Supplementary Information

Palladaelectro-catalyzed *ortho*-C–H-monoarylation of 2-Phenylpyridines with arenediazonium salt

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1. General Considerations:

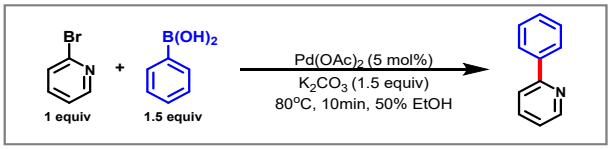
All the chemicals were purchased from Sigma Aldrich, Alfa Aesar, Spectrochem, and Sisco Research Laboratories Pvt. Ltd. Solvents were bought from Sisco Research Laboratories Pvt. Ltd. and used after distillation. Deuterated solvents were purchased from Sigma Aldrich. Silica gel (100–200 mesh) was used for column chromatography obtained from Finar. A mixture of petroleum ether and ethyl acetate was used as a gradient elution for column chromatography. Gradient elution was conducted using petroleum ether and ethyl acetate based on Merck aluminum TLC sheets (silica gel 60F254).

Catalytic reactions were performed in an undivided electrochemical cell. The electrochemical cell and platinum electrodes (5 mm × 15 mm × 0.25 mm, 99.9%) were obtained from SmartChemSynths Machine (OPC) Pvt. Ltd., Hyderabad. Graphite felt (GF) electrodes (10 mm × 15 mm × 6 mm) were connected using stainless steel 416 wire (Apex Surgined Company). Electrocatalysis and cyclic voltammetric studies were conducted using a potentiostat (PGSTAT204) from Metrohm Autolab. A divided H-cell and Nafion 117 membrane (thickness- 183 microm) both were purchased from Kanopy Techno Solutions Pvt. Ltd. Yields refer to isolated compounds. NMR spectra were recorded on a JEOL-400 spectrometer at MLSU Udaipur in $CDCl_3$ solvent. HRMS data were recorded using Agilent 6500 series Qtof HRMS at department of chemistry, IIT Bombay.

Chemical shifts (δ) are given in ppm, referenced to an internal TMS standard for 1H NMR (δ 7.26). Chemical shifts of 13C NMR are reported relative to CDCl3 (δ 77.00). The following abbreviations were used to describe peak splitting patterns when appropriate: s = singlet, d =doublet, t = triplet, q = quartet, m = multiplet.

2. General procedure for preparation of starting material synthesis:

2.1. General procedure for preparation of 2-phenylpyridine and its derivatives (GPPP)



A dry, screw-cap reaction tube charged with a magnetic stir bar, 0.5 mmol of 2-bromopyridine and 0.75 mmol of benzene boronic acid, 5 mol% of $Pd(OAc)_2$, 1.5 equivalents of K_2CO_3, and a solvent mixture of EtOH:H_2O (1:1). The reaction mixture was heated to 80°C and stirred at 1000 rpm overnight. After cooling to ambient temperature, the reaction mixture was subjected to sequential extracted with H_2O (3 × 20 ml) and EtOAc (3 × 10 mL). The organic layer obtained was desiccated over anhydrous Na_2SO_4, filtered, and the solvent was subsequently removed via rotary evaporation. The resulting crude product underwent purification via column chromatography on silica gel to yield the final product.[1]

2.2. General procedure for preparation of arene tetrafluoroborate salts (GPAT)

In a beaker, *p*-anisidine (50.0 mmol) was combined with tetrafluoroboric acid (20 mL) and deionized water (25 mL) in the presence of a magnetic stir bar. This mixture was placed in an ice bath to maintain a temperature range of 0-5°C and stirred for 15 minutes. Simultaneously, in a separate beaker, $NaNO_2$ (50 mmol) was dissolved in deionized water (10 mL). The $NaNO_2$

solution was added dropwise to *p*-anisidine solution while stirring at 700 rpm. After addition of $NaNO_2$, the mixture was stirred for an additional 30 minutes. The reaction mixture was then subjected to vacuum filtration. The resulting residue was dissolved in acetone (50 mL) and precipitated by the addition of diethyl ether (50 mL). The precipitate was collected via vacuum filtration to obtain the final compound.[2]

3. General procedure for electrochemical C-H arylation of 2-phenylpyridine (GPEA)

Electrocatalysis was conducted in a pre-dried, three-neck, undivided cell equipped with GF anode and Pt cathode. The cell was charged with substrate **1a** (0.10 mmol, 1.0 equiv.), substrate **2a** (0.25 mmol, 2.5 equiv.), $Pd(OAc)_2$ (2.24 mg, 10 mol %), K_2HPO_4 (43.5 mg, 2.0 equiv.), $n$$Bu_4NBF_4$ (33 mg, 2.0 equiv.) and in MeOH (10 mL). Electrocatalysis was performed at 80 °C with a constant current of 0.6 mA and stirring at 500 rpm for 18 h. After cooling to ambient temperature, the reaction mixture was diluted with EtOAc (5.0 mL). The GF anode was washed with EtOAc (3 × 10 mL) in an ultrasonic bath, and the washings were added to the reaction mixture. The resulting mixture was filtered through Celite to remove palladium catalysts and transferred to a separating funnel with 60 mL water. The mixture was extracted with EtOAc (3 × 10 mL), and the combined organic phases were dried over Na_2SO_4, and filtered. The solvent was removed in rotary evaporator. The crude product was purified by column chromatography on silica gel to yield the products.

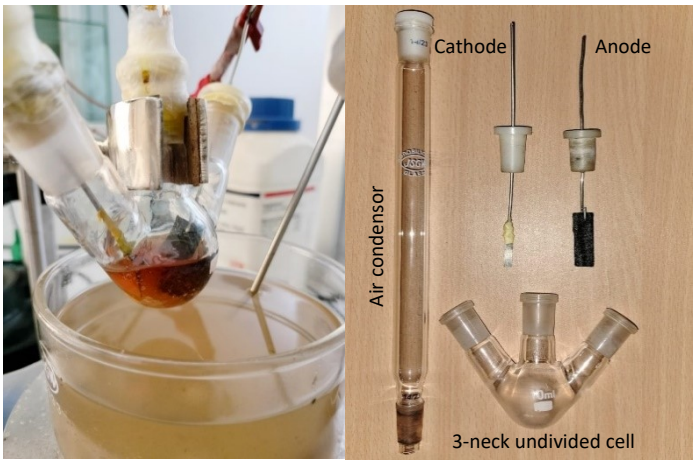
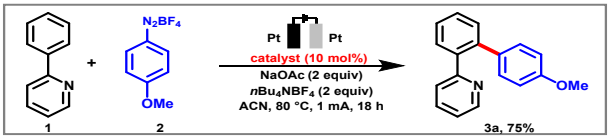


Figure 1: General reaction setup

4. Optimization of the Reaction Conditions

4.1. Optimization of catalyst

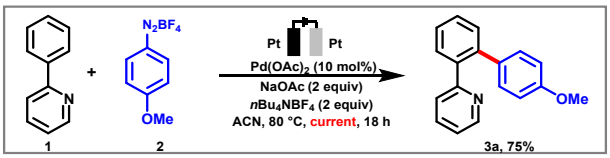


S.No.	Catalyst	Yield(%)
1.	---	n.r.

2.	$Pd(OAc)_2$	69%
3.	$PdSO_4$	n.r.
4.	$PdCl_2$	n.r.
5.	PdO	n.r.
6.	$Pd_2(dba)_3$	45%
7.	$Pd(TFA)_2$	68%
8.	$PdCl_2(PPh_3)_2$	n.r.

The optimization of different catalysts in a reaction is summarized in Table S1, along with the corresponding yields. Among the catalysts tested, $Pd(OAc)_2$ and $Pd(TFA)_2$ achieved the highest yields, at 69% and 68%, respectively. In contrast, $Pd_2(dba)_3$ gave a lower result of 45%. Other catalysts such as $PdSO_4$, $PdCl_2$, PdO, and $PdCl_2(PPh_3)_2$ showed no activity. Overall, this optimization study highlighted $Pd(OAc)_2$ and $Pd(TFA)_2$ as the most effective catalysts.

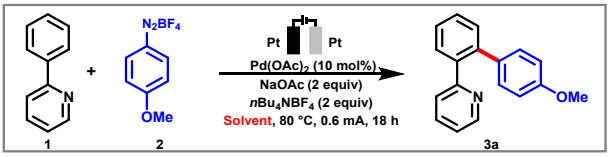
4.2. Optimization of current



S.No.	Current	Yield (%)
1.	---	n.r.
2.	0.2mA	20%
3.	0.4mA	60%
4.	0.5mA	62%
5.	0.6mA	69%
6.	0.8mA	60%
7.	1mA	65%
8.	1.5mA	64%
9.	2mA	n.r.
10.	4mA	n.r.
11.	5mA	n.r.
12.	6mA	n.r.
13.	7mA	n.r.
14.	8mA	n.r.

The optimization of current in relation to their yields in a reaction is summarized in Table S2. The findings reveal a distinct pattern: the yield increases as the current rises from 0.2 mA to 0.6 mA, reaching a maximum of 69% at 0.6 mA. Beyond this point, the yields decline slightly, with 1.0 mA yielding 65% and 1.5 mA producing 65%. A threshold appears to exist beyond which higher current does not improve the yield, as indicated by no results (n.r.) being reported at 2 mA and above. At the lowest current of 0.2 mA, only a trace yield was observed. Overall, 0.6 mA is identified as the optimal current for achieving the highest yield.

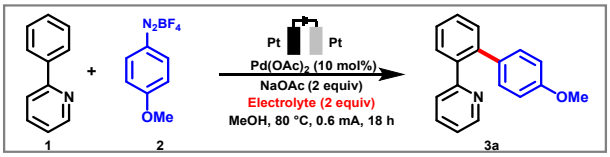
4.3. Optimization of solvent



S.No.	Solvent	Yield(%)
1.	ACN	45%
2.	ACN:HFIP(9:1)	n.r.
3.	ACN:HFIP(5:5)	n.r.
4.	DMSO	n.r.
5.	DMF	22%
6.	Acetone	n.r.
7.	AcOH	n.r.
8.	AcOH:$(Ac)_2O$ (1:1)	n.r.
9.	Isopropanol	n.r.
10.	Ethanol	n.r.
11.	t-Butanol	n.r.
12.	C_6H_6	n.r.
13.	Toluene	n.r.
14.	C_6H_6	n.r.
15.	Dioxane	n.r.
16.	MeOH	70%
17.	MeOH:H_2O (1:1)	n.r.

The optimization of various solvents and their corresponding yields in a reaction is summarized in Table S3. Methanol (MeOH) yielded the highest result among the solvents tested, achieving 70%. Dimethylformamide (DMF) produced a significantly lower yield of 22%, while acetonitrile (ACN) gave a moderate yield of 45%. Most other solvents, including combinations such as ACN:HFIP and other polar and non-polar solvents, showed no results (n.r.). These findings indicate that MeOH outperforms the other tested solvents by a substantial margin, making it as the most effective solvent for this process.

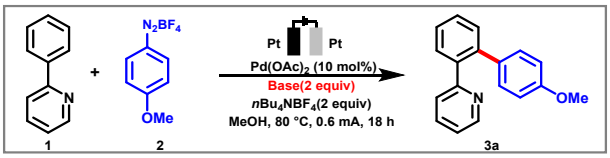
4.4. Optimization of electrolyte



S.No.	Electrolyte	Yield (%)
1.	Lithium perchlorate	50%
2.	Tetrabutylammonium perchlorate	63%
3.	Tetrabutylhexafluorophosphate	Trace
4.	Sodium perchlorate monohydrate	Trace
5.	Tetrabutylammonium tetrafluoroborate	70%

The optimization of various electrolytes and their corresponding yield percentages is summarized in Table S4. Among the tested electrolytes, tetrabutylammonium tetrafluoroborate achieved the highest yield at 70%, followed by tetrabutylammonium perchlorate, which produced a yield of 63%. Tetrabutylhexafluorophosphate and sodium perchlorate monohydrate generated only trace amounts, indicating negligible yields. Lithium perchlorate, on the other hand, provided a moderate yield of 50%.

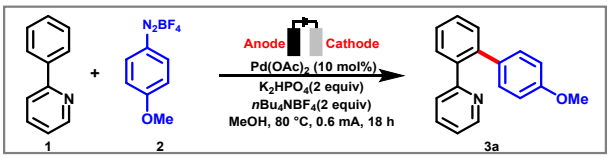
4.5. Optimization of base



S.No.	Base	Yield(%)
1.	NaOAc	30%
2.	C_6H_5COONa	25%
3.	NaH_2PO_4	50%
4.	NaH_2PO_4. $2H_2O$	55%
5.	$NaH_2PO_4.H_2O$	Trace
6.	NaF	Trace
7.	Na_2CO_3	20%
8.	Cs_2CO_3	n.r.
9.	CH_3COOK	40%
10.	KH_2PO_4	62%
11.	K_2HPO_4	69%
12.	KPF_6	Trace
13.	CsF	n.r.
14.	NaOPiv	n.r.
15.	KOPiv	n.r.

The optimization of different bases and their corresponding yields is summarized in Table S5. The highest yield, 69%, was obtained using K_2HPO_4, followed by KH_2PO_4 (62%) and $NaH_2PO_4{\cdot}2H_2O$ (55%). Other bases, such as NaH_2PO_4 and CH_3COOK, yielded 50% and 40%, respectively. Bases including $NaH_2PO_4.H_2O$, NaF, KPF_6, and others produced only trace amounts or no yield. These results highlight the importance of carefully selecting bases to maximize yield and efficiency in chemical processes.

4.6. Optimization of electrodes



S.No.	Anode	Cathode	Yield(%)
1.	Pt	Pt	69 %
2.	RVC	Pt	32%
3.	RVC	RVC	n.r.
4.	C cloth	Pt	trace

5.	Gf rod	Pt	n.r.
6.	Graphite plate	Pt	n.r.
7.	GF	Pt	75%
8.	Pt	GF	22%
9.	Graphite plate	Graphite rod	n.r.
* Graphite felt – GF * Platinum - Pt			

The optimization of electrode materials, with various anode and cathode combinations, is presented in Table S6 along with the corresponding yield percentages. Using GF felt as the anode and platinum as the cathode produced the highest yield of 75%. In contrast, platinum electrodes used as both the anode and cathode resulted 69%. The combination of RVC as the anode and platinum as the cathode produced a moderate yield of 32%. No yields were observed for other combinations, including RVC/RVC, carbon cloth/platinum, GF rod/platinum, GF plate/platinum, and GF plate/GF rod. Notably, using platinum as the anode and GF felt as the cathode yielded 22%. These findings emphasize the critical role of electrode material selection in determining reaction outcomes, with GF felt showing significant potential for enhancing product yield, whereas other materials resulted in negligible or no product formation.

4.7. Optimization of Temperature

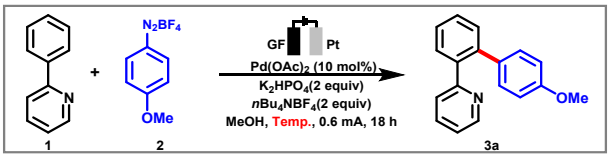
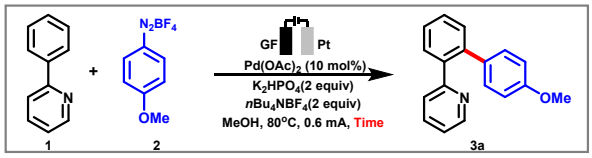


Table S7. Optimization of temperature		
S.No.	Temperature	Yield(%)
1.	R.T.	n.r.
2.	60°C	Trace
3.	70°C	62%
4.	80°C	75%
5.	90°C	73%
6.	100°C	72%

In the context of Table S7, the optimization of temperature revels that 80°C is the optimal temperature for achieving the highest yield (75%). This suggests that the reaction benefits from increased temperature but does not require excessively high heat. Temperatures above 80°C, such as 90°C and 100°C, resulted in slightly lower yields, possibly due to reduced efficiency or the occurrence of side reactions. Additionally, the reaction did not proceed at room temperature, and at 60°C the reaction produced trace amount of product. Thus, 80°C can be classified as a moderately high temperature, suitable for maximizing yield without extreme conditions.

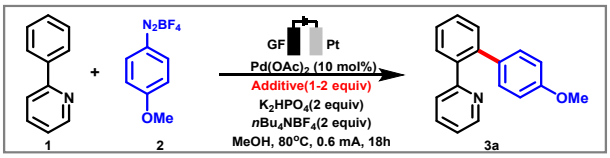
4.8. Optimization of Time



S.No.	Time(h)	Yield(%)
1.	3 h	n.r.
2.	5 h	25%
3.	7 h	40%
4.	10 h	50%
5.	18 h	75%
6.	24 h	75%

Table S8 summarizes optimization reaction time. This revels that as reaction time increases, product yields increased as well: from no reaction at 3 hours to 25% at 5 hours, 40% at 7 hours, 50% at 10 hours, and a plateau of 75% at 18 and 24 hours. This indicates a time-dependent improvement in product formation, with optimal yields achieved after extended reaction periods, highlighting the importance of reaction duration in controlling the outcome of these electrochemical processes.

4.9. Optimization of additives

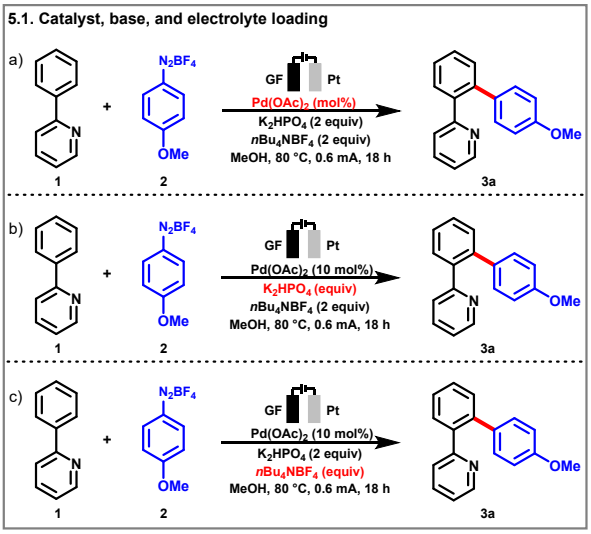


S.No.	Additives	Result
1.	BQ (2 equiv)	35%
2.	KI (1 equiv)	n.r.
3.	I_2 (1 equiv)	24%
4.	Pivalic acid (1 equiv)	n.r.
5.	1,4-Naphthoquinone	30%
6.	Adamantane	n.r.
7.	AgF (1 equiv)	n.r.
8.	AgOAc (1 equiv)	n.r.
9.	Ag_2CO_3 (1 equiv)	n.r.
10.	---	75%

The optimization of impact of various additives is presented in Table S9 along with the corresponding yield percentages. The data shows that BQ resulted in a yield of only 35%, while KI, I_2, pivalic acid, and several silver salts (AgF, AgOAc, and Ag_2CO_3) either failed to initiate a reaction or produced extremely low yields. Notably, the reaction performed best in the absence of additives, achieving a 75% yield.

5. Control experiments

5.1. Catalyst, base, and electrolyte loading

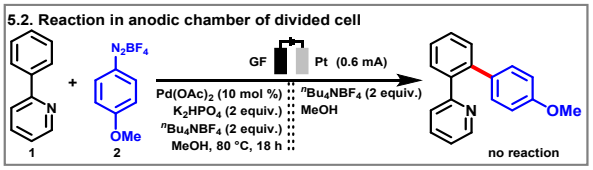


In the controlled experiments, we tested various loadings of the catalyst, base, and electrolyte individually under optimized reaction conditions. The first optimization focused on catalyst loading. Varying the amount of $Pd(OAc)_2$ to 5 mol% resulted in a negative impact on yield, while increasing it to 15 mol% or 20 mol% showed no significant improvement. A catalyst loading of 10 mol% $Pd(OAc)_2$ demonstrated evident catalytic activity under this reaction protocol.

Next, base loading was optimized. Using 0.05 mmol K_2HPO_4 resulted in no reaction, while 0.1 mmol yielded only trace amounts of the product, indicating that an increased base loading was required. Base concentrations of 0.15 mmol to 0.2 mmol K_2HPO_4 improved the isolated product yield from 50% to 75%, respectively. Thus, 0.2 mmol (2 equiv.) of base loading found to be suitable for maximizing yield.

Electrolyte loading optimization showed similar trends. Lower yields were observed with 0.05 mmol to 0.15 mmol of electrolyte. A significant improvement was achieved at 0.2 mmol of n-Bu_4NBF_4, yielding 75% of the isolated product. These results demonstrate that the precise amounts of catalyst, base, and electrolyte are critical for obtaining the desired product in good yield.

5.2. Reaction in anodic chamber of divided cell

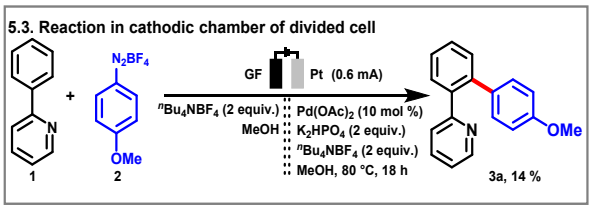


Electrocatalysis was conducted in a pre-dried H-cell separated by a Nafion membrane. The cell was equipped with a GF anode in the anodic chamber and a Pt cathode in the cathodic chamber, both attached to stainless steel wires (Figure 2a). The anodic chamber contained substrate 1a (0.10 mmol, 1.0 equiv.), substrate 2a (0.25 mmol, 2.5 equiv.), $Pd(OAc)_2$ (2.24 mg, 10 mol%), K_2HPO_4 (43.5 mg, 2.0 equiv.), and n-Bu_4NBF_4 (33 mg, 2.0 equiv.) in 10 mL of MeOH. The cathodic chamber contained n-Bu_4NBF_4 (33 mg, 2.0 equiv.) dissolved in 10 mL of MeOH.

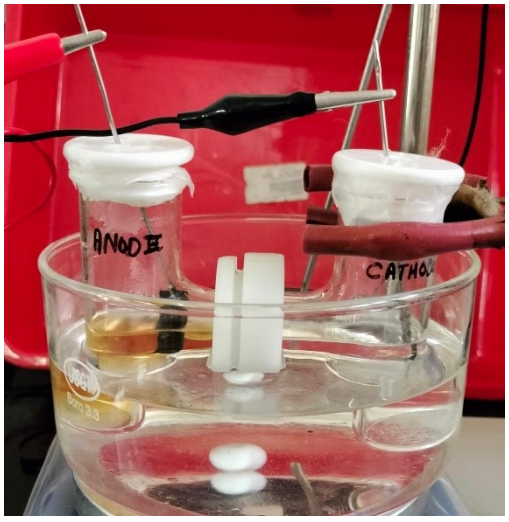
Electrocatalysis was carried out at 80 °C with a constant current of 0.6 mA and a stirring rate of 500 rpm for 18 hours. After the reaction, the crude product was purified by column chromatography on silica gel to yield the final product.

This reaction led to no product formation. This is because the reduction of arenediazonium tetrafluoroborate salts does not occur in the anodic chamber of a divided cell. This observation provides further insight into the reaction mechanism, suggesting that the cathodic reduction of arenediazonium salts generates an aryl free radical, which subsequently arylates the substrate.

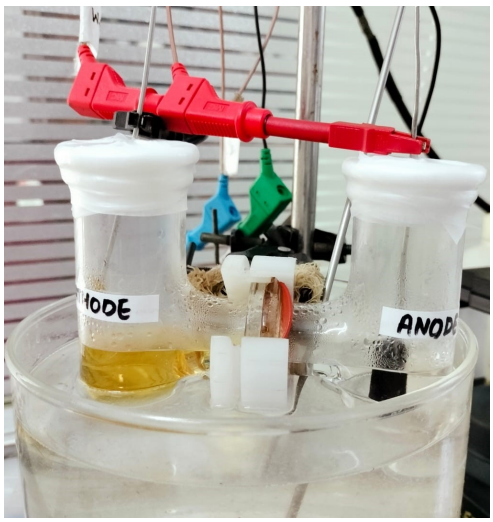
5.3. Reaction in cathodic chamber of divided cell



Electrocatalysis was conducted in a pre-dried H-cell separated by a Nafion membrane. The cell was equipped with a GF anode in the anodic chamber and a Pt cathode in the cathodic chamber, both attached to stainless steel wires (Figure 2b). The cathodic chamber contained substrate 1a (0.10 mmol, 1.0 equiv.), substrate 2a (0.25 mmol, 2.5 equiv.), $Pd(OAc)_2$ (2.24 mg, 10 mol%), K_2HPO_4 (43.5 mg, 2.0 equiv.), and n-Bu_4NBF_4 (33 mg, 2.0 equiv.) in 10 mL of MeOH. The anodic chamber contained n-Bu_4NBF_4 (33 mg, 2.0 equiv.) dissolved in 10 mL of MeOH. Electrocatalysis was carried out at 80 °C with a constant current of 0.6 mA and a stirring rate of 500 rpm for 18 hours. After the reaction, the crude product was purified by column chromatography on silica gel to yield the final product. This reaction led to 14% product formation. This is because the oxidation of the palladium catalyst does not occur in the cathodic chamber of a divided cell. This observation provides further insight into the reaction mechanism, suggesting that anodic oxidation of the palladium catalyst is necessary to regenerate the active catalyst.



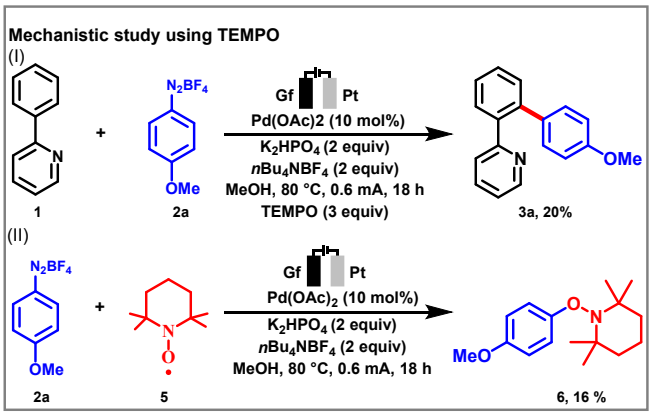
a) Reaction in anodic chamber



b) Reaction in cathodic chamber

Figure 2: Control experiment in divided cell

5.4. Mechanistic study using TEMPO



Under standard conditions, electrocatalysis was performed with TEMPO (0.3 mmol, 3 equiv.), resulting in a lower yield of approximately 20%. Similar to the first reaction, TEMPO acted as a radical scavenger, capturing the aryl radical formed from the cathodic reduction of the diazonium salt. This radical scavenging significantly reduced the product yield.[3]

5.5. Cyclic voltammetric studies

All cyclic voltammetric (CV) studies were performed in a pre-dried 100 mL cell equipped with a platinum disc as the working electrode, a platinum wire as the counter electrode, and an Ag/AgCl electrode as the reference electrode at a scan rate of 0.1 Vs^{-1}.

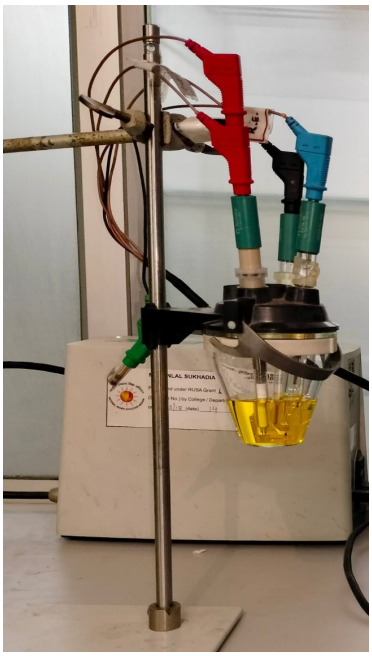


Figure 3: Cyclic Voltammetry setup

First, substrate 1a was tested, and no distinct oxidation or reduction peaks were observed (Fig. 1, blue line), indicating that this substrate is challenging to activate directly. An oxidation-reduction pair appeared at 0.1904 V and -0.6152 V in the CV of $Pd(OAc)_2$ with 1a (Fig. 1, red line), indicating the redox behaviour of palladium. However, $Pd(OAc)_2$ alone (Fig. 1, brown line) displayed only reduction peaks at -0.4565 V. Additionally, diazonium salt 2a exhibited an irreversible reduction peak at -0.3906 V (Fig. 1, yellow line), suggesting the reduction of 2a to a phenyl radical. In the presence of $Pd(OAc)_2$, 2a again showed two reduction peaks (Fig. 1, green line), attributed to the reduction of both 2a and $Pd(OAc)_2$. Finally, a CV experiment with 1a, 2a, base, and $Pd(OAc)_2$ revealed two reduction and one oxidation peak, suggesting the reduction of 2a and $Pd(OAc)_2$ and an oxidation peak corresponding to the Pd(0) to Pd(II) transition (Fig. 1, purple line). In the palladium redox system, the cathodic peak current was significantly lower than the oxidation peak, being suggestive of the current regenerating the catalytically active palladium species.

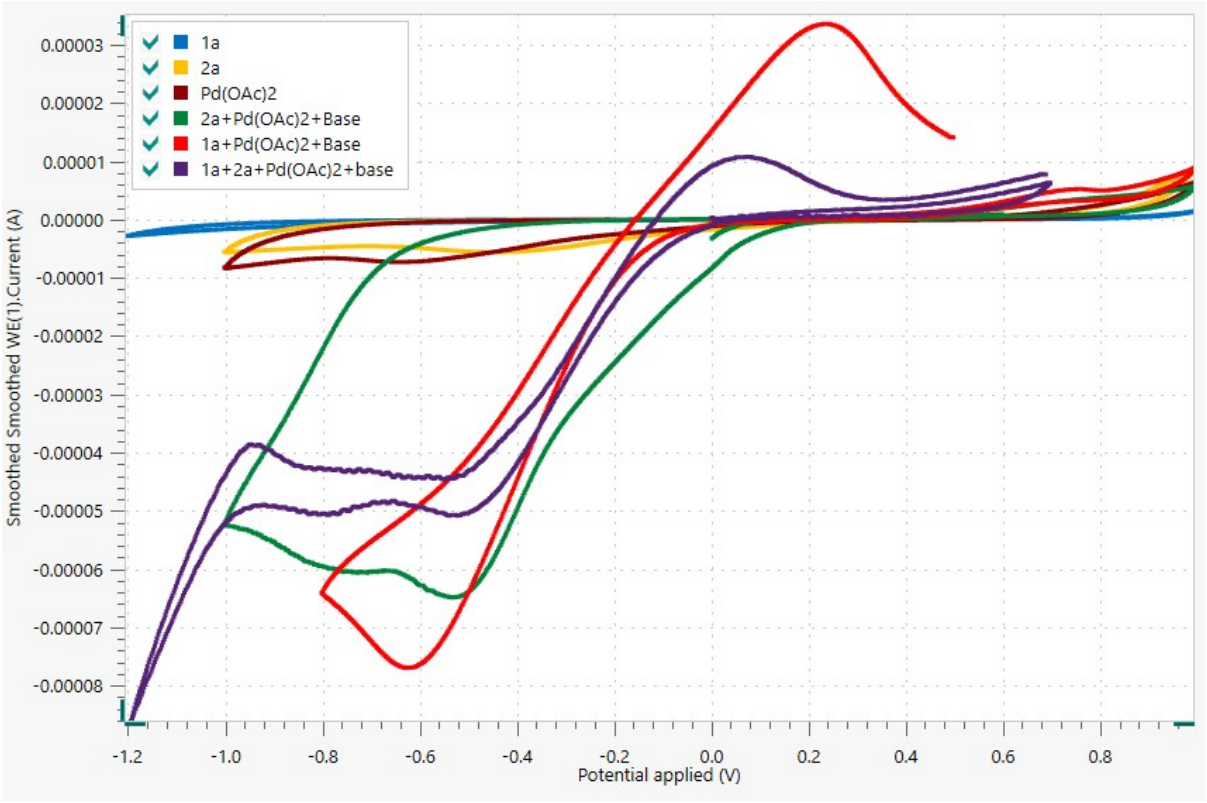
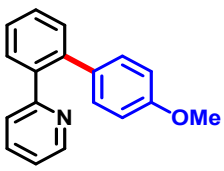


Figure 4: Cyclic Voltammetry analysis

6. Characterization data of C-H arylation products:



2-(4'-methoxy-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3a)[4]

C-H arylation was carried out by following the general procedure GPEA.

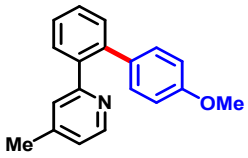
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow liquid.

Isolated yield: 75%

Molecular weight: 261.32 g/ mol

H^1 NMR (400 MHz): δ 8.64 (d, *J* = 4.1 Hz), 7.67 (dd, *J* = 6.0, 3.5 Hz), 7.43 (dd, *J* = 5.4, 3.5 Hz), 7.07 (d, *J* = 8.8 Hz), 6.90 (d, *J* = 7.9 Hz), 6.77 (d, *J* = 8.8 Hz), 3.78 (s).
C^{13} NMR (100 MHz): δ 159.51 (s), 158.58 (s), 149.50 (s), 140.26 (s), 139.40 (s), 135.36 (s), 133.76 (s), 130.85 (s), 130.54 (d, *J* = 5.2 Hz), 128.62 (s), 127.40 (s), 125.53 (s), 121.38 (s), 113.61 (s), 55.28 (s).



2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3b)[5]

C-H arylation was carried out following the general procedure (GPEA).

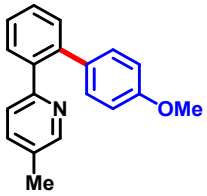
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow liquid.

Isolated yield: 69%

Molecular weight: 275.25 g/mol

H^1 NMR (400 MHz) δ 8.47 (d, *J* = 5.8 Hz), 7.62 (s), 7.52 – 7.31 (m), 7.06 (d, *J* = 9.1 Hz), 6.96 (s), 6.77 (d, *J* = 9.0 Hz), 3.78 (s), 2.13 (s).
C^{13} NMR (100 MHz) δ 158.54 (s), 144.75 (s), 143.90 (s), 140.26 (d, *J* = 8.8 Hz), 133.73 (s), 130.81 (s), 130.53 (d, *J* = 3.3 Hz), 128.68 (s), 127.35 (s), 126.52 (s), 122.62 (s), 113.55 (s), 55.33 (s), 29.81 (s), 21.15 (s).



2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3c)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

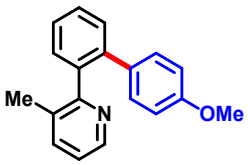
Appearance: Sticky brown liquid.

Isolated yield: 66%

Molecular weight: 275.35 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{19}H_{17}NO$: 276.1344, found: 276.1398.

H^1 NMR (400 MHz) δ 8.46 (dd, *J* = 16.6, 6.0 Hz), 7.70 – 7.63 (m), 7.51 – 7.34 (m), 7.10 – 7.02 (m), 6.91 – 6.67 (m), 3.78 (s), 2.33 – 2.28 (m).
C^{13} NMR (100 MHz) δ 158.52 (s), 156.62 (s), 149.83 (s), 140.19 (s), 139.24 (d, *J* = 17.9 Hz), 136.07 (s), 133.95 (s), 130.65 (dd, *J* = 25.9, 7.8 Hz), 129.87 (s), 128.38 (s), 127.96 (s), 127.37 (s), 124.94 (s), 113.80 (s), 113.58 (s), 55.28 (s), 18.24 (s).



2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-3-methylpyridine (Scheme 2, 3d)

C-H arylation was carried out by following the general procedure GPEA.

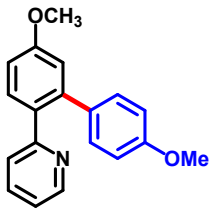
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky brown liquid.

Isolated yield: 15%

Molecular weight: 275.35 g/ mol

H^1 NMR (400 MHz,) δ 8.67 (d, *J* = 5.3 Hz), 7.66 (s), 7.60 – 7.30 (m), 7.10 (t, *J* = 20.4 Hz), 6.91 (d, *J* = 8.3 Hz), 6.76 (d, *J* = 9.0 Hz), 3.77 (s), 2.00 (s).



2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3g)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Yellow solid.

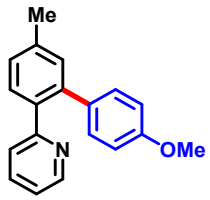
Isolated yield: 69%

Molecular weight: 291.35 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{19}H_{17}NO_2$: 291.1259, found: 291.1269.

H^1 NMR (400 MHz,) δ 8.67 – 8.59 (m), 7.93 (d, *J* = 9.1 Hz), 7.64 (d, *J* = 1.2 Hz), 7.20 – 7.10 (m), 7.05 – 6.88 (m), 3.82 (s).

C^{13} NMR (100 MHz,) δ 160.51 (s), 157.16 (s), 149.61 (s), 136.80 (s), 132.07 (s), 128.37 – 128.14 (m), 121.53 (s), 119.93 (s), 114.31 – 114.05 (m), 55.43 (s).



2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3h)[6]

C-H arylation was carried out by following the general procedure GPEA.

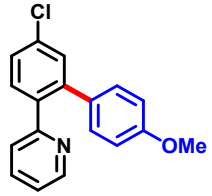
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow liquid.

Isolated yield: 68%

Molecular weight: 275.35 g/ mol

H^1 NMR (400 MHz,) δ 8.62 (d, *J* = 8.1 Hz), 7.58 (d, *J* = 7.9 Hz), 7.39 (d, *J* = 2.1 Hz), 7.22 (s), 7.06 (d, *J* = 9.0 Hz), 6.86 (d, *J* = 8.0 Hz), 6.76 (d, *J* = 9.0 Hz), 3.77 (s), 2.42 (s).
C^{13} NMR (100 MHz,) δ 158.56 (s), 155.02 (s), 149.16 (s), 140.12 (s), 139.08 (s), 138.61 (s), 135.58 (s), 133.83 (s), 131.30 (s), 130.83 (s), 130.60 (s), 128.22 (s), 125.69 (s), 121.27 (s), 113.60 (s), 55.29 (s), 21.36 (s).



2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3i)[8]

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

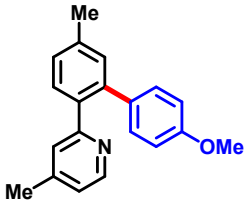
Appearance: Sticky yellow liquid.

Isolated yield: 55%

Molecular weight: 295.77 g/ mol

H^1 NMR (400 MHz) δ 8.66 (dd, *J* = 4.9, 3.3 Hz), 7.67 (d, *J* = 0.8 Hz), 7.45 (dd, *J* = 6.1, 4.0 Hz), 7.13 (ddd, *J* = 7.6, 4.9, 1.5 Hz), 7.08 (d, *J* = 9.0 Hz), 6.91 (d, *J* = 7.9 Hz), 6.78 (d, *J* = 9.0 Hz), 3.79 (s).

C^{13} NMR (100 MHz) δ 159.33 (s), 158.59 (s), 149.27 (s), 140.28 (s), 135.63 (s), 133.67 (s), 130.86 (s), 130.58 (d, *J* = 5.2 Hz), 128.74 (s), 127.44 (s), 125.67 (s), 121.49 (s), 113.62 (s), 55.29 (s).



2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3l)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow liquid.

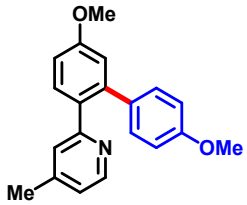
Isolated yield: 72%

Molecular weight: 289.38 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{20}H_{19}NO$: 289.1467, found: 289.1471.

H^1 NMR (400 MHz) δ 8.48 (d, *J* = 6.4 Hz), 7.63 (s), 7.43 (d, *J* = 7.3 Hz), 7.23 (s), 7.08 (d, *J* = 10.8 Hz), 6.95 (s), 6.86 – 6.66 (m), 3.79 (s), 2.44 (s), 2.13 (s).

C^{13} NMR (100 MHz) δ 158.50 (s), 131.26 (s), 130.79 (d, *J* = 3.2 Hz), 130.51 (d, *J* = 4.7 Hz), 128.12 (s), 127.32 (s), 126.41 (s), 124.09 (s), 122.46 (d, *J* = 14.1 Hz), 113.53 (s), 55.54 (d, *J* = 41.4 Hz), 55.30 – 55.23 (m), 45.40 (s), 42.55 (s), 21.36 (s), 21.14 (s).



2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3m)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

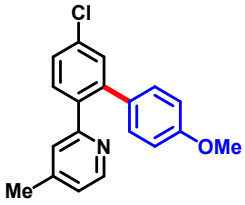
Appearance: Sticky brown liquid.

Isolated yield: 20%

Molecular weight: 305.38 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{20}H_{19}NO_2$: 306.1486, found: 306.1486.

H^1 NMR (400 MHz) δ 8.27 (s), 7.06 (d, *J* = 9.0 Hz), 6.92 (s), 6.70 (d, *J* = 9.0 Hz), 3.74 (s), 2.18 (s).



2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3n)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

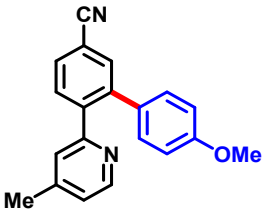
Appearance: Sticky white liquid.

Isolated yield: 57%

Molecular weight: 309.79 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{19}H_{16}ClNO$: 309.0934, found: 309.0920.

H^1 NMR (400 MHz) δ 8.45 (s), 7.57 (s), 7.38 (d, *J* = 7.7 Hz), 7.04 (d, *J* = 8.9 Hz), 6.95 (s), 6.77 (d, *J* = 8.9 Hz), 6.71 (d, *J* = 1.9 Hz), 3.78 (s), 2.13 (s).
C^{13} NMR (100 MHz) δ 158.98 (s), 158.23 (s), 149.40 (s), 141.91 (s), 135.75 (s), 134.49 (s), 132.37 (s), 132.02 (s), 130.74 (s), 130.37 (s), 127.45 (s), 125.56 (s), 121.76 (s), 120.50 (s), 113.79 (s), 95.76 (s), 55.32 (s).



4'-methoxy-6-(4-methylpyridin-2-yl)-[1,1'-biphenyl]-3-carbonitrile (Scheme 2, 3o)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

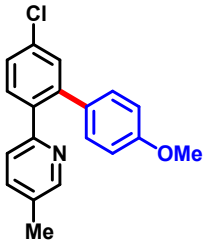
Appearance: white solid.

Isolated yield: 70%

Molecular weight: 300.36 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{20}H_{16}N_2O$: 323.1151, found: 323.1151.

H^1 NMR (400 MHz) δ 8.49 (d, *J* = 6.0 Hz), 7.72 (dd, *J* = 18.9, 1.1 Hz), 7.03 (d, *J* = 9.0 Hz), 6.79 (d, *J* = 9.0 Hz), 3.79 (s), 2.15 (s).
C^{13} NMR (100 MHz) δ 159.26 (s), 149.17 (s), 141.49 (s), 136.73 (s), 134.12 (s), 131.47 (d, *J* = 5.7 Hz), 130.64 (d, *J* = 3.6 Hz), 126.28 (s), 123.51 (s), 118.86 (s), 113.95 (s), 112.38 (s), 55.38 (s), 21.16 (s).



2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3p)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

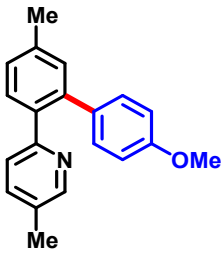
Appearance: Sticky brown liquid.

Isolated yield: 56%

Molecular weight: 309.79 g/ mol

HRMS (*m*/*z*): $[M + Na]^+$ calcd for $C_{19}H_{16}ClNO$: 310.9986, found: 310.9986.

H^1 NMR (400 MHz) δ 8.45 (s), 7.58 (d, *J* = 8.9 Hz), 7.42 – 7.34 (m), 7.24 – 7.18 (m), 7.04 (d, *J* = 9.0 Hz), 6.75 (dd, *J* = 15.7, 8.5 Hz), 3.77 (s), 2.28 (s).
C^{13} NMR (100 MHz) δ 158.92 (s), 155.43 (s), 149.84 (s), 141.82 (s), 137.61 (s), 136.30 (s), 134.15 (s), 132.59 (s), 131.97 (s), 131.19 (s), 130.71 (s), 130.31 (s), 127.37 (s), 124.91 (s), 113.76 (s), 55.30 (s), 18.25 (s).



2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3q)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

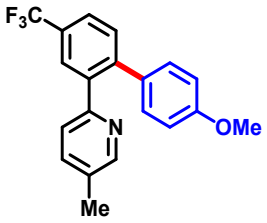
Appearance: Sticky brown liquid.

Isolated yield: 58%

Molecular weight: 289.38 g/ mol

H^1 NMR (400 MHz,) δ 8.52 (d, *J* = 4.0 Hz), 7.68 (s), 7.60 (s), 7.54 (s), 7.19 (s), 7.05 (d, *J* = 9.0 Hz), 6.94 – 6.83 (m), 6.82 – 6.62 (m), 3.83 (s), 2.39 (s), 2.35 (s).

C^{13} NMR (100 MHz,) δ 142.56 (s), 141.35 (s), 131.27 (s), 130.83 (d, *J* = 5.8 Hz), 129.45 (s), 128.19 (s), 124.73 (s), 123.48 (s), 121.89 (s), 121.13 (s), 116.83 (s), 116.35 (s), 113.57 (s), 112.26 (s), 103.39 (s), 100.32 (s), 55.67 (s), 21.82 (s), 18.31(s).



2-(4'-methoxy-4-(trifluoromethyl)-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3r)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky brown liquid.

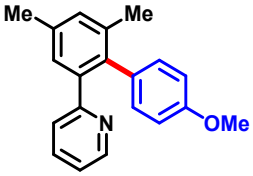
Isolated yield: 28%

Molecular weight: 343.35 g/mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{20}H_{16}F_3NO$: 343.1184, found: 343.1231.

H^1 NMR (400 MHz) δ 8.48 (d, *J* = 2.5 Hz), 7.92 (d, *J* = 2.2 Hz), 7.71 – 7.62 (m), 7.49 (d, *J* = 8.2 Hz), 7.25 – 7.15 (m), 7.07 (d, *J* = 9.0 Hz), 6.79 (d, *J* = 9.0 Hz), 3.79 (s), 2.31 (s).

C^{13} NMR (100 MHz) δ 159.10 (s), 155.11 (s), 149.95 (s), 143.68 (s), 136.50 (s), 132.46 (s), 131.65 (s), 130.98 (s), 130.76 (s), 127.73 (d, *J* = 18.7 Hz), 125.33 – 124.68 (m), 114.22 (s), 113.85 (s), 55.32 (s), 29.80 (s), 18.27 (s).



2-(4'-methoxy-4,6-dimethyl-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3s)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky brown liquid.

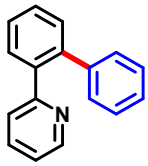
Isolated yield: 30 %

Molecular weight: 289.37 g/ mol

HRMS (*m/z*): $[M + Na]^+$ calcd for $C_{20}H_{19}NO$: 289.1467, found: 289.1479.

H^1 NMR (400 MHz) δ 8.56 (d, *J* = 7.7 Hz, 4H), 7.32 (dd, *J* = 10.0, 2.6 Hz, 10H), 7.16 (s, 5H), 7.05 – 6.93 (m, 13H), 6.78 (dd, *J* = 14.2, 8.1 Hz, 14H), 3.77 (s, 22H), 2.40 (s, 20H), 2.16 (s, 20H).

C^{13} NMR (100 MHz) δ 159.75 (s), 158.07 (s), 148.87 (s), 136.74 (d, *J* = 19.3 Hz), 134.97 (s), 131.54 (s), 131.09 (s), 128.25 (s), 125.30 (s), 120.88 (s), 113.28 (s), 55.12 (s), 21.11 – 20.90 (m).



2-([1,1'-biphenyl]-2-yl)pyridine (M.W.= 231.30 g/mol) (Scheme 3, 4a)[7]

C-H arylation was carried out by following the general procedure GPEA.

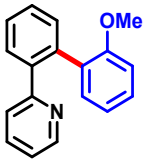
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow solid.

Isolated yield: 69%

Molecular weight: 231.30 g/ mol

H^1 NMR (400 MHz) δ 8.67 (d, *J* = 7.2 Hz), 7.82 – 7.69 (m), 7.69 – 7.38 (m), 7.30 (s), 7.19 (d, *J* = 11.3 Hz), 7.14 (s), 6.92 (d, *J* = 9.4 Hz).
C^{13} NMR (100 MHz) δ 159.24 (s), 149.42 (s), 141.36 (s), 140.69 (s), 139.38 (s), 135.43 (s), 130.60 (d, *J* = 2.8 Hz), 129.81 (s), 129.19 (s), 128.69 (s), 128.17 (s), 127.77 (s), 126.82 (s), 125.59 (s), 121.51 (s).



2-(2'-methoxy-[1,1'-biphenyl]-2-yl)pyridine (M.W.= 261.32 g/mol) (Scheme 3, 4b)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

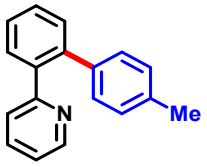
Appearance: White solid.

Isolated yield: 70%

Molecular weight: 261.32 g/ mol

HRMS (*m*/*z*): $[M + Na]^+$ calcd for $C_{18}H_{24}N_2NaO5$: 262.1187, found: 262.1245.

H^1 NMR (400 MHz) δ 8.60 (s), 7.72 (s), 7.45 (d, *J* = 5.2 Hz), 7.37 (d, *J* = 18.1 Hz), 7.22 (d, *J* = 2.0 Hz), 7.07 (s), 6.94 (d, *J* = 1.5 Hz), 6.71 (s), 3.33 (s).
C^{13} NMR (100 MHz) δ 159.59 (s), 156.12 (s), 149.07 (s), 137.07 (s), 135.21 (s), 131.55 (s), 131.10 (s), 130.43 (s), 129.72 (s), 128.84 (s), 128.47 (s), 127.84 (s), 123.75 (s), 121.25 (s), 120.76 (s), 110.70 (s), 54.98 (s).



2-(4'-methyl-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4c)[7]

C-H arylation was carried out by following the general procedure GPEA.

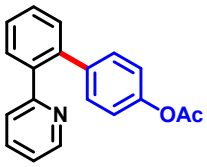
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow liquid.

Isolated yield: 64%

Molecular weight: 245.33 g/ mol

H[1] NMR (400 MHz) δ 8.86 (d, *J* = 8.2 Hz), 7.93 – 7.87 (m), 7.69 – 7.59 (m), 7.48 (s), 7.36 – 7.26 (m), 7.12 (d, *J* = 8.0 Hz), 2.53 (s).
C[13] NMR (100 MHz) δ 159.45 (s), 149.46 (s), 140.61 (s), 139.41 (s), 138.39 (s), 136.47 (s), 135.35 (s), 130.58 (d, *J* = 4.1 Hz), 129.65 (s), 128.90 (s), 128.61 (s), 127.53 (s), 125.55 (s), 121.41 (s), 21.22 (s).



2'-(pyridin-2-yl)-[1,1'-biphenyl]-4-yl acetate (Scheme 3, 4d)

C-H arylation was carried out by following the general procedure GPEA.

Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

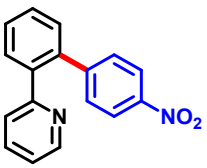
Appearance: White solid.

Isolated yield: 65%

Molecular weight: 289.33 g/ mol

HRMS (*m*/*z*): $[M + Na]^+$ calcd for $C_{19}H_{15}NO_2$: 289.1103, found: 289.1080.

H[1] NMR (400 MHz) δ 8.61 (d, *J* = 6.6 Hz), 7.83 (d, *J* = 8.7 Hz), 7.76 – 7.62 (m), 7.47 (dd, *J* = 25.1, 9.7 Hz), 7.24 (s), 7.13 (dd, *J* = 8.0, 5.3 Hz), 6.92 (d, *J* = 8.4 Hz), 2.58 (s).
C[13] NMR (100 MHz) δ 198.08 (s), 158.89 (s), 149.59 (s), 146.51 (s), 139.57 (d, *J* = 5.7 Hz), 135.73 (s), 135.36 (s), 130.73 (s), 130.42 (s), 129.97 (s), 128.80 (s), 128.35 (d, *J* = 17.2 Hz), 125.36 (s), 121.76 (s), 26.75 (s).



2-(4'-nitro-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4e)[6]

C-H arylation was carried out by following the general procedure GPEA.

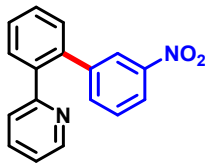
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Yellow solid.

Isolated yield: 75%

Molecular weight: 276.30 g/ mol

H^1 NMR (400 MHz) δ 8.61 – 8.55 (m), 8.08 (d, *J* = 9.0 Hz), 7.69 (d, *J* = 9.7 Hz), 7.61 – 7.47 (m), 7.43 (d, *J* = 9.3 Hz), 7.29 (d, *J* = 9.0 Hz), 7.17 (ddd, *J* = 7.8, 5.0, 1.3 Hz), 6.99 (d, *J* = 7.9 Hz).
C^{13} NMR (100 MHz) δ 179.02 (s), 158.43 (s), 149.49 (s), 148.44 (s), 146.66 (s), 138.50 (s), 136.24 (s), 130.87 (s), 130.46 (d, *J* = 13.0 Hz), 129.04 (d, *J* = 2.5 Hz), 125.24 (s), 123.46 (s), 122.08 (s).



2-(3'-nitro-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4f)[4,5]

C-H arylation was carried out by following the general procedure GPEA.

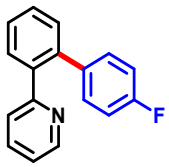
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: White solid.

Isolated yield: 57%

Molecular weight: 276.30 g/ mol

H^1 NMR (400 MHz) δ 8.58 (d, *J* = 7.5 Hz), 8.09 (d, *J* = 2.0 Hz), 7.68 (s), 7.53 (dd, *J* = 9.9, 4.9 Hz), 7.48 (s), 7.43 – 7.33 (m), 7.14 (s), 7.04 (s).
C^{13} NMR (100 MHz) δ 149.51 (s), 143.12 (s), 138.24 (s), 135.97 (s), 130.81 (s), 130.49 (s), 129.24 – 128.71 (m), 125.25 (s), 124.40 (s), 122.03 (s), 121.78 (s).



2-(4'-fluoro-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4g)[7]

C-H arylation was carried out by following the general procedure GPEA.

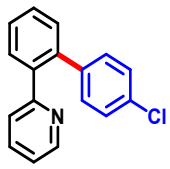
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: White solid.

Isolated yield: 72%

Molecular weight: 249.29 g/ mol

H^1 NMR (400 MHz) δ 8.61 (d, *J* = 4.9 Hz), 7.66 (d, *J* = 5.8 Hz), 7.49 – 7.36 (m), 7.10 (dd, *J* = 8.9, 5.4 Hz), 6.91 (t, *J* = 8.9 Hz).
C^{13} NMR (100 MHz) δ 159.11 (s), 149.48 (s), 139.62 (s), 135.61 (s), 131.29 (d, *J* = 8.1 Hz), 130.56 (d, *J* = 11.1 Hz), 129.80 (s), 128.74 (s), 128.17 (s), 127.89 (s), 125.46 (s), 121.59 (s), 115.23 (s), 115.02 (s).



2-(4'-chloro-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4h)[7]

C-H arylation was carried out by following the general procedure GPEA.

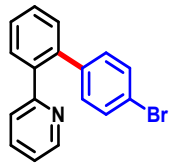
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Sticky yellow liquid.

Isolated yield: 64%

Molecular weight: 265.74 g/ mol

H^1 NMR (400 MHz) δ 8.62 (d, *J* = 7.4 Hz), 7.74 – 7.60 (m), 7.47 (d, *J* = 10.4 Hz), 7.35 (d, *J* = 8.4 Hz), 7.15 (dd, *J* = 31.9, 19.0 Hz), 6.96 (dd, *J* = 39.1, 7.7 Hz).
C^{13} NMR (100 MHz) δ 149.43 (s), 142.80 (s), 141.10 (s), 140.30 (s), 139.43 (s), 135.87 (s), 131.36 (d, *J* = 4.9 Hz), 131.04 (s), 130.72 (s), 130.40 (s), 128.87 (s), 128.39 (s), 128.12 (s), 125.50 (s), 121.71 (d, *J* = 1.5 Hz), 121.16 (s).



2-(4'-bromo-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4i)[4]

C-H arylation was carried out by following the general procedure GPEA.

