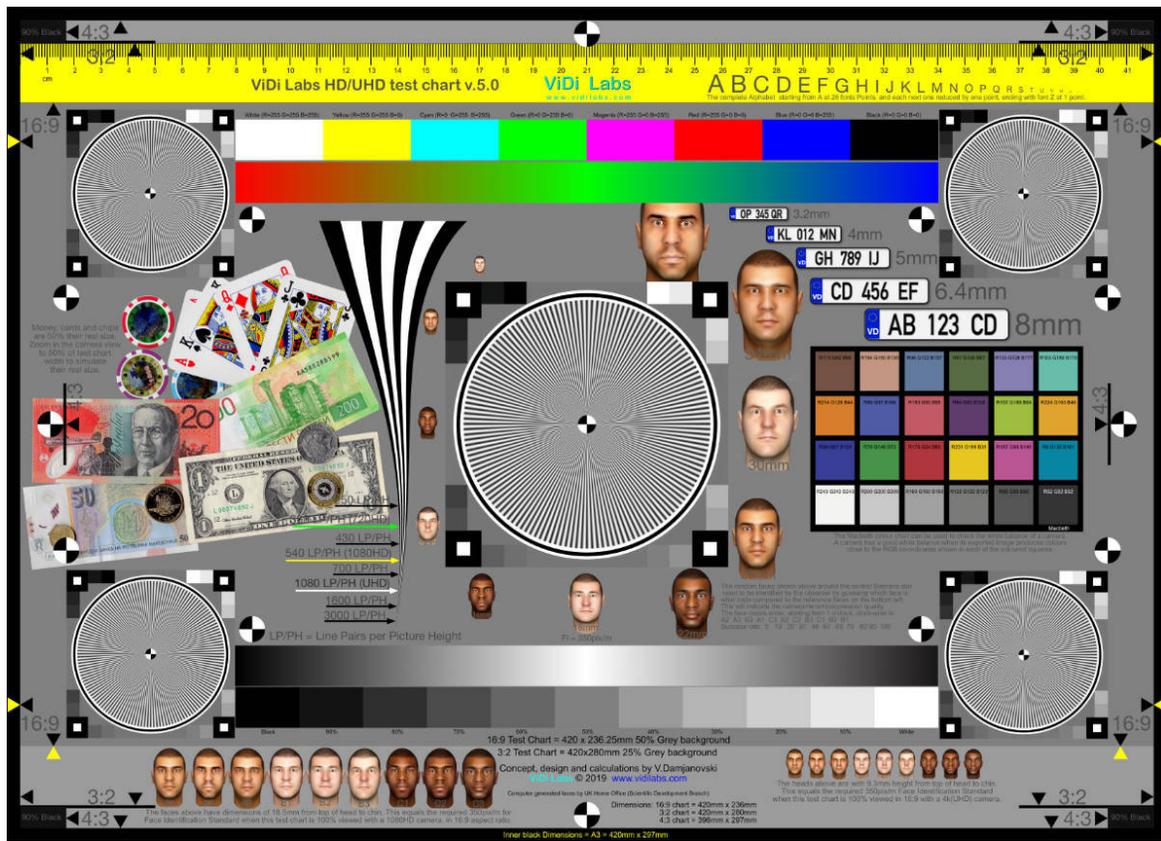


ViDi Labs HD/UHD test chart v.5.0



We have just produced a new test chart specifically for the CCTV industry, dedicated to testing all camera resolutions, from HD (1920x1080) to UHD (3840x2160), version 5.0. The latest test chart v.5.0 is yet another **evolution** in our development of test charts that goes hand in hand with the latest technologies and standards.

Like the version 4.x, the ViDiLabs version 5.x is a **multi-format test chart**, which allows for testing cameras with aspect ratios 4:3, 3:2 and certainly 16:9, all within the one test chart.

While the ViDi Labs test chart v.4.x was intended for SD and HD resolutions, in this new version 5.0 we have gone one level higher. Now you can test and evaluate **HD (2k) and UHD (4k) cameras** up to 12MP, and all mega-pixel sensors in between.

The ViDi Labs HD/UHD test chart v.5.0 is a great update with many new features that will easily and convincingly test various camera qualities.

