

Editor's proposed disposition of comments to Biometric Sample Quality Standard Draft (M1/06-0948) in response to call for contribution (M1/06-0949)

Date: 2006-11-28	Document: M1/06-1000
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1	2	(3)	4	5	(6)	(7)
MB¹	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/ Note (e.g. Table 1)	Type of comment²	Comment (justification for change) by the MB	Proposed change by the MB	Proposed Editors Disposition
Aware 1	0.1	All	Ed	Section is 19794 specific.	Remove section.	Accept
Aware 2	throughout		Ed	Spelling of "normalisation", "behaviour" is incorrect	Spell "normalization", "behavior"	Accept
NIST0	0.2.X		te	A quality value can be used as a survey statistic across an "enterprise". For example for all ATM machines owned by a particular bank. This use should be identified in Clause 0	Insert a new subclause 0.2.x with x < 4 as follows 0.2.x Use as a survey statistic Quality values may be used to monitor operational quality. For example aggregated quality values could be compared with preset limits or monitored against an operational requirement. If, for example, quality values are generated from biometric samples collected at many sites, or over different time periods, then they may be used to identify anomalous operation. For example, if face image quality is computed at the license issuance desks at a DMV then a ranked list of aggregated quality values could be used to identify desks that exhibit a lower than average quality, or to monitor trends over weeks or months.	Accept.

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NIST1	8.2.x		te	To facilitate the use of quality values as a survey statistics as suggested in NIST0, quality algorithm suppliers shall provide a method for aggregating quality values into a single summary value.	<p>Insert a new subclause 8.2.x as follows</p> <p>8.2.x Aggregation of quality values</p> <p>The supplier of a quality apparatus SHALL provide a means for aggregating quality values into a single summary value. The aggregation metric is not specified by this standard. However because subclause 8.2.1 requires the measure to be related to performance the aggregate too should be an appropriate performance indicator.</p> <p>EXAMPLE Suppose a single-finger capture station measure the following values from 20 individuals. 5 5 6 2 6 1 6 5 6 5 4 6 7 5 4 4 7 5 7 5 7 2 6 1. The aggregation metric, declared by the quality provider and implemented in their software, is the proportion of fingerprints with quality less than or equal to 2, which in this case is $4/20 = 0.2$.</p>	Reject. Too prescriptive, out of scope, need more data.
NIST2	0.2.2	last sentence:	te	“Quality data can be ... determining whether an enrolment sample should be replaced when next sample is captured”, That is just an example of how quality data can be used.	<p>add “for example” before determining, that is, change to</p> <p>Quality data can be retained for later use in, for example, determining whether an enrolment sample should be replaced when next sample is captured.</p>	Accept
NIST3	0.2.3	Last sentence:	Te	“Thus a quality metric - ideally predicting performance for a matcher or matchers ..” It might be unlikely that a quality metric (specially for some modality like face) be able to predict the performance for all matchers.	Clarify it by changing “matcher or matchers” to “matchers or a class of matchers”	Accept

