NEC EA274WMi Monitor Review: Eco-Friendly At 2560x1440

By Christian Eberle , MAY 14, 2014 12:00 AM

1. NEC EA274WMi: A High-Performance 27" Monitor

Over the past 14 months or so, we've reviewed 11 different QHD displays at 2560x1440. In that time, more consistent contrast performance, greater image accuracy, selectable color gamuts, and factory calibration have all become more prevalent. But one trend we haven't seen yet is lower price points. Unless you opt for a Korean gray-market screen, you're still looking at an outlay of at least $600. And if you need capabilities like an Adobe RGB gamut or pinpoint accuracy, expect to write an even larger check.

Because of the standstill in LCD panel prices (across the board, really; cheaper displays aren't going down either), QHD remains more of a resolution for professionals and power users rather than mainstream gamers. Cost isn't the only obstacle, either. There still aren't any high-res monitors suitable for the latest fast-paced titles. Unless you mod the control board, you're stuck with 60 Hz and enough input lag to make quick-reacting enthusiasts cringe as their TN-wielding opponents deliver the kill shot.

For business and graphics users, however, QHD is now a must-have. The 27-inch size is a price and performance sweet spot when you're talking about high pixel density. The last few 2560x1440 screens I reviewed set new benchmarks for clarity; so much so, in fact, that DPI scaling is no longer necessary to see small text. And when we get an old-school FHD monitor in for review, Windows suddenly looks like a large-font children's book. I find myself reaching for the scroll bars much more often as a result. Trust me, once you acclimate to QHD, it's really hard to go back!

Our subject today is NEC's EA274WMi. Looking at the company's description and specs, we can see this display isn't aimed at graphics pros or photographers. Rather, NEC is catering to the "high-performance enterprise user." There's no factory calibration or wide-gamut option. Nor is there 12- or 14-bit color output. What you do get is a well-engineered monitor built to a high standard and packed with features that are appropriate to a productivity-oriented desktop.

Brand	NEC
Model	EA274WMi
MSRP	$800
Panel Type	AH-IPS
Backlight	W-LED, edge array
Screen Size	27-inch

Max Resolution	2560x1440
Max Refresh Rate	60 Hz
Aspect Ratio	16:9
Native Color Depth	8-bit
Native Gamut	sRGB
Response Time (GTG)	6 ms
Brightness	350 cd/m2
Speakers	2 x 1 W
VGA	1
DVI	1
DisplayPort v1.2	1
HDMI 1.4	1
Audio In	1
Headphone	1
USB	v3.0: 1 up, 2 down v2.0: 2 down
Media card reader	-
Panel Dimensions W x H x D w/base	25.2 x 16.5-21.6 x 9.1 in 639 x 418-548 x 230 mm
Panel Thickness	2.6 in / 67 mm
Weight	19.2 lbs / 8.7 kg
Warranty	Three years

NEC differentiates the EA274WMi from its other QHD offerings in a few different ways. First is the price. At $800, this is the least-expensive high-res model in the line. Second, the next-up PA272W includes the wider Adobe RGB gamut, a 14-bit internal LUT, and software calibration options. Look for that screen in an upcoming review.

The EA274WMi is lit by a white LED edge array like the majority of IPS monitors on the market. NEC specs this panel as IPS versus AH-IPS for its higher-priced screens, but a check of the panel part database tells us the EA274WMi is AH-IPS as well. The core is made by LG, features a native sRGB gamut, and 8-bit color depth for both the input and output signals.

We talked about bit depth recently in **ViewSonic VP2772 27-Inch QHD Professional Monitor Review**. While a 10- or 12-bit panel is a normal complement for a pro photographer's workstation, you also need a full 10-bit signal path to take advantage of it. NEC's monitor is spec'd just fine for any task you might need it for.

What you're really paying for here is rugged build quality and energy-saving features. NEC takes those characteristics very seriously by including controls to automatically lower brightness and even shut down the screen when you leave your desk. Admittedly, there's a bit of fun in using the carbon footprint and energy cost indicators on the EA274WMi, sort of like watching the charging gauges on a Prius. Let's take a closer look.

2. Packaging, Physical Layout, And Accessories

NEC packages the EA274WMi in a very sturdy double-corrugated carton. There is plenty of rigid and semi-rigid foam to keep the contents from shifting during transport. If you're getting this thing shipped, there should be no reason for it to arrive damaged.

Bundled with the monitor is a standard IEC power cord for the internal power supply. You also get DVI and VGA cables, but not DisplayPort. Ancillary pieces include a USB 3.0 A to B connector, as well as a 3.5 mm audio cable and NEC's proprietary ControlSync cable. This is used to daisy-chain multiple NEC monitors so they can share setup parameters. Rounding out the box is a Quick Start Guide. There is no printed manual, nor is there a CD enclosed. But you can download all of the relevant documentation from NEC's website.

Product 360

NEC’s styling is firmly industrial, and function is clearly the top priority. The bezel is squared off and looks a bit wide, but is in fact only 20 millimeters across on all sides. That actually makes it smaller than most of the other monitors we've reviewed. Putting multiple EA274WMis on a desk becomes an attractive proposition since you only end up with 40 mm between screens.

Speaking of the screen, it is covered with an effective anti-glare layer, though it’s not the most aggressive implementation we’ve seen. Image clarity is preserved well and all, but the harshest reflections are rendered invisible. The high-impact black plastic of the panel and chassis also serve to absorb light. All in all, it’s a design that gets the job done without calling attention to itself.

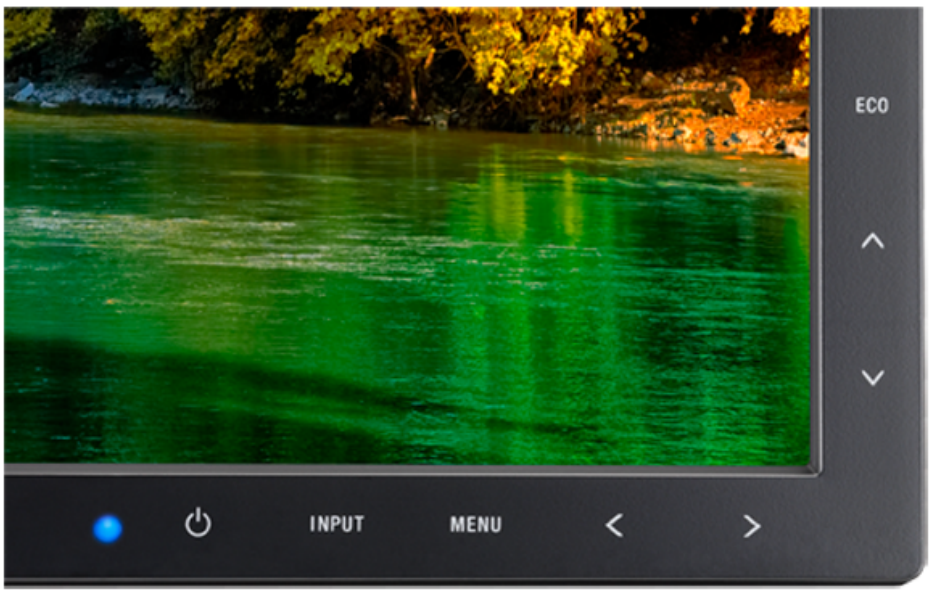
There is a complete set of positioning adjustments available thanks to a sturdy base and upright.

Not only can you rotate the EA274WMi to portrait mode, you have almost 360 degrees of swivel and around 40 degrees of tilt, which is a good deal more than we're accustomed to. All of the movements are smooth and sure, with no slop and little effort required. Build quality falls firmly in the

high-end category. This is something we saw in **NEC EA294WMi 29" Monitor Review: 21:9 At Twice The Price** as well.

Side-mounted USB ports are not unusual, but a headphone jack sure is. Most monitors relegate audio connections to the input panel where you have to plug in your cans by feel. Who wants to do that? Other vendors should be taking note right about now. The only flaw is that the USB ports are 2.0-capable. The USB 3.0 connectors are on the rear input panel.

Here’s a close-up of the control panel.



The buttons are touch-sensitive, obviously. And the labels are almost unnecessary because when you touch Menu, icons appear on the screen telling you each function. See the next section for more detail on that. We like this feature because it’s easier to read labels on the screen than on a black bezel, especially in the dark.

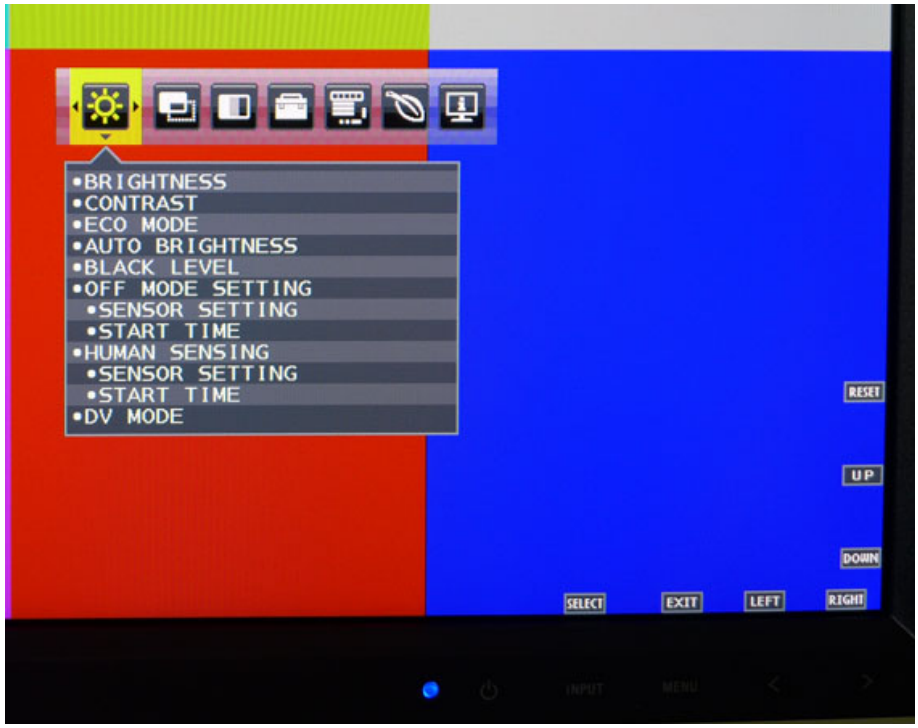
Around back there is cable management built in to the upright and two 100 mm VESA mounts for use with aftermarket brackets and monitor arms. You can see the large bulge that contains most of the EA274WMi's innards along with a pair of 1 W speakers. You're able to feed digital audio via HDMI or DisplayPort, or use a 3.5 mm stereo cable. Sound quality is centered in the upper mid-range only for a somewhat tinny presentation. It's fine for basic Windows sounds, though you'll want something better for movies. Ventilation and shielding are substantial, and the panel is fairly thick as a result at 2.6 inches (67 mm).

The input panel has a couple of features that are becoming increasingly rare on newer displays, namely VGA and DVI inputs. While we don't expect many users to connect a QHD monitor to an analog source, it's nice to have the option. To send a full-resolution signal, you'll need to use DVI or DisplayPort. The USB ports down there are 3.0-compatible, both upstream and down. The round blue jack is a 3.5 mm audio input and the black and white ones represent NEC's ControlSync feature.

3. OSD Setup And Calibration Of The NEC EA274WMi

OSD Tour

If you recall our review of the EA294WMi wide-screen monitor, than this menu tour will look familiar. The EA274WMi's OSD is identical to it in every way. There is a myriad of features to not only calibrate the display, but also to control and track energy usage, manage multiple NEC monitors, and display multiple sources with PBP. Let's take a look.



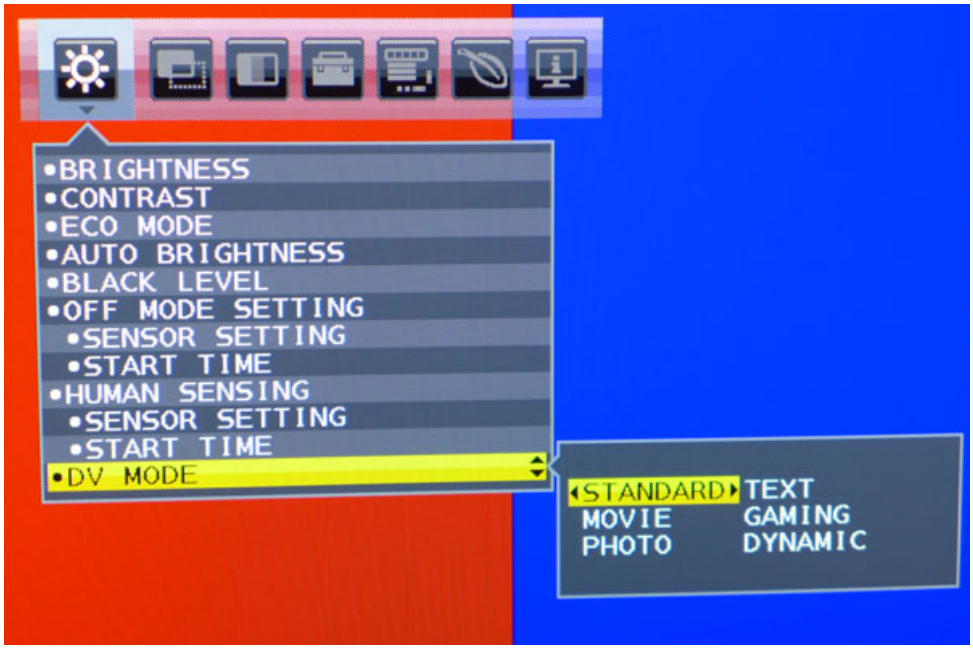
When you touch the menu control, the OSD appears along with little tags telling you what the other bezel keys do. This is super-handy in dark environments when you would not be able to read labels silk-screened onto plastic. In addition to traditional Brightness and Contrast sliders, the first sub-menu has controls for Eco Mode (limits brightness to a max of 30 or 60 percent), and the front-mounted sensors. They can detect when a user is present and modulate brightness accordingly, or even turn off the power when you leave your desk. Auto Brightness adjusts brightness along with changes in ambient room light. When we tried this feature, we found it dimmed the picture a little too aggressively for our taste.

