

Supplementary Materials

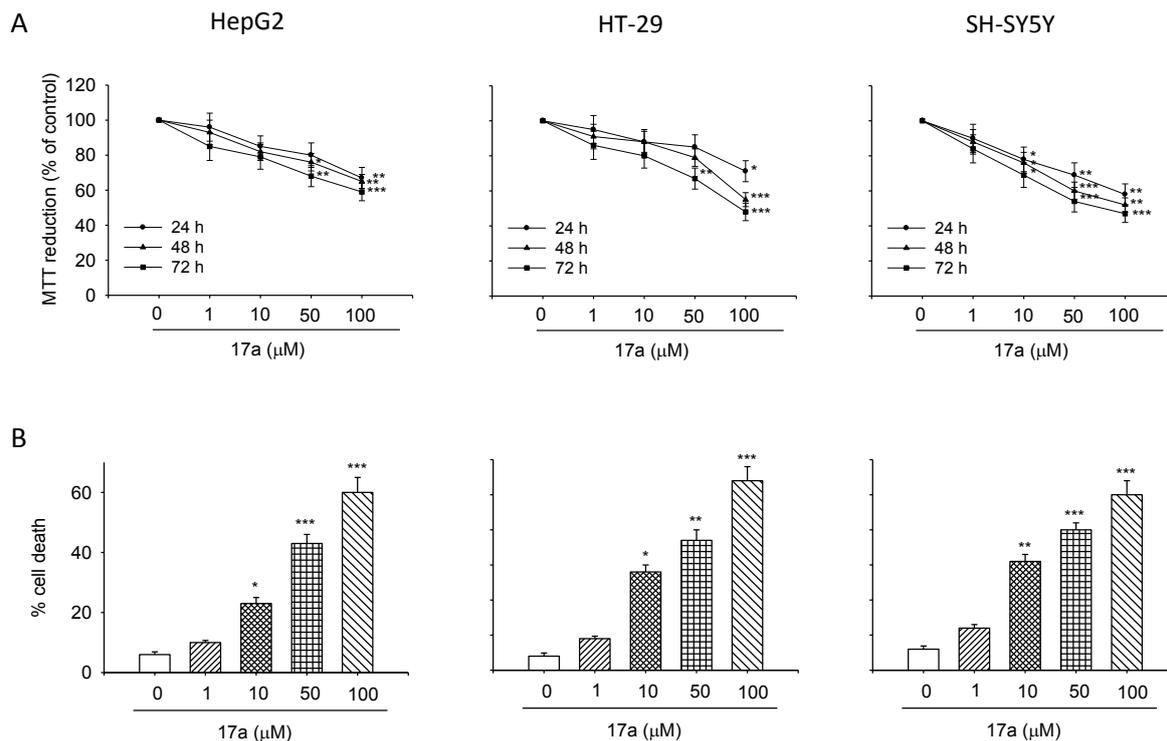


Figure S1. Effect of **17a** compound on cell growth and viability. **(A)** The HepG-2, HT-29 and SH-SY5Y cells were exposed to increased concentration of **17a** compound at the indicated concentrations for 24, 48 and 72 h. Cell proliferation was assessed by the MTT assay. Results are expressed as percentages of growth rates of treated cells compared to control cultures. **(B)** The cells were treated with the **17a** compound at concentrations ranging from 1 to 100 μM for 24 h. Then, cytotoxic effect was evaluated in terms of cell death by the trypan blue test, and was reported as the percentage of stained (non viable) vs. total cells counted. Each value is the mean ± S.E.M. of three experiments. * $p < 0.05$ vs. ctrl, ** $p < 0.01$ vs. ctrl, *** $p < 0.001$ vs. ctrl.

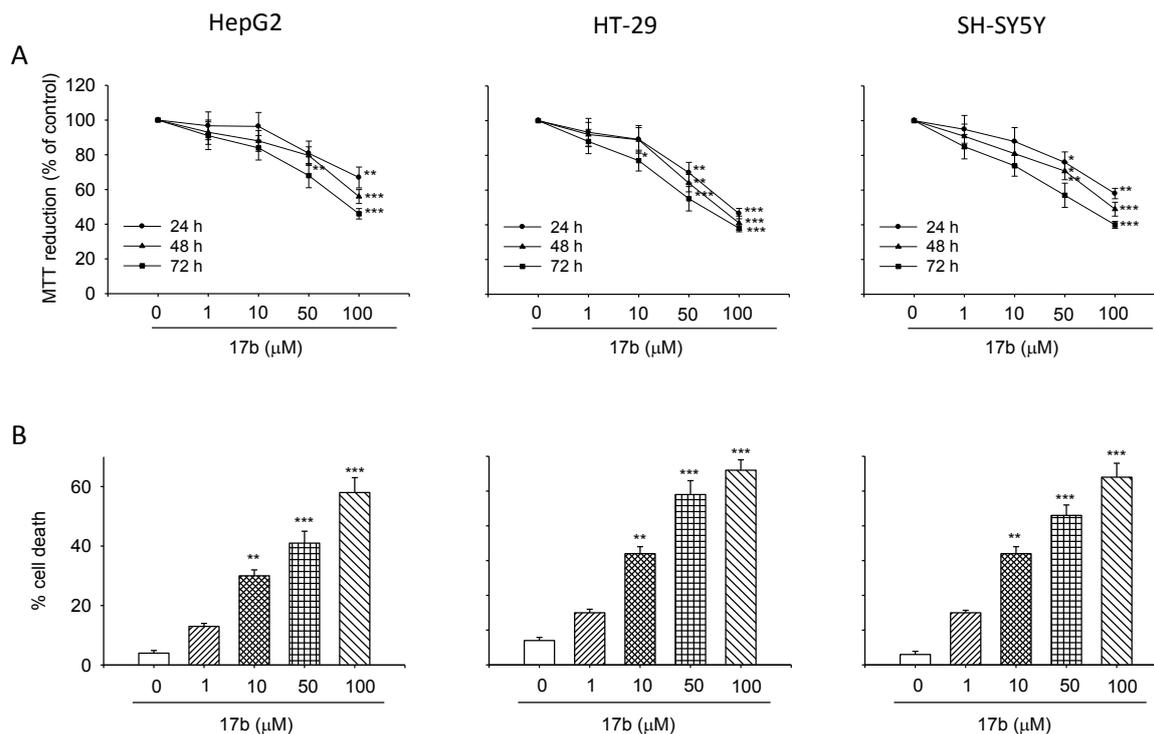


Figure S2. The compound 17b reduces both cell growth and viability. Results of MTT (A) and trypan blue (B) assays. * $p < 0.05$ vs. ctrl, ** $p < 0.01$ vs. ctrl, *** $p < 0.001$ vs. ctrl.

Chemistry

General Click Chemistry Procedure

To a solution of 3-butyn-1-ol **10** (1.2 equiv.) in *tert*-BuOH (40 mL) and H₂O (40 mL), CuSO₄·5H₂O (0.25 equiv.), sodium ascorbate (0.5 equiv.), aryl/alkyl azide **9** (1.1 equiv.) and triethylamine (1.0 equiv.) were added. The mixture was stirred at r.t. under N₂ for 4 h, and then concentrated *in vacuo*. The residue was extracted with CH₂Cl₂ (3 × 30 mL). The organic layer was dried over MgSO₄, filtered, and concentrated under reduced pressure. The obtained triazoles were used for the next reaction without further purification.

General Tosylation Procedure

To a solution of **9a** (2.0 g, 10.57 mmol) and TEA (3.24 mL, 23.25 mmol) in DCM (40 mL), tosyl chloride (2.42 g, 12.68 mmol) was added and the resulting mixture was stirred at r.t. for 12 h. Then, the mixture was diluted with water and extracted with ethyl acetate (3 × 30 mL). The organic layer was dried over MgSO₄, filtered and concentrated at reduced pressure. The crude product was purified via flash column chromatography (7:3 cyclohexane/ethyl acetate) to yield 3.08 g (85%) of **11a** as white powder, mp = 130–132 °C.

2-(1-Phenyl-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzenesulphonate (11a): ¹H-NMR (500 MHz, CDCl₃): δ = 7.80 (s, 1H), 7.75–7.71 (m, 2H), 7.70–7.66 (m, 2H), 7.55–7.49 (m, 2H), 7.47–7.40 (m, 1H), 7.32–7.27 (m, 2H), 4.36 (t, *J* = 6.4, 2H), 3.17 (t, *J* = 6.4, 2H), 2.39 (s, 3H). ¹³C-NMR (126 MHz, CDCl₃) δ = 145.10, 143.67, 137.09, 132.86, 130.01, 129.87, 128.85, 127.95, 120.52, 120.34, 69.13, 26.04, 21.72. Anal. Calcd for C₁₇H₁₇N₃O₃S: C, 59.46; H, 4.99; N, 12.24; found: C, 59.50; H, 5.05; N, 12.31.

2-(1-Benzyl-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzenesulphonate (11b): Compound 11b was prepared by the general tosylation procedure in 87% yield as yellow oil. ¹H-NMR (500 MHz, CDCl₃) δ = 7.72–7.51 (m, 3H), 7.38–7.26 (m, 6H), 7.06 (d, *J* = 7.8 Hz, 1H), 5.45 (s, 2H), 4.24 (t, *J* = 6.6 Hz, 2H), 3.04 (t, *J* = 6.6 Hz, 2H), 2.41 (s, 3H). ¹³C-NMR (126 MHz, CDCl₃) δ = 145.01, 13.61, 134.71, 130.19, 129.96, 129.30, 129.18, 129.05, 128.82, 128.28, 128.09, 127.91, 125.88, 69.02, 54.17, 25.93, 21.33. Anal. Calcd for C₁₈H₁₉N₃O₃S: C, 60.49; H, 5.36; N, 11.76; found C, 60.55; H, 5.41; N, 11.81.

2-(1-(pyridin-2-yl-methyl)-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzenesulphonate (11c): Compound 11c was prepared by the general tosylation procedure in 82% yield as yellow oil. ¹H-NMR (500 MHz, CDCl₃) δ = 8.57 (d, *J* = 4.3 Hz, 1H), 7.67–7.64 (m, 1H), 7.54 (s, 1H), 7.29–7.23 (m, 3H), 7.14 (d, *J* = 7.8 Hz, 1H), 7.02 (d, *J* = 7.9 Hz, 2H), 5.59 (s, 2H), 4.26 (t, *J* = 6.6 Hz, 2H), 3.06 (t, *J* = 6.6 Hz, 2H), 2.41 (s, 3H). ¹³C-NMR (126 MHz, CDCl₃) δ = 154.43, 149.77, 145.01, 139.57, 137.54, 129.97, 128.80, 127.94, 125.86, 123.54, 122.83, 69.03, 55.54, 25.96, 21.72. Anal. Calcd for C₁₇H₁₈N₄O₃S: C, 56.97; H, 5.06; N, 15.63; found: C, 57.01; H, 5.11; N, 15.70.

2-(1-(4-Chloro-3-(trifluoromethyl)phenyl)-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzenesulphonate (11d): Compound 11d was prepared by the general tosylation procedure in 88% yield as yellow oil. ¹H-NMR (500 MHz, CDCl₃) δ = 8.05 (d, *J* = 2.6 Hz, 1H), 7.89 (s, 1H), 7.85 (dd, *J* = 8.7, 2.6 Hz, 1H), 7.74 (d, *J* = 8.3 Hz, 2H), 7.68 (d, *J* = 8.6 Hz, 1H), 7.31 (d, *J* = 8.1 Hz, 2H), 4.36 (t, *J* = 6.2 Hz, 2H), 3.18 (t, *J* = 6.2 Hz, 2H), 2.41 (s, 3H). ¹³C-NMR (126 MHz, CDCl₃) δ = 145.26, 135.55, 133.14, 132.80, 132.51, 130.06, 129.95, 128.68, 127.96, 125.27, 124.29, 119.61 (q, *J* = 5.5 Hz), 68.85, 26.02, 21.73; anal calcd for C₁₈H₁₅ClF₃N₃O₃S: C, 48.49; H, 3.39; N, 9.42; found: C, 48.55; H, 3.46; N, 9.49.

2-(1-(4-Methoxyphenyl)-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzenesulphonate (11e): Compound 11e was prepared by the general tosylation procedure in 81% yield as yellow solid, mp = 84–86 °C. ¹H-NMR (500 MHz, CDCl₃) δ = 7.74 (s, 1H), 7.73–7.71 (m, 2H), 7.57 (d, *J* = 8.9 Hz, 2H), 7.32–7.27 (m, 2H), 7.01 (d, *J* = 8.8 Hz, 2H), 4.34 (t, *J* = 6.4 Hz, 2H), 3.86 (s, 3H), 3.15 (t, *J* = 6.4, 2H), 2.40 (s, 3H). ¹³C-NMR (126 MHz, CDCl₃) δ = 159.91, 145.09, 143.41, 132.86, 130.57, 130.01, 127.96, 122.16, 120.51, 114.88, 69.18, 55.76, 26.04, 21.74. Anal. Calcd for C₁₈H₁₉N₃O₄S: C, 57.89; H, 5.13; N, 11.25; found: C, 57.93; H, 5.18; N, 11.31.

2-(1-(4-Fluorophenyl)-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzenesulphonate (11f): Compound 11f was prepared by the general tosylation procedure in 80% yield as yellow solid, mp = 92–94 °C. ¹H-NMR (500 MHz, CDCl₃) δ = 7.78 (s, 1H), 7.74 (d, *J* = 8.2 Hz, 2H), 7.70–7.63 (m, 2H), 7.30 (d, *J* = 8.2 Hz, 2H), 7.21 (t, *J* = 8.5 Hz, 2H), 4.35 (t, *J* = 6.3 Hz, 2H), 3.17 (t, *J* = 6.3 Hz, 2H), 2.40 (s, 3H). ¹³C-NMR

(126 MHz, CDCl₃) δ = 163.49, 161.51, 146.14, 143.83, 132.84, 130.03, 127.96, 122.52 (d, J = 8.6 Hz), 120.56, 116.83 (d, J = 23.3 Hz), 69.06, 26.03, 21.74. Anal. Calcd for: C₁₇H₁₆FN₃O₃S: C, 56.50; H, 4.46; N, 11.63; found: C, 56.58; H, 4.52; N, 11.69.

2-(1-(Naphthalen-2-yl-metyl)-1H-1,2,3-triazol-4-yl)ethyl 4-methylbenzensulphonate (11g): Compound 11g was prepared by the general tosylation procedure in 89% yield as white solid, mp = 114–116 °C. ¹H-NMR (500 MHz, CDCl₃) δ = 7.87–7.80 (m, 3H), 7.74 (s, 1H), 7.67 (d, J = 8.2 Hz, 2H), 7.52 (dd, J = 6.1, 3.3 Hz, 2H), 7.36–7.31 (m, J = 5.3, 2H), 7.21 (d, J = 8.1 Hz, 2H), 5.63 (s, 2H), 4.26 (t, J = 6.6 Hz, 2H), 3.06 (t, J = 6.6 Hz, 2H), 2.38 (s, 3H). ¹³C-NMR (126 MHz, CDCl₃) δ = 145.00, 143.37, 133.34, 133.30, 132.82, 132.10, 129.95, 129.27, 128.09, 127.92, 127.48, 126.89, 126.87, 125.42, 122.14, 69.01, 54.43, 26.03, 21.71. Anal. Calcd for C₂₂H₂₁N₃O₃S: C, 64.85; H, 5.19; N, 10.31; found: C, 64.91; H, 5.23; N, 10.38.

General Elimination Procedure

To a solution of 11a (1.0 g, 2.91 mmol) in *tert*-BuOH (20 mL), *tert*-BuOK (0.49 g, 4.36 mmol) was added and the resulting mixture was stirred at 40 °C for 12 h. The mixture was diluted with water and extracted with DCM (3 × 10 mL). The organic layer was dried over MgSO₄, filtered and concentrated at reduced pressure to yield 438 mg (88%) of 12a as white solid, mp = 75–77 °C.

1-phenyl-4-vinyl-1H-1,2,3-triazole (12a): ¹H-NMR (500 MHz, CDCl₃) δ = 7.95 (s, 1H), 7.70–7.66 (m, 2H), 7.50–7.44 (m, 2H), 7.41–7.36 (m, 1H), 6.75 (dd, J = 17.7, 11.2 Hz, 1H), 5.97 (dd, J = 17.7, 1.2 Hz, 1H), 5.37 (dd, J = 11.2, 1.2 Hz, 1H). ¹³C-NMR (126 MHz, CDCl₃) δ = 146.90, 136.91, 129.74, 128.72, 125.27, 120.41, 118.39, 116.77. Anal. Calcd for C₁₀H₉N₃: C, 70.16; H, 5.30; N, 24.54; found: C, 70.21; H, 5.39; N, 24.59.

1-benzyl-4-vinyl-1H-1,2,3-triazole (12b): Compound 12b was prepared by the general elimination procedure in 85% yield as colorless oil. ¹H-NMR (500 MHz, CDCl₃) δ = 7.41 (s, 1H), 7.37–7.30 (m, 3H), 7.29–7.23 (m, 2H), 6.67 (dd, J = 17.8, 11.2 Hz, 1H), 5.85 (dd, J = 17.8, 1.3 Hz, 1H), 5.50 (s, 2H), 5.31 (dd, J = 11.2, 1.3 Hz, 1H). ¹³C-NMR (126 MHz, CDCl₃) δ = 146.90, 134.74, 129.23, 128.87, 128.15, 125.71, 120.20, 116.24, 54.21. Anal. Calcd for C₁₁H₁₁N₃: C, 71.33; H, 5.99; N, 22.69; found: C, 71.39; H, 6.05; N, 22.73.

2-((4-vinyl-1H-1,2,3-triazol-1-yl)methyl)pyridine (12c): Compound 12c was prepared by the general elimination procedure in 78% yield as yellow oil. ¹H-NMR (500 MHz, CDCl₃) δ = 8.58–8.48 (m, 1H), 7.66 (s, 1H), 7.66–7.60 (m, 1H), 7.23–7.19 (m, 1H), 7.14 (dd, J = 7.8, 0.9 Hz, 1H), 6.66 (ddd, J = 17.7, 11.2, 1.2 Hz, 1H), 5.84 (dt, J = 17.8, 1.2 Hz, 1H), 5.58 (s, 2H), 5.28 (dt, J = 11.2, 1.2 Hz, 1H). ¹³C-NMR (126 MHz, CDCl₃) δ = 154.41, 149.74, 146.76, 137.42, 125.56, 123.47, 122.45, 120.93, 116.23, 55.54. Anal. Calcd for C₁₀H₁₀N₄: C, 64.50; H, 5.41; N, 30.09; found: C, 64.56; H, 5.46; N, 30.13.

1-(4-Chloro-3-(trifluoromethyl)phenyl)-4-vinyl-1H-1,2,3-triazole (12d): Compound 12d was prepared by the general elimination procedure in 82% yield as white solid, mp = 108–110 °C. ¹H-NMR (500 MHz, CDCl₃) δ = 8.08 (d, J = 2.6 Hz, 1H), 7.97 (s, 1H), 7.91 (dd, J = 8.7, 2.6 Hz, 1H), 7.69 (d,

$J = 8.7$ Hz, 1H), 6.78 (dd, $J = 17.7, 11.2$ Hz, 1H), 6.05 (dd, $J = 17.7, 1.1$ Hz, 1H), 5.47 (dd, $J = 11.2, 1.1$ Hz, 1H). $^{13}\text{C-NMR}$ (126 MHz, CDCl_3) $\delta = 147.68, 135.78, 133.17, 129.90, 127.72, 124.89, 124.34, 119.35$ (q, $J = 5.5$ Hz), 118.01, 117.87. Anal. Calcd for $\text{C}_{11}\text{H}_7\text{ClF}_3\text{N}_3$: C, 48.28; H, 2.58; N, 15.36; found: C, 48.32; H, 2.64; N, 15.39.

1-(4-Methoxyphenyl)-4-vinyl-1H-1,2,3-triazole (12e): Compound 12e was prepared by the general elimination procedure in 85% yield as white solid, mp = 77–79 °C. $^1\text{H-NMR}$ (500 MHz, CDCl_3) $\delta = 7.85$ (s, 1H), 7.61 (d, $J = 9.1$ Hz, 2H), 7.00 (d, $J = 9.1$ Hz, 2H), 6.77 (dd, $J = 17.7, 11.2$ Hz, 1H), 5.97 (dd, $J = 17.7, 1.2$ Hz, 1H), 5.39 (dd, $J = 11.2, 1.2$ Hz, 1H), 3.85 (s, 3H). $^{13}\text{C-NMR}$ (126 MHz, CDCl_3) $\delta = 159.92, 146.88, 130.55, 125.56, 122.24, 118.56, 116.62, 114.88, 55.75$. Anal. Calcd for $\text{C}_{11}\text{H}_{11}\text{N}_3\text{O}$: C, 65.66; H, 5.51; N, 20.88; found: C, 65.69; H, 5.58; N, 20.92.

1-(4-fluorophenyl)-4-vinyl-1H-1,2,3-triazole (12f): Compound 12f was prepared by the general elimination procedure in 81% yield as white solid, mp = 113–115 °C. $^1\text{H-NMR}$ (500 MHz, CDCl_3) $\delta = 7.90$ (s, 1H), 7.72–7.66 (m, 2H), 7.23–7.18 (m, 2H), 6.76 (ddd, $J = 17.6, 11.2, 3.1$ Hz, 1H), 6.00 (dd, $J = 17.7, 2.1$ Hz, 1H), 5.41 (dd, $J = 11.2, 3.1$ Hz, 1H). $^{13}\text{C-NMR}$ (126 MHz, CDCl_3) $\delta = 161.49, 147.14, 133.32, 129.64, 125.22, 122.53$ (d, $J = 8.6$ Hz), 118.54, 117.09, 116.79 (d, $J = 23.3$ Hz). Anal. Calcd for $\text{C}_{10}\text{H}_8\text{FN}_3$: C, 63.49; H, 4.26; N, 22.21; found: C, 63.52; H, 4.29; N, 22.27.

1-(Naphthalen-2-yl-methyl)-4-vinyl-1H-1,2,3-triazole (12g): Compound 12g was prepared by the general elimination procedure in 90% yield as white solid, mp = 86–88 °C. $^1\text{H-NMR}$ (500 MHz, CDCl_3) $\delta = 8.01$ –7.94 (m, 3H), 7.71 (s, 1H), 7.50 (dd, $J = 6.1, 3.2$, 2H), 7.44 (s, 1H), 7.32 (d, $J = 8.3$ Hz, 1H), 6.68 (dd, $J = 17.7, 11.2$ Hz, 1H), 5.85 (d, $J = 17.7$ Hz, 1H), 5.62 (s, 2H), 5.30 (d, $J = 11.2$ Hz, 1H). $^{13}\text{C-NMR}$ (126 MHz, CDCl_3) $\delta = 146.85, 133.23, 133.20, 132.04, 129.18, 127.96, 127.82, 127.36, 126.78, 126.76, 125.64, 125.34, 120.32, 116.20, 54.28$. Anal. Calcd for $\text{C}_{15}\text{H}_{13}\text{N}_3$: C, 76.57; H, 5.57; N, 17.86; found: C, 76.61; H, 5.63; N, 17.89.

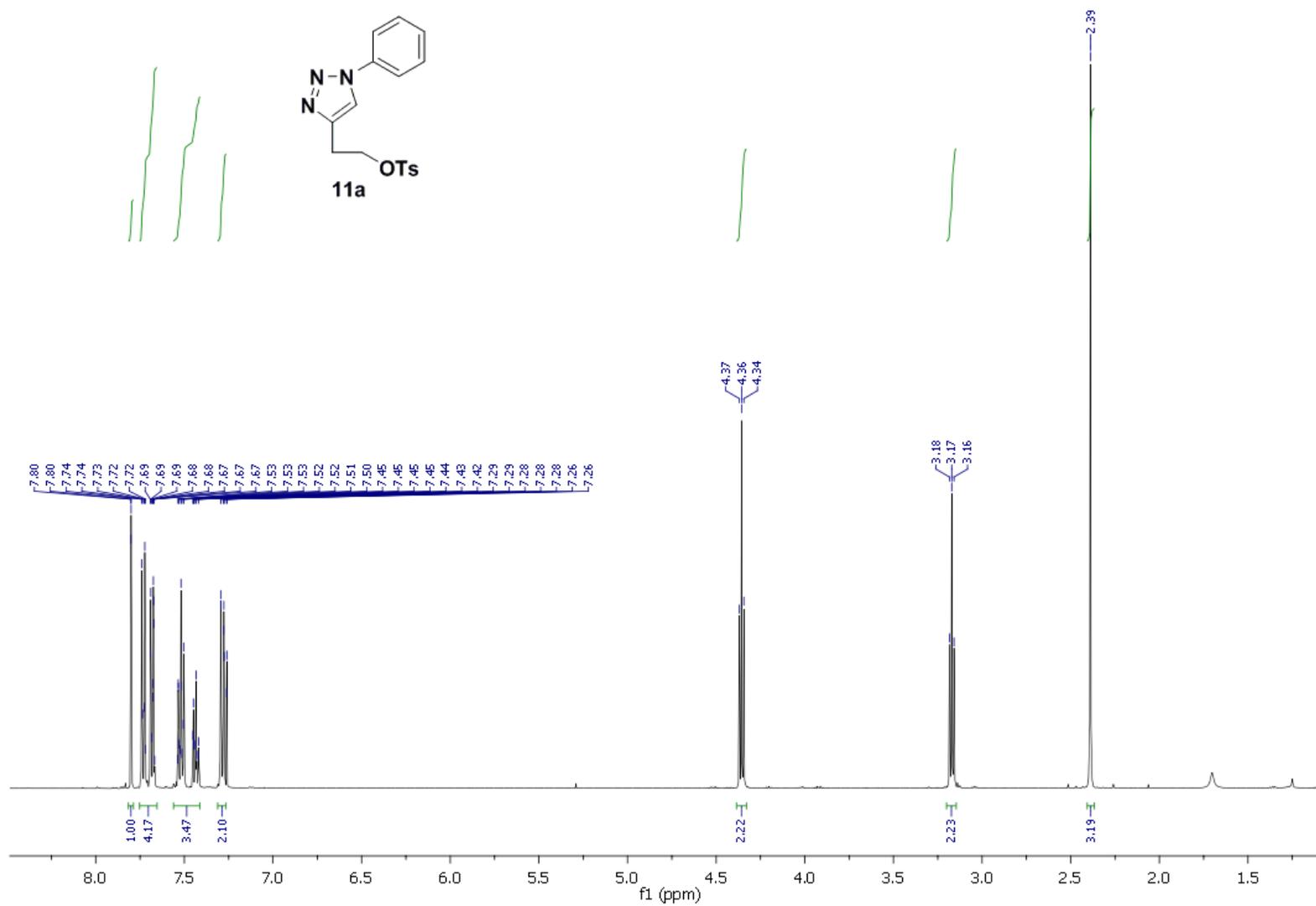


Figure S3. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **11a**.

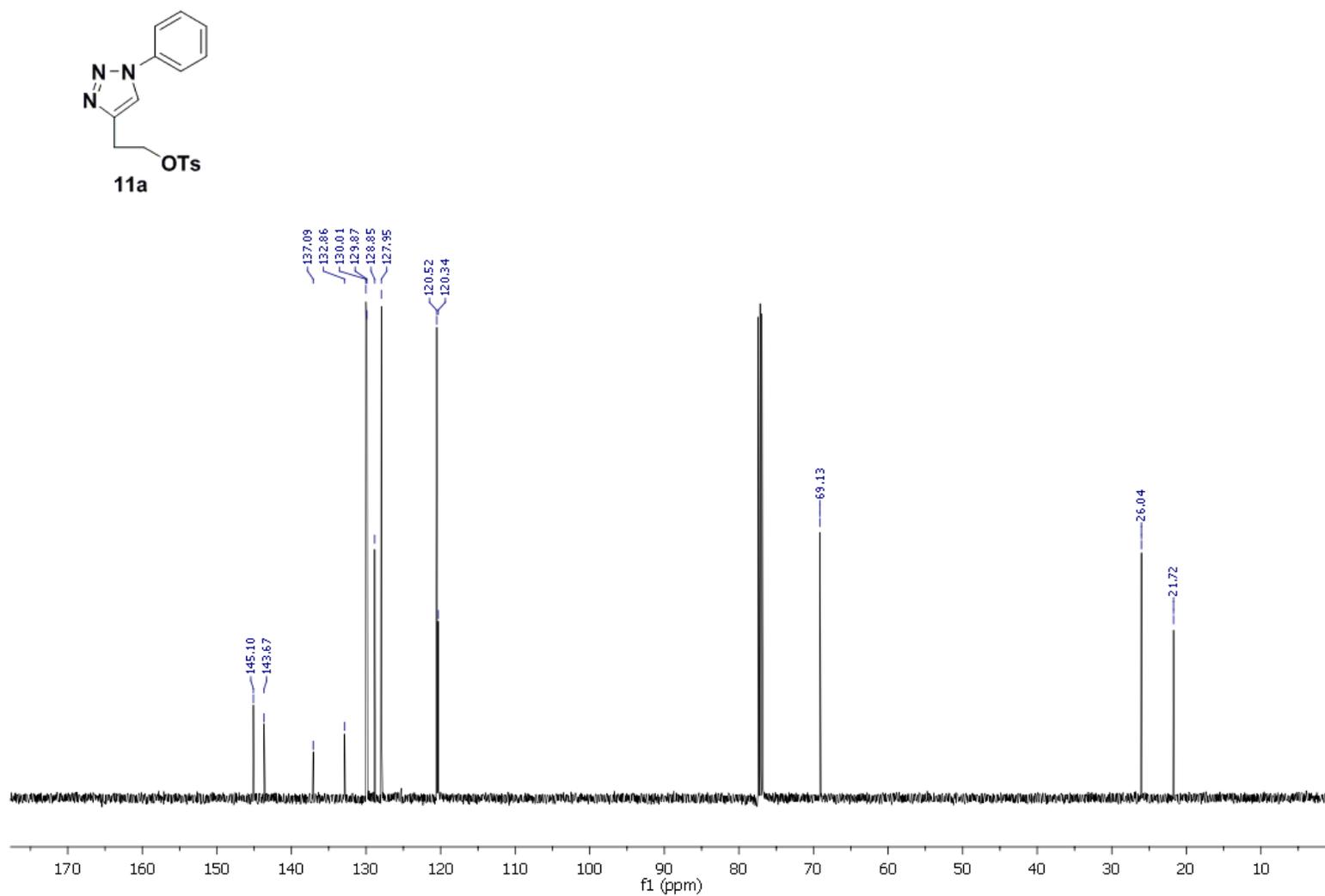


Figure S4. ^{13}C -NMR (125 MHz, CDCl_3) of compound 11a.

