453; Found 256.0449.

_N_-(3-Bromophenyl)-_N_-(difluoromethyl)pyrimidin-2-amine (product 4c)



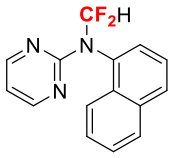
This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.4) to afford a yellow sticky oil in 83% yield (74 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.22-8.21 (m, 1H), 7.64 (t, *J* = 60.6 Hz, 1H), 7.56 (dd, *J* = 7.2, 2.4 Hz, 1H), 7.25 (s,1H), 7.18-7.14 (m, 2H), 7.00-6.96 (m, 1H), 6.02-6.00 (q, *J* = 3.6 Hz, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 164.1, 148.8, 146.9, 138.5, 130.1, 126.2, 126.0, 122.4, 121.7, 108.6 (t, *J* = 253.1 Hz), 102.5; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.1 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{11}H_9BrN_3F_2$ 299.9948; Found 299.9945.

_N_-(5-Bromo-2-methylphenyl)-_N_-(difluoromethyl)pyrimidin-2-amine (product 4d)



This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.4) to afford a yellow sticky oil in 81% yield (76 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.20 (t, *J* = 2.4 Hz, 1H), 7.66 (t, *J* = 60.8 Hz, 1H), 7.57-7.55 (dd, *J* = 7.2, 2.4 Hz, 1H), 7.12-7.04 (m, 3H), 6.00-5.97 (m, 1H), 2.11 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 164.1, 147.4, 146.0, 138.3 (t, *J* = 3.6 Hz), 131.6, 129.6, 126.0, 124.6, 119.2, 108.6 (t, *J* = 253.2 Hz), 102.3, 17.8; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.4 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{12}H_{11}BrN_3F_2$ 314.0104; Found 314.0101.

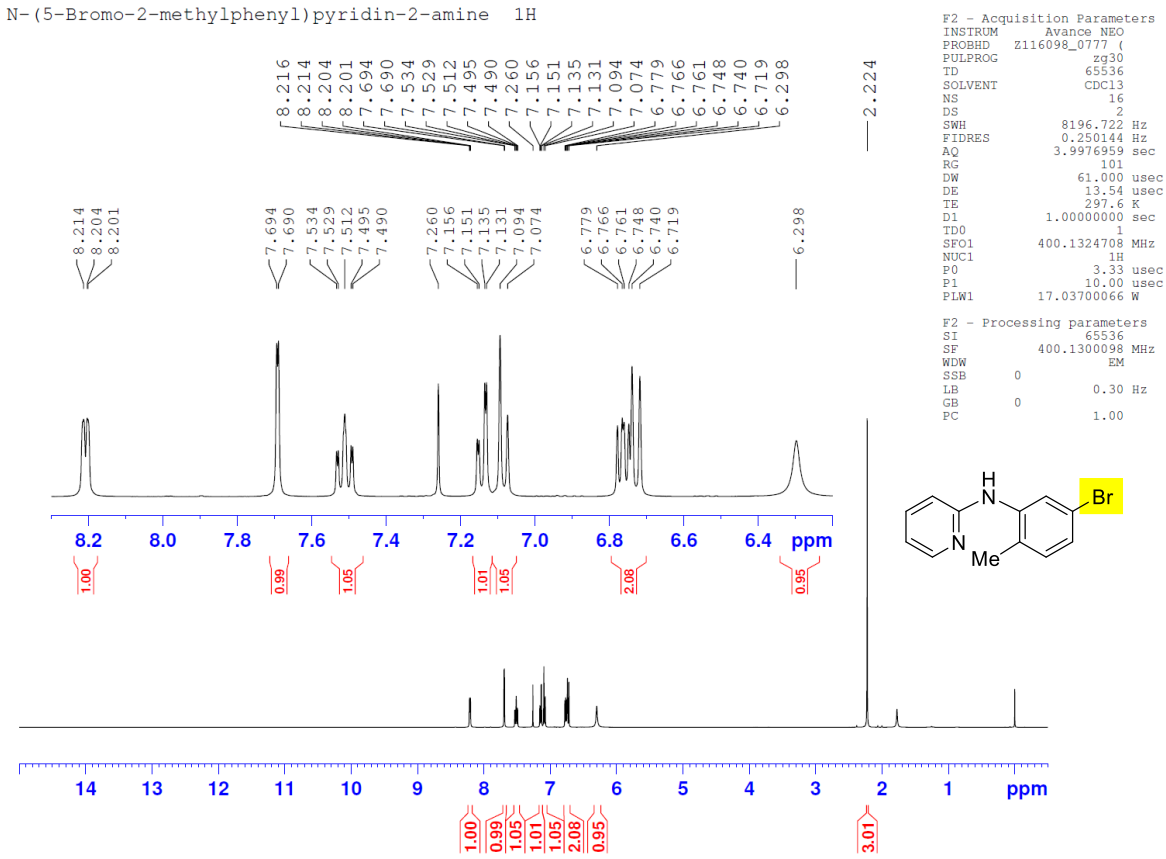
_N_-(Difluoromethyl)-_N_-(naphthalen-1-yl)pyrimidin-2-amine (product 4e)

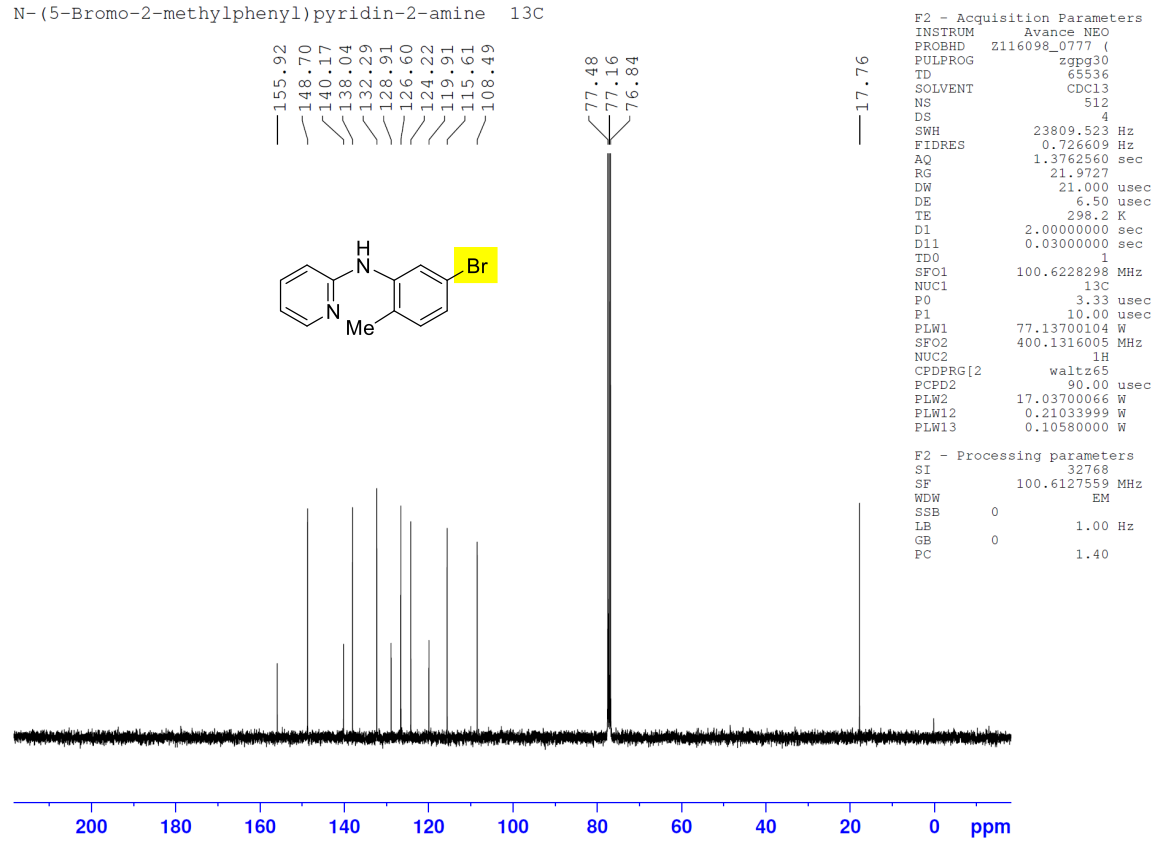


This compound was purified by column chromatography (ethyl acetate/hexane = 1:5, R_f =0.4) to afford a yellow sticky oil in 84% yield (68 mg); **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.15 (t, *J* = 2.4 Hz, 1H), 8.04-7.71 (m, 2H), 7.86 (t, *J* = 60.8 Hz, 1H), 7.60-7.58 (m, 2H), 7.48-7.41 (m, 3H), 7.14 (d, *J* = 7.3 Hz, 1H), 5.95-5.94 (m, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 164.0, 146.6, 143.7, 138.4, 134.6, 128.7, 128.1, 126.0, 125.9, 125.2, 123.8, 123.3, 116.6, 108.8 (t, *J* = 252.8 Hz), 102.2; **^{19}F NMR** (376 MHz, $CDCl_3$) δ -104.2 (s, 2F); **HRMS** (ESI-TOF) *m/z*: $[M+H]^+$ Calcd for $C_{15}H_{12}N_3F_2$ 272.0999; Found 272.0995.

9. ^{1}H, ^{13}C, and ^{19}F NMR spectra

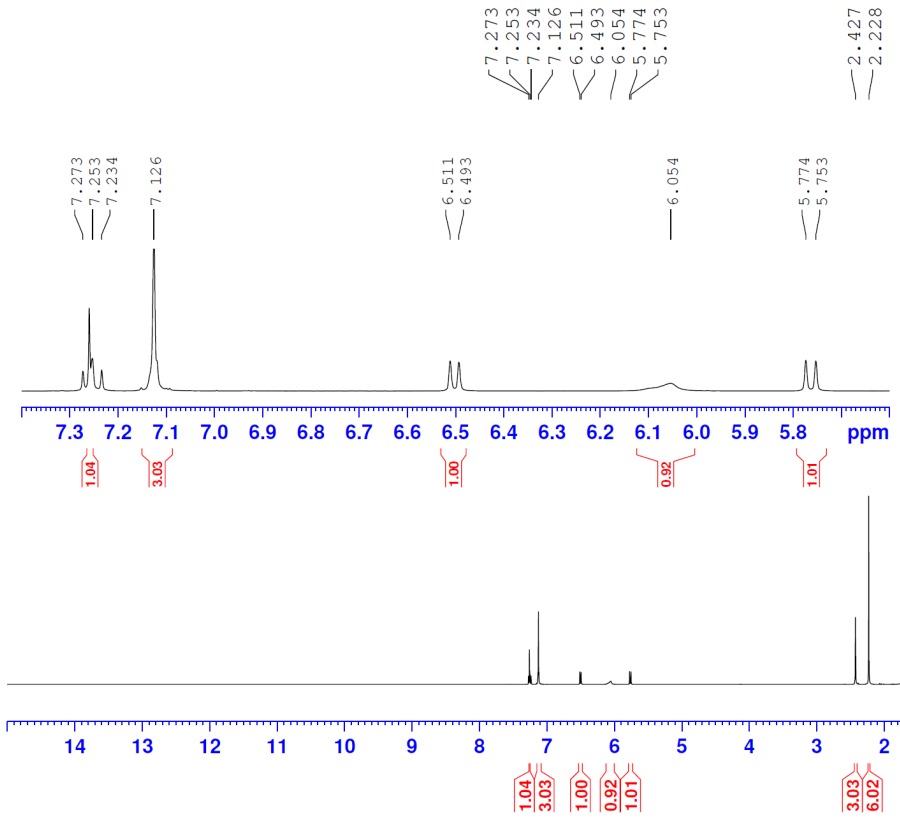
N-(5-Bromo-2-methylphenyl)pyridin-2-amine (Compound 1p)





N-(2,6-Dimethylphenyl)-6-methylpyridin-2-amine (Compound 1y)

N-(2,6-dimethylphenyl)-6-methylpyridin-2-amine 1H

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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                297.5 K
D1             1.00000000 sec
TD0                    1
SFO1          400.1324708 MHz
NUC1                  1H
P0                  3.33 usec
P1                 10.00 usec
PLW1          17.03700066 W

F2 - Processing parameters
SI                 65536
SF            400.1300099 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
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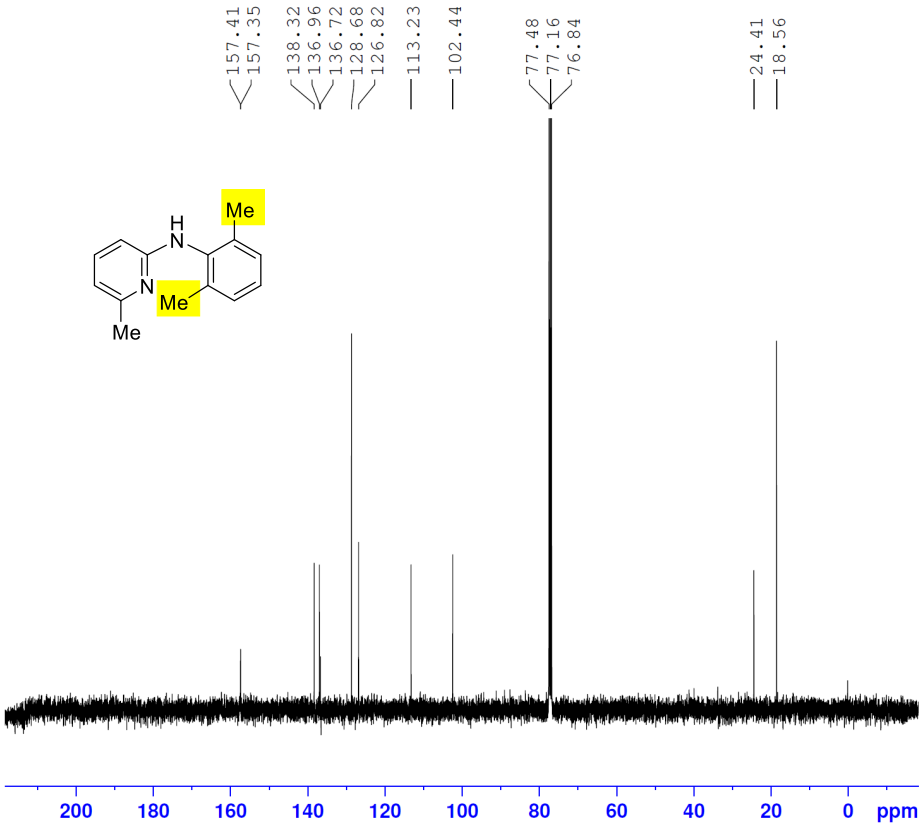
N-(2,6-dimethylphenyl)-6-methylpyridin-2-amine 13C

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F2 - Acquisition Parameters
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PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   512
DS                     4
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FIDRES          0.726609 Hz
AQ              1.3762560 sec
RG                27.0433
DW                21.000 usec
DE                 6.50 usec
TE                298.1 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          77.13700104 W
SFO2          400.1316005 MHz
NUC2                  1H
CPDPRG[2          waltz65
PCPD2              90.00 usec
PLW2          17.03700066 W
PLW12          0.21033999 W
PLW13          0.10580000 W

F2 - Processing parameters
SI                 32768
SF            100.6127547 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
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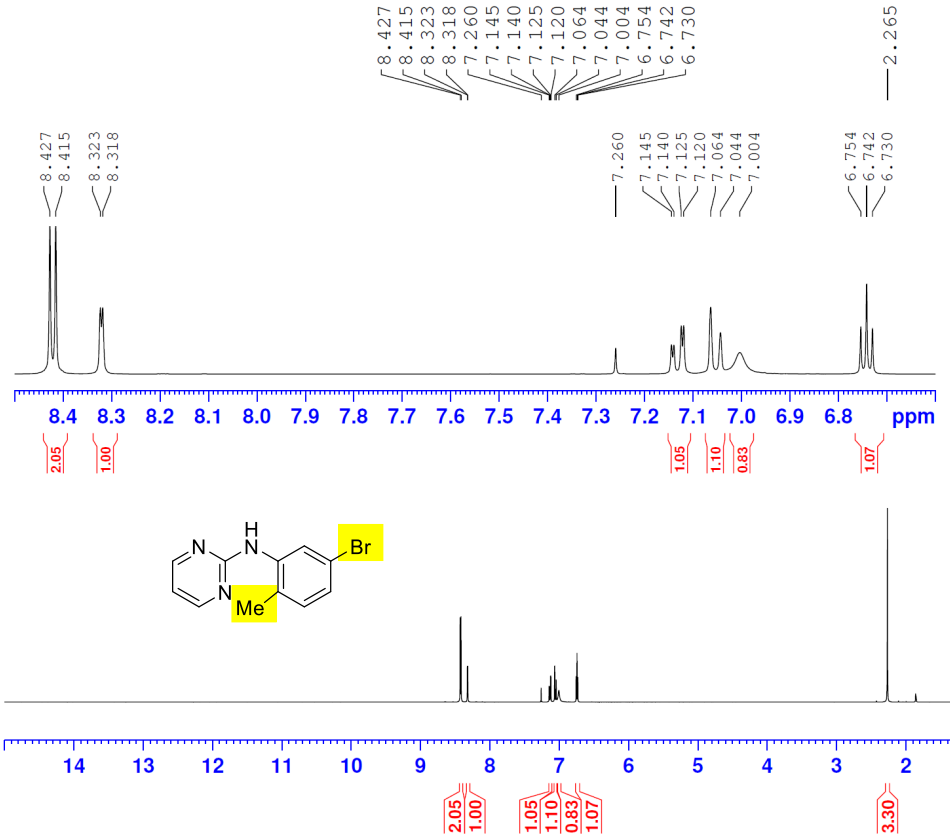
N-(5-Bromo-2-methylphenyl)pyrimidin-2-amine (Compound 3d)

N-(5-Bromo-2-methylphenyl)pyrimidin-2-amine 1H

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F2 - Acquisition Parameters
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PROBHD    Z116098_0777 (
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                297.6 K
D1             1.00000000 sec
TD0                    1
SFO1          400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1          17.03700066 W

F2 - Processing parameters
SI                 65536
SF            400.1300098 MHz
WDW                   EM
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LB                 0.30 Hz
GB        0
PC                 1.00
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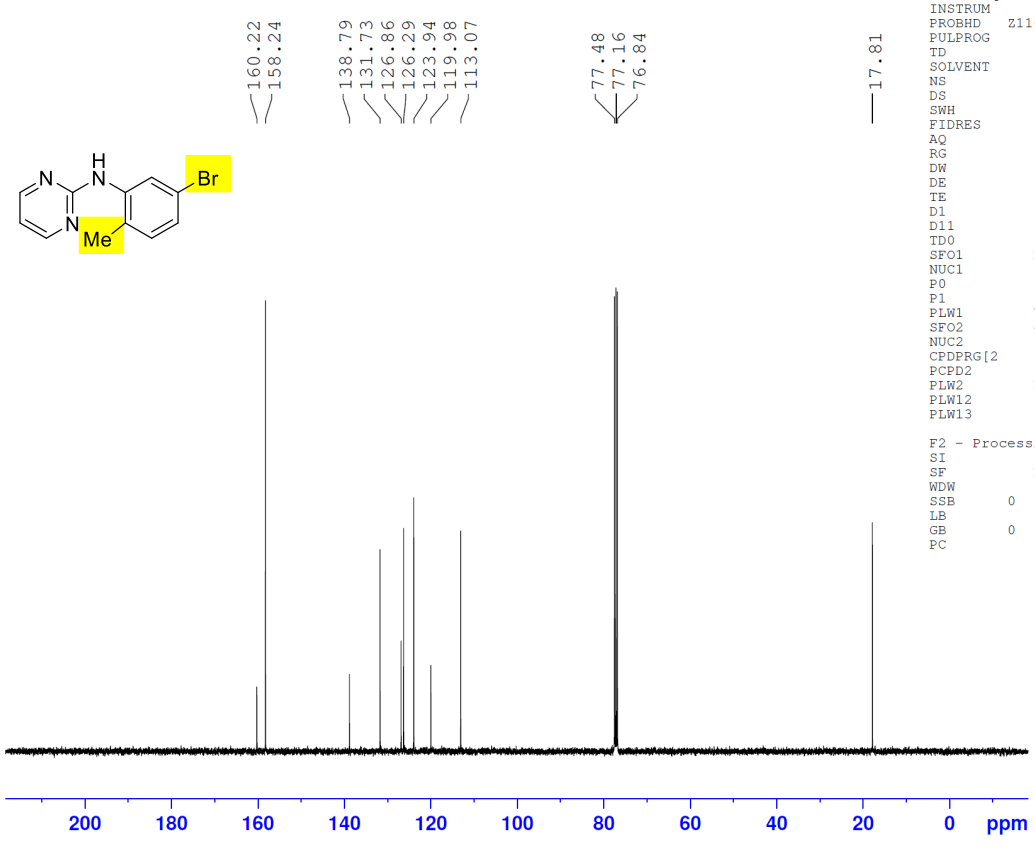
N-(5-Bromo-2-methylphenyl)pyrimidin-2-amine 13C

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F2 - Acquisition Parameters
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PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   512
DS                     4
SWH            23809.523 Hz
FIDRES          0.726609 Hz
AQ              1.3762560 sec
RG                19.5313
DW                21.000 usec
DE                 6.50 usec
TE                298.2 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          77.13700104 W
SFO2          400.1316005 MHz
NUC2                  1H
CPDPRG[2          waltz65
PCPD2             90.00 usec
PLW2          17.03700066 W
PLW12          0.21033999 W
PLW13          0.10580000 W

F2 - Processing parameters
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SF            100.6127582 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
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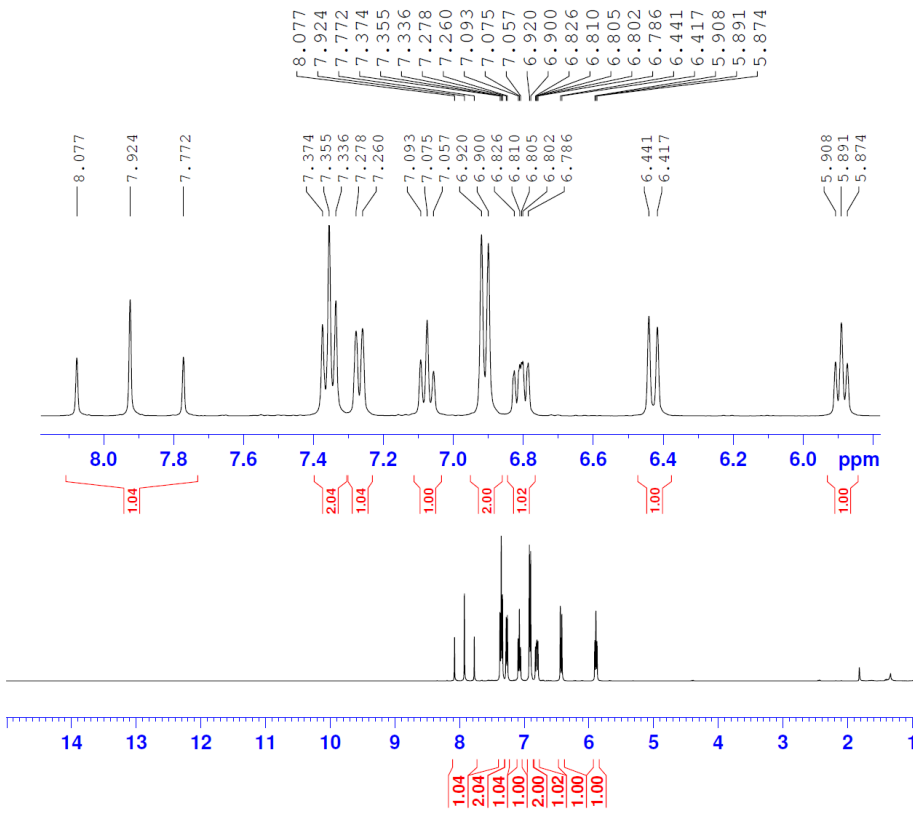
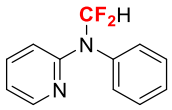
N-(Difluoromethyl)-*N*-phenylpyridin-2-amine (Product 2a)

N-(Difluoromethyl)-N-phenylpyridin-2-amine 1H



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F2 - Acquisition Parameters
INSTRUM            spect
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PULPROG            zg30
TD                32050
SOLVENT           CDCl3
NS                   16
DS                    2
SWH            8012.820 Hz
FIDRES            0.250010 Hz
AQ             1.9999200 sec
RG                 28.5
DW                62.400 usec
DE                 6.50 usec
TE                298.2 K
D1             1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.70 usec
PL1       0 dB
PL1W       11.88122272 W
SFO1       400.1336012 MHz

F2 - Processing parameters
SI                32768
SF           400.1300000 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
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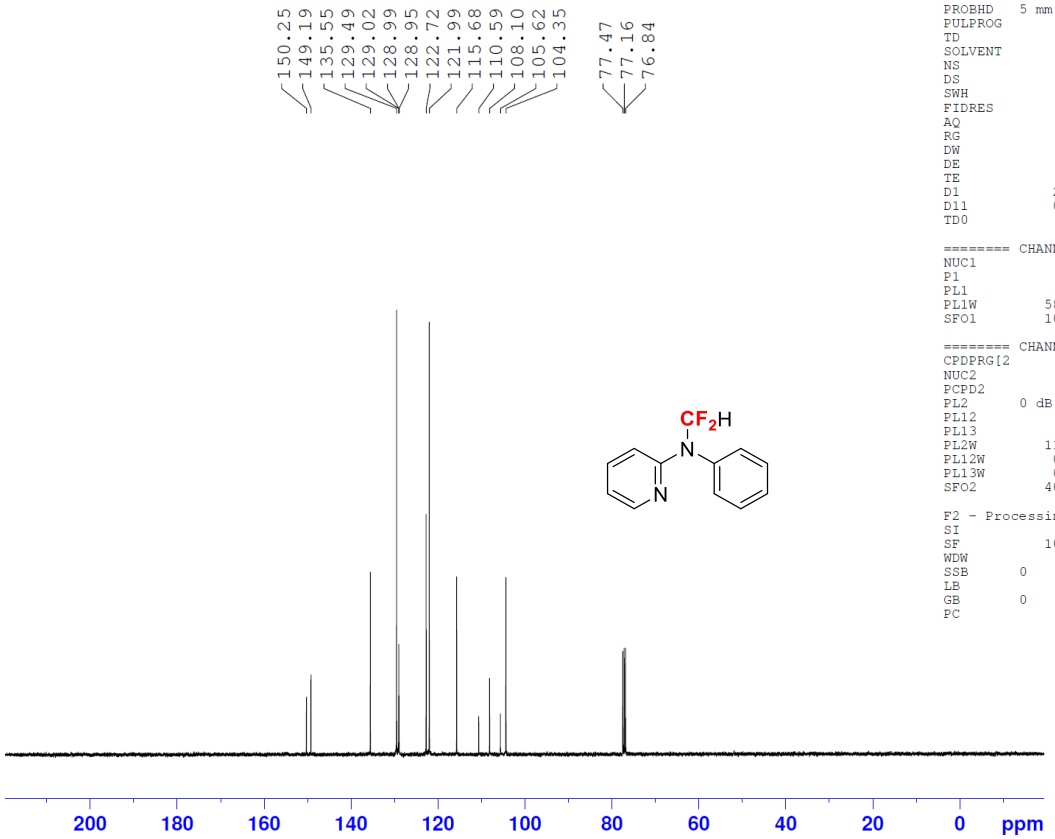
N-(Difluoromethyl)-N-phenylpyridin-2-amine 13C

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F2 - Acquisition Parameters
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TD                65536
SOLVENT           CDCl3
NS                   77
DS                    2
SWH           24038.461 Hz
FIDRES            0.366798 Hz
AQ             1.3631488 sec
RG                  203
DW                20.800 usec
DE                 6.50 usec
TE                298.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1                 9.50 usec
PL1               -2.00 dB
PL1W       58.52175522 W
SFO1       100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PL2       0 dB
PL12              15.00 dB
PL13              15.00 dB
PL2W       11.88122272 W
PL12W       0.37571725 W
PL13W       0.37571725 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                32768
SF           100.6127643 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
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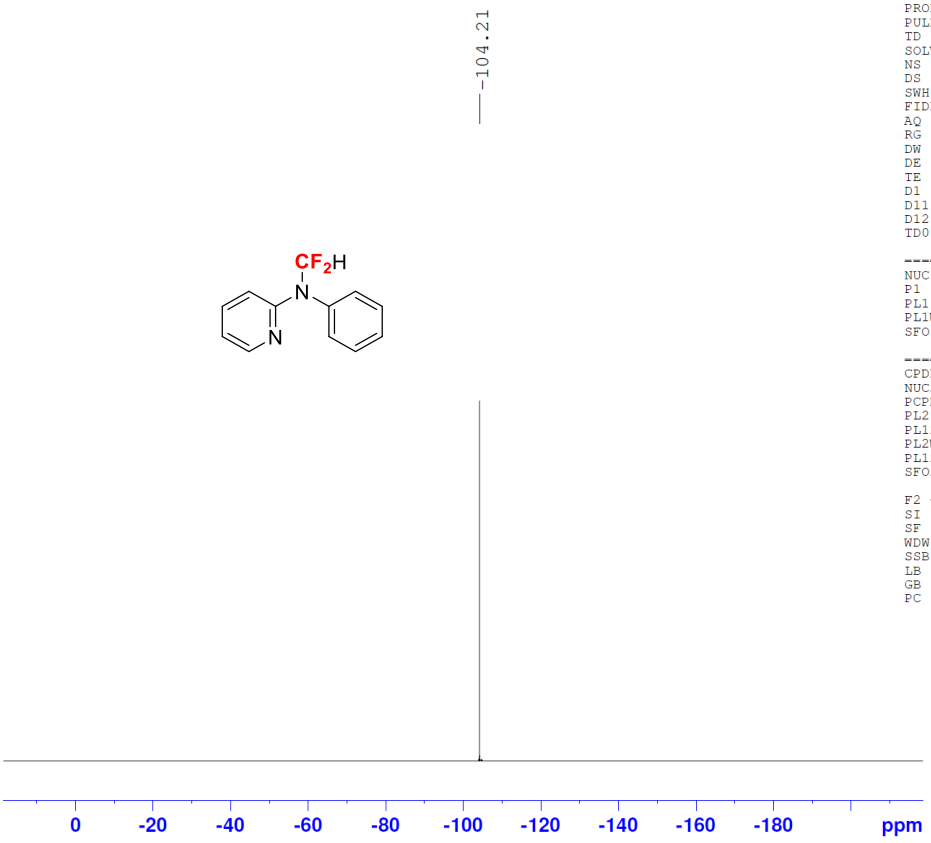
N-(Difluoromethyl)-N-phenylpyridin-2-amine 19F

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F2 - Acquisition Parameters
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TD                131072
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DS                      4
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FIDRES              0.681196 Hz
AQ                0.7340032 sec
RG                    512
DW                  5.600 usec
DE                  6.50 usec
TE                  298.6 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                     1

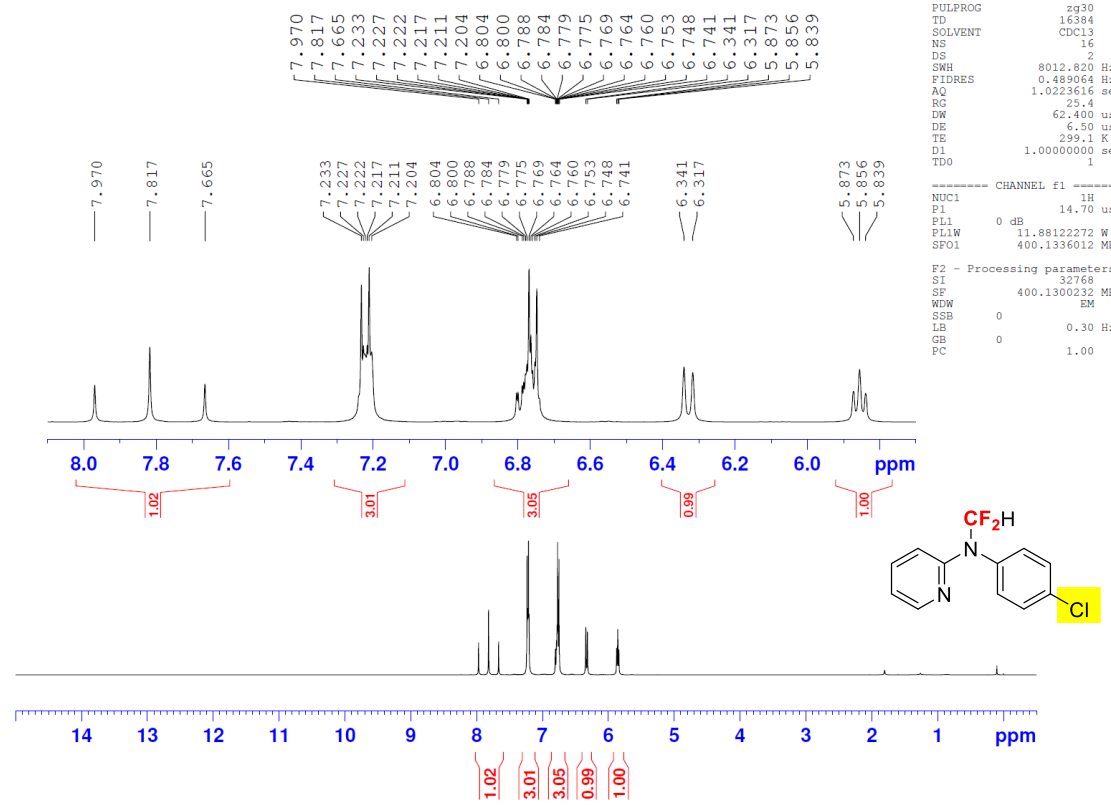
======== CHANNEL f1 ========
NUC1                  19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    65536
SF            376.4983660 MHz
WDW                     EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

N-(4-Chlorophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2b)

N-(4-Chlorophenyl)-N-(difluoromethyl)pyridin-2-amine 1H

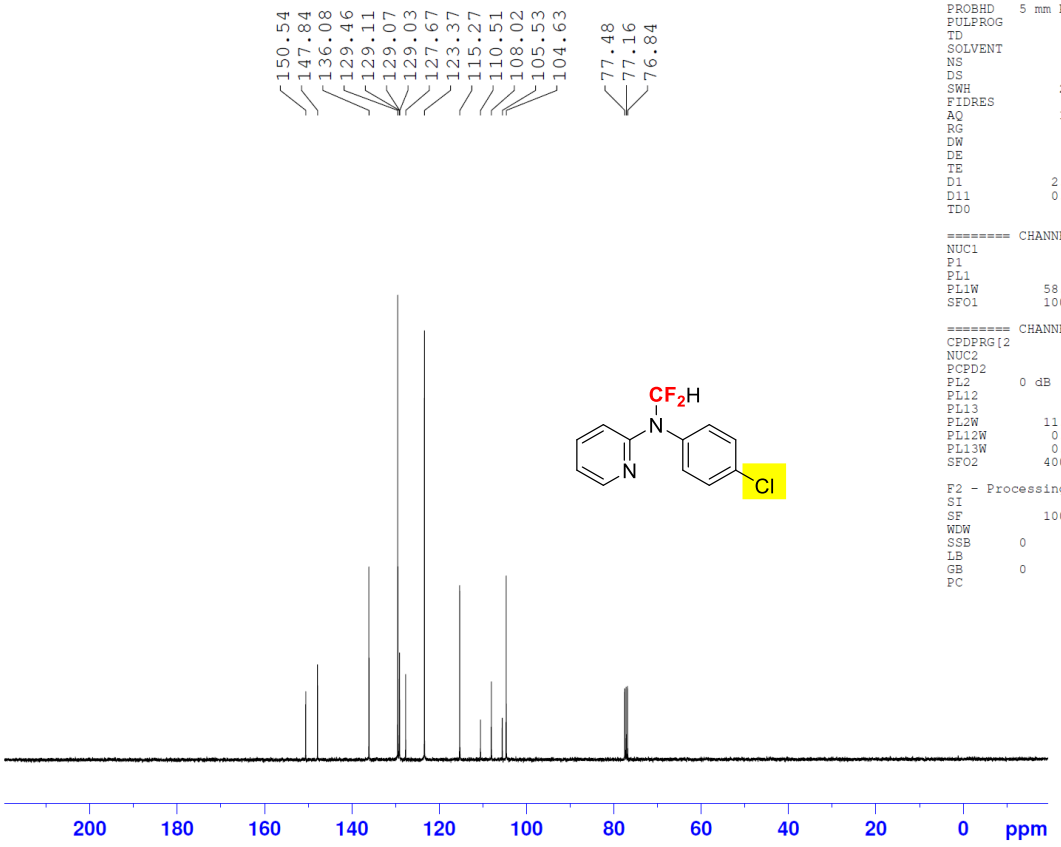



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG             zg30
TD                 16384
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES              0.489064 Hz
AQ                1.0223616 sec
RG                   25.4
DW                  62.400 usec
DE                  6.50 usec
TE                  299.1 K
D1             1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.70 usec
PL1        0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                    32768
SF            400.1300232 MHz
WDW                     EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

N-(4-Chlorophenyl)-N-(difluoromethyl)pyridin-2-amine 13C



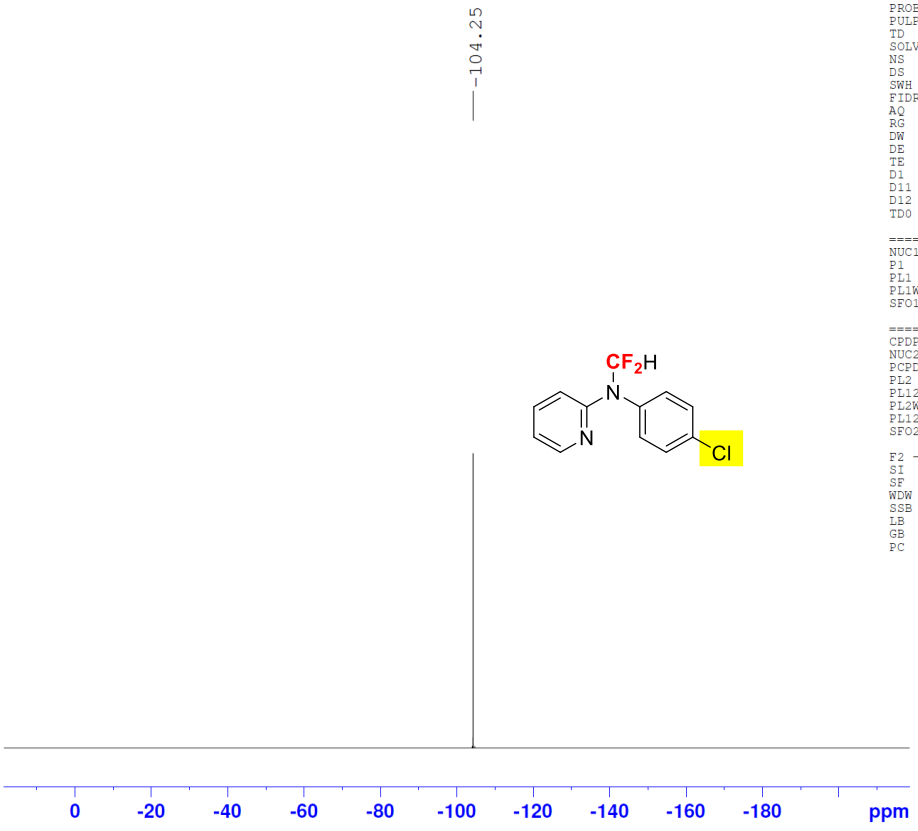

```
F2 - Acquisition Parameters
INSTRUM             spect
PROBHD   5 mm PABBO BB-
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   45
DS                    2
SWH           24038.461 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                  181
DW               20.800 usec
DE                6.50 usec
TE               300.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1                 9.50 usec
PL1               -2.00 dB
PL1W        58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2            80.00 usec
PL2        0 dB
PL12              15.00 dB
PL13              15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
PL13W        0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127654 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

N-(4-Chlorophenyl)-N-(difluoromethyl)pyridin-2-amine 19F



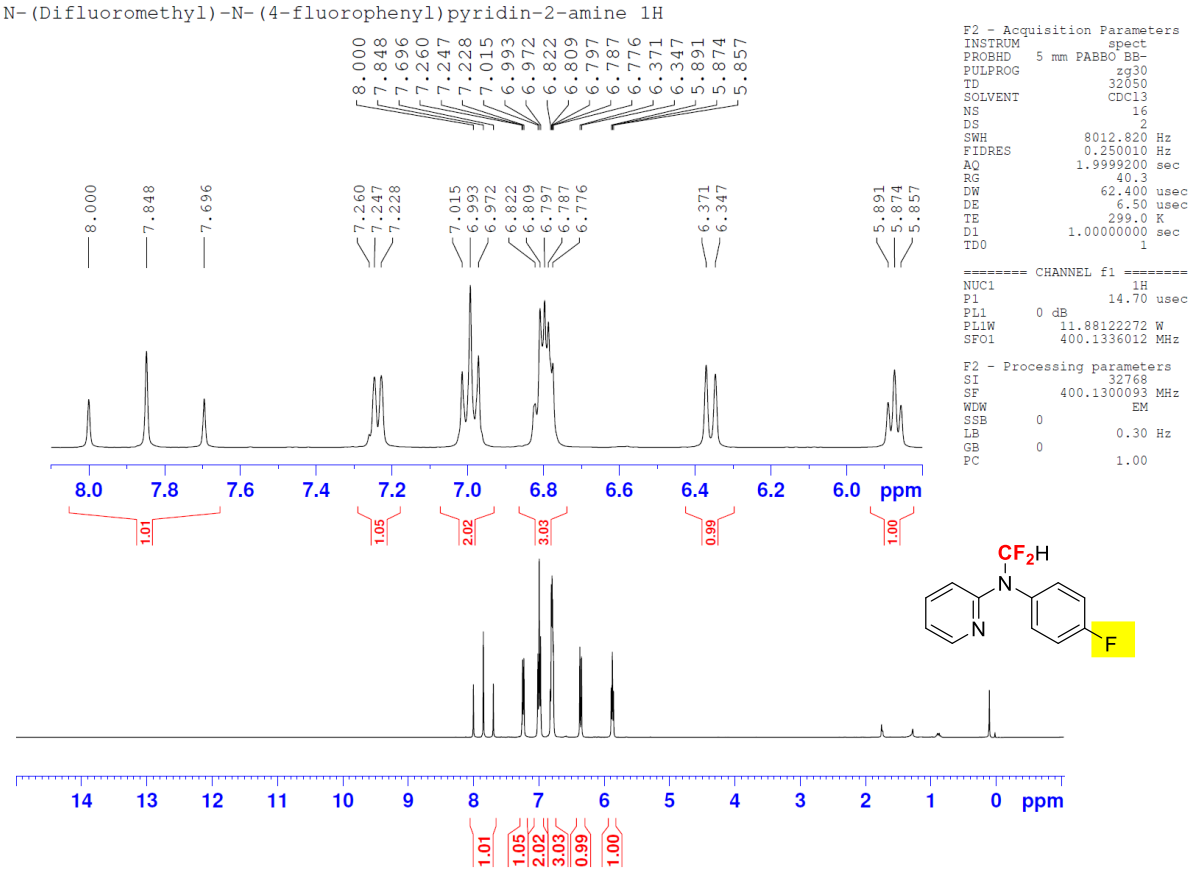

```
F2 - Acquisition Parameters
INSTRUM             spect
PROBHD   5 mm PABBO BB-
PULPROG         zgfhigqn
TD               131072
SOLVENT           CDCl3
NS                   16
DS                    4
SWH           89285.711 Hz
FIDRES        0.681196 Hz
AQ            0.7340032 sec
RG                  406
DW                5.600 usec
DE                6.50 usec
TE               299.5 K
D1           1.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                19F
P1                14.20 usec
PL1               -3.00 dB
PL1W        18.69428444 W
SFO1        376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2            80.00 usec
PL2        0 dB
PL12              15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                65536
SF          376.4983660 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

