By Les Simmonds

New Technology Colour Camera Tests

This year we will start our objective video testing articles with two new technology, high performance colour CCTV cameras.

We will carry out some basic objective tests on the Bosch Dinion XF LTC0610 1/2" colour camera and the Bosch Dinion XF LTC0485 1/3" colour camera. Bosch claims these cameras are the first CCTV cameras with 15 bit digital processing technology and we understand this series of cameras will be available in Australia later this month.

The camera tests we will carry out will comply with the European Standard EN 61146-1 Video Cameras (PAL/SECAM/NTSC) – Methods of measurement – Part 1: Non-broadcast single-sensor cameras. This standard is also known as IEC 1146-1 and BS EN 61146-1 and is accepted world wide as the preferred method of testing single chip CCTV cameras and is suitable for all current colour or monochrome single chip cameras. The standard includes a large number of camera tests and it would take the whole magazine to show you test results and waveform images for each of the tests so we will limit the results to the most common tests discussed in the industry in relation to CCTV cameras.

The Cameras

For most of last year we were hearing of the previous model Bosch Dinion cameras winning the bulk of the CCTV camera shootouts in Europe so we were very interested to get our hands on the new and improved Dinion XP cameras.

The features and manufacturer's specification for both tested cameras are the same except for sensitivity which is improved with the 1/2" model.

Some of the interesting features of both cameras include:

XF Dynamic – 15 bit digital processing which greatly improves the dynamic range (contrast handling capabilities) of the camera compared to other CCTV cameras.

We noted one of the effects of this on the greyscale test where the results were found to be superior to any previous CCTV cameras we have tested. It was also interesting to note that the greyscale output from both Bosch cameras was superior to the much more expensive digital camera we used to photograph the greyscale test chart.

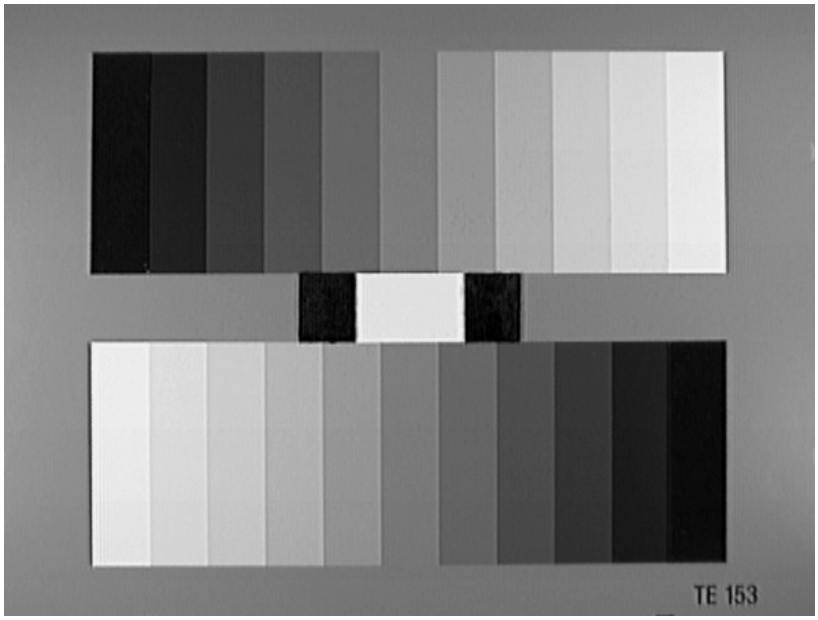
Both cameras were accurately set for 1 volt peak-peak output during manufacture. Regular readers know my concerns about the non standard and very high video levels from many CCTV cameras affecting and/or overloading digital recording and transmission equipment.

Programmable Modes – Both cameras support three independent operating profiles which are fully programmable from the on screen menu which is controlled from the side of the camera or via the Bosch Bilinx communications module which can control any menu item from a remote location via the coax cable.