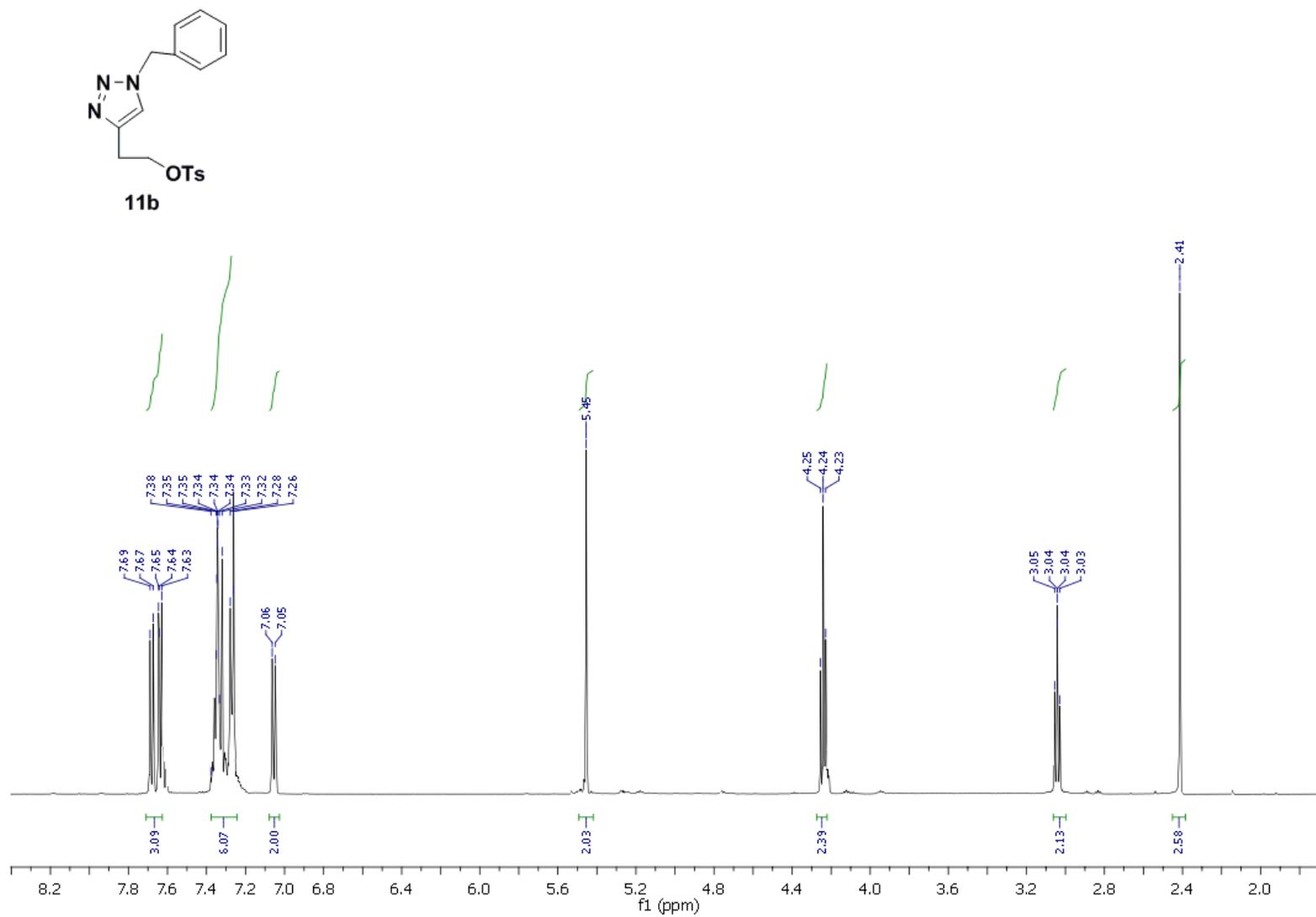


Figure S5. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **11b**.

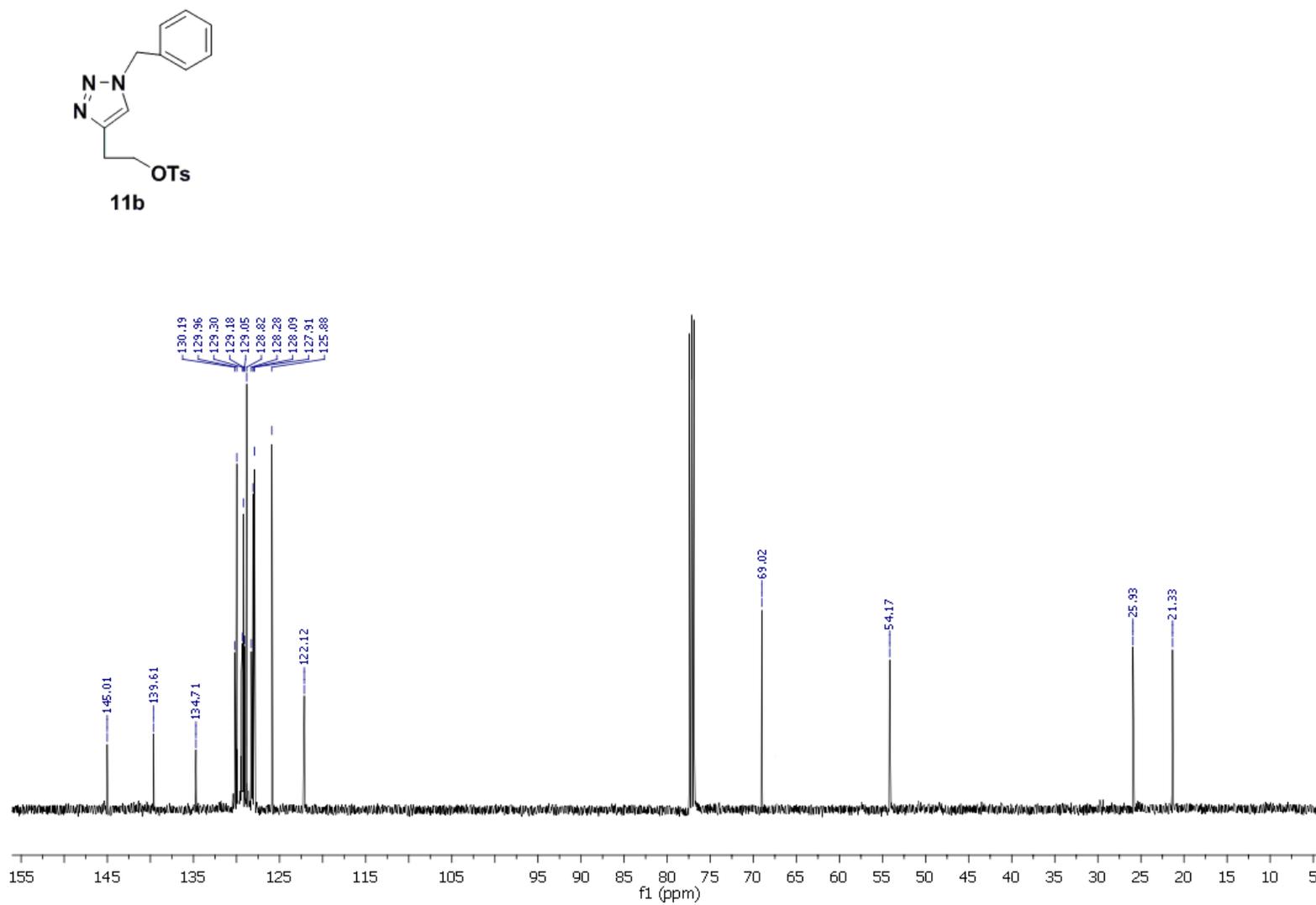


Figure S6. ¹³C-NMR (125 MHz, CDCl₃) of compound **11b**.

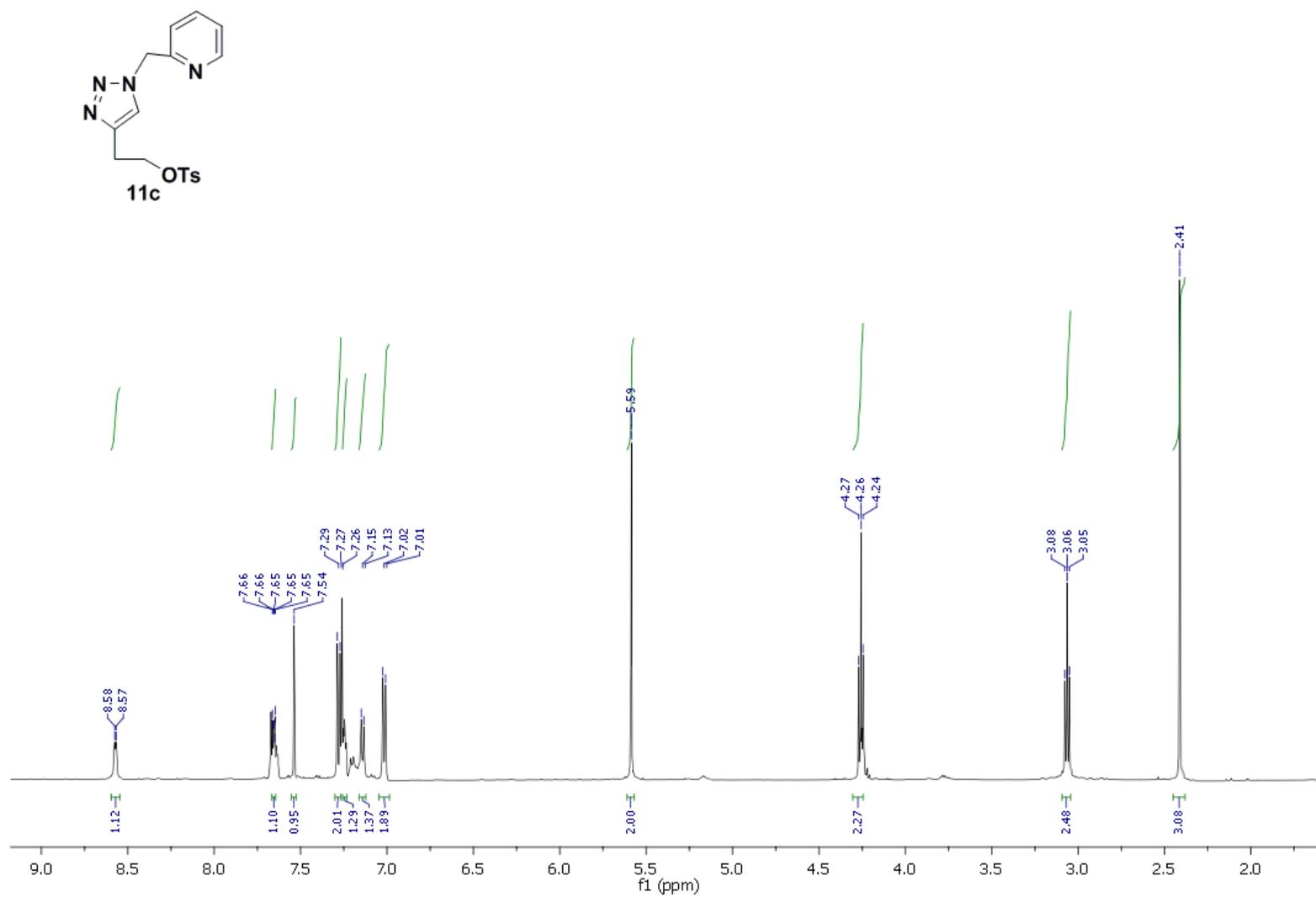


Figure S7. ¹H-NMR (500 MHz, CDCl₃) of compound 11c.

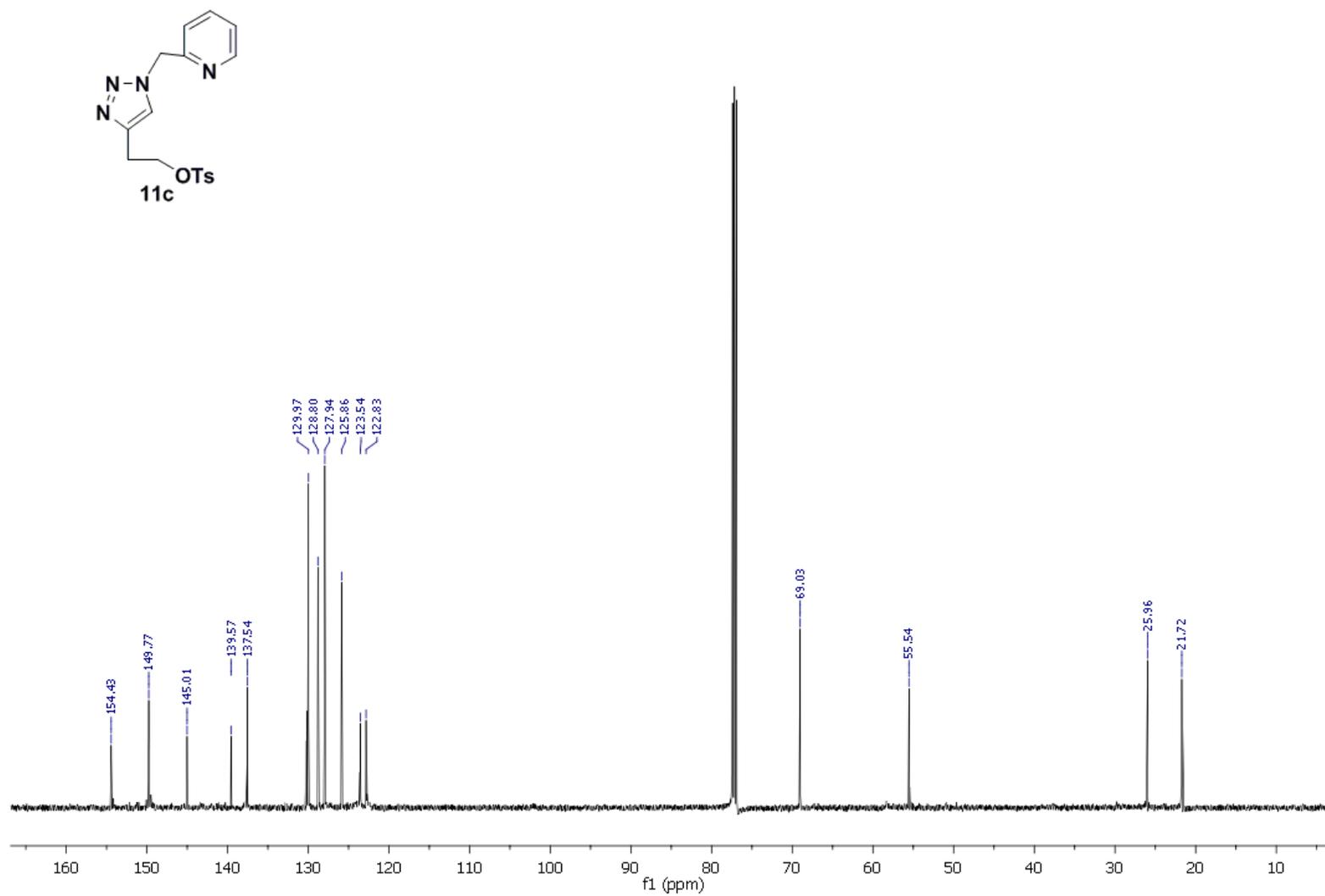


Figure S8. $^{13}\text{C-NMR}$ (125 MHz, CDCl_3) of compound **11c**.

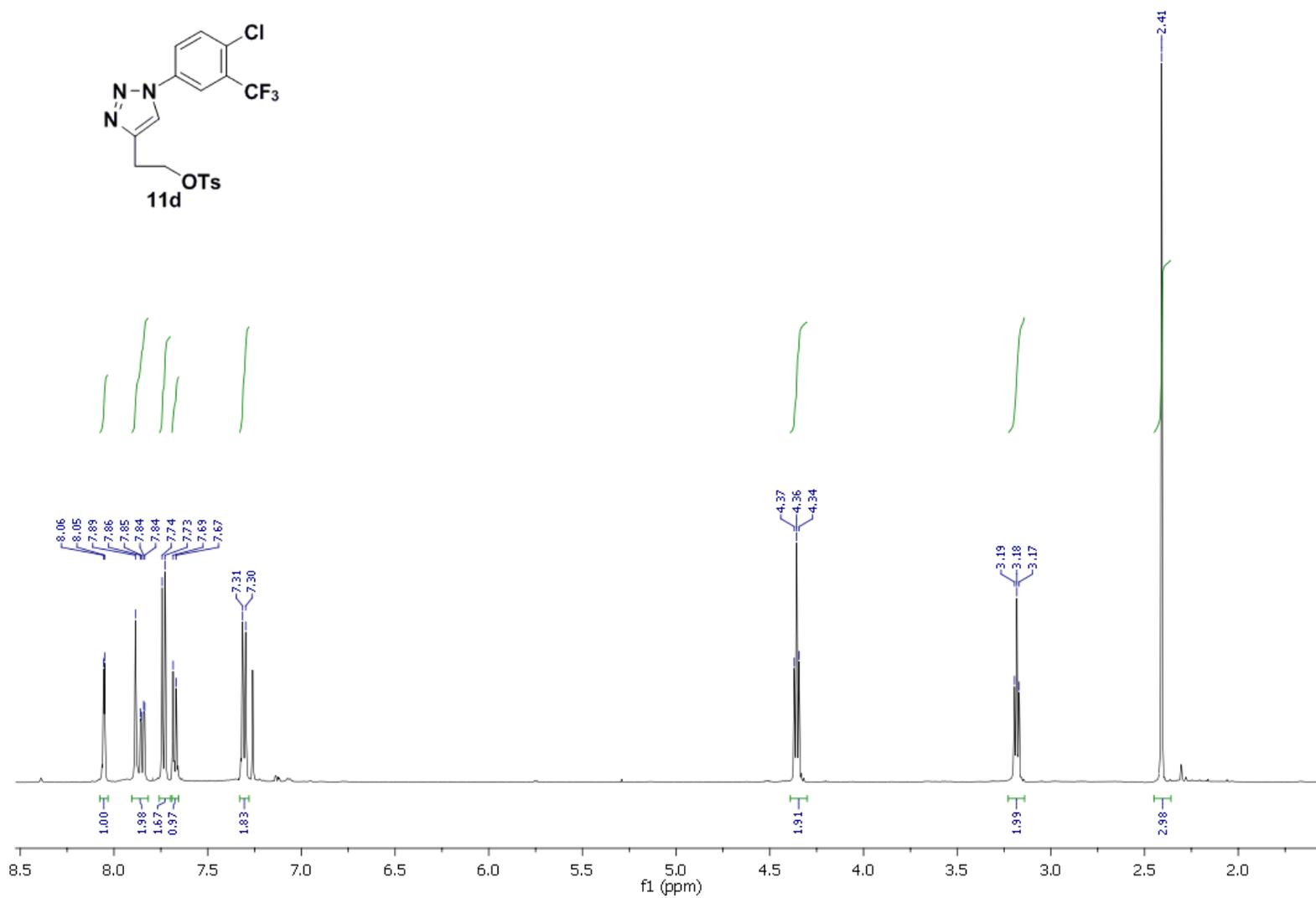


Figure S9. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound 11d.

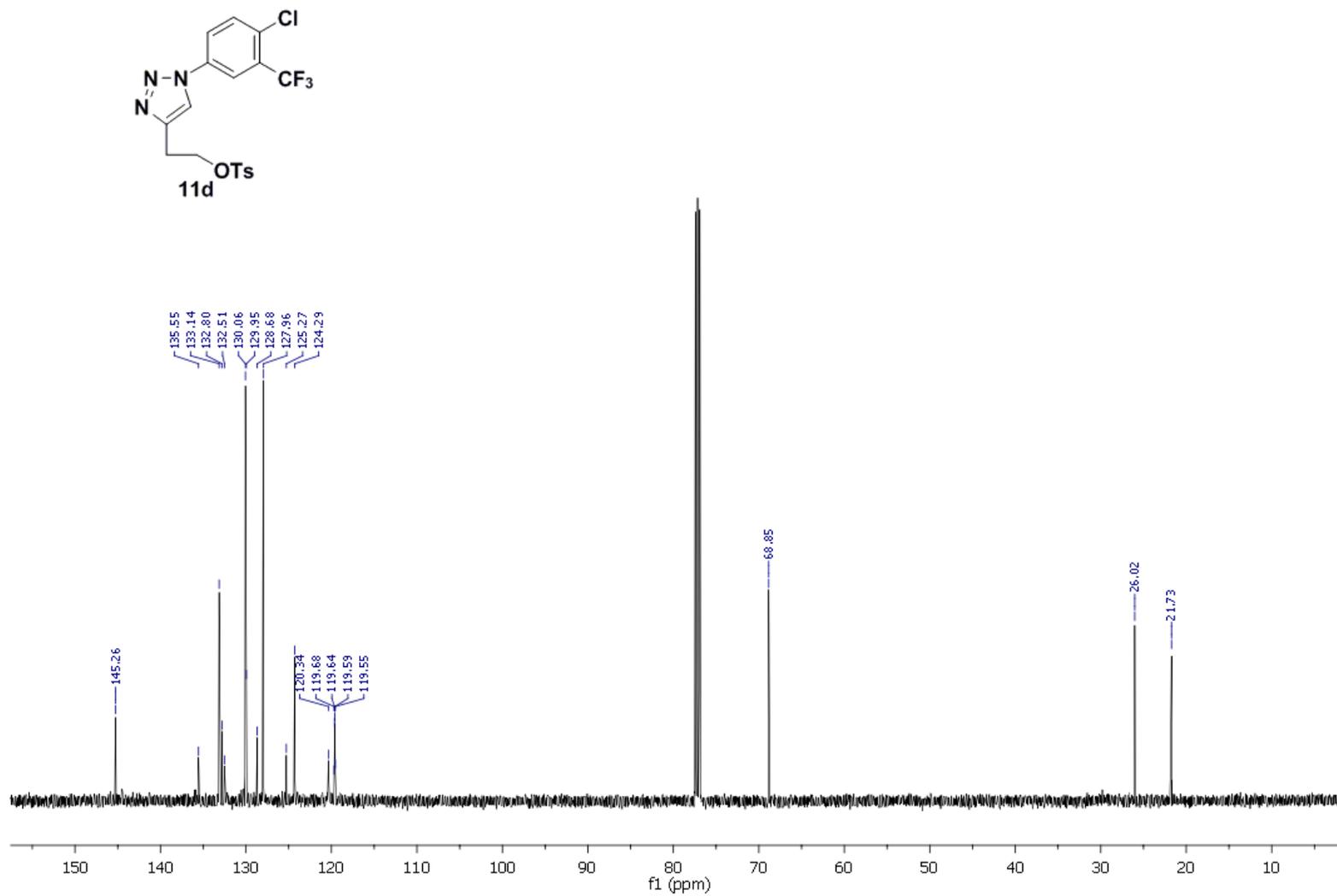


Figure S10. ^{13}C -NMR (125 MHz, CDCl_3) of compound 11d.

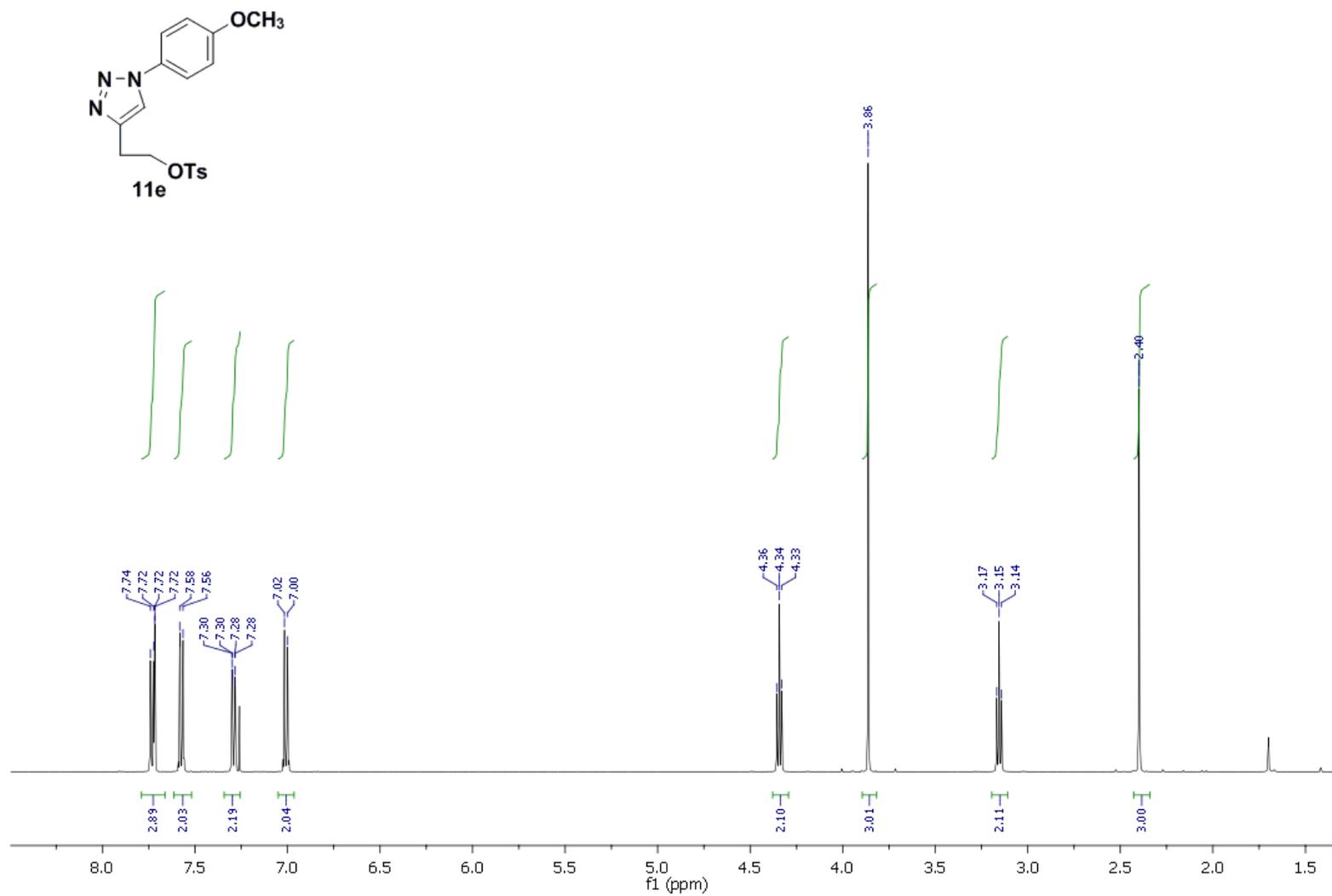


Figure S11. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **11e**.

