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High Frequency Electron Paramagnetic Resonance studies of $NiCl_2$-4SC(NH_2)$_2$ SUNG SU KIM, S. HILL, Physics, University of Florida, P. SENGUPTA, V.S. ZAPF, R. MCDONALD, M. JAIME, C.D. BATISTA, MST and NHMFL, Los Alamos National Labs, S. TOZER, NHMFL, Tallahassee, FL, A. PADUAN-FILHO, Universidade de Sao Paulo, Brazil — High-frequency (50 to 311 GHz) Electron Paramagnetic Resonance (HFEPR) measurements have been performed on a single-crystal sample of the easy-plane $S = 1$ linear-chain Heisenberg antiferromagnet $NiCl_2$4SC(NH_2)$_2$ (DTN). DTN has received much interest due to the possibility that it undergoes a Bose-Einstein condensation of the $S^z = 1$ excitations (magnons) in the vicinity of the field tuned crossing of the $S^z = 0$ and 1 states. Low-temperature frequency-dependent studies provide a direct measure of the zero-field spin gap separating the $S^z = 0$ and 1 states. Lower frequency (92 GHz), temperature dependent studies with $B//c$ reveal two resonances either side of the $S^z = 0$ and 1 crossing. Strong shifts and changes in the lineshapes of these resonances as the temperature is raised from 2 to 15 K can be understood in terms of the gradual population of multi-magnon states. The trends observed from HFEPR experiments can be reproduced via numerical simulations using accepted values for the intra-chain Heisenberg interaction J and the local anisotropy parameter D.

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