

## Murata Wi-Fi/BT (CYW) Solution for i.MX

FreeRTOS User Guide



# **Revision History**

Revision	Date	Author	Change Description
1.0	Nov 17, 2020	TF	Initial Release. <b>NOTE:</b> Material moved from previous Quick Start Guide.
			Added alternative option to download SDK in <b>Section 6</b> . Added more sample application example in <b>Section 7</b> . Removed i.MX RT1052 references.
1.1	Jan 28, 2021	TF	Added sample application example in <b>Section 7</b> .

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# 1 Introduction

This document provides detailed instructions on adding wireless functionality with Embedded Artists' Wireless <u>M.2 Modules</u> on <u>NXP Semiconductor</u>'s i.MX RT 1020/1050/1060/1064 Evaluation Kit and <u>Embedded Artists AB</u>'s i.MX RT 1062 Developer's kit. NXP's latest SDK supports 1DX and 1LV M.2 modules. The SDK supports both Wi-Fi and Bluetooth for all the i.MX RT boards (except i.MX RT 1064 EVK where BLE is not functional). Murata provides a patch release for supporting Type 1MW – please go to Murata's Forum. This chapter explains how to set up the hardware and the steps required for software installation.

## 1.1 Acronyms

Acronym	Meaning
BT	Bluetooth
CYW	Cypress
EA	Embedded Artists designs, manufactures and distributes current Wi-Fi/BT M.2 EVB's ( <u>link here</u> ). EA also have enhanced i.MX developer kits which provide comprehensive support for Murata modules ( <u>link here</u> ).
EULA	End User License Agreement
EVB	Evaluation Board (Embedded Artists' Wi-Fi/BT module)
EVK	Evaluation Kit
FTDI	Future Technology Devices International
IDE	Integrated Development Environment
JTAG	Joint Test Action Group
M.2	Formerly known as the Next Generation Form Factor (NGFF), is a specification for internally mounted computer expansion cards and associated connectors. The M.2 specification is defined by PCI-SIG (www.pcisig.com).
PC	Personal Computer
RF	Radio Frequency
RTOS	Real-time Operating System
RX	Receive
SD	Secure Digital
SDIO	Secure Digital Input Output
SDK	Software Development Kit
ТХ	Transmit
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
uSD	Micro SD
uSD-M.2	Micro SD to M.2 Adapter
Wi-Fi	Wireless LAN: "Wi-Fi" is a registered trademark of Wi-Fi Alliance
WLAN	Wireless Local Area Network

#### Table 1: Acronyms used in Quick Start Guide

## 1.1 References

#### 1.1.1 Murata Wi-Fi/BT (CYW) Solution for i.MX FreeRTOS Quick Start Guide

This <u>Quick Start Guide</u> provides quick steps to get started with Murata Wi-Fi/BT Cypress chipsetbased solution with the help of an example.

#### 1.1.2 Murata Wi-Fi/BT Solution for i.MX Hardware User Manual

This <u>manual</u> describes the Murata uSD-M.2 Adapter hardware. All interface signals to the NXP i.MX RT, 6, 7, and 8 EVK's are described. Specifics on interfacing each i.MX EVK to Murata uSD-M.2 Adapter are provided.

#### 1.1.3 Murata's Community Forum Support

Murata's Community provides online support for the Murata Wi-Fi/Bluetooth modules on various i.MX platforms. Refer to <u>this link</u> for main Forum Wi-Fi and Bluetooth landing page.

#### 1.1.4 Murata uSD-M.2 Adapter Datasheet (Rev B1)

This <u>datasheet</u> documents the current version of the Murata' latest uSD-M.2 adapter hardware and its interfacing options.

#### 1.1.5 Murata uSD-M.2 Adapter Datasheet (legacy Rev A)

This <u>datasheet</u> documents the current version of the Murata's legacy uSD-M.2 adapter hardware and its interfacing options. This adapter version is no longer manufactured.

#### 1.1.6 Murata's uSD-M.2 Adapter Landing Page

This <u>website landing page</u> provides latest/comprehensive information on Murata's adapter including links to where it can be purchased.

#### 1.1.7 Embedded Artists' Reference Documentation

Embedded Artists designed the 1DX/1MW/1LV M.2 EVB's in close collaboration with Murata. It is *important to note* that Embedded Artists manufactures and distributes the Wi-Fi/BT M.2 EVB's. Refer to this main landing page for more information: <u>www.embeddedartists.com/m2</u>. **Table 2** lists some relevant documents published by Embedded Artists.

#### 1.1.8 Murata's i.MX Wireless Solutions Landing Page

This <u>website landing page</u> provides latest/comprehensive information on Murata's i.MX Wireless solutions which use the uSD-M.2 Adapter as a key enabler so customers can easily evaluate Murata's modules on i.MX processors.

#### 1.1.9 Murata's i.MX Wireless Solutions Landing Page

This <u>website landing page</u> provides latest/comprehensive information on Murata's i.MX Wireless solutions which use the uSD-M.2 Adapter as a key enabler so customers can easily evaluate Murata's modules on i.MX processors.

Table 2: Embedded Artists Documentation List	ing
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Documentation Filename	Note
Wi-Fi/BT M.2 EVB Primer	Introduction and drill-down on M.2 interface
M.2 SDIO Interface Schematic	Reference schematic for customers designing in WLAN-SDIO M.2 EVB.
M.2 PCIe Interface Schematic	Reference schematic for customers designing in WLAN-PCIe M.2 EVB.
1DX M.2 Module Datasheet	Comprehensive details on 1DX Wi-Fi/BT M.2 Module.
1MW M.2 Module Datasheet	Comprehensive details on 1MW Wi-Fi/BT M.2 Module.
1LV M.2 Module Datasheet	Comprehensive details on 1LV Wi-Fi/BT M.2 Module.

## **1.2 Hardware Options**

This section describes how to configure the hardware correctly, for both NXP and Embedded Artists i.MX RT series platforms. The following table lists the different platforms supported by Murata modules.

i.MX EVK / Dev kit	Manufacturer	Part number	Murata modules supported	Interconnect
i.MX RT1064 EVK	NXP	MIMXRT1064-EVK	<u>1DX</u> , <u>1MW</u> <sup>1</sup> , <u>1LV</u> <sup>2</sup>	uSD-M.2 Adapter
i.MX RT1060 EVK	NXP	MIMXRT1060-EVK	<u>1DX</u> , <u>1MW</u> <sup>1</sup> , <u>1LV</u> <sup>2</sup>	uSD-M.2 Adapter
i.MX RT1050 EVK	NXP	IMXRT1050-EVKB	<u>1DX</u> , <u>1MW</u> <sup>1</sup> , <u>1LV</u> <sup>2</sup>	uSD-M.2 Adapter
i.MX RT1020 EVK	NXP	MIMXRT1020-EVK	<u>1DX</u> , <u>1MW</u> <sup>1</sup> , <u>1LV</u> <sup>2</sup>	uSD-M.2 Adapter
i.MX RT106A	NXP	SLN-ALEXA-IOT	<u>1DX</u>	Soldered down
iMX RT1062 Dev Kit	Embedded Artists	EAK00310	<u>1DX, 1MW, 1LV</u>	M.2

#### Table 3: Murata module support on NXP and Embedded Artists' platforms

**NOTE:** The Embedded Artists' iMX RT1062 Developer's Kit can be used instead of previous (now discontinued) iMX RT1052 Dev Kit for development/evaluation purposes. The main difference between the iMX RT1052 and the iMX RT1062 is that the iMX RT1062 has 1 MB of SRAM while the iMX RT1052 has 0.5 MB SRAM. The iMX RT1052 OEM COM is available for order <u>here</u>.

<sup>&</sup>lt;sup>1</sup> Driver support is present, example code to be added. Post on Murata Community Forum for assistance. <sup>2</sup> Currently 1LV only supports Wi-Fi examples. Bluetooth example is not included yet. Go to Forum for assistance.

Several toolchains are supported by NXP as below, but MCUXpresso IDE is the primary focus in this document:

- NXP supports MCUXpresso IDE
- GNU toolchain for Arm® Cortex® -M with Cmake build system
- IAR Embedded Workbench
- Keil™ MDK-Arm

# 2 Hardware Setup for NXP EVKs with uSD-M.2 Adapter

To enable Murata's wireless solution on NXP's i.MX RT 1020/1050/1060/1064 Evaluation Kits, Embedded Artists' Wi-Fi/BT M.2 EVB's (Murata module onboard) connected to Murata's uSD-M.2 Adapter. The on-board debug adapter is supported. Refer to **Figure 1**, **Figure 2** and **Figure 3** for example of i.MX RT1050 EVK. Murata's uSD-M.2 Adapter plugs in directly to the EVK's microSD connector. The micro-USB connector (J28) is used for USB-UART/JTAG.

Refer to **Section 8** on how to correctly connect Embedded Artists' Wi-Fi/BT M.2 EVB to the Murata Adapter and how to properly jumper the Adapter for default 1.8V VIO operation (not 3.3V override mode). Now insert the Murata Adapter into the microSD slot (J20) until you hear the click sound (push-push connector). Per **Section 8.3**, it is best to tape the uSD Adapter-microSD connection. Make sure the green LED (LED1) on the adapter board is illuminated when powered. Also, the blue LED (LED2) should <u>not be</u> illuminated. Repeating the Murata uSD-M.2 Adapter jumper settings:

- For rev B1 adapter, J12 is in 1-2 pos & J13 is in 1-2 pos.
- For (legacy) rev A adapter, J12 is open.

# NUR INCOLOR DE LA CARRENTI DE LA CAR

## Figure 1: Connecting the EVB to the EVK

## Figure 2: Connected setup close up



Figure 3: NXP i.MX RT 1050-EVKB with Type 1DX M.2 & uSD-M.2 Adapter



# 3 Hardware Setup for Embedded Artists Dev Kits via M.2 interface

Embedded Artists' i.MX RT 1062 Developer Kit has a M.2 connector onboard for direct connection to the M.2 EVB (no adapter required). LPC-Link2 is recommended for the debug adapter. Embedded Artists' website provides support package. **Figure 4** shows the full connection of developer's kit with M.2 and debug probe. Micro-USB connector (J22) is used for USB-UART. J10 is used for LPC-Link2 connection.

**<u>NOTE</u>**: The red line in the flex cable used to connect the debug probe to the developer's kit should align with the arrow at J10 (i.e., pin 1 of J10).



Figure 4: Embedded Artists i.MX RT 1062 Developer's Kit

# 4 Software Setup for NXP EVKs

If you are using Embedded Artists Board, please skip this section and go to **Section 5** of this document.

Click <u>here</u> to go the NXP landing page as shown in **Figure 5**. Follow the steps described in NXP web to install these tools:

- MCUXPresso IDE
- mbed Virtual COM Port Driver
- Terminal application (TeraTerm, Putty, etc.)

#### Figure 5: NXP Getting Started Web Page

Get Started w MIMXRT105	vith the O-EVK
Jump To	Plug It In
1. Plug It In 1.1 Attach the USB Cable	Let's take your MIMXRT1050-EVK / EVKB for a test drive! You have the choice of watching the sequence in a short video or following the detailed actions list below.
1.2 Run the Out-of-Box Demo	
2. Get Software	Get Started with MIMXRT1050-EVK / EVKB Development Platform - How to
3. Build, Run	
4. Leam	
Quick Reference	
+ Chip Documents	
+ Errata	

You should now be able to see mbed Serial Port on the Device Manager as shown in **Figure 6** if you completed software installation successfully.

#### Figure 6: COM Port of NXP IMXRT1050-EVKB



For installing the required SDK(s) for MCUXpresso IDE, please refer to Section 6.

# 5 Software Setup for Embedded Artists Dev Kits

If you are using NXP Board, please skip this section and go back to **Section 4** of this document.