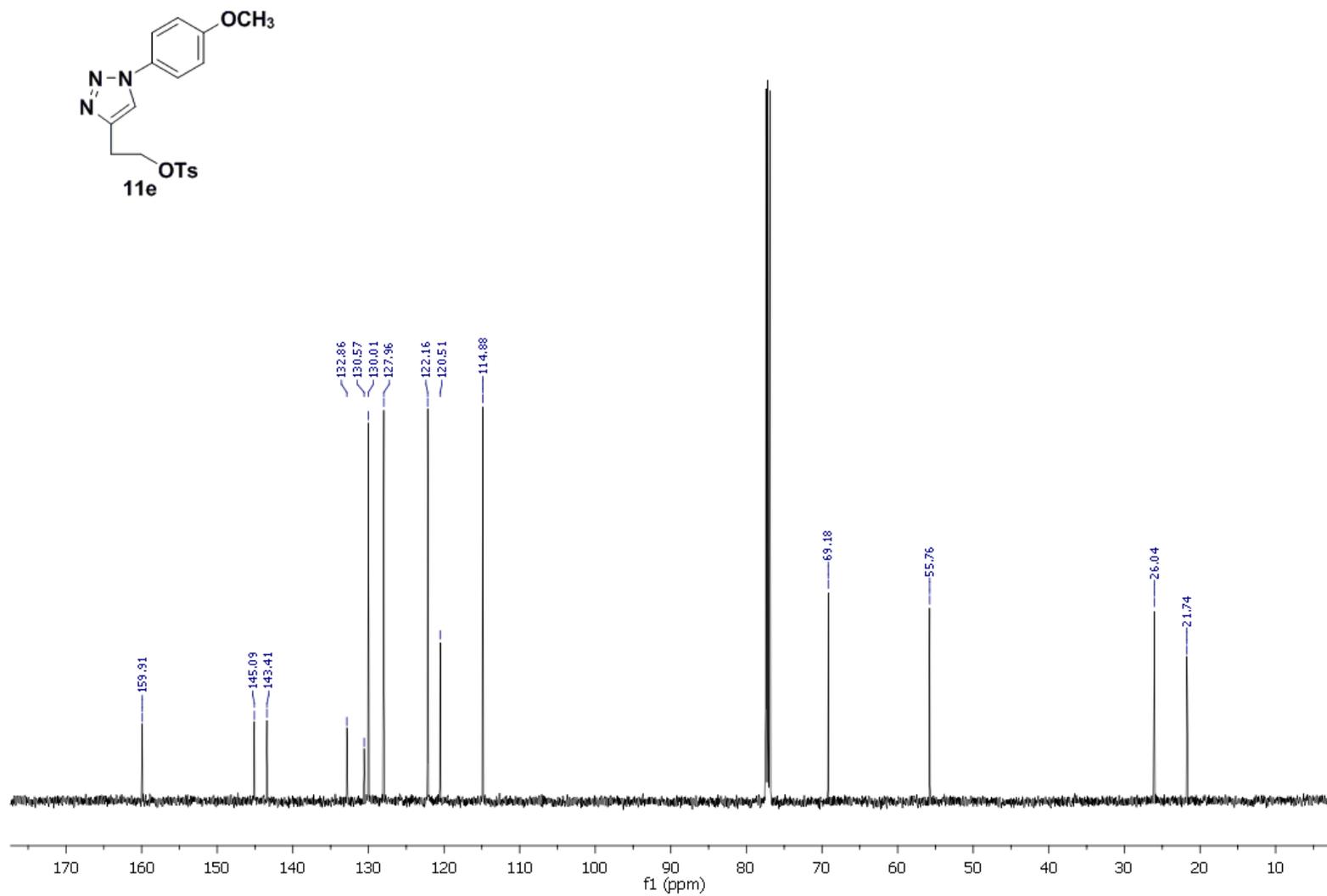


Figure S12. ¹³C-NMR (125 MHz, CDCl₃) of compound 11e.

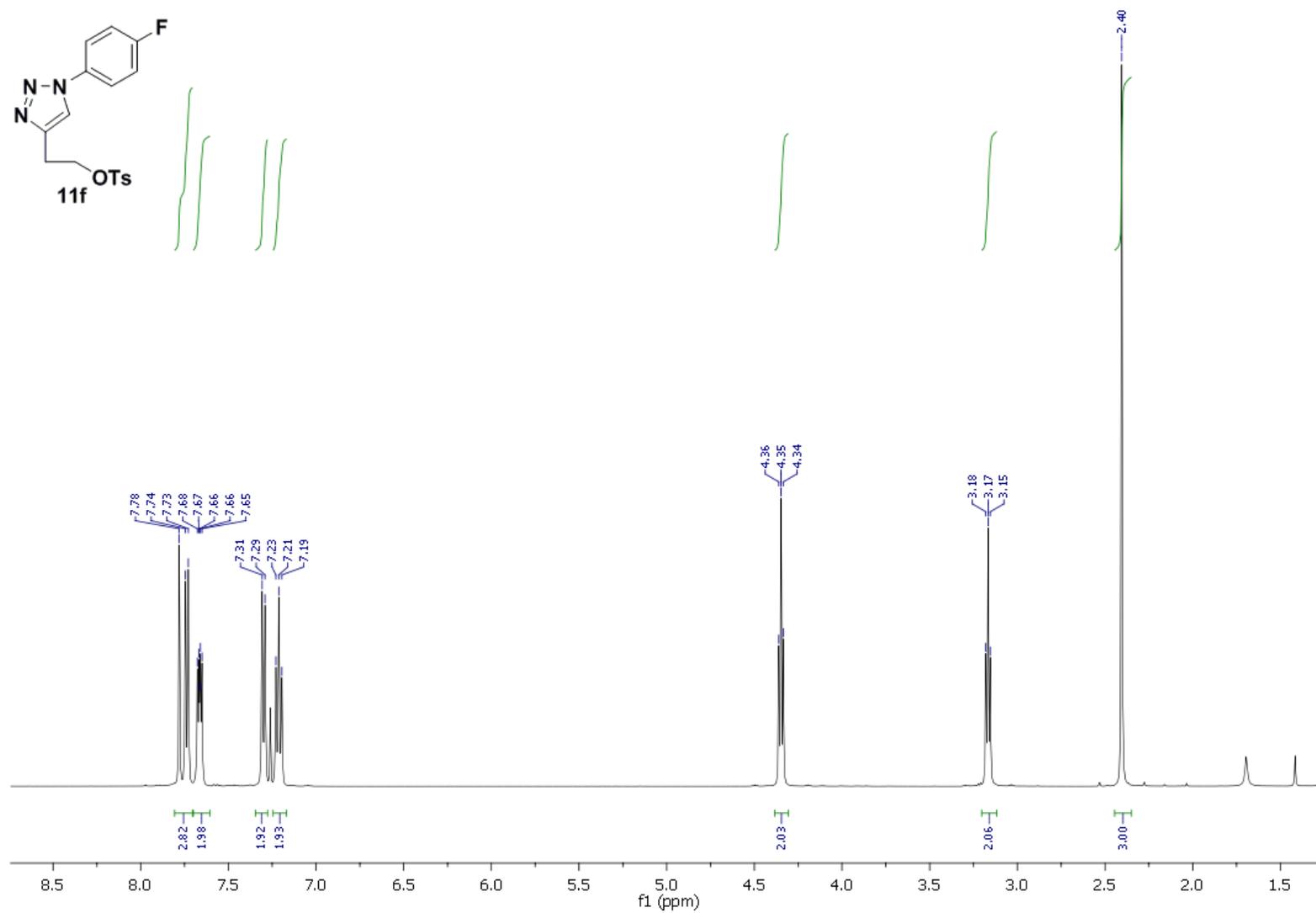


Figure S13. ¹H-NMR (500 MHz, CDCl₃) of compound **11f**.

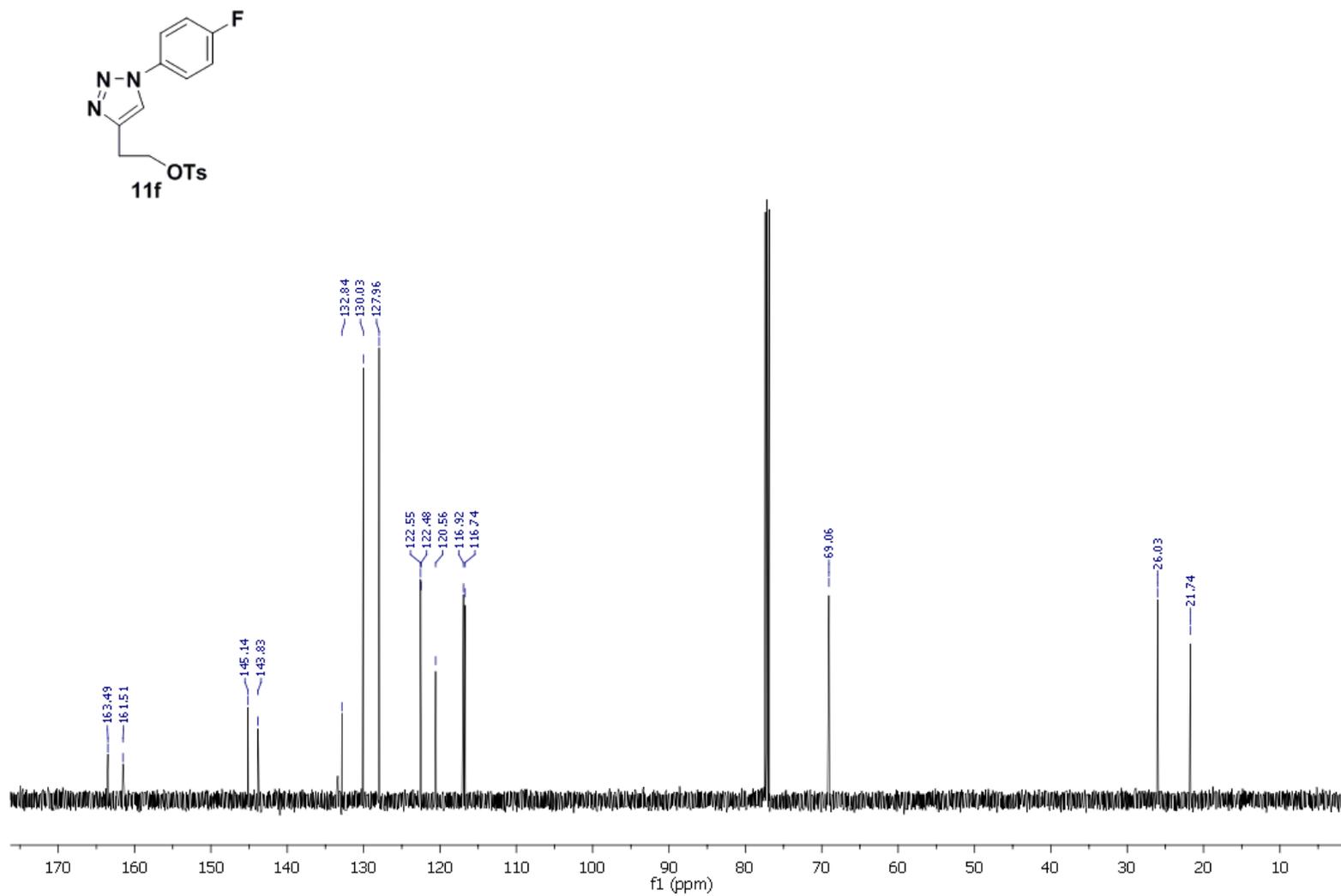


Figure S14. ¹³C-NMR (125 MHz, CDCl₃) of compound 11f.

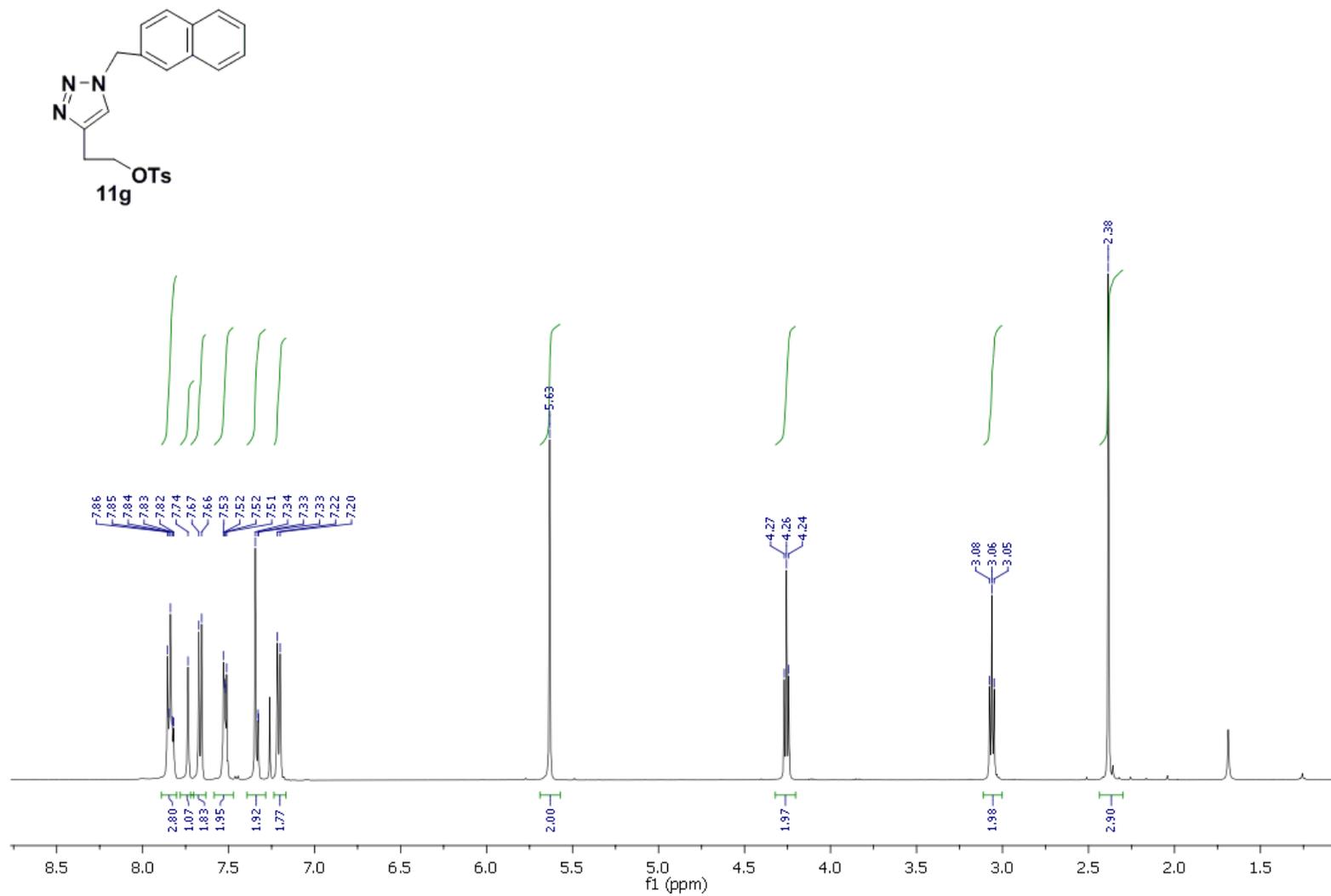


Figure S15. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **11g**.

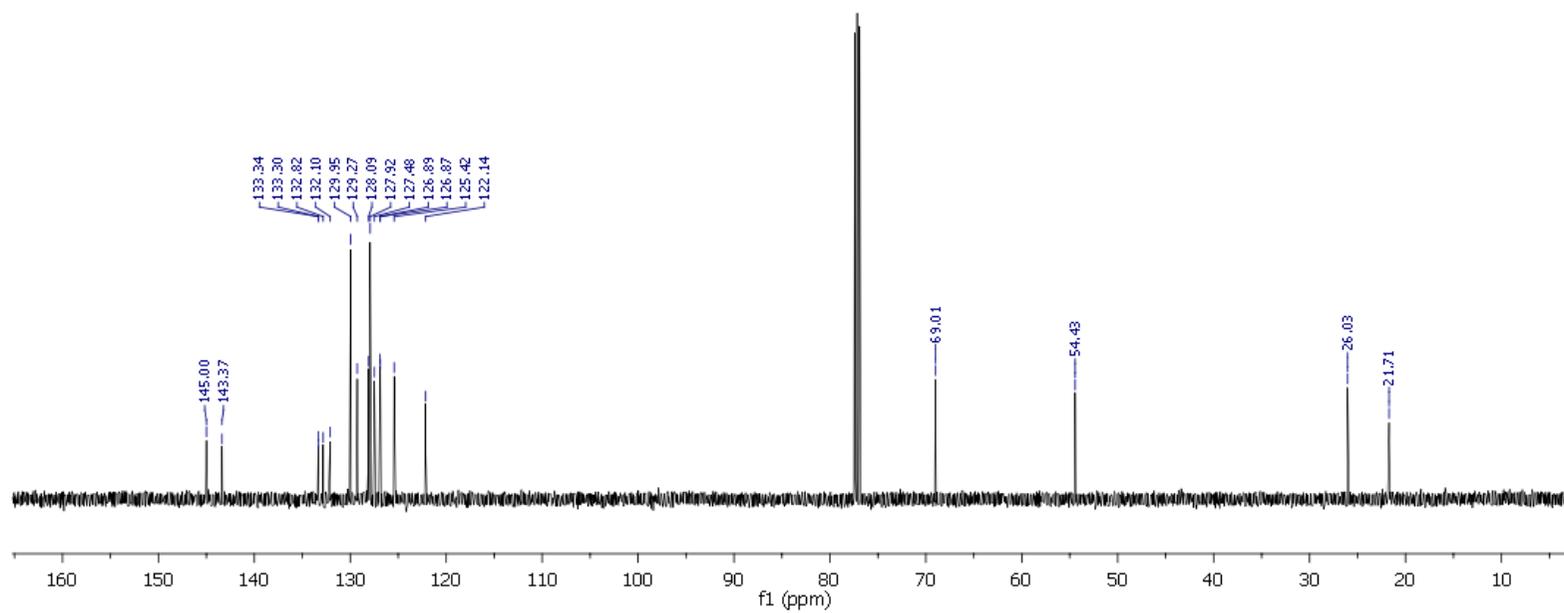
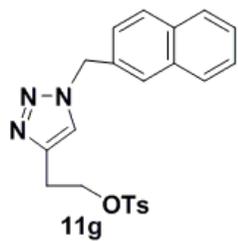


Figure S16. ¹³C-NMR (125 MHz, CDCl₃) of compound **11g**.

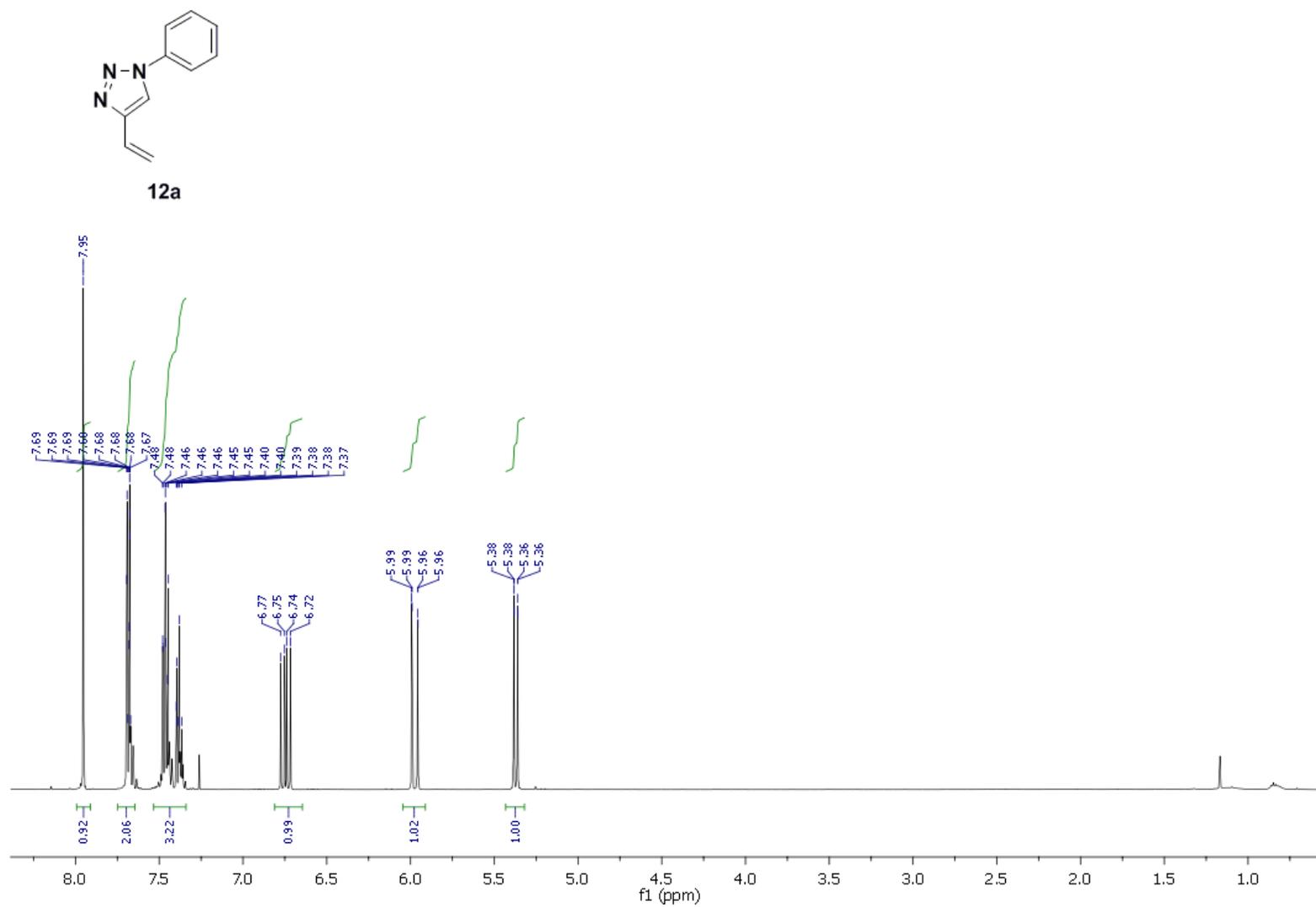


Figure S17. ¹H-NMR (500 MHz, CDCl₃) of compound **12a**.

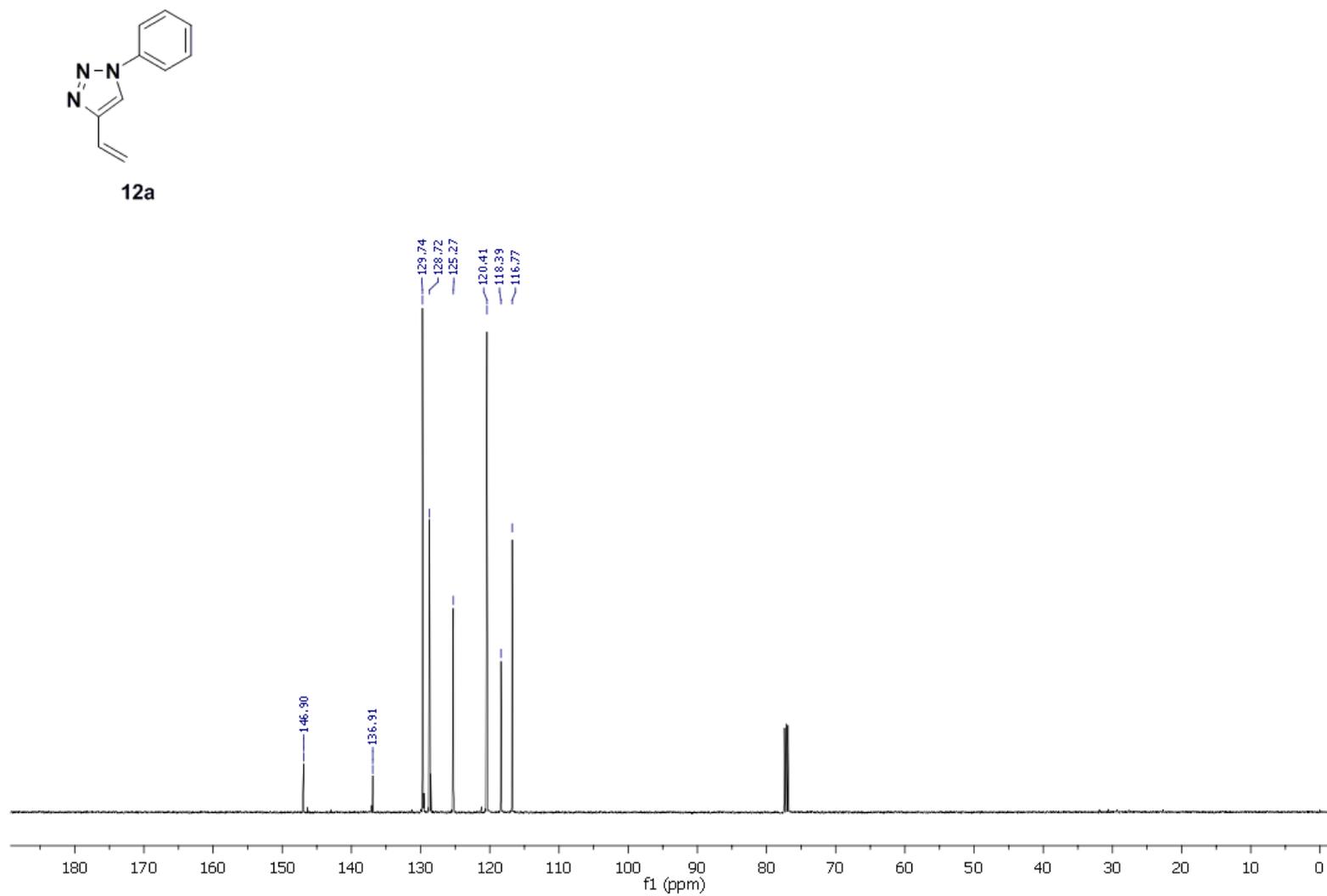
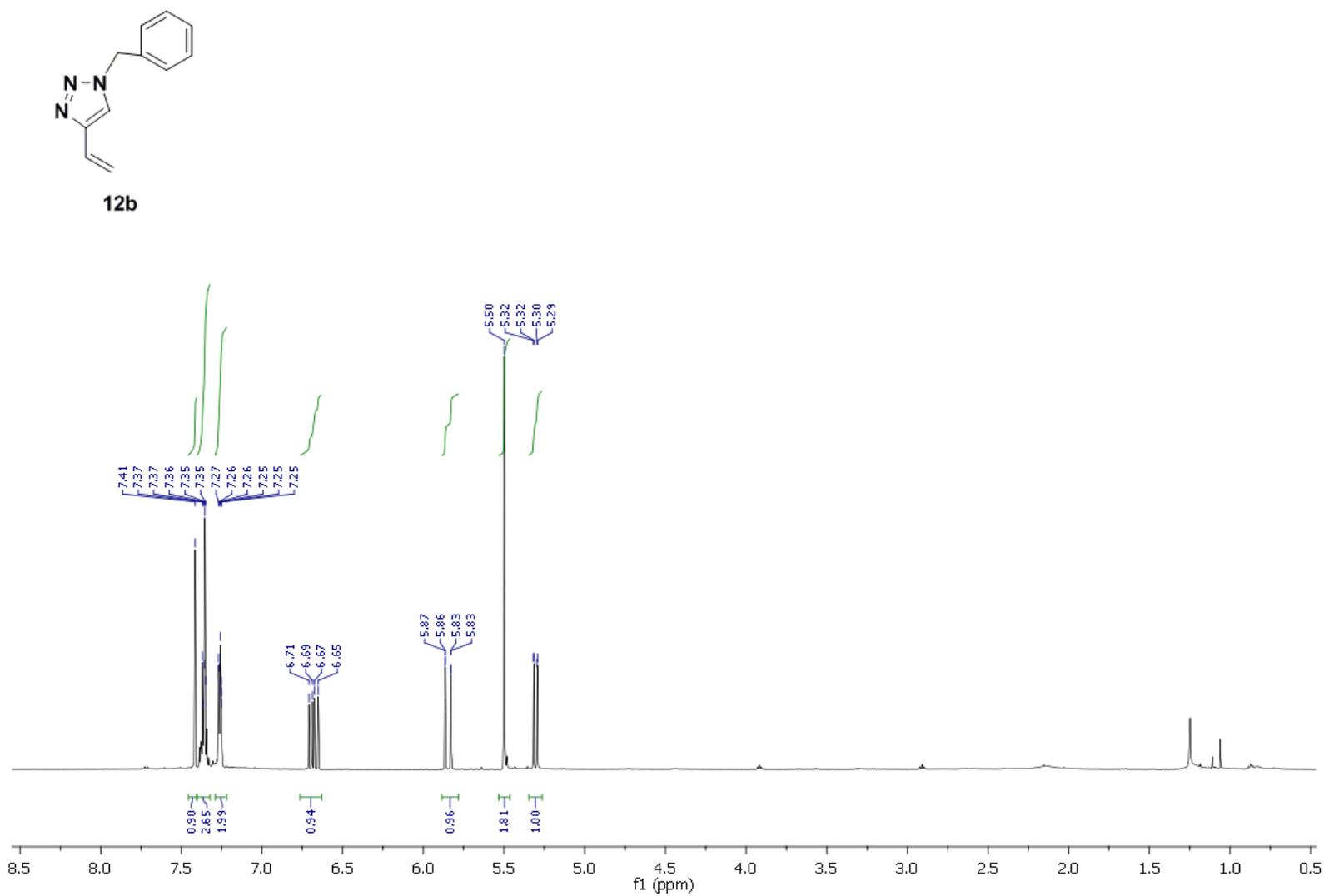


Figure S18. ¹³C-NMR (125 MHz, CDCl₃) of compound **12a**.



