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AKG N90Q Headphones Review

An absurdly good pair of headphones, for an absurd price

\$1,499.95



8.5
SCORE

TESTED BY
EXPERTS

- The **AKG N90Q** is better than **94%** of the **headphones** we tested.
- It is better than **93%** of the **headphones** we have tested under **\$1,500**.
- It is better than **90%** of the **over-ear headphones** we have tested.

**Nick Schmiedicker**

August 21, 2015



For most people, all you really need is a good pair of affordable, reliable headphones. For audiophiles, words like "affordable" are meaningless; paying a little extra for sound quality is all part of the fun.

Then there's the far end of the spectrum: the lunatic fringe for whom money is no object. For those people, there are headphones that are so ludicrously expensive that only a small percentage of audio enthusiasts will even think about buying them. Well, for those people, AKG has something to show you: the **AKG N90Q Headphones** (MSRP: \$1,499.95).

The "Q" in the model name denotes a personal stamp of approval from Grammy-winner Quincy Jones. As the latest addition to his signature line of well-respected headphones, the AKG N90Q have a lot to live up to. But even with his blessing, what could possibly justify spending \$1,500 on a pair of headphones? That's still not totally clear, but after a month with the AKG N90Qs, I'm not sure I want to ever go back to regular headphones.

The Looks

Extravagant in all the best ways

With such a steep asking price, you'd expect AKG to pull out all of the stops. The N90Qs don't disappoint, making a striking first impression as soon as you lay eyes on the case. Shed the outer cardboard sleeves and you're greeted with a weighty gold and black case stylishly etched with the model name. Ostentatious doesn't even begin to cover it. Scrooge McDuck would be proud.

Crack that case open—not an easy feat—and the first thing you'll see is a small, black cleaning cloth that's marked (again) with the model name and a quote from Quincy Jones himself. Once that's out of the way you'll find the real prize, the headphones themselves. While there is an all black option, the model we received for review is accented with bright gold highlights, that teeter dangerously on the line between tacky and luxury.

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Even the cleaning cloth is given that extra bit of attention.

You'll notice just how bulky they are as soon as you lift the N90Qs out of the case. This is mostly due to the earcups, which are absolutely enormous thanks to the built-in tech and incredibly thick, plush leather padding. Not only do they completely encompass my rather large ears, but the earcups have a wide range of motion, with a headband that can be adjusted for even the biggest heads. Despite their large size and weight, there's no denying that these are some of the most comfortable over-ears we've ever used.

The N90Qs are packed with features, and various knobs to control them. The right earcup houses the majority of the controls, including an aluminum control ring for volume, the power switch, and a small gold button to switch between the three sound modes and activate the TruNote technology (more on that below). The left side only has an aluminum control ring, but it's used to adjust bass/treble notes—letting you fine-tune your audio experience on the fly.

There is one glaring oversight though: While the bass/treble control ring has audible cues to indicate which setting you're on, there's no way to tell which of the three main settings—standard, studio, surround—you're currently using. There's a distinct shuffle sound when you switch between them, but that's it.

Sure, in theory the sound of your music should be enough, but not everyone has pitch perfect ears. Some modes—like surround—are far more noticeable if content is mastered for it, but that doesn't always apply. It's a small detail, but it's one we felt should have been included.

In order to play music or use the additional features, the N90Qs rely on rechargeable batteries. AKG claims these will last about 12 hours per full charge and that's right on par with what we saw. In order to help alleviate that hassle, AKG included a small battery backup—in black and gold, of course—that's about the size of a deck of cards and connects to the earcups via a micro USB cord.



Each earcup has a control ring to control either volume or the bass/treble modes. [View Larger](#)



Why grow your hair out when the N90Qs make compelling Princess Leia hair buns?

Along with the vault-like case (which has a spot for the battery backup and a built-in micro USB port to charge it through the case), AKG included the usual list of accessories with the N90Qs. First up is a leather carrying bag—and an additional one for the battery charger—so despite its bulky frame, the N90Qs can be ferried from place to place with relative ease.

For connectivity there's a four foot audio cable with an in-line remote to control music playback, volume, and phone controls. If that doesn't quite cut it and you're working in a studio/home office there's also a 10-foot audio cable, which should be more than enough to reach any hidden port. Of course, sometimes a standard 3.5mm jack won't cut it and for those circumstances AKG also threw in two adapters—a stereo adapter and a two-pronged airplane adapter.

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The advertisement features the Amazon logo in the top right corner. The main text reads "Save 20% on Digital SLR Cameras" in a large, dark red font. Below the text are two digital SLR cameras: a Nikon on the left and a Canon on the right. At the bottom left of the ad, there is a link that says "> Shop now" and a smaller link for "Privacy".

The Features

"Personalized sound"—at least, that's the elevator pitch

So what exactly does \$1,500 get you? Quite a lot, actually. AKG, in partnership with Quincy Jones, has really gone the extra mile to craft a killer pair of headphones, all with the hope of creating the ultimate audio experience for enthusiasts and professionals alike.



Before you reach the headphones you'll have to get past a vault-like case that protects your investment.

The star of the show is the new TruNote technology, which is designed to give every user a unique experience that's tailor-made to their ears. When the gold button on the right earcup is held for five seconds, TruNote activates and two chirrups echo through your ears. The N90Qs actually has two little microphones in each earcup, which measure the frequency response of your ears and then adjust the sound accordingly. Theoretically, no two people should hear exactly the same thing as the audio will be customized for each person based on the shape of their ears.

TruNote is only the first step, though. Once the headphones are personalized to you, you can use the aforementioned dials to tweak sound output to your liking. To begin with, you have the three base modes: standard, studio, and surround. Standard boosts and lowers certain frequencies to provide a more balanced sound, while studio is designed to have a flat response to help master tracks. Surround sound, much like in a home theater, adds distance to the sounds, giving everything a sense of space.



The wide range of extra features help justify the absurd cost of the N90Qs.

Once you've nailed down which of the settings you'd like to use, you can use the left control ring on the earcup to finely adjust bass/treble levels. When you spin the dial there are four tones ranging from "low" to "high" marking each shift. It might be hard for someone to pick up the differences in the audio unless they have a finely tuned ear, but for audiophiles it might be that extra level of control they need to justify such an immense purchase.

Rounding out the list of high-end features is active noise cancellation. It's not among the best ANC we've ever seen on a pair of headphones—the [Bose QC20i](#) is better—but you can still expect the relative volume of ambient sounds to at least be cut in half. The only downside is that there isn't a separate off/on switch for the ANC, and it's one of the biggest drags on the battery.

Comparable Products

Before you buy the AKG N90Q, take a look at these other headphones.



