

## **W1.1 Image Quality of Printers**

INCITS W1.1 2003-057

Gloss and Gloss Uniformity

Yee Ng, Oct 14 and Oct 28, 2003

### **Gloss/Gloss Uniformity Ad Hoc Teleconference Meeting Notes:**

(10/14/2003 teleconference)

Present: Yee Ng (Chair, Nexpress), Michael Viola (Cabot Corp), Chunghui Kuo (Nexpress), Eric Zeise (NexPress), Lui Cui (Lexmark)

Absent members:

Dale Mashtare (Xerox), Dan Hann (RIT), Mike Pointer (National Physical Lab, UK), John Kessler (Paxar), Pashant Mehta (ImageExpert), Eric Maggard (HP), Peter Morris (HP).

(10/28/2003 teleconference)

Present: Yee Ng (Chair, Nexpress), Dale Mashtare (Xerox), John Kessler (Paxar), Chunghui Kuo (NexPress)

Absent members:

Dan Hann (RIT), Mike Pointer (National Physical Lab, UK), Pashant Mehta (ImageExpert), Eric Maggard (HP), Peter Morris (HP), Lui Cui (Lexmark), Eric Zeise (NexPress).

Next Teleconference: Tuesday, Nov 11, 2003 @ 1:30 EST.

#### **Agenda:**

10/14/2003

- (1) NIP19 short discussion.
- (2) Gloss Artifact round-robin experiment evaluation procedure discussion.
- (3) Upcoming paper to the Electronic imaging conference.
- (4) Haze effect on perceived gloss proposal – INCITS W1.1 2003-0051 discussion.

10/28/2003

- (1) EI2004 paper discussion.
- (2) Within-page gloss uniformity reporting discussion.
- (3) Gloss Artifact round-robin experiment.
- (4) Haze effect on gloss discussion

The Gloss/Gloss uniformity ad hoc team met on 10/14/2003 and 10/28/2003 and approved the respective agenda. First we report on the meeting on 10/14/2003. YN gave a short review of NIP19. There are a few interesting papers relating to gloss – such as DOI effect on gloss appearance and some differential gloss poster prints with pigmented inkjet. The team reviewed the gloss artifact round-robin experiment procedure proposal

sent out by DM. There are minor modifications to the procedure suggested (such as evaluators should be allowed to rotate the prints during viewing to observe gloss artifacts). DM has so far received gloss artifact print samples (artificially generated) from CK and have some of his own from different printers. LC has agreed to send in some samples from Lexmark as well. From the viewpoint of the round-robin experiment, it appears 4 groups are willing to participate (Xerox, NexPress, Lexmark and HP). So the test procedure is approved to move forward with the experiment. The team has decided to include 3 items in the status update paper for the Standard team for EI2004 conference. They are gloss uniformity within-page, gloss artifact round-robin experiment, and the effect of haze on gloss appearance. The issue of haze on gloss is discussed (MV). MV is using a Byk-Gardner Gloss/haze meter for his measurement using the 40 steps differential gloss test chart. He has samples from AgX, thermal dye sublimation, inkjet with dye-based ink, and inkjet with pigmented ink on micro-porous paper. CK will work with him to design a subjective evaluation experiment to link haze to the effect on gloss appearance.

The following is the meeting minute for the 10/28/2003 teleconference meeting. The ad hoc team approved the agenda. YN reported that the EI2004 paper has been integrated (with paper input from YN, DM, CK, MV and others) and submitted to SPIE/IS&T. The gloss team members that are contributing to the paper relating to the 3 subjects discussed above are included as authors. For the within-page uniformity, it appears that works better if we keep the 48 rows of data (average gloss, {maxgloss – mingloss}, gloss standard deviation) from each color strips separate than to combined them into 24 rows of data (so the vertical and horizontal gloss data of the same color strips are combined), in order to overcome problem of where the strips are physically on the page if the printer has a large side to side gloss non-uniformity problem. YN also report to use the jnd as a scaling factor at different average gloss for the color strips to link the (max-min) objective gloss non-uniformity data to the subjective importance of the within-page gloss uniformity. The gloss artifact round-robin experiment is discussed and decided (DM) to wait till Lexmark's prints arrived, then sort for the gloss artifact range from all the print samples in relationship to gloss streak, gloss band, gloss mottle and gloss grain before the experiment starts. MV has sent in the haze/gloss analysis for the EI2004 paper. The physical samples are now in the hands of K. We also get supplemental print samples of thermal dye sublimation and digital AgX from Kodak to broaden our sample base. MV reported objective data of gloss haze for inkjet with dye based ink, inkjet with pigmented ink on micro-porous paper, and AgX. The inkjet print with pigmented ink creates another challenge due to its differential gloss problem. In order to separate between differential gloss and effect of haze on gloss, CK suggested sorting the patches by color/coverage and ranking the samples of a similar gloss, but different haze. This can overcome the additional issue of color/gloss interaction. YN/CK will measure all the prints with gloss/haze meter to correlate with MV's objective measurement, also given time for the team to evaluate the haze/gloss subjective experimental plan that CK has proposed. This experiment is probably going to be a round-robin experiment as well.

Next call-in conference: Tuesday, Nov. 11, 2003, 1:30PM EST.

Proposed agenda for Nov. 11, 2003

- (1) Gloss Artifact round-robin experiment update.
- (2) Haze and perceived gloss experiment status

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