UM11441

Getting Started with NXP-based Wireless Modules and i.MX Platforms Running FreeRTOS

Rev. 21.0 — 16 September 2025 **User manual**

Document information

Information	Content
Keywords	i.MX RT crossover MCU, i.MX RT products, i.MX RT1040, i.MX RT1050, i.MX RT1060, i.MX RT1060EVKB, i.MX RT1060EVKC, i.MX RT1064, i.MX RT1160, i.MX RT1170, i.MX RT1170EVKB, i.MX RT500, i.MX RT600, i.MX RT595, i.MX RT1020, i.MX RT685, i.MX RT685S, i.MX RT700, MCUXpresso SDK, IW416-based wireless module, 88W8987-based wireless module, RTOS image
Abstract	Provides the step-by-step guidance to set up NXP-based wireless modules with i.MX RT products, build the firmware image and run Wi-Fi and Bluetooth demo applications.

1 About this document

This document details the integration of modules based on NXP Wi-Fi and Bluetooth solutions with i.MX RT crossover MCUs. It describes the hardware setup to connect NXP-based wireless modules with i.MX RT EVK boards, the software download, and how to run Wi-Fi and Bluetooth demo applications.

The i.MX RT crossover MCUs are powered by FreeRTOS and the FreeRTOS-based Wi-Fi drivers are used for NXP-based wireless modules.

1.1 Considerations

This document does not include the detailed description of i.MX RT evaluation kits (EVKs) nor MCUXpresso SDK implementation and configuration as these are covered in i.MX documentation (see ref.[11] and ref.[15]).

2 i.MX RT products

i.MX RT crossover MCUs feature NXP's advanced implementation of the ARM Cortex-M core and support the FreeRTOS available within the MCUXpresso SDK to help users reduce the overall time-to-market for their product. This section provides a brief description of i.MX RT EVK along with the jumpers or switch settings. For more details on i.MX RT Crossover MCUs, see ref.[16].

The following i.MX RT products support NXP-based wireless modules:

- i.MX RT1020
- i.MX RT1040
- i.MX RT1050
- i.MX RT1060
- i.MX RT1060B
- i.MX RT1060C
- i.MX RT1064
- i.MX RT1160
- i.MX RT1170
- i.MX RT1170B
- i.MX RT500
- i.MX RT600
- i.MX RT595
- i.MX RT685
- i.MX RT685S
- i.MX RT1180A
- i.MX RT700

2.1 i.MX RT processor family

The i.MX RT processor family offers high-performance processing optimized for the lowest power consumption and best real-time response. The i.MX RT products provide various memory interfaces and types including SDRAM, Raw NAND FLASH, NOR FLASH, SD/eMMC, and Quad SPI (FlexSPI). The i.MX RT crossover MCUs also feature a wide range of other interfaces for peripherals, such as SDIO, UART, displays, camera sensors, and GPS. i.MX RT series supports rich audio and video features, including LCD display, 2D graphics, camera interface, SPDIF and I2S audio interface.

2.2 i.MX RT products and NXP-based wireless modules

Figure 1 shows the interfaces between i.MX RT products and NXP-based wireless modules. The SDIO interface is used for Wi-Fi communication and UART interface is used for Bluetooth communication.

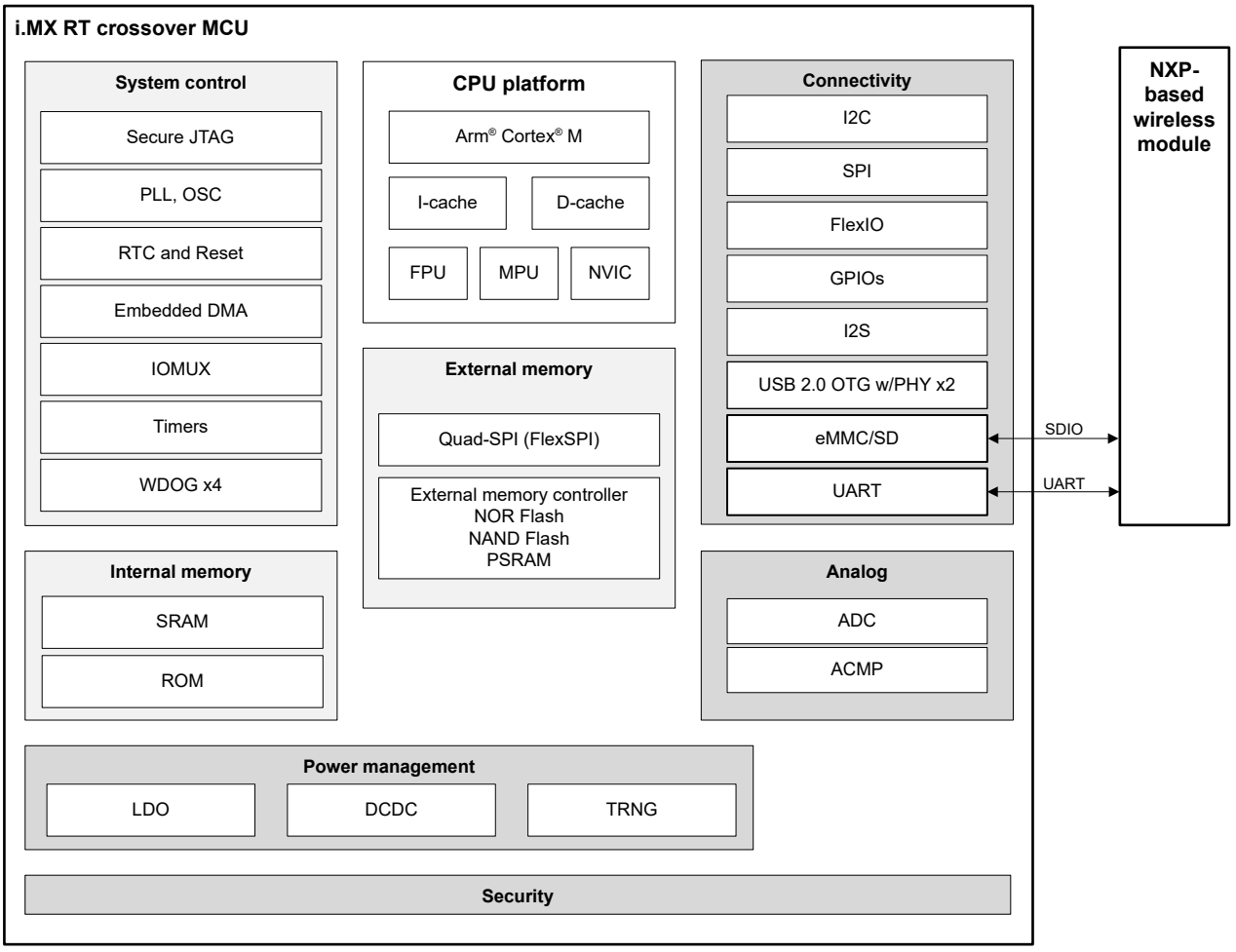

Figure 1. Interfaces between i.MX RT products and NXP-based wireless modules

Table 1 shows the combinations of i.MX RT products and wireless modules.

Table 1. Combinations of i.MX RT products and wireless modules

i.MX RT product	Wireless product	NXP-based wireless module [1]
SDIO interface for Wi-Fi		
i.MX RT1060 EVK	IW416	AW-AM457-uSD AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2 EVK-MAYA-W1
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2 EVK-JODY-W2
i.MX RT1050 EVKB i.MX RT1064 EVK i.MX RT600 EVK	IW416	AW-AM457-uSD AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2
i.MX RT595 EVK	IW416	AW-AM457 M.2 AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT685 EVK	IW416	AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2
i.MXRT685-AUD-EVK	IW416	AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT1160 EVK	IW416	AW- AM510MA M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT1170 EVK	IW416	AW- AM510MA M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT1060 EVKB	IW416	AW-AM457-uSD AW- AM510MA M.2 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2

Table 1. Combinations of i.MX RT products and wireless modules *...continued*

i.MX RT product	Wireless product	NXP-based wireless module [1]
i.MX RT1060 EVKC	IW416	1XK M.2 Module (EAR00385)
	88W8987	1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409) + LBEE0ZZ2WE-uSD-M2 2EL M.2 Module (EAR00409)
	IW610	2LL M2 Module (EAR00500/EAR00501)
i.MX RT1040 EVK	IW416	AW-AM457MA M.2 AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409)
i.MX RT1170 EVKB	IW416	AW- AM510MA M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409) + LBEE0ZZ2WE-uSD-M2 2EL M.2 Module (EAR00409)
i.MX RT1180 EVKA	AW611	u-blox Jody W5
i.MX RT700	IW416	1XK M.2 Module (EAR00385)
	88W8987	1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409)
UART interface for Bluetooth/Bluetooth LE		
i.MX RT1060 EVK	IW416	AW-AM457-uSD AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2
i.MX RT1040 EVK	IW416	1XK M.2 Module (EAR00385)
	88W8987	1ZM M.2 Module (EAR00364)
i.MX RT1050 EVKB	IW416	AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2
i.MX RT1060 EVKB	IW416	AW-AM457-uSD AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2

Table 1. Combinations of i.MX RT products and wireless modules ***...continued***

i.MX RT product	Wireless product	NXP-based wireless module [1]
i.MX RT1160 EVK	IW416	AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT1060 EVKC	IW416	1XK M.2 Module (EAR00385)
	88W8987	1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409) + LBEE0ZZ2WE-uSD-M2 2EL M.2 Module (EAR00409)
	IW610	2LL M2 Module (EAR00500/EAR00501)
i.MX RT1170 EVK	IW416	AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT1170 EVKB	IW416	AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409) + LBEE0ZZ2WE-uSD-M2 2EL M.2 Module (EAR00409
i.MX RT1180 EVKA	AW611	u-blox Jody W5
i.MX RT595 EVK	IW416	AW-AM510 M.2 1XK M.2 Module (EAR00385)
	88W8987	AW-CM358MA M.2 1ZM M.2 Module (EAR00364)
i.MX RT685 EVK	IW416	AW-AM457-uSD AW-AM510-uSD 1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
	88W8987	AW-CM358-uSD 1ZM M.2 Module (EAR00364) + LBEE0ZZ1WE-uSD-M2
i.MX RT685-AUD-EVK	IW416	1XK M.2 Module (EAR00385)
	88W8987	1ZM M.2 Module (EAR00364)
i.MX RT700	IW416	1XK M.2 Module (EAR00385)
	88W8987	1ZM M.2 Module (EAR00364)
	IW612	2EL M.2 Module (EAR00409)

[1] uSD refers to microSD interface, and M2 refers to M.2 interface.
Information about the board settings of M.2 interface is available in the *readme_modules.md* file in *<PATH_TO_SDK_Wi-Fi_Example>* directory.

Table 2 shows NXP-based wireless modules which are configured by default for a list of i.MX RT products.

Table 2. Wireless modules configured by default on i.MX RT products

i.MX RT product	NXP-based wireless module
i.MX RT1060 EVK i.MX RT1050 EVKB i.MX RT1064 EVK i.MX RT685 EVK	1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
i.MX RT1060 EVKB	1XK M.2 Module (EAR00385) + LBEE0ZZ1WE-uSD-M2
i.MX RT1040 EVK	1XK M.2 Module (EAR00385)
i.MX RT1160 EVK i.MX RT1170 EVK i.MX RT1170 EVKB i.MX RT595 EVK i.MX RT685-AUD-EVK	1XK M.2 Module (EAR00385)
i.MX RT 1170 EVKB i.MX RT 1060 EVKC	2EL M.2 Module (EAR00409) + LBEE0ZZ2WE-uSD-M2 2EL M.2 Module (EAR00409)
i.MX RT 1080 EVKA	u-blox Jody W5
i.MX RT700 EVK	2EL M.2 Module (EAR00409)

2.3 i.MX RT EVK boards

The i.MX RT EVK boards are USB powered printed circuit boards (PCB). At their heart lies the i.MX RT crossover MCU, featuring NXP's advanced implementation of the Arm Cortex-M core. This core operates at sufficient speed to provide high CPU performance and excellent real-time response.

For more details on i.MX RT EVK, visit i.MX RT Products page, click the link to the product of interest, and look for the section under ***Development Boards and Designs***.

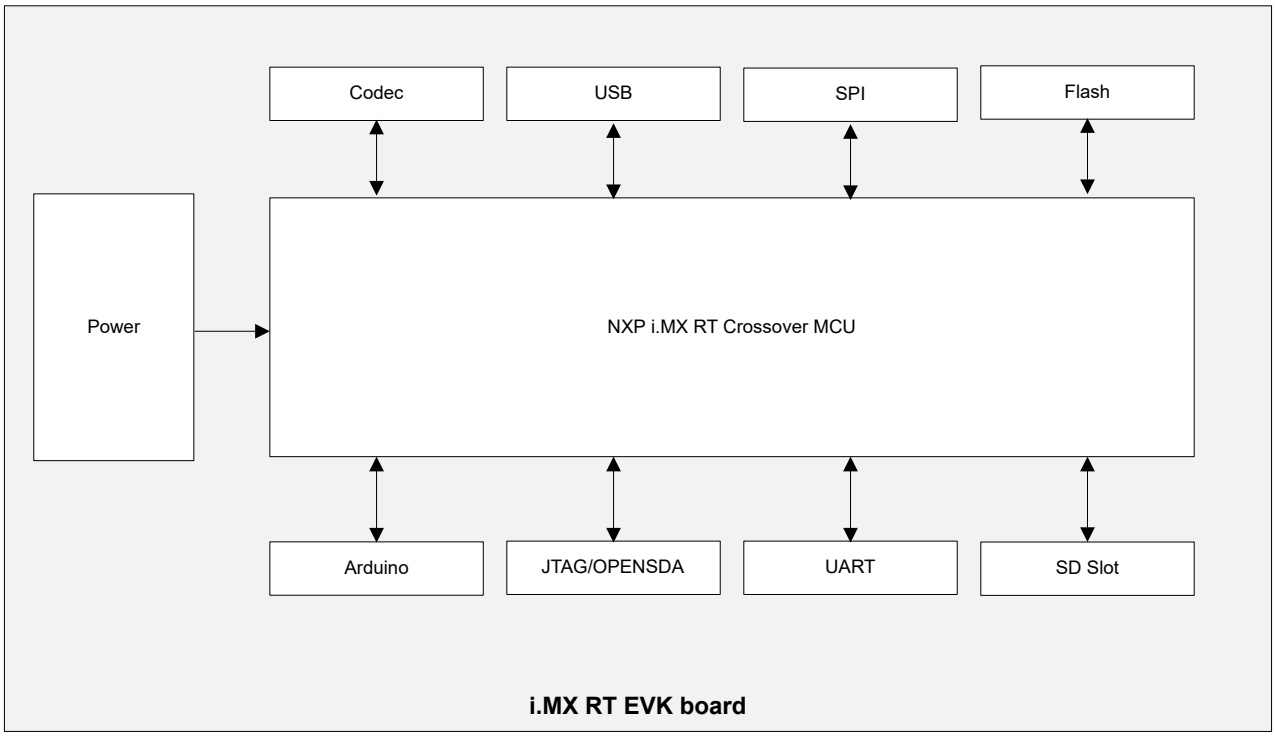

Figure 2. i.MX RT evaluation board diagram

The i.MX RT EVK boards support different boot modes. Specific switch and/or jumper settings are used to configure the boot modes. Select the i.MX RT product of interest on i.MX RT Products web page and look for the *EVK User Manual* and *EVK Hardware User Guide* on the documentation tab of the product web page. The documents include the details on the jumpers, boot mode, and switch settings.

Table 3 shows the switch settings for the i.MX RT EVK boards that support NXP-based wireless modules.

Table 3. Boot mode selection

i.MX RT EVK board	Component	Configuration	Boot mode
i.MX RT1020	SW8	0010	Internal (QSPI flash)
i.MX RT106X	SW7	0010	Internal (QSPI flash)
I.MX RT1040	SW4	0010	Internal (QSPI flash)
i.MX RT1050	SW7	0110	Internal (Hyperflash)
i.MX RT1170	SW1	0010	Internal (QSPI flash)
i.MX RT1170B	SW1	0010	Internal (QSPI flash)
i.MX RT1160	SW1	0010	Internal (QSPI flash)
i.MX RT1160B	SW7	0010	Internal (QSPI flash)
i.MX RT1180A	SW5	0010	Internal (QSPI flash)
i.MX RT500	SW7	001	Internal (OSPI flash)
i.MX RT600	SW5	101	Internal (OSPI flash)
i.MX RT685S	SW2	011	Internal (OSPI flash)
i.MX RT700	SW10	10	Internal (OSPI flash)

2.4 i.MX RT MCUXpresso SDK

This section provides an overview of MCUXpresso Software Development Kit. The MCUXpresso SDK architecture consists of the following key components:

- The Arm Cortex Microcontroller Software Interface Standard (CMSIS) CORE compliance device specific header files, SOC Header, and CMSIS math/DSP libraries
- Cloud connectivity APIs for Amazon AWS, and Microsoft Azure
- IW416/88W8987 Firmware with a support for SDIO and UART host interfaces
- Peripheral drivers such as SPI, I2C, ADC, uSDHC, UART
- Real-time Operating Systems (FreeRTOS)
- Stacks and Middleware that are part of MCUXpresso SDK and include:
  - Connectivity, Security, DMA, File System, MCU boot, and other software features
  - Specific features for Wi-Fi connectivity: lwIP stack, DHCP Daemon, Wireless connection manager and Wi-Fi module driver
  - Specific features for Bluetooth connectivity: Bluetooth stack, Bluetooth module driver
- Demo Applications based on the MCUXpresso SDK

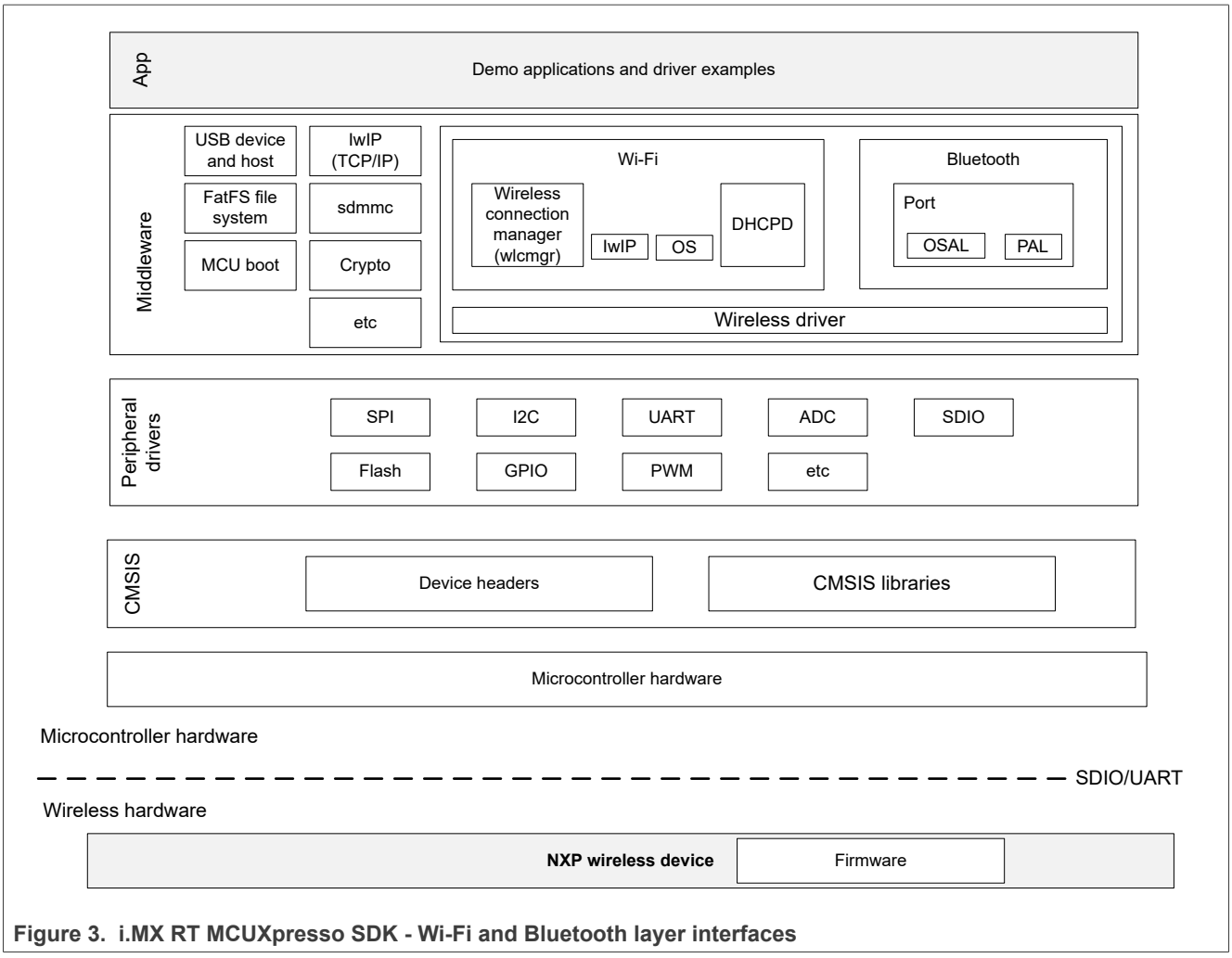

Figure 3. i.MX RT MCUXpresso SDK - Wi-Fi and Bluetooth layer interfaces

3 NXP-based wireless modules

The wireless modules described in this section are based on the following NXP products:

- IW416
- 88W8987
- IW612
- AW611[1]
- IW610

1 The AW611 module support is available only in i.MX RT1180 EVKA and SDK version 2.16.0.

3.1 IW416-based wireless modules

This section provides information about a few IW416-based modules: details about the evaluation board, jumper configuration, and how to connect the module to an i.MX RT EVK board.

3.1.1 AzureWave AW-AM457 module

The AW-AM457 is a 2.4 GHz and 5 GHz dual band Wi-Fi and Bluetooth radio module, specifically designed for highly integrated and cost-effective applications. This module is based on the IW416 chipset supporting 802.11a/b/g/n simultaneous station and access point. The integrated power management, the fast dual-core CPU, 802.11i security standard support, and high-speed data interfaces deliver the performance for the speed, reliability, and quality requirements of products. For more details about module Wi-Fi and Bluetooth features, see ref.[2].

3.1.1.1 AzureWave AW-AM457-uSD evaluation board

The AW-AM457-uSD evaluation board comprises AW-AM457 wireless module and the uSD-15x15 adapter board. The adapter board enables the Micro SD interface for the module.

Table 4. AzureWave AW-AM457 module features

Feature	Description
Wi-Fi chipset	IW416
Module name	AW-AM457
Module evaluation board	AW-AM457-uSD EVB
Host interface	Wi-Fi: SDIO 3.0 Bluetooth: UART
Antenna	AW-AM457-uSD EVB kit includes Mag Layers MSA-4008-25GC1-A2_V01 PIFA antenna
Form factor	15 x 15 x 2.5 mm stamp module

Figure 4 shows the interfaces and jumpers on the AW-AM457-uSD adapter board.