Click <u>here</u> to go the EA landing page as shown in **Figure 7**. Download the document <u>iMX</u> <u>RT1052/1062 Developer's Kit Program Development Guide</u> from the resource tab for detailed instructions about downloading and setting up the SDK. Download "imxrt10xx\_ea\_files\_sdk270\_yyyymm-dd.zip" for the SDK setup. Go to **Section 6** for more detail. You can also download "Getting Started with M.2 modules and i.MX RT" to run the sample example for the wiced\_iperf. Also install all the tools mentioned below:

- MCUXpresso IDE
- FTDI Virtual COM Port Driver
- Terminal application (TeraTerm, Putty, etc.)

#### Figure 7: Embedded Artists Resource Web

General Specifications	Videos/Images Resources	Ordering Info
Flyers and specifications	Documentation and guides	Conformity
<ul> <li>iMX OEM Carrier board schematics revB</li> </ul>	iMX RT1062 Developer's Kit User's Guide iMX RT1052/1062 Developer's Kit	Product compliance declarations Software resources
	Program Development Guide	imxrt1062_ea_files_sdk270_2020- 05-13
	and i.MX RT	<ul> <li>imxrt_secure_provisioning_2020- 01-28</li> </ul>
		UTasker project (Commerical OS)

You should see LPC based USB device and USB Serial Port on the Device Manager as below if you completed software installation successfully. The driver for LPC-Link2 is included in the MCUXpresso.





# 6 SDK Setup for MCUXpresso

MCUXpresso supports various processors, so it requires appropriate SDK for i.MX RT. To support Embedded Artists' Wireless M.2 Modules, additional components (wifi\_wiced and other related components) are required. There are two ways to install SDK in the new MCUXpresso IDE. Follow the steps below carefully to install right components.

## 6.1 Drag and drop SDK in the IDE

1. First download the MCUXpresso SDK by following this URL: <u>https://mcuxpresso.nxp.com</u>. You will need to login to your NXP account and then click "Select Development Board".

MCUXpresso SDK brings oper middleware, and reference example your software development. Custor SDK specific to your processor or e selections.	SDK Builder a source drivers, a applications to speed mize and download an avaluation board Q Explore and filter devi	ices
OVERVIEW	SOFTWARE AND TOOLS	DEVELOPER RESOURCES

2. Type "1050", then select "EVKB-IMXRT1050" for i.MX RT 1050 EVKB.

Search by Name		
1050	()	
Select a Board, Kit, or Processor		
<ul> <li>Boards</li> </ul>		
EVK-MIMXRT1050	Deprecated	
EVKB-IMXRT1050		

3. Scroll down, then click "Build MCUXpresso SDK"

Board	EVKB-IMXRT1050
Device	MIMXRT1052
Core Type / Max Freq	Cortex-M7F / 600MHz
Device Memory Size	0 KB Flash 512 KB RAM
Actions	рк
Actions Build MCUXpresso S	DK vith Pins tool

4. Click "Select All" and then select "Download SDK" to download the SDK.

Versio 7.0 2	n 2019-12-19		Toolchain / IDE Host O MCUXpresso IDE	s dows •
earch	Name, Category, or	Description	Select All	Unselect All
\$	Name 🗘	Category *	Description	Dependencies
~	CMSIS DSP Library		CMSIS DSP Software Library	
~	AWS IOT	Middleware	AWS IOT	
	Azure IoT	Middleware	Azure IoT SDK	
	canopen	Middleware	CANopen Stack - MicroCANopen Plus	
	cjson	Middleware	cjson library	
	Crank Storyboard GUI	Middleware	Crank Storyboard GUI Engine	
	elQ	Middleware	elQ machine learning SDK containing the ARM CMSIS-NN library (neural network ker (more)	
_	Embedded	Middlowara	Embaddad Willaad Oll	

5. Agree to the EULA to start the SDK download.

ease read	the following agreement and click "I AGREE" at the bottom before downloading your software.
EULA	Software Content Register
A_OPT_N	IXP_Software_License v10 December 2019
company, of this Agre the terms of agreement	to bind your company to these terms. You may then download or install the file. In the event of a conflict between the terms ement and any license terms and conditions for NXP'S proprietary software embedded anywhere in the Licensed Software file, if this Agreement shall control. If a separate license agreement for the Licensed Software has been signed by you and NXP, then that shall govern your use of the Licensed Software and shall supersede this Agreement.
	NXP SOFTWARE LICENSE AGREEMENT
This is a employe	legal agreement between your employer, of which you are an authorized representative, or, if you have no ; you as an individual ("you" or "Licensee"), and NXP B.V. ("NXP"). It concerns your rights to use the software

6. Click "Download SDK Archive" if download does not start automatically. You can also download SDK Documentation, then click "Close".

	nloads	×
MCUX	Apresso SDK	
*	Download SDK Archive (128 MB)	
*	Download SDK Documentation	
ď	Download Standalone Example Project	
	For MCUXpresso IDE, example projects can be imported as standalone projects directly within the IDE by downloading the SDK Archive	
Additi	onal Tools	
Dow modi SDK	nload additional tools from NXP or its partners to create new projects and fy example projects using the associated software components included in this .	
ď	Crank Storyboard	
ď	Embedded Wizard Studio	
Online	Documentation	
	View SDK API Reference Manual	
Ø		
CP CP	ISSDK API Reference Manual	
Ø Ø MCUX	SSDK API Reference Manual	

7. To install the SDK in the MCUXpresso, drag and drop the SDK Archive file on "Installed SDKs window".



## 6.2 Install SDK directly from MCUXpresso IDE

1. To install the SDK in the MCUXpresso IDE, click on "Download and Install SDKs". To switch to normal IDE, click on IDE.



2. Type "1060" in the filter box. Click on "evkmimxrt1060" and click on "install" to download and install the SDK for i.MX RT 1060 EVK.

i LMX RT 1060_1MW_BLE - MCUXpresso E Edit Navigate Search Project	DE ConfigTools Run Analysis FreeRTOS } Welcome	Window He	Þ				×
Select MCUXpresso	SDKs to install from https://m reso IDE allowing projects to be created a foress SDKs to provide device knowledge ands _Processors]	A service of the serv	xxp.com/rel	rence examples for the former of the former	dk le applications for y 1024 1024 1024	Vour development board or MCU.	Cortex-M33 Cortex-M33 CAN
	Install and Create	Project	Install and Ir	mport Exam	oles	Install	Cancel
٢			1			: U	>

3. Accept the license agreement and click on finish to start the download.

🔀 Install			×
Review Licenses Licenses must be reviewed and accepted before the software can be installed.			
License text (for SDK_2.x_EVK-MIMXRT1060 2.7.0.201911251446):			
LA_OPT_NXP_Software_License v10 December 2019 IMPORTANT. Read the following NXP Software License Agreement ("Agreement") completely. By select button at the end of this page, or by downloading, installing, or using the Licensed Software, you indic the terms of the Agreement and you acknowledge that you have the authority, for yourself or on beha to bind your company to these terms. You may then download or install the file. In the event of a confi terms of this Agreement and any license terms and conditions for NXP's proprietary software embedde Licensed Software file, the terms of this Agreement shall control. If a separate license agreement for the has been signed by you and NXP, then that agreement shall govern your use of the Licensed Software I accept the terms of the license agreement	ting the ate that y of your lict betwe ad anywh E License and shall	"I Accep you acce compar een the here in th d Softwa supersed	t" pt ny, e ire de
? < Back Next > Finish		Cance	1

# 7 Running Sample Application

Various sample applications are provided by the SDK. There are four Wi-Fi examples included in the latest SDK:

- wiced\_iperf\_4343W: this is for performance test for 1DX (CYW4343W).
- wiced\_iperf\_43012: this is for performance test for 1LV (CYW43012).
- wiced\_mfg\_test\_4343W: this is for RF measurements and Regulatory testing for 1DX.
- wiced\_mfg\_test\_43012: this is for RF measurements and Regulatory testing for 1LV.
- wiced\_bt\_passthrough\_4343W: this is for Bluetooth testing for 1DX.
- wiced\_ble\_4343W: this is for BLE testing for 1DX.
- wiced\_webconfig\_4343W: this is for STA + SoftAP with a web server testing for 1DX.

# 7.1 Example wiced\_iperf\_4343W

1. Click on "Import SDK example(s)..." in the Quickstart Panel.



2. Select "evkbimxrt1050" board and click Next button.

SDK Import Wizard				× G,
Board and/or Device	selection page			^
SDK MCUs	Available boards			
ACUs from installed SDKs. Please	Please select an available board for your project.			
dditional SDKs. NXP MIMXRT1052xxxB ✓ MIMXRT1050 MIMXRT1052xxxB	Supported boards for device: MIMXRT1052xxx8	( ( () () () () () () () () () () () ()	SDK	- -
?	< Back Next >	Finish	Cance	ł

3. Expand wifi\_examples and select wiced\_iperf\_4343W. Select UART for SDK Debug Console, then click Finish button.

🔀 SDK Import Wizard		– 🗆 X	
The source from the SDK will be copied into the will be used in the source from the SDK will be copied into the 'SDK be used in the 'SDK be use	orkspace. (2.x_EVKB-IMXRT1050' SDK.	P 👝	
Import projects			
Project name prefix: evkbimxrt1050	2 Project name suffix:	æ	
Use default location			
Location: C:\Users\Puja Sah\Documents\MCUXpres	soIDE_11.1.0_3209\workspace\i.MX RT 1050_2.7.0\evkbimxrt1050	Browse	
Project Type	Project Ontions		
C Project      C++ Project      C Static Library	C++ Static Library SDK Debug Console Semihost OUART	C Example default	
	☑ Import other files	-	
Examples	2	🖉 🗹 🔆 🖻 🖻	
type to filter			
Name	Description	Version ^	Name
✓ ■ Ξ wifi_examples	Demonstrates Common WEEL and RUE and and any UEDUC		🗸 🔳 🗧 wifi_examples
□	Sends HCI commands to Cypress Bluetooth via UART		$\Box \equiv$ wiced ble 4343W
□ ≡ wiced_iperf3_4343W	The wiced_iperf3_4343W measures performance.		
= wiced inerf 42012	Demonstrates Cypress WiFi connected over USDHC/SDIO		≧ wiced_bt_passtnrougn_4343w
I = wiced inerf 4242W	Demonstrates Cupress WiFi connected over USDHC (SDIO		
	Demonstrates Cypress WiFi connected over USDHC/SDIO		🔲 🧮 wiced_iperf3_4343W
wiced_mfg_test_4343W ⇒ wiced_mfg_test_4343W ⇒ wiced_mfg_test_4343W	Demonstrates Cypress WiFi connected over USDHC/SDIO Mon. Certwing Test Application Manufacturing Test Application	~	□
Image: wiced_iperf_4343W       Image: wiced_inerf_4343W       Image: wiced_inerf_4343W       Image: wiced_inerf_4343W       Image: wiced_inerf_4343W	Demonstrates Cypress WiFi connected over USDHC/SDIO m. Cetwing Test Application Manufacturing Test Application	v >	
	Demonstrate Cypress WiFi connected over USDHC/SDIO mo. Costwing Test Application Manufacturing Test Application	<b>v</b>	<ul> <li>□</li></ul>
	Demonstrate Cypress WiFi connected over USDHC/SDIO m. Costwing Test Application Manufacturing Test Application	~	<ul> <li>wiced_iperf3_4343W</li> <li>wiced_iperf_43012</li> <li>wiced_iperf_4343W</li> <li>wiced_iperf_4343W</li> <li>wiced_mfg_test_43012</li> </ul>
	Demonstrates Cypress WiFi connected over USDHC/SDIO m. Cycluion 124 Application Manufacturing Test Application	, ,	<ul> <li>wiced_iperf3_4343W</li> <li>wiced_iperf_43012</li> <li>wiced_iperf_4343W</li> <li>wiced_mfg_test_43012</li> <li>wiced_mfg_test_43012</li> <li>wiced_mfg_test 4343W</li> </ul>

**NOTE:** If you are using Embedded Artists board, modify flash memory size from 0x800000 to 0x400000 and select "MIMXRT1050-EcoXiP\_ATXP032.cfx" as the driver. For details and to run the wiced\_iperf\_4343W example in the EA's i.MX RT 1062 Developer's Kit, please refer to the <u>Getting</u> <u>Started with M.2 modules and i.MX RT</u>.

