ROHDE&SCHWARZ

Test and Measurement
Division

Operating Manual

cdmaOne Base Station Tests

Application Firmware Module FSIQK71

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cdmaOne Base Station Tests - Application Firmware Module FSIQK71

Contents of Application Firmware FSIQK71 Manual

This manual contains all information on the operation of FSIQ equipped with Application Firmware FSIQK71. It includes operation via menus and the remote-control commands for the code domain measurement mode.

The manual comprises the data sheet and 9 chapters:

The data sheet informs on the guaranteed technical data and the firmware characteristics.

Chapter 1 describes how to enable the application firmware module.

Chapter 2 describes typical examples of measurements by means of tests.

Chapter 3 describes the measurement setup for base station tests.

Chapter 4 describes the cdmaOne test model as stipulated in standard TIA/EIA-97-C.

Chapter 5 gives a schematic overview on the cdmaOne BTS control menus.

Chapter 6 contains a detailed description of the possible base station test measurements as a reference section for manual operation The chapter also presents a list of remote-control commands associated with each function.

Chapter 7 describes all remote-control commands defined for the code domain measurement. An alphabetic list of all remote-control commands and a table of softkeys with the assignment of commands are given at the end of this chapter.

Chapter 8 describes the checking of rated specifications of code domain power and modulation quality measurements.

Chapter 9 contains an explanation of terms related to measured quantities of the code domain measurement.

Chapter 10 contains the index of the present operating manual.

This manual is a supplement to the FSIQ operating manual. It includes exclusively functions of Application Firmware FSIQK71. For all other descriptions, please refer to the FSIQ operating manual.

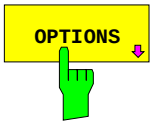
cdmaOne Base Station Tests - Application Firmware Module FSIQK71

Signal Generator FSIQ used with Application Firmware FSIQK71 becomes a cdmaOne base station tester. The basic unit is extended by the code domain measurement mode. In addition, some base station tests which are performed in the analyzer and vector analyzer modes and require several settings can be called via a separate softkey.
A prerequisite for operating FSIQ with option FSIQK71 is configuration with option FSIQB70, DSP and IQ memory extension.

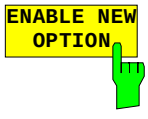
1 Enabling the Firmware Option

Firmware Option FSIQK71 is enabled in the *CONFIGURATION SETU*P menu by entering a keyword. The keyword is delivered with the option. If the option is factory-installed, it is already enabled.

CONFIGURATION SETUP menu:



The *OPTIONS* softkey opens a submenu where keywords for new firmware options (application firmware modules) can be entered. Available options are displayed in a table which is opened when entering the submenu.



The *ENABLE NEW OPTION* softkey activates the entry of the keyword for a firmware option.

One ore several keywords can be entered in the entry field. On entering a valid keyword, *OPTION KEY OK* is displayed on the message line and the option is entered in the *FIRMWARE OPTIONS* table.

The *FIRMWARE OPTIONS* table can be displayed in the *FIRMWARE OPTIONS* softkey in the *INFO* menu.

In case of invalid keywords, *OPTION KEY INVALID* is displayed on the message line.

2 Getting Started

The following chapter explains basic cdmaOne measurements by means of a setup with Signal Generator SMIQ. It describes how operating and measurement errors can be avoided using correct presetting.
The measurement screen is presented in chapter 6 for each measurement.

Key settings are shown as examples to avoid measurement errors. Following the correct setting, the effect of an incorrect setting is shown. The following measurements are performed:

- Measurement 1: Measuring the spectrum
- Measurement 2: Measuring the modulation quality
  - Setting: Synchronization of reference frequencies
- Measurement 3: Measuring relative code domain power
  - Setting: Setting the analyzer center frequency to the DUT frequency
- Measurement 4: Measuring relative code domain power with 9 active code channels
  - Setting: Analyzer at full amplitude (setting of reference level)
  - Setting: Setting of threshold for inactive channels

The measurements are performed using the following units and accessories:

- Signal Analyzer FSIQ with Application Firmware FSIQK71: cdmaOne base station tests (option FSIQB70 required)
- Vector Signal Generator SMIQ with option SMIQB42: digital standard IS- 95 CDMA
  (options SMIQB20 and SMIQB11 required)
- 1 coaxial cable, 50 Ω, approx. 1 m, N connector
- 1 coaxial cable, 50 Ω, approx. 1 m, BNC connector

Conventions for displaying settings on FSIQ:

[***<KEY>***]	Press a key on the front panel, eg ***[SPAN]***
[<SOFTKEY>]	Press a softkey, eg *[MARKER -> PEAK]*
[<nn unit>]	Enter a value and terminate by entering the unit, eg *[12 kHz]*

Conventions for displaying settings on SMIQ:

[***<KEY>***]	Press a key on the front panel, eg **[FREQ]**
<MENU>	Select a menu, parameter or a setting, eg *DIGITAL STD.* The menu level is marked by an indentation.
<nn unit>	Enter a value and terminate by entering the unit, eg *12 kHz*

Basic Settings in the Code Domain Measurement Mode

In the default setting after PRESET, FSIQ is in the analyzer mode. The following default settings of the code domain measurement are activated provided the code domain measurement mode is selected.

Parameter	**Setting**
CDMA standard	CDMA forward 800
Transmitter nominal power	0 dB
Upper/lower limit value of power tolerance	2 dB / -4 dB
Upper/lower limit value of pilot power ratio	0,5 dB / - 0.5 dB
Upper/lower limit value of inactive channel power ratio	-27 dB
Upper/lower limit value of pilot time alignment	3 µs / - 3 µs
Upper/lower limit value of channel time error	50 ns / - 50 ns
Upper/lower limit value of channel phase error	50 mrad / - 50 mrad
Upper/lower limit value of frequency error	200 Hz / -200 Hz
Demodulation time	AUTO ON
PN offset	0
Threshold value	-23 dB

IEC/IEEE-bus command:

```
:INSTrument[:SELect] CDPower
```

Measurement 1: Measuring the Spectrum

The measurement of the spectrum gives an overview of the cdmaOne signal and the spurious emissions close to the carrier.

Test setup

On power up of the two units, the RF output of SMIQ is connected to the input of FSIQ (coaxial cable with N connectors).

Settings on SMIQ:

.

[PRESET]
[LEVEL: *0 dBm**]***
[FREQ: *870.03 MHz**]***
DIGITAL STD
IS95
STATE: ON
SAVE / RCL MAPPING
MODE: FWD_LINK_18
GET PREDEFINED MAPPING...: PILOT
MODULATION
FWD LINK FILTER: IS-95 + EQUALIZER
FILTER MODE: LOW EVM
LOW DISTORTION MODE: OFF

Settings on FSIQ:

.

[PRESET]
[CENTER: *870.03 MHz**]***
[MODE: *CDMA ONE BTS: POWER*
[REF: *0 dBm**]***

Measurement on FSIQ:

The following is displayed:

- The spectrum of the cdmaOne signal (pilot only) on the trace
- The signal channel power within the 1.23 MHz channel bandwidth (in the marker info field)

Measurement 2: Measuring modulation quality

The measurement of the modulation quality allows the determination of the RHO factor to TIA/EIA-97-C. In the following example, the display of the error vector diagram is selected.
The synchronization of the reference oscillator is performed during the next step (setting 1) to show the behavior of the unit in the absence of synchronization.

Settings on SMIQ: *As for measurement 1*

Settings on FSIQ: *As for measurement 1**, plus***

[REF:	*ATTEN AUTO NORMAL]*
[REF:	*+10 dBm**]***
[MODE:	*CDMA ONE BTS: MODULATION QUALITY*
MEAS RESULT:	*MEAS SIGNAL: POLAR [IQ] VECTOR*
[menu change key UP]	
RESULT LENGTH	*100*

Measurement on FSIQ: The following is displayed:

- Screen A: IQ trace of a cdmaOne signal (pilot only) after the prescribed receive filtering
- Screen B: signal error (numerical results)

RHO — The cdmaOne-relevant test parameter rho represents a quality factor for the compliance of the test signal with an ideal receive signal and should be > 0.9995.

Frequency error — The frequency error may be several 100 Hz in this setting since the reference oscillators are synchronized and the center frequencies of the two units slightly differ.

Setting: Synchronizing the reference frequencies

The synchronization of the reference oscillators both of the DUT and analyzer strongly reduces the measured frequency error.

Test setup: Connect the reference input (EXT REF IN/OUT) on the rear panel of FSIQ to the reference input (REF) on the rear panel of SMIQ (coaxial cable with BNC connectors).

Settings on SMIQ: *As for measurement 1, plus:*

UTILITIES:
REF OSC
SOURCE: EXT
EXT FREQUENCY: 10 MHz

Settings on FSIQ: *As for step1, plus*

SETUP:	*REFERENCE INT*

Measurement on FSIQ: Frequency error — The displayed frequency error should be < 10 Hz.

The reference frequencies of the analyzer and of the DUT should be synchronized

Measurement 3: Code domain power measurement with an active channel

The following sequence shows a relative code domain power measurement with an active channel. With this measurement, the individual power values of the code channels are normalized to the sum of all code power values (= 0 dB) and displayed as relative values. A horizontal line indicates the threshold below which all channels are considered as inactive.

Settings on SMIQ: *As under Synchronizing the reference frequencies*

Settings on FSIQ: *As under Synchronizing the reference frequencies, plus*
[MODE: *CDMA ONE BTS: CDP MEAS]*
DISPLAY MODE CDP *CDP RELATIVE*

Measurement on FSIQ: A *CODE DOMAIN POWER RELATIVE* diagram with an active code channel (channel 0) is presented.
The level of this channel is 0 dB (referred to the total power of the cdmaOne signal), ie the total transmit power is concentrated in this code channel.

Setting: Behavior with a deviating center frequency setting

In the following setting, the behavior of the DUT and the analyzer with deviating center frequency setting is shown.

Settings on SMIQ: Tune the center frequency of the signal generator in 10 kHz steps up to 869.830 MHz and observe the analyzer screen:

Measurement on FSIQ:
- At about 869.930 MHz, the level of inactive channels has strongly increased, the measurement time is considerably extended.
- At about 869.830 MHz, no measurement is possible, the analyzer displays all channels with the same level.

Settings on SMIQ: Set again the signal generator center frequency to 870.03 MHz:
[FREQ: *870.03 MHz**]***

The analyzer center frequency should be accurately set to the DUT frequency

Measurement 4: Code domain power measurement with nine active channels

The following sequence shows a relative code domain power measurement with 9 active code channels.

Settings on SMIQ:
As for measurement 3, plus
DIGITAL STD
IS-95
SAVE / RCL MAPPING:
GET PREDEFINED MAPPING: 09CHAN

Settings on FSIQ:
As for measurement 3, plus
***[REF:** REF LEVEL 10dBm]*

Measurement on FSIQ:
A *CODE DOMAIN POWER RELATIVE* diagram with 9 active code channels is displayed.
The channels bearing the numbers 0, 1 and 32 are management channels and highlighted in blue. The other channels are traffic channels and are represented in yellow. The power values of the different channels are normalized to the total power of all channels (TOTAL POWER).
At this point, the total power of the cdmaOne signal is distributed over the 9 code channels in line with the TIA/EIA-97-C test model (see following section cdmaOne test model).

