PLC PHY Tester

PLC PHY Tester User Guide

Introduction

The Power Line Communication (PLC) Physical Layer (PHY) Tester has been developed to allow the user to test basic characteristics of physical layers of Microchip PLC products. This tool is able to configure the different physical layers of each product with basic parameters such as modulation schemes, transmission power, baudrate, etc. in order to make the interchange of basic PLC messages possible.

The tool has been structured similar to a wizard, where each step allows the user to configure some parameters related to one aspect of the test. This structure allows the user to configure the test to be performed, and at the end of the wizard the test will start with the proper configuration chosen by the user.

It should be kept in mind that in order to obtain repeatable results, a physical test must be done under controlled condition; it is recommended to carry out the test in an isolated path free of other PLC messages or interferences that can introduce uncontrolled signals in the channel to be evaluated.

Features

- Supported Platforms: ATPL230, SAM4CP16B, ATPL250A, SAM4CP16C and PL360
- Basic PHY Configuration for Transmission and Reception of Messages
- Signal Quality Measurement

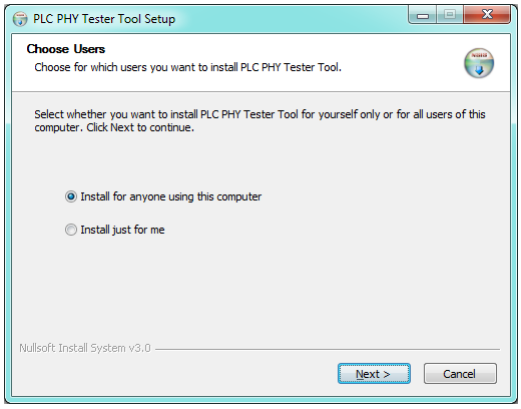
Table of Contents

1. Initial Steps

1.1 Software Installation

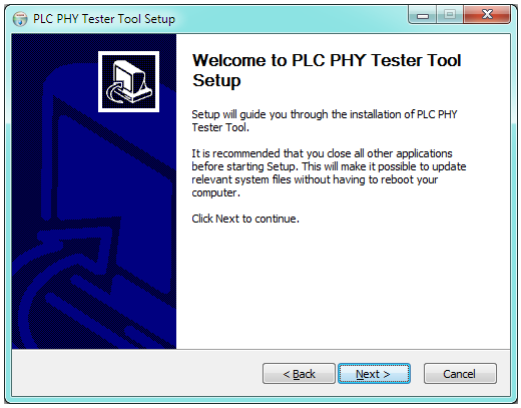
To install the software, execute the installation wizard provided. The first window allows selecting between multi-user support and current user:

Figure 1-1. First Wizard Window



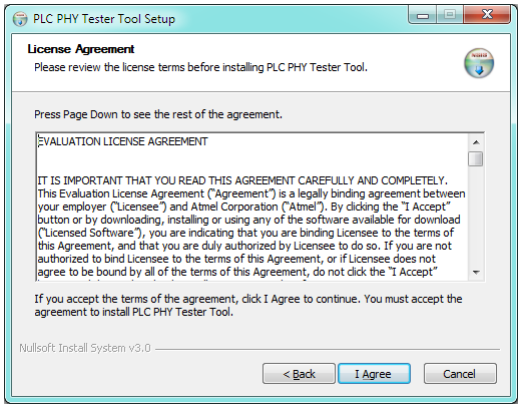
Next window is the welcome window and contains some advice about tool installation:

Figure 1-2. Welcome Window



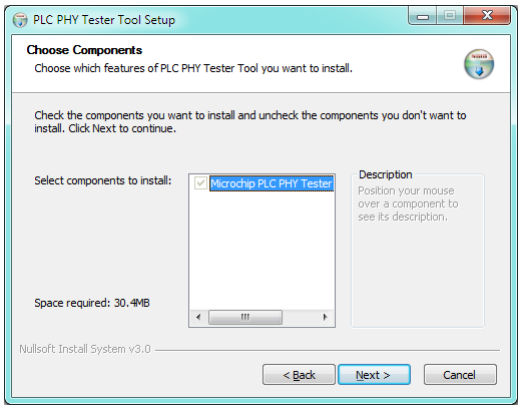
The next window shows you the License Agreement:

Figure 1-3. License Agreement Window



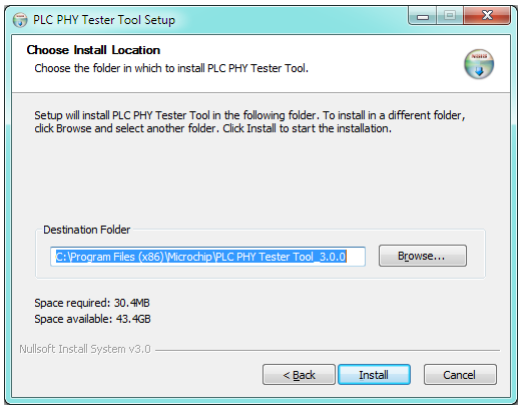
Next, select the components to install:

Figure 1-4. Select Components



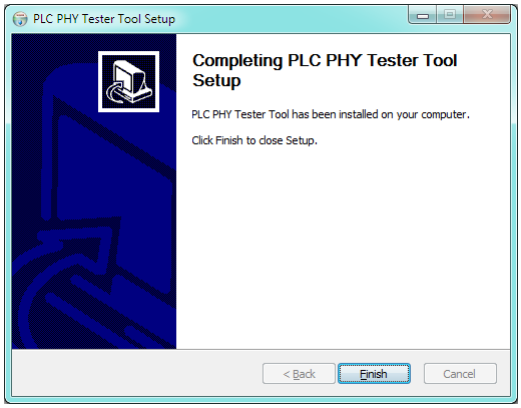
And finally, select the install location:

Figure 1-5. Select Folder



The wizard must complete without any other configuration:

Figure 1-6. Installation Completed



The installation procedure generates a desktop link and start menu entry. Use either to start the tool.[1]

1.2 Hardware Device

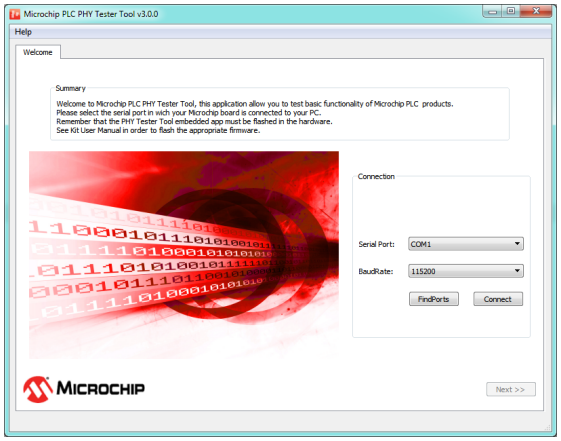
The different firmware releases include PHY layer project examples. Use the right software to have all the features enabled. Follow the instructions supplied with the kit to program the firmware correctly.

1.3 Starting the Tool

The first step is to plug the hardware device to the power line. Then, connect the USB cable to the host computer. Now we are ready to start the PLC PHY Tester software using, for example, the link created on your desktop during the install process. In order to work with PLC PHY Tester, the hardware must be flashed with the PHY Tester tool embedded application. See *"Kit User Manual"* in order to flash the appropriate firmware.

Upon start, the main window will appear:

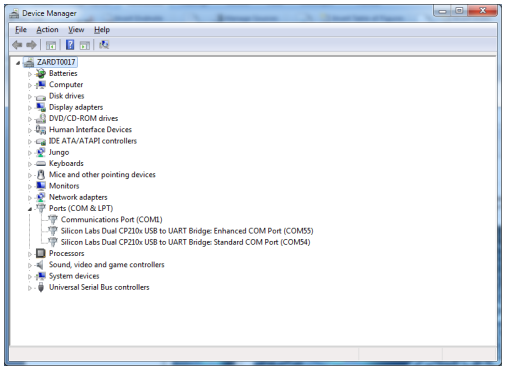
Figure 1-7. Starting Window



If the COM port to choose is not known, it can be located at the Windows Device Manager in the Port (COM & LPT) section.[2] In this example, the COM55 is used:

[1] In order to be able to connect to the Microchip PLC boards, USB drivers are provided with this software. Please be sure that these drivers are installed before using this tool.

Figure 1-8. Windows Device Manager



[2] Some Microchip PLC evaluation kits use a USB to UART bridge from Silicon Labs. This device creates two COM ports (one standard and one enhanced) when you connect the evaluation kit to the PC. In order to work with this application the enhanced one must be selected.

2. General Operation

The PLC PHY Tester has been designed to work as a wizard commonly used by many desktop applications. The wizard is structured in tabs that are shown and enabled as the user sets configurations specific for each tab, and goes to the next tab by means of the proper button. The next sections show the general layout of the tabs that compose the wizard.