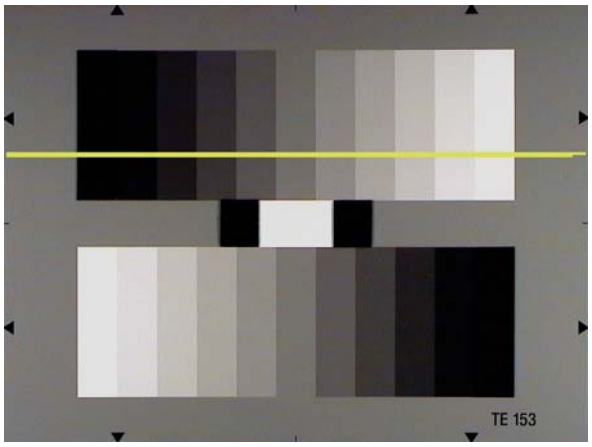
Lens Wizard – The Dinion XF cameras auto detects the lens type (manual iris, DC iris, video iris) or it can set manually. The lens wizard can be used to back focus the lens with maximum iris opening so the lens will maintain focus through all lighting conditions over a 24 hour period. This and many other features make these cameras very easy to install.

Cable Compensation – The cameras include built in and menu controlled cable compensation which eliminates the need for an additional equalising amplifier on long coaxial cable runs. The cable compensation can be switched off or set for three types of coaxial cable and the equalising levels can be adjusted over a wide range.

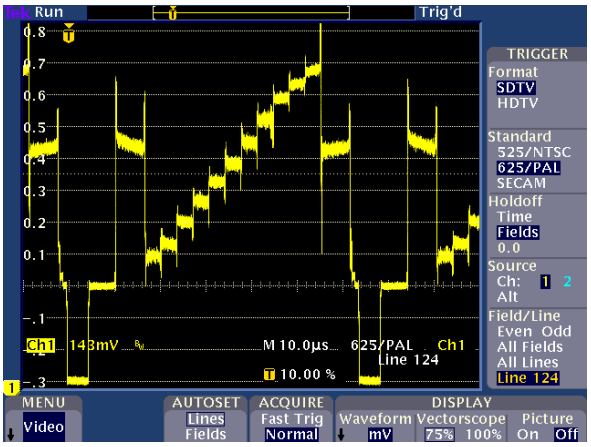
Our tests showed that there is a degree of cable compensation even when the cable compensation is switched off. This can add overshoot and undershoot to the video signal with very short cable runs as can be seen on the waveform images. Our tests suggest Bosch have set the off position



Bosch Dinion XF LTC0610 colour camera greyscale image.



Greyscale test chart image showing measurement area in yellow.



Bosch Dinion XF LTC0610 colour camera greyscale waveform image of test area and good linearity.

cable compensation to suit coaxial cable runs of about 100 metres, which is about average.

The overshoot and undershoot from these cameras is very clean and does not detract from the viewed image but is very noticeable when the camera is connected via 1.5 mtres of coaxial cable to sensitive test equipment. It is interesting to note that the European Standard EN 61146-1 Video Cameras (PAL/SECAM/NTSC) – Methods of measurement – Part 1: Non-broadcast single-sensor cameras states the following in a footnote for the overshoot and undershoot tests: "To improve the apparent sharpness of the visible picture, some cameras may produce an overshoot at the edge of a bar signal. Taking this into account, it should be noted that a smaller amplitude of overshoot and undershoot does not necessarily indicate better picture quality".

The Tests

This series of tests shows the camera test chart with a yellow marker showing the actual position of measurement on the camera test chart in relation to the waveform image. This will assist those who are interested in how these test measurements are made.

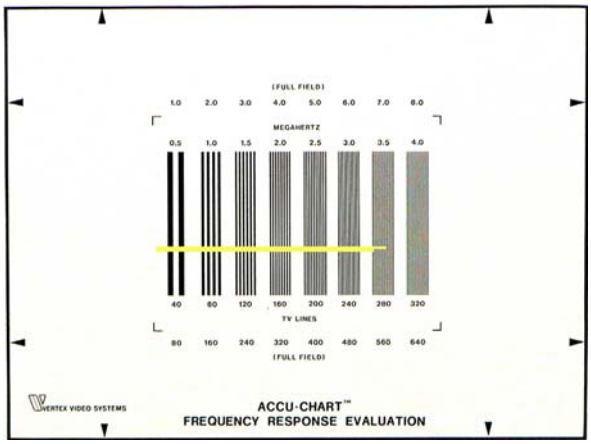
The tests were carried out with both cameras in their default (out of the box) settings, except for the lens wizard which was set for a manual lens to suit our high performance Schneider test lens.

