X9 REGISTRY FOR CHECK IMAGE TESTS

CONTROLLING SPECIFICATION: ANS X9.100-40 Parts 1 & 2

Image Test Name:	IBM Compressed Data Size
Image Test Number:	023.00
Image Test Version:	00
Image Test Status:	A
Where:	
A = Active (approved for use)	
W = Withdrawn (not for use)	
S = Superseded (not for use - replaced by specified test)	

1	**Applicant Information**	
1.1	Organization Name:	IBM Corporation
1.2	Organization Address:	8501 IBM Drive MG83/202-3 Charlotte, NC 28262
1.3	Organization Web Site URL:	http://www.ibm.com

Approved by: X9 RMG for Check Image Tests March 30, 2007

2	**Image Test Description**	
2.1	**Image Test Name:**	IBM Compressed Data Size
2.2	**Image Test XML Name:**	compressed
2.3	**Image Test Definition:**	A metric examining the size of the compressed image data.
2.4	**Image Test Applicability:** Check all that apply.	☒*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.	This metric evaluates the compressed size of the image. An image with a size that is either too small or too large can indicate that the image may be invalid or contain incorrect data. The "score" associated with this metric provides an assessment of the compressed data size and provides a hint (*and only a hint*) as to whether or not the data within the image should be suspect.
2.6	**Possible Causes for Condition Being Tested:**	This test will execute whenever an image is processed. This metric will be generated for every image. This will evaluate and the image's compressed size. This test can fail if the image file size is too large or it is too small.

2.7	**Additional (or Repetitive) Information:**	This test is performed by comparing the compressed image size with bounds for "too large" and "too small".
		The parameters that are reported in this test are also available in XML format from the IBM IQA product. An excerpt of the XML output by the product for this test is shown below:
		`<compressed>`
		`  <bytes>10411</bytes>`
		`  <scorelow>10.0</scorelow>`
		`  <scorehigh>10.0</scorehigh>`
		`</compressed>`
		The parameters and test thresholds used for performing this test are settable by the user. Please refer to section 2.10 for information regarding how the test "score" is obtained and how the score is used to decide pass or fail criteria.

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				
Test Result Name: Compressed Score Low				
Test Result XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Margin of Error (in Data Units) (Where Applicable):**
scorelow	Numeric	None	0 to 1000	

Description:	This value provides an assessment of the image quality based on the size of the compressed image. If the image size is lower than a predetermined value, the test **fails**. If the image size is greater than or equal to the predetermined value, this test **passes**.
Formula and/ or Algorithm:	This value is the result of generating a "size score" value and comparing the score of the compressed image data (in bytes) to a threshold. The test will fail if the score is below a user controllable parameter.
Additional Information:	The thresholds and parameters used for this test are controlled by the user. The thresholds and parameters used for the test are reported in the ***Test Parameters*** portion of the record. This value is also reported by the IBM IQA product in its XML output, but scaled from 0 to 10. This parameter is reported in the XML as the <scorelow> item. For an example of the IBM IQA XML output of this parameter, see section 2.7. Refer to section 2.10 for detailed information on scoring and thresholding.

2.8.2 Second Image Test Result					
Test Result Name: Compressed Score High					
Test Result XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Margin of Error in Data Units (Where Applicable):**
scorehigh		Numeric	None	0 to 1000	
Description:	This value provides an assessment of the image quality based on the size of the compressed image. If the image size is greater than a predetermined value, the test **fails**. If the image size is less than or equal to the predetermined value, this test **passes**.				
Formula and/ or Algorithm:	This value is the result of generating a "size score" value and comparing the score of the compressed image data (in bytes) to a threshold. The test will fail if the score is below a user controllable parameter.				
Additional Information:	The thresholds and parameters used for this test are controlled by the user. The thresholds and parameters used for the test are reported in the ***Test Parameters*** portion of the record. This value is also reported by the IBM IQA product in its XML output, but scaled from 0 to 10. This parameter is reported in the XML as the <scorelow> item. For an example of the IBM IQA XML output of this parameter, see section 2.7. Refer to section 2.10 for detailed information on scoring and thresholding.				

