

Comparative Performance Testing

DECEMBER 2019

Canon PIXMA GM2050 versus Device A and Device B

Test Objective

Keypoint Intelligence - Buyers Lab was commissioned by Canon Europe Ltd. to conduct a comparative image quality evaluation of the Canon PIXMA GM2050 monochrome inkjet printer and two competing monochrome devices: Device A and Device B. Testing was based on printing a mix of Buyers Lab image quality test targets on budget office paper and premium paper. Buyers Lab technicians compared the results of the Canon device with that of Device A and Device B. The three test devices were operated in default (Standard) mode and draft (Eco) mode. Buyers Lab technicians also tested the optical density of output from each device as well as the colour gamut. All testing was conducted at Buyers Lab's European test facility in Wokingham, UK. The Canon PIXMA G2050 is also sold as the Canon PIXMA G2040, so this report is also applicable to that device.

Executive Summary

Due to their very nature, monochrome devices are not intended to reproduce faithfully full-colour photographs and skin tones, but image quality should still be good enough to convey detail and the scene that an image represents. When printing in Eco/Draft mode, the Canon PIXMA GM2050 produced the most faithful reproductions of test targets. Device A produced washed-out images that were too light and lacked detail, while device B's dithering pattern produced a zig-zag effect that marred images, reduced detail, and made images look too light. This also meant that the Canon PIXMA GM2050 produced the best skin tones, with its image quality samples most closely resembling the shades of the models on the test target.

Things were better for the Canon PIXMA GM2050's rivals in Standard/Default mode, but the Canon device still held the advantage. Device B's photo and skin tones samples were grainy and slightly too dark, while Device A's photographic output was similar to the Canon PIXMA GM2050's but grainier. The Canon PIXMA GM2050's photographic output wasn't perfect, though, as it had too much banding at regular intervals.

Perhaps the most important ability of a monochrome device is text reproduction, and once again the Canon PIXMA GM2050 proved to have the advantage over its rivals. Indeed, the Canon PIXMA GM2050 was able to produce Times New Roman and Arial text that was still legible at 3 pt. font size except when producing Times New Roman text on Premium paper Standard/Default mode. In contrast, Device B's Eco/Draft mode Times New Roman and Arial text was only legible to 8-pt. font size and was judged to

be poor, although its text was legible to 3-pt. in Standard/Draft mode. Device A's text in Eco/Draft mode was also visible to 8-pt. font size, but its Standard/Default mode text was still below par for Times New Roman text, which was legible to 5 pt. size. Its Arial text was better quality and was legible at 4-pt. size.

The Canon PIXMA GM2050 gained the highest average image quality score for Eco/Draft mode output, but missed out on the top spot to Device B for the Standard/Default mode output, as Device B's output was much improved when printing in Standard/Default mode. Device B produced clean, crisp, and legible text at low font sizes in Standard/default mode, for example.

