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WHITE PAPER

Mythbusting - Just the Facts on Plasma TV Performance

Sponsored by: Pioneer

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IDC OPINION

The digital television market is rife with misinformation and inaccurate perceptions of the performance capabilities of different display technologies—in particular, plasma televisions. Through extensive testing, IDC generated quantitative data on the video capabilities of current generation plasma TVs, LCD TVs and microdisplay (MD) rear projection TVs. The objective was to show the strengths and weaknesses of the technologies in real-world viewing environments. The results show that commonly voiced concerns regarding plasma picture quality and viability were not found to exist in a sampling of current products. Plasma picture quality was, in fact, very well suited to common viewing situations.

METHODOLOGY

IDC, in partnership with Imaging Science Foundation (ISF), independently purchased (through nationwide electronics retailers) and tested a total of nine current model televisions from seven different major brands in June and July 2005, including three plasma, three LCD and three microdisplay rear-projection TVs. In addition, a CRT monitor was used as a reference point for certain tests. The TVs were meant to be a sample of products from each category and the test results were averaged for each category.

The video tests were conducted in California and Florida by ISF technicians with 10+ years of experience in installing and calibrating video systems. They used identical instrumentation to perform the video tests:

- New Minolta CS-200 Chroma Meter used at its widest angle of view
- Sencore VP-403 test pattern generator

Each of the nine sets, as well as the reference CRT, was fed both high brightness (100 IRE) test signals, indicative of watching bright content like sports, as well as lower brightness (20 IRE) tests signals, akin to watching a movie. Test signals used were pure white, pure black, and separate red, green and blue. In addition, because very few people are able to sit directly in front of the TV when watching at all times, the different content types were tested from different viewing angles.

The TVs were initially calibrated on brightness, contrast, and sharpness using common THX tools found on many movie DVDs prior to its 4 weeks of continuous playback (the equivalent of two hours a day for almost one year). Measurements were taken and the TVs were returned to factory settings. Image retention testing was then done by leaving the menu from the game Half-Life 2 on the screen for 48 hours, replicating what would happen if someone accidentally left a static image on their TV while they went away for the weekend.

EXECUTIVE SUMMARY

Today's couch potatoes are finding their brains a bit mashed when the subject turns to upgrading their favorite news/entertainment delivery device. In fact, buying a new TV has quickly become one of the most confusing and challenging purchase decisions that consumers now face. Between the transition to digital TV and HDTV programming, and the overabundance of TV types, technologies, and terminologies, it's no wonder modern TV buyers can't separate fact from fiction. Most television vendors sell TVs using several display technologies so that they're able to offer consumers the widest variety of TV sizes, shapes and—most importantly—price points.

One of the most bewildering aspects of the buying process involves the technology used in generating the image on the screen. Specifically, the qualities and characteristics of plasma TVs are poorly understood and subject to a great deal of misinformation. Commonly held beliefs about plasmas include:

- Screens are subject to permanent image retention (commonly referred to as "burn in")
- Lifetimes are short
- Black levels are less than CRTs (and other technologies)
- Viewing angles are no different than TVs using other technologies
- Screen brightness is worse than TVs using other technologies
- Color accuracy is the same as TVs using other technologies

IDC & ISF undertook a rigorous set of tests using real-world products purchased from retail stores to determine the veracity of these claims. The goal was to determine whether they are accurate or simply myths that need to be dispelled to more accurately reflect the capabilities of today's plasma televisions.

In order to better understand the results, it's important to know a bit about how the human eye works. Unlike the equipment used to take measurements for these tests, our eyes are not equally sensitive to all frequencies (colors) of light. Notably, our eyes are more sensitive to red as compared to blue and green. As such, although ISF tested the color capabilities of all nine TVs, we report more on how the "reds" fared than other colors. Similarly, our eyes are very aware of blacks and different levels of black (or gray) and are more sensitive to changes in black than changes in white. The

amount of "black" in a video image, therefore, has a profound impact on the range of colors that are visible to our eyes. Contrast ratio, on the other hand, which essentially measures the difference between the black and white signals, is not a good indicator of image quality. Displays with high contrast ratios may still look washed out if the white levels are extremely high, but the black levels are only modestly low.

So what's the verdict on plasma? Our test results and other research show that, while there may be a tiny glimmer of truth in some of these statements, they are all myths. Plasma TVs are an excellent choice for consumers who are willing to pay the relatively high price for these displays and want accurate image recreation, particularly in viewing environments with controlled lighting.

