i.MX Linux® Release Notes

1   Overview

This document contains important information about the package contents, supported features, known issues and limitations in this release.

For information on changes in this release, see the manifest Readme at index: imx-manifest.git and the Change Logs at index: imx-manifest.git.

Supported hardware SoC/board

- i.MX 8MQuad Board (Beta Quality)

NOTE

In this document, the following notation is used:

- 8MQ stands for the i.MX 8MQuad EVK Platform.

1.1   Release contents

This release consists of the following package files:

- L4.9.51-beta_images_mx8mq.tar.gz
- fsl-yocto-L4.9.51_imx8mq-beta.tar.gz

The GA releases are named "L<Kernel_version>_<x.y.z>".

"<Kernel_version>": BSP Kernel version. (For example, "L4.9.51 indicates that this BSP release is based on the kernel version 4.9.51)

"<x.y.z>": Semantic versioning specification, where X is the major version, Y is the minor version, and Z is the patch version.

The following tables list the contents included in each package.

Table 1. Release contents

Component	Description
Linux® OS Kernel and Device Trees	4.9.51
U-Boot	v2017.03
SD Card images	Pre-built images for download, and image files gathering a suggestion of packages and libraries needed for the common tests.
Manufacturing Tools for i.MX 8MQuad.	MFGtools is a program used to burn a production image into the board using a set of predefined parameters, such as the target memory to be used.
	USB recognition may fail in serial download mode. You can use SD boot mode without an SD card in socket to force ROM to enter serial download mode, and then the MFGtools can work.

In the following table, the U-Boot configurations are listed for each machine configuration. The machine configurations are provided through the Yocto Project layers in the meta-freescale and meta-freescale-fsl-bsp-release layers in the `conf/machine` sub-directory.

Table 2. U-Boot configurations

U-Boot configuration for Boot device	Description	Supported machine configuration
sd	This supports booting from the SD card. This is the default U-Boot configuration.	imx8mqevk

The following table describes the kernel and device trees included in this release. A list of several device tree files are provided for each board to offer examples on how to handle different pin conflicts due to pin muxing.

Table 3. Kernel and device tree configurations

Kernel and device tree configuration	Description
Kernel image for i.MX 8	Binary kernel image for i.MX 8MQuad kernel is built using defconfig in arch/arm64/configs/.
	Kernel image: Image
	Board DTB files:
	• fsl-imx8mq-evk.dts: for HDMI output
	• fsl-imx8mq-evk-lcdif-adv7535.dts: for MIPI-DSI output
Default DTB	Each reference board has a standard device tree as follows:
	• Image-fsl-imx8mq-evk.dtb

The release package contains the following pre-built images.

Table 4.   Pre-built images

Package	Description
Frame Buffer SDCard	This release provides the following SD card images for the Frame Buffer backend: • fsl-image-qt5-validation-imx-fb-imx8mqevk.tar.bz2 • fsl-image-validation-imx-fb-imx8mqevk.tar.bz2
XWayland SDCard	This release provides the following SD card images for the XWayland backend with the Weston compositor: • fsl-image-qt5-validation-imx-xwayland-imx8mqevk.sdcard.bz2 • fsl-image-validation-imx-xwayland-imx8mqevk.sdcard.bz2
Kernel	Kernel and device trees as specified in Table 3.
U-Boot	U-Boot files as specified in Table 2.
mfgtools_with_rootfs.tar.gz	Manufacturing tools are supported with the manufacturing tools kernel.
M4-Demo	• imx8mq_m4_hello_world.bin • imx8mq_m4_TCM_hello_world.bin • imx8mq_m4_TCM_rpmsg_lite_pingpong_rtos_linux_remote.bin • imx8mq_m4_TCM_rpmsg_lite_str_echo_rtos.bin
Combined Boot Image	Boot image that combines HDMI Firmware, DDR Firmware, U-Boot, and Arm Trusted Firmware: imx-boot-imx8mqevk-sd.bin-flash_hdmi_spl_uboot, imx-boot-imx8mqevk-sd.bin-flash_spl_uboot.

Table 5.   fsl-yocto-L4.9.51_imx8mq-beta.tar.gz content

File name	Description
README	README for L4.9.51_imx8mq-beta.
/doc	The following docs are provided: i.MX Linux® Release Notes, User's Guide, Porting Guide, Graphics Guide, Yocto Project User's Guide, and Reference Manual.

