

Figure S138. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

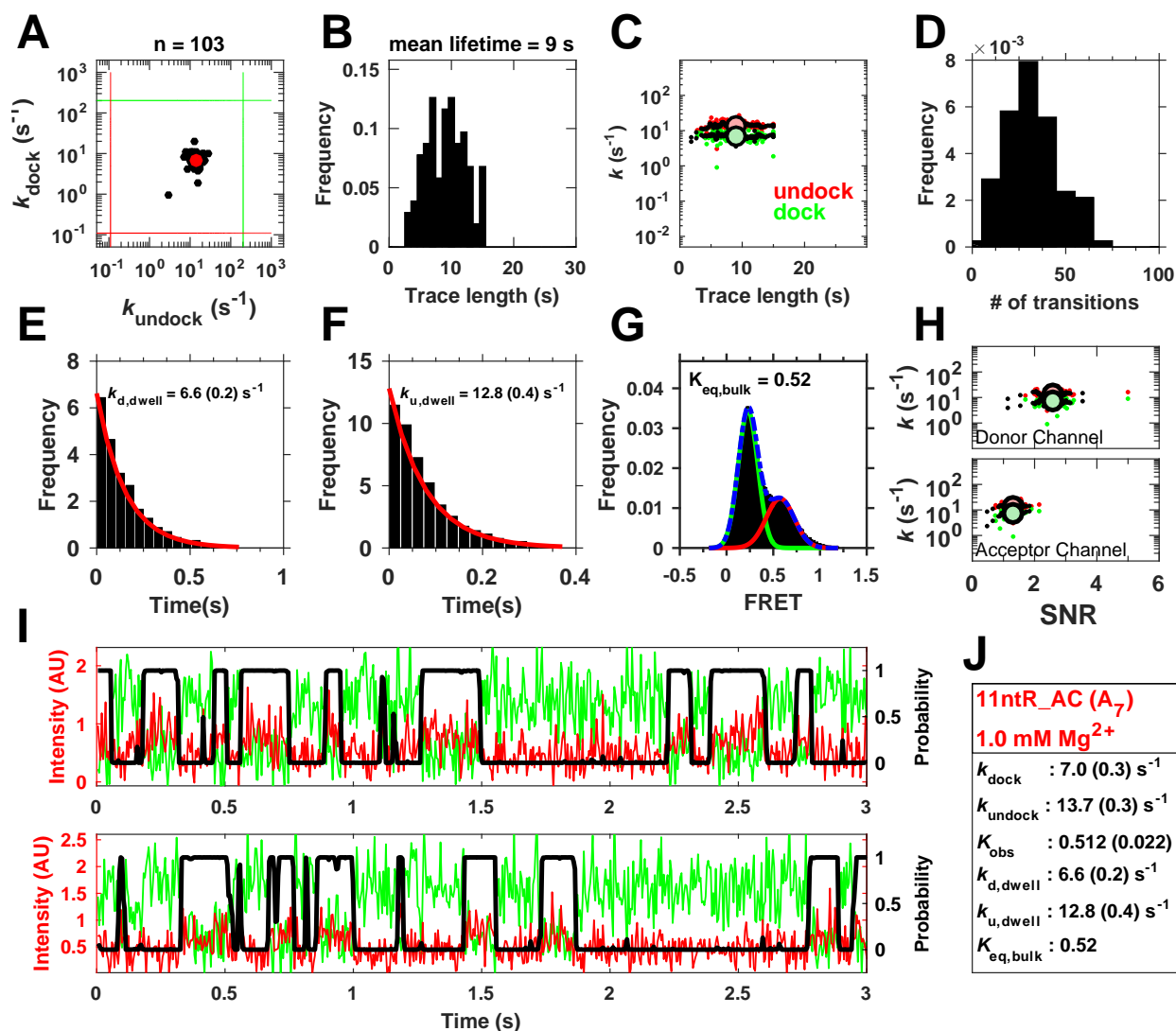


Figure S139. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

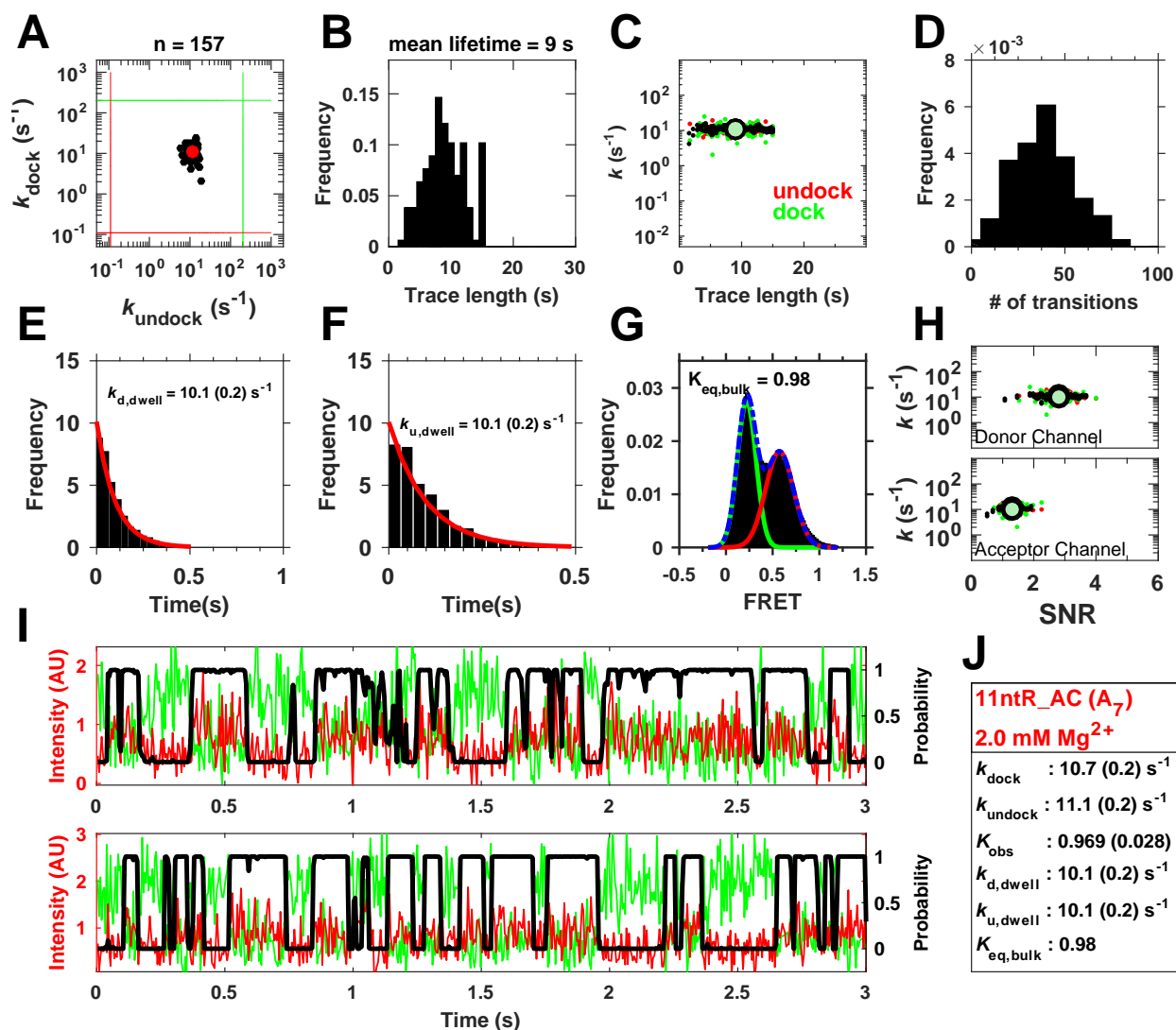


Figure S140. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

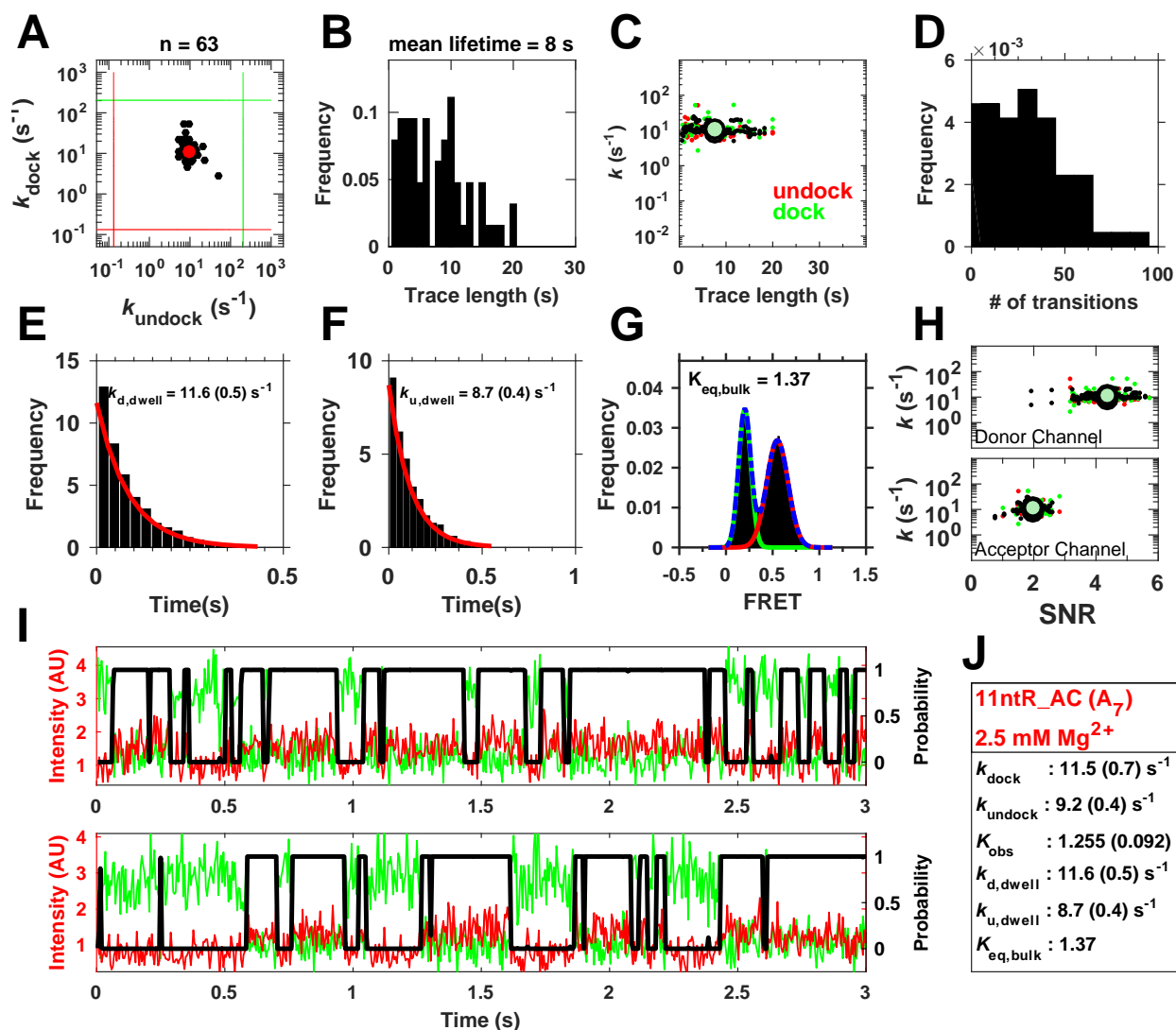


Figure S141. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

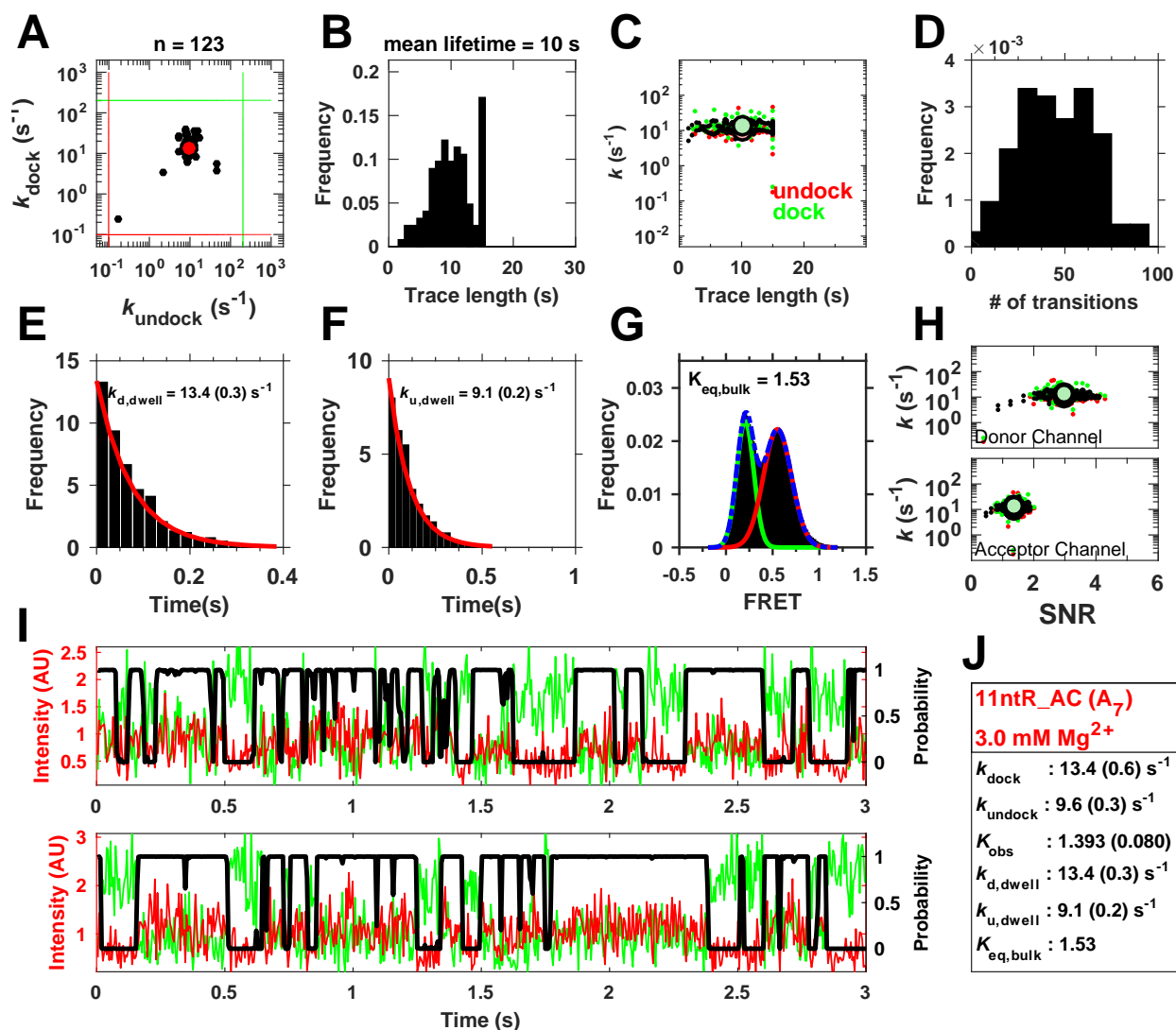


Figure S142. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

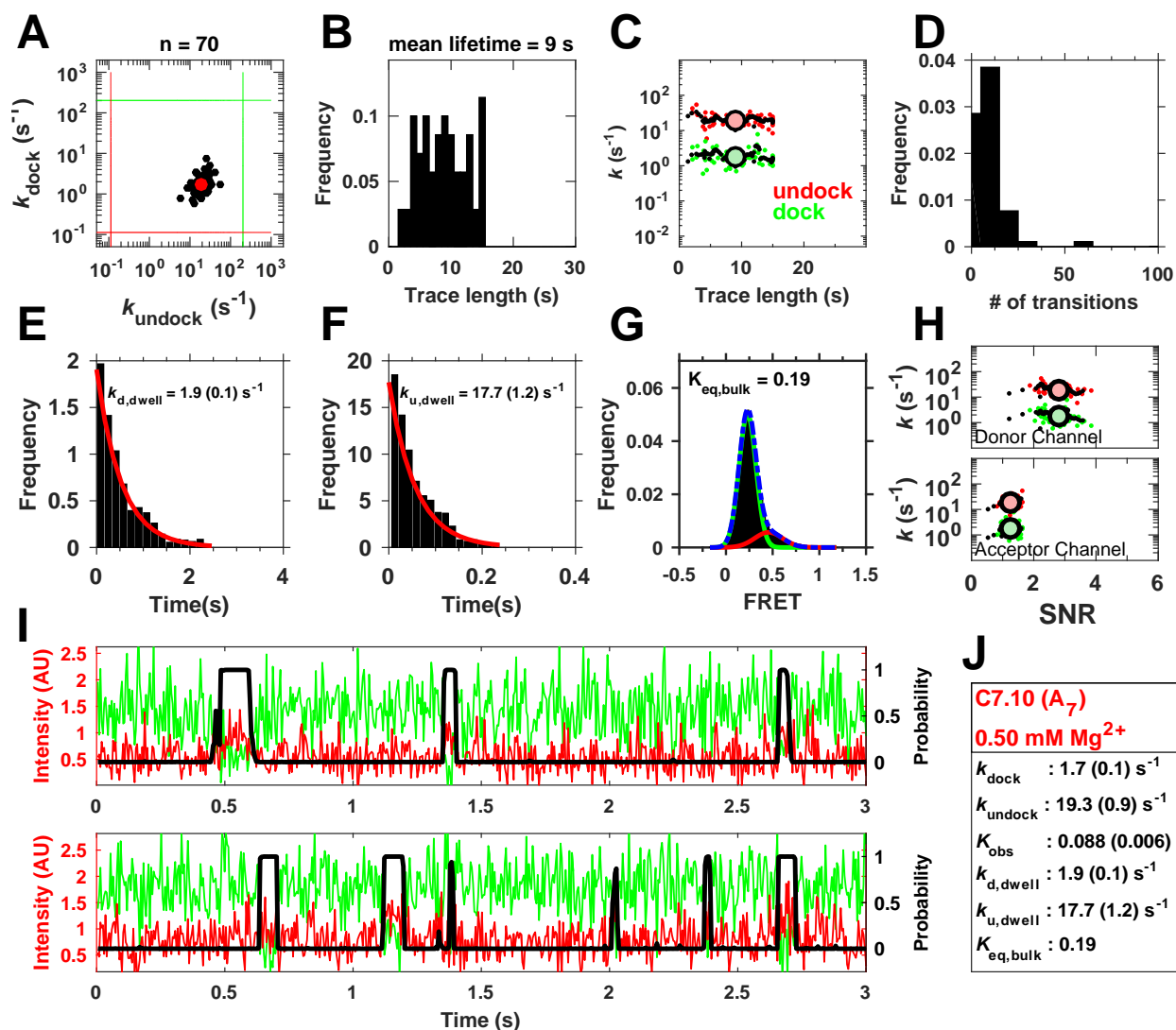


Figure S143. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

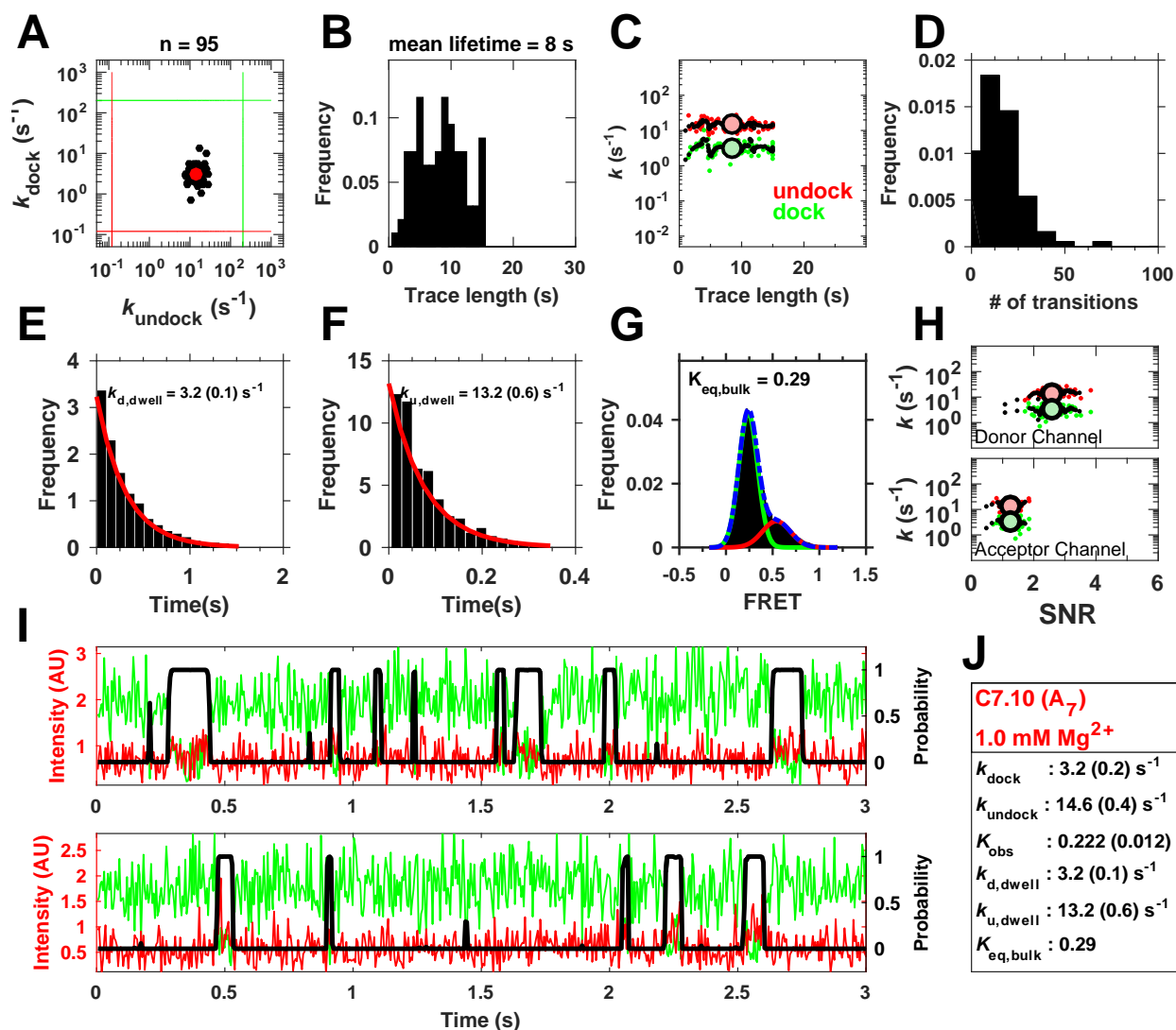


Figure S144. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

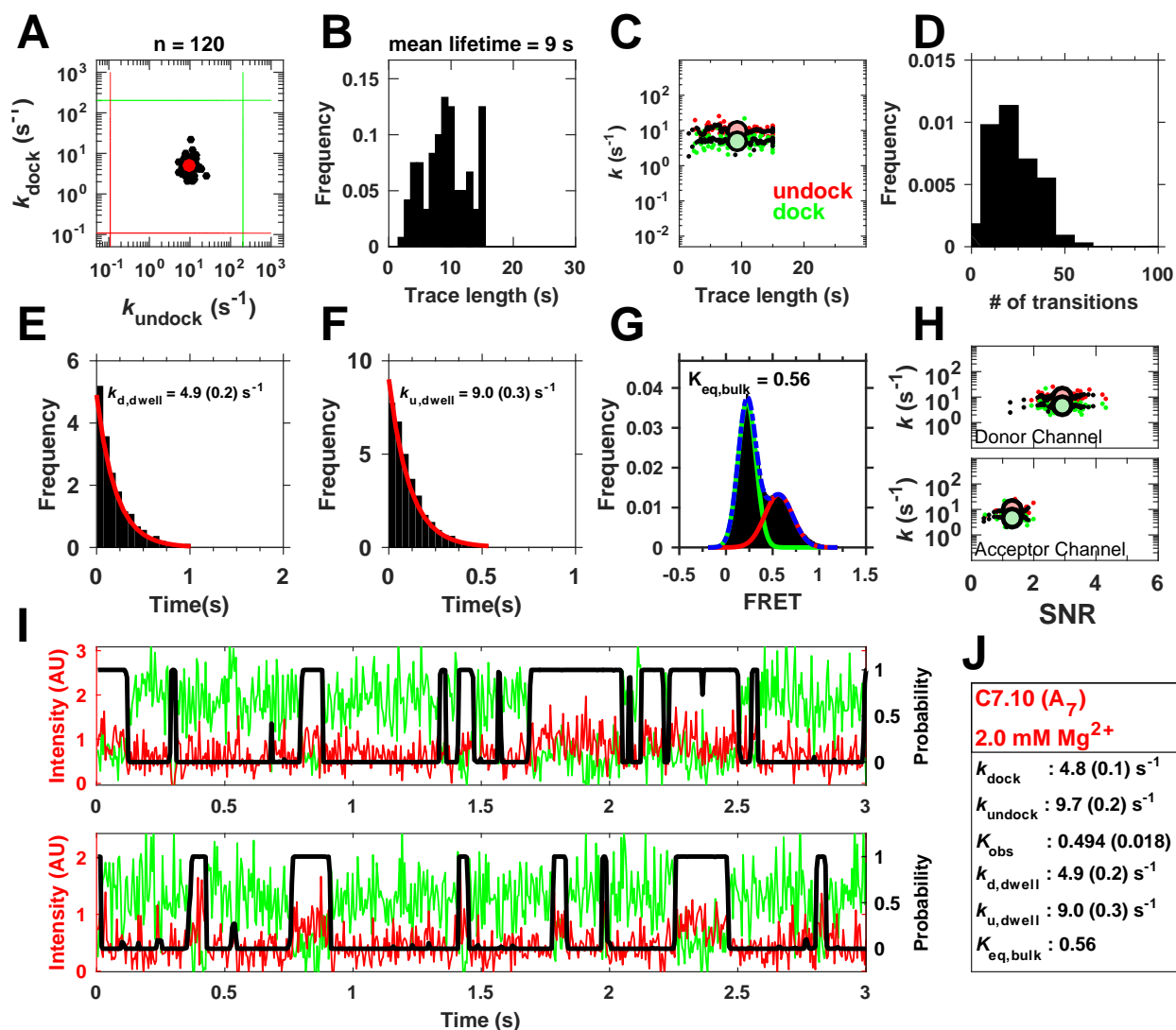


Figure S145. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

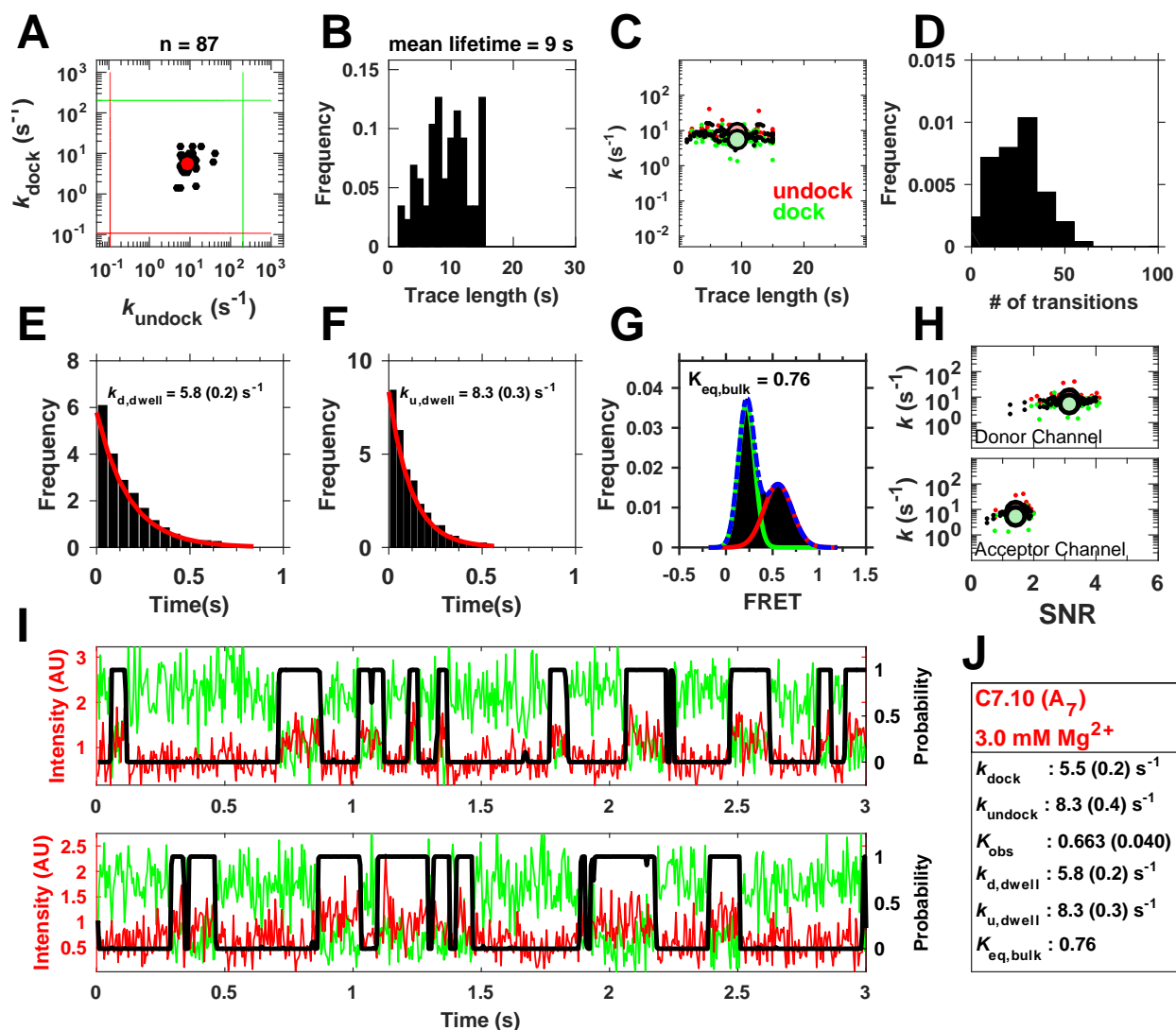


Figure S146. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

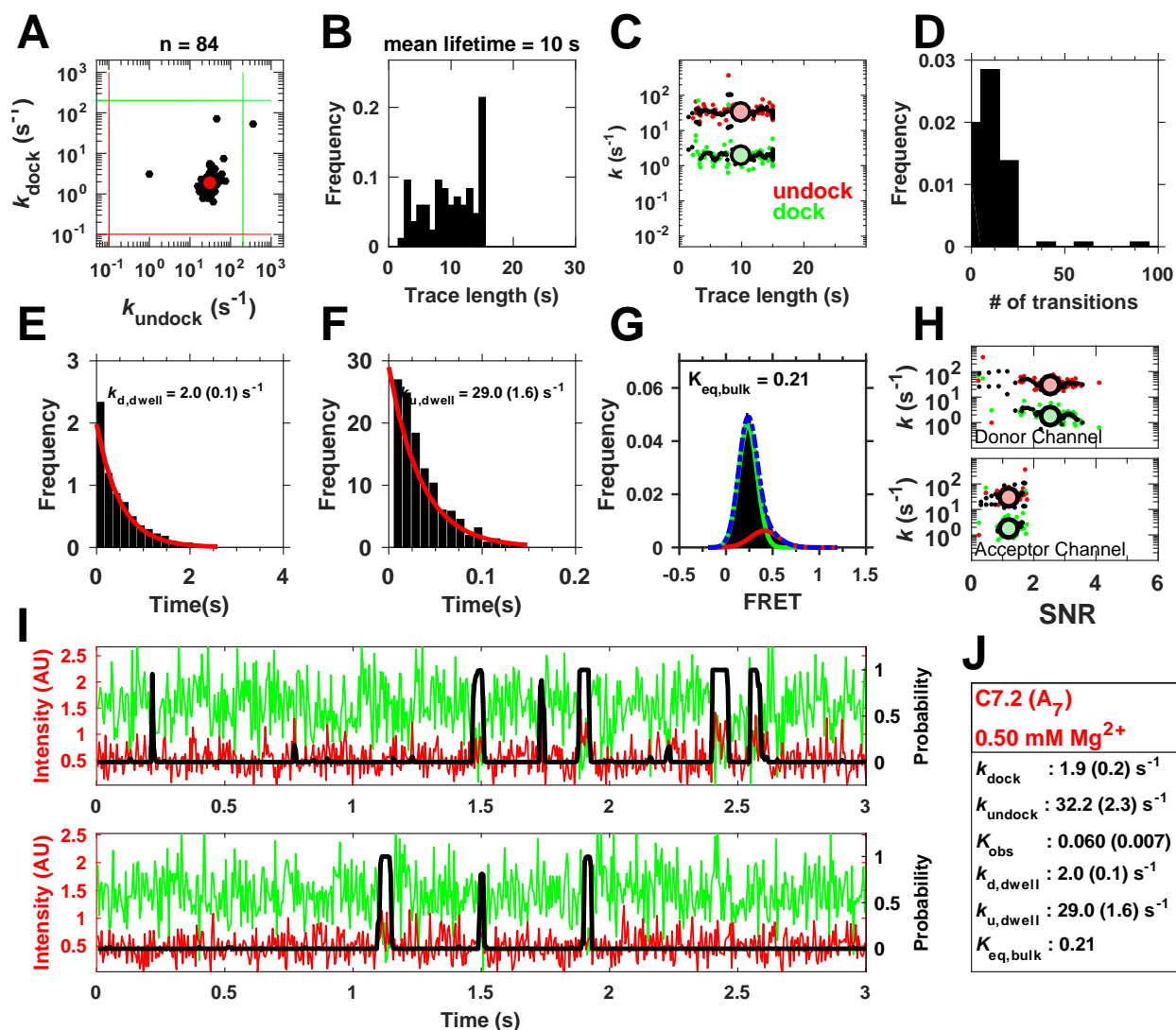


Figure S147. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

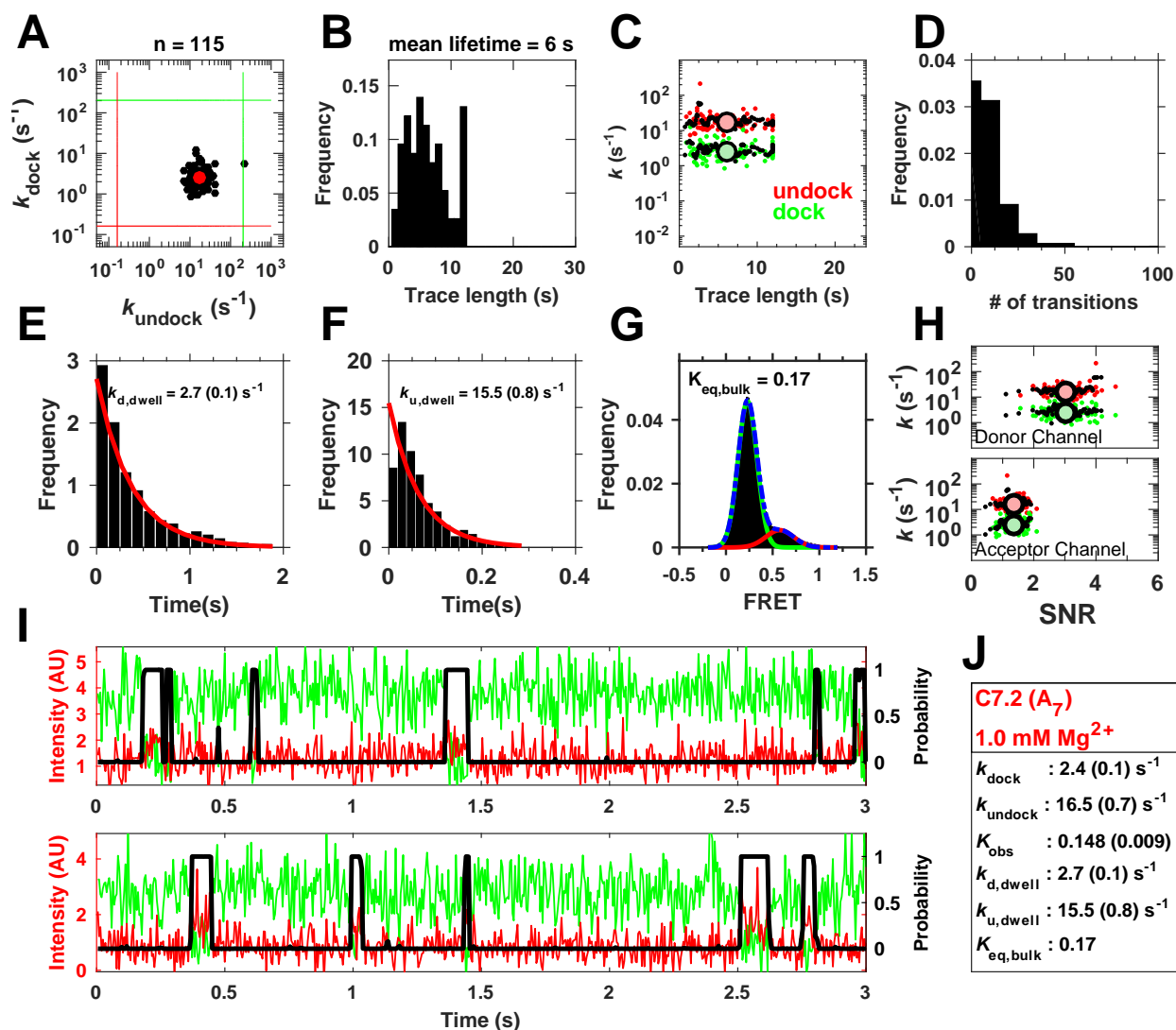


Figure S148. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

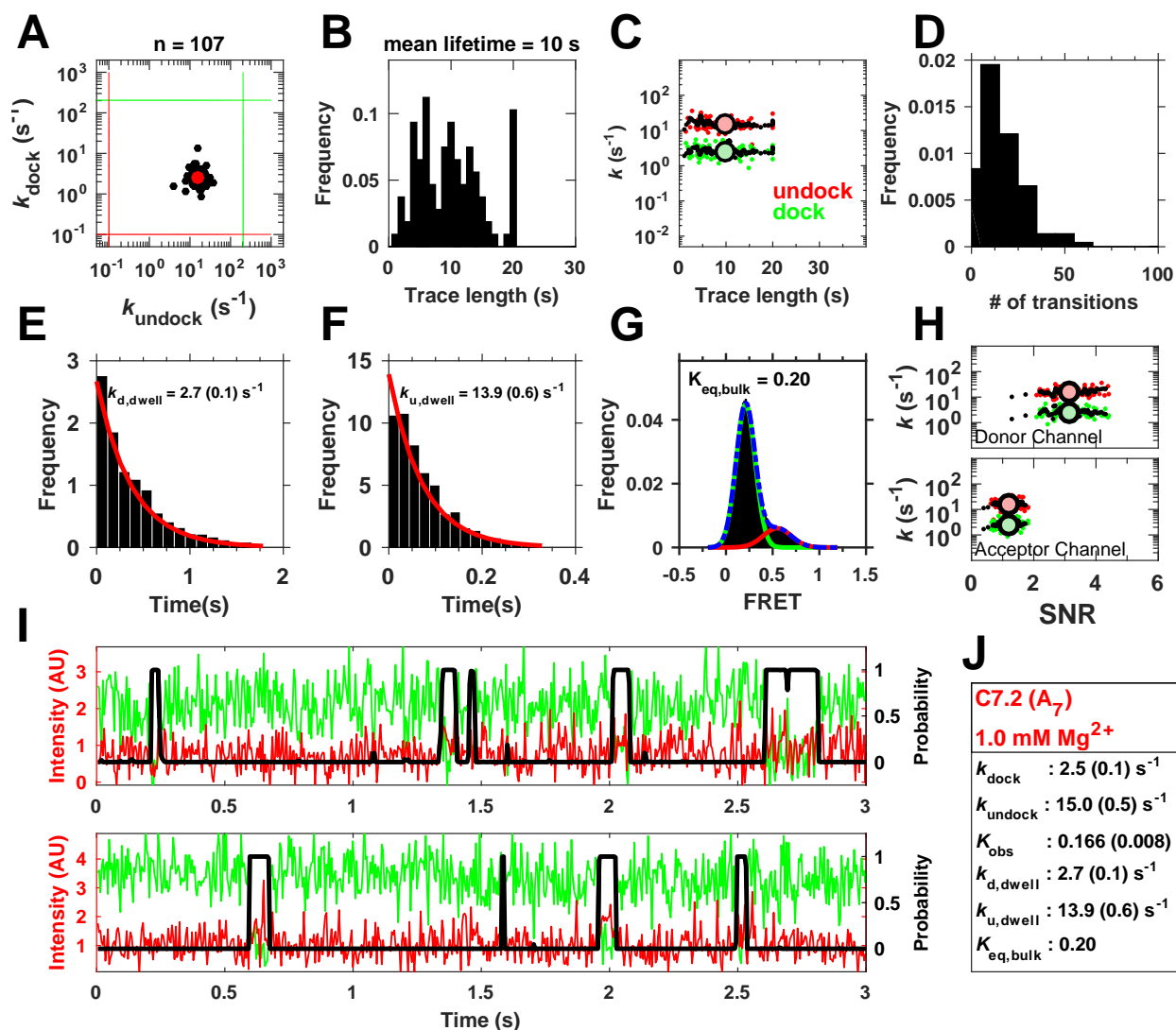


Figure S149. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

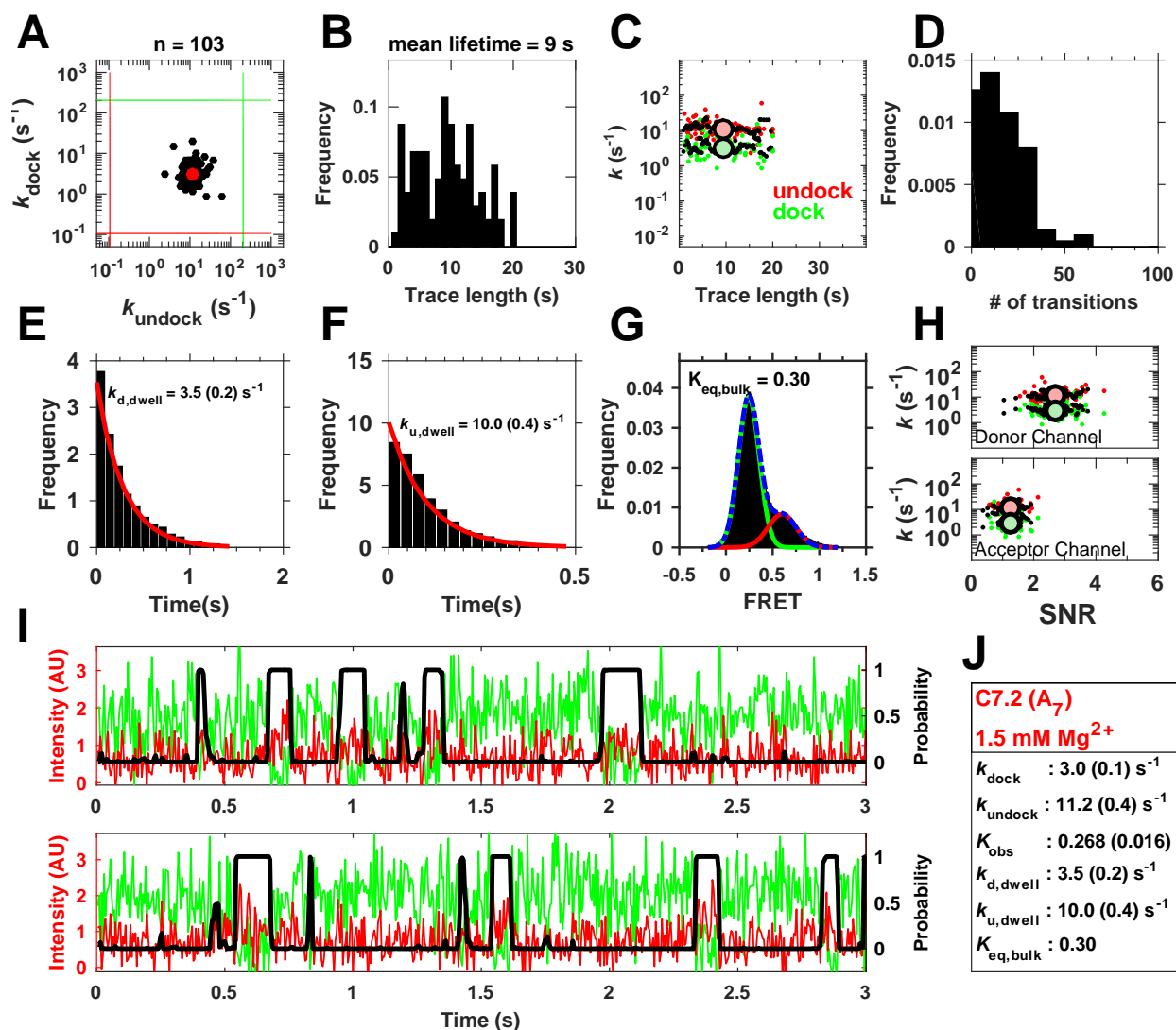


Figure S150. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

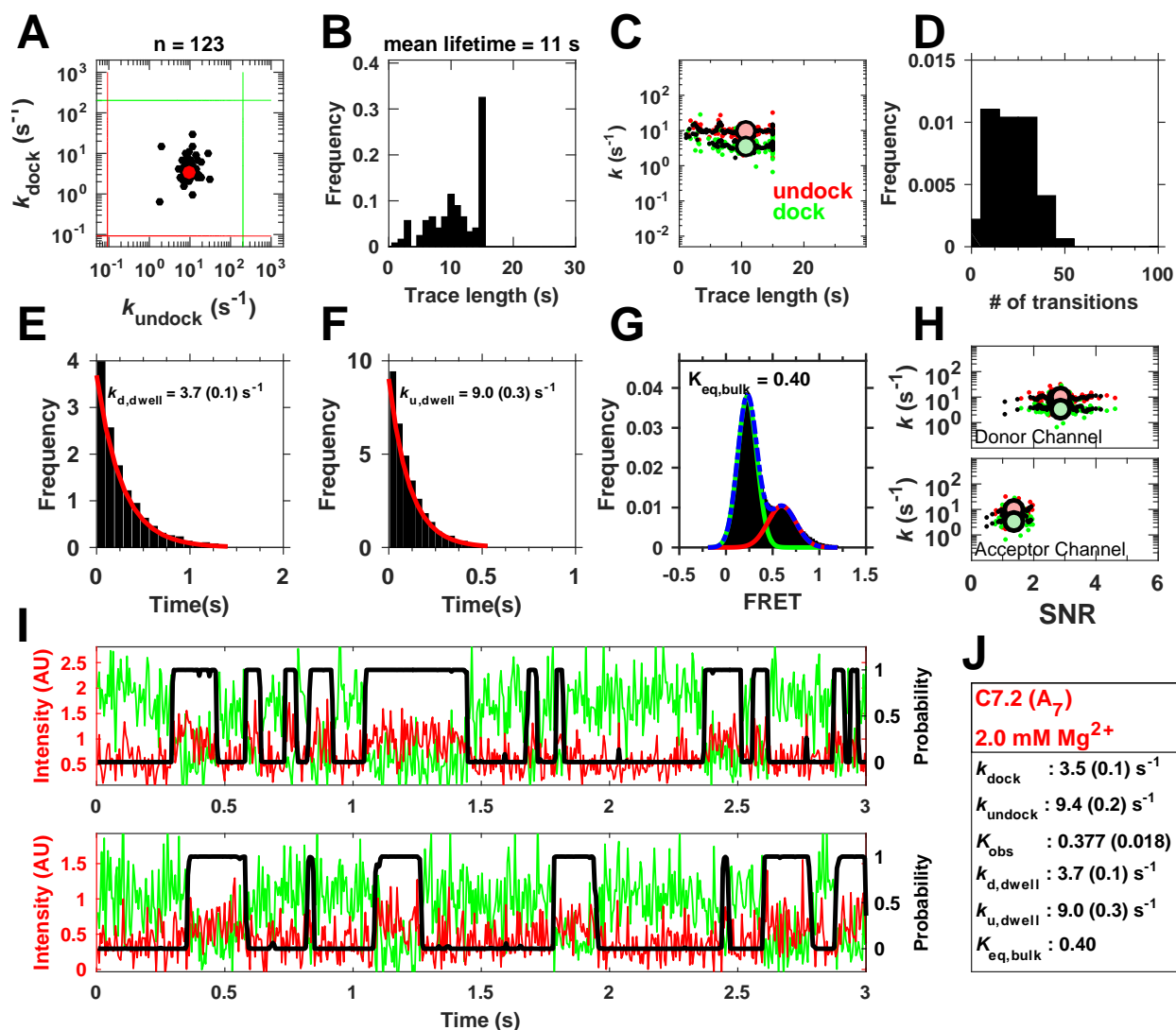


Figure S151. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

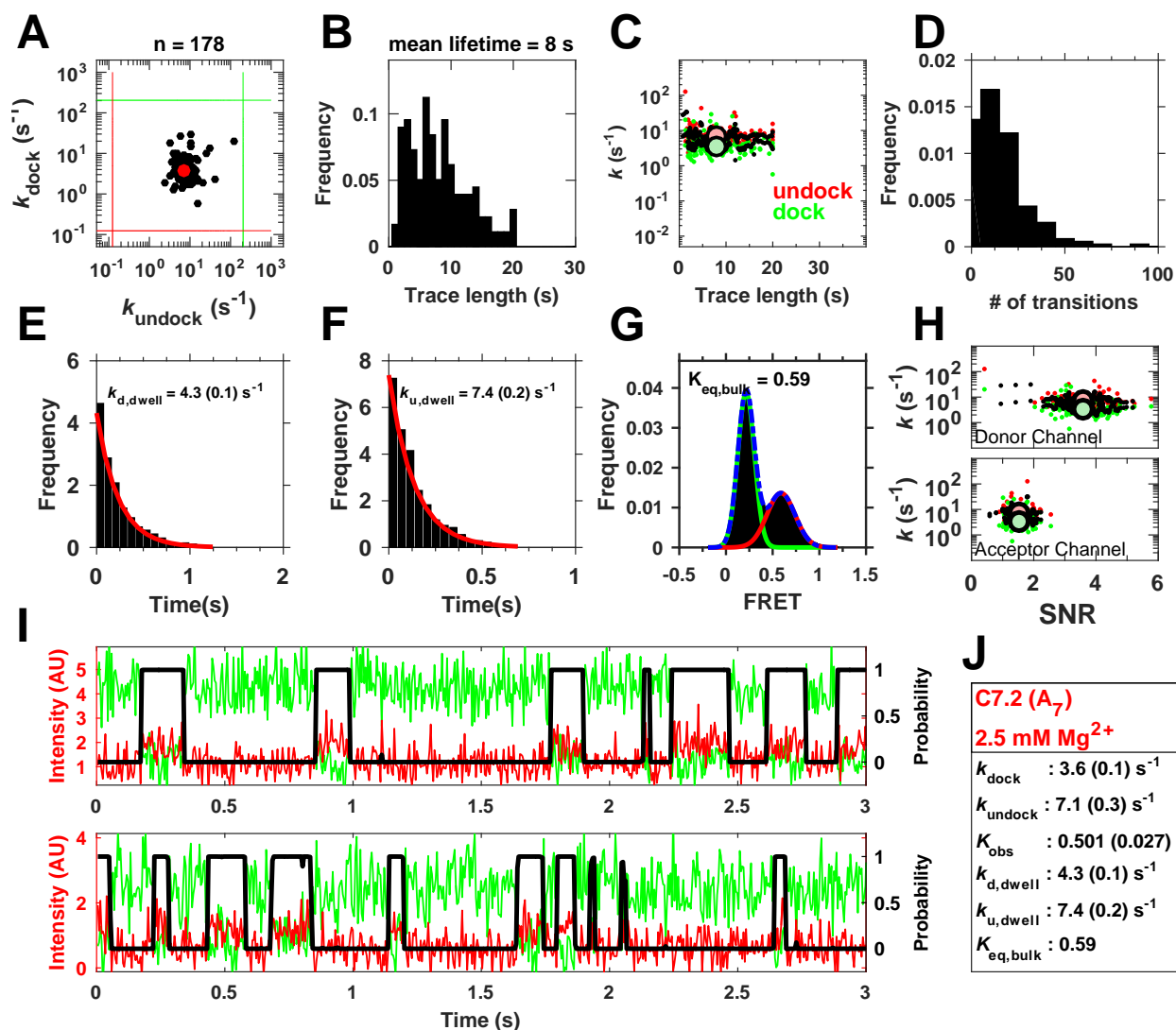


Figure S152. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

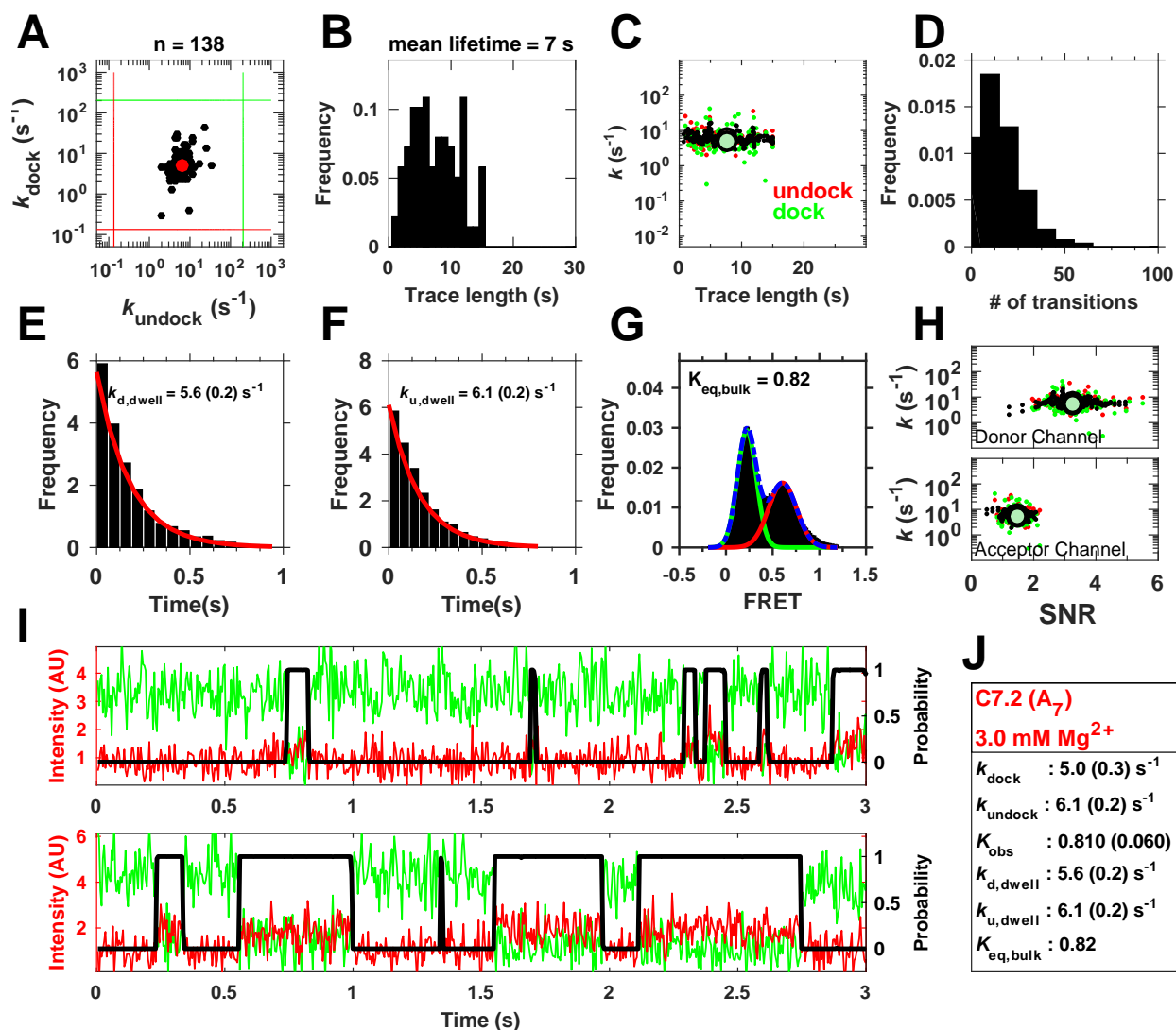


Figure S153. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

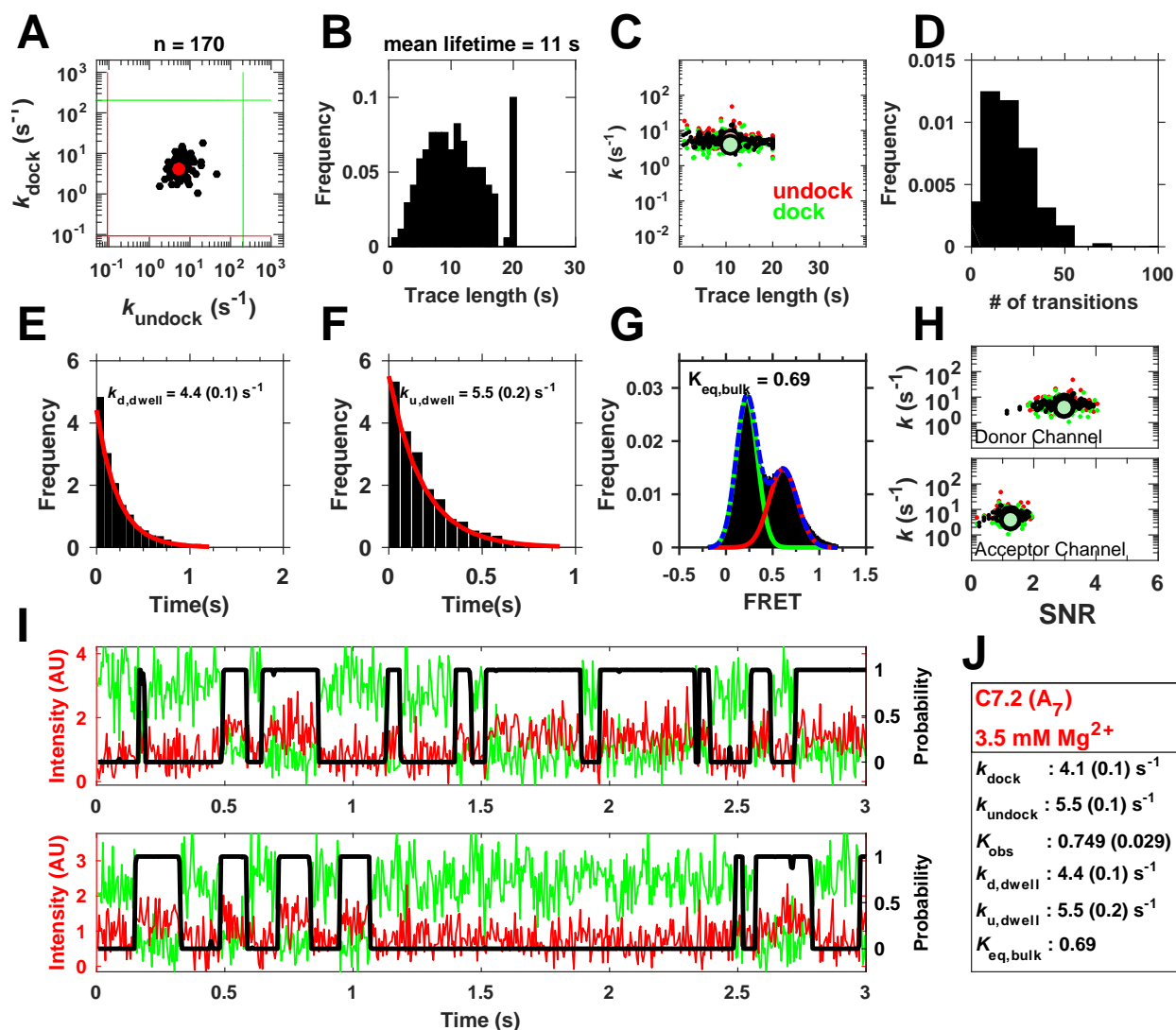


Figure S154. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

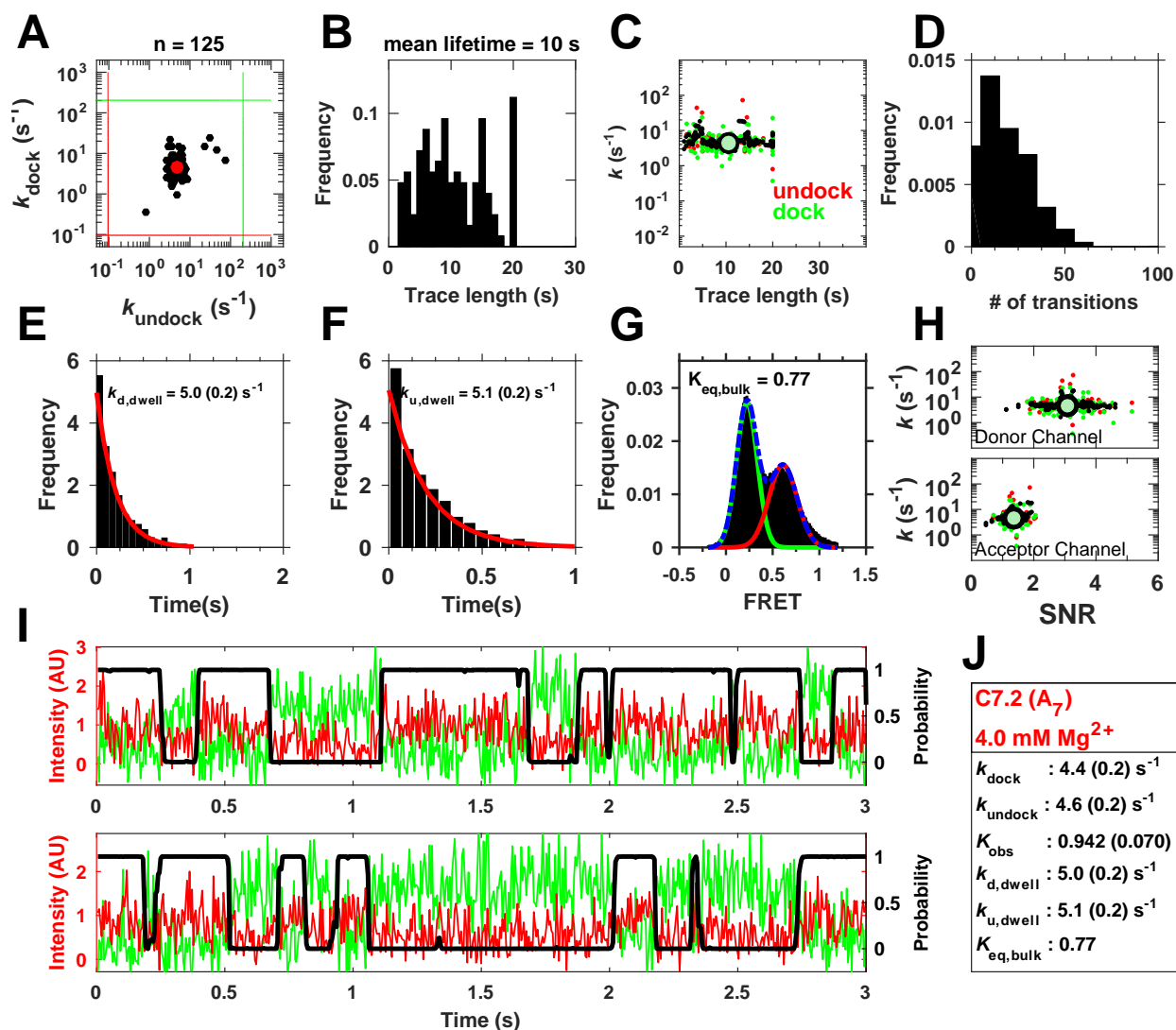


Figure S155. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

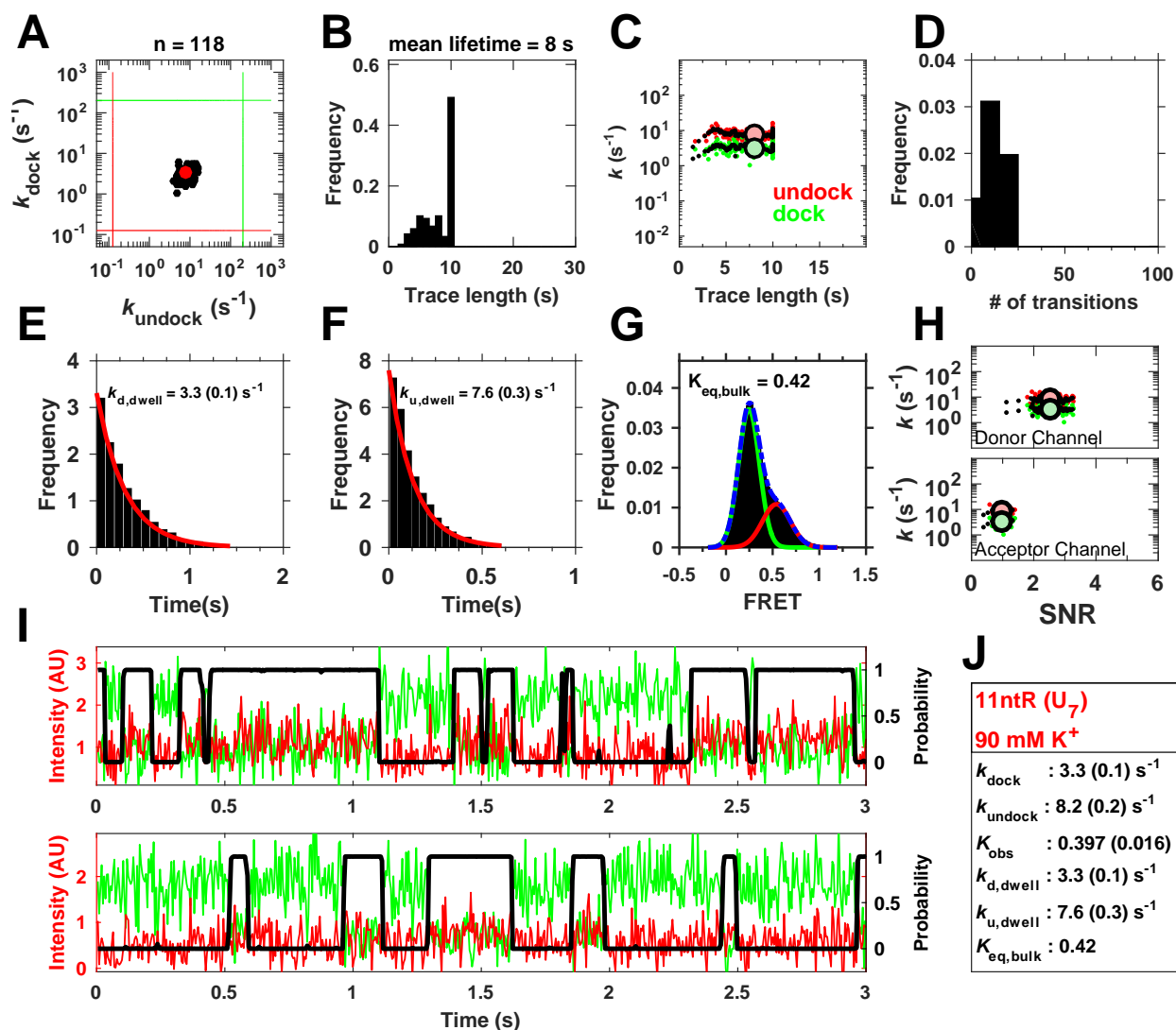


Figure S156. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

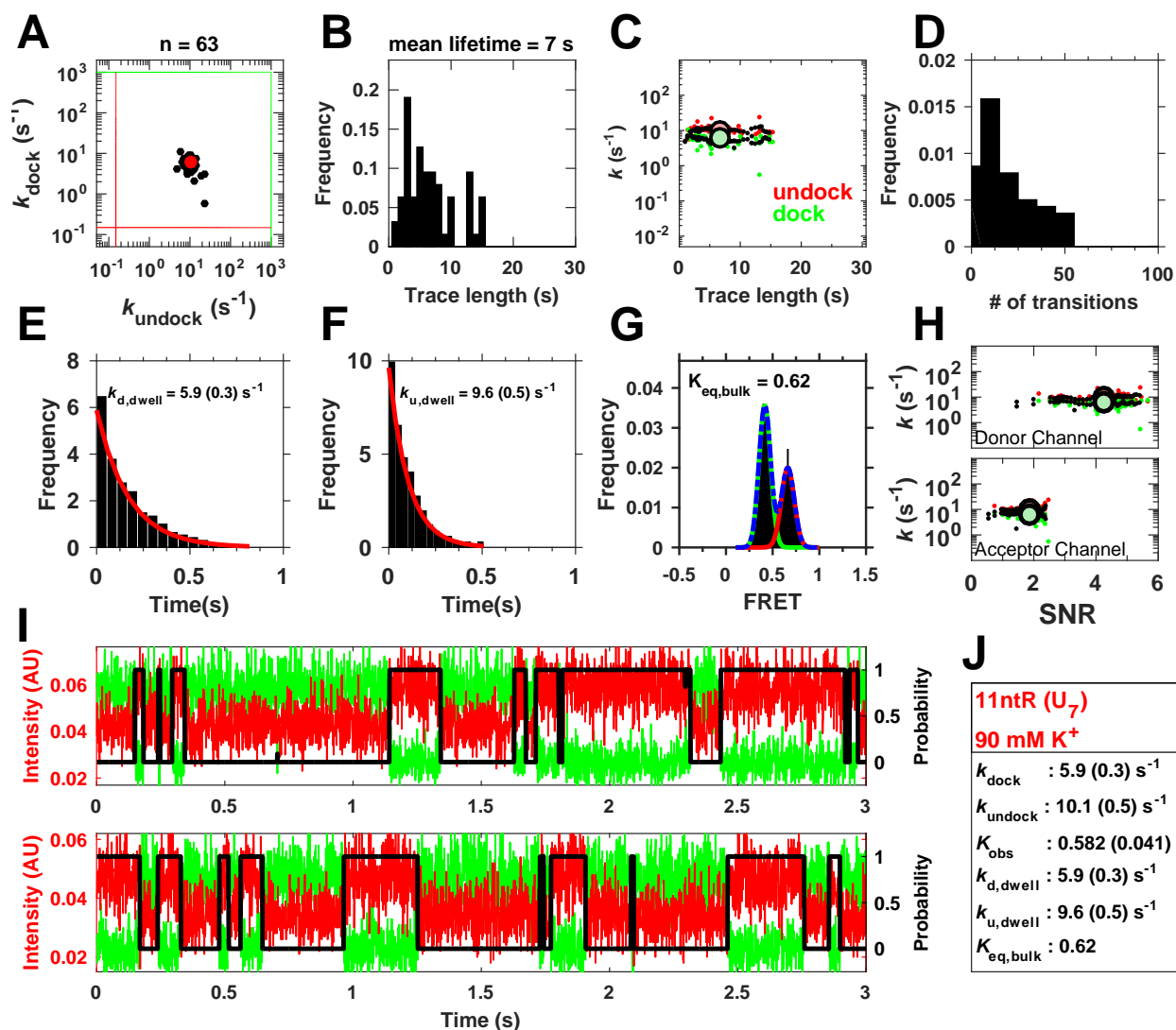


