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INTERNATIONAL STANDARD

Multimedia systems and equipment – Colour measurement and management – Part 2-2: Colour management – Extended RGB colour space – scRGB

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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International Standard IEC 61966 has been prepared by Technical Area 2: Colour measurement and management, of IEC technical committee 100: Audio, video and multimedia systems and equipment and ISO TC 42: Photography.

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

FDIS	Report on voting
100/556A/FDIS	100/626/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 61966 consists of the following parts, under the general title *Multimedia systems and equipment – Colour measurement and management*:

Part 2-1: Colour management – Default RGB colour space – sRGB

Part 2-2: Colour management – Extended RGB colour space – scRGB

Part 3: Equipment using cathode ray tubes

Part 4: Equipment using liquid crystal display panels

Part 5: Equipment using plasma display panels

Part 7-1. Colour printers – Reflective prints – RGB inputs

Part 8: Multimedia colour scanners

Part 9: Digital cameras

It is published as a double logo standard.

In the ISO the Standard has been approved by 9 P-members out of 10 having cast the vote.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

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- withdrawn;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

The contents of the corrigendum of August 2003 have been included in this copy.

INTRODUCTION

The IEC 61966 standards are a series of methods and parameters for colour measurements and management for use in multimedia systems and equipment applicable to the assessment of colour reproduction.

The method of digitization in this part is designed to provide high bit precision, large colour gamut and extended dynamic range that is linear with respect to scene radiance. Based on IEC 61966-2-1 (sRGB), this colour space is well suited to meet the needs of the multimedia, gaming and computer graphics applications. This standard provides a robust solution to these needs. The white point and colour primaries of the scRGB solution are directly inherited from the IEC 61966-2-1 (sRGB) standard. The encoding transformations provide all of the necessary information to encode an image.

MULTIMEDIA SYSTEMS AND EQUIPMENT – COLOUR MEASUREMENT AND MANAGEMENT –

Part 2-2: Colour management – Extended RGB colour space – scRGB

1 Scope

This part of IEC 61966 is applicable to the encoding, editing and communication of relative scene radiance, wide dynamic range, extended colour gamut, and extended bit precision RGB colours as a colour space used in computer systems and similar applications by defining encoding transformations. Primaries and white point values of the colour space defined in this standard are identical to CIE chromaticities for ITU-R BT.709-5 reference primaries and CIE standard illuminant D65 as its white point. The scRGB colour space is an extension of sRGB and it is considered compatible with sRGB.

Additional transformations, such as white point adaptation methods, are beyond the scope of this standard. The appropriate CIE recommendations should be referred to for guidelines in this area.

2 Normative references

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

IEC 60050(845):1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

3 Definitions

For the purposes of this document, the following definitions apply. Definitions of illuminance, radiance, tristimulus, and other relating lighting terms are defined in IEC 60050(845).

3.1
output referred colour space
a colour space that represents the colorimetry of an output device with specified viewing conditions

3.2
wide dynamic range colour space
a colour space whose encoding encompasses values below black and above white

3.3
luma
luminance signal as defined by SMPTE/EG28: 1993

NOTE Video systems approximate the lightness response of vision by computing a luma component Y′ as a weighted sum of nonlinear R′G′B′ primary components: Each RGB signal is, comparable to the 1/3 power function with an offset defined by L*. Luma is often incorrectly referred to as luminance.

4 Encoding characteristics

4.1 General

The encoding transformations provide unambiguous methods to transform between CIE 1931 XYZ tristimulus values and 16-bit values for each channel of scRGB. The CIE 1931 XYZ values are scaled so that the sRGB black point to white point luminance is 0,0 to 1,0, not 0,0 to 100,0. Y-tristimulus values less than 0,0 in CIE 1931 XYZ space represent values below black. Y-tristimulus values greater than 1,0 represent values brighter than relative white.

The scRGB components that range from 0 to 16 384 encompass all visible surface colours (from –0,5 to 1,5). The range from 12 288 to 65 535 is used to encode an extended specular range of colours (from larger than 1,0 to 7,4999).

