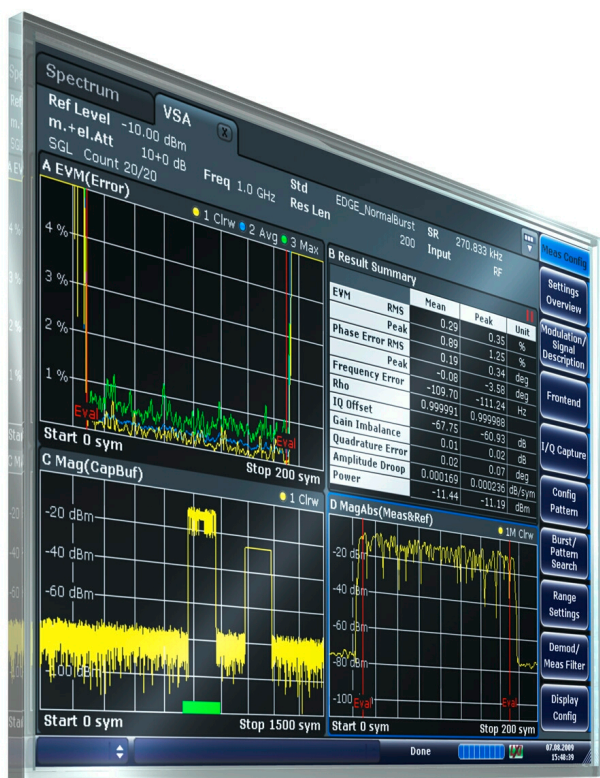# R&S® FSV-K70
Firmware Option Vector Signal Analysis
Getting Started

ROHDE&SCHWARZ

This manual describes the following R&S®FSV options:

- R&S FSV-K70 (1310.8455.02)

This manual is applicable for the following analyzer models with firmware version 1.61 and higher:

- R&S®FSV 3 (1307.9002K03)
- R&S®FSV 7 (1307.9002K07)
- R&S®FSV 13 (1307.9002K13)
- R&S®FSV 30 (1307.9002K30)
- R&S®FSV 40 (1307.9002K39)
- R&S®FSV 40 (1307.9002K40)

The firmware of the instrument makes use of several valuable open source software packages. For information, see the "Open Source Acknowledgement" on the user documentation CD-ROM (included in delivery).
Rohde & Schwarz would like to thank the open source community for their valuable contribution to embedded computing.

The following abbreviations are used throughout this manual: R&S®FSV is abbreviated as R&S FSV.

Contents

1 Preface

When equipped with application firmware R&S FSV-K70, the analyzer performs vector measurements on digitally modulated signals in the time domain. Based on the vector measurements, further evaluations, e.g. statistical evaluations, can be performed.

1.1 Documentation Overview

The user documentation for the R&S FSV-K70 application is divided as follows:

- Getting Started
- Operating Manual
- Online Help

Getting Started

With the help of a few sample measurements for the digital GSM and EDGE standards, this document provides a quick introduction to typical vector analyzer measurements. The individual measurements are in logical order and are meant to familiarize you gradually with the measurements required of general vector signal analysis.

Transmitter operation is only described as far as required for performing the measurements. For more details on the measurements, refer to the test transmitter documentation.

Operating Manual

The operating manual describes the specific instrument functions of the option in detail. It also includes background information on vector signal analysis, as well as troubleshooting information.

For additional information on default settings and parameters, refer to the data sheets. Basic information on operating the R&S FSV is not included, see the base unit documentation for that.

Online Help

The online help contains context-specific help on operating the R&S FSV, including the K70 option. It describes both manual and remote operation. The online help is installed on the R&S FSV by default.

1.2 Conventions Used in the Documentation

1.2.1 Typographical Conventions

The following text markers are used throughout this documentation:

Convention	Description
"Graphical user interface elements"	All names of graphical user interface elements on the screen, such as dialog boxes, menus, options, buttons, and softkeys are enclosed by quotation marks.
KEYS	Key names are written in capital letters.
`File names, commands, program code`	File names, commands, coding samples and screen output are distinguished by their font.
Input	Input to be entered by the user is displayed in italics.
Links	Links that you can click are displayed in blue font.
"References"	References to other parts of the documentation are enclosed by quotation marks.

1.2.2 Conventions for Procedure Descriptions

When describing how to operate the instrument, several alternative methods may be available to perform the same task. In this case, the procedure using the touch screen is described. Any elements that can be activated by touching can also be clicked using an additionally connected mouse. The alternative procedure using the keys on the instrument or the on-screen keyboard is only described if it deviates from the standard operating procedures.

The term "select" may refer to any of the described methods, i.e. using a finger on the touchscreen, a mouse pointer in the display, or a key on the instrument or on a keyboard.

2 Brief Introduction to Vector Signal Analysis

In this chapter we provide a brief overview of vector signal analysis. For detailed information see the R&S FSV-K70 Operating manual.

The goal of vector signal analysis is to determine the quality of the signal that is transmitted by the device under test (DUT) by comparing it against an ideal signal. The DUT is usually connected with the analyzer via a cable. The key task of the analyzer is to determine how the ideal signal would look. Hence, the analyzer aims to reconstruct the ideal signal from the measured signal that is transmitted by the DUT. This ideal signal is commonly referred to as the reference signal, while the signal from the DUT is called the measurement signal.

After the extraction of the reference signal, the measurement signal and the reference signal are compared by the vector signal analysis software and the results of this comparison are displayed on the analyzer screen.

The most common vector signal analysis measurement is the EVM (Error Vector Magnitude) measurement. Here, the complex baseband reference signal is subtracted from the complex baseband measurement signal. The magnitude of this error vector represents the EVM value. The EVM has the advantage that it "summarizes" all potential errors and distortions in one single value. If the EVM value is low, the signal quality of the DUT is high.
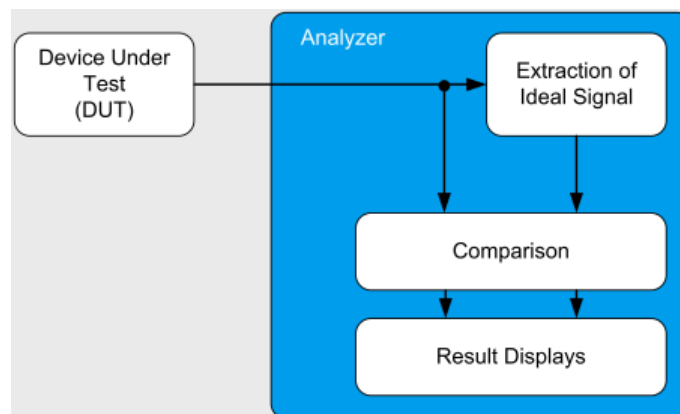

Fig. 2-1: Simplified schema of vector signal analysis

3 Connecting the Transmitter and Analyzer

In order to perform measurements with the R&S FSV-K70, you require a test transmitter to emulate a DUT. For measurement example 2 (see chapter 5, "Measurement Example 2: Burst GSM EDGE Signals", on page 19), the test transmitter needs to be GSM-compatible. It is recommended that you use an R&S®SMU (order number 1141.2005.02) with the digital standard option GSM/EDGE (order number 1160.7609.02).

