

# RN00201

## Android Release Notes

Rev. android-14.0.0\_2.2.0 — 18 October 2024

Release notes

### Document information

Information	Content
Keywords	Android, i.MX, android-14.0.0_2.2.0
Abstract	i.MX android-14.0.0_2.2.0 is a release for Android 14 on the i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8ULP, i.MX 8QuadMax, and i.MX 8QuadXPlus applications processors of NXP.



## 1 Release Description

i.MX android-14.0.0\_2.2.0 is a release for Android 14 on the i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8ULP, i.MX 8QuadMax, i.MX 8QuadXPlus and i.MX 95 applications processors of NXP.

i.MX android-14.0.0\_2.2.0 release includes all necessary code, documents, and tools to assist users in building and running Android 14 on the i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Plus EVK, i.MX 8M Quad WEVK/EVK, i.MX 8ULP EVK i.MX 8QuadMax MEK, i.MX 8QuadXPlus MEK, i.MX 95 EVK, i.MX 95 15x15 EVK, and i.MX 95 Verdin EVK board. The corresponding release quality for each board is listed in the following table.

Table 1. Release description

Platform name	Release quality
i.MX 8M Mini EVK	GA
i.MX 8M Nano EVK	GA
i.MX 8M Plus EVK	GA
i.MX 8M Quad WEVK/EVK	GA
i.MX 8ULP (A2 9x9) EVK	GA
i.MX 8ULP (A2) EVK	GA
i.MX 8QuadMax	GA
i.MX 8QuadXPlus	GA
i.MX 95 (A1 19x19) EVK	Beta
i.MX 95 (A1 15x15) EVK	Alpha
i.MX 95 (A1 19x19) Verdin EVK	Beta

The prebuilt images are also included for a quick trial on NXP i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Plus EVK, i.MX 8M Quad WEVK/EVK, i.MX 8ULP EVK, i.MX 8QuadMax MEK, i.MX 8QuadXPlus MEK, i.MX 95 EVK, i.MX 95 15x15 EVK, and i.MX 95 Verdin EVK Board and Platforms.

This release includes all porting and enhancements based on the Android open source code.

Most of the deliveries in this release are provided in source code with the exception for some proprietary modules/libraries from third parties.

## 2 Supported Hardware SoC/Boards

The supported hardware system-on-chip (SoCs)/boards are listed as follows:

- i.MX 8M Mini EVK
  - Supported daughter boards:
    - With DDR4 RAM, ROHM BD71847 PMIC chip
    - With LPDDR4 RAM, NXP PCA9450 PMIC chip, and NXP 88W8987 Wi-Fi/Bluetooth module.
  - Supported mother board:
    - Rev. C mother board
- i.MX 8M Nano EVK
  - Supported daughter boards:
    - With DDR4 RAM, ROHM BD71847 PMIC chip
    - With LPDDR4 RAM, NXP PCA9450 PMIC chip, and NXP 88W8987 Wi-Fi/Bluetooth module
  - Supported mother board:
    - Rev. C mother board

- i.MX 8M Plus (Silicon Revision A1) Rev. A EVK Board and Platform
- i.MX 8M Quad WEVK REV B and EVK Rev. A Board and Platform
- i.MX 8ULP (A2) EVK Board and Platform, i.MX 8ULP (A2) EVK 9x9 Board and Platform.
- i.MX 8QuadMax (Silicon Revision B0) MEK Board (Board Rev. B5, Rev. C2, and Rev. E) and Platform
- i.MX 8QuadXPlus (Silicon Revision B0 and C0) MEK Board and Platform
- i.MX 95 EVK Boards and Platforms.
  - i.MX 95 (Silicon Revision A1 19X19) EVK Board (Rev. A) and Platform.
  - i.MX 95 (Silicon Revision A1 15x15) EVK Board (Rev. A) and Platform.
  - i.MX 95 (Silicon Revision A1 19x19) Verdin EVK Board (v1.2) and Platform.

### 3 Release Package Contents

The android-14.0.0\_2.2.0 release package includes the following software and documents.