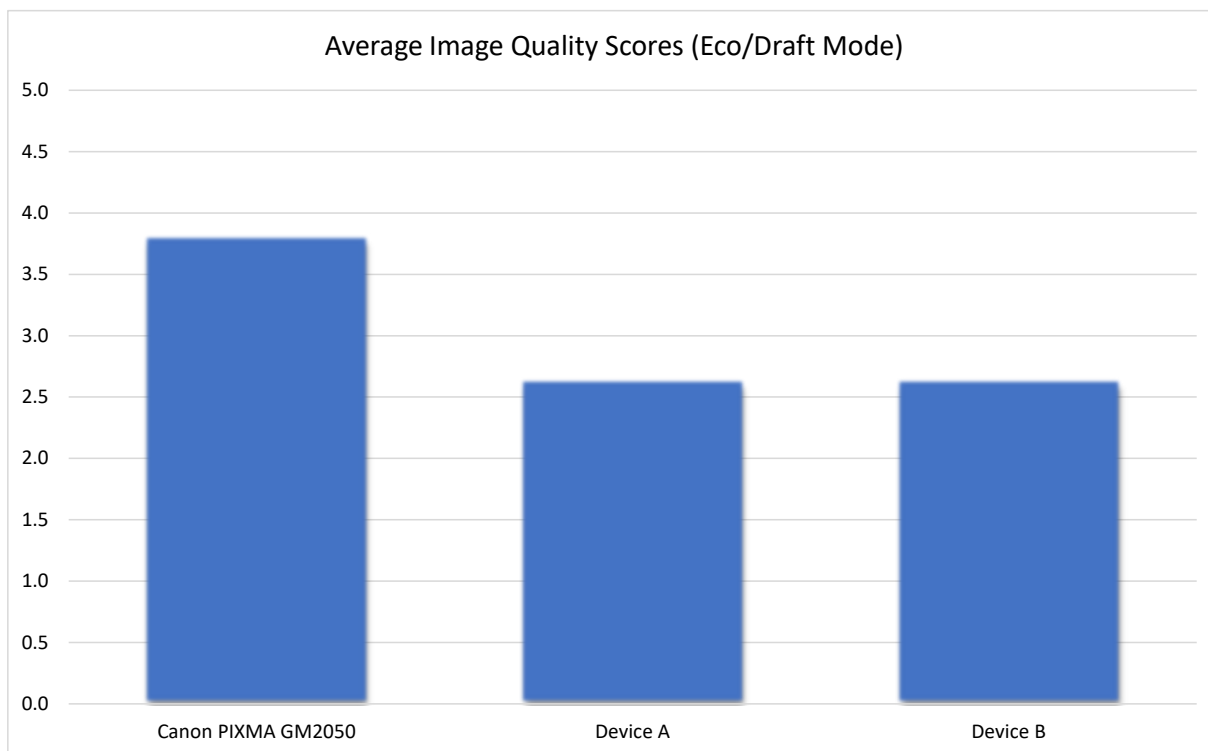
Based on the results of this test, the Canon PIXMA GM2050 provides very good monochrome business output. Device B had a higher average image quality score for Standard/Default mode image quality, but the Canon PIXMA GM2050 wasn't far behind, so overall it's the device we'd recommend of the three if image quality is a paramount concern.

Image Quality

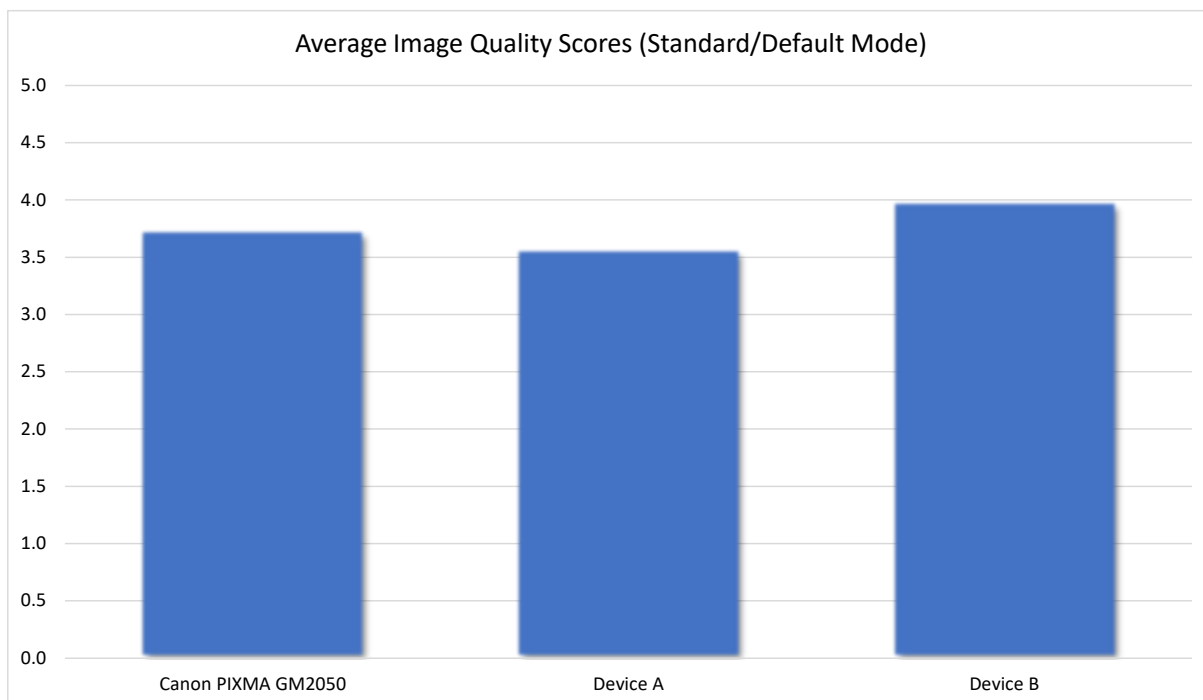
Using a range of proprietary test targets, Buyers Lab assessed the devices' image quality from a variety of perspectives, including text, fine lines, and photographic image reproduction. All tests were conducted in Draft/Eco and Standard/Default modes on all devices. Buyers Lab used two types of media: 80 gsm budget office paper and 80 gsm premium paper. Each device's results for text and fine lines, halftone range and pattern, photographic images, and business graphics were graded on a five-point scale where 5 is excellent, 4 is very good, 3 is good, 2 is poor, and 1 is very poor.

