Episode Book

EPISODE #6603

Lossless vs. Hi-Res Audio and Whether Ears Can Tell

PUBLISHED	14 November 2026 at 19:59 UTC
DURATION	21:08
LISTEN	myweirdprompts.com/episode/lossless-hi-res-audio-streaming-86425/
HOSTS	Corn, Herman, Dorothy, Hilbert
SCRIPT MODEL	z-ai/glm-5.3
VOICES	omnivoice
PIPELINE	V5.28
SOURCES	25 cited by the research (listed at the end)
BOOK GENERATED	15 November 2026 at 11:16 UTC

SYNOPSIS

A 24-bit, 192-kilohertz studio master streams at 4,608 kilobits per second, yet blind tests show trained listeners barely beat a coin flip when telling hi-res audio apart from CD quality. Breaking down Music Assistant's spec tables, this episode separates lossless from hi-res across FLAC, ALAC, and Tidal's abandoned MQA, and compares ceilings at Qobuz, Deezer, Apple Music, Amazon Music HD, and Spotify. From Joshua Reiss's Audio Engineering Society meta-analysis to McGill University's expert trials, the numbers reveal where bitrate stops mattering.

TRANSCRIPT



Corn

Four thousand six hundred and eight kilobits per second. That's what a twenty-four bit, one hundred ninety-two kilohertz studio master costs you in bandwidth — about three point three times a compact disc — and that number is what "audiophile streaming" actually boils down to when you make the marketing take its shoes off.



Herman

And that's the nicest part of Daniel's question. He was digging through the Music Assistant plugin, of all places, saw a streaming service listed with a hard maximum stream quality in its config table, and thought: hang on, what is this number actually made of?



Corn

His question, in his own words, is what "high quality" or "audiophile" streaming actually means on the digital distribution side. Concretely — what bitrate, what format — and where, if anywhere, the difference becomes audible to a person who takes their music seriously. DJs, dedicated listeners, him.



Herman

And he's picked a good door to come in through, because that plugin table is a more honest spec sheet than most of the marketing pages. Music Assistant doesn't romanticize. A music source is just somewhere your music lives — a streaming service, a folder on a NAS, radio — and the plugin tells you what each one's ceiling is, flat, in one line.



Corn

Qobuz says FLAC, one ninety-two kilohertz, twenty-four bit. Deezer says FLAC, forty-four point one, sixteen. One line each. No adjectives at all.



Herman

Which is more than Qobuz's own homepage will give you.



Corn

Start there, then. The table.



Herman

So the first thing that table forces on you is a distinction the marketing deliberately blurs: lossless and hi-res are not the same word. Deezer's line — FLAC at forty-four point one kilohertz, sixteen bit — that is compact disc quality. Perfectly lossless, reconstructable bit for bit, and not hi-res at all. Hi-res generally means lossless above CD: twenty-four bit at forty-eight kilohertz or more. Qobuz and Tidal in the Music Assistant table go up to twenty-four, one ninety-two. Deezer stops at the CD. Napster, same place.



Corn

Which means Deezer is selling "lossless" and a listener could reasonably believe they're buying the other thing.



Herman

They could, and the service hasn't lied. That's the trick of it. Both words are true; they're just true about different properties.



Corn

Now, the formats. FLAC is the one everyone names — Free Lossless Audio Codec. It's decades old, it belongs to nobody, and it's what Bandcamp, Spotify, Tidal, Deezer, Qobuz and Amazon all use.



Herman

And Apple uses ALAC, which sounds like the most proprietary thing in the world — "Apple Lossless Audio Codec" — and is actually open-source and royalty-free. Apple open-sourced it back in twenty eleven. The file you get is typically sitting in an MP4 container with the m4a extension, which is the same extension and the same container as lossy AAC. Same box, different contents.



Corn

The one place I'll defend the m4a extension: it's honest about being a container. It never promised anything about the codec.



Herman

Tidal's a good sidebar here, because they spent years streaming this thing called MQA — Master Quality Authenticated — which was proprietary, licensed, and beloved by exactly the people who write "reproduces the space around the instruments" in reviews. They dropped it in twenty twenty-four and went to native FLAC at up to twenty-four, one ninety-two. The whole catalog.



Corn

An audiophile format that couldn't survive contact with an open plugin ecosystem. Put that on a T-shirt.