2.8.3 Third Image Test Result					
Test Result Name: Compressed Data Size					
Test Result XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Margin of Error (in Data Units) (Where Applicable):**
bytes		Numeric	Bytes		
Description:	This value reports the size of the image being processed in bytes.				
Formula and/ or Algorithm:	This value is the size of the image being processed in bytes.				
Additional Information:					

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				
Test Parameter Name: Test Threshold				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
	Numeric	None	0-1000	700 *(default)*
Description:	This reported parameter is the threshold used to make the pass/fail decision. This value is settable by the user. If the calculated "score" is greater than or equal to the threshold, the test passes. If the "score" is lower than the threshold, the test fails.			
Additional Information:	This value corresponds to the value that the user sets in the IBM IQA profile that is active for this test execution. The value may be set to any floating point value between 0 and 10.0 by the user. In reporting this parameter, the value used internally by the image quality analysis software is multiplied by 100 and converted to an integer.			

2.9.2 Second Test Parameter				
Test Parameter Name: Compressed Data Low First Bad				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
	Numeric	Bytes		
Description:	This is the First Bad value utilized in the evaluation of the image's compressed data size when the image size is being evaluated for being too small.			
Additional Information:	Refer to section 2.7 for more information about this parameter. Refer to section 2.10 for information about how this parameter is used in scoring and evaluating the results of the test. There are four values used by the IQA software for this metric. The particular value used is dependent upon the type of image being evaluated. The four values are dependent upon these types of images: 1. Front Black/White 2. Front Grayscale 3. Back Black/White 4. Back Grayscale			

2.9.3 Third Test Parameter				
Test Parameter Name: Compressed Data Low Last Good				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
	Numeric	Bytes		

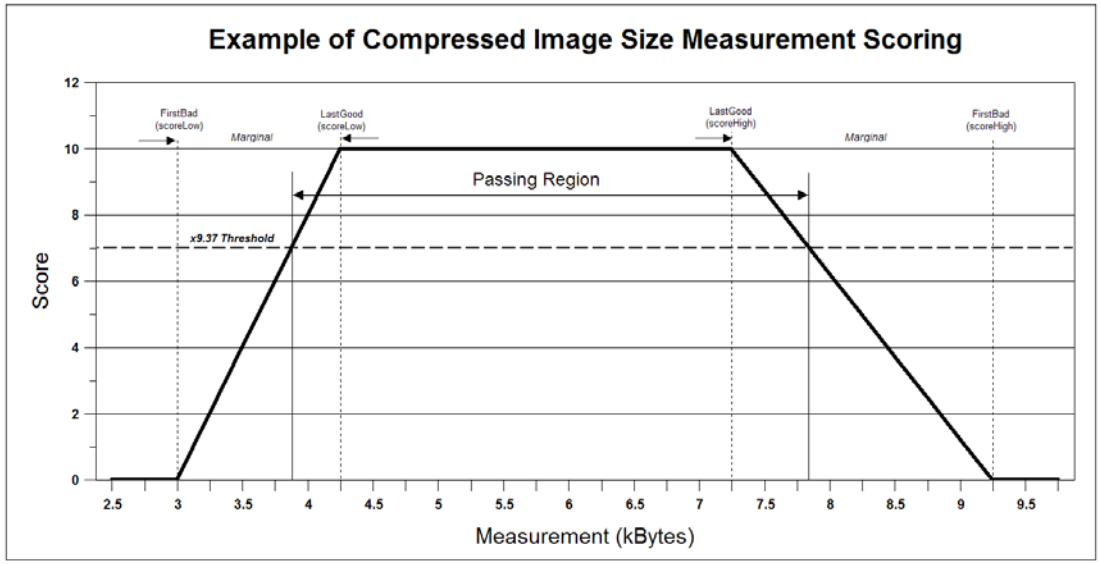
Description:	This is the Last Good value utilized in the evaluation of the image's compressed data size when the image size is being evaluated for being too small.
Additional Information:	Refer to section 2.7 for more information about this parameter. Refer to section 2.10 for information about how this parameter is used in scoring and evaluating the results of the test. The particular value used is dependent upon the type of image being evaluated. The four values are dependent upon these types of images: 1. Front Black/White 2. Front Grayscale 3. Back Black/White 4. Back Grayscale

