Learn about LDAC, aptX, LHDC: High-Resolution Bluetooth Audio Codecs

Confused about many existing Bluetooth codecs? Don't worry anymore! The following article will explain to you what the popular Bluetooth codecs are today, how they work, which are better than the other, and why.

What is LDAC?

Unveiled at CES 2015, LDAC is a codec designed by Sony to deliver high-quality wireless audio. LDAC lets you stream high-resolution audio up to 32-bit/96kHz wirelessly over Bluetooth at up to 990kbps.

Sony says that LDAC, due to its efficient encoding and "optimized speed", allows you to transfer 3 times more data than existing audio codecs.

LDAC beats the standard Bluetooth SBC codec, which only offers a maximum data rate of 328kbps, and Qualcomm's aptX HD, which lets you stream at 576kbps. Even Qualcomm's flagship aptX Adaptive codec, which dynamically scales from 279kbps up to 860kbps, can't compete with Sony's LDAC.

Furthermore, in 2019, LDAC obtained the "High-Res Audio Wireless" certification from the Japan Audio Association (JAS). As for what LDAC stands for, Sony doesn't explain this, so the article can't say anything about what it means either.

What is AptX?

Launched in the 1980s, aptX is an audio encoding algorithm. It was popular with studios and radio stations at first, but later Steven Spielberg used aptX to digitally record 5.1 surround sound for his movies.

However, today aptX is completely synonymous with Bluetooth, found on many computers, smartphones and many other consumer electronics products.

Furthermore, aptX can transmit any audio at 16-bit/44.1kHz like CD and its data rate is 352kbps. aptX uses compression, which minimizes latency issues.

What is LHDC?

LHDC (also known as HWA) is a low-latency, high-resolution audio codec that supports transfer rates up to 900kbps and sample rates up to 96kHz. Like LDAC, the Japan Audio Association (JAS) also grants the LHDC High-Res Audio Wireless certification. Currently, LHDC and LDAC are the only codecs with Hi-Res Audio Wireless certification.

What is LLAC?

Low-Latency Audio Codec (LLAC) is a high-definition wireless audio technology based on LHDC, but designed for better low-latency performance, for ~30ms end-to-end latency. LLAC supports bit rates of 400-600kbit/s, bit-depth up to 24 bits, and sample rates up to 48kHz.

LLAC is more popular among gamers because of its low latency audio transmission.

Is LDAC better than aptX?

In terms of specs alone, LDAC is definitely better than aptX. However, if we talk about real world experience using both codecs, you may not notice any real difference.

Is LHDC better than aptX?

LHDC is better than aptX if you are looking for low latency performance Bluetooth codec. However, in terms of actual sound quality, you may not notice much of a difference.

Is LHDC better than LDAC?

Both LHDC and LDAC are very similar in terms of baud rate and sample rate. However, LHDC performs better in terms of low latency audio and beats LDAC.

Is LLAC better than LHDC?

LLAC is designed for better low-latency performance, with end-to-end latency claimed to be around ~30ms. As a result, LLAC is better than LHDC for some specific use cases, such as professional gaming, where gamers prefer to hear in-game sound effects with the lowest possible latency.

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