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Synthesis of 2-imidazolines by co-grinding of *N*-tosylaziridines and nitriles

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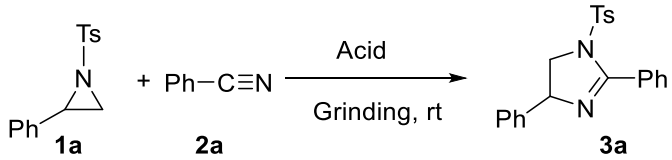
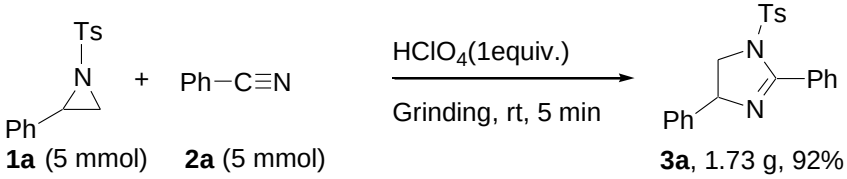
Table S1 Optimization of the reaction conditions.[a]



Entry	Acids (1 equiv)	Time (min)	Yields[b] (%)
1	H_2SO_4	10	36
2	HCl	10	15
3	$HClO_4$	10	92
4	HBr	10	trace
5	H_3PO_4	10	ND
6	AcOH	10	ND
7	TFA	10	ND
8	TsOH	10	ND
9	TfOH	10	84
10	$HClO_4$	5	95
11[c]	$HClO_4$	5	64

[a]*Reaction conditions:* 0.25 mmol of **1a** and **2a** each were ground on a mortar at room temperature in presence of 1 equiv. of an acid. [b]All are isolated yields. [c] 0.5 equiv of $HClO_4$ was used.



Scheme S1 Gram-scale reaction.

Structure Determination (X-ray crystallographic data of 3l):

White crystals of **3l** were obtained by crystallization from a solution in dichloromethane/ hexane.
Chemical Formula: **$C_{23}H_{21}ClN_2O_3S$**

- ORTEP (with 50% probability) diagram for the structure

  4-(2-chlorophenyl)-2-(3-methoxyphenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3l)

Crystal system	**Monoclinic**	
Formula	**$C_{23}H_{21}ClN_2O_3S$**	
Space group	**P 1 2_1 1**	
Wavelength	**0.71073 Å**	
Unit cell dimensions	***a* = 9.3569(8) Å**	**α = 90°**
	***b* = 10.1481(8) Å**	**β = 90.037(4)°**
	***c* = 21.9506(18) Å**	**γ = 90°**
R-factor (%)	**9.78**	
Volume	**2084.3(3) $Å^3$**	
Z	**2**	

Experimental Section

General Information: All reagents were purchased from commercial sources and used without further purification. ^{1}H NMR spectra were determined on a 400 MHz spectrometer as solutions in CDCl3. Chemical shifts are expressed in parts per million (δ), and the signals were reported as s (singlet), d (doublet), t (triplet), m (multiplet), dd (double doublet), and coupling constants (*J*) were given in Hz. ^{13}C NMR spectra were recorded at 100 MHz in $CDCl_3$ solution. TLC was done on silica gel coated glass slide. Silica gel (60–120 mesh) was used for column chromatography. Petroleum ether refers to the fraction boiling in the range of 60–80 °C unless otherwise mentioned. Melting points were determined on a glass disk with an electric hot plate. All solvents were dried and distilled before use. Commercially available substrates were freshly distilled before the reaction. All reactions involving moisture sensitive reactants were executed using oven dried glassware. X-ray single crystal data were collected using Mo Kα (λ = 0.71073 Å) radiation with a CCD area detector. All the aziridines were prepared according to the previously reported method.

General experimental procedure for the synthesis of aziridines (1). A mixture of olefin (1 mmol), anhydrous chloramine-T (0.228 g, 1 mmol), NBS (20 mol%) acetonitrile (5 ml) was taken in round bottom flask. The resulting mixture was stirred at 25 °C (monitored by TLC). After completion, the reaction mixture was diluted with EtOAc (15 ml) and washed with water and brine. The organic layer was dried over anhydrous Na_2SO_4. Evaporation of solvent furnished the crude product which was subjected to column chromatography using petroleum ether–ethyl acetate as the eluent to obtain the pure aziridines.

2,4-Diphenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3a) [S1].

White liquid, 357 mg, yield 95%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.78-7.76 (m, 2H), 7.54-7.51 (m, 1H), 7.45-7.39 (m, 4H), 7.24-7.19 (m, 5H), 6.98-6.96 (m, 2H), 5.01-4.97 (m, 1H), 4.46-4.41 (m, 1H), 3.88-3.83 (m, 1H), 2.42 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.0, 144.8, 141.7, 134.6, 131.3, 130.3, 130.0, 129.9, 128.7, 127.9, 127.8, 127.5, 126.5, 68.0, 57.0, 21.7.

2-(3-Methoxyphenyl)-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3b).

Yellow liquid, 301 mg, yield 74%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.44-7.42 (m, 2H), 7.34-7.33 (m, 2H), 7.283-7.276 (m, 1H), 7.23-7.19 (m, 5H), 7.08-7.05(m, 1H), 7.00-6.98 (m, 2H), 5.01-4.96 (m, 1H), 4.47-4.41 (m, 1H), 3.89-3.84 (m, 4H), 2.42 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 159.8, 159.0, 144.8, 141.6, 134.7, 131.5, 129.9, 129.0, 128.7, 127.8, 127.6, 126.5, 122.4, 117.6, 115.0, 68.1, 57.1, 55.6, 21.7. Anal. Calcd. for $C_{23}H_{22}N_2O_3S$: C, 67.96; H, 5.46; N, 6.89%; Found: C, 67.89; H, 5.38; N, 6.80%.

2-(2-Chlorophenyl)-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3c) [S2].

Colourless liquid, 259 mg, yield 63%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.49-7.46 (m, 3H), 7.41-7.40 (m, 2H), 7.35-7.31 (m, 1H), 7.28-7.22 (m, 5H), 7.17-7.15(m, 2H), 5.27-5.23 (m, 1H), 4.42-4.37 (m, 1H), 3.87-3.82 (m, 1H), 2.42 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 155.9, 144.8, 141.6, 134.8, 133.7, 131.42, 131.40, 130.0, 129.8, 129.7, 128.8, 127.82, 127.76, 126.7, 126.2, 68.3, 55.7, 21.7.

2-(3-Chlorophenyl)-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3d).

Yellowish brown gum, 218 mg, yield 53%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.70-7.67 (m, 2H), 7.50-7.47 (m, 1H), 7.44-7.38 (m, 3H), 7.24-7.22 (m, 5H), 7.00-6.97 (m, 2H), 5.03-4.99 (m, 1H), 4.46-4.41 (m, 1H), 3.89-3.84 (m, 1H), 2.43 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 158.7, 145.1, 141.3, 134.6, 133.9, 132.1, 131.3, 130.0, 129.74, 129.68, 129.2, 128.8, 128.2, 127.7, 126.4, 68.2, 56.9, 21.7. Anal. Calcd. for $C_{22}H_{19}ClN_2O_2S$: C, 64.30; H, 4.66; N, 6.82%; Found: C, 64.39; H, 4.60; N, 6.92%.

2-(4-Chlorophenyl)-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3e).

Yellow solid, 267 mg, yield 65%,mp 175-177 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.75-7.72 (m, 2H), 7.43-7.39 (m, 4H), 7.22-7.20 (m, 5H), 6.95-6.93(m, 2H), 4.99-4.95 (m, 1H), 4.45-4.40 (m, 1H), 3.87-3.83 (m, 1H), 2.43 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 159.2, 145.0, 141.4, 137.6, 134.4, 131.4, 130.0, 128.8, 128.7, 128.3, 127.71, 127.67, 126.4, 68.0, 57.0, 21.8. Anal. Calcd. for $C_{22}H_{19}ClN_2O_2S$: C, 64.30; H, 4.66; N, 6.82%; Found: C, 64.40; H, 4.58; N, 6.75%.

2-(2-Fluorophenyl)-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3f).

Yellow solid, 241 mg, yield 61%,mp 106-108 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.47-7.45 (m, 1H), 7.42-7.38 (m, 3H), 7.18-7.14 (m, 6H), 7.08-7.04 (m, 1H), 6.98-6.95(m, 2H), 5.12-5.08 (m, 1H), 4.32-4.26 (m, 1H), 3.77-3.72 (m, 1H), 2.34 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.8 (d, $^{1}J_{C\text{-}F}$ = 251 Hz), 154.6, 144.9, 141.7, 134.7, 132.6 (d, $^{6}J_{C\text{-}F}$ = 9 Hz), 131.4, 130.0, 128.84, 127.8 (d, $^{5}J_{C\text{-}F}$ = 4 Hz), 126.5, 123.7(d, $^{4}J_{C\text{-}F}$ = 3 Hz), 119.2 (d, $^{3}J_{C\text{-}F}$ = 14 Hz), 115.9 (d, $^{2}J_{C\text{-}F}$ = 22 Hz), 68.3, 55.9, 21.8. Anal. Calcd. for $C_{22}H_{19}FN_2O_2S$: C, 66.99; H, 4.85; N, 7.10%; Found: C, 66.90; H, 4.76; N, 7.04%.

2-(3-Methoxyphenyl)-4-(*o*-tolyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3g).

Brown semi-solid, 311 mg, yield 74%,mp 106-108 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.43-7.34 (m, 4H), 7.31-7.30 (m, 1H), 7.19 (d, *J* = 8.4 Hz, 2H), 7.12-7.04(m, 3H), 7.00-6.96 (m,1H), 6.78 (d, *J* = 7.6 Hz, 1H), 5.14-5.09 (m, 1H), 4.50-4.45 (m, 1H), 3.86 (s, 3H), 3.74-3.69 (m, 1H), 2.41 (s, 3H), 2.24 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.0, 159.0, 144.8, 140.0, 134.8, 134.4, 131.6, 130.4, 129.9, 129.0, 127.7, 127.3, 126.4, 125.8, 122.4, 117.6, 115.0, 65.1, 56.5, 55.6, 21.7, 19.5. Anal. Calcd. for $C_{24}H_{24}N_2O_3S$: C, 68.55; H, 5.75; N, 6.66%; Found: C, 68.49; H, 5.68; N, 6.76%.

2-(3-Methoxyphenyl)-4-(*m*-tolyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3h).

Colourless liquid, 212 mg, yield 68%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.45-7.43 (m, 2H), 7.34-7.33 (m, 2H), 7.283-7.278 (m, 1H), 7.22-7.20 (m, 2H), 7.12-7.04 (m,3H), 6.80 (d, J = 8.0 Hz, 2H), 4.96-4.92 (m, 1H), 4.45-4.40 (m, 1H), 3.87-3.82 (m, 4H), 2.42 (s, 3H), 2.27 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 159.7, 159.0, 144.8, 141.5, 138.4, 134.8, 131.5, 129.9, 129.0, 128.6, 128.4, 127.8, 127.2, 123.7, 122.5, 117.6, 115.0, 68.1, 57.0, 55.6, 21.8, 21.5. Anal. Calcd. for $C_{24}H_{24}N_2O_3S$: C, 68.55; H, 5.75; N, 6.66%; Found: C, 68.67; H, 5.82; N, 6.73%.

2-(2-Fluorophenyl)-4-(*m*-tolyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3i).

Yellow gum, 225 mg, yield 55%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.57-7.46 (m, 4H), 7.26-7.21 (m, 3H), 7.17-7.12 (m, 2H), 7.05 (d, J = 7.6 Hz, 1H), 6.85-6.84 (m,2H), 5.16-5.12 (m, 1H), 4.38-4.33 (m, 1H), 3.84-3.79 (m, 1H), 2.43 (s, 3H), 2.27 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.8 (d, $^{1}J_{C\text{-}F}$ = 251 Hz), 154.4, 144.8, 141.5, 138.5, 134.6, 132.6 (d, $^{6}J_{C\text{-}F}$ = 9 Hz), 131.4, 129.9, 128.6 (d, $^{5}J_{C\text{-}F}$ = 20 Hz), 127.8, 127.2, 123.7 (d, $^{4}J_{C\text{-}F}$ = 7 Hz), 119.2 (d, $^{3}J_{C\text{-}F}$ = 14 Hz), 115.9 (d, $^{2}J_{C\text{-}F}$ = 22 Hz), 68.3, 55.9, 21.8, 21.5. Anal. Calcd. for $C_{23}H_{21}FN_2O_2S$: C, 67.63; H, 5.18; N, 6.86%; Found: C, 67.54; H, 5.12; N, 6.95%.

4-(2-Chlorophenyl)-2-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3j) [S2].

Yellow liquid, 378 mg, yield 92%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.83-7.80 (m, 2H), 7.57-7.53 (m, 1H), 7.48-7.44 (m, 2H), 7.37 (d, J = 8.4 Hz, 2H), 7.33-7.31 (m, 1H), 7.18-7.13 (m, 3H), 7.05-7.01 (m, 1H), 6.92-6.90 (m, 1H), 5.26-5.22 (m, 1H), 4.61-4.55 (m, 1H), 3.80-3.75 (m, 1H), 2.38 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 155.2, 138.8, 133.7, 128.6, 126.1, 125.5, 124.3, 124.0, 123.9, 123.3, 122.5, 121.9, 121.6, 121.4, 121.0, 59.3, 50.2, 15.7.

4-(2-Chlorophenyl)-2-(*m*-tolyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3k).

Yellowish white solid, 331 mg, yield 78%, mp 85-87 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.61-7.58 (m, 2H), 7.40-7.31 (m, 5H), 7.18-7.14 (m, 3H), 7.07-7.03 (m, 1H), 6.96-6.93 (m,1H), 5.25-5.21 (m, 1H), 4.60-4.55 (m, 1H), 3.80-3.75 (m, 1H), 2.42 (s, 3H), 2.39 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 161.3, 144.7, 139.7, 137.6, 134.7, 132.2, 132.1, 130.35, 130.26, 129.8, 129.3, 128.5, 127.8, 127.6, 127.5, 127.1, 127.0, 65.3, 56.2, 21.7, 21.5. Anal. Calcd. for $C_{23}H_{21}ClN_2O_2S$: C, 65.01; H, 4.98; N, 6.59%; Found: C, 65.11; H, 4.90; N, 6.52%.

4-(2-Chlorophenyl)-2-(3-methoxyphenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3l).

Off-white solid, 326 mg, yield 74%, mp 88-90 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.41-7.31 (m, 6H), 7.18-7.14 (m, 3H), 7.10-7.02 (m, 2H), 6.94-6.91 (m, 1H), 5.26-5.21 (m,1H), 4.61-4.56 (m, 1H), 3.87 (s, 3H), 3.80-3.75 (m, 1H), 2.39 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 161.0, 159.0, 144.8, 139.7, 134.6, 132.1, 129.9, 129.3, 129.0, 128.5, 127.6, 127.5, 127.0, 122.4, 117.7, 115.1, 65.3, 56.3, 55.6, 21.7. Anal. Calcd. for $C_{23}H_{21}ClN_2O_3S$: C, 62.65; H, 4.80; N, 6.35%; Found: C, 62.72; H, 4.89; N, 6.42%.

4-(2-Chlorophenyl)-2-(3-chlorophenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3m).

Off-white solid, 387 mg, yield 87%,mp 116-118 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.73-7.71 (m, 2H), 7.53-7.50 (m, 1H), 7.43-7.38 (m, 3H), 7.34-7.32 (m,1H), 7.19-7.16 (m, 3H), 7.08-7.04 (m, 1H), 6.92-6.90 (m, 1H), 5.27-5.23 (m, 1H), 4.61-4.55 (m, 1H), 3.80-3.75 (m, 1H), 2.40 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 159.9, 145.1, 139.4, 134.6, 134.0, 132.2, 132.1, 131.5, 130.0, 129.7, 129.4, 129.3, 128.7, 128.3, 127.6, 127.4, 127.1, 65.6, 56.2, 21.7. Anal. Calcd. for $C_{22}H_{18}Cl_2N_2O_2S$: C, 59.33; H, 4.07; N, 6.29%; Found: C, 59.38; H, 4.14; N, 6.38%.

4-(2-Chlorophenyl)-2-(4-chlorophenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3n).

Yellow liquid, 405 mg, yield 91%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.79-7.77 (m, 2H), 7.45-7.43 (m, 2H), 7.37 (d, *J* = 8.4 Hz, 2H), 7.33-7.31 (m, 1H), 7.18-7.14 (m,3H), 7.05-7.01 (m, 1H), 6.87-6.85 (m, 1H), 5.23-5.19 (m, 1H), 4.59-4.54 (m, 1H), 3.79-3.74 (m, 1H), 2.39 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.3, 145.0, 139.5, 137.8, 134.5, 132.1, 131.4, 130.0, 129.4, 128.8, 128.6, 128.3, 127.6, 127.4, 127.1, 65.5, 56.3, 21.7. Anal. Calcd. for $C_{22}H_{18}Cl_2N_2O_2S$: C, 59.33; H, 4.07; N, 6.29%; Found: C, 59.27; H, 4.01; N, 6.20%.

4-(2-Chlorophenyl)-2-(2-fluorophenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3o).

Colourless liquid, 382 mg, yield 89%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.62-7.58 (m, 1H), 7.52-7.50 (m, 1H), 7.42 (d, *J* = 8.0 Hz, 2H), 7.34-7.32 (m, 1H), 7.27-7.25 (m,1H), 7.19-7.14 (m, 4H), 7.11-7.07 (m, 1H), 7.04-7.02 (m, 1H), 5.50-5.45 (m, 1H), 4.54-4.48 (m, 1H), 3.77-3.72 (m, 1H), 2.39 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.7(d, $^{1}J_{C\text{-}F}$ = 241 Hz), 155.7, 144.9, 139.7, 134.6, 132.7 (d, $^{6}J_{C\text{-}F}$ = 9 Hz), 131.5, 129.9, 129.4, 128.7, 127.7 (d, $^{5}J_{C\text{-}F}$ = 9 Hz), 127.4 (d, $^{4}J_{C\text{-}F}$ = 45 Hz), 123.8 (d, $^{3}J_{C\text{-}F}$ = 3 Hz), 116.0(d, $^{2}J_{C\text{-}F}$ = 21 Hz), 65.5, 55.2, 21.7. Anal. Calcd. for $C_{22}H_{18}ClFN_2O_2S$: C, 61.61; H, 4.23; N, 6.53%; Found: C, 61.53; H, 4.14; N, 6.43%.

4-(2-Chlorophenyl)-2-(4-fluorophenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3p).

Yellow gum, 382 mg, yield 89%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.86-7.82 (m, 2H), 7.37-7.30 (m, 3H), 7.18-7.13 (m, 5H), 7.05-7.01 (m,1H), 6.89-6.86 (m, 1H), 5.23-5.18 (m, 1H), 4.60-4.55 (m, 1H), 3.79-3.75 (m, 1H), 2.39 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 164.8 (d, $^{1}J_{C\text{-}F}$ = 250 Hz), 160.2, 144.9, 139.6, 134.5, 132.3, 132.2 (d, $^{4}J_{C\text{-}F}$ = 9 Hz), 129.9, 129.4, 128.6, 127.5 (d, $^{3}J_{C\text{-}F}$ = 18 Hz), 127.0, 126.4, 115.2 (d, $^{2}J_{C\text{-}F}$ = 22 Hz), 65.3, 56.3, 21.7. Anal. Calcd. for $C_{22}H_{18}ClFN_2O_2S$: C, 61.61; H, 4.23; N, 6.53%; Found: C, 61.70; H, 4.32; N, 6.62%.

4-(3-Chlorophenyl)-2-(3-methoxyphenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3q).

Off-white solid, 375 mg, yield 85%, mp 158-160 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.40 (d, *J* = 8.4 Hz, 2H), 7.36-7.29 (m, 3H), 7.20-7.16 (m, 4H), 7.09-7.07 (m,1H), 6.93-6.89 (m, 2H), 5.01-4.97 (m, 1H), 4.47-4.42 (m, 1H), 3.86-3.82 (m, 4H), 2.41 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.5, 159.1, 145.1, 143.8, 134.7, 134.4, 131.3, 130.8, 130.0, 129.9, 129.0, 127.7, 126.6, 124.7, 122.5, 117.7, 115.1, 67.3, 56.8, 55.6, 21.8. Anal. Calcd. for $C_{23}H_{21}ClN_2O_3S$: C, 62.65; H, 4.80; N, 6.35%. Found: C, 62.60; H, 4.84; N, 6.45%.

4-(4-Chlorophenyl)-2-(3-methoxyphenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3r).

Off-white solid, 357 mg, yield 81%,mp 104-106°C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.39 (d, *J* = 8.4 Hz, 2H), 7.35-7.33 (m, 2H), 7.284-7.277 (m, 1H), 7.18 (d, *J* = 8.0 Hz, 4H), 7.09-7.06 (m, 1H), 6.92 (d, *J* = 8.4 Hz, 2H), 5.00-4.96 (m, 1H), 4.56-4.40 (m, 1H), 3.85-3.81 (m, 4H), 2.43 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.3, 159.1, 145.0, 140.4, 134.6, 133.4, 131.3, 129.9, 129.0, 128.8, 127.8, 127.7, 122.4, 117.7, 115.1, 67.2, 56.9, 55.6, 21.7. Anal. Calcd. for $C_{23}H_{21}ClN_2O_3S$: C, 62.65; H, 4.80; N, 6.35%; Found: C, 62.60; H, 4.85; N, 6.28%.

4-(3-Bromophenyl)-2-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3s).

Colourless liquid, 346 mg, yield 76%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.79-7.77 (m, 2H), 7.56-7.52 (m, 1H), 7.47-7.43 (m, 2H), 7.38-7.33 (m, 3H), 7.19 (d, *J* = 8.0 Hz, 2H), 7.12-7.06 (m, 2H), 6.95 (d, *J* = 7.6 Hz, 1H), 5.00-4.96 (m, 1H), 4.46-4.41 (m, 1H), 3.86-3.81 (m, 1H), 2.42 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 154.6, 139.0, 138.1, 128.3, 125.5, 124.6, 124.2, 124.0, 123.9, 123.5, 121.9, 121.7, 121.1, 119.2, 116.9, 61.2, 50.8, 15.9. Anal. Calcd. for $C_{22}H_{19}BrN_2O_2S$: C, 58.03; H, 4.21; N, 6.15%; Found: C, 58.09; H, 4.27; N, 6.22%.

4-(3-Bromophenyl)-2-(*p*-tolyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3t).

Yellow liquid, 404 mg, yield 86%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.70 (d, *J* = 8.0 Hz, 2H), 7.38 (d, *J* = 8.4 Hz, 2H), 7.34-7.32 (m, 2H), 6.95-6.84 (m, 1H), 7.27-7.23 (m. 2H),7.18 (d, *J* = 8.0 Hz, 2H), 7.10-7.05 (m, 2H), 6.93 (d, *J* = 7.6 Hz, 1H), 4.95-4.91(m, 1H), 4.44-4.39 (m, 1H), 3.84-3.79 (m, 1H), 2.44 (s, 3H), 2.41 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.7, 145.0, 144.2, 142.0, 134.3, 130.5, 130.2, 130.0, 129.9, 129.5, 128.6, 127.7, 127.2, 125.2, 122.9, 67.1, 56.8, 21.85, 21.78. Anal. Calcd. For $C_{23}H_{21}BrN_2O_2S$: C, 58.85; H, 4.51; N, 5.97%; Found: C, 58.76; H, 4.46; N, 5.89%.

4-(3-Bromophenyl)-2-(3-methoxyphenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3u).

Light yellow gum, 408 mg, yield 84%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.40 (d, *J* = 8.4 Hz, 2H), 7.35-7.34 (m, 3H), 7.294-7.287 (m, 1H), 7.25-7.18 (m, 2H), 7.12-7.05 (m, 3H), 6.96(d, *J* = 8.0 Hz, 1H), 5.00-4.95 (m, 1H), 4.47-4.41 (m, 1H), 3.86-3.81 (m, 4H), 2.41 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.5, 159.0, 145.1, 144.1, 134.4, 131.3, 130.7, 130.3, 130.0, 129.5, 129.1, 127.7, 125.2, 122.9, 122.5, 117.7, 115.1, 67.2, 56.8, 55.6, 21.9. Anal. Calcd. For $C_{23}H_{21}BrN_2O_3S$: C, 56.91; H, 4.36; N, 5.77%; Found: C, 56.84; H, 4.30; N, 5.84%.

4-(4-Bromophenyl)-2-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (3v) [S2].

Colourless liquid, 364 mg, yield 80%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.78-7.76 (m, 2H), 7.56-7.52 (m, 1H), 7.46-7.43 (m, 2H), 7.37-7.31 (m, 5H), 7.17 (d, *J* = 8.0 Hz, 2H), 6.86-6.83 (m, 2H), 4.99-4.95 (m, 1H), 4.45-4.40 (m, 1H), 3.85-3.81 (m, 1H), 2.43 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 154.5, 139.0, 134.9, 128.5, 125.8, 125.5, 124.0, 123.9, 122.4, 122.0, 121.9, 121.7, 115.4, 61.1, 50.9, 15.7.

4-(4-Bromophenyl)-2-(*m*-tolyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3w).

White gummy mass, 375 mg, yield 80%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.54-7.51 (m, 1H), 7.39-7.31 (m, 7H), 7.18 (d, *J* = 8.4 Hz, 2H), 6.87-6.84 (m, 2H), 4.98-4.94(m, 1H), 4.45-4.39 (m, 1H), 3.85-3.80 (m, 1H), 2.43 (s, 3H), 2.40 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.7, 145.0, 141.0, 137.7, 134.6, 132.3, 131.8, 130.4, 129.9, 128.4, 128.1, 127.8, 127.7, 127.2, 121.4, 67.2, 56.8, 21.8, 21.5. Anal. Calcd. For $C_{23}H_{21}BrN_2O_2S$: C, 58.85; H, 4.51; N, 5.97%; Found: C, 58.92; H, 4.56; N, 5.90%.

4-(4-Bromophenyl)-2-(3-methoxyphenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3x).

Off-white solid, 398 mg, yield 82%,mp 130-132°C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.40-7.28 (m, 7H), 7.18 (d, *J* = 8.0 Hz, 2H), 7.09-7.06 (m, 1H), 6.86 (d, *J* = 8.4 Hz, 2H), 4.99-4.95(m, 1H), 4.46-4.40 (m, 1H), 3.86-3.81 (m, 4H), 2.43 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.3, 159.1, 145.0, 140.9, 134.6, 131.8, 131.3, 129.9, 129.0, 128.1, 127.7, 122.4, 121.4, 117.7, 115.1, 67.2, 56.9, 55.6, 21.8. Anal. Calcd. For $C_{23}H_{21}BrN_2O_3S$: C, 56.91; H, 4.36; N, 5.77%; Found: C, 56.84; H, 4.30; N, 5.68%.

4-(4-Bromophenyl)-2-(2-fluorophenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3y).

Colorless liquid, 360 mg, yield 76%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.50-7.42 (m, 2H), 7.37-7.35 (m, 2H), 7.30-7.28 (m, 2H), 7.19-7.13 (m, 3H), 7.11-7.06 (m, 1H), 6.85-6.83 (m, 2H), 5.10-5.05(m, 1H), 4.32-4.27 (m, 1H), 3.73-3.69 (m, 1H), 2.37 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.8 (d, $^{1}J_{C\text{-}F}$ = 245 Hz), 155.1, 145.1, 140.8, 134.5, 132.8 (d, $^{6}J_{C\text{-}F}$ = 7 Hz), 131.9, 131.4 (d, $^{5}J_{C\text{-}F}$ = 2 Hz), 129.9, 127.9 (d, $^{4}J_{C\text{-}F}$ = 43 Hz), 123.8 (d, $^{3}J_{C\text{-}F}$ = 2 Hz), 116.0 (d, $^{2}J_{C\text{-}F}$ = 20 Hz), 67.5, 55.7, 21.8. Anal. Calcd. For $C_{22}H_{18}BrFN_2O_2S$: C, 55.82; H, 3.83; N, 5.92%; Found: C, 55.88; H, 3.87; N, 5.98%.

4-(4-Bromophenyl)-2-(4-fluorophenyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (3z).

Off-white solid, 359 mg, yield 74%,mp 205-207 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.82-7.79 (m, 2H), 7.36-7.31 (m, 4H), 7.18-7.11 (m, 4H), 6.83-6.81 (m, 2H), 4.96-4.92 (m, 1H), 4.44-4.39 (m, 1H), 3.85-3.80 (m, 1H), 2.43 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 164.8 (d, $^{1}J_{C\text{-}F}$ = 250 Hz), 159.5, 145.2, 140.8, 134.4, 132.3 (d, $^{4}J_{C\text{-}F}$ = 8 Hz), 131.7, 129.9, 128.2 (d, $^{3}J_{C\text{-}F}$ = 40 Hz), 127.6, 121.4, 115.1 (d, $^{2}J_{C\text{-}F}$ = 22 Hz), 67.1, 56.9, 21.7. Anal. Calcd. for $C_{22}H_{18}BrFN_2O_2S$: C, 55.82; H, 3.83; N, 5.92%; Found: C, 55.74; H, 3.88; N, 5.84%.

2-Methyl-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (5a) [S2].

White solid, 179 mg, yield 57%, mp 100-102 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.67-7.65 (m, 2H), 7.25 (d, *J* = 8.4 Hz, 2H), 7.17-7.15 (m, 3H), 6.96-6.94(m, 2H), 4.91-4.87 (m, 1H), 4.11-4.06 (m, 1H), 3.56-3.51 (m, 1H), 2.36 (s, 3H), 2. 30 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 156.6, 144.9, 141.6, 135.3, 130.2, 128.7, 127.7, 127.3, 126.4, 66.6, 55.6, 21.6, 16.8.

4-(2-Chlorophenyl)-2-methyl-1-tosyl-4,5-dihydro-1*H*-imidazole (5b) [S2].

White solid, 293 mg, yield 84%, mp 156-158°C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.73-7.71 (d, *J* = 8.0 Hz, 2H), 7.34-7.30 (m, 3H), 7.19-7.16 (m, 2H), 7.10-7.08 (m,1H), 5.34-5.29 (m, 1H), 4.33-4.28 (m, 1H), 3.55-3.50 (m, 1H), 2.44-2.42 (m, 6H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 157.6, 144.9, 139.8, 135.5, 132.4, 130.2, 129.5, 128.8, 127.6, 127.3, 127.2, 63.9, 54.9, 29.8, 21.7, 17.1.

2-(3-Chloropropyl)-4-phenyl-1-tosyl-4,5-dihydro-1*H*-imidazole (5c).

Yellow liquid, 222 mg, yield 59%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.69-7.67 (m, 2H), 7.27 (d, *J* = 8.0 Hz, 2H), 7.19-7.16 (m, 3H), 6.95-6.92(m, 2H), 4.94-4.90 (m, 1H), 4.12-4.07 (m, 1H), 3.62-3.59 (m, 2H), 3.54-3.50 (m, 1H), 2.87-2.85 (m, 2H), 2.39 (s, 3H), 2.19-2.16 (m, 2H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 158.7, 145.0, 141.8, 135.2, 130.3, 128.9, 127.8, 127.4, 126.5, 67.0, 55.8, 44.5, 29.2, 27.1, 21.8. Anal. Calcd. for $C_{19}H_{21}ClN_2O_2S$: C, 60.55; H, 5.62; N, 7.43%; Found: C, 60.64; H, 5.74; N, 7.50%.

4-(2-Chlorophenyl)-2-(3-chloropropyl)-1-tosyl-4,5-dihydro-1*H*-imidazole (5d).

Brown liquid, 329 mg, yield 80%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.74-7.72 (m, 2H), 7.35-7.31 (m, 3H), 7.20-7.16 (m, 2H), 7.04-7.02 (m,1H), 5.36-5.32 (m, 1H), 4.36-4.30 (m, 1H), 3.74-3.70 (m, 2H), 3.56-3.51 (m, 1H), 3.01-2.98 (m, 2H), 2.44 (s, 3H), 2.33-2.27 (m, 2H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 132.3, 130.7, 130.4, 130.0, 129.9, 129.6, 129.1, 127.6, 127.4, 127.3, 127.2, 63.5, 55.0, 44.4, 29.3, 27.0, 21.8. Anal. Calcd. for $C_{19}H_{20}Cl_2N_2O_2S$: C, 55.48; H, 4.90; N, 6.81%; Found: C, 55.40; H, 4.82; N, 6.76%.

4-(2-Chlorophenyl)-2-styryl-1-tosyl-4,5-dihydro-1*H*-imidazole (5e).

Off-white solid, 358 mg, yield 82%,mp 128-130 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.79-7.75 (m, 1H), 7.67-7.62 (m, 4H), 7.48-7.39 (m, 4H), 7.34-7.32 (m,1H), 7.23-7.15 (m, 3H), 7.10-7.06 (m, 1H), 6.95-6.93 (m, 1H), 5.42-5.37 (m, 1H), 4.37-4.32 (m, 1H), 3.61-3.56 (m, 1H), 2.39 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 157.2, 144.8, 141.0, 140.1, 135.5, 134.7, 132.3, 130.1, 129.9, 129.4, 129.1, 128.7, 128.0, 127.7, 127.5, 127.1, 115.3, 64.1, 55.1, 21.7. Anal. Calcd. for $C_{24}H_{21}ClN_2O_2S$: C, 65.97; H, 4.84; N, 6.41%; Found: C, 65.89; H, 4.76; N, 6.37%.

4-(4-Chlorophenyl)-2-styryl-1-tosyl-4,5-dihydro-1*H*-imidazole (5f).

