SAMR21ZLL-EK
User guide

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1 Introduction

This document explains how to get started using ATSAMR21ZLL-EK hardware and connect to Atmel studio for program download.

2 Connecting the Kit

2.1 Top View of the Kit

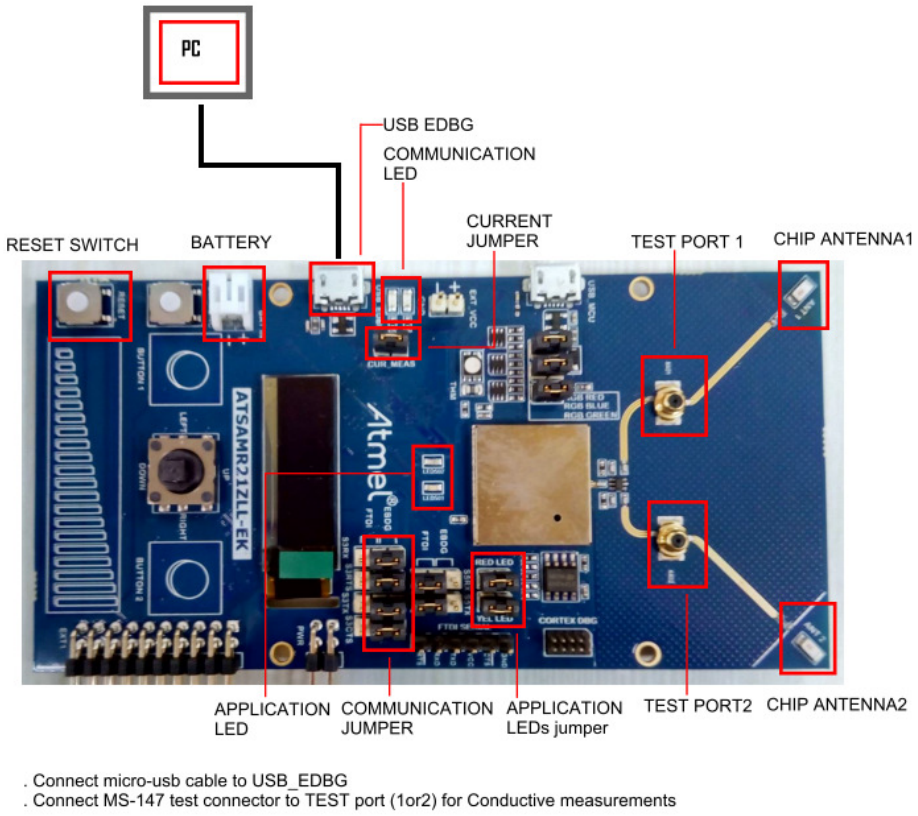


Figure 1 : ATSAMR21ZLL – Kit Description

2.2 USB Connection

Connect micro USB cable to USB_EDBG of the EK board.

2.3 Jumper settings

As highlighted, populate current jumper, Communication jumper and Application LED jumpers

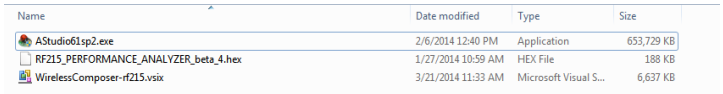
2.4 Connecting MS147 for conductive RF measurements

Connect MS147 SMA Adaptor to either of the test ports (Port 1 or Port 2) for RF measurements. Port1 or Port2 can be chosen from performance analyser.

3. Software Installation

Note: If Atmel Studio 6.2.1502 and Performance Analyzer have been already installed in Test PC, Skip this software installation step

1. Open the DVD containing the Atmel Studio 6.2 Software package
2. Click the “as-installer-6.2.1502-full.exe” file to launch Atmel Studio Installation.



