PD ISO/TS 19567-1:2016

BSI Standards Publication

Photography — Digital cameras — Texture reproduction measurements

Part 1: Frequency characteristics measurements using cyclic pattern

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National foreword

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Photography — Digital cameras — Texture reproduction measurements —

Part 1: Frequency characteristics measurements using cyclic pattern

Photographie — Caméras numériques — Mesurages de la reproduction de la texture —

Partie 1: Mesurages des caractéristiques de fréquence en utlisant un modèle cyclique

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 42, *Photography*.

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Introduction

Texture generally means the visual and tactile surface quality derived from the physicality of the material and the roughness or graininess of the surface. For digital still cameras, texture is of course the visual surface quality and the characteristic of texture reproduction in the captured image is interpreted into the reproduction of the low contrast fine details. This Technical Specification specifies the measurement of how cameras reproduce texture defined as low contrast fine details.

The tendency to utilize small sensors with high pixel counts in some cameras leaves a very small amount of light reaching the individual pixel. With the signal getting smaller and the noise level remaining at a certain level, it is necessary to reduce the noise in the image processing after capturing the image. Although the algorithms used for noise reduction have been developed over time, they are still not able to differentiate texture in the actual scene from the unwanted noise introduced by the capturing system. This decreases the image quality and it is therefore helpful to have a method to measure the loss of texture. Texture can also be enhanced to increase the acutance of the image. The texture reproduction is dependent on frequency and contrast because the noise reduction and the acutance enhancement, etc. are nonlinearly dependent on the pixel value and the difference among the surrounding pixels.

This part of ISO 19567 specifies methods to measure texture reproduction using test charts with cyclic patterns. The test charts are based on the established measurement methods, multiburst (IEC 61146-1) and siemens star (ISO 12233). This part of ISO 19567 newly defines the density of the test charts and exposure setting of measured cameras. The measurement results are presented in the spatial frequency response (SFR) curves.

If one SFR is larger than the other in all frequency range, larger amount of texture is reproduced in the corresponding image. If two SFRs have a cross point and the larger SFR depends on the frequency range, the superior image in the subjective evaluation is dependent on the dominant frequency of the image. Comparison of the measurement result provides important information in the texture comparison of the captured images.

Texture in a real scene consists mostly of non-structured or random patterns as shown in Annex A. Although it has been confirmed by experiments (Annex C and Annex D) that the texture reproduction characteristics of most cameras are well represented by the measurements in this Technical Specification, some cameras are found to indicate different characteristics for structured patterns compared to those for non-structured patterns. Measurement methods using non-structured or random patterns are under study and are expected to be included in consequent parts to this Technical Specification.

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Photography — Digital cameras — Texture reproduction measurements —

Part 1: Frequency characteristics measurements using cyclic pattern

1 Scope

This part of ISO 19567 specifies a protocol to measure the texture reproduction in the images captured and processed by digital cameras including cameras in other devices, e.g. in camera phones.

This part of ISO 19567 specifies protocols for the measurement of the texture reproduction using test charts with cyclic pattern.

This part of ISO 19567 excludes the acceptable range of value for texture reproduction.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61966-2-1:1999, *Multimedia systems and equipment — Colour measurement and management — Part 2-1: Colour management — Default RGB colour space —sRGB*

IEC 61966-2-1/Amd 1:2003, *Multimedia systems and equipment — Colour measurement and management — Part 2-1: Colour management — Default RGB colour space —sRGB*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
texture
low contrast fine details, which appear in objects

EXAMPLE Low contrast fine details, which is visible in *foliage, fur, sand, textiles, grass, or masonry surfaces*.

3.2
texture reproduction
response in the output image of cameras to the texture of the object in the scene

4 Test conditions

4.1 General

The following measurement conditions should be used as nominal conditions when measuring the texture reproduction of a digital camera.

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4.2 Environments for measurement

The measurement shall be carried out in the following environment unless otherwise stated:

— Temperature: 23 °C ± 3 °C

4.3 Apparatus and hardware

Either a reflective chart or a transmissive chart may be used. The light flux from the target shall be diffused and shall not include any specular component.

4.4 Arrangement of measuring equipment

4.4.1 Reflective test chart

The arrangement of the measuring equipment for a reflective test chart shall be set up as shown in Figure 1. The camera shall be positioned so that it casts no shadow on the chart. The lamps shall be positioned at an angle which avoids direct specular reflection from the test chart entering the camera.

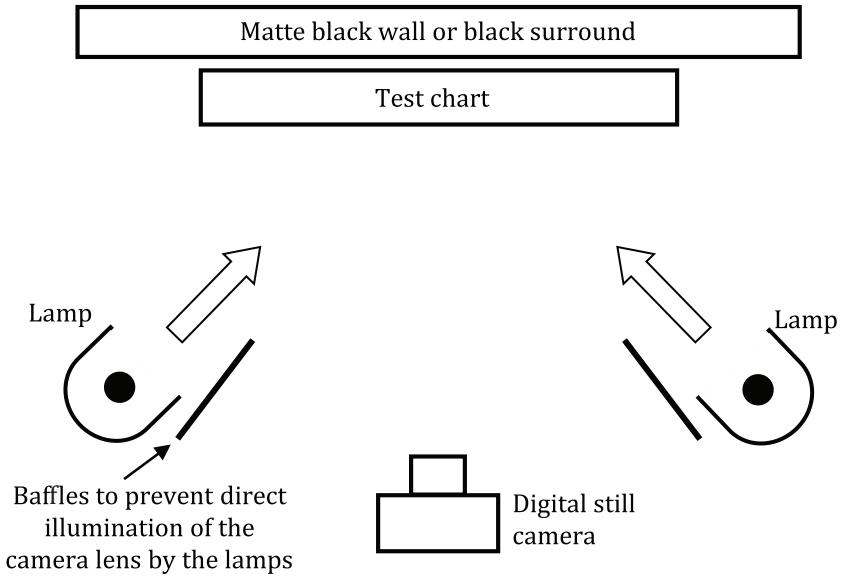

Figure 1 — Arrangement of measuring equipment for reflective test chart

4.4.2 Transmissive test chart

The arrangement of the measuring equipment for a transmissive test chart shall be set up as shown in Figure 2.

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