2.9.4 Fourth Test Parameter				
Test Parameter Name: Compressed Data Low Exponent				
Test Parameter XML Name:	**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
	Numeric	N/A		1
Description:	This is the value that controls the shape of the "line" between the **Compressed Data Low First Bad** and **Compressed Data Low Last Good** parameters. The IBM IQA product stores this value internally as a floating point number. In reporting this parameter, the value is multiplied by 10 and converted to an integer. See section 2.10 for further descriptions.			
Additional Information:	Refer to section 2.7 for more information about this parameter. Refer to section 2.10 for information about how this parameter is used in scoring and evaluating the results of the test. The particular value used is dependent upon the type of image being evaluated. The four values are dependent upon these types of images: 1. Front Black/White 2. Front Grayscale 3. Back Black/White 4. Back Grayscale			

2.9.5 Fifth Test Parameter					
Test Parameter Name: Compressed Data High Last Good					
Test Parameter XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
		Numeric	Bytes		100000 (All image types)
Description:	This parameter provides the Last Good data point for measuring whether or not the image under test is larger than its predefined threshold and might be a bad image.				
Additional Information:	Refer to section 2.7 for more information about this parameter. Refer to section 2.10 for information about how this parameter is used in scoring and evaluating the results of the test. The particular value used is dependent upon the type of image being evaluated. The four values are dependent upon these types of images: 1. Front Black/White 2. Front Grayscale 3. Back Black/White 4. Back Grayscale				

2.9.6 Sixth Test Parameter					
Test Parameter Name: Compressed Data High First Bad					
Test Parameter XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
		Numeric	Bytes		122880 (All image types)
Description:	This parameter provides the First Bad data point for measuring whether or not the image under test is larger than its predefined threshold and might be a bad image.				
Additional Information:	Refer to section 2.7 for more information about this parameter. Refer to section 2.10 for information about how this parameter is used in scoring and evaluating the results of the test. The particular value used is dependent upon the type of image being evaluated. The four values are dependent upon these types of images: 1. Front Black/White 2. Front Grayscale 3. Back Black/White 4. Back Grayscale				

2.9.7 Seventh Test Parameter					
Test Parameter Name: Compressed Data High Exponent					
Test Parameter XML Name:		**Data Type:**	**Data Units:**	**Data Range:**	**Recommended Value(s) (Where Applicable):**
		Numeric	N/A		1
Description:	This is the value that controls the shape of the "line" between the **Compressed Data High First Bad** and **Compressed Data High Last Good** parameters. The IBM IQA product stores this value internally as a floating point number. When it is reported in the Type 54 record, it is multiplied by 10 and converted to an integer.				
Additional Information:	Refer to section 2.7 for more information about this parameter. Refer to section 2.10 for information about how this parameter is used in scoring and evaluating the results of the test. The particular value used is dependent upon the type of image being evaluated. The four values are dependent upon these types of images: 1. Front Black/White 2. Front Grayscale 3. Back Black/White 4. Back Grayscale				

