X9 REGISTRY FOR CHECK IMAGE TESTS

FSTC Horizontal Streaks Present In The Image #015.00

Check Image Test Status: A

Where:
A = Active (approved for use)
W = Withdrawn (not for use)
S = Superseded (not for use - replaced by specified test)

Check Image Test Summary:

Field/ Element	Defined Values	Recommended Value	Data Units
Image Test Name	FSTC Horizontal Streaks Present In The Image		
Image Test Number	015.00		
Image Test Version	00		
Image Test Results (Ref. #):			
Number of Streaks (R1)	'0' through '99'		
Largest Streak Height (R2)	'0' through '99'		Scan Lines
Image Test Parameters (Ref #):			
Maximum Black Streak Count Threshold (P1)	'0' through '99'	Front: 3 Rear: Not Available	
Maximum Black Streak Height Threshold (P2)	'0' through '99'	Front: 24 Rear: 50	Pixels
Maximum Gray Level Streak Count Threshold (P3)	'0' through '99'	Front: 3 Rear: Not Available	
Maximum Gray Level Streak Height Threshold (P4)	0' through '99'	Front: 24 Rear: 25	Pixels
Black Streak Percentage (P5)	0' through '1000'	99	Tenths of a Percent
Streak Contrast (P6)	0' through '1000'	400	Tenths of a Percent

1.0	**Applicant Information**	
1.1	Organization Name:	**Financial Service Technology Consortium**
1.2	Organization Address:	**44 Wall St. 12th Floor New York, NY 10005**
1.3	Organization Web Site URL:	www.fstc.org

2.0	**Image Test Description**	
2.1	**Image Test Name:**	FSTC Horizontal Streaks Present In The Image
2.2	**Image Test XML Name:**	HorizontalStreaksInImage
2.3	**Image Test Definition:**	A defect due to the image containing one or more "dark" (for all images) or "light" (for gray level and color images) horizontal streaks that extend horizontally across the majority of the entire document image.
2.4	**Image Test Applicability:**	☒*Front Image* ☒ *Rear Image* ☒*B/W Image* ☒*Grayscale Image* ☒ *Color Image*
2.5	**Intended Use:** Intended business use/ application, business context, and business impact when test fails.	FSTC recommends this metric for use as part of a general system-health monitoring and image quality assurance program. The Horizontal Streaks metric for all check images is designed to detect occurrences of images where there is a high probability that the check data obscured by one or more streaks in the image. The impact of this may be: • Dark streaks can result in the illegibility and/or potential non-usability of a required field within an image representation of an item. • The appearance of "white streaks" may lead to image capture suspects and/or non-usability. • Either light or dark streaks and/or bands will affect image capture suspect rates, for both are treated somewhat equally during the image quality suspect routine.
2.6	**Possible Causes for Condition Being Tested:**	This defect may be due to one or more of the following problems: • Dirt and/or ink that can adhere to either the image capture scan window or camera lens commonly present in most high, medium or low-speed document transport imaging systems. • A scratch or irregularity present on the image scan window or camera lens – top or bottom.

		• Dirt or debris on camera calibration targets, i.e., white reference targets. • Failure of the image camera CCD sensor or electronics.
2.7	**Additional (or Repetitive) Information:**	**Streak Description:** A horizontal streak in a bi-tonal image will be characterized by two attributes: (1) A horizontal scan line that is composed almost entirely of black pixels, and (2) A height which is the measure of the number of contiguous scan lines that appear to be nearly all black. There is no provision for measuring a "white" streak in a bi-tonal image. A gray level or color horizontal streak is characterized by the following two attributes: (1) A horizontal scan line whose average gray level is significantly "lighter" or "darker" than the neighboring horizontal scan lines, and (2) A height which is a measure of the number of contiguous gray level scan lines that appear to be have nearly the same average gray level value. **XML Names**: FSTC defined XML names as needed for its project. FSTC is not submitting these XML names, and instead requests that the RMG or X9B assign appropriate XML names and data structures for the metrics. **Border Rule**: Metric measurements and computations for both bi-tonal and gray/color image renditions shall **exclude** the image pixels that are located in a perimeter region at the top and bottom of the document image. The size of the top and bottom perimeter is defined to be .25 inches from the top and bottom edges of the image. **Rounding Rule**: All fractional values shall be rounded to the nearest whole unit of measure when rounding is required. Fractional values of exactly ½ unit shall be rounded up. **Data Ranges**: FSTC did not establish a formal data range for individual metrics. Any data ranges provided are based on adjusted values used during the FSTC project. FSTC does not object if the RMG modifies the data ranges. **Data Range Exception Handling:** If a result exceeds the defined data range, the preferred handling is to truncate the result at the maximum (or minimum) value. If truncation is not implemented, then the test should fail and a result of indeterminate should be returned. **Margin of Error**: FSTC established a margin of error for use during the FSTC Image Quality and Usability Phase 2 project. This margin of error is included in the recommendations below. It was established based on the expertise of the project's membership, the potential for various algorithms to produce slightly different results for a given metric, and the observed precision of the results submitted during accuracy testing of metric implementations. **Value Reporting**: The value of this metric will be reported under all image quality flag conditions. If the defect condition is "not tested" or "indeterminate", the value of the image metric(s) reported for this defect will be set to zero (0). **Contrast Definition:** The term "Contrast" is defined in the "Image Too Light" test.

