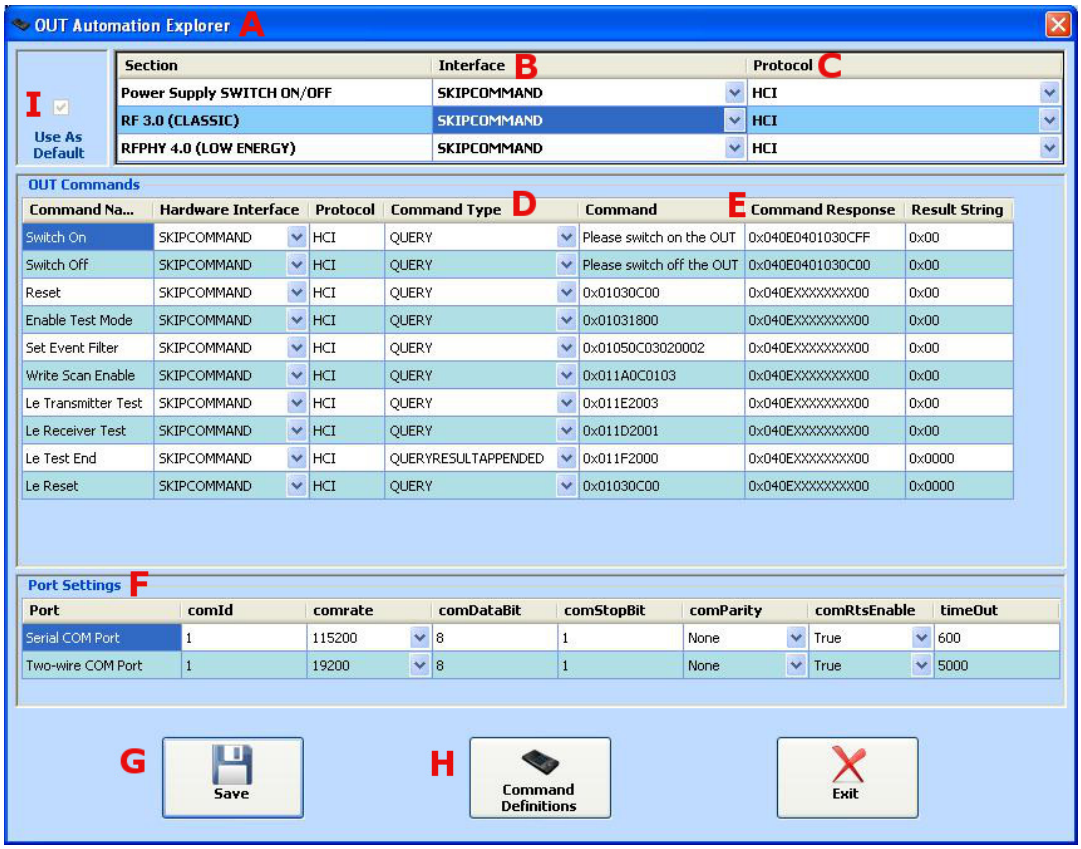
7 Automation

This section provides details on test automation capabilities of InterLab® Bluetooth® RF Test Solution.

7.1 OUT Automation Explorer

The System Software supports several automation commands and interfaces for communication with the OUT. These configuration options can be selected directly from a drop down menu in the OUT Automation Explorer (shown below).

The OUT Automation Explorer is a built-in component of the System Software, yet it can also be installed as a standalone OUT configuration tool for use in pre-testing. The OUT Automation Explorer does not require your CodeMeter license dongle to be connected to the PC when installed in standalone mode. This allows device configurations to be verified prior to laboratory resources being allocated. The OUT Automation Explorer standalone install package can be downloaded from the InterLab Bluetooth RF Test Solution download page on the 7Layers support portal.



The menu consists of the following modules:

A. **Title Bar**: Title bar with the OUT-specific project name

B. **Interface Selection**: Dropdown box to select type of communication with the OUT. The options are explained in section 6.1.2.

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C. **Protocol Selection**: Dropdown box to select protocol for communication, i.e. HCI/TWOWIRE. The options are explained in section 6.1.3.

D. **Command Type**: Dropdown box to select how commands are carried out.

E. **OUT Command Response**: Read-only text grid depicting the raw OUT Automation Command formats. The commands are listed in section 6.1.1

F. **Port Settings**: Text grid for configuring the communication port settings.

G. **SAVE**: Saves the current settings.

H. **Command Definitions**: Opens the OUT Command Definitions window where OUT Commands are set and can be manually tested for functionality.

I. **Default Check Box**: To specify if the current configuration should be used as a default prototype for OUT Automation in the future.

7.1.1 OUT Command Definitions

The OUT Command Definitions window allows the customization of automation commands sent to the OUT during testing. Additionally, a test feature has been implemented here to allow the verification of command functionality prior to execution of a test session.

