GENERIC REMOTE INTERFACE R&S®ADVISE

Products:

► R&S®AdVISE

This application note describes how to use the generic interface in R&S®AdVISE for remote operation.

ROHDE & SCHWARZ

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Contents

1 Introduction

R&S®AdVISE is a visual inspection software to monitor up to 32 different Regions of Interest in one video for visible and audible change. It can be controlled via a remote-control interface. Although R&S®AdVISE is generally used with an EMS system it can be used by any system that wishes to receive information about a monitored object and control when that information is collected and returned.

If used together with R&S®ELEKTRA or R&S®EMC32, the generic driver is already implemented in these tools. In that case, no additional information is needed to run the system via remote control. If R&S®AdVISE is supposed to be controlled via any other software, this document provides the information needed to configure the system.

R&S®AdVISE offers two different interfaces to communicate with - a generic and an advanced interface. The generic interface, described in this document, is open for any external control software and passes on a collective information about the state of all ROIs. The advanced interface offers the same possibilities, but in addition presents the individual ROI statuses for processing them in the remote-control software. For information about the advanced interface, see "Advanced Remote Interface R&S®AdVISE - Application Note"

This application note explains how to set up R&S®AdVISE for remote testing via the generic interface, and how to set up the remote software at the example of R&S®Forum (chapter 2). The message flow between R&S®AdVISE and a remote system is specified and the most important commands are explained (chapter 3). Specific commands in other EUT monitoring software might differ. Finally, an overview over different commands is given (appendix A) and a R&S®Forum sample script is provided for conducting a remote test using the generic interface (see appendix B).

2 R&S®AdVISE Operation under Remote Control

When R&S®AdVISE is used in a remote test, i.e. a test under the control of a remote system, R&S®AdVISE responds only to the commands sent to it by the remote system.

R&S®AdVISE initiates a listen on port 57777 and waits for a connection request from the remote system. R&S®AdVISE will only support a single connection at any one time and is tolerant of systems that use a 'connect' - 'send command' - 'disconnect' behavior as well as system that will connect and hold that connection for the duration of a test.

All messages between the remote system and R&S®AdVISE are sent as UTF-8 type characters or in ASCII format.

When R&S®AdVISE is used in the remote test mode, it is fully under the control of the remote system and will remain so until the remote system sends the "STOPTEST" command. The other way to stop the remote test is pressing the "STOP" button in R&S®AdVISE. If done so, R&S®AdVISE will close the camera window and close the recorder file, but it will **not** inform the remote system.

2.1 Software Settings in R&S®AdVISE

2.1.1 Configuring R&S®AdVISE

In addition to the usual configuration as described in the user manual, the following adjustments have to be made to run R&S®AdVISE in remote mode.

1. Go to: `Setup` → `EMC System Options` → select `Generic EMC System`

2. Click on the `Run Test` icon → select `Remote` → select your test → `Run Test`

3. Adjust `EMS Data Fields`
Ticking or unticking the different boxes enables the corresponding text fields in the video. Those categories that are unticked won't show up in the video window and won't be burned onto the video during the recording.

4. Click `Start test`

Now R&S®AdVISE is ready for remote testing.

2.1.2 Status signaling

During remote testing, you can check for proper operation by various visual components:

► Once an EUT monitoring software establishes a connection to R&S®AdVISE the EMC Connection Status will change from "DOWN" to "UP" (Figure 2-1) and R&S®AdVISE will move to standby state waiting to receive commands (Figure 2-2)

► Once R&S®AdVISE receives the "Start Test" command it moves to the active test state and starts recording a video (Figure 2-3)

► EMS information is displayed in the top left corner unless manually moved to another position (Figure 2-4)

► Each analysis period is indicated by green text "Analysis ON" directly below the EMS information. Otherwise, it states "Analysis OFF" in red (Figure 2-4).