Connect the RF output of the R&S SMU with the RF input of the R&S FSV.
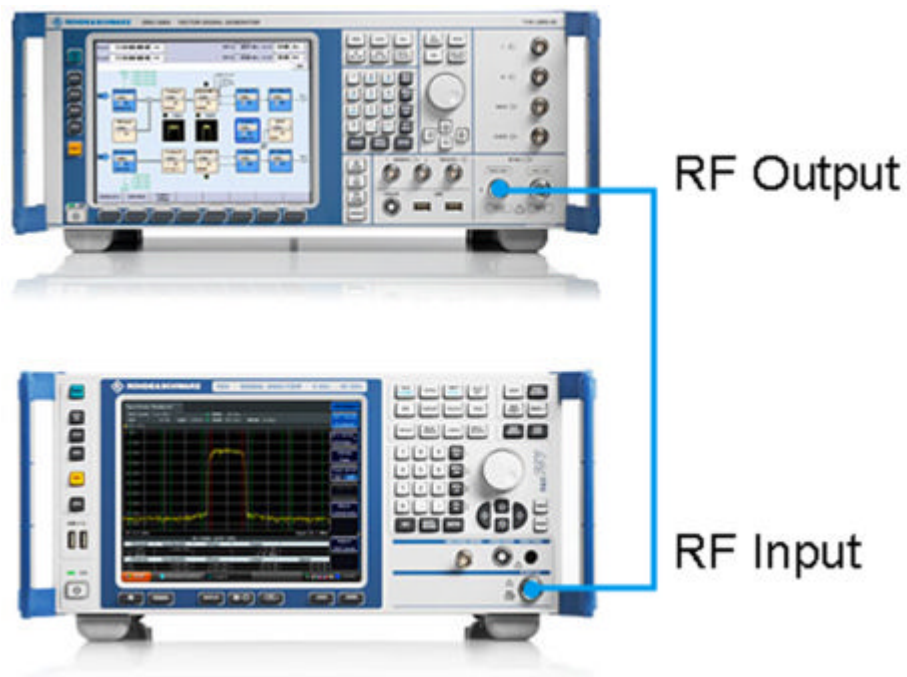
Fig. 3-1: Connection to a test transmitter (for example R&S SMU)

4 Measurement Example 1: Continuous QPSK Signal

In this measurement example a continuous QPSK (Quadrature Phase Shift Keying) signal will be measured and evaluated. QPSK is used in several standards such as DVB-S2, APCO25, WCDMA, CDMA2000, etc. For the description (characterization) of a continuous QPSK signal, the following parameters are the most important:

● Carrier Frequency

● Level

● Symbol Rate

● Transmit Filter

4.1 Transmitter Settings

This section summarizes the necessary transmitter settings. It contains a list of the parameters and step-by-step instructions for the R&S SMU. If you are interested in a more detailed description or background information, refer to the user manual of the R&S SMU, which can be downloaded from the Rohde&Schwarz website: www.rohde-schwarz.com/downloads/manuals/smu200A.html.

Frequency	1 GHz
Level	0 dBm
Modulation	QPSK
Symbol Rate	1 Msym/s
Filter	Root Raised Cosine with Roll-Off 0.35

To define the settings for the R&S SMU

1. Press the PRESET key to start from a defined state.

2. Press the FREQ key and enter *1 GHz*.

3. Press the LEVEL key and enter *0 dBm*.

4. To define the modulation:
   a) Press the DIAGRAM key.
   b) Select the first block ("Baseband A") in the settings overview and press ENTER.
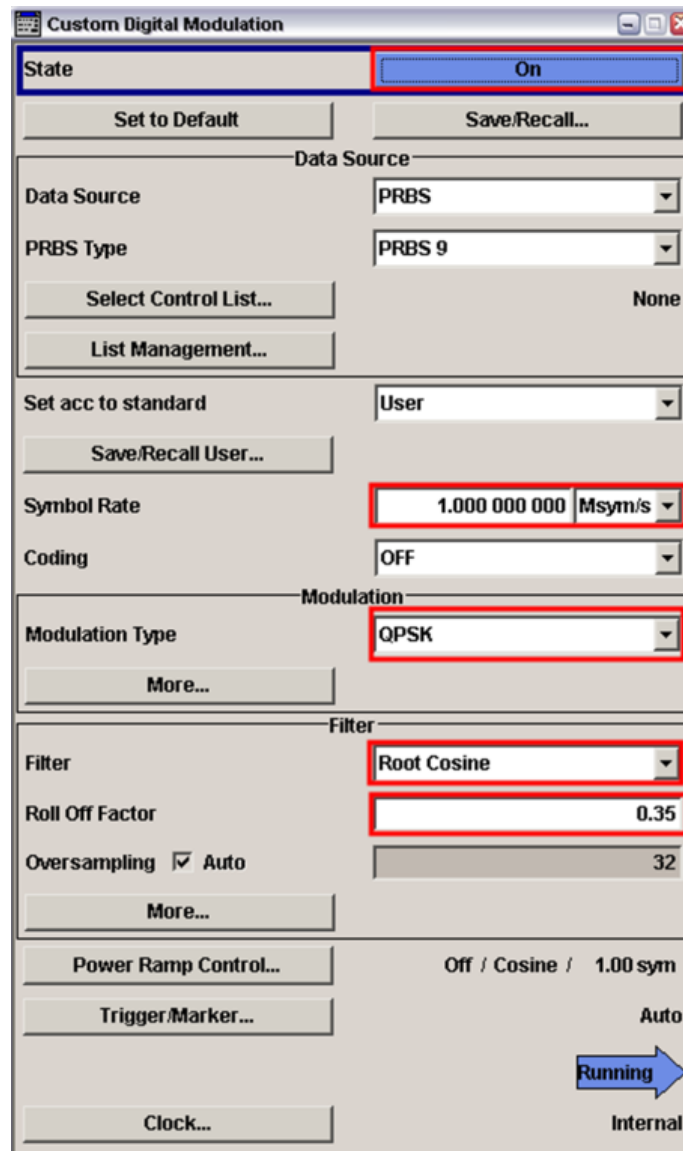
c) Select "Custom Digital Mod...".

Fig. 4-1: R&S SMU: Custom Digital Modulation Dialog

d) Under "Modulation Type" select "PSK" > "QPSK".

5. In the "Custom Digital Modulation" dialog box:

a) Enter the "Symbol Rate" *1 MHz*.
b) Select the "Filter" "Root Cosine".
c) Enter the "Roll Off Factor" *0.35*.
d) Toggle the "State" to "On" (at the top of the dialog box) to switch modulation on.

6. Press the RF ON/OFF key to switch the RF transmission on.

4.2 Analyzer Settings

This section helps you get your first valid measurement. It starts with step-by-step instructions and continues with a more detailed description of further functionality. Note that the settings are described for firmware version 1.60. Small differences in labels or titles may be found in other versions.

Frequency	1 GHz
Ref Level	4 dBm
Modulation	QPSK
Symbol Rate	1 MHz
Tx Filter	Root Raised Cosine with Alpha BT 0.35

To define the settings on the R&S FSV

1. Press the PRESET key to start from a defined state.

2. Press the FREQ key and enter *1 GHz*.

3. Press the AMPT key, then the "Ref Level" softkey and enter *4 dBm*. This corresponds approximately to the peak envelope power of the signal.

