

# Android™ Release Notes

## 1 Release Description

The i.MX Android™ L5.1.1\_2.1.0-ga release is a GA release for the Android 5.1 Lollipop (L) platform on Freescale's i.MX 6Quad, i.MX 6QuadPlus, i.MX 6Dual, i.MX 6SoloLite, i.MX 6SoloX, and i.MX 7Dual applications processors.

i.MX Android L5.1.1\_2.1.0-ga release includes all necessary code, documents, and tools to assist users in building and running the Android 5.1 platform on the i.MX 6Quad, i.MX 6QuadPlus, i.MX 6DualLite, i.MX 6Solo, i.MX 6SoloLite, i.MX 6SoloX, and i.MX 7Dual hardware boards from scratch. Pre-built images are also included for a quick trial on the following platforms:

- Freescale i.MX 6Quad, and i.MX 6DualLite SABRE-SD board and platform
- i.MX 6Quad, i.MX 6QuadPlus, and i.MX 6DualLite SABRE-AI board and platform
- i.MX 6SoloLite EVK platform
- i.MX 6SoloX SABRE-SD board and platforms
- i.MX 6SoloX SABRE-AI board and platforms
- i.MX 7Dual SABRE-SD board and platforms

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

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

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## 2 Supported Hardware SoC/Boards

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

- i.MX 6Quad SABRE-SD board and platform  
Full test on a full image
- i.MX 6DualLite SABRE-SD platform  
Full test on a full image
- i.MX 6Quad SABRE-AI board and platform  
Full test on a full image
- i.MX 6QuadPlus SABRE-AI board and platform  
Full test on a full image
- i.MX 6DualLite SABRE-AI board and platform  
Full test on a full image
- i.MX 6SoloLite EVK platform  
Full test on a full image
- i.MX 6SoloX SABRE-SD board  
Full test on a full image
- i.MX 6SoloX SABRE-AI board and platform  
Full test on a full image
- i.MX 7Dual SABRE-SD board and platform  
Full test on a full image

## 3 Release Package Contents

The L5.1.1\_2.1.0-ga release package includes the following software and documents:

**Table 1. Release package contents**

Android source code patch	<ul style="list-style-type: none"> <li>• android_L5.1.1_2.1.0-ga_core_source.tar.gz: Freescale i.MX-specific patches (apply to Google Android repo) to enable the Android platform on i.MX-based boards. For example, Hardware Abstraction Layer implementation, hardware codec acceleration, etc.</li> </ul>
Documents	<p>The following documents are included in android_L5.1.1_2.1.0-ga_docs.tar.gz</p> <ul style="list-style-type: none"> <li>• <i>Android™ Quick Start Guide (AQSUG)</i>: A manual that explains how to run the Android platform on an i.MX board using prebuilt images.</li> <li>• <i>Android™ User's Guide (AUG)</i>: A detailed manual for this release package.</li> <li>• <i>Android™ Frequently Asked Questions (AFAQ)</i>: A document that contains the answers to the Frequently Asked Questions (FAQs).</li> <li>• <i>Android™ Release Notes (ARN)</i>: A document that introduces key updates and known issues in this release.</li> </ul>

*Table continues on the next page...*

**Table 1. Release package contents (continued)**

	<ul style="list-style-type: none"> <li>• <i>i.MX Android™ Extended Codec Release Notes</i> (IMX6ACRN)</li> <li>• <i>i.MX 6 Graphics User's Guide</i> (IMX6GRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.</li> </ul>
Tools	<p>Tools in android_L5.1.1_2.1.0-ga_tools.tar.gz</p> <ul style="list-style-type: none"> <li>• MFGTool: Manufacturing tools for i.MX platform.</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>• android_L5.1.1_2.1.0-ga_core_image_6qsabresd.tar.gz: Prebuilt images with default Android features for the SABRE-SD board.</li> <li>• android_L5.1.1_2.1.0-ga_core_image_6qsabreauto.tar.gz: Prebuilt images with default Android features for the SABRE-AI board.</li> <li>• android_L5.1.1_2.1.0-ga_core_image_6slevk.tar.gz: Prebuilt images with default Android features for the 6SoloLite EVK platform.</li> <li>• android_L5.1.1_2.1.0-ga_core_image_6sxsabresd: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-SD board.</li> <li>• android_L5.1.1_2.1.0-ga_core_image_6sxsabreauto: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-AI board.</li> <li>• android_L5.1.1_2.1.0-ga_core_image_7dsabresd: Prebuilt images with default Android features for the i.MX 7Dual SABRE-SD board.</li> <li>• android_L5.1.1_2.1.0-ga_full_image_6qsabresd.tar.gz: Prebuilt images with Freescale Extended Multimedia features for the SABRE-SD board. For more information about the Freescale Extended Multimedia Feature Package, see Section 6.</li> <li>• android_L5.1.1_2.1.0-ga_full_image_6qsabreauto.tar.gz: Prebuilt images with Freescale Extended Multimedia features for the SABRE-AI board. For more information about the Freescale Extended Multimedia Feature Package, see Section 6.</li> <li>• android_L5.1.1_2.1.0-ga_full_image_6slevk.tar.gz: Prebuilt images with Freescale extended features for the i.MX 6SoloLite EVK board. The extended features include more multimedia format support.</li> <li>• android_L5.1.1_2.1.0-ga_full_image_6sxsabresd.tar.gz: Prebuilt images with Freescale extended features for the i.MX 6SoloX SABRE-SD board. The extended features include more multimedia format support.</li> <li>• android_L5.1.1_2.1.0-ga_full_image_6sxsabreauto.tar.gz: Prebuilt images with Freescale extended features for the i.MX 6SoloX SABRE-AI board. The extended features include more multimedia format support.</li> <li>• android_L5.1.1_2.1.0-ga_full_image_7dsabresd: Prebuilt images with Freescale extended features for the i.MX 7Dual SABRE-SD board. The extended features include more multimedia format support.</li> </ul> <p>All prebuilt images are in a separate package. See the <i>Android™ Quick Start Guide</i> (AQSUG) and <i>Android™ User's Guide</i> (AUG) to understand which image should be used.</p>