2.1 Welcome Tab

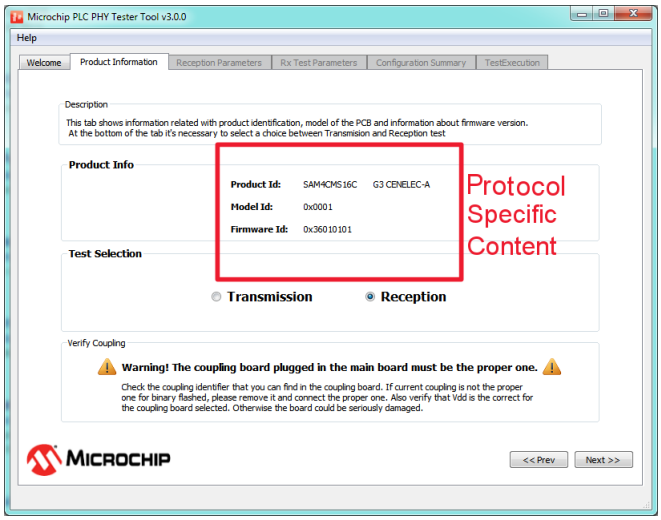
The main window that appears as soon as the application is started (Figure 1-7) shows a welcome message and asks the user to select the serial port where Microchip PLC Development Board has been connected.

The user must select the proper port and baudrate to connect and then press the “Connect” button. As soon as the button is pressed the button text changes to “connecting” triggering a process of board identification; after few seconds the button text changes to “Disconnect” which means that the identification process has finished. A new tab (Product Information) appears on the wizard and the “Next” button is enabled allowing the user to advance to the following step of the configuration. In case of error, please check the FW of the board and configuration of the serial connection.

2.2 Product Information Tab

As soon as the user presses the Next button in the Welcome tab, a new tab is shown:

Figure 2-1. Product Information Tab



The Product Information tab shows basic board information and also asks the user to configure the board as transmitter or receiver.

The information shown is related to the physical layer implemented in the firmware of the board:

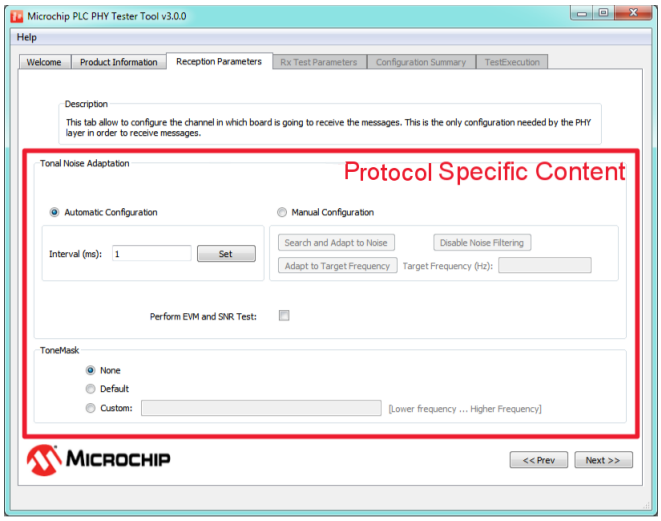
- **Product ID:** Shows a text string identifying the Microchip PLC product (platform)
- **Model ID:** Is a 16-bits unsigned integer that identifies the model of the board
- **Firmware ID:** Is a 32-bits unsigned integer that identifies the physical layer firmware version running on the board

The next tab depends on transmission or reception test selection. For reception tests “Reception Parameters” and “Rx Test Parameters” tabs are added; for transmission tests “Transmission Parameters” and “Tx Test Parameters” tabs are added. Finally, independently of the kind of test selected, two more tabs are added: “Configuration Summary” and “Test Execution”. All of these tabs are disabled at this point; as the user navigates through the wizard with the Next and Prev. buttons, the tabs become enabled.

2.3 Reception Parameters Tab

This tab allows configuration of the reception parameters of the board. These parameters depend on the PHY layer (Protocol). Section Protocol Specific Tabs shows the content of this tab for each PLC protocol supported. The following figure shows the general aspect of this tab:

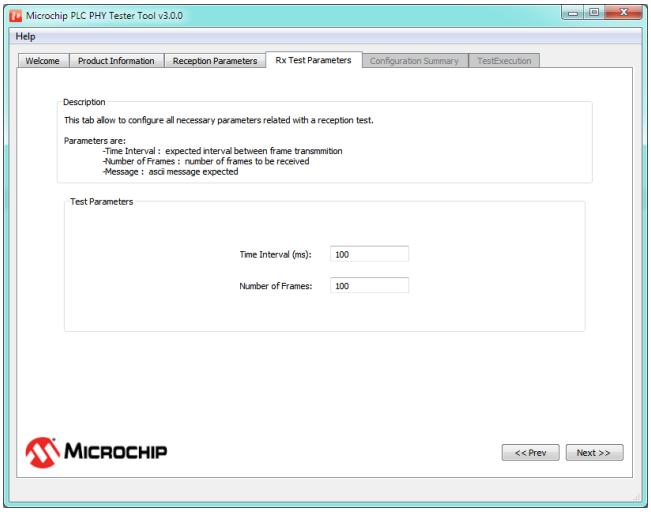
Figure 2-2. Reception Parameters Tab (G3-PLC Example)



2.4 Rx Test Parameters Tab

This tab allows configuration of the reception test parameters. These parameters are the amount of expected messages to be received and the time interval from message to message (receiver instance will wait for this time prior to consider message is missed). These parameters are used just for test statistic results. Unlike the previous one, this tab is common for all the Microchip PLC protocols. The following figure shows the tab layout:

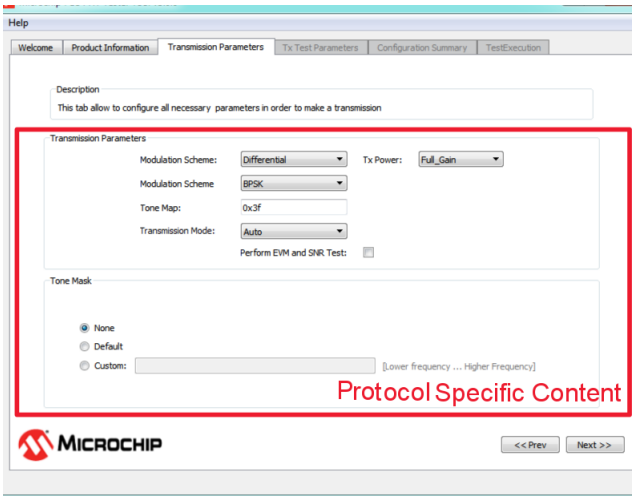
Figure 2-3. Rx Test Parameters Tab



2.5 Transmission Parameters Tab

This tab allows the user to configure transmission parameters such as modulation, gain, etc. This tab is protocol-dependent, thus its content varies depending on which PHY layer runs on the board connected to the tool. Section Protocol Specific Tabs shows the content of this tab depending on the PHY layer. The following figure shows the tab layout in case of G3-PLC PHY layer:

Figure 2-4. Transmission Parameters Tab (G3-PLC example)



2.6 Tx Test Parameters Tab

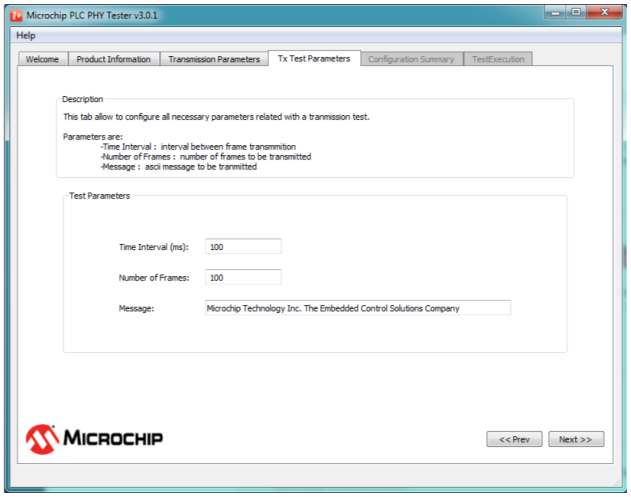
This tab is very similar to the Rx Test Parameters tab. The “Message” parameter allows configuration of the content of the message to be transmitted in ASCII characters. the “Time Interval” parameter defines the interval of time, measured in milliseconds, between the transmissions of two messages.[3]Finally, the “Number of Frames” parameter allows configuration of the number of messages to be transmitted. As in the Rx Test Parameter Tab, this tab is independent of PHY layer.

[3] This time interval indicates the time between the beginnings of two frames.

IMPORTANT: 10ms drifts in the transmission and reception times may appear due to the application running on a non-real time operating system.

IMPORTANT: A "Time Interval" shorter than 70 milliseconds may not work properly due to PC OS and USB connection. Please use the PHY TX console firmware example to transmit messages with shorter time interval.

