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INTERNATIONAL STANDARD

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AMENDMENT 1
AMENDEMENT 1

Medical electrical equipment – Medical image display systems – Part 1: Evaluation methods

Appareils électromédicaux – Systèmes d'imagerie médicale – Partie 1: Méthodes d'évaluation

IEC 62563-1:2009-12/AMD1:2016-03(en-fr)

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FOREWORD

This amendment has been prepared by subcommittee 62B: Diagnostic imaging equipment, of IEC technical committee 62: Electrical equipment in medical practice.

The text of this amendment is based on the following documents:

CDV	Report on voting
62B/983/CDV	62B/995/RVC

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Introduction to Amendment 1

This amendment is published to introduce colour measurement.

Since publication of IEC 62563-1:2009, IEC 61223-2-5, *Evaluation and routine testing in medical imaging departments Part 2-5: Constancy tests – Image display devices* has been reviewed and withdrawn.

1 Scope

Replace the first sentence of the third paragraph with the following:

This standard applies to medical IMAGE DISPLAY SYSTEMS, which can display image information on greyscale and colour IMAGE DISPLAY SYSTEMS.

Add, at the end of the third paragraph, the following new sentence:

Handheld IMAGE DISPLAY SYSTEMS might require additional or modified versions of the procedures described in this standard.

Replace, in the fourth paragraph, the word "nor" *with* "or".

3.2 Symbols

Table 1 – Overview to the definitions of physical parameters

Add, before the last row, the following new row:

a_R	L_{amb}/L_{min}	Alternative safety factor. This factor is defined to provide consistency with other relevant documents (e.g. ACR–AAPM–SIIM Technical Standard For Electronic Practice Of Medical Imaging, Amended 2014, Resolution 39).

Replace, in the last row, third column, "Maximum distance" *by* "Distance".

7.2 Evaluation method table overview

Table 3 – List of the evaluation methods that can be used for testing medical IMAGE DISPLAY SYSTEMS

Replace, in the fourth but last row, first column, "Chromaticity evaluation" *by* "Chromaticity uniformity evaluation".

Replace, in the third but last row, "Chromaticity evaluation of multiple displays" *by* "Chromaticity evaluation across multiple displays".

Add, at the end of Table 3, the following new row:

Greyscale chromaticity evaluation	Colour meter

7.4.4 LUMINANCE evaluation of multiple displays

Replace, in the last sentence, "average" *by* "lowest".

7.4.5 Chromaticity evaluation

Replace the title of subclause 7.4.5 by the following:

7.4.5 Chromaticity uniformity evaluation

Add, before the existing first sentence of the second paragraph, the following new sentence:

The distance is calculated as the maximum for any two locations within the display screen.

7.4.6 Chromaticity evaluation of multiple displays

Replace the title of subclause 7.4.6 by the following:

7.4.6 Chromaticity evaluation across multiple displays

Add, in the second sentence of the first paragraph, after the word "measurements" *the phrase* "for all IMAGE DISPLAY DEVICES".

Delete, in the second paragraph, the words "deviation in".

Add the following new subclause:

7.4.9 Greyscale chromaticity evaluation

With a colour meter, luminance and colour coordinates (u', v') are measured using TG18-LN test patterns (TG18-LNx-i, i = 01, 02, …, 18). Measurements shall be performed without ambient light. With only the measurements corresponding to recorded luminance values higher than or equal to 5 cd/m^2, the distances in the u',v' plane with respect to the measurement at full white (i.e. from TG18-LNx-18) are computed as

$$\Delta u'_i v'_i = ((u_i' - u_{18}')^2 + (v_i' - v_{18}')^2)^{1/2}$$

The number of discarded measurements (luminance values less than 5 cd/m^2) will vary depending on the calibrated display function. For this reason, reporting greyscale chromaticity results should be accompanied by the calibrated display function used for the display device being measured.

The greyscale chromaticity is quantified as the maximum deviation in the computed values.The greyscale chromaticity evaluation method described in 7.4.9 is applicable to both colour and monochrome display devices.

Annex A
(informative)

Sample test reports

Table A.1 – Acceptance test sample report of a diagnostic display

Delete, in the second row, fifth line, the words "Brand Monochrome"*.*

Delete, in the second row, fifth line, the text "983300444 (first display of dual head)"*.*

Add the following new row at the end of Table A.1:

Greyscale chromaticity evaluation NOTE This device was calibrated according to the GSDF.	Colour meter	Max. deviation < 0,01 Discarded measurements: (L < 5 cd/m^2) LN01: L = 0,64 cd/m^2 u' = 0,193 6 v' = 0,427 6 LN02: L = 2,03 cd/m^2 u' = 0,200 3 v' = 0,449 1 LN03: L = 4,17 cd/m^2 u' = 0,203 9 v' = 0,464 9 Remaining measurements: LN04: u' = 0,204 6 v' = 0,469 5 LN05: u' = 0,204 8 v' = 0,471 5 LN06: u' = 0,204 9 v' = 0,472 7 LN07: u' = 0,205 0 v' = 0,473 5 LN08: u' = 0,205 1 v' = 0,474 0 LN09: u' = 0,205 1 v' = 0,474 3 LN10: u' = 0,205 1 v' = 0,474 4 LN11: u' = 0,205 3 v' = 0,474 3 LN12: u' = 0,205 1 v' = 0,474 1 LN13: u' = 0,205 2 v' = 0,473 8 LN14: u' = 0,205 3 v' = 0,473 3 LN15: u' = 0,205 0 v' = 0,472 4 LN16: u' = 0,204 9 v' = 0,471 5 LN17: u' = 0,204 9 v' = 0,470 8 LN18: u' = 0,205 0 v' = 0,470 8 Max. deviation = 0,003 6	OK

Table A.2 – Constancy test sample report of a diagnostic display

Delete, in the second row, fifth line, the words "Brand Monochrome".