**Beyerdynamic
Custom One Pro**
\$219.99 at Amazon [↗](#)
9.9



Shure SRH1540
\$479.00 at Amazon [↗](#)
7.4



Denon AH-D5000
\$699.99 MSRP
8.6



**Audio-Technica
ATH-MSR7**
\$209.06 at Amazon [↗](#)
8.9



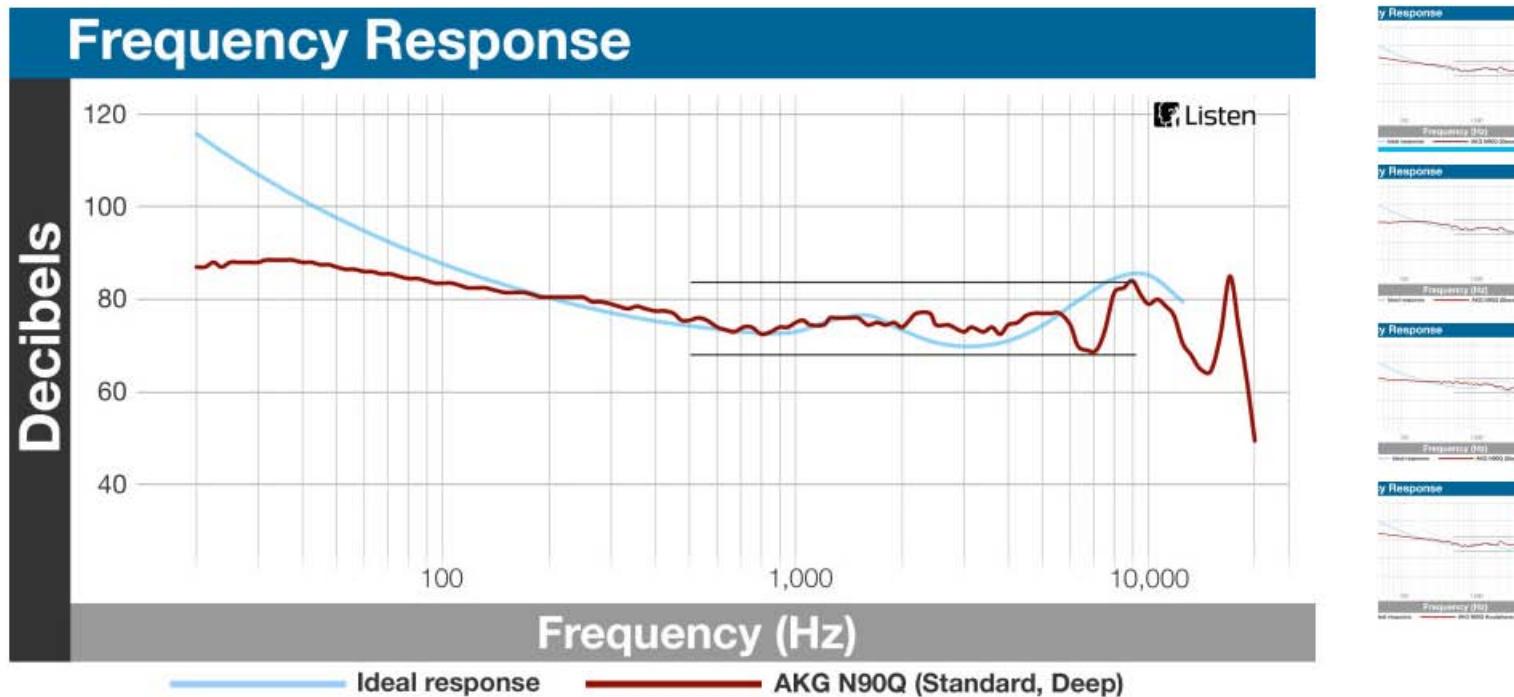
**Beyerdynamic
Custom One Pro Plus**
\$230.00 MSRP
10.0

The Sound

With so many settings to choose from, it's easy to find one you'll like.

I spent a lot of time with the N90Qs—both in the lab and at my desk—listening to podcasts, rock, pop, electro, and even a bit of classical. I cycled through each, seeing what you get with headphones that cost more than my laptop. And while the N90Qs aren't entirely flawless, with the right settings they're only a sliver away from being perfect.

For the average listener—and even the audiophiles these are targeted at—they'll sound absolutely fantastic and the flaws that we did find were only caught by the highly sensitive ear of our [audio testing robot](#)—or as we like to call him, HATS. Even so, HATS only uncovered a few minor nitpicks. (Of course, \$1,500 price tags tend to invite nitpicking.)



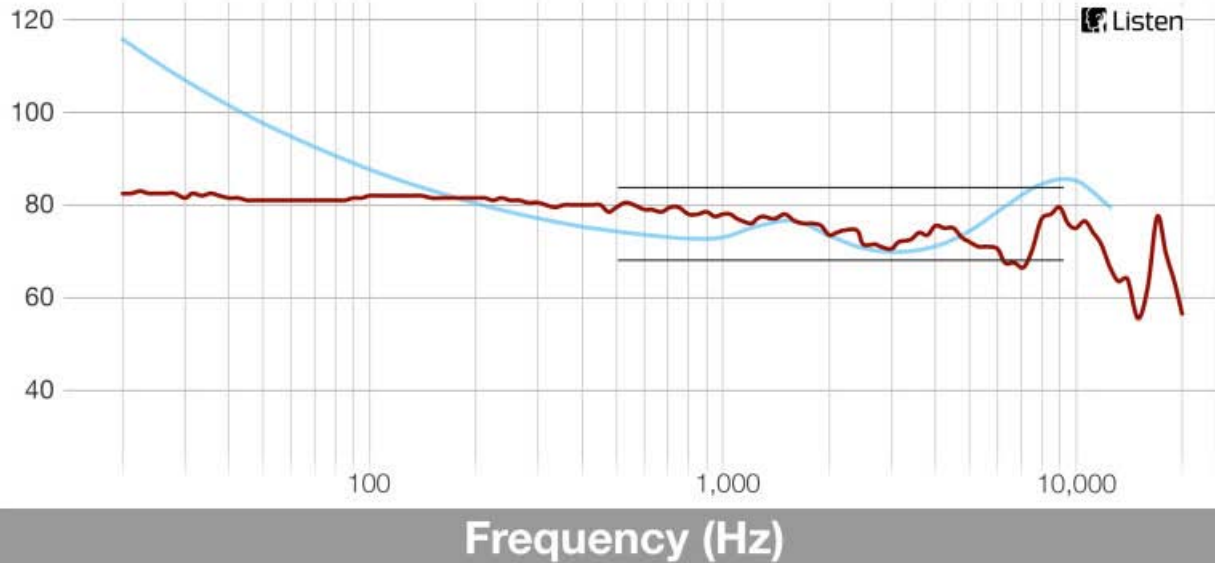
The standard setting is meant to follow an equal-loudness contour for mass appeal.

The bass/treble control ring certainly had a profound impact, boosting some frequencies by as much as 10dB between the highest and lowest setting. If you want to tweak the heck out of your music this should absolutely be your first stop.

As far as the three main settings? On both standard and studio, the headphones produced a consumer friendly sound profile. It wasn't quite an [equal-loudness contour](#), but had a bit too much of a curve for an ideal studio response. While it's a little disappointing not to have two truly unique settings that highlight each style, you can still expect top-quality audio.

Frequency Response

Decibels



— Ideal response — AKG N90Q (Studio, Deep)



