User Manual

Tektronix

RSA3303B, RSA3308B, & RSA3408B
Option 24
GSM/EDGE Analysis Software

071-2398-00

This document applies to firmware version 4.0
and above.

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Preface

This manual describes how to use the RSA3303B, RSA3308B, and RSA3408B Option 24 GSM/EDGE Analysis Software.

This manual supports the following instruments:

- RSA3303B Option 24
- RSA3308B Option 24
- RSA3408B Option 24

About This Manual

The manual consists of the following sections:

- *Getting Started* describes the overview of the GSM/EDGE analysis.
- *Operating Basics* explains the menu functions and measurement procedures.
- *Appendices* provide additional information about scale setting ranges.

The analyzer uses Microsoft Windows XP as the operating system. This manual does not describe common usage of Windows XP. Refer to your Windows manuals as necessary.

Related Documents

The following documents are also available for the analyzer:

- *RSA3303B & RSA3308B User Manual*
  (Standard accessory; Tektronix part number 071-2363-XX)
  RSA3408B User Manual
  (Standard accessory; Tektronix part number 071-2364-XX)
  Describes how to install the analyzer and how to work with the menus, and details the standard functions.
- *RSA3000B Series Programmer Manual*
  (Standard accessory; PDF, Tektronix part number 071-2382-XX)
  Contains an alphabetical listing of the programming commands and other information related to controlling the analyzer over the GPIB interface.

PDF Manual

The *RSA3000B Series Programmer Manual* (PDF only) is included in the Documents CD (Tektronix part number 063-4089-XX).

Getting Started

Getting Started

This section outlines the modulation analysis according to the GSM/EDGE standard using the RSA3303B, RSA3308B, and RSA3408B Option 24. Table 1–1 summarizes the additional functions in Option 24 by measurement mode.

Table 1-1: Additional functions in Option 24

Measurement mode	Additional functions
S/A (spectrum analysis)	None
Demod (modulation analysis)	Six measurement functions under the GSM/EDGE standard
Time (time analysis)	None

Figure 1–1 shows an example of the GSM/EDGE analysis.

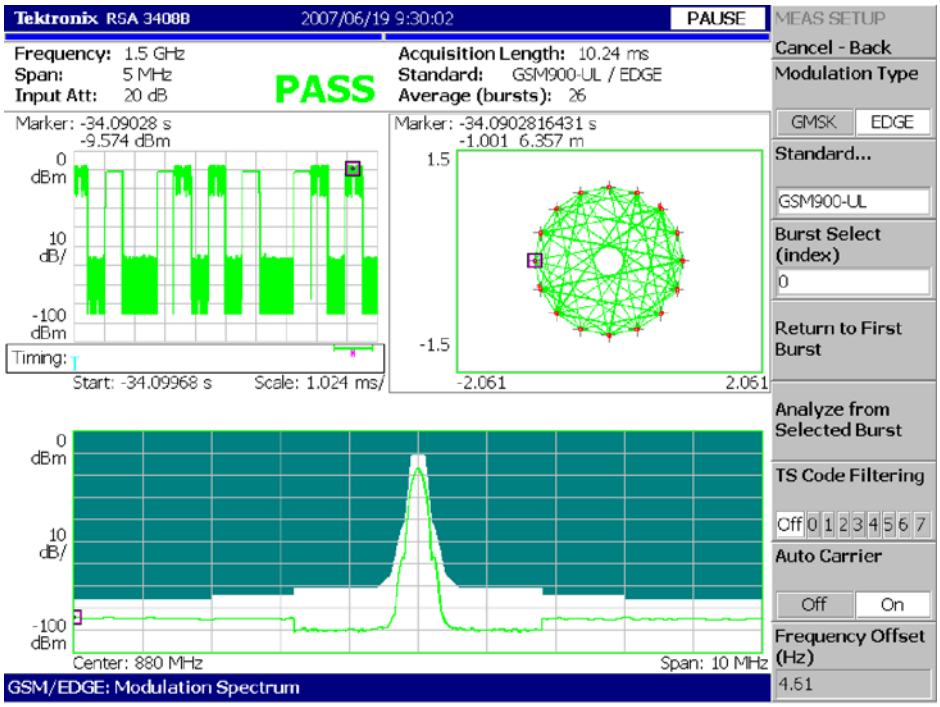

Figure 1-1: An example of the GSM/EDGE analysis display

Definition of the GSM/EDGE Analysis

The analyzer performs GSM/EDGE analysis that conforms to the 3GPP TS45.005 V4.1.0.5 standard.

Channel Frequencies

The analyzer includes GSM/EDGE channel tables as shown in Table 1–2:

Table 1-2: Channel Frequencies

Standard	Link	Channel (N)	Frequency range (MHz)	Frequency calculation formula (MHz)
GSM850	Uplink	128 to 251	824.2 to 848.8	0.2 (N - 128) + 824.2
	Downlink	128 to 251	869.2 to 893.8	0.2 (N - 128) + 869.2
GSM900	Uplink	0 to 124	890 to 914.8	0.2N + 890
		975 to 1023	880.2 to 889.8	0.2 (N - 1024) + 890
	Downlink	0 to 124	935 to 959.8	0.2N + 935
		975 to 1023	925.2 to 934.8	0.2 (N - 1024) + 935
DCS1800	Uplink	512 to 885	1710.2 to 1784.8	0.2 (N - 512) + 1710.2
	Downlink	512 to 885	1805.2 to 1879.8	0.2 (N -512) + 1805.2
PCS1900	Uplink	512 to 810	1850.2 to 1908.8	0.2 (N - 512) + 1850.2
	Downlink	512 to 810	1930.2 to 1989.8	0.2 (N - 512) + 1930.2

Measurement Functions

The analyzer provides six GSM/EDGE measurement functions as shown in Table 1–3:

Table 1-3: Measurement items

Measurement item	Standard
Modulation accuracy	GSM 11.20 - 2.1.6.2
Mean carrier power	GSM 11.20 - 2.1.6.3
Power versus Time	GSM 11.20 - 2.1.6.4
Modulation spectrum	GSM 11.20 - 2.1.6.5.1
Switching spectrum	GSM 11.20 - 2.1.6.5.2
Spurious signals within transmission band	GSM 5.05 v.8.5.0/4.3.3

Modulation Accuracy

The analyzer measures EVM (Error Vector Magnitude), amplitude error, and phase error in accordance with the GSM standard 11.20 – 2.1.6.2.

The analyzer uses the 147 symbols located at the center of a specified burst to measure EVM, amplitude error, phase error, waveform quality (ρ), frequency error, and origin offset. (“Origin offset” is also called “IQ feedthrough.”)

Mean Carrier Power

The analyzer measures mean carrier power in accordance with the GSM standard 11.20 – 2.1.6.3.

Figure 1–2 illustrates the data structure of a slot. The analyzer measures power in the interval E (Data 2) located after TS (Training Sequence) for each burst to calculate the mean value of the power within the measurement range.