Figure S157. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

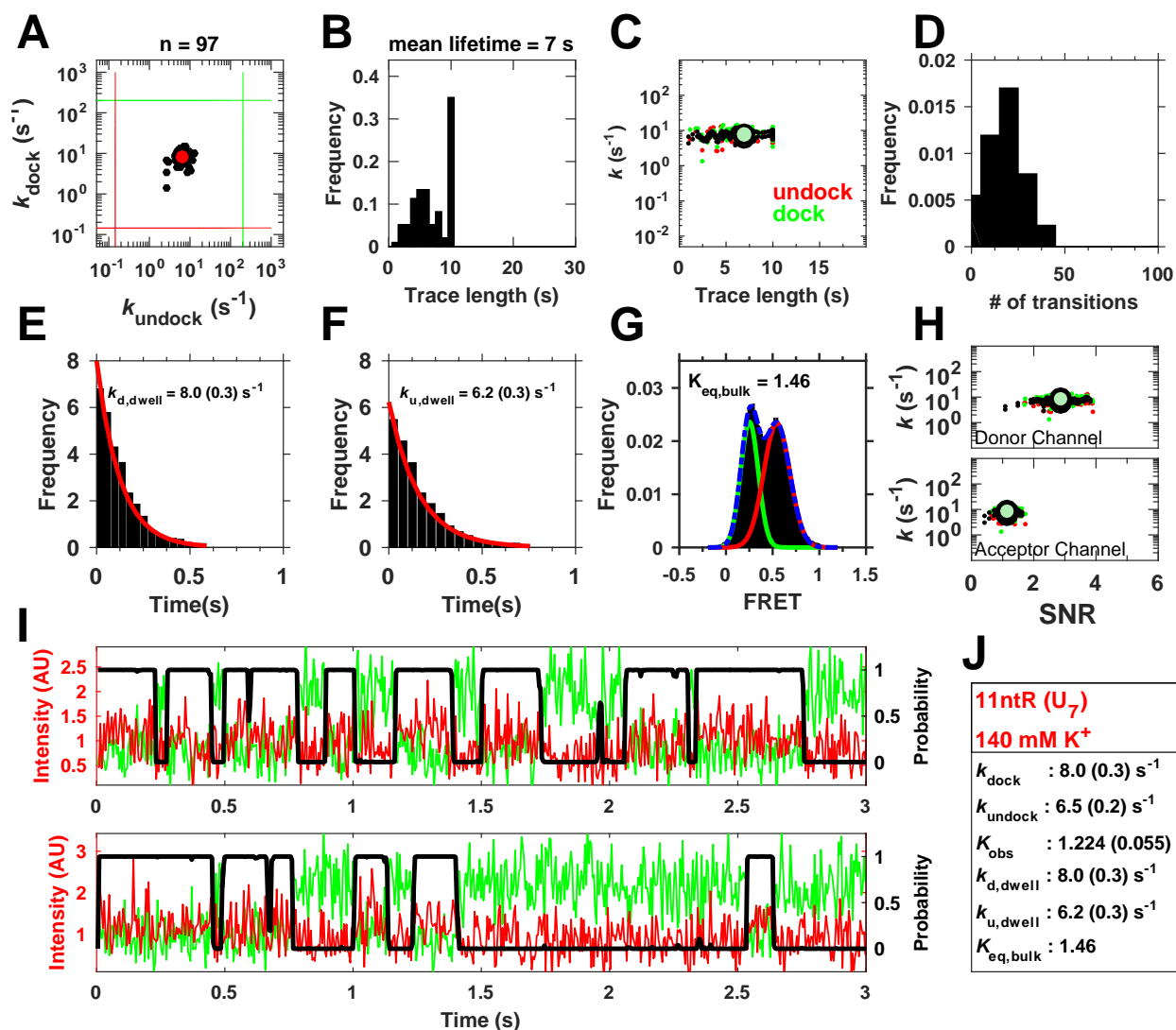


Figure S158. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

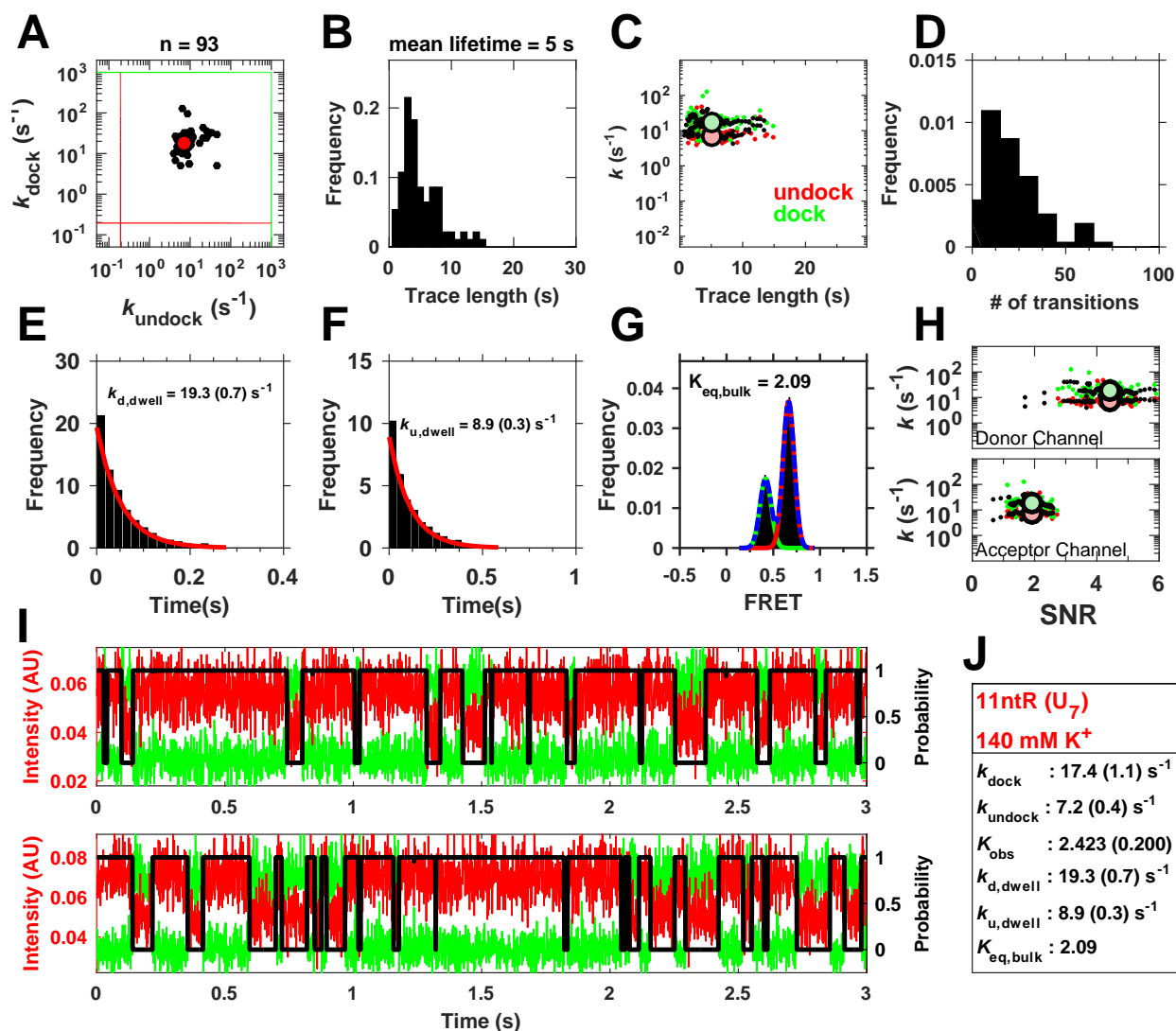


Figure S159. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

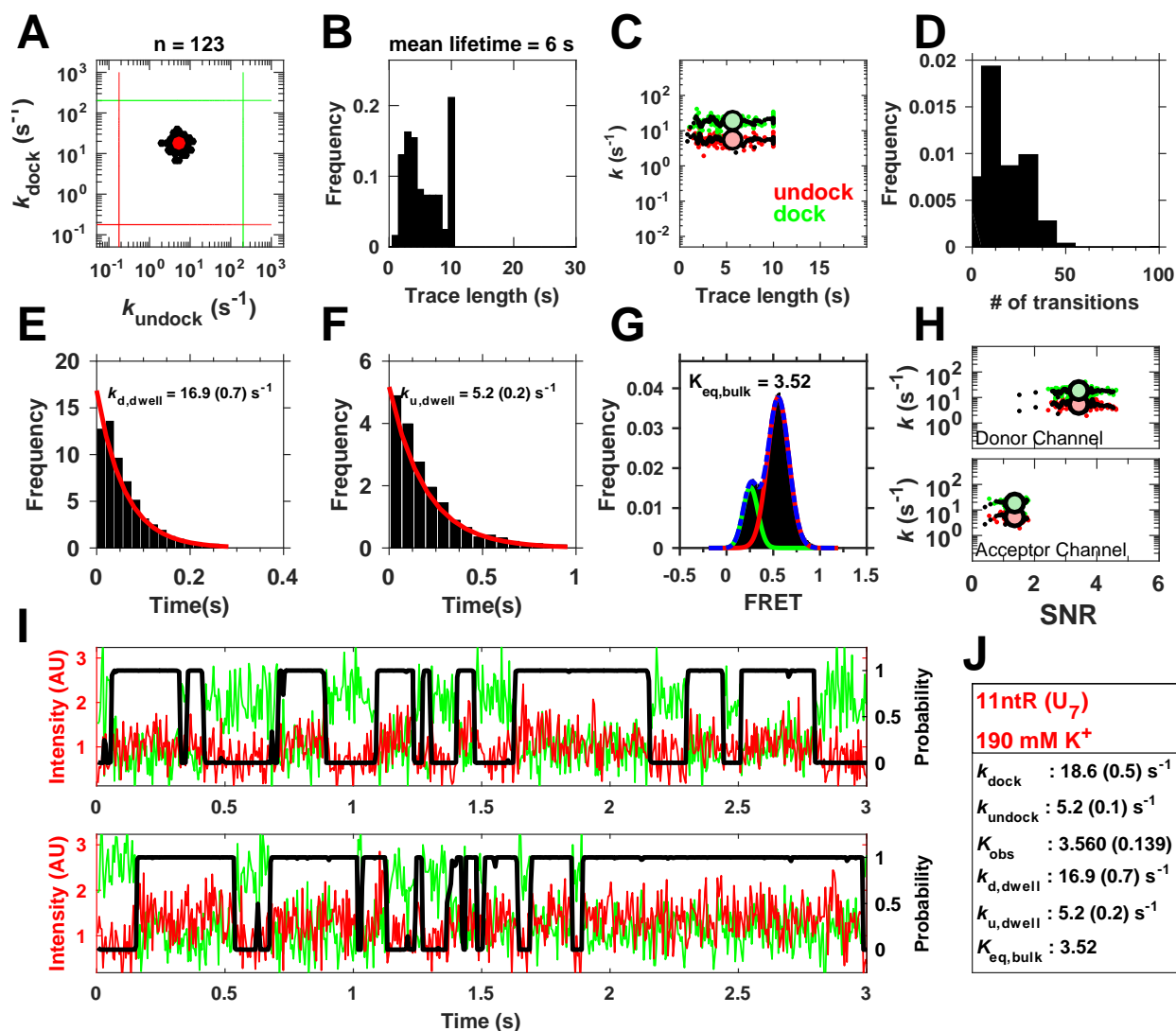


Figure S160. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

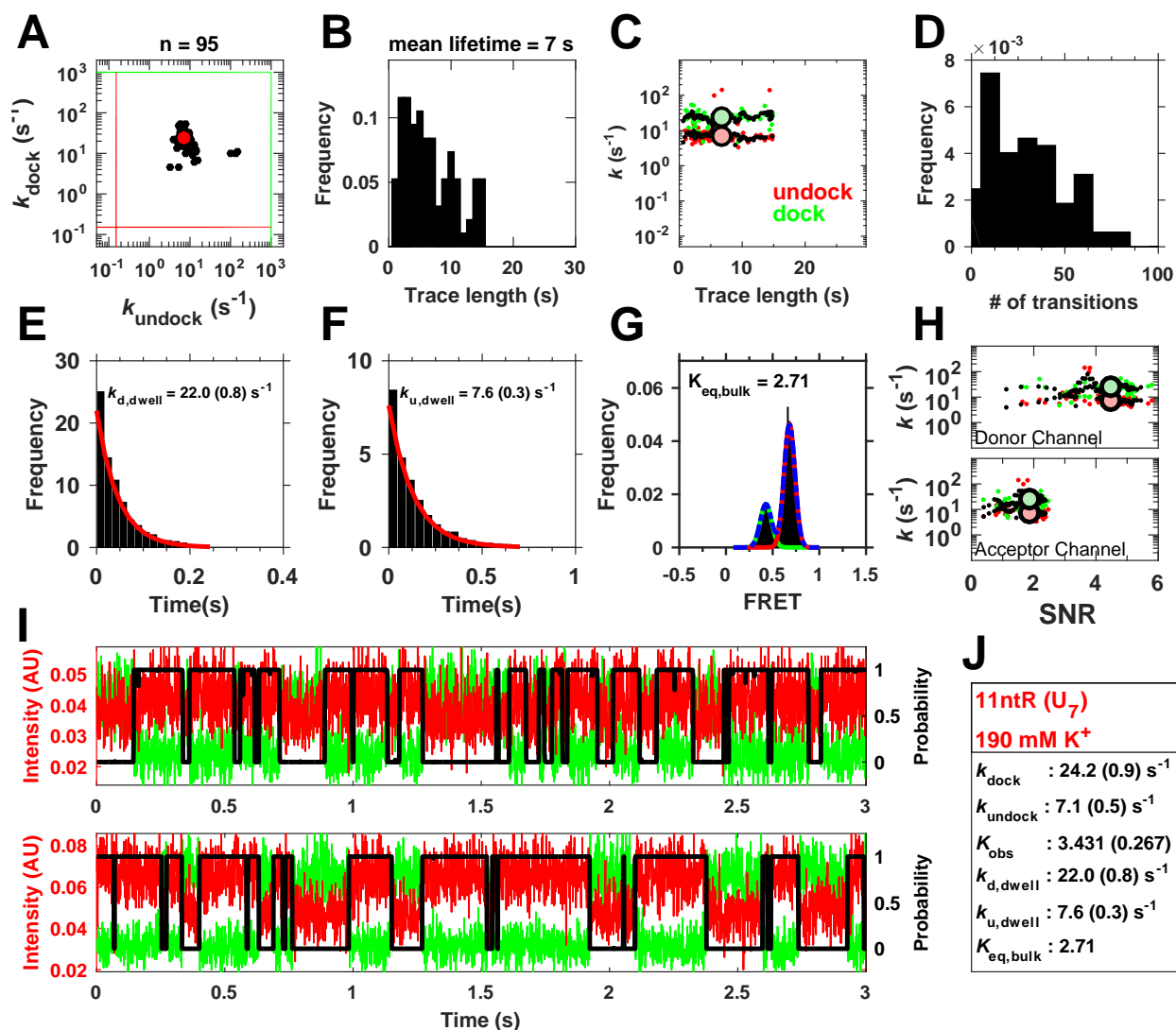


Figure S161. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

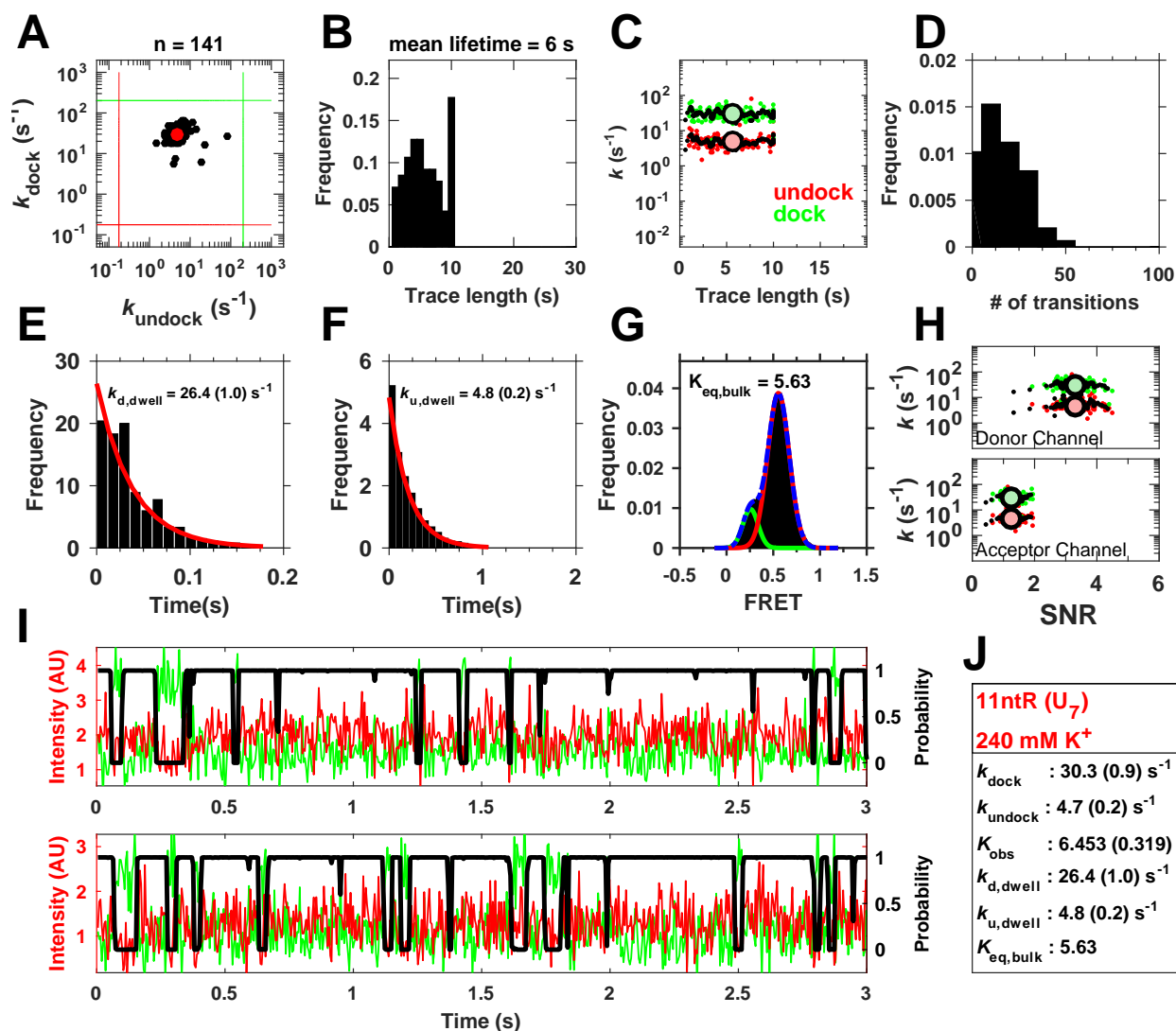


Figure S162. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

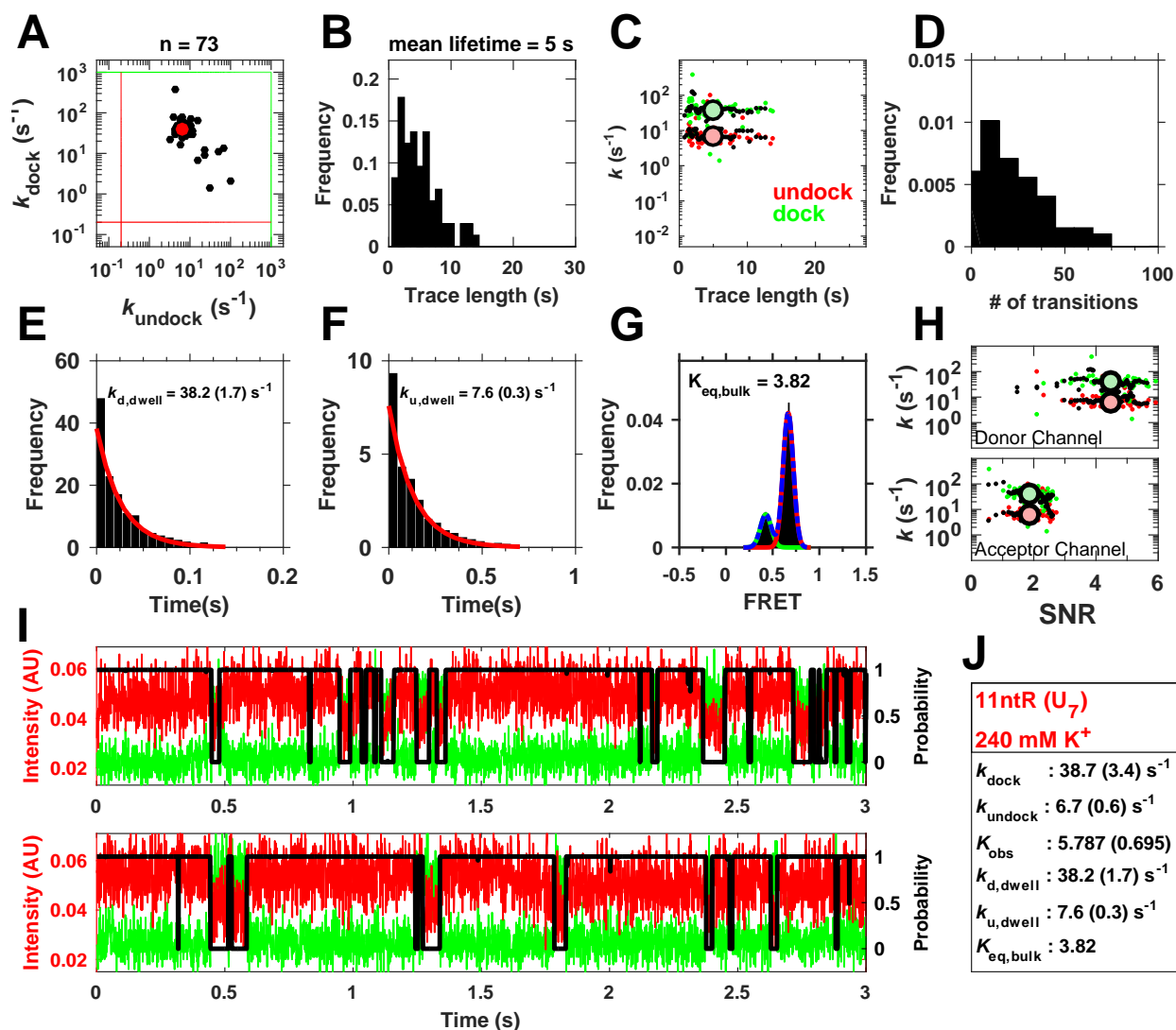


Figure S163. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

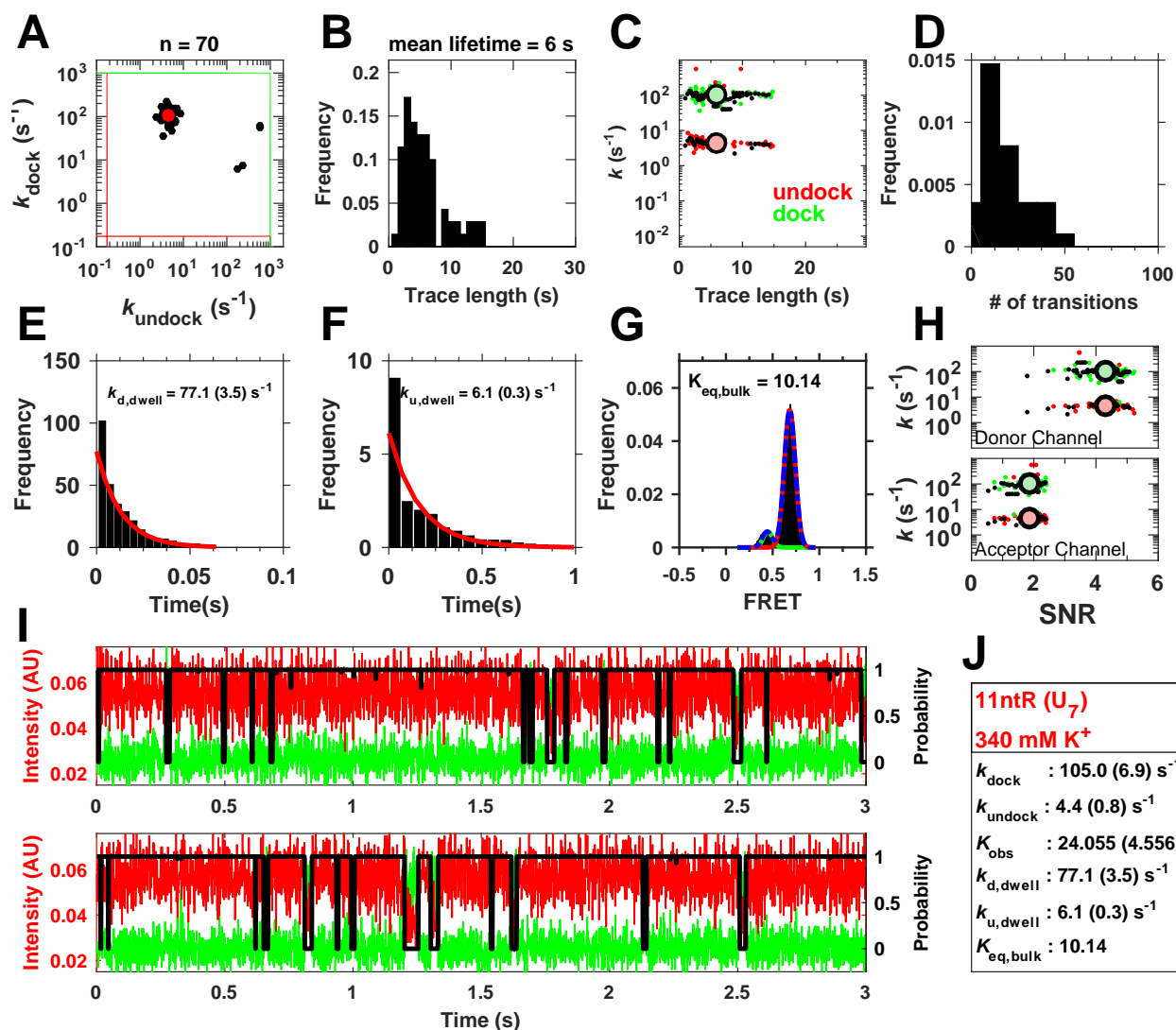


Figure S164. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

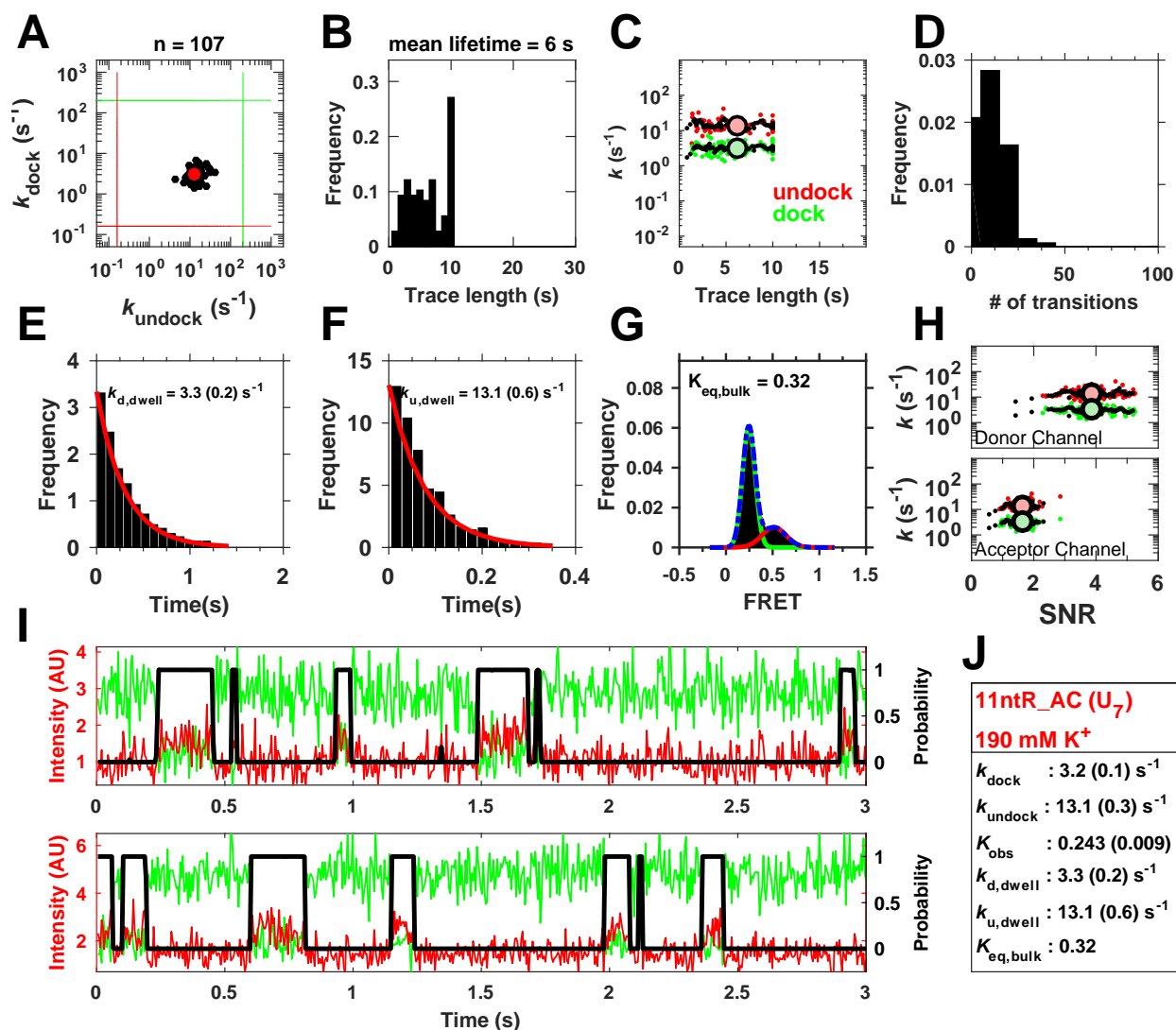


Figure S165. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

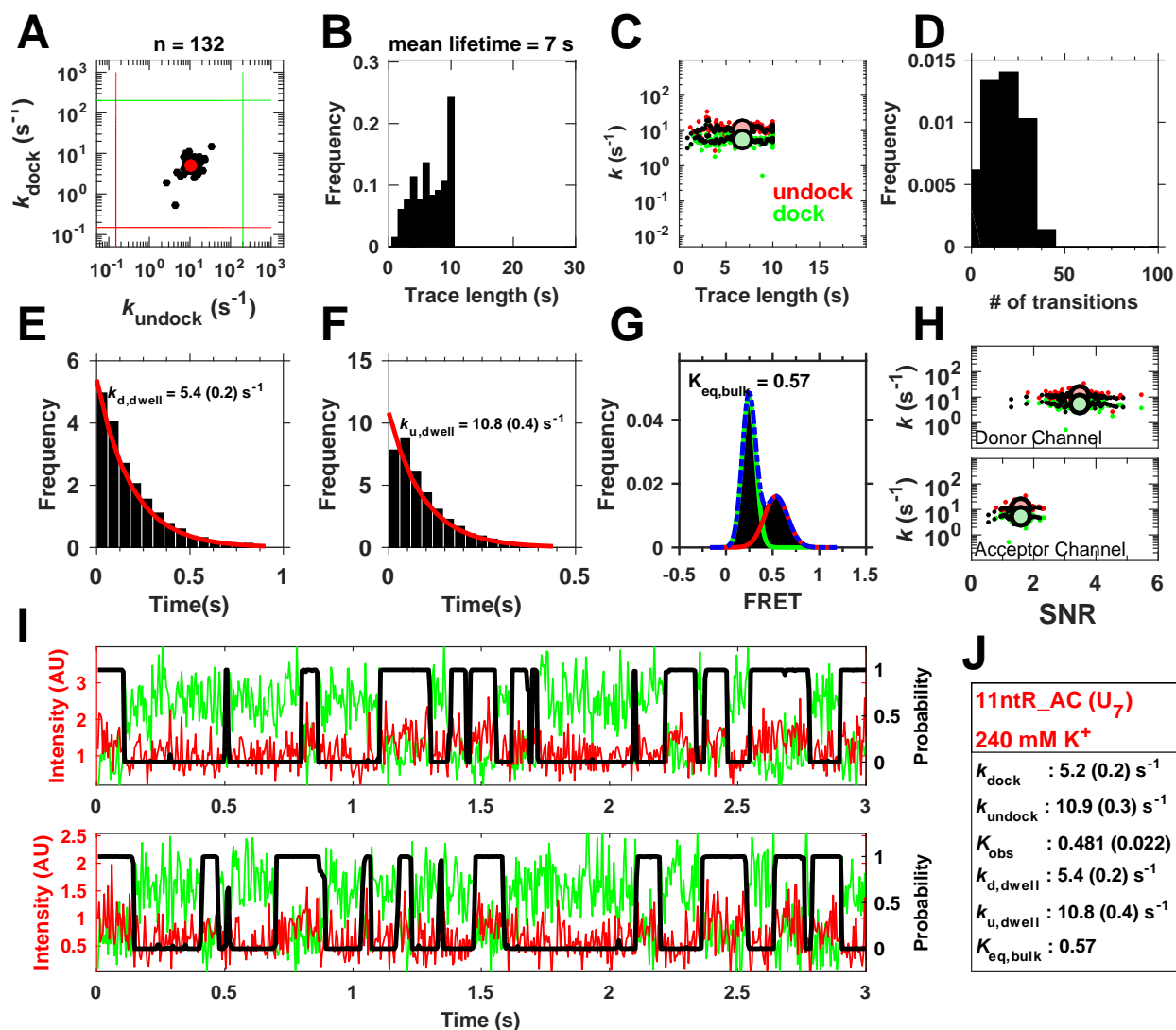


Figure S166. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

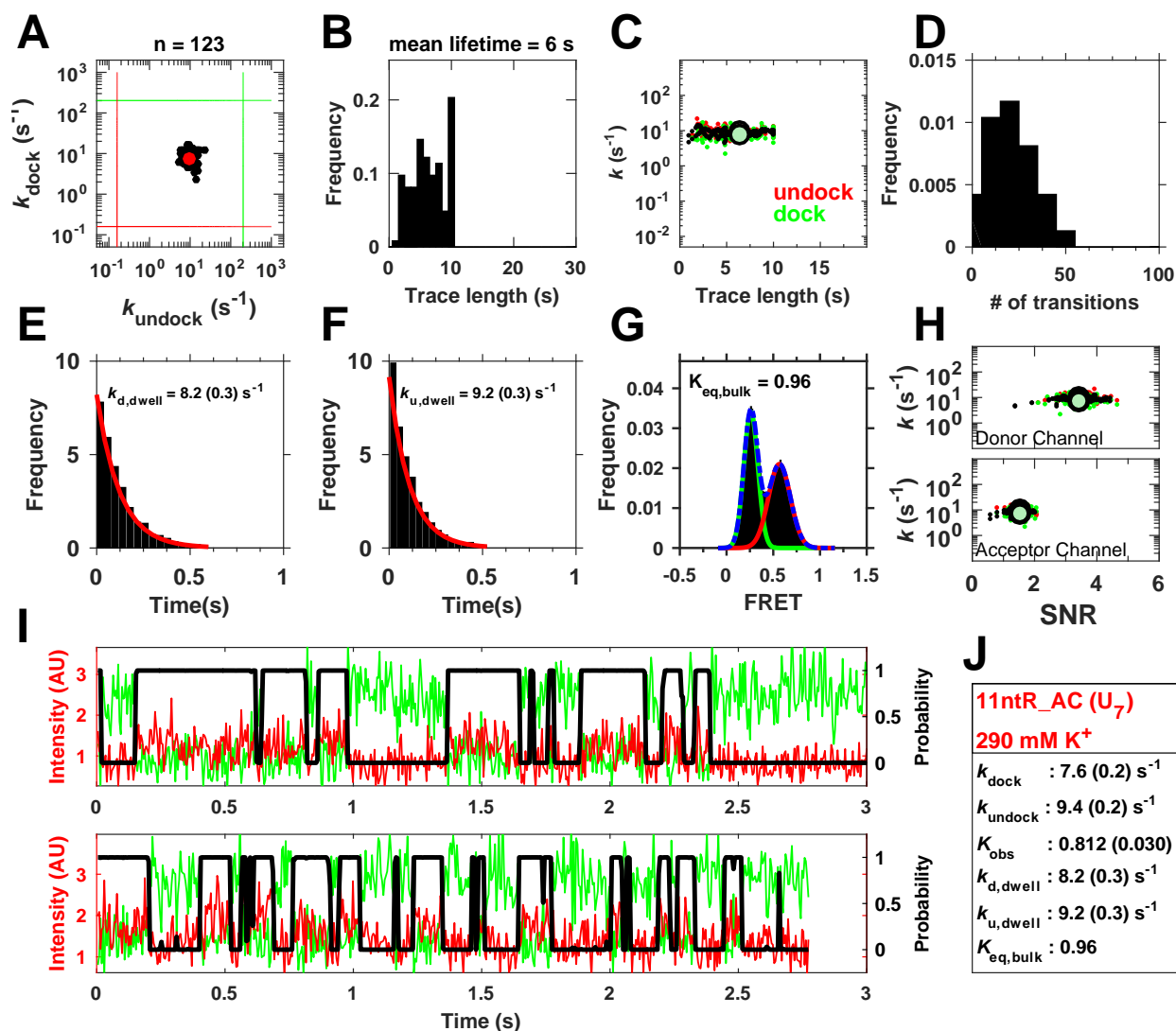


Figure S167. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

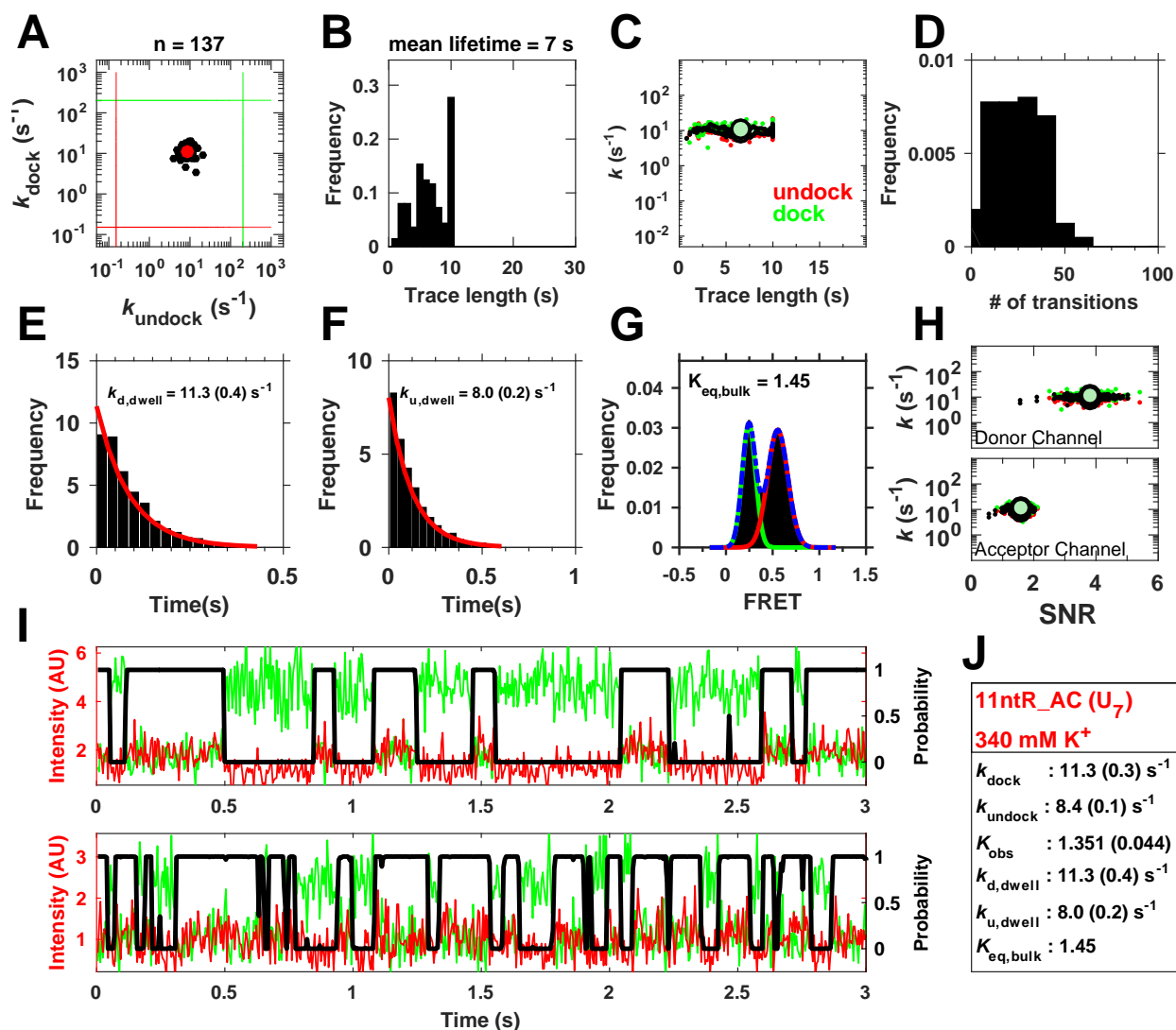


Figure S168. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

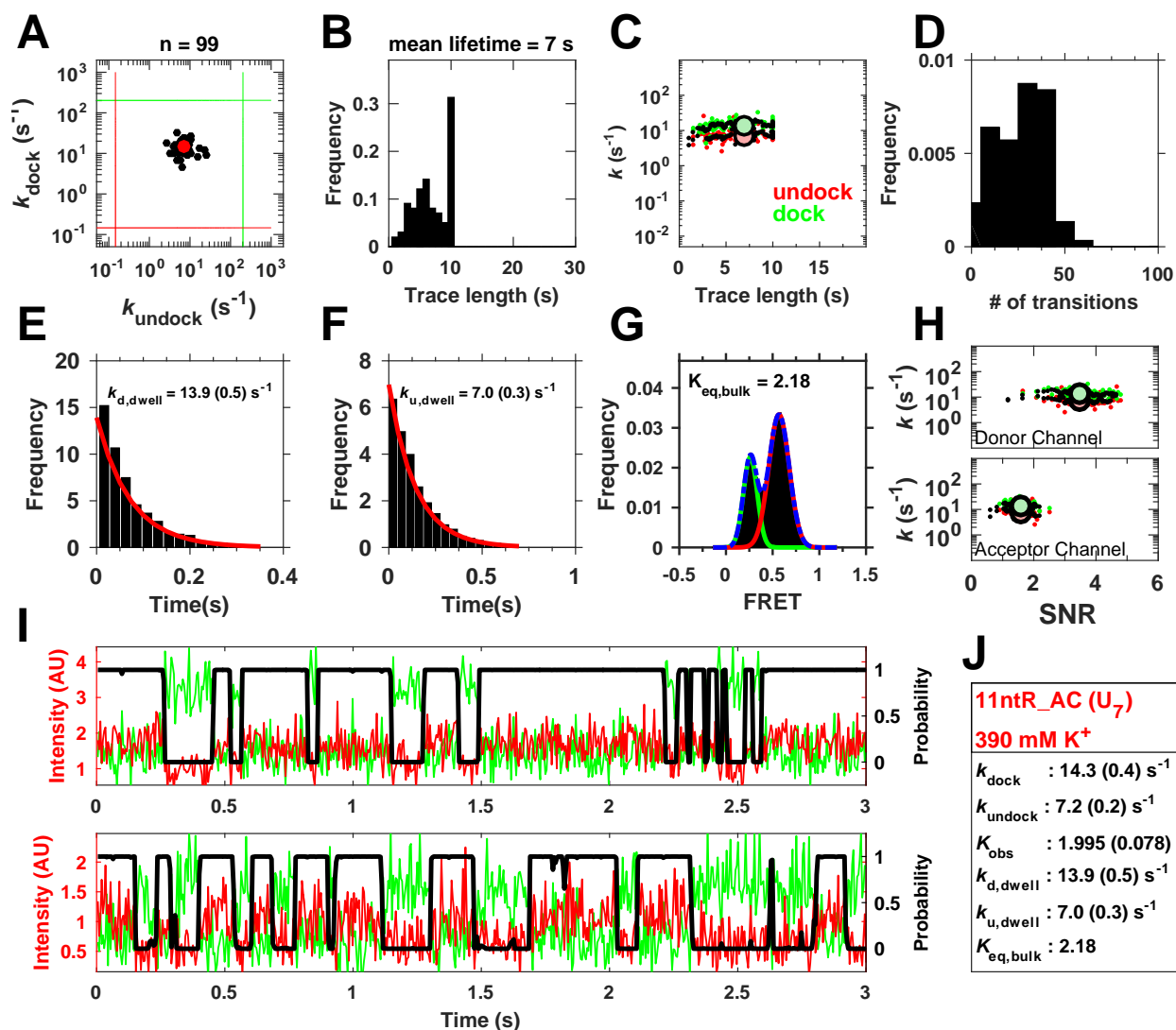


Figure S169. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

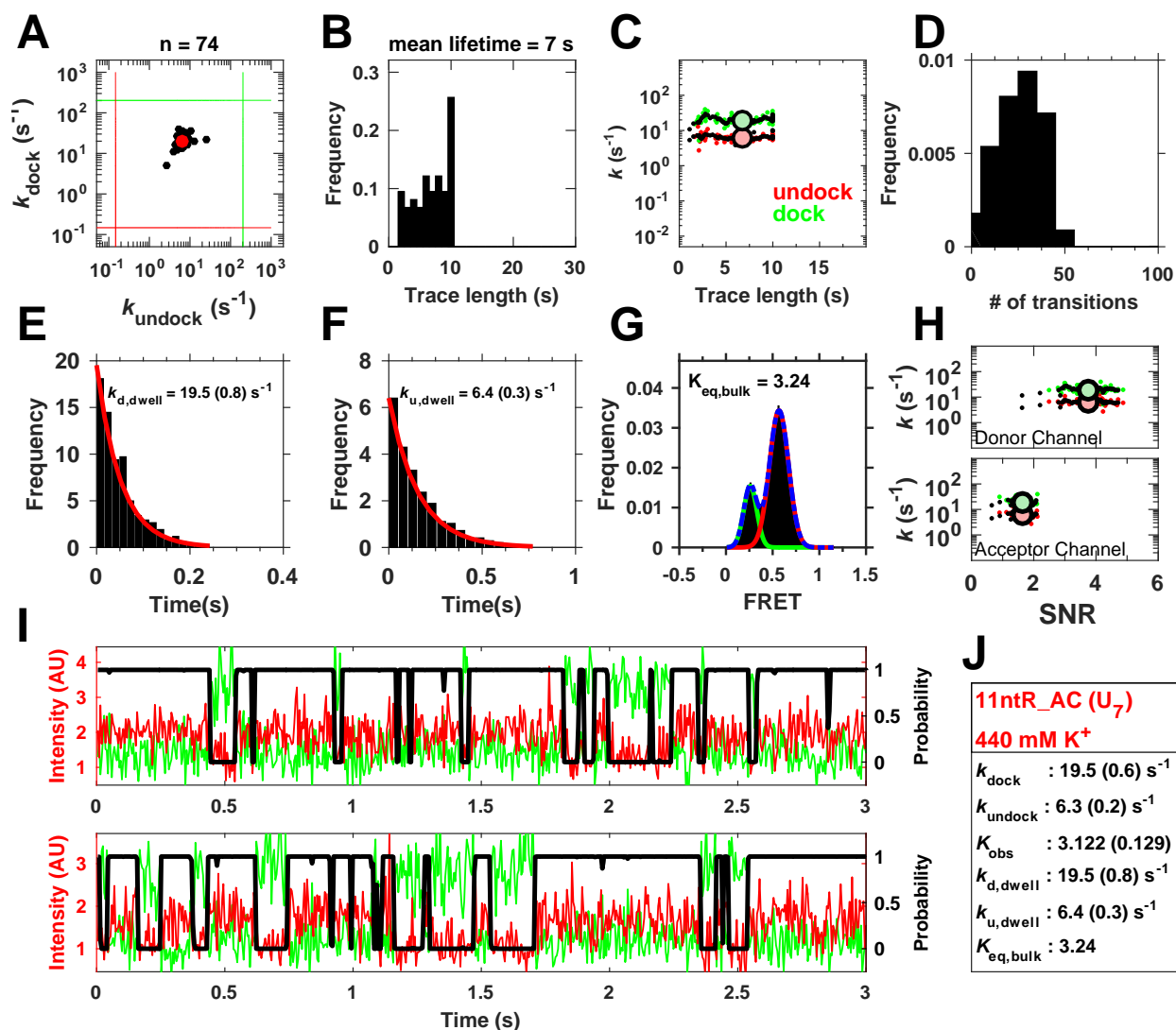


Figure S170. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

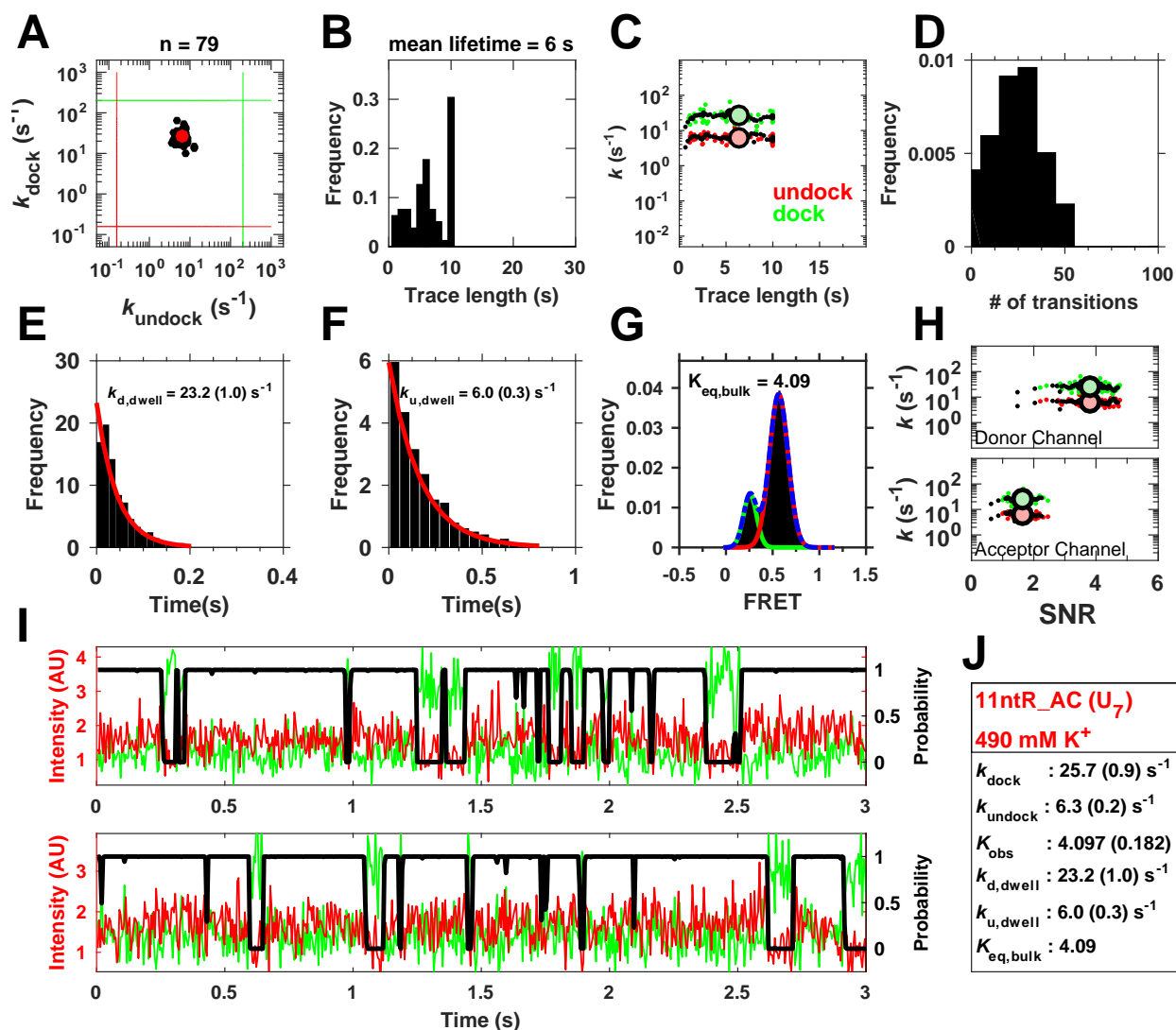


Figure S171. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

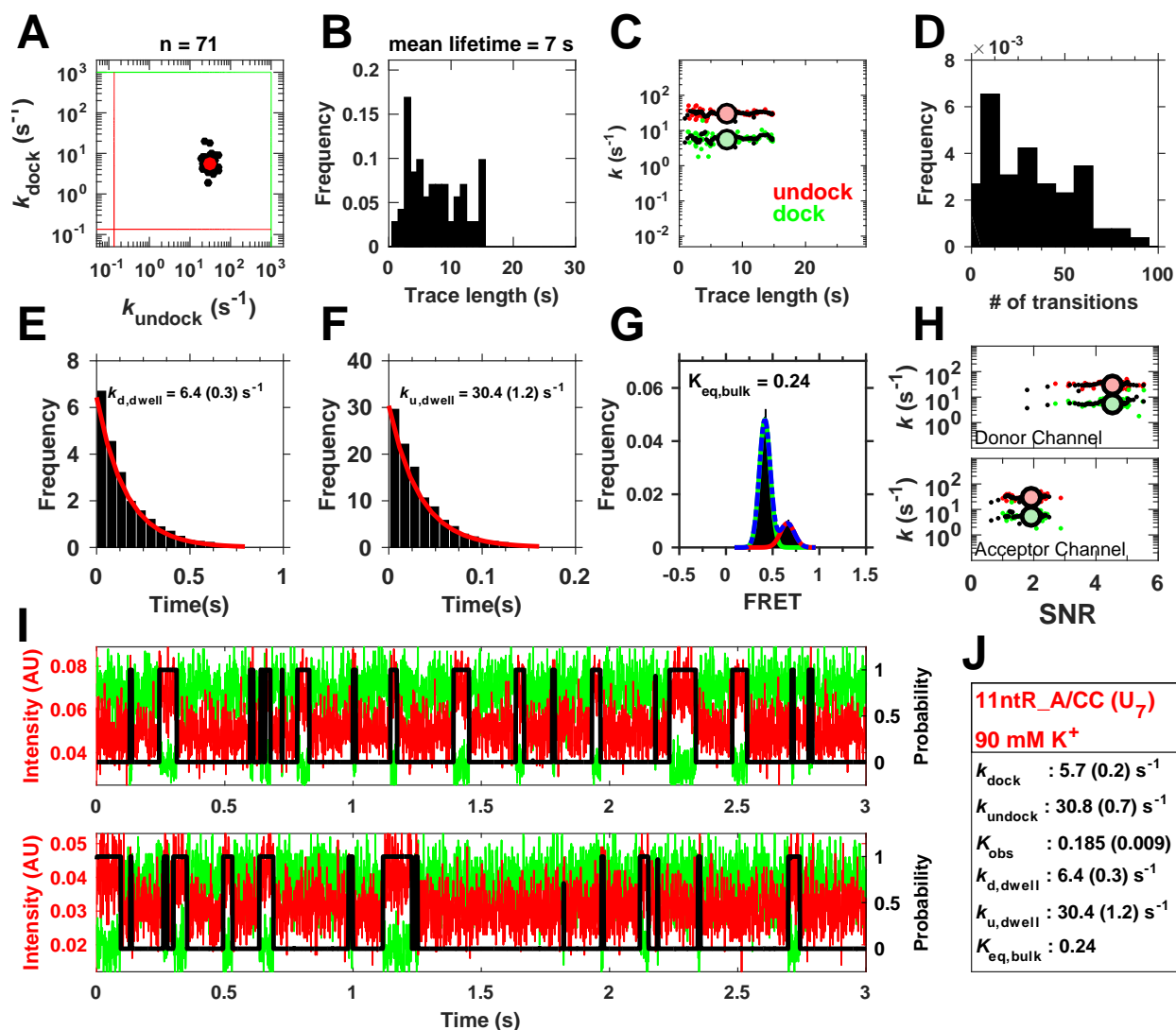


Figure S172. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

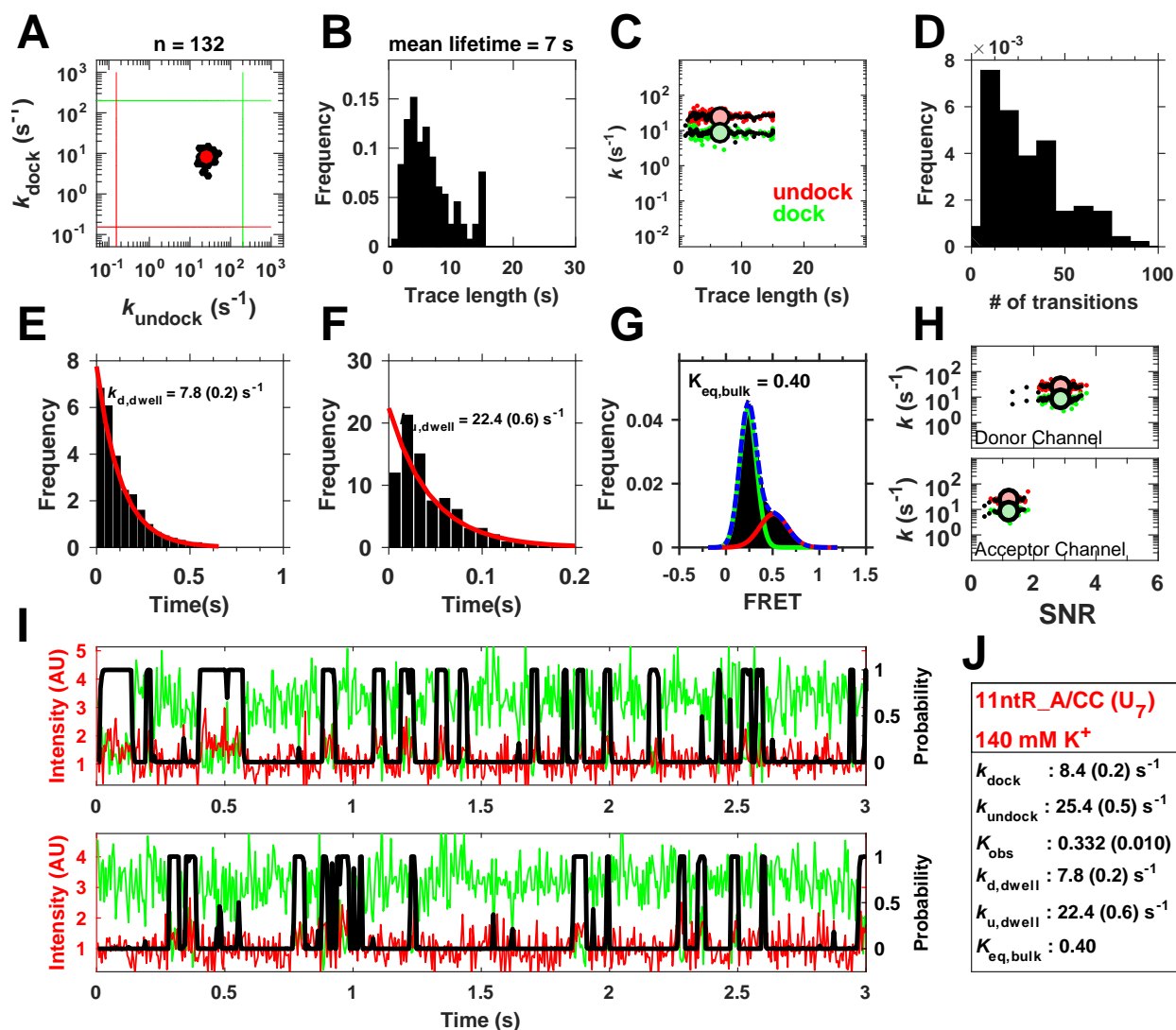


Figure S173. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

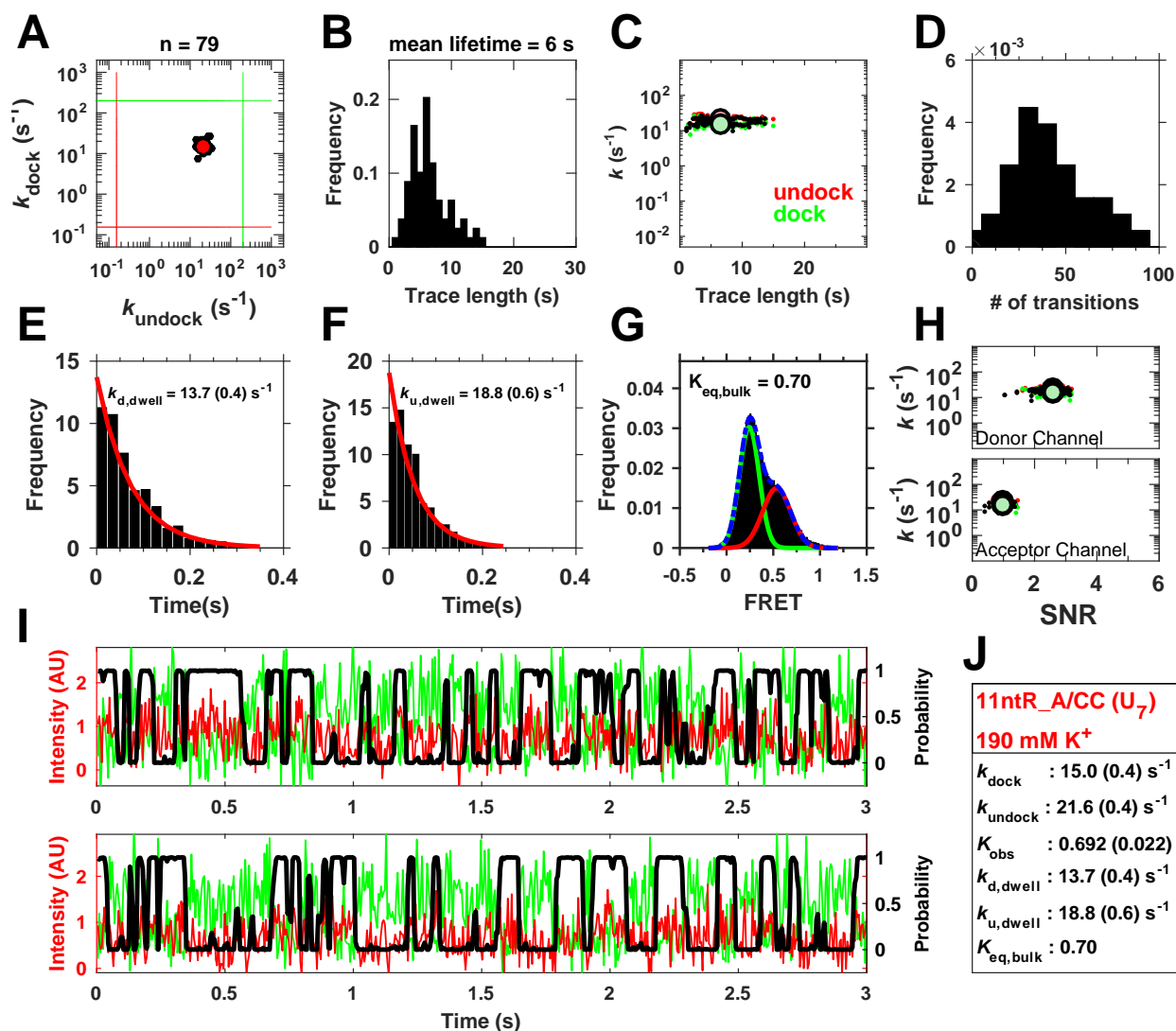


Figure S174. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

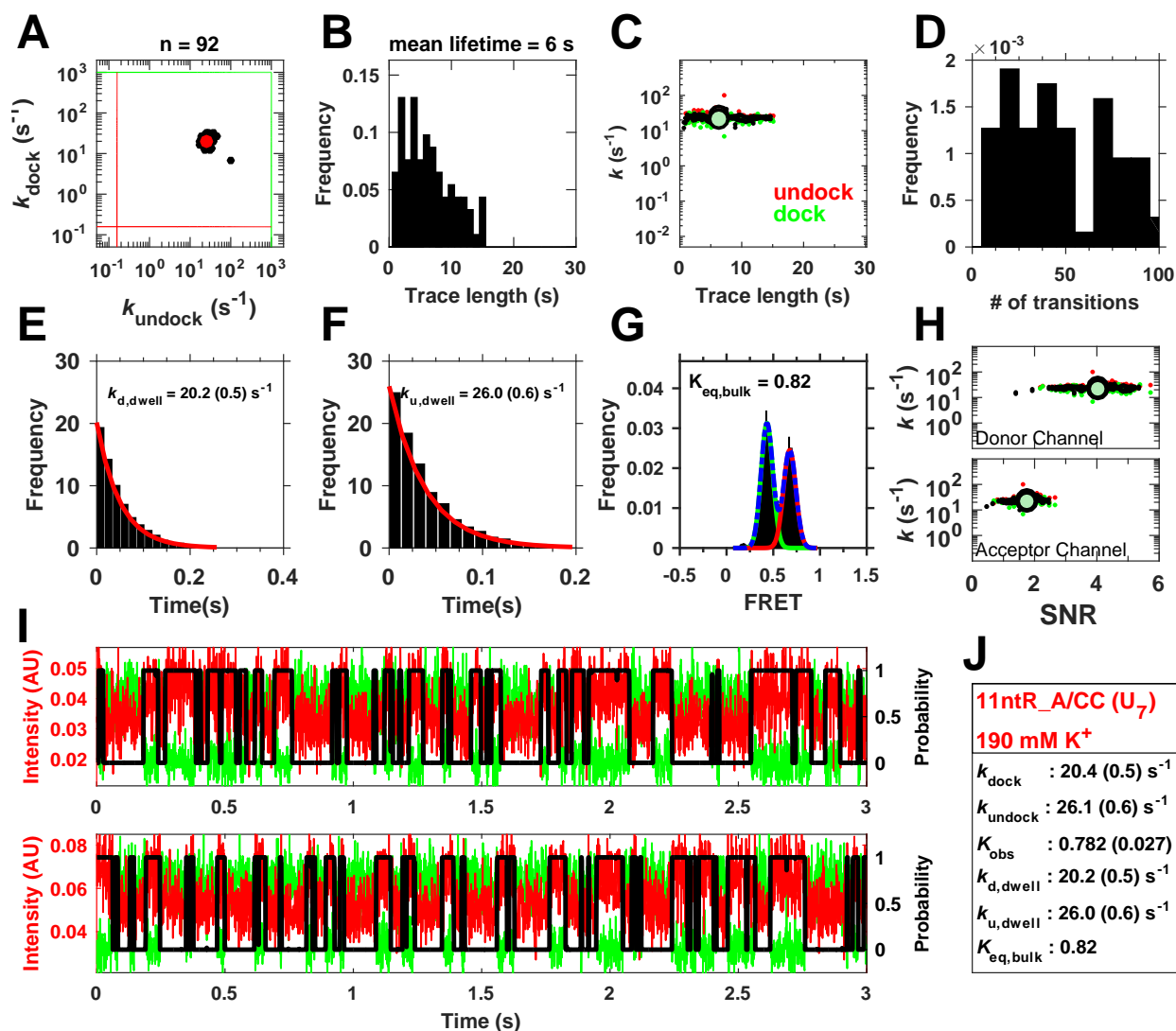


Figure S175. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

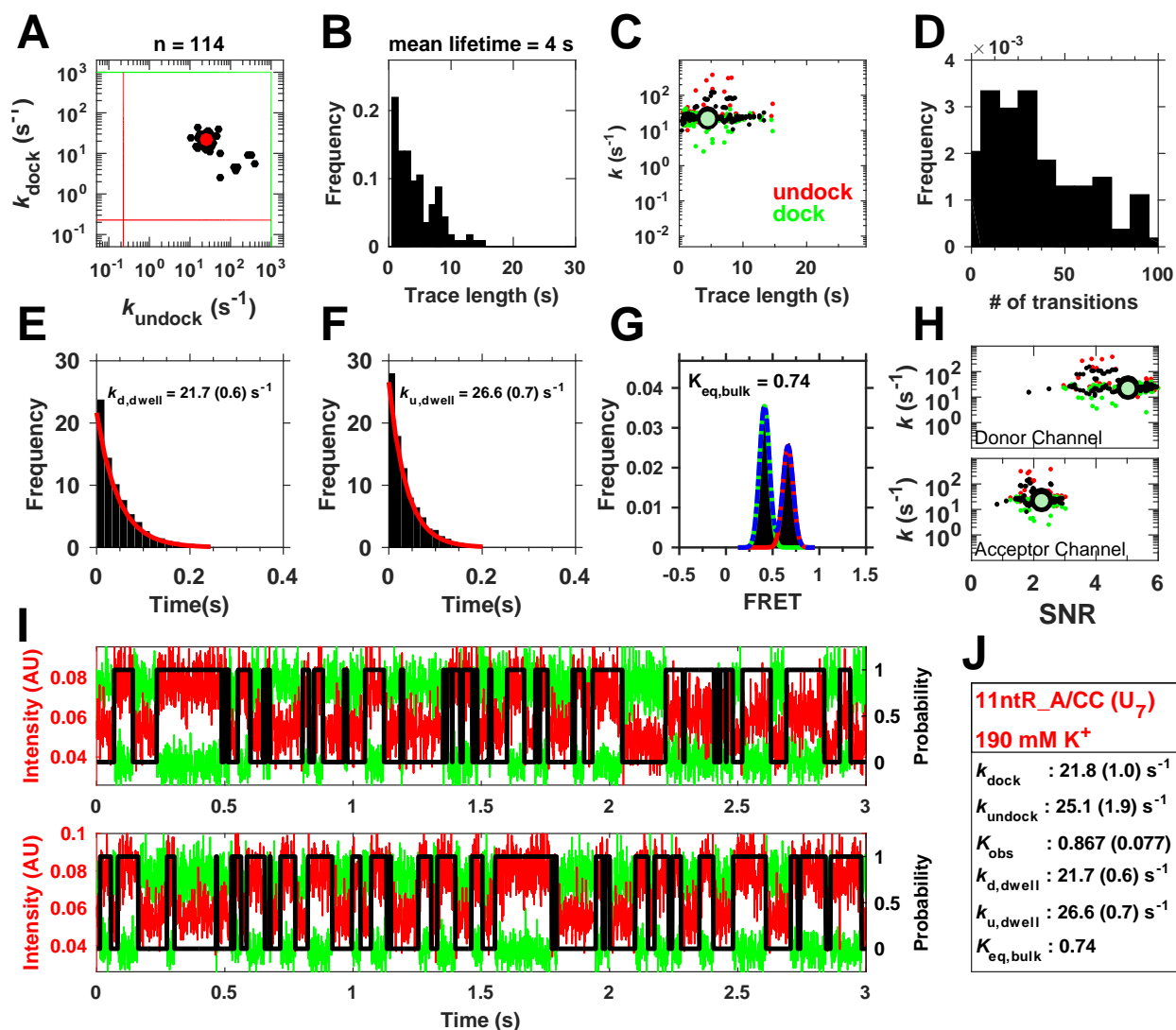