Setting: Behavior in case of overdrive

The effect of insufficient analyzer level is shown below. The CODE DOMAIN measurement mode offers the *LEVEL AUTO ADJUST* softkey which activates the automatic adaptation of the analyzer level to the input signal, thus preventing overdrive.

Settings on SMIQ:
Change level from 0 dBm to +10 dBm
***[LEVEL:** +10dBm]*

Measurement on FSIQ:
The analyzer indicates overdrive by a red OVL symbol at the left-hand top of the screen. The overdrive causes a strong increase of the CODE POWER inactive channels.

Settings on FSIQ:
As above, plus
*[**MODE** cdmaOne BTS*
CDP MEAS: LEVEL AUTO ADJUST]

Measurement on FSIQ:
The *LEVEL AUTO ADJUST* softkey is used for the automatic level adjustment of the analyzer to the input signal. Overdrive of the analyzer does not occur again.

The analyzer should not be overdriven

Setting: Threshold values for demodulation

A CODE DOMAIN POWER RELATIVE diagram with 9 active code channels is presented in measurement 4.
A horizontal red line indicates the value for INACT CHANNEL THRESHOLD. Code channels with a level above this line are recognized as active channels. Further modulation errors such as phase and time error are calculated for these channels. For code channels below this threshold, only the CODE POWER is calculated and displayed.

Behavior in case of a too high setting

Settings on FSIQ:	*As for measurement 4, plus*	
	*[**MODE***	*cdmaOne BTS*
	CDP MEAS:	*MEAS SETTINGS*
	INACT CHANNEL THRESH	*-8.3 dB]*
Measurement on FSIQ:	A CODE DOMAIN POWER RELATIVE diagram with 9 active code channels is presented.	
	With the setting value of –8.3 dB, only the PILOT channel is recognized as an active channel.	
Settings on SMIQ:	*As for measurement 4*	
Settings on FSIQ:	*As for measurement 4, plus*	
	[MODE:	*cdmaOne BTS*
	CDP MEAS	*ERROR SUMMARY*
	INACT CHANNEL THRESH	Slowly adjust from –8.3 dB to –15 dB using the rollkey and observe the screen display.
Measurement on FSIQ:	A tabulated overview of active channels and some numerical errors are presented. Modifying the *INACT CHANNEL THRESH* changes the number of table entries in the channel table. The number of channels is in addition displayed as *ACTIVE CHANNELS*.	

Code channels below the threshold are not measured

Summary

The most important settings for the correct demodulation of a cdmaOne BTS signal are summarized in the menus *MEAS SETTINGS, LIMIT SETTINGS* and *REF LEVEL* (*CONFIGURATION MODE - cdmaOne BTS - CDP MEAS*).

It is indispensable to set the analyzer center frequency accurately to the DUT frequency and to set correctly the analyzer level using the *REF LEVEL* or *LEVEL AUTO ADJUST* softkeys.
Overdrive of the measuring instrument causes larger errors (can be noticed by adjacent channel crosstalk in the CDPR diagram) and an underdrive increased noise power in the non-occupied code channels.

The analyzer assumes a channel configuration in line with the test model to TIA/EIA-97-C (section Test Setups), table Base Station Test Model, Nominal). In case of incorrect synchronization (for example, if no signal is applied to the analyzer input connector), all 64 code channels are displayed in the CDPR diagram with the same power.

3 Setup for Base Station Tests

Caution:

Before turning the instrument on, the following conditions must be fulfilled:

- *instrument covers are in place and all fasteners are tightened,*
- *fan openings are free from obstructions,*
- *signal levels at the input connectors are all below specified maximum values. The level at the FSIQ RF input of +20 dBm with a 0 dB input attenuator must under no circumstances be exceeded. ,*
- *signal outputs are correctly connected and not overloaded.*

Non-observance may cause damage to the instrument *.*

This section describes how to set up the FSIQ for cdmaOne base station tests. As a prerequisite for starting the test, the instrument must be correctly set up and connected to the AC power supply as described in chapter 1 of the operating manual for the FSIQ basic unit. Furthermore, the application firmware module must be properly installed following the instructions given in chapter 1 of the present manual.

Standard test setup

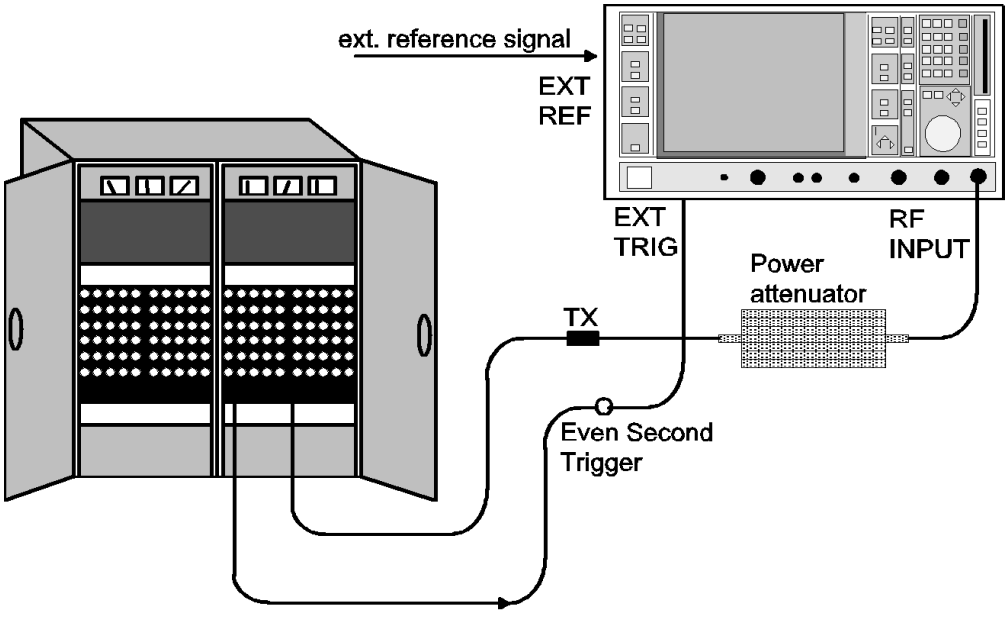


Fig. 3-1 BTS test setup

- Connect trigger output of BTS to the rear BNC connector *EXT TRIG GATE* (external trigger or gate input) of FSIQ. With this trigger signal, FSIQ can measure the pilot time alignment error.
- Connect antenna output (or TX output) of BTS to FSIQ RF input via a power attenuator of suitable attenuation.

Note: *The following values are recommended for the external attenuator to ensure that the FSIQ RF input is protected and the sensitivity of the FSIQ is not reduced too much. The FSIQ level display is automatically corrected by the entered value.*

Max. power	Recommended ext. attenuation
≥ 55 to 60 dBm	35 to 40 dB
≥ 50 to 55 dBm	30 to 35 dB
≥ 45 to 50 dBm	25 to 30 dB
≥ 40 to 45 dBm	20 to 25 dB
≥ 35 to 40 dBm	15 to 20 dB
≥ 30 to 35 dBm	10 to 15 dB
≥ 25 to 30 dBm	5 to 10 dB
≥ 20 to 25 dBm	0 to 5 dB
< 20 dBm	0 dB

- Connect the external reference frequency to the rear BNC connector *EXT REF IN/OUT* of FSIQ.

Presetting

- Enter external attenuation (reference level offset)
- Enter reference level
- Enter center frequency
- Set the trigger
- Select standard and measurement

4 cdmaOne Test Model

Calculation of the nominal code power distribution

The nominal power distribution of the code channels is described in standard TIA/EIA-97-C (section Test Setups, table Base Station Test Model, Nominal) as test model:

	No. of Channels	**Channel No.**	**Rel. Power**
Pilot Channel	1	0	-7 dB
Paging Channel	1	1	-7.3 dB
Sync Channel	1	32	-13.3 dB
Traffic Channels	6		-10.3 dB

For the general case (with a deviating number of traffic channels), the power values are obtained from the table Base Station Test Model, General:

	Rel. Power
Pilot Channel	$P_{Pilot} = 10 \cdot \log_{10}(0.2) = -7\text{dB}$
Paging Channel	$P_{Paging} = P_{Traffic} + 3\text{dB}$
Sync Channel	$P_{Sync} = P_{Traffic} - 3\text{dB}$
Traffic Channel	Same power in each traffic channel: $P_{Traffic} = 10 \cdot \log_{10} \left\| \frac{0.8}{(N_{Traffic} + 0.5 + 2)} \right\| =$ $= 10 \cdot \log_{10}(0.8) - 10 \cdot \log_{10}(N_{Traffic} + 2.5) =$ $= -1\text{dB} - 10 \cdot \log_{10}(N_{Traffic} + 2.5);$

5 Menu Overview

Application Firmware Module FSIQK71 (cdmaOne base station tests) extends FSIQ by the code domain measurement mode. Additional softkeys are available which allow overview measurements in the analyzer and vector analyzer modes.