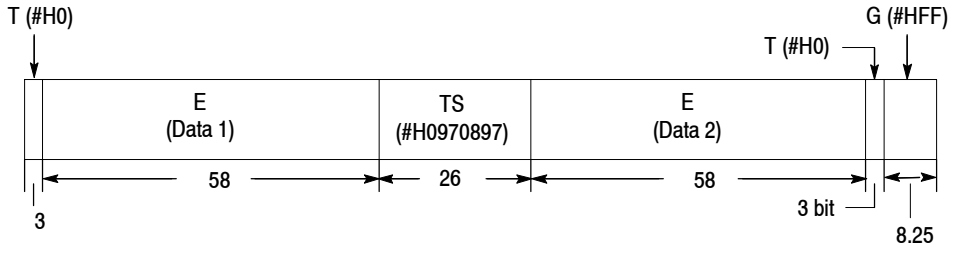

Figure 1-2: Slot data structure

Power versus Time

The analyzer measures Power versus Time in accordance with the GSM standard 11.20 – 2.1.6.4.

The analyzer demodulates a specified burst and synchronizes with the TS (Training Sequence). The analyzer uses the comparison between the spectrum and the GSM/EDGE standard mask (see Figure 1–3), to determine the Pass/Fail status of the test.

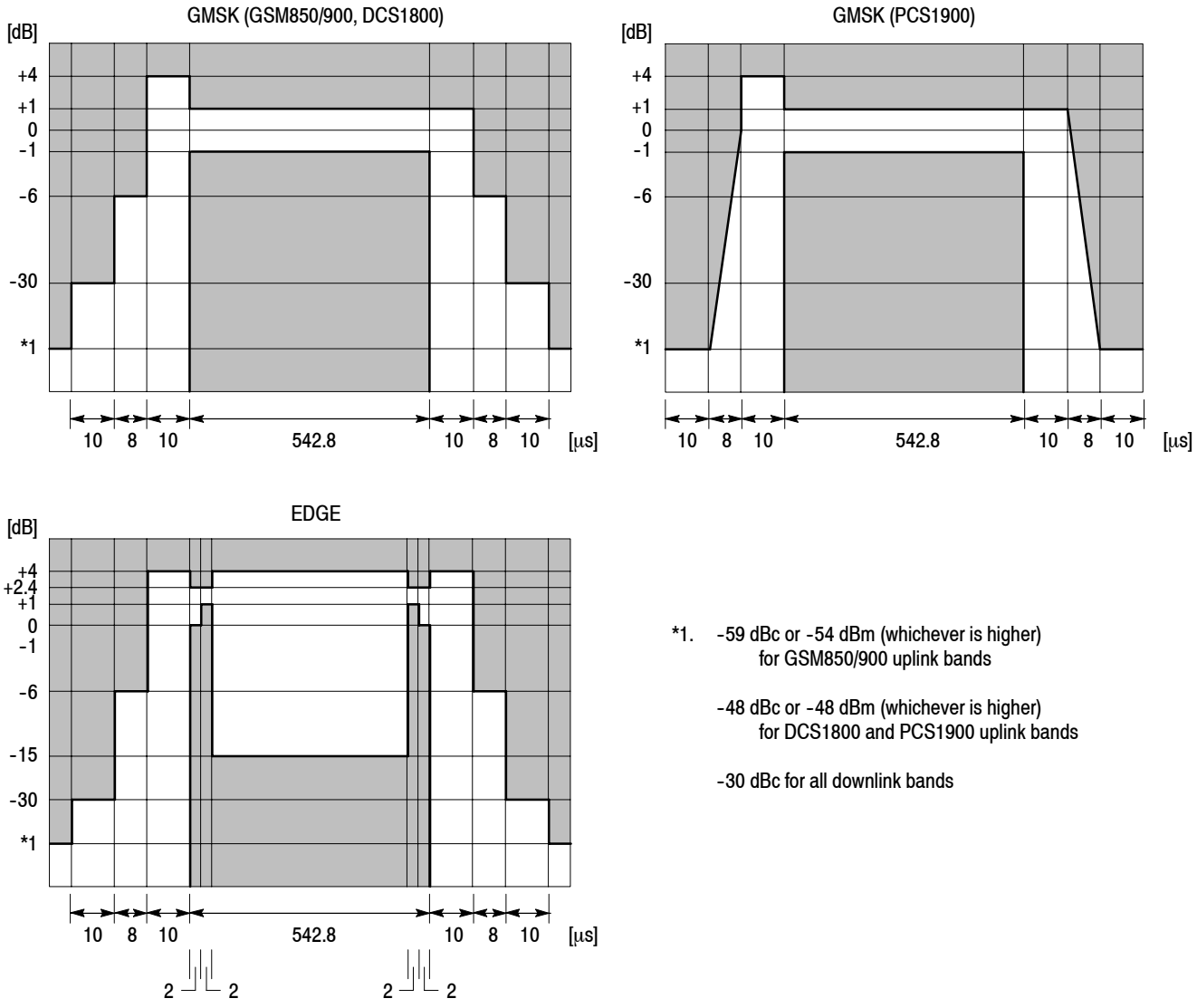

Figure 1-3: GSM/EDGE standard masks for Power versus Time measurement

Modulation Spectrum

The analyzer measures the spectrum generated by the modulation process in accordance with the GSM standard 11.20 – 2.1.6.5.1.

The analyzer acquires the input signal with a span of 15 MHz and demodulates a single burst. The spectrum of the burst is calculated from the center of the training sequence over an interval of 320 μs. This spectrum is calculated using a 30 kHz RBW up to 1.8 MHz from the carrier, and 100 kHz RBW from 1.8 to 6 MHz from the carrier. Finally, the analyzer compares the spectrum and GSM/EDGE standard masks (see Table 1–4 below) to determine pass/fail status of testing.

Table 1-4: Modulation spectrum standard masks [1]

GSM850/900 uplink								
Offset (MHz)	0.1	0.2	0.25	0.4	≥0.6 <1.8	≥1.8 <3	≥3 <6	≥6
Level (dBc)	+0.5	-30	-33	-60 -54	-60	-63	-65	-71
GSM850/900 downlink								
Offset (MHz)	0.1	0.2	0.25	0.4	≥0.6 <1.8	≥1.8 <3	≥3 <6	≥6
Level (dBc)	+0.5	-30	-33	-60 -54	-70	-73	-75	-80
DCS1800 uplink								
Offset (MHz)	0.1	0.2	0.25	0.4	≥0.6 <1.8	≥1.8 <6	≥6	
Level (dBc)	+0.5	-30	-33	-60 -54	-60	-59	-67	
DCS1800 downlink								
Offset (MHz)	0.1	0.2	0.25	0.4	≥0.6 <1.2	≥1.2 <1.8	≥1.8 <6	≥6
Level (dBc)	+0.5	-30	-33	-60 -56	-70	-73	-75	-80

[1] **The levels are common for GMSK and EDGE. In cases where two values are indicated in a single column, however, values in the upper line are for GMSK and values in the lower line are for EDGE.**

Table 1-4: Modulation spectrum standard masks [1] (Cont.)

