# X9 REGISTRY FOR CHECK IMAGE TESTS

## FSTC Excessive Spot Noise In The Image #014.00

### 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*W = Withdrawn (not for use)*
*S = Superseded (not for use - replaced by specified test)*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 Excessive Spot Noise In The Image | | |
| **Image Test Number** | 014.00 | | |
| **Image Test Version** | 00 | | |
| ***Image Test Results (Ref. #):*** | | | |
| **Average Number of Spots (R1)** | '0' through '9999' | | Number of Sports |
| ***Image Test Parameters (Ref #):*** | | | |
| **Excessive Spot Noise Threshold (P1)** | '0' through '9999' | Front: 575<br>Rear: Not Available | Number of Spots |

| 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** | |
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| **2.1** | **Image Test Name:** | FSTC Excessive Spot Noise In The Image |
| **2.2** | **Image Test XML Name:** | ExcessiveImageSpotNoise |
| **2.3** | **Image Test Definition:** | An image defect due to a bi-tonal image containing "excessive occurrences" (greater than some defined count) of "spot noise" in the image rendition.<br>"Spot noise" is defined as an isolated "small grouping" of connected black pixels surrounded on all sides by white pixels. |
| **2.4** | **Image Test Applicability:** | ☒*Front Image* ☒ *Rear Image* ☒*B/W Image* ☐*Grayscale Image* ☐ *Color Image* |
| **2.5** | **Intended Use:**<br>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.<br>The Excessive Spot Noise metric is used to flag the presence of an image which may contain noise which obscures information or causes the image to be unacceptably large. The business impact may include:<br>• The distribution of the noise may negatively impact legibility and usability of the image for subsequent processing.<br>• Presence of "spot noise" in the image generally leads to increased image file sizes since images containing "spot noise" negatively impact data compression of the image pixel data. This will negatively impact operational requirements associated with check image storage and transmission bandwidth. |

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| **2.6** | **Possible Causes for Condition Being Tested:** | The presence of "spot noise" in the image is generally due to:<br>• The scanned document may have a “cluttered” background such as a complex high contrast image. When imaged and thresholded, this type of background can result in many small dark regions or noise.<br>• Noise can result from a document that has very low contrast. In this case the threshold algorithm may produce many isolated dark regions as it struggles to differentiate between what is dark and what is bright. This can happen if the original grayscale image is bright or dark.<br>• Low contrast and subsequent noise can also occur if there is a problem with the scanning system such as improper illumination.<br>• Noise could be the result of physical defects on the document being scanned.<br>• The surface of an item may contain actual dark regions resulting from dirt or other contaminants that will result in a noisy image. |
| **2.7** | **Additional (or Repetitive) Information:** | **Maximum Spot Size**: The maximum size/area of the “spot noise” groupings will range from a single black pixel (1x1) up to a 3x3 pixel grouping of connected black pixels. The only requirement is that the pixel grouping be surrounded on all sides by at least one “white” pixel, i.e., no connectivity to other black pixels in the immediate vicinity. Although larger “spot noise” geometries are possible, it is assumed that if spot noise is present in an image, a large number of 1x1 to 3x3 spots will be present.<br>**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.<br>**Border Rule**: Metric measurements and computations for bi-tonal image renditions shall **exclude** the image pixels that are located in a perimeter region of the document image. The size of the excluded bottom, left, top, and right perimeter is defined to be .25 inches from the edge of the image for all four edges.<br>**Special Border Rule**: Spot noise groupings that are within the image and are adjacent to the excluded perimeter region are to be counted. This is equivalent to treating the perimeter region as being filled with “white” pixels, thus isolating the spot noise groupings located at the boundary.<br>**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.<br>**Rounding Rule**: All fractional values shall be rounded to the nearest whole unit of measure |

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| | | when rounding is required. Fractional values of exactly ½ unit shall be rounded up.<br><br>**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.<br><br>**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.<br><br>**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). |

| 2.8 | **Test Results Reported**<br>*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.*<br>*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.*<br>*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.* |
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| **2.8.1 First Image Test Result (R1)** | | | | |
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| **Test Result Name: Average Number of Spots** | | | | |
| **Test Result XML Name:** | **Data Type:** | **Data Units:** | **Data Range:** | **Margin of Error (in Data Units) (Where Applicable):** |
| AverageSpotNumber | Numeric | Number of Spots | 0 - 9999 | 0 |

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| **Description:** | The count of the average number of "spot noise" groupings per 200 by 200 pixel area of the image. |
| **Formula and/ or Algorithm:** | $\text{Average Spot Noise Count (N)} = \frac{\text{(Spot noise group count) * (200*200)}}{\text{(Image Width (in pixels) * Image Height (in pixels))}}$ |
| **Additional Information:** | See section 2.7 |

| 2.9 | **Test Parameters Reported**<br>*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.*<br>*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.*<br>*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.*<br>*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.* |
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| **2.9.1 First Test Parameter (P1)** | | | | |
|---|---|---|---|---|
| **Test Parameter Name: Excessive Spot Noise Threshold** | | | | |
| **Test Parameter XML Name:** | **Data Type:** | **Data Units:** | **Data Range:** | **Recommended Value(s) (Where Applicable):** |
| ExcessiveSpotNoiseThreshold | Numeric | Number of Spots | 0 - 9999 | Front: 575<br>Rear: Not Available |
| **Description:** | The threshold value at which spot noise was determined to have a reasonable probability of impacting the usability of the check image. | | | |
| **Additional Information:** | | | | |