Colourless liquid, 341 mg, yield 78%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.65-7.59 (m, 3H), 7.54-7.52 (m, 2H), 7.40-7.32 (m, 4H), 7.19 (d, *J* = 7.6 Hz, 2H), 7.13-7.10 (m, 2H), 6.83-6.81 (m, 2H), 4.99-4.94 (m, 1H), 4.17-4.12 (m, 1H), 3.55-3.51 (m, 1H), 2.36 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 156.5, 145.0, 141.1, 140.7, 135.4, 134.5, 133.5, 130.2, 130.0, 129.1, 128.9, 128.0, 127.9, 127.6, 115.1, 66.4, 55.8, 21.7. Anal. Calcd. for $C_{24}H_{21}ClN_2O_2S$: C, 65.97; H, 4.84; N, 6.41%; Found: C, 65.90; H, 4.74; N, 6.35%.

4-(4-Bromophenyl)-2-styryl-1-tosyl-4,5-dihydro-1*H*-imidazole (5g).

Yellow liquid, 337 mg, yield 70%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.65-7.58 (m, 3H), 7.54-7.51 (m, 2H), 7.39-7.31 (m, 4H), 7.28-7.24 (m, 2H), 7.19-7.17 (m, 2H), 6.77-6.75 (m, 2H), 4.97-4.92 (m, 1H), 4.16-4.11 (m, 1H), 3.55-3.50 (m, 1H), 2.35 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 156.5, 145.0, 141.23, 141.17, 135.4, 134.5, 131.8, 130.1, 130.0, 129.0, 128.2, 128.0, 127.5, 121.6, 115.1, 66.4, 55.7, 21.7. Anal. Calcd. For $C_{24}H_{21}BrN_2O_2S$: C, 59.88; H, 4.40; N, 5.82%; Found: C, 59.80; H, 4.33; N, 5.76%.

References

[S1]. R. Li, H. Jiang, W.-Y. Liu, P.-M. Gu and X.-Q. Li, *Chin. Chem. Lett.*, 2014, **25**, 583.

[S2]. X. Li, X. Yang, H. Chang, Y. Li, B. Ni and W. Wei, *Eur. J. Org. Chem.*, 2011, 3122.

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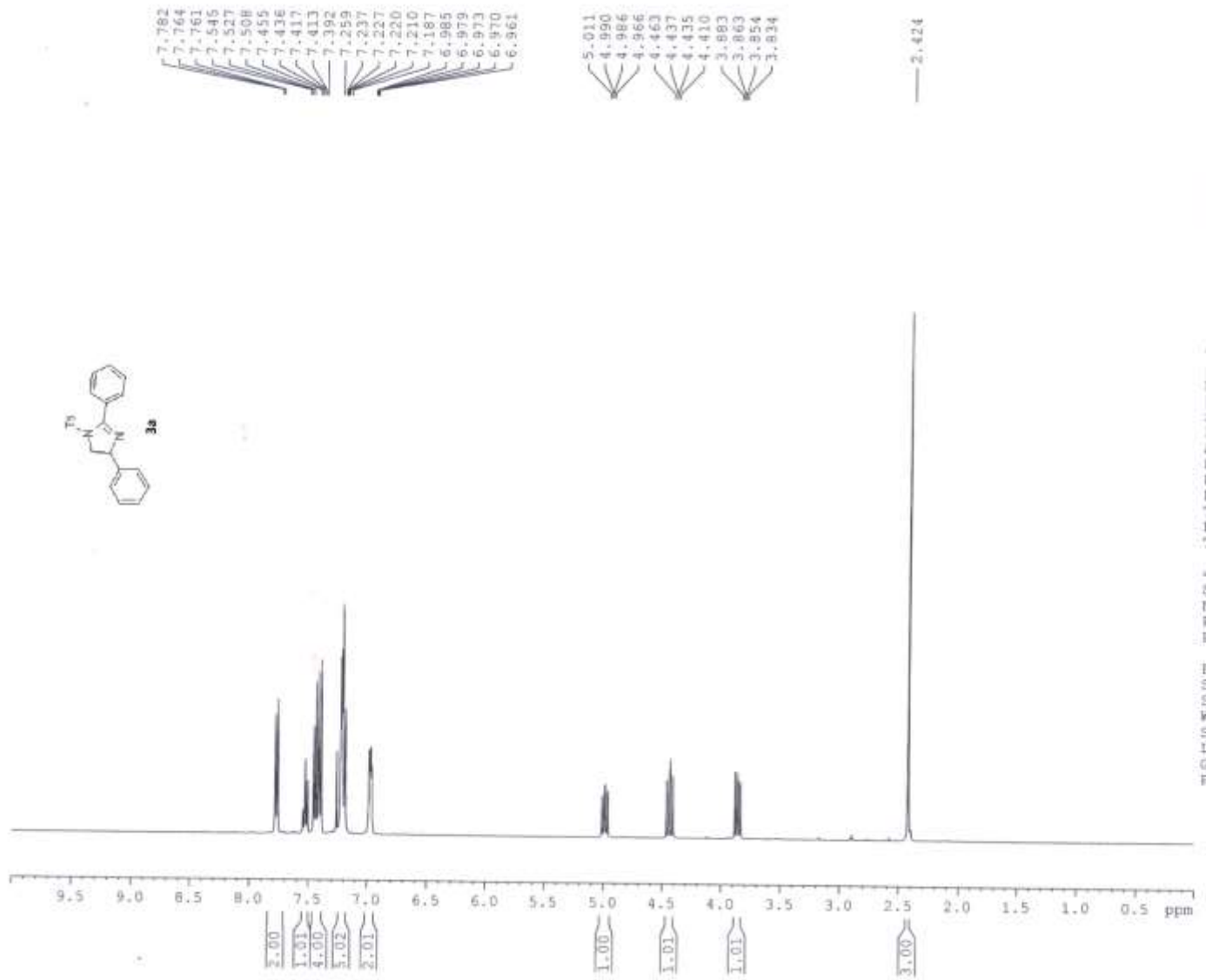

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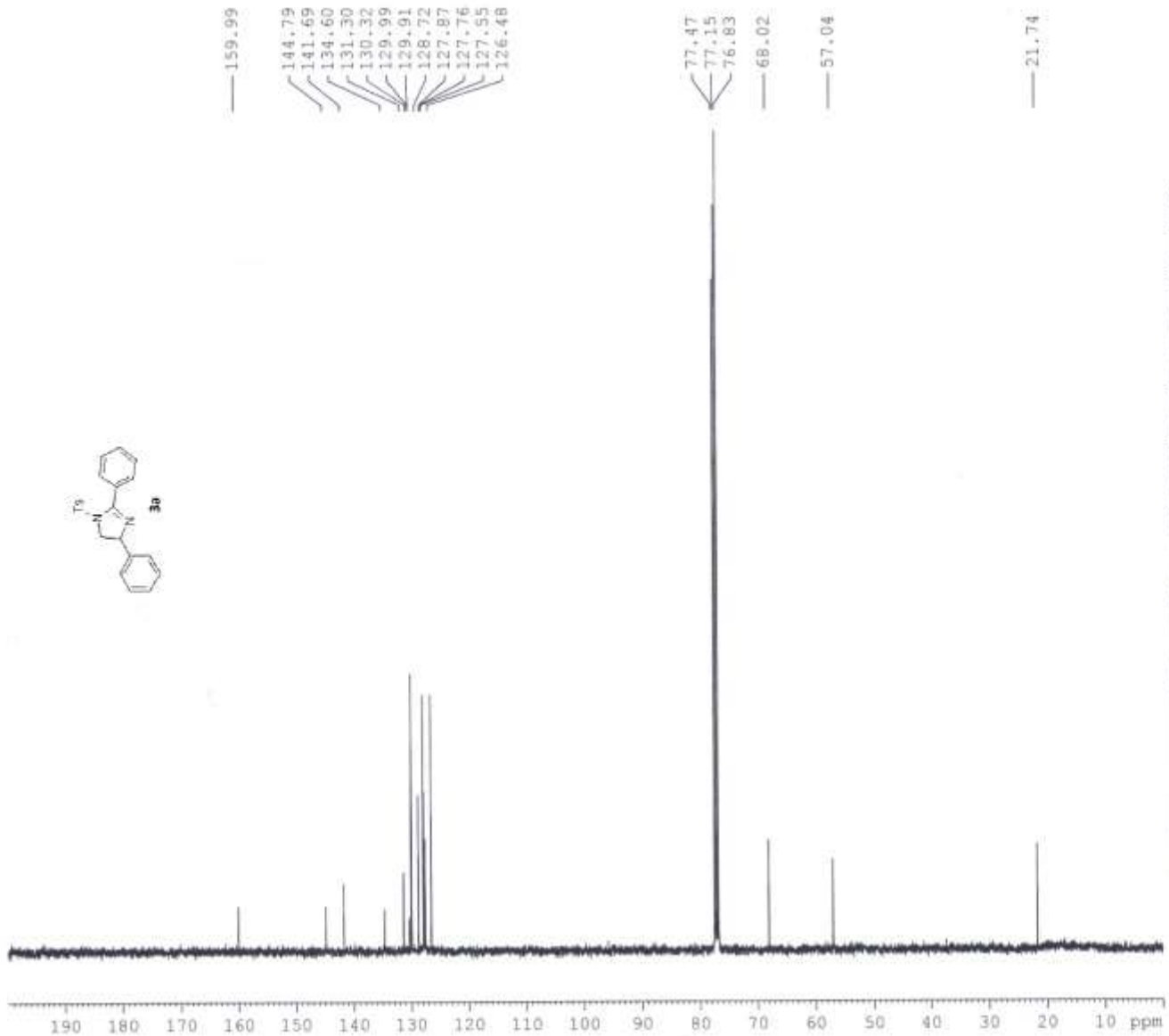

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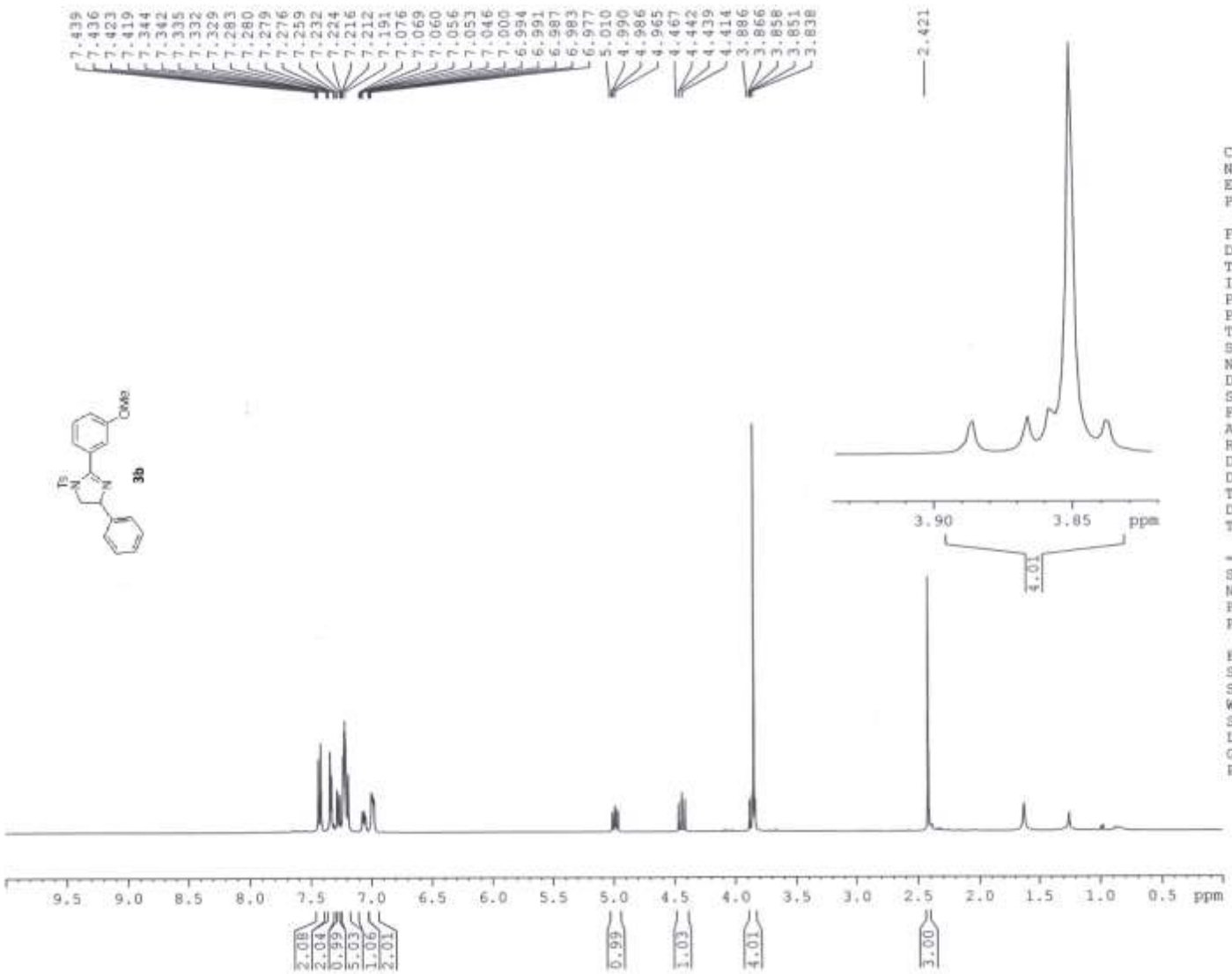

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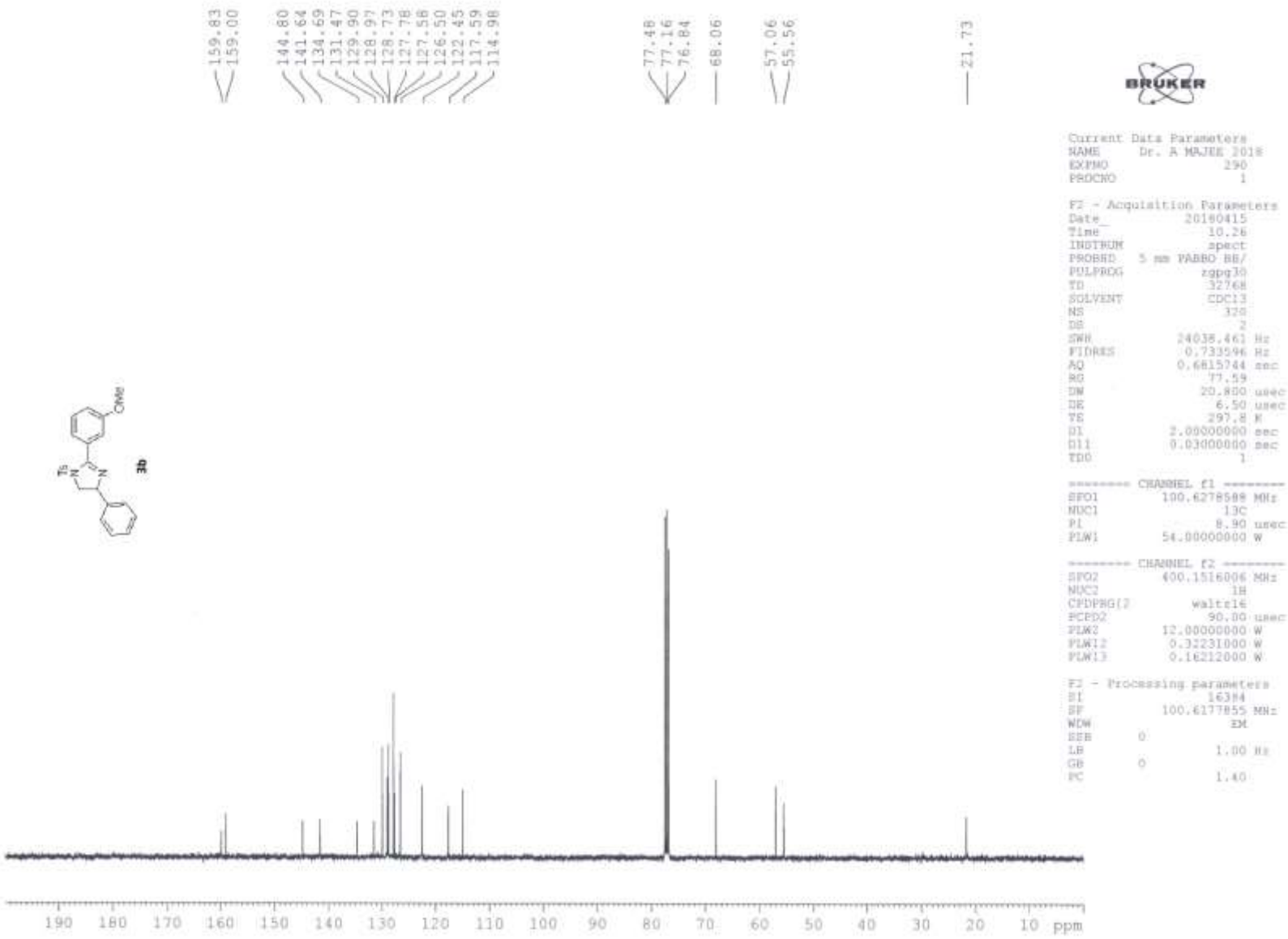
13C of VBAR 278/5



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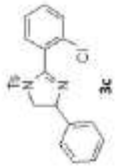
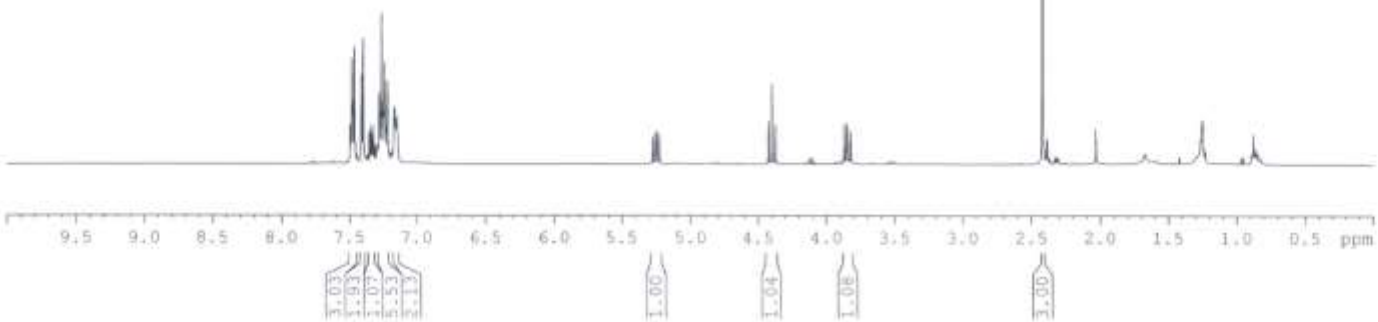
1H of VBAR-278





BRUKER

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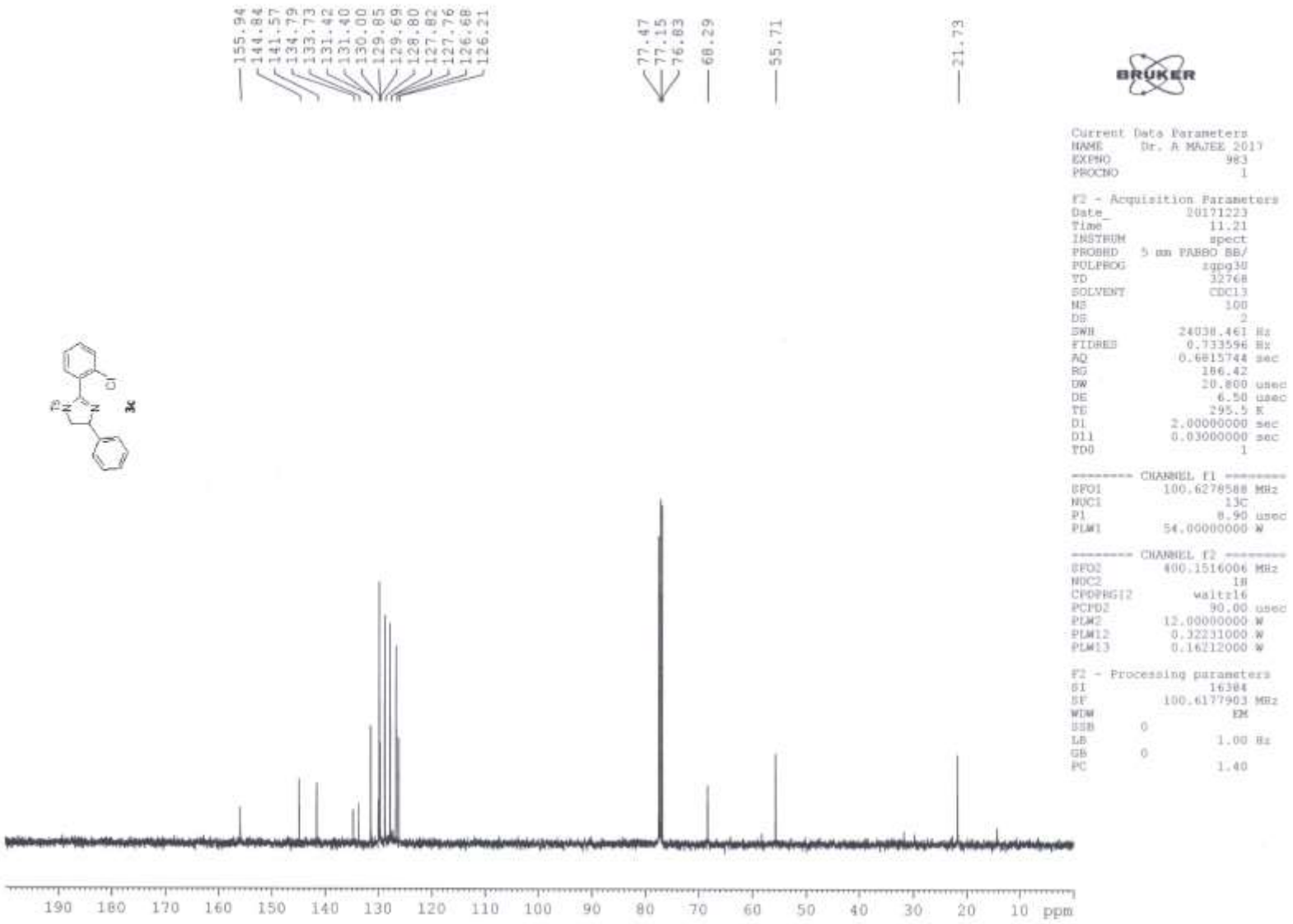
```

13C of VBAR-278




```
Current Data Parameters
NAME      Dr. A MAJEE 2017
EXPNO              983
PROCNO               1

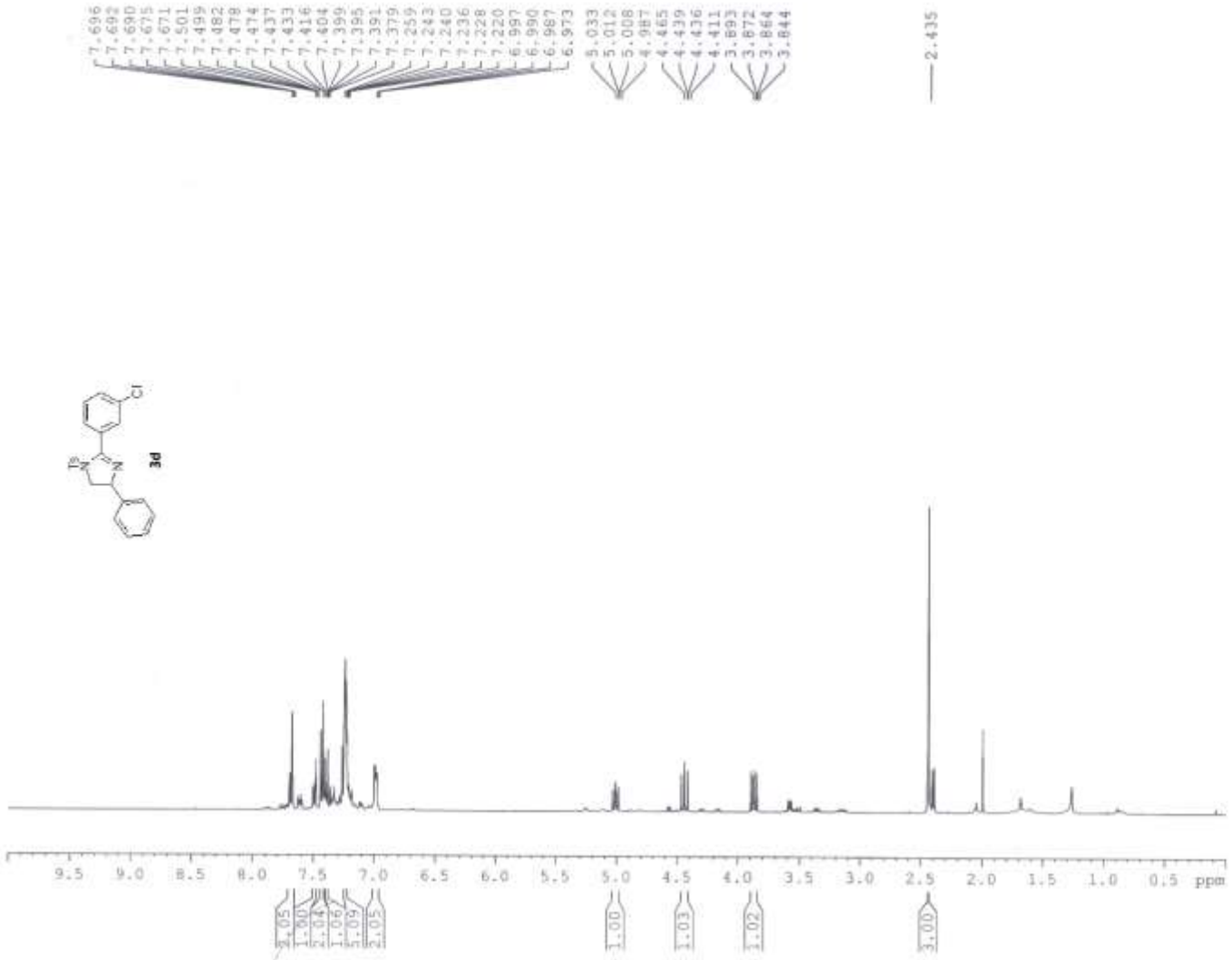
F2 - Acquisition Parameters
Date_          20171223
Time              11.21
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                 100
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ           0.6815744 sec
RG              186.42
DW              20.800 usec
DE               6.50 usec
TE              295.5 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1        54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG12        waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177903 MHz
WDW                 EM
SSB       0
LB               1.00 Hz
GB        0
PC               1.40
```

1H of VBAR-278/14



BRUKER

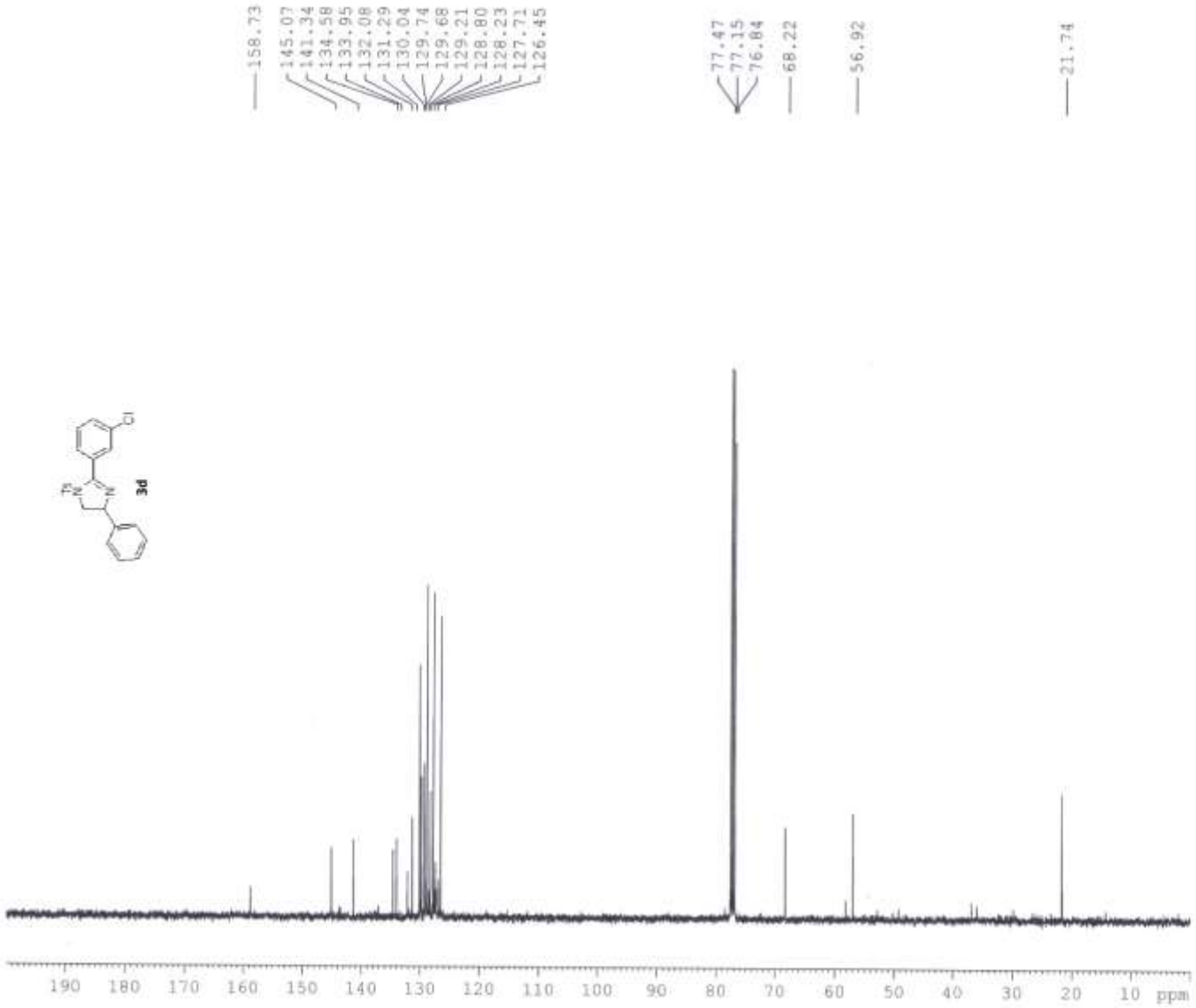
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              126
PROCNO               1

F2 - Acquisition Parameters
Date_          20180618
Time              18.18
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              106.66
DW              60.800 usec
DE               6.50 usec
TE              300.3 K
D1          1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500096 MHz
WDW                EM
SSB       0
LB              0.30 Hz
GB        0
PC              1.00
```

13C of VBAR-278/14



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              136
PROCNO             1