Herman

Now what "lossless" means, concretely. People hear lossless and think uncompressed. It isn't. A lossless codec compresses to roughly half the original size — the key property is that it reconstructs exactly. You can verify the output matches the input. Lossy compression is a different animal: it removes data according to a psychoacoustic model, stuff the model says humans can't hear, and the implementer gets real freedom in choosing what to throw away.



Corn

That freedom is the whole reason three hundred twenty kilobit MP3s from different encoders sound different from each other. Same number on the file, different decisions underneath.



Herman

Right — the number on the label is the budget, not the shopping list.



Corn

The arithmetic, then. CD is sixteen bit at forty-four point one kilohertz, which multiplies out to one thousand four hundred eleven point two kilobits per second. Sixteen bit gives you sixty-five thousand five hundred thirty-six discrete amplitude values and ninety-six decibels of dynamic range. Twenty-four bit takes that to one hundred forty-four decibels.



Herman

Which, for scale, is more than the gap between a quiet room and a jet engine. Nobody's living room needs it. The argument for it is headroom — quiet passages having somewhere to live — and we'll get to whether that argument survives a blind test.



Corn

Apple Music tops out at ALAC twenty-four, one ninety-two. Tidal Max, same ceiling on FLAC. Spotify shipped lossless in September of last year, twenty-four bit at forty-four point one kilohertz, included in Premium, fifty-plus markets, no extra charge — and that forty-four point one ceiling is the interesting one. They went out of their way to stop at the CD's sample rate while everyone else races to one ninety-two.



Herman

Amazon Music HD is nine ninety-nine a month, the cheapest hi-res option, and reportedly the quality varies between albums by the same artist — which should tell you something about how much the label's delivery matters versus the service's spec sheet.



Corn

Tidal's eleven ninety-nine a month now, since August. I want to note, for the record, that their DJ tier costs nineteen ninety-nine, and I know at least one donkey checking whether it's tax deductible.



Herman

It is equipment, Corn. It's research equipment that plays cascada at weddings.



Corn

That was one wedding.



Herman

Three. And the crowd loved it. Catalog-wise they're all claiming north of a hundred million tracks — Tidal says a hundred and ten plus, Qobuz and Deezer a hundred plus — but Qobuz is the specialist: no free tier, no Dolby Atmos, a quarter million hi-res tracks from independent classical labels like Linn and Chandos, and it sells permanent downloads you actually keep. Their pitch, in Music Assistant's own dry phrasing, is a service "aimed at people who care about sound quality."



Corn

Care about sound quality, French, no recommendations algorithm. That's practically a mission statement written on a napkin by the last honest men in the industry.



Herman

The Qobuz fans go further — one review site claims their streams are bit-perfect and match the MD5 hashes of the original studio files. Which is a lovely claim, and I've never seen the methodology, so I file it under "asserted with confidence."



Corn

So that's the landscape: two lossless codecs, one abandoned boutique codec, and a pile of numbers. The contested question is whether any of it reaches a pair of ears.



Herman

And here the evidence disagrees with itself, which I find wonderful. Start with the pessimists. There's a Goldsmiths study — Williamson, South and Müllensiefen — whose blunt summary was that most people cannot discriminate the sound quality of typical commercial recordings. They leaned on an earlier test, Pras and colleagues, twenty-oh-nine, where thirteen expert listeners — musicians, studio engineers, people who mix for a living — could not tell CD from MP3 at two fifty-six or three twenty.



Corn

Thirteen experts, zero hits.



Herman

As a group, yes. Now the same body of work contains its own counterweight. Olive, twenty eleven: seventy percent of students and eighty-six percent of expert listeners preferred CD over one hundred twenty-eight kilobit MP3. So the experts can hear a badly broken file — they just can't hear a good lossy one. And the Goldsmiths authors ran a second study comparing only the extremes, MP3 against full studio master, and in every case listeners discriminated and preferred the master.



Corn

So the story so far is "experts can't hear small differences but can hear large ones," which is the least surprising result in the history of listening.



Herman

But here's where it gets strange. Joshua Reiss at Queen Mary London ran a meta-analysis for the Audio Engineering Society in twenty sixteen — eighty studies screened, sixty-eight thrown out on methodology, eighteen pooled, over four hundred participants, more than twelve and a half thousand trials. Overall, people picked the better-than-CD track fifty-two point three percent of the time.