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| **2.10** | **Image Test Flag Pass/Fail Criteria:**<br>*The Image Test Flag (see ANS X9.100-40-1-2006 for details) will convey one of the following four test conditions:*<br>• *Condition not tested*<br>• *Condition tested and result = fail*<br>• *Condition tested and result = pass*<br>• *Condition tested and result=indeterminate* | 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.<br>If condition not tested then **flag=not tested**<br>If condition tested then **flag = fail** if the following condition is present:<br>**Front:**<br>Average Number of Spots (2.8.1) **>** Excessive Spot Noise Threshold (2.9.1)<br>If condition tested and none of the fail conditions is present then **flag=pass**<br>If condition tested but could not determine pass or fail for any reason then **flag=indeterminate** |

| 3.0 | **Restrictions & Intellectual Property** | |
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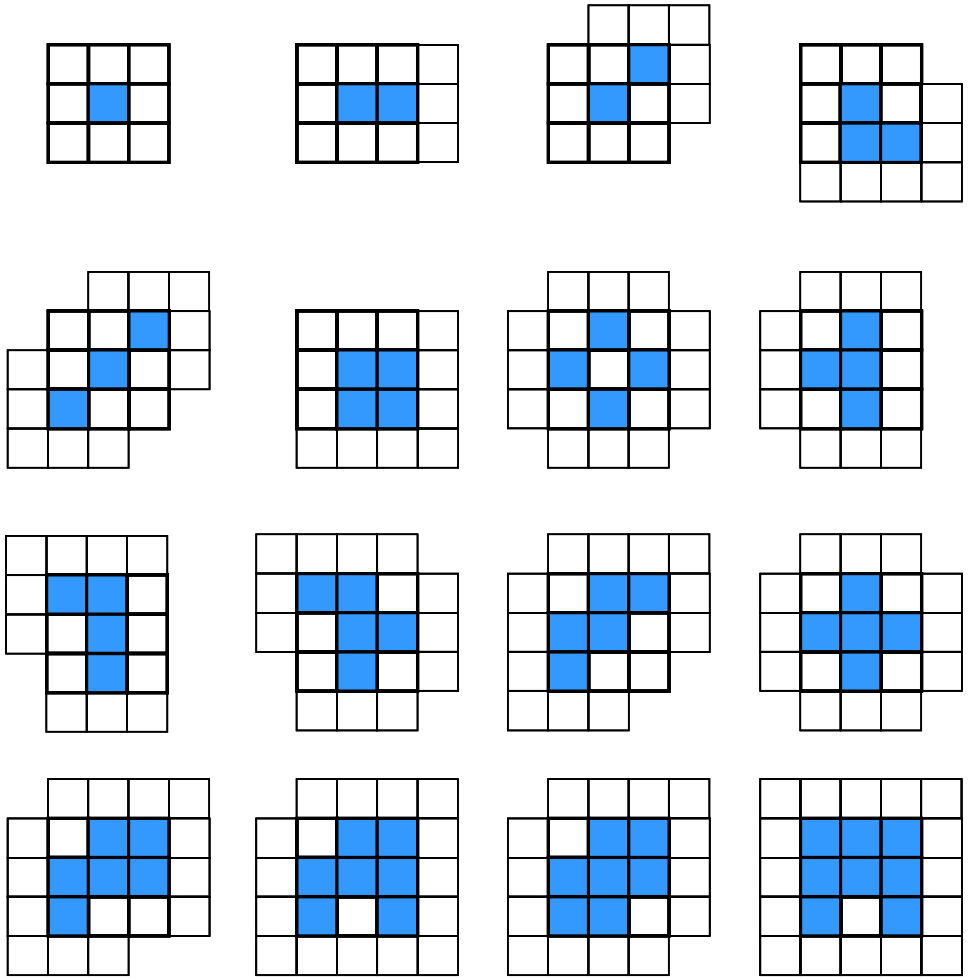
| **3.1** | Are there any known restrictions in the use of the submitted check image test and related technology (technical, performance, legal, business, platform, etc.)? | ☒ No<br>☐ Yes - *please provide details:* |
| **3.2** | Are proprietary Intellectual Property (IP) rights in the form of Patents associated with the description and use of the submitted check image test? | ☒ No<br>☐ 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<br>☐ 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:* |

| 4.0 | Other Information | |
|---|---|---|
| 4.1 | Please provide any additional information that is relevant to this Application: |  13A – Examples of “Spot Noise” Constrained Up To a 3x3 Pixel Area |

***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.*