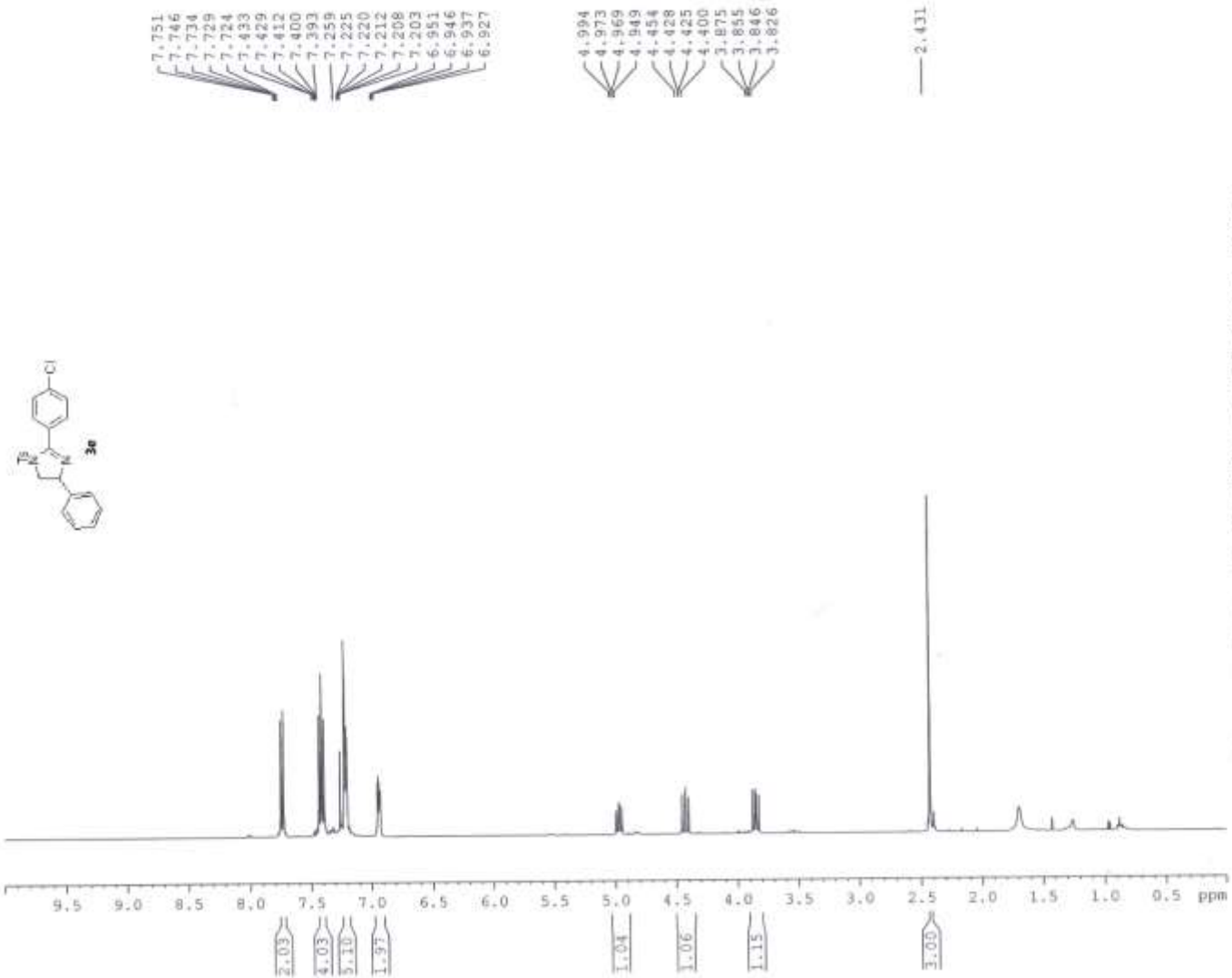
F2 - Acquisition Parameters
Date_          20180618
Time             18.45
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD               32768
SOLVENT          CDCl3
NS                 480
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG              186.42
DW             20.800 usec
DE              6.50 usec
TE             301.0 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1             13C
P1              8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI               16384
SF         100.6177858 MHz
WDW                EM
SSB        0
LB              1.00 Hz
GB         0
PC              1.40
```

1H of VBAR-278/15



BRUKER

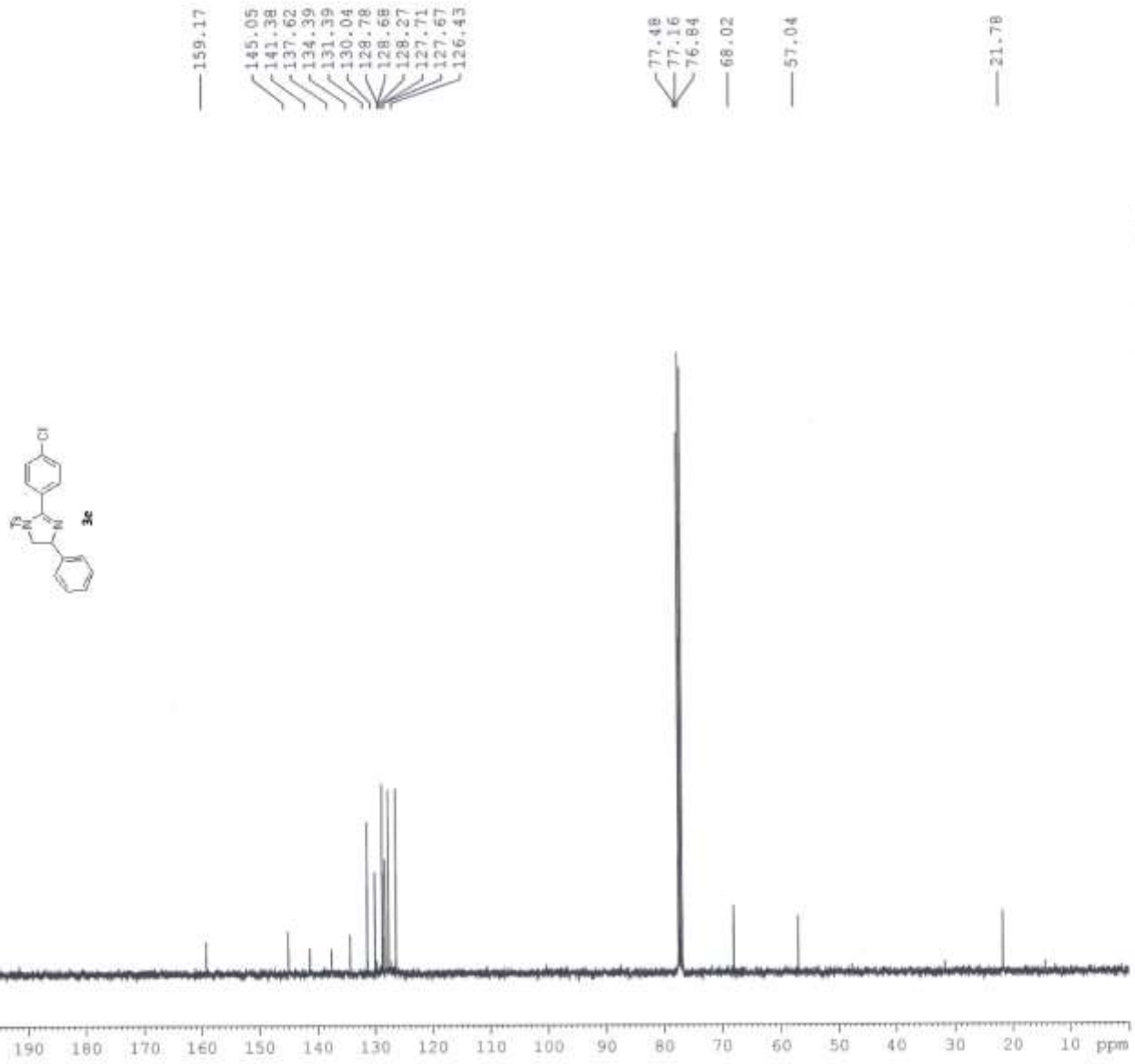
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 127
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180218
Time 19.57
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 12
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 106.66
DW 60.800 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR-278/15



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2019
EXPNO              128
PROCNO               1

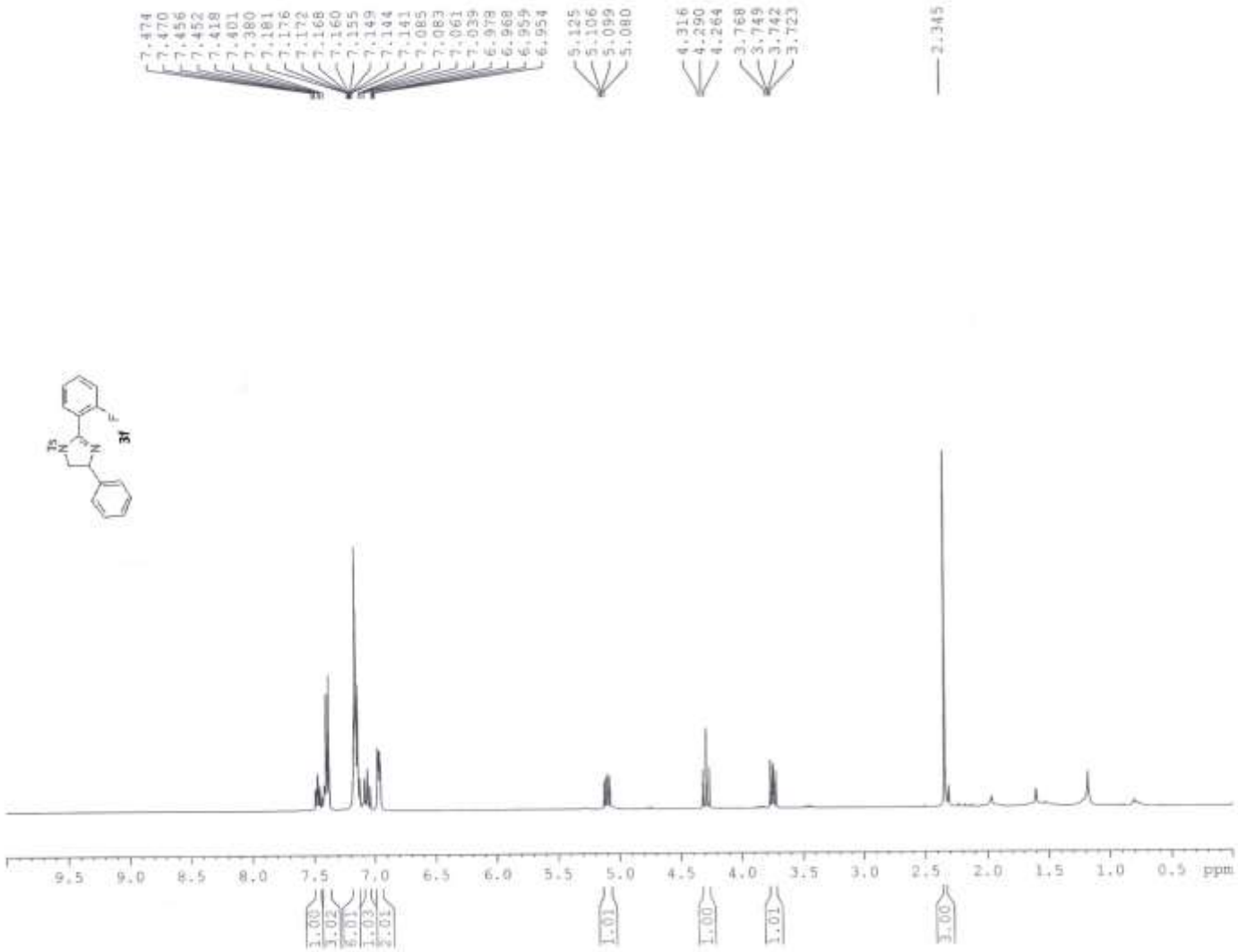
F2 - Acquisition Parameters
Date_          20180218
Time             20.17
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG        zgpg30
TD             32768
SOLVENT          CDCl3
NS                 409
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ           0.6815744 sec
RG              106.66
DW               20.800 usec
DE                6.50 usec
TE              296.7 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.50 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI               16384
SF         100.6177851 MHz
WDW                EM
SSB      0
LB                1.00 Hz
GB       0
PC                1.40
```

1H of VBAR-278/16



BRUKER

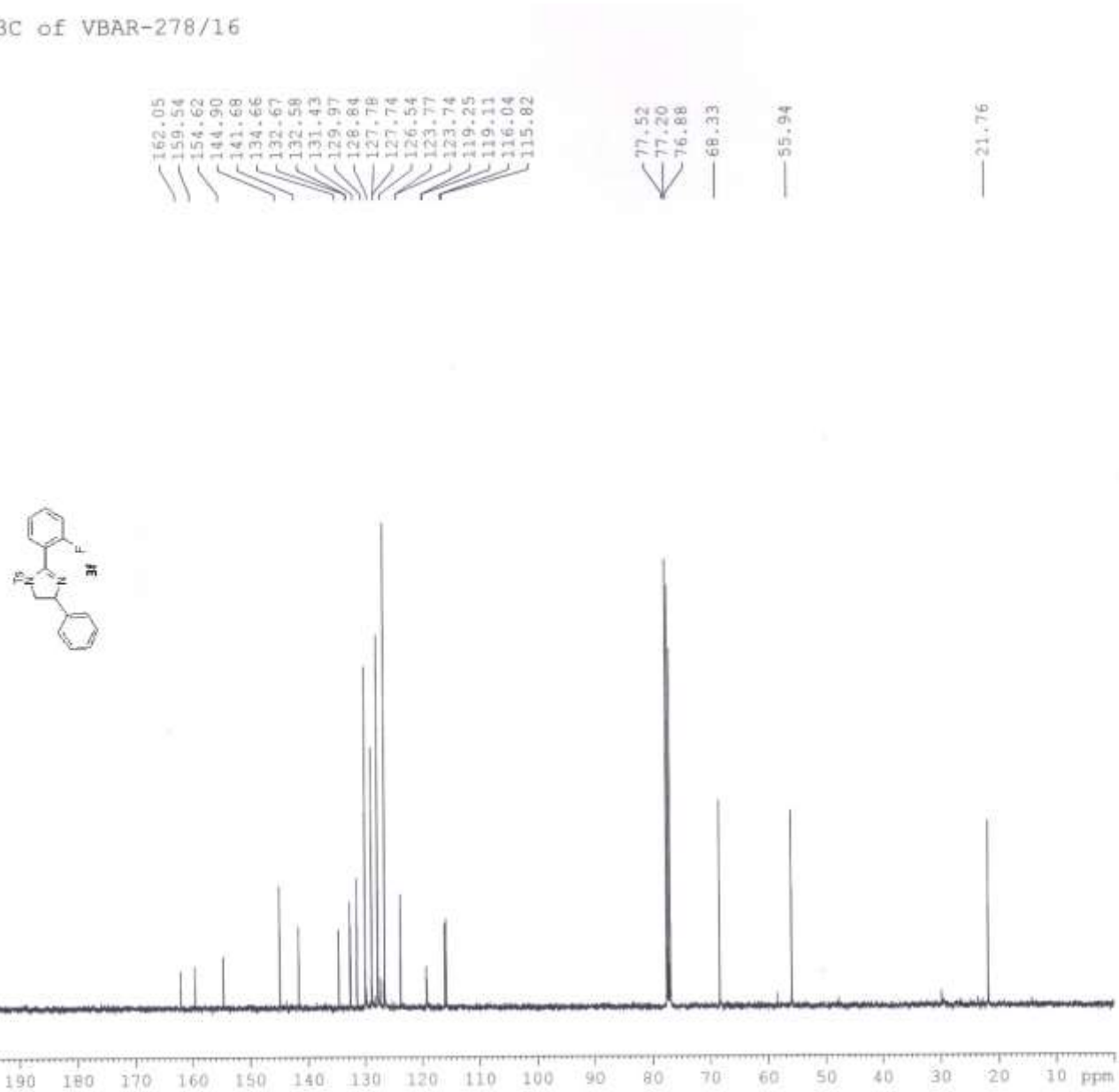
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              157
PROCNO               1

F2 - Acquisition Parameters
Date_          20180618
Time             18.54
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               67.81
DW              60.800 usec
DE               6.50 usec
TE              300.4 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500428 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```

13C of VBAR-278/16



Current Data Parameters
NAME Dr. A NAJEE 2018
EXPNO 501
PROCNO 1

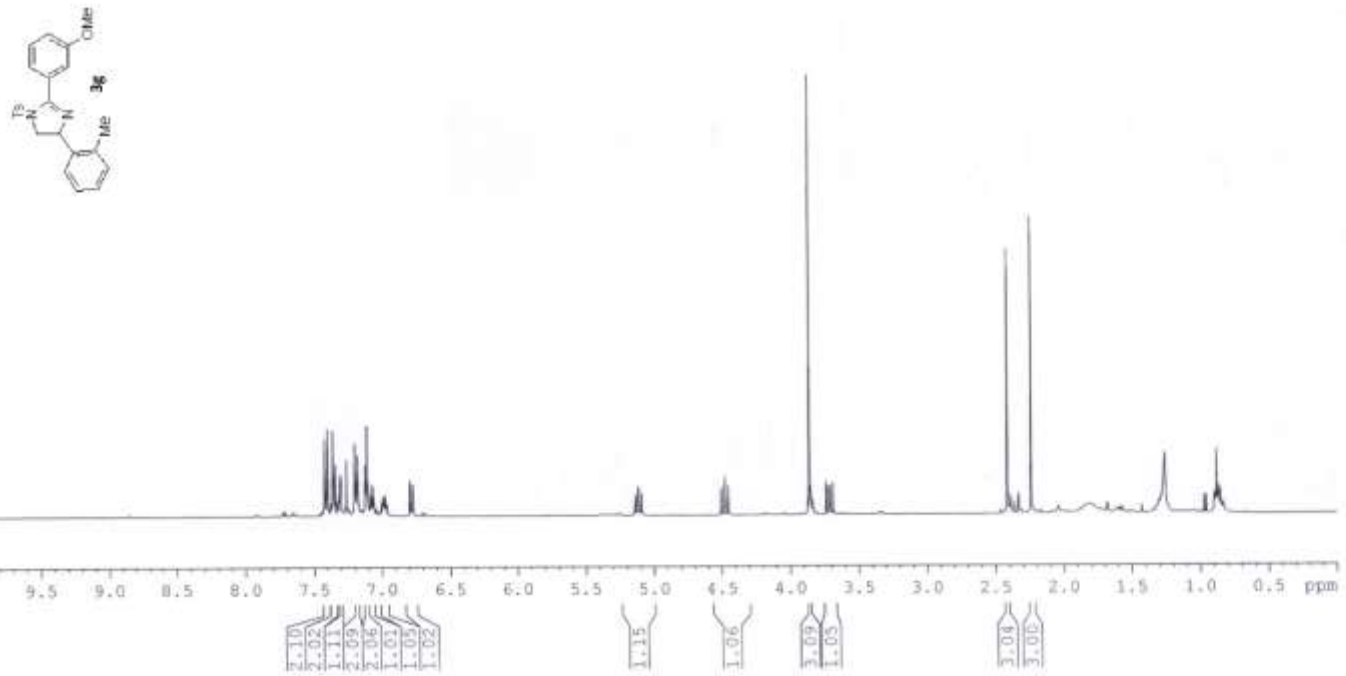
F2 - Acquisition Parameters
Date_ 20180618
Time 19.28
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 560
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 135.7
DW 20.800 usec
DE 6.50 usec
TE 301.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177829 MHz
MDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 2.00

1H of VBAR-278/49



BRUKER

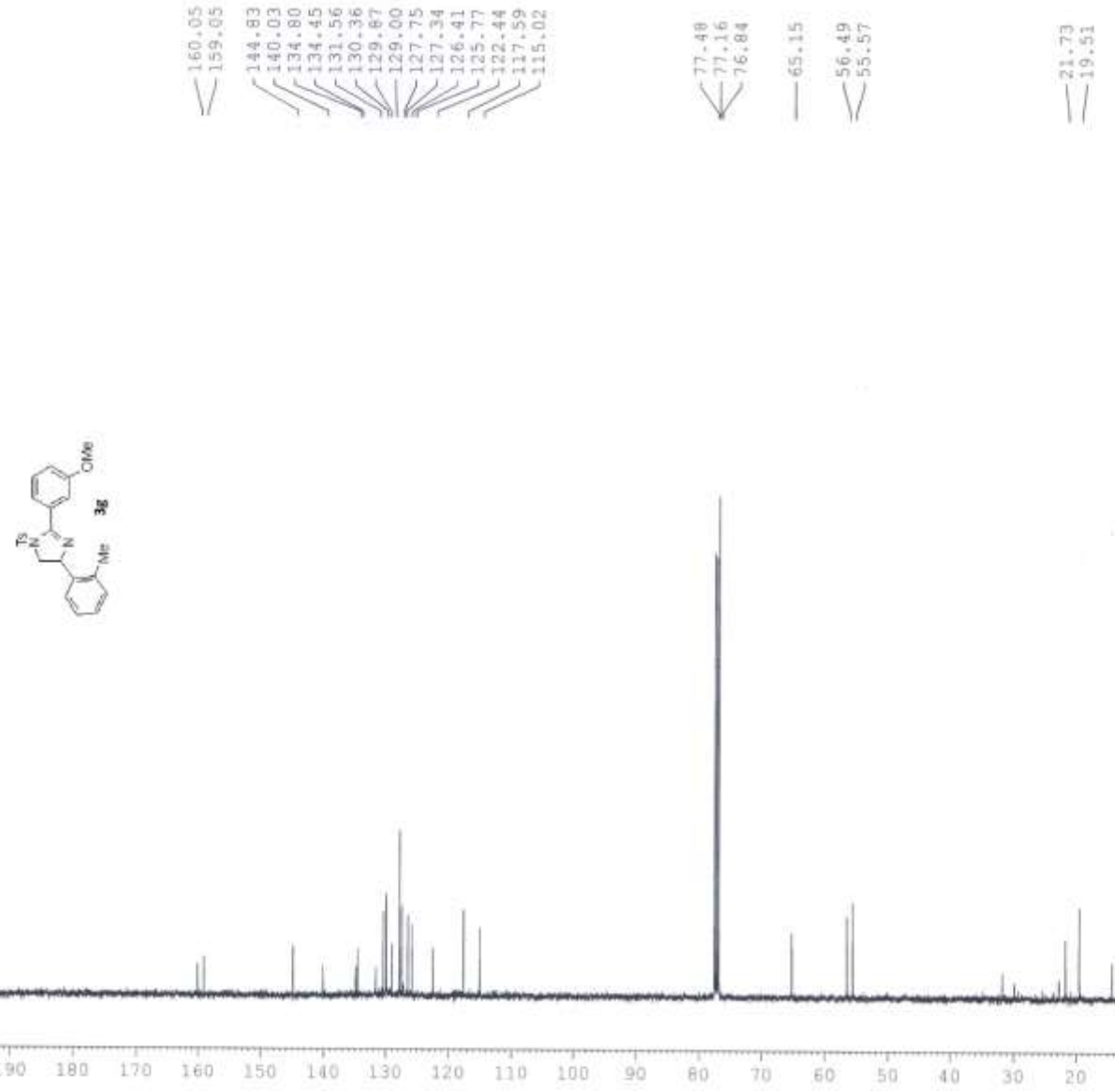
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 359
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180503
Time 19.18
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 93.46
DW 60.800 usec
DE 6.50 usec
TE 297.4 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR-278/49



BRUKER

Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 374
PROCNO 1

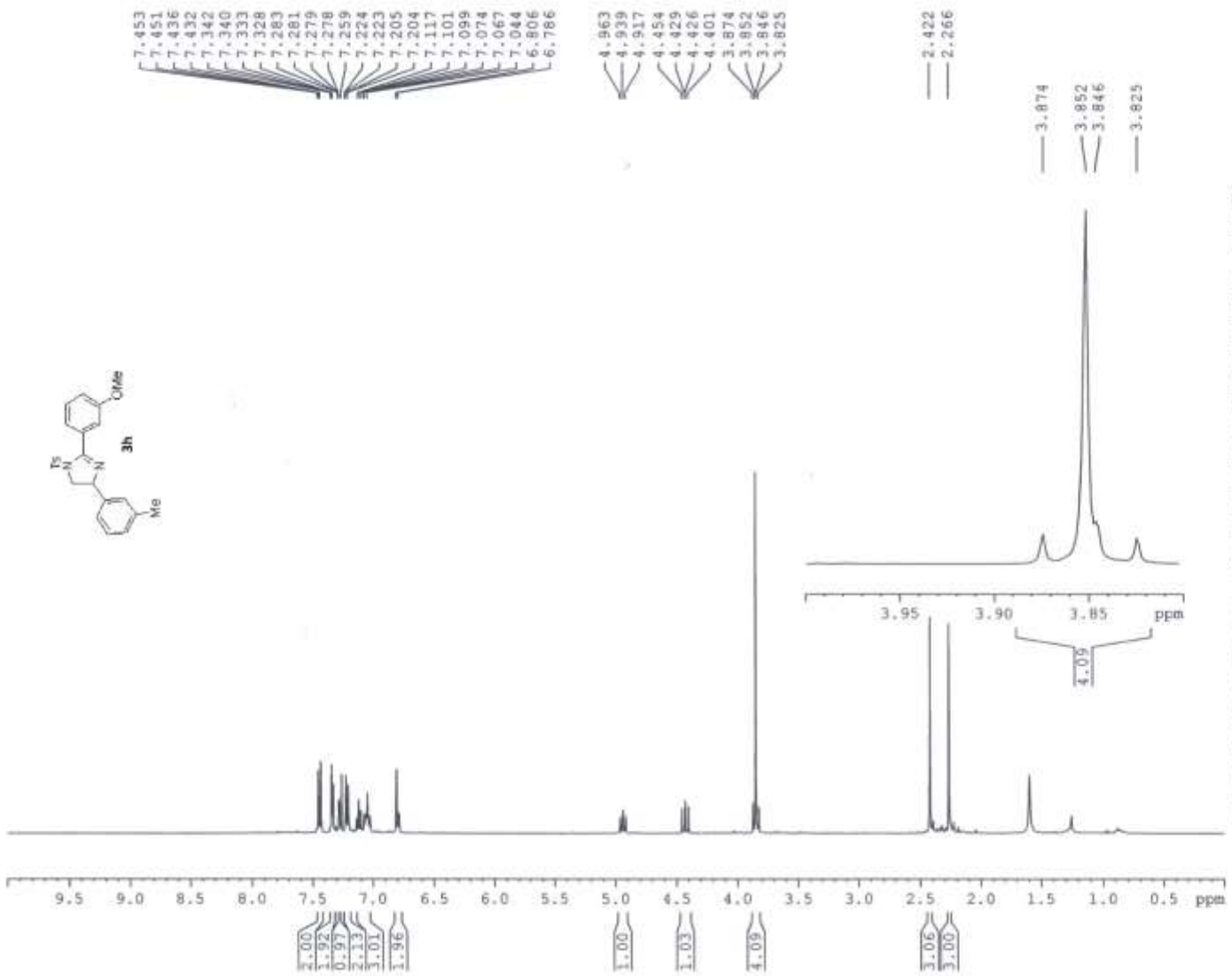
F2 - Acquisition Parameters
Date_ 20180507
Time 12.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 436
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 299.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177844 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.20

1H of VBAR-278/30



BRUKER

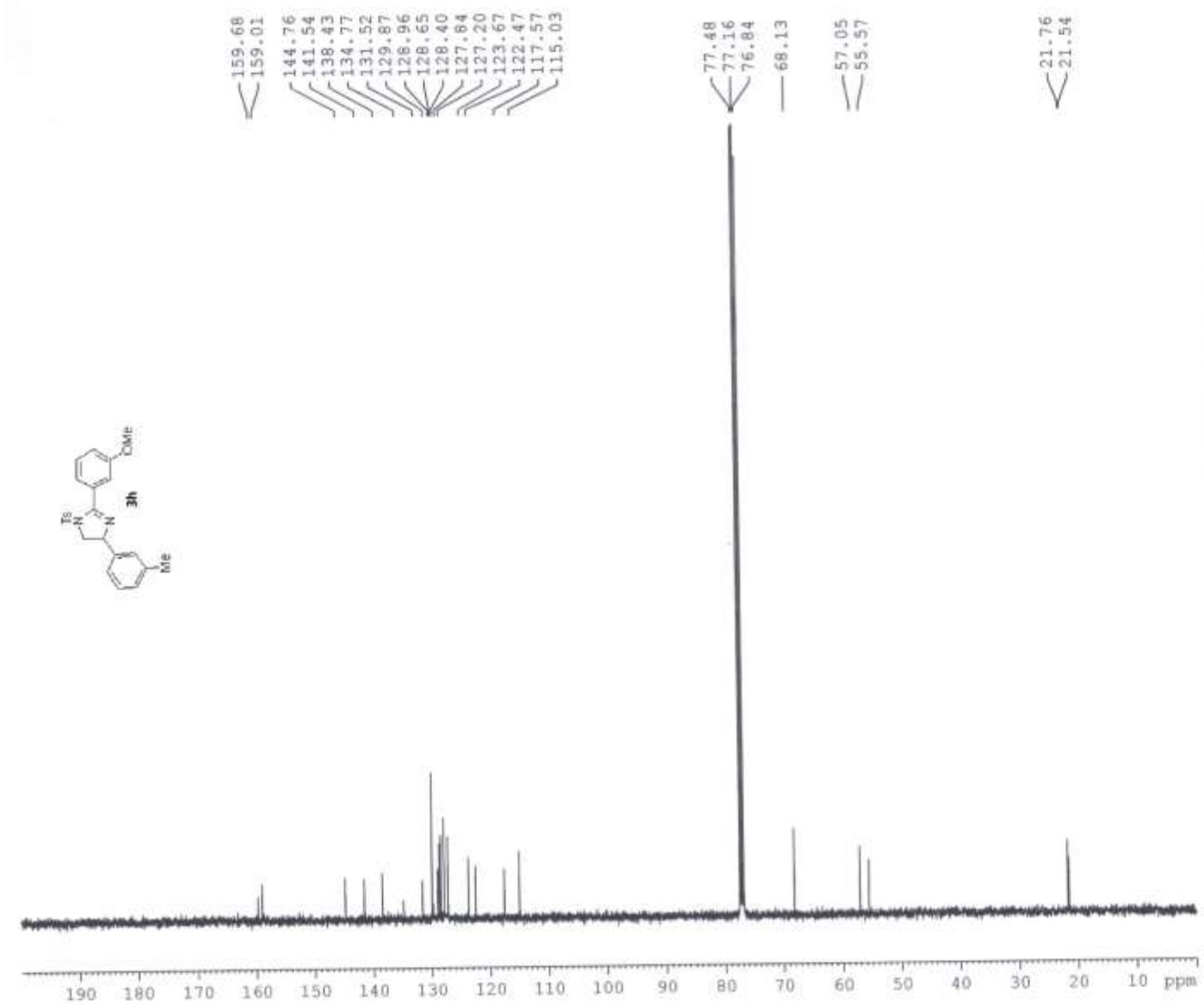
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              239
PROCNO               1

F2 - Acquisition Parameters
Date_          20180331
Time             19.02
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                  24
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              120.16
DW              60.800 usec
DE               6.50 usec
TE              298.1 K
D1          1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500097 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```

13C of VBAR-278/30



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              240
PROCNO               1

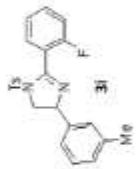
F2 - Acquisition Parameters
Date_          20180331
Time              19.59
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                 640
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               120.16
DW               20.800 usec
DE                6.50 usec
TE              298.8 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

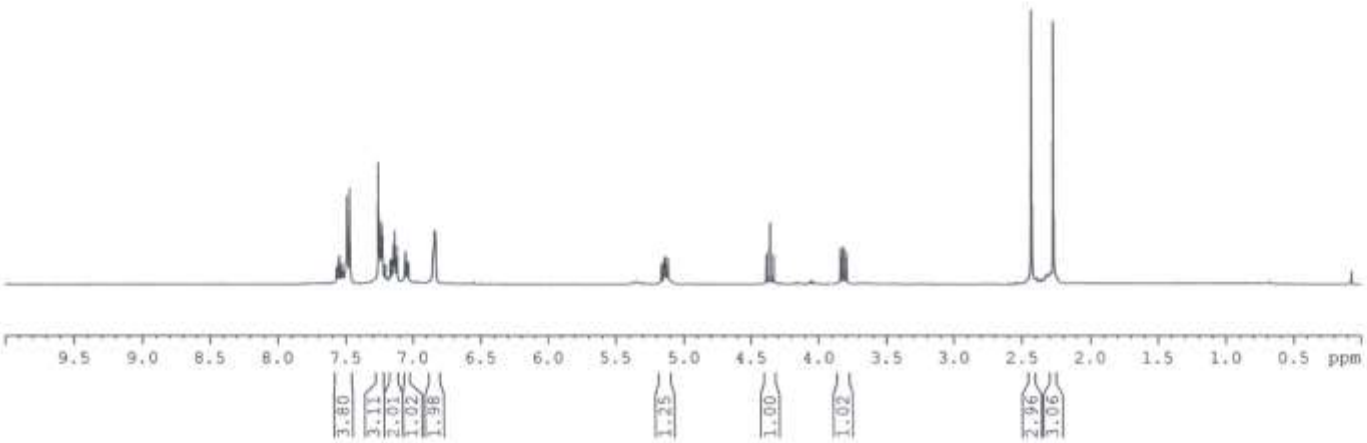
======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1              13C
P1                8.90 usec
PLW1      54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2            90.00 usec
PLW2      12.00000000 W
PLW12      0.32231000 W
PLW13      0.16212000 W

F2 - Processing parameters
SI                16384
SF         100.6177843 MHz
WDW                  EM
SSB      0
LB                1.00 Hz
GB       0
PC                1.40
```

1H of VBAR 278/36





BRUKER

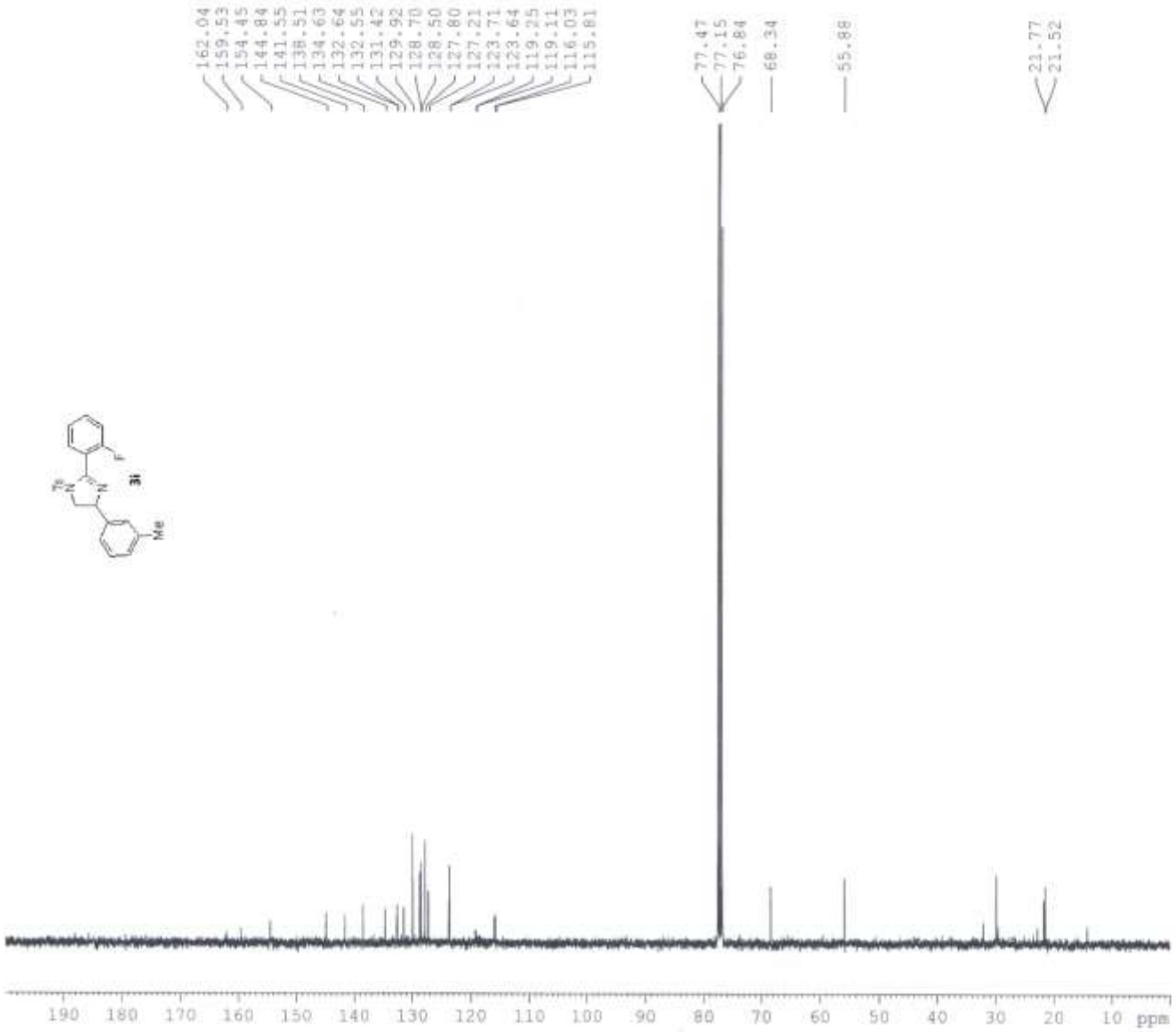
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO                275
PROCNO                 1

F2 - Acquisition Parameters
Date_           20180411
Time              10.09
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  12
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                135.7
DW               60.800 usec
DE                6.50 usec
TE               296.7 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```

13C of VBAR 278/36



BRUKER