4. Open evkbimxrt1050\_wiced\_iperf\_4343W/source/wiced\_iperf.c to modify WIFI\_SSID, WIFI\_PASSWORD and IPERF\_SERVER\_ADDRESS.



In case of Embedded Artists' board, you need to add or modify some files in the example before starting debug. You can get these files from "imxrt10xx\_ea\_files\_sdk270\_yyyy-mm-dd.zip" downloaded in **Section 5.** 

File to copy	Destination	Comment
pin_mux.c	board/	Replace existing file
fsl_lpi2c.c	drivers/	New file
fsl_lpi2c.h	drivers/	New file
pca6416.c	source/	New file
pca6416.h	source/	New file
wwd_platform.c	43xxx_wifi/WICED/platform/MC U/LPC/WWD	Replace existing file
wwd_SDIO.c	43xxx_wifi/WICED/platform/MC U/LPC/WWD	Replace existing file
evkmimxrt10xx_flexspi _nor_config.c	xip/	Replace existing file

#### Table 4: Files to be modified on Embedded Artists' Dev Kit

5. Click Debug in the QuickStart Panel.

🔀 i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_iperf_4343W/sou	urce/wiced_iperf.c - MCUXpresso 🗕 🗆 🗙
File Edit Source Refactor Navigate Search Project	ConfigTools Run Analysis FreeRTOS Window
1 → □ 0 → % → □ 0 → % ★ ☆ → 0	• 🌯 • 🏂 🛷 • 🌛 🗈 🗉 🗉 🗐
	L Q .R & Ø ▼ 🛛 🏠 🔗 📕 🛼
	Quick Access
🍋 Projec 🔀 🚼 Periph 🔠 Regist 🔅 Faults 🖓	□ iviced_iperf.c 🛛 □
<ul> <li>E Solution</li> <li>evkbimxrt1050_wiced_iperf_4343W &lt; Debug&gt;</li> <li>Project Settings</li> <li>In aludar</li> </ul>	<pre>&gt; 31 /* Common WiFi parameters */ ^ 32 #ifndef WIFI_SSID 33 #define WIFI_SSID "nxp-ipecf" &gt;</pre>
() Quickstart Panel 💥 (x)= Variables 💁 Breakpoints 🖵	□ 🍘 I 🖾 P 🔮 P 📮 C 🤧 🗖 🗖
✓ Debug your project IS ▼ IN ▼ IN ▼	▲ Installed SDKs <u>SDK 2.x EVKB-IMXRT1</u>
Terminate, Build and Debug	✓ To install an SDK_simply drag and drop an SDK (zi ♥     ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
c /evkbimxrt1050_wiced_iperf_4343W/source/wiced_iperf.c	d
U <u>NXP MIMXRT1052xxxxB</u> * (evkbi4343W)	

6. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

1 probe found. Select the pro	be to use:				
vailable attached pr	obes				^
Name	Serial number/	Туре	Man	IDE Debug Mo	
S DAPLink CMSIS-DAP	022700004111	Link	ARM	Non-Stop	
Supported Probes (tick/untick	to enable/disable)	prober			
P&E Micro probes	er (inc. civisis-bAr)	probes			
SEGGER J-Link probes					~
0		F			

 After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

File     Action     View     Help       Image: I	
<ul> <li>Ports (COM &amp; LPT)</li> <li>Intel(R) Active Management Technology - SOL (COM3)</li> </ul>	^
mbed Serial Port (COM22)	~

8. Now the iperf example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Tera Term - [disconnected] VT			
ile Edit Setup Control Window Help			
Terminal			
Window			
Font	Tera Term: Serial port set	an	×
Keyboard		-F	
Serial port	Port:	COM22 ~	011
Proxy		115000	UK
SSH	Speed:	115200 ~	
SSH Authentication	Data:	8 bit 🗸	Cancel
SSH Forwarding			
SSH KeyGenerator	Parity:	none ~	
TCP/IP	Stop bits:	1 bit v	Help
General			
Additional settings	Flow control:	none ~	
Save setup			
Restore setup	Transmit dela	iy	
Setup directory	0 mse	c/char 0 ms	ec/line
Load key map			
,			

9. To download the iperf, follow the following link:

For Windows: <u>https://iperf.fr/download/windows/iperf-2.0.5-win32.zip</u> For Linux: Follow the steps to install iperf.

- 1. Download the .deb file for iperf 2.05 via <u>https://iperf.fr/download/ubuntu/iperf\_2.0.5+dfsg1-</u> 2 amd64.deb
- 2. Change directory to where the .deb file is.
- Run the following commands to install it.
   \$ dpkg -I iperf\_2.0.5+dfsg1-2\_amd64.deb
   \$ sudo dpkg -i iperf\_2.0.5+dfsg1-2\_amd64.deb
   \$ sudo apt install iperf

10. Click resume button in MCUXpresso.



11. You should see this output from i.MX RT.



12. Type "c" to run as client mode. The sample wiced\_iperf support several options. Let's try iperf server. Type '1' in Tera Term.



13. To see the throughput numbers, type iperf command in another laptop with iperf2 installed in it: "iperf -c <ip address> -w 256k -i 1 -P 1". You will see below throughput.

#### Laptop iPerf Results:

<mark>8 🗢 🗉</mark> skerr@SDK-W520: ~							
kerr@SDK-W520:~\$ iperf -c 192.168.2.130 -w 256k -i 1 -P 1							
Llient connecting to 192.108.2.130, TCP port 5001 TCP window size: 416 KByte (WARNING: requested 256 KByte)							
3] local 192.168.2.120 port 60564 connected with 192.168.2.130 port 5001							
ID] Interval Transfer Bandwidth							
3] 0.0- 1.0 sec 4.12 MBytes 34.6 Mbits/sec							
3] 1.0- 2.0 sec 3.38 MBytes 28.3 Mbits/sec							
3] 2.0- 3.0 sec 3.25 MBytes 27.3 Mbits/sec							
3] 3.0- 4.0 Sec 3.88 MBytes 32.5 MDIts/sec							
3] 5 0- 6 0 sec 3 88 MBytes 32 5 Mbits/sec							
3] 6.0- 7.0 sec 3.38 MBytes 28.3 Mbits/sec							
3] 7.0- 8.0 sec 3.38 MBytes 28.3 Mbits/sec							
3] 8.0- 9.0 sec 4.00 MBytes 33.6 Mbits/sec							
3] 9.0-10.0 sec 3.50 MBytes 29.4 Mbits/sec							
3] 0.0-10.1 sec 35.9 MBytes 29.9 Mbits/sec							
kerr@SDK-W520:~\$							



14. Type 2 in Tera Term to run TCP client mode (TX only). Before typing 2, make sure to run server on another Laptop ("iperf -s -w 256k -i 1"). You will see below outputs:

Laptop iPerf Results:

😣 🚍 🗉 skerr@SDK-W520: ~
skerr@SDK-W520:~\$ iperf -s -w 256k -i 1
Server listening on TCP port 5001 TCP window size: 416 KByte (WARNING: requested 256 KByte)
<pre>[ 4] local 192.168.2.120 port 5001 connected with 192.168.2.130 port 49153 [ ID] Interval Transfer Bandwidth [ 4] 0.0- 1.0 sec 1.65 MBytes 13.9 Mbits/sec [ 4] 1.0- 2.0 sec 1.93 MBytes 16.2 Mbits/sec [ 4] 2.0- 3.0 sec 1.79 MBytes 15.1 Mbits/sec [ 4] 3.0- 4.0 sec 1.71 MBytes 14.3 Mbits/sec [ 4] 4.0- 5.0 sec 1.84 MBytes 15.4 Mbits/sec [ 4] 5.0- 6.0 sec 1.71 MBytes 14.4 Mbits/sec [ 4] 6.0- 7.0 sec 1.63 MBytes 13.7 Mbits/sec [ 4] 7.0- 8.0 sec 1.78 MBytes 14.9 Mbits/sec [ 4] 9.0-10.0 sec 1.70 MBytes 14.2 Mbits/sec</pre>

Console Output – Tera Term:

File Edit Setup Control Window Help TCP_DONE_CLIENT (TX) Local address : 192.168.2.130 Port 49153 Docal address : 192.168.2.130 Port 49153	
TCP_DONE_CLIENT (TX) Local address : 192.168.2.130 Port 49153	
Remote address : 192.168.2.120 Fort 5001 Bytes Transferred 18365364 Duration (ms) 10002 Bandwidth (kbitpsec) 14689	Ŷ

## 7.2 Example wiced\_iperf\_43012

1. Click on "Import SDK example(s)..." in the Quickstart Panel.



2. Select "evkbimxrt1050" board and click Next button.



3. Expand wifi\_examples and select wiced\_iperf\_43012. Select UART for SDK Debug Console, then click Finish button.



4. Open source/wiced\_iperf.c to modify WIFI\_SSID, WIFI\_PASSWORD and IPERF\_SERVER\_ADDRESS.

i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_iperf_43012/source/wik         File Edit Source Refactor Navigate Search Project Confi <sup>•</sup> □	ted_iperf.c - MCUXpresso IDE
<ul> <li>Component</li> <li>Comp</li></ul>	<pre>38 #endif 39 40 #ifndef WIFI_SECURITY 41 #define WIFI_SECURITY_WICED_SECURITY_WPA2_MIXED_PSK 42 #endif 43 44 /* Parameters that apply to AP mode only */ 45 #ifndef WIFI_AP_CHANNEL 46 #define WIFI_AP_CHANNEL 1 47 #endif 48 49 #define WIFI_AP_IP_ADDR "192.168.1.1" 50 #define WIFI_AP_NET_MASK "255.255.0.0" 51 52 /* IPerf calated parameters */ 53 /* IPerf calated parameters */</pre>
	53       #ifndef IPERF_SERVER_ADDRESS         55       #define IPERF_SERVER_ADDRESS         (       >         (       >         ()       >         ()       In ⊗ □ Pr        Pr        □ C        □ Te        □ L        □ De □ □
) items selected	

5. Click on "Debug" button in the Quickstart Panel.

X i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_iperf_4301	2/source/wiced_iperf.c - MCUXpresso IDE - 🛛 🗙
File Edit Source Refactor Navigate Search Pro	ject ConfigTools Run Analysis FreeRTOS Window Help
🔁 • 🔚 🔞   🕲 • 🔦 • 🔜 🗇 🐤 🚸 🌴 •	🖸 🕶 隆 🛷 🕶 🍠 💀 🗐 👖 🖳
🔌 🗈 🗉 🖬 🖓 3. (3) . (2) 🗟 😿 🚺	🖷 3. I. K. 🖑 🏟 🕶 🔣 🏠 🥜 📕 🐜
∲a ▼ ∛a ▼ ∜> <> ▼	Quick Access
🔁 Pr 🙁 🔀 Per 🕮 Re 🚸 Fa 🖳 🗖	i wiced_iperf.c ☆
Image: Constraint of the second s	53 54 #ifndef IPERF_SERVER_ADDRESS 55 #define TPERF_SERVER_ADDRESS "192 168 2 1:
U Quicks 💥 (x)= Variabl 💁 Break 🗖 🗖	👘 н 🕱 р 🔮 р 🚍 с 🖉 т 🔜 н 🖳 р 🖓 🗖
▼ Debug your project IS ▼ III ▼	Installed SDKs (2.x EVKB-IMXR11050' (2.6.1') rep
🕵 🕸 Debug	To install an SDK, simply drag and drop an SDK (zip file/folder) int
< >	>
c /evkbimxrt1050_wiced_iperf_43012/source/wiced_iperf	l.c
U NXP MIMXRT1052xxxxB* (evkbi43012)	