Table 2. Release package contents

i.MX Android proprietary source code package	<ul style="list-style-type: none"><li>• <code>imx-android-14.0.0_2.2.0.tar.gz</code>: i.MX Android proprietary source code package to enable Android on i.MX boards. For example, Hardware Abstraction Layer implementation, hardware codec acceleration.</li></ul>
Documents	<p>The following documents are included in <code>android-14.0.0_2.2.0_docs.zip</code>:</p> <ul style="list-style-type: none"><li>• <i>Android Quick Start Guide</i> (UG10157): A document that explains how to run the Android platform on an i.MX board using prebuilt images.</li><li>• <i>Android User's Guide</i> (UG10156): A document describing procedures for configuring and building this release package.</li><li>• <i>Android Release Notes</i> (RN00201): A document that introduces key updates and known issues in this release.</li><li>• <i>i.MX Android Extended Codec Release Notes</i> (RN00202): A document that provides the extended codec information.</li><li>• <i>i.MX Android Security User's Guide</i> (UG10158): A document that describes how to do customization work on security features supported by i.MX Android software.</li><li>• <i>i.MX Graphics User's Guide</i> (UG10159): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.</li></ul>
Prebuilt images	<p>You can test the Android platform with a prebuilt image on i.MX reference board before building any code:</p> <ul style="list-style-type: none"><li>• <code>android-14.0.0_2.2.0_image_8mmevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Mini EVK board.</li><li>• <code>android-14.0.0_2.2.0_image_8mnevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Nano EVK board.</li><li>• <code>android-14.0.0_2.2.0_image_8mpevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Plus EVK board.</li><li>• <code>android-14.0.0_2.2.0_image_8mqevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Quad WEVK/EVK board.</li><li>• <code>android-14.0.0_2.2.0_image_8ulpevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8ULP EVK board and i.MX 8ULP EVK 9x9 board.</li><li>• <code>android-14.0.0_2.2.0_image_8qmek.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8QuadMax MEK board and i.MX 8QuadXPlus MEK board.</li><li>• <code>android-14.0.0_2.2.0_image_95evk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 95 EVK board.</li></ul> <p>All prebuilt images are in a separate package. See the <i>Android Quick Start Guide</i> (UG10157) and <i>Android User's Guide</i> (UG10156) to choose the appropriate image.</p>

4 Features

This section contains features in this package.

Table 3. Features

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8 Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
Google Android 14 release	Y	Y	Y	Y	Y	Y	Y	Y	Based on the AP2A android-14.0.0_r55 release.
Linux 6.6.36 kernel (merge with AOSP kernel)	Y	Y	Y	Y	Y	Y	Y	Y	Based on the Linux OS BSP LF6.6.36_2.1.0 release.
Generic Kernel Image (6.6.30)	Y	Y	Y	Y	Y	Y	Y	Y	Based on AOSP android15-6.6-2024-08.
U-Boot	Y	Y	Y	Y	Y	Y	Y	Y	v2024.04.
Trusty OS	Y	Y	Y	Y	Y	Y	Y	Y	-
Graphic-HW	Y	Y	Y	Y	Y	Y	Y	Y	VeriSilicon GC7000NanoUltra GPU with the 6.4.11.p2 driver for i.MX 8M Mini EVK. VeriSilicon GC7000UL GPU with 6.4.11.p2 driver for i.MX 8M Nano EVK and i.MX 8M Plus EVK. VeriSilicon GC7000L GPU with 6.4.11.p2 driver for i.MX 8M Quad EVK. VeriSilicon GCNANOULTRA31 GPU with 6.4.11.p2 driver for i.MX 8ULP EVK. VeriSilicon GC7000XSVX GPU with 6.4.11.p2 driver FOR i.MX 8Quad Max. VeriSilicon GC7000L GPU with 6.4.11.p2 driver for i.MX 8QuadXPlus. Mali-G310 GPU with r47p0-01eac0 driver for i.MX 95 EVK.
Graphic-HW 3D acceleration	Y	Y	Y	Y	Y	Y	Y	Y	OpenGL ES1.1/2.0 through GC7000NanoUltra for i.MX 8M Mini EVK. OpenGL ES1.1/2.0/3.1 through GC7000UL for i.MX 8M Nano EVK and i.MX 8M Plus EVK. OpenGL ES1.1/2.0/3.1 through GC7000L for i.MX 8M Quad EVK. OpenGL ES1.1/2.0/3.1 through GCNANOULTRA31 for i.MX 8ULP EVK.

