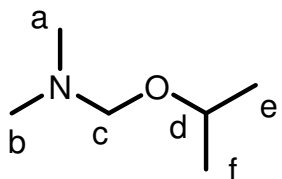
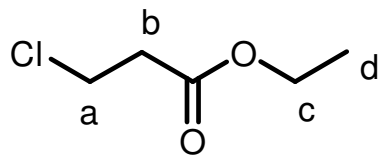
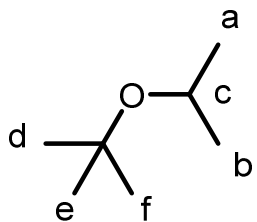
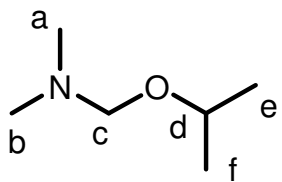
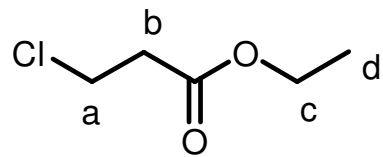
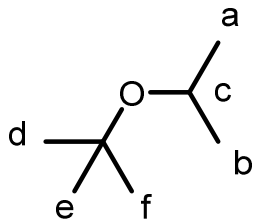
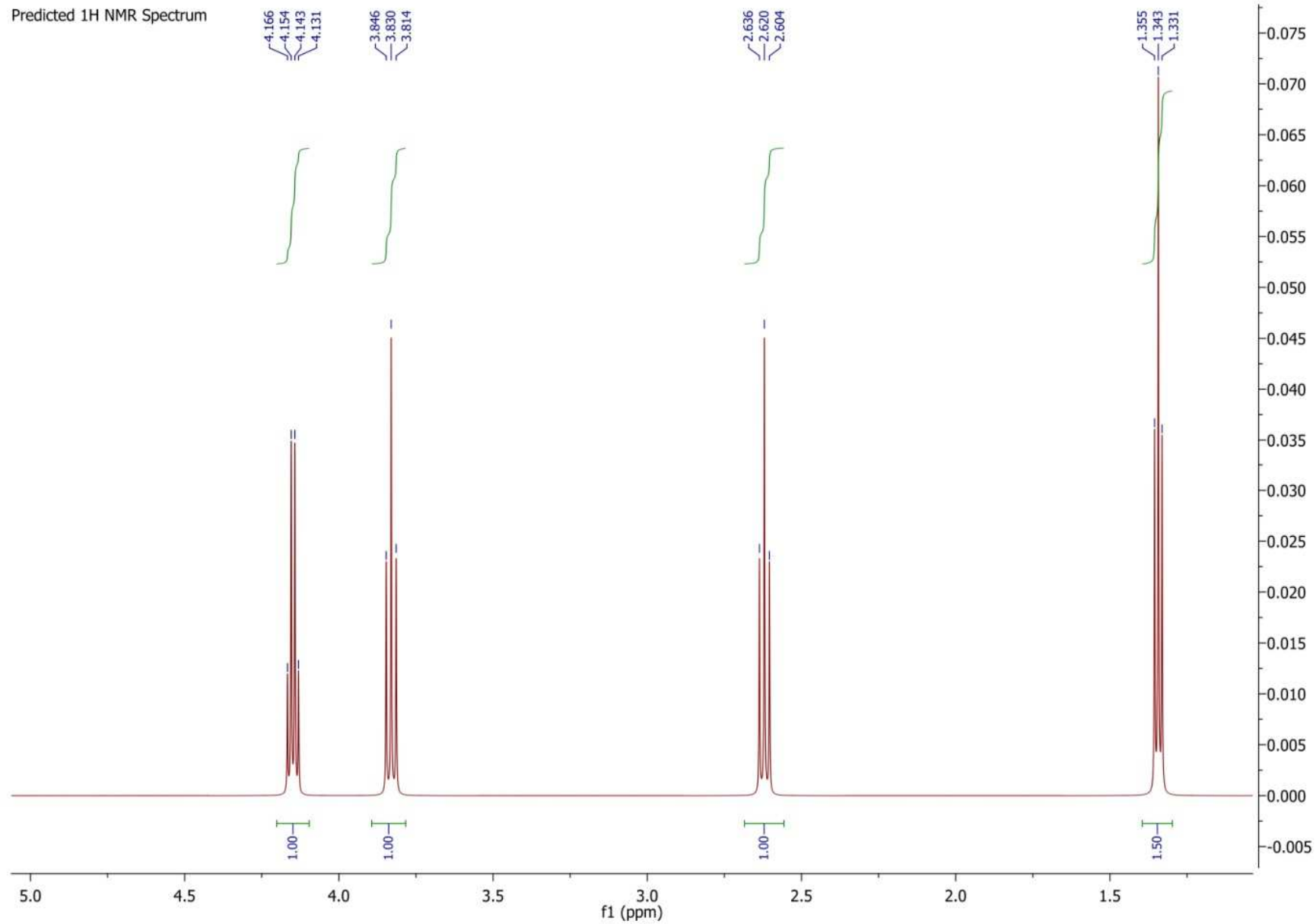


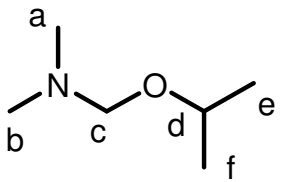
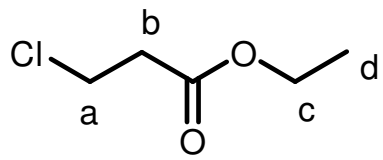
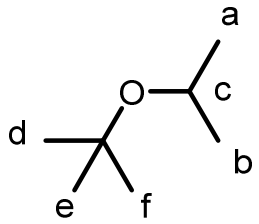
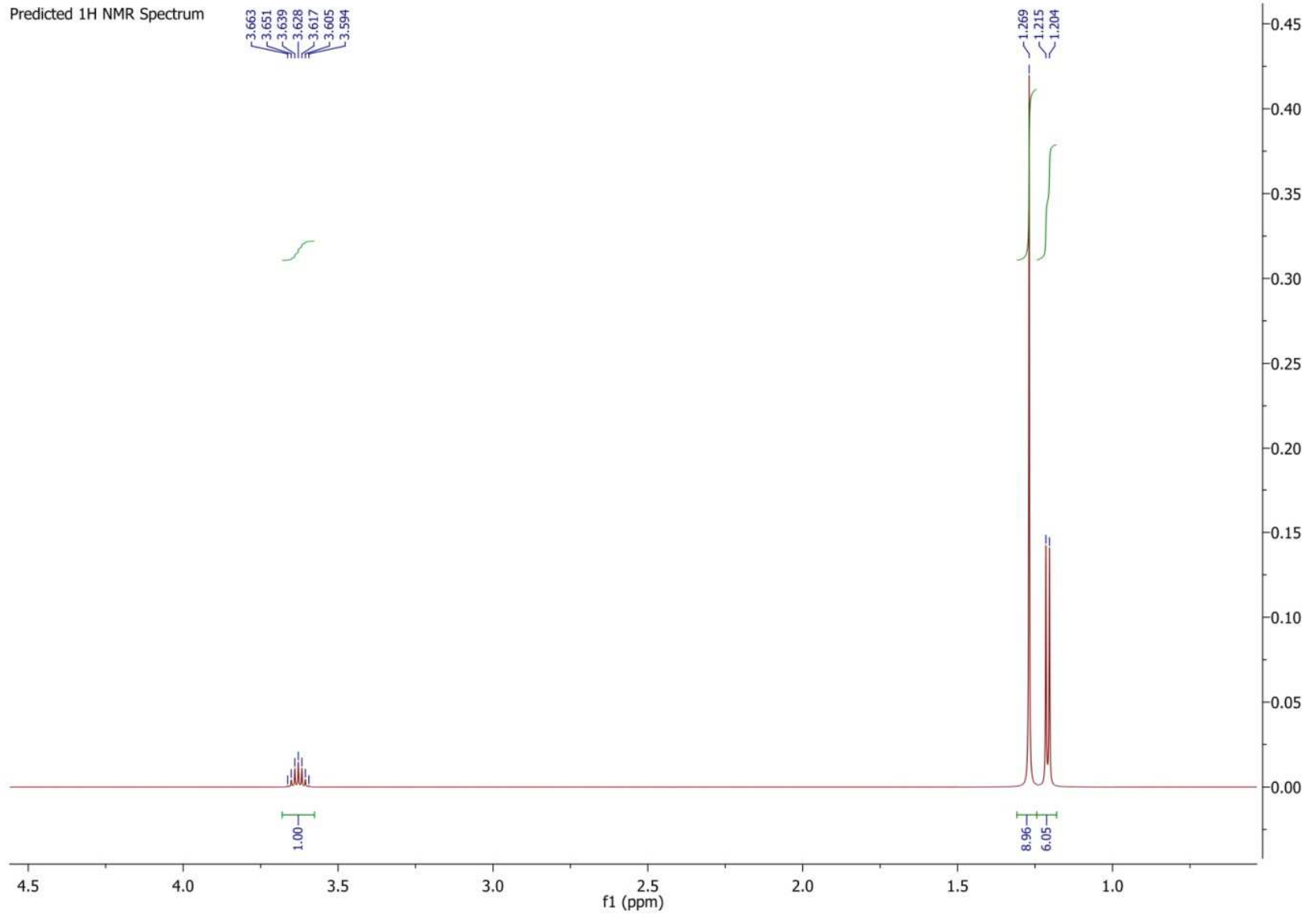
**Zadanie 1.** Dla poniższych cząsteczek przypisz sygnały w widmie  $^1\text{H-NMR}$  odpowiednim grupom protonów. Określ intensywność sygnałów, rodzaj multipletów oraz stosunki sygnałów w multiplecie. Zapisać skrótową postać widma. Widma rejestrowane dla częstotliwości pola 500MHz.



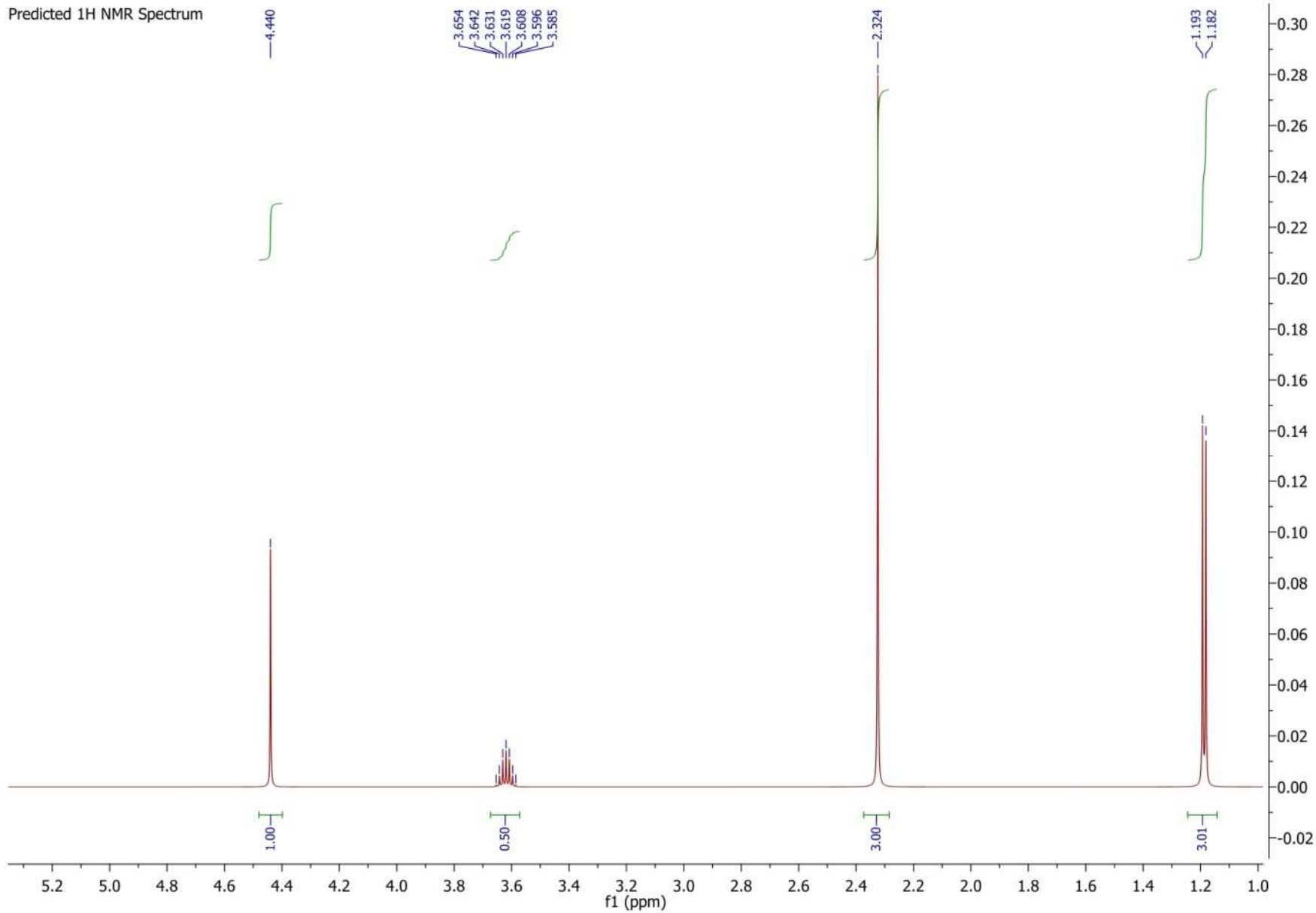
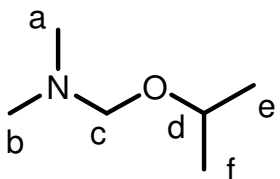
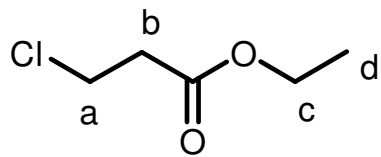
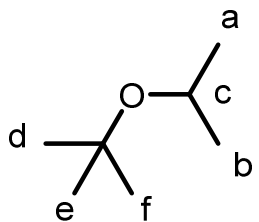
Predicted 1H NMR Spectrum



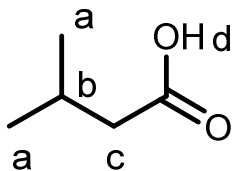
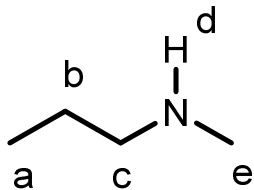
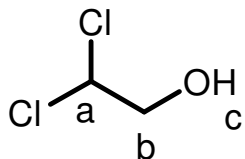
Predicted 1H NMR Spectrum

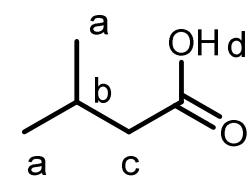
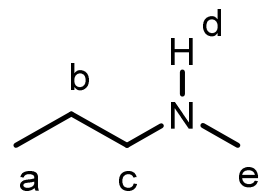
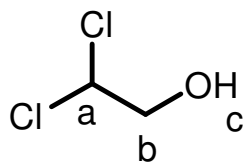


Predicted 1H NMR Spectrum

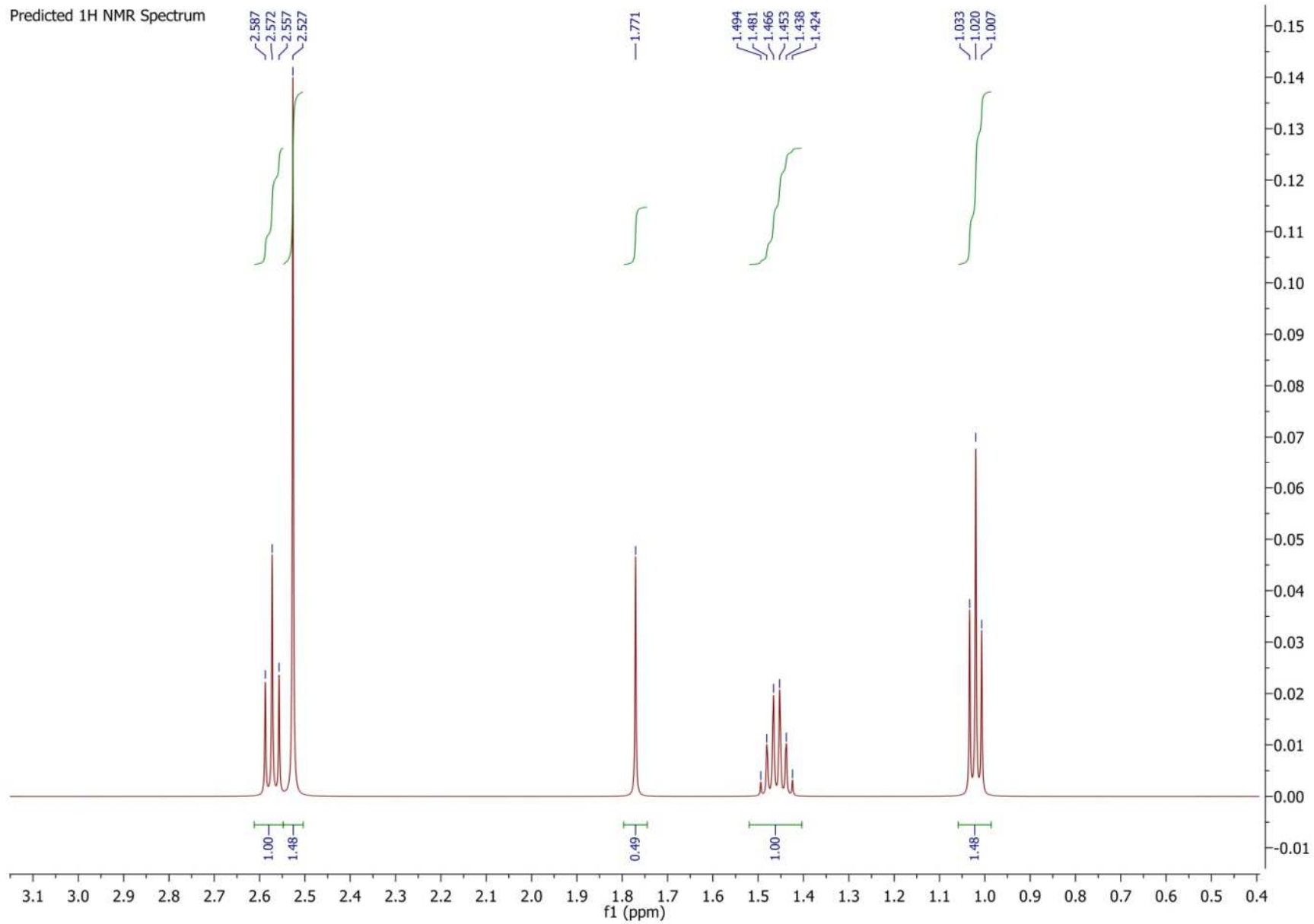


**Zadanie 2.** Dla poniższych cząsteczek przypisz sygnały w widmie  $^1\text{H-NMR}$  odpowiednim grupom protonów. Określ intensywność sygnałów, rodzaj multipletów oraz stosunki sygnałów w multiplicie. Zapisać skrótową postać widma. Widma rejestrowane dla częstości pola 500MHz ( $\text{CDCl}_3$ , stężenie 2-5%, temp. pok.).