```
Current Data Parameters
NAME        Dr. A MAJEE 2018
EXPNO                    278
PROCNO                     1

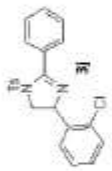
F2 - Acquisition Parameters
Date_              20180411
Time                  11.12
INSTRUM                spect
PROBHD   5 mm PABBO BB/
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                     640
DS                       2
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                   186.42
DW                   20.800 usec
DE                    6.50 usec
TE                   297.8 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                        1

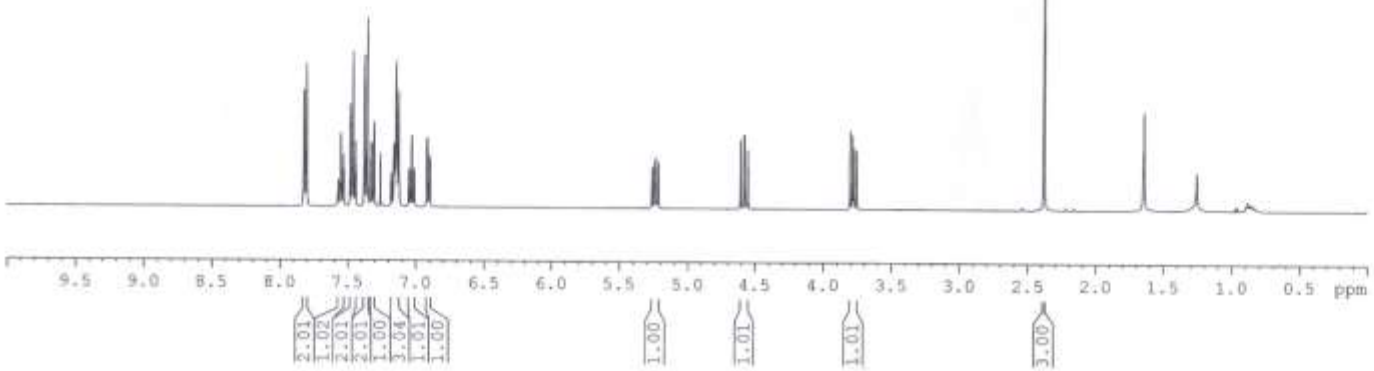
======== CHANNEL f1 ========
SFO1         100.6278588 MHz
NUC1                   13C
P1                    8.90 usec
PLW1         54.00000000 W

======== CHANNEL f2 ========
SFO2         400.1516006 MHz
NUC2                   1H
CPDPRG[2          waltz16
PCPD2                90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                   16384
SF           100.6177843 MHz
WDW                     EM
SSB      0
LB                    1.00 Hz
GB       0
PC                    1.40
```

1H of VBAR 278/55





BRUKER

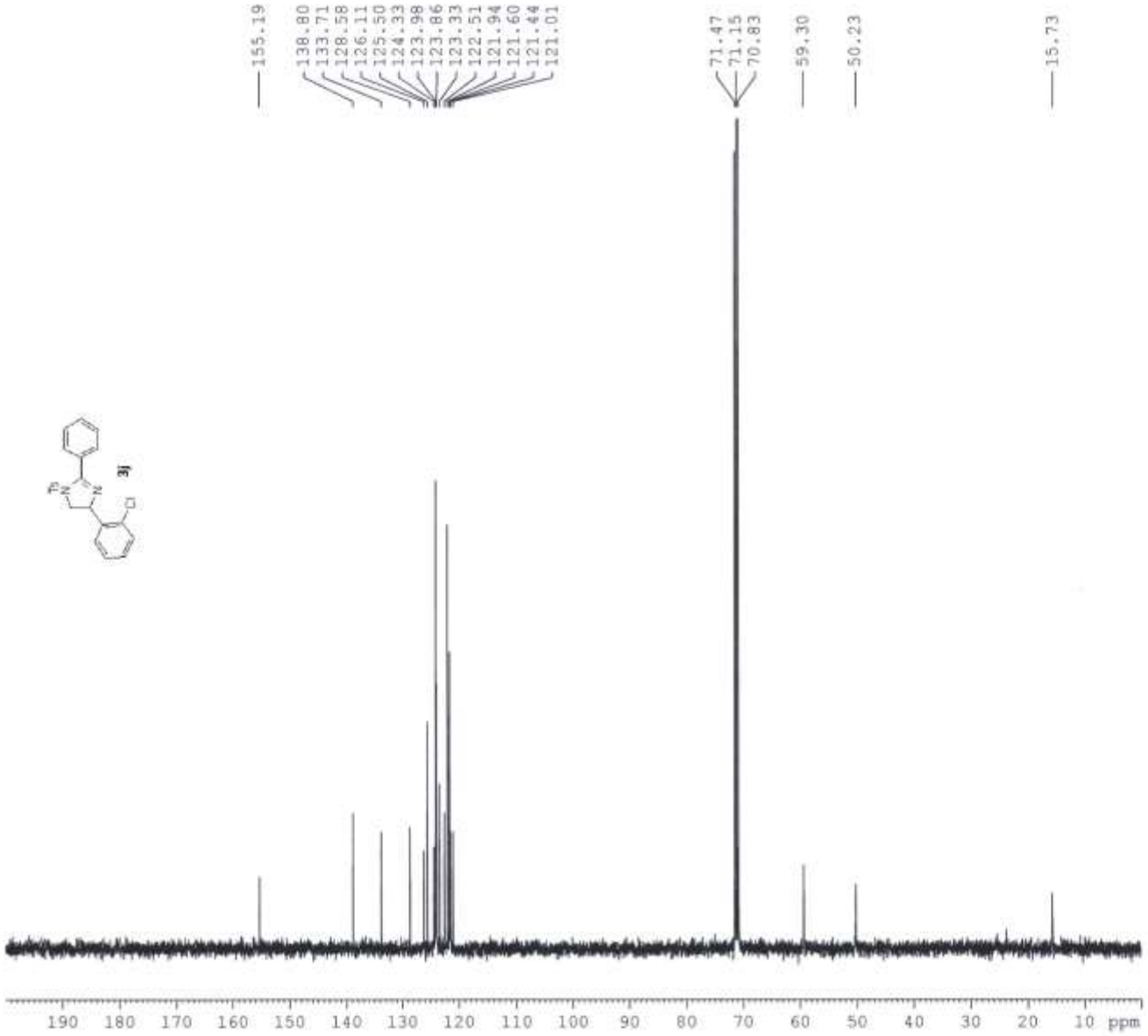
```
Current Data Parameters
NAME      Dr. A MAJEE 2019
EXPNO              289
PROCNO               1

F2 - Acquisition Parameters
Date_          20190518
Time               9.18
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               186.42
DW               60.800 usec
DE                6.50 usec
TE               296.1 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1                14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500094 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                3.00
```

13C of VBAR 278/55



Current Data Parameters
NAME Dr. A MAJEE 2019
EXPNO 290
PROCNO 1

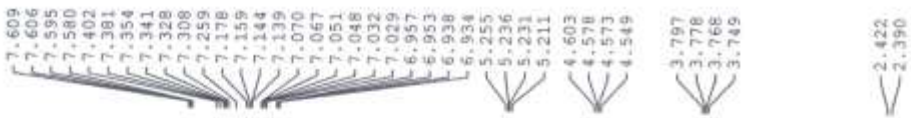
F2 - Acquisition Parameters
Date_ 20190518
Time 9.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 248
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

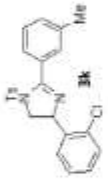
======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

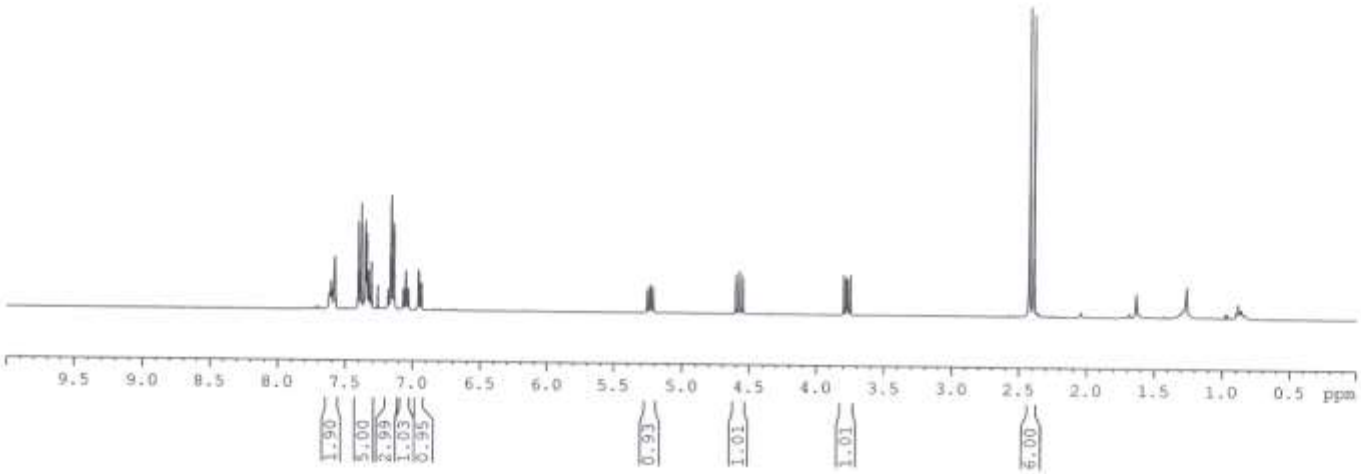
======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6183909 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 2.00

1H of VBAR-278/25







BRUKER

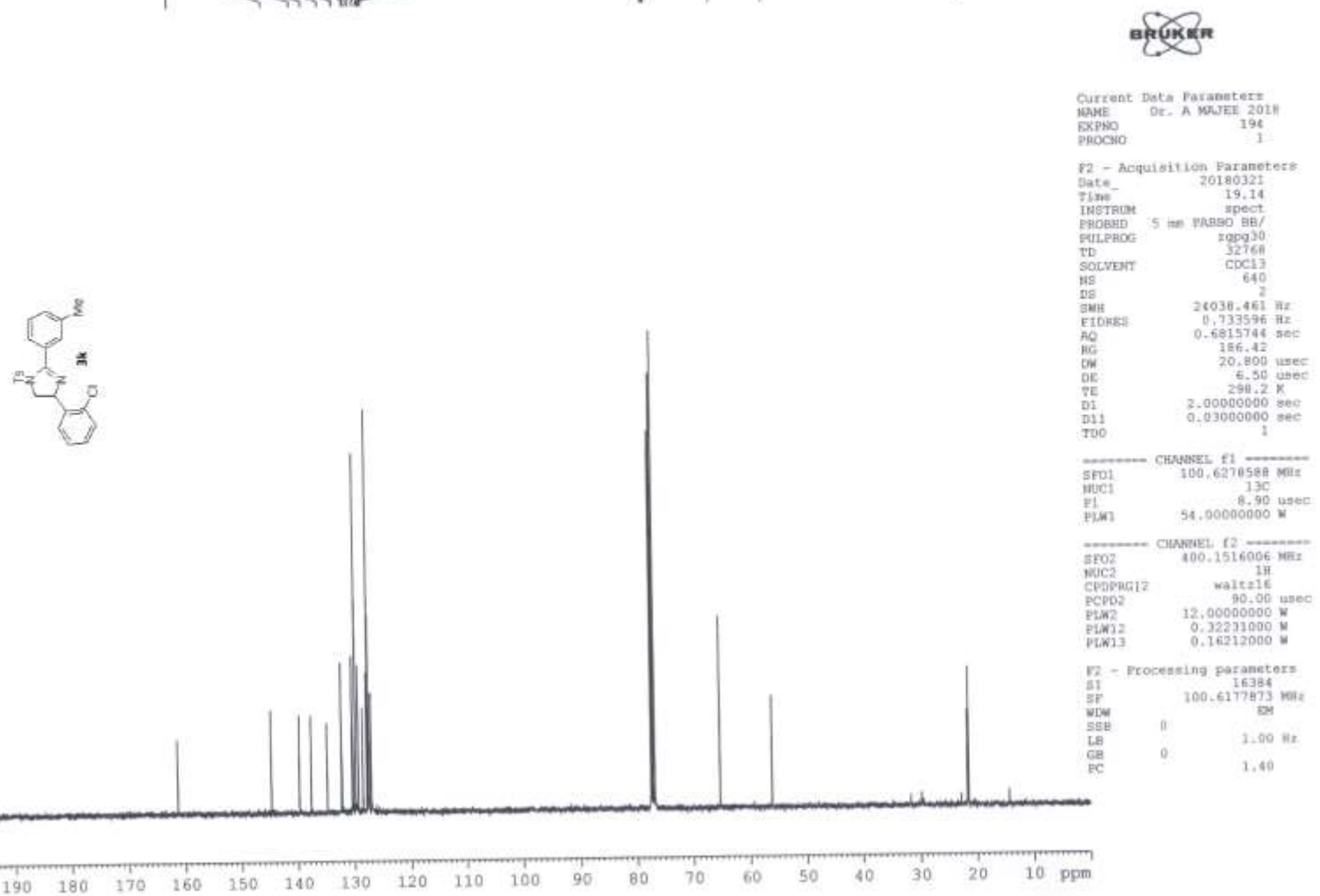
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              188
PROCNO               1

F2 - Acquisition Parameters
Date_          20180320
Time              19.16
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                67.81
DW               60.800 usec
DE                6.50 usec
TE               298.3 K
D1          1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500096 MHz
WDW                EM
SSB      0
LB               0.30 Hz
GB       0
PC               1.00
```

13C of VBAR 278/25



BRUKER

Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 194
PROCNO 1

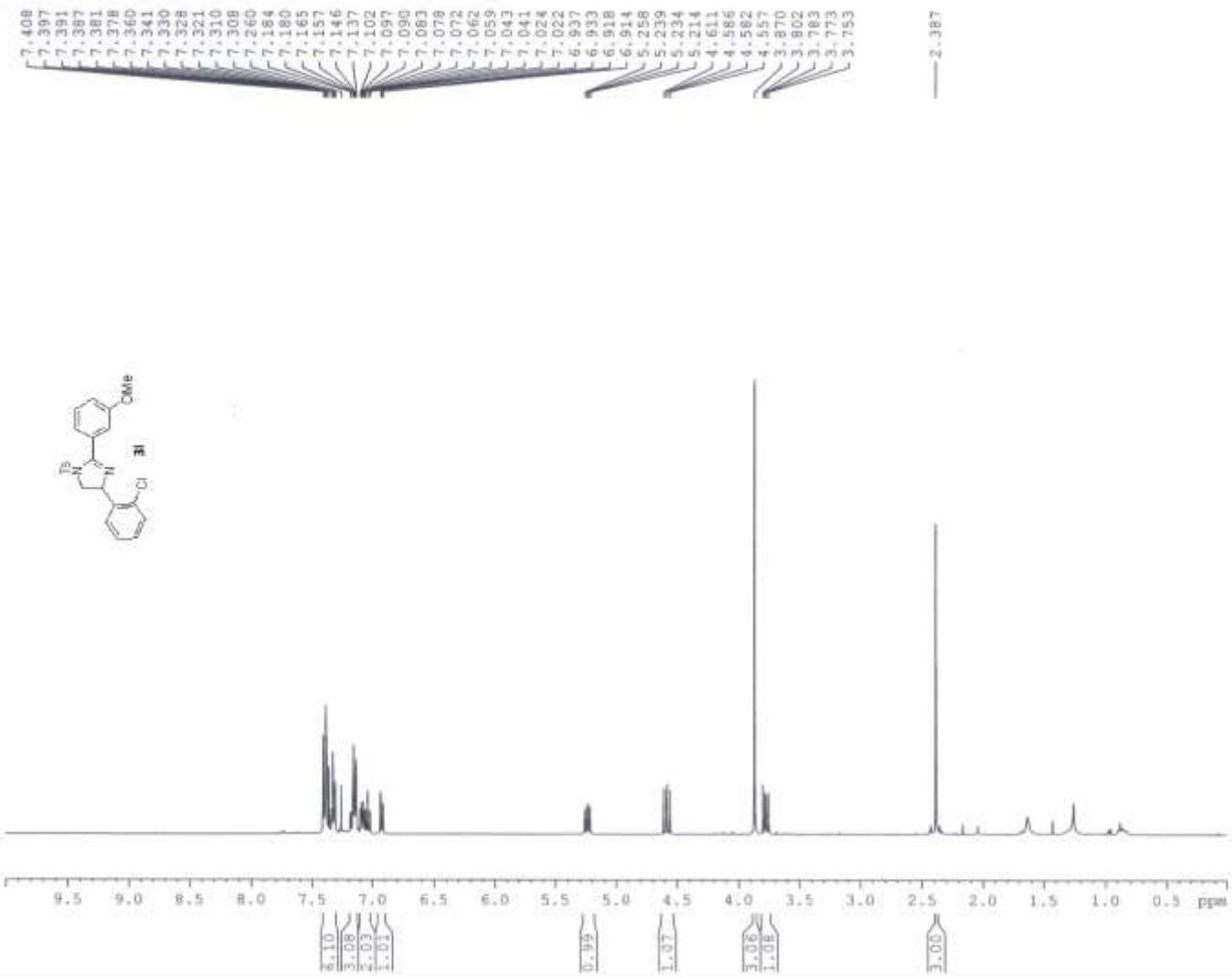
F2 - Acquisition Parameters
Date_ 20180321
Time 19.14
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 640
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6270588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177873 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1H of VBAR-CN6



BRUKER

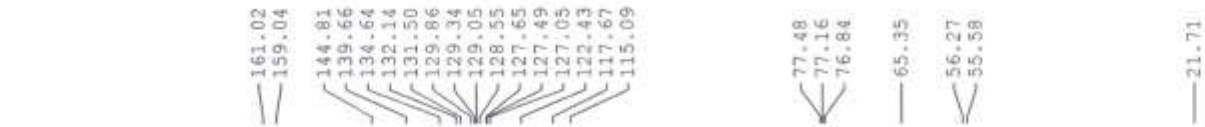
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO                1
PROCNO               1

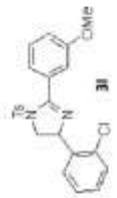
F2 - Acquisition Parameters
Date_           20180102
Time              18.27
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  17
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               87.66
DW              60.800 usec
DE               6.50 usec
TE              296.0 K
D1            1.00000000 sec
TD0                  1

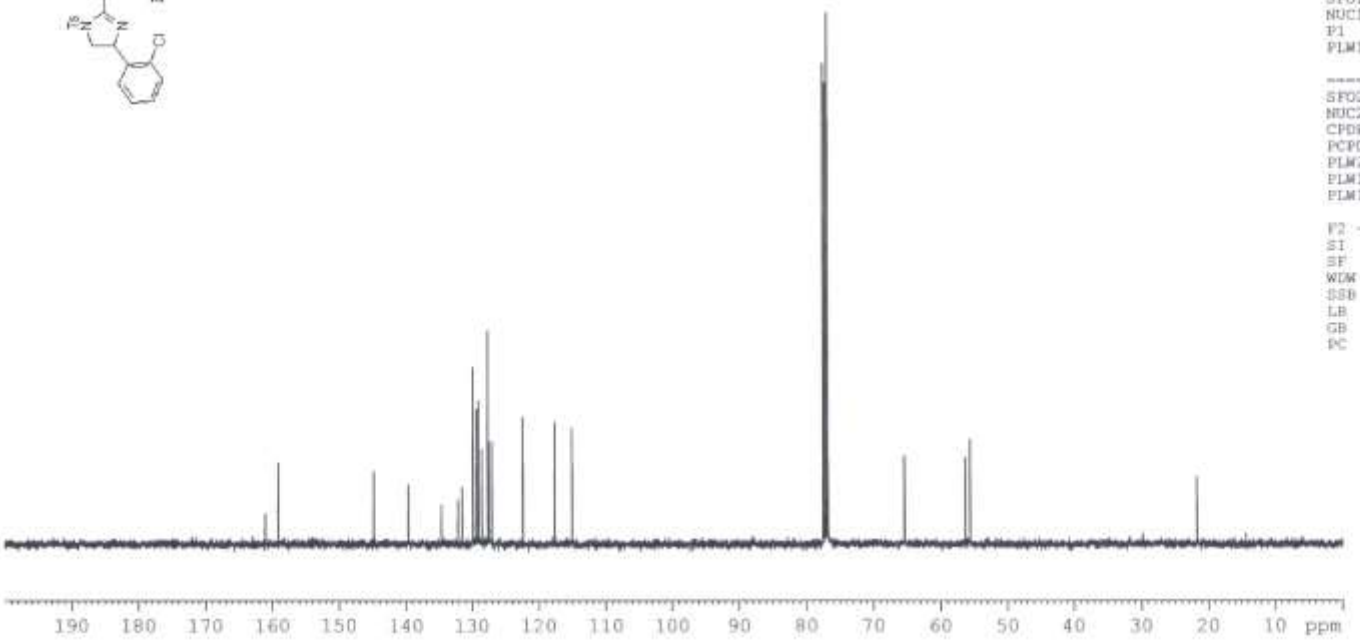
======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500094 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```

13C of VBAR-CN6








```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO                   4
PROCNO                  1

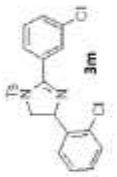
F2 - Acquisition Parameters
Date_              20180102
Time                 18.45
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG            zgpg30
TD                  32768
SOLVENT             CDCl3
NS                    320
DS                      2
SWH             24038.461 Hz
FIDRES          0.733596 Hz
AQ              0.6815744 sec
RG                  87.66
DW                20.800 usec
DE                 6.50 usec
TE                296.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1

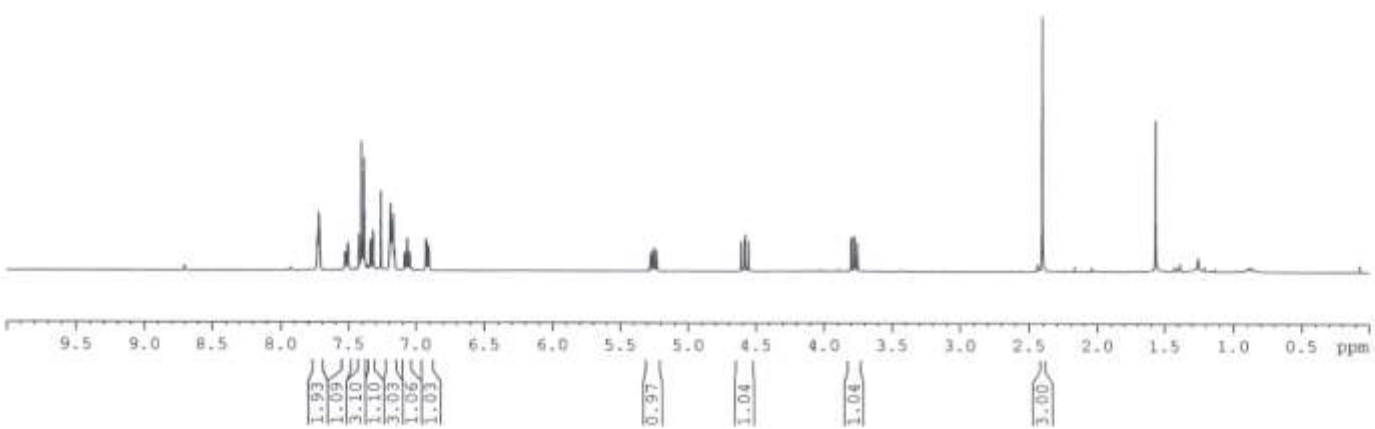
======== CHANNEL f1 ========
SFO1          100.6276588 MHz
NUC1                  13C
P1                   8.90 usec
PLW1         54.00000000 W

======== CHANNEL f2 ========
SFO2          400.1516006 MHz
NUC2                  1H
CPDPRG[2          waltz16
PCPD2               90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                   16384
SF            100.6177060 MHz
WDW                    EM
SSB       0
LB                   1.00 Hz
GB        0
PC                   1.40
```

1H of VBAR-278/24





BRUKER

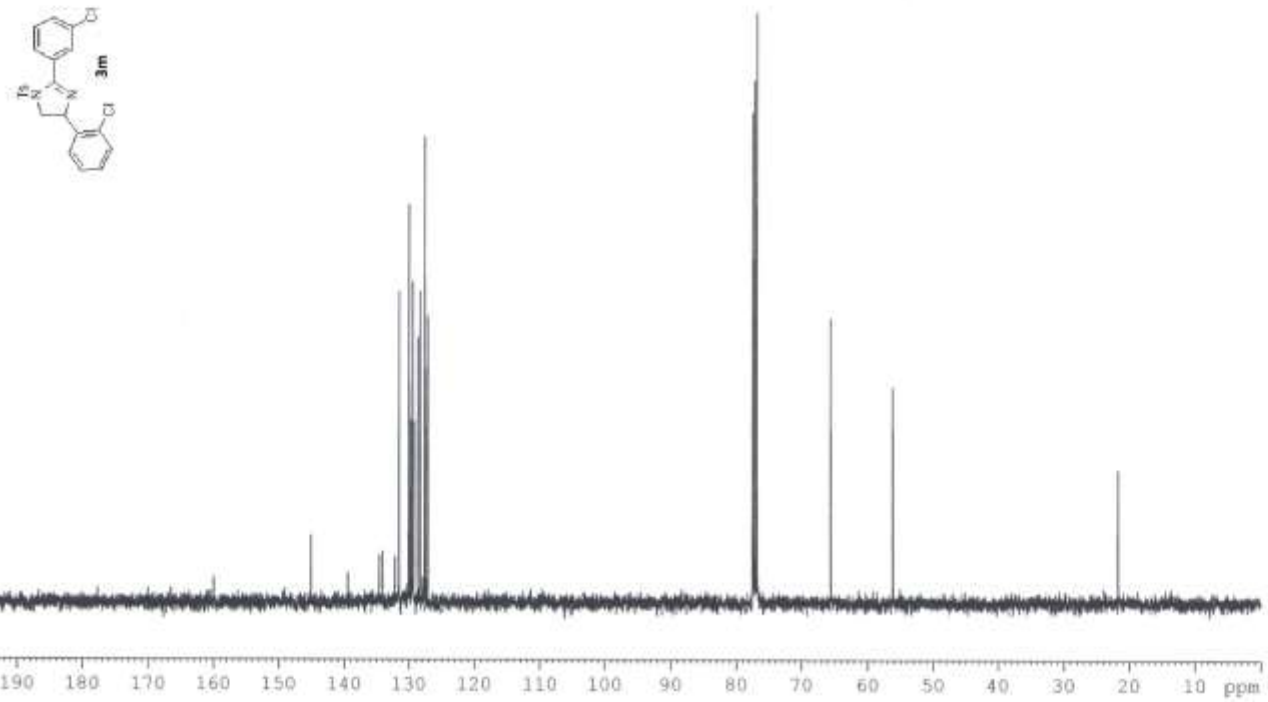
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              187
PROCNO               1

F2 - Acquisition Parameters
Date_          20180320
Time               19.11
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   12
DS                    1
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9922944 sec
RG                168.31
DW                60.800 usec
DE                 6.50 usec
TE                298.3 K
D1             1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1          400.1524711 MHz
NUC1                 1H
P1                14.75 usec
PLW1          12.00000000 W

F2 - Processing parameters
SI                16384
SF            400.1500097 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

13C of VBAR 278/24



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              193
PROCNO             1

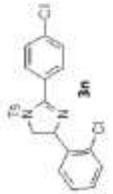
F2 - Acquisition Parameters
Date_          20180321
Time              11.37
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zgdc
TD               32768
SOLVENT          CDCl3
NS                 800
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               168.31
DW              20.800 usec
DE               6.50 usec
TE              298.7 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

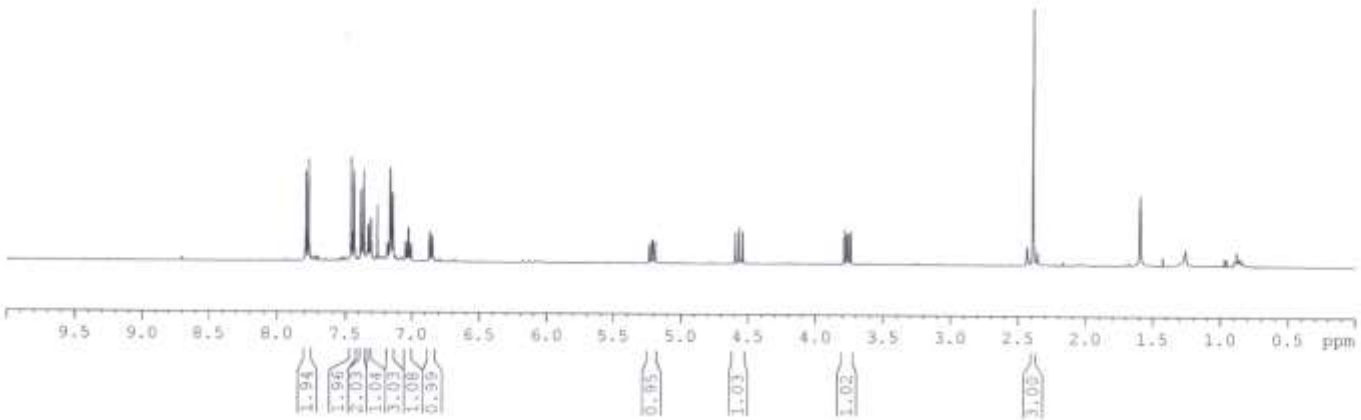
========== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1               13C
P1                8.90 usec
PLW1       54.00000000 W

========== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W

F2 - Processing parameters
SI                16384
SF          100.6177841 MHz
WDW                 EM
SSB          0
LB                1.00 Hz
GB           0
PC                1.40
```

1H of VBAR 278/43





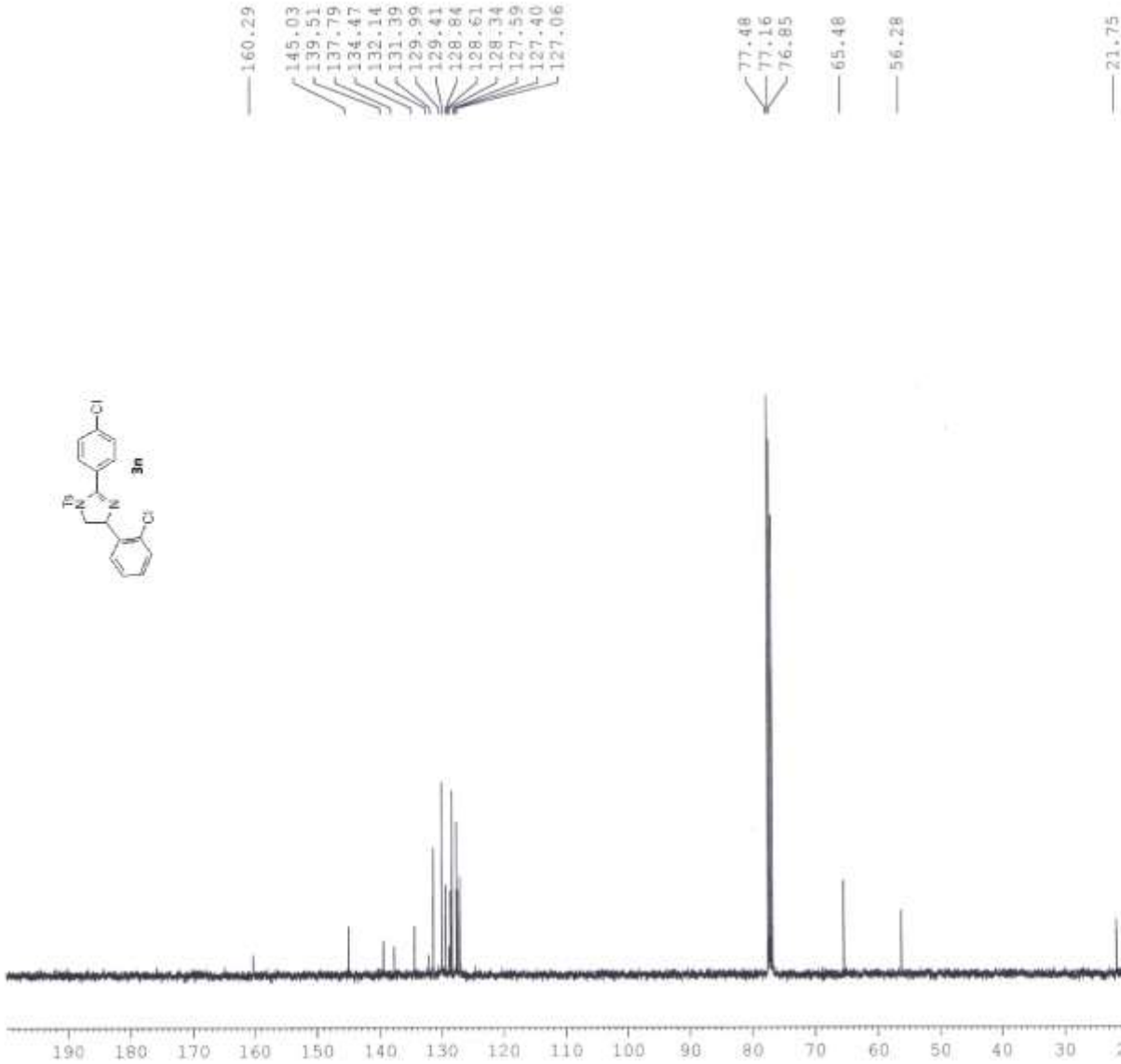
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 343
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180428
Time 22.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 12
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 93.46
DW 60.800 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR 278/43



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              344
PROCNO               1

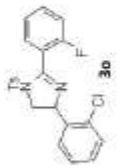
F2 - Acquisition Parameters
Date_          20180428
Time              22.50
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT         CDCl3
NS                380
DS                  2
SWH           24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               57.28
DW              20.800 usec
DE               6.50 usec
TE             298.8 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0                 1

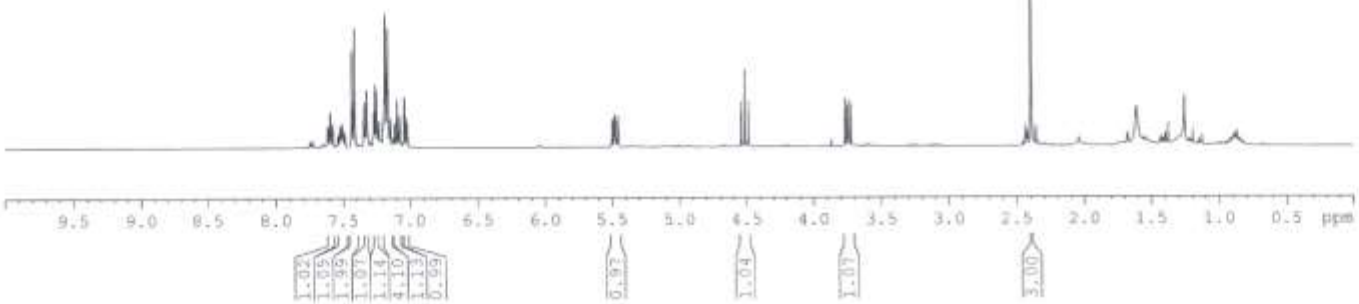
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1        54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6177835 MHz
WDW                EM
SSB       0
LB               1.00 Hz
GB        0
PC               1.40
```