2.8	**Test Results Reported** *A test result is the outcome realized from executing an image test. The outcome will typically be the observed or measured value of some attribute pertaining to the image being tested.* *Any dependency of a test result on an image side (front or rear), image rendition (B/W, Gray, Color), or other condition shall be fully defined in the Additional Information section.* *Data types allowed are as defined in ANS X9.100-180-2006, but are typically alphabetic, numeric, alphanumeric, signed numeric (using "+" and "-" to denote sign), etc.*

2.8.1 First Image Test Result (R1)				
Test Result Name: Number of Streaks				
Test Result XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Margin of Error (in Data Units) (Where Applicable):**
StreakNumber	Numeric		0-99	0
Description:	The number of horizontal streaks detected on image of the check where the height of the streak is less than or equal to the Maximum [Black or Gray] Streak Height to be Detected (2.9.2 or 2.9.4)			
Formula and/ or Algorithm:				
Additional Information:	See section 2.7			

2.8.2 Second Image Test Result (R2)					
Test Result Name: Largest Streak Height					
Test Result XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Margin of Error in Data Units (Where Applicable):**
LargestStreakHeight		Numeric	Scan lines	0-99	5
Description:	The height, in scan lines, of the largest streak detected in the image.				
Formula and/ or Algorithm:	The formula for defining Streak Height is as follows: For Black and White: Number of Contiguous Horizontal Scan Lines where the Black Pixel Percentage > Black Streak Percentage Parameter (2.9.5) For Grayscale or Color: Number of Contiguous Horizontal Scan Lines for which the Average Horizontal Scan Line Contrast > Streak Contrast Parameter (2.9.6)				
Additional Information:	See section 2.7				

2.9	**Test Parameters Reported** *Examples of image test parameters are threshold values used to compute a pass/fail image test flag condition, and constant values used in a formula or algorithm to compute an image test result.* *Any dependency of a test parameter on an image side (front or rear), image rendition (B/W, Gray, Color), or other condition shall be fully defined in the Additional Information section.* *Any dependency of recommended values on an image side (front or rear), image rendition (B/W, Gray, Color), or other condition shall be fully defined in the Recommended Values section.* *Data types allowed are as defined in ANS X9.100-180-2006, but are typically alphabetic, numeric, alphanumeric, signed numeric (using "+" and "-" to denote sign), etc.*

2.9.1 First Test Parameter (P1)				
Test Parameter Name: Maximum Black Streak Count Threshold				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
MaxBlackStreakCountThreshold	Numeric		0-99	Front: 3 Rear: Not Available
Description:	This threshold represents the maximum number of black streaks allowed in the image.			
Additional Information:	See section 2.7			

2.9.2 Second Test Parameter (P2)				
Test Parameter Name: Maximum Black Streak Height Threshold				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
MaxBlackStreakHeightThreshold	Numeric	Pixels	0-99	Front: 24 Rear: 50
Description:	This threshold represents the maximum height of black streaks to be included within the count of black streaks allowed on the image. This parameter limits the height of streaks that are included in the black streak count as well as defining a streak size above which a defect will always be reported.			
Additional Information:	See section 2.7 The rear threshold reported above was the setting used in FSTC's accuracy testing, not determined from the testing with the Viewpointe Archive.			

2.9.3 Third Test Parameter (P3)				
Test Parameter Name: Maximum Gray Level Streak Count Threshold				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
MaxGrayStreakCountThreshold	Numeric		0-99	Front: 3 Rear:
Description:	This threshold represents the maximum number of Gray Level streaks allowed on the image.			
Additional Information:	See section 2.7 Due to limitations in the sample tested, Gray Level recommendations should be regarded as tentative.			