Table 6.   Multimedia standard packages

File name	Description	Comment
imx-gst1.0-plugins-4.3.2.tar.gz	GStreamer plugins	i.MX GStreamer plugins
imx-codec-4.3.2.bin	i.MX codecs	i.MX optimized A/V core codec
imx-parser-4.3.2.bin	i.MX parser	i.MX optimized core parser

Contact a marketing representative to get access to the following controlled packages.

Table 7.   Controlled access packages

File name	Description	Comment
imx-aacpcodec-4.3.2.bin	AACplus decoder	i.MX optimized AACplus decoder
imx-mscodec-4.3.2.bin	Microsoft codecs	i.MX optimized Microsoft codecs
imx-msparser-4.3.2.bin	Microsoft parser	i.MX optimized Microsoft ASF parser
imx-ac3codec-4.3.2.bin	AC3 decoder	i.MX optimized Dolby audio AC3 decoder

Table continues on the next page...

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

Table 7. Controlled access packages (continued)

File name	Description	Comment
imx-ddpcodec-4.3.2.bin	DDplus decoder	i.MX optimized Dolby audio DDplus decoder
imx-real-4.3.2.bin	Real Networks codecs and parser	i.MX optimized Real Networks real audio decoder, real media parser.
firmware-bcmdhd-1.363.22.bin	Broadcom Bluetooth® firmware and Wi-Fi firmware	Broadcom Firmware for Wi-Fi and Bluetooth wireless technology.

1.2 License

The Board Support Package (BSP) is composed of a set of packages and metadata (for Yocto Project Recipes) and each one has its own licensing. Verify the license of the target package before developing. The license can be found at the top of a recipe or a source file (such as *.c or *.h). For details, contact your NXP representative.

The following components are released as binary files on the Yocto Project Mirror and have NXP Proprietary Licenses. During the Yocto Project setup, to set up an i.MX build, accept the NXP license. This acceptance is recorded in the build configuration files so that the following proprietary binaries can be extracted during the build process. The NXP proprietary packages contain a Software Content Register (SCR) file that lists information about the package:

- imx-gpu-viv
- imx-codec
- imx-parser

1.3 Proprietary Licensing Packages

i.MX packages can be found in two locations:

- Standard packages are provided on the NXP mirror. They are accessed automatically by the Yocto Project scripts as needed.

- Limited Access packages listed in the following table are provided on nxp.com with controlled access. Contact your sales representative for access. These include codecs to support WMA, WMV, RMVB, AAC+, AC3, DD+ decoding, encoding, WMA, Broadcom firmware, and E Ink firmware. Each package has its own Readme file with instructions on how to build, install, and run.

Table 8. Limited access packages for Yocto project releases

Name	Package	Comment
AACPlus Decoder	imx-aacpcodec-4.3.2.bin	i.MX AACplus core decoder
Microsoft Codec	imx-mscodec-4.3.2.bin	i.MX optimized MS codec
Microsoft Parser	imx-msparser-4.3.2.bin	i.MX optimized ASF parser
AC3 Decoder	imx-ac3codec-4.3.2.bin	i.MX AC3 core decoder
DDplus Decoder	imx-ddpcodec-4.3.2.bin	i.MX DD-plus decoder
RMVB Decoders and Parser	imx-real-4.3.2.bin	i.MX Real Networks
Broadcom Firmware	firmware-bcmd-1.363.22.bin	Broadcom Bluetooth wireless technology and Wi-Fi firmware

1.4   References

This release includes the following references and additional information.

- *i.MX Linux® Release Notes* (IMXLXRN) - Provides the release information.
- *i.MX Linux® User's Guide* (IMXLUG) - Contains the information on installing U-Boot and Linux OS and using i.MX-specific features.
- *i.MX Yocto Project User's Guide* (IMXLXYOCTOUG) - Contains the instructions for setting up and building Linux OS in the Yocto Project.
- *i.MX Reference Manual* (IMXLXRM) - Contains the information on Linux drivers for i.MX.
- *i.MX Graphics User's Guide* (IMXGRAPHICUG) - Describes the graphics used.
- *i.MX BSP Porting Guide* (IMXXBSPPG) - Contains the instructions on porting the BSP to a new board.

