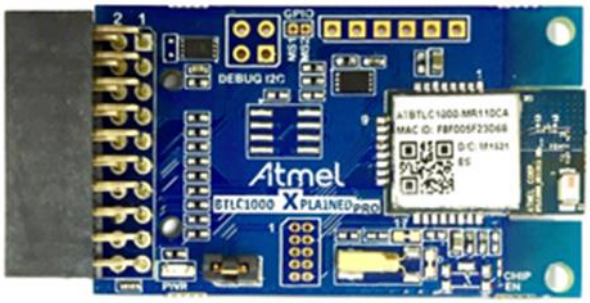
ATBTLC1000

Wireless Composer

USER GUIDE



Introduction

This document describes how to establish a setup to perform TX and RX tests by using the Direct Test mode between two Atmel® ATBTLC1000 Modules. The BLE Performance Analyzer is a performance analysis tool that is part of the Wireless Composer tool in Atmel Studio. This tool will be used at both ends (one assuming the role of a transmitter and the other the role of a receiver) for execution of tests. ATBTLC1000 Xplained Pro extensions are connected to a compatible MCU host Xplained Pro kit (E.g.: SAM L21/SAM D21 or SAM G55). The BLE Performance Analyzer communicates to ATBTLC1000 by using a serial bridge application running on the MCU.

Table of Contents

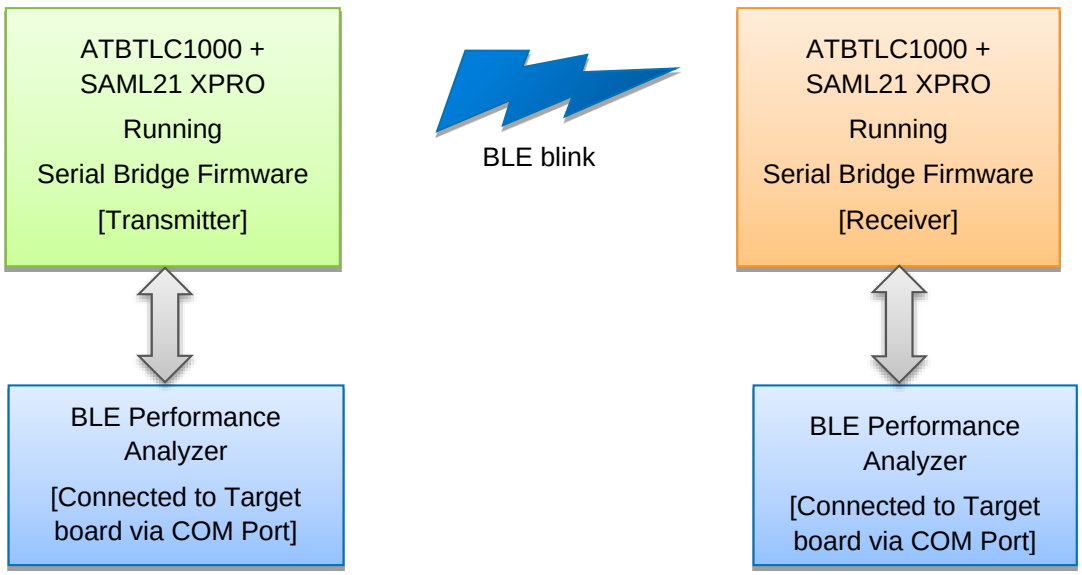
1 Supported Hardware Platforms and IDEs

Table 1-1. BLE Performance Analyzer - Supported Hardware and IDEs

Platform	MCU	Supported BLE device	Supported evaluation kits	Supported IDEs
SAM L21 (MCU)	ATSAML21J18A	ATBTLC1000	SAML21 XPRO ATBTLC1000-XSTK	Atmel Studio v6.2
SAM D21 (MCU)	ATSAMD21J18A	ATBTLC1000	SAMD21-XPRO + ATBTLC1000	Atmel Studio v6.2
SAM G55 (MCU)	ATSAMG55J19	ATBTLC1000	SAMG55-XPRO + ATBTLC1000	Atmel Studio v6.2

2 Demo Setup

Figure 2-1. Demo Setup for BLE Performance Analyzer



3 Hardware Setup

1. SAM L21 Xplained Pro Direct Test Mode setup.

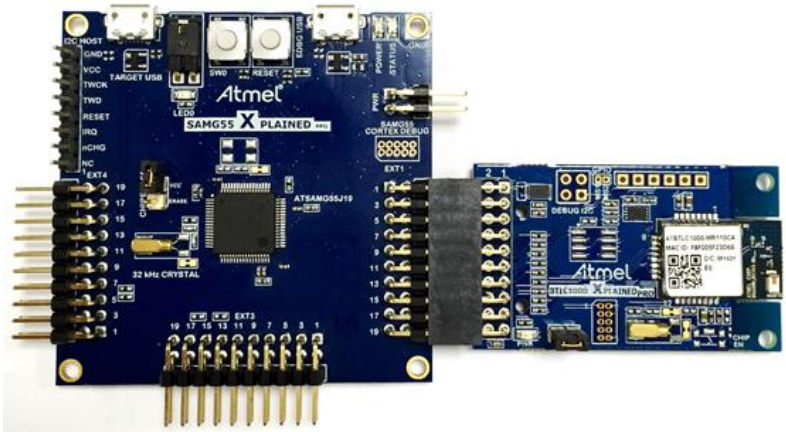
Figure 3-1. ATBTLC1000 Xplained Pro Extension Connected to a SAM L21 Xplained Pro

2. SAM D21 Xplained Pro Direct Test Mode setup.

Figure 3-2. ATBTLC1000 Xplained Pro Extension Connected to a SAM D21 Xplained Pro

3. SAM G55 Xplained Pro Direct Test Mode setup.

Figure 3-3. ATBTLC1000 Xplained Pro Extension Connected to a SAM G55 Xplained Pro



4 Software Setup

4.1 Installation Steps

1. Atmel Studio installation [**Atmel Studio 6.2 sp2 (build 1563) Installer – with .NET**] http://www.atmel.com/tools/atmelstudio.aspx.

   (Note: SAM L21/SAM D21 part pack is built-in as part of Atmel Studio 6.2 sp2.)

2. Part Packs.

   a. Install SAM G55 Part pack http://www.atmel.com/images/as-partpack-ATSAMG55-6.2.13.zip.