You may have noticed a Black Level control. NEC is the only company we know of that includes this adjustment in its monitors, and it works like the brightness control on an HDTV. Rather than adjusting the backlight, it changes the black level threshold. The default setting is as low as you can go without clipping a PC signal, but if you use a video signal, such as one from a Blu-ray player, you can improve contrast by turning it down a few notches.

When you select an option, a little fly-out pops up.

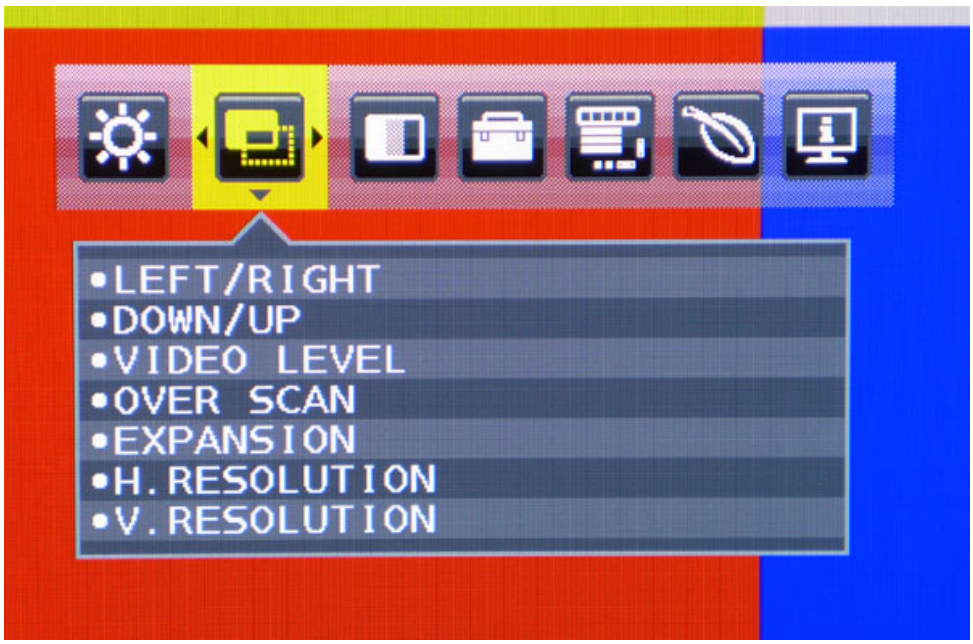
All of the adjustments on the EA274WMi work this way. Once the fly-out appears, move the slider left or right to make your choice.

There are six picture modes.



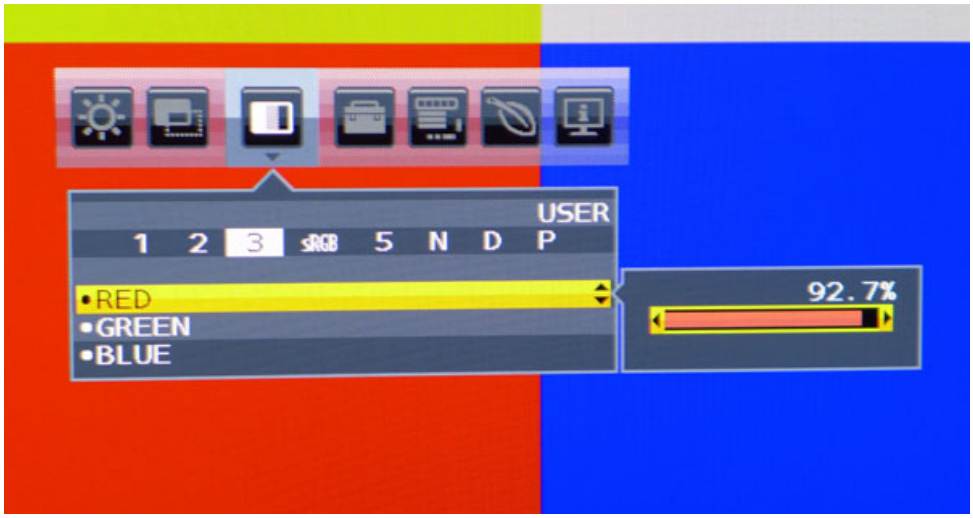
We measured all of the modes and found Standard to offer the most accurate basis for calibration. The other modes make subtle changes to gamma and color that fall outside our accepted standards. Text for instance, adds a little edge enhancement to make fonts more crisp. And Movie bumps up only the lower brightness levels. In Dynamic mode, the contrast shifts depending on image content. Take care with this setting; it can sometimes crush highlight and shadow detail.

Since the EA274WMi includes a VGA input, the next menu can help you adjust the resolution, size, and position of analog signals.



Newer monitors are doing without old-school VGA inputs. But NEC still includes them. If the image needs to be centered or expanded to fill the screen, you can do that here.

Here are the color temp controls.



Presets 1, 2, 3, and 5 are adjustable, and they start at color temps of 9300, 8200, 7500, and 5000 Kelvins, respectively. Number 3 is closest to the preferred 6500 K setting. sRGB, N (Native), and D (DICOM) (used in medical imaging) cannot be changed. P is for Programmable and works with a PC app to control the EA274WMi, but it only addresses gamma, which is fine as-is.

The RGB sliders start at or near the top of their range, depending on which preset you choose. We prefer sliders that default to a center point so we can move them in both directions. With NEC's system, you can only adjust downwards.

If you choose the Movie, Gaming, or Photo picture mode, the color temp is locked to Native and cannot be changed.

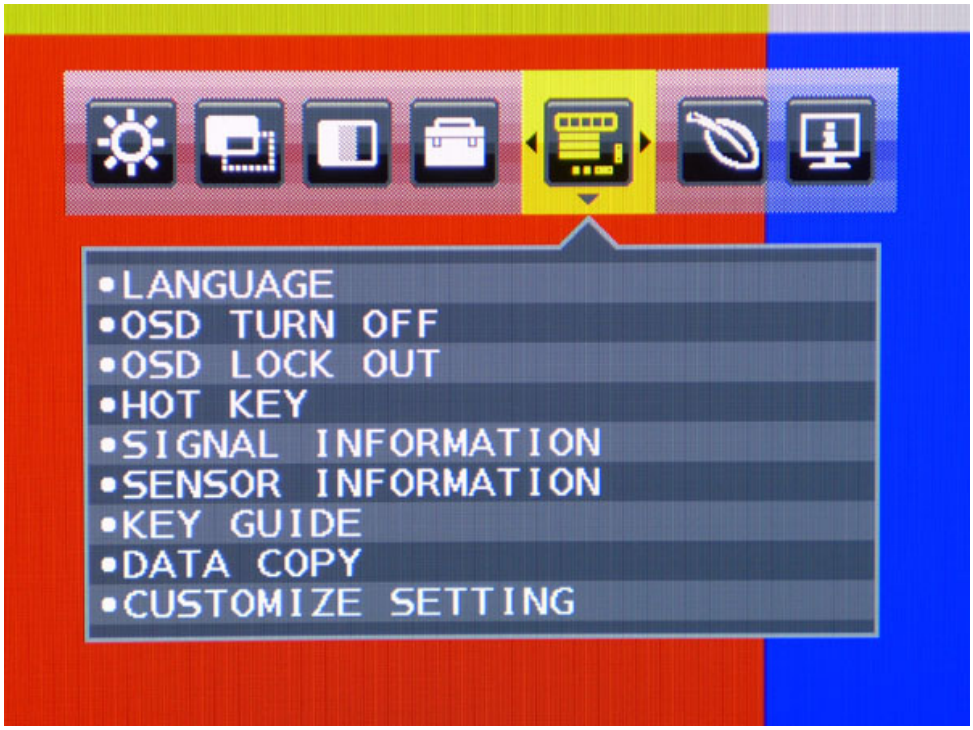
The next menu has more ergonomic features.

Volume controls both the internal speakers and the headphone output. Since audio signals can come in via a 3.5mm jack, HDMI, or DisplayPort, Sound Input lets you select the source.

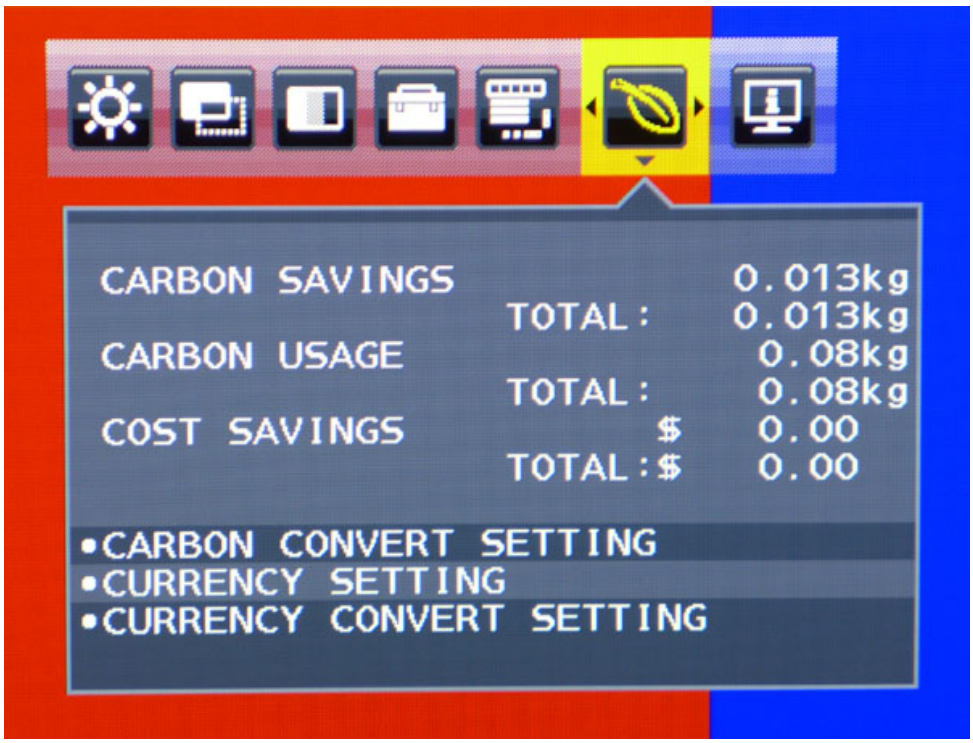
The PBP feature will display two sources simultaneously side-by-side on the screen. You can adjust each image independently if you wish.

Response Improve can reduce image blur, though, depending on the content, you might see color fringing artifacts. We saw them in vertically scrolling text, but not in any fast-paced games or video.

Off Timer powers down the monitor after a user-specified period. LED Brightness controls the front-panel power indicator. DDC/CI should be left on to allow your computer to control the EA294WMi, and USB Power lets you leave the ports active even when the monitor is in power saver mode. Factory Preset returns all settings to their defaults.



This is the Menu Tools screen. Besides the nine available languages, you can lock out the OSD to prevent adjustment. To re-enable it, press Select and Left simultaneously. Hot Key turns on PBP, Brightness, and Volume hot keys on the front panel, saving you a trip into the OSD. Signal Information, Sensor Information, and Key Guide toggle various info pop-ups. Data Copy will copy settings to other monitors connected via the ControlSync feature. And Customize Settings stores all options so you can restore them after an accidental reset.



NEC takes energy usage very seriously. As an incentive to users, the EA274WMi can show the savings in financial and carbon usage terms. This is pretty cool, especially for large organizations running hundreds of displays at a time.

If you need to know the serial number of your particular monitor, it's shown here. That saves you the challenge of peeking around back at the tiny info decal below the input panel.

NEC EA274WMi Calibration

We set up our press sample using the Standard picture mode, which provides the most accurate gamma and color, along with all possible color temp options. Since we do all our testing with full-range PC signals, we left the Black Level control at its default setting of 50. Contrast starts to clip information above 50, but we lowered it to 43 to improve the grayscale accuracy. The tradeoff is worth it if you're critical about color, even if it reduces image contrast somewhat.

The adjustable color temp presets all start at a different Kelvin value. Number 3 is labeled 7500 K, so we used that one. Only small adjustments are required to achieve excellent grayscale tracking and a high degree of gamut accuracy. Be sure to check out page seven where we show the effect of grayscale calibration on the gamut results.