6. After the debug process is complete, the iperf example is ready to run. Open Tera Term on the appropriate COM port (i.e., COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Terminal	Tera Term: Serial port set	up	×
Window	Dort'	COM22 V	
Font	FUIG		ОК
Serial port	Speed:	115200 ~	
Proxy	Data:	8 bit $\sim$	Cancel
SSH Authentication	Parity:	none v	
SSH Forwarding			11-1-
SSH KeyGenerator	Stop bits:	1 bit 🗸 🗸	нер
TCP/IP	El		
General	Flow control:	none v	
Additional settings			
Save setup	Transmit dela	iy	
Restore setup	0	olohor 🕕 mo	مطالعه
Setup directory	u mse		cynne
Load key map			

7. Click resume button in MCUXpresso.

🔀 i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_iperf_43012/sc	ource/wiced_iperf.c - MCUXpresso IDE -	×
File Edit Source Refactor Navigate Search Project	t ConfigTools Run Analysis FreeRTOS Window Help	
· □ · □ · □ · □ · · · · · · · · · · · ·		
½ - <sup>5</sup> / <sub>1</sub> - <sup>1</sup> / <sub>2</sub>	Quick Access	
陷 Proj 🛛 🔀 Peri 👭 Regi 🞋 Fau 🖳 🗖	🎋 Debug 🛛 🙀 🙀 🔽	- 8
□         □         □         ▼         ▼           ~         □         □         □         □         ▼         ▼           ~         □	<ul> <li>v LS evkbimxrt1050_wiced_iperf_43012 LinkServer Debug [C/C+</li> <li>v R evkbimxrt1050_wiced_iperf_43012.axf [MIMXRT1052xxxx]</li> </ul>	+ (N ∧ B (cc <sub>↓</sub>
> S Project Settings	<	>
> ﷺ Binaries	i wiced_iperf.c 🕅	
S CASIS Y	int main(void)	
😃 Quicksta 💥 💷 Variables 🍨 Breakpo 🗖 🗖	👘 і 🔲 Р 🚉 Р 📮 С 🐹 🖉 Т 🔜 І 🖓 О 📑	
MCUXpresso IDE - Quickstart Pan $\hat{\checkmark}$	■ X X   De LinkServer Debug [C/C++ (NXP [MCUXpresso Semihosting Telnet console for 'evkbing <	Semico nxrt∴ >
Sevkbimxrt1050_wiced_iperf_43012		
U <u>NXP MIMXRT1052xxxxB* (evkbi43012</u> )		
10000		

8. You should see following output in Tera Term.



9. Type "c" to run as client mode. The sample wiced\_iperf support several options. Let's try iperf server. Type '1' in Tera Term.



10. To see the throughput numbers, type iperf command in another laptop with iperf2 installed in it: "iperf -c <ip address> -w 256k -i 1 -P 1". Throughput performance numbers are shown for both 2.4GHz and 5GHz below.

#### Laptop iPerf Results (2.4GHz):

```
🔵 🔲 skerr@SDK-W520: ~
skerr@SDK-W520:~$ iperf -c 192.168.2.144 -w 256k -i 1 -P 1
Client connecting to 192.168.2.144, TCP port 5001
TCP window size: 416 KByte (WARNING: requested 256 KByte)
                            3] local 192.168.2.120 port 58913 connected with 192.168.2.144 port 5001
 ID] Interval Transfer Bandwidth
  3]
      0.0- 1.0 sec 4.38 MBytes 36.7 Mbits/sec
      1.0- 2.0 sec 4.12 MBytes 34.6 Mbits/sec
  3]
      2.0- 3.0 sec 3.62 MBytes 30.4 Mbits/sec
  3]
      3.0- 4.0 sec 4.25 MBytes 35.7 Mbits/sec
   3]
      4.0- 5.0 sec 4.12 MBytes 34.6 Mbits/sec
5.0- 6.0 sec 4.25 MBytes 35.7 Mbits/sec
   3]
  3]
  31
      6.0- 7.0 sec 3.88 MBytes 32.5 Mbits/sec
   3]
      7.0- 8.0 sec 4.25 MBytes 35.7 Mbits/sec
   31
      8.0- 9.0 sec 4.12 MBytes 34.6 Mbits/sec
      9.0-10.0 sec 3.75 MBytes 31.5 Mbits/sec
   31
      0.0-10.0 sec 40.9 MBytes 34.2 Mbits/sec
   3]
skerr@SDK-W520:~$
```

Console Output – Tera Term (2.4GHz):



Laptop iPerf Results (5GHz):

💊 🔵 🗊 🛛 sk	err@SDK-W5	20: ~	
skerr@SDK-	W520:~\$ ip	erf -c 192.16	8.2.144 -w 256k -i 1 -P 1
client con		102 160 2 14	4 TCD post 5001
TCP window	size: 41	6 KRvte (WARN	4, TCP port 5001 ING: requested 256 KBvte)
[ 3] loca	l 192.168.	2.120 port 58	949 connected with 192.168.2.144 port 5001
[ ID] Inte	rval	Transfer	Bandwidth
[ 3] 0.0	- 1.0 sec	5.75 MBytes	48.2 Mbits/sec
[ 3] 1.0	- 2.0 sec	5.38 MBytes	45.1 Mbits/sec
[ 3] 2.0	- 3.0 sec	5.38 MBytes	45.1 Mbits/sec
[ 3] 3.0	- 4.0 sec	5.50 MBytes	46.1 Mbits/sec
[ 3] 4.0	- 5.0 sec	5.50 MBytes	46.1 Mbits/sec
[ 3] 5.0	- 6.0 sec	5.50 MBytes	46.1 Mbits/sec
[ 3] 6.0	- 7.0 sec	5.38 MBytes	45.1 Mbits/sec
[ 3] 7.0	- 8.0 sec	5.62 MBytes	47.2 Mbits/sec
[ 3] 8.0	- 9.0 sec	5.25 MBytes	44.0 Mbits/sec
[ 3] 9.0	-10.0 sec	5.50 MBytes	46.1 Mbits/sec
[ 3] 0.0	-10.0 sec	54.9 MBytes	45.9 Mbits/sec
skerr@SDK-	W520:~\$		

Console output – Tera Term (5GHz):

🔟 COM22	- Tera 1	Ferm VT			_	×
File Edit	Setup	Control	Window	Help		
TCP_DONE Local ad Remote a Bytes Tr Duration Bandwidt	SERU dress ddres ansfe (ms) h (kb	ER (RX) : 192 s : 192 rred 57 10092 itpsec)	) 168.2.1 2.168.2 7540632 9 45612	44 Port 50 120 Port 9	001 58949	 ~

11. Type 2 in Tera Term to run TCP client mode (TX only). Before typing 2, make sure to run server on another Laptop ("iperf -s -w 256k -i 1"). You will see below outputs:

Laptop iPerf Results (2.4GHz):

```
🔊 🗐 🗉 🛛 skerr@SDK-W520: ~
skerr@SDK-W520:~$ iperf -s -w 256k -i 1
Server listening on TCP port 5001
TCP window size: 416 KByte (WARNING: requested 256 KByte)
  4] local 192.168.2.120 port 5001 connected with 192.168.2.144 port 49153
                                  Bandwidth
 ID] Interval
                     Transfer
   41
       0.0- 1.0 sec
                    1.47 MBytes
                                 12.3 Mbits/sec
       1.0- 2.0 sec 1.66 MBytes 13.9 Mbits/sec
  41
  41
       2.0- 3.0 sec
                    1.70 MBytes
                                 14.2 Mbits/sec
   4]
      3.0- 4.0 sec
                    1.30 MBytes 10.9 Mbits/sec
   41
      4.0- 5.0 sec 1.24 MBytes
                                 10.4 Mbits/sec
   41
       5.0- 6.0 sec
                    1.52 MBytes
                                 12.7 Mbits/sec
   41
       6.0- 7.0 sec 1.57 MBytes
                                 13.2 Mbits/sec
   41
       7.0- 8.0 sec 1.09 MBytes 9.12 Mbits/sec
   4]
      8.0- 9.0 sec
                    1.51 MBytes 12.7 Mbits/sec
   41
                    1.49 MBytes 12.5 Mbits/sec
      9.0-10.0 sec
   4]
       0.0-10.0 sec
                    14.6 MBytes 12.2 Mbits/sec
```

Console output – Tera Term (2.4GHz):

V	COM2	2 - Tera	Term VT				_		×
File	Edit	Setup	Control	Window	Help				
Ente Pres	er mo s SP	de num ACE to	ber: 2 abort	the tes	st and	return	to main	menu	^
TCI Loc Rer Byt	P_DON al a note a tes Tr	E_CLIE ddress addres ransfe	NT (TX) : 192 :s : 192 :rred 1	) .168.2.1 2.168.2 5258484	144 P 120	ort 4919 Port 500	53 01		
Dui Bar	ation dwid	n (ms) th (kh	itpsec	> 12206					~

```
😑 🗉 skerr@SDK-W520: ~
skerr@SDK-W520:~$ iperf -s -w 256k -i 1
Server listening on TCP port 5001
TCP window size: 416 KByte (WARNING: requested 256 KByte)
   4] local 192.168.2.120 port 5001 connected with 192.168.2.144 port 49153
                                   Bandwidth
 ID] Interval
                     Transfer
   4]
       0.0- 1.0 sec
                     2.01 MBytes
                                  16.9 Mbits/sec
                     1.75 MBytes
                                  14.7 Mbits/sec
   4]
       1.0- 2.0 sec
   4]
       2.0- 3.0 sec
                     2.42 MBytes
                                  20.3 Mbits/sec
   41
       3.0- 4.0 sec
                     2.47 MBytes
                                  20.7 Mbits/sec
   4]
       4.0- 5.0 sec
                     2.54 MBytes
                                  21.3 Mbits/sec
   41
       5.0- 6.0 sec
                     2.51 MBytes
                                  21.1 Mbits/sec
   41
                                  20.9 Mbits/sec
       6.0- 7.0 sec
                     2.50 MBytes
   4]
       7.0- 8.0 sec
                     2.56 MBytes 21.5 Mbits/sec
   41
                                  21.7 Mbits/sec
       8.0- 9.0 sec
                     2.58 MBytes
   41
       9.0-10.0 sec
                     2.53 MBytes
                                  21.2 Mbits/sec
   4]
       0.0-10.0 sec
                     23.9 MBytes
                                 20.0 Mbits/sec
```

Console output – Tera Term (5GHz):



## 7.3 Example wiced\_mfg\_test\_4343W

- 1. Hardware Requirement (Optional):
  - a. evkbimxrt1050 board's connector J22, pin 3 to Murarta\_uSD M.2 Adapter's connector J9, pin 3
  - b. Connect the board with PC by using USB/UART converter:
    - board uart RX (pin 1 on J22) connect it to TX pin on converter
    - board uart TX (pin 2 on J22) connect it to RX pin on converter
    - board GND (pin 7 on J24)
- 2. Step 1 is only required if you want to see throughput in the terminal window. Otherwise just skip step 1 and go to step 3.
- 3. Click on "Import SDK example(s)..." in the Quickstart Panel.



4. Select "evkbimxrt1050" board and click Next button.



5. Expand wifi\_examples and select wiced\_mfg\_test\_4343W. Select UART for SDK Debug Console, then click Finish button.



