



XIII. Mobile Multimedia File Formats

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Mobile multimedia file formats

3GP

- 3GP or .3gp is a third-generation video standard. 3GP is a multimedia container format defined by the 3GPP (3rd Generation Partnership Project) for use by 3G mobile phones, but can also be used with some 2G and 4G phones.
- 3GP files store video streams as MPEG-4 Part 2 or H.263 or MPEG-4 Part 10 (AVC/H.264) and audio streams as AMR-NB, AMR-WB, AMR-WB+, AAC-LC or HE -AAC. 3GP files have extensions .3gp or .3g2 .



Mobile multimedia file formats

3GP

- 3GP also describes image sizes and bandwidth so that content can be scaled correctly on mobile screens.
- 3GP files can also be viewed on a personal computer using QuickTime or RealPlayer.
- 3GP is a simplified version of the MPEG-4 Part 14 standard .



Mobile multimedia file formats

3 GP

- There are two varieties of the 3 GP file format:
 - 3GPP – used by mobile phones over the 3G UMTS mobile network and files have the extension .3GP .
 - 3GPP2 – was developed by the 3rd Generation Partnership Project 2 and for use by CDMA phones. The files have the extension .3G2.



Mobile multimedia file formats

MP4

- MPEG-4 Part 14 (ISO / IEC 14496-14:2003) is a multimedia container format standard specified as part of MPEG-4.
- Most commonly used to save digital audio and video streams, especially those defined by MPEG, but it can also be used to save still images and subtitles.
- Like other modern formats, it allows streaming over the Internet.
- The official file extension is .mp4 and very often this container format is referred to as MP4.



Mobile multimedia file formats

AMR

- AMR short for Adaptive Multi-Rate Codec File.
- Used by 3G mobile phones to record voice as MMS messages
- It uses the Algebraic Code Excited Linear Prediction (ACELP) algorithm, which was developed for efficient voice compression.



Mobile multimedia file formats

M4R

- M4R is a file format for Apple iPhone ringtones .
- M4R is a renamed AAC (M4A) file created with iTunes .
- This is a custom iPhone ringtone that is automatically transferred to the phone when synced with a computer using Apple iTunes .

Supported graphic file formats in Android OS

Formatting	Coder	Decoder	Information	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 quality 100.	WebP (.webp)
HEIF		Android 8.0+		HEIF (.heic ; .heif)

Supported audio file formats in Android OS

Formatting	Coder	Decoder	Information	File types Container formats
AAC LC	YES	YES	Support for mono/stereo/5.0/5.1 content with standard sample rates from 8 to 48 kHz .	<ul style="list-style-type: none"> • 3GPP (.3gp) • MPEG-4 (.mp4, .m4a) • ADTS raw AAC (.aac, decoding in Android 3.1+, encoding in Android 4.0+, ADIF not supported) • MPEG-TS (.ts, not searchable, 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 sample rates from 8 to 48 kHz.	
xHE -AAC		Android 9+	Support for up to 8-channel content with standard sample rates from 8 to 48 kHz	
AAC ELD (Enhanced AAC with little delay)	Android 4.1+	Android 4.1+	Support for mono/stereo content with standard sample rates from 16 to 48 kHz	
AMR-NB	YES	YES	4.75 to 12.2 kbps sampling at 8 kHz	<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 at 16 kHz	
FLAC	Android 4.1+	Android 3.1+	Mono/Stereo (no multi-channel). Sampling rate up to 48 kHz (but up to 44.1 kHz is recommended for devices with 44.1 kHz output , as 48 to 44.1 kHz does not include a low-pass filter)	<ul style="list-style-type: none"> • FLAC (.flac) • MPEG-4 (.mp4, .m4a, Android 10+)

Supported audio file formats in Android OS

Formatting	Coder	Decoder	Details	File types Container formats
MIDI		YES	MIDI Type 0 and 1. DLS Version 1 and 2. XMF and Mobile XMF. Support for RTTTL/RTX, OTA and iMelody melody formats	<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 8-320k bps 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. Sample rate for raw PCM recordings at 8, 16 and 44 , 1k Hz .	WAVE (.wav)
Vorbis		YES		<ul style="list-style-type: none"> • Ogg (.ogg) • Matroska (.mkv, Android 4.0+) • MPEG-4 (.mp4, .m4a, Android 10+)

Supported video file formats in Android OS

Formatting	Coder	Decoder	Information	File types Container formats
H.263	YES	YES	H.263 support is optional in Android 7.0+	<ul style="list-style-type: none"> • 3GPP (.3gp) • MPEG-4 (.mp4) • Matroska (.mkv)
H.264 AVC Base Profile (BP)	Android 3.0+	YES		<ul style="list-style-type: none"> • 3GPP (.3gp) • MPEG-4 (.mp4) • MPEG-TS (.ts , AAC audio only, Android 3.0+) • Matroska (.mkv)
H.264 AVC Main Profile (MP)	Android 6.0+	YES	Decoder is required, encoder is recommended.	
H.265 HEVC		Android 5.0+	Basic profile level 3 for mobile devices and basic 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+	Streaming only on Android 4.0 and up	<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 10+	The decoder is optional.	<ul style="list-style-type: none"> • MPEG-4 (.mp4) • Matroska (.mkv)

Video encoding recommendations

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

	SD (low quality)	SD (High Quality)	HD 720p (not supported by all devices)
Video resolution	176 x 144 pixels	480 x 360 pixels	1280 x 720 pixels
Video frame rate	12 frames per second	30 frames per second	30 frames per second
Video	56 Kbps	500 Kbps	2 Mbps
Audio Codec	AAC-LC	AAC-LC	AAC-LC
Audio channels	1 (mono)	2 (stereo)	2 (stereo)
Audio	24 Kbps	128 Kbps	192 Kbps

Video encoding recommendations

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

	SD (low quality)	SD (high quality)	HD 720p (not supported by all devices)	HD 1080p (not supported by all devices)
Video resolution	320 x 180 pixels	640 x 360 pixels	1280 x 720 pixels	1920 x 1080 pixels
Video frame rate	30 frames per second	30 frames per second	30 frames per second	30 frames per second
Video	800 Kbps	2 Mbps	4 Mbps	10 Mbps