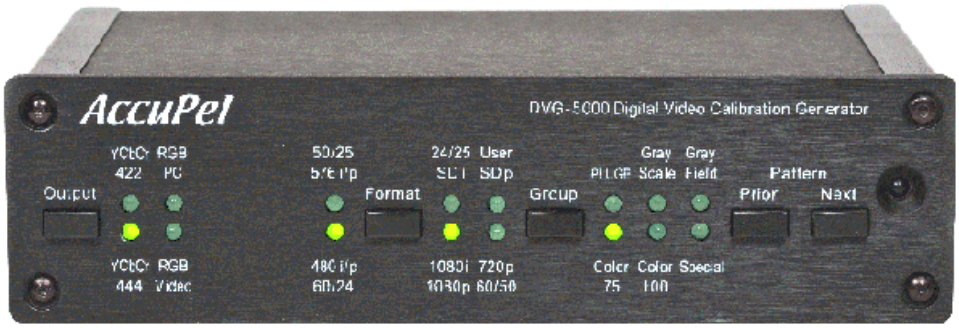
NEC EA274WMi Calibration Settings	
DV Mode	Standard
Brightness	65
Contrast	43
Black Level	50
Color Temp	3
RGB	Red 92.7, Green 90.6, Blue 100

4. Measurement And Calibration Methodology: How We Test

To measure and calibrate monitors, we use an i1Pro spectrophotometer, a Spectracal C6 colorimeter, and version 5.2.0.1374 of SpectraCal's CalMAN software.

The i1Pro is very accurate and consistent measuring color on all types of displays, regardless of the backlight technology used. When we just need a luminance value, the C6 works better, especially in low light.

For patterns, we employ an AccuPel DVG-5000 video signal generator. This approach removes video cards and drivers from the signal chain, allowing the display to receive true reference patterns. Connections are made via HDMI.



The AccuPel DVG-5000 is capable of generating all types of video signals at any resolution and refresh rate up to 1920x1080 at 60 Hz. It can also display motion patterns to evaluate a monitor's video processing capabilities, with 3D patterns available in every format. This allows us to measure color and grayscale performance, crosstalk, and ghosting in 3D content via the 3D glasses.

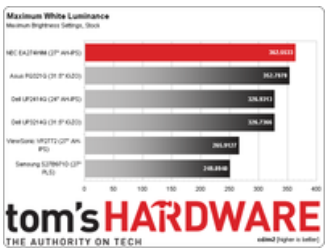
The i1Pro/C6 is placed at the center of the screen (unless we’re measuring uniformity) and sealed against it to block out any ambient light. The

AccuPel pattern generator (bottom-left) is controlled via USB by CalMAN, which is running on the Dell XPS laptop on the right.

Our version of CalMAN Ultimate allows me to design all of the screens and workflows to best suit the purpose at hand. To that end, I've created a display review workflow from scratch. This way, we can be sure and collect all the necessary data with a concise and efficient set of measurements.

The charts show us the RGB levels, gamma response, and Delta E error for every brightness point from zero to 100 percent. The table shows us the raw data for each measurement. And the area in the upper-left tells us luminance, average gamma, Delta E, and contrast ratio. The individual charts can be copied to the Windows clipboard to easily create graphics for our reviews.

Every primary and secondary color is measured at 20-, 40-, 60-, 80-, and 100-percent saturation. The color saturation level is simply the distance from the white point on the CIE chart. You can see the targets moving out from white in a straight line. The farther a point is from center, the greater the saturation until you hit 100 percent at the edge of the gamut triangle. This shows us the display's response at a cross-section of color points. Many monitors score well when only the 100-percent saturations are measured. Hitting the targets at the lower saturations is more difficult, and factors into our average Delta E value (which explains why our Delta E values are sometimes higher than those reported by other publications).

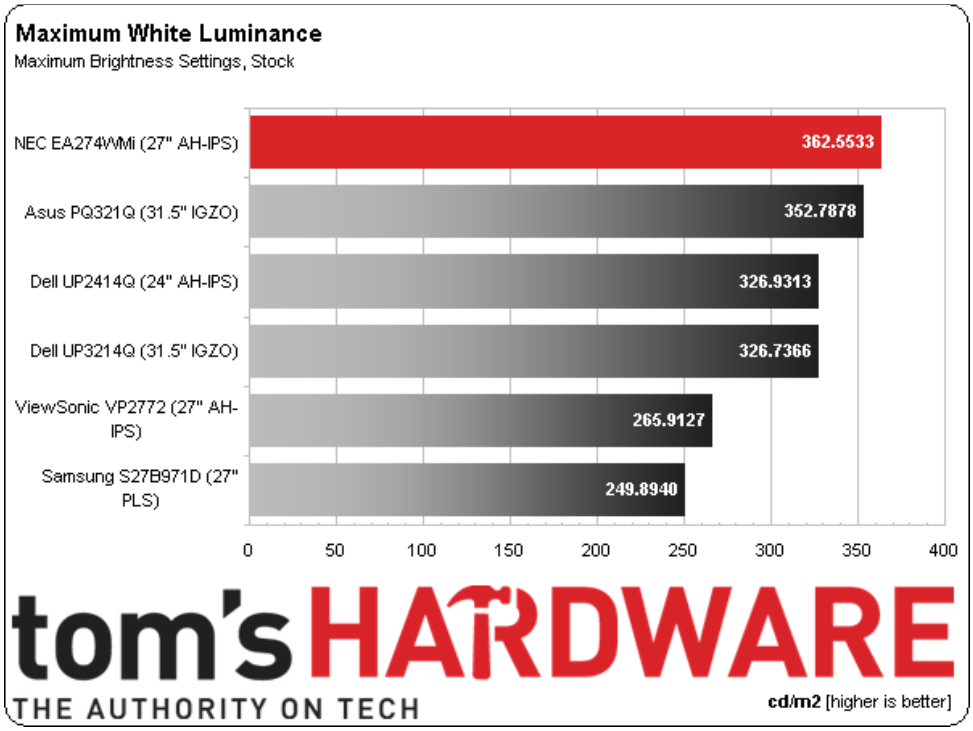


5. Results: Brightness And Contrast

Uncalibrated

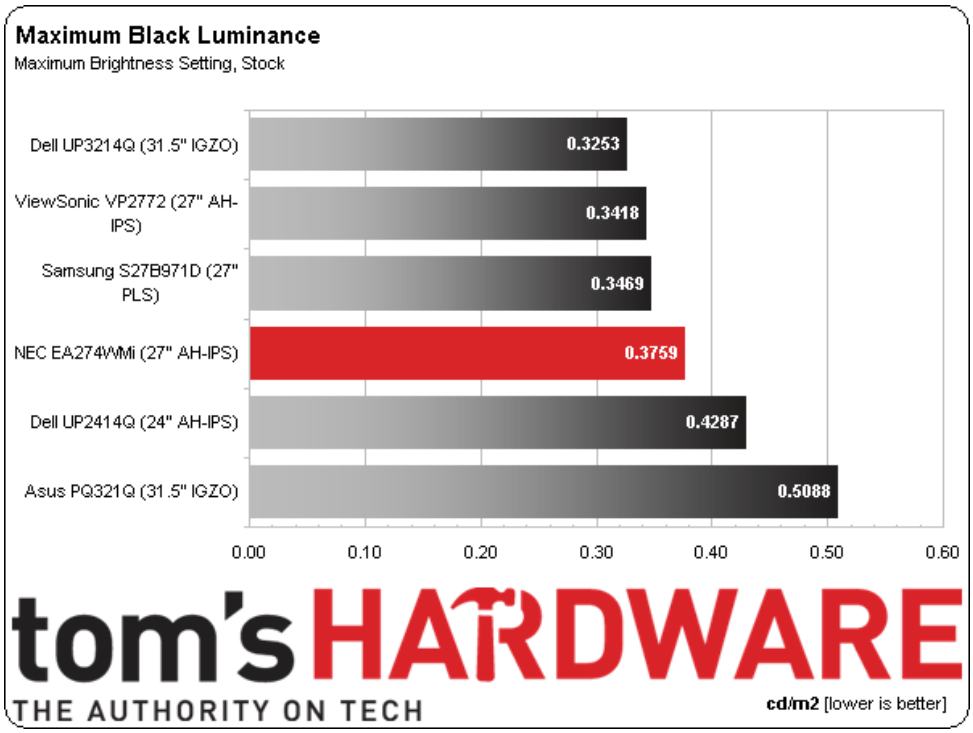
Before calibrating any panel, we measure zero and 100-percent signals at both ends of the brightness control range. This shows us how contrast is affected at the extremes of a monitor's luminance capability. We do not increase the contrast control past the clipping point. While doing this would increase a monitor's light output, the brightest signal levels would not be visible, resulting in crushed highlight detail. Our numbers show the maximum light level possible with no clipping of the signal.

Our comparison group is the last six monitors reviewed at Tom's Hardware. The Asus PQ321Q, Dell UP3214Q, and UP2414Q are Ultra HD displays. The Samsung S27B971D is an sRGB panel with QHD resolution. And the ViewSonic VP2772 is a wide-gamut display, also QHD.



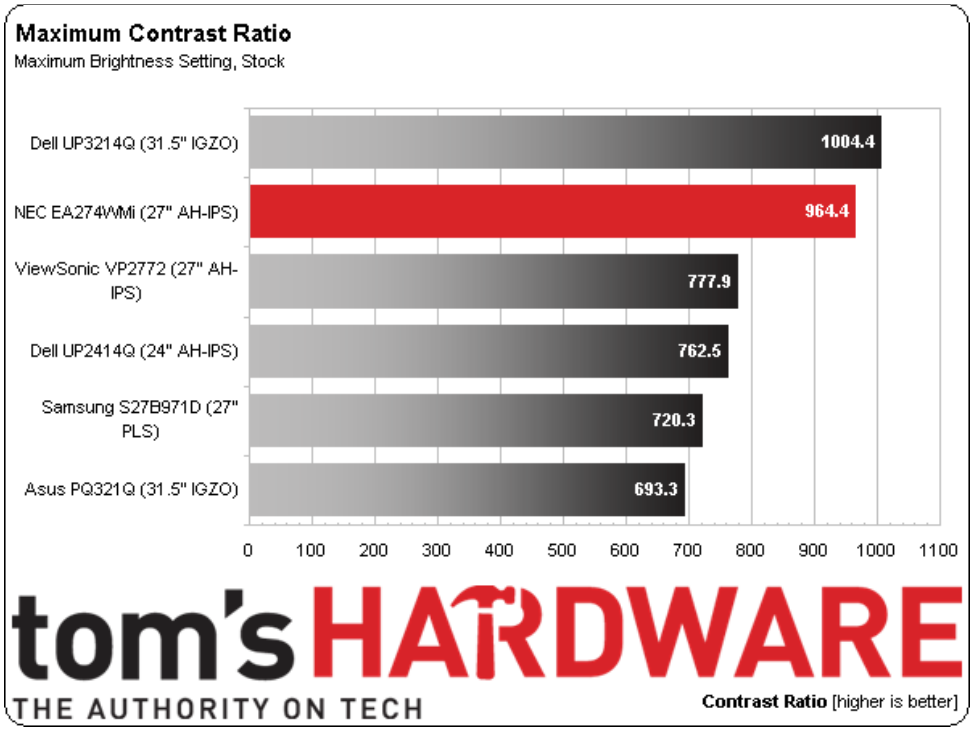
The max brightness result is measured in the EA274WMi's Standard picture mode using the Native color temp preset. Contrast is set halfway through its range (50 out of 100). You can get a little more light by upping the slider, but clipping starts at 51. The result is a little higher than the panel's rating of 350 cd/m^2.

Our measured black level is pretty good, given the panel's high brightness.



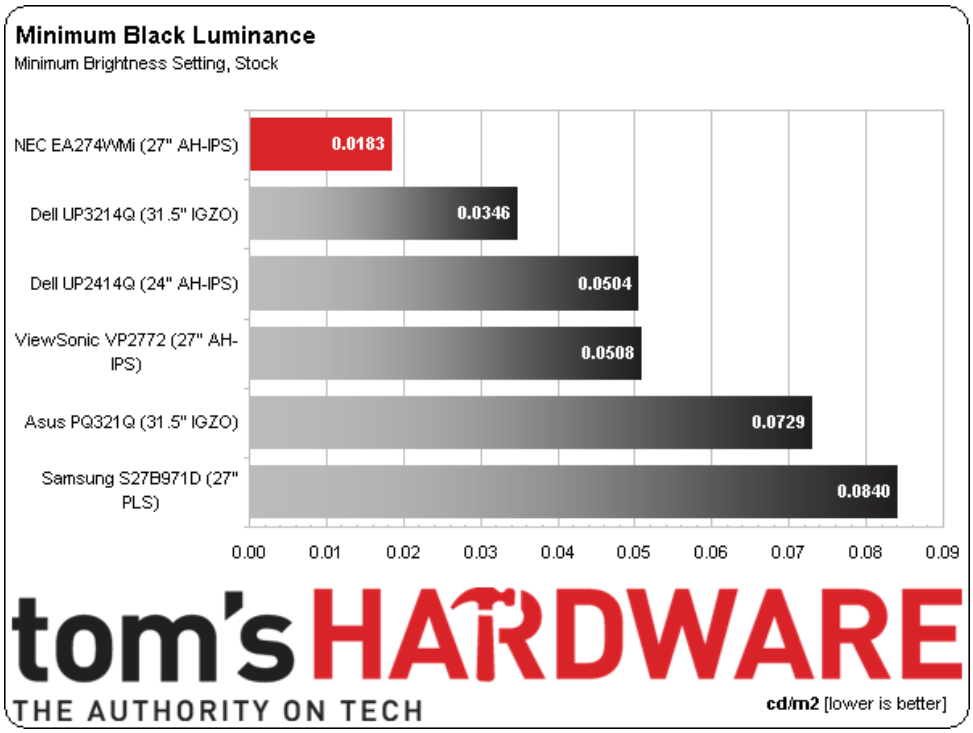
When the backlight is on full, most monitors won't deliver a decent black level. NEC lands mid-pack; the EA274WMi is about average for our last 22 screens tested.