6. Click on "Debug" button in the Quickstart Panel.

🐹 i.MX RT 1050_2.7.0 MCUXpresso IDE	- 🗆 X
File Edit Navigate Search Project ConfigTools Run	Analysis FreeRTOS Window Help
🔁 - 🔚 🕼   🛞 - 🍫 - 🔝 🛷 🏷   🎋 🌴 - 💽 -	• 💁 • 🤔 🛷 • 🖻 🗉 🗉 🖻
x   D II = N 2. 3 .e   🗟 😿   D II = 3	L 🕾 🖈 🍪 🗣 🔣 🏠 🥜 📕 💺 👘
<u>4</u> • ₩ ↔ ↔ • ↔ •	Quick Access 🔡 😭 🔀
陷 Proj 🙁 🔀 Peri 👭 Regi 🚸 Faults 🖓 🗖	
🖻 🔄 🖶 🍫 🔣 🕶 芩	
> 😂 evkbimxrt1050_wiced_mfg_test_4343W <debug></debug>	
() Quickstar ☆ (×)= Variables 🍨 Breakpoi 🖓 🗖	🎁 I 🐹 🔲 P 🚉 P 🔤 C 🄧 🗖 🗖
	🔟 🎱 🕹 🔲
🕵 🕸 Debug	
Terminate Ruild and Debug	To install an SDK, simply drag and drop an SDI ✓
<pre>evkbimxrt1000_wiced_mtg_test_4343w</pre>	
<u>U</u> <u>NXP</u>	MIMXRT1052xxxxB* (evkbi343W)

7. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

🗄 Device Manager — 🗆	×
File Action View Help	
← →   □   2 □	
✓	^
Intel(R) Active Management Technology - SOL (COM	13)
mbed Serial Port (COM22)	
USB Serial Port (COM24)	~
	_

 Open evkbimxrt1050\_wiced\_mfg\_test\_4343W/wiced/43xxx\_Wi-Fi/libraries/test/wl\_tool and right click on wl\_tool. Select Utilities/Open command prompt here and a command prompt window will come up.



9. After the command prompt window shows up, click on "resume debug" in the MCUXpresso IDE.

i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_mfg_test_4343	W/source/mfg_test.c - MCUXpresso I 🛛 🗙
File Edit Source Refactor Navigate Search Project	ConfigTools Run Analysis FreeRTOS Window Help
T → □ □ □ → ∞ → ∞ → ∞ → ∞ → ∞ → ∞ → ∞ → ∞	) • 💁 • 🤔 🛷 • 🥒 🔛 🗐 👖 📮
2 ▼ २ ▼ ♥ ♥ ♥ ♥ ♥	Quick Access
🔁 Proj 🛛 🔀 Peri 👭 Regi 救 Faults 🖓 🗖	🎋 Debug 🛛 🦌 🙀 🔽 🗖 🗖
🖻 😫 🖗 🕅 🔻 🏹	ic mfg_test.c ⊠ □
evkbimxrt1050_wiced_mfg_test_4343W < Debug>	10 /*
> S Binaries	2 * Copyright (c) 2015, Freescale Semi 3 * Copyright 2016-2017 NXP
< >	<
(U) Quicksta 💥 (x)= Variables 💁 Breakpoi 🗖 🗖	👘 Пр 🖹 р 📃 с 👷 🖉 т 🗟 і 🖓 р 🖓 🗖
c /evkbimxrt1050_wiced_mfg_test_4343W/source/mfg_test.c	
U NXP MIMXRT1052xxxxB* (evkbi343W)	

10. To see logs from debug console, open the Tera Term with USB/UART converter port number (i.e., COM 24). You should see the output as below in the terminal window:

🔟 COM24 - Tera Term VT	_		$\times$
File Edit Setup Control Window Help			_
Initializing WiFi Connection			^
AsyncInterrupt is not supported WLAN MAC Address : 00:9D:6B:8E:89:76 WLAN Firmware : w10: Apr 30 2018 04:13:29 version 7.45.98.50 (r688715 D 01-68e4a7a6 WLAN CLM : API: 12.2 Data: 9.10.39 Compiler: 1.29.4 ClmImport: 1. 2018-04-11 22:31:04 Successfully Initialized WiFi Connection Starting WL server	CY WLT 36.3 C	TEST Creati	FWI on :

11. Type "wl4343WA1 --serial <COM port number> ver" and hit return. If you can see CY WLTEST in the output that means the manufacturing example is working fine.



## 7.4 Example wiced\_mfg\_test\_43012

1. Click on "Import SDK example(s)..." in the Quickstart Panel.



2. Select "evkbimxrt1050" board and click Next button.



3. Expand wifi\_examples and select wiced\_mfg\_test\_43012. Select UART for SDK Debug Console, then click Finish button.



4. Click on "Debug" button in the Quickstart Panel.

File Edit Navigate Search Project ConfigTools Run r +	Analysis FreeRTOS Window Help
×   D> 00 = N 2. 3 . 10 = 00 = 1	R. R. & K - X & A -
	Quick Access 🔡 😰 🔀
陷 Proj 😥 🚼 Peri 🔠 Regi 🚸 Faul 🖳 🗖	
🖻 🔄 🖶 🍫 🕅 🕶 🌫	
> 👺 evkbimxrt1050_wiced_mfg_test_43012 <debug></debug>	
😃 Quicksta 💥 💷 Variables 💁 Breakpo 🖻 🗖	👘 I 🕱 🗖 P 🚉 P 🚍 C 🖉 T 🦖 🗖 🗖
	🔀 🥹 😫 🗐
▼ Debug your project IS ▼ III ▼ ^	Installed SDKs <u>SDK 2.x EVKB-IMXRT1050</u>
w Debug	To install an SDK, simply drag and drop an SDK (zip file
Terminate, Build and Debug	<
evkbimxrt1050_wiced_mfg_test_43012	
(1) AD	(D. MIN AVET 1052 D* (

5. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

	^
OL (COM3)	
	~
	OL (COM3)

 Open evkbimxrt1050\_wiced\_mfg\_test\_43012/43xxx\_Wi-Fi/libraries/test/wl\_tool and right click on wl\_tool. Select Utilities/Open command prompt here and a command prompt window will come up.



7. After the command prompt window shows up, click on "resume debug" in the MCUXpresso IDE.

🔀 i.MX RT 1050_2.7.0 - evkbimxrt1050_wi	ced_mfg_test_4301	2/source/mfg_test.c - MC	UXpresso I —	пx
File Edit Source Refactor Navigate Help	Search Project	ConfigTools Run A	nalysis FreeRTOS	Window
	> <b>* * * 0</b> ∑ <b>0 0 0</b>	▼ 94 ▼ 19 A ▼ R R R & 6 ▼	<u></u>	
E Proj ☆ Regi ☆ F	au	∰ Debug ⊠	×	i⇒ ▽ □ □
<ul> <li>w Settings</li> <li>w Settings</li> <li>w Settings</li> <li>w Settings</li> <li>W Binaries</li> </ul>	♦ Debug>	© mfg_test.c ⊠ 1⊕ /* 2 * Copyright 3 * Copyright	(c) 2015, Eree 2016-2017 NXP	scale Semi
<	>	<		>
U Quicksta ☆ (x)= Variables Solution Bread	Smart Insert	177:1	C 🖾 🎤 T 🔜 I	
U <u>NXP MIMXRT1052xxxxB* (evkbi3012</u> )				

8. Type "wl43012C0 --serial <COM port number> ver" and hit return. If you can see WLTEST in the output that means the manufacturing example is working fine.



## 7.5 Example wiced\_bt\_passthrough\_4343W

#### 1. Hardware requirements:

- a. Connect the uSD-M.2 adapter with the NXP i.MX RT EVK as per **Table 5** and **Figure 9**.
- b. Set the uSD-M.2 adapter to run in 3.3V override mode:
  - i. For rev A adapter, J12 is closed for 3.3V VIO
  - ii. For rev B1 adapter, J12 is in 2-3 pos for 3.3V & J13 is in 1-2 pos for 3.3V VIO
- c. Connect the board with PC by using USB/UART converter (Optional):
  - board UART RX (pin 8 on J22) connect it to TX pin on converter
  - board UART TX (pin 7 on J22) connect it to RX pin on converter
  - board GND (pin 7 on J24)

#### Table 5: Additional connections to run BT passthrough

Signal Name	uSD-M.2 Adapter Header/Pin	i.MX RT EVK Pin	i.MX RT EVK Signal
BT_UART_TXD_HOST	J9 / Pin 1	J22 / 1	LPUART3_RX
BT_UART_RXD_HOST	J9 / Pin 2	J22 / 2	LPUART3_TX
BT_REG_ON_HOST	J9 / Pin 4	J22 / 4	GPIO1_IO24
BT_UART_RTS_HOST	J8 / Pin 3	J23 / 3	LPUART3_CTS_B
BT_UART_CTS_HOST	J8 / Pin 4	J23 / 4	LPUART3_RTS_B

#### Figure 9: NXP i.MX RT 1050 EVK hardware settings to run BT passthrough



 Click on "Import SDK example(s)..." in the Quickstart Panel. Select "evkbimxrt1050" board and click Next button. Expand wifi\_examples and select wiced\_bt\_passthrough\_4343W. Select UART for SDK Debug Console, then click Finish button.

🔀 SDK Import Wizard		- C X	
The source from the SDK will be copied into the w If you want to use linked files, please unzip the 'SD	vorkspace. K_2.x_EVKB-IMXRT1050' SDK.	NP	
Import projects			
oject name prefix: evkbimxrt1050	Project name suffix:	æ	
Use default location			
cation: C:\Users\Puja Sah\Documents\MCUXpre	ssoIDE_11.1.0_3209\workspace\i.MX RT 1050_2.7.0	Vevkbimxrt1050 Browse	
roject Type	Project Ontions		
C Project C++ Project C Static Library	C++ Static Library SDK Debug Console	Semihost  UART Example default	
amples		🔤 🖉 🗹 🔆 🗎 🖃	
ype to filter			
Name	Description	Version ^	
<ul> <li>■ wifi_examples</li> <li>■ wired_ble_2423W</li> <li>■ wired_tpasthrough_4343W</li> <li>■ wired_iperf_4343W</li> <li>■ wired_iperf_4343W</li> <li>■ wired_iperf_4343W</li> <li>■ wired_ingerf_4343W</li> <li>■ wired_ing_test_43012</li> <li>■ wired_mfg_test_4343W</li> </ul>	Demonstrates Cypress WiFi and BLE Sends HCl commands to Cypress Blt The wiced_pensWife onsures p Demonstrates Cypress WiFi connecte Demonstrates Cypress WiFi connecte Manufacturing Test Application Manufacturing Test Application	connected over USDHC erformance. Id over USDHC/SDIO ed over USDHC/SDIO	Name       Wifi_examples       Wicd_ble_4343W       Wiced_ble_4343W       Wiced_bt_passthrough_4343W
2	< Back Next :	> Finish Cancel	<ul> <li>□ ■ wiced_iperf_43012</li> <li>□ ■ wiced_iperf_4343W</li> <li>□ ■ wiced_mfg_test_43012</li> <li>□ ■ wiced_mfg_test_4343W</li> </ul>

3. Click on "Debug" button.

🔀 i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_bt_passthrough_4	4343W/source/wiced_bt_passthro − □ ×
File Edit Source Refactor Navigate Search Project	ConfigTools Run Analysis FreeRTOS Window
Help	
📑 👻 🔚 🕼   🥸 🕶 🗞 🕶 🔜 💝 😒 🗐	
🔌 🕪 🗉 🖬 🖉 R. 🖓 . R 🛛 🗮 🕄 🧊 🖬 🖷 R	. 👁 🕼 🖑 🌘 🕶 📶 🏠 🥜 📕 🔩
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🖻 🔄 🖶 🍫 🕅 🕶 🗢	1⊖/* ^
> 😂 evkbimxrt1050_wiced_bt_passthrough_4343W <debug></debug>	2 * Copyright 2019 NXP
	< > ATT PIPELS PERPUPE. >
🕛 Quickstart 💢 💷 Variables 💁 Breakpoints 🗖 🗖	🍘 I 🔀 🗖 P 🚉 P 🚍 C 🖉 T 🧏 🗖 🗖
	🔀 🥹 🔜
▼ Debug your project IS ▼ IA ^	🗥 Installed SDKs <u>SDK 2.x EVKB-IMXRT1050</u>
🙀 🔅 Debug	To install an SDK, simply drag and drop an SDK (zip file 🗸
< >>	< >
vkbimxrgh_4343W	
U NXP MIMXRT1052xxxxB* (evkbi343W)	

