Challenger

$\xrightarrow{\begin{array}{c} G \\ \hline Q_1, Q_2, Q_3 \end{array}}$

Randomly choose $\{u_1, u_2, ..., u_v\}$, $\{r_1, r_2, ..., r_c\}$, $\{t_{1,1}, t_{1,2}, ..., t_{v,c}\}$ in $[1, n)$, assign $L_{i,j} = ([r_j]G, t_{i,j}, [u_i r_j]G)$ for $1 \leq i \leq v$ and $1 \leq j \leq c$

Randomly choose j' in $[1, c]$, t' in $[1, n)$, assign $L' = ([r_{j'}]G, t', [r_{j'}]Q_1)$

Randomly choose j'' in $[1, c]$, replace $L_{i,j''}$ with $(Q_2, t_{i,j''}, [u_i]Q_2)$ for $1 \leq i \leq v$

Randomly choose $\{u_1, u_2, ..., u_w\}$, $\{t_1, t_2, ..., t_w\}$ in $[1, n)$, assign $L_k = (Q_2, t_k, [u_k]Q_2)$, for $1 \leq i \leq w$ randomly choose d in $[1, w]$, replace L_d with (Q_2, t_d, Q_3)

RP-based Linkage
Adversary

$L_{i,j;\ 1 \leq i \leq v,\ 1 \leq i \leq v}$
$L' = ([r_{j'}]G, t', [r_{j'}]Q_1)$
$L_{k;\ 1 \leq k \leq w} = (Q_2, t_k, [u_k]Q_2)$

$\xrightarrow{}$

$ID_{U'}$ in $\{u_1, u_2, ..., u_w\}$ or not

$\xleftarrow{s}\xleftarrow{s}$