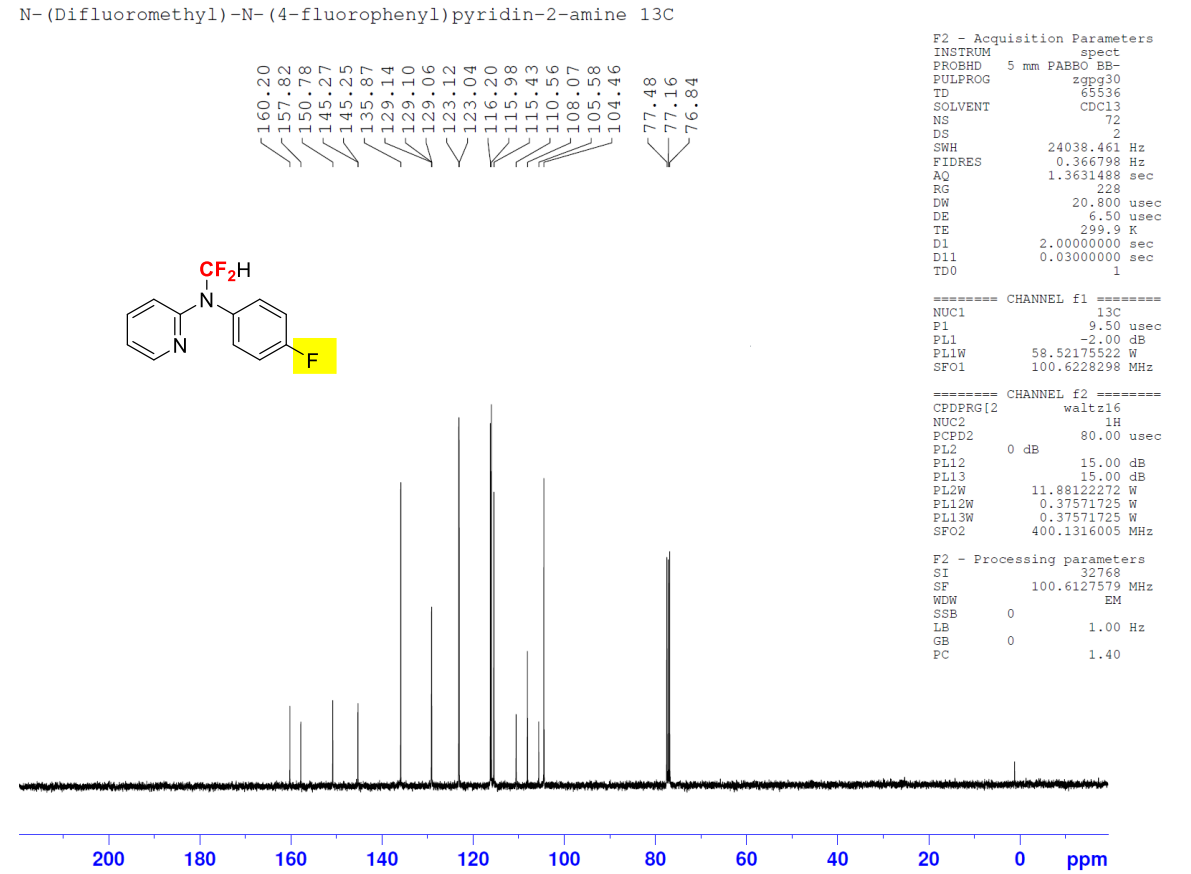
N-(Difluoromethyl)-*N*-(4-fluorophenyl)pyridin-2-amine (product 2c)




```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 32050
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8012.820 Hz
FIDRES             0.250010 Hz
AQ              1.9999200 sec
RG                  40.3
DW                 62.400 usec
DE                  6.50 usec
TE                299.0 K
D1              1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.70 usec
PL1       0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF            400.1300093 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

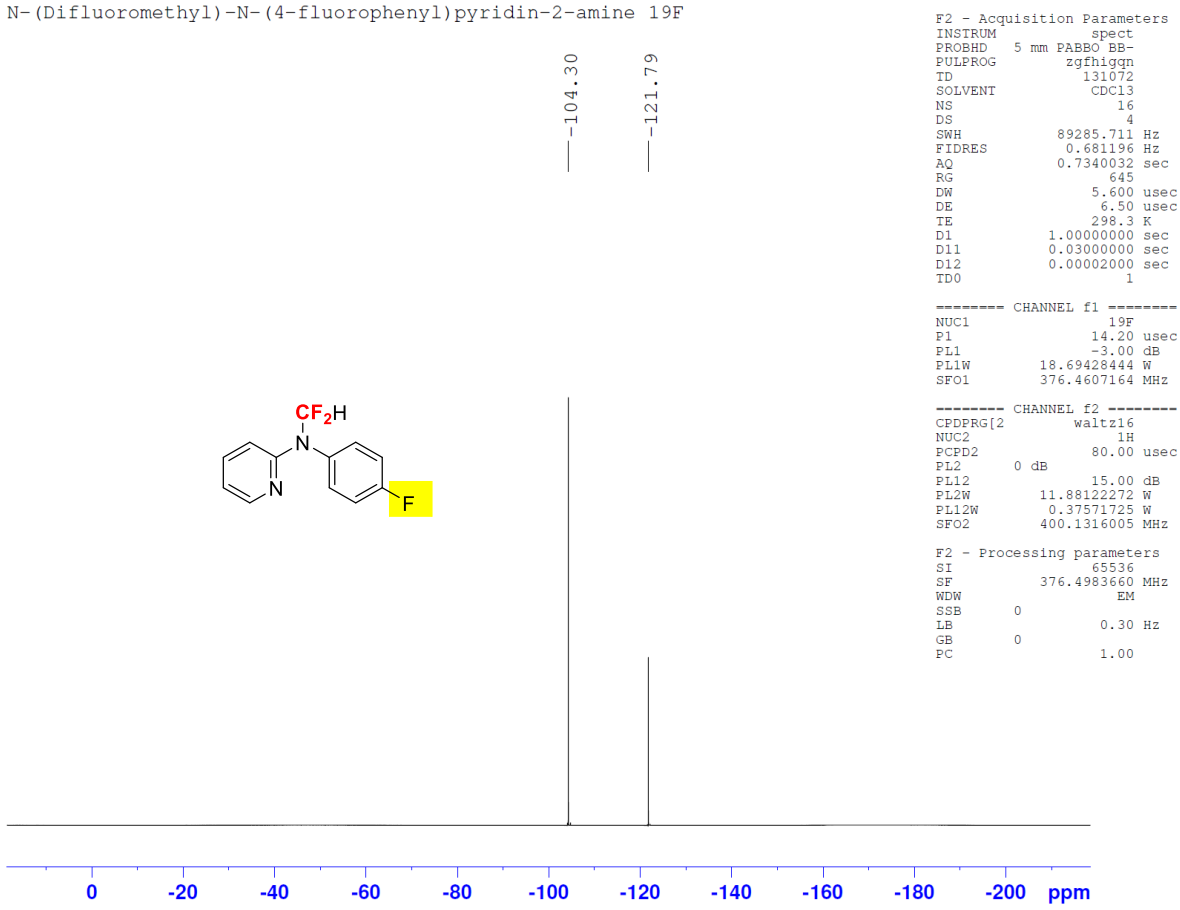



```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                    72
DS                     2
SWH            24038.461 Hz
FIDRES             0.366798 Hz
AQ              1.3631488 sec
RG                   228
DW                 20.800 usec
DE                  6.50 usec
TE                299.9 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

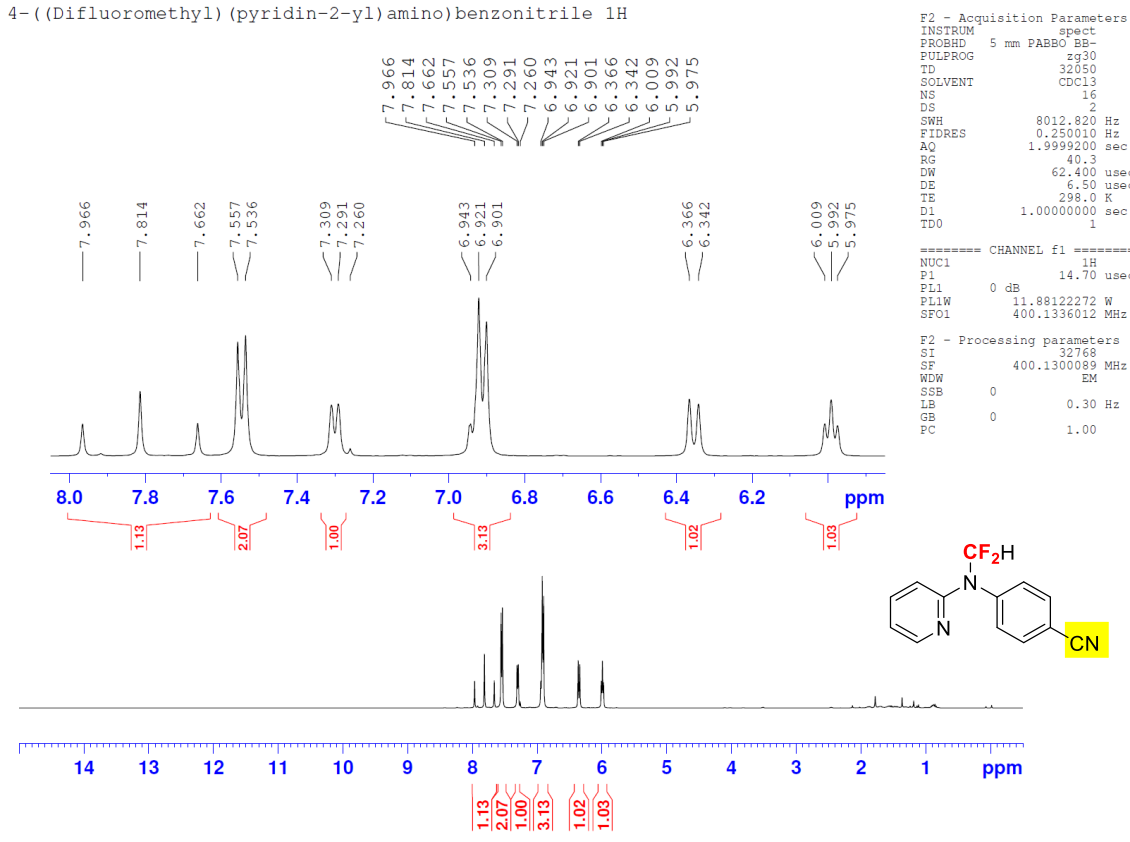
======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2       0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2          400.1316005 MHz

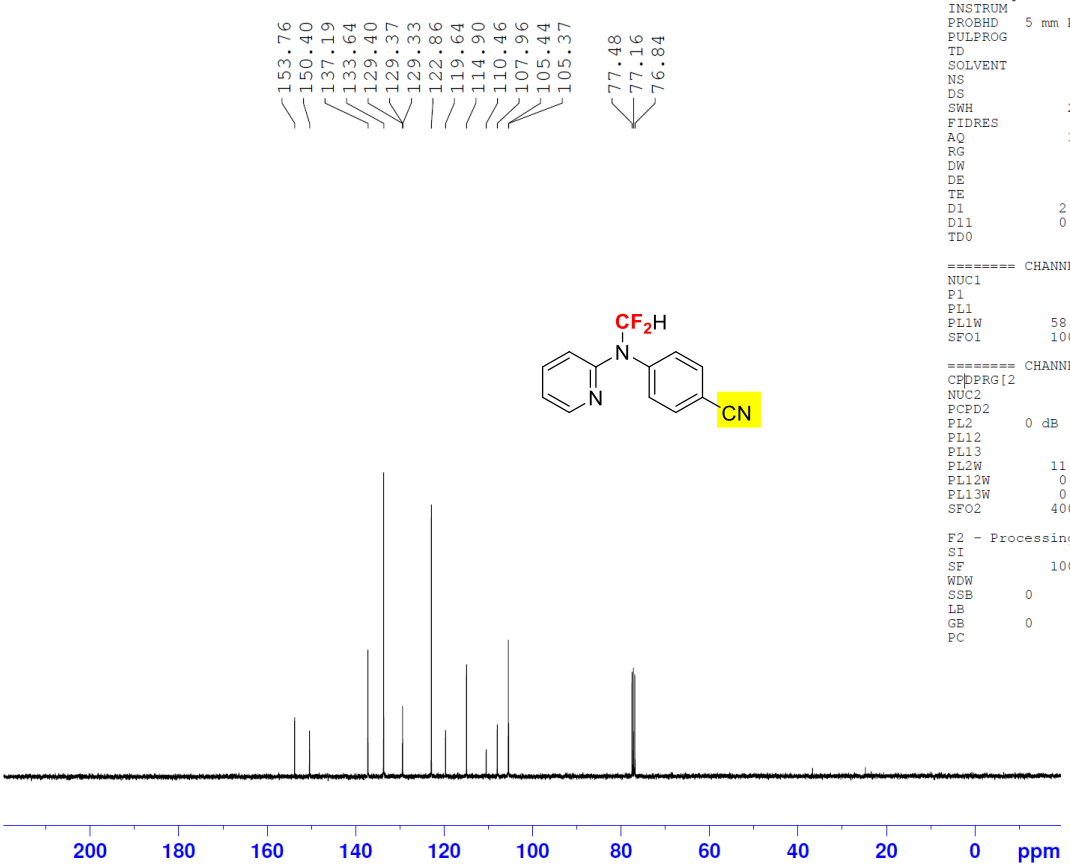
F2 - Processing parameters
SI                 32768
SF            100.6127579 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```



4-((Difluoromethyl)(pyridin-2-yl)amino)benzonitrile (product 2d)



4-((Difluoromethyl)(pyridin-2-yl)amino)benzonitrile 13C



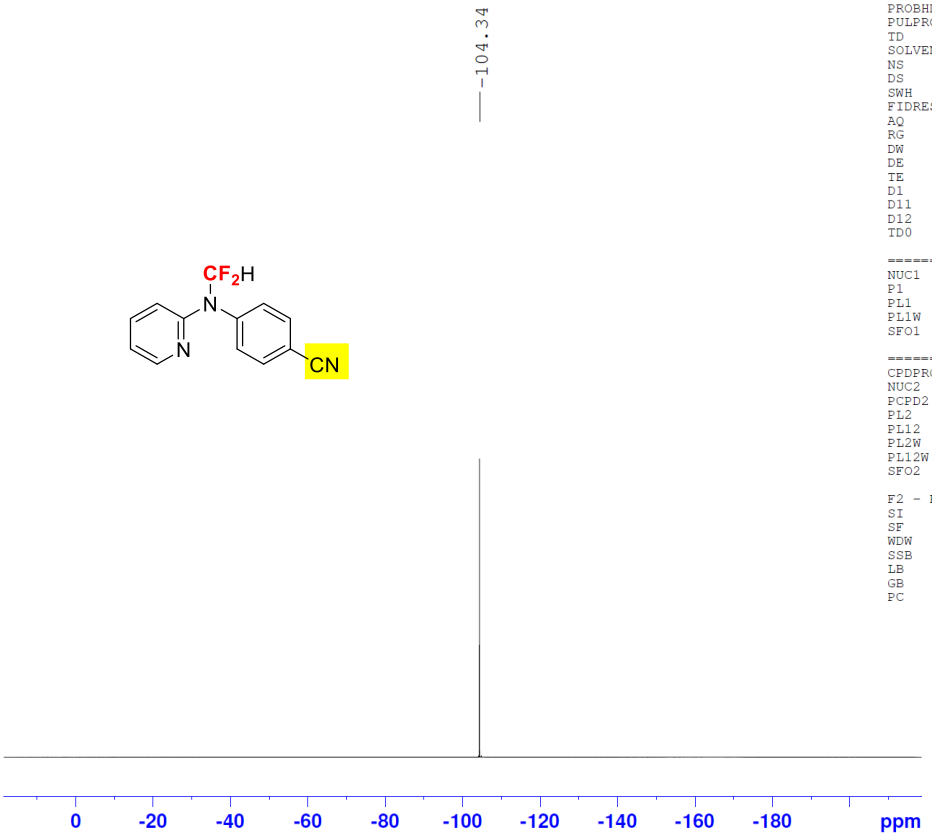

```
F2 - Acquisition Parameters
INSTRUM             spect
PROBHD   5 mm PABBO BB-
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                     35
DS                      2
SWH             24038.461 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                    181
DW                20.800 usec
DE                 6.50 usec
TE                298.7 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127649 MHz
WDW                    EM
SSB        0
LB                  1.00 Hz
GB         0
PC                  1.40
```

4-((Difluoromethyl)(pyridin-2-yl)amino)benzonitrile 19F



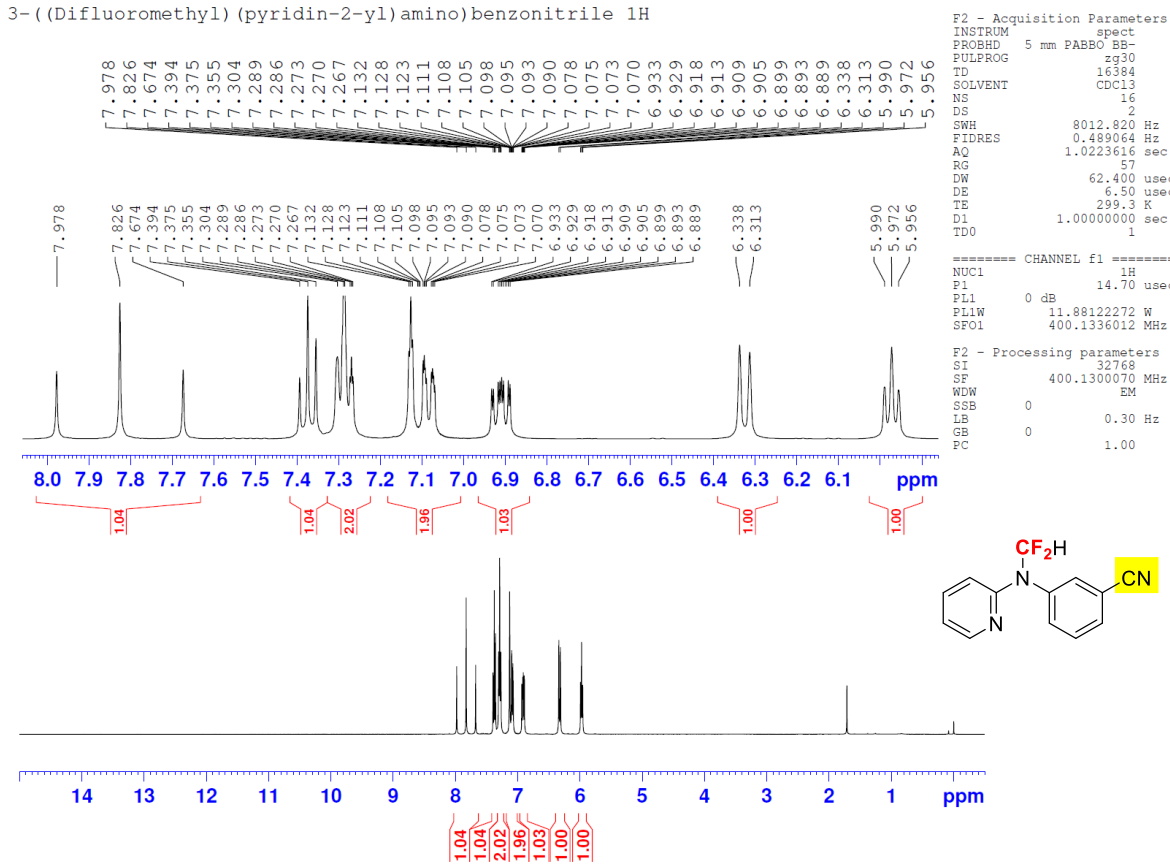

```
F2 - Acquisition Parameters
INSTRUM             spect
PROBHD   5 mm PABBO BB-
PULPROG          zgfhigqn
TD                 131072
SOLVENT             CDCl3
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                    724
DW                5.600 usec
DE                 6.50 usec
TE                298.1 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W         18.69428444 W
SFO1        376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  65536
SF           376.4983660 MHz
WDW                    EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

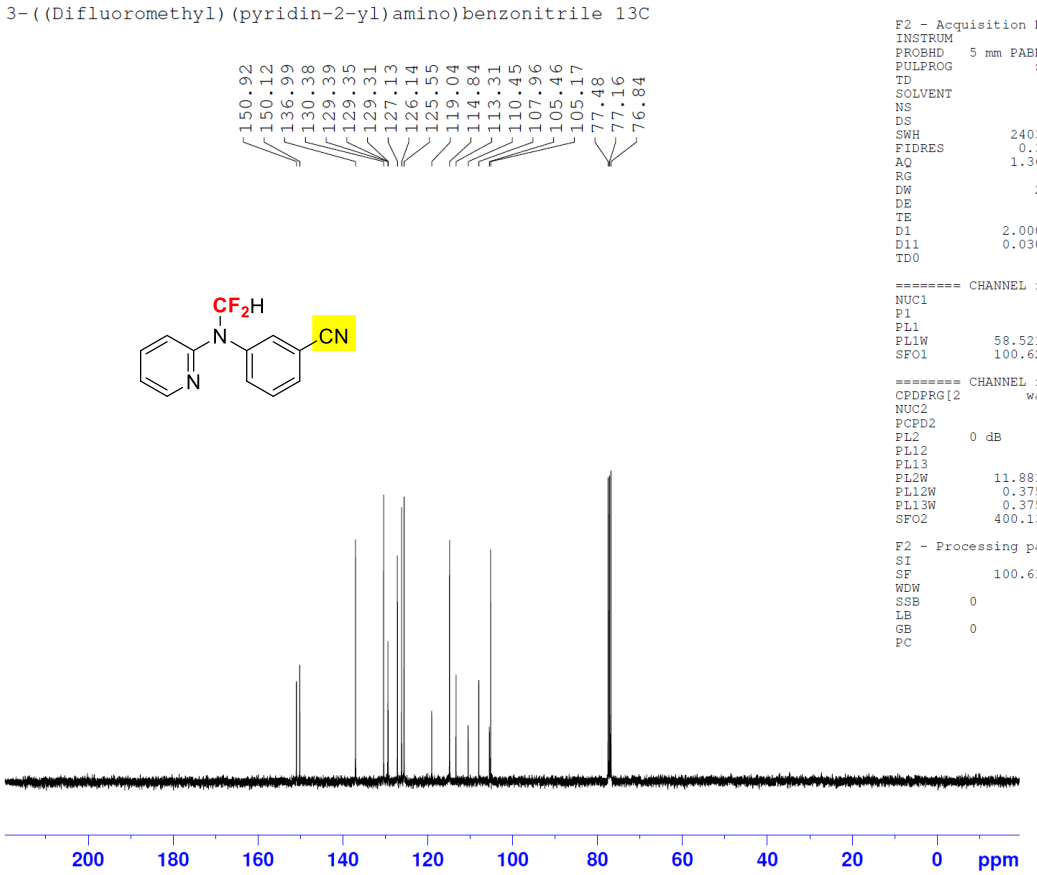
3-((Difluoromethyl)(pyridin-2-yl)amino)benzonitrile (product 2e)




```
F2 - Acquisition Parameters
INSTRUM             spect
PROBHD    5 mm PABBO BB-
PULPROG             zg30
TD                 16384
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8012.820 Hz
FIDRES             0.489064 Hz
AQ              1.0223616 sec
RG                    57
DW                 62.400 usec
DE                  6.50 usec
TE                299.3 K
D1              1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.70 usec
PL1        0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF            400.1300070 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

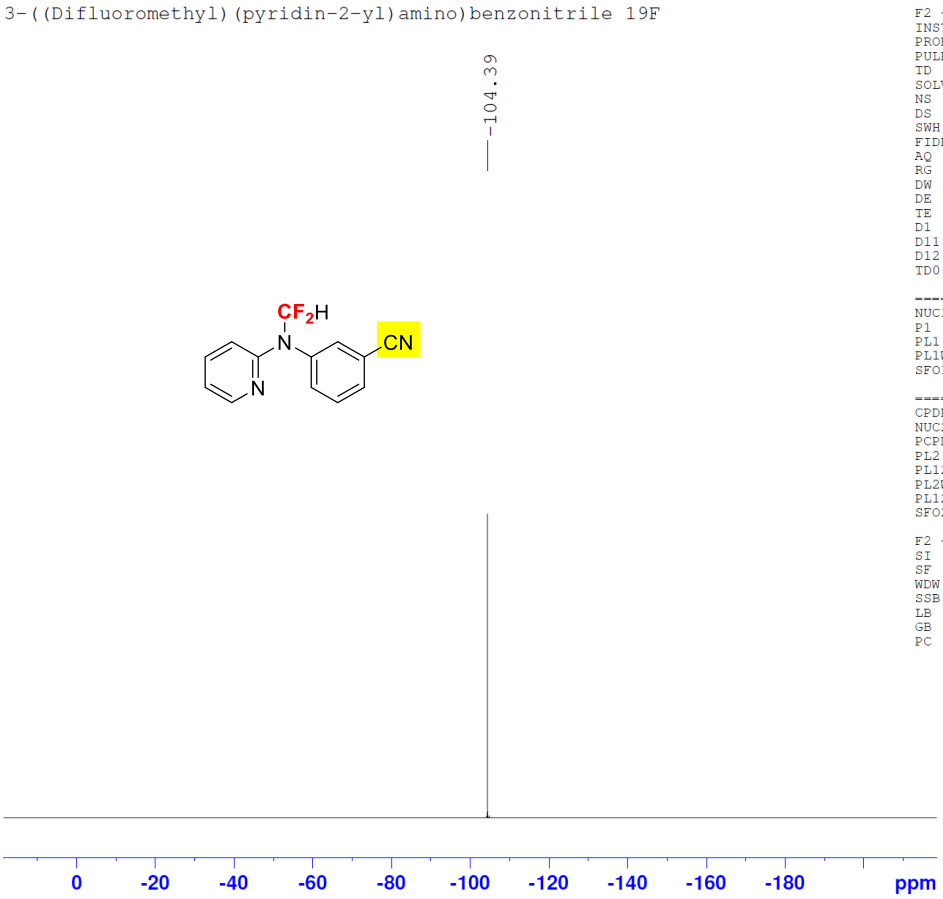



```
F2 - Acquisition Parameters
INSTRUM             spect
PROBHD    5 mm PABBO BB-
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                    51
DS                     2
SWH            24038.461 Hz
FIDRES             0.366798 Hz
AQ              1.3631488 sec
RG                   228
DW                 20.800 usec
DE                  6.50 usec
TE                299.9 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W          58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12              15.00 dB
PL13              15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF            100.6127617 MHz
WDW                   EM
SSB        0
LB                 1.00 Hz
GB         0
PC                 1.40
```



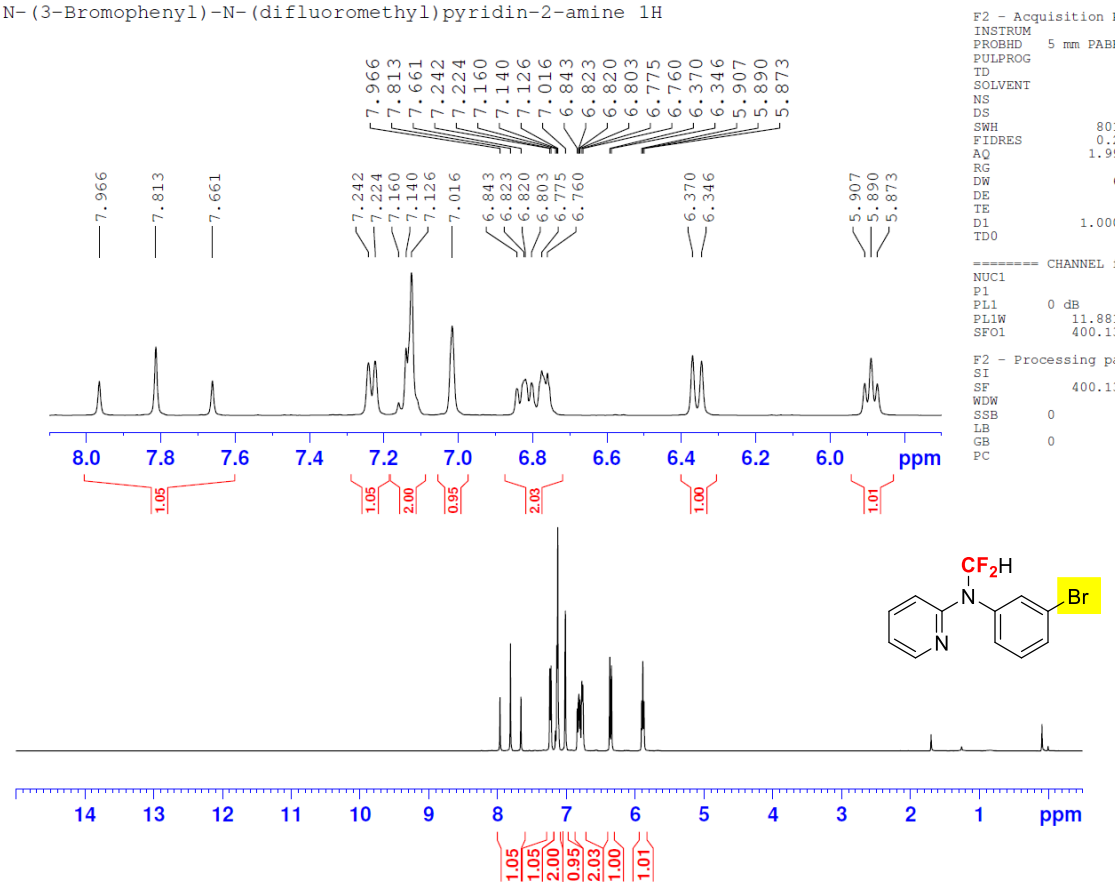

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                  131072
SOLVENT              CDCl3
NS                      16
DS                       4
SWH              89285.711 Hz
FIDRES           0.681196 Hz
AQ               0.7340032 sec
RG                     812
DW                 5.600 usec
DE                 6.50 usec
TE                 299.6 K
D1              1.00000000 sec
D11             0.03000000 sec
D12             0.00002000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                   65536
SF            376.4983660 MHz
WDW                     EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

N-(3-Bromophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2f)

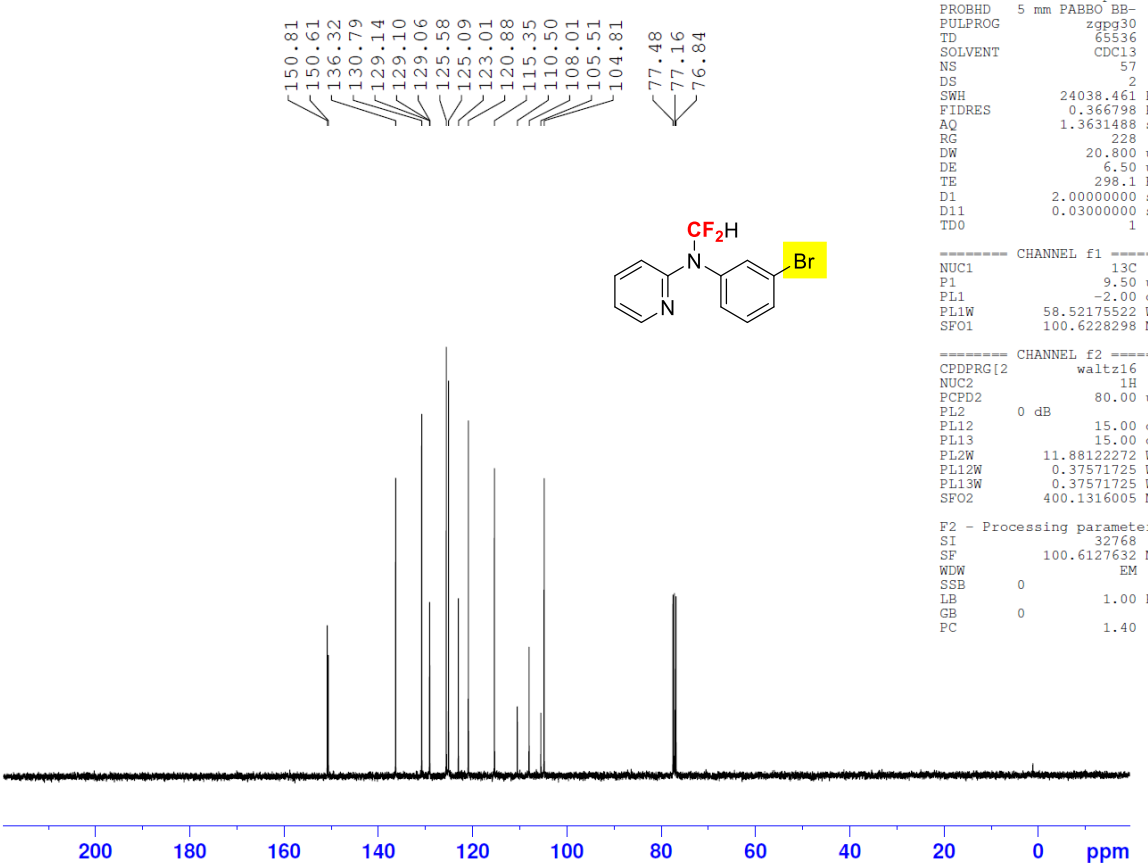



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  32050
SOLVENT              CDCl3
NS                      16
DS                       2
SWH              8012.820 Hz
FIDRES           0.250010 Hz
AQ               1.9999200 sec
RG                      32
DW                62.400 usec
DE                 6.50 usec
TE                 298.1 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                 14.70 usec
PL1        0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                   32768
SF            400.1300186 MHz
WDW                     EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

N-(3-Bromophenyl)-N-(difluoromethyl)pyridin-2-amine 13C



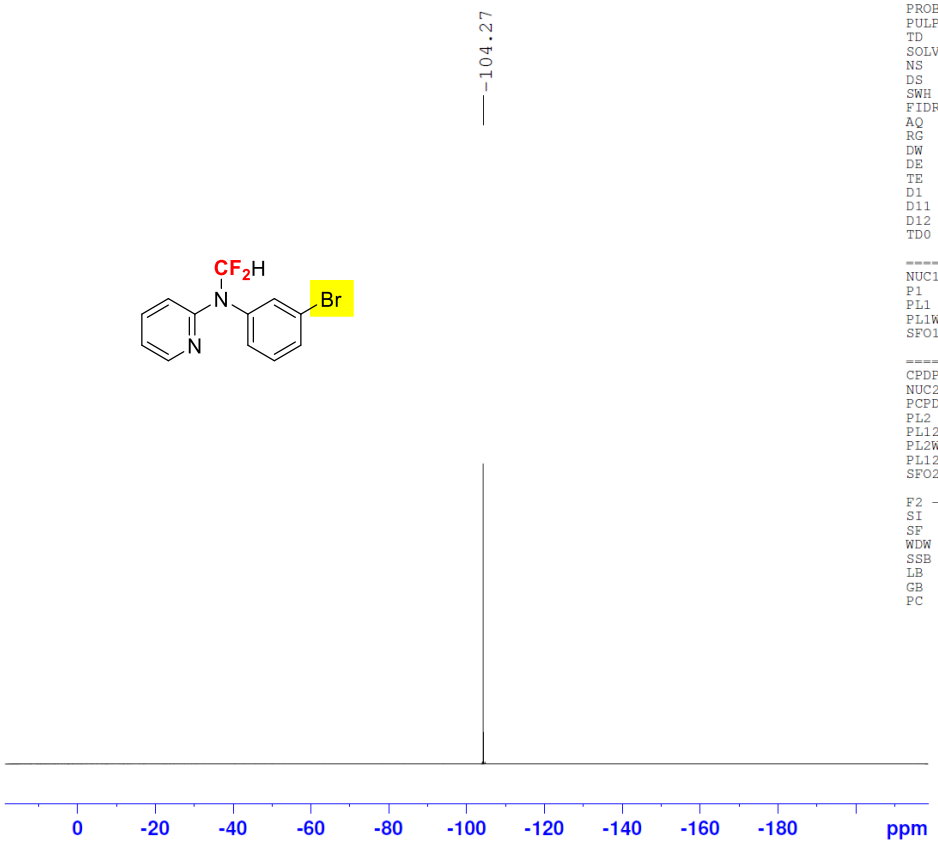

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                     57
DS                      2
SWH             24038.461 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                    228
DW                20.800 usec
DE                 6.50 usec
TE                298.1 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                 9.50 usec
PL1               -2.00 dB
PL1W          58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12              15.00 dB
PL13              15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127632 MHz
WDW                   EM
SSB        0
LB                 1.00 Hz
GB         0
PC                 1.40
```

N-(3-Bromophenyl)-N-(difluoromethyl)pyridin-2-amine 19F



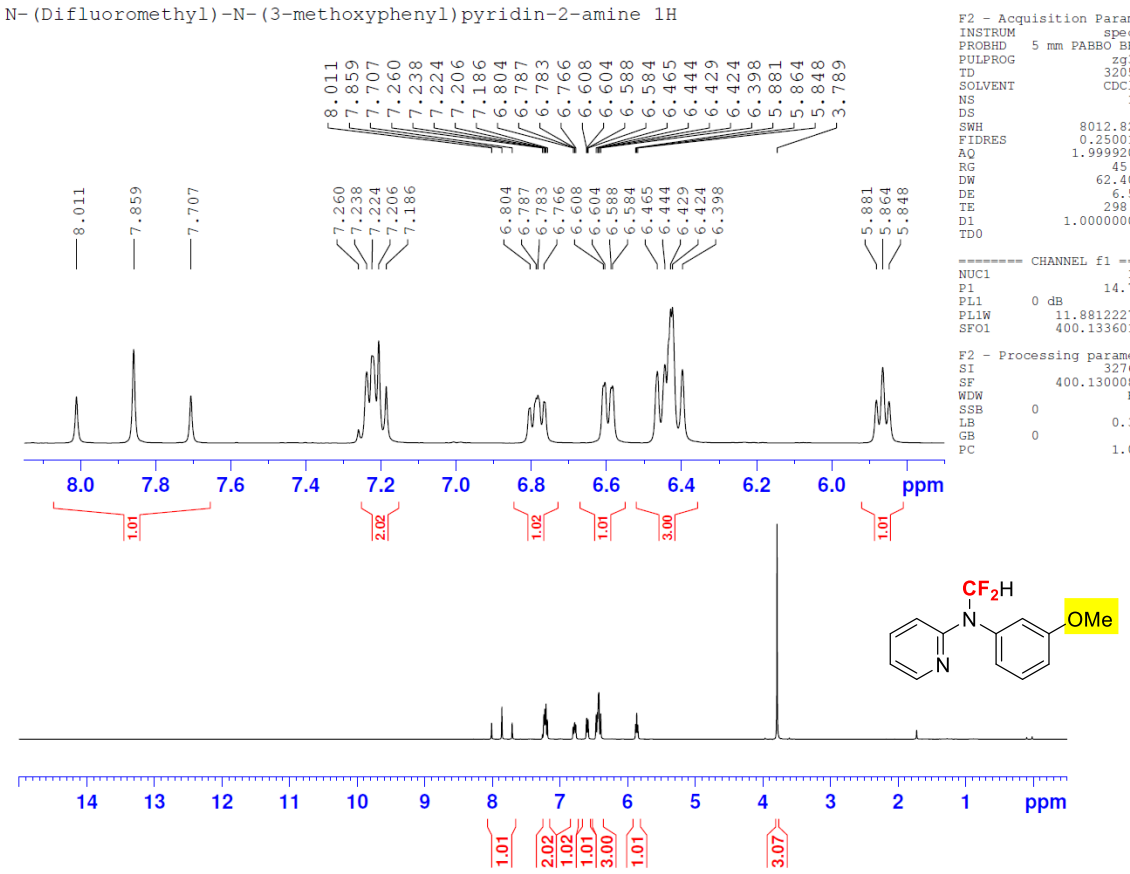

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD                 131072
SOLVENT             CDCl3
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                    512
DW                5.600 usec
DE                 6.50 usec
TE                298.2 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                     1

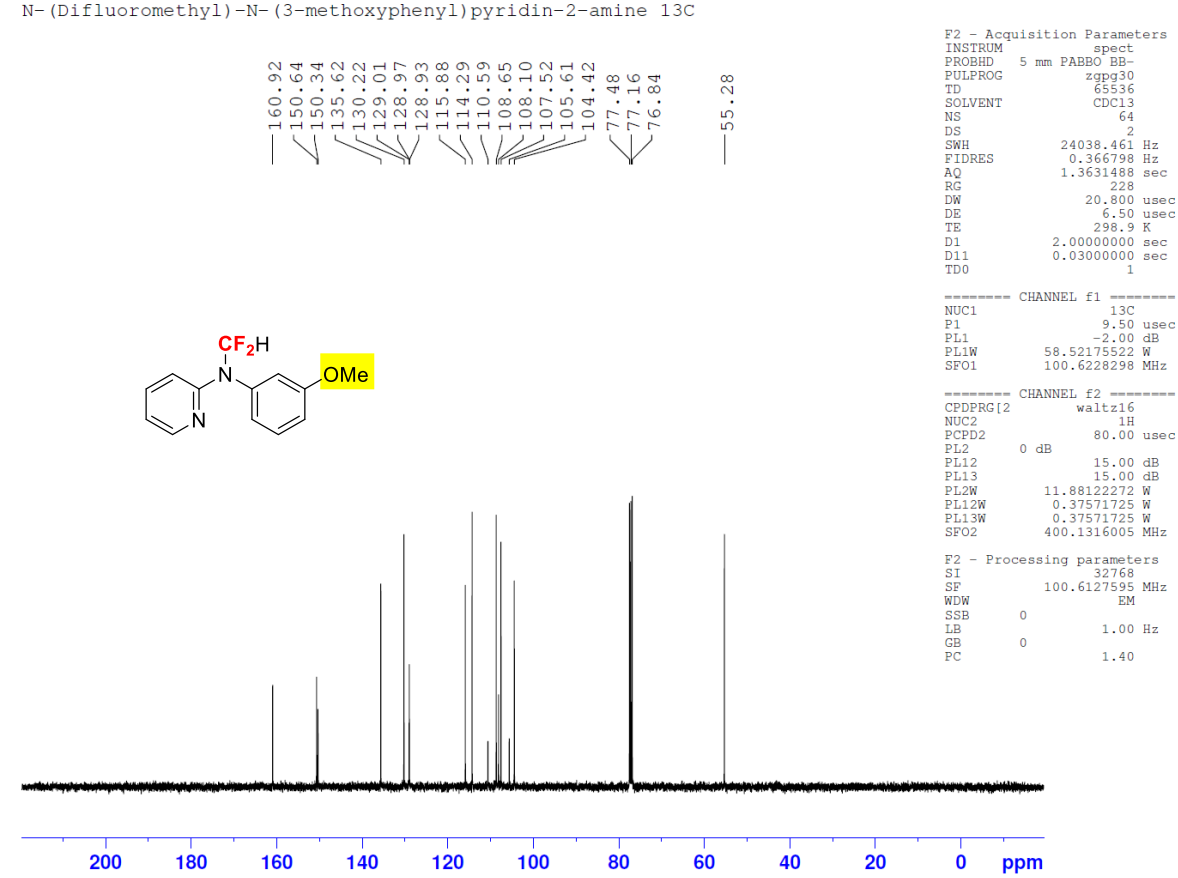
======== CHANNEL f1 ========
NUC1                  19F
P1                14.20 usec
PL1               -3.00 dB
PL1W          18.69428444 W
SFO1         376.4607164 MHz

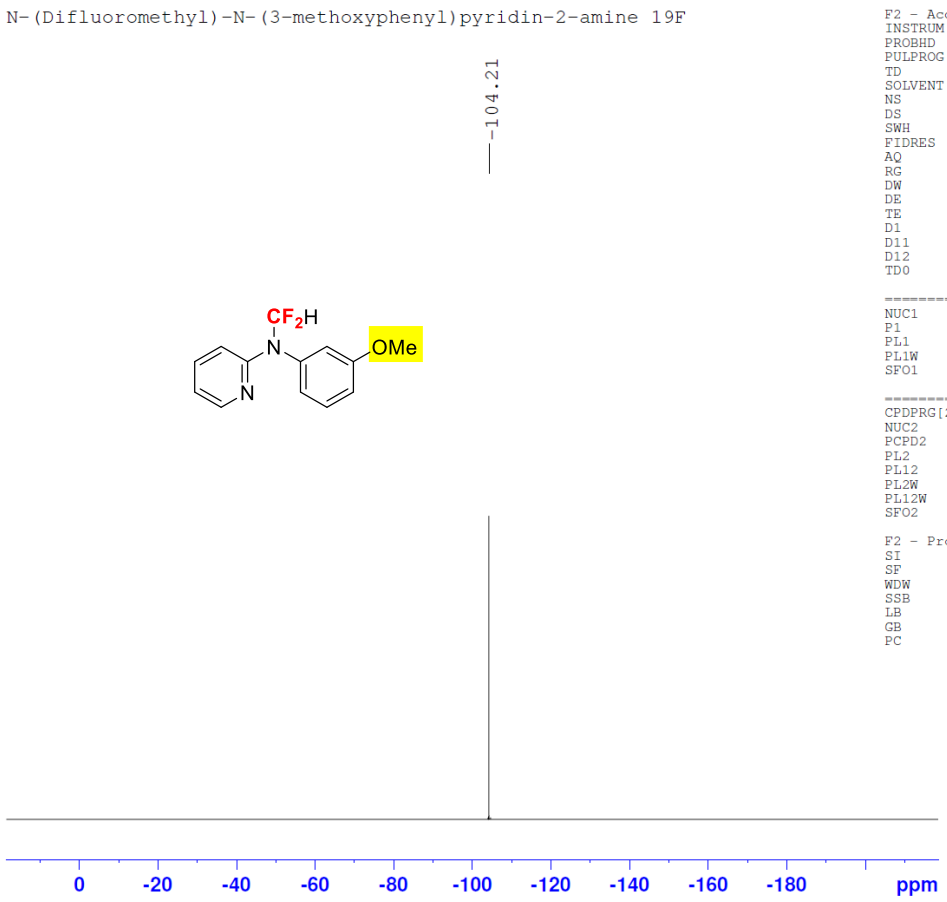
======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12              15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF           376.4983660 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

N-(Difluoromethyl)-*N*-(3-methoxyphenyl)pyridin-2-amine (product 2g)







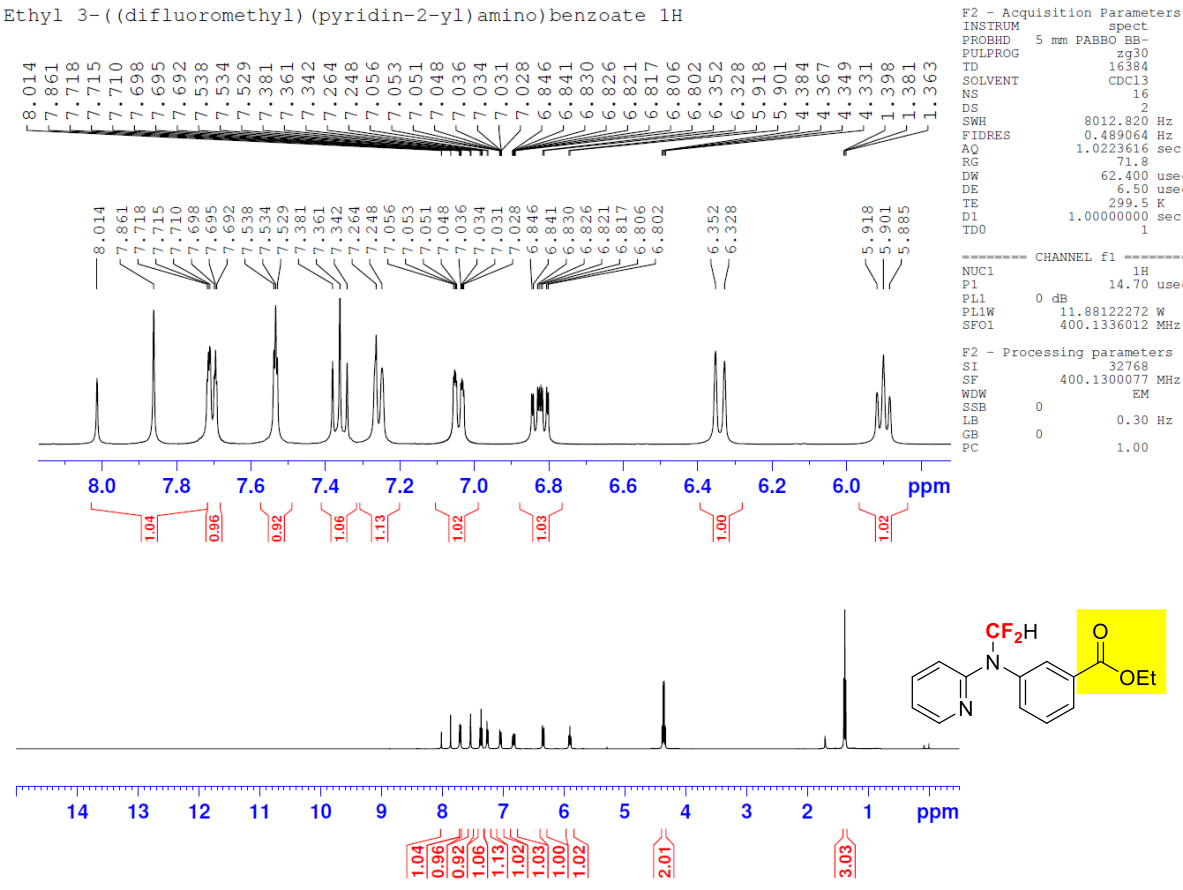

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                  131072
SOLVENT              CDCl3
NS                      16
DS                       4
SWH              89285.711 Hz
FIDRES           0.681196 Hz
AQ               0.7340032 sec
RG                     724
DW                 5.600 usec
DE                  6.50 usec
TE                 298.3 K
D1              1.00000000 sec
D11             0.03000000 sec
D12             0.00002000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   19F
P1                  14.20 usec
PL1                 -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2               80.00 usec
PL2        0 dB
PL12                15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                  65536
SF            376.4983660 MHz
WDW                    EM
SSB         0
LB                  0.30 Hz
GB          0
PC                  1.00
```