Delete, in the second row, fifth line, the text "983300444 (first head of dual head)".

Add the following new row at the end of Table A.2:

Greyscale chromaticity evaluation NOTE This device was calibrated according to the GSDF.	Colour meter	Max. deviation < 0,01 Discarded measurements: (L < 5 cd/m^2) LN01: L = 0,64 cd/m^2 u' = 0,193 6 v' = 0,427 6 LN02: L = 2,03 cd/m^2 u' = 0,200 3 v' = 0,449 1 LN03: L = 4,17 cd/m^2 u' = 0,203 9 v' = 0,464 9 Remaining measurements: LN04: u' = 0,204 6 v' = 0,469 5 LN05: u' = 0,204 8 v' = 0,471 5 LN06: u' = 0,204 9 v' = 0,472 7 LN07: u' = 0,205 0 v' = 0,473 5 LN08: u' = 0,205 1 v' = 0,474 0 LN09: u' = 0,205 1 v' = 0,474 3 LN10: u' = 0,205 1 v' = 0,474 4 LN11: u' = 0,205 3 v' = 0,474 3 LN12: u' = 0,205 1 v' = 0,474 1 LN13: u' = 0,205 2 v' = 0,473 8 LN14: u' = 0,205 3 v' = 0,473 3 LN15: u' = 0,205 0 v' = 0,472 4 LN16: u' = 0,204 9 v' = 0,471 5 LN17: u' = 0,204 9 v' = 0,4708 LN18: u' = 0,205 0 v' = 0,470 8 Max. deviation = 0,003 6	OK

Table A.3 – Acceptance test sample report of a monochrome reviewing display

Delete, in the second row, fifth line, the words "Brand Monochrome".

Delete, in the second row, fifth line, the text "44829922 (first display of dual head)".

Table A.4 – Constancy test sample report of a monochrome reviewing display

Delete, in the second row, fifth line, the words "Brand Monochrome".

Delete, in the second row, fifth line, the text "44829923 (second display of dual head)".

Table A.5 – Acceptance test sample report of a colour reviewing display

Delete, in the second row, fifth line, the words "Brand Colour".

Delete, in the second row, fifth line, the text "56698221 (first display of dual head)".

Add the following new row at the end of Table A.5:

Greyscale chromaticity evaluation NOTE: This device was calibrated according to the GSDF.	Colour meter	Max. deviation < 0,01 Discarded measurements: (L < 5 cd/m^2) LN01: L = 0,7 cd/m^2 u' = 0,192 7 v' = 0,458 3 LN02: L = 1,92 cd/m^2 u' = 0,193 5 v' = 0,461 5 LN03: L = 3,48 cd/m^2 u' = 0,193 5 v' = 0,464 0 Remaining measurements: LN04: u' = 0,192 7 v' = 0,462 0 LN05: u' = 0,193 5 v' = 0,464 1 LN06: u' = 0,192 7 v' = 0,464 7 LN07: u' = 0,193 0 v' = 0,464 8 LN08: u' = 0,193 0 v' = 0,464 9 LN09: u' = 0,192 8 v' = 0,465 0 LN10: u' = 0,193 3 v' = 0,465 1 LN11: u' = 0,193 1 v' = 0,465 5 LN12: u' = 0,193 1 v' = 0,465 5 LN13: u' = 0,193 1 v' = 0,465 3 LN14: u' = 0,193 3 v' = 0,465 5 LN15: u' = 0,193 4 v' = 0,465 4 LN16: u' = 0,193 4 v' = 0,465 4 LN17: u' = 0,193 5 v' = 0,465 7 LN18: u' = 0,193 9 v' = 0,466 1 Max. deviation = 0,004 3	OK

Table A.6 – Constancy test sample report of a colour reviewing display

Delete, in the second row, fifth line the words "Brand Colour".

Delete, in the same line the text "56698221 (first display of dual head)".

Add the following new row at the end of Table A.6:

Greyscale chromaticity evaluation NOTE This device was calibrated according to the GSDF.	Colour meter	Max. deviation < 0,01 Discarded measurements: (L < 5 cd/m^2) LN01: L = 0,7 cd/m^2 u' = 0,192 7 v' = 0,458 3 LN02: L = 1,92 cd/m^2 u' = 0,193 5 v' = 0,461 5 LN03: L = 3,48 cd/m^2 u' = 0,193 5 v' = 0,464 0 Remaining measurements: LN04: u' = 0,192 7 v' = 0,462 0 LN05: u' = 0,193 5 v' = 0,464 1 LN06: u' = 0,192 7 v' = 0,464 7 LN07: u' = 0,193 0 v' = 0,464 8 LN08: u' = 0,193 0 v' = 0,464 9 LN09: u' = 0,192 8 v' = 0,465 0 LN10: u' = 0,193 3 v' = 0,465 1 LN11: u' = 0,193 1 v' = 0,465 5 LN12: u' = 0,193 1 v' = 0,465 5 LN13: u' = 0,193 1 v' = 0,465 3 LN14: u' = 0,193 3 v' = 0,465 5 LN15: u' = 0,193 4 v' = 0,465 4 LN16: u' = 0,193 4 v' = 0,465 4 LN17: u' = 0,193 5 v' = 0,465 7 LN18: u' = 0,193 9 v' = 0,466 1 Max. deviation = 0,004 3	OK