4. Start the R&S FSV-K70 option by pressing the MODE key and then selecting the "VSA" (vector signal analysis) softkey.

5. In the main VSA menu, select the "Settings Overview" softkey. This overview dialog serves as a guide to set up the R&S FSV-K70 option. It is described in more detail in "Settings Overview" on page 29.

6. Select the first block in the overview diagram: "Modulation / Signal Description".

    a) In the "Modulation Settings" section, ensure that the "Type" is "PSK" and that the "Order" is "QPSK". The "Mapping" defines the mapping of the bits to the QPSK symbols. It is relevant if you are interested in a bit stream measurement and does not affect the other measurement results. Hence, you do not need to change it here.

    b) Enter the "Symbol Rate" *1 MHz*.

c) In the "Transmit Filter" section, select "RRC" as "Type" and enter the "Alpha/BT" value *0.35*. In the preview area of the dialog you should then see a non-distorted QPSK constellation diagram, as shown in figure 4-2.
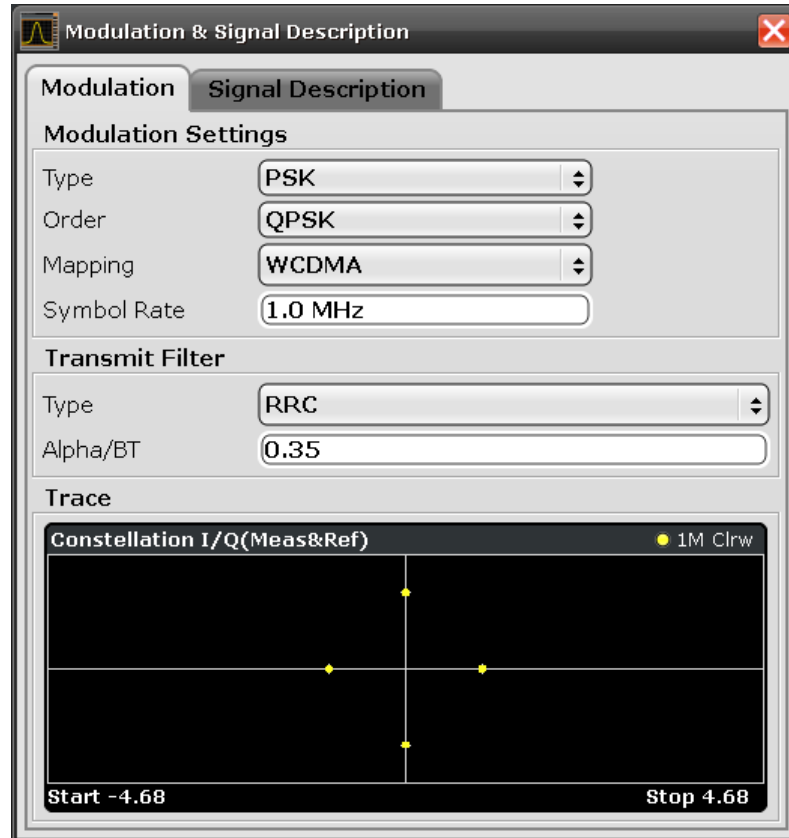

Fig. 4-2: R&S FSV-K70: Modulation Dialog for Measurement Example 1

7. Close all open dialog boxes. By default, four measurement screens showing different measurement results are displayed.
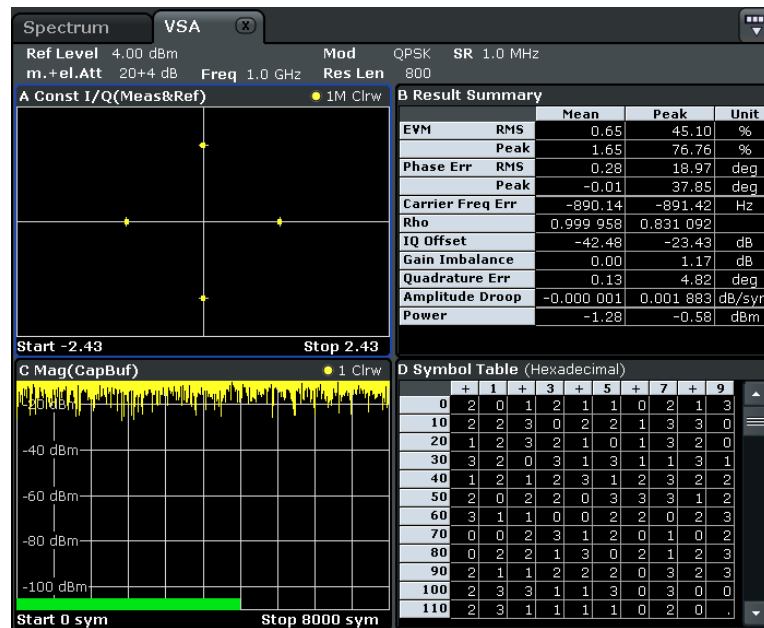
Fig. 4-3: R&S FSV-K70: Default Screen Layout for Measurement Example 1

4.3 Changing the Display Configuration

► To change the screen layout, i.e. the display configuration, do one of the following:
- Select the "Display Config" softkey in the main VSA menu.
- Select the "Display Configuration" block in the "Settings Overview" diagram.
- Press the MEAS key.

Predefined Display Configurations

Some predefined display configurations for specific modulations are available in the "Predefined" tab. The most common measurements for one specific modulation can then be selected with just one click. For example, if you are unsure about the characteristics of your signal, you should select the predefined "Signal Overview" configuration, as this display configuration gives you a general overview of your signal.
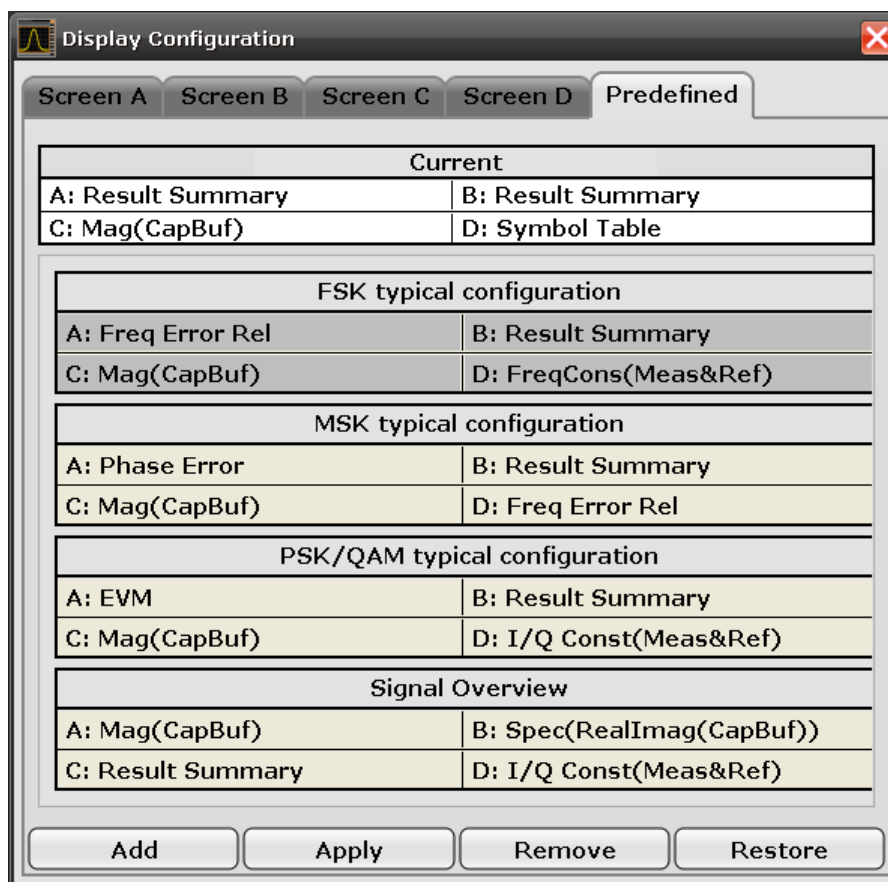
Fig. 4-4: R&S FSV: Predefined display configurations