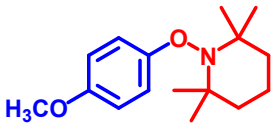
Eluent: ethyl acetate/ petroleum ether (5% EA-PE).

Appearance: Brown solid.

Isolated yield: 59%

Molecular weight: 310.19 g/ mol

H^1 NMR (400 MHz) δ 8.64 – 8.59 (m), 7.69 – 7.64 (m), 7.46 (dd, *J* = 10.8, 4.3 Hz), 7.19 (d, *J* = 8.8 Hz), 7.15 – 7.10 (m), 7.07 (d, *J* = 8.8 Hz), 6.91 (d, *J* = 7.9 Hz).
C^{13} NMR (100 MHz) δ 159.03 (s), 149.60 (s), 139.88 (s), 139.45 (d, *J* = 9.7 Hz), 135.64 (s), 132.90 (s), 131.04 (s), 130.67 (s), 130.44 (s), 128.75 (d, *J* = 1.4 Hz), 128.38 (s), 128.07 (s), 125.40 (s), 121.64 (s).



1-(4-methoxyphenoxy)-2,2,6,6-tetramethylpiperidine (Scheme 4, 6)

Eluent: ethyl acetate/ petroleum ether (3-5% EA-PE).

Appearance: colourless liquid

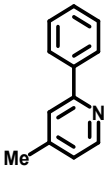
Isolated yield: 16 %

Molecular weight: 263.38 g/mol

H^1 NMR (400 MHz) δ 6.77 (s, 4H), 3.75 (s, 3H), 2.04 (s, 12H), 1.24 (dd, *J* = 9.2, 5.3 Hz, 2H), 0.87 (s, 1H).

C^{13} NMR (100 MHz) δ 149.45 (s), 130.86 (s), 130.51 (s), 113.65 (s), 55.28 (s), 29.80 (s), 22.80 (s), 14.24 (s).

7. Characterization data of 2-phenylpyridine derivatives



4-methyl-2-phenylpyridine (1b)
C-H arylation was carried out by following the general procedure GPPP.

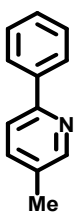
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 80%

Molecular weight: 169.23 g/mol

H^1 NMR (400 MHz) δ 8.55 (d, *J* = 5.0 Hz), 7.98 (d, *J* = 7.0 Hz), 7.55 (s), 7.46 (d, *J* = 7.5 Hz), 7.41 (s), 7.07 (d, *J* = 5.0 Hz), 2.42 (s).
C^{13} NMR (100 MHz) δ 157.43 (s), 149.48 (s), 147.91 (s), 139.58 (s), 128.86 (d, *J* = 13.4 Hz), 127.04 (s), 123.26 (s), 121.69 (s), 21.34 (s).



5-methyl-2-phenylpyridine (1c)

C-H arylation was carried out by following the general procedure GPPP.

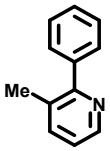
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 85%

Molecular weight: 169.23 g/mol

H^1 NMR (400 MHz) δ 8.62 – 8.46 (m), 8.02 – 7.92 (m), 7.67 – 7.54 (m), 7.44 (dd, *J* = 26.1, 4.1 Hz), 2.38 (s).
C^{13} NMR (100 MHz) δ 154.91 (s), 150.14 (s), 139.48 (s), 137.46 (s), 131.72 (s), 128.74 (d, *J* = 10.4 Hz), 126.80 (s), 120.21 (s), 18.26 (s).



3-methyl-2-phenylpyridine (1d)
C-H arylation was carried out by following the general procedure GPPP.

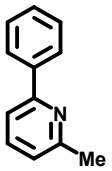
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 78%

Molecular weight: 169.23 g/mol

H^1 NMR (400 MHz) δ 7.96 (d, *J* = 8.4 Hz), 7.63 (t, *J* = 7.8 Hz), 7.55 – 7.49 (m), 7.45 (t, *J* = 4.1 Hz), 7.40 (d, *J* = 7.4 Hz), 7.13 – 7.05 (m), 2.63 (s).
C^{13} NMR (100 MHz) δ 158.45 (s), 157.08 (s), 139.84 (s), 137.02 (s), 128.79 (d, *J* = 1.9 Hz), 127.11 (s), 121.72 (s), 117.78 (s), 24.86 (s).



2-methyl-6-phenylpyridine (1e)
C-H arylation was carried out by following the general procedure GPPP.

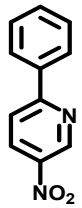
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 86%

Molecular weight: 169.23 g/mol
H^1 NMR (400 MHz) δ 8.02 – 7.92 (m), 7.62 (d, *J* = 7.7 Hz), 7.55 – 7.33 (m), 7.12 – 7.06 (m), 2.62 (s).

C^{13} NMR (100 MHz) δ 158.45 (s), 157.08 (s), 139.84 (s), 137.02 (s), 128.80 (d, *J* = 2.2 Hz), 127.11 (s), 121.73 (s), 117.79 (s), 24.86 (s).



5-nitro-2-phenylpyridine (1f)
C-H arylation was carried out by following the general procedure GPPP.

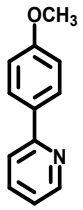
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: Yellow solid

Isolated yield: 86%

Molecular weight: 200.20 g/mol

H^1 NMR (400 MHz) δ 9.49 (d, *J* = 3.6 Hz), 8.63 – 8.46 (m), 8.19 – 8.06 (m), 7.91 (dd, *J* = 8.8, 0.8 Hz), 7.61 – 7.43 (m).
C^{13} NMR (100 MHz) δ 162.57 (s), 145.35 (s), 142.94 (s), 137.12 (s), 132.07 (s), 131.00 (s), 129.24 (s), 127.78 (s), 120.19 (s).



2-(4-methoxyphenyl)pyridine (1g)
C-H arylation was carried out by following the general procedure GPPP.

Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 88%

Molecular weight: 185.23 g/mol

H^1 NMR (400 MHz) δ 8.65 (d, *J* = 6.2 Hz), 7.94 (d, *J* = 9.1 Hz), 7.69 (dd, *J* = 12.3, 4.3 Hz), 7.21 – 7.14 (m), 7.00 (d, *J* = 9.0 Hz), 3.86 (s).
C^{13} NMR (100 MHz) δ 160.52 (s), 157.16 (s), 149.57 (s), 136.87 (s), 132.01 (s), 128.28 (s), 121.55 (s), 120.00 (s), 114.20 (s), 55.45 (s).

2-(p-tolyl)pyridine (1h)
C-H arylation was carried out by following the general procedure GPPP.

Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 80%

Molecular weight: 169.23 g/mol

H^1 NMR (400 MHz) δ 8.67 (d, *J* = 6.5 Hz), 7.89 (d, *J* = 8.6 Hz), 7.73 – 7.59 (m), 7.29 (d, *J* = 0.8 Hz), 7.17 (dd, *J* = 8.8, 4.9 Hz), 6.83 (dd, *J* = 92.9, 4.7 Hz), 2.39 (s).
C^{13} NMR (100 MHz) δ 157.55 (s), 149.61 (s), 139.09 (s), 136.93 (s), 136.61 (s), 129.98 (s), 129.63 (s), 126.93 (s), 121.98 (s), 120.52 (s), 115.54 (s), 21.39 (s).

2-(4-chlorophenyl)pyridine (1i)

C-H arylation was carried out by following the general procedure GPPP.

Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: white liquid

Isolated yield: 89%

Molecular weight: 189.64 g/mol

H^1 NMR (400 MHz) δ 8.69 (d, *J* = 8.0 Hz), 7.94 (d, *J* = 9.0 Hz), 7.81 – 7.67 (m), 7.45 (d, *J* = 8.9 Hz), 7.24 (d, *J* = 1.3 Hz).
C^{13} NMR (100 MHz) δ 156.30 (s), 149.83 (s), 137.86 (s), 137.02 (s), 135.20 (s), 129.03 (s), 128.27 (s), 122.49 (s), 120.47 (s).

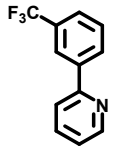
2-(4-bromophenyl)pyridine (1j)
C-H arylation was carried out by following the general procedure GPPP.

Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 87%

Molecular weight: 234.10 g/mol
H^1 NMR (400 MHz) δ 8.66 (d, *J* = 8.1 Hz), 7.84 (d, *J* = 8.8 Hz), 7.74 – 7.63 (m), 7.57 (d, *J* = 8.8 Hz), 7.22 (d, *J* = 14.1 Hz).
C^{13} NMR (100 MHz) δ 156.29 (s), 149.84 (s), 138.29 (s), 137.03 (s), 131.97 (s), 128.57 (s), 123.54 (s), 122.55 (s), 120.44 (s).



2-(3-(trifluoromethyl)phenyl)pyridine (1k)

C-H arylation was carried out by following the general procedure GPPP.

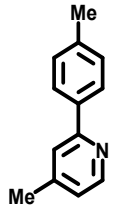
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White liquid

Isolated yield: 89%

Molecular weight: 223.20 g/mol

H^1 NMR (400 MHz) δ 8.71 (d, *J* = 8.1 Hz), 8.27 (d, *J* = 0.8 Hz), 8.15 (s), 7.75 (dd, *J* = 3.9, 3.1 Hz), 7.68 – 7.63 (m), 7.59 (dd, *J* = 7.8, 0.8 Hz), 7.30 – 7.24 (m).
C^{13} NMR (100 MHz) δ 155.90 (s), 149.97 (s), 140.17 (s), 137.13 (s), 130.15 (d, *J* = 1.4 Hz), 129.32 (s), 125.66 (s), 123.86 (s), 122.94 (s), 120.72 (s).



4-methyl-2-(p-tolyl)pyridine (1l)

C-H arylation was carried out by following the general procedure GPPP.

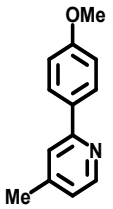
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White liquid

Isolated yield: 90%

Molecular weight: 183.25 g/mol

H^1 NMR (400 MHz) δ 8.50 (d, *J* = 5.8 Hz), 7.85 (d, *J* = 8.5 Hz), 7.54 – 7.47 (m), 7.26 – 7.19 (m), 7.07 – 6.95 (m), 2.38 (s).
C^{13} NMR (100 MHz) δ 157.36 (s), 149.34 (s), 138.93 (s), 136.67 (s), 129.53 (s), 126.88 (s), 122.99 (s), 121.37 (s), 21.37 (d, *J* = 1.3 Hz), 1.13 (s).



2-(4-methoxyphenyl)-4-methylpyridine (1m)

C-H arylation was carried out by following the general procedure GPPP.

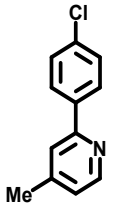
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White liquid

Isolated yield: 87%

Molecular weight: 199.25 g/mol

H^1 NMR (400 MHz) δ 8.50 (d, *J* = 5.8 Hz), 7.93 (d, *J* = 9.1 Hz), 7.48 (d, *J* = 0.8 Hz), 7.09 – 6.93 (m), 3.85 (s), 2.39 (s).
C^{13} NMR (100 MHz) δ 160.44 (s), 156.99 (s), 149.22 (s), 147.92 (s), 132.04 (s), 128.29 (s), 122.63 (s), 120.96 (s), 114.14 (s), 55.43 (s), 21.36 (s).



2-(4-chlorophenyl)-4-methylpyridine (1n)
C-H arylation was carried out by following the general procedure GPPP.

Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

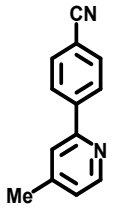
Appearance: White solid

Isolated yield: 86%

Molecular weight: 203.67 g/mol

H^1 NMR (400 MHz) δ 8.53 (d, *J* = 5.0 Hz), 7.92 (d, *J* = 8.7 Hz), 7.51 (s), 7.43 (d, *J* = 8.7 Hz), 7.07 (dd, *J* = 5.0, 0.8 Hz), 2.41 (s).

C^{13} NMR (100 MHz) δ 156.16 (s), 149.49 (s), 148.16 (s), 137.92 (s), 135.06 (s), 128.96 (q, *J* = 1.2 Hz), 128.29 (d, *J* = 1.5 Hz), 123.51 (s), 121.48 (s), 21.34 (s).



4-(4-methylpyridin-2-yl)benzonitrile (1o)

C-H arylation was carried out by following the general procedure GPPP.

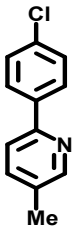
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 88%

Molecular weight: 194.24 g/mol

H^1 NMR (400 MHz) δ 8.57 (d, *J* = 4.3 Hz), 8.09 (d, *J* = 8.0 Hz), 7.75 (d, *J* = 8.1 Hz), 7.58 (s), 7.14 (d, *J* = 3.8 Hz), 2.44 (s).
C^{13} NMR (100 MHz) δ 155.19 (s), 149.80 (s), 148.47 (s), 143.67 (s), 132.61 (s), 127.58 (s), 124.44 (s), 122.15 (s), 118.95 (s), 112.38 (s), 21.35 (s).



2-(4-chlorophenyl)-5-methylpyridine (1p)

C-H arylation was carried out by following the general procedure GPPP.

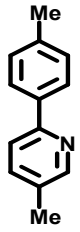
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 92%

Molecular weight: 203.67 g/mol

H^1 NMR (400 MHz) δ 8.51 (s), 7.89 (d, *J* = 8.9 Hz), 7.67 – 7.51 (m), 7.42 (d, *J* = 8.9 Hz), 2.37 (s).
C^{13} NMR (100 MHz) δ 153.60 (s), 150.13 (s), 137.72 (d, *J* = 8.1 Hz), 134.82 (s), 132.16 (s), 129.46 (s), 128.98 (s), 128.07 (s), 120.04 (s), 116.86 (s), 18.30 (s).



5-methyl-2-(p-tolyl)pyridine (1q)
C-H arylation was carried out by following the general procedure GPPP.

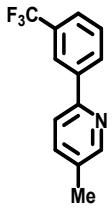
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 95%

Molecular weight: 183.25g/mol

H^1 NMR (400 MHz) δ 8.50 (s), 7.85 (d, *J* = 7.8 Hz), 7.57 (d, *J* = 17.7 Hz), 7.28 (s), 2.40 (s), 2.36 (s).
C^{13} NMR (100 MHz) δ 154.92 (s), 150.02 (s), 138.62 (s), 137.41 (s), 136.67 (s), 131.37 (s), 130.04 (s), 129.51 (s), 126.65 (s), 119.92 (s), 21.33 (s), 18.24 (s).



5-methyl-2-(3-(trifluoromethyl)phenyl)pyridine (1r)
C-H arylation was carried out by following the general procedure GPPP.

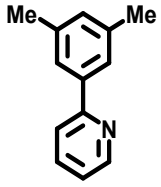
Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: White solid

Isolated yield: 90%

Molecular weight: 237.23g/mol

H^1 NMR (400 MHz) δ 8.55 (d, *J* = 2.4 Hz), 8.24 (d, *J* = 0.7 Hz), 8.15 (d, *J* = 7.8 Hz), 7.82 – 7.43 (m), 2.40 (s).
C^{13} NMR (100 MHz) δ 153.22 (s), 150.28 (s), 140.06 (s), 137.77 (s), 132.70 (s), 131.38 (s), 131.06 (s), 129.97 (s), 129.29 (s), 125.33 (d, *J* = 3.8 Hz), 123.65 (d, *J* = 4.0 Hz), 120.31 (s), 18.31 (s).



5-methyl-2-(3-(trifluoromethyl)phenyl)pyridine (1s)
C-H arylation was carried out by following the general procedure GPPP.

Eluent: ethyl acetate/ petroleum ether (2% EA-PE).

Appearance: Yellow liquid

Isolated yield: 87%

Molecular weight: 183.25 g/mol

H^1 NMR (400 MHz) δ 8.69 (d, *J* = 4.7 Hz, 1H), 7.71 (s, 2H), 7.61 (s, 2H), 7.23 – 7.17 (m, 1H), 7.07 (s, 1H), 2.40 (s, 6H).
C^{13} NMR (100 MHz) δ 157.78 (s), 149.53 (s), 139.33 (s), 138.31 (s), 136.71 (s), 130.66 (s), 124.80 (s), 121.97 (s), 120.72 (s), 21.42 (s).

8. References

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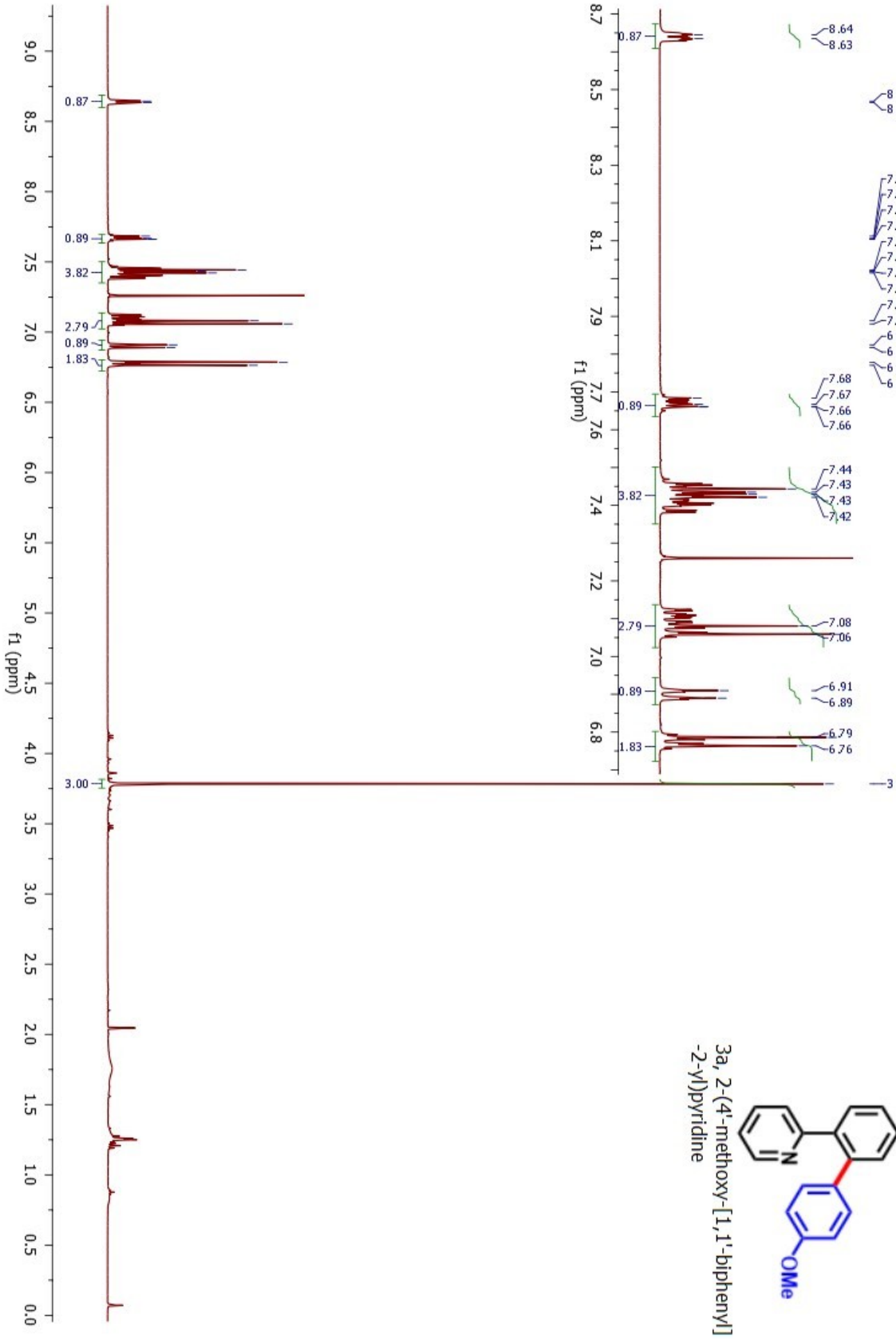
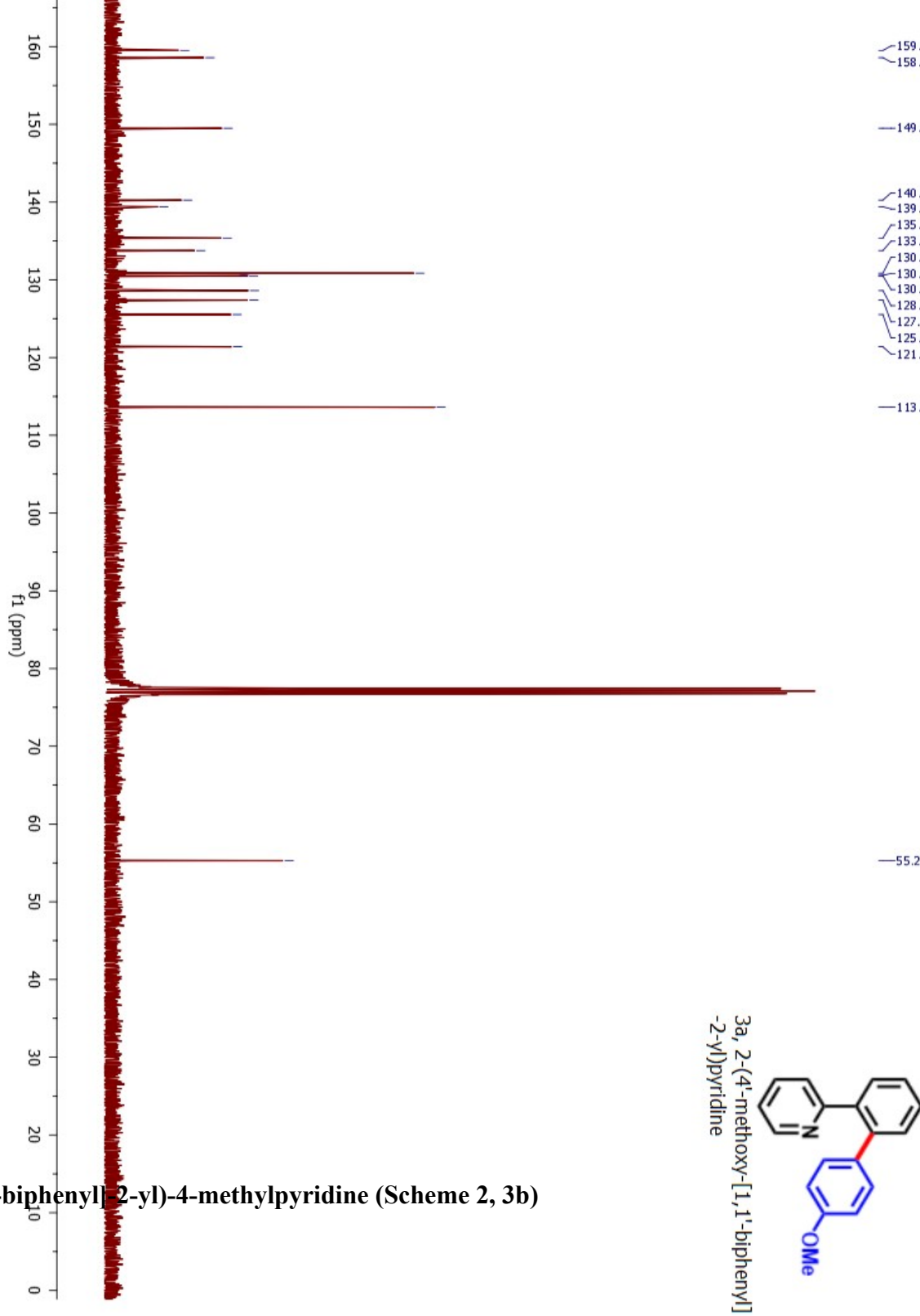
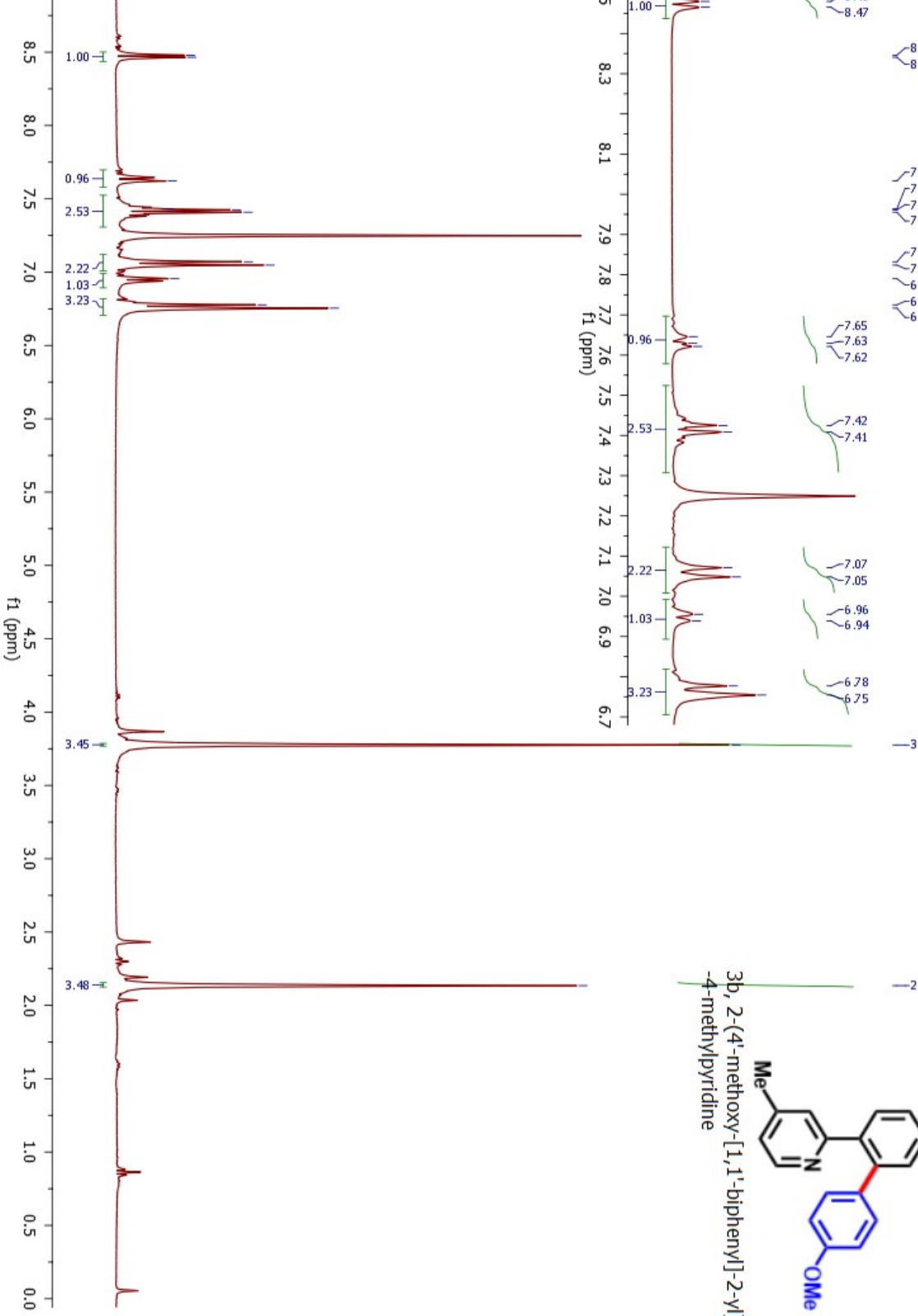
9. NMR spectra of (

2-(4'-methoxy-[1,1'-

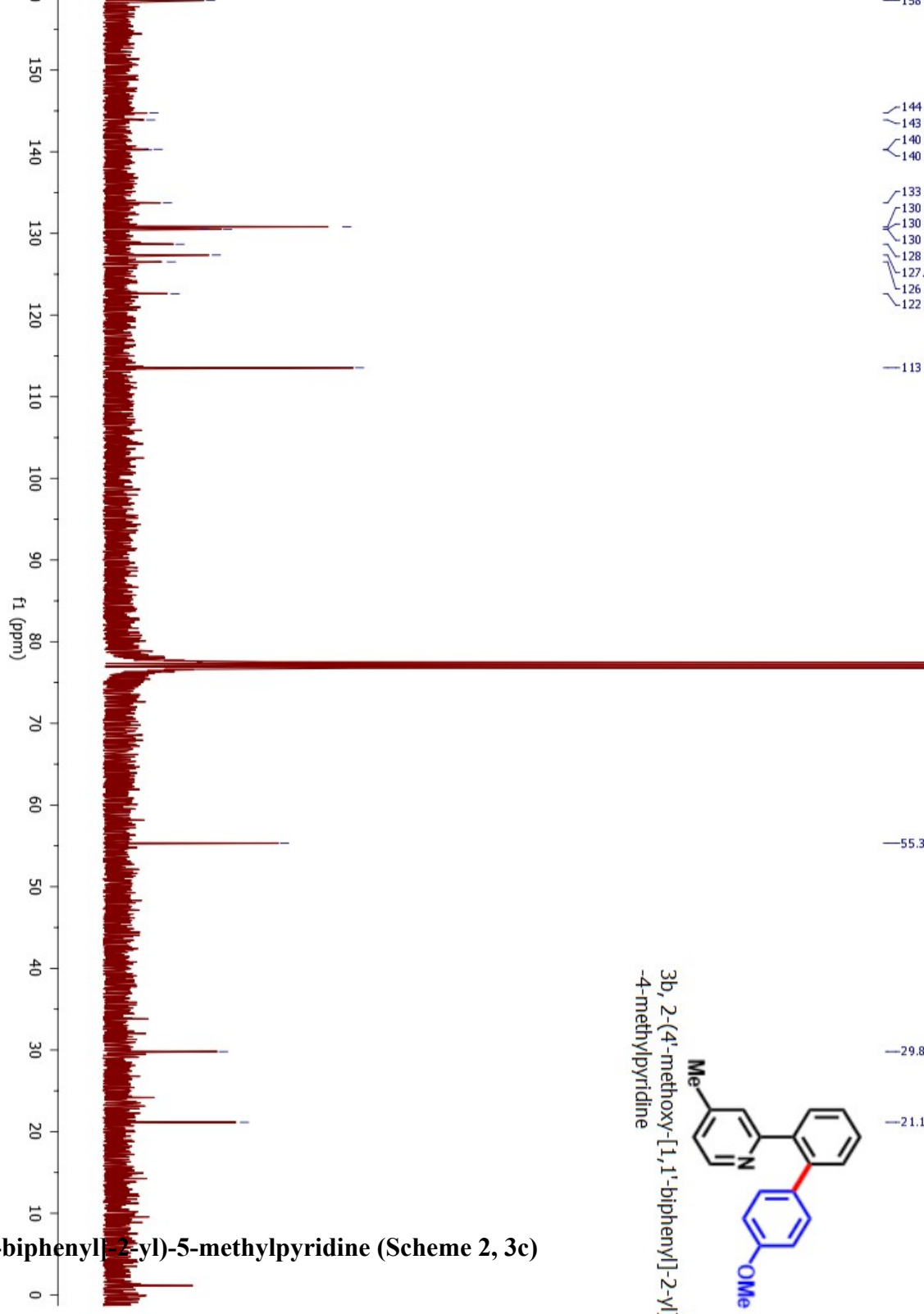




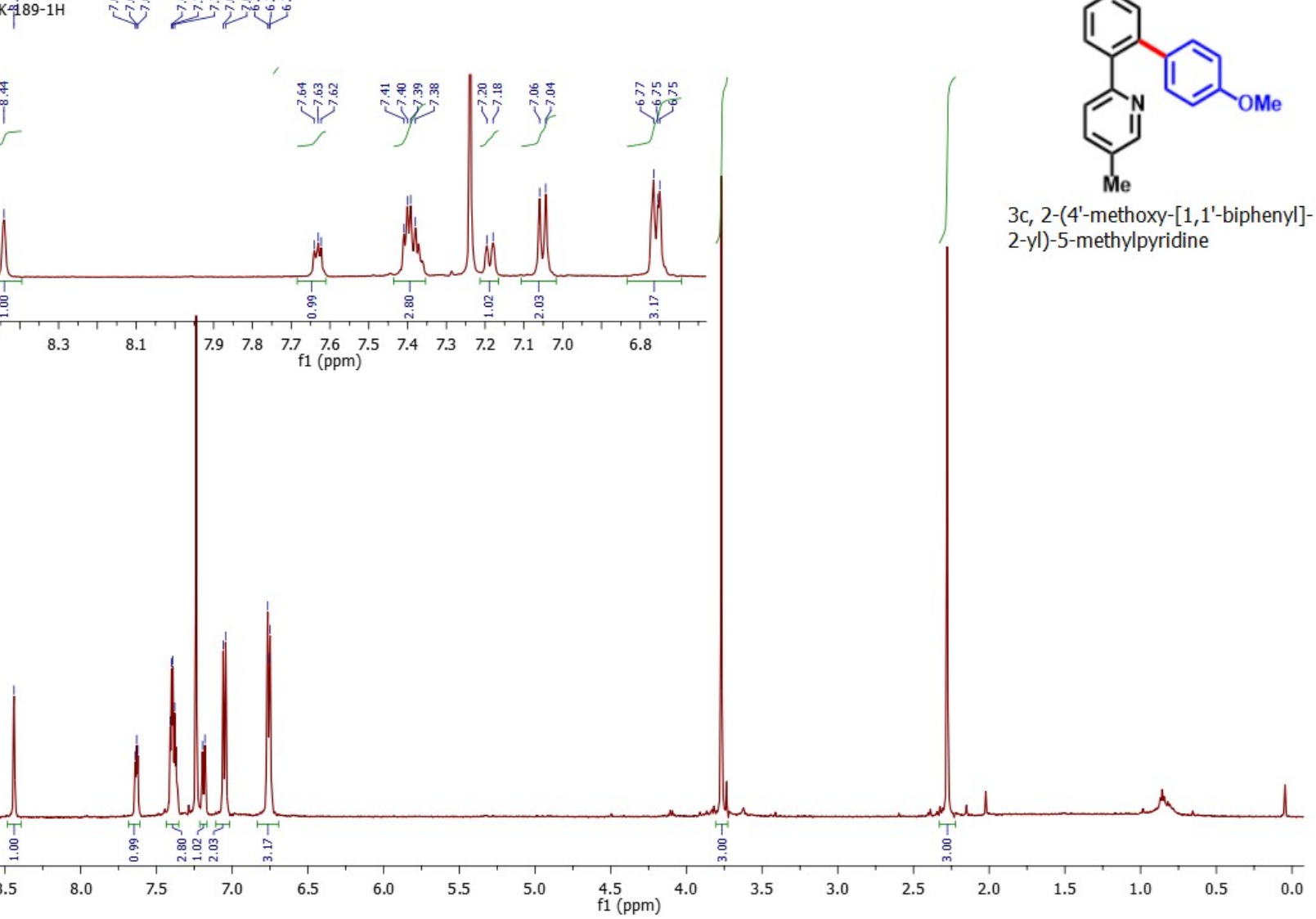
2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3b)



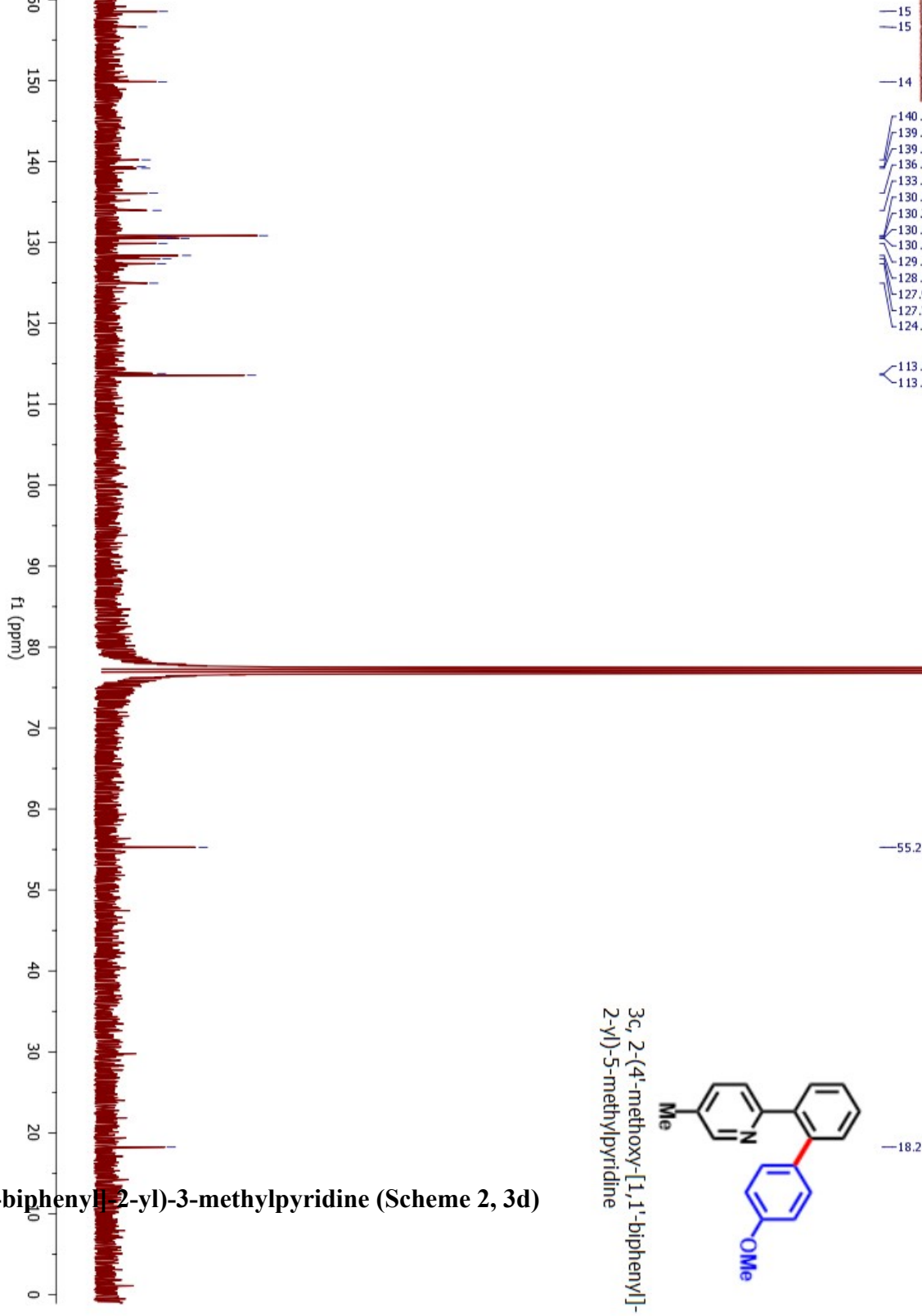
3b, 2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine



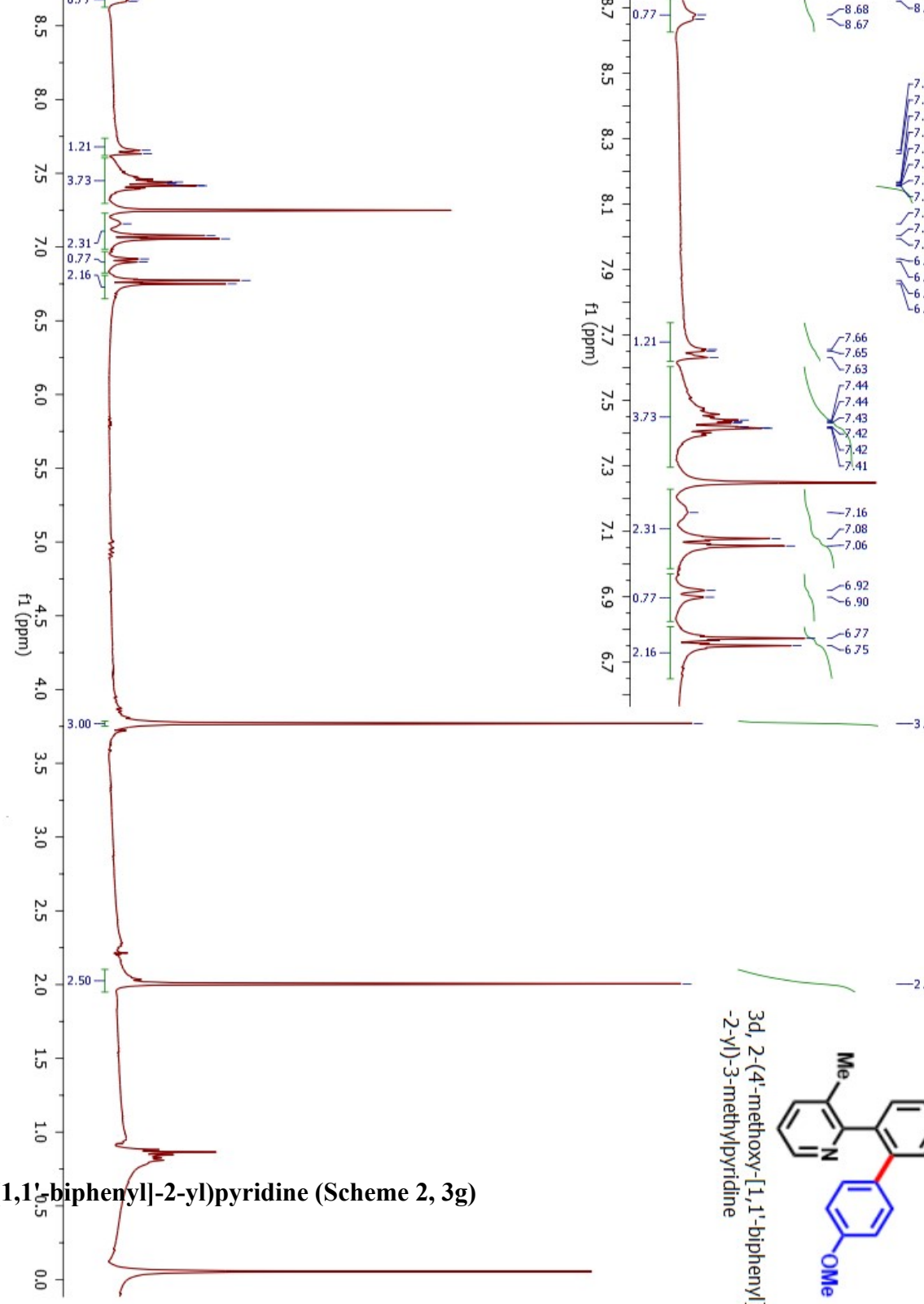
2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3c)



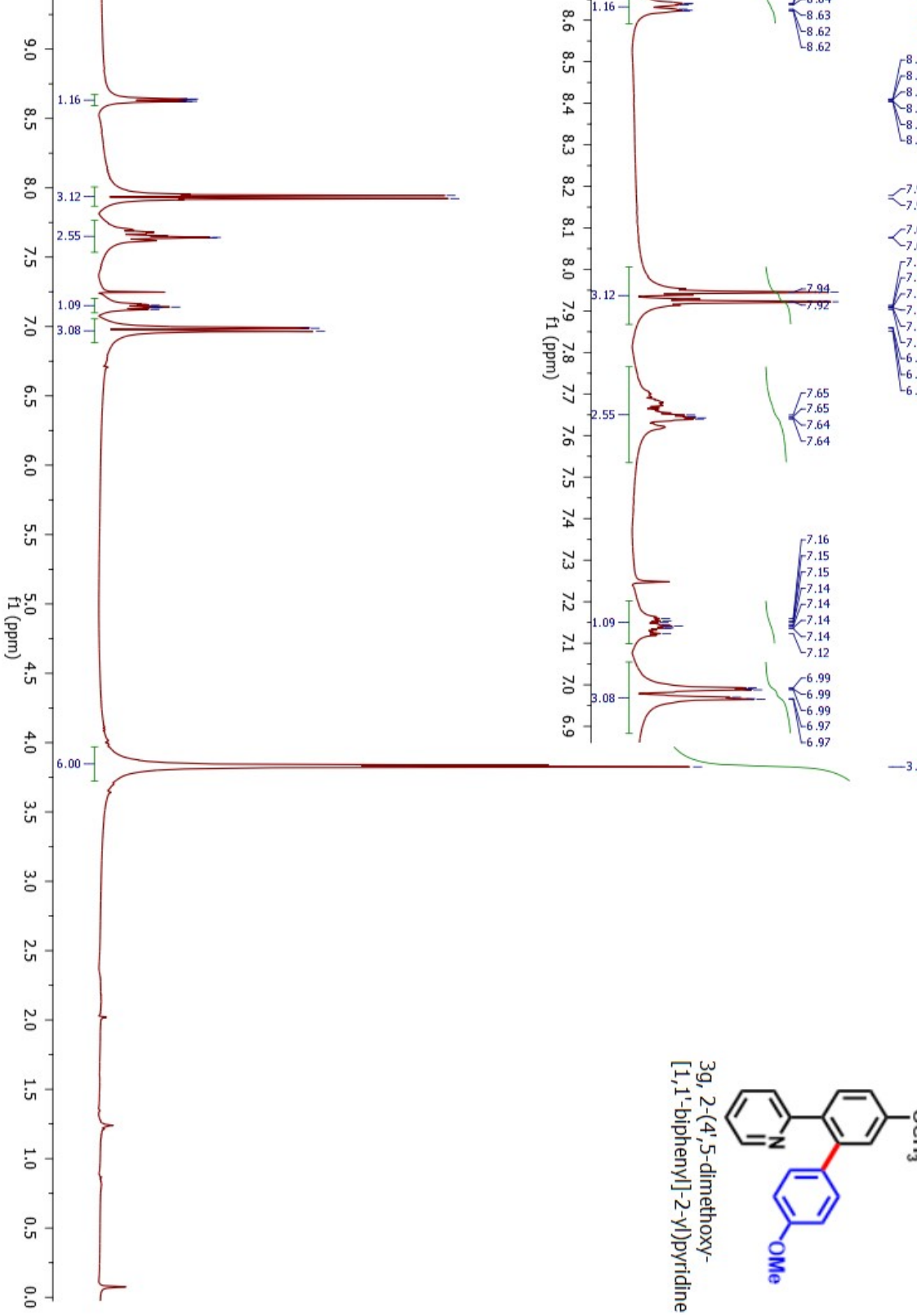
3c, 2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine



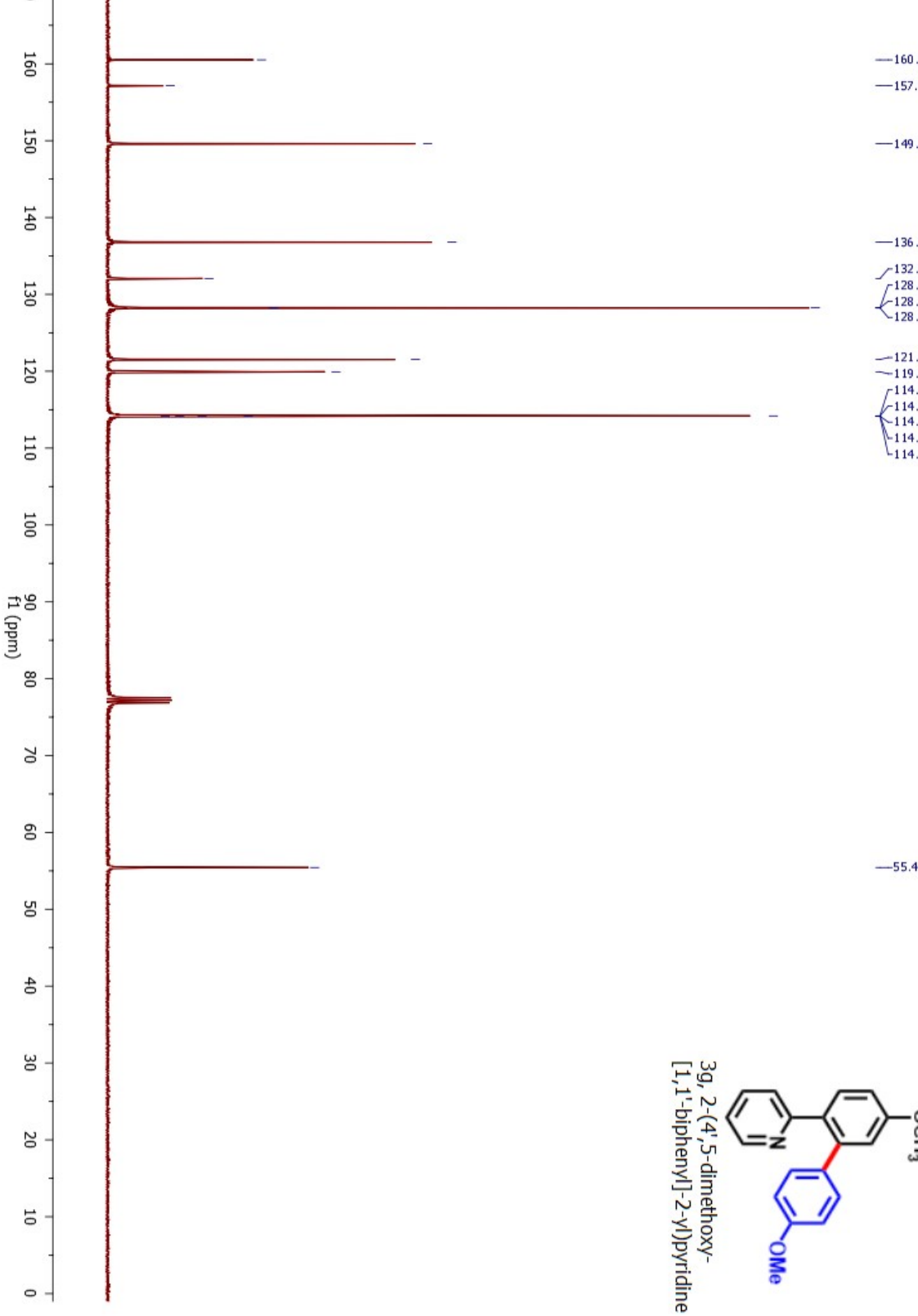
2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-3-methylpyridine (Scheme 2, 3d)



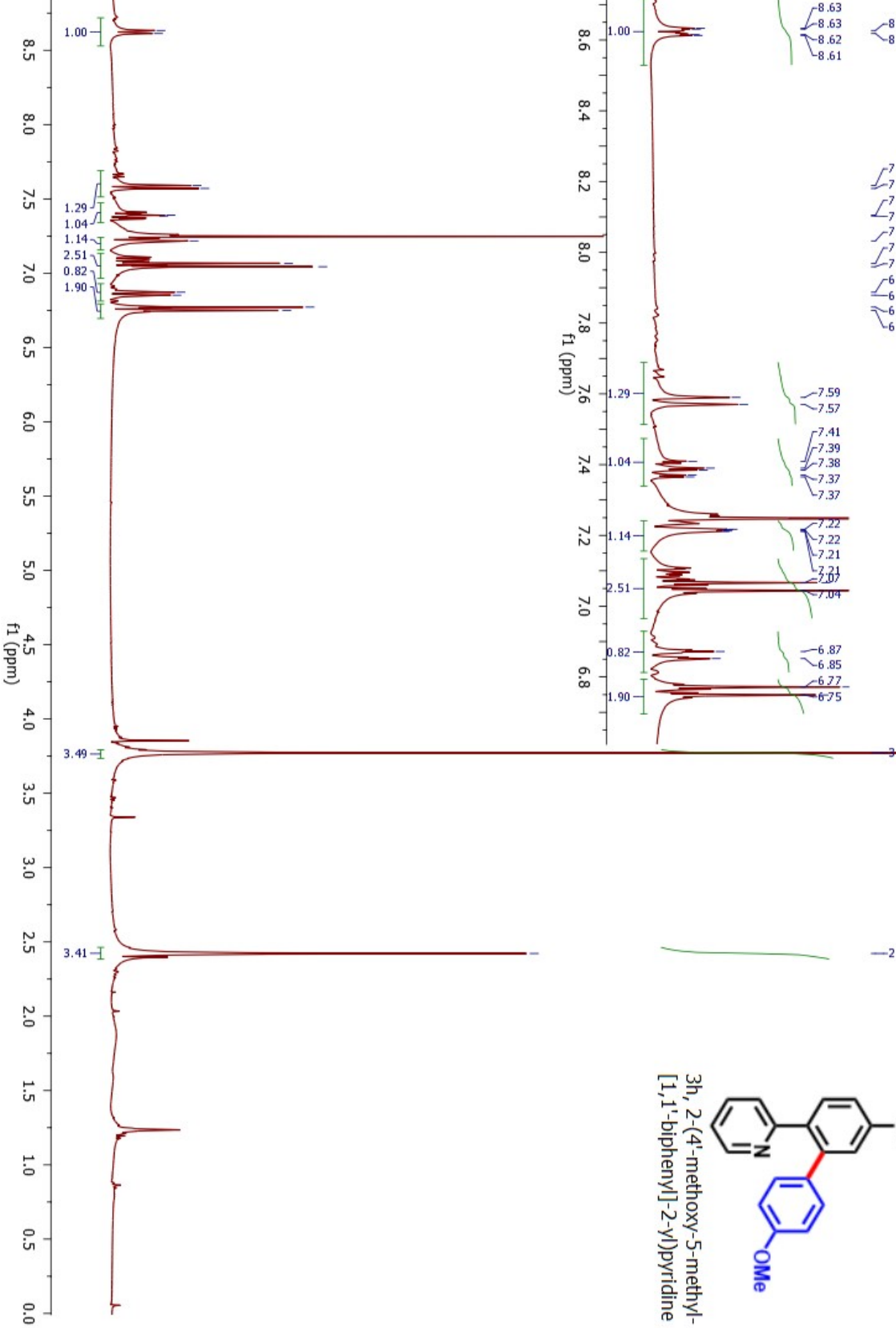
2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3g)

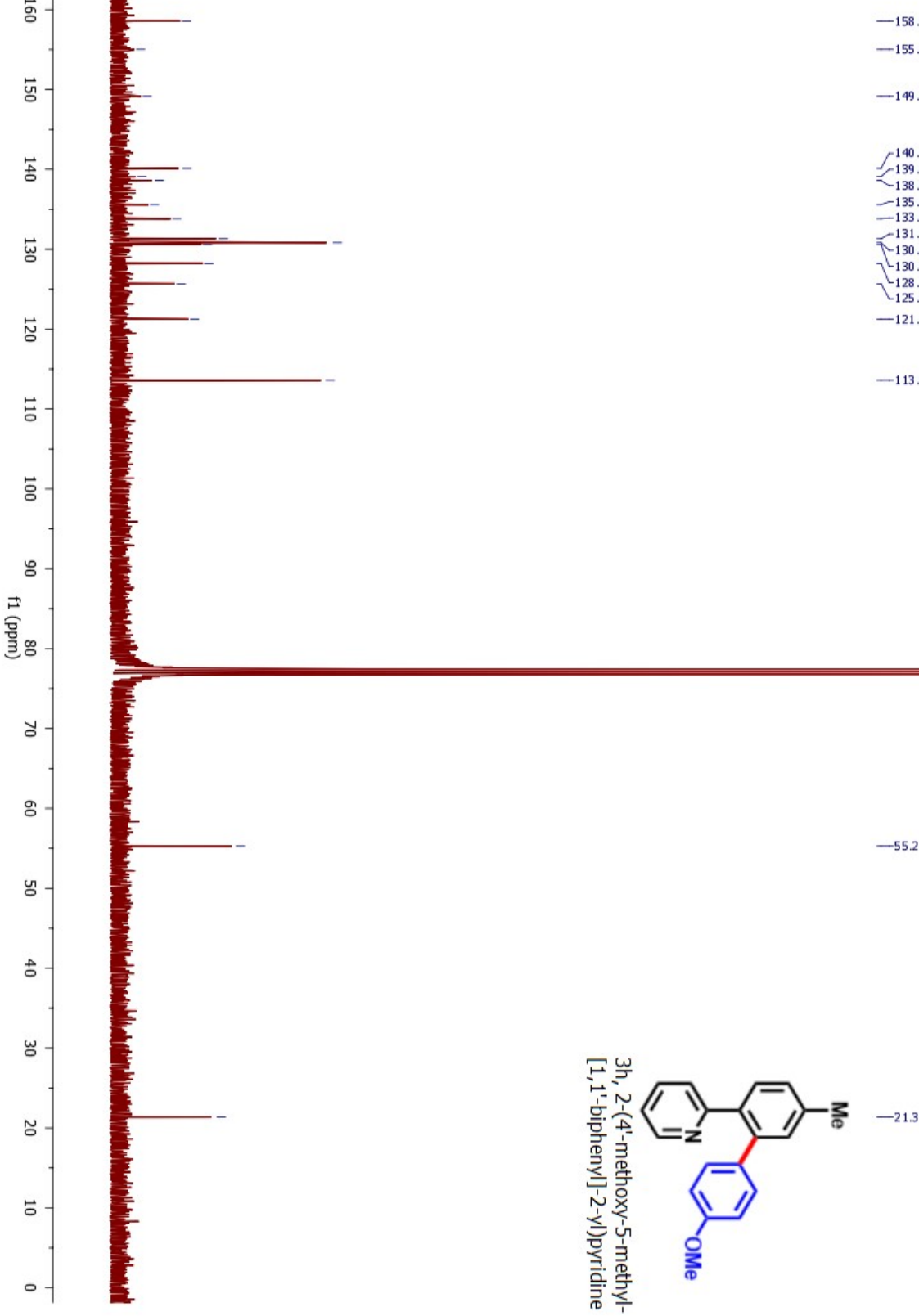


3g, 2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)pyridine


f1 (ppm)
160.
157.
149.
136.
132.
128.
128.
128.
121.
119.
114.
114.
114.
114.
114.
55.4
3g, 2-(4',5-dimethoxy-
[1,1'-biphenyl]-2-yl)pyridine
N
OMe