- The Canon PIXMA GM2050 had a clear overall advantage for Eco/Draft mode image quality, with an average image quality score of 3.8 that was 30.4% higher than those for both Devices A and B.
- However, Device B had the highest average score for Standard/Default mode image quality thanks to its much improved text reproduction and photographic quality in this mode. The scores were close, though, with Device B enjoying only a 6.7% and 11.6% lead on the Canon GM2050 and Device A, respectively.

Overall Image Quality Scores (Draft/Fastest Mode)



Average image quality scores are based on assigned grades of 1 through 5 (where 5 is best) for black and colour output produced by each device in default mode on two media types (budget and premium).



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Detailed Image Quality Scores

	Canon PIXMA GM2050	Device A	Device B
Draft Mode Budget	23	16	16
Draft Mode Premium	23	16	16
Standard Mode Budget	21	21	23
Standard Mode Premium	24	22	25

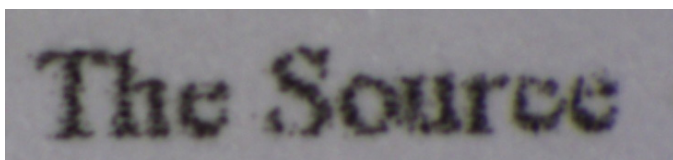
Each device's results for text and fine lines, halftone range and pattern, photographic images, and business graphics were graded on a five-point scale where 5 is excellent, 4 is very good, 3 is good, 2 is poor, and 1 is very poor. See Supporting Test Data section for more information on how each area was scored.

Text and Fine Line Reproduction

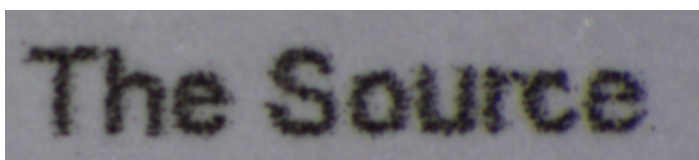
- In Eco/draft mode, the Canon PIXMA GM2050 reproduced text to a higher standard than Device A and Device B. The Canon GM2050's Arial and Times New Roman text was legible down to 3-pt. size, while Device A's text was not legible at 8-pt. size and deteriorated further from there, as did Device B's. This was true of output printed on both budget and premium paper.
- In Standard/default mode, the Canon GM2050's text was again well formed to 3-pt. on both budget and premium paper, except for its Times New Roman text, which was well formed to 4-pt.
- In contrast, Device A was legible at 5-pt. and 4-pt. sizes for Times New Roman and Arial text, respectively, on budget paper, and 6-pt. and 4-pt. sizes on premium paper. Although Device A's text was legible to a lower size on budget paper, the text overall was better formed when printed on premium paper and so was judged to be very good.
- Device B's Times New Roman text was deemed very good when printed on budget media and excellent when printed on premium paper, with the Times New Roman text legible to 4 pt. size and Arial to 3 pt. size.