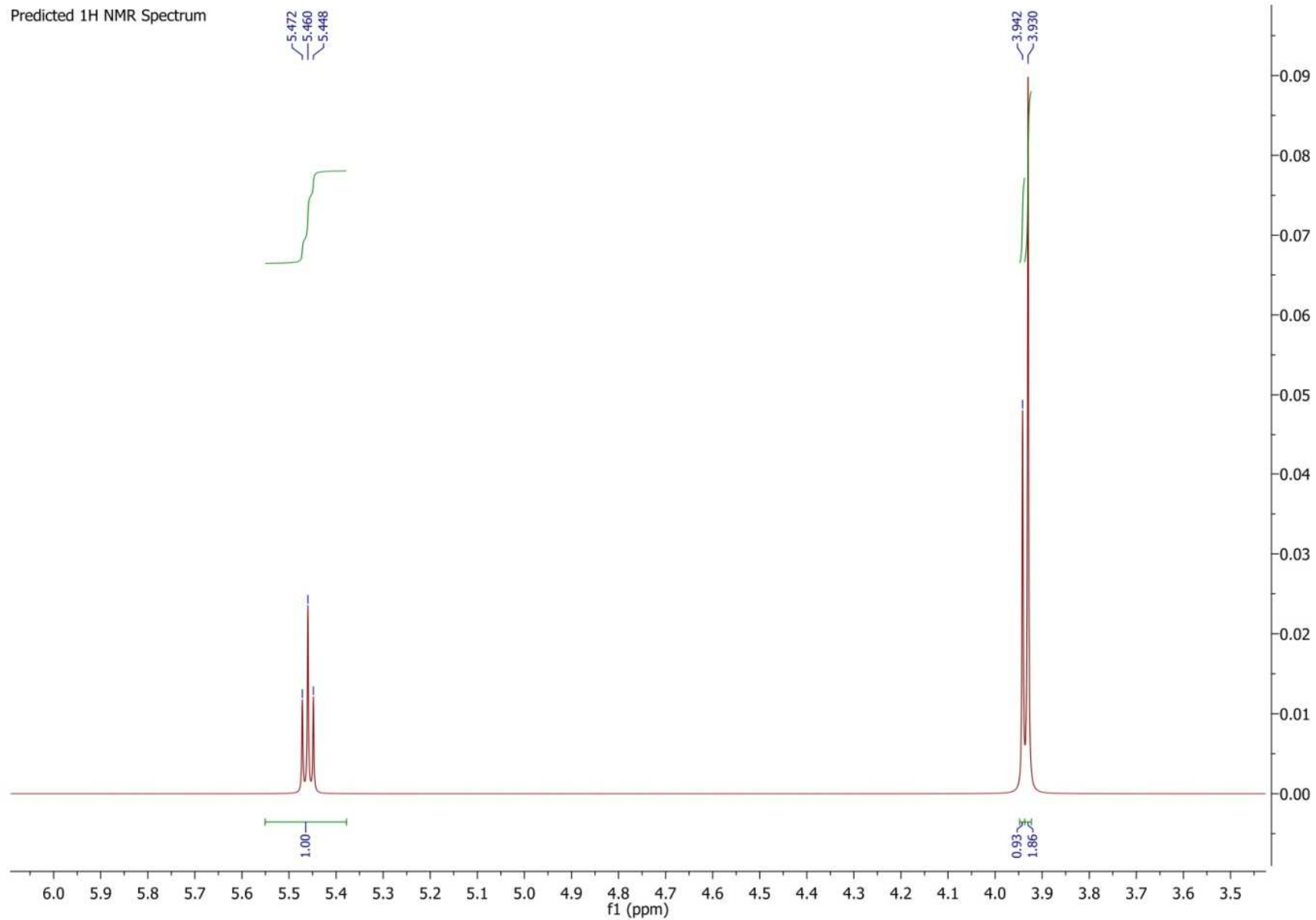
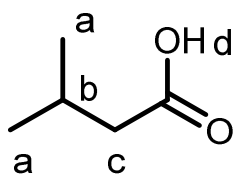
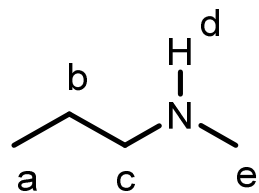
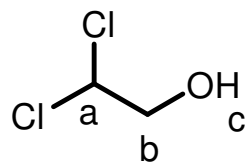


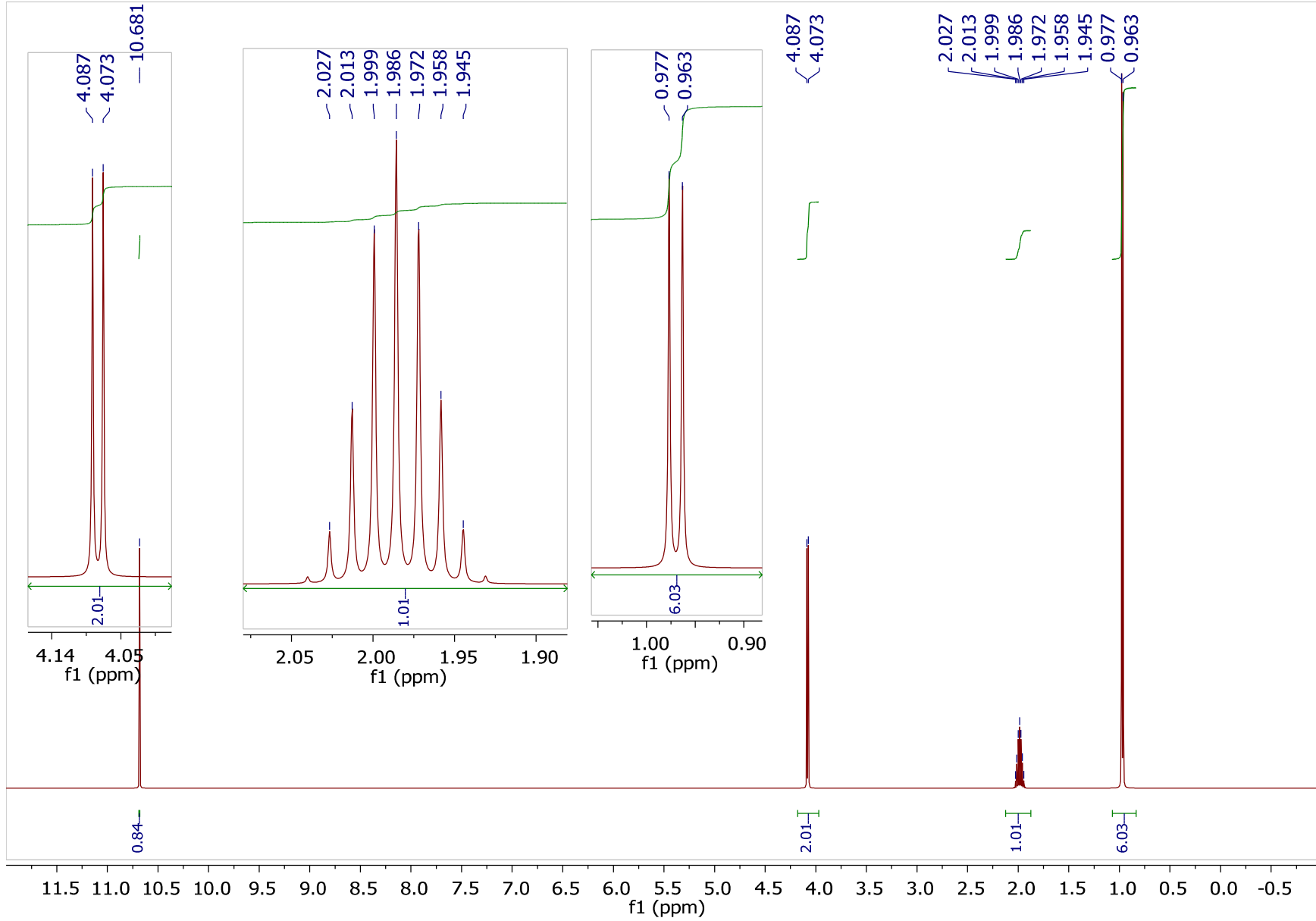
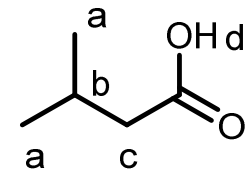
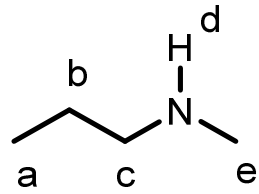
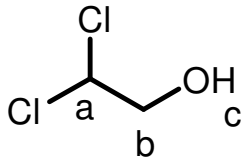


Predicted 1H NMR Spectrum



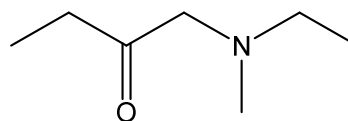
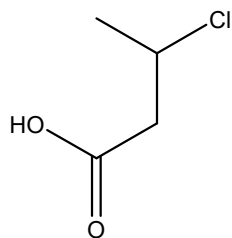
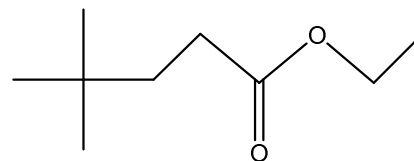
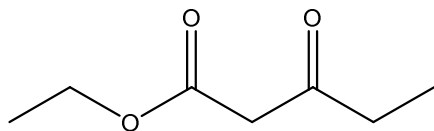
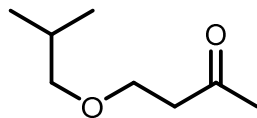
Predicted 1H NMR Spectrum