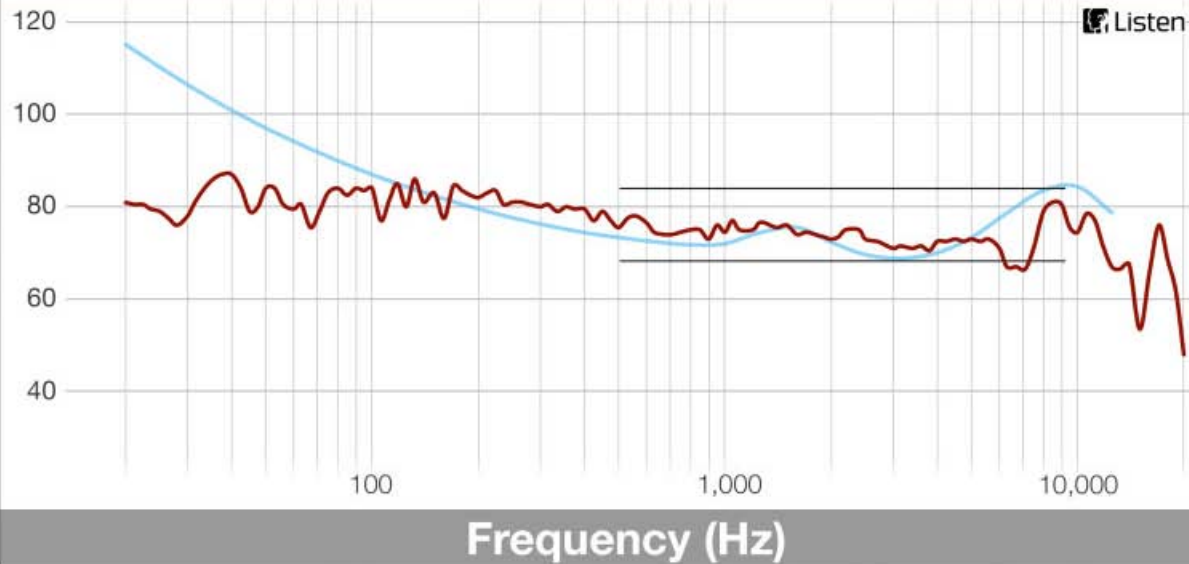
Studio is meant to produce a flat response in order to help musicians equalize their own music.

Surround sound is an entirely different beast that does some strange things to the audio in order to create that illusion of space. Unlike the other two modes—detailed in the charts above—the surround sound charts—both frequency response and tracking—are much noisier. By drastically shifting the audio between channels and adjusting how the loud the frequencies are, the headphones are able to fool your ears into thinking the sound is coming from all around you.

If you like listening to full-orchestra classical music, it's a real treat. There's no reason you shouldn't be able to get the full home theater experience from your laptop while traveling—as long as you bring a separate amp for an extra bit of power. Just keep in mind the quality won't exactly be top tier. We noticed a higher amount of distortion using the surround sound setting, but that's most likely a necessary evil of that immersive spatial effect.

Frequency Response

Decibels



— Ideal response — AKG N90Q (Surround, Deep)

There are a lot of fluctuations in the frequency response and tracking in order to create the illusion of 3D space.

Our tests and data seem to indicate the N90Qs were designed to combine the performance and capabilities required by a professional with the balanced sound of premium consumer headphones, and it largely succeeds. That combination results in some unfortunate sacrifices, but they're so minor that it seems almost silly to bring them up. Bottom line is, the N90Qs already sound near perfect. Throw in the standard equipment of an audio enthusiast—like an external amplifier—and you've got a surefire win.

For a full breakdown of the 12 settings and how they affect the frequencies across the audible spectrum head over to the [Science Page](#) to find out more.



The Verdict

They're undeniably good—but are they \$1,500 good?

With 12 customizable settings for audio, always-on ANC, an extremely comfortable fit, and the most opulent case we've ever seen, the **AKG N90Q Headphones** (MSRP: \$1,499.95) are a luxury product through and through. Unfortunately, based on cost alone they'll only appeal to a very small group within an already small demographic. There's simply too much here for the average consumer. Unless you're an audiophile who's willing to blow a paycheck on a single pair of headphones, it's unlikely you'll be able to get the most out of this product.

But, that's okay. Now and again it's fun for a company to go all-out and throw caution to the wind. AKG has done that, and in the process created some of our favorite headphones to date. Sure, they're overpriced, absurdly opulent, and over-the-top—but we love them anyway. Would we buy them? Probably not, but we don't have \$1,500 to spend on headphones. And why would we when there's arguably better Quincy Jones-branded headphones, like the **AKG Q 701** (MSRP: \$479.00), which you can get for a fraction of the price.

If you like the idea of a customizable pair of headphones, our best recommendation are the **Beyerdynamic Custom One Pro Plus** (MSRP: \$229.00). While they don't have *all* of the same features of the N90Qs, they do offer four customizable settings to adjust your sound, as well as an unprecedented level of customization for the design of the cans themselves. We liked their [predecessors](#) so much that they were our [Best of Year](#) top picks for 2013 and 2014.



[Buy now for \\$199.95 →](#)



Each earcup features thick, plush leather padding for optimum comfort.

There's also the [Denon AH-D5000 Over-Ear Headphones](#) (MSRP: \$699.99). They have a beautiful wood (or wood-like) earcup and rival the N90Qs in terms of style—without going over the top with glitz and glamour—with the sound quality to match. Expect a rich, balanced sound that will go great with practically any genre you listen to. The only downside is that there's no customization here—in sound or design—and if you like a little more control over your audio, you'll need an equalizer.

Ultimately, the N90Qs are in a league all of their own. The wealth of features, accessories, and high-end design is unmatched in the category. It has an absurd price, but if you're a serious audio enthusiast and want everyone to know it, these will get the job done. The N90Qs are currently up for [pre-order](#) on the Harman Audio website. They might cost you a pretty penny, but if you can afford it, it'll be 149,595 pennies well spent.



Nick Schmiedicker
August 21, 2015



The Insides That Count

There's no doubt the **AKG N90Q** (MSRP: \$1,499.95) try to do it all. With twelve different sound profiles, ANC, and the fancy TruNote tech, there's plenty here to get excited about.

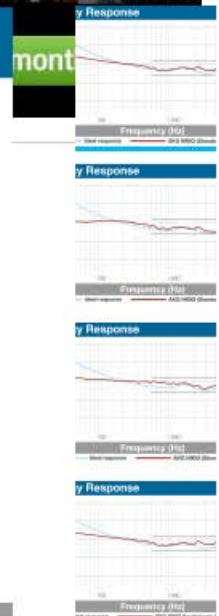
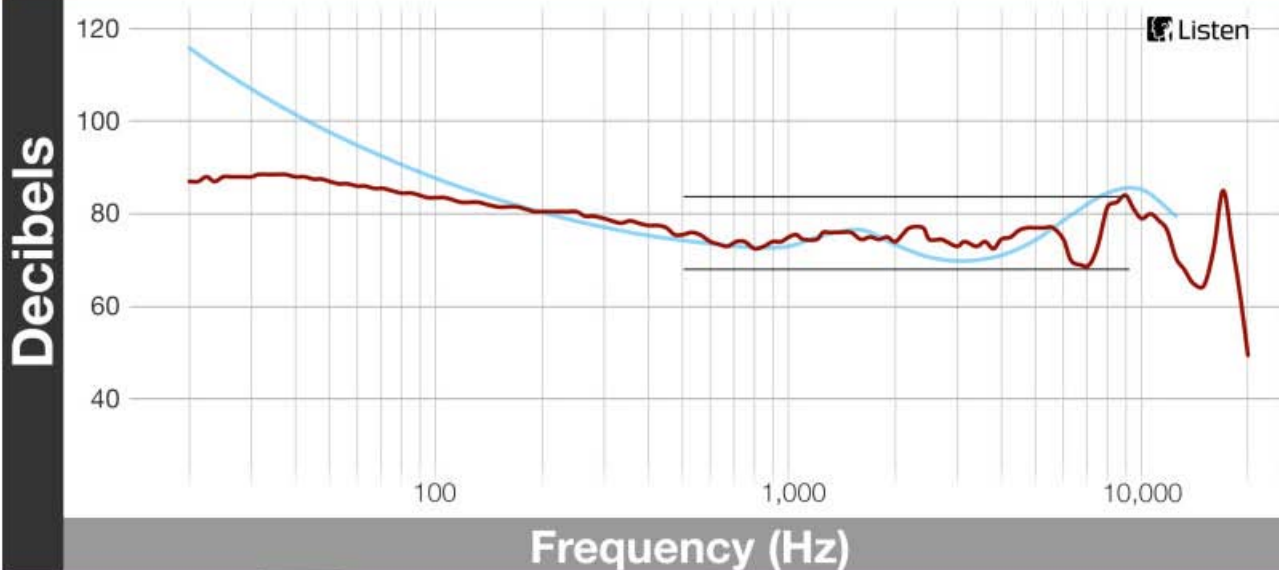
Our first thought was that this was a bit of overkill, but using our reliable pal **HATS (head and torso simulator)** we were able to put the N90Q through their paces and see how exactly those settings compared—and if it was worth it in the end.