PCS1900 uplink								
Offset (MHz)	0.1	0.2	0.25	0.4	≥0.6 <1.2	≥1.2 <1.8	≥1.8 <6	≥6
Level (dBc)	+0.5	-30	-33	-60 -54	-60	-60	-59	-67
PCS1900 downlink								
Offset (MHz)	0.1	0.2	0.25	0.4	≥0.6 <1.2	≥1.2 <1.8	≥1.8 <6	≥6
Level (dBc)	+0.5	-30	-33	-60 -56	-70	-73	-75	-80

Switching Spectrum

The analyzer measures the spectrum due to switching transients in accordance with the GSM standard 11.20 – 2.1.6.5.2.

The analyzer acquires the input signal with a span of 5 MHz, and calculates the spectrum using a 30 kHz RBW conversion. The analyzer uses peak hold for multiple bursts, and compares the spectrum with GSM/EDGE masks (see Table 1–5) to determine pass/fail status of the test.

Table 1-5: Switching spectrum standard masks [1]

GSM850/900, DCS1800, and PCS1900 uplink				
Offset (MHz)	0.4	0.6	1.2	1.8
Level (dBc)	-23	-26	-32	-36
GSM850/900 downlink				
Offset (MHz)	0.4	0.6	1.2	1.8
Level (dBc)	-57 / -52	-67 / -62	-74	-74
DCS1800 and PCS1900 downlink				
Offset (MHz)	0.4	0.6	1.2	1.8
Level (dBc)	-50	-58	-66	-66

[1] **The levels are common for GMSK and EDGE. In cases where two values are indicated in a single column, however, the values to the left are for GMSK and the values to the right are for EDGE.**

Inband Spurious Signals

The analyzer detects the spurious signals existing within the transmission band in accordance with the GSM standard 5.05 version 8.5.0/4.3.3.

The analyzer calculates the spectrum of the input signal, using the correct RBW for the frequency offset from the carrier, as shown in Table 1–6. The largest peak in the specified transmission band is assumed to be the carrier and all other peaks are assumed to be spurious responses.

Table 1-6: Spurious measurement conditions

Standard	Transmission band	RBW	Threshold [1]
GSM850	824 to 849 MHz (Uplink) 869 to 894 MHz (Downlink)	30 kHz (Offset ≥1.8 MHz) 100 kHz (Offset ≥6 MHz)	-36 dBm
GSM900	876 to 915 MHz (Uplink) 921 to 960 MHz (Downlink)		
DCS1800	1710 to 1785 MHz (Uplink) 1805 to 1880 MHz (Downlink)		
PCS1900	1850 to 1910 MHz (Uplink) 1930 to 1960 MHz (Downlink)		

[1] **User-definable**

Measurement Menu

Figure 1–4 shows the measurement menu items added in Option 24.

Figure 1-4: GSM/EDGE measurement menu

The following sections provide the measurement procedures.

Operating Basics

Burst Analysis

The following five measurements can be performed on one or more GSM/EDGE bursts:

- Modulation accuracy
- Mean carrier power
- Power versus time
- Modulation spectrum
- Switching spectrum

The burst analysis is based on the digital modulation analysis function. For the digital modulation analysis, refer to your instrument user manual.

For the spurious signal analysis, refer to page 2–11.

Measurement Procedure

Use the following steps to perform the burst analysis:

1. Select the measurement:
   a. Press the **Demod** key on the front panel.
   b. Press the **Standard...** side key and then the **GSM/EDGE** side key.
   c. Press one of the following side keys to select the measurement:

      Modulation Accuracy
      Mean Carrier Power
      Power vs. Time
      Modulation Spectrum
      Switching Spectrum

2. Acquire the waveform of signal to be measured:

NOTE. *When the input signal is not according to the GSM/EDGE standard, no measurement result may be displayed. However, the waveform of the signal will still be displayed in the overview.*

   a. Press the **Frequency/Channel** key on the front panel to set center frequency.

How to use the channel table:

- Press **Channel Table...** side key.
- Select one of the GSM/EDGE standards.
- Use **Channel** side key to select a channel.

b. Press the **Span** key on the front panel to set span. Range: 1 to 15 MHz

***NOTE**. It is important to set the span as narrow as possible for the selected modulation type, and to adjust the reference level carefully. Setting these parameters incorrectly can result in incorrect recognition of the signal's modulation type.*

c. Press the **Amplitude** key on the front panel to set up the amplitude of the signal near the full scale in the overview.

d. Press the **Trig** key on the front panel to set up the trigger as necessary.

e. Press the **Acquisition/Analysis** key on the front panel, and then press the **Acquisition Length** side key to set the number of slots for one acquisition block (see Figure 2–1). Default: 18 slots.

f. After you have acquired the measurement data, you can stop the acquisition using the **Run/Stop** key.

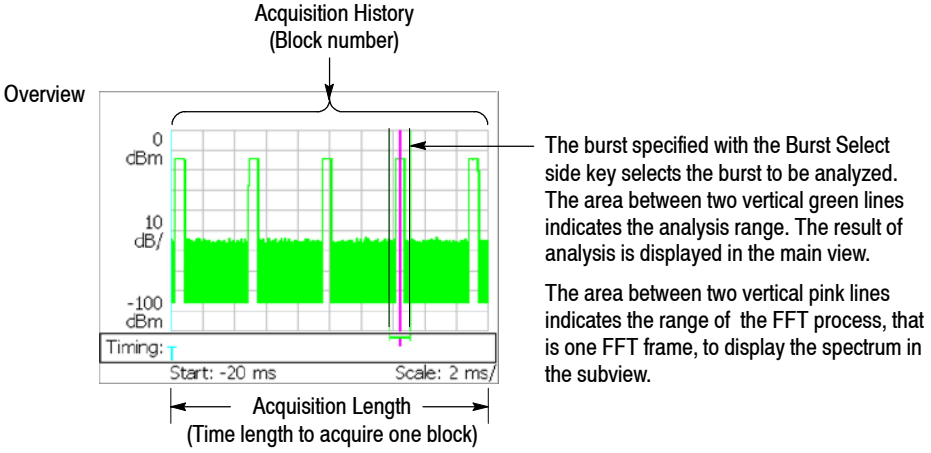

Figure 2-1: Setting analysis range on the overview

3. From the overview, select the burst to be analyzed (see Figure 2–1).

   a. Press the **Acquisition/Analysis** key on the front panel.

   b. *If you acquired the signal in continuous trigger repeat:*
   Press the **Acquisition History** side key to specify the block number to be analyzed. Block number "0" corresponds to the latest block.

   c. Press the **Burst Select** side key to specify the burst number to be analyzed. Burst number "0" corresponds to the latest burst.

      How to return to the first burst:
      To select the first burst of all the data that has been acquired in memory, press the **Return to First Burst** side key.

***NOTE**. In GSM/EDGE, the analysis length must be at least 1.28 ms.*

   The specified burst is analyzed and the result of the analysis is displayed on the screen.

4. Press the **Meas Setup** key and change the measurement conditions as necessary.

   For the Meas Setup menu, refer to page 2–4.

5. To analyze waveform data that has been acquired in memory, do the following steps:

   a. Press the **Acquisition/Analysis** key on the front panel.

   b. *If you acquired the signal in continuous trigger repeat:*
   Press the **Acquisition History** side key to specify the block number to be analyzed.

   c. Press the **Burst Select** side key to specify the burst number to be analyzed.