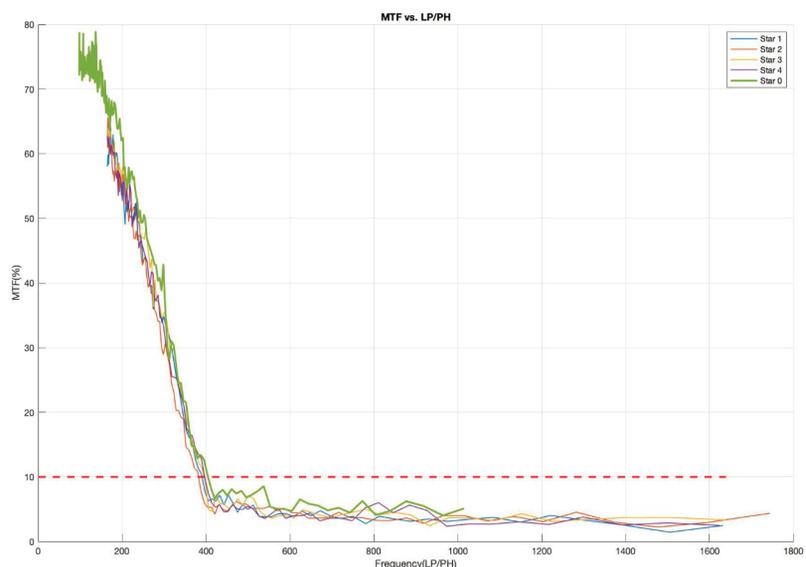
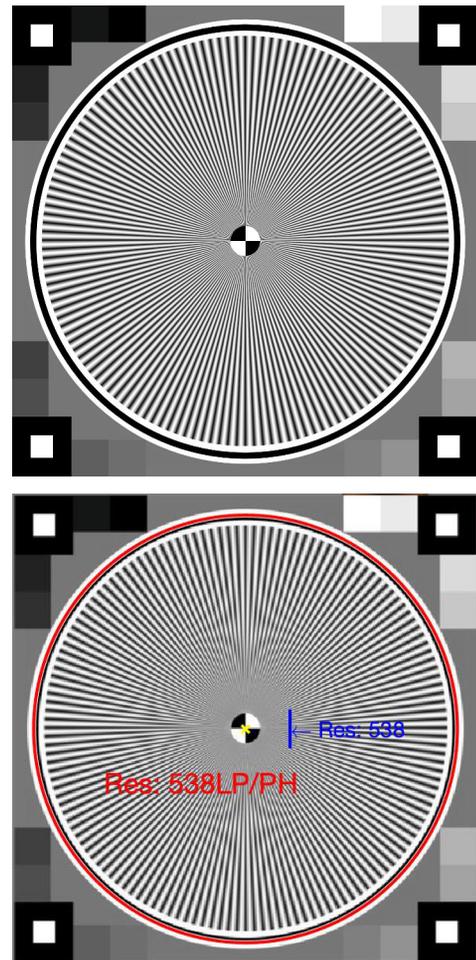
The most important advancement we have made has been the creation of **dedicated software to permit objective testing of critical camera parameters**, all compliant with the latest IEC 62676-5 standards. These parameters include the resolution, colour reproduction, linearity, gamma and noise levels, all of which are done by our software. **This removes human error and guesstimates made by visual inspection only.**

We have now included **sine-wave Siemens stars** for more objective resolution measurements, as recommended by the IEC 62676-5. We have one larger star in the middle of the chart, that can also be used for focusing, as well as another four smaller sine-wave stars in the corner of the chart. These are useful for aligning the perpendicularity of the camera versus the test chart. The stars also permit checking of the corner resolution of lenses, as well as verifying if a camera sensor is tilted relative to the optical axis.

While you can see and inspect the results of your camera visually, you can also run your exported image through our ViDiLabs software and you will get an MTF-vs-Resolution plot. The MTF (Modulation Transfer Function) is also known as Spatial Frequency Response (SFR) in the standards, and it is now expressed in LP/PH (Line Pairs per Picture Height) as per the IEC 62676-5 standards.

The most important reason for introducing the sine-wave stars is that they will reveal the camera resolution accurately even if there is no perfect alignment in regards to the cropping of the test chart image exactly to the test chart markers. This is difficult to achieve during 'traditional' resolution measurement methods. Using convolutional sine-wave stars makes such (mis)-alignment less critical. The chart can even be moved closer or further away from the ideal position relative to the camera, but the resolution can still be measured accurately.

