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Australian STANDARD

Photography—Electronic still-picture imaging—Noise measurements

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Australian Standard®

Photography—Electronic still-picture imaging—Noise measurements

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PREFACE

This Standard was prepared by the Standards Australia Committee MS-065, Photography.

The objective of this Standard is to specify methods for measuring and reporting the noise versus signal level and dynamic range of digital still cameras. It applies to both monochrome and colour electronic digital still cameras.

This Standard is identical with, and has been reproduced from, ISO 15739:2013, *Photography–Electronic still-picture imaging—Noise measurements*.

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text 'this International Standard' should read 'this Australian Standard'.

(b) A full point substitutes for a comma when referring to a decimal marker.

None of the normative references in the source document have been adopted as Australian or Australian/New Zealand Standards.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

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INTRODUCTION

Noise is an important attribute of electronic photographic systems. The camera noise measurements described in this International Standard are performed in the digital domain, using digital analysis techniques. Since the noise performance of an image sensor may vary significantly with exposure time and operating temperature, these operating conditions are specified. The visibility of noise to human observers depends on the magnitude of the noise, the apparent tone of the area containing the noise and the spatial frequency of the noise. The magnitude of the noise present in an output representation depends on the noise present in the stored image data and the contrast amplification or gain applied to the data in producing the output. The noise visibility is different for the luminance (or monochrome) channel and the colour (or colour difference) channels. Therefore, this International Standard accounts for these factors in measuring and reporting the camera noise measurements. Annex A specifies the method for determining the components of the digital camera noise from a number of samples. The perceptibility of noise in an image can vary depending on the viewing distance, spatial frequency, density, colour and viewing conditions. Annex B describes a procedure for measuring the visual noise level using a human visual model as a method for weighting the spectral components of the noise. A method for removing low frequency variations in the patch data resulting, for example, from luminance shading is given in Annex C. A recommended step-by-step procedure for determining the signal to noise ratio and incremental gain is provided in Annex D. In Annex E recommendations for practical viewing conditions for various output media are given.

AUSTRALIAN STANDARD

Photography—Electronic still-picture imaging—Noise measurements

1 Scope

This International Standard specifies methods for measuring and reporting the noise versus signal level and dynamic range of digital still cameras. It applies to both monochrome and colour electronic digital still cameras.

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.

ISO 7589:2002, *Photography — Illuminants for sensitometry — Specification for daylight, incandescent tungsten and printer*

ISO 12232:2006, *Photography — Digital still cameras — Determination of exposure index, ISO speed ratings, standard output sensitivity, and recommended exposure index*

ISO 14524:2009, *Photography — Electronic still-picture cameras — Methods for measuring opto-electronic conversion functions (OECFs)*

ITU-R BT.709-5, *Parameter values for the HDTV Standards for production and International programme exchange*

CIE 15:2004, *Colorimetry*, 3rd edition

3 Terms and definitions

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

3.1
camera opto-electronic conversion function
camera OECF
relationship between the input scene log luminances and the pixel values for an opto-electronic digital capture system

Note 1 to entry: The units of measurement for this function are $\log_{10}$ candelas per square metre.

3.2
clipping value
pixel value that remains constant for further increases in exposure (highlight clipping value) or for further decreases in exposure (dark clipping value)

3.3
digital still camera
DSC
camera that produces a digital still image from the digitized output of a solid-state photo sensor and records the digital still image using a digital memory, such as a removable memory card