4.2 Transformation from CIE 1931 XYZ values to 16-bit scRGB values ($R_{\text{scRGB}(16)}$, $G_{\text{scRGB}(16)}$, $B_{\text{scRGB}(16)}$)

The relationship is defined as follows:

$$\begin{bmatrix} R_{\text{scRGB}} \\ G_{\text{scRGB}} \\ B_{\text{scRGB}} \end{bmatrix} = \begin{bmatrix} 3{,}240\,625 & -1{,}537\,208 & -0{,}498\,629 \\ -0{,}968\,931 & 1{,}875\,756 & 0{,}041\,518 \\ 0{,}055\,710 & -0{,}204\,021 & 1{,}056996 \end{bmatrix} \begin{bmatrix} X \\ Y \\ Z \end{bmatrix} \qquad (1)$$

and:

$$\begin{aligned} R_{\text{scRGB}(16)} &= \text{round}\left[\left(R_{\text{scRGB}} \times 8192{,}0\right) + 4\,096\right] \\ G_{\text{scRGB}(16)} &= \text{round}\left[\left(G_{\text{scRGB}} \times 8192{,}0\right) + 4\,096\right] \\ B_{\text{scRGB}(16)} &= \text{round}\left[\left(B_{\text{scRGB}} \times 8192{,}0\right) + 4\,096\right] \end{aligned} \qquad (2)$$

4.3 Transformation from 16-bit scRGB values ($R_{\text{scRGB}(16)}$, $G_{\text{scRGB}(16)}$, $B_{\text{scRGB}(16)}$) to CIE 1931 XYZ values

The relationship is defined as follows:

$$\begin{aligned} R_{\text{scRGB}} &= \left(R_{\text{scRGB}(16)} \div 8192{,}0\right) - 0{,}5 \\ G_{\text{scRGB}} &= \left(G_{\text{scRGB}(16)} \div 8192{,}0\right) - 0{,}5 \\ B_{\text{scRGB}} &= \left(B_{\text{scRGB}(16)} \div 8192{,}0\right) - 0{,}5 \end{aligned} \qquad (3)$$

and

$$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix} = \begin{bmatrix} 0{,}4124 & 0{,}3576 & 0{,}1805 \\ 0{,}2126 & 0{,}7152 & 0{,}0722 \\ 0{,}0193 & 0{,}1192 & 0{,}9505 \end{bmatrix} \begin{bmatrix} R_{\text{scRGB}} \\ G_{\text{scRGB}} \\ B_{\text{scRGB}} \end{bmatrix} \qquad (4)$$

Annex A
(informative)

Simple transformation between 8-bit sRGB and 16-bit scRGB values

A.1 General

This annex describes a simple transformation between 8-bit sRGB and 16-bit scRGB. While more complicated and intelligent tonal rendering should be applied for the scRGB images to obtain the most preferred images, this transformation is targeted to real-time display transformations for quick and easy previewing. Other transformations that focus on other requirements are possible. If such other transformations are intended to exchange with other devices or applications, these transformations should be described within the application documentation or file format as appropriate.

A.2 Transformation from 16-bit scRGB values ($R_{\text{scRGB}(16)}$, $G_{\text{scRGB}(16)}$, $B_{\text{scRGB}(16)}$) to 8-bit sRGB values ($R_{\text{sRGB}(8)}$, $G_{\text{sRGB}(8)}$, $B_{\text{sRGB}(8)}$)

The relationship is defined as follows:

$$\begin{aligned} R_{\text{scRGB}} &= \left(R_{\text{scRGB}(16)} \div 8192\right) - 0{,}5 \\ G_{\text{scRGB}} &= \left(G_{\text{scRGB}(16)} \div 8192\right) - 0{,}5 \\ B_{\text{scRGB}} &= \left(B_{\text{scRGB}(16)} \div 8192\right) - 0{,}5 \end{aligned} \qquad \text{(A.1)}$$

If $R_{\text{scRGB}}, G_{\text{scRGB}}, B_{\text{scRGB}} < 0 \quad \left(R_{\text{scRGB}(16)}, G_{\text{scRGB}(16)}, B_{\text{scRGB}(16)} \leq 4095\right)$

$$\begin{aligned} R_{\text{sRGB}(8)} &= 0 \\ G_{\text{sRGB}(8)} &= 0 \\ B_{\text{sRGB}(8)} &= 0 \end{aligned} \qquad \text{(A.2)}$$

else if

$0 \leq R_{\text{scRGB}}, G_{\text{scRGB}}, B_{\text{scRGB}} < 0{,}018 \quad \left(4096 \leq R_{\text{scRGB}(16)}, G_{\text{scRGB}(16)}, B_{\text{scRGB}(16)} \leq 4243\right)$