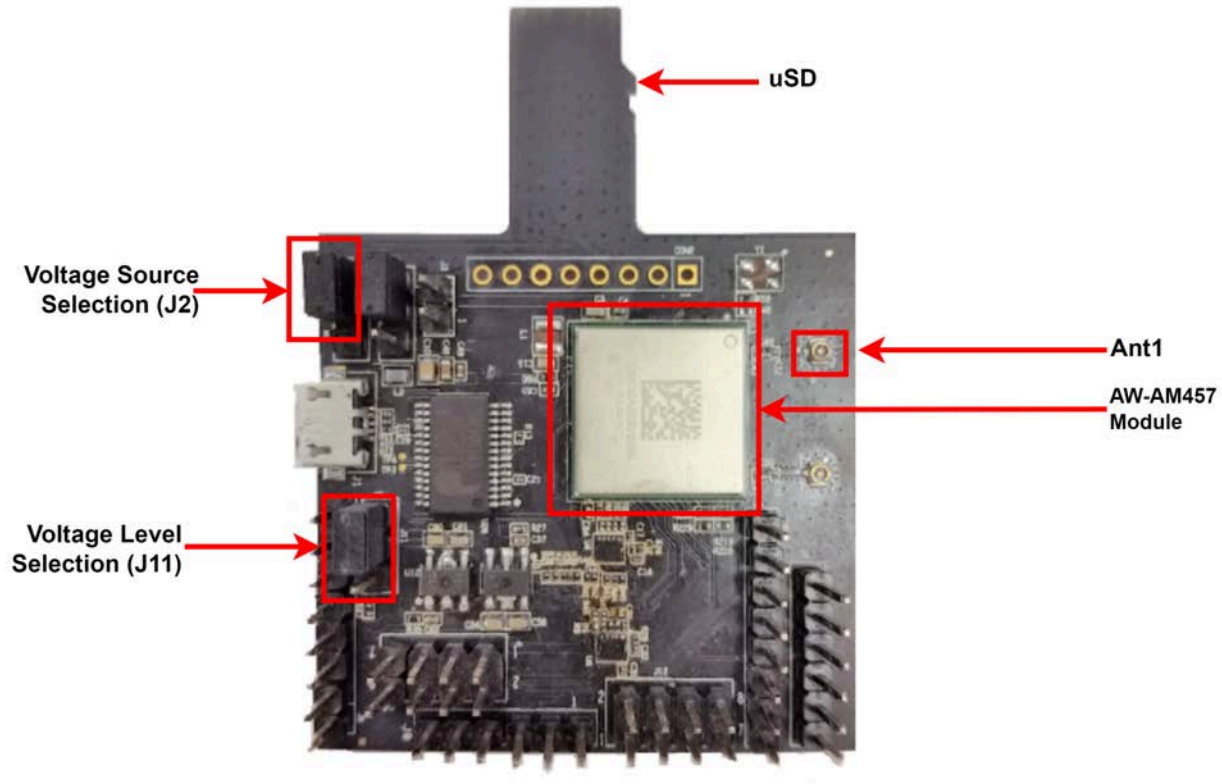

Figure 4. AzureWave AW-AM457-uSD evaluation board

3.1.1.2 Jumper settings on AzureWave AW-AM457-uSD evaluation board

Table 5 shows the jumper settings for the power source and for VIO_SD voltage level selection.

Table 5. Jumper settings on AzureWave AW-AM457-uSD evaluation board

Jumper	Description
J2 (1-2)	Connect J2 on pins 1 and 2 to set the power source to VIO_uSD
J11 (1-2)	Connect J11 on pins 1 and 2 to set VIO_SD voltage level to 1.8 V supply

3.1.1.3 Connecting AzureWave AW-AM457-uSD to i.MX RT1060 EVK board

To connect AzureWave AW-AM457-uSD to i.MX RT1060 EVK board

- Plug AzureWave AW-AM457-uSD evaluation board into the Micro SD slot of i.MX RT1060 EVK board

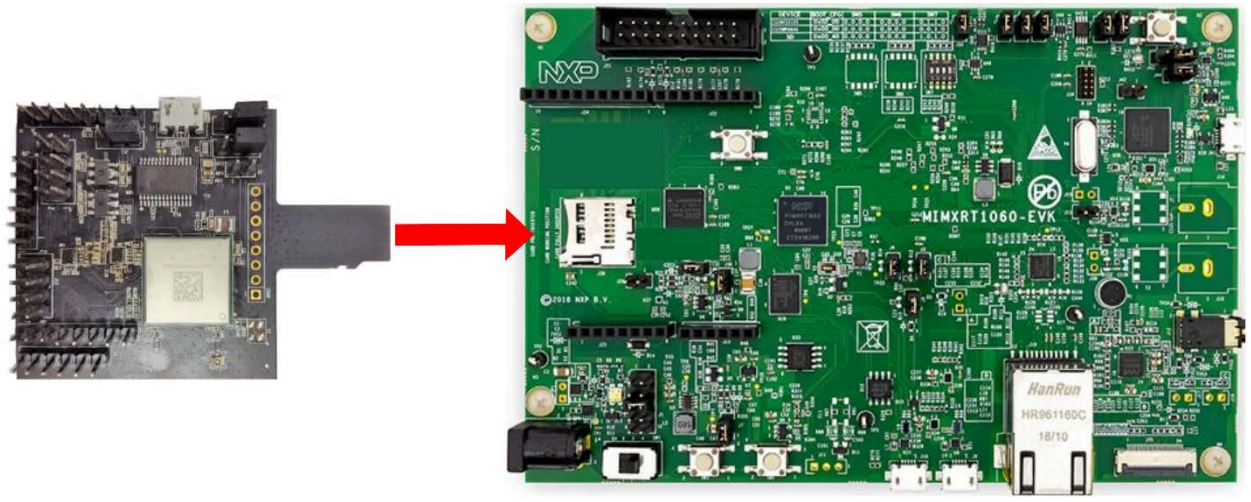

Figure 5. AzureWave AW-AM457-uSD connection to i.MX RT1060 EVK board

- Connect the antenna to AzureWave AW-AM457-uSD evaluation board
- Use a Micro USB to USB cable to connect i.MX RT1060 EVK board to a host computer running Windows, Linux or Mac OS

Figure 6. i.MX RT1060 EVK connection to the host computer for power supply and console access

Note: *In case the initialization of the Wi-Fi driver fails with the setup described in Figure 6, it is recommended to use an external power supply for RT1060 instead of a USB connector to power up RT1060 EVK board. Connect the 5V 3A adapter over the J2 connector of RT1060 as shown in Figure 7. Set the J1 jumper to position 1-2 instead of 5-6 to power up RT1060 EVK board.*

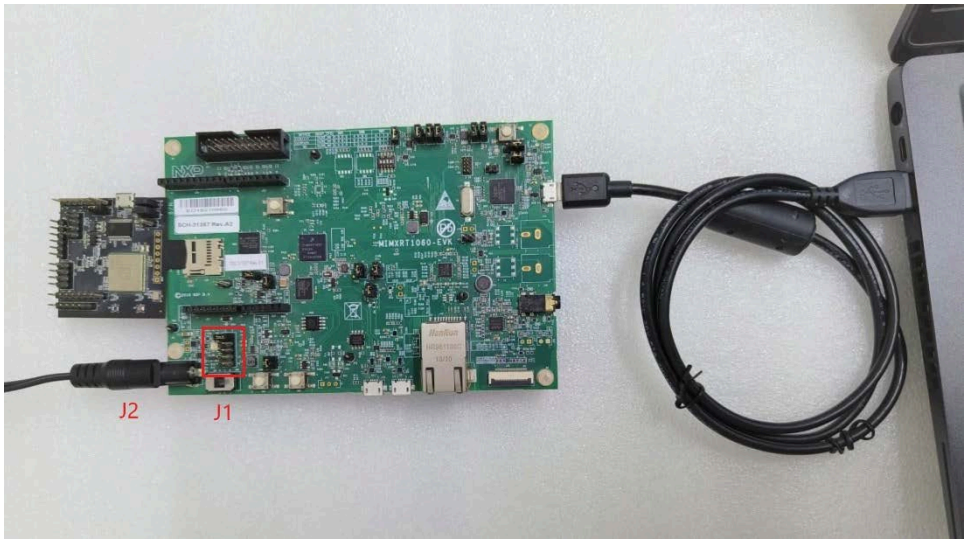

Figure 7. External power supply for i.MX RT1060 EVK board and connection to the host computer for console access

3.1.1.4 About Bluetooth host and audio interfaces

For Bluetooth, the communication between the Host stack and the Link Layer (LL) is implemented via the standard HCI UART host interface and PCM interface for voice.

To enable the Bluetooth UART and PCM interfaces, some rework is required. See ref.[12].

3.1.2 Embedded Artists' (Murata) 1XK M.2 module

Type 1XK is a small module with high-performance based on NXP IW416 combo chipset which supports Wi-Fi 802.11a/b/g/n and Bluetooth 5.2 BR/EDR/LE up to 150 Mbps PHY data rate on Wi-Fi and 3 Mbps PHY data rate on Bluetooth. The Wi-Fi section supports SDIO 3.0 interface. The Bluetooth section supports high-speed 4-wire UART interface (optional support for SDIO) and PCM for audio data. The IW416 implements sophisticated enhanced collaborative coexistence hardware mechanisms and algorithms, which ensure that Wi-Fi and Bluetooth collaboration is optimized for maximum performance. In IEEE 802.11n mode, the Wi-Fi operation supports rates of MCS0 – MCS7 in 20 MHz and 40 MHz channels for data rate up to 150 Mbps. Type 1XK module is packaged in an impressively small form factor that facilitates integration into size- and power-sensitive applications such as IoT applications, hand-held wireless system, gateway and more.

Embedded Artists collaborated with Murata on designing/validating their type 1XK M.2 module. For more details about the module, see ref.[4]. And for details on the M.2 module, see ref.[18].

Table 6. Embedded Artists' 1XK M.2 module features

Feature	Description
Wi-Fi and Bluetooth chipset	NXP IW416
Module name	Murata Type 1XK M.2
Module interface	M.2 (Type 2230-S3-E) / microSD (via the Murata uSD-M.2 adapter)
Antenna	PCB trace antenna or U.FL connected patch antenna
Wi-Fi standard	Wi-Fi 4, 802.11 b/g/n
Frequency	2.4 GHz and 5 GHz
Network	uAP and STA dual mode
Measurement	22x30 mm without trace antenna, 22x44 mm with trace antenna
Supply voltage	3.3 V (3.0 V-3.6 V)
Operating temperature range	-40°C to +85°C

Figure 8 shows the main components on Embedded Artists' 1XK M.2 module.

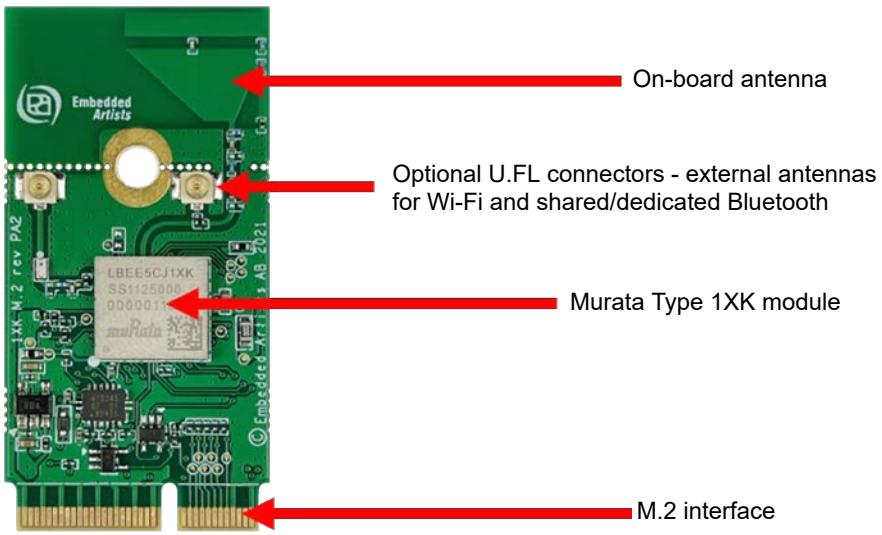

Figure 8. Embedded Artists' 1XK M.2 module

3.1.2.1 Connecting Embedded Artists' (Murata) 1XK M.2 module to i.MX RT1050 EVK using Murata's uSD-M.2 adapter

Embedded Artists' 1XK M.2 module can be connected to i.MX RT1050 EVK (or any other EVK with a microSD or full-size SD slot) using Murata's uSD-M.2 adapter. Figure 9 shows the connection scheme.

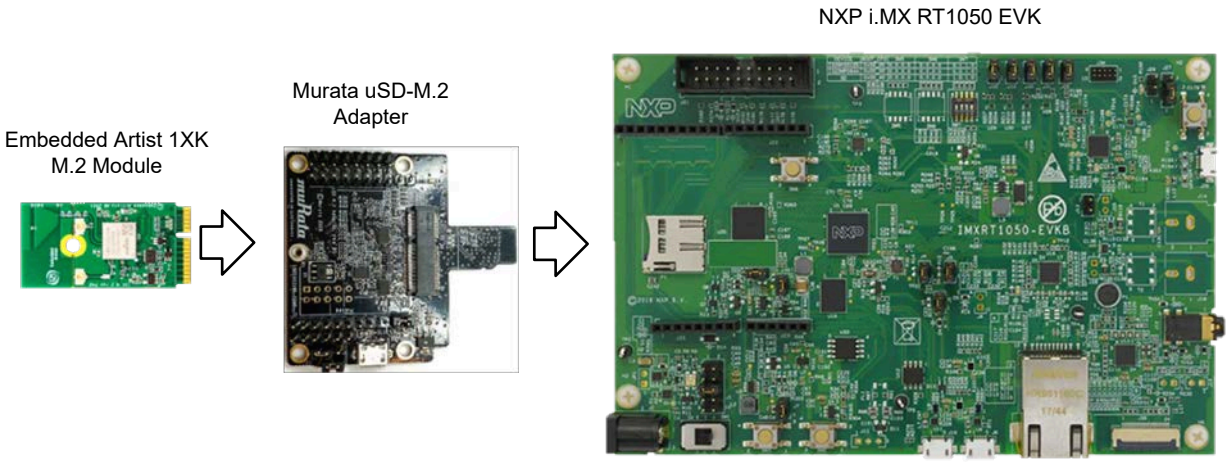

Figure 9. Connecting Embedded Artists' 1XK M.2 module to i.MX RT1050 EVK

The Murata uSD-M.2 adapter provides the following interfaces to host MCU/MPU:

- microSD (uSD) interface for Wi-Fi-SDIO (SD is an option with microSD-SD adapter)
- Arduino Headers for Bluetooth UART, Bluetooth PCM and Wi-Fi/Bluetooth control signals
- Optional power, debug, and clocking signals connect through Arduino header or Micro-AB USB connector

For details of the uSD-M.2 adapter, see ref.[20] or ref.[22] .

Note: *For EVKs with M.2 slots (e.g., NXP i.MX RT1160, RT1170), Embedded Artists' M.2 module can be directly connected.*

3.1.2.2 Bluetooth host and audio interfaces

For Bluetooth, the communication between the Host stack and the Link Layer (LL) is implemented via the standard HCI UART host interface and PCM interface for voice.

To enable the Bluetooth UART and PCM interfaces, some rework is required. See ref.[12].

3.1.3 AzureWave AW-AM510 module

The AW-AM510 is a 2.4 GHz and 5 GHz dual-band single-antenna Wi-Fi and Bluetooth radio module. The module includes IW416 wireless device that supports 802.11a/b/g/n simultaneous station and access point. For more details about the module Wi-Fi and Bluetooth features, see ref.[3].

3.1.3.1 AzureWave AW-510-uSD evaluation board

The AW-AM510-uSD evaluation board comprises AW-AM510 wireless module and the uSD-12x12 adapter board. The adapter board enables the Micro SD interface for the module.

Table 7. AzureWave AW-AM510 module features

Feature	Description
Wi-Fi chipset	IW416
Module name	AW-AM510
Module evaluation board	AW-AM510-uSD EVB
Host interface	Wi-Fi: SDIO 3.0 Bluetooth: UART
Antenna	AW-AM510-uSD EVB kit includes Mag Layers MSA-4008-25GC1-A2_V01 PIFA antenna
Form factor	12 x 12 x 2 mm stamp module

Figure 10 shows the interfaces of AzureWave AW-AM510-uSD evaluation board and the jumpers used for VIO_SD and VIO voltage level options.

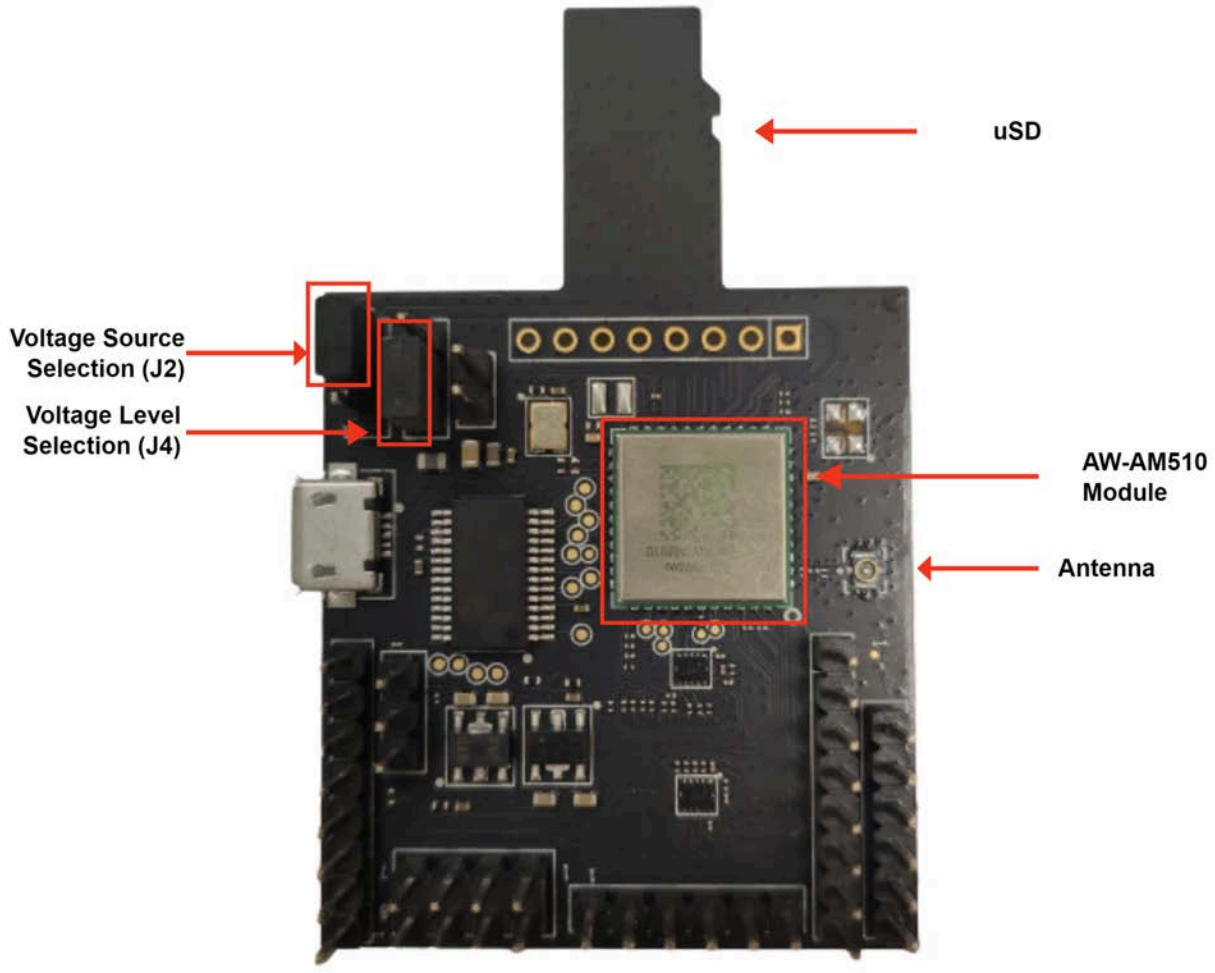

Figure 10. AzureWave AW-AM510-uSD evaluation board

3.1.3.2 Jumper settings on AzureWave AW-AM510-uSD evaluation board

Table 8 shows the jumper settings for the power source and for VIO_SD voltage level selection.

Table 8. Jumper settings on AzureWave AW-AM510-uSD evaluation board

Jumper	Description
J2 (1-2)	Connect J2 on pins 1 and 2 to set the power source to VIO_uSD
J4 (1-2)	Connect J4 on pins 1 and 2 to set VIO_SD voltage level to 1.8 V supply

3.1.3.3 Connecting AzureWave AW-AM510-uSD to i.MX RT1060 EVK board

To connect AzureWave AW-AM510-uSD to i.MX RT1060 EVK board:

- Plug AzureWave AW-AM510-uSD evaluation board into the Micro SD slot of i.MX RT1060 EVK board

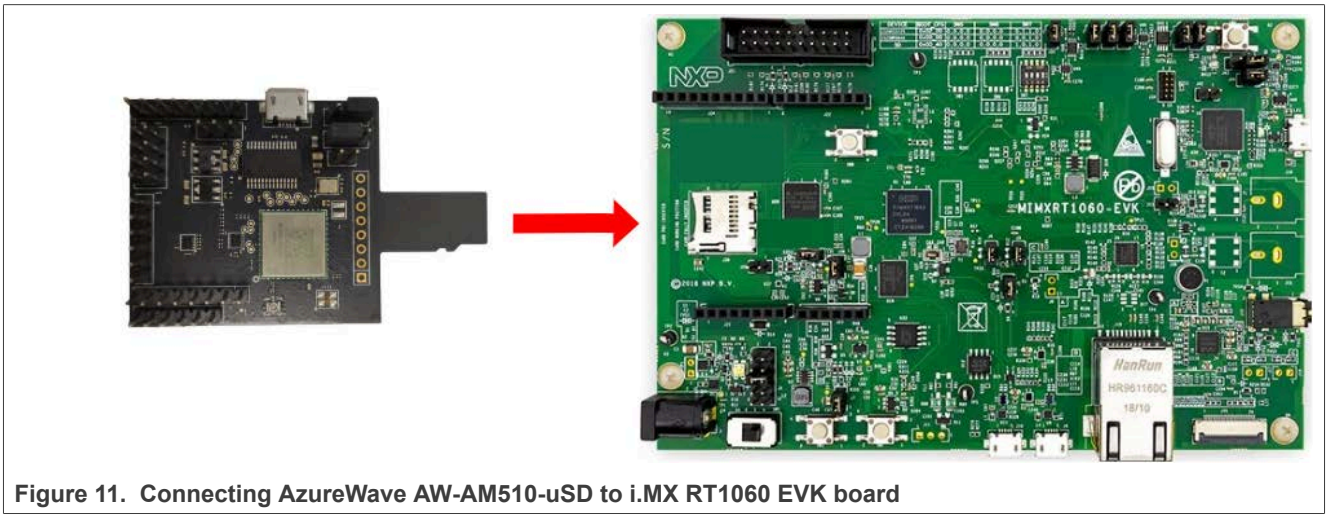

Figure 11. Connecting AzureWave AW-AM510-uSD to i.MX RT1060 EVK board

- Connect the antenna to AzureWave AW-AM510-uSD evaluation board
- Use a Micro USB to USB cable to connect i.MX RT1060 EVK board to a host computer running Windows, Linux or Mac OS

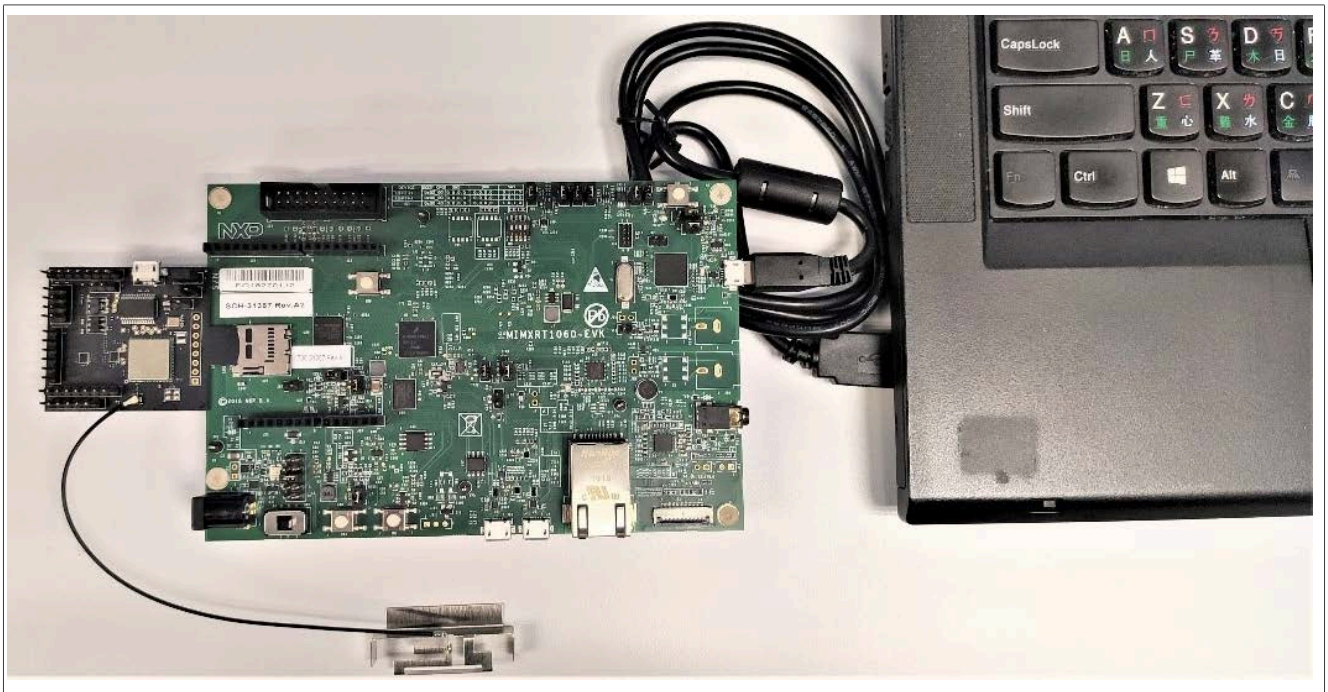

Figure 12. i.MX RT1060 EVK board connection to host computer for power supply and console access

3.1.3.4 Bluetooth host and audio interfaces

For Bluetooth, the communication between the Host stack and the Link Layer (LL) is implemented via the standard HCI UART host interface and PCM interface for voice.