Corn

A coin flip with a coupon.



Herman

Statistically significant, barely. But — and this is the part both camps quote — when he isolated the studies that trained their listeners first, performance rose to around sixty percent, and it climbed further with extensive training. Meanwhile an AES survey with a single author concluded hi-res was undetectable by a substantial majority regardless of experience. And at McGill, sixteen expert listeners in a blind test comparing forty-four point one against eighty-eight point two kilohertz: the group discriminated, but only three of sixteen did significantly as individuals.



Corn

Three out of sixteen experts. The other thirteen are in a room being wrong about their own profession.



Herman

And now, before we wade further into decibels, a word from the woman who ironed us both into existence. Here's Dorothy with her History of Toast.

D

Dorothy

Hello dear, it's Mum. Time for Dorothy's History of Toast.

D

Dorothy

Melba toast is named after the opera singer Nellie Melba, and the chef Auguste Escoffier is credited with it, in the eighteen nineties.

D

Dorothy

Funny thing, a singer gets a cracker and the chef gets the credit. Doesn't quite seem fair, does it, sweetheart.

D

Dorothy

Anyway. Your father's put the kettle on and I've got a bit of ironing. Bye bye now.



Herman

A singer gets a cracker, a chef gets the credit. That's the music industry too, isn't it.



Corn

The drummer gets a stool and the producer gets the royalty.



Herman

Poor Nellie. The bit depth and the sample rate are not the same axis. The audiophile writers at Hifiverse make the case that bit depth improvements are clearly audible — micro-dynamic contrasts can be clipped at sixteen bit — but that going above forty-eight kilohertz in sample rate is very hard to reliably identify. Their conclusion is that bit depth, mastering quality and bitrate deserve to be the primary criteria, and sample rate is secondary.



Corn

Which, if true, means most of the hi-res arms race — the one ninety-two number, the number on the box — is competing on the axis nobody can hear.



Herman

And Spotify, notably, agrees with the second half. Their research scientist, Andreas Rossholm, said last October that in their Stockholm listening tests, once you go beyond twenty-four bit, forty-four point one, even trained listeners couldn't reliably hear the difference — and, he added, you don't need anything higher "unless you're a bat or a greater wax moth."



Corn

The wax moth has the last laugh. Its streaming service is excellent.



Herman

So the forty-four point one ceiling is a defended position, not a lazy one. Whether it's honest engineering or a bandwidth-cost decision wearing a lab coat is unresolved — and I swing both ways on it, because the lab result is real and the bandwidth saving is also real.



Corn

Let me push the other direction, though. Reiss's training effect — fifty-two to sixty percent with training, climbing further. Doesn't that cut both ways? It says the audiophiles are right that critics haven't learned to listen, and simultaneously that the benefit is unavailable to almost everyone almost all of the time. If you need a training regimen to hear your twenty-dollar premium, that's a hobby, not a feature.



Herman

That's the cleanest statement of it I've heard, and the McGill result sharpens it — even the training doesn't reliably get you there. Three of sixteen. These were experts. I'd say that's the strongest single number in the whole debate, because it removes the excuse of "well, they just didn't train enough."



Corn

But here's what I keep noticing, and it's the part that isn't in any of the listening tests: the chain after the stream. Bluetooth can't carry lossless at all — there isn't the bandwidth, the signal gets compressed before it's sent. No AirPods play lossless, ever, because they run the lossy AAC Bluetooth codec. LDAC and aptX Adaptive move more bits, but they're still mathematically lossy.



Herman

And Apple's the worst offender for the badge. AirPlay 2, the default wireless path on every Apple device in this flat, re-encodes to two hundred fifty-six kilobit AAC — regardless of what the Hi-Res Lossless indicator displays.



Corn

The light on the screen says one thing, the pipe says another.



Herman

The iPhone's own output and the HomePod cap at twenty-four bit, forty-eight kilohertz, so genuine hi-res on Apple Music needs an external DAC. Tidal Connect's resolution depends entirely on the device at the other end. So a listener paying for twenty-four, one ninety-two, sending it over AirPlay to a pretty speaker, is hearing two hundred fifty-six kilobits and never knows.



Corn

I do like that the audiophile's enemy turned out to be his own wireless speaker.