Name	Date modified	Type	Size
AStudio61sp2.exe	2/6/2014 12:40 PM	Application	653,729 KB
RF215_PERFORMANCE_ANALYZER_beta_4.hex	1/27/2014 10:59 AM	HEX File	188 KB
WirelessComposer-rf215.vsix	3/21/2014 11:33 AM	Microsoft Visual S...	6,637 KB

Figure 2 : Atmel Studio Installer

3. Now, Atmel Studio installation begins

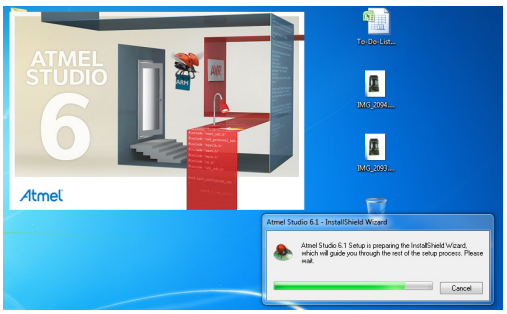
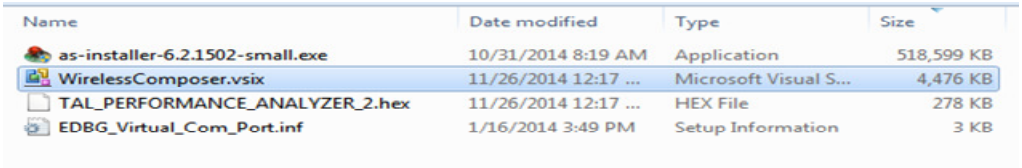


Figure 3: Atmel Studio Installation

4. Follow the on-screen instructions to complete the installation

Figure 4: Atmel Studio Installation

5. Next install the Wireless Composer extension by clicking the “WirelessComposer.vsix” file in the DVD as shown in the following figure.



Name	Date modified	Type	Size
as-installer-6.2.1502-small.exe	10/31/2014 8:19 AM	Application	518,599 KB
WirelessComposer.vsix	11/26/2014 12:17 ...	Microsoft Visual S...	4,476 KB
TAL_PERFORMANCE_ANALYZER_2.hex	11/26/2014 12:17 ...	HEX File	278 KB
EDBG_Virtual_Com_Port.inf	1/16/2014 3:49 PM	Setup Information	3 KB

Figure 5: Wireless Composer Installation

4. Hardware and Driver Installation

1. Connect a micro USB cable to **USB_EDBG** port of ATSAMR21ZLL-EK board.
2. Connect the other end of the USB cable to one of the PC's USB Port
3. Now the EDBG Virtual COM port driver installation will begin automatically

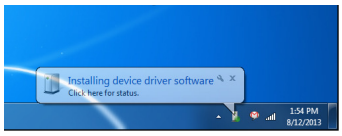


Figure 6: EDBG Virtual COM PORT Driver installation

4. Click the taskbar notification. When the driver installation is successfully completed, there will be a notification as shown in the figure.

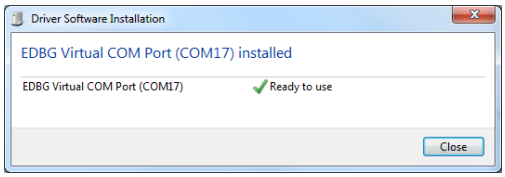


Figure 7: EDBG Virtual COM PORT Driver installation

Note: COM17 in the above figure is for an example. The COM Port number varies from PC to PC.

5. Performance Analyzer

1. Launch Atmel Studio Tool by clicking the Atmel Studio icon

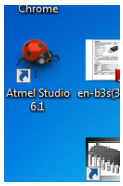


Figure 8: Launch Atmel Studio 6.2

2. For the First Time launch, studio will show the below error for Wireless Composer. Click Ok and studio will be launched

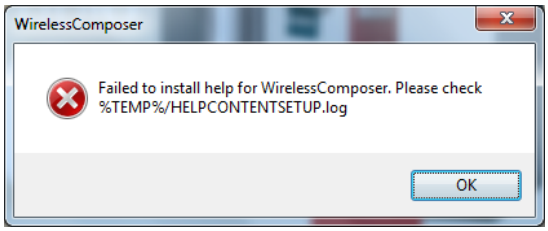


Figure 9: Wireless composer Error

3. From the Atmel Studio Start page, Open Performance Analyzer utility by clicking the icon as shown from the following figure.