Ethyl 3-((difluoromethyl)(pyridin-2-yl)amino)benzoate (product 2h)

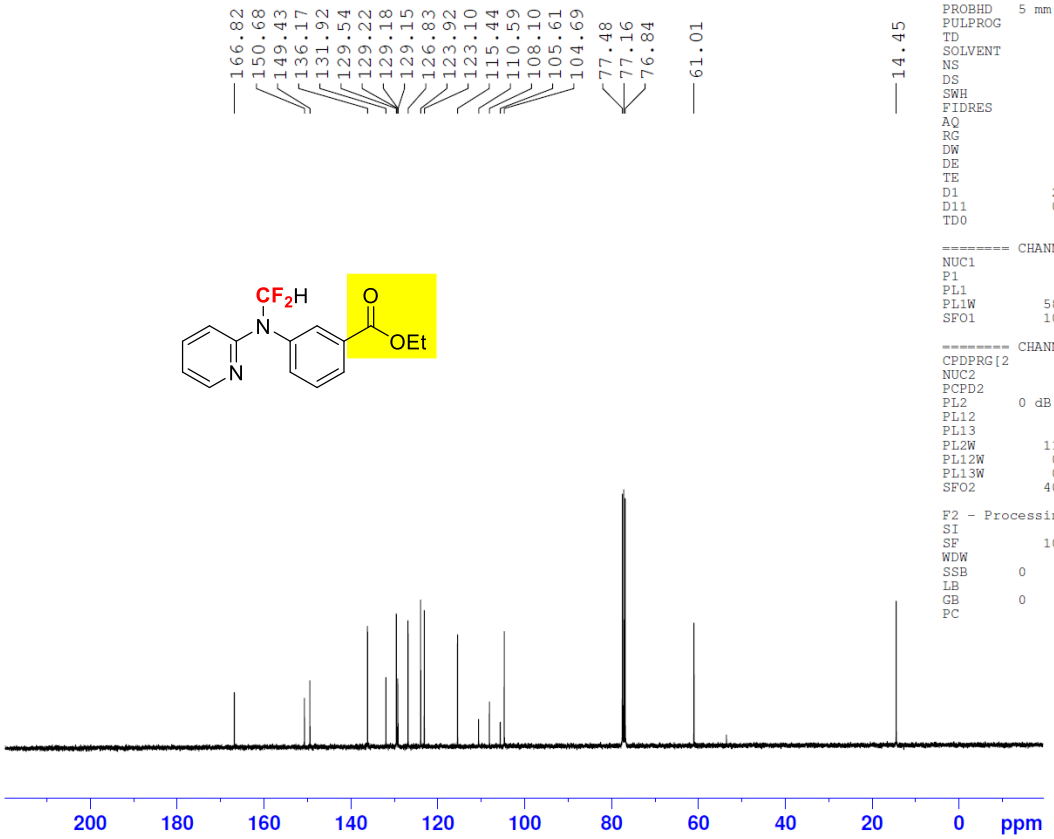



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  16384
SOLVENT              CDCl3
NS                      16
DS                       2
SWH              8012.820 Hz
FIDRES           0.489064 Hz
AQ               1.0223616 sec
RG                    71.8
DW                 62.400 usec
DE                  6.50 usec
TE                 299.5 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  14.70 usec
PL1         0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                  32768
SF            400.1300077 MHz
WDW                    EM
SSB         0
LB                  0.30 Hz
GB          0
PC                  1.00
```

Ethyl 3-((difluoromethyl)(pyridin-2-yl)amino)benzoate 13C



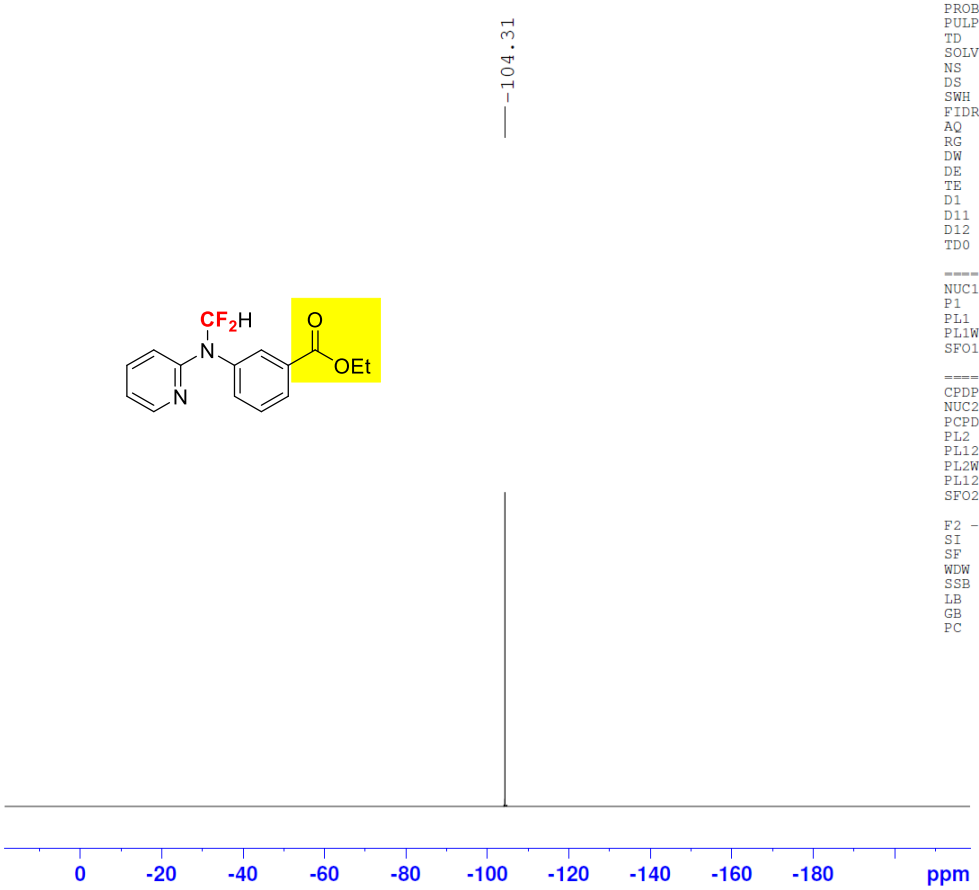

```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                        274
DS                          2
SWH                 24038.461 Hz
FIDRES              0.366798 Hz
AQ                  1.3631488 sec
RG                        181
DW                   20.800 usec
DE                    6.50 usec
TE                    301.2 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                      13C
P1                     9.50 usec
PL1                   -2.00 dB
PL1W               58.52175522 W
SFO1               100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2               waltz16
NUC2                       1H
PCPD2                 80.00 usec
PL2           0 dB
PL12                  15.00 dB
PL13                  15.00 dB
PL2W               11.88122272 W
PL12W               0.37571725 W
PL13W               0.37571725 W
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                        32768
SF                 100.6127554 MHz
WDW                          EM
SSB           0
LB                     1.00 Hz
GB            0
PC                     1.40
```

Ethyl 3-((difluoromethyl)(pyridin-2-yl)amino)benzoate 19F



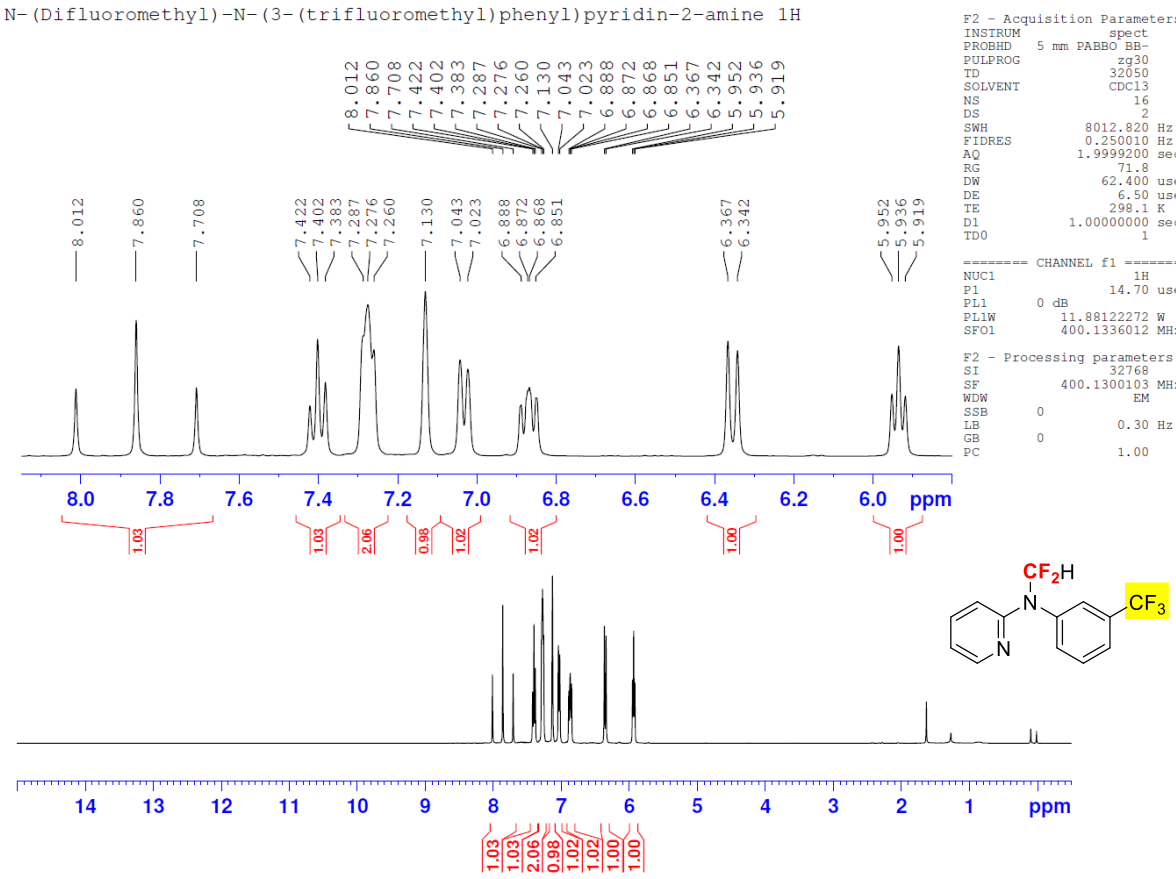

```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG               zgfhigqn
TD                     131072
SOLVENT                 CDCl3
NS                         16
DS                          4
SWH                 89285.711 Hz
FIDRES              0.681196 Hz
AQ                  0.7340032 sec
RG                       1030
DW                    5.600 usec
DE                    6.50 usec
TE                    299.5 K
D1                  1.00000000 sec
D11                 0.03000000 sec
D12                 0.00002000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                      19F
P1                    14.20 usec
PL1                   -3.00 dB
PL1W               18.69428444 W
SFO1               376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2               waltz16
NUC2                       1H
PCPD2                 80.00 usec
PL2           0 dB
PL12                  15.00 dB
PL2W               11.88122272 W
PL12W               0.37571725 W
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                        65536
SF                 376.4983660 MHz
WDW                          EM
SSB           0
LB                     0.30 Hz
GB            0
PC                     1.00
```

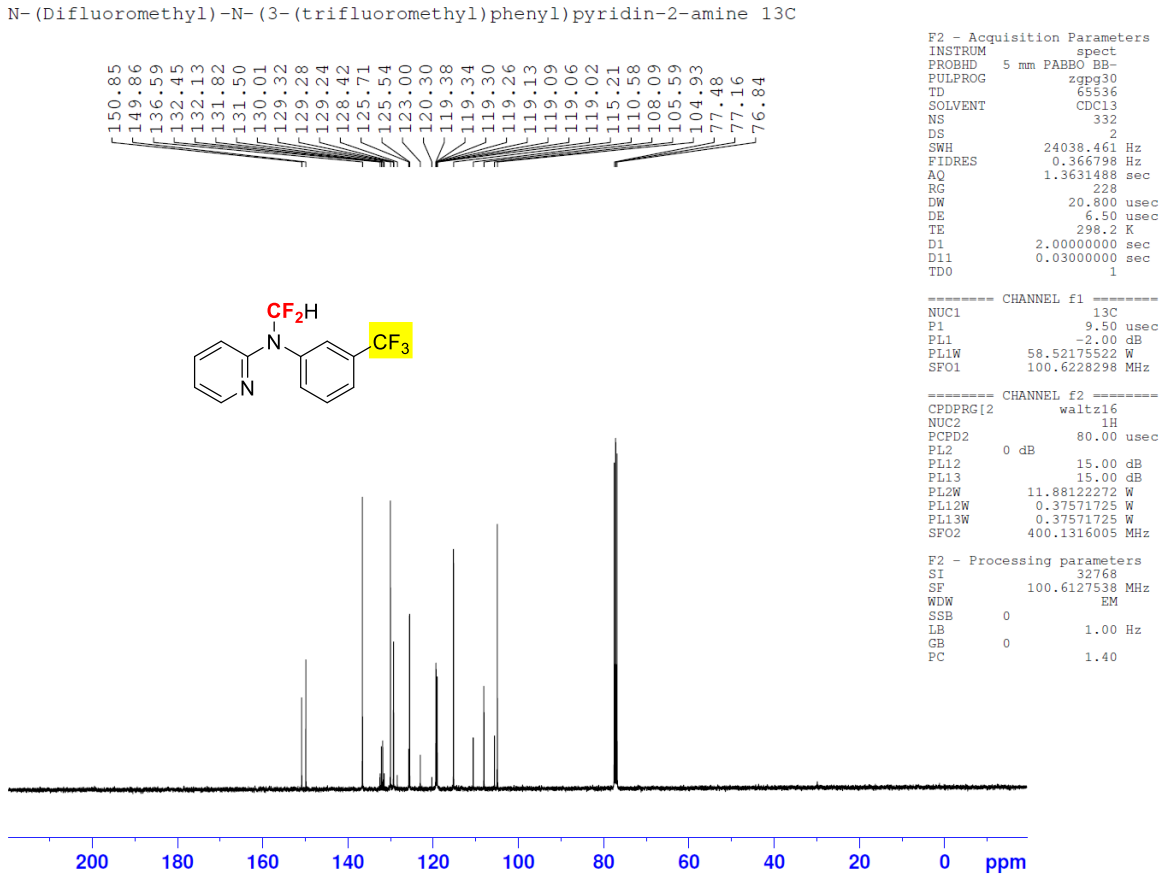
N-(Difluoromethyl)-*N*-(3-(trifluoromethyl)phenyl)pyridin-2-amine (product 2i)




```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  32050
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.250010 Hz
AQ               1.9999200 sec
RG                   71.8
DW                  62.400 usec
DE                   6.50 usec
TE                  298.1 K
D1               1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  14.70 usec
PL1        0 dB
PL1W         11.88122272 W
SFO1         400.1336012 MHz

F2 - Processing parameters
SI                  32768
SF           400.1300103 MHz
WDW                    EM
SSB         0
LB                   0.30 Hz
GB          0
PC                   1.00
```

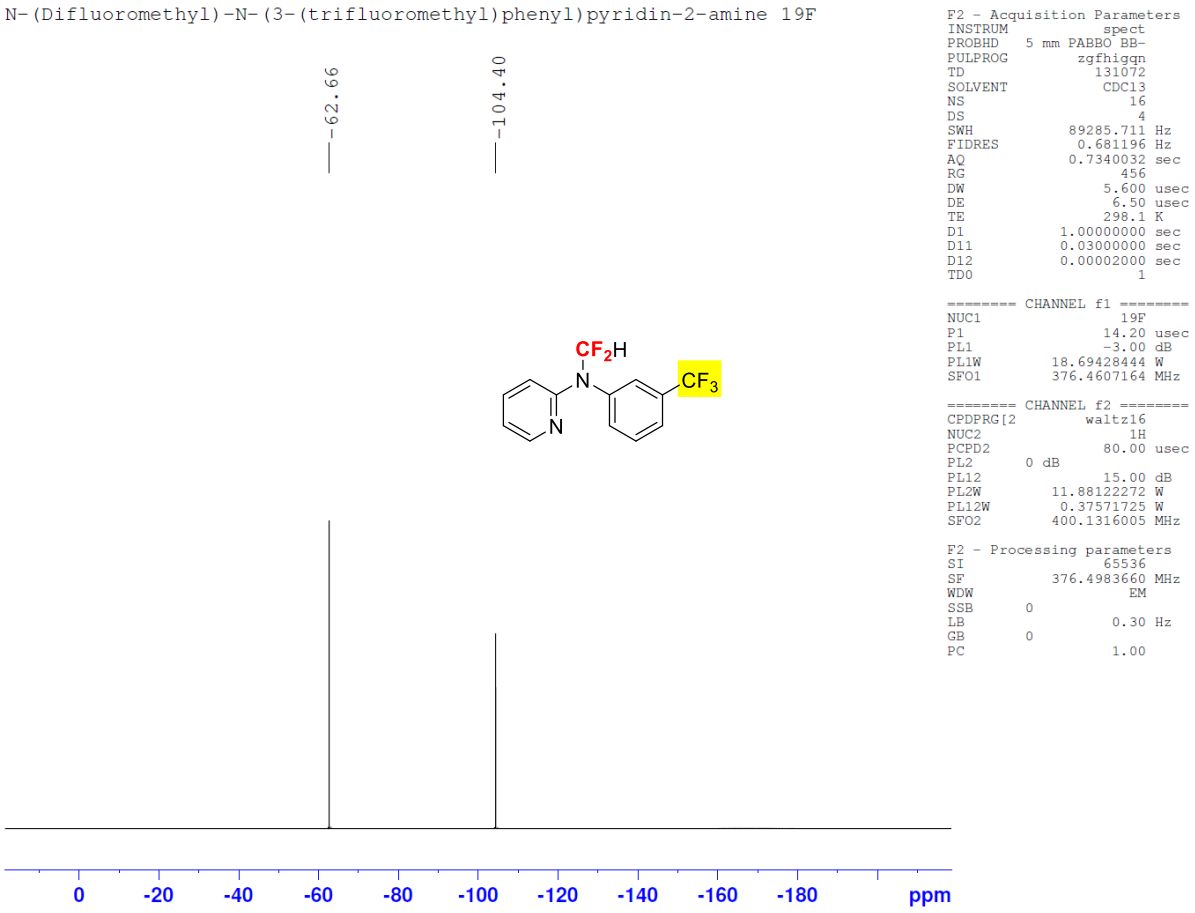



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    332
DS                      2
SWH             24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                   228
DW                  20.800 usec
DE                   6.50 usec
TE                  298.2 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                   9.50 usec
PL1                 -2.00 dB
PL1W        58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                   1H
PCPD2               80.00 usec
PL2        0 dB
PL12                15.00 dB
PL13                15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
PL13W        0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127538 MHz
WDW                    EM
SSB         0
LB                   1.00 Hz
GB          0
PC                   1.40
```



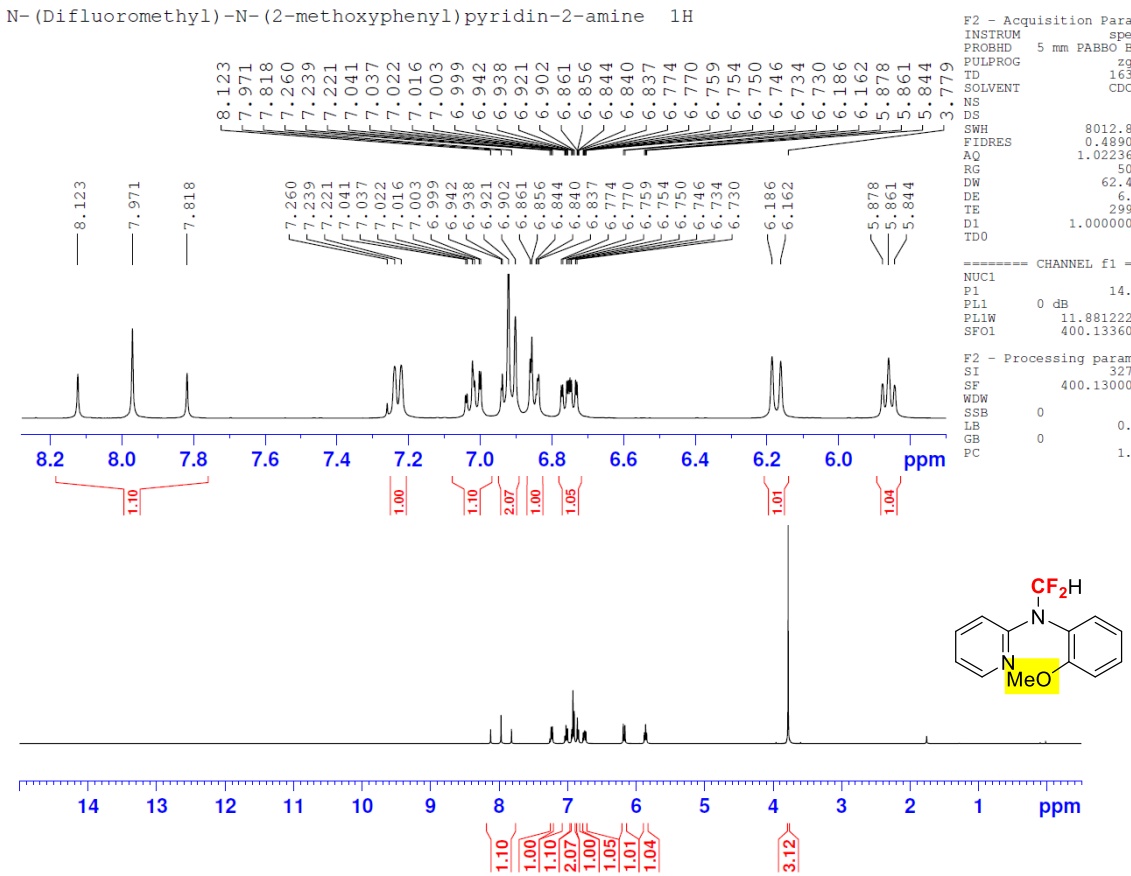
F2 - Acquisition Parameters
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfhigqn
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340032 sec
RG 456
DW 5.600 usec
DE 6.50 usec
TE 298.1 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 19F
P1 14.20 usec
PL1 -3.00 dB
PL1W 18.69428444 W
SFO1 376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0 dB
PL12 15.00 dB
PL2W 11.88122272 W
PL12W 0.37571725 W
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

N-(Difluoromethyl)-*N*-(2-methoxyphenyl)pyridin-2-amine (product 2j)

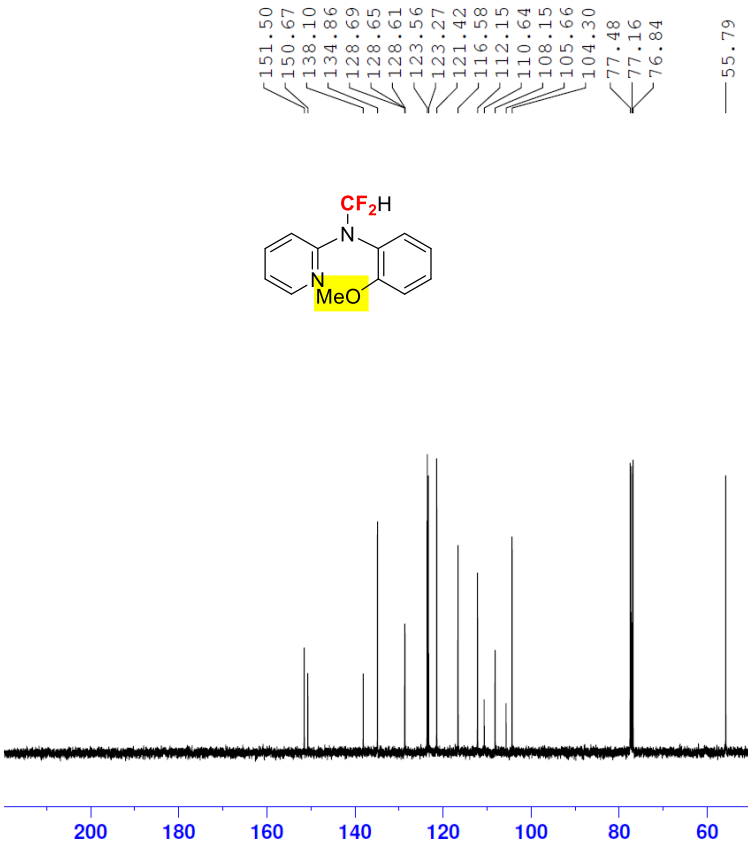


F2 - Acquisition Parameters
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 16384
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.489064 Hz
AQ 1.0223616 sec
RG 50.8
DW 62.400 usec
DE 6.50 usec
TE 299.3 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 14.70 usec
PL1 0 dB
PL1W 11.88122272 W
SFO1 400.1336012 MHz

F2 - Processing parameters
SI 32768
SF 400.1300091 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

N-(Difluoromethyl)-N-(2-methoxyphenyl)pyridin-2-amine 13C



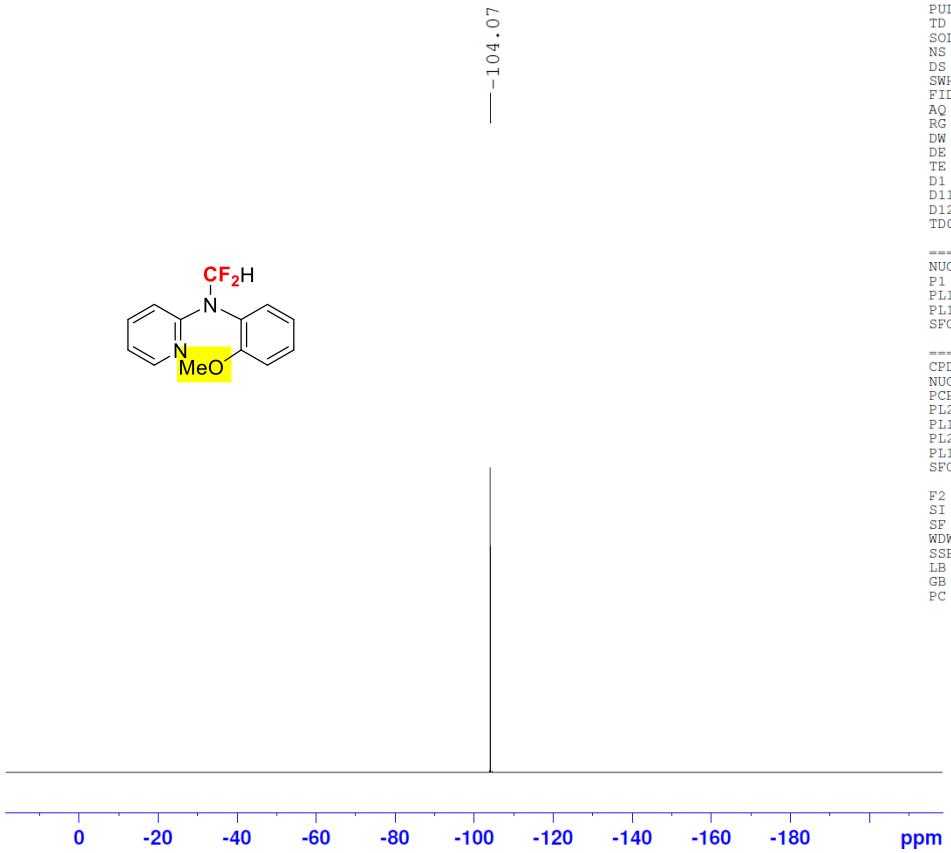

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   53
DS                    2
SWH           24038.461 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                 71.8
DW               20.800 usec
DE                6.50 usec
TE               299.9 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1                9.50 usec
PL1              -2.00 dB
PL1W        58.52175522 W
SFO1       100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2            80.00 usec
PL2       0 dB
PL12             15.00 dB
PL13             15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
PL13W        0.37571725 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127601 MHz
WDW                EM
SSB       0
LB              1.00 Hz
GB        0
PC              1.40
```

N-(Difluoromethyl)-N-(2-methoxyphenyl)pyridin-2-amine 19F




```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG         zgfhigqn
TD               131072
SOLVENT           CDCl3
NS                   16
DS                    4
SWH           89285.711 Hz
FIDRES        0.681196 Hz
AQ            0.7340032 sec
RG                  724
DW               5.600 usec
DE                6.50 usec
TE               299.6 K
D1           1.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec
TD0                   1

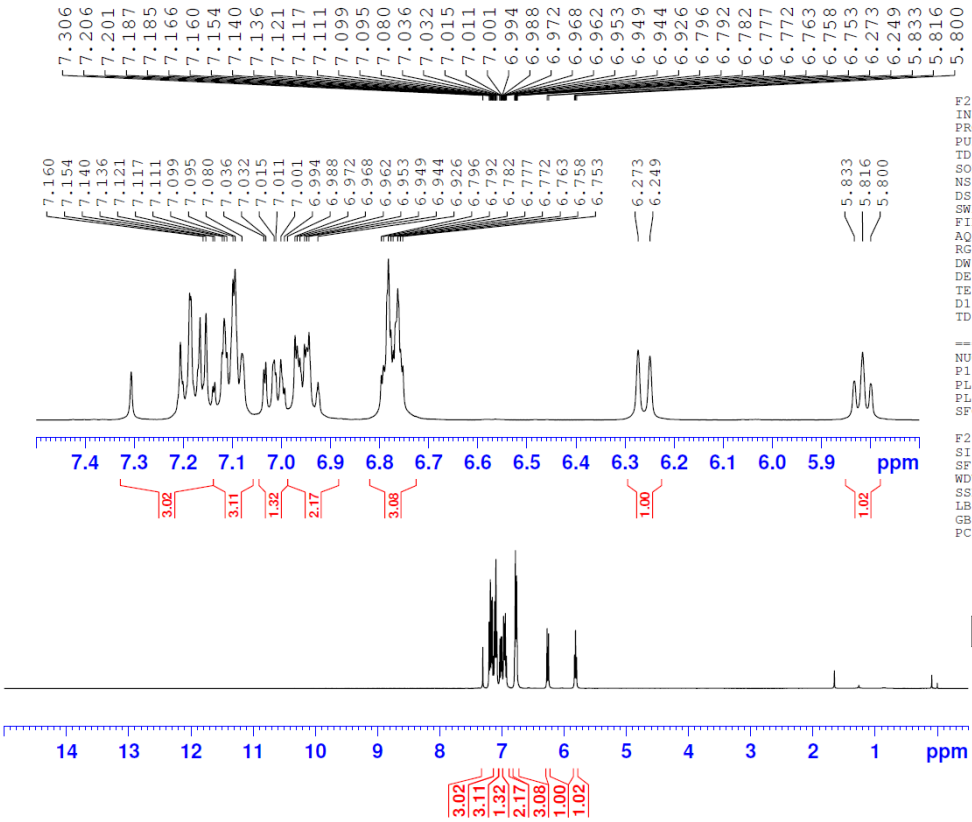
======== CHANNEL f1 ========
NUC1                19F
P1               14.20 usec
PL1              -3.00 dB
PL1W        18.69428444 W
SFO1       376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2            80.00 usec
PL2       0 dB
PL12             15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                65536
SF          376.4983660 MHz
WDW                EM
SSB       0
LB              0.30 Hz
GB        0
PC              1.00
```

N-(Difluoromethyl)-*N*-(2-phenoxyphenyl)pyridin-2-amine (product 2k)

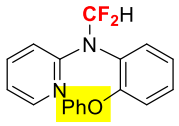
N-(Difluoromethyl)-N-(2-phenoxyphenyl)pyridin-2-amine 1H



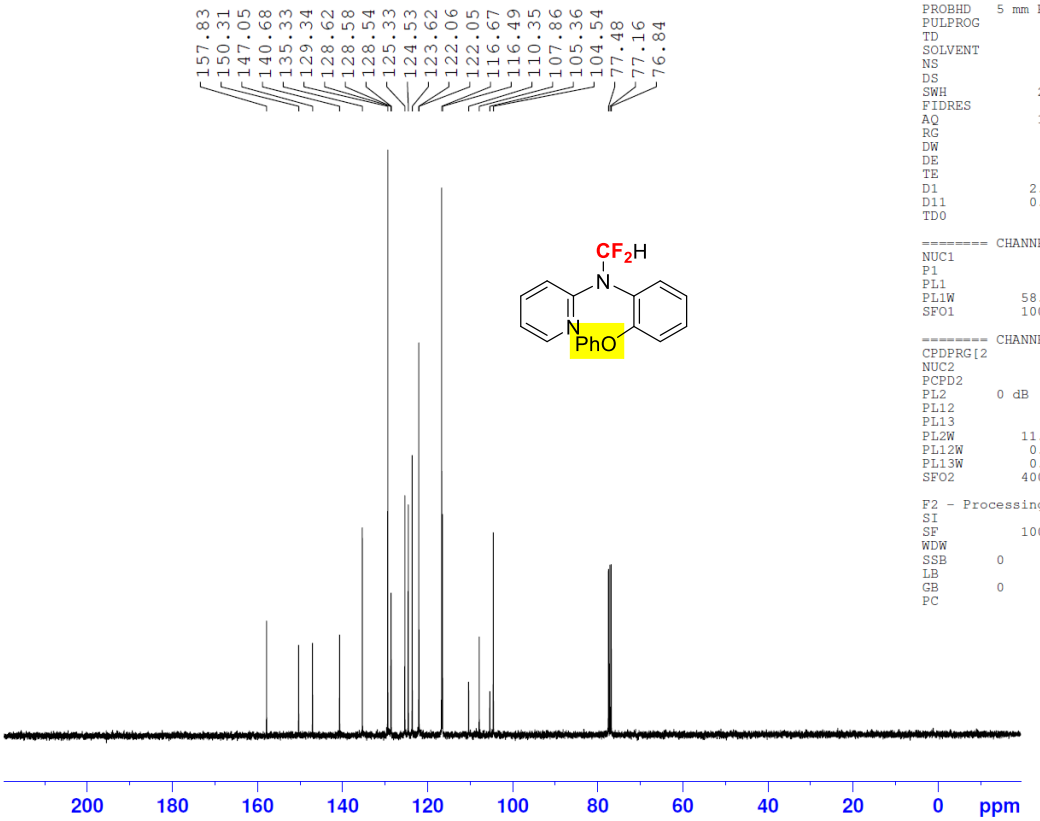

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  16384
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.489064 Hz
AQ               1.0223616 sec
RG                   25.4
DW                62.400 usec
DE                 6.50 usec
TE                299.1 K
D1             1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  14.70 usec
PL1        0 dB
PL1W         11.88122272 W
SFO1        400.1336012 MHz

F2 - Processing parameters
SI                  32768
SF           400.1300300 MHz
WDW                    EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```



N-(Difluoromethyl)-N-(2-phenoxyphenyl)pyridin-2-amine 13C

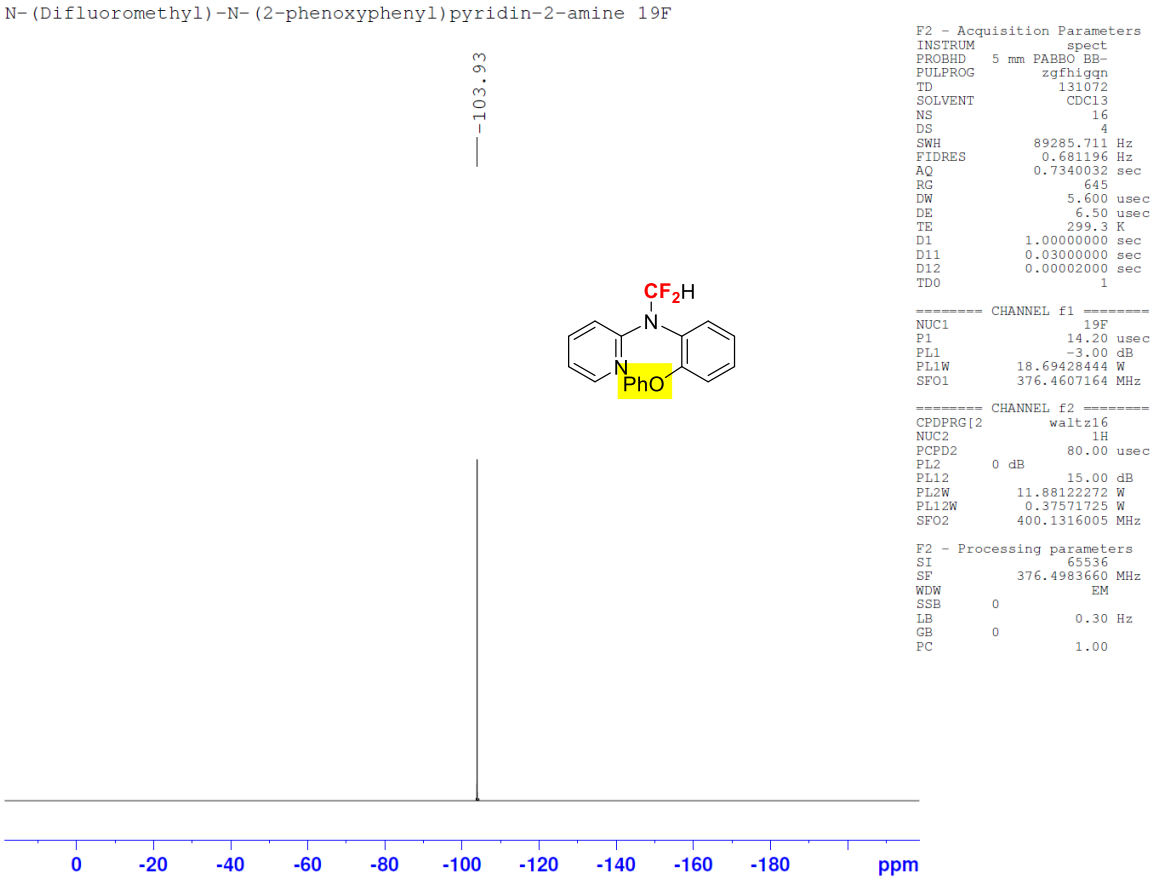



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                     59
DS                      2
SWH             24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                   287
DW                20.800 usec
DE                 6.50 usec
TE                299.7 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127633 MHz
WDW                    EM
SSB        0
LB                  1.00 Hz
GB         0
PC                  1.40
```



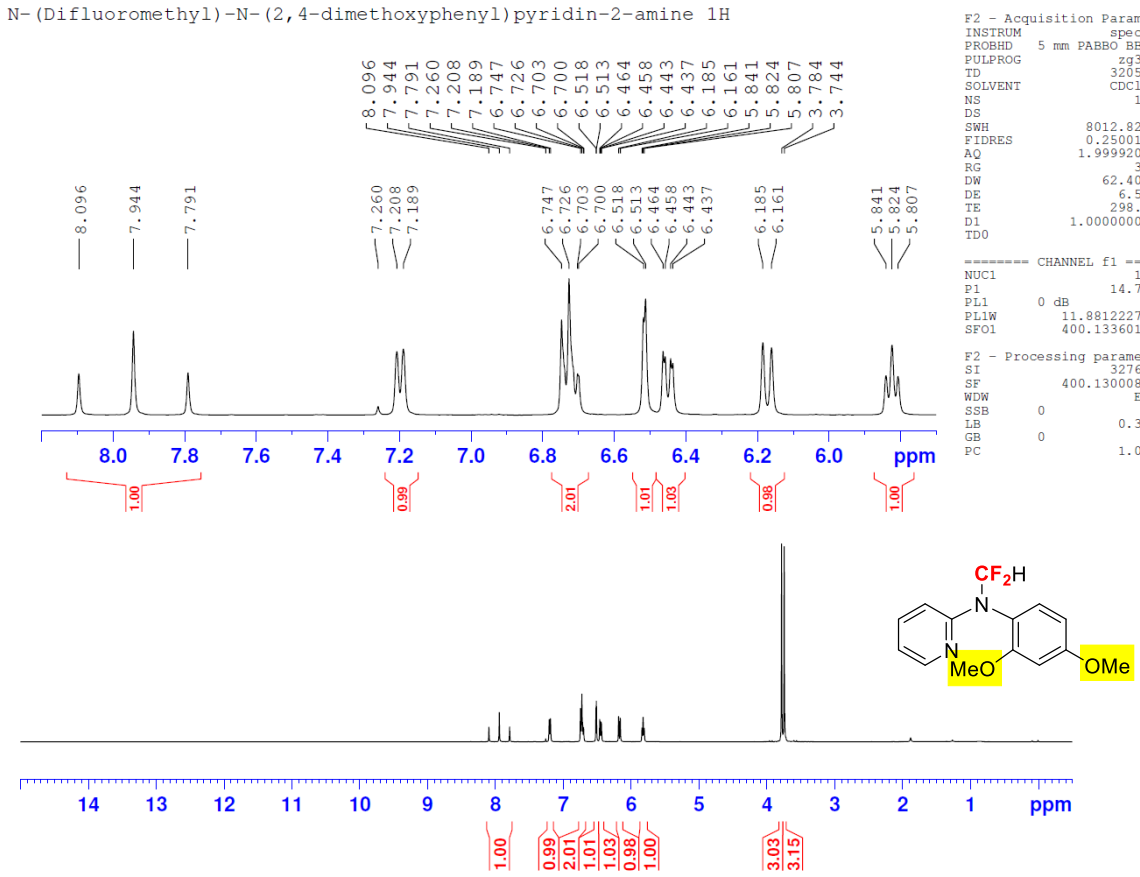

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD                131072
SOLVENT             CDCl3
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                    645
DW                5.600 usec
DE                6.50 usec
TE                299.3 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 19F
P1                14.20 usec
PL1               -3.00 dB
PL1W         18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PL2        0 dB
PL12              15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                   65536
SF           376.4983660 MHz
WDW                     EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

N-(Difluoromethyl)-*N*-(2,4-dimethoxyphenyl)pyridin-2-amine (product 2l)