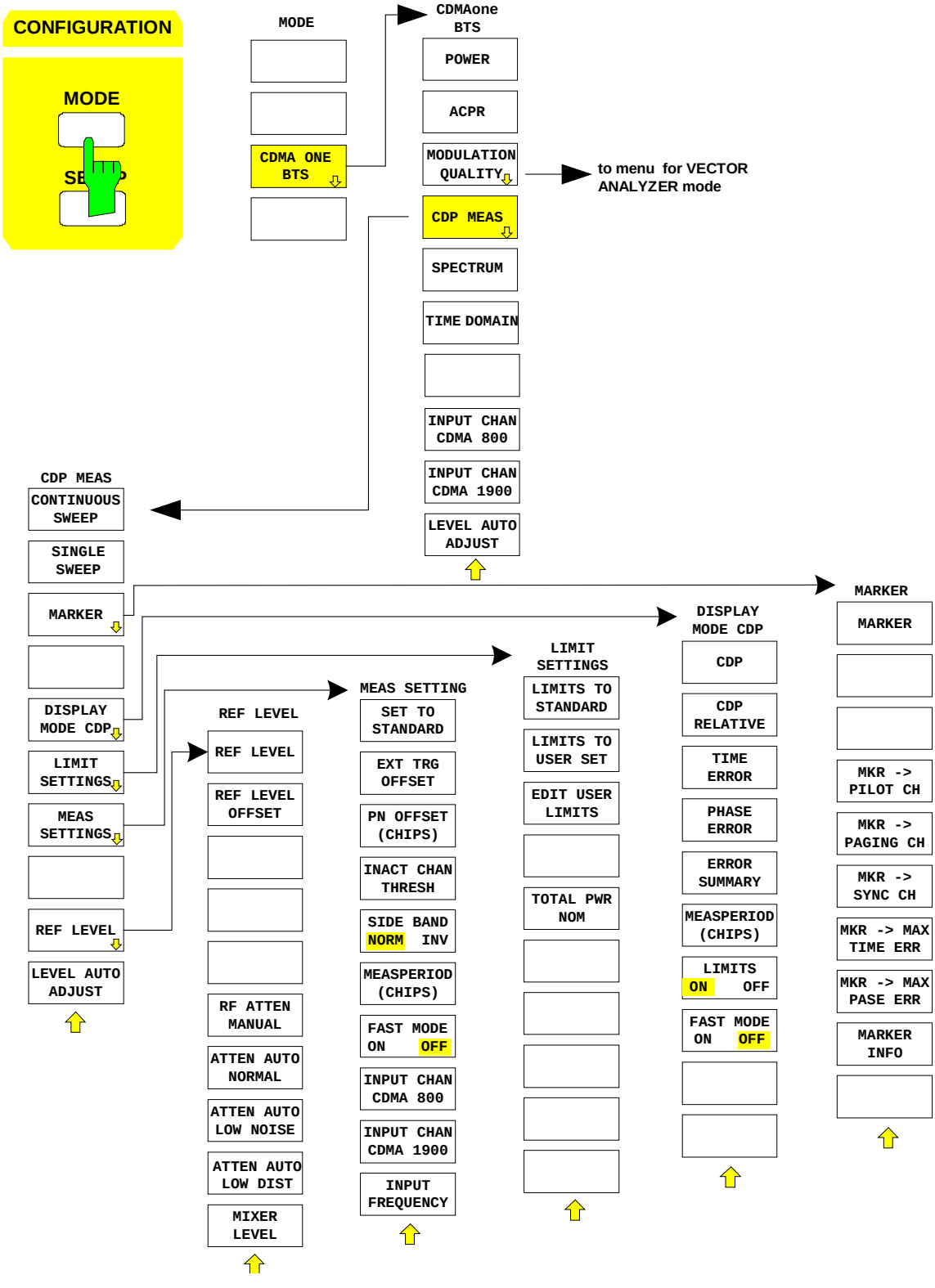


Fig. 5-1 Overview of menus

6 Configuration of cdmaOne Measurements

The most important parameters for the correct demodulation of a cdmaOne BTS signal are summarized in the menu *cdmaOne BTS* (*CONFIGURATION* key group*, Mode* key) and are explained below using the softkey functions.

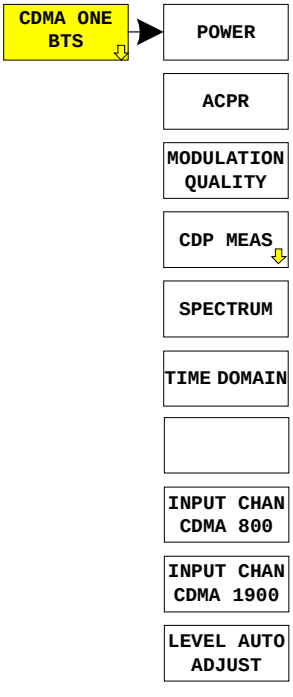
The *CDP MEAS* softkey activates the code domain measurement mode and opens the submenus for setting the measurement. The other menus of FSIQ either have the same function as in the basic unit or in main menu *CDP MEAS*, or they are not available for the code domain measurement mode (the softkeys are shown in grey).

The trigger setting for measurement is performed in the menu *TRIGGER*. The settings for display mode and evaluation of the trace are performed in the menu *TRACE1*. These menus are described after the *CDP MEAS* menu.

The display is set to *FULL SCREEN* in code domain measurements. Examples for the different measurement masks in the various result display modes are shown in the description for the relevant softkey.

The *POWER*, *ACPR*, *MODULATION QUALITY* and *SPECTRUM* softkeys activate base station tests in the analyzer or vector analyzer mode. The required settings are performed by pressing the corresponding softkey, a subsequent modification of settings is possible. The other menus of FSIQ correspond to the menus of these modes and are described in the operating manual of FSIQ.

CONFIGURATION MODE menu

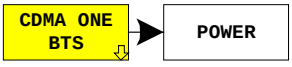


The *CDMA ONE BTS* softkey opens a submenu for setting the various measurement modes of option FSIQK71:

- *POWER* activates the channel power measurement with defined settings in the analyzer mode.
- *ACPR* activates the adjacent channel power measurement with defined settings in the analyzer mode.
- *MODULATION QUALITY* activates the RHO factor measurement in the vector analyzer mode.
- *CDP MEAS* activates the code domain measurement mode and opens another submenu for selecting and configuring the different CODE DOMAIN measurements. All other menus of FSIQ are adapted to the functions of the code domain measurement mode.
- *SPECTRUM* activates an overview measurement with defined settings in the analyzer mode.
- *TIME DOMAIN* activates the measurement of the cdmaOne signal CREST factor in the time domain display mode (analyzer mode).

Measurement of Channel Power

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – POWER*



The *POWER* softkey activates the measurement of the cdmaOne signal channel power .

FSIQ measures the RF signal power in the 1.23 MHz bandwidth. The bandwidth is displayed numerically in the marker info field at the top right edge of the screen.

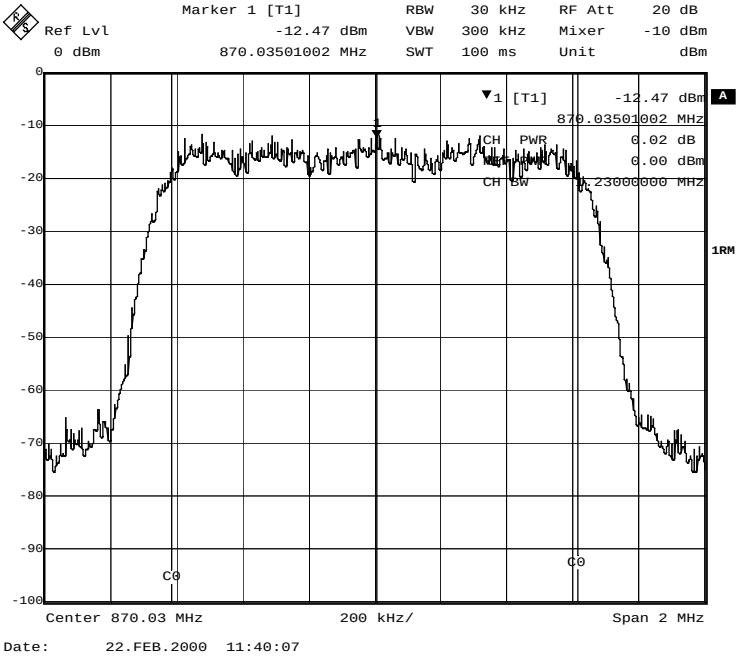


Fig. 6-1 Power measurement in the 1.23 MHz transmission channel

Pressing the softkey activates the analyzer mode with defined settings:

SYSTEM PRESET		
After Preset the following user-specific settings are restored and so the adaptation to the DUT is maintained: Reference Level, Center Frequency, Input Attenuation, Mixer Level		
MARKER NORMAL	CHANNEL POWER	
MARKER NORMAL	POWER MEAS SETTINGS - ACP STANDARD	CDMA_ONE 1900 FWD
FREQUENCY SPAN		2 MHz
SWEEP SWEEP	SWEEP TIME	MANUAL 0.1 sec

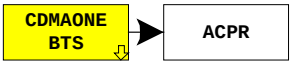
Starting from these settings, FSIQ can be operated in all functions available in the ANALYZER mode, ie all test parameters can be adapted to the requirements of the specific measurement.

IEC/IEEE-bus command: `:CONFigure:IS95:MEASurement POWer`

Query of results: `:CALCulate:MARKer:FUNCtion:POWer:RESult? CPOWer`

Measurement of Adjacent-Channel Power - ACPR

Submenu: *CONFIGURATION MODE – cdmaOne BTS – ACPR*



The *ACPR* softkey activates the adjacent-channel power measurement in the default setting according to TIA/EIA-97-C, Class1 (cdmaOne 1900 FWD).

FSIQ measures the channel power and the relative power of adjacent channels and of the next channels but one.

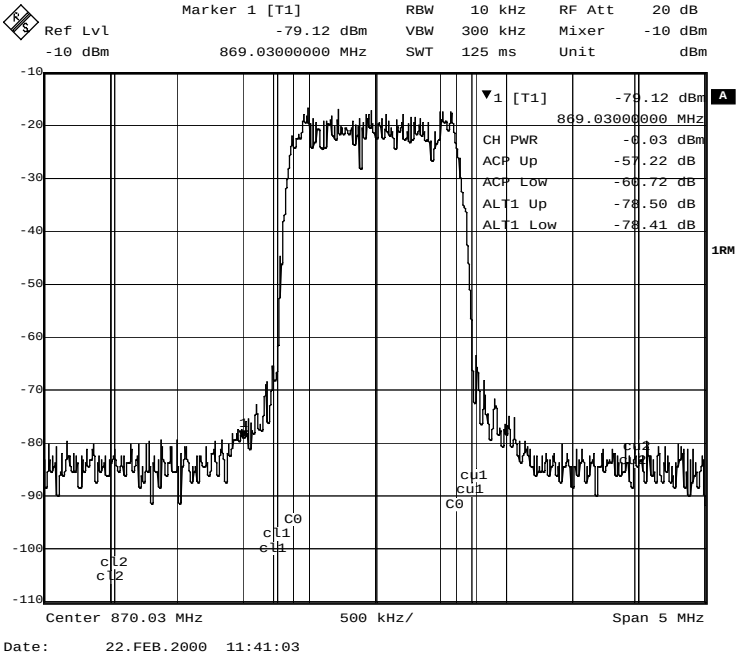


Fig. 6-2 Adjacent-channel power measurement of a cdmaOne base station.

Pressing the softkey activates the analyzer mode with defined settings:

SYSTEM PRESET		
After Preset the following user-specific settings are restored and so the adaptation to the DUT is maintained: Reference Level, Center Frequency, Input Attenuation, Mixer Level		
MARKER NORMAL	ADJACENT CHAN POWER	
MARKER NORMAL	POWER MEAS SETTINGS - ACP STANDARD	CDMA_ONE 1900 FWD
SWEEP SWEEP	SWEEP TIME	MANUAL 0.125 sec
SWEEP COUPLING	RES BW	MANUAL 10 kHz

Starting from these settings, FSIQ can be operated in all functions available in the ANALYZER mode, ie all test parameters can be adapted to the requirements of the specific measurement. In particular, the setting of the ACP standard can be modified as follows:

- Press ***MARKER NORMAL*** key.
- Change to the left-hand menu using menu key
- Press the *POWER MEAS SETTINGS* softkey
- Press *ACP STANDARD* softkey, a table is displayed for selecting the ACP standard

After selection, the following operations can be performed:

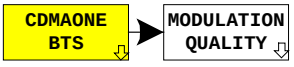
- ACP limit values can be adapted using the *EDIT ACP LIMITS* softkey
- Bandwidth can be modified using the *CHANNEL BANDWITH* softkey and
- Limit checking of measured values can be switched on or off using the *LIMIT CHECK* softkey

IEC/IEEE-bus command: `:CONFigure:IS95:MEASurement ACPR`

Query of results: `:CALCulate:MARKer:FUNCtion:POWer:RESult? ACPower`

Measurement of the RHO Factor - MODULATION QUALITY

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – MODULATION QUALITY*



The *MODULATION QUALITY* softkey leads to the vector analyzer mode and the constellation diagram is shown in the upper half of the screen, in the lower one the ERROR SUMMARY with the modulation errors of the cdmaOne signal.

The setting allows the measurement of the RHO factor in line with TIA/EIA-97-C Chapter "Waveform Quality Measurement Equipment", Table "Accuracy of Waveform Quality Measurement Equipment". On measuring the RHO factor, the base station is to be configured such that only the pilot channel is transmitted (see also chapter Performance Test).