To enable the Bluetooth UART and PCM interfaces, some rework is required. See ref.[12].

3.1.4 u-blox MAYA-W1 module

The MAYA-W1 series are host-based Wi-Fi 4 and Bluetooth 5 multi-radio modules based on IW416 device. MAYA-W1 modules support the Wi-Fi 4 (802.11a/b/g/n) standard, Bluetooth classic and the full-feature set of Bluetooth Low Energy 5.

Table 9. u-blox MAYA-W1 module features

Feature	Description
Wi-Fi chipset	NXP IW416
Wi-Fi standard	Wi-Fi 4, IEEE 802.11 a/b/g/n (2.4 GHz and 5 GHz) Bluetooth 5.2
Antenna	MAYA-W160: 2 U.FL connectors MAYA-W161: 2 antenna pins MAYA-W166: 1 embedded PCB antenna
Host interfaces	Wi-Fi: SDIO Bluetooth: UART
Output RF power	LILY-W131: 19 dBm including 3 dBi antenna gain LILY-W132 and LILY-W133: 15 dBm including antenna gain
Operating temperature range	-40°C to +85°C

3.1.4.1 u-blox EVK-MAYA-W1 evaluation board

EVK-MAYA-W1 features:

- External connectors to all host interfaces through SD card and M.2 key E adapters
- USB interface to easily access the Bluetooth UART interface via a USB-to-UART bridge
- Digital and analog audio interfaces for Bluetooth
- SMA connectors for external antennas (EVK-MAYA-W161)
- Multiple power supply options

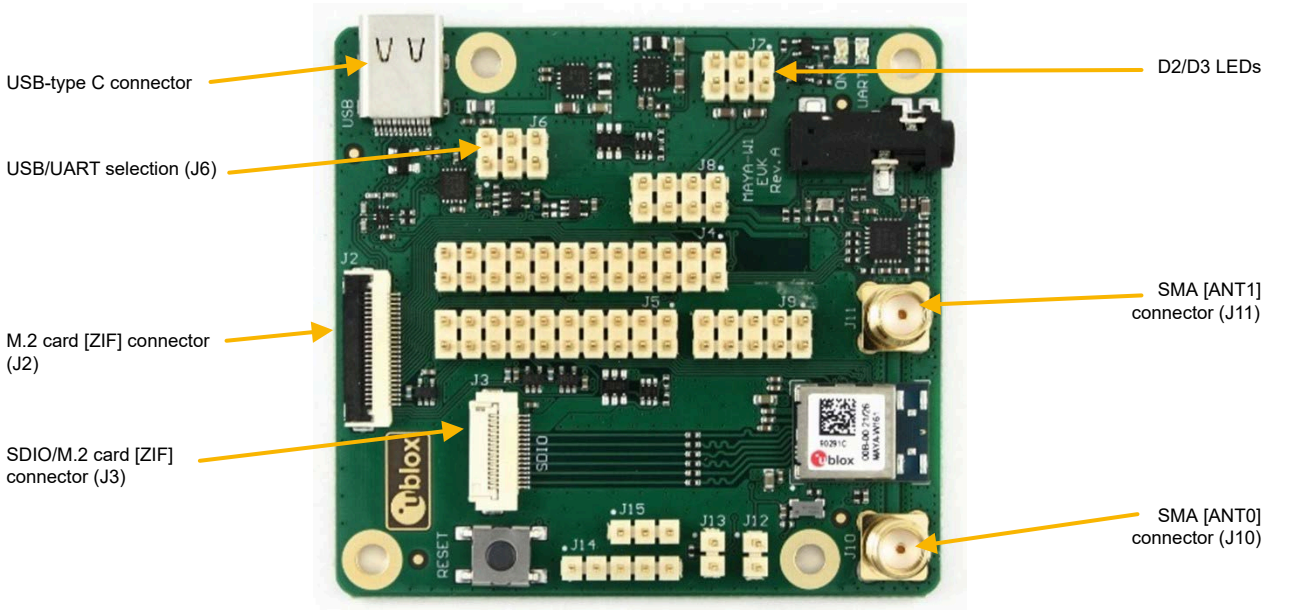

Figure 13. u-blox EVK-MAYA-W1 evaluation board

3.1.4.2 Jumper settings on u-blox EVK-MAYA-W1 evaluation board for uSD

Figure 14 shows the jumper settings on u-blox EVK-MAYA-W1 evaluation board.

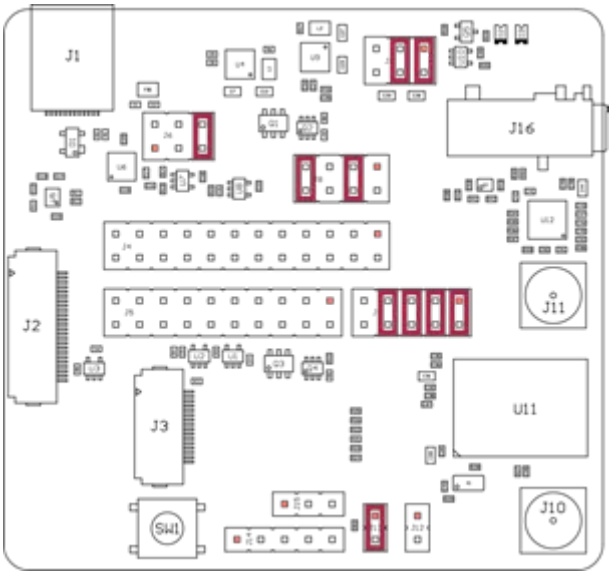

Figure 14. u-blox EVK-MAYA-W1 jumper settings for uSD connection

3.1.4.3 Connecting u-blox EVK-MAYA-W1 to i.MX RT1060 EVK board using uSD

To connect u-blox EVK-MAYA-W1 to i.MX RT1060 EVK board:

- Use a Micro SD/SDIO adaptor to connect EVK-MAYA-W1 evaluation board to i.MXRT1060 EVK board

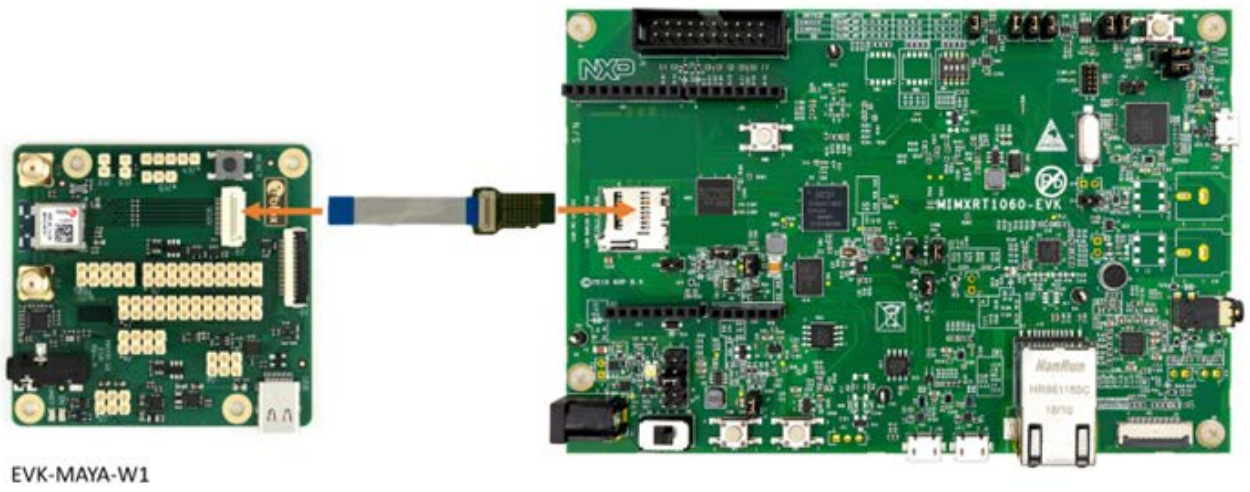

Figure 15. : u-blox EVK-MAYA-W1 connected to i.MX RT1060 EVK using uSD interface

- Use a Micro USB to USB cable to connect i.MX RT1060 EVK board to a host computer running Windows, Linux or Mac OS

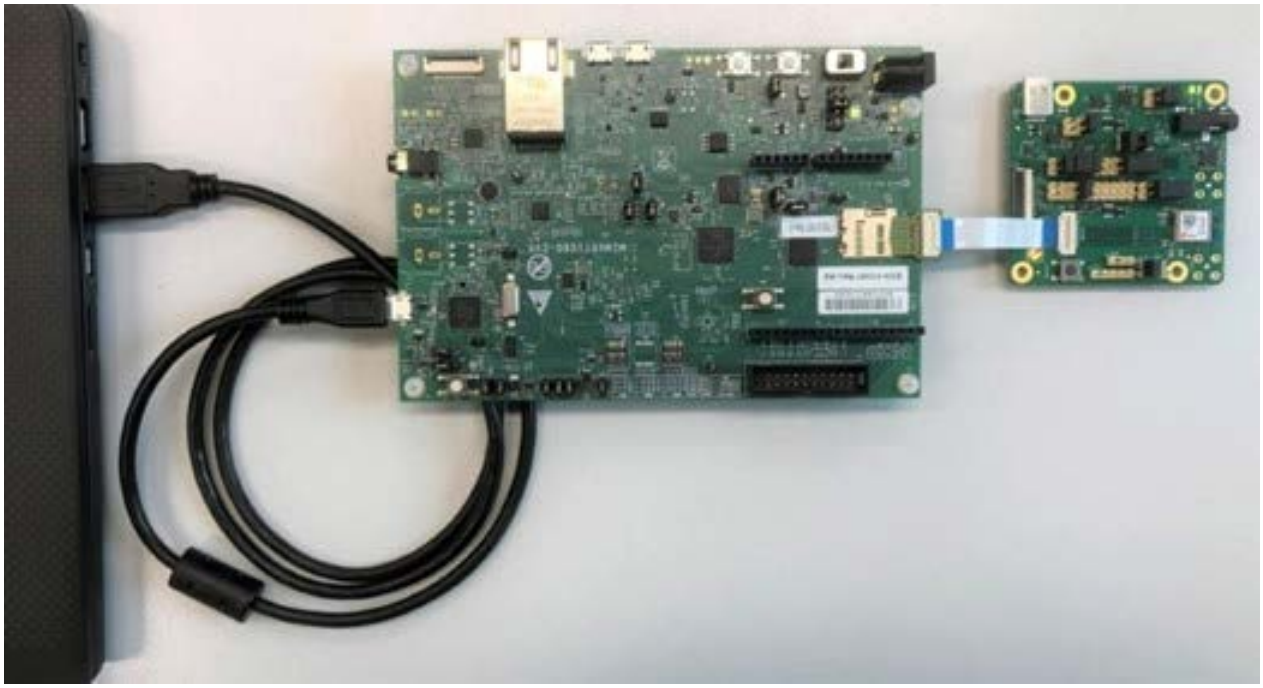

Figure 16. i.MX RT1060 EVK board connection to the host computer for power supply and console access

3.2 88W8987-based wireless modules

This section provides information about a few 88W8987-based modules: details about the evaluation board, jumper configuration, and how to connect the module to an i.MX RT EVK board.

3.2.1 AzureWave AW-CM358-uSD adapter board

The AW-CM358 is a 2.4 GHz and 5 GHz dual band Wi-Fi and Bluetooth radio module, specifically designed for highly integrated and cost-effective applications. This module is based on the 88W8987 chipset supporting 802.11a/b/g/n/ac simultaneous station and access point. The integrated power management, the fast dual-core CPU, 802.11i security standard support, and high-speed data interfaces deliver the performance for the speed, reliability, and quality requirements of products. For more details about module Wi-Fi and Bluetooth features, see ref.[1].

The AW-CM358-uSD adapter board includes AW-CM358 (88W8987-based Wi-Fi) module and the uSD-1212 adapter which enables the Micro SD interface for the module.

Table 10. AzureWave AW-CM358 module features

Feature	Description
Wi-Fi chipset	88W8987
Module name	AW-CM358
Module evaluation board	AW-CM358-uSD EVB
Host interface	Wi-Fi: SDIO 3.0 Bluetooth: UART
Antenna	AW-CM358-uSD EVB kit includes Mag Layers MSA-4008-25GC1-A2_ V01 PIFA antenna
Form factor	12 x 12 x 1.65 mm stamp module

Figure 17 shows the interfaces and jumpers on AW-CM358-uSD adapter board

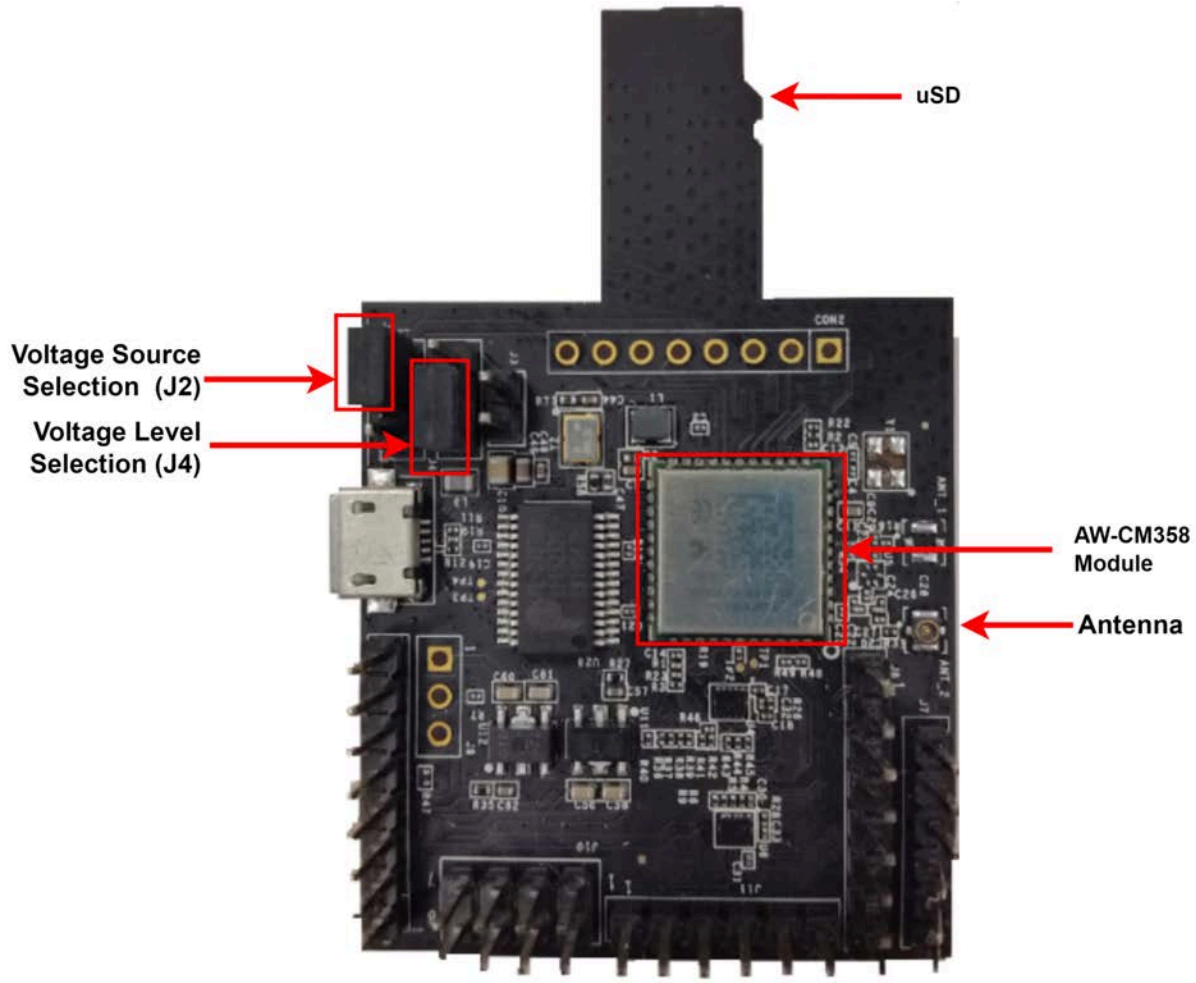

Figure 17. AzureWave AW-CM358-uSD adapter board

3.2.1.1 Jumper settings on AzureWave AW-CM358-uSD evaluation board

Table 11 shows the jumper settings for the power source and for VIO_SD voltage level selection.

Table 11. Jumper settings on AzureWave AW-CM358-uSD evaluation board

Jumper	Description
J2 (1-2)	Connect J2 on pins 1 and 2 to set the power source to VIO_uSD
J4 (1-2)	Connect J4 on pins 1 and 2 to set VIO_SD voltage level to 1.8 V supply

3.2.1.2 Connecting AW-CM358-uSD adapter board to i.MX RT1060 EVK board

- Plug AW-CM358-uSD adapter board into the Micro SD slot of i.MX RT1060 EVK board (Figure 18).

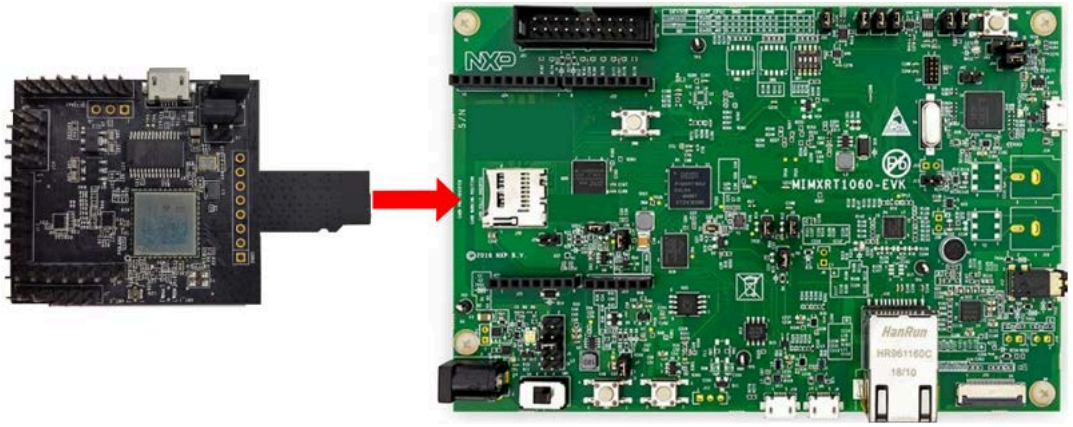

Figure 18. Connecting AW-CM358-uSD adapter board to i.MX RT1060 EVK board

- Connect the antenna to the antenna slot of the AW-CM358-uSD adapter board (Figure 19).
- Use a Micro USB to USB cable to connect i.MX RT1060 EVK board to a host computer running Windows, Linux or Mac OS (Figure 19).

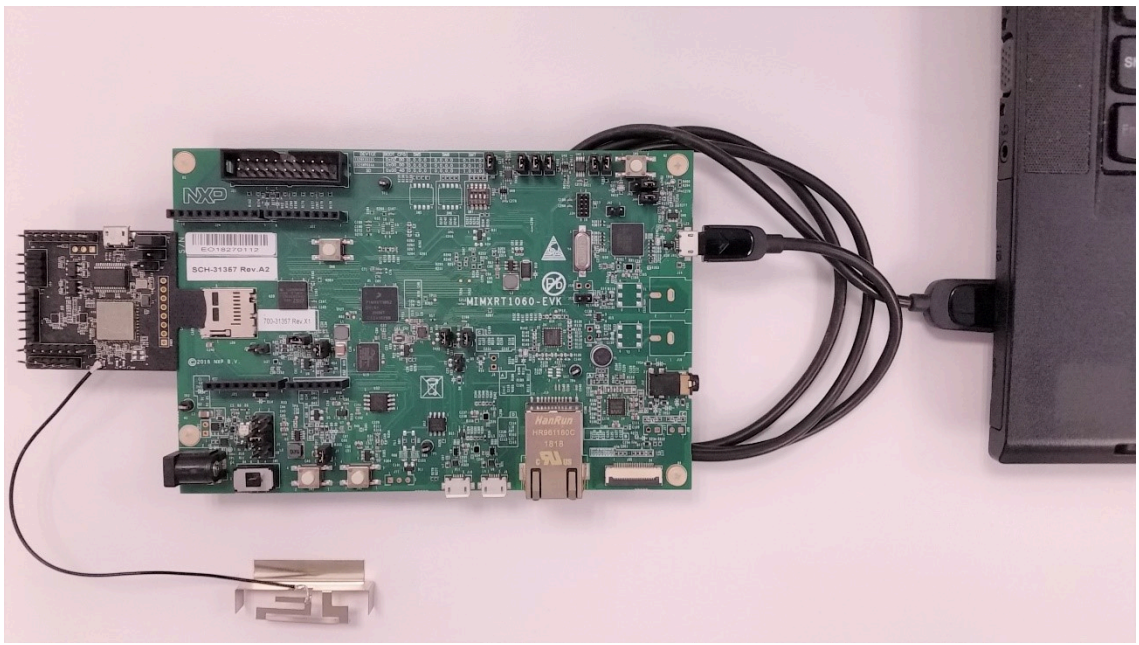

Figure 19. Connection to i.MX RT1060 EVK board and connection of the antenna

About Bluetooth host and audio interfaces

For Bluetooth, the communication between the Host stack and the Link Layer (LL) is implemented via the standard HCI UART host interface and PCM interface for voice.

To enable the Bluetooth UART and PCM interfaces, some rework is required. See ref.[12].

3.2.2 AzureWave AW-CM358MA M.2 adapter board

The AW-CM358MA M.2 adapter board includes AW-CM358 (88W8987-based Wi-Fi and Bluetooth) module with M.2 adapter which enables the SDIO interface for the module.

Note: *Only i.MX RT1170 EVK board require AW-CM358MA M.2 adapter board as it does not has support for the Bluetooth on AW-CM358-uSD adapter board.*

Table 12. AzureWave AW-CM358MA module features

Feature	Description
Wi-Fi chipset	88W8987
Module name	AW-CM358
Module evaluation board	AW-CM358MA M.2
Host interface	Wi-Fi: SDIO 3.0 Bluetooth: UART
Antenna	AW-CM358MA M.2 adapter board includes Mag Layers MSA-4008-25GC1-A2_ V01 PIFA antenna
Form factor	22 x 30 x 2.45 mm stamp module

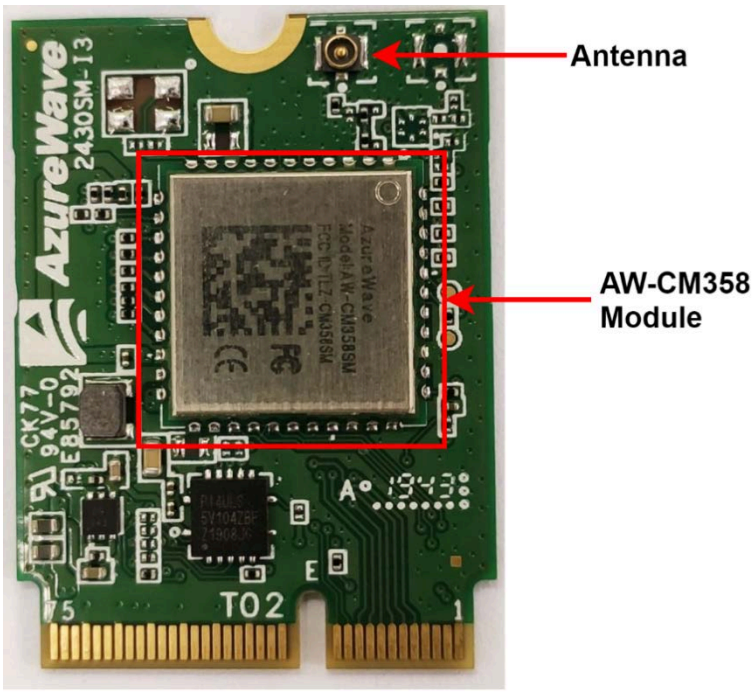

Figure 20. AzureWave AW-CM358MA M.2 adapter board

3.2.2.1 Connecting AW-CM358MA adapter board to i.MX RT1170 EVK board

- Plug AW-CM358MA adapter board into the M.2 slot of i.MX RT1170 EVK board screw (Figure 21).