Text Quality Examples – Eco/Draft Mode, 80 gsm Premium Paper

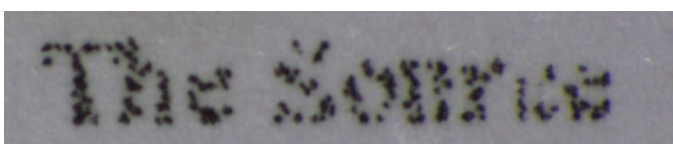
All samples show 4-pt. text printed on 80 gsm premium paper, and all were printed in Eco/Draft mode. The examples are magnified to show detail.



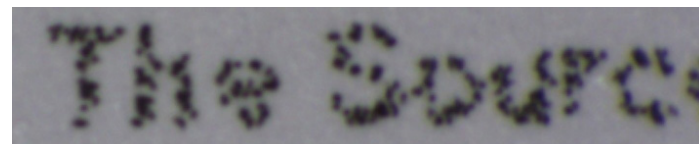
Canon PIXMA GM2050 Times New Roman



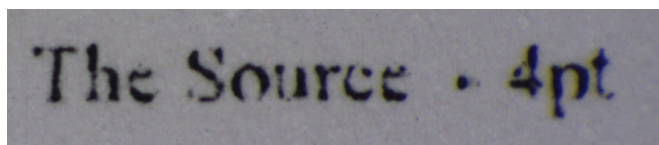
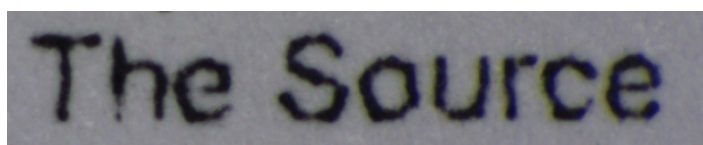
Canon PIXMA GM2050 Arial



Device A Times New Roman

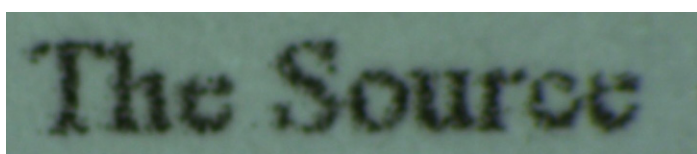


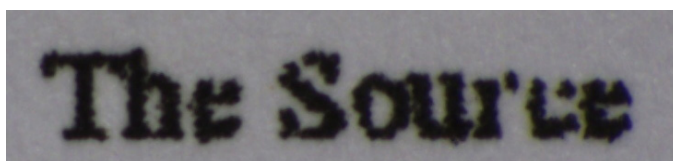
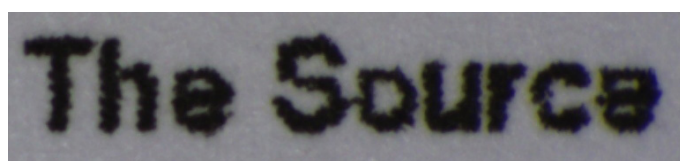
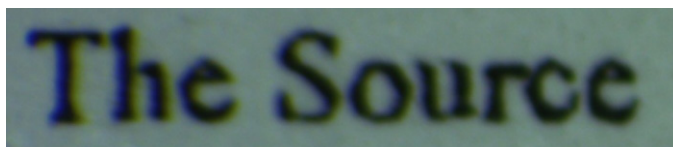
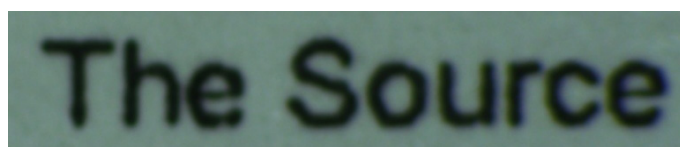
Device A Arial


Device B Times New Roman

Device B Arial

Text Quality Examples – Standard/Default Mode, 80 gsm Premium Paper

All samples show 4-pt. text, all examples were printed on 80 gsm premium paper, and all were printed in Standard mode. The examples are magnified to show detail.