First, while image retention can occur in modern plasmas, the effect is temporary. After the 48-hour torture test, all three of the plasma TVs that were tested showed clearly visible images from the game menu, whereas none of the LCD or MD rear-projection-based sets showed any image retention. However, after regular video material (a DVD movie set to continuously loop) was played through the sets for 24 hours, the image completely disappeared from all three plasmas, leaving no trace. Unlike early generation plasmas, where those type of images would not go away and could actually "burn" onto the screen, modern plasma TVs enjoy a combination of more robust screen materials and subtle image-shifting technologies that have rendered this former issue moot.

Second, the accelerated aging tests show that plasma TVs maintain consistent image quality and brightness even after extending viewing. The image quality of all televisions (and all displays, for that matter) degrade somewhat over time, but in our tests plasmas results were typically within 5% of their "out of the box" performance at the conclusion of our testing. While this is not a definitive statement on product lifetimes—true lifetime tests are impossible without a several year test cycle—it is a reasonable proxy of extended performance. In fact, many plasma TV vendors now claim 60,000-hour lifetimes (translated: 8 hours of daily viewing for more than 20 years before the screen reaches half of its original brightness).

Third, when measuring black levels, the plasma TVs as a group actually outperformed the reference CRT monitor as well as the TVs using the other two technologies. The tangible benefit of this is that a deeper range of colors can be displayed, which translates into a richer overall picture.

Fourth, the viewing angles for plasma TVs were the most consistent of all the TV types tested. In other words, regardless of where you are in the room, the image quality on a plasma will look very similar. Also, even if you're seated in a fixed position, you won't be able to see any difference when, for example, a person walks across the screen or a football flies from one end of the screen to the other.

Fifth, although the absolute brightness of plasma TVs is lower than other TV technologies, it is the most consistent from side-to-side, making "hotspots" or "deadspots" less likely, regardless of where you view the TV from within a room. The LCD TVs and microdisplay rear projection sets that were tested had brighter pictures when viewed head on, which could make them a better choice in rooms where viewing positions are limited and the lighting cannot always be controlled (such as

those with lots of natural sunlight). When tested from different angles, however, both the overall brightness and the color performance varied on the sets using LCD and microdisplay rear projection technologies.

Finally, when it comes to color accuracy, the end goal for all televisions continues to be SMPTE (Society of Motion Picture and Television Engineers) standards, which are red, green, and blue color frequency specifications that Hollywood producers adhere to in the mastering of their content. We found that plasma TVs generated colors that were closest to that of HD SMPTE, particularly with low brightness (e.g., movies) signals.

Of course, there's more to the TV purchase decision than performance—price, in particular, plays a critical role. In that regard, the plasma TVs were the most expensive option tested, with an average price of $3,999, versus $3,599 for LCD and $2,266 for microdisplay rear projection.

SITUATION OVERVIEW

Understanding the real nature of television performance is getting harder and harder as more technologies come to market, more vendors introduce new products, and more FUD (Fear, Uncertainty and Doubt) is generated in this increasingly competitive marketplace. IDC set out to determine which issues about plasma televisions were genuine and which issues were not, by conducting a wide range of performance-focused tests in conjunction with Imaging Science Foundation (ISF) test personnel. The detailed results of those tests are discussed below.

TEST RESULTS

Image Retention

Test Significance – We address the most contentious issue first, as plasma has yet to shed its lingering reputation as a technology that permanently "burns in" images when left static for a set period of time. Manufacturers have indeed come clean about first generation products that left permanent damage on the screens seen in airports and other text heavy applications. Technologies such as "orbiting" or micro-pixel movement were created to mitigate the possibility for this burn-in, but little research has been done to refute the perception that static images will cause permanent damage to plasma displays.

Test Methodology - ISF test technicians left a static video game (Half Life 2) menu image on each TV for a period of 48 hours to simulate a full weekend "burn". Post 48-hour observations were quantified and documented as: 1 = Not Visible, 2 = Barely Visible, 3 = Somewhat Visible, 4 = Easily Visible, 5 = Readily Visible and Clearly Defined. A subsequent 24-hour movie loop was then run in an attempt to "fix" any image retention caused by the static video game menu.

Test Results – After the 48-hour test, all LCD and microdisplay rear projection televisions scored a "1", as there was no indication of any image retention after the test period. Plasma, on the other hand, did show clear signs of image retention, with all displays scoring a "5" after 48-hours of displaying the video game menu. However, after running a movie loop on each plasma display for 24 hours, ISF testers could not perceive the previously retained images while watching video on the plasmas after the 24 hour "fix". As such, plasma's image retention score went back down to a "1".