The sensitivity according to EN 61146-1 standard for the Dinion XF LTC0610 1/2" colour camera sensitivity to be 14.96 lux for full video and 7.84 lux for half video and the Dinion XF LTC0485 1/3" colour camera sensitivity to be 27.8 lux for full video and 8.96 lux for half video. This figure is in variance with the manufacturer's claim, but this is normal with most cameras because sensitivity test references are rarely quoted by manufacturer's these days.

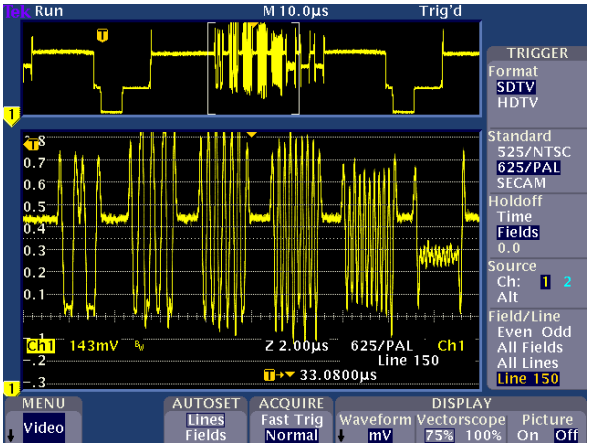
We found the greyscale of both cameras to be well within specification and more linear than most we have tested. See the earlier note about the linear greyscale compared with digital camera.

The resolution of both cameras was 480 TV lines which is exactly as specified by Bosch. Another pleasant surprise! The waveform image shows a depth of modulation of about 15% at 480 TV lines which is three times more than the 5% depth of modulation as specified in EN 61146-1.

We included an image and waveform of the overshoot mentioned above. This apparently complies with the EN 61146-1 standard and improves the apparent resolution to the eye viewing a CCTV monitor over a normal coaxial cable length.



Frequency response evaluation test chart image showing measurement area.



Bosch Dinion XF LTC0610 colour camera frequency response waveform image showing 1.0 MHz, 2.0 MHz, 3.0 MHz, 4.0 MHz, 5.0 MHz and 6.0 MHz. Note: 6.0 MHz is equal to 480 TV lines.

These two cameras show the high level of engineering expertise and strong commitment Bosch are putting into their CCTV products.

In the next issue we may test the monochrome equivalents of the two tested above and an Australian made RF transmission system.

Acknowledgements:
Bosch Security Systems Pty Ltd
Web:
www.boschsecuritysystems.com.au.

Les Simmonds is a truly independent CCTV consultant and CCTV testing authority.