Furthermore, the reason for using black and white sine-wave 'rays' instead of only black lines (as used in the past) is that the sine-wave colour change from black to white lines is more 'natural' for digital processing and there are less ringing artefacts. Ringing artefacts are always present in image processing, when there are sharp contrast changes and the signal bandwidth of the electronics is very limited. This produces unnatural edge ghosting, which is

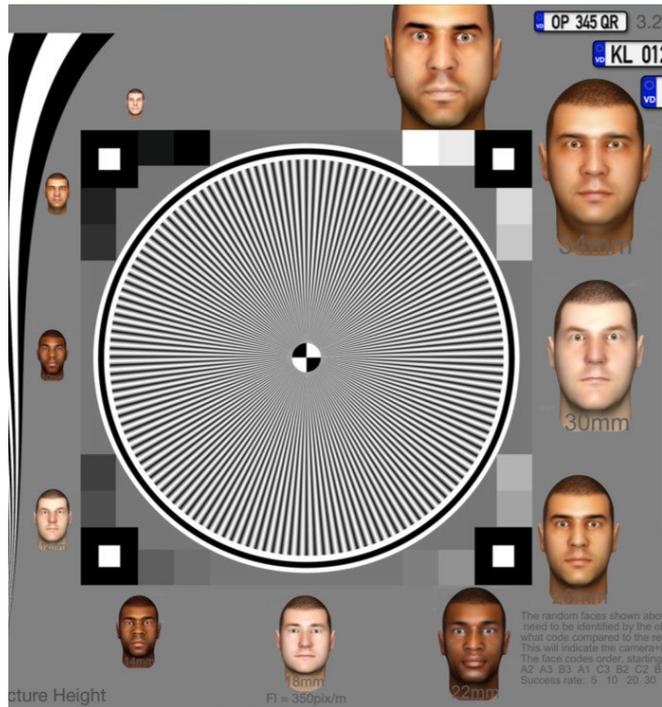


typical, but not natural, with over-sharpened images. We would like to add that designing of the sine-wave Siemens star patterns is not an easy task, it is an art in itself! Yet, after many months of designing, calculating and drawing using the finest drawing software available, we



are proud to say that we have produced a very accurate sine-wave Siemens stars. Our stars consist of 144 rays, displaced at 2.5° each, and printed in high quality on our latest test chart, granting accurate measurements of resolution.

We have also included the **face identification** method advised by the IEC 62676-4, which is based on UK's Home Office computer generated faces with various skin colours and facial expressions. This method is designed to offer visual evaluation of the entire system's quality based on the observer's judgement. Using this method, an observer can evaluate which camera, using which settings, and with which display decoding quality is suitable for the system. By determining which of the **random positioned** faces - decreasing in size clockwise - one can score the last recognised face going around the clock. Starting from the largest face at 1 o'clock, which is the easiest to identify (score 1), the observer can navigate clockwise around to the smallest face at 11 o'clock, (score 11). The importance of this method is that it does not rely on any numbers, nor technical understanding by the observer of the camera technology, or compression and decompression quality. It is deduced **purely by the observer's judgement**, one that usually works with such a system.





The next thing we included in the v.5.0 test chart is a variety of **licence plate** sizes positioned on the right hand side of the chart. We have reproduced plates that replicate those used in Europe (as well as other countries) with standard lettering sizes to cover

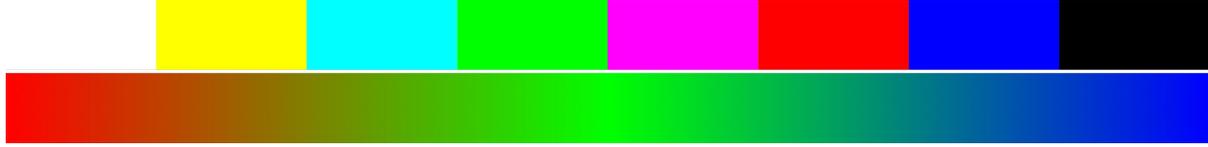
HD and UHD resolution cameras.

We have also included the **Macbeth colour chart**, familiar to many photographers and cinematographers. This colour chart is accurately reproduced with the standard 24 colours that are chosen for critical skin colour reproductions and at various colour light sources instead of saturated television colour bars. Using the software that we have developed for evaluating your exported image, we compare the produced colours by your camera with the chart reference and write the Delta E difference in each colour patch.

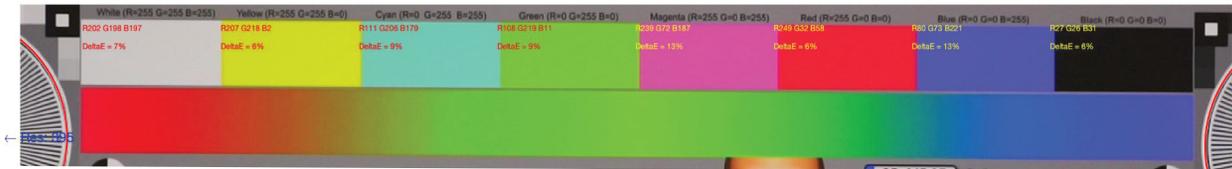


To the left of the middle Siemens star, we have included **money, coins, casino chips and cards**. These inclusions can be used to visually inspect the quality of a camera and lens setting for best reproduction needed in banks, casinos, or where money is exchanged.