Key Takeaway – Central to this test is the acknowledgement that our demonstration was an extreme scenario that few consumers would ever experience with their televisions. Most potential buyers scared off by the notion of plasma "burn-in" are more focused on the damage caused while pausing a football game or their favorite show on TiVo for a few minutes while running around the house. Our tests show that current plasma technology can tolerate a full 48-hour session on pause, and then resume its original state with no permanent effects after a 24-hour video loop. Thus, while it is unlikely that a consumer of a current generation (or later) plasma TV will even notice any image retention caused by 5 or 10 or even 60 minutes on pause, it is most definite that any such image retention will disappear over the course of subsequent TV watching.

Accelerated Aging

Test Significance – In addition to image retention, one of the most widely discussed issues regarding plasma TV performance is the real-world lifetime of the display. In the world of display specifications, lifetime is defined as the amount of time it takes before a screen produces half the brightness that it did when new. Common lifetimes for today's displays are measured in thousands (and typically tens of thousands) of hours. To put this into perspective, a display with a 30,000 hour lifetime wouldn't reach half-brightness level until more than 10 years of viewing it 8 hours a day or 20 years of 4 hours a day. Given that most people replace their TVs within 10 years, any product with lifetimes of 30,000 hours or higher should not be a cause for concern.

Test Methodology – ISF conducted a 4-week accelerated aging test, in which all TVs were left on and running a movie loop 24-hours a day. After that, each of the screens were re-measured for their brightness, color accuracy, viewing angle accuracy and all the other tests that were run when the TVs were first pulled out of the box. The results before the "aging" process and after were then compared to create a percentage difference between the two.

FIGURE 1

Post 4-Week Aging TV Brightness

Source: IDC, 2005

Test Results – As illustrated in Figure 1, the plasma TVs that were tested showed a smaller amount of light output decrease, and therefore outperformed all the TV technologies. The post 4-week aging brightness measurement for plasma was –5.5%, whereas the LCD brightness decreased by 11.2%, and microdisplay rear projection TVs declined by 22.8%.

Note that the brightness drops illustrated above are a percentage based brightness degradation of absolute white but the level of white to gray seen above would not mirror the actual physical appearance of the tested TVs.

Key Takeaway – Consumers who purchase current generation plasma TVs can rest fairly easy with the knowledge that their TV's brightness levels should remain stable.

Black Level

Test Significance - The richness of an image simply wouldn't be conveyed if colors appeared washed out - a condition when good black levels aren't present. As an example, the color red can range from a deep, dark fire truck red on one extreme to a light rose red on the other. If a TV could only generate a middle grade red up to a rose red, then the fire truck would look strange because you're missing out on bottom, dark end of what makes up the true red of the fire truck. Good black levels are also vital to provide a sense of depth—for example, to illustrate the proper perspective of an individual standing within the dark confines of a street alley. With poor black levels, the shadow areas would look gray and washed out, making the picture look flat.

Test Methodology – ISF employed its colorimeters to measure black levels on each TV screen, and the results were averaged within each TV technology category. Black level measurements are represented as an absolute number; the lower the number, the better the black level.

Test Results – The plasma displays generated the best black levels among all the technologies, at .19 nits—even better than the reference CRT. After going through the 4-week aging process, plasma's black level numbers rose by 13%, signifying a slight drop in black level, but still led the way amongst its competitors, as shown in Table 1.

TABLE 1

Plasma, LCD TV & MD RPTV Black Level - Pre & Post 4-week Aging

(UNIT OF MEASUREMENT = NITS; LOWER IS BETTER)

	Plasma	LCD	MD RPTV
Pre Aging	0.19	0.40	1.23
Post 4-week Aging	0.22	0.39	0.97
Net change	+13%	-0.4%	-21%

Source: IDC, 2005

The LCD black level was essentially the same after four weeks and the rear projection black improved by 21%, but it still remained well below the other technologies. The increase in black level is due to the microdisplay rear projection TVs losing a significant amount of brightness (-23%), per the results detailed earlier in this report.

Key Takeaway – With its best in category black levels, plasma provides the most image "pop" and sense of depth and realism. TVs that have lower-quality black results produce images that appear relatively washed out and flat, and colors appear to have a slight gray sheen about them.