## 4 Features

This section contains features in this package.

**Table 2. Features**

Feature	i.MX 6Quad/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLit e EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	i.MX 7Dual SABRE- SD	Remarks
Linux 3.14.52 kernel	Y	Y	Y	Y	Y	Y	Based on Linux® OS BSP L3.14.52 GA release
Google Lollipop 5.1 release	Y	Y	Y	Y	Y	Y	Based on android-5.1.1_r1 release
Boot source	eMMC, External SD	SD, NAND	External SD	External SD	External SD, NAND	External SD	Default NAND chip supported is Micron MT29F64G08AFAAA
Splash Screen for LVDS	Y	Y	Y	Y	Y	Y	-
UI (input)	Multi-touch on LVDS panel	Multi-touch on LVDS panel	N	Multi- touch on LVDS panel	Multi- touch on LVDS panel	Touch on LCD panel	-
UI (display)	LVDS panel, HDMI display	LVDS panel, HDMI display	LCD panel	LVDS panel	LVDS panel	LCD panel, E- Ink	-
UI (dual display, LVDS +HDMI, UI mirror displayed on second device)	Y	Y	N	N	N	N	-
UI (brightness control)	Y	Y	Y	Y	Y	Y	-
Storage - External Media	Y	Y	Y	Y	Y	Y	SD, External SD, and UDisk
Connectivity - Ethernet	Y	Y	Y	Y	Y	Y	-
Connectivity - Bluetooth wireless technology	Y	N	N	Y	N	Y	Hardware: <ul style="list-style-type: none"> <li>• Broadcom BCM4339</li> </ul> Profiles: <ul style="list-style-type: none"> <li>• A2DP Source</li> </ul>

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Table 2. Features (continued)

Feature	i.MX 6Quad/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLite EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	i.MX 7Dual SABRE- SD	Remarks
							<ul style="list-style-type: none"> <li>• A2DP Sink</li> <li>• HID</li> <li>• OPP</li> <li>• PBAP</li> <li>• AVRCP</li> <li>• PAN</li> <li>• FTP</li> <li>• BLE Host</li> </ul>
Connectivity - Wi-Fi	Y	Y	Y	Y	Y	Y	Hardware: <ul style="list-style-type: none"> <li>• Broadcom BCM4339</li> </ul> Features: <ul style="list-style-type: none"> <li>• AP mode</li> </ul>
Connectivity - 3G	Y	N/A	N/A	N/A	N/A	N/A	Hardware: <ul style="list-style-type: none"> <li>• HUAWEI EM770W modem</li> </ul>
Connectivity - GPS	N	N/A	N/A	N/A	N/A	N/A	-
Connectivity - USB Tethering	Y	Y	Y	Y	Y	Y	Supports Wi-Fi or Ethernet as upstream
Power - Battery status report	Y	N/A	N/A	N/A	N/A	N/A	Known limitations about the accuracy in some use cases
Power - CPU Freq	Y	Y	Y	Y	Y	Y	-
Power - Bus Freq	Y	Y	Y	Y	Y	Y	-
Media - Music Play	Y	Y	Y	Y	Y	Y	SSI WM8962 for SABRE-SD, ESAI CS42888 for SABRE-AI
Media - Sound Record	Y	Y	Y	Y	Y	Y	SSI WM8962 for SABRE-SD, ESAI CS42888 for SABRE-AI
Media - Video Play	Y	Y	Y	Y	Y	Y	-
Media - Camera	Y	Y	Y	Y	Y	Y	Camera panorama is not supported on the i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD boards.
Media - TVIN	N/A	Y	N/A	N/A	Y	N/A	PAL/NTSC
Media - Dual Camera	Y	Y	Y	Y	Y	N/A	Hardware for SABRE-SD:

Table continues on the next page...