      How to return to the first burst:
      To select the first burst of all the data that has been acquired in memory, press the **Return to First Burst** side key.

   d. Press the **Meas Setup** key on the front panel and then press the **Analyze from Selected Burst** side key.

   The analyzer performs analysis from the burst specified in step c to the end of the waveform data. To interrupt the analysis, press the **Cancel-Back** (top) side key.

Meas Setup Menu

The Meas Setup menu items for the burst analysis are as follows:

Modulation Type. Selects the modulation type.

- **GMSK.** *Default.* Selects GMSK (Gaussian filtered Minimum Shift Keying).
- **EDGE.** Selects EDGE (Enhanced Data rate for GSM Evolution).

Standard... Selects specification of the mask for comparison with the spectrum waveform:

- GSM850-UL
- GSM850-DL
- GSM900-UL
- GSM900-DL
- DCS1800-UL
- DCS1800-DL
- PCS1900-UL
- PCS1900-DL

UL and DL mean uplink and downlink, respectively.

This menu item is unavailable in the mean carrier power measurement.

Burst Select. Sets the burst number to be analyzed. This menu item is the same as the Burst Index parameter in the Acquisition/Analysis menu. Burst number "0" corresponds to the latest burst. The larger the negative values, the older the bursts.

Return to First Burst. Selects the first burst of all the data that has been acquired in memory. This menu item is invalid during acquisition of an input signal.

Analyze from Selected Burst. Press this key for repeated analysis of waveform data that has previously been acquired in memory. The analysis is done from the selected burst. This menu item is invalid during acquisition of an input signal.

TS Code Filtering. Determines whether to perform the analysis while specifying Training Sequence (TS), or not.

- **Off.** *Default.* No training sequence is specified. The analyzer will perform the analysis for all the training sequences.
- **0** to **7.** Sets the training sequence code number to be analyzed. The analysis result is displayed in the main view only for the bursts containing the specified training sequence, and only results from bursts containing the specified training sequence are included in averaged results.

This menu item is unavailable in the switching spectrum measurement.

Analyze Includes. Sets the number of symbols for EVM calculation in the modulation accuracy measurement.

- **142.** Measures 142 symbols excluding the tail bits for the EDGE signal.
- **147.** Measures 147 symbols specified for the GMSK signal.
- **148.** Measures all symbols in a burst.

Midpoint shift. Defines the center of the mask in the power versus time measurement.

- **Off.** Positions the center of the mask halfway between symbol 13 and 14 in the training sequence.
- **On.** Aligns the center of the mask with symbol 14 in the training sequence.

Auto Carrier. Determines whether to activate the automatic carrier detection.

- **On.** *Default.* The carrier is automatically detected during data analysis.
- **Off.** No detection of carrier frequency is performed. Set the carrier frequency offset in Frequency Offset.

This menu item is unavailable in the switching spectrum measurement.

Frequency Offset. When Off is selected in Auto Carrier above, it is necessary to set the carrier frequency offset with reference to the center frequency.

This setup item is unavailable in the switching spectrum measurement.

Modulation Accuracy Measurement

Figure 2-2 shows an example of the modulation accuracy measurement.

- Overview: Power versus Time for the specified block
- Subview: Constellation for the specified burst
- Main view: Measurement results and EVM view

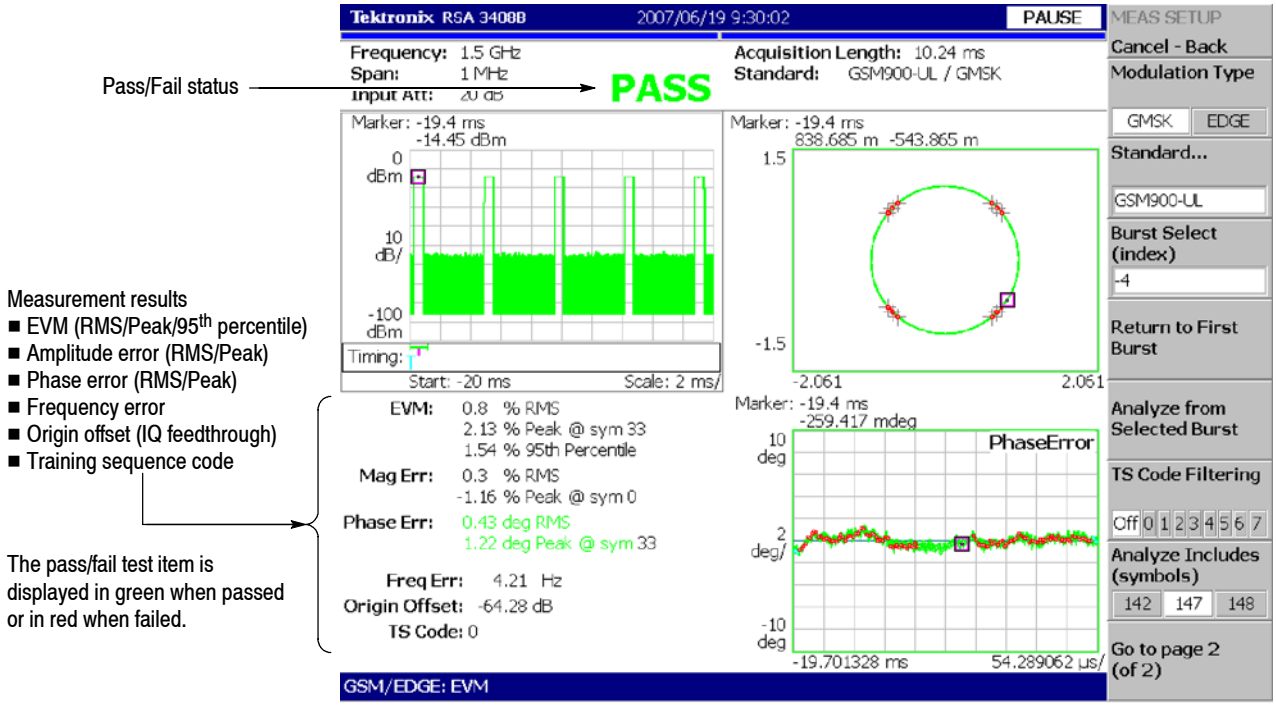

Figure 2-2: Modulation accuracy measurement

Changing Views. You can change the presentation of the overview, the subview, and the main view. Procedures to change the presentation of the overview or the subview are common with those for the modulation analysis. Refer to your instrument user manual.

To change the presentation of the main view, proceed as follows:

1. Press the View: **Define** key on the front panel.
2. Press the **Mainview Content...** side key and select the main view content:
   - Constellation
   - EVM (Error Vector Magnitude)

Mean Carrier Power Measurement

Figure 2–3 shows an example of the mean carrier power measurement.

- Overview: Power versus Time for the specified block
- Subview: Constellation for the specified burst
- Main view: Power versus Time for the specified burst

The blue domain in the Power versus Time display on the right of the main view shows the range of calculation process. The mean power, maximum power, and minimum power are indicated on the left of the main view for each burst.