In our example, we know that we are measuring a QPSK modulation.

1. Select "PSK/QAM typical configuration" and then "Apply".

2. Close the dialog box.

    The display is then configured as described in the dialog box.

Customized Display Configuration

The tabs for customized display configuration provide several possibilities:
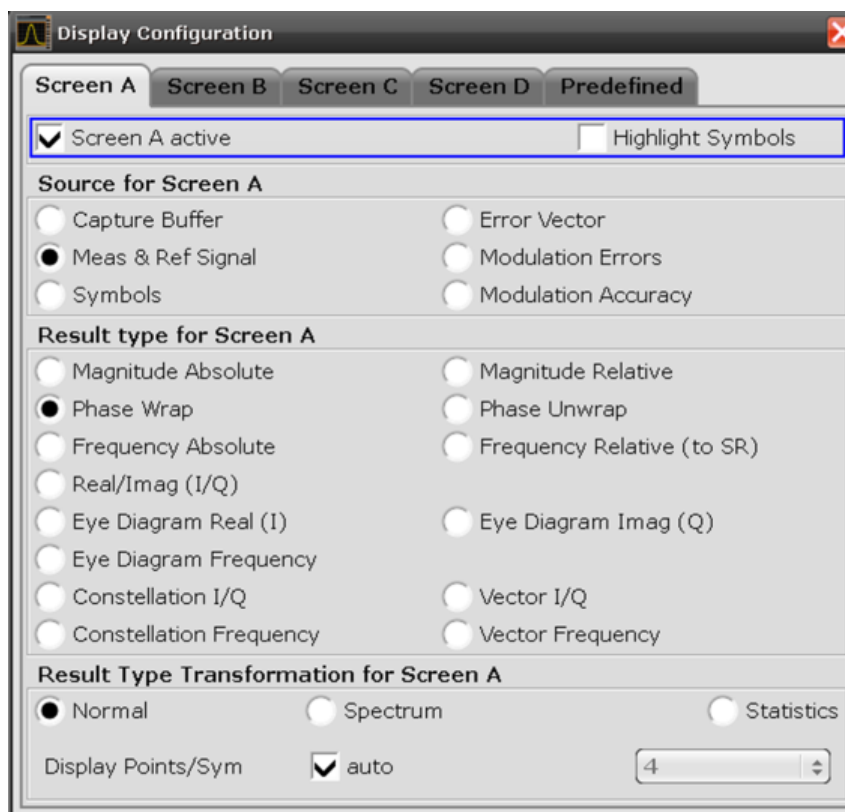
Fig. 4-5: R&S FSV-K70: Customized display configuration

- **Source**
  Here you can choose whether you would like to see results from the capture buffer, the measurement signal, the error vector, etc.

- **Result type**
  Here you can specify the way you want to look at the "Source". For example, select "Magnitude Absolute" to see the magnitude of your measurement signal. The available choices depend on the selected source. For example, an eye diagram of the inphase component can only be selected if the source for the current screen is "Meas & Ref Signal".

- **Result type transformation**
  For certain result types it is not only possible to see the common "over time" representation of the measurement, but also the spectrum or the statistics (in form of a histogram). Furthermore, it is possible to specify how many points (i.e. samples) per symbol should be displayed. For example, it might make sense for certain measurement results to only display the symbol instants. In this case, the parameter "Display Points/Sym" should be set to 1.

To customize your own display configuration:

1. Select the tab for the screen you want to configure, e.g. "Screen A".

2. Close screen A by disabling "Screen A active" (highlighted in figure 4-5) and close the dialog. You will now see only three screens in your display layout.

3. Enable screen A again to take a look at the eye diagram of the inphase component of the measurement signal. Select:

    ● Source: "Meas & Ref"
    ● Result Type: "Eye Diagram Real (I)"

4. Close the dialog to take a look at your new display configuration.

5. Change the "Result Type" of screen A back to "EVM" (Source: "Error Vector", Result Type: "EVM").


4.4 Navigating Through the Capture Buffer

Using the R&S FSV-K70 option you can navigate through the capture buffer, i.e. control which part of the capture buffer is currently analyzed. (Note: In Spectrum mode, this functionality is referred to as "gating".)

1. In the measurement display, take a closer look at screen C (magnitude of the capture buffer). The green bar shows how far the current measurement has already proceeded, i.e. how much of the signal has been evaluated.
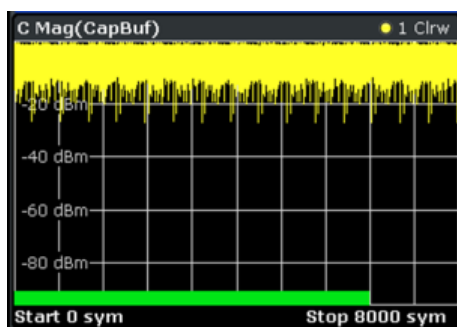
2. Press the RUN SINGLE key.
    Since the signal you are currently analyzing is continuous (as opposed to containing bursts),the entire capture buffer is analyzed, and hence will be marked with the green bar. The last evaluated result range (i.e. the currently evaluated result range at the time the measurement stopped) is highlighted in blue.
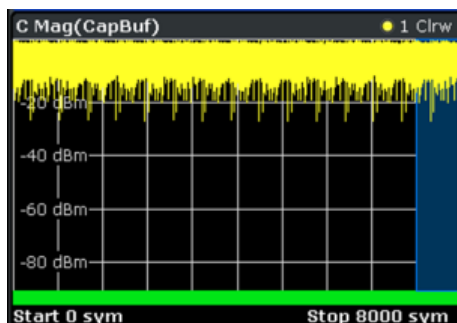

3. To go back to a previously evaluated result range within the same capture buffer, press the SWEEP key and then the "Select Result Rng" softkey. By selecting different

result ranges (for exmaple using hte rotary knob), you can move the highlighted blue area through the capture buffer and choose your currently demodulated result range. The results for this range are displayed in the Clear/Write trace of the EVM measurement screen.