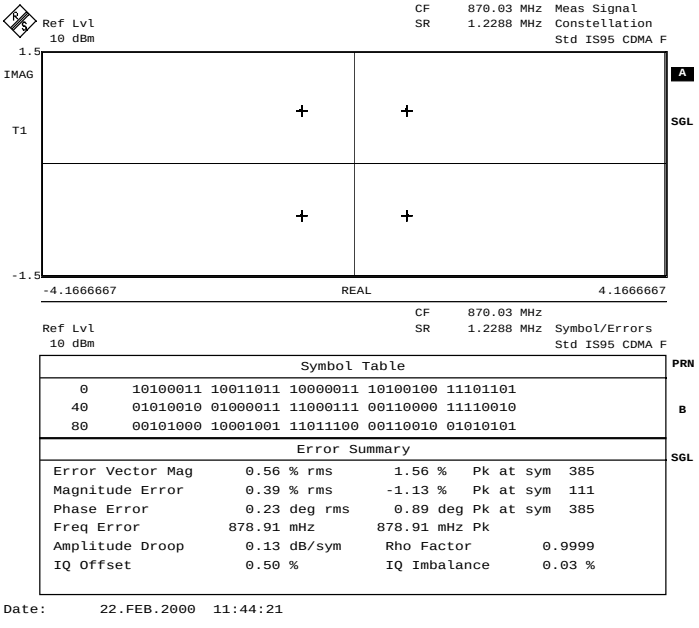


Fig. 6-3 Vector analysis of cdmaOne signal (pilot only)

Pressing the softkey activates the vector analyzer mode with defined settings:

SYSTEM PRESET		
After Preset the following user-specific settings are restored and so the adaptation to the DUT is maintained: Reference Level; Center Frequency; Input Attenuation; Mixer Level		
CONFIGURATION MODE	VECTOR ANALYZER	
	DIGITAL STANDARDS	IS95-CDMA FWD CH
SYSTEM DISPLAY	SPLIT SCREEN	
	ACTIVE SCREEN B	
CONFIGURATION MODE	VECTOR ANALYZER	
	MEAS RESULT	SYMB TABLE /ERROR
SYSTEM DISPLAY	ACTIVE SCREEN A	

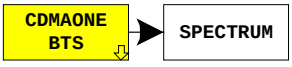
Starting from these settings, FSIQ can be operated in all functions available in the vector analyzer mode, ie all test parameters can be adapted to the requirements of the specific measurement. This can be done in the *MODULATION QUALITY* submenu which is identical to the *VECTOR ANALYZER* menu.

IEC/IEEE-bus command: `:CONFigure:IS95:MEASurement MODulation`

Query of results: `:CALCulate<1|2>:MARKer<1|2>:FUNCtion:DDEMod:RESult? RHO`

Spectrum Measurement - SPECTRUM

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – SPECTRUM*



The *SPECTRUM* softkey displays the spectrum of the cdmaOne BTS signal with a span of 5 MHz in the ANALYZER mode.
This submenu allows the overview display of the cdmaOne transmit signal and the checking of the harmonics close to the carrier.

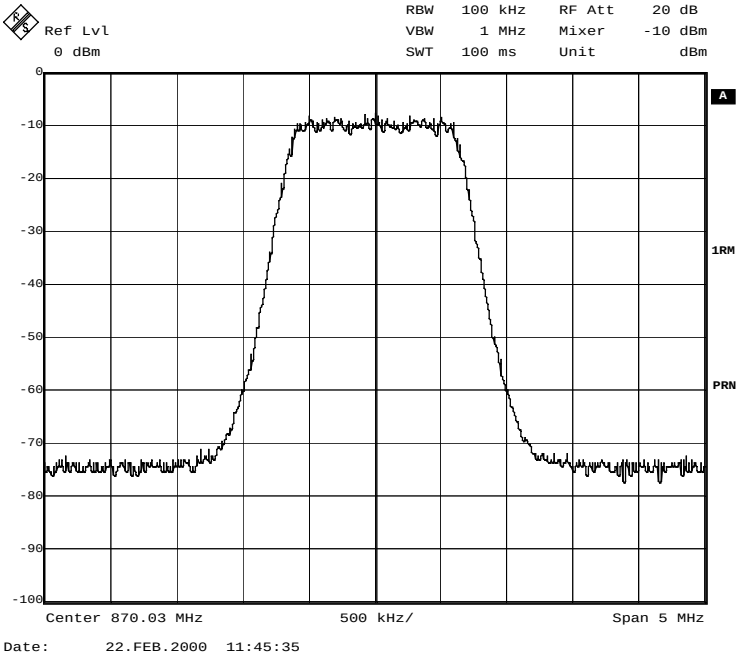


Fig. 6-4 Spectrum display of cdmaOne signal at a 5 MHz span.

Pressing the softkey activates the analyzer mode with defined settings:

SYSTEM PRESET		
After Preset the following user-specific settings are restored and so the adaptation to the DUT is maintained:		Reference Level Center Frequency Input Attenuation Mixer Level
FREQUENCY SPAN		5 MHz
SWEEP SWEEP	SWEEP TIME	MANUAL 0.1 sec
SWEEP COUPLING	RES BW	MANUAL 100 kHz
TRACE 1	DETECTOR	RMS

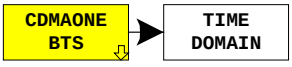
Starting from these settings, FSIQ can be operated in all functions available in the ANALYZER mode, ie all test parameters can be adapted to the requirements of the specific measurement.

IEC/IEEE-bus command: `:CONFigure:IS95:MEASurement FDOMain`

Query of results: `-- (visual evaluation)`

Time Domain Measurement - TIME DOMAIN

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – TIME DOMAIN*



The *TIME DOMAIN* softkey displays the CREST factor of the cdmaOne BTS signal in the ANALYZER mode.
The CREST factor designates the level difference between the peak power and rms power of the signal in dB.

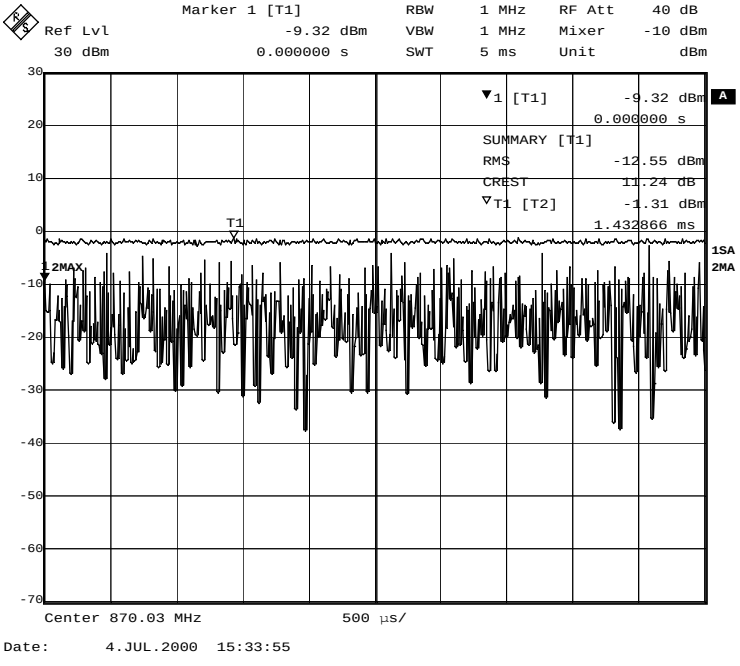


Fig. 6-5 Time domain display of cdmaOne signal.

Pressing the softkey activates the analyzer mode with defined settings:

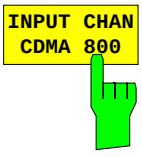
SYSTEM PRESET		
After Preset the following user-specific settings are restored and so the adaptation to the DUT is maintained:		Reference Level Center Frequency Input Attenuation Mixer Level
FREQUENCY SPAN		ZERO SPAN
TRACE 1	DETECTOR	SAMPLE
MARKER NORMAL		MARKER 1
TRACE 2		MAX HOLD
TRACE 2	DETECTOR	MAX PEAK
MARKER SEARCH	SUMMARY MARKER	ON
MARKER SEARCH	SUMMARY MARKER	RMS
MARKER NORMAL	MARKER INFO	ON

Starting from these settings, FSIQ can be operated in all functions available in the ANALYZER mode, ie all test parameters can be adapted to the requirements of the specific measurement.

IEC/IEEE-bus command: `:CONFigure:IS95:MEASurement TDOMain`

Query of results:
```
:CALCulate<1|2>:MARKer<1...4>:FUNCtion:CRESt?
:CALCulate:MARKer:FUNCtion:SUMMary:RMS:RESult?
:CALCulate:MARKer:FUNCtion:SUMMary:STATe ON
```

Selecting the Input Channel - INPUT CHAN CDMA



The *INPUT CHAN CDMA 800* softkey opens a window for entering a channel number in the CDMA 800 MHz frequency band. The corresponding center frequency of the analyzer is calculated from it and indicated in the display:

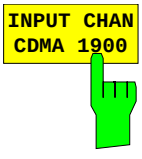
Base station (869 to 894 MHz)

F_{TX} = 870 MHz + N x 0.03; N = 1 to 799
or
F_{TX} = 870 MHz + (N - 1023) x 0.03; N = 991 to 1023

The channel assignment is obtained from TIA/EIA-97-C (chapter CDMA Receiver Minimum Standards, table CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 0).

IEC/IEEE bus commands:

```
:CONFigure:CDPower:PRESet FWCDMA8 | NONE
:CONFigure:CDPower:CHANnel 1
```



The *INPUT CHAN CDMA 1900* softkey opens a window for entering a channel number in the CDMA 1900 MHz frequency band. The corresponding center frequency of the analyzer is calculated from it and indicated in the display:

Base station (1930 to 1990 MHz)

F_{TX} = 1930.000 MHz + N x 0.05; N = 1 to 1199

The channel assignment is obtained from TIA/EIA-97-C (chapter CDMA Receiver Minimum Standards, table CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 1).

IEC/IEEE bus commands:

```
:CONFigure:CDPower:PRESet FWCDMA19 | NONE
:CONFigure:CDPower:CHANnel 1
```

Automatic Adaptation to the Input Level - LEVEL AUTO ADJUST

Submenu: *CONFIGURATION- MODE – LEVEL AUTO ADJUST*

The *LEVEL AUTO ADJUST* softkey is used for setting automatically the RF attenuation and IF gain to the level of the applied signal. Manual re-adjustment is permissible with the *REF LEVEL* softkey.

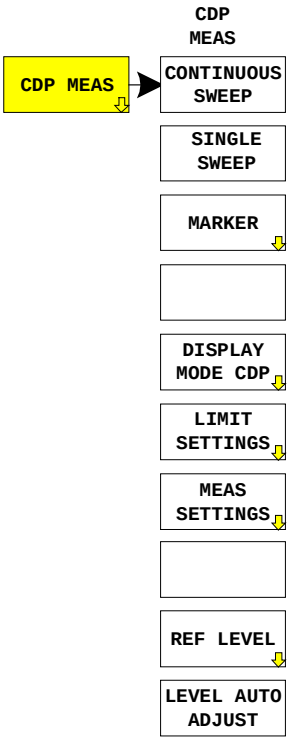
The instrument is to be switched to the *ATTEN MANUAL* mode so as to set the RF attenuation and IF gain to optimum values independently of each other. This mode is maintained after changing from code-domain power measurements to the analyzer or vector analyzer mode.