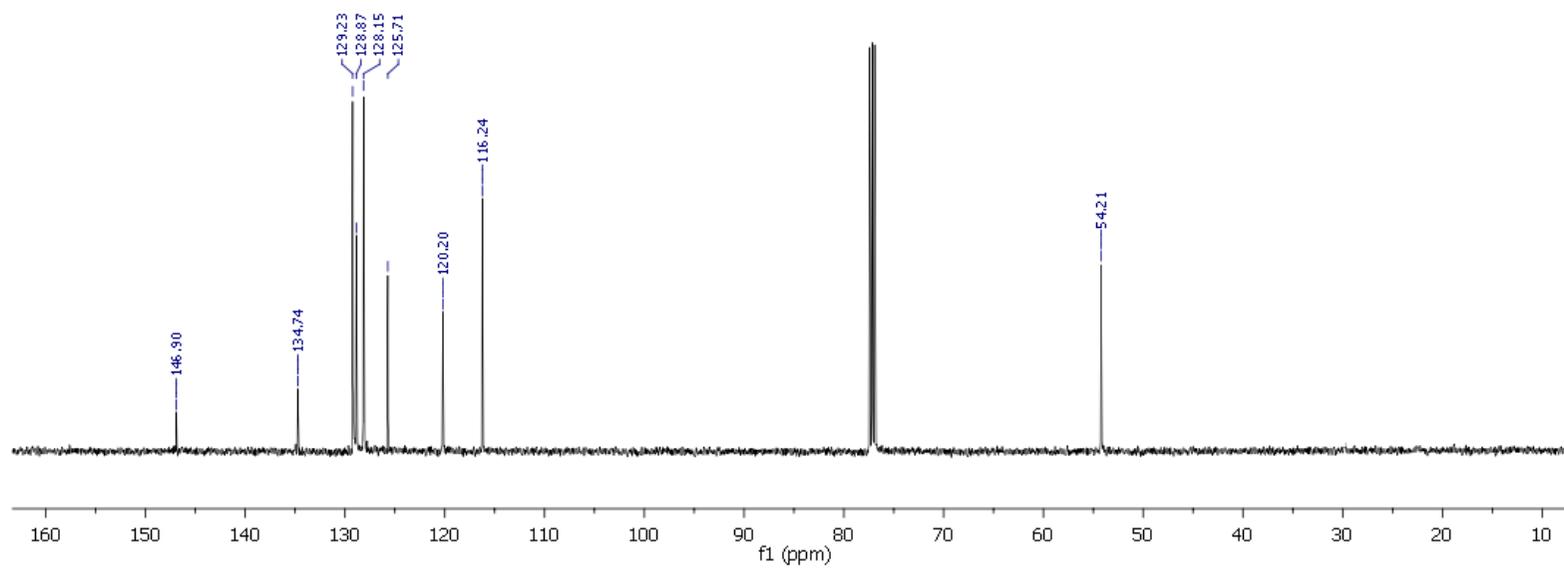
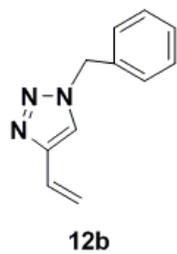


Figure S20. ¹³C-NMR (125 MHz, CDCl₃) of compound **12b**.

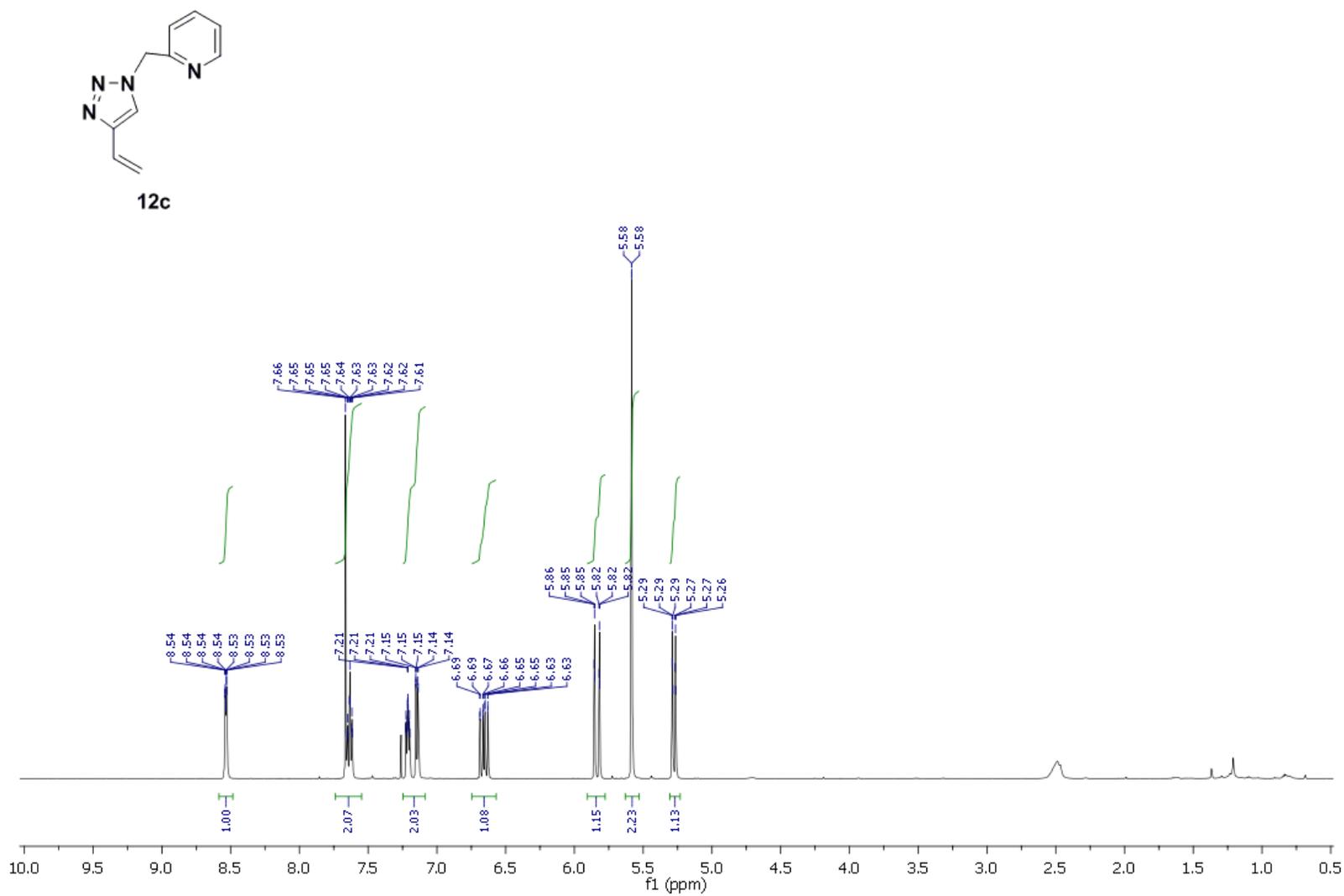


Figure S21. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **12c**.

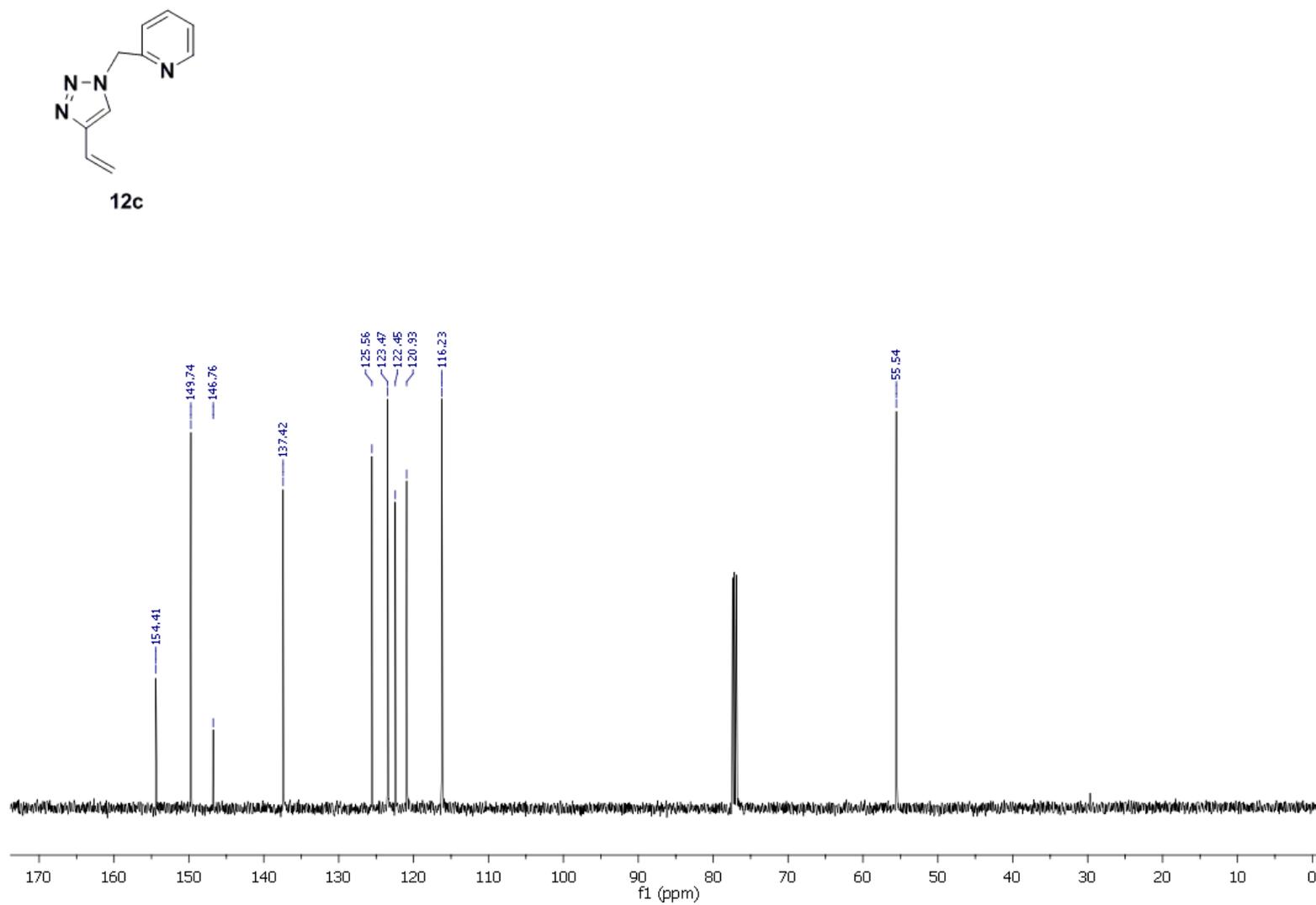


Figure S22. ¹³C-NMR (125 MHz, CDCl₃) of compound **12c**.

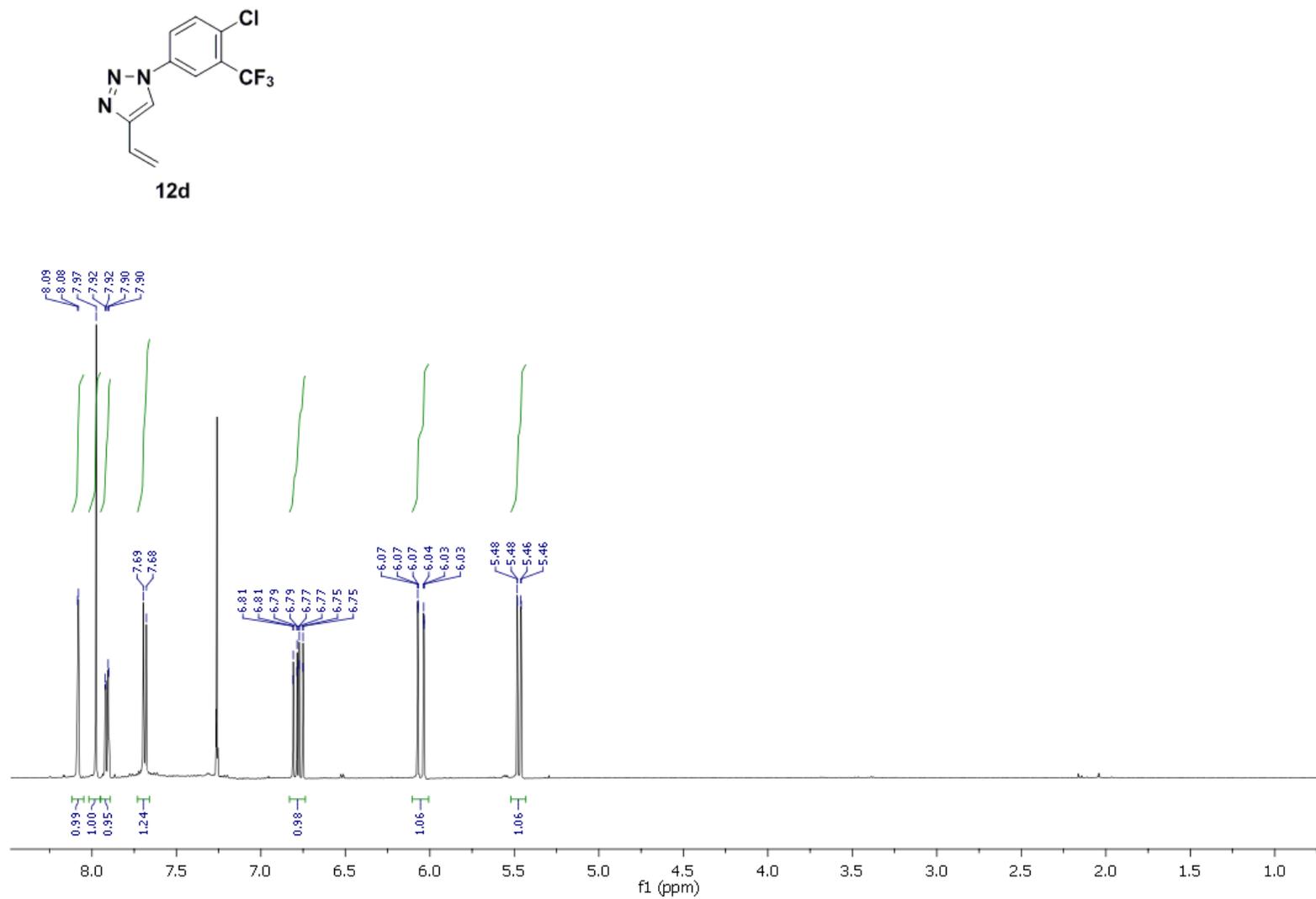


Figure S23. ¹H-NMR (500 MHz, CDCl₃) of compound **12d**.

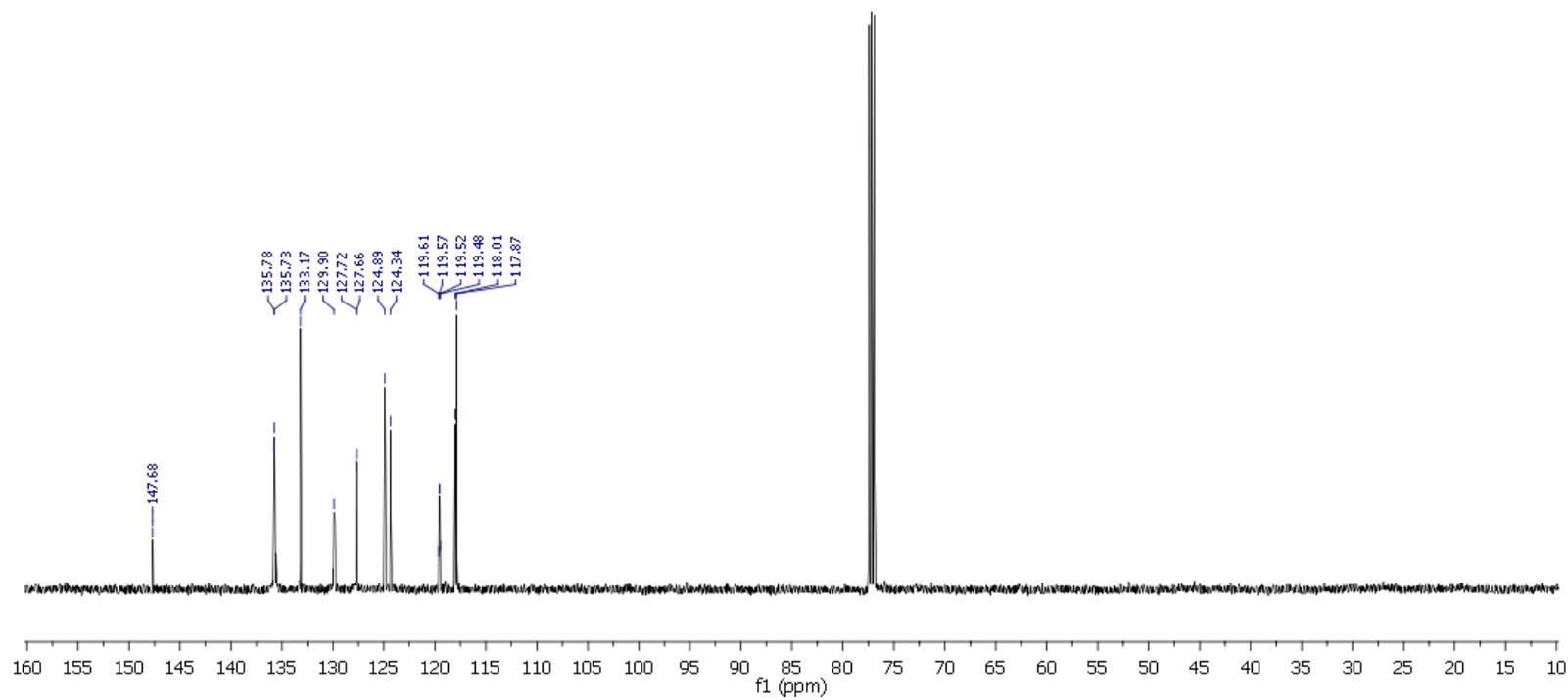
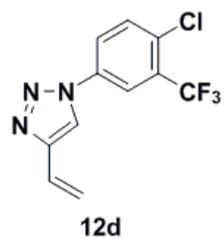


Figure S24. ¹³C-NMR (125 MHz, CDCl₃) of compound **12d**.

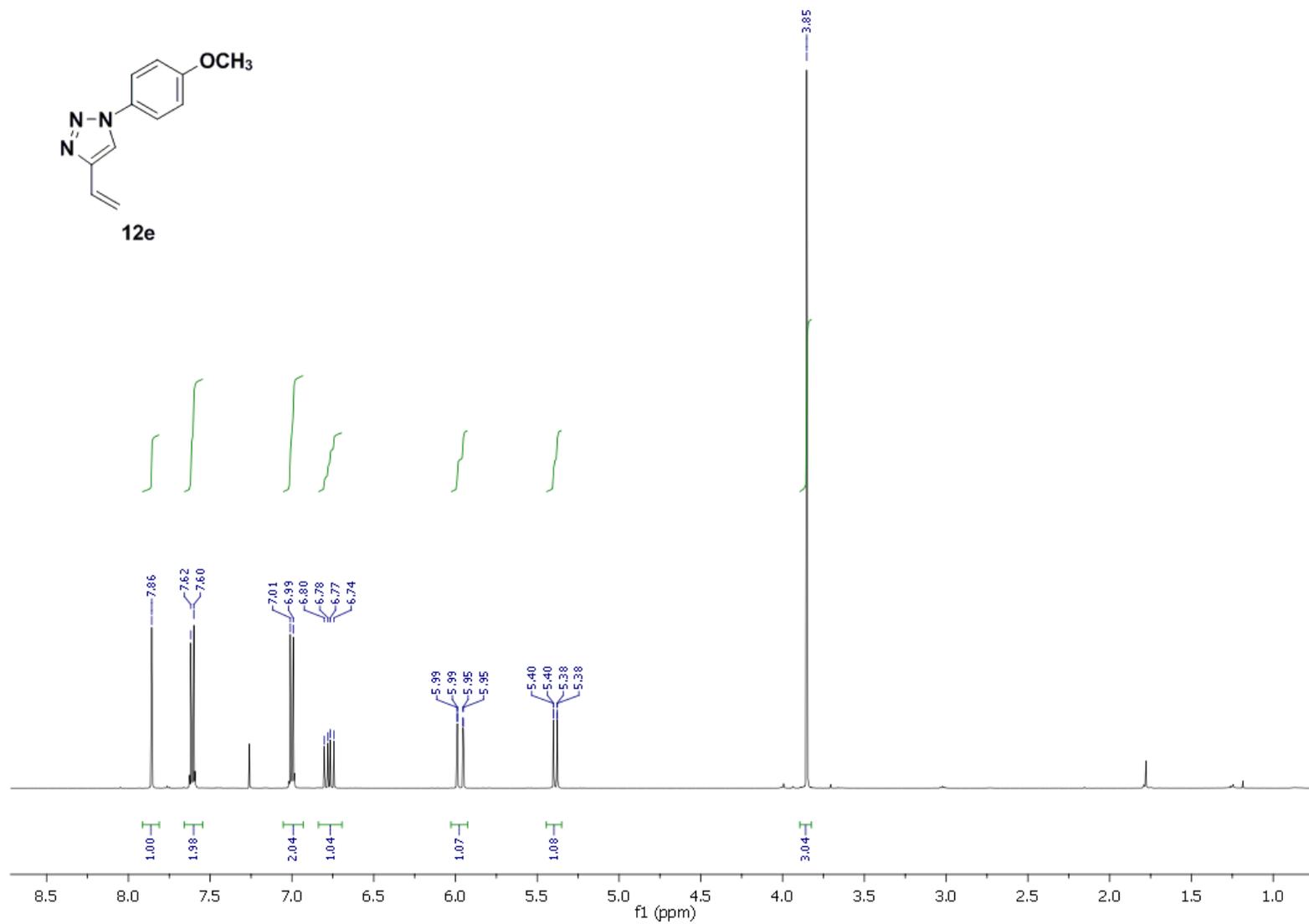


Figure S25. ¹H-NMR (500 MHz, CDCl₃) of compound **12e**.

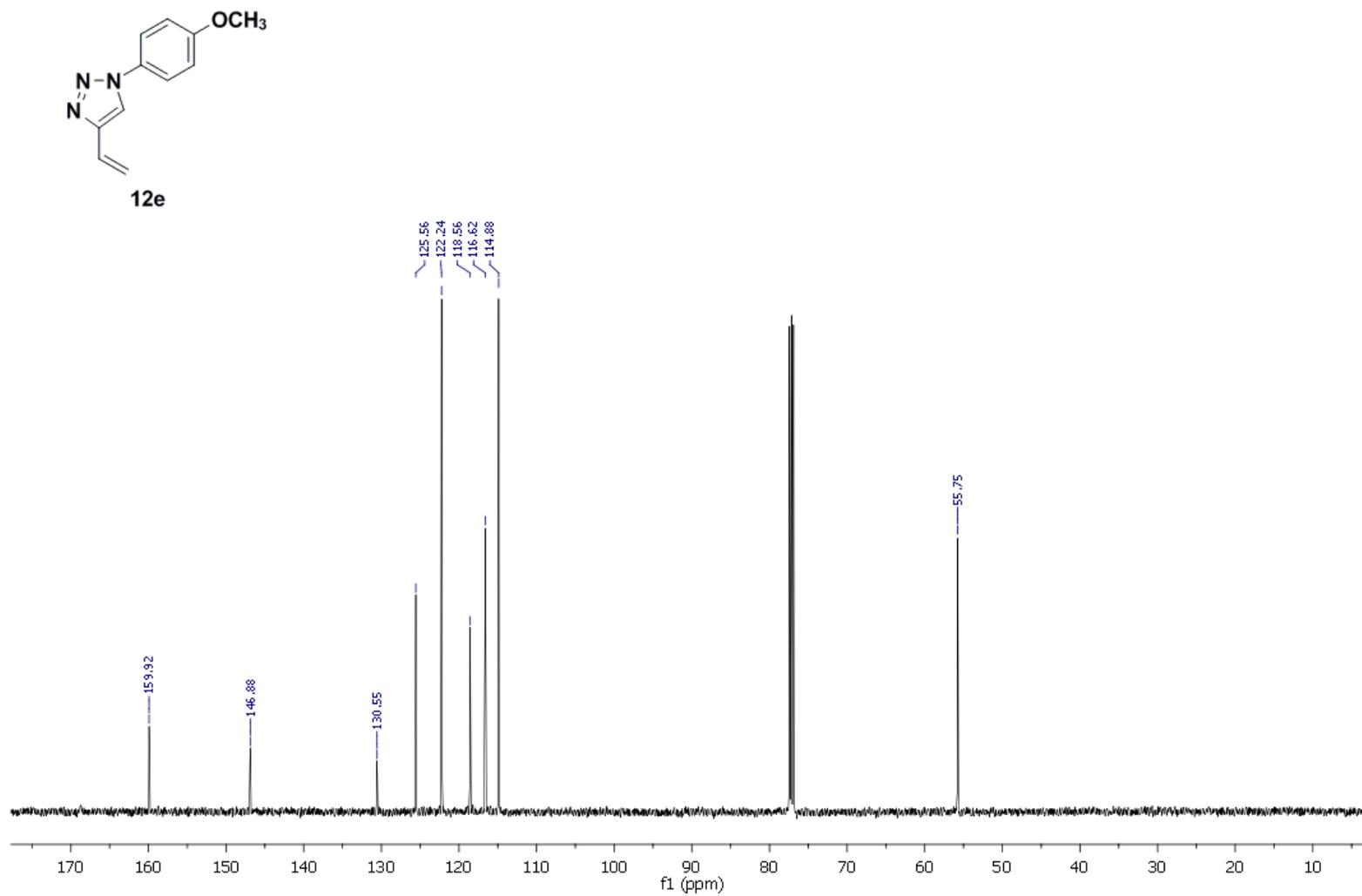


Figure S26. ^{13}C -NMR (125 MHz, CDCl_3) of compound **12e**.

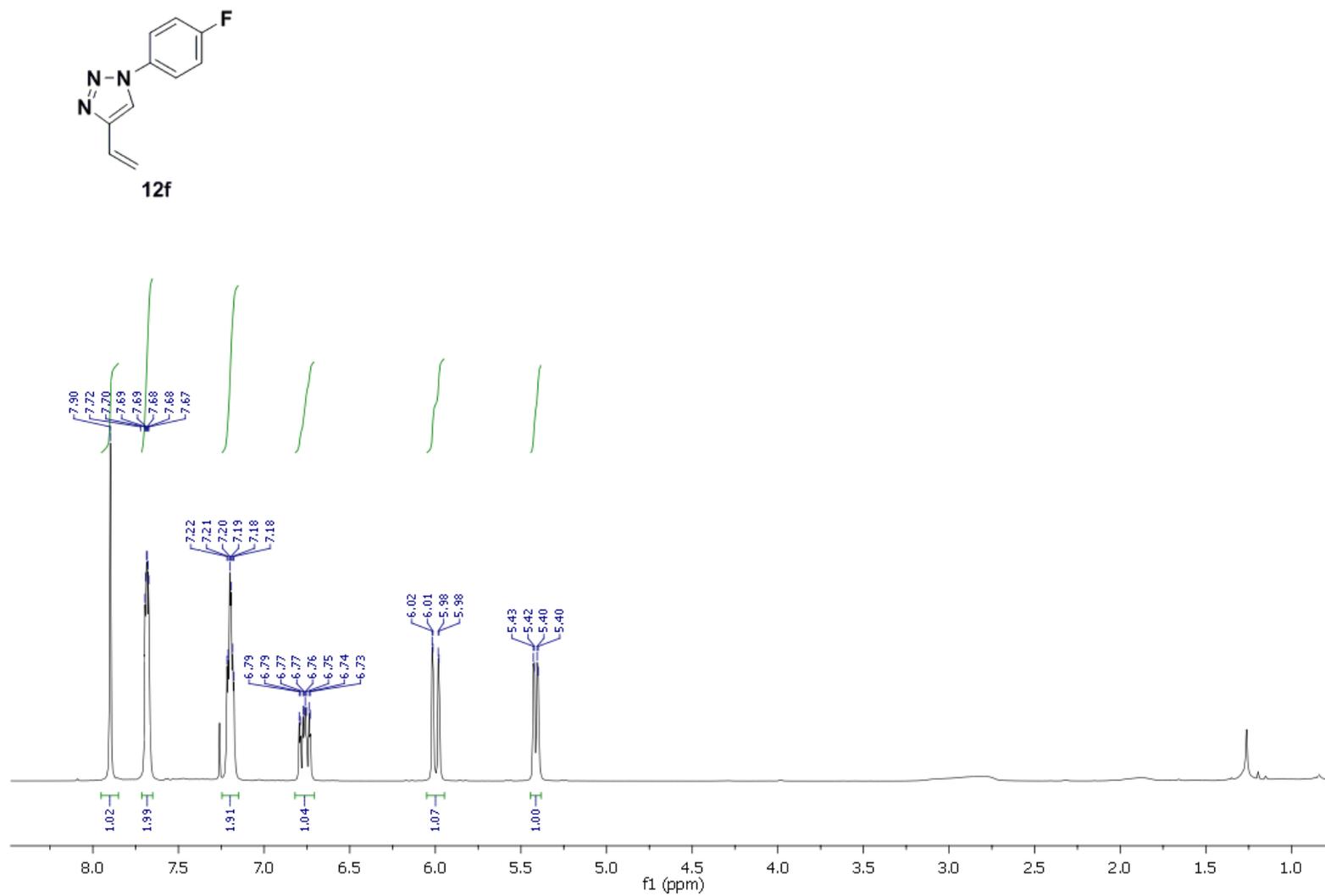


Figure S27. ¹H-NMR (500 MHz, CDCl₃) of compound **12f**.