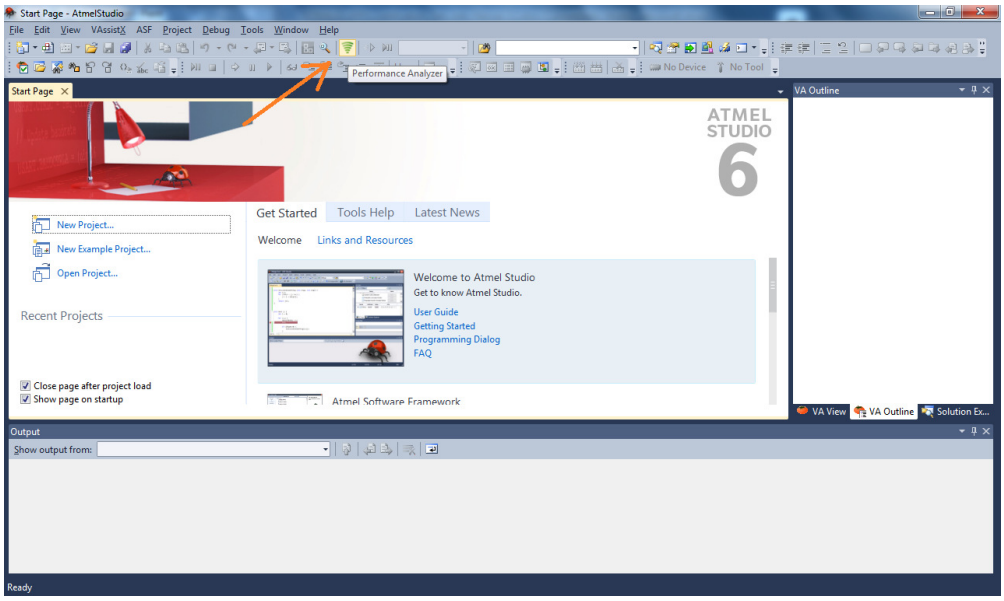


Figure 10: Atmel Studio 6.2 – Start Page

4. After clicking the Performance Analyzer icon, Performance Analyzer window will open as shown below.

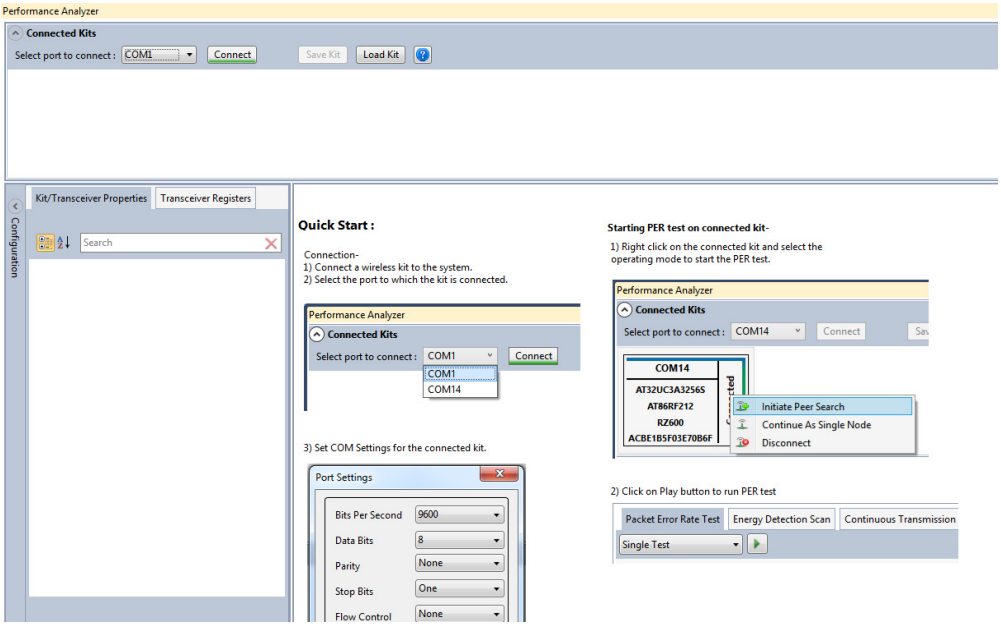


Figure 11: Performance Analyzer

5. Ensure the hardware is connected to the PC as explained in the section2

6. Tx Test (Single node / Continuous Transmission (CW/PRBS))

1. Select the COM Port from the dropdown menu to which the kit is connected and click "Connect"

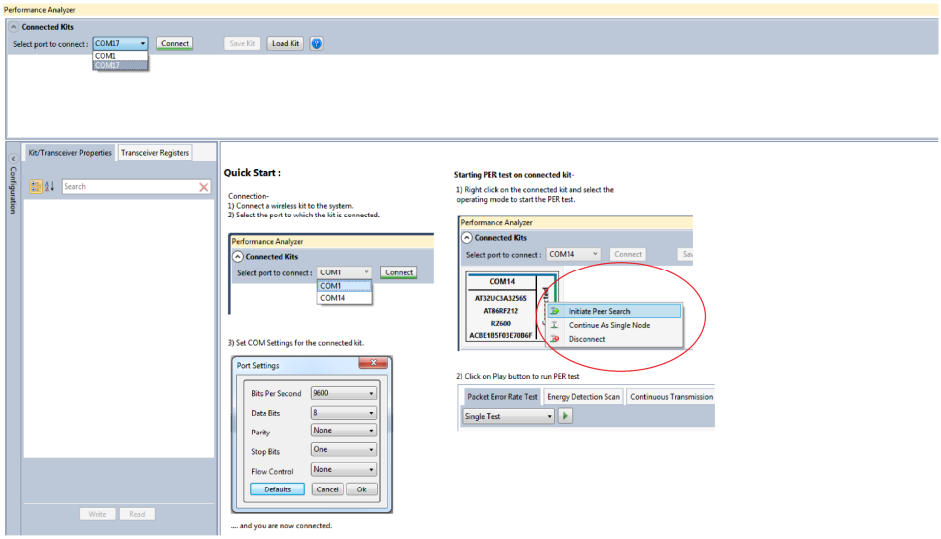


Figure 12: Performance Analyzer – COM Port Selection

Note: COM17 in the above figure is for an example. The COM Port number varies from PC to PC.

2. Set the COM port settings from the pop-up window. Click “Defaults” and then click “OK”
3. To check the transmission only, right click on the Kit information area select “Continue as a single node”. This is also used for continuous transmission. Refer encircled portion in Figure 12.
4. Kit / Transceiver properties, Channel Page, channel Number and Power level can also be changed in the Performance Analyzer window. Refer steps 1 to 3 in Figure 13
5. TX power register values to change transmit power. Refer Step 4 in Figure 13

Value	TX Output Power [dBm]
0x0	+4
0x1	+3.7
0x2	+3.4
0x3	+3
0x4	+2.5
0x5	+2
0x6	+1
0x7	0
0x8	-1
0x9	-2
0xA	-3
0xB	-4
0xC	-6
0xD	-8
0xE	-12
0xF	-17

6. To Transmit CW mode or PRBS mode, click on Continuous transmission and select continuous transmission CW or PRBS. Refer step 5 in Figure 13