1H of VBAR 278/41





BRUKER

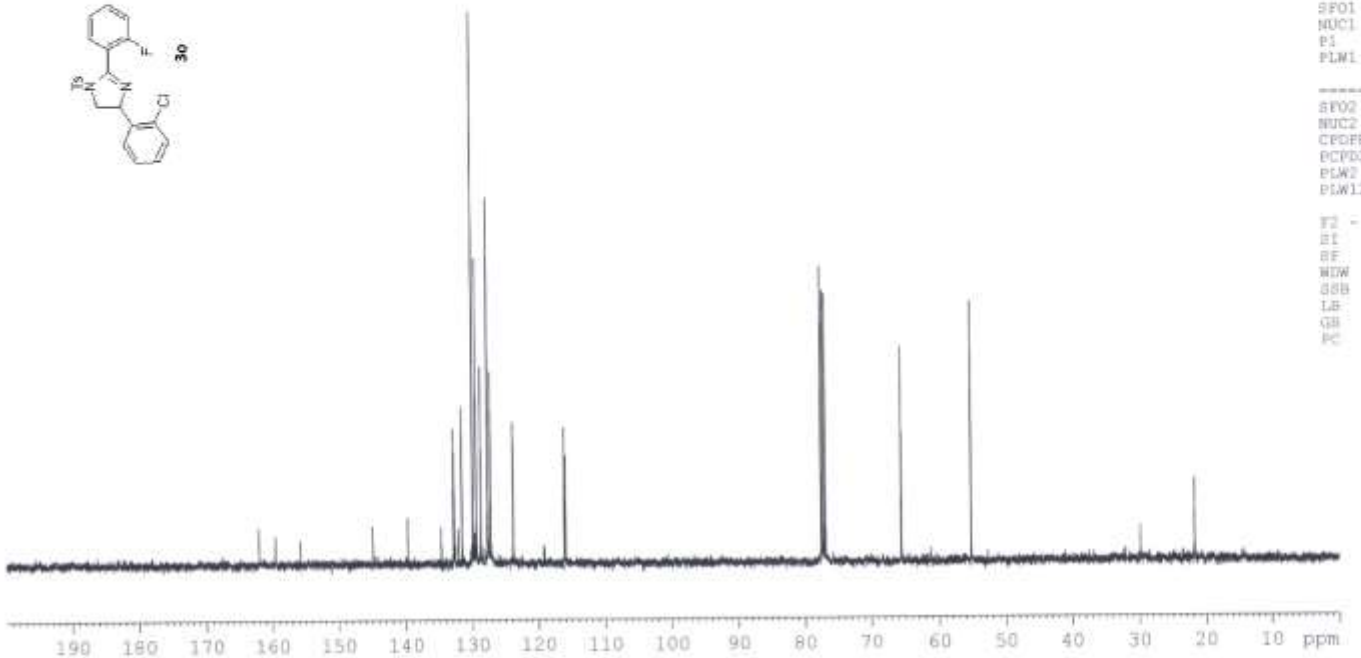
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              335
PROCNO               1

F2 - Acquisition Parameters
Date_          20180426
Time              11.43
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  20
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               93.46
DW              60.800 usec
DE               6.50 usec
TE              298.6 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1       400.1524711 MHz
NUC1               1H
P1              14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI                16384
SF         400.1500097 MHz
WDW                EM
SSB       0
LB              0.30 Hz
GB        0
PC                1.00
```

13C of VBAR 278/41



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              347
PROCNO               1

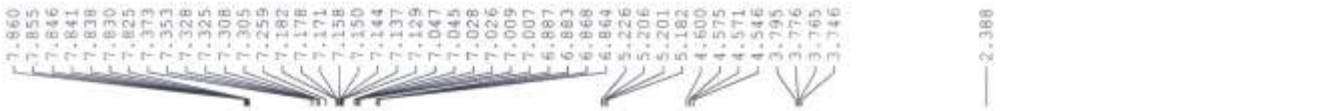
F2 - Acquisition Parameters
Date_          20180429
Time              11.36
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zgdc
TD               32768
SOLVENT          CDCl3
NS                 640
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG              186.42
DW              20.800 usec
DE               6.50 usec
TE              299.1 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0                  1

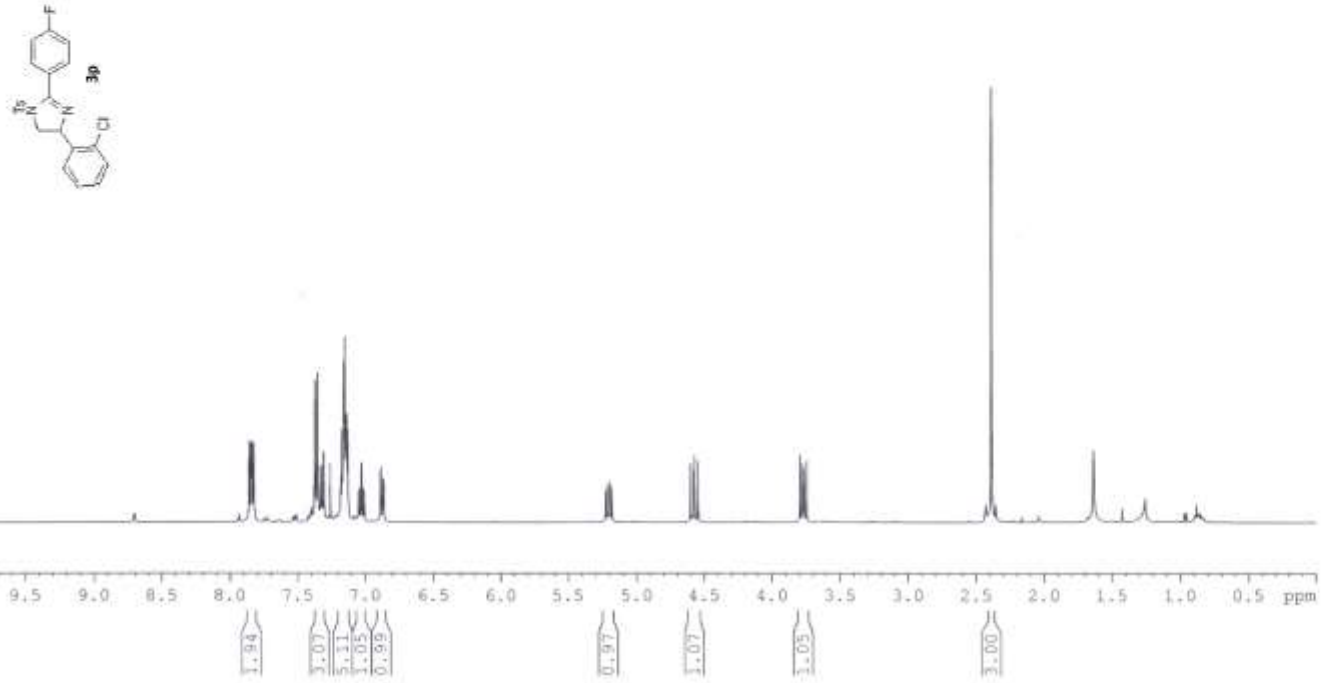
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W

F2 - Processing parameters
SI               16384
SF          100.6177840 MHz
WDW                EM
SSB      0
LB               1.00 Hz
GB       0
PC               1.00
```

1H of VBAR 278/42





BRUKER

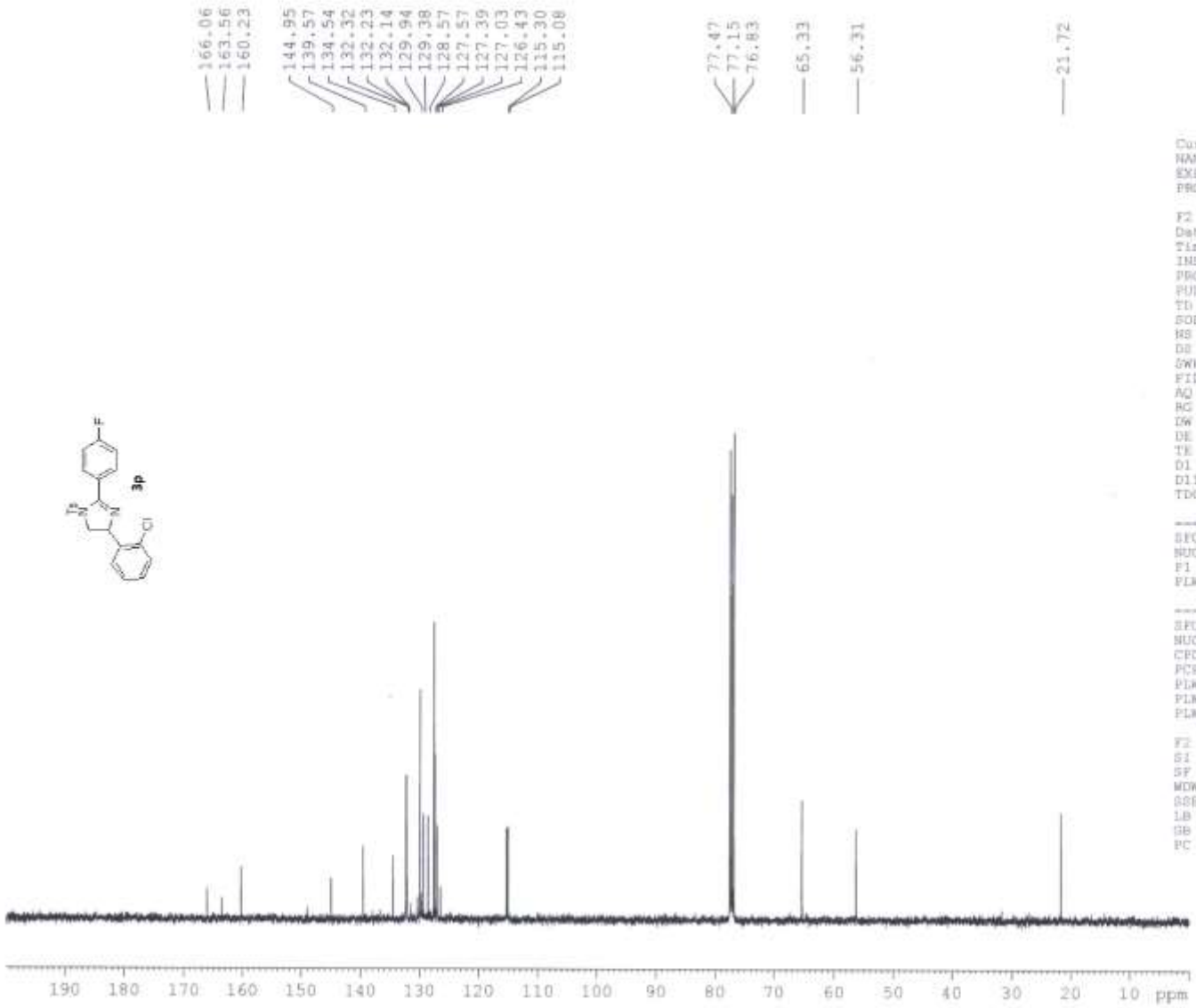
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              336
PROCNO               1

F2 - Acquisition Parameters
Date_          20180426
Time              11.48
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  24
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                93.46
DW               60.800 usec
DE                6.50 usec
TE               298.6 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500098 MHz
WDW                EM
SSB      0
LB               0.30 Hz
GB       0
PC               1.00
```

13C of VBAR 278/42



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              337
PROCNO               1

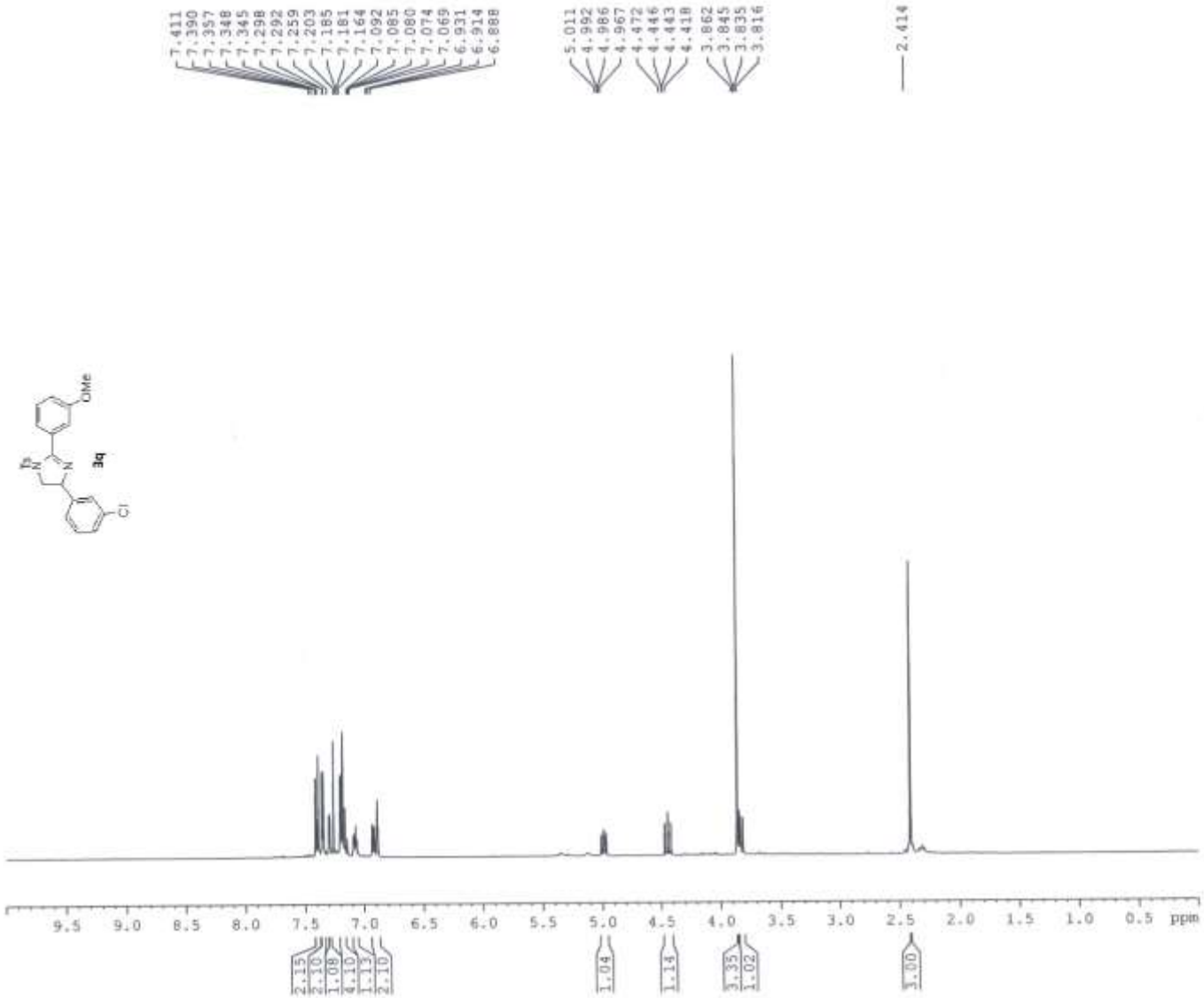
F2 - Acquisition Parameters
Date_          20180426
Time              12.19
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  480
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6815744 sec
RG                57.28
DW                20.800 usec
DE                 6.50 usec
TE               299.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1              13C
P1                8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG12        waltz16
PCPD2             90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177853 MHz
WDW                 EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

1H of VBAR-278/28



BRUKER

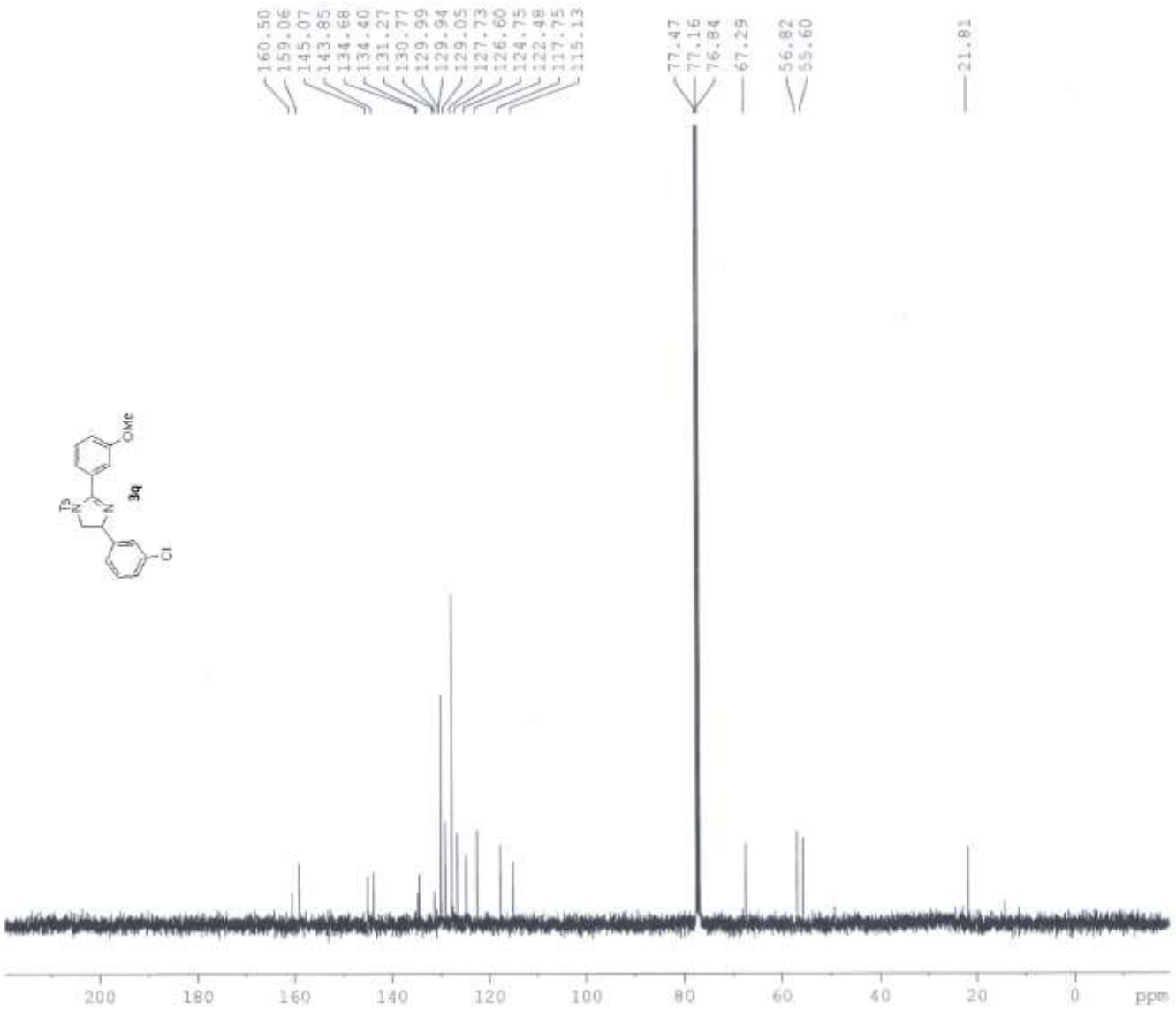
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              233
PROCNO               1

F2 - Acquisition Parameters
Date_          20180329
Time              17.51
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               120.16
DW               60.800 usec
DE                6.50 usec
TE               299.0 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1         400.1524711 MHz
NUC1               1H
P1                14.75 usec
PLW1         12.00000000 W

F2 - Processing parameters
SI                16384
SF           400.1500098 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

13C of VBAR 278/28



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              234
PROCNO               1

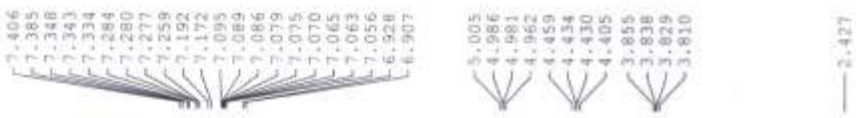
F2 - Acquisition Parameters
Date_          20180329
Time               18.18
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                 87.66
DW               20.800 usec
DE                6.50 usec
TE               299.7 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

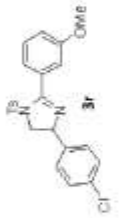
======== CHANNEL f1 ========
SFO1         100.6278588 MHz
NUC1               13C
P1                8.90 usec
PLW1        54.00000000 W

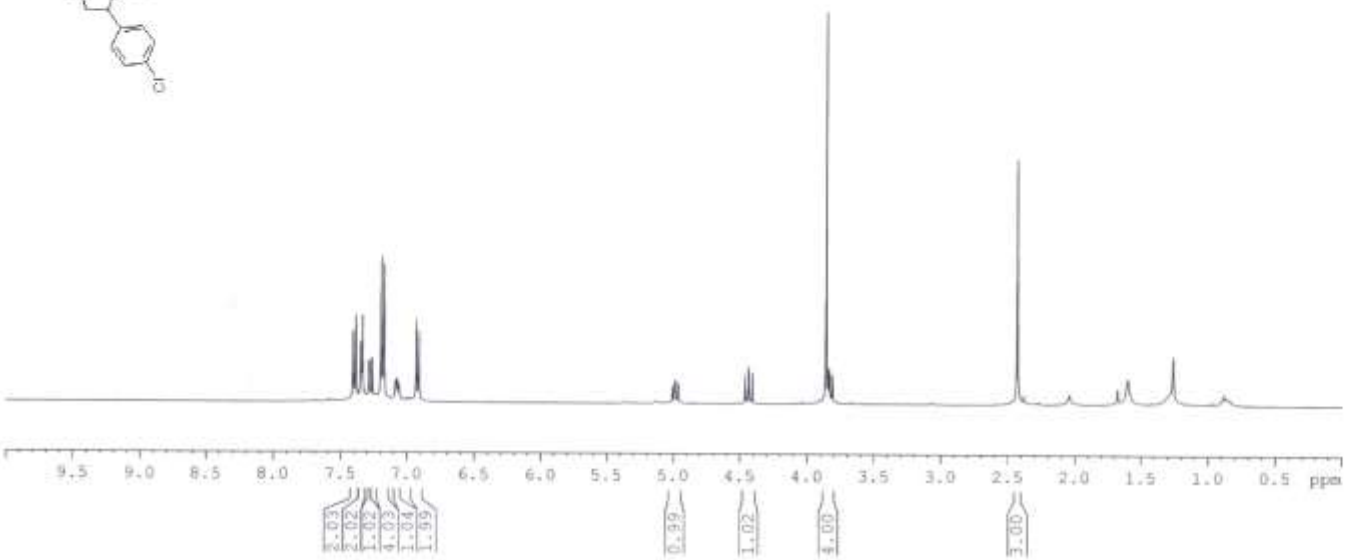
======== CHANNEL f2 ========
SFO2         400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177832 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

1H of VBAR-278/51







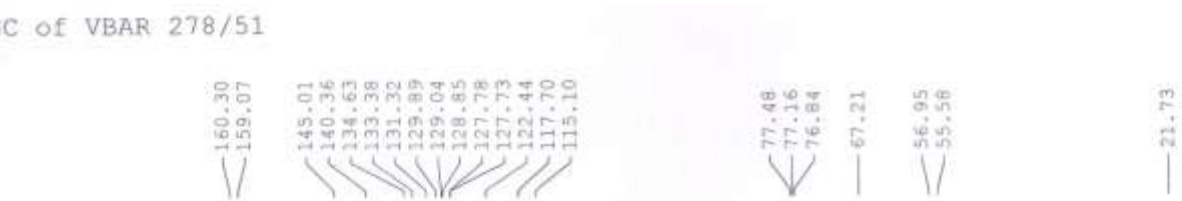
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 355
PROCNO 1

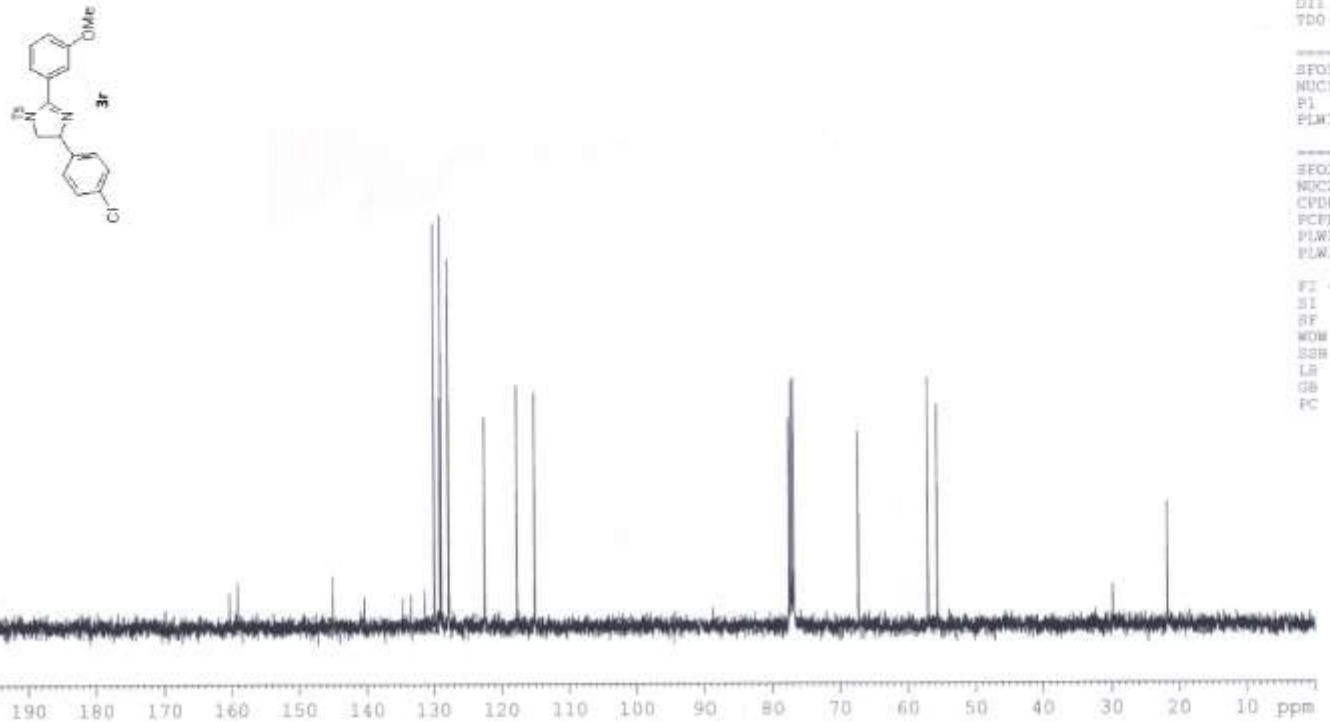
F2 - Acquisition Parameters
Date_ 20180502
Time 16.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 24
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 93.46
DW 60.800 usec
DE 6.50 usec
TE 298.9 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR 278/51





BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              356
PROCNO               1

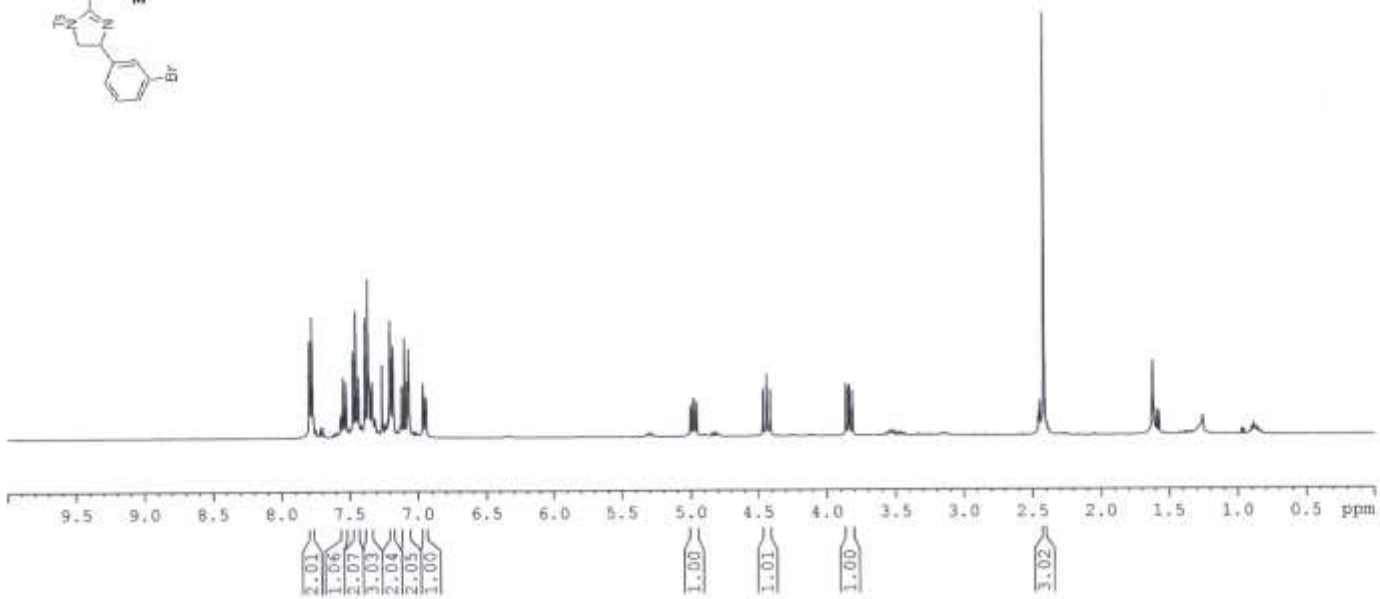
F2 - Acquisition Parameters
Date_          20180502
Time              16.44
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zgdc
TD               32768
SOLVENT          CDCl3
NS                 264
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               93.46
DW              20.800 usec
DE               6.50 usec
TE              300.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1               13C
P1                8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2             90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W

F2 - Processing parameters
SI                16384
SF          100.6177836 MHz
WDW                 EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

1H of VBAR 278/56



BRUKER

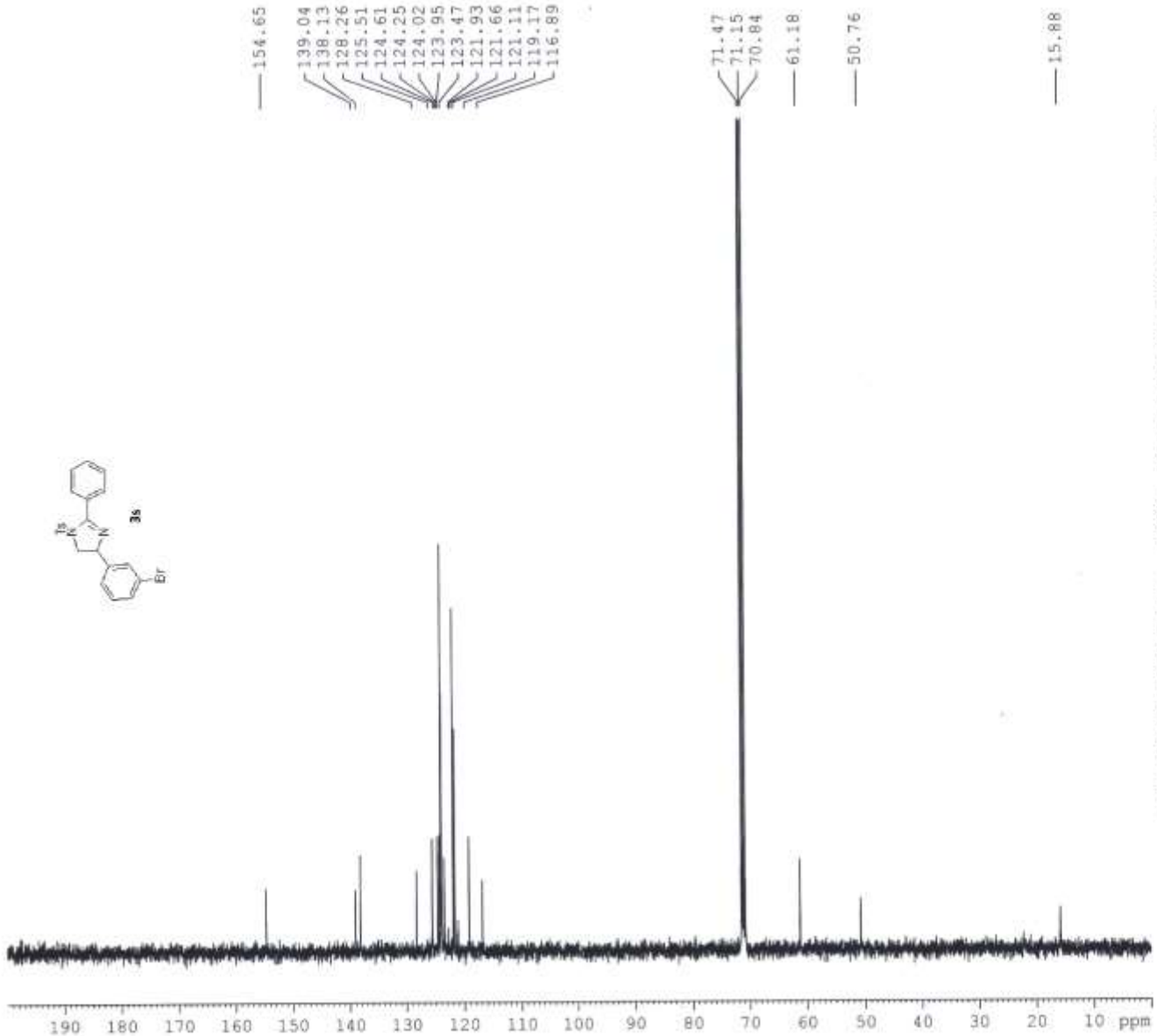
```
Current Data Parameters
NAME      Dr. A MAJEE 2019
EXPNO              291
PROCNO               1

