



COLOUR CALIBRATION

BASICS OF CALIBRATION

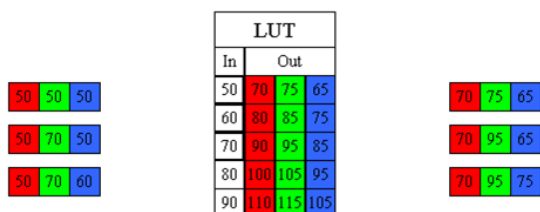
LUT, 3D LUT

DICOM, BT.709, BT.1886 AND BT.2020

CALIBRATION

Nowhere else is precise image representation as essential as in the medical environment, for example in radiology or surgery. To guarantee a constant image display, it needs to be calibrated property.

Calibration is the adjustment of two values to a defined value. Important parameters to be calibrated are brightness, gamma, colour temperature and colour space. These must correspond to a fixed value and be kept constant. The brightness is measured for white and is called Lmax. Integrated ALS (Automatic-Luminance-Stabilization) ensures that brightness settings remain stable. Another parameter is the display gamma. This measures the relationship of input signal to brightness. Gamma is the brightness correction for the grey values of the monitor, i.e. the steps between black and white.

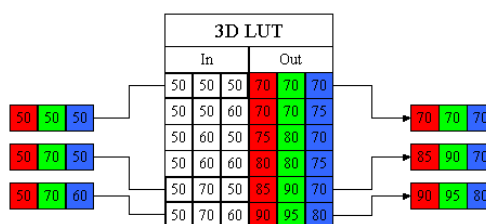


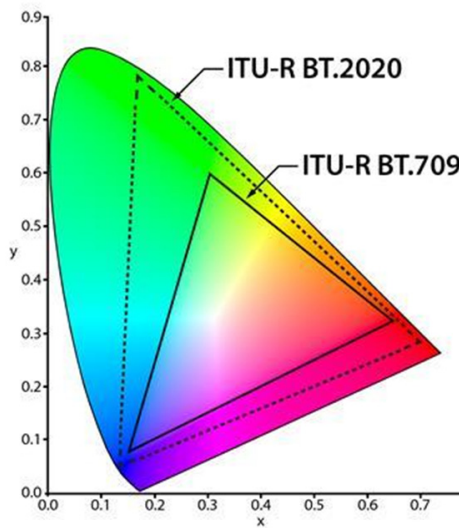
LUT

A central element of colour calibration is the Lookup Table (LUT). This serves as a translation table between input and output. The input and output values are linked by the factory or by the user. The size of the LUT has a big effect on the result. The more gradations are possible, the more precise the calibration can be.

3D LUT calibration

The perceived colour difference is called Delta E and represents the difference between two values. This distance can be further minimised by the new 3D LUT, which makes it possible to create a 3 x 3 matrix, so R, G, B channels can be controlled independently.





BT.709, BT.1886 and BT.2020

All colours that are actually to be output are displayed in a three-dimensional colour space. Colour space is the subset of the colour range that is visible to the human eye. The known tested colour spaces are BT.709, BT.1886 and BT.2020.

BT.709 standardises parameters for HDTV with an aspect ratio of 16:9. BT.1886 was then defined to standardise the gamma curve for HDTV flat panel displays. An exception is currently the extended colour space according to BT.2020, which focuses on different aspects of UH-DTV. This colour space exceeds the colour space of all currently available panels.

Comparison table

		CLINIO432DCUH Rein Medical test values	Reference product* Competitor test test values
BT.709	Colour rendering (dE avg.)	0,5	1,75
	Colour rendering (dE max.)	0,7	5,07
BT.2020	Colour rendering (dE avg.)	2,8	3,15
	Colour rendering (dE max.)	3,5	7,99

Delta E:

- < 2: no difference visible
- > 2: slight colour distortion
- > 4: Colour distortion
- > 6: other colour

*Comparable product with similar technical specifications in test, for the full report contact our staff
(Tel: +49 (0) 2161/6984-0)

Why Rein Medical?

The Rein Medical UHD high brightness monitors have

- ALS (Automatic Luminance Stabilisation) which keeps the monitor at a constant brightness level over its entire lifetime.
- new 3D-LUT calibration for DICOM, BT.709, BT.1886 and BT.2020 for perfect display of greyscales and colours
- Factory calibration of each unit before delivery.

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