2   What's New?

This section describes the changes in this release, including new features and defect fixes.

2.1   New features

A summary of the main new features is as follows.

New features added for all supported boards:

- Upgraded the kernel to 4.9.51.
- Updated EULA to v20 June 2017.
- New location at Code Aurora Forum at https://source.codeaurora.org/external/imx/:
  - New manifest imx-manifest for distributions
  - New repos at Code Aurora Forum repo site
- Upgraded the Yocto Project to version 2.2 Morty.
- Upgraded U-Boot to 2017.03.
- Supports the GCC 6.2.0 toolchain.
- Graphics updates:
  - Upgraded to 6.2.4.p0
  - GPU SDK upgraded to 4.0.2
- Chromium browser upgraded to v53.0.2785.143 for XWayland.
- New multimedia features and changes::
  - GStreamer upgraded to 1.12.2
  - Qt upgraded to 5.8
  - Supports 64-bit audio codecs and parsers.
- Supports Qualcomm Wi-Fi and Bluetooth.

Features on i.MX 8MQuad:

- Supports U-Boot SPL.
- Supports Arm Trusted Firmware.
- Supports 4kp60 video playback with HDMI display.
- Supports USB3.0.
- Supports USB Type-C and Power Delivery.
- Supports HDMI2.0.
- No X11 backend supported in i.MX 8MQuad.
- Supports Camera.

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

- Supports DRM/KMS for display drivers.
- Supports low-power features: runtime power gating, CPU idle, DDR retention, and DDR low frequency.
- Supports security boot and CAAM driver in Linux OS.
- Supports CSU, RDC, and TZASC in Arm Trusted Firmware.

3 BSP Supported Features

The following table describes the features that are supported in this BSP release. In this table, if no board is explicitly stated, the feature is shared across all boards listed in Supported Hardware in the Release contents section; otherwise, the feature is only supported on the boards listed.

Table 9. Supported features

Feature	Supported board	Comment
Kernel		
Kernel	All i.MX	Kernel version: 4.9.51
File System	All i.MX	EXT2/EXT3/EXT4 are used as the file system in MMC/eMMC/SD card.
Bootloader		
U-Boot	All i.MX	U-Boot delivery is based on U-Boot version v2017.03.
		Clock, Anatop regulator, ENET, UART, MMC/SD, eMMC4.3/4.4/4.5.
		High-Assurance Boot, ROM Plug-in Mode.
		SPI-NOR, NAND, FlexSPI-NOR, USB Mass Storage.
		See Table 2 in Section 1.1 for U-Boot configurations supported on each board for SPI_NOR, NAND, Parallel NOR, FlexSPI-NOR. These are not supported on all boards.
		i.MX 8 uses imx-mkimage to produce the flash.bin file that contains the i.MX 8 system controller firmware and U-Boot, and the flash.bin file that can be flashed to the SD cards with the command: dd if=flash.bin of=/dev/sd<x> seek=33 bs=1K.
		8MQuad and 8QuadMax use seek=33 bs=1k.
Machine-specific layer		
Arm® Core	All i.MX	i.MX 8MQuad supports four Cortex-A53 cores.
Memory	All i.MX	On i.MX 8 with 64-bit configuration, the memory is not split.
Interrupt	All i.MX	GIC.
Clock	All i.MX	Controls the system frequency and clock tree distribution.
Timer (GPT)	All i.MX	System timer tick and broadcast timer support.
GPIO/EDIO	All i.MX	GPIO is initialized in earlier phase according to hardware design.
Character device drivers		
MXC UART	All i.MX	i.MX 8 supports through LPUART0.
Networking drivers		
ENET	8MQuad	i.MX 8 supports Atheros AR8031 PHY with 10/100/1000 bps mode and AVB features.
IEEE® 1588		Supports Linuxptp stack. Features: • Supports IPv4, IPv6, and IEEE 802.3 transport.

Table continues on the next page...