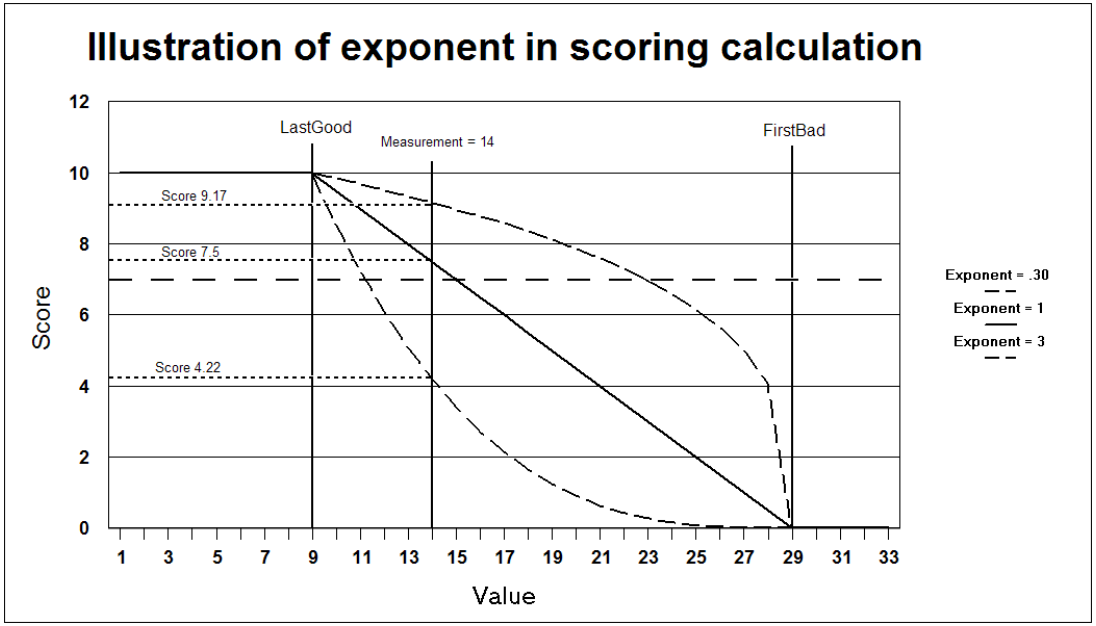
2.10	**Image Test Flag Pass/Fail Criteria:** *The Image Test Flag (see ANS X9.100-40-1-2006 for details) will convey one of the following four test conditions:* • *Condition not tested* • *Condition tested and result = fail* • *Condition tested and result = pass* • *Condition tested and result=indeterminate*	The software will *always* report this result. There will be two possible results: • *Condition tested and result = fail* This test will **fail** when the size of the image being tested is outside the range of previously determined good values. The values are variable and are settable by the user. • *Condition tested and result = pass* This test will **pass** when the size of the image being tested is within the range of previously determined good values The chart below shows the way in which the test score is derived.  In the chart above, the items that the user can set are: • X9.37 threshold (*set to 7.0 in this example*) • FirstBad(scoreLow) (*set to 3000 in this example*) • LastGood(scoreLow) (*set to 4250 in this example*) • LastGood(scoreHigh) (*set to 7250 in this example*) • FirstBad(scoreHigh) (*set to 9250 in this example*) • The Exponent in both cases (which controls the shape of the line between the LastGood and FirstBad parameters) is set to '*1*'. • Any item that has a compressed image size of between ~3850 bytes and ~7800 bytes will pass the test with the given parameters. The test will be scored as a "*pass*" whenever the image size is within the passing region. In addition to the items shown above, the shape line between the LastGood and FirstBad elements may be set by

the Exponent value.

The “Last Good” parameter is the point beyond which the judgment of the measurement results begins to decrease from a “10.0”. The “First Bad” parameter beyond which the measurement results will be a “0.0”. The “direction” from “Last Good” to “First Bad” is determined by the relative size of the two parameters. If the “LastGood” is less than “First Bad”, then the score will get worse as its measurement grows from the “LastGood” measurement point. If “FirstBad” is less than “LastGood”, then the score will get better as its measurement grows from the “FirstBad” measurement point.

The scoring of items with values that fall between the relevant “LastGood” and “FirstBad” values is performed in two steps:

- The first step generates the preliminary score, which is a linear interpolation between the LastGood and FirstBad elements. This preliminary score is normalized to a value of between 0 and 1.
- After the preliminary score is calculated, it is finalized by raising that score to the value of the Exponent and multiplied by 10 to yield the final result. This results in a curved shape of the score. An example of this scoring method is shown in the following diagram:



For this example, we have a “LastGood” value of 9 and a “FirstBad” value of 29. If the user selects an exponent value for this measurement of ‘1’, we see the linear slope between the “LastGood” point and the “FirstBad” point. If

		the exponent is other than 1, we see an exponential curve between the two points. For this particular example, with a measured value of 14, we score the result as 9.17 with an exponent value of .3. It scores as a 7.5 with an exponent value of 1, and it scores 4.22 with an exponent value of 3. If the score value is at or above the x9.37Threshold value of 7, then the test is graded as a "**pass**". If the score value is below the x9.37Threshold, then the test is graded as a "**fail**".

3	**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.*