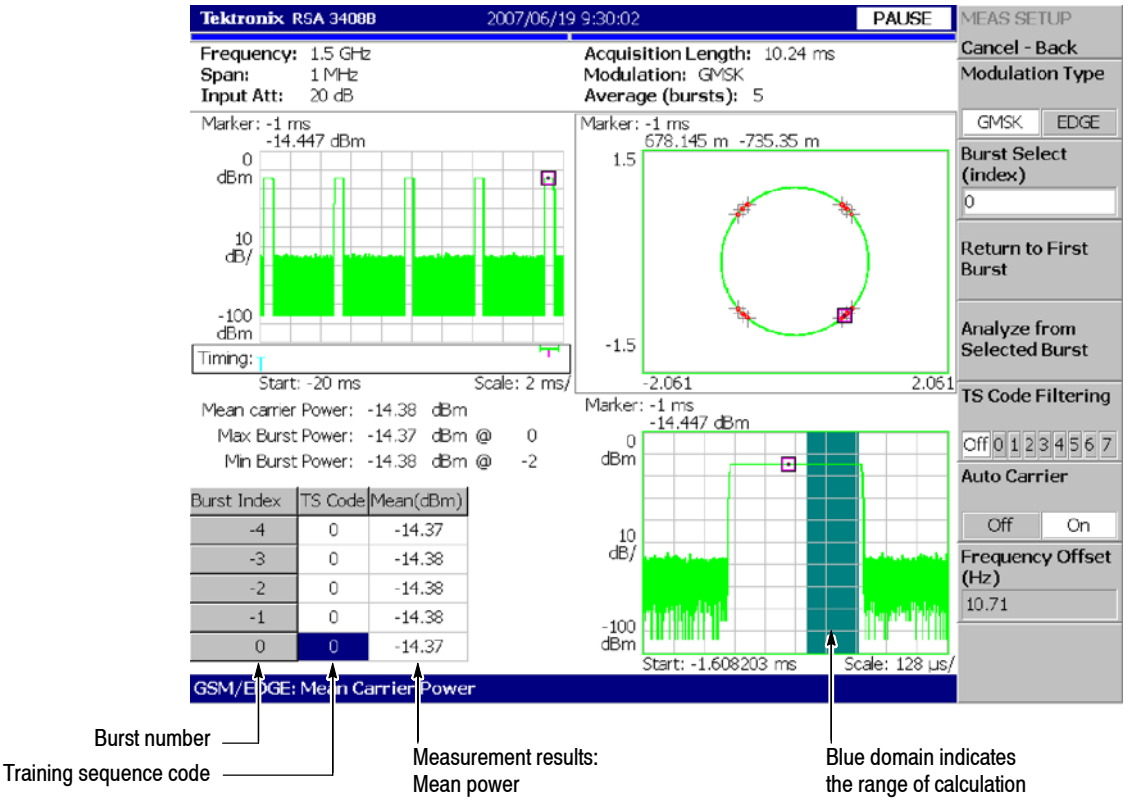

Figure 2- 3: Mean carrier power measurement

Changing Views. You can change the presentation of the overview and the subview. The procedures to change the presentation of the overview and the subview are common with those of the modulation analysis. Refer to your instrument user manual.

Power versus Time Measurement

Figure 2–4 shows an example of the power versus time measurement.

- Overview: Power versus Time for the specified block
- Subview: Constellation for the specified burst
- Main view: Measurement results and the mask for the specified burst

The Power versus Time waveform and the GSM/EDGE standard mask are shown on the right of the main view. The mean power as well as Pass/Fail status of testing are shown on the left of the main view for each burst.

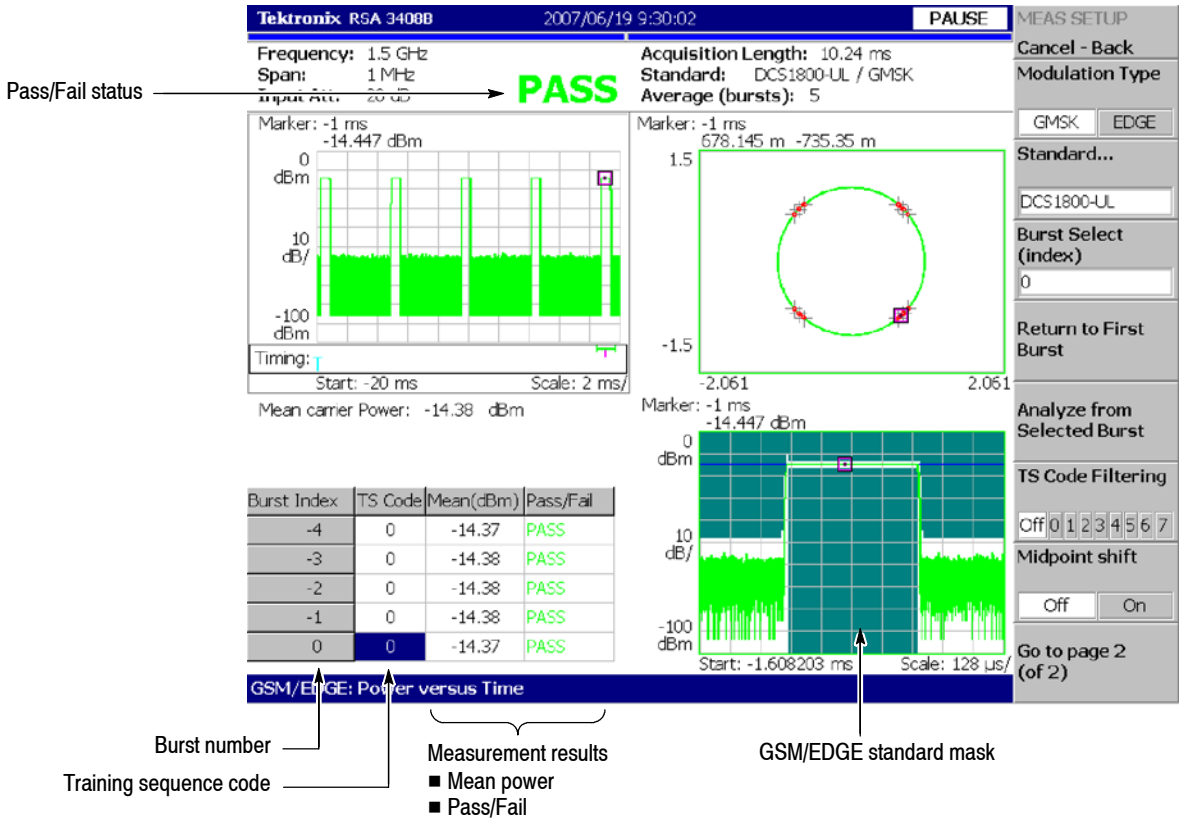

Figure 2- 4: Power versus Time measurement

Changing Views. You can change the presentation of the overview and the subview. The procedures to change the presentation of the overview and the subview are common with those of the modulation analysis. Refer to your instrument user manual.

Modulation Spectrum Measurement

Figure 2-5 shows an example of the modulation spectrum measurement.