4. Copy and paste the folder 4343W (evkbimxrt1050\_wiced\_bt\_passthrough\_4343W/firmware/4343W) in your desktop.

i.MX RT 1050_2.7.0 - evkbimxrt1050_wiced_bt_passthrough_4343W/ File Edit Source Refactor Navigate Search Project Config	'source/wiced_bt_passthrough.c - MCUXpresso IDE — □ × Tools Run Analysis FreeRTOS Window Help
📑 🕶 🔚 🕼   🛞 🕶 🗞 🖛 🔜 🥔 🗇 📮 🔌   🕪 🗉 🔳	N R 70 . R 🗟 🚺 🖬 🖬 🖬 R 70 . R 70 . R 10
🛛 🟠 🥜 🤳 🍢 🔯 🎋 + 🔿 - 🂁 - 🎒 🖉 -	□ π : 🖢 ▼ 🖓 ▼ 🏷 ↔ ▼ ↔ ▼ □ Quick Access : 🗄 😭   🔀
陷 Project 🛛 🚼 Periph 👭 Registers 🚸 Faults 👘 🗖	💽 wiced_bt_passthrough.c 🔀 🗖 🗖
<ul> <li>E S</li> <li>E S</li> <li>E Evkbimxrt1050_wiced_bt_passthrough_4343W &lt; Debug&gt;</li> <li>Project Settings</li> <li>Project Settin</li></ul>	<pre>1⊖ /*</pre>
> 🔁 source 🗸 🗸	< >>
(1) Quickstart Panel 😫 (x)= Variables 💁 Breakpoints 🛛 🗖	😚 📖 🐹 🔲 P 😰 P 📮 C 🐙 T 📷 L 🙀 D 🦳 🗖
😂 evkbimxrt1050_wiced_bt_passthrough_4343W	
U NXP MIMXRT1052xxxxB* (evkbi343W)	

5. Open the device manager and check for the port numbers.



6. Open Tera Term at the USB serial port number (i.e., COM 24). Run debug in the IDE and then do resume debug. You will see below output in the terminal window.

NOTE: This step is optional. This step is required only when USB/UART converter is used.

🔟 COM24 - Tera Term VT						
File	Edit	Setup	Control	Window	Help	_
****	****	****	******	******	*****	_
Bluetooth HCI Pass-Through example ************************************						
BLU ××××	etoo ××××	th HCl *****	Pass-'       Pass-'	Through ******	example ************************************	
81u *****	etoo ××××	th HC] *****	[ Pass-] <del>(xxxxxx)</del>	Through ******	example ************************************	

7. Open the CyBluetool and select Firmware Download.

S CyBluetool	-		×
File Tools Help			_
Selec Firmware Download			_
Logs Clear			
			_
			_
			_
			- 1
	-	-	

8. The below window will come up. Select the UART as mbed serial port number (i.e., COM 22). Browse for the BTP file and go to the 4343W folder location in Desktop. Also browse for the Firmware file and then Click on "Download".

Firmware Downloa	d
Transport	
UART COM2	2 ▼ Baudrate Auto 115200 ✓
O USB	✓
Download files	
BTP file	:/Users/Puja Sah/Desktop/4343W/4343A1_runtime_RAM_37_4MHz_XTAL.btp Browse
Minidriver file	C:/Users/Puja Sah/Desktop/4343W/uart.hex Browse
Config file	ART\37_4MHz\fcbga_BU\bld\4343A0_Generic_UART_37_4MHz_fcbga_BU.cgs Browse
Firmware file	4343A1_001.002.009.0103.0000_Generic_UART_37_4MHz_wlbga_wiced.hex Browse
✓ Override BD Add ✓ Send DL minidrive	ress 0123456789AB  er command  Cancel .::

- 9. Click on "Select device" in CyBluetool. Use the following settings in the dialog window:
  - Transport: UART
  - Device Name: the name of the mbed serial port
  - Baud Rate: 115200
  - Flow Control: None

😔 CyBluetool	—	$\times$		
File Tools Help				
Select device				
Logs				
Clear log				
			Select Device ?	$\times$
			Transport UART	•
			Device Name COM22	-
			Baud Rate 115200	~
			Flow Control None	-
			Connect	ancel

10. Using CyBluetool, send command Reset to verify its successful working.

COM22					đΧ
rese	Expand all Collapse all	Parameter	Value		
Command Name * 7 Hest Centroller & Baseb Set Reserved LT_ADDR Delete, Reserved LT_ADD * 7.5: Status Parameters Reset_Failed_Contact_Co	and Commands R unter	Description:	 		
HCI Throughput Test				Send	
Clear log					
COM22					_
01/06/20 15:24:00.954 com22 c5 + HCI Command com22@115200 [03 0C 00 ] opcode = 0x0C03 { 01/06/20 15:24:00.960 com22 <c f<br="">HCI Command Co com22@115200</c>	(3075, "Reset") Reset mplete Event				^

11. Send command LE\_Set\_Advertise\_Enable with parameter Advertising\_Enable set to "Advertising is enabled".

😴 CyBluetool					_		×
File Tools Help							
Select device							_
COM22							đΧ
LE_SET	Expand all	Collapse all	Parameter		Value		
Command Name		^	Advartising En	Advartising is	anablad		
✓ 7.8: LE Controller Command	s		Advertising_ch	Advertising is	enableu		
LE_Set_Event_Mask							
LE_Set_Random_Address			Description:				_
LE_Set_Advertising_Para	meters						- 1
LE Set Scan Response							- 1
LE_Set_Advertise_Enable	]						- 1
LE_Set_Scan_Parameters							- 1
LE_Set_Scan_Enable	assification						- 1
LE_Set_Data_Length	assincation					Sen	м
The second second second		•				001	<u> </u>
HCI Inrougnput Test							
Logs							_
Clear log							- 8
COM22							
01/06/20 15:25:16.679 com22 c> HCI Command	LE_Set_Adve	rtise_Enable					^
com22@115200							
[0A 20 01 ]: 01 opcode = 0x200A	(8202, "LE_S	et Advertise E	inable")				
Advertising_Enable	e = 0x1(1, "A	dvertising is e	nabled")				
01/06/20 15:25:16.683 com22 <c< td=""><td>LE_Set_Adve</td><td>rtise_Enable</td><td></td><td></td><td></td><td></td><td></td></c<>	LE_Set_Adve	rtise_Enable					
HCI Command Co	mplete Event						
[0E 04]: 01 0A 20	00						
event = 0x0E (14,	Command Co	omplete")					
Num_HCI_Comman Command Opcode	= 0x200A (8	0x1(1) 202, "LE Set	Advertise Enable")				
Status = 0x0 (0, "S	Success", "Su	ccess")	,				
							~
	_				_	_	.::

12. Send command Read\_BD\_ADDR by double clicking on "Read\_BD\_ADDR".

COM22					₽×
READ_BD	Expand all Collapse all	Parameter	Value		
Command Name 7.4: Informational Parameter Read_BD_ADDR	3	Description:			
Read_BD_Clock				Se	nd
HCI Throughput Test					
Logs Clear log					
COM22					
01/06/20 15:26:58.606 com22 c> 1 HCI Command Com22@115200 [09 10 0 0] opcode = 0x1009 ( 01/06/20 15:26:58.611 com22 <c HCI Command Co com22@115200 [0E 0A]: 01 09 10 event = 0x0E (14, Num_HCI_Comman Command_Opcode Status = 0x0 (0, 5</c 	(4105, "Read_BD_ADDR") Read_BD_ADDR mplete Event 00 93 76 12 A1 43 43 'command Complete") id Packets = 0x1 (1) = 0x1009 (4105, "Read_Bi buccess", "Success")	D_ADDR")			^

## 7.6 Example wiced\_ble\_4343W

#### 1. Hardware Requirements:

- a. Connect the uSD-M.2 adapter with the NXP i.MX RT EVK as per Table 5 and Figure 10.
- b. Run at 3.3V:
  - i. For rev A adapter, J12 is closed for 3.3V VIO
  - ii. For rev B1 adapter, J12 is in 2-3 pos for 3.3V & J13 is in 1-2 pos for 3.3V VIO

Table 6: Additional connections to run BLE

Signal Name	uSD-M.2 Adapter Header/Pin	i.MX RT EVK Pin	i.MX RT EVK Signal
BT_UART_TXD_HOST	J9 / Pin 1	J22 / 1	LPUART3_RX
BT_UART_RXD_HOST	J9 / Pin 2	J22 / 2	LPUART3_TX
WL_REG_ON_HOST	J9 / Pin 3	J22 / 3	GPIO1_IO11
BT_REG_ON_HOST	J9 / Pin 4	J22 / 4	GPIO1_IO24
BT_UART_RTS_HOST	J8 / Pin 3	J23 / 3	LPUART3_CTS_B
BT_UART_CTS_HOST	J8 / Pin 4	J23 / 4	LPUART3_RTS_B

#### Figure 10: NXP i.MX RT 1050 EVK hardware settings to run BLE



2. Click on "Import SDK example(s)..." in the Quickstart Panel. Select "evkbimxrt1050" board and click Next button. Expand wifi\_examples and select "wiced\_ble\_4343W". Select UART for SDK Debug Console, then click Finish button.

SDK Import Wizard		– 🗆 X	
The source from the SDK will be copied into t If you want to use linked files, please unzip the	he workspace. ! 'SDK_2x_EVKB-IMXRT1050' SDK.	<b>)P</b>	
Import projects			
oject name prefix: evkbimxrt1050	2 Project name suffix:	æ	
Use default location			
pcation: C:\Users\Puja Sah\Documents\MCUX	pressolDE_11.1.0_3209\workspace\i.MX RT 1050_2.7.0\evkbimxrt105	0 Browse	
Project Type	Project Options		
C Project O C++ Project O C Static Libra	ry OC++ Static Library SDK Debug Console O Semihost (	UART Example default	
	Import other files	_	
kamples			
vpe to filter			
xamples type to filter Name	Description	Version	New
xamples type to filter Name ✓ ■ = wifi.examples	Description	Version	Name
xamples type to filter Name ✓ ■ S wiff: examples ↓ S wiced_ble_4343W ↓ S wiced_ble_4343W	Description Demonstrates Cypress WiFi and BLE connected ove Sends FICI commandate ways and the theory in 104	Version	Name
xamples type to filter Name ✓ ■ wiff examples → wiced_ble_4343W → wiced_ble#3433W → wiced_iperf3_4343W	Description Demonstrates Cypress WiFi and BLE connected ove Sends HCI commany system of the destroy of the The wiced_iperf3_4343W measures performance.	Version	Name
xamples type to filter Name ✓ ■ wiced_ble_4343W ■ wiced_ble_4343W ■ wiced_ole_4343W ■ wiced_ole_4343W ■ wiced_ole_4343W ■ wiced_ole_4343W ■ wiced_ole_4343W	Description Demonstrates Cypress WiFi and BLE connected ove Sends FICI commance opp and in cortain and The wiced, juget 3443W measures performance. Demonstrates Cypress WiFi connected over USDHC	Version ^ r USDHC	Name ✓ ■ Ξ wifi_examples ✓ = wiced_ble_4343W
xamples type to filter Name  Use to filter  Same  Same Same Same Same Same Same Same Same Same	Description Demonstrates Cypress WiFi and BLE connected ove Sends HCL communications of the sends with IAI The wiced_iperf3_4343W measures performance. Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC	Version ^ r USDHC I /SDIO /SDIO	Name ✓ ■ 등 wifi_examples ✓ ➡ wiced_ble_4343W □ ≣ wiced_bt_passthrough_43
xamples  type to filter  Name	Description Demonstrates Cypress WiFi and BLE connected over Sends HCI comminicary system of the device in HA The wiced juent 34343W measures performance. Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC Manufacturing Test Application Manufacturing Test Application	Version  VUSDHC TUSDHC TUSDHC TUSDHC	Name ✓ ■
xamples type to filter Name	Description Demonstrates Cypress WiFi and BLE connected ove Sends HCI commandous of yr an Britanshuia HAI The wiced_iperf3_4343W measures performance. Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC Manufacturing Test Application Manufacturing Test Application	Version  VUSDHC	Name ✓ ■
xamples type to filter Name	Description Demonstrates Cypress WiFi and BLE connected ove Sends HCF commany of the send of the The wiced_jperf3_4343W measures performance. Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC Manufacturing Test Application Manufacturing Test Application	version r USDHC //SDIO /SDIO	Name         ✓       Image: wifi_examples         ✓       Image: wiced_ble_4343W         Image: miced_ble_4343W       Image: wiced_ble_4343W         Image: wiced_iperf3_4343W       Image: wiced_iperf3_4343W         Image: wiced_iperf_43012       Image: wiced_iperf_43012
xamples type to filter Name	Description Demonstrates Cypress WiFi and BLE connected over Sends HCL communications of the sends of the sends of the sends Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC Manufacturing Test Application Manufacturing Test Application	Version ^ r USDHC /SDIO /SDIO	Name V  S wifi_examples V  S wiced_ble_4343W V  Wiced_ble_4343W V  V  V  V  V  V  V  V  V  V  V  V  V
xamples type to filter Name	Description Demonstrates Cypress WiFi and BLE connected over Sends HCL communications, e.g., and the sends HAL The wiced_iperf3_4343W measures performance. Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC Manufacturing Test Application Manufacturing Test Application	Version  VUSDHC  VSDHC  VSDHC.	Name ✓ ■
xamples type to filter Name	Description Demonstrates Cypress WiFi and BLE connected over Sends HCI communicacy opp. The Vice bia UAI The wiced jperf3-4343W measures performance. Demonstrates Cypress WiFi connected over USDHC Demonstrates Cypress WiFi connected over USDHC Manufacturing Test Application Manufacturing Test Application	Version  VUSDHC  VSDHC  VSDHC.	Name ✓ ■ ■ wifi_examples ✓ ■ wiced_ble_4343W ■ wiced_bt_passthrough_43 ■ wiced_iperf3_4343W ■ wiced_iperf_43012 ■ wiced_iperf_4343W ■ wiced_iperf_4343W ■ wiced_iperf_4343W