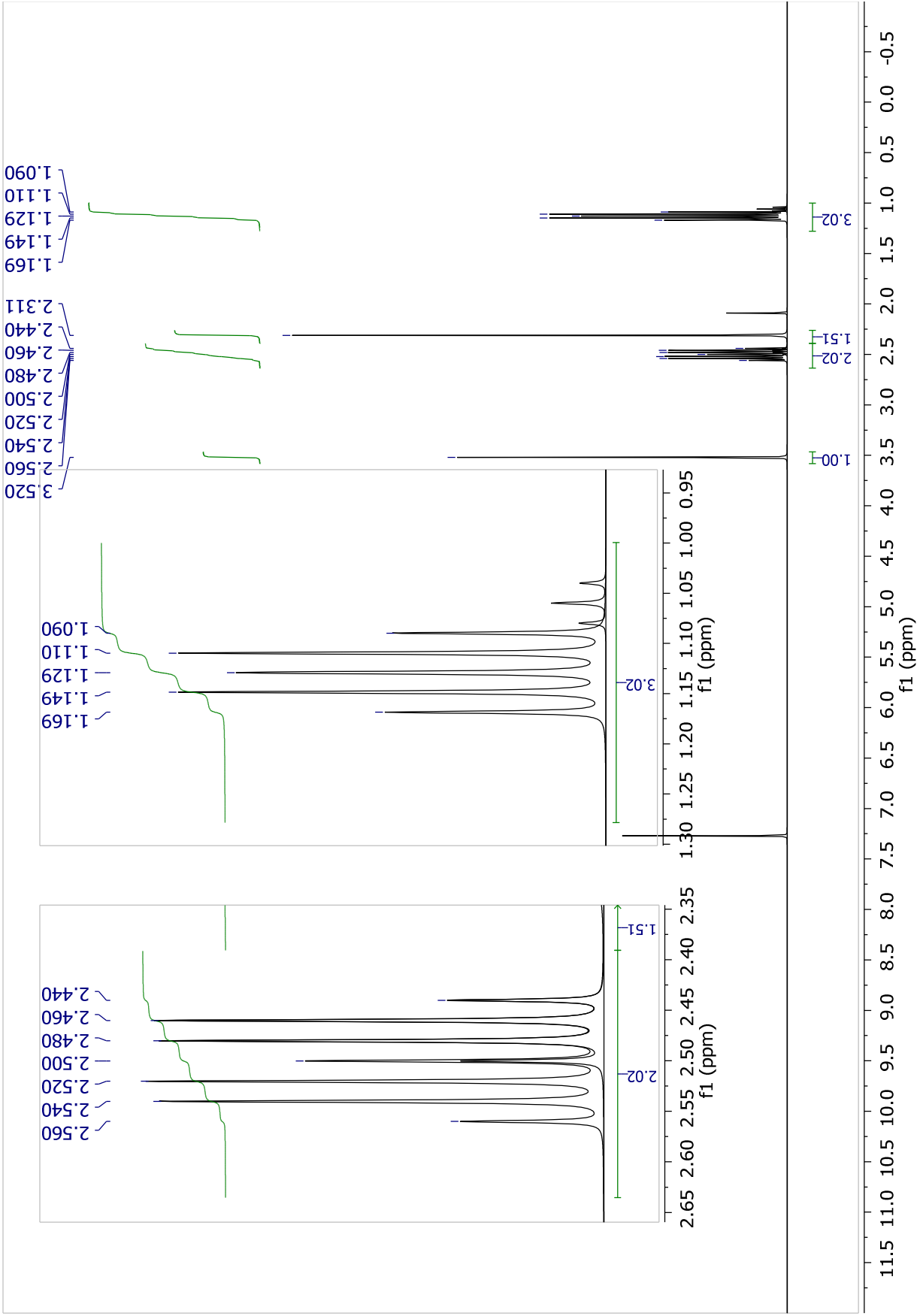


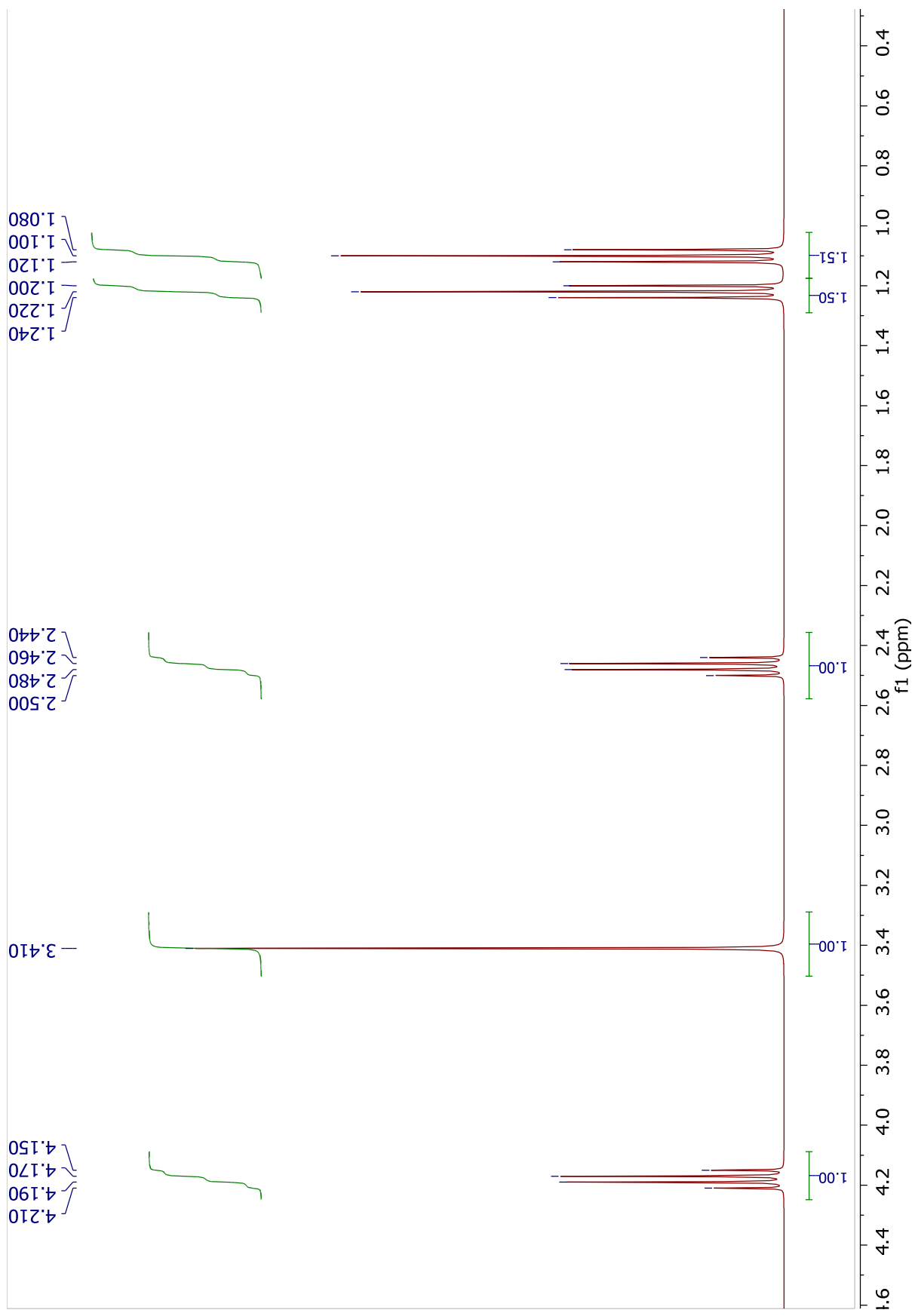


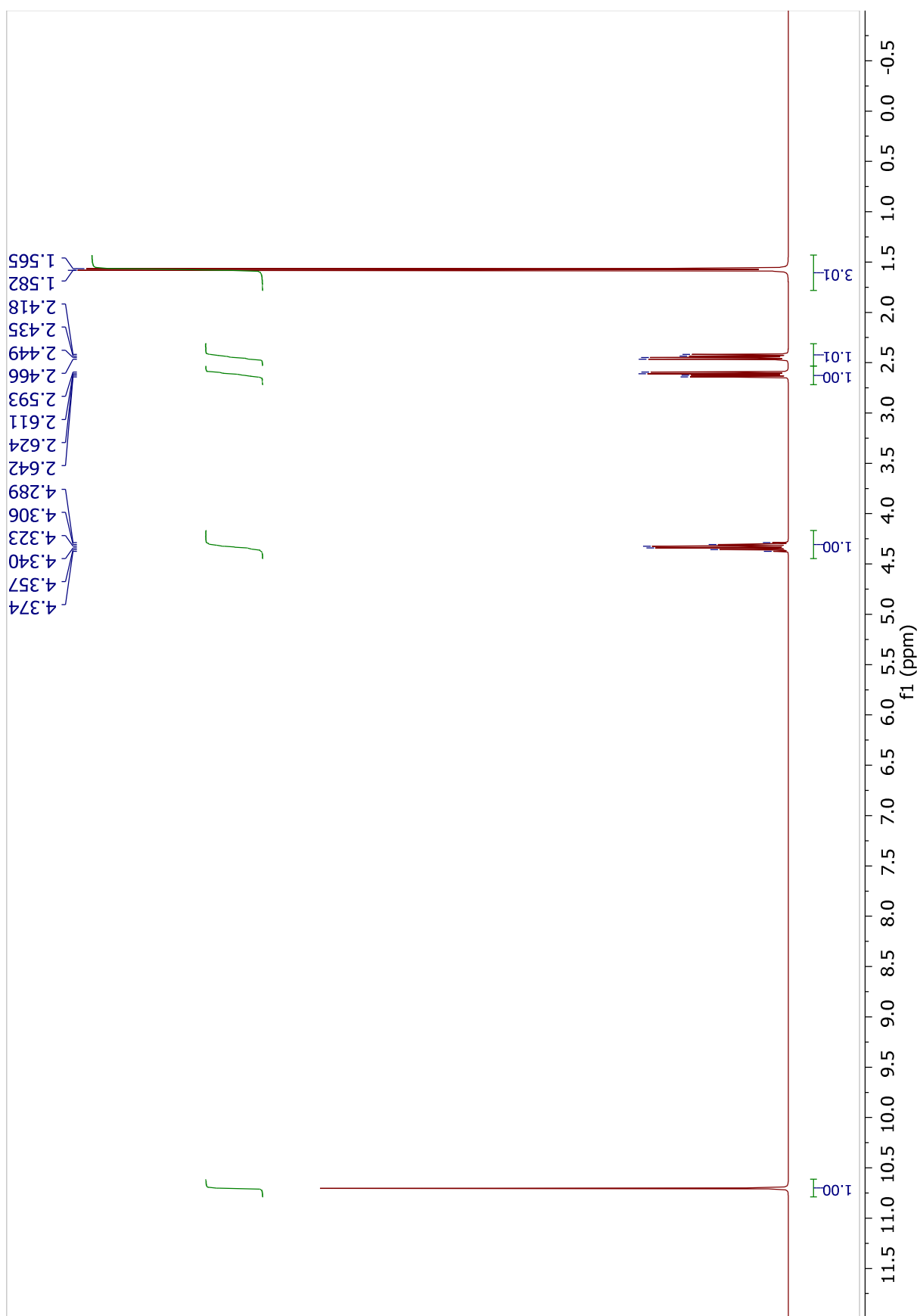


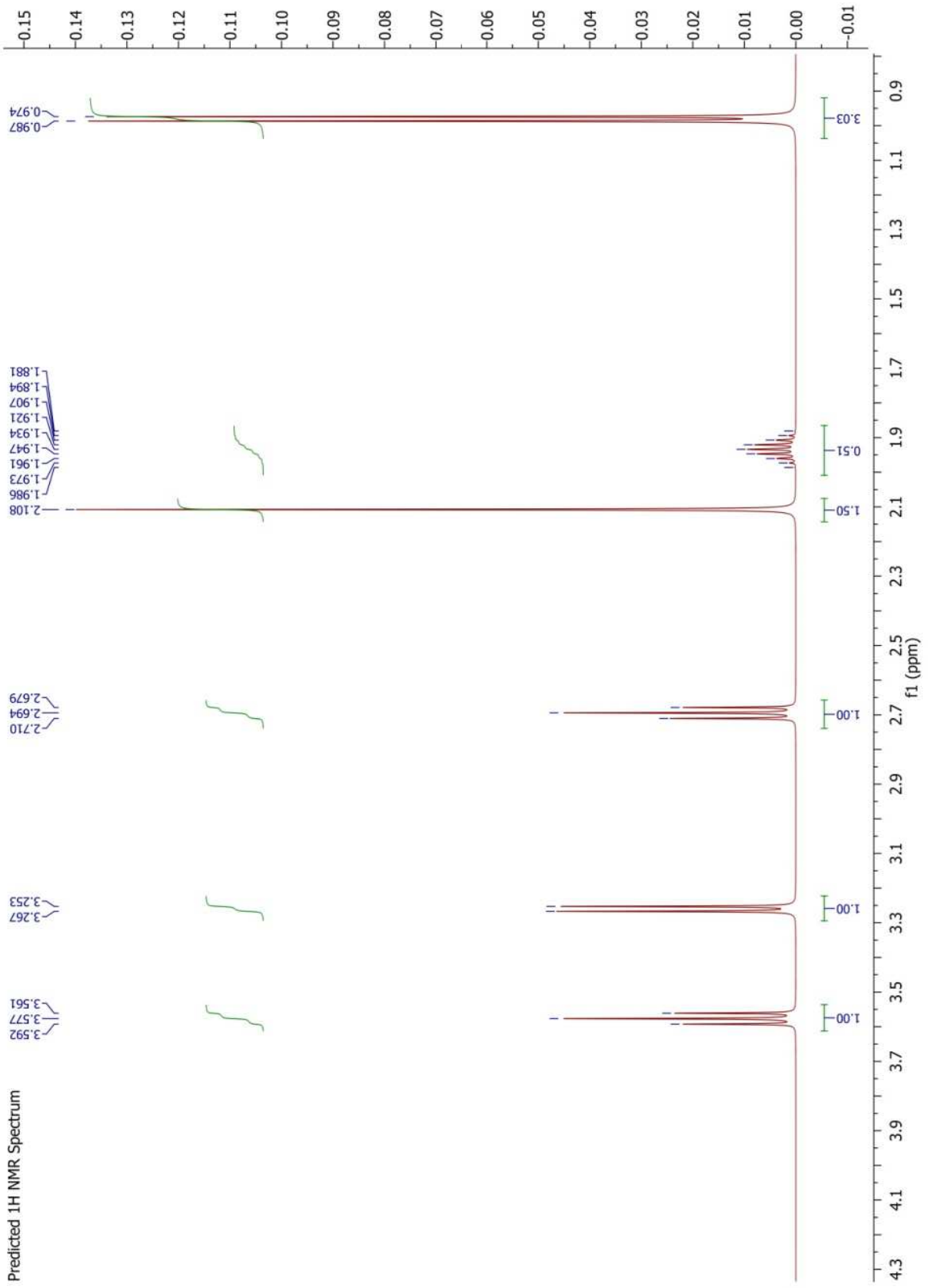
**Zadanie 3.** Dla poniższych cząsteczek przypisz sygnały w widmie  $^1\text{H-NMR}$  odpowiednim grupom protonów. Określ intensywność sygnałów, rodzaj multipletów oraz stosunki sygnałów w multiplicie. Zapisz skrótową postać widma. Widma rejestrowane dla częstości pola 400MHz ( $\text{CDCl}_3$ , stężenie 2-5%, temp. pok.).

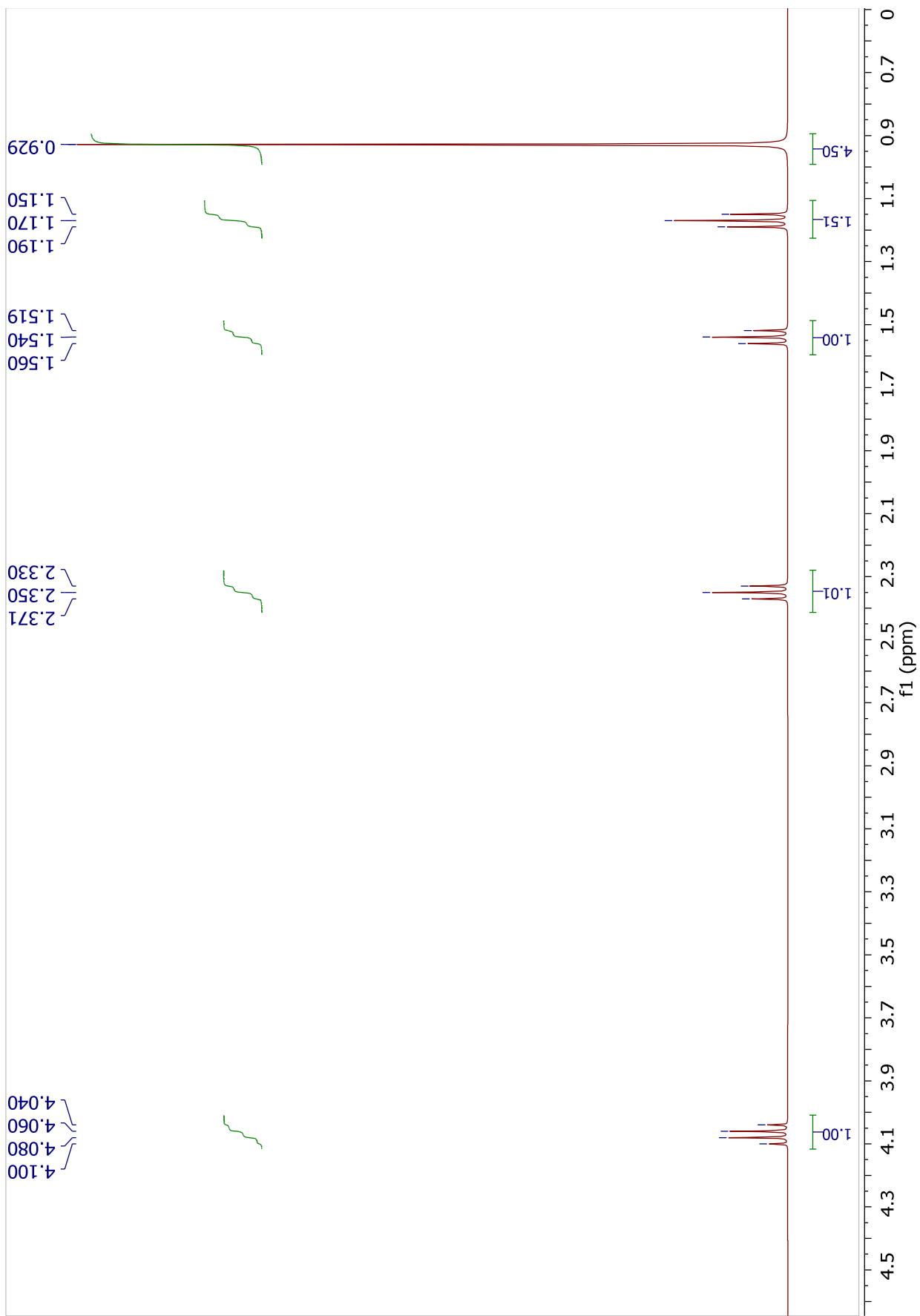




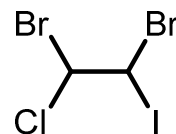
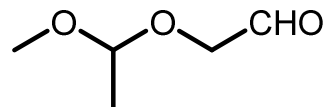
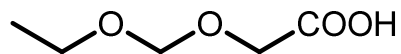
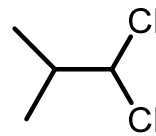
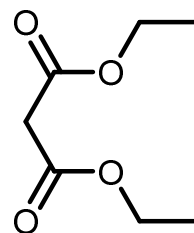
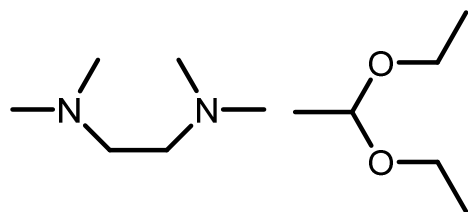




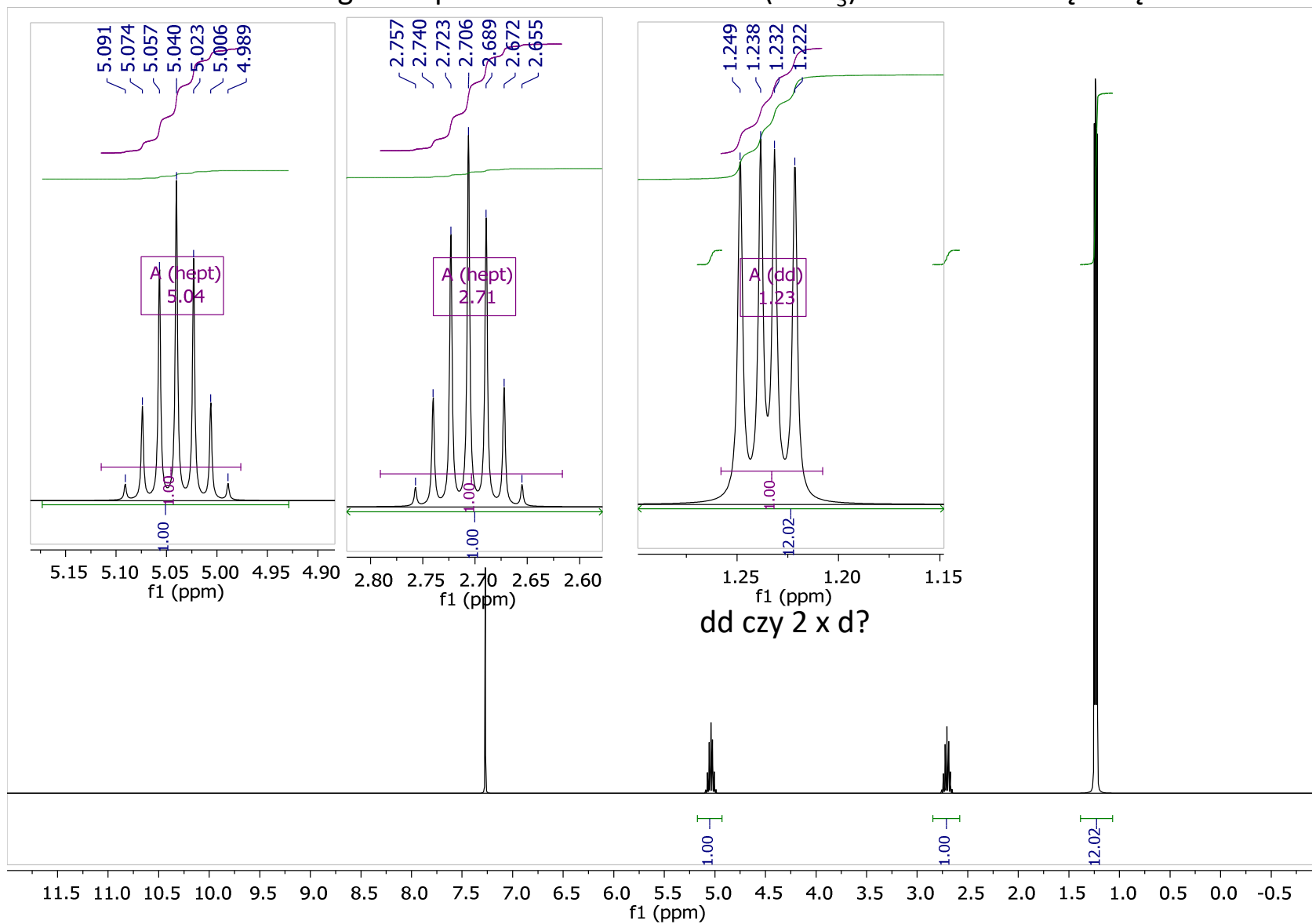




**Zadanie 4.** Narysuj przewidywane widma  $^1\text{H-NMR}$  dla następujących struktur (uwzględnić multipletowość oraz powierzchnie sygnałów).