Frequency Response

In order to test frequency response we start by inputting a parent signal of 82dB and measuring the response of the headphones across the audible spectrum (20Hz–20kHz). Now, the N90Qs have three primary settings—standard, studio, and surround sound—and, in addition to that, the control ring on the left earcup adjusts bass and treble levels. All counted, there are 12 unique settings for how to listen to your music.



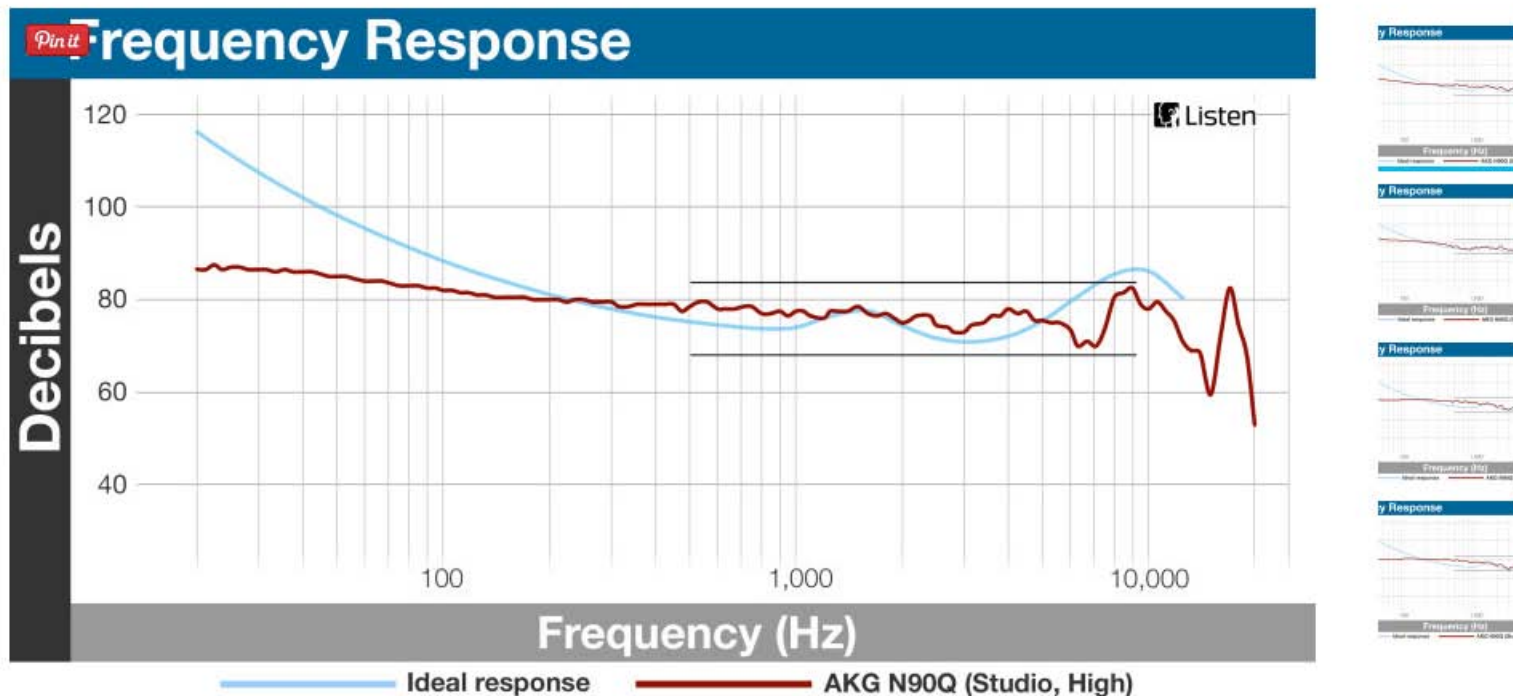
Frequency Response



The standard setting is meant to follow an equal-loudness contour for mass appeal.

The first setting, standard, is billed as being for the everyman and with that the usual buzzwords of “rich” and “balanced sound” immediately spring to mind. That typically translates to an [equal-loudness contour](#) (ELC), which means certain frequencies are boosted or diminished so they can all be heard equally as well by the human ear.

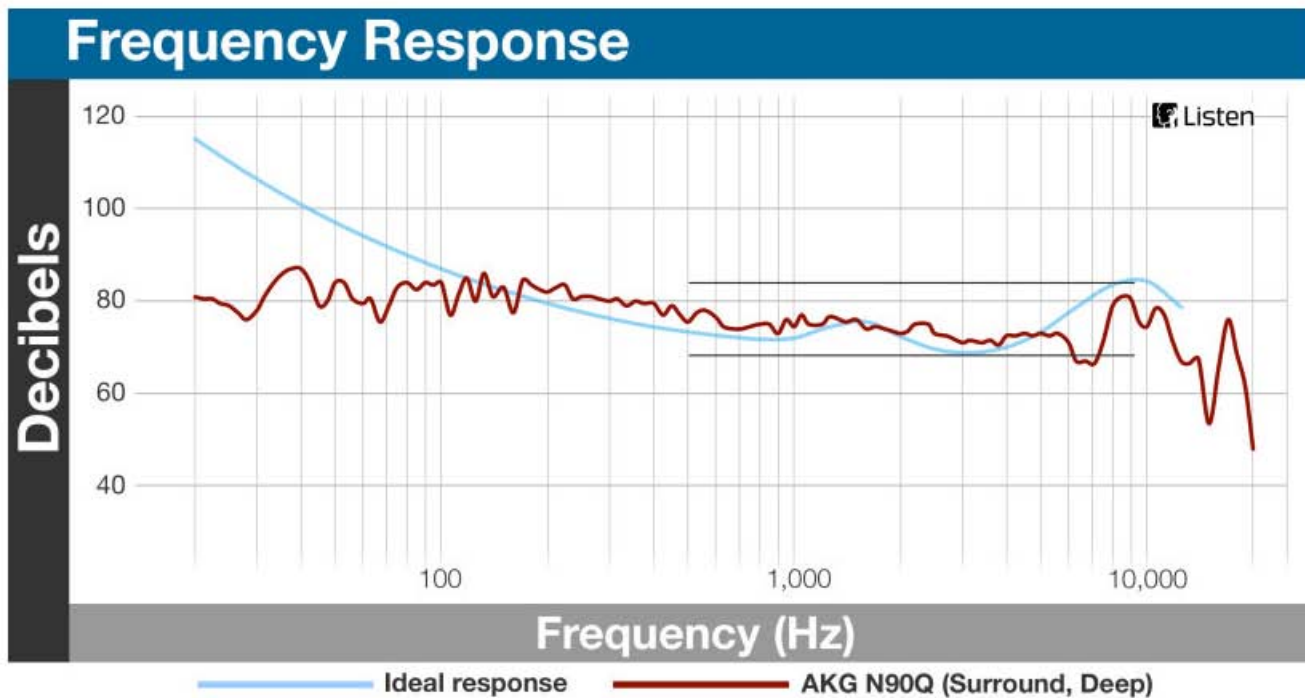
Meanwhile, the studio setting is meant to be as close to flat as possible, which in this scenario would mean a reading of 82dB across the audible spectrum. This is most beneficial to anyone looking to equalize their own music—professionally or as a hobby.