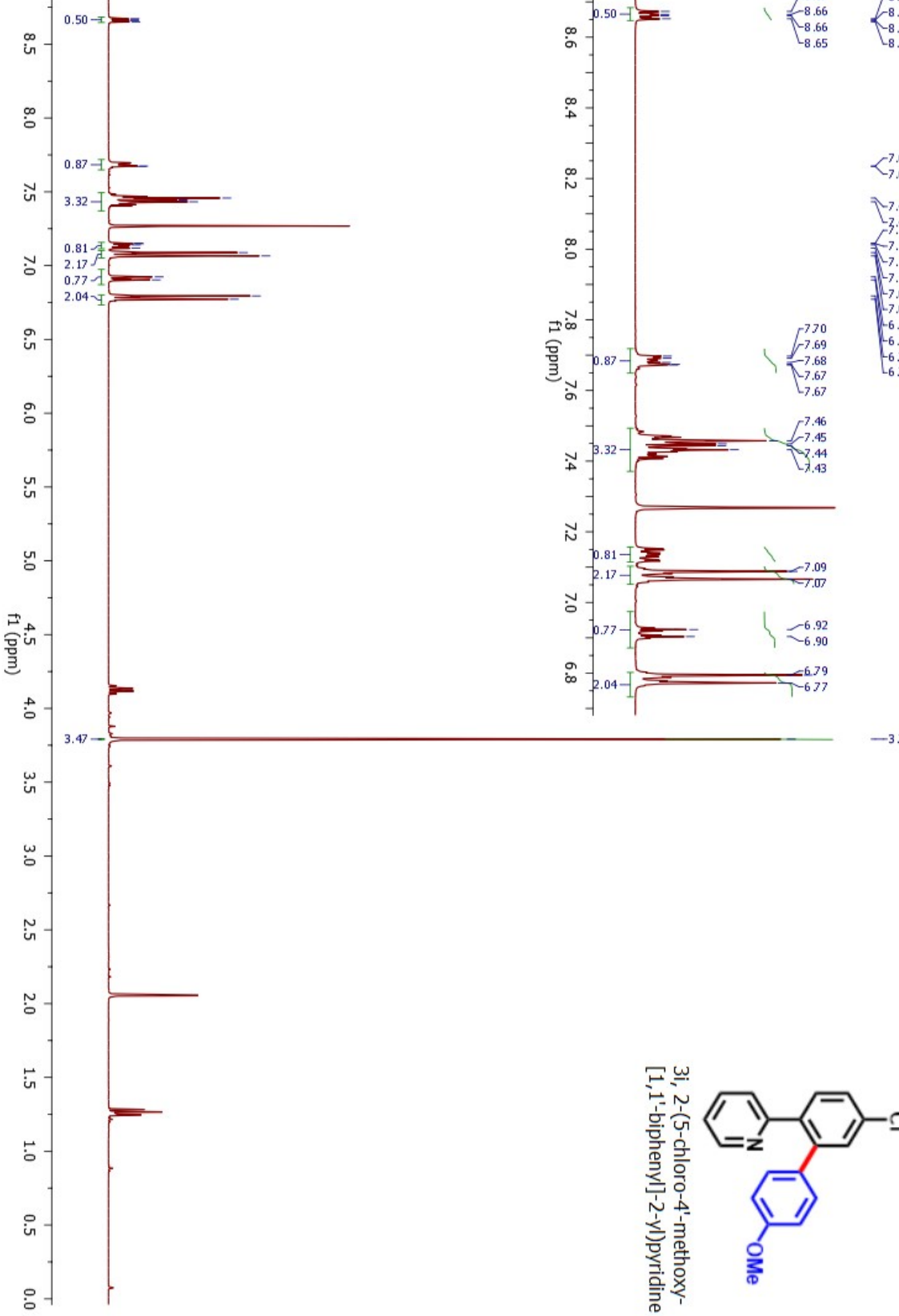
2-(4'-methoxy-5-me

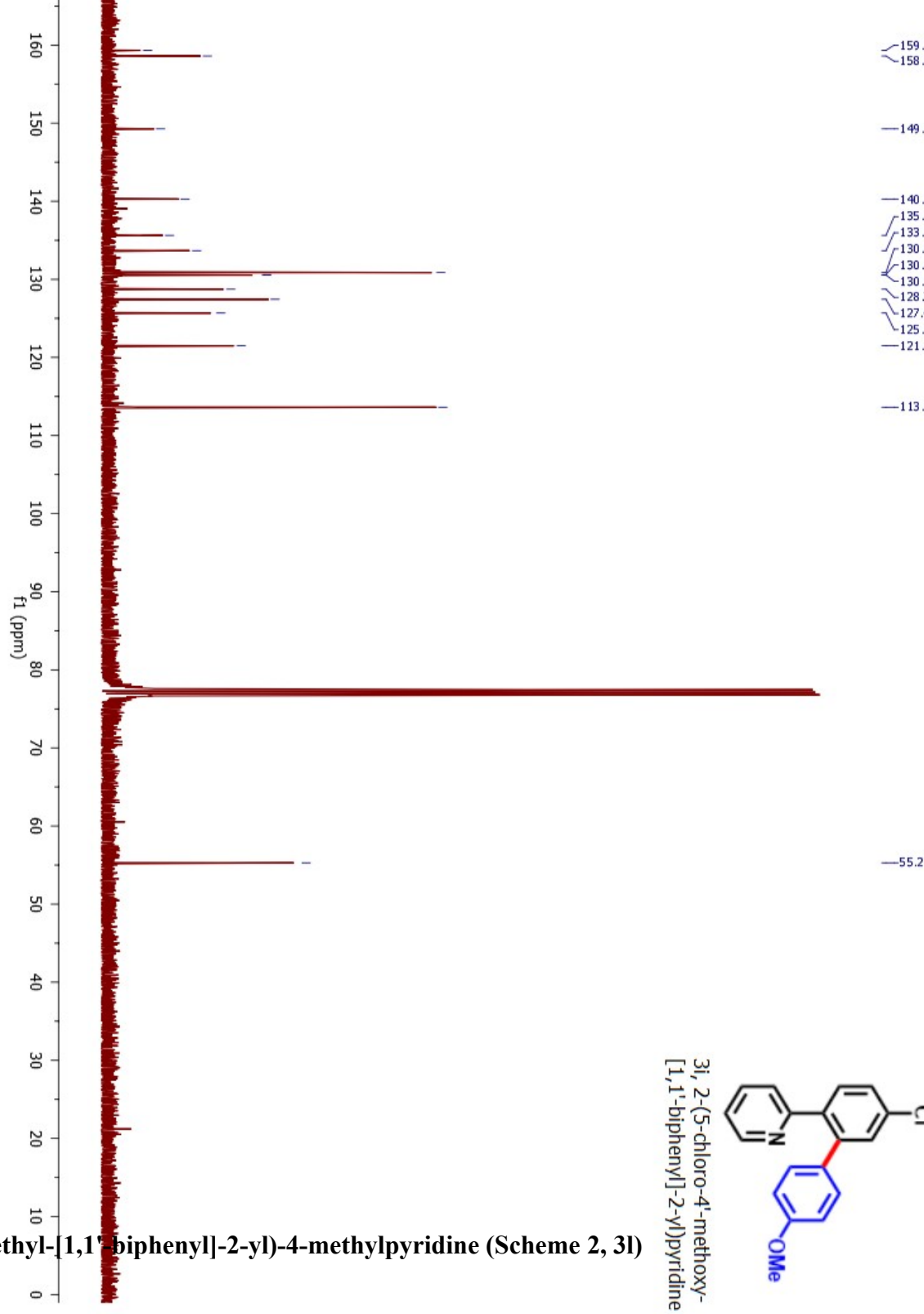




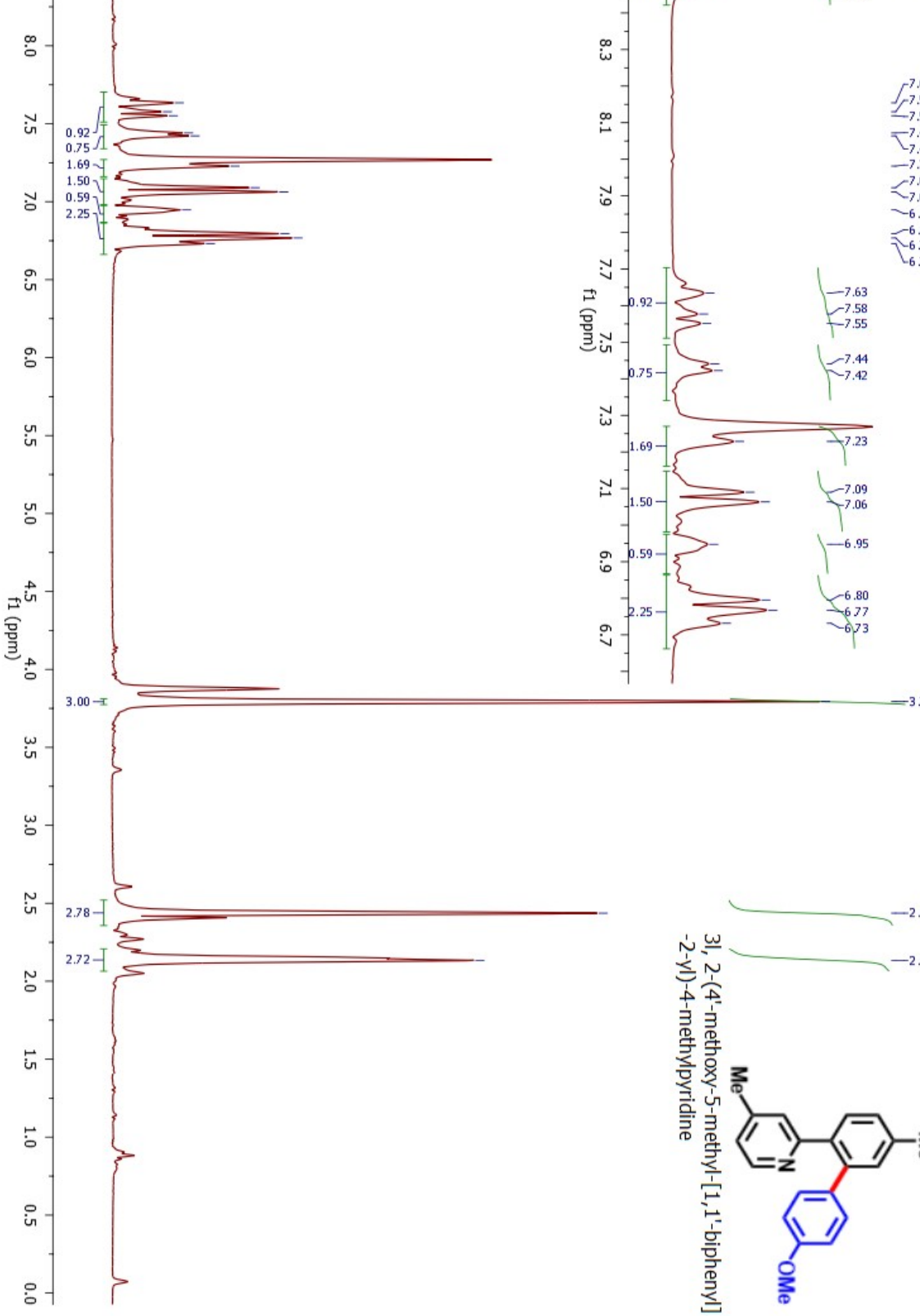
3h, 2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)pyridine

2-(5-chloro-4'-metl

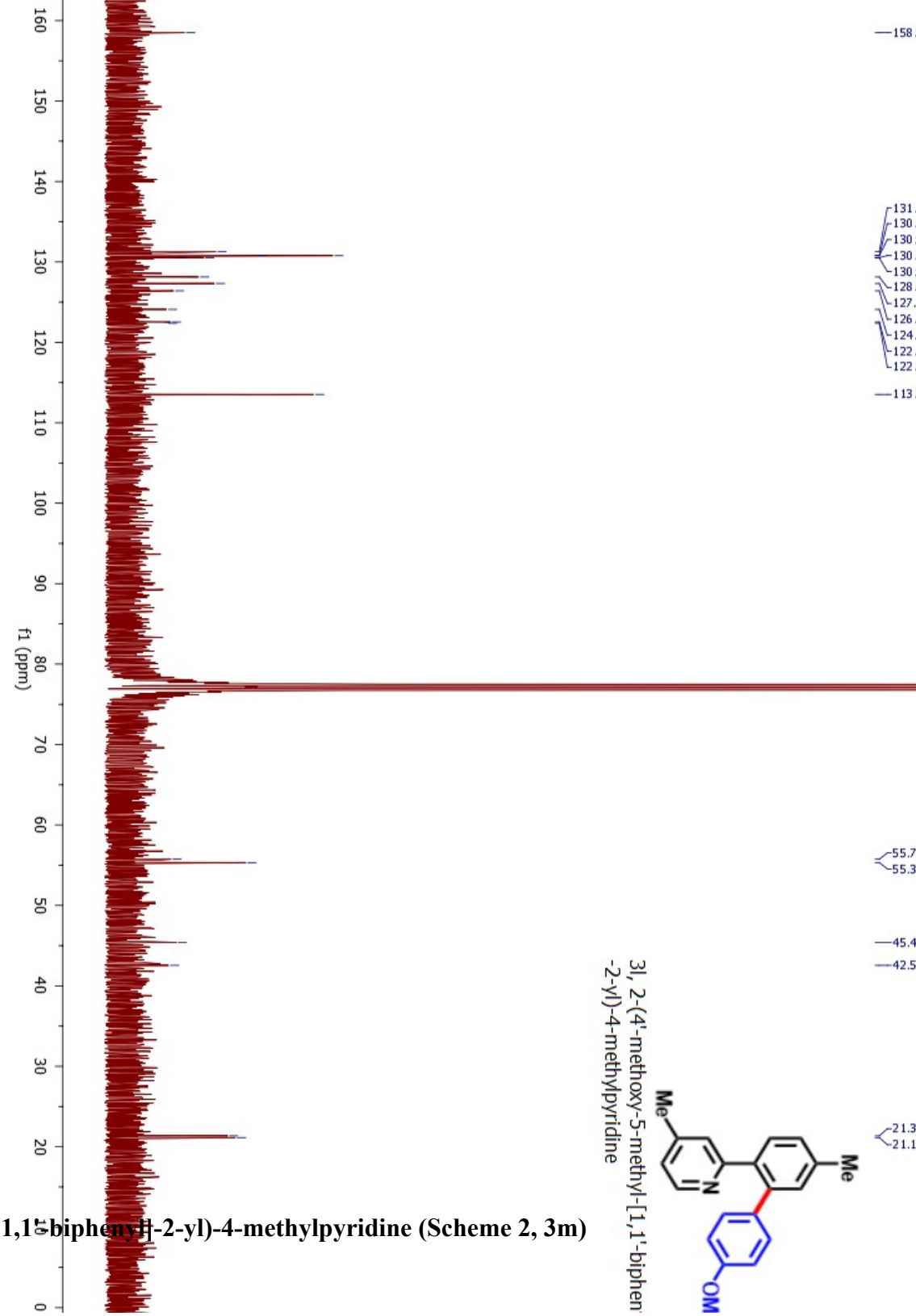




2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3l)

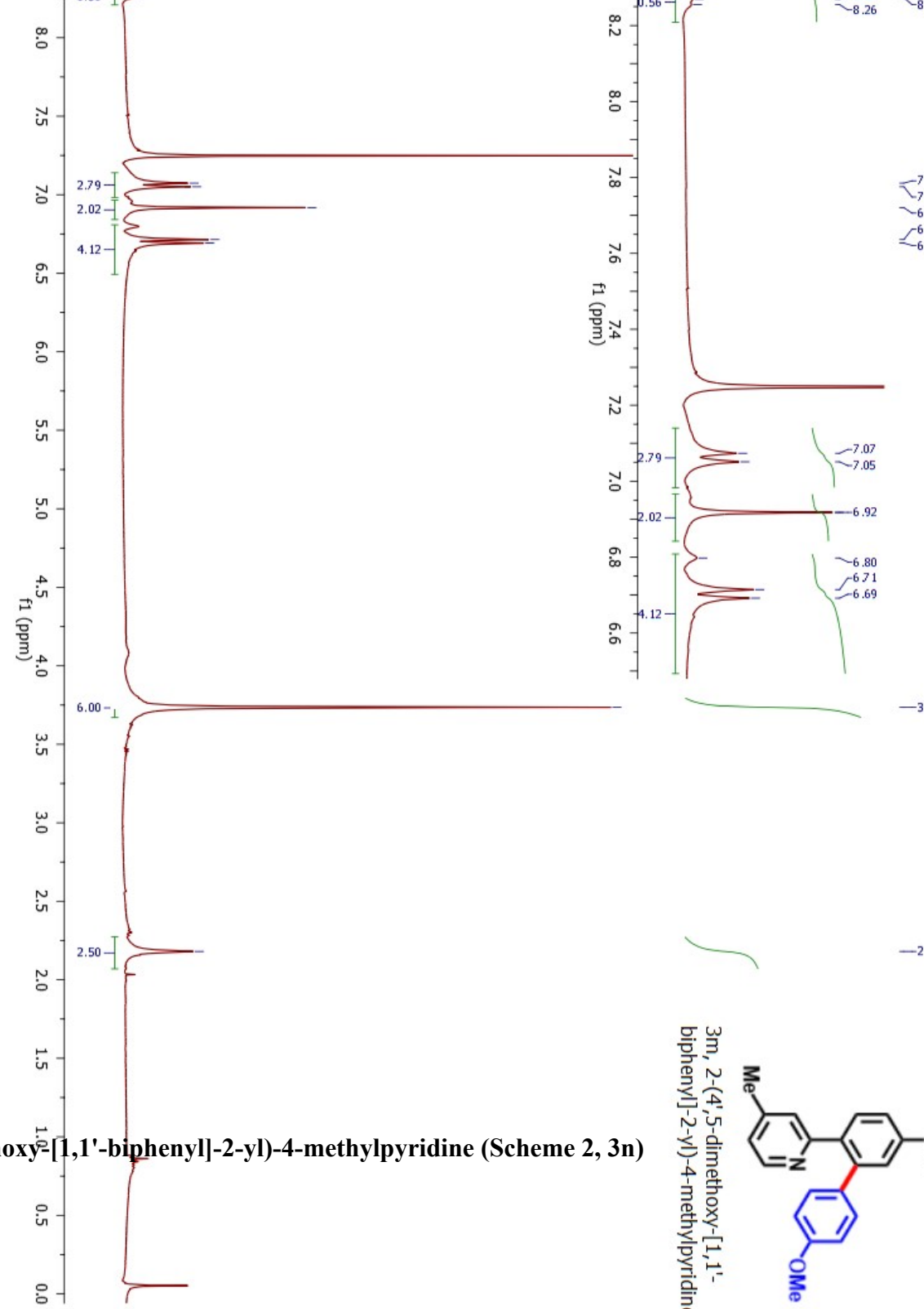


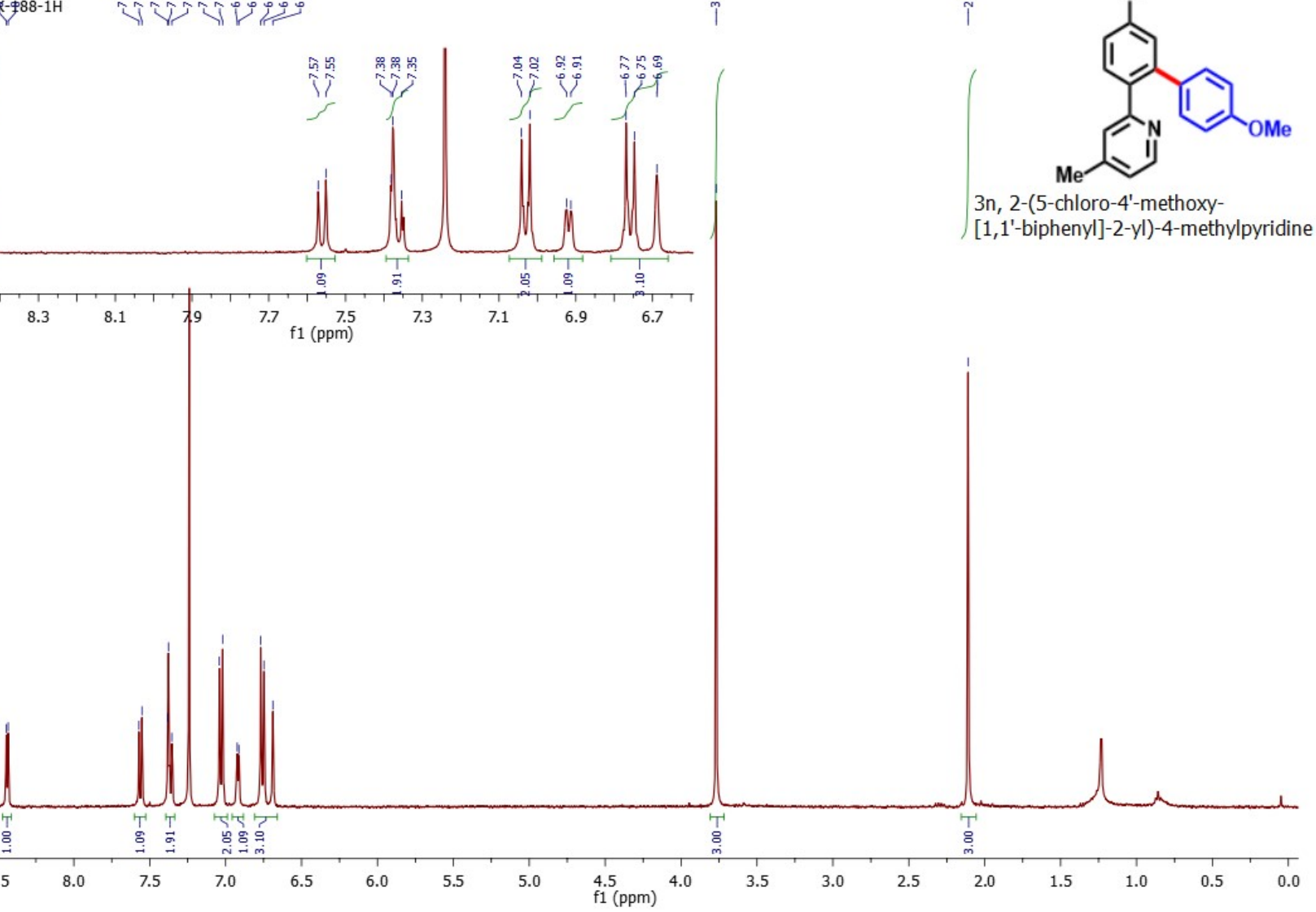
3l, 2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-4-methylpyridine



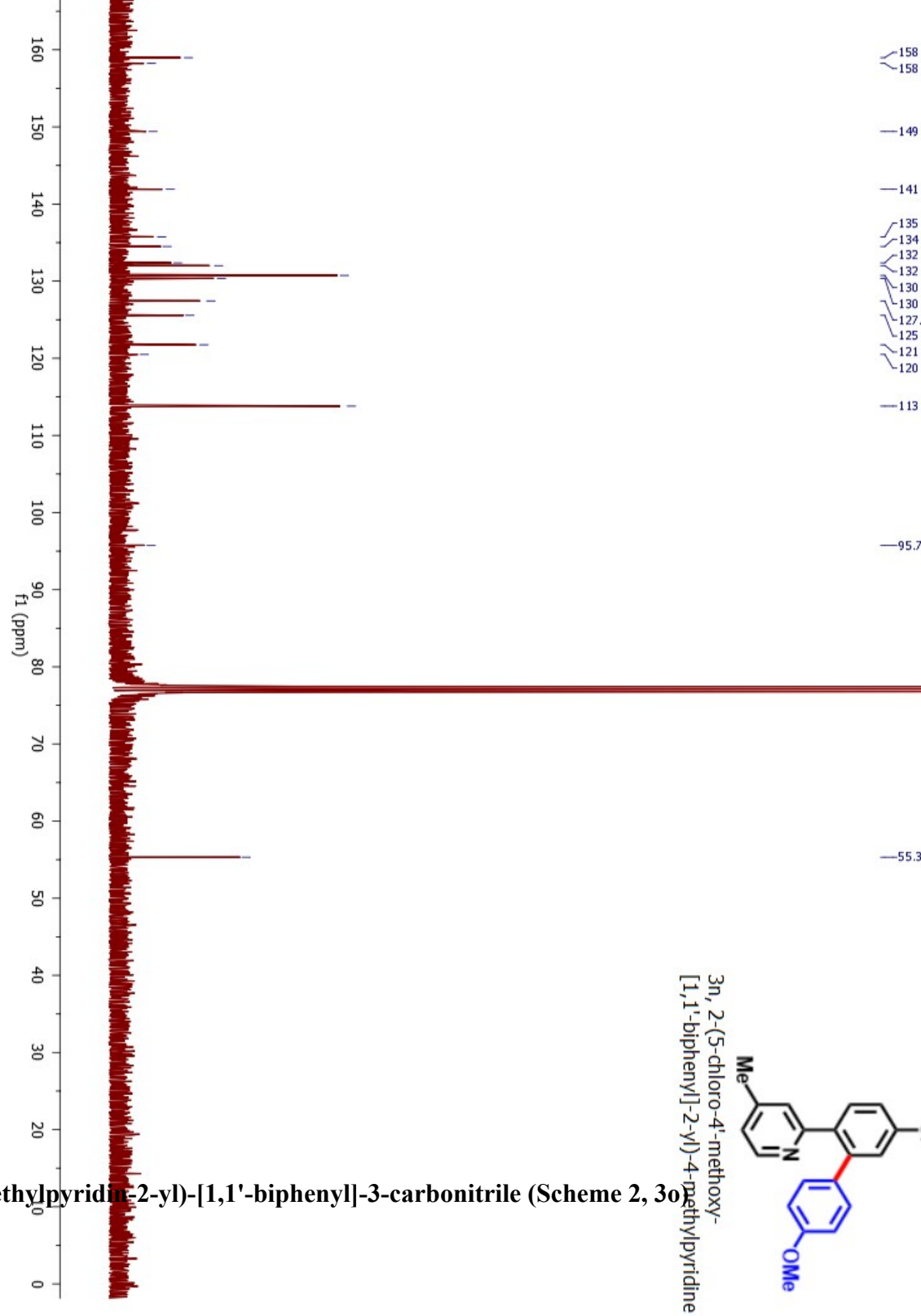
2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3m)

2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3n)

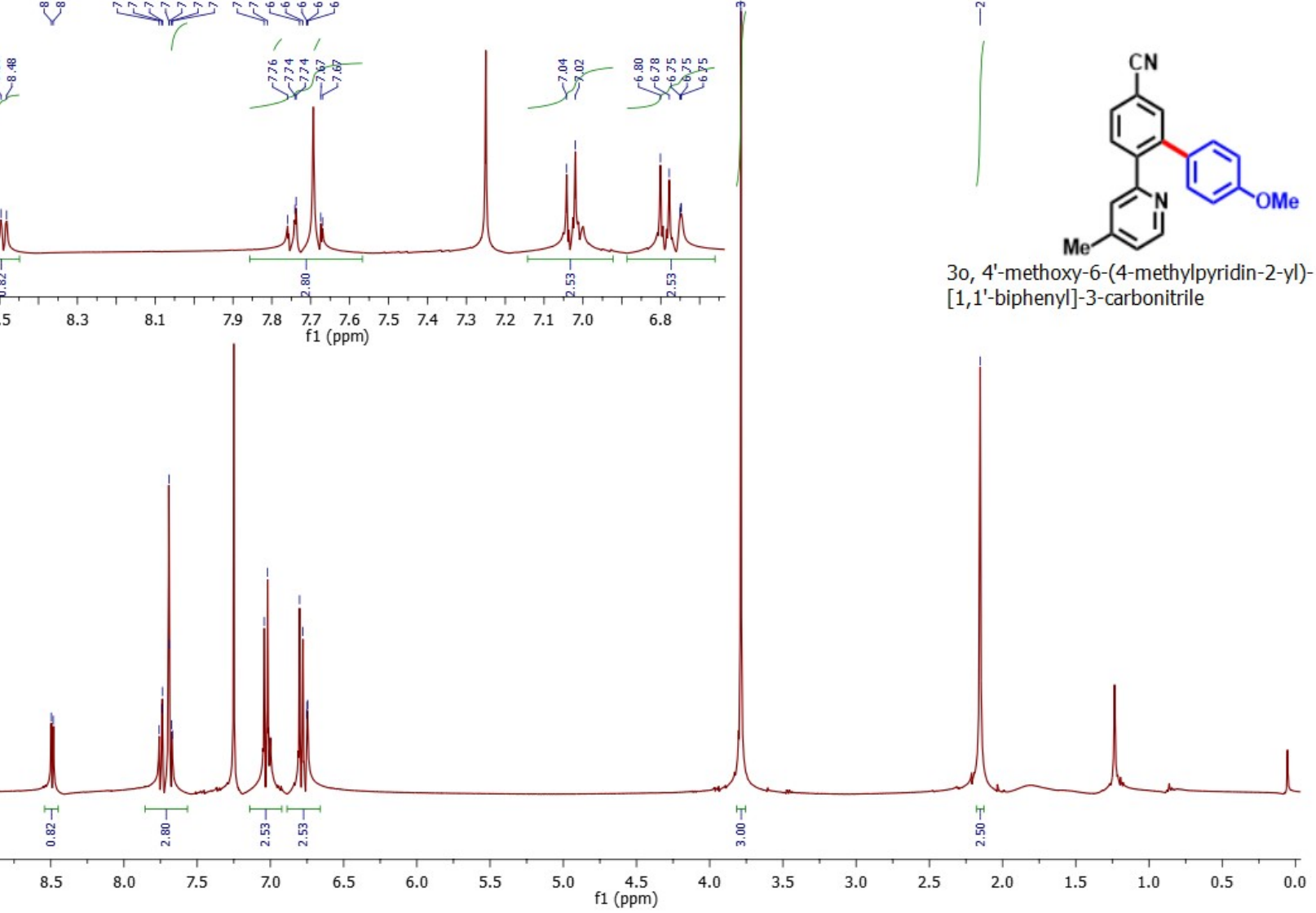




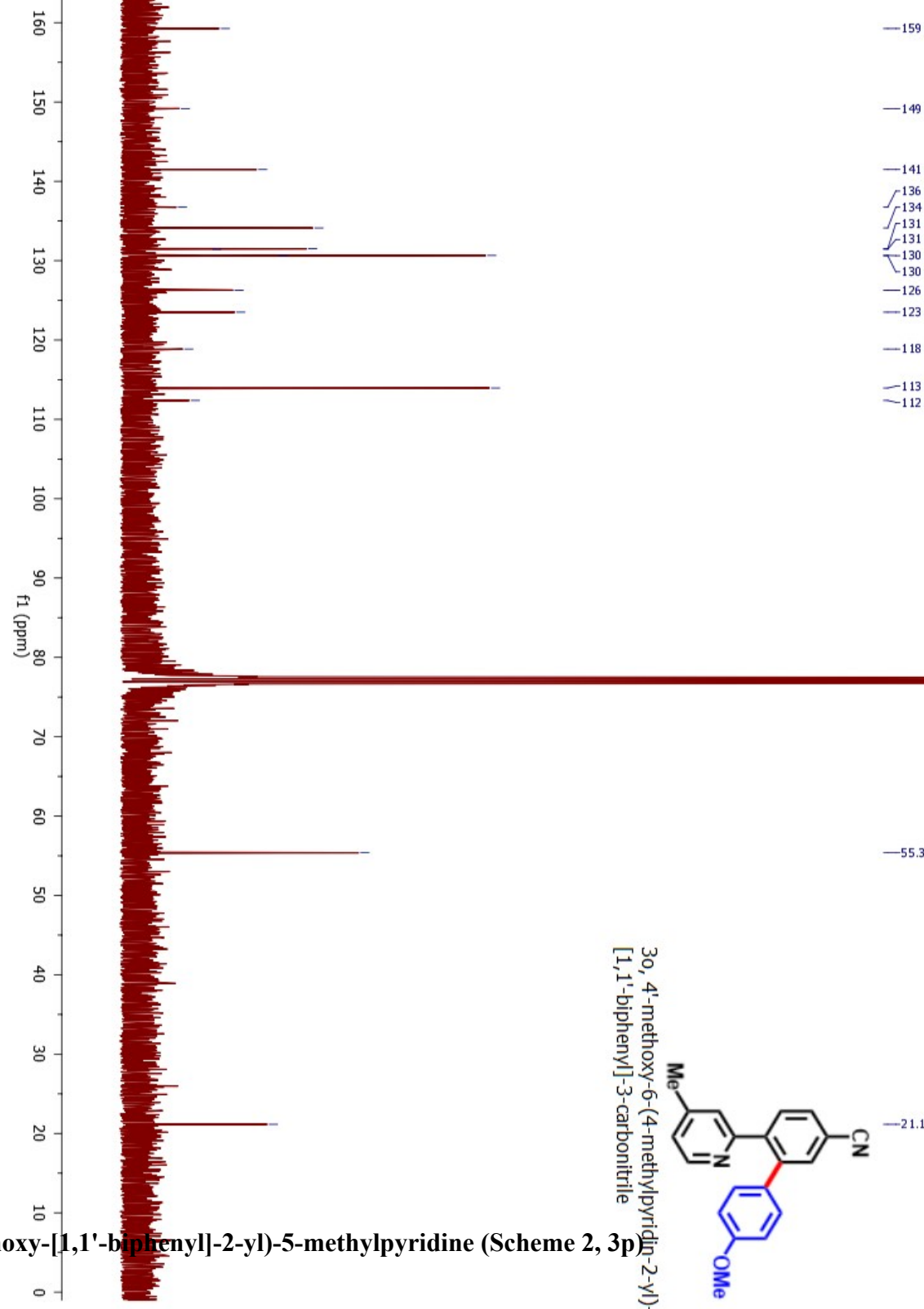
3n, 2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine



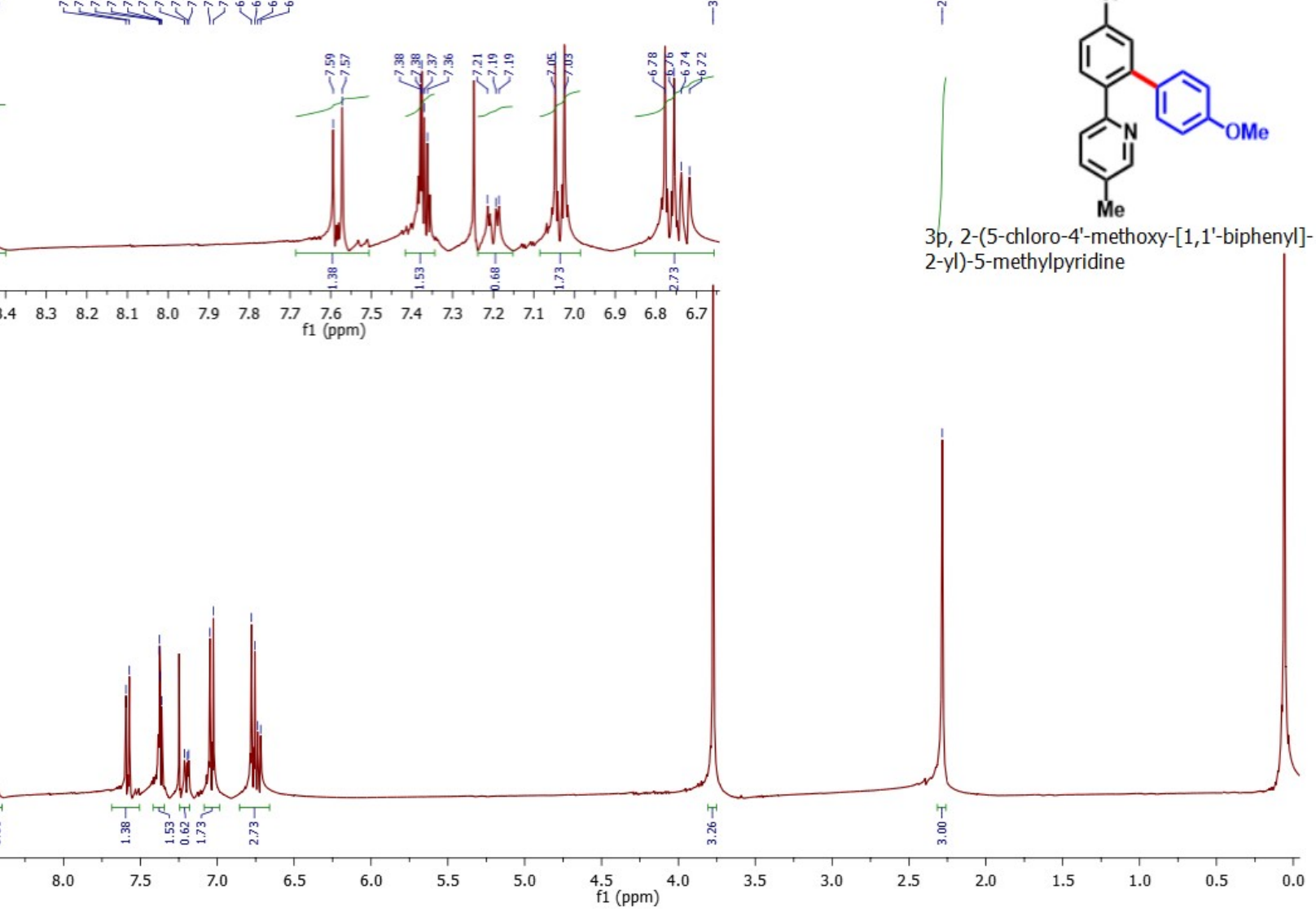
4'-methoxy-6-(4-methylpyridin-2-yl)-[1,1'-biphenyl]-3-carbonitrile (Scheme 2, 3o)



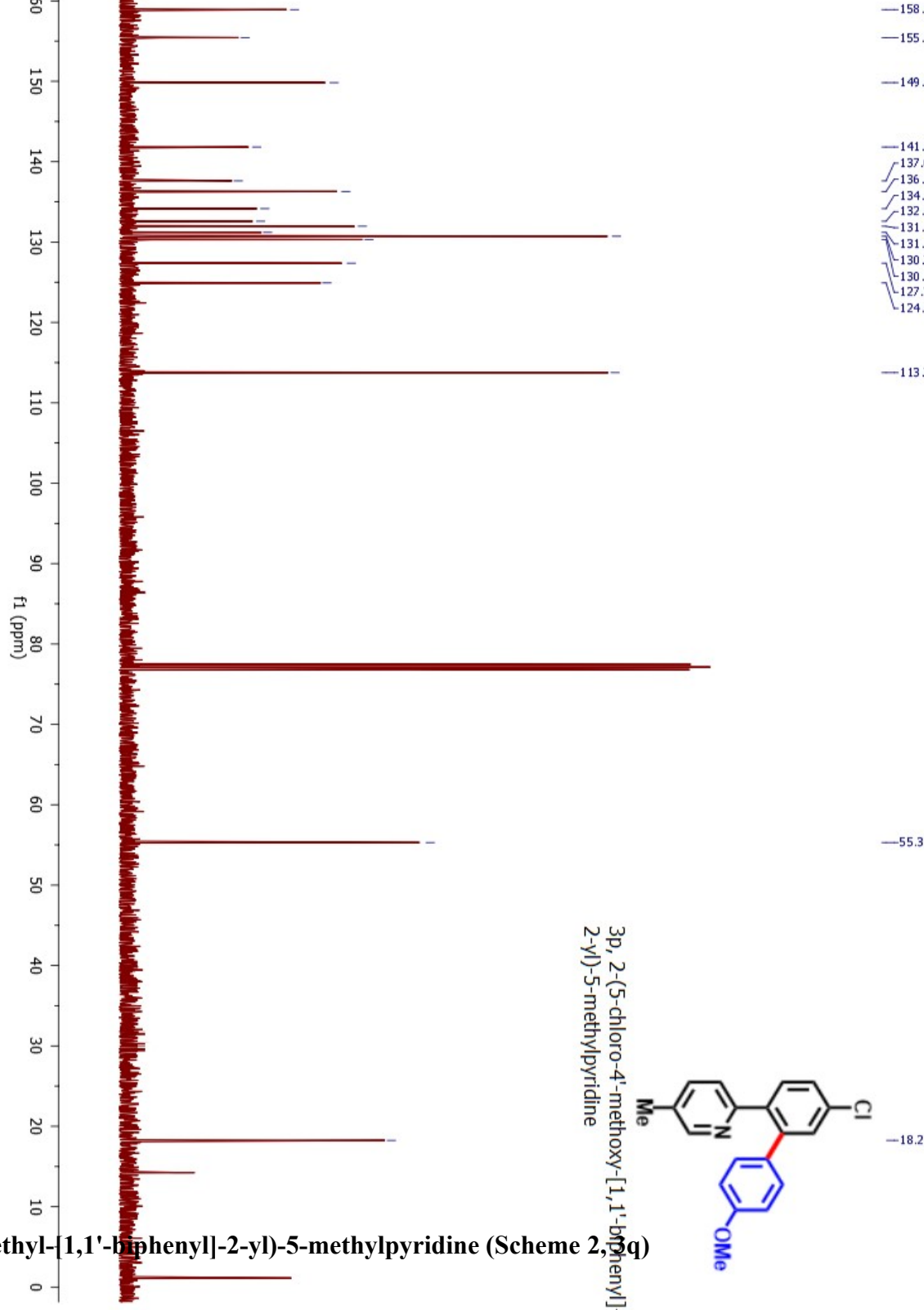
3o, 4'-methoxy-6-(4-methylpyridin-2-yl)-[1,1'-biphenyl]-3-carbonitrile



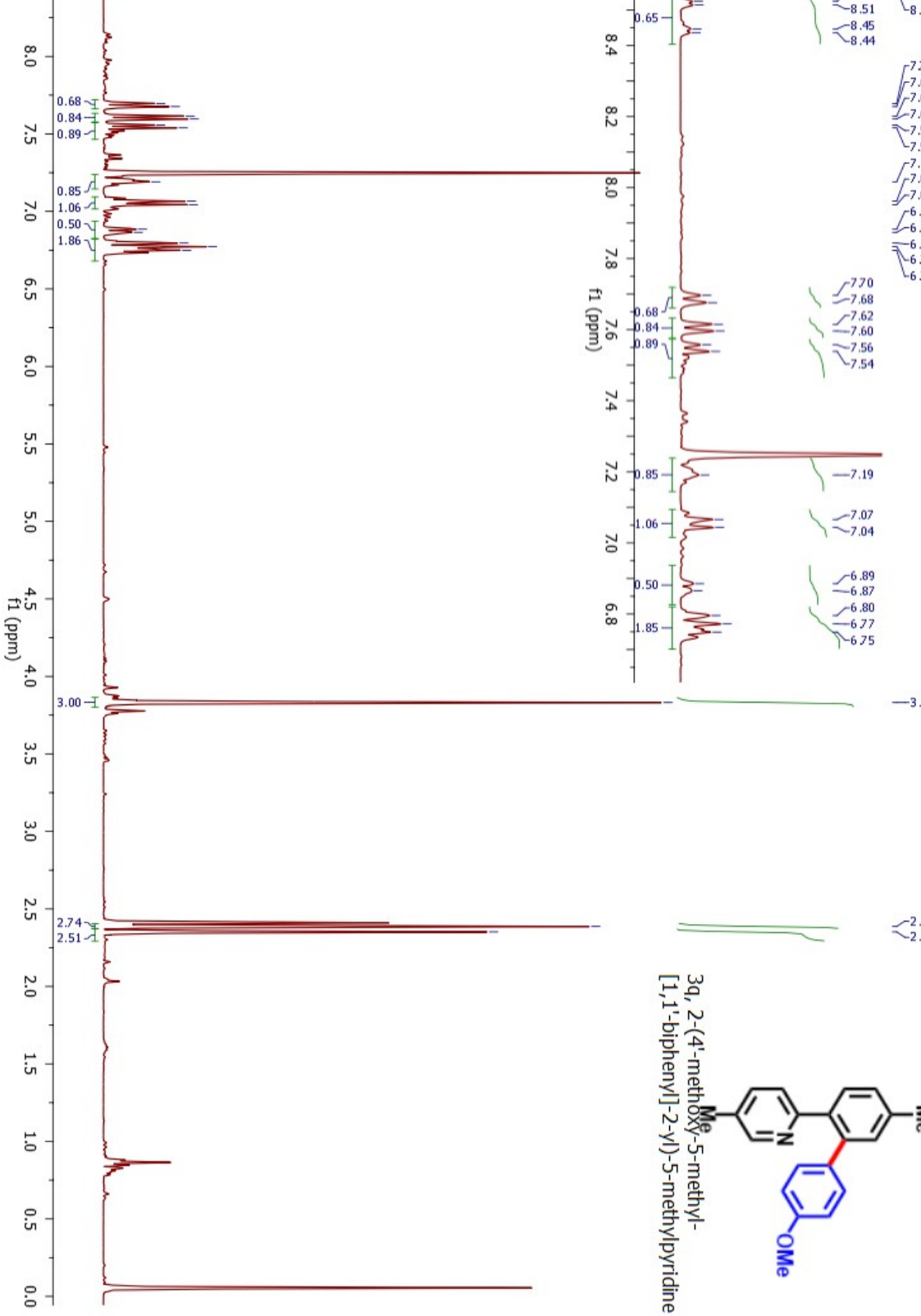
2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3p)

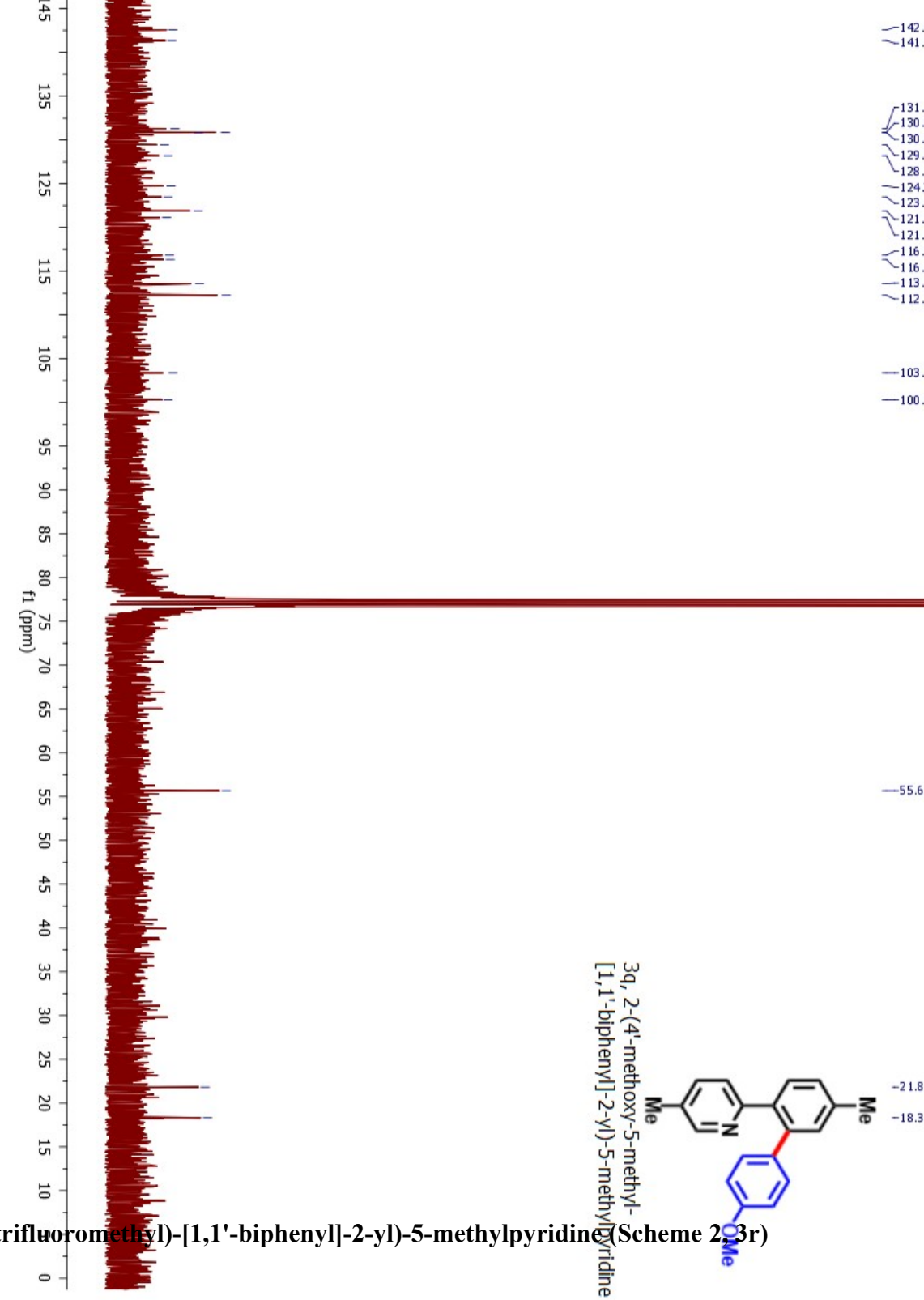


3p, 2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine

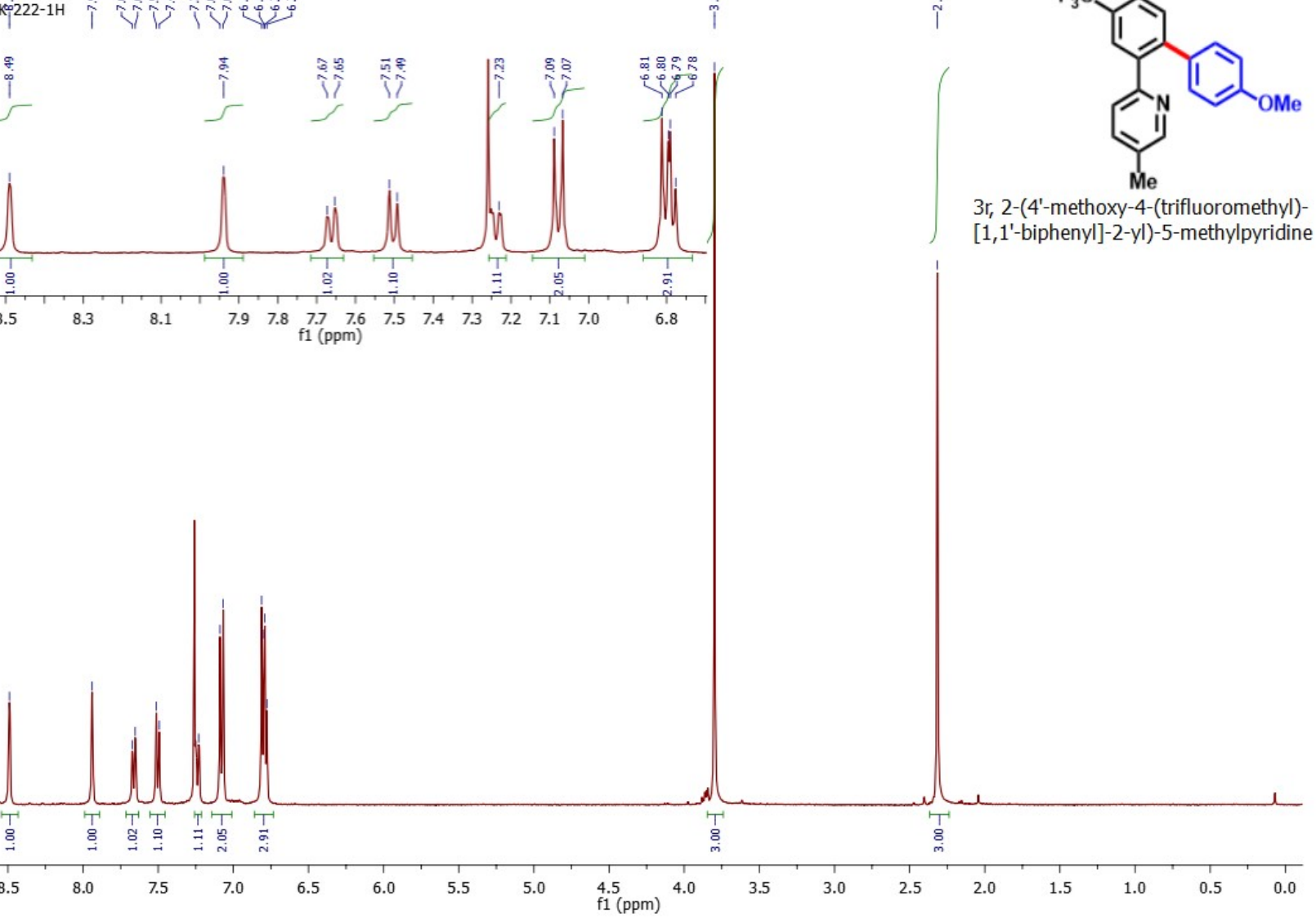


2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3q)

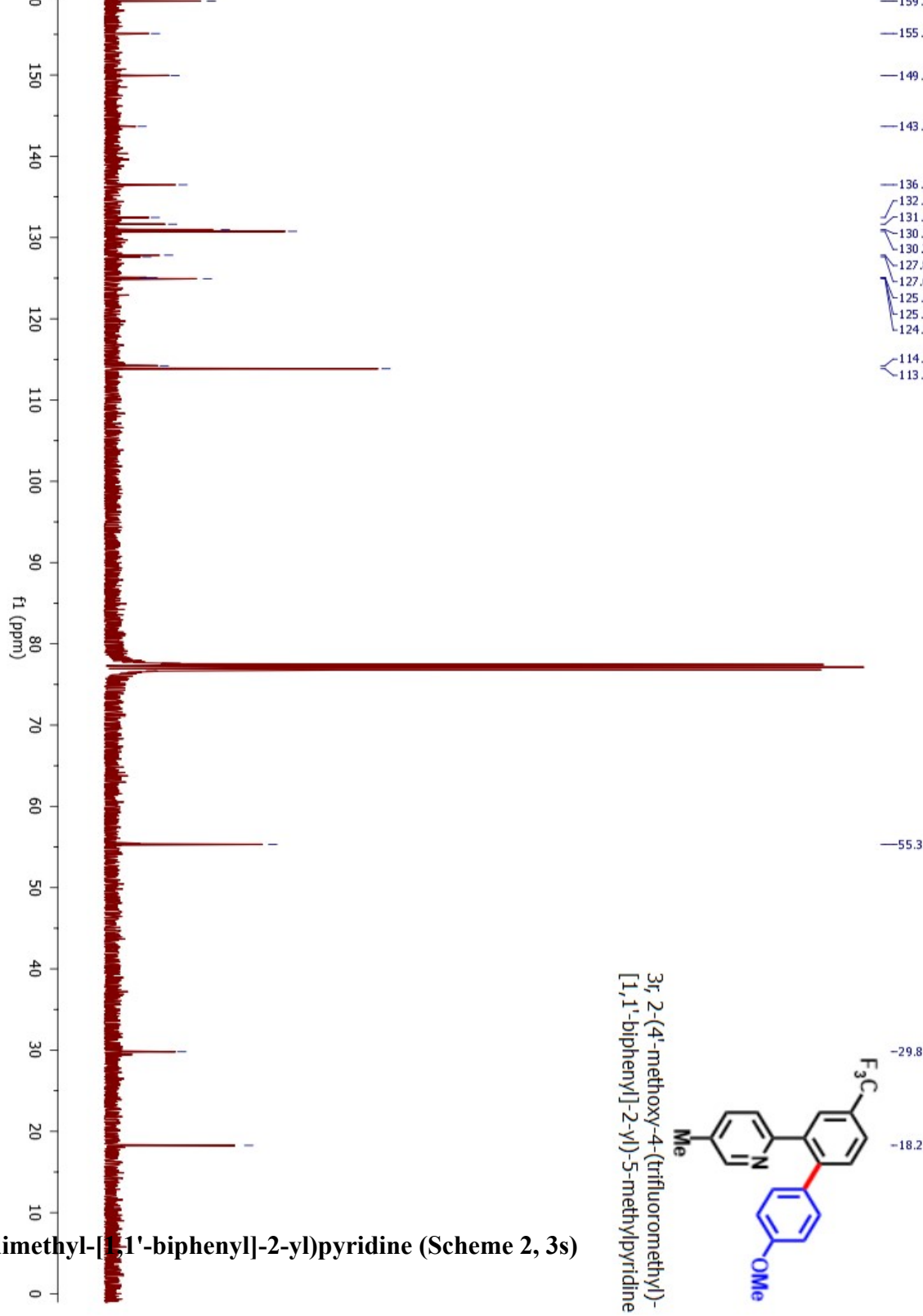

3q, 2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-5-methylpyridine
Me
N
OMe
f1 (ppm)