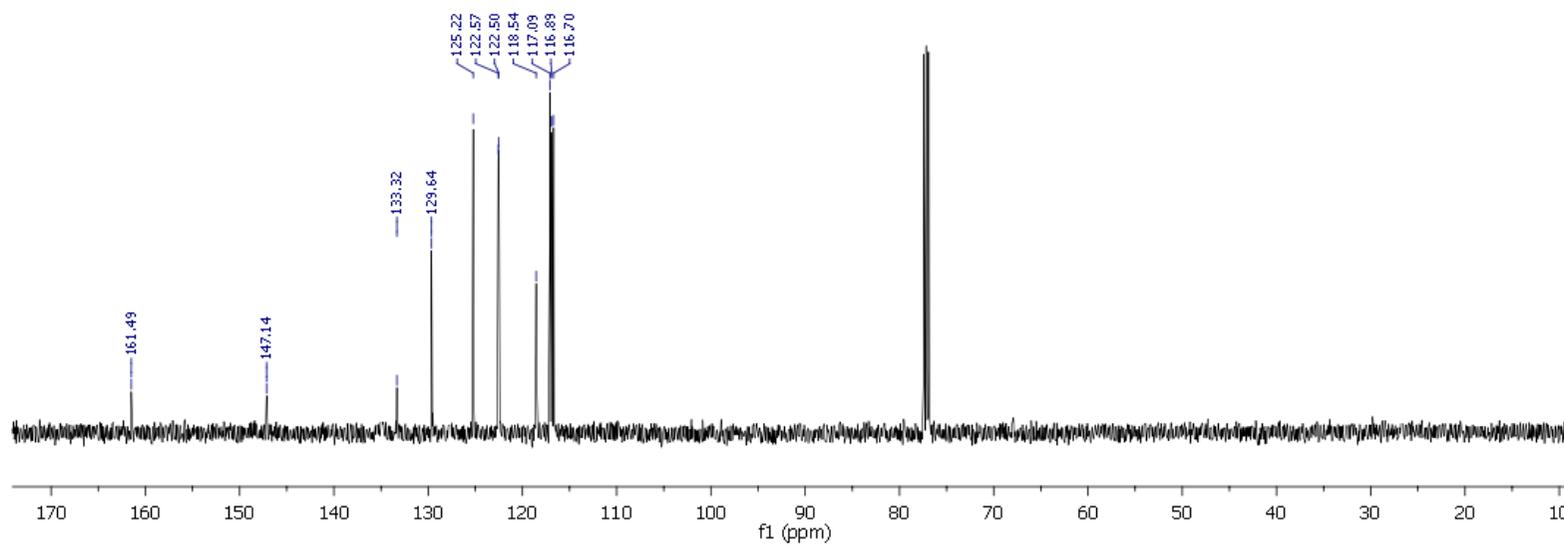
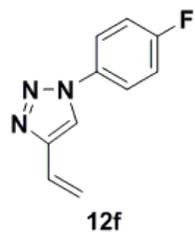


Figure S28. ^{13}C -NMR (125 MHz, CDCl_3) of compound **12f**.

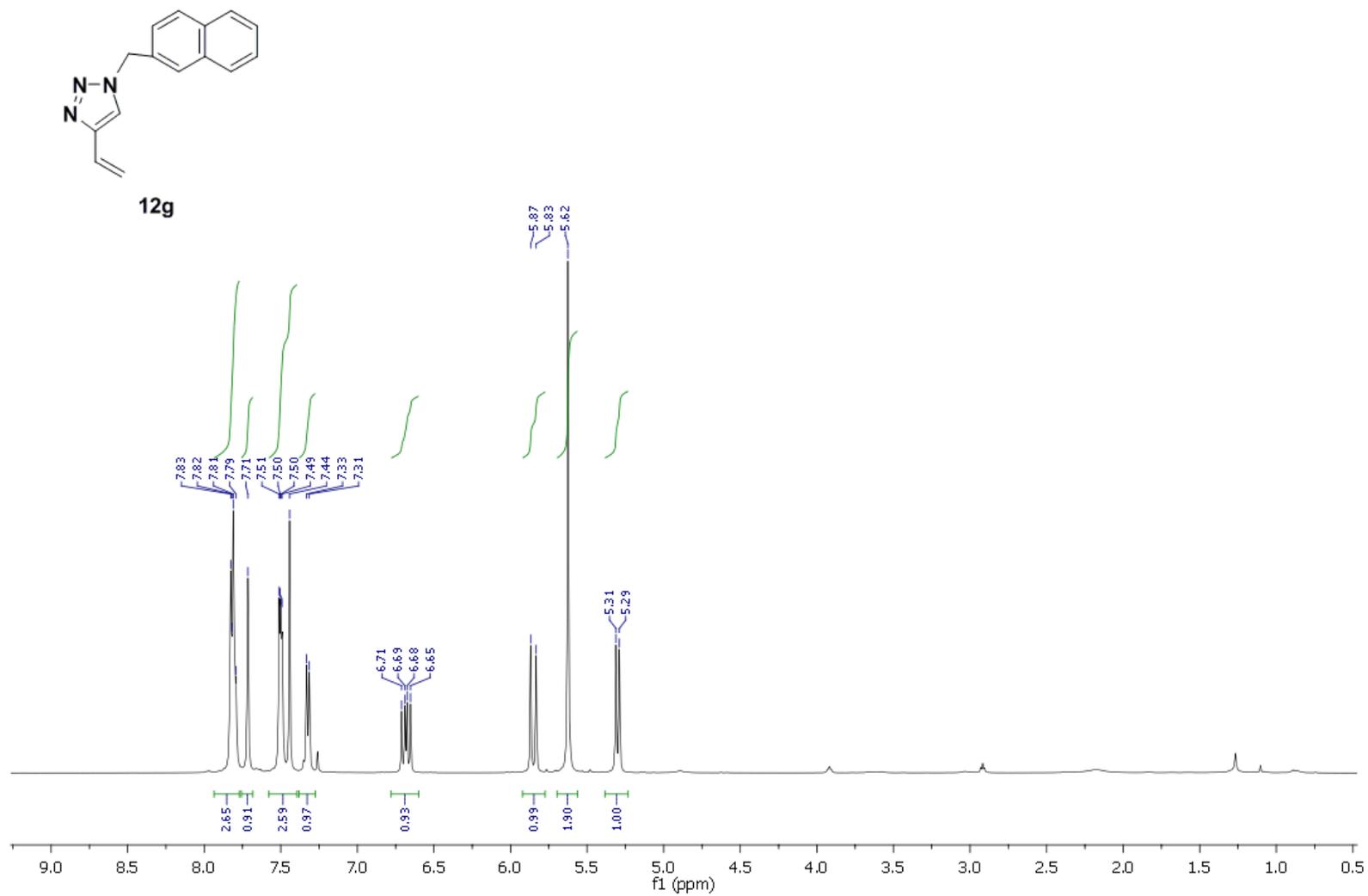


Figure S29. ¹H-NMR (500 MHz, CDCl₃) of compound **12g**.

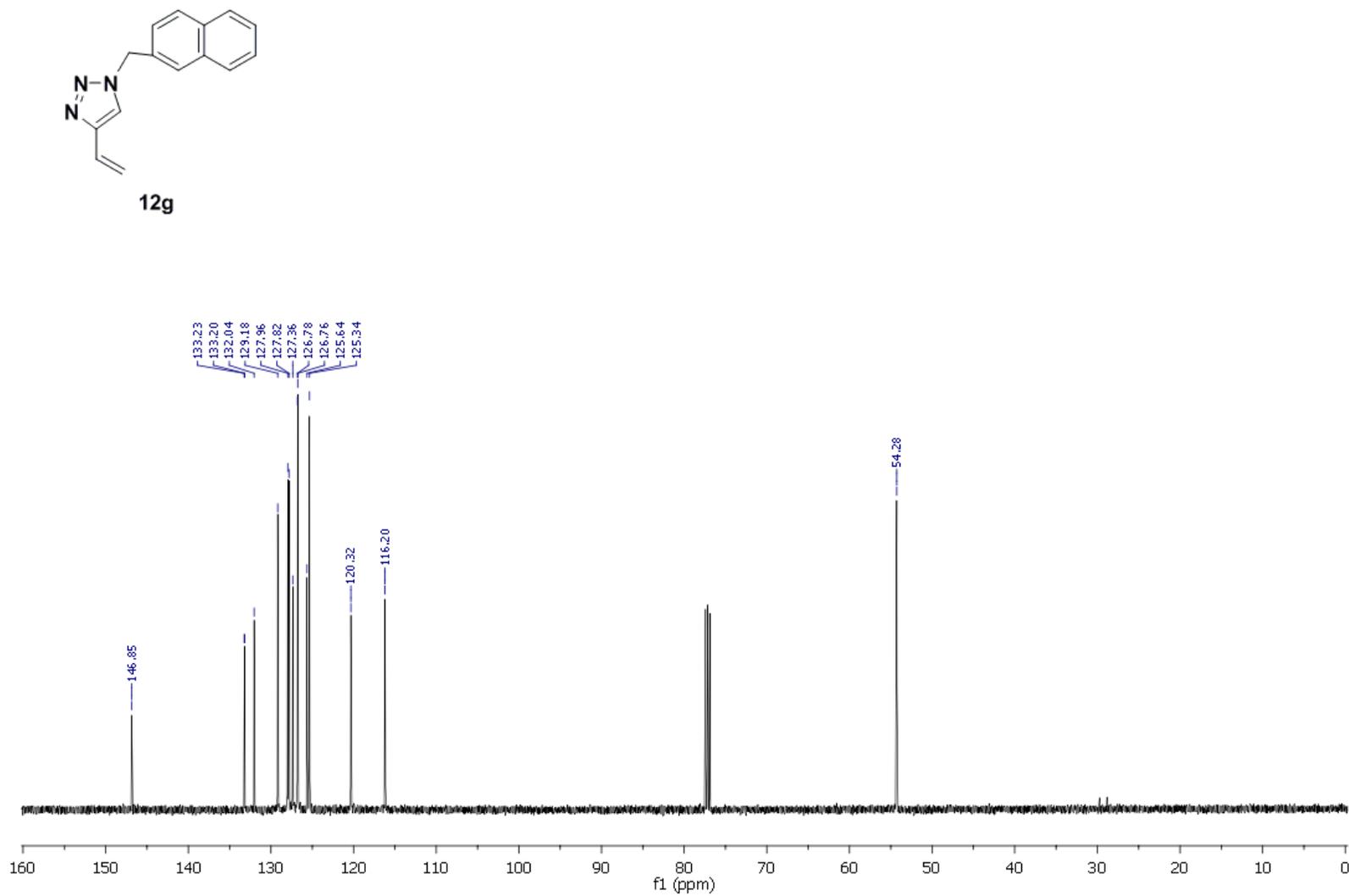


Figure S30. ¹³C-NMR (125 MHz, CDCl₃) of compound **12g**.

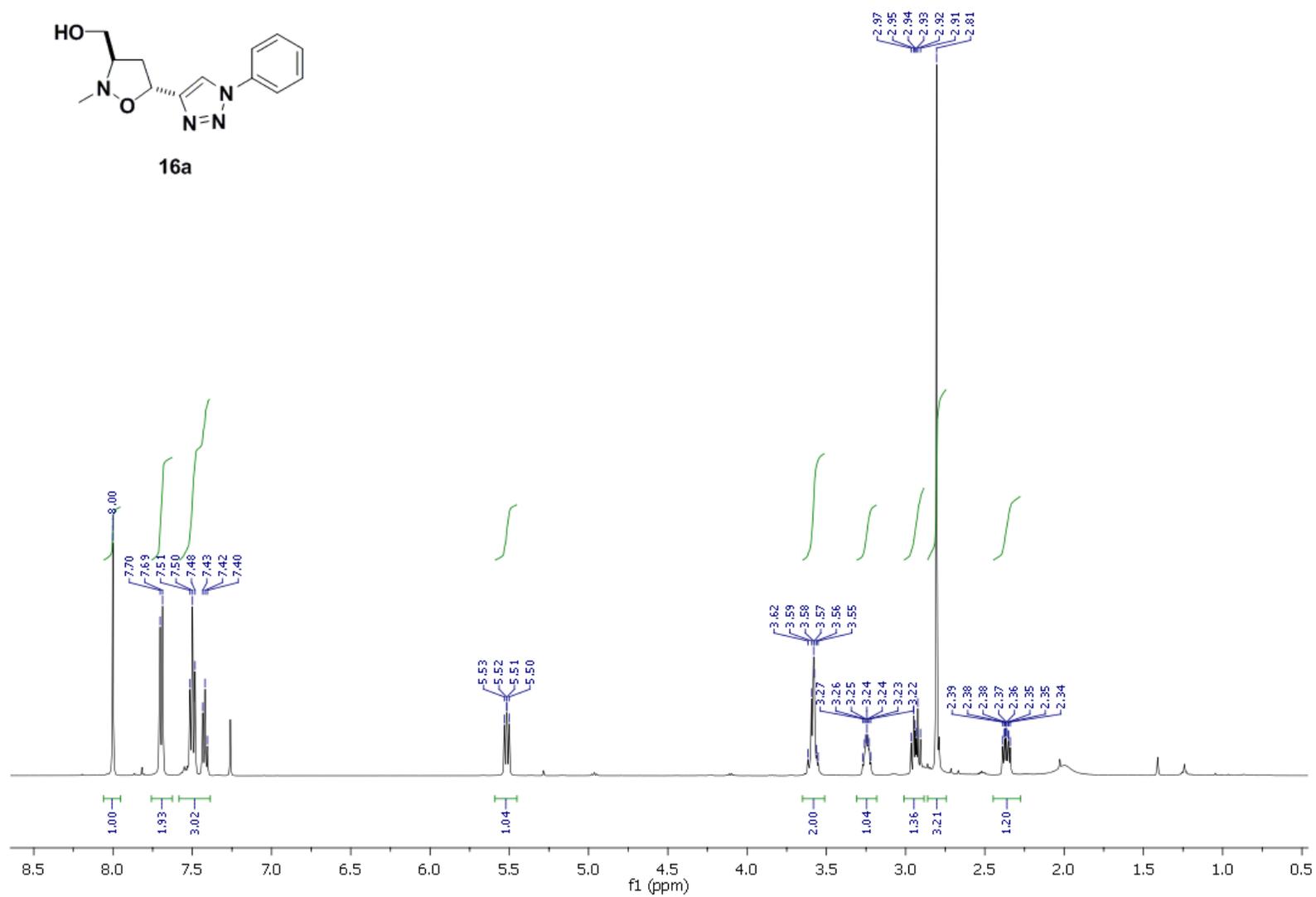


Figure S31. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **16a**.

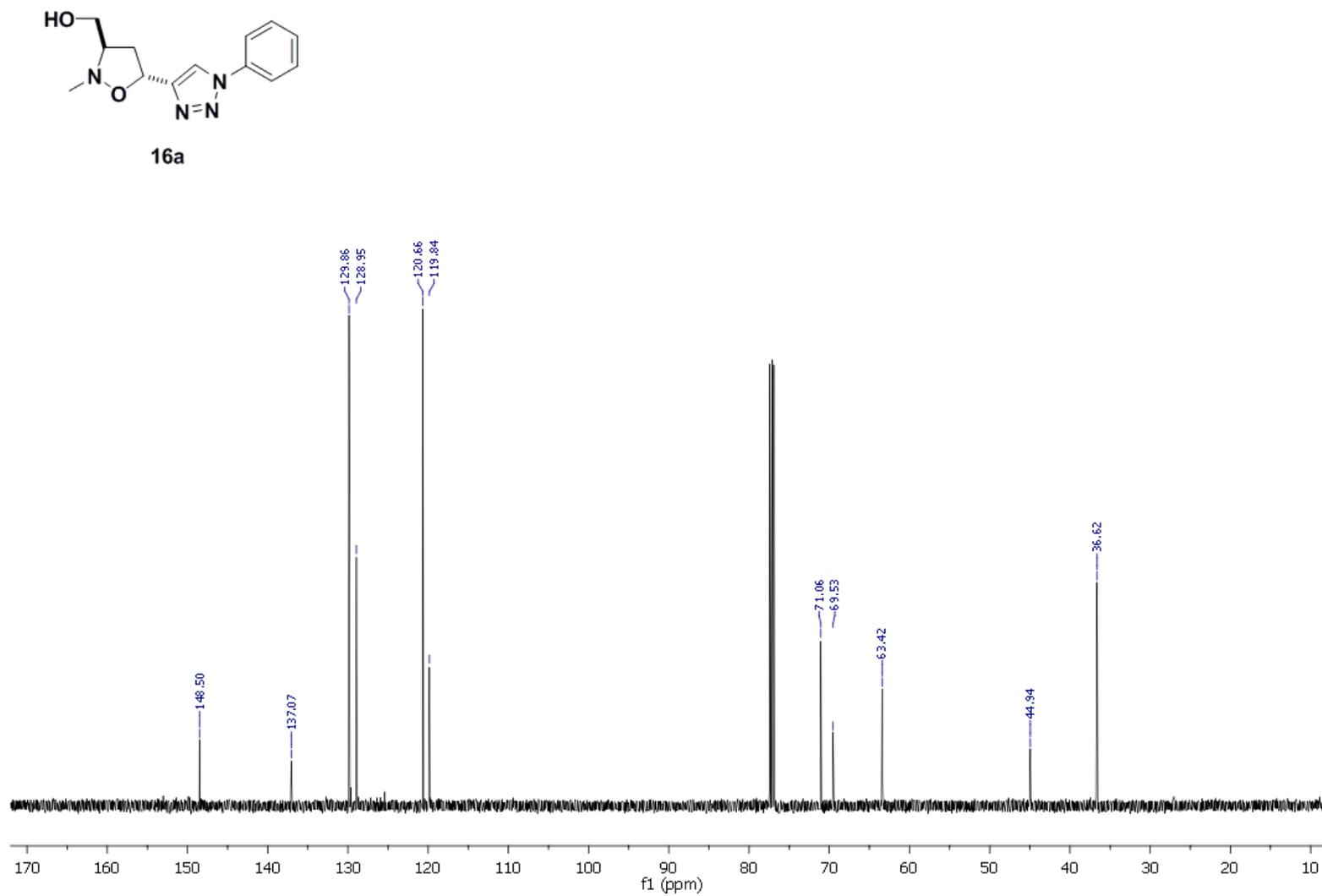


Figure S32. ¹³C-NMR (125 MHz, CDCl₃) of compound **16a**.

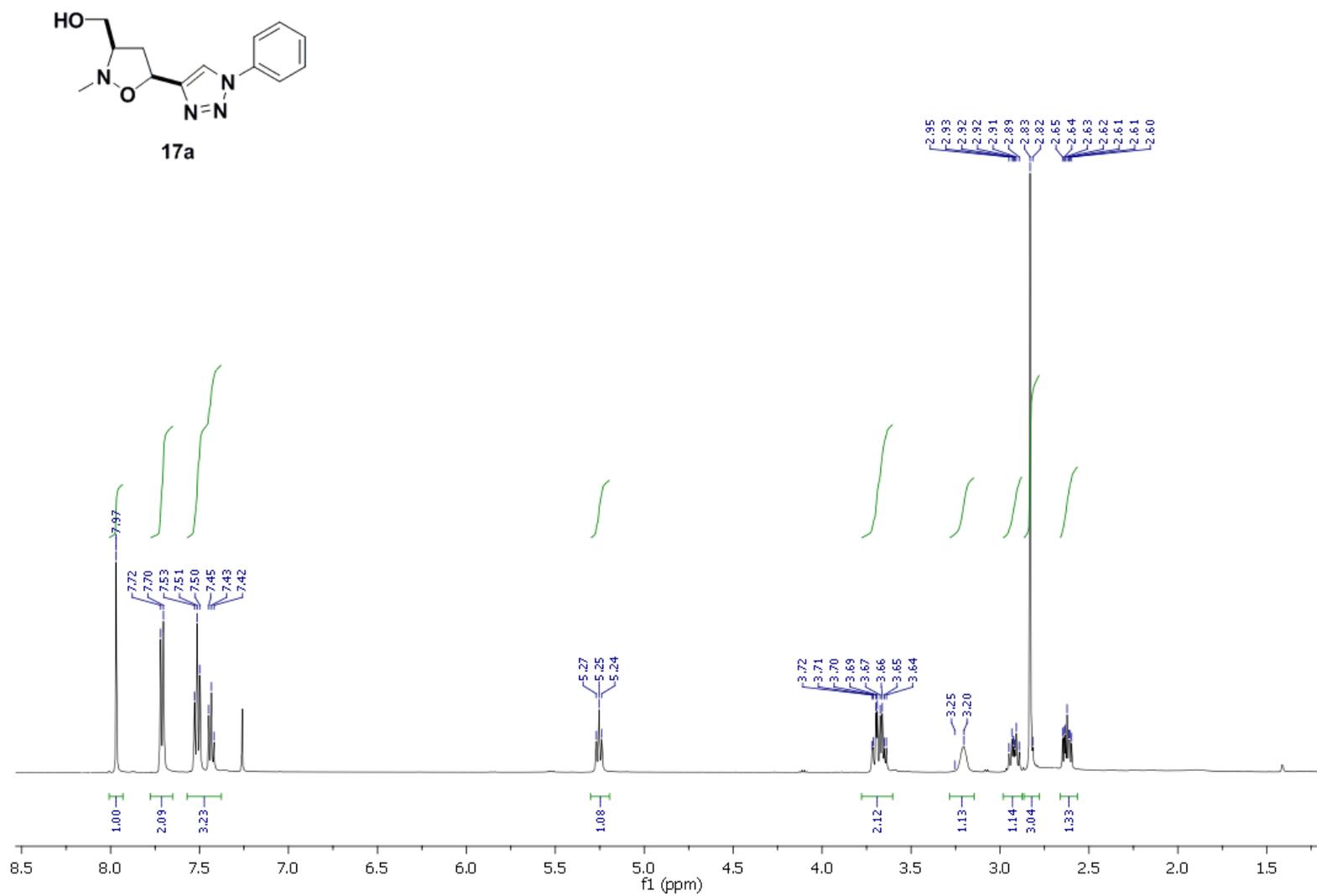


Figure S33. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **17a**.

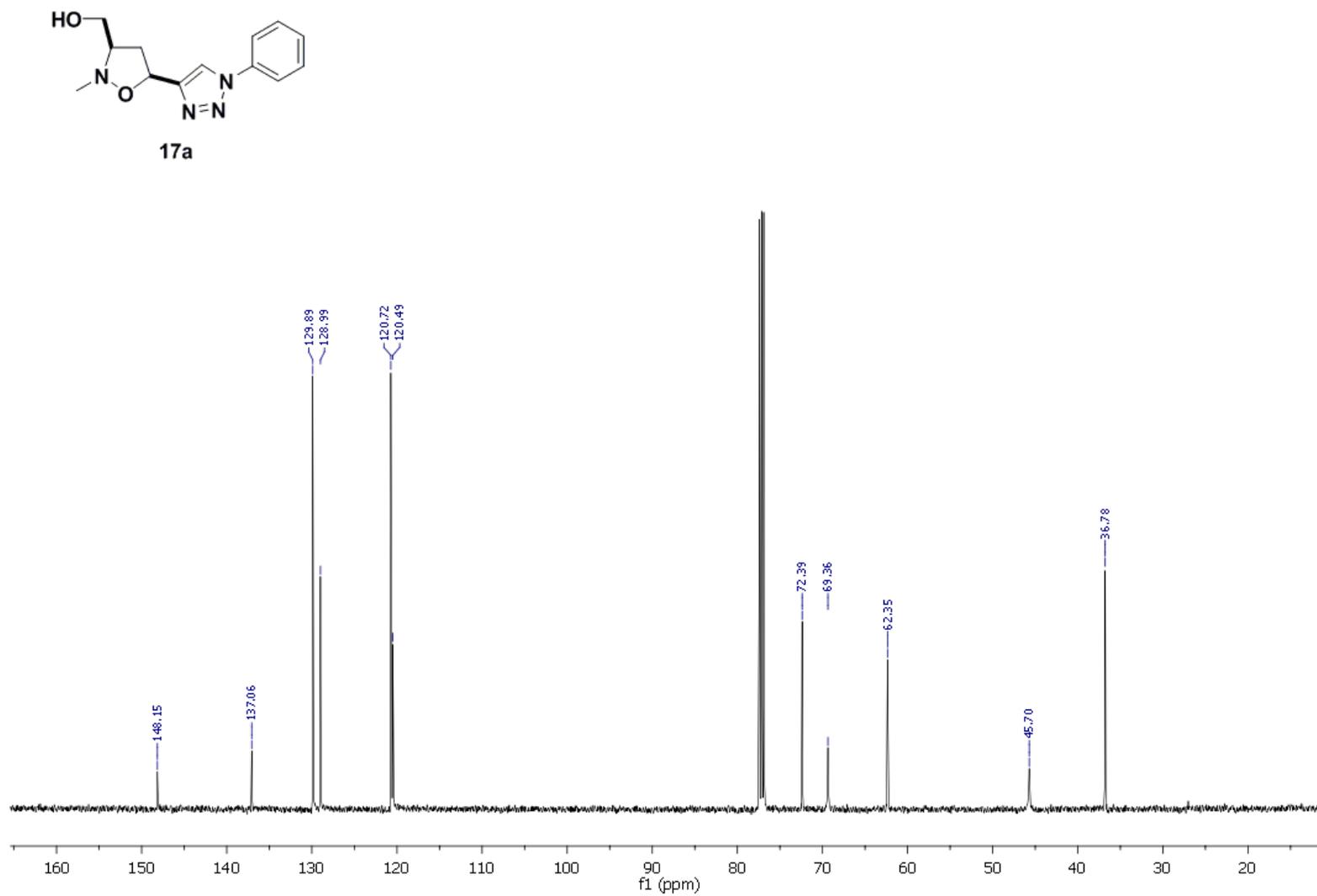


Figure S34. ^{13}C -NMR (125 MHz, CDCl_3) of compound **17a**.

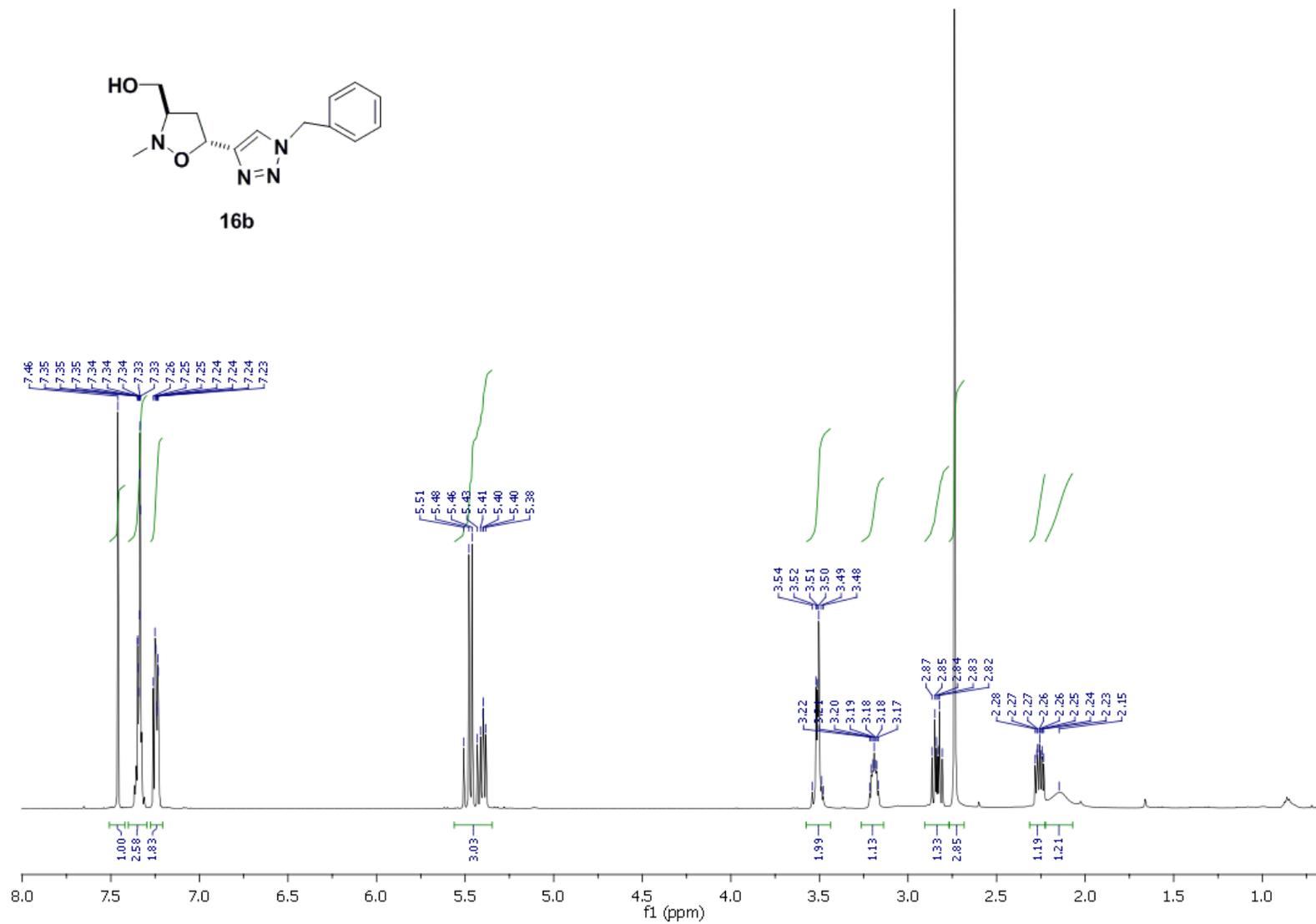


Figure S35. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **16b**.

