

S7 Table Comparison of communication costs

Scheme	Messages Communicated During AKE Phase	Total (bits)
Park <i>et al.</i> [69]	$RU_y \xrightarrow{1536} GW \xrightarrow{1408} SN_x \xrightarrow{1280} GW \xrightarrow{480} RU_y$	5632
Shuai <i>et al.</i> [36]	$RU_y \xrightarrow{768} GW \xrightarrow{320} SN_x \xrightarrow{320} GW \xrightarrow{320} RU_y$	1728
Das <i>et al.</i> [30]	$RU_y \xrightarrow{672} GW \xrightarrow{512} SN_x \xrightarrow{352} RU_y$	1536
Shin <i>et al.</i> [31]	$RU_y \xrightarrow{512} GW \xrightarrow{512} SN_x \xrightarrow{384} GW \xrightarrow{512} RU_y$	1920
Challa <i>et al.</i> [22]	$RU_y \xrightarrow{992} GW \xrightarrow{1024} j \xrightarrow{512} RU_y$	2528
Srinivas <i>et al.</i> [33]	$RU_y \xrightarrow{672} GW/RC \xrightarrow{512} SN_x \xrightarrow{352} RU_y$	1536
Wazid <i>et al.</i> [35]	$RU_y \xrightarrow{672} GW/RC \xrightarrow{512} SN_x \xrightarrow{512} RU_y$	1696
Chen <i>et al.</i> [27]	$RU_y \xrightarrow{928} GW/RC \xrightarrow{672} SN_x \xrightarrow{896} GW/RC \xrightarrow{672} RU_y$	3168
SRUA-IoT	$RU_y \xrightarrow{432} GW \xrightarrow{512} SN_x \xrightarrow{412} RU_y$	1356