Viewing Angles

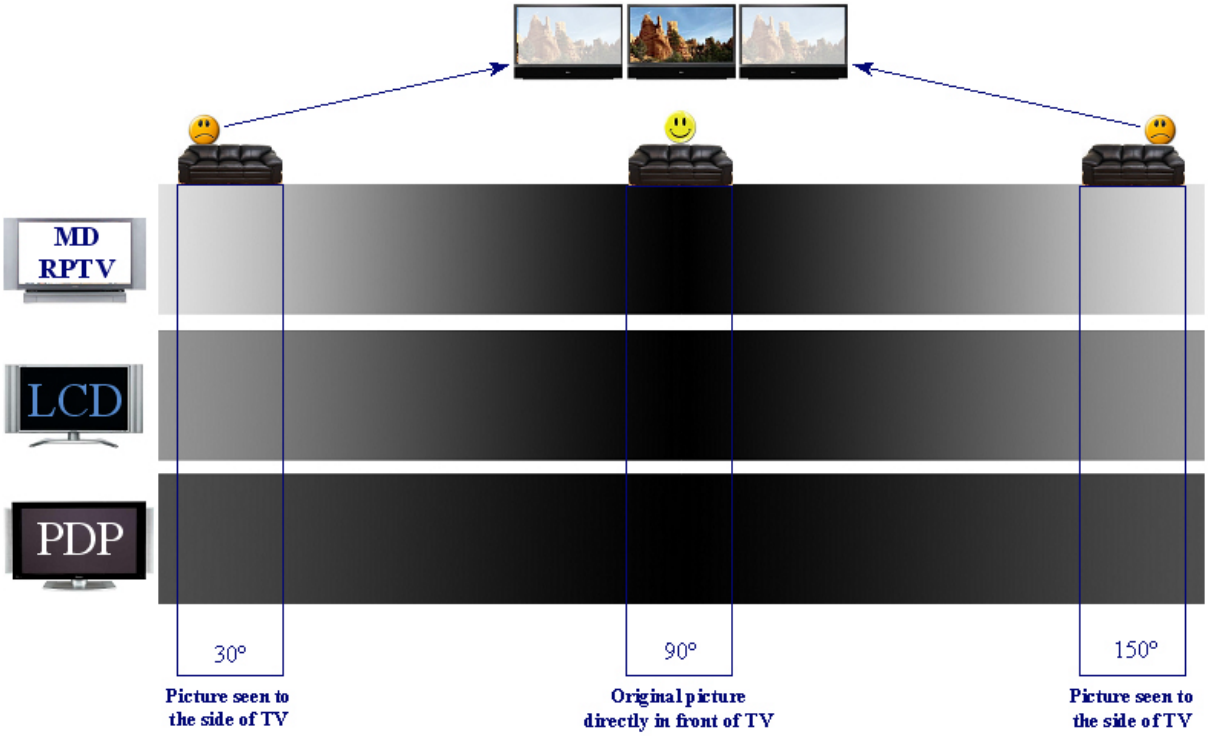
Test Significance - Another highly hyped spec in the digital TV market is "Viewing Angle." It refers to the maximum off-axis point or angle in which one can still physically see a picture. What is notably absent in those specs, however, is the *quantity* or *amount* of picture still viewable, as a barely dim picture seen off to the side, at the end of one's couch can hardly be considered satisfactory.

Test Methodology - Using the same video inputs mentioned earlier, ISF measured the brightness level of the center of the TV at varying angles (far left 30º, 50º, 70º, straight on 90º, 110º, 130º, far right 150º) to quantify the amount of a TV's picture that is actually reaching an individual if he/she moves to a sitting area off-center.

Figure 2 below illustrates the results of the day level brightness test.