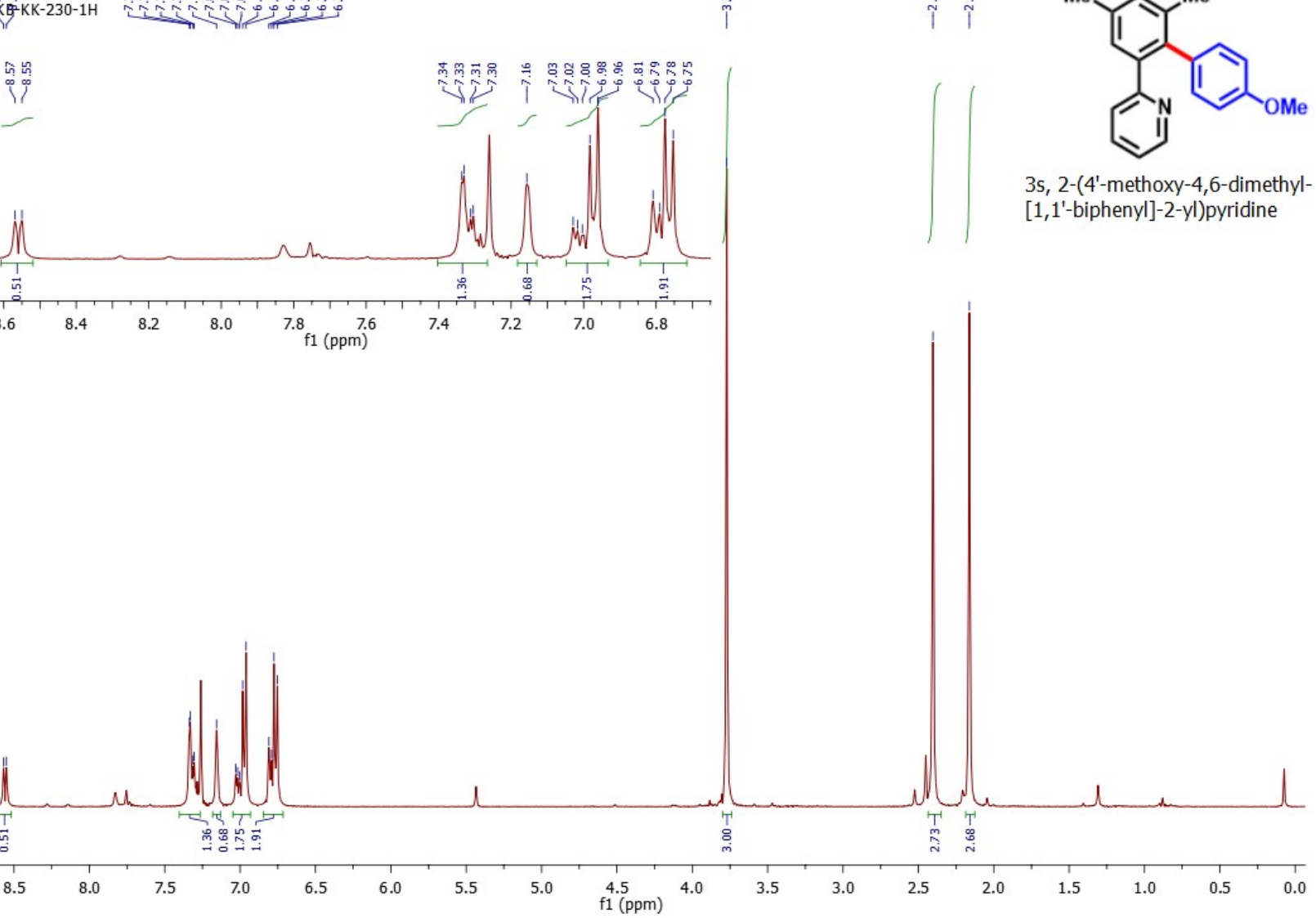
2-(4'-methoxy-4-(trifluoromethyl)-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3r)



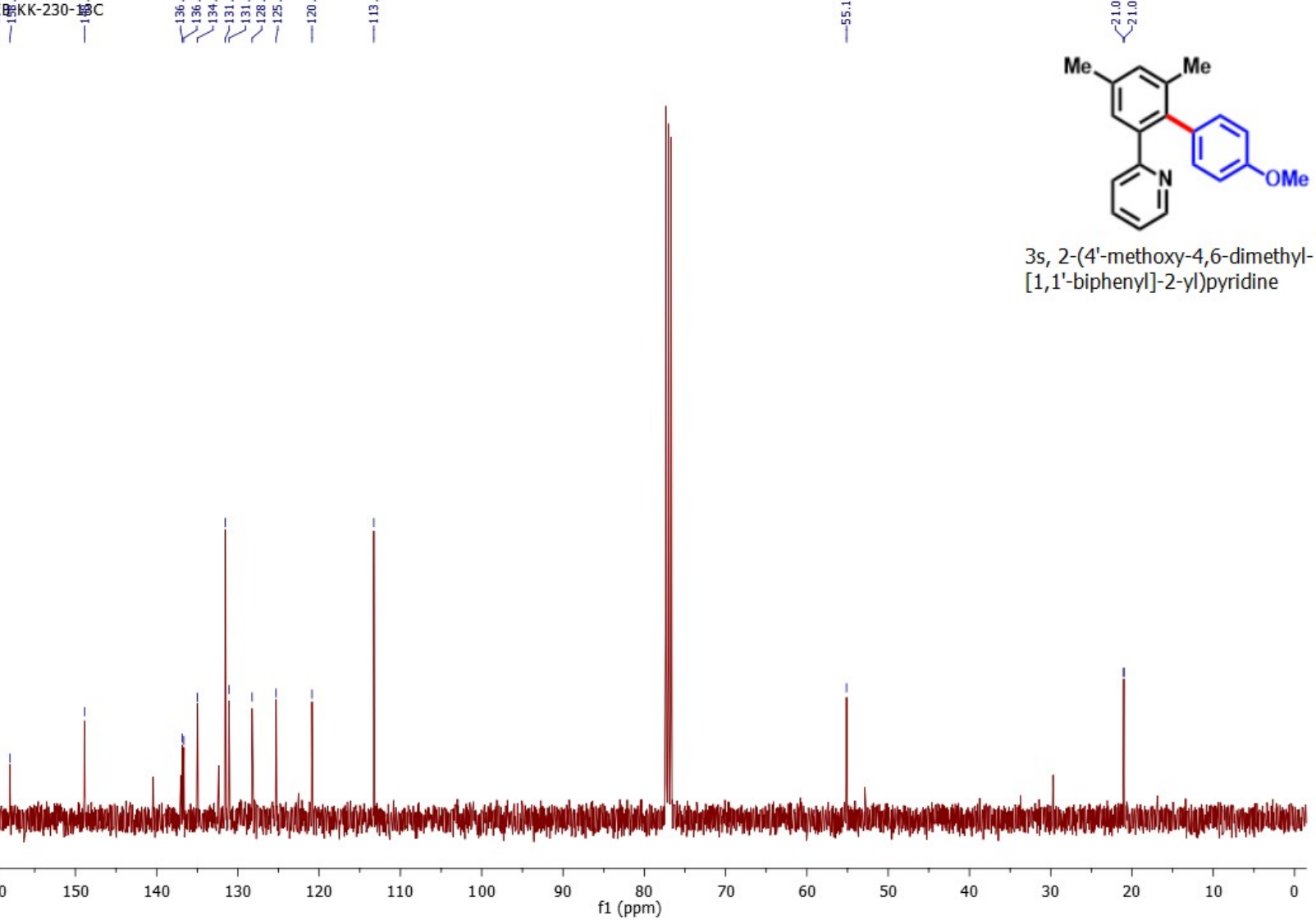
3r, 2-(4'-methoxy-4-(trifluoromethyl)-[1,1'-biphenyl]-2-yl)-5-methylpyridine



2-(4'-methoxy-4,6-dimethyl-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3s)

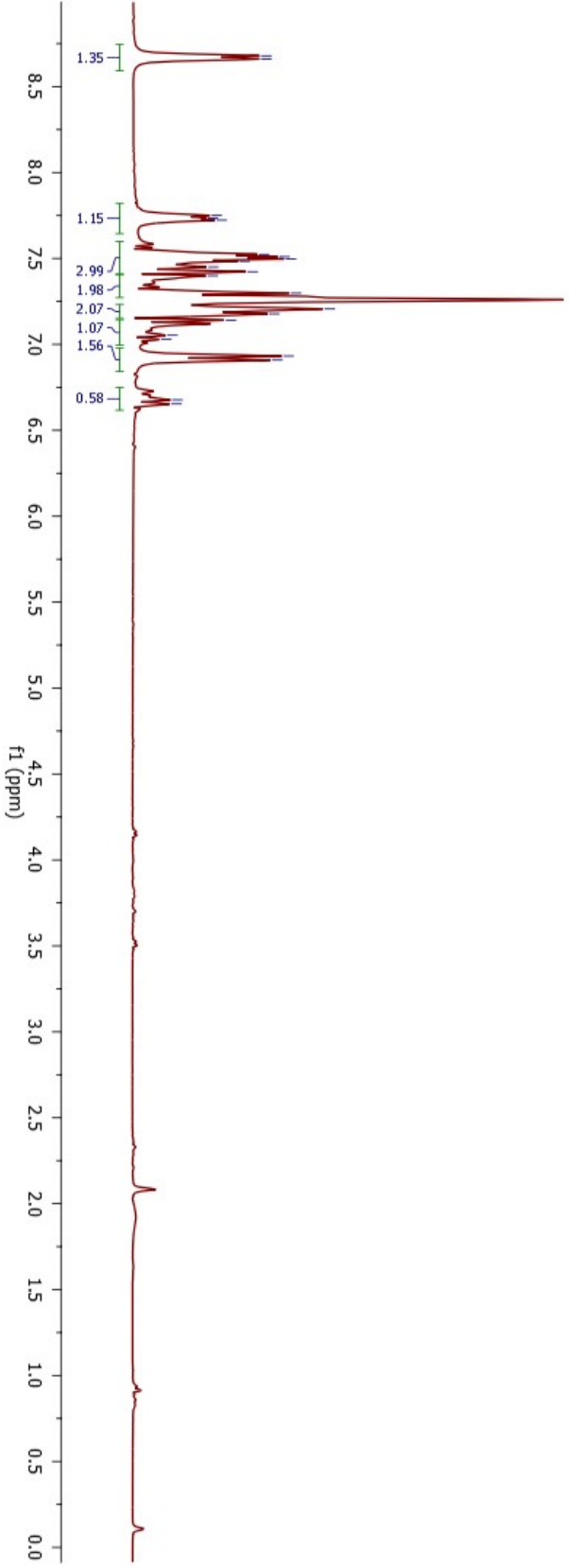


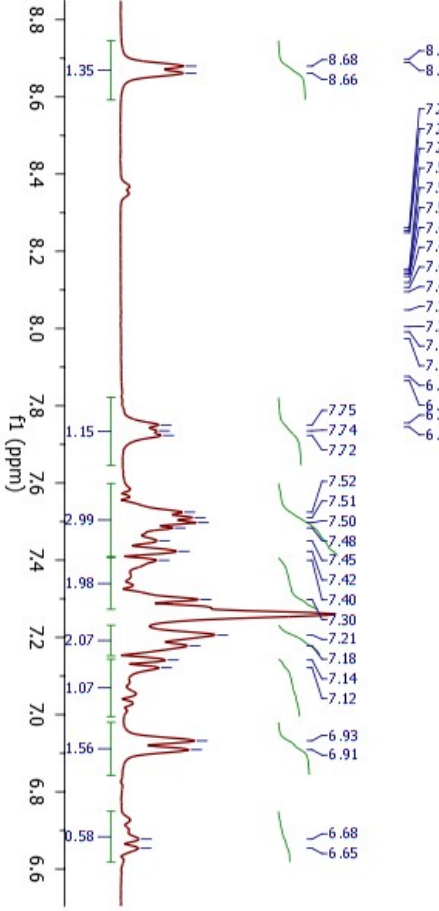
3s, 2-(4'-methoxy-4,6-dimethyl-[1,1'-biphenyl]-2-yl)pyridine



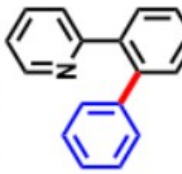
3s, 2-(4'-methoxy-4,6-dimethyl-[1,1'-biphenyl]-2-yl)pyridine

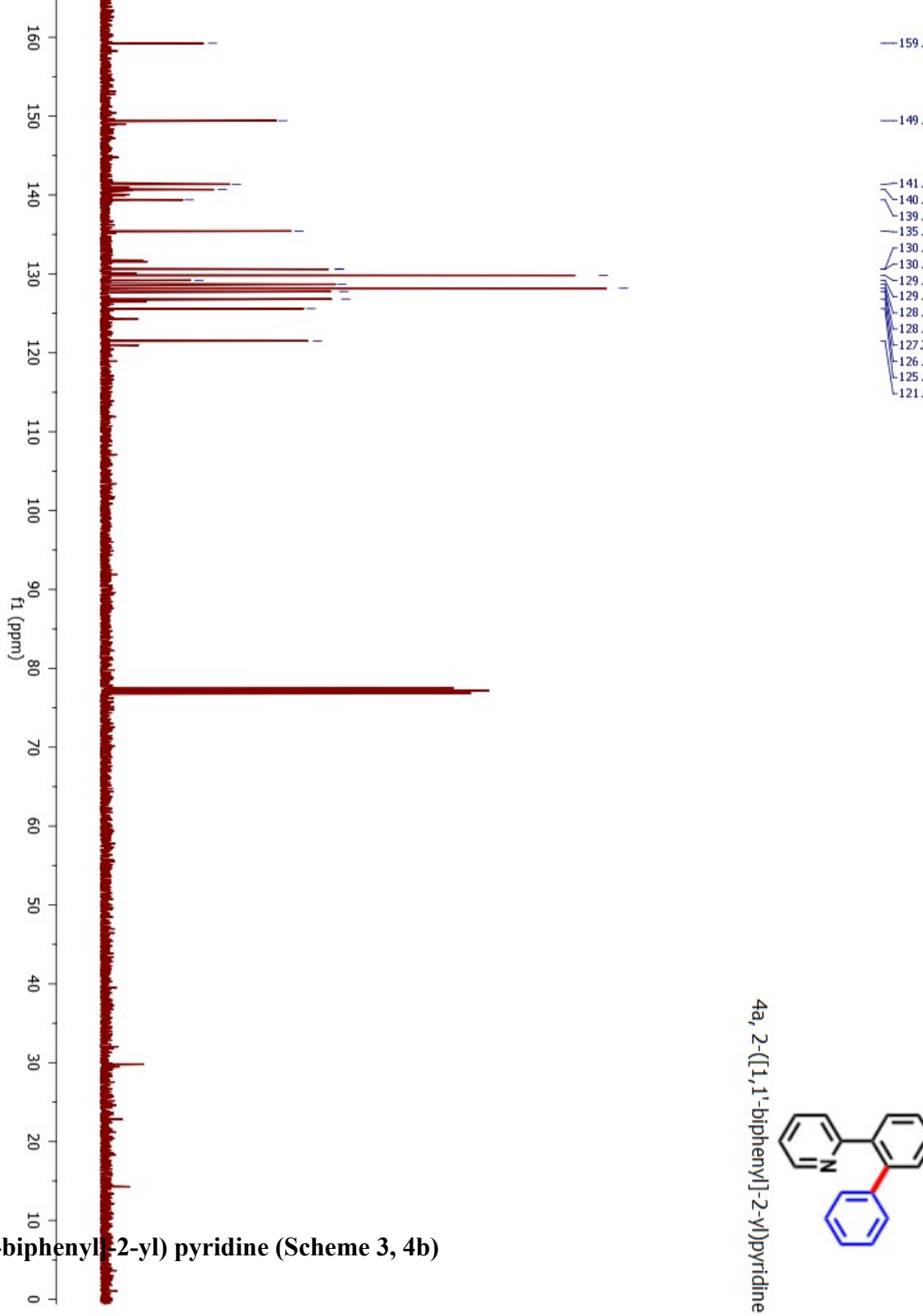
2-([1,1'-biphenyl]-2



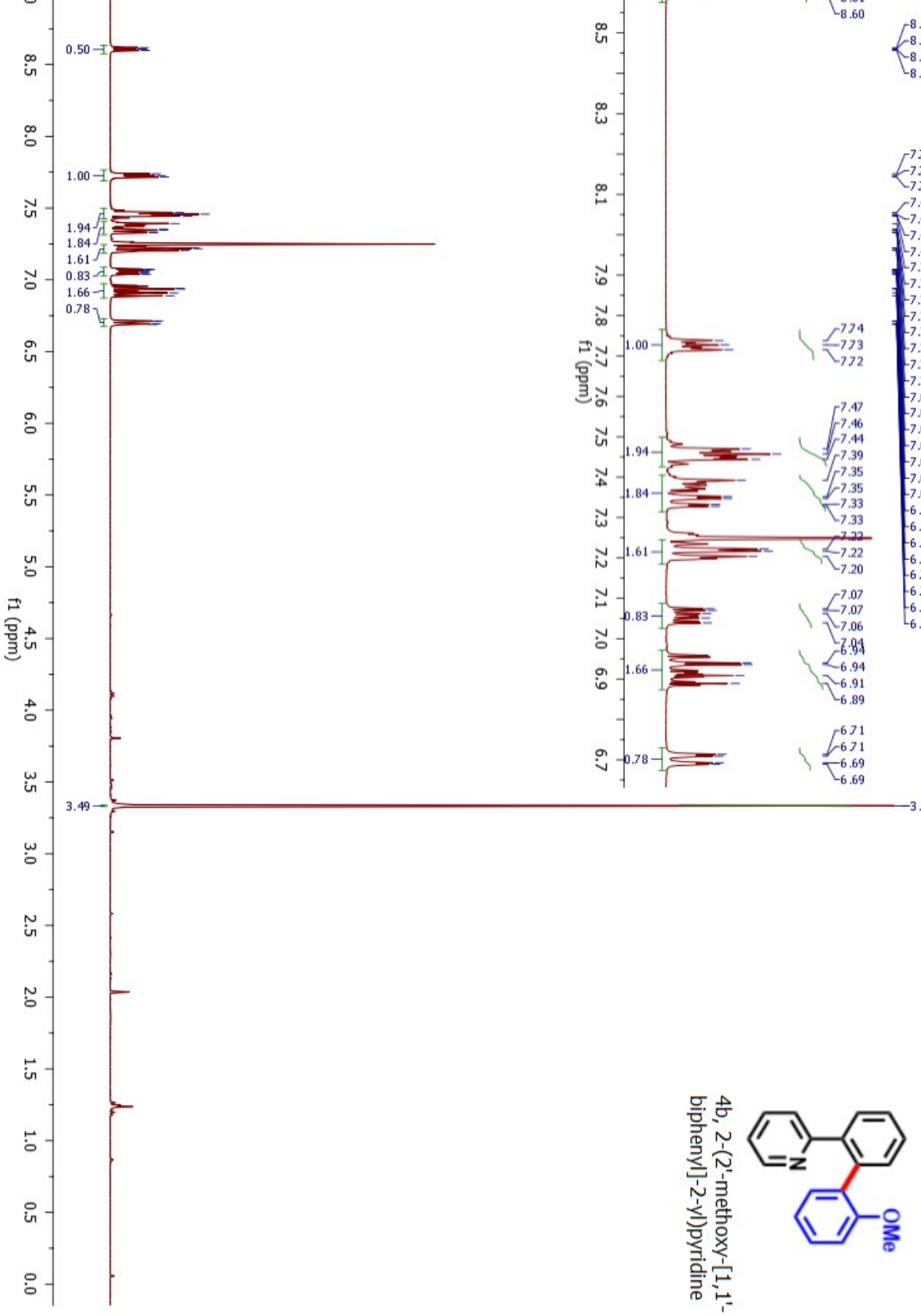


4a, 2-([1,1'-biphenyl]-2-yl)pyridine

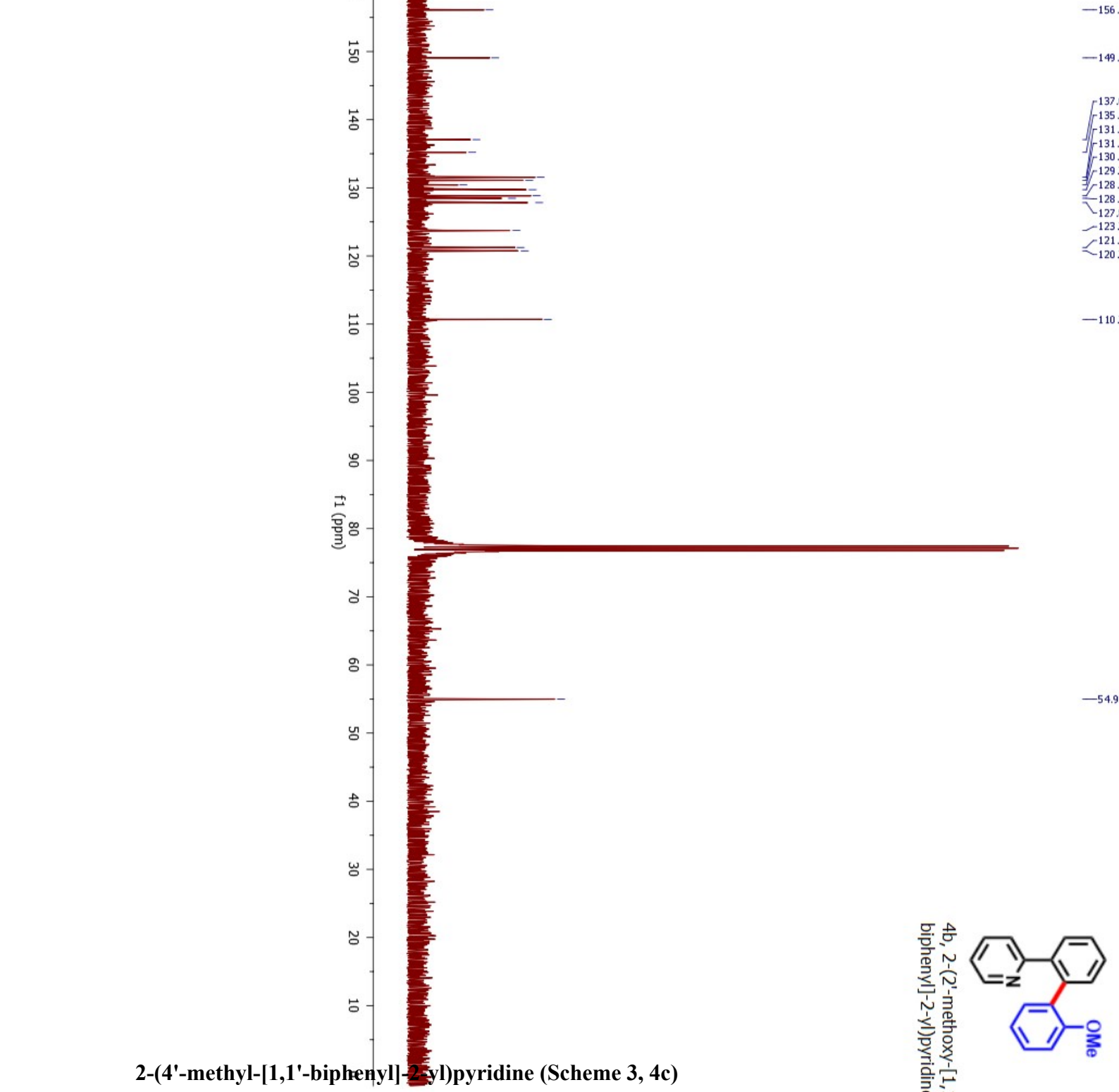




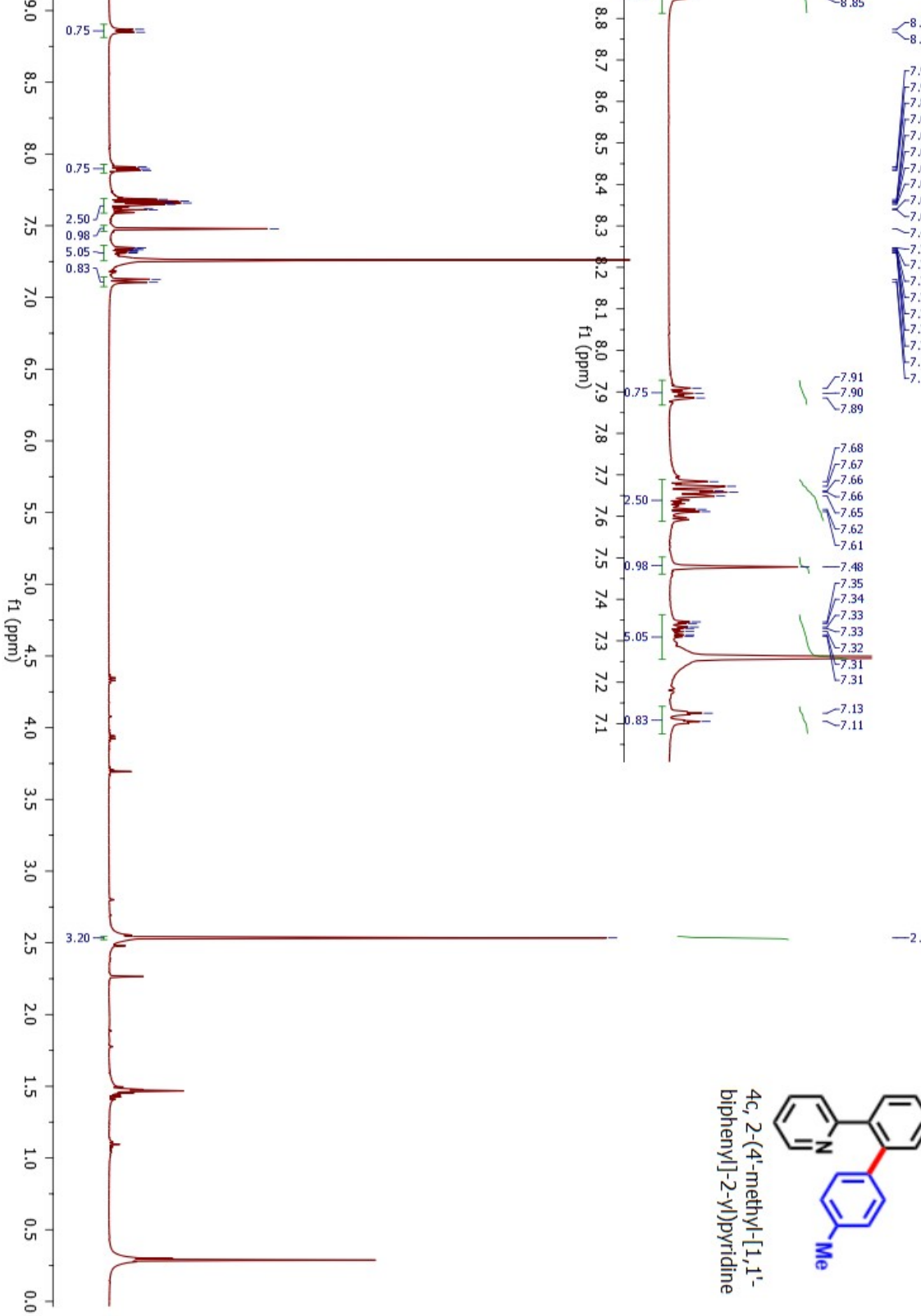
2-(2'-methoxy-[1,1'-biphenyl]-2-yl) pyridine (Scheme 3, 4b)



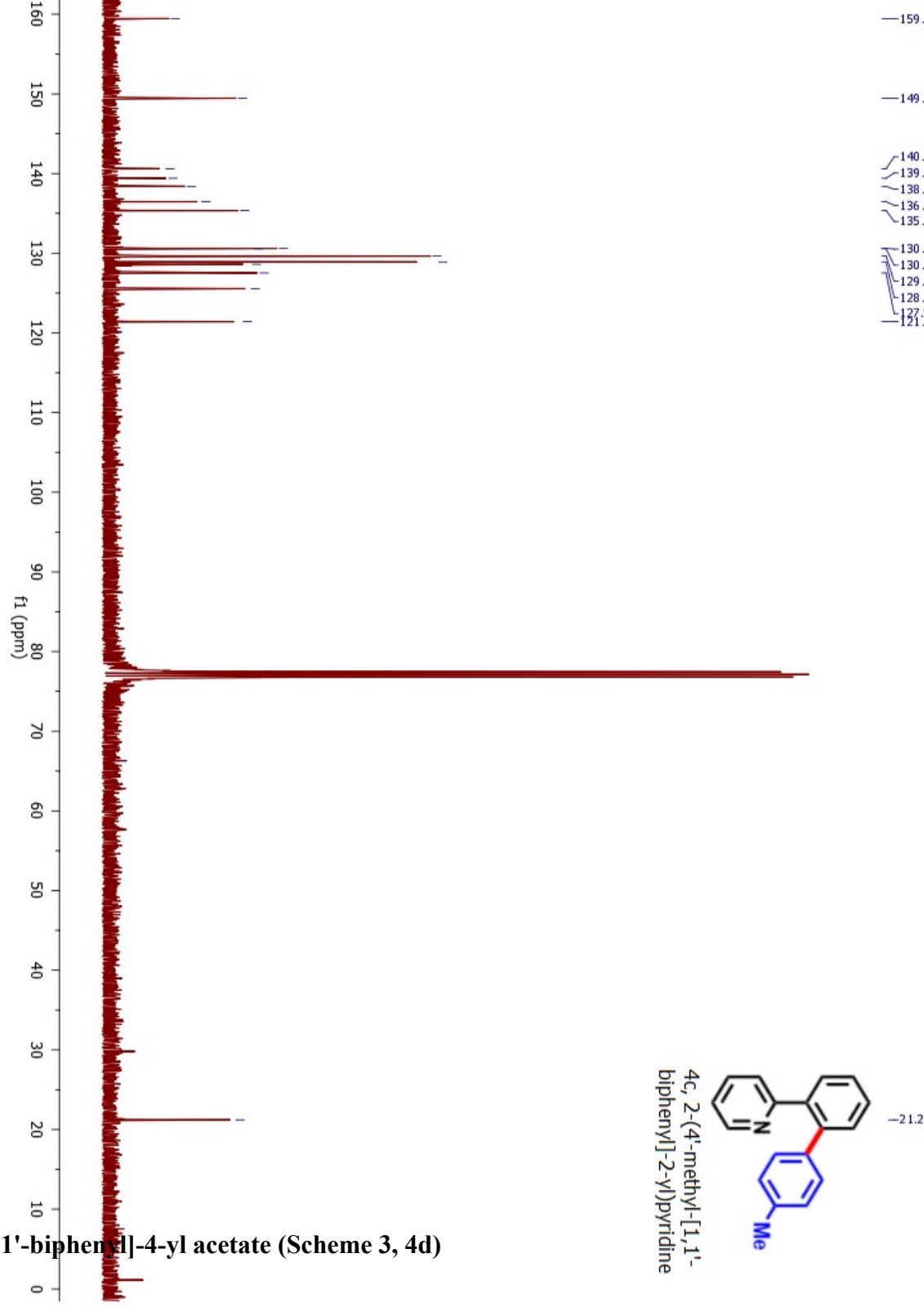
4b, 2-(2'-methoxy-[1,1'-biphenyl]-2-yl)pyridine



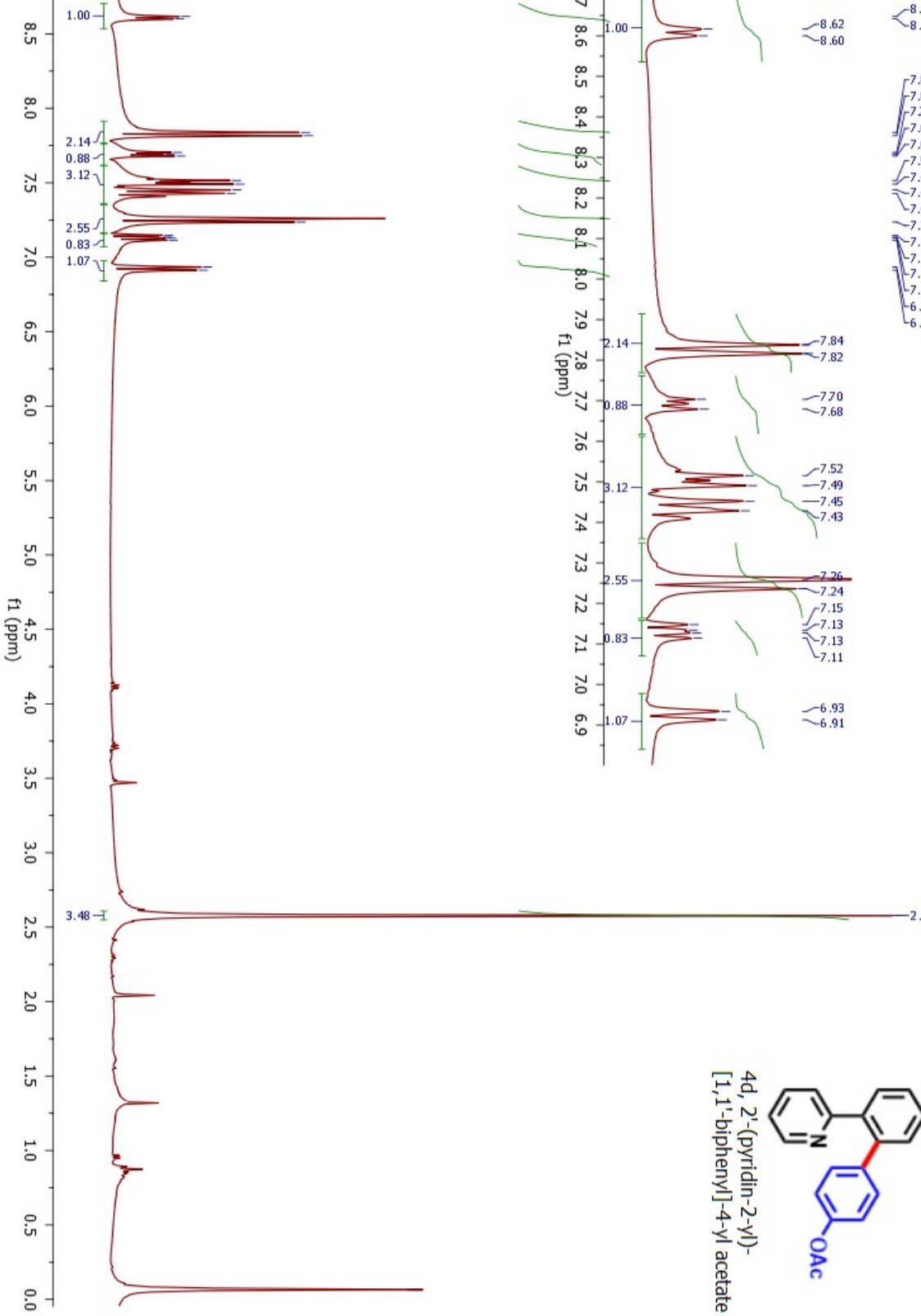
2-(4'-methyl-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4c)

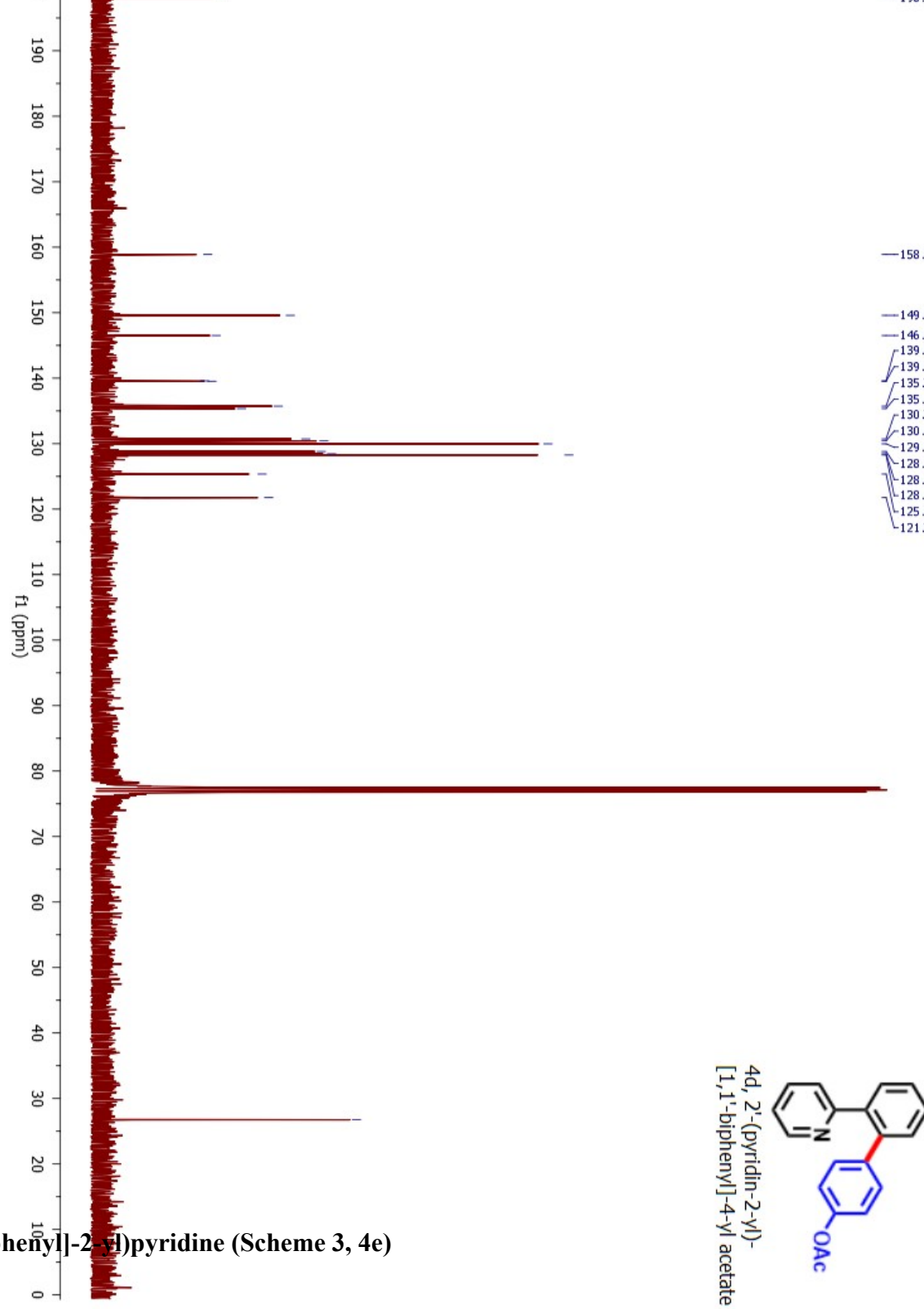


4c, 2-(4'-methyl-[1,1'-biphenyl]-2-yl)pyridine

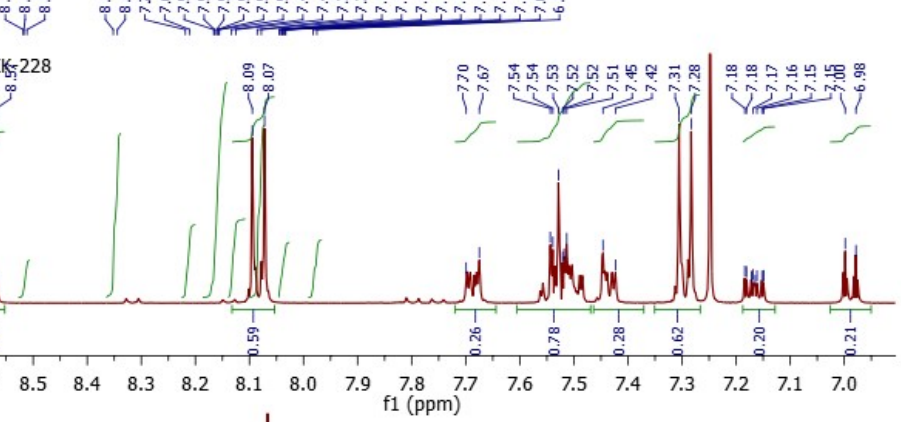


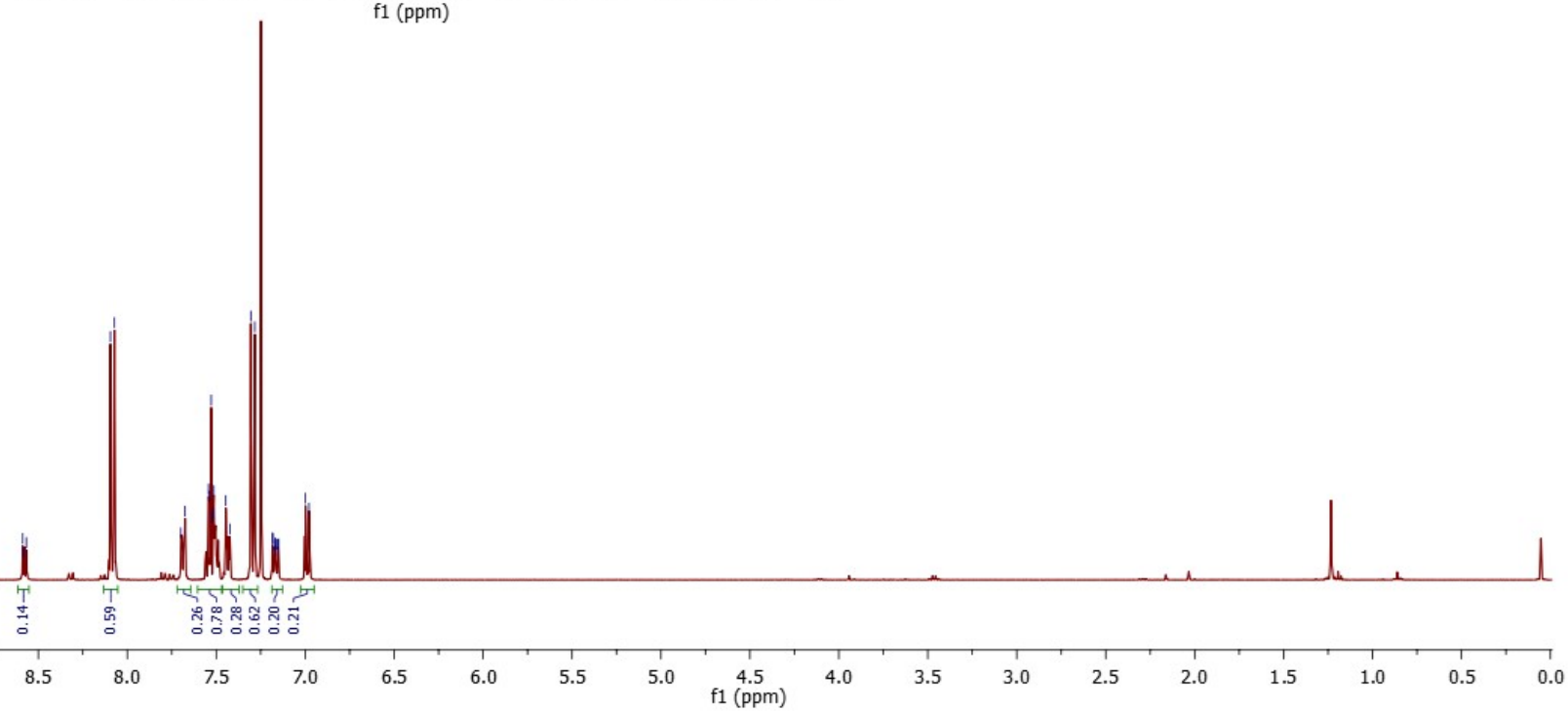
2'-(pyridin-2-yl)-[1,1'-biphenyl]-4-yl acetate (Scheme 3, 4d)

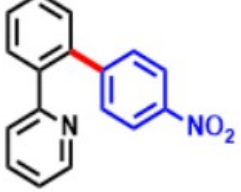

4d, 2'-(pyridin-2-yl)-[1,1'-biphenyl]-4-yl acetate
f1 (ppm)
OAc



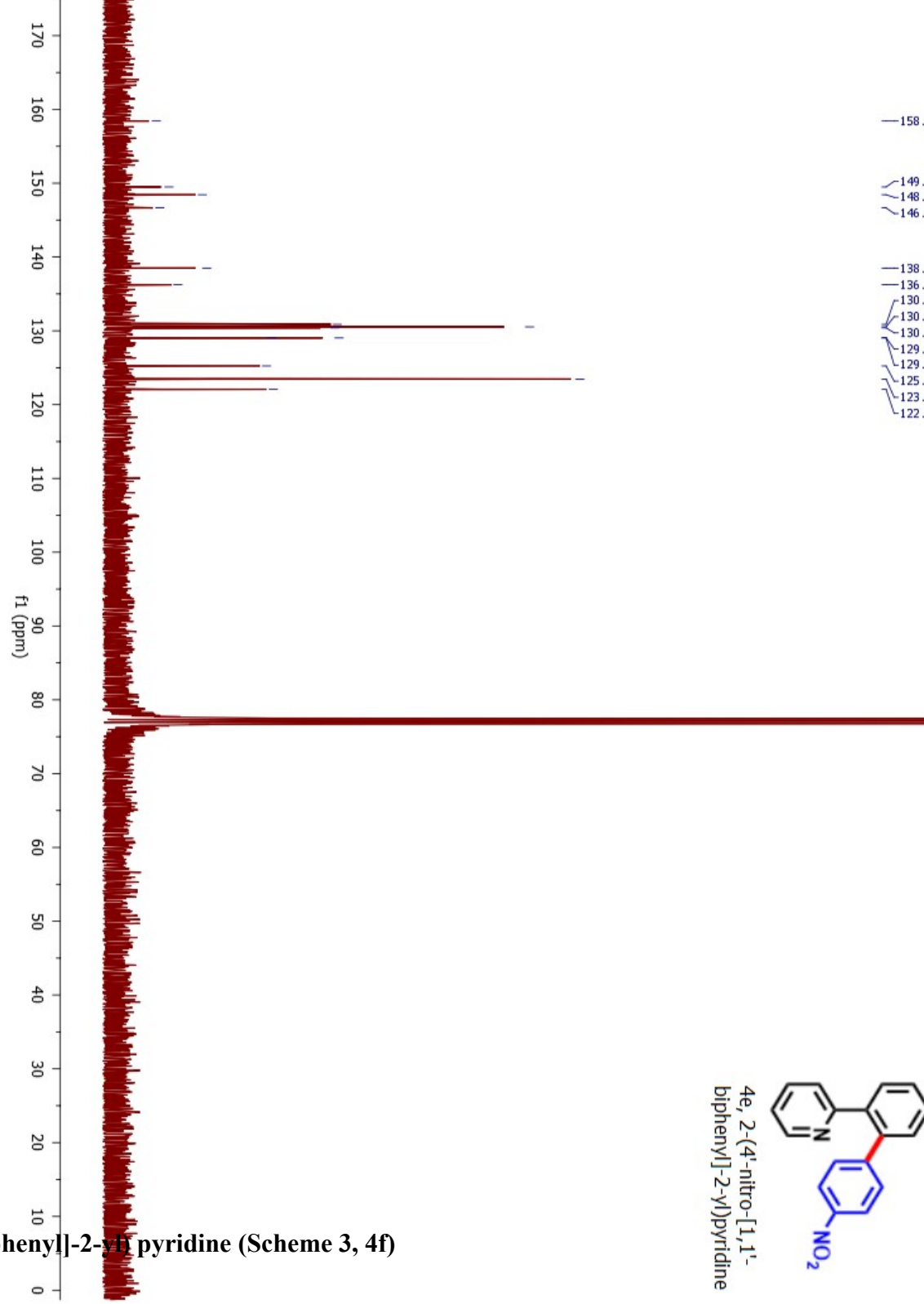
2-(4'-nitro-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4e)



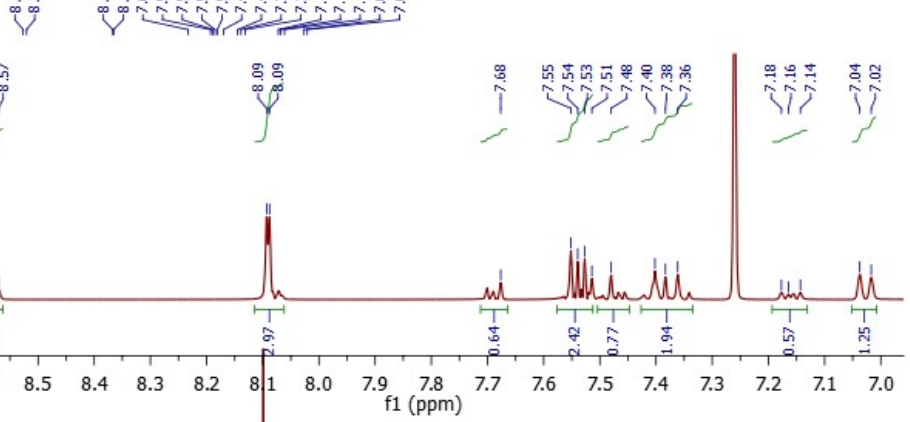


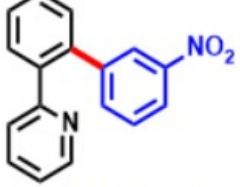


4e, 2-(4'-nitro-[1,1'-biphenyl]-2-yl)pyridine

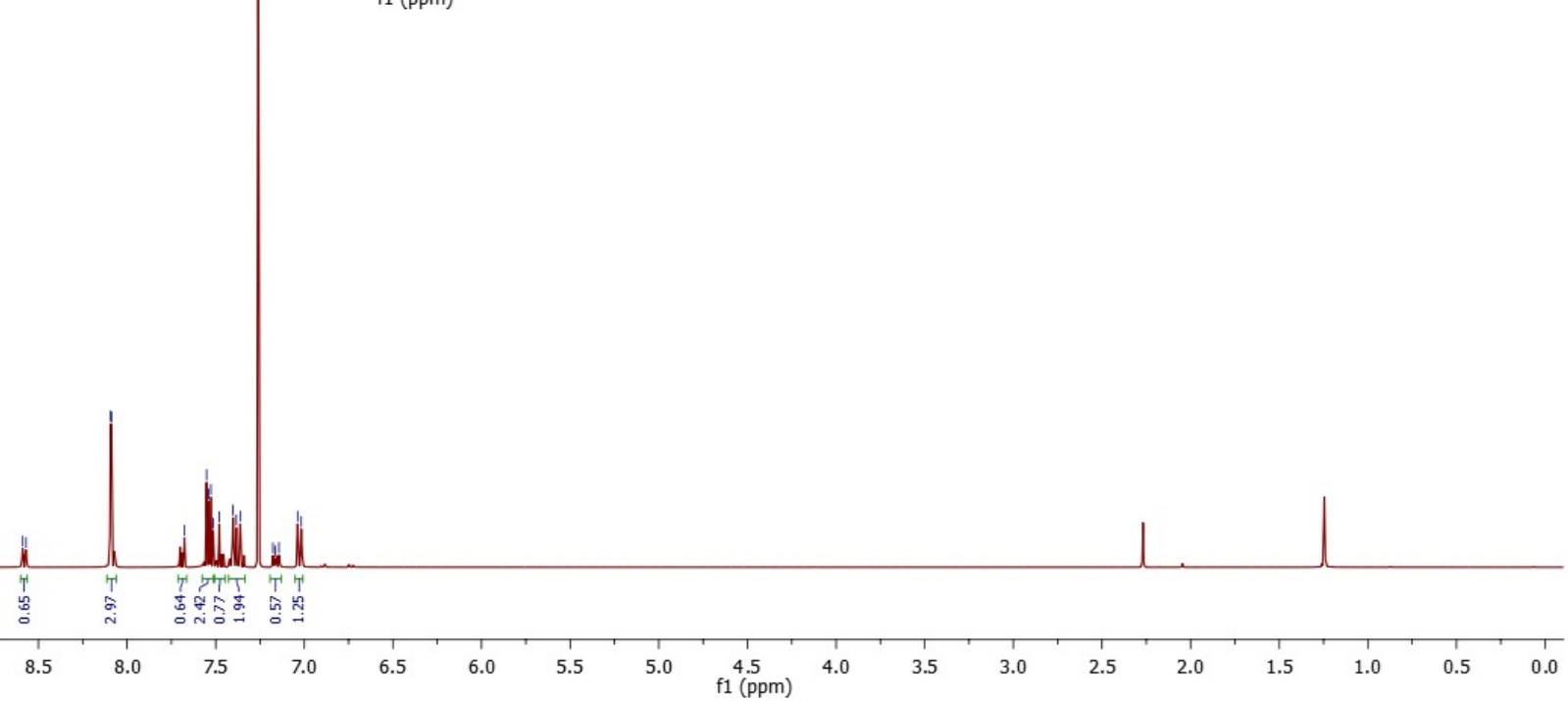


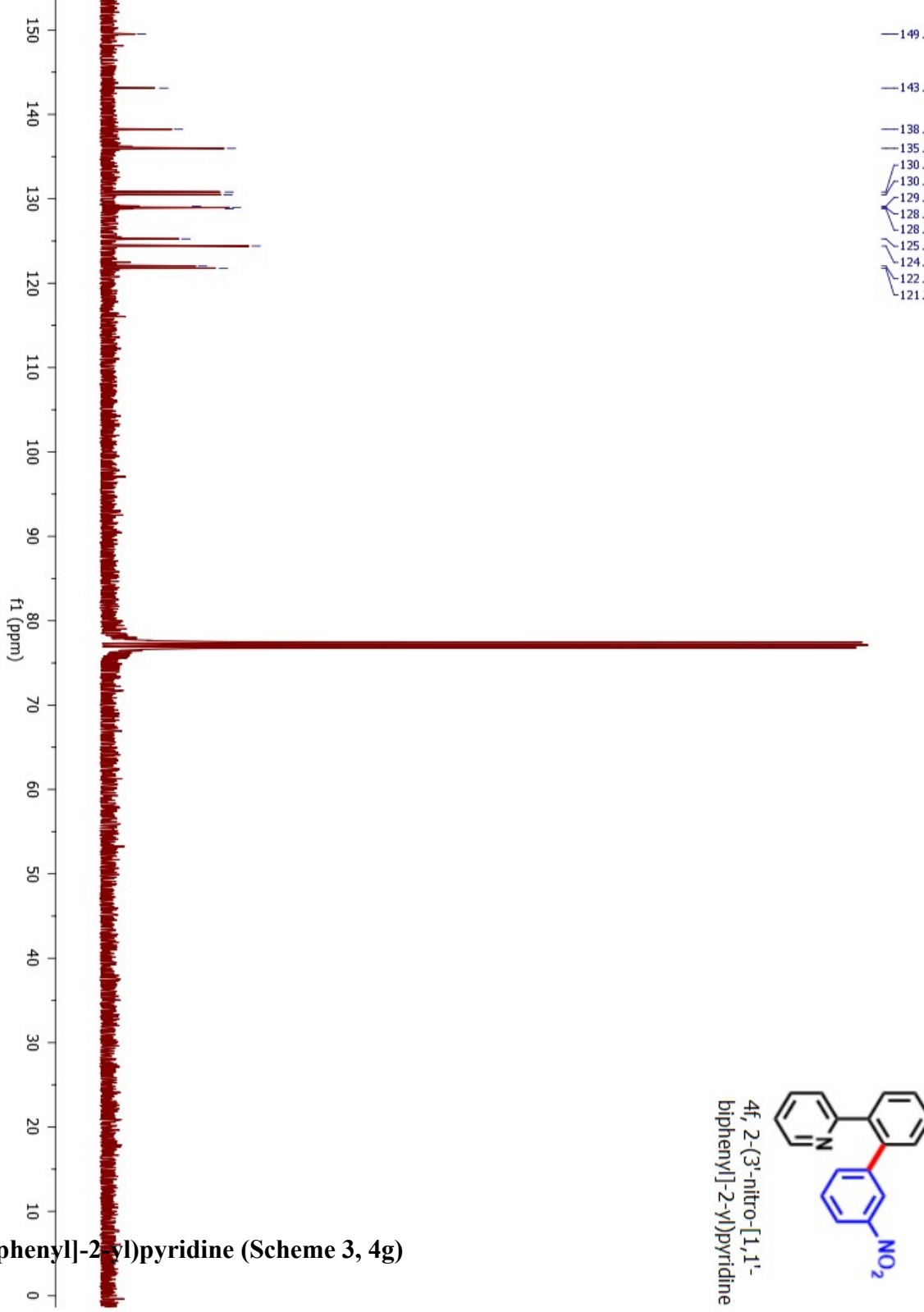
2-(3'-nitro-[1,1'-biphenyl]-2-yl) pyridine (Scheme 3, 4f)