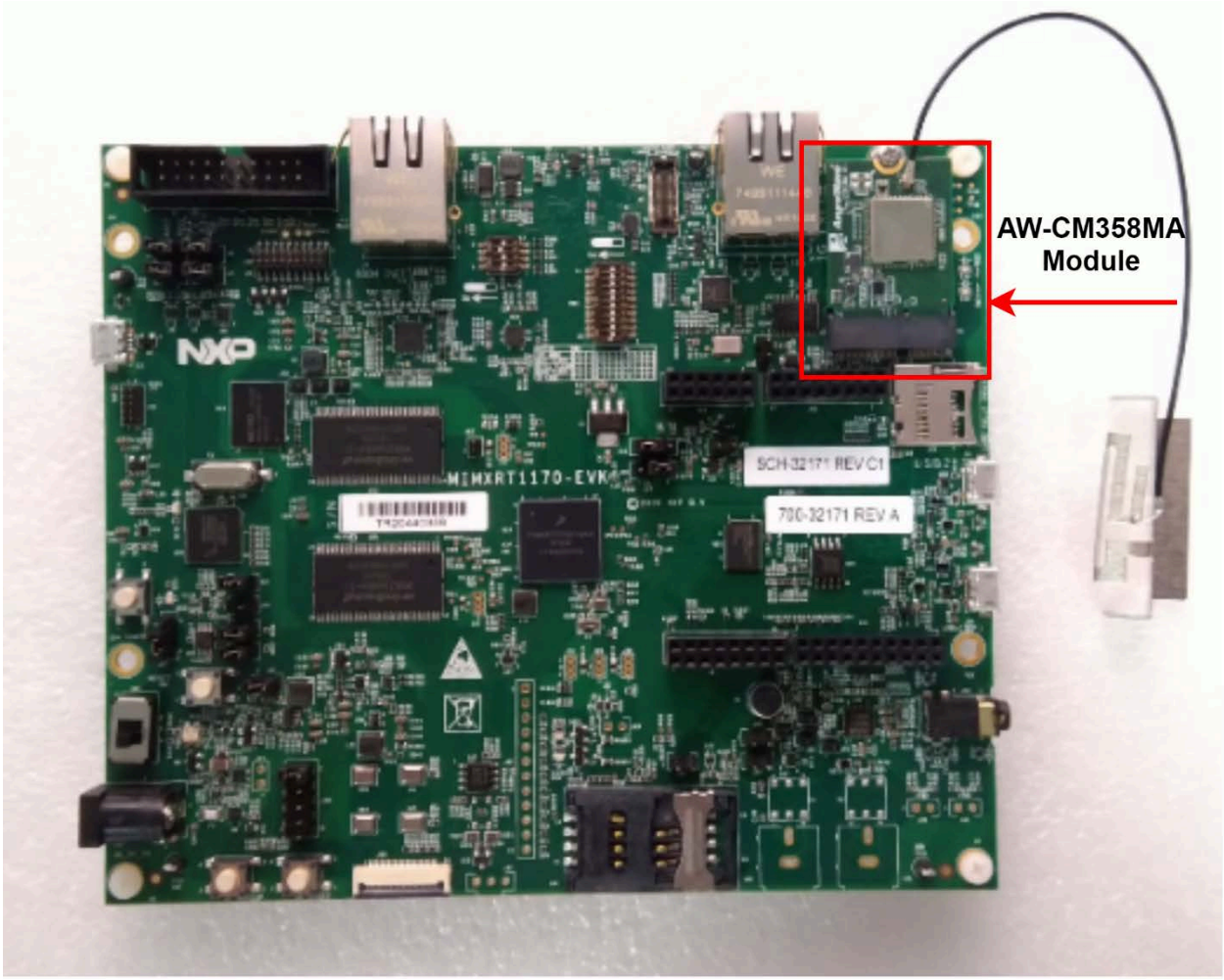

Figure 21. AW-CM358MA adapter board plugged to the M.2 slot of i.MX RT1170 EVK board

- Connect the antenna to the antenna slot of the AW-CM358MA adapter board (Figure 22).
- Use a Micro USB to USB cable to connect i.MX RT1170 EVK board to the host computer (Figure 22).

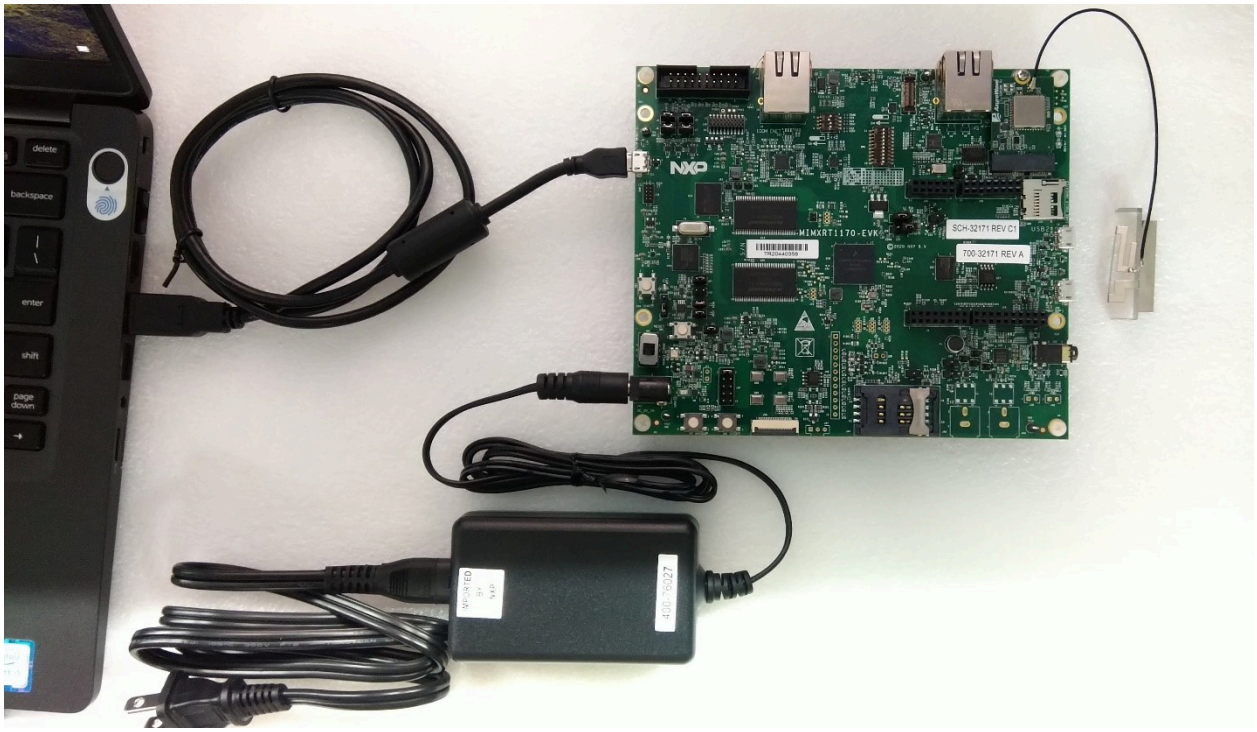

Figure 22. Connection to i.MX RT1170 EVK board and connection of the antenna

3.2.3 Embedded Artists' (Murata) 1ZM M.2 module

Type 1ZM is a small module with and very high performance based on NXP 88W8987 combo chipset which supports Wi-Fi 802.11a/b/g/n/ac + Bluetooth 5.1 BR/EDR/LE up to 433 Mbps PHY data rate on Wi-Fi and 3 Mbps PHY data rate on Bluetooth. The Wi-Fi section supports SDIO 3.0 interface, and the Bluetooth section supports high-speed 4-wire UART interface and PCM for audio data. The 88W8987 implements highly sophisticated enhanced collaborative coexistence hardware mechanisms and algorithms, which ensure that Wi-Fi and Bluetooth collaboration is optimized for maximum performance. In IEEE 802.11ac mode, the Wi-Fi operation supports rates of MCS0 - MCS9 (up to 256 QAM) in 20 MHz, 40 MHz and 80 MHz channels for data rate up to 433 Mbps. Type 1ZM module is packaged in an impressively small form factor that facilitates integration into size- and power-sensitive applications such as IoT applications, hand-held wireless system, gateway and more.

Embedded Artists collaborated with Murata on designing/validating their Type 1ZM M.2 Module. For more details about the module, see ref.[5]. And for details on the M.2 module, see ref.[19].

Table 13. Embedded Artists' 1ZM M.2 module features

Feature	Description
Wi-Fi chipset	NXP 88W8987
Module name	Murata Type 1ZM M.2
Module interface	M.2 (Type 2230-S3-E) / microSD (via the Murata uSD-M.2 adapter)
Antenna	PCB trace antenna or U.FL connected patch antenna
Wi-Fi standard	Wi-Fi 5, 802.11a/b/g/n/ac
Frequency	2.4 GHz and 5 GHz
Network	uAP and STA dual mode
Measurement	22x30 mm without trace antenna, 22x44 mm with trace antenna
Supply voltage	3.3 V (3.2 V-3.6 V)
Operating temperature range	-30°C to +85°C

Figure 23 shows the main components on Embedded Artists' 1ZM M.2 module.

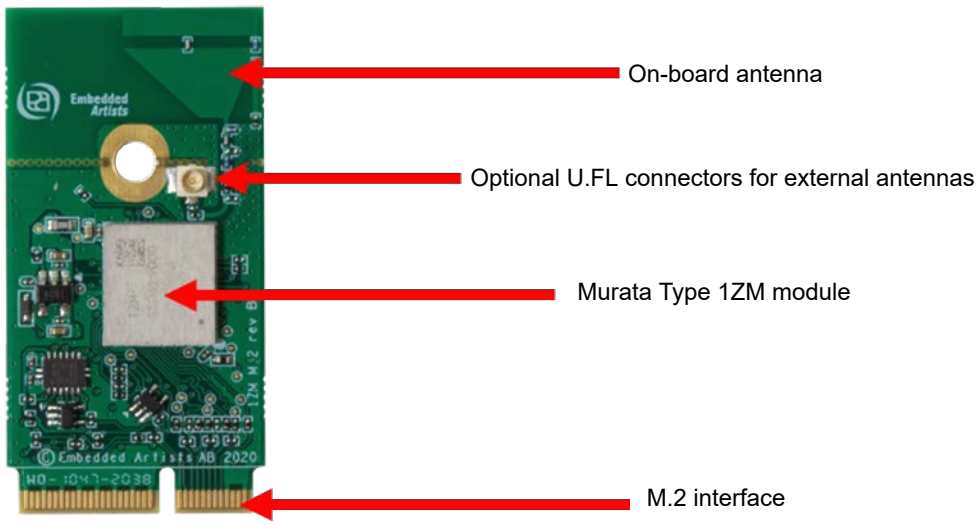

Figure 23. Embedded Artists' 1ZM M.2 module

3.2.3.1 Connecting Embedded Artists' (Murata) 1ZM M.2 module to i.MX RT1050 EVK using Murata's uSD-M.2 adapter

Embedded Artists' M.2 module can be connected to i.MX RT1050 EVK (or any other EVK with a microSD or full-size SD slot) using Murata's uSD-M.2 adapter. Figure 24 shows the connection scheme.

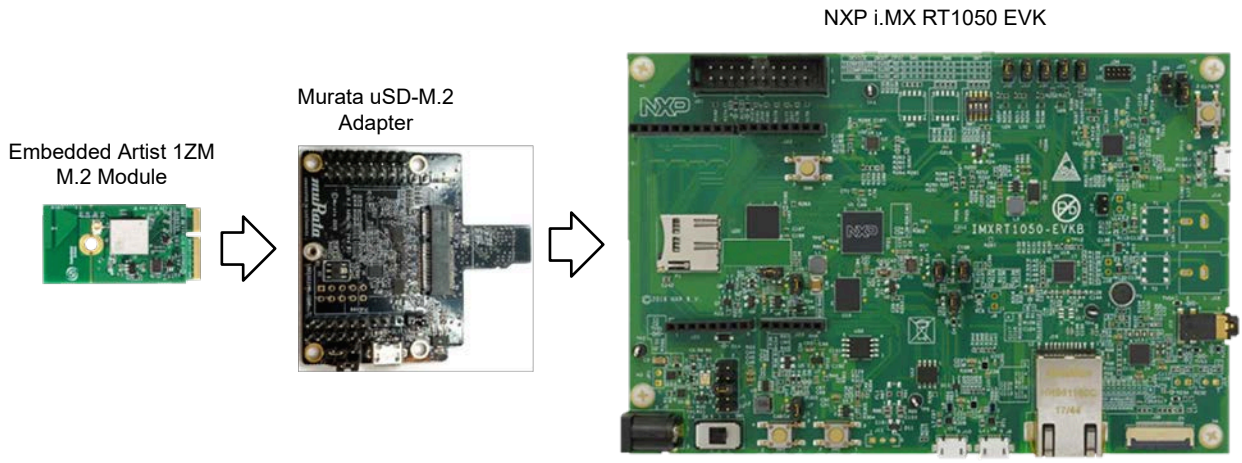

Figure 24. Connecting Embedded Artists' 1ZM M.2 module to i.MX RT1050 EVK

The Murata uSD-M.2 adapter provides the following interfaces to host MCU/MPU:

- microSD (uSD) interface for Wi-Fi-SDIO (SD is an option with microSD-SD adapter)
- Arduino headers for Bluetooth UART, Bluetooth PCM and Wi-Fi/Bluetooth control signals
- Optional power, debug, and clocking signals connect through Arduino header or Micro-AB USB connector

For details of the uSD-M.2 adapter, see ref.[21] or ref.[22].

For EVKs with M.2 slots like NXP i.MX RT1160 or RT1170, the Murata M.2 EVB can be directly connected.

3.2.3.2 About Bluetooth host and audio interfaces

For Bluetooth, the communication between the Host stack and the Link Layer (LL) is implemented via the standard HCI UART host interface and PCM interface for voice.

To enable the Bluetooth UART and PCM interfaces, some rework is required. See ref.[12].

3.2.4 u-blox JODY-W2 module

The JODY-W2 series are compact modules based on NXP 88W8987 wireless device for automotive. The JODY-W2 modules comply with AEC-Q100 automotive grade, and enable Wi-Fi, Bluetooth, and Bluetooth Low Energy (LE) communication. These modules are ideal for automotive and industrial applications. For more details, see ref.[7].

Table 14. u-blox JODY-W2 module features

Feature	Description
Wi-Fi chipset	NXP 88W8987
Wi-Fi standard	Wi-Fi 5, IEEE 802.11 a/b/g/n/ac (2.4 GHz and 5 GHz) Bluetooth 5.2
Antenna	Antenna pin 1: 2.4 GHz and 5 GHz Wi-Fi Antenna pin 2: 2.4 GHz Bluetooth
Host interfaces	Wi-Fi: SDIO Bluetooth: UART
Operating temperature range	-40°C to +105°C (JODY-W263-01A)

3.2.4.1 u-blox EVK-JODY-W2 evaluation board

The EVK-JODY-W2 evaluation board includes NXP 88W8987-based JODY-W2 module. An external host processor can access the module via SDIO and UART communication. The EVK provides internal antennas and SMA connectors for external antennas. All the module interfaces are externally available via connectors or pin headers.

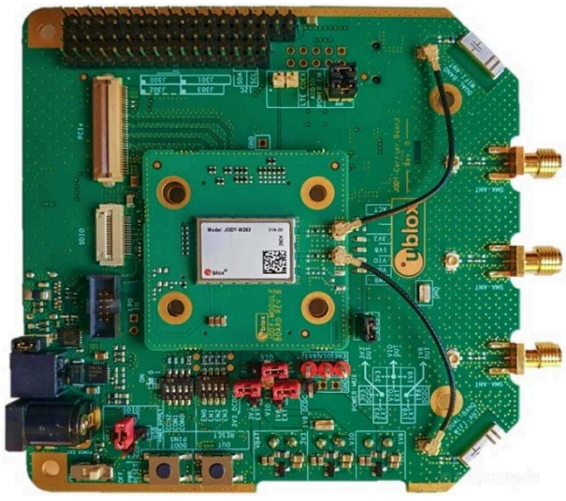

Figure 25. u-blox EVK-JODY-W2 evaluation board

3.2.4.2 Connecting u-blox EVK-JODY-W2 to i.MX RT1060 EVK board using uSD

To connect u-blox EVK-JODY-W2 to i.MX RT1060 EVK board:

- Use the included SD card adapter to connect EVK-JODY-W2 to i.MX RT1060 EVK board

Figure 26. u-blox EVK-JODY-W2 connected to i.MX RT1060 EVK using uSD interface

- Use a Micro USB to USB cable to connect i.MX RT1060 EVK board to a host computer running Windows, Linux or Mac OS

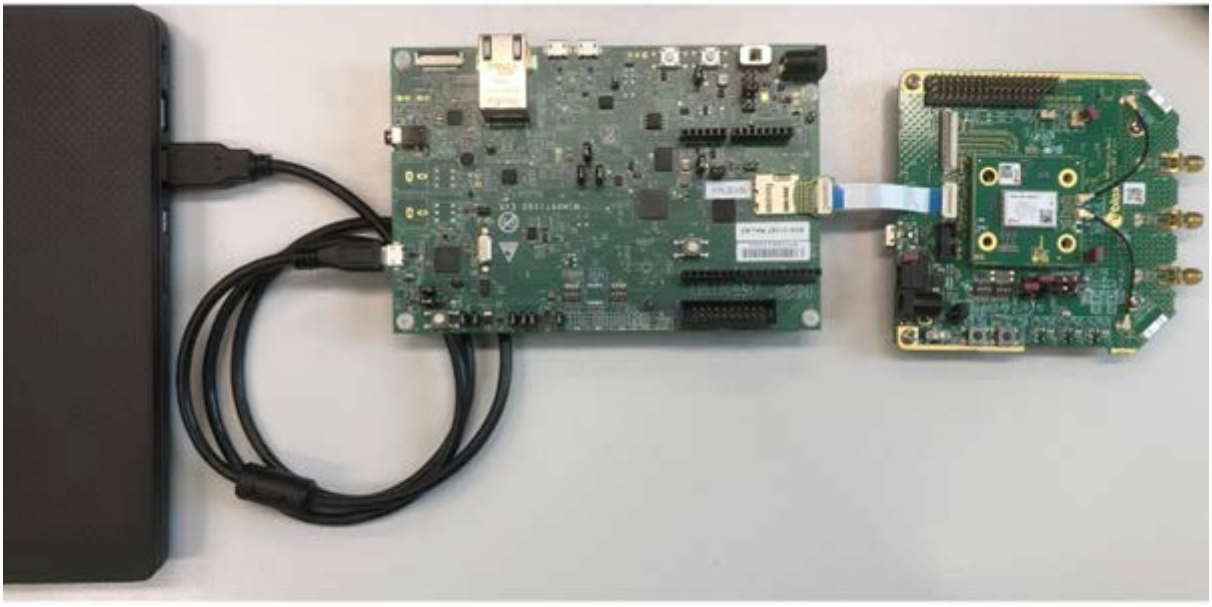

Figure 27. i.MX RT1060 EVK board connection to the host computer for power supply and console access

3.3 IW612-based wireless modules

This section provides information about one IW612-based module: details about the evaluation board, jumper configuration, and how to connect the module to an i.MX RT EVK board.

3.3.1 Embedded Artists' (Murata) 2EL M.2 module

Type 2EL is a small module with high-performance based on NXP IW612 combo solution. The module supports:

- Wi-Fi 802.11a/b/g/n
- Bluetooth 5.3 BR/EDR/LE
- IEEE 802.15.4 up to 601 Mbps PHY data rate on Wi-Fi
- 3 Mbps PHY data rate on Bluetooth

The Wi-Fi section supports SDIO 3.0 interface. The Bluetooth section supports high-speed 4-wire UART interface (optional support for SDIO) and PCM for audio data.

The IW612 implements sophisticated enhanced collaborative coexistence hardware mechanisms and algorithms, which ensure that Wi-Fi and Bluetooth collaboration is optimized for maximum performance. In IEEE 802.11n mode, the Wi-Fi operation supports rates of MCS0 – MCS11 in 20 MHz and 40 MHz channels for data rate up to 150 Mbps. Type 2EL module is packaged in an impressively small form factor that facilitates integration into size- and power-sensitive applications such as IoT applications, hand-held wireless system, gateway and more.

Embedded Artists collaborated with Murata on designing/validating their type 2EL M.2 module. For more details about the module, see ref.[6]. And for details on the M.2 module, see ref.[14].

Figure 28 shows the main components on Embedded Artists' 2EL M.2 module.

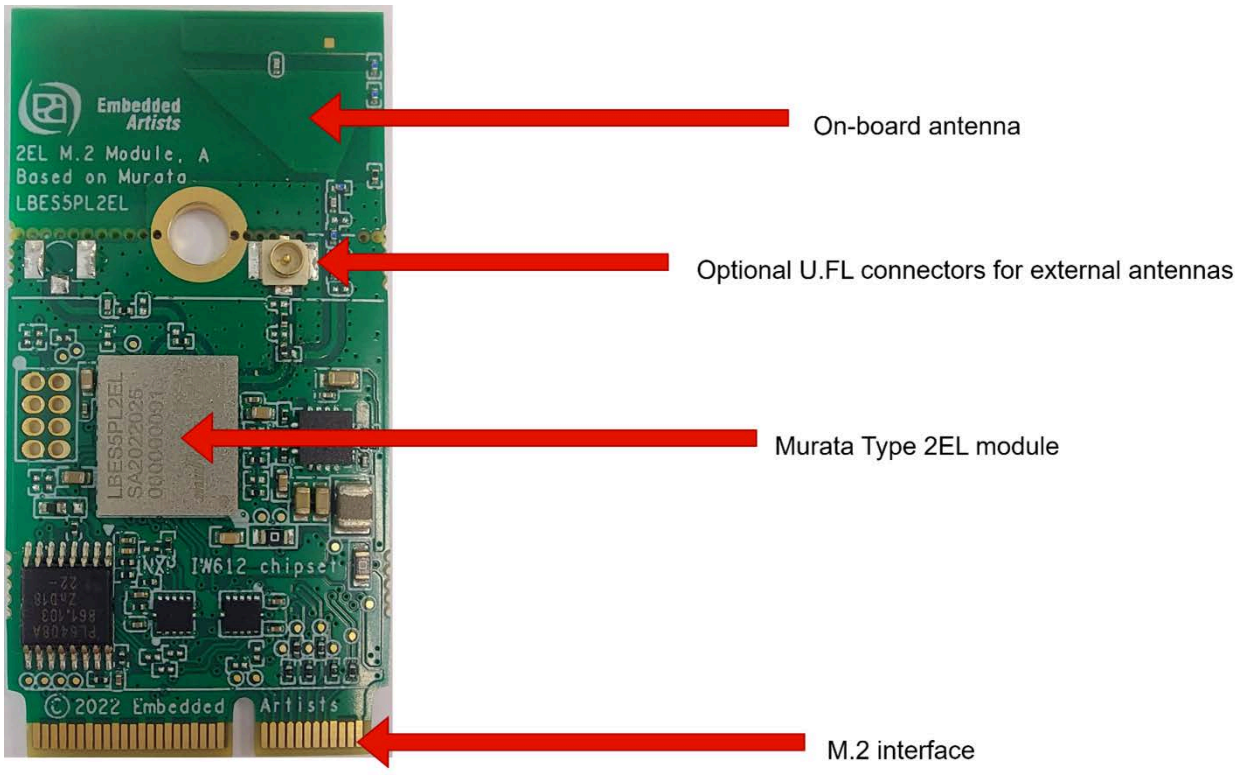

Figure 28. Embedded Artists' 2EL M.2 module

Table 15. Embedded Artists' 2EL M.2 module features

Feature	Description
Wi-Fi and Bluetooth chipset	NXP IW612
Module name	Murata Type 2EL M.2
Module interface	M.2 (Type 2230-D5-E) M.2 (Type 2230-D5-E) / microSD (via the Murata uSD-M.2 adapter)
Antenna	PCB trace antenna or U.FL connected patch antenna
Wi-Fi standard	Wi-Fi 6, 802.11a/b/g/n/ac/ax SISO
Frequency	2.4 GHz and 5 GHz
Network	uAP and STA dual mode
Measurement	22x30 mm without trace antenna, 22x44 mm with trace antenna
Supply voltage	3.3 V (3.0 V-3.6 V)
Operating temperature range	-40°C to +85°C

3.3.1.1 Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1170 EVKB

Embedded Artists' M.2 module can be connected to i.MX RT1170 EVKB (or any other EVK with a microSD or full-size SD slot). Figure 29 shows the connection scheme.

