The Upcoming JILA Gen. III eEDM Experiment KIA BOON NG, YAN ZHOU, WILLIAM CAIRNCROSS, TANYA ROUSSY, YUVAL SHAGAM, KEVIN BOYCE, ANTONIO VIGIL, MADELINE PETTINE, JUN YE, ERIC CORNELL, University of Colorado, Boulder — ThF$^+$ is the champion for the third-generation (Gen. III) measurement of the electric dipole moment of the electron (eEDM) at JILA. Compared to the current HfF$^+$ eEDM experiment, ThF$^+$ has several advantages: (i) the eEDM-sensitive state ($^3\Delta_1$) is the ground state [1,2], with a projected coherence time on the order of a few minutes; and (ii) its effective electric field (38 GV/cm) is 50% larger than that of HfF$^+$ [3], which promises a direct increase of the eEDM sensitivity. Herein, we present the final spectroscopic work on the $^3\Delta_1$ state, and discuss multiplexing strategies to increase our effective count rate in Gen. III by two orders of magnitude over the Gen. II experiment.