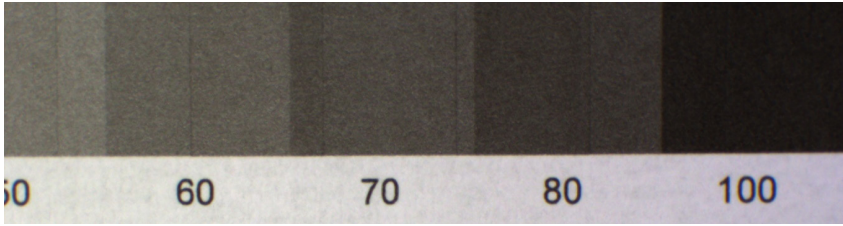
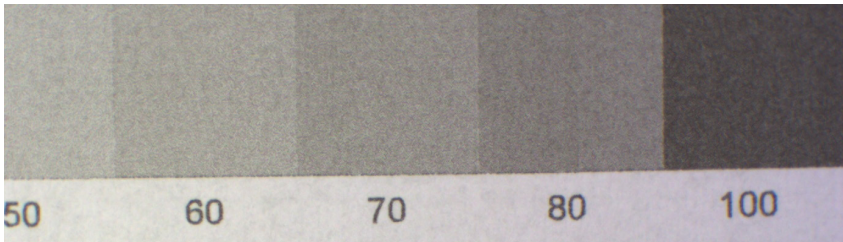
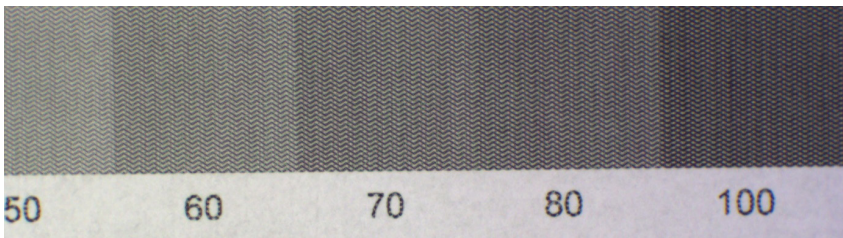