F2 - Acquisition Parameters
Date_         20190518
Time              9.35
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  24
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              186.42
DW              60.800 usec
DE               6.50 usec
TE              296.2 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500092 MHz
WDW                EM
SSB       0
LB              0.30 Hz
GB        0
PC                4.00
```

13C of VBAR 278/56



Current Data Parameters
NAME Dr. A MAJEE 2019
EXPNO 292
PROCNO 1

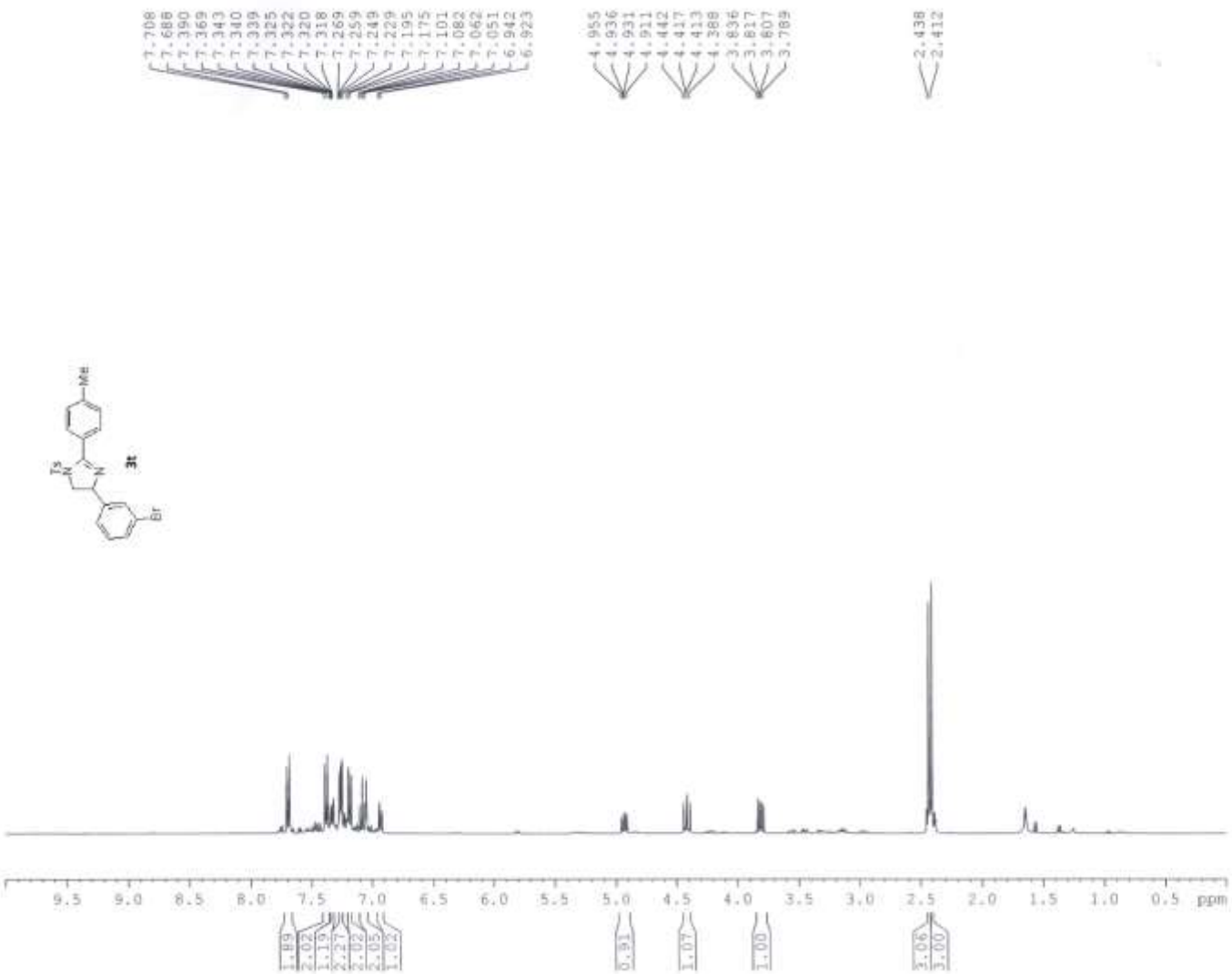
F2 - Acquisition Parameters
Date_ 20190518
Time 9.52
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 360
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 296.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6183903 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 2.00

1H of VBAR-278/55



BRUKER

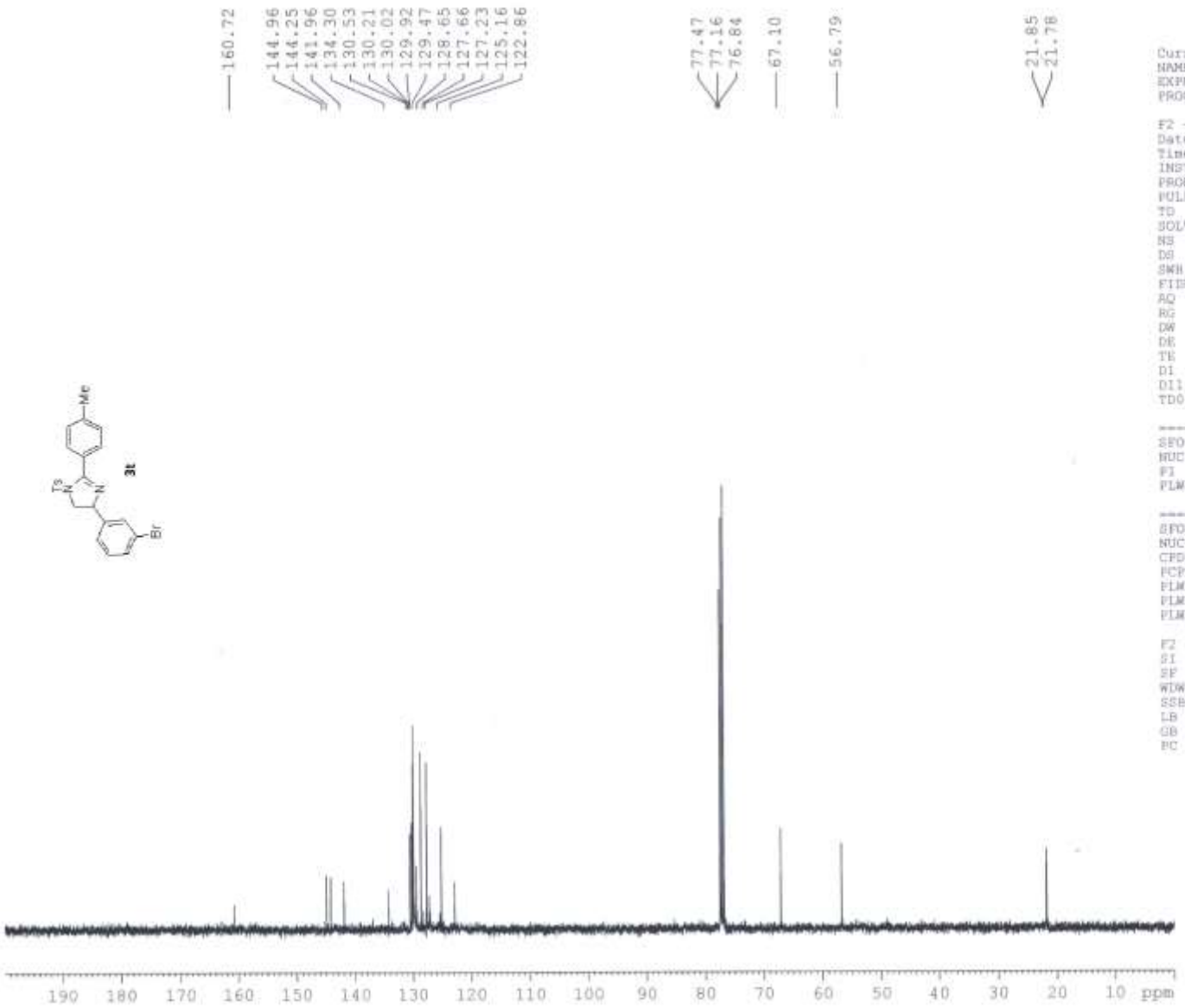
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              408
PROCNO               1

F2 - Acquisition Parameters
Date_          20180519
Time              10.12
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               87.66
DW               60.800 usec
DE                6.50 usec
TE               298.6 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1                14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500097 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

13C of VBAR-278/55



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO                  409
PROCNO                   1

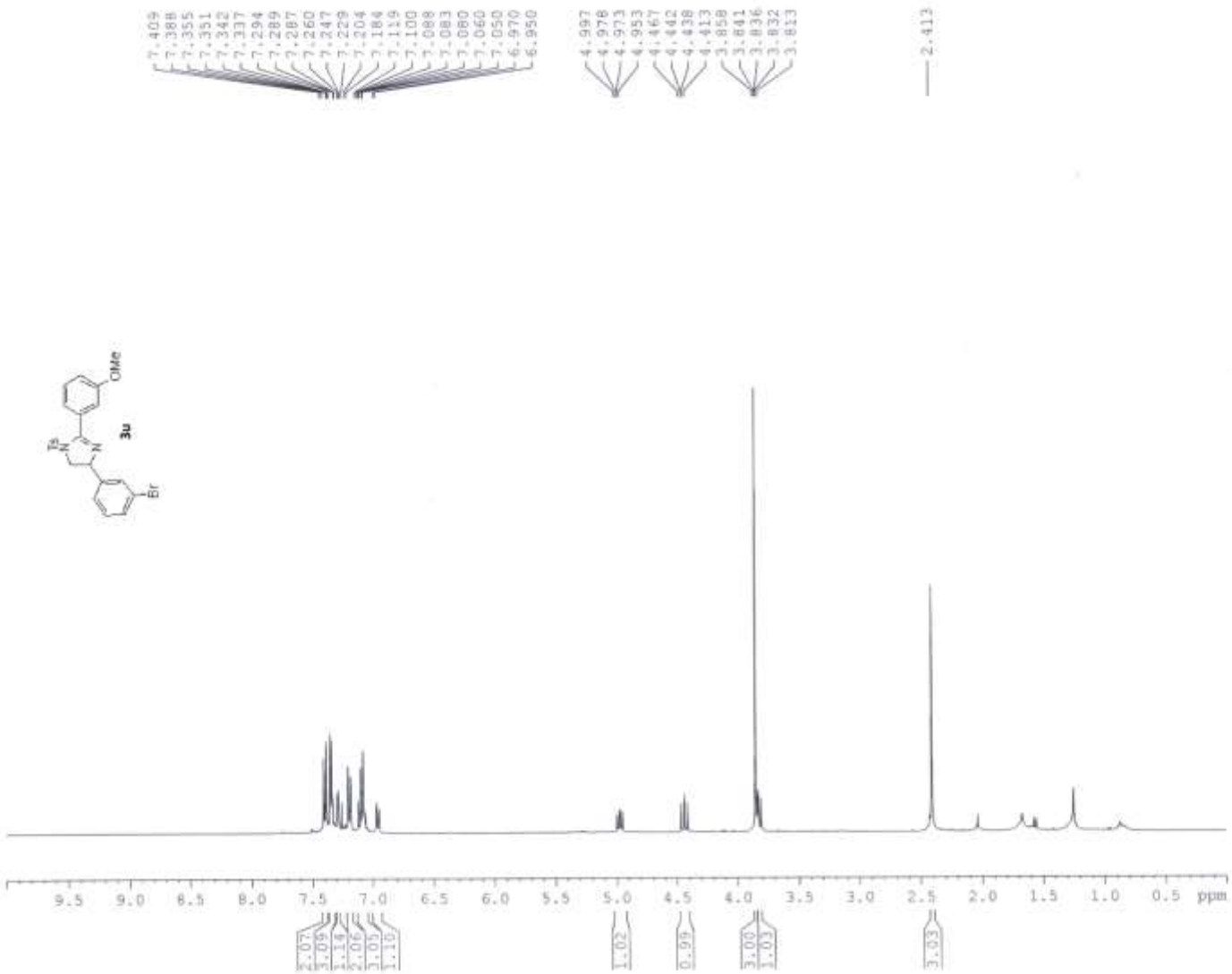
F2 - Acquisition Parameters
Date_           20180519
Time              10.21
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT         CDCl3
NS                160
DS                  2
SWH           24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               87.66
DW              20.800 usec
DE               6.50 usec
TE              299.1 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                 1

======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1              13C
P1                8.90 usec
PLW1        54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6177866 MHz
WDW                 EM
SSB       0
LB                1.00 Hz
GB        0
PC                2.00
```

1H of VBAR-278/50



BRUKER

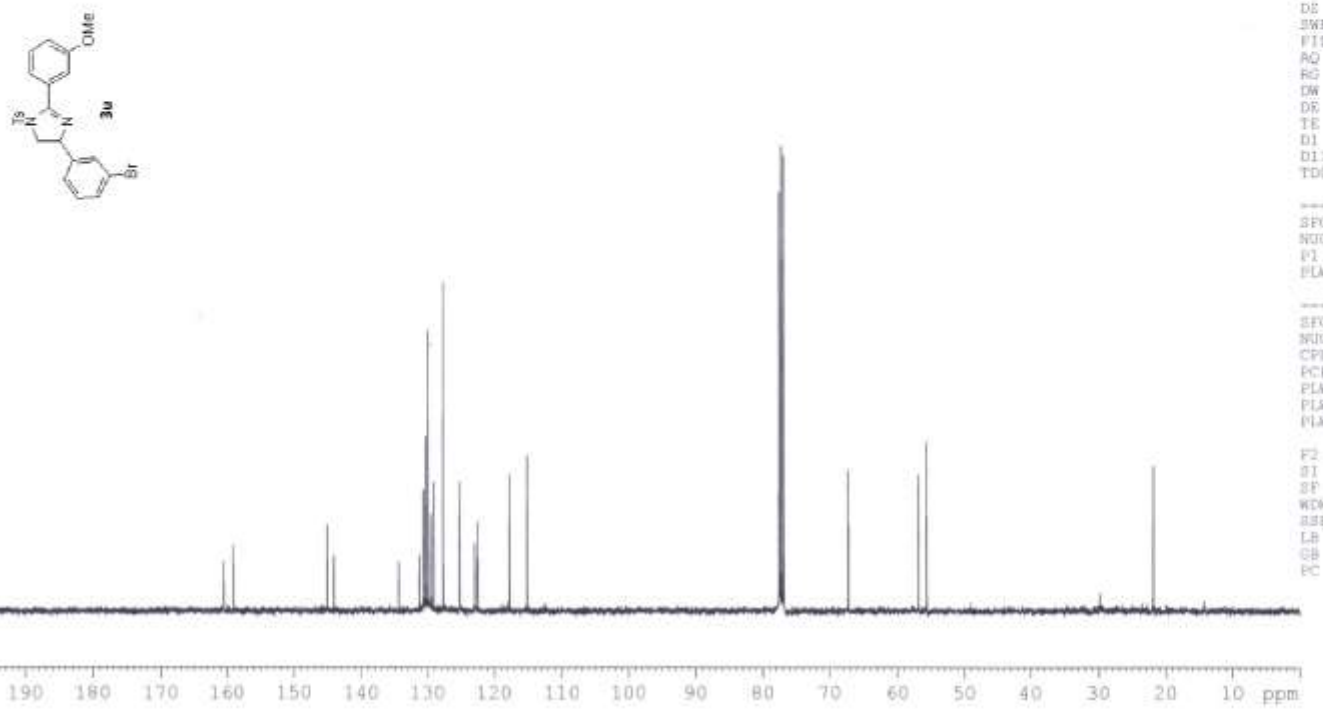
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              360
PROCNO               1

F2 - Acquisition Parameters
Date_          20180503
Time              19.25
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                93.46
DW               60.800 usec
DE                6.50 usec
TE               297.4 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1                14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500096 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

13C of VBAR 278/50




```
Current Data Parameters
NAME      Dr. A MAJEE 2019
EXPNO              361
PROCNO               1

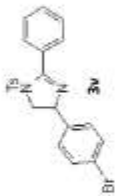
F2 - Acquisition Parameters
Date_          20180503
Time              19.50
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD              32768
SOLVENT          CDCl3
NS                 512
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               93.46
DW               20.800 usec
DE                6.50 usec
TE              298.1 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

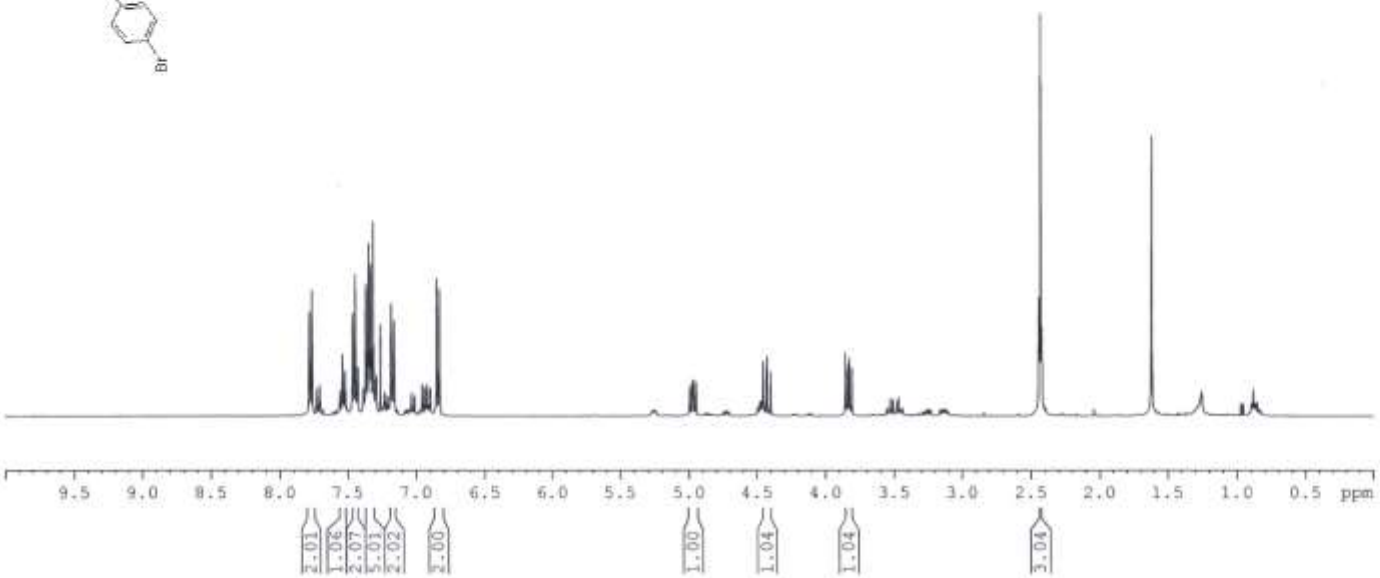
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1              13C
P1                8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6377835 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

1H of VBAR 278/57





BRUKER

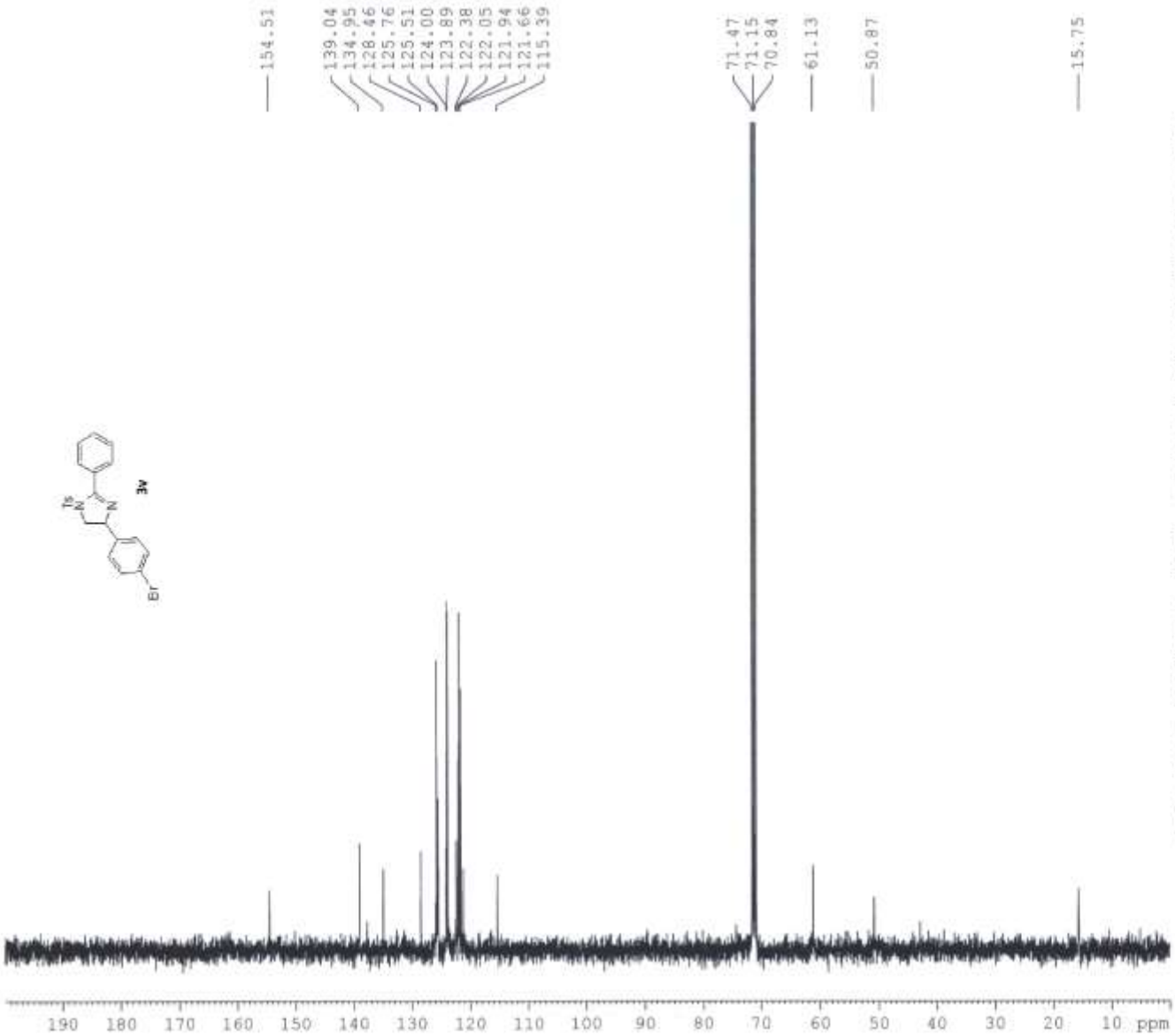
```
Current Data Parameters
NAME      Dr. A MAJEE 2019
EXPNO                  293
PROCNO                   1

F2 - Acquisition Parameters
Date_           20190518
Time               9.57
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                    8
DS                    1
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              186.42
DW              60.800 usec
DE               6.50 usec
TE              296.4 K
D1          1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500093 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               4.00
```

13C of VBAR 278/57




```
Current Data Parameters
NAME      Dr. A MAJEE 2019
EXPNO              294
PROCNO               1

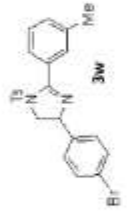
F2 - Acquisition Parameters
Date_          20190510
Time              10.12
INSTRUM           spect
PROBHD  .5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  320
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6815744 sec
RG                186.42
DW                20.800 usec
DE                 6.50 usec
TE                296.7 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

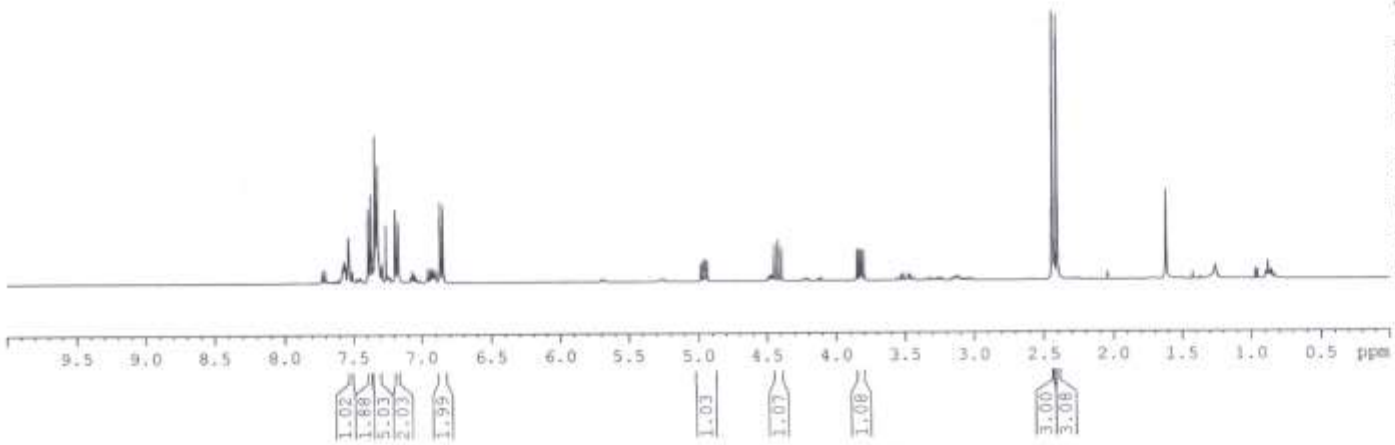
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1                13C
P1                 8.90 usec
PLW1         54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2                1H
CPDPRG[2          waltz16
PCPD2             90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                 16384
SF          100.6183897 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 2.00
```

1H of VBAR-278/33





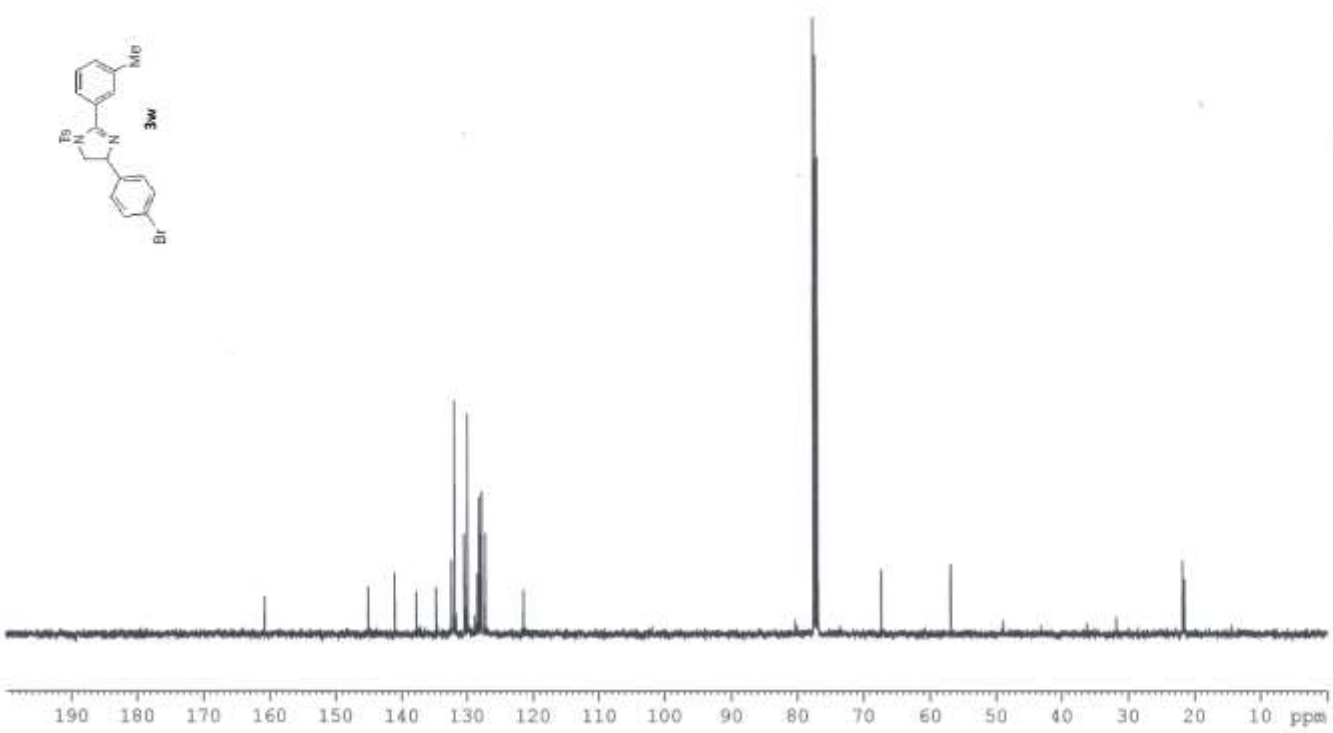
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 247
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180403
Time 16.44
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 93.46
DW 60.800 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR-278/33




```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              248
PROCNO               1

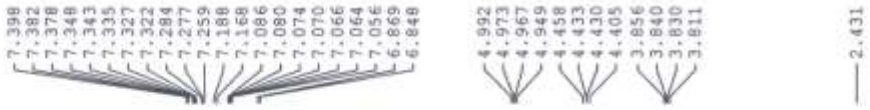
F2 - Acquisition Parameters
Date_          20180403
Time              17.12
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6815744 sec
RG                93.46
DW               20.800 usec
DE                6.50 usec
TE               296.8 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

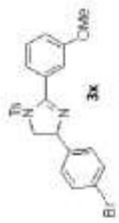
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1               13C
P1                8.90 usec
PLW1         54.00000000 W

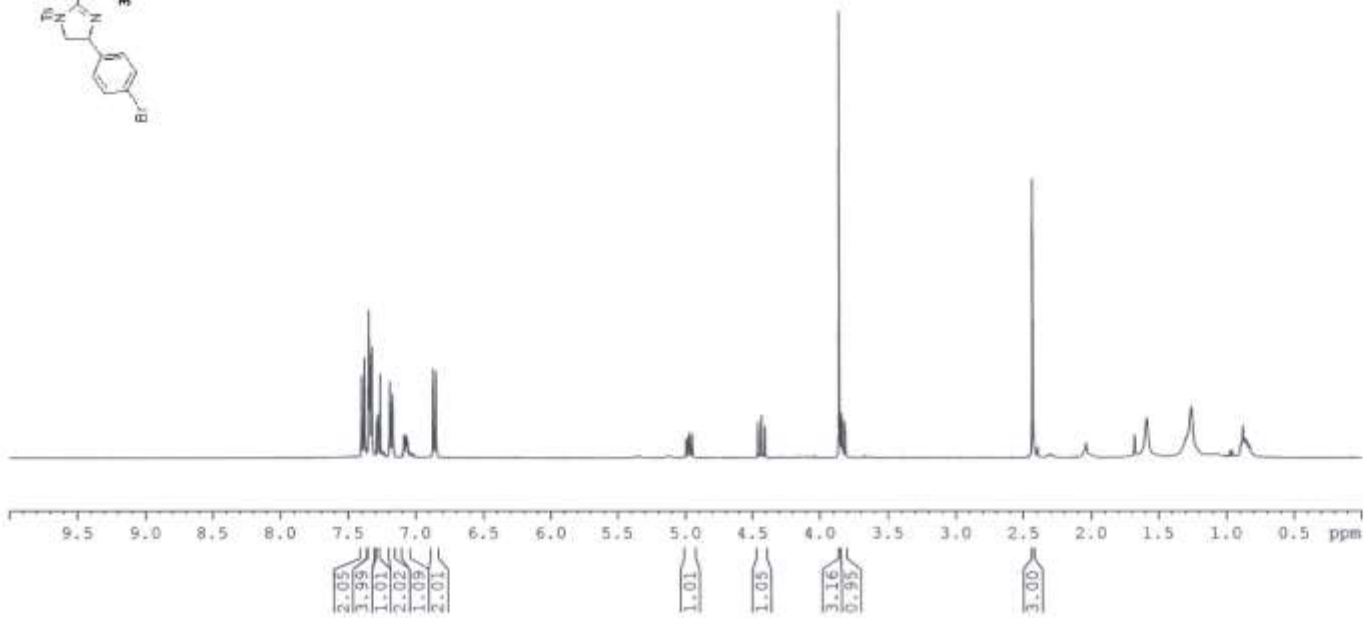
======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177043 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

