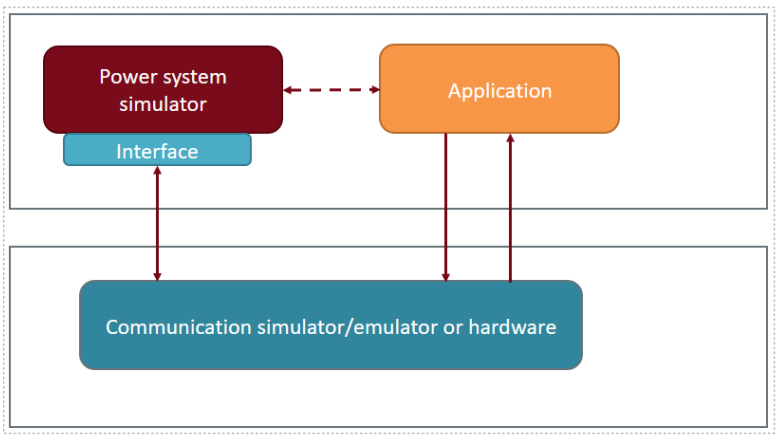
About

Provide general information regarding the test specification (TS).

Title of Test *Provide a unique and meaningful name. Consider using a machine-readable name (e.g., use underscores or periods instead of blanks).*	AdjustCommsParameters
Author / Organization	Petra Raussi (VTT)
Reference to Test Case *Test Cases (TC) are described in a separate form. They provide the scope and goal of a test (incl. links to SC / UC), identify the test components and define the test criteria.*	CommsVoltageControl
Test Rationale *Provide a short description of how this TS addresses the goals and test criteria defined in the TC.*	This test aims to showcase the impact of the coupled ICT network to the power system communication by adjusting the communication channel parameters.

Test System and Test Design

Define how the TC's object under investigation is embedded in a specific test system. Describe how the results are used to evaluate the objective function or test objective. Explain the detailed process of how this test addresses the TC's goal.

Specific Test System *Provide a **graphical and textual description** of the specific test system and its components. Objects and functions that are not in the focus of the test are simplified to the minimum function, functional equivalent or boundary parameters necessary to execute the test.*	The test system is comprised of the components and their interconnection according to the figure shown below. The emulation delay must be set to different values depending on the delay to be assessed. One experiment must be carried out for each of these delays. The application for the power system has a set of specified data fed through a simulated communication network, in which the communication channel parameters impact of performance of the communication and impact the performance of the application on the power system. 

<table>
<tr><td rowspan="3">Test and Output Parameters

Provide a list of parameters that are significant for executing the test. And provide a list of outputs / measured parameters. For each parameter, define name, unit and type (time-series input, static parameter, optimization result, etc.).

Consider using a machine-readable name (e.g., use underscores or periods instead of blanks).

If available, provide a link to existing input data (data files in SmILES data format).</td><td>Test Parameters</td></tr>
<tr><td>All parameters according to the system configuration.
Controllable parameters:
The time duration for which each value from the data profile is sent.
The specific communication protocol to send the information.
The emulation delay of the communication emulator.
Uncontrollable parameters:
Time that takes the data to be received back to the power system simulation.</td></tr>
<tr><td>Outputs / Measured Parameters</td></tr>
<tr><td></td><td>External electric grid:
Power flows to and from
Power transmission/distribution network:
Voltages at consumer connection points
Transformer loading
Communication network
latency
throughput
packet loss
Voltage control algorithm
success rate
Voltage deviation from setpoint (e.g. 1 p.u.)
Voltage control settling time</td></tr>
<tr><td>Test Design

Explain the choice of test design. This involves explaining, e.g., available test parameters, the test sequence or decision criteria. Textual or graphical description of the sequence of steps carried out during the test, including parameter ranges and variation of input parameters.</td><td>Choose data profile to be sent around the system.
Choose the number of values that will be sent through the system (at least 1000 recommended for statistical purposes)
Choose communication protocols
Select a set of delay emulation values to be assessed
Set the delay emulation from the communication emulator to the first value from the set
Run the experiment and determine for each sent value whether the power system simulation received it.
If the value was received, determine the roundtrip time by calculating the difference of the timestamps registered by the power system simulation.
Assess test criteria for each of the values.
Repeat procedure selecting a different delay emulation value from the set, until all the experiments have been executed.</td></tr>
</table>

General Simulation Setup

Provide general information that helps translating the test system into an executable simulation model. However, do not include details about an implementation in a specific toolchain here!

Component Models *Provide a link to the description of the most relevant component models. Component models are defined in separate forms.*	None.
Initial System State *Description of conditions that are prerequisites to run the simulation/ optimization and initial choices of input (and internal) parameters.*	Stable power system and communication network simulations and communication channel operational.
Temporal Resolution *Specify the time resolution of the simulation (fixed step size, event based, etc.).*	Order of seconds.
Evolution of System State and Test Signals *Provide a quantitative characterization of the temporal evolution of test events and evolution of the relevant test parameters.*	The successful received values and the timestamps of sending/receiving values are registered in the power system simulation.
Source of Uncertainty *List possible sources of uncertainty and how they can be quantified, in order to evaluate the quality of the test.*	The delay that can occur within any of the simulations used in the system has a stochastic nature. There are therefore sources of uncertainty.
Stopping Criteria *Under which conditions are the test results not valid or the test is interrupted?*	The experiment concludes when the data profile has been sent a previously defined number of times.
Storage of Data *In which format are the output parameters and other results stored?*	*.csv as primary format.

Additional Information

Link to other Test Specifications *Provide a link to other test specifications here. In the case of SmILES cross-simulations, mention how this TS relates to the other TS. For instance, what results from the other TS are used as inputs for this TS?*	None.