IEC/IEEE-bus command: `:SENSe:CDPower:LEVel:ADJust`

The softkey is only available for *TIME DOMAIN* and *CDP* measurement.

Code Domain Measurements on cdmaOne Signals

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – CDP MEAS*



The *CDP MEAS* softkey activates the code domain measurement mode and opens a submenu for configuring the measurements.
All settings can be performed in these submenus. An exception is the trigger setting which is done in the *SWEEP TRIGGER* menu.

IEC/IEEE-bus command:

```
:INSTrument[:SELect] CDPower
```

or

```
:CONFigure:IS95:MEASurement CDPower
```

Query of results

1.
```
:CALCulate:FEED  'XTIM:CDP:ERR:SUMM';
:CALCulate:MARKer:FUNCtion:CDPower:RESult?
      PTOTal |CPOWer | PERRor | FERRor |
      ERRor | ACHannels | PTALignment | ACOunt
```

2.
```
:TRACe:DATA? TRACE1
```

3. Marker functions (see MARKER submenu)

Continuous Measurement - Continuous Sweep

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – CDP MEAS – CONTINUOUS SWEEP*

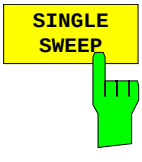
The *CONTINUOUS SWEEP*softkey sets a continuous measurement mode. The start of the actual measurement, however, may depend on an external trigger. (see section Trigger Settings - TRIGGER Menu)

IEC/IEEE-bus command:

```
:INITiate:CONTinuous ON;
:INITiate:IMMediate
```

Single Measurement - Single Sweep

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – CDP MEAS – SINGLE SWEEP*



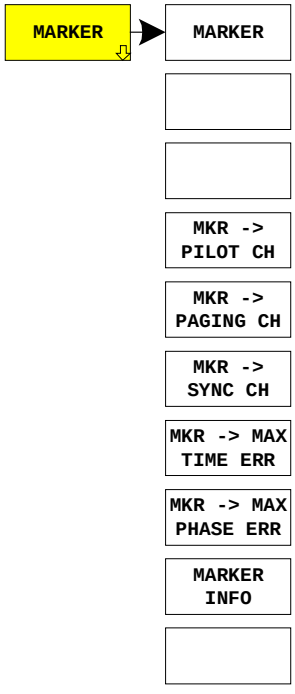
The *SINGLE SWEEP* softkey sets the single measurement mode. A single sweep is performed upon pressing the softkey. The start of the actual measurement, however, may depend on an external trigger (see section Key group SWEEP).

IEC/IEEE-bus command:

```
:INITiate:CONTinuous OFF;
:INITiate:IMMediate
```

MARKER Functions

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – CDP MEAS – MARKER*



The *MARKER* softkey opens a submenu with the marker settings.

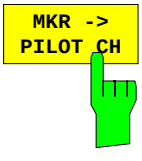
These settings can only be selected in the graphical display modes

- CDP
- CDP RELATIVE
- TIME ERROR
- PHASE ERROR

Markers are not available in the tabulated display mode *ERROR SUMMARY*.

The *MARKER* softkey switches the marker on or off.

IEC/IEEE-bus command:
```
:CALCulate:MARKer:STATe ON
:CALCulate:MARKer:X <channel_number>
:CALCulate:MARKer:Y?
```

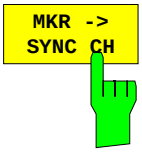


The *MKR -> PILOT CH* softkey sets the marker to the pilot channel (WALSH channel #0)

IEC/IEEE-bus command:
```
:CALCulate:MARKer:FUNCtion:PILot
:CALCulate:MARKer:Y?
```

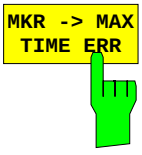
The *MKR -> PAGING CH* softkey sets the marker to the paging channel (WALSH channel #1)

IEC/IEEE-bus command:
```
:CALCulate:MARKer:FUNCtion:PAGing
:CALCulate:MARKer:Y?
```



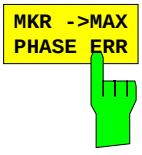
The *MKR -> SYNC CH* softkey sets the marker to the sync channel (WALSH channel #32)

IEC/IEEE-bus command:
```
:CALCulate:MARKer:FUNCtion:SYNC
:CALCulate:MARKer:Y?
```



The *MKR -> MAX TIME ERR* softkey sets the marker to the code channel with the maximum measured value for timing error.

IEC/IEEE-bus command:
```
:CALCulate:MARKer:FUNCtion:TERRor
:CALCulate:MARKer:X?
                    (queries the channel)
:CALCulate:MARKer:Y?
                    (queries the value)
```



The *MKR -> MAX PHASE ERR* softkey sets the marker to the code channel with the maximum measured value for phase error.

IEC/IEEE-bus command:
```
:CALCulate:MARKer:FUNCtion:PERRor
:CALCulate:MARKer:X?
                    (queries the channel)
:CALCulate:MARKer:Y?
                    (queries the value)
```

The *MARKER INFO* softkey switches the *MARKER INFO* field on and off.

This field shows additional information and measured values which are not shown in the selected display mode:

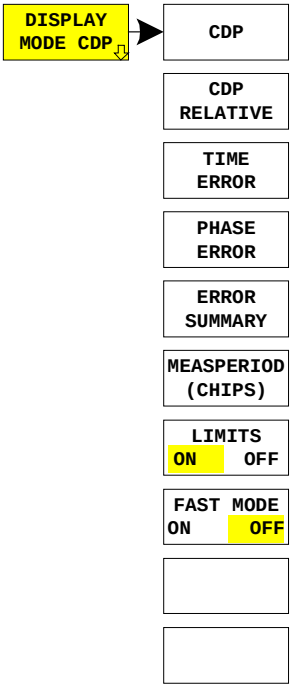
The CDP display mode indicates for example the absolute power of the different code channels. Additional information is given in the marker info field for the currently selected channel:

- Total Power
- CDP
- CDP RATIO
- Phase Error
- Time Error

IEC/IEEE-bus command: `:DISPlay:WINDow:MINFo ON | OFF`

CDP Display Mode

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – CDP MEAS – DISPLAY MODE CDP*



The *DISPLAY MODE CDP* softkey opens a submenu for setting the display mode, the limit checking and some other test parameters.

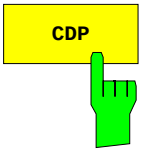
The following display modes are available:

CDP	Code Domain Power
CDP RELATIVE	Relative Code Domain Power
TIME ERROR	Pilot Channel to Code Channel Time Tolerance according to TIA/EIA-97-C (Section "Pilot Channel to Code Channel Time Tolerance" and Section "Code Domain Measurement Equipment", Table "Accuracy of Code Domain Measurement Equipment")
PHASE ERROR	Pilot Channel to Code Channel Phase Tolerance according to TIA/EIA-97-C (Section "Pilot Channel to Code Channel Phase Tolerance" and Section "Code Domain Measurement Equipment", Table "Accuracy of Code Domain Measurement Equipment")
ERROR SUMMARY	Display of the most important measured values, limit values and set test parameters

The demodulation period is set in number of chips using the *MEAS PERIOD (CHIPS)* softkey.

The limit check is switched on with *LIMITS ON/OFF*. The limit check settings are performed in the *LIMIT SETTINGS* menu.

The measurement speed can be increased by switching off the calculation of timing and phase errors with *FAST MODE ON*.



The *CDP* softkey sets the display mode Code Domain Power. This diagram displays the power of code channels in absolute scaling.

An info field with further measured values that cannot be seen in the CDP display can be inserted using the *MARKER INFO* softkey in the *MARKER NORMAL* menu.

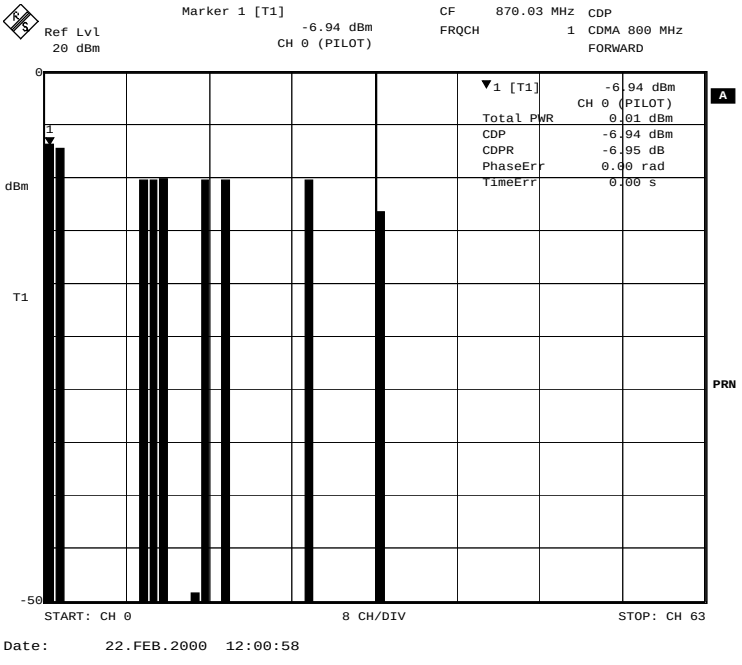
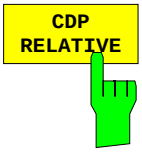


Fig. 6-6 Display of the Code Domain Power with marker info. All measured values for the code selected with the marker are displayed in the marker info field.

IEC/IEEE bus commands:

```
:CALCulate:FEED "XPOW:CDP"
:CALCulate:MARKer:FUNCtion:CDPower:RESult? CPOWer
```



The *CDP RELATIVE* softkey sets the display mode to relative code domain power measurement .
With this measurement, the individual power values of all code channels are normalized to the sum of all code power values (= 0 dB) and displayed as relative values.
A horizontal line indicates the set threshold value (INA = Inactive Channel Threshold) below which all channels are considered as inactive.
Code channels with a level below this threshold are assumed to be inactive for further evaluation; for such channels, further error evaluation is not carried out.

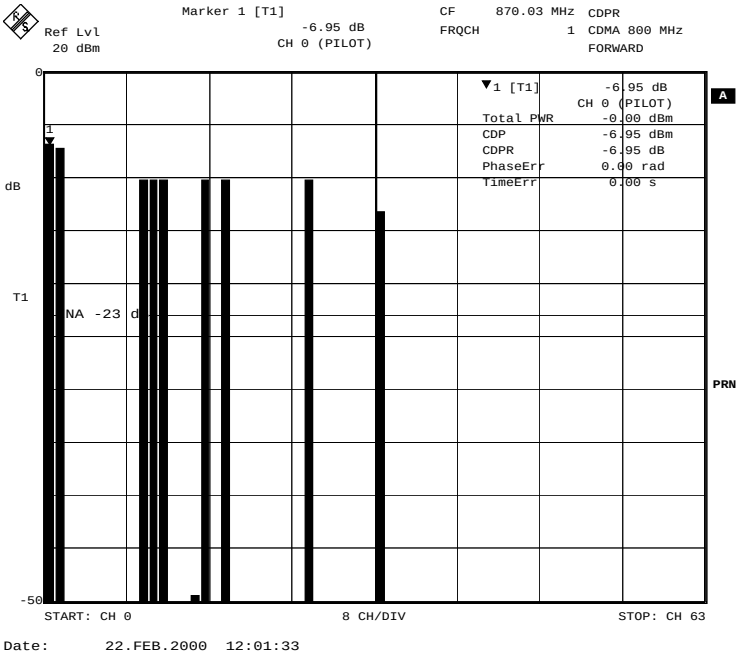
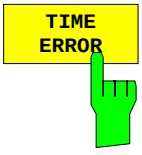


Fig. 6-7 Display of the relative code domain power measurement with threshold for inactive channels

IEC/IEEE-bus command: `:CALCulate:FEED "XPOW:CDP:RAT"`



The *TIME ERROR* softkey sets the display mode **Pilot Channel to Code Channel Time Tolerance**.
Time shifts of code channels referred to the pilot channel are displayed here. The scaling of the y-axis is adapted to the limit values.