      (Note: This installer is needed only if the bring-up is being done on the SAM G55 platform)

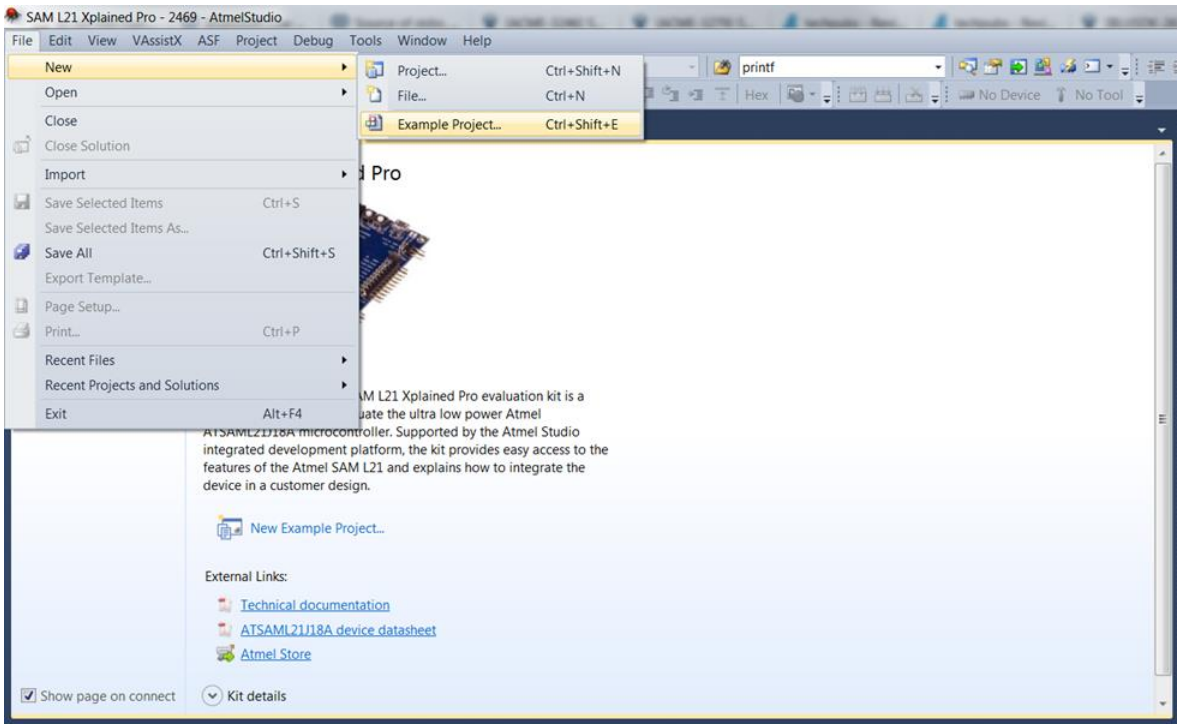
3. Atmel USB Driver Installer http://www.atmel.com/tools/atmelstudio.aspx.
4. Install the package Wireless Composer from Atmel Gallery. https://gallery.atmel.com/
   1. BLE Performance Analyzer is a part of the Wireless Composer tool

4.2 Serial Bridge Firmware for SAM L21

The following is the procedure to build the serial bridge firmware for SAM L21. The same procedure is valid for the case of all the other supported platforms (see Chapter 1) as well.

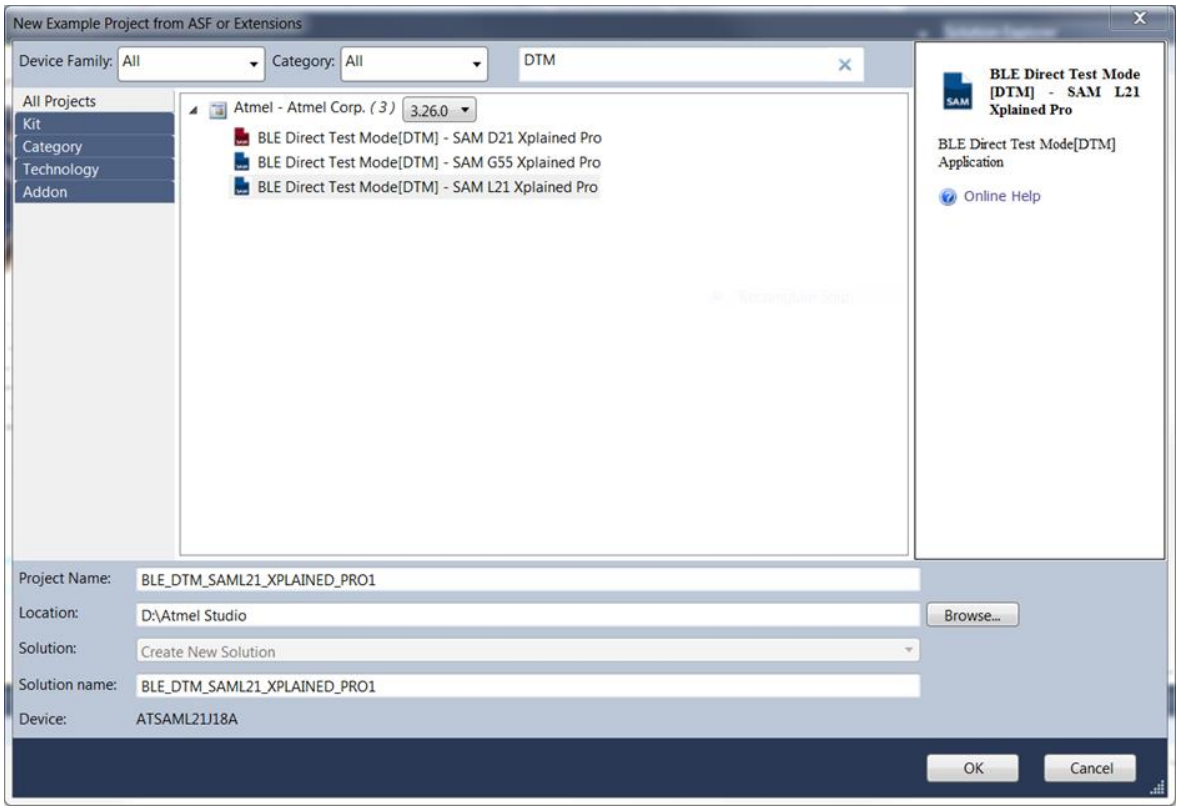
1. Select New Example Project.

Figure 4-1. Creating a New Project



2. In search box enter “DTM” in the search window and expand Atmel Corp. Projects. The location and the name of the project can be selected in the respective fields. Click **OK**.