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NIST4	0.2.7		ed	seems like font size is different from the rest of document.	Check the font size	Accept.
NIST5	0.2.9	list item 2	te	The purpose of normalisation is to add context to the score. If the normalisation dataset is unidentified, no intrinsic context can be added so it won't help interoperability.	The dataset used to generate normalised score shall not be unidentified.	Change "dataset is unidentified" to "dataset were unidentified"
NIST6	0.2.9	list item 2 – last sentence	Te	"As a result, the data is less reliable." Clarify that the data is less reliable if the dataset used for normalisation is unidentified.	Clarify it by rewriting the sentence: As a result, the data is less reliable if the dataset used for normalisation is unidentified."	Accept.
NIST7	0.2.9	List item 3.b	te	"Importantly, the scores created by different algorithms can be segregated and analyzed separately in order to detect, isolate, and normalize any such effects." Only if the recipient (or user) of the quality score has enough data and resources for testing, analyzing and interpretation of the quality score, which is not the case most of the time.	Suppress the remark by deleting "Importantly", also clarify that test and interpretation of quality score by recipient is only possible if the recipient of the quality score has data and resources for testing, analyzing, and interpreting the quality scores.	Partial accept. Delete "importantly".
NIST8	0.3.2	Last sentence	te	"This may be applicable in situations where the enrolment sample is always of good quality and better than that of the use-phase sample." Explain that it is true for enrolment because enrolment is a supervised phase.	Change to: "This is applicable in situations where the enrolment sample is of good quality and often better than that of the use-phase sample, because enrolment is a supervised phase."	Accept.
NIST9	2 conformance		te	It is ambiguous. No reference to any normative clause of this standard. Also please see editor's response to DE 8 in ISO/IEC-N1688	clarify it. add the following per ISO/IEC-N1688: "A block of quality data shall be conformant to this standard if it conforms to the normative requirements of clause 8 of this standard." Note: N1688 specifies clause 6 of 1 st WD, which is clause 8 of 2 nd WD.	Accept.

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NIST10	4.5		ed	seems like font size is different from the rest of document.	Check the font size	accept
NIST11	4.8		ed	seems like font size is different from the rest of document.	Check the font size	accept
NIST12	4.10		ed	seems like font size is different from the rest of document.	Check the font size	accept
NIST13	4.11		ed	seems like font size is different from the rest of document.	Check the font size	accept
NIST14	4.12		ed	seems like font size is different from the rest of document.	Check the font size	accept
NIST15	4.23		ed	seems like font size is different from the rest of document.	Check the font size	accept
NIST16	4.23		te	Is QSND a method or just a reference dataset? I think it should be a quality annotated reference set.	Discuss and correct the definition if QSND is a reference data set	QSND has historically been used to describe a method.
Aware3	6	All	Ed	"General Biometric System" section required in Part 1 of ISO Framework documents, but not required in INCITS documents	Remove section.	Accept
NIST17	6 General Biometric System		te	The whole section is new addition to 2 nd WD. It is rather a high level description of "general biometric system". There is nothing quality specific about it. Therefore, this standard does not seem to be the appropriate place for it.	Remove the whole section	Accept
NIST18	7.1	2 nd paragraph	ed	"Utility is a function of both the character and fidelity of a sample, and P erformance is a function of U tility. Utility is most closely indicative of P erformance." Capitalization	change them to lower case.	accept
NIST19	7.1	Last paragraph	ed	bold font	change to un-bold	accept
NIST20	7.1	Table 1	ed	ISO requires the captions of figures and tables to be centred	Centre the caption	accept

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NIST21	7.2	figure 2	Ed	caption must be centred	Centre the caption	accept
Aware 4	8.1	Table 2	Te	<p>Recommendation of inclusion of data quality fields should be preceded by the successful implementation of systems and tools needed to properly assign values to the fields. It is premature to allocate fields in those cases where the tools and systems needed to fulfil the requirements of the fields does not exist.</p> <p>Quality Algorithm Classification field implies that an algorithm certification program is envisioned. This program is out of scope of this standard, has not been defined, and there is no consent on its form or value.</p> <p>Quality Score Normalization Dataset fields rely on a QSND infrastructure, which is currently undefined, and there is inadequate consent on its form or value.</p> <p>Signal Processing Fidelity Score and Quality Impairment Bitfield are similarly undefined, and there is a lack of consensus regarding their value in data interchange formats.</p>	Replace Data Fields Summary table with table suggested by NIST to ISO common headers group, as shown below, which includes QAID fields.	Accept