1H of VBAR-278/29







BRUKER

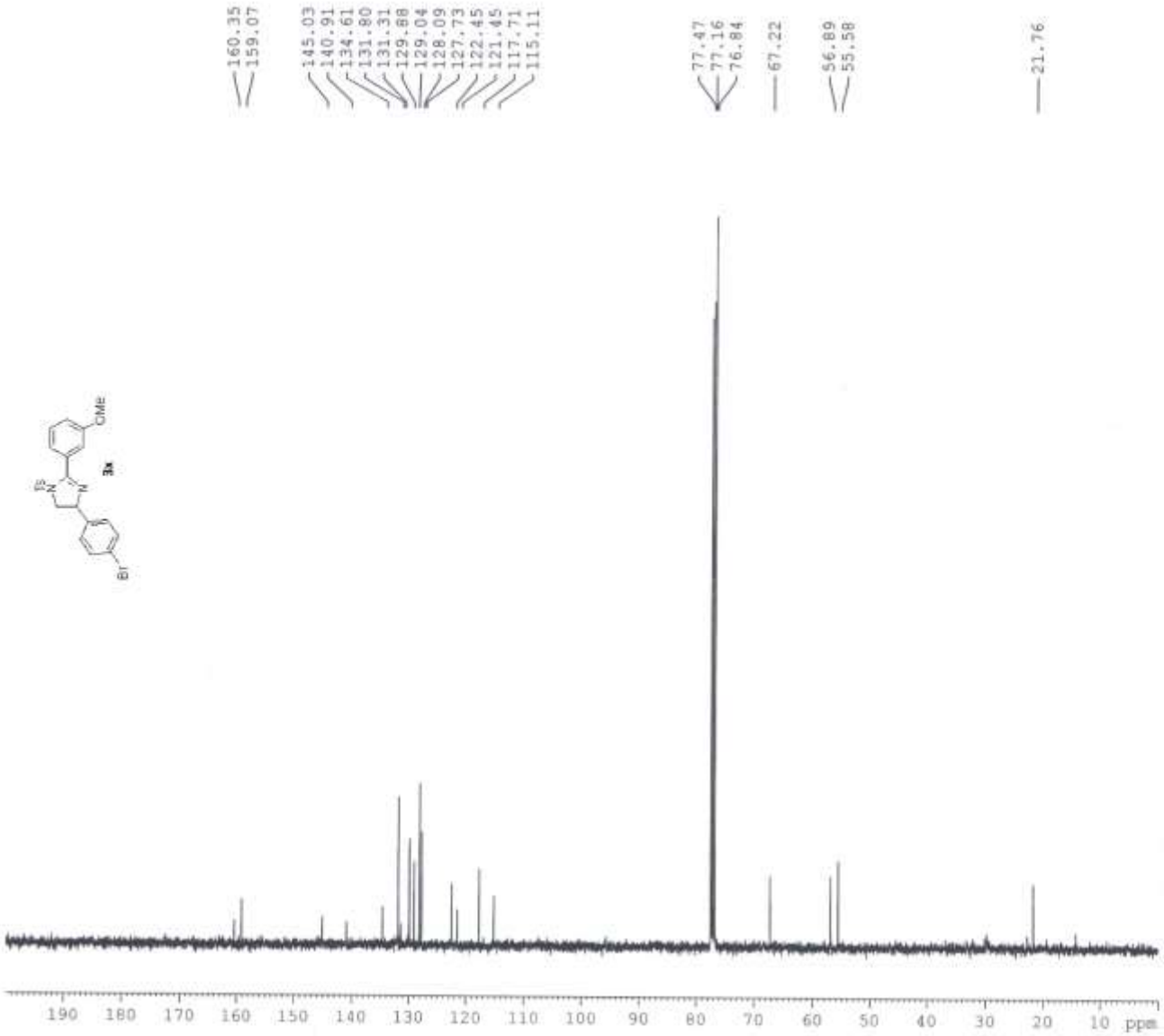
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              235
PROCNO               1

F2 - Acquisition Parameters
Date_          20180329
Time              18.27
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               120.16
DW               60.800 usec
DE                6.50 usec
TE               299.1 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500097 MHz
WDW                EM
SSB                0
LB              0.30 Hz
GB                 0
PC                 1.00
```

13C of VBAR-278/29



BRUKER

Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 236
PROCNO 1

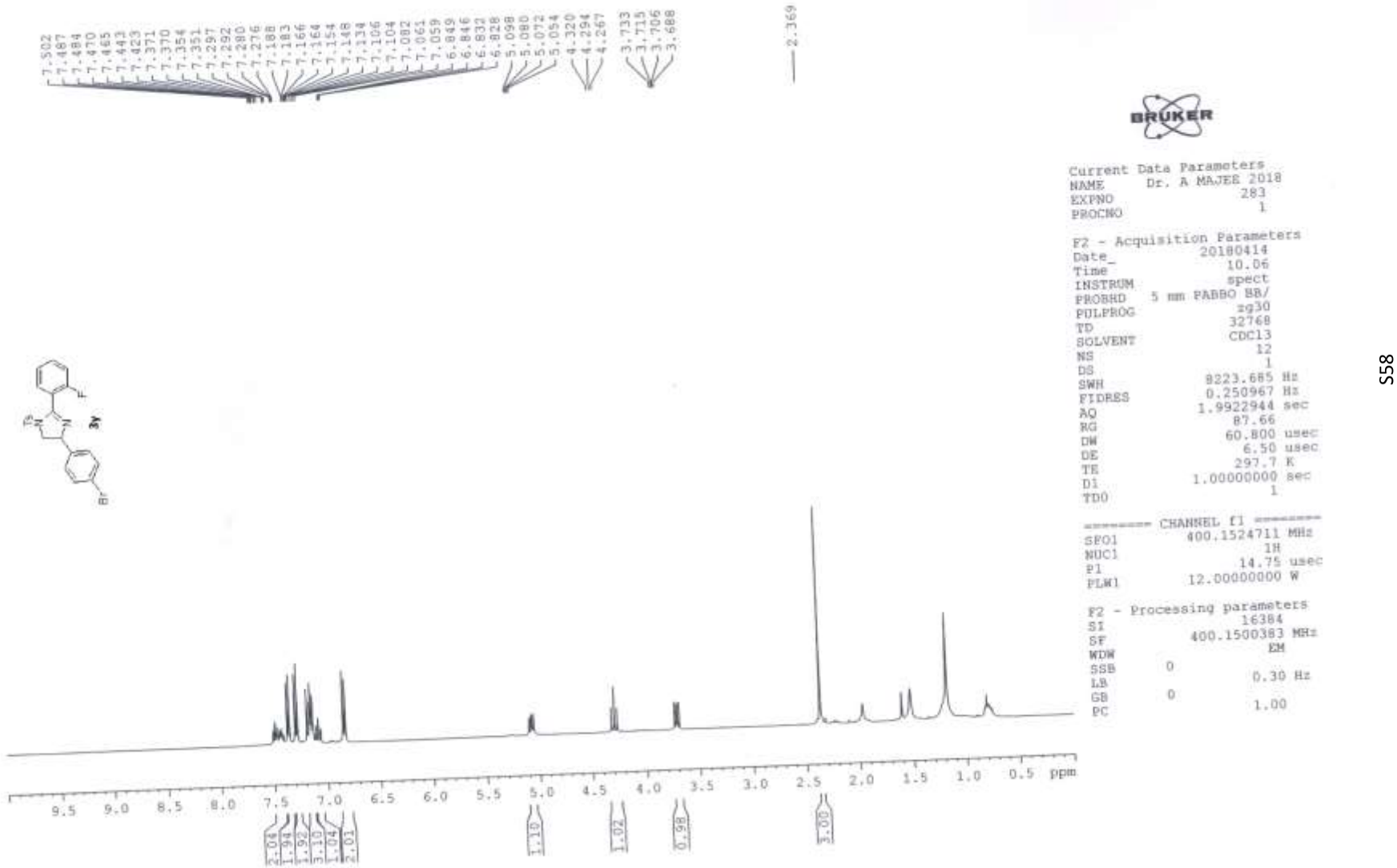
F2 - Acquisition Parameters
Date 20180329
Time 18.55
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 47.25
DW 20.800 usec
DE 6.50 usec
TE 299.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177837 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1H of VBAR 278/40



BRUKER

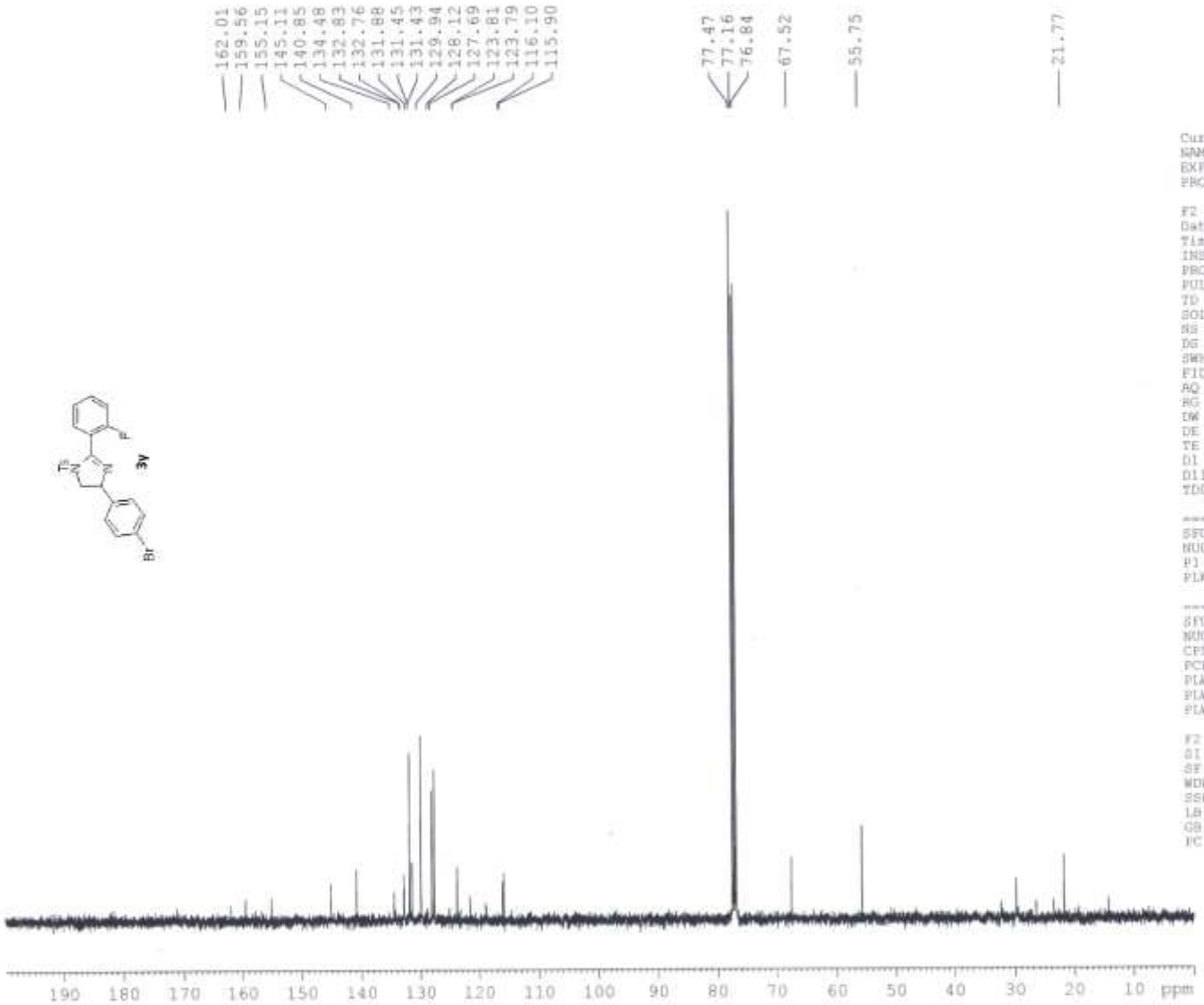
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 283
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180414
Time 10.06
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 12
DS 1
SWH 9223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 87.66
DW 60.800 usec
DE 6.50 usec
TE 297.7 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500383 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR 278/40



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              287
PROCNO               1

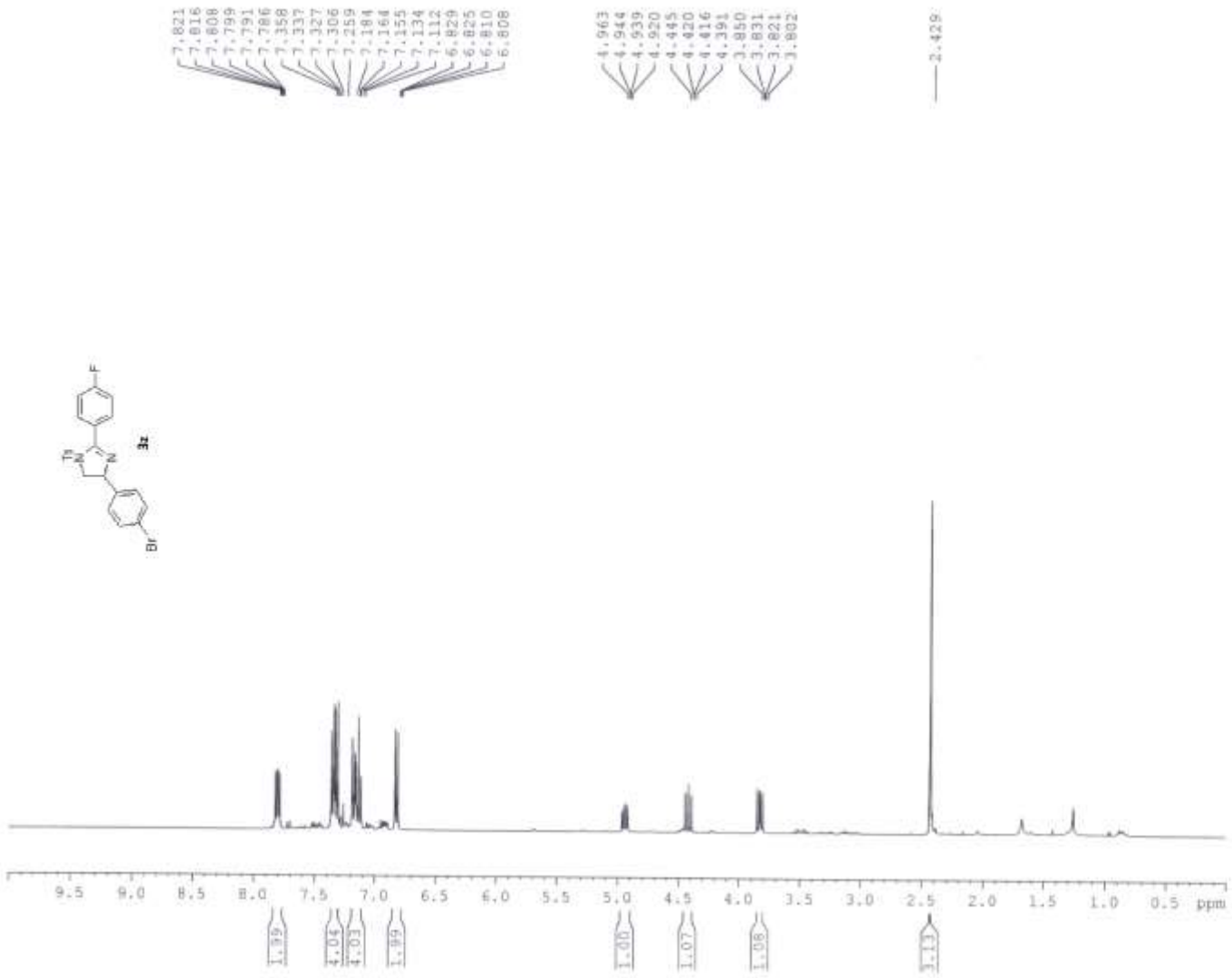
F2 - Acquisition Parameters
Date_          20180414
Time              11.25
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                32768
SOLVENT           CDCl3
NS                  320
DS                    2
SWH           24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                77.59
DW                20.800 usec
DE                 6.50 usec
TE               298.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1               13C
P1                8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2             90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177843 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

1H of VBAR 278/45



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              346
PROCNO               1

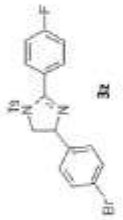
F2 - Acquisition Parameters
Date_          20180428
Time              23.00
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  12
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              62.69
DW              60.800 usec
DE               6.50 usec
TE              298.2 K
D1          1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

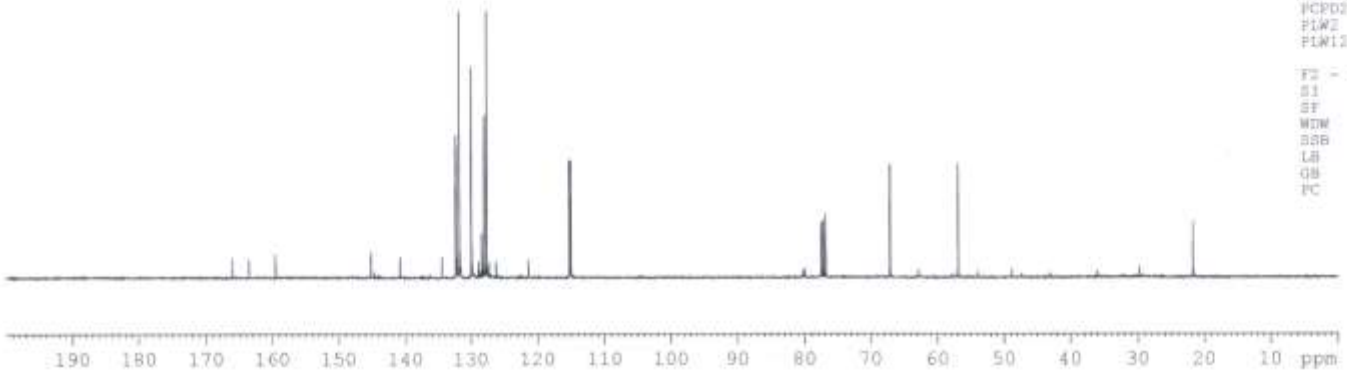
F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                EM
SSB      0
LB              0.30 Hz
GB       0
PC              1.00
```

13C of VBAR 278/45

166.01
163.51
159.51
145.17
140.78
134.36
132.30
132.22
131.75
129.93
128.37
127.97
127.58
121.41
115.26
115.04
77.46
77.15
76.83
67.08
56.87
21.73



3z




```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              340
PROCNO               1

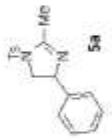
F2 - Acquisition Parameters
Date_          20180429
Time              11.02
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                 380
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG              168.31
DW              20.800 usec
DE               6.50 usec
TE              299.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

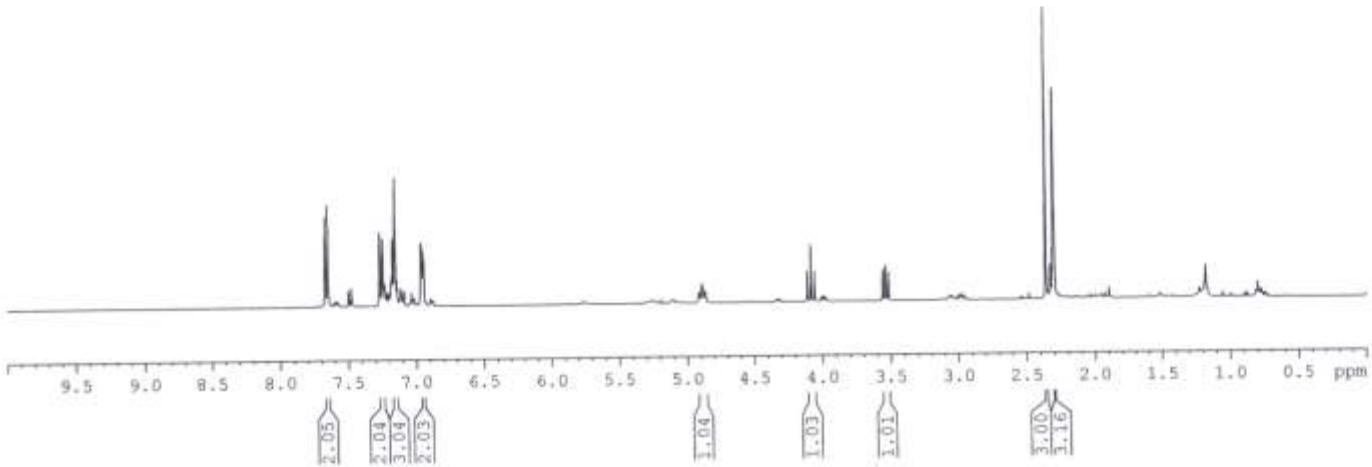
======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W

F2 - Processing parameters
SI               16384
SF         100.6177006 MHz
WDW                EM
SSB      0
LB               1.00 Hz
GB       0
PC               1.40
```

1H of VBAR-278/3





BRUKER

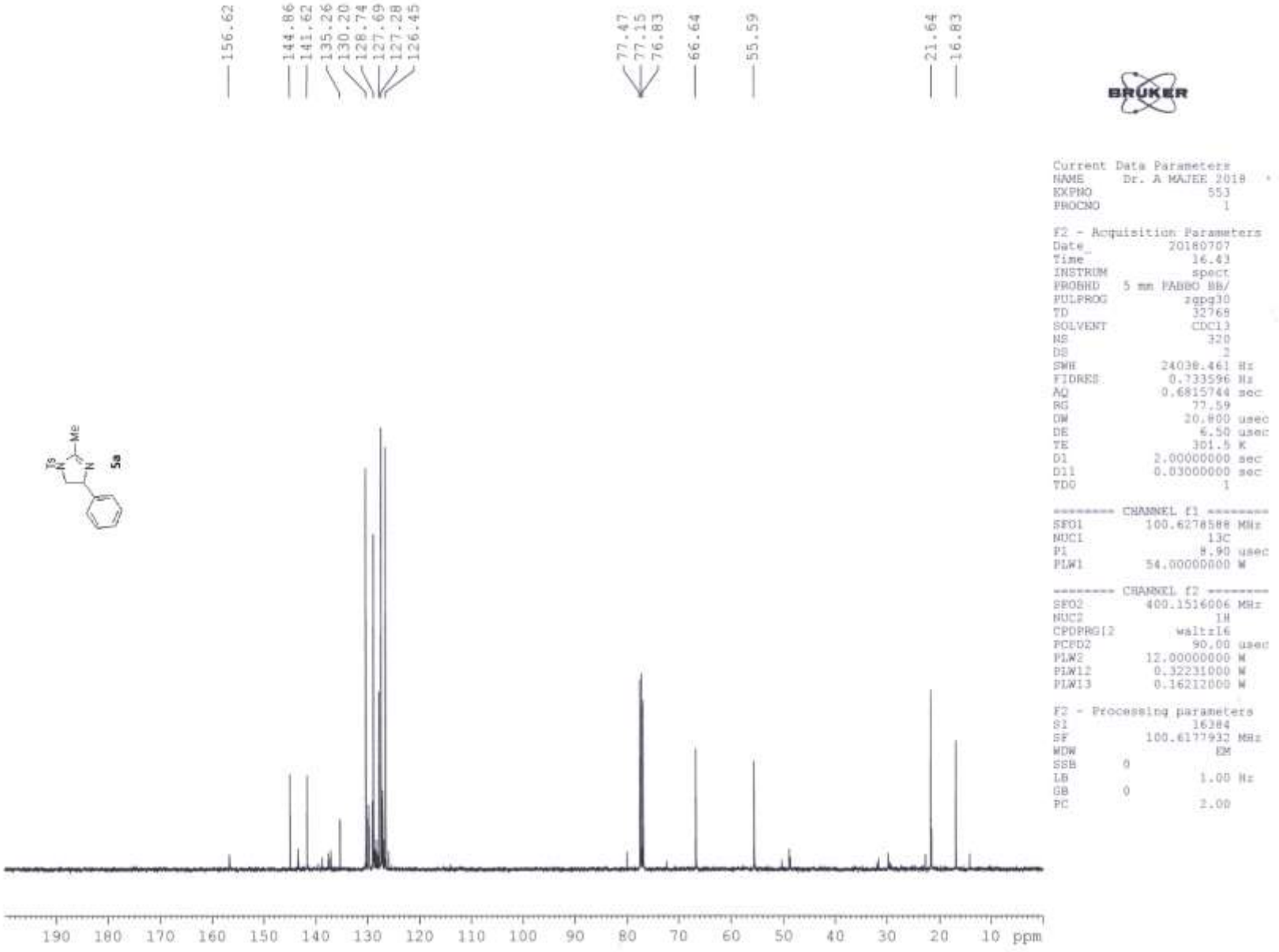
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              552
PROCNO               1

F2 - Acquisition Parameters
Date_          20180707
Time             16.23
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  24
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                30.11
DW               60.800 usec
DE                6.50 usec
TE               300.7 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500420 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.50
```

13C of VBAR-278/3




```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              553
PROCNO               1

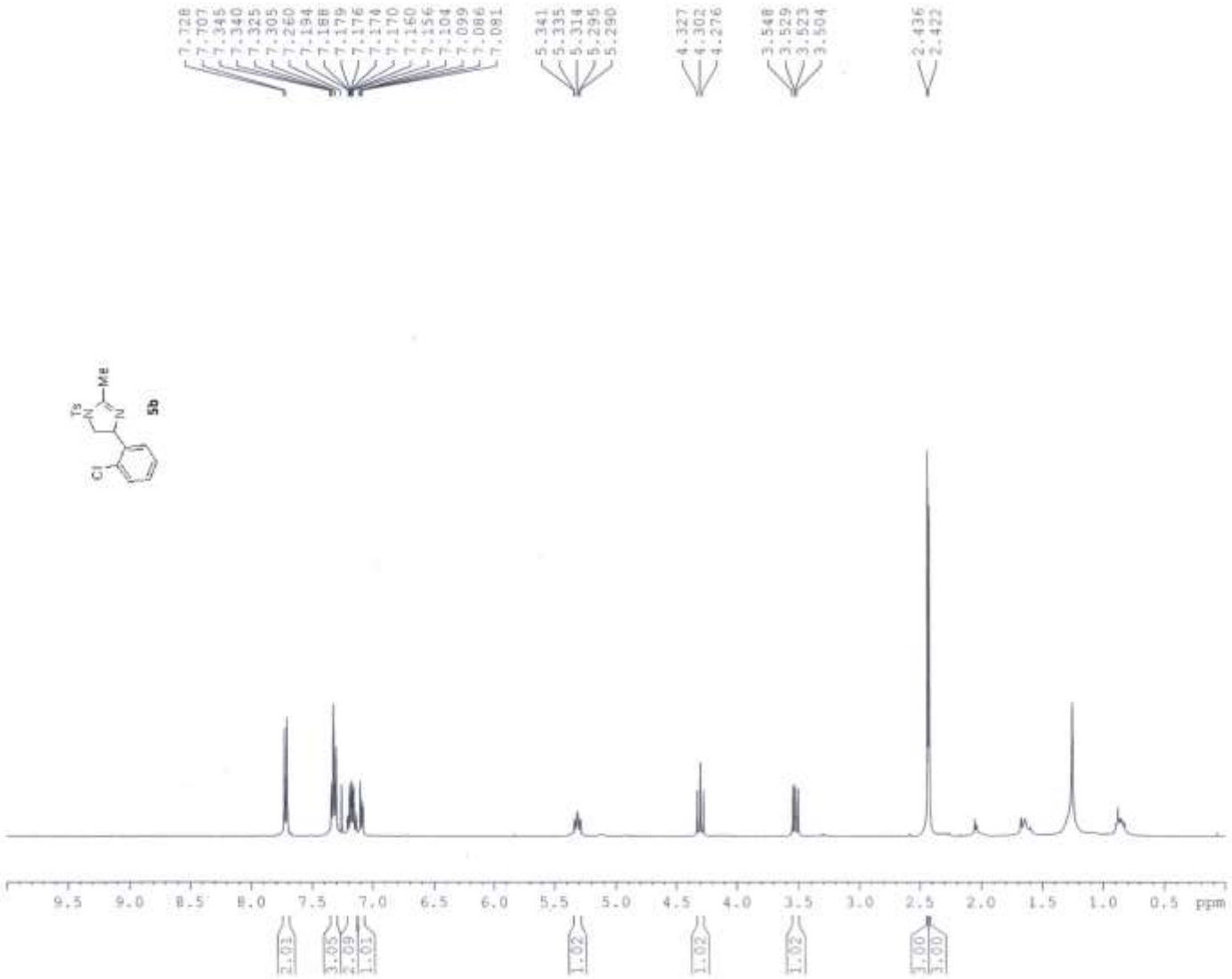
F2 - Acquisition Parameters
Date_          20180707
Time              16.43
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                320
DS                  2
SWH         24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               77.59
DW              20.800 usec
DE               6.50 usec
TE              301.5 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0                 1

======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI               16384
SF         100.6177932 MHz
WDW                EM
SSB       0
LB               1.00 Hz
GB        0
PC               2.00
```

1H of VBAR-278/23



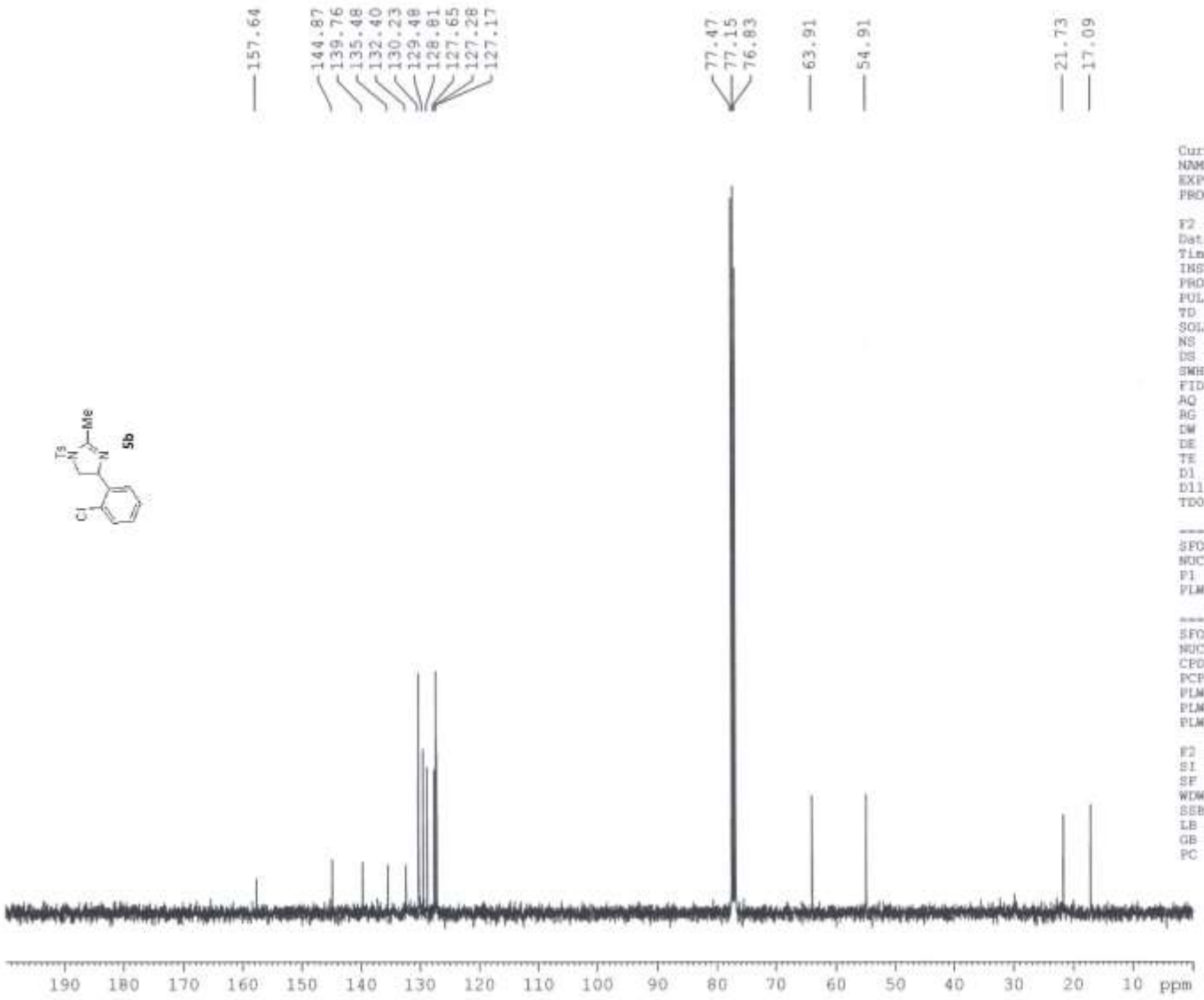
Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 186
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180320
Time 19.06
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 20
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 93.46
DW 60.800 usec
DE 6.50 usec
TE 298.4 K
D1 1.00000000 sec
TDO 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500095 MHz
WDW SM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

13C of VBAR-278/23



BRUKER

```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              190
PROCNO               1

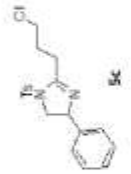
F2 - Acquisition Parameters
Date_          20180320
Time             19.36
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD               32768
SOLVENT          CDCl3
NS                 256
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                93.46
DW               20.800 usec
DE                6.50 usec
TE              298.9 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