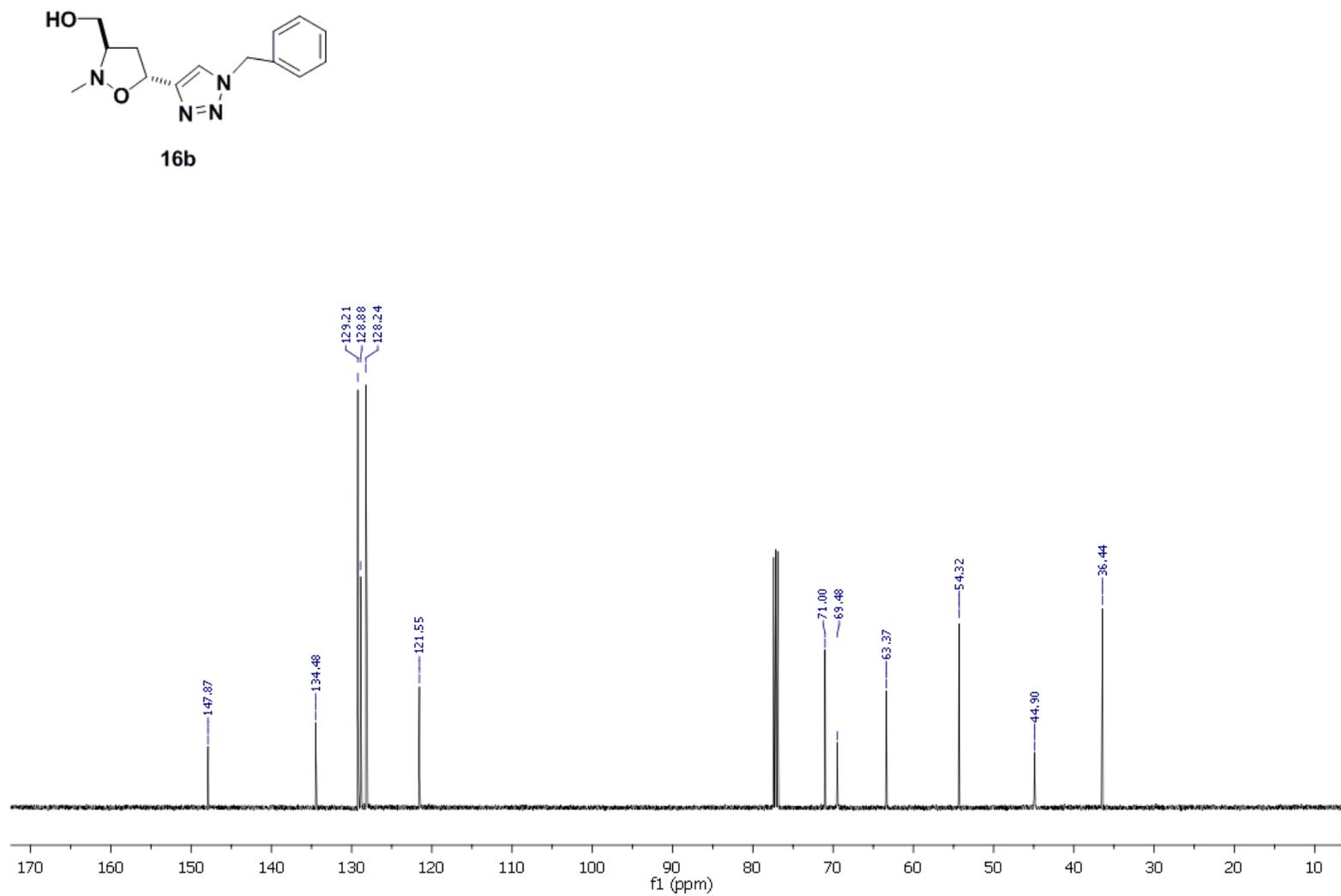


Figure S36. ¹³C-NMR (125 MHz, CDCl₃) of compound **16b**.

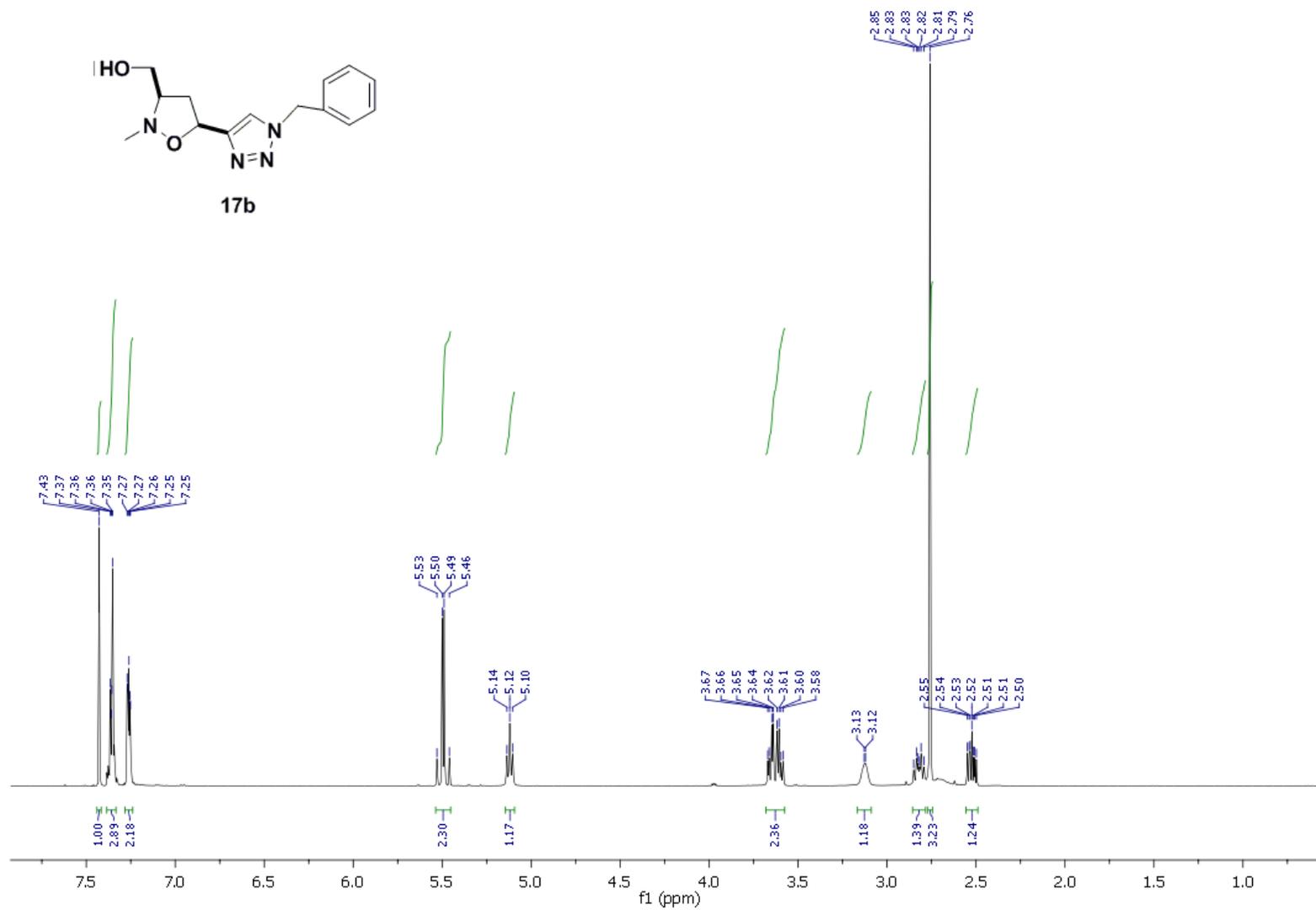


Figure S37. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **17b**.

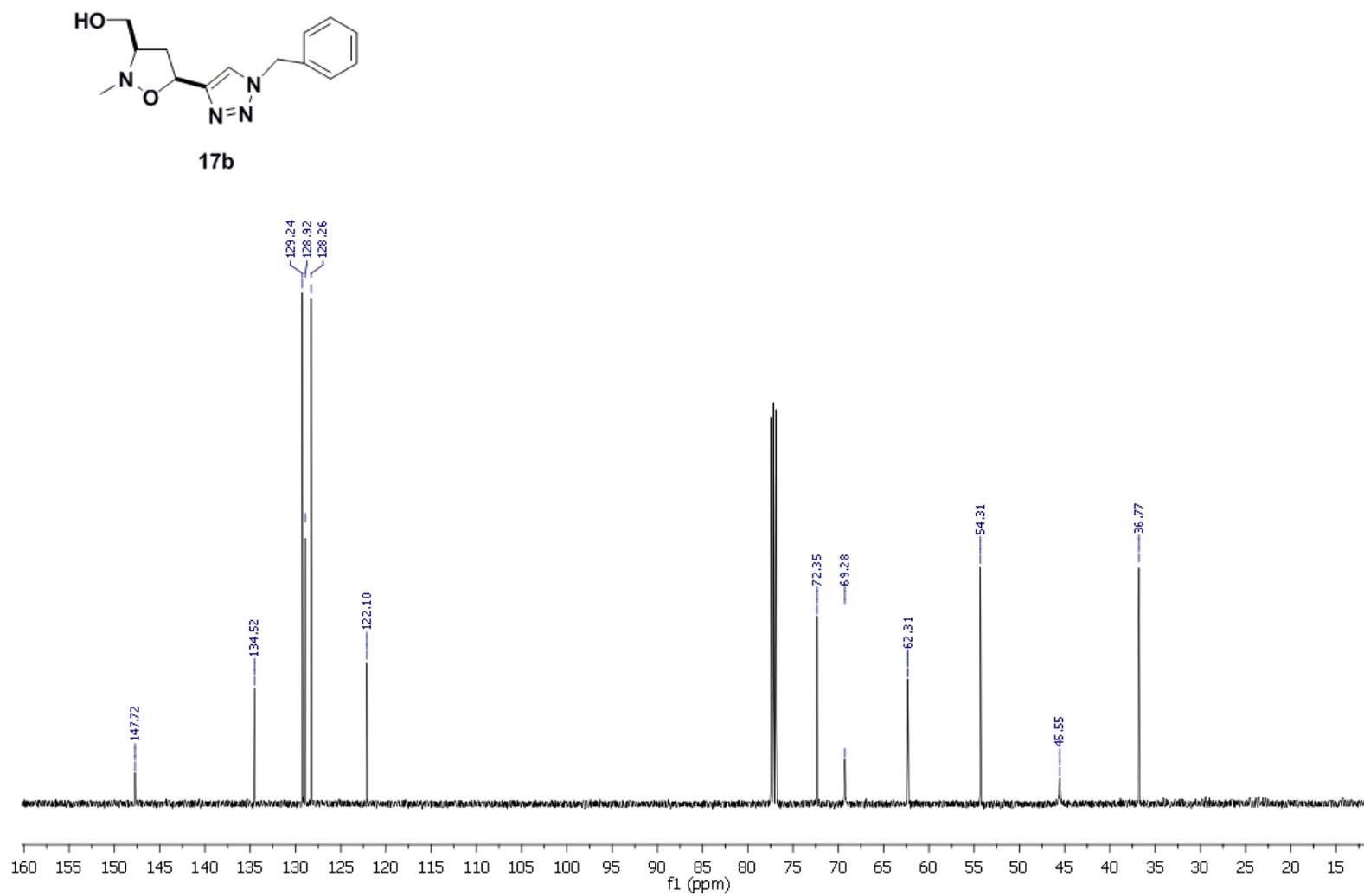


Figure S38. ^{13}C -NMR (125 MHz, CDCl_3) of compound **17b**.

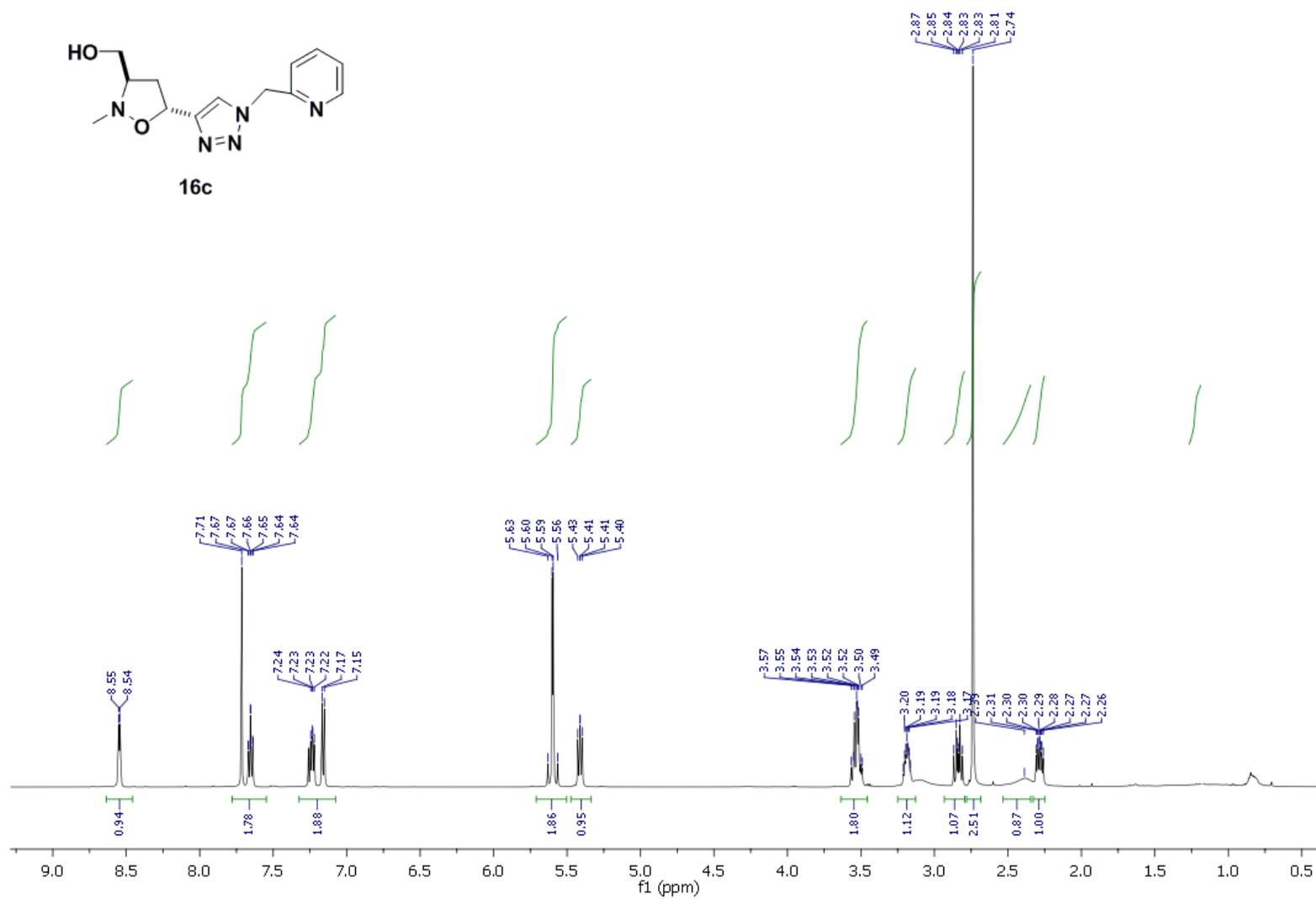
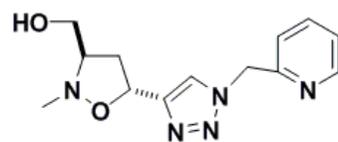
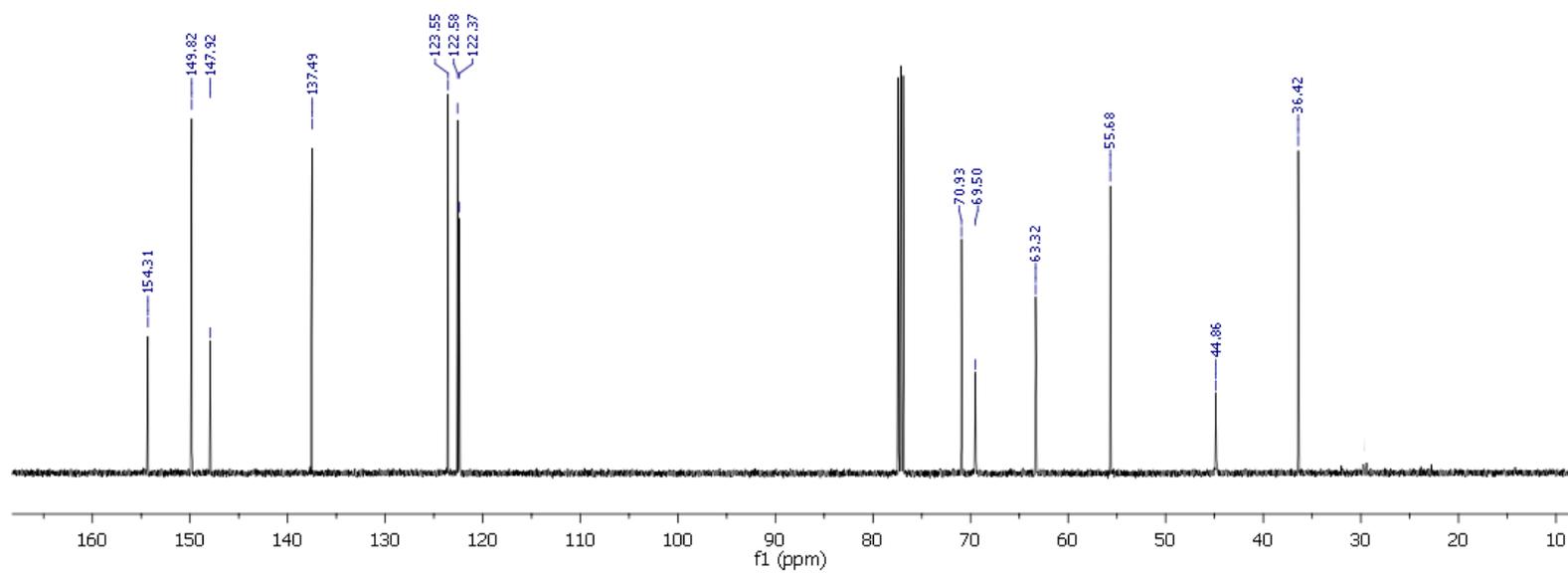


Figure S39. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **16c**.



16c

**Figure S40.** ^{13}C -NMR (125 MHz, CDCl_3) of compound 16c.

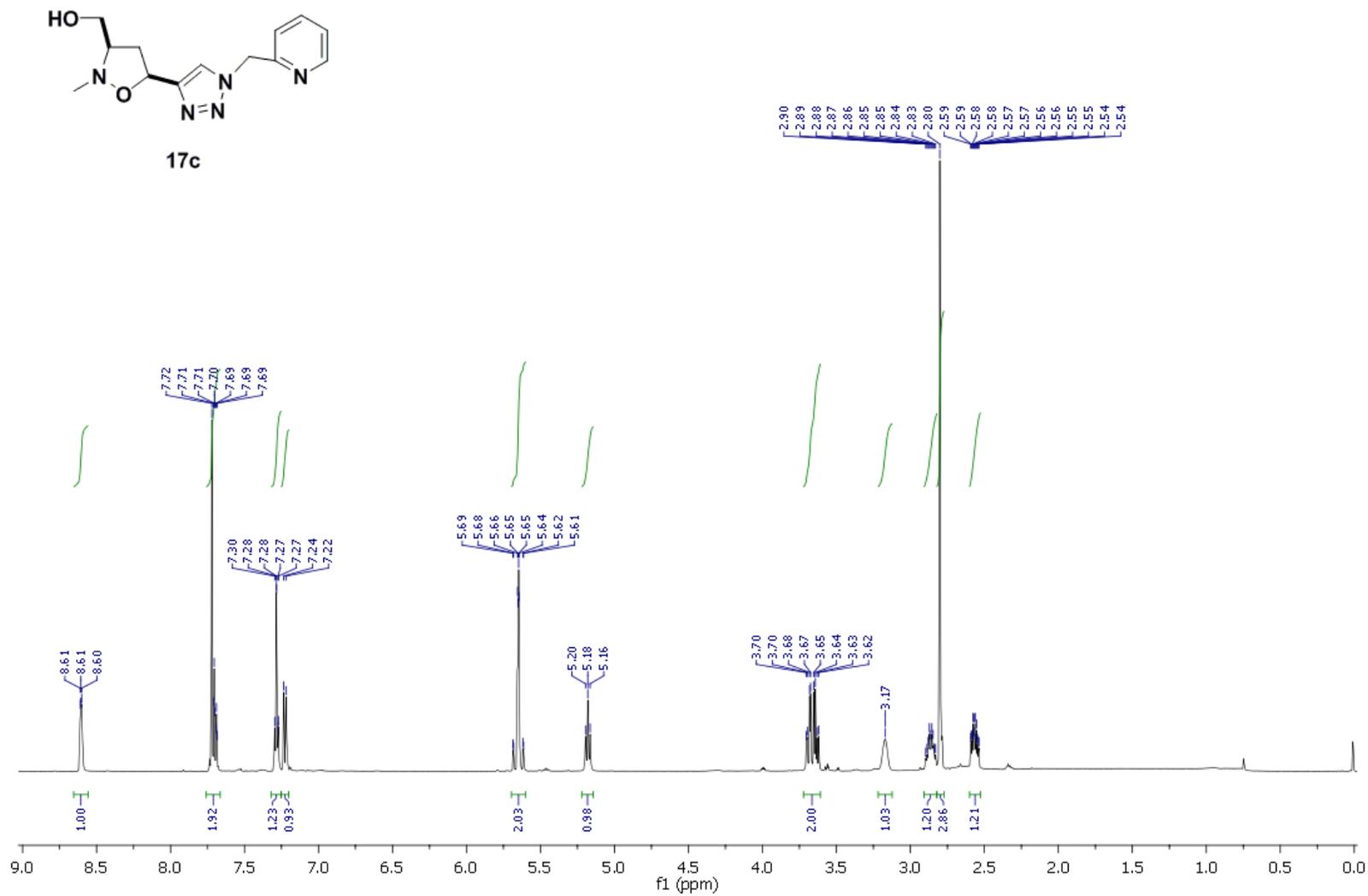


Figure S41. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **17c**.

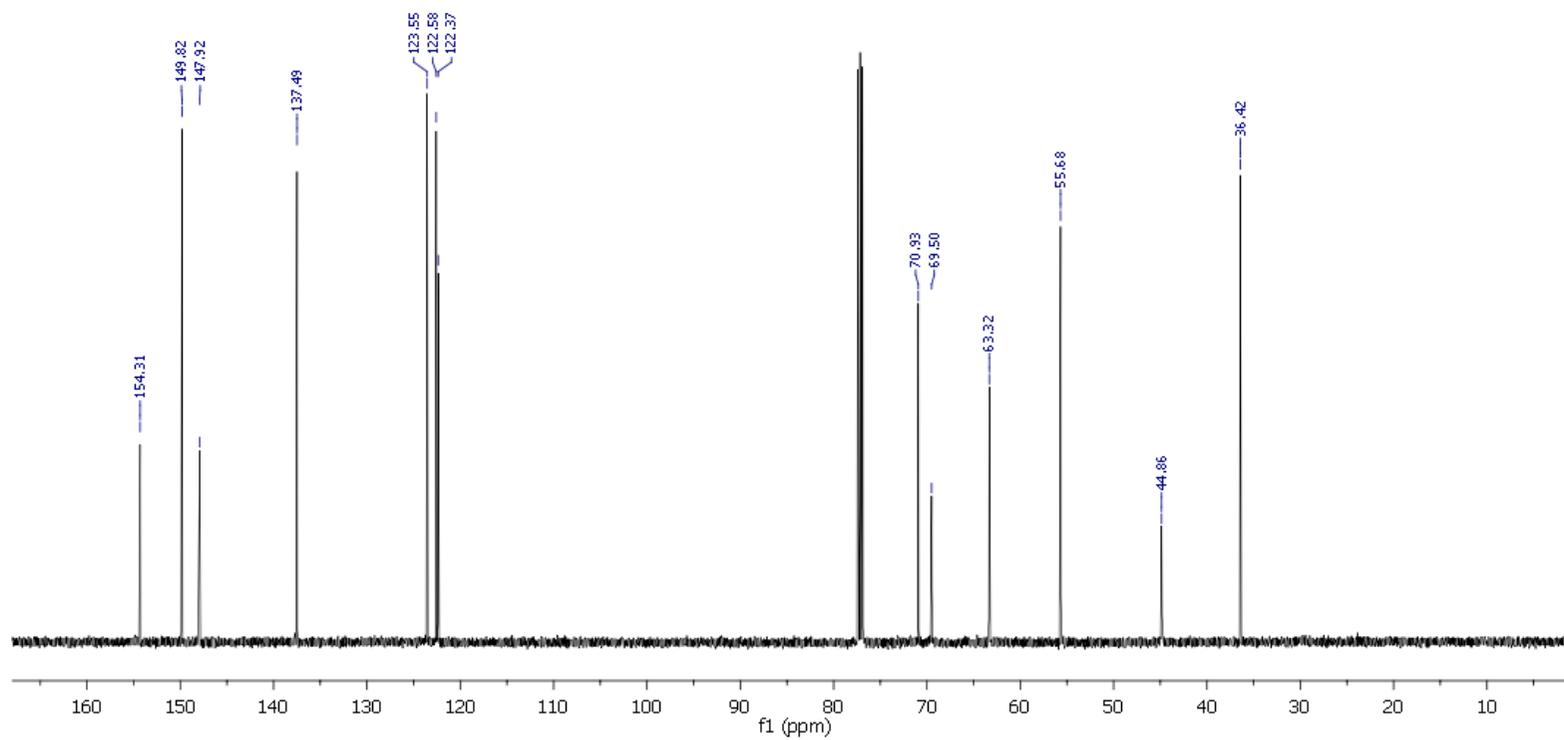
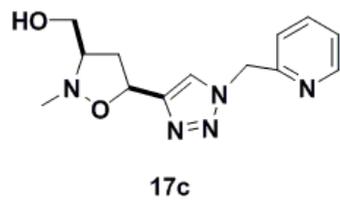


Figure S42. ^{13}C -NMR (125 MHz, CDCl_3) of compound 17c.

