# Episode Book

EPISODE #6419

# Why Bluetooth Headsets Still Sound Like AM Radio

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## SYNOPSIS

Standard Bluetooth headsets still plummet to low-fidelity audio the moment their microphones activate, trapped by legacy hands-free profiles and hardware limits. An examination of the Yealink BH71 reveals why dedicated USB dongles offer range rather than better codecs, how Windows silently downgrades calls to narrowband telephone quality, and what LE Audio and LC3 must align to fix it.

# TRANSCRIPT



### Corn

Daniel spent his afternoon testing dictation headsets and found something that annoyed him enough to write us a paragraph about it. The Yealink BH71, the one he bought over the summer because it sits comfortably over the ears, was delivering his microphone to the computer as SBC over the Bluetooth hands-free profile. He tried the bundled USB dongle expecting better. Same result.



### Herman

Of course it was the same result. I'm sorry, I'll get to why I said of course, but... that dongle. That's the part everyone gets wrong.



### Corn

That's where he went next, though. He dug in, found most headsets don't support the better codecs, found the dongle doesn't necessarily give you one, and landed on the thing that felt strange to him in 2026: wired is not just the best way to get high-quality microphone audio from a headset, it's almost the only way. So he's asking us to look at the quality gap between wired, built-in Bluetooth, and dongle connections. Whether wired is really that far ahead, what LE Audio actually changes, and whether a computer's own Bluetooth will ever carry a decent mic codec without a dongle, or whether there's less progress than meets the eye.



### Herman

Herman Poppleberry here, and I want to say immediately: his diagnosis is completely correct, and the documentation explains every word of it. That's the rare case. Usually when someone sends us a mystery, the answer is half user error and half vibes. This one, Yealink's own spec sheet confesses to.



### Corn

You've been waiting all week to say that.



**Herman**

I have. So the shape of it. In 2026 we have lossless USB microphones, forty-eight kilohertz capture, AI noise suppression that can pull a voice off a construction site. The moment you put a Bluetooth headset on and open the microphone, you drop to something Microsoft itself describes as sounding a little worse than AM radio. Not a reviewer being rude. Microsoft's own documentation.



**Corn**

The company that ships the problem, documenting the problem.



**Herman**

Well, that's the interesting part. Microsoft is simultaneously the best explainer of this and the slowest fixer of it. But hold on, let's ground it in Daniel's actual headset first, because the BH71's spec sheet tells you nearly everything. Under audio codecs it lists SBC. One codec. And the microphone, an omni MEMS type, has a frequency range of one hundred hertz to eight kilohertz.



**Corn**

Eight kilohertz. So the microphone itself tops out where narrowband telephony tops out.



**Herman**

The transport was never the only bottleneck. The transducer is band-limited before a single bit gets compressed. You could wave a magic wand over the Bluetooth stack tomorrow, give it a perfect lossless codec, and the microphone still hands you nothing above eight kilohertz, because it never captured any of it.



**Corn**

So the thing is a telephone with extra steps.



### Herman

A very comfortable telephone. Eighteen grams, well reviewed, four-mic beamforming that Yealink says eliminates ninety percent of background noise. All of that marketing is about noise and comfort, and none of it is about fidelity, which is honest in a way, because there's no fidelity to talk about. But let's do the mechanism properly, because this is where it gets strange. Bluetooth Classic, which is what the BH71 speaks, has two great profiles that hate each other. A2DP gives you high-quality stereo audio out. HFP, hands-free, gives you the microphone. Pick one.



### Corn

The moment the mic opens...



### Herman

The device drops any A2DP stream it had and falls into HFP, which is mono and low fidelity. It's not a bug. Microsoft's write-up says the design decisions go back over two decades, to flip phones and bulky earpieces, and were "hardly seen as limitations" at the time. Nobody was expecting AM-radio-plus quality from a thing dangling off a Motorola.



### Corn

They were impressed it worked at all.



### Herman

They were impressed it didn't catch fire. So on Windows, HFP gives you exactly two modes. Narrowband, eight kilohertz, SBC. Wideband, sixteen kilohertz, mSBC. Nothing above that exists in the profile on Windows. Wideband only arrived properly in recent builds, ten-seventeen-oh-three on Windows 10, and then improved in twenty-two-H-two on Windows 11, and Microsoft still cautions that some wideband-capable devices aren't compatible with certain radios and silently revert to narrowband.



### Corn

Silently.



**Herman**

It's the theme of the episode, actually. Silence. The system never tells you which mode you're in. Daniel had to dig to find out he was getting SBC. There's no little amber light that says telephone quality.