- Overview: Power versus Time for the specified block
- Subview: Constellation for the specified burst
- Main view: Spectrum and the mask for the specified burst

The spectrum waveform and the GSM/EDGE specification mask are displayed in the main view. To select the mask specification, use the **Standard...** side key in the Meas Setup menu.

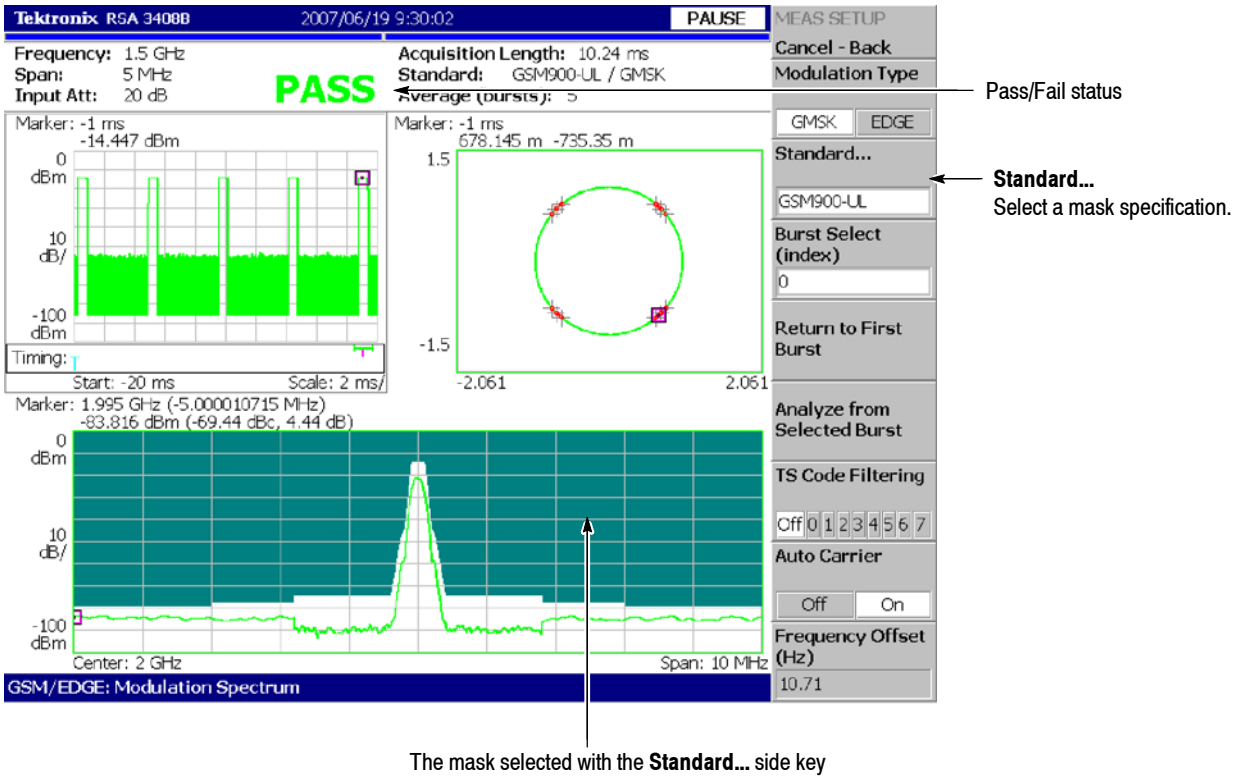

Figure 2-5: Modulation spectrum measurement

Changing Views. You can change the presentation of the overview and the subview. The procedures to change the presentation of the overview and the subview are common with those of the modulation analysis. Refer to your instrument user manual.

Switching Spectrum Measurement

Figure 2-6 shows an example of the switching spectrum measurement.

- Overview: Power versus Time for the specified block
- Subview: Constellation for the specified burst
- Main view: Spectrum and the mask for the specified burst

The spectrum waveform and the GSM/EDGE specification mask are shown in the main view. To select the mask specification, use the **Standard...** side key in the Meas Setup menu.

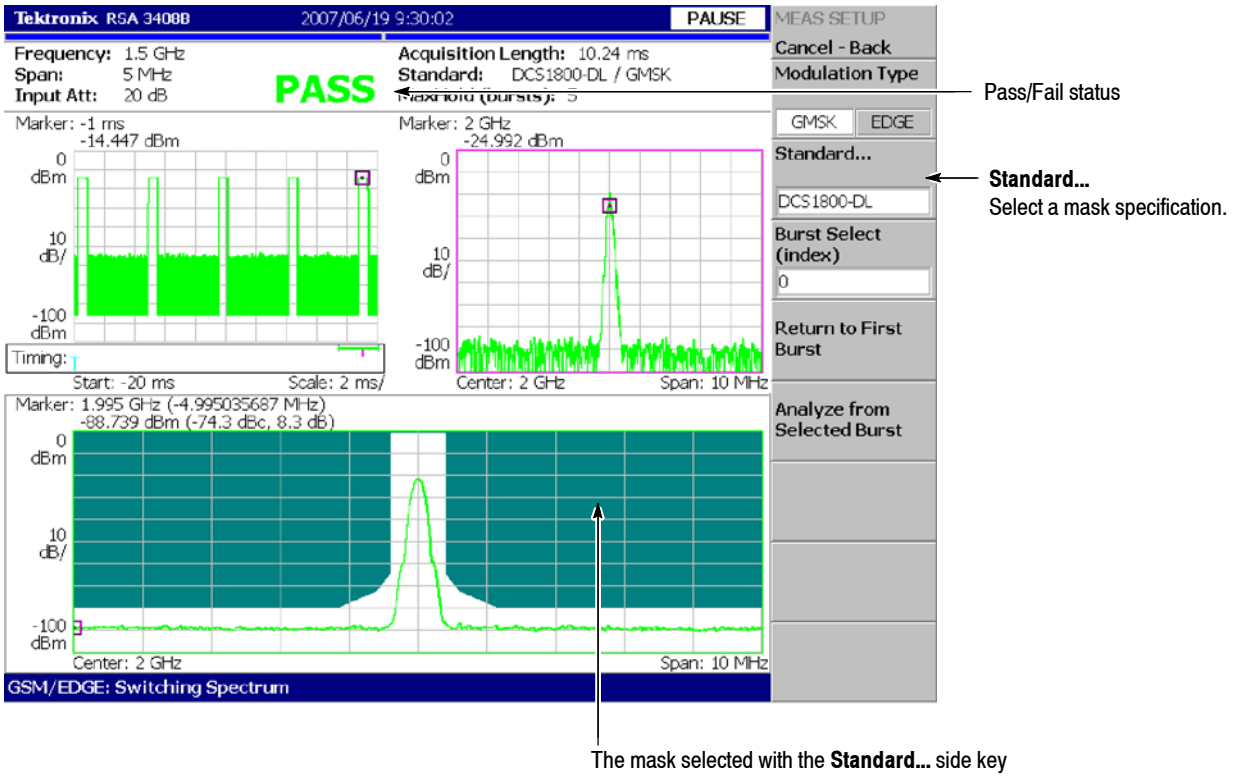

Figure 2-6: Switching spectrum measurement

Changing Views. You can change the presentation of the overview. The procedure to change the presentation of the overview is common with that of the modulation analysis. Refer to your instrument user manual for the details.