Table 9.   Supported features (continued)

Feature	Supported board	Comment
		• Supports E2E, and P2P transparent clock. • Supports IEEE802.1AS-2011 in the role of end station. Note: Linuxptp stack is open source. Command instance: `ptp4l -A -4 -H -m -i eth0`
PCIe	All i.MX	With the platform that supports the PCIe module.
Sound drivers		
SAI	8MQuad	Supports 16 bit, 24 bit, and 32 bit PCM format. Supports sample rate from 8 KHz to 96 KHz for record and playback . Supports full duplex operations. Supports amixer alsamixer control from user space. Supports clock control.
Input device drivers		
USB devices	All i.MX	Supports USB mouse and USB keypad through USB ports.
MTD driver		
USB drivers		
USB Device	All i.MX	Supports USB OTG device mode.
USB	All i.MX	Supports USB OTG2.0, USB Host2.0, USB 3.0, and Type-C ports. USB Host mode: MSC, HID, UVC, and USB audio. USB device mode: MSC, Ethernet, and Serial. USB OTG pin detect support for Dual-role switch at USB2.
Graphics drivers		
HDMI	8MQuad	i.MX DCSS is used for i.MX 8MQuad.
MIPI Display	8MQuad	Supports MIPI display drived by LCDIF with up to 720p60.
Multimedia Drivers		
VPU	8MQuad	i.MX 8MQuad Decoder: HEVC, VP9, H.264, MPEG-2, MPEG-4p2, VC-1, VP8, RV9, AVS, MJPEG, H.263.
MIPI Camera	8MQuad	Supports MIPI camera OV5640 with 720p30, 1080p30, 2592x1944@15.
General drivers		
uSDHC	All i.MX	Supports SD2.0 and SDXC. Supports SD3.0 on all i.MX except 6SABRE-SD.
Watchdog	All i.MX	Supports Watchdog reset.
I2C	All i.MX	Supports I2C master.
SPI	All i.MX	Supports SPI master mode.
PWM	All i.MX	Supports the backlight driver through PWM.
Temperature monitor	All i.MX	Pre-calibrated. See the "Thermal Driver" chapter in *i.MX Linux® Reference Manual* (IMXLXRM) for more information.

Table continues on the next page...

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

Table 9. Supported features (continued)

Feature	Supported board	Comment
Wi-Fi/Bluetooth wireless technology	8MQuad	Supports the Qualcom QCOM6174 Bluetooth/Wi-Fi module. Firmware "board.bin" in rootfs "lib/firmware/ath10k/QCA6174/hw3.0" requires to be updated to the special "board.bin" file supplied by Wi-Fi module vendor Murata.

4 Kernel Boot Parameters

Depending on the booting or usage scenario, you may need different kernel boot parameters.

The following table describes different boot parameters.

Table 10. Common kernel boot parameters

Kernel parameter	Description	Typical value	Used when
console	Where to output the kernel logging by printk.	console=ttymxc0,115200	All use cases
nosmp	A command-line option of 'nosmp' disables SMP activation entirely.	nosmp	CONFIG_SMP is defined. Use this to disable SMP activation. SMP is activated by default through the CONFIG_SMP configuration.
ip	Tells the kernel how or whether to get an IP address.	ip=none ip=dhcp ip=static_ip_address	"ip=dhcp" or "ip=static_ip_address" is mandatory in "boot from TFTP/NFS."
nfsroot	Location of the NFS server/directory.	nfsroot=<ip_address>:<rootfs path>	Used in "boot from tftp/NFS" together with "root=/dev/nfs."
root	Location of the root file system.	root=/dev/nfs or root=/dev/mmcblk0p2	Used in "boot from tftp/NFS" (that is, root=/dev/nfs); Used in "boot from SD" (that is, root=/dev/mmcblk0p2).
rootfstype	Indicates the file system type of the root file system.	rootfstype=ext4	Used in "boot from SD" together with "root=/dev/mmcblkXpY" (X is the MMC device number while Y is the rootfs partition number.)
rootwait	Waits (indefinitely) for the root device to show up.	rootwait	Used when mounting SD root file system.
mem	Tells the kernel how much memory can be used.	None or mem=864M	Note: MemTotal-<mem> - <gpu_memory> is reserved.
fec.macaddr	Tells the Ethernet MAC address.	fec.macaddr=0x00,0x04,0x9f, 0x01,0x30,0x05	Changes the FEC MAC address.

Table continues on the next page...