3. Open evkbimxrt1050\_wiced\_ble\_4343W/source/wiced\_ble.c to modify AP\_SSID, AP\_PASS if necessary.

X RT 1050_2.7.0 - evkbimxrt1050_wiced_ble_4343W/source/wice           File Edit Source Refactor Navigate Search Project Confi           Image: Source Refactor Navigate Search Project Confi </th <th>ed_ble.c - MCUXpresso IDE - □ X gTools Run Analysis FreeRTOS Window Help · · · · · · · · · · · · · · · · · · ·</th>	ed_ble.c - MCUXpresso IDE - □ X gTools Run Analysis FreeRTOS Window Help · · · · · · · · · · · · · · · · · · ·
Projec №	Quick Access : wiced_blec & 250 /************************************
Ouckstart Panel X3 (№) Variables • Breakpoints       ■         Image: MCUXpresso IDE - Quickstart Panel       ↓         Project: exkbinxxt1050_wiced_ble_4343W [Debug]       ↓         ∴ exkbinxxt1050_wiced_ble_4343W/source/wiced_ble.c       ↓         ① NXP MIMXRT1052∞x08* (evkbi4343W)       ↓	Image: SDK 2x EVKB-IMXRT1050' (2.6.1') replaced by S         i

4. Run debug in the IDE. Once the app is booted, BLE advertising starts with the device name "mcuxpresso-hello-sensor".



- 5. Download and install any of the BLE scanner apps such as LightBlue / BLE Scanner / nRF Connect to the BLE enabled device.
- 6. Open the app and scan for devices. Scan results shows "mcuxpresso-hello-sensor". You will see below output in your phone.

II AT&T Wi-Fi	<del>?</del> 5:11 F	РМ	@ 1 🗖
Sort	Light	Blue	Filter
Peripherals	Nearby		
-88 No ser	amed rvices		>
hello	o-sensor		>
-74 No ser	amed rvices		>
-87 No ser	amed rvices		>
-85 No set	amed rvices		>
-87 No ser	amed rvices		>
-83 No set	amed rvices		>
-88 No ser	amed rvices		>
	amed		>
	((0))	=-,	•••
Peripherals	(()) Virtual Devices	Log	More

7. Connect to mcuxpresso-hello-sensor to view its services. When paired to the device, you will see below outputs:

In Tera Term:



In Phone:

🖬 AT&T Wi-Fi 🗢	5:11 PM	e 1 🗖
K Back	Peripheral	Clone
hello-sens	sor	
UUID: 876365FA-7	24C-7AF7-EDF1-57	CFC582E947
Connected		
ADVERTISEN	IENT DATA	Show
UUID: 1B7E8 CF057C562	251-2877-410 023	C3-B46E-
0x8AC32D3F-5C Properties: Read No	B9-4D44-BEC2-EE	689169F626 >
0x5E9BF2A8-F93 Properties: Read W	3F-4481-A67E-3B2 'rite	F4A07891A >
Device Inform	nation	
Manufacturer	Name String	>
Model Numbe	er String	>
System ID <bbb8a180.5f9f91< td=""><th>71&gt;</th><td>&gt;</td></bbb8a180.5f9f91<>	71>	>
	(0)) =-]	
Peripherals Virtua	al Devices Log	More

## 7.7 Example wiced\_webconfig\_4343W

- 1. Hardware Requirement:
  - a) Connect pin3 of evkbimxrt1050 board's connector J22 to pin 3 of Murata uSD M.2 Adapter's connector J9, using plug-to-receptable cables:



#### Figure 11: Additional cabling pins

See the figure below for this additional cabling.



#### Figure 12: Additional cabling

2. Click on "Import SDK example(s)..." in the Quickstart Panel.

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3. Select "evkbimxrt1050" board and click Next button.

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Board and/or Device s	election page				
SDK MCUs	Available boards				
CUs from installed SDKs. Please	Please select an available board for your project.				
cuxpresso.nxp.com to obtain	Supported boards for device: MIMXRT1052xxxxB				
NXP MIMXRT1052xxxxB MIMXRT1052xxxxB MIMXRT1052xxxxB	evkbimurt1050	SDK 0_agm01			
elected Device: MIMYRT1052vvvv	R using board: EVKR-IMYRT1050	SDKs for selected MCU			
arget Core: cm7	a using boards EVRD-INART 1050	Name	SDK Version	Manifest Ve	Location
escription: i.MX MIMXRT1052 6 Cortex-M7 Core	00MHz, 512KB SRAM Microcontrollers (MCUs) based on ARM	SDK_2.x_EVKB-IMXRT1050	2.8.6 (Eplugin	3.6.0	<pre>/com.n</pre>
					>

4. Expand wifi\_examples and select "wiced\_webconfig\_4343W". Select "UART" for SDK Debug Console, then click "Finish" button.

X SDK Import Wizard		—	×
A The source from the SDK will be copied into the worksp If you want to use linked files, please unzip the 'SDK_2.x.	ace. EVKB-IMXRT1050' SDK.	NP	G
Import projects			
Project name prefix: evkbimxrt1050	2 Project name suffix:		æ
Use default location			
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Project Type	Project Options		
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> □ ⊆ usb_examples ✓ ■ Ξ wifi_examples			
□ ≡ wiced_ble_4343W	Demonstrates Cypress WiFi and BLE connected o	over USDHC/SDIO	
□ ≡ wiced_bc_passtnrough_4545W	The wiced_iperf3_4343W measures performance	DARI 2.	
wiced_iperf_43012	Demonstrates Cypress WiFi connected over USD	DHC/SDIO	
□ ≡ wiced_ipert_4343W □ ≡ wiced_mfg_test_43012	Demonstrates Cypress WiFi connected over USD Manufacturing Test Application	DHC/SDIO	
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	Simple AP to Client configuration over web.		
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5. Click "Debug" in the Quickstart Panel.

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the Debug     the Terminate, Build and Debug		Name         SDK Version         Manifest Vers           ☞ ☞ SDK_2.x_EVK-MIMXRT1060         2.8.6 (Epluginsite 3.6.0)           ☞ ☞ SDK_2.x_EVKB-IMXRT1050         2.8.6 (Epluginsite 3.6.0)		
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IN3 Edit project cettings				

6. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

onnect to target: MIMXRT1 1 probe found. Select the probe	052xxxxB to use:				-
vailable attached pro	bes				
Name	Serial number/ID	Туре	Мари	IDE Debug M	ode
S DAPLink CMSIS-DAP	0227000040214	LinkS	ARM	Non-Stop	
Supported Probes (tick/untick t	o enable/disable)				
MCUXpresso IDE LinkServer	(inc. CMSIS-DAP) pr	obes			
P&E Micro probes					
SEGGER J-Link probes					
Probe search options					
Search again					
Remember my selection (for t	his Launch configura	tion)			
?			OK	Cancel	

 After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 14 is our COM port number.

🗂 Device Manager	_	×
<u>File Action View H</u> elp		
<ul> <li>&gt; Monitors</li> <li>&gt; Portwork adapters</li> <li>&gt; Portable Devices</li> <li>&gt; Ports (COM &amp; LPT)</li> <li>mbed Serial Port (COM14)</li> </ul>		
	-	

 Now the webconfig example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 14 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

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tory	- Transmit delay	v	
map	0 msec	, c/ <u>c</u> har 0 mse	c/line

9. Click Resume button in MCUXpresso.



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#### 10. You should see this output from i.MX RT on Tera Term.



11. From a wireless client device (can be a laptop, or a phone), search for available wireless networks and connect to "nxp\_configuration\_access\_point" SSID. The password is "NXP0123456789".

Murata_Test JioFi2_F63142 mxp_configuration_access_point Sontoo
JioFi2_F63142
<pre>http://www.seconfiguration_access_point figuration_access_point figuratio</pre>
Sontoo
· · · ·
6 2020TPLNKC6
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A dlink
Network & Internet settings Change settings, such as making a connection metered.
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Wi-Fi Airplane mode hotspot

12. Open the web browser on the client device (Microsoft Internet Explorer is not supported) and go to "192.168.1.1" IP address. The wiced\_webconfig\_4343W example creates a web-based configuration interface to set up the Wi-Fi client configurations here. The EVK is currently set up as an AP, as can be seen in the UI. You can scan for available networks here.

	Wi-Fi web configuration	
IMXRT1050-EVKB	Welcome!	
192.168.1.1	This is example of a HTTP based Wi-Ei credential configuration web	
Current Wi-Fi Mo	e: service.	
AP Clie	Available Wi-Fi Networks - Click to Join:	
	BSSID: 32:49:50:19:5A:51	
Scan Wi-fi Netwo	KS Channel: 1	
	Signal Strength: -38dBm	
Clear Board setti	gs 2020TPLNKC6 (WPA2 Mixed)	
	BSSID: E4:C3:2A:0F:72:89	
	Channel: 4	
	BSNL (WPA2 Mixed)	
	BSSID: 28:3B:82:65:4C:AD	
	Channel: 6	

13. Click on a network of your selection to connect to it.

BSNL (WPA2 Mixed)	
BSSID:	28:3B:82:65:4C:AD
Channel:	6
Signal Strength:	-81dBm
JioFi2 F63142 (WPA2 AES)	
BSSID:	C8:D7:79:F6:31:42
Channel:	7
Signal Strength:	61dBm
Aurata_Test (WPA2 AES)	60:38:E0:9A:A3:9D
<b>Jurata_Test (WPA2 AES)</b> 3SSID: Dhannel: 3ignal Strength:	-01dBh 60:38:E0:9A:A3:9D 10 -27dBm
Murata_Test (WPA2 AES) 3SSID: Dhannel: 3ignal Strength: RNMKR_2 (WPA2 AES)	-01dBh 60:38:E0:9A:A3:9D 10 -27dBm
Alurata_Test (WPA2 AES) 3SSID: Channel: Signal Strength: RNMKR_2 (WPA2 AES) BSSID:	-01dBh 60:38:E0:9A:A3:9D 10 -27dBm 30:49:50:29:5A:51
Aurata_Test (WPA2 AES) SSSID: Channel: Signal Strength: RNMKR_2 (WPA2 AES) BSSID: Channel:	-01dBh 60:38:E0:9A:A3:9D 10 _27dBm 30:49:50:29:5A:51 1

14. Enter the network password and click on connect.

Enter Credentials SSID: Murata_Test Password Connect BSSID: 302	
Sional Strength: Attempting connection to <u>Murata Test</u> Network The will get disconnected from the current Wi-Fi Access-point while the board switches as a client to your selected network. Please connect your device to that network to continue.	