Note: Generally, all Clear/Write traces and the "Current" column in the Result Summary are affected by this selection.
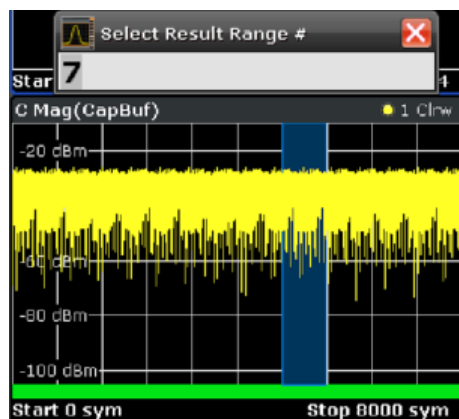
4.5 Averaging Several Evaluations

By default, all measurement screens are displayed with a single trace, which is the Clear/Write trace. This trace displays the result of the current evaluation, i.e. the highlighted blue area from the example in chapter 4.4, "Navigating Through the Capture Buffer", on page 16. However, for most real-world measurement tasks, you need to obtain a result that is averaged over a certain number of evaluations, or a worst-case result of a certain number of evaluations. This section explains how to achieve this.

- The number of evaluations that should be considered can be set via the SWEEP key.
- Traces that are averaged over these evaluations, e.g. Max Hold, Min Hold, Average, can be added to the result display via the TRACE key.

To evaluate EVM vs. Time

1. Configure screen A such that it displays the EVM versus time measurement (see chapter 4.3, "Changing the Display Configuration", on page 13). Tap in the screen to set the focus on it.

2. To display the trace averaged over several measurements, or the maximum hold trace over several measurements, press the TRACE key.

3. Add further traces by pressing the TRACE key and then either using the "Trace 2/3..." softkeys or the "Trace Wizard".
   Set the second trace to "Average" and the third trace to "Max Hold".
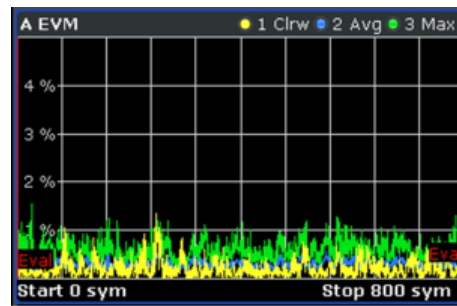   Note that the configured traces appear in the screen title.

Fig. 4-6: R&S FSV: Several traces in one screen

4. Press RUN SINGLE again.

    The current capture buffer is evaluated for this trace setup. In the channel information bar you can see the number of completed evaluations ("Stat Count").

5. To change the number of evaluations, press the SWEEP key and select "Statistic Count".
    Select "Manual" and enter the desired number of evaluations, e.g. 12. When you press RUN SINGLE, the R&S FSV-K70 will capture I/Q data until 12 evaluations are completed.

5 Measurement Example 2: Burst GSM EDGE Signals

In this measurement example a bursted GSM EDGE signal will be measured and evaluated. The goal of this section is to familiarize you with the R&S FSV-K70 features that are relevant specifically for the analysis of bursted signals.

5.1 Transmitter Settings

This section summarizes the necessary transmitter settings. It contains a list of the parameters and step-by-step instructions for the R&S SMU. If you are interested in a more detailed description or background information, refer to the user manual of the R&S SMU, which can be downloaded from the Rohde&Schwarz website: www.rohde-schwarz.com/downloads/manuals/smu200A.html.

Frequency	1 GHz
Level	0 dBm
Standard	GSM EDGE Burst with normal symbol rate

To define the settings for the R&S SMU

1. Press the PRESET key to start from a defined state.

2. Press the FREQ key and enter *1 GHz*.

3. Press the LEVEL key and enter *0 dBm*.

4. To define the standard:
    a) Press the DIAGRAM key.
    b) Select the first block ("Baseband A") in the settings overview and press ENTER.
    c) Select "GSM/EDGE...".

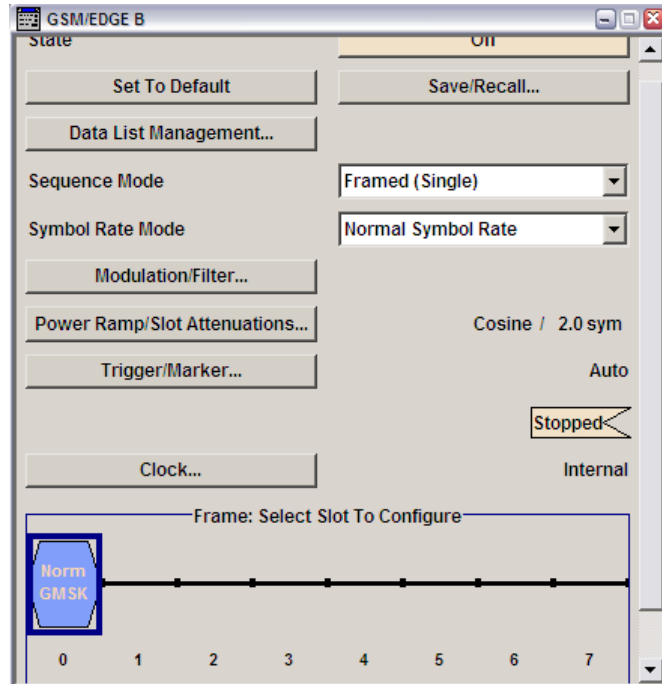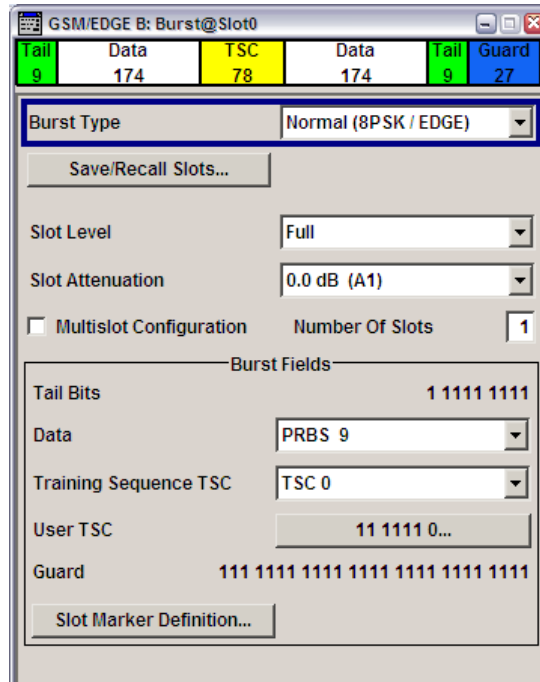d) Highlight the first slot in the frame diagram and press ENTER.

Fig. 5-1: R&S SMU: GSM/EDGE Frame Configuration Dialog

e) Select the "Burst Type" "Normal (8PSK / EDGE)".

f) Close the "GSM/EDGE: Burst@Slot0" dialog box.

5. Toggle the "State" to "On" (at the top of the "GSM/EDGE" dialog box) to switch the modulation on.

6. Press the RF ON/OFF key to switch the RF transmission on.

5.2 Analyzer Settings

This section helps you get your first valid measurement with a bursted signal. It starts with step-by-step instructions and continues with a more detailed description of further functionality. Note that the settings are described for firmware version 1.60. Small differences in labels or titles may be found in other versions.