With the treble/bass dial set to high all of the frequencies shift up by roughly 5–10dB, but otherwise staying the same.

Our lab tests showed that instead of two distinct results, the standard and studio settings are near identical and look closer to a blending of an ELC and a flat, studio response. In both settings sub-bass starts at about 82dB (our parent signal) and then stays relatively flat through the bass frequencies (60Hz–300Hz.)

The midrange frequencies, on the other hand, differ between the two settings. On standard, there's a drop that nearly touches 70dB around 600Hz, while on studio the midrange holds steady around 80dB until 1kHz. Once the frequencies are high enough to reach the treble range the two settings are very similar again, with peaks and valleys to emphasize the bright, airy notes against the deeper bass sounds.



There are a lot of fluctuations in the frequency response and tracking in order to create the illusion of 3D space.

Surround sound, as noted in other places of this review, is really a series of audio tricks that the headphones use in order to create the illusion of space in your music. While the curve follows the same general pattern of the other modes, you'll notice a much more jagged response—one of the necessary side effects of creating the illusion of surround sound.

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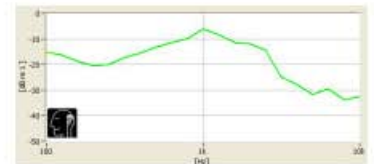
The advertisement features two digital SLR cameras, a Nikon on the left and a Canon on the right, positioned centrally. The text is arranged around the cameras, with the Amazon logo in the top right corner and a 'Shop now' link in the bottom left. A small 'Privacy' link is located at the very bottom left of the ad area.

Active Noise Cancellation

Typically, we like to measure the passive isolation of a pair of headphones in order to determine how well they're able to block ambient sound from diminishing the quality of your music. While the N90Q have thick, plush earcups that form a fantastic seal and would do wonders with passive isolation, music can't actually be played without the active noise cancellation (ANC) being turned on as well—so all of our results feature ANC.

While isolation varied slightly based on which setting was selected, for the most part the N90Qs are able to block enough ambient noise to keep you trapped in musical bliss. The relative volume of sub-bass and bass sounds (0–300Hz) are reduced to about a quarter as loud as they are normally, which is fantastic for anyone planning to wear the N90Qs on a subway or for a trip on a plane.

Unfortunately, the N90Qs don't do nearly as well at blocking the midrange frequencies (300Hz–2kHz). Instead of dropping to a quarter as loud, midrange sounds will only be diminished to about half as loud as they would be normally. Expect the dull hum of any HVAC units to be cut out completely and the general chatter of an office to be brought to a barely audible whisper.



The active noise cancellation keeps ambient sounds reduced by at least half and sometimes as low as 1/8th as loud.

It's unlikely that you'll run into anything that registers in the high mids and high frequencies (2–20kHz), but if you did it would be reduced from anywhere from half to 1/8th as loud. So while you won't be completely blocked off from the outside world, only certain ambient sounds are going to affect the quality of your music. Just make sure to keep the battery charged because the headphones are useless without it and ANC is a real drain.

Comparable Products

Before you buy the AKG N90Q, take a look at these other headphones.



Shure SRH1540

\$479.00 at Amazon [↗](#)

7.4



Denon AH-D5000

\$699.99 MSRP

8.6



**Beyerdynamic
Custom One Pro**

\$219.99 at Amazon [↗](#)

9.9



**Beyerdynamic
Custom One Pro Plus**

\$230.00 MSRP

10.0



**Audio-Technica
ATH-MSR7**

\$209.06 at Amazon [↗](#)

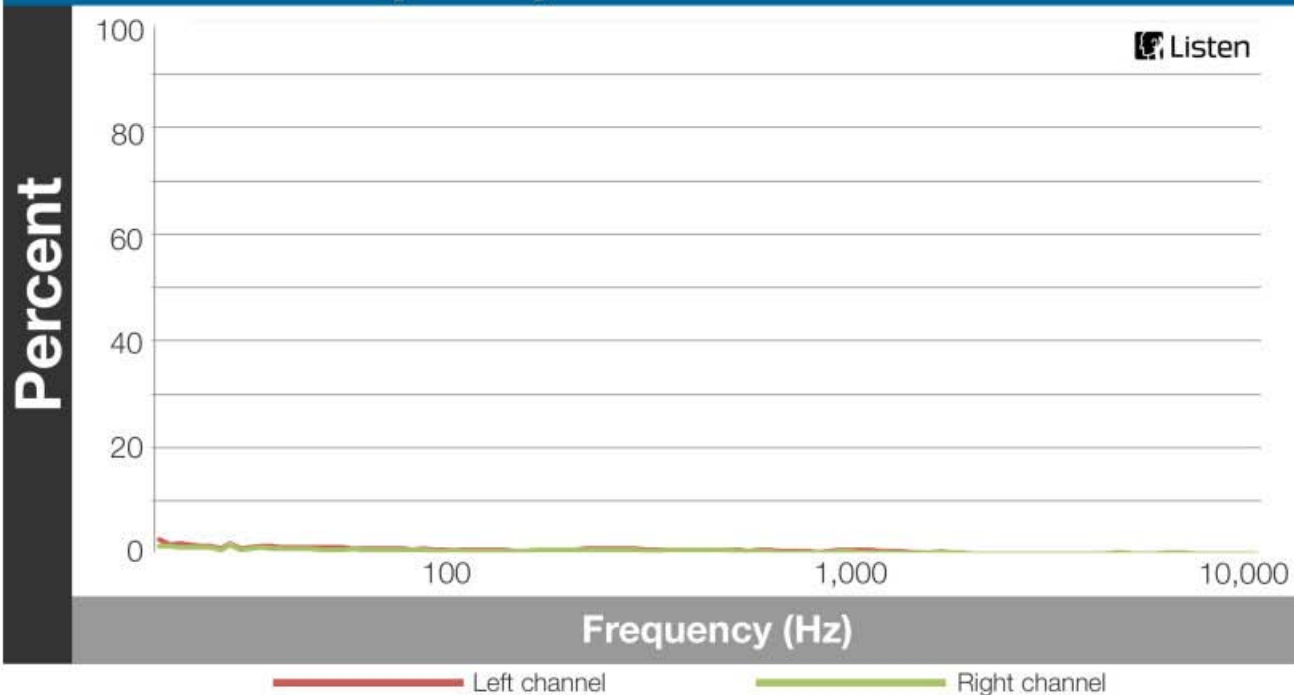
8.9

Distortion

One of the biggest impacts to the quality of music is the fuzzy, scratching sounds that are typically introduced by internal components. Each of the settings handled distortion a little differently, but on average distortion was never enough of a concern to be a major problem.

Using the N90Qs in standard mode keeps distortion low. While the different bass/treble controls affected distortion slightly, it never reached higher than 5%. In fact, on average, distortion hovered closer to 1% across the audible spectrum. This means that unless your music was mixed to include fuzzy, crackling sounds, it's highly unlikely you'll hear anything that wasn't meant to be there.

Distortion (THD)



While HATS recorded a small measure of distortion, it wasn't enough that it should seriously impact your music.