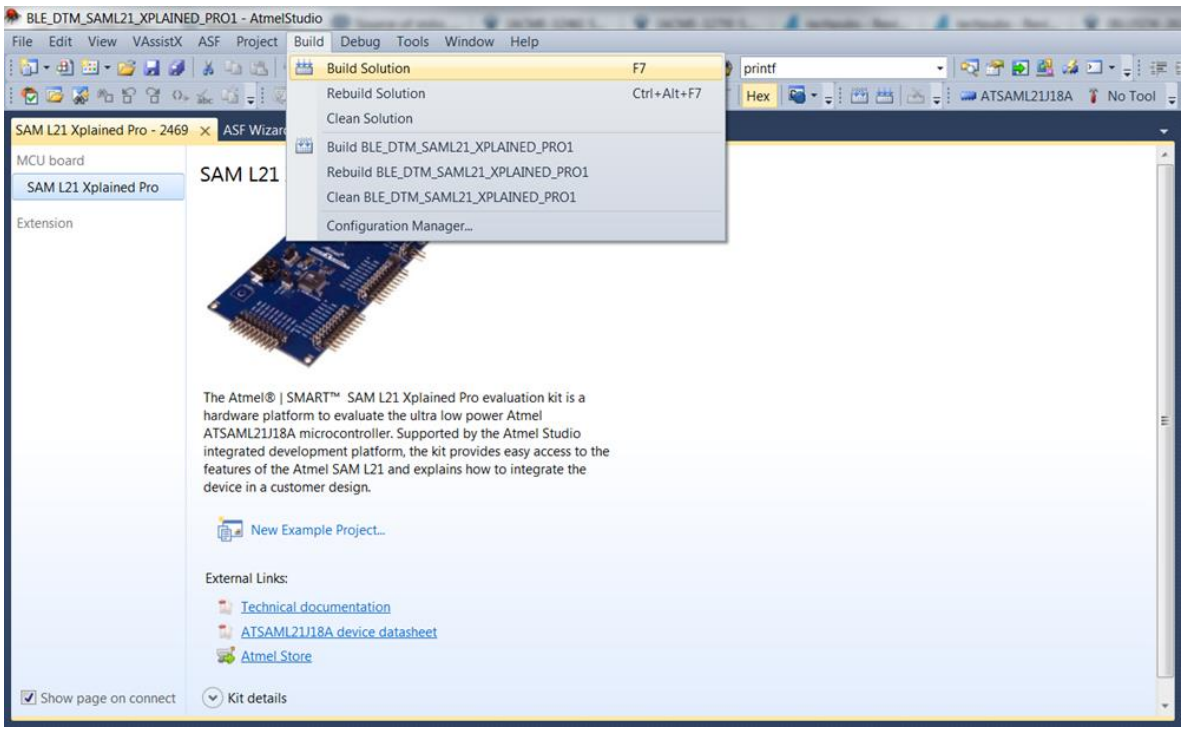
Figure 4-2. Searching for DTM Example Application



3. Accept the license agreement. The Atmel studio will generate the Direct Test Mode Example project for SAM L21.

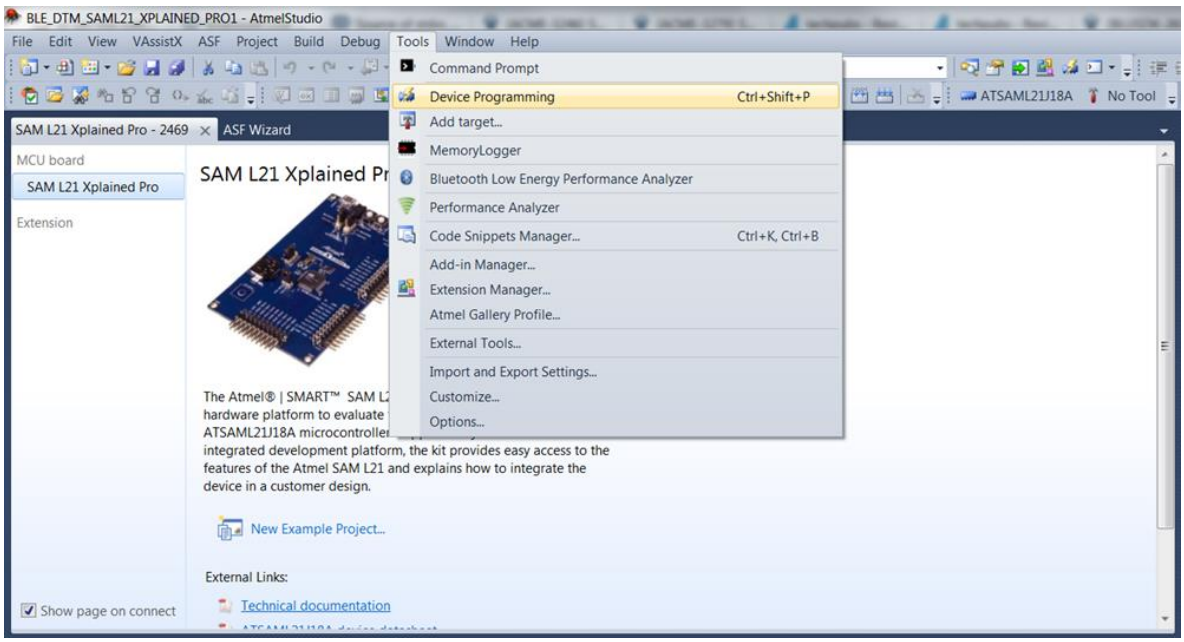
4. Build the solution.

Figure 4-3. Building the DTM Application



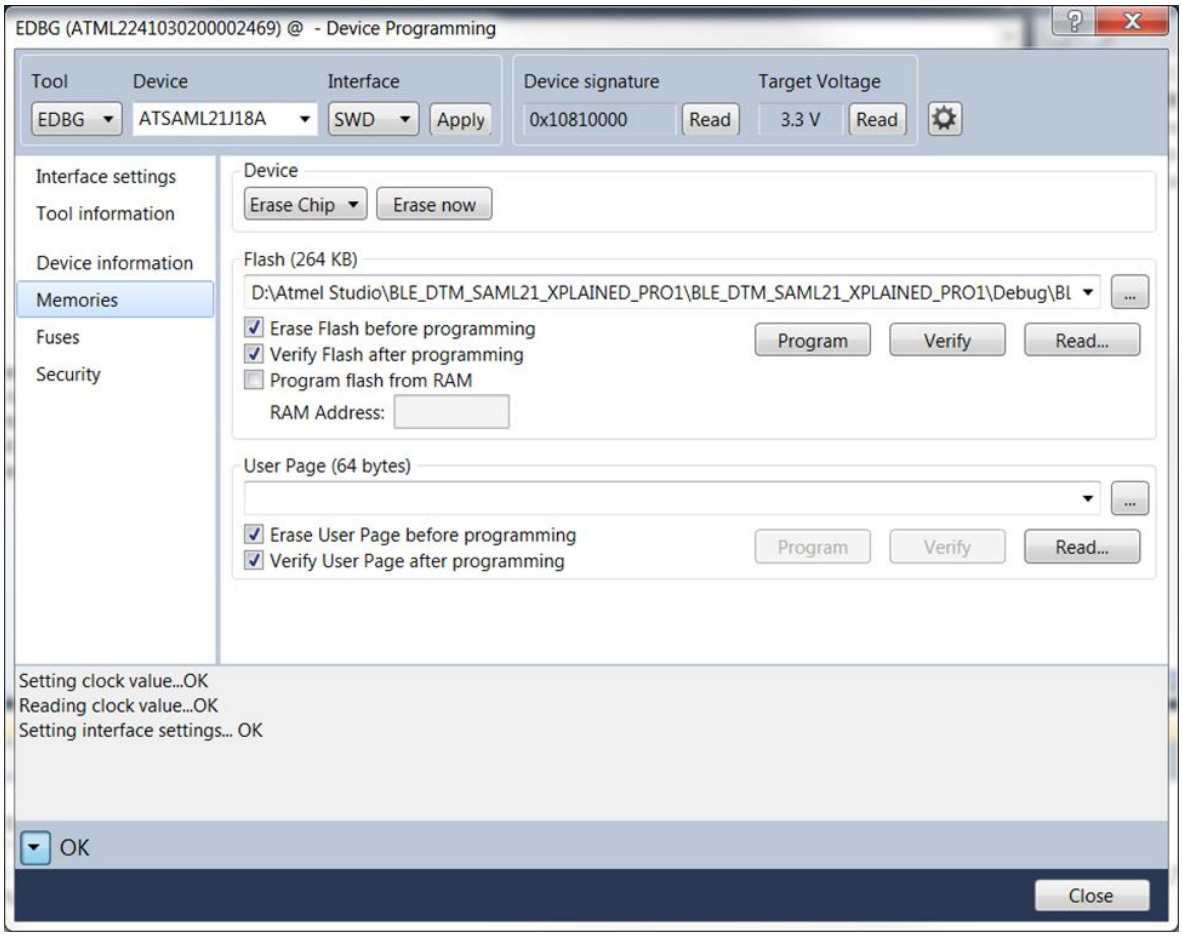
5. Download the application via the USB to the SAM L21 board using the Device Programming option available in Tools as mentioned below.