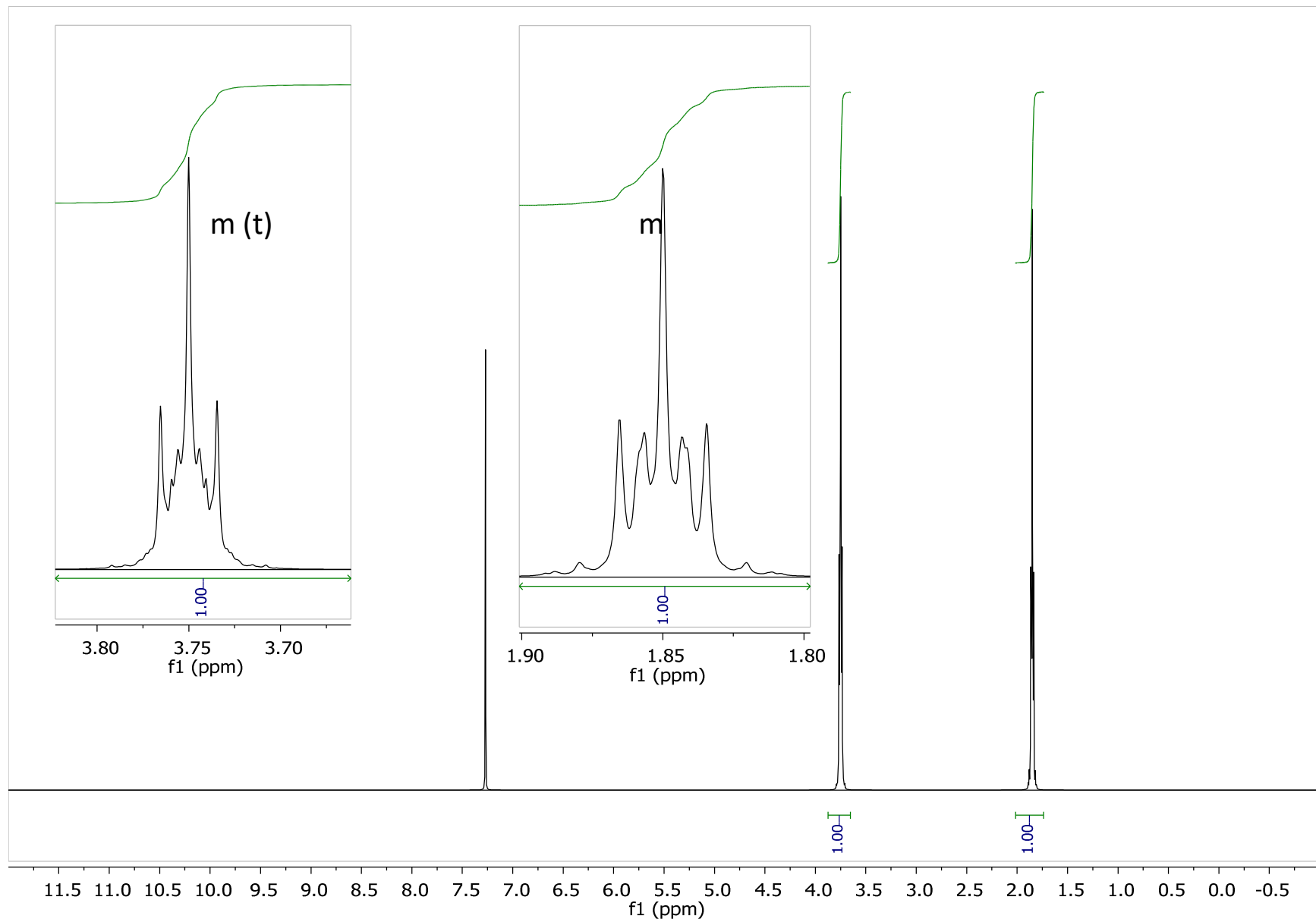


**Zadanie 7.** Na podstawie widma  $^1\text{H}$  NMR zmierzonego na aparacie Bruker 400 MHz ( $\text{CDCl}_3$ ) określ strukturę związku chemicznego.