The resulting contrast ratio isn't too bad thanks to a high white level.



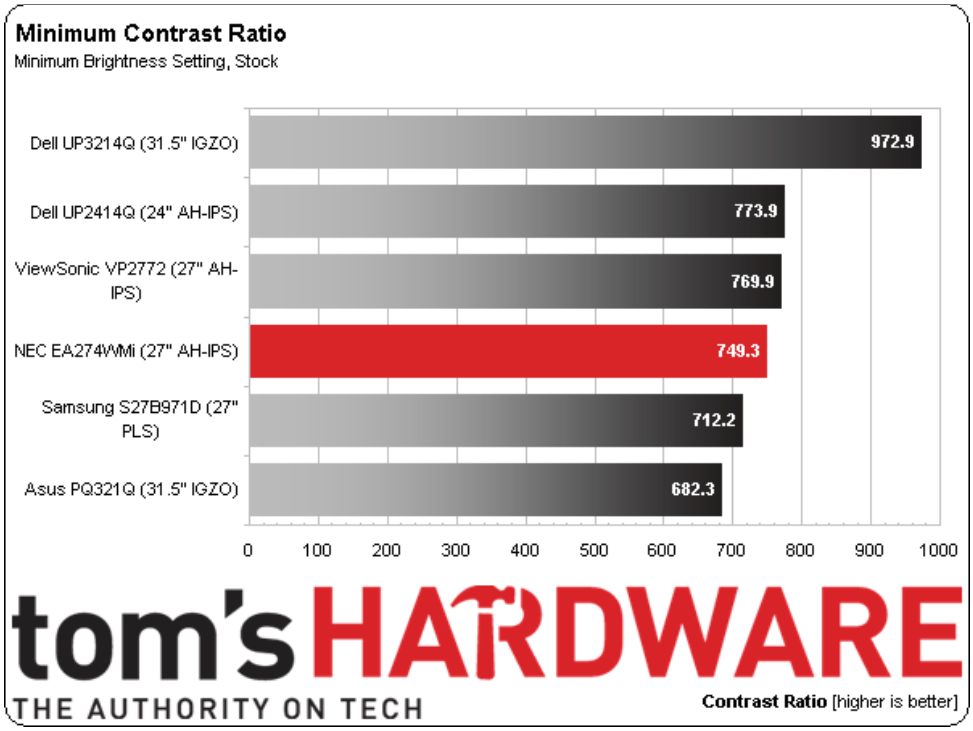
The EA274WMi comes in second in this fairly expensive group. You could easily use it outdoors in bright sunlight and see a pretty decent image. Photographers on location might want to consider a display like this.

We believe 50 cd/m^2 is a practical minimum standard for screen brightness. Any lower and you risk eyestrain and fatigue. Some monitors like the EA274WMi will measure under that level. We recorded a very low white level of 13.7128 cd/m^2 with the backlight turned all the way down. This is a bit too dim for practical use. Raising the brightness to 12 gets you 50 cd/m^2 with a black level of .0625 cd/m^2 and a contrast ratio of 788.4 to 1.



Our measured minimum black level trounces the other monitors in the group, but that is mainly because of the extremely dim backlight. At 50 cd/m^2 max, the black level would put NEC in fifth place, which is an otherwise typical performance for a 27-inch QHD screen based on an LED-lit IPS panel.

The contrast ratio is starting to look more like the rest.

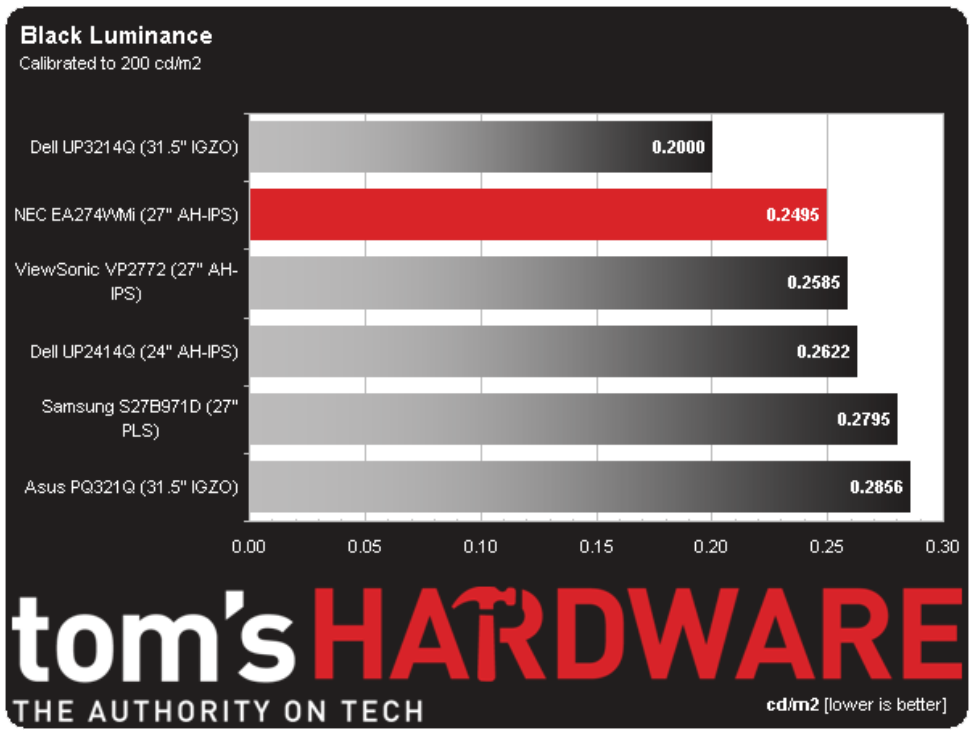


The minimum contrast ratio drops around 22 percent from the max number, yielding a decent result (even if it's less consistent than the last few monitors we tested). The other five in this group all measured closely in their maximum and minimum contrast tests. Hopefully, the calibrated result will be somewhere in between.

After Calibration

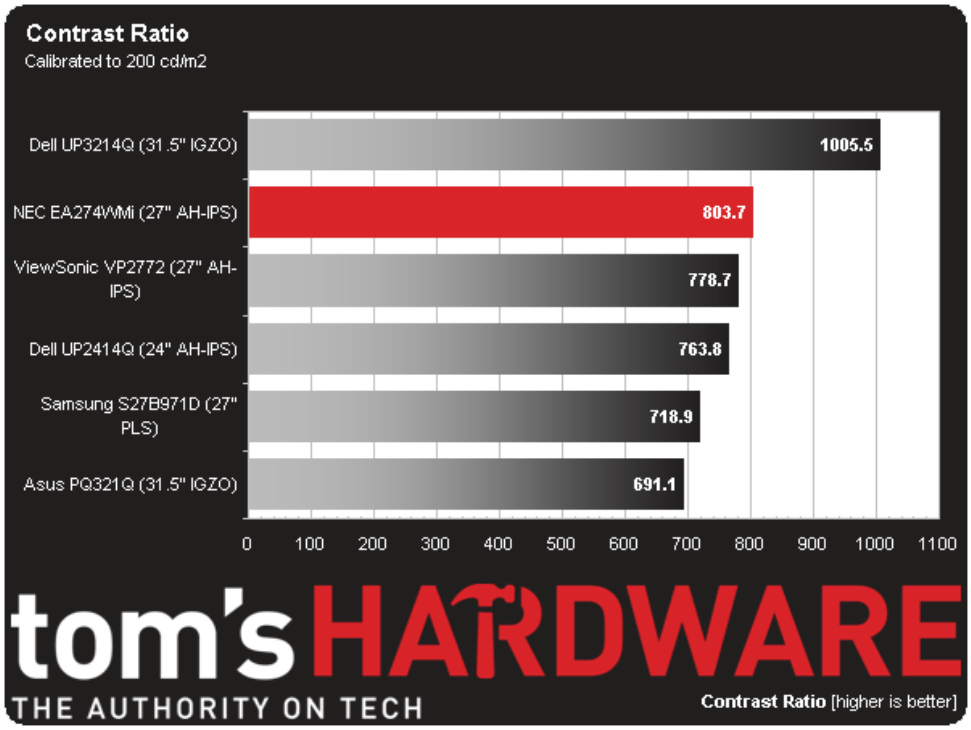
Since we consider 200 cd/m^2 to be an ideal point for peak output, we calibrate all of our test monitors to that value. In a room with some ambient light (like an office), this brightness level provides a sharp, punchy image with maximum detail and minimum eye fatigue. It's also the sweet spot for gamma and grayscale tracking on some monitors, which we'll consider on the next page. In a darkened room, many professionals prefer a 120 cd/m^2 calibration. We find it makes little to no difference on the calibrated black level and contrast measurements.

To calibrate the EA274WMi, you have to use one of the four adjustable color temp presets. We went with number three and the result is an excellent black level.



Calibration often raises the black level from its out-of-box state. But the EA274WMi doesn’t suffer from that phenomenon.

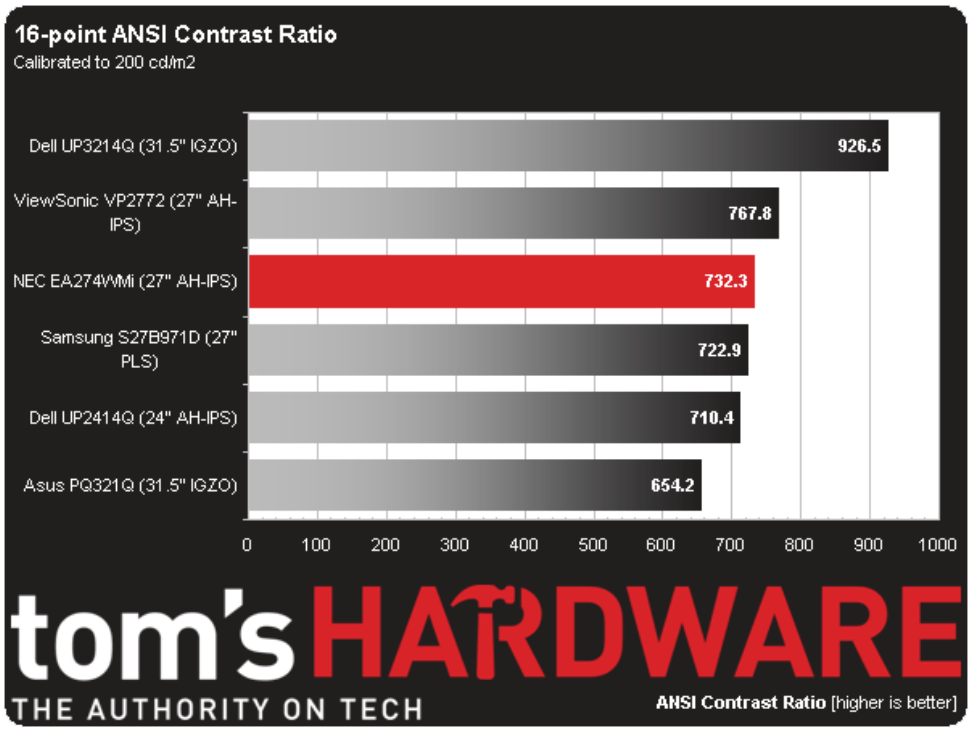
As we hoped, contrast is a little better after calibration than before. We’re now at over 800 to 1.



We've seen several monitors achieve better than 1000 to 1 contrast after calibration. However, the only screen that did this recently was Dell's UP3214Q. The NEC comes closer to that elusive figure than the other four screens in our group.

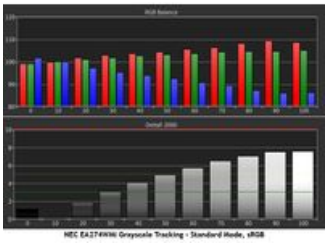
ANSI Contrast Ratio

Another important measure of contrast is ANSI. To perform this test, a checkerboard pattern of sixteen zero and 100-percent squares is measured, giving us a somewhat more real-world than on/off measurements because it tests a display's ability to simultaneously maintain both low black and full white levels, factoring in screen uniformity. The average of the eight full-white measurements is divided by the average of the eight full-black measurements to arrive at the ANSI result.