Spurious Analysis

This section describes operating basics for the measurement of spurious signals within a transmission band. The spurious signal measurement in GSM/EDGE is based on that function in the normal spectrum analysis. For the basics, refer to *Spurious Signal Measurement* in your instrument user manual.

Measurement Procedure

The following is the fundamental procedure for the spurious signal measurement.

1. Press the **Demod** key on the front panel.
2. Press the side key **GSM/EDGE → Inband Spurious**.
3. Display the spectrum waveform of the measurement signal:
   a. Press the **Run/Stop** key on the front panel to start data acquisition.

***NOTE**. For details on setting frequency, span, and amplitude, refer to your instrument user manual.*

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   b. Set the frequency by pressing the **Frequency/Channel** key on the front panel.

      How to use the channel table:

      - Press the **Channel Table...** side key.
      - Select one of the GSM/EDGE standards.
      - Use the **Channel** side key to select a channel.

   c. Set the span by pressing the **Span** key on the front panel.
   d. Set the amplitude by pressing the **Amplitude** key on the front panel.
4. Set the following measurement setup controls by pressing the **Meas Setup** key on the front panel.

Meas Setup Menu

The Meas Setup menu for the spurious signal measurement contains the following controls:

Standard... Selects a specification of the mask for comparison with the spectrum waveform:

- GSM850-UL
- GSM850-DL
- GSM900-UL
- GSM900-DL
- DCS1800-UL
- DCS1800-DL
- PCS1900-UL
- PCS1900-DL

UL and DL mean uplink and downlink, respectively.

Signal Threshold. Sets the threshold for detecting the carrier. A signal with the amplitude larger than this threshold is regarded as a carrier.
Range: –100 to +30 dBm (default: –20 dBm)

Spurious Threshold. Sets the threshold for detecting spurious signals. A signal with the amplitude larger than this threshold is regarded as a spurious signal.
Range: –150 to 0 dBm (default: –36 dBm)

Scroll Table. Horizontally scrolls the spurious table displayed in the lower part of the screen. Up to 10 spurious signals are displayed.

Measurement Example

Figure 2–7 shows an example of the spurious measurement. The analyzer compares the spectrum waveform with the standard mask to extract 10 peaks that exceeded the spurious threshold in ascending order. Detected spurious signals are assigned markers, numbered in descending order by amplitude. The frequency and the amplitude are shown in the table at the bottom of the screen.

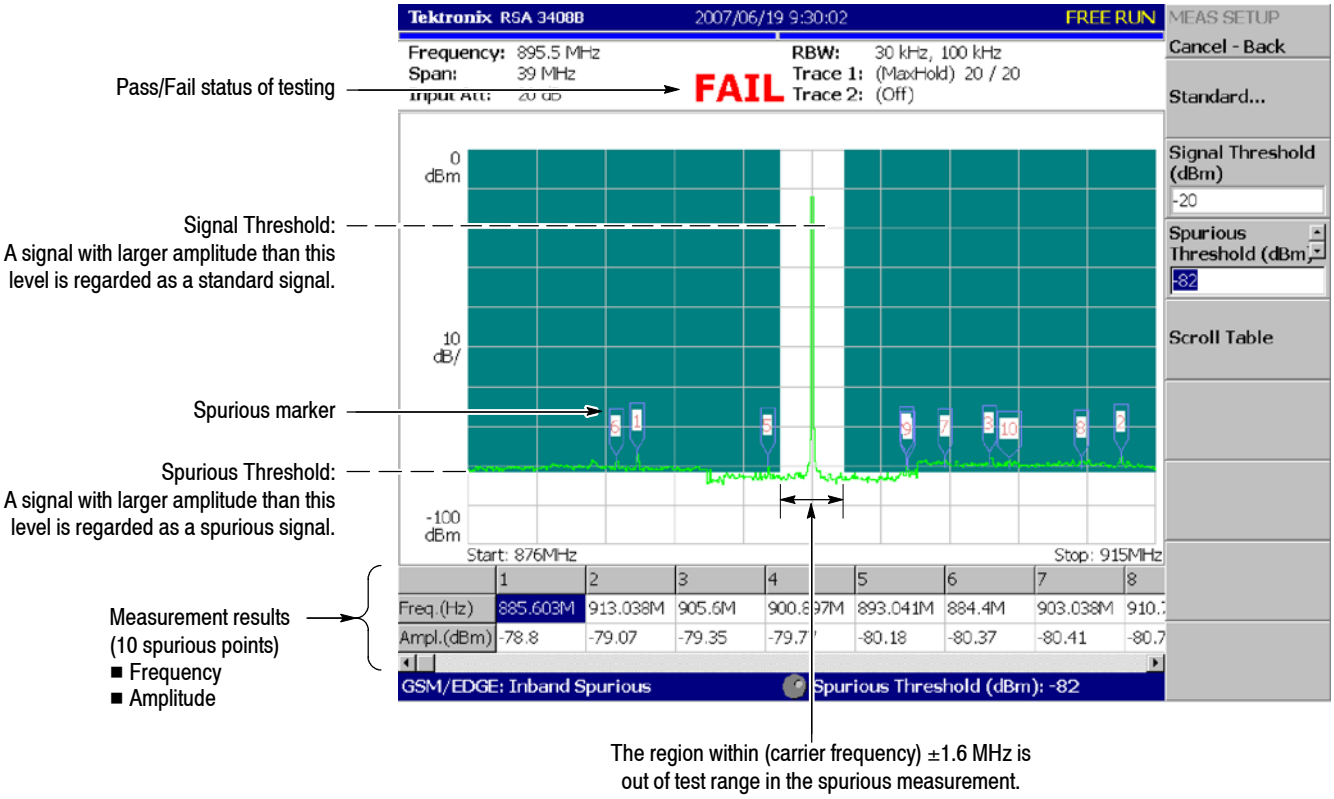


Figure 2-7: Spurious measurement

Scale and Format of View

Setup procedures for the scale and format of views in the GSM/EDGE analysis are the same with those in other measurement modes, except the following views:

- Constellation view
- EVM view
- Power versus Time view (for the Power versus Time measurement only)

This section describes the Scale menus for these three views. For details on setup procedures for the other views, refer to *Scale and Format of Views* in your instrument user manual.

Constellation View

The Scale menu for the constellation view in the GSM/EDGE analysis has the following controls:

Measurement Content. Select vector or constellation display.

- **Vector.** Selects the vector display. The phase and amplitude of the input signal are displayed in a two-dimensional IQ diagram. The red points indicate the symbol positions of the measured signal, and the yellow trace indicates the IQ trajectory between symbols.
- **Constellation.** Selects the constellation display. It is basically the same as the vector display, except that symbols of the measured signal are indicated in red, and the IQ trajectory between the symbols is not shown. The cross marks (+) indicate symbol positions of ideal signal.