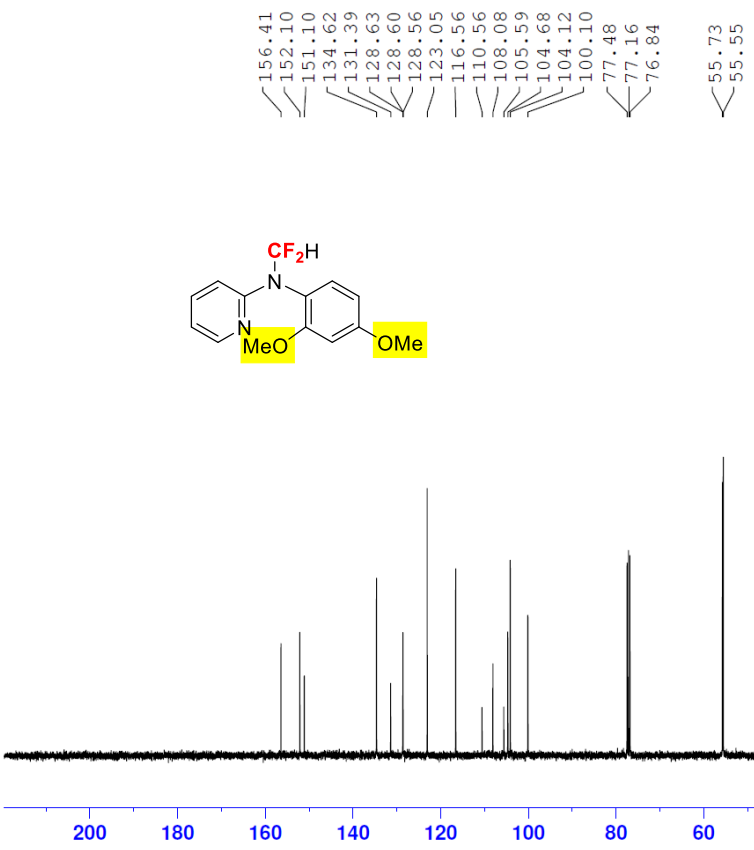



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  32050
SOLVENT             CDCl3
NS                     16
DS                      2
SWH             8012.820 Hz
FIDRES          0.250010 Hz
AQ              1.9999200 sec
RG                     32
DW                62.400 usec
DE                6.50 usec
TE                298.0 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.70 usec
PL1        0 dB
PL1W         11.88122272 W
SFO1         400.1336012 MHz

F2 - Processing parameters
SI                   32768
SF           400.1300089 MHz
WDW                     EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

N-(Difluoromethyl)-N-(2,4-dimethoxyphenyl)pyridin-2-amine 13C



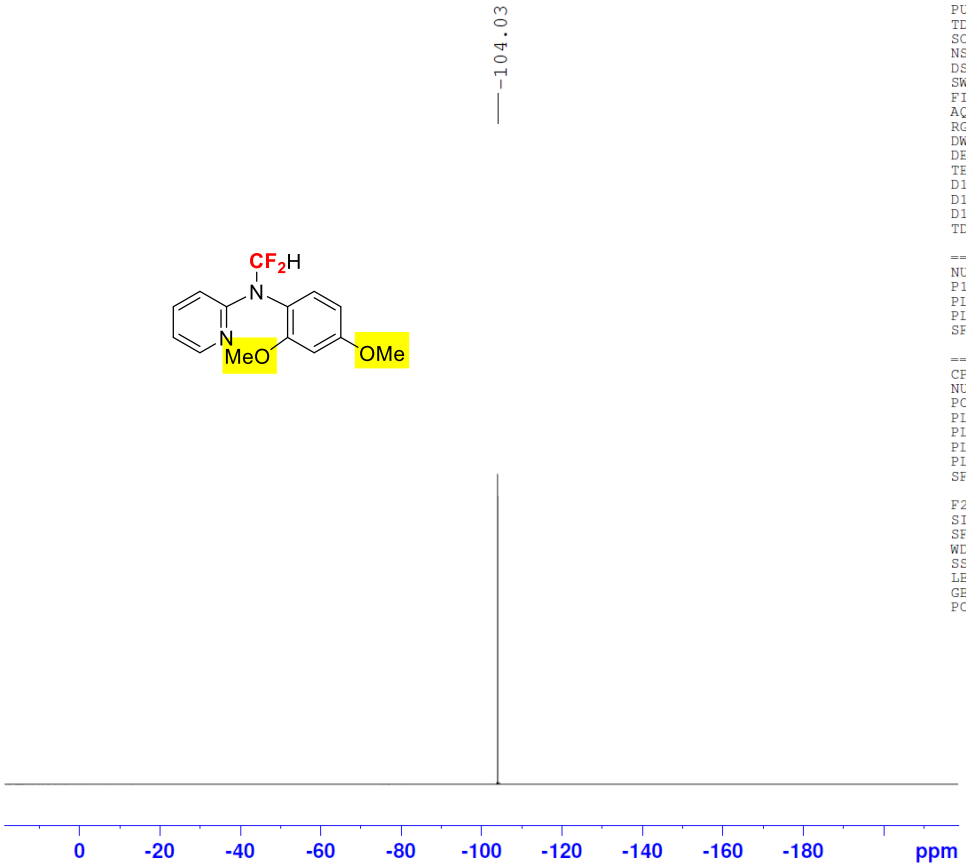

```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                         44
DS                          2
SWH                 24038.461 Hz
FIDRES                0.366798 Hz
AQ                  1.3631488 sec
RG                        228
DW                     20.800 usec
DE                      6.50 usec
TE                     298.9 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                      13C
P1                       9.50 usec
PL1                     -2.00 dB
PL1W               58.52175522 W
SFO1               100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2               waltz16
NUC2                       1H
PCPD2                   80.00 usec
PL2           0 dB
PL12                    15.00 dB
PL13                    15.00 dB
PL2W               11.88122272 W
PL12W               0.37571725 W
PL13W               0.37571725 W
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                         32768
SF                 100.6127633 MHz
WDW                           EM
SSB           0
LB                       1.00 Hz
GB            0
PC                       1.40
```

N-(Difluoromethyl)-N-(2,4-dimethoxyphenyl)pyridin-2-amine 19F




```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG              zgfhigqn
TD                     131072
SOLVENT                 CDCl3
NS                         16
DS                          4
SWH                 89285.711 Hz
FIDRES                0.681196 Hz
AQ                  0.7340032 sec
RG                        645
DW                      5.600 usec
DE                      6.50 usec
TE                     298.3 K
D1                  1.00000000 sec
D11                 0.03000000 sec
D12                 0.00002000 sec
TD0                         1

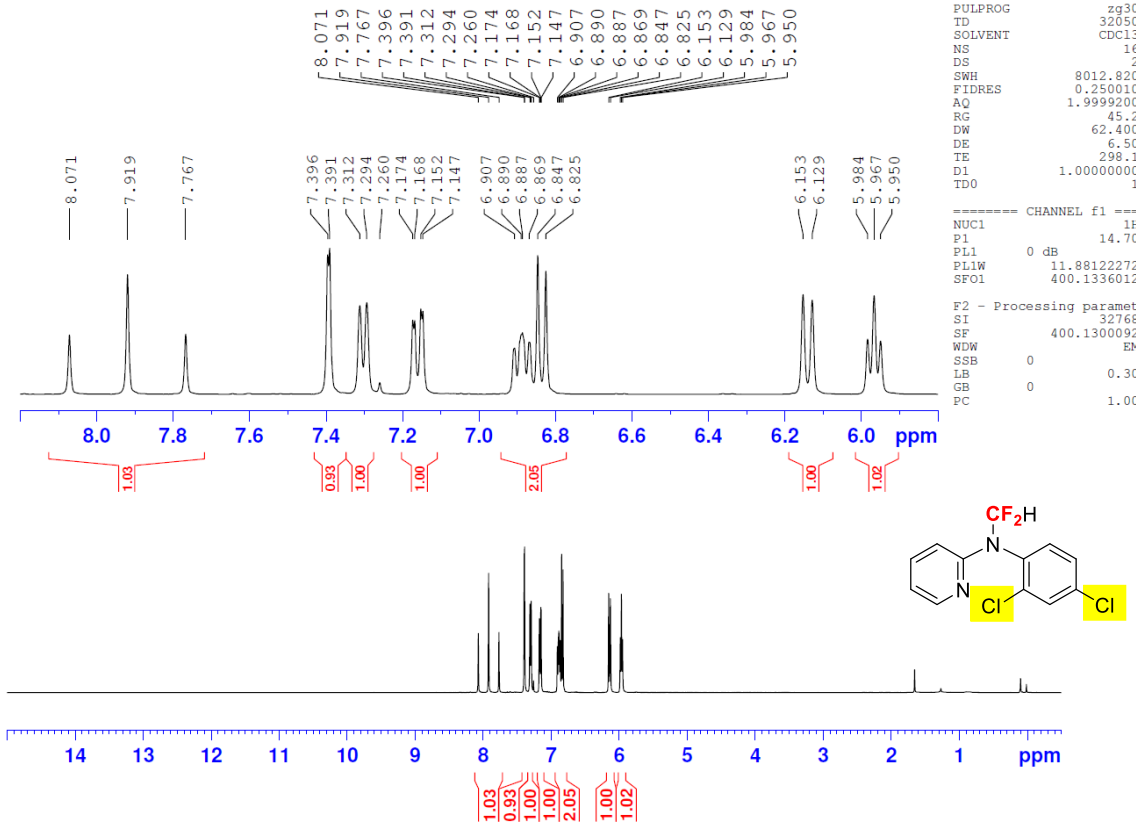
======== CHANNEL f1 ========
NUC1                      19F
P1                      14.20 usec
PL1                     -3.00 dB
PL1W               18.69428444 W
SFO1               376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2               waltz16
NUC2                       1H
PCPD2                   80.00 usec
PL2           0 dB
PL12                    15.00 dB
PL2W               11.88122272 W
PL12W               0.37571725 W
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                         65536
SF                 376.4983660 MHz
WDW                           EM
SSB           0
LB                       0.30 Hz
GB            0
PC                       1.00
```

N-(2,4-Dichlorophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2m)

N-(2,4-Dichlorophenyl)-N-(difluoromethyl)pyridin-2-amine 1H

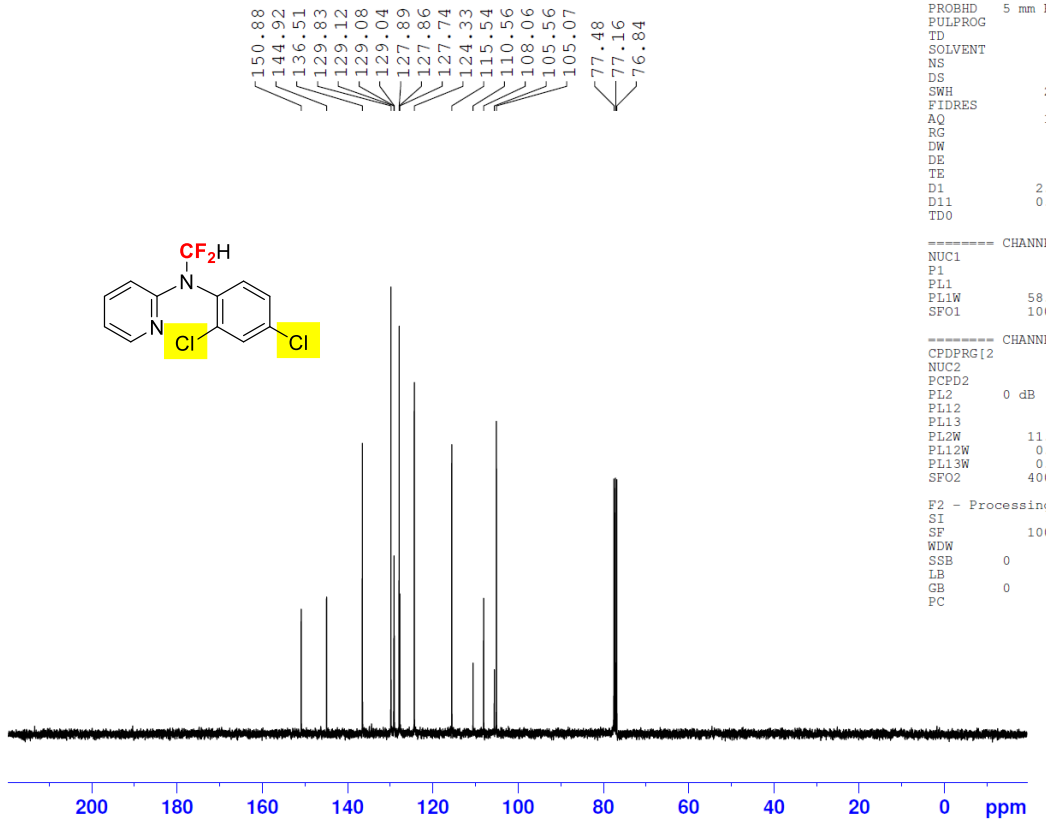



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  32050
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.250010 Hz
AQ               1.9999200 sec
RG                   45.2
DW                62.400 usec
DE                 6.50 usec
TE                298.1 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                14.70 usec
PL1        0 dB
PL1W        11.88122272 W
SFO1       400.1336012 MHz

F2 - Processing parameters
SI                  32768
SF             400.1300092 MHz
WDW                    EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

N-(2,4-Dichlorophenyl)-N-(difluoromethyl)pyridin-2-amine 13C

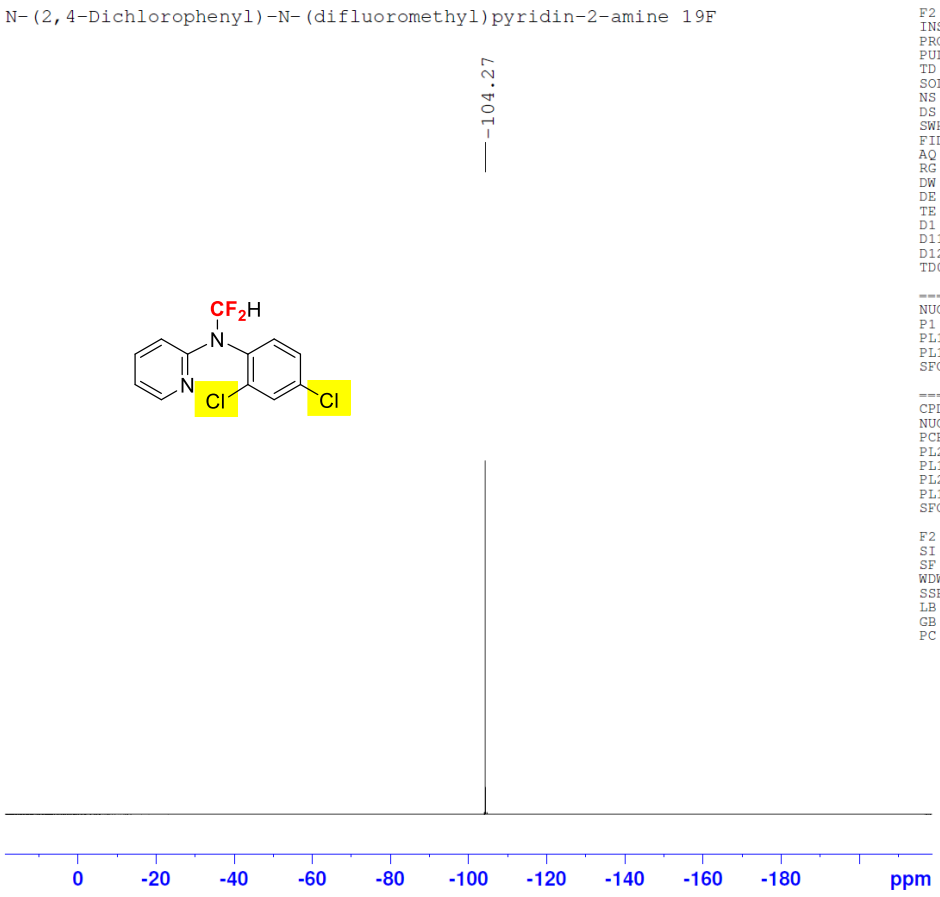



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                  65536
SOLVENT             CDCl3
NS                     53
DS                      2
SWH             24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                   228
DW                20.800 usec
DE                 6.50 usec
TE                299.2 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.50 usec
PL1                -2.00 dB
PL1W        58.52175522 W
SFO1       100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
PL13W        0.37571725 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF             100.6127592 MHz
WDW                    EM
SSB        0
LB                  1.00 Hz
GB         0
PC                  1.40
```



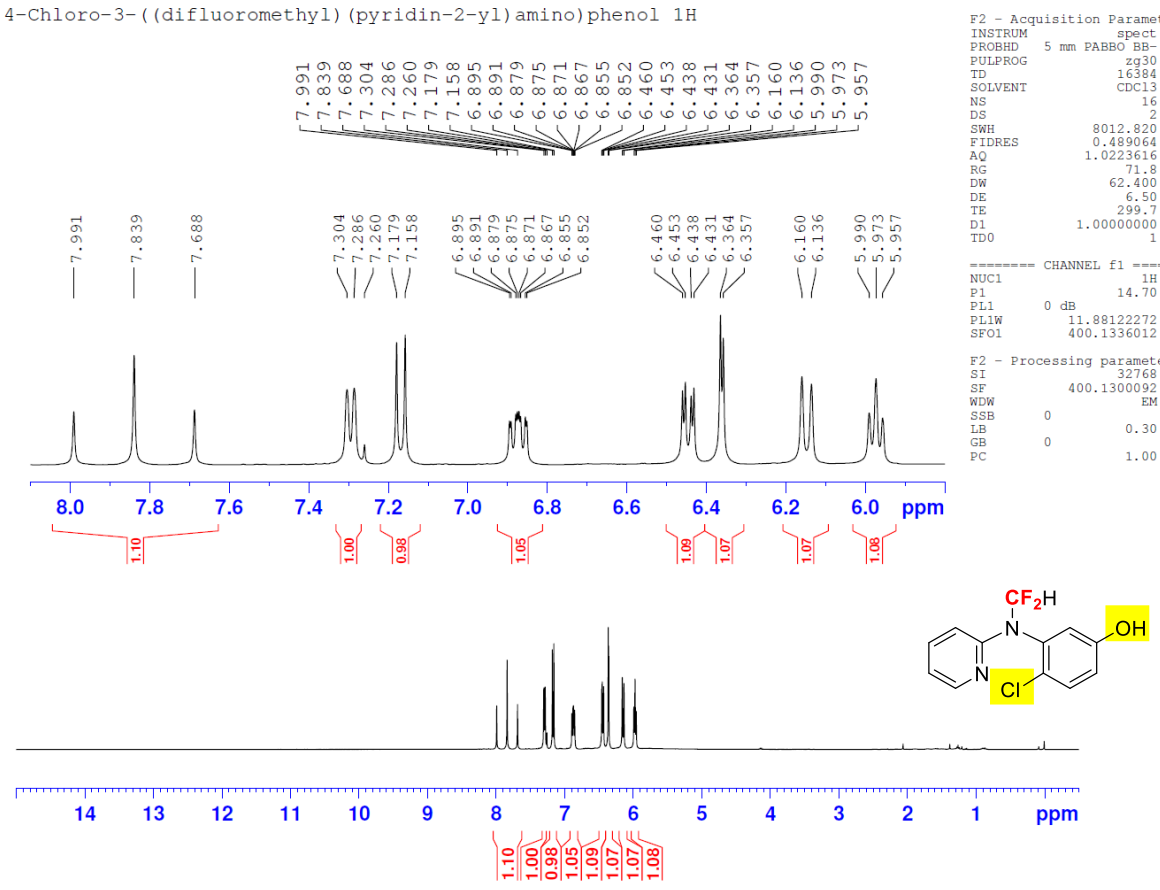

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD                131072
SOLVENT             CDC13
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                    645
DW                5.600 usec
DE                6.50 usec
TE                298.4 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W          18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF           376.4983660 MHz
WDW                   EM
SSB        0
LB              0.30 Hz
GB         0
PC                 1.00
```

4-Chloro-3-((difluoromethyl)(pyridin-2-yl)amino)phenol (product 2n)

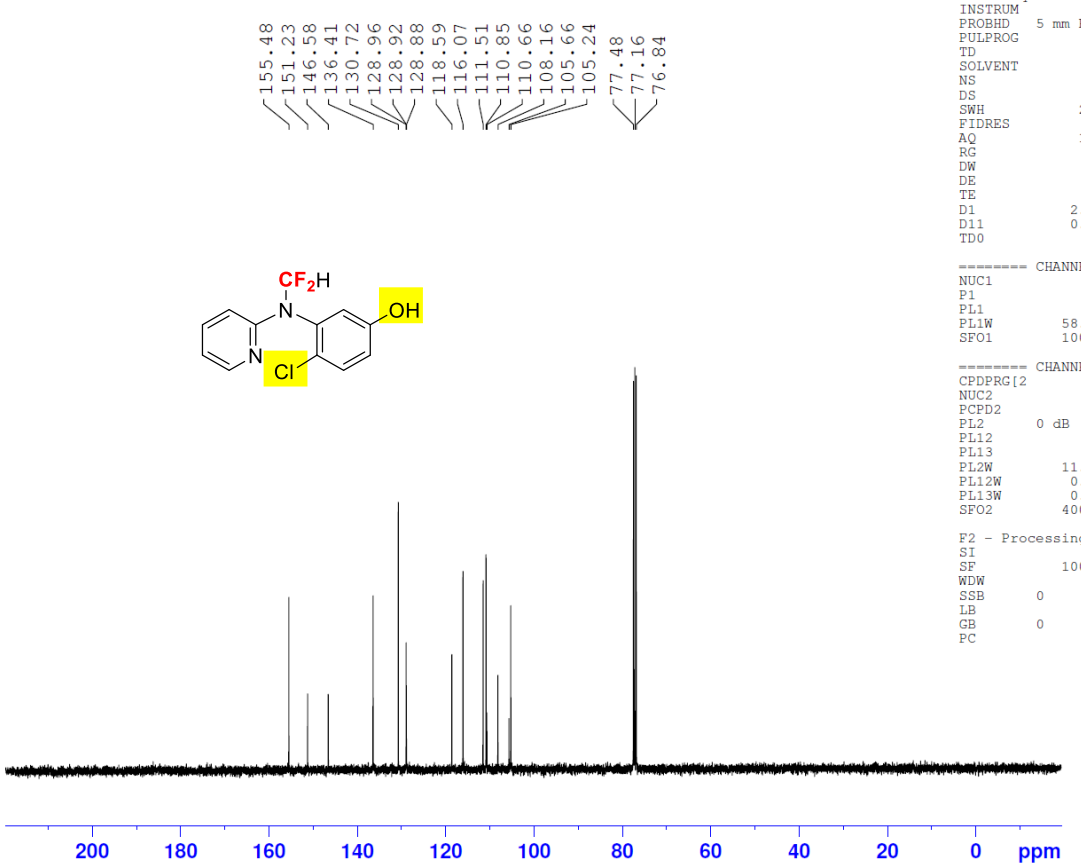



```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG            zg30
TD                16384
SOLVENT             CDC13
NS                     16
DS                      2
SWH             8012.820 Hz
FIDRES          0.489064 Hz
AQ              1.0223616 sec
RG                   71.8
DW                62.400 usec
DE                6.50 usec
TE                299.7 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                   1H
P1                 14.70 usec
PL1        0 dB
PL1W          11.88122272 W
SFO1         400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF           400.1300092 MHz
WDW                   EM
SSB        0
LB              0.30 Hz
GB         0
PC                 1.00
```

4-Chloro-3-((difluoromethyl)(pyridin-2-yl)amino)phenol 13C



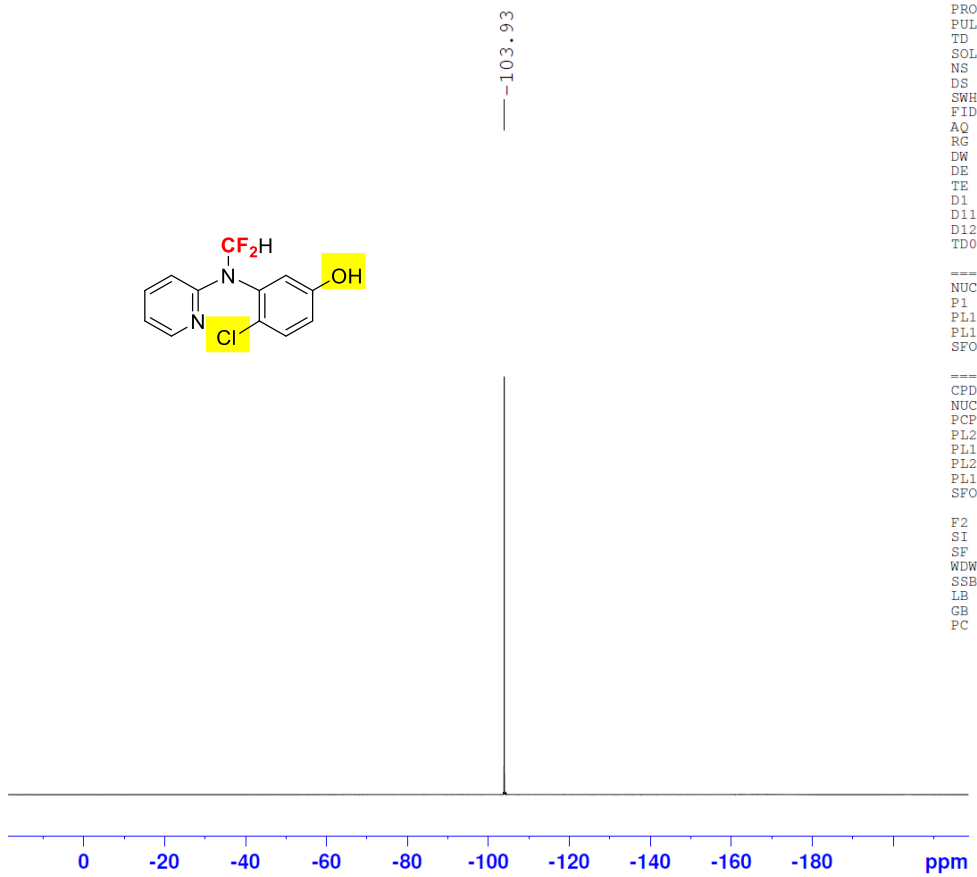

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                      83
DS                       2
SWH              24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                     181
DW                20.800 usec
DE                 6.50 usec
TE                 300.4 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                    9.50 usec
PL1                  -2.00 dB
PL1W          58.52175522 W
SFO1          100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2       0 dB
PL12                 15.00 dB
PL13                 15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    32768
SF            100.6127574 MHz
WDW                      EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.40
```

4-Chloro-3-((difluoromethyl)(pyridin-2-yl)amino)phenol 19F



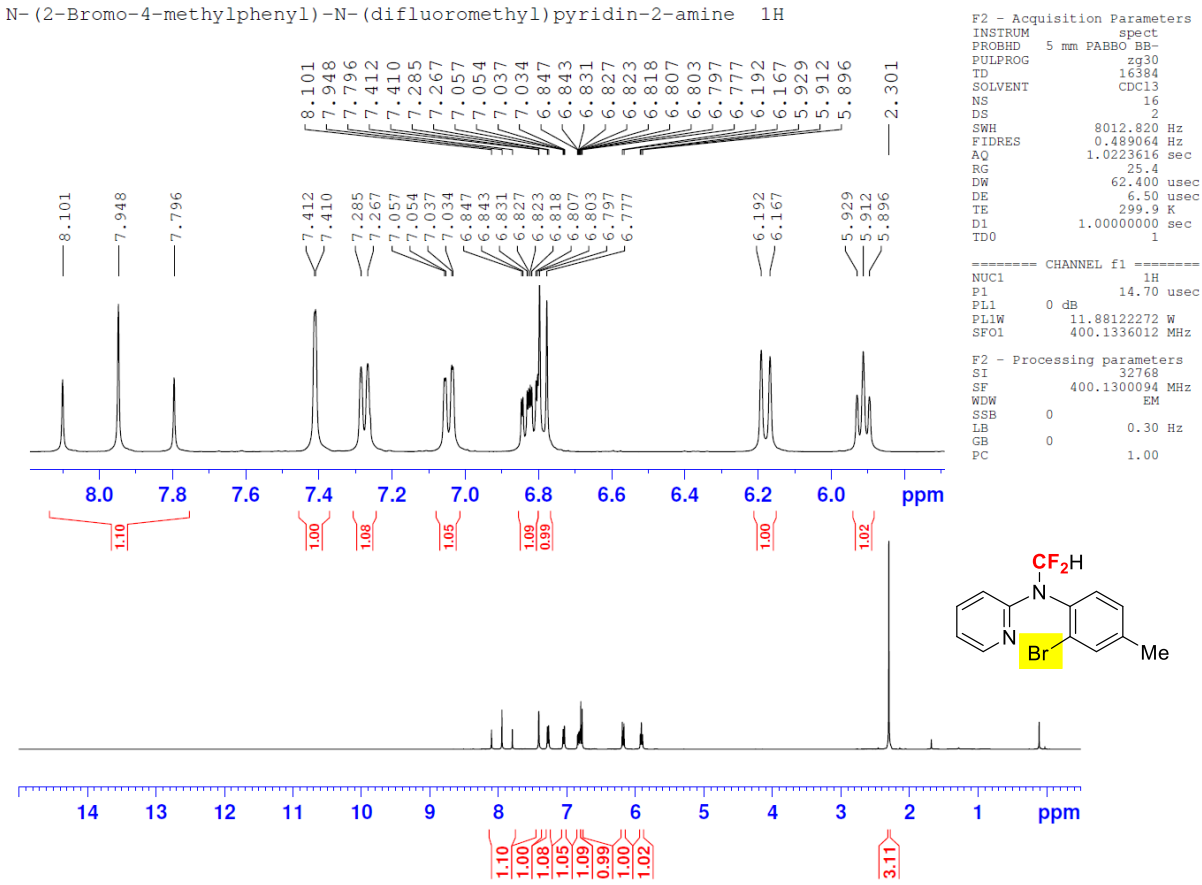

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                  131072
SOLVENT              CDCl3
NS                      16
DS                       4
SWH              89285.711 Hz
FIDRES           0.681196 Hz
AQ               0.7340032 sec
RG                    1150
DW                5.600 usec
DE                 6.50 usec
TE                 298.1 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   19F
P1                   14.20 usec
PL1                  -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2       0 dB
PL12                 15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    65536
SF            376.4983660 MHz
WDW                      EM
SSB       0
LB                    0.30 Hz
GB        0
PC                    1.00
```

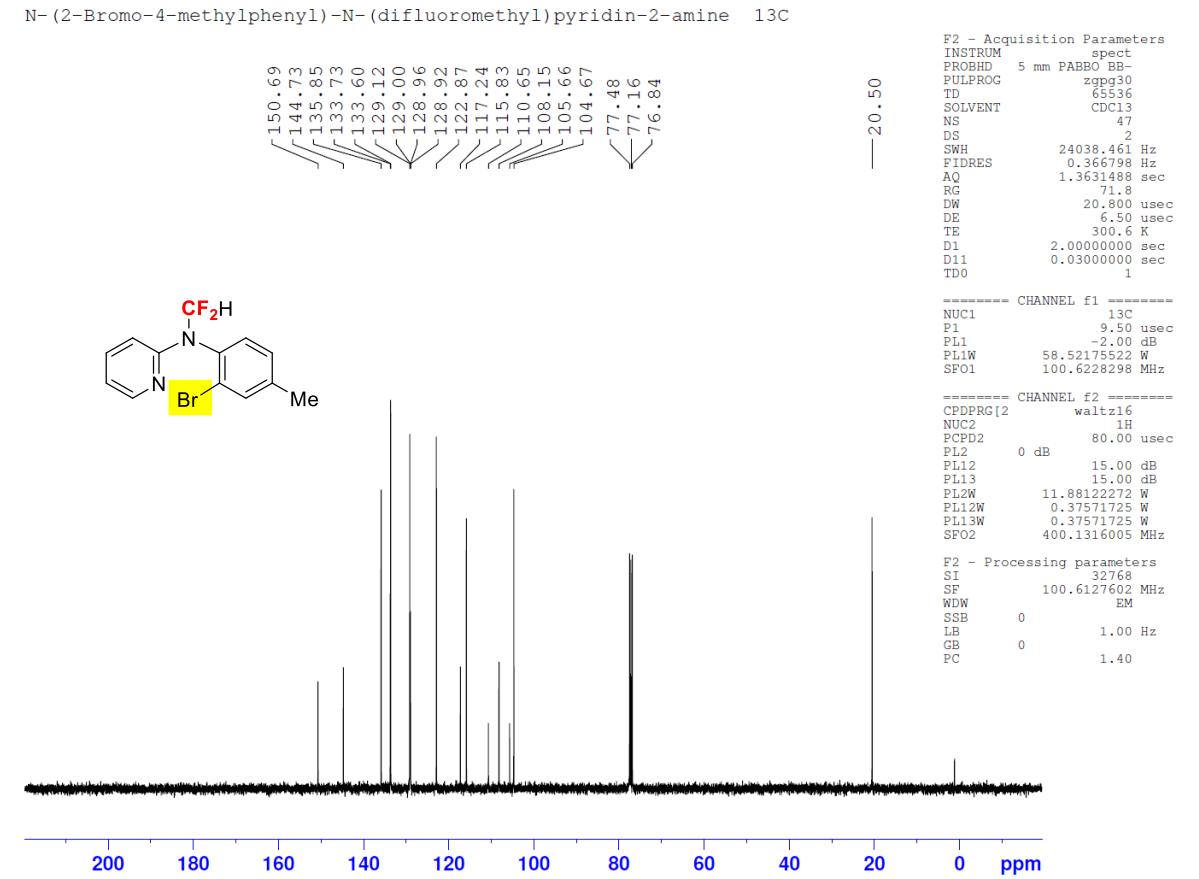
N-(2-Bromo-4-methylphenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2o)




```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG             zg30
TD                 16384
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8012.820 Hz
FIDRES             0.489064 Hz
AQ              1.0223616 sec
RG                  25.4
DW                 62.400 usec
DE                  6.50 usec
TE                 299.9 K
D1              1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.70 usec
PL1          0 dB
PL1W           11.88122272 W
SFO1           400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF           400.1300094 MHz
WDW                   EM
SSB          0
LB                 0.30 Hz
GB           0
PC                 1.00
```

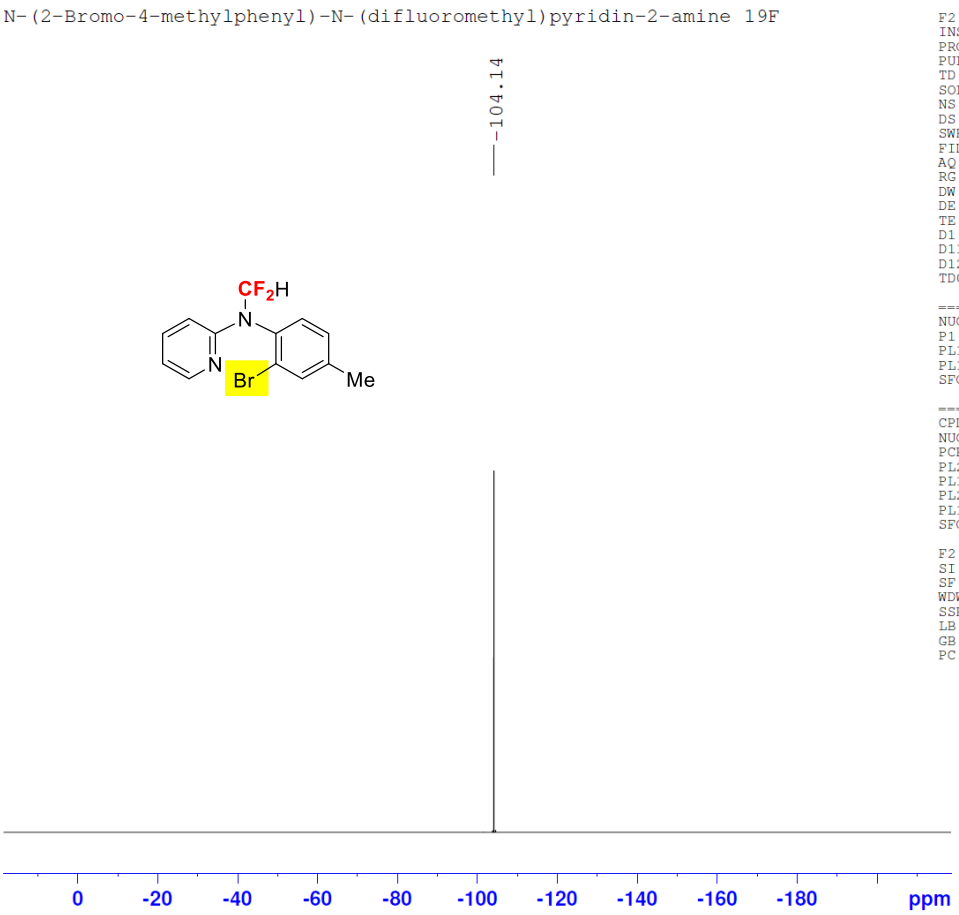



```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                    47
DS                     2
SWH            24038.461 Hz
FIDRES             0.366798 Hz
AQ              1.3631488 sec
RG                  71.8
DW                 20.800 usec
DE                  6.50 usec
TE                 300.6 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1          100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2          0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127602 MHz
WDW                   EM
SSB          0
LB                 1.00 Hz
GB           0
PC                 1.40
```



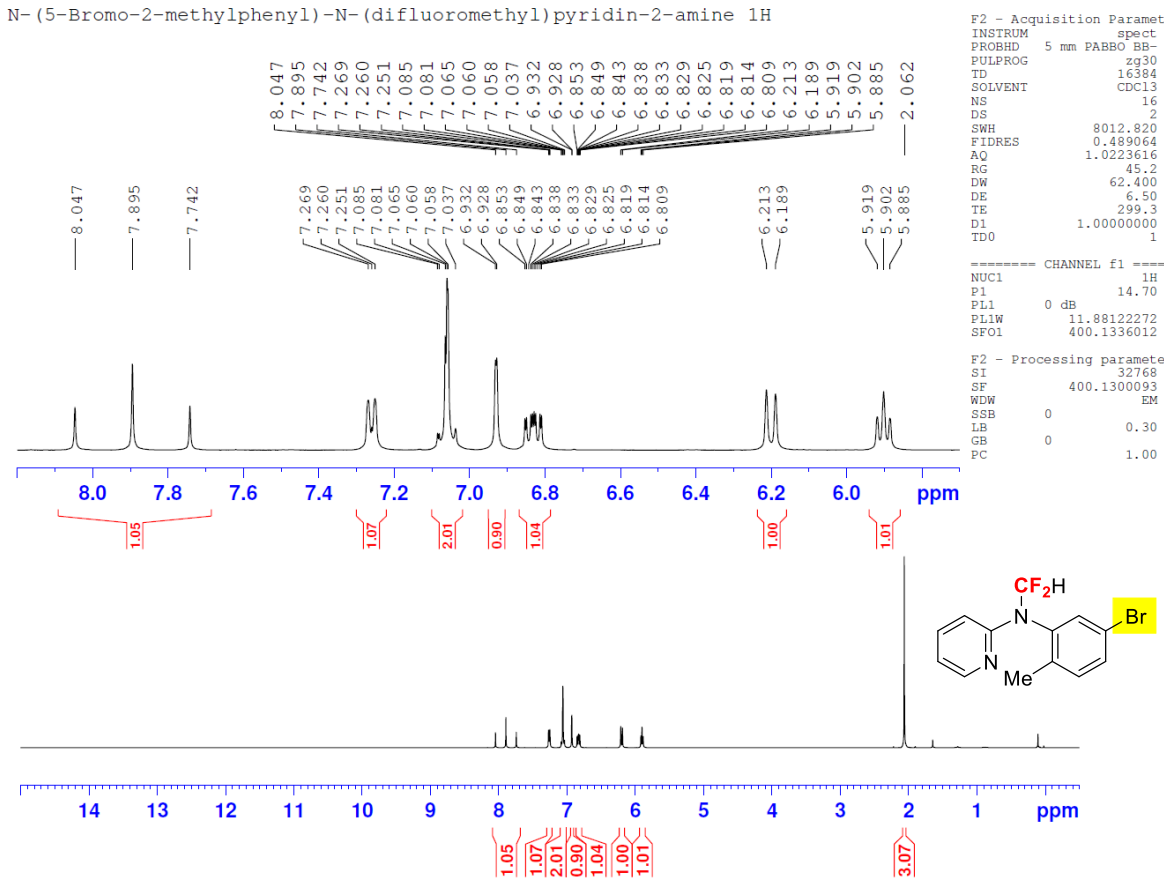
F2 - Acquisition Parameters
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfhigqn
TD 131072
SOLVENT CDC13
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340032 sec
RG 645
DW 5.600 usec
DE 6.50 usec
TE 300.1 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 19F
P1 14.20 usec
PL1 -3.00 dB
PL1W 18.69428444 W
SFO1 376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0 dB
PL12 15.00 dB
PL2W 11.88122272 W
PL12W 0.37571725 W
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

N-(5-Bromo-2-methylphenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2p)

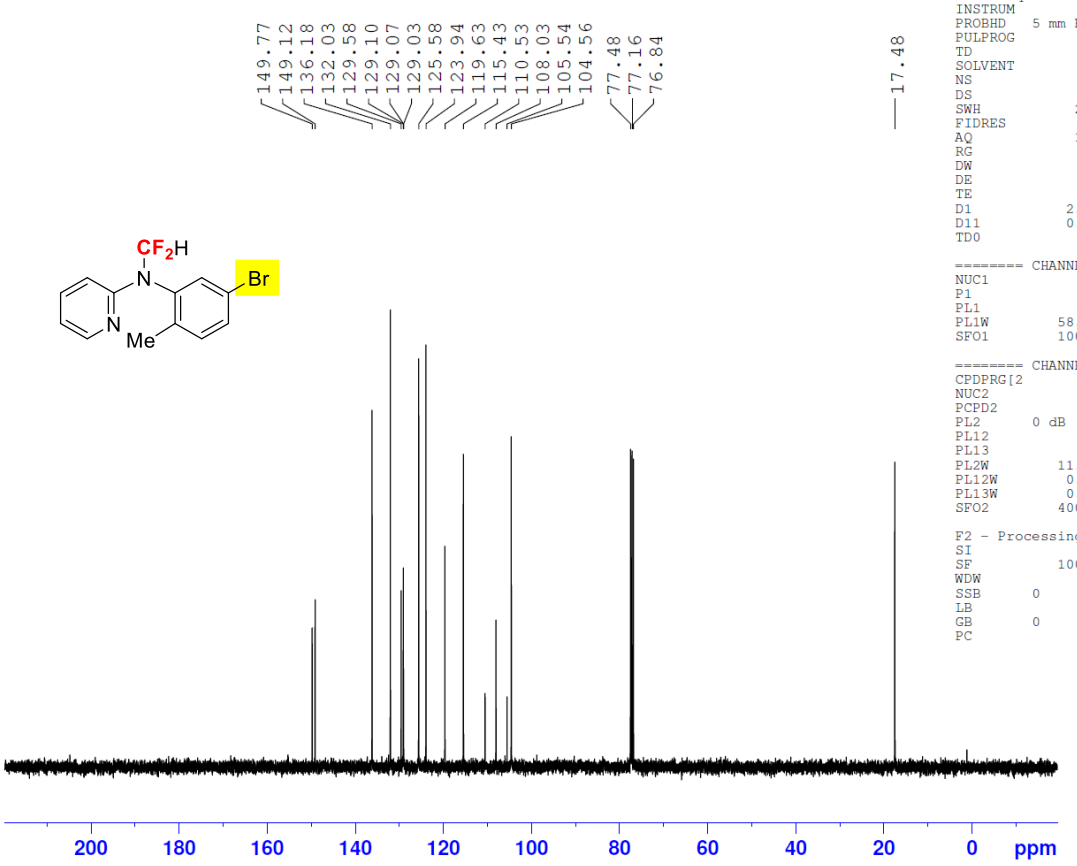


F2 - Acquisition Parameters
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 16384
SOLVENT CDC13
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.489064 Hz
AQ 1.0223616 sec
RG 45.2
DW 62.400 usec
DE 6.50 usec
TE 299.3 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 14.70 usec
PL1 0 dB
PL1W 11.88122272 W
SFO1 400.1336012 MHz

F2 - Processing parameters
SI 32768
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