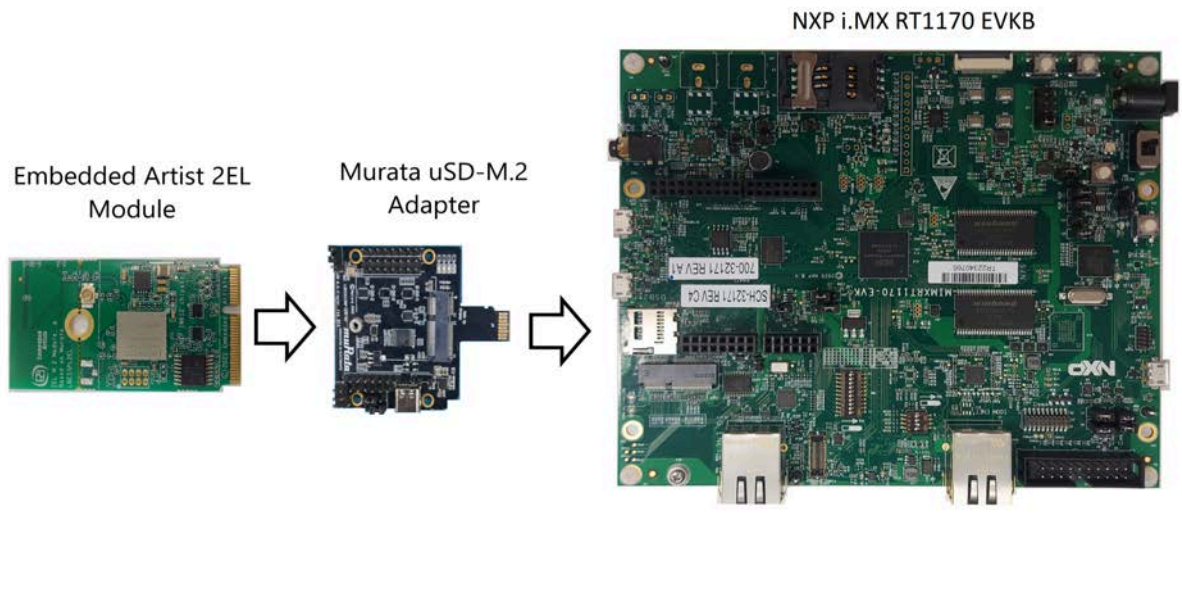

Figure 29. Embedded Artists' 2EL M.2 module connected to i.MX RT1170 EVKB

The Murata uSD-M.2 adapter provides the following interfaces to host MCU/MPU:

- microSD (uSD) interface for Wi-Fi-SDIO (SD is an option with microSD-SD adapter)
- Arduino headers for Bluetooth UART, Bluetooth PCM and Wi-Fi/Bluetooth control signals
- Optional power, debug, and clocking signals connect through Arduino header or Micro-AB USB connector

For details of the uSD-M.2 adapter, see ref.[21] or ref.[22].

Note: *Wi-Fi and Bluetooth operations can be validated by connecting the module directly to the M.2 slot of the i.MX RT board. For the 802.15.4 operations only, Murata uSD adapter is required.*

3.3.1.2 Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1060 EVKC

Embedded Artists' M.2 module can be connected to i.MX RT1060 EVKC direct on the M.2 slot. Figure 30 shows the connection scheme.

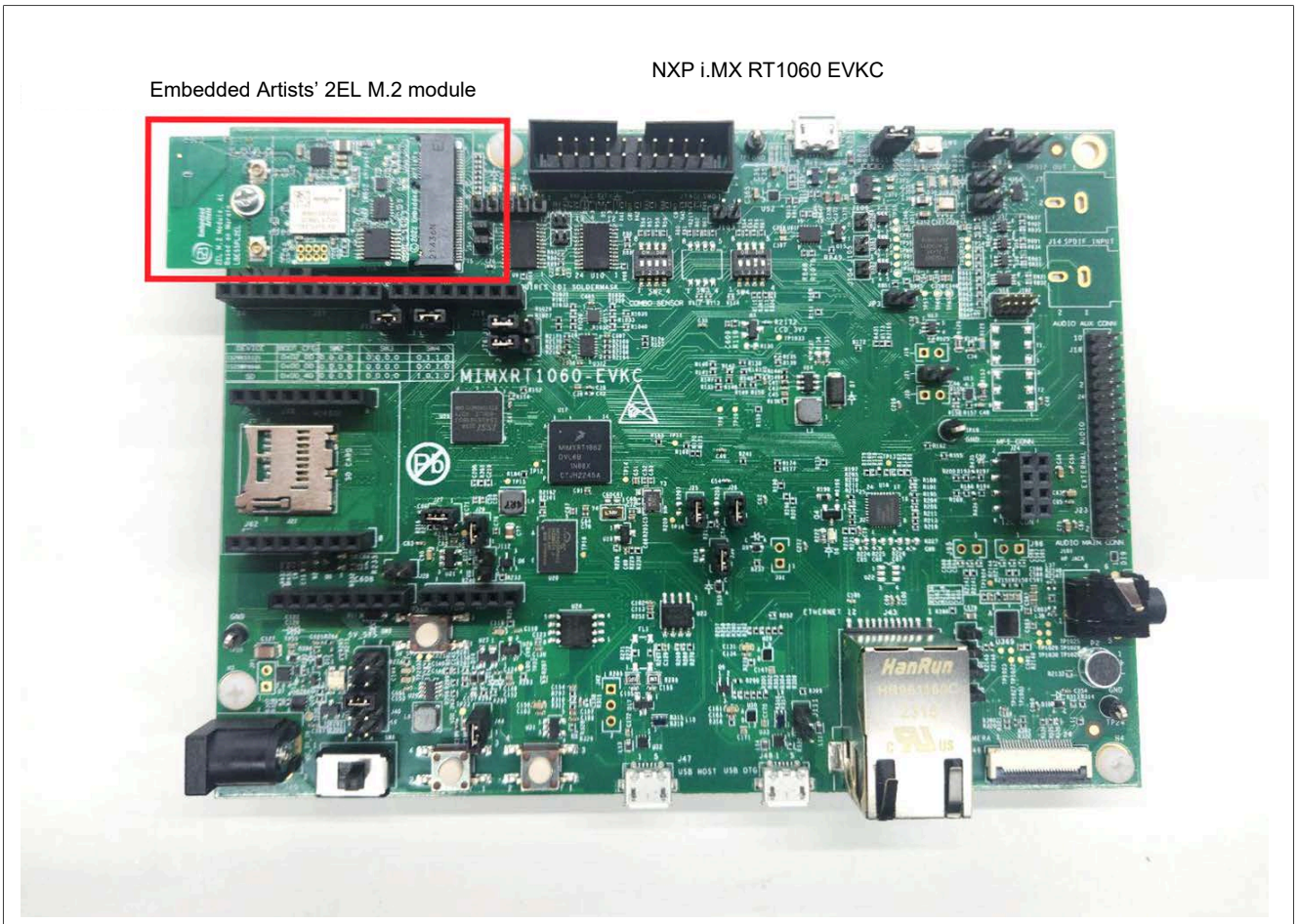

Figure 30. Embedded Artists' 2EL M.2 module connected to i.MX RT1060 EVKC

Note: *USB power supply of i.MX RT1060 EVKC is not sufficient for Murata 2EL module. Power up the i.MX RT1060 EVK with an external power supply:*

- *Connect the external power supply to J45.*
- *set J40: 1-2 and turn on SW6.*

3.3.1.3 About Bluetooth host and audio interfaces

For Bluetooth, the communication between the Host stack and the Link Layer (LL) is implemented via the standard HCI UART host interface and PCM interface for voice.

To enable the Bluetooth UART and PCM interfaces, some rework is required. See ref.[12].

3.3.1.4 Module limitations for the 802.15.4 SPI interface

The 802.15.4 subsystem is only supported on NXP IW612-based modules with Murata uSD adapters.

Note: *Murata uSD adapters version LBEE0ZZ2WE-uSD-M2/LBEE0ZZ2WF-uSD-M2 and higher do not have any limitation.*

3.4 IW611-based wireless modules

This section provides information about one IW611-based module: details about the evaluation board, jumper configuration, and how to connect the module to an i.MX RT EVK board.

3.4.1 Embedded Artists' (Murata) 2DL M.2 module

The type 2DL M.2 is a small module with high-performance based on NXP IW611 combo solution. The module supports:

- Wi-Fi 6, 802.11a/b/g/n/ac/ax SISO
- Bluetooth 5.3 BR/EDR/LE
- 601 Mbps PHY data rate on Wi-Fi
- 3 Mbps PHY data rate on Bluetooth

The Wi-Fi subsystem supports SDIO 3.0 interface. The Bluetooth subsystem supports high-speed 4-wire UART interface (optional support for SDIO) and PCM for audio data.

The IW611 implements sophisticated enhanced collaborative coexistence hardware mechanisms and algorithms, which ensure that Wi-Fi and Bluetooth operation is optimized for maximum performance. In IEEE 802.11n mode, the Wi-Fi operation supports rates of MCS0 – MCS11 in 20 MHz and 40 MHz channels for data rate up to 150 Mbps. Type 2DL module is packaged in a small form factor that facilitates integration into size- and power-sensitive applications such as IoT applications, hand-held wireless system, gateway, and more.

Embedded Artists collaborated with Murata on designing/validating their type 2DL M.2 module. For more details about the module, see ref.[23]. And for details on the M.2 module, see ref.[24].

Figure 31 shows the main components on Embedded Artists' 2DL M.2 module.

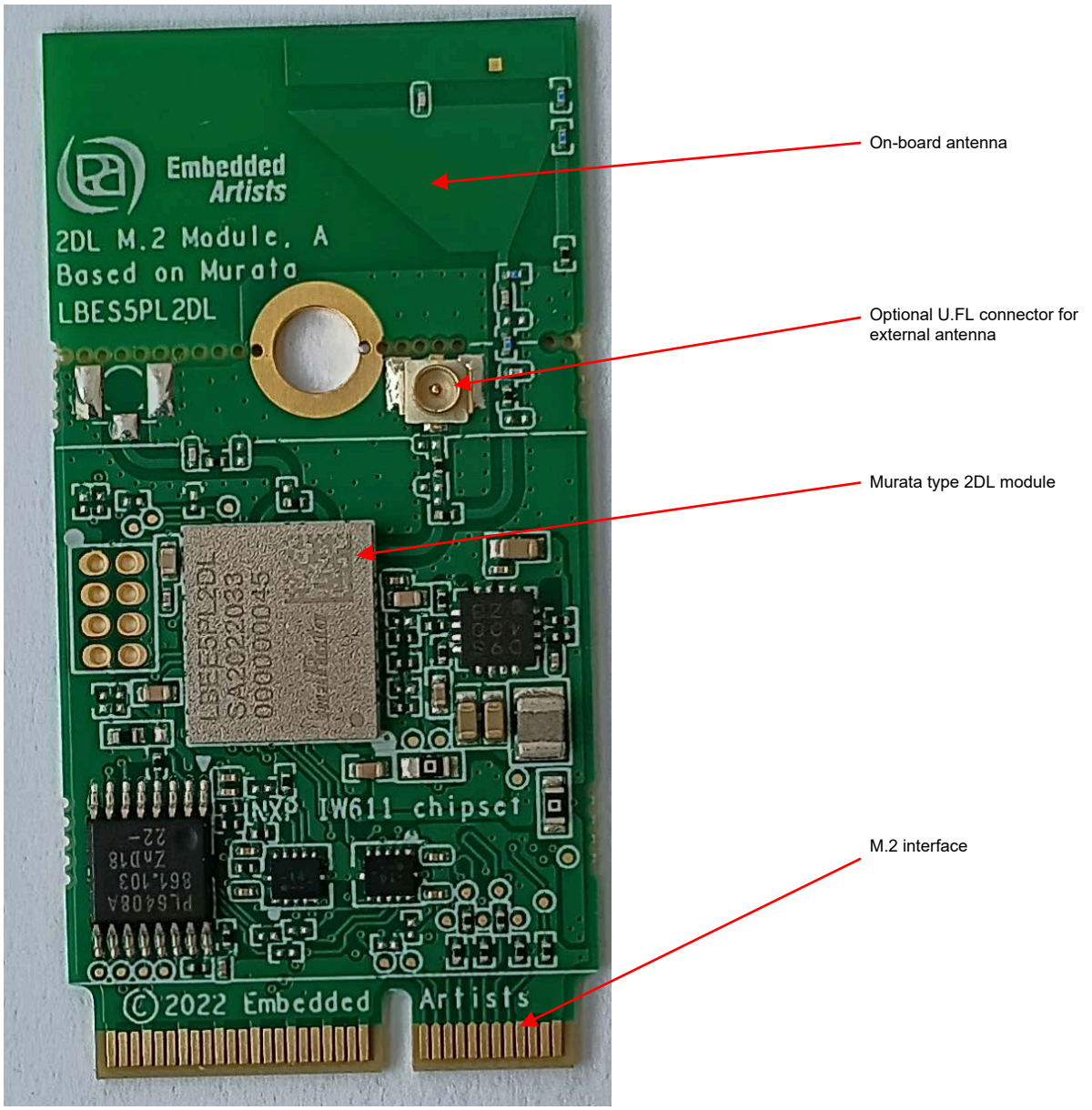

Figure 31. Embedded Artists' 2DL M.2 module

Table 16. Embedded Artists' 2DL M.2 module features

Feature	Description
Wi-Fi and Bluetooth SoC	NXP IW611
Module name	Murata Type 2DL M.2
Module interface	M.2 (Type 2230-D5-E)
Antenna	PCB trace antenna or U.FL connected patch antenna
Wi-Fi standard	Wi-Fi 6, 802.11a/b/g/n/ac/ax SISO
Frequency	2.4 GHz and 5 GHz
Network	uAP and STA dual mode
Bluetooth / Bluetooth LE standard	Dual mode Bluetooth and Bluetooth LE - Bluetooth 5.3
Bluetooth / Bluetooth LE data rates	BR/EDR 3Mbit/s, Bluetooth LE 2Mbit/s via High-Speed UART
Key Bluetooth LE features	Bluetooth LE Long Range, Bluetooth LE Power Control, Isochronous channels for LE Audio
Measurement	22x30 mm without trace antenna, 22x44 mm with trace antenna
Supply voltage	3.3 V (3.0 V-3.6 V)
Operating temperature range	-40°C to +85°C

3.4.1.1 Connecting Embedded Artists' (Murata) 2DL M.2 module to i.MX RT1060 EVKC

Embedded Artists' M.2 module can be connected to i.MX RT1060 EVKC on the M.2 slot. Figure 32 shows the connection scheme.

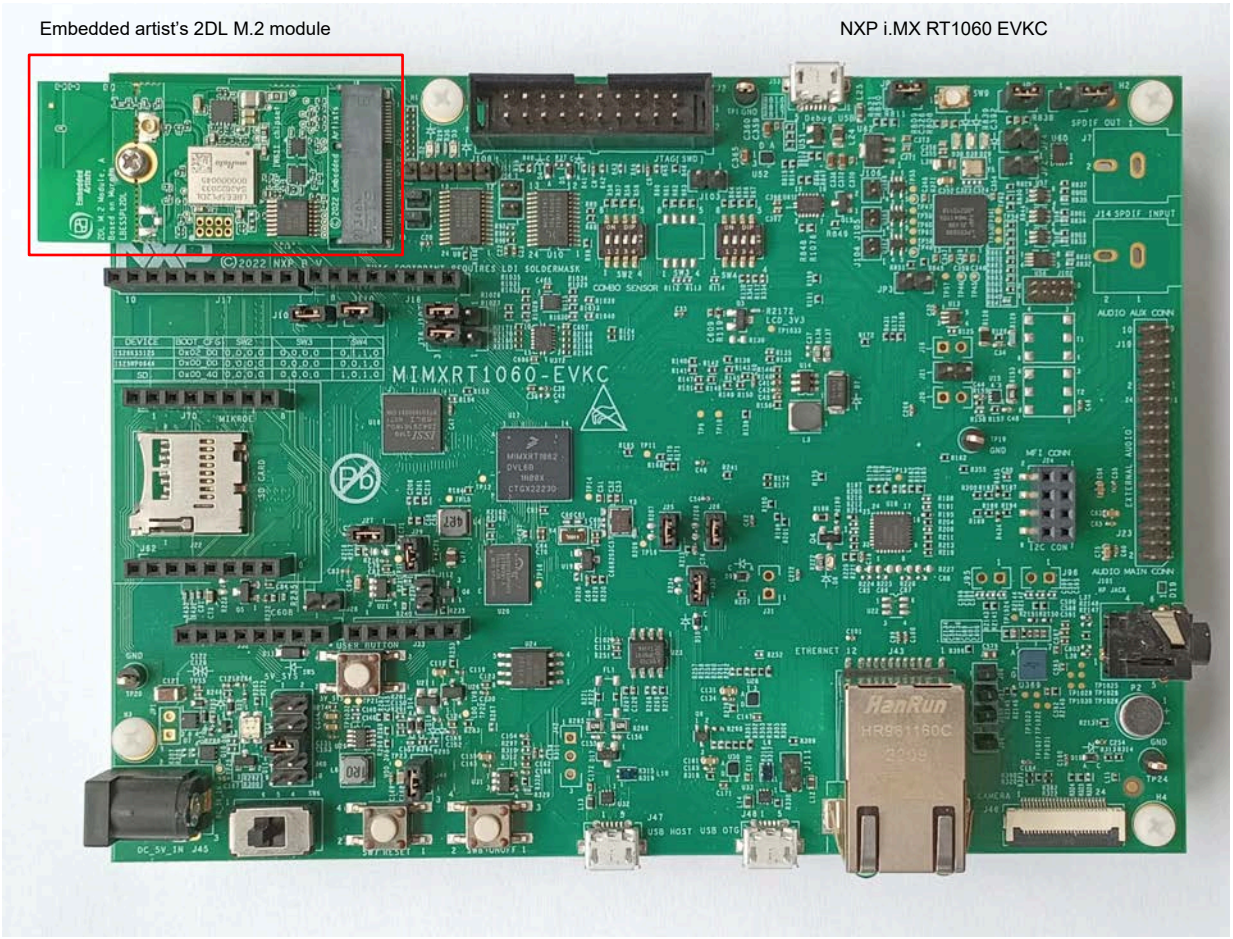

Figure 32. Embedded Artists' 2DL M.2 module connected to i.MX RT1060 EVKC

3.5 AW611-based wireless modules

This section provides information about one AW611-based module: details about the evaluation board, jumper configuration, and how to connect the module to an i.MX RT EVK board.

3.5.1 u-blox JODY-W5 module

The JODY-W5 series are compact modules based on NXP AW611 wireless device for automotive. The JODY-W5 modules comply with AEC-Q104 automotive grade, and enable Wi-Fi, Bluetooth, and Bluetooth Low Energy (LE) communication. These modules are ideal for automotive and industrial applications. For more details, see ref.[8].

Note: *AW611 module operation is available only with i.MX RT1180 EVKA.*

Table 17. u-blox JODY-W5 M.2 module features

Feature	Description
Wi-Fi and Bluetooth chipset	NXP AW611
Module name	u-blox JODY-W5 module
Module interface	M.2 (Type 2230-D5-E)
Antenna	PCB trace antenna or U.FL connected patch antenna
Wi-Fi standard	Wi-Fi 6 (802.11ax), 802.11d/e/h/i/k/r/u/v/w/mc/az, 1X1 SISO
Frequency	2.4 GHz and 5 GHz
Wi-Fi Throughput	Up to 480 Mbit/s throughput via SDIO 3.0
Wi-Fi security	WPA3, WPA2, WAPI, AES
Network	uAP and STA dual mode
Bluetooth / Bluetooth LE standard	Dual mode Bluetooth and Bluetooth LE - Bluetooth 5.3
Bluetooth / Bluetooth LE data rates	BR/EDR 3Mbit/s, LE 2Mbit/s via High-Speed UART
Key Bluetooth LE features	LE Long Range, LE Power Control, Isochronous channels for LE Audio
Coexistence management	Internal (Wi-Fi / Bluetooth) and external via WCI-2 and PTA interfaces
Measurement	22x30 mm without trace antenna, 22x44 mm with trace antenna
Security features	Secure boot and secure OTP
Supply voltage	3.3 V (3.0 V-3.6 V)
Operating temperature range	-40°C to +85 / 105°C

Figure 33 shows the main components on u-blox JODY-W5 M.2 module.

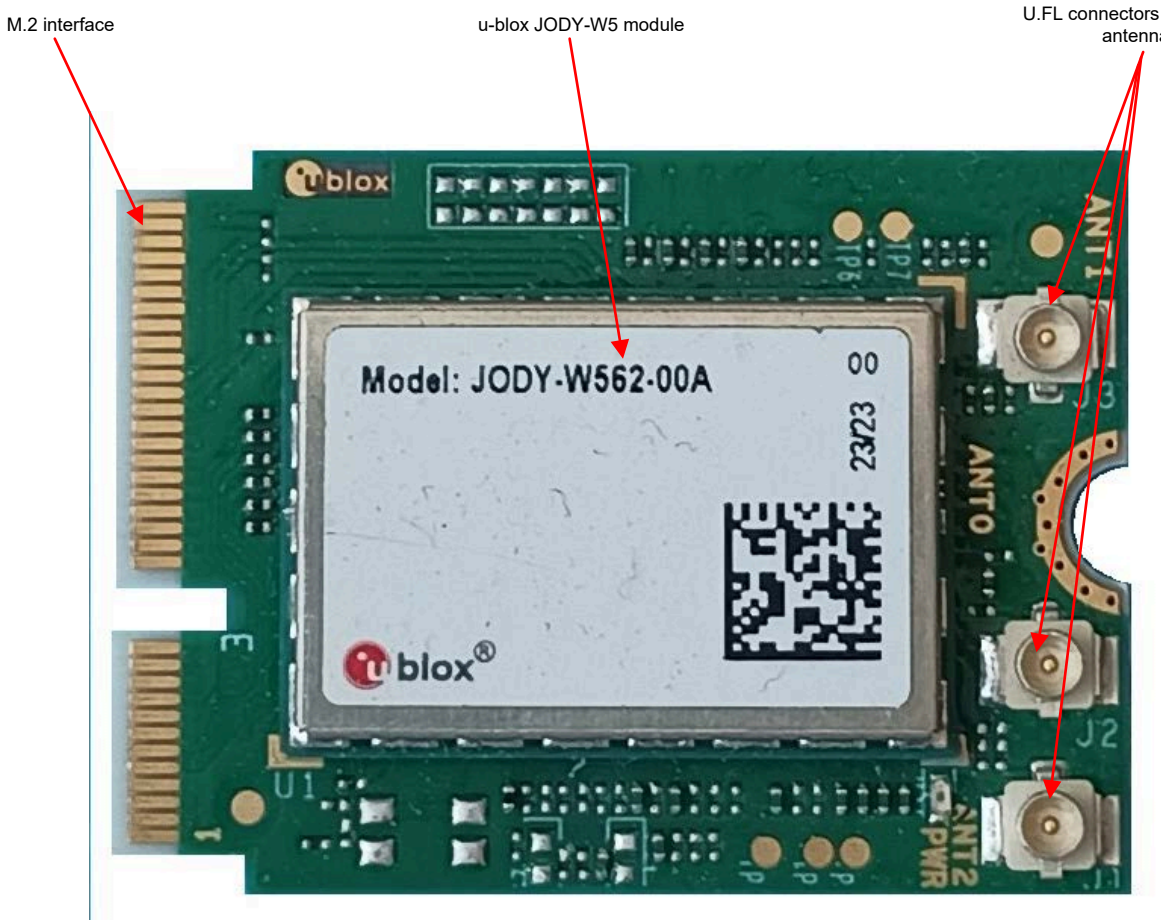

Figure 33. u-blox JODY-W5 M.2 module

3.5.1.1 Connecting u-blox JODY-W5 to i.MX RT1180 EVKA board

- Plug u-blox JODY-W5 adapter board into the M.2 slot of i.MX RT1180 EVKA board screw.
- Connect the antenna to the antenna slot of the u-blox JODY-W5 adapter board.