Table 2. Features (continued)

Feature	i.MX 6Quad/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLite EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	i.MX 7Dual SABRE- SD	Remarks
							<ul style="list-style-type: none"> <li>Front camera: OV5642/ OV5640 CSI camera</li> <li>Rear camera: OV5640 MIPI camera</li> </ul> <p>Hardware for SABRE-AI:</p> <ul style="list-style-type: none"> <li>Front camera: UVC camera</li> <li>Rear camera: TV IN</li> </ul> <p>Hardware for i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD:</p> <ul style="list-style-type: none"> <li>Front camera: UVC camera</li> <li>Rear camera: OV5640</li> </ul>
Media - Camcorder	Y	Y	Y	Y	Y	Y	No recorder function for Rear Camera on SABRE-AI.
Media - USB Camera	Y	Y	Y	Y	Y	Y	Logitech: <ul style="list-style-type: none"> <li>C250</li> <li>E3500</li> </ul> <p>Camera panorama is not supported on the i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD board.</p>
Media - USB Mic	Y	Y	Y	Y	Y	Y	-
Media - HDMI audio output	Y	Y	N/A	N/A	N/A	N/A	-
Graphic - HW 3D acceleration	Y	Y	N/A	Y	Y	N/A	OpenGL-ES 1.1/2.0/3.0 through GC2000, GC880 3D core, or GC400T
Graphic - HW accelerated UI surface composition	Y	Y	Y	Y	Y	N/A	-
Misc - ADB over USB	Y	Y	Y	Y	Y	Y	-
Misc - Fastboot utility	Y	Y	Y	Y	Y	Y	-
Misc - SW update and factory reset	Y	Y	Y	Y	Y	Y	-

Table continues on the next page...

Table 2. Features (continued)

Feature	i.MX 6Quad/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLit e EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	i.MX 7Dual SABRE- SD	Remarks
Sensor - Magnetometer	Y	Y	N	Y	N/A	Y	Freescale MAG3110 for i.MX 6, Freescale FXAS8700 for i.MX 7Dual
Sensor - Accelerometer	Y	Y	N	Y	N/A	Y	Freescale MMA8451Q for i.MX 6, Freescale FXOS8700 for i.MX 7Dual
Sensor - Gyroscope	N/A	N/A	N/A	N/A	N/A	Y	Freescale FXAS2100
Sensor - Light	Y	Y	N/A	Y	N/A	Y	Intersil ISL29023
Sensor - Pressure	N/A	N/A	N/A	N/A	N/A	Y	Freescale MPL3115
Sensor - Temperature	N/A	N/A	N/A	N/A	N/A	Y	Freescale MPL3115
NTFS-3G File System	Y	Y	Y	Y	Y	Y	For external Storage
NAND	N/A	Y	N	N	Y	N/A	Tested NAND chip: - Micron MT29F64G08AFAAA
Wi-Fi Display Source	Y	Y	N/A	N/A	N/A	N/A	Hardware: • Realtek 8821AS SDIO card
Data Partition Encryption	Y	Y	Y	Y	Y	Y	Not supported for NAND boot in Sabre-AI
USB Accessory	Y	Y	Y	Y	Y	Y	Google AOA v2.0
Screen Recording	Y	Y	N/A	N/A	N/A	N/A	-
Ethernet APK	Y	Y	Y	Y	Y	Y	-
webGL	Y	Y	N/A	Y	Y	N/A	-
UIBC in Wi-Fi Display Source	Y	Y	N/A	N/A	N/A	N/A	-

## 5 Multimedia Codecs

For multimedia codecs and features, see Section 5 in the [Google Android Lollipop 5.1 Compatibility Definition Document \(CDD\)](#)

## 6 Freescale Extended Feature Packages

Several packages are available for the release to extend the base Android Multimedia features. For more information and details about any of the packages below, send inquiries to "L2manager-android@freescale.com".