Canon PIXMA GM2050 Times New Roman

Canon PIXMA GM2050 Arial

Device A Times New Roman

Device B Arial

Device B Times New Roman

Device B Arial

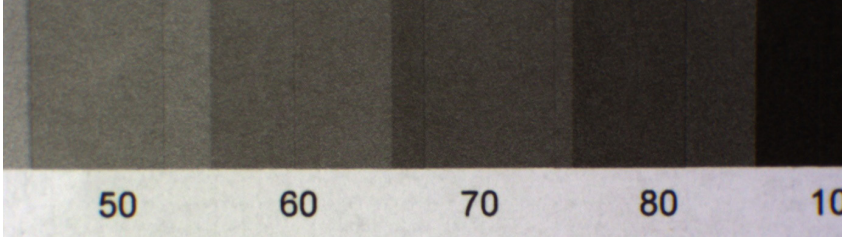
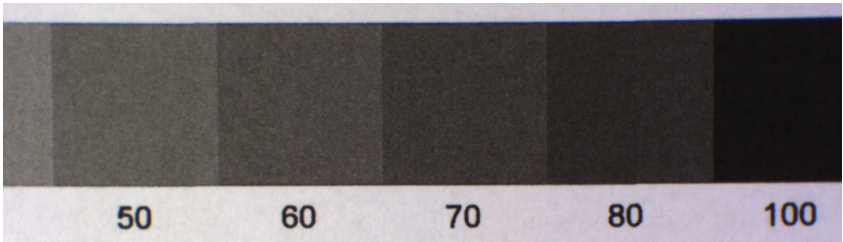
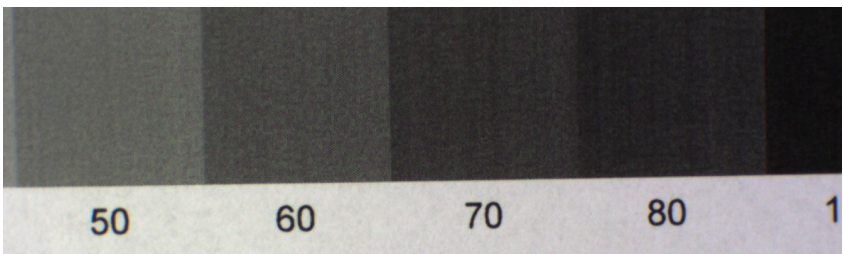
Halftone Fill Coverage

- Although there was clear distinction between the full 10% to 100% dot-fill range for all devices' output, there were differences in fill.
- The Canon GM2050's halftones in Eco/Draft mode exhibited some very slight banding.
- For output printed in Eco/Draft mode, Device A's range on both budget and premium paper was too light, and the fill was patchy and grainy especially when compared to the Canon GM2050's. The same was true of Device A's halftones in standard mode.
- In Eco/Draft mode, Device B had very good range, but a strange, mottled fill resulted in a poor grade. In contrast, Device B's halftones on premium paper were judged to be very good.

Halftone Fill Examples - Eco/Draft mode, 80 gsm premium paper

	Canon PIXMA GM2050
	Device A
	Device B

Halftone Fill Examples - Standard/Default mode, 80 gsm premium paper

	Canon PIXMA GM2050
	Device A
	Device B

Subjective Photographic Image Quality

- The Canon PIXMA GM2050's photographic image quality in Eco Mode was noticeably smoother and less grainy than Device A and B's output, which had the added benefit of preserving detail. Although the Canon's contrast could be better, its output had better contrast than that of Device B. It's worth noting that the Canon PIXMA GM2050's output suffered from banding that appeared at a regular interval.
- Device A's photographic image quality in Eco/Draft mode was overly light and washed out. The examples shown below are much darker than they are in real-life. The consequence of this lightness is better contrast than either of Device A's rivals, but that increased contrast comes at too high a cost: Detail is lost and output is grainy.
- Device B's Eco/Draft mode photographic images were very grainy and the device's dithering pattern produced a clearly apparent zig-zag effect that reduced detail and drew attention away from the actual images. Contrast was lower compared to the Canon and Device A's output.
- The Canon PIXMA GM2050's Standard/Default mode had good contrast, with the interior of the Lamborghini being visible, for example. Images were smoother than those of the other devices tested and had a pleasing level of detail. Banding was still visible on some images.
- In Standard/Default mode, Device A's photographic image quality was close to that of the Canon GM2050, but was grainier in some images and had some banding.
- Device B's photo output in Standard/Default mode was darker and grainier than Device A and the Canon GM2050's output, which minimised detail.
- Device A's skin tones in Eco/Draft mode were too light and washed-out, which produced unnatural results. However, its Standard/Default mode skin tones more closely resembled the original shade.
- Device B's zig-zag dithering pattern produced lighter skin tones than the test target, but its Standard/Default mode output was closer to that of the test target.
- The Canon GM2050's skin tones for both Eco/Draft and Standard/Default mode most closely resembled that of the test target.