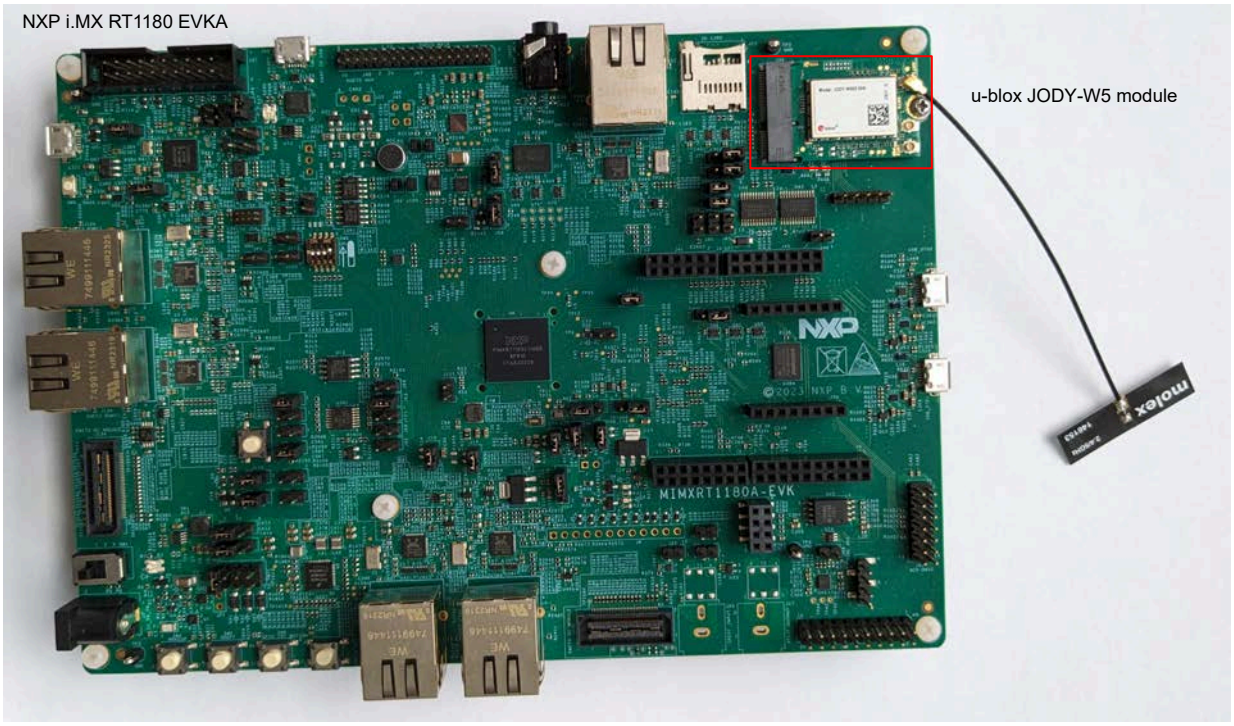

Figure 34. u-blox JODY-W5 M.2 module connected to i.MX RT1180 EVKA

3.6 IW610-based wireless modules

This section provides information about one IW610-based module: details about the evaluation board, and how to connect the module to an i.MX RT EVK board.

3.6.1 Embedded Artists' (Murata) 2LL M.2 module

The type 2LL is a small module with high performance based on NXP IW610 combo solution. The module supports:

- Wi-Fi 802.11a/b/g/n/ac/ax
- Bluetooth LE
- IEEE 802.15.4 up to 114.7 Mbps PHY data rate on Wi-Fi
- 2 Mbps PHY data rate on Bluetooth

The Wi-Fi section supports SDIO v3.0 DDR50 interface. The Bluetooth section supports high-speed 4-wire UART interface (optional support for SDIO) and PCM for audio data.

The IW610 implements coexistence hardware mechanisms and algorithms, which ensure that Wi-Fi, Bluetooth and 802.15.4 collaboration is optimized for maximum performance.

In IEEE 802.11ax mode, the Wi-Fi operation supports rates of MCS0 – MCS9 in 20 MHz for data rate.

The type 2LL module is packaged in a small form factor that facilitates integration into size- and power-sensitive applications such as IoT applications, hand-held wireless system, , and more.

Embedded Artists collaborated with Murata on designing/validating their type 2LL M.2 module.

Figure 35 shows the main components on Embedded Artists' 2LL M.2 module.

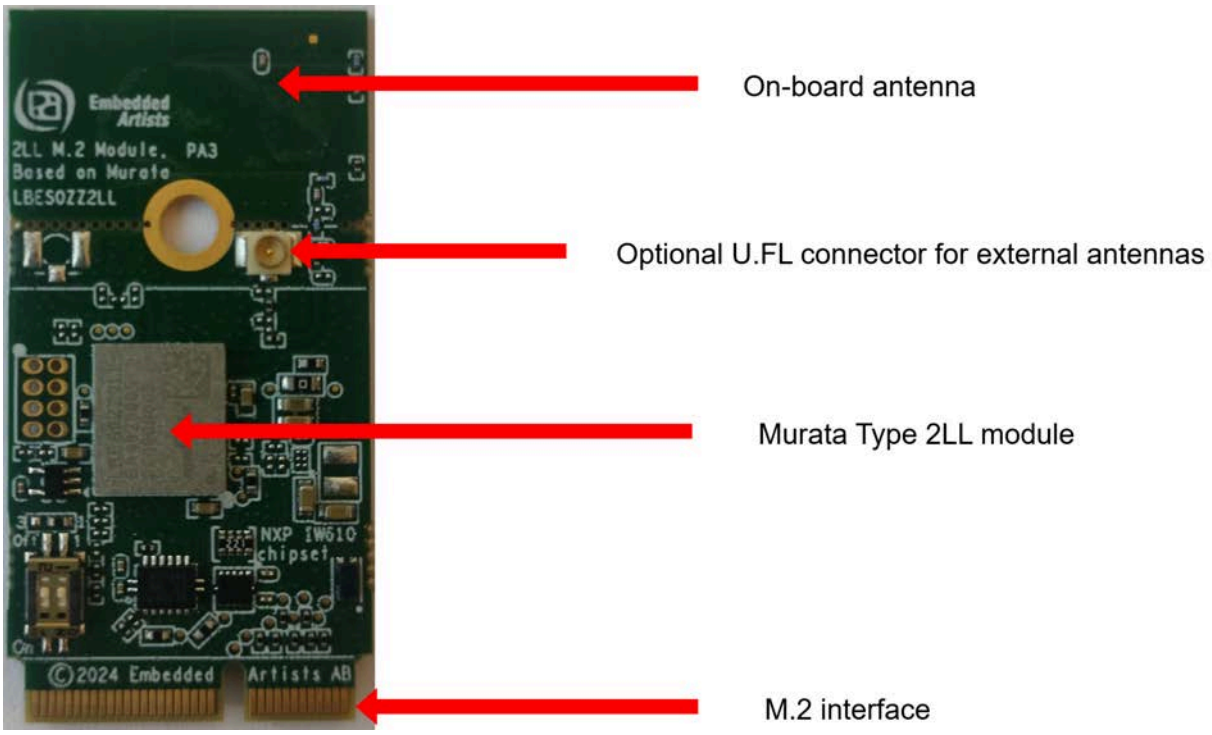

Figure 35. Embedded Artists' 2LL M.2 module

Table 18. Embedded Artists' 2LL M.2 module features

Feature	Description
Wi-Fi and Bluetooth SoC	NXP IW610G
Module name	Murata Type 2LL M.2
Module interface	M.2 (Type 2230-D5-E)
Antenna	PCB trace antenna or U.FL connected patch antenna
Wi-Fi standard	Wi-Fi 6, 802.11a/b/g/n/ac/ax SISO
Frequency	2.4 GHz and 5 GHz
Network	uAP and STA dual mode
Measurement	7.7 mm x 8.8 mm x 1.3 mm
Supply voltage	3.3 V (3.14V to 3.46V)
Operating temperature range	-40°C to +85°C

3.6.1.1 Connecting Embedded Artists' (Murata) 2LL M.2 module to i.MX RT1060 EVKC

Embedded Artists' M.2 module can be connected to i.MX RT1060 EVKC using the M.2 slot. Figure 36 shows the connection scheme.

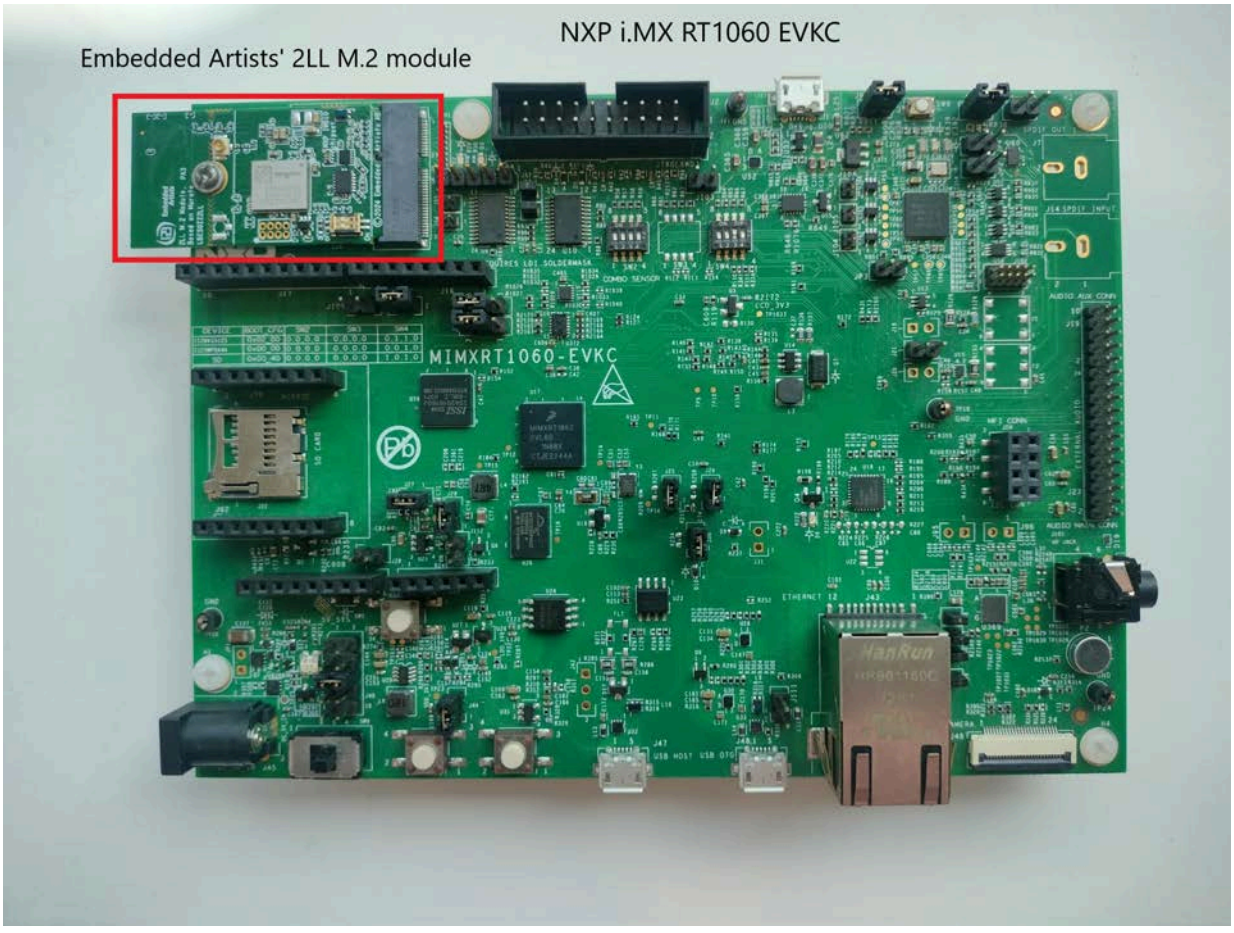

Figure 36. Embedded Artists' 2LL M.2 module connected to i.MX RT1060 EVKC

Note:

1. *USB power supply of i.MX RT1060 EVKC is not sufficient for Murata 2LL module. Power up the i.MX RT1060 EVKCx with an external power supply:*
   - *Connect the external power supply to J45.*
   - *Set J40: 1-2 and turn on SW6.*
2. *For any Wi-Fi initialization issue, connect J112 on i.MX RT1060 EVKC.*

4 Software download

This section provides guidance for MCUXpresso SDK download and for the serial console setup.

Note: *This section covers the download of MCUXpresso SDK and IDE. For the other IDEs and toolchains such as uVision Keil, Arm GNU toolchain, and IAR, see ref.[13].*

4.1 SDK download

The section presents the two ways to download MCUXpresso SDK.

4.1.1 MCUXpresso SDK download

- Go to MCUXpresso SDK Builder page on NXP website ref.[17].
- Click **Select Development Board**.

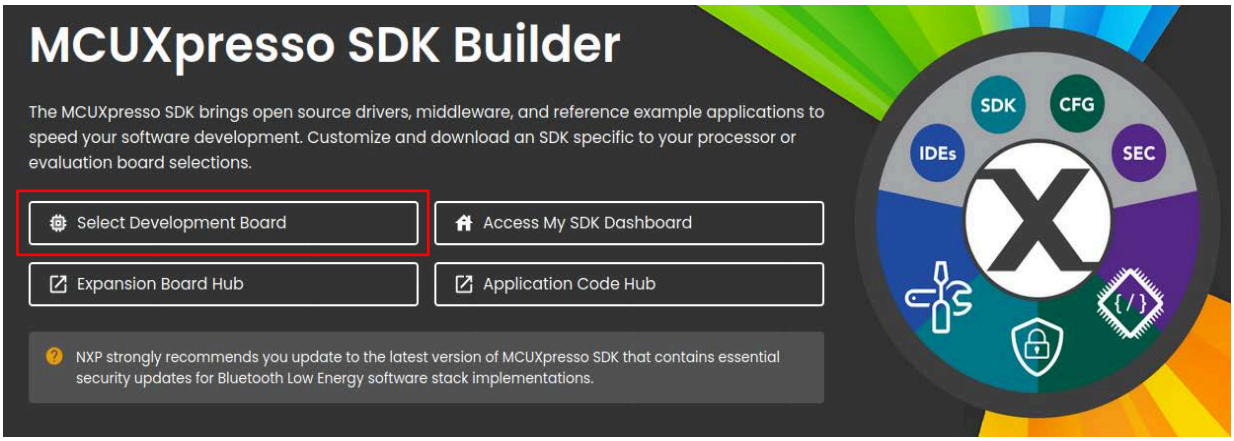

Figure 37. Select Development board

- Select the board and the latest SDK version.
- Click **Build SDK.**

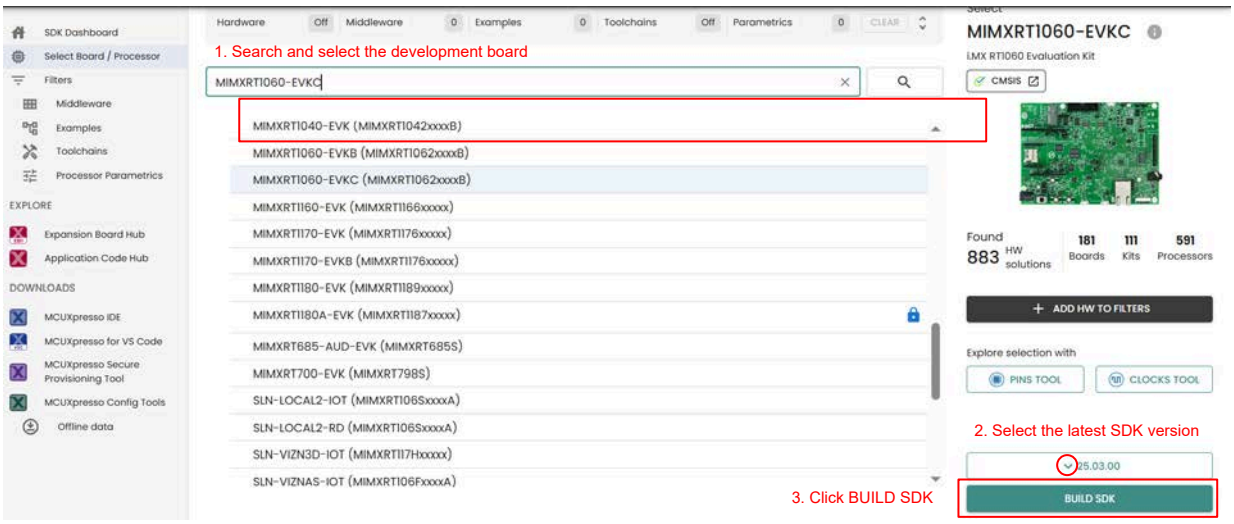

Figure 38. Select the board and latest SDK

- Select the Host OS and the Toolchain.
- Click **Build SDK**.

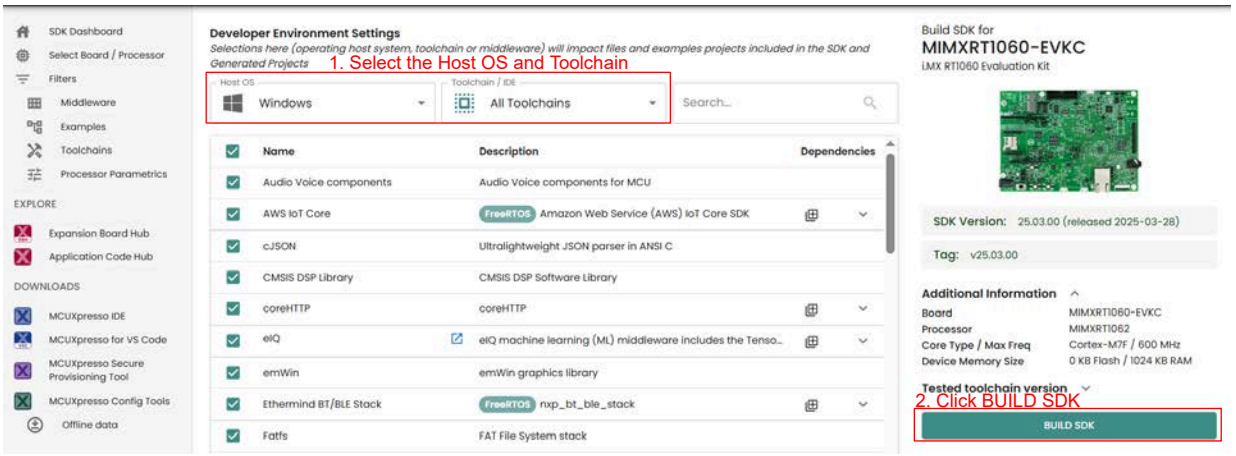

Figure 39. Figure Caption

- Check the content on MCUXpresso SDK Dashboard.
- Click **DOWNLOAD**.

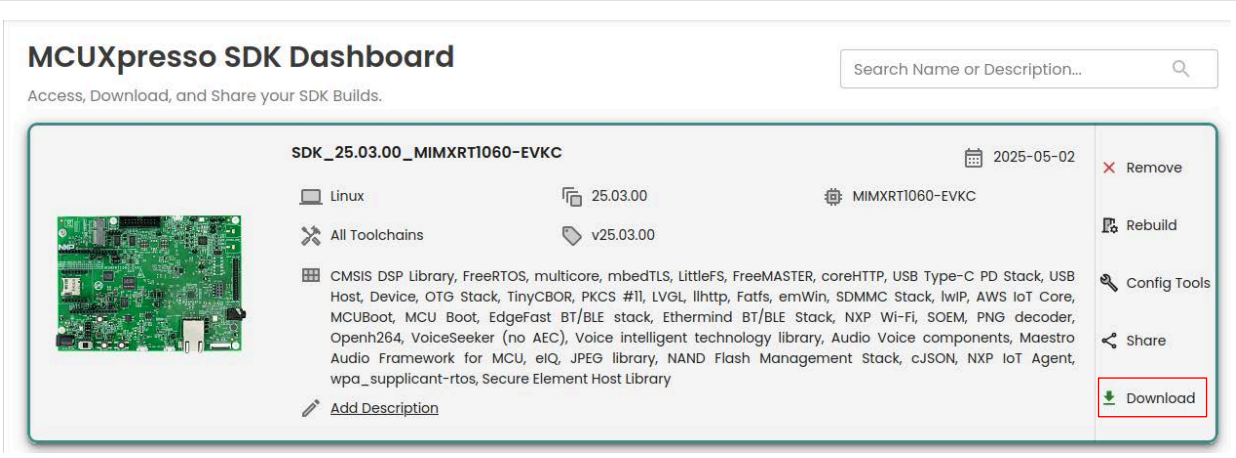

Figure 40. Download the SDK

- Read the terms and conditions.
- Click **AGREE**.

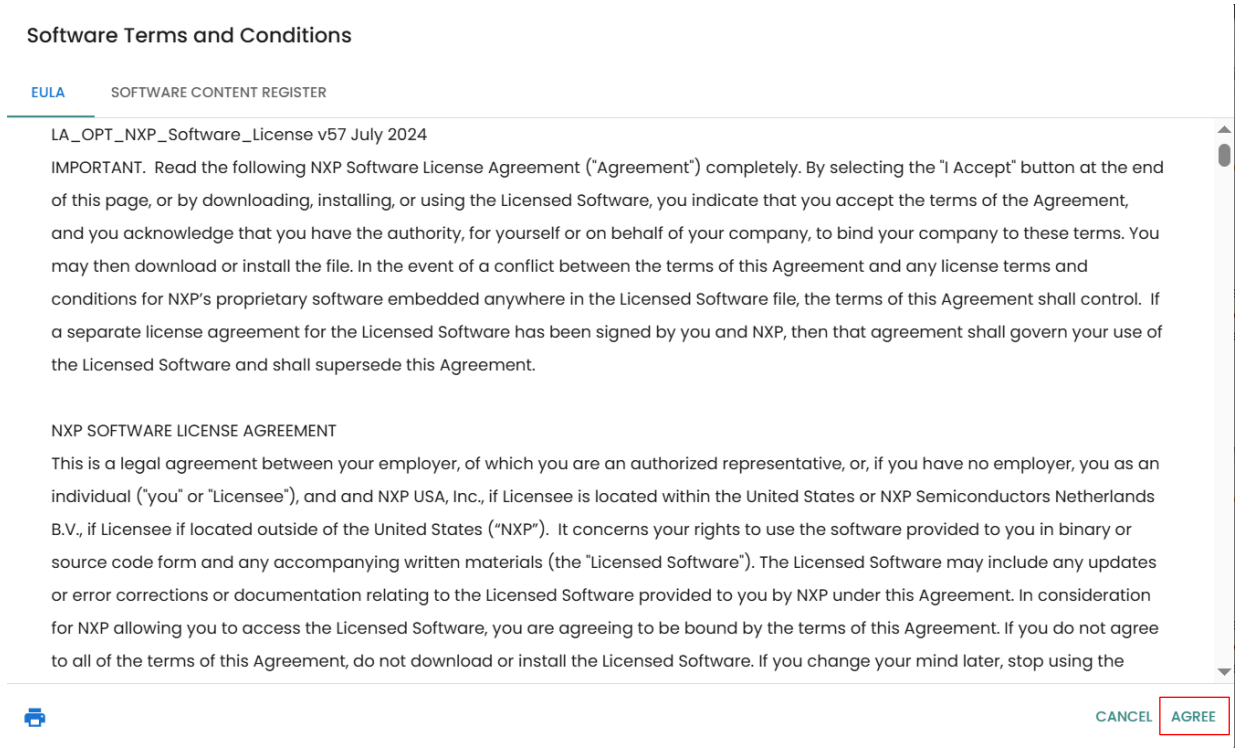

Figure 41. Terms and conditions

- Select the items to download.

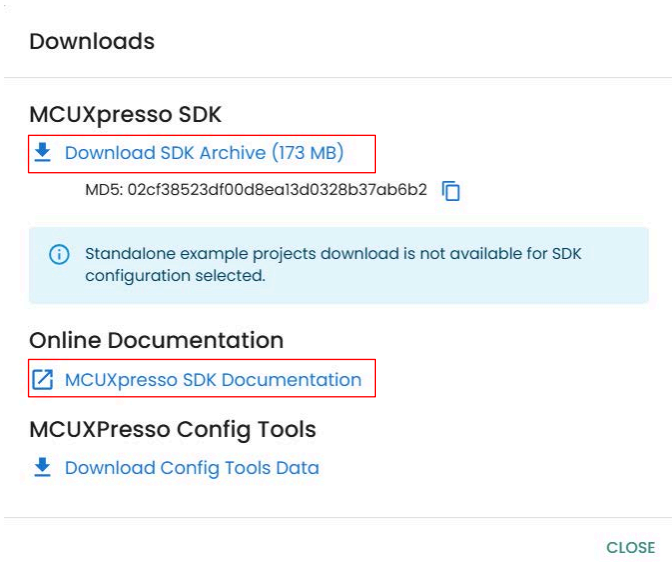

Figure 42. Download page

4.1.2 GitHub download

- Go to the GitHub NXP MCUXPresso project ref.[9].

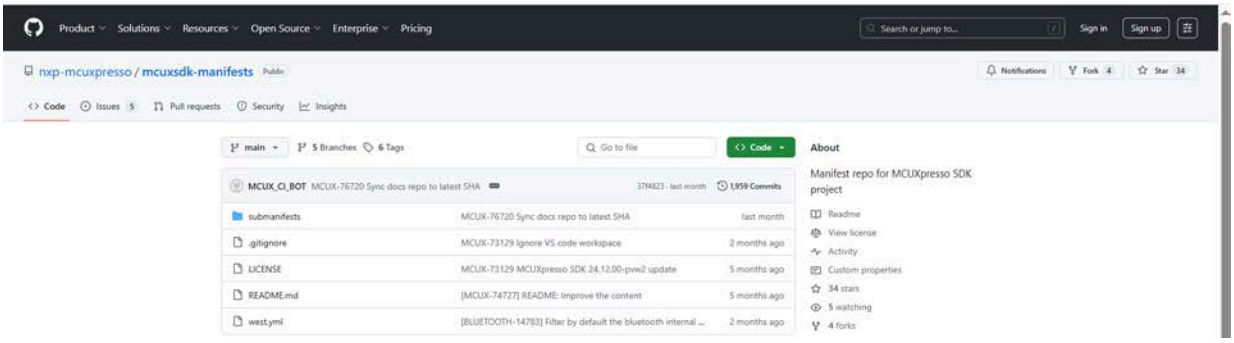

Figure 43. GitHub nxp-mcuxpresso

- Scroll down to the *README.md* file.

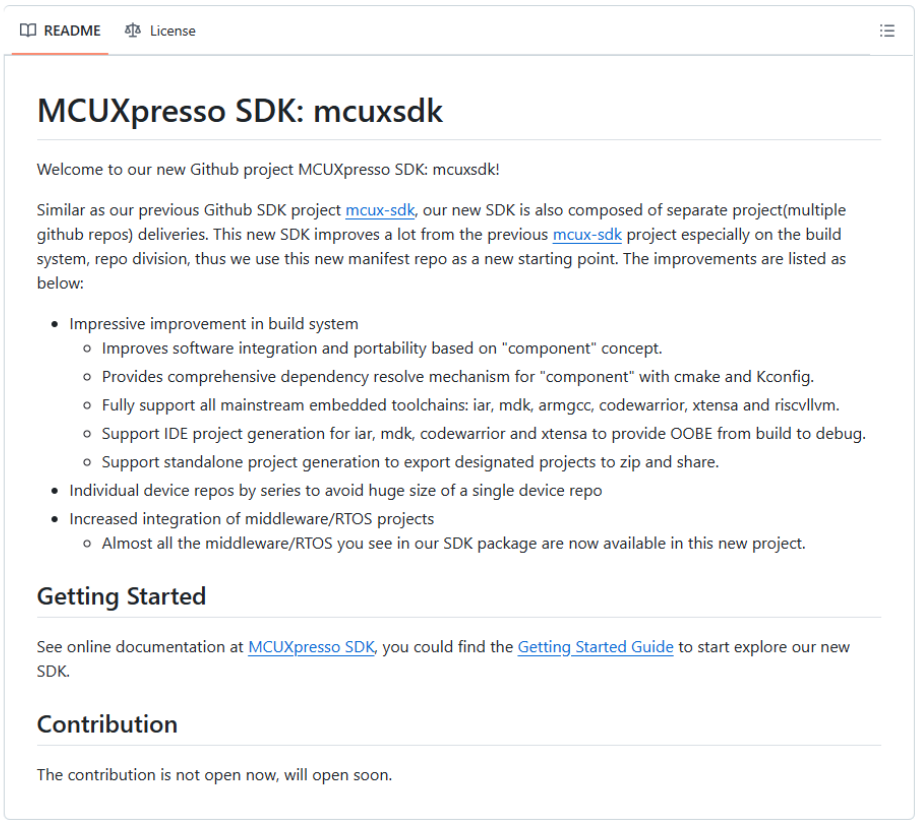

Figure 44. README overview on GitHub

- Follow the instructions in the README to "Clone/check-out a new delivery of whole SDK" or "Update existing west cloned SDK whole delivery".

4.2 Serial console tool setup

The serial console tool is used to read out the demo application logs on the computer connected to i.MX RT EVK board.

- Download and install the terminal emulator software such as Tera Term (Windows) or Minicom (Linux or Mac OS)
- Use a micro USB to USB cable to connect i.MX RT1060 EVKC board to the host computer running Windows, Linux, or Mac OS
- Open a terminal emulator program like Minicom or Tera Term, and configure the settings for serial console access

Command to access Minicom configuration menu:

```
# minicom -s
```

Settings for serial console access:

```
- /dev/ttyACMX serial port
- 115200 baud rate
- 8 data bits
- No parity
- One stop bit
- No flow control
```

Prior to running the Bluetooth demo application, update the serial console configuration so there is no extra spacing.

For Tera Term:

- Go to **Setup > Terminal**
- Look for the **New line** section
- Set the **Receive** to **Auto**

For Minicom:

- Press the **Ctrl** + **A** keys and then press the **Z** key to open the *Help* menu
- Press the **U** key to add a carriage return

4.3 IDE setup

- Go to MCUXpresso IDE page on NXP website
- Download MCUXpresso IDE
- Install MCUXpresso IDE on the host computer

5 i.MX RT product image setup

- Open the Getting started page ref.[15].
- Select the section **2.Build and Run Wi-Fi demo from the SDK** in the left navigation pane
- Click on the icon to play the video.

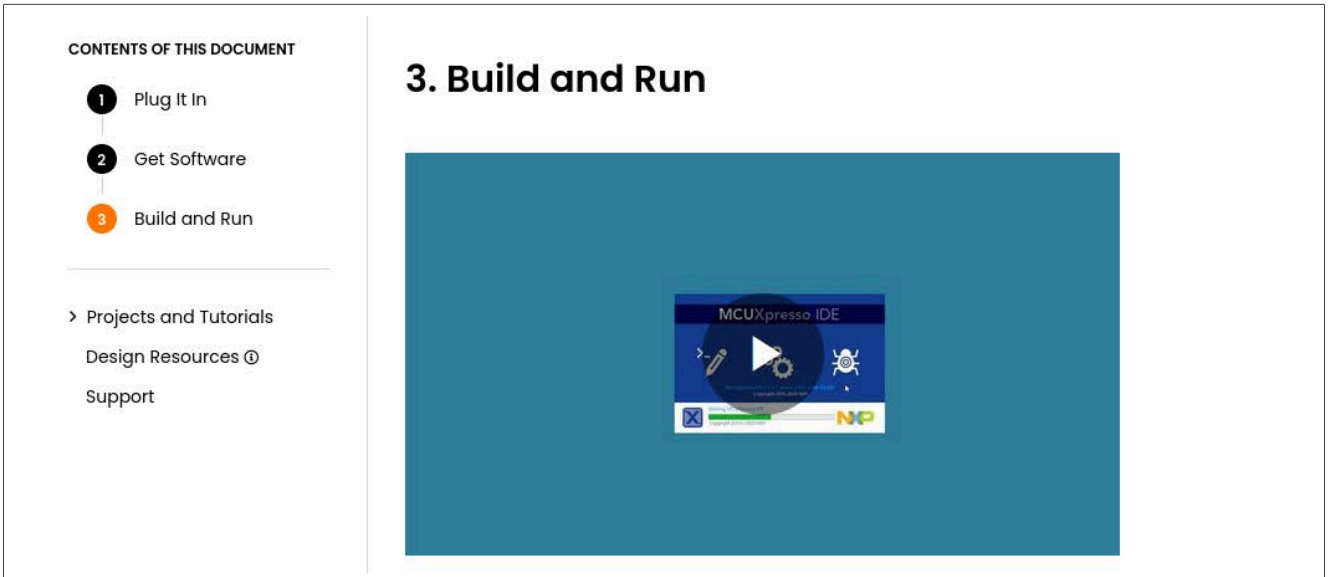

Figure 45. Build and run the Wi-Fi demo from the SDK

- Follow the instructions to install the SDK, import a project, build an image, and run an application in debug mode

6 Run a Wi-Fi demo application

Use the Wi-Fi example application available in the SDK to bring up the Wi-Fi interface.

Step 1 – Open the Getting started page ref.[15].

Step 2 – Select the section **2.Build and Run Wi-Fi demo from the SDK** in the left navigation pane.

Step 3 – Scroll down the page and click **BUILD AND RUN WIFI EXAMPLE** button to access the step-by-step procedure to build and run a Wi-Fi demo application.

Note: *The default application works on Murata 2EL module using the macro* `WIFI_IW612_BOARD_MURATA_2EL_M2`.

To enable the support for other modules:

- *Import the project.*
- *Go to project properties > C/C++ Build > Settings > Preprocessor (Figure 46).*
- *Select another macro.*

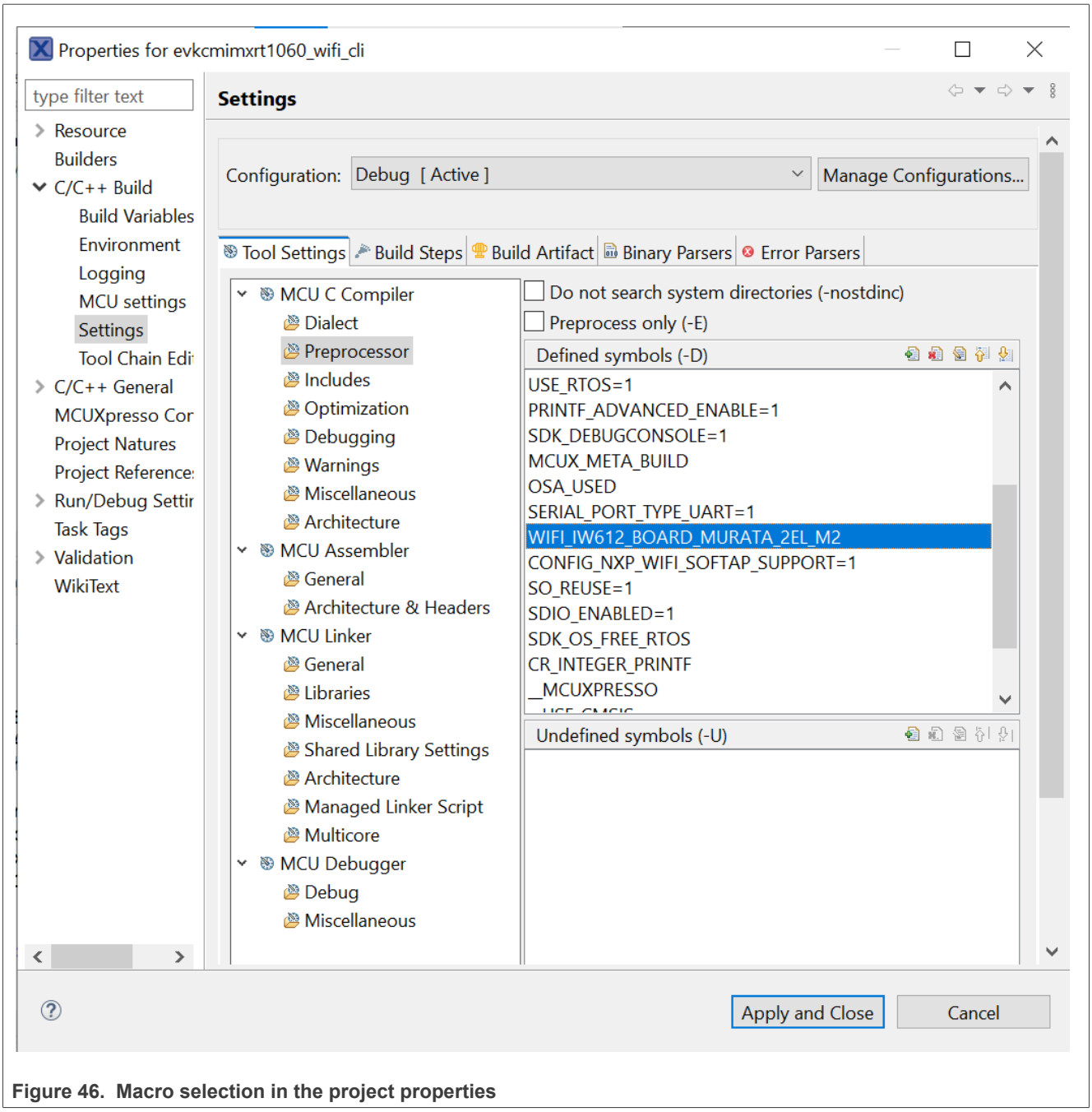

Figure 46. Macro selection in the project properties

Table 19. List of macros

Module	Wireless product	Macro[1]
AzureWave AW-AM457	IW416	WIFI_IW416_BOARD_AW_AM457_USD WIFI_IW416_BOARD_AW_AM457MA
AzureWave AW-CM358	88W8987	WIFI_88W8987_BOARD_AW_CM358_USD WIFI_88W8987_BOARD_AW_CM358MA
Murata Type 1XK	IW416	WIFI_IW416_BOARD_MURATA_1XK_USD WIFI_IW416_BOARD_MURATA_1XK_M2
Murata Type 1ZM	88W8987	WIFI_88W8987_BOARD_MURATA_1ZM_USD WIFI_88W8987_BOARD_MURATA_1ZM_M2
EVK-MAYA-W1	IW416	WIFI_IW416_BOARD_UBX_MAYA_W1_USD
EVK-JODY-W2	88W8987	WIFI_88W8987_BOARD_UBX_JODY_W2_USD
Murata Type 2EL	IW612	WIFI_IW612_BOARD_MURATA_2EL_M2
EVK-JODY-W5	AW611	WIFI_AW611_BOARD_UBX_JODY_W5_M2
Murata Type 2LL	IW610	WIFI_IW610_BOARD_MURATA_2LL_M2

[1] USD refers to microSD interface, and M2 refers to M.2 interface.

7 Run a Bluetooth/Bluetooth LE demo application

This section describes the steps to run *peripheral_ht* demo application. The application demonstrates the Bluetooth LE peripheral role, more specifically, it exposes the health thermometer (HT) GATT Service. Peer devices that subscribe to receive temperature indications get temperature readings every second. The temperature readings show values between 20°C and 25°C.

7.1 Demo start-up logs

Step 1 – Build and run *peripheral_ht* application.

Step 2 – Flash the image on i.MX RT EVK board.

Refer to Section 5 for guidance on how to build and run a demo application. Follow the steps with *peripheral_ht* application instead of *iperf* application.

Note: *The default application works on Murata 2EL module using the macro* `WIFI_IW612_BOARD_MURATA_2EL_M2`.

To enable the support for other modules:

- *Import the project.*
- *Go to project properties > C/C++ Build > Settings > Preprocessor (Figure 47).*
- *Select another macro.*

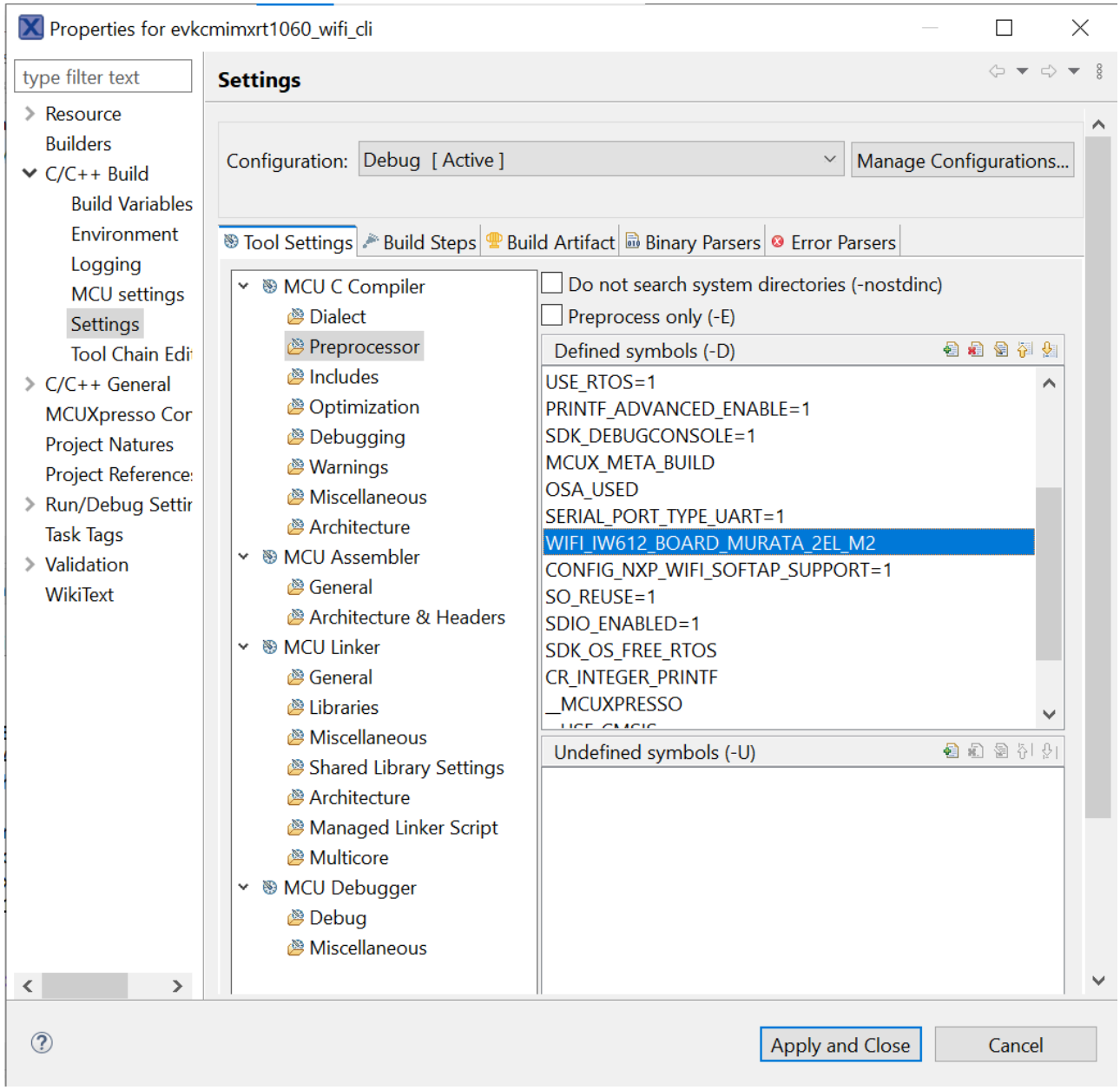

Figure 47. Macro selection in the project properties

Step 3 – Apply a power reset on i.MX RT EVK board.

Step 4 – Check the console on the connected computer screen to see the application start-up logs.

The demo application first loads the Wi-Fi and Bluetooth module firmware through the SDIO interface. Next, the application automatically sets the Bluetooth LE advertisement parameters and enables the advertisements for a sample Bluetooth LE service. The following logs can be observed once the i.MX RT EVK board and NXP-based wireless module are up and running.

```
Bluetooth initialized
Advertising successfully started
```

At this point, the stack is ready to accept incoming connections from any peer device.

Table 20. List of macros

Module	Wireless product	Macro[1]
AzureWave AW-AM457	IW416	WIFI_IW416_BOARD_AW_AM457_USD
AzureWave AW-AM510	IW416	WIFI_IW416_BOARD_AW_AM510_USD WIFI_IW416_BOARD_AW_AM510MA
AzureWave AW-CM358	88W8987	WIFI_88W8987_BOARD_AW_CM358_USD
Murata Type 1XK	IW416	WIFI_IW416_BOARD_MURATA_1XK_USD WIFI_IW416_BOARD_MURATA_1XK_M2
Murata Type 1ZM	88W8987	WIFI_88W8987_BOARD_MURATA_1ZM_USD WIFI_88W8987_BOARD_MURATA_1ZM_M2
Murata Type 2EL	IW612	WIFI_IW612_BOARD_MURATA_2EL_M2
u-blox EVK-JODY-W5	AW611	WIFI_AW611_BOARD_UBX_JODY_W5_M2
Murata Type 2LL	IW610	WIFI_IW610_BOARD_MURATA_2LL_M2

[1] USD refers to microSD interface, and M2 refers to M.2 interface.

7.2 Establishing a Bluetooth LE connection

This section describes the steps to establish a Bluetooth LE connection between a smartphone and NXP-based wireless module.

- **Install** and **launch** the *IoT Toolbox* application on the smartphone
- **Enable** the *Bluetooth and Location service* of the smartphone
- **Select** *Thermometer* to scan the available devices using the *Health Thermometer service*

Figure 48. IoT Toolbox application

- **Look for** *peripheral_ht* in *IoT Toolbox* application ref.[10]. From the application it is now be possible to connect to the device.
- Upon successful connection, temperature readings show on the smartphone.