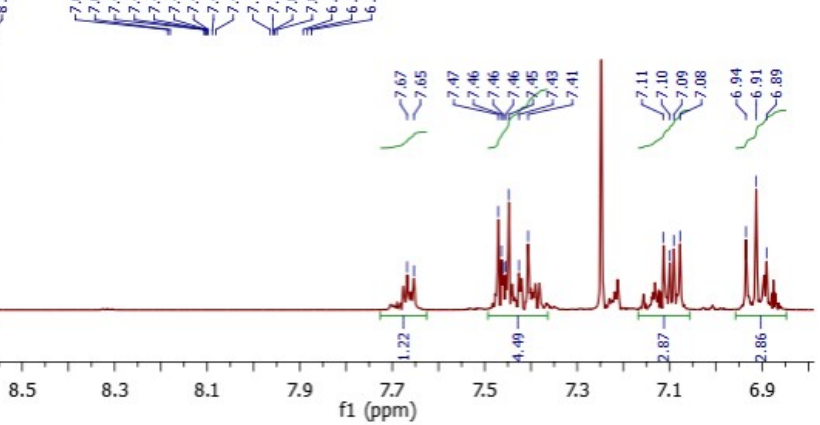


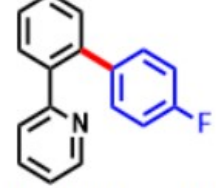
4f, 2-(3'-nitro-[1,1'-biphenyl]-2-yl)pyridine



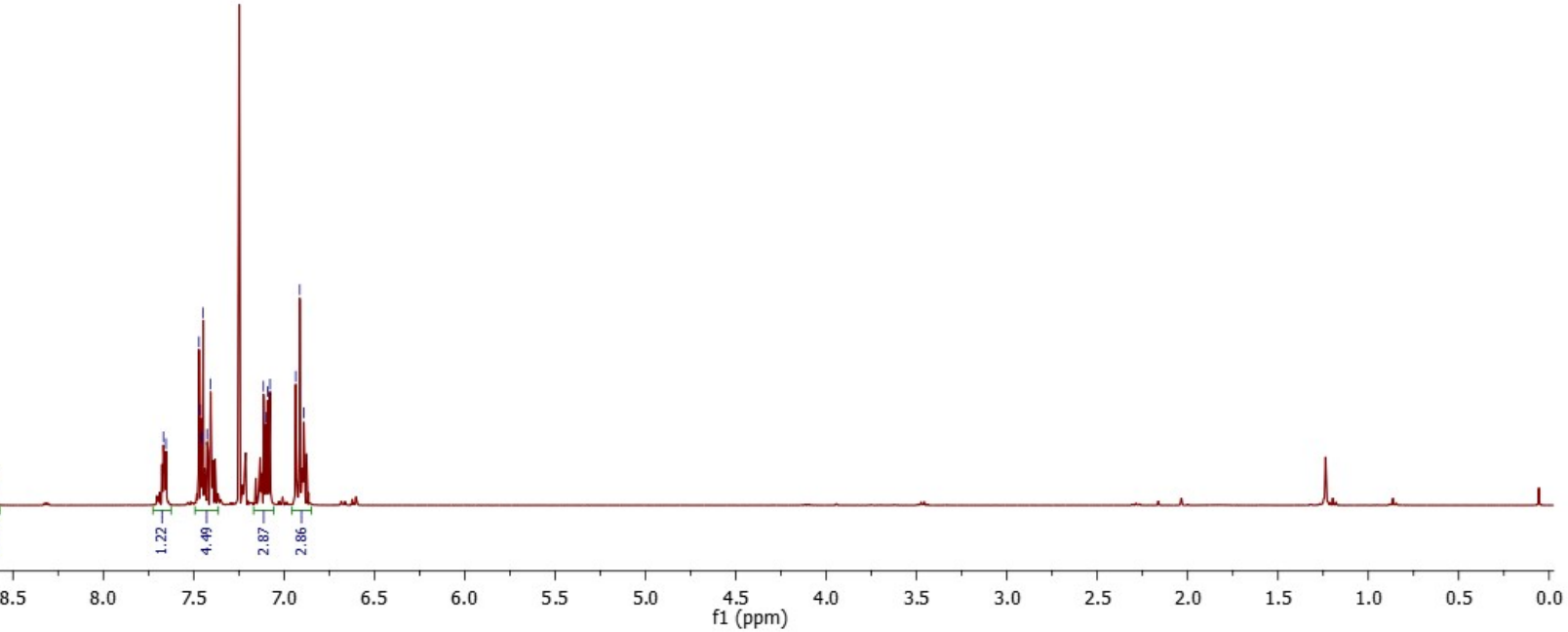


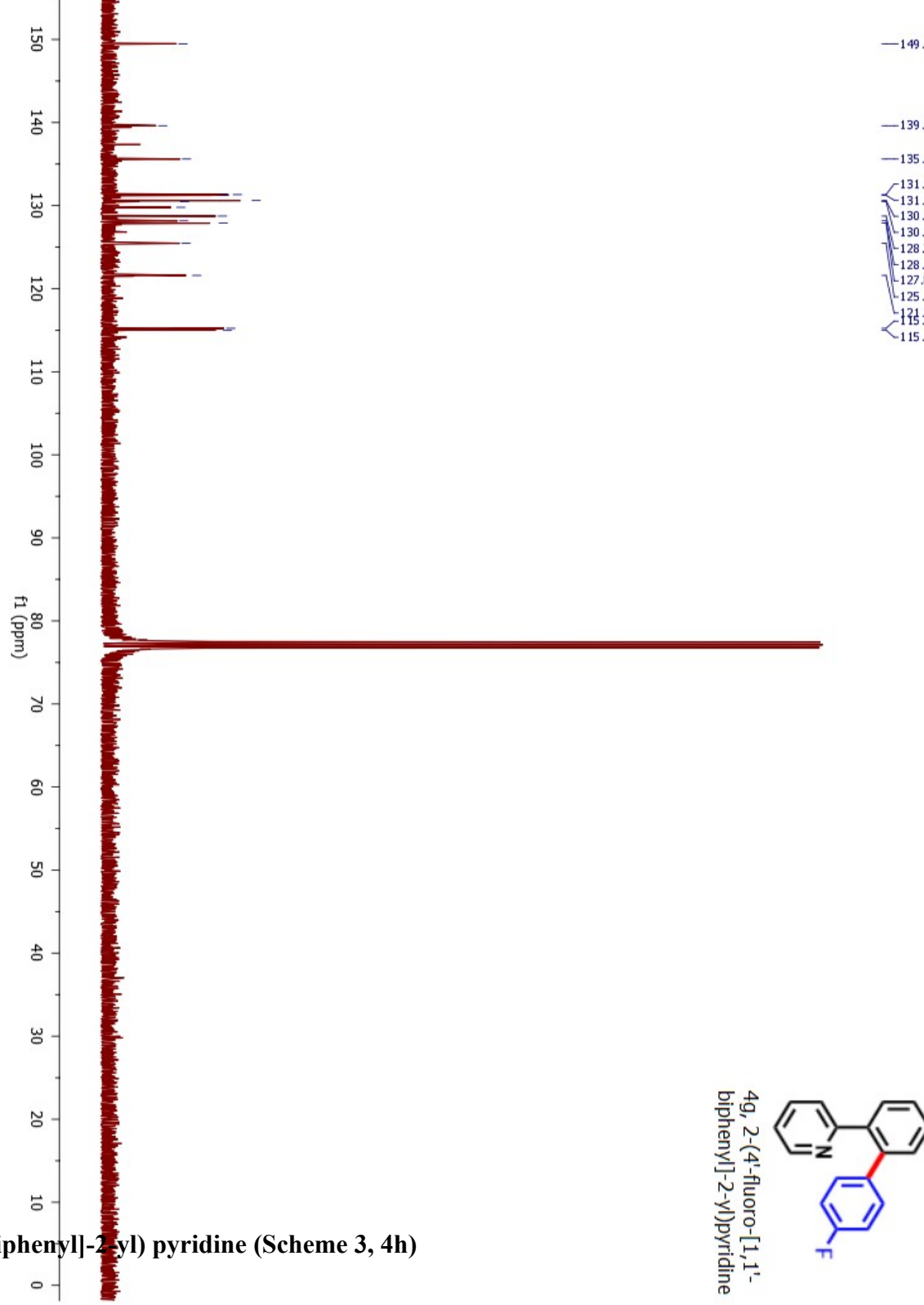
2-(4'-fluoro-[1,1'-biphenyl]-2-yl)pyridine (Scheme 3, 4g)



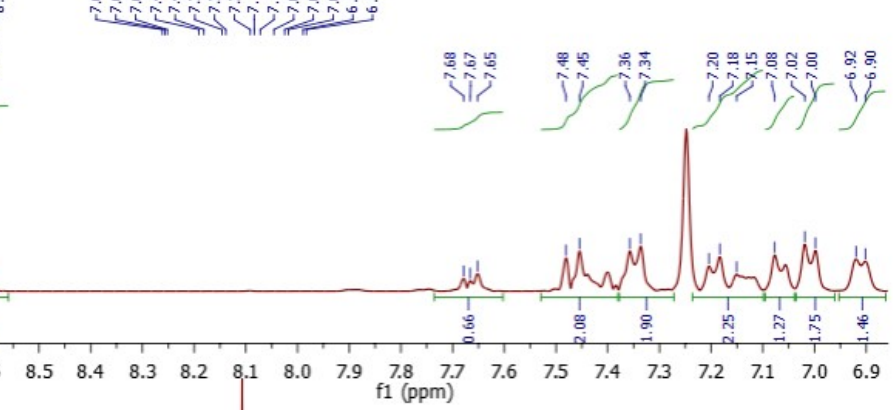


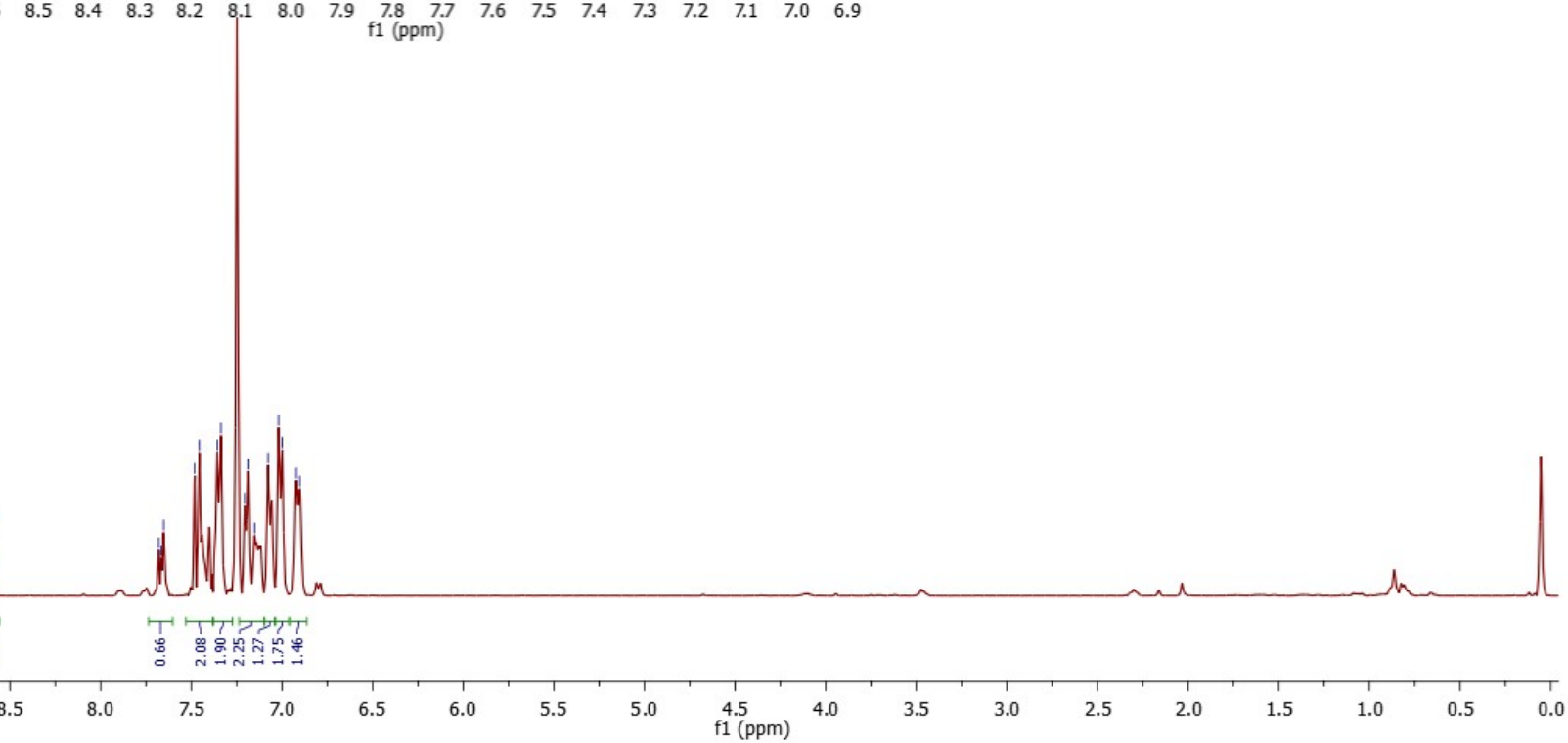
4g, 2-(4'-fluoro-[1,1'-biphenyl]-2-yl)pyridine

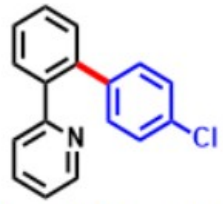




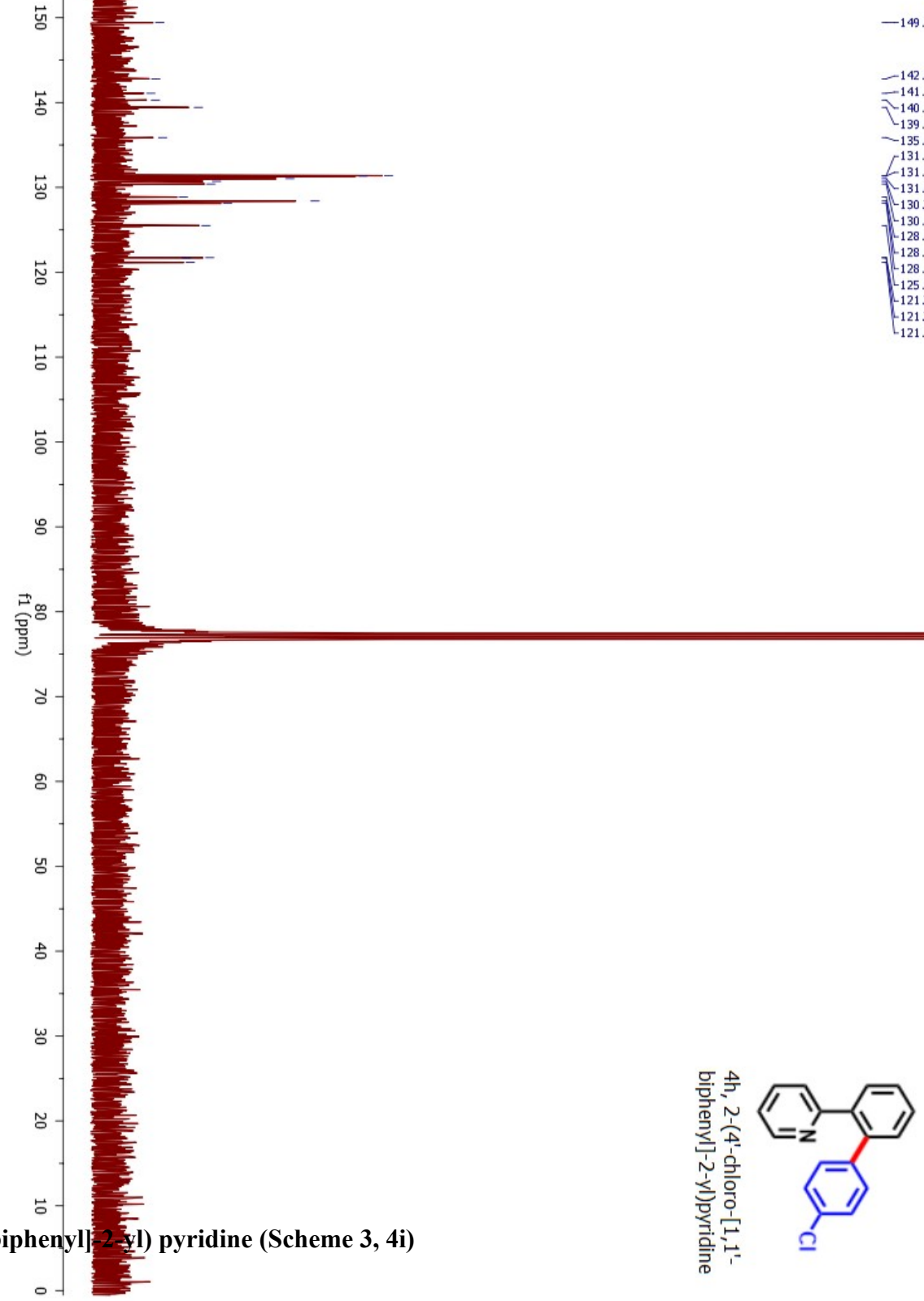
2-(4'-chloro-[1,1'-biphenyl]-2-yl) pyridine (Scheme 3, 4h)



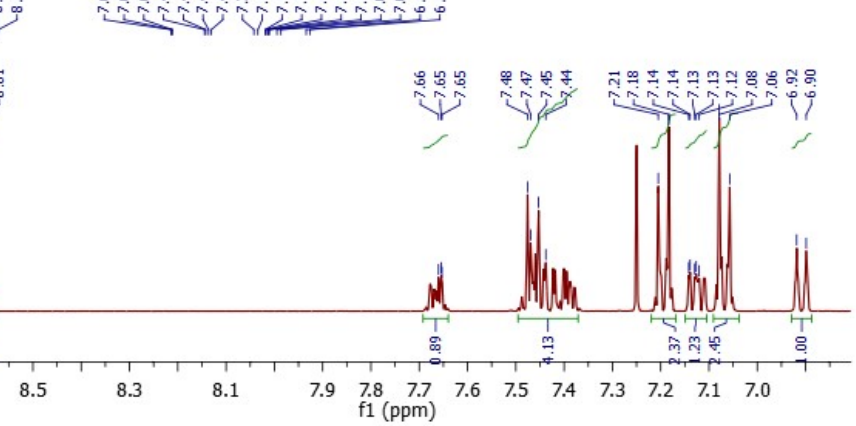


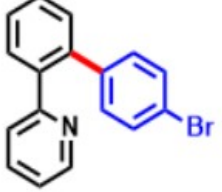


4h, 2-(4'-chloro-[1,1'-biphenyl]-2-yl)pyridine

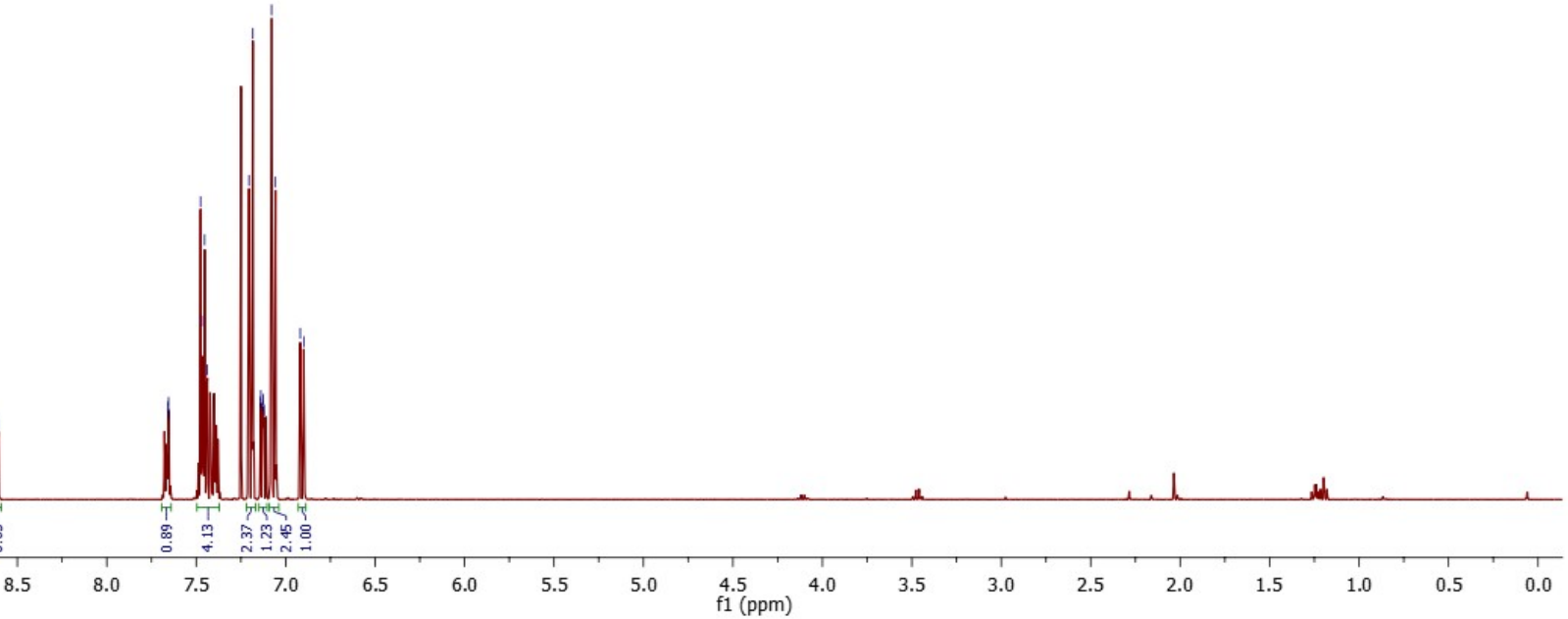


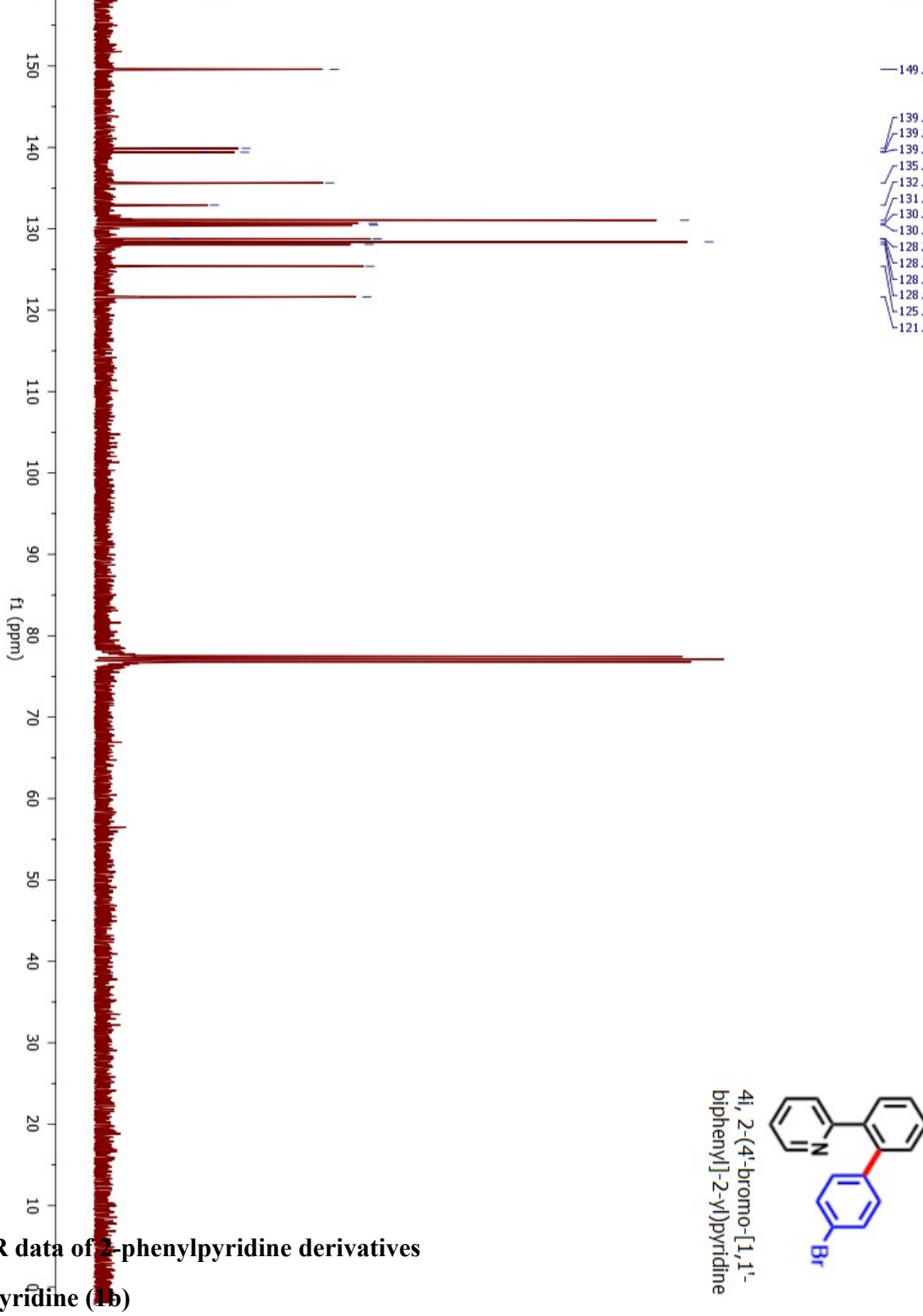
2-(4'-bromo-[1,1'-biphenyl]-2-yl) pyridine (Scheme 3, 4i)





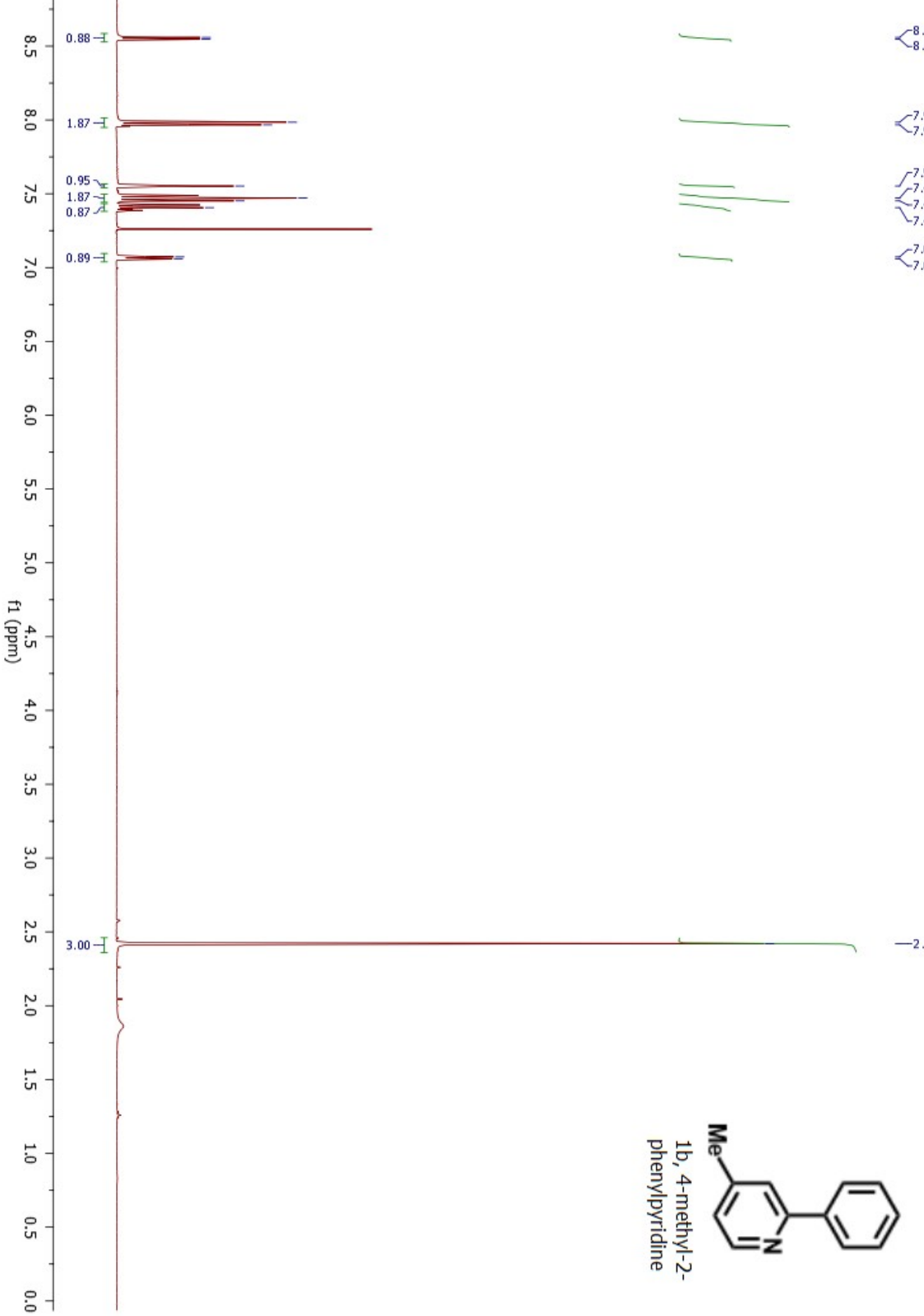
4i, 2-(4'-bromo-[1,1'-biphenyl]-2-yl)pyridine

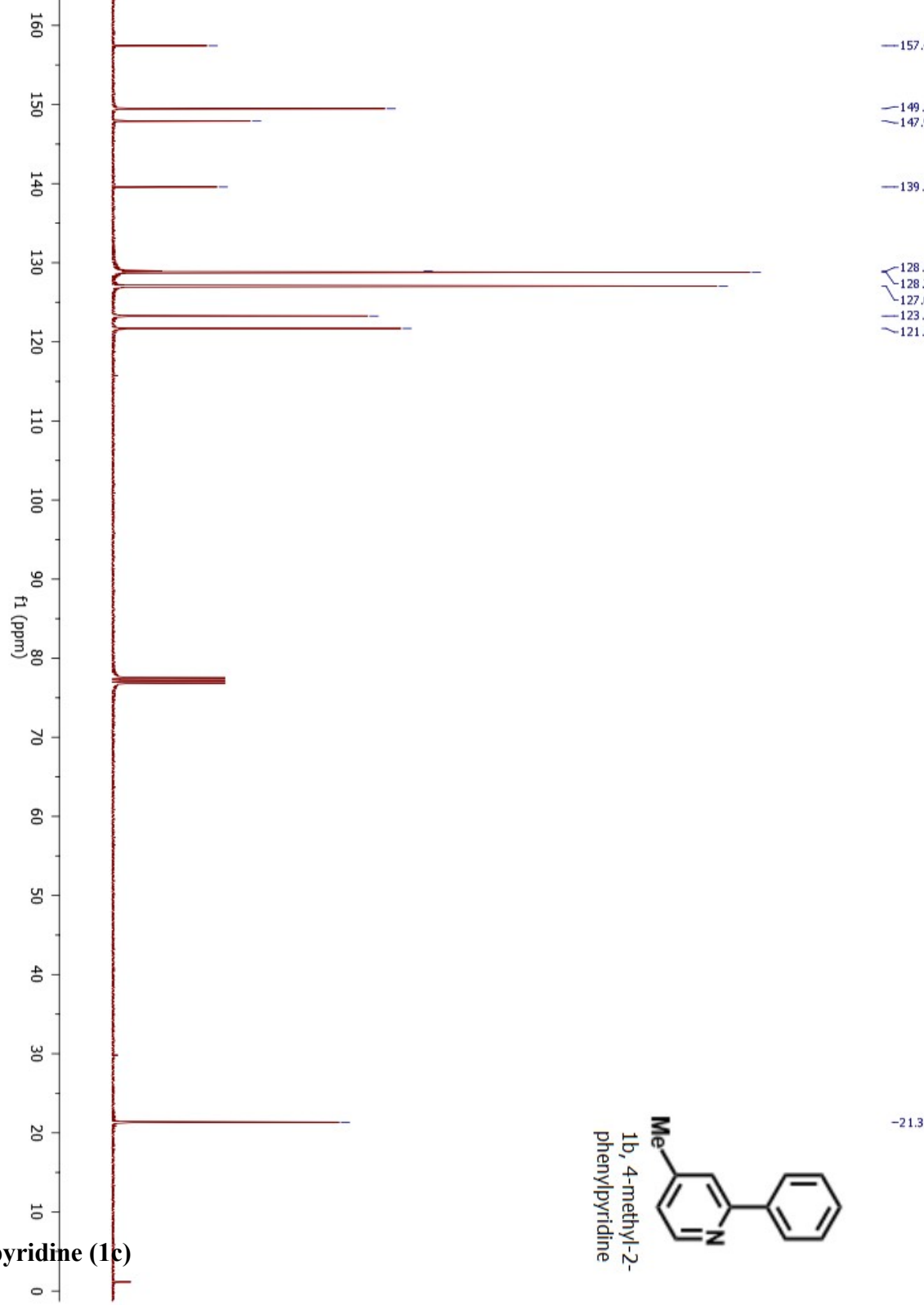




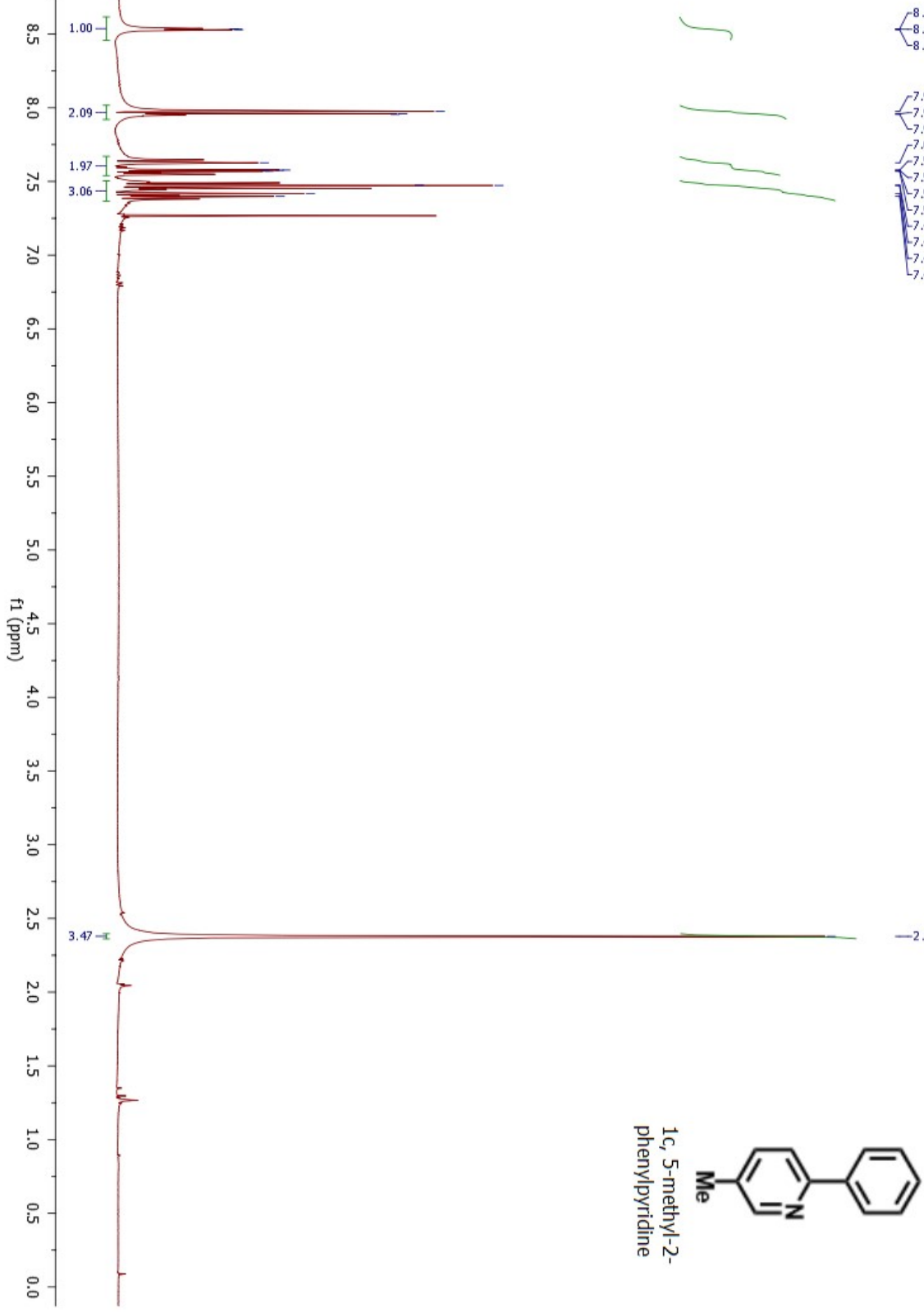
10. ^{1}H and ^{13}C NMR data of 2-phenylpyridine derivatives

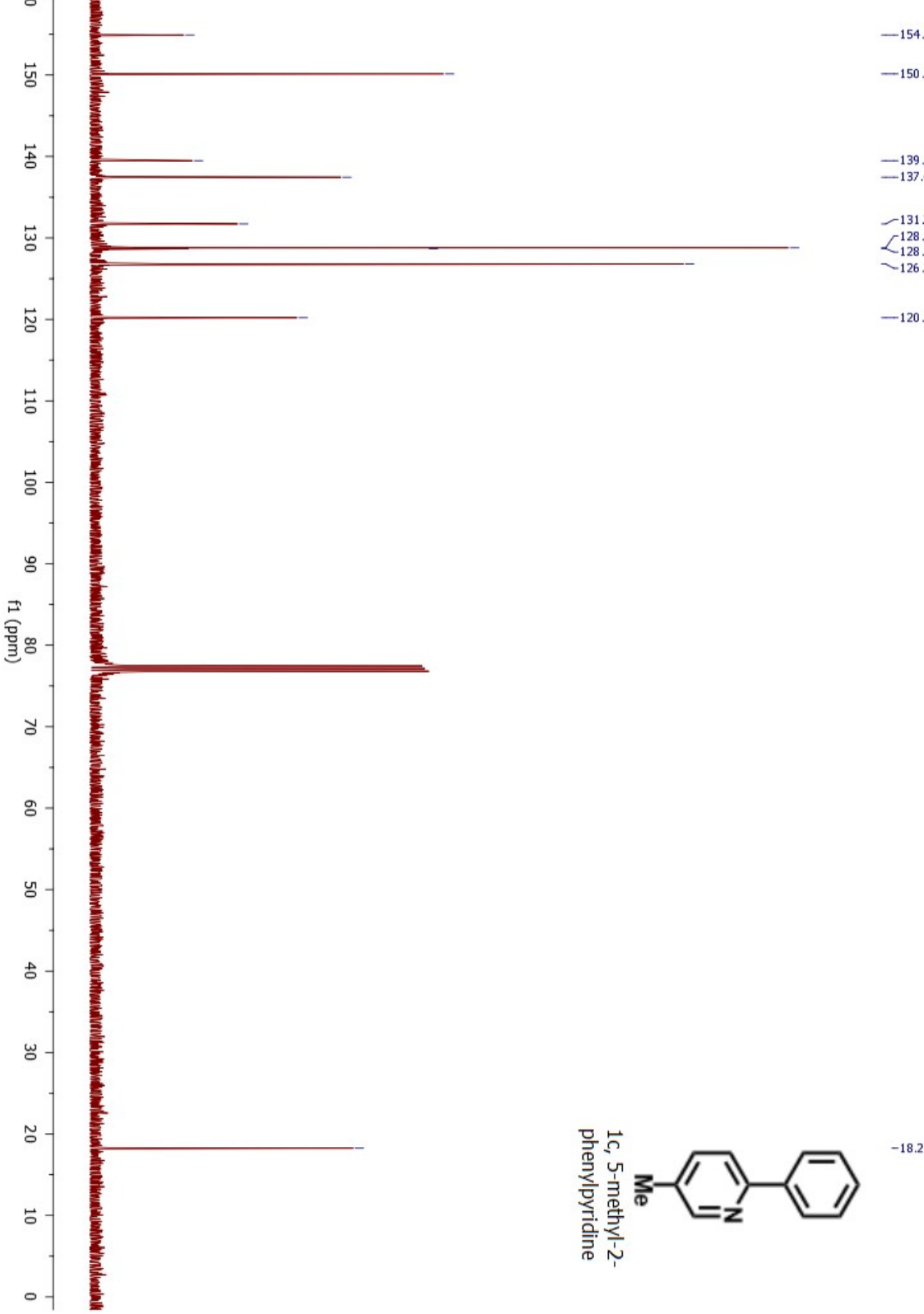
4-methyl-2-phenylpyridine (1b)


0.88
1.87
0.95
1.87
0.87
0.89
3.00
f1 (ppm)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Me
N
1b, 4-methyl-2-phenylpyridine

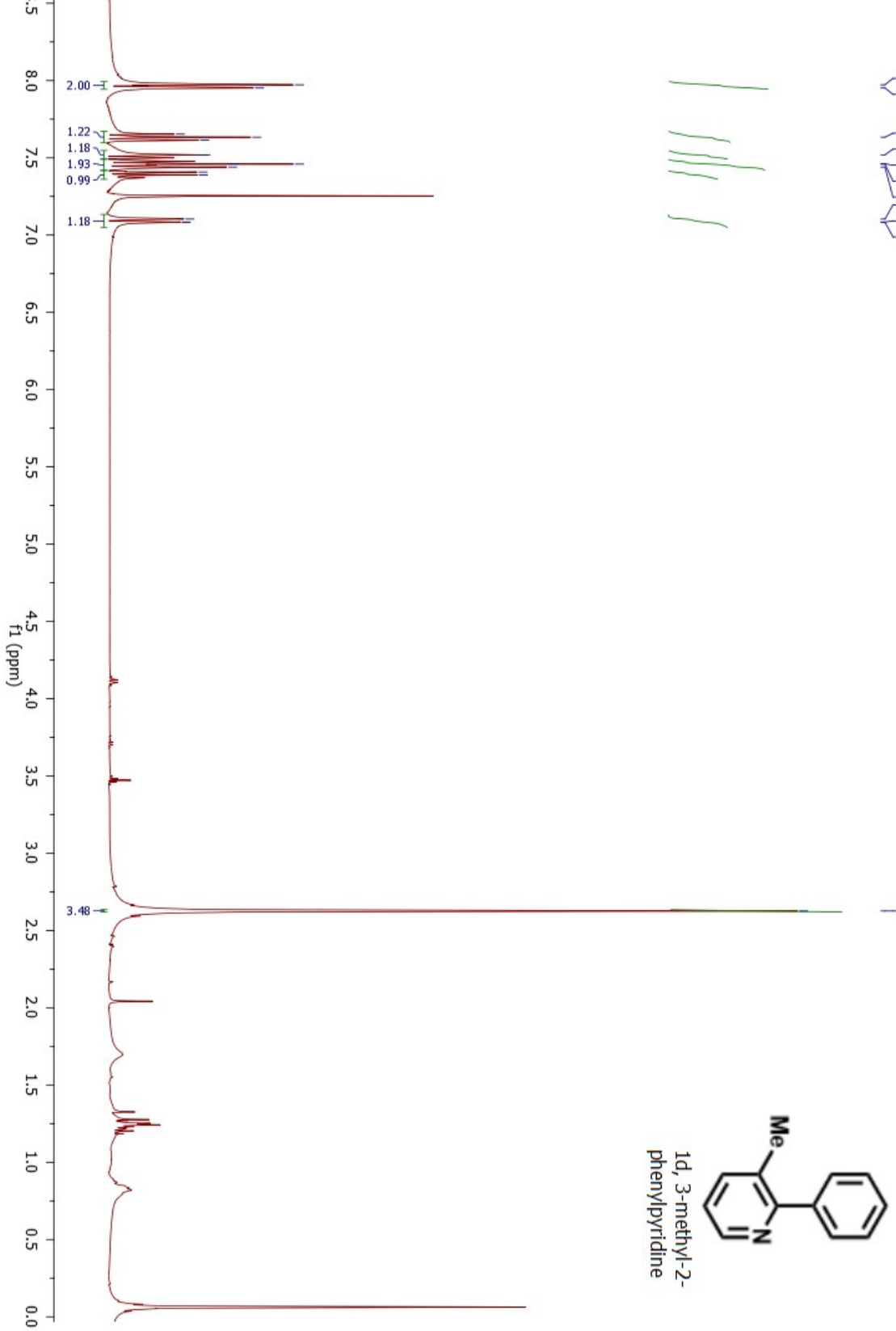


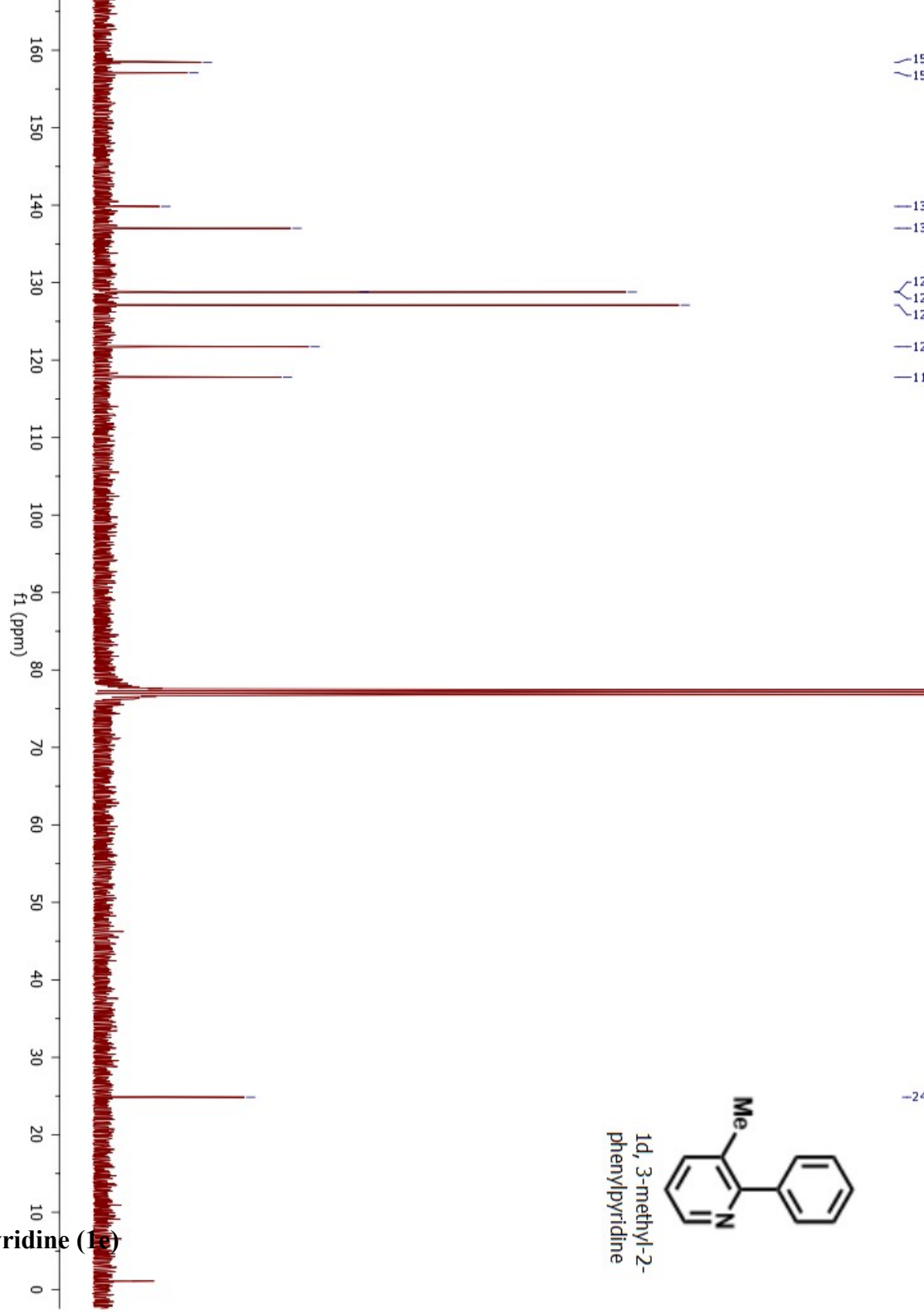
5-methyl-2-phenylpyridine (1c)


1.00
2.09
1.97
3.06
3.47
f1 (ppm)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Me
N
1c, 5-methyl-2-phenylpyridine

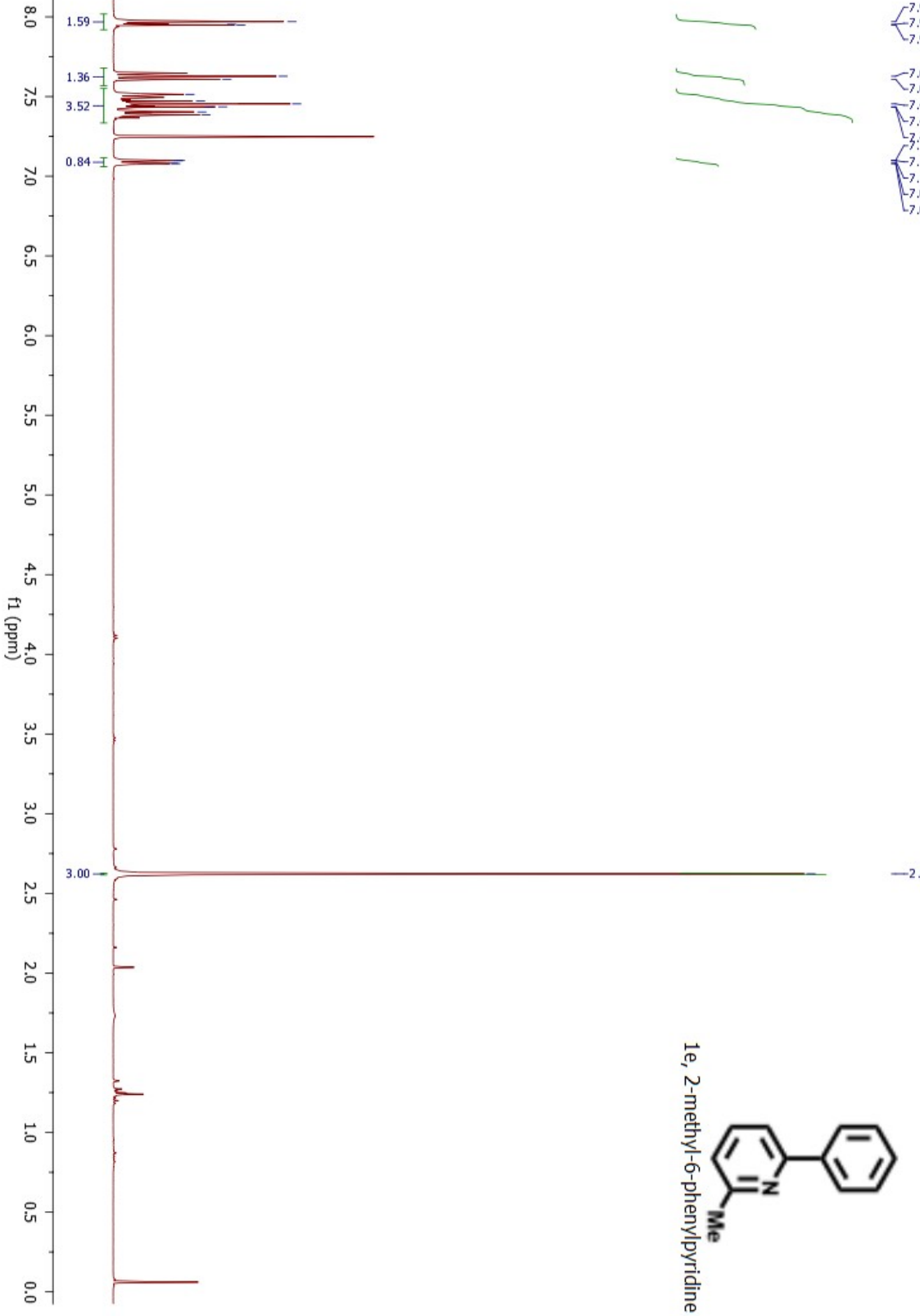

f1 (ppm)
154.
150.
139.
137.
131.
128.
128.
126.
120.
18.2
Me
N
1c, 5-methyl-2-phenylpyridine