Examples from the Original Photographic Image and Skin Tones Test Targets



Photographic Image Quality - Eco/Draft Mode, Budget Paper



Canon PIXMA GM2050



Device A



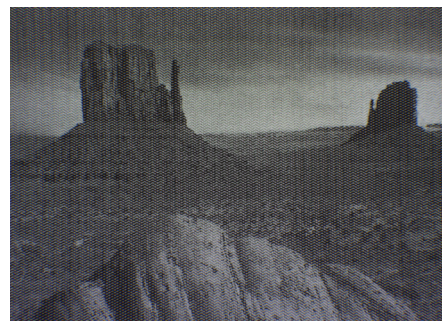
Device B



Canon PIXMA GM2050



Device A



Device B



Canon PIXMA GM2050



Device A



Device B

Photographic Image Quality - Standard/Default Mode, Budget Paper



Canon PIXMA GM2050



Device A



Device B



Canon PIXMA GM2050



Device A



Device B



Canon PIXMA GM2050



Device A



Device B

Skin Tone Quality - Eco/Draft Mode, Budget Paper



Canon PIXMA GM2050



Device A



Device B

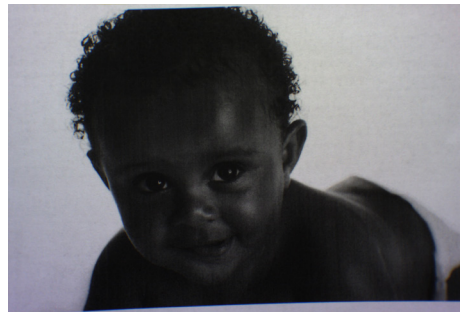
Skin Tone Quality - Standard/Default Mode, Budget Paper



Canon PIXMA GM2050



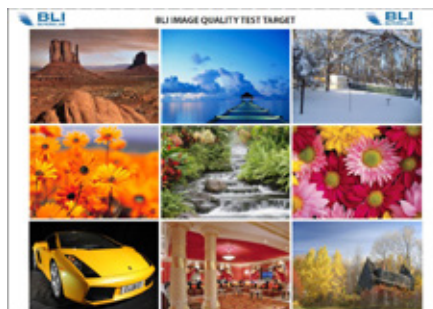
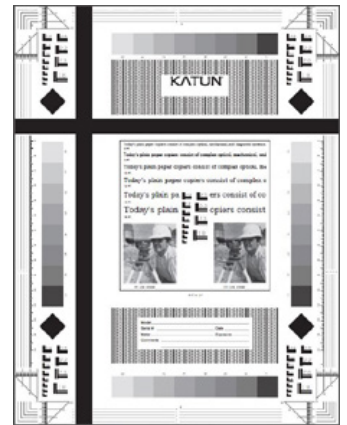
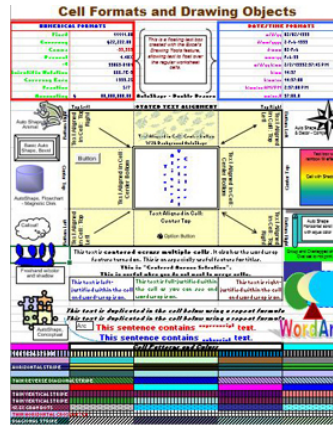
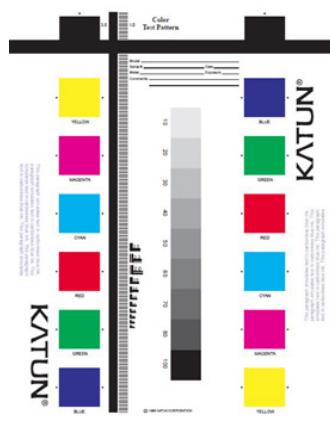
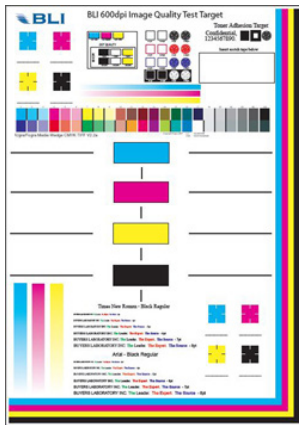
Device A



Device B

Supporting Test Data

Buyers Lab used a variety of proprietary image quality test files to test the Canon PIXMA GM2050 inkjet printer and two rival devices. The documents used are displayed below.



