

Application Note

AUTOMATED EUT TEMPERATURE MONITORING USING R&S®ADVISE WITH IR CAMERAS

Products:

- ▶ R&S®AdVISE

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1 Overview

R&S®AdVISE is a visual inspection software to monitor different regions of interest (ROIs) in a video for visible and audible changes. It automates the process of visually monitoring equipment under test during a test sequence and therefore eliminates human inattention, ensures reproducible results and simplifies the test documentation. R&S®AdVISE offers the possibility to monitor up to 32 ROIs in one video with 12 different specialized ROI types for different kinds of events. That allows the user to apply R&S®AdVISE to all sorts of individual test setups.

This application note explains how to setup R&S®AdVISE to monitor the temperature of an EUT by using an infrared camera.

2 Preparation

2.1 Setup

Figure 2-1 shows a typical setup for using R&S®AdVISE in an EMC test. Connected to the R&S®AdVISE test PC is the thermal camera, either directly via USB or through a capture device.

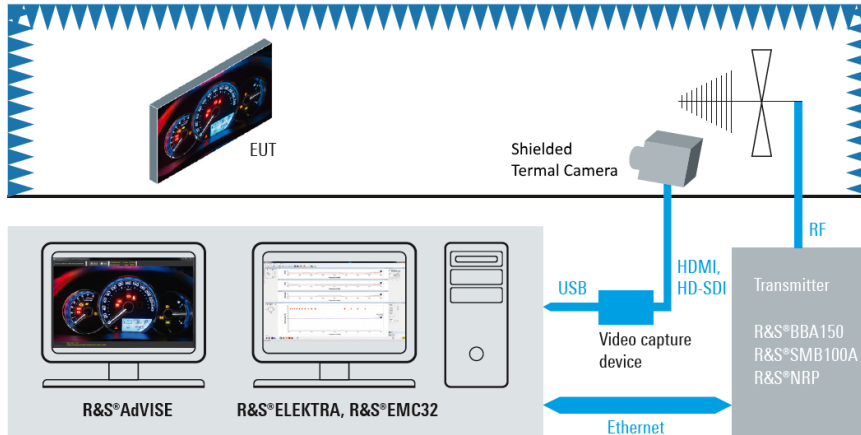


Figure 2-1: Block diagram of an EMC Test with a shielded thermal camera

2.2 Infrared Camera Signals

Infrared cameras show a picture as a function of the temperature. Usually the output video comes with a scale, to assign different colors to certain temperatures. Figure 2-2 shows the output of an infrared camera with the corresponding scale embedded in the video. It monitors a smartphone.

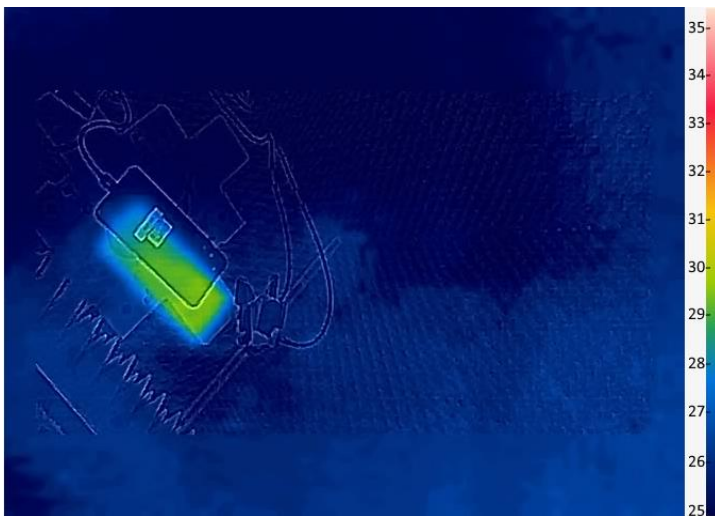
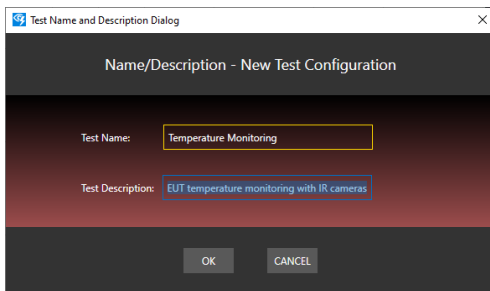