Figure S176. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

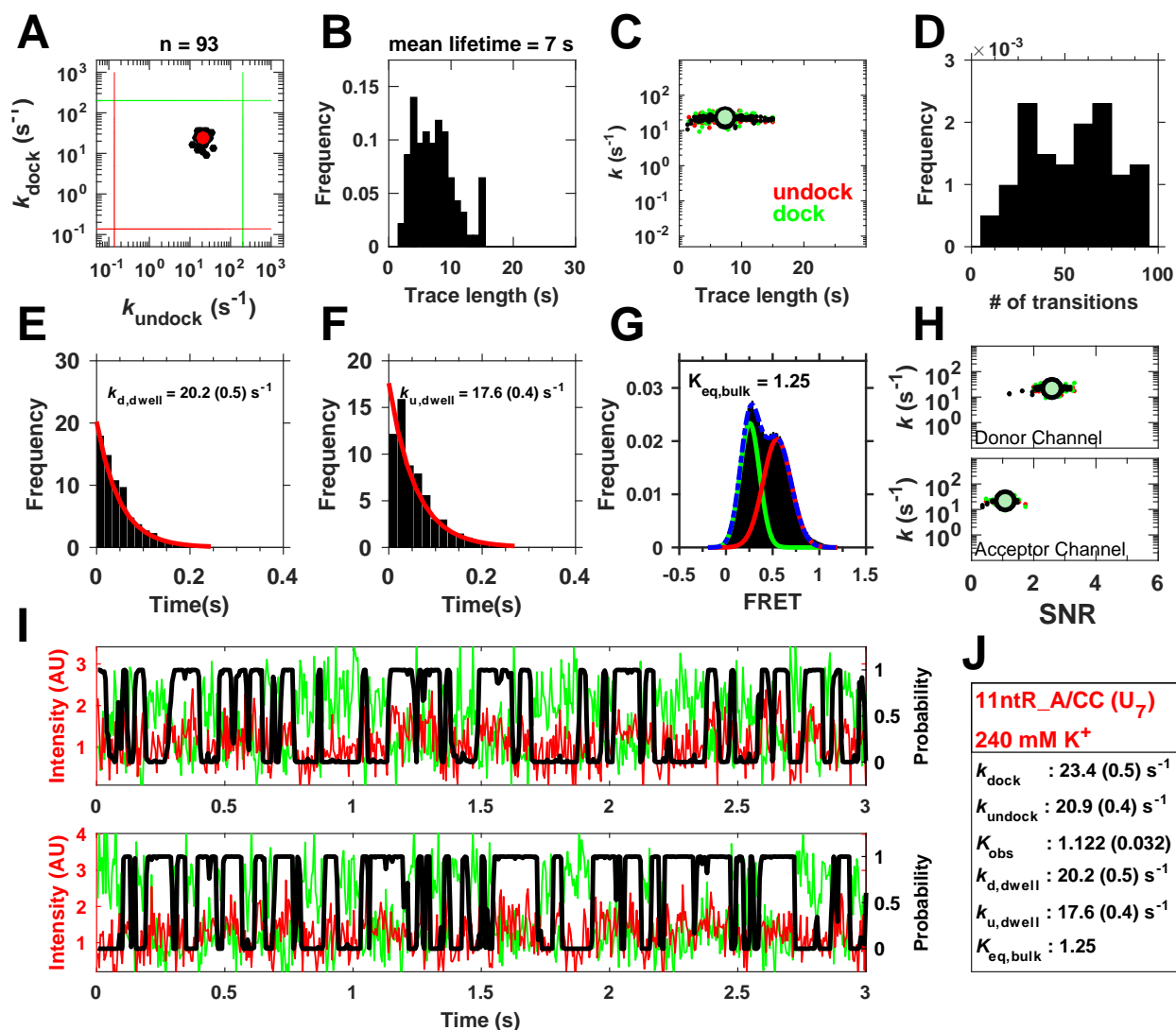


Figure S177. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

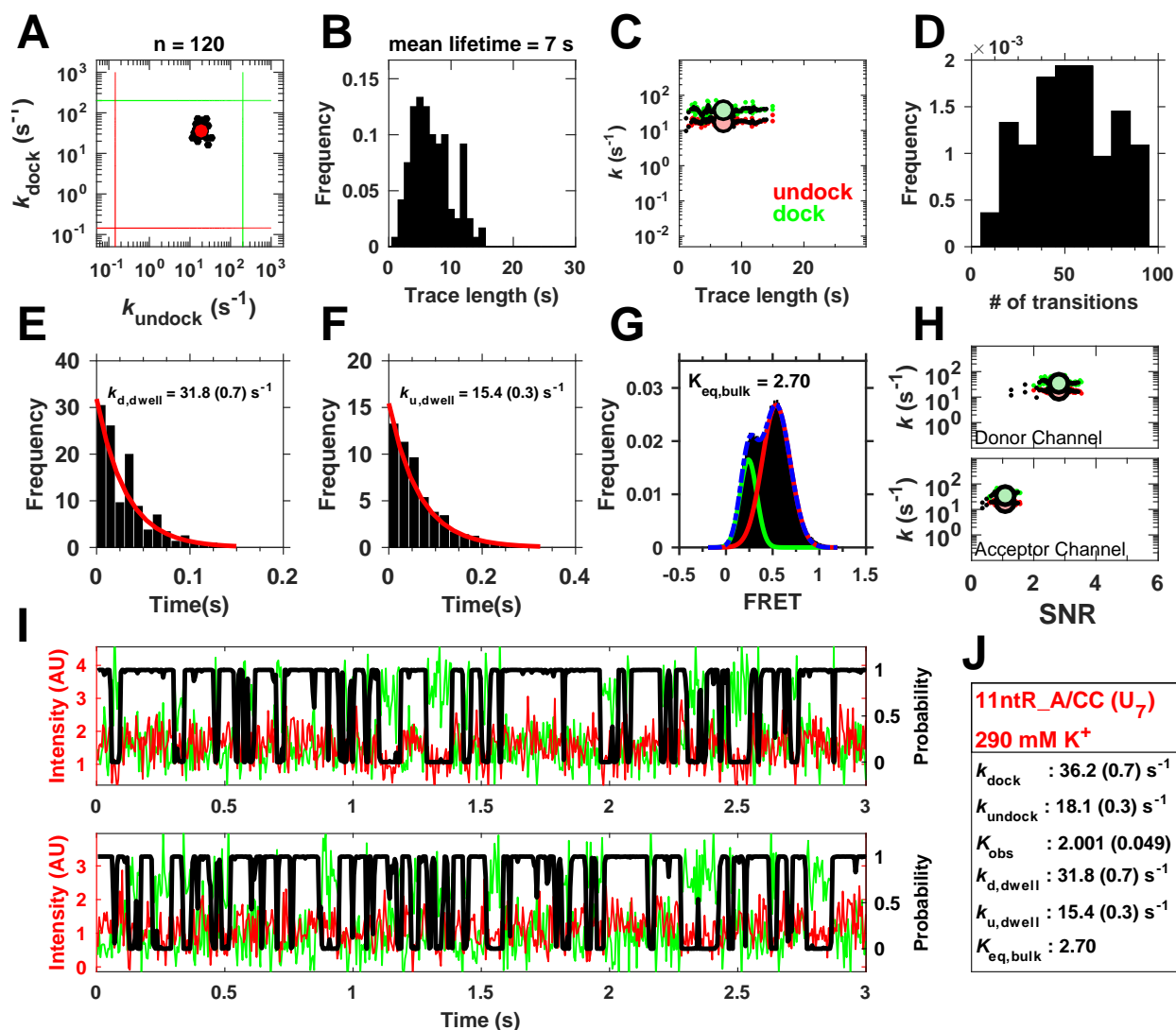


Figure S178. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

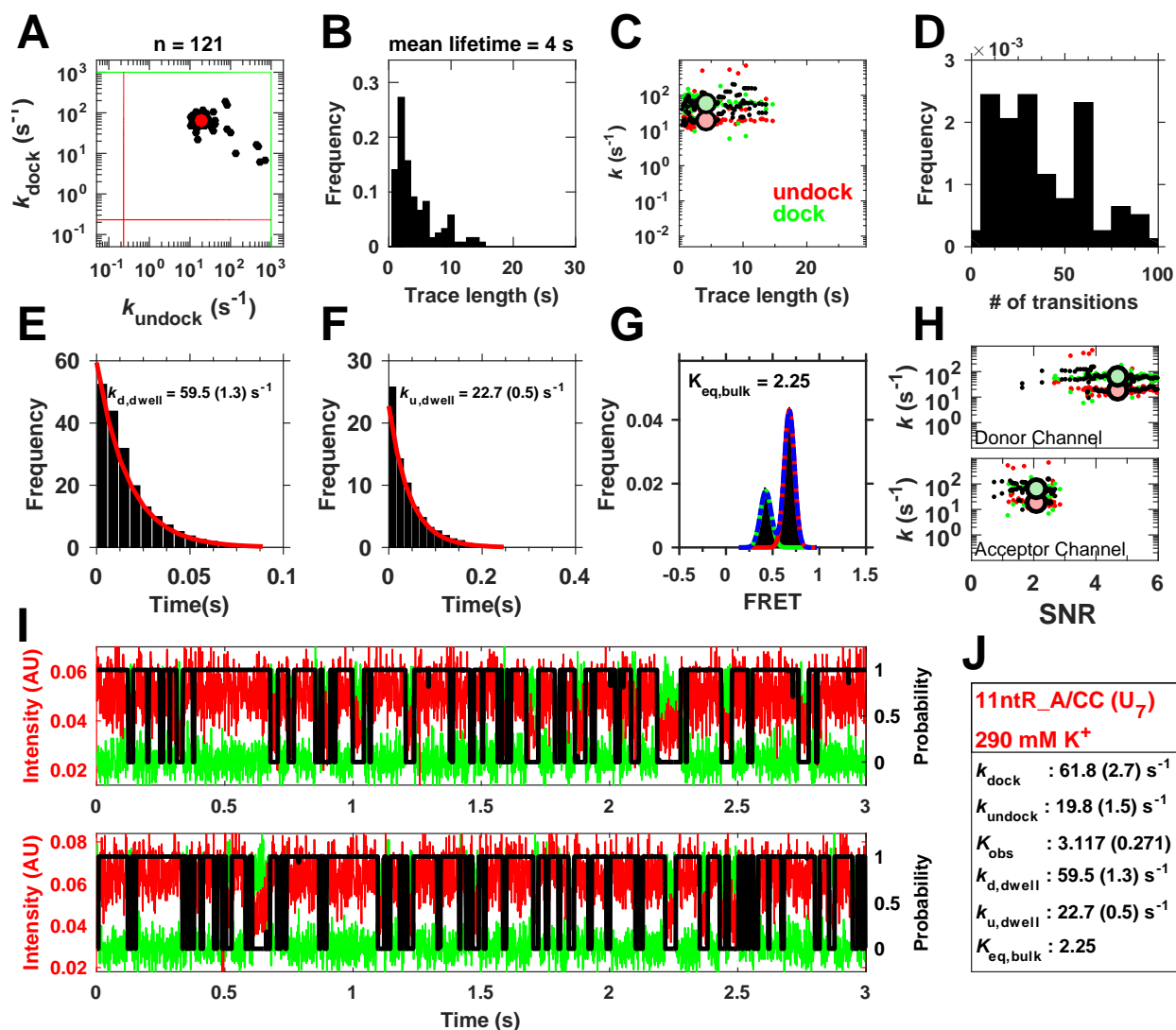


Figure S179. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

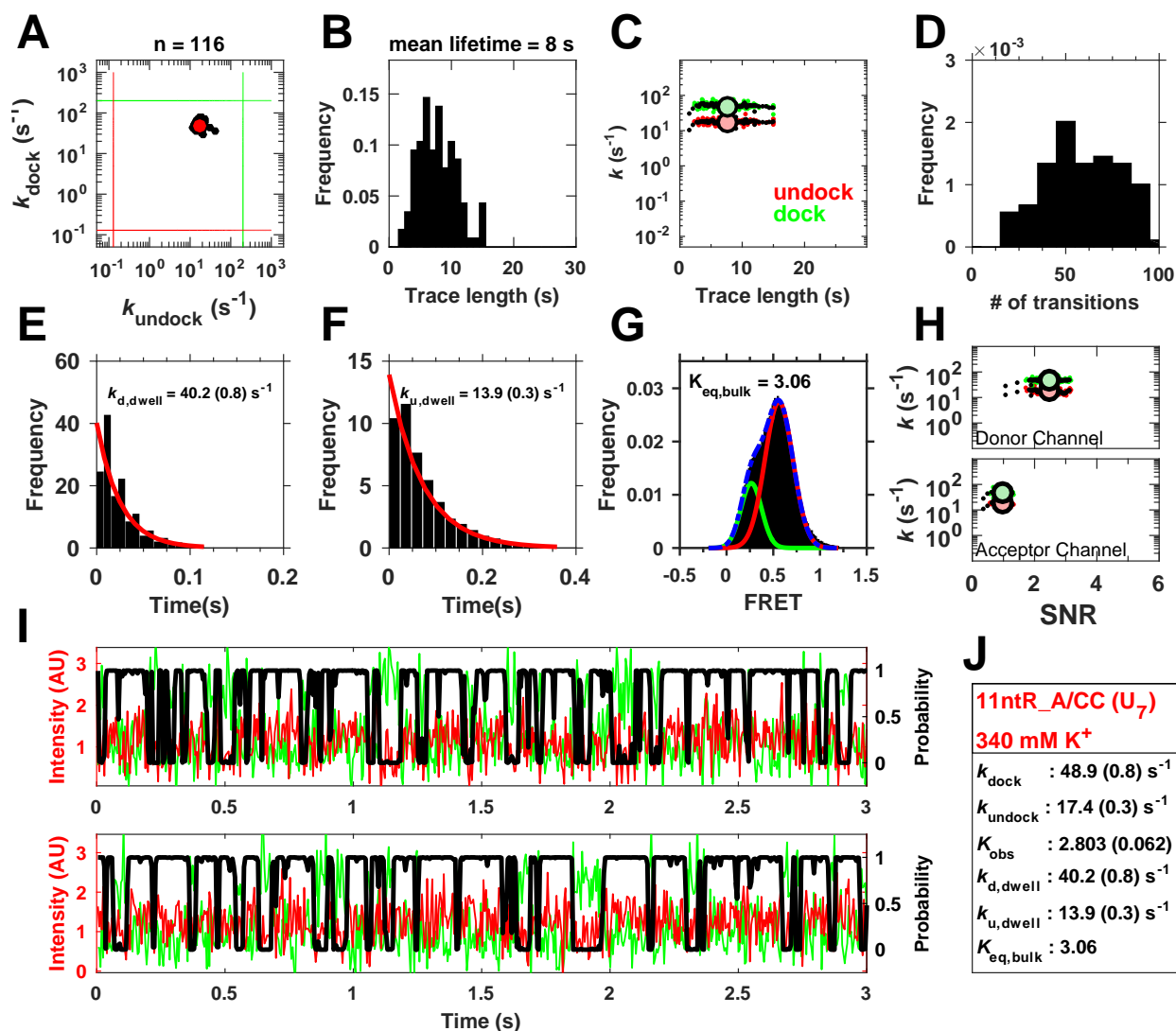


Figure S180. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

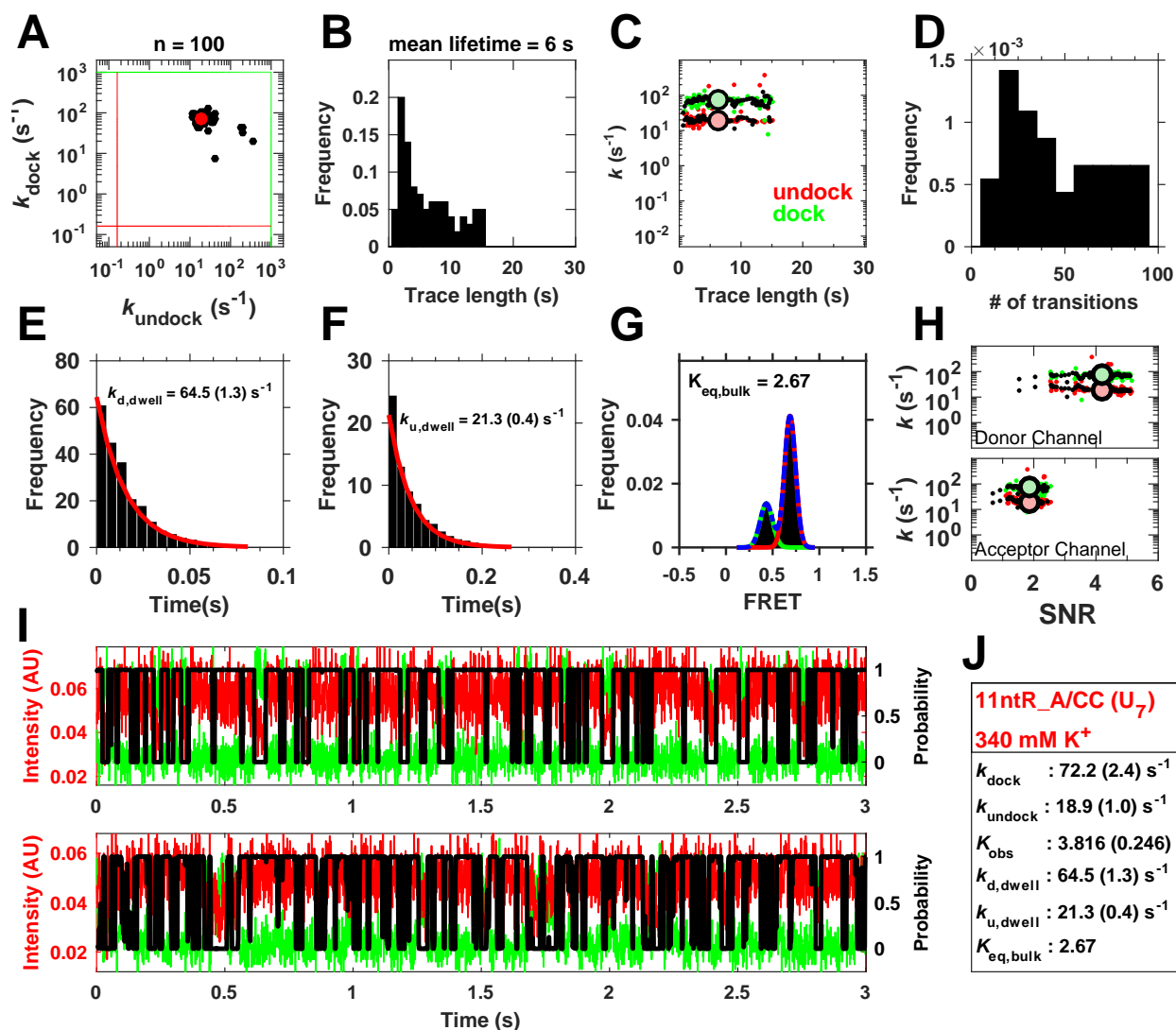


Figure S181. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

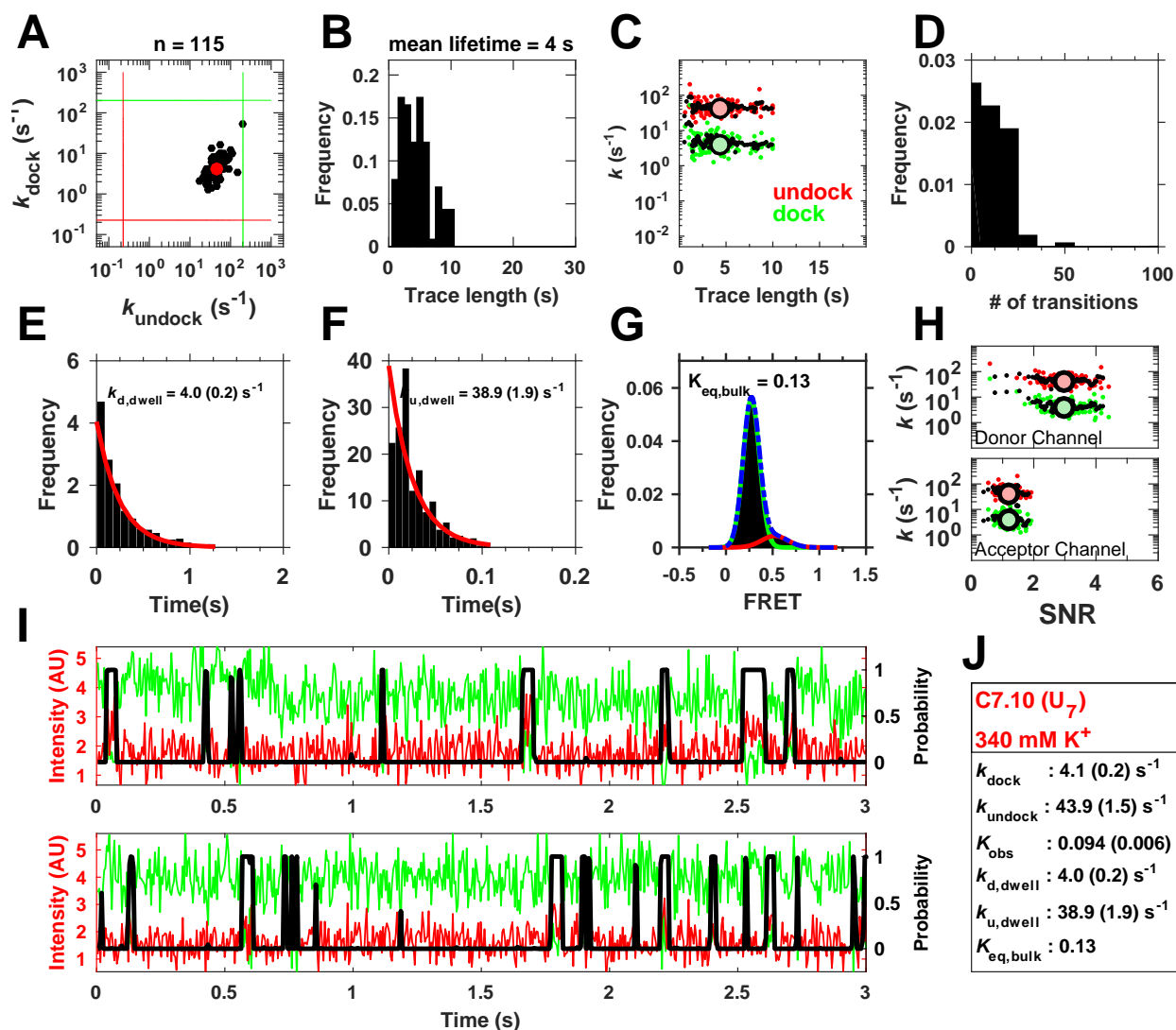


Figure S182. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

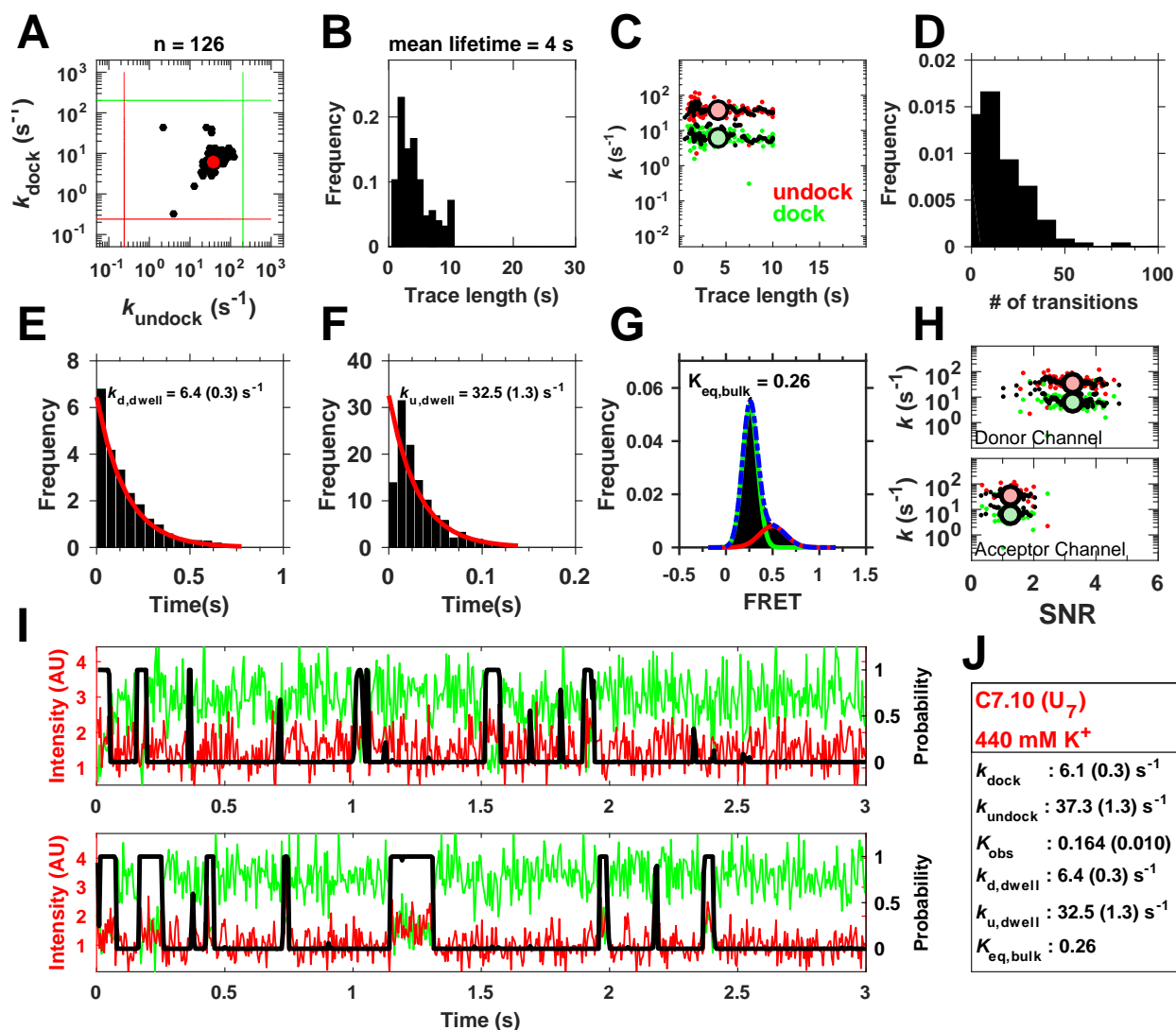


Figure S183. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

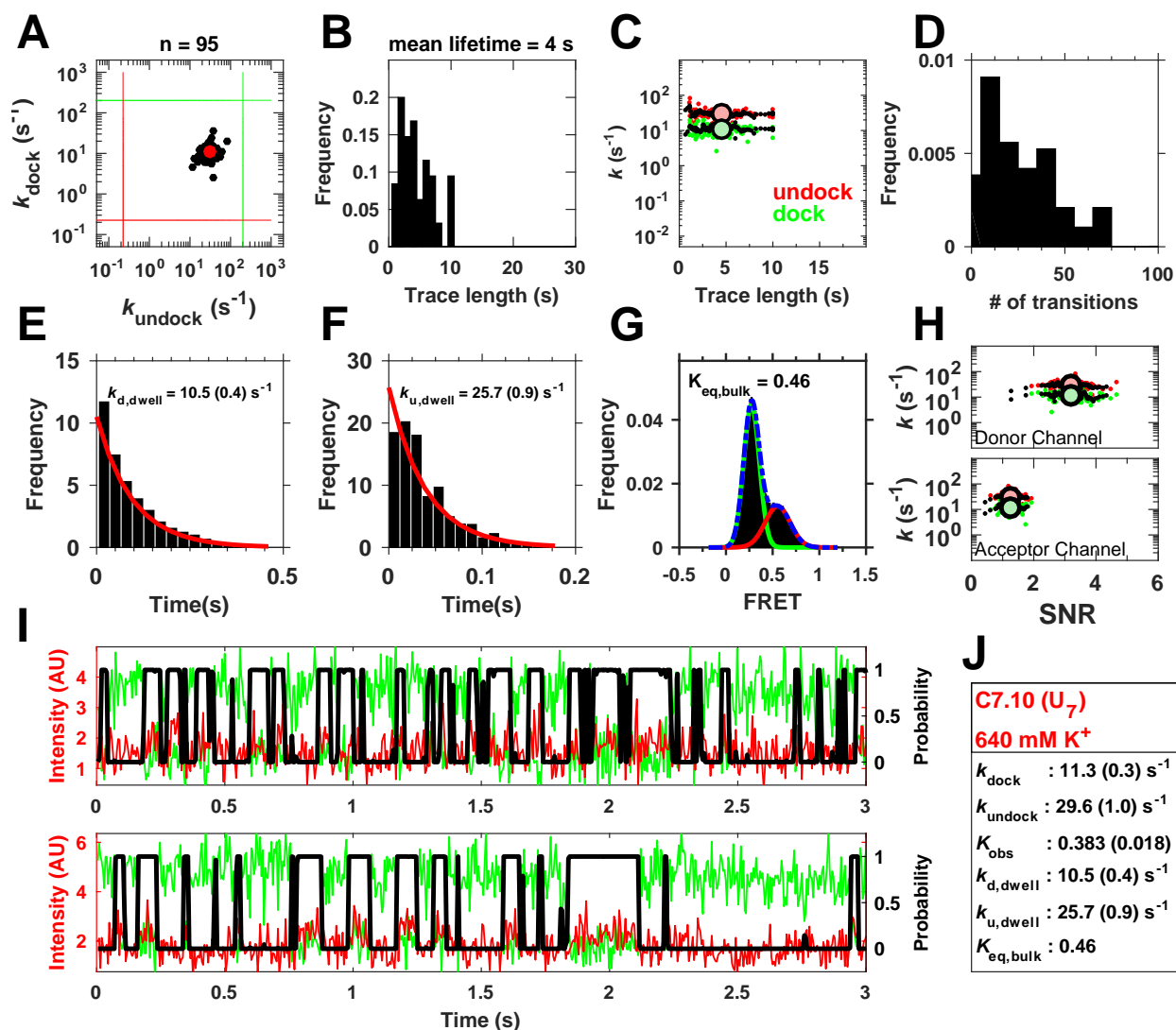


Figure S184. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

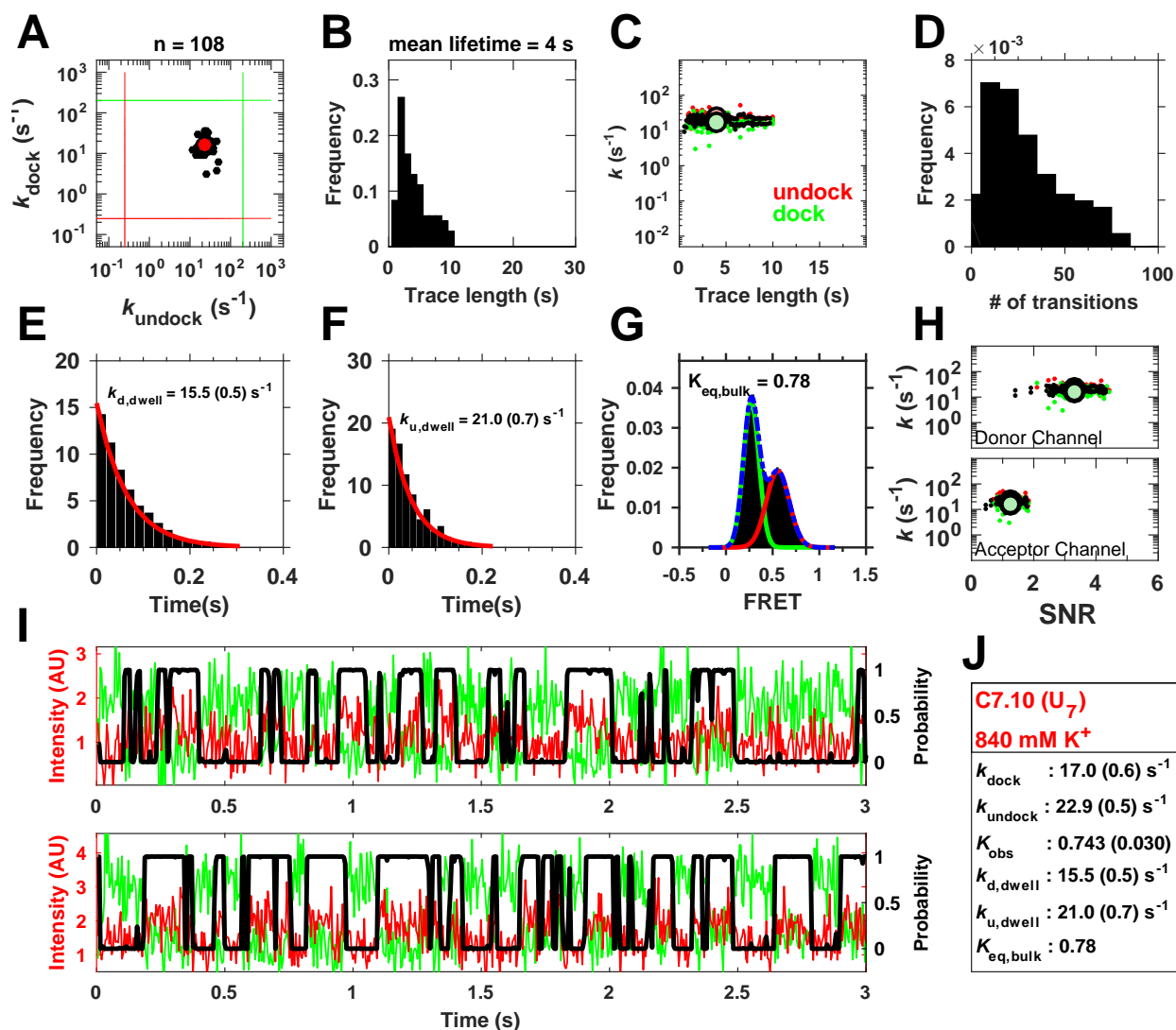


Figure S185. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

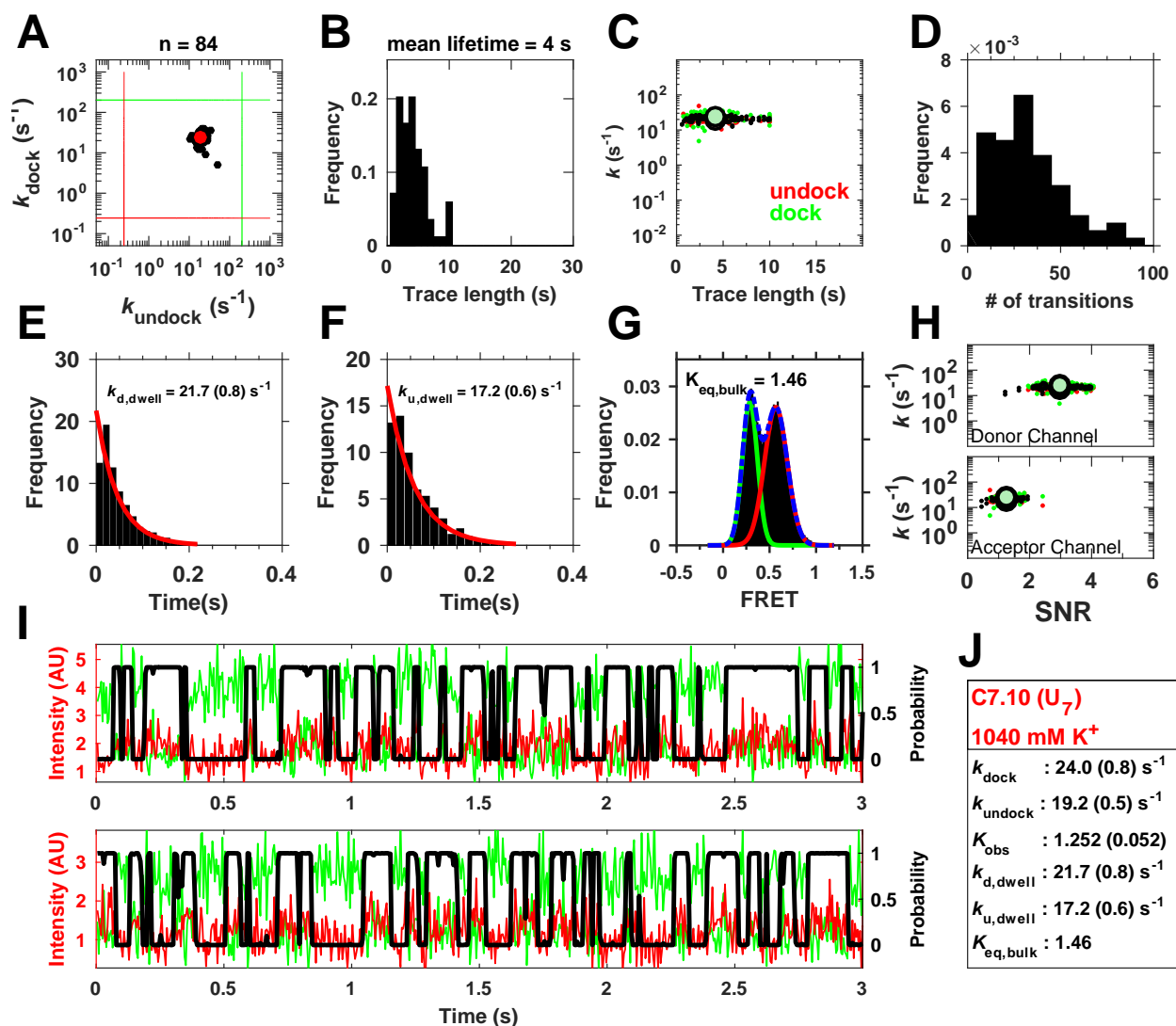


Figure S186. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

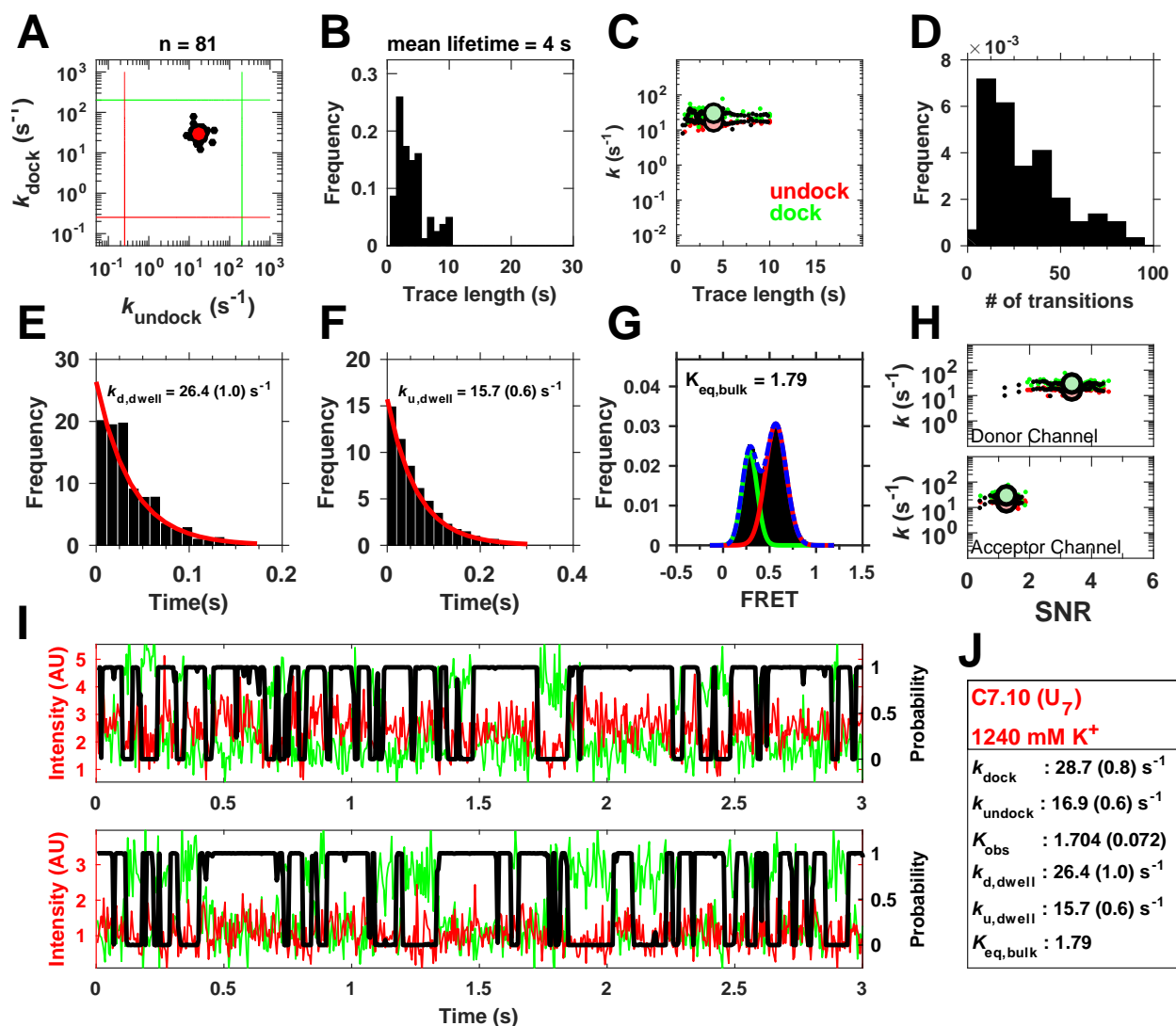


Figure S187. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

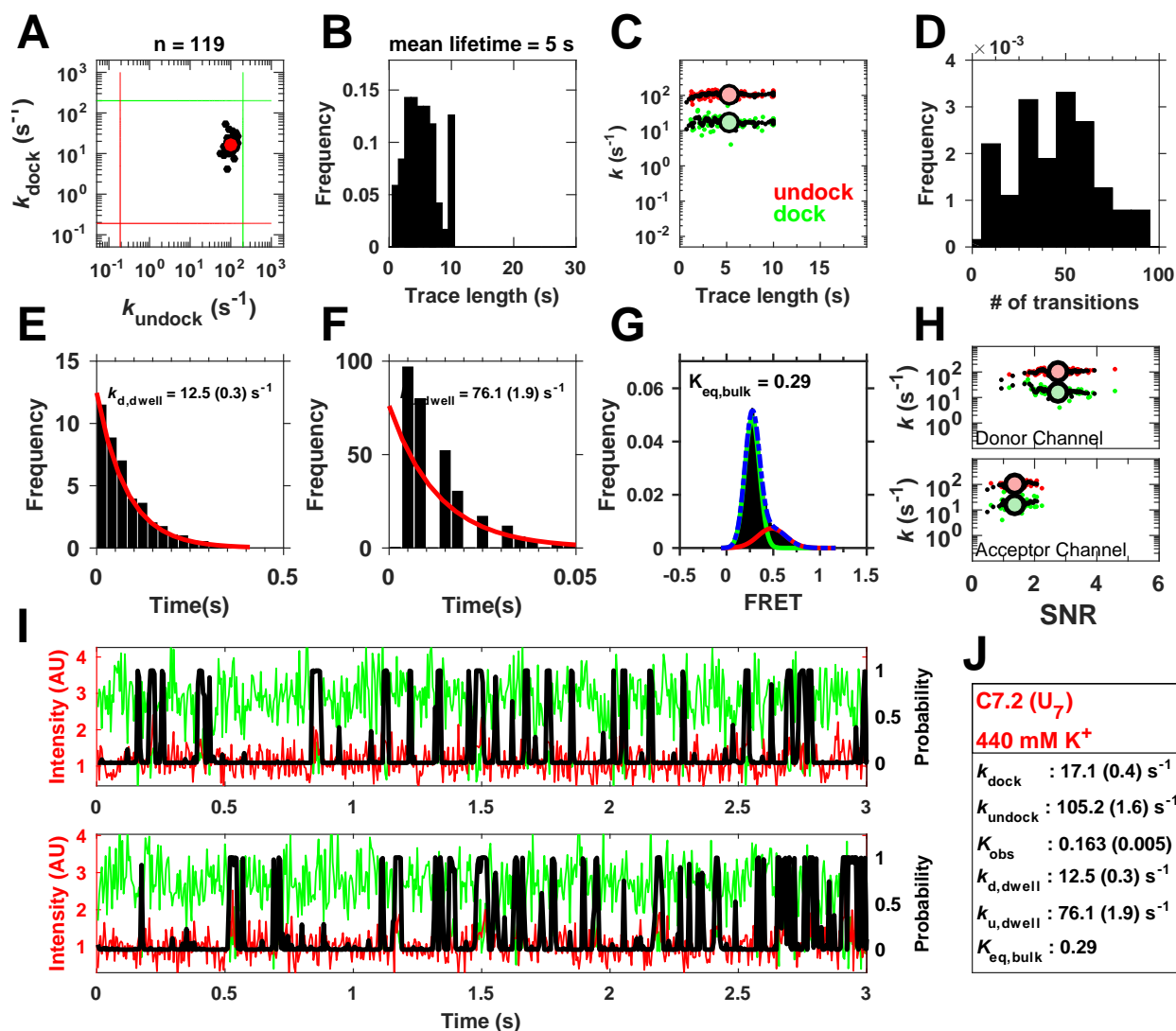


Figure S188. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

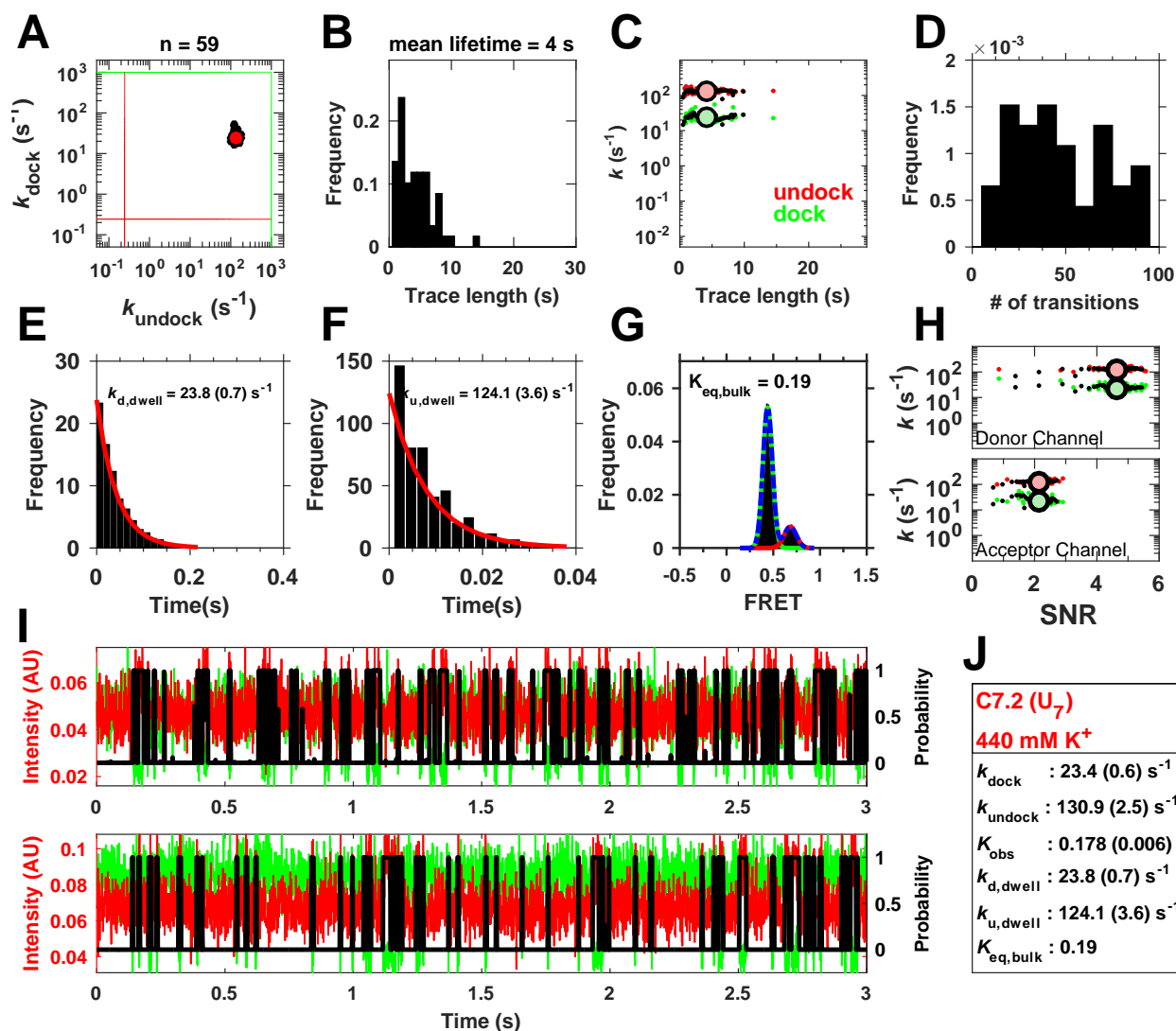


Figure S189. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

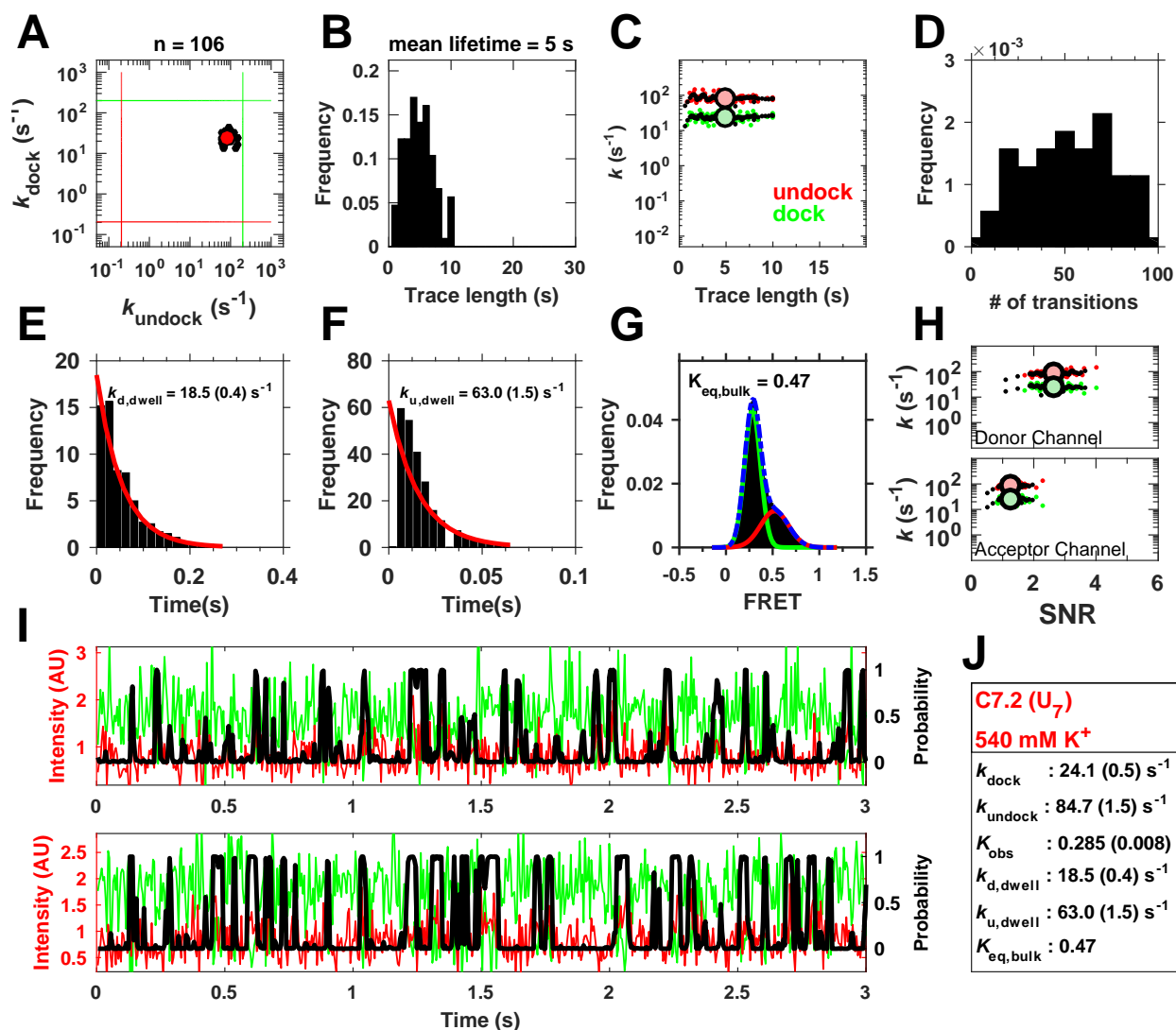


Figure S190. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

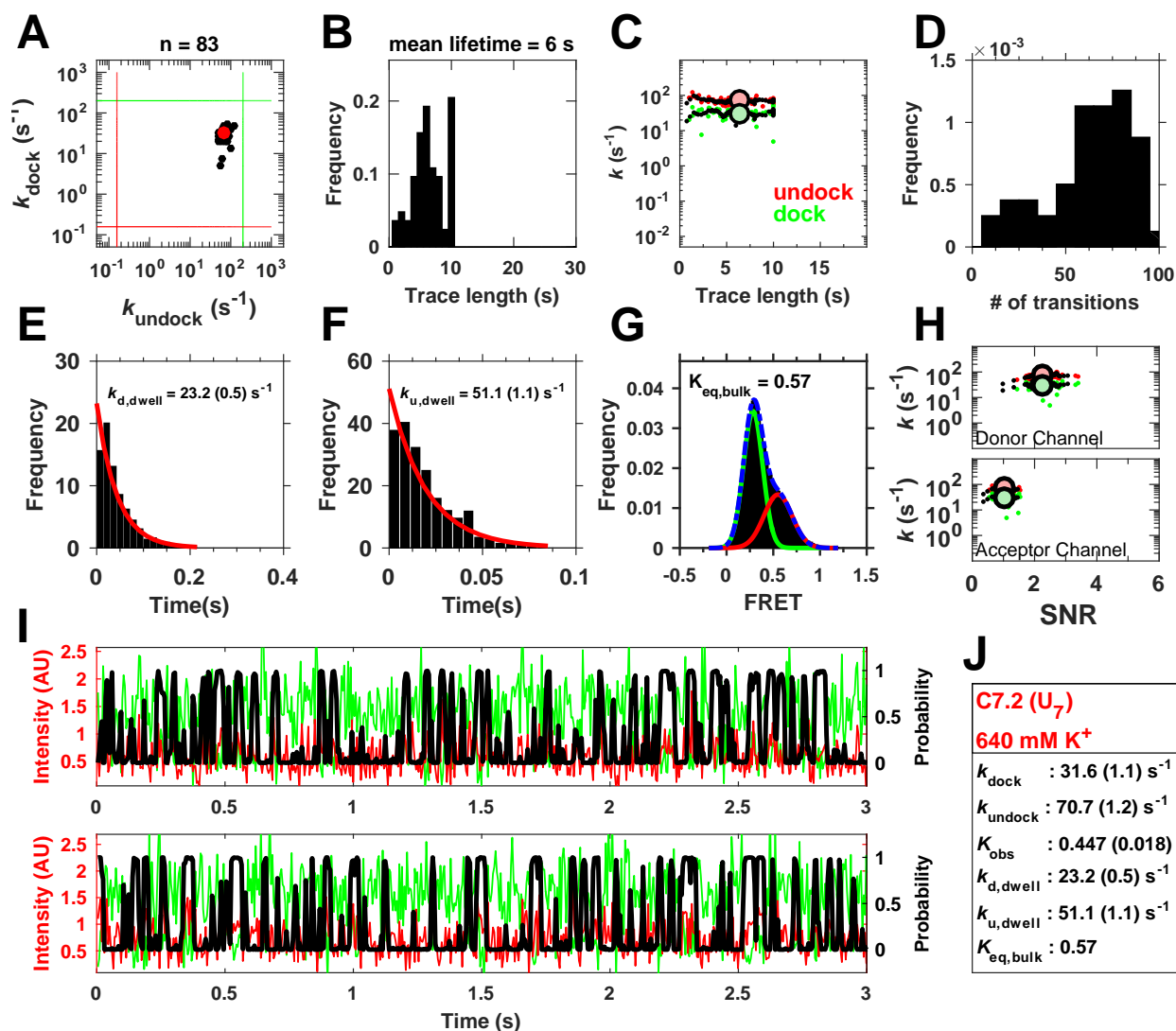


Figure S191. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

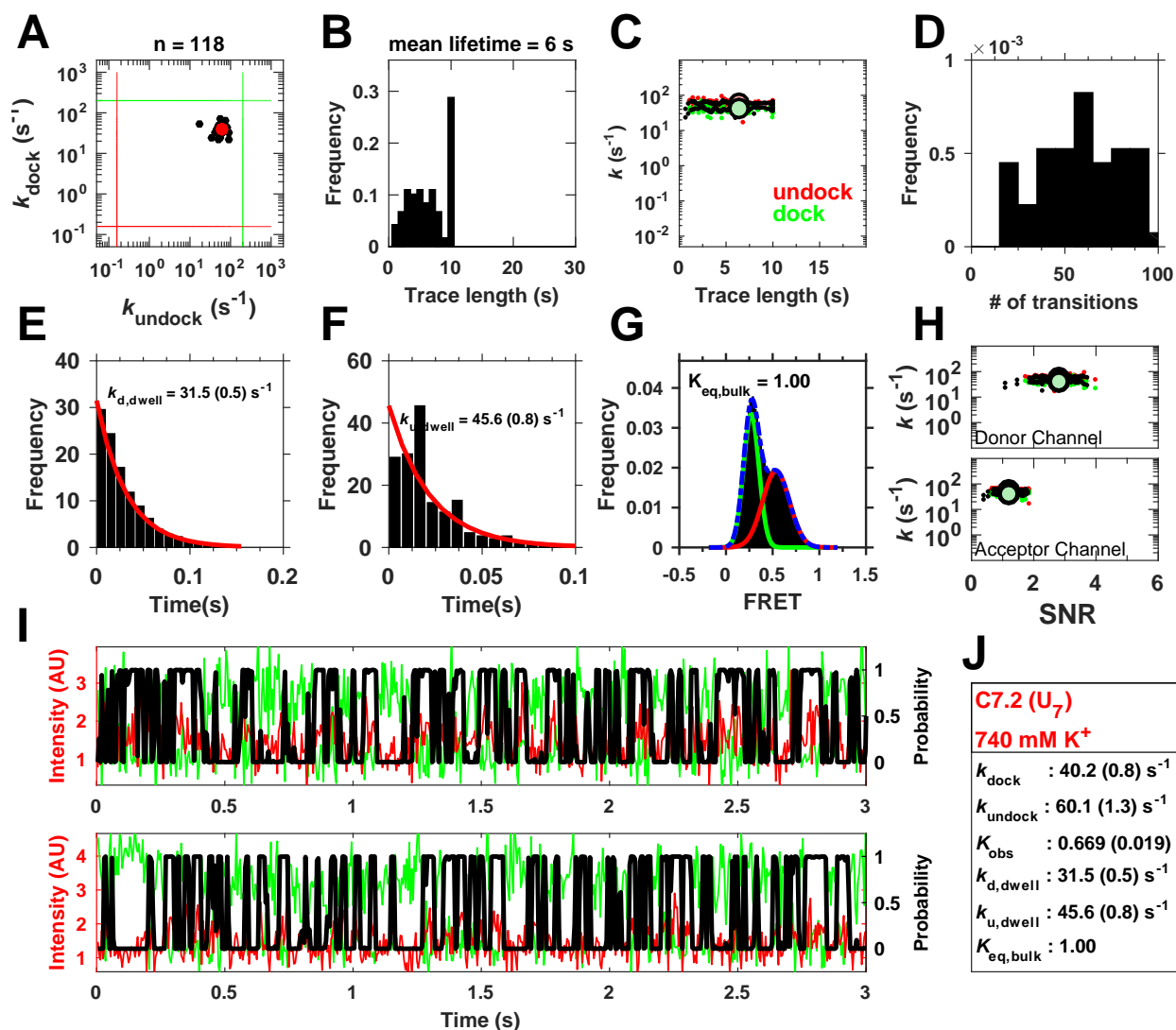


Figure S192. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

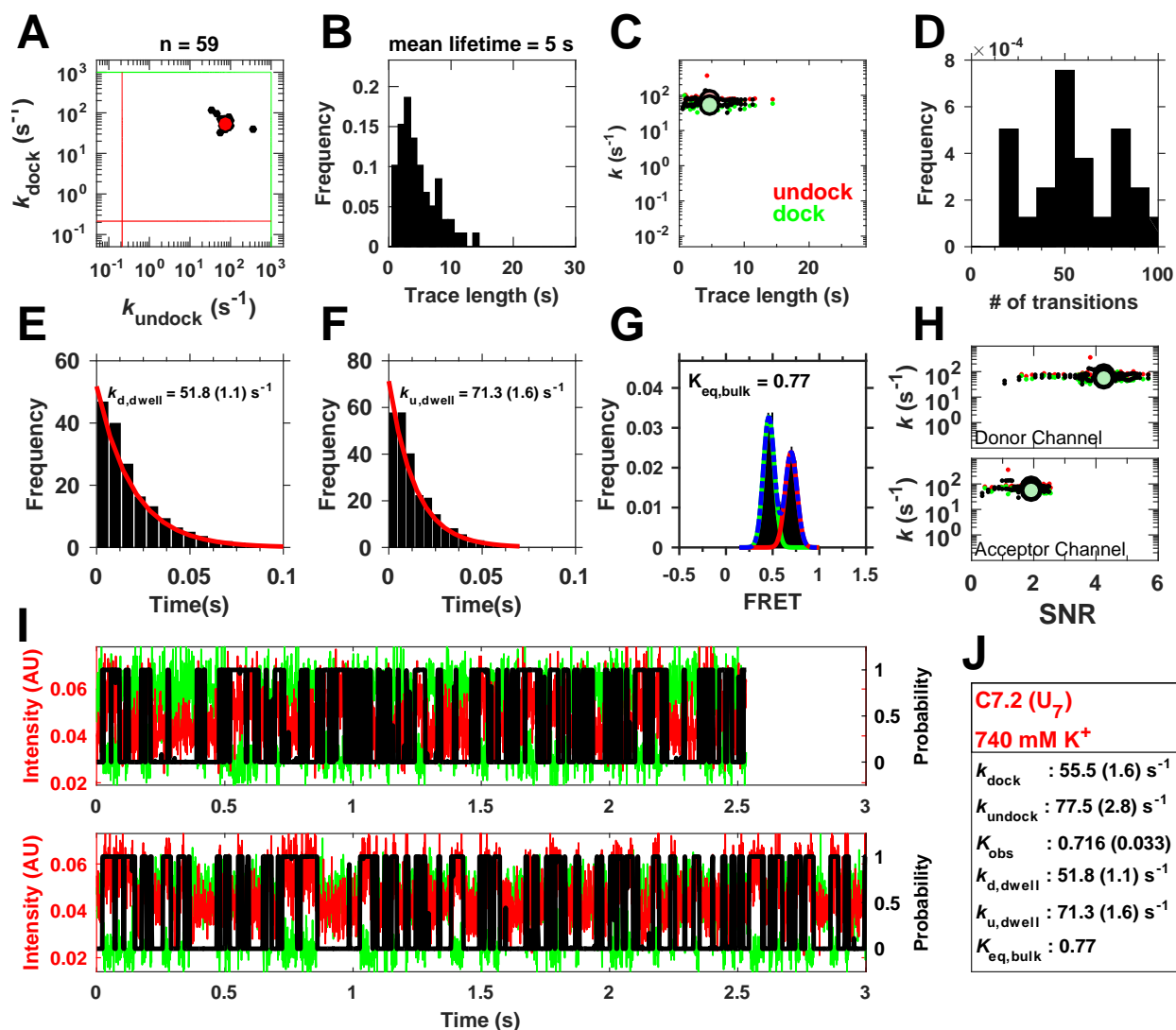


Figure S193. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

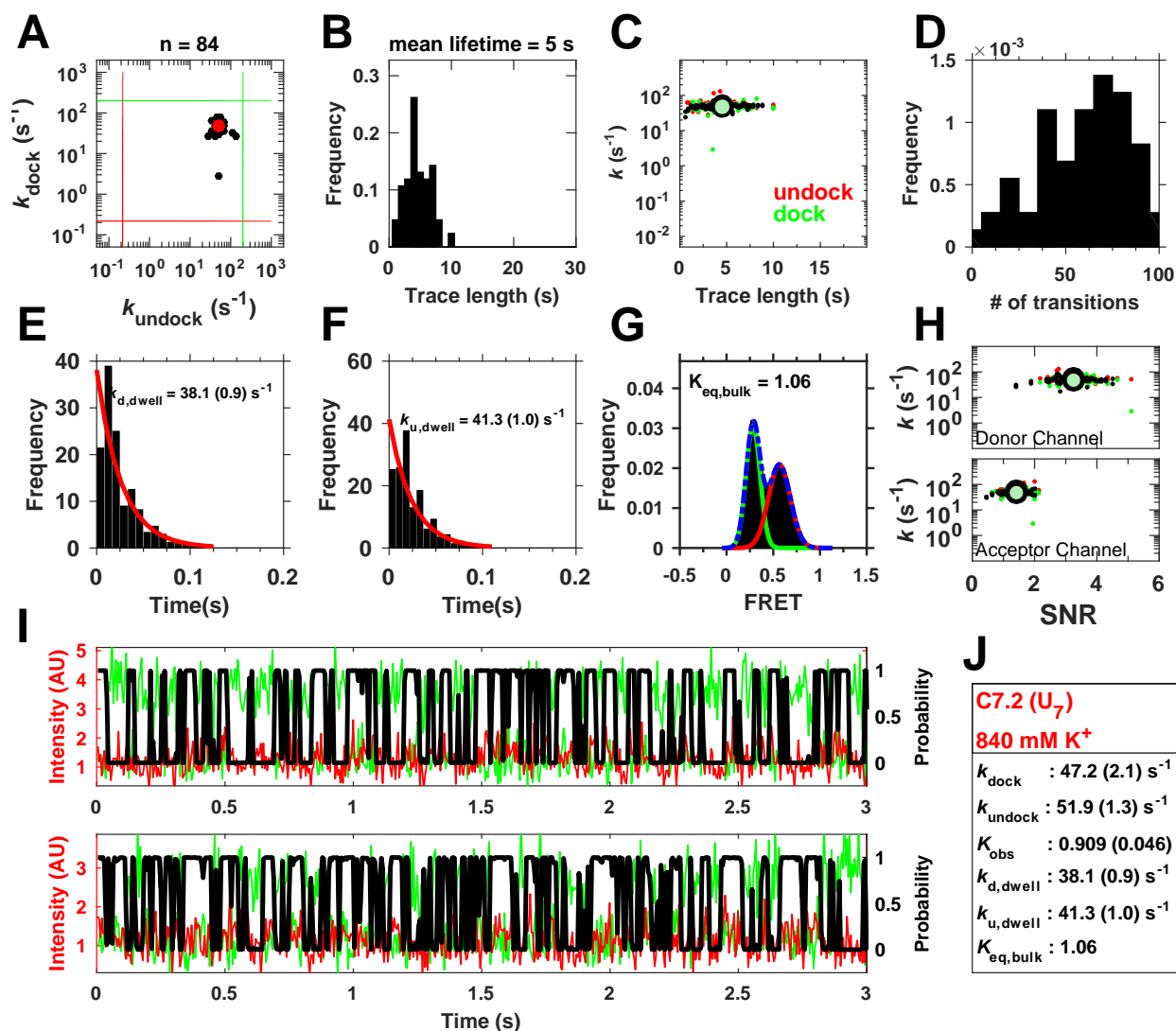


Figure S194. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

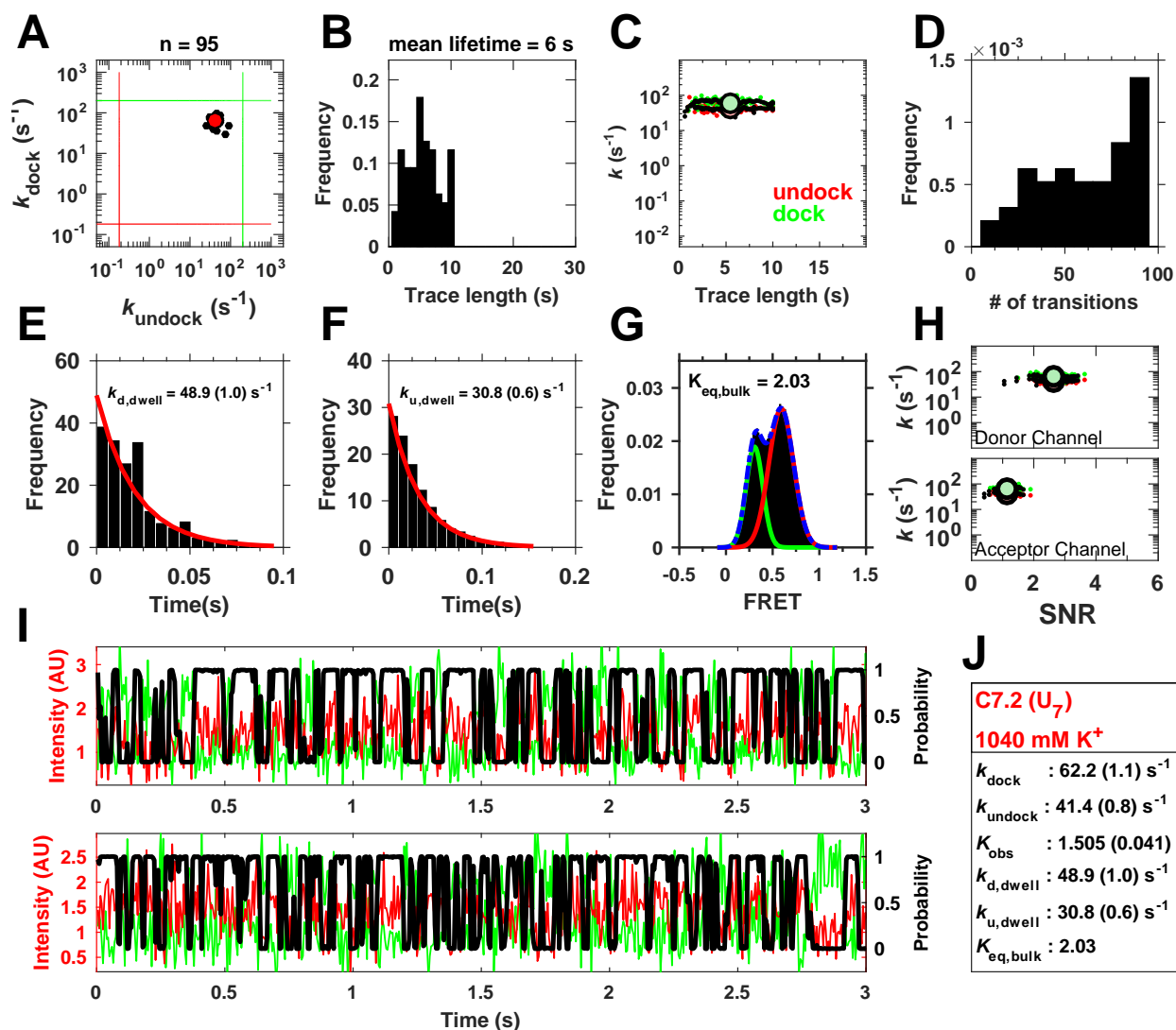