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NIST22	8.1 / Table 2		te	A quality block of 12 bytes is too big to be placed on all view headers. Computing Signal Processing Fidelity Score is problematic (see NIST38) and Quality Impairment Bitfield is not well defined. QAID can be formatted more efficiently.	Replace the table with <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>description</th> <th>Size</th> <th>Valid values</th> <th>Note</th> </tr> </thead> <tbody> <tr> <td>Quality score</td> <td>1 byte</td> <td>[0,100] 254. 255</td> <td>0: lowest 100: highest 254: no attempt made 255: failed attempt</td> </tr> <tr> <td rowspan="2">Quality Algorithm Vendor ID</td> <td>2 bytes</td> <td>"0" if Quality Score = 254 [1,6553 5] otherwise</td> <td rowspan="2">1st two bytes are vendorID registered by IBIA and the other two bytes are algorithm ID provided by the vendor (optionally registered with IBIA).</td> </tr> <tr> <td>2 bytes</td> <td>"0" if Quality Score = 254 [1,6553 5] otherwise</td> </tr> <tr> <td>QSND</td> <td>1 bit</td> <td>0/1</td> <td>0:Quality score=254 or scores on QSND is not reported. 1:scores on QSND is not reported.</td> </tr> </tbody> </table>	description	Size	Valid values	Note	Quality score	1 byte	[0,100] 254. 255	0: lowest 100: highest 254: no attempt made 255: failed attempt	Quality Algorithm Vendor ID	2 bytes	"0" if Quality Score = 254 [1,6553 5] otherwise	1st two bytes are vendorID registered by IBIA and the other two bytes are algorithm ID provided by the vendor (optionally registered with IBIA).	2 bytes	"0" if Quality Score = 254 [1,6553 5] otherwise	QSND	1 bit	0/1	0:Quality score=254 or scores on QSND is not reported. 1:scores on QSND is not reported.	Partial accept. See Aware4. Editor recommends omitting QSND field, as shown in Table 1 below. QSND=0/1 field not useful, redundant to QAID function.
description	Size	Valid values	Note																					
Quality score	1 byte	[0,100] 254. 255	0: lowest 100: highest 254: no attempt made 255: failed attempt																					
Quality Algorithm Vendor ID	2 bytes	"0" if Quality Score = 254 [1,6553 5] otherwise	1st two bytes are vendorID registered by IBIA and the other two bytes are algorithm ID provided by the vendor (optionally registered with IBIA).																					
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QSND	1 bit	0/1	0:Quality score=254 or scores on QSND is not reported. 1:scores on QSND is not reported.																					
NIST23	8.1	table 2	ed	Caption must be centred	change it to "Quality Data Field" and centre it	Accept.																		

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NIST24	8.2.2	1 st sentence	te	“A quality measure shall be an integer scalar taking on $N \geq 4$...” It would be beneficial to mention that BioAPI also suggests 4 categories of quality as shown in table 3.	Cite BioAPI	Accept. Include BioAPI citation.
NIST25	8.2.2.	Table 3	ed	caption is not centred	Centre the caption	accept
NIST26	8.2.3	2 nd paragraph	ed	font size seems bigger than the rest of the document	Check the font size	accept
NIST27	8.2.3	2 nd paragraph	te	It is true that currently not all parts of 19794 contain quality fields, but the work and recommendation of SG on common header might change that.	Add a note that it is beneficial if all parts of 19794 contain quality fields and SG on common header is currently considering it (according to ISO/IEC-N1712)	accept
NIST28	8.2.3	3 rd paragraph	ed	“ after period	delete it	accept
NIST29	8.2.3	3 rd paragraph	te	“For instance, to achieve a compact encoding in environments where sample quality data is not needed, ...” Why quality is not needed for card format?	Please explain.	Noted.
NIST30	8.3.1		te	Problem with QAID is lack of interoperability	add to the end “because interoperability is not achieved.”	Reject. There are multiple degrees of interoperability. QAID achieves some level of interoperability.