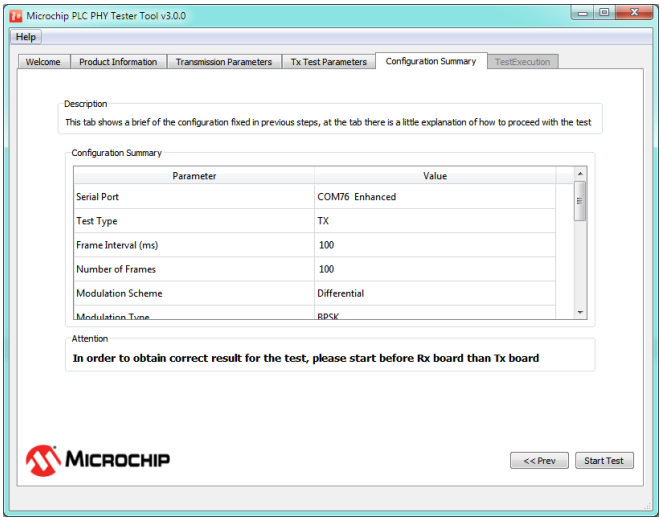
Figure 2-5. Tx Test Parameters Tab



2.7 Configuration Summary Tab

This is the last tab in the wizard before starting the execution of the test. This tab shows a table where all the configuration parameters are listed that have been configured along the wizard. The “Next” button has been substituted with a “Start Test” button that allows starting the message transmission or reception.

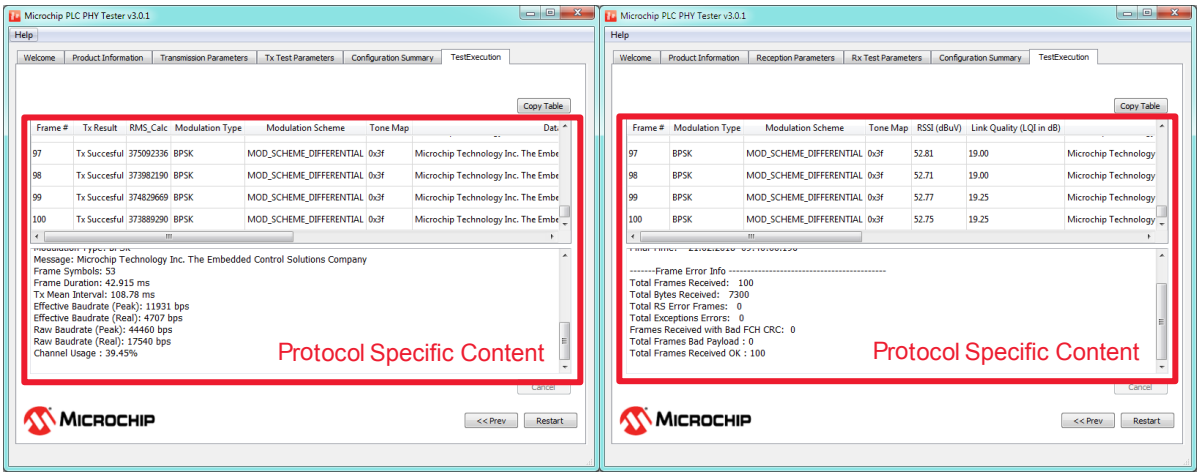
Figure 2-6. Configuration Summary Tab of a Transmission Test



2.8 Test Execution Tab

This is the tab shown while the test is being executed; it shows the transmission or reception of each message in form of a table. The following figures show examples of this tab for transmission and a reception tests:

Figure 2-7. Execution Tab for Transmission and Reception



Both views (Tx and Rx) show tables representing different information depending on test type (transmission/reception). When the test is finished or is cancelled, a final report is shown at the bottom of the tab.

This tab will provide additional information about signal quality in case of selecting "Performing EVM and SNR Test" check-box in the "Reception Parameters" tab. More information about this feature can be found in Section Protocol Specific Tabs.

The user can copy the information included in the corresponding table to the clipboard by clicking on the "Copy Table" button. Then users can paste this information in a spreadsheet for later data processing. This tab is only able to hold the information of the last 10000 frames; the user can choose a bigger number of frames to be transmitted/received but only the last 10000 frames will be available.

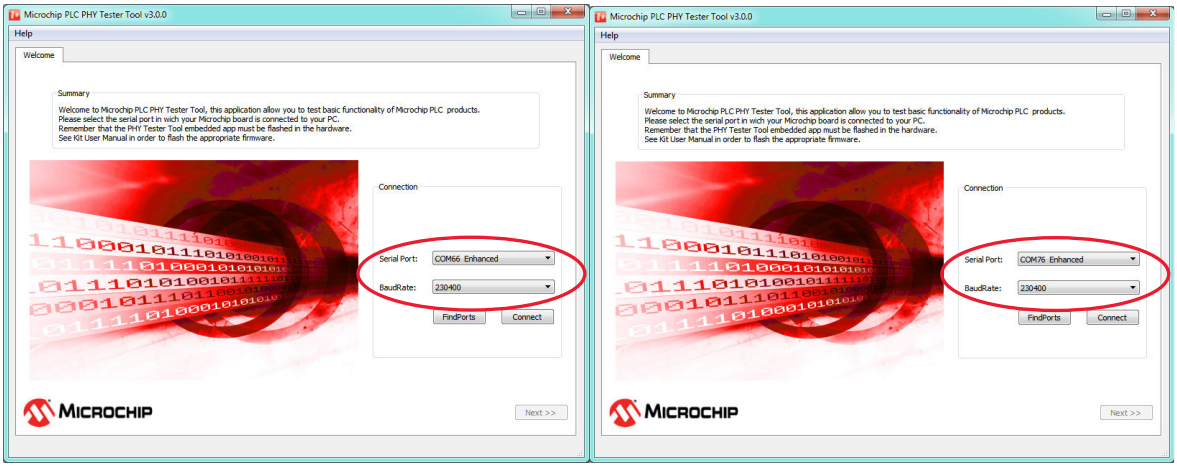
3. Test Execution Example

Boards must be connected to a computer by means of USB connections. The PLC PHY Tester must be installed in the PC and the user has to initiate one instance of the tool for each board. The next example shows a G3-PLC PHY layer test using PL360, but it is general enough to be valid for other platforms.

3.1 Connection Step

Once each tool instance is opened, it is necessary to select the proper port in each instance.

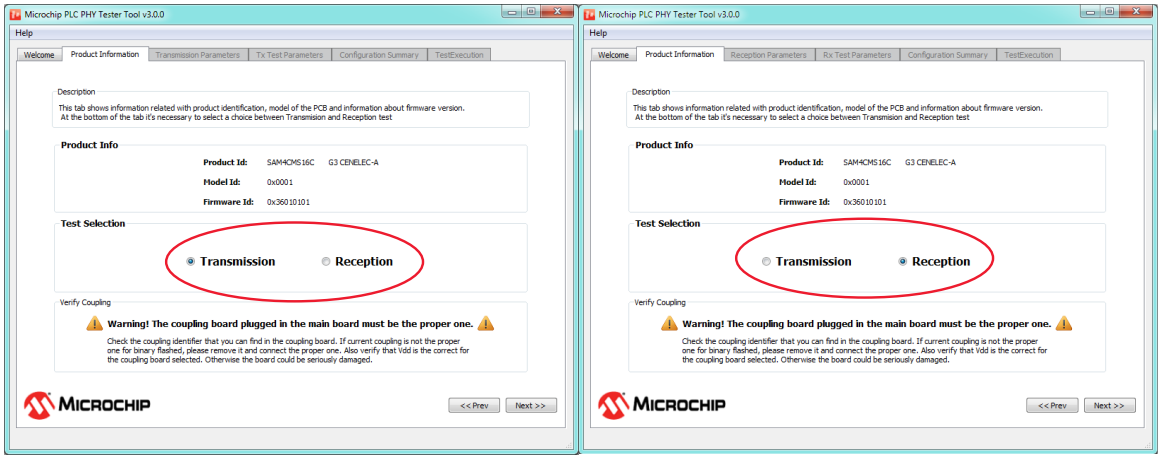
Figure 3-1. Example First Step: Connection



3.2 Test Type Selection Step

After selecting each port and performing the connection and pressing the “Next” button, the tool shows the Product Information tab. In this tab the user has to configure one board in Reception mode and the other in Transmission mode. In case of a connection error, please check the FW of the board and configuration of the serial connection.