Figure S195. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

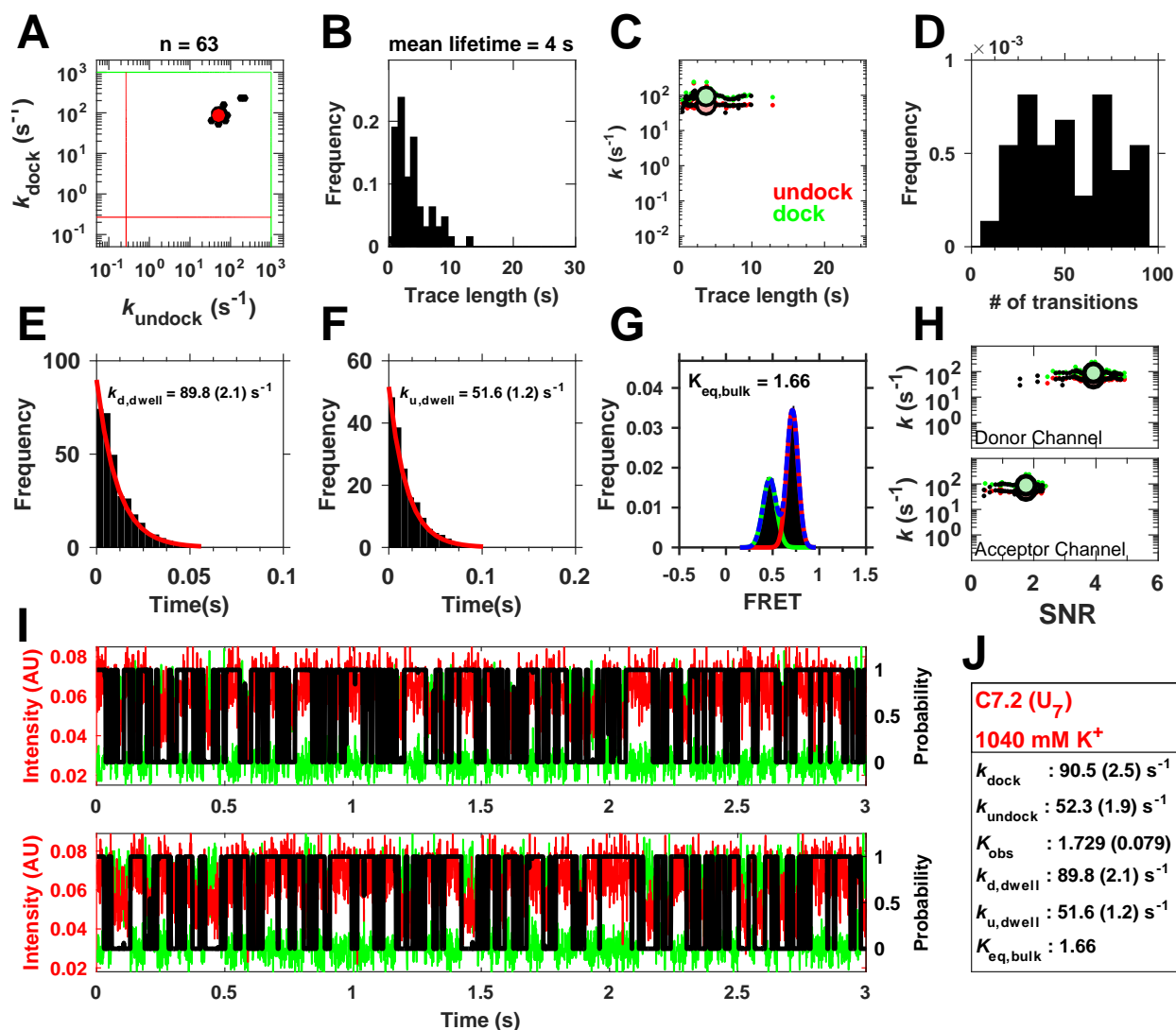


Figure S196. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

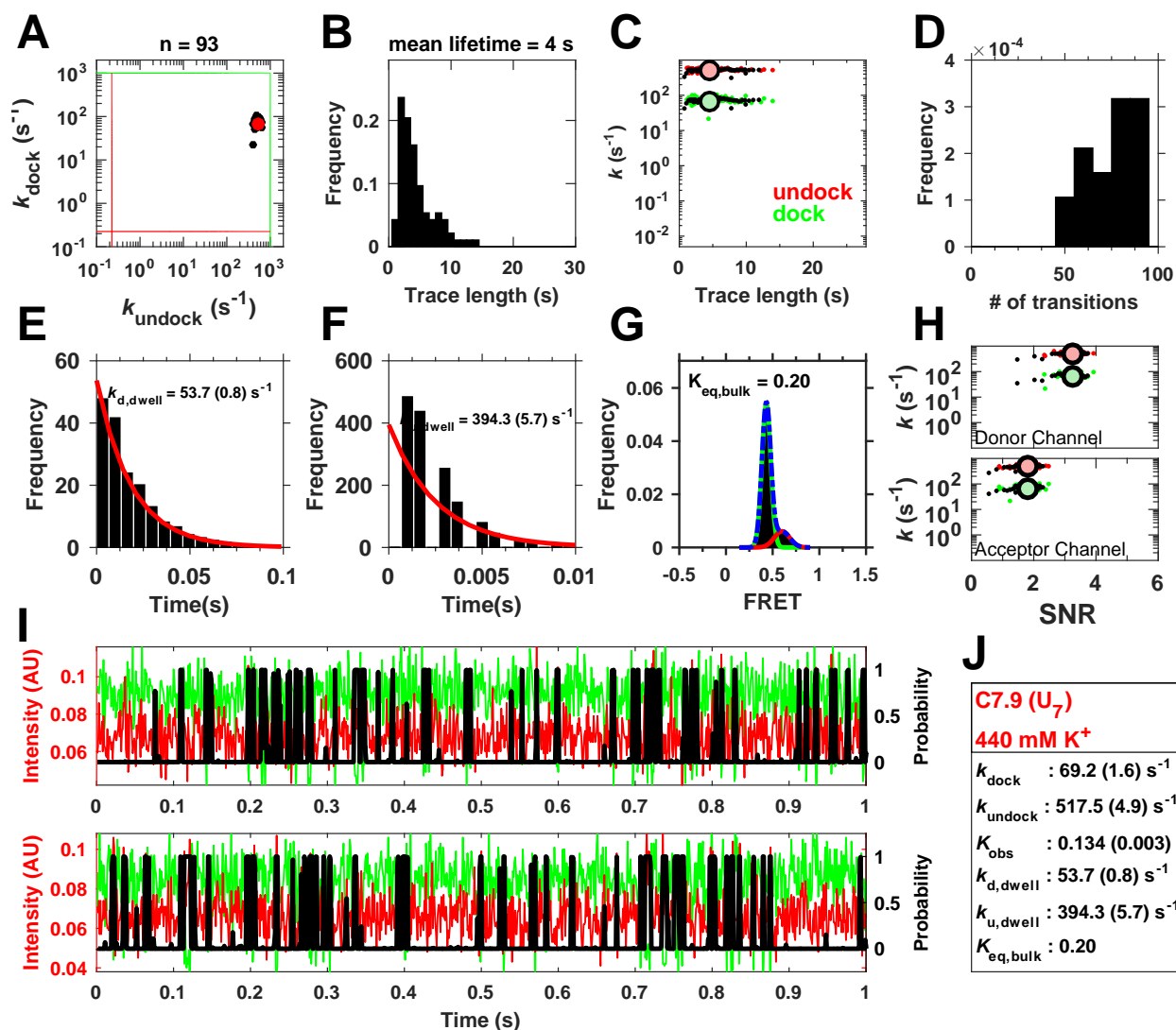


Figure S197. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

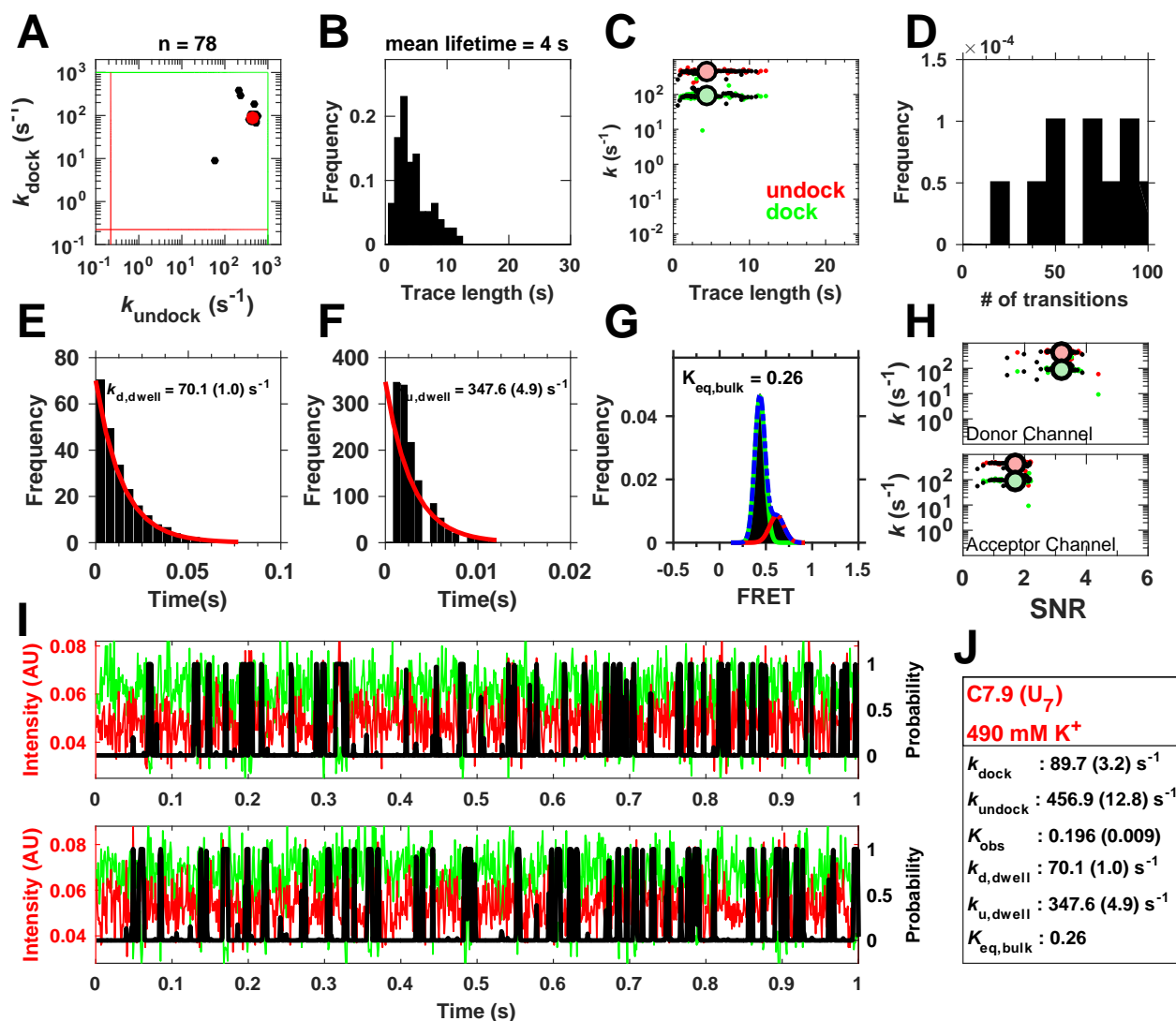


Figure S198. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

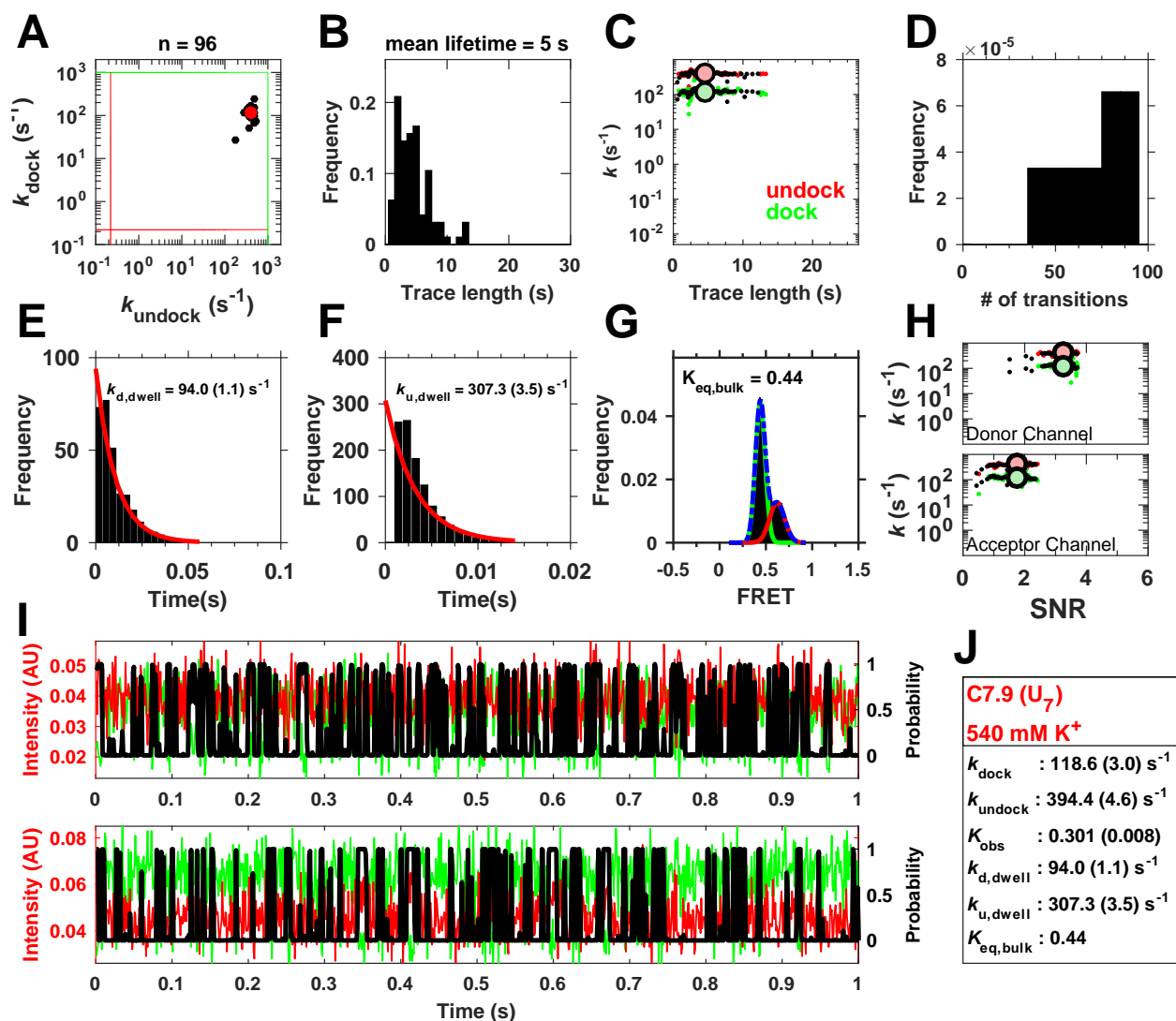


Figure S199. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

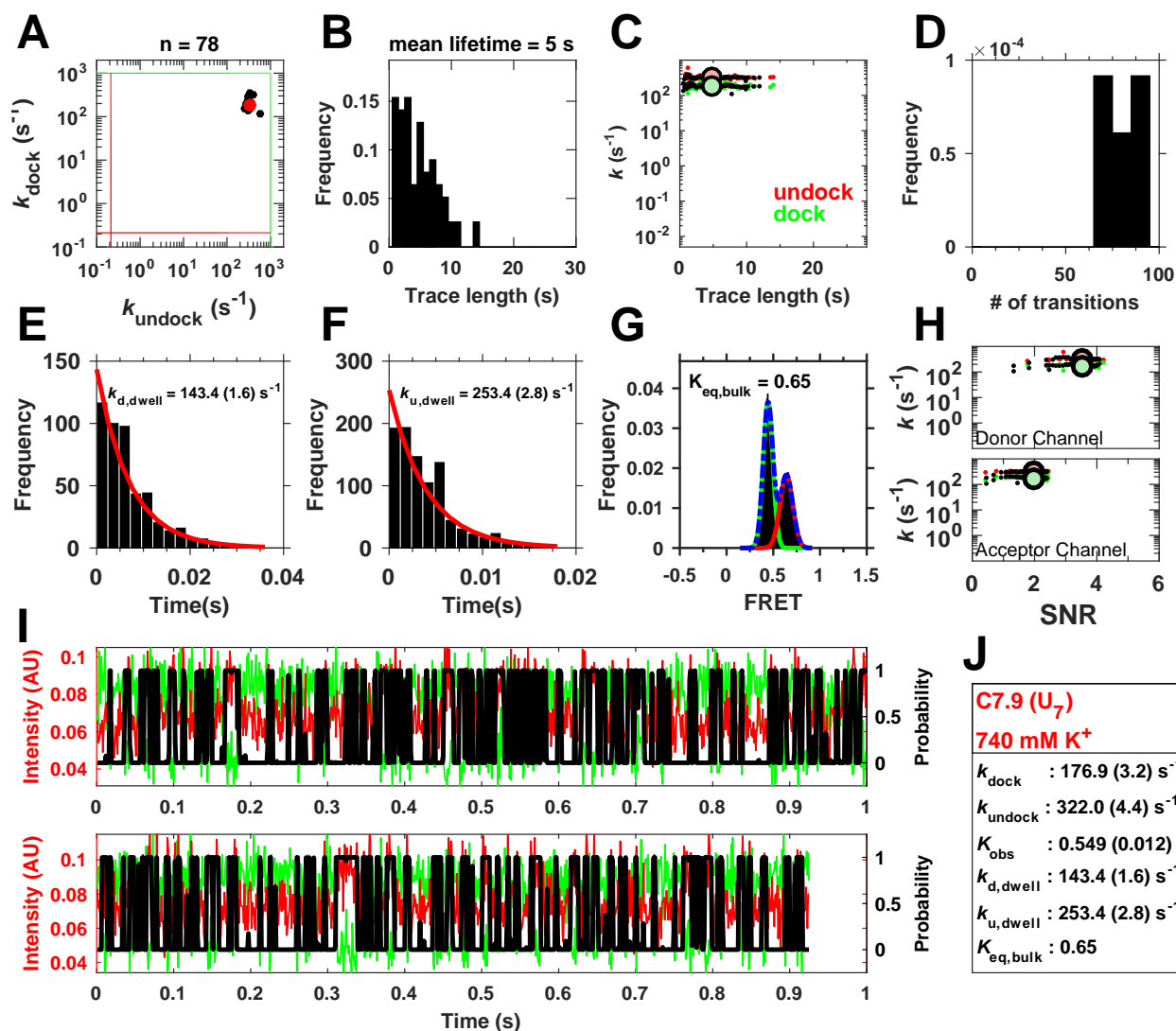


Figure S200. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

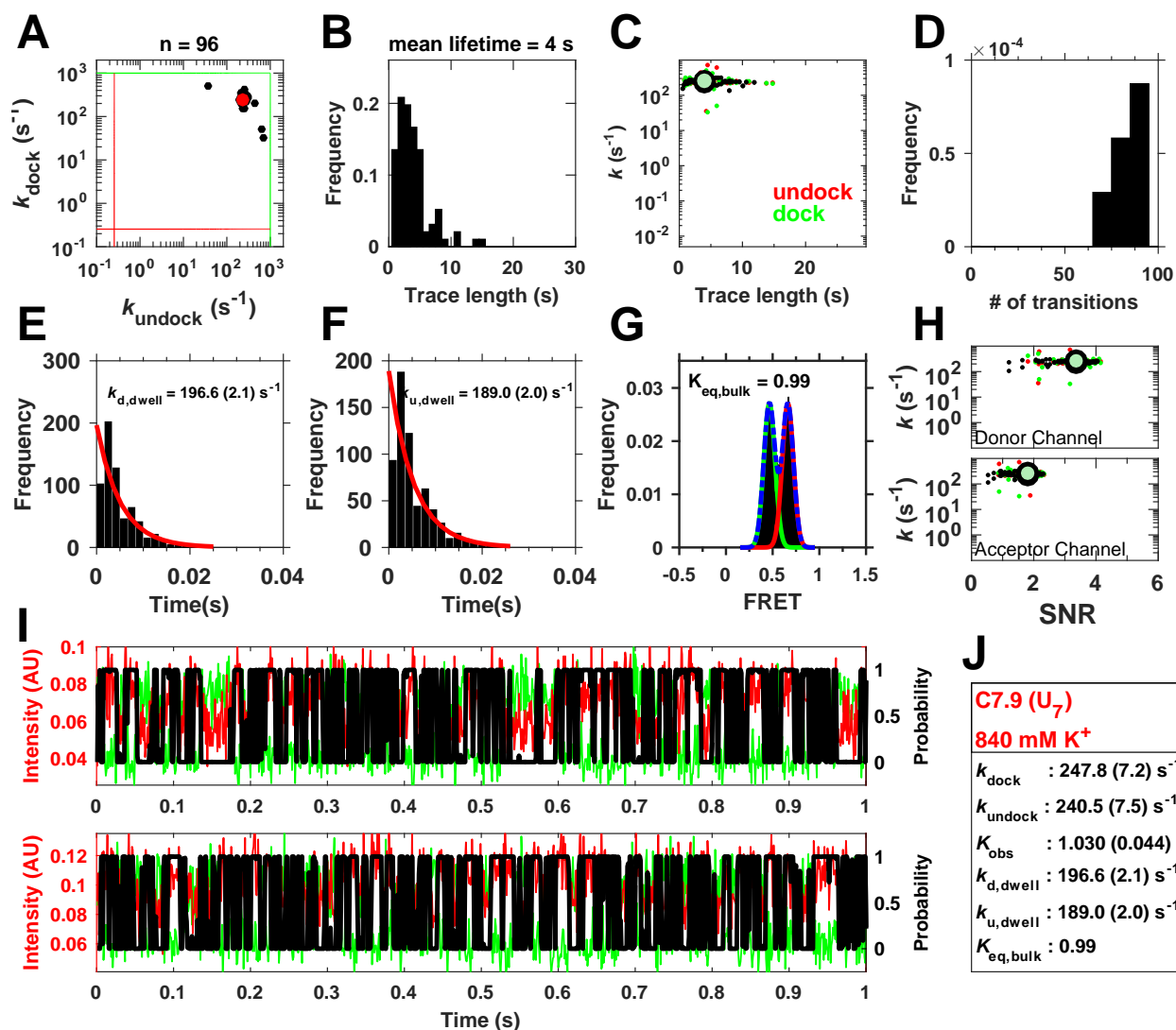


Figure S201. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

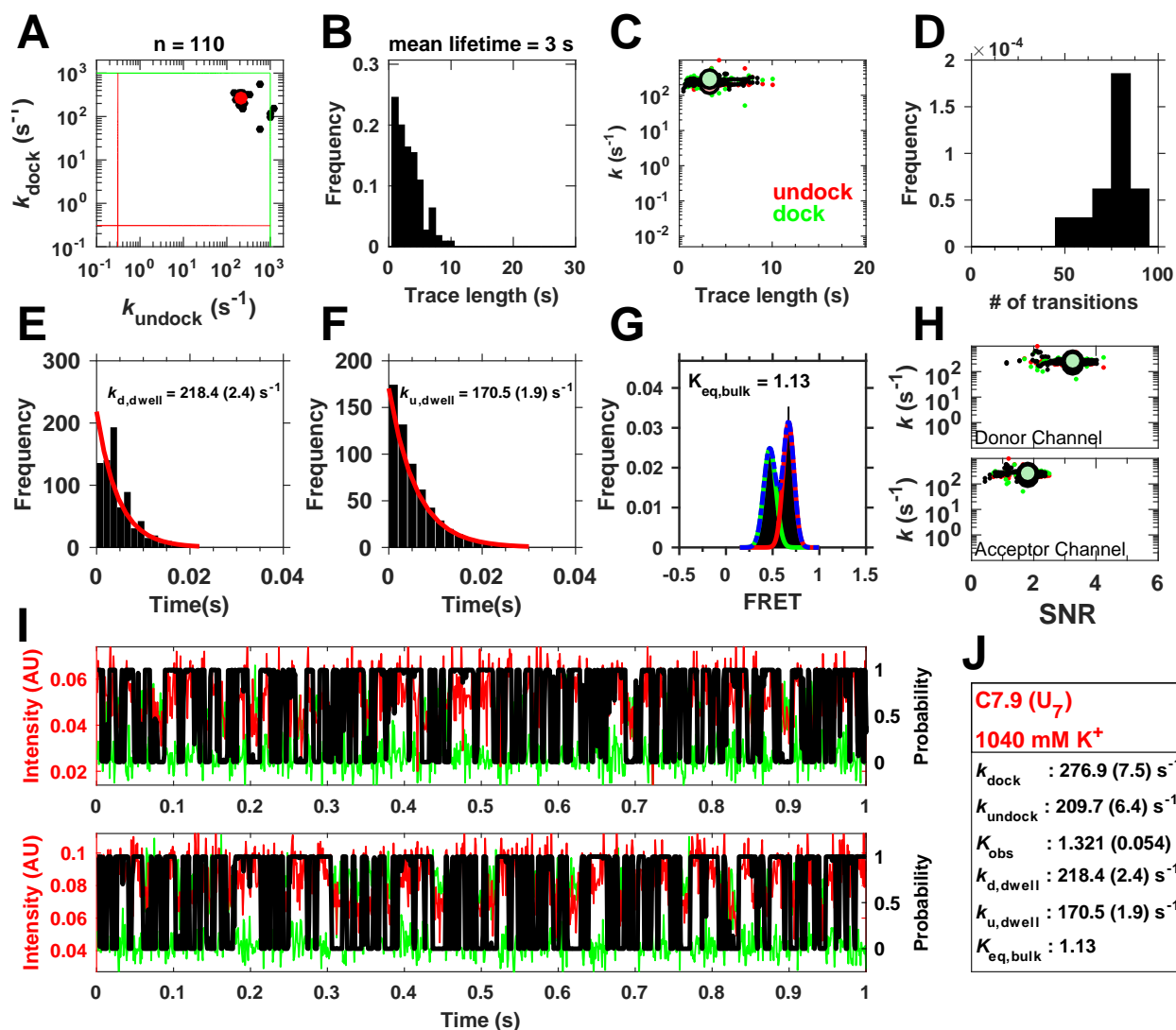


Figure S202. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

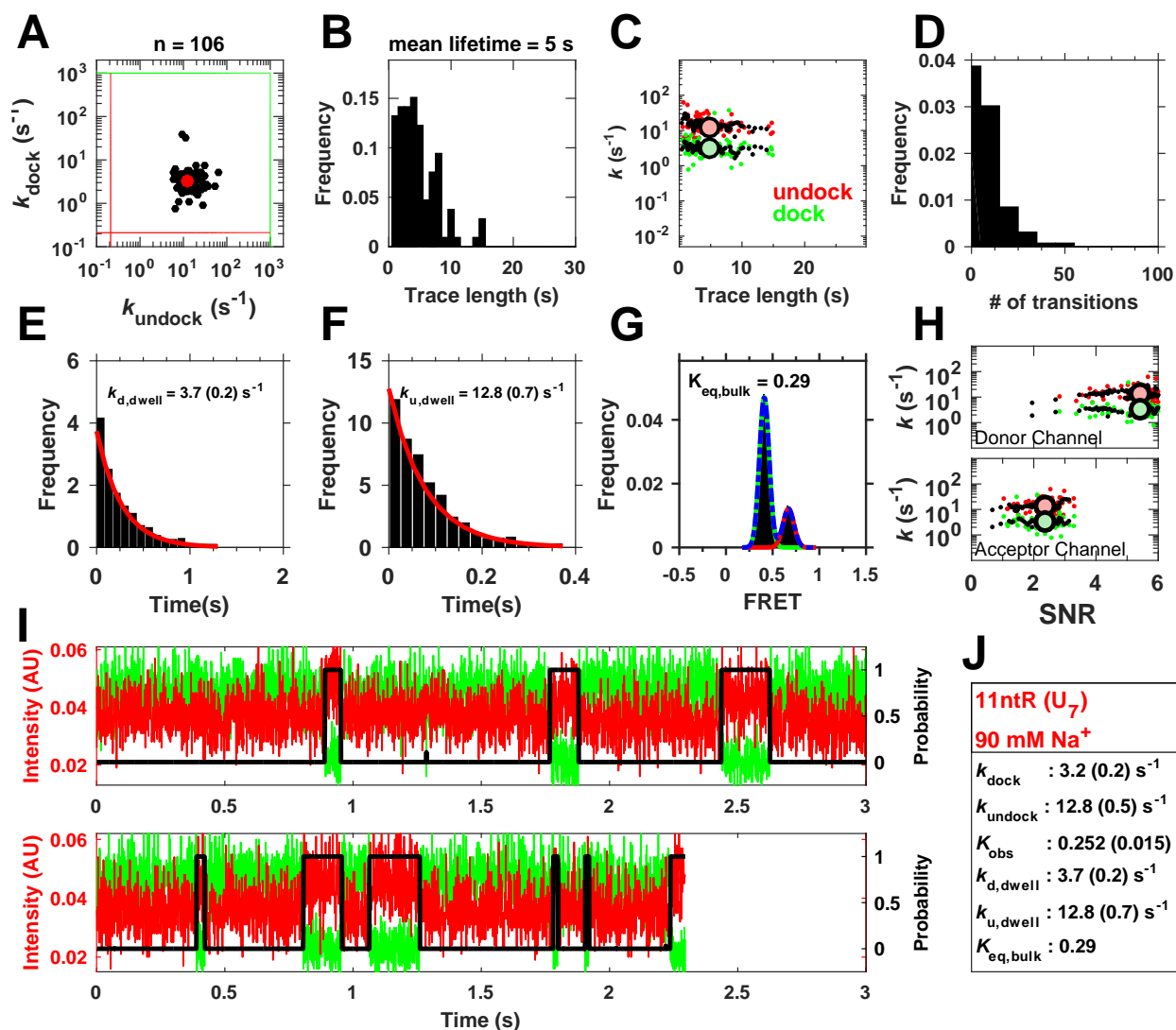


Figure S203. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

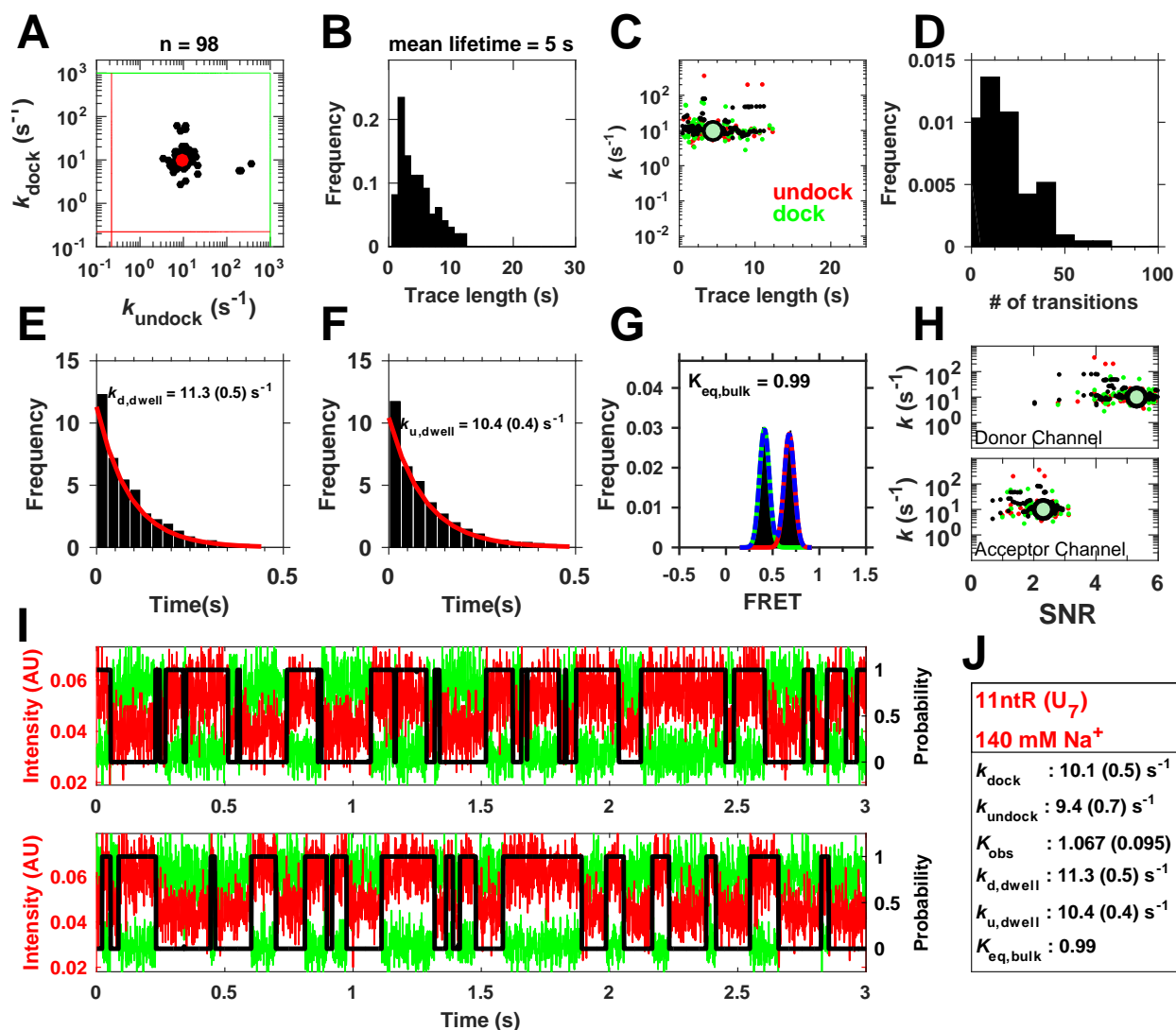


Figure S204. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

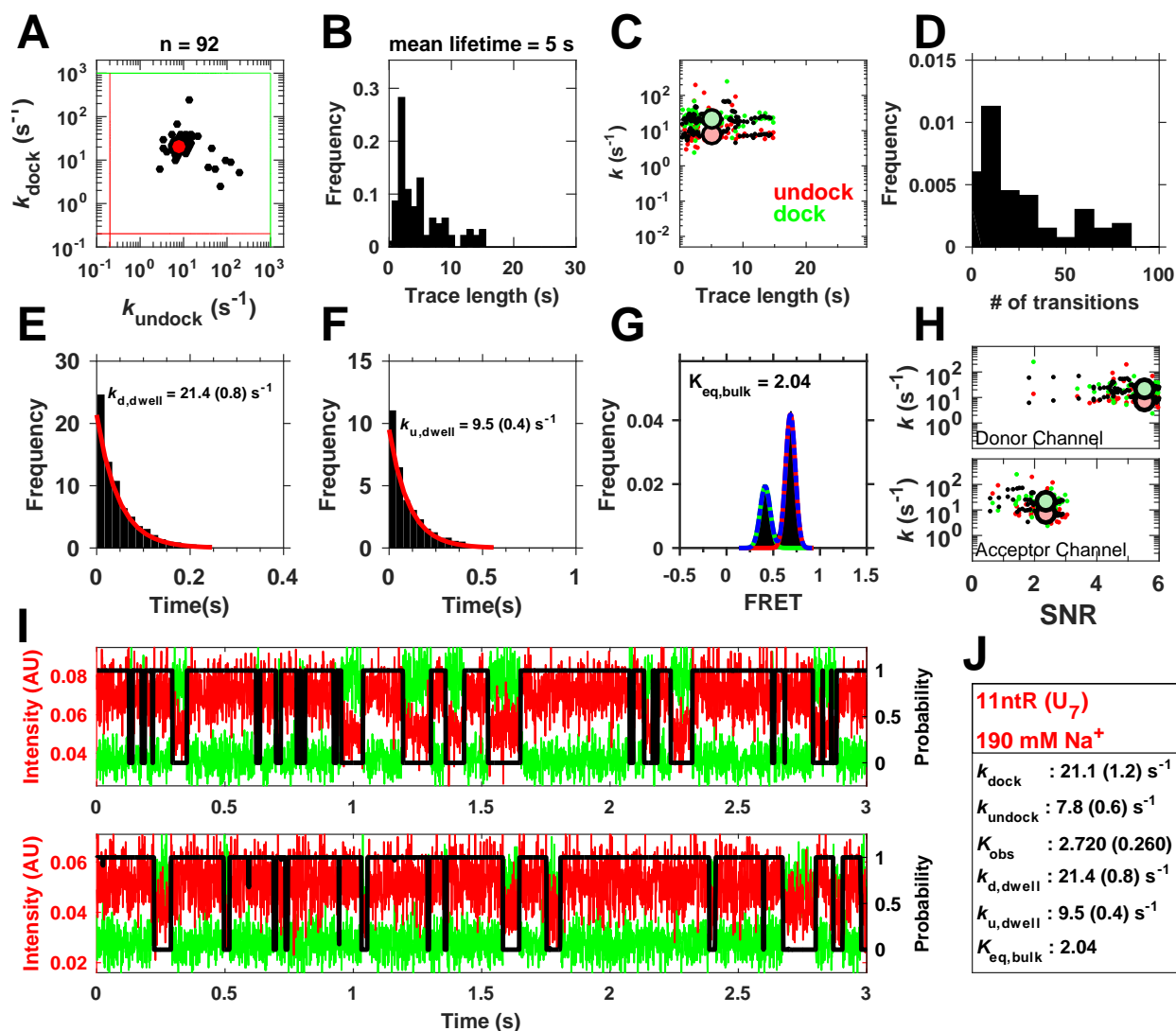


Figure S205. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

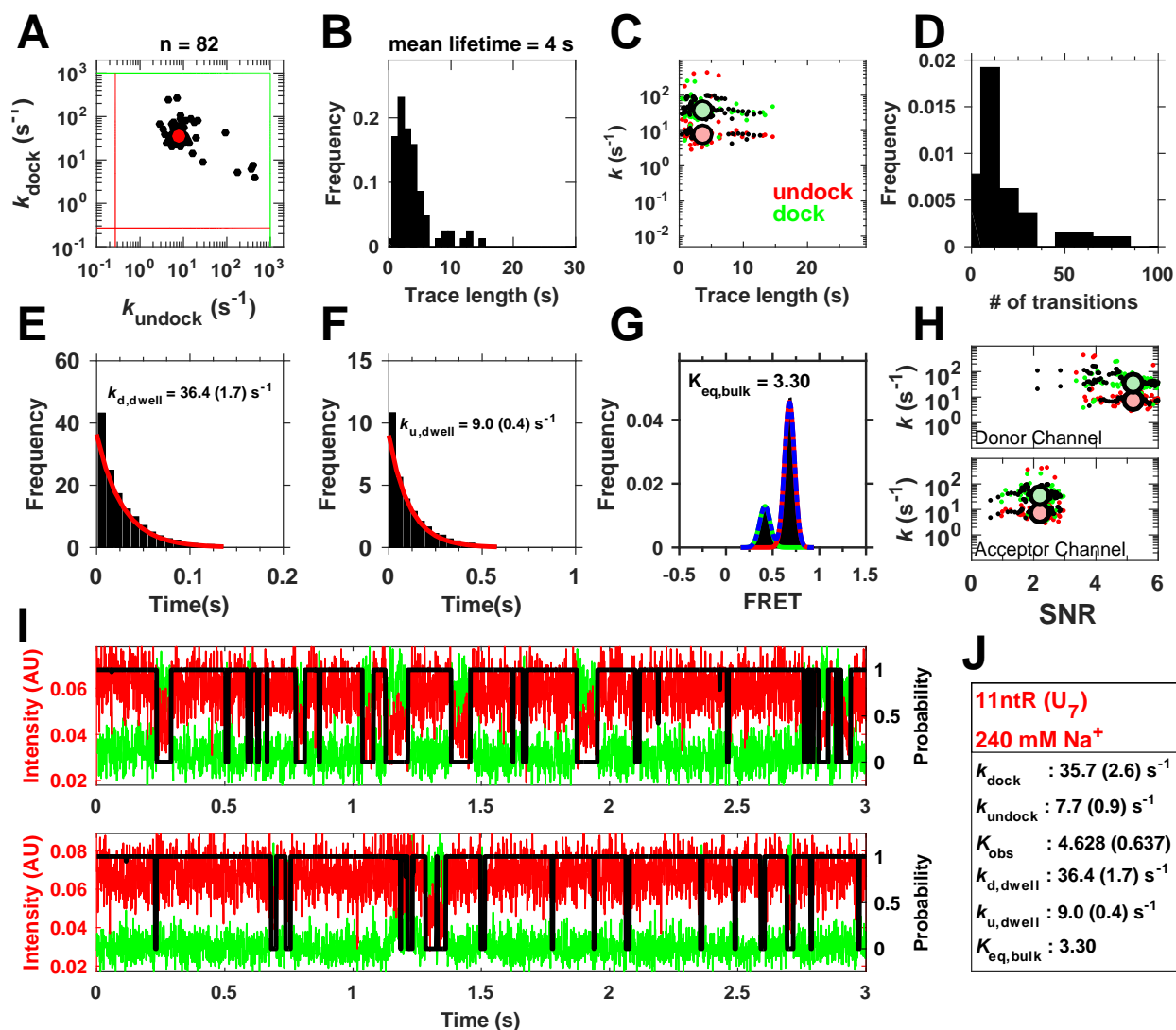


Figure S206. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

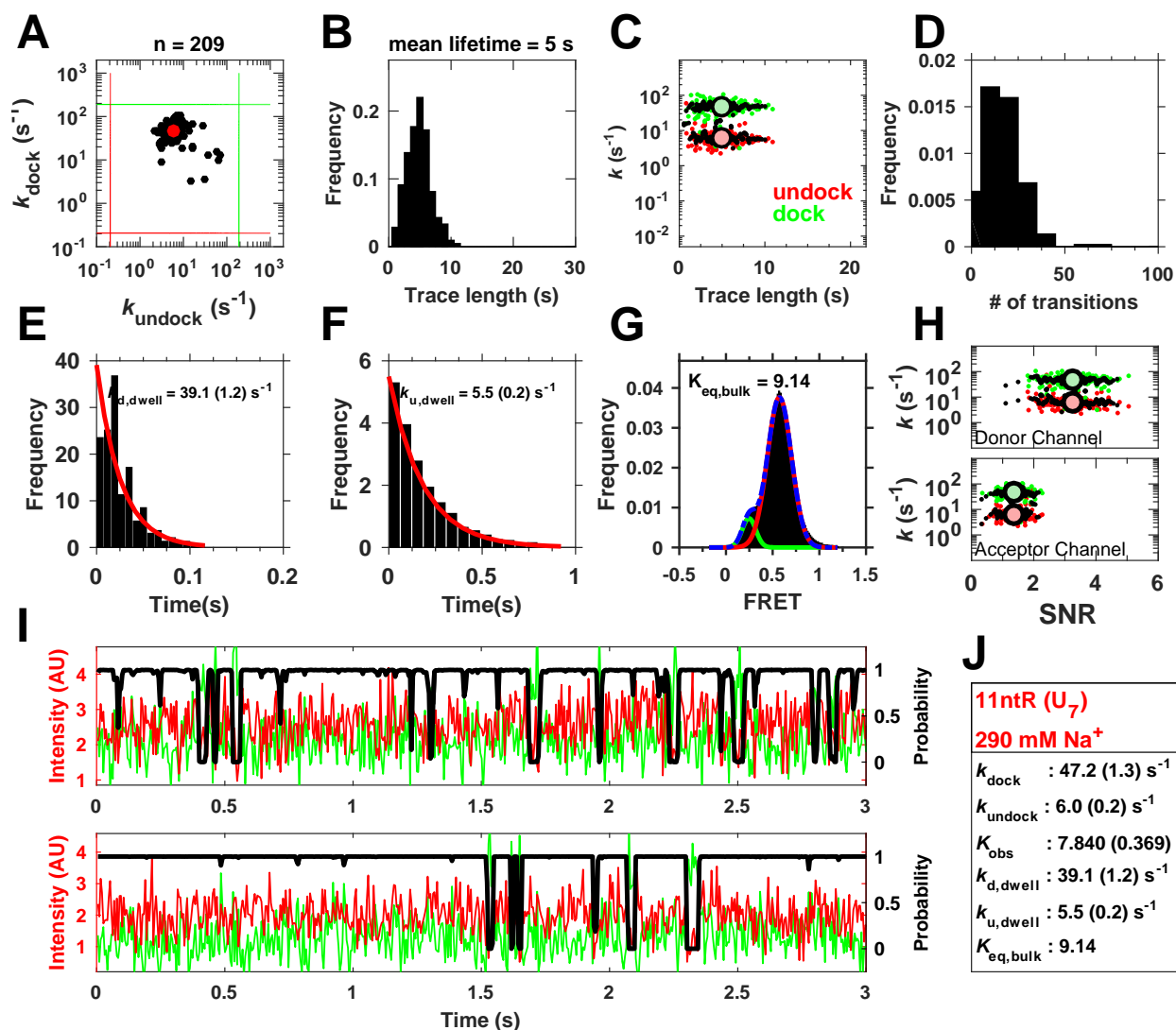


Figure S207. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

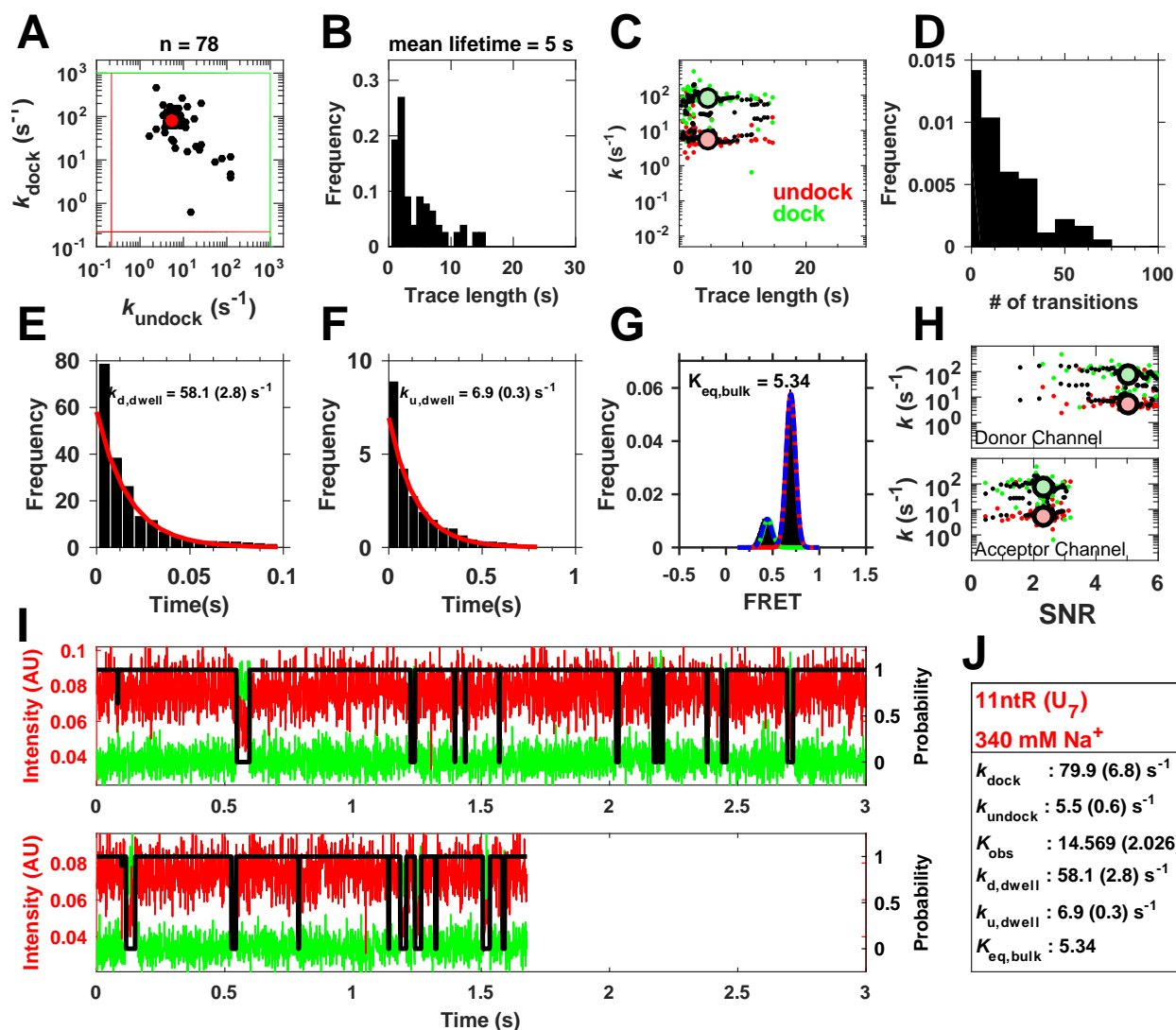


Figure S208. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

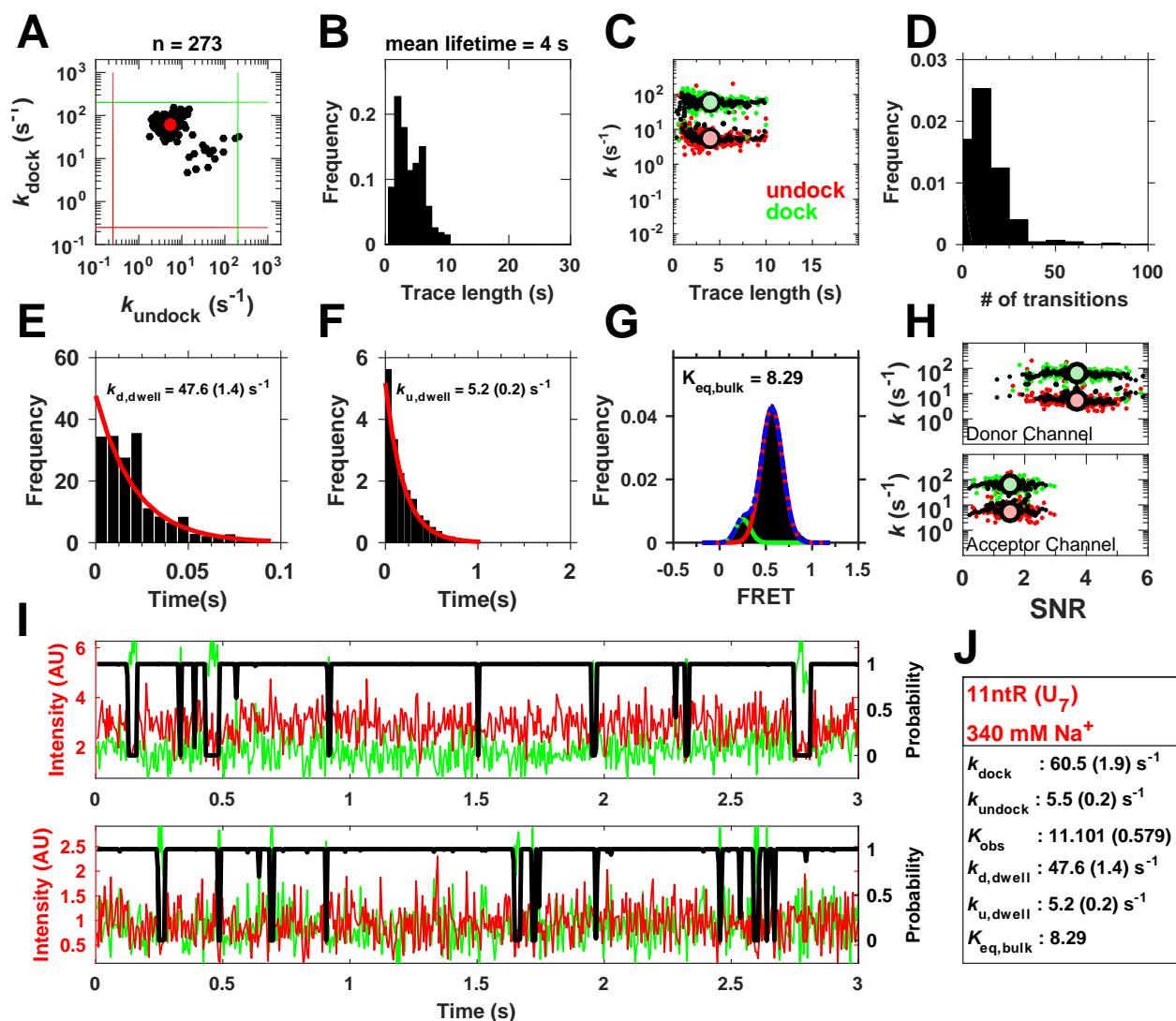


Figure S209. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

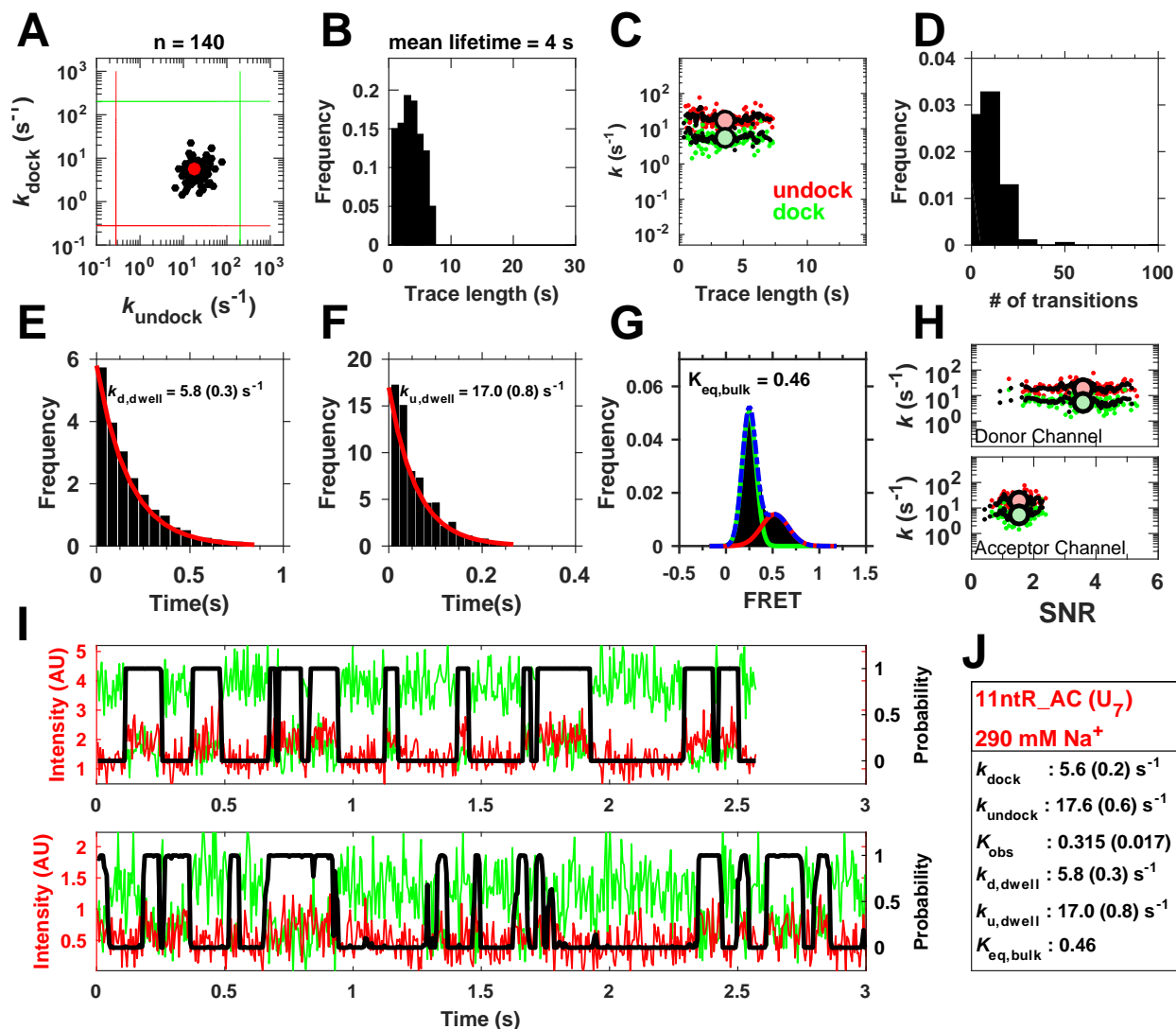


Figure S210. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

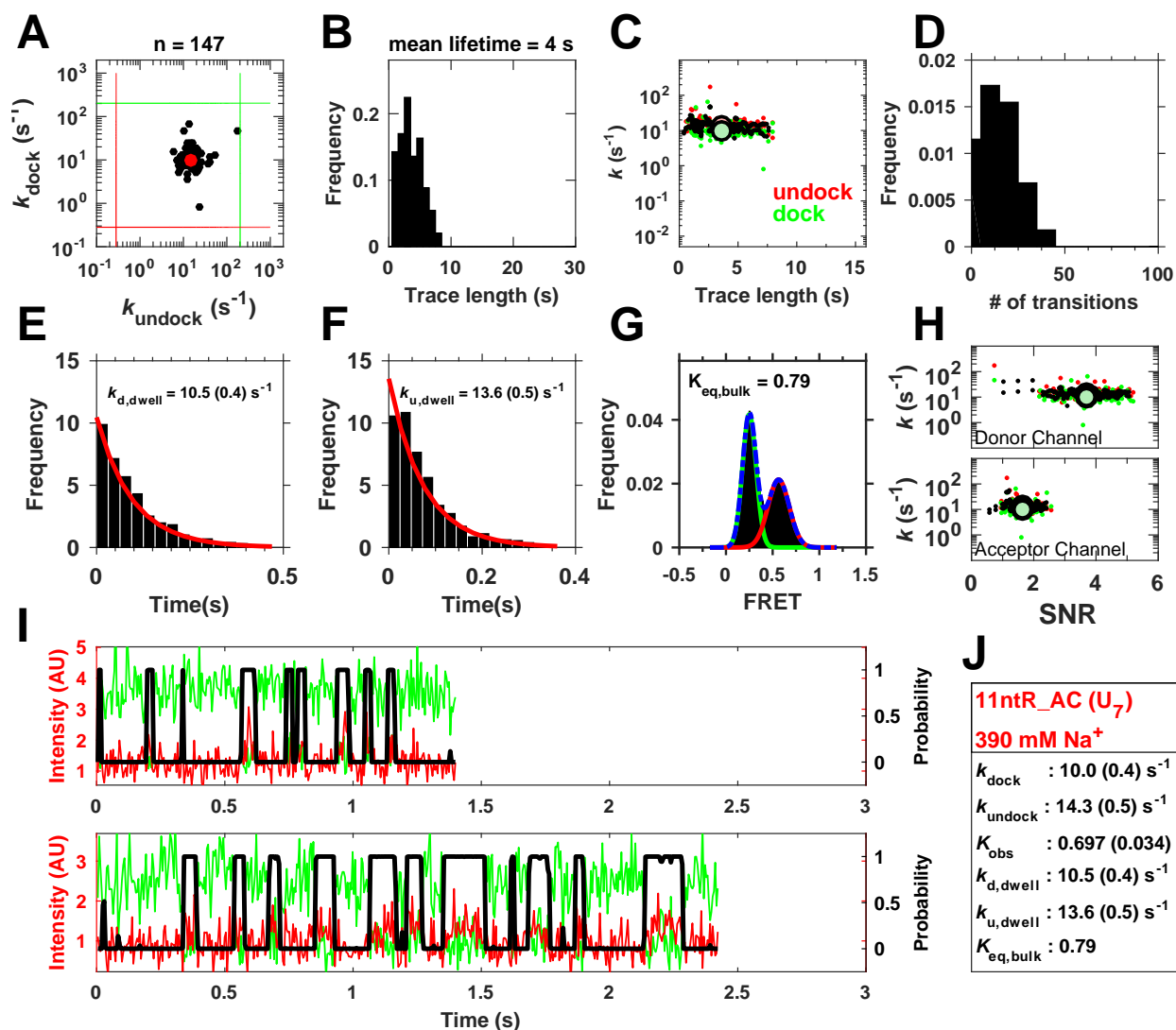


Figure S211. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

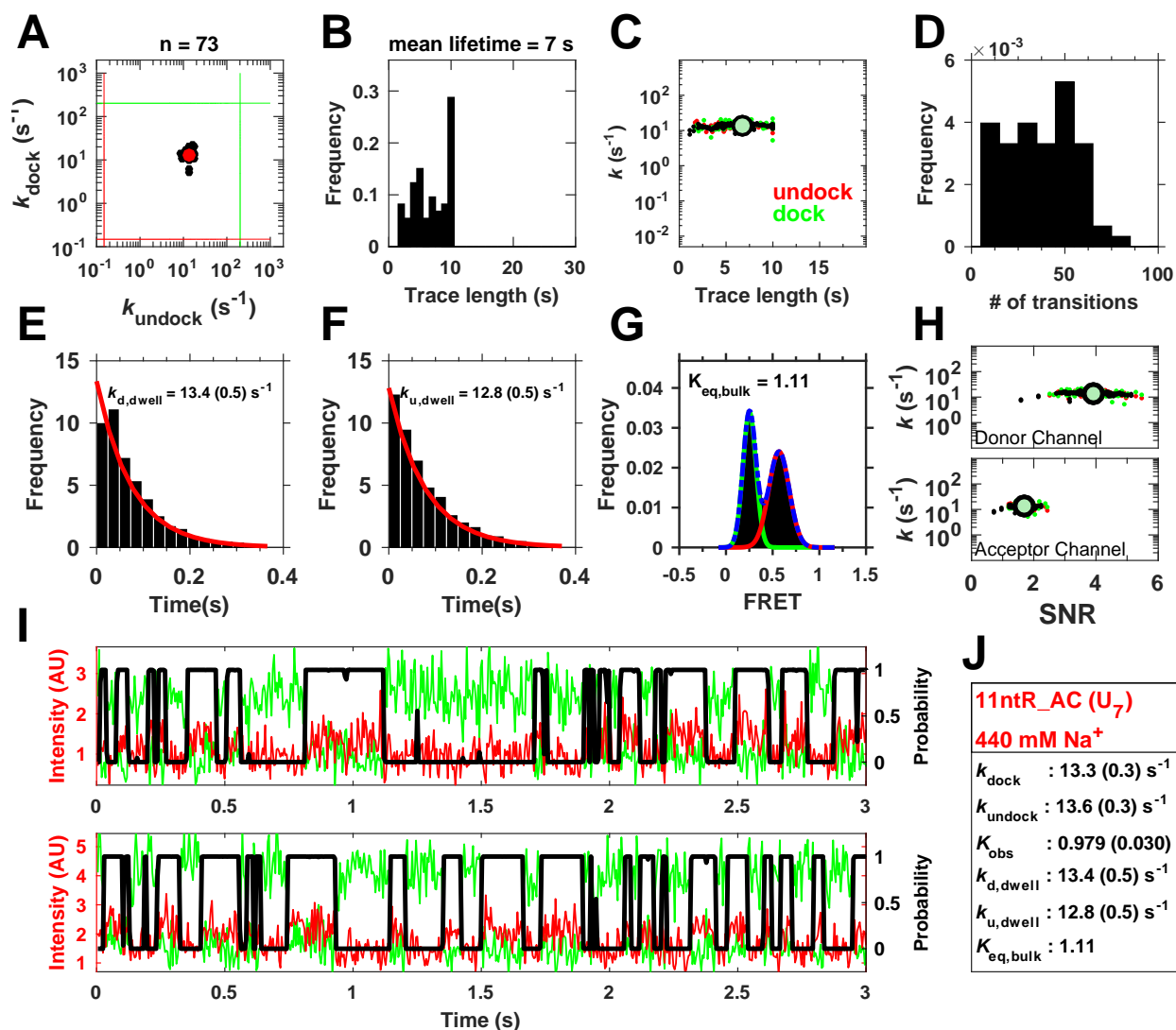


Figure S212. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

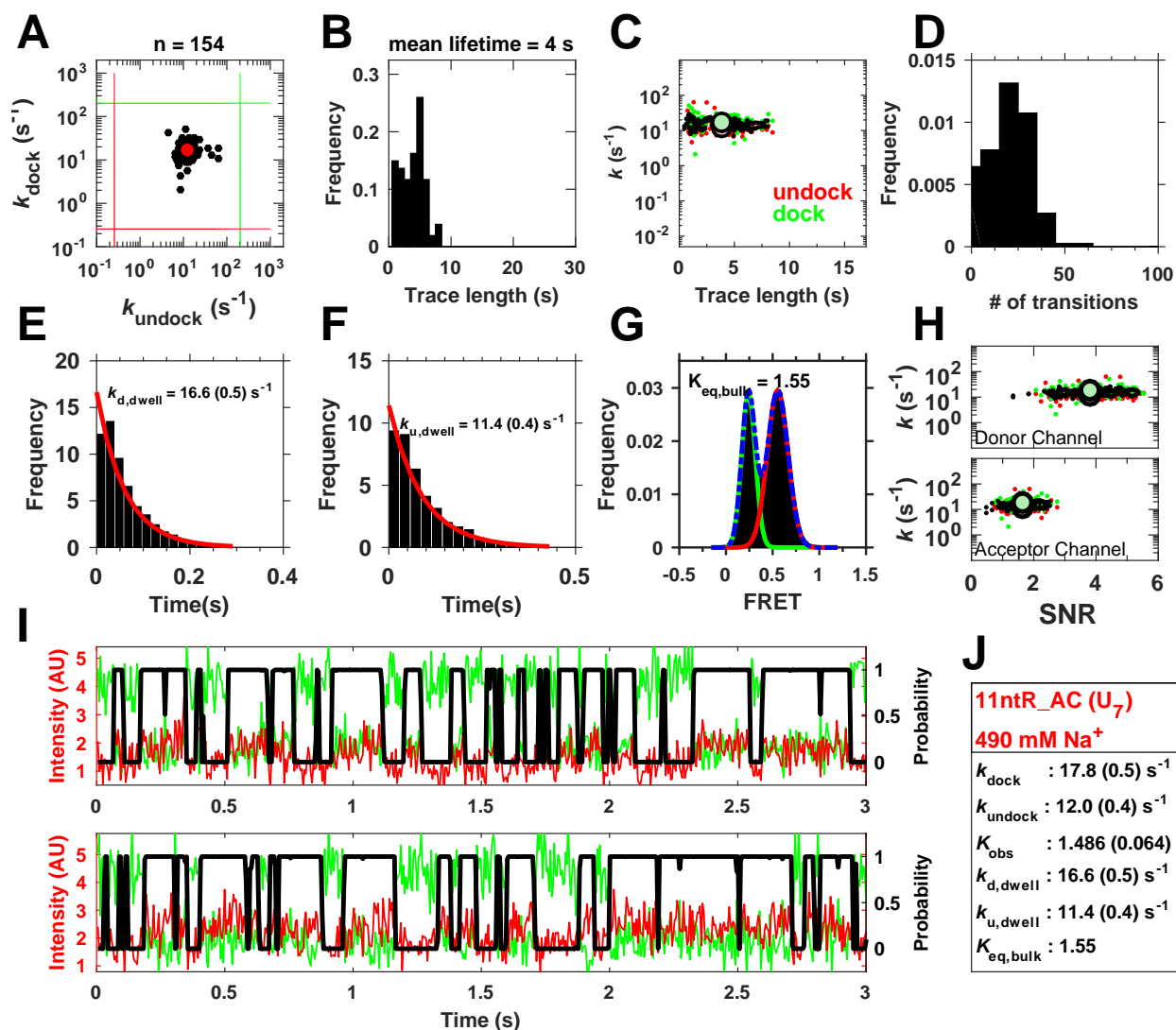


Figure S213. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

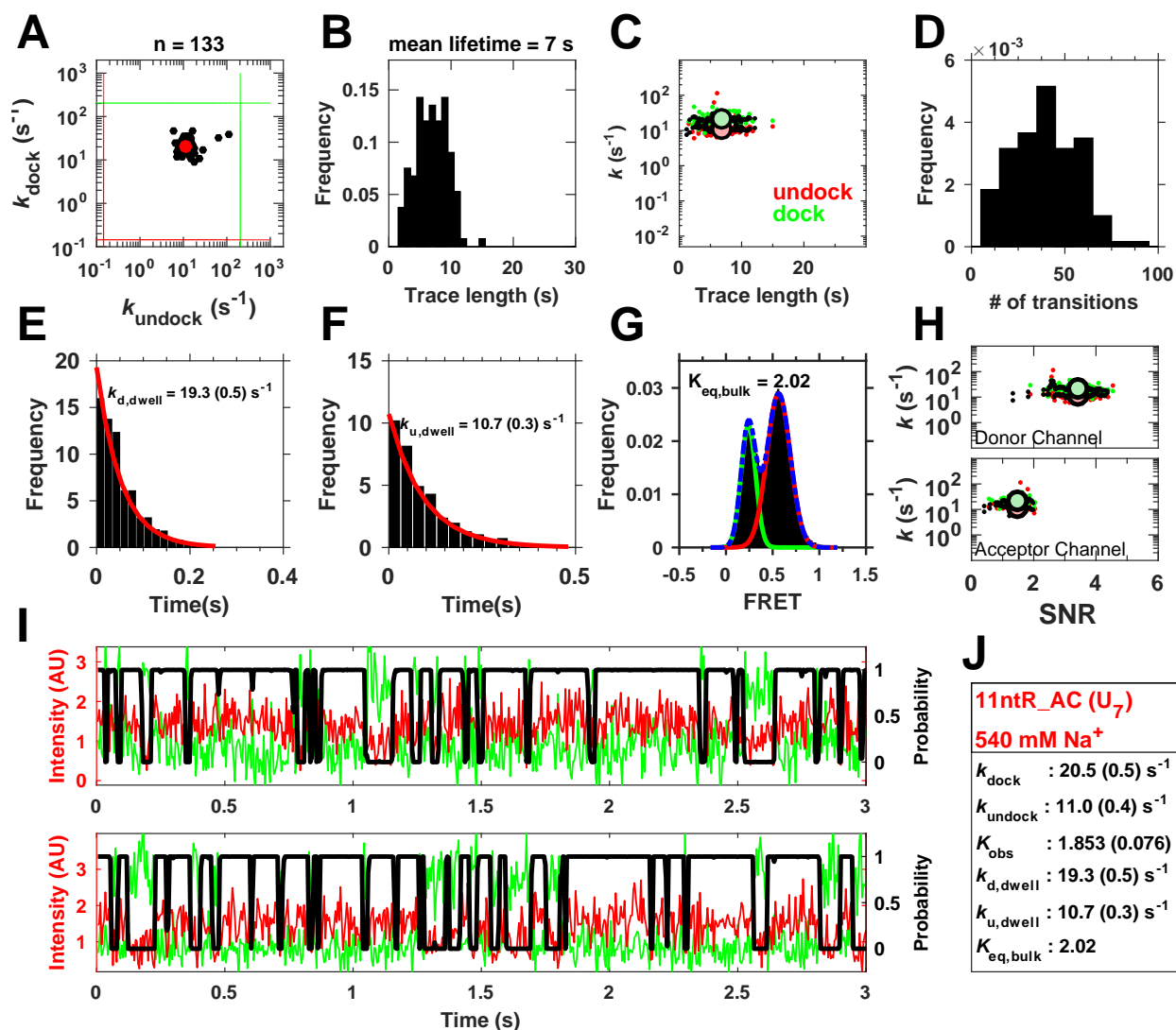