3-methyl-2-phenylpy

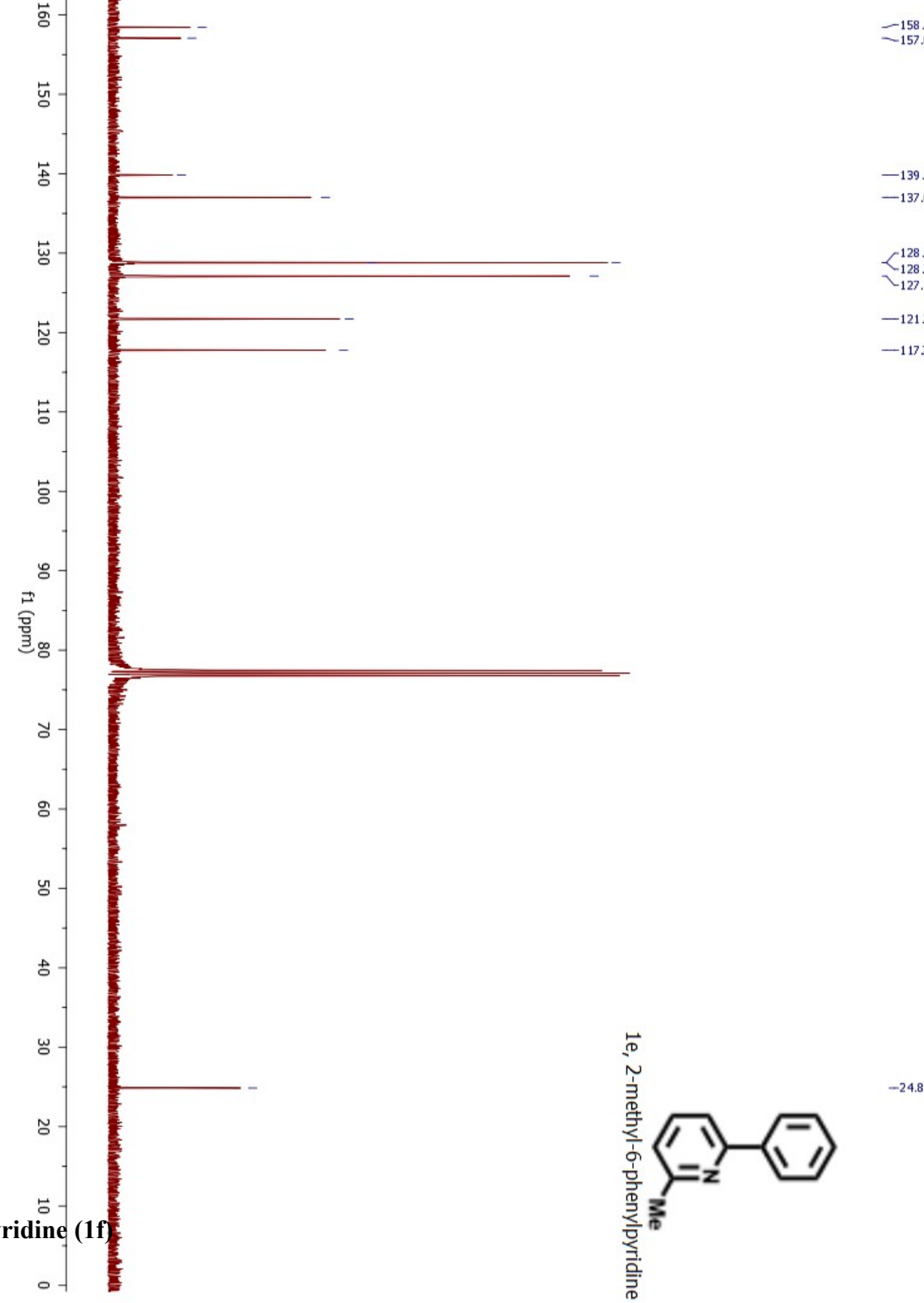




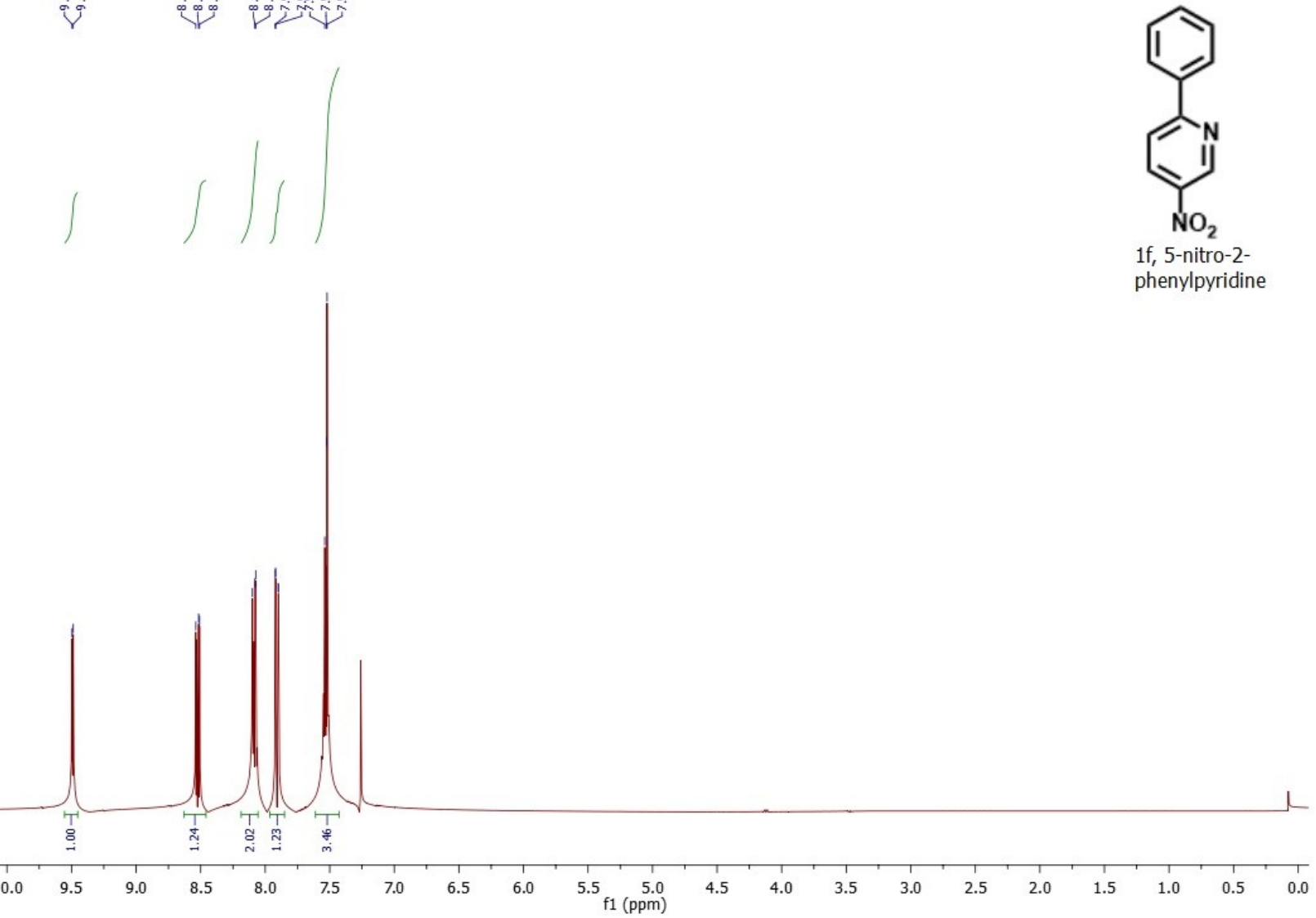
2-methyl-6-phenylpyridine (1e)



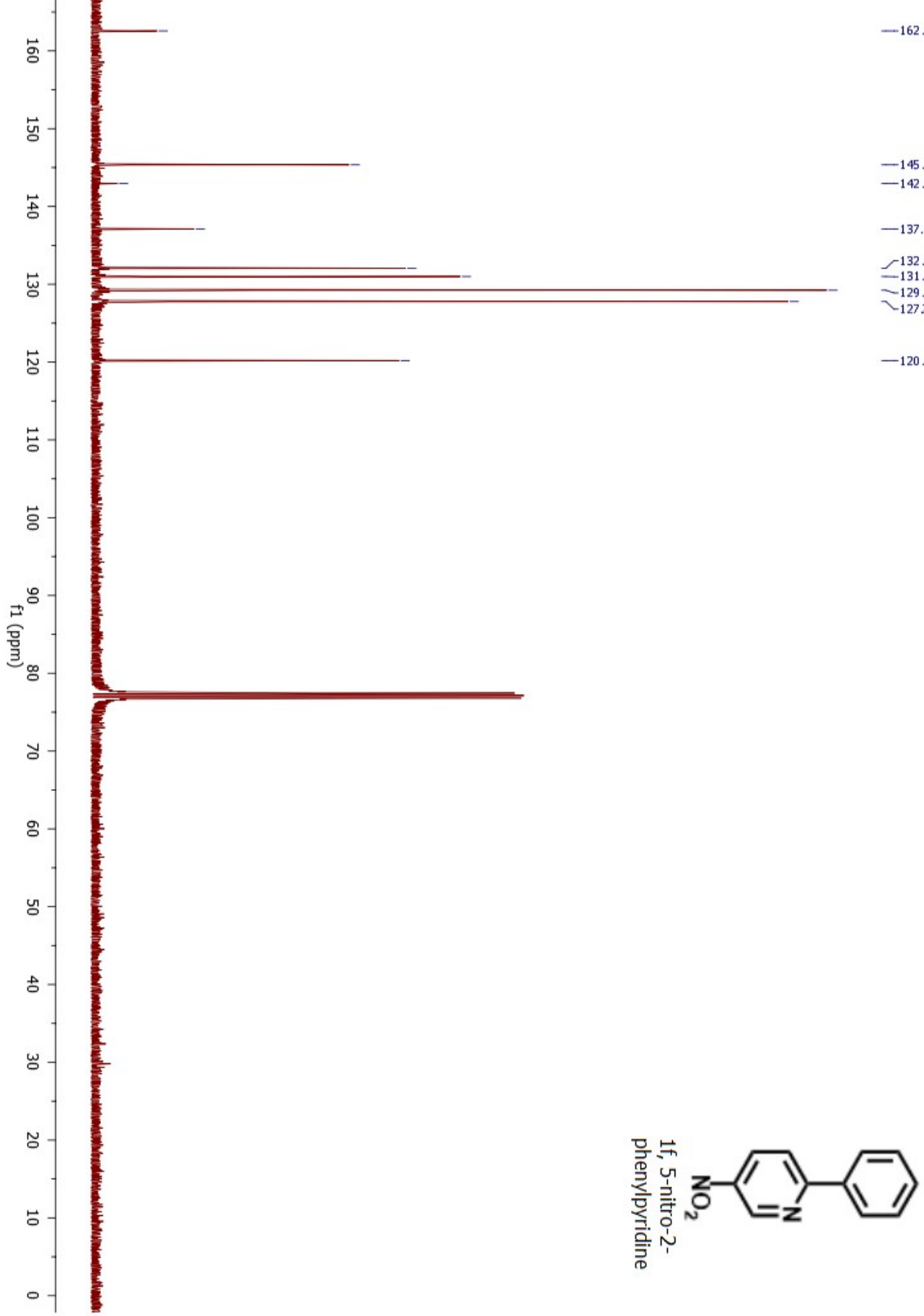
1e, 2-methyl-6-phenylpyridine



5-nitro-2-phenylpyridine (1f)

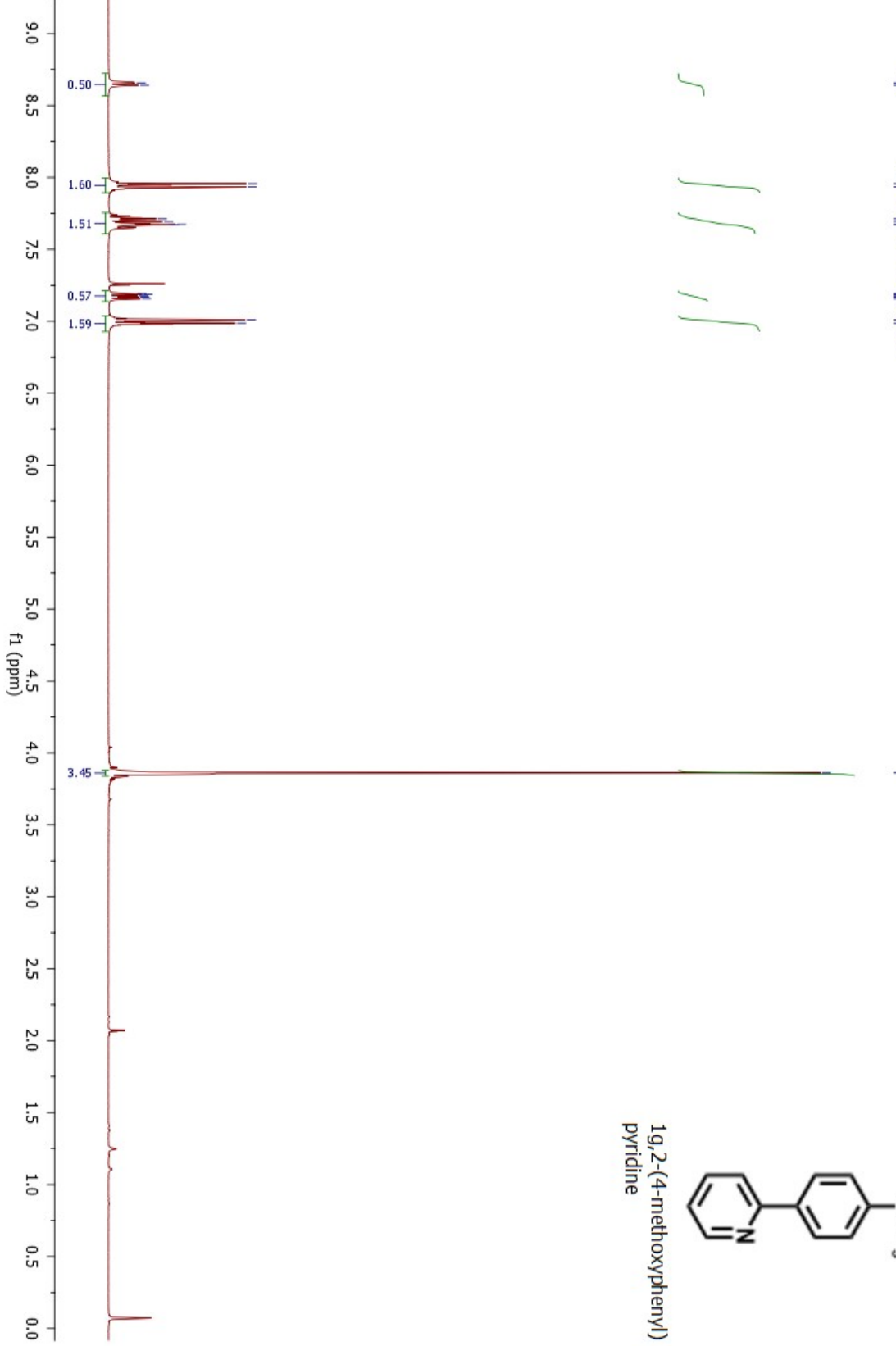


1f, 5-nitro-2-phenylpyridine

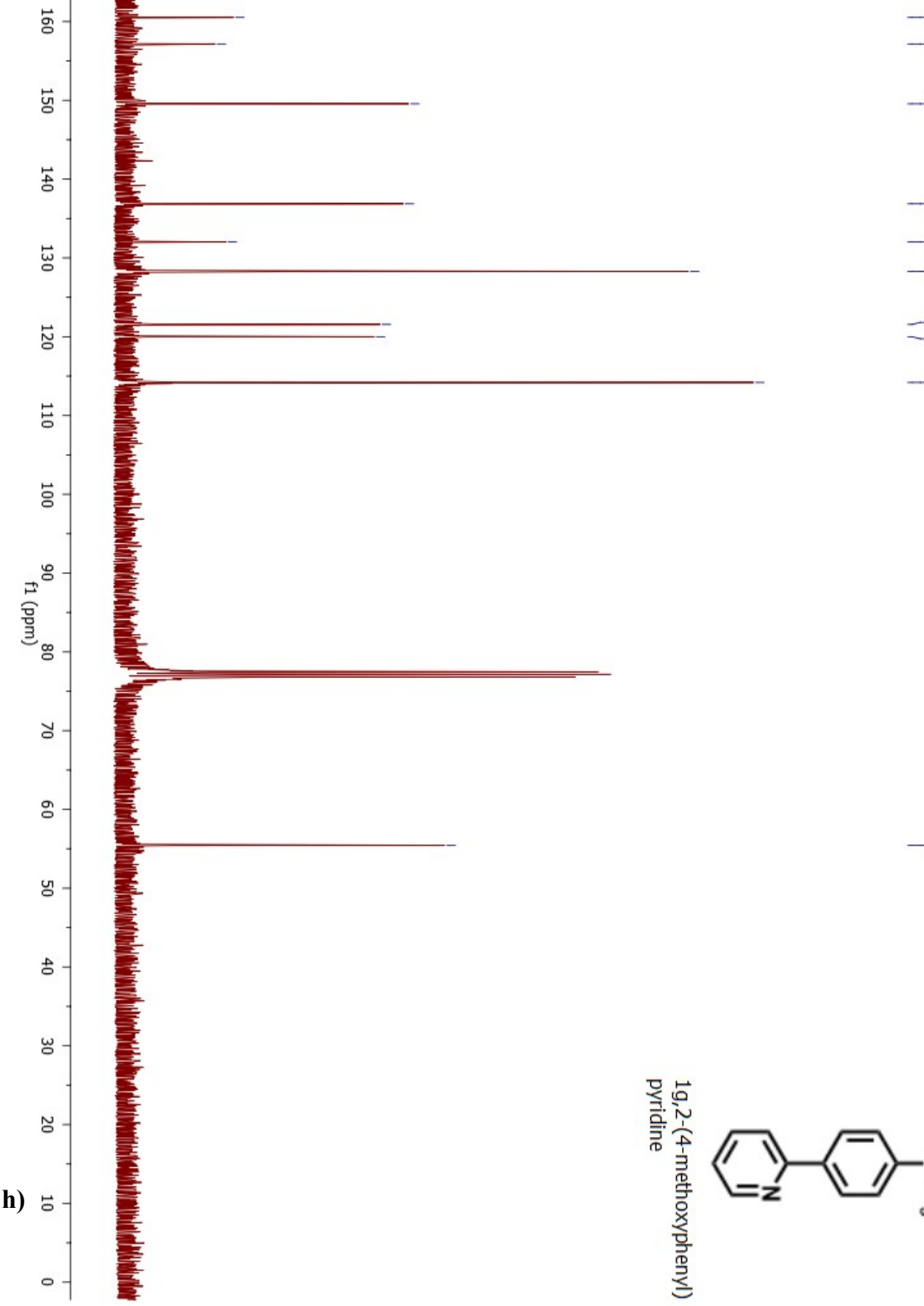


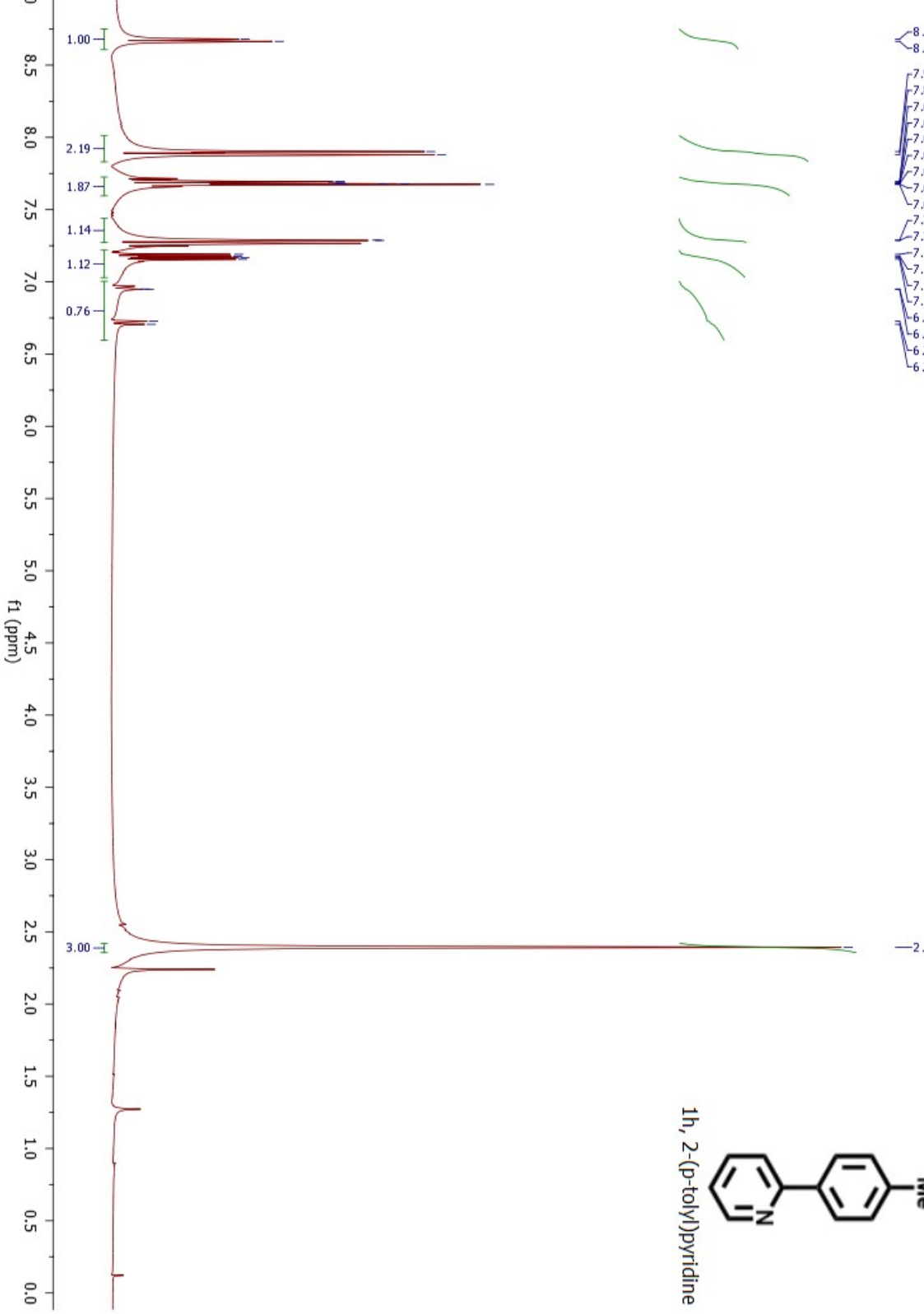
1f, 5-nitro-2-phenylpyridine

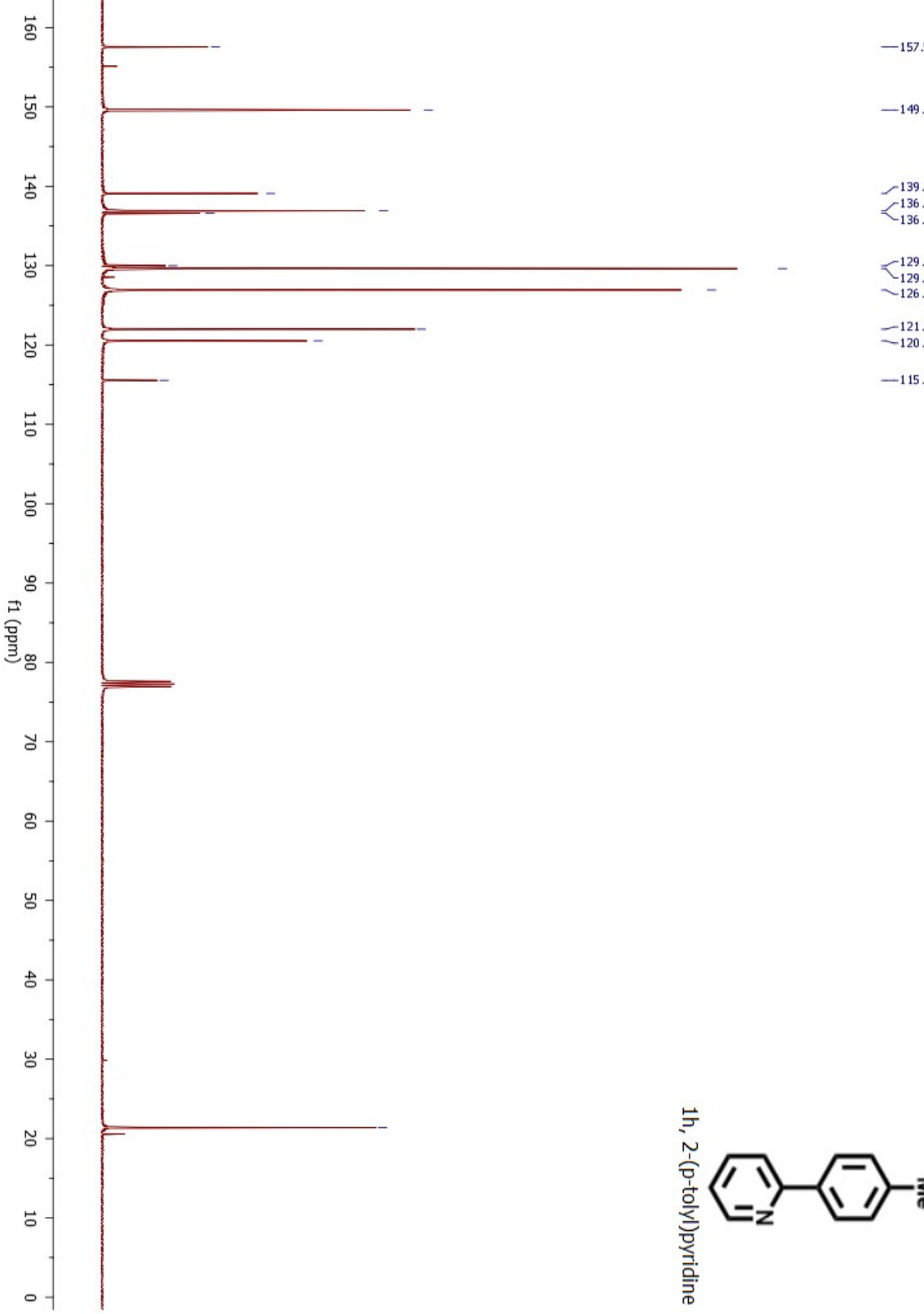
2-(4-methoxyphenyl)p



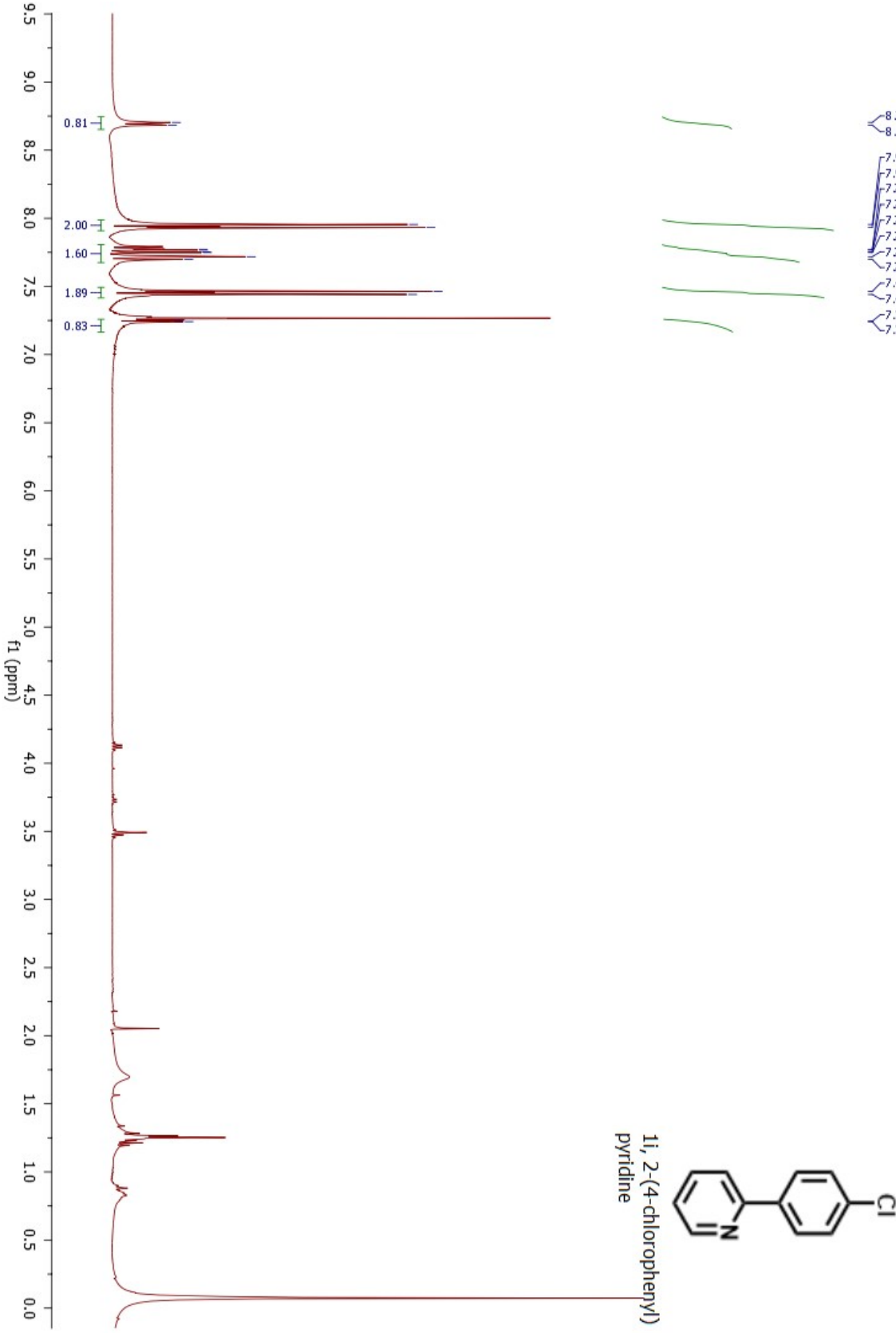
2-(p-tolyl)pyridine (1h)

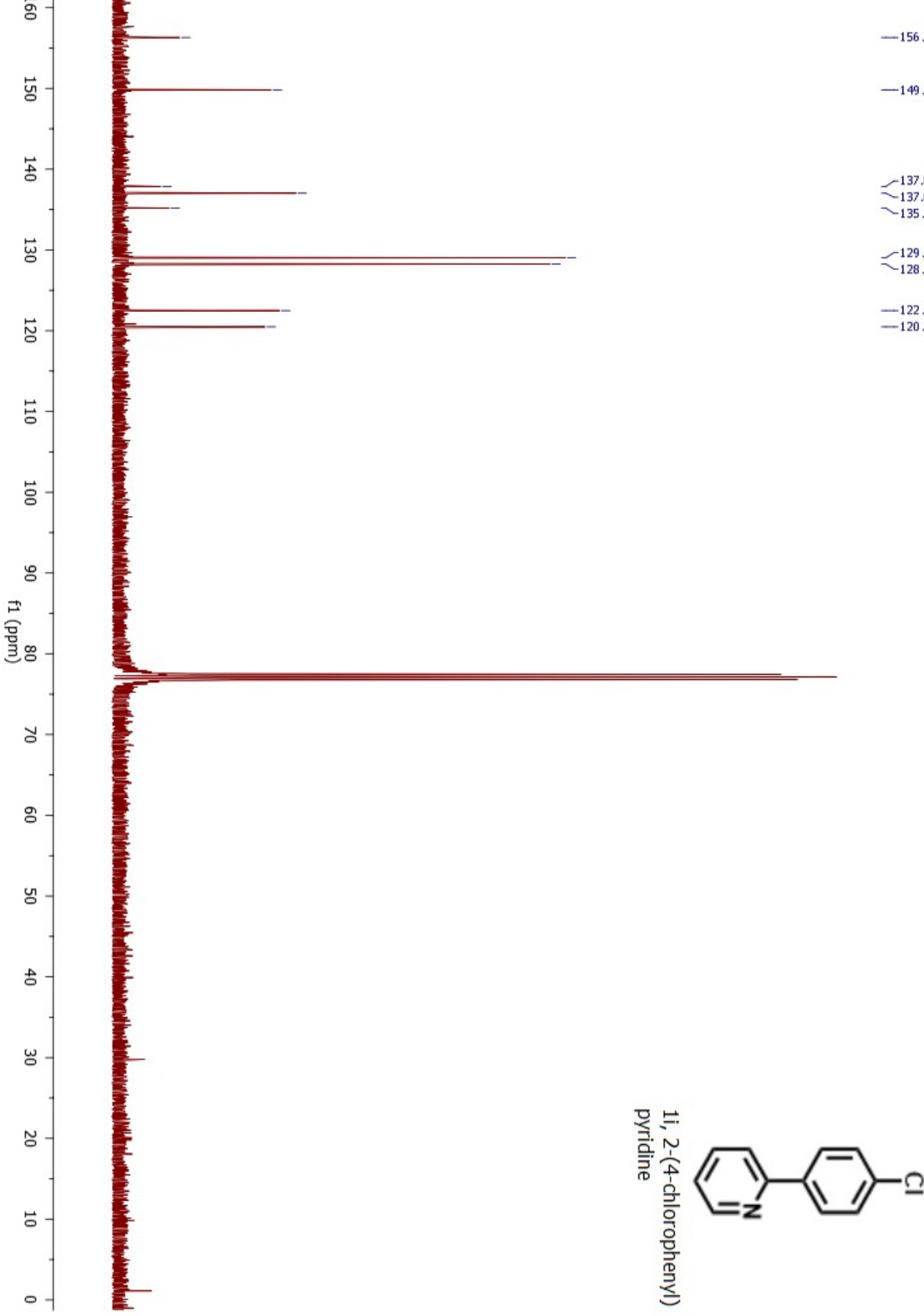



1.00
2.19
1.87
1.14
1.12
0.76
3.00
f1 (ppm)
1h, 2-(p-tolyl)pyridine

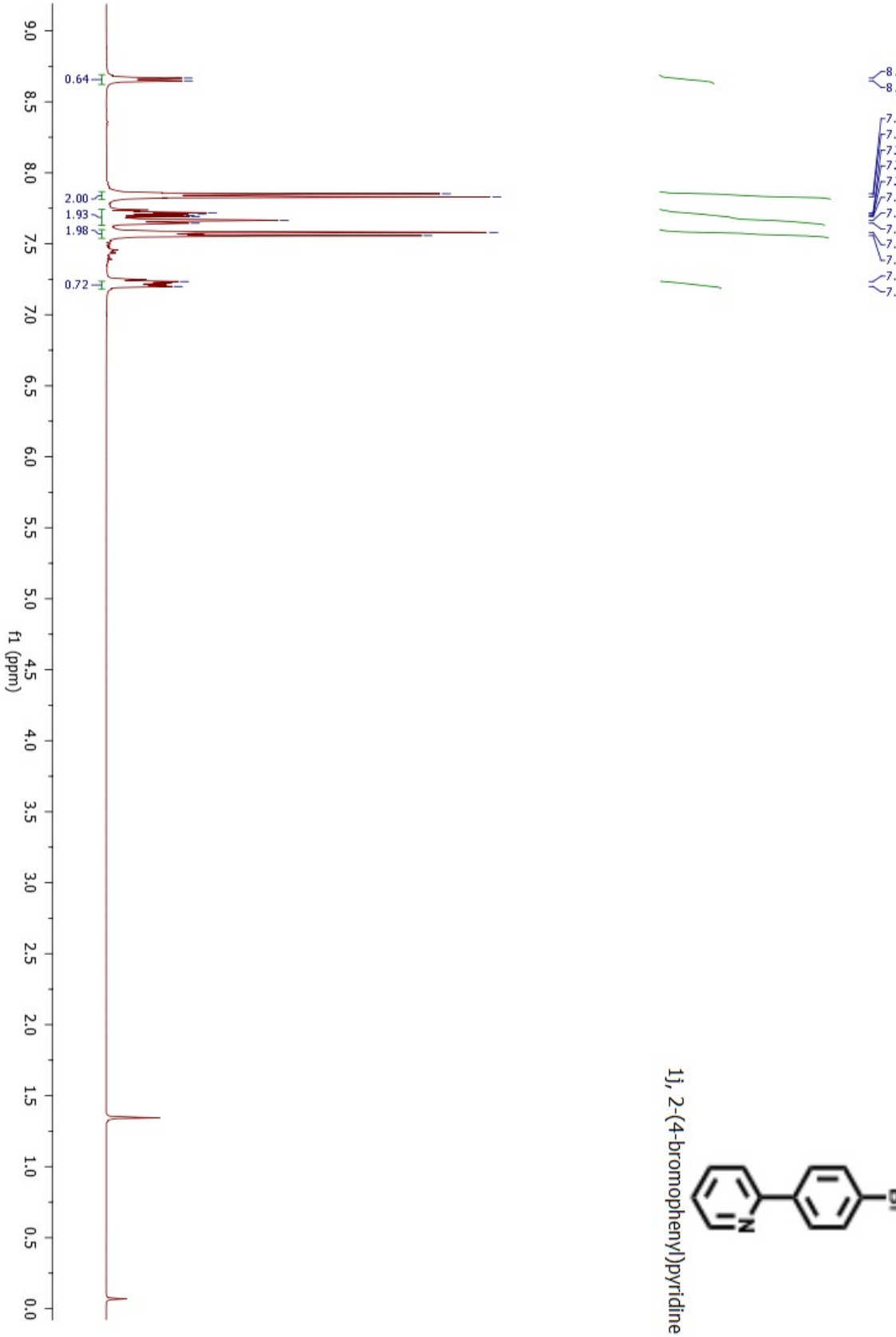

f1 (ppm)
157.
149.
139.
136.
136.
129.
129.
126.
121.
120.
115.
1h, 2-(p-tolyl)pyridine

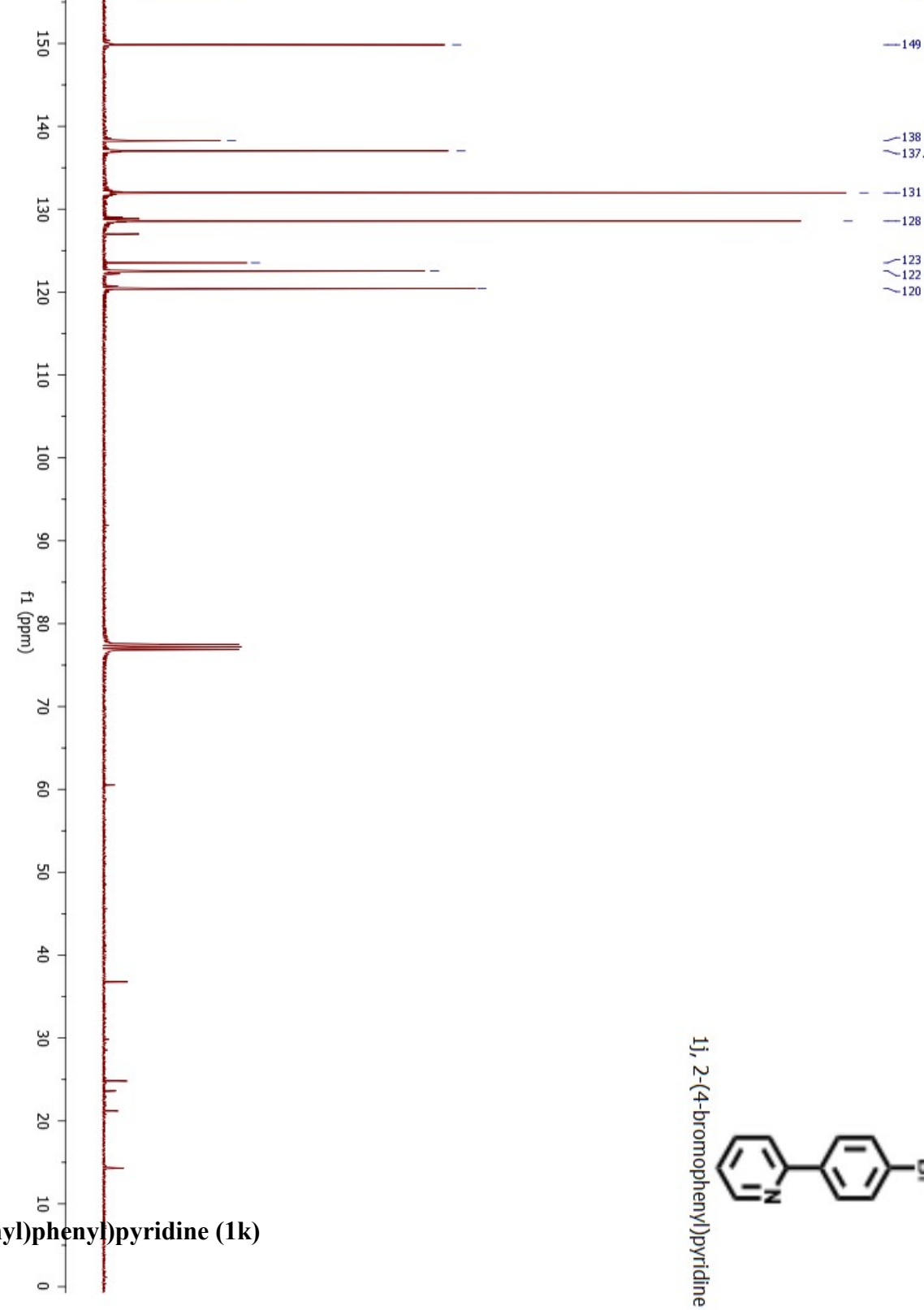
2-(4-chlorophenyl)p



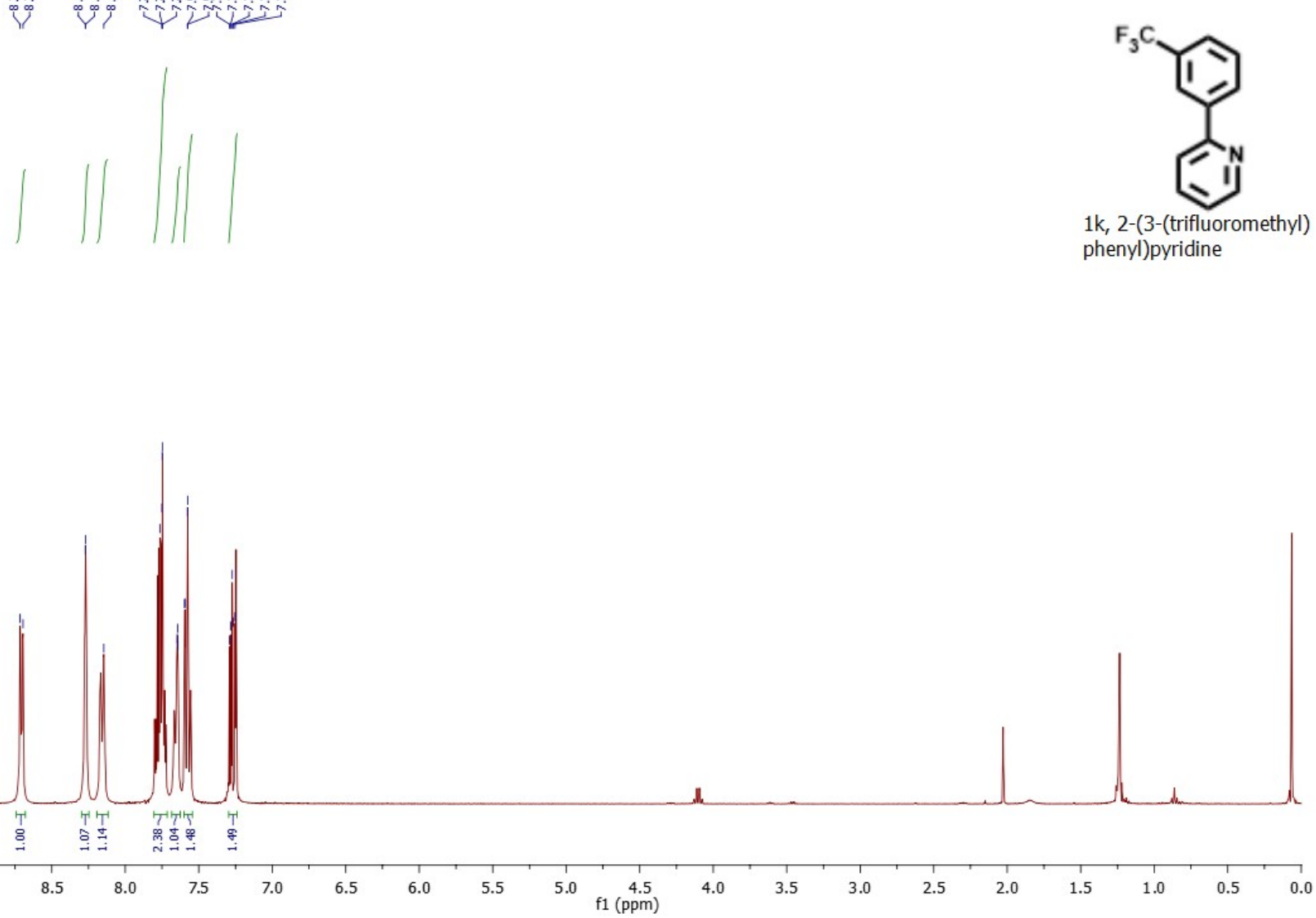

156.
149.
137.
137.
135.
129.
128.
122.
120.
f1 (ppm)
1i, 2-(4-chlorophenyl)
pyridine
N
Cl

2-(4-bromophenyl)

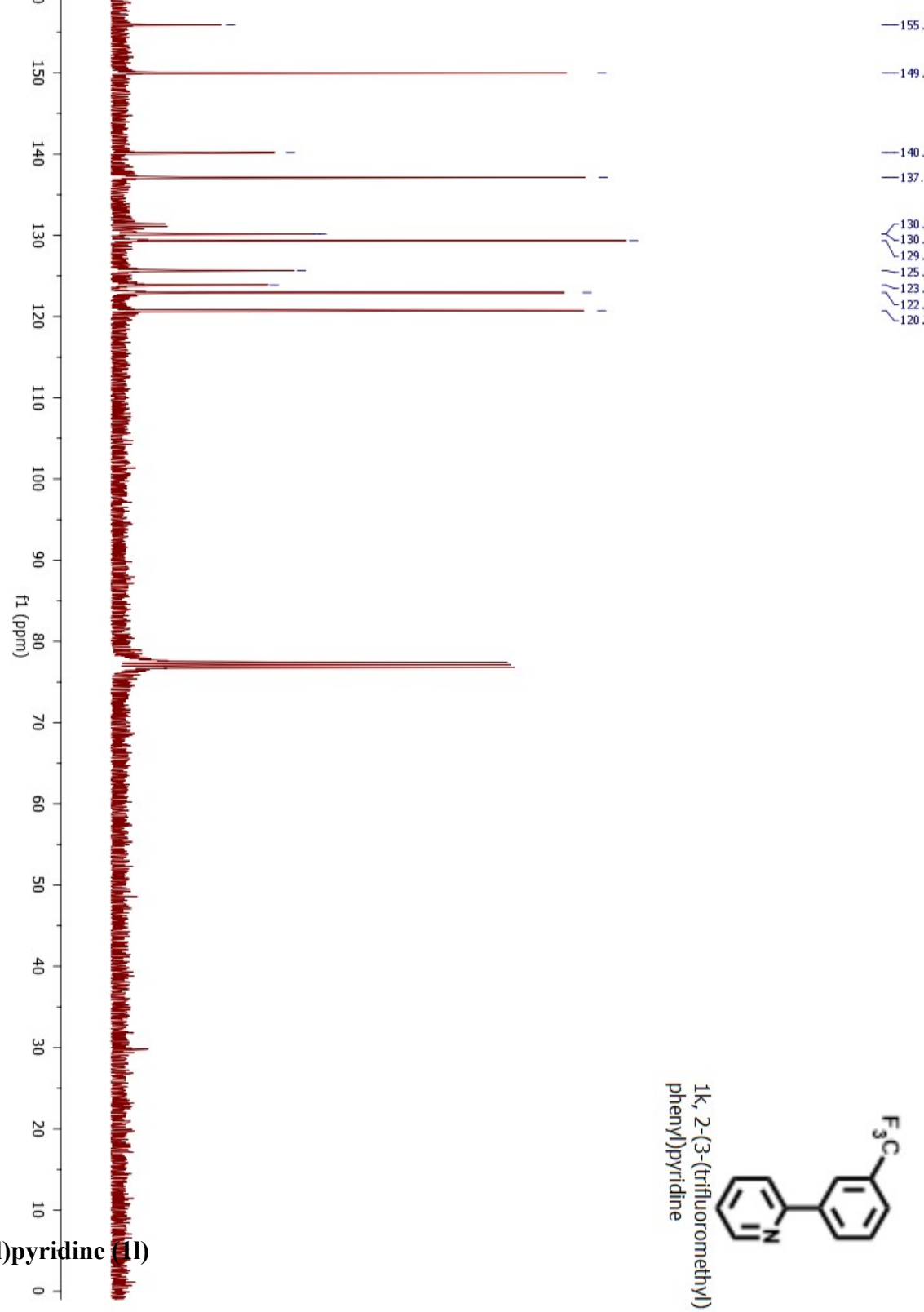




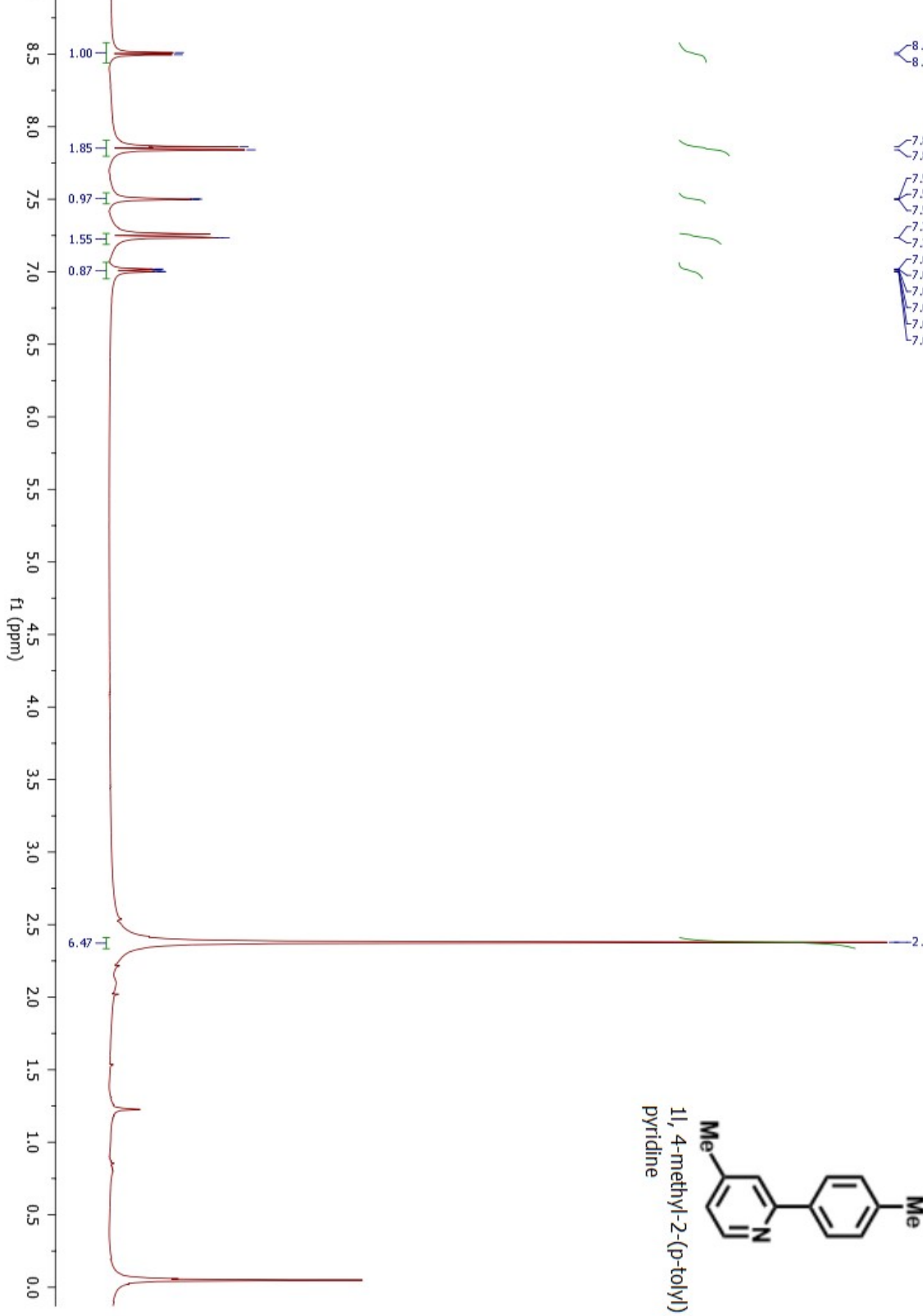
2-(3-(trifluoromethyl)phenyl)pyridine (1k)

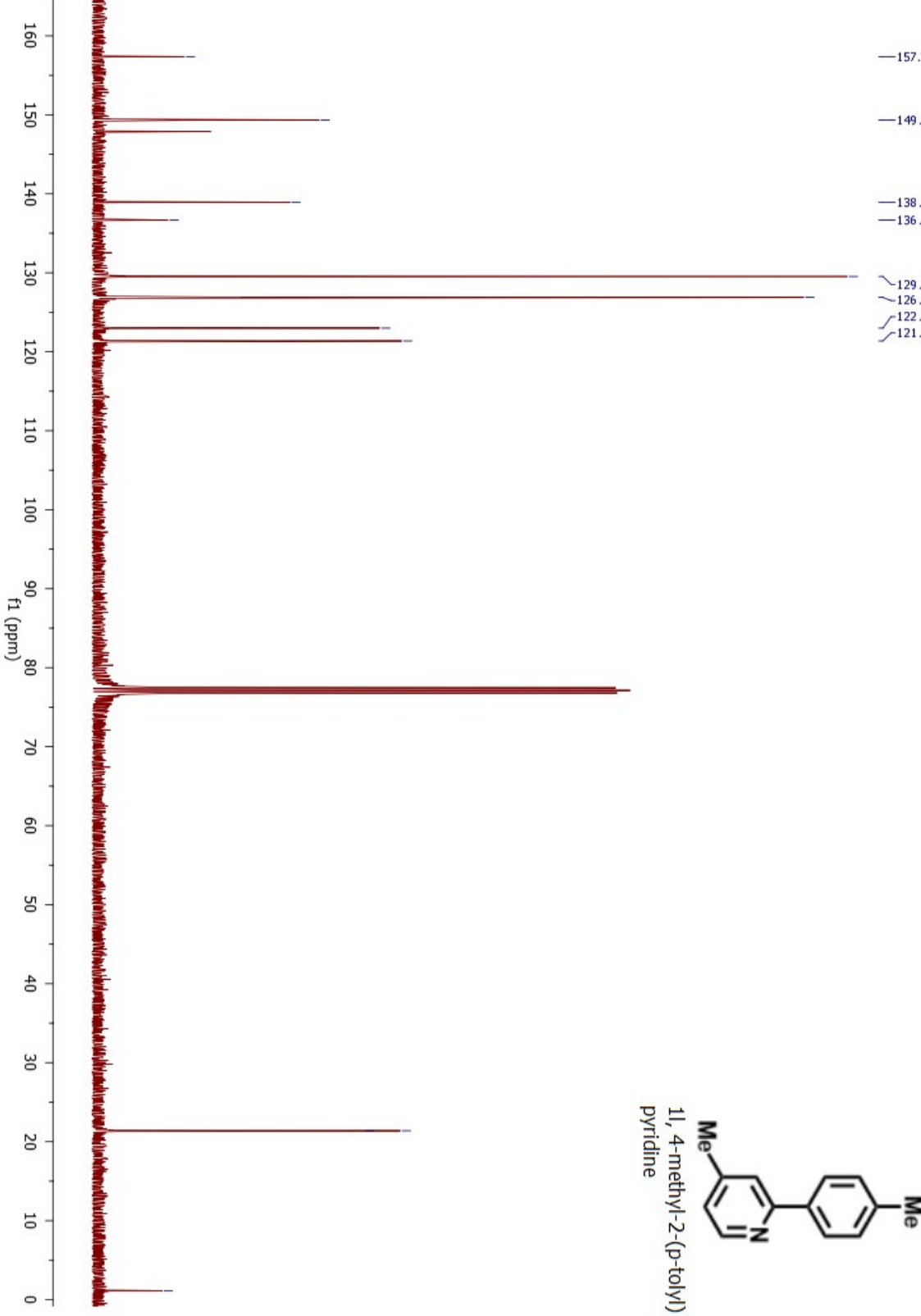


1k, 2-(3-(trifluoromethyl) phenyl)pyridine



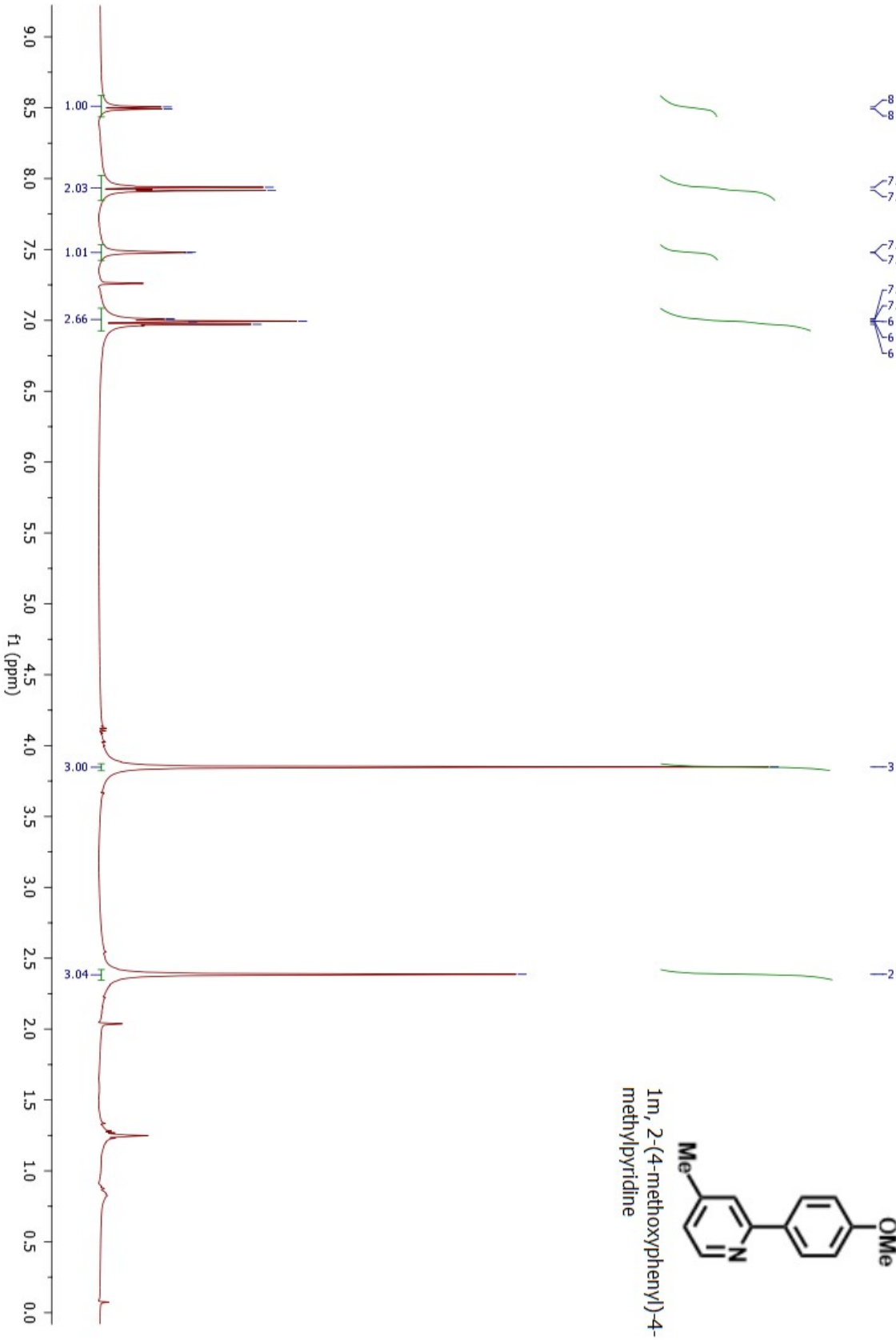
4-methyl-2-(p-tolyl)pyridine (1l)