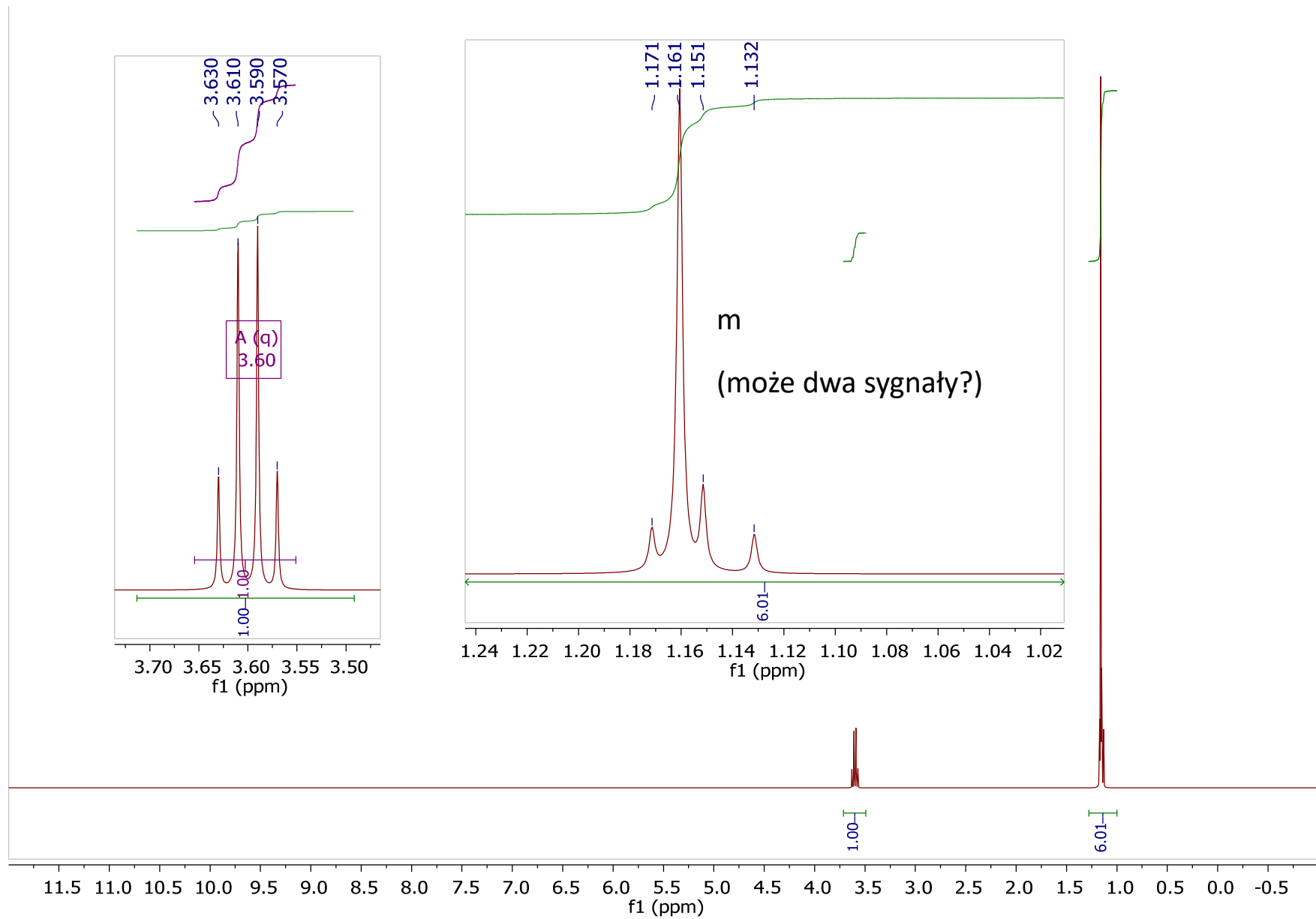




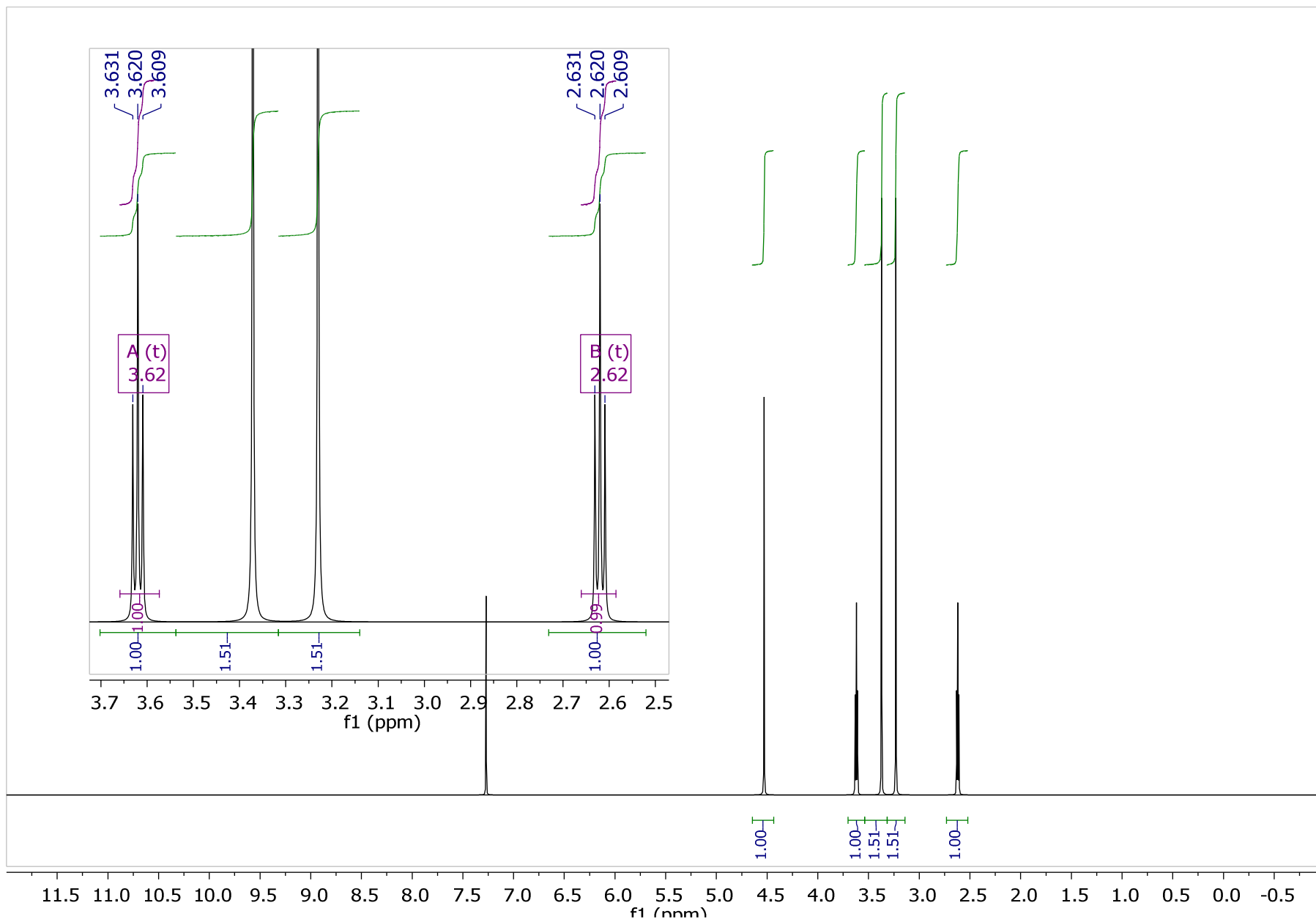
(b)  $C_4H_8O$



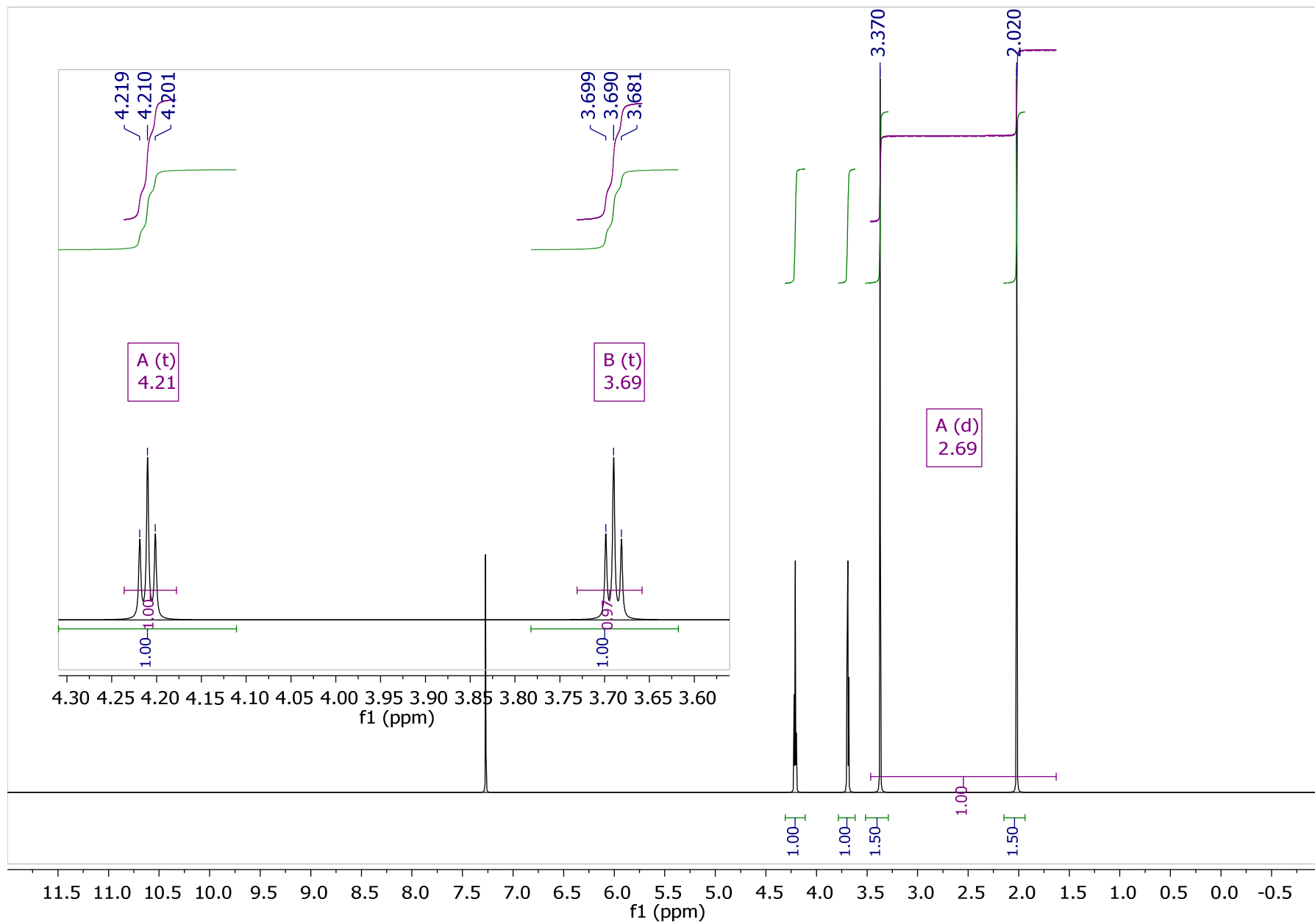
(c)  $C_6H_{14}O$



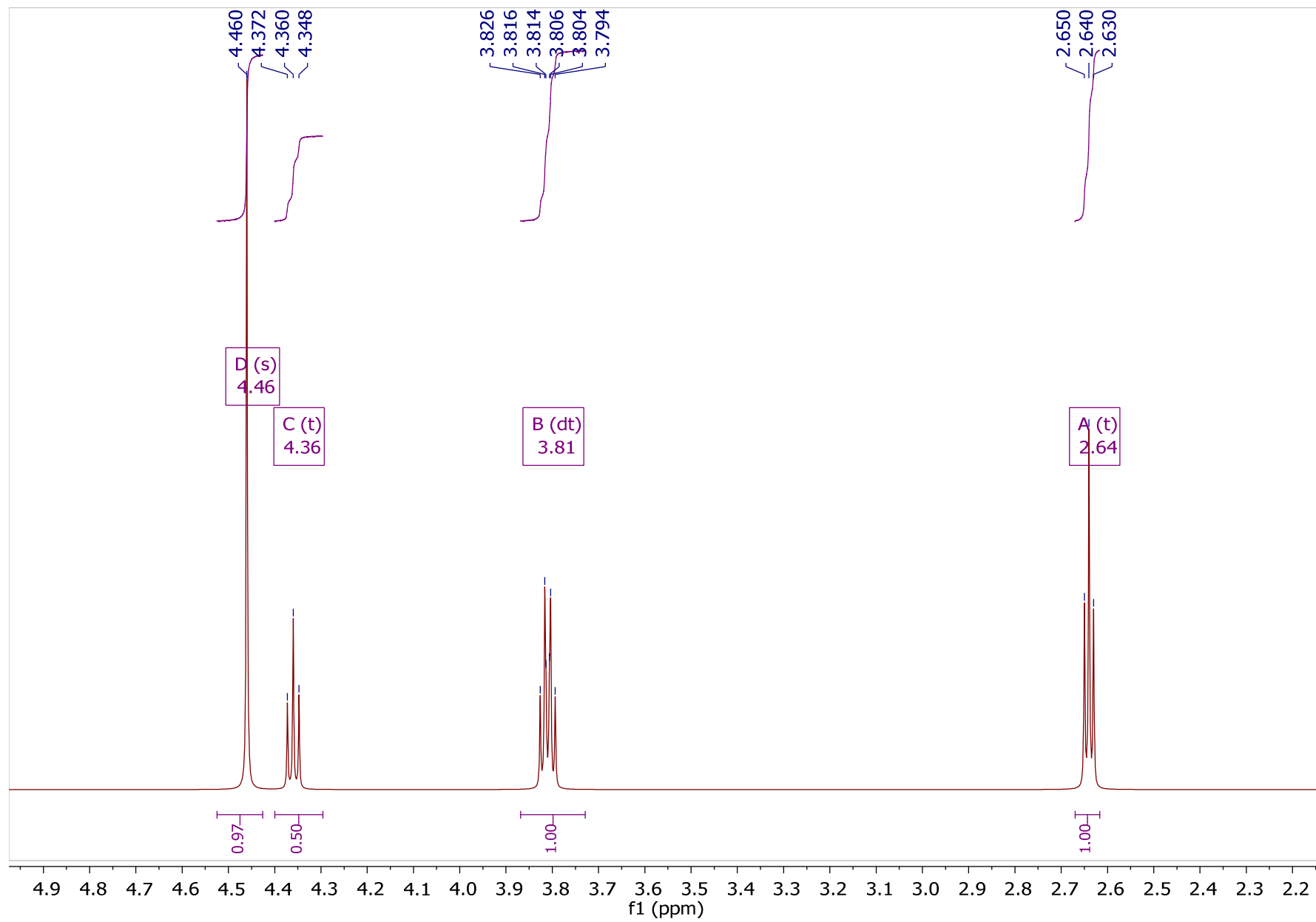
(d)  $C_6H_{12}O_3$



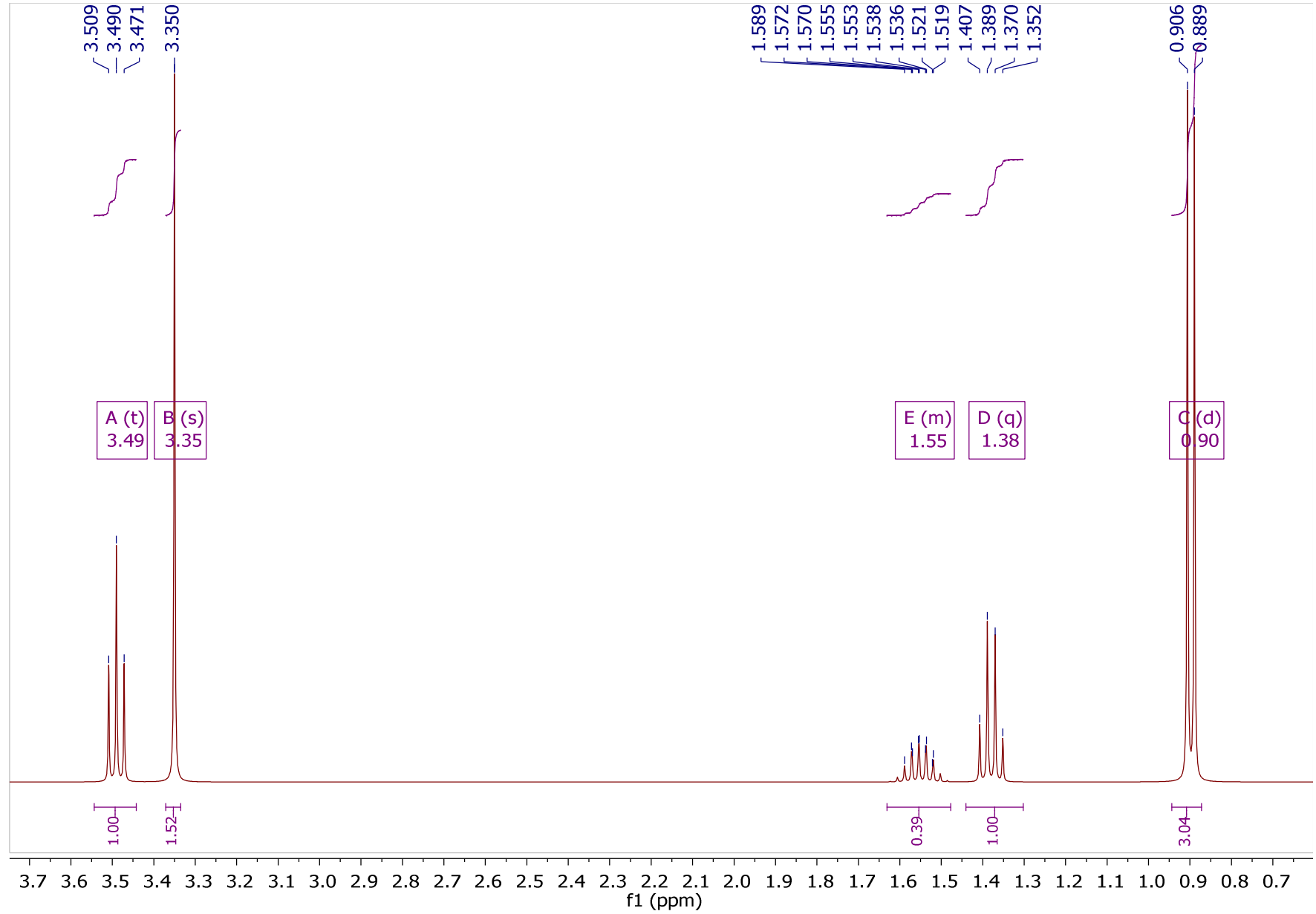
(e)  $C_5H_{10}O_3$



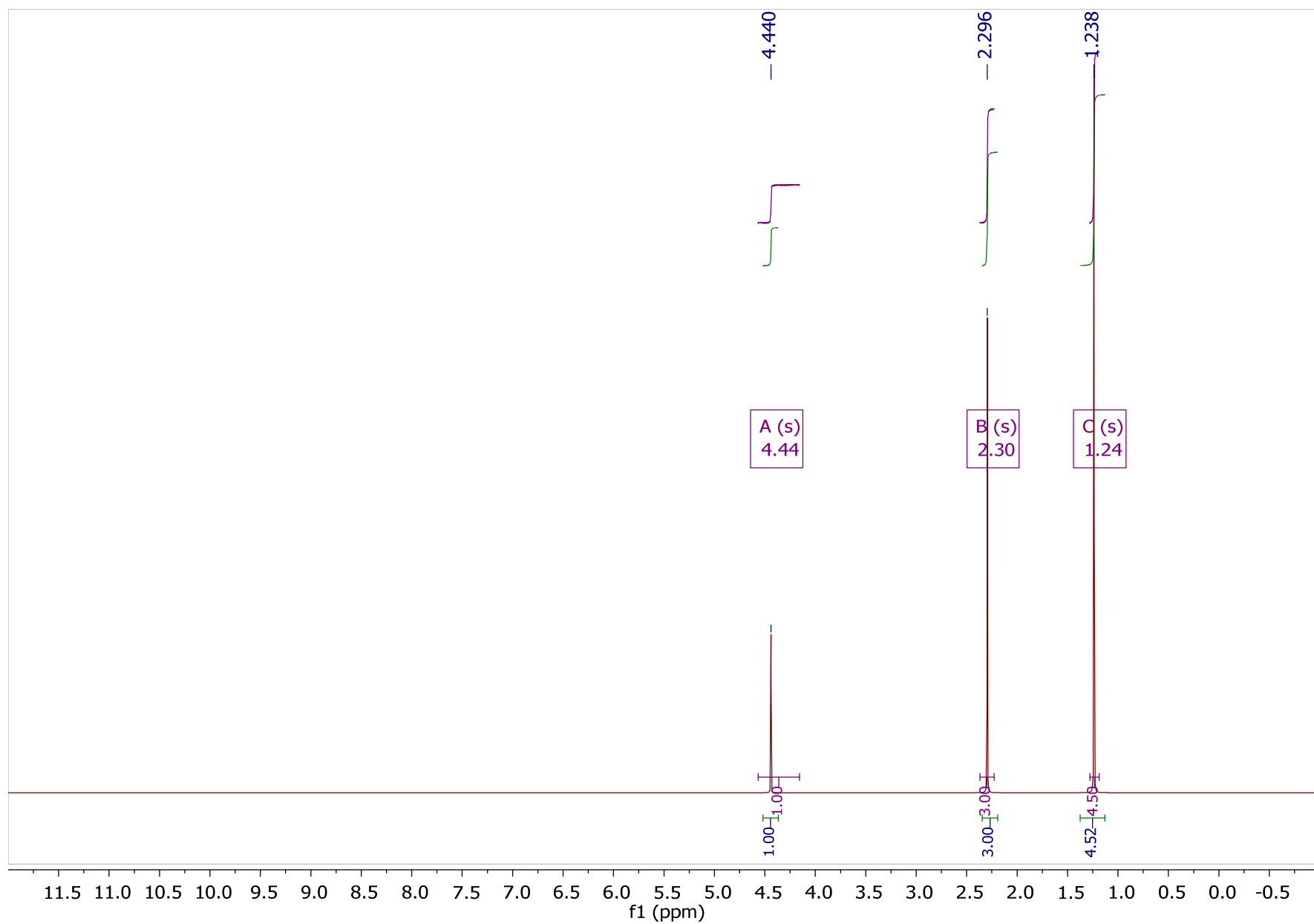
(f)  $C_4H_7BrO_2$

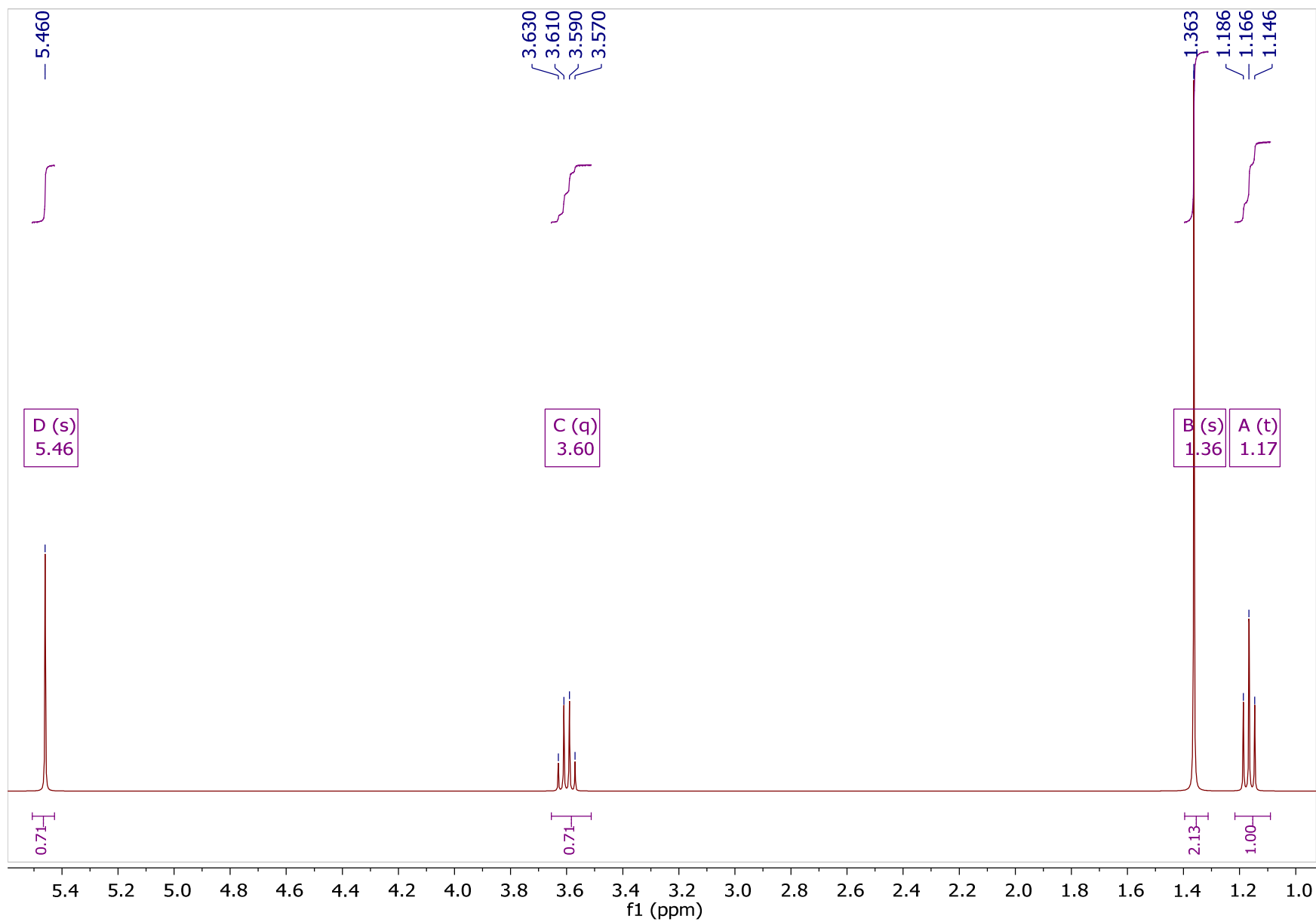
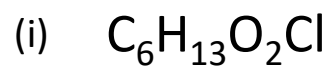