Figure S214. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

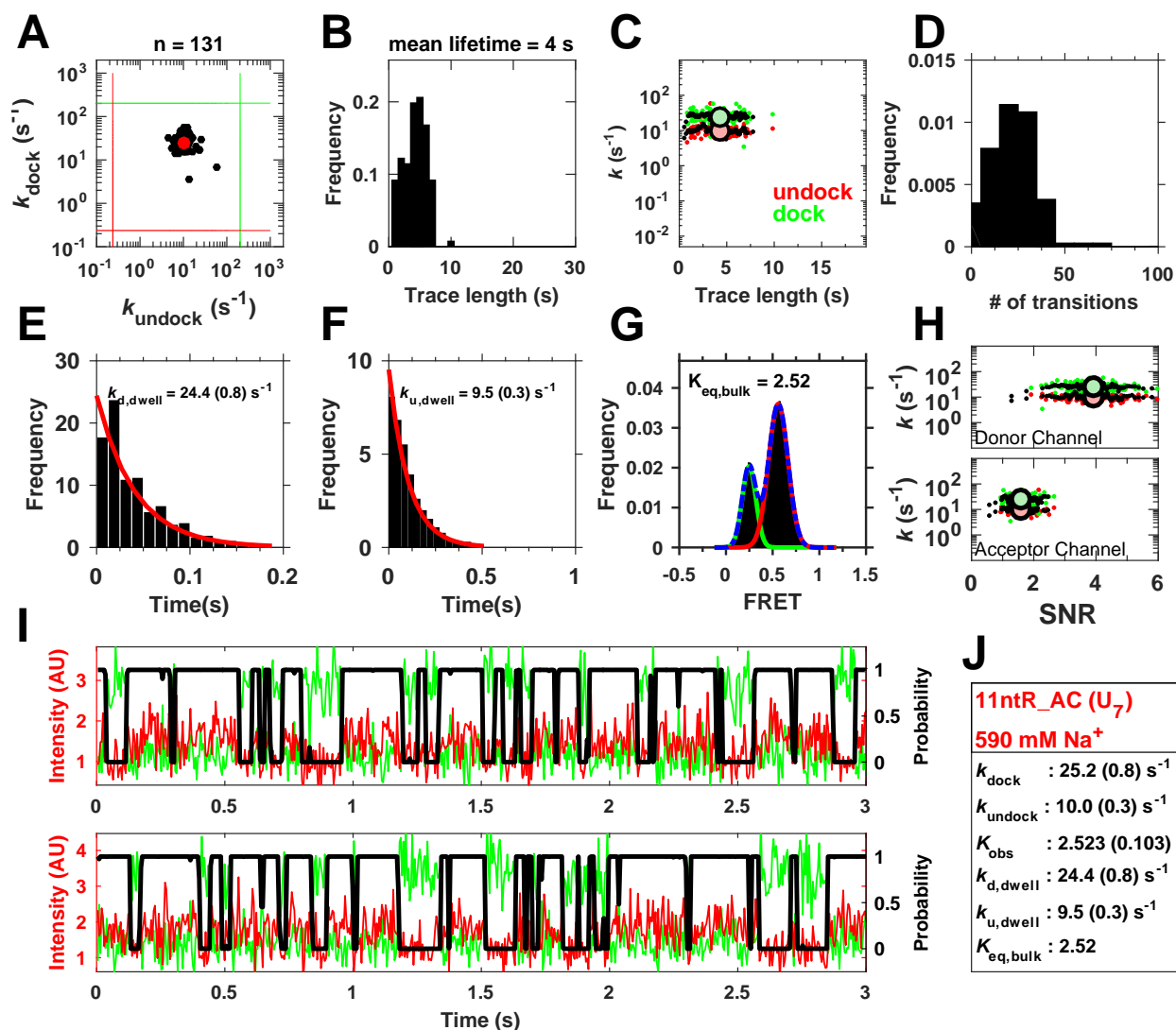


Figure S215. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

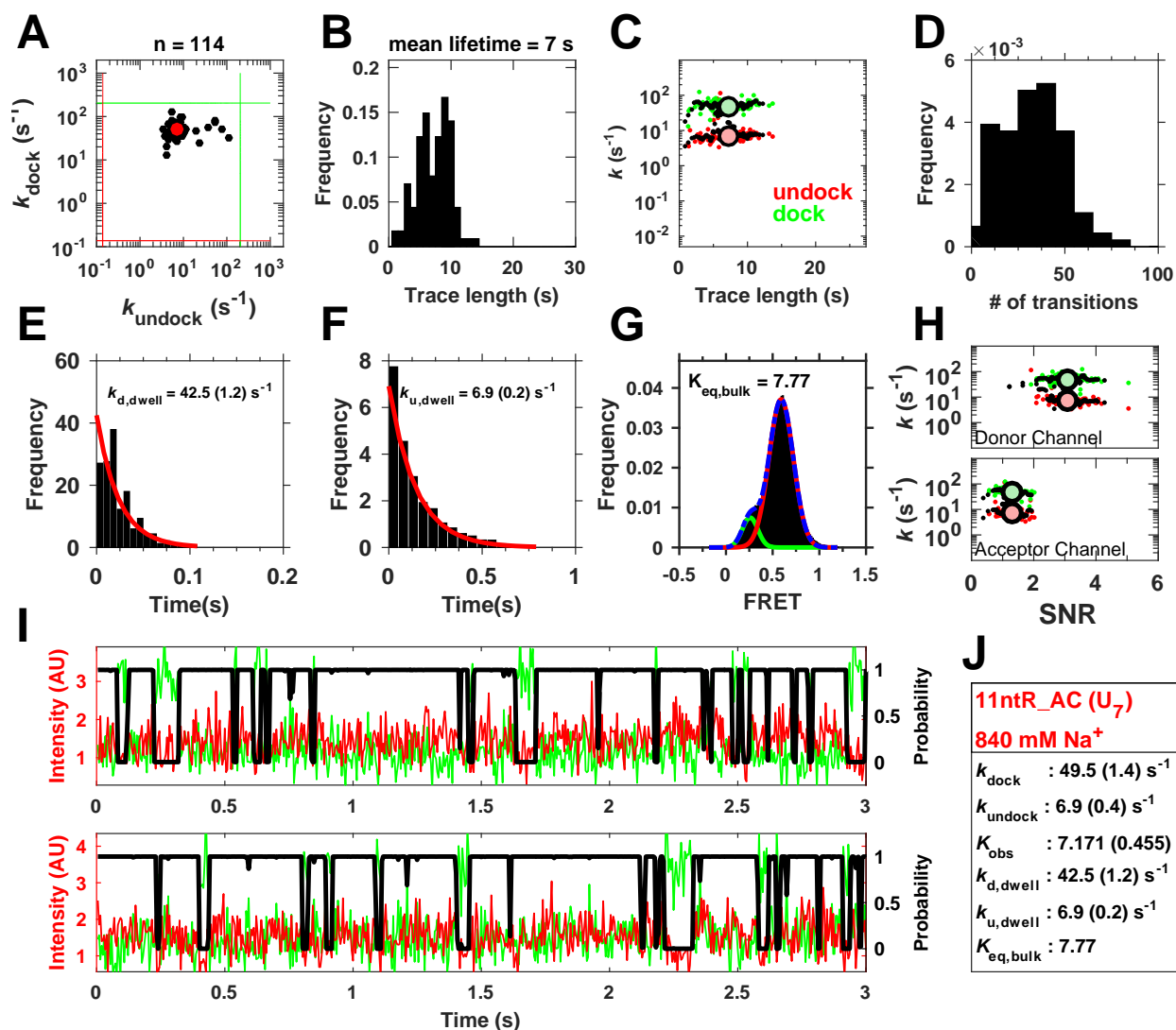


Figure S216. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

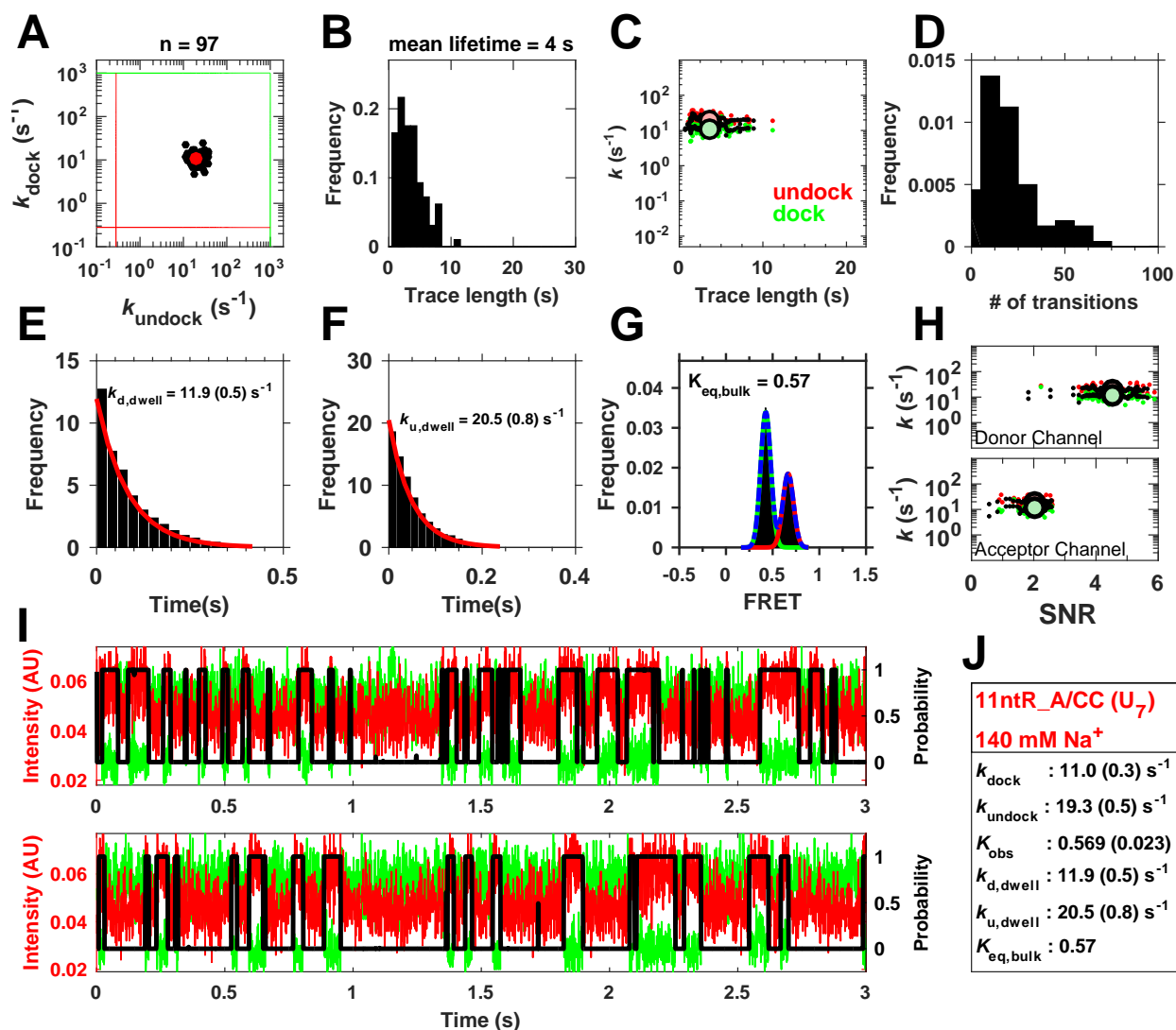


Figure S217. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

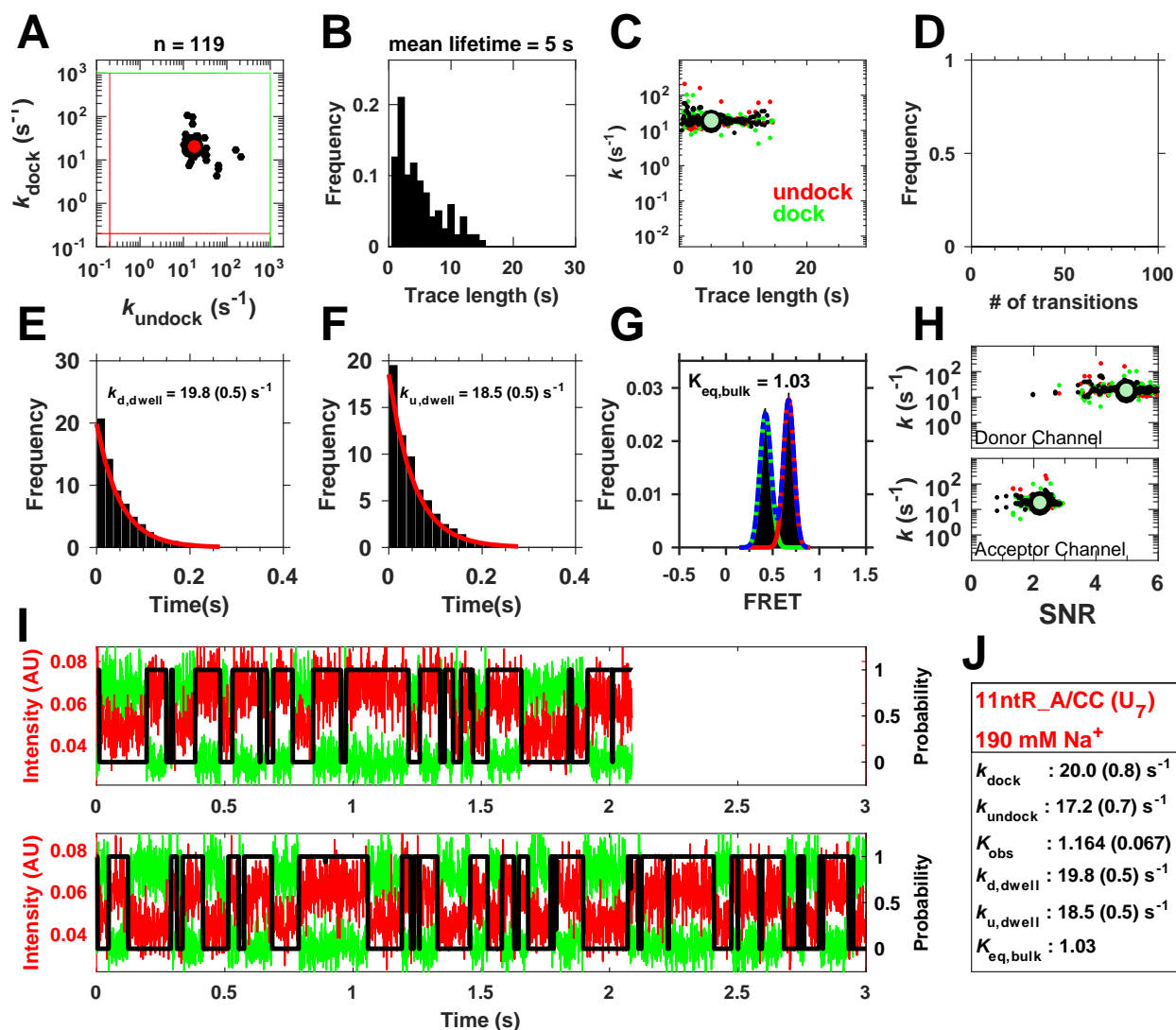


Figure S218. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

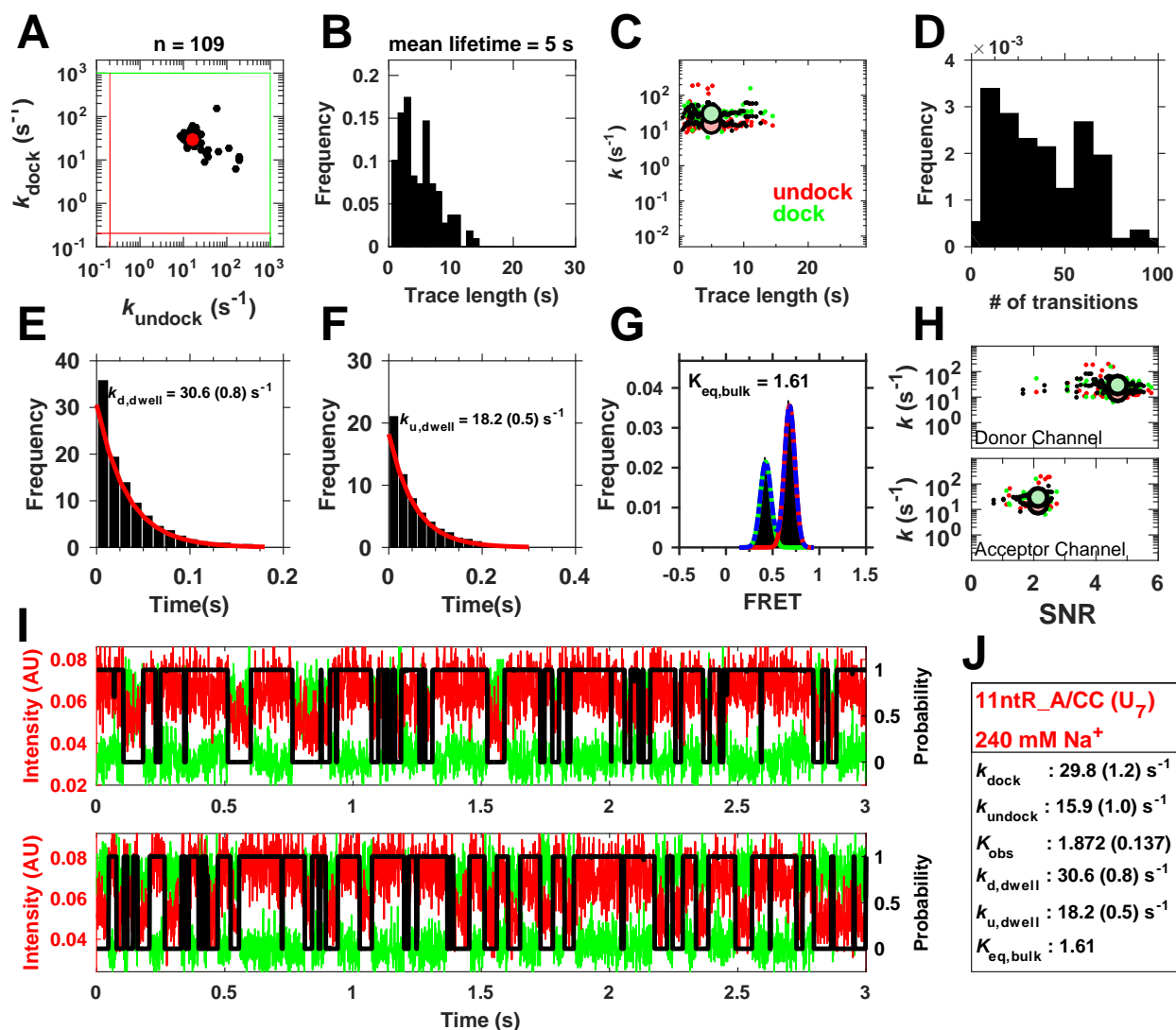


Figure S219. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

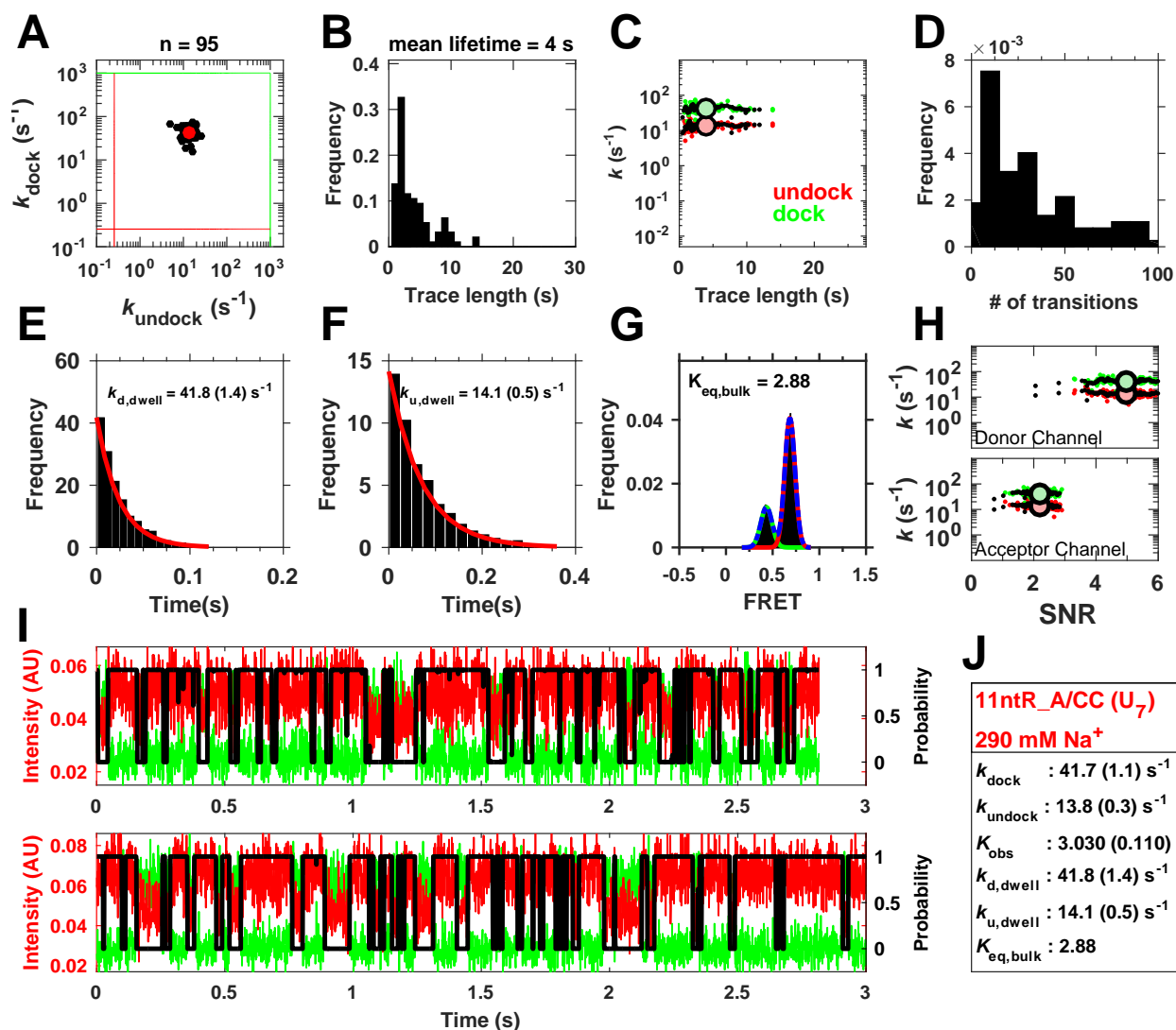


Figure S220. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

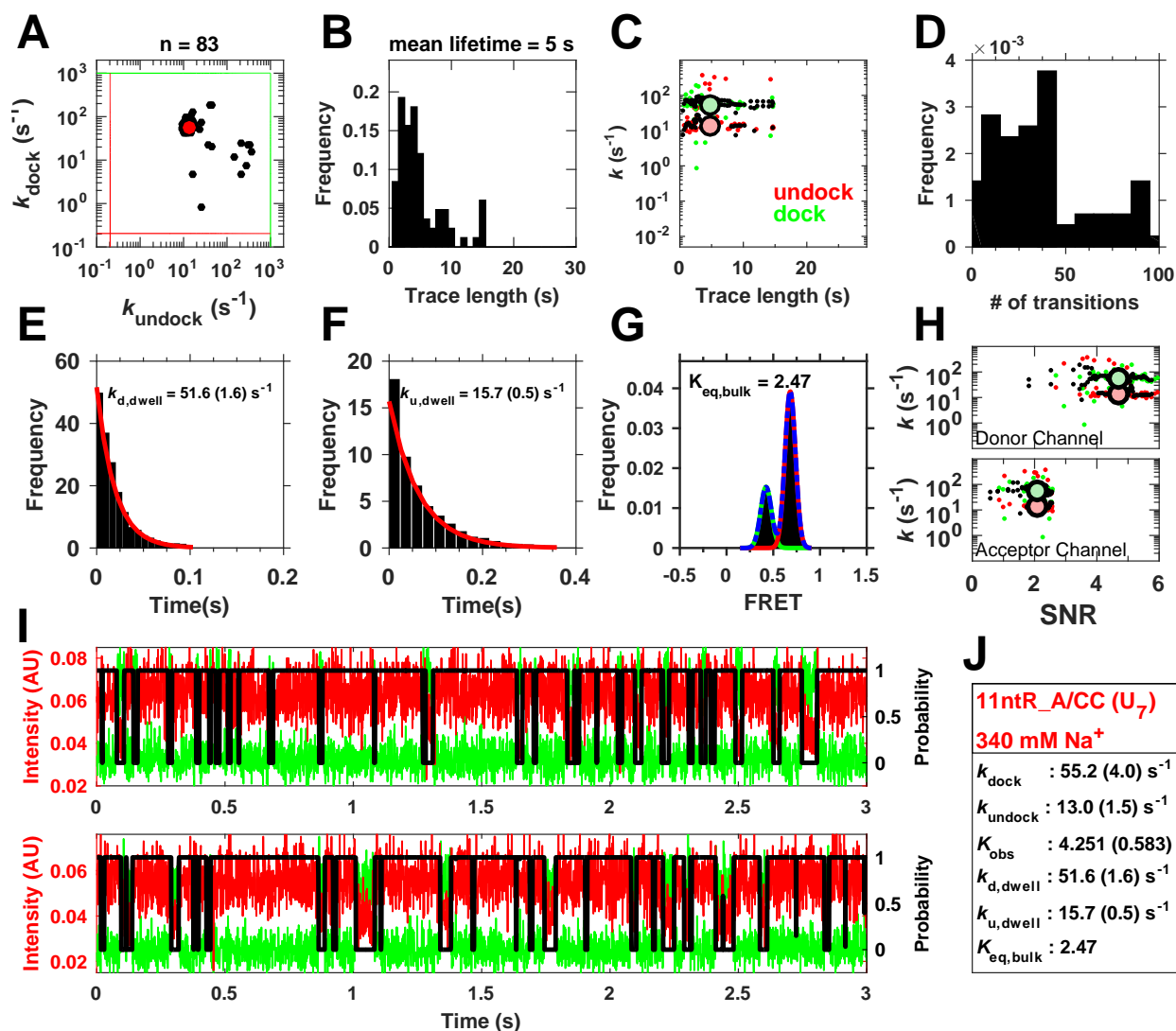


Figure S221. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

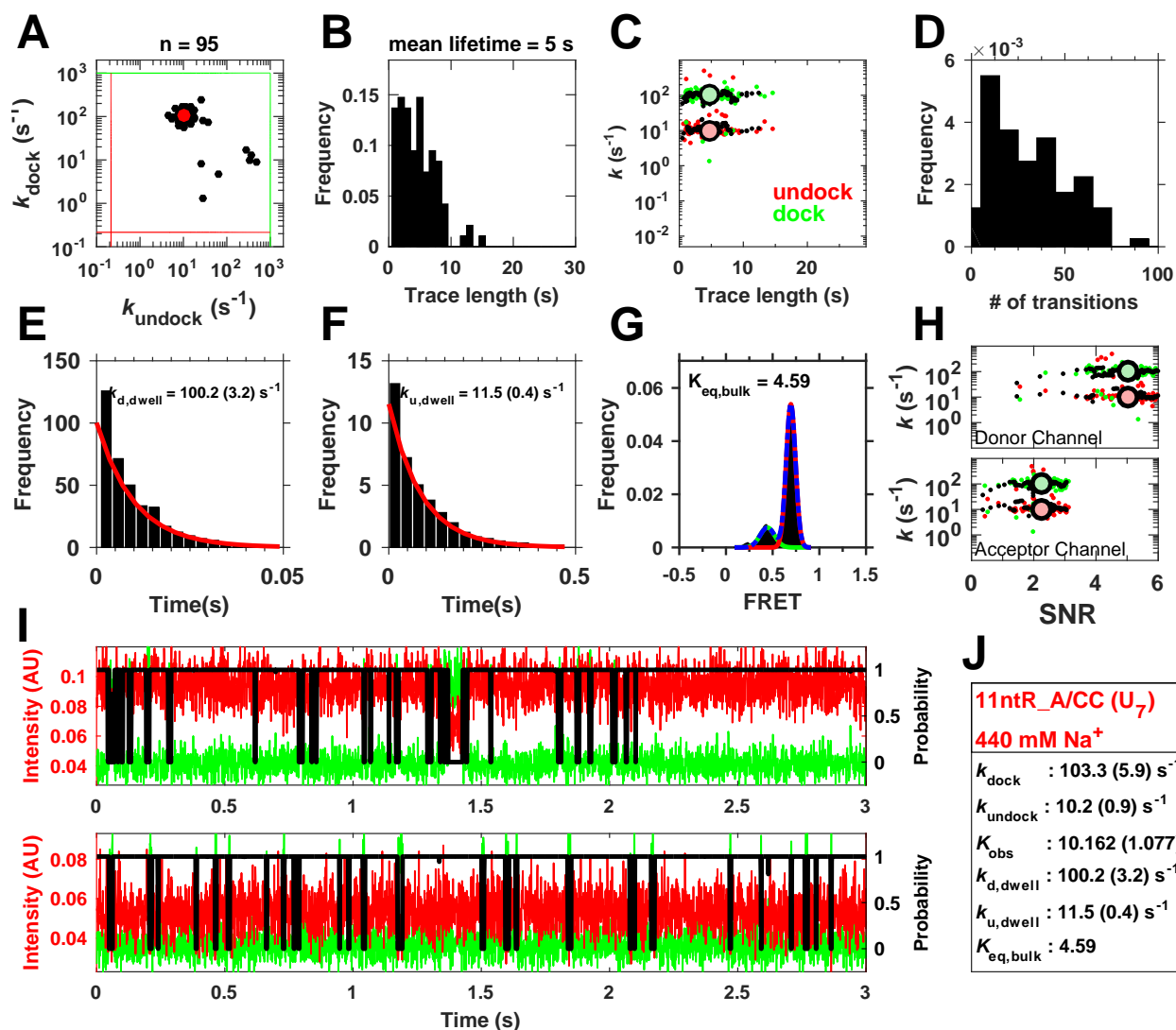


Figure S222. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

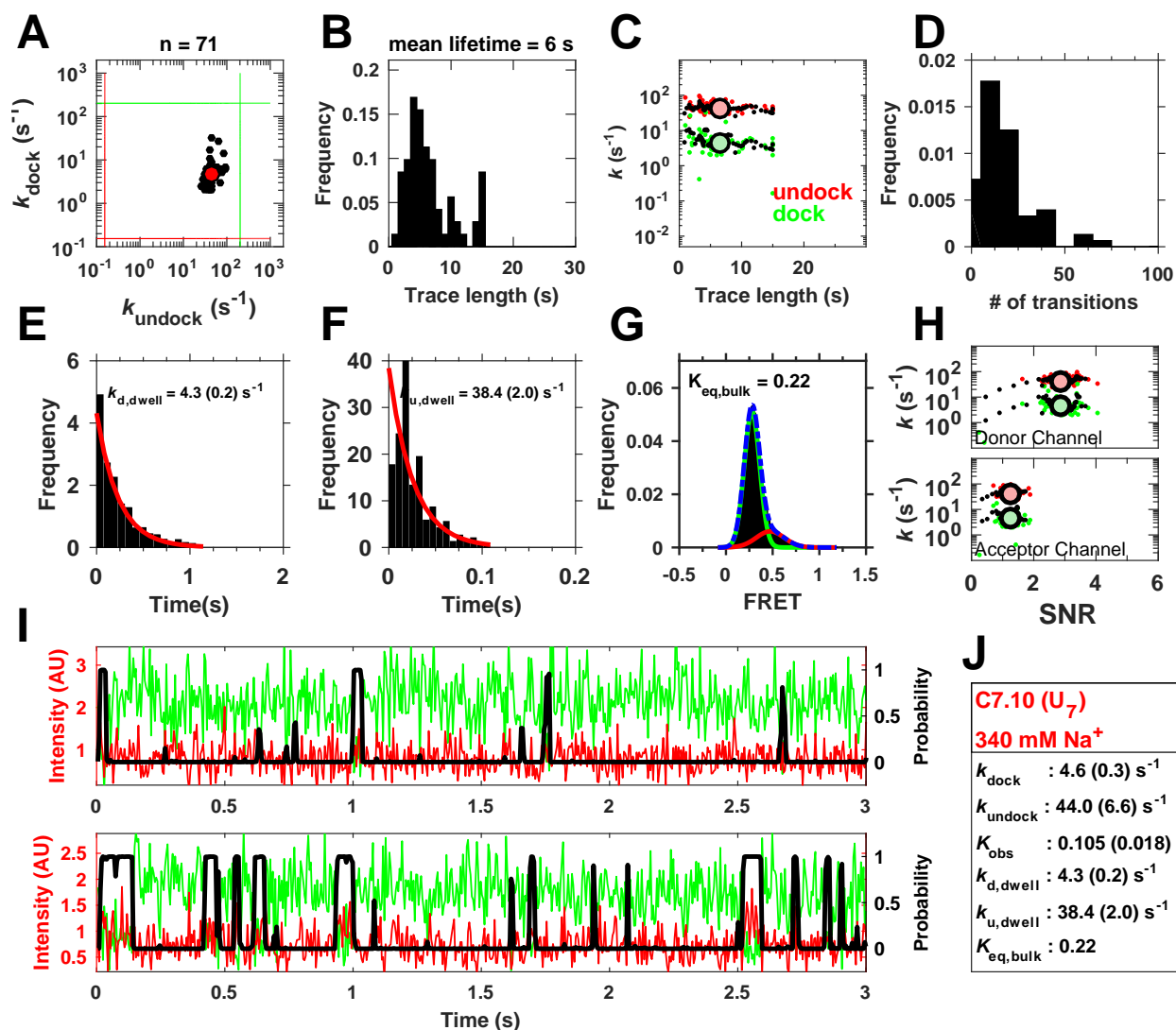


Figure S223. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

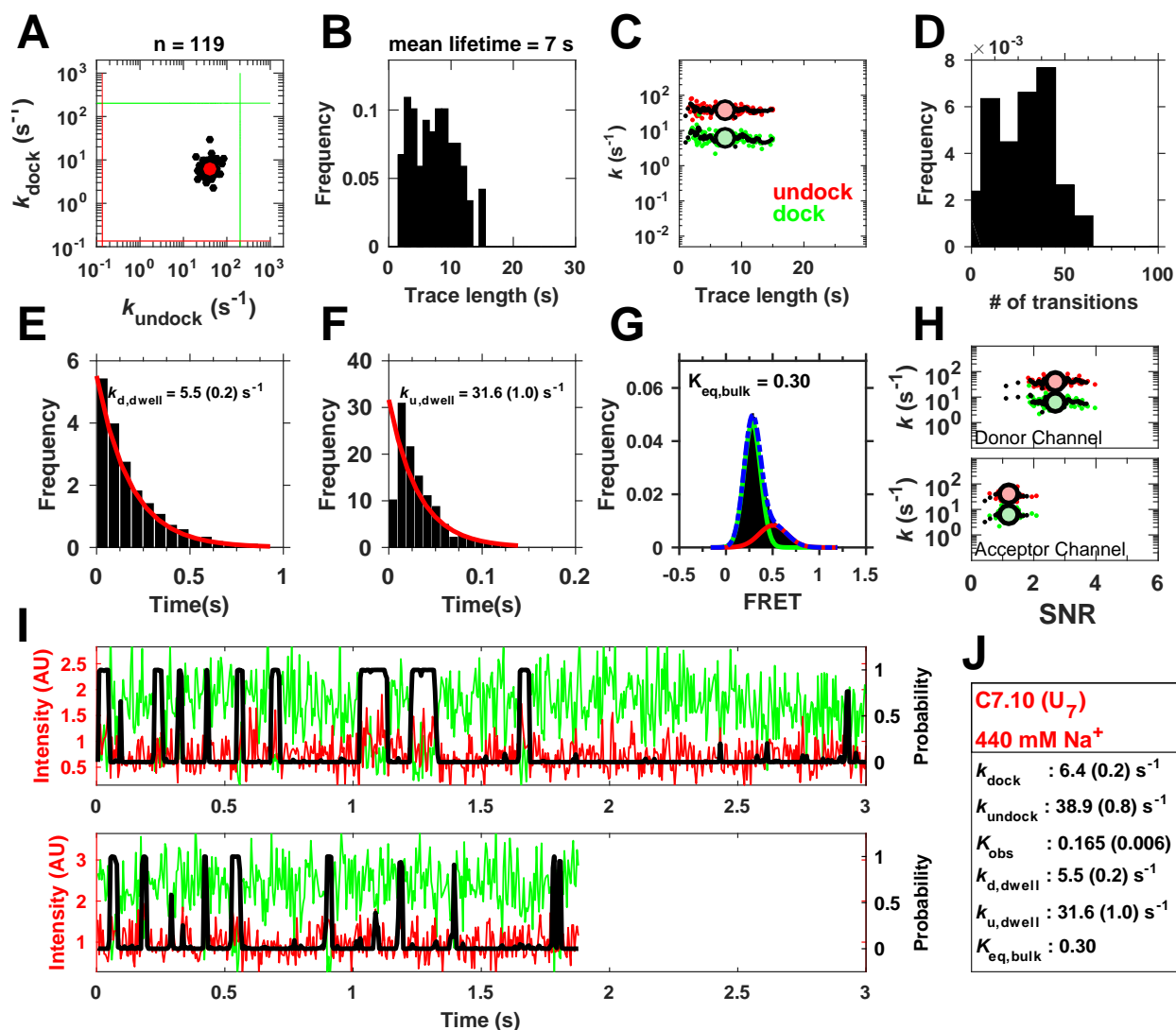


Figure S224. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

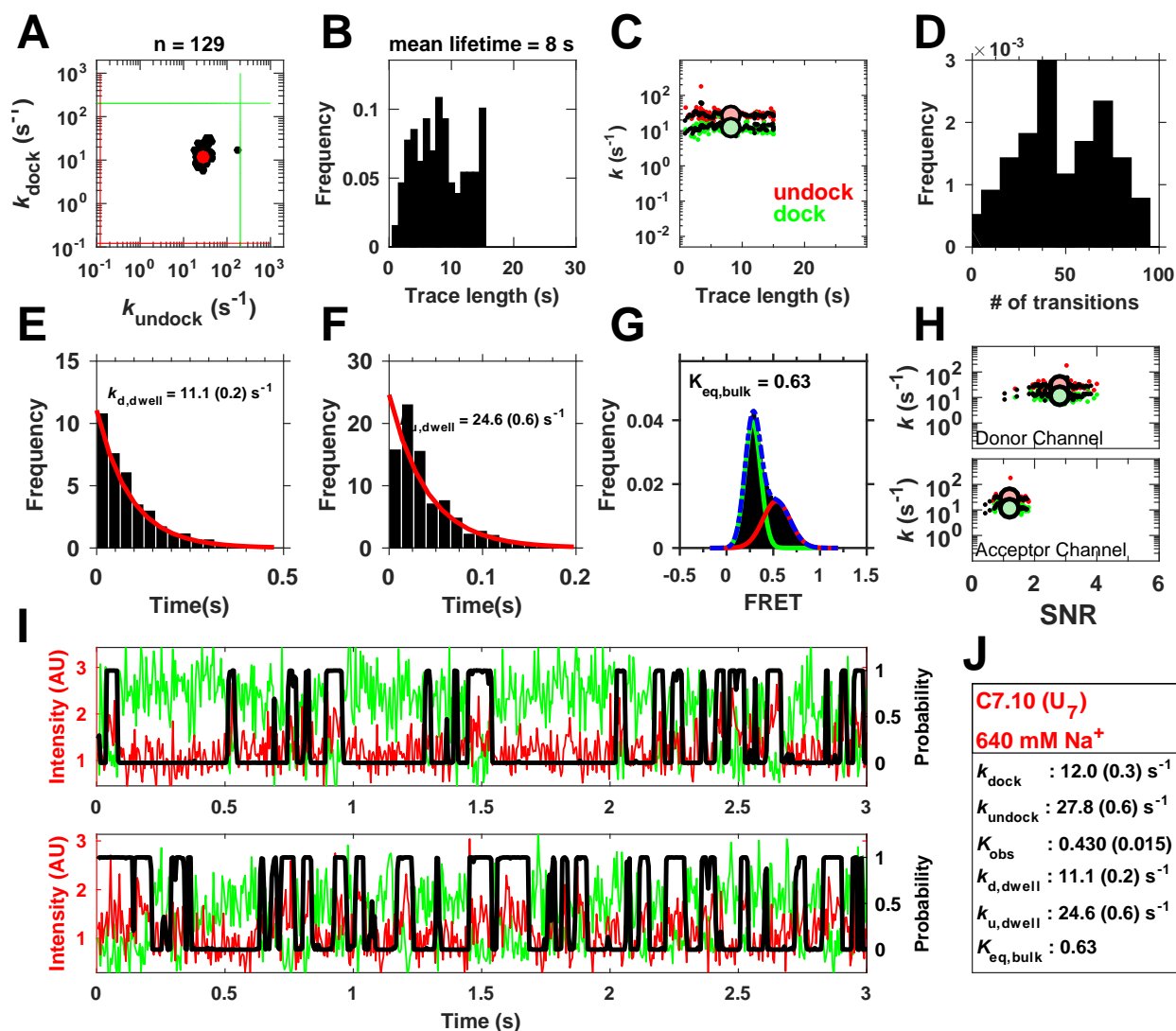


Figure S225. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

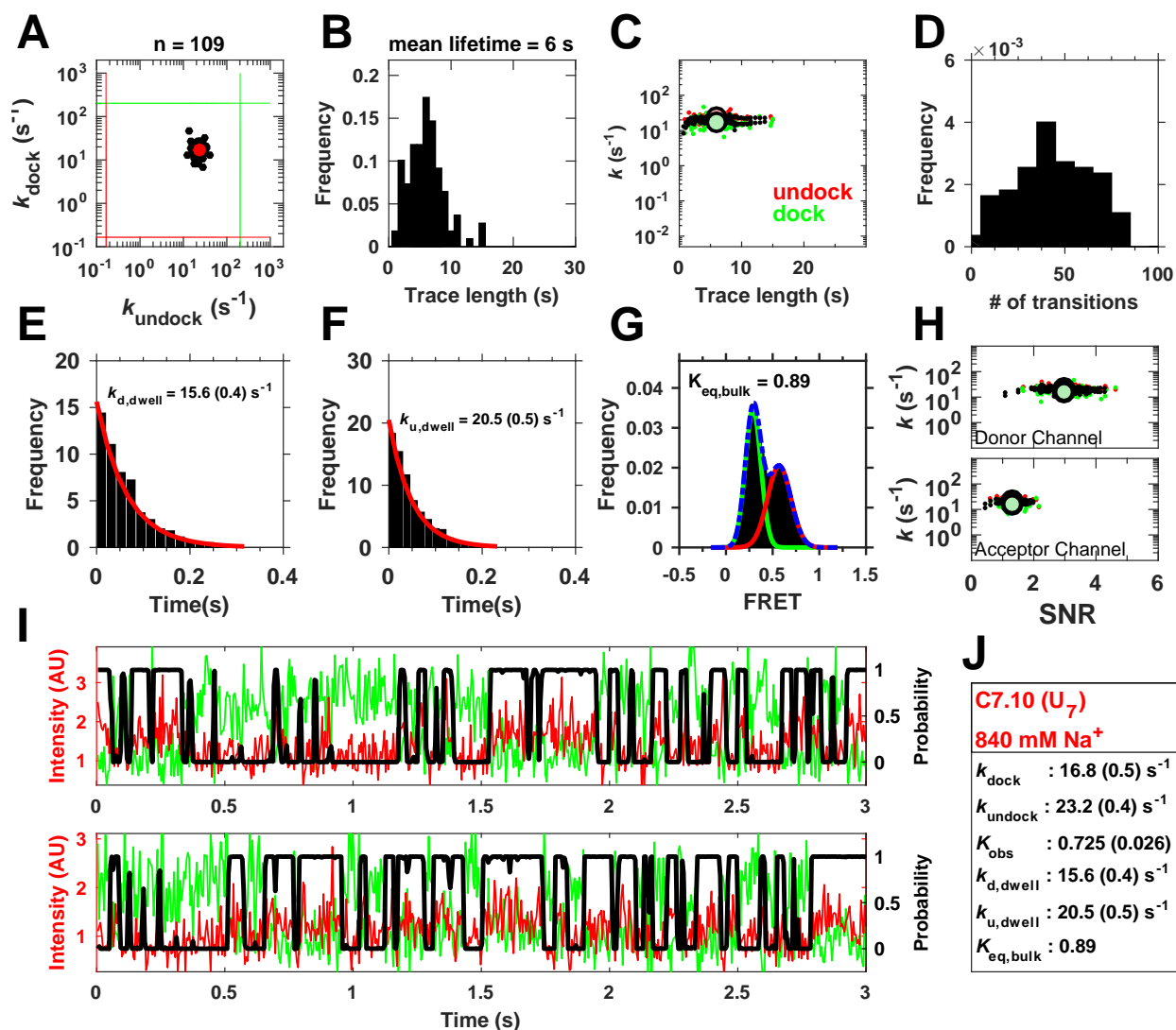


Figure S226. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

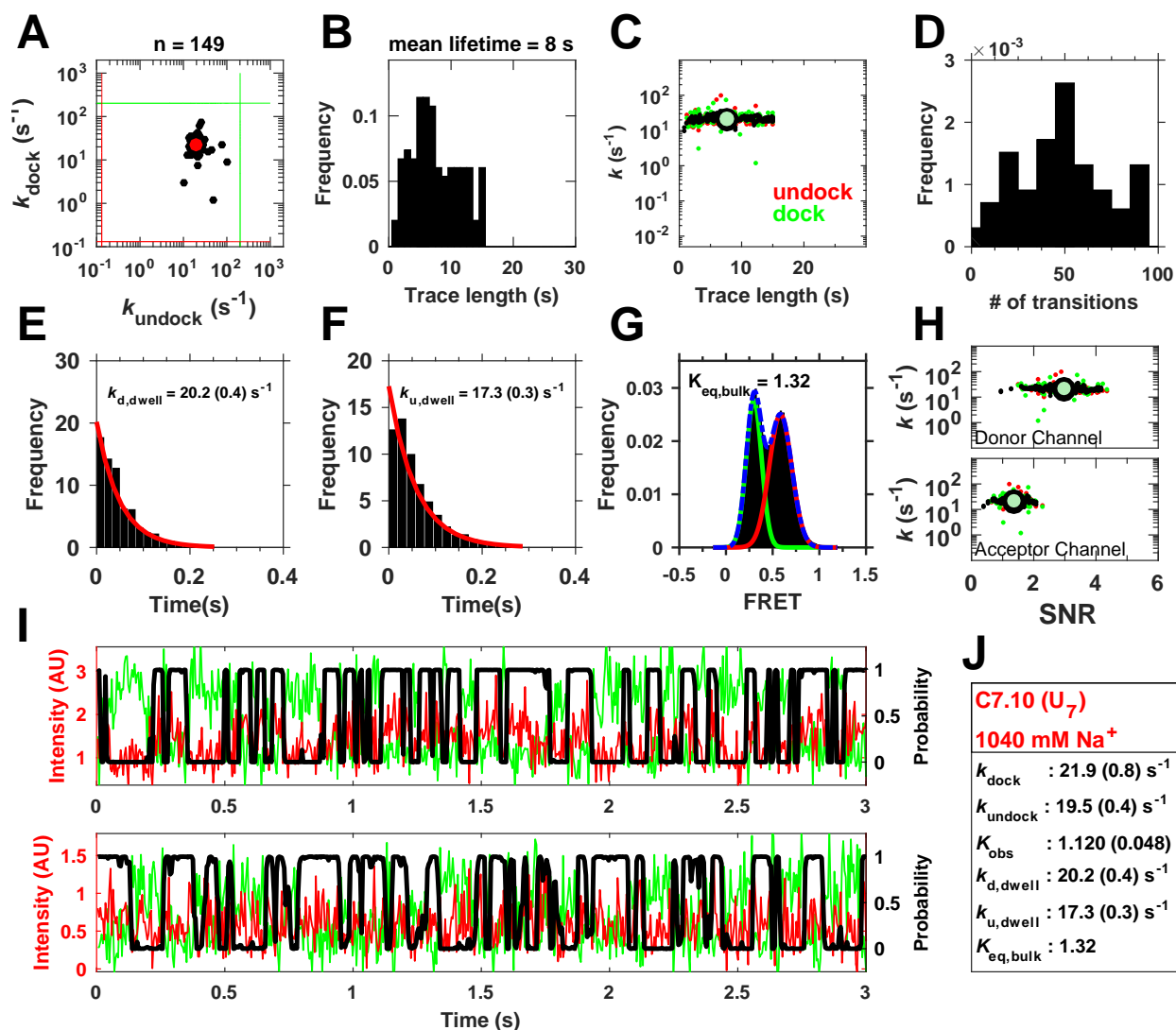


Figure S227. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

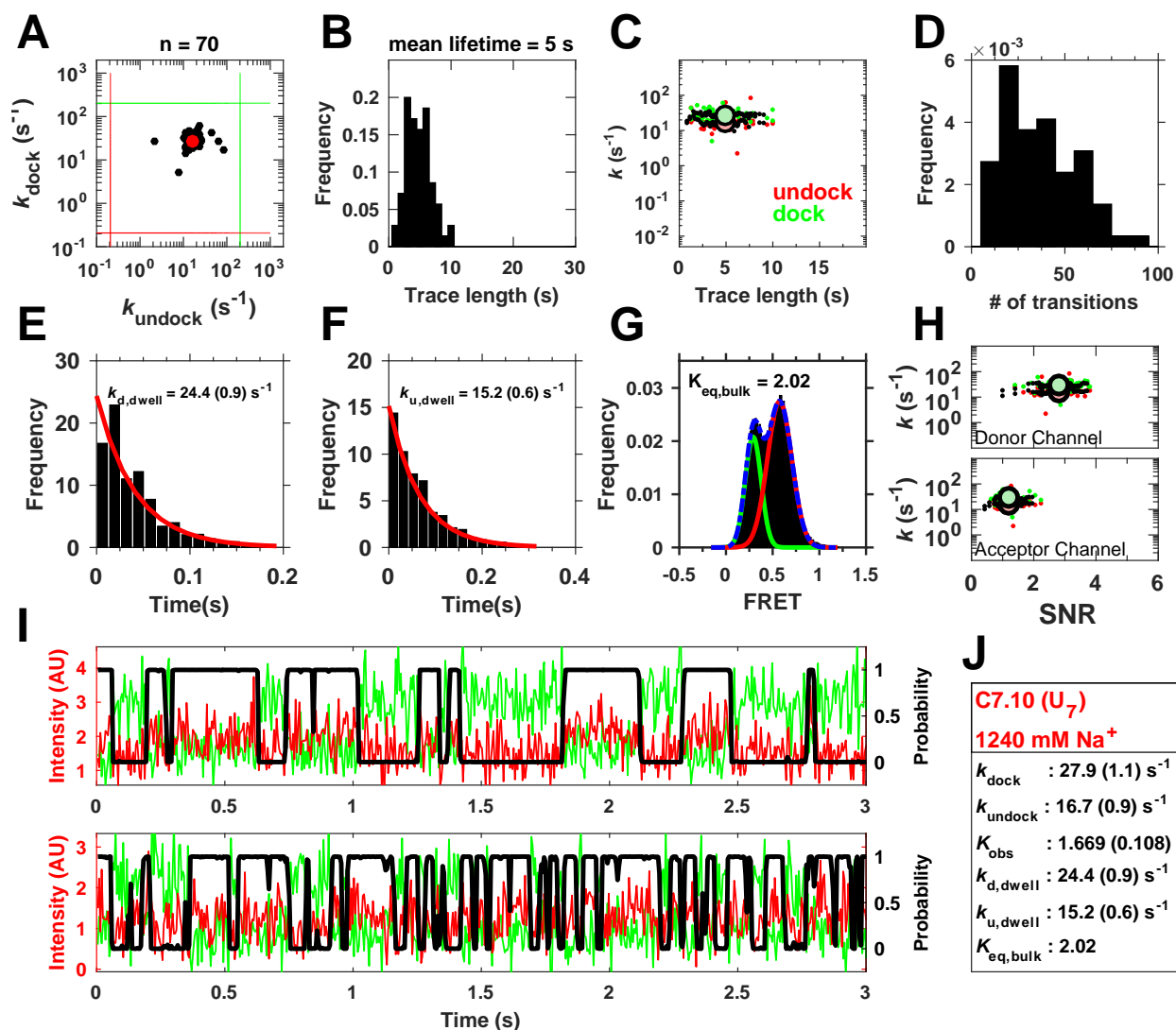


Figure S228. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

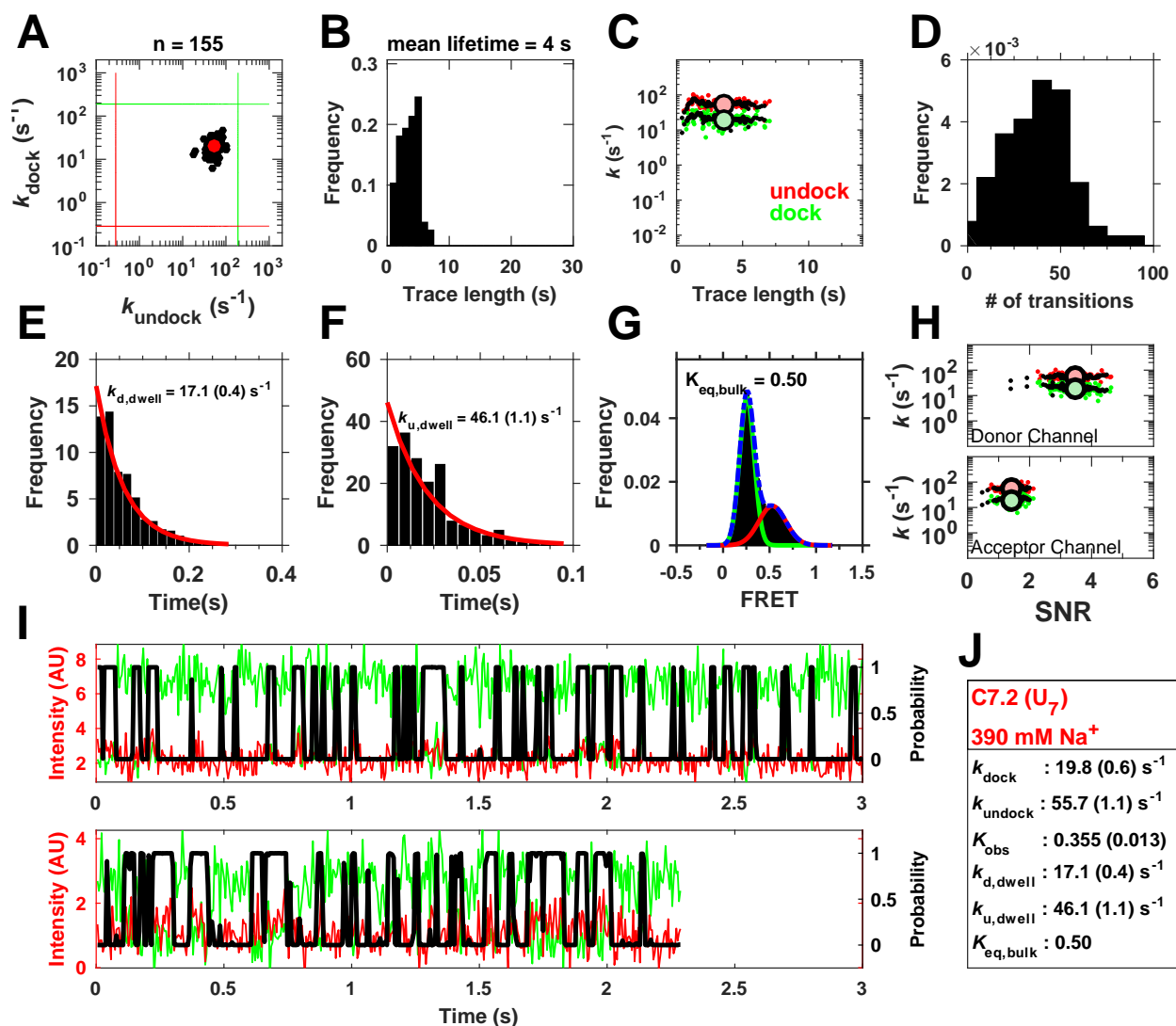


Figure S229. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

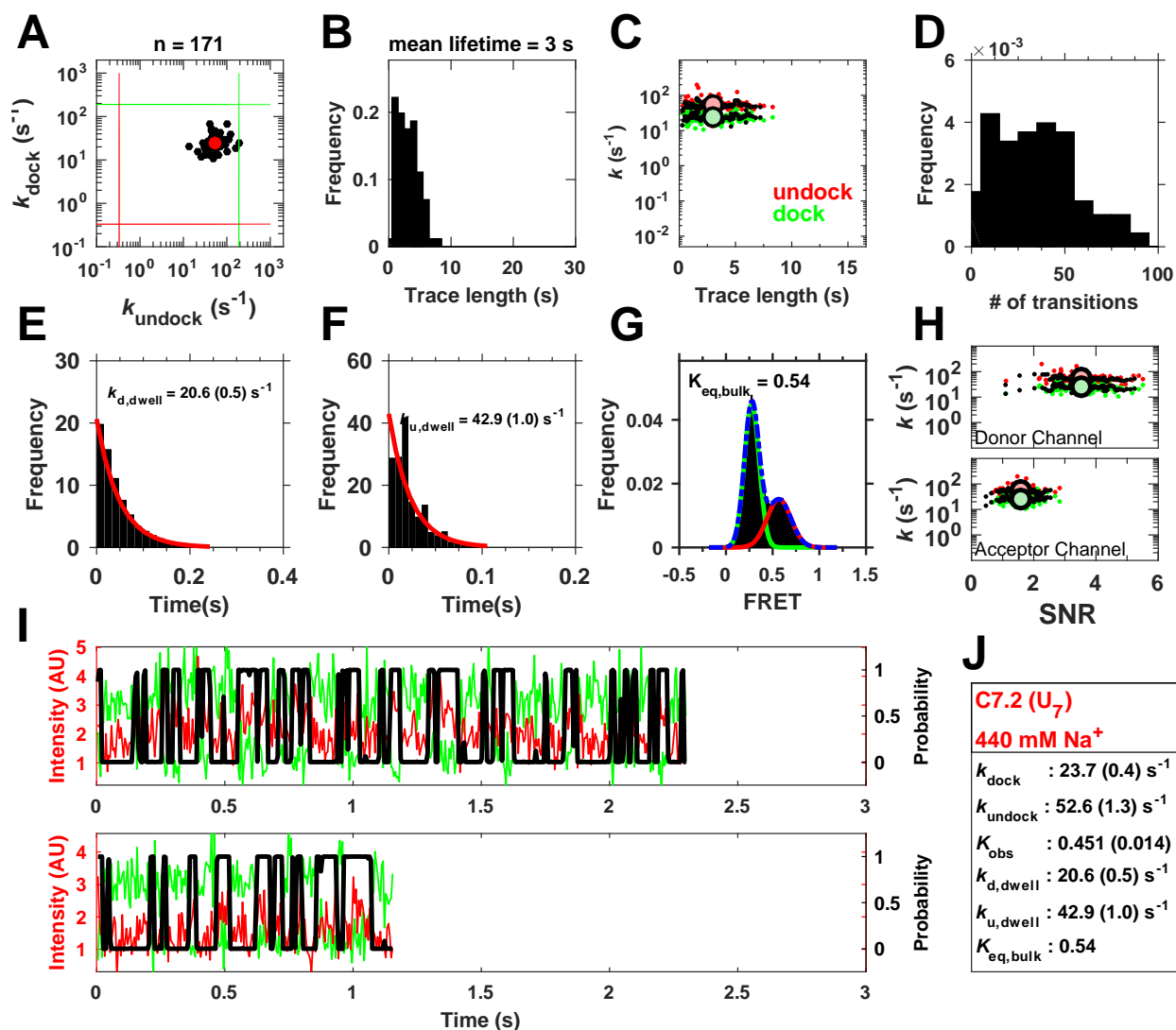


Figure S230. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

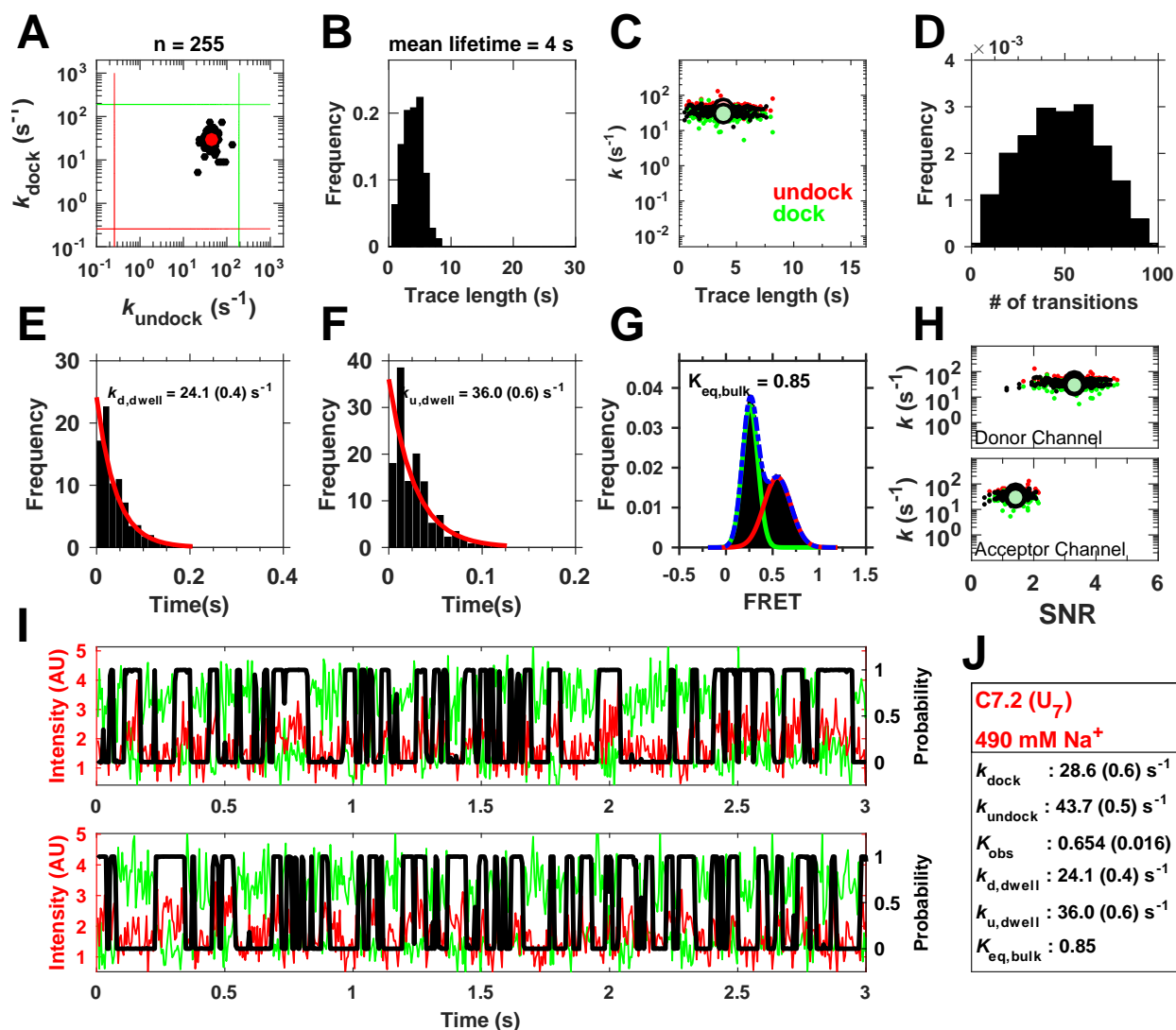


Figure S231. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

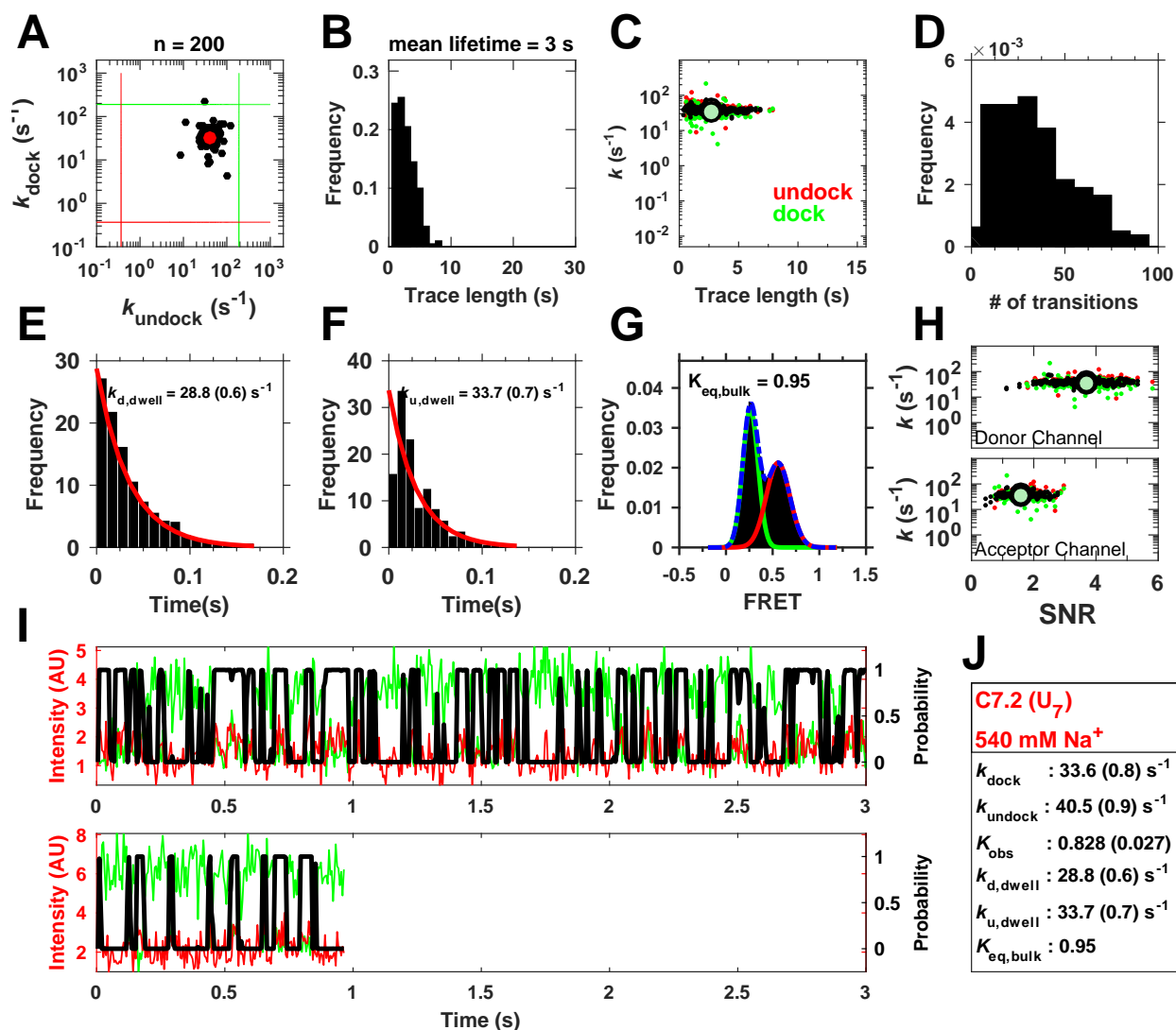


Figure S232. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

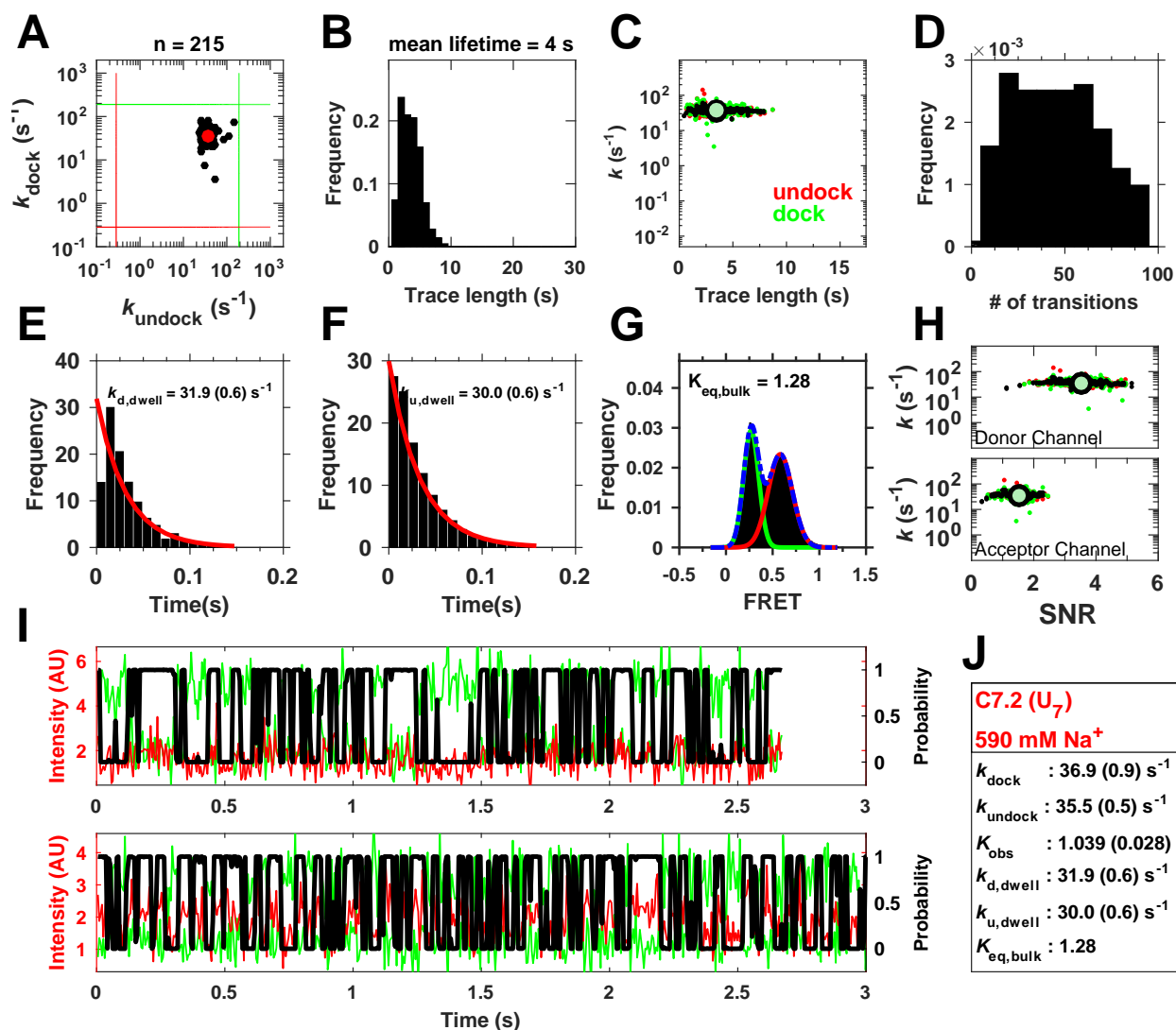