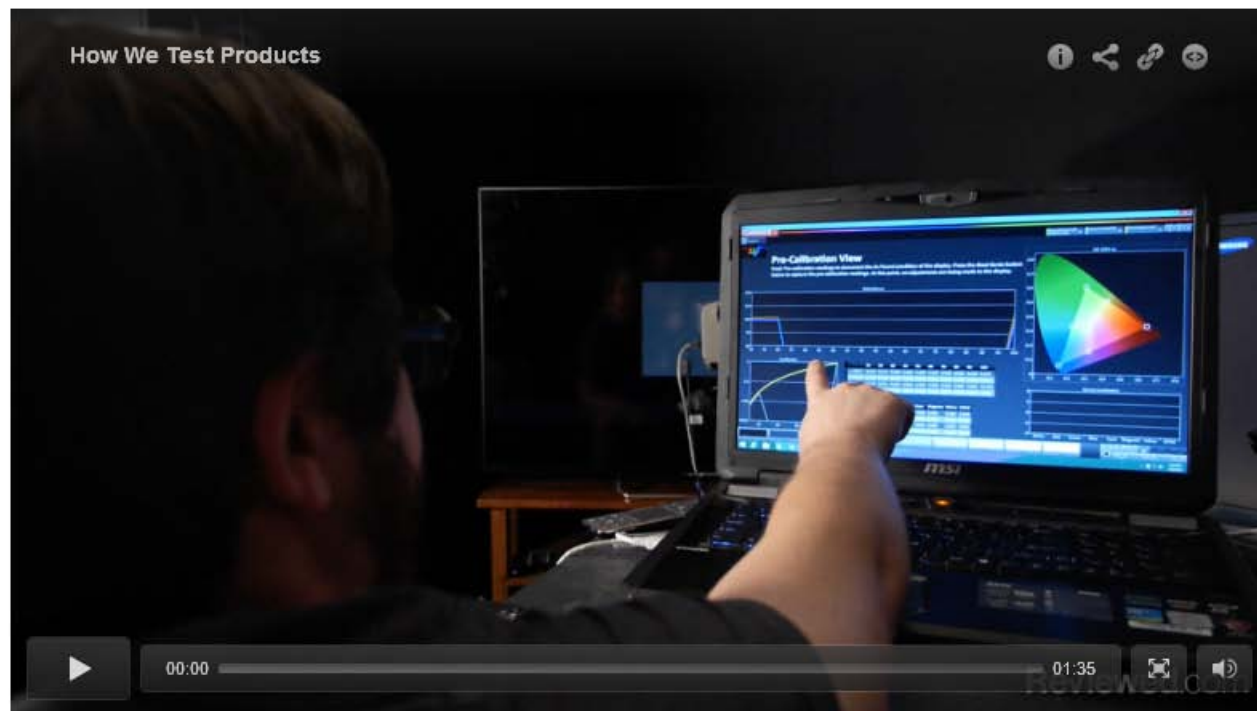
Switching over to studio mode nets almost identical results. The highest distortion measured was 2.5%, which only occurred when the bass/treble control was turned all of the way down. Otherwise, it stayed consistent at 1.0–1.5%.

Surround sound is a different story entirely. In order to create that illusion of space in your music, the N90Qs have to do some weird stuff to the music. And while our ears might not be able to pick up on it, carefully calibrated hardware—like HATS—can. Most of the frequencies stick close to the 2% distortion that we saw in the other modes, but there's anywhere between 40–50% distortion between the frequencies of 500Hz–1kHz. While that may seem alarming at first glance, it isn't immediately noticeable by most people and is ultimately just a strange byproduct of the surround sound experience.

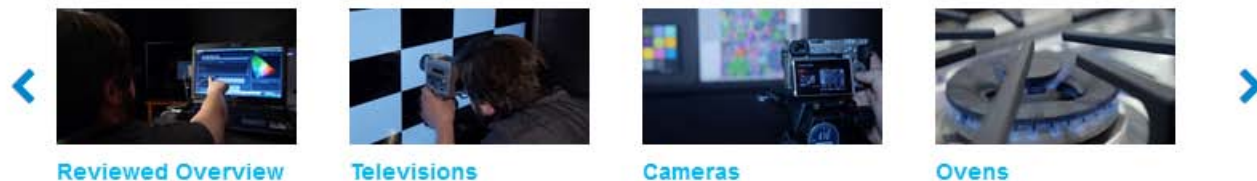
Type	High-End
Over-Ear Back Design	Closed
Cable Type	I
Weight	16.226 oz.
Cable Length	9.84252 ft.
Sensitivity (at 1 kHz)	32 dB
Frequency Low	10 Hz
Frequency High	30 Hz
Microphone	Yes
Remote	Yes
Extension Cord	Yes
Collapsible Band	No
Connection	1/8 in.
Active Noise Cancelling	Yes
Wireless	No
Battery	Internal
On/Off Option	Yes
Other Features	Power case, Battery pack, Charging cable
Adapters Included	Yes
Type of Adapter	1/4 in. Airplane
Available Colors	Black Other

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How We Test Headphones



See How We Test Other Products:



Our approach to testing things like sound quality is to use scientific testing methods.

While many other testers rely on 'golden ears' (those with good hearing who subjectively judge headphones), we use proven scientific test methods developed by industry experts. This means that we can not only quote specific numbers for tests (instead of saying that the music sounded bassy, we can quote a specific frequency response), but that we can run exactly the same tests and get the same results year by year.

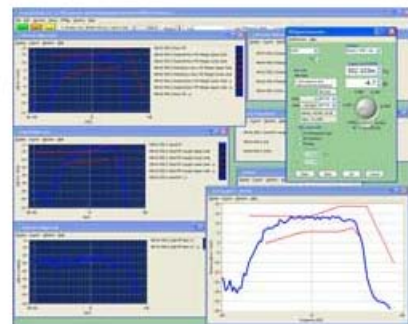
Audio performance is the most important thing we test on headphones, so we put a lot of time and effort into testing the quality of the sound that headphones produce. We evaluate the electroacoustic performance of headphones (meaning the details of the sound produced) objectively using a test system from [Listen, Inc](#) which is comprised of a SoundCheck™, electroacoustic test system, and a Brüel & Kjær Head and Torso Simulator (HATS). This enables us to do precise, scientific testing of headphones, rather than the subjective testing that is often used. These components of our testing system are described in more detail below.

Our Testing Rig

SoundCheck

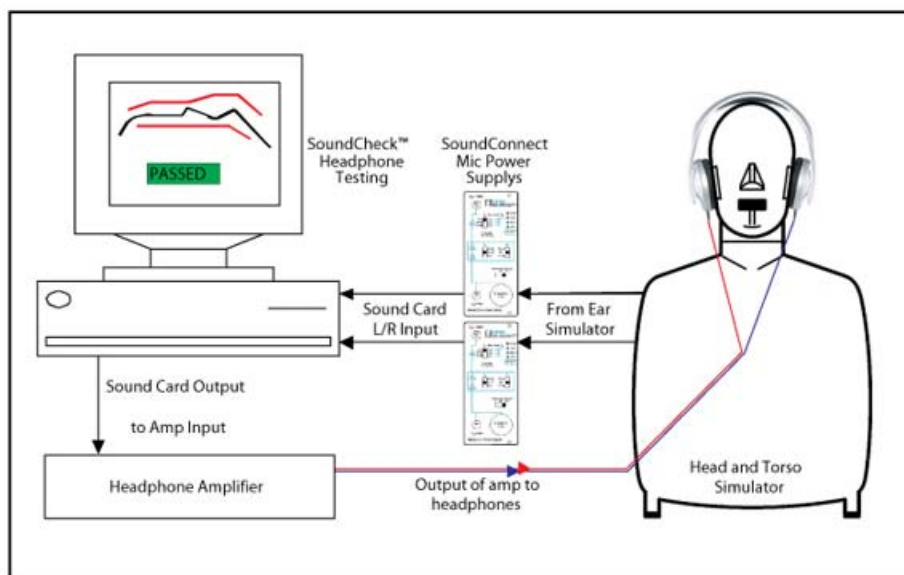
SoundCheck, from Listen, Inc. is an electroacoustic measurement and analysis package widely used for testing audio devices, both on the production line and in R&D applications. It is a PC and sound card based system which communicates with both analog and digital equipment using standard, non-proprietary interfaces.