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
									OpenGL ES 1.1/2.0/3.1/3.2 through GC7000 XSVX for i.MX 8Quad Max MEK. OpenGL ES 1.1/2.0/3.1 through GC7000L. OpenGL ES1.1/2.0/3.2 via Mali-G310 for i.MX 95 EVK.
Android Neural Network API acceleration	N	Y	Y	Y	Y	Y	Y	N	Android Neural Network API 1.3 accelerated through GC7000UL for i.MX 8M Nano EVK. Android Neural Network API 1.3 accelerated through GC7000L for i.MX 8M Quad EVK. Android Neural Network API 1.3 accelerated through NPU for i.MX 8M Plus EVK. Android Neural Network API 1.3 accelerated through GCNANOULTRA31 for i.MX 8ULP EVK Android Neural Network API 1.3 accelerated through GC7000L for i.MX 8QuadXPlus. Android Neural Network API 1.3 accelerated through GC7000XSVX for i.MX 8QuadMax.
Graphic-HW accelerated UI surface composition	Y	Y	Y	Y	Y	Y	Y	Y	OpenGL ES2.0 through GC7000NanoUltra for i.MX 8M Mini EVK. OpenGL ES3.1 through GC7000UL for i.MX 8M Nano EVK and i.MX 8M Plus EVK. OpenGL ES3.1 through GC7000L for i.MX 8M Quad EVK. OpenGL ES3.1 through GCNANOULTRA31 for i.MX 8ULP EVK. OpenGL ES 3.2 through GC7000XSVX for i.MX 8Quad Max MEK. OpenGL ES 3.1 through GC7000L for i.MX 8QuadXPlus MEK.
SCFW	N	N	N	N	N	Y	Y	N	Version 1.17.0
SECO firmware	N	N	N	N	N	Y	Y	N	Version 3.8.5.
Boot source	SD/ eMMC	SD/ eMMC	SD/ eMMC	SD/ eMMC	eMMC	SD/ eMMC	SD/ eMMC	SD/ eMMC	-
Splash Screen	Y	Y	Y	Y	Y	Y	Y	Y	-
UI (input)	Y	Y	Y	Y	Y	Y	Y	Y	USB Mouse and Multi-touch on the MIPI panel display.
UI (display)	MIPI-DSI-to-HDMI/	MIPI-DSI-to-HDMI/	HDMI/MIPI-to-HDMI/	HDMI/MIPI-DSI-to-	HDMI/MIPI/EPDC	HDMI/MIPI-to-HDMI/	LVDS-to-HDMI/MIPI-	MIPI-to-HDMI4K/	i.MX 8M Mini EVK maximum resolution: • MIPI-to-HDMI: 1920 x 1080 • MIPI Panel: 1080 x 1920 i.MX 8M Nano EVK maximum resolution:

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
	MIPI panel	MIPI panel	MIPI panel/ LVDS-to-HDMI/ LVDS panel/ dual channel LVDS to HDMI  The physical HDMI supports HDMI-CEC	HDMI/ MIPI panel  The physical HDMI supports HDMI-CEC		MIPI-panel/ LVDS-to-HDMI Display  The physical HDMI supports HDMI-CEC	to-HDMI Display	MIPI-to-HDMI/ LVDS-to-HDMI/ MIPI Panel/ LVDS Panel/ BOE panel/ 10 inch panel	<ul style="list-style-type: none"> <li>MIPI-to-HDMI: 1920 x 1080</li> <li>MIPI Panel: 1080 x 1920</li> </ul> i.MX 8M Plus EVK maximum resolution: <ul style="list-style-type: none"> <li>Physical HDMI: 3840 x 2160</li> <li>MIPI-to-HDMI: 1920 x 1080</li> <li>LVDS-to-HDMI: 1280 x 720</li> <li>LVDS panel: 1920 x 1200</li> <li>MIPI panel: 1080 x 1920</li> <li>Dual-channel LVDS to HDMI: 1920 x 1080</li> </ul> i.MX 8M Quad EVK maximum resolution: <ul style="list-style-type: none"> <li>Physical HDMI: 3840 x 2160</li> <li>MIPI-to-HDMI: 1280 x 720</li> <li>MIPI panel: 1080 x 1920</li> </ul> i.MX 8ULP EVK maximum resolution: <ul style="list-style-type: none"> <li>HDMI: 720 x 480</li> <li>MIPI: 720 x 1280</li> <li>EPDC: 1024 x 758</li> </ul> i.MX 8Quad Max MEK maximum resolution: <ul style="list-style-type: none"> <li>physical HDMI: 3840 x 2160</li> <li>LVDS-to-HDMI/MIPI-to-HDMI: 1920 x 1080</li> <li>MIPI panel: 1080 x 1920</li> </ul> i.MX 8QuadXPlus MEK maximum resolution: <ul style="list-style-type: none"> <li>LVDS-to-HDMI/MIPI-to-HDMI: 1920 x 1080</li> </ul> i.MX 95 EVK maximum resolution: <ul style="list-style-type: none"> <li>MIPI-to-HDMI4K: 3840 x 2160</li> <li>MIPI-to-HDMI: 1920 x 1080</li> <li>LVDS-to-HDMI: 1920 x 1080</li> <li>MIPI Panel: 1080 x 2340</li> <li>LVDS Panel: 1920 x 1200</li> <li>BOE panel: 1280 x 800</li> <li>10-inch panel: 1280 x 800</li> </ul>
UI (multiple displays)	N	N	Y	Y	N	Y	Y	Y	i.MX 8M Plus EVK supports the combination of 2 to 3 of the following displays: <ul style="list-style-type: none"> <li>MIPI-to-HDMI</li> <li>HDMI</li> <li>LVDS-to-HDMI</li> </ul> i.MX 8M Quad EVK supports MIPI-to-HDMI and HDMI displays. i.MX 8Quad Max MEK supports the combination of 2 to 4 of the following 4 displays: <ul style="list-style-type: none"> <li>HDMI_TX</li> <li>LVDS0_CH0</li> </ul>