Figure 2-1: EMC Connection Status (left: no TCP/IP connection, right: TCP/IP connection established

Figure 2-2: Waiting for Start Test command

Figure 2-3: Start Test command received
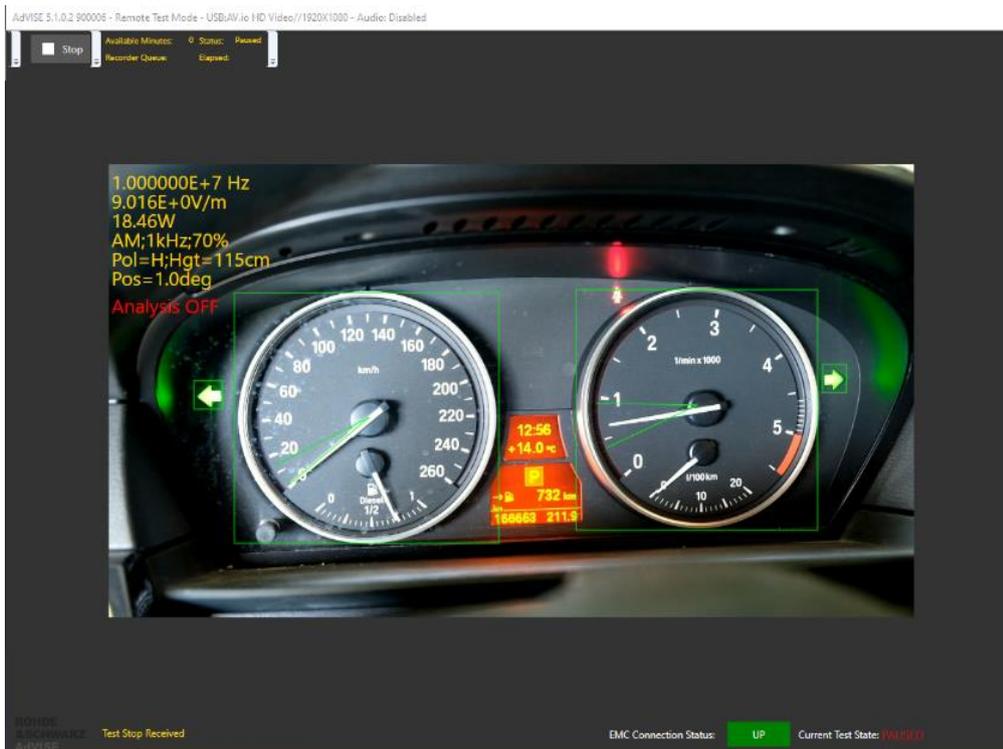
Figure 2-4: Camera view with embedded EMS information and analysis status

2.2 Software Settings in R&S®FORUM

The settings shown here are only relevant, if R&S®FORUM is used to establish a connection. Other system requirements may vary.

In R&S®FORUM go to: `Settings` → `Instruments` → `Add`

Add the R&S®AdVISE generic interface as follows:

```
Name: AdVISE
Interface Type: Socket
IP Address: IP Address of AdVISE
Port: 57777
```

The port of the generic interface is always set to 57777. That can be looked up by opening R&S®AdVISE and going to

`Setup` → `EMC System Options` → `Default TCP IP Port`

3 Procedure: Remote testing

After successfully establishing a TCP/IP connection between R&S®AdVISE and the remote system, this section describes the operation of the generic interface including message flow, responses and the correct order in which messages must be sent. Only if this order is met, it is ensured, that the results will be as anticipated.

3.1 Signal flow

All commands appearing in the diagram are essential to the success of the test. Other additional commands are listed in appendix A.

