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IEEE Standard for Camera Phone Image Quality

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IEEE Std 1858™-2016
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of the
IEEE Standards Association Board of Governors

Approved 22 September 2016

IEEE-SA Standards Board

Abstract: Quantifying the performance of camera-equipped mobile devices is covered in this standard, with an emphasis on metrics and procedures appropriate to the types of sensors, lenses, and signal processing routines present on such devices. It is not intended as a general image quality standard for photographs produced by high-end dedicated cameras, e.g., DSLRs. Metrics include spatial frequency response, color uniformity, chroma level, lateral chromatic displacement, local geometric distortion, texture blur, and visual noise.

Keywords: camera, cell phone, IEEE 1858™, image quality, mobile, photography, visual quality

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Leland Yu, *Vice Chair*

Apkudo Inc.
AT&T
CAICT (RITT)
Cisco Systems, Inc.
DxO Labs
Google
Imatest LLC
Image Engineering GmbH & Co. KG
Intel Corporation
Lenovo Group Ltd.†
NVIDIA Corporation

Major contributions were also received from the following entities:

Broadcom Limited†
DT-T-Mobile
Huawei Technologies Co., Ltd.†
Microsoft Corporation†
Omnivision Technologies
Pelican ImagingQualcomm
STMicroelectronics

† Did not participate in Corrigendum 1

The following members of the entity balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

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Cisco Systems, Inc.†
Google
Image Engineering GmbH & Co. KG
Imatest LLC
Intel Corporation
Marvell Semiconductor, Inc.†
NVIDIA Corporation
Sony Corporation‡
US Food and Drug Administration (FDA)

† Did not vote on Corrigendum 1
‡ Only voted on Corrigendum 1

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Introduction

This introduction is not part of IEEE Std 1858-2016, IEEE Standard for Camera Phone Image Quality.

Camera-equipped mobile devices have become ubiquitous, displacing dedicated digital cameras as many users' primary tools for photography. However, consumers have little guidance about the quality of the images produced by a particular device. That lack of guidance is due in part to a lack of uniform image quality testing for the devices, and what testing is done seldom is accessible to the layperson. This standard attempts to establish a uniform means of evaluating the quality of cameras in mobile devices, allowing objective comparison between device models and manufacturers, using a variety of metrics that are relevant to consumer photography.

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IEEE Standard for Camera Phone Image Quality

1. Overview

1.1 Scope

This intent of this standard is to quantify the performance of camera-equipped mobile devices. There is an emphasis on metrics and procedures appropriate to the types of sensors, lenses, and signal processing routines present on such devices. It is not intended as a general image quality standard for photographs produced by high-end dedicated cameras, e.g., digital single-lens reflex (DSLR) cameras.

1.2 Purpose

Camera-equipped mobile devices have become ubiquitous, displacing dedicated digital cameras as many users' primary tools for photography. However, consumers have little guidance about the quality of the images produced by particular device models. That lack of guidance is due in part to a lack of uniform image quality testing for the devices, and what testing is done seldom is accessible to the layperson. This standard attempts to establish a uniform means of evaluating the quality of cameras in mobile devices, allowing objective comparison between devices, models, and manufacturers, using a variety of metrics that are relevant to consumer photography.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEC 61966-2-1, Multimedia systems and equipment–Colour measurement and management–Part 2-1: Colour management–Default RGB colour space–sRGB.[1]

[1]IEC publications are available from the Sales Department of the International Electrotechnical Commission, (http://www.iec.ch/). IEC publications are also available in the United States from the Sales Department, American National Standards Institute (http://www.ansi.org/).