Frequency	1 GHz
Ref Level	4 dBm
Standard	GSM 8PSK EDGE

To define the settings on the R&S FSV

1. Press the PRESET key to start from a defined state.

2. Press the FREQ key and enter *1 GHz*.

3. Press the AMPT key, then the "Ref Level" softkey and enter *4 dBm*.

4. Start the R&S FSV-K70 option by pressing the MODE key and then selecting the "VSA" (vector signal analysis) softkey.

5. In the main VSA menu, select the "Digital Standards" softkey.

6. From the file selection list, select the GSM folder and then the file EDGE_8PSK.

   Predefined settings corresponding to the selected standard are loaded. The R&S FSV-K70 should show good measurement results.
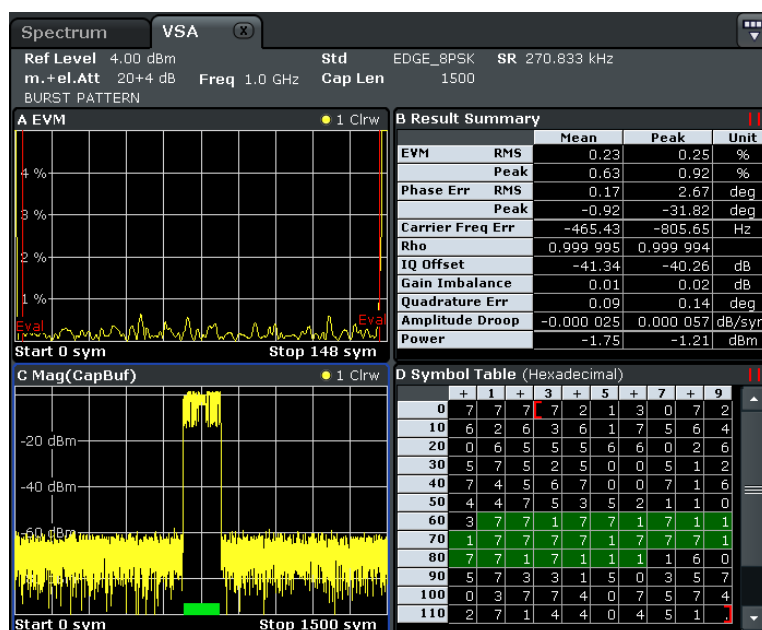
Fig. 5-2: R&S FSV-K70: Default display configuration for GSM 8PSK EDGE

7. In screen C, you see the currently evaluated burst marked with a green bar.
   To include more bursts in the display you need to increase the capture length.

   a) Press the HOME key and then the "Settings Overview" softkey.
   b) Select the "I/Q Capture" block.
   c) Increase the "Capture Length", e.g. 10000 symbols.

   In the preview area of the dialog box you see that more bursts are now contained in the capture buffer. They are all marked with a green bar, meaning that they are all evaluated.

Fig. 5-3: R&S FSV-K70: Preview of capture buffer

5.3 Navigating Through the Capture Buffer

chapter 4.4, "Navigating Through the Capture Buffer", on page 16 describes how to navigate through the capture buffer for a continuous signal. This navigation feature is especially important for bursted signals. Therefore, we give here a further navigation example for the GSM EDGE signal.

1. In order to see more details in the capture buffer, close Screen D.

a) Press the "Display Config" softkey, or the "Display Configuration" block in the "Settings Overview" diagram.

b) Deactivate Screen D.

2. Press the RUN SINGLE key.

3. In the "EVM vs. Time" display (Screen A), add a maximum hold trace by pressing the TRACE key (see chapter 4.5, "Averaging Several Evaluations", on page 17).

4. Re-evaluate the whole capture buffer by pressing the SWEEP key and then the "Refresh" softkey.

5. Use the "Select Result Rng" softkey to navigate through your capture buffer. Thus, you can determine which peak was caused by which burst.
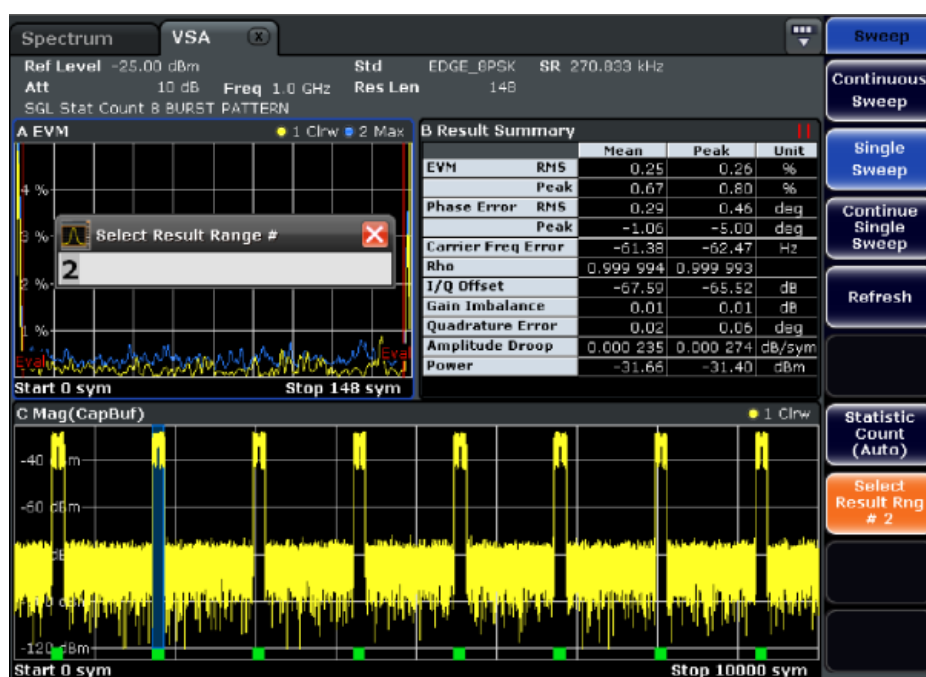

Fig. 5-4: R&S FSV-K70: Navigation through the capture buffer

5.4 Evaluating the Rising and Falling Edges

The "Result Length" is the number of symbols that are to be demodulated and analyzed together. In most common applications, only the parts of the capture buffer containing the bursts need to be analyzed. Hence, for bursted signals the "Result Length" usually coincides with the burst length. However, there are certain scenarios where the rising and falling edge of a burst are also of interest, e.g. checking the power ramping of the device under test. For this measurement task, it is useful to choose a "Result Length" that exceeds the burst length.

1. In order to include the rising and falling edges of the bursts in the EVM vs Time display (Screen A), you need to increase the "Result Length". The "Result Length" is the number of symbols from the capture buffer that are to be demodulated together.
   In the "Settings Overview" diagram, select the "Result Range" block and increase the "Result Length" to *200* symbols.

2. To evaluate the rising and falling edges further, display the absolute magnitude values of the measured signal in screen D. In the "Display Config" dialog box, activate Screen D and select the "Meas&Ref Signal" as the "Source" and "Magnitude" as the "Result Type".