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

Table 10.   Common kernel boot parameters (continued)

Kernel parameter	Description	Typical value	Used when
video	Set the HDMI maximum supported resolution.	1920x1080p60: video=HDMI-A-1:1920x1080-32@60 3840x2160p30: video=HDMI-A-1:3840x2160-32@30 1280x720p60: video=HDMI-A-1:1280x720-32@60 720x480p60: video=HDMI-A-1:720x480-32@60	Connected to an HDMI display that can only support up to 1080p60.

5   Known Issues/Limitations

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

The following tables list some key known issues.

Table 11.   Known issues and workarounds for i.MX 8

Module	Source	Description	Workaround
Yocto rootfs	Software	Release image only has 64 bit libraries, so this rootfs cannot support 32 bit application running.	Built multiple-libraries for both 32 bit and 64 bit in one rootfs image.
GPU	Software	GLES multiple-conformance test meet galcore down after running for more than 20 hours. OpenCL 1.2FP and ES31 conformance test random fails. Miss eglretrace in Wayland and FB image.	Eglretrace from Linux/Windows desktop shall be used to replay from the apitrace file generated from i.MX 8MQuad.
USB Type-C	Software	The system cannot boot up succesfully if the power supply is only from type-c port on the i.MX 8MQuad EVK board in the Alpha and Beta relase.	No workaround.
CAAM	Software	The default SoC configuration places the secure memory in the Secure World, while the Linux Kernel runs in Normal World. Thus, the CAAM driver running in Normal World cannot access the secure memory.	Update the CAAM secure memory control configuration to allow Normal World access before starting the Linux Kernel.

6   Multimedia

This chapter contains the information on the 4.3.0 multimedia component of the BSP.

The GStreamer version in this release is 1.12.2.

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

6.1 i.MX GStreamer plugins

Table 12. i.MX GStreamer 1.0 plugins

Plugin	Features
Audio decoder	beepdec: unified audio decoder plugin
	Supports MP3, AAC, AAC+, WMA, AC3, Vorbis, DD+, AMR, RA
Demux	aiurdemux: aiur universal demuxer plugin supporting
	Supports AVI, MKV, MP4, MPEG2, ASF, OGG, FLV, WebM, RMVB
Video Decoder	vpudec: video decoder plugin based on the hardware video decoder
Video render	• kmssink: video sink based on the DCSS KMS driver • glimagesink: video sink based on EGL
Video source	• v4l2src: V4L2 based camera source plugin
OpenGL (ES) Plugins	• glimagesink: OpenGL (ES)-based video sink plugin, supported in Wayland and FB backends • gleffects: GL Shading Language effects plugin • gldeinterlace: video deinterlacing based on shaders • glvideomixer: compositing multiple videos together • glcolorconvert: video color space convert based on shaders • glcolorbalance: adjusting brightness, contrast, hue, and saturation on a video stream

NOTE
- To support WMA, AAC+, AC3, DD+, and RA decoding, install separate packages.
- OpenGL (ES) plugins are from the gst-plugins-bad package, accelerated with Vivante private APIs.

6.2 i.MX playback example

i.MX provides an example gplay-1.0 application based on GStreamer's high-level API GstPlayer. The example provides the following functions.

Table 13. i.MX playback engine example

Function	Feature
Playback	• Play, Stop • Pause, Resume • Fast seek, Accurate seek • Playback rate control (fast forward, fast rewind, slow forward)
Media Info	• Media meta data (artist, year, etc.) • Video Thumbnail • Audio Album Art
Subtitle	Supports internal and external subtitle
Track Selection	• Audio Track Selection • Video Track Selection • Subtitle Selection
Display Control	• Resize

6.3   Multimedia feature matrix

This section provides feature matrix details of various codecs used for play back.

6.3.1   Parser/Demuxer specifications

The demuxer support of a particular audio or video type requires the availability of the codec.