### 6.1 Extended multimedia feature package

Freescale offers an enhanced multimedia experience for the Android platform. This package delivers an error-resilient, feature-rich multimedia solution by extending the existing multimedia features of the Android platform, and introduces additional features. Extended and additional features include:

- Local playback
  - Freescale Enhanced Codecs, Demultiplexer, and File Format support
    - MOV, AVI, ASF, FLV, MPEG-PS, MPEG-TS, RealMedia, and APE
  - Trick Mode Playback
  - Multiple Audio Track Selection
  - Audio pass through to AV receiver
- Recording
- Streaming playback
  - HTTP
  - RTSP
  - RTP
  - UDP
- Subtitle support

### 6.2 Microsoft codec support

Licensed package feature support is described in the following table.

**Table 3. Microsoft codec support**

File extension	Demuxers	Video decoders	Audio decoders
.wma	ASF	-	WMA STD, PRO, Lossless
.wmv/.asf	ASF	VC-1 SP/MP/AP WMV 7/8	WMA STD, PRO, Lossless
.mkv/.mka	MKV	VC-1 SP/MP/AP	WMA STD, PRO, Lossless



## 6.3 RealMedia support

Licensed package feature support is described in the following table.

**Table 4. RealMedia support**

File extension	Demuxers	Video decoders	Audio decoders
.rmvb	RM	RV 8/9/10	RA Cook
.rm			AAC
.ra			

## 6.4 Dolby digital audio

Freescall offers two Dolby Digital Audio solutions which can be integrated into the Extended Multimedia Package.

- Dolby Digital (AC-3) with support for Audio Pass-through
- Dolby Digital Plus

## 6.5 Wi-Fi Display Sink feature package

Freescall extends the Android platform by offering a Wi-Fi Display Sink feature. The Wi-Fi hardware module used for this feature is the Broadcom BCM4339 SDIO Card (Murata TypeZP Ver2.0 SDIO module), but the design of this feature allows porting to any Wi-Fi hardware module. Using the Freescall Wi-Fi Display Sink API and the demonstration application, users can easily develop their own Sink Application. This feature has been verified using several of the most popular Android phones and tablets.

## 7 Change Log

Compared to the L5.1.1\_2.0.0\_6qp-ga release, this release has the following major changes:

- Upgraded the Linux kernel version from the L3.14.38\_6qp-ga release to the L3.14.52-ga release.
- Added i.MX 6QuadPlus SABRE-SD board support.
- Enabled Broadcom BCM4339 Wi-Fi and Bluetooth module.
- Fixed screen tearing in recovery mode during factory resetting and OTA upgrading.
- Fixed system hang-up issue when playing some short videos for a long time.
- Moved all Freescall extended API to freescall-extended.jar.
- Enabled the ZRAM function for Android platform to enlarge the memory size.
- Integrated 2015-11 AOSP Security patches.

## 8 Known Issues and Limitations

Read through all hardware-related reference material and ensure the necessary hardware modifications have been made before using the software.

**Table 5. Known issues and limitations**

Issue description	Remarks
Battery level info is incorrect when charged in i.MX 6DualQuad/6DualLite SABRE-SD board and platform.	To resolve this issue, add a fuel gauge in hardware.
UI is in Landscape mode while camera preview is in Portrait mode on the SABRE-SD platform.	SABRE-SD platform issue. See " <i>i.MX Android Camera Issue on the SDP Board</i> " for more details.
PCIe does not support Hot Plug and Power Management.	PCIe Intel Wi-Fi source code has been integrated into this release. However, PCIe is not enabled by default because the power management is not supported. See <a href="http://community.freescale.com/docs/DOC-94045">community.freescale.com/docs/DOC-94045</a> about the instructions to enable PCIe Wi-Fi.
L/R channel is swapped in SABRE-AI board.	It is a hardware issue. Connect the red line to white port, white line to red port.
3G modem cannot work if the BT in bootargs of the bootloader is enabled.	The I/O pin KEY_COL4 is either used by the UART5 as UART RTS pin or by the 3G modem as a DISABLE pin.
Google USB driver must be installed multiple times for the MTP, PTP, MTP&ADB, PTP&ADB, and ADB function settings.	Some Windows® XP OS environments may display MTP and PTP Windows OS even though PTP only is enabled in the device.
There is silence in the first a few seconds for HDMI output when connecting the SABRE-AI or SABRE-SD board to a TV set.	This issue is related to the TV set. Some TV sets have no issues while some TV sets have issues.
Youku 4.6.5 and 4.7.7 Apks cannot play any stream.	This issue is still under investigation.
Wi-Fi P2P connection may be interrupted in bad wireless environment.	Murata TypeZP Ver2.0 SDIO module has defect in P2P connection stability.
Power consumption on the audio and video playback use case has decreased.	This issue is still under investigation.
Some CTS use cases may fail randomly if running the whole CTS suite.	This issue is still under investigation.

## 9 Revision History

**Table 6. Revision history**

Revision number	Date	Substantive changes
L5.1.1_2.1.0-ga	01/2016	Initial release.

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