FIGURE 2

Plasma, LCD TV & MD RPTV Black Full Brightness Viewing Angles



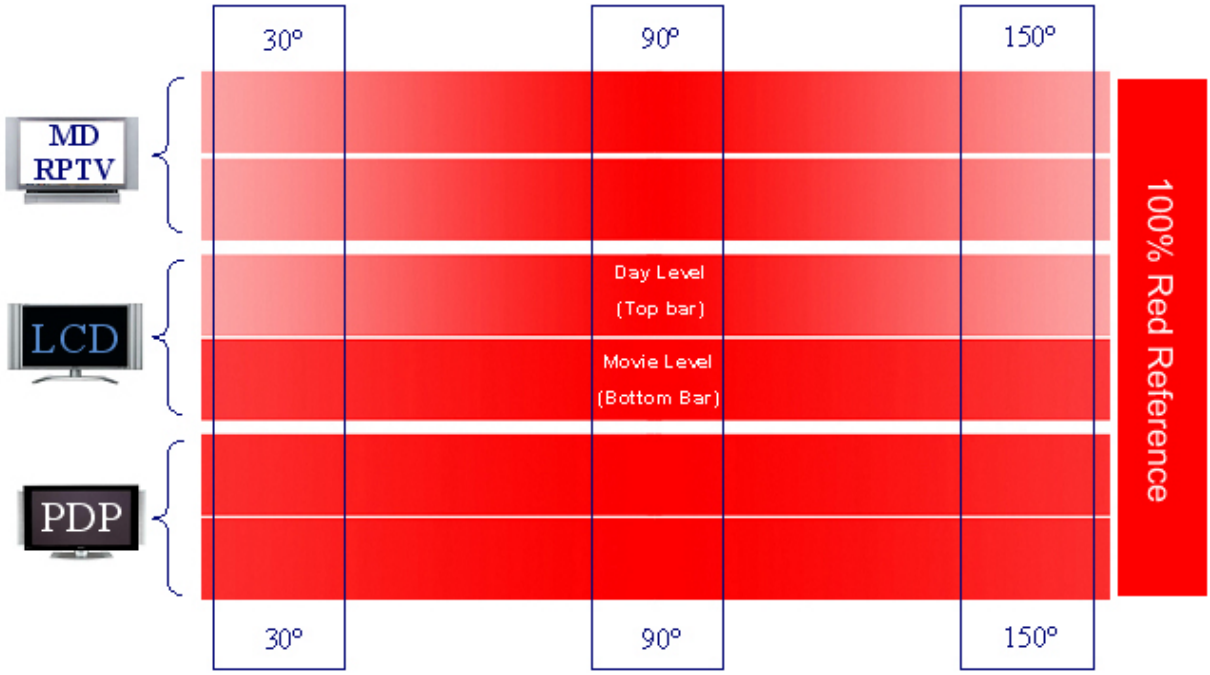
Source: IDC, 2005

Test Results (Black)– As seen in Figure 2, 90º is the point directly in front of the TV. At that point, the entire picture is clearly visible from each TV technology. As we move off to either side, it is clear that the amount of light or picture starts to drop off. At the far end of the viewing spectrum (e.g., at the far end of a sofa), plasma lost approximately a third of its picture brightness, , but it fared well from a relative standpoint as MD rear projection TVs lost over 90% of their picture brightness at the test angles of 30º and 150º and LCD TVs lost 60% of their brightness. The test data at lower movie level brightness showed that the plasma and MD RPTVs tested retained approximately the same brightness loss percentage as they did on the day level brightness tests but the LCDs actually increased 125% in brightness at the outer 30º and 150º viewing angles

Figure 3 below illustrates the brightness results from the red color day and movie level viewing angle tests.

FIGURE 3

Plasma, LCD TV & RPTV Red Viewing Angle Brightness



Source: IDC, 2005

Test Results (Red)–As with the black test signals, plasma brightness levels with red declined as the viewing angle increased, but in the case of plasma, the changes were consistent from side-to-side with brightness declines of approximately -28% at the far viewing angles of 30º and 150º. The LCD TVs tested however, showed inverse results, in that their high viewing angle brightness actually increases by as much as 121% when movie level images are shown but their day level red brightness drops by –55% at the outer edge viewing angles of 30º and 150º. The combined MD rear projection category's brightness drop is steep yet consistent in both the day and movie level brightness tests, at approximately –39%.

Key Takeaway – For both black and white and color content across all brightness spectrums, our tests show that plasma technology retains the highest (compared to its center screen point) and most even brightness across the viewing spectrum – whether a person sits directly in front or to the side of his couch. This is in contrast to the other TV technologies, where the differences in brightness levels at different viewing angles were more pronounced. It's important to note, however, that the impact on viewing regular viewing material on all these TVs will not be as dramatic as these test figures might imply.

White and Color Brightness Uniformity

Test Significance - LCD, microdisplay rear projection, and plasma technologies all employ different methods in "lighting up" their TV screens, and produce very different results in terms of even or uniform brightness across the screen.

LCD TVs use fluorescent backlights that are always on and have to shine through a number of different filters (such as one for color) before the light makes it to your eyes. Microdisplay rear projection TVs employ a high intensity lamp to produce white light that is reflected off a tiny imaging device (the microdisplay), and then through a lens to generate the picture on the screen. Plasma technology gets its name from the plasma gases trapped in many tiny cells behind the screen which light up to form red, green, or blue colors depending on the electrical energy fed to those cells.