Figure 4-4. Select Device Programming



6. Inside Device Programming the user has to select the correct configuration for the device and finally program the device by using the program button.

Figure 4-5. Flash Programming



7. Once the application is flashed, the Direct Test Mode application is ready for use.

5 Serial Bridge Application

In order to allow the Performance Analyzer application, send the DTM commands to ATBTLC1000. Supported platforms (see Chapter 1) will act as serial bridge between the ATBTLC1000 and DTM Tool. As soon as the supported platforms (see Chapter 1) are powered on or reset, it initializes the Wakeup, Chip Enable, and downloads the patch file to ATBTLC1000, then completes the initialization procedure of the BLE module. After this the ATBTLC1000 initialization application will initialize the serial bridge. Then onwards supported platforms (see Chapter 1) will be acting as serial bridge between the PC and ATBTLC1000.

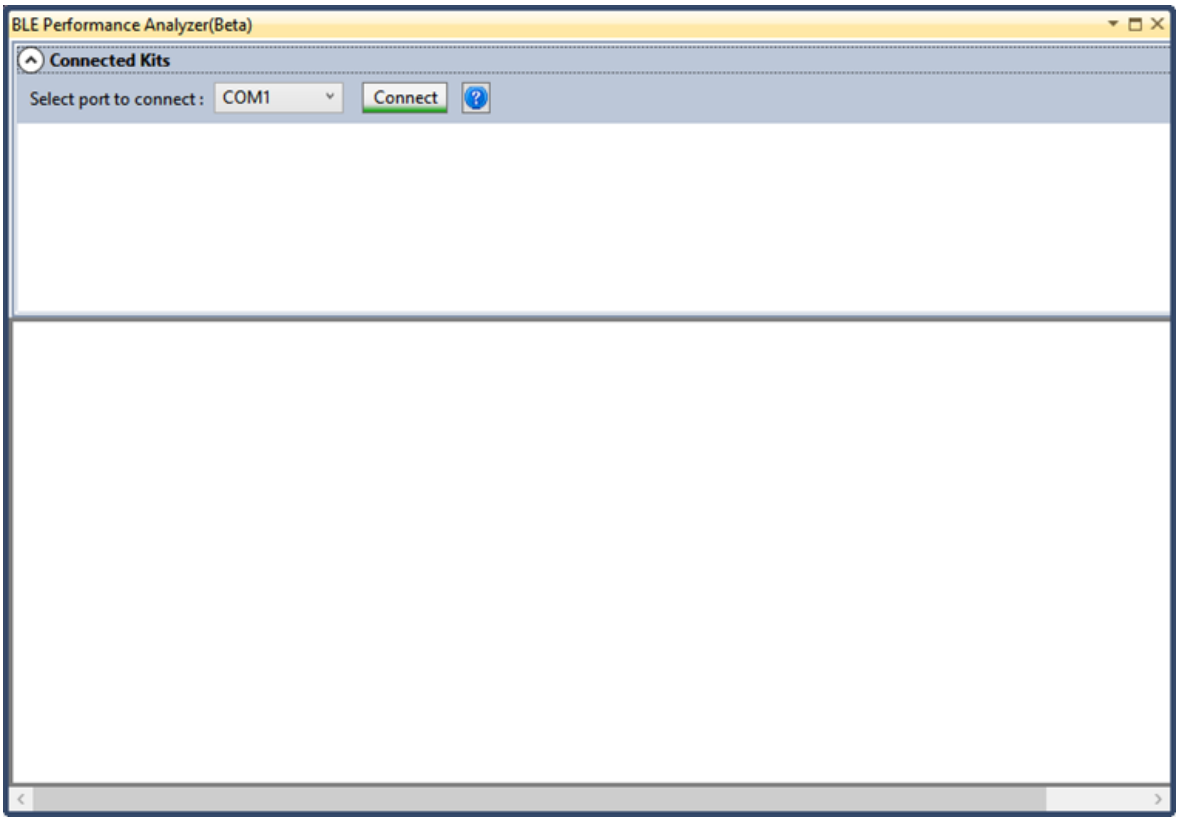
Serial Bridge application uses the below connection parameters:

Baudrate:	115200
Stop bit:	1
Parity:	None
Data:	8-bit

6 BLE Performance Analyzer

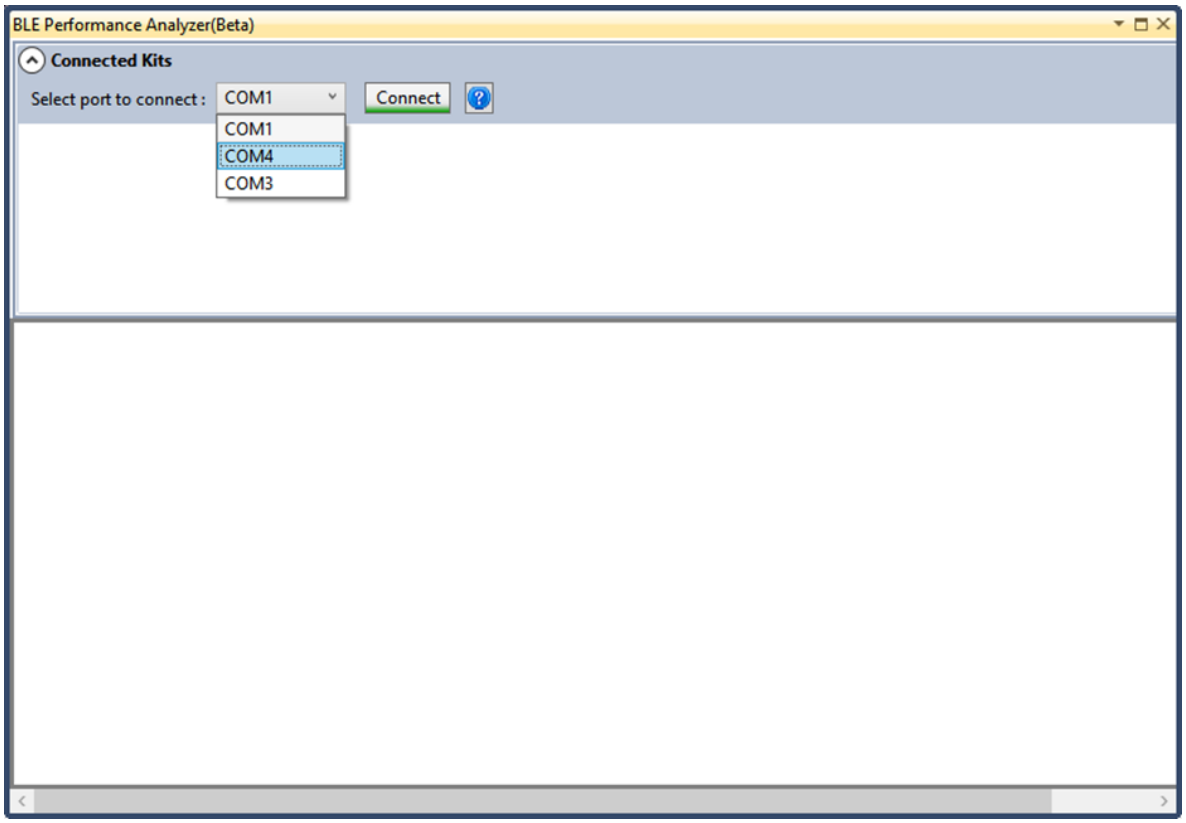
1. Start Atmel Studio.
2. Open the Performance Analyzer tool using the menu command Tools → BLE Performance Analyzer.Figure 6-1 shows the Performance Analyzer application:

Figure 6-1. BLE Performance Analyzer



3. Select the COM port to which the HW platform is connected to. (E.g., if SAM L21 XPRO is used as a serial bridge, then a Virtual COM port will be available to connect).

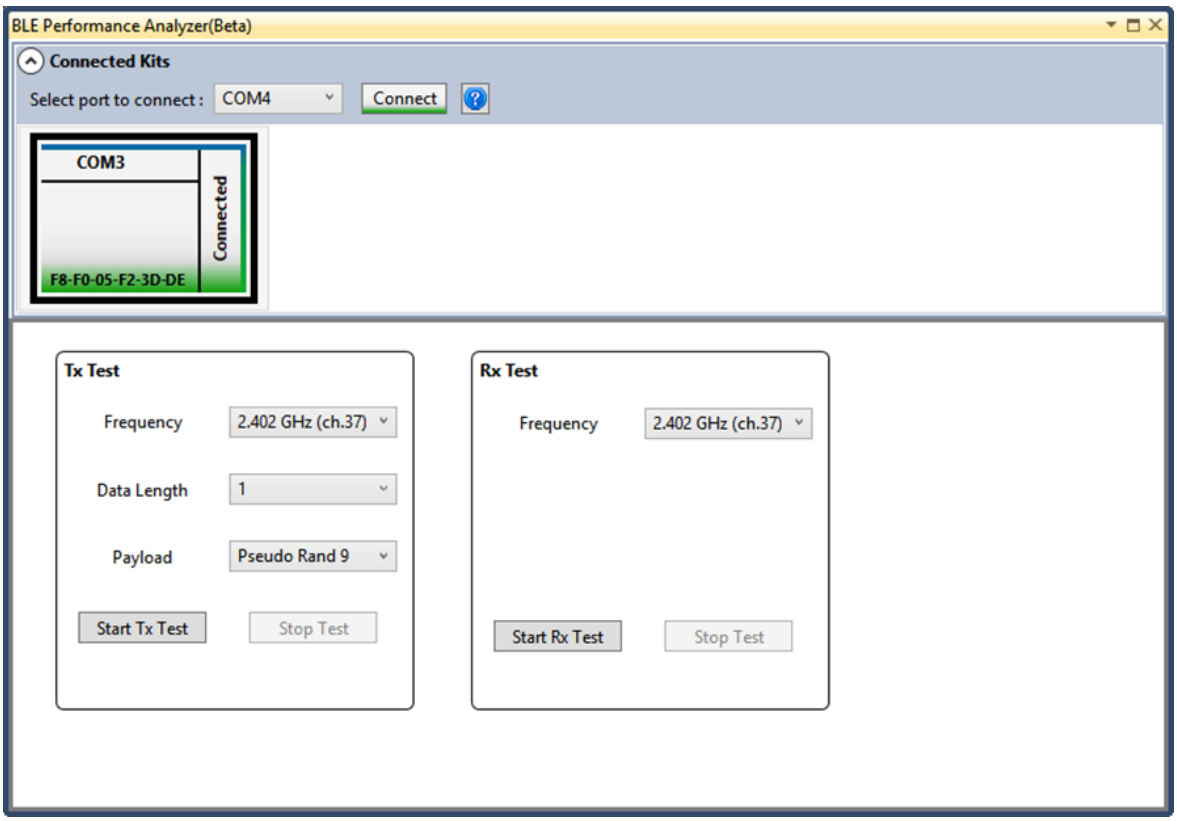
Figure 6-2. Select COM Port



4. After selecting the COM port (or Virtual COM port) click the button Connect to establish communication between the BLE Performance Analyzer tool and the connected HW platform.