**Corn**

And the wired baseline, for contrast.



**Herman**

USB microphones run at forty-four or forty-eight kilohertz, sixteen-bit, lossless. So the gap in one line: eight to sixteen kilohertz lossy, versus forty-four to forty-eight kilohertz lossless. And the reason is structural, not just a spec gap. Wired carries the analog signal straight to a digitizer. Wireless has to digitize, compress, transmit over a shared radio band, and decompress, and it loses something at each of those steps. Wired isn't old technology that happens to win. It's the path with four fewer places to be bad.



**Corn**

Now the dongle, because this is the part Daniel fell for. Along with everyone else.



**Herman**

Along with everyone else, and I want to be fair to him, because "USB dongle" sounds like "USB audio." Sounds like a sound card. The BT51, the dongle in the box, is a Bluetooth 5.0 Classic device. Profiles: hands-free 1.7, A2DP 1.3, AVRCP 1.6. Audio bandwidth listed as, and I'm quoting the datasheet, "Narroband, Wideband, A2DP."



**Corn**

Narroband.



### Herman

Narroband. One r. That typo is the most candid sentence Yealink has ever published about that product. There is no LE Audio in it, no LC3, no anything newer than what the PC's own radio already does. Yealink's own support docs describe the dongle's function as enabling a more stable Bluetooth connection with Yealink devices and supporting pre-pairing. Stability and range, up to thirty meters. It's a better radio, not a better codec.



### Corn

So it's the same telephone call, on a day with good weather.



### Herman

That's the whole thing. He swapped the PC's radio for Yealink's radio, and the phone call stayed a phone call. There's one more wrinkle, which is Yealink's pages disagree with themselves on the Bluetooth version, datasheet says 5.2, tech specs page says 5.3, and here's the part that matters: neither number means anything. Bluetooth 5.2 is where the LE Audio plumbing was introduced, but a device advertising 5.2 or 5.3 is not obligated to implement it.



### Corn

The version number has become a sticker.



### Herman

It's the badge on the hood of the car. Nobody checks whether the engine's in it. Corn, let me ask you something, because you're the one in that flat who actually has to live with whatever Herman installs. When you record, and you've got the choice, do you ever go wireless? Honestly.



### Corn

I go wired on principle and wireless by accident, and the accidents are the episodes where listeners write in about the audio.



### Herman

That tracks with everything I've seen. And your principle, defend it, because I know you have one. Wired wins on quality, but you'd take wired even if it didn't. Why?



### Corn

Because everything between me and the recording is one thing I can hold. One cable. If it's broken I can see where. The wireless chain is six things I can't see, and every one of them is allowed to fail quietly.



### Herman

That's... yes. And it's going to become very relevant in about five minutes, because that is almost word for word the problem with LE Audio on Windows. But first, the dongle question deserves one more burial, because there's a subtlety. Yealink's own support page says pairing with the PC's built-in Bluetooth allows normal audio use but does not allow YUC recognition, because YUC, their management thing, supports Yealink USB devices only. So the dongle exists partly to make the headset manageable from their software. It's an identity accessory.



### Corn

It answers the question "is this a Yealink" rather than the question "does this sound any good."



### Herman

Which, for an IT department managing four hundred headsets, is the more important question. That tells you who this product is for. It was never aimed at Daniel's dictation use case, and that's not Yealink being sneaky, it's Yealink selling to people whose definition of "audio works" is "the call connected."



### Corn

Before we go to the promised land, I want to hold a second on what Daniel's actually doing with this headset, because it's dictation. He's feeding a speech model.



### Herman

And that's the quietly funny part. So a narrowband microphone doesn't break Whisper. It just flattens every sibilant and asks the model to reconstruct your voice from context. The mic isn't unusable for dictation. It's just doing to his voice what a bad photocopy does to a signature.



### Corn

He bought the comfortable one so he could wear it for hours, and the hours are fine. It's the eight kilohertz he's wearing.



### Herman

Right. Comfort on the head, telephone at the mouth.



### Corn

Desmond, you have a money tip for us, I understand.

D

### Desmond

Desmond's Money Tip. Take two fewer steps a day. It sounds like nothing, but over a year it spares your soles roughly seven hundred steps of wear, and at the rate I replace shoes, that is about four pounds fifty saved annually.

D

### Desmond

Over a lifetime, near enough a hundred and eighty pounds. I do it. I count my steps and I stop short of things. I once stood still in a doorway rather than cross a room.

D

### Desmond

Money is mostly just not doing things. That is the whole tip.



**Corn**

I'm going to try taking two fewer steps a day. I already take about nine, so this is a rounding error.