$$\begin{aligned} R_{\text{sRGB}(8)} &= \text{round}\left[\left(4{,}500 \times R_{\text{scRGB}}\right) \times 255\right] \\ G_{\text{sRGB}(8)} &= \text{round}\left[\left(4{,}500 \times G_{\text{scRGB}}\right) \times 255\right] \\ B_{\text{sRGB}(8)} &= \text{round}\left[\left(4{,}500 \times B_{\text{scRGB}}\right) \times 255\right] \end{aligned} \qquad \text{(A.3)}$$

else if

$0{,}018 \leq R_{\text{scRGB}}, G_{\text{scRGB}}, B_{\text{scRGB}} \leq 1{,}0 \quad \left(4244 \leq R_{\text{scRGB}(16)}, G_{\text{scRGB}(16)}, B_{\text{scRGB}(16)} \leq 12288\right)$

$$
\begin{aligned}
R_{\mathrm{sRGB}(8)} &= \mathrm{round}\left[\left(\left(1{,}099 \times R_{\mathrm{scRGB}}{}^{(0{,}45)}\right) - 0{,}099\right) \times 255\right] \\
G_{\mathrm{sRGB}(8)} &= \mathrm{round}\left[\left(\left(1{,}099 \times G_{\mathrm{scRGB}}{}^{(0{,}45)}\right) - 0{,}099\right) \times 255\right] \\
B_{\mathrm{sRGB}(8)} &= \mathrm{round}\left[\left(\left(1{,}099 \times B_{\mathrm{scRGB}}{}^{(0{,}45)}\right) - 0{,}099\right) \times 255\right]
\end{aligned} \tag{A.4}
$$

else

$$
\begin{aligned}
R_{\mathrm{sRGB}(8)} &= 255 \\
G_{\mathrm{sRGB}(8)} &= 255 \\
B_{\mathrm{sRGB}(8)} &= 255
\end{aligned} \tag{A.5}
$$

A.3 Transformation from 8-bit sRGB values ($R_{\mathrm{sRGB}(8)}, G_{\mathrm{sRGB}(8)}, B_{\mathrm{sRGB}(8)}$) to 16-bit scRGB values ($R_{\mathrm{scRGB}(16)}, G_{\mathrm{scRGB}(16)}, B_{\mathrm{scRGB}(16)}$)

The relationship is defined as follows:

If $0 \le R_{\mathrm{sRGB}(8)}, G_{\mathrm{sRGB}(8)}, B_{\mathrm{sRGB}(8)} < 21$

$$
\begin{aligned}
R_{\mathrm{scRGB}(16)} &= \mathrm{round}\left(7{,}139 \times R_{\mathrm{sRGB}(8)} + 4096\right) \\
G_{\mathrm{scRGB}(16)} &= \mathrm{round}\left(7{,}139 \times G_{\mathrm{sRGB}(8)} + 4096\right) \\
B_{\mathrm{scRGB}(16)} &= \mathrm{round}\left(7{,}139 \times B_{\mathrm{sRGB}(8)} + 4096\right)
\end{aligned} \tag{A.6}
$$

else

$$
\begin{aligned}
R_{\mathrm{scRGB}(16)} &= \mathrm{round}\left\{\left[\left(R_{\mathrm{sRGB}(8)} + 25{,}245\right) \big/ 280{,}245\right]^{\left(1{,}0/0{,}45\right)} \times 8192 + 4096\right\} \\
G_{\mathrm{scRGB}(16)} &= \mathrm{round}\left\{\left[\left(G_{\mathrm{sRGB}(8)} + 25{,}245\right) \big/ 280{,}245\right]^{\left(1{,}0/0{,}45\right)} \times 8192 + 4096\right\} \\
B_{\mathrm{scRGB}(16)} &= \mathrm{round}\left\{\left[\left(B_{\mathrm{sRGB}(8)} + 25{,}245\right) \big/ 280{,}245\right]^{\left(1{,}0/0{,}45\right)} \times 8192 + 4096\right\}
\end{aligned} \tag{A.7}
$$

Annex B
(informative)

Non-linear encoding for scRGB: scRGB-nl and its YCC Transformation: scYCC-nl

B.1 General

This annex describes non-linear encoding for scRGB: scRGB-nl and its YCC transformation: scYCC-nl. Applications and hardware developers who want to support various colour compression schemes based on luma-chroma-chroma spaces can utilise this standard. This transformation is targeted for compression and storage, and is not targeted for displaying images.