Figure S233. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

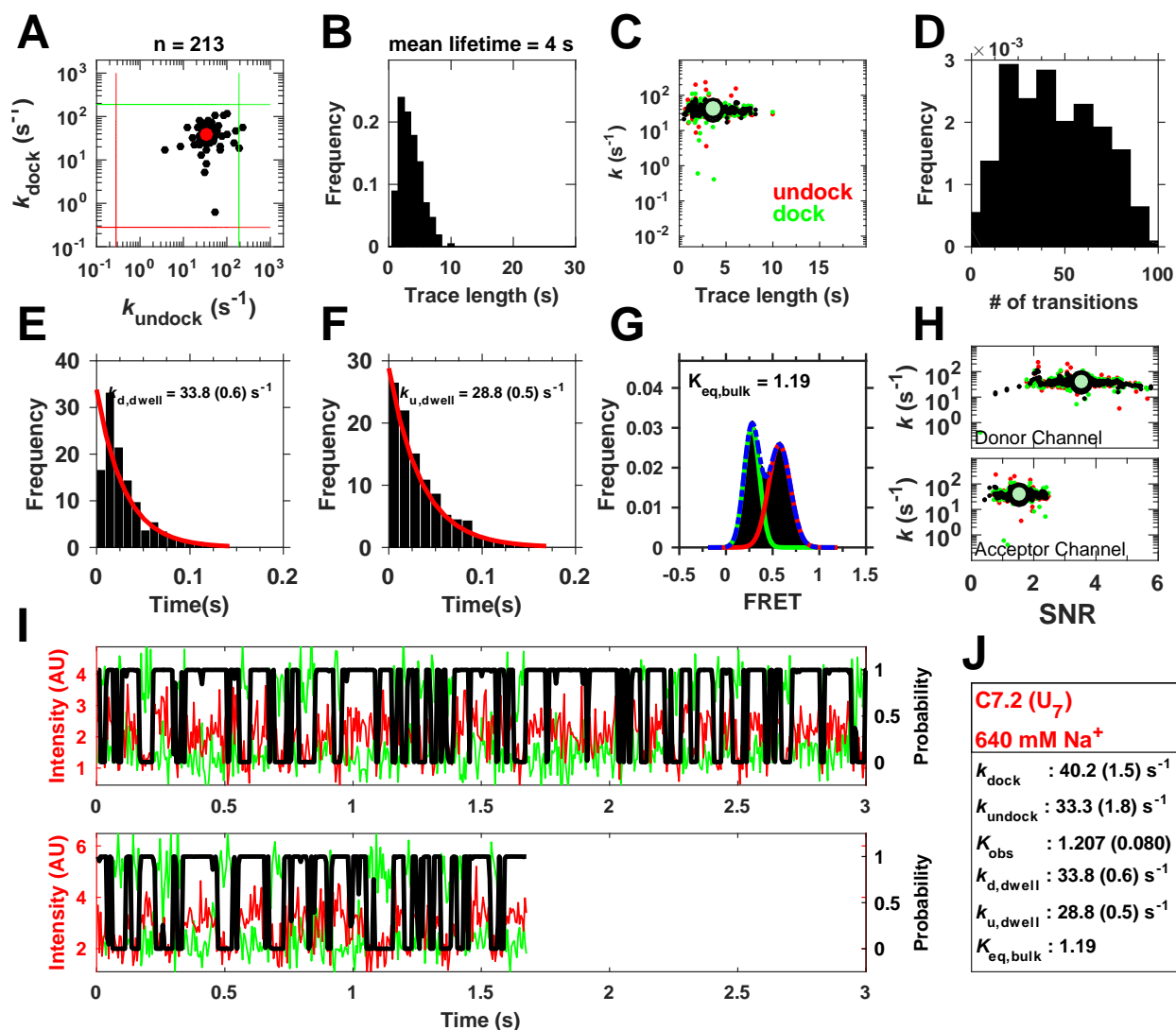


Figure S234. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

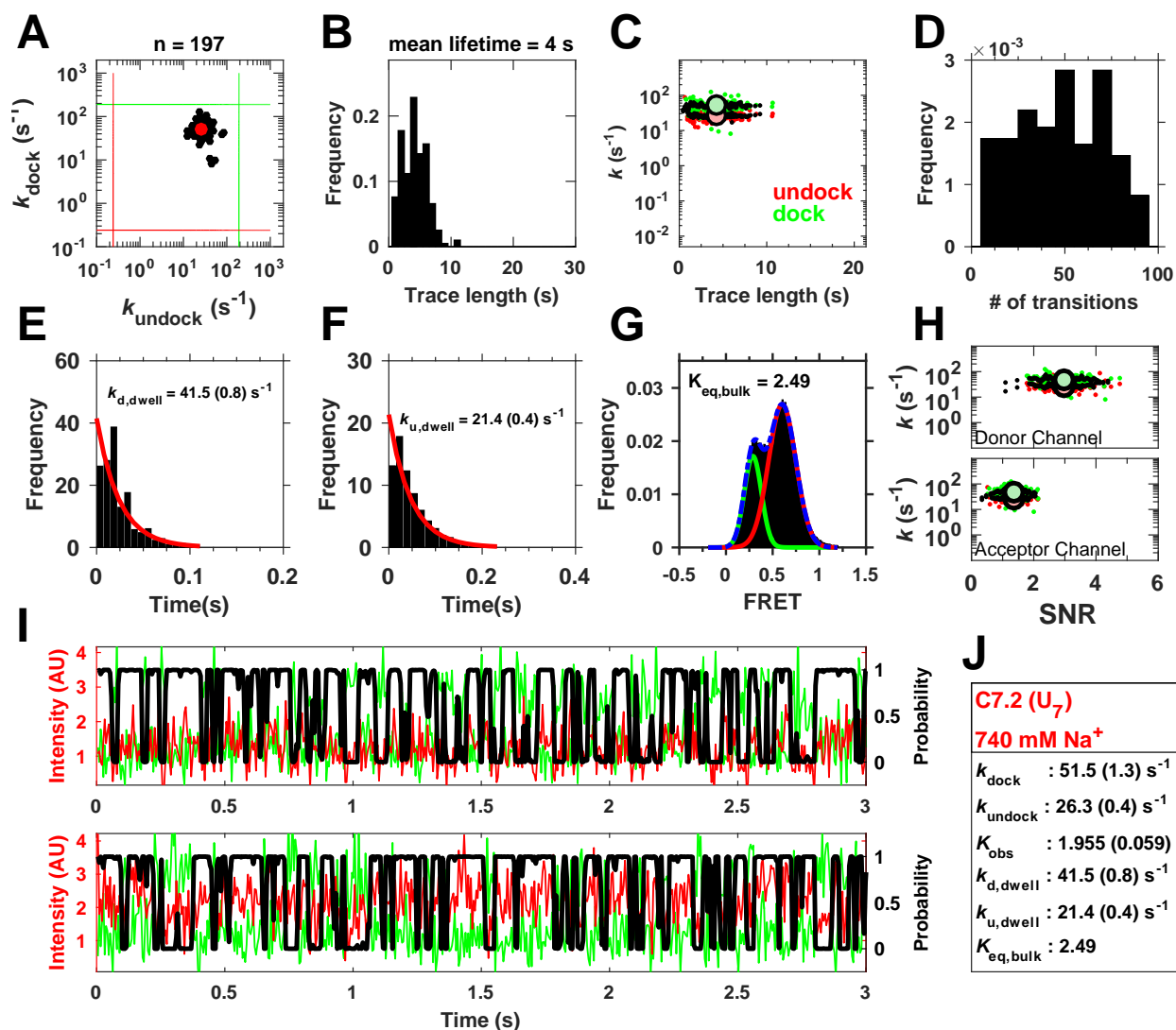


Figure S235. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

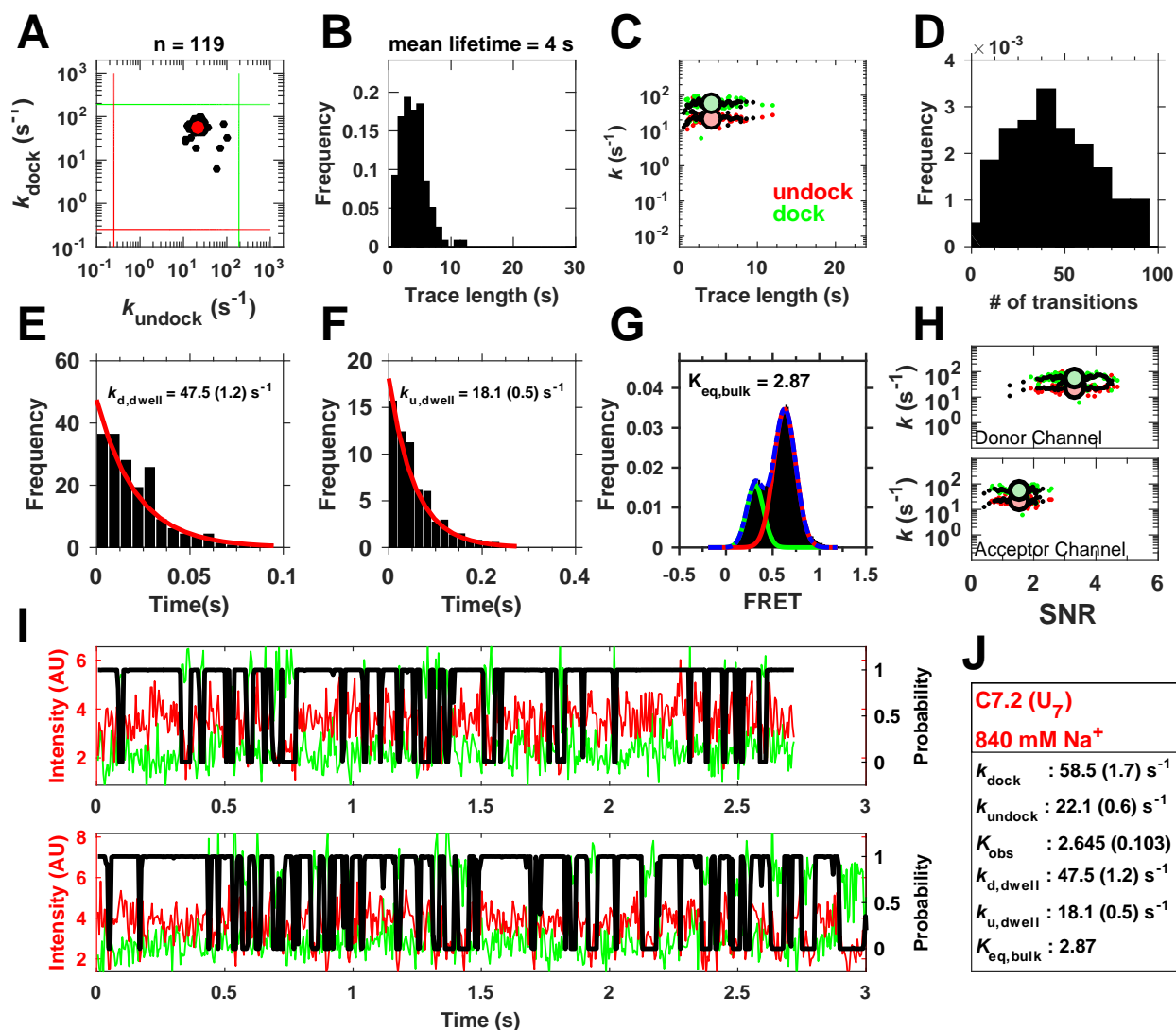


Figure S236. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

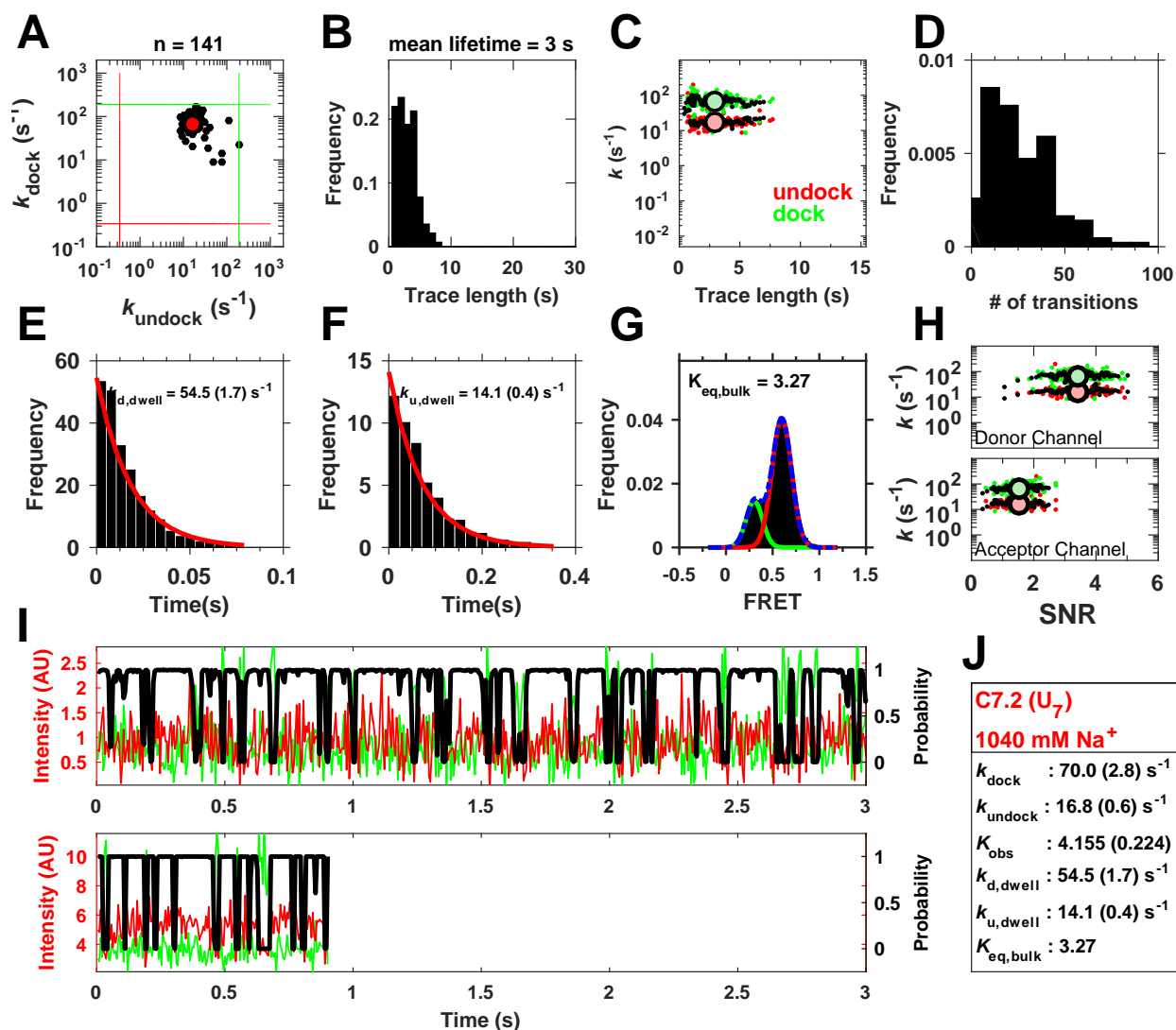


Figure S237. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

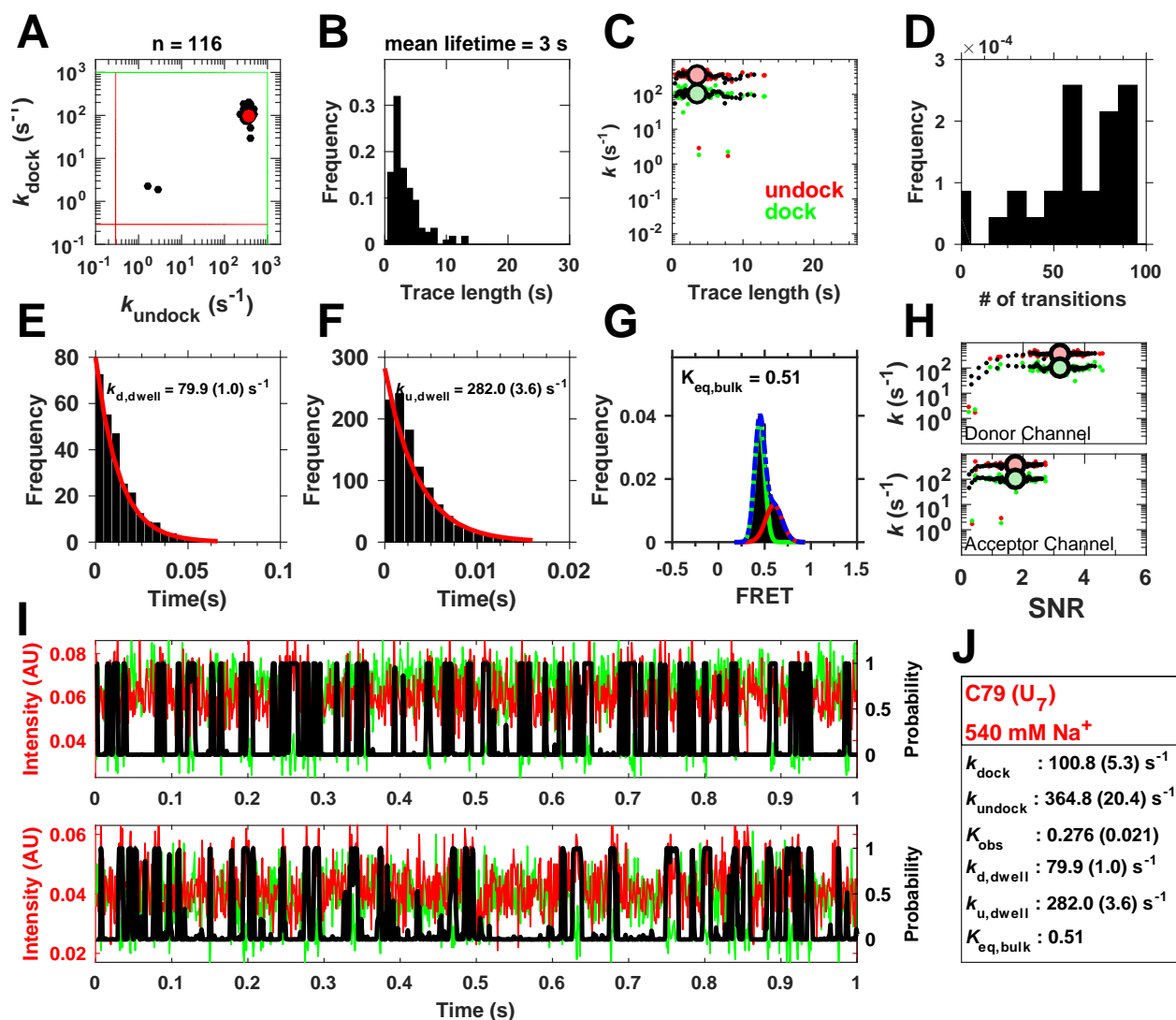


Figure S238. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

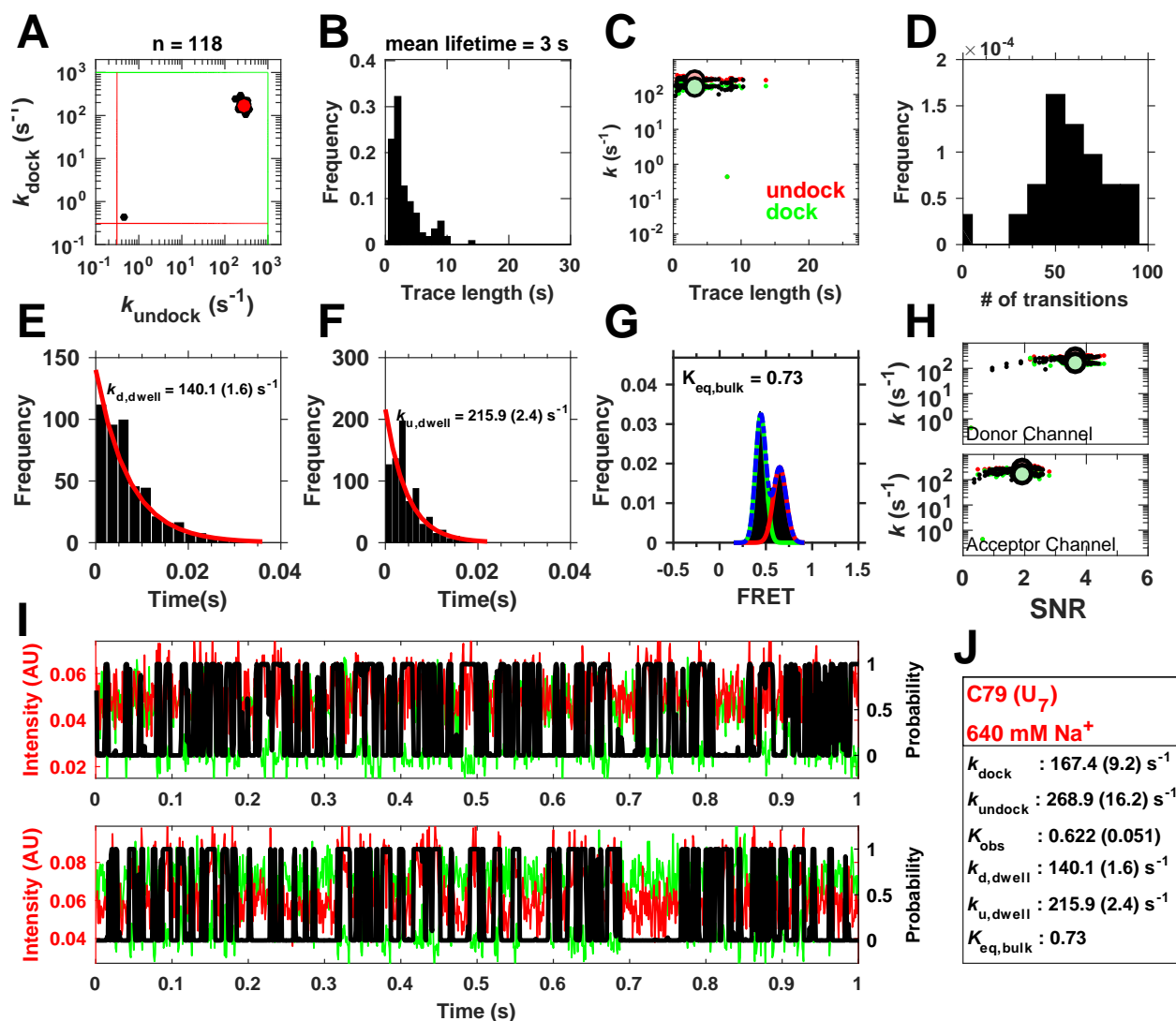


Figure S239. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

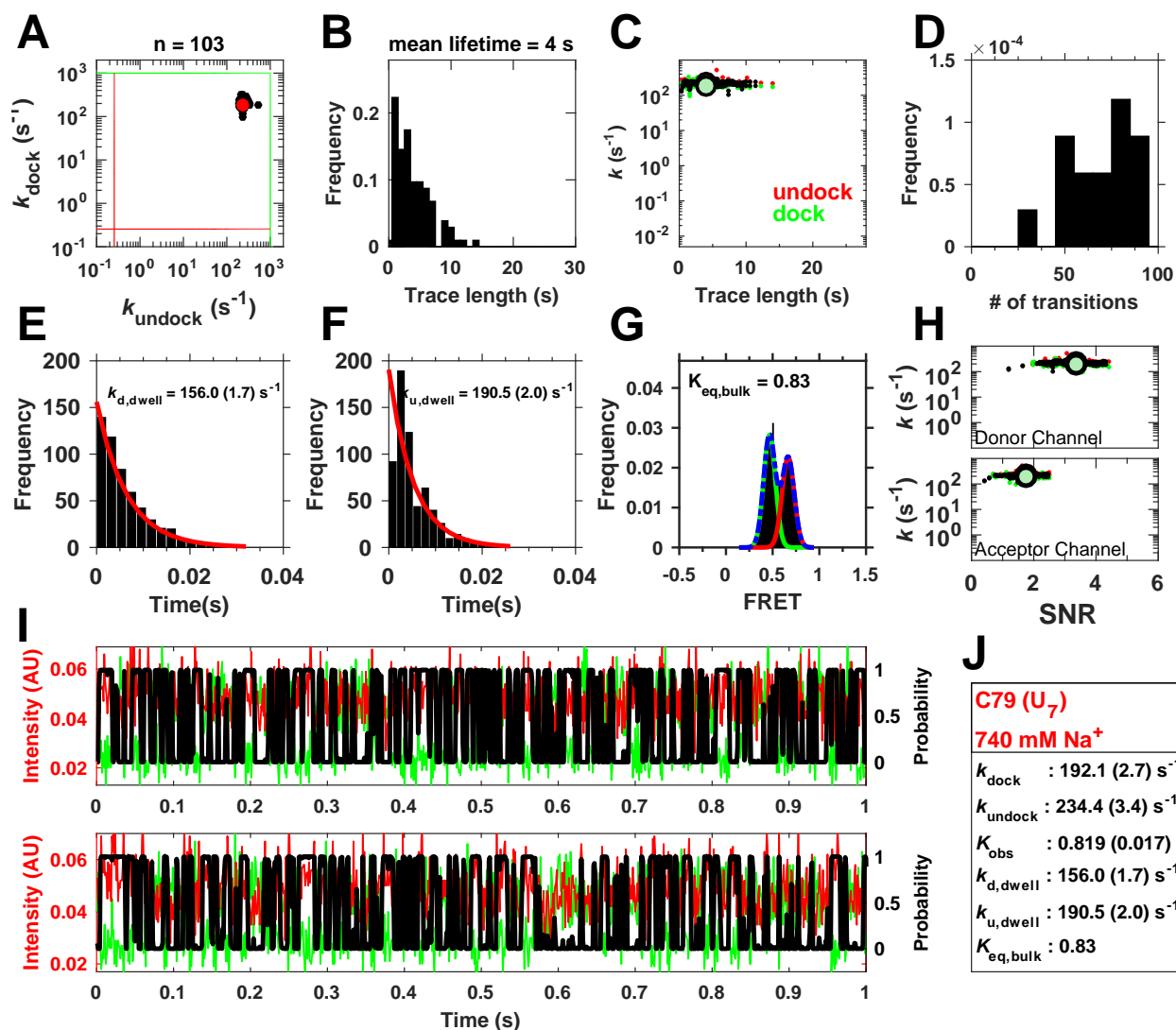


Figure S240. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

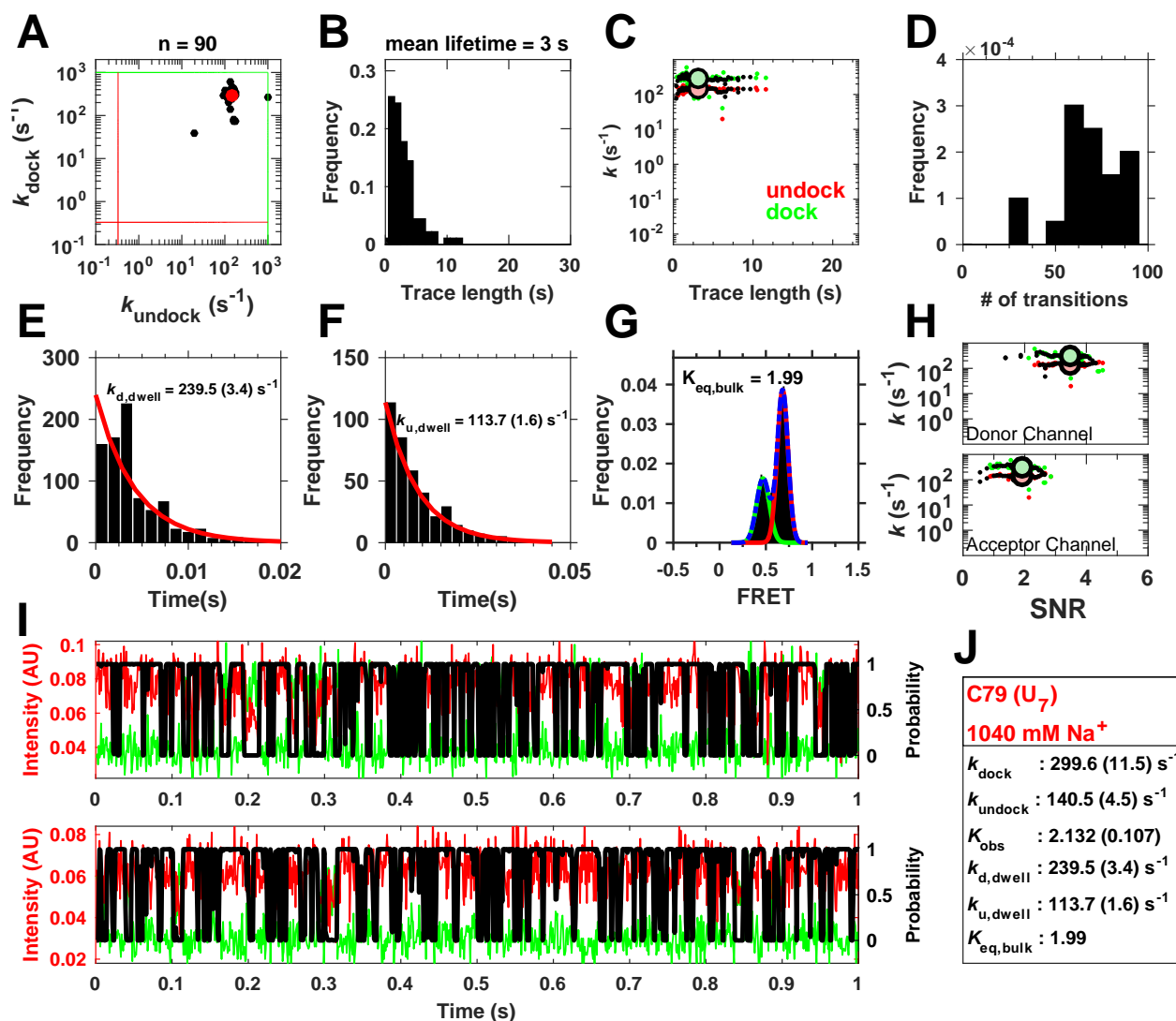


Figure S241. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

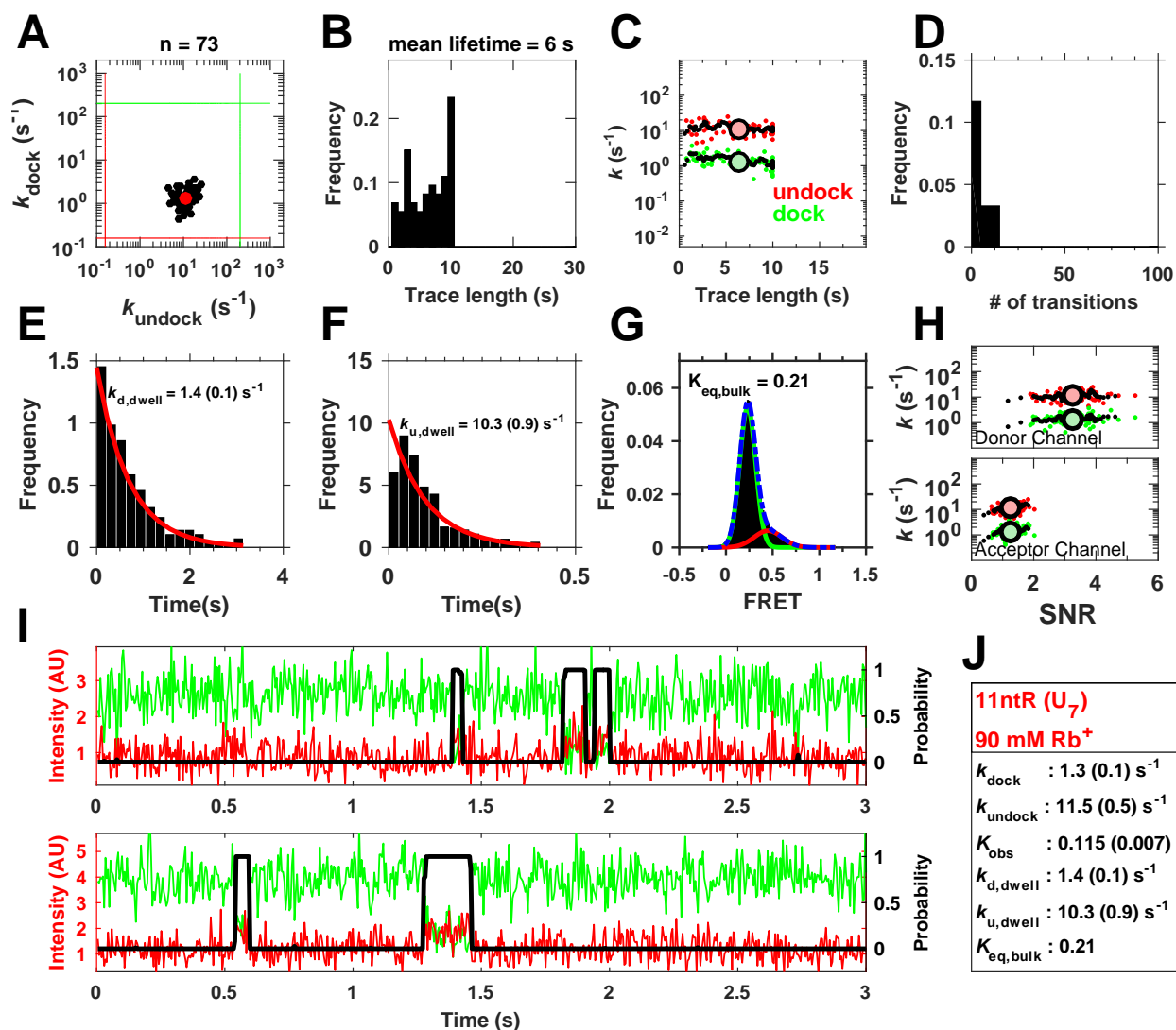


Figure S242. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

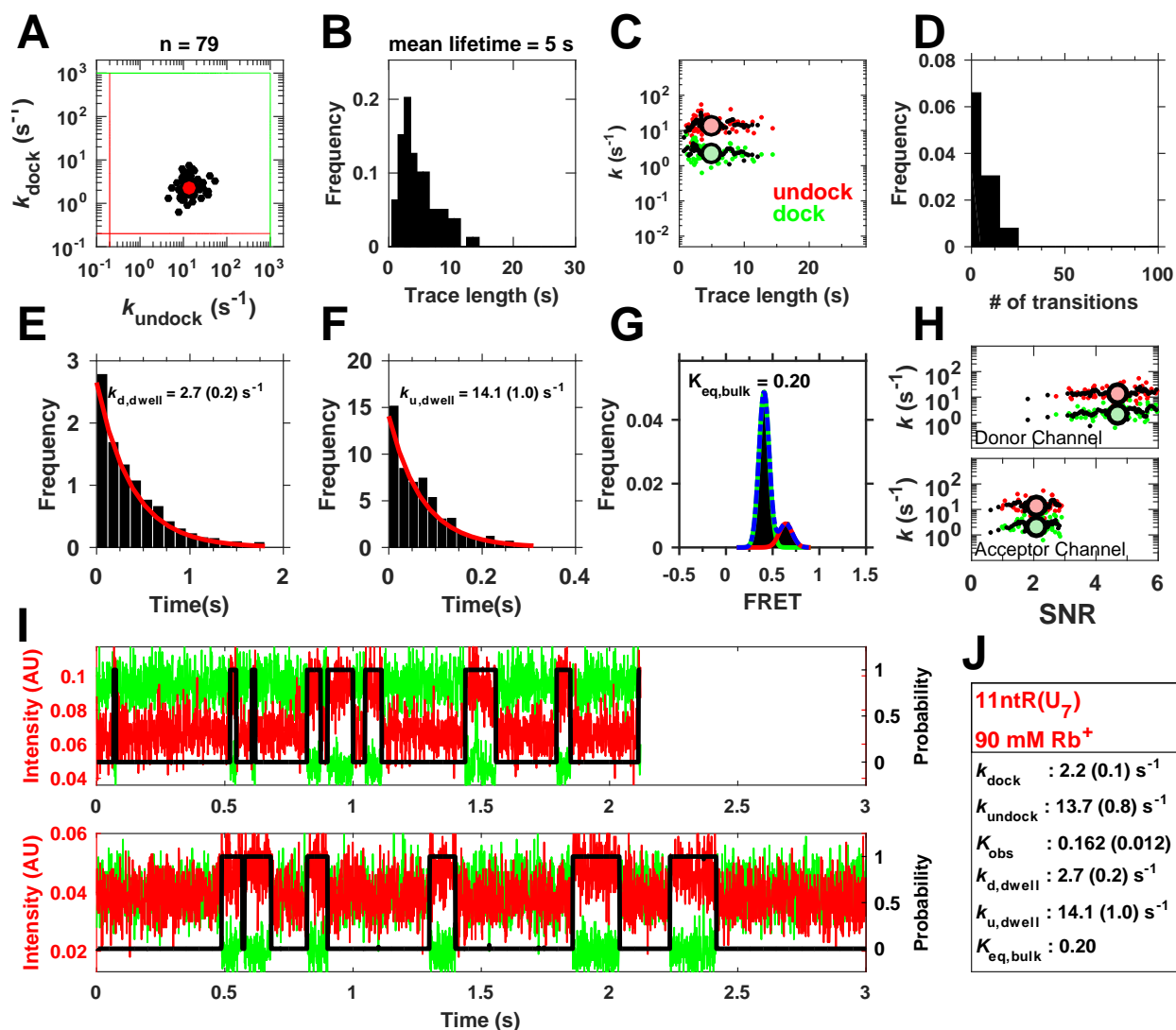


Figure S243. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

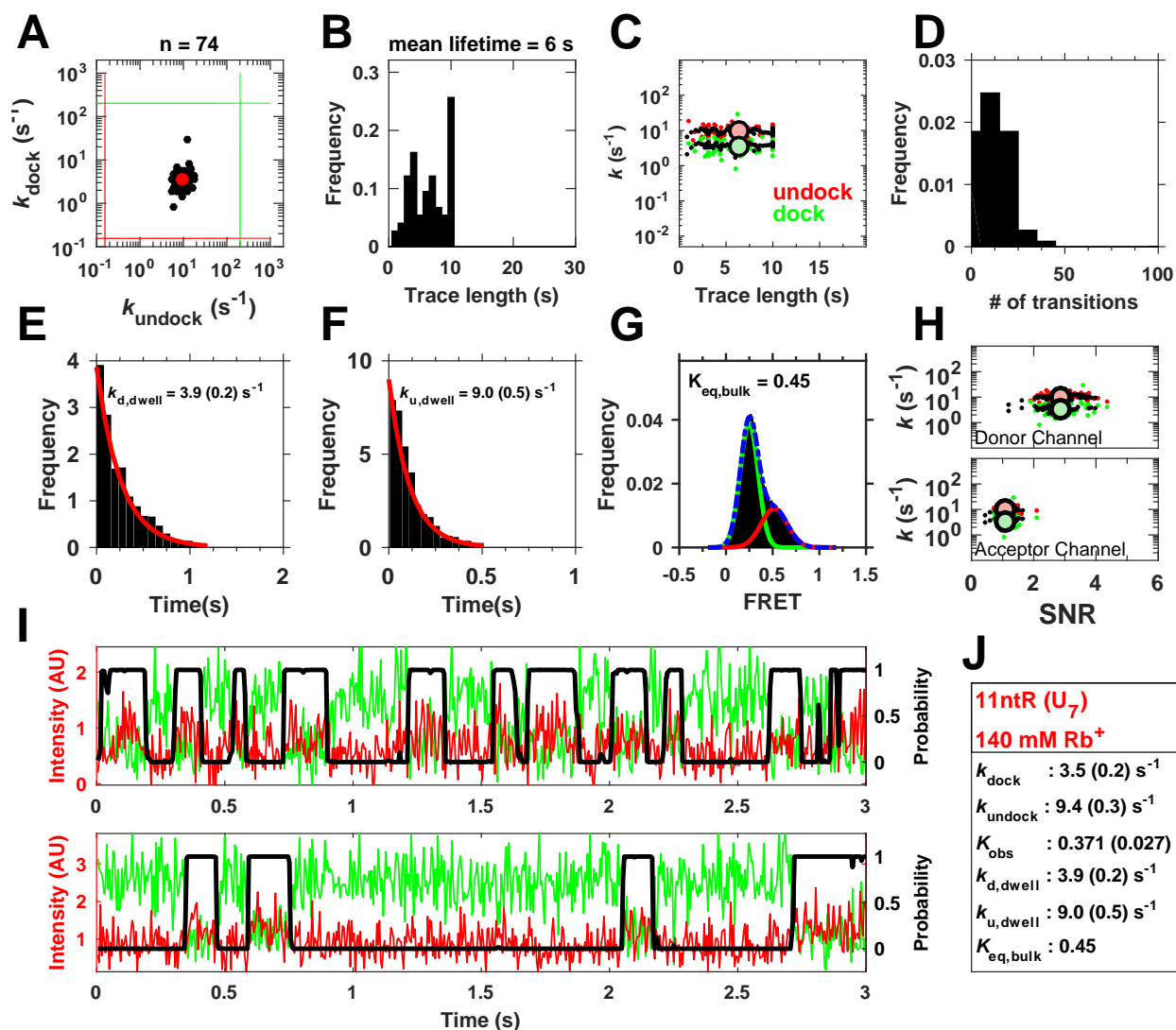


Figure S244. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

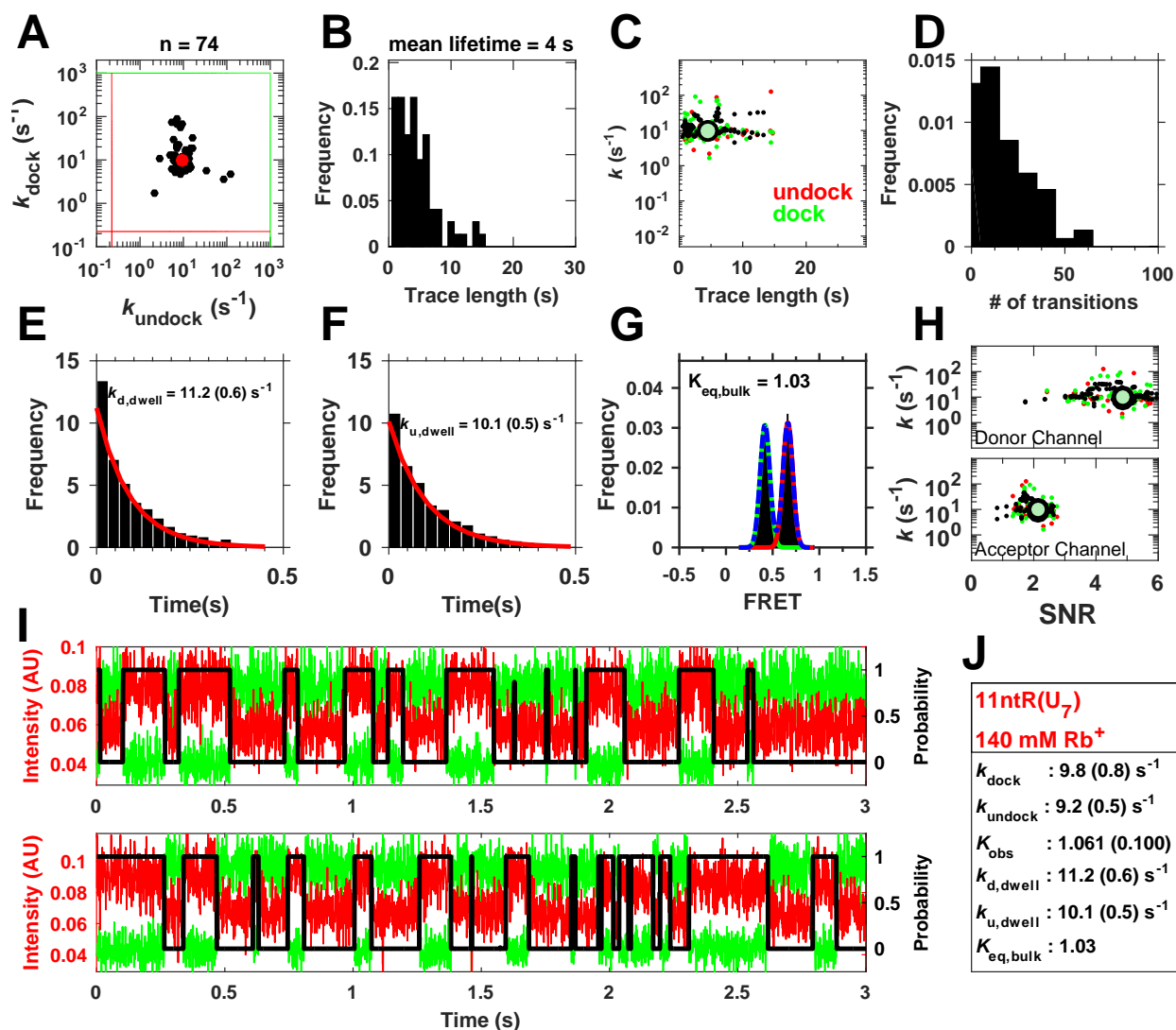


Figure S245. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

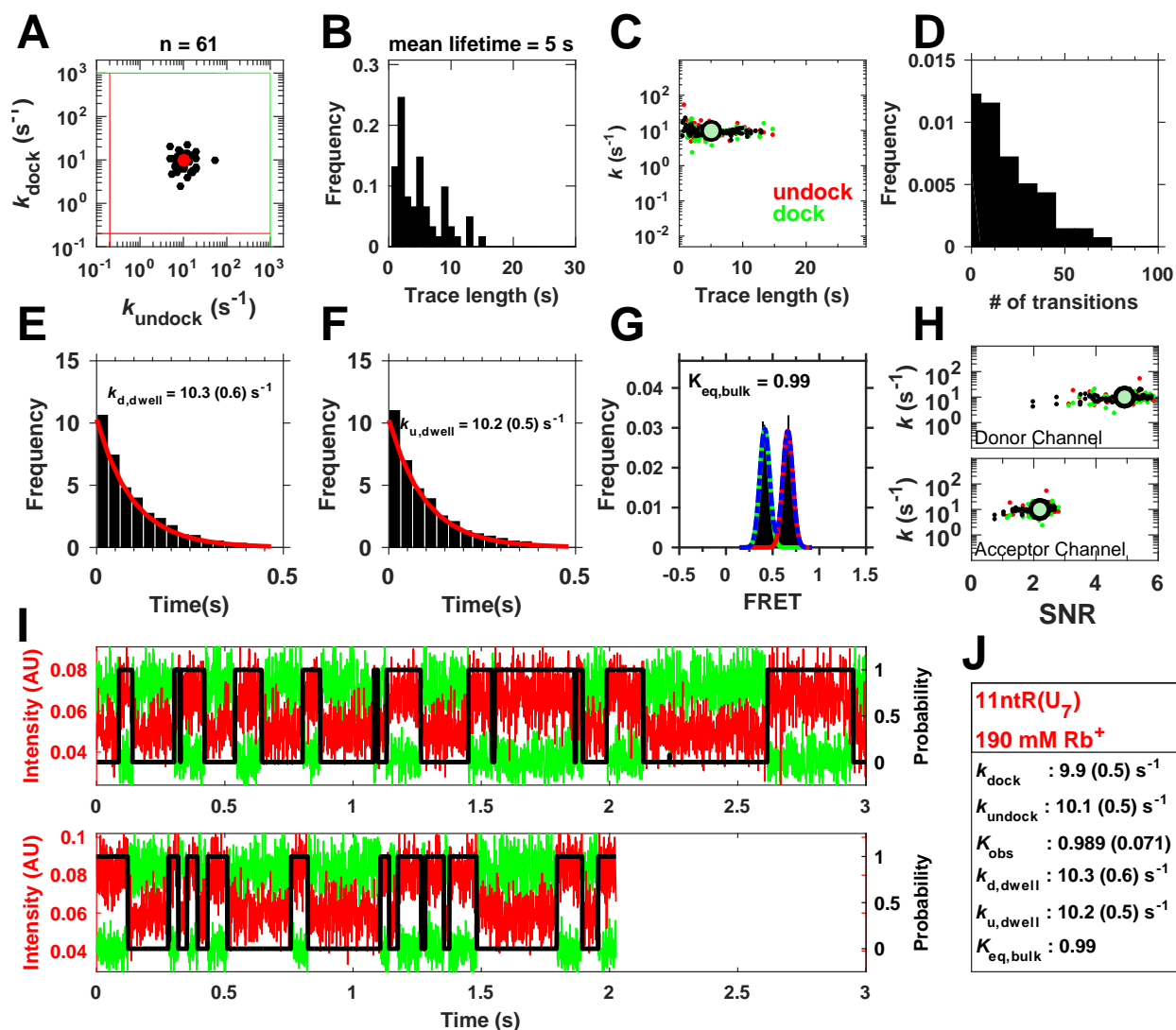


Figure S246. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

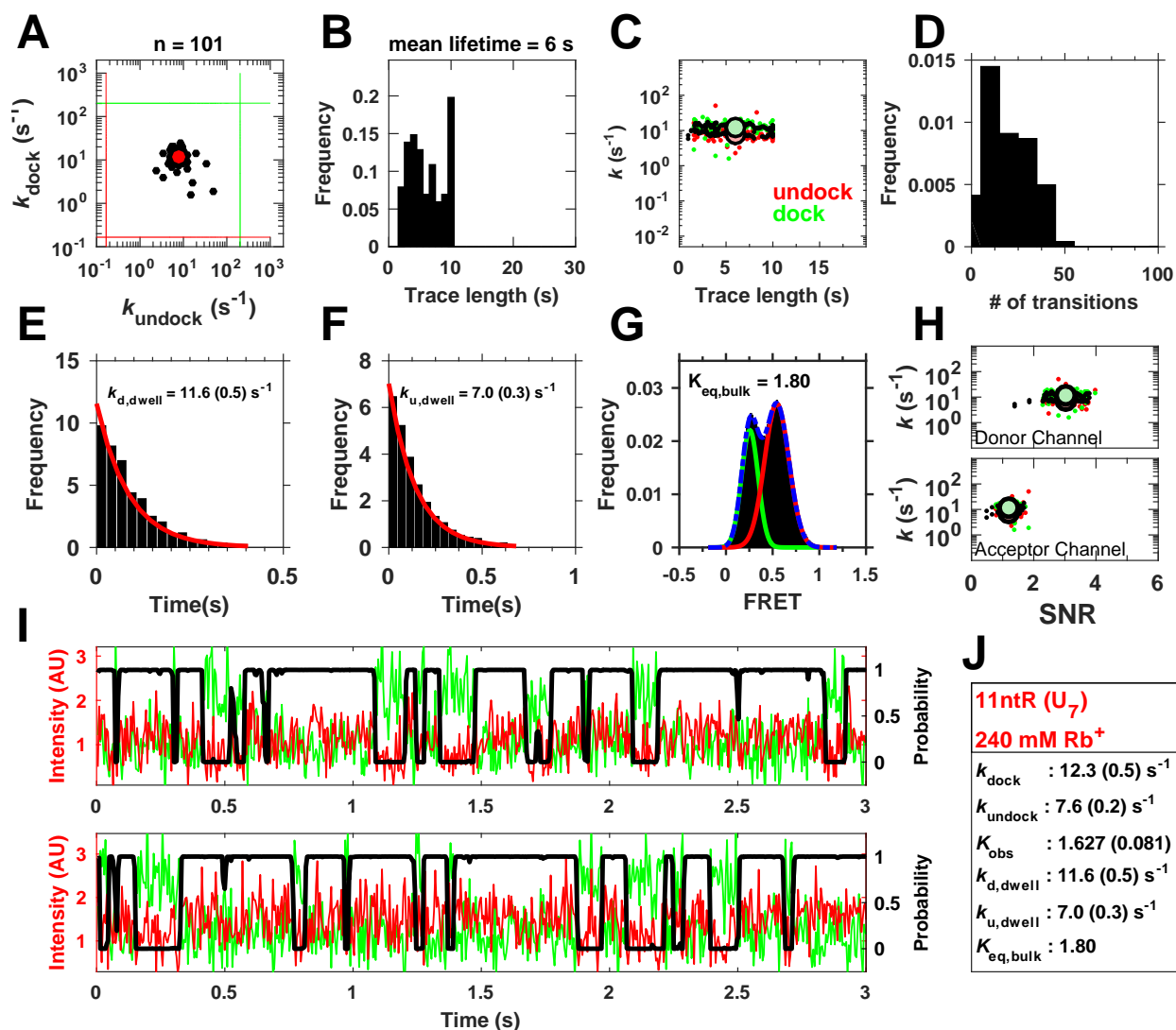


Figure S247. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

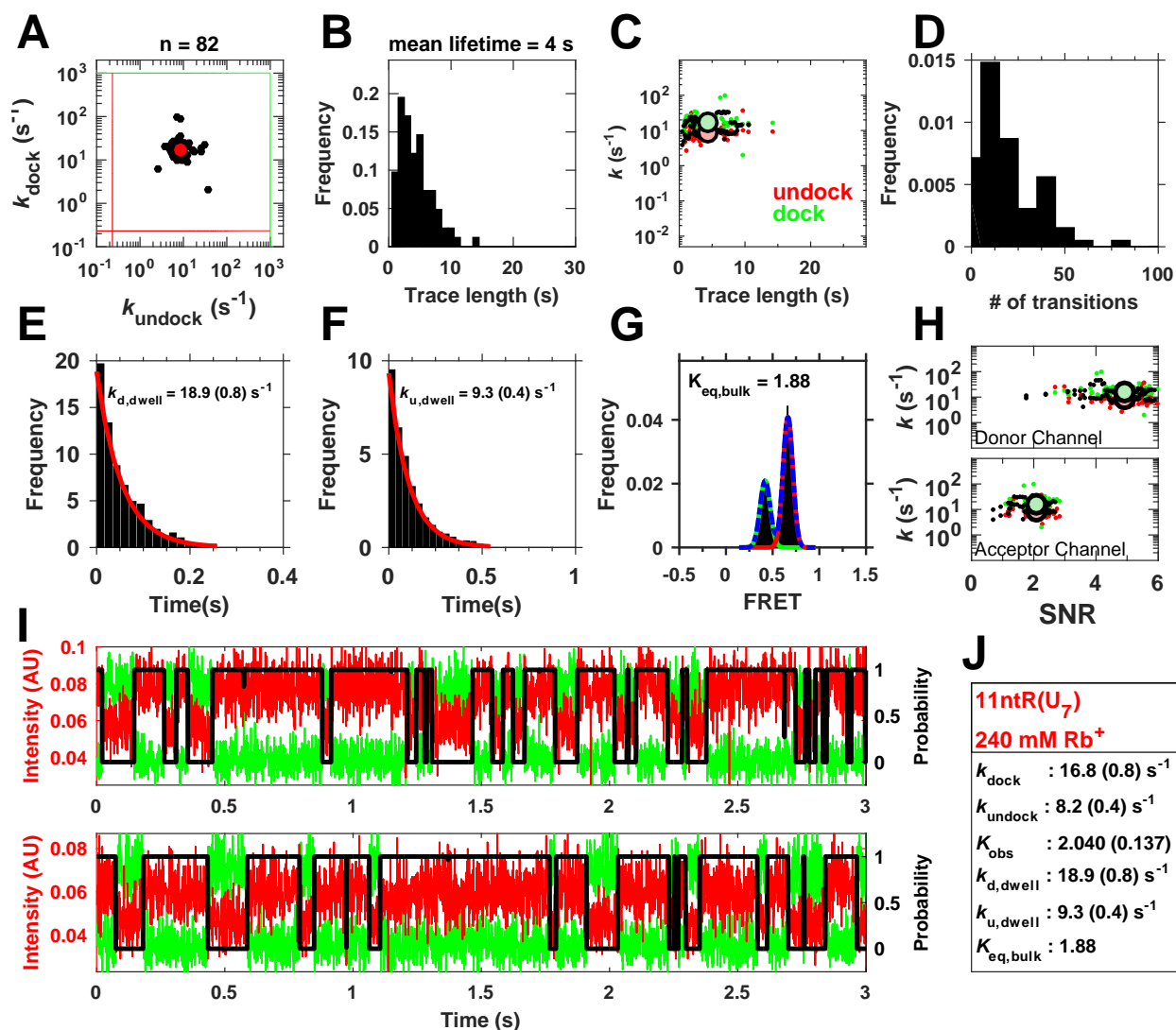


Figure S248. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

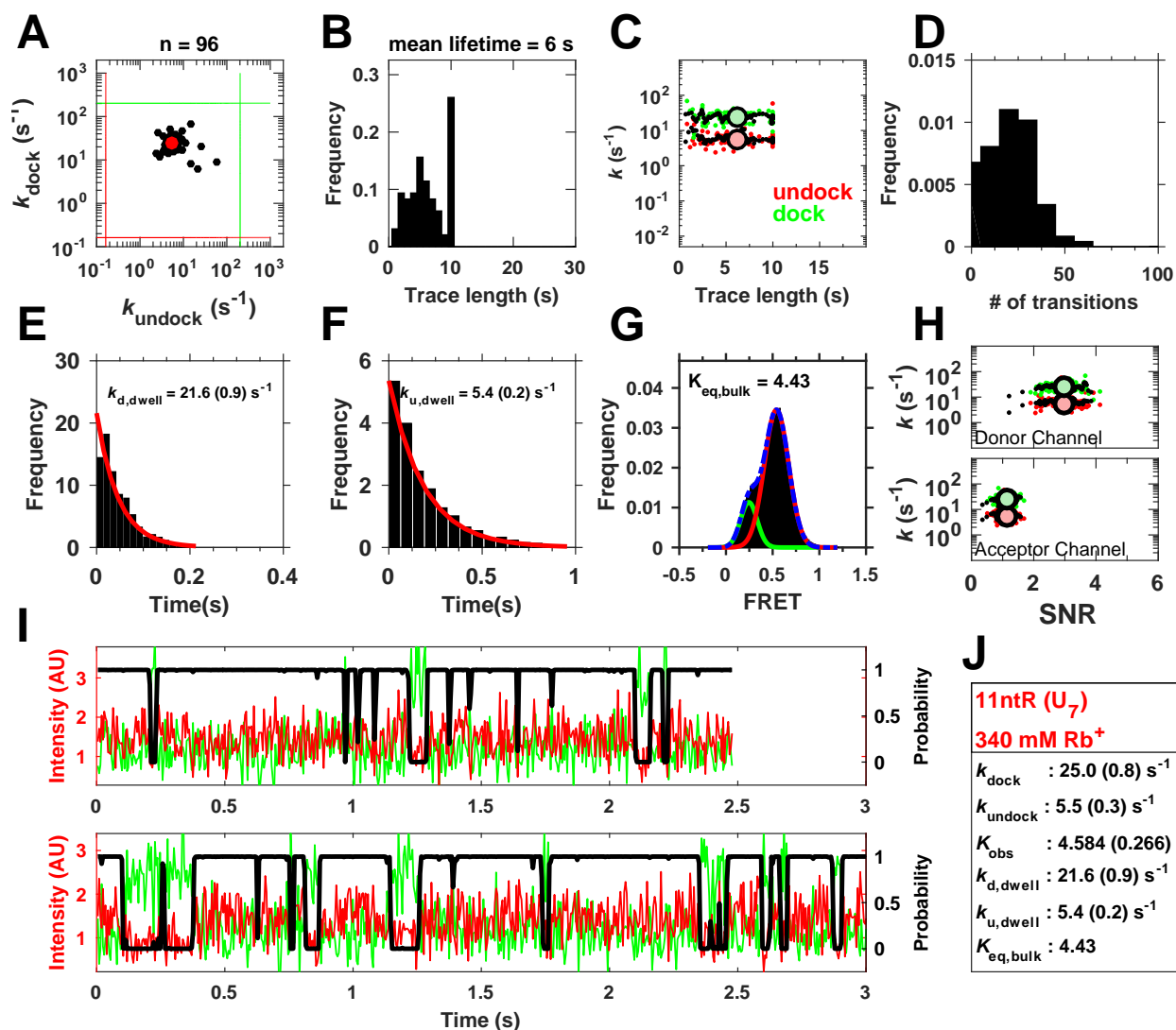


Figure S249. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

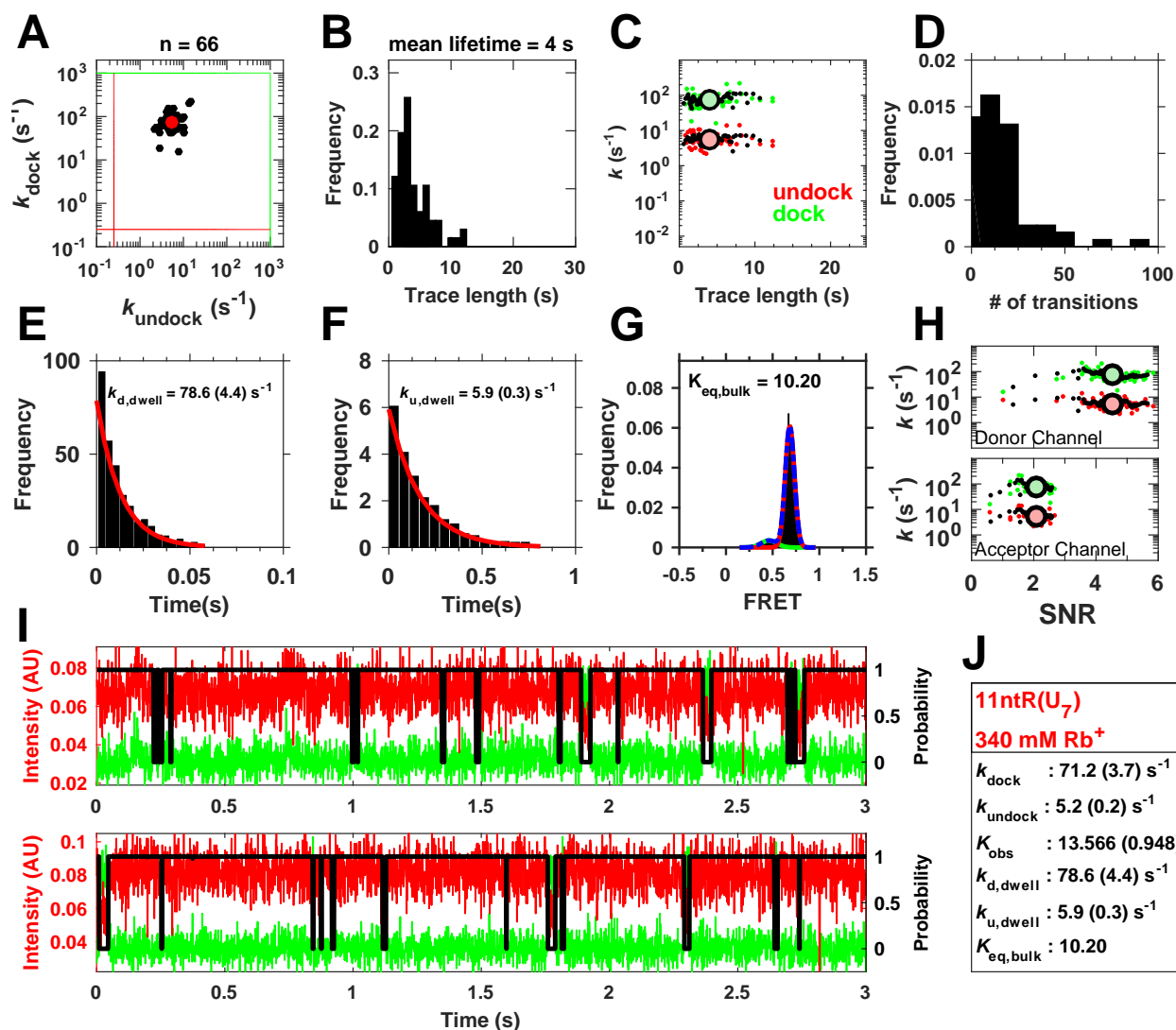


Figure S250. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

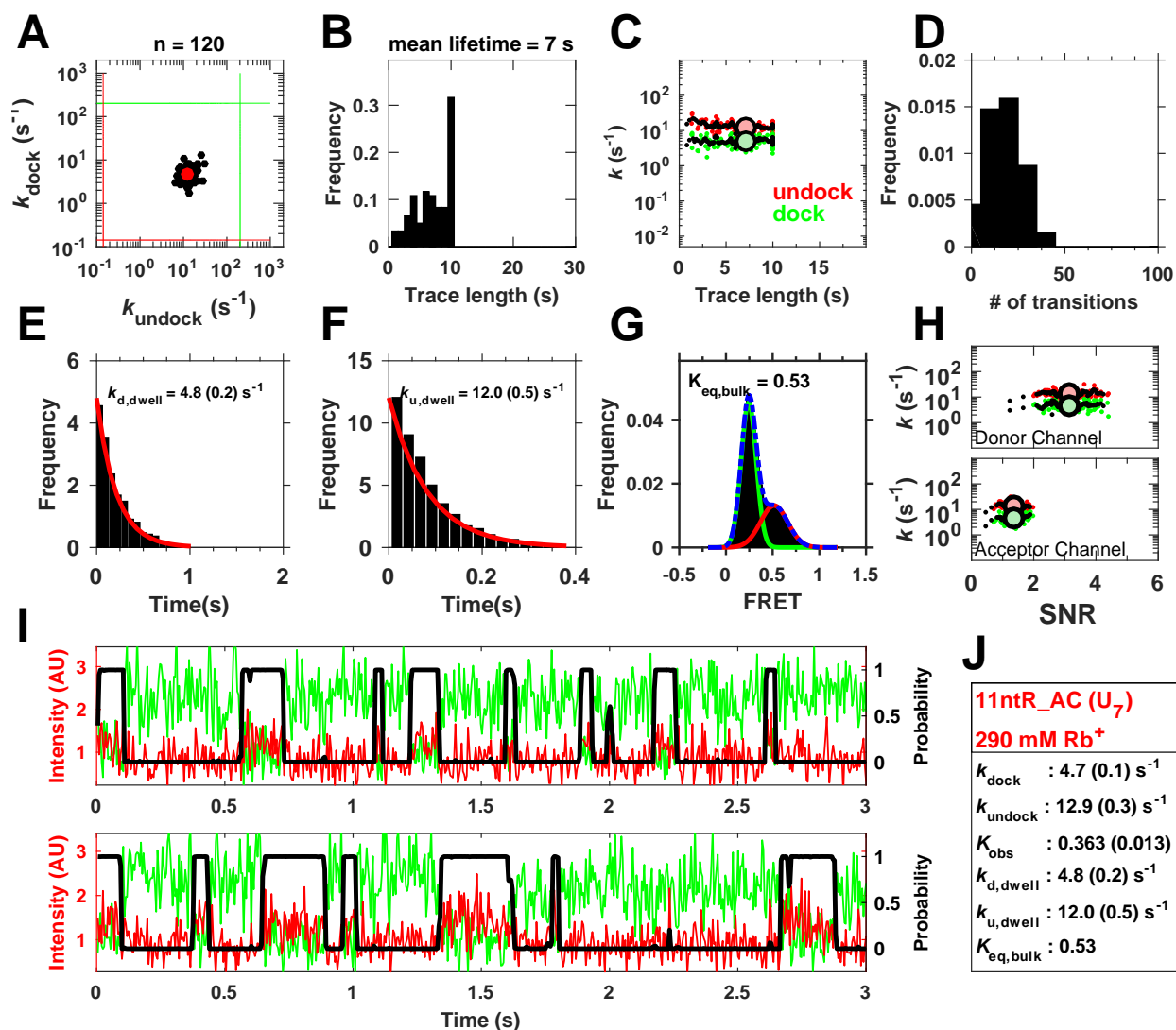


Figure S251. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

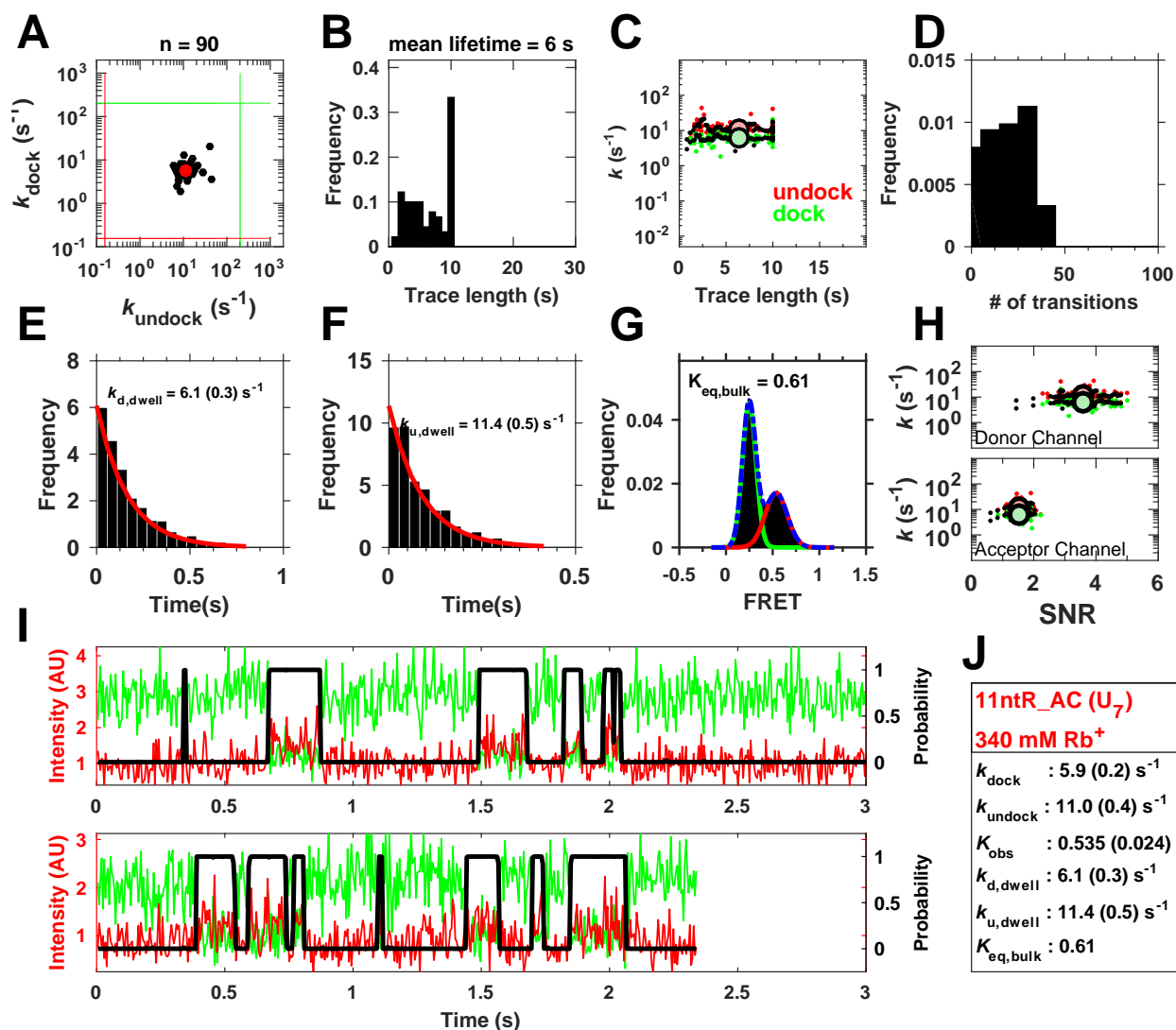