**Herman**

Please don't budget your movement, brother. You barely move as it is.



**Herman**

Okay. LE Audio. This is the real architectural fix, and I want to be precise, because there's both real progress here and less than meets the eye, and Daniel asked for exactly that split.



**Corn**

Give me the real progress first.



**Herman**

LC3 is the mandatory codec of LE Audio, and it replaces SBC everywhere. It matches SBC's quality at roughly half the bitrate, and it runs anywhere from eight to forty-eight kilohertz, in ten or seven-and-a-half millisecond frames. But the codec is honestly the smaller news. The bigger news is structural. LE Audio throws out the whole A2DP-versus-HFP split I described earlier and replaces it with a single stack that does media and voice together. Headphones use a profile called TMAP, and TMAP requires super wideband, thirty-two kilohertz, while the voice is live.



**Corn**

So the "close the mic, lose the quality" trap...



**Herman**

Deleted at the architecture level. The thing that made Daniel's headset a telephone is the thing LE Audio was designed to stop being. And Microsoft shipped the milestone: August of last year, super wideband stereo for LE Audio voice on Windows 11 with the



### Herman (continued)

twenty-four-H-two update. First time Windows could do high-quality stereo while the microphone was live. Their headline was "Goodbye, muffled audio!" and they've promised more, quote, CD-quality audio playback in game chat and voice calls, just like when not using the microphone. So the direction of travel is real.



### Corn

Now the fine print. You've been vibrating.



### Herman

Because the fine print is the episode. On Windows, LE Audio only activates when an entire chain lines up. Windows 11 twenty-two-H-two or newer. Bluetooth LE support on the radio. A compatible codec. And LE-capable drivers from the manufacturer for both the radio and the codec. Microsoft says it plainly: not all Windows 11 devices support LE Audio, even if the device is marketed as supporting Bluetooth LE. A current buying guide counts six conditions that all have to hold, and if one fails, Windows silently falls back to Classic Bluetooth.



### Corn

Silently again.



### Herman

And your check is a single toggle in settings, "Use LE Audio when available." If the toggle isn't there, your PC doesn't support it. Not a warning. An absence. You find out by not finding the switch.



### Corn

So the user's diagnostic procedure is wandering the settings app looking for a toggle that may have been removed for reasons the system will never name. That's not a compatibility chain, that's a scavenger hunt.



### Herman

The scavenger hunt with no prize announcement. And there's a delicious irony I keep circling. Microsoft writes the clearest, bluntest plain-English explanation of why Bluetooth microphones sound bad that exists anywhere. "A little worse than an AM radio." Same company. The same company that documented the disease is the one whose cure requires six conditions and a toggle that vanishes. Best diagnostician, slowest pharmacist.



### Corn

And even the demo is hedged, isn't it. They published a comparison video...



### Herman

They did, wideband mono Classic versus super wideband stereo LE Audio, and the caveats on it say it uses additional audio and video compression for online streaming and may not perfectly represent the quality heard from a real PC. Which is an honest caveat! It's just also a demonstration of the problem: nobody has published a measured, controlled comparison of wired versus built-in Bluetooth versus dongle microphones on the same headset. The gap is real and everyone in audio knows it's real, but the precise number lives in nobody's lab.



### Corn

The entire industry is running on vibes with a spec sheet attached.



### Herman

Which leads us to the ecosystem, and here's the hole in the middle of the room. As of this summer, LE Audio with LC3 is shipping. Most Android flagships. Headline headphones from Sony, Sennheiser, JBL, Samsung. A first wave of hearing aids, which was actually the design driver. But Apple. The iPhone 17 carries Bluetooth 6 hardware and exposes no LE Audio, no Auracast. AirPods Pro 3 still list Bluetooth 5.3 with no LC3.



### Corn

The largest premium audio vendor on earth is sitting on silicon that could do it and choosing not to flip it on.



### Herman

And if Apple won't, what's the business case for Yealink? Their customers are contact centers and offices, buying in hundreds, where the accepted quality bar is "sounds like a phone call" because it is a phone call. There's an LC3plus, Fraunhofer's superset, which adds one and a quarter millisecond frames and about seven milliseconds of end-to-end latency, aimed squarely at gaming headsets. So the enthusiast side is moving. The office side has no constituency demanding it. Corn, you buy nothing new on principle. Would you pay extra for an LE Audio business headset?



### Corn

I'd pay extra for the headset that tells me what mode it's in. The codec could be tin cans and string, as long as the box says so.