Between the money images and the middle Siemens star we have managed to squeeze in a vintage-style squiggly four line **resolution evaluation** by judging where four black lines merge into three or two. This method is not as accurate as the Siemens star software measurement, but certainly can be used if needed. Here, the resolution is shown using the new units LP/PH, as advised by the IEC 62676-5.



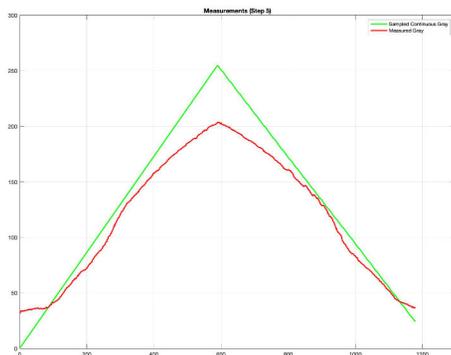
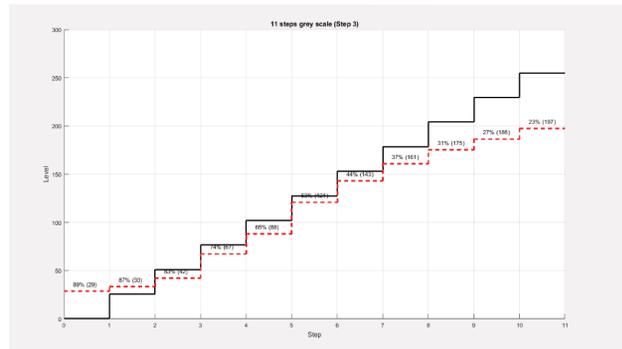
Both above and below the middle Siemens star you will find our traditional colour bars. Our software measures the **colour accuracy** of the eight television bars on top and shows them with their RGB values. This can be used for checking white balance accuracy of the system, together with the Macbeth colour chart. The continuous colour bar transitioning from red (on the left) to green (in the middle) and blue (on the



right) of the second colour bar has the same function as with our previous test chart v.4.x. It can be used to easily evaluate **quantisation and compression artefacts**.



With our software, the observer can now evaluate the continuity and shape of the black-white-black bar at the bottom, and produce the luminance change curve, which reveals the **image processing qualities** of the camera. The observer can also check the luminance of the 11 grey steps at the bottom, and display a graph of the luminance change, which

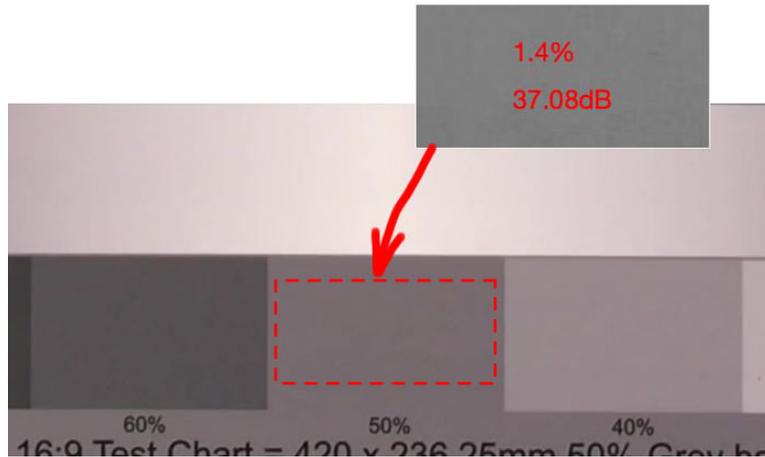


indicates the **Gamma** of the system.

We now sample the pixel variation of the middle grey patch of the 11 grey steps, which represents 50%. The variation of this pixel luminance is calculated as standard deviation, and produces a percentage of the pixel luminance variation, resulting in a **noise value in dB** for the given illumination, temperature and camera electronics. From

this we also derive the **S/N** value for the camera.

In a final note, we have included a yellow **metric ruler** at the top of the chart that is 1:1 scale and can be used for various measurements, often needed when evaluating and testing cameras.



The chart comes in A3 format, mounted on light but hardened board for easy transporting and mounting, together with user's manual. On special requests we can produce the chart in A2 format.

More information and ordering details can be found on our web site <http://www.vidilabs.com/testcharts.html>.

Danjanovski