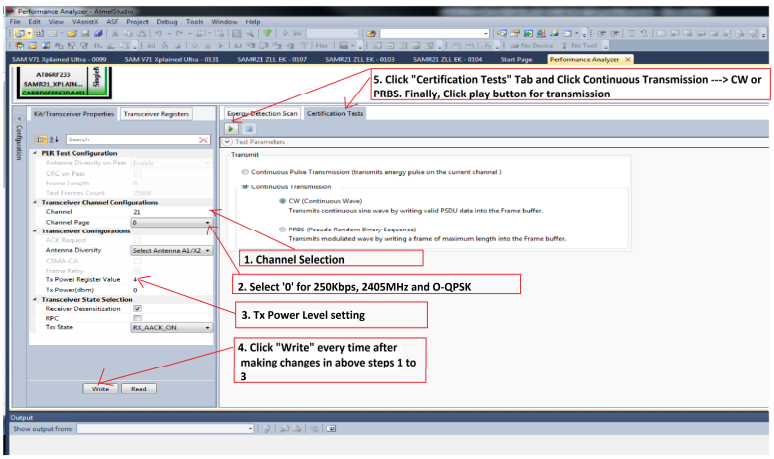


Figure 13: Performance Analyzer – Continuous mode configuration

7. Tx Test - legacy O-QPSK, 4dBm

1. Performance Analyzer configuration settings are

Table 1: Performance analyser settings for Legacy O-QPSK

Channel	*11 to 26 (2405MHz to 2480MHz)*
Channel Page	*0*
Tx Power (dBm)	*4*

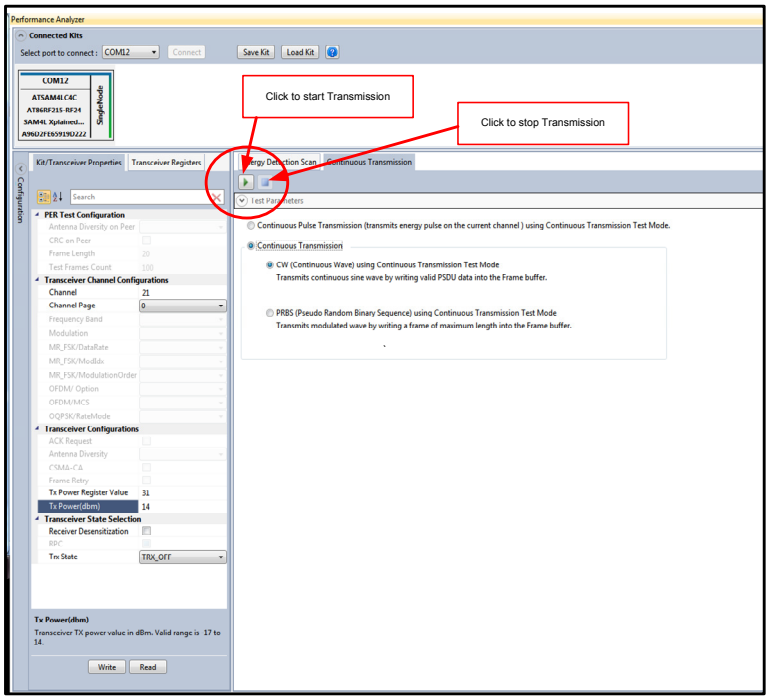


Figure 14: O-QPSK- Continuous mode configuration

8. Rx Test (Transmit and Receive test)

1. Connect two devices with PC by USB cable so both are powered up.
2. Select one COM Port to which the device is connected and select “Initiate Peer Search” So that another device can be connected by RF (RF Pairing). (Device connected to COM Port is transmitter and other device is receiver)