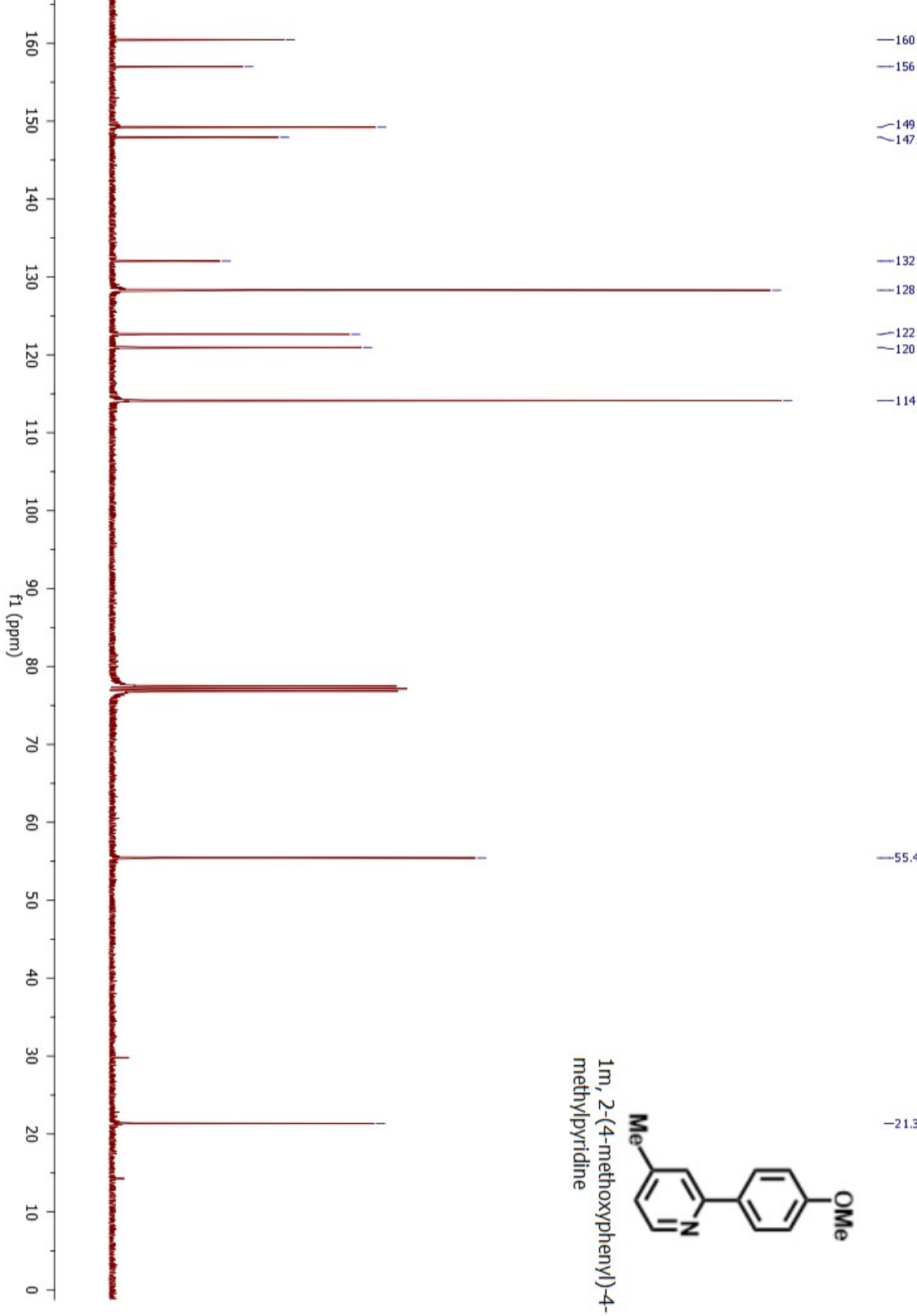

1.00
1.85
0.97
1.55
0.87
6.47
f1 (ppm)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1l, 4-methyl-2-(p-tolyl)
pyridine
Me
N
Me



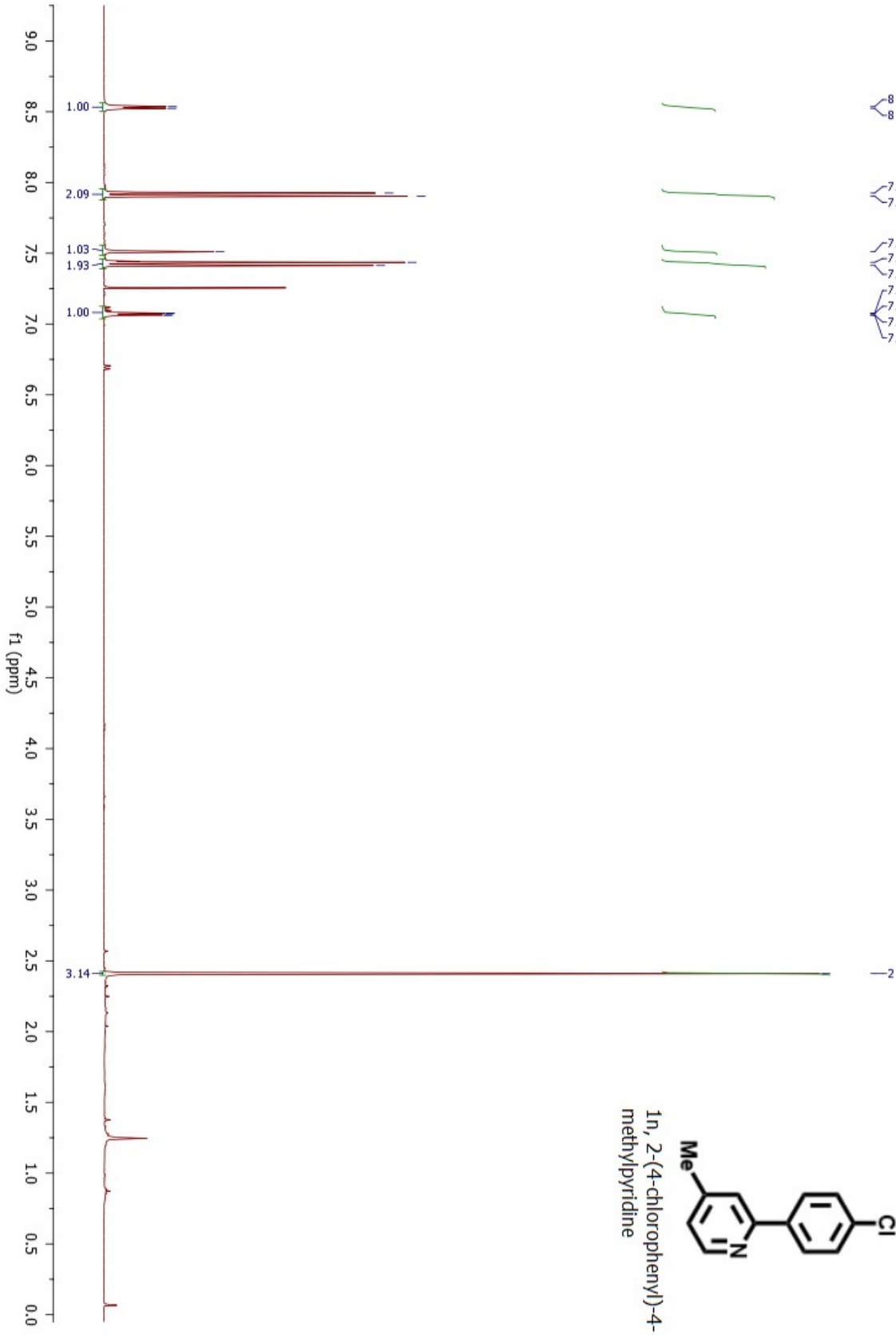
1l, 4-methyl-2-(p-tolyl) pyridine

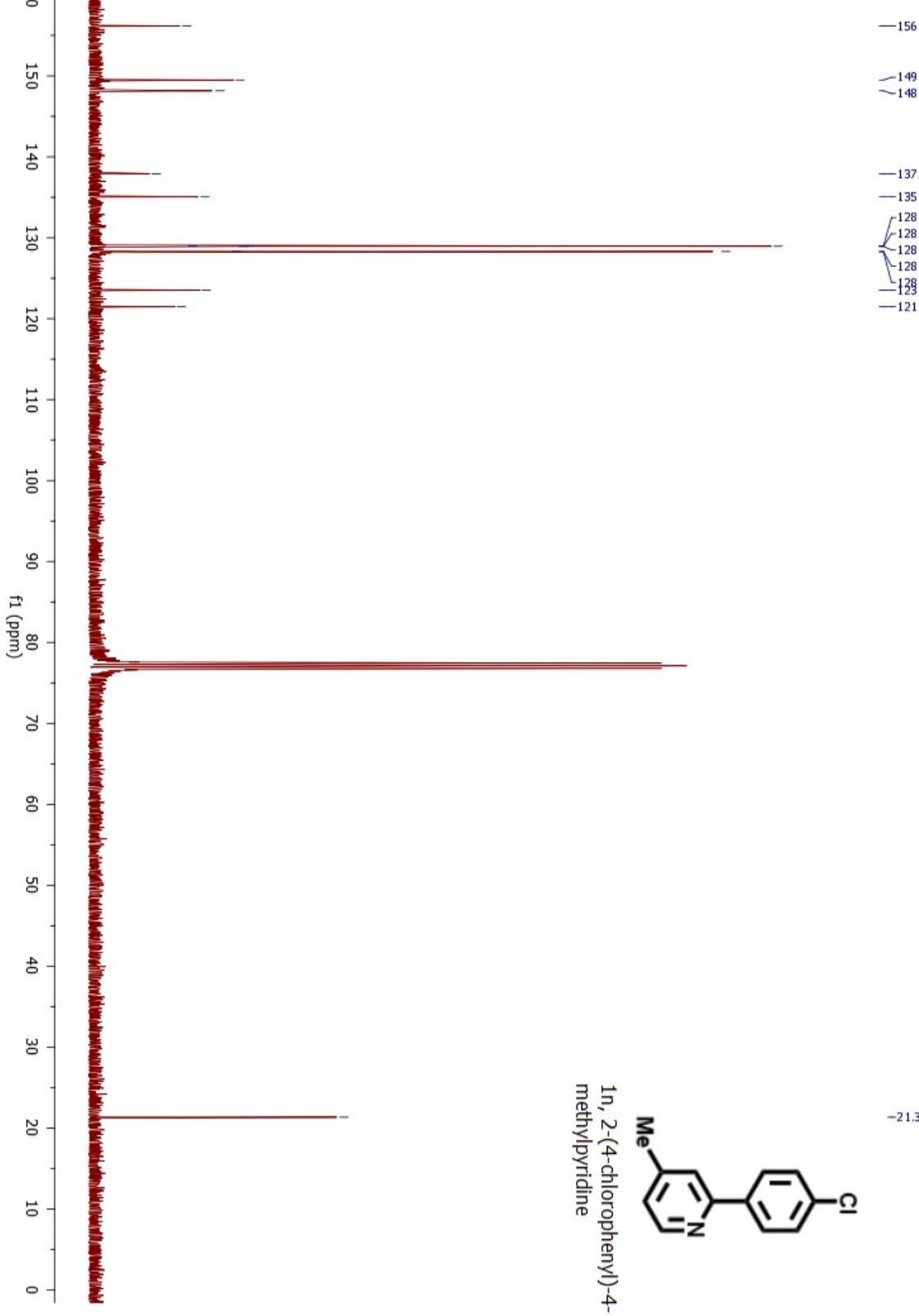
2-(4-methoxypheny




f1 (ppm)
160
156
149
147
132
128
122
120
114
55.4
21.3
1m, 2-(4-methoxyphenyl)-4-methylpyridine
Me
N
OMe

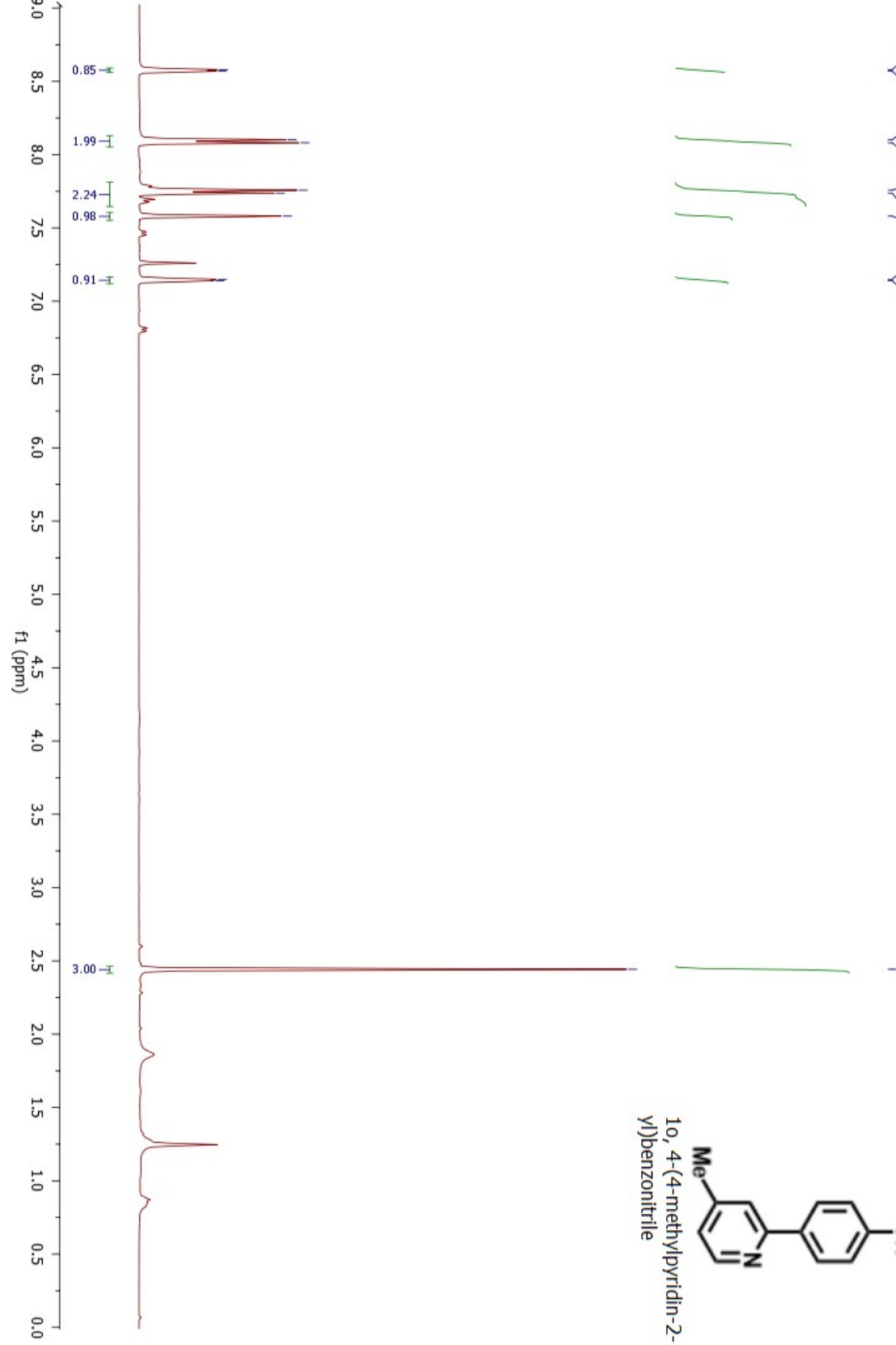
2-(4-chlorophenyl)-

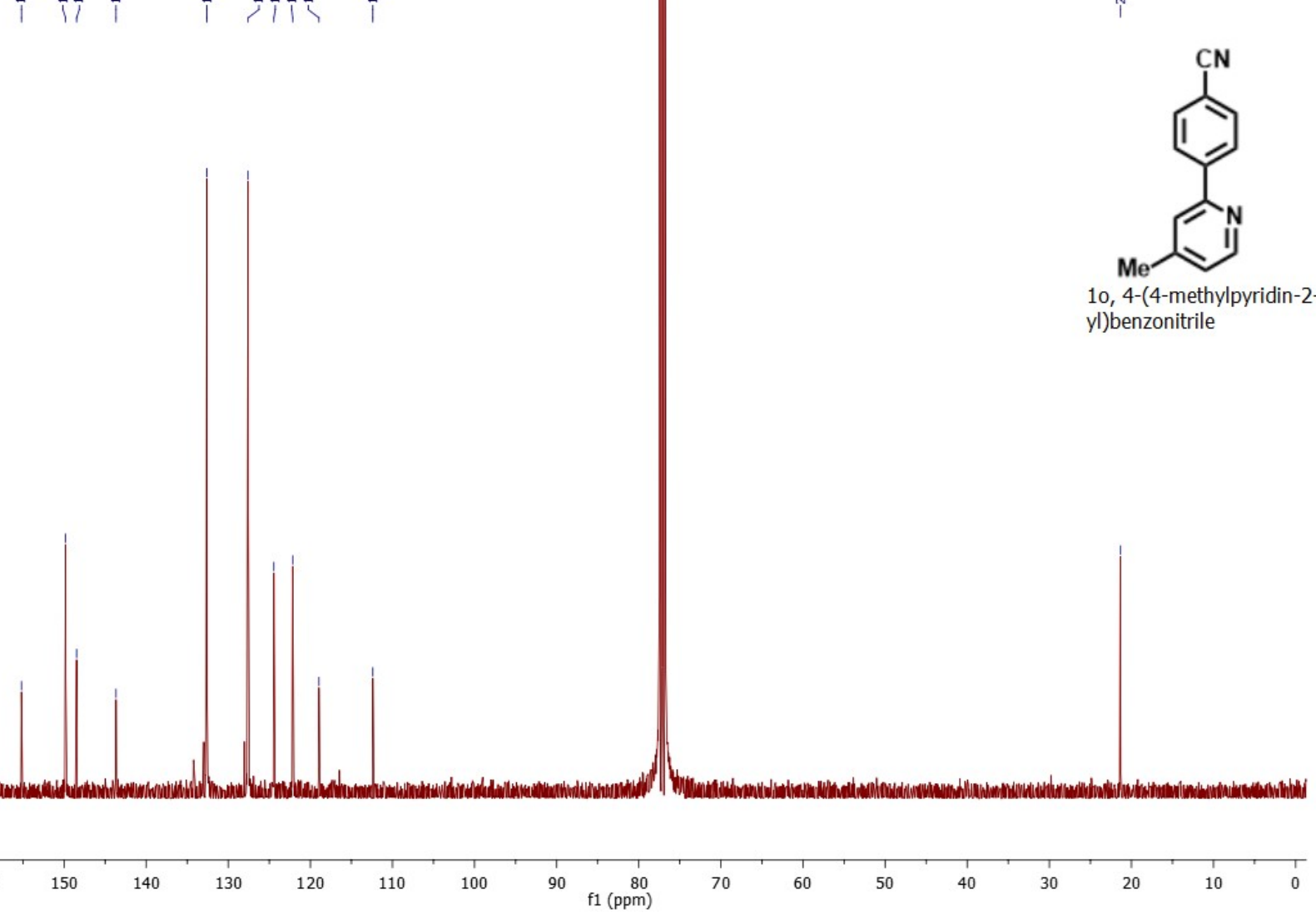




1n, 2-(4-chlorophenyl)-4-methylpyridine

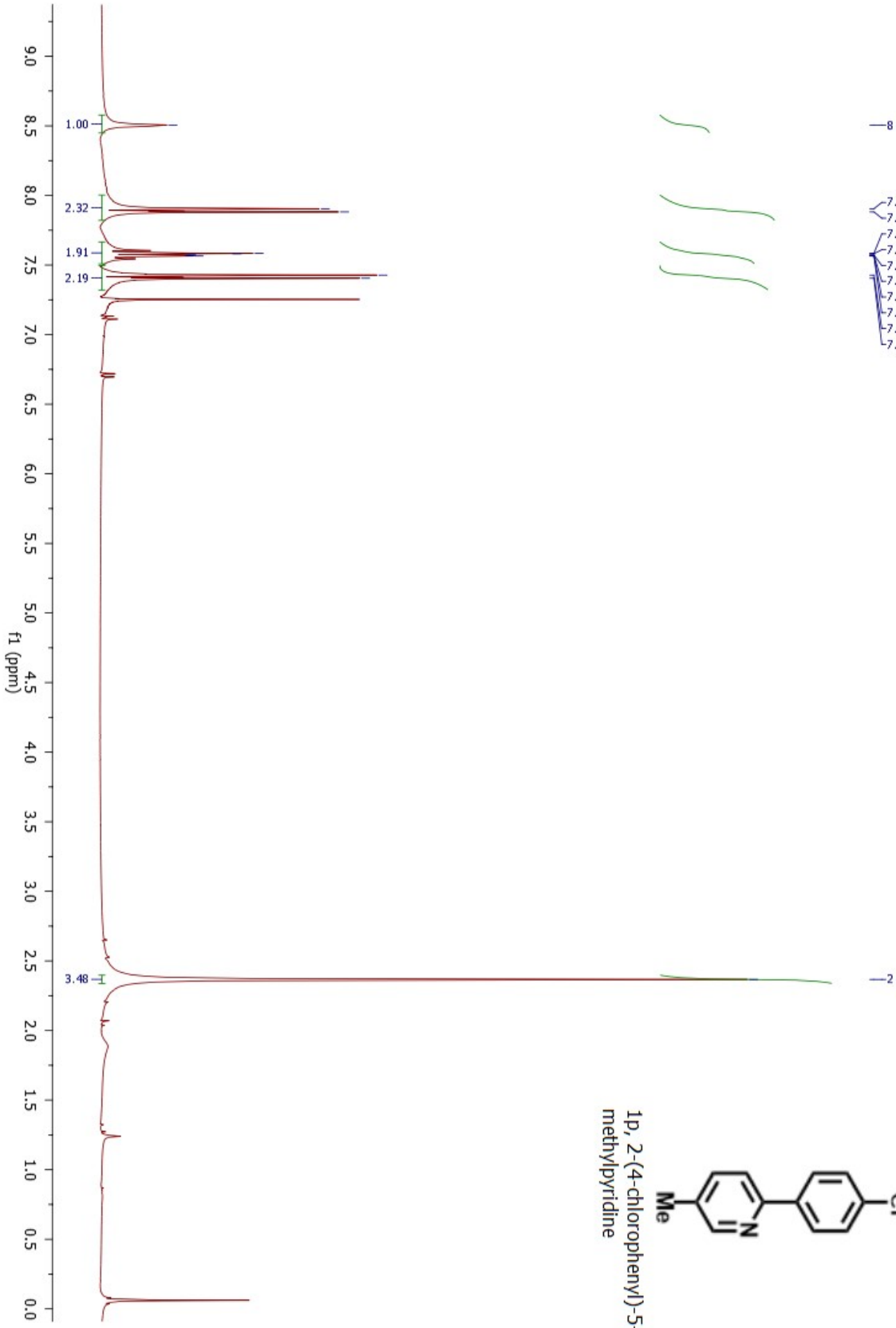
4-(4-methylpyridin-2-

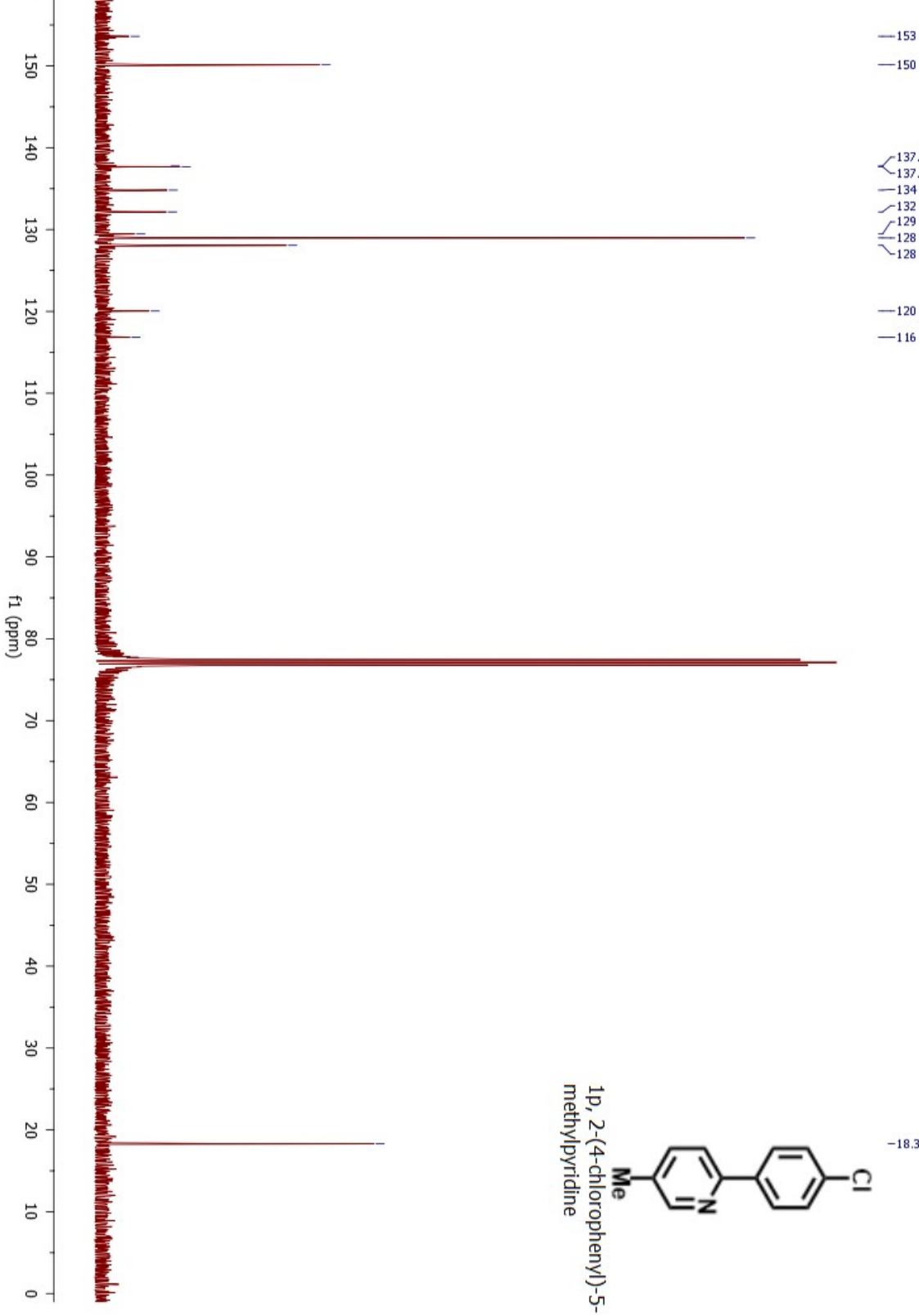




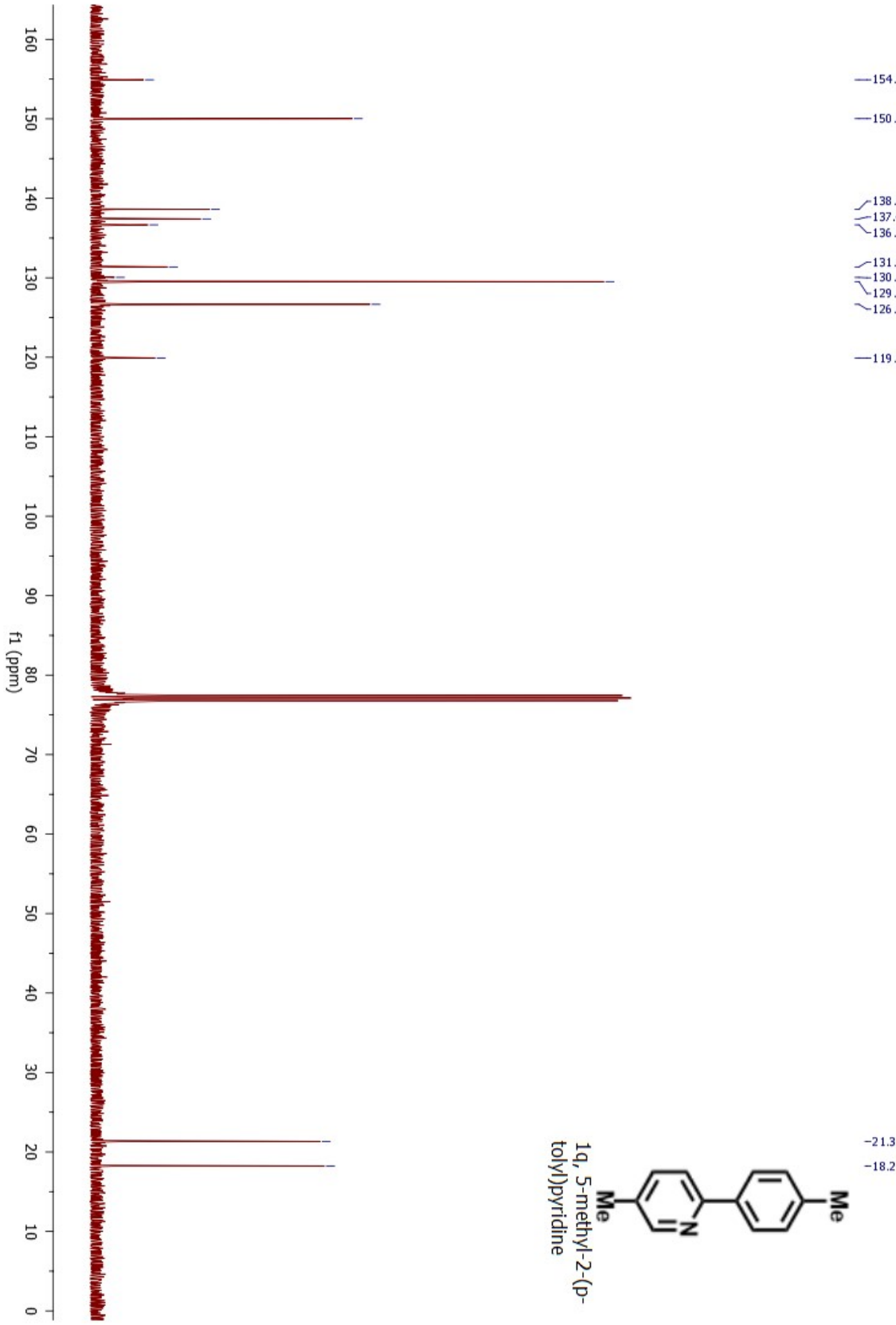
1o, 4-(4-methylpyridin-2-yl)benzonitrile

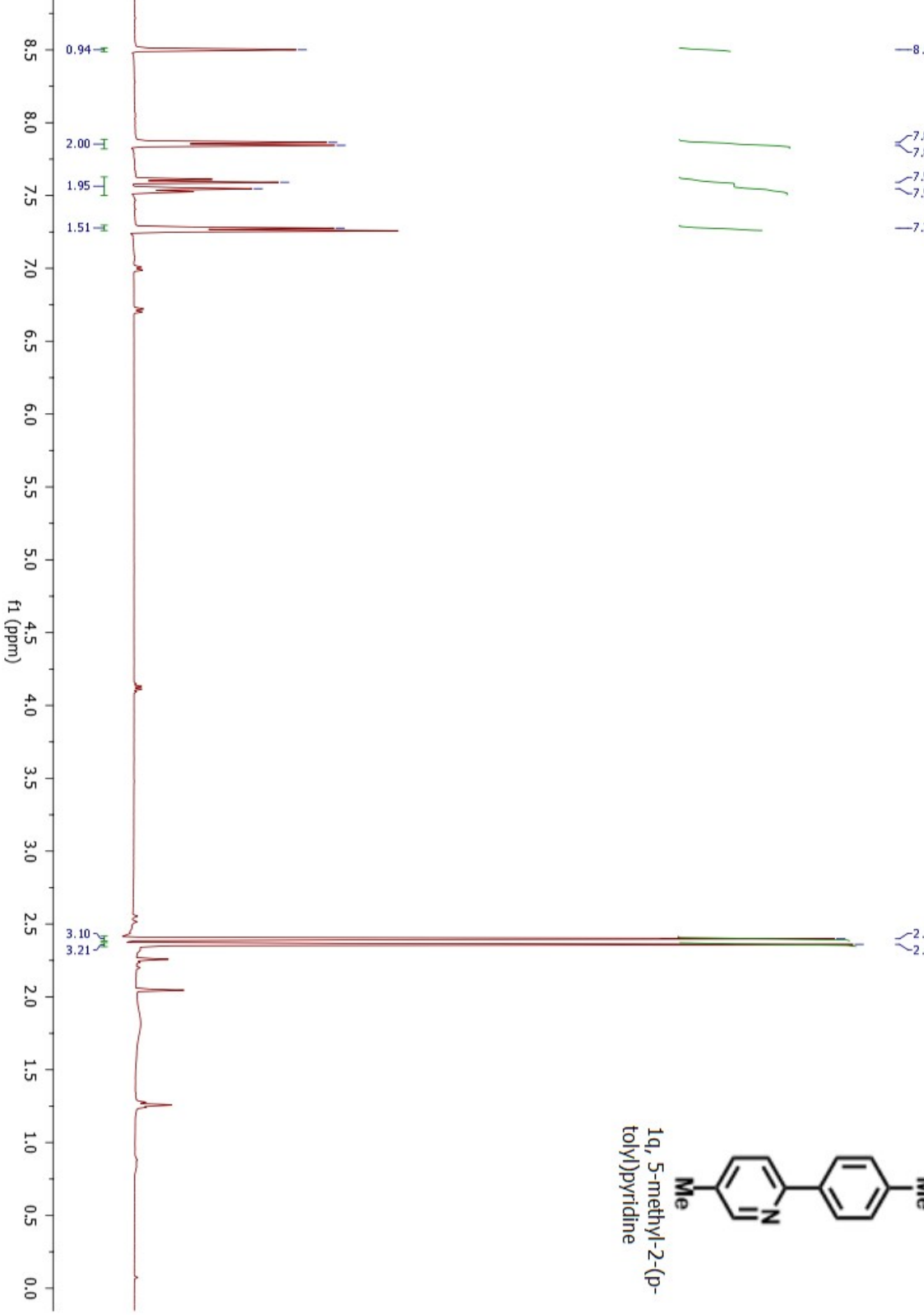
2-(4-chlorophenyl)-



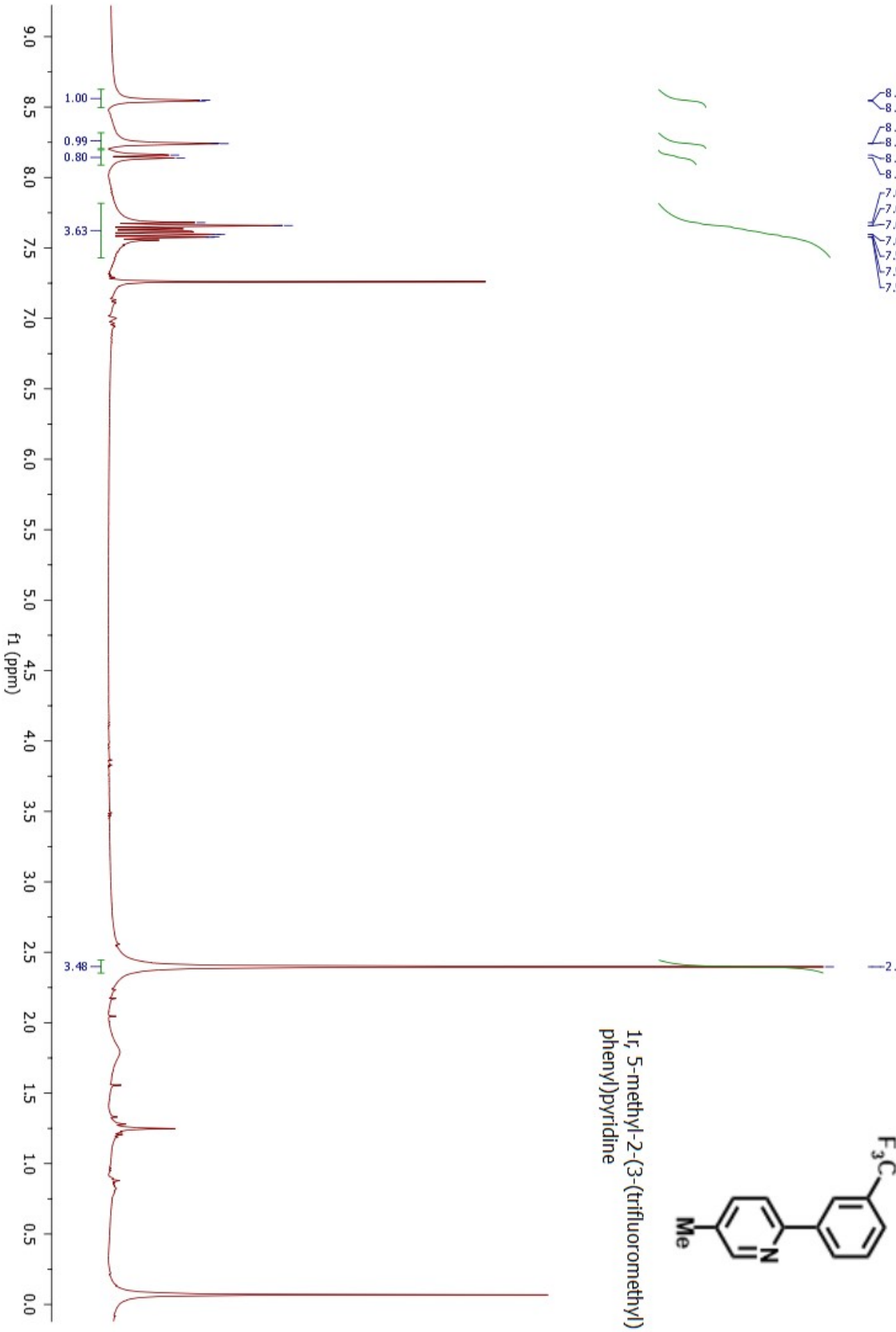

f1 (ppm)
153
150
137
137
134
132
129
128
128
120
116
18.3
1p, 2-(4-chlorophenyl)-5-methylpyridine
Me
N
Cl

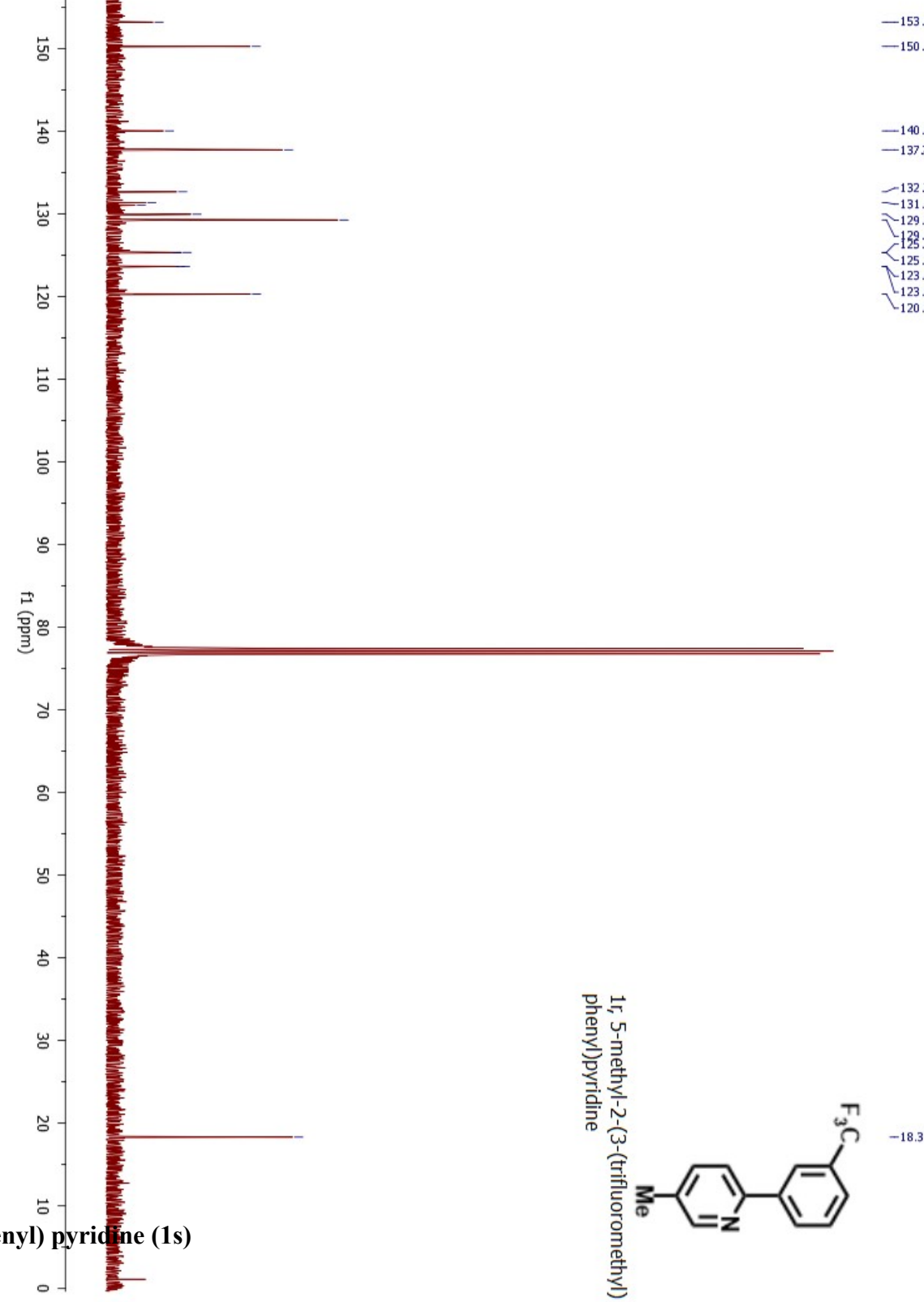
5-methyl-2-(p-tolyl



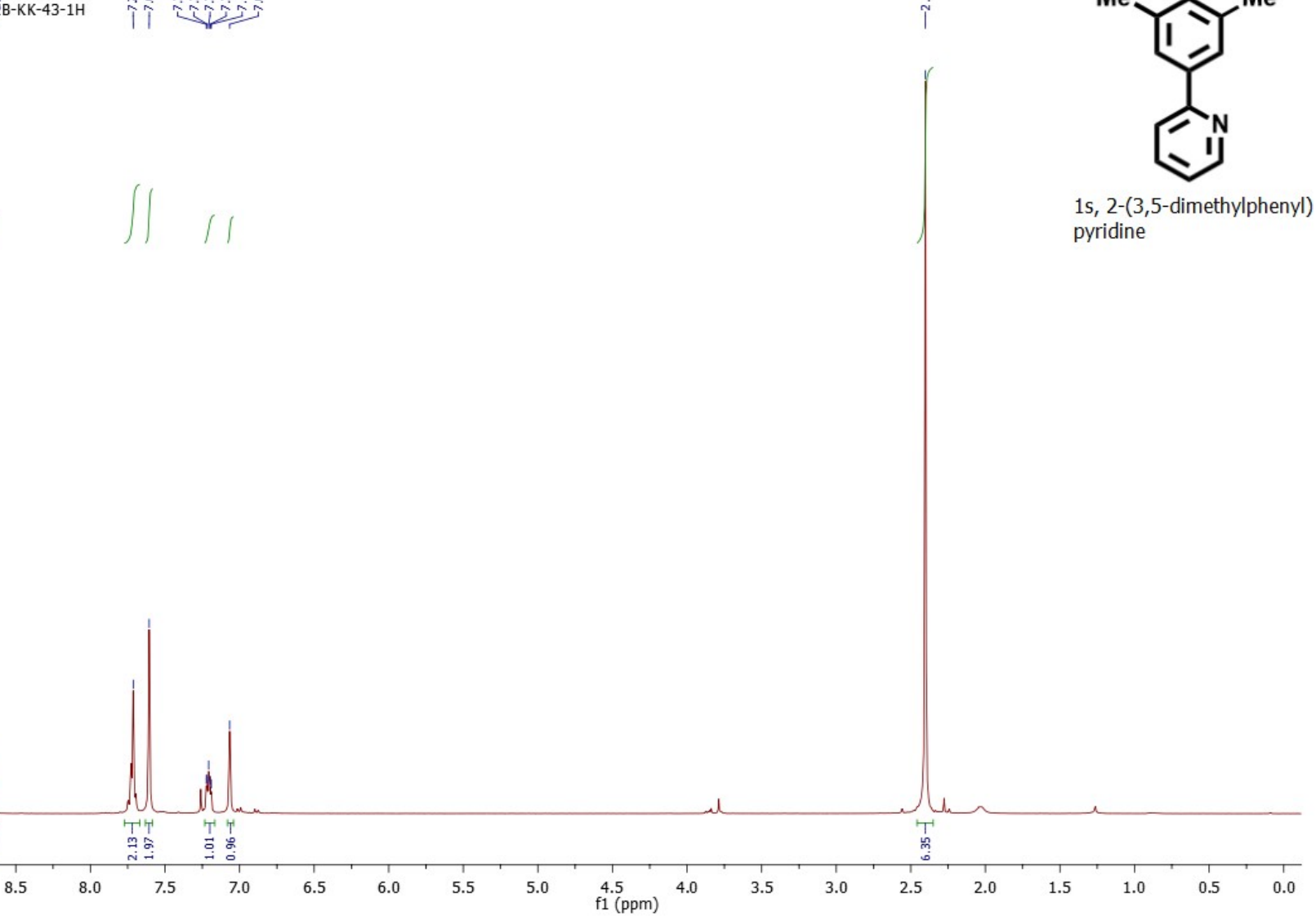

0.94
2.00
1.95
1.51
3.10
3.21
f1 (ppm)
1q, 5-methyl-2-(p-tolyl)pyridine
Me
N

5-methyl-2-(3-(trifl

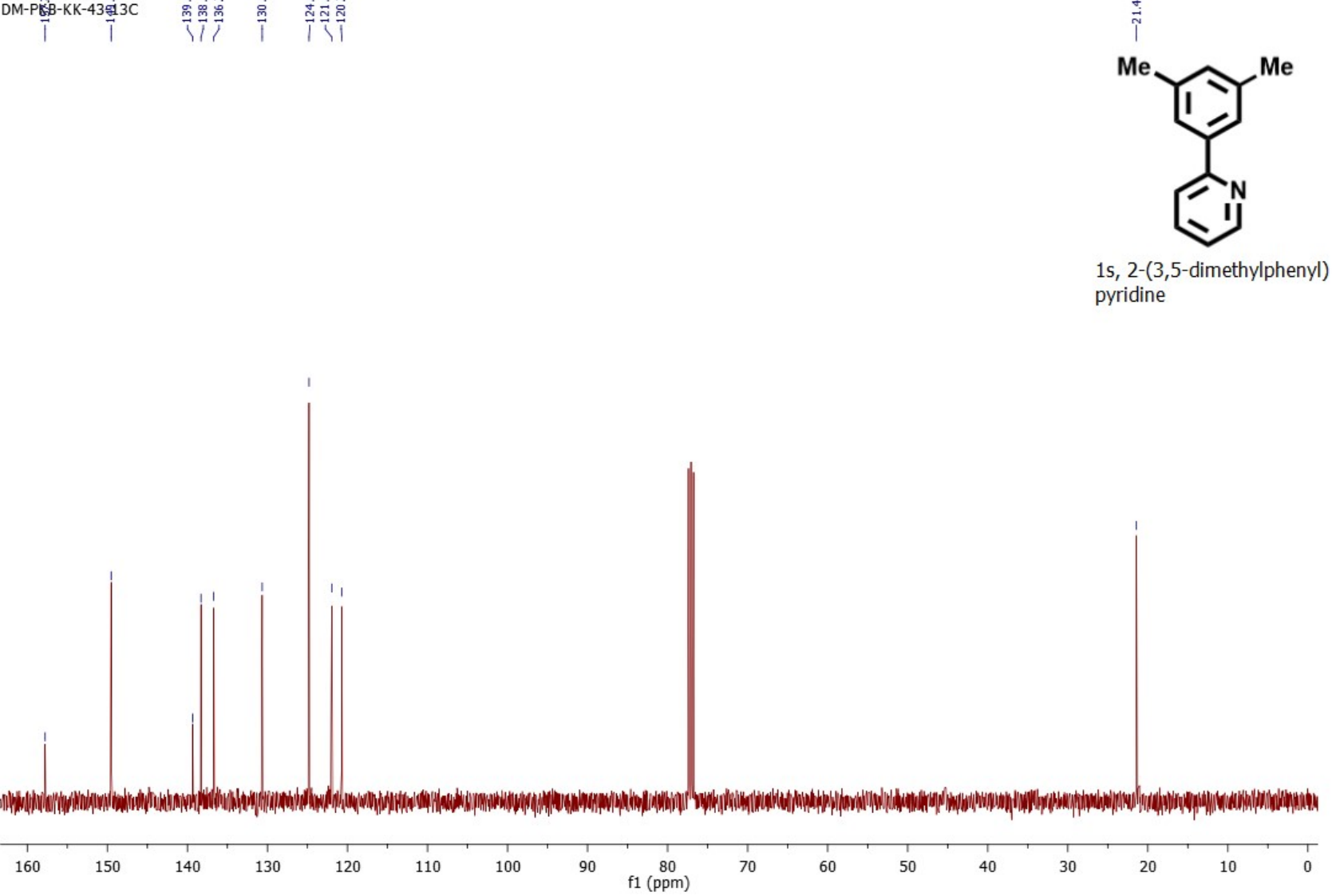




2-(3,5-dimethylphenyl) pyridine (1s)

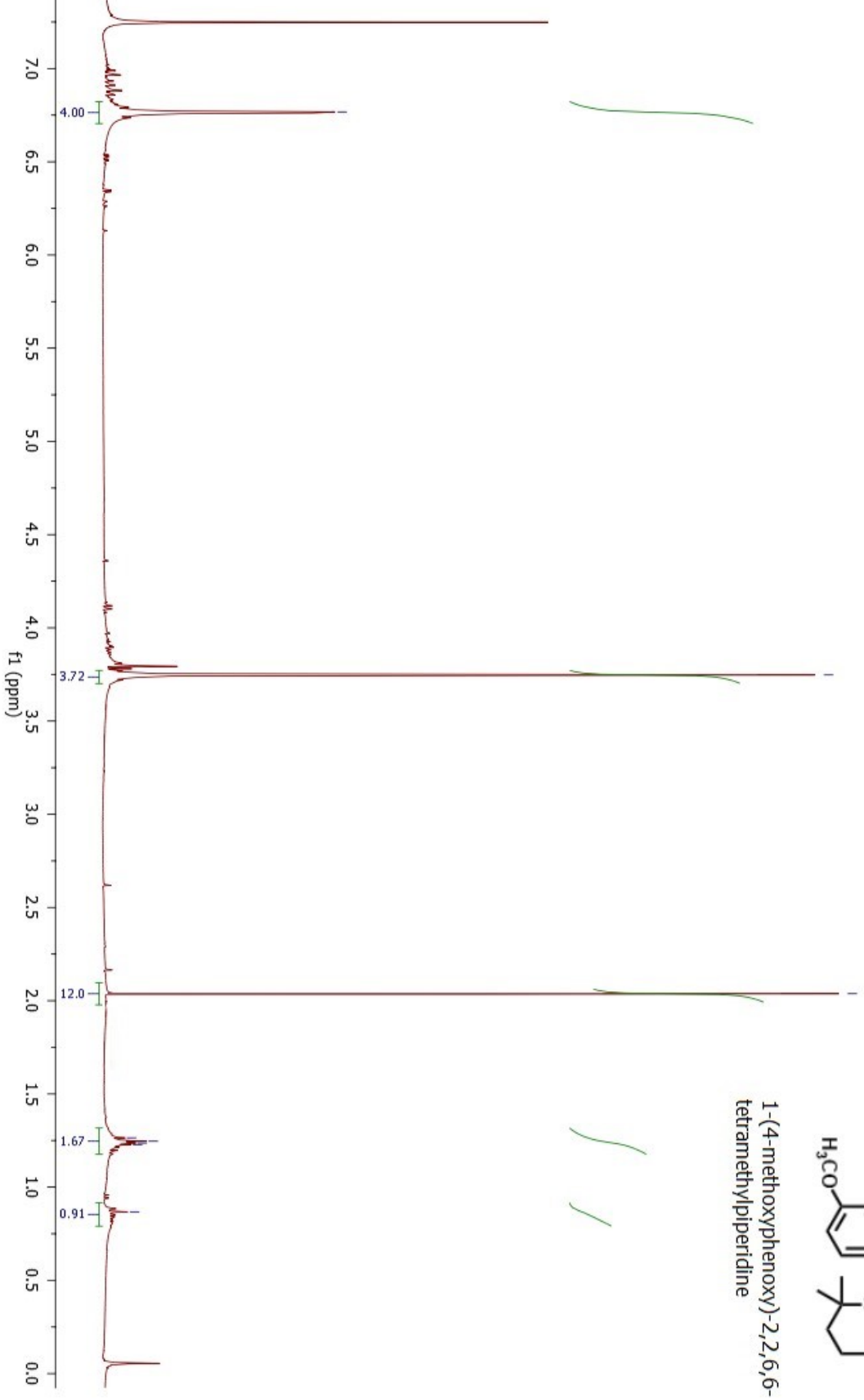


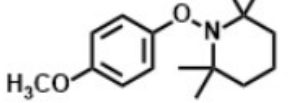
1s, 2-(3,5-dimethylphenyl) pyridine



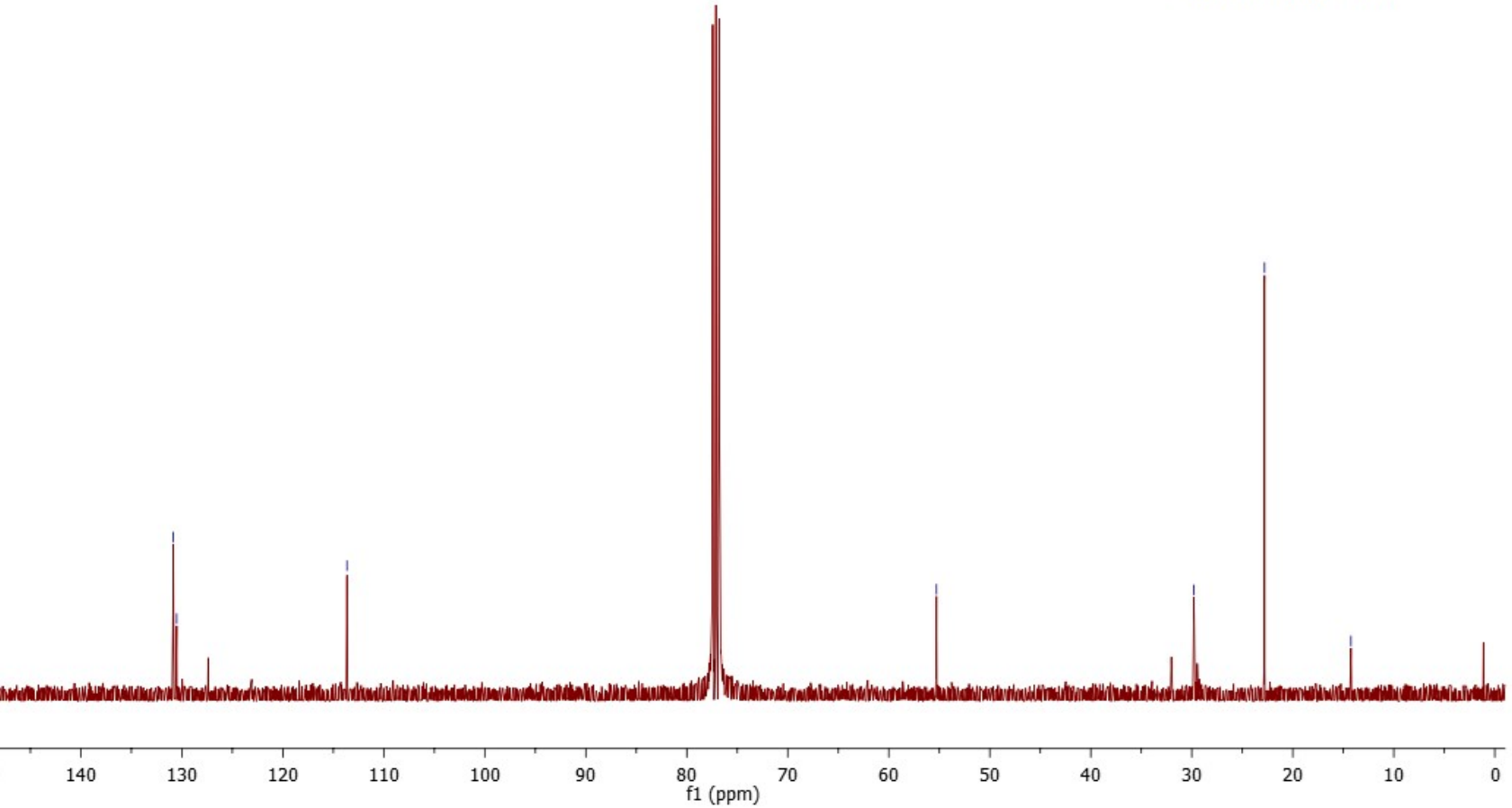
1s, 2-(3,5-dimethylphenyl) pyridine

1-(4-methoxyphenox

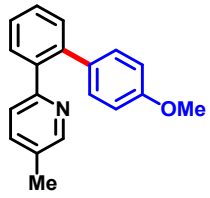




1-(4-methoxyphenoxy)-2,2,6,6-tetramethylpiperidine



11. HRMS data of C-H arylation products:



2-(4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3c)