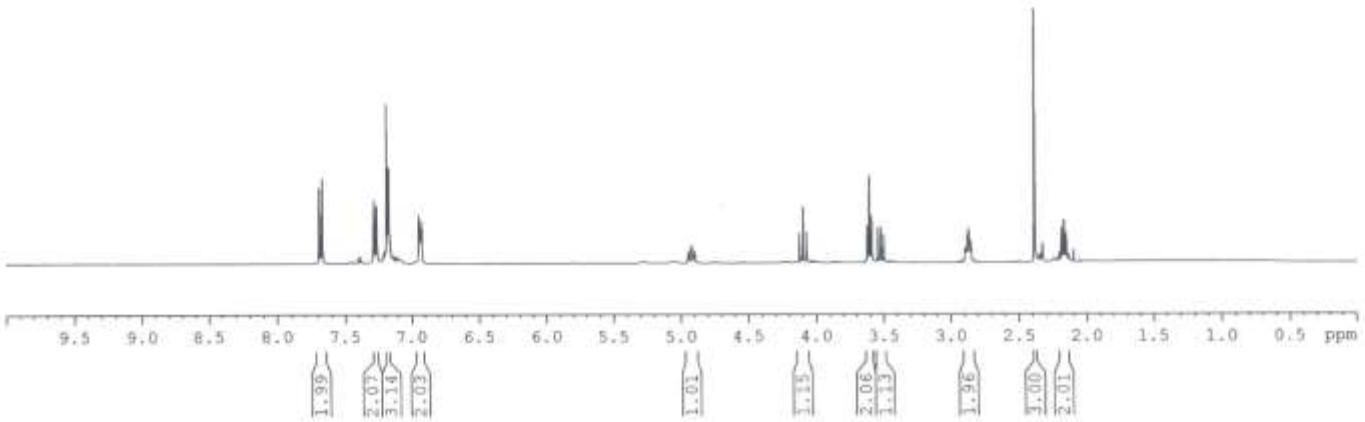
======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1              13C
P1                8.90 usec
PLW1      54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2      12.00000000 W
PLW12      0.32231000 W
PLW13      0.16212000 W

F2 - Processing parameters
SI               16384
SF         100.6177845 MHz
WDW                EM
SSB      0
LB                1.00 Hz
GB       0
PC                1.40
```

1H of VBAR-278/21





BRUKER

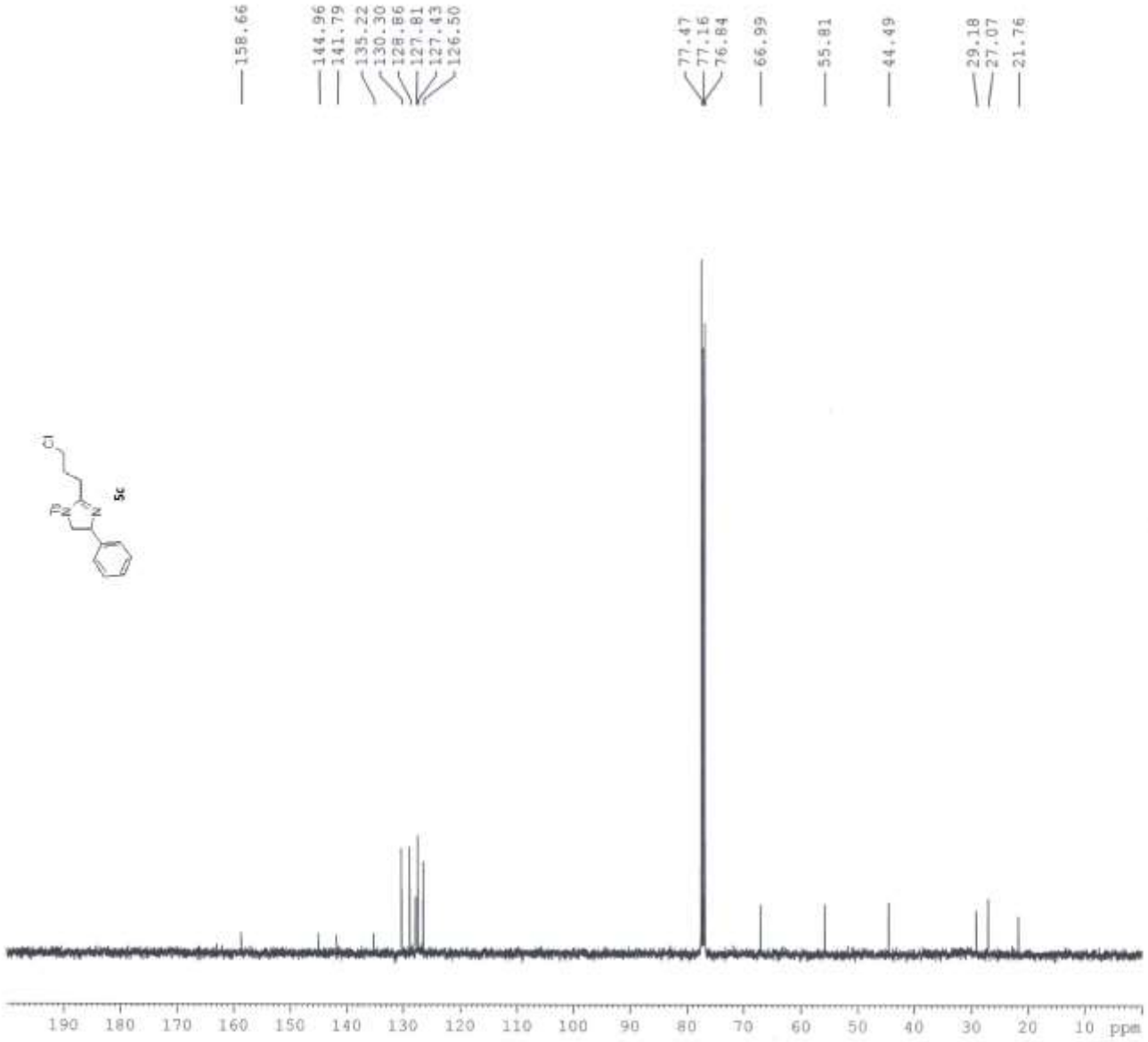
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              211
PROCNO               1

F2 - Acquisition Parameters
Date_          20180324
Time              20.09
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               120.16
DW               60.800 usec
DE                6.50 usec
TE               299.3 K
D1          1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1                1H
P1                14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500373 MHz
WDW                 EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

13C of VBAR 278/21



BRUKER

Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 212
PROCNO 1

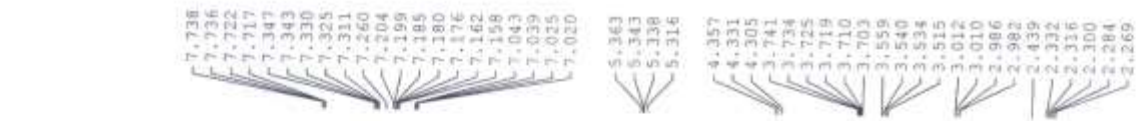
F2 - Acquisition Parameters
Date_ 20180324
Time 20.46
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 299.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

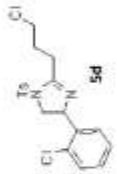
======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

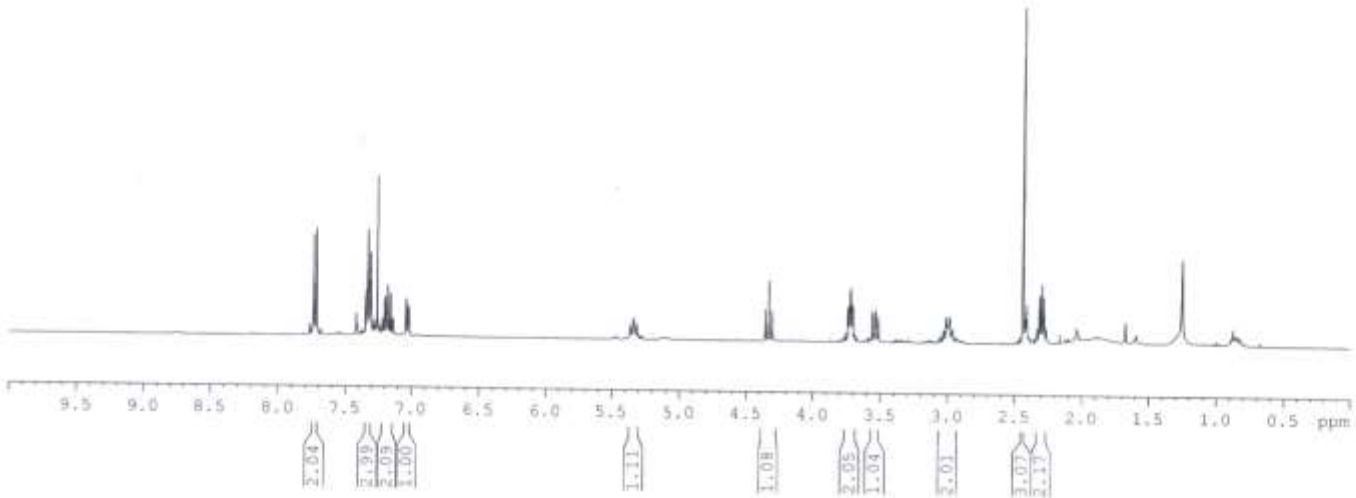
======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177829 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1H of VBAR 278/44







BRUKER

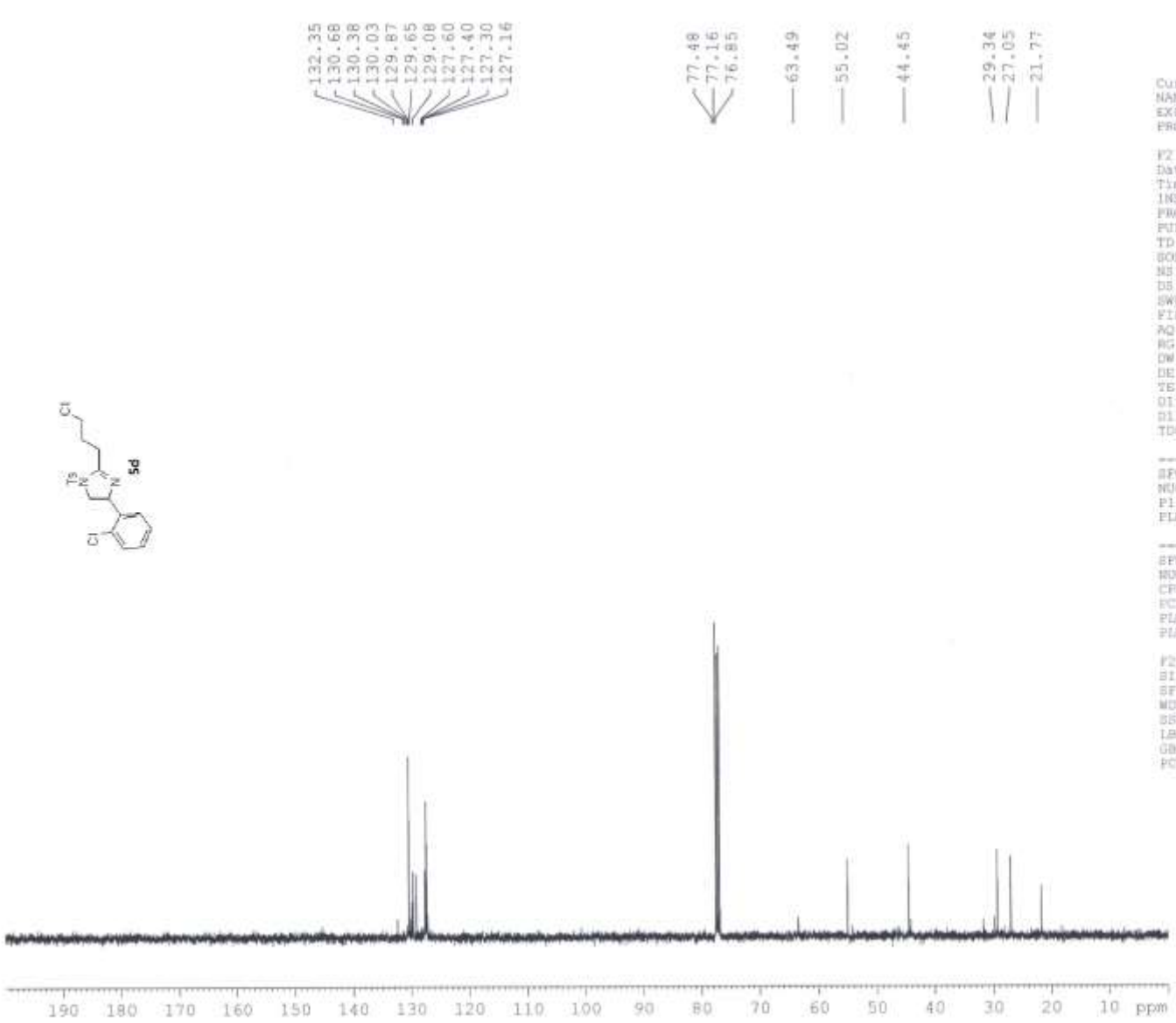
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              345
PROCNO               1

F2 - Acquisition Parameters
Date_          20180428
Time             22.55
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                 16
DS                  1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              168.31
DW              60.800 usec
DE               6.50 usec
TE              298.3 K
D1            1.00000000 sec
TD0                 1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500096 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```

13C of VBAR 278/44



Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 351
PROCNO 1

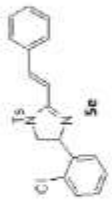
F2 - Acquisition Parameters
Date_ 20180429
Time 19.56
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 640
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 300.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

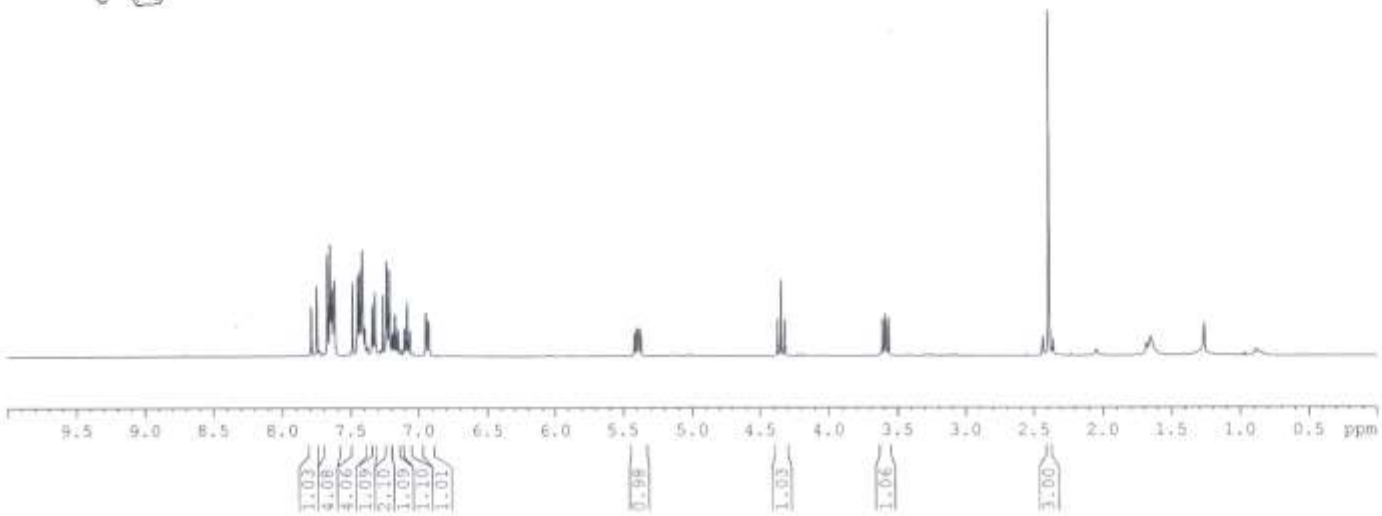
======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W

F2 - Processing parameters
SI 16384
SF 100.6177825 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1H of VBAR-278/58





BRUKER

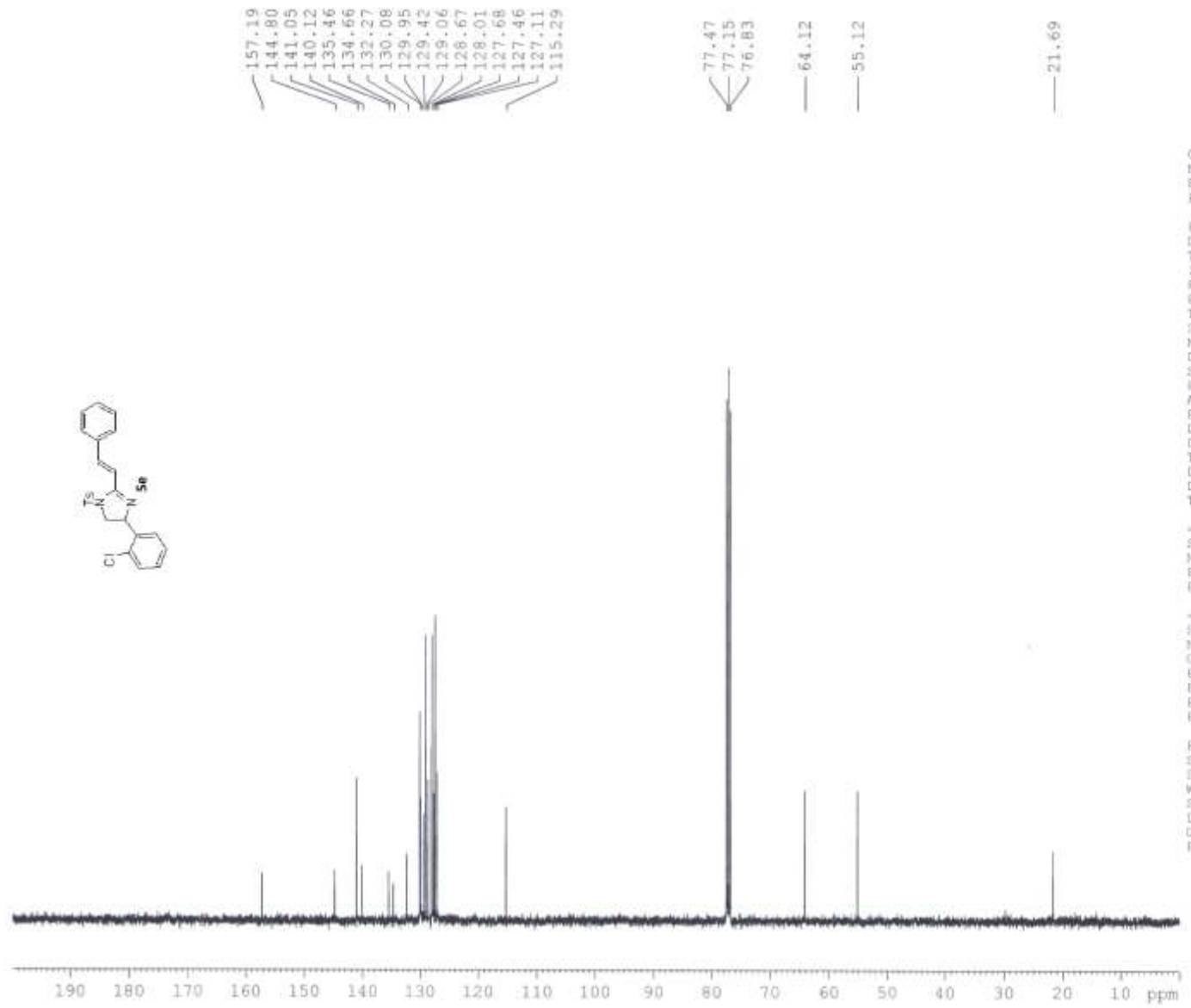
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO                  412
PROCNO                   1

F2 - Acquisition Parameters
Date_           20180519
Time              17.43
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    15
DS                     1
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9922944 sec
RG                 93.46
DW                60.800 usec
DE                 6.50 usec
TE                299.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1                   1H
P1                 14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                 16384
SF          400.1500094 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

13C of VBAR-278/58




```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              413
PROCNO               1

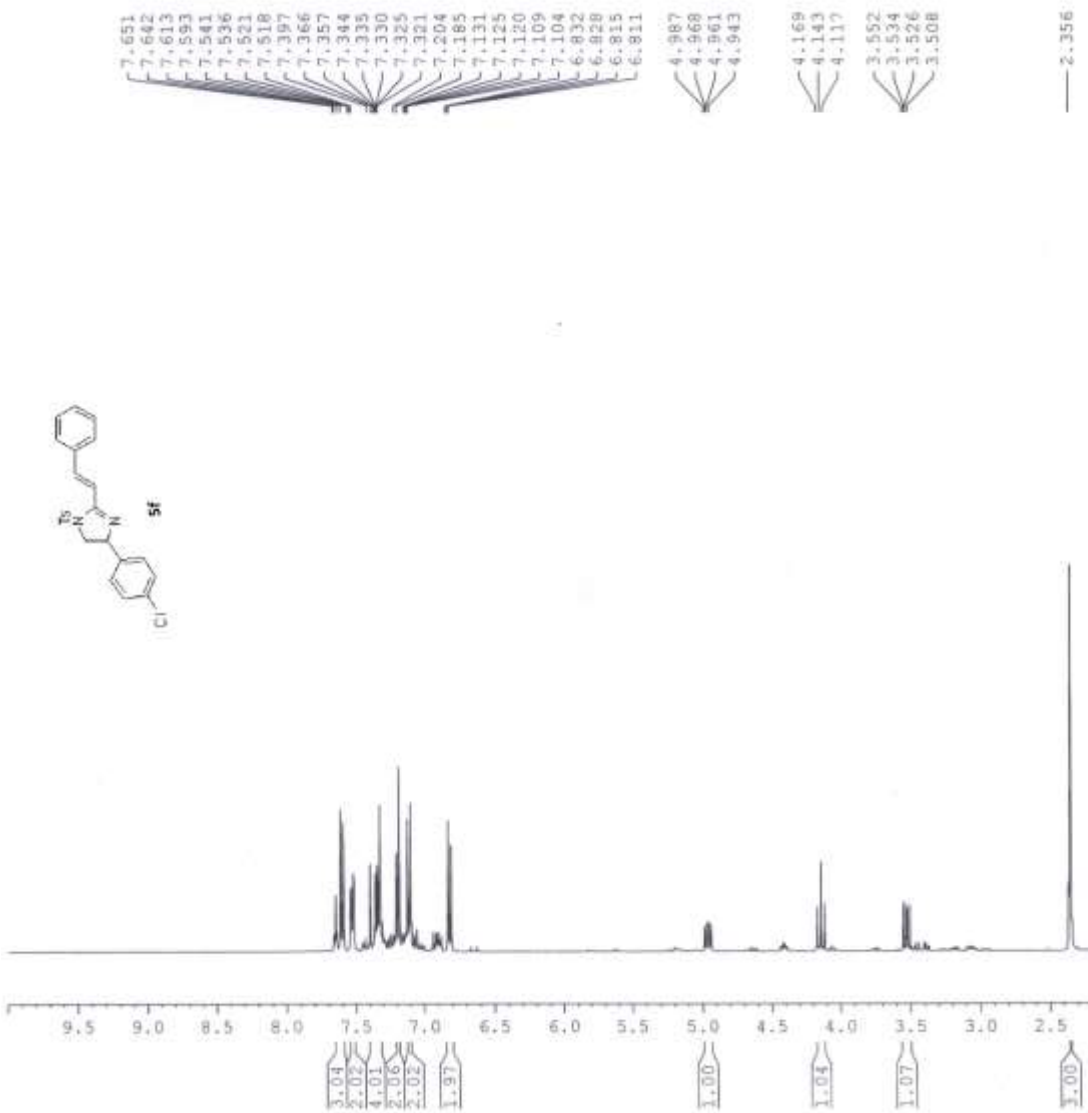
F2 - Acquisition Parameters
Date_          20180519
Time              17.58
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT         CDCl3
NS                264
DS                  2
SWH         24038.461 Hz
FIDRES       0.733596 Hz
AQ           0.6815744 sec
RG              93.46
DW             20.800 usec
DE              6.50 usec
TE             299.8 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0                 1

======== CHANNEL f1 ========
SFO1       100.6278588 MHz
NUC1              13C
P1               8.90 usec
PLW1       54.00000000 W

======== CHANNEL f2 ========
SFO2       400.1516006 MHz
NUC2               1H
CPDPRG[2       waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

F2 - Processing parameters
SI              16384
SF         100.6177958 MHz
WDW                EM
SSB       0
LB              1.00 Hz
GB        0
PC              2.00
```

1H of VBAR-278/73



BRUKER

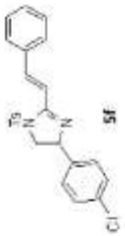
```
Current Data Parameters
NAME      Dr. A MAJEE 2016
EXPNO                 508
PROCNO                  1

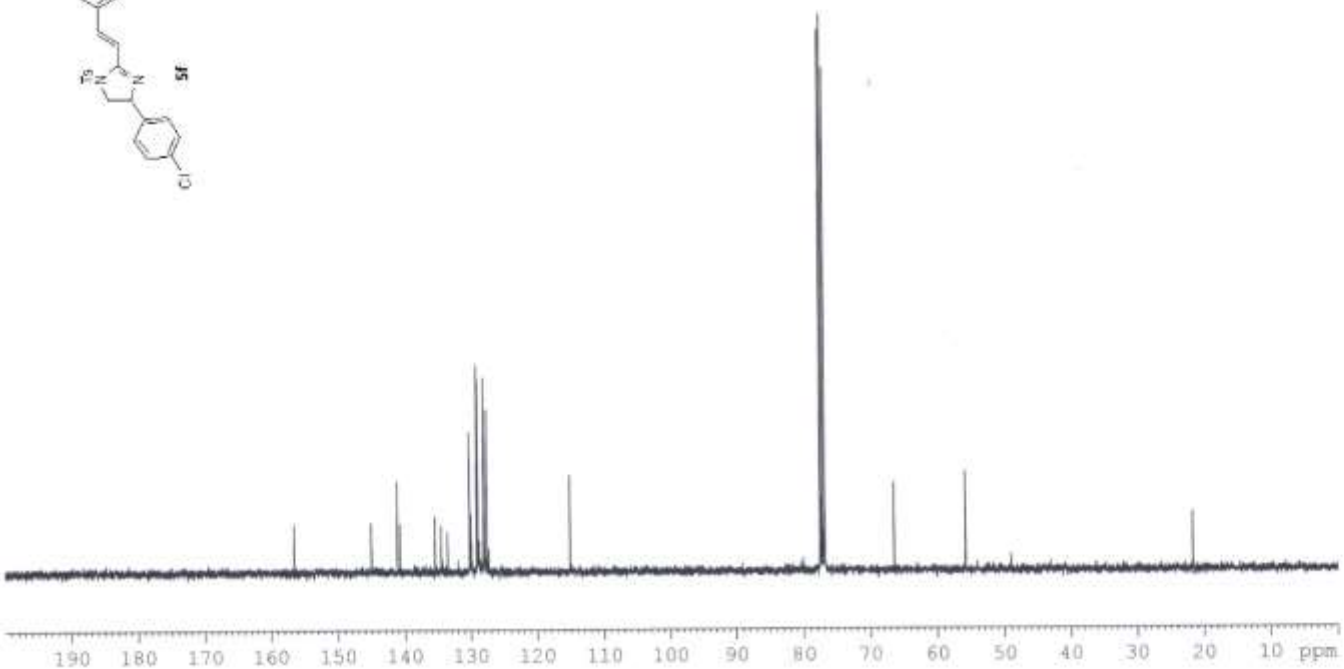
F2 - Acquisition Parameters
Date_           20180620
Time              12.08
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   1
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                87.66
DW               60.800 usec
DE                6.50 usec
TE               300.7 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500393 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

13C of VBAR-278/73





BRUKER

```
Current Data Parameters
NAME        Dr. A MAJEE 2018
EXPNO                  509
PROCNO                   1

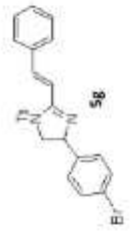
F2 - Acquisition Parameters
Date_           20180620
Time               12.32
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                32768
SOLVENT           CDCl3
NS                  424
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ            0.6815744 sec
RG                186.42
DW               20.800 usec
DE                6.50 usec
TE               301.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

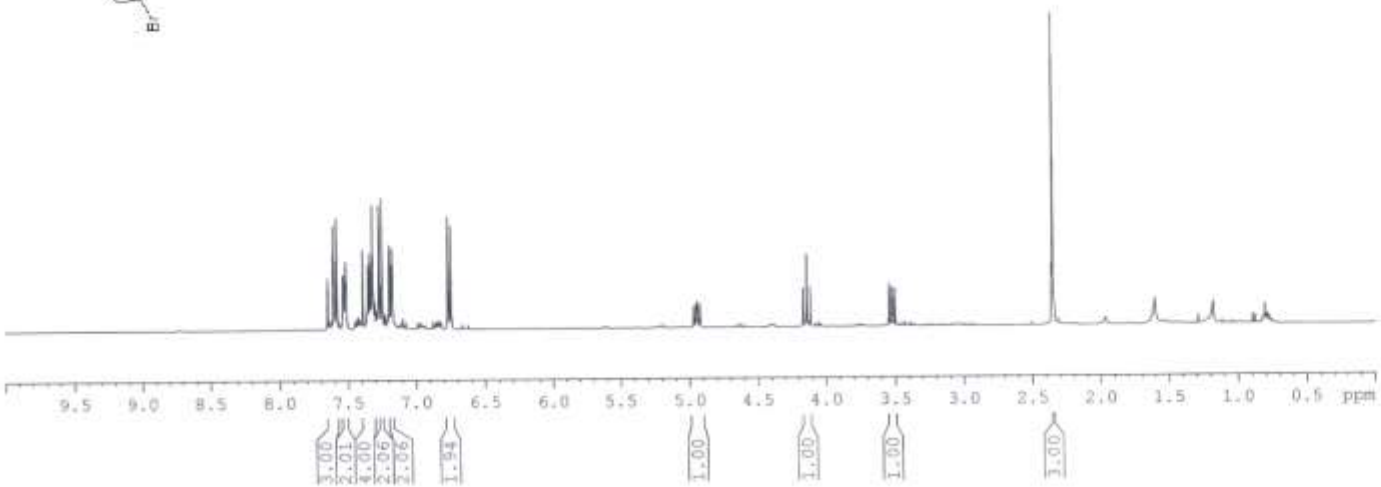
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1                13C
P1                 8.90 usec
PLW1        54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2                1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI                 16384
SF          100.6177844 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 2.00
```

1H of VBAR-278/74





BRUKER

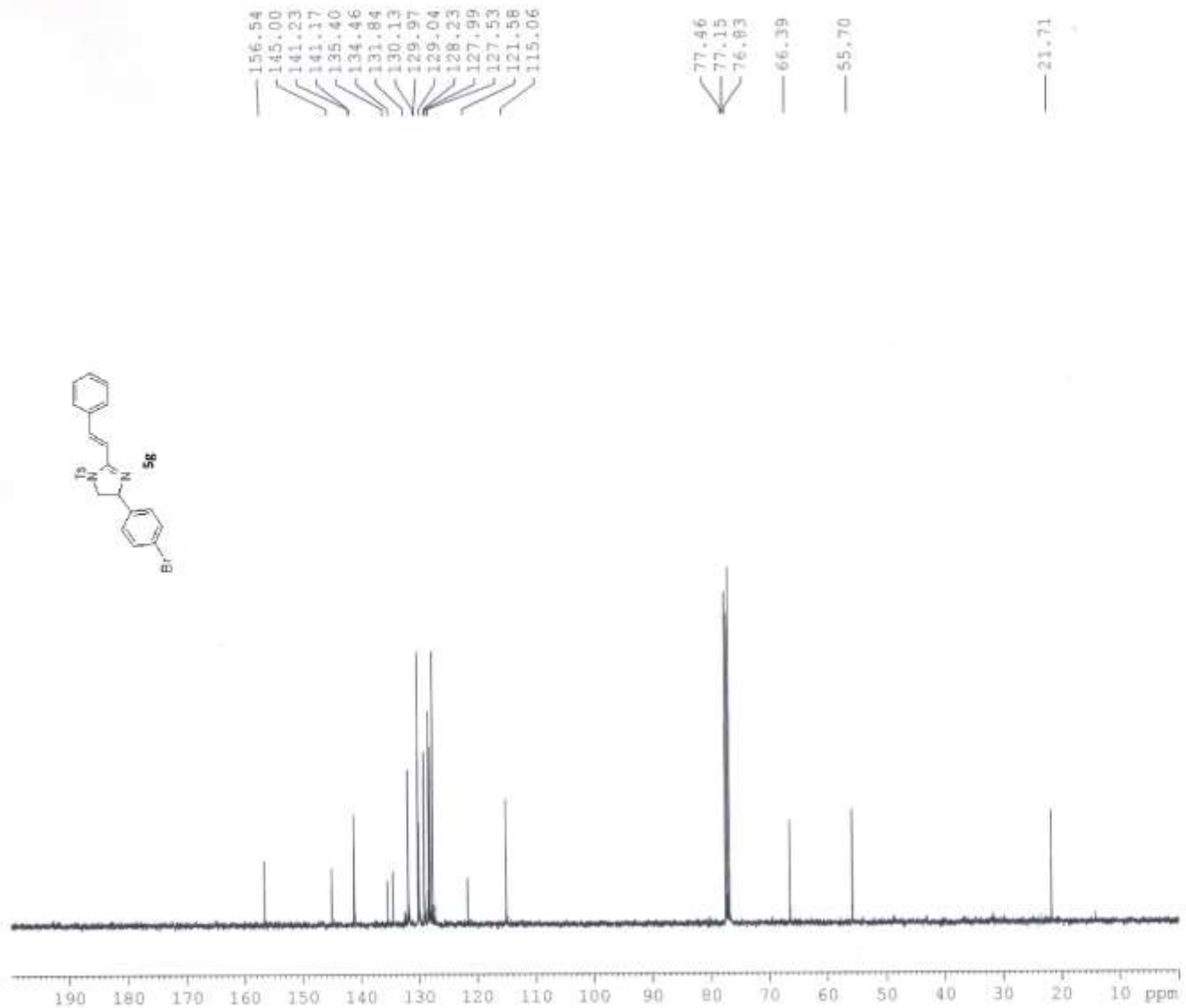
```
Current Data Parameters
NAME      Dr. A MAJEE 2018
EXPNO              510
PROCNO               1

F2 - Acquisition Parameters
Date_          20180620
Time              12.41
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               87.66
DW              60.800 usec
DE               6.50 usec
TE              300.8 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1              1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500412 MHz
WDW                 EM
SSB      0
LB              0.30 Hz
GB       0
PC                1.00
```

13C of VBAR-278/74



Current Data Parameters
NAME Dr. A MAJEE 2018
EXPNO 511
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180620
Time 13.02
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 400
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 106.66
DW 20.800 usec
DE 6.50 usec
TE 301.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177873 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 2.00