Each command contains one or more steps where the System Software will send a command to the OUT interface, and then read an expected response back. The Expected Response back should be able to determine from the returned string when a command is correctly executed on the OUT. The commands set in this form will remain between OUTCode-SampleId combinations
The default automation commands should already have the instructions set correctly for typical OUT automation use cases, depending on the interface being used.

Command flags are used in some command steps as placeholders for sending/receiving certain test parameter information to and from the device i.e. the frequency channel to transmit on.
Various command flags can be entered in to each command which will be replaced with the correct information by the System Software when a command is test ran by the user or executed during testing. The following command flags are available:

- <F>: Placeholder for the target Tx and Rx frequency when running a LE test
- <L>: Placeholder for the length of the packet when running a LE Transmitter Test command
- <P>: Placeholder for the packet payload when running a LE Transmitter Test command
- <RESULT,#>: Placeholder for the resulting number of packets returned when running an LE Test End command. # should be set to the number of places to expect this indicator
- <WAIT,#>: Placeholder to instruct the System Software to wait for # seconds. No command will be sent to the device during this time.
  The step can be set to read back any results from the device at the end of the wait timer, or a new step can be added for additional queries.

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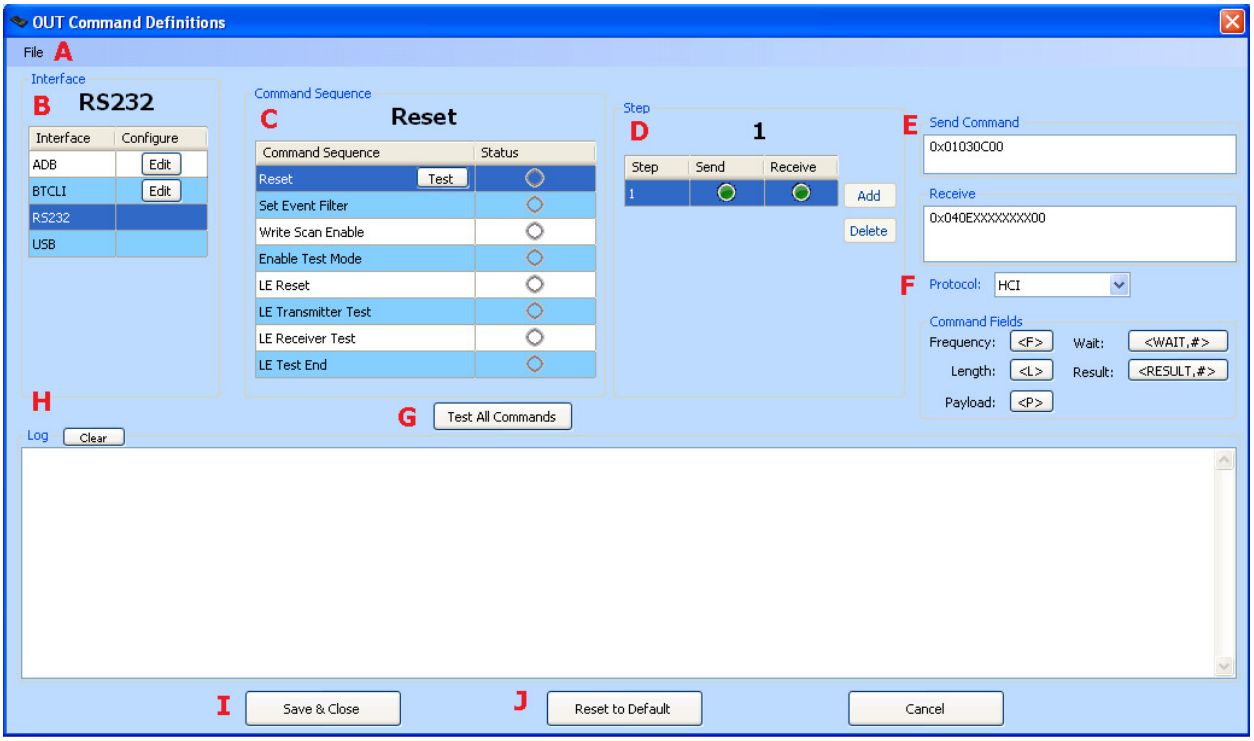

A: **File Menu > Import/Export**: Import or Export settings to .XML file for future use.

B: **Interface**: Select interface for commands (ADB, BTCLI, RS232 or USB). The application launch configuration for ADB & BTCLI can be configured via the "Edit" button.

C: **Command Sequence**: Select the command you want to define or test sending.

D: **Step List**: Define, add or delete additional steps for the selected command.

E: **Send Command/ Recieve**: Define the command to be sent to OUT/Received back.

F: **Protocol**: Set command protocol, HCI or 2-Wire.

G: **Test All Commands**: Tests all commands for functionality from top to bottom. A green dot denotes a successful test and a red dot denotes a failed test (unexpected value received).

H: **Log**: Shows the command activity in a window.

I: **Save & Close**: Saves the current settings and closes the OUT Command Definitions.