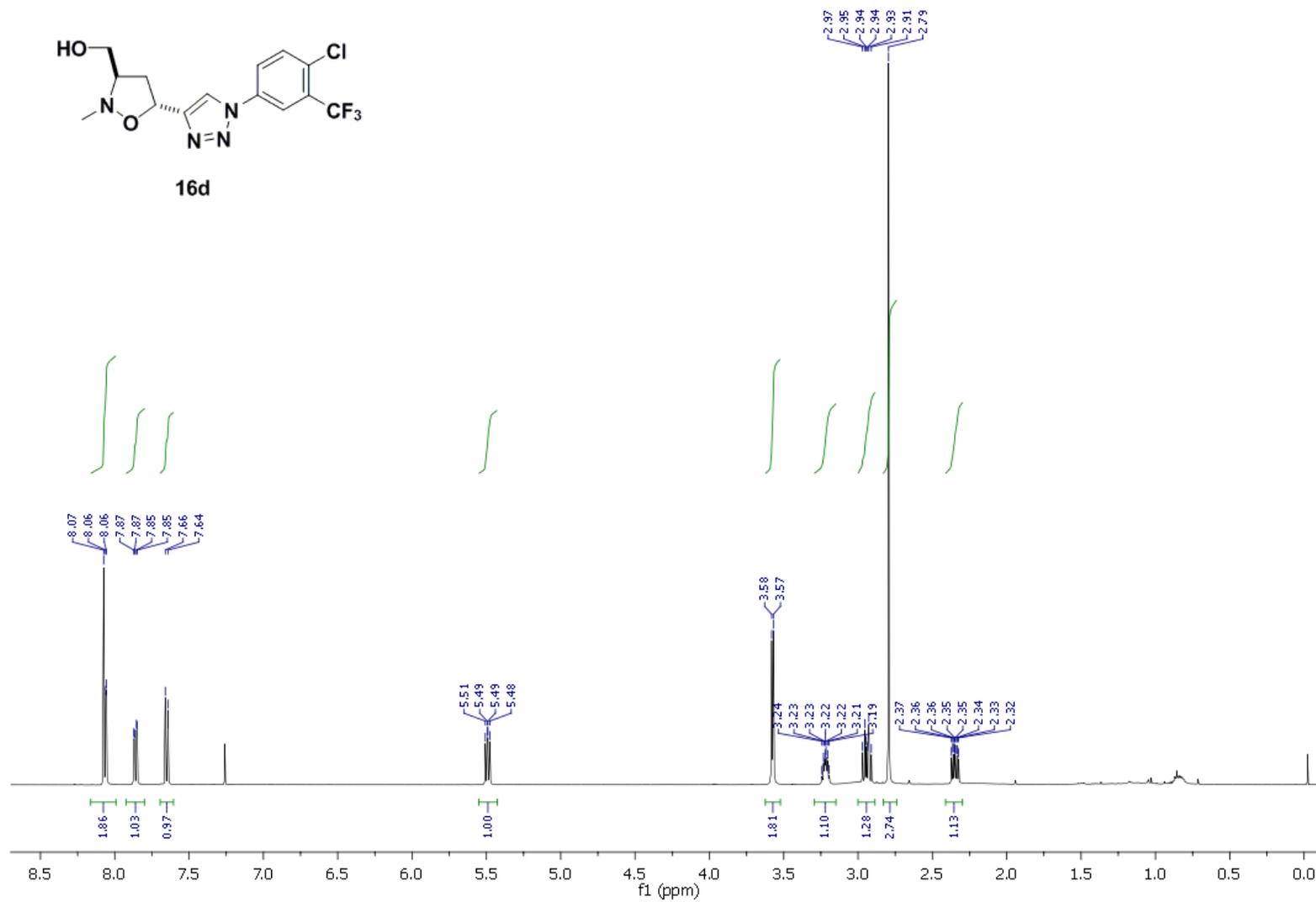
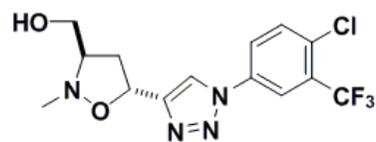
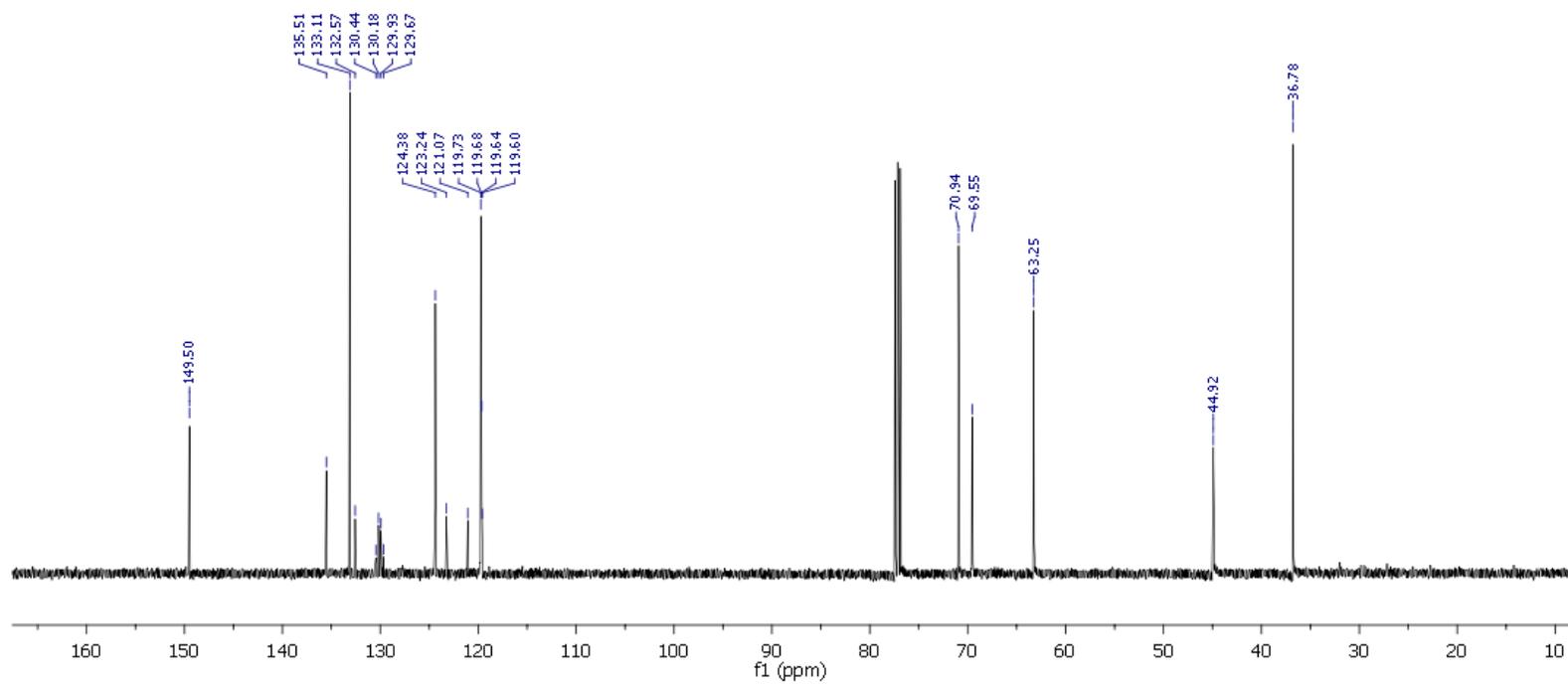


Figure S43. ¹H-NMR (500 MHz, CDCl₃) of compound 16d.



16d

Figure S44. ¹³C-NMR (125 MHz, CDCl₃) of compound 16d.

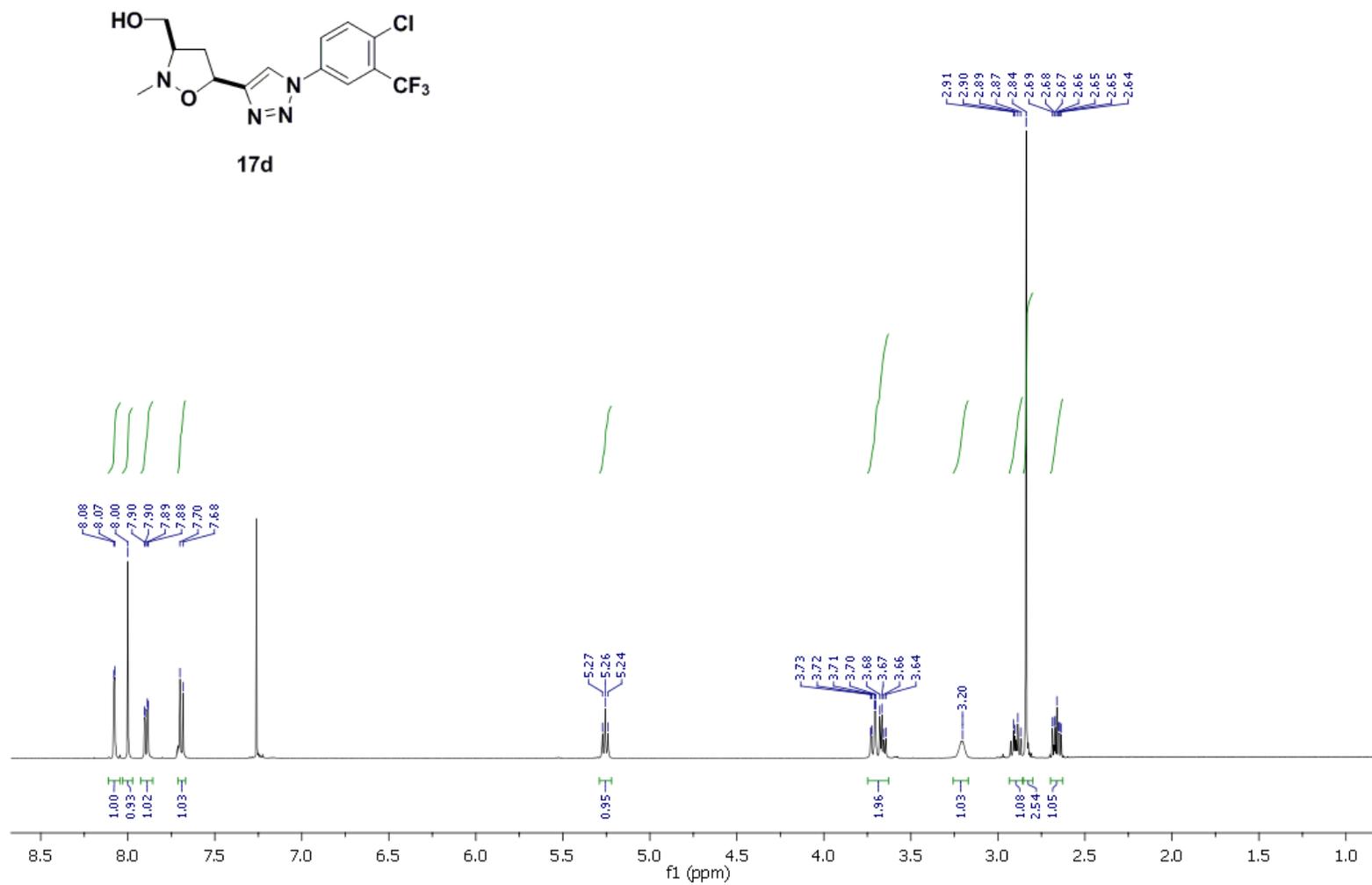


Figure S45. ¹H-NMR (500 MHz, CDCl₃) of compound **17d**.

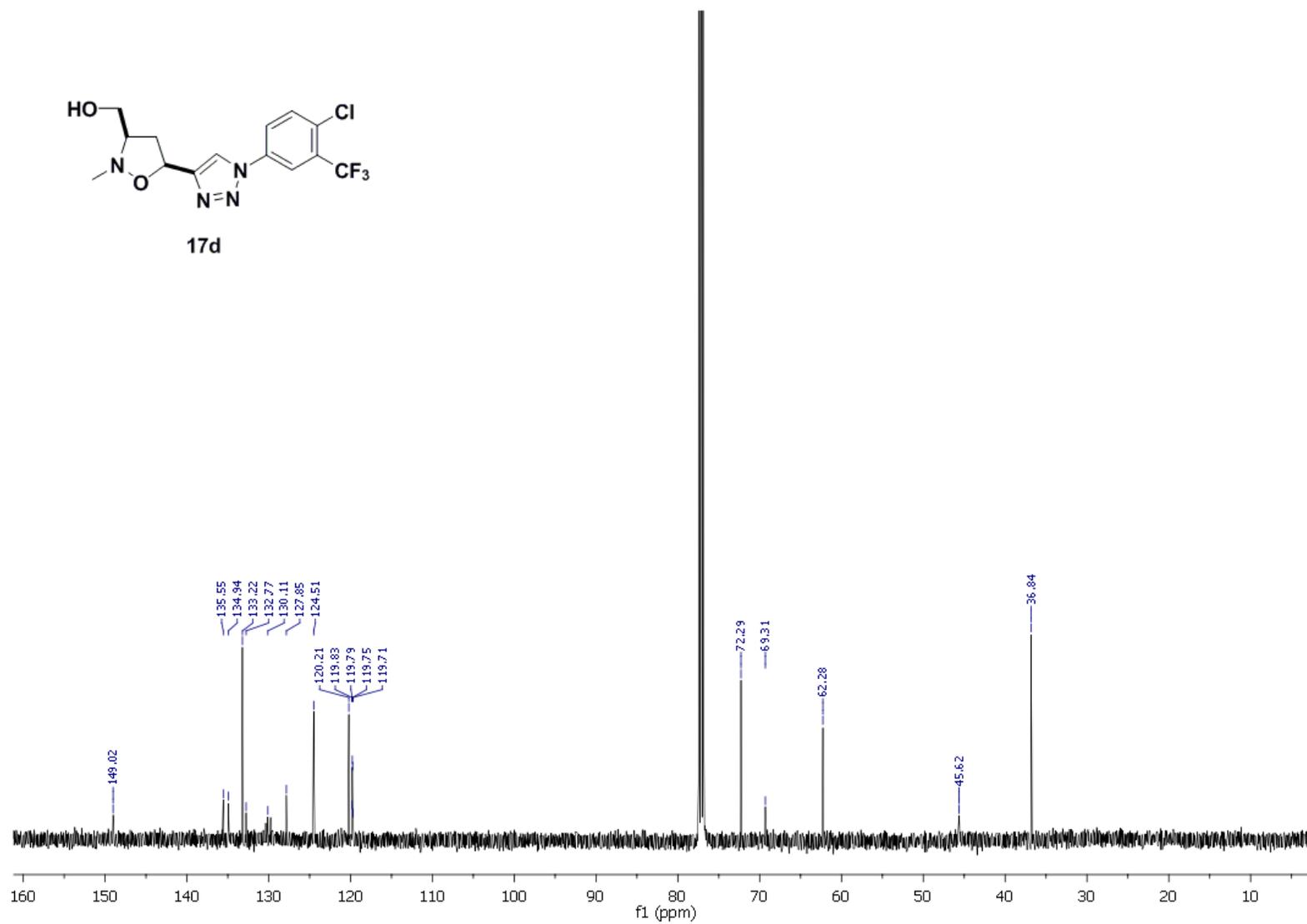


Figure S46. ^{13}C -NMR (125 MHz, CDCl_3) of compound **17d**.

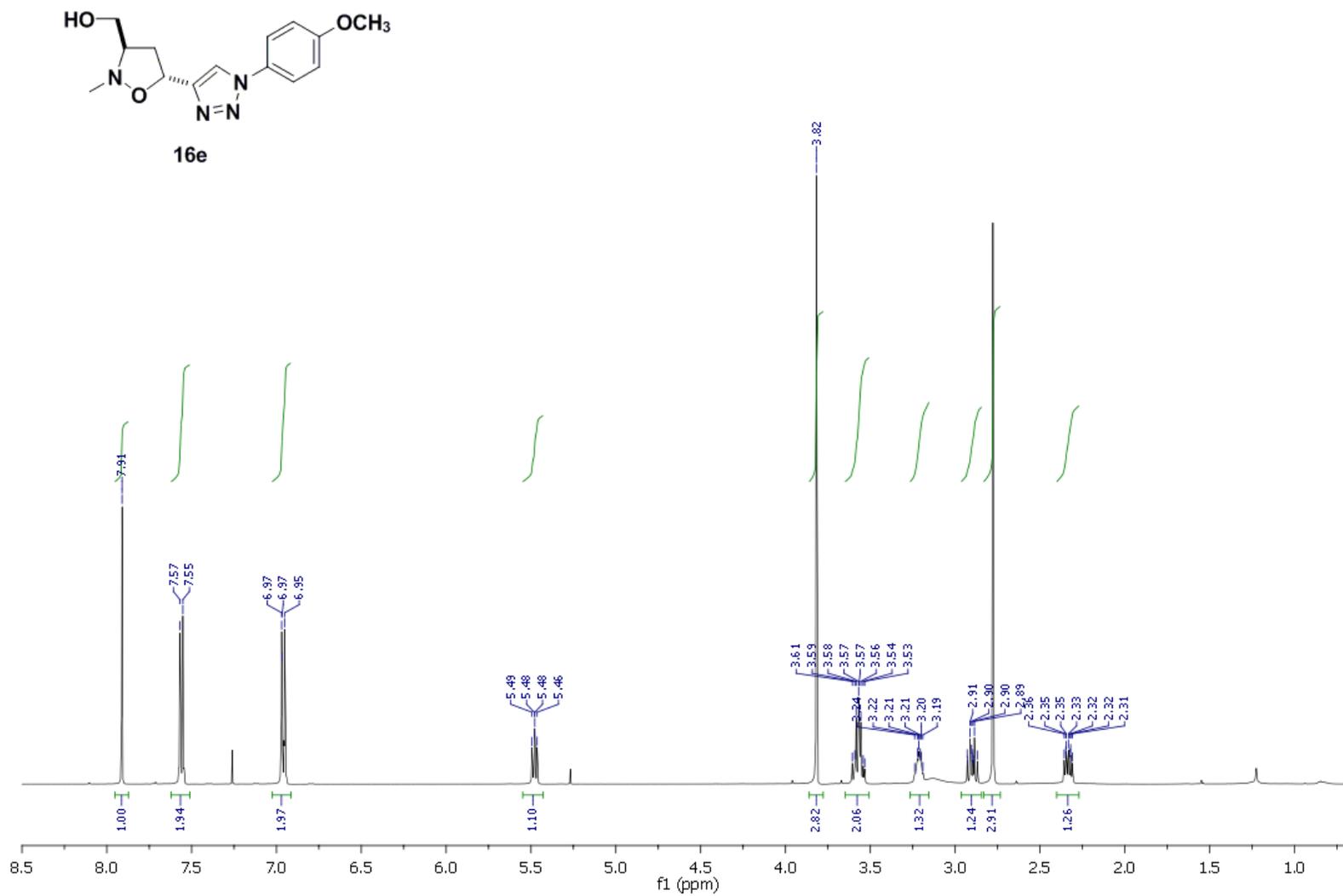
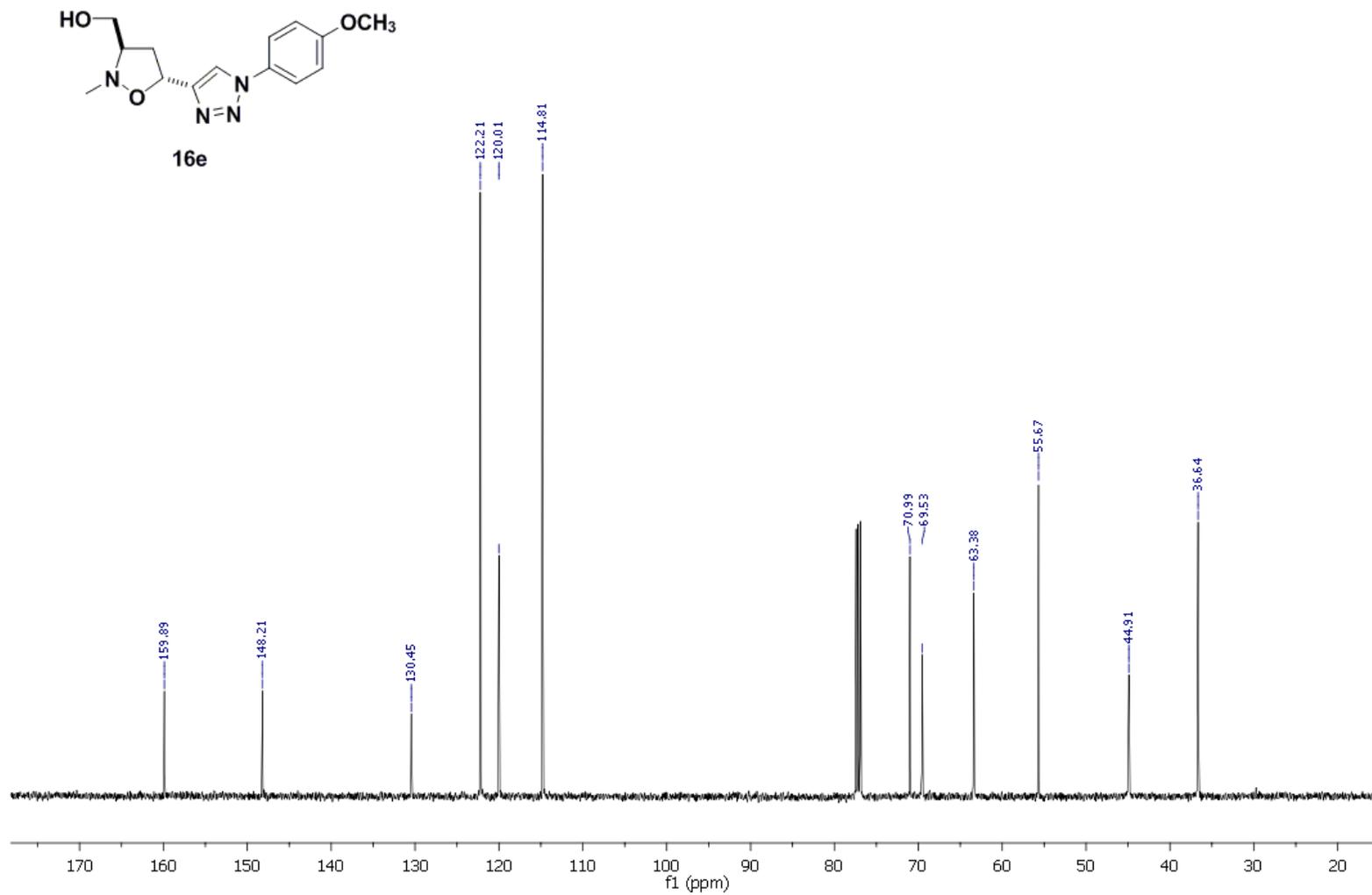


Figure S47. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **16e**.



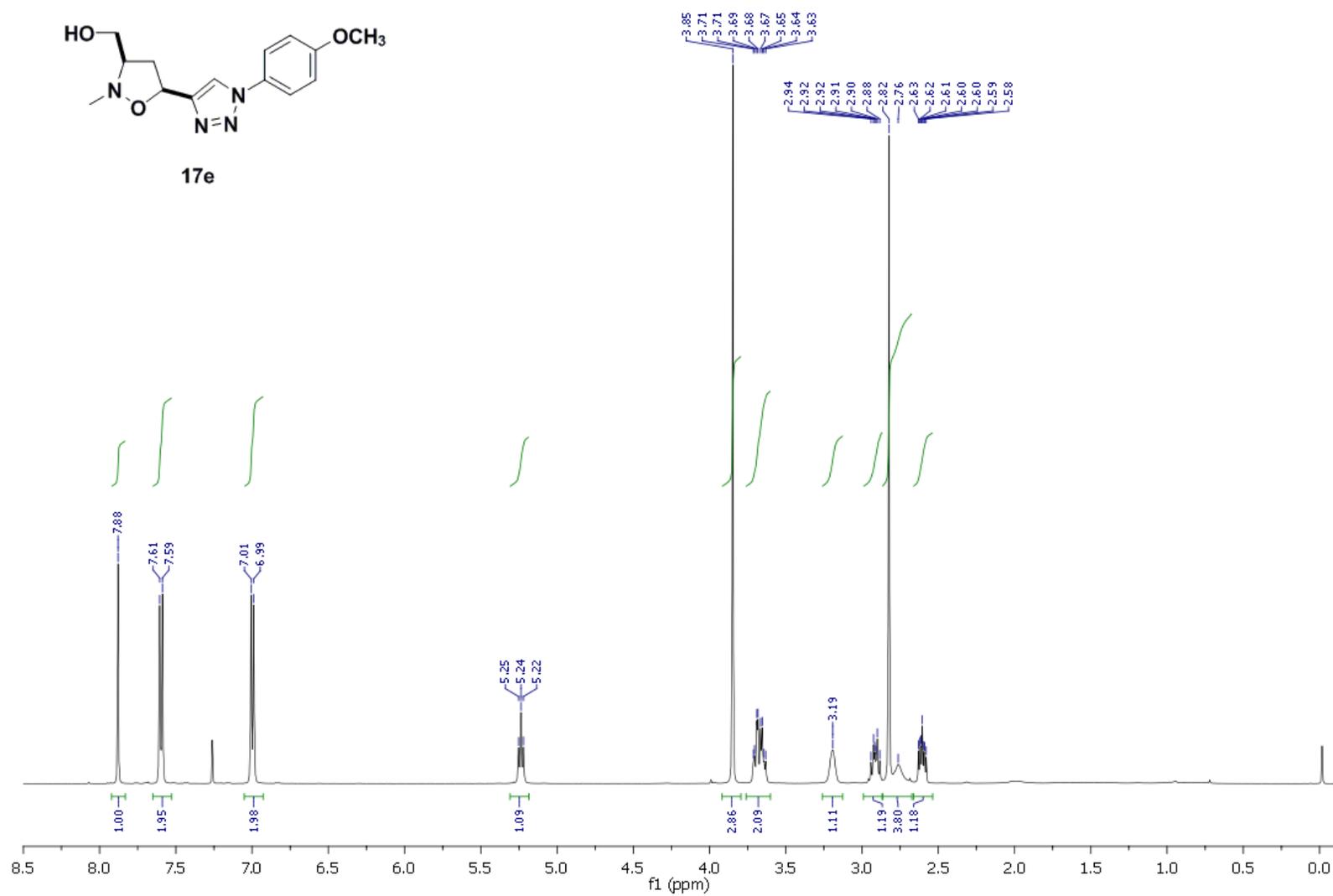
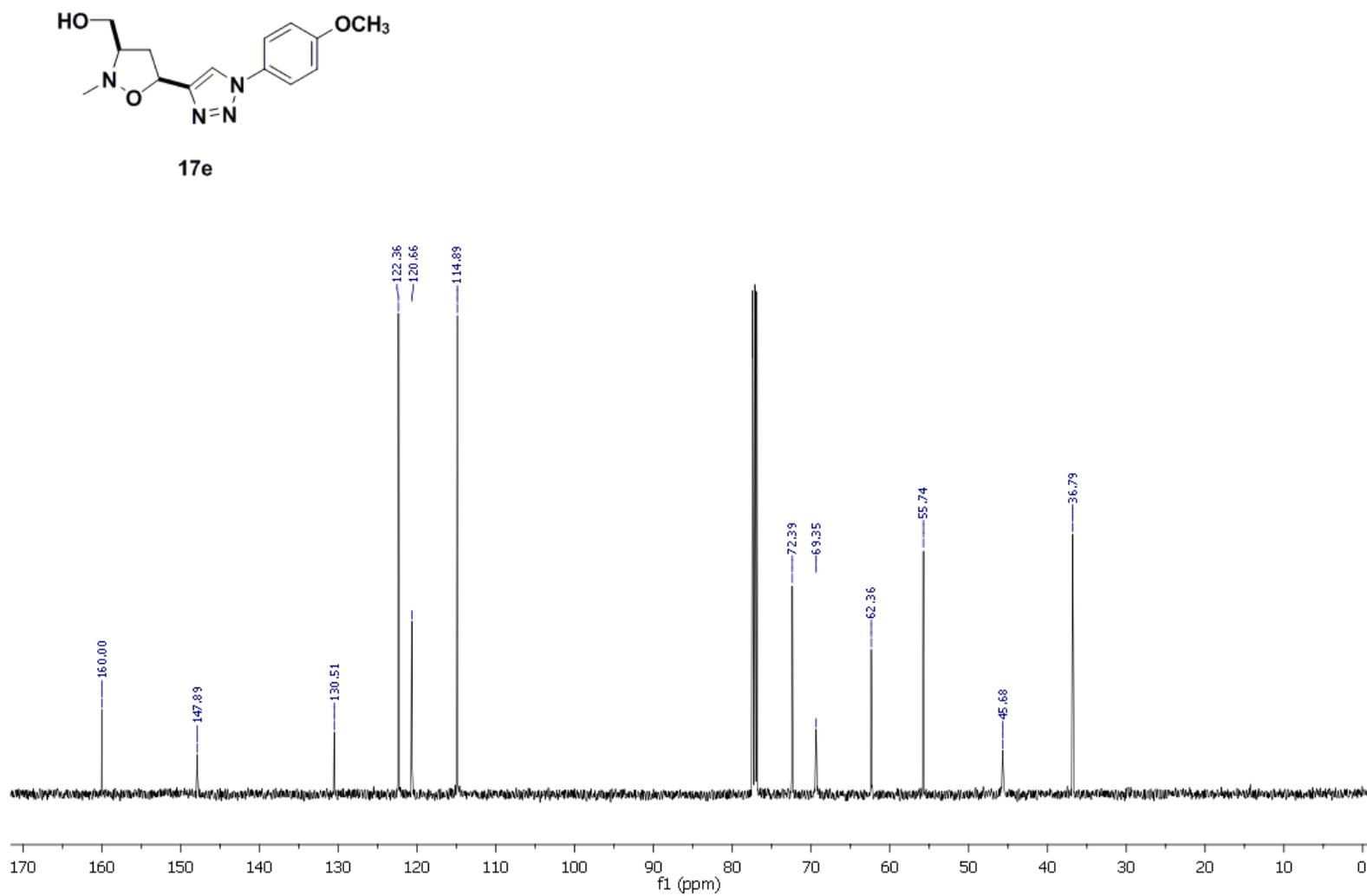


Figure S49. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **17e**.