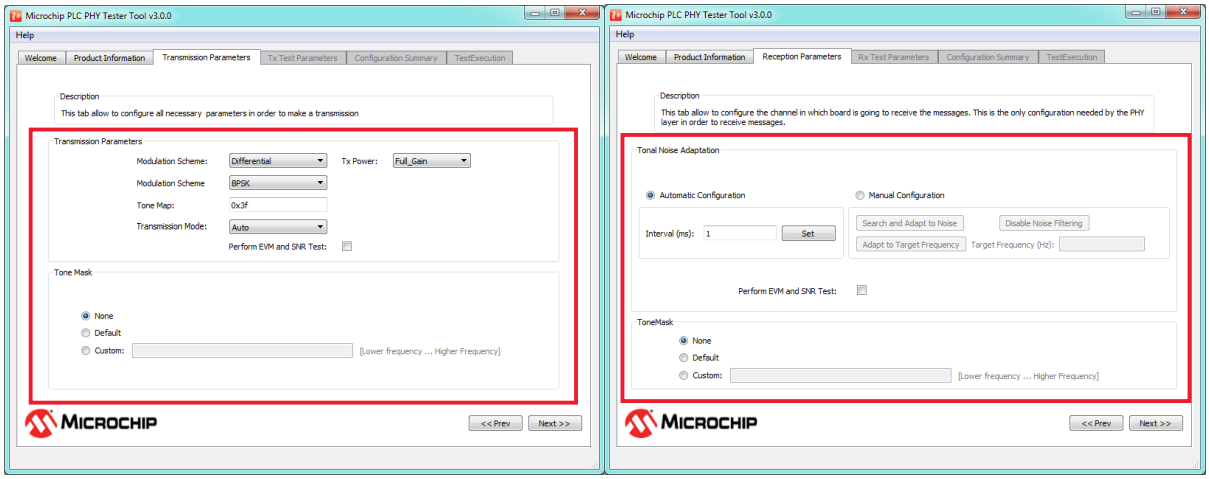
Figure 3-2. Example Second Step: Test Type Selection



3.3 Transmission/Reception Parameters Configuration Step

At this step parameters for transmission and reception can be configured. Specific PHY layer documentation must be checked in order to perform a proper configuration.

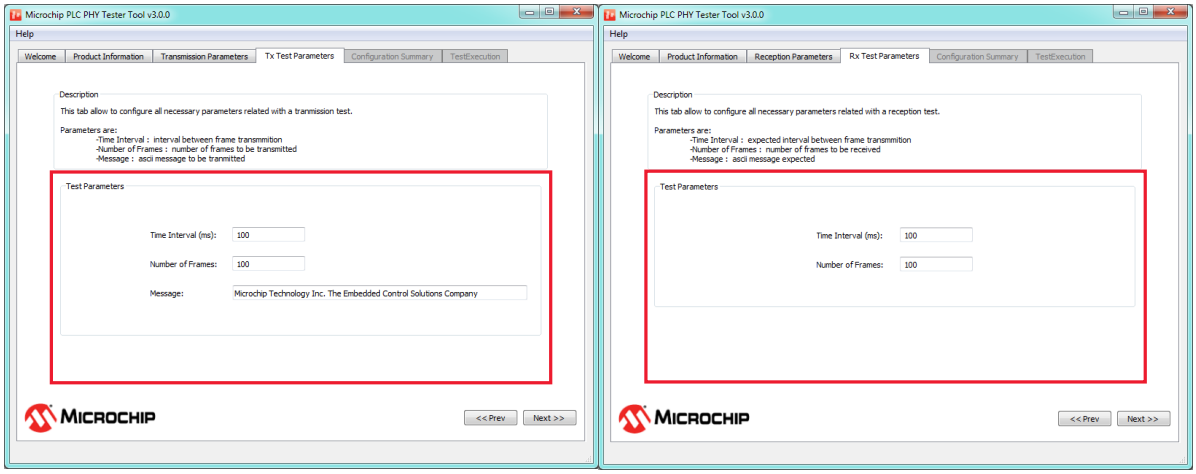
Figure 3-3. Example Third Step: Tx/Rx Parameter Configuration



3.4 Tx/Rx Test Parameters Configuration Step

At this point it is recommended to configure both boards with the same configuration (Message, Time Interval and Number of Frames), otherwise the test results may not be as expected.

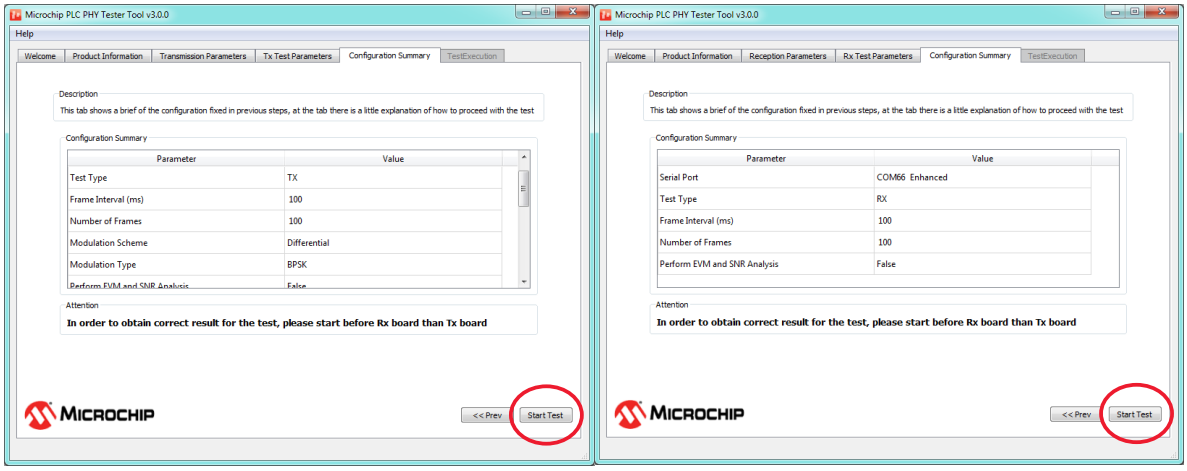
Figure 3-4. Example Fourth Step: Tx/Rx Parameter Configuration



3.5 Summary Check Step

This tab shows a short summary of the configuration fixed in previous steps and allows the user to start the test by pressing the corresponding “Start test” button. The test should start first with the reception, and in less than 10 seconds start with the transmission.

Figure 3-5. Example Fifth Step: Tx/Rx Parameter Configuration



3.6 Test Execution Step

This tab is shown while the test execution is being performed. The information in this tab is presented in table format, filled with information about the messages transmitted or received. At the end of the test a short summary of the information is shown.

Figure 3-6. Example Sixth Step: Execution

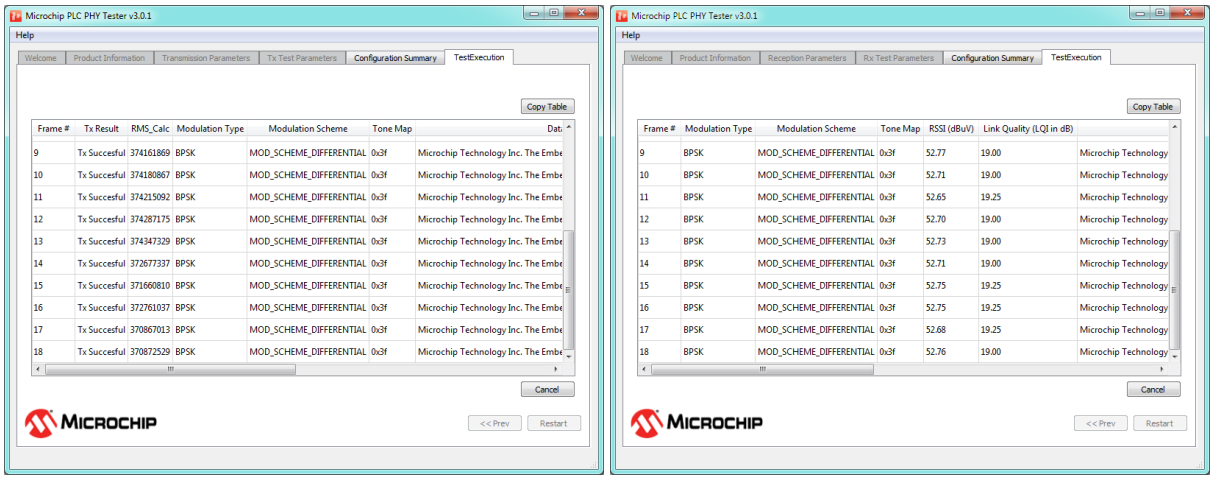
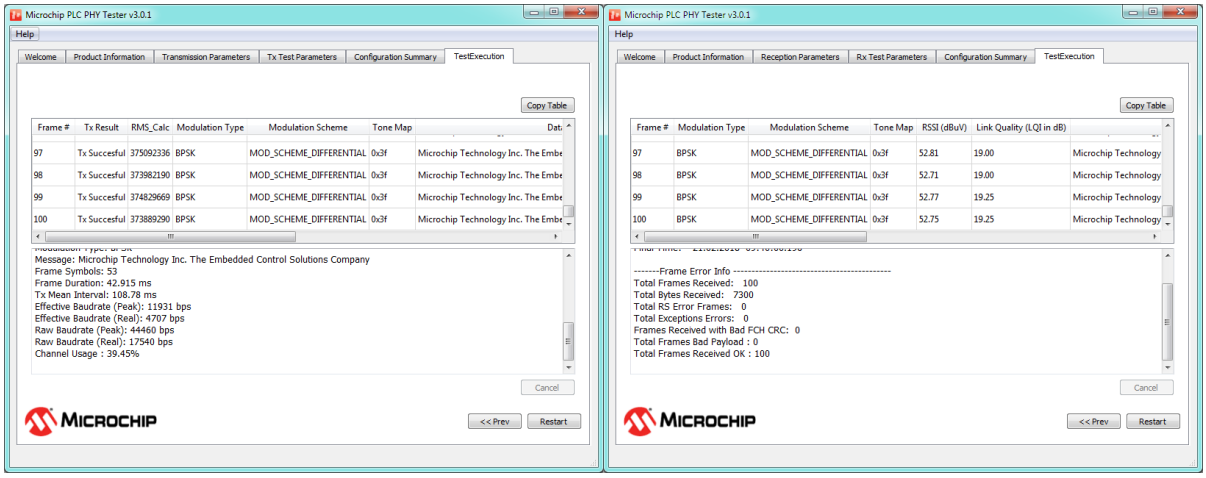