Email:
les@cctvconsultants.com.au

Web:
www.cctvconsultants.com.au

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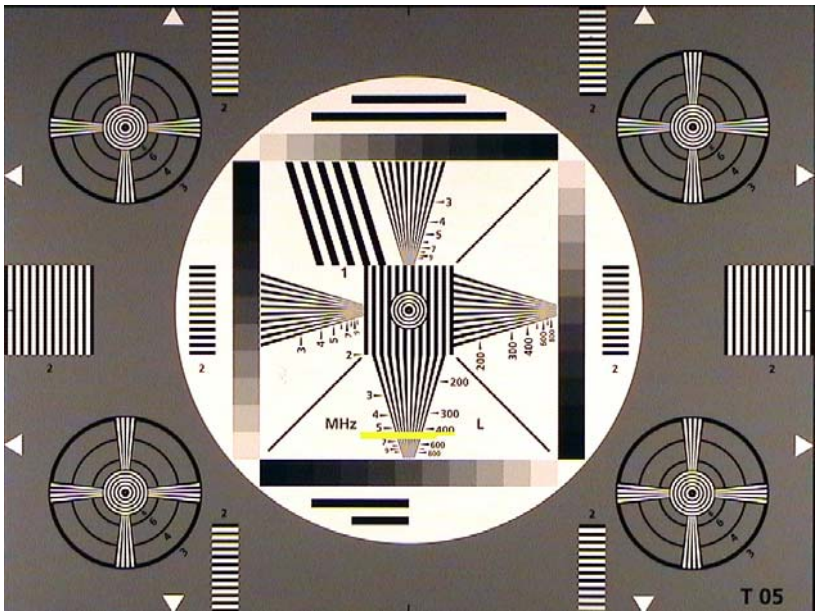
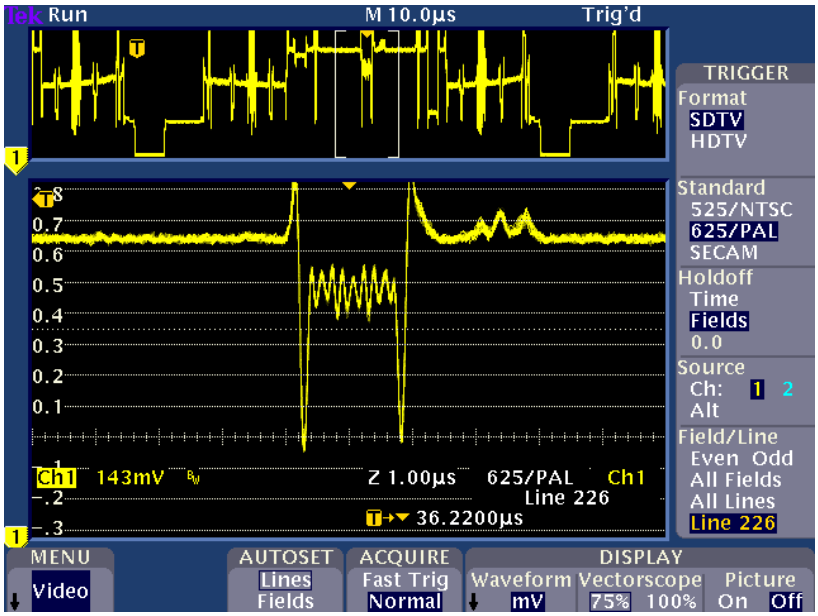
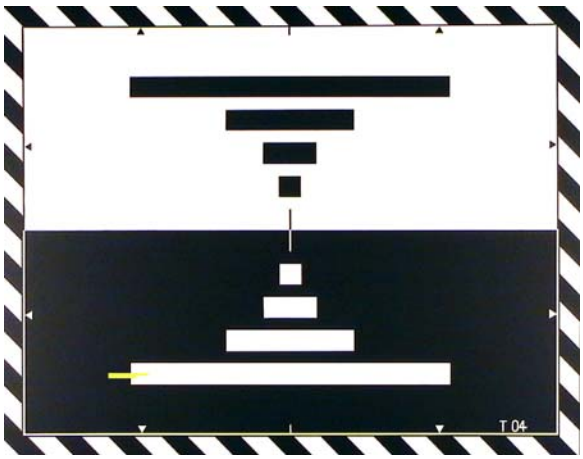


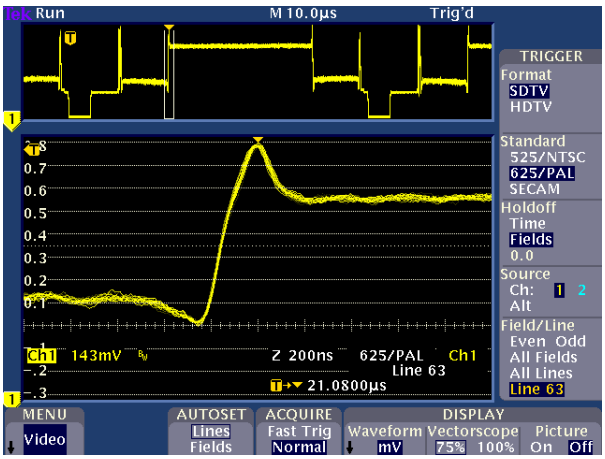
Universal camera test chart (RETMA) image showing area of resolution measurement.



Bosch Dinion XF LTC0610 colour camera resolution waveform showing about 15% depth of modulation at 480 TV lines.



Bar Test Chart showing area of overshoot measurement.



Bosch Dinion XF LTC0610 colour camera overshoot measurement waveform showing overshoot level.