N-(5-Bromo-2-methylphenyl)-N-(difluoromethyl)pyridin-2-amine 13C



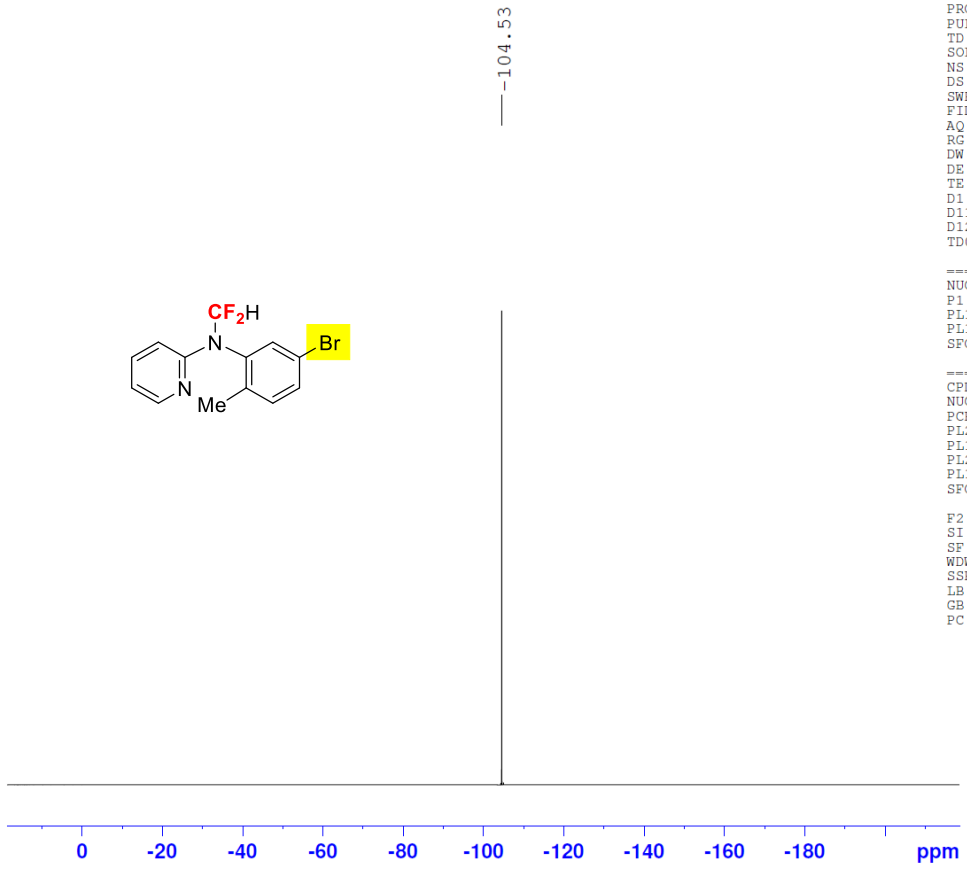

```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                       38
DS                        2
SWH               24038.461 Hz
FIDRES             0.366798 Hz
AQ                1.3631488 sec
RG                      228
DW                   20.800 usec
DE                    6.50 usec
TE                   300.0 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                    9.50 usec
PL1                  -2.00 dB
PL1W            58.52175522 W
SFO1            100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL2          0 dB
PL12                 15.00 dB
PL13                 15.00 dB
PL2W            11.88122272 W
PL12W            0.37571725 W
PL13W            0.37571725 W
SFO2            400.1316005 MHz

F2 - Processing parameters
SI                       32768
SF              100.6127598 MHz
WDW                         EM
SSB          0
LB                    1.00 Hz
GB           0
PC                    1.40
```

N-(5-Bromo-2-methylphenyl)-N-(difluoromethyl)pyridin-2-amine 19F



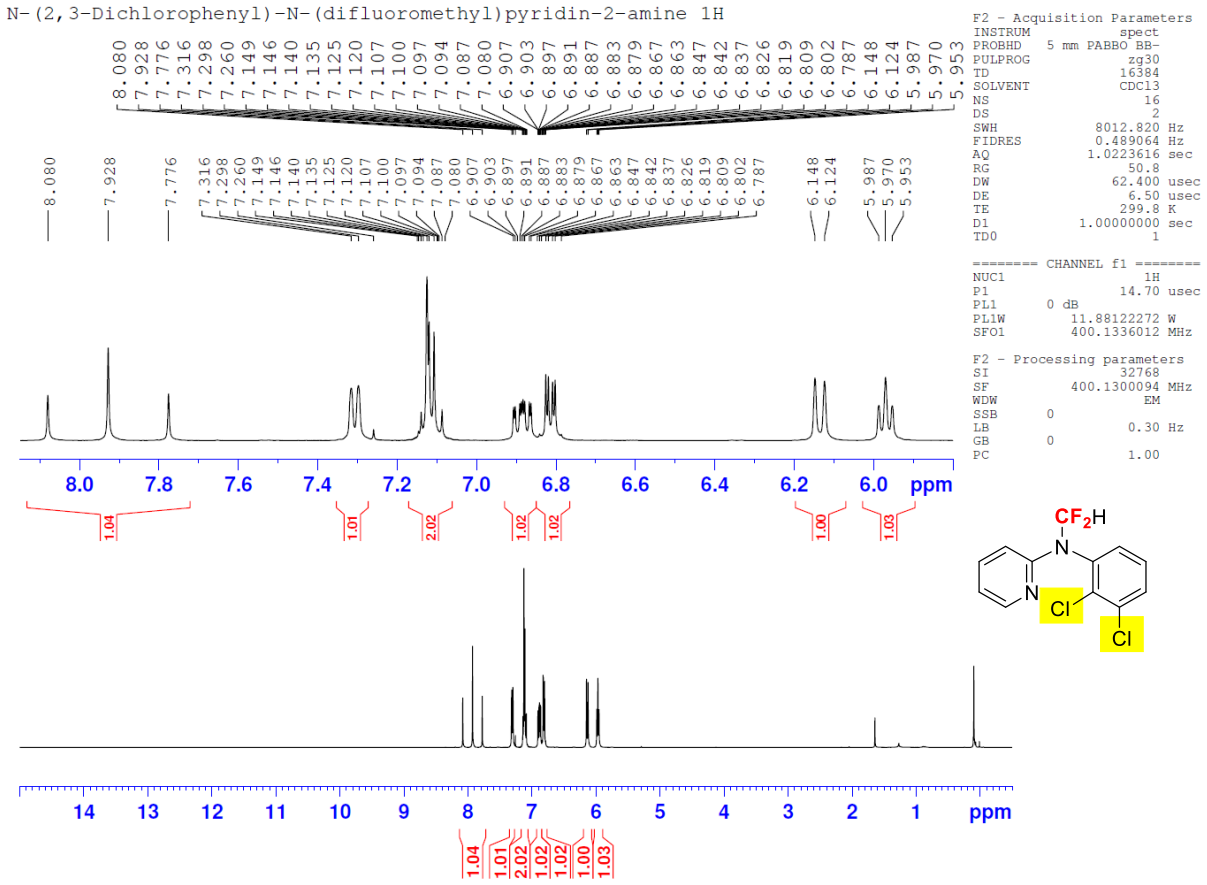

```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG             zgfhigqn
TD                   131072
SOLVENT               CDCl3
NS                       16
DS                        4
SWH               89285.711 Hz
FIDRES             0.681196 Hz
AQ                0.7340032 sec
RG                      724
DW                   5.600 usec
DE                    6.50 usec
TE                   299.5 K
D1               1.00000000 sec
D11              0.03000000 sec
D12              0.00002000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    19F
P1                   14.20 usec
PL1                  -3.00 dB
PL1W            18.69428444 W
SFO1            376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2            waltz16
NUC2                    1H
PCPD2                80.00 usec
PL2          0 dB
PL12                 15.00 dB
PL2W            11.88122272 W
PL12W            0.37571725 W
SFO2            400.1316005 MHz

F2 - Processing parameters
SI                       65536
SF              376.4983660 MHz
WDW                         EM
SSB          0
LB                    0.30 Hz
GB           0
PC                    1.00
```

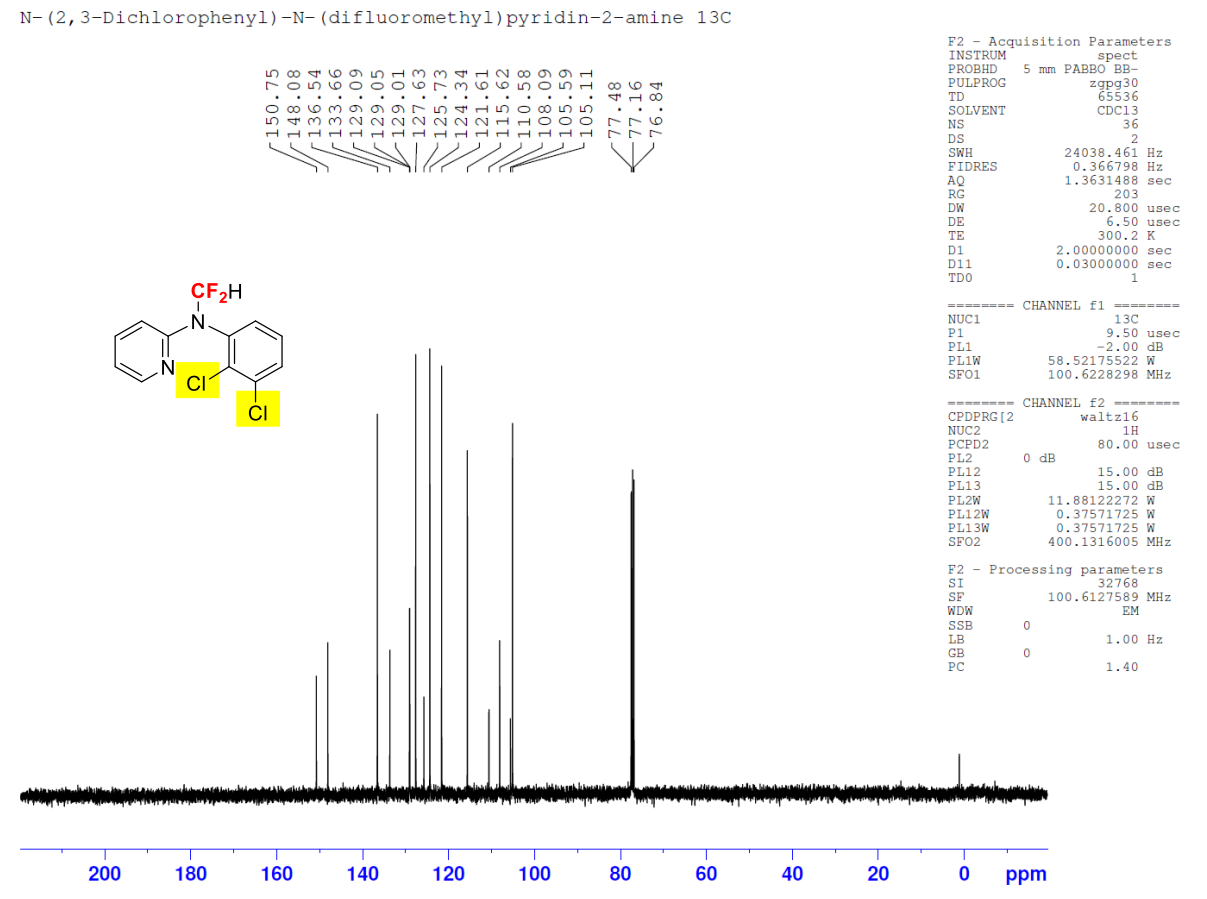
N-(2,3-Dichlorophenyl)-*N*-(difluoromethyl)pyridin-2-amine (product 2q)




```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG                  zg30
TD                      16384
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                 8012.820 Hz
FIDRES              0.489064 Hz
AQ                  1.0223616 sec
RG                       50.8
DW                     62.400 usec
DE                      6.50 usec
TE                     299.8 K
D1                  1.00000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                       1H
P1                      14.70 usec
PL1            0 dB
PL1W             11.88122272 W
SFO1              400.1336012 MHz

F2 - Processing parameters
SI                      32768
SF                400.1300094 MHz
WDW                        EM
SSB            0
LB                      0.30 Hz
GB             0
PC                      1.00
```

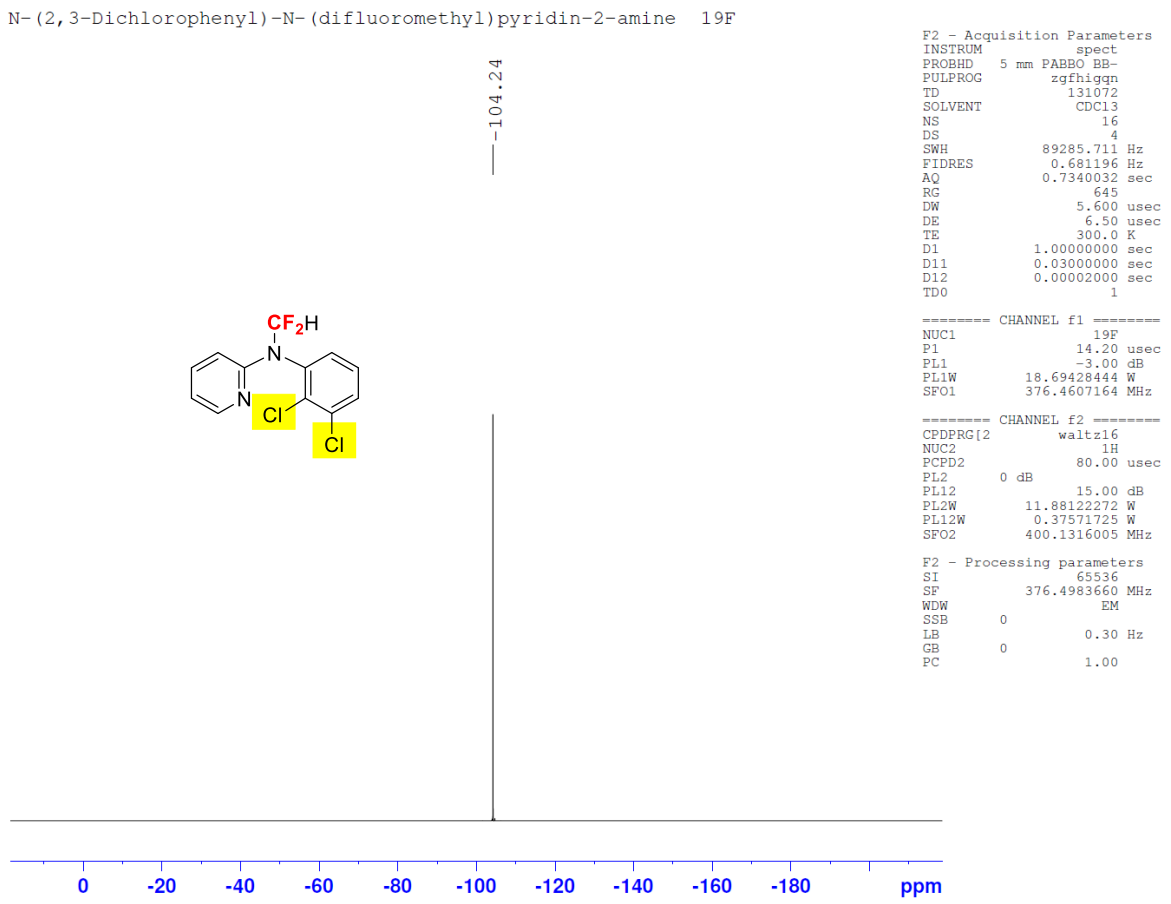



```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                         36
DS                          2
SWH                24038.461 Hz
FIDRES              0.366798 Hz
AQ                  1.3631488 sec
RG                        203
DW                     20.800 usec
DE                      6.50 usec
TE                     300.2 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                         1

======== CHANNEL f1 ========
NUC1                      13C
P1                       9.50 usec
PL1                     -2.00 dB
PL1W             58.52175522 W
SFO1              100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2              waltz16
NUC2                       1H
PCPD2                  80.00 usec
PL2            0 dB
PL12                    15.00 dB
PL13                    15.00 dB
PL2W             11.88122272 W
PL12W             0.37571725 W
PL13W             0.37571725 W
SFO2              400.1316005 MHz

F2 - Processing parameters
SI                      32768
SF                100.6127589 MHz
WDW                        EM
SSB            0
LB                      1.00 Hz
GB             0
PC                      1.40
```



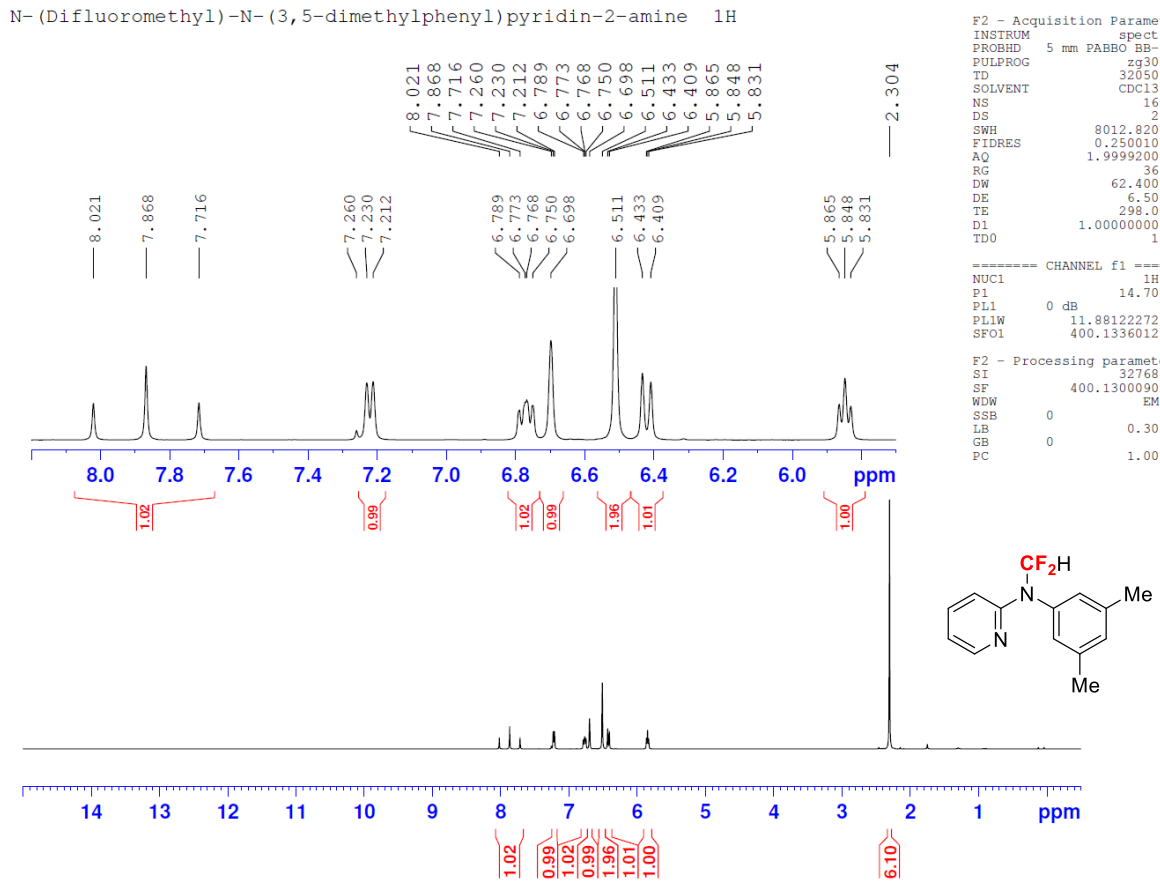
F2 - Acquisition Parameters
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfhigqn
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340032 sec
RG 645
DW 5.600 usec
DE 6.50 usec
TE 300.0 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 19F
P1 14.20 usec
PL1 -3.00 dB
PL1W 18.69428444 W
SFO1 376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0 dB
PL12 15.00 dB
PL2W 11.88122272 W
PL12W 0.37571725 W
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

N-(Difluoromethyl)-*N*-(3,5-dimethylphenyl)pyridin-2-amine (product 2r)

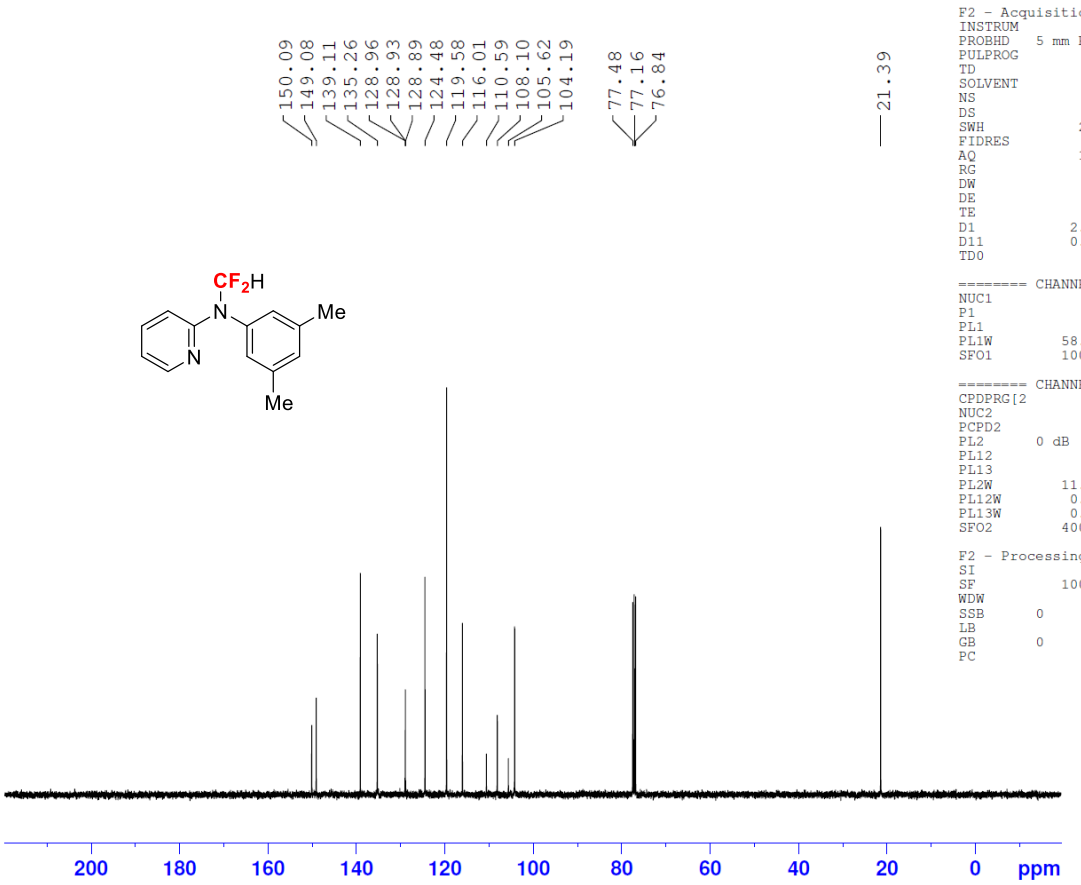


F2 - Acquisition Parameters
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 32050
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.250010 Hz
AQ 1.9999200 sec
RG 36
DW 62.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 14.70 usec
PL1 0 dB
PL1W 11.88122272 W
SFO1 400.1336012 MHz

F2 - Processing parameters
SI 32768
SF 400.1300090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

N-(Difluoromethyl)-N-(3,5-dimethylphenyl)pyridin-2-amine 13C



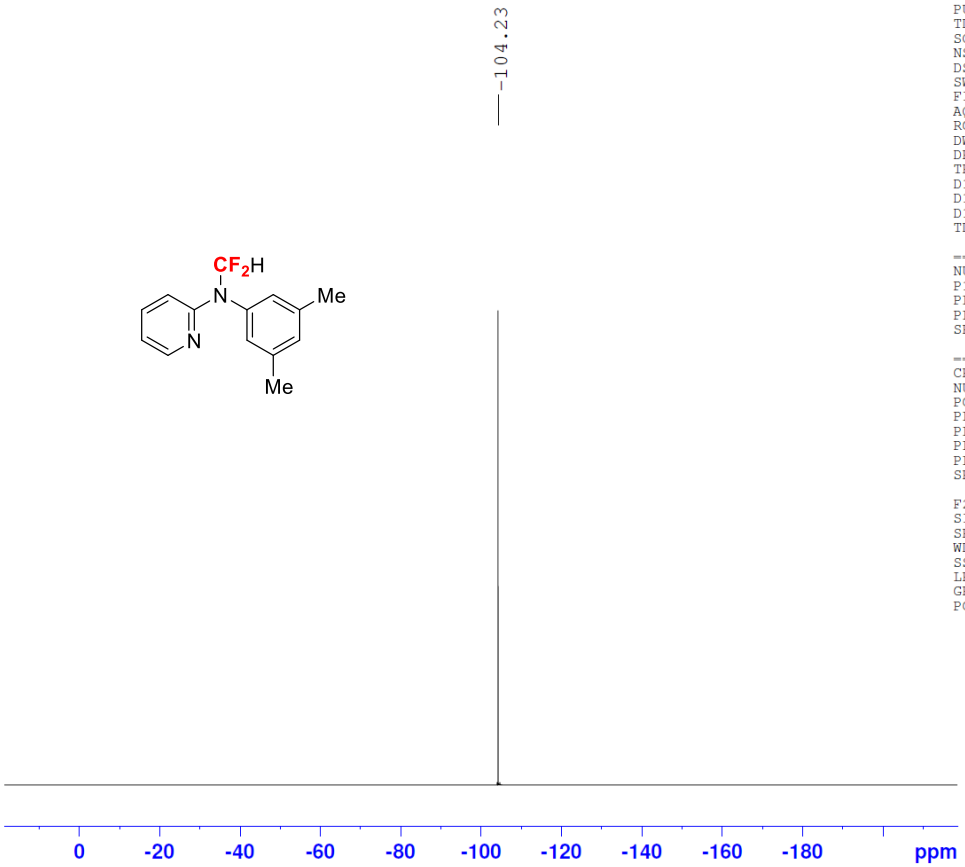

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgpg30
TD                65536
SOLVENT            CDCl3
NS                    51
DS                     2
SWH           24038.461 Hz
FIDRES            0.366798 Hz
AQ               1.3631488 sec
RG                   228
DW                20.800 usec
DE                 6.50 usec
TE                298.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2               80.00 usec
PL2        0 dB
PL12                15.00 dB
PL13                15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127612 MHz
WDW                    EM
SSB        0
LB                  1.00 Hz
GB         0
PC                  1.40
```

N-(Difluoromethyl)-N-(3,5-dimethylphenyl)pyridin-2-amine 19F



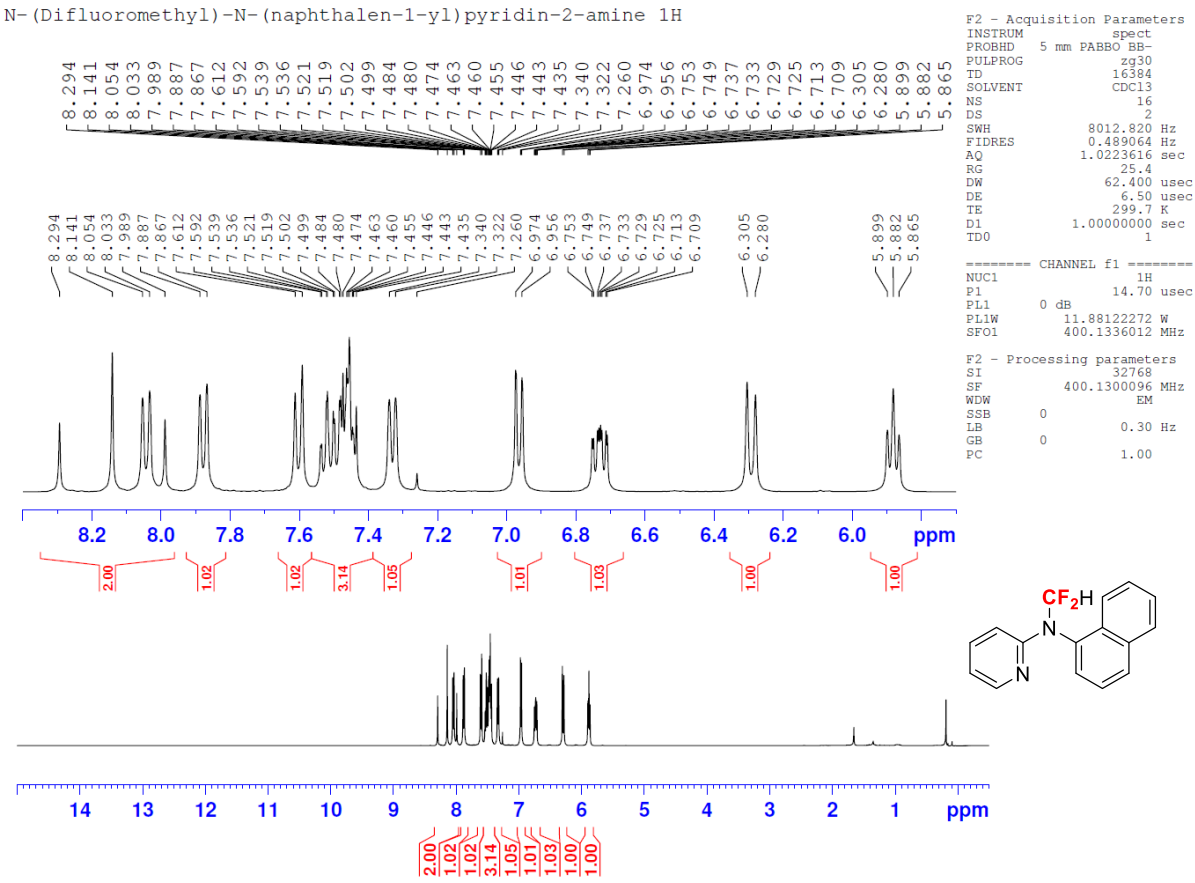

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG         zgfhigqn
TD               131072
SOLVENT            CDCl3
NS                    16
DS                     4
SWH           89285.711 Hz
FIDRES            0.681196 Hz
AQ               0.7340032 sec
RG                   645
DW                 5.600 usec
DE                 6.50 usec
TE                298.2 K
D1            1.00000000 sec
D11           0.03000000 sec
D12           0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W         18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2               80.00 usec
PL2        0 dB
PL12                15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  65536
SF           376.4983660 MHz
WDW                    EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

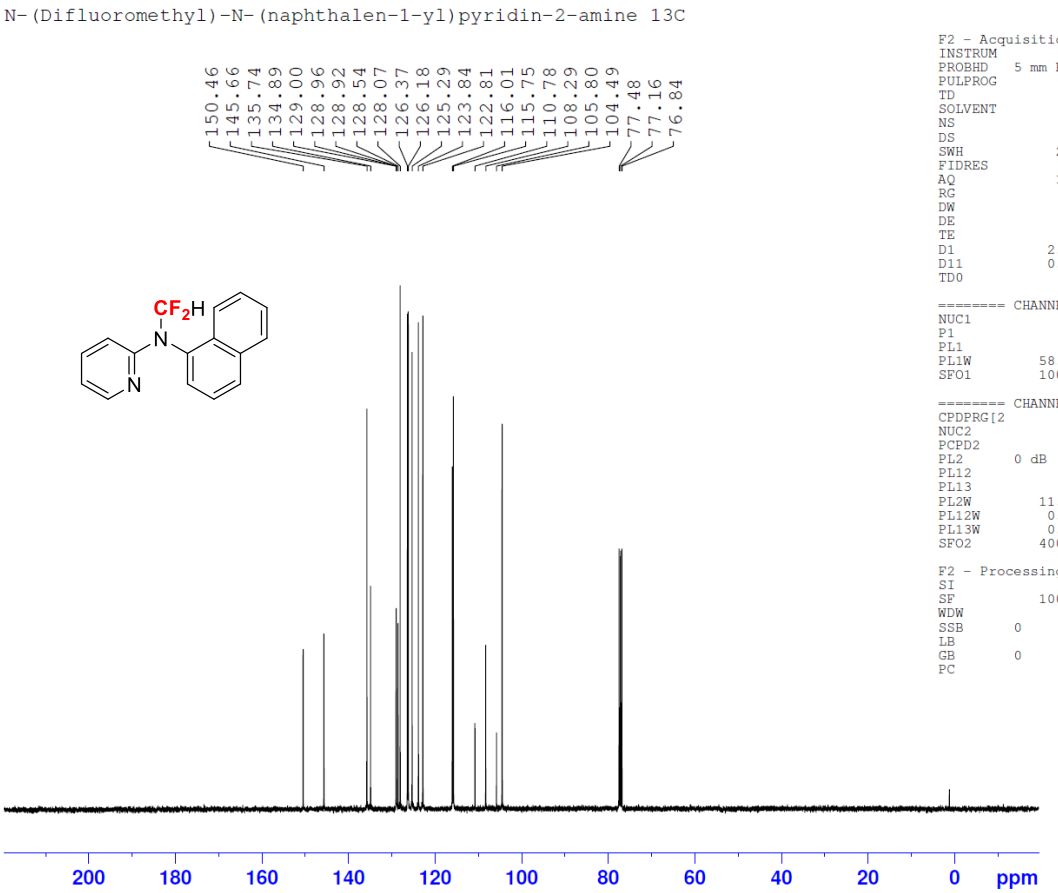
N-(Difluoromethyl)-*N*-(naphthalen-1-yl)pyridin-2-amine (product 2s)




```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD     5 mm PABBO BB-
PULPROG                zg30
TD                    16384
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8012.820 Hz
FIDRES                0.489064 Hz
AQ                 1.0223616 sec
RG                     25.4
DW                    62.400 usec
DE                     6.50 usec
TE                    299.7 K
D1                 1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                      1H
P1                     14.70 usec
PL1          0 dB
PL1W           11.88122272 W
SFO1           400.1336012 MHz

F2 - Processing parameters
SI                    32768
SF                400.1300096 MHz
WDW                      EM
SSB          0
LB                     0.30 Hz
GB           0
PC                     1.00
```

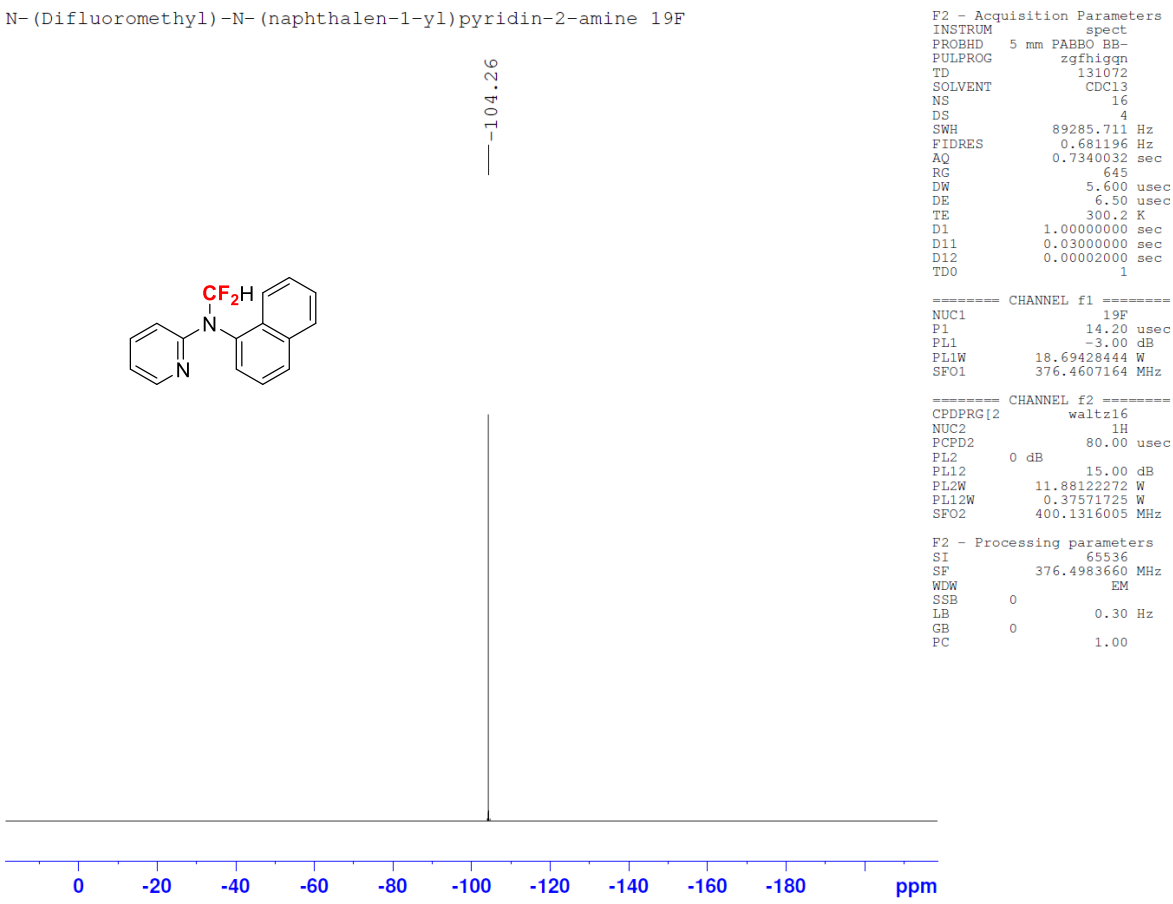



```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD     5 mm PABBO BB-
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      287
DS                        2
SWH               24038.461 Hz
FIDRES                0.366798 Hz
AQ                 1.3631488 sec
RG                     71.8
DW                    20.800 usec
DE                     6.50 usec
TE                    301.2 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     13C
P1                     9.50 usec
PL1                   -2.00 dB
PL1W           58.52175522 W
SFO1           100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2            waltz16
NUC2                      1H
PCPD2                  80.00 usec
PL2          0 dB
PL12                  15.00 dB
PL13                  15.00 dB
PL2W           11.88122272 W
PL12W           0.37571725 W
PL13W           0.37571725 W
SFO2           400.1316005 MHz

F2 - Processing parameters
SI                    32768
SF                100.6127651 MHz
WDW                      EM
SSB          0
LB                     1.00 Hz
GB           0
PC                     1.40
```



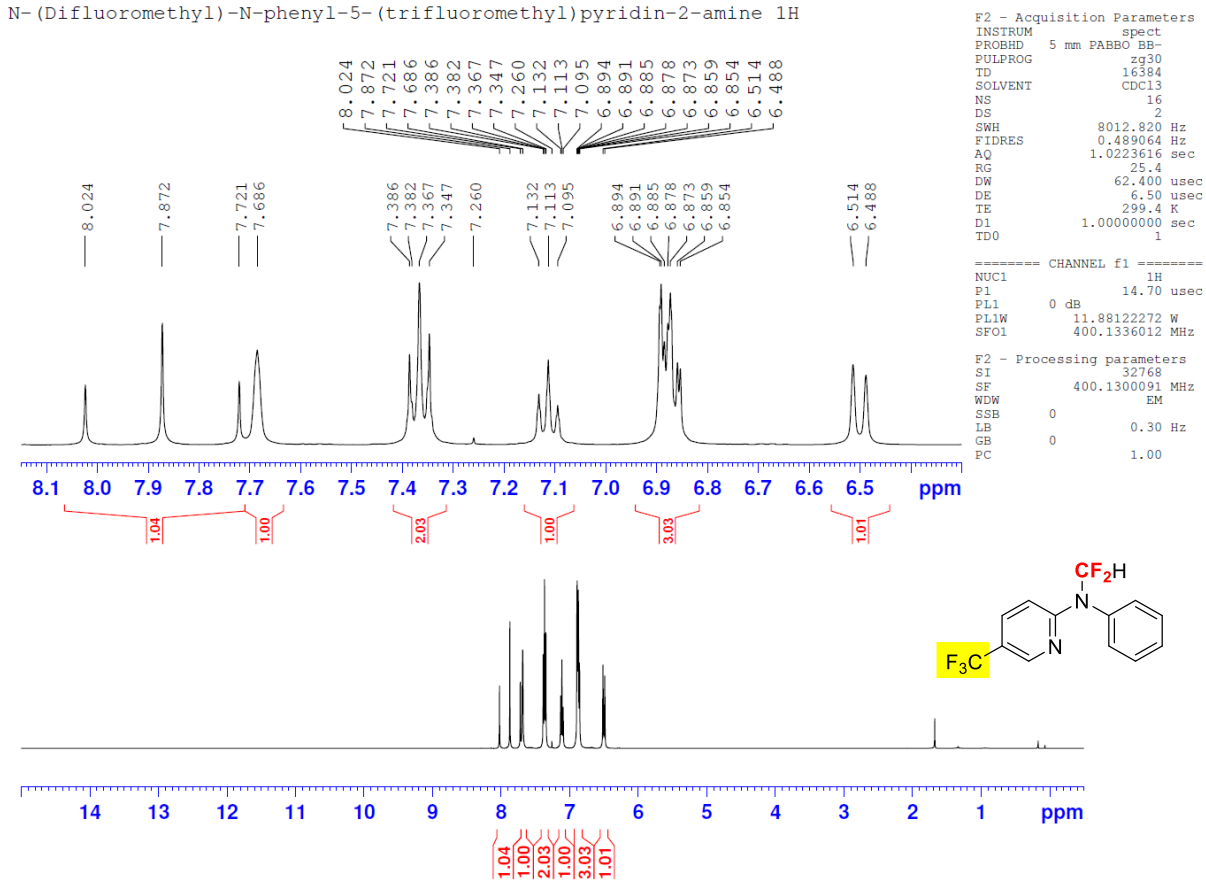

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                  131072
SOLVENT              CDCl3
NS                      16
DS                       4
SWH               89285.711 Hz
FIDRES             0.681196 Hz
AQ                0.7340032 sec
RG                     645
DW                   5.600 usec
DE                   6.50 usec
TE                   300.2 K
D1              1.00000000 sec
D11             0.03000000 sec
D12             0.00002000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   19F
P1                   14.20 usec
PL1                  -3.00 dB
PL1W           18.69428444 W
SFO1           376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2            waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2          0 dB
PL12                 15.00 dB
PL2W           11.88122272 W
PL12W           0.37571725 W
SFO2           400.1316005 MHz

F2 - Processing parameters
SI                    65536
SF             376.4983660 MHz
WDW                    EM
SSB          0
LB                    0.30 Hz
GB           0
PC                    1.00
```

N-(Difluoromethyl)-*N*-phenyl-5-(trifluoromethyl)pyridin-2-amine (product 2t)

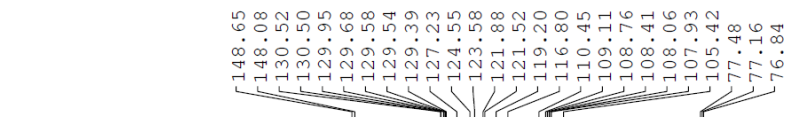


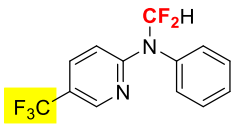

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  16384
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               8012.820 Hz
FIDRES            0.489064 Hz
AQ                1.0223616 sec
RG                    25.4
DW                  62.400 usec
DE                   6.50 usec
TE                  299.4 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                   14.70 usec
PL1          0 dB
PL1W           11.88122272 W
SFO1           400.1336012 MHz

F2 - Processing parameters
SI                    32768
SF             400.1300091 MHz
WDW                    EM
SSB          0
LB                    0.30 Hz
GB           0
PC                    1.00
```

N-(Difluoromethyl)-N-phenyl-5-(trifluoromethyl)pyridin-2-amine 13C





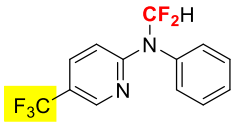

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   179
DS                     2
SWH            24038.461 Hz
FIDRES             0.366798 Hz
AQ              1.3631488 sec
RG                   228
DW                20.800 usec
DE                 6.50 usec
TE                300.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.50 usec
PL1               -2.00 dB
PL1W         58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PL2        0 dB
PL12              15.00 dB
PL13              15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF          100.6127574 MHz
WDW                  EM
SSB        0
LB                1.00 Hz
GB         0
PC                1.40
```

N-(Difluoromethyl)-N-phenyl-5-(trifluoromethyl)pyridin-2-amine 19F




```
F2 - Acquisition Parameters

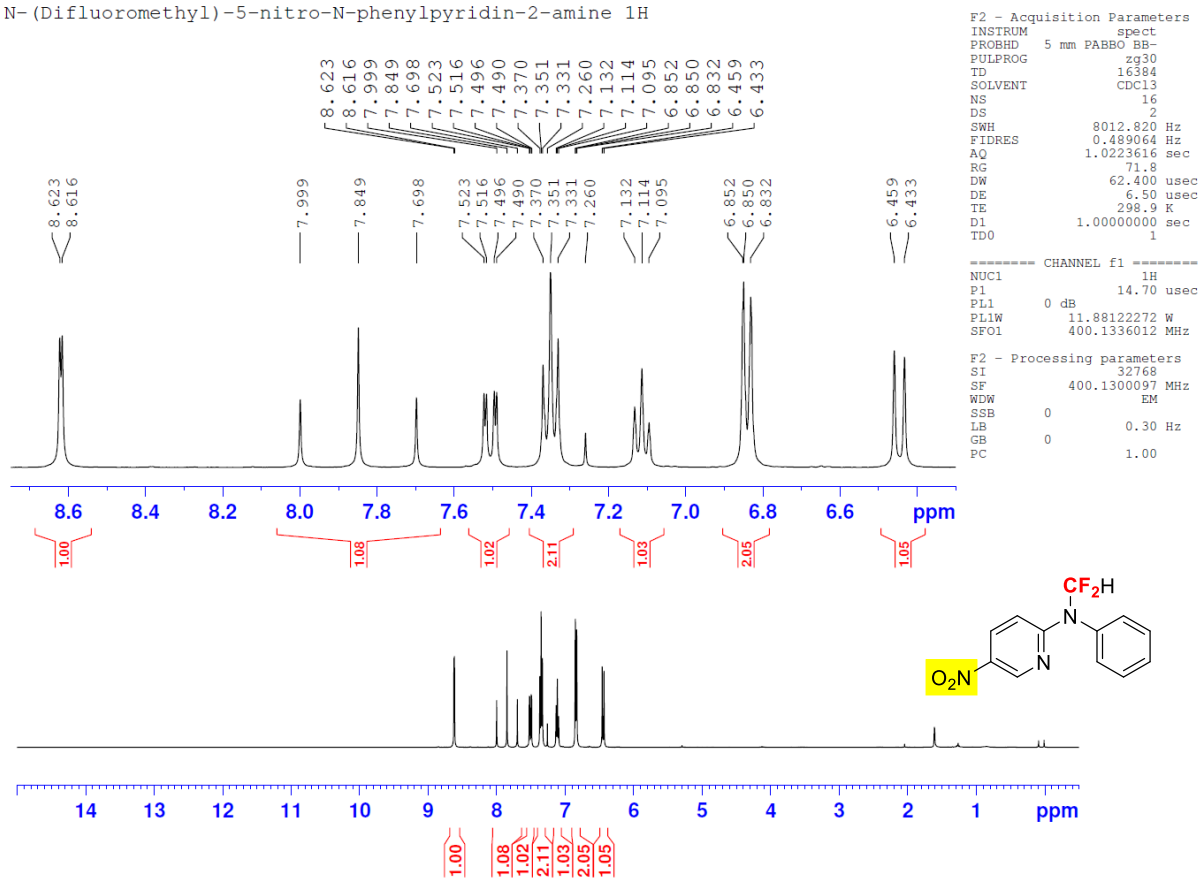
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD                131072
SOLVENT            CDCl3
NS                   16
DS                    4
SWH            89285.711 Hz
FIDRES             0.681196 Hz
AQ              0.7340032 sec
RG                   203
DW                5.600 usec
DE                 6.50 usec
TE                299.7 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

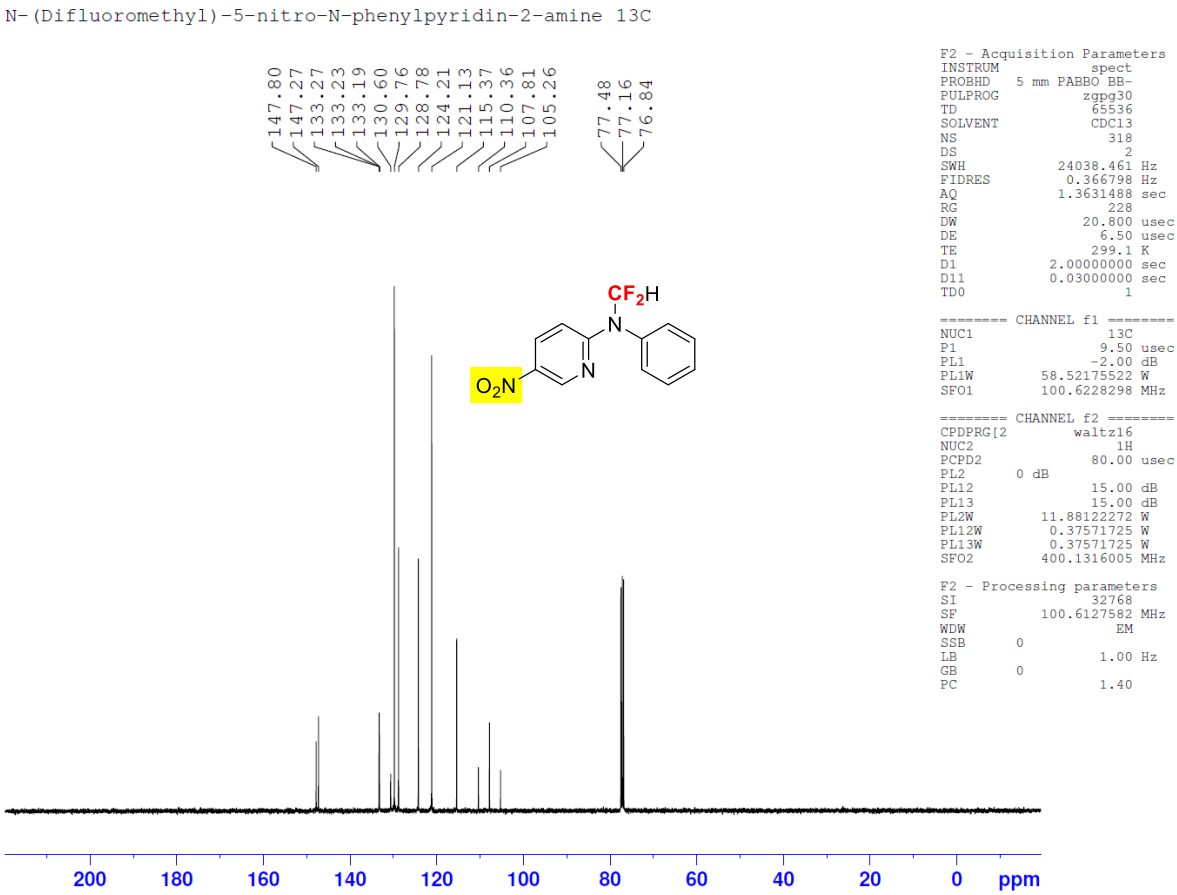
======== CHANNEL f1 ========
NUC1                 19F
P1                14.20 usec
PL1               -3.00 dB
PL1W         18.69428444 W
SFO1        376.4607164 MHz

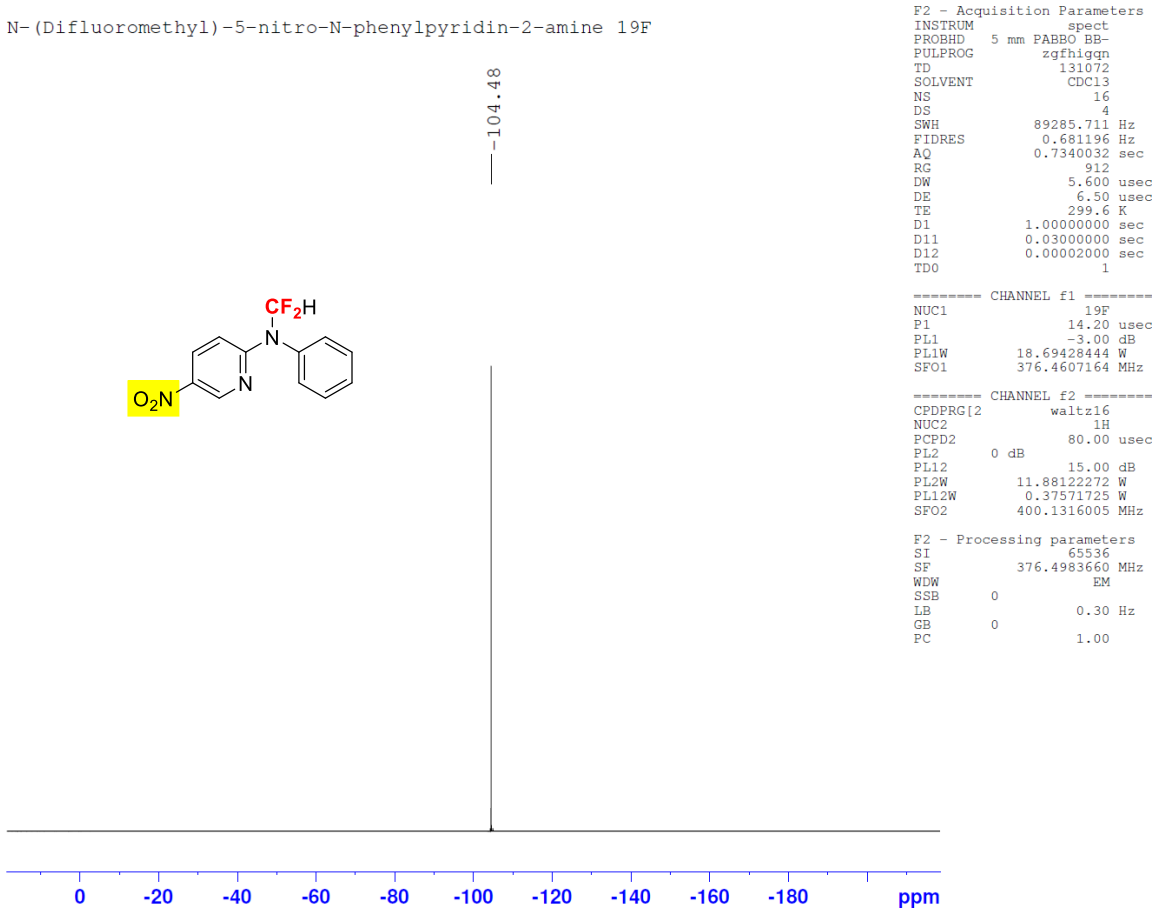
======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PL2        0 dB
PL12              15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF          376.4983660 MHz
WDW                  EM
SSB        0
LB                0.30 Hz
GB         0
PC                1.00
```

N-(Difluoromethyl)-5-nitro-*N*-phenylpyridin-2-amine (product 2u)







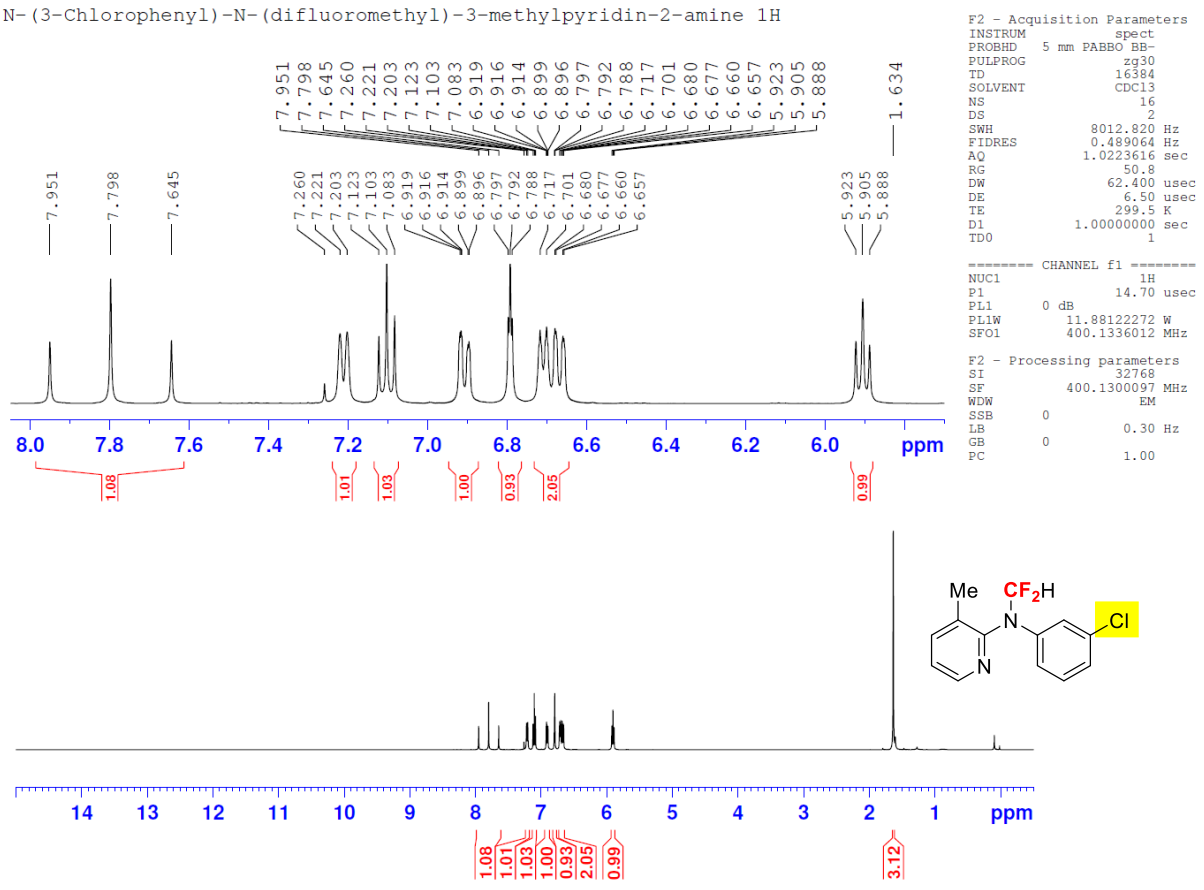

```
F2 - Acquisition Parameters
INSTRUM          spect
PROBHD    5 mm PABBO BB-
PULPROG       zgfhigqn
TD              131072
SOLVENT           CDC13
NS                   16
DS                    4
SWH           89285.711 Hz
FIDRES        0.681196 Hz
AQ            0.7340032 sec
RG                  912
DW                5.600 usec
DE                6.50 usec
TE                299.6 K
D1           1.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                19F
P1                14.20 usec
PL1               -3.00 dB
PL1W        18.69428444 W
SFO1       376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2             80.00 usec
PL2       0 dB
PL12              15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                65536
SF          376.4983660 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

N-(3-Chlorophenyl)-*N*-(difluoromethyl)-3-methylpyridin-2-amine (product 2v)

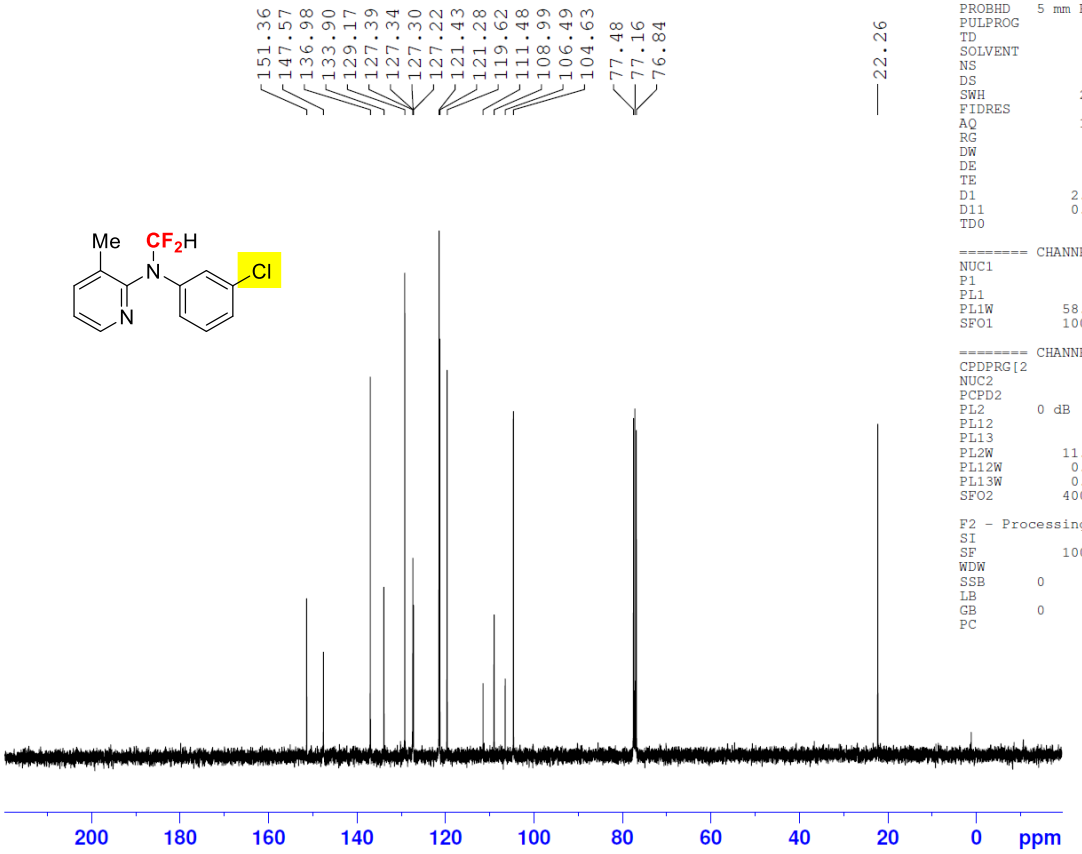



```
F2 - Acquisition Parameters
INSTRUM          spect
PROBHD    5 mm PABBO BB-
PULPROG          zg30
TD              16384
SOLVENT           CDC13
NS                   16
DS                    2
SWH           8012.820 Hz
FIDRES        0.489064 Hz
AQ            1.0223616 sec
RG                 50.8
DW                62.400 usec
DE                6.50 usec
TE                299.5 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1                14.70 usec
PL1       0 dB
PL1W        11.88122272 W
SFO1       400.1336012 MHz

F2 - Processing parameters
SI                32768
SF          400.1300097 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

N-(3-Chlorophenyl)-N-(difluoromethyl)-3-methylpyridin-2-amine 13C



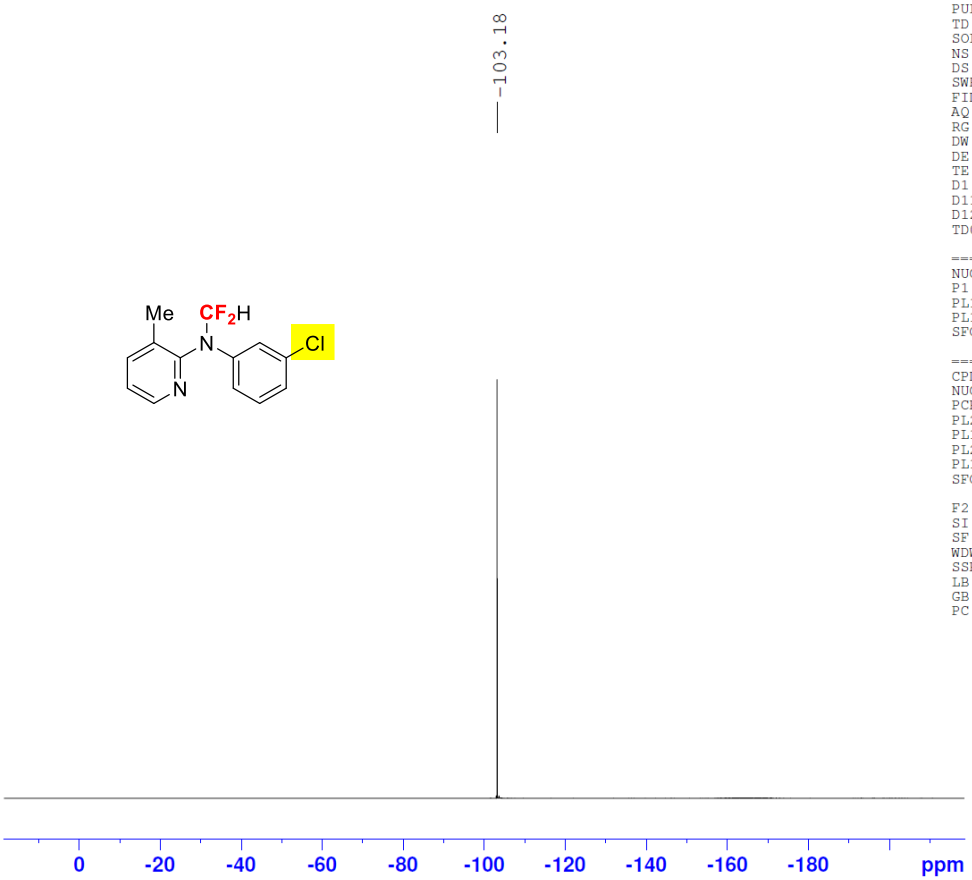

```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                      52
DS                       2
SWH              24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                     161
DW                  20.800 usec
DE                   6.50 usec
TE                  299.9 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                    9.50 usec
PL1                  -2.00 dB
PL1W          58.52175522 W
SFO1          100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2        0 dB
PL12                 15.00 dB
PL13                 15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    32768
SF            100.6127568 MHz
WDW                      EM
SSB        0
LB                    1.00 Hz
GB         0
PC                    1.40
```

N-(3-Chlorophenyl)-N-(difluoromethyl)-3-methylpyridin-2-amine 19F



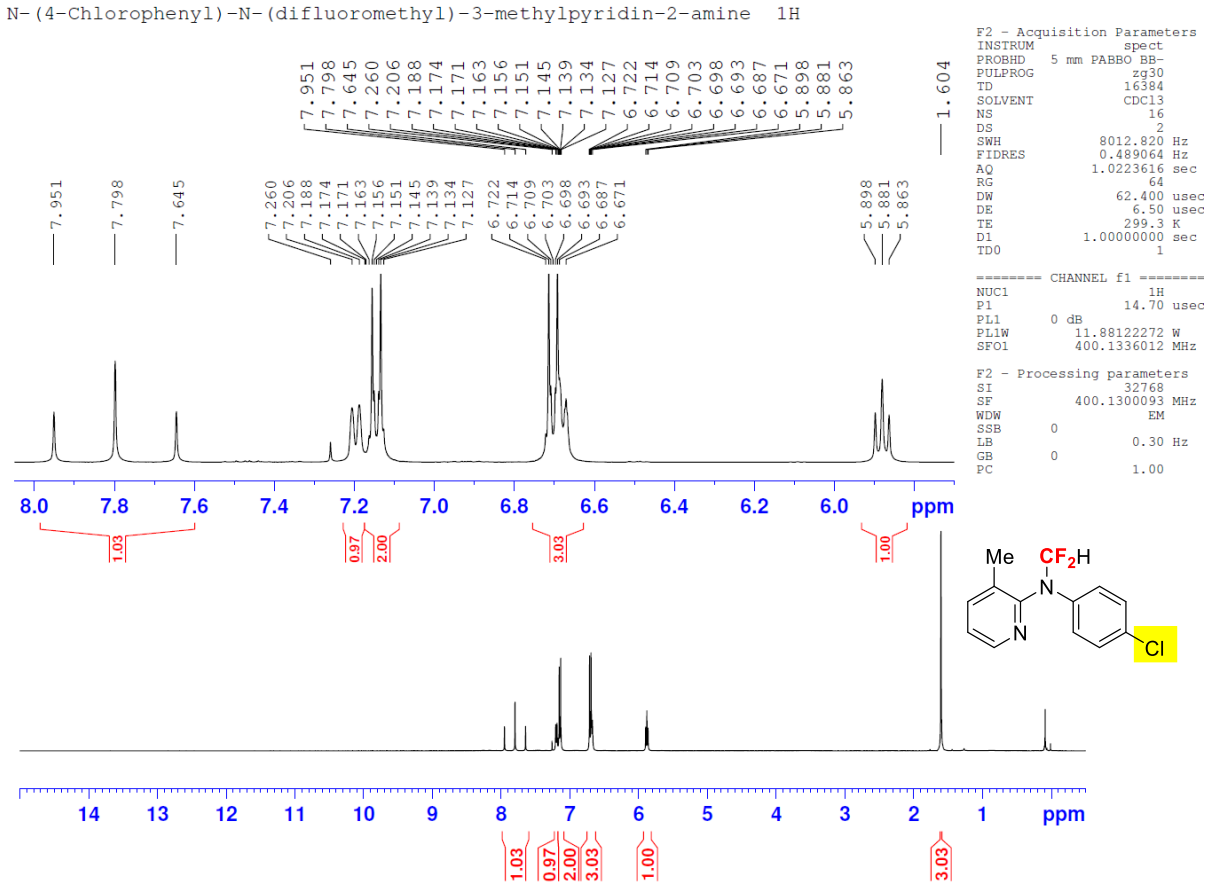

```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                  131072
SOLVENT              CDCl3
NS                      16
DS                       4
SWH              89285.711 Hz
FIDRES           0.681196 Hz
AQ               0.7340032 sec
RG                     812
DW                  5.600 usec
DE                   6.50 usec
TE                  299.9 K
D1               1.00000000 sec
D11              0.03000000 sec
D12              0.00002000 sec
TD0                      1

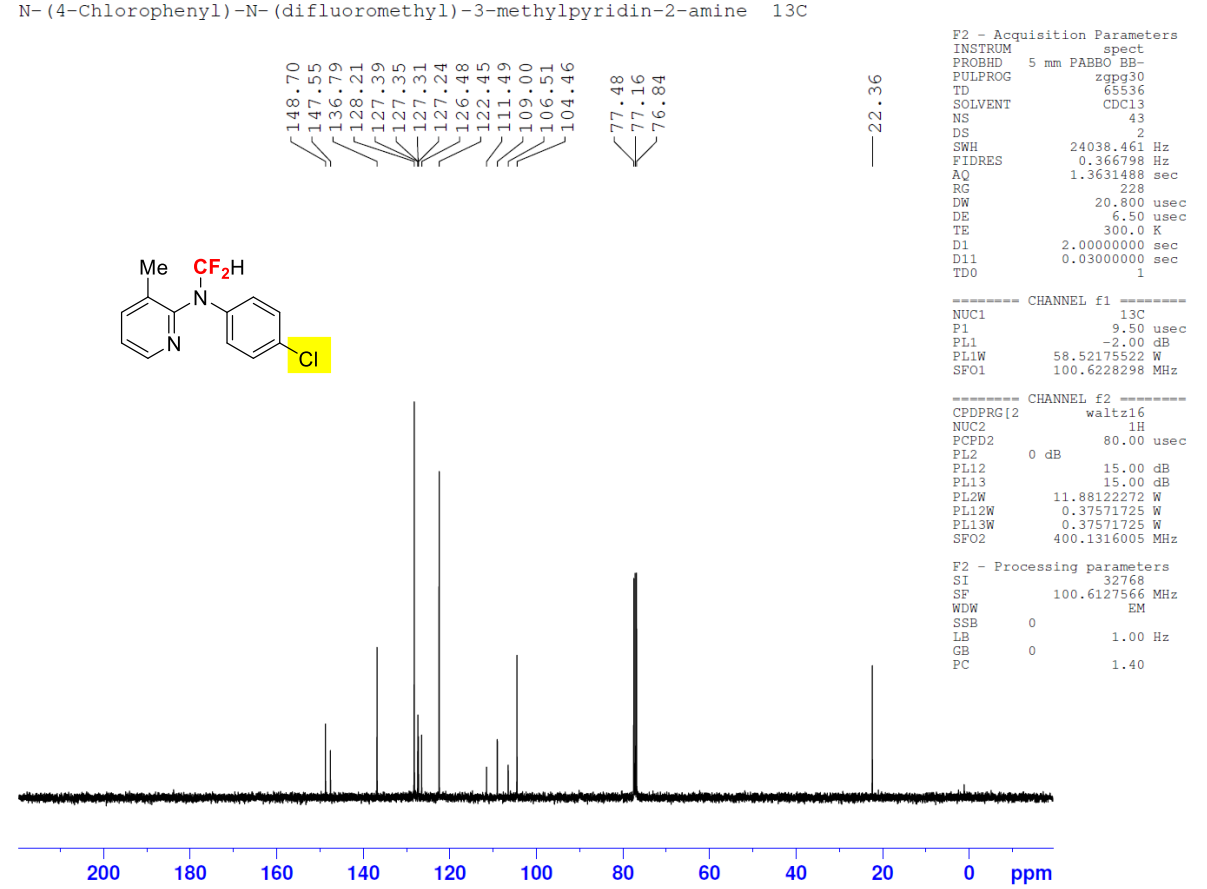
======== CHANNEL f1 ========
NUC1                   19F
P1                   14.20 usec
PL1                  -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

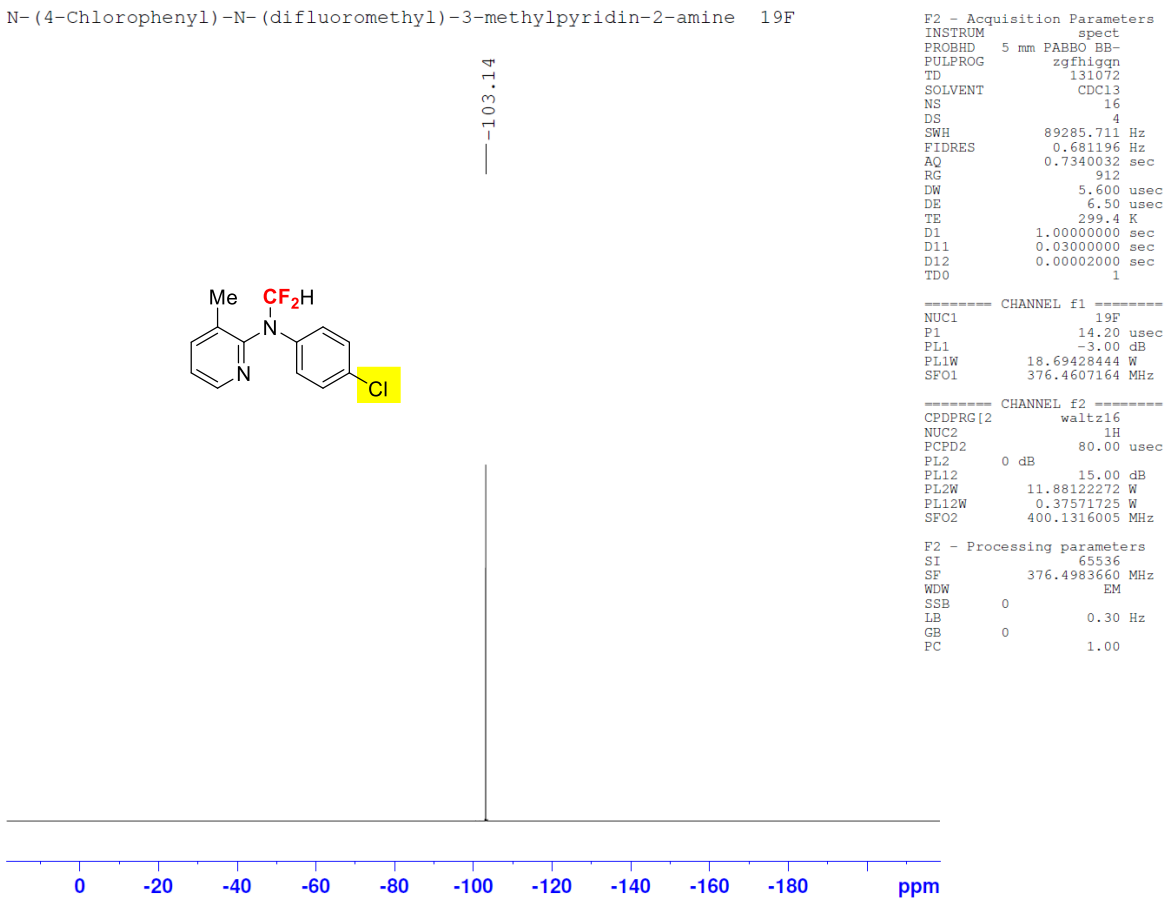
======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2        0 dB
PL12                 15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    65536
SF            376.4983660 MHz
WDW                      EM
SSB        0
LB                    0.30 Hz
GB         0
PC                    1.00
```

N-(4-Chlorophenyl)-*N*-(difluoromethyl)-3-methylpyridin-2-amine (product 2w)







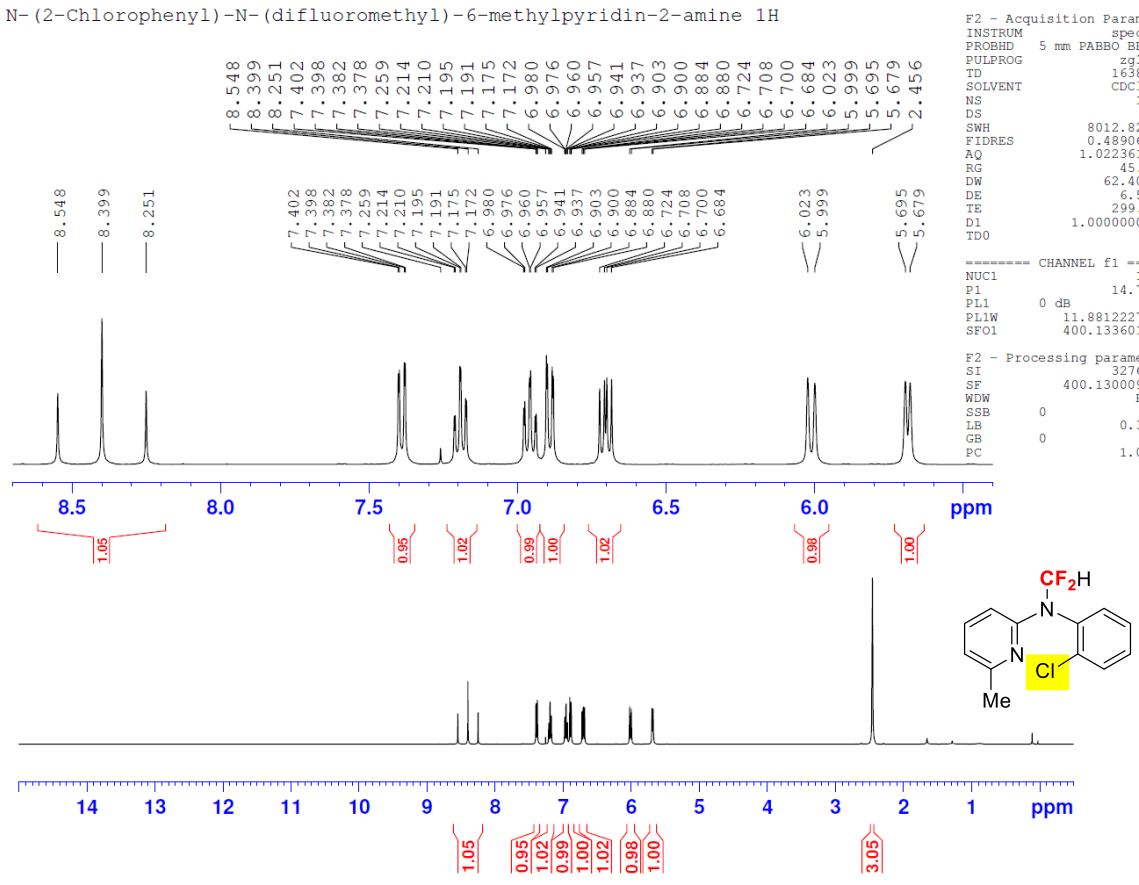
F2 - Acquisition Parameters

INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgfhigqn
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	89285.711 Hz
FIDRES	0.681196 Hz
AQ	0.7340032 sec
RG	912
DW	5.600 usec
DE	6.50 usec
TE	299.4 K
D1	1.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	14.20 usec
PL1	-3.00 dB
PL1W	18.69428444 W
SFO1	376.4607164 MHz
======== CHANNEL f2 ========	
CPDPRG[2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	0 dB
PL12	15.00 dB
PL2W	11.88122272 W
PL12W	0.37571725 W
SFO2	400.1316005 MHz

F2 - Processing parameters

SI	65536
SF	376.4983660 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

N-(2-Chlorophenyl)-*N*-(difluoromethyl)-6-methylpyridin-2-amine (product 2x)



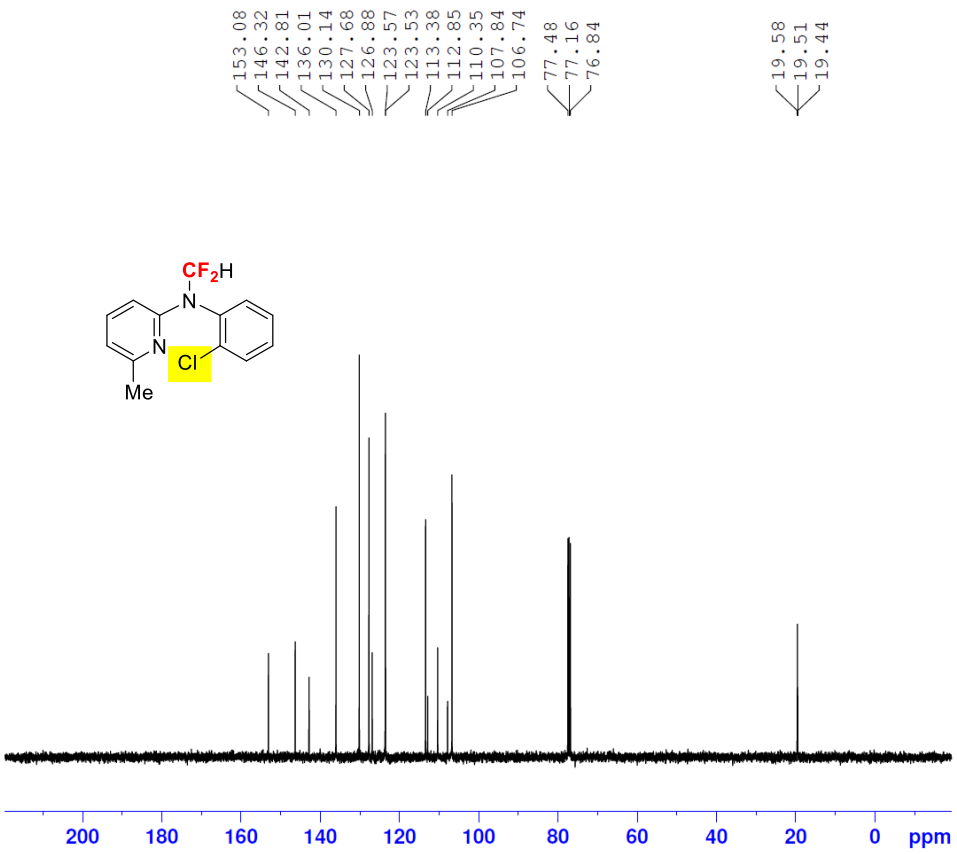
F2 - Acquisition Parameters

INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	16384
SOLVENT	CDCl3
NS	16
DS	2
SWH	8012.820 Hz
FIDRES	0.489064 Hz
AQ	1.0223616 sec
RG	45.2
DW	62.400 usec
DE	6.50 usec
TE	299.2 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	14.70 usec
PL1	0 dB
PL1W	11.88122272 W
SFO1	400.1336012 MHz

F2 - Processing parameters

SI	32768
SF	400.1300094 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

N-(2-Chlorophenyl)-N-(difluoromethyl)-6-methylpyridin-2-amine 13C



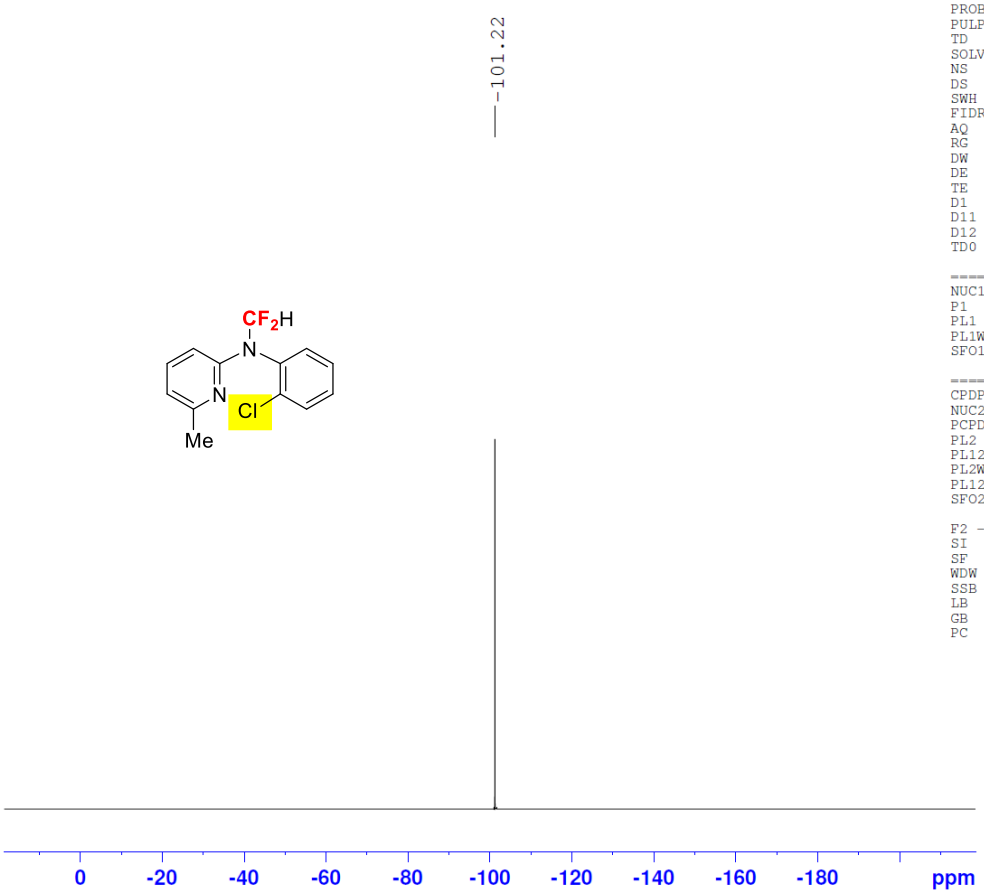

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                    49
DS                     2
SWH            24038.461 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                   228
DW                20.800 usec
DE                 6.50 usec
TE                299.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127598 MHz
WDW                   EM
SSB        0
LB                 1.00 Hz
GB         0
PC                 1.40
```

N-(2-Chlorophenyl)-N-(difluoromethyl)-6-methylpyridin-2-amine 19F



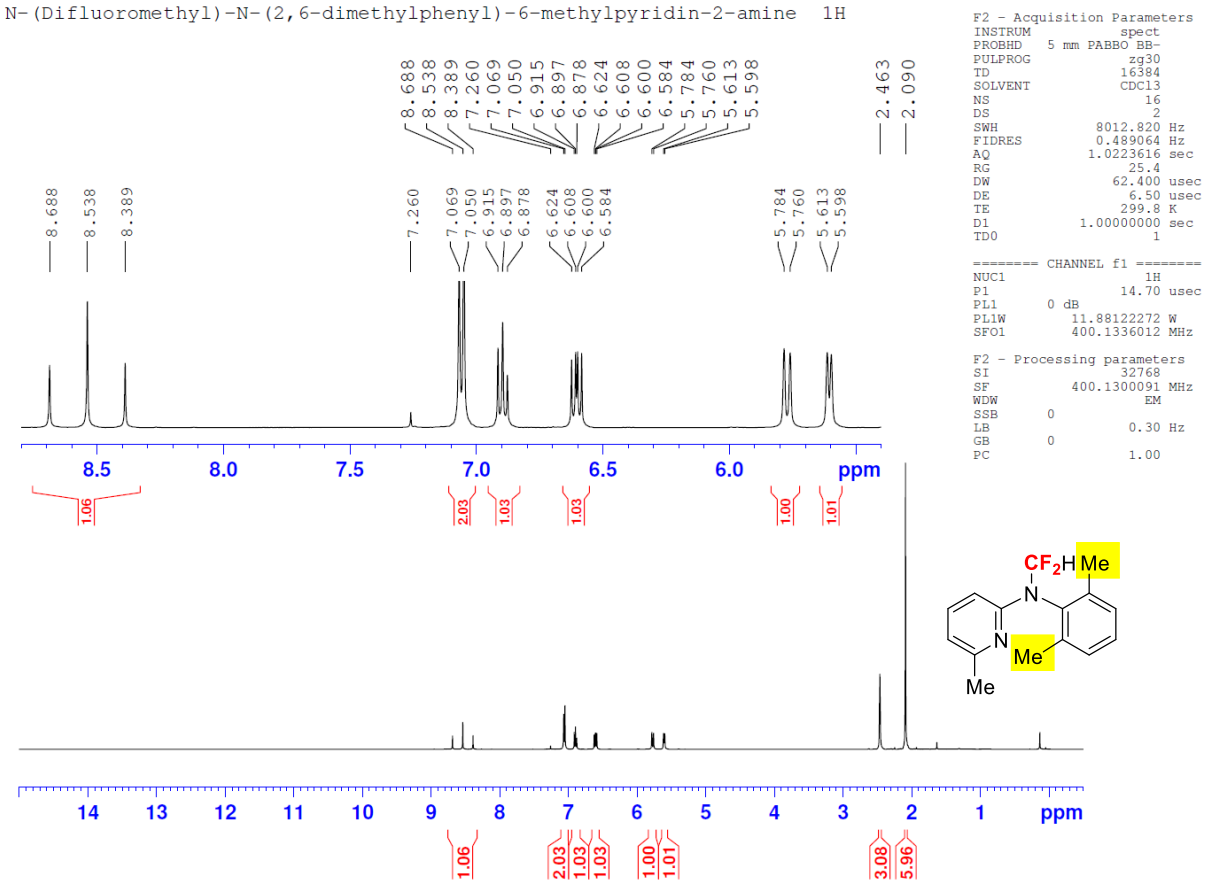

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                131072
SOLVENT            CDCl3
NS                    16
DS                     4
SWH            89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                   645
DW                5.600 usec
DE                 6.50 usec
TE                299.5 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W         18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF           376.4983660 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

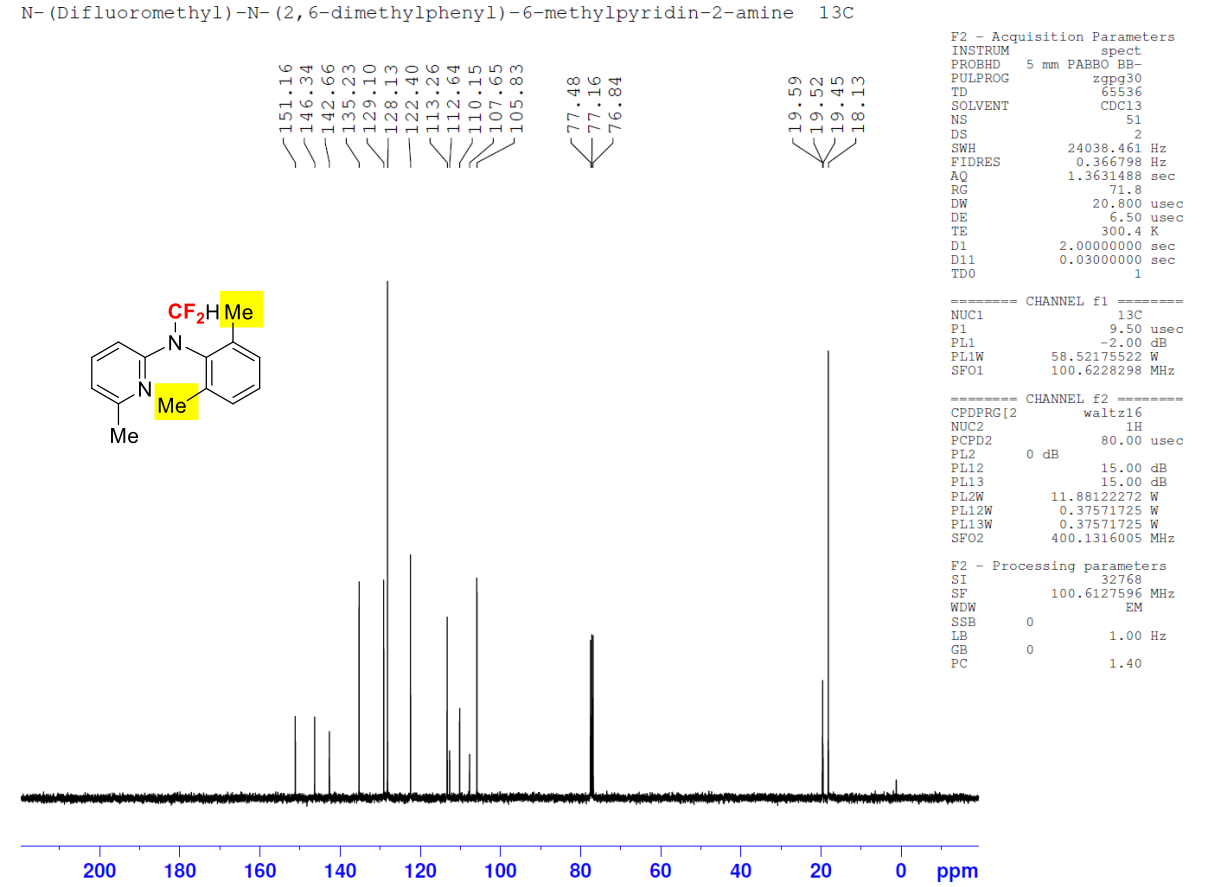
N-(Difluoromethyl)-*N*-(2,6-dimethylphenyl)-6-methylpyridin-2-amine (product 2y)