Figure 3-7. Example Sixth Step: Execution Finished



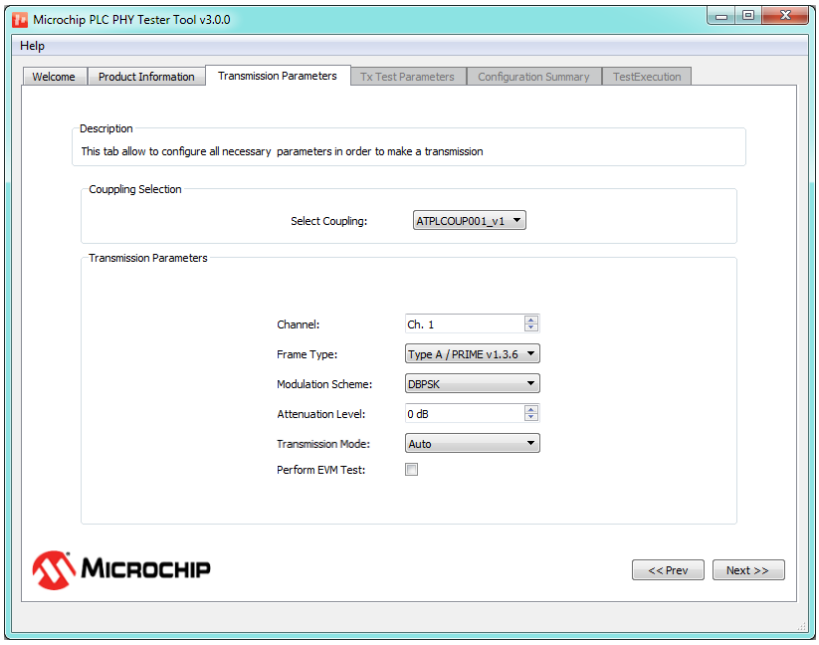
4. Protocol Specific Tabs

PLC PHY Tester is a multi-platform tool designed to work with any device from the Microchip PLC family of products. The way of working with the tool is similar for all the platforms supported, but some of the tabs of the wizard may contain specific PLC protocol content. This section describes the content of these tabs.

4.1 Tx/Rx Parameters for PRIME PHY Layer

4.1.1 Transmission Parameters for PRIME PHY Layer

Figure 4-1. Transmission Parameters Tab for PRIME PHY Layer



This tab is shown when transmission test is selected after connecting the application to a board which is running a serialized PRIME PHY Layer. It allows configuration of the coupling that is connected to the chip, as well as some parameters related with the transmission.

First of all, users must select the coupling. PRIME PHY Layer defines several coupling circuits to be selected and plugged in the Evaluation Kit boards. Each coupling board is identified as: ATPLCOUPXXX, where XXX identifies each coupling. In the “Select Coupling” list, the user must select the same coupling that has been plugged in the board.[4]

The transmission specific parameters are:

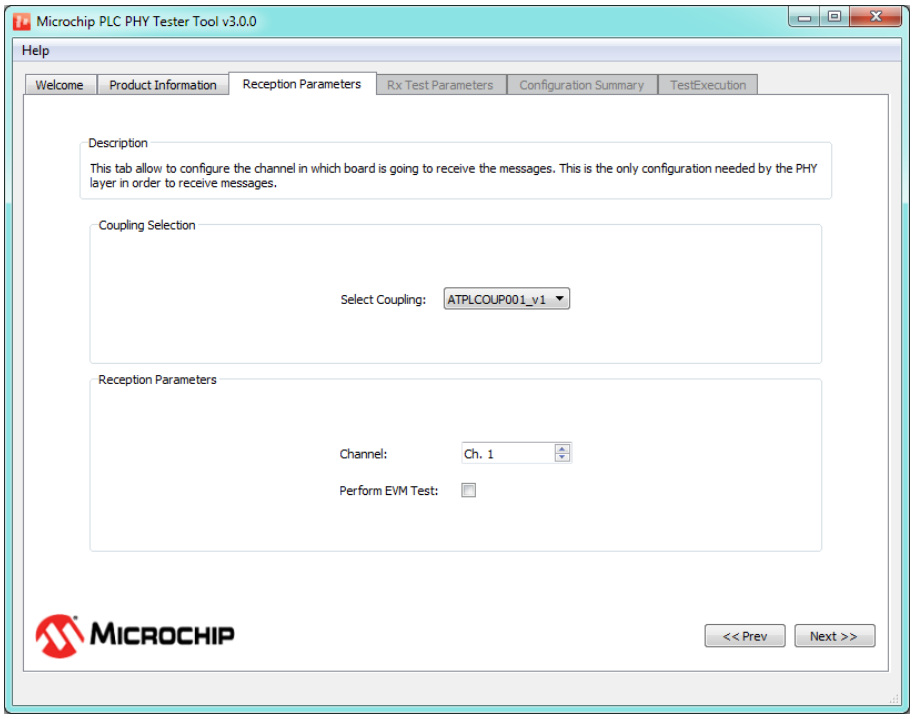
- Channel: Allows selection of which channel the frames are going to be transmitted on; depending on the coupling plugged to the board, different channels can be available
- Frame Type: Configures the board to transmit different types of frames (Type A/B/BC) following PRIME 1.4 specification

[4] Warning! If current coupling is not the proper one for the channel you want to transmit, please remove it and plug the proper one. Also verify that V_{DD} has the correct value for the coupling board selected. Otherwise the board could be seriously damaged.

- Modulation Scheme: Configures the modulation scheme of the frames[5]
- Attenuation Level: Allows to attenuate the transmitted signal in 1dB steps
- Transmission Mode: Configures the output stage depending on the line impedance seen by the board
- Perform EVM Test: Selecting this option changes the message and interval of transmission in order to make a test that evaluates the PHY layer performance. For more information check application note *"Guidelines for PLC Performance Verification"*.

4.1.2 Reception Parameters for PRIME PHY Layer

Figure 4-2. Reception Parameters Tab for PRIME PHY Layer



This tab is shown when reception test is selected after connecting the application to a board that is running a serialized PRIME PHY Layer. It allows selection of the coupling as well as the PRIME channel where test will be performed.

First of all, users must configure the coupling board. PRIME PHY Layer defines several coupling circuits to be selected and plugged in the Evaluation Kit boards. Each of the coupling boards is identified as: ATPLCOUPXXX, where XXX identifies each coupling. In the “Select Coupling” list, the user must select the coupling that has been plugged in the board.[6]

The “Perform EVM Test” option changes the message and time interval of consecutive receptions in order to make a test that evaluates the PHY layer performance. In test execution tab some extra columns are added in order to obtain more information about performance of the PHY layer. For more information check application note *“Guidelines for PLC Performance Verification"*.

[5] Robust modulation schemes are only supported in Type B Frames.

