

Supported media formats

This document describes the media codec, container, and network protocol support provided by the Android platform.

The tables below describe the media format support built into the Android platform. YES means the format is available on handholds and tablets running all Android versions. Where a specific Android platform is specified, the format is available on handsets and tablets running that version and all later versions. The format might also be available in earlier versions, but this is not guaranteed. On form factors other than handsets and tablets, media format support may vary.

Note that a particular mobile device might support additional formats or file types that are not listed in these tables. In addition, if you use a [MediaCodec](#) (</reference/android/media/MediaCodec>) directly, you can access any of the available media formats regardless of the supported file types and container formats.

Audio support

Format	Encoder	Decoder	Details	File Types Container Formats
AAC LC	YES	YES	Support for mono/stereo/5.0/5.1 content with standard sampling rates from 8 to 48 kHz.	<ul style="list-style-type: none"> • 3GPP (.3gp) • MPEG-4 (.mp4, .m4a) • ADTS raw AAC (.aac, decode in Android 3.1+, encode in Android 4.0+, ADIF not supported) • MPEG-TS (.ts, not seekable, Android 3.0+)
HE-AACv1 (AAC+)	Android 4.1+	YES		
HE-AACv2 (enhanced AAC+)		YES	Support for stereo/5.0/5.1 content with standard sampling rates from 8 to 48 kHz.	
xHE-AAC		Android 9+	Support for up to 8ch content with standard sampling rates from 8 to 48 kHz	

AAC ELD (enhanced low delay AAC)	Android 4.1+	Android 4.1+	Support for mono/stereo content with standard sampling rates from 16 to 48 kHz	
AMR-NB	YES	YES	4.75 to 12.2 kbps sampled @ 8kHz	<ul style="list-style-type: none"> • 3GPP (.3gp) • AMR (.amr)
AMR-WB	YES	YES	9 rates from 6.60 kbit/s to 23.85 kbit/s sampled @ 16kHz	
FLAC	Android 4.1+	Android 3.1+	Mono/Stereo (no multichannel). Sample rates up to 48 kHz (but up to 44.1 kHz is recommended on devices with 44.1 kHz output, as the 48 to 44.1 kHz downsampler does not include a low-pass filter). 16-bit recommended; no dither applied for 24-bit.	<ul style="list-style-type: none"> • FLAC (.flac) • MPEG-4 (.mp4, .m4a, Android 10+)
MIDI		YES	MIDI Type 0 and 1. DLS Version 1 and 2. XMF and Mobile XMF. Support for ringtone formats RTTTL/RTX, OTA, and iMelody	<ul style="list-style-type: none"> • Type 0 and 1 (.mid, .xmf, .mxmf) • RTTTL/RTX (.rtttl, .rtx) • OTA (.ota) • iMelody (.imy)
MP3		YES	Mono/Stereo 8-320Kbps constant (CBR) or variable bit-rate (VBR)	<ul style="list-style-type: none"> • MP3 (.mp3) • MPEG-4 (.mp4, .m4a, Android 10+) • Matroska (.mkv, Android 10+)
Opus	Android 10+	Android 5.0+		<ul style="list-style-type: none"> • Ogg (.ogg) • Matroska (.mkv)
PCM/WAVE	Android 4.1+	YES	8- and 16-bit linear PCM (rates up to limit of hardware). Sampling rates for raw PCM recordings at 8000, 16000 and 44100 Hz.	WAVE (.wav)
Vorbis		YES		<ul style="list-style-type: none"> • Ogg (.ogg) • Matroska (.mkv, Android 4.0+)

				<ul style="list-style-type: none"> • MPEG-4 (.mp4, .m4a, Android 10+)
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Video support

Video formats

Format	Encoder	Decoder	Details	File Types Container Formats
H.263	YES	YES	Support for H.263 is optional in Android 7.0+	<ul style="list-style-type: none"> • 3GPP (.3gp) • MPEG-4 (.mp4) • Matroska (.mkv)
H.264 AVC Baseline Profile (BP)	Android 3.0+	YES		<ul style="list-style-type: none"> • 3GPP (.3gp) • MPEG-4 (.mp4) • MPEG-TS (.ts, AAC audio only, not seekable, Android 3.0+)
H.264 AVC Main Profile (MP)	Android 6.0+	YES	The decoder is required, the encoder is recommended.	<ul style="list-style-type: none"> • Matroska (.mkv)
H.265 HEVC		Android 5.0+	Main Profile Level 3 for mobile devices and Main Profile Level 4.1 for Android TV	<ul style="list-style-type: none"> • MPEG-4 (.mp4) • Matroska (.mkv)
MPEG-4 SP		YES		3GPP (.3gp)
VP8	Android 4.3+	Android 2.3.3+	Streamable only in Android 4.0 and above	<ul style="list-style-type: none"> • WebM (.webm) • Matroska (.mkv, Android 4.0+)
VP9		Android 4.4+		<ul style="list-style-type: none"> • WebM (.webm) • Matroska (.mkv)

AV1	Android 14+	Android 10+	Encoder and decoder are mandatory beginning with Android 14.	<ul style="list-style-type: none"> • MPEG-4 (.mp4) • Matroska (.mkv)
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Video encoding recommendations

The table below lists the Android media framework video encoding profiles and parameters recommended for playback using the H.264 Baseline Profile codec. The same recommendations apply to the Main Profile codec, which is only available in Android 6.0 and later.