The flow should be as follows:
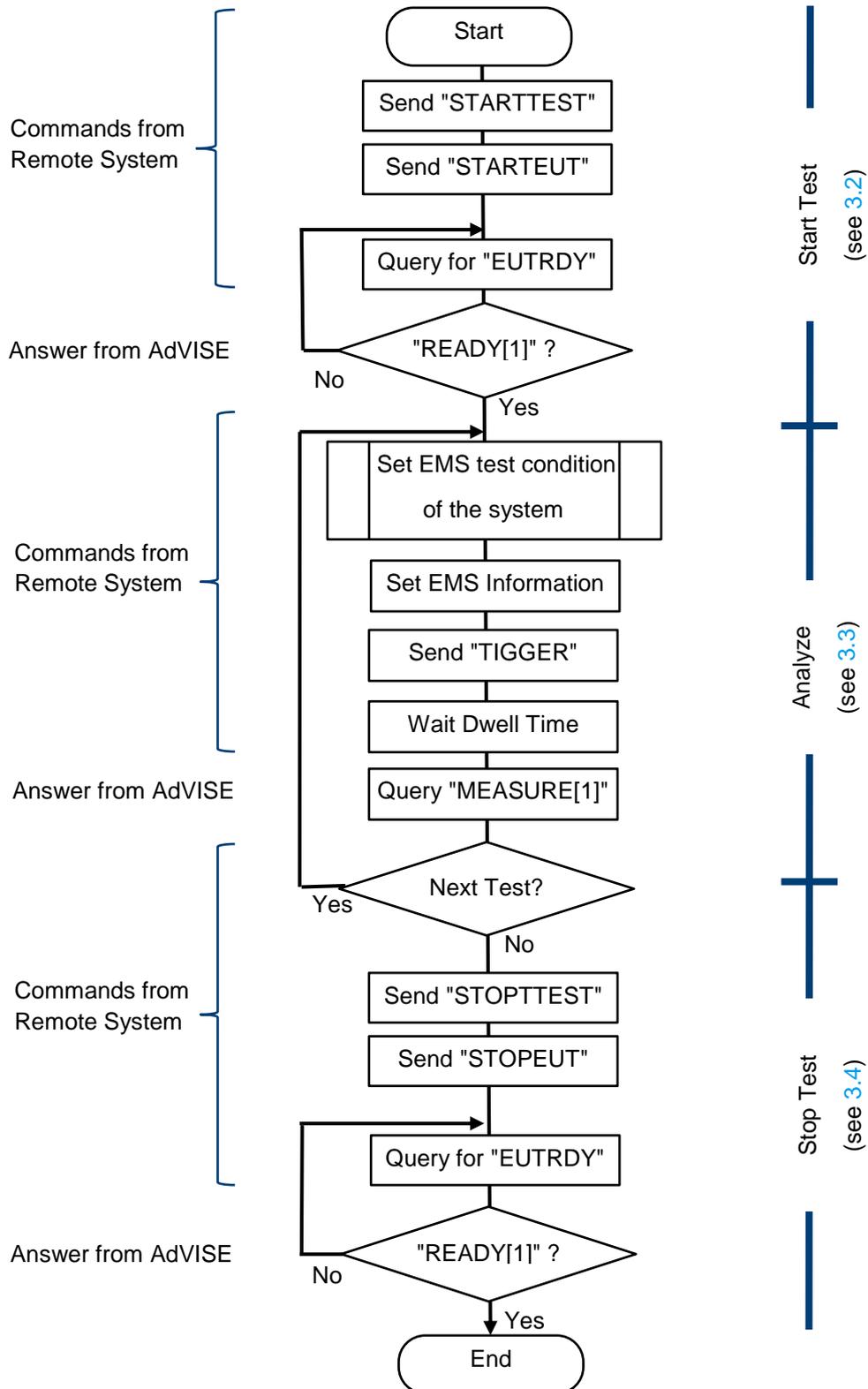
3.2 Start test

The following commands have to be sent in order to start a test:

```
STARTTEST
STARTEUT
do {
    ready <- EUTRDY
} WHILE ready != READY[1]
```

3.3 Analyze

After starting a test an arbitrary number of analysis periods can be conducted. In order to do that you should first set EMS information in order to identify the analysis period and secondly measure.

3.3.1 Set EMS test condition of the system

Here you configure the test conditions like the number of analysis periods and the changing EMS information.

3.3.2 Set non-changing EMS information

Use the commands given in the EMS information table in the next section in order to set the non-changing EMS information (see appendix A). Together with the changing EMS information, they appear in the video window in R&S®AdVISE and are burnt onto the video.

3.3.3 Measure

Start an analysis period by sending "TRIGGER". After some waiting time query "MEASURE[1]". R&S®AdVISE returns "MEAS:1.0V" if no ROI triggered an event during the analysis period and "MEAS:0.0V" otherwise.