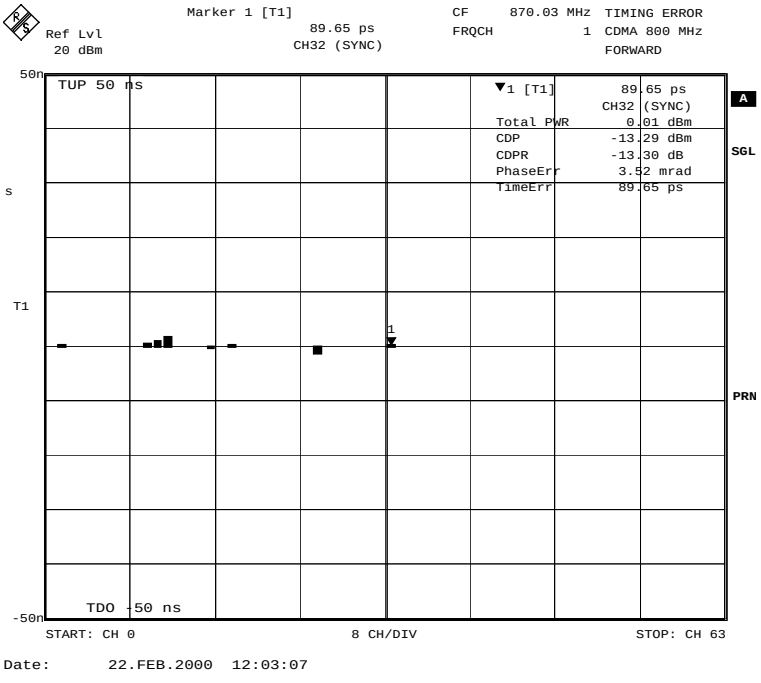
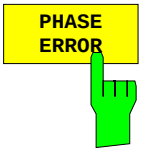


Fig. 6-8 Display of timing error (referred to the pilot channel) for assigned code channels

IEC/IEEE bus commands:

```
:CALCulate:FEED "XTIM:CDP:ERR"
:CALCulate:MARKer:FUNCtion:CDPower:RESult? TERRor
```



The *PHASE ERROR* softkey sets the display mode **Pilot Channel to Code Channel Phase Tolerance**.
Time shifts of code channels referred to the pilot channel are displayed here. The scaling of the y-axis is adapted to the nominal value.

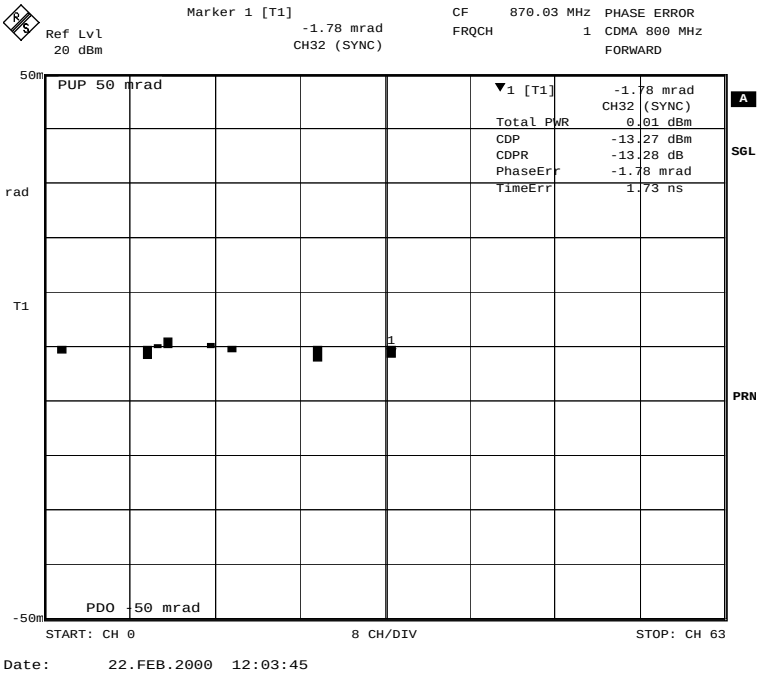


Fig. 6-9 Display of phase error (referred to the pilot channel) for assigned code channels

IEC/IEEE bus commands:

```
:CALCulate:FEED "XTIM:CDP:ERR:PHAS"
:CALCulate:MARKer:FUNCtion:CDPower:RESult? PERRor
```

The *ERROR SUMMARY* softkey opens a tabulated display of the most important measured values, limit values and set test parameters:

Measured values of the different code channels are indicated in the upper half **(A)** of the diagram, eg:

- CODE PWR
- CODE PWR RATIO (Code PWR referred to Total PWR)
- TIMING ERROR
- PHASE ERROR.

The center section **(B)** contains numerical values for the total cdmaOne signal, eg:

- TOTAL PWR (sum of the power values of all code channels)
- PILOT to TOTAL PWR (pilot channel power referred to the sum power)
- PILOT TIME ALIGNMENT
- FREQUENCY ERROR

The display of PILOT TIME ALIGNMENT is suppressed if no external trigger is on since the measurement is referred to the trigger point (EVEN SECOND TRIGGER).

The lower half **(C)** contains setting parameters which will be considered in the measurement or the results, eg:

- INACTIVE CHANNEL THRESHOLD
- TRIGGER OFFSET
- PN OFFSET

Additional general information are available such as

- Number of active code channels
- MEASPERIOD (set value or current value if AUTO is selected)
- AVERAGE ON /OFF

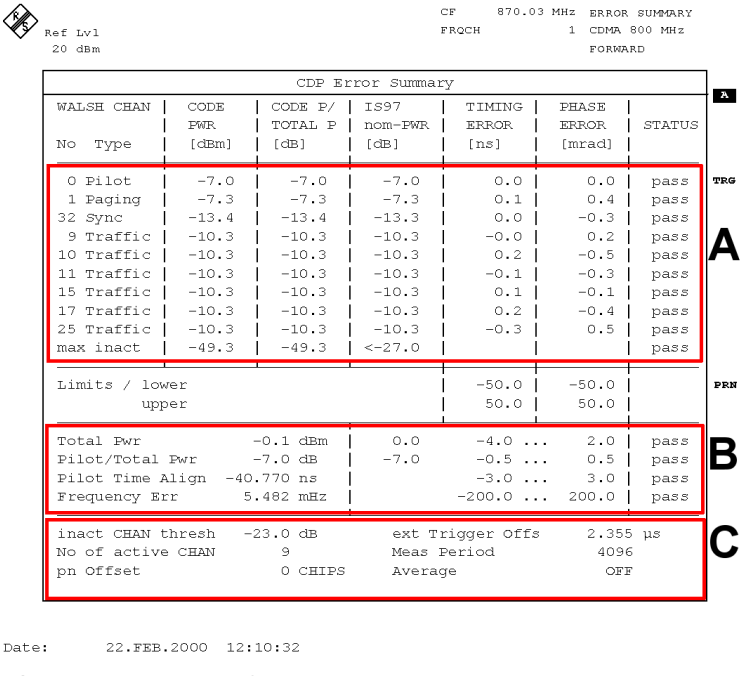
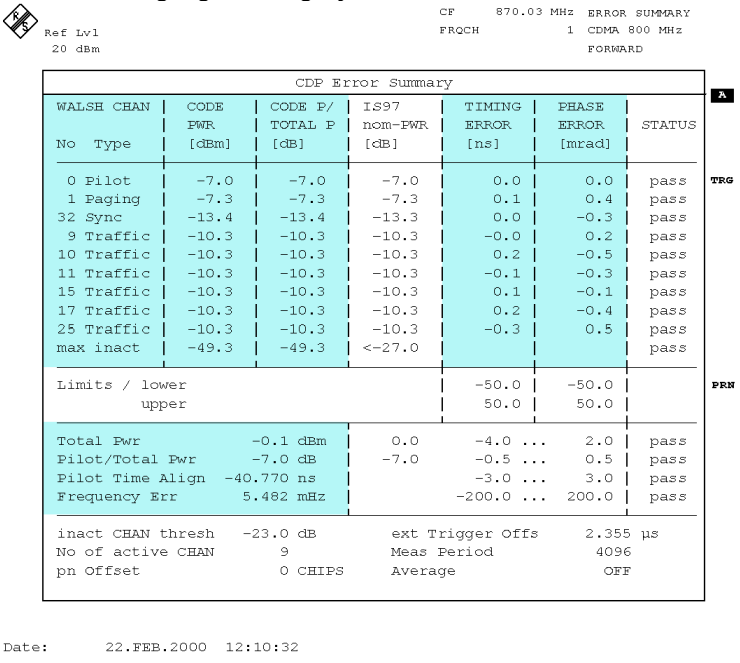


Fig. 6-10 Structure of ERROR SUMMARY

The numbers of code channels, their designation as well as the measured values are highlighted in grey in the table below:

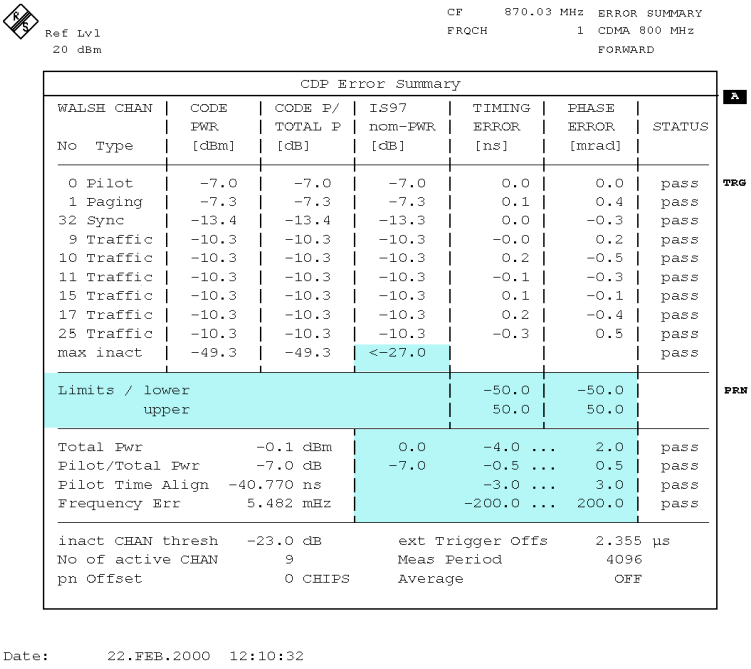


WALSH CHAN No Type	CODE PWR [dBm]	CODE P/ TOTAL P [dB]	IS97 nom-PWR [dB]	TIMING ERROR [ns]	PHASE ERROR [mrad]	STATUS
0 Pilot	-7.0	-7.0	-7.0	0.0	0.0	pass
1 Paging	-7.3	-7.3	-7.3	0.1	0.4	pass
32 Sync	-13.4	-13.4	-13.3	0.0	-0.3	pass
9 Traffic	-10.3	-10.3	-10.3	-0.0	0.2	pass
10 Traffic	-10.3	-10.3	-10.3	0.2	-0.5	pass
11 Traffic	-10.3	-10.3	-10.3	-0.1	-0.3	pass
15 Traffic	-10.3	-10.3	-10.3	0.1	-0.1	pass
17 Traffic	-10.3	-10.3	-10.3	0.2	-0.4	pass
25 Traffic	-10.3	-10.3	-10.3	-0.3	0.5	pass
max inact	-49.3	-49.3	<-27.0			pass
Limits / lower				-50.0	-50.0	
upper				50.0	50.0	
Total Pwr	-0.1 dBm		0.0	-4.0 ...	2.0	pass
Pilot/Total Pwr	-7.0 dB		-7.0	-0.5 ...	0.5	pass
Pilot Time Align	-40.770 ns			-3.0 ...	3.0	pass
Frequency Err	5.482 mHz			-200.0 ...	200.0	pass

inact CHAN thresh	-23.0 dB	ext Trigger Offs	2.355 µs
No of active CHAN	9	Meas Period	4096
pn Offset	0 CHIPS	Average	OFF

Fig. 6-11 ERROR SUMMARY: Measured values

The limit values used to perform limit checking are marked with grey. The limit values are obtained from the predefined standard limits or the user limits.
Modifications of these limits by pressing the *LIMIT TO STANDARD* or *LIMIT TO USER SET* softkey affect directly the displayed limit values and will be considered in limit checking.
Checking can be switched on or off using the *LIMITS ON/OFF* softkey.

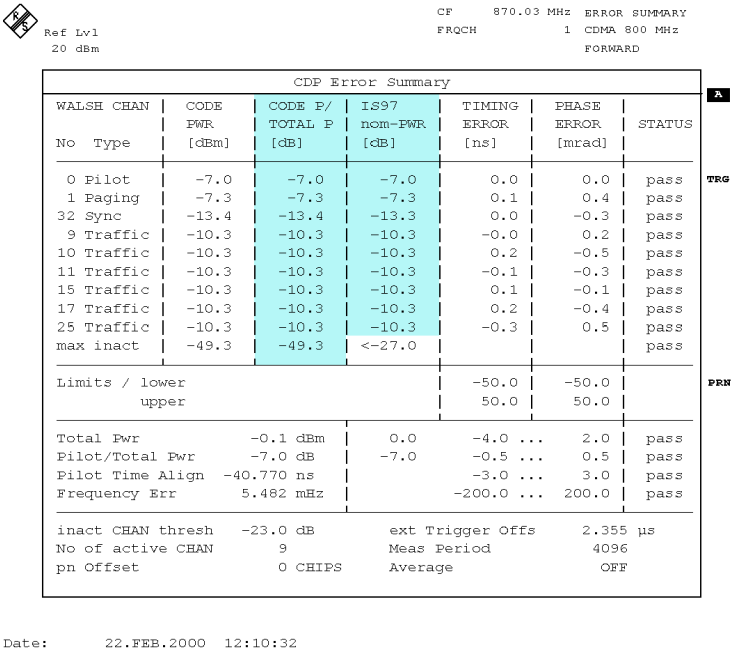


WALSH CHAN No Type	CODE PWR [dBm]	CODE P/ TOTAL P [dB]	IS97 nom-PWR [dB]	TIMING ERROR [ns]	PHASE ERROR [mrad]	STATUS
0 Pilot	-7.0	-7.0	-7.0	0.0	0.0	pass
1 Paging	-7.3	-7.3	-7.3	0.1	0.4	pass
32 Sync	-13.4	-13.4	-13.3	0.0	-0.3	pass
9 Traffic	-10.3	-10.3	-10.3	-0.0	0.2	pass
10 Traffic	-10.3	-10.3	-10.3	0.2	-0.5	pass
11 Traffic	-10.3	-10.3	-10.3	-0.1	-0.3	pass
15 Traffic	-10.3	-10.3	-10.3	0.1	-0.1	pass
17 Traffic	-10.3	-10.3	-10.3	0.2	-0.4	pass
25 Traffic	-10.3	-10.3	-10.3	-0.3	0.5	pass
max inact	-49.3	-49.3	<-27.0			pass
Limits / lower				-50.0	-50.0	
upper				50.0	50.0	
Total Pwr	-0.1 dBm		0.0	-4.0 ...	2.0	pass
Pilot/Total Pwr	-7.0 dB		-7.0	-0.5 ...	0.5	pass
Pilot Time Align	-40.770 ns			-3.0 ...	3.0	pass
Frequency Err	5.482 mHz			-200.0 ...	200.0	pass

inact CHAN thresh	-23.0 dB	ext Trigger Offs	2.355 µs
No of active CHAN	9	Meas Period	4096
pn Offset	0 CHIPS	Average	OFF

Fig. 6-12 ERROR SUMMARY: Limit values

In the following table, the columns Code P / Total P and their nominal distribution are in grey.
Except PILOT / TOTAL PWR and the limit value for INACT CHAN POWER RATIO, the **nominal distribution is used only as information** and will not be considered in limit checking.
The nominal distribution of code power values is obtained from the test model in standard TIA/EIA-97-C (section Test Setups, table Base Station Test Model, Nominal).



CDP Error Summary

WALSH CHAN No Type	CODE PWR [dBm]	CODE P/ TOTAL P [dB]	IS97 nom-PWR [dB]	TIMING ERROR [ns]	PHASE ERROR [mrad]	STATUS
0 Pilot	-7.0	-7.0	-7.0	0.0	0.0	pass
1 Paging	-7.3	-7.3	-7.3	0.1	0.4	pass
32 Sync	-13.4	-13.4	-13.3	0.0	-0.3	pass
9 Traffic	-10.3	-10.3	-10.3	-0.0	0.2	pass
10 Traffic	-10.3	-10.3	-10.3	0.2	-0.5	pass
11 Traffic	-10.3	-10.3	-10.3	-0.1	-0.3	pass
15 Traffic	-10.3	-10.3	-10.3	0.1	-0.1	pass
17 Traffic	-10.3	-10.3	-10.3	0.2	-0.4	pass
25 Traffic	-10.3	-10.3	-10.3	-0.3	0.5	pass
max inact	-49.3	-49.3	<-27.0			pass
Limits / lower				-50.0	-50.0	
upper				50.0	50.0	

Total Pwr	-0.1 dBm	0.0	-4.0 ...	2.0 pass
Pilot/Total Pwr	-7.0 dB	-7.0	-0.5 ...	0.5 pass
Pilot Time Align	-40.770 ns		-3.0 ...	3.0 pass
Frequency Err	5.482 mHz		-200.0 ...	200.0 pass

inact CHAN thresh	-23.0 dB	ext Trigger Offs	2.355 µs
No of active CHAN	9	Meas Period	4096
pn Offset	0 CHIPS	Average	OFF

Fig. 6-13 ERROR SUMMARY: Nominal power distribution

The display of the nominal power distribution is suppressed in the following cases:

- There is no traffic channel
- One of the management channels (pilot, paging or sync) is missing

The suppression is effective, for example when *INACT CHAN THRESH* is set such that only the pilot channel meets the trigger condition.

The right-hand column marked in grey on the display shows the status of limit checking (pass / fail). Checking can be switched off using the *LIMITS OFF* softkey.

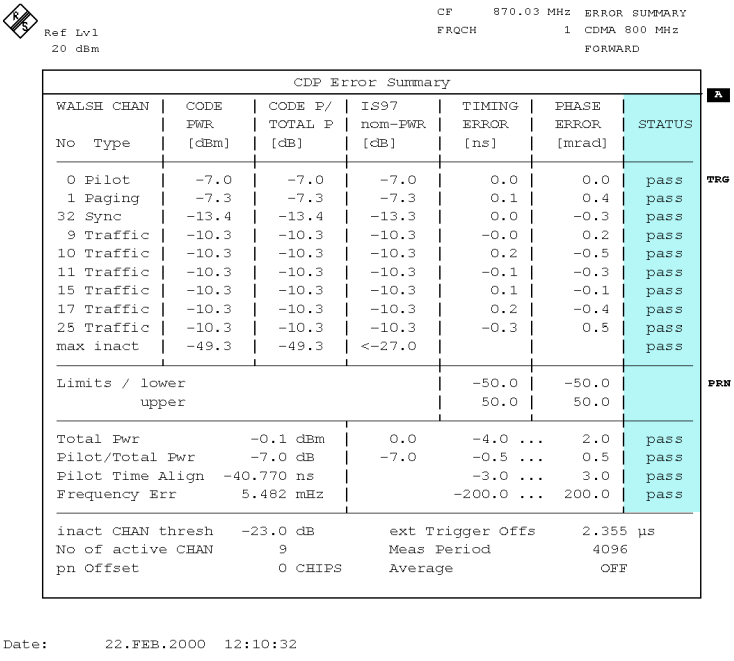


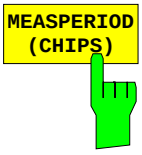
Fig. 6-14 ERROR SUMMARY: Limit checking

IEC/IEEE bus commands:

```
:CALCulate:FEED "XTIM:CDP:ERR:SUMM"
:CALCulate:MARKer:FUNCtion:CDPower:RESult? PTOTal |
                                CPOWer | PERRror | FERRor |
                                TERRor | ACHannels |
                                PTALignment | ACOunt
```

or

```
:TRACe:DATA? TRACE1
```



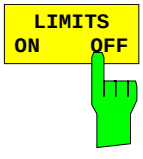
The *MEASPERIOD* softkey sets the demodulation period in number of chips. The function of this softkey is identical to that of the softkey with the same name in the *MEAS SETTINGS* menu.
The permissible setting values are: Auto, 1k, 2k, 4k, 8k, 12k, 16k, 20k, 24k

In the Auto mode, the demodulator calculates the signal/noise ratio of the cdmaOne signal and automatically selects a suitable setting for MEASPERIOD. The period currently selected is indicated in the display mode ERROR SUMMARY. Default setting is AUTO.

MEAS PERIOD
Auto
1k
2k
4k
8k
12k
16k
20k
24k

IEC/IEEE bus commands:

```
:SENSe:CDPower:MPERiod:AUTO ON | OFF
:SENSe:CDPower:MPERiod 1|2|4|8|12|16|20|24
```



The *LIMITS ON / OFF* softkey switches the limit checking on and off in the display mode ERROR SUMMARY.
The ERROR SUMMARY with limit checking switched off (LIMITS OFF) is presented below.