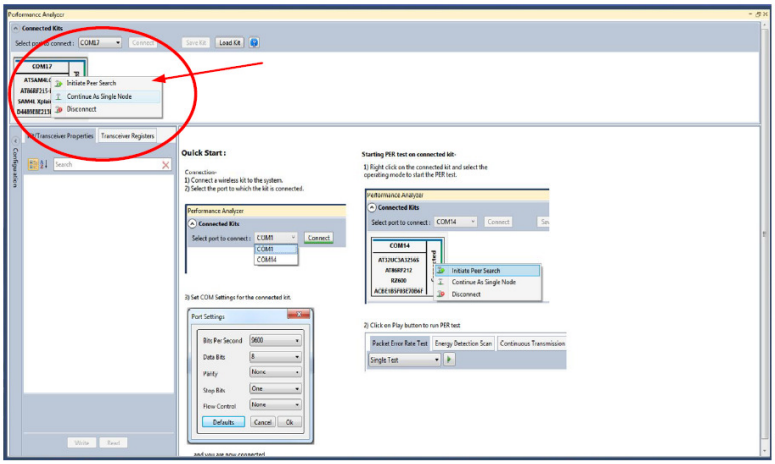


Figure 15: Performance Analyzer – Paring devices

3. When both the devices are paired, the following window appears and it is ready to do PER (Packet Error Rate) test. Also can be configured Transmitting channel, number of frames (packets) from the left side of the window.