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
									<ul style="list-style-type: none"><li>• LVDS1_CH0</li><li>• MIPI_DSI1</li></ul> and the combination of 2 to 4 of the following 4 displays: <ul style="list-style-type: none"><li>• LVDS0_CH0</li><li>• LVDS1_CH0</li><li>• MIPI_DSI0</li><li>• MIPI_DSI1</li></ul> i.MX 8QuadXPlus MEK support dual LVDS-to-HDMI displays. i.MX 95 EVK supports dual LVDS-to-HDMI displays, MIPI-to-HDMI, and LVDS-to-HDMI multiple displays.
UI (brightness control)	Y	Y	Y	Y	Y	Y	N	Y	With MIPI panel display for all boards. With LVDS panel display for i.MX 8M Plus EVK and i.MX 95 EVK.
UI-Low Power Display(LPD)	N	N	N		Y	N	N	N	Shares display with the RTD core.
Storage - External Media	Y	Y	Y	Y	Y	Y	Y	Y	i.MX 8M Mini EVK and i.MX 8M Nano EVK support U-disk on the USB 2.0 port. i.MX 8M Plus EVK and i.MX 8M Quad EVK support U-disk on the USB Type-A host port. i.MX 8ULP EVK supports U-disk on the USB 0 port and USB 1 port. i.MX 8Quad Max MEK, i.MX 8QuadXPlus MEK, and i.MX 95 EVK support U-disk on the USB 2.0 port.
Connectivity - Ethernet	Y	Y	Y	Y	Y	Y	Y	Y	For i.MX 8M Plus EVK, ENET1 port is the default Ethernet port.
Connectivity - Bluetooth wireless technology	Y	Y	Y	Y	Y	Y	Y	Y	Hardware: <ul style="list-style-type: none"><li>• NXP 88W8987 for i.MX 8M Mini EVK LPDDR4 board, i.MX 8M Nano EVK LPDDR4 board</li><li>• NXP 88W8997 for i.MX 8M Plus EVK.</li><li>• PCIE9098 (Murata LBEE5ZZ1XL) for i.MX 8M Quad EVK Rev. A board, i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK.</li><li>• NXP IW416 (v2) for i.MX 8ULP EVK board.</li><li>• PCIE9098/SDIW612 for i.MX 95 EVK.</li></ul> Profiles: <ul style="list-style-type: none"><li>• A2DP Source</li><li>• AVRCP</li><li>• BLE Host</li></ul>

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
									<ul style="list-style-type: none"> <li>• HSP</li> <li>• HID Host</li> <li>• HID Device</li> <li>• PAN</li> <li>• OPP</li> </ul>
Connectivity - Wi-Fi	Y	Y	Y	Y	Y	Y	Y	Y	Hardware: <ul style="list-style-type: none"> <li>• NXP 88W8987 for i.MX 8M Mini EVK LPDDR4 board, i.MX 8M Nano EVK LPDDR4 board.</li> <li>• NXP 88W8997 for i.MX 8M Plus EVK board.</li> <li>• PCIE9098 (Murata LBEE5ZZ1XL) for i.MX 8MQuad EVK Rev. A board, i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK board.</li> <li>• NXP IW416 (v2) for i.MX 8ULP EVK board.</li> <li>• PCIE9098/SDIW612 for i.MX 95 EVK.</li> </ul> Features: <ul style="list-style-type: none"> <li>• STA mode</li> <li>• AP mode</li> <li>• Wi-Fi Direct</li> <li>• AP/STA Concurrency</li> <li>• MAC randomization</li> </ul>
Connectivity - USB Tethering	Y	Y	Y	Y	Y	Y	Y	Y	Supports Wi-Fi and Ethernet as upstream.
Power - CPU Freq	Y	Y	Y	Y	N	Y	Y	Y	-
Power - Bus Freq	Y	Y	Y	Y	N	Y	Y	Y	-
ISP	N	N	Y	N	N	N	N	N	VeriSilicon ISP8000NANO_V1802 with 4.2.2_p24.3 driver/server for i.MX 8M Plus EVK.
Media - Music Play	Y	Y	Y	Y	Y	Y	Y	Y	SSI+WM8524 for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Quad EVK, and i.MX 95 EVK. SSI+WM8960+PCM512 (for powersave image) for i.MX 8M Plus EVK. SSI+WM8960 for i.MX 8ULP EVK. WM8960+CS42888+HDMI for i.MX 8Quad Max MEK. WM8960+CS42888 for i.MX 8QuadXPlus MEK.



Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
Media - Sound Record	Y	Y	Y	Y	Y	Y	Y	Y	PDM for i.MX 8M Mini EVK, i.MX 8M Nano EVK. AK5558 for i.MX 8M Quad EVK. SSI+WM8960+PDM for i.MX 8M Plus EVK. SSI+WM8960 for i.MX 8ULP EVK. ESAI+CS42888 for i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK. WM8962+PDM for i.MX 95 EVK.
Media-Compress Playback	N	N	Y	N	N	Y	Y	N	Compress MP3 playback through SOF (Sound Open Firmware)
Media - Video Play	Y	Y	Y	Y	Y	Y	Y	Y	For i.MX 8M Mini, i.MX 8M plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8Quad XPlus, which have VPU integrated, see the <i>i.MX Android Extended Codec Release Notes</i> (RN00202) to find the information about the supported format, resolution, frame rate, and bit rate.  For i.MX 8M Nano and i.MX 8ULP, which do not have VPU integrated, the video playback is supported by Google software decoder.  For i.MX 8QuadMax, if Trusty OS is used, see Section "Secure firmware Loader" in the <i>i.MX Android Security User's Guide</i> (UG10158) to flash the keys related to the firmware loader manually so that the video can play back normally.
Media-HDR Video Play	N	N	N	Y	N	N	N	N	-
Media - Camera	Y	Y	Y	Y	Y	Y	Y	Y	OV5640 CSI MIPI camera for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Quad EVK, i.MX 8ULP EVK, i.MX 8Quad Max MEK, and i.MX 8QuadXPlus MEK.  For i.MX 8M Plus EVK: <ul style="list-style-type: none"> <li>Two Basler cameras (maximum resolution 1920x1080)</li> <li>Basler + OV5640 (Basler maximum resolution 3840 x 2160 depends on the boot parameter)</li> <li>Single Basler (maximum resolution 3840 x 2160 depends on the boot parameter)</li> <li>Single OV5640</li> </ul>

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
									<ul style="list-style-type: none"><li>Two OS08A20 (maximum resolution 1920 x 1080)</li><li>Single OS08A20 (maximum OS08A20 resolution can reach 3840 x 2160, depending on the boot parameter)</li></ul> For i.MX 95 EVK: <ul style="list-style-type: none"><li>OS08A20 or AP1302</li></ul>
Media - Camera DeviceAsWebcam	Y	N	N	Y	N	Y	Y	Y	Supports MJPEG 1080p and MJPEG 720p streams. For i.MX 8M Quad, it is only supported on the EVK board, not on the WEVK board.
Media HDMI RX	N	N	N	N	N	Y	N	N	-
Media - TVIN	N	N	N	N	N	N	N	N	-
Media - Dual Camera	Y	Y	Y	Y	Y	Y	Y	Y	For i.MX 95 EVK <ul style="list-style-type: none"><li>OS08A20 or AP1302 + USB camera</li></ul>
Media - Camcorder	Y	Y	Y	Y	Y	Y	Y	Y	-
Media - USB Camera	Y	Y	Y	Y	Y	Y	Y	Y	USB camera supports C920, C930, and C270 for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Quad EVK, i.MX 8M Plus EVK, i.MX 8Quad Max MEK, i.MX 8QuadXPlus MEK, and i.MX 95 EVK. USB camera supports C270 for i.MX 8ULP EVK. It can only work with the Camera2 Basic application.
Media - USB Mic	Y	Y	Y	Y	Y	Y	Y	Y	-
Media - HDMI audio output	N	N	Y	Y	Y	Y	N	N	-
Media-DSD Playback	Y	N	N	Y	N	N	N	Y	DSD playback on Audio Expansion Board.
Media-PlayReady DRM	N	N	N	N	N	N	N	N	-
Media-WideVine DRM	Y	N	Y	Y	N	Y	N	N	Supports WideVine DRM Level 3 for i.MX 8M Mini EVK with GMS package. Widevine CDM version 18.0 and OPK version 18.1.