```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG             zg30
TD                 16384
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8012.820 Hz
FIDRES             0.489064 Hz
AQ              1.0223616 sec
RG                  25.4
DW                 62.400 usec
DE                  6.50 usec
TE                 299.8 K
D1              1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.70 usec
PL1          0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF            400.1300091 MHz
WDW                   EM
SSB          0
LB                 0.30 Hz
GB           0
PC                 1.00
```

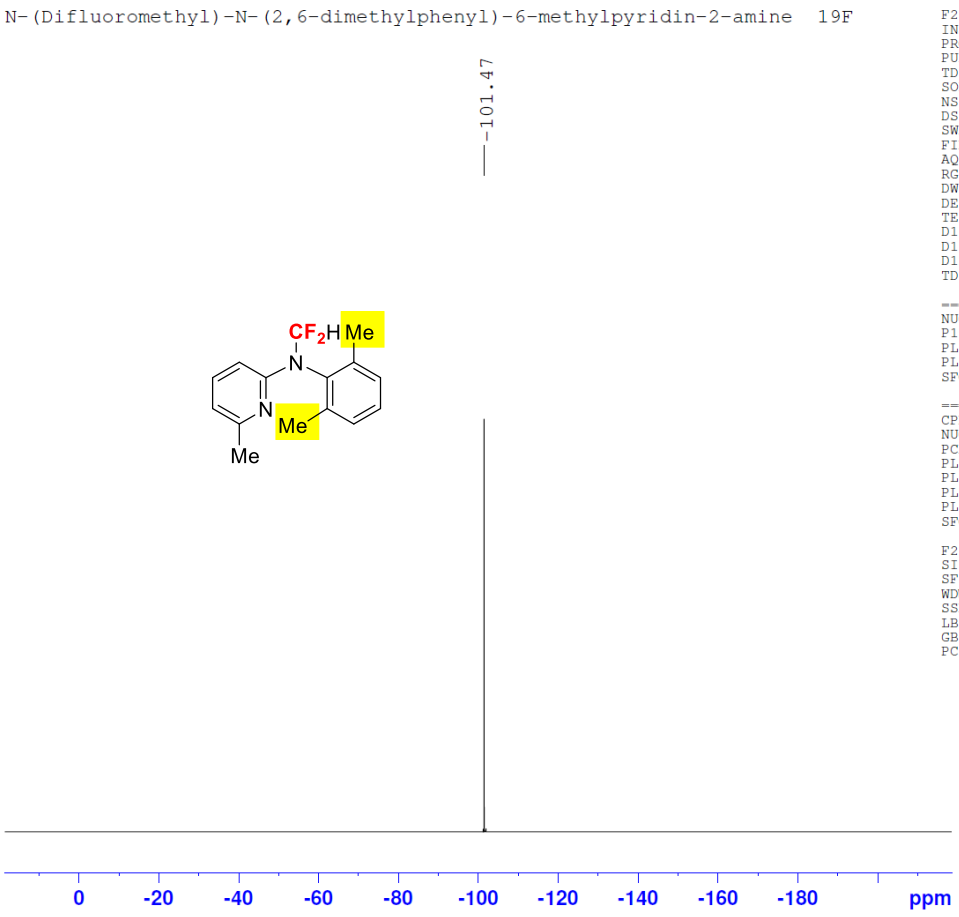



```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                    51
DS                     2
SWH            24038.461 Hz
FIDRES             0.366798 Hz
AQ              1.3631488 sec
RG                  71.8
DW                 20.800 usec
DE                  6.50 usec
TE                 300.4 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W          58.52175522 W
SFO1          100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2          0 dB
PL12                15.00 dB
PL13                15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF            100.6127596 MHz
WDW                   EM
SSB          0
LB                 1.00 Hz
GB           0
PC                 1.40
```



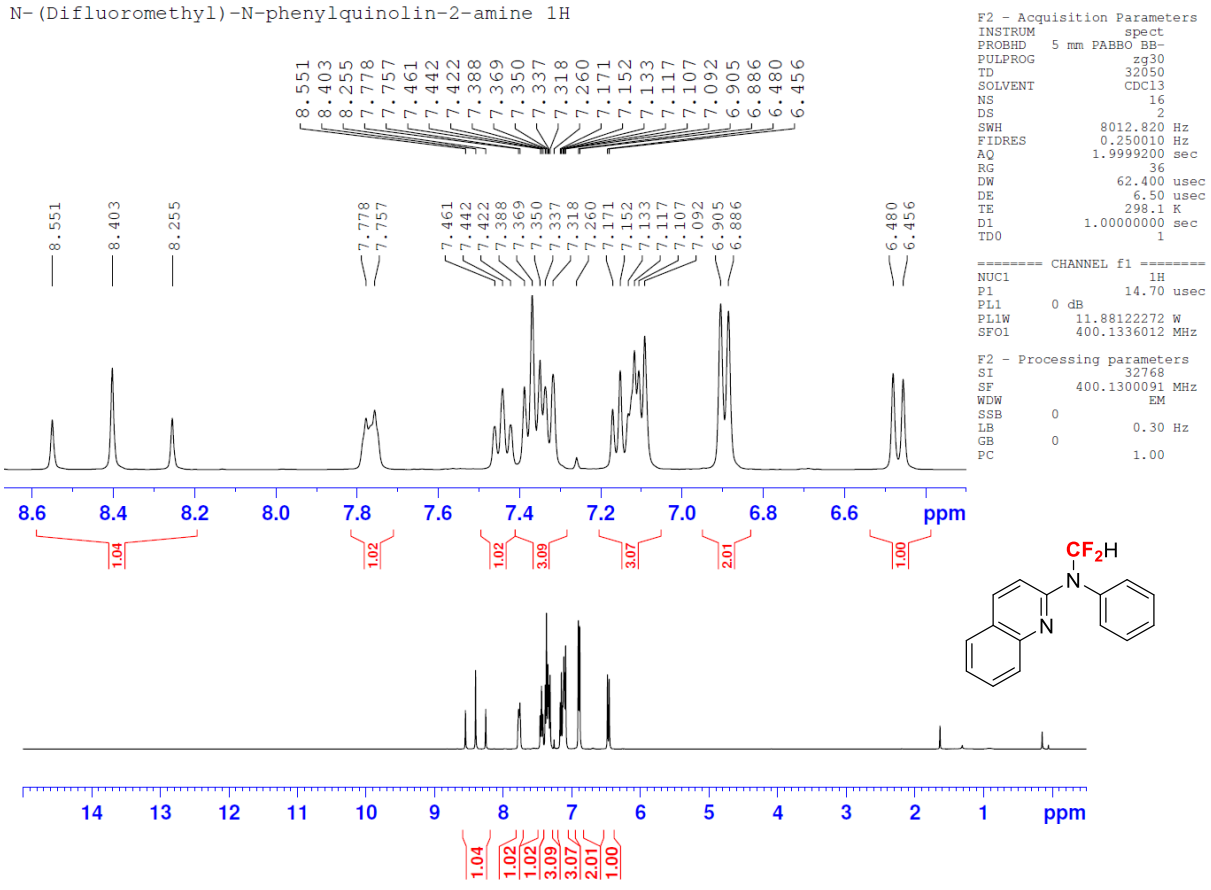

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD                 131072
SOLVENT             CDCl3
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                    645
DW                5.600 usec
DE                6.50 usec
TE                300.1 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  19F
P1                14.20 usec
PL1               -3.00 dB
PL1W         18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL2         0 dB
PL12              15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF            376.4983660 MHz
WDW                   EM
SSB         0
LB                 0.30 Hz
GB          0
PC                 1.00
```

N-(Difluoromethyl)-*N*-phenylquinolin-2-amine (product 2z)

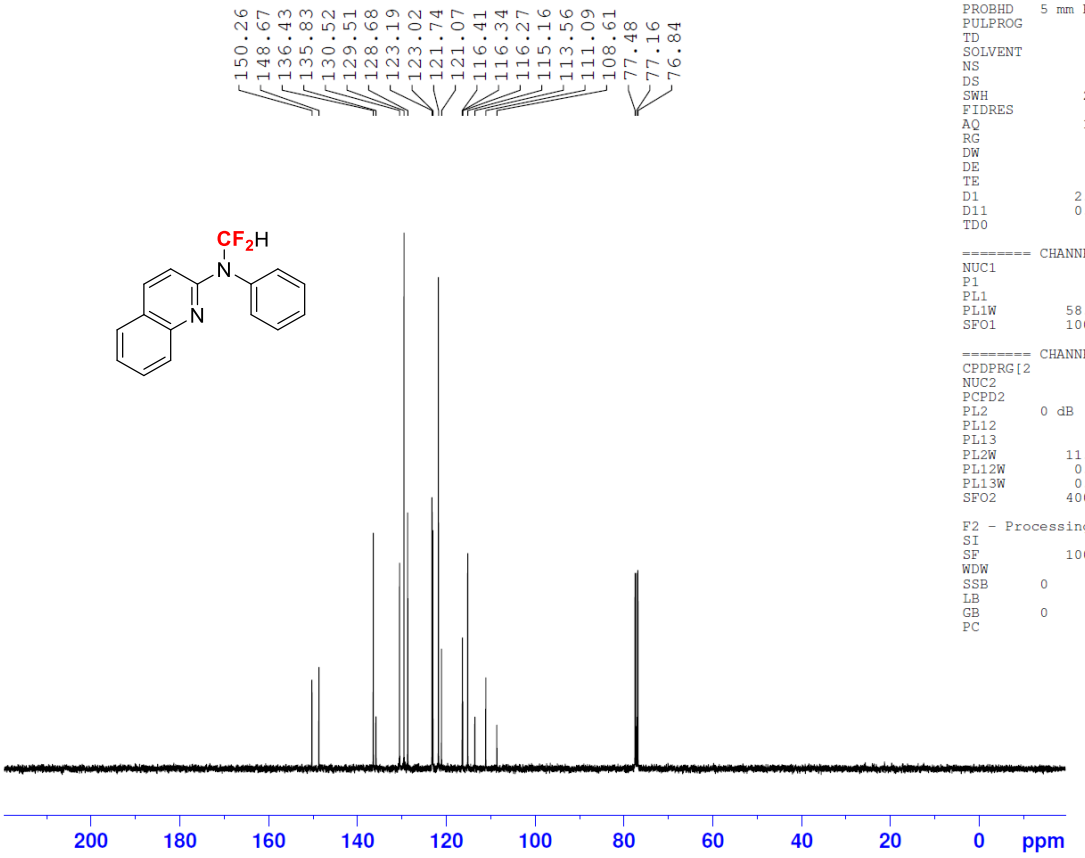



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  32050
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.250010 Hz
AQ               1.9999200 sec
RG                     36
DW                62.400 usec
DE                 6.50 usec
TE                 298.1 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                   1H
P1                14.70 usec
PL1         0 dB
PL1W         11.88122272 W
SFO1         400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF            400.1300091 MHz
WDW                   EM
SSB         0
LB                 0.30 Hz
GB          0
PC                 1.00
```

N-(Difluoromethyl)-N-phenylquinolin-2-amine 13C



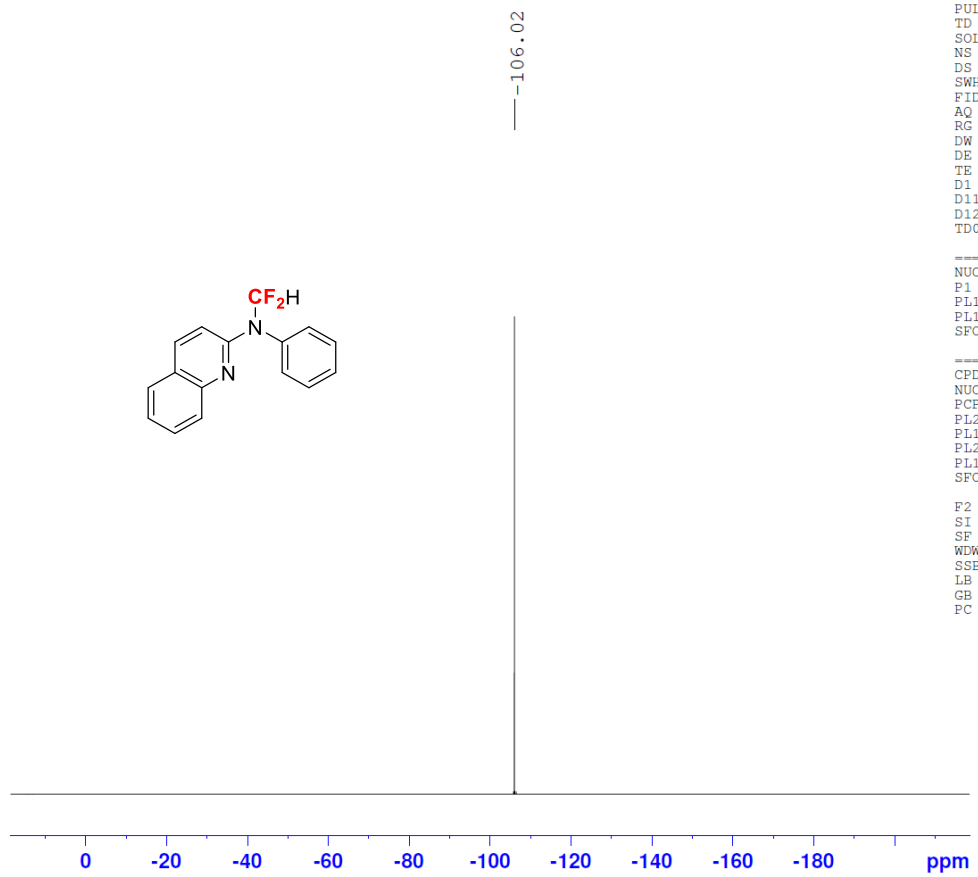

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   60
DS                    2
SWH           24038.461 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                  228
DW               20.800 usec
DE                6.50 usec
TE                298.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W        58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2               80.00 usec
PL2       0 dB
PL12                15.00 dB
PL13                15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
PL13W        0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF          100.6127624 MHz
WDW                    EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

N-(Difluoromethyl)-N-phenylquinolin-2-amine 19F



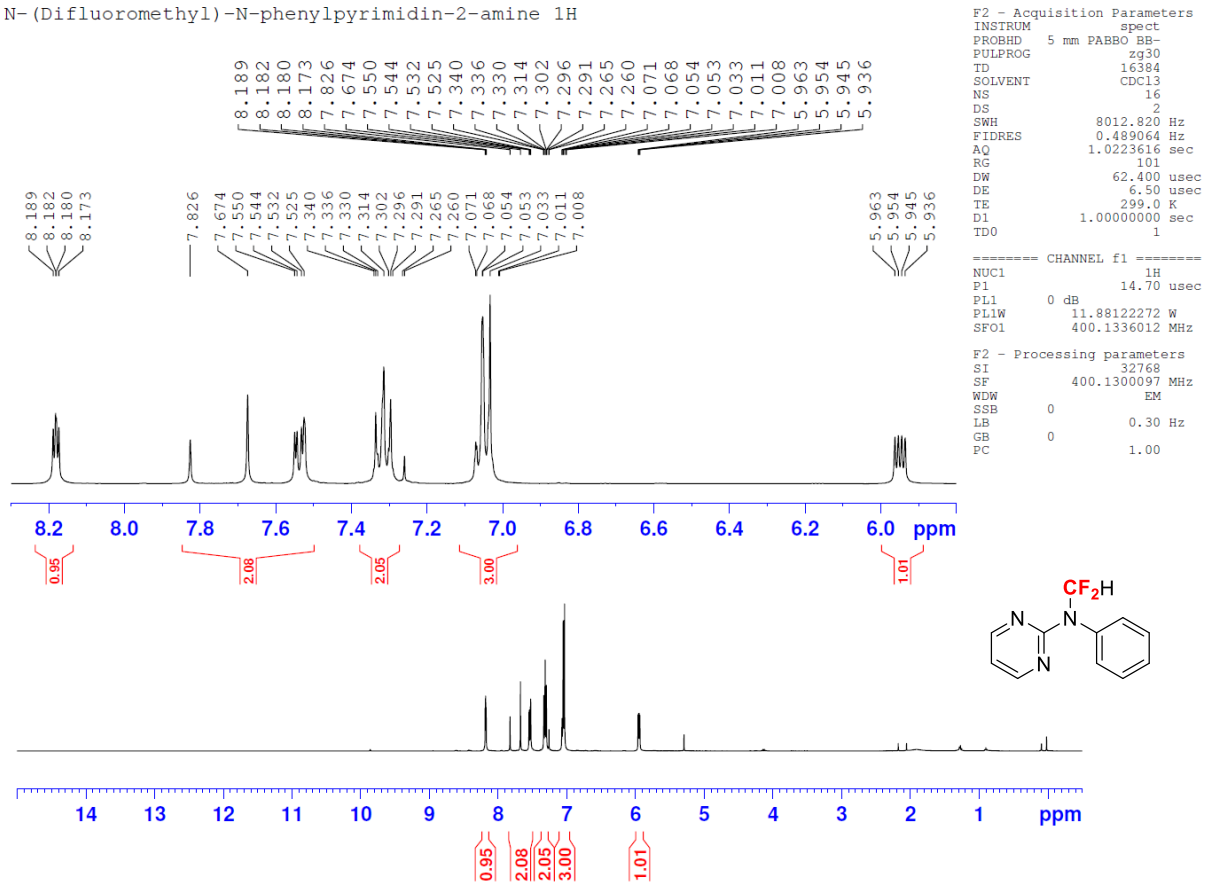

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD               131072
SOLVENT           CDCl3
NS                   16
DS                    4
SWH           89285.711 Hz
FIDRES        0.681196 Hz
AQ            0.7340032 sec
RG                  645
DW               5.600 usec
DE                6.50 usec
TE                298.2 K
D1            1.00000000 sec
D11           0.03000000 sec
D12           0.00002000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W        18.69428444 W
SFO1        376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2               80.00 usec
PL2       0 dB
PL12                15.00 dB
PL2W        11.88122272 W
PL12W        0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                  65536
SF          376.4983660 MHz
WDW                    EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

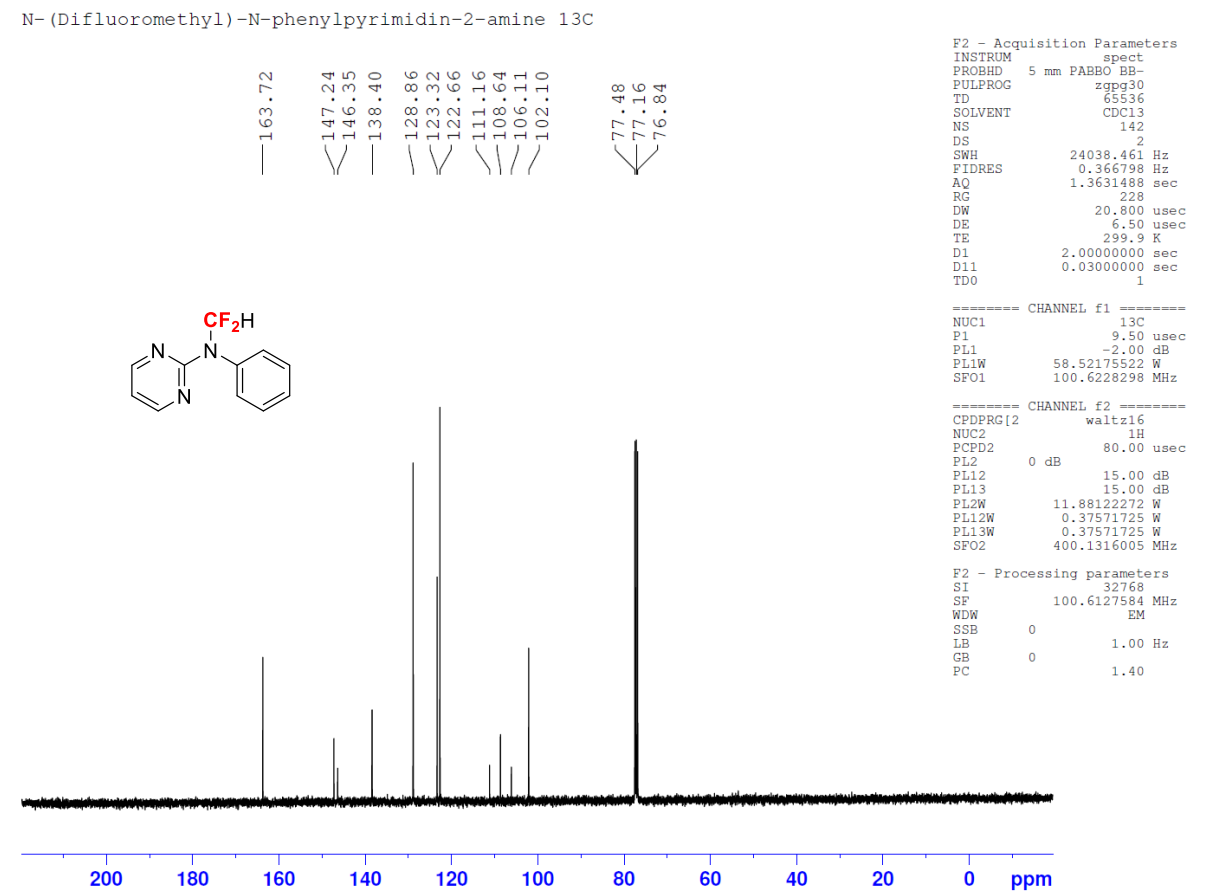
N-(Difluoromethyl)-*N*-phenylpyrimidin-2-amine (product 4a)




```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG                  zg30
TD                      16384
SOLVENT                  CDCl3
NS                          16
DS                           2
SWH                 8012.820 Hz
FIDRES                 0.489064 Hz
AQ                  1.0223616 sec
RG                         101
DW                     62.400 usec
DE                      6.50 usec
TE                      299.0 K
D1                  1.00000000 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                        1H
P1                      14.70 usec
PL1          0 dB
PL1W               11.88122272 W
SFO1               400.1336012 MHz

F2 - Processing parameters
SI                          32768
SF                 400.1300097 MHz
WDW                            EM
SSB          0
LB                       0.30 Hz
GB           0
PC                       1.00
```

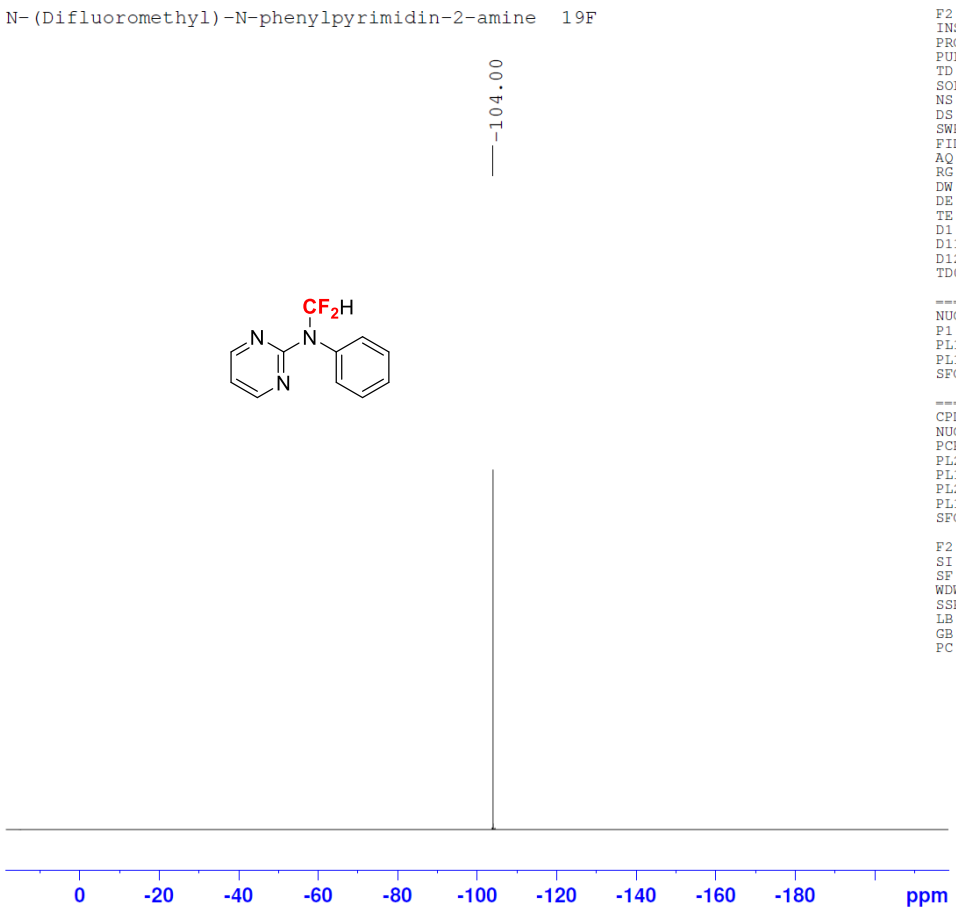



```
F2 - Acquisition Parameters
INSTRUM                  spect
PROBHD    5 mm PABBO BB-
PULPROG                 zgpg30
TD                      65536
SOLVENT                  CDCl3
NS                         142
DS                           2
SWH                24038.461 Hz
FIDRES                 0.366798 Hz
AQ                  1.3631488 sec
RG                         228
DW                     20.800 usec
DE                      6.50 usec
TE                      299.9 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                       13C
P1                      9.50 usec
PL1                    -2.00 dB
PL1W               58.52175522 W
SFO1               100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2                waltz16
NUC2                        1H
PCPD2                   80.00 usec
PL2          0 dB
PL12                   15.00 dB
PL13                   15.00 dB
PL2W               11.88122272 W
PL12W               0.37571725 W
PL13W               0.37571725 W
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                          32768
SF                 100.6127584 MHz
WDW                            EM
SSB          0
LB                       1.00 Hz
GB           0
PC                       1.40
```



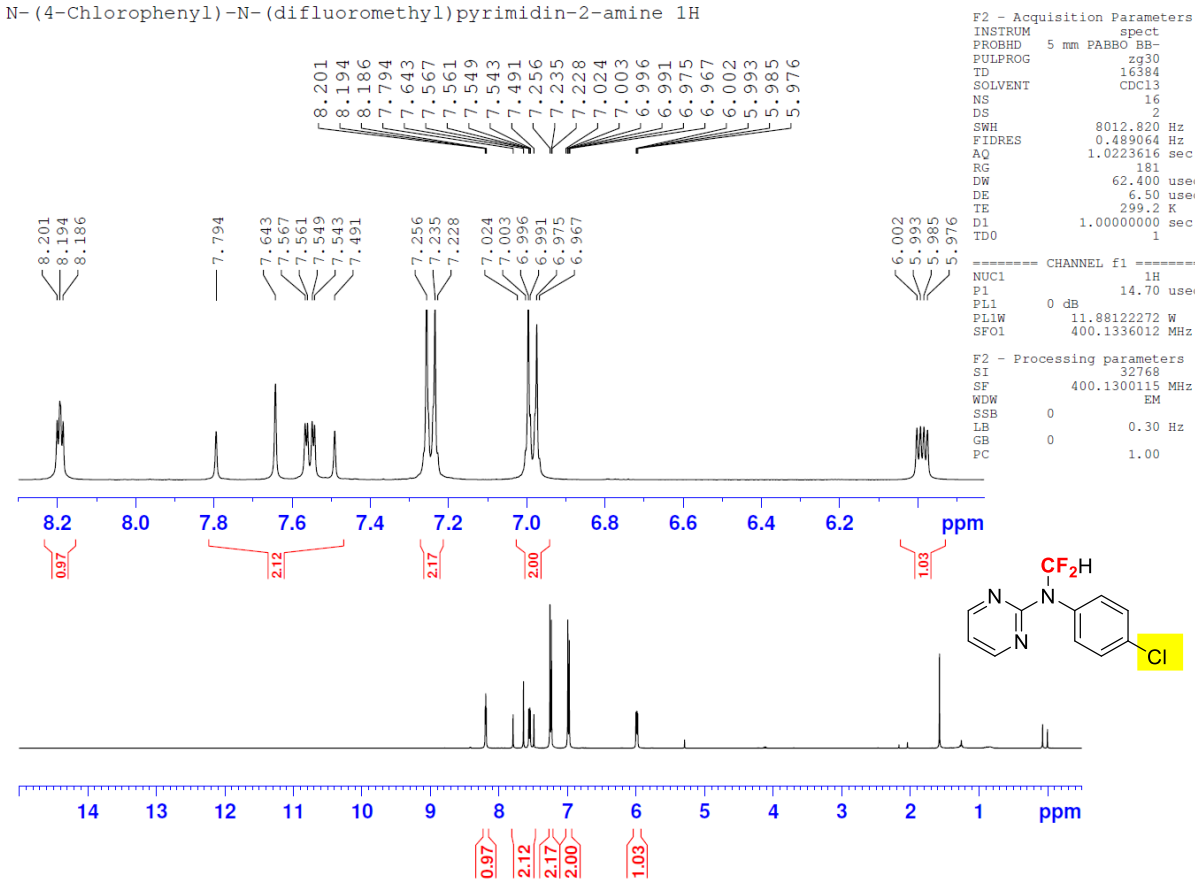

```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG         zgfhigqn
TD                131072
SOLVENT             CDC13
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                   1030
DW                5.600 usec
DE                6.50 usec
TE                299.2 K
D1           1.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  19F
P1                14.20 usec
PL1               -3.00 dB
PL1W         18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL2       0 dB
PL12              15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF            376.4983660 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

N-(4-Chlorophenyl)-*N*-(difluoromethyl)pyrimidin-2-amine (product 4b)

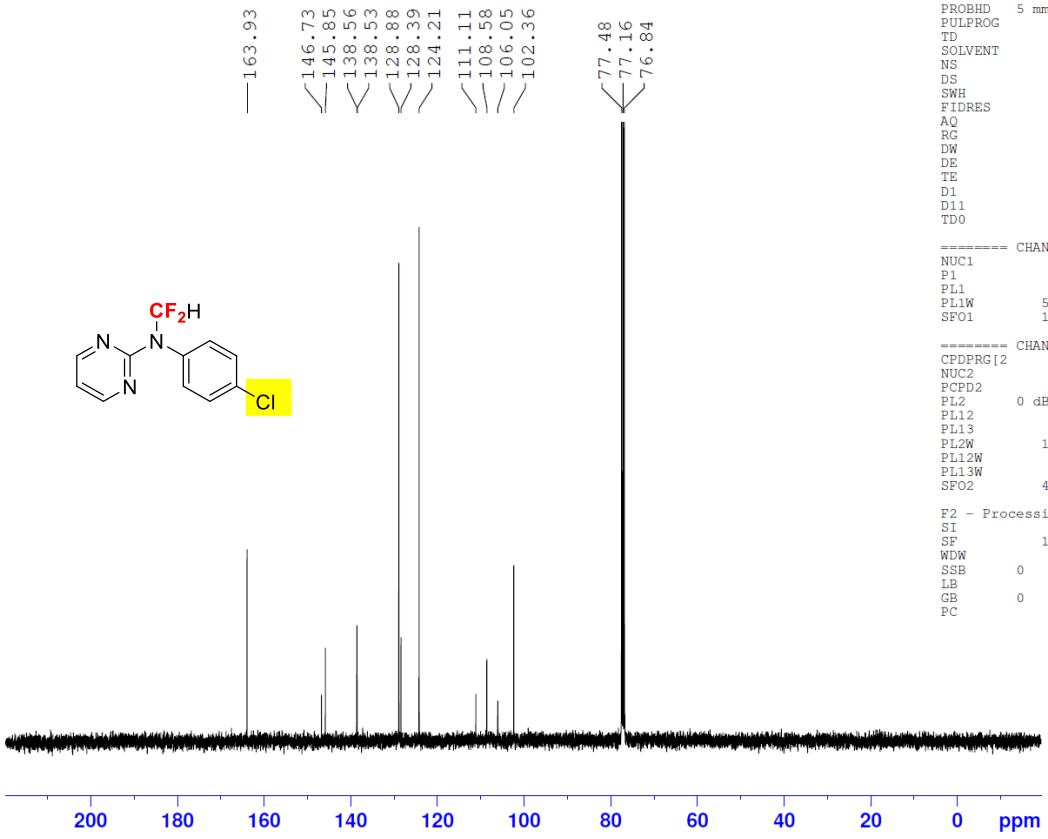



```
F2 - Acquisition Parameters
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 16384
SOLVENT             CDC13
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.489064 Hz
AQ               1.0223616 sec
RG                   181
DW                62.400 usec
DE                6.50 usec
TE                299.2 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                14.70 usec
PL1       0 dB
PL1W         11.88122272 W
SFO1         400.1336012 MHz

F2 - Processing parameters
SI                 32768
SF            400.1300115 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

N-(4-Chlorophenyl)-N-(difluoromethyl)pyrimidin-2-amine 13C



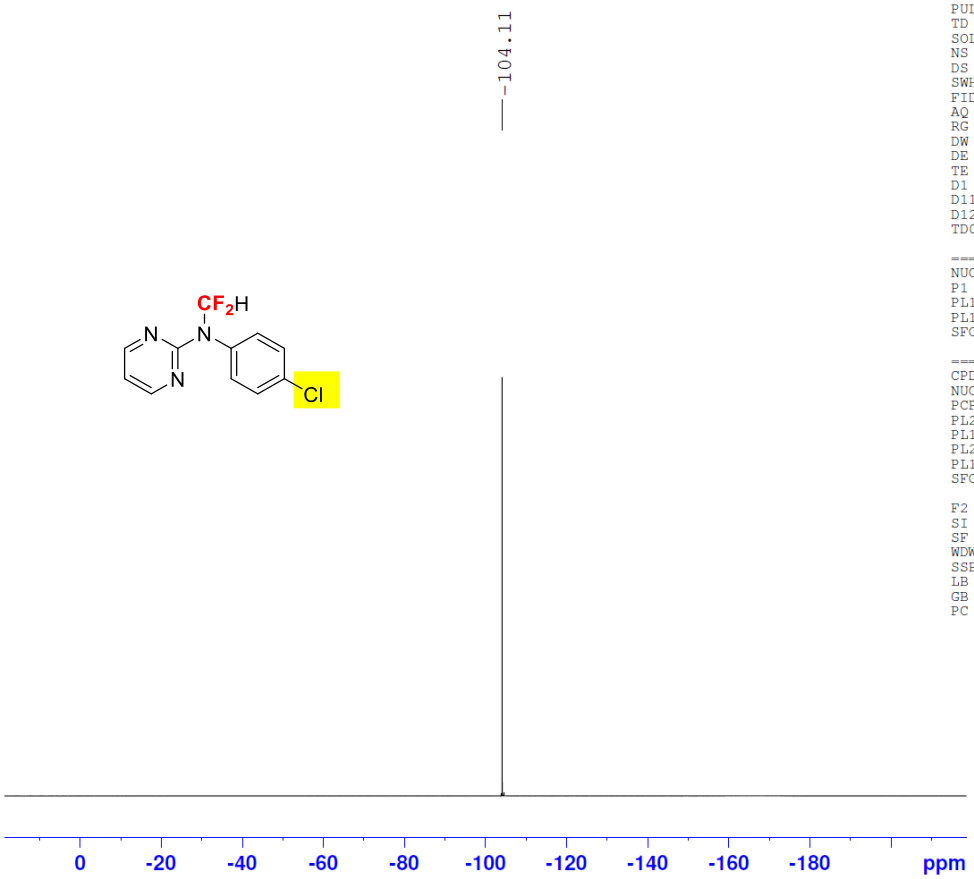

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    275
DS                      2
SWH             24038.461 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                    228
DW                20.800 usec
DE                 6.50 usec
TE                299.2 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127545 MHz
WDW                   EM
SSB        0
LB                 1.00 Hz
GB         0
PC                 1.40
```

N-(4-Chlorophenyl)-N-(difluoromethyl)pyrimidin-2-amine 19F



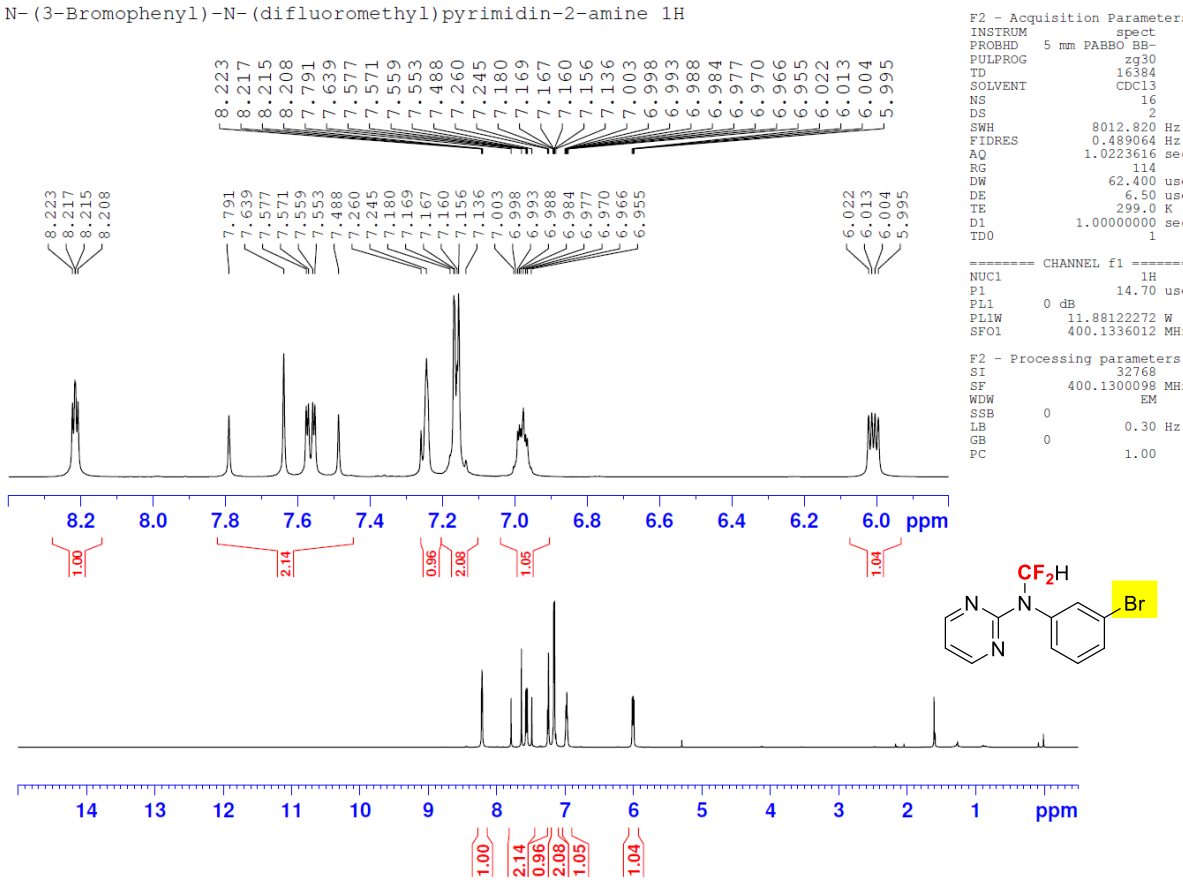

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG          zgfhigqn
TD                 131072
SOLVENT             CDCl3
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                   1290
DW                5.600 usec
DE                 6.50 usec
TE                299.2 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W         18.69428444 W
SFO1         376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2        0 dB
PL12               15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 65536
SF           376.4983660 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

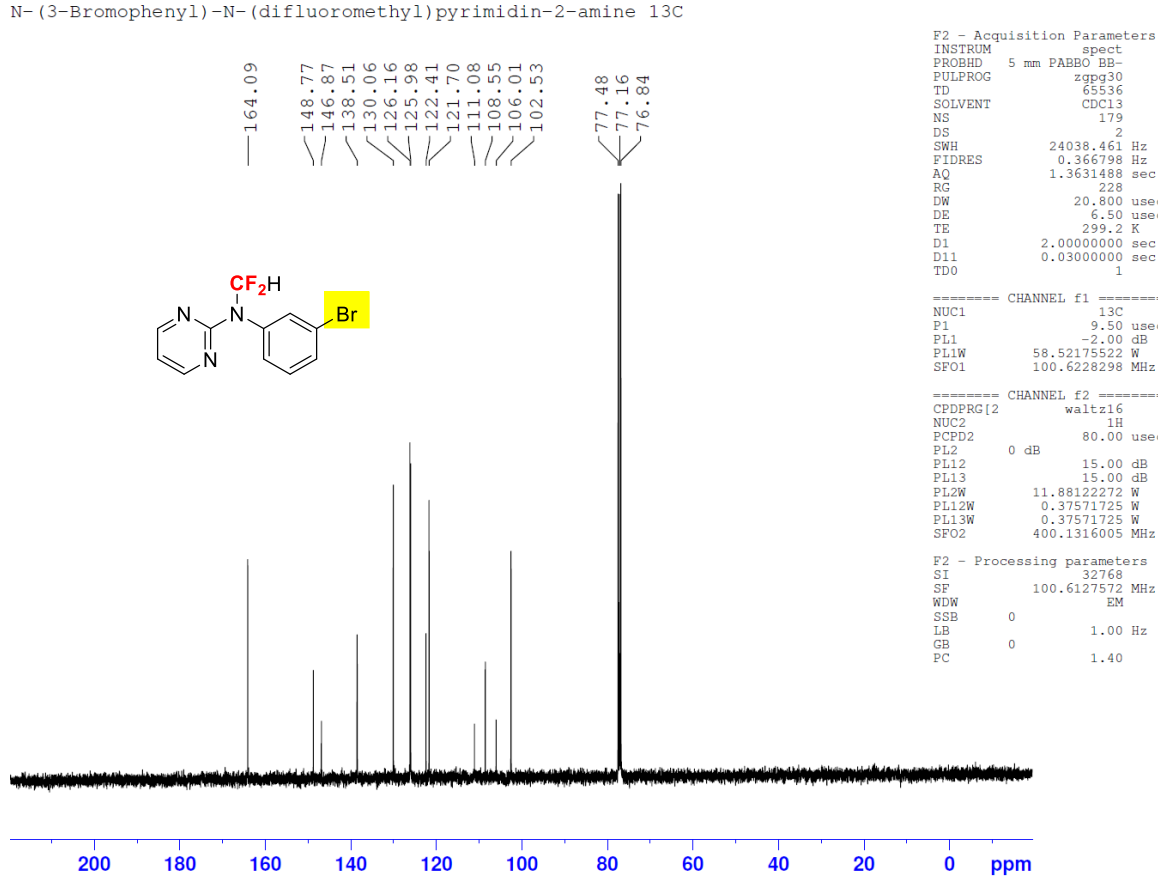
N-(3-Bromophenyl)-*N*-(difluoromethyl)pyrimidin-2-amine (product 4c)




```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  16384
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.489064 Hz
AQ              1.0223616 sec
RG                    114
DW                 62.400 usec
DE                  6.50 usec
TE                 299.0 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  14.70 usec
PL1        0 dB
PL1W         11.88122272 W
SFO1        400.1336012 MHz

F2 - Processing parameters
SI                  32768
SF           400.1300098 MHz
WDW                    EM
SSB        0
LB                  0.30 Hz
GB         0
PC                  1.00
```