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NIST31	8.3.2	3 rd paragraph	te	<p>“But importantly, the recipient can automatically distinguish between quality scores generated by different quality algorithms and interpret them appropriately.”</p> <p>QAID is enough for recipient of the quality score to distinguish between score generated by different quality algorithms, but is not enough to help recipients of the quality score to interpret those scores. The burden of test, analysis and interpretation of quality scores is on recipients of the quality scores, which may not have enough data and resources to perform those analyses. Plus QAID does not achieve interoperability of quality scores. Please see NIST7</p>	<p>Change it to:</p> <p>The recipient can automatically distinguish between quality scores generated by different quality algorithms, however in order to interpret the scores, the recipient needs to perform test and analysis. Further, Interoperability is not achieved by QAID.</p>	<p>Partial Reject.</p> <p>The recipient can automatically distinguish between quality scores generated by different quality algorithms. in order to interpret the scores, the recipient may need to perform test and analysis.</p>
NIST32	8.3.2	4 th paragraph	Te	<p>“The result can be used to specify an acceptance operation threshold.”</p> <p>Specifying an acceptance operating threshold is only of use of quality score.</p>	<p>Change it to:</p> <p>The result can be used to, for example, specify an acceptance operation threshold.</p>	<p>Accept.</p>
NIST33	8.3.2	4 th paragraph	Te	<p>“This method provides the recipient the information necessary to interpret the score ...”</p> <p>QAID does not provide necessary information to interpret the scores. See NIST7 and NIST31.</p>	<p>Delete the entire sentence.</p>	<p>Partial reject. Replace sentence with: “this method enables the recipient to perform data analysis that in turn can be used to program software to automate score interpretation.</p>
Aware 5	8.4 thru 8.7			See Aware4	Remove sections 8.4 through 8.7	Accept.

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NIST34	8.4.1			“The Quality Score Normalisation Dataset (QSND) standardization method aims to provide a consistent interpretation of the quality score.” QSND also facilitates interoperability of quality scores generated by of different algorithms and/or vendors.	Change to: “The Quality Score Normalisation Dataset (QSND) standardization method aims to provide a consistent and interoperable interpretation of the quality score.” ”	accept
NIST35	8.4.1		te	“Several sample data that fall into each class will be collected and made available in the standards for the algorithm developers.” This information is useful to recipients and users of quality scores too.	Change to: “Several sample data that fall into each class will be collected and made available in the standards for the algorithm developers and recipients (users) of quality scores.”	Accept.
NIST36	8.4.1		te	“The dataset will then be made as part of the standard and will be made available for the algorithm developers.” This information is useful to recipients and users of quality scores too. (see NIST 35)	Change to: The dataset will then be made as part of the standard and will be made available for the algorithm developers and recipients (user) of quality scores.	Accept.
NIST37	8.4.1		Te	See Annex A for more information. Annex A provides a standard procedure to construct a quality annotated reference dataset that can be applied to any modality.	Change it to: Annex A provides a standard procedure to construct a quality annotated reference dataset that can be applied to any modality.	Accept.

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NIST38	8.5		te	<p>SPFS could be useful, but the original unprocessed image is needed to compute a SPFS. Computing SPFS is problematic:</p> <ol style="list-style-type: none"> 1- If the original unprocessed image is not available (cases like the image is already compressed by the capture device e.g. cameras that outputs jpeg images) then SPFS cannot be computed. Or, 2- 2- if an image is processed at several stages by different vendors. <p>(please see DE24 and its editor's response in N1688)</p> <p>Plus 8.5 has no normative requirement.</p>	<p>Consider solution to cases that image is already processed by the capture device or processed by different vendors.</p> <p>OR</p> <p>make this section an informative annex.</p>	Accept.
NIST39	8.7	table 5	ed	Caption in not centred	centre it	Accept.
NIST40	Annex A	Eq 4	ed/te	Typo	<p>Change to</p> $\sigma_i^2 = (J-1)^{-1} \sum_{j=1}^J (s_{ij}^{(k)} - m_i)^2$	Accept.
NIST41	Annex A	Second list item 2	te	<p>"Bin normalized match score range into K bins based on quantiles of the normalized match score distribution. ..."</p> <p>K has been used to represent to different variables.</p> <p>Also F has been used as a placeholder for C and W, but it is better to clarify it.</p>	<p>Change to:</p> <p>Bin normalized match score range into L bins based on quantiles of the normalized match score distribution. One strategy, for $L = 5$, is shown in Table I in which $W^{-1}(\cdot)$ and $C^{-1}(\cdot)$ are the quantile functions, and $C^{-1}(0)$ and $C^{-1}(1)$ denote the empirical minima and maxima, respectively (same for $W^{-1}(0)$ and $W^{-1}(1)$). If $W^{-1}(1) \geq C^{-1}(0.25)$ an appropriate quartile of $C(z)$ must be selected.</p>	Please discuss why it wouldn't be more clear to use an example that aligns with 4 bins as described by BioAPI.
Aware 6	Annex A	Page 28 line 36		The QSND appendix refers to a particular quality scoring algorithm, NFIQ. References to specific algorithms should be removed from this text.	Remove sentences referring to NFIQ	Accept