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
									Supports WideVine DRM Level 1 and Level 3 for i.MX 8M Plus EVK, i.MX 8M Quad EVK, and i.MX 8Quad Max MEK. Widevine CDM version 18.0 and OPK version 18.6.
Media-MCU Playback	Y	N	Y	N	Y	N	N	Y/N/N	Audio playback based on: <ul style="list-style-type: none"><li>FreeRTOS on the Cortex-M4 core for i.MX 8M Mini EVK and i.MX 95 EVK.</li><li>FreeRTOS on the Cortex-M7 core for i.MX 8M Nano EVK.</li><li>FreeRTOS on Cortex-M33 core for i.MX 8ULP EVK and i.MX 95 19x19 EVK.</li></ul>
Media-Audio HAT	N	N	N	N	N	N	N	N/Y/N	-
Media-MQS audio output	N	N	N	N	N	N	N	N/Y/N	-
Media-Hi-Res audio output	Y	N	N	Y	N	Y	Y	Y	High-resolution audio output from Audio. Expansion Board for i.MX 8M Mini EVK, i.MX 8M Quad EVK, and i.MX 95 EVK: <ul style="list-style-type: none"><li>2-channel: 384000, 768000 sampling rate</li><li>4-channel: 48000, 96000, 192000, 384000, 768000 sampling rate</li><li>6-channel: 48000, 96000, 192000, 384000 sampling rate</li><li>8-channel: 48000, 96000, 192000, 384000, 768000 sampling rate</li></ul> For i.MX 8Quad Max MEK and i.MX 8Quad XPlus MEK: <ul style="list-style-type: none"><li>4/6/8-channel: 48000, 96000, 192000 sampling rate</li></ul>
Media-Play Ready DRM	N	N	N	N	N	N	N	N	-
Media-WideVine DRM	N	N	N	N	N	N	N	Y	Supports WideVine DRM Level 1 and Level 3, Widevine CDM version 18.0 and OPK version 18.4.
Misc - ADB over USB	Y	Y	Y	Y	Y	Y	Y	Y	-

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8 Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
Misc - Fastboot utility	Y	Y	Y	Y	Y	Y	Y	Y	-
Misc - Factory reset	Y	Y	Y	Y	Y	Y	Y	Y	-
Misc- Recovery mode	Y	Y	Y	Y	Y	Y	Y	Y	Supports installing updates and wiping data.
Powerkey- Suspend & Resume	Y	Y	Y	Y	Y	Y	Y	Y	-
Battery- Charger mode	Y	Y	Y	Y	Y	Y	Y	Y	-
Sensor - Magnetometer	N	N	N	N	N	Y	Y	N	FXOS8700
Sensor - Accelerometer	N	N	N	N	N	Y	Y	N	FXOS8700
Sensor - Gyroscope	N	N	N	N	N	Y	Y	N	FXAS2100
Sensor - Light	N	N	N	N	N	Y	Y	N	ISL29023
Sensor - Pressure	N	N	N	N	N	Y	Y	N	MPL3115
Sensor - Temperature	N	N	N	N	N	Y	Y	N	MPL3115
Sensor - Pedometer	N	N	N	N	Y	N	N	N	-
File Based Encryption	Y	Y	Y	Y	Y	Y	Y	Y	-
USB Accessory	Y	Y	Y	Y	Y	Y	Y	Y	Google AOA v2.0
USB-MTP	Y	Y	Y	Y	Y	Y	Y	Y	-
USB-PTP	Y	Y	Y	Y	Y	Y	Y	Y	-
USB-MIDI	Y	Y	Y	Y	Y	Y	Y	Y	-
Real Time Clock (RTC)	Y	Y	Y	Y	Y	Y	Y	Y	-

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
Screen Recording	N	N	N	N	N	N	N	Y	
Ethernet APK	Y	Y	Y	Y	Y	Y	Y	N	-
imx-chip-tool APK	N	Y	N	N	N	N	N	N	Supports Matter devices control tool <code>imx-chip-tool apk</code> .
webGL	Y	Y	Y	Y	Y	Y	Y	Y	-
Vulkan	N	Y	Y	Y	Y	Y	Y	N	-
Neural Networks	N	N	N	N	N	N	N	N	
OTA for A/B	Y	Y	Y	Y	Y	Y	Y	Y	Supports OTA with secure boot and encrypted boot.
USB Type-C PD	Y	Y	Y	Y	N	Y	Y	Y	Supports power role switch with devices that support USB power delivery.
DM Verity	Y	Y	Y	Y	Y	Y	Y	Y	-
TEE backed Keymint HAL	Y	Y	Y	Y	Y	Y	Y	Y	This is based on i.MX Trusty OS TEE firmware.
TEE backed AVB	Y	Y	Y	Y	Y	Y	Y	Y	This is based on i.MX Trusty OS TEE firmware and secure storage of eMMC chip. In this release, users need to initialize the RPMB part manually.
Neural Networks	N	Y	Y	Y	Y	Y	Y	N	-
Secure boot	Y	Y	Y	Y	Y	Y	Y	Y	Secure boot based on HABv4 for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Plus EVK, i.MX 8M Quad EVK, and i.MX 95 EVK. Secure boot based on AHAB for i.MX 8ULP EVK, i.MX 8Quad Max MEK, and i.MX 8QuadXPlus MEK.
Encrypted boot	N	N	N	N	N	N	N	N	-
TEE backed security	Y	Y	Y	Y	Y	Y	Y	Y	This is based on i.MX Trusty OS TEE firmware.
Software backed	Y	Y	Y	Y	Y	Y	Y	Y	Supports software backed OEM Lock AIDL and store the <code>oem unlocking flag</code> to the <code>fbmisc</code> partition.

