Description of Additional Supplementary Information

**Supplementary Movie 1. Time-lapse FRAP imaging of GFP-FtsN fusion cells.**
Half of the ring in the cell on the right was bleached (cyan arrow). The cell on the left served as a control (yellow arrowhead). Images were acquired every 1 s for 150 s after photobleaching, with a 50-ms exposure time. Scale bars, 500 nm.

**Supplementary Movie 2. Time-lapse TIRF-SIM imaging of a mNG-FtsN fusion cell.**
Images were acquired every 1 s for 40 s, with a 50-ms exposure time. Scale bars, 500 nm.

**Supplementary Movie 3. SMT imaging of a cell with an immobile JF646-FtsN-Halo\textsuperscript{SW} molecule.**
Images were acquired every 1 s for 150 s, with a 100-ms exposure time. Scale bars, 500 nm.

**Supplementary Movie 4. SMT imaging of a cell with a processively moving JF646-FtsN-Halo\textsuperscript{SW} molecule.**
Images were acquired every 1 s for 150 s, with a 100-ms exposure time. Scale bars, 500 nm.

**Supplementary Movie 5. SMT imaging of a cell with a JF646-FtsN-Halo\textsuperscript{SW} molecule switching between the stationary state and moving state with different speeds.**
Images were acquired every 1 s for 150 s, with a 100-ms exposure time. Scale bars, 500 nm.