For the total image quality scores, each criterion is rated individually. The bottom row labelled "TOTAL" is the total across all criteria. A maximum of 30 points is available.

Speed	Media		Canon PIXMA GM2050	Device A	Device B
Eco / Draft	Budget	Text	4	2	2
		Line Art	3	2	2
		Halftone Range	4	3	4
		Halftone Pattern	4	3	2
		Photographic Images	4	3	3
		Business Graphics	4	3	3
		TOTAL	23	16	16
Eco / Draft	Premium	Text	4	2	2
		Line Art	3	2	2
		Halftone Range	4	3	4
		Halftone Pattern	4	3	2
		Photographic Images	4	3	3
		Business Graphics	4	3	3
		TOTAL	23	16	16
Standard	Budget	Text	4	3	4
		Line Art	3	4	4
		Halftone Range	3	3	4
		Halftone Pattern	3	3	4
		Photographic Images	4	3	3
		Business Graphics	4	5	4
		TOTAL	21	21	23
Standard	Premium	Text	4	4	5
		Line Art	4	4	5
		Halftone Range	4	3	4
		Halftone Pattern	4	3	4
		Photographic Images	4	3	3
		Business Graphics	4	5	4
		TOTAL	24	22	25

Based on a five-point scale where 5 is excellent, 4 is very good, 3 is good, 2 is poor, and 1 is very poor.

Test Methodology

Buyers Lab used three test devices and printed a series of image quality test targets on each device. All three devices were operated in Eco/Draft (fastest) and Standard (default) modes. Tests were conducted using different media types as follows:

Device	Media Type	
	Budget	Premium
Canon PIXMA GM2050	Pukka Paper Everyday A4 80gsm	Canon Red Label Presentation A4, 80gsm
Device A	Pukka Paper Everyday A4 80gsm	Canon Red Label Presentation A4, 80gsm
Device B	Pukka Paper Everyday A4 80gsm	Canon Red Label Presentation A4, 80gsm

In addition to a visual observation, colour print quality and gamut size are evaluated using X-Rite i1 profile software and an i1 Pro colour spectrophotometer and analysed using an X-Rite i1i0 Advanced Scanning Table. Density was measured using an X-Rite ExactXP densitometer.

Test Environment/Conditions

All testing was conducted in a controlled environment at Buyers Lab's test facility located at Unit 11, The Business Centre, Molly Millars Lane, Wokingham, RG41 2QZ per the following conditions:

- A. Temperature was maintained at 22°C, +/-2.7°C with daily conditions monitored and logged 24/7 by a Seven-Day Temperature/Humidity Chart Recorder.
- B. Relative humidity was maintained within 45% +/- 10% with daily conditions monitored and logged 24/7 by a Seven-Day Temperature/Humidity Chart Recorder.
- C. Materials conditioning: Printers, paper and cartridges were acclimatized to the above conditions for a minimum of 24 hours prior to testing. Prior to acclimatization, packaging and shipping materials were opened in a manner that prevented light damage from occurring to the print cartridge during acclimatization. Paper was acclimatized in a ream wrapper.

About Keypoint Intelligence - Buyers Lab

Keypoint Intelligence is a one-stop shop for the digital imaging industry. With our unparalleled tools and unmatched depth of knowledge, we cut through the noise of data to offer clients the unbiased insights and responsive tools they need in those mission-critical moments that define their products and empower their sales.

For over 50 years, Buyers Lab has been the global document imaging industry's resource for unbiased and reliable information, test data, and competitive selling tools. What started out as a consumer-based publication about office equipment has become an all-encompassing industry resource. Buyers Lab evolves in tandem with the ever-changing landscape of document imaging solutions, constantly updating our methods, expanding our offerings, and tracking cutting-edge developments.

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