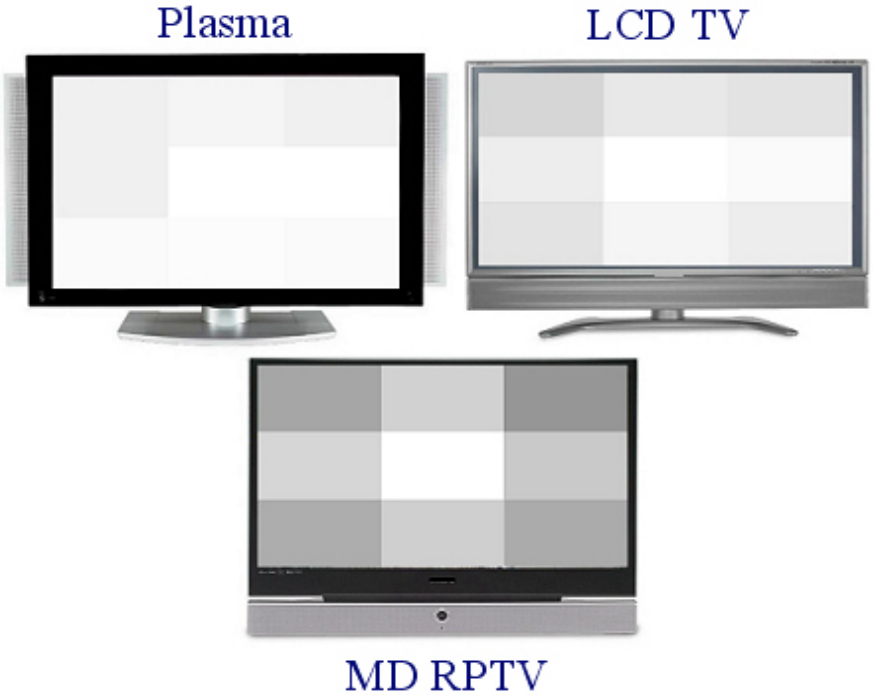
Test Methodology - Each television was fed a solid white or colored (red, green, or blue) video signal in varying brightness. Using the Minolta chroma meter (placed two screen widths from the screen), ISF measured the amount of light emanating from 9 different sectors of each TV to determine whether the brightness levels across the entire screen were even or inconsistent.

We used the middle center sector as a brightness reference point, and each corner or side sector reflects the *difference* in brightness as compared to the middle. When viewed this way, we can see that the different technologies' brightness levels vary in different parts of the screen as compared to the middle of the TV. We summed each TV's test measurements within its respective technology category (all plasma scores, for example) and then averaged them to generate the data points for the figure.

Test Results – As seen below in Figure 4, plasma's brightness differences range from being –6% dimmer in the top left part of the screen to being 4% brighter in the middle right. LCD's brightness drops away from center are a bit more dramatic than plasma at –10% to -15%, especially in the corners, and MD rear projection's brightness falloff is significant in each corner, by as much as –40%. Note, however, that the absolute brightness, or light output, of the plasma is significantly lower than either the LCD TV or MD rear projection TV category. In fact, LCD TV brightness levels at the center of the TV are five and a half times higher than the plasma average and MD rear projection TV brightness levels are eight times higher than the plasma average.

FIGURE 4

Plasma, LCD TV & MD RPTV Day Level White Uniformity (Relative Levels)



Source: IDC, 2005

To be clear, what we've illustrated above in Figure 4 is a strictly *relative* comparison of light level from an original (middle center) starting point between each TV technology. The real world perceived uniformity deviations do not appear this harsh to the naked eye. Nonetheless, in terms of *measured* light level uniformity, this illustration of light level variations is indeed valid.

In addition to the high brightness white test, plasma presented the most uniform and consistent spread of red across its sectors. Our *low*-level or "movie" brightness tests for both white and red were also consistent with the results shown above, in that plasma generated a relatively even picture throughout.

Key Takeaway - White and color uniformity are important data points to consider in evaluating a TV's video quality and its ability to achieve a smooth and even picture. Looking at the images above, it's not so much that you'll always perceive the drop-off in brightness in a TV's corners, but that the center and other edge areas may appear uneven, as prominent "hotspots" of brightness whether you watch bright sports in the day or a movie at night. In addition, while plasmas are more consistent than the other TV technologies, they are much dimmer overall, making LCD TVs and microdisplay rear projection TVs a better choice in rooms where high brightness levels are important (such as those with lots of ambient light).

Color Accuracy

Test Significance - The concept of "color accuracy" can be described as how colors *should* look based on SMPTE (Society of Motion Picture and Television Engineers) High Definition color standards. Professional grade studio monitors are calibrated to particular color specifications used by Hollywood television and movie directors to finalize the color "look" of their video content. It is against this standard that we compared ISF's color test measurements with the tested TVs.