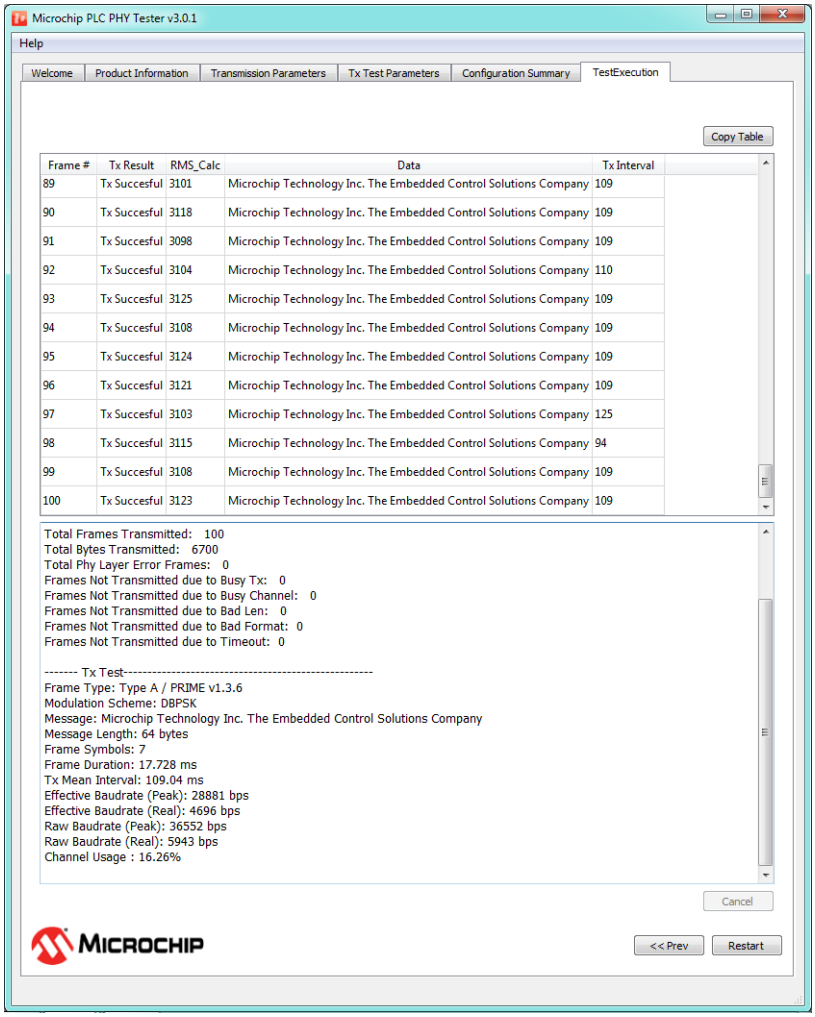
[6] Warning! If current coupling is not the proper one for the channel you want to receive, please remove it and connect the proper one. Also verify that V_{DD} has the correct value for the coupling board selected. Otherwise the board could be seriously damaged.

4.2 Execution Tab for PRIME PHY Layer

This tab shows information about the frames received/transmitted while the test is being executed, and when the test finished it shows some summary information.

4.2.1 Transmission Test

Figure 4-3. Execution Tab for PRIME PHY Layer in Tx Test



While the test is executing, a row is added to the top of the table for every transmitted frame. The table contains four columns showing the following information:

- Frame #: Indicates the number of frame transmitted. It is useful to track the test progress
- Tx Result: Indicates the result of transmission. If an error occurs, a descriptive text will appear
- RMS_Calc: This number is related with the impedance detected in the Power Line; it is used by the PHY layer to determine the Transmission mode
- Data: Shows the message received in ASCII format
- Tx Interval: Represents measured time between the current frame and the previous one

After all frames have been transmitted, a text box with information about the test will appear at the bottom of the tab. First of all, information about starting and ending time is shown. This information is measured by the PC application.

After that, there is a section called Frame Error information that shows information about transmitted frames and possible errors. Finally, another section shows a summary of the transmission test - this contains information such as modulation scheme, message length, and other fields with the following meaning:

- Frame Duration: Is the duration of the frame in milliseconds calculated as:

$$(\text{Frame Symbols x2.21}) + \text{chirp duration(ms)}$$

- Tx mean Interval: Is the average interval between transmissions calculated from top table data
- Effective Baudrate (Peak): Is the effective baudrate if frames were transmitted consecutively, calculated as following:

$$\frac{\text{Message length in Bytes x8}}{\text{Frame Duration}}$$

- Effective Baudrate (Real): Is the effective baudrate, calculated as following:

$$\frac{\text{Message length in Bytes x8}}{\text{Tx mean interval}}$$

- Raw Baudrate (Peak): Is the baudrate taking into account all headers that previous baudrates have not considered if frames were transmitted consecutively, calculated as following:

$$\frac{\text{All bits transmitted}}{\text{Frame Duration}}$$

- Raw Baudrate (Real): Is the baudrate taking into account all headers that previous baudrates have not considered, calculated as following:

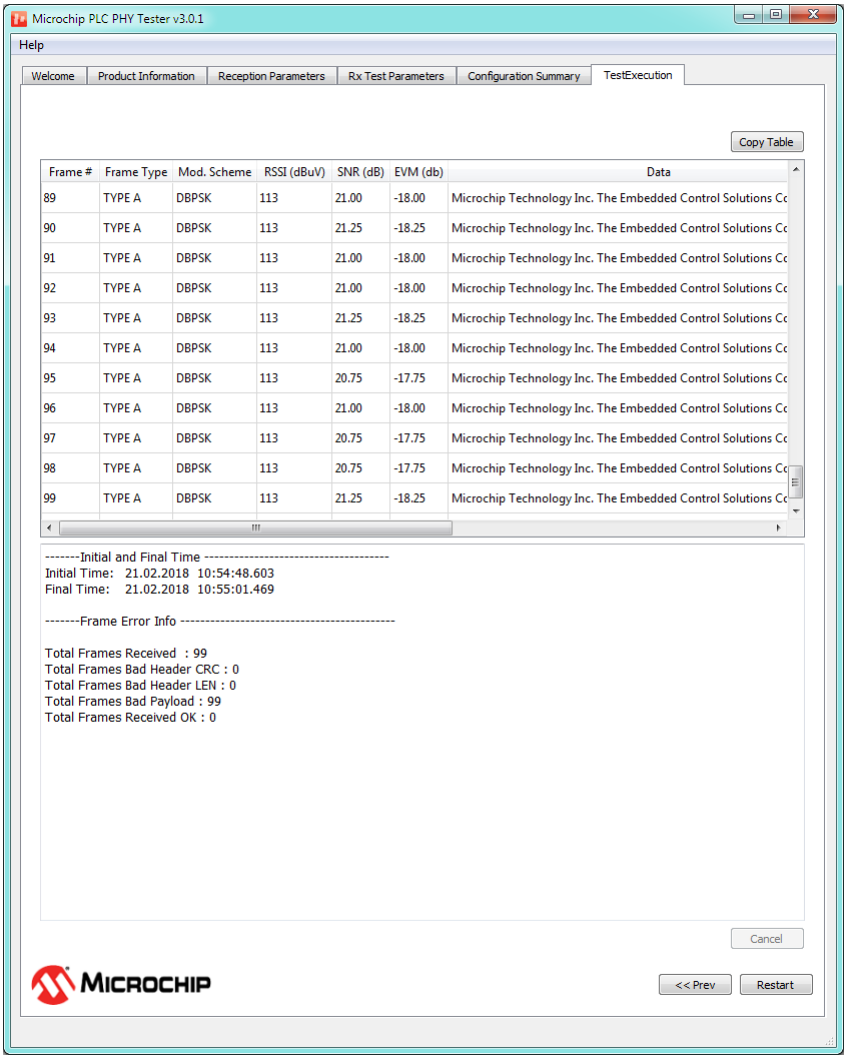
$$\frac{\text{All bits transmitted}}{\text{Tx mean interval}}$$

- Channel Usage : Is the percentage of channel that has been used, calculated as this:

$$\frac{\text{Frame Duration}}{\text{Tx mean interval}}$$

4.2.2 Reception Test

Figure 4-4. Signal Quality Information for Reception Test for PRIME PHY Layer



While the test is running, a row is added to the top of the table with information about the frame currently received. The columns contain the following information:

- Frame #: Indicates the number of frame transmitted. It is useful to track the test progress
- Frame Type: Indicates the format of the frame received
- Mod. Scheme: Indicates the modulation scheme of the frame
- RSSI (dBuV): Indicates the strength of the signal received in dBuV
- SNR (dB): Signal-to-Noise Ratio calculated as PRIME 1.4 Spec
- EVM (dB): Error Vector Magnitude calculated as PRIME 1.4 Spec
- Data: Received message in ASCII format
- Rx Interval: Interval of time between the reception of the current frame and the previous one
- Payload Integrity: Shows if the content of the frame is correct or not

After all frames have been received, or the test has been cancelled, a text box with information about the test will appear at the bottom of the tab. First of all, information about starting and ending time is shown. This information is measured by the PC application. After that, there is a section called Frame Error