3. Press RUN SINGLE.

   The rising and falling edges of the burst in the selected result range are displayed in screen D. You could now add an average trace to evaluate the rising and falling edges further.

Fig. 5-5: R&S FSV-K70: Result range that exceeds the burst length

5.5 Setting the Evaluation Range

The R&S FSV-K70 contains three major ranges that need to be set by the user:

● **Capture Buffer**
  Here you specify how many data points should be captured for your signal analysis. For example, if you want to measure a bursted signal, it is recommended that you make the capture length long enough to ensure that in all captures at least one entire burst is included.
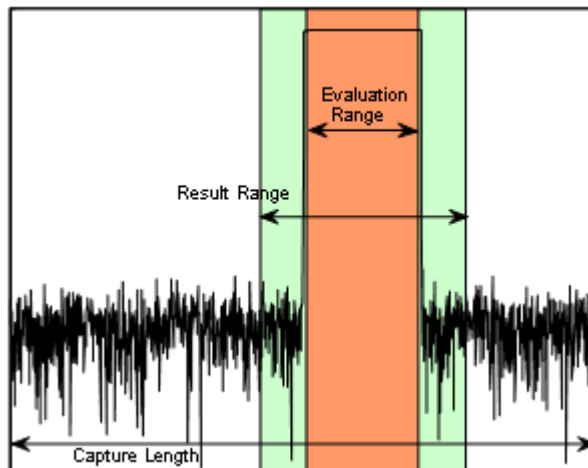
- **Result Range**
  The "Result Length" is the number of symbols from the capture buffer that are to be demodulated and analyzed together. The "Result Range" defines the area of the capture buffer in which the symbols are located. For example, if the signal is bursted, the "Result Length" usually coincides with the burst length, and the result range coincides with the range of the capture buffer in which the burst is located.

- **Evaluation Range**
  In some scenarios, the result range contains symbols that are not supposed to be considered for the EVM that is to be displayed in the Result Summary. One of these scenarios is described in chapter 5.4, "Evaluating the Rising and Falling Edges", on page 23. The evaluation range is always equal to or smaller than the result range and defines:
    - The range over which traces that do not have a time axis are displayed, e.g. polar diagrams

    - The range over which the following parameters are calculated for the Result Summary: EVM, MER, Phase Error, Magnitude Error, Power.
      (Note: You need to enlarge the Result Summary with the "Split/Maximize" key (![Split/Maximize icon]), to see all of these parameters.)

Fig. 5-6: Schematic overview of Capture Length, Result Range, and Evaluation Range

To change the evaluated data

1. Start from the configuration described in chapter 5.4, "Evaluating the Rising and Falling Edges", on page 23.

2. Display the I/Q constellation diagram of the signal in screen A. In the "Display Config" dialog box, activate Screen A and select the "Meas & Ref Signal" as the "Source" and "Constellation I/Q" as the "Result Type".

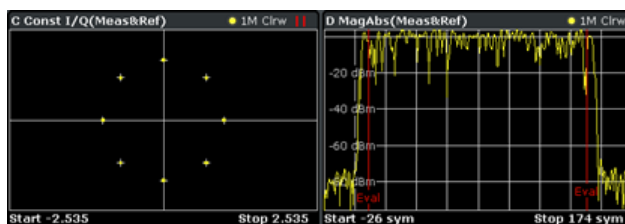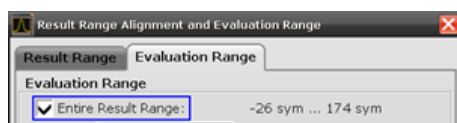   A clear 8PSK constellation is displayed.

Fig. 5-7: R&S FSV-K70: Evaluation lines properly adjusted

3. In order to understand the effect of an incorrectly set evaluation range, change the evaluation range to include the entire result range.

   a) In the "Settings Overview" diagram, select the "Evaluation Range" block.
   b) Select the "Entire Result Range" option.

The displayed constellation diagram is no longer clear, it contains additional points. This is due to the fact that the constellation diagram now displays symbol instants that are beyond the burst.
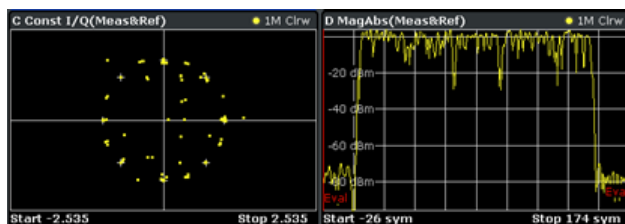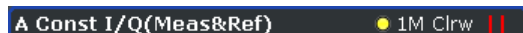

Fig. 5-8: R&S FSV-K70: Evaluation lines not properly adjusted

All measurement screens that consider the evaluation range are marked with two small red lines in the title bar.


5.6 Comparing the Measurement Signal to the Reference Signal

You have seen that it is possible to add different traces such as maximum hold or average to each screen. When evaluating the measurement signal it is also possible to display the ideal reference signal as an additional trace. This can be a significant help when troubleshooting, since it allows for an immediate comparison.

1. Start from the configuration described in chapter 5.4, "Evaluating the Rising and Falling Edges", on page 23.

2. Select screen D to set the focus on it.

3. Press the TRACE key and then the "Trace 2" softkey.

4. Select "Clear Write" as the Trace Mode and "Evaluation Ref". This adds a second trace to your result display. This trace is the ideal reference signal that can now be compared to the measurement signal (see figure 5-9).

5. To view the traces in more detail, enlarge the screen using the "Split/Maximize" key (�₁), and zoom into the display using the 🔍 icon in the toolbar (see the dotted rectangle in figure 5-9).
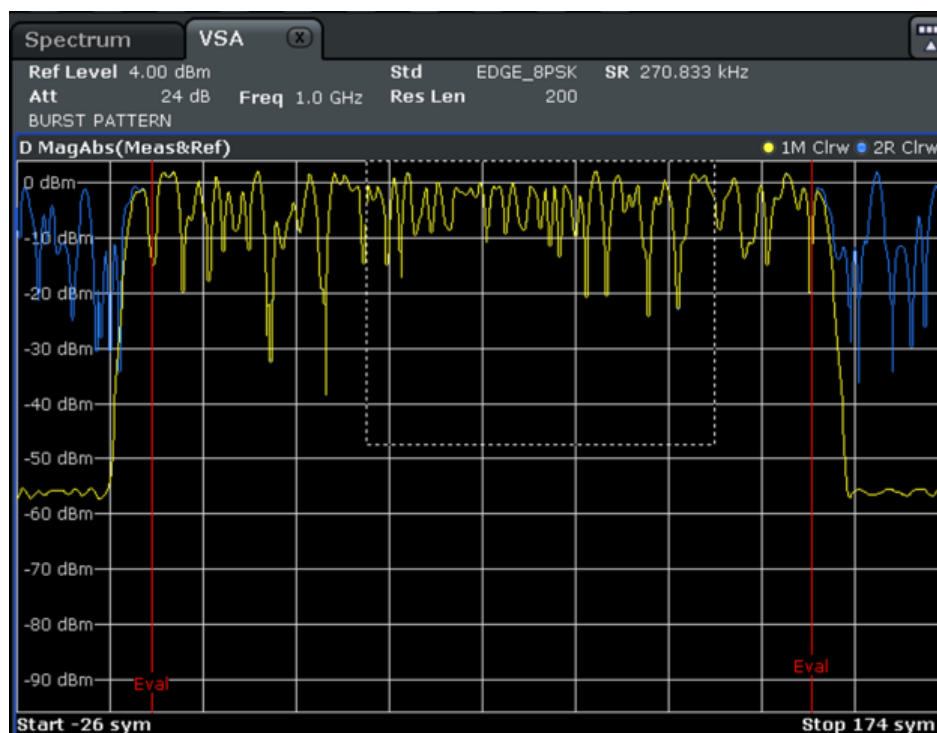
Fig. 5-9: R&S FSV-K70: Zooming

Now you can compare the measured and the ideal reference signal.