Table 3. Features...continued

Feature	i.MX 8M Mini EVK	i.MX 8M Nano EVK	i.MX 8M Plus EVK	i.MX 8M Quad WEVK/ EVK	i.MX 8ULP EVK	i.MX 8Quad Max MEK	i.MX 8 Quad XPlus MEK	i.MX 95 19x19 EVK/ 15x15 EVK/ Verdin EVK	Remarks
OEM unlock									
Virtualization Android	N	N	N	N	N	N	N	Y	Supports virtualization Android on i.MX 95 Xen.
EdgeLock Secure Enclave HAL	N	N	N	N	N	N	N	Y	Supports EdgeLock Secure Enclave (ELE) HAL.

5 Multimedia Codecs

For multimedia codecs and features, see the *i.MX Android Extended Codec Release Notes* (RN00202).

6 Extended Features

An enhanced multimedia experience is available for the Android platform.

This release delivers an error-resilient, feature-rich multimedia solution by extending the existing multimedia features of the Android platform and introduces additional features. Extended codec packages are provided on [nxp.com](http://nxp.com) with controlled access because they require additional licensing by a third party. Contact your sales representative for access.

For detailed extended and additional features, see the *i.MX Android Extended Codec Release Notes* (RN00202).

7 Change Logs

Compared to the android-14.0.0\_2.0.0 release, android-14.0.0\_2.2.0 release has the following major changes:

- Upgraded the Android code base from android-14.0.0\_r34 to AP2A android-14.0.0\_r55.
- Upgraded the i.MX kernel from v6.6.30 to v6.6.36.
- Upgraded the GKI kernel from android15-6.6 to android15-6.6-2024-08.
- W-Fi/Bluetooth integrated in the WCS 24Q3 release.
- Upgraded ISP from 4.2.2p24.2 to 4.2.2\_p24.3.
- Upgraded SCFW from Version 1.16.0 to Version 1.17.0.
- Upgraded the CTS tool to android-cts-14.0\_r5, upgraded the VTS tool to android-vts-14.0\_r55 (built from the r55 source code), and upgraded the STS tool to 14\_sts-r30.
- Upgraded GMS to 202406 version and upgraded the GTS tool to gts-11-R4 version.
- Supports virtualization Android on i.MX 95 Xen based on L6.6.36\_2.1.0.
- Supports the i.MX 95 15x15 EVK and i.MX 95 Verdin EVK Boards.
- Supports the i.MX 8M Quad WEVK Rev. B Board (drop WEVK Rev. A Board).

- Supports the MIPI-to-HDMI 4k converter card for 4K display on the i.MX 95 EVK, i.MX 95 15x15 EVK, and i.MX 95 Verdin EVK Boards.
- Supports Audio-hat and MQS on the i.MX 95 15x15 EVK Board.
- Supports Low Power Audio (LPA) on i.MX 95 EVK.
- Supports Loadable TA rollback detection.
- Upgraded OEMCrypto from v18.5 to v18.6.
- Supports EdgeLock Secure Enclave HAL for i.MX 95.
- Supports encrypted boot feature on i.MX 95.
- Supports encrypted boot with the OTA feature on the i.MX 95 EVK Board.

## 8 Known Issues and Limitations

The known issues about the hardware and hardware rework instructions are not included in this document. There may be hardware-related reference materials for some reference boards. Make sure to check the link [i.MX Application Processors](#) to see if it is applicable.