Positive figures from these tests signify "over saturated" colors, whereas the negative points to "under saturated". Over saturated colors can be thought of as overdone, or bloomed out, whereas under saturated colors are under-developed or washed out. Neither is better or worse than the other as it points to how a TV technology performed as compared to SMPTE – both are just variations away the ideal. The key takeaway is in seeing how *far* from the ideal each TV ended up for each color, regardless of being over or under saturated.

Direct Viewing Color Accuracy

Test Methodology – The primary colors of red, green, and blue (RGB) were individually displayed on each TV and measured against our SMPTE specification reference standard RGB colors. Each TV's ability to accurately display these three colors is represented as a deviation away from SMPTE – e.g., plasma blue vs. SMPTE blue.

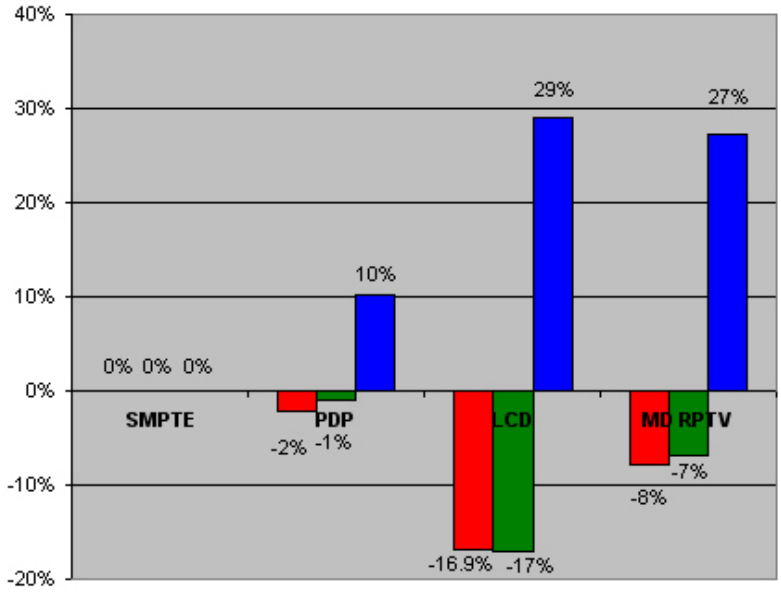
Test Results - We first measured each TV's color accuracy when displaying full brightness, day level color. Across the board, we saw that all the TV technologies adhered very closely to the ideal SMPTE standard, with color deviations no more than 2%, with the exception of MD RPTV's 4% Blue color deviation.

Key Takeaway - For bright video content, all TV technologies performed fairly similarly in regards to red, green, and blue color comparisons of SMPTE specifications.

We conducted the same color test with lower brightness levels commonly found in movie video content, and the disparate results between plasma and the other TV technologies were quite apparent., as shown in Figure 5.

FIGURE 5

Direct Viewing Color Accuracy - Movie Level Video - Plasma, LCD TV & MD RPTV
Deviation from SMPTE



Source: IDC, 2005

Plasma's red and greens were nearly spot-on to the ideal SMPTE quality, and its blues were measured as being 10% over-saturated. The LCD TV's red and green deviations were –17%, whereas its blues were oversaturated by 29%. Lastly, the microdisplay rear projection category was measured to have red and green undersaturation by 7% and 8%, respectively, and its blue color accuracy deviated away from SMPTE by 27%.

It is clear that all displays had the most trouble with generating accurate blue, but remember that the human eye is less sensitive to blue color frequencies than it is to red and green. As such, the blue color deviations are of lesser significance relative to their red and green color counterparts.

Key Takeaway - When watching movies, current generation plasma TVs will generate color accuracy levels close to that of the reference point colors directors and producers envisioned their content to be shown.

Side Viewing Color Accuracy

Most TV watchers would agree that a person's viewing experience should be the same whether watching from the middle or from the far end of a couch. As we've shown a bit earlier in this report, however, brightness levels fall off considerably at the sides for some TVs. Perhaps not surprisingly, color representation and accuracy levels are considerably affected when watching movies at wide viewing angles as well.

Test Methodology – - Again, we compared color accuracy for the TVs against ideal SMPTE – this time measuring how colors actually shifted depending on where you're sitting.

Test Results – Using SMPTE as a baseline, we observed that all three technologies shifted colors by less than 3% when viewing day level video at wide viewing angles, as compared to SMPTE colors. However, as with the direct viewing tests, when we tested movie level video, stark differences in color accuracy arose.

Remember that "movie level" video is content that is mostly dark and dynamic, heavy on blacks, on shadows, and deep colors. In this environment, the reds and greens of LCD TVs and microdisplay rear projection TVs shifted by as much as 10%-12% from their original color seen directly in the middle of the screen. In other words, the person sitting on the far end of the couch will see different (and inaccurate) colors than the person watching directly in front of the TV.