(g)  $C_7H_{17}O$



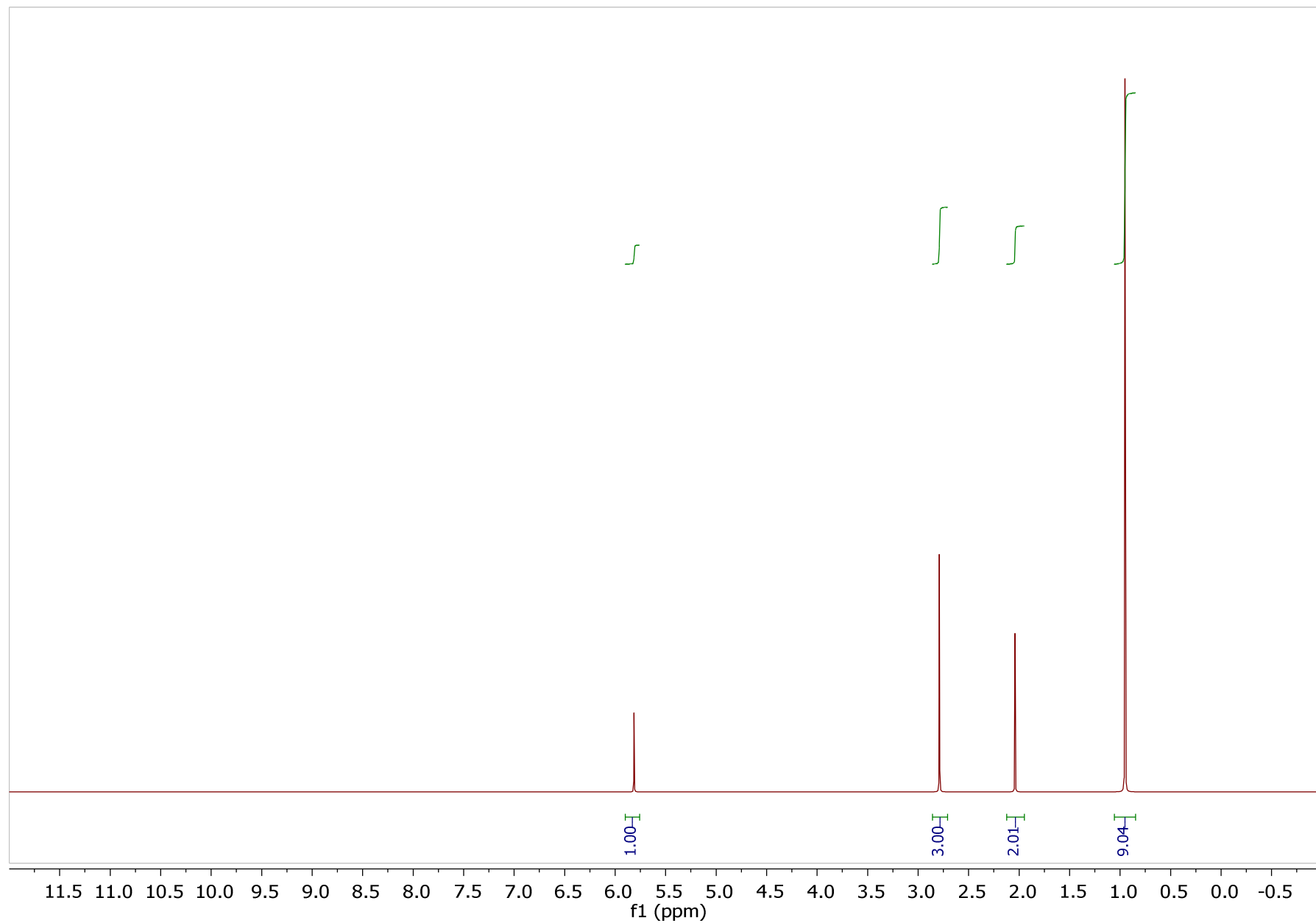
(h)  $C_7H_{17}ON$



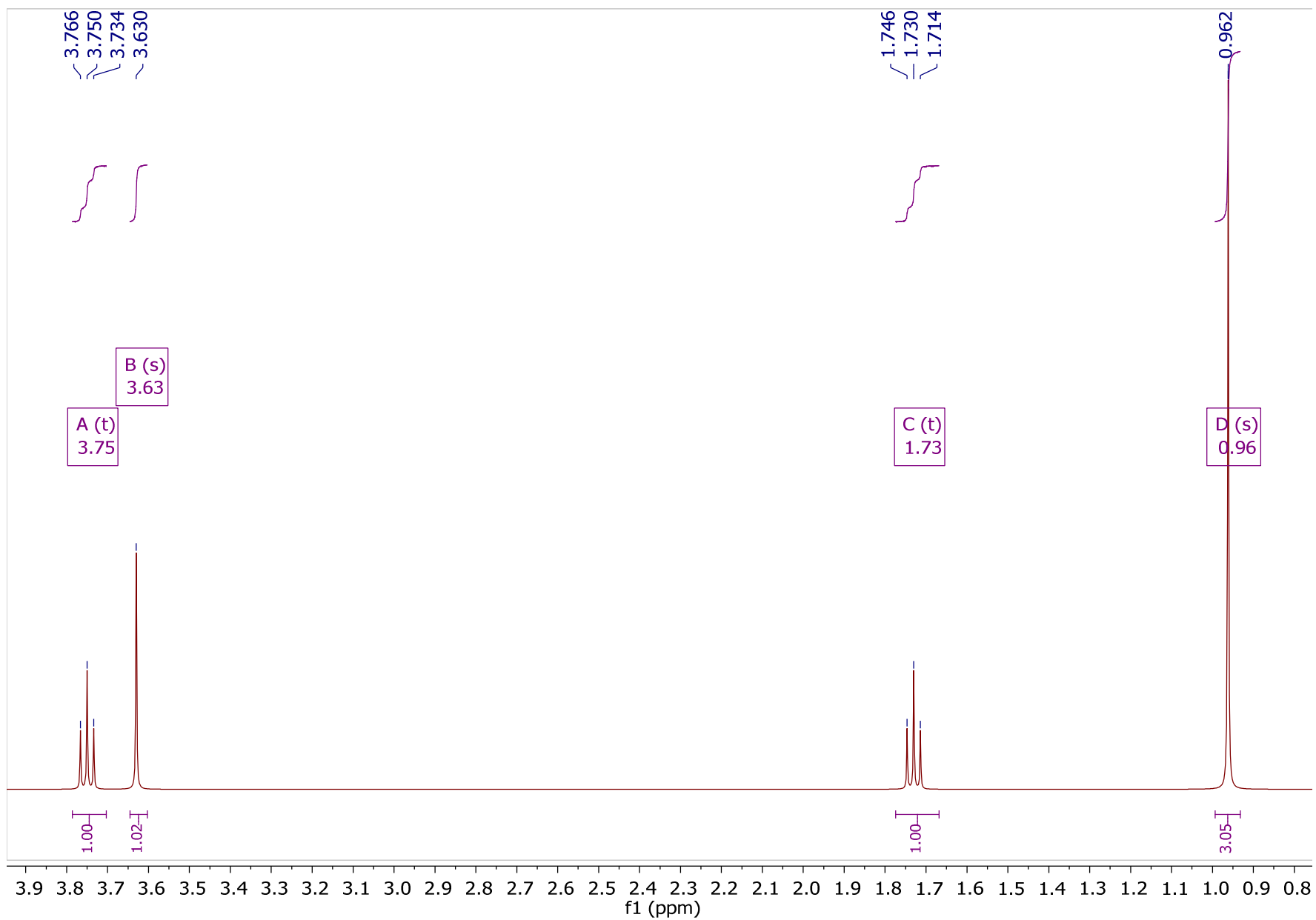




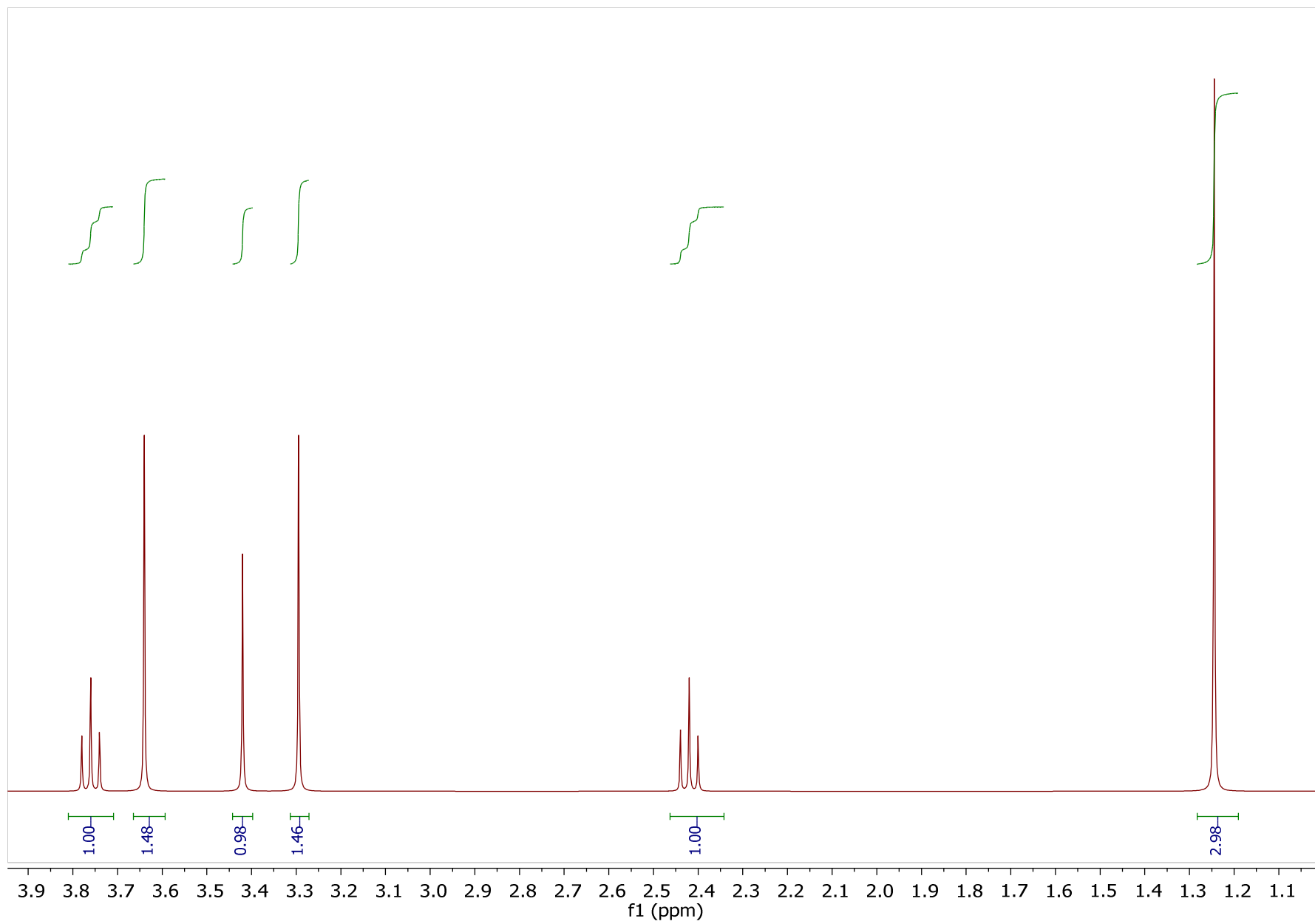
(j)  $C_7H_{15}ON$



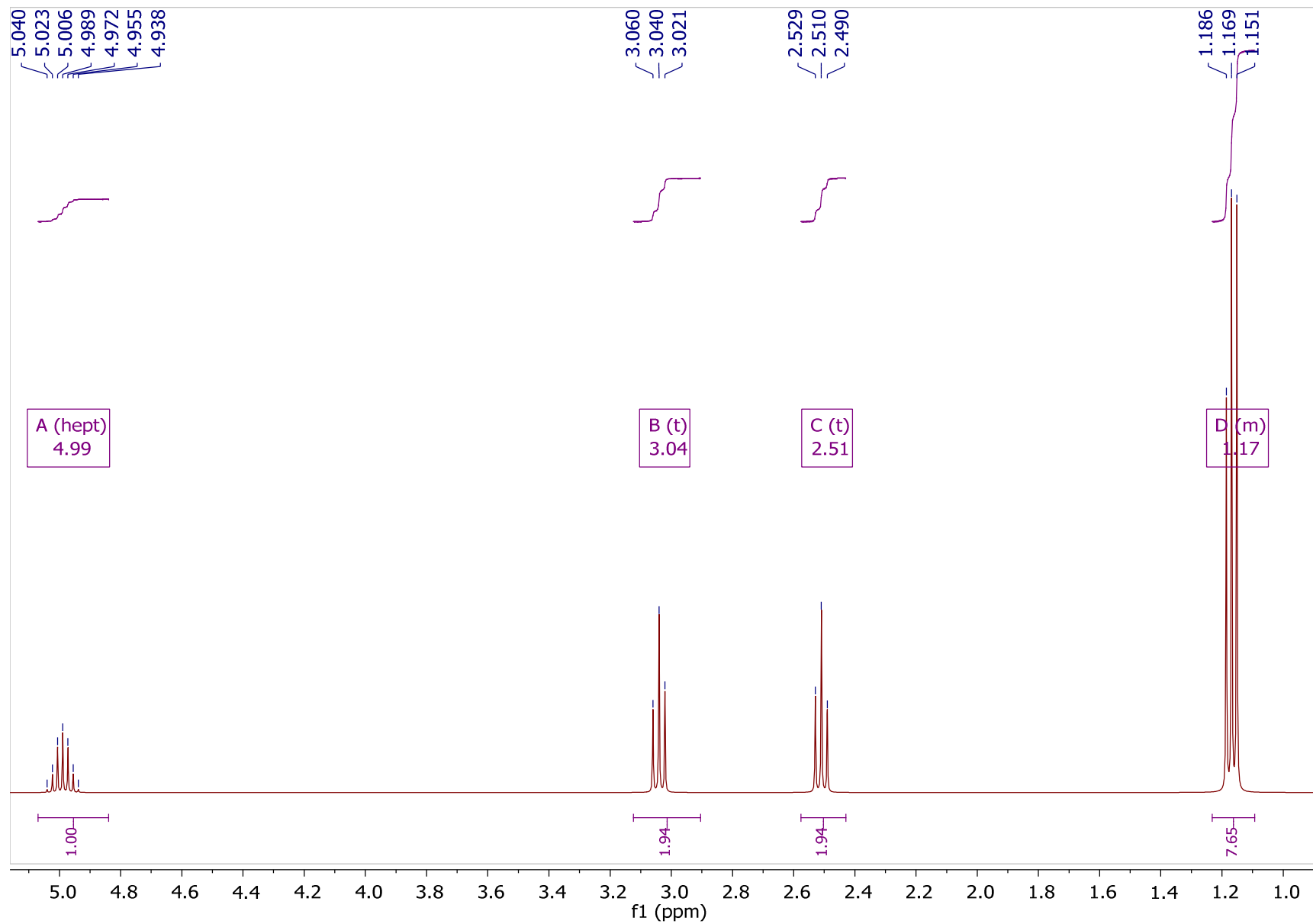
(k)  $C_6H_{12}O$



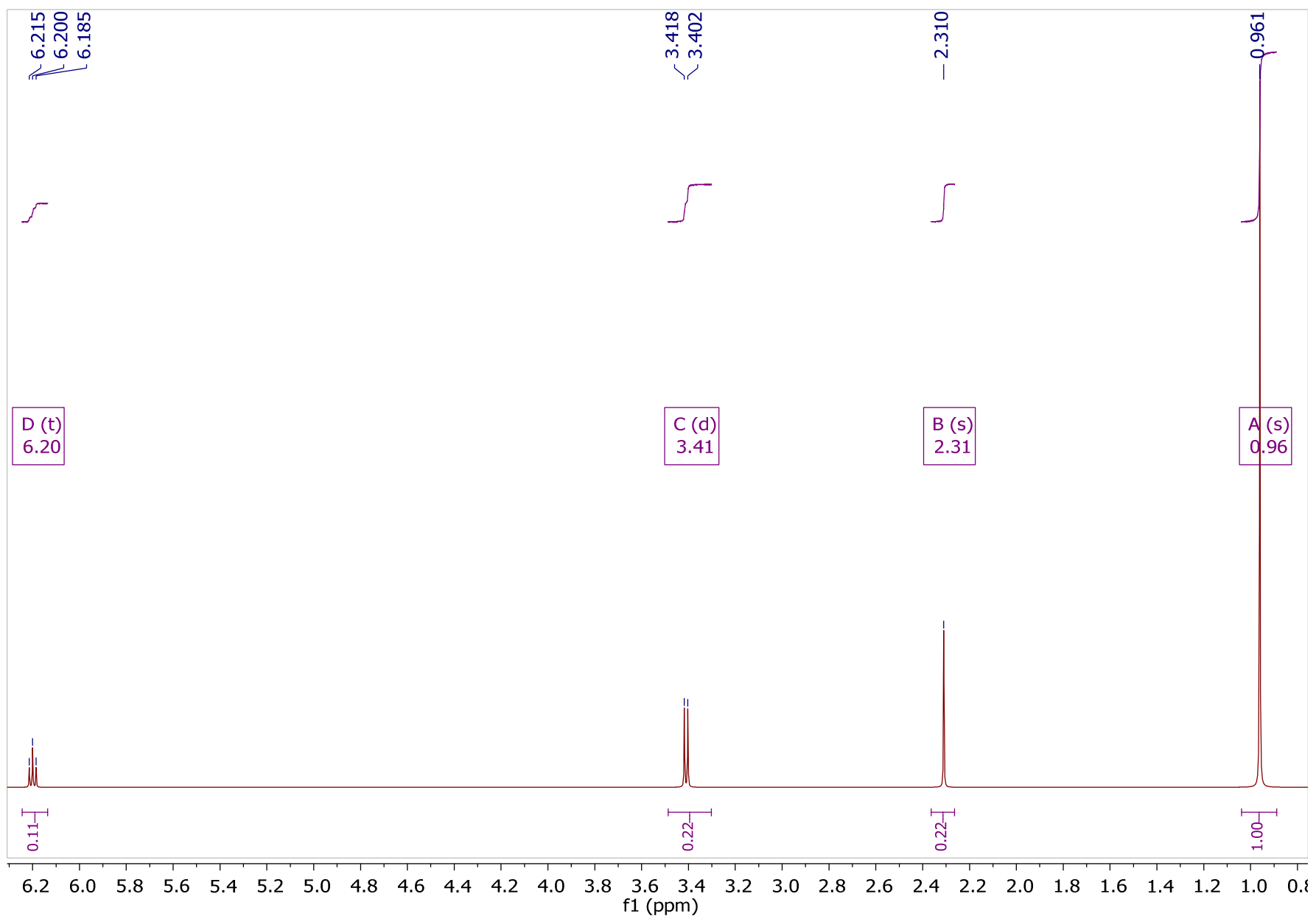
(I)  $C_9H_{18}O_4$



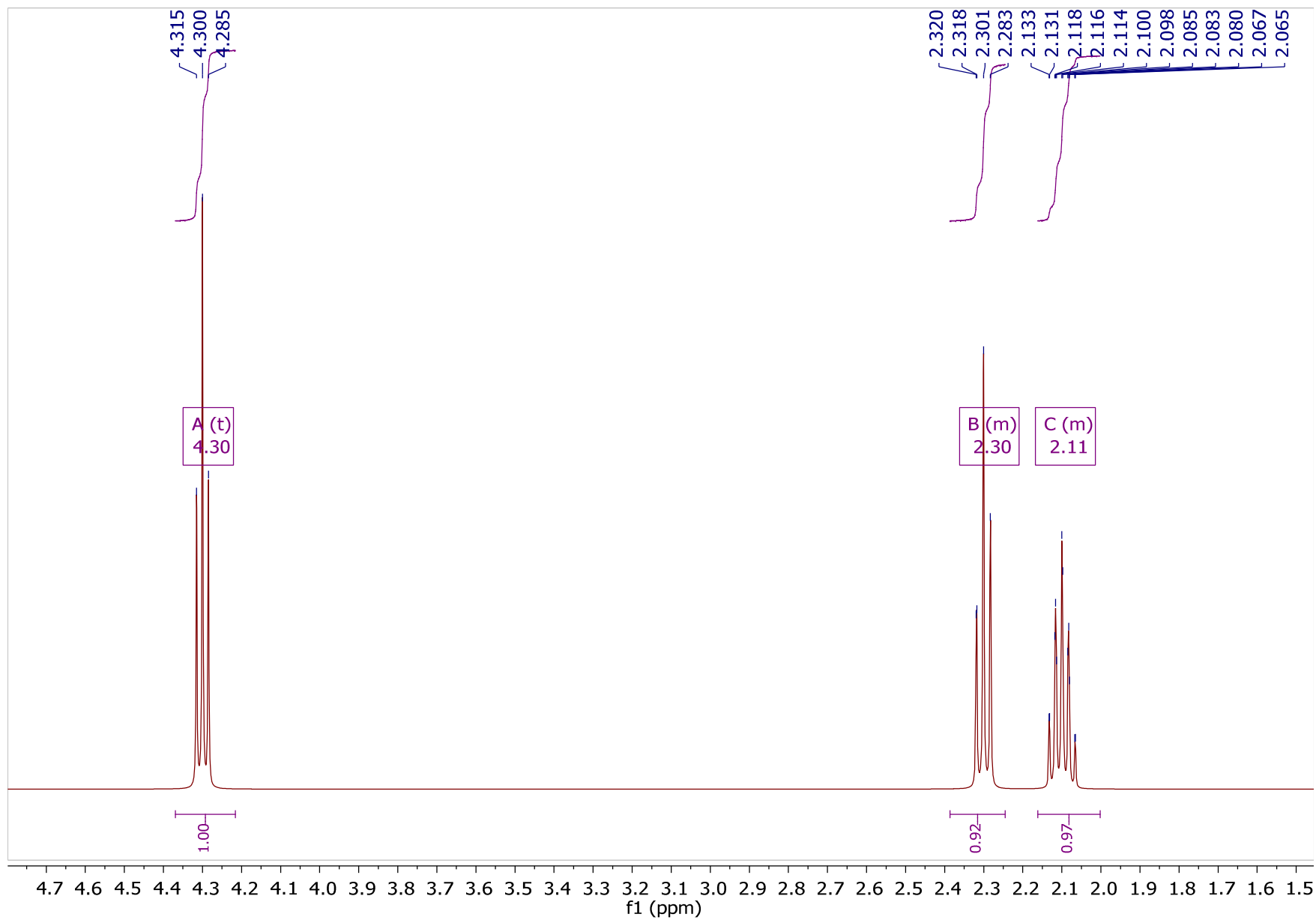
(m)  $C_6H_{13}NO_2$



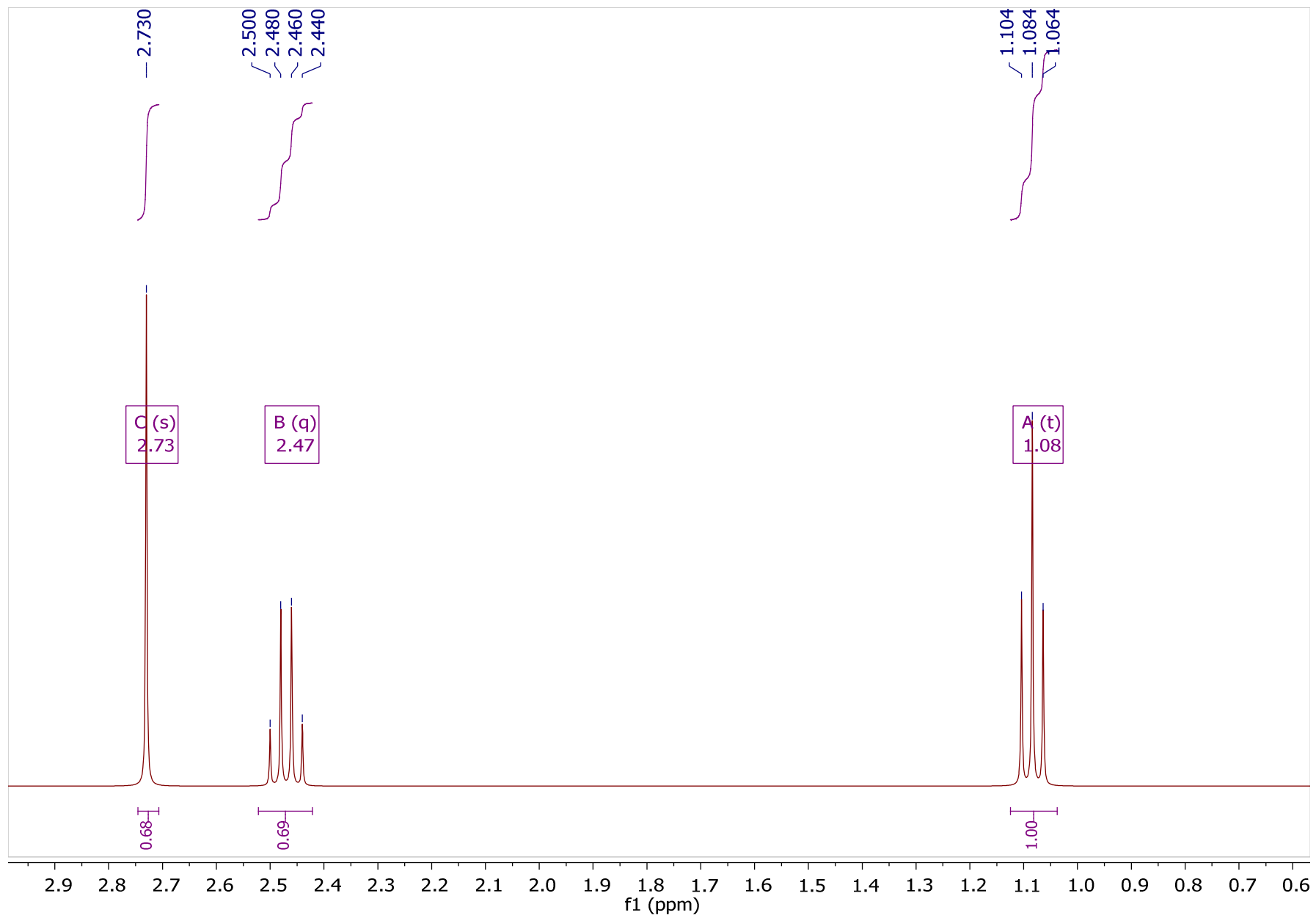
(n)  $C_8H_{14}OBr_2$



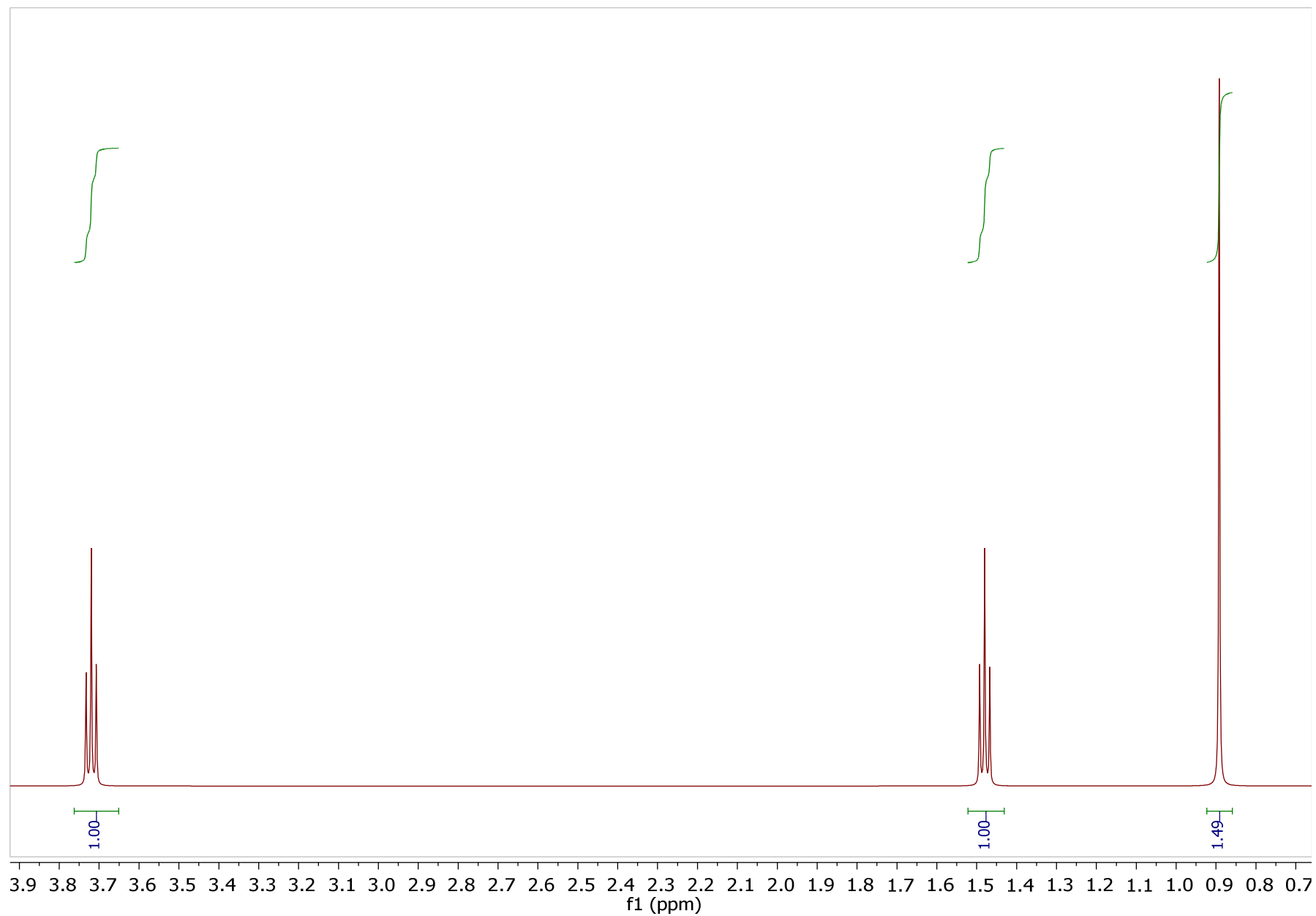
(o)  $C_4H_6O_2$



(p)  $C_8H_{14}O_2$

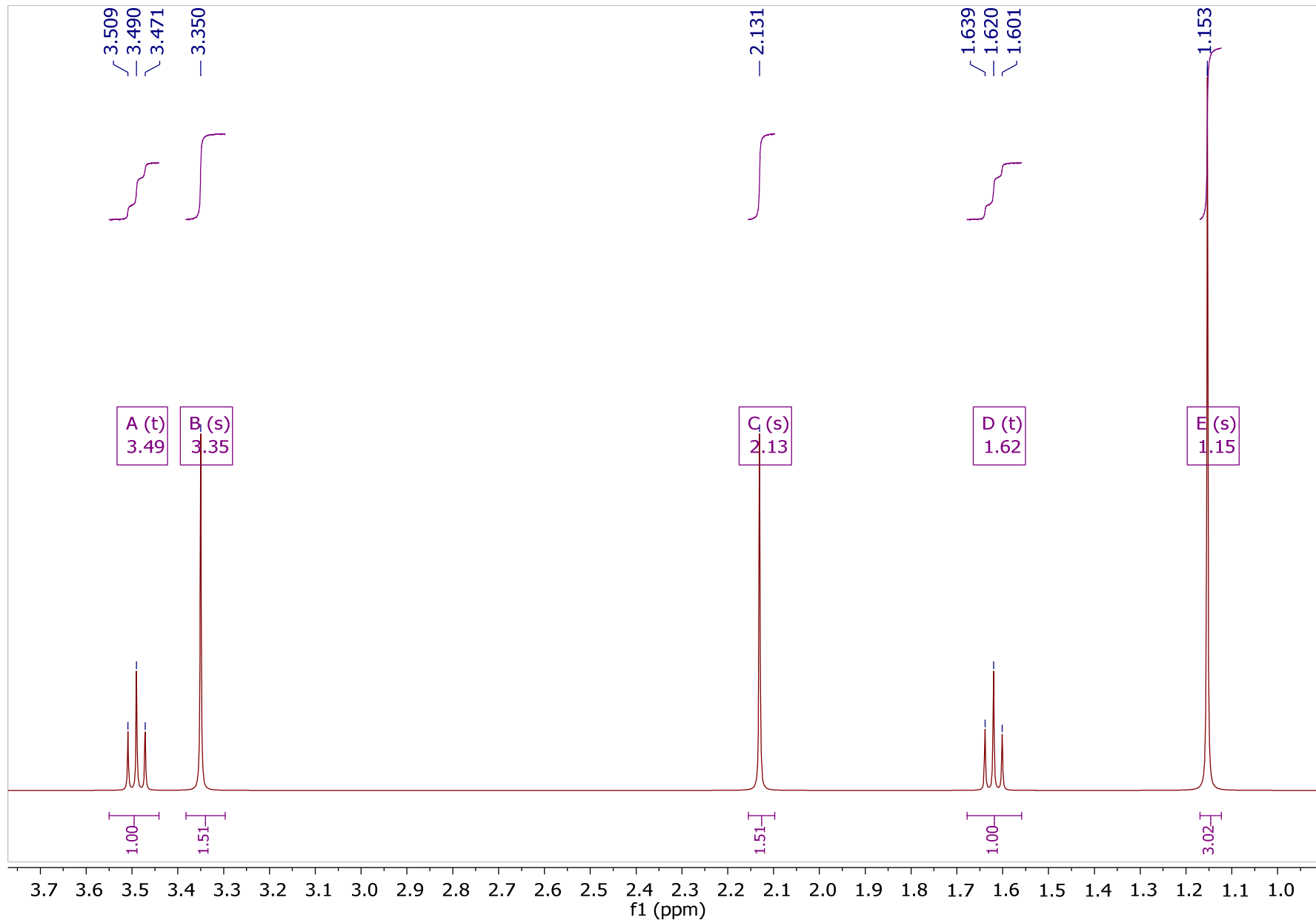


(r) C<sub>7</sub>H<sub>14</sub>O

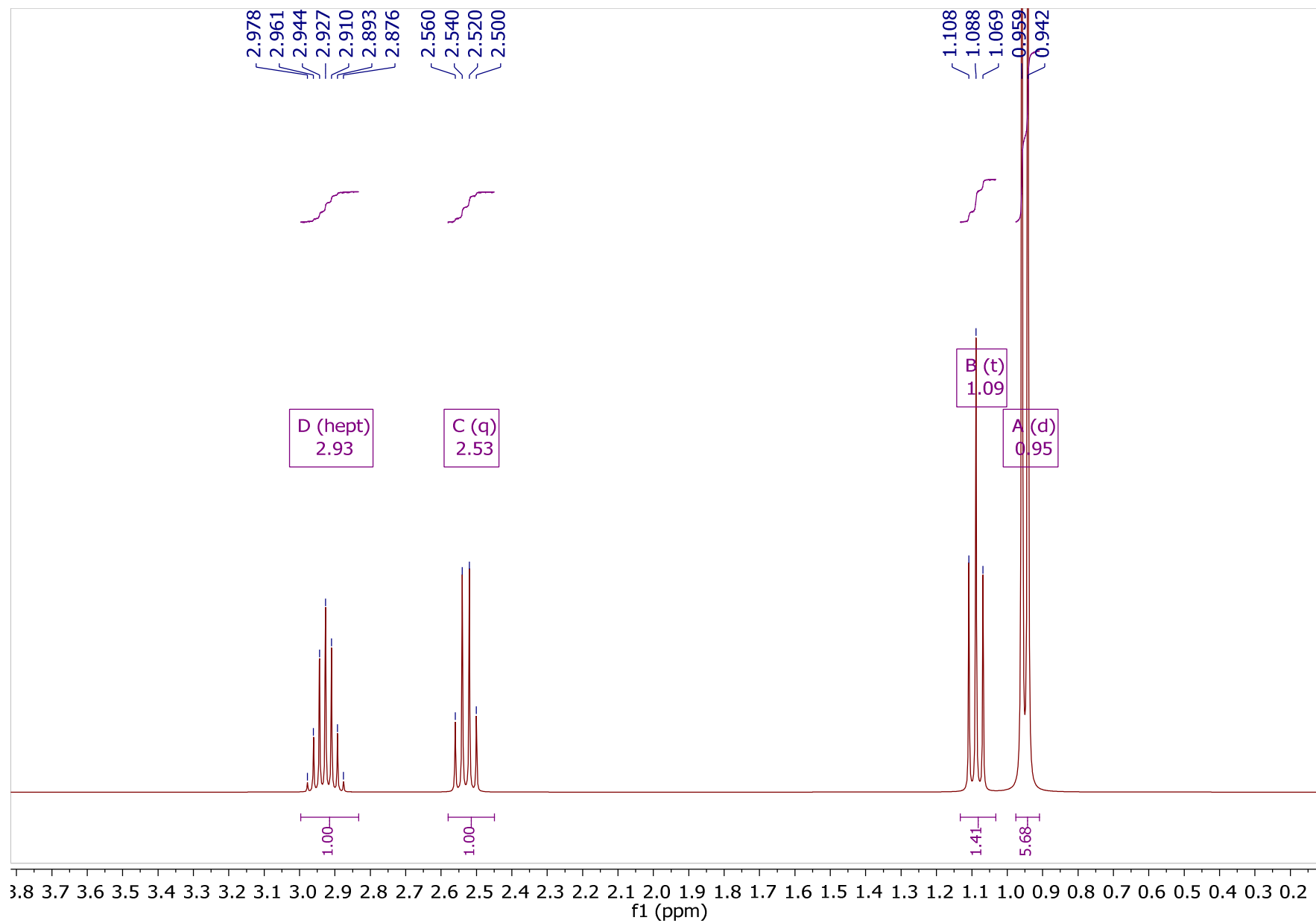




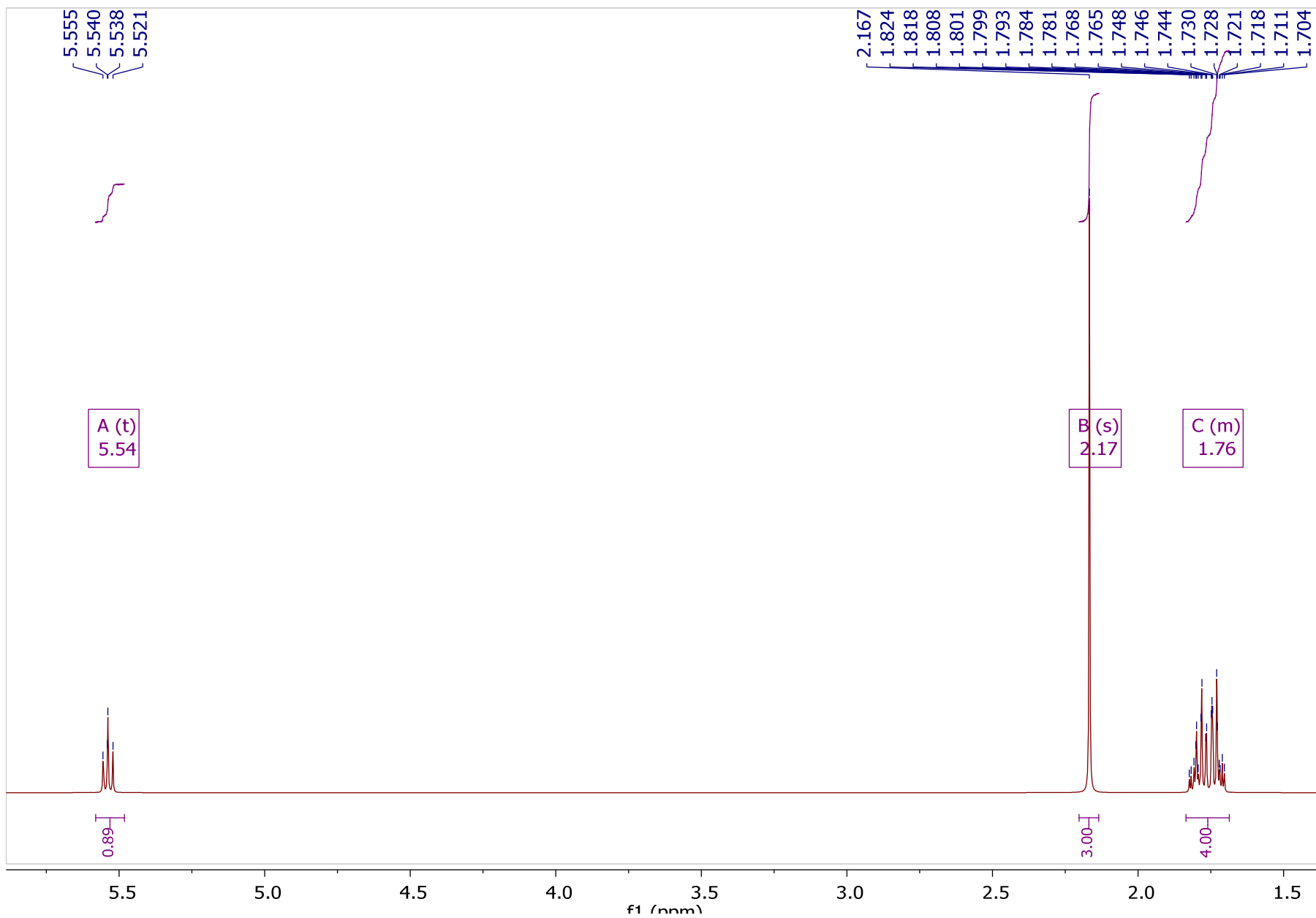
(s)  $C_8H_{16}O_2$



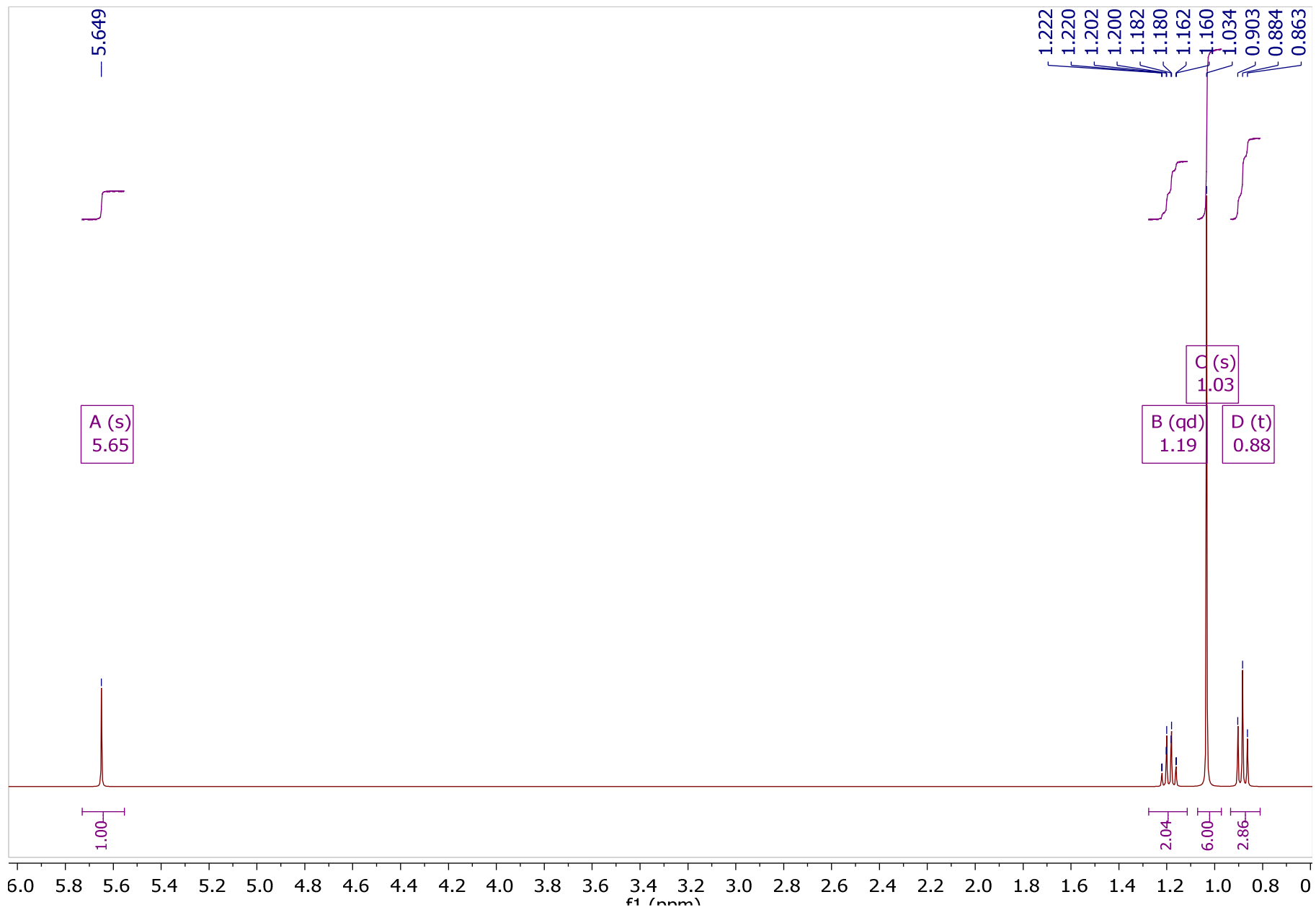
(t)  $C_8H_{19}N$



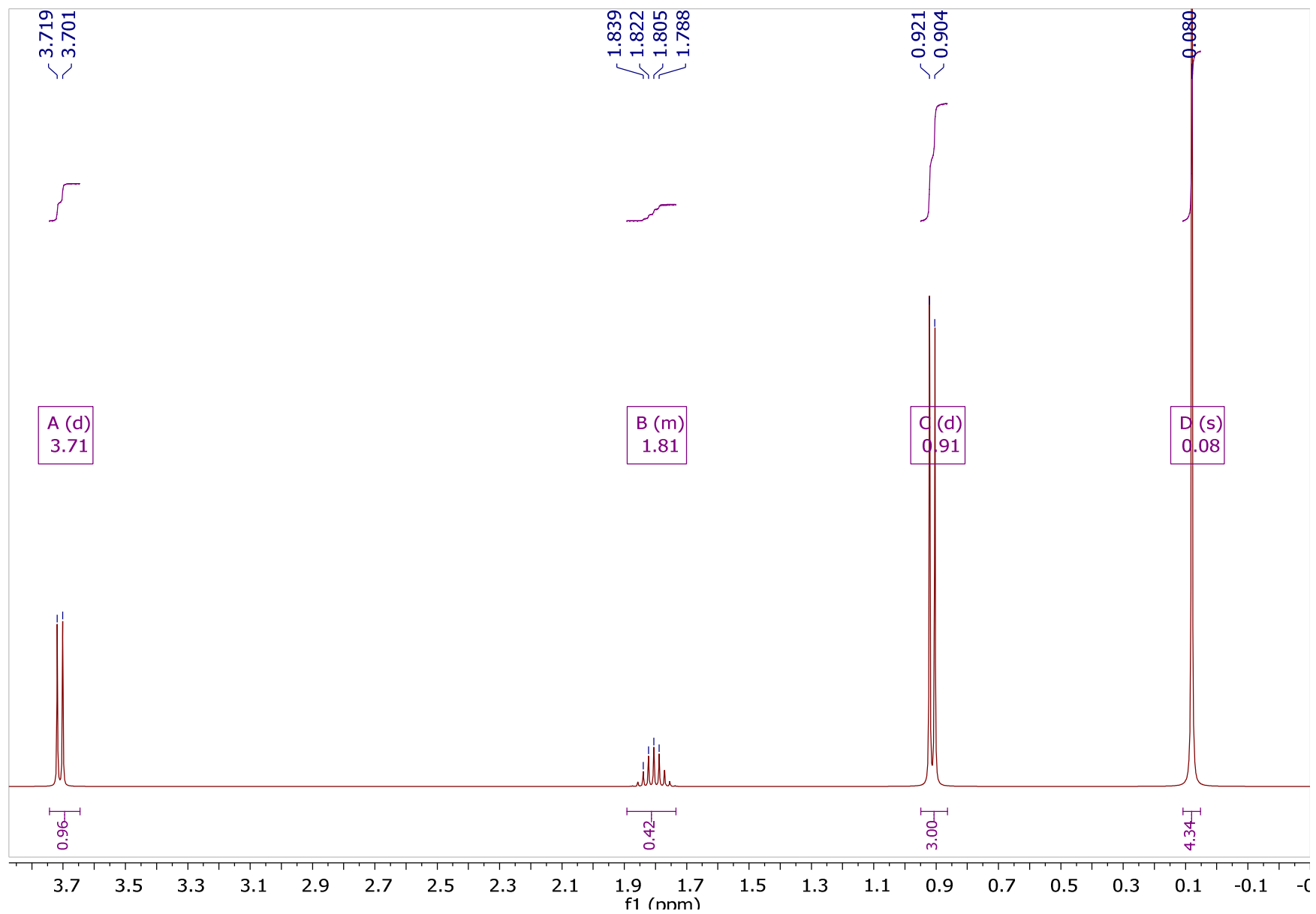
(u)  $C_8H_{14}O_2$



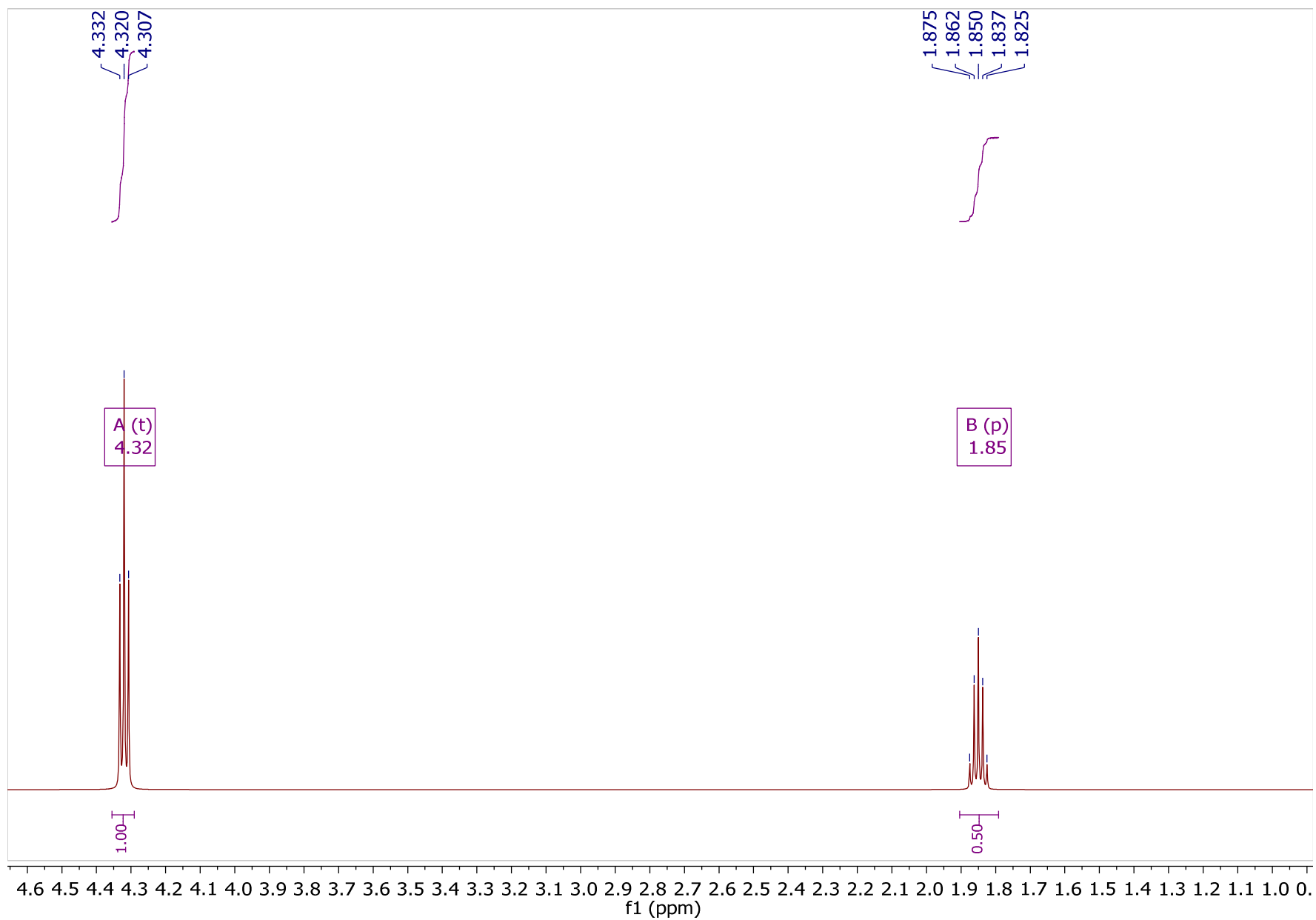
(w)  $C_6H_{12}Br_2$



(x)  $C_7H_{18}OSi$



(y)  $C_4H_6O_3$



(z)  $C_4H_{10}O_3$