Table 4. Known issues and limitations

Issue description	Remarks
The Google USB driver must be installed multiple times for the MTP, PTP, MTP&ADB, PTP&ADB, and ADB function settings.	Some Windows XP environments may display MTP and PTP windows even with only PTP enabled in the device.
U-Boot hangs when erasing Kingston SD card.	U-Boot hangs when sending the erase command on some Kingston SD cards.
Manufacturing protection feature is not supported on i.MX 8ULP, so features that require the manufacturing protection public key like secure unlock and secure provisioning would not be supported.	-
For i.MX 95 EVK, the USB-Type C port vbus is connected to a 3.3v power source. Once it is connected to the host and successfully enumerated by the host, the gadget stage is changed to be configured, and the USB HAL acquires its wakelock. Disconnection from the host does not generate a disconnection interrupt. The gadget state keeps unchanged, and the USB HAL does not release its wakelock.	-
cpuidle is not stable and disabled for i.MX 95.	-
The MPPUBK is not ready on i.MX 95 EVK, so features requiring the MPPUBK like secure unlock and secure provisioning are not ready.	-
The i.MX 95 EVK sometimes cannot be powered on by the power switch or PDU due to the PMIC hardware issue.	-
There is a timeout issue with <code>mxv-jpeg</code> encoding and decoding on i.MX 95 EVK due to the hardware issue.	-
Android14 AOSP recommended kernel combination versions are L5.15 and L6.1. This release is based on kernel L6.6 to align with NXP Linux factory quarterly release, some xTS cases may fail due to not taking L6.6 support into account. If customers need to pass Google certification, Android14 releases combined with L6.1 kernel such as android-14.0.0_1.0.0 and android-14.0.0_1.2.0 releases are recommended.	-

9 Revision History

Revision history

Document ID	Release date	Description
RN00201 v.android-14.0.0_2.2.0	18 October	i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8ULP, i.MX 8QuadMax, i.MX 8QuadXPlus GA release, i.MX 95 (A1 15x15) Alpha release, and i.MX 95 (A1 19x19) Beta release.
RN00201 v.android-14.0.0_2.0.0	9 August 2024	i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8ULP, i.MX 8QuadMax, i.MX 8QuadXPlus GA release, and i.MX 95 Alpha release. Updated the document ID.
ARN v.android-14.0.0_1.2.0	19 April 2024	i.MX 8ULP EVK, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8Quad XPlus GA release.
ARN v.android-14.0.0_1.0.0	6 Feburary 2024	i.MX 8ULP EVK, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8Quad XPlus GA release.
ARN v.android-13.0.0_2.2.0	24 October 2023	i.MX 8ULP EVK, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8Quad XPlus GA release.
ARN v.android-13.0.0_2.0.0	07/2023	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8 QuadXPlus GA release.
ARN v.android-13.0.0_1.2.0	03/2023	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8 QuadXPlus GA release.
ARN v.android-13.0.0_1.0.0	01/2023	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8 QuadXPlus GA release.
ARN v.android-12.1.0_1.0.0	10/2022	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8 QuadXPlus GA release.
ARN v.android-12.0.0_2.0.0	07/2022	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release.
ARN v.android-12.0.0_1.0.0	03/2022	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release.
ARN v.android-11.0.0_2.6.0	01/2022	i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release.
ARN v.android-11.0.0_2.4.0	10/2021	i.MX 8ULP EVK Alpha release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release.
ARN v.android-11.0.0_2.2.0	07/2021	i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release.
ARN v.android-11.0.0_2.0.0	04/2021	i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release.
ARN v.android-11.0.0_1.0.0	12/2020	i.MX 8M Plus EVK Beta release, and all the other i.MX 8 GA release.



## Revision history...continued

Document ID	Release date	Description
ARN v.android-10.0.0_2.3.0	07/2020	i.MX 8M Plus EVK Beta1 release, and all the other i.MX 8 GA release.
ARN v.android-10.0.0_2.0.0	05/2020	i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Quad, i.MX 8Quad Max, and i.MX 8QuadXPlus GA release.
ARN v.android-10.0.0_2.1.0	04/2020	i.MX 8M Plus Alpha and i.MX 8QuadXPlus Beta release.
ARN v.android-10.0.0_1.0.0	03/2020	Deleted the Android 10 image.
ARN v.android-10.0.0_1.0.0	02/2020	i.MX 8M Mini, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release.
ARN v.P9.0.0_2.0.0-ga	08/2019	Updated the location of the SCFW porting kit.
ARN v.P9.0.0_2.0.0-ga	04/2019	i.MX 8M, i.MX 8QuadMax, i.MX 8QuadXPlus GA release.
ARN v.P9.0.0_1.0.0-ga	01/2019	i.MX 8M, i.MX 8QuadMax, i.MX 8QuadXPlus GA release.
ARN v.P9.0.0_1.0.0-beta	11/2018	Initial release

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