The Brüel & Kjær hardware is directly controlled through SoundCheck, with the test sounds passing from the soundcard to the high-end audio amplifier we use to drive the headphones (a Crown D45). Tests are fully programmable, enabling the sound signal, various analysis methods and result output format to be selected.



Head and Torso Simulator

The Head and Torso Simulator (HATS) is a mannequin with built-in ear and mouth simulators that provides a realistic reproduction of the acoustic properties of an average adult human head and torso, including how it absorbs and reflects sound. It incorporates an artificial mouth and ear with pinna (the visible part of your ear that acts to gather sound). We mount the headphones on the HATS in the same way that they are mounted on a human head, and the sensitive microphones in the ears of the HATS pick up the sound from the headphones and feed this back to the SoundCheck system through two high-end microphone amplifiers. The entire system is calibrated and tested on a regular basis.



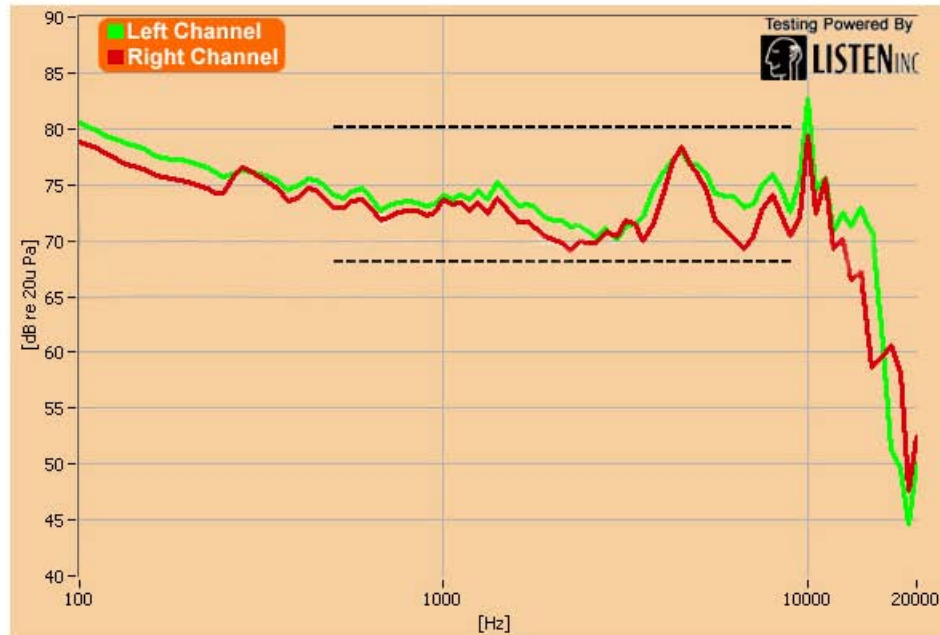
Our Tests

Our audio quality tests are broken down into 6 sections: frequency response, distortion, tracking, sound pressure level, isolation and leakage. Below, we describe the tests we do for each of these sections in turn.

Frequency Response

Frequency response describes how a set of headphones emphasizes different frequencies. To test this, we first put the headphones on HATS, and make sure they have a proper fit. We then use SoundCheck to send a frequency sweep through the headphones, which covers a range from 20 to 20,000Hz. This frequency range covers all the frequencies the human ear can hear. The sound is played through the headphones and into HATS' precision microphone ears. HATS records the playback and sends the data back to SoundCheck. Now we can compare the original sound file to what HATS recorded to determine how the headphones have altered the original sound file.

This process produces a graph like the one below, which shows the frequency response of the headphones from low frequencies (at the left) to high frequencies (at the right). The two lines are for the left (in green) and right (in red) channels of the headphones. The response curve we feature includes a diffuse free field correction, which corrects for the effects of the head, torso, pinna and ear canal on the response curve.



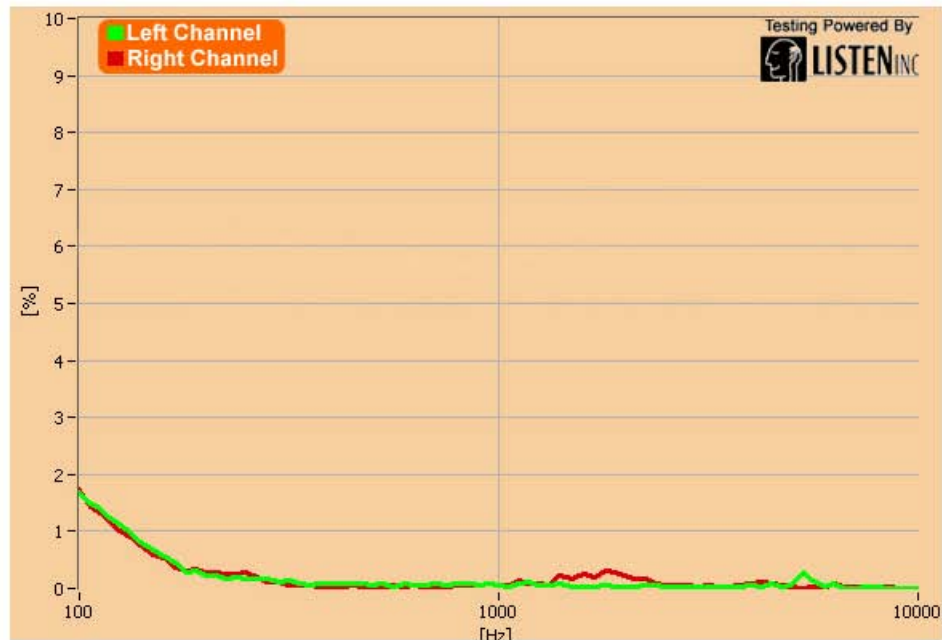
There is no ideal response for headphones, so there is not a single response curve that we test against. Instead, we set a range of +/- 6 dB SPL in the frequency range of 500Hz to 9KHz, and our testing system puts these limits against the response curve of the headphones. Our scores are then based on how much the headphones go outside these limits, so we are not scoring on the exact curve, but rather on the smoothness of the curves. Although headphones are often regarded as being a matter of personal taste, a good pair of headphones should produce a good, clean frequency response that does not overly exaggerate or diminish nearby frequencies. We're looking for the headphones to accurately reproduce the music you're putting through them.

We test the headphones frequency response at an average level of 78 dB SPL, measured at 1 kHz. This represents a typical listening level for someone listening in a quiet room or other low-noise environment.

Distortion

Distortion is a measure of how accurately the headphones reproduce the waveforms that make up the music you listen to; if they clip, compress or otherwise mangle the waveform, your music won't sound the way it should. Using the SoundCheck system, we measure something called Total Harmonic Distortion (THD), which relates to how well the headphones reproduce not only the fundamental frequency itself, but the higher frequency harmonics that accompany it. A decent set of headphones should be able to accurately reproduce both the fundamental frequency and the harmonics at the same level as they are present in the original sound.