Figure 2-2: Example of a thermal camera output

3 Configuration

Explained in this application note are two main different use cases. The first use case is **detecting changes in the temperature** of the EUT, no matter in which direction. The second use case is **detecting overheating**, which means making sure, that the EUT doesn't go over a defined temperature. The basic configuration however is the same, so first of all you have to perform the steps 1 to 5.

1. Open R&S®AdVISE.
2. Choose the infrared camera under "Setup" as the camera input and make sure, the right image is shown under "Camera Maintenance".
3. Under "Manage Test Configurations" create a new test configuration.



4. Now open the created test configuration in the test mode you need (Virtual Camera, Local or Remote test mode).

Your test should now look similar to [Figure 3-1](#).

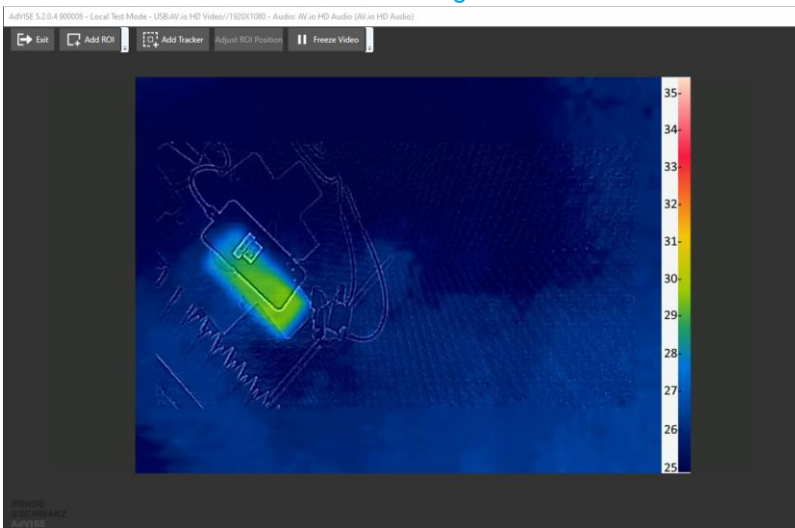


Figure 3-1: Example of local test with a thermal camera

From this point on the two different use cases are distinguished.

3.1 Detecting changes in temperature

After performing the basic configuration from above, to detect changes in the temperature of the DUT, perform the following steps:

- ▶ Select the ROI "Color Change" and place it over your EUT, as it is shown in [Figure 3-2](#). Here the ROI covers the whole smartphone. For more detailed information about the Color Change ROI, please refer to the user manual.
- ▶ Then set the limits of the ROI to a percentage that matches your test case. If you want to have only bigger changes detected, you can choose something around 5 to 10%. If you want to detect all changes, even small ones, better choose something around 2% as shown in [Figure 3-2](#).