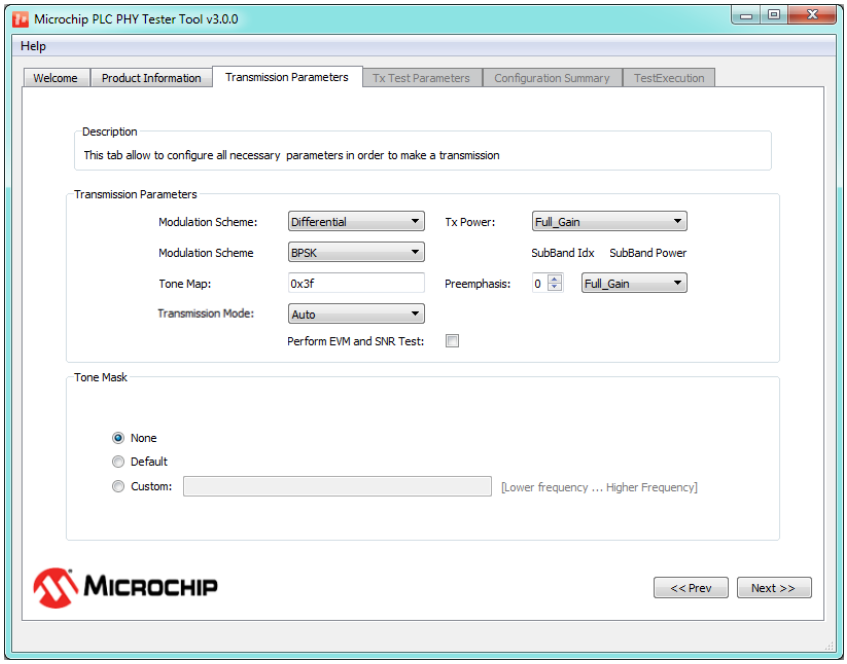
information that shows information about received frames and possible errors. Fields shown in this section are:

- Total Frames Received: Shows the number of frames detected, not taking into account if the frame has errors
- Total Frames Bad Header CRC: Shows the number of frames in which the header CRC8 is not valid. These frames are discarded by the hardware and are not reported in the application
- Total Frames Bad Header LEN: Shows the number of frames in which the header LEN field is not correct. These frames are discarded by the hardware and are not reported in the application
- Total Frames Bad Payload: Shows the number of frames where the content of the payload is not what it is supposed to be
- Total Frames Received OK: Shows the number of frames received with the correct content

4.3 Tx/Rx Parameters for G3-PLC PHY Layer

4.3.1 Transmission Parameters for G3-PLC PHY Layer

Figure 4-5. Transmission Parameters Tab for G3-PLC PHY Layer



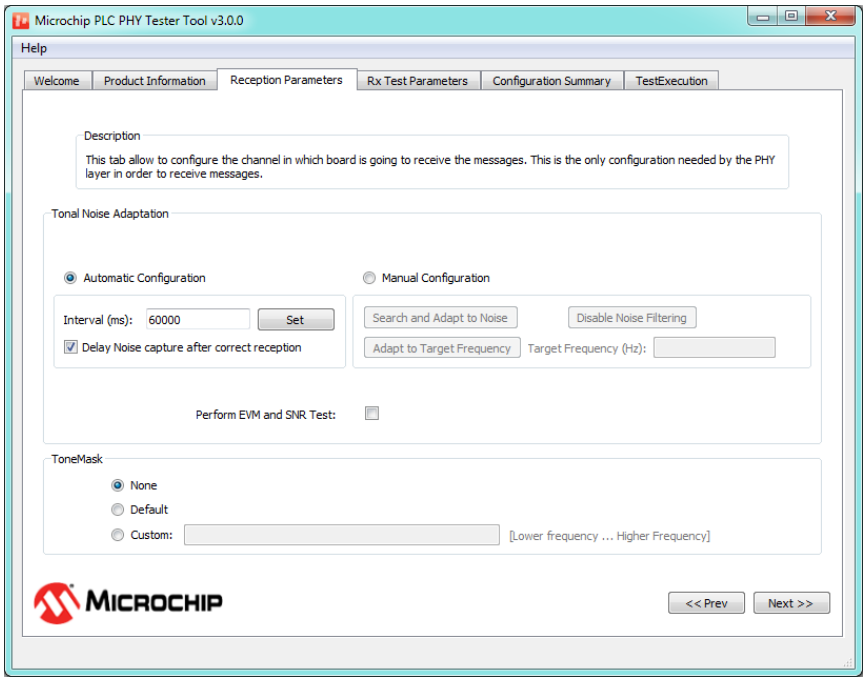
This tab allows the user to configure all parameters related with the transmission of G3-PLC PHY frames. Configurable parameters are the following:

- Modulation Scheme: Allows configuration of differential or coherent modulation scheme
- Modulation Type: Allows selection between BPSK, QPSK, 8PSK and robust BPSK
- Tone Map: Allows disabling sub-bands (groups of tones), and the format depends on the selected bandplan. Each band is activated or deactivated setting to ‘1’ or ‘0’ the corresponding bit in the hex array. The different sub-bands are ordered in the hex array from least significant bit (lower frequency sub-band) to most significant bit (higher frequency sub-band). For example, in CENELEC-A bandplan (6 sub-bands) 0x01 represent a tone map where only the lower sub-band is active, as well as 0x20 is the tone map corresponding to a tone map where only higher sub-band is active

- Reed Solomon 2nd Block: Only available for FCC bandplan, it allows to introduce a second RS block as defined in the G3-PLC specification
- Tx Power: Allows to decrease the transmission power in 3dB steps
- Pre-emphasis: Allows to decrease the transmission power in steps of 3 dB to each sub-band
- Transmission Mode: Configures the output stage depending on the line impedance seen by the board
- Tone-Mask: it allows to suppress the energy of carriers as defined in the G3-PLC specification. An array of booleans is used to define the tone mask. The array length depends on the bandplan: (CENELEC-A = 36; FCC = 72; ARIB = 54), 1 means carrier disabled and 0 means carrier enabled.
- Perform EVM and SNR Test: Selecting this option changes the message and interval of transmission in order to make a test that evaluates the PHY layer performance. For more information check application note *"Guidelines for PLC Performance Verification"*

4.3.2 Reception Parameters for G3-PLC PHY Layer

Figure 4-6. Reception Parameters Tab for G3-PLC PHY Layer



This tab allows the user to configure all parameters related with the reception of frames. Configurable parameters are as follows:

- Tone-Mask: it allows to suppress the energy of carriers as G3-PLC specification defines. An array of booleans is used to define the tone mask. The length of array depends on bandplan: (CENELEC-A = 36; FCC = 72; ARIB = 54), 1 means carrier disabled and 0 means carrier enabled. It is important to configure the same value for Tone-Mask both in transmission board as well as in reception board, otherwise communication will fail
- Tonal Noise Adaptation: The PHY layer is able to detect tonal noise and configure some input filters in order to cancel this noise. The user can select:
  - Automatic Configuration: Hardware is performing noise captures every fixed interval (configurable, see *"G3-PLC FW Manual"*). After each capture the hardware selects the proper filtering for the detected noise (if any). User can configure to only perform the noise captures

when hardware is not receiving (only available for ATPL250A/SAM4CP16C platforms). This option is activated by means of the “Delay Noise capture after correct reception” check box.

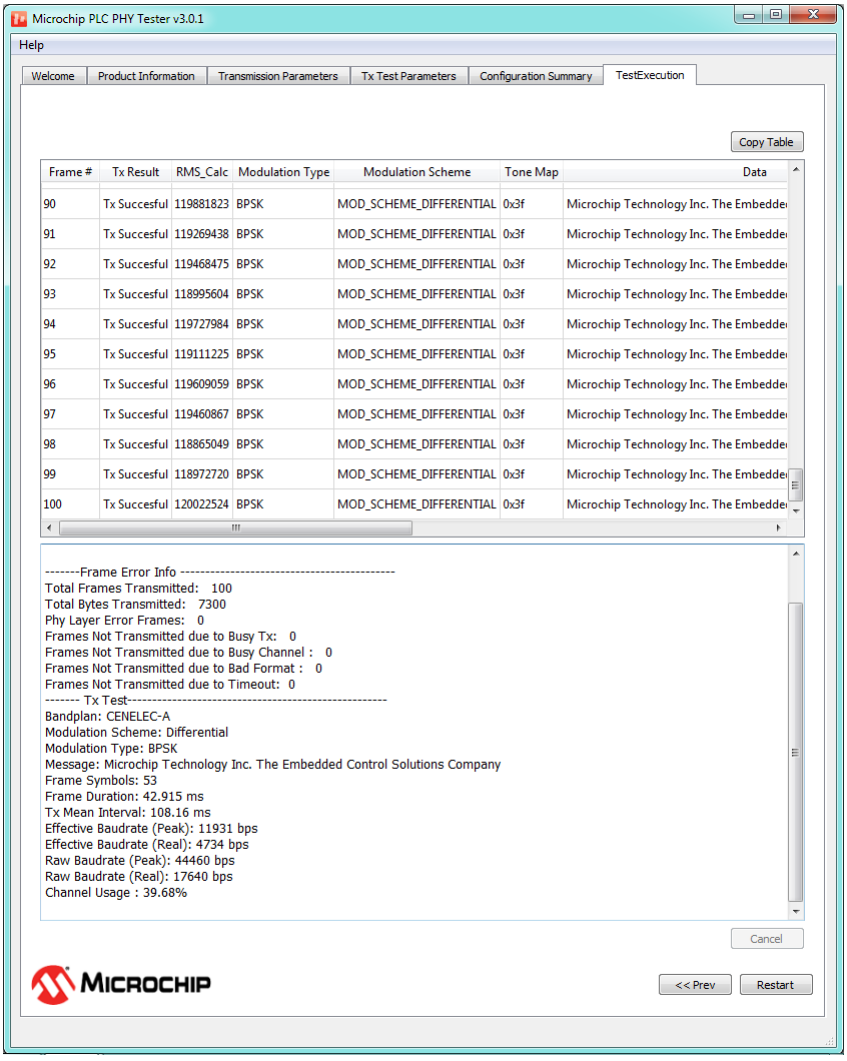
– Manual Configuration: In this mode the hardware only performs noise analysis when the user presses “Search and Adapt to Noise”. The user can also configure the hardware to configure notch filter to certain frequency by means of the “Adapt to Target Frequency”. Finally the user can disable noise adaptation using the “Disable Noise Filtering” option