B.2 Non-linear encoding in 12-bit

The relationship is defined as follows:

If $R_{\text{scRGB}}, G_{\text{scRGB}}, B_{\text{scRGB}} \geq 0{,}003\ 130\ 8$

$$\begin{aligned} R'_{\text{scRGB}} &= 1{,}055 \times R_{\text{scRGB}}^{(1{,}0/2{,}4)} - 0{,}055 \\ G'_{\text{scRGB}} &= 1{,}055 \times G_{\text{scRGB}}^{(1{,}0/2{,}4)} - 0{,}055 \\ B'_{\text{scRGB}} &= 1{,}055 \times B_{\text{scRGB}}^{(1{,}0/2{,}4)} - 0{,}055 \end{aligned} \quad \text{(B.1)}$$

If $0{,}003\ 130\ 8 > R_{\text{scRGB}}, G_{\text{scRGB}}, B_{\text{scRGB}} > -0{,}003\ 130\ 8$

$$\begin{aligned} R'_{\text{scRGB}} &= 12{,}92 \times R_{\text{scRGB}} \\ G'_{\text{scRGB}} &= 12{,}92 \times G_{\text{scRGB}} \\ B'_{\text{scRGB}} &= 12{,}92 \times B_{\text{scRGB}} \end{aligned} \quad \text{(B.2)}$$

If $R_{\text{scRGB}}, G_{\text{scRGB}}, B_{\text{scRGB}} \leq -0{,}003\ 130\ 8$

$$\begin{aligned} R'_{scRGB} &= -1{,}055 \times (-R_{scRGB})^{(1{,}0/2{,}4)} + 0{,}055 \\ G'_{scRGB} &= -1{,}055 \times (-G_{scRGB})^{(1{,}0/2{,}4)} + 0{,}055 \\ B'_{scRGB} &= -1{,}055 \times (-B_{scRGB})^{(1{,}0/2{,}4)} + 0{,}055 \end{aligned} \quad \text{(B.3)}$$

12 bit non-linear version of scRGB-nl: $R_{\text{scRGB-nl}}, G_{\text{scRGB-nl}}, B_{\text{scRGB-nl}}$ is defined as:

$$\begin{aligned} R_{\text{scRGB-nl}} &= \text{round}(1\ 280 \times R'_{\text{scRGB}} + 1\ 024) \\ G_{\text{scRGB-nl}} &= \text{round}(1\ 280 \times G'_{\text{scRGB}} + 1\ 024) \\ B_{\text{scRGB-nl}} &= \text{round}(1\ 280 \times B'_{\text{scRGB}} + 1\ 024) \end{aligned} \quad \text{(B.4)}$$

For compression, scRGB-nl is converted to luma-chroma-chroma encoding: scYCC-nl.

$$\begin{bmatrix} Y'_{\mathrm{scYCC}} \\ Cb'_{\mathrm{scYCC}} \\ Cr'_{\mathrm{scYCC}} \end{bmatrix} = \begin{bmatrix} 0{,}299\ 0 & 0{,}587\ 0 & 0{,}114\ 0 \\ -0{,}168\ 7 & -0{,}331\ 3 & 0{,}500\ 0 \\ 0{,}500\ 0 & -0{,}418\ 7 & -0{,}081\ 3 \end{bmatrix} \begin{bmatrix} R'_{\mathrm{scRGB}} \\ G'_{\mathrm{scRGB}} \\ B'_{\mathrm{scRGB}} \end{bmatrix} \tag{B.5}$$

And quantization for 12 bit non-linear scYCC-nl: $Y_{\mathrm{scYCC\text{-}nl}}$, $Cb_{\mathrm{scYCC\text{-}nl}}$, $Cr_{\mathrm{scYCC\text{-}nl}}$ is defined as:

$$\begin{aligned} Y_{\mathrm{scYCC\text{-}nl}} &= \mathrm{round}(1\ 280 \times Y'_{\mathrm{scYCC}} + 1\ 024) \\ Cb_{\mathrm{scYCC\text{-}nl}} &= \mathrm{round}(1\ 280 \times Cb'_{\mathrm{scYCC}} + 2\ 048) \\ Cr_{\mathrm{scYCC\text{-}nl}} &= \mathrm{round}(1\ 280 \times Cr'_{\mathrm{scYCC}} + 2\ 048) \end{aligned} \tag{B.6}$$

Note that this quantization leads to the following relationships, where a value of 65 535 in $\mathrm{scRGB}_{(16)}$ is equivalent to 7,499 9 in scRGB and 4 080 in scRGB-nl. This is to ease computational implementations.