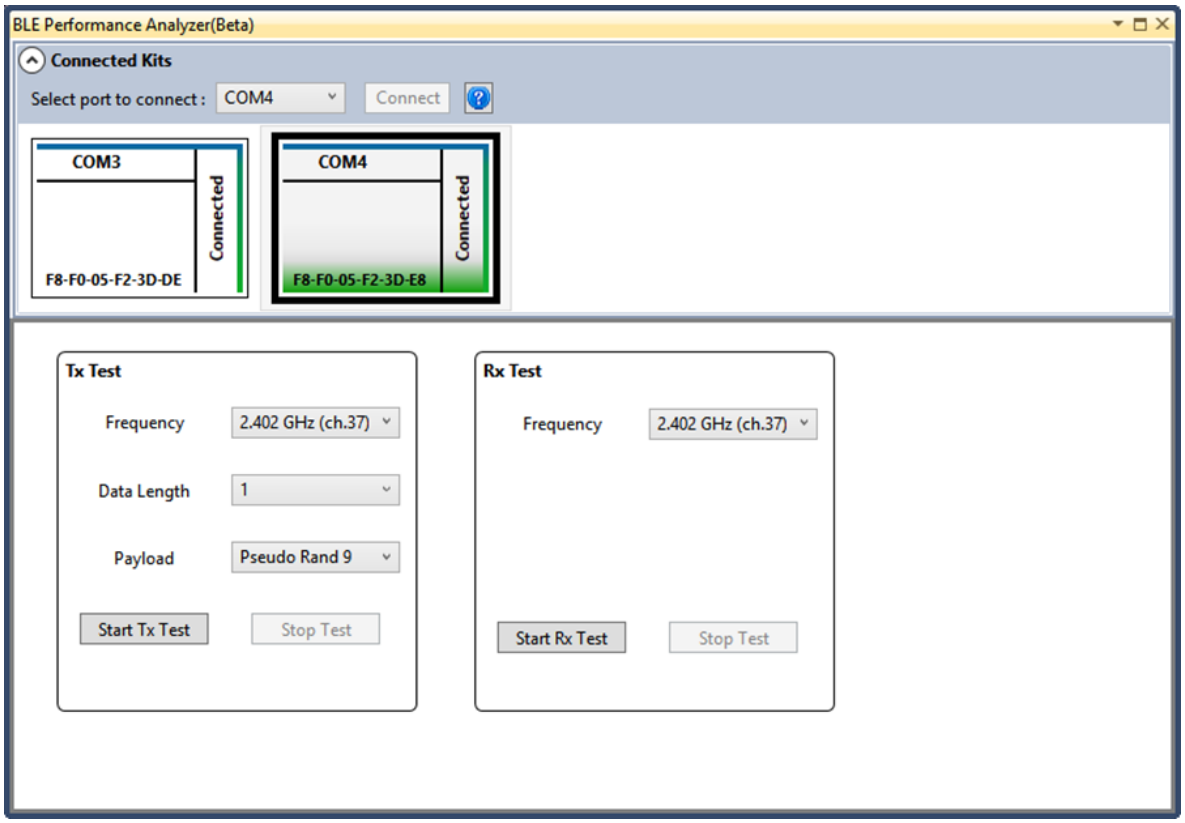
   Figure 6-3 shows the HW platform connected to the Performance Analyzer.

Figure 6-3. Single Kit connected



5. Ensure that both the HW platforms (one for TX and one for RX) are connected to the Performance Analyzer as shown below:

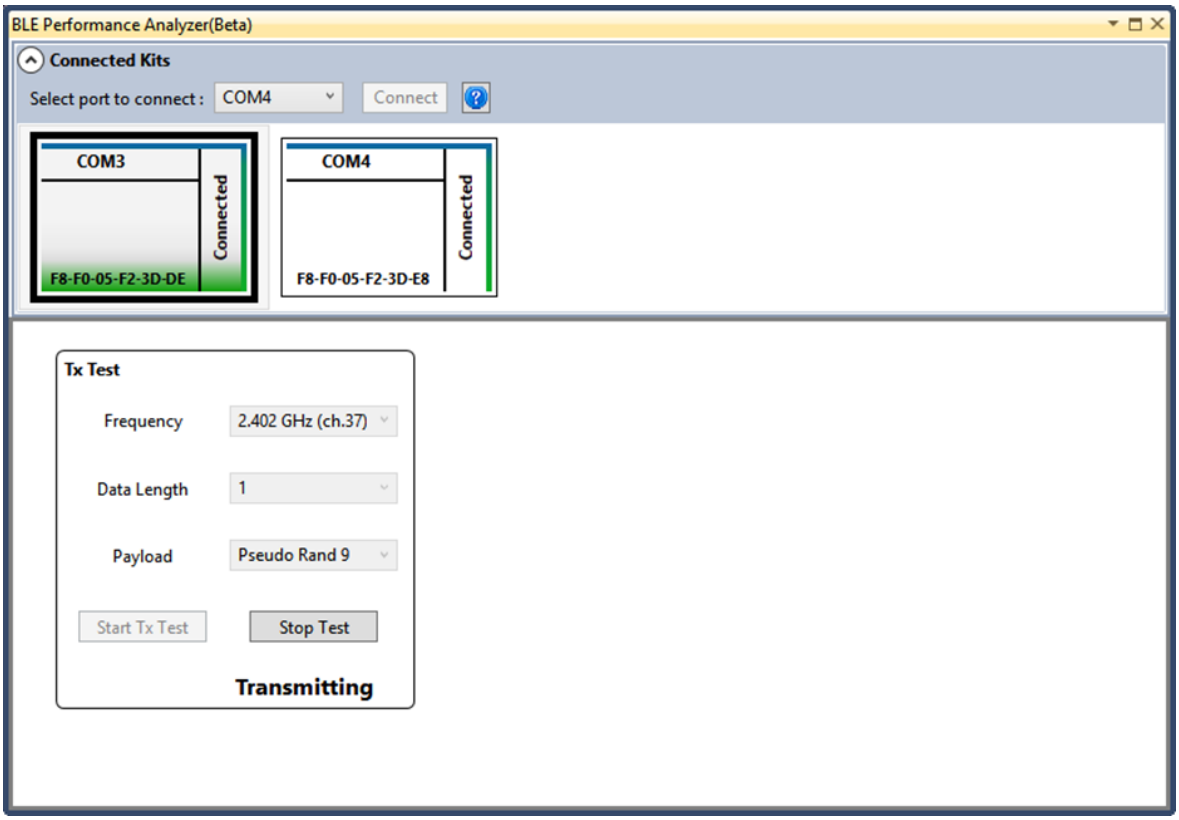
Figure 6-4. Two Kits connected



6. Start the Direct Test mode, configure one board as TX and the other one as RX. Note that any side can be replaced by a standard compliant test equipment. Make sure to select the same RF Channel for both during the test and to start the RX test before the TX Test in order not to miss any packets.