Figure S252. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

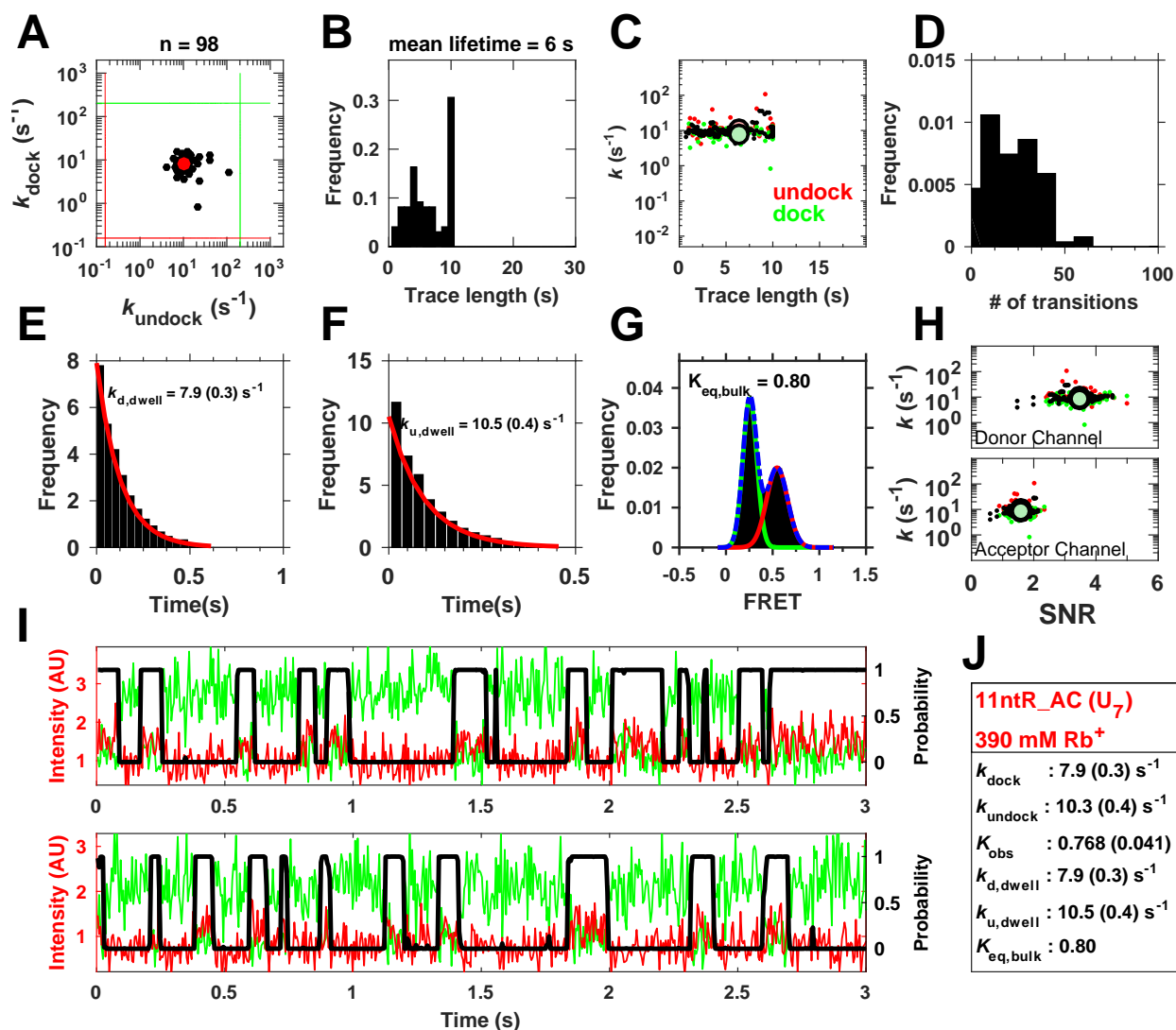


Figure S253. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

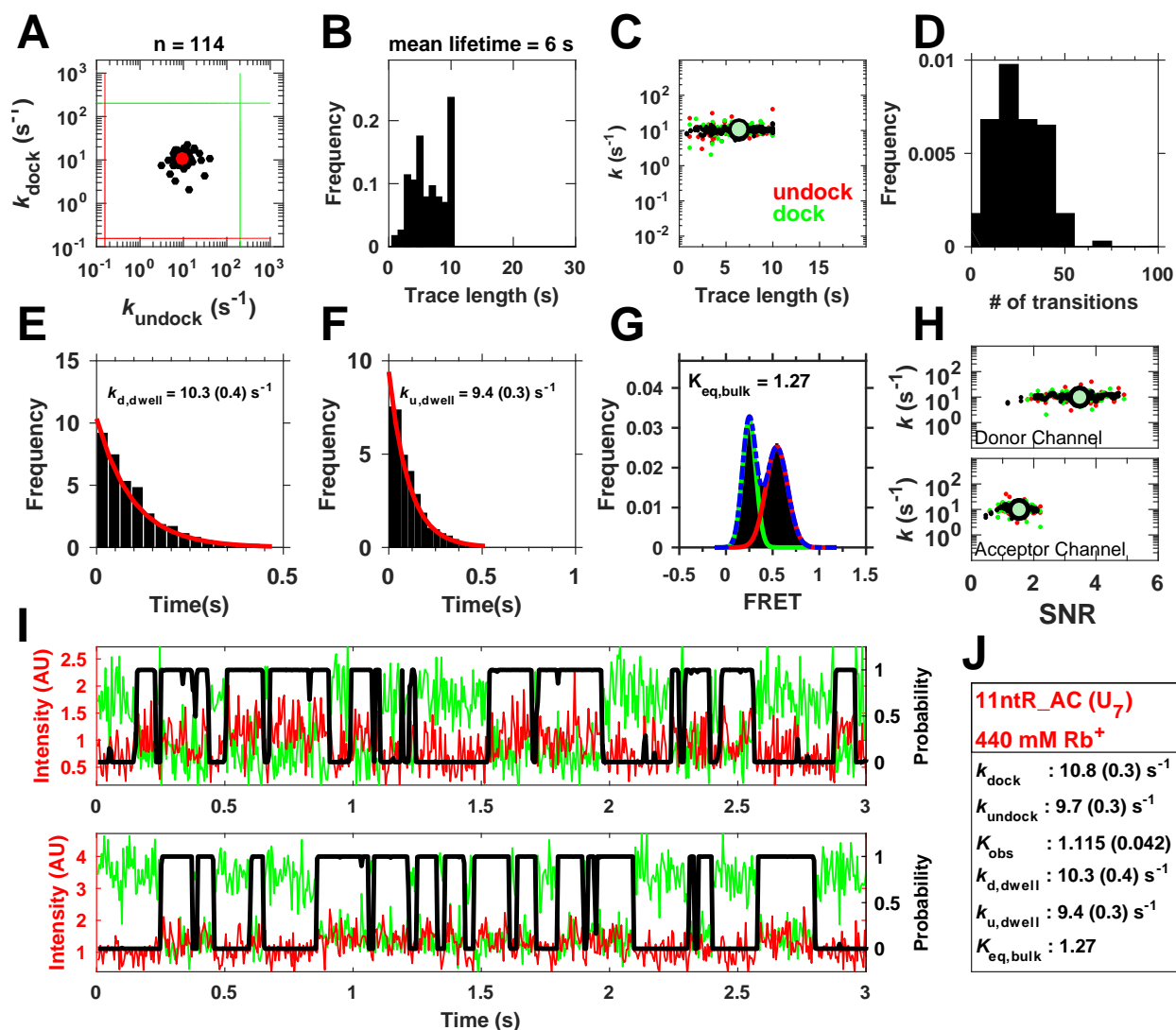


Figure S254. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

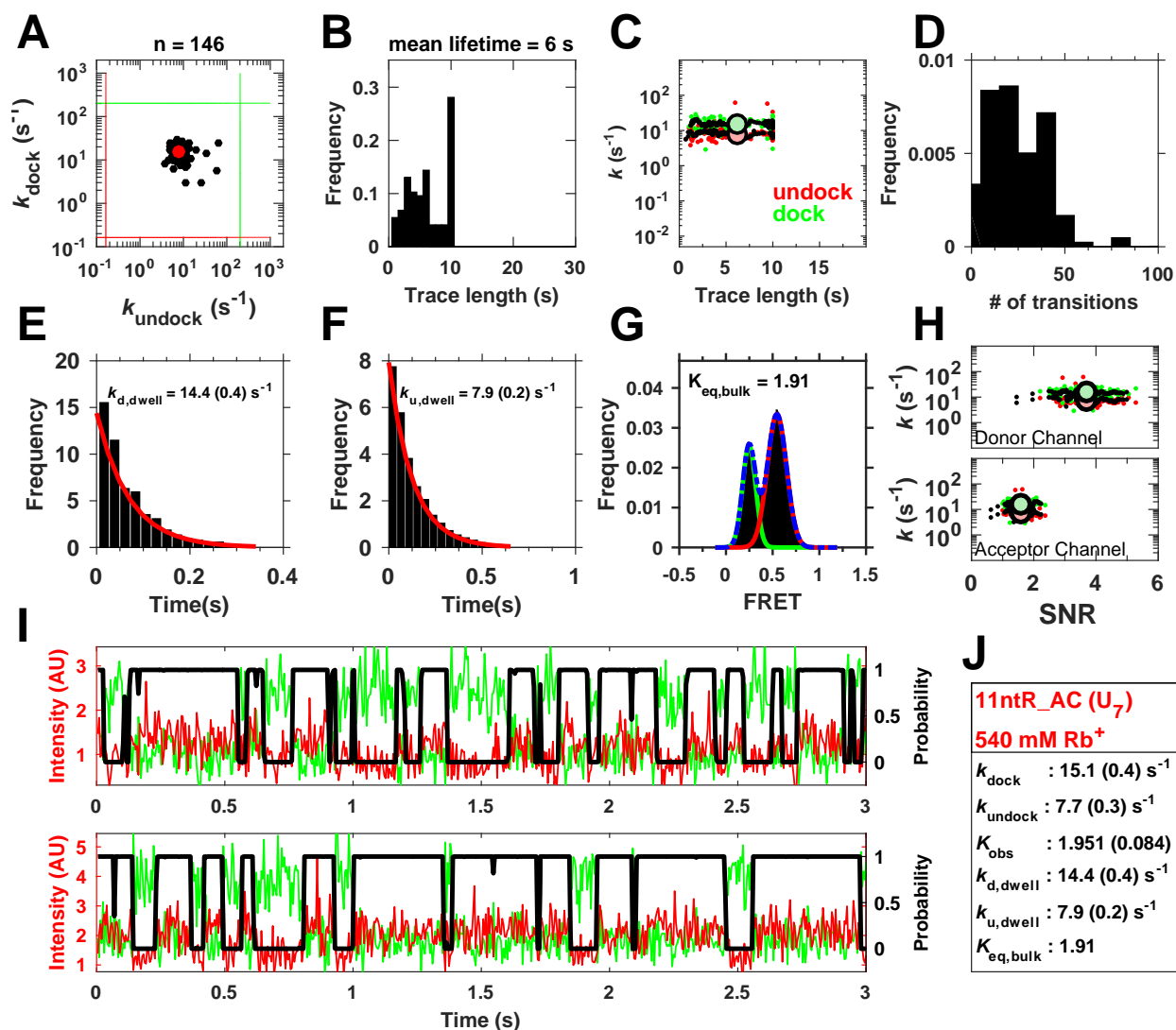


Figure S255. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

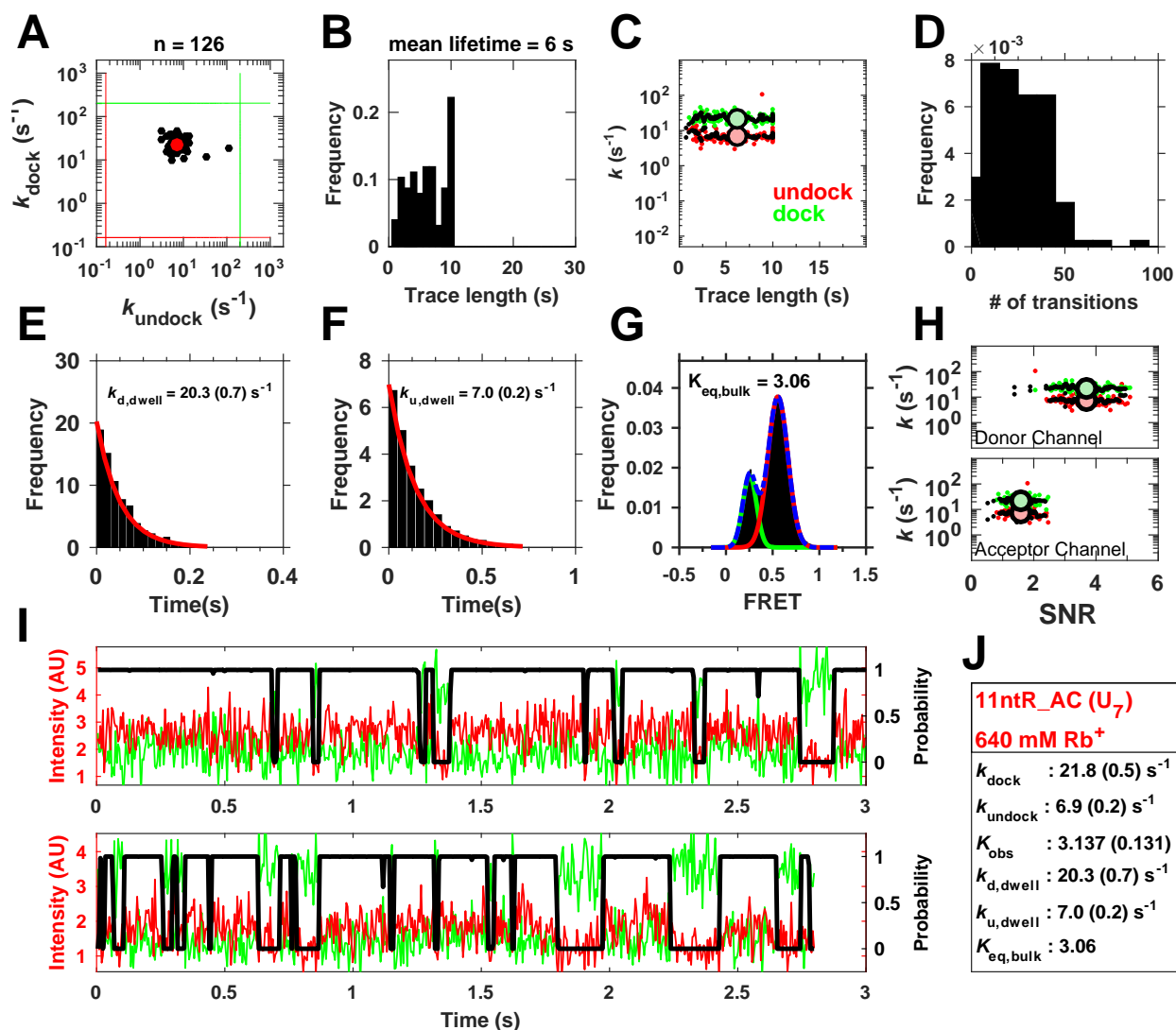


Figure S256. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

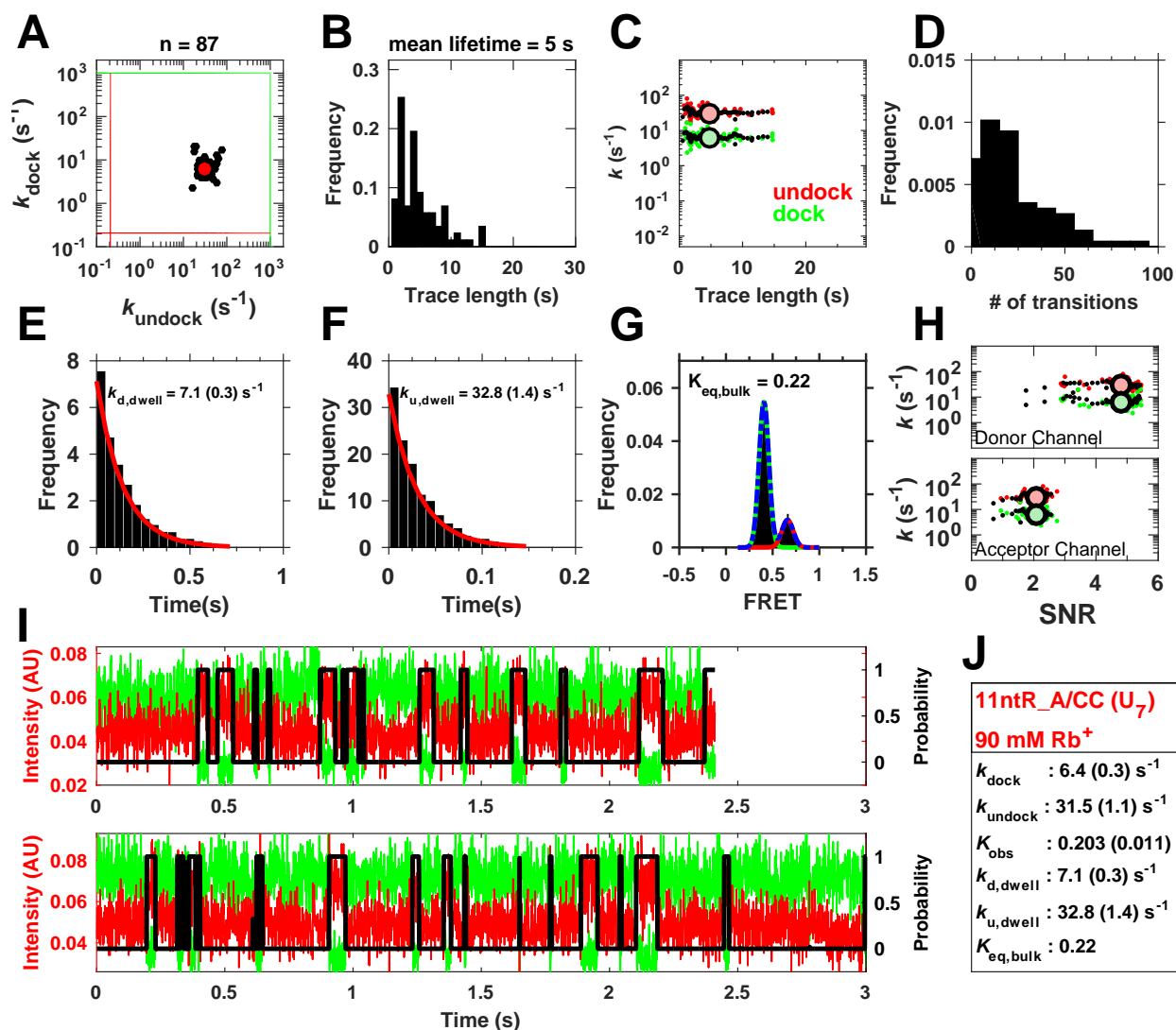


Figure S257. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

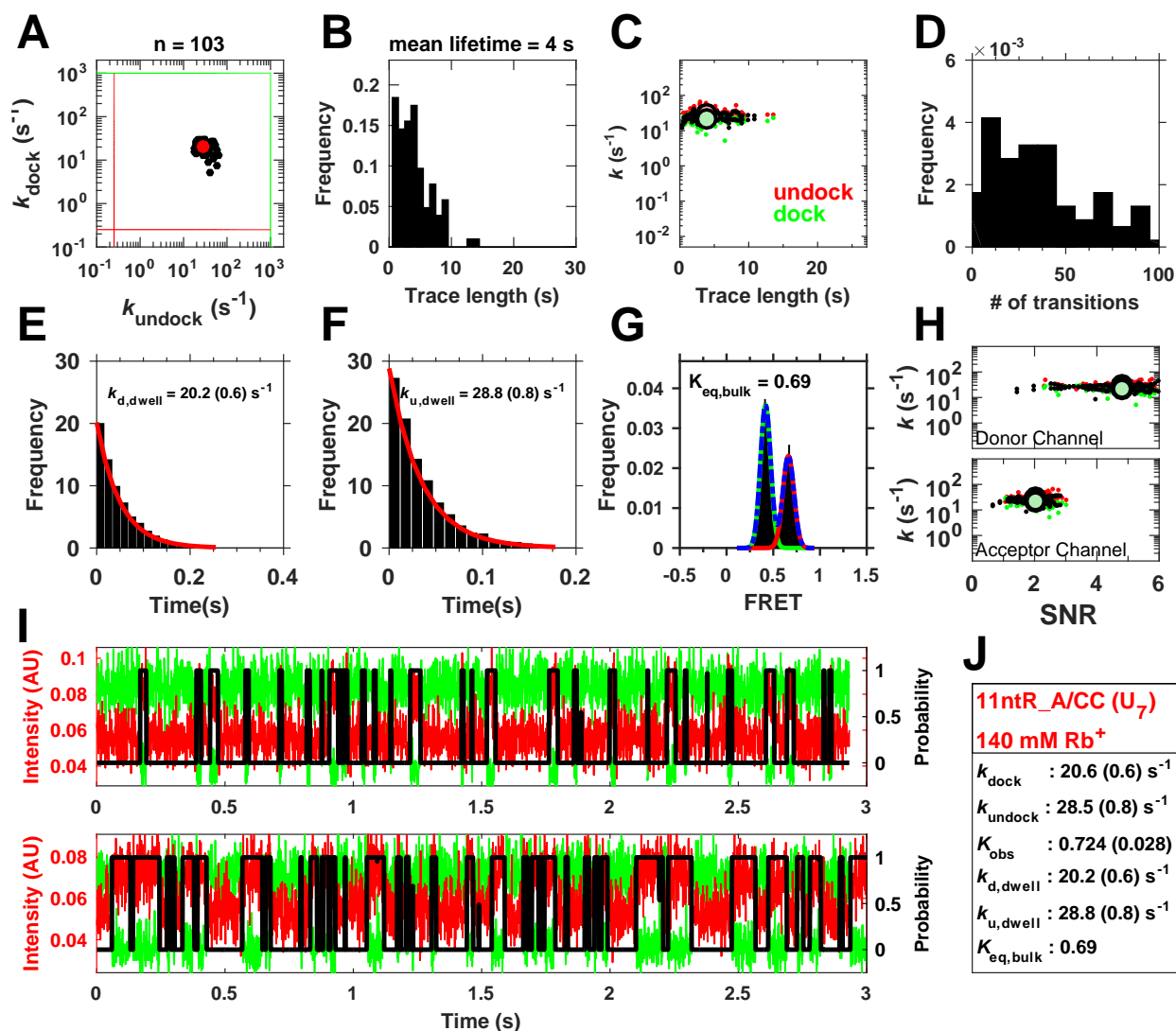


Figure S258. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

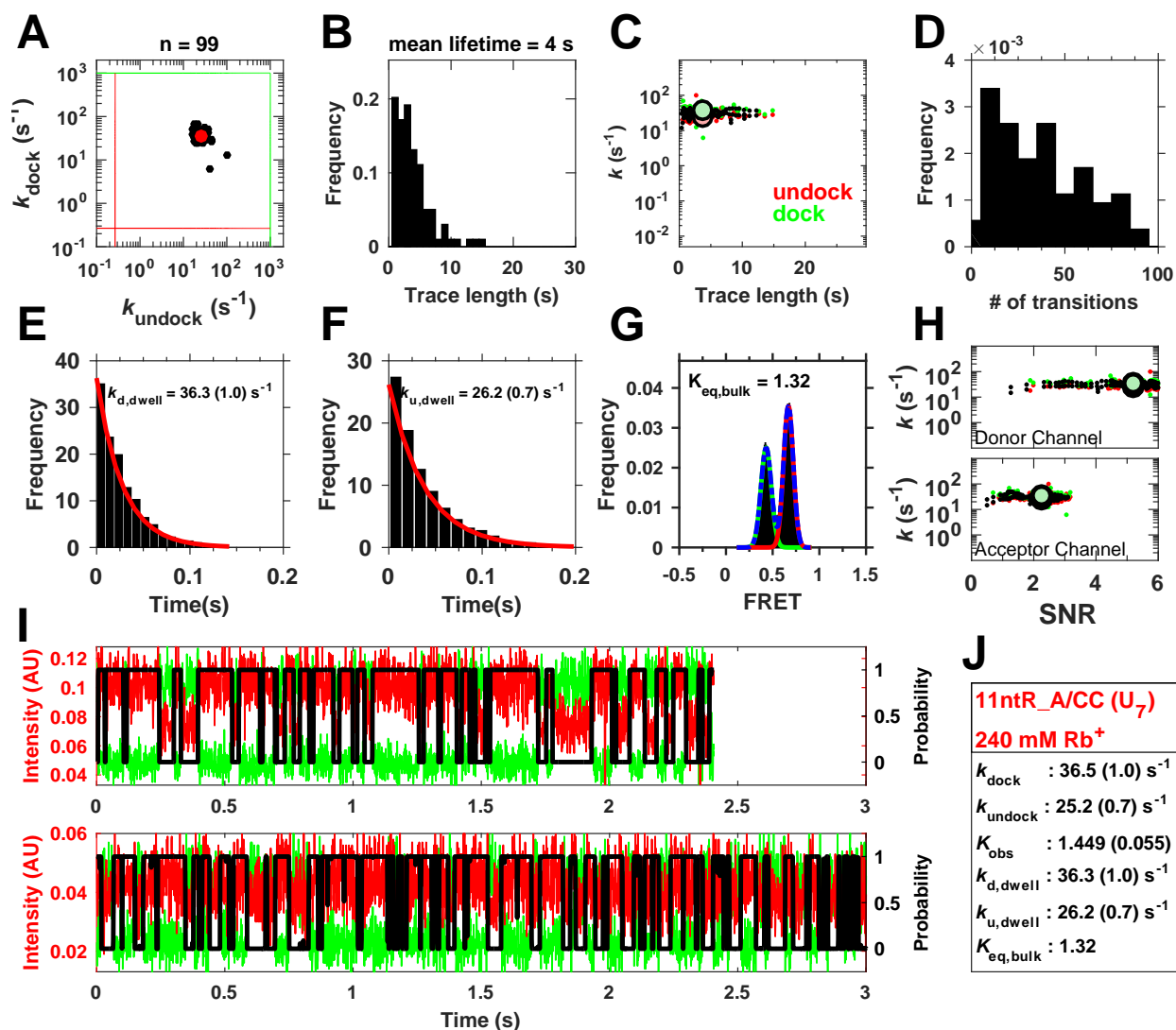


Figure S259. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

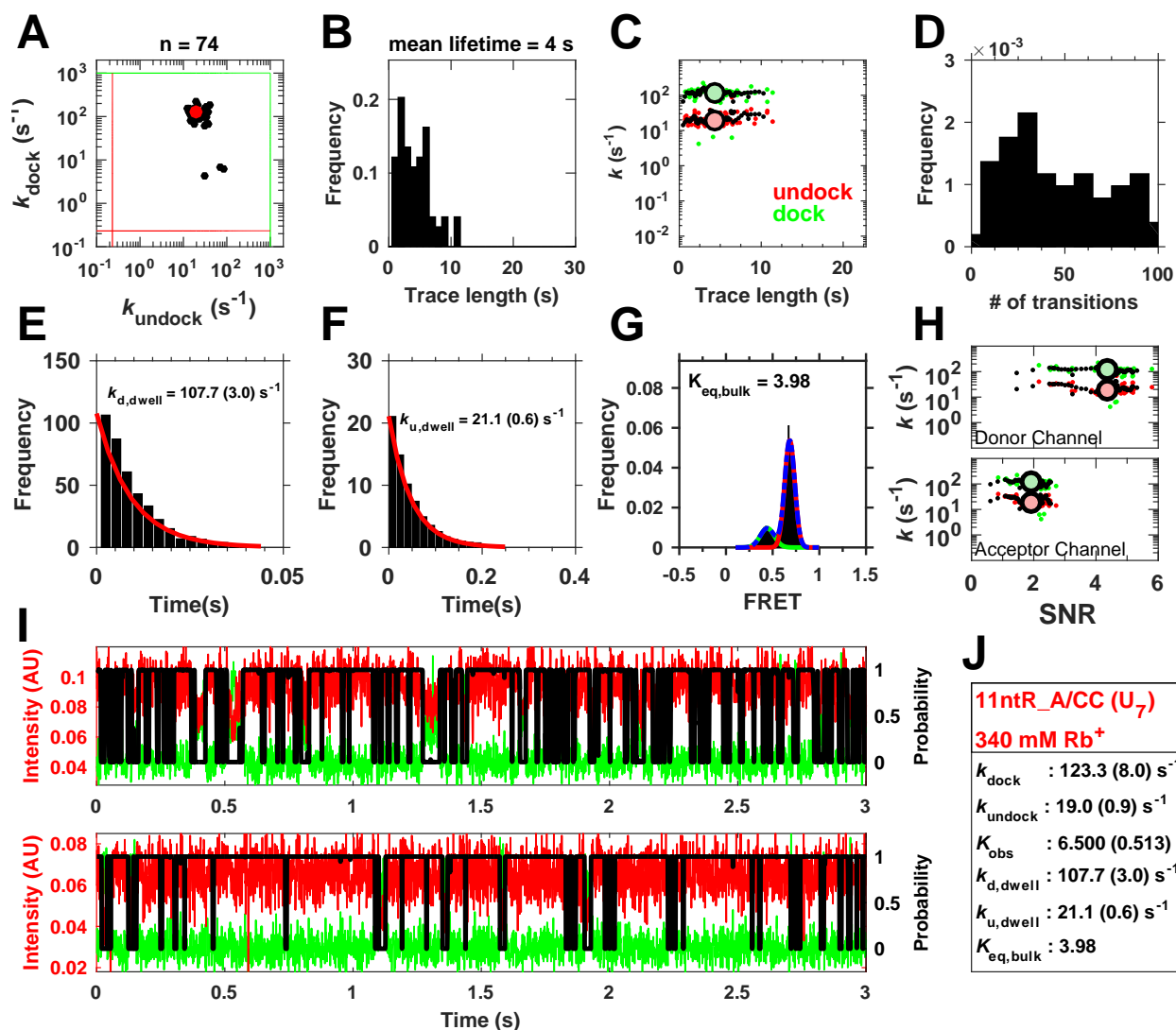


Figure S260. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

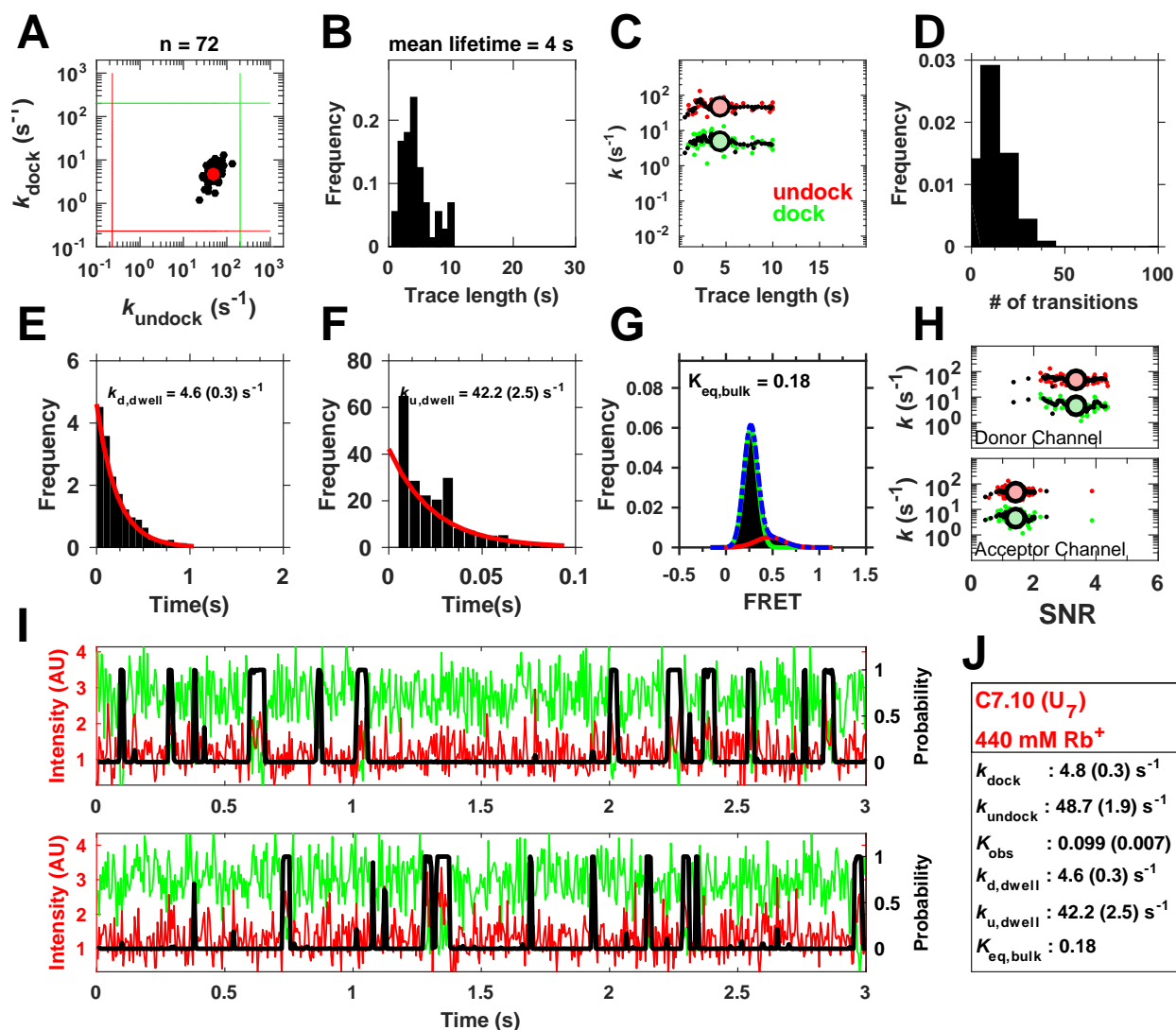


Figure S261. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

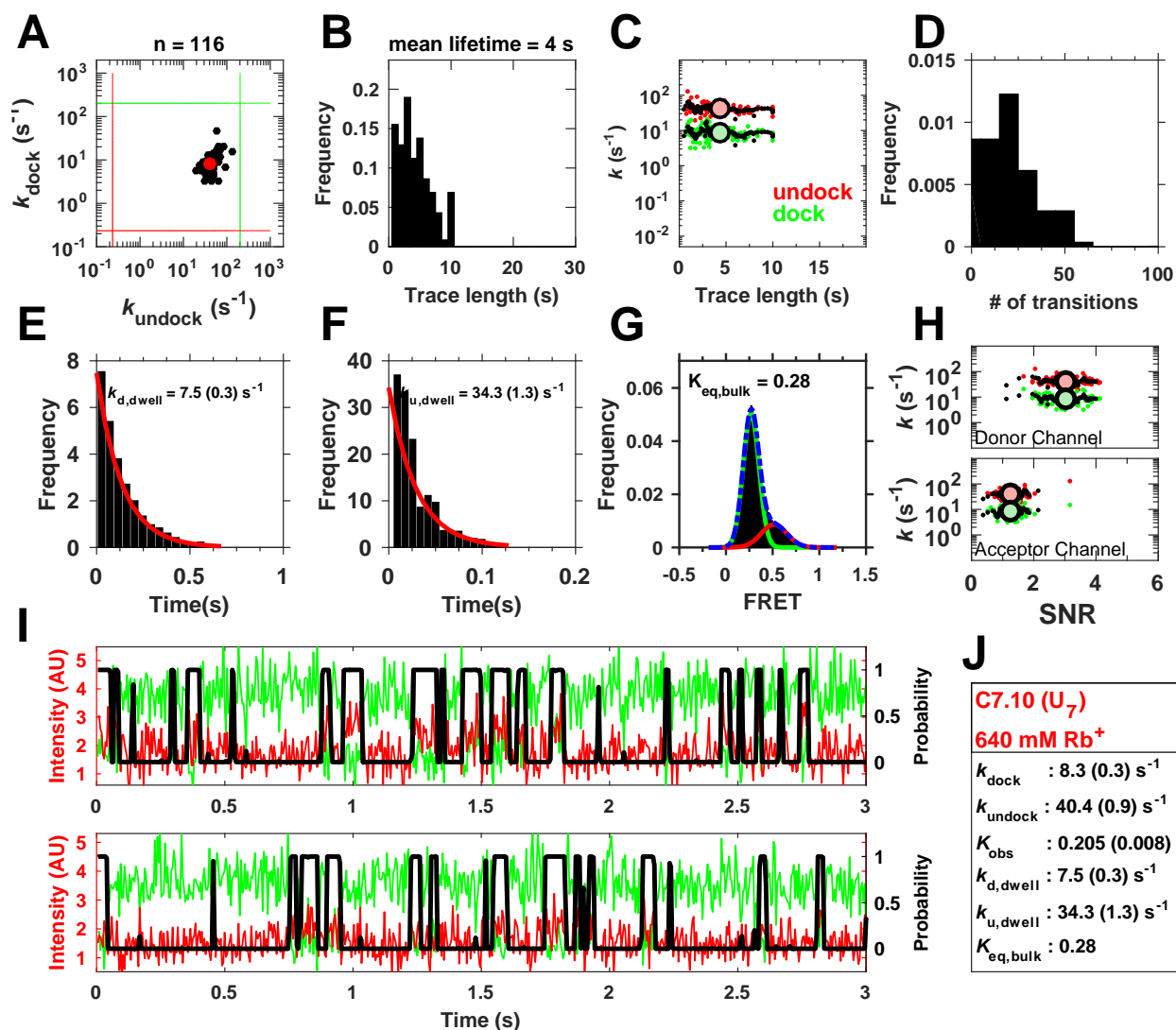


Figure S262. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

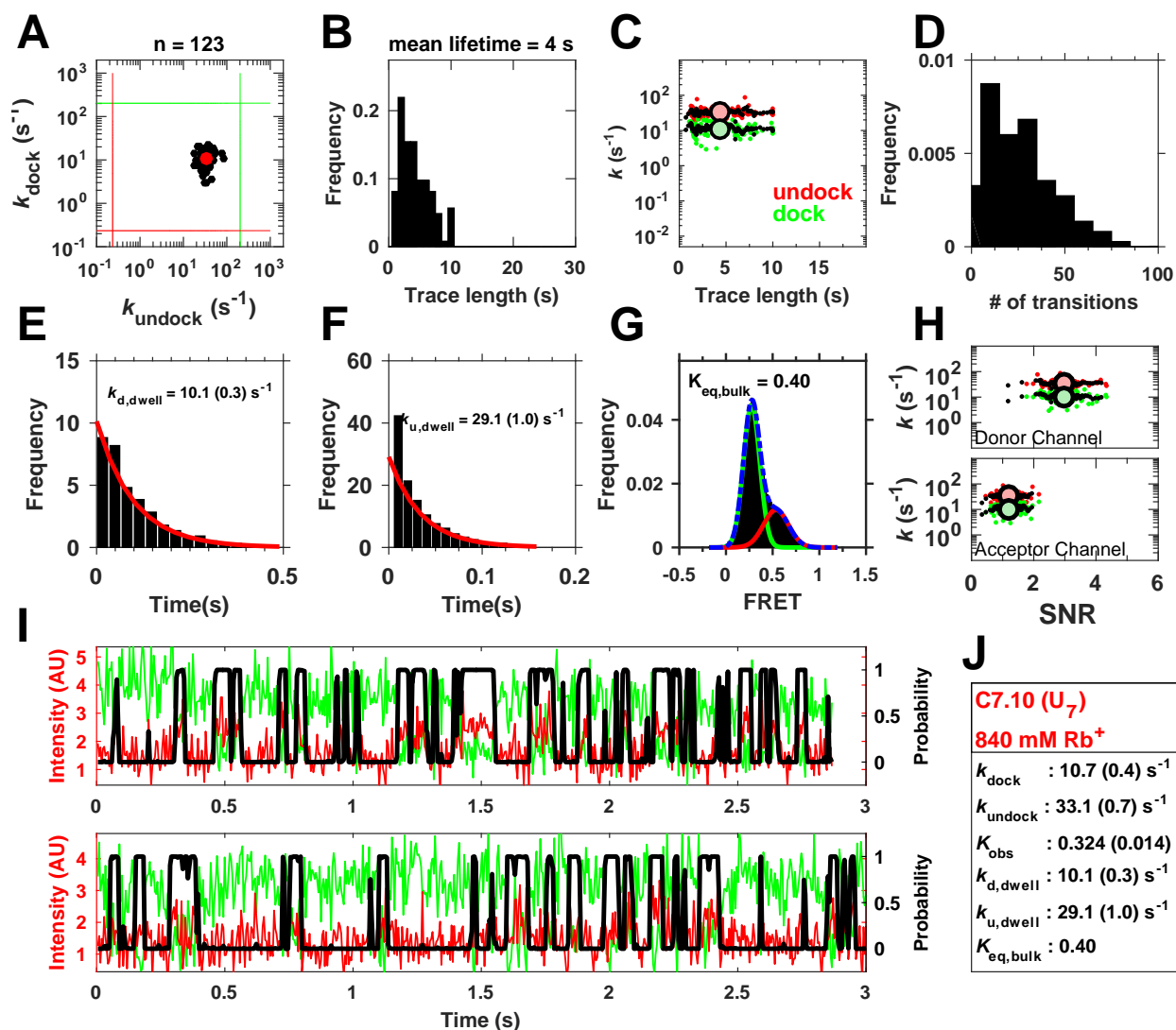


Figure S263. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

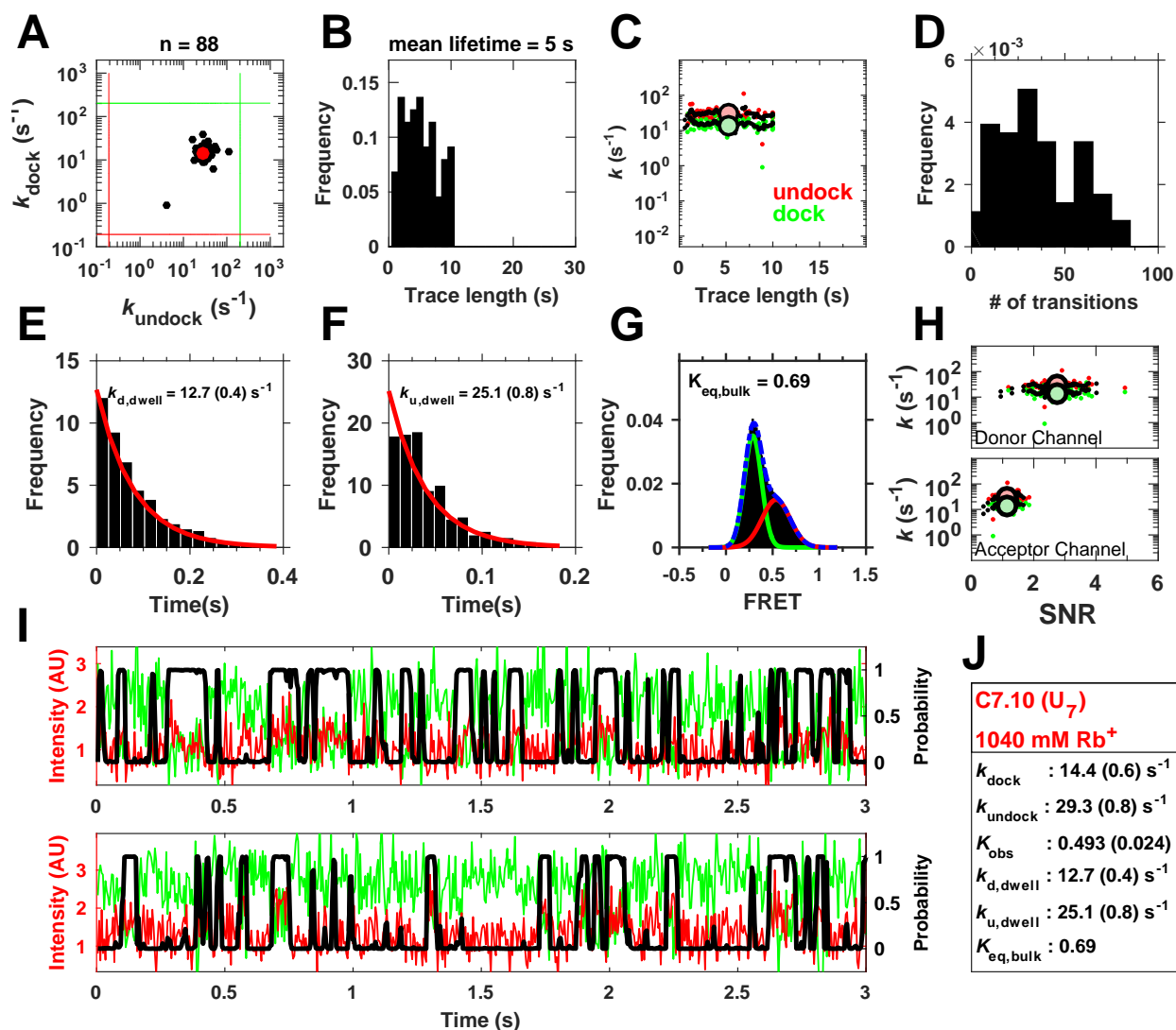


Figure S264. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

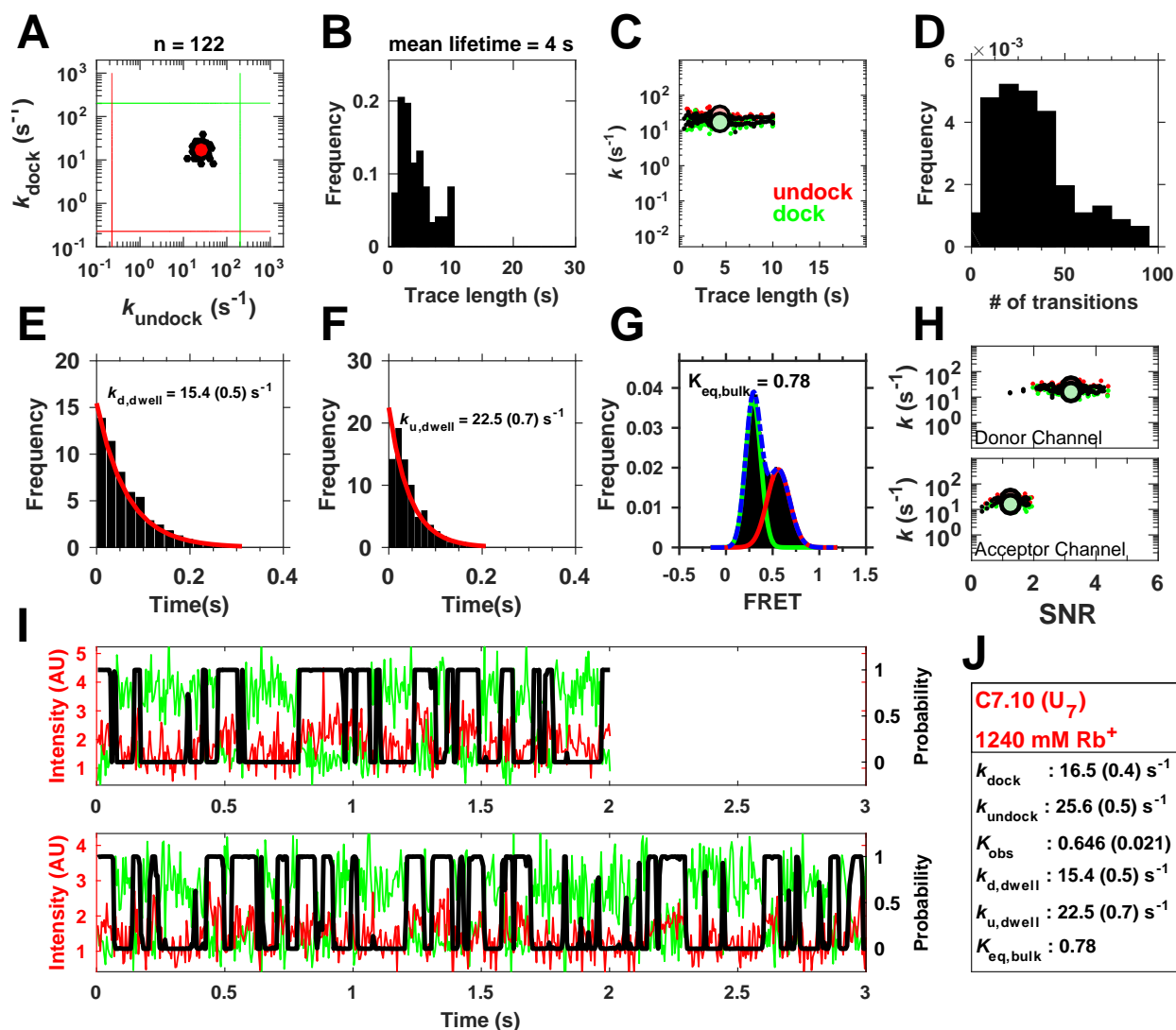


Figure S265. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

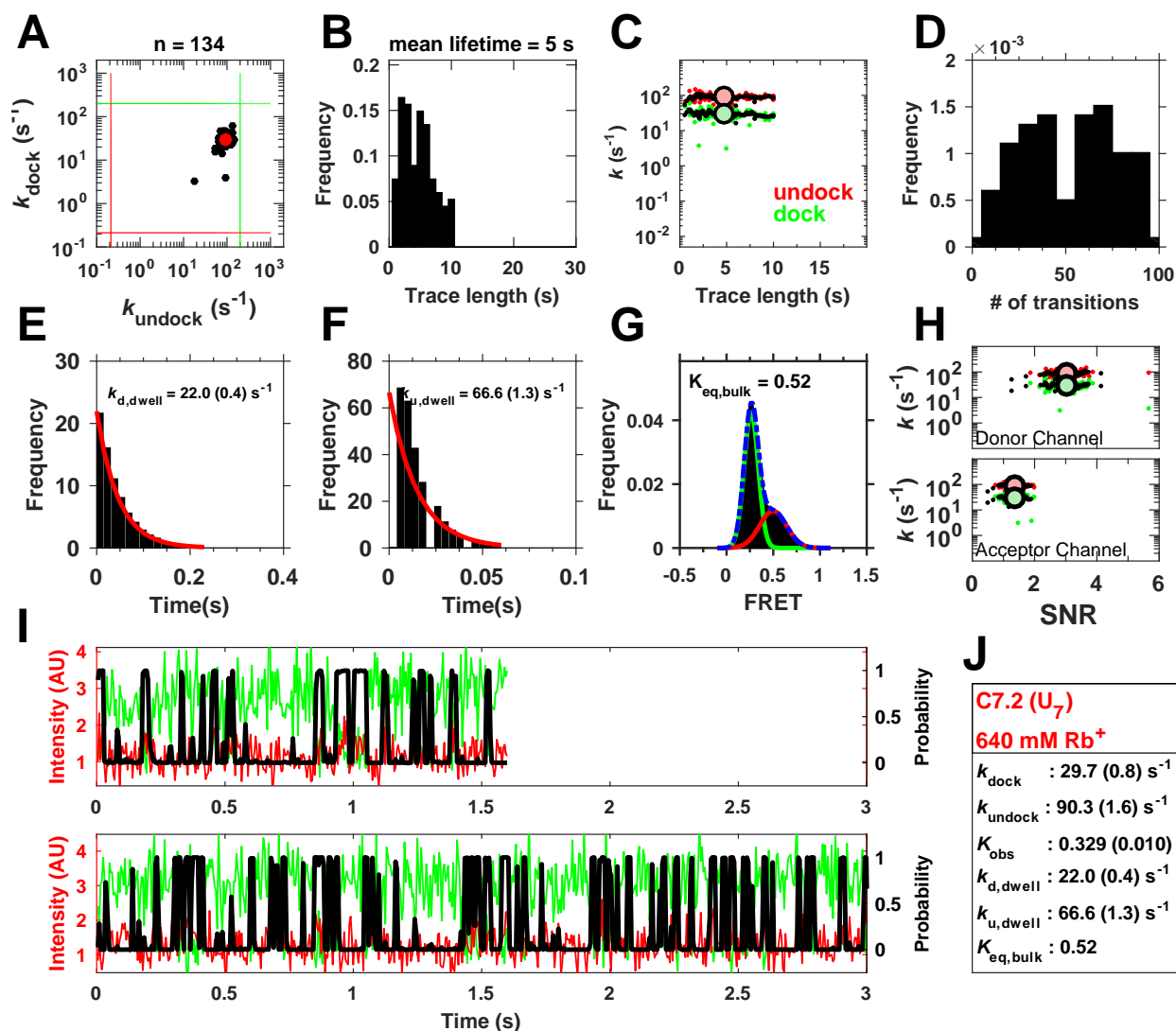


Figure S266. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

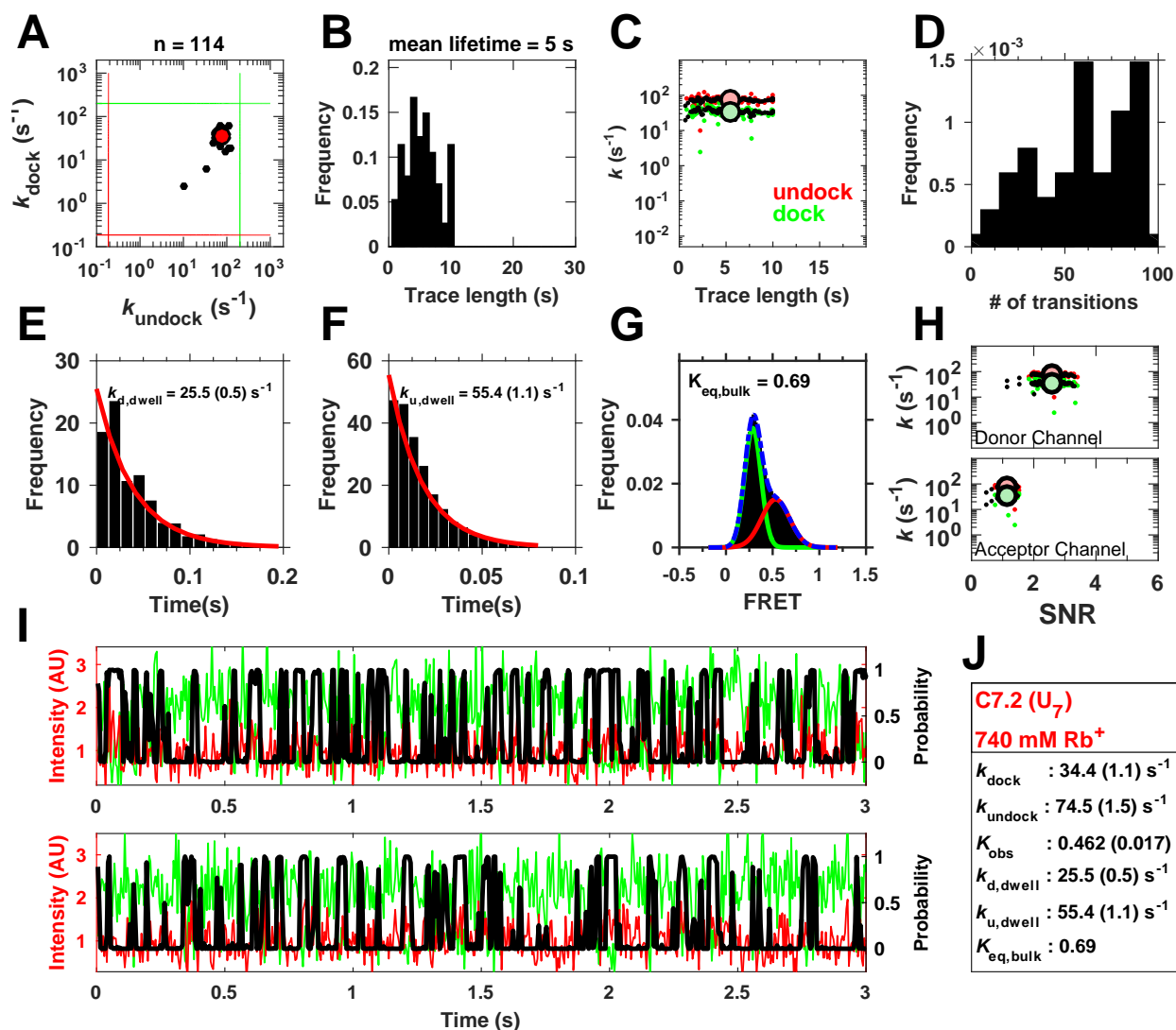


Figure S267. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

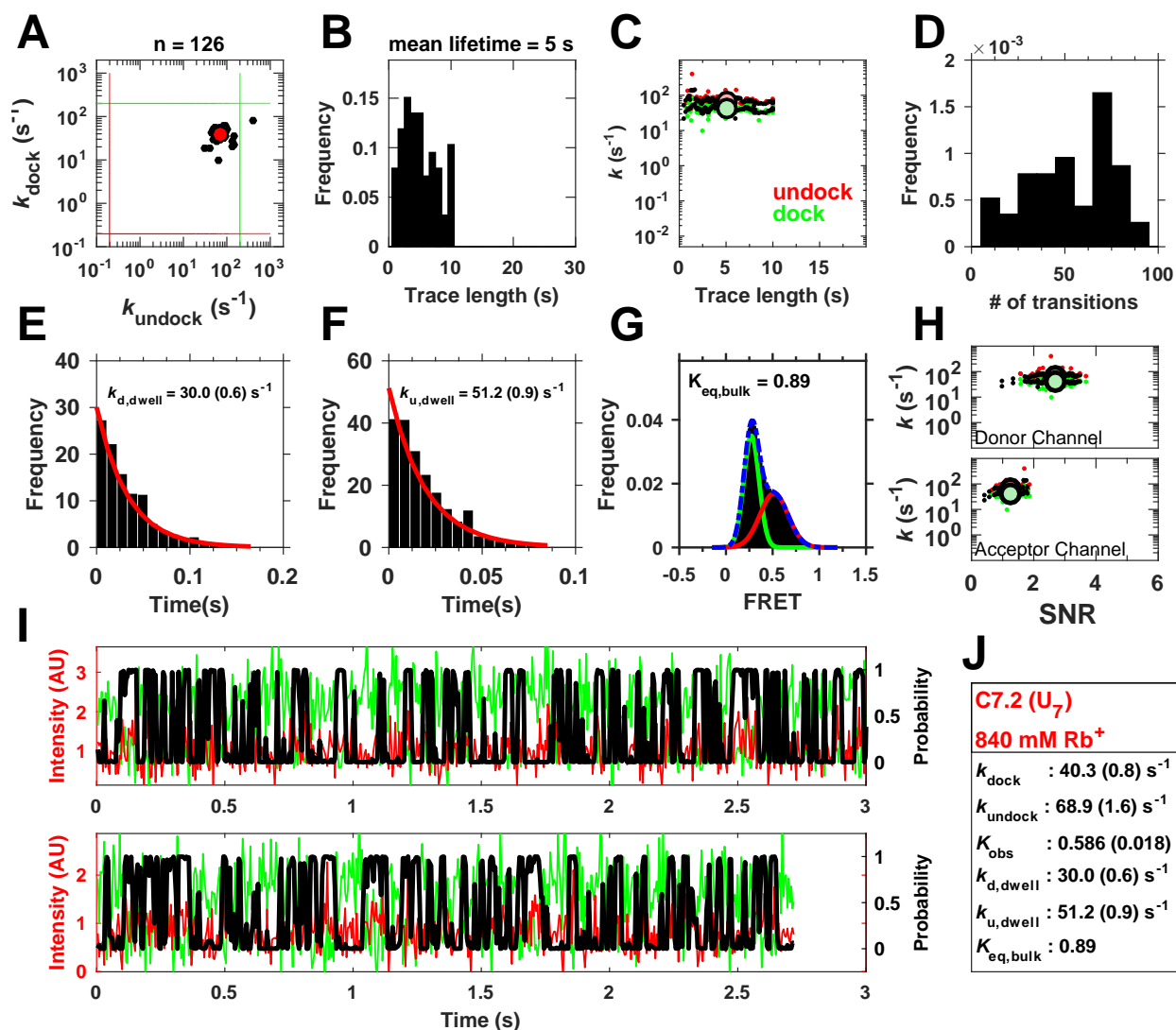


Figure S268. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

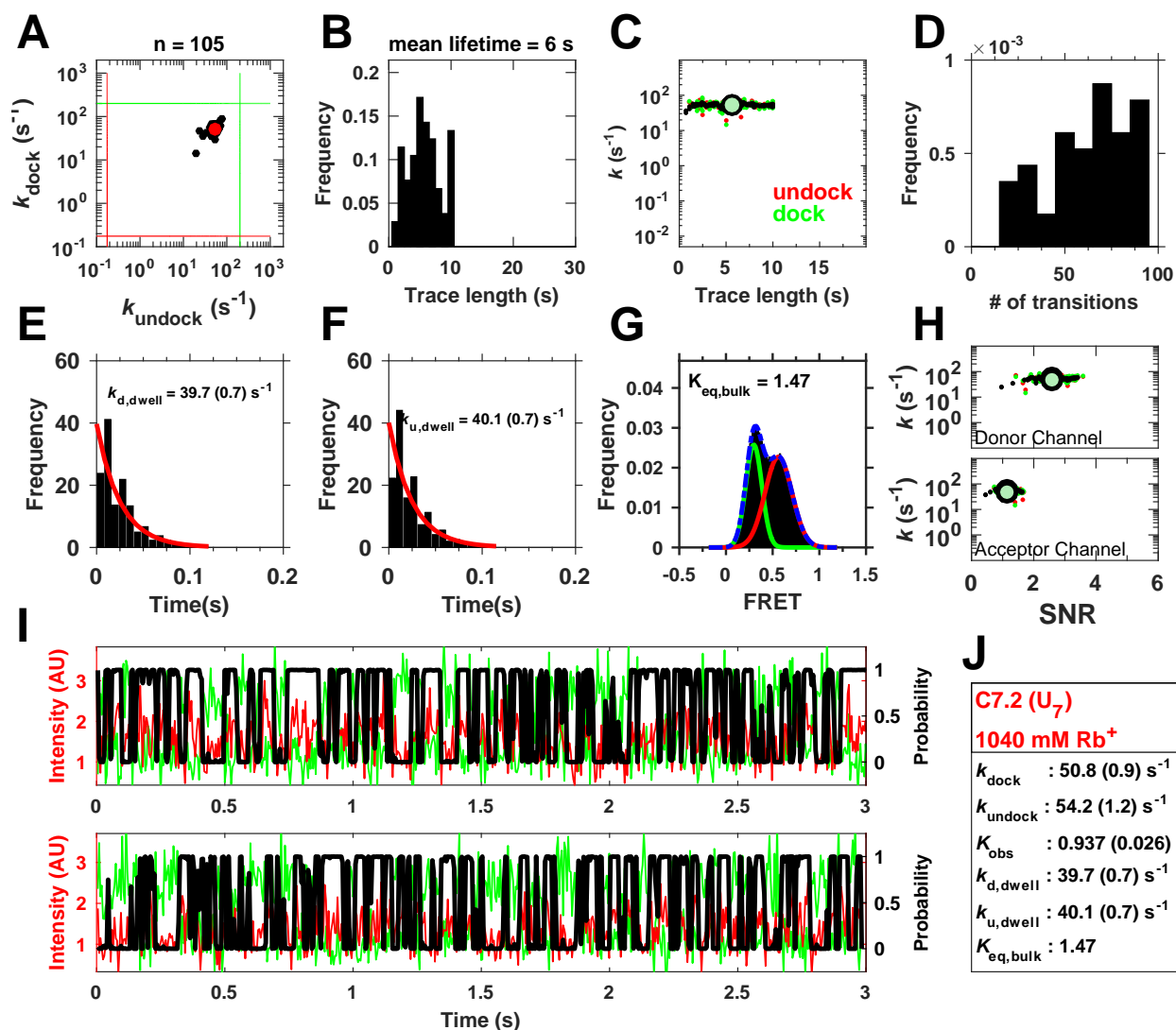


Figure S269. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

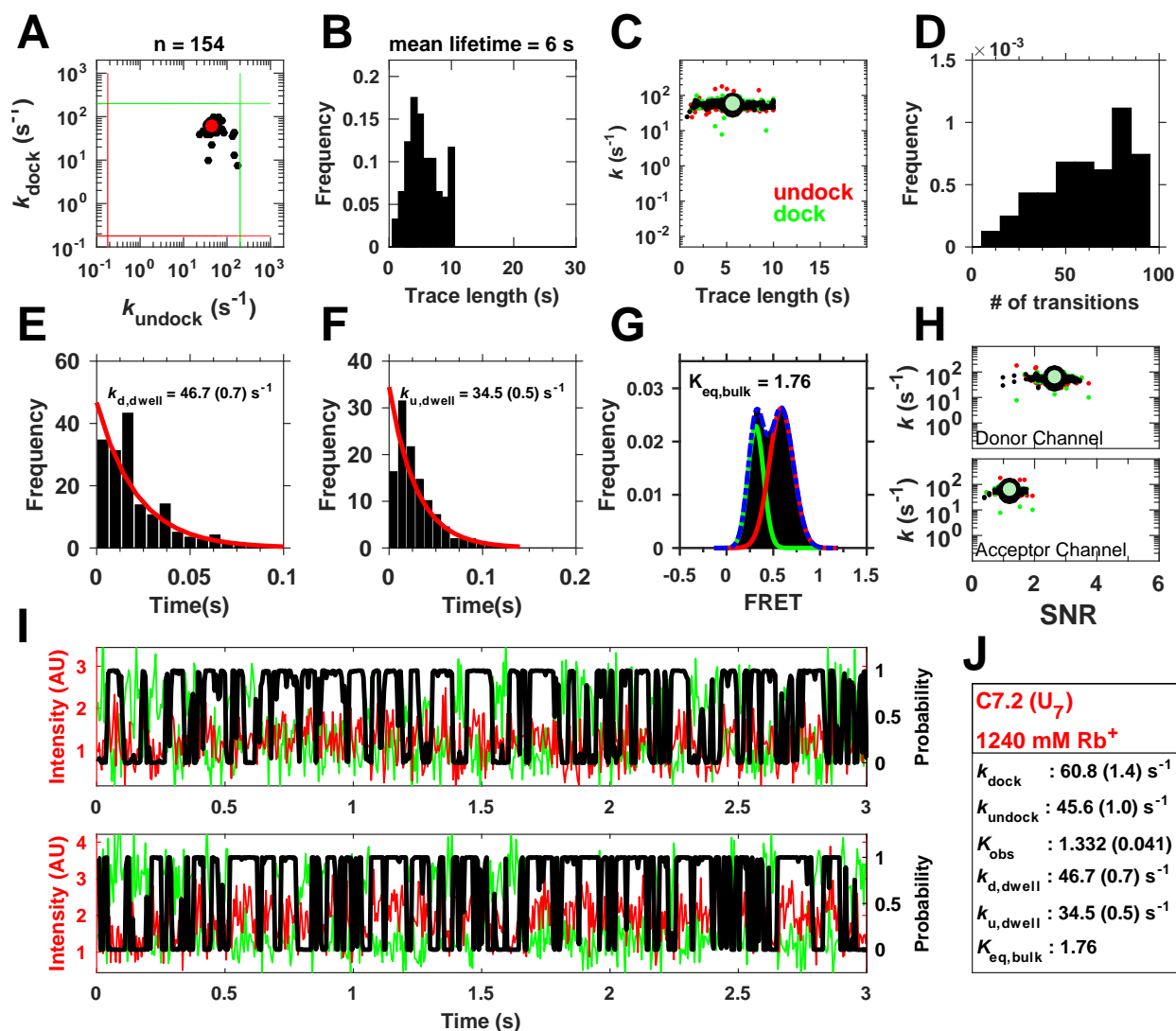


Figure S270. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

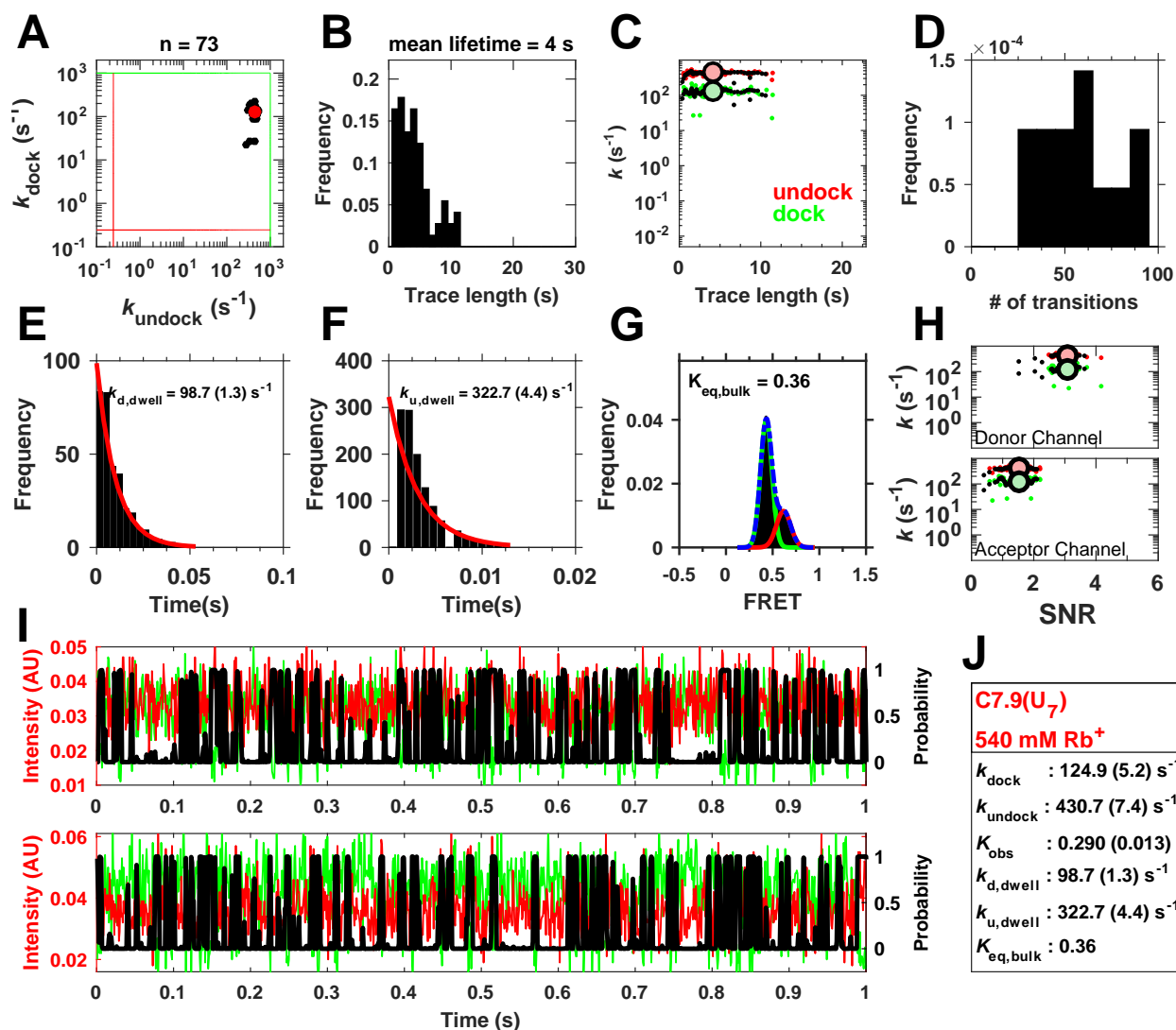