Table B.1 – Quantization relationships using scRGB

$\mathrm{scRGB}_{(16)}$	scRGB	scR'G'B	scRGB-nl
N/A	–0,603 8	–0,800 0	0
0	–0,5	–0,735 4	83
2 048	–0,25	–0,537 1	337
4 096	0	0,000 0	1 024
12 288	1	1,000 0	2 304
20 480	2	1,353 3	2 756
28 672	3	1,612 5	3 088
36 864	4	1,824 8	3 360
45 056	5	2,008 0	3 594
53 248	6	2,170 8	3 803
61 440	7	2,318 4	3 992
65 535	7,499 9	2,387 6	4 080
N/A	7,5	2,387 7	4 080
N/A	7,591 3	2,400 0	4 096

Annex C
(informative)

scRGB background information

C.1 Two basic families of colour spaces: perceptual and radiance

There exist two basic families of colour spaces that almost all other colour spaces can be categorized into; perceptual colour spaces like sRGB and CIELAB and radiance colour spaces like scRGB and CIE 1931 XYZ. Each of these basic types of colour space have their appropriate uses and using one colour space in processes natively intended for the other results in less than optimal colour quality. For example, computing the perceptual colour difference is usually done in CIELAB, where colour differences are more uniformly distributed. Computing perceptual colour differences in CIE 1931 XYZ can easily lead to misleading results. When comparing different device gamuts, it is also recommended to visualize the gamuts in the three dimensional CIELAB or CIELUV colour spaces instead of two dimensional xy chromaticity diagrams. This is because colour spaces and gamuts are inherently three dimensional, not two dimensional.

C.2 Processes best performed in radiance colour spaces

Just as there are processes best performed in perceptual spaces, there are also processes best performed in radiance spaces, such as scRGB or CIE 1931 XYZ. This includes processes that are fundamentally based on linear processing of light, such as transparency blending, anti-aliasing, convolution, light rendering, etc. In fact, most virtual reality and computer visualization processes are performed in radiance colour spaces before being converted for display or output as a final step in the process. This allows for much more efficient and effective processing. It is already clear that these types of processing are migrating into the consumer spaces. For example, major multimedia equipment manufacturers have products that fundamentally rely on radiance processing for their success. In the future, the line between such realistic effects and processing and traditional imaging that has been based on perceptual spaces will be very blurred. In order to provide potential and reasonable paths forward for vendors to understand and investigate the impact of these trends, it is critical to have robust and standard support for both types of colour spaces, both radiance and perceptual. While one could theoretically use CIELAB and CIE 1931 XYZ to address these investigations, most consumer workflows depend upon RGB solutions and thus sRGB and scRGB are well-suited to address these needs.

C.3 Bit depth benefits to consumer devices

In addition to the linear space, the trends of most consumer devices are toward higher quality as is evidenced by improvements in resolution by both consumer printers and digital cameras. This also applies to bit precision as evidenced by consumer scanners output 12 bits and 16 bits per channel. As digital camera D/As become more affordable, it is clear that even consumer digital cameras will be able to output 10 bits, 12 bits and possible 14 bits per channel in the next five years. Some colour printers today can already accept higher bit precision than 8 bits per channel. This standard enables support for very large colour gamut device

Finally, as discussed above, there are two fundamental colour space types, radiance and perceptual, each of which has their best uses. In order to provide vendors maximum flexibility to address their markets in the future, it appears to be advantageous to provide infrastructure support by these two colour spaces to these vendors.

C.4 Advantages of scRGB

The basic advantage of scRGB is to allow work in a large gamut, wide dynamic range linear space. For processes which require or desire such a space, the potentially simple 1D LUT conversion is a small price to pay for the computational simplicity gained.