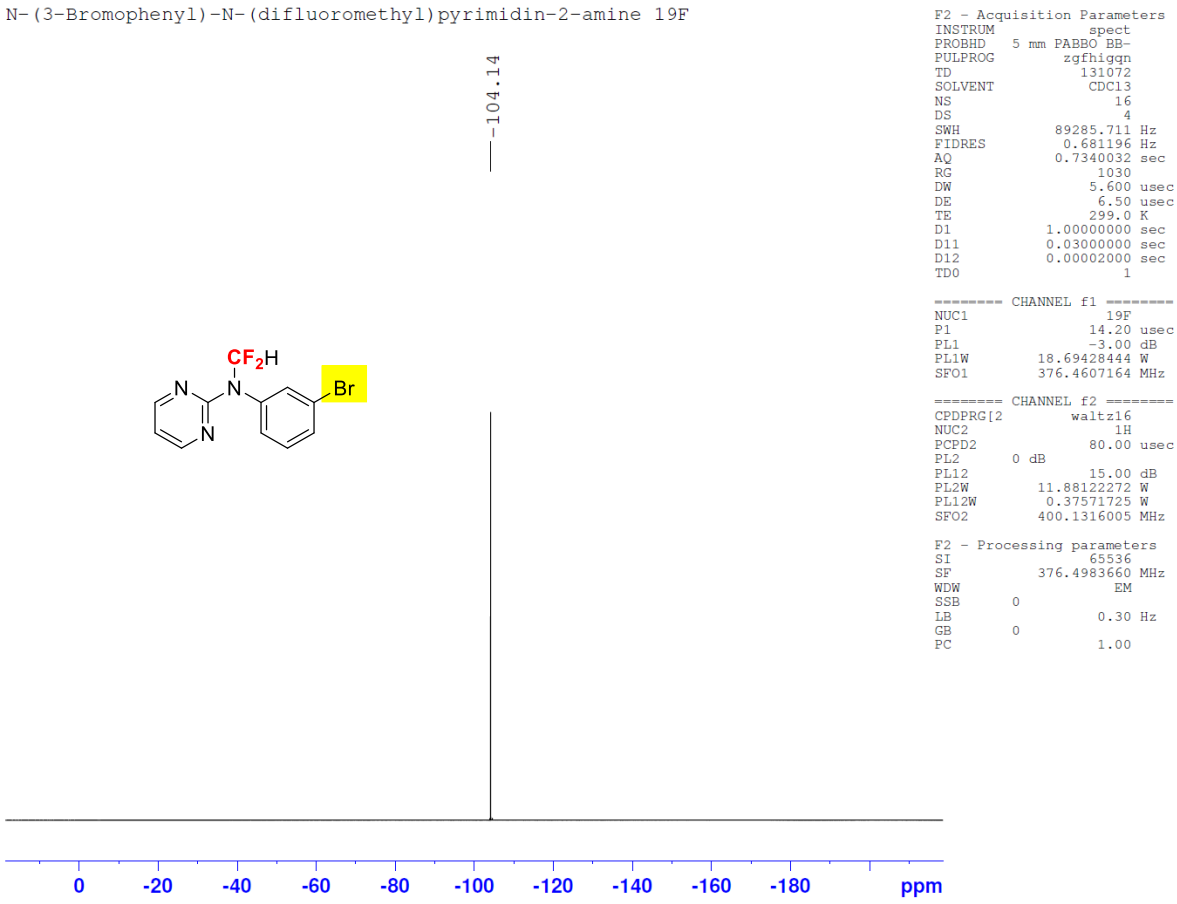



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    179
DS                      2
SWH             24038.461 Hz
FIDRES           0.366798 Hz
AQ              1.3631488 sec
RG                    228
DW                 20.800 usec
DE                  6.50 usec
TE                 299.2 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                   1H
PCPD2               80.00 usec
PL2        0 dB
PL12                15.00 dB
PL13                15.00 dB
PL2W         11.88122272 W
PL12W         0.37571725 W
PL13W         0.37571725 W
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127572 MHz
WDW                    EM
SSB        0
LB                  1.00 Hz
GB         0
PC                  1.40
```



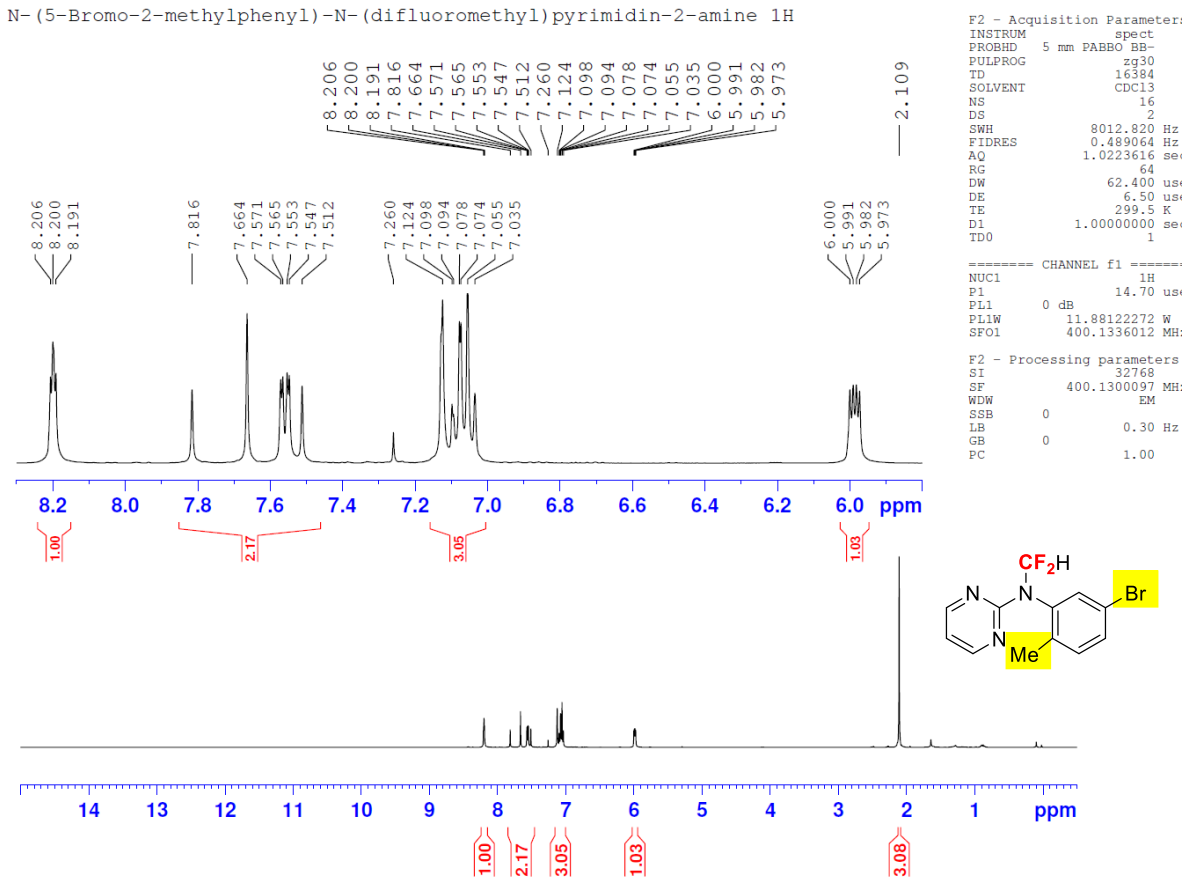

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgfhigqn
TD                  131072
SOLVENT              CDCl3
NS                      16
DS                       4
SWH              89285.711 Hz
FIDRES           0.681196 Hz
AQ               0.7340032 sec
RG                    1030
DW                5.600 usec
DE                6.50 usec
TE                299.0 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2         0 dB
PL12               15.00 dB
PL2W          11.88122272 W
PL12W          0.375717725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    65536
SF            376.4983660 MHz
WDW                      EM
SSB         0
LB                  0.30 Hz
GB          0
PC                  1.00
```

N-(5-Bromo-2-methylphenyl)-*N*-(difluoromethyl)pyrimidin-2-amine (product 4d)

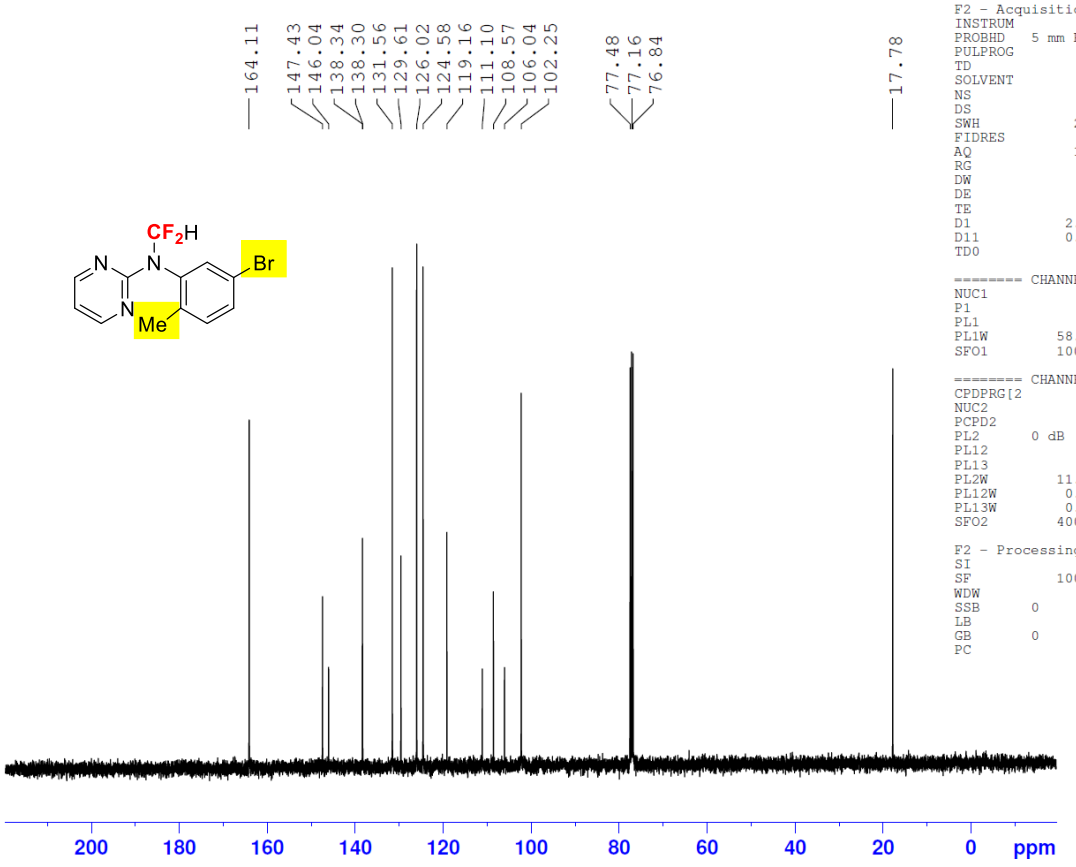



```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  16384
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               8012.820 Hz
FIDRES           0.489064 Hz
AQ               1.0223616 sec
RG                      64
DW                62.400 usec
DE                6.50 usec
TE                299.5 K
D1             1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                 14.70 usec
PL1         0 dB
PL1W          11.88122272 W
SFO1          400.1336012 MHz

F2 - Processing parameters
SI                    32768
SF            400.1300097 MHz
WDW                      EM
SSB         0
LB                  0.30 Hz
GB          0
PC                  1.00
```

N-(5-Bromo-2-methylphenyl)-N-(difluoromethyl)pyrimidin-2-amine 13C



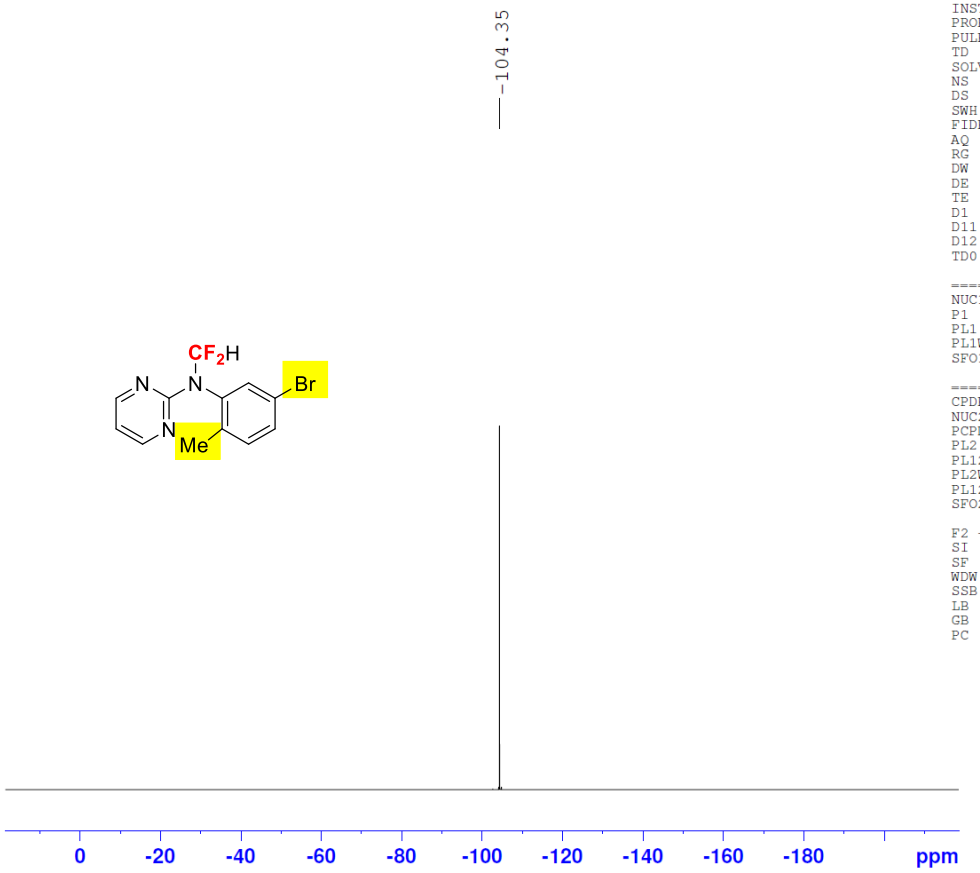

```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      128
DS                        2
SWH               24038.461 Hz
FIDRES            0.366798 Hz
AQ                1.3631488 sec
RG                      228
DW                   20.800 usec
DE                    6.50 usec
TE                   300.6 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                   13C
P1                    9.50 usec
PL1                  -2.00 dB
PL1W          58.52175522 W
SFO1          100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2       0 dB
PL12                 15.00 dB
PL13                 15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    32768
SF            100.6127610 MHz
WDW                     EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.40
```

N-(5-Bromo-2-methylphenyl)-N-(difluoromethyl)pyrimidin-2-amine 19F



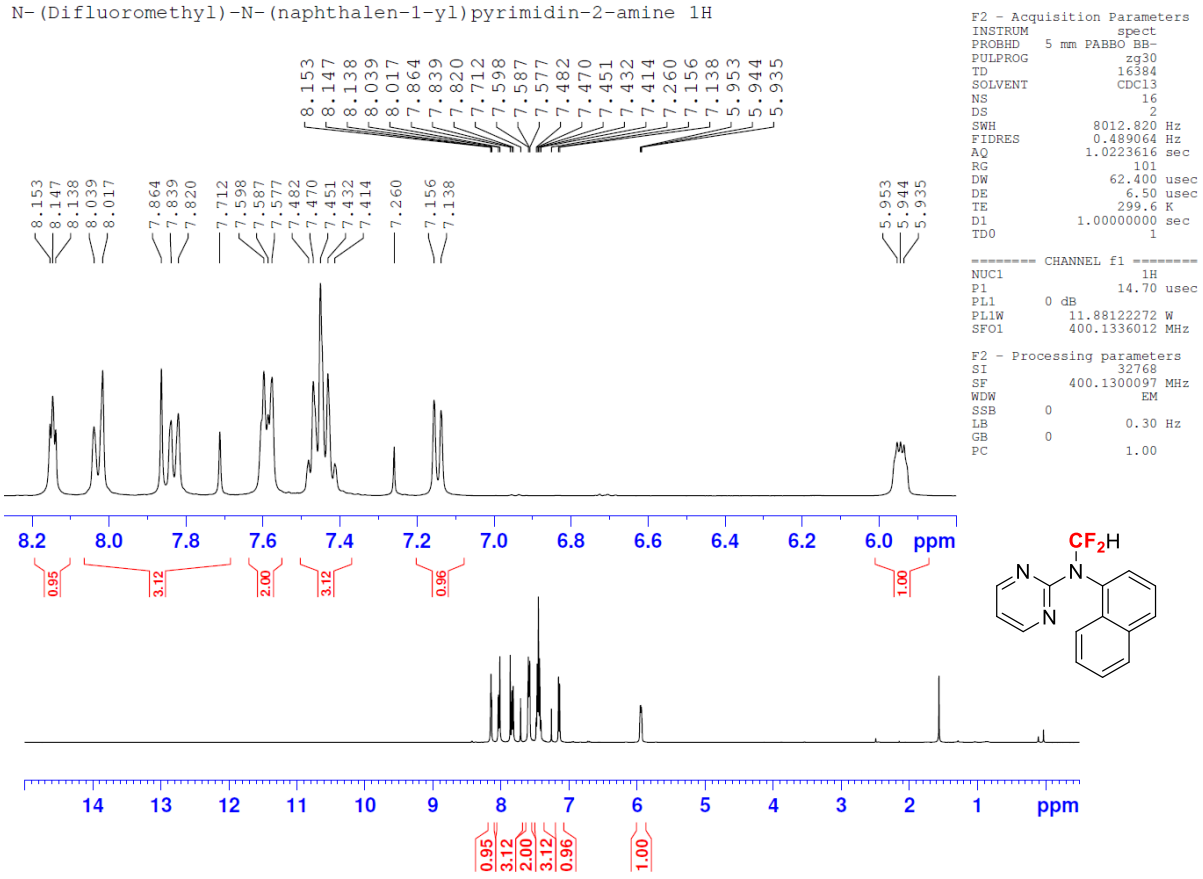

```
F2 - Acquisition Parameters
INSTRUM                spect
PROBHD    5 mm PABBO BB-
PULPROG             zgfhigqn
TD                   131072
SOLVENT               CDCl3
NS                       16
DS                        4
SWH               89285.711 Hz
FIDRES            0.681196 Hz
AQ                0.7340032 sec
RG                      912
DW                   5.600 usec
DE                    6.50 usec
TE                   300.0 K
D1              1.00000000 sec
D11             0.03000000 sec
D12             0.00002000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                   19F
P1                   14.20 usec
PL1                  -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2       0 dB
PL12                 15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    65536
SF            376.4983660 MHz
WDW                     EM
SSB       0
LB                    0.30 Hz
GB        0
PC                    1.00
```

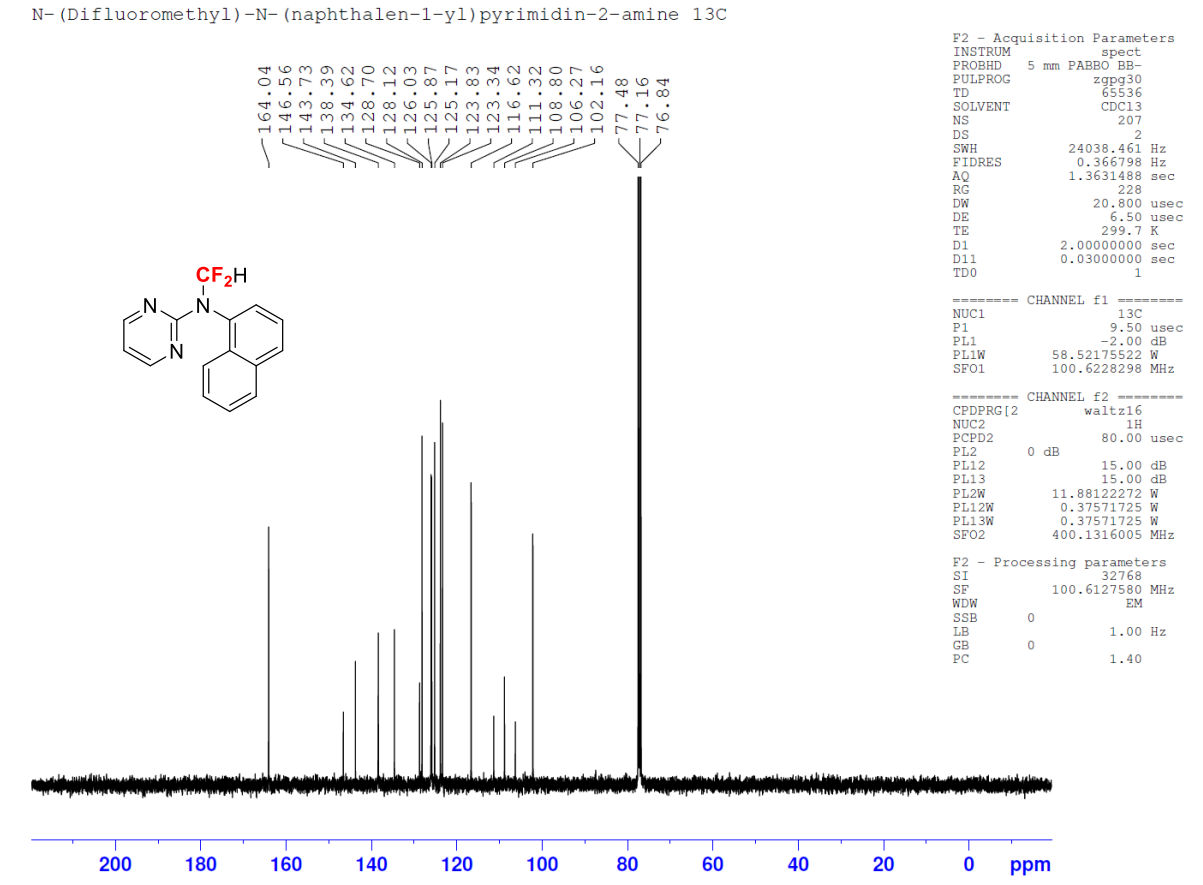
N-(Difluoromethyl)-*N*-(naphthalen-1-yl)pyrimidin-2-amine (product 4e)




```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG              zg30
TD                  16384
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8012.820 Hz
FIDRES           0.489064 Hz
AQ               1.0223616 sec
RG                    101
DW                 62.400 usec
DE                  6.50 usec
TE                 299.6 K
D1               1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  14.70 usec
PL1          0 dB
PL1W          11.88122272 W
SFO1         400.1336012 MHz

F2 - Processing parameters
SI                  32768
SF           400.1300097 MHz
WDW                    EM
SSB          0
LB                  0.30 Hz
GB           0
PC                  1.00
```



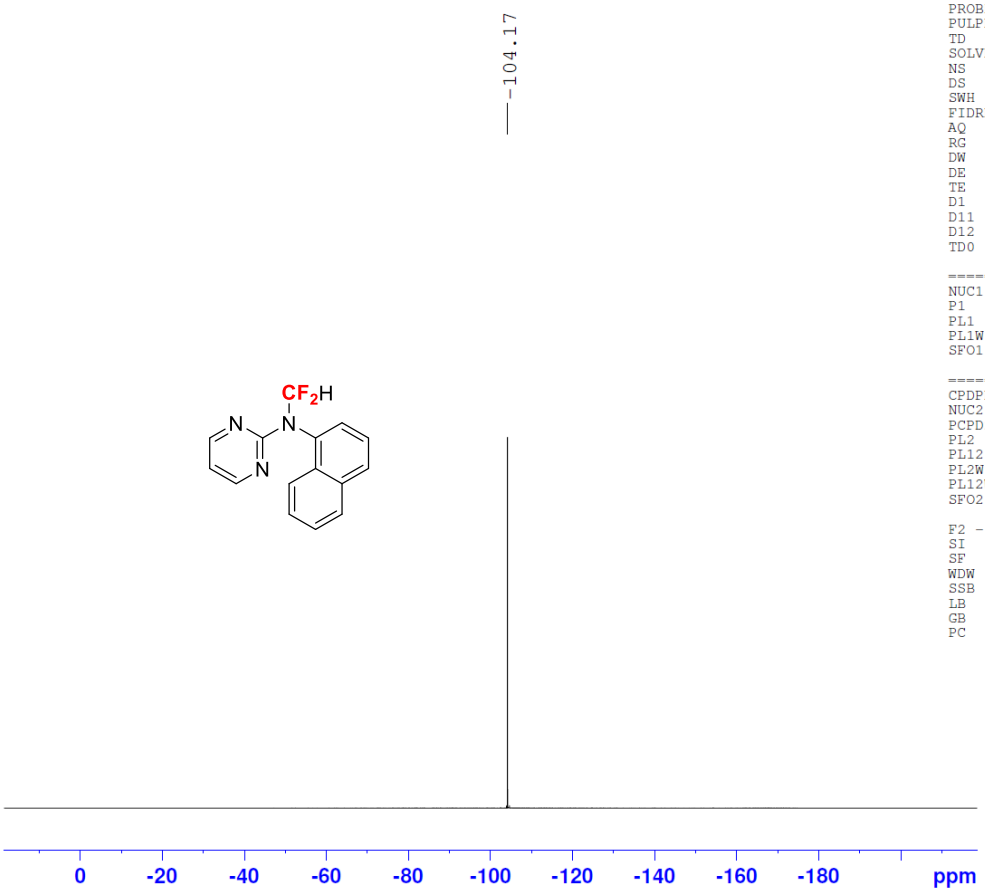

```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD    5 mm PABBO BB-
PULPROG           zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    207
DS                      2
SWH             24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                    228
DW                 20.800 usec
DE                  6.50 usec
TE                 299.7 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.50 usec
PL1                -2.00 dB
PL1W         58.52175522 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2          0 dB
PL12               15.00 dB
PL13               15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
PL13W          0.37571725 W
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127580 MHz
WDW                    EM
SSB          0
LB                  1.00 Hz
GB           0
PC                  1.40
```

N-(Difluoromethyl)-N-(naphthalen-1-yl)pyrimidin-2-amine 19F




```
F2 - Acquisition Parameters
INSTRUM              spect
PROBHD   5 mm PABBO BB-
PULPROG          zgfhigqn
TD                131072
SOLVENT             CDCl3
NS                     16
DS                      4
SWH             89285.711 Hz
FIDRES          0.681196 Hz
AQ              0.7340032 sec
RG                   1150
DW                5.600 usec
DE                6.50 usec
TE                300.2 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                    1

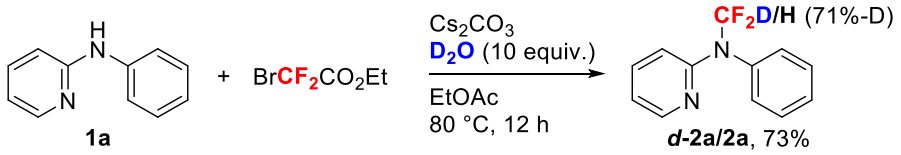
======== CHANNEL f1 ========
NUC1                  19F
P1                 14.20 usec
PL1                -3.00 dB
PL1W          18.69428444 W
SFO1          376.4607164 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2       0 dB
PL12               15.00 dB
PL2W          11.88122272 W
PL12W          0.37571725 W
SFO2          400.1316005 MHz

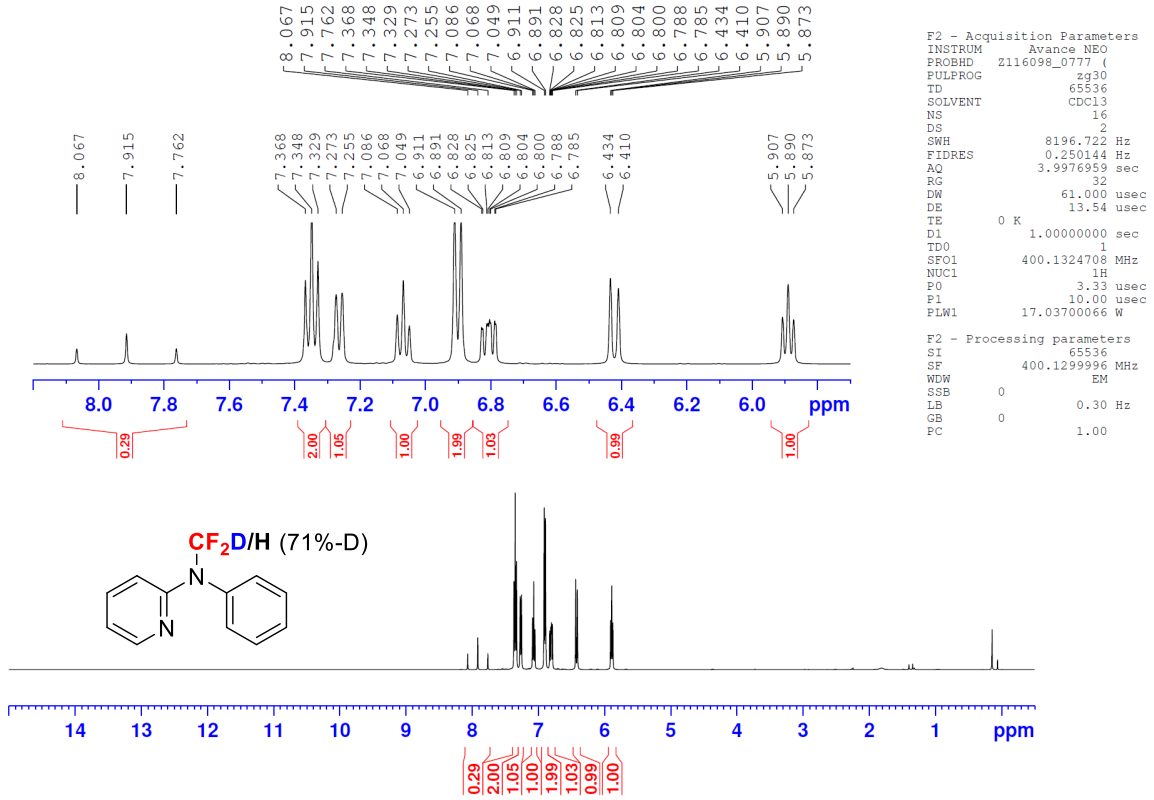
F2 - Processing parameters
SI                 65536
SF            376.4983660 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

10. ^{1}H spectra for D-labelling experiments

Addition of D_2O



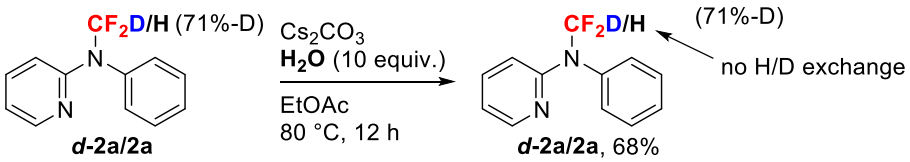
N-(Difluoromethyl-d)-N-phenylpyridin-2-amine & N-(Difluoromethyl)-N-phenylpyridin-2-amine 1H



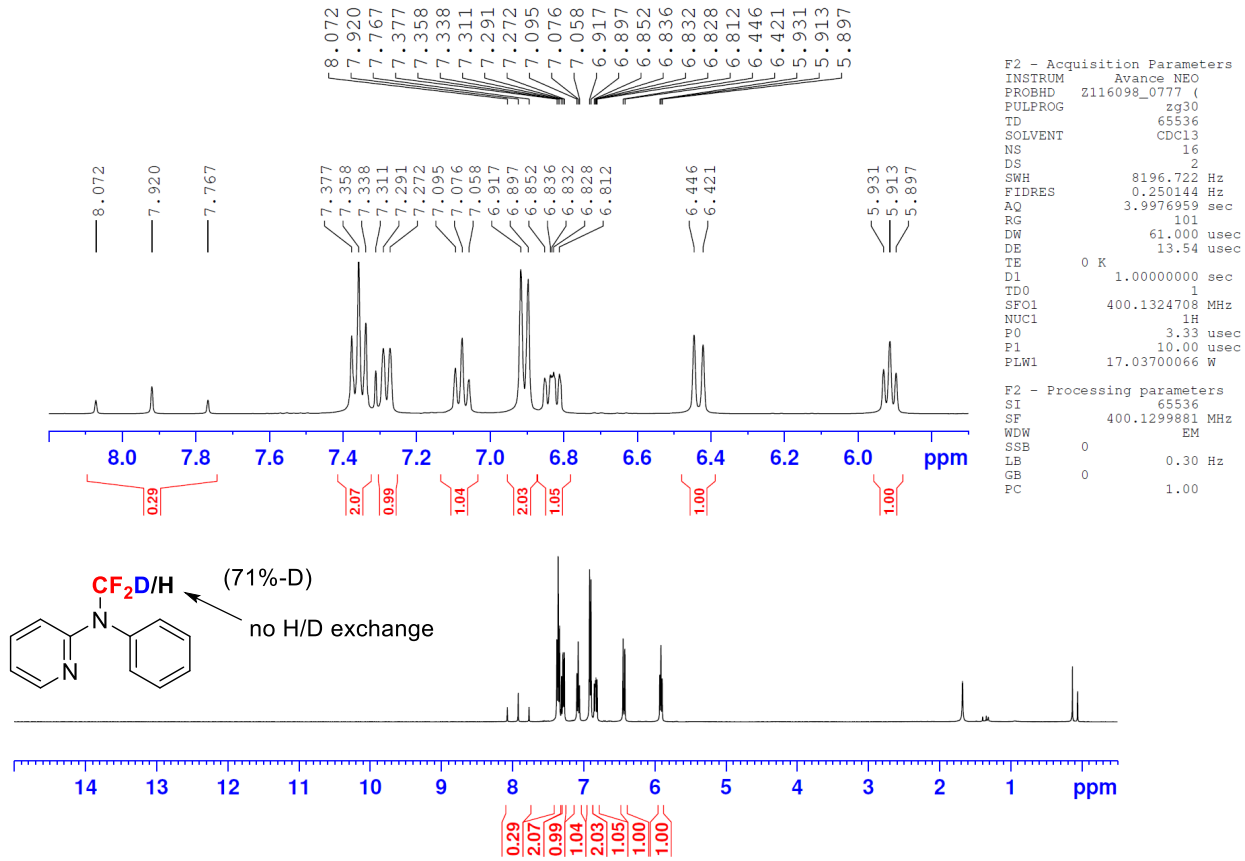

```
F2 - Acquisition Parameters
INSTRUM       Avance NEO
PROBHD   Z116098_0777 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8196.722 Hz
FIDRES          0.250144 Hz
AQ              3.9976959 sec
RG                    32
DW                61.000 usec
DE                13.54 usec
TE        0 K
D1          1.00000000 sec
TD0                    1
SFO1        400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1        17.03700066 W

F2 - Processing parameters
SI                 65536
SF          400.1299996 MHz
WDW                   EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

Addition of H_2O



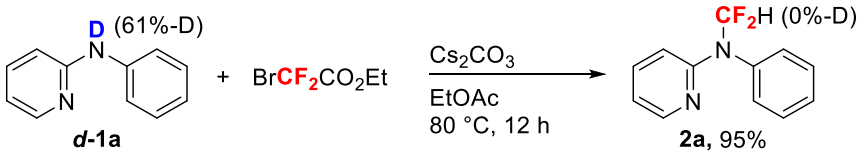
N-(Difluoromethyl-d)-N-phenylpyridin-2-amine & N-(Difluoromethyl)-N-phenylpyridin-2-amine 1H



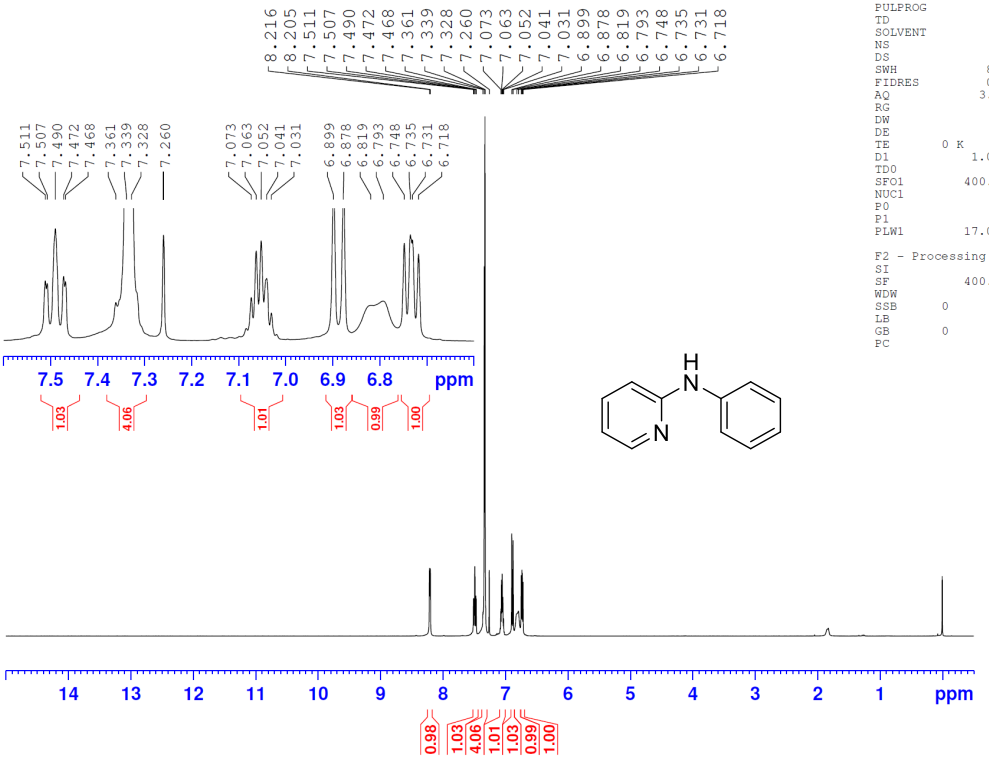

```
F2 - Acquisition Parameters
INSTRUM       Avance NEO
PROBHD    Z116098_0777 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8196.722 Hz
FIDRES          0.250144 Hz
AQ              3.9976959 sec
RG                   101
DW                61.000 usec
DE                13.54 usec
TE         0 K
D1          1.00000000 sec
TD0                    1
SFO1         400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1         17.03700066 W

F2 - Processing parameters
SI                 65536
SF           400.1299881 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

Investigation of proton source in difluoromethyl moiety



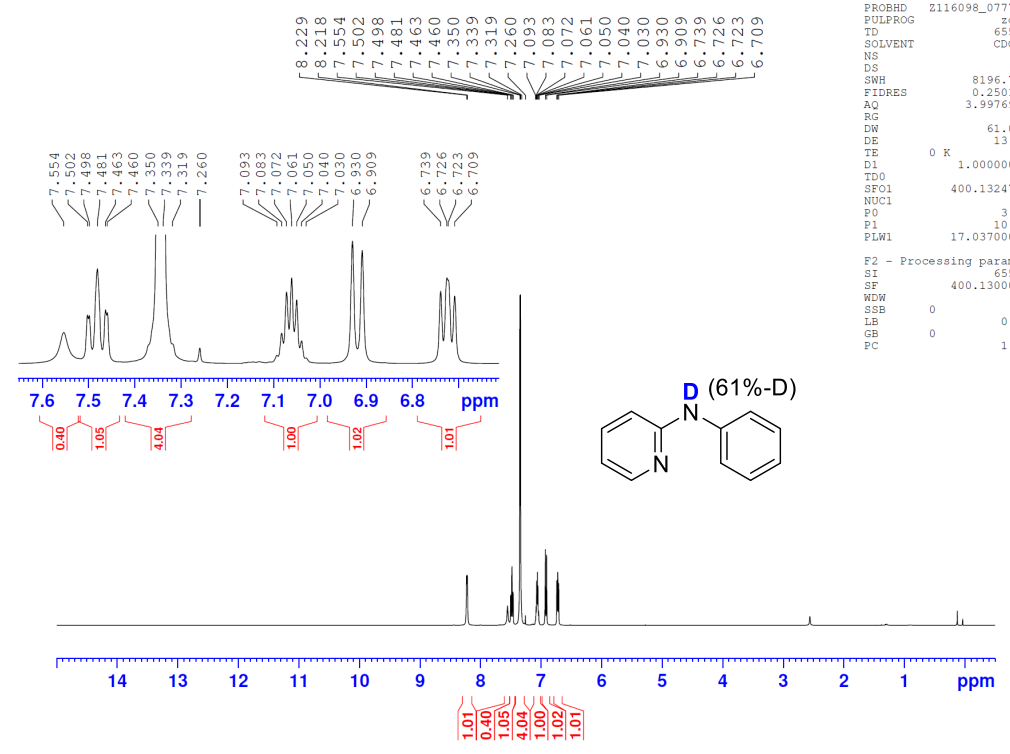
N-phenylpyridin-2-amine 1H




```
F2 - Acquisition Parameters
INSTRUM       Avance NEO
PROBHD    Z116098_0777 (
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         0 K
D1          1.00000000 sec
TD0                    1
SFO1         400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1         17.03700066 W

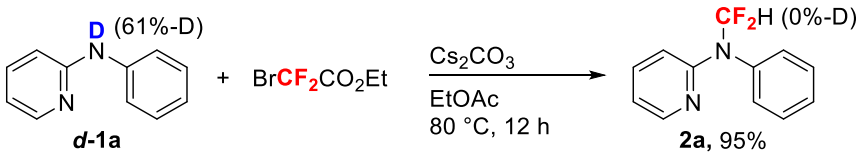
F2 - Processing parameters
SI                 65536
SF          400.1300086 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

N-Phenylpyridin-2-amine-d (61%D) 1H

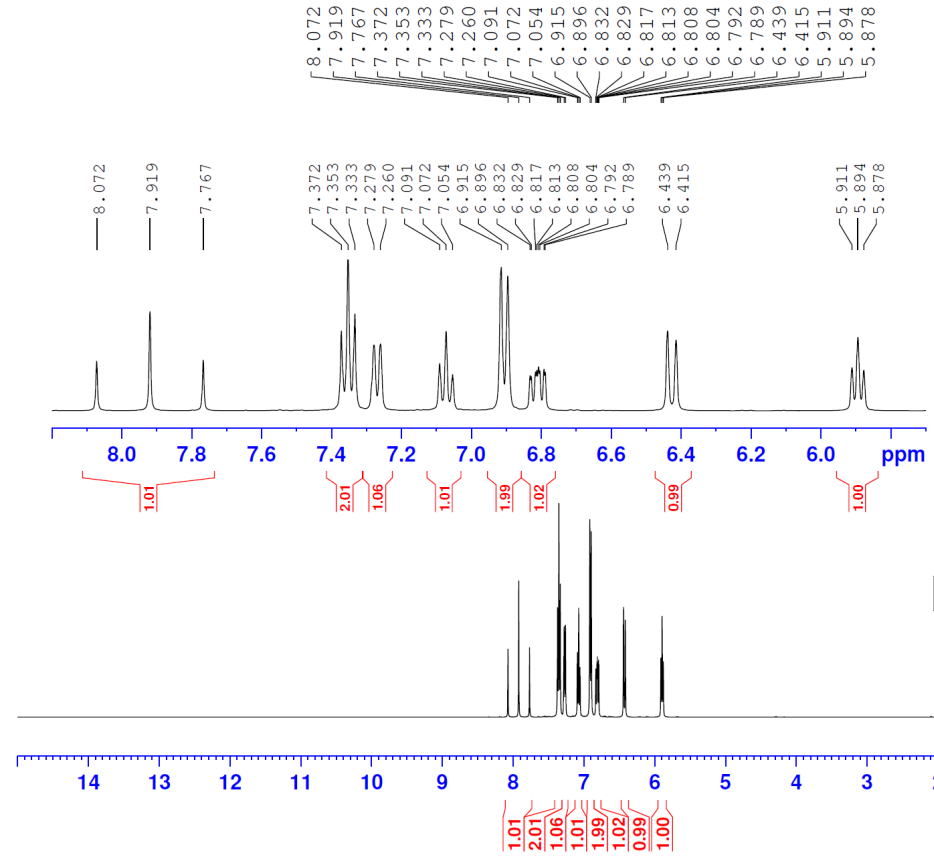



```
F2 - Acquisition Parameters
INSTRUM       Avance NEO
PROBHD    Z116098_0777 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8196.722 Hz
FIDRES          0.250144 Hz
AQ              3.9976959 sec
RG                    32
DW                61.000 usec
DE                13.54 usec
TE         0 K
D1          1.00000000 sec
TD0                    1
SFO1         400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1         17.03700066 W

F2 - Processing parameters
SI                 65536
SF          400.1300086 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```



N-(Difluoromethyl)-N-phenylpyridin-2-amine 1H




```
F2 - Acquisition Parameters
INSTRUM       Avance NEO
PROBHD    Z116098_0777 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8196.722 Hz
FIDRES          0.250144 Hz
AQ              3.9976959 sec
RG                    32
DW                61.000 usec
DE                13.54 usec
TE         0 K
D1           1.00000000 sec
TD0                    1
SFO1         400.1324708 MHz
NUC1                  1H
P0                 3.33 usec
P1                10.00 usec
PLW1         17.03700066 W

F2 - Processing parameters
SI                 65536
SF           400.1299980 MHz
WDW                   EM
SSB        0
LB                 0.30 Hz
GB         0
PC                 1.00
```

11. References

1 D. Wang, D. Kuang, F. Zhang, Y. Liu, and S. Ning, *Tetrahedron Lett*., 2014, **55**, 7121.

2 X. Huang, S. Xu, Q. Tan, M. Gao, M. Li, and B. Xu, *Chem. Commun*., 2014, **50**, 1465.