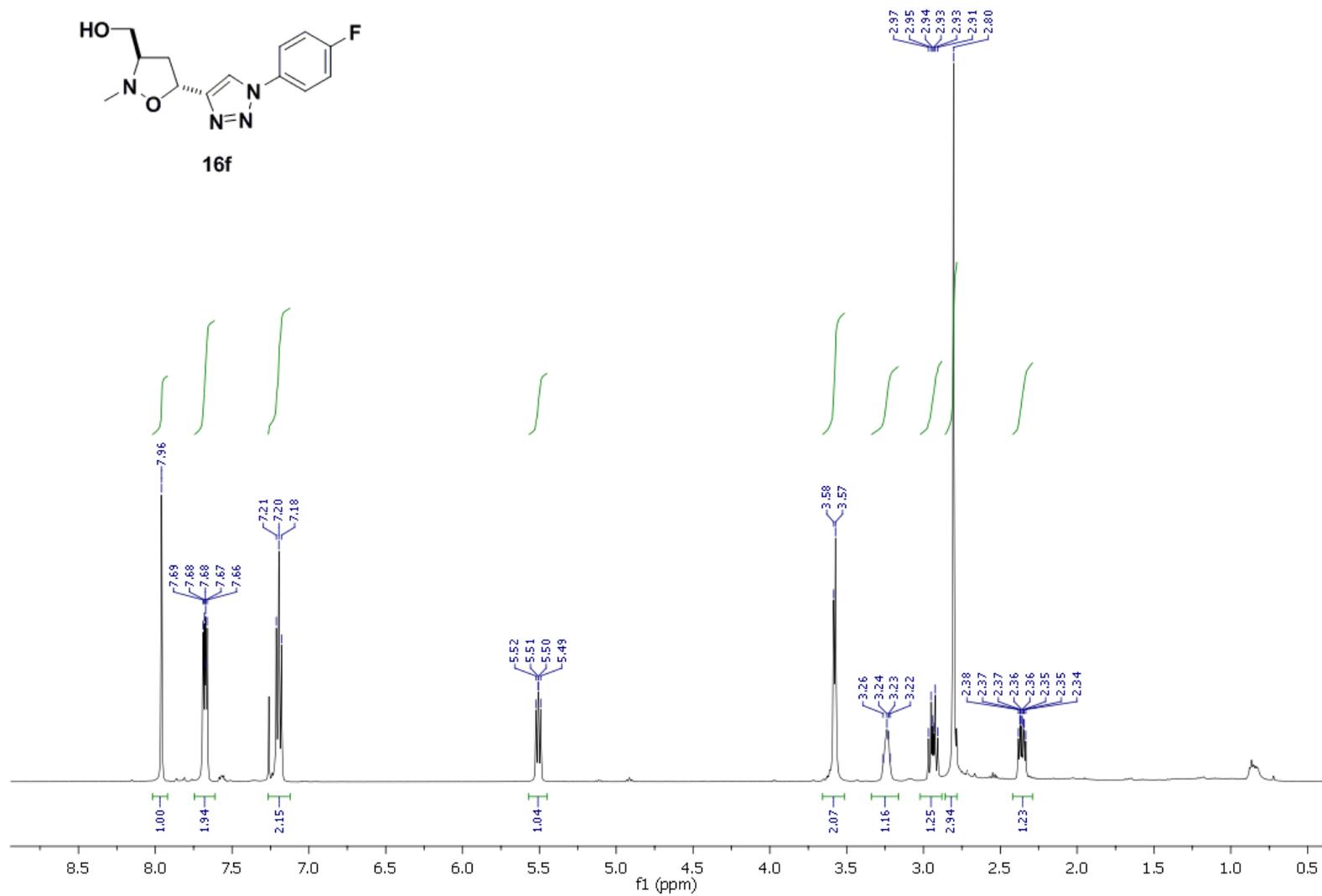


Figure S51. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **16f**.

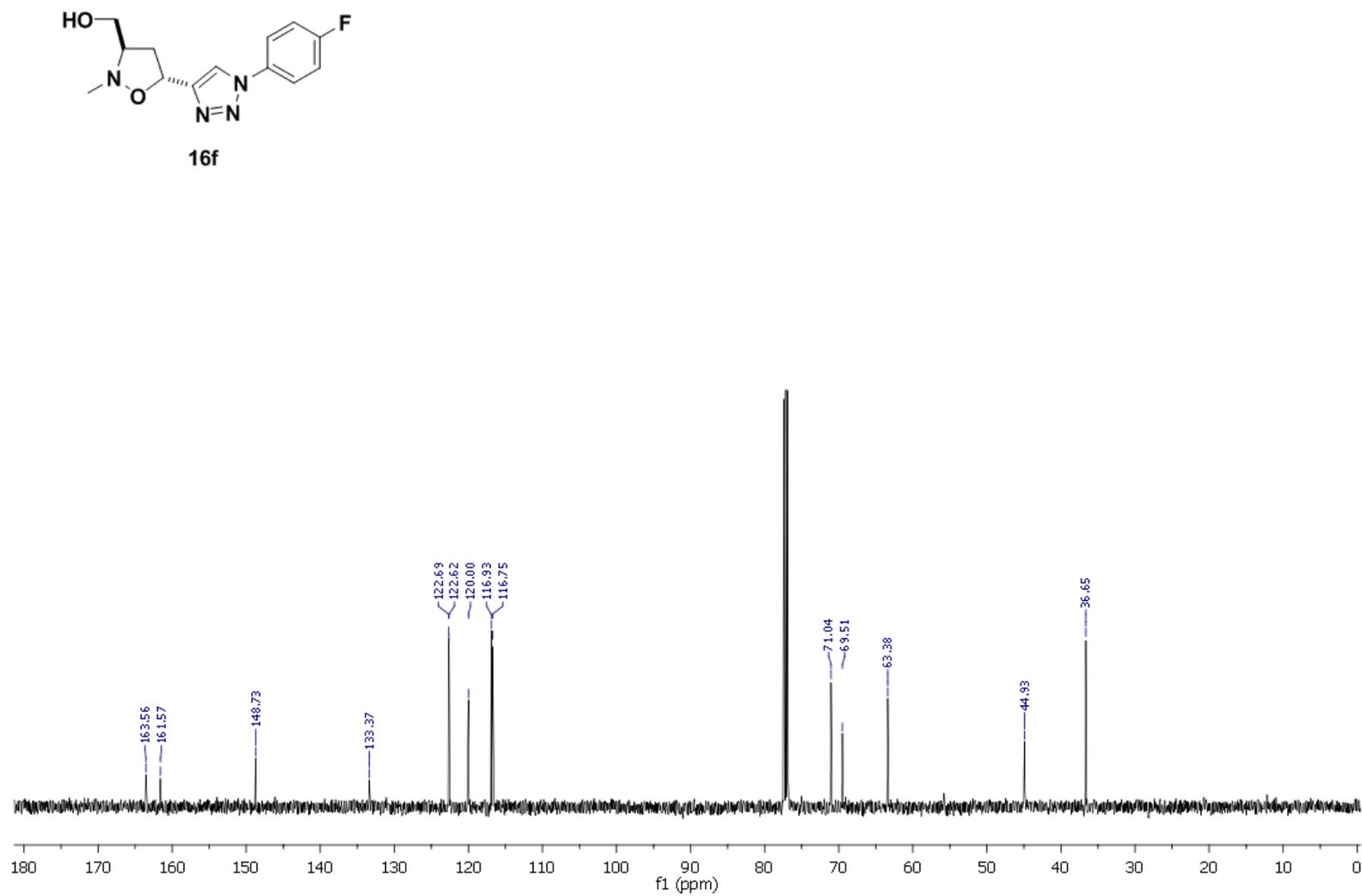


Figure S52. ¹³C-NMR (125 MHz, CDCl₃) of compound **16f**.

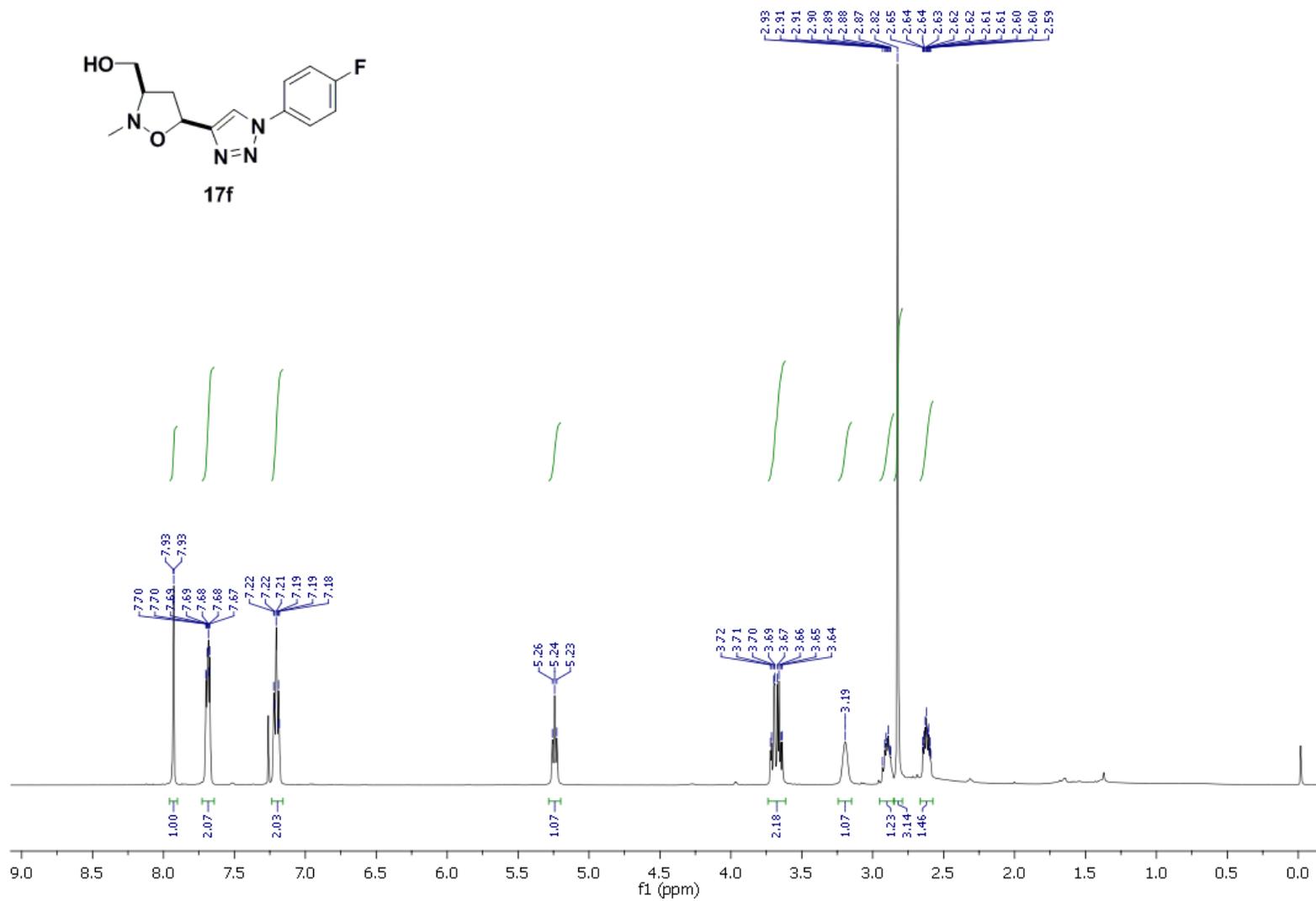


Figure S53. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **17f**.

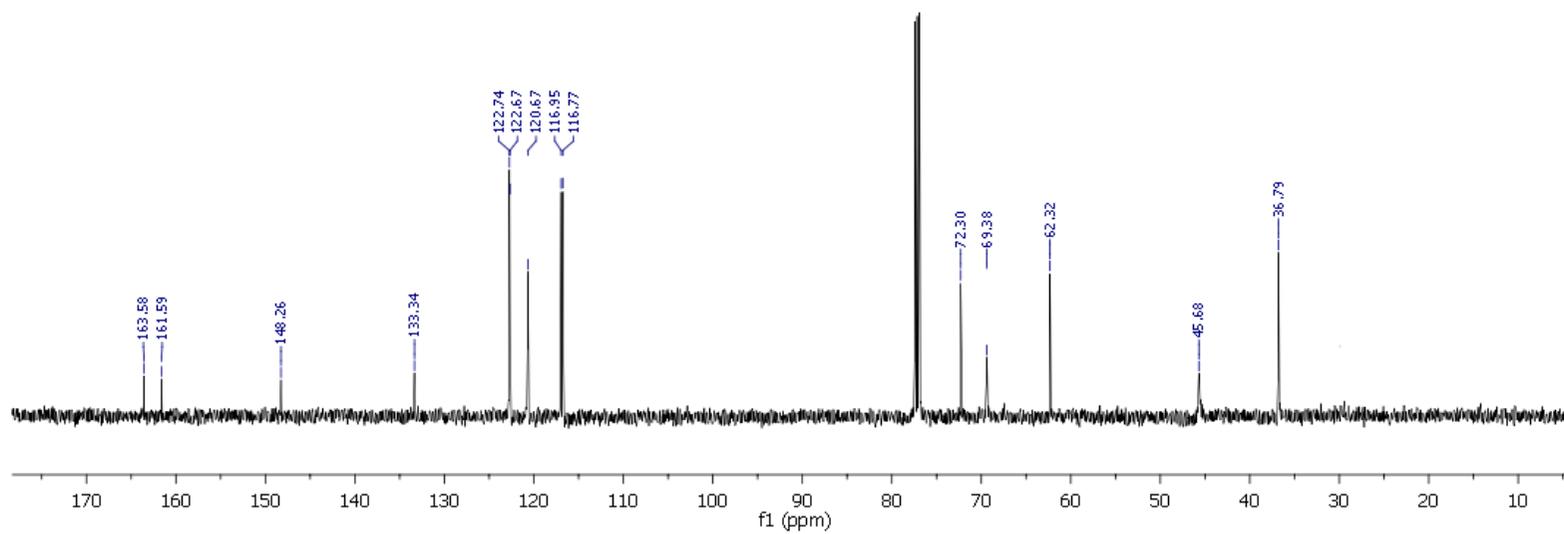
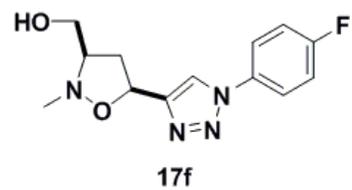


Figure S54. ^{13}C -NMR (125 MHz, CDCl_3) of compound 17f.

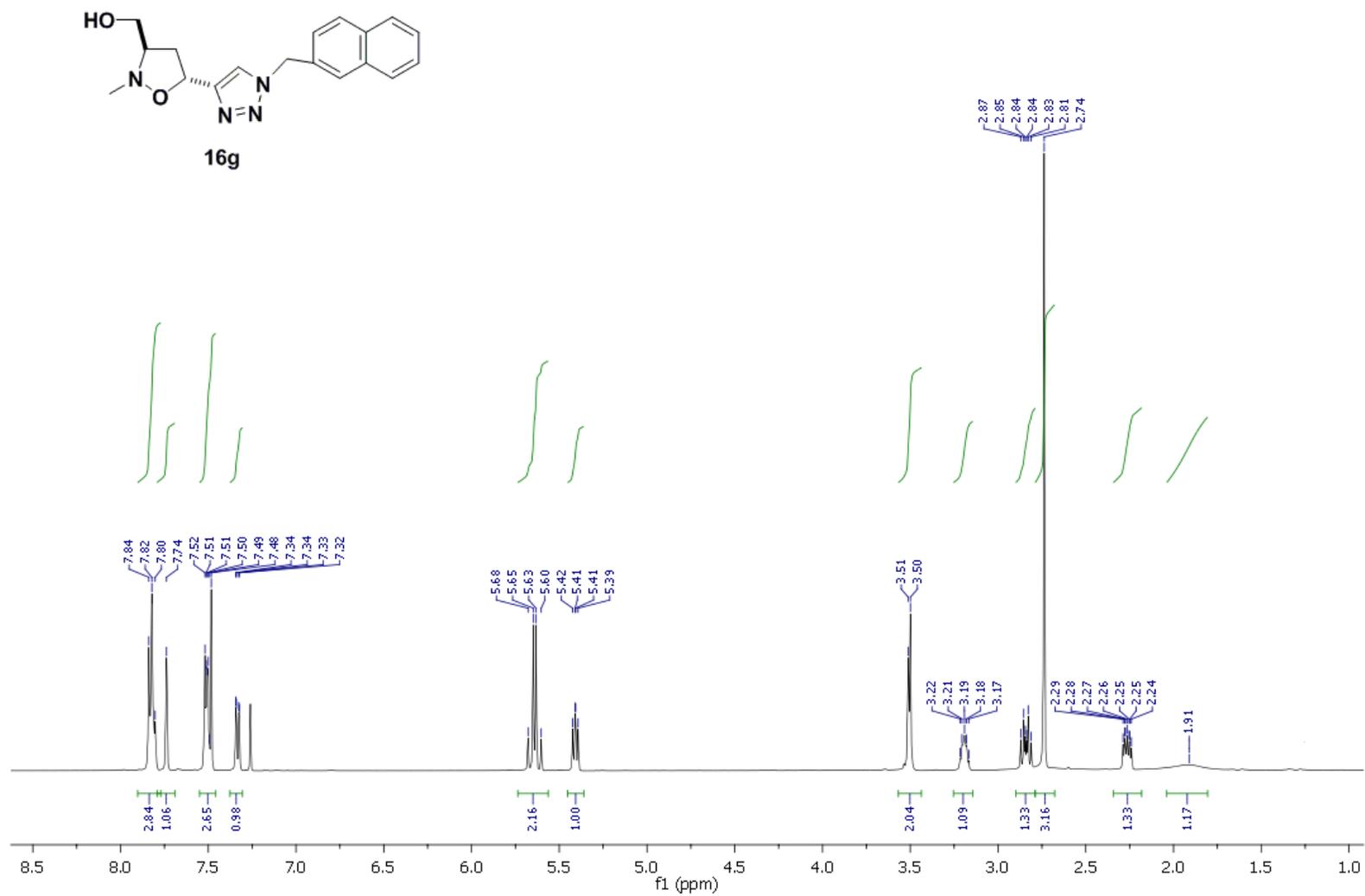


Figure S55. ¹H-NMR (500 MHz, CDCl₃) of compound **16g**.

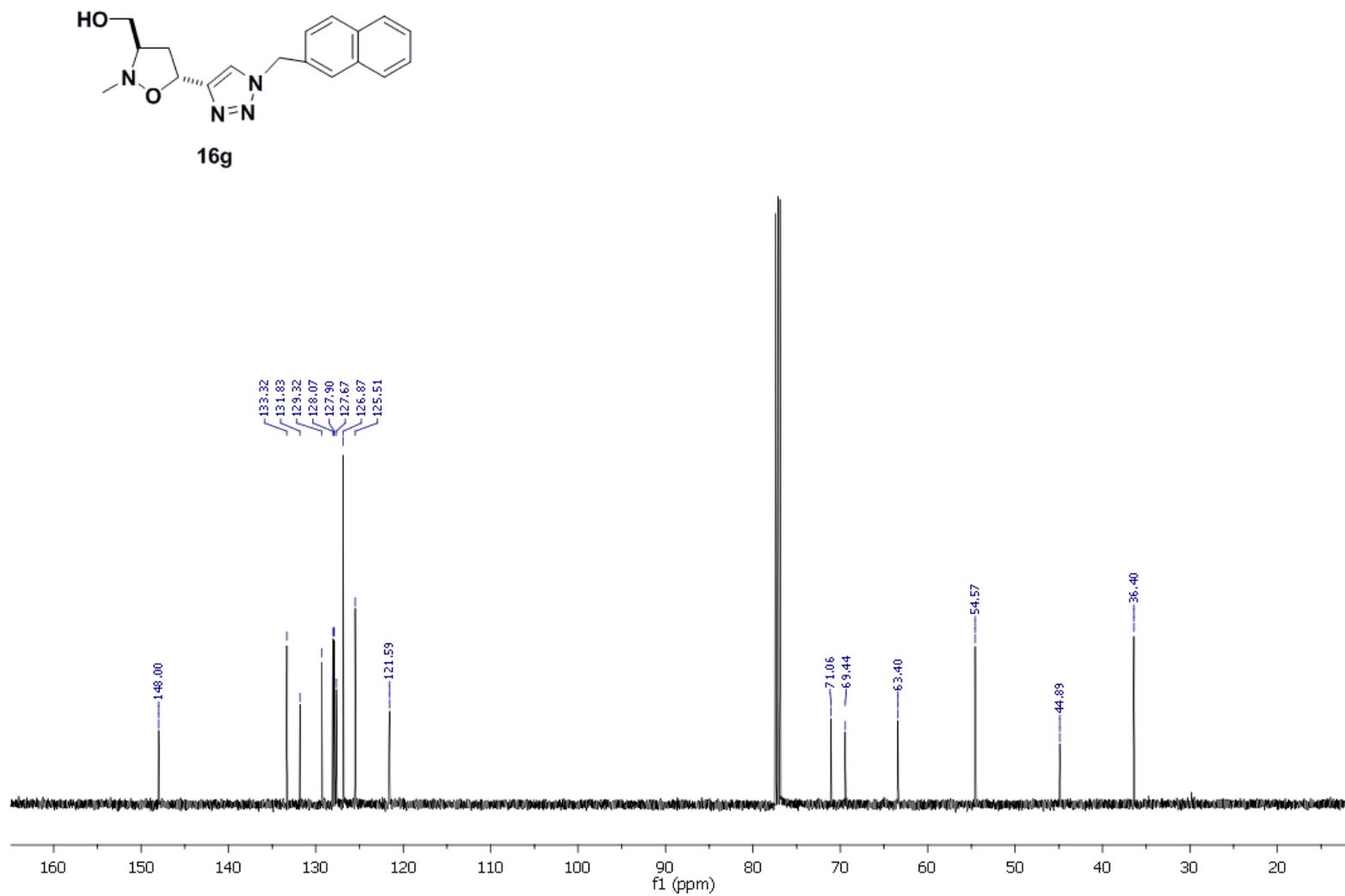


Figure S56. ¹³C-NMR (125 MHz, CDCl₃) of compound **16g**.

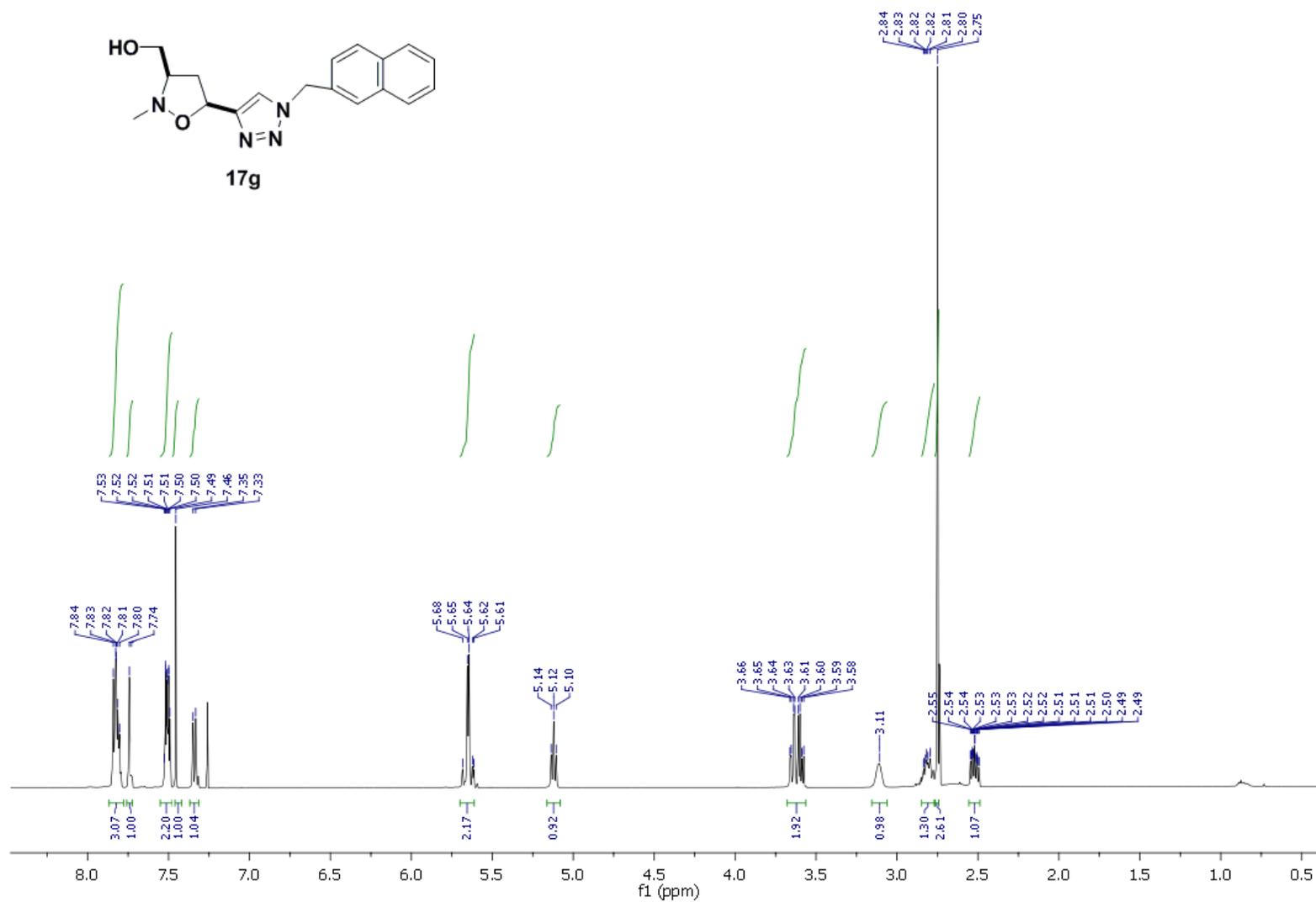


Figure S57. $^1\text{H-NMR}$ (500 MHz, CDCl_3) of compound **17g**.

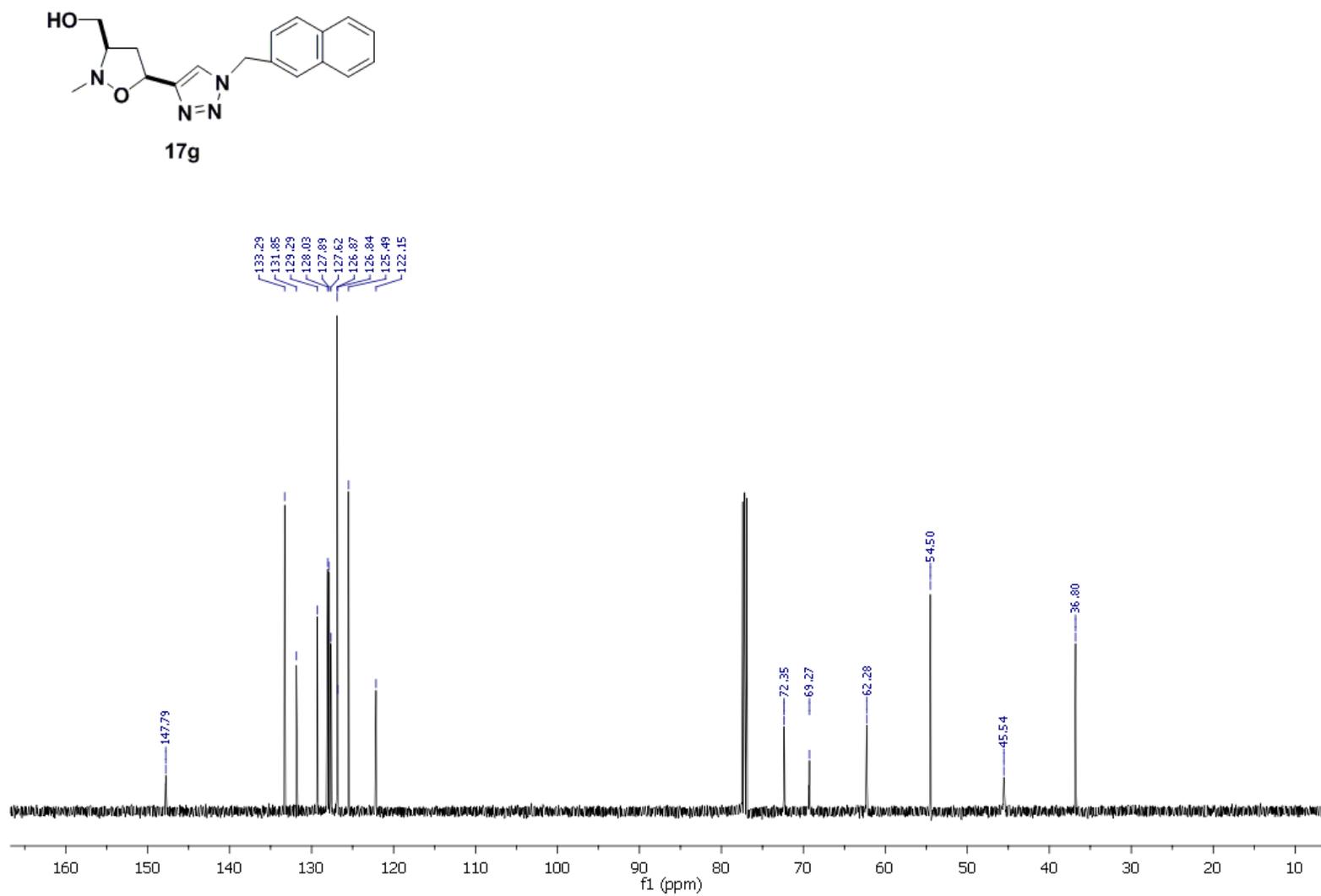


Figure S58. ^{13}C -NMR (125 MHz, CDCl_3) of compound **17g**.