C.5 Disadvantages of scRGB

The additional bits per channel is the largest disadvantage. The other issues such as signed encoding and linear gamma can be shown as advantages for particular markets using appropriate demonstrations.

Since scRGB is a higher bit precision space, it suffers the same performance and memory limitations that other 16 bit channel colours spaces suffer. This alone will make it inappropriate for many low end consumer devices. Yet, many high end consumers are willing to accept these performance and memory issues to obtain the advantages in linear process capabilities, gamut and dynamic range. There are three potential disadvantages of scRGB; 1) bit precision, 2) linear gamma incompatible with many current consumer practices, and 3) signed encoding incompatible with many current consumer practices. The advantages of linear gamma and signed encoding have been discussed above that thus, this is simply a matter of each vendor weighing the advantages and the disadvantages. The increased bit precision allows improvements in banding, contouring and signal-to-noise issues. These advantages must also be weighed by each vendor with the disadvantage of increased memory sizes.

C.6 Explanation of negative tristimulus values in scRGB

The colour space, scRGB, allows for negative tristimulus values which provide some significant advantages. For gamut encapsulation, one might consider display gamuts to be shaped like apples, with the bulk of the colour gamut in the bright colours due to the additive nature of the devices and similarly one might consider printer gamuts to be shaped like pears, with the bulk of the colour gamut in the shadow colours due to the subtractive nature of the devices. While it is possible to use wide primaries to accommodate the pear shape, this requires very aggressive matrix transformations for display, which is a disadvantage for many workflows. By allowing negative tristimulus values to be encoded in an unsigned encoding, this creates a black region instead of a black point. Having a black region provides for easy encapsulation of very dark, but saturated colours while maintaining a reasonable use of gamut volume and coverage. The negative encoding has a second significant advantage in simplifying colour processing applications. Most current applications have a hard limit of black and white at 0,0 and 1,0. This means than any colour processing that overflows or underflows these limits will be clipped or gamut mapped. Such processes are very common in colour correcting images, such as additive colour changes. By having an unsigned encoding of negative tristimulus values (along with encoding values greater than one), this allows the application to persist the overflows and underflows and allows for multiple "undos" without having to cache a large number of interim history images in the process. This in turn significantly reduces the memory requirements for simple image processing applications that often are provided with digital imaging devices. Since the shape of scRGB is similar to the shape of sRGB and efficiently encapsulates the shapes of printer gamuts, gamut mapping can be simple and efficient. As for the negative numbers, since negative photons do not make radiance, it is expected that when gamut mapping, these values will be treated appropriately.

C.7 Explanation of D65 white point in scRGB

In order to be consistent with common practice in most consumer electronic imaging fields (television, computers, digital photography), a white point of D65 was chosen. Two other alternatives would have been to not define the white point at all or choose the hard-copy viewing illuminant, D50. A white point was defined in order to provide ease of use to implementers. For many implementers, the only processing between scRGB and sRGB will be a simple gamma correct, as it is in HDTV. If a white point correction had also been required, this would have led to many complexities such as which white point adaptation to use and how to communicate this down stream effectively. Currently the ICC has only just begun to discuss this fundamental problem in their significantly more complex workflows. By defining the white point to D65, this processing is left to the expertise of the device vendor. A white point of D65 was chosen instead of D50, because in many cases, D65 has been shown to provide a better display match to typical or even professional prints. Several colour management experts have compared different white points in their professional work and found D65 to be superior for a working space for display work. In addition, D50 white point is specified for hardcopy viewing and is thus as the end of the workflow. Using a D65 white point in standard colour spaces allows maximum flexibility both for compatibility with other industries in multimedia workflows and redirecting content to different output media.

C.8 Explanation of ITU-R BT.709-5 primaries in scRGB

The ITU-R BT.709-5 primaries were chosen to be consistent with sRGB and common practices in most consumer markets today.

C.9 Requirements for compressing scRGB

Since most compression formats require a gamma corrected YCC space, it is expected that a gamma correction will be performed prior to the actual compression. Such a space is described in Annex B.

C.10 Example workflow using scRGB

A diagram describing such a workflow had been developed. This is included in Figure C.1. Of particular interest in this diagram is the definition of scRGB as a colour space based upon a raw RGB space with automatic white balancing to D65, optional scene processing and white level determined by the image itself. This allows for easy transformation into sRGB.