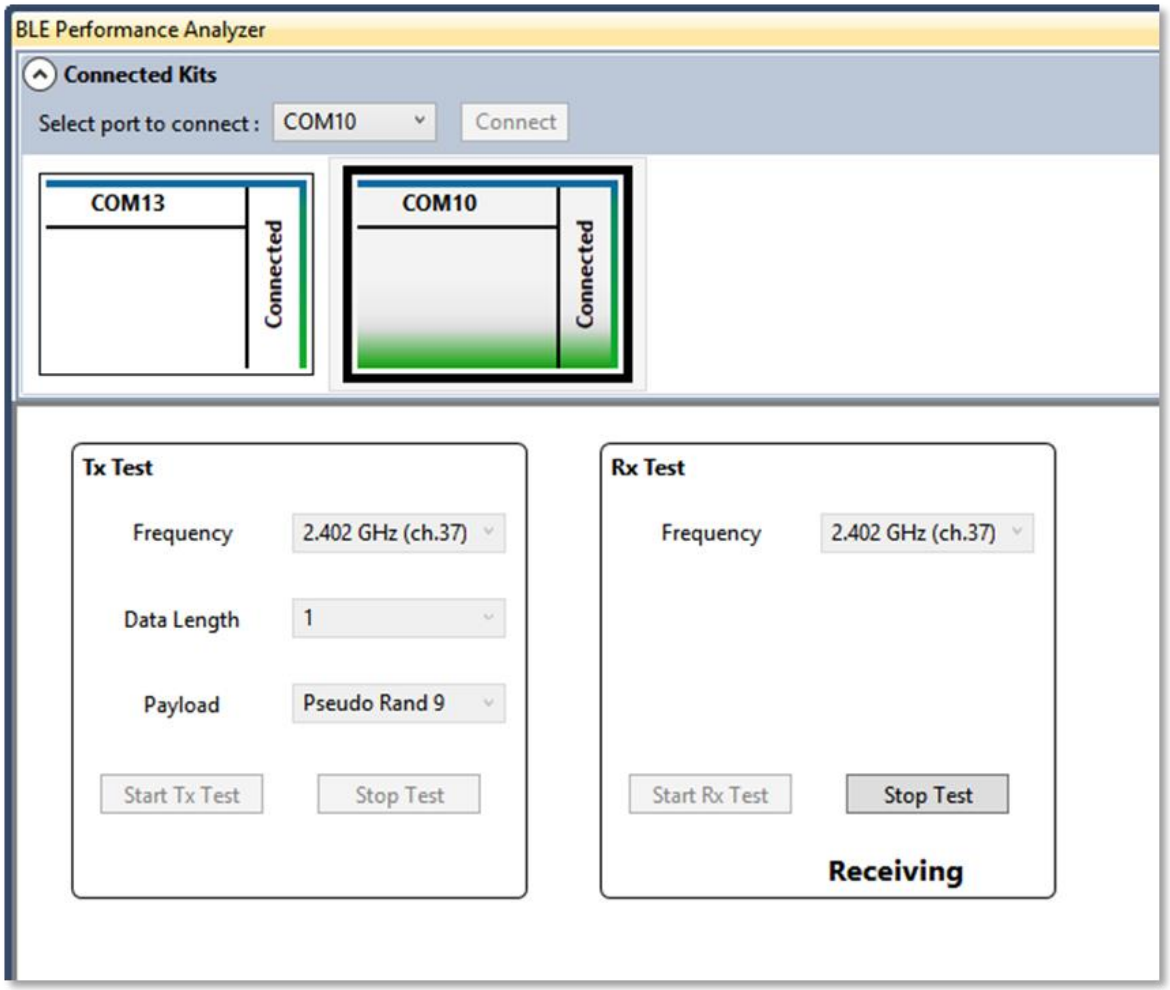
   The first kit is selected for executing the TX Test. Select a kit and click the “Start Tx Test” button.

Figure 6-5. TX Test Running



7. Select a kit for executing RX tests. Note that the second kit is selected for executing RX tests. Select a kit and click the “Start Rx Test” button to start the RX test.

Figure 6-6. RX Test Running



8. On the RX test pane, press the “Stop Test” button. The number of successful received packets is displayed after pressing the “Stop Test” button.

Figure 6-7. RX Side Test Stop

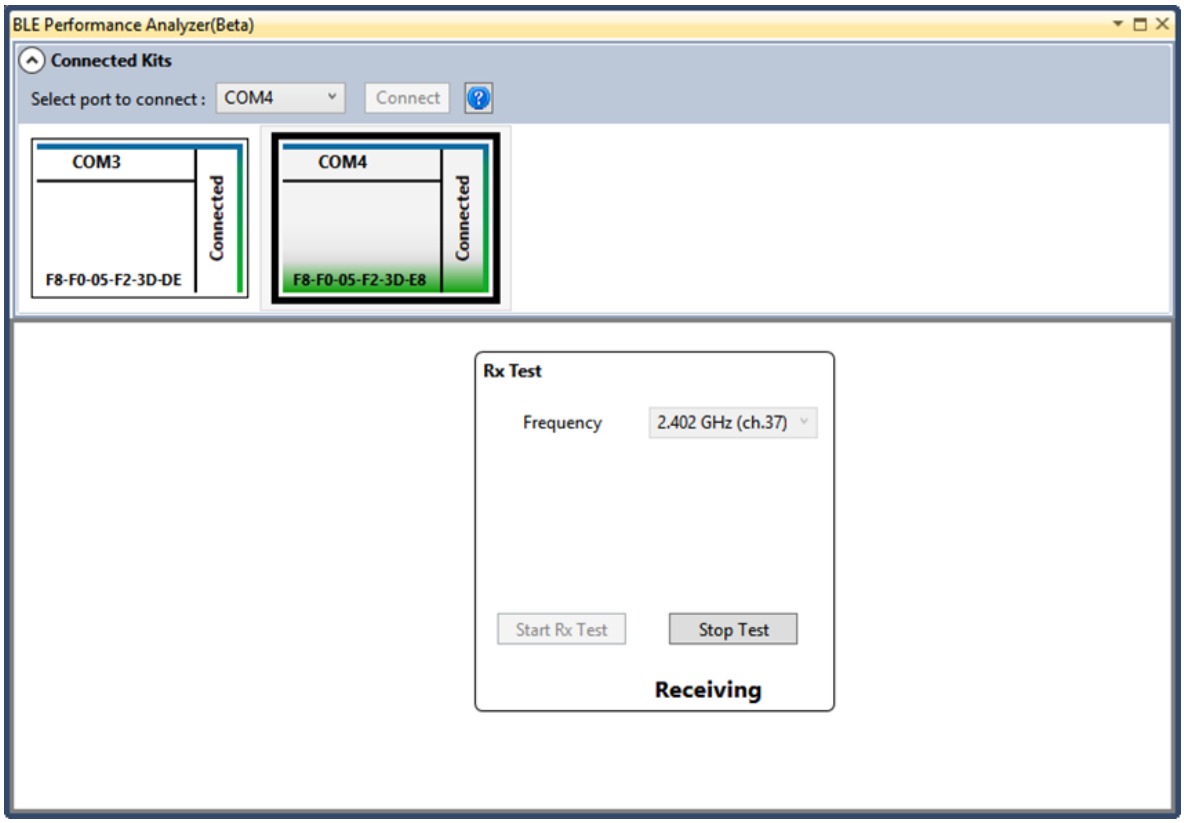
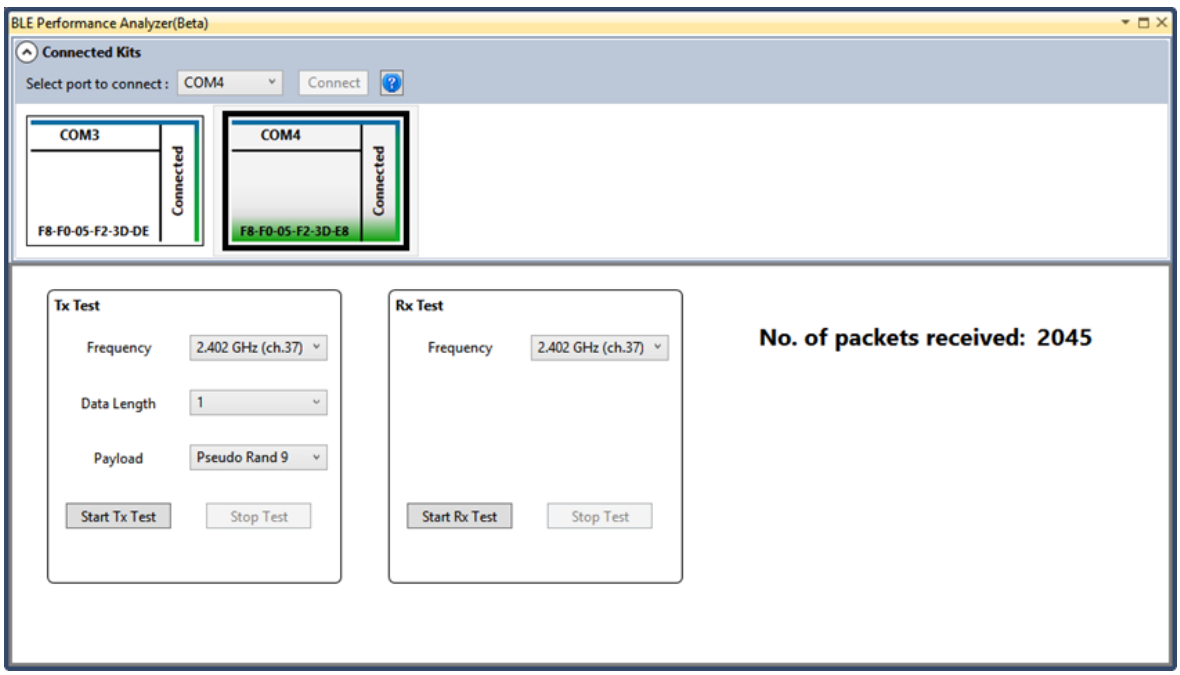