Herman

For the Music Assistant user, this is actually the whole advantage — Daniel's setup controls the chain end to end. Self-hosted server, wired output, and a spec table that tells him the truth about the source. Most listeners are flying blind through three re-encodes with a badge lying to them on the screen.



Herman

—anything worth carrying over it, anyway.



Corn

You have views on the badge, I take it.



Hilbert

I have a neighbour, Ronald. Nineteen seventy-eight, he'd bought a reel-to-reel machine the size of a chest freezer, and he wanted me to confirm it sounded better than his old deck. We called the big tapes the full loaves, because they were the width of one and cost about as much as the bread in those days.



Herman

The full loaves.



Hilbert

So I sat behind his sofa where he couldn't see my paws on the switches, and I played him the same recording off both decks, and I wrote down his guesses in pencil. Fourteen of them. He got six right, and he wanted to argue the eighth, so I stopped reading the notebook out loud to him and kept it behind the tinned fruit. He never asked again. He just told everyone at the pub the machine was better, and he was happier for it.



Corn

Fourteen trials, six right. Ronald beat the -analysis.



Hilbert

Ronald was very proud of his ears. I used the pencil because he'd have taken the pen home.



Corn

And you're sure you weren't switching the cables wrong yourself?



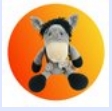
Hilbert

I checked twice. My claws aren't made for the little RCA plugs, but I made sure of it. Then I had my tea and went home.



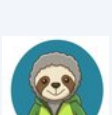
Corn

The full loaves. I'm adopting that.



Herman

It's better terminology than most of the industry's. Ronald, mind you, is the Reiss result wearing slippers — six right and telling the pub he has golden ears. That's exactly what sixty percent with confidence looks like in the wild.



Corn

And the happier-for-it part is the piece nobody puts in the spec table. Now — the mastering thing, because I think it's the underreported half of this whole topic.



Herman

The same recording can sound noticeably different from one platform to the next, even with the same codecs, because of mastering choices, post-processing, loudness normalization and server infrastructure. Same file format, different sound.



Corn

Which means two people arguing "Tidal sounds warmer than Qobuz" might both be right and neither is talking about bit depth. They're talking about which master they got handed.



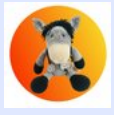
Herman

Amazon's catalog is the cautionary tale there — quality varying between albums by the same artist, on the same service, at the same tier. The delivery isn't uniform even within one platform.



Corn

So the misconception to leave people with, then.



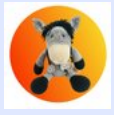
Herman

The big one is that a Hi-Res badge means you're hearing hi-res. AirPlay re-encodes to lossy AAC no matter what the indicator says, Bluetooth can't carry lossless at all, and the phone itself caps below the badge. The badge describes the stream, not your ears.



Corn

The second one's the pair we opened with — lossless and hi-res are different properties, and Deezer sells the first while calling it close enough to the second.



Herman

The open question is the one nobody's settled: Reiss's fifty-two percent with training pushing sixty, versus a survey finding most people detect nothing regardless of experience. Those two results are both peer-reviewed and they are not friends.



Corn

My forward thought is Ronald-shaped. If the training effect is real and climbs with practice, then the honest question isn't whether hi-res is audible — it's whether anyone would notice they've become the person who can hear it. The gear rarely changes the listener. The listener sometimes changes for the gear.



Herman

Ronald would say yes.



Corn

Ronald would say six out of fourteen and mean yes. Producer credit, as ever, to Hilbert Flumingtop, keeper of the notebook and the full loaves — sorry, that's the producing, and the pencil. If you enjoyed this one, try episode twenty, Architectural AI; episode seventeen, Cloud Render Superpowers; and episode three, Safetensors or something else. This has been My Weird Prompts. If today's spec tables earned their keep, leave us a review on Spotify, and the website's at my weird prompts dot com.



Herman

We'll be back soon.



Corn

See you then.

SOURCES

What the research for this episode read before the script was written. Primary sources first.