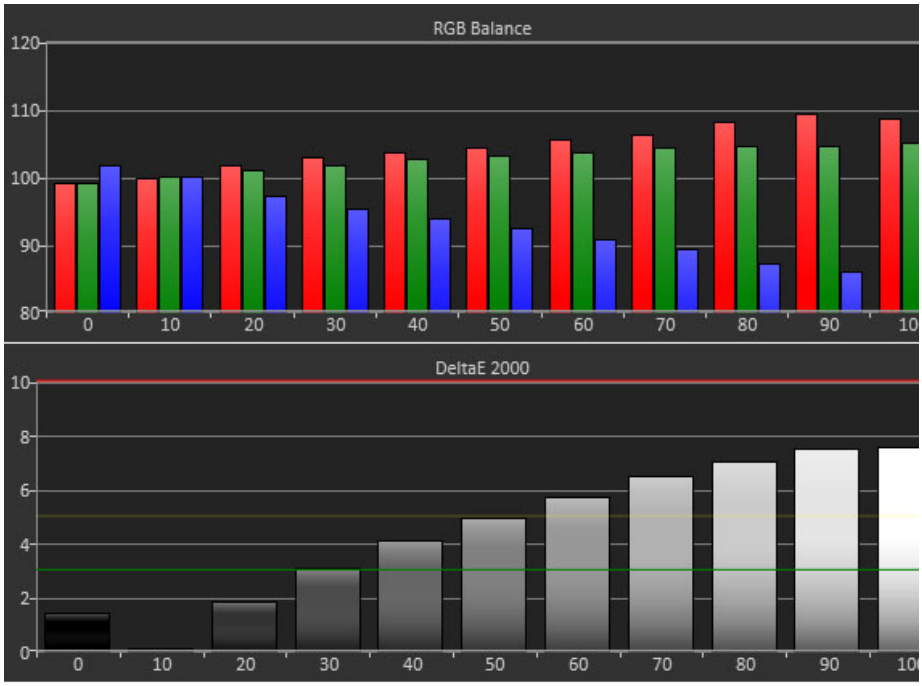
The ANSI value is a little lower than the on/off one, just like every other display that's been in our lab. Obviously this is an extreme test. As mentioned, though, it's also more real-world. Intra-image contrast is what we see in a typical image. In the case of the EA274WMi, the drop is less than nine percent. I consider that to be excellent.

6. Results: Grayscale Tracking And Gamma Response



A majority of monitors, especially newer models, display excellent grayscale tracking (even at stock settings). It's important that the color of white be consistently neutral at all light levels from darkest to brightest. Grayscale performance impacts color accuracy with regard to the secondary colors: cyan, magenta, and yellow. Since computer monitors typically have no color or tint adjustment, accurate grayscale is key.

We had to explore a few different options to find both the best out-of-box color temp and best starting point for calibration. Since the Standard picture mode is the most neutral, we stuck with that and measured all of the presets. You might think that sRGB would be a good set-and-forget option, but you'd be wrong in this case.



NEC EA274WMi Grayscale Tracking - Standard Mode, sRGB

The grayscale tracking in sRGB mode is only fair. Errors become visible at the 40-percent level and rise from there to almost eight Delta E at 90 and 100 percent. The chart shows red and green tracking upward, while blue drops off at the highest brightness levels. The overall tint looks green to the naked eye. For a monitor at this price point, the sRGB preset should be closer to an average error of three Delta E. And there are no RGB sliders available in that mode, either.

Switching to the Color Temp 3 preset is a step in the right direction.

NEC EA274WMi Pre-Calibration Grayscale Tracking - Standard Mode, Color Temp 3

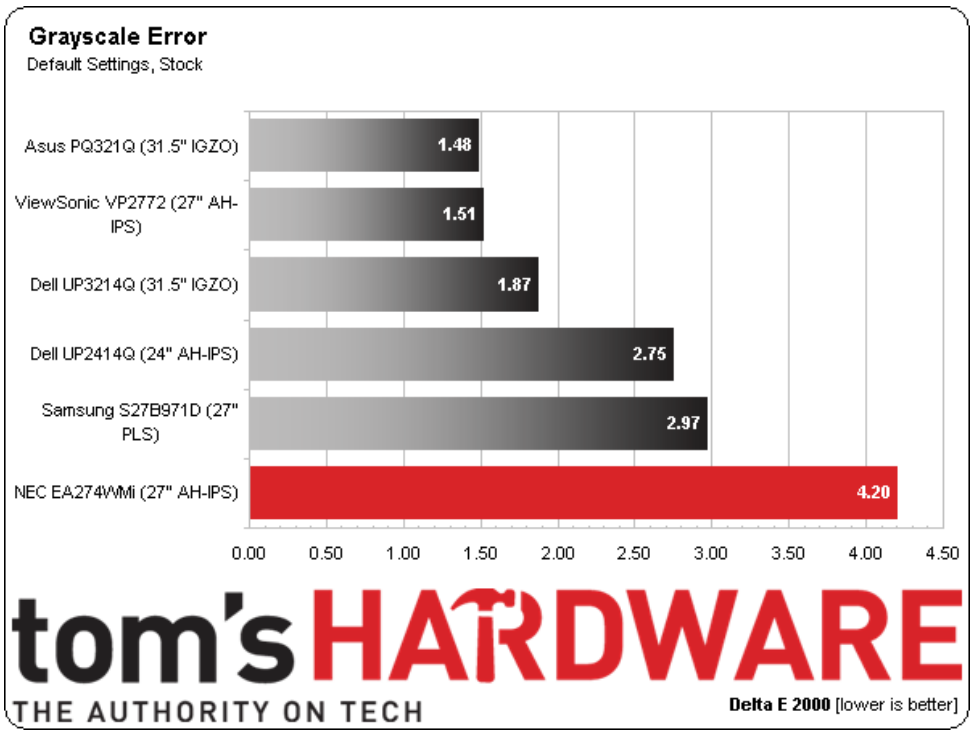
If you lack tools to calibrate the EA274WMi, this mode works pretty well without further adjustment. Red and blue only fall off gradually as brightness rises, while green tracks slightly upward. The green tint is still visible above the 50-percent level, but only barely.

Working the RGB sliders brings us to a much higher standard of accuracy.

NEC EA274WMi Post-calibration Grayscale Tracking - Standard Mode, Color Temp 3

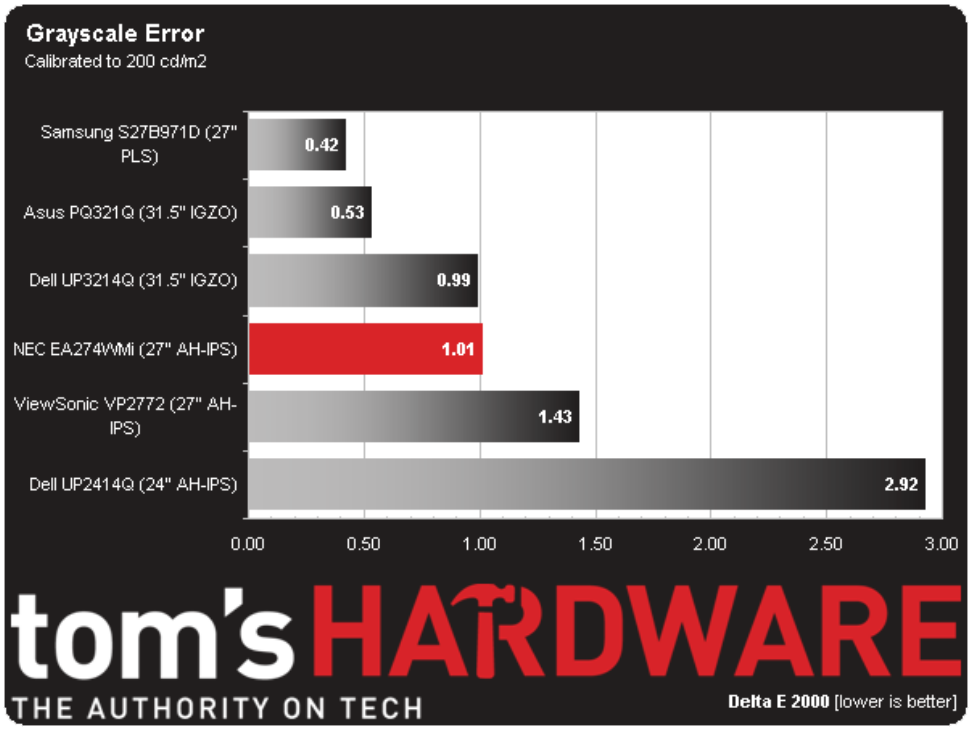
Our final measurement run is just what we're looking for from an $800 monitor. All errors are now well under two Delta E. We did have a little challenge getting the 90- and 100-percent levels under control. Reducing the Contrast to 43 did the trick there. If you're willing to accept slight green errors at the highest brightness levels, leaving it at 50 improves the on/off contrast to around 1000 to 1.

As shipped, the EA274WMi comes set to its Standard picture mode and Native color temp preset. We suggest changing to Color Temp 3, at least. Then you should match our pre-calibration results.



For a pro-level display, this is below-average performance. Many of the screens we test now fall below the three Delta E threshold without calibration. Our result of 4.20 Delta E represents the Color Temp 3 preset. Native is slightly higher at 4.38, and sRGB is the highest at 4.77.

The obvious conclusion is that the EA274WMi benefits greatly from calibration.

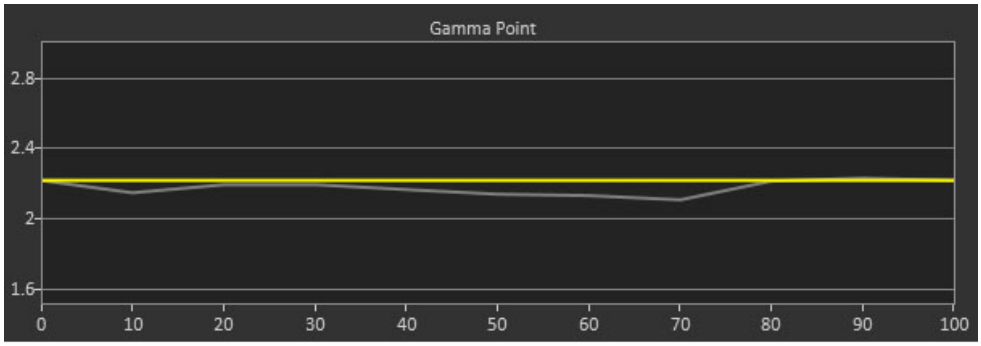


A 1.01 Delta E error is pretty close to the best displays we've tested. As you'll see later in the color gamut tests, calibration improves accuracy across the board.

Gamma Response

Gamma is the measurement of luminance levels at every step in the brightness range from 0 to 100 percent. It's important because poor gamma can either crush detail at various points or wash it out, making the entire picture appear flat and dull. Correct gamma produces a more three-dimensional image, with a greater sense of depth and realism. Meanwhile, incorrect gamma can negatively affect image quality, even in monitors with high contrast ratios.

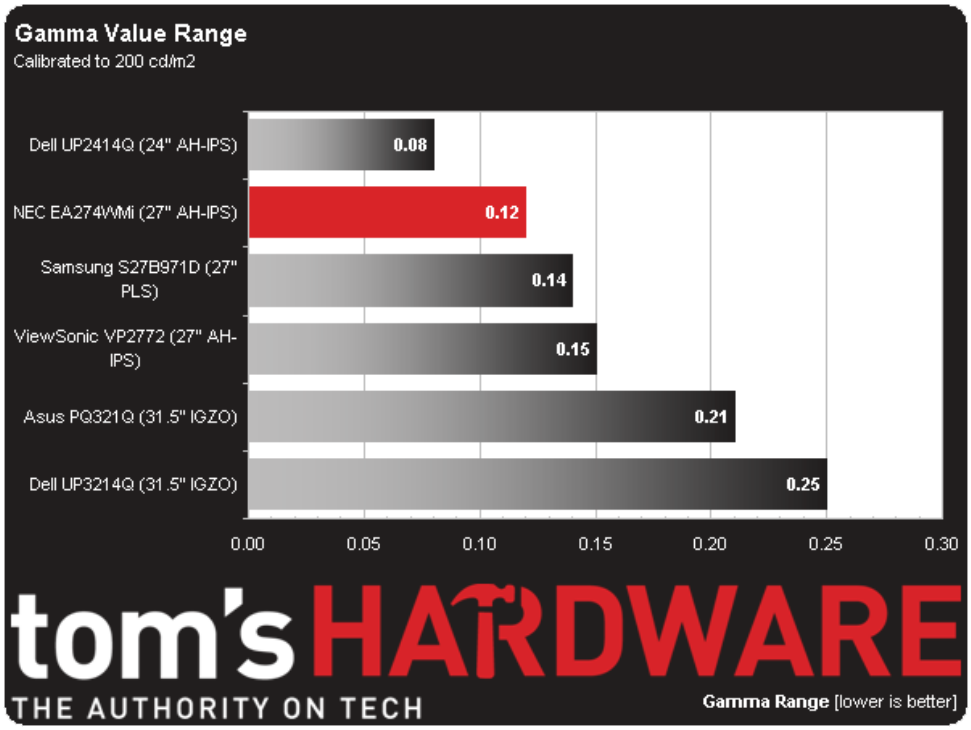
In the gamma charts below, the yellow line represents 2.2, which is the most widely used standard for television, film, and computer graphics production. The closer the white measurement trace comes to 2.2, the better.