Table 14.   Parser/Demuxer supported audio/video

	Demuxer feature	ASF	AVI	MP4	OGG	FLV	MPG2	MKV	RMVB
MPEG2	-	Y	-	-	-	Y	Y	-	
MPEG4	Y	Y	Y	-	-	-	Y	-	
H263	-	Y	Y	-	Y	-	Y	-	
MJPEG	-	Y	Y	-	-	-	Y	-	
VC1	Y	Y	-	-	-	-	Y	-	
DivX	Y	Y	Y	-	-	-	Y	-	
Xvid	-	Y	-	-	-	-	Y	-	
VP8	-	-	-	-	-	-	Y	-	
VP6	-	-	-	-	Y	-	Y	-	
Theora	-	-	-	Y	-	-	-	-	
RV	-	-	-	-	-	-	Y	Y	
Audio	AAC	-	Y	Y	-	Y	Y	Y	Y
	MP3	Y	Y	Y	-	Y	Y	Y	-
	WMA	Y	Y	-	-	-	-	Y	-
	AC3	-	Y	Y	-	-	Y	Y	-
	PCM/ADPCM	Y	Y	Y	-	Y	Y	Y	-
	AMR	-	-	Y	-	-	-	Y	-
	Vorbis	-	Y	Y	Y	-	-	Y	-
	SPEEX	-	-	-	Y	Y	-	Y	-
	DTS	-	-	-	-	-	Y	Y	-
	FLAC	-	-	-	Y	-	-	Y	-
	DD+	Y	-	Y	-	-	Y	Y	-
	RA	-	-	-	-	-	-	-	Y

6.3.2   Video codec specifications

The tables in this section show the video codec specifications .

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

Table 15.   Video codec specification for hardware with VPU acceleration

	Feature	Profile	Max. resolution	Min. resolution	Max. framerate	H/W or S/W	Bitrate	Comment
Video decoder	MPEG2	MP	1920 * 1080	64 * 64	30 fps	H/W	50 Mbps	-
	MPEG4	SP	1920 * 1080	64 * 64	30 fps	H/W	40 Mbps	-
	MPEG4	ASP	1920 * 1080	64 * 64	30 fps	H/W	40 Mbps	-
	H.263	P3	1920 * 1080	64 * 64	30 fps	H/W	20 Mbps	-
	H.264	BP	3840 * 2160	64 * 64	30 fps	H/W	50 Mbps	-
	H.264	MP	3840 * 2160	64 * 64	30 fps	H/W	50 Mbps	-
	H.264	HP	3840 * 2160	64 * 64	30 fps	H/W	50 Mbps	-
	VC-1	SP	1920 * 1080	64 * 64	30 fps	H/W	45 Mbps	-
	VC-1	MP	1920 * 1080	64 * 64	30 fps	H/W	45 Mbps	-
	VC-1	AP	1920 * 1080	64 * 64	30 fps	H/W	45 Mbps	-
	VP8	-	1920 * 1080	64 * 64	30 fps	H/W	20 Mbps	-
	MJPEG	-	1920 * 1080	64 * 64	30 fps	H/W	120 Mpixl	-
	RV	8/9/10	1920 * 1080	64 * 64	30 fps	H/W	40 Mbps	-
	HEVC	main, main 10	3840 * 2160	64 * 64	60 fps	H/W	160 Mbps	-
	VP9	profile 0, 2	3840 * 2160	64 * 64	60 fps	H/W	160 Mbps	-

6.3.3   Audio codec specification

Table 16.   Audio codec specification

Decoder	Feature/Profile	Channel	Sample rate (KHz)	Bit rate (kbps)	H/W or S/W	Comment
MP3	MPEG-1 (Layer-1/ Layer-2/Layer-3) MPEG-2 (Layer-1/ Layer-2/Layer-3) MPEG-2.5 (Layer-3)	stereo/mono	<= 48	8 - 448	S/W and H/W	-

Table continues on the next page...

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

Table 16.   Audio codec specification (continued)