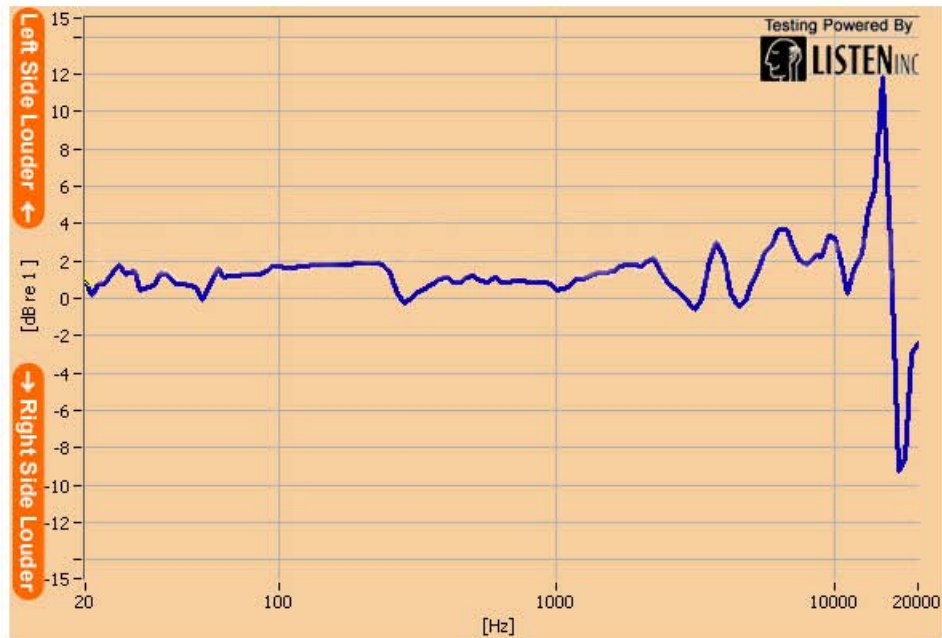
Our testing system measures the THD of headphones at 90 dB SPL and produces a graph like the one below. On the graph, you can see the THD for both channels: the left channel is the green line, and the right is in red. Big peaks in this graph indicate that the headphones are having a particular problem with the harmonics of that frequency: notes at that frequency may sound buzzy or rough, like a distorted guitar. THD is measured as a percentage, indicating how much the original waveform is distorted. The bottom line is that lower is better here: you don't want either the red or green lines to peek above the zero line.



Our distortion score is based on the total amount of distortion across the frequency range; the higher the graph (and any peaks on it), the lower the score. However, it is worth remembering that in the complex assortment of frequencies that is music, you are very unlikely to be able to detect low levels of distortion. The distortion won't be particularly noticeable until around the 3% THD mark.

Tracking

Headphones have two channels, one for each ear. Both of these channels should sound the same, so we test this to make sure. Our testing system analyzes the sound both channels produce and creates a graph to show any differences between the two as a percentage of the frequency response. Again, we're testing the audible range, from 20 to 20,000Hz.



If both channels were producing the same sound, the blue line would stay along the zero line. When the left channel is louder, the blue line will rise above zero; when the right channel is louder, the blue line will dip below zero. A difference of a couple of percentage points here isn't a problem, but we don't expect to see anything above 4 to 5 percent; that could make the sound feel unbalanced and unpleasant.

Our score for this test is based on the maximum imbalance between the two channels; the bigger the peak or valley on the graph, the lower the score.

Maximum Usable Volume

In this test, we examine how high we can increase the volume on the headphones before they reach a peak THD of 3%. The SoundCheck test sequence gradually increases the level of the stimulus and analyzes the THD until it reaches 3 percent, or the level of the sound reaches 120 dB SPL. We don't test any higher than 120 dB SPL, because that's the ceiling of safe headphone use: anything higher could cause permanent hearing damage with long term exposure.

Isolation

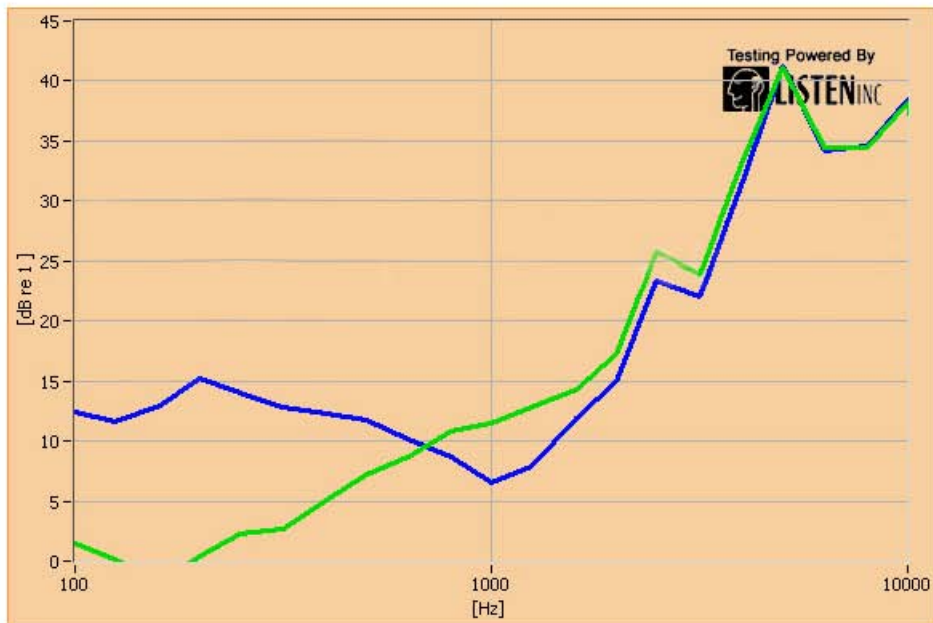
In many situations—especially if you're looking for portable headphones—you'll want to block out the noise of the outside world. Public transit, air travel, traffic noise, or obnoxious roommates can be distracting and interrupt your music. We therefore test how much external noise the headphones can block out. We do this by placing a speaker next to the HATS and playing pink noise, which has equal power across the entire frequency range.



SoundCheck measures and records the noise levels. We next put the headphones on HATS and blast both with noise again. Afterwards, we run the test again with active noise cancellation turned on (if applicable). Once we're done, SoundCheck compares the three curves: without headphones, with headphones, and with active cancellation on. We subtract the latter two curves from the former, which produces a graph like this:



This shows how much of the sound was blocked; the higher the line, the more sound was prevented from reaching the ears. In the case of headphones that include active noise cancellation (such as the Bose QuietComfort 15s and AblePlanet Clear Harmony NC200s), we feature a graph with two lines; one for the active noise cancellation disabled (the green) and one for the noise canceling enabled (the blue).



Our score is based on how well the headphones block the noise; the more they block, the better the score. With active noise canceling headphones, we use whichever test provides the best results as the basis for our score. The best results are almost invariably with the active cancellation enabled, but the feature often creates just as much noise as it cancels out.

Leakage

If you're trying to block out the world by listening to music, it's only polite to return the favor: the person sitting next to you on the bus wants to hear their own conversation, not your music. Leakage is also an important figure to know if you're planning on being in a quiet public place, like a library or museum.

Our test uses a sensitive microphone, placed a set distance away from HATS. We first take a measurement of the ambient noise of the room. Next, we measure the sound level with about 90 dB SPL of pink noise playing back over the headphones. We then calculate the difference between these two levels; the bigger the difference, the more the headphones contribute to the aural pollution of our world. Our scoring for this test is based on this difference: the more sound the headphones leak, the lower the score.