In contrast, plasma remained relatively stable, shifting by 2% in reds, and less than a percentage point in greens as compared to SMPTE. Wide-angle plasma blue color shifted by 12% compared to 17% for LCD and a 40% SMPTE wide-angle color deviation for MD RPTV.

Key Takeaway - While watching movies with certain types of TVs, your viewing experience will change if you watch from the sides and not the middle. Inaccurate colors will be seen at the far viewing corners, in contrast to plasma's images being relatively stable and more accurate to SMPTE colors at wide viewing angles.

CHALLENGES/OPPORTUNITIES

TVs using plasma technology can generate stunning images, but they do so at a premium price. For consumers who want accurate, top-notch video quality, plasmas are an attractive option, but for cost-conscious buyers, TVs using other technologies may be a more realistic choice. Frankly speaking, many consumers cannot see the differences in picture quality among TVs of various types and will simply opt for the one that they believe offers the best value for their money. In addition, for TV buyers who purchase based on spec sheets more than visual comparisons, plasma has a disadvantage versus LCD and microdisplay rear projection when it comes to screen resolution—specifically the lack of products that support 1080p. While we question the current real-world value of a 1080p display, given the dearth of 1080p content both now and in the foreseeable future, some TV buyers may look to buy on that one specification alone.

As discussed throughout the paper, plasma may not be the best technology choice in certain environments. Rooms that feature a great deal of natural light or where it's difficult to control the lighting could make it difficult to see and appreciate the image quality of which plasma TVs are capable.

Probably the largest challenge for plasma TV is the size of the manufacturing infrastructure that supports it versus the LCD juggernaut. Investments being made to create large LCD manufacturing plants designed specifically to turn out lower-cost, high quality, large LCD panels designed for TVs dwarf those being made for new plasma plants. That's not to say plasma industry growth has stagnated—far from it—but the tremendous capital investment made by Japanese, Korean, and Taiwanese LCD manufacturers who view LCD TV as the future, primary consumption category does have an impact. Price declines for (current) large format LCD TVs have fallen faster than anticipated, for example, with 40"-42" native HD LCD TVs coming to market at near price parity to like size HD plasma by the end of 2005—about a year earlier than many industry observers had expected.

Nevertheless, IDC market forecasts predict that plasma TVs will maintain their advantage in worldwide (and US) unit shipments versus LCD TVs in the over 40" category through 2009. Plasma panel vendors have no intention of ceding the TV market to LCD vendors and the billions of dollars in capital they're investing in new factories will continue to make plasma a viable television technology well into the future. In fact, we expect unit shipments to reach 14.3 million units in 2009, which works out to a compound annual growth rate of nearly 32% for the 2005-2009 time period.

CONCLUSION

The commonly held beliefs about the viability and performance quality of plasma TVs turn out to be merely myths when held up to the discerning eye of quantifiable testing. In particular, concerns about plasma lifetimes and image retention ("burn in") are half-truths that may have been legitimate concerns for early generations of plasma displays, but are non-issues with today's current generation products. Yes, plasmas may show signs of retention if still images are left on the display for very long periods of time (such as 24 hours or more), but even in this extreme example, the result is only temporary. Today's plasma TVs essentially heal themselves with subsequent viewing of regular TV material. As a result, more common scenarios of 5 to 10 minute (or even several hour) image pauses will not cause permanent damage.

When it comes to image quality and accuracy across wide viewing angles, plasmas perform very well, enabling a consistent viewing experience anywhere within a room. Color accuracy and black levels, both of which are critical to create an accurate, rich image, are also very strong on plasma TVs. In fact, the plasmas that were tested actually outperformed the reference CRT on black level and nearly matched it on color accuracy. Videophiles and other consumers who value a high-quality image should really appreciate these results. The contrast ratios on plasma TVs may not reach the high levels touted by some other TV technologies, but as explained earlier, the value of a contrast ratio without an accompanying black level is questionable.

It's also worth noting that the testing did not cover response time (because of the controversies surrounding how to accurately, fairly, and consistently measure it), which is generally perceived as an advantage that plasma displays have over TVs using other technologies.

The challenge for vendors is to adequately convey accurate information on the real-world capabilities of today's generation plasma TVs and to overcome many of the objections potential buyers may still have based on lingering and pervasive myths and inaccurate "prejudices" against the technology. Certainly plasma TVs cannot and will not be the ultimate choice for all TV buyers, but for those who want a very high-quality image and can afford the purchase costs, they represent a very compelling option.