Room-temperature rotational spectra are dense and difficult to assign, and so we have been working to develop methods to accelerate this process. We have tested two different methods with our waveguide-based spectrometer, which operates from 8.7 to 26.5 GHz. The first method, based on previous work by Medvedev and De Lucia⁴, was used to estimate lower state energies of transitions by performing relative intensity measurements at a range of temperatures between -20 and +50 °C. The second method employed hundreds of microwave-microwave double resonance measurements to determine level connectivity between rotational transitions. The relative intensity measurements were not particularly successful in this frequency range (the reasons for this will be discussed), but the information gleaned from the double-resonance measurements can be incorporated into other spectral search algorithms (such as autofit or genetic algorithm approaches) via scoring or penalty functions to help with the spectral assignment process.