2.9.4 Fourth Test Parameter (P4)					
Test Parameter Name: Maximum Gray Level Streak Height Threshold					
Test Parameter XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
MaxGrayStreakHeightThreshold		Numeric	Pixels	0-99	Front: 24 Rear: 25
Description:	This threshold represents the maximum height of gray level streaks to be included within the count of streaks allowed on the image. This parameter limits the height of streaks that are included in the gray level streak count as well as defining a streak size above which a defect will always be reported.				
Additional Information:	See section 2.7 Due to limitations in the sample tested, Gray Level recommendations should be regarded as tentative. The rear threshold reported above was the setting used in FSTC's accuracy testing, not determined from the testing with the Viewpointe Archive.				

2.9.5 Fifth Test Parameter (P5)					
Test Parameter Name: Black Streak Percentage					
Test Parameter XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
BlackStreakPercentage		Numeric	Tenths of a percent	0-1000	99
Description:	This parameter is used to determine what percentage of the pixels on a scan line must be black in order for that scan line to be considered a streak in a bitonal image. The same value is used on both the front and rear images.				
Additional Information:	See section 2.7				

2.9.6 Sixth Test Parameter (P6)					
Test Parameter Name: Streak Contrast					
Test Parameter XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
StreakContrast		Numeric	Tenths of a percent	0-1000	400
Description:	This parameter is defined as the percent change in the vertical gray level contrast, in units of 0.1 percent., e.g. 250 = a 25.0 % change in contrast between a horizontal scan line (or group of scan lines) and adjacent horizontal scan lines will be required before the scan line is considered the starting/ending boundary of a gray level streak. The same value is used on both the front and rear images.				
Additional Information:	See section 2.7				

<table>
<tr>
<td>2.10</td>
<td>Image Test Flag Pass/Fail Criteria:

The Image Test Flag (see ANS X9.100-40-1-2006 for details) will convey one of the following four test conditions:
• Condition not tested
• Condition tested and result = fail
• Condition tested and result = pass
• Condition tested and result=indeterminate</td>
<td>Results are reported independently for the Front and Rear image renditions. Selection of the threshold value corresponding to the image view (front or rear) is the responsibility of the implementer. The numbers in the parentheses in the formulae below refer to the section of this document where each result and parameter is defined.

If condition not tested then flag=not tested

If condition tested then flag = fail if one or more of the following conditions is present:

Bitonal:
<table>
<tr><td>Number of Streaks (2.8.1)</td><td>></td><td>Maximum Black Streak Count Threshold (2.9.1)</td><td>OR</td></tr>
<tr><td>Largest Streak Height (2.8.2)</td><td>></td><td>Maximum Black Streak Height Threshold (2.9.2)</td><td></td></tr>
</table>
Grayscale or Color:
<table>
<tr><td>Number of Streaks (2.8.1)</td><td>></td><td>Maximum Gray Level Streak Count Threshold (2.9.3)</td><td>OR</td></tr>
<tr><td>Largest Streak Height (2.8.2)</td><td>></td><td>Maximum Gray Level Streak Height Threshold (2.9.4)</td><td></td></tr>
</table>
If condition tested and none of the fail conditions is present then flag=pass

If condition tested but could not determine pass or fail for any reason then flag=indeterminate</td>
</tr>
</table>

3.0	**Restrictions & Intellectual Property**	
3.1	Are there any known restrictions in the use of the submitted check image test and related technology (technical, performance, legal, business, platform, etc.)?	☒ No ☐ Yes - *please provide details:*
3.2	Are proprietary Intellectual Property (IP) rights in the form of Patents associated with the description and use of the submitted check image test?	☒ No ☐ Yes – *Please provide patent and/or patent application numbers and indicate who owns the IP. Also provide evidence that the patent holder agrees to comply with the X9 Procedures including the X9 patent policy:*
3.3	Are proprietary Intellectual Property (IP) rights in the form of proprietary material and/or other intellectual property (e.g. specific to a vendor tool, device, or product) associated with the description and use of the submitted check image test?	☒ No ☐ Yes – *Please provide evidence that the owner agrees to provide the Proprietary IP Holder Statement contained in Annex B of ANS X9.100-40-2006 Part 2:*

Notice: *By accepting a check image test for registration, ASC X9 is not endorsing, certifying validity, certifying performance, nor providing any warranty for the registered check image test. The organization using the test shall determine which test(s) to use based on their own business needs, perceived benefit, and validation/ assessment of any test results provided by the check image test supplier, their own testing, or a third party.*