NEC EA274WMi Gamma

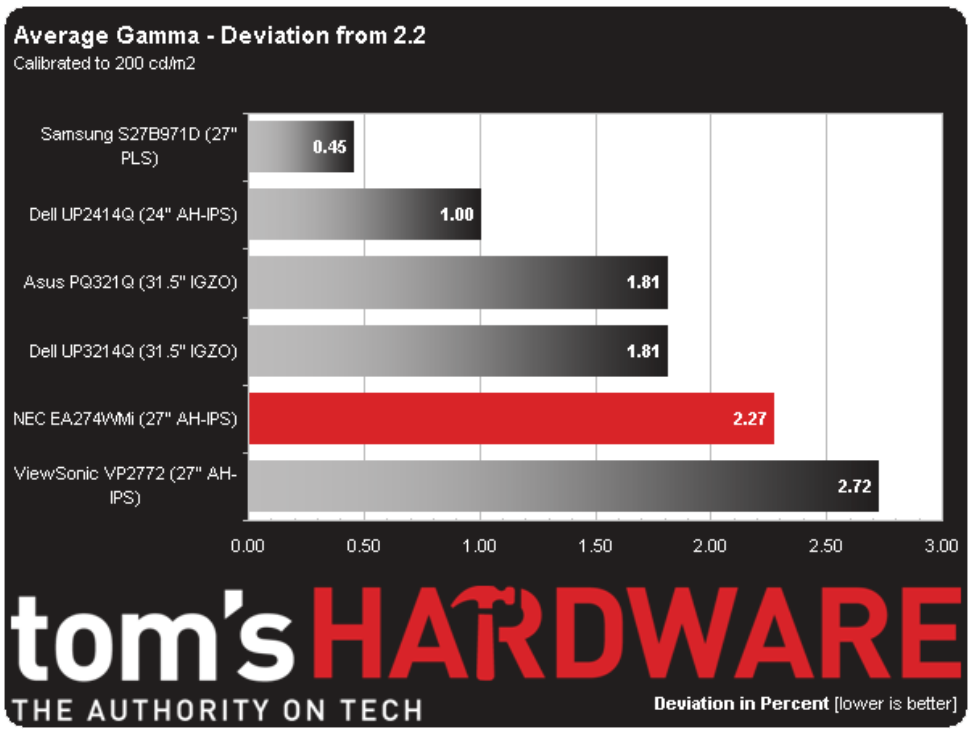
We're only showing you one gamma result because it's what you'll see no matter what color temp setting you choose. There are no gamma controls on the EA274WMi, so we're glad the results are so consistent. Aside from miniscule dips at 10 and 70 percent, this is a perfect chart. The maximum measured luminance error is 3.7 cd/m^2.

Here is our comparison group again.



A .12 variation represents extremely flat gamma tracking. That kind of consistency is important no matter what the image source. Only three other screens of our last 22 have scored higher in this test. The tracking runs from a low of 2.09 to a high of 2.21.

We calculate gamma deviation by simply expressing the difference from 2.2 as a percentage.

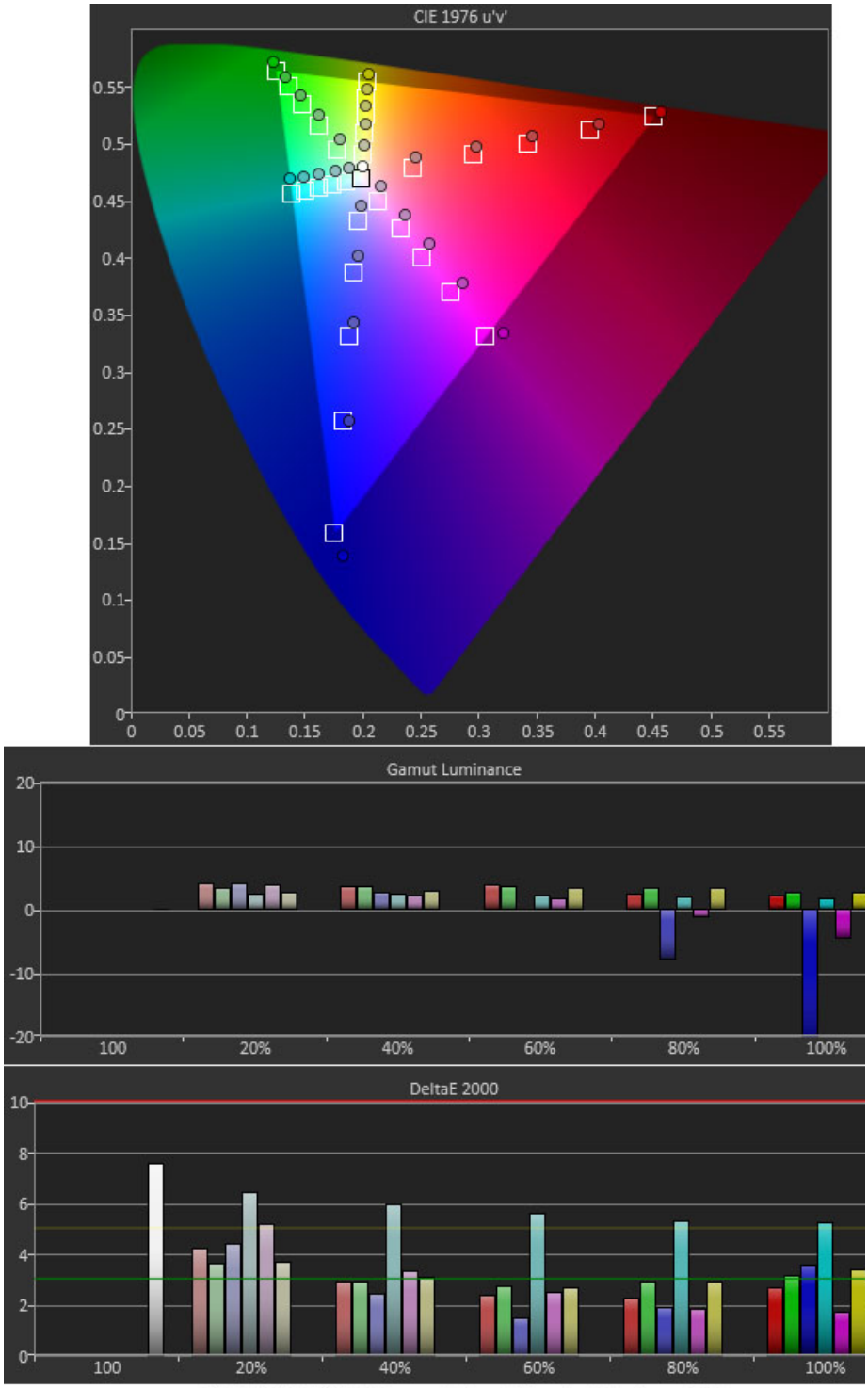


You can expect the same tight gamma tracking from the EA274WMi in every color temp preset using the Standard picture mode. As we said, preset three provides the best grayscale tracking, but if you want to use a different white balance setting, gamma does not change.

7. Results: Color Gamut And Performance

Color gamut is measured using a saturation sweep that samples the six main colors (red, green, blue, cyan, magenta, and yellow) at five saturation levels (20, 40, 60, 80, and 100%). This provides the most realistic view of color accuracy possible.

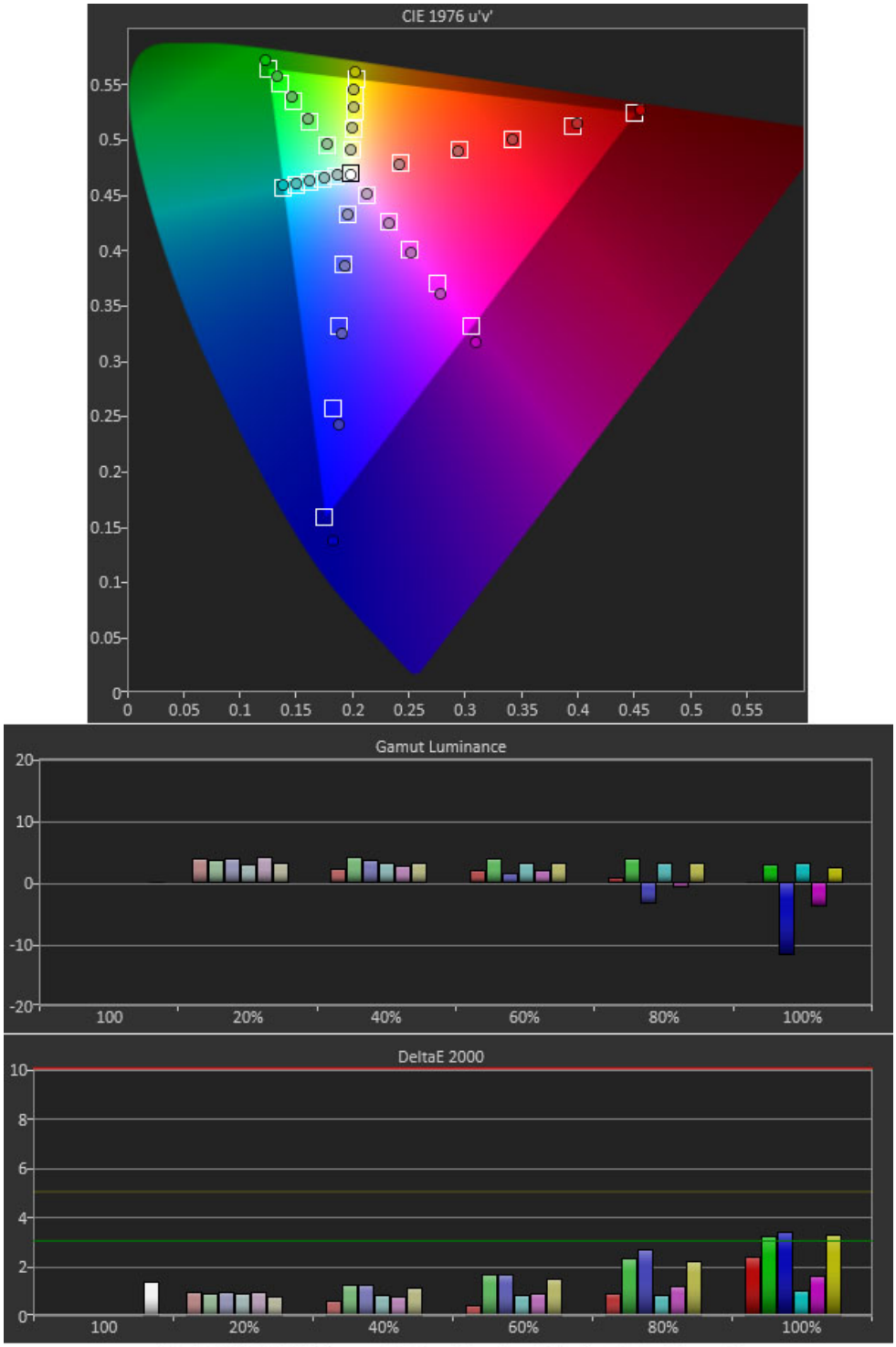
First, we'll show you the sRGB preset. This is still the EA274WMi's Standard picture mode. sRGB has no adjustments available except Brightness and Contrast.



NEC EA274WMi Chromaticity - Standard Mode, sRGB

The most telling chart of the three is the CIE triangle. The primary colors are pretty close, although blue falls outside the gamut. And the cyan and magenta secondaries are outside of their targets because you can't adjust grayscale in sRGB mode. If you read **Display Calibration 201: The Science Behind Tuning Your Monitor**, then you know accurate grayscale tracking is essential to lining up the secondary colors properly. Without the ability to adjust them, you're stuck with the above gamut. Fortunately, the luminance values are almost perfect. You can see that NEC purposely lowered the brightness of blue in order to compensate for its oversaturated result at 100 percent.

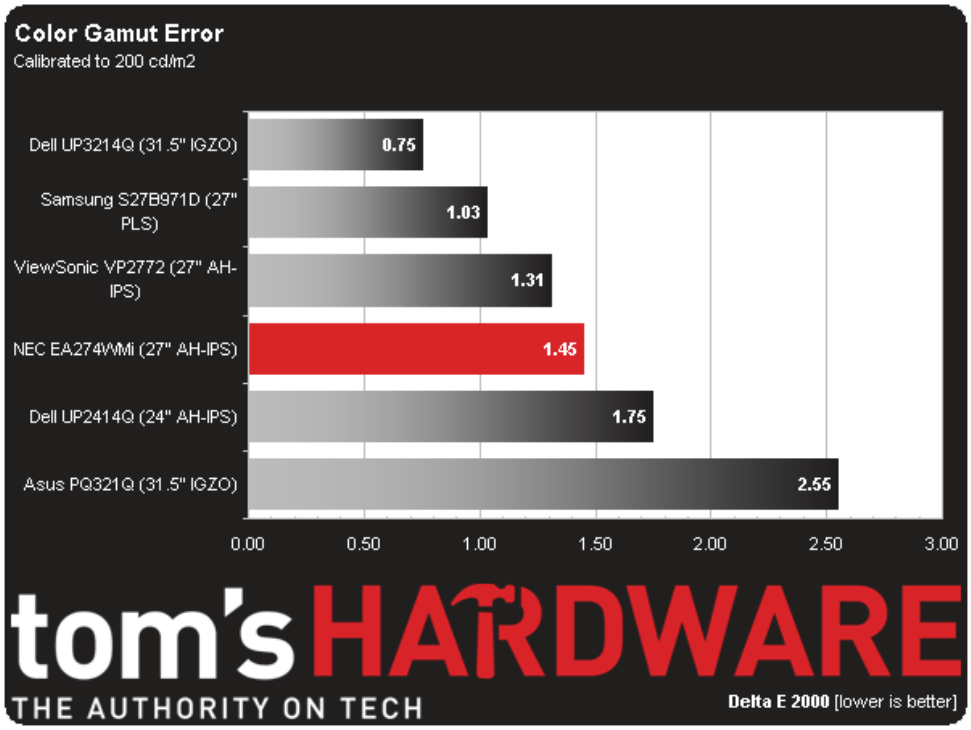
Calibrating the EA274WMi in its Color Temp 3 mode produces far better numbers.