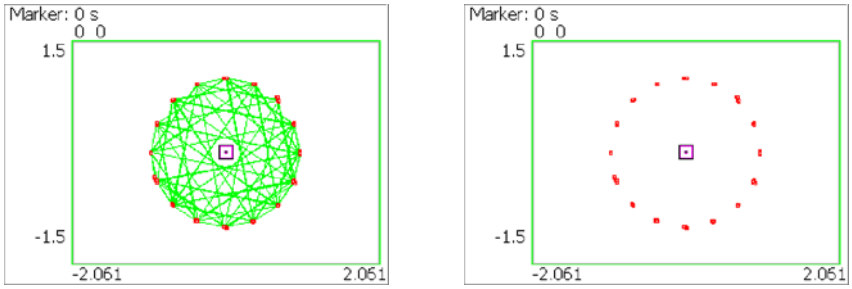


Figure 2- 8: Vector and Constellation display

EDGE Inverse Filter. Determines whether to apply the inverse filter to the received data for displaying the waveform of an EDGE signal.

- **Off.** Displays the waveform without applying the inverse filter to the received data.
- **On.** *Default.* Displays the waveform while applying the inverse filter to the received data.

This menu item is invalid for a GMSK signal. It is available when you select EDGE with Modulation Type in the Meas Setup menu.

Slice Timing. Selects the positions on which the red points are to be located.

- **0.** *Default for GMSK.* The red points are located at the ideal symbol positions.
- **0.5.** *Default for EDGE.* The red points are located at positions halfway between the ideal symbols.

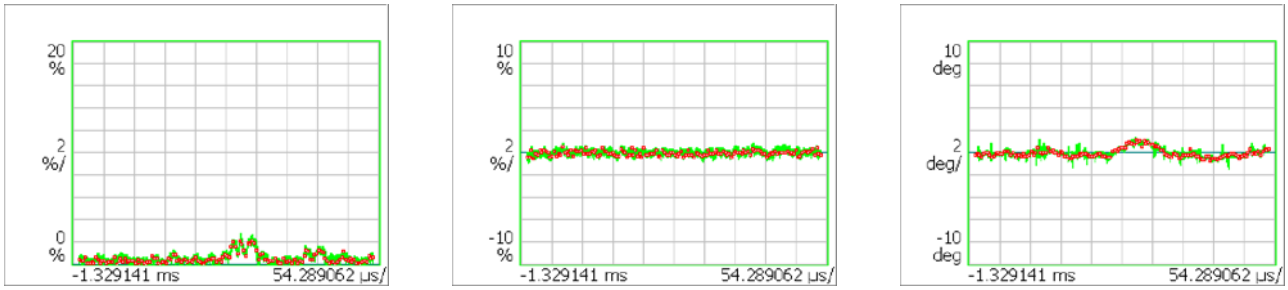
For the EDGE modulation analysis, this menu item is available when you select Off with EDGE Inverse Filter above.

EVM View

The Scale menu for the EVM view in the GSM/EDGE analysis has the following controls:

Measurement Content.... Selects one of the following formats for view (see Figure 2–9).

- **EVM.** *Default.* Displays the temporal response of EVM (Error Vector Magnitude) versus time.
- **Mag Error.** Displays the amplitude error versus time.
- **Phase Error.** Displays the phase error versus time.



EVM display | Magnitude error display | Phase error display

Figure 2- 9: EVM, amplitude error, and phase error display

EVM Bandpass Filter. Turns on or off the Raised Cosine Windowed Raised Cosine filter. The default setting is On according to the GSM/EDGE standard.

Auto Scale. Executes the auto scale function. When auto scale is activated, the starting value and the scale of the vertical axis are automatically set so that the waveform will be displayed for optimal viewing.

Horizontal Scale. Sets the scale of the horizontal axis.

Horizontal Start. Sets the starting value of the horizontal axis.

Vertical Scale. Sets the of the scale of the vertical axis.

Vertical Stop. Sets the maximum value (top edge) of the vertical axis.

Full Scale. Sets the scale of the vertical axis to the default full-scale value.

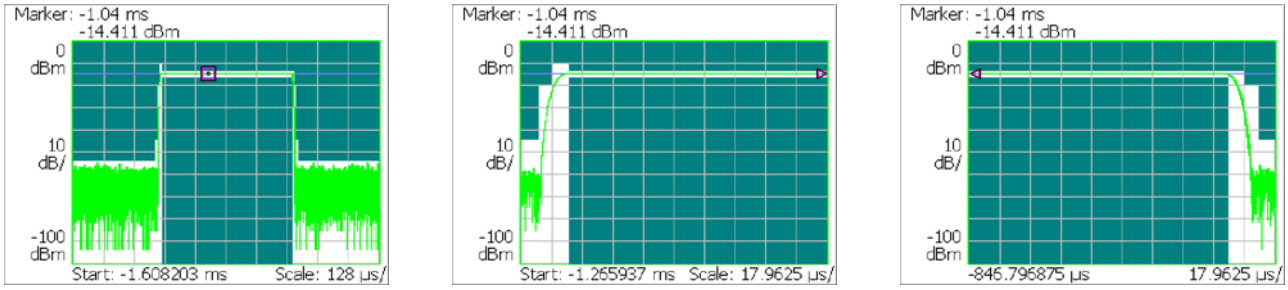
Power versus Time View

The Scale menu for the power versus time display on the main view in the Power versus Time measurement has the following controls:

View Full Burst. Displays the entire burst (see Figure 2–10).

View Rising Edge. Expands the rising edge horizontally (see Figure 2–10).

View Falling Edge. Expands the falling edge horizontally (see Figure 2–10).



View Full Burst View Rising Edge View Falling Edge

Figure 2-10: Expanding a burst

Auto Scale. Sets the start value and scale of the vertical axis to automatically display the entire waveform.

Horizontal Scale. Sets the scale of the horizontal axis.

Horizontal Start. Sets the minimum value (left edge) of the horizontal axis.

Vertical Scale. Sets the scale of the vertical axis.

Vertical Stop. Sets the maximum value (top edge) of the vertical axis.

Full Scale. Sets the scale and start value of the vertical axis to the default full-scale value.

Appendices

Appendix A: Scale Setting Range

This section lists the setting ranges of the horizontal and the vertical scales for the views used in the GSM/EDGE analysis.

Table A-1: Display format and scale

Display format	Horizontal range	Vertical range
Spectrum	0 Hz to 8 GHz	-200 to +100 dBm
Spectrogram	0 Hz to 8 GHz	Frame -15999 to 0 Frame -63999 to 0 (Option 02)
Time domain view	- ($T_f \times N_f$) to 0 s *	-200 to +100 dBm (Amplitude) -30 to +30 V (I/Q level) -300 to +300% (AM) -38.4 to +38.4 MHz (FM/FVT) -675 to +675 degrees (PM)
Constellation	- ($T_f \times N_f$) to 0 s *	fixed
EVM	- ($T_f \times N_f$) to 0 s *	-100 to +200% (EVM) -300 to +300% (amplitude error) -675 to +675 degrees (phase error)
Eye diagram	- ($T_f \times N_f$) to 0 s *	fixed
Symbol table	0 to (1024 × N_f) symbols	NA

* **T_f: Frame time; N_f: Frame number**

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