Decoder	Feature/Profile	Channel	Sample rate (KHz)	Bit rate (kbps)	H/W or S/W	Comment
AACLC	MPEG-2 AACLC MPEG-4 AACLC	<= 5.1	8 - 96	8 - 256	S/W and H/W	For H/W, it only supports mono and stereo channels.
HE-AAC	HE-AAC V1 HE-AAC V2	stereo/mono	8 - 96	Mono: 8 - 384 stereo: 16 - 768	S/W	-
WMA10 Std	L1 @ QL1	stereo/mono	44.1	64 - 161	S/W	-
	L2 @ QL1	stereo/mono	<= 48	<= 161	S/W	-
	L3 @ QL1	stereo/mono	<= 48	<= 385	S/W	-
WMA10 Pro	M0a @ QL2	stereo/mono	<= 48	48 - 192	S/W	-
	M0b @ QL2	stereo/mono	<= 48	<= 192	S/W	-
	M1 @ QL2	<= 5.1	<= 48	<= 384	S/W	-
	M2 @ QL2	<= 5.1	<= 96	<= 768	S/W	-
	M3 @ QL2	<= 7.1	<= 96	<= 1500	S/W	-
WMA 9 Lossless	N1	stereo/mono	<= 48	<= 3000	S/W	-
	N2	<=5.1	<= 96	<= 3000	S/W	-
	N3	<=7.1	<= 96	<= 3000	S/W	-
AC-3	-	<=5.1	<= 48	32 - 640	S/W	-
FLAC	-	<=7.1	8 - 192	-	N/A	-
BSAC	-	<=5.1	<= 48	64 per channel	N/A	Core codec only
Ogg Vorbis	q1 - q10	Stereo	8 - 192	<= 500	S/W	-
DD-plus	-	<=7.1	32, 44.1, 48 64, 88.2, 96	<= 6.144 Mbps	S/W	-
RA	cook	stero/mono	8k, 11.025k, 22.05k, 44.1k	-	S/W	-

NOTE

- The bitrate (bps) supported for MP3 encoder: 32 k, 48 k, 56 k, 64 k, 80 k, 96 k, 112 k, 128 k, 160 k, 192 k, 224 k, 256 k, 320 k
- The sample and supported bitrate (bps) combinations for WMA8 encoder:
    - For mono output:
        - 22050 Hz: 20 k, 16 k, 22 k, 17.6 k
        - 32000 Hz: 20 k, 22 k
        - 44100 Hz: 32 k, 35.2 k, 48 k, 52.8 k
    - For Stereo output:
        - 22050 Hz: 35.2 k, 32 k, 22 k, 20 k
        - 32000 Hz: 52.8 k, 48 k, 44 k, 40 k, 35.2 k, 32 k
        - 44100 Hz: 211.2 k, 192 k, 176 k, 160 k, 140.8 k, 128 k, 105.6 k, 96 k, 88 k, 80 k, 70.4 k, 64 k
        - 48000 Hz: 211.2 k, 192 k, 176 k, 160 k, 140.8 k, 128 k

i.MX Linux® Release Notes, Rev. L4.9.51_imx8mq-beta, 12/2017

6.3.4 Speech codec specification

Table 17. Speech codec specification

	Feature	Sample rate	Bit rate (kbps)	H/W or S/W
Speech codec	G.711	8 KHz	64	S/W
	G.723.1	8 KHz	5.3, 6.3	S/W
	G.726	8 KHz	16, 24, 32, 40	S/W
	G.729ab	8 KHz	8	S/W
	AMR_NB	8 KHz	12.2, 10.2, 7.9, 7.4, 6.7, 5.9, 5.15, 4.75	S/W
	AMR_WB	16 KHz	23.85, 23.05, 19.85, 18.25, 15.85, 14.25, 12.65, 8.85, 6.6	S/W

6.3.5 Streaming protocol specification

Table 18. Streaming protocol specification

Protocol	Feature
HTTP	HTTP progressive streaming
RTSP	RTP, SDP
RTP/UDP	RTP/UDP MPEGTS streaming

6.3.6 Subtitle specification

Table 19. Subtitle specification

Internal/External	Subtitle format
Internal	SRT, SSA, ASS
External	SRT

6.4 Known issues and limitations for multimedia

Issues seen on GStreamer 1.x:

7 Revision History

This table provides the revision history.

Table 20. Revision history

Revision number	Date	Substantive changes
L4.9.51_imx8qxp-alpha	11/2017	Initial release
L4.9.51_imx8qm-beta1	12/2017	Added i.MX 8QuadMax
L4.9.51_imx8mq-beta	12/2017	Added i.MX 8MQuad

How to Reach Us:

Home Page:
nxp.com

Web Support:
nxp.com/support

Information in this document is provided solely to enable system and software implementers to use NXP products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document. NXP reserves the right to make changes without further notice to any products herein.

NXP makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does NXP assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. ìTypicalî parameters that may be provided in NXP data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including ìtypicals,î must be validated for each customer application by customerís technical experts. NXP does not convey any license under its patent rights nor the rights of others. NXP sells products pursuant to standard terms and conditions of sale, which can be found at the following address: nxp.com/SalesTermsandConditions.