NEC EA274WMi Chromaticity - Standard Mode, Color Temp 3

Blue is still over-saturated, but now the secondary colors are right where they should be. We only had to tweak the RGB sliders to achieve excellent color performance. The blue luminance at 100-percent saturation is still low, but that's OK. Now the image looks perfectly accurate and natural as it should.

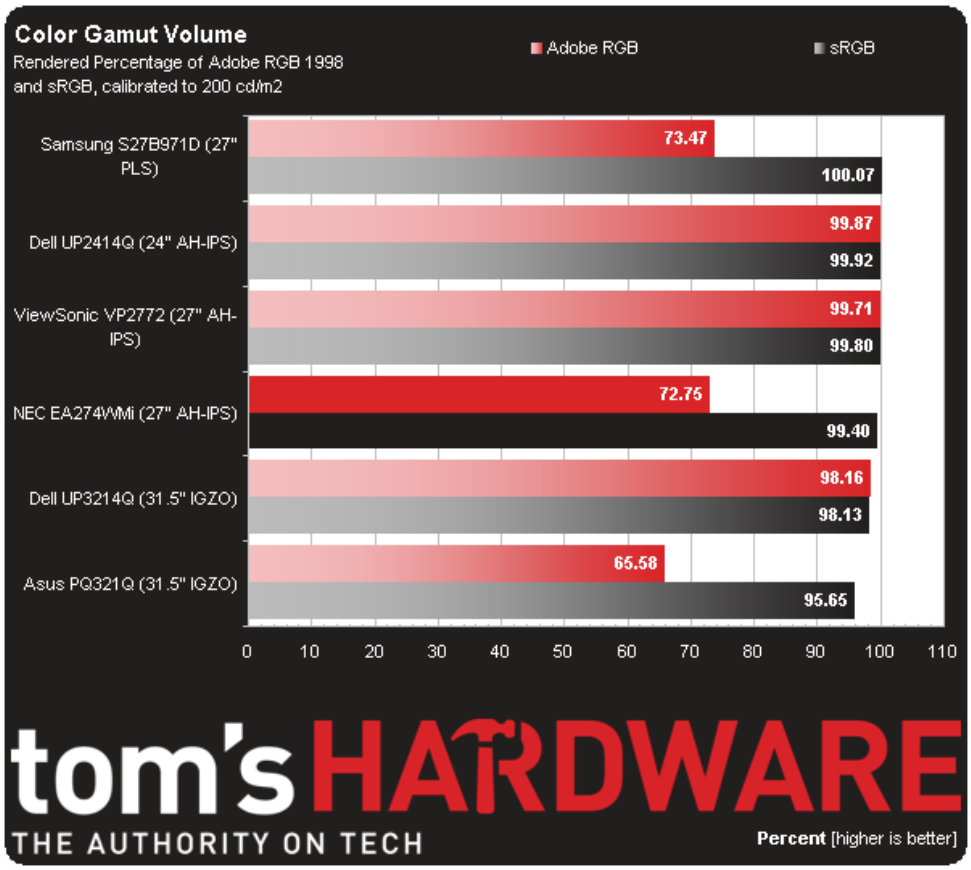
Returning to the comparison group...



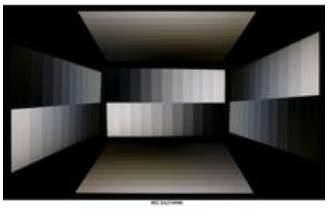
An average error of 1.45 Delta E is very low, as we'd expect from a monitor selling for $800. This display is certainly worthy of a professional's toolkit, as long as you don't need the wider Adobe RGB color gamut. We'll talk about that below.

Gamut Volume: Adobe RGB 1998 And sRGB

There are basically two categories of displays in use today: those that conform to the sRGB/Rec. 709 standard like HDTVs, and wide-gamut panels that show as much as 100 percent of the Adobe RGB 1998 spec. We use Gamutvision to calculate the gamut volume, based on an ICC profile created from our actual measurements. Although we recently tested a couple of screens that offer both gamuts, NEC's EA274WMi maxes out at sRGB.

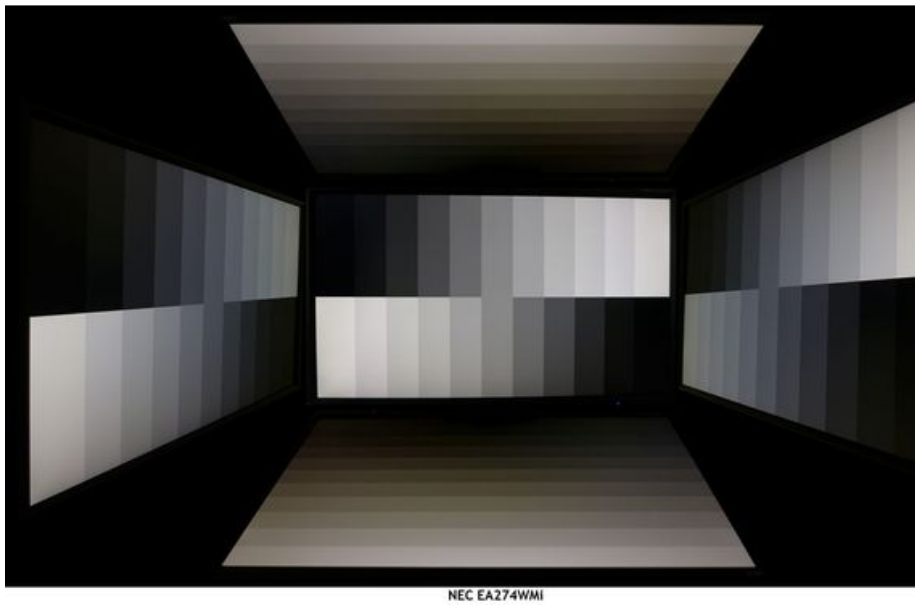


sRGB is the gamut used for gaming and video content, and a majority of productivity applications. The NEC matches that volume almost perfectly. If you look at the CIE chart again, you'd think the volume is a little greater than 100 percent sRGB. But Gamutvision takes luminance into account as well. Blue, magenta, and to a slight extent red are a little low, which brings the overall percentage just under 100. Pros requiring an sRGB monitor would do well to consider this one.



8. Results: Viewing Angles And Uniformity

The more monitors we test, the more we can see that off-axis viewing performance is dependent not only on pixel structure (IPS, PLS, TN, etc.), but the backlight technology as well.

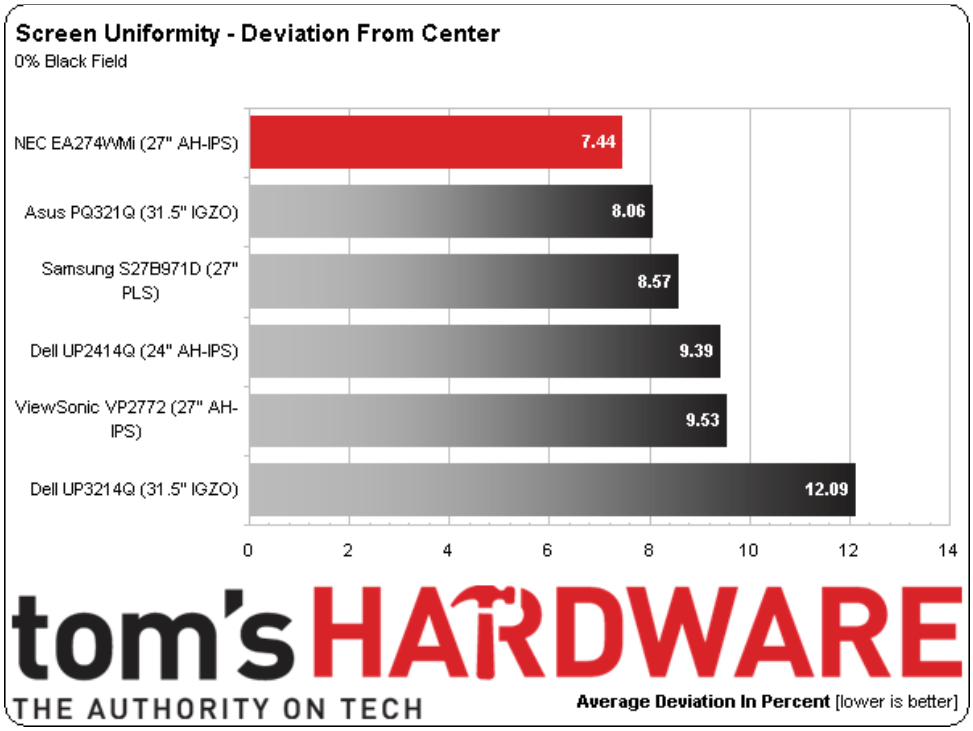


Since IPS technology has not changed over the past year or so, we can only conclude that the better off-axis viewing results we're getting are due to improvements in the panels' anti-glare layer. Where earlier QHD screens showed an obvious green shift to the sides, now there is little to no color change. The red tint in the top and bottom views is fairly typical. The other positive effect of this trend is increased image clarity. In the past, an aggressive anti-glare coating would make the picture look hazy and poorly defined. Now you really can have your cake and eat it too. Reflections are practically non-existent, small text is super-clear, and you get a far more consistent image when viewed left or right of center.

Screen Uniformity: Luminance

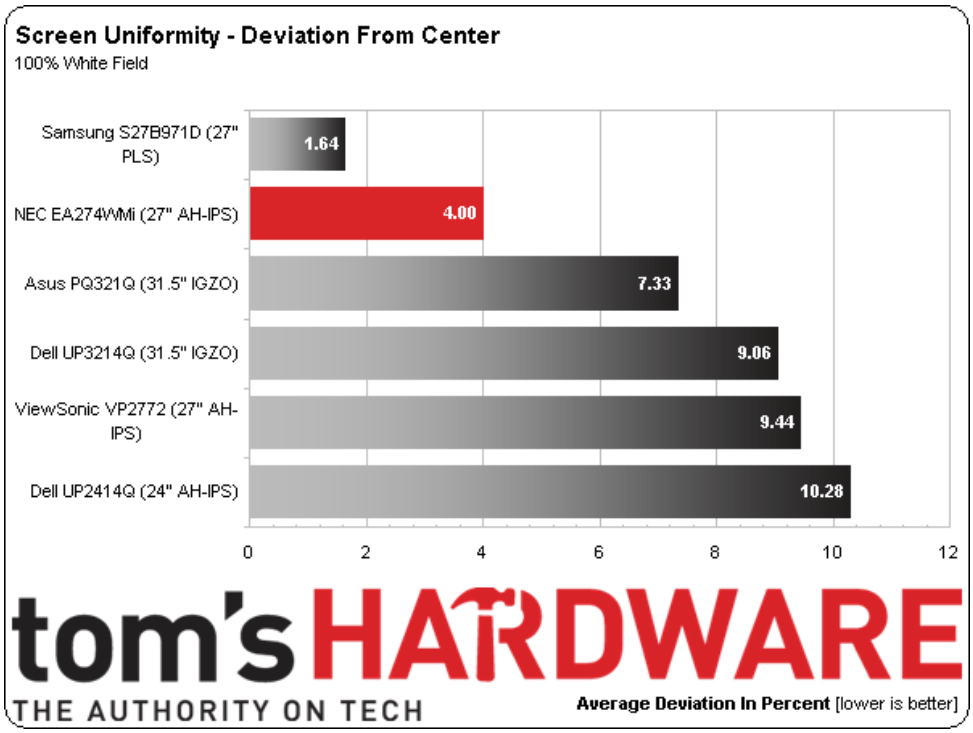
To measure screen uniformity, zero and 100-percent full-field patterns are used, and nine points are sampled. First, we establish a baseline measurement at the center of each screen. Then the surrounding eight points are measured and their values expressed as a percentage of the baseline, either above or below. This number gets averaged. It is important to remember that we only test the review sample each vendor sends us. Other examples of the same monitor can measure differently.

First up is black field uniformity.



The EA274WMi doesn't have any uniformity compensation built in. But it obviously isn't needed, since we get one of the best results we've recorded, beating some displays that have the feature. Our sample showed no visible issues at all. Looking at the raw measurements, the C6 sees a little extra brightness in the top-center and upper-right portions of the screen.