	<u>SD (Low quality)</u>	<u>SD (High quality)</u>	<u>HD 720p (N/A on all devices)</u>
Video resolution	176 x 144 px	480 x 360 px	1280 x 720 px
Video frame rate	12 fps	30 fps	30 fps
Video bitrate	56 Kbps	500 Kbps	2 Mbps
Audio codec	AAC-LC	AAC-LC	AAC-LC
Audio channels	1 (mono)	2 (stereo)	2 (stereo)
Audio bitrate	24 Kbps	128 Kbps	192 Kbps

The table below lists the Android media framework video encoding profiles and parameters recommended for playback using the VP8 media codec.

	<u>SD (Low quality)</u>	<u>SD (High quality)</u>	<u>HD 720p (N/A on all devices)</u>	<u>HD 1080p (N/A on all devices)</u>
Video resolution	320 x 180 px	640 x 360 px	1280 x 720 px	1920 x 1080 px
Video frame rate	30 fps	30 fps	30 fps	30 fps
Video bitrate	800 Kbps	2 Mbps	4 Mbps	10 Mbps

Video decoding recommendations

Device implementations must support dynamic video resolution and frame rate switching through the standard Android APIs within the same stream for all VP8, VP9, H.264, and H.265 codecs in real time and up to the maximum resolution supported by each codec on the device.

Implementations that support the Dolby Vision decoder must follow these guidelines:

- Provide a Dolby Vision-capable extractor.
- Properly display Dolby Vision content on the device screen or on a standard video output port (e.g., HDMI).
- Set the track index of backward-compatible base-layer(s) (if present) to be the same as the combined Dolby Vision layer's track index.

Video streaming requirements

For video content that is streamed over HTTP or RTSP, there are additional requirements:

- For 3GPP and MPEG-4 containers, the `moov` atom must precede any `mdat` atoms, but must succeed the `ftyp` atom.
- For 3GPP, MPEG-4, and WebM containers, audio and video samples corresponding to the same time offset may be no more than 500 KB apart. To minimize this audio/video

drift, consider interleaving audio and video in smaller chunk sizes.

Image support

Format	Encoder	Decoder	Details	File Types Container Formats
BMP		YES		BMP (.bmp)
GIF		YES		GIF (.gif)
JPEG	YES	YES	Base+progressive	JPEG (.jpg)
PNG	YES	YES		PNG (.png)
WebP	Android 4.0+ Lossless: Android 10+ Transparency: Android 4.2.1+	Android 4.0+ Lossless: Android 4.2.1+ Transparency: Android 4.2.1+	Lossless encoding can be achieved on Android 10 using a quality of 100.	WebP (.webp)
HEIF		Android 8.0+		HEIF (.heic; .heif)
AVIF (baseline profile)	Android 14+	Android 14+	Encoder and decoder are mandatory beginning with Android 14.	AVIF (.avif)

Network protocols

The following network protocols are supported for audio and video playback:

- RTSP (RTP, SDP)
- HTTP/HTTPS progressive streaming

- HTTP/HTTPS live streaming [draft protocol](http://tools.ietf.org/html/draft-pantos-http-live-streaming) (<http://tools.ietf.org/html/draft-pantos-http-live-streaming>):
 - MPEG-2 TS media files only
 - Protocol version 3 Android 4.0 and above
 - Protocol version 2 Android 3.x
 - Not supported before Android 3.0

Note: HTTPS is not supported before Android 3.1.

HDR video formats

OEMs can enable any HDR format they choose with the Android HDR architecture, which provides the core needs of HDR formats: 10-bit buffers, metadata (static, dynamic, and none), transfer function, and color space handling.

To ensure consistency for developers and address key HDR use cases, we require OEMs to support a few base formats on devices that support HDR:

- For professional content playback, such as streaming movies, we require HDR10.
- For user-generated content capture and playback, we require HLG10 to provide a consistent experience across Android devices.

OEMs that add HDR support must support these formats, but can also support additional formats like HDR10+ or Dolby Vision.

Format	Transfer Function	Metadata	Codec	Bit Depth
HLG10	HLG	No	HEVC	10-bit
HDR10	PQ	Static	HEVC	10-bit

HDR10+	PQ	Static	HEVC	10-bit
Dolby Vision 8.4	HLG	Dynamic	HEVC	10-bit

Format handling recommendations

Capture format	Upload format	Delivery format
HLG	App Backend support HDR HLG	Devices supporting HDR (HLG): HLG Devices support HDR (no HLG support only PQ): SDR (Tone map from HLG to SDR in the backend) Devices that don't do not support HDR: SDR (Tone map from HLG to SDR in the backend)

Use case 2: Native camera capture or import from user's gallery (App backend supports HDR)

Capture format	Upload format	Delivery format
HLG	HLG	Same as in-app capture use case
HDR10+	HLG Tone map from HDR10+ (PQ) to HLG before upload using transformer APIs	Same as in-app capture use case
DV8.4	HLG (DV8.4 uses HLG and bitstream will behave as HLG hence no tone mapping required)	Same as in-app capture use case

Use case 3: App backend does not support HDR

Capture format	Upload format	Delivery format
Any format	SDR Tone map from HLG to SDR before upload using transformer APIs	SDR

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