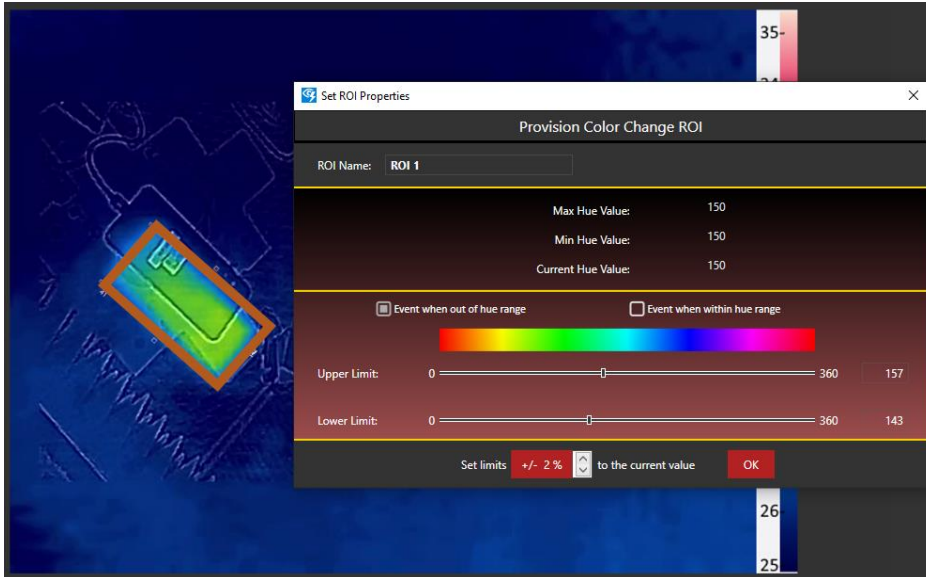


Figure 3-2: Placing the ROI and setting limits to +/- 2%

- ▶ Now you are ready to start the test.

3.2 Detecting overheating

If the EUT consists of different areas with different temperatures zones, you should place several ROIs at the critical location, as shown in the following example. If however, the EUT basically has the same temperature everywhere, you can work with one ROI that covers the whole EUT.

In this example, an alarm should be triggered, if the EUT goes above 32°C.

- ▶ First you have to determine which color value corresponds to the limit temperature. To do this, place the ROI "Color Change" very narrow onto the color on the color scale that represents 32°C as shown in [Figure 3-3](#).

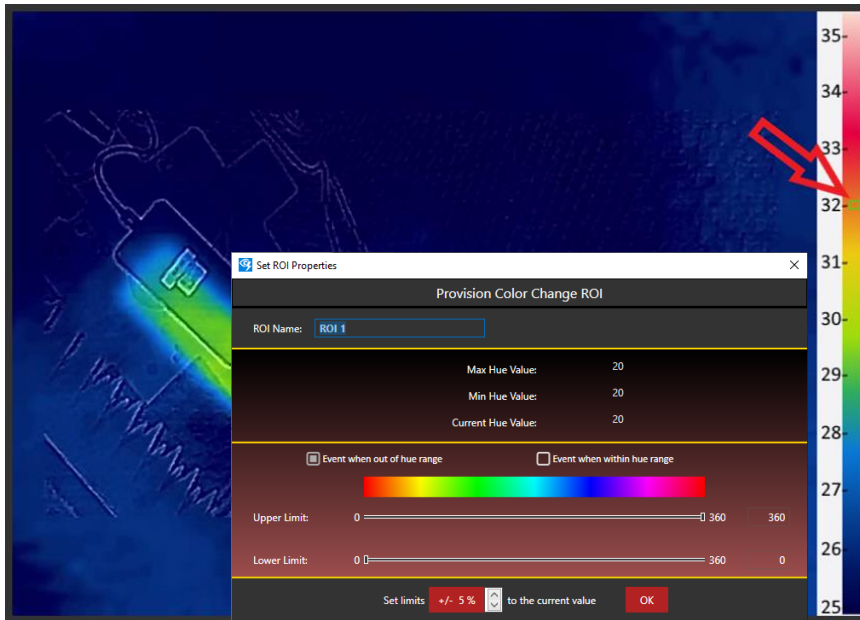


Figure 3-3: Position of the Color Change ROI to determine the hue value for the lower limit

- ▶ Now look at the "Current Hue Value" and memorize that value for the following steps. In this case it is 20.
- ▶ Delete the ROI on the scale and place a new Color Change ROI onto the first region of your EUT you want to monitor.
- ▶ In the configuration menu,
 - set the lower limit onto the memorized Hue value of 20
 - set the upper limit to the color that represents the maximum temperature at the scale of the thermal camera. In this case it is 278
 - set "Event when outside of the range,"

Figure 3-4 shows the configuration of the Color Change ROI for this example.

