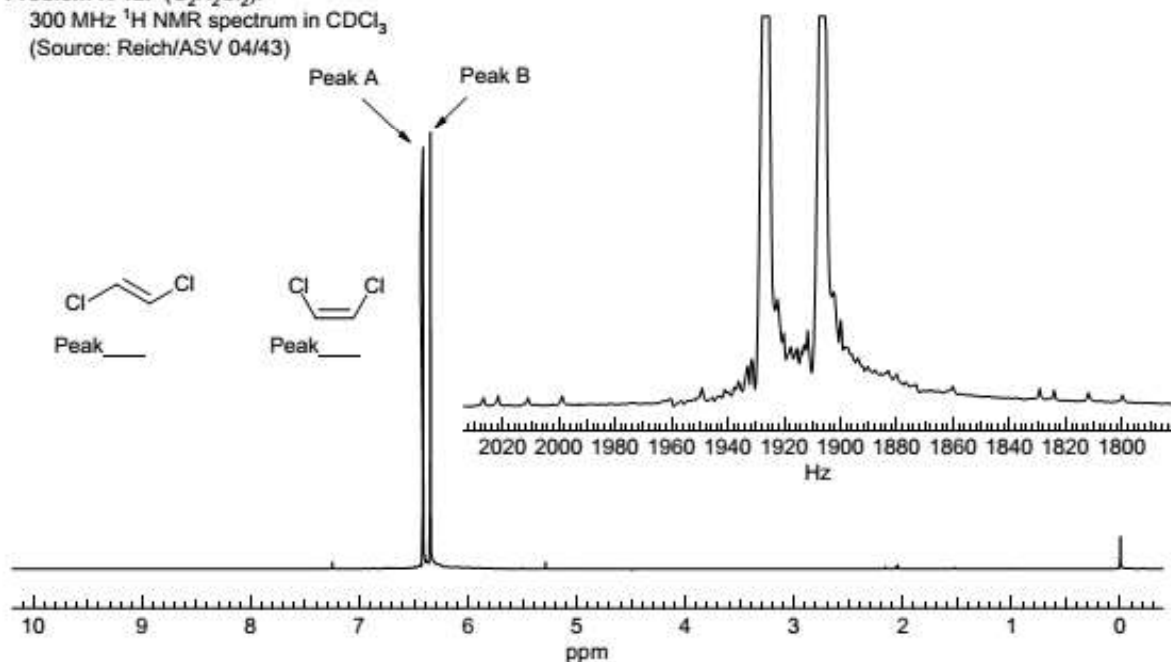


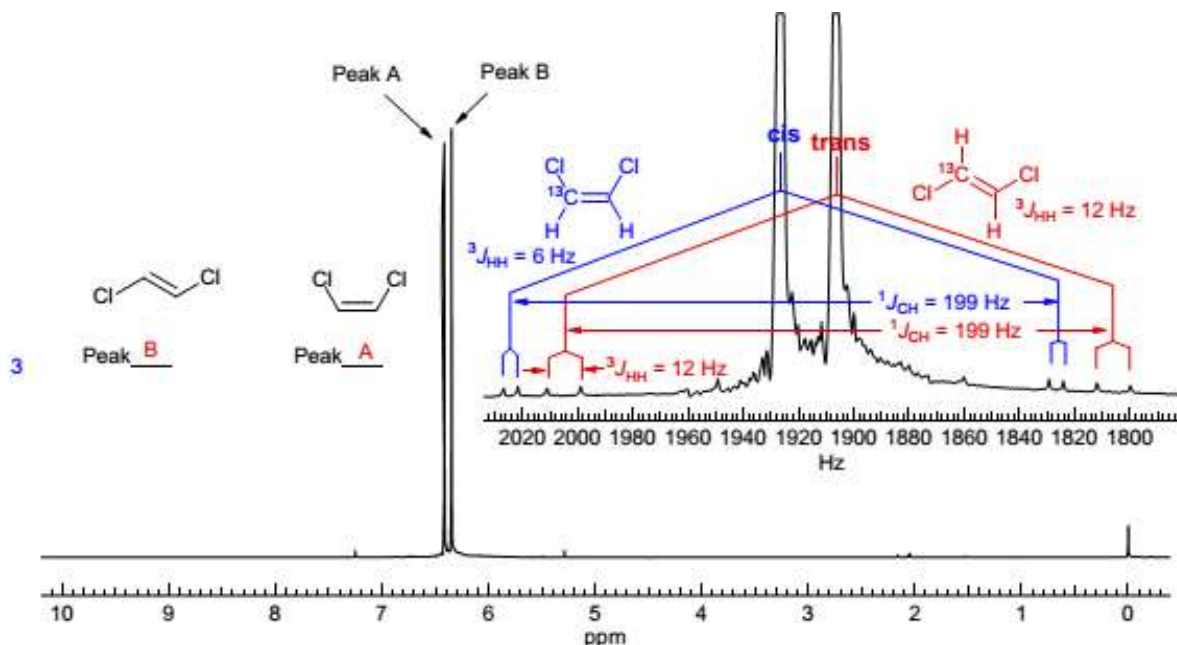
Problem R-12F. Below is the 300 MHz ^1H NMR spectrum of a nearly 1:1 mixture of the *E* and *Z* isomers of 1,2-dichloroethylene. Also shown is a vertical and horizontal expansion.

Problem R-12F ($\text{C}_2\text{H}_2\text{Cl}_2$).

300 MHz ^1H NMR spectrum in CDCl_3
(Source: Reich/ASV 04/43)



Indicate which peak (A or B) is *cis* and which is *trans* 1,2-dichloroethylene. Summarize all chemical shift and/or coupling information you obtained from the spectrum.



Indicate which peak (A or B) is *cis* and which is *trans* 1,2-dichloroethylene. Summarize all chemical shift and/or coupling information you obtained from the spectrum.

The *cis* and *trans* 3-bond J_{HH} can be measured directly from the ^{13}C satellites of each peak - the one at δ 6.42 has a coupling of 6 Hz, thus *cis* isomer, the one at δ 6.35 has $J_{\text{HH}} = 12 \text{ Hz}$, so *trans* isomer