- The “Perform EVM and SNR Test” option changes message and interval of reception in order to make a test that evaluates the PHY layer performance. In test execution tab some extra columns are added in order to obtain more information about performance of the PHY layer. For more information check application note *“Guidelines for PLC Performance Verification”*

4.4 Execution Tab for G3-PLC PHY Layer

4.4.1 Transmission Test

Figure 4-7. Execution Tab for G3-PLC PHY Layer in Tx Test



There are eight columns that show the following information:

- Frame #: Indicates the number of frames transmitted. It is useful to track the test progress
- Tx Result: Indicates the result of the transmission. If an error occurs, a descriptive text will appear
- RMS_Calc: This number is related with the impedance detected in the power line; it is used by the PHY layer to determine the transmission mode.
- Modulation Scheme: Indicates if modulation scheme is differential or coherent
- Modulation Type: Indicates the type of modulation: BPSK, QPSK, 8PSK or BPSK_ROBO
- Tone Map: Indicates active sub-bands in the frame
- Data: Shows the message received in ASCII format
- Tx Interval: Represents the time interval between the current frame and the previous one

After all frames have been transmitted, a text box with information about the test will appear at the bottom of the tab.

Test timestamps are provided; this information is measured by the PC application. After that, there is a section of information called Frame Error information that shows information about transmitted frames and possible errors. Finally, another section shows a summary of the transmission test; apart from known transmission parameters other parameters are shown:

- Frame Duration: Is the duration in millisecond of the frame
- Tx Mean Interval: Is the average interval between transmissions calculated from top table data
- Effective Baudrate (Peak): Is the effective baudrate if frames were transmitted consecutively, calculated as follows:

$$\frac{\text{Message length in Bytes x8}}{\text{Frame Duration}}$$

- Effective Baudrate (Real): Is the effective baudrate, calculated as follows:

$$\frac{\text{Message length in Bytes x8}}{\text{Tx mean interval}}$$

- Raw Baudrate (Peak): Is the baudrate taking into account all headers and redundancies:

$$\frac{\text{Num Symbols FCH*Carriers FCH*Bits per carrier FCH} + \text{Num Symbols Payload*Carriers Payload*Bits per carrier Payload}}{\text{Frame Duration}}$$

- Raw Baudrate (Real): Is the baudrate taking into account all headers and redundancies, calculated as follows:

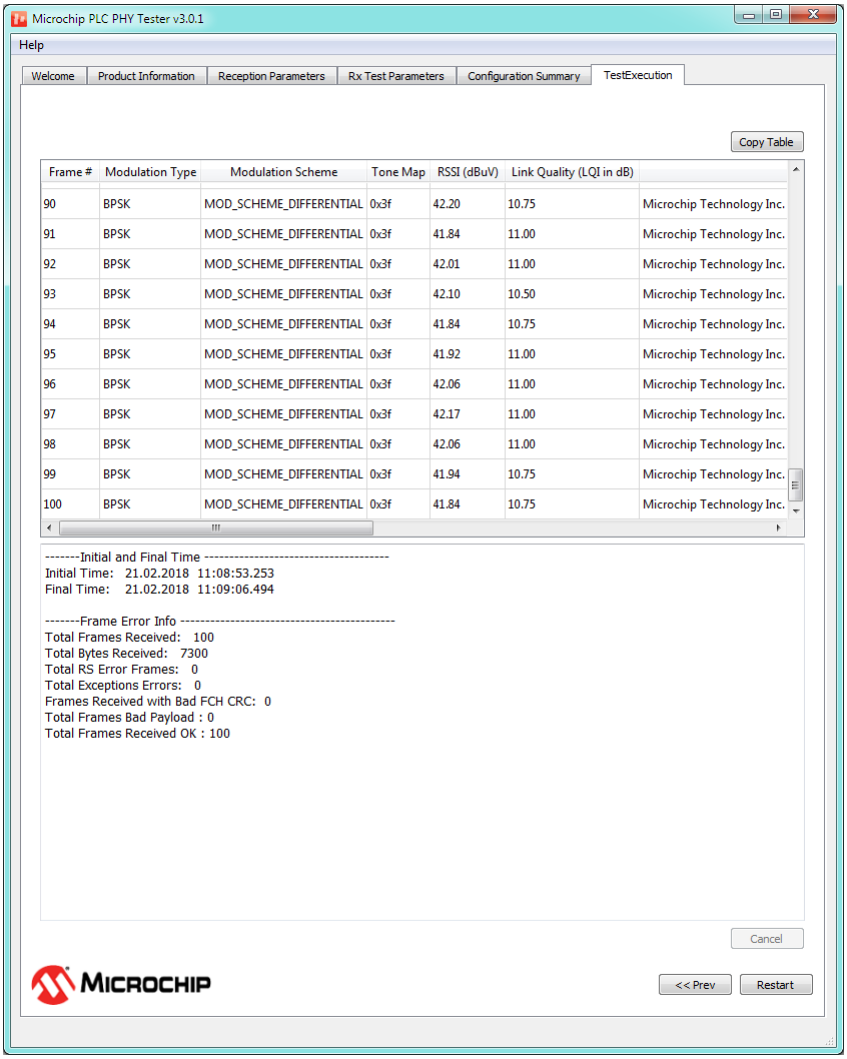
$$\frac{\text{Num Symbols FCH*Carriers FCH*Bits per carrier FCH} + \text{Num Symbols Payload*Carriers Payload*Bits per carrier Payload}}{\text{Tx mean interval}}$$

- Channel Usage : Is the percentage of channel that has been used, calculated as follows:

$$\frac{\text{Frame Duration}}{\text{Tx mean interval}}$$

4.4.2 Reception Test

Figure 4-8. Execution Tab for G3-PLC PHY Layer Rx Test



Information included in the table is as follows:

- Frame #: Indicates the received frame number
- Modulation Type: Indicates the type of modulation: BPSK, QPSK, 8PSK or BPSK_ROBO
- Modulation Scheme: Indicates if modulation scheme is differential or coherent
- Tone Map: Indicates active sub-bands in the frame
- RSSI (dBuV): Indicates the strength of the received signal in dBuV
- LQI (dB): Link Quality Indicator (See G3-PLC specification for more information)
- Data: Is the received info in ASCII format
- Rx Interval: Is the interval of time between the reception of the current frame and the previous one
- Payload Integrity: Shows if the content of the frame is correct or not

After all frames have been received, or the test has been cancelled, a text box with information about the test will be shown at the bottom of the tab. First of all, test timestamps are shown; this information is measured by the PC application. After that, there is a section called Frame Error information that shows information about received frames and possible errors. Fields shown in this section are:

- Total Frames Received: Shows the number of frames detected, not taking into account if the frame has errors
- Total Frames Bad FCH CRC: Shows the number of frames in which the header CRC is not valid. These frames are discarded by the firmware and are not reported in the application
- Total Frames Bad RS LEN: Frames that RS block is not able to correct are discarded by the firmware
- Total Exception Errors: Other kinds of errors in the reception chain
- Total Frames Bad Payload: Shows the number of frames where the content of the payload is not what it is supposed to be
- Total Frames Received OK: Shows the number of frames received with the correct content

5. Revision History

5.1 Atmel Rev A - 04/2014

Note: Rev A-F (2014-2015) reference Atmel document number 43057. This document was updated to the Microchip format, with document number DS50002734 in March 2018 starting with Microchip Rev A.

Document	Initial document release of Atmel document number 43057.

5.2 Rev B - 10/2014

Document	Added support for ATPL250A

5.3 Rev C - 12/2014

Document	Added support for EVM test in PRIME and Tonal Noise Adaptation for G3

5.4 Rev D - 02/2015

Document	Improved Tonal Noise for ATPL250/SAM4CP16C

5.5 Rev E - 02/2015

Document	Improved file format

5.6 Rev F - 10/2015

Document	Added support for G3 EVM and SNR test

5.7 Microchip Rev A - 03/2018

Document	Updated to Microchip format with new document number DS50002734 and added references to PL360 (G3)

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