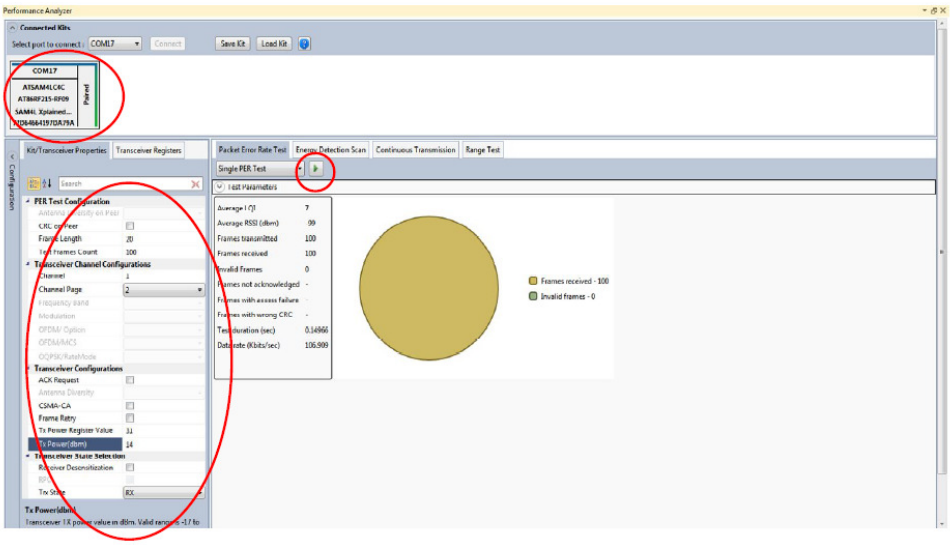


Figure 16: performance Analyzer – PER Test Configuration

4. PER test is Transmit receive Test, number of transmit packets can be set by changing “Test Frames Count”

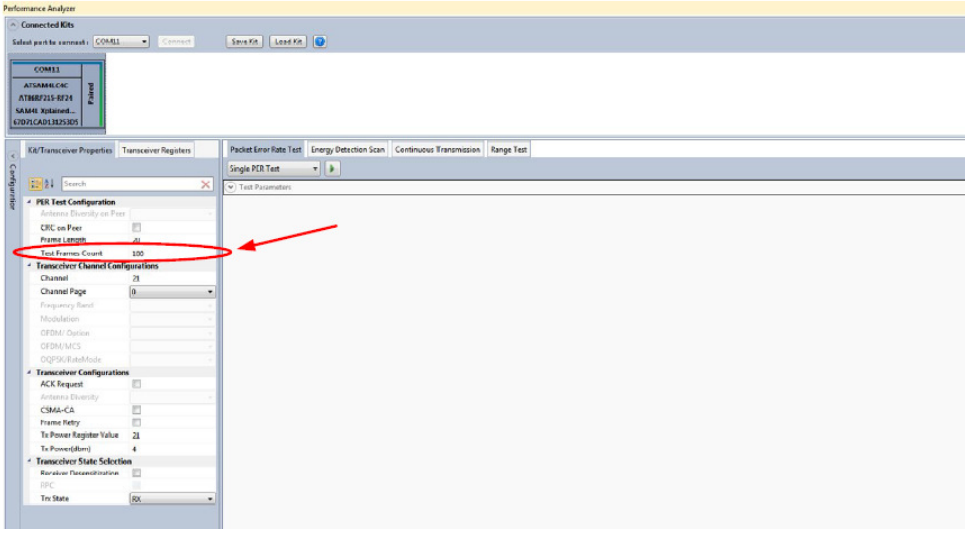


Figure 17: Performance Analyzer – Transmit Packets

5. Run Single PER Test. Test parameter window display the Transmit packets (Frames transmitted), Receive packets (Frames received) and RSSI (received signal strength)

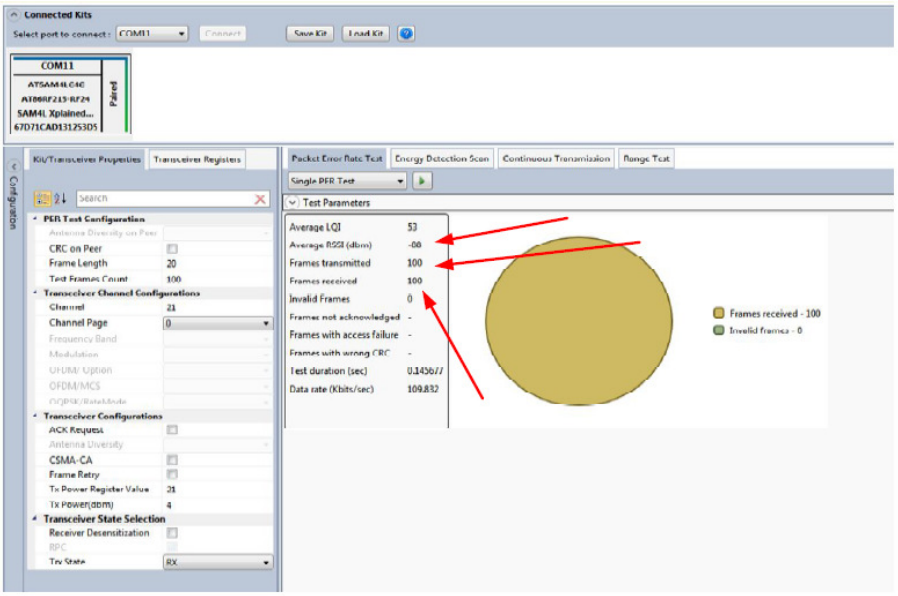


Figure 18: Performance Analyzer – PER Test

FCC Warning:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been modularly approved and is intended for use in evaluation of ATSAMR21G18A module in Zigbee based light link application.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .

Labeling of end - user equipment

This device has been modularly approved. The Final end product label must contain the following statement on the product label:
"Contains FCC ID: VW4A092412"

IC Warning:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

Per RSS GEN section 3.21 requirement, The module must be labeled with its own certification number, and, if the certification number is not visible when the module is installed inside a host device, then the host device into which the module is installed must also display a label referring to the enclosed module.

Par RSS GEN section 3.21 exigence, Le module doit être étiqueté avec son propre numéro de certification, et, si le nombre de certification ne est pas visible lorsque le module est installé à l'intérieur d'un dispositif hôte, alors le dispositif hôte dans laquelle le module est installé doit également afficher un label faisant référence au module ci-joint.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment

Cet équipement est conforme aux limites IC d'exposition aux radiations définies pour un environnement non contrôlé.

Labeling of end - user equipment

This device has been modularly approved. The Final end product label must contain the following statement on the product label:
“Contains IC: 11019A-092412