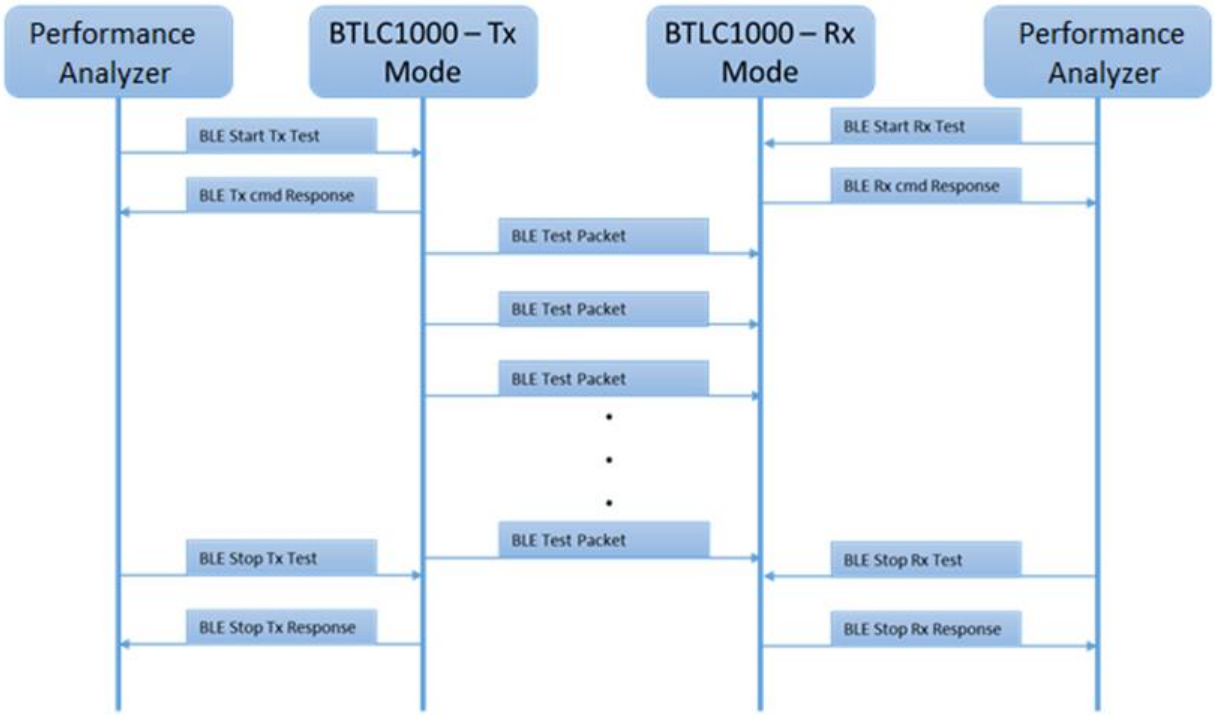
Figure 6-8. RX Side Test Result



7 DTM Test Sequence

The diagram in Figure 7-1 depicts the Direct Test mode between the two ATBTLC1000 devices. The DTM commands are initiated from the BLE Performance Analyzer. To create the below test setup, open the BLE Performance Analyzer and connect to the devices using the COM Ports of each ATBTLC1000 device.

Figure 7-1. DTM RX/TX Test Sequence



8 ATMEL EVALUATION BOARD/KIT IMPORTANT NOTICE AND DISCLAIMER

This evaluation board/kit is intended for user's internal development and evaluation purposes only. It is not a finished product and may not comply with technical or legal requirements that are applicable to finished products, including, without limitation, directives or regulations relating to electromagnetic compatibility, recycling (WEEE), FCC, CE or UL. Atmel is providing this evaluation board/kit “AS IS” without any warranties or indemnities. The user assumes all responsibility and liability for handling and use of the evaluation board/kit including, without limitation, the responsibility to take any and all appropriate precautions with regard to electrostatic discharge and other technical issues. User indemnifies Atmel from any claim arising from user's handling or use of this evaluation board/kit. Except for the limited purpose of internal development and evaluation as specified above, no license, express or implied, by estoppel or otherwise, to any Atmel intellectual property right is granted hereunder. ATMEL SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMGES RELATING TO USE OF THIS EVALUATION BOARD/KIT.

ATMEL CORPORATION

1600 Technology Drive

San Jose, CA 95110

USA

9 Revision History

Doc Rev.	Date	Comments
42536A	09/2015	Initial document release.

Atmel | Enabling Unlimited Possibilities®

Atmel Corporation 1600 Technology Drive, San Jose, CA 95110 USA **T:** (+1)(408) 441.0311 **F:** (+1)(408) 436.4200 | **www.atmel.com**