MODULE *hello_world*

EXTENDS *Sequences*

VARIABLES
A_msgs,
network,
status,
B_inbox

$$
\begin{aligned}
&Init \triangleq \\
&\quad \land A\_msgs = \{\} \\
&\quad \land network = \{\} \\
&\quad \land status = \text{“None”} \\
&\quad \land B\_inbox = \langle\rangle
\end{aligned}
$$

$$
\begin{aligned}
&Send(m) \triangleq \\
&\quad \land m \notin A\_msgs \\
&\quad \land A\_msgs' = A\_msgs \cup \{m\} \\
&\quad \land network' = network \cup \{m\} \\
&\quad \land \text{UNCHANGED } \langle status,\ B\_inbox\rangle
\end{aligned}
$$

$$
\begin{aligned}
&NetworkLoss \triangleq \\
&\quad \land \exists\, e \in network : network' = network \setminus \{e\} \\
&\quad \land \text{UNCHANGED } \langle status,\ B\_inbox,\ A\_msgs\rangle
\end{aligned}
$$

$$
\begin{aligned}
&NetworkDeliver \triangleq \\
&\quad \land \exists\, e \in network : \\
&\qquad \land B\_inbox' = B\_inbox \circ \langle e\rangle \\
&\qquad \land network' = network \setminus \{e\} \\
&\quad \land \text{UNCHANGED } \langle status,\ A\_msgs\rangle
\end{aligned}
$$

$$
\begin{aligned}
&Receive \triangleq \\
&\quad \land status' = \text{IF } B\_inbox = \langle \text{“hello”},\ \text{“world”}\rangle \text{ THEN “Ok” ELSE “None”} \\
&\quad \land \text{UNCHANGED } \langle network,\ B\_inbox,\ A\_msgs\rangle
\end{aligned}
$$

$$
\begin{aligned}
Next \triangleq\ & \lor Send(\text{“hello”}) \\
& \lor Send(\text{“world”}) \\
& \lor NetworkLoss \\
& \lor NetworkDeliver \\
& \lor Receive
\end{aligned}
$$

$$NothingUnexpectedInNetwork \triangleq \forall\, e \in network : e \in A\_msgs$$

$$
\begin{aligned}
TypeOK \triangleq\ & \land A\_msgs \in \text{SUBSET } \{\text{“hello”},\ \text{“world”}\} \\
& \land network \in \text{SUBSET } \{\text{“hello”},\ \text{“world”}\} \\
& \land status \in \{\text{“Ok”},\ \text{“None”}\}
\end{aligned}
$$

```
EventuallyStatusIsOK ≜
LET IsStatusOk ≜ status = "Ok"
IN  ∼IsStatusOk
```