Figure S271. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

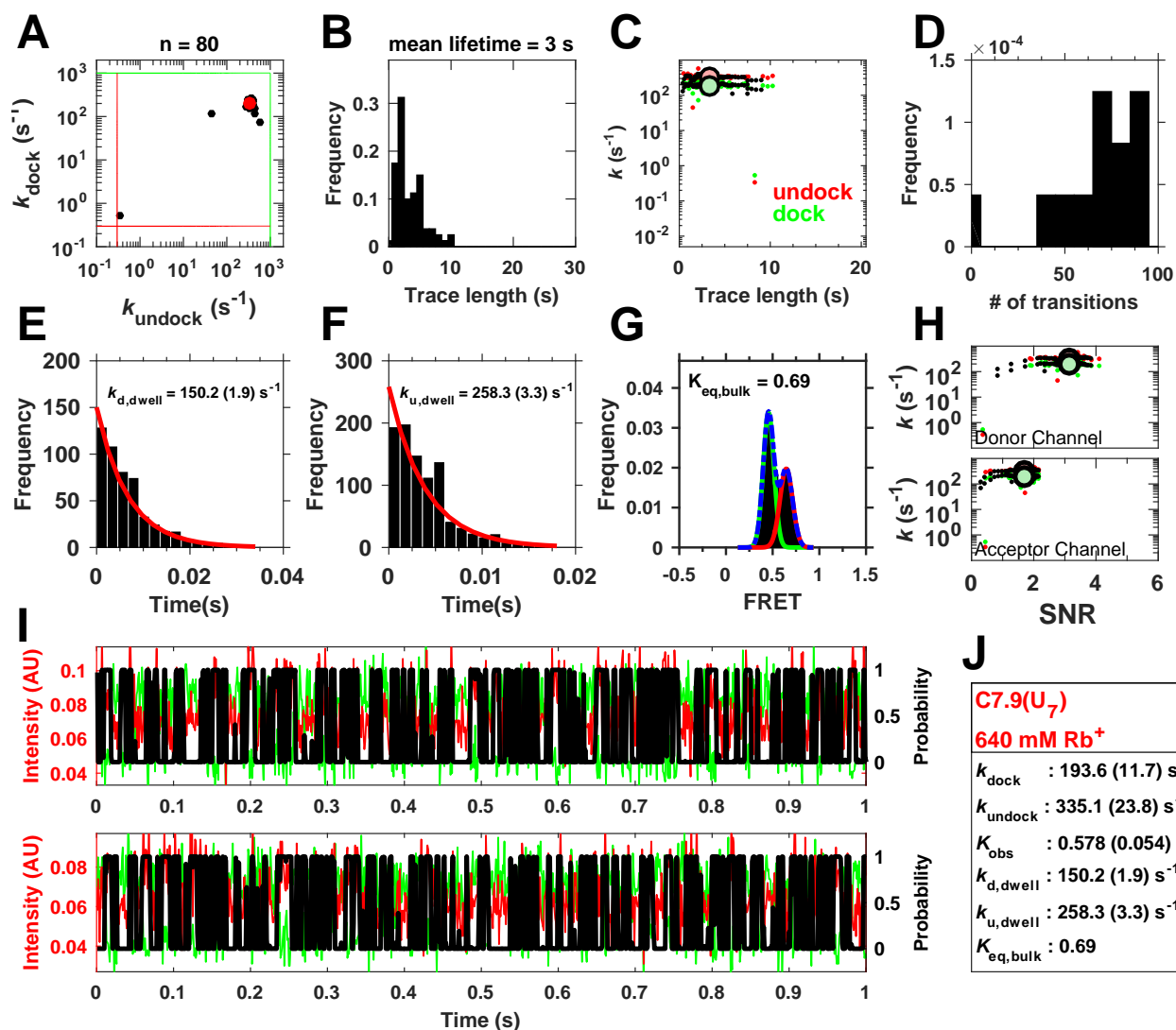


Figure S272. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

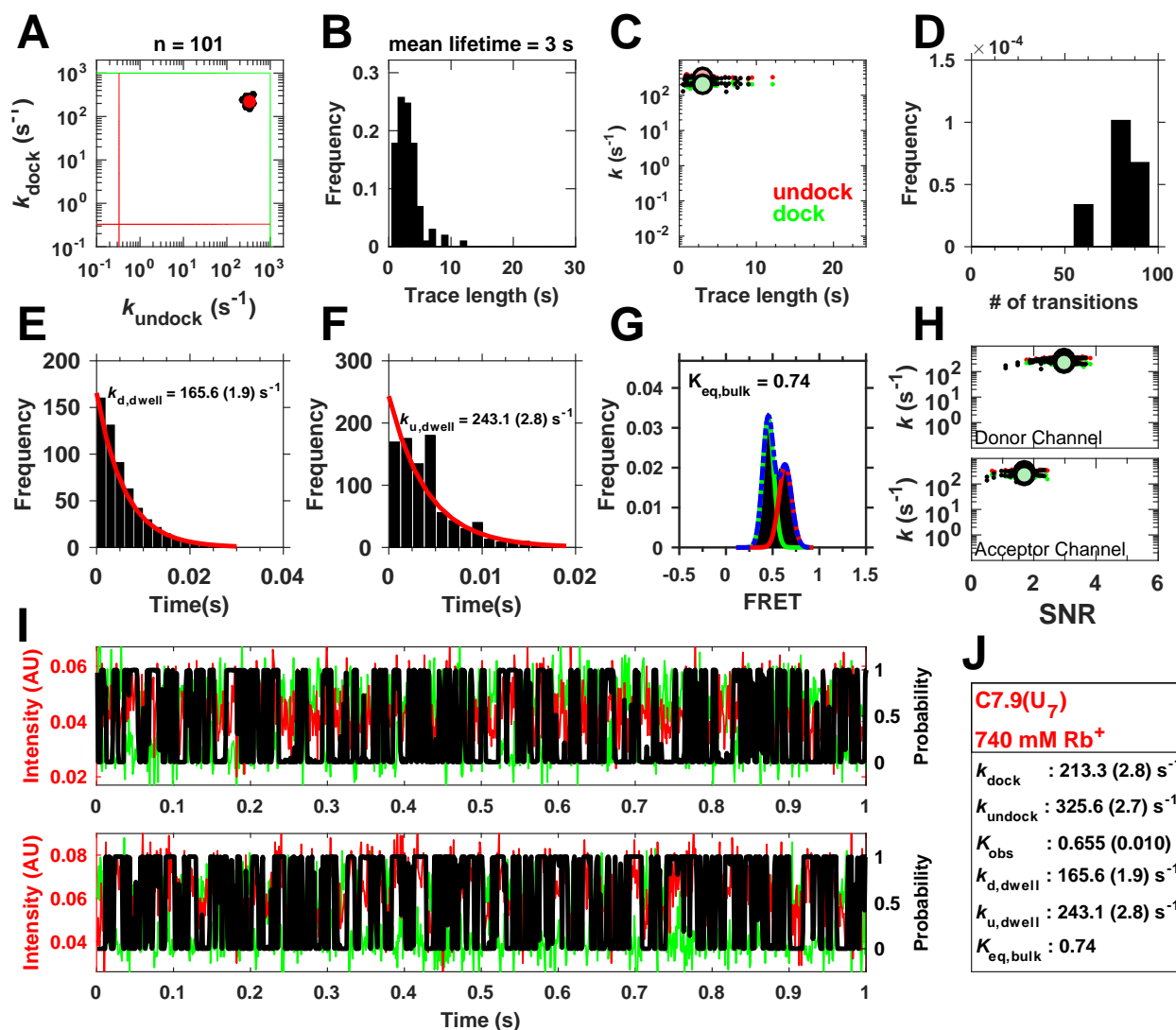


Figure S273. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

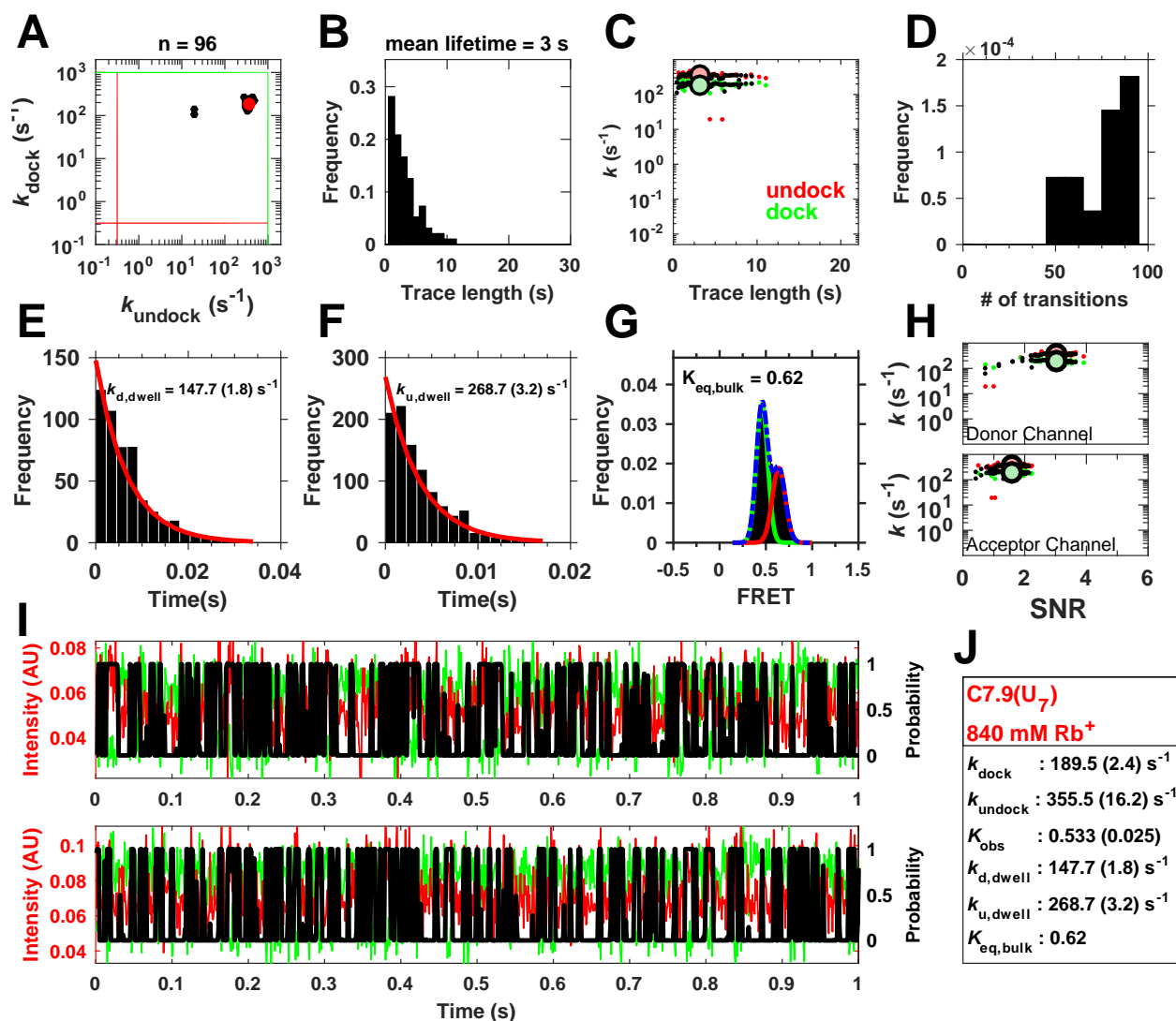


Figure S274. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

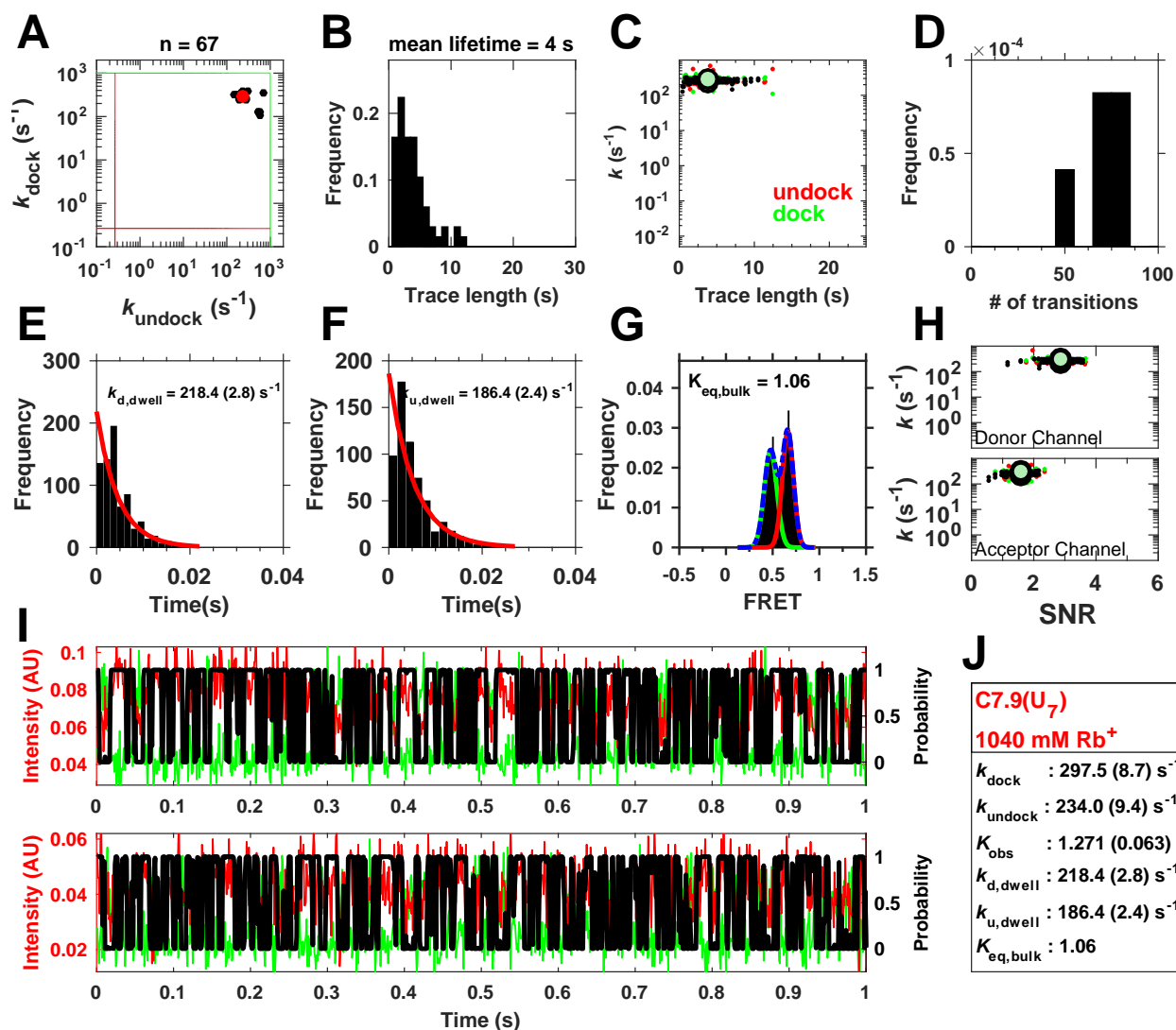


Figure S275. smFRET data summary. (A) Scatter plot of fitted values of the docking versus undocking rate constants of individual molecules. Green lines indicate the frame rate of data collection (upper limit) and red lines indicate the mean lifetime of the molecules (lower limit). Red dot is the population median. (B) Histogram of lifetimes of the smFRET traces. (C) Scatter plots of rate constants versus the length of the smFRET traces. The mean value for each rate constant is represented by a larger circle. Black dots are averages of five values and are shown to provide a visual guide. (D) Distribution of the number of transitions per trace. Distribution of dwell times in the low (E) and high (F) FRET states. Exponential fits are shown (red lines) along with the fitted single-exponential rate constants. (G) Cumulative FRET distributions. Distribution was fitted to a sum of two Gaussians (blue dashed line). The observed equilibrium constant from cumulative data was determined from the ratio of area under the high (red) and low (green) FRET components of the distribution. (H) Rate constants as functions of the signal-to-noise ratio (SNR) in the donor (top) and acceptor (bottom) channels. (I) Randomly-selected smFRET traces. Traces were truncated at one or three seconds for ease of comparison. The intensities of the donor dye (green) and the acceptor dye (red) are shown. The black line denotes the probability of occupying the high FRET state as determined by a two-state HMM model. (J) Summary table of single-molecule and cumulative kinetic and thermodynamic parameters.

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