### Herman

That's more radical than LE Audio, honestly. A status readout. Nobody's working on that. There's one more wrinkle worth naming: even if Yealink shipped a firmware update tomorrow, the BH71's microphone tops out at eight kilohertz. Thirty-two kilohertz super wideband needs a microphone that captures thirty-two kilohertz. So Daniel's specific headset is two gates behind: the transport, and then the capsule itself.



### Corn

The spec sheet promised him nothing and delivered exactly that.



### Hilbert

Corn, when you said telephone with extra steps, how many steps are you counting?



### Corn

Between the mouth and the recording... I count four. Digitize, compress, transmit, decompress.



### Hilbert

I counted five, because I included the mistake. I bought a Bluetooth headset in the spring for the mixing desk, sixty-eight euros, because a cable gets caught on the fader arm when I turn. First call I made on it, my sister's boy asked if I was ringing from a tunnel. A tunnel. He's nineteen, he has never heard a bad phone line in his life, and the first one he heard was mine. I put that headset back in the box it came in and I've got the Sennheiser HD 25s on the desk with a ModMic clipped to the headband. Same boy, next call, asked what I'd done to fix the audio. The ModMic is the most inelegant solution to a problem that shouldn't exist and I have recommended it to three people this month. The headset is still in the box. Sixty-eight euros, sitting on the shelf, because I refuse to sell a thing that lies.



### Corn

You refuse to sell it but you keep it within reach.



### Hilbert

It's evidence. And to be fair to myself, I test everything the same way before it goes on the desk. I record myself reading the same paragraph on each device. It's the opening of the manual for a tape machine I don't own anymore. I've read it so many times I could do it from memory. Your own voice is the only one you actually know. Everything else you're guessing. Herman, you'd get that, the way you go on about gain staging.



### Herman

I do go on about gain staging, and I stand by every word. And the paragraph from a manual for a machine you no longer own… that's a control variable. A fixed text, a fixed reader, so the only thing changing across recordings is the chain. That's better methodology than most of the audio reviews I've read.



### Corn

The show's producer maintaining a calibration paragraph for equipment he's auditioning, while Microsoft can't tell you which codec your PC just used. Herman, there's the answer to Daniel's last question, kind of. The way to know what your mic sounds like is to record yourself and listen. The system will never tell you.



### Herman

Never voluntarily. Okay, so let's take stock of where that leaves Daniel's question, because the honest answer has two halves. Will a computer's built-in Bluetooth ever do a decent microphone codec without a dongle? The technology exists and is shipping, on phones, on new PCs, thirty-two kilohertz with the mic live. But the compatibility chain is long, the toggle is fragile, and the business headset market, his market, has no reason to lead. Microsoft expects most new mobile PCs from late last year onward to have super wideband stereo from the factory, and driver updates are rolling out to some existing models. So progress, gated.



### Corn

And the gating is silent, which is the part I can't get past. Every failure in this chain fails by omission. No toggle, no warning, no fallback message. The user's entire experience of the improvement is noticing that maybe, one day, things sound better and not knowing why.



### Herman

It's an odd design philosophy for the company that wrote the AM radio line. They understand the problem completely and they fixed it in a way that requires you to already understand the fix.



### Corn

So the open question sitting under all of it. If the BH71's microphone is hardware-limited to eight kilohertz, and the dongle is a stability accessory, what would it actually take for a business headset maker to ship a good Bluetooth microphone? A new capsule, LE Audio end to end, and a PC that doesn't quietly fall back to Classic. Three gates, one market.



### Herman

And the moment that changes is the moment Microsoft ships the promised CD-quality game chat, or Apple flips LE Audio on. Either one moves the incentive structure. Until then, wired holds, not because wireless technology is bad, but because nobody in the office-audio business is being paid to care.



**Corn**

What I keep noticing is that the spec sheet told Daniel everything. It said SBC, it said eight kilohertz, it said Bluetooth 5.0 on the dongle. The interesting story isn't that the BH71 sounds bad. It's that the documentation predicted it and the dongle was never designed to fix it. The gap between what "Bluetooth 5.3" sounds like on a page and what it does on a desk.



**Herman**

And credit where it's due, he read the spec sheet after the fact, which is more than most buyers ever do. Our producer is Hilbert Flumingtop, who records himself reading a manual for a machine he no longer owns, and whose audio has never once sounded like a tunel.



**Corn**

For more along these lines, there's episode ten, How ASR Went From Frustration To ... Whisper Magic; episode fifteen, AI Gets Personal; and episode two, Local STT For AMD GPU Owners. This has been My Weird Prompts. If you've enjoyed this one, the whole archive lives at my weird prompts dot com, six thousand odd episodes deep.



**Herman**

We'll be back soon. See you tomorrow.

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