► Press the "Toolbar" icon to the right of the tabs in the display to toggle the toolbar on or off.

Alternatively:

1. Press the SETUP key.

2. Press the "Display Setup" softkey.

3. Press the "Tool Bar State On/Off" softkey or press the DISPLAY key and in the "Display Settings" dialog box, select "Tool Bar State: On".

    The toolbar is displayed at the top of the screen.

6 Brief Overview of the Operating Philosophy

Now that you have completed the two measurement examples, we would like to introduce the operating philosophy of the R&S FSV-K70. For a detailed description of functions and settings see the R&S FSV-K70 Operating Manual. For information on general operation of the analyzer, see the R&S FSV base unit operating manual.

The main principle of the R&S FSV-K70 application is that you do not need to worry about measurement settings. As already explained in Brief Introduction to Vector Signal Analysis, the key task of the vector signal analysis software is to reconstruct the ideal signal. We try to perform this reconstruction based on the knowledge about the DUT that you provide. Therefore, we have introduced a dialog box in which you can describe your signal. There, you specify whether you have a continuous or a bursted signal, the modulation of your signal, the symbol rate, the transmit filter, whether your signal contains a known training sequence (pattern), etc.

This dialog box starts with the "Signal Description" and then guides you through the remaining settings. However, most of the settings will already be configured correctly based on your signal description. For example, the burst search will be deactivated if you specify a continuous signal.
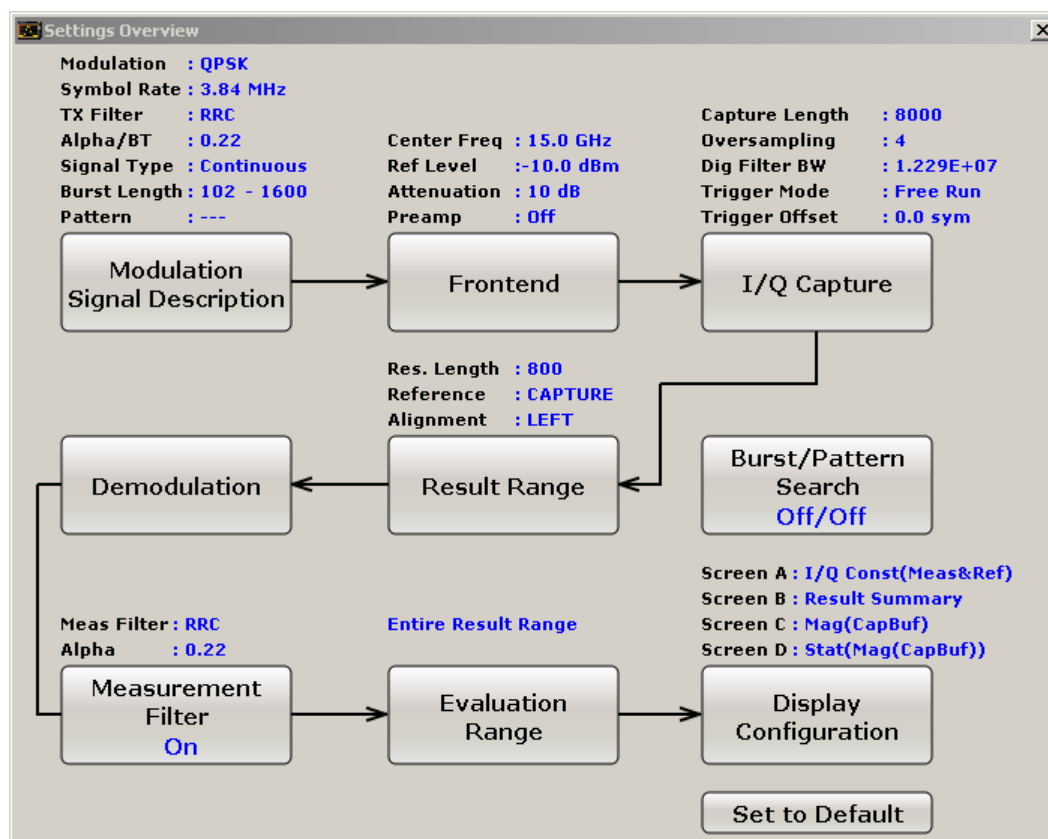

Fig. 6-1: R&S FSV-K70: Settings Overview dialog box

Settings Overview

The "Settings Overview" dialog box displays the most important parameters to provide a quick overview of your settings. Furthermore, it serves as a wizard to guide you through the settings. The "Settings Overview" dialog can be opened with the "Settings Overview" softkey in the main VSA menu.

The "Settings Overview" dialog box consists of nine blocks that can be configured step-by-step. If you have covered all blocks, you can be sure that you have not missed an important setting:

- **Modulation & Signal Description**
  This is the most important block for configuring the R&S FSV-K70. Here you describe the structure of your signal, e.g. its modulation, its transmit filter, whether the signal is bursted or continuous, etc. Based on this description, the R&S FSV-K70 configures most remaining blocks automatically.

- **Frontend**
  Includes major settings for the frontend of the analyzer, such as the center frequency

- **I/Q Capture**
  This block specifies how many I/Q data points should be captured. Furthermore, you can choose the oversampling for the captured data. With a high oversampling, you can cover a larger bandwidth.

- **Burst/Pattern Search**
  You can manually enable/disable the burst and pattern search here. However, based on your signal description, this block is automatically configured correctly. So there is usually no need to change the configuration manually.

- **Result Range**
  The result range specifies how many symbols should be analyzed together. For example, if the signal is bursted, the result range usually coincides with the burst length.

- **Demodulation**
  Includes advanced settings regarding the demodulation. For example, whether a potential I/Q offset should be compensated for prior to result calculation.

- **Measurement Filter**
  The type of measurement filter is specified here and can be enabled or disabled. It limits the measurement signal, the reference signal, and therefore also the error signal in bandwidth. By default, the R&S FSV-K70 will choose a suitable measurement filter for your selected transmit filter specified in the signal description.

- **Evaluation Range**
  The evaluation range is always equal to or smaller than the result range and defines:
  – The range over which traces are displayed that do not have a time axis, e.g. polar diagrams
  – The range over which the following parameters are calculated for the result summary: EVM, MER, Phase Error, Magnitude Error, Power.

  See

- Display Configuration
  You can select which measurement results should be displayed on the screen (see