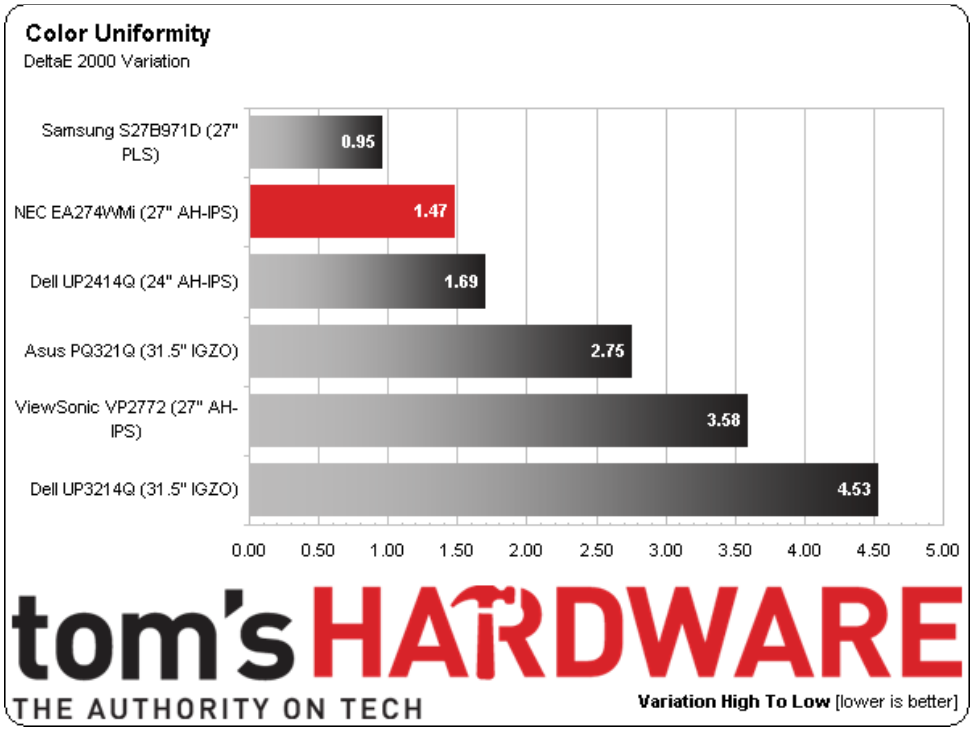
Here's the white field measurement.



This is the second-best result we've recorded to date. The biggest deviation is at the top-center, where we measure 5 cd/m^2 brighter than the center. That's phenomenal performance for any LCD panel of any type.

Screen Uniformity: Color

To measure color uniformity, we display an 80-percent white field and measure the Delta E error of the same nine points on the screen. Then we simply subtract the lowest value from the highest to arrive at the result. A smaller number means a display is more uniform. Any value below three translates to a variation invisible to the naked eye.



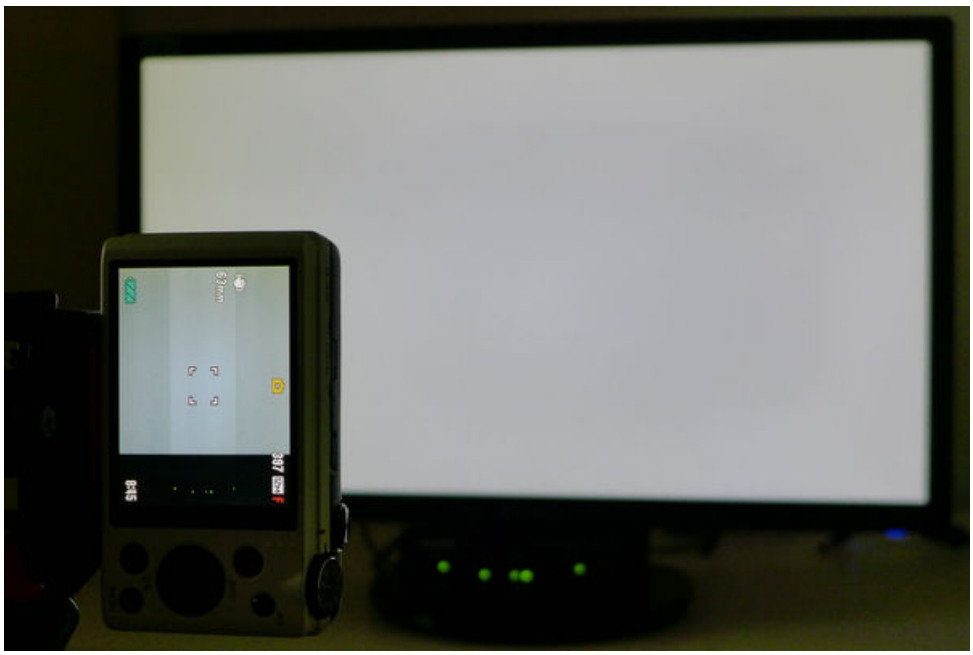
We saw no color uniformity problems with our press sample, and an error range of 1.47 Delta E backs that up. The highest value is 2.00 and the lowest is .53. All of our measurements are well below the threshold of visibility. We're using an 80-percent white field pattern, though patterns at other brightness levels look just as neutral across the screen.

9. Results: Pixel Response And Input Lag

To perform these tests, we use a high-speed camera that shoots at 1000 frames per second. Analyzing the video frame-by-frame allows us to observe the exact time it takes to go from a zero percent signal to a 100% white field.

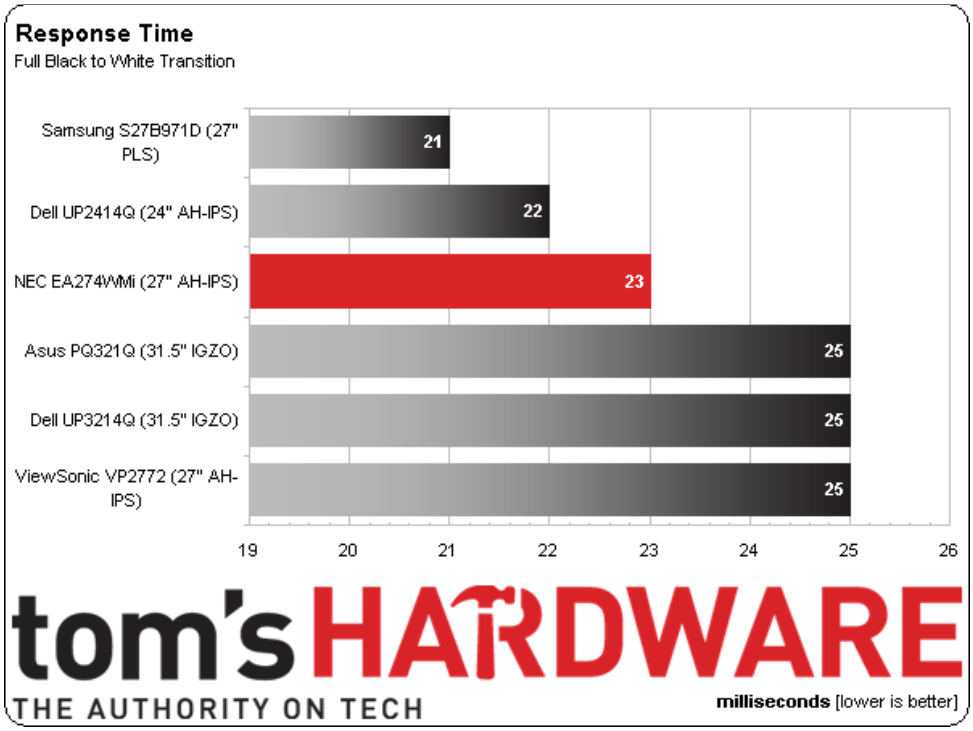
The pattern generator is placed at the base of the monitor so our camera can capture the precise moment its front-panel LED lights up, indicating that a video signal is being received by the monitor. With this camera placement, we can easily see how long it takes to fully display a pattern after pressing the button on the generator’s remote. This testing methodology allows for accurate and repeatable results when comparing panels.

Here’s a shot of our test setup. Click on the photo to enlarge.



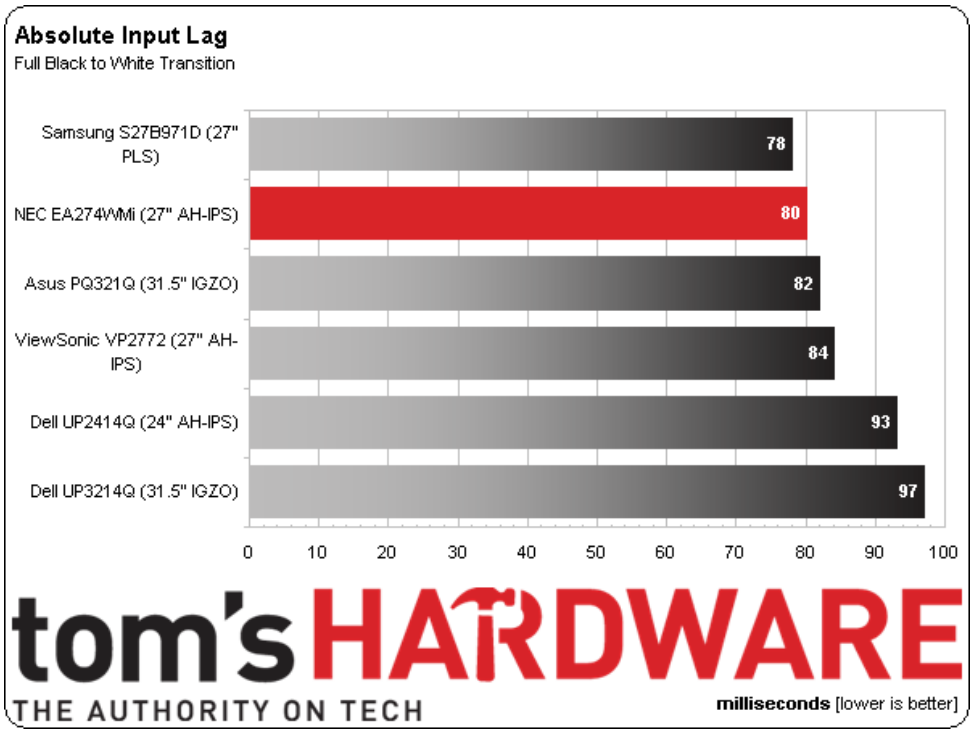
The brighter section of the camera’s screen is what actually appears in the video. You can see the lights of the pattern generator in the bottom of the viewfinder. We flash the pattern on and off five times and average the results.

Here’s the screen draw result.



This is a predictable result from an IPS panel running at a 60 Hz. Since efforts to improve draw time are currently being directed towards high-refresh and G-Sync-capable TN screens, we don't expect this level of performance to change any time soon.

Here are the lag results.



The EA274WMi is a tad quicker than other recently-tested monitors. While none of the group is classified as gaming-oriented, an input lag of 80 milliseconds is sufficient for all but the fastest titles.

10. NEC EA274WMi: Some Unique Features

It is unfortunate that LCD panel prices aren't dropping as quickly as they have in the past. Not only are QHD (2560x1440) screens still positioned at premium levels, but the newest and most capable Ultra HD monitors are even more expensive. Without question, for the foreseeable future, expect to pay extra for high pixel density.

Panel speed also seems to be evolving slowly. Gamers are pining for more responsive displays able to keep up with their sizable investments in high-end graphics. All of our tolerances are different. But it's common wisdom that IPS is not the technology you want to complement a competitive gaming box. These days, it's fairly easy to

exceed 60 FPS with v-sync off in a first-person shooter. Unfortunately, the only IPS monitors able to exceed that figure are modified ones.

There is still no factory support for refresh rates greater than 60 Hz. A few high-refresh rate TN-based screens are popular in the gaming community though, and we have some of those heading our way too. And of course, the next big thing for gamers is likely to be G-Sync, which matches framerates between source and display on-the-fly creating a blur-free experience with no pesky artifacts like frame tears. Look for hands-on reviews of these new monitors very soon as well.

Getting back to NEC's EA274WMi; this is a monitor that is good for everything *else*. Someone who sits in front of their screen eight or more hours a day at work is going to appreciate the color accuracy, clarity, and high pixel density. IT managers will enjoy the rugged build quality and management features NEC includes. As you can see from our tests and hands-on impressions, this display does what it sets out to do really well.

Pre-calibration performance lags behind competing products. But choosing the right color temp preset (number three) means you'll be close enough to avoid complaints about accuracy. If you have the instruments, you can calibrate the EA274WMi to a pretty high standard, which matches a few of the more expensive monitors we've tested. Brightness and contrast are right up there with other displays in this price category too. Light output is more than sufficient. You could conceivably use this monitor outdoors, on location at a photo shoot, for example. Contrast, while not record-breaking, is about average for the IPS monitors I've seen.

And when you do calibrate, ControlSync and NEC's NaViSet Administrator software make it easy to replicate those settings across the other units deployed in your office. We're not aware of anyone else offering that functionality. And managing energy usage is equally simple thanks to some neat features built in to the OSD.

I'm not calling the EA274WMi a revolutionary product by any stretch. But we're still impressed with its design, build quality, enterprise-class features, and performance. The NEC display also isn't cheap. Then again, though, cheap isn't a word you can use to describe *any* QHD screen. Perhaps when everyone has recouped their R&D costs from Ultra HD and prices on 4K hardware start dropping, they'll put some pressure on displays with 2560x1440 resolution. Until then, this monitor at least deserves consideration for what it does well.