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Aware 6a	Annex A	Page 28, 29 Tables I and II		Example presents a five-bin method, while alignment with 4-bin assignment as outlined by BioAPI is allegedly more desirable.	Edit tables to present 4 bins and not 5. A discussion of the relationship between bin resolution and algorithm "alignability" might be useful.	Accept
Aware 7	New Section			QSPR, Quality Score Percentile Rank, is a relatively easy and effective mechanism to help align sample quality scores from different algorithms. See Aware contribution for detail.	Include text of Section 2.2 of Aware contribution M1/06-0979, preceded by text: "Normalization of quality score output by means of the QSPR method described below is recommended as a best practice."	For discussion.

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NIST42	New section - QSPR		te	QSPR was part of earlier drafts (M1/05-0093), and was removed by the editor in response to comments from DHS and NIST (M1/05-0654rev). Comments and editor's response on QSPR are shown in the table below.		NIST opposes introducing a new section on recommending QSPR as best practice for normalization of quality scores. See NIST contribution on QSPR and QSND for more detail.	For discussion. Editor opinion is that the NIST contribution fails to illustrate why QSPR is not complementary to other methods, given its relative simplicity to implement. It would seem that this work would benefit data recipients. Contribution indicates that QSPR would fail if the dataset is too narrow, but why would we define a narrow database? Would this method be complementary to QSND?	
				Comment on QSPR (document M1/05-0654rev)	Proposed change			Editor response
				DHS- This seems to be a non-sequitur. It is good and interesting material, but I don't even see it as quite right as an annex	Consider removal			Reject. There is currently consideration given to reserving a field for this score at SC 37.
				NIST - Is it really "universal" or is it an interpretation of quality score associated with a dataset? If QSND is changed, so would QSPR. The cumulative distribution function (CDF) of the quality scores is defined over some data set. That means QSPR is well defined only to the dataset it is computed over. But samples from a new lower quality set that comes along might all have QSPR = 1 (or low) without any ability to express lower values. Similarly images from a high quality set may all have QSPR = 100 without any distinction.	Delete material on QSPR.	Accept		

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Major problems with QSPR are:

1. Proposed QSPR requires a standardized dataset, which does not exist today.

2. The standardized dataset that QSPR will be computed over must be diverse in quality. That

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Table 1 (from Aware4)

description	size	valid values	Note
Quality Score	1 byte	[0,100] 254, 255	0: lowest 100: highest 254: no attempt made 255: failed attempt
Quality Algorithm Vendor ID	2 bytes	"0" if Quality Score = 254 [1,65535] otherwise	1 st two bytes are vendorID registered by IBIA and the other two bytes are algorithm ID provided by the vendor (optionally registered with IBIA).
	2 bytes	"0" if Quality Score = 254 [1,65535] otherwise	

1 **MB** = Member of M1 - affiliation

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial – For technical comments, please indicate whether your comment is a MAJOR or MINOR technical comment. **NOTE** Columns 1, 2, 4, 5 and 6 are compulsory.