Sample Purity Report

Agilent | Trusted Answers

Sample Information

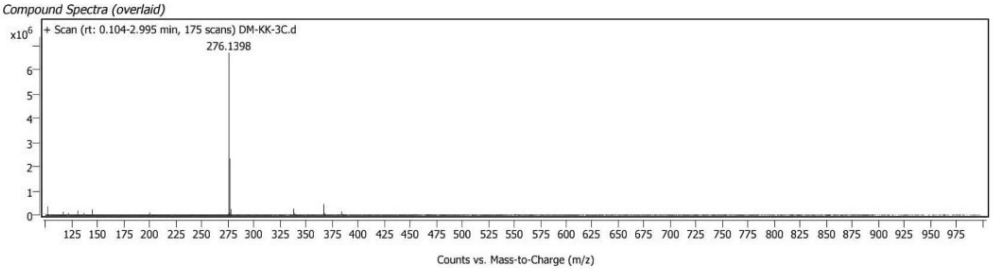
Name	DM-KK-3C	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3C.d
Sample ID		**Acq. Time (Local)**	14-01-2025 09:47:12 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A1	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	

Compound Details

Compound 1

Formula	RT	Mass	Mass (Tgt)	Abund	Purity Value Algorithm	Purity Comments
					Spectrum Extraction	

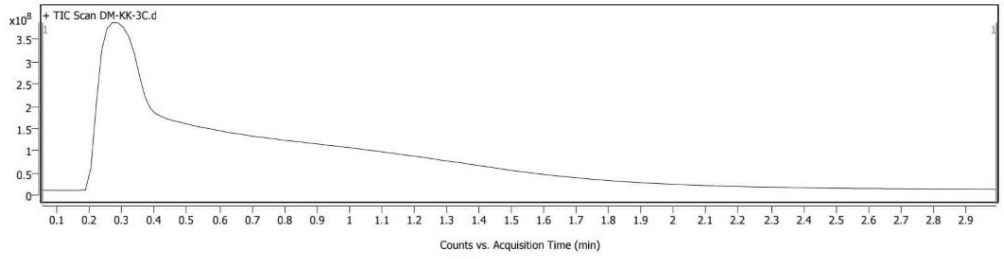
Compound Spectra (overlaid)

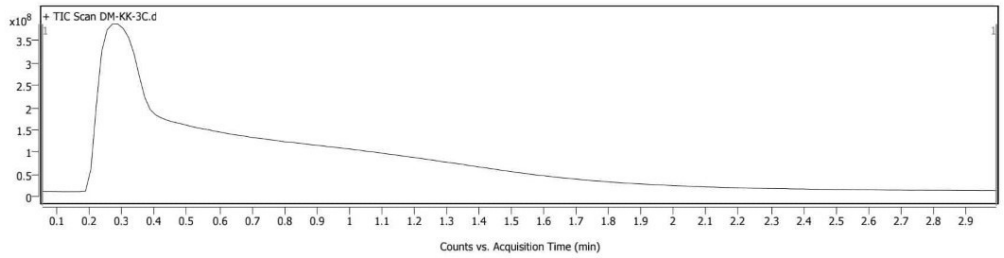


Spectrum Peaks

m/z	m/z (Calc)	Diff (ppm)	Abund	Height %	Height % (Calc)	Ion Species	Z
276.1398			6699324				1
277.1409			2331888				1

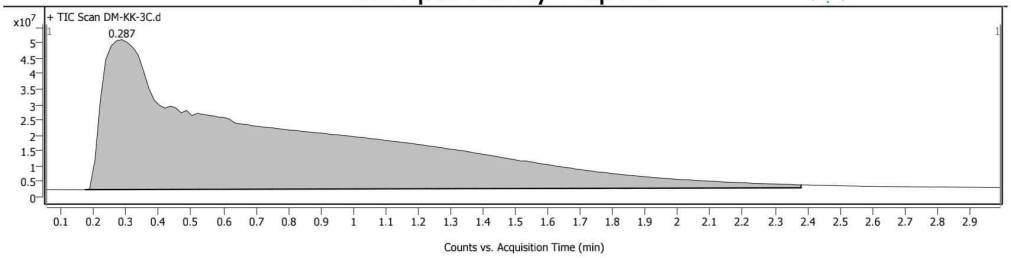
Sample Chromatograms





Sample Purity Report

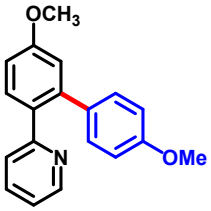
Agilent | Trusted Answers



Chromatogram Peaks

RT	Height	Height %	Area	Area %	Base Peak m/z	Symmetry	Width Label
0.287	48718492	100.00	1853860722	100.00	276.1392	16.87	2.207

MassHunter Qual 10.0
(End of Report)



2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3g)

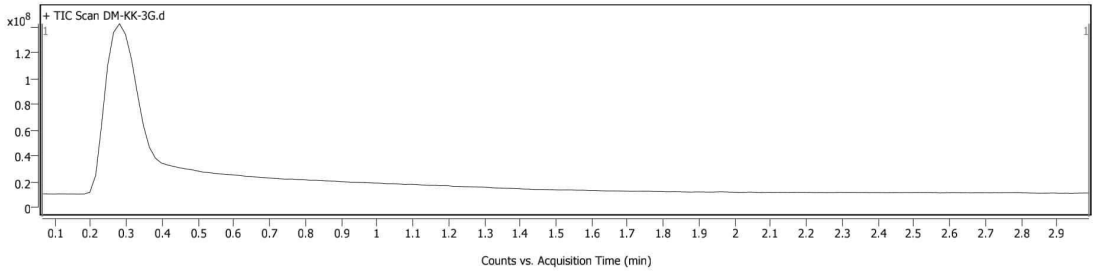
Target Screening Report

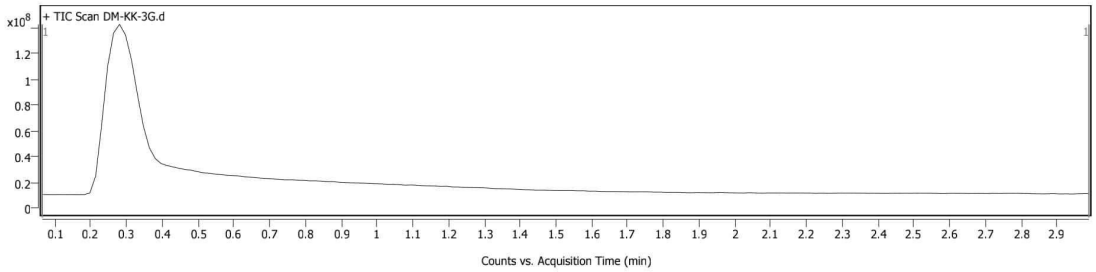
Agilent Trusted Answers

Sample Information

Name	DM-KK-3G	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3G.d
Sample ID		**Acq. Time (Local)**	13-01-2025 16:05:41 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A3	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_IITB_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Chromatograms





Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C19 H17 N O2		0.281	291.1269	291.1259	3.25	97.35	FBF

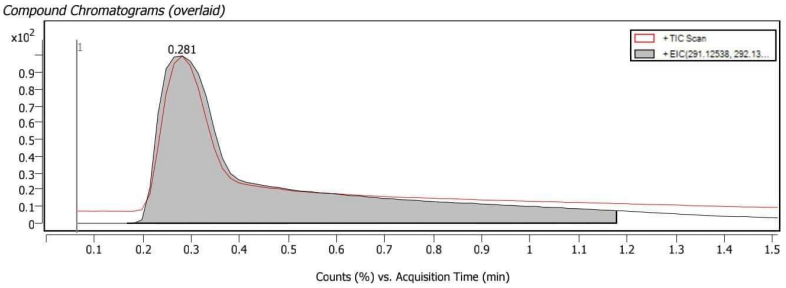
Compound Details

Cpd. 1: C19 H17 N O2

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C19 H17 N O2	0.281		291.1269	3.25		FBF	97.35	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+H)+ (M+Na)+	291.1214 292.1343 314.1153	97.35				

Compound Chromatograms (overlaid)

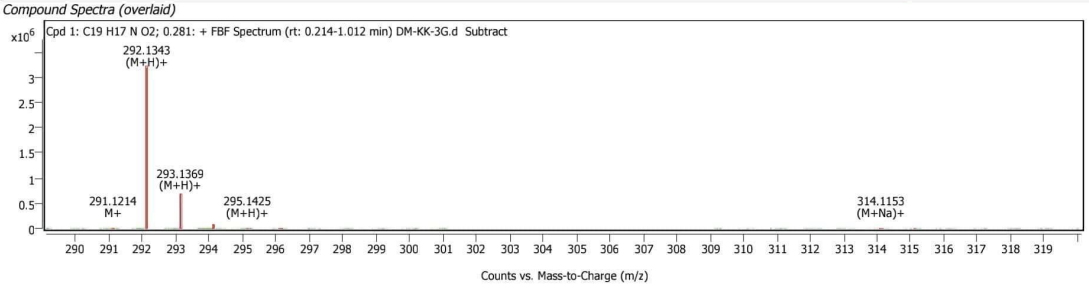


Structure

Target Screening Report

Agilent | Trusted Answers

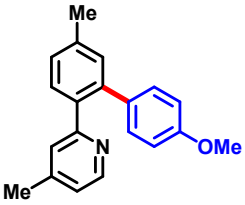
Compound Spectra (overlaid)



Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C19 H17 N O2	M+ (M+H)+ (M+Na)+	0.281		291.1269		FBF	97.35		97.35

MassHunter Qual 10.0
(End of Report)



2-(4'-methoxy-5-methyl-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3l)

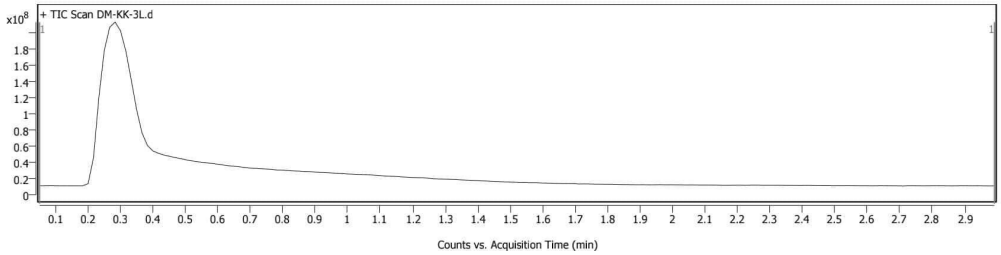
Target Screening Report

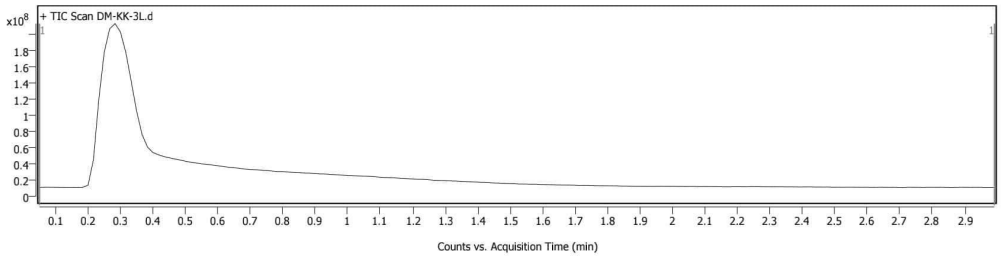
Agilent | Trusted Answers

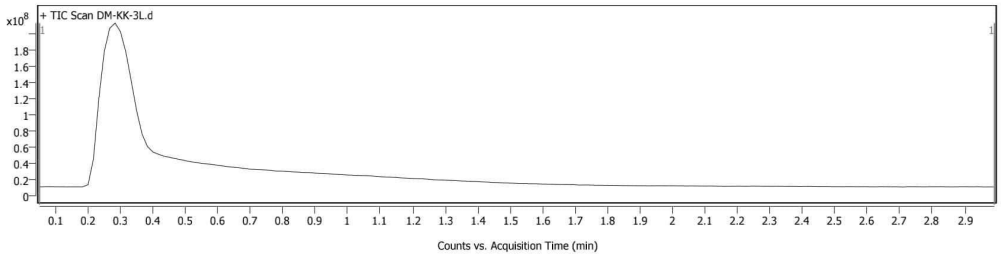
Sample Information

Name	DM-KK-3L	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3L.d
Sample ID		**Acq. Time (Local)**	14-01-2025 09:51:17 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A2	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Chromatograms







Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C20 H19 N O		0.284	289.1471	289.1467	1.44	79.60	FBF

Compound Details

Cpd. 1: C20 H19 N O

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C20 H19 N O	0.284		289.1471	1.44		FBF	79.60	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+H)+ (M+H2O)+ (M+Na)+ (M+K)+	289.1327 290.1550 307.1509 312.1337 328.1113	79.60				

Target Screening Report

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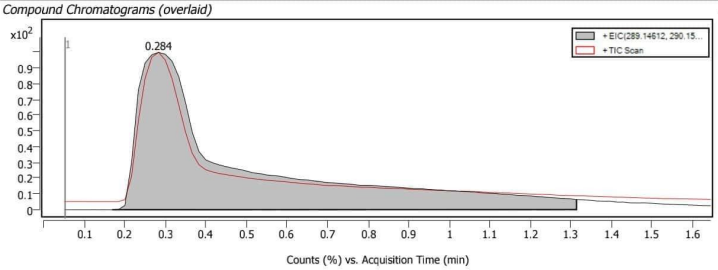
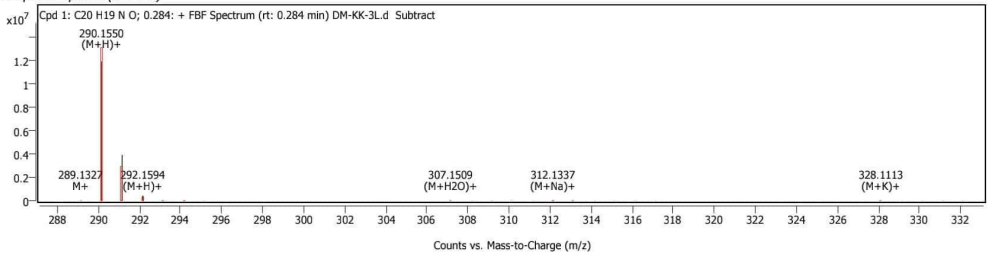
Compound Chromatograms (overlaid)

Structure



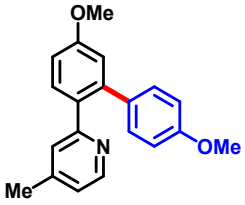
Compound Spectra (overlaid)



Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C20 H19 N O	M+ (M+H)+ (M+H2O)+ (M+Na)+ (M+K)+	0.284		289.1471		FBF	79.60		79.60

MassHunter Qual 10.0
(End of Report)



2-(4',5-dimethoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3m)

Department of Chemistry I.I.T. (B)

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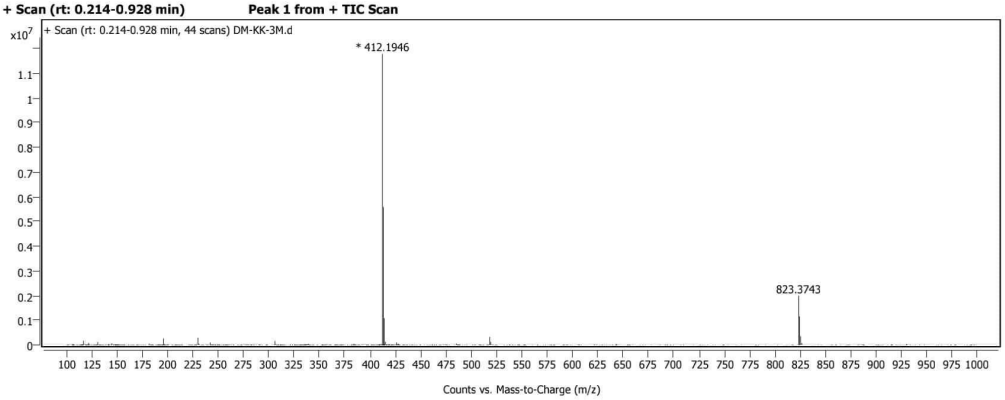
Sample Information

Name	DM-KK-3M	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3M.d
Sample ID		**Acq. Time (Local)**	01-01-2025 15:22:30 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A3	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Spectra

+ Scan (rt: 0.214-0.928 min) **Peak 1 from + TIC Scan**

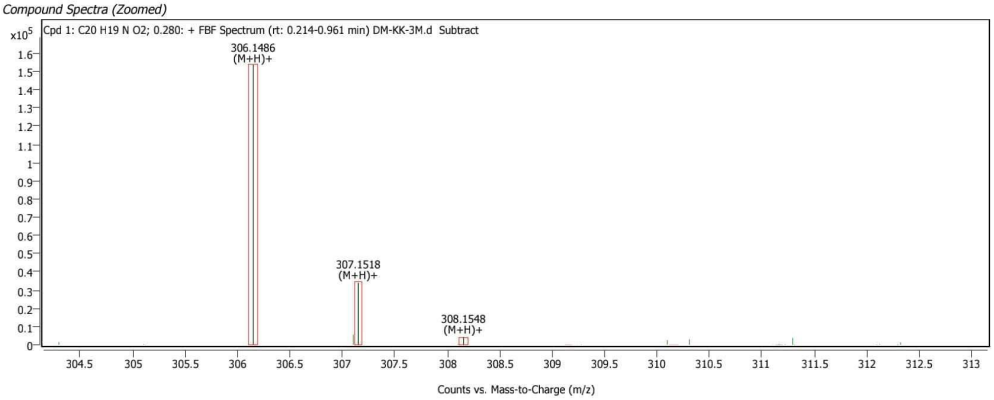


Compound Details

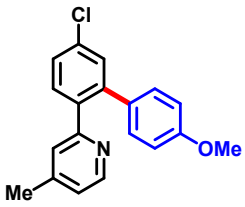
Cpd. 1: C20 H19 N O2

Formula	m/z	Observed M/Z	Difference_Da	Difference_PPM	Score
C20 H19 N O2	306.1486	306.148642373801	-0.242616304944931	-0.795094217749182	99.74

Compound Spectra (Zoomed)



MassHunter Qual 10.0
(End of Report)



2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-4-methylpyridine (Scheme 2, 3n)

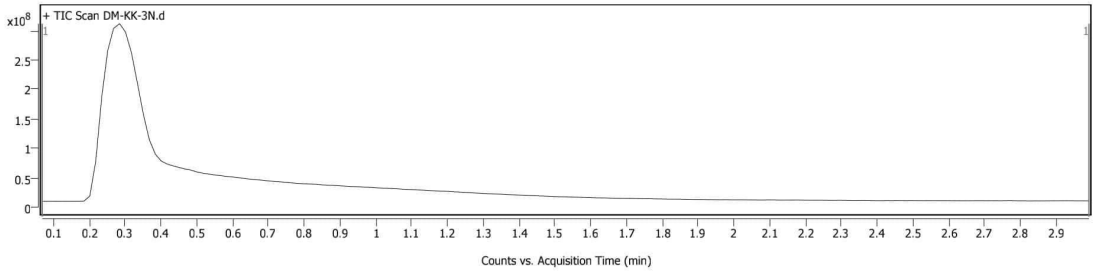
Target Screening Report

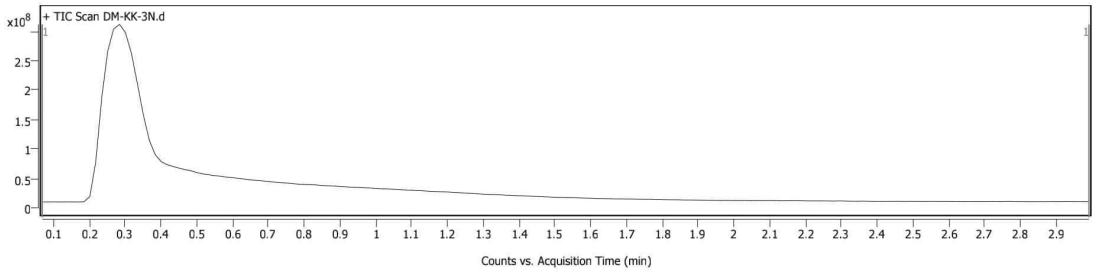
Agilent Trusted Answers

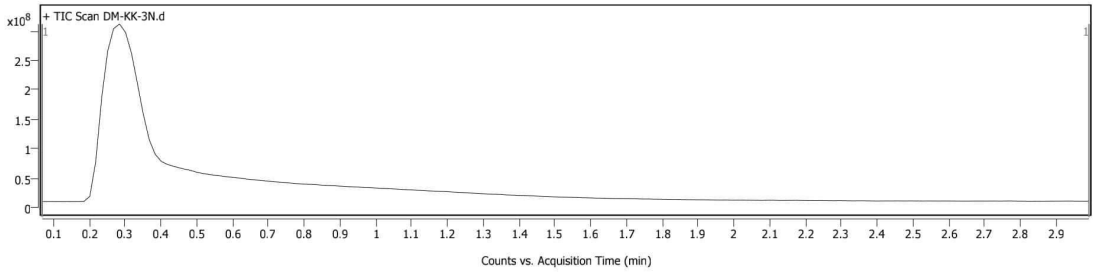
Sample Information

Name	DM-KK-3N	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3N.d
Sample ID		**Acq. Time (Local)**	13-01-2025 16:09:46 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A4	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_IITB_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

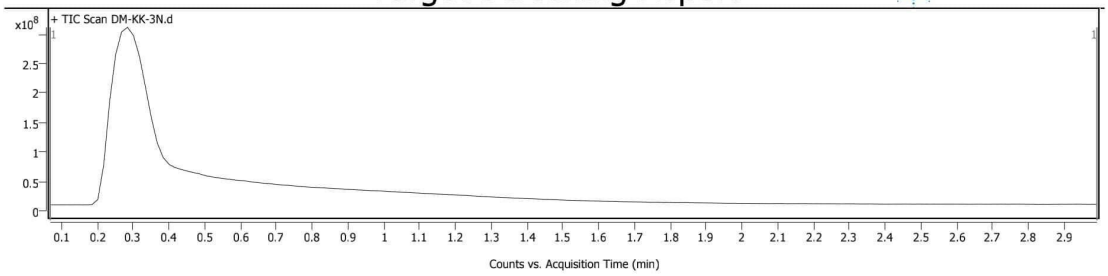
Sample Chromatograms







Target Screening Report



Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C19 H16 Cl N O		0.284	309.0934	309.0920	4.37	90.15	FBF

Compound Details

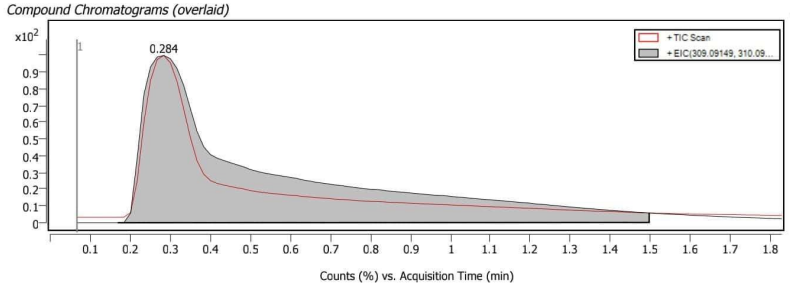
Cpd. 1: C19 H16 Cl N O

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C19 H16 Cl N O	0.284		309.0934	4.37		FBF	90.15	FBF

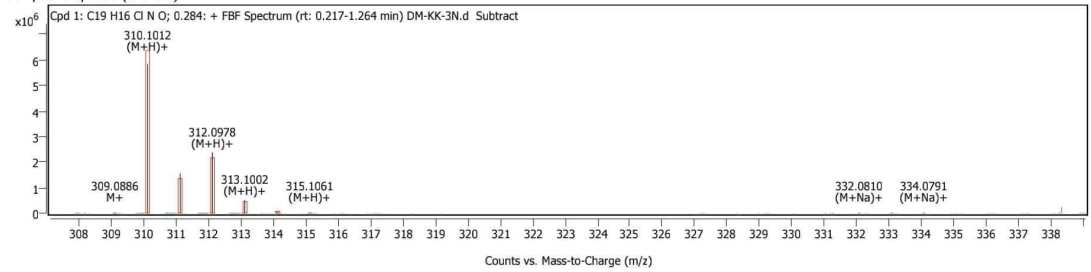
Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+H)+ (M+Na)+	309.0886 310.1012 332.0810	90.15				

Compound Chromatograms (overlaid)

Structure



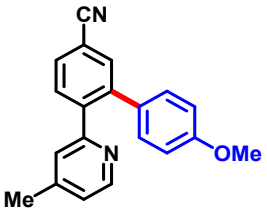
Compound Spectra (overlaid)



Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C19 H16 Cl N O	M+ (M+H)+ (M+Na)+	0.284		309.0934		FBF	90.15		90.15

MassHunter Qual 10.0
(End of Report)



4'-methoxy-6-(4-methylpyridin-2-yl)-[1,1'-biphenyl]-3-carbonitrile (Scheme 2, 3o)

Department of Chemistry I.I.T. (B)

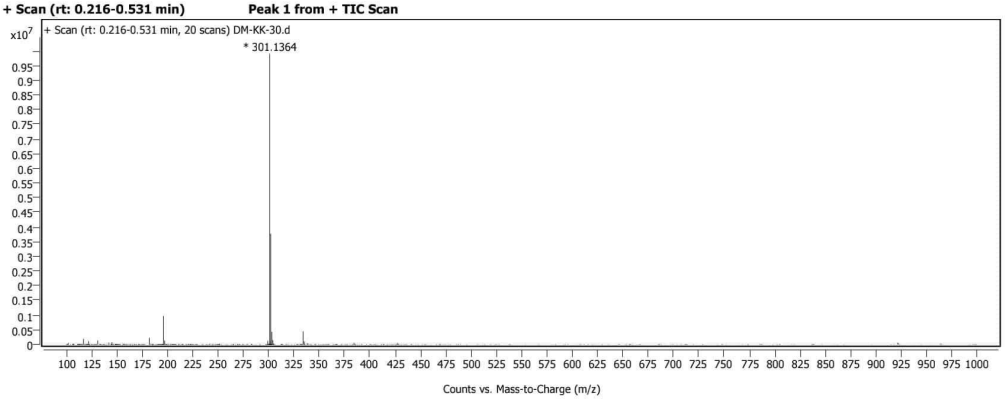
Agilent | Trusted Answers

Sample Information

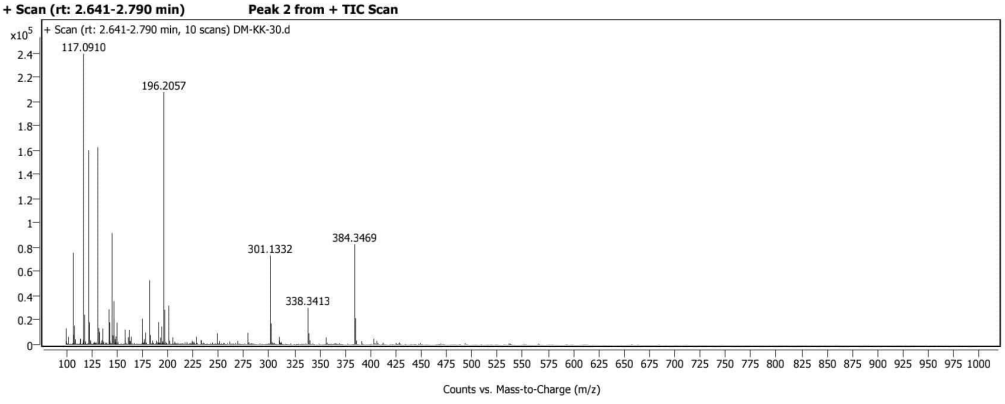
Name	DM-KK-30	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-30.d
Sample ID		**Acq. Time (Local)**	01-01-2025 15:18:25 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A2	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Spectra

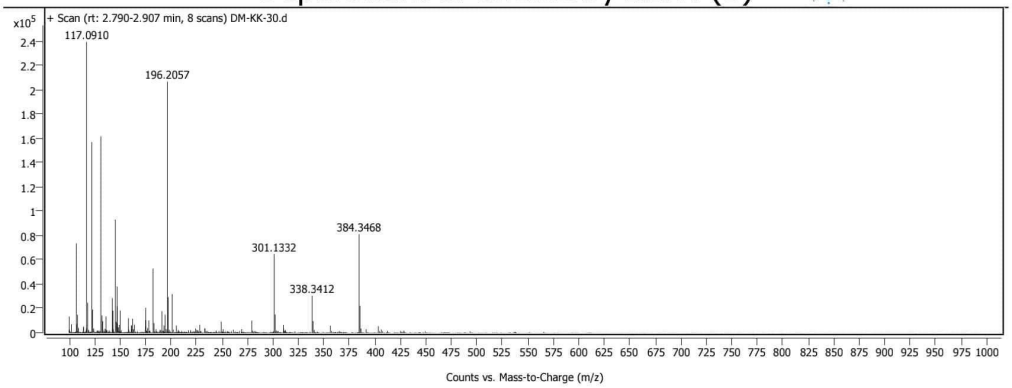
+ Scan (rt: 0.216-0.531 min) **Peak 1 from + TIC Scan**



+ Scan (rt: 2.641-2.790 min) **Peak 2 from + TIC Scan**



+ Scan (rt: 2.790-2.907 min) **Peak 3 from + TIC Scan**

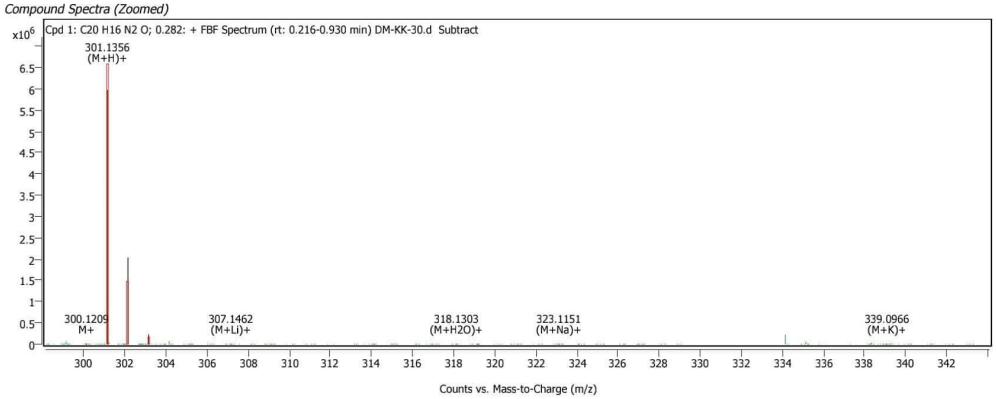


Compound Details

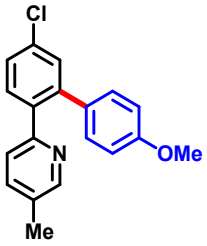
Cpd. 1: C20 H16 N2 O

Formula	m/z	Observed M/Z	Difference_Da	Difference_PPM	Score
C20 H16 N2 O	323.1151	323.115108063764	1.6224649783112	5.40594135713416	74.95

Compound Spectra (Zoomed)



MassHunter Qual 10.0
(End of Report)



2-(5-chloro-4'-methoxy-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3p)

Department of Chemistry I.I.T. (B)

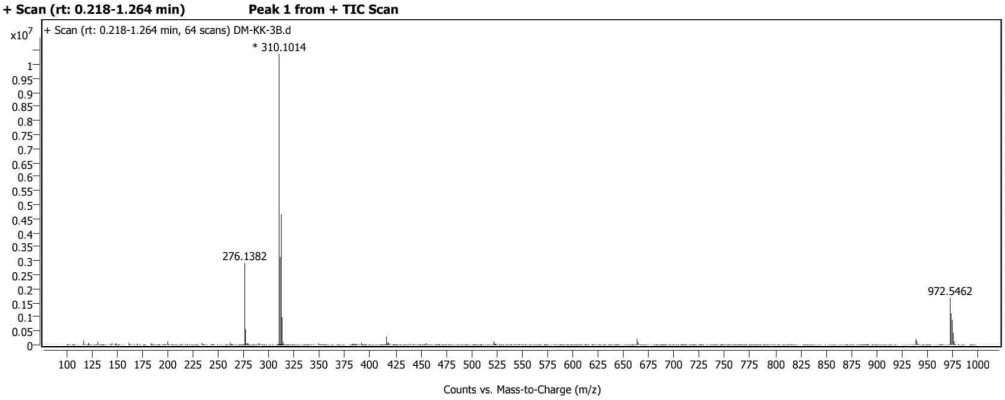
Agilent Trusted Answers

Sample Information

Name	DM-KK-3B	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3B.d
Sample ID		**Acq. Time (Local)**	01-01-2025 14:50:01 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A3	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Spectra

+ Scan (rt: 0.218-1.264 min) **Peak 1 from + TIC Scan**

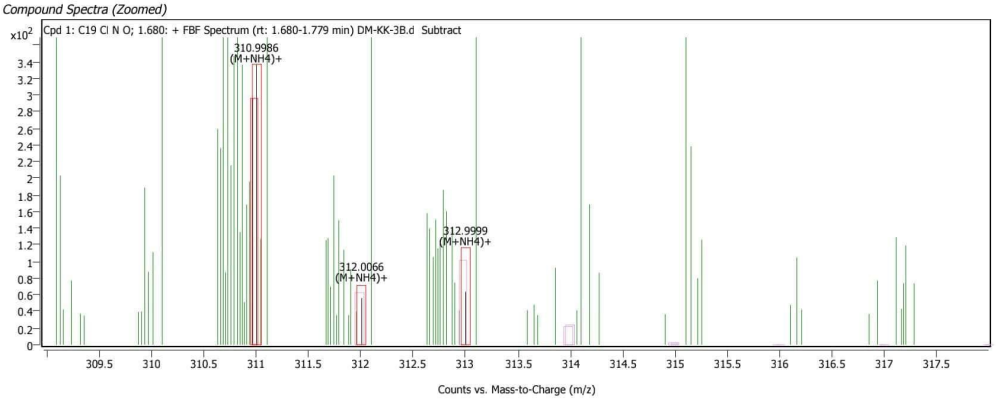


Compound Details

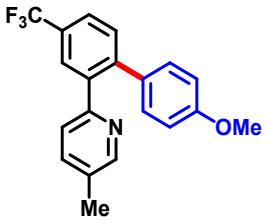
Cpd. 1: C19 Cl N O

Formula	m/z	Observed M/Z	Difference_Da	Difference_PPM	Score
C19 Cl N O	310.9986	310.998630283371	-5.49471107427735	-18.7554026563236	62.04

Compound Spectra (Zoomed)



MassHunter Qual 10.0
(End of Report)



2-(4'-methoxy-4-(trifluoromethyl)-[1,1'-biphenyl]-2-yl)-5-methylpyridine (Scheme 2, 3r)

Target Screening Report

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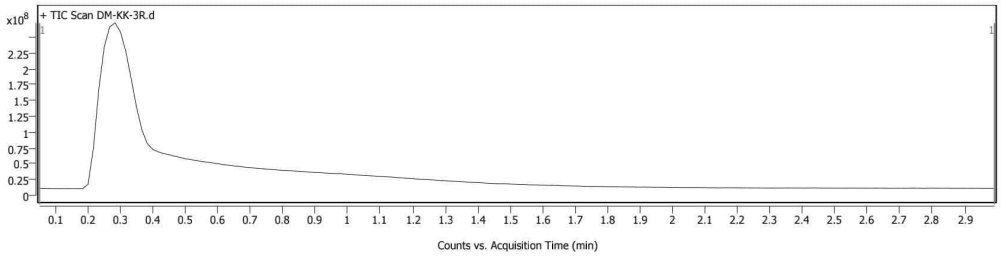
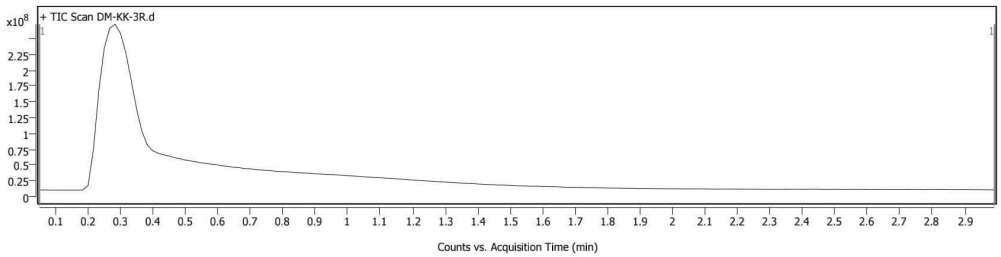
Sample Information

Name	DM-KK-3R	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3R.d
Sample ID		**Acq. Time (Local)**	14-01-2025 09:55:21 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A3	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Chromatograms





Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C20 H16 F3 N O		0.283	343.1231	343.1184	13.71	75.15	FBF

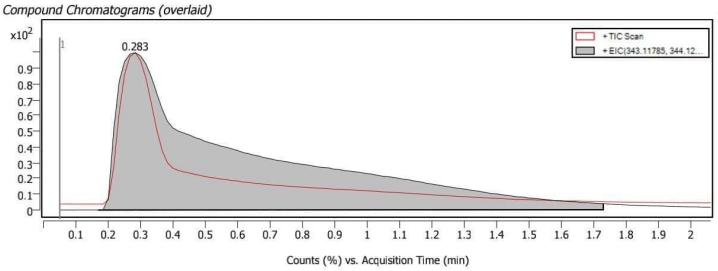
Compound Details

Cpd. 1: C20 H16 F3 N O

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C20 H16 F3 N O	0.283		343.1231	13.71		FBF	75.15	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
(M+H)+ (M+Na)+	344.1308 366.1056	75.15				

Compound Chromatograms (overlaid)



Structure

Target Screening Report

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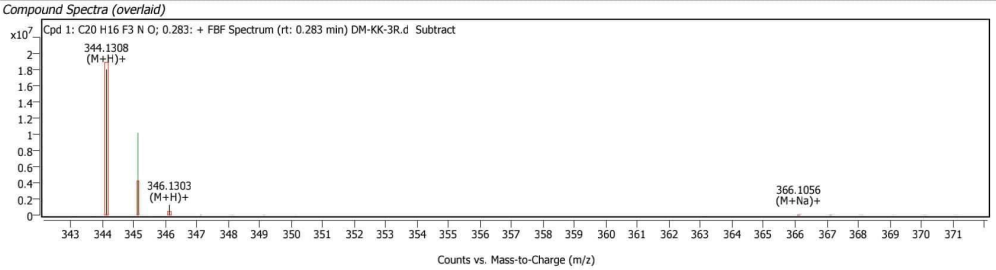
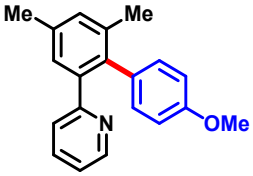
Compound Spectra (overlaid)



Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C20 H16 F3 N O	(M+H)+ (M+Na)+	0.283		343.1231		FBF	75.15		75.15

MassHunter Qual 10.0
(End of Report)



2-(4'-methoxy-4,6-dimethyl-[1,1'-biphenyl]-2-yl)pyridine (Scheme 2, 3s)

Target Screening Report

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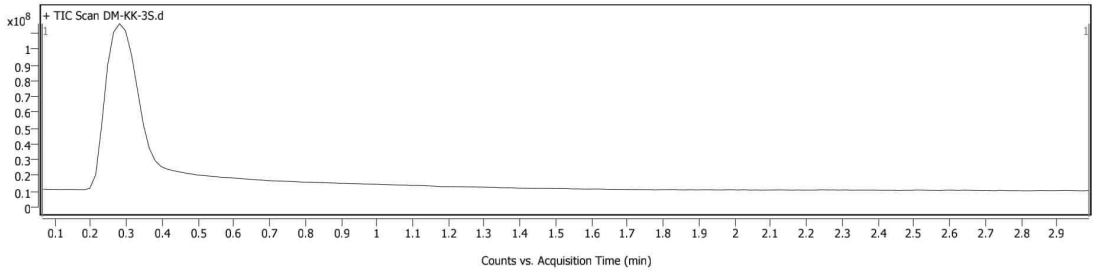
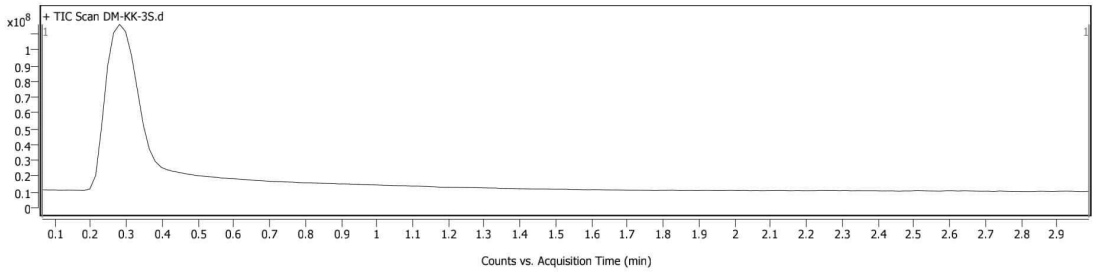
Sample Information

Name	DM-KK-3S	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-3S.d
Sample ID		**Acq. Time (Local)**	13-01-2025 16:01:36 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A2	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_IITB_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Chromatograms





Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C20 H19 N O		0.281	289.1479	289.1467	4.38	93.98	FBF

Compound Details

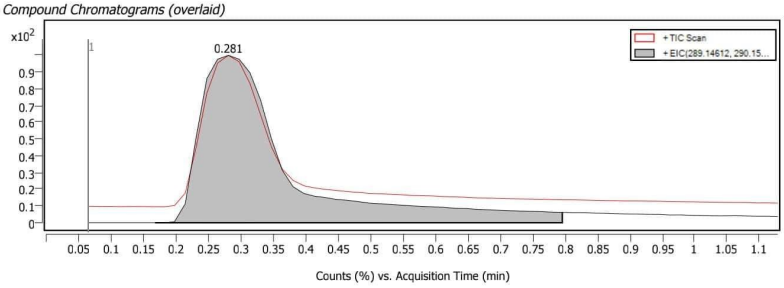
Cpd. 1: C20 H19 N O

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C20 H19 N O	0.281		289.1479	4.38		FBF	93.98	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
(M+H)+ (M+Na)+	290.1554 312.1364	93.98				

Compound Chromatograms (overlaid)

Structure



Target Screening Report

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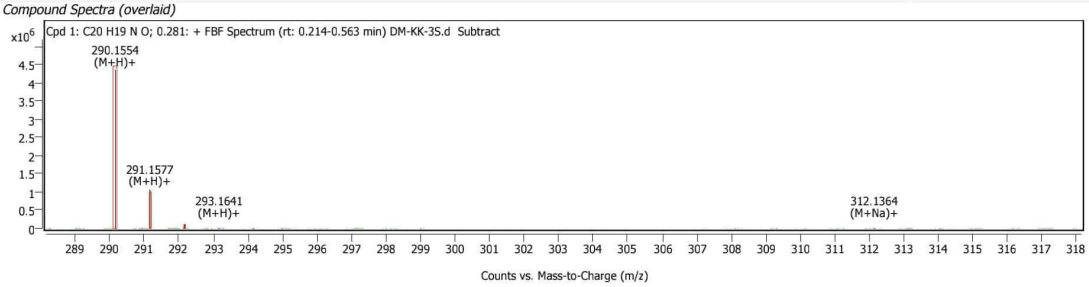
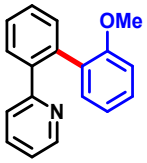
Compound Spectra (overlaid)



Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C20 H19 N O	(M+H)+ (M+Na)+	0.281		289.1479		FBF	93.98		93.98

MassHunter Qual 10.0
(End of Report)



2-(2'-methoxy-[1,1'-biphenyl]-2-yl)pyridine (M.W.= 261.32 g/mol) (Scheme 3, 4b)

Target Screening Report

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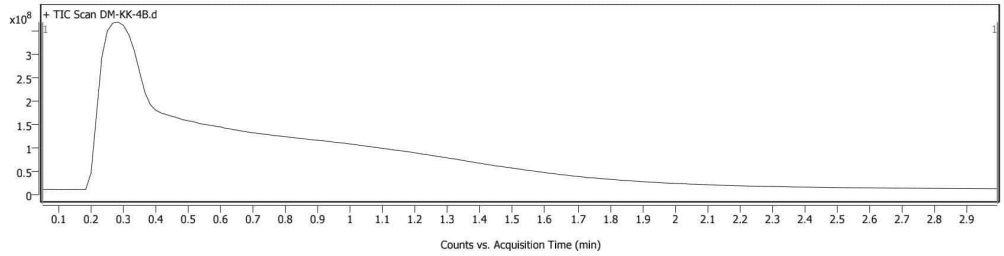
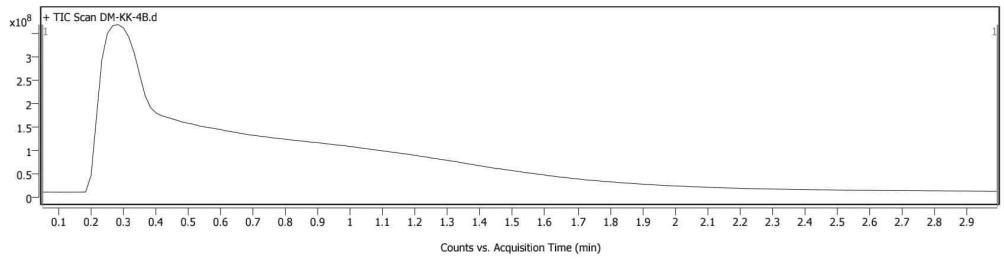
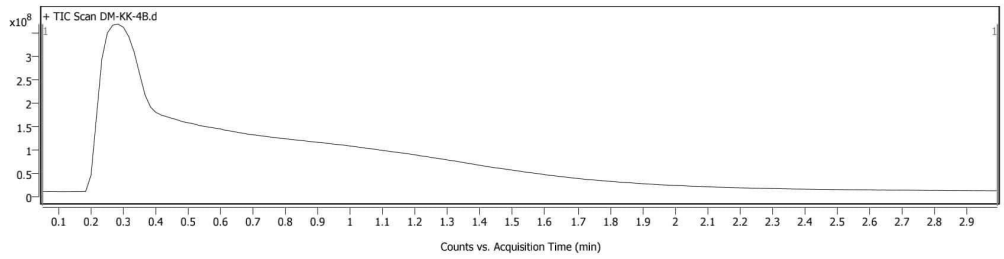
Sample Information

Name	DM-KK-4B	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-4B.d
Sample ID		**Acq. Time (Local)**	14-01-2025 09:59:25 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A4	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	0 qualified (1 targets)

Sample Chromatograms







Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1									Spectrum Extraction

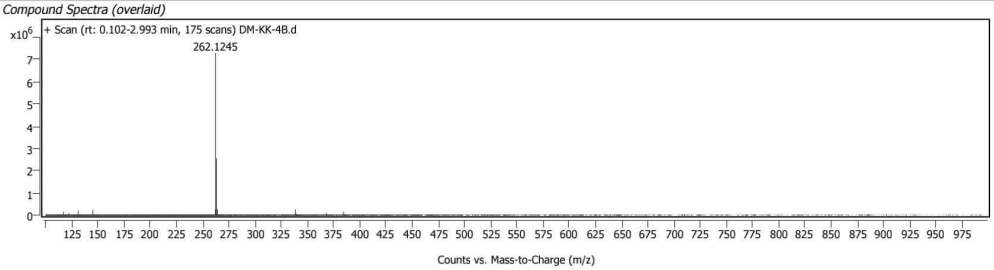
Compound Details

Compound 1

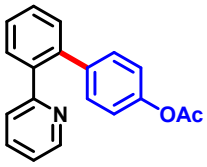
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
									Spectrum Extraction

Compound Chromatograms (overlaid) *Structure*

Compound Spectra (overlaid)



MassHunter Qual 10.0
(End of Report)



2'-(pyridin-2-yl)-[1,1'-biphenyl]-4-yl acetate (Scheme 3, 4d)

Target Screening Report

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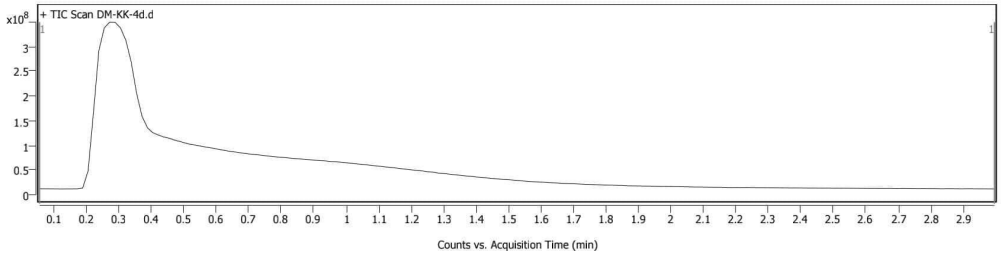
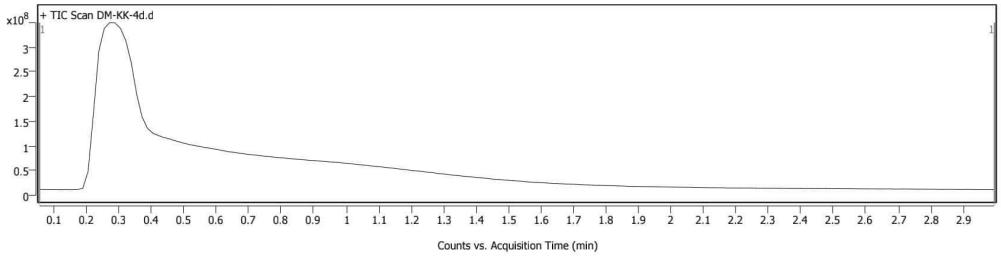
Sample Information

Name	DM-KK-4d	**Data File Path**	D:\Projects\MASS Data\Data\JAN 2025\DM-KK-4d.d
Sample ID		**Acq. Time (Local)**	14-01-2025 10:03:26 (UTC+05:30)
Instrument	LCMSQTOF-G6545B	**Method Path (Acq)**	D:\Projects\MASS Data\Methods\A1B1_POS_100-1000_4000_500_120.m
MS Type	QTOF	**Version (Acq SW)**	6200 series TOF/6500 series Q-TOF (11.0.203.0)
Inj. Vol. (ul)	2	**IRM Status**	Success
Position	P2A5	**Method Path (DA)**	C:\Users\LCMS QTOF G6545\Desktop\Report Templates\REPORT METHOD\HRMS_1.m
Plate Pos.		**Target Source Path**	
Operator	SYSTEM (SYSTEM)	**Result Summary**	1 qualified (1 targets)

Sample Chromatograms





Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C19 H15 N O2		0.272	289.1080	289.1103	-8.01	75.69	FBF

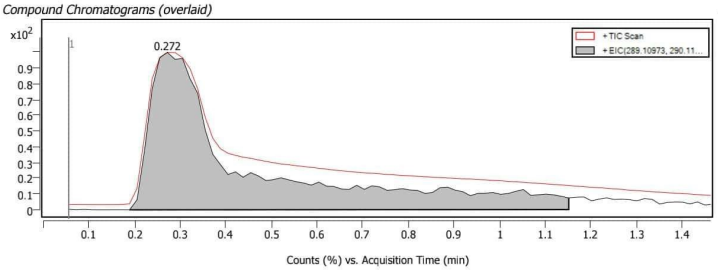
Compound Details

Cpd. 1: C19 H15 N O2

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C19 H15 N O2	0.272		289.1080	-8.01		FBF	75.69	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
(M+H)+ (M+Na)+	290.1157 312.0901	75.69				

Compound Chromatograms (overlaid)



Structure

Target Screening Report

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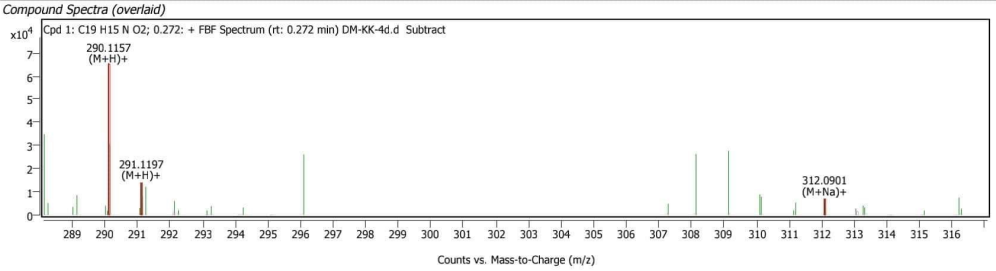
Compound Spectra (overlaid)



Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C19 H15 N O2	(M+H)+ (M+Na)+	0.272		289.1080		FBF	75.69		75.69

MassHunter Qual 10.0
(End of Report)