1. **Music Assistant, Qobuz provider docs , retrieved 2026-11-14 [primary]**
https://www.music-assistant.io/music-providers/qobuz/

2. **Music Assistant, Tidal provider docs , retrieved 2026-11-14 [primary]**
https://www.music-assistant.io/music-providers/tidal/

3. **Music Assistant, Deezer provider docs , retrieved 2026-11-14 [primary]**
https://www.music-assistant.io/music-providers/deezer/

4. **Music Assistant, Music Sources overview , retrieved 2026-11-14 [primary]**
https://www.music-assistant.io/music-providers/

5. **Spotify Newsroom, 2025-09-10 (updated 2025-10-06) , retrieved 2026-11-14 [primary]**
https://newsroom.spotify.com/2025-09-10/lossless-listening-arrives-on-spotify-premium-with-a-richer-more-detailed-listening-experience/

6. **Spotify Selects / Andreas Rossholm, 2025-10-06 , retrieved 2026-11-14 [primary]**
https://spotifyselects.substack.com/p/closer-to-the-music-with-spotify

7. **Tidal Support, updated 2026-01-09 , retrieved 2026-11-14 [primary]**
https://support.tidal.com/hc/en-us/articles/17412130162961-HiRes-FLAC-audio

8. **Tidal Support, updated 2026-08-03 , retrieved 2026-11-14 [primary]**
https://support.tidal.com/hc/en-us/articles/115003662825-Subscription-Types

9. **Tidal pricing page , retrieved 2026-11-14 [primary]**
https://tidal.com/pricing

10. **Hifiverse, John Makovsky, published 2026-02-12, updated 2026-03-13, retrieved 2026-11-14**
https://www.hifiverse.io/en/articles/audio/2026-hi-res-streaming-services-compared

11. **Popdust, retrieved 2026-11-14**
https://www.popdust.com/high-res-streaming-compared-qobuz-tidal-and-apple-music-on-what-actually-reaches-your-ears

12. **RottenWifi, 2026-10-15, retrieved 2026-11-14**
https://rottenwifi.com/apple-music-vs-tidal-vs-qobuz-which-lossless-streaming-service-is-best-in-2026/

13. **Smart Home Sounds, updated 2026-08-06, retrieved 2026-11-14**
https://www.smarthomesounds.co.uk/blog/faqs/hi-res-audio-streaming-explained

14. **Pocket-lint, retrieved 2026-11-14**
https://www.pocket-lint.com/are-apple-music-spotify-tidal-actually-lossless/

15. **Williamson, South & Müllensiefen, Sound Quality Enhances the Music Listening Experience, ICMPC 2014, retrieved 2026-11-14**
http://www.doc.gold.ac.uk/~mas03dm/papers/SoundQuality_WilliamsonSouthMullensiefen_ICMPC2014.pdf

16. **Reiss, A Meta-Analysis of High Resolution Audio Perceptual Evaluation, JAES, June 2016, retrieved 2026-11-14**
https://doi.org/10.17743/jaes.2016.0015

17. **Queen Mary University of London, 2016-06-28, retrieved 2026-11-14**
https://www.qmul.ac.uk/news/latest-news/2016/se/people-can-hear-the-difference-in-high-resolution-audio-study-finds.html

18. **Scientific American, retrieved 2026-11-14**
https://www.scientificamerican.com/podcast/episode/human-ears-can-hear-better-than-cd-quality-just-barely/

19. **AVS Forum (Scott Wilkinson), retrieved 2026-11-14**
https://www.avsforum.com/threads/high-resolution-audio-perception-meta-analysis.2501370/page-4

20. **Stereophile, retrieved 2026-11-14**
http://stereophile.com/content/hi-rez-audio-distinguished-blind-testing

21. **AES E-Library, Native High-Resolution versus Red Book Standard Audio: A Perceptual Discrimination Survey (abstract only; full page blocked by CAPTCHA), retrieved 2026-11-14**
https://aes.org/publications/elibrary/elibrary-page/?id=20954

22. **McGill Convention Paper 8101, retrieved 2026-11-14**
https://www.collinsaudio.com/Prosound_Workshop/McGill_PCM_Test.pdf

23. **Music Business Worldwide, 2025-09-10, retrieved 2026-11-14**
https://www.musicbusinessworldwide.com/spotify-is-finally-launching-lossless-but-its-not-part-of-a-super-premium-tier/

24. **Ecoustics, updated 2026-07-16, retrieved 2026-11-14**
https://www.ecoustics.com/news/tidal-price-increase-2026/

25. **DocumentaryTube, 2026-10-02, retrieved 2026-11-14**
https://www.documentarytube.com/blog/tidals-new-price-changes-the-high-quality-streaming-equation/