15. If connection is successful, the credential will be saved on the EVK mflash and will be used automatically after the EVK reboots. The AP will be turned off. You should see this output on Tera Term. Note the IP address shown.



Upon reboot, the EVK will henceforth automatically connect to the saved network.

- 16. Connect the wireless client device to the same network as the EVK, open the web browser and go to the IP address shown on the Tera Term window (192.168.1.126 in this example).
- 17. The web-based configuration interface will be accessible here. The EVK is currently set up as a Wi-Fi client, as can be seen in the UI.

Wi-Fi web configuration $\times$ + $\leftrightarrow$ C $\uparrow$ A Not secure 192.168.1.126		→ □ ×
	Vi-Fi web configuration	· · · · · · · · · · · · · · · · · · ·
IMXRT1050-EVKB 192.168.1.126 Current Wij Ei Mode	Welcome! This is example of a HTTP based Wi-Fi credential configuration web service.	
AP Client	Available Wi-Fi Networks - Click to Join: [Hidden SSID] (WPA2 AES) BSSID: EA:C3:2A:0F:72:89	
Scan Wi-fi Networks Clear Board settings	Channel: 4 Signal Strength: -73dBm 2020TPLNKC6 (WPA2 Mixed)	
	BSSID: E4:C3:2A:0F:72:89 Channel: 4 Signal Strength: -76dBm	
	JioFi2_F63142 (WPA2 AES)           BSSID:         C8:D7:79:F6:31:42           Channel:         7           Signal Strength:         -62dBm	
	Murata_Test (WPA2 AES) BSSID: 60:38:E0:9A:A3:9D Channel: 9	•

18. You can use the "Clear Board settings" button on the interface to remove the saved network settings.

Wi-Fi web configuration × +		– 🗆 X
- → C △ ▲ Not secure   192.168.1.126	/i-Fi web configuration	rt 🛞 Incognito :
Data   Data	Welcome!         This is example of a HTTP based Wi-Fi credential configural service.         Available Wi-Fi Networks - Click to Join:         Hidden SSID100202 AES!         Clearing settings Are you sure?         This will clear the saved Wi-Fi credentials from the board of annually reconnect to the board access point.         Clear       Cancel         ZU201FLINKCP         Channel       Signal Strength         Murata_Test (WPA2 AES)         DSSID:         Channel:       Successfully cleare Please connect you IP: 192.168.1.1.	tion web flash e to Success ed the flash memory and reset to an AP. a device back to the AP and browse to the IStrength

# 8 Murata's uSD-M.2 Adapter

## 8.1 Connecting the Wi-Fi/BT M.2 EVB to uSD-M.2 Adapter

When connecting the Wi-Fi/BT M.2 EVB to uSD-M.2 Adapter Rev B1 (**Figure 13**), make sure to (#1) firmly insert it before using M.2 screw to (#2) secure it in place. Important Jumpers (J12, J13, and J1) are highlighted.



Figure 13: Connecting the Wi-Fi/BT M.2 EVB to uSD-M.2 Adapter

## 8.2 Configuring uSD-M.2 Adapter Jumpers for Correct VIO Signaling

**Figure 14** shows a block diagram highlighting the Host (i.MX RT10xx EVK) and Wi-Fi/BT M.2 EVB VIO signaling voltages.

Default configuration is to have J13/J12 set to 1-2/1-2 positions respectively for the 1.8V VIO default configuration (WLAN-SDIO VIO at 1.8V VIO; BT-UART and WLAN/BT control signals at 3.3V VIO). Rev B1 Adapter level shifts the BT-UART signals and all WLAN/BT control signals except WL\_REG\_ON/BT\_REG\_ON which get level shifted on Wi-Fi/BT M.2 EVB.

In certain configurations where Host WLAN-SDIO VIO is 3.3V, we J13/J12 set to 1-2/2-3 positions respectively for the 3.3V VIO override mode setting (WLAN-SDIO, BT-UART, and WLAN/BT control signals all at 3.3V VIO). There is no level shifting on the Adapter of Wi-Fi/BT M.2 EVB in this case.

#### Figure 14: Host/M.2 IO Voltage Level Shift Options on Rev B1 Adapter



## 8.3 Securing uSD-M.2 Adapter to NXP i.MX RT10xx EVK

On NXP's i.MX RT10xx EVK's, one potential problem is an unreliable uSD/SD electrical connection when using Murata's uSD-M.2 Adapter. This is due to the "push push" uSD connector and lack of friction in the interface between Adapter and microSD connector.



#### Figure 15: Securing uSD-M.2 Adapter to i.MX RT10xx EVK

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To properly secure the uSD-M.2 Adapter interconnect on the i.MX RT10xx EVK's, Murata *strongly recommends* to simply tape the <u>uSD Adapter-EVK</u> connection as shown in **Figure 15**. Note that taping the <u>uSD Adapter-EVK</u> connection makes the platform a little less flexible to work with. However, removing and re-applying clear tape is straightforward.

# 8.4 uSD-M.2 Adapter High-Level Description

**Figure 16** and **Figure 17** show the features on the uSD-M.2 Adapter; with details in **Table 7.** The uSD-M.2 Adapter supports additional signals to WLAN-SDIO using either Arduino headers (J5, J8, and J9) or 20 pin FFC connector (J6). For more details on Murata's uSD-M.2 Adapter, refer to the <u>Hardware User Manual</u>.

Char	Description
Α	microSD connector provides Power (VBAT, GND) and WLAN-SDIO
В	SDIO bus test points (CLK, CMD, DAT0, DAT1, DAT2, DAT3)
С	Power LED Indicator (green): if not illuminated then no power applied to M.2 EVB
D	J11 = Optional BT Disable Jumper for WLAN-Only Mode (close this jumper to drive BT_REG_ON low and disable Bluetooth Core; thereby optimizing power consumption)
E	J9 = BT UART TX/RX and WLAN/BT Control Signals (8 pin header)
F	J5 = Optional BT PCM and WLAN/BT Debug Signals (2x8 pin header)
G	Threaded mount for M.2 screw: 30mm distance from M.2 connector
Н	Regulator to step down optional 5V VBAT from USB or Arduino header to 3.3V
1	External sleep clock input (32.768kHz)
J	J7 = Optional Arduino Header Power Supply (8 pin header; 5V or 3.3V VBAT)
K	J8 = BT UART RTS/CTS Signals (6 pin header)
L	J13 = Host IO Voltage: J13 in 1-2 pos for 3.3V VDDIO (default); J13 in 2-3 pos for 1.8V
М	J12 = M.2 IO Voltage: J12 in 1-2 pos for 1.8V VDDIO (default); J12 in 2-3 pos for 3.3V
Ν	J2 = Optional 5V USB Power Supply via Micro-AB USB Connector
Ο	LED2 = 3.3V M.2 IO Voltage Indicator (Blue) – not illuminated in default configuration
Р	Regulator to provide optional 1.8V VIO to M.2 interface (M.2 EVB's have own 1.8V onboard)
Q	J1 = Power Supply Selector Jumper must be installed to power Adapter (unless J5 Arduino Header Pins #15/16 are connected to external GND/3.3V VBAT). Position 1-2: 5V/3.3V VBAT supply from micro-USB (J2); or Arduino (J7) Position 2-3: VBAT supply (typical 3.1~3.3V) from microSD connector
R	M.2 Connector: type 2230-xx-E
S	microSD connector pins: provides Power (VBAT, GND) and WLAN-SDIO
Т	WLAN JTAG header (header pins not populated)
U	20 pin FFC connector (BT UART, BT PCM, WLAN/BT Control signals)
V	Additional test points from 20pin flat/flex connector

#### Table 7: uSD-M.2 Adapter Features

## Figure 16: uSD-M.2 Adapter Features (Top View)



Figure 17: uSD-M.2 Adapter Features (Bottom View)



# 9 Technical Support Contact

Table 8 lists all the support resources available for the Murata Wi-Fi/Bluetooth solution.

Support Site	Notes
Murata Community Forum	<b>Primary support point for technical queries.</b> This is an open forum for all customers. Registration is required.
Murata i.MX Landing Page	<b>No</b> login credentials required. Murata documentation covering hardware, software, testing, etc. is provided here.
<u>Murata uSD-M.2 Adapter Landing</u> <u>Page</u>	Landing page for uSD-M.2 Adapter. In conjunction with Murata i.MX Landing Page, this should provide the user with comprehensive getting started documentation.
Murata Module Landing Page	<b>No</b> login credentials required. Murata documentation covering all Cypress-based Wi-Fi/BT modules is provided here.

## **Table 8: List of Support Resources**

# **10 Additional Useful Links**

In addition to **Table 8** listings of support resources, **Table 9**, **Table 10**, **Table 11** and **Table 12** provides some useful links.

I ADIE J. INAF IIIINS	Table	9:	NXP	links
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Link	Notes
MCUXpresso IDE	Landing page to download MCUXpresso IDE
MCUXpresso SDK	Comprehensive information of MCUXpresso SDK
MCUXpresso SDK Builder	Customize and build MCUXpresso SDKs
LPC-Link 2	Landing page of the debug probe for i.MX RT EVKs
i.MX RT 1050 EVK	Landing page of the i.MX RT 1050 EVK
i.MX RT 1060 EVK	Landing page of the i.MX RT 1060 EVK
i.MX RT 1050 Getting Started	Getting started guide for the i.MX RT 1050 EVK
i.MX RT 1056 Getting Started	Getting started guide for the i.MX RT 1056 EVK

#### Table 10: Embedded Artists' Landing Pages

Landing Pages	Notes
Embedded Artists' Website	The Art of Embedded Systems Development – made EASY™
i.MX RT COM Boards	Listing of Computer-on-Module boards.
i.MX RT COM Carrier Board V2	Main baseboard which all the COM boards plug into.
M.2 Module Family	Top level listing of 1DX, 1LV, 1MW M.2 EVBs.

## Table 11: Embedded Artists' Datasheets and Schematics

Datasheets and Schematics	Notes
i.MX RT COM Carrier Board V2 Datasheet	Comprehensive definition of COM Carrier (baseboard).
i.MX RT COM Carrier Board V2 Schematics	Complete schematics including clear definition of uSD-M.2 Adapter.
M.2 SDIO Interface Schematic	Reference schematic for customers designing in WLAN-SDIO M.2 EVB.
M.2 PCIe Interface Schematic	Reference schematic for customers designing in WLAN-PCIe M.2 EVB.
EACOM Board Specification Guide	Comprehensive definition of Embedded Artists' Computer- On-Module's.
1DX M.2 Module Datasheet	Comprehensive details on 1DX Wi-Fi/BT M.2 Module.
1LV M.2 Module Datasheet	Comprehensive details on 1LV Wi-Fi/BT M.2 Module.
1MW M.2 Module Datasheet	Comprehensive details on 1MW Wi-Fi/BT M.2 Module.

## Table 12: Embedded Artists' User Manuals and Software

User Manuals and Software	Notes
Getting Started with M.2 modules and i.MX RT	How to bring up Embedded Artists i.MX RT Dev Kits.
Wi-Fi/BT M.2 EVB Primer	Introduction and drill-down on M.2 interface.