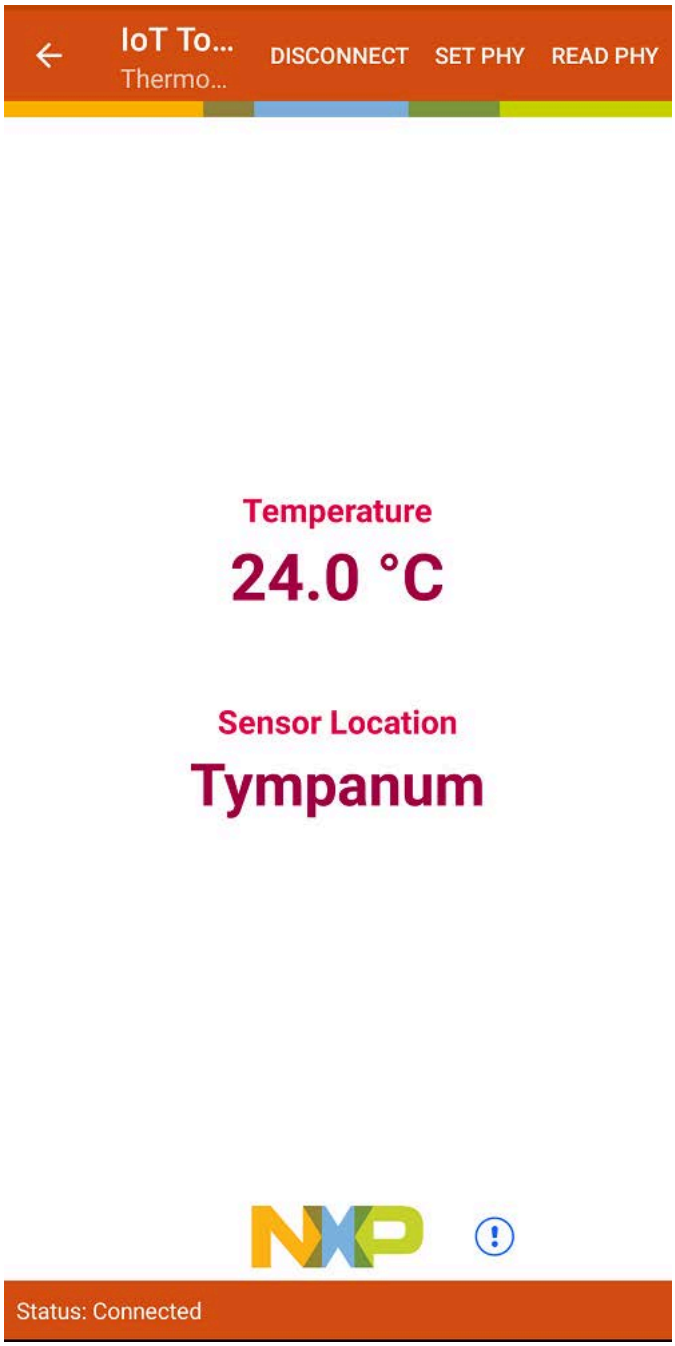

Figure 49. Temperature reading on phone screen

Note: *The SDK package includes other Bluetooth demo applications. See ref.[13].*

8 Run a 802.15.4 demo application

This section describes the steps to run 802.15.4 cli demo application on the RT1170 EVK.

Step 1 - Clone the OT-NXP source code

- Use the github link https://github.com/NXP/ot-nxp to clone the OT-NXP source.

Step 2 - Set up the tool-chain

- *SDK_2_10_1_MIMXRT1170-EVK_RFP_Linux.zip* or later version of the software package includes all the required tool-chain for i.MX RT1170. See ref.[11] to download the SDK.
- For OpenThread, go to *ot-nxp* directory

```
$ cd <path_to_ot-nxp>
```

Step 3 - Compile 802.15.4 demo

- Download and unzip *SDK_2_10_1_MIMXRT1170-EVK_RFP_Linux.zip* or a later version of the software package.

```
$ unzip SDK_2_10_1_MIMXRT1170-EVK_RFP_Linux.zip
```

- Use `cd` command to go to *ot-nxp* directory and compile the code

```
$ cd SDK_2_10_1_MIMXRT1170-EVK_RFP_Linux/<path_to_ot-nxp>
$ export NXP_RT1170_SDK_ROOT=<patch_to_ SDK_2_10_1_MIMXRT1170-
EVK_RFP_Linux.zip_decompress_folder>
$ ./script/build_rt1170
```

The binary image *ot-cli-rt1170* for i.MX RT1170 is created in *ot-nxp/build_rt1170/iwx12_spi* directory.

Step 4 - Load the image onto i.MX RT1170 EVK board

- Set the switch SW1 on RT1170 (Table 3)
- Connect i.MX RT1170 EVK board to the host PC with the USB port.
  To check that the host PC recognizes the USB port, look for the USB port in Linux file manager GUI.
- For 802.15.4 demo, copy the binary image from *<path_to_ot-nxp>/build_rt1170/iwx12_spi/* directory into the directory with i.MX RT1170 USB location.
- Check the red LED close to the mini USB port on i.MX RT1170 EVK board. This LED should be blinking while the image is being copied.
- When the LED stops blinking, the USB port in the host laptop is unmounted and mounted automatically. (You can monitor this in GUI directory)
- Look at the content of *RT1170 USB* directory. If the directory includes the *fail.txt* file, it means that the image flashing process has failed.

Note: *For the demo to work, there must be a micro SD connection between RT1170 EVK and IW612 evaluation board.*

Step 5 - Check the output in the serial console

- When you have completed the steps above, you should see the following output in the serial console:

```
>
```

- Run the `help` command to get the list of `ot-cli` commands

```
> help
```

Command output example:

```
bufferinfo
ccathreshold
channel
child
childip
childmax
childsupervision
childtimeout
coap
commissioner
contextreusedelay
counters
dataset
delaytimermin
discover
dns
eidcache
eui64
extaddr
extpanid
factoryreset
```

Example using `scan` command:

```
> scan
```

Command output:

```
| J | Network Name | Extended PAN | PAN | MAC Address | Ch | dBm | LQI |
+---+------------------+------------------+------+------------------+----+-----+-----+
| 0 | | 0000000000000000 | 3334 | 00d02dfffefb75f5 |11 | -59 | 92 |
| 0 | | 0000000000000000 | 3334 | 00d02dfffefb75f5 |25 | -59 | 92 |
Done
```

Note: *Refer to the README for details on OpenThread commands.*

9 Abbreviations

Table 21. Abbreviations

Terms	Definition
AP	Access point
DHCP	Dynamic host configuration protocol
DHCPD	DHCP daemon
EVB	Evaluation board
EVK	Evaluation kit
FW	Firmware
HCI	Host controller interface
HTS	Health thermometer service
I/O	Input/output
IDE	Integrated development environment
IP	Internet protocol
LE	Low energy
lwIP	Light weight IP
PCM	Pulse code modulation
SD	Secure digital
SDK	Software development kit
STA	Station/client
SW	Software
UART	Universal asynchronous receiver-transmitter
uSD	Micro SD
uSDHC	ultra-secured digital host controller
WLAN	Wireless local area network

10 References

[1] Data sheet – AzureWave – AW-CM358 – IEEE 802.11a/b/g/n/ac WLAN with Bluetooth 5 Combo Stamp Module With M.2 2230 adapter Board (link)

[2] Data sheet – AzureWave – AW-AM457 – IEEE 802.11 1X1 a/b/g/n Wireless LAN + Bluetooth 5.1 Combo LGA Module (link)

[3] Data sheet – Azurewave AW-AM510 IEEE 802.11 1X1 a/b/g/n Wireless LAN + Bluetooth 5.2 Combo 12 x 12 LGA Module(link)

[4] Data sheet – Murata – Type 1XK W-LAN+Bluetooth Combo Module Data Sheet (link)

[5] Data sheet – Murata – Type 1ZM W-LAN+Bluetooth Combo Module Data Sheet (link)

[6] Data sheet – Murata – LBES5PL2EL-923 – Type 2EL Wi-Fi + Bluetooth + 802.15.4 Tri-Radio Module Data Sheet NXP IW612 Chipset for 802.11a/b/g/n/ac/ax + Bluetooth 5.3 + IEEE 802.15.4 (link)

[7] Data sheet – u-blox – JODY-W2 series – Host-based multiradio modules with Wi-Fi 5 and Bluetooth 5.2 – Data sheet (link)

[8] Data sheet – u-blox – JODY-W5 series – Host-based multiradio modules with Wi-Fi 6 and Bluetooth 5.3 (link)

[9] GitHub – nxp-mcuxpresso/mcuxsdk-manifests (link)

[10] Mobile application – NXP – IoT Toolbox Android (IoT Toolbox on Google Play) (IoT Toolbox on the APP Store)

[11] User guide – Getting Started with MCUXpresso SDK (link)

[12] User guide – HWRGEFBTPA: Hardware Rework Guide for EdgeFast Bluetooth PAL (link)

[13] User manual – UM11442: NXP Wi-Fi and Bluetooth Demo Applications User Guide for i.MX RT Platforms (link)

[14] Webpage – Embedded Artists – EAR – 2EL M.2 module (link)

[15] Webpage – Getting Started with Wi-Fi on i.MX RT platforms (link)

[16] Webpage – i.MX RT Crossover MCUs (link)

[17] Webpage – MCUXpresso SDK Builder (link)

[18] Webpage – Embedded Artists – EAR00385 – 1XK M.2 Module (link)

[19] Webpage – Embedded Artists – EAR00364 – 1ZM M.2 Module (link)

[20] Webpage – Murata – LBEE0ZZ1WE-uSD-M2 – uSD-M.2 Adapter (link)

[21] Webpage – Murata – LBEE0ZZ2WE-uSD-M2 – uSD-M.2 Adapter (link)

[22] Webpage – Murata – LBEE0ZZ2WF-uSD-M2 – uSD-M.2 Adapter (link)

[23] Webpage – Murata – Type 2DL (link)

[24] Webpage – Embedded Artists – Type 2DL M2 module (link)

11 Contact information

Refer to the following links for more details on the products, and for queries or support.

- Web home page: nxp.com
- Web support: nxp.com/support
- NXP community: https://community.nxp.com/

12 Note about the source code in the document

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13 Revision history

Revision history

Rev	Date	Description
UM11441 v.21.0	16 September 2025	• Section 2.2 "i.MX RT products and NXP-based wireless modules": updated the footnote of Table 1. • Section 3.6.1.1 "Connecting Embedded Artists' (Murata) 2LL M.2 module to i.MX RT1060 EVKC": updated the last note.
UM11441 v.20.0	9 June 2025	• Removed the support for 88W8801-based modules. • Section 4.1.1 "MCUXpresso SDK download": updated. • Section 4.1.2 "GitHub download": updated. • Section 5 "i.MX RT product image setup": updated. • Section 10 "References": updated.
UM11441 v.19.0	25 March 2025	• Table 1 "Combinations of i.MX RT products and wireless modules ": added IW610 module. • Section 3.1.1.4 "About Bluetooth host and audio interfaces": updated. • Section 3.1.2.2 "Bluetooth host and audio interfaces": updated. • Section 3.1.3.4 "Bluetooth host and audio interfaces": updated. • Section 3.2.1 "AzureWave AW-CM358-uSD adapter board": updated the paragraph *About Bluetooth host and audio interfaces*. • Section 3.2.3.2 "About Bluetooth host and audio interfaces": updated. • Section 3.3.1.3 "About Bluetooth host and audio interfaces": updated. • Section 3.6 "IW610-based wireless modules": added. • Section 6 "Run a Wi-Fi demo application": – Updated the note about the default application. – Table 19 "List of macros": added IW610 LL2 module. • Section 7.1 "Demo start-up logs" – Updated the note about the default application. – Table 20 "List of macros ": added IW610 LL2 module. • Section 7.2 "Establishing a Bluetooth LE connection": updated the note.
UM11441 v.18.0	9 January 2025	• Added i.MX RT700 in: – Section 2 "i.MX RT products" – Table 1 "Combinations of i.MX RT products and wireless modules " – Table 2 "Wireless modules configured by default on i.MX RT products" – Table 3 "Boot mode selection" • Updated the release process version in the footnote of: – Table 1 "Combinations of i.MX RT products and wireless modules " – Table 19 "List of macros" – Table 20 "List of macros "

Revision history...*continued*

Rev	Date	Description
UM11441 v.17.0	24 September 2024	• Table 1 "Combinations of i.MX RT products and wireless modules ": – Updated the release version and modules tested for the release. – Added 2EL M.2 module for IW612 and i.MX RT1060 EVKC, IW612 and i.MX RT1170 EKVB. – Removed the footnote about the module operation support for AW611. • Table 2 "Wireless modules configured by default on i.MX RT products": Added 2EL M.2 module for i.MX RT1060 EVKC and i.MX RT1170 EKVB. • Table 15 "Embedded Artists' 2EL M.2 module features": updated the description of the module interface. • Section 3.3.1.2 "Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1060 EVKC": added a note about USB power supply. • Table 19 "List of macros": updated. • Table 20 "List of macros ": updated.
UM11441 v.16.0	26 June 2024	• Section 2 "i.MX RT products": added i.MX RT1180A. • Table 1 "Combinations of i.MX RT products and wireless modules ": – Updated the release version and modules tested for the release. – Added i.MX RT1180A. • Section 2.3 "i.MX RT EVK boards": added i.MX RT1180A. • Section 3 "NXP-based wireless modules": added AW611. • Section 3.4 "IW611-based wireless modules": added. • Section 3.5 "AW611-based wireless modules": added. • Table 19 "List of macros": updated. • Table 20 "List of macros ": updated. • Section 10 "References": added two data sheets: Murata - LBEE5PL2DL-921 and u-blox - JODY-W5 series.
UM11441 v.15.0	1 April 2024	• Table 1 "Combinations of i.MX RT products and wireless modules ": updated the release version and modules tested for the release. • Section 3.3.1.1 "Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1170 EVKB" – Updated the section heading (added " EVKB"). – Replaced the note. • Section 3.3.1.4 "Module limitations for the 802.15.4 SPI interface": added a note. • Section 4 "Software download": – Section 4.1 "SDK download": added. – Section 4.1.2 "GitHub download": added. • Table 19 "List of macros": updated the release version and modules tested for the release. • Table 20 "List of macros ": updated the release version and modules tested for the release.

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Rev	Date	Description
UM11441 v.14.0	9 January 2024	• Section 10 "References": added entries for LBEE0ZZ2WE-uSD-M2 module. • Section 2 "i.MX RT products": added i.MX RT1060C • Table 1 "Combinations of i.MX RT products and wireless modules ": added i.MX RT1060 EVKC and i.MX RT685-AUD-EVK. Updated the table footnotes. • Table 2 "Wireless modules configured by default on i.MX RT products": added i.MX RT1060 EVKC. • Section 3 "NXP-based wireless modules": removed the footnote about IW612 module support. • Section 3.3.1.1 "Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1170 EVKB": replaced the figure. • Section 3.3.1.2 "Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1060 EVKC": added. • Section 3.3.1.4 "Module limitations for the 802.15.4 SPI interface": updated. • Section 4.1.1 "MCUXpresso SDK download": removed the note about IW612 module support. • Table 19 "List of macros": updated the table footnote. • Table 20 "List of macros ": updated the table footnote.

Revision history...*continued*

Rev	Date	Description
UM11441 v.13.0	13 October 2023	• Section 2.2 "i.MX RT products and NXP-based wireless modules": updated the note about support for Bluetooth. • Updated the versions of SDK that support IW612-based modules in: – Section 2.2 "i.MX RT products and NXP-based wireless modules" – Section 3 "NXP-based wireless modules" – Section 4.1.1 "MCUXpresso SDK download" – Section 6 "Run a Wi-Fi demo application" – Section 7.1 "Demo start-up logs" • Section 8 "Run a 802.15.4 demo application": added step 1, removed the note about NXP git server, and added a note for step 4.
UM11441 v.12.0	29 June 2023	• Section 10 "References": added references for IW612-based modules • Table 1 "Combinations of i.MX RT products and wireless modules ": added IW612-based modules and updated for SDK release 2.14.0 • Section 3 "NXP-based wireless modules": added IW612 • Figure *AzureWave AW-NM191NF-uSD adapter board*: added the jumpers • Figure 4 "AzureWave AW-AM457-uSD evaluation board": added the jumpers • Section 3.1.2.2 "Bluetooth host and audio interfaces": added • Figure 10 "AzureWave AW-AM510-uSD evaluation board": added the jumpers • Figure 17 "AzureWave AW-CM358-uSD adapter board": added the jumpers • Section 3.2.3.2 "About Bluetooth host and audio interfaces": added • Section 3.3 "IW612-based wireless modules": added • Section 3.3.1.1 "Connecting Embedded Artists' (Murata) 2EL M.2 module to i.MX RT1170 EVKB": updated the figure and added a note • Section 4.1.1 "MCUXpresso SDK download": added the note about IW612 module support • Table 19 "List of macros": added IW612 module and updated for SDK release 2.14.0 • Table 20 "List of macros ": added IW612 module and updated for SDK release 2.14.0 • Section 8 "Run a 802.15.4 demo application": added • Section 12 "Note about the source code in the document": added
UM11441 v.11.0	21 March 2023	• Added i.MX RT1170EVKB to the list of keywords on the front page • Section 2 "i.MX RT products": added i.MX RT1170B • Table 1 "Combinations of i.MX RT products and wireless modules ": . Removed the link to the footnote for some modules in the third column . Added i.MX RT1170EVKB . Updated the release version in the footnote • Table 2 "Wireless modules configured by default on i.MX RT products": added i.MX RT1170 EVKB • Table 3 "Boot mode selection": added i.MX RT1060B and i.MX RT1170B • Table 19 "List of macros": updated the release version in the table footnote • Table 20 "List of macros ": updated the release version in the table footnote

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Rev	Date	Description
UM11441 v.10.0	5 January 2023	• Table 1 "Combinations of i.MX RT products and wireless modules ": updated • Table 2 "Wireless modules configured by default on i.MX RT products": updated • Section 6 "Run a Wi-Fi demo application": . Updated the note . Updated the release version in the table footnote • Section 7.1 "Demo start-up logs": . Updated the note . Updated the release version in the table footnote
UM11441 v.9.0	15 September 2022	• *List of keywords on the cover page*: added i.MX RT1040 and i.MX RT1060EVKB, and removed the reference to 88W8977-based wireless modules • Section 10 "References": removed 88W8977 and PAN9026 items • Section 2 "i.MX RT products": added i.MX RT1040 and i.MX RT1060B • Table 1 "Combinations of i.MX RT products and wireless modules ": . Updated the release version in the table footnote . Removed 88W8977-based modules in *SDIO interface for Wi-Fi* section . Removed the existing reference to i.MX RT1060 EVKB entry in *SDIO interface for Wi-Fi* section . Added rows for i.MX RT1040 EVK and I.MX RT1060 EVK B in *SDIO interface for Wi-Fi* section . Updated i.MX RT1060 EVKB entries in *UART interface for Bluetooth* section . Added i.MX RT1040 EVK in *UART interface for Bluetooth* section . Added i.MX RT1050 EVK in *UART interface for Bluetooth* section • Table 2 "Wireless modules configured by default on i.MX RT products": . Added rows for i.MX RT1060 EVKB and i.MX RT1040 . Removed the existing reference to i.MX RT1060 EVKB • Table 3 "Boot mode selection": added a row for i.MX RT1040 • Section 2.4 "i.MX RT MCUXpresso SDK": removed the reference to 88W8977 firmware • Section 3 "NXP-based wireless modules": . Removed the reference to 88W8977 in the introduction . Removed the section *88W8977-based wireless module* • Table 19 "List of macros": . Removed the two rows for 88W8977 wireless product . Updated the release version in the table footnote • Table 20 "List of macros ": updated the release version in the table footnote

Revision history...*continued*

Rev	Date	Description
UM11441 v.8.0	6 July 2022	• Section 10 "References": added the references to u-blox modules (Maya, Lily, and Jody) • Section 2.2 "i.MX RT products and NXP-based wireless modules": updated Table 1 with the references to u-blox modules • Section *Jumper settings on AzureWave AW-NM191NF-uSD adapter board*: renamed VIO as VIO_SD for the voltage level selection • Section *u-blox LILY-W1 evaluation board*: added. • Section 3.1.1.1 "AzureWave AW-AM457-uSD evaluation board": replaced the paragraph introducing the figure • Section 3.1.1.2 "Jumper settings on AzureWave AW-AM457-uSD evaluation board": renamed VIO as VIO_SD for the voltage level selection • Section 3.1.1.3 "Connecting AzureWave AW-AM457-uSD to i.MX RT1060 EVK board": added the note and figure at the end of the section • Section 3.1.2.1 "Connecting Embedded Artists' (Murata) 1XK M.2 module to i.MX RT1050 EVK using Murata's uSD-M.2 adapter": highlighted the last paragraph as a note • Section 3.1.3.2 "Jumper settings on AzureWave AW-AM510-uSD evaluation board": renamed VIO as VIO_SD for the voltage level selection • Section 3.1.4 "u-blox MAYA-W1 module": added the section • Section 3.2.4 "u-blox JODY-W2 module": added the section • Table 19 "List of macros": added the macros for u-blox EVKs • Section 4.1.1 "MCUXpresso SDK download": updated the screen captures. • Section 7.1 "Demo start-up logs": updated the references to macros
UM11441 v.7.0	14 March 2022	• Section 1 "About this document": updated • Figure 3 "i.MX RT MCUXpresso SDK - Wi-Fi and Bluetooth layer interfaces": replaced *uHDHC* with *SDIO* • Section 2.4 "i.MX RT MCUXpresso SDK": updated the first sentence • Section 3 "NXP-based wireless modules": updated the first sentence • Section *AzureWave AW-NM191NF-uSD adapter board*: removed the section *About antenna diversity feature*. • Section 3.1.1.4 "About Bluetooth host and audio interfaces": updated the path to *Hardware Rework Guide for EdgeFast BT PAL* • Section 3.1.3.4 "Bluetooth host and audio interfaces": updated the path to *Hardware Rework Guide for EdgeFast BT PAL* • Figure 8 "Embedded Artists' 1XK M.2 module": updated the module reference • Section 3.2.1.2 "Connecting AW-CM358-uSD adapter board to i.MX RT1060 EVK board": updated the path to *Hardware Rework Guide for EdgeFast BT PAL* • Figure 23 "Embedded Artists' 1ZM M.2 module": updated the module reference • Section 4 "Software download": updated the first paragraph and the path to *UM11442* • Section 4.1.1 "MCUXpresso SDK download": replaced some screen captures • Section 6 "Run a Wi-Fi demo application": updated the path to *app_config.h* file • Table 1, Table 19, and Table 20: updated the release process version in the table footnote • Section 7.2 "Establishing a Bluetooth LE connection": updated the path to *UM11442*

Revision history...*continued*

Rev	Date	Description
UM11441 v.6.0	10 January 2022	• Section 1 "About this document": updated • Section 1.1 "Considerations": updated • Section 2 "i.MX RT products": extended the list of i.MX RT products that support NXP-based wireless modules • Figure 1 "Interfaces between i.MX RT products and NXP-based wireless modules": updated • Figure 2 "i.MX RT evaluation board diagram": updated • Table 1 "Combinations of i.MX RT products and wireless modules ": updated the content • Table 2 "Wireless modules configured by default on i.MX RT products": added • Table 3 "Boot mode selection": updated the content • Figure 3 "i.MX RT MCUXpresso SDK - Wi-Fi and Bluetooth layer interfaces": updated • Section 3.1.3 "AzureWave AW-AM510 module": added the section • Section 6 "Run a Wi-Fi demo application": updated the module reference in the note • Table 19 "List of macros": updated the table content • Section 7.1 "Demo start-up logs": updated the module reference in the note • Table 20 "List of macros ": updated the table content
UM11441 v.5.0	9 September 2021	• Extended the scope to IW416-based module (Embedded Artists), 88 W8801-based module (Embedded Artists) and 88W8987-based module (Embedded Artists) • Section 10 "References": updated • Table 1 "Combinations of i.MX RT products and wireless modules ": updated • Section *Embedded Artists'(Murata) 2DS M.2 module*: added • Section *Murata uSD-M.2 adapter*: added. • Section 3.1.1 "AzureWave AW-AM457 module" • Section 3.1.2 "Embedded Artists' (Murata) 1XK M.2 module ": added • Section *Embedded Artist'Murata 1ZM M.2 module*: added • Section 6 "Run a Wi-Fi demo application": updated • Section 7.1 "Demo start-up logs" : updated
UM11441 v.4.0	12 June 2021	• Extended the scope to 88W8987, i.MX RT500, i.MX RT1070 and i.MX RT1160 • Section 10 "References": updated • Table 1 "Combinations of i.MX RT products and wireless modules ": added • Table 3 "Boot mode selection": updated • Section 3.2 "88W8987-based wireless modules": added • Section 4 "Software download": updated to version 2.10.0 • Section 6 "Run a Wi-Fi demo application": updated • Section 7.1 "Demo start-up logs": updated
UM11441 v.3.0	24 March 2021	• Section 2 "i.MX RT products": updated the list of i.MX RT products that support NXP-based wireless modules • Section 3 "NXP-based wireless modules": updated the section headings • Section 4.1.1 "MCUXpresso SDK download": updated • Section 7 "Run a Bluetooth/Bluetooth LE demo application": updated

Revision history...*continued*

Rev	Date	Description
UM11441 v.2.0	13 January 2021	• Extended the scope to IW416-based modules • Section 2 "i.MX RT products": reorganized the content • Section 3.1 "IW416-based wireless modules": added • Section 5 "i.MX RT product image setup": added • Section 6 "Run a Wi-Fi demo application": added • Section 7 "Run a Bluetooth/Bluetooth LE demo application": added
UM11441 v.1.0	17 July 2020	Initial version

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Tables

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