Spin excitations in \( S = \frac{1}{2} \) AFM chains with alternating \( g \)-tensor and the Dzyaloshinskii-Moriya interaction. S.A. ZVYAGIN, J. WOSNITZA, Dresden High Magnetic Field Laboratory (HLD), Forschungszentrum Rossendorf, 01314 Dresden, Germany, A.K. KOLEZHUK, Physics Dept., Harvard University, Cambridge, MA 02138, J. KRZYSTEK, National High Magnetic Field Laboratory, Tallahassee, FL 32310, R. FEYERHERM, Hahn-Meitner-Institute (HMI), 14109 Berlin, Germany — The magnetic excitation spectrum of copper pyrimidine dinitrate (Cu-PM), an \( S = \frac{1}{2} \) antiferromagnetic chain system with alternating \( g \)-tensor and the Dzyaloshinskii-Moriya interaction, is probed using ESR spectroscopy in magnetic fields up to 25 T. The field-induced gap is measured directly. Signatures of a soliton and three breather branches are identified, and their frequency-field dependences are described in frame of the quantum field sine-Gordon model. Furthermore, the ESR linewidth and shift behavior in Cu-PM in the perturbative spinon regime is studied as function of temperature and field. Excellent quantitative agreement between theoretical predictions (Phys. Rev. Lett. 82, 5136 (1999)) and experiment is obtained. The results are published in: S.A. Zvyagin et al., Phys. Rev. Lett. 93, 027201 (2004); ibid. 95, 012707 (2005).