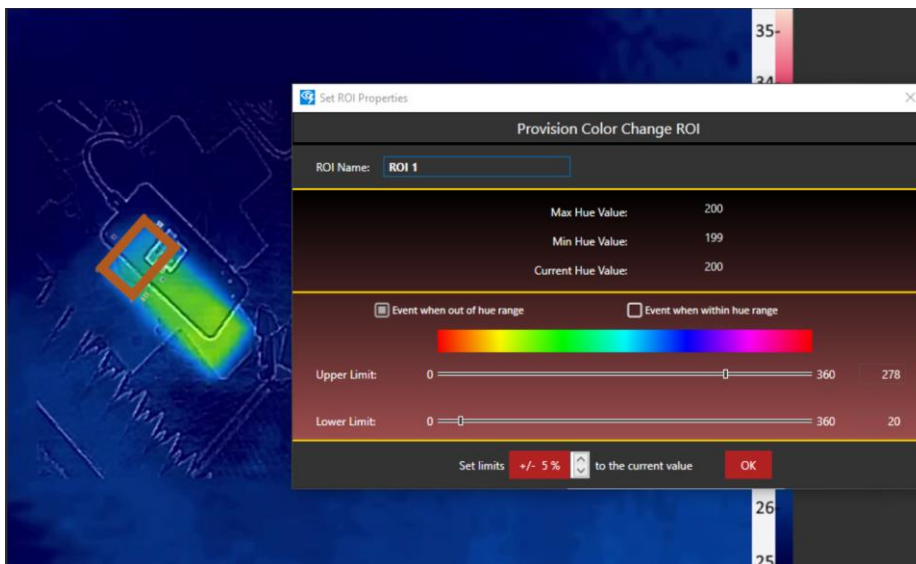
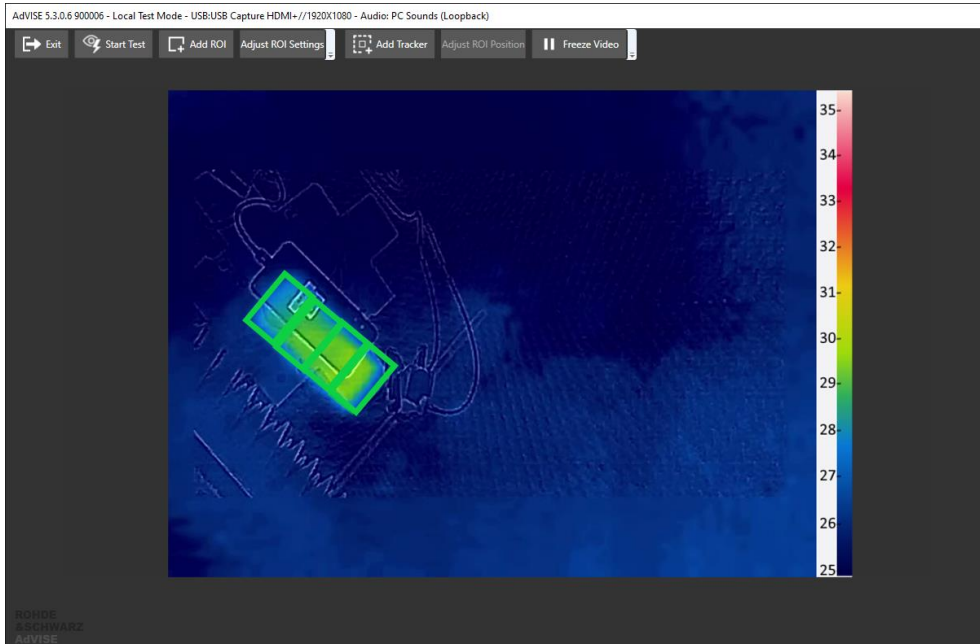


Figure 3-4: Configuring a Color Change ROI for a defined upper temperature

- ▶ Confirm your decision with "OK".
- ▶ Set the remaining ROIs analogously if necessary.
- ▶ Now the setup is ready and the test can be started.



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R&S@AdVISE with IR cameras

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