J: **Reset to Default**: Resets all settings to the test system default

7.1.1.1 Launch Configuration

The OUT Command Definitions supports ADB, BTCLI, RS232 and USB command interfaces. The path to the executable of the tool for ADB and BTCLI can be adjusted by clicking the "Edit" button next to the respective interface type on the interface section. An example of the ADB launch configuration is shown below.

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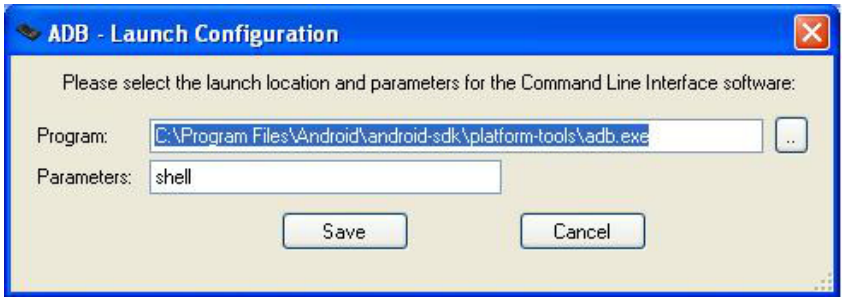


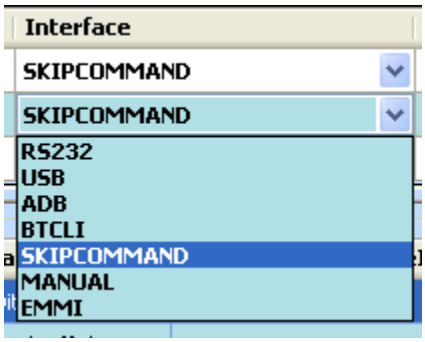
NOTE: In the event that the path is incorrect when a verification test is run from this window, the software will prompt the user to search for the executable in several common locations for the tool, and will again prompt the user to set an alternate path if it is found.

7.1.2 OUT Automation Commands

The following OUT automation commands will be used during testing:

- **Power Supply SWITCH ON/OFF**
  - SwitchOn - OUT power switch on
  - SwitchOff - OUT power switch off
- **RF 3.0 (CLASSIC)**
  - Reset - BR/EDR: software reset
  - EnableTestMode - BR/EDR: test mode preparation
  - SetEventFilter - BR/EDR: test mode preparation (HCI protocol only)
  - WriteScanEnable - BR/EDR: test mode preparation (HCI protocol only)
- **RFPHY 4.0 (LOW ENERGY)**
  - LeTransmitterTest - LE: configure and enable direct Tx mode
  - LeReceiverTest - LE: configure and enable direct Rx mode
  - LeTestEnd - LE: End current direct test mode (returns number of received packets)
  - LeReset - LE: software reset

7.1.3 Interface Overview



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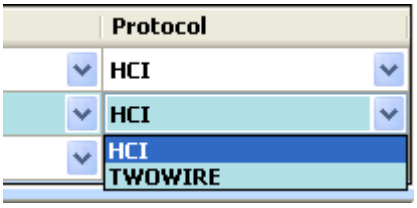
The following Interface options are available:

- **RS232** - Serial port is used to interface with the OUT.
- **USB** - the OUT commands are encoded and dispatched over USB interface (comprehensive support provided for all HCI protocol stack variants, e.g. CSR, Widcomm/Broadcom).
- **ADB** - available for OUT's that use Google's Android OS.
- **BTCLI** - CSR's command line interface.
- **SKIPCOMMAND** - (Default) Automation command will be skipped.
- **MANUAL** - Manual interaction will be triggered by popup messages; the message text can be customized.
- **EMMI** - Automation command will be handled via EMMI; the connection to EMMI can be configured using the "EMMI" entry in "E. Port Settings".
- **USEPS** – Power Supply will be used to recycle the power to the OUT (only available for the **Power Supply SWITCH ON/OFF** section).

7.1.4 Protocol Overview



The following Protocol options are available:

- **HCI** - (Default) Automation command will be handled via HCI interface. The COM port connection can be configured using the "HCI" entry in "E. Port Settings".
- **TWOWIRE** - Automation command will be handled via 2-wire interface; the COM port connection can be configured using the "TWOWIRES" entry in "E. Port Settings".

  NOTE: TWOWIRE automation is applicable only for **RFPHY 4.0 (LOW ENERGY)** commands.

7.2 Climatic Chamber Control (CCC)

The Climatic Chamber Control (CCC) gives the user the option to remote control a climatic chamber via GPIB, Ethernet or RS232. The Bluetooth® RF Test Solution is capable of interfacing with the Climatic Chamber Control to enable full automation under extreme temperature conditions.

It is capable to set the target temperature and constantly read out the current temperature of the climatic chamber. Additionally it is possible to set different wait timers for the temperature to settle after reaching the target temperature.

Several climatic chamber vendors and model drivers are implemented.

For more information please visit:

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