Ref Lvl
20 dBm

CF 870.03 MHz ERROR SUMMARY
FRQCH 1 CDMA 800 MHz
FORWARD

CDP Error Summary

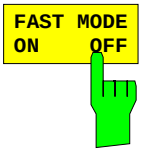
WALSH CHAN No	Type	CODE PWR [dBm]	CODE P/ TOTAL P [dB]	IS97 nom-PWR [dB]	TIMING ERROR [ns]	PHASE ERROR [mrad]	STATUS	
0	Pilot	-6.9	-7.0	-7.0	0.0	0.0		TRG
1	Paging	-7.3	-7.3	-7.3	0.1	0.5		
32	Sync	-13.3	-13.4	-13.3	-0.1	-0.3		
9	Traffic	-10.3	-10.3	-10.3	0.1	0.2		
10	Traffic	-10.3	-10.3	-10.3	0.0	-0.5		
11	Traffic	-10.3	-10.3	-10.3	-0.1	0.1		
15	Traffic	-10.3	-10.3	-10.3	0.0	0.2		
17	Traffic	-10.3	-10.3	-10.3	0.2	0.2		
25	Traffic	-10.3	-10.3	-10.3	-0.2	0.4		
max	inact	-49.2	-49.2	<-27.0				
Limits /	lower				-50.0	-50.0		PRN
	upper				50.0	50.0		

Total Pwr	0.0 dBm		0.0	-4.0 ...	2.0
Pilot/Total Pwr	-7.0 dB		-7.0	-0.5 ...	0.5
Pilot Time Align	15.658 ns			-3.0 ...	3.0
Frequency Err	-13.994 mHz			-200.0 ...	200.0
inact CHAN thresh	-23.0 dB	ext Trigger Offs		2.355 µs	
No of active CHAN	9	Meas Period		4096	
pn Offset	0 CHIPS	Average		OFF	

Date: 22.FEB.2000 14:54:59

Fig. 6-15 ERROR SUMMARY with LIMIT CHECK off

IEC/IEEE-bus command: `:CALCulate:LIMit:STATe ON | OFF`



The *FAST MODE ON / OFF* softkey switches the calculation of timing and phase errors on and off.
The display mode ERROR SUMMARY is shown below without calculation of timing and phase errors (FAST MODE ON).

Ref Lvl
20 dBm

CF 870.03 MHz ERROR SUMMARY
FRQCH 1 CDMA 800 MHz
FORWARD

CDP Error Summary

WALSH CHAN No Type	CODE PWR [dBm]	CODE P/ TOTAL P [dB]	IS97 nom-PWR [dB]	TIMING ERROR [ns]	PHASE ERROR [mrad]	STATUS
0 Pilot	-6.9	-7.0	-7.0			
1 Paging	-7.2	-7.3	-7.3			
32 Sync	-13.3	-13.4	-13.3			
9 Traffic	-10.2	-10.3	-10.3			
10 Traffic	-10.2	-10.3	-10.3			
11 Traffic	-10.2	-10.3	-10.3			
15 Traffic	-10.2	-10.3	-10.3			
17 Traffic	-10.2	-10.3	-10.3			
25 Traffic	-10.2	-10.3	-10.3			
max inact	-49.1	-49.2	<-27.0			pass
Limits / lower				-50.0	-50.0	
upper				50.0	50.0	
Total Pwr	0.0 dBm		0.0	-4.0 ...	2.0	pass
Pilot/Total Pwr	-7.0 dB		-7.0	-0.5 ...	0.5	pass
Pilot Time Align	-49.860 ns			-3.0 ...	3.0	pass
Frequency Err	4.569 mHz			-200.0 ...	200.0	pass

inact CHAN thresh	-23.0 dB	ext Trigger Offs	2.355 µs
No of active CHAN	9	Meas Period	4096
pn Offset	0 CHIPS	Average	OFF

A
TRG
PRN

Date: 22.FEB.2000 14:48:13

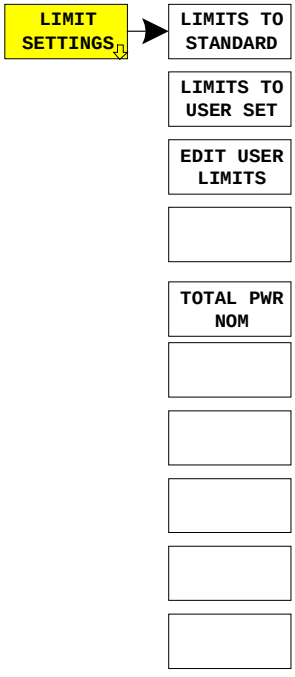
Fig. 6-16 ERROR SUMMARY: in FAST MODE

IEC/IEEE-bus command:

```
:SENSe:DETector:CDPower:FUNCtion:MODE  FAST| NORMal
```

Configuration of Limit Checking – Limit Settings

Submenu: *CONFIGURATION MODE – cdmaOne BTS – LIMIT SETTINGS*



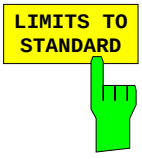
The *LIMIT SETTINGS* softkey opens the submenu for setting all limit values which the cdmaOne test signal is checked for.

The result is indicated as PASS or FAIL in the right-hand column of the ERROR SUMMARY display.

Checking can be switched on or off using the *LIMITS ON/OFF* softkey in the *DISPLAY MODE CDP* menu.

Limit checking is performed using the following measured values or CDMA channels:

Channels	Designation	Test standard
Sync, Paging, Traffic channels	TIMING ERROR	TIA/EIA-97- C, Chapter "CDMA Transmitter Minimum Standards", Section "Pilot Channel to Code Channel Time Tolerance"
Sync, Paging, Traffic channels	PHASE ERROR	TIA/EIA-97- C, Chapter "CDMA Transmitter Minimum Standards", Section "Pilot Channel to Code Channel Phase Tolerance"
Pilot channel	Pilot PWR to Total PWR Ratio	TIA/EIA-97-C, Chapter "CDMA Transmitter Minimum Standards", Section "Pilot Power"
	Pilot Time Alignment	Pilot Time Alignment Error TIA/EIA-97-C Chapter "CDMA Transmitter Minimum Standards", Section "Pilot Time Tolerance"
Inactive channels	Inact Channels PWR Ratio	TIA/EIA-97-B Chapter "CDMA Transmitter Minimum Standards", Section "Code Domain Power"
Received signal	Total Power	TIA/EIA-97-B Chapter "CDMA Transmitter Minimum Standards", Section "Total Power"
Received signal	Frequency error	TIA/EIA-97-C, Chapter "CDMA Transmitter Minimum Standards", Section "Frequency Tolerance"



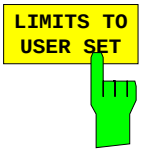
The *LIMITS TO STANDARD* softkey sets the current limit values to the limit values required by standards IS95 and TIA/EIA-97-C.

The following default settings are used:

	Lower Limit	Upper Limit
Total PWR Tolerance	- 4 dB	+ 2dB
Pilot PWR Ratio	- 0.5 dB	+ 0.5 dB
Pilot Time Alignment	- 3 µs	+ 3 µs
Inact. Chan PWR Ratio		- 27 dB
Chan Time Error	- 50 ns	+ 50 ns
Chan Phase Error	- 50 mrad	+ 50 mrad
Frequency Error	- 200 Hz	+ 200 Hz

The limit value settings are adopted at a keystroke and appear on the ERROR SUMMARY display.

IEC/IEEE-bus command: `:CONFigure:CDPower:LIMit:STANdard ON`



The *LIMITS TO USER SET* softkey sets the limit values set by the user, they appear on the ERROR SUMMARY display.
The user-specific limit values can be set and modified in a list with the softkeys *EDIT USER LIMITS*.

IEC/IEEE-bus command: `:CONFigure:CDPower:LIMit:STANdard OFF`

The *EDIT USER LIMITS* softkey serves for setting user-specific limits of code-domain measurement.
The softkey opens an editable list with the following entries:

CDP USER LIMITS		
	Lower Limit	Upper Limit
Total PWR Tolerance	-4 dB	+2 dB
Pilot PWR Ratio	-0.5 dB	+0.5 dB
Pilot Time Alignment	-3 us	+3 us
Inact. Chan PWR Ratio		-27 dB
Chan Time Error	-50 ns	+50 ns
Chan Phase Error	-50 mrad	+50 mrad
Frequency Error	-200 Hz	+200 Hz

The numeric values indicated in the columns Lower Limit and Upper Limit can be modified and are used for limit checking with the *LIMIT TO USER SET* softkey.

IEC/IEEE bus commands:

```
:CONFigure:CDPower:LIMit:UPPer:POWer:TOLerance 2 dB
:CONFigure:CDPower:LIMit:LOWer:POWer:TOLerance -4 dB

:CONFigure:CDPower:LIMit:UPPer:POWer:PRATio +0.5dB
:CONFigure:CDPower:LIMit:LOWer:POWer:PRATio -0.5dB

:CONFigure:CDPower:LIMit:UPPer:TIME:PALignment 4 us
:CONFigure:CDPower:LIMit:LOWer:TIME:PALignment -3 us

:CONFigure:CDPower:LIMit:UPPer:POWer:ICRatio -27 dB

:CONFigure:CDPower:LIMit:UPPer:ERRor:CTIMe 50ns
:CONFigure:CDPower:LIMit:LOWer:ERRor:CTIMe -50ns

:CONFigure:CDPower:LIMit:UPPer:ERRor:CPHase 50e-3
:CONFigure:CDPower:LIMit:LOWer:ERRor:CPHase -50e-3

:CONFigure:CDPower:LIMit:UPPer:ERRor:FREQuency 200 Hz
:CONFigure:CDPower:LIMit:LOWer:ERRor:FREQuency –200 Hz
```

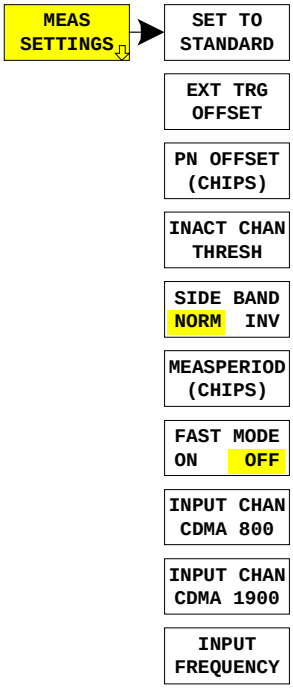
The *TOTAL PWR NOM* softkey opens a field for entering the nominal power of the cdmaOne base station. The nominal power and measured power of the base station are compared with each other on checking the limit values for TOTAL PWR TOLERANCE.

IEC/IEEE-bus command:

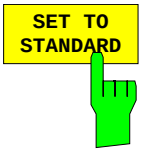
```
:CONFigure:CDPower:LIMit:POWer:NOMinal 3
```

Configuration of cdmaOne Demodulation - MEAS SETTINGS

Submenu: *CONFIGURATION MODE – cdmaOne BTS – MEAS SETTINGS*



The *MEAS SETTINGS* softkey opens a submenu with setting parameters for the cdmaOne demodulation.



The *SET TO STANDARD* softkey is used to perform the default settings for the cdmaOne demodulation.

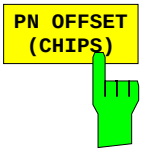
The following operating parameters are modified:

- INACT CHAN THRESH: -23 dB
- LIMITS TO STANDARD
- LIMITS ON
- DISPLAY MODE CDP RATIO

IEC/IEEE-bus command: `:SENSe:CDPower:PRESet`

The *EXT TRