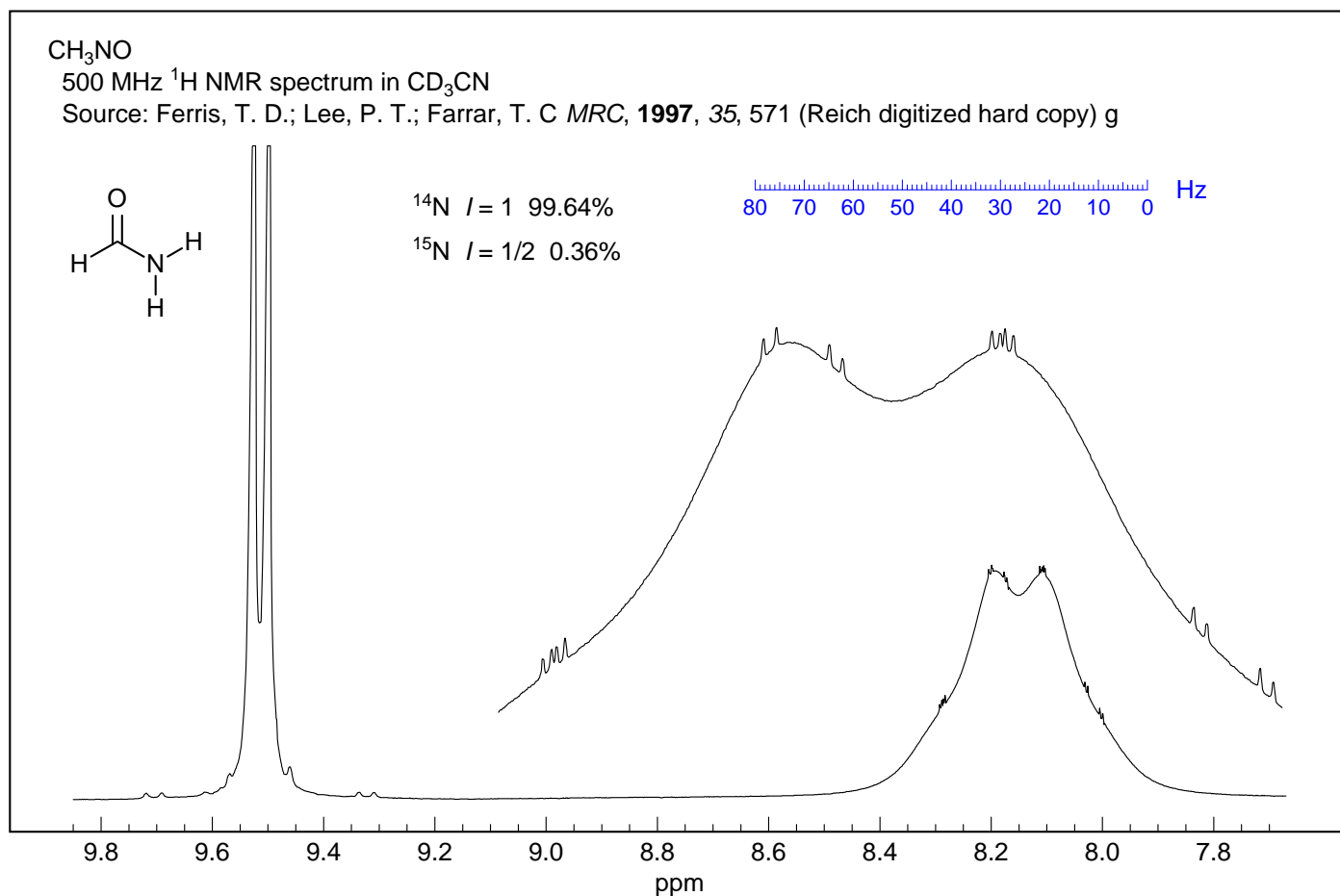
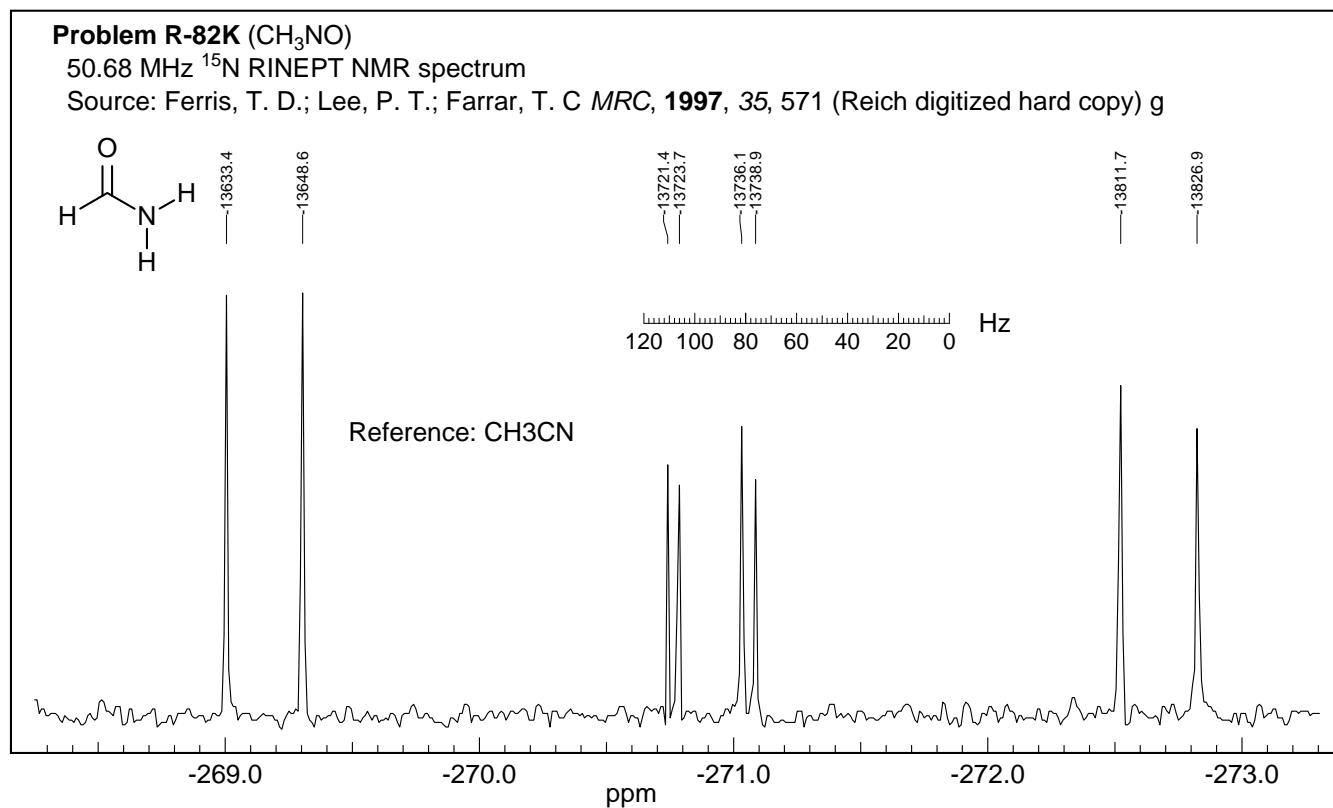


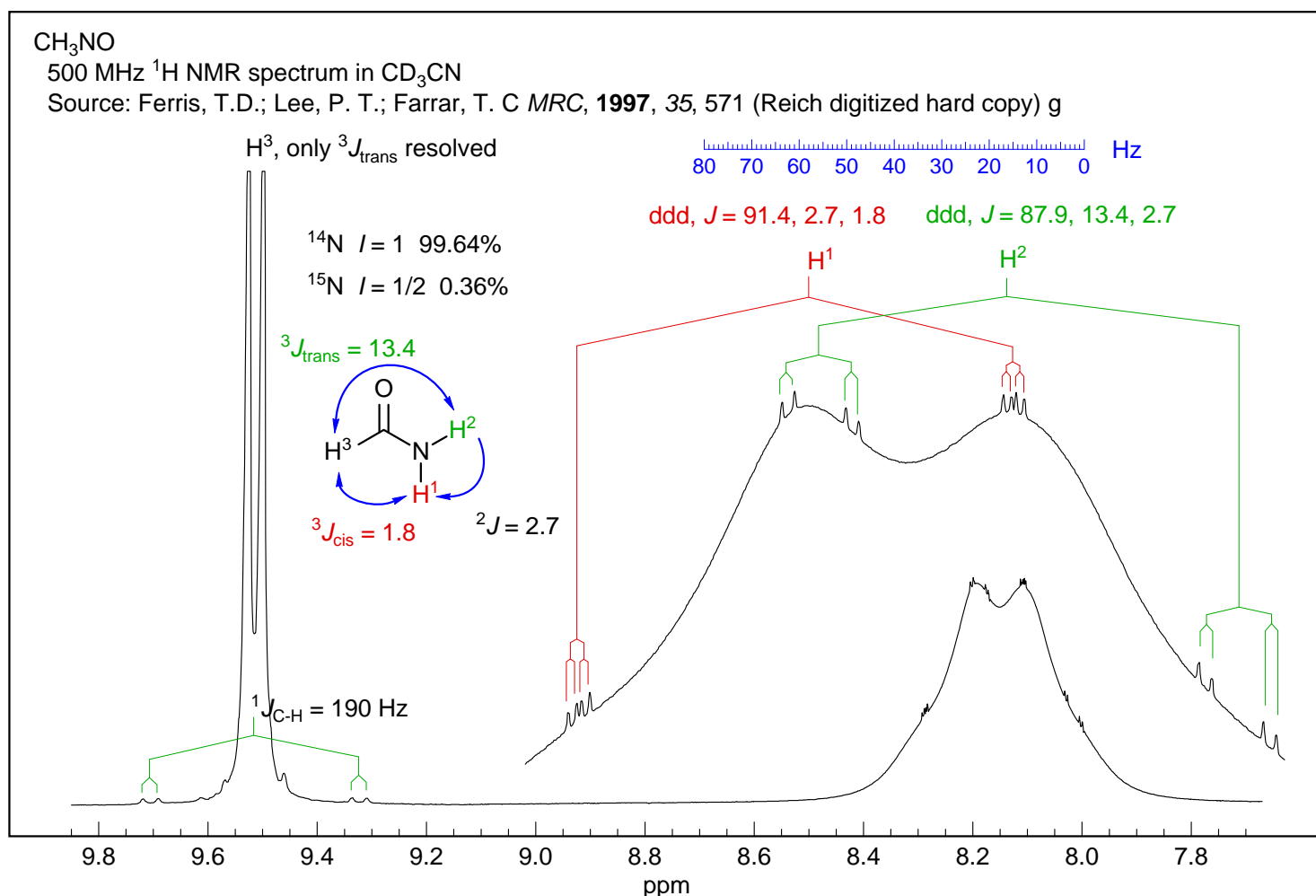
Exercise: Analyze and interpret ALL of the peaks in the proton NMR spectrum of formamide below:



Problem R-82K. Interpret the 11.1 MHz ¹⁵N NMR spectrum of formamide below. Determine coupling constants.



Exercise: Analyze and interpret ALL of the peaks in the proton NMR spectrum of formamide below:



The broad doublet centered at δ 8.2 is from the $^{14}\text{NH}_2$ protons. They are broadened by residual coupling to the ^{14}N . The two protons are diastereotopic (slow rotation around O=C-N bond, and slow intermolecular exchange of N-H protons). On the surface of the broad peaks are a series of small sharp peaks (a ddd, $J = 91.4, 2.7, 1.8$; ddd, $J = 87.9, 13.4, 2.7$) corresponding to the 0.36% of $^{15}\text{NH}_2$ in the sample.

The formyl proton should be a dd from coupling to the two NH_2 protons, but only the larger *trans* coupling is resolved. The ^{13}C satellites of the formyl proton are visible, $^1J_{\text{C-H}} = 190 \text{ Hz}$.

Problem R-82K. Interpret the 11.1 MHz ^{15}N NMR spectrum of formamide below. Determine coupling constants.

Problem R-82K (CH₃NO)

50.68 MHz ^{15}N NMR spectrum

Source: Ferris, T. D.; Lee, P. T.; Farrar, T. C *MRC*, **1997**, 35, 571 (Reich digitized hard copy) g