3.4 Stop test

The following commands have to be sent in order to stop a test:

```
STOPTEST
STOPEUT
```

Appendix

A   List of commands

The usage of the following commands is explained in more detail in chapter 3.

Commands

Command	Description / Example	Response
INIT	Initializes TCP/IP connection `'INIT'`	no
STARTEUT	Tells R&S®AdVISE to ensure the camera is running and the recorder has opened a new file and is ready to receive processed/analyzed video frames `'STARTEUT'`	no
STARTTEST	Starts recording, should only be sent once per test `'STARTTEST'`	no
STOPEUT	Tells R&S®AdVISE to stop all processing and to put itself in a READY state `'STOPEUT'`	no
STOPTEST	Tells R&S®AdVISE to stop capturing and close the recorder file Should only be sent once per test `'STOPTEST'`	no
TRIGGER	Starts an analysis period, must be paired with MEASURE command `'TRIGGER'`	no

Queries

Command	Description / Example	Response
EUTRDY	Checks if R&S®AdVISE is ready to perform it's tasks after calling STARTEUT, is sent once at the beginning and once at the end of a test `'EUTRDY'`	`WAIT[0] or` `READY[1]`
MEASURE	Terminates R&S®AdVISE's measurement period, must be paired with TRIGGER command `'MEASURE[1]'`	`MEAS:1.0V` ≜ Go `MEAS:0.0V` ≜ No Go
*IDN?	Identifies R&S®AdVISE `'*IDN?'`	`R&S AdVISE,` `V.<x>.<y>`

For the commands and queries, ";" is a permitted separator as well as self defined sperarators.

EMS information

The following commands are optional. They will be shown in the camera window by R&S®AdVISE and additionally will be burned onto the video. The values are not interpreted by R&S®AdVISE but simply displayed. The entire String for each command cannot exceed 50 characters.

Command	Description / Example	Response
FREQ <text>	Set test frequency information `'FREQ 1.00000E+7Hz'`	no
LEVEL <text>	Set immunity level information `'LEVEL 9,875E+0V/m'`	no
POWER <text>	Set transducer power information `'POWER 18.96 W'`	no
MODULATION <text>	Set modulation parameter information `'MODULATION AM,1kHz,80%'`	no
ANTPOSITION <text>	Set antenna position information `'ANTPOSITION Pol=H, Hgt=155cm'`	no
TTPOSITION <text>	Set turntable position information `'TTPOSITION Pos=0.0deg'`	no

B Sample script

The following R&S®Forum sample script (also downloadable from the R&S website) transmits some EMS information to R&S®AdVISE and performs a remote test with two analysis periods.

In `Settings` → `Instruments` → `Add,` add the R&S®AdVISE generic EMC system as follows:

```
Name: AdVISE
Interface Type: Socket
IP Address: IP Address of AdVISE
Port: Port of AdVISE generic interface (=57777)
```

Prepare R&S®AdVISE as described in chapter 2.

```
AdVISE.instrument.write_termination = '\n'
AdVISE.instrument.read_termination = '\n'

#Start a test
AdVISE.write('STARTTEST')
time.sleep(.2)
AdVISE.write('STARTEUT')
time.sleep(.2)
_ready = AdVISE.query('EUTRDY')
while _ready != 'READY[1]':
    _ready = AdVISE.query('EUTRDY')
    time.sleep(0.5)

#Two analysis periods
for i in range(2):
    AdVISE.write('FREQ {0}.000000E+7 Hz'.format(i+1))
#Changing frequency
    AdVISE.write('TRIGGER')
    time.sleep(6)
    _result = AdVISE.query("MEASURE[1]")

#Set non-changing EMS information
AdVISE.write('LEVEL 9.875E+0 V/m')
AdVISE.write('POWER 18.96 W')
AdVISE.write('MODULATION AM,1kHz,80%')
AdVISE.write('ANTPOSITION Pol=H, Hgt=155cm')
AdVISE.write('TTPOSITION Pos=0.0deg')

#End the test
AdVISE.write('STOPTEST')
AdVISE.write('STOPEUT')
AdVISE.query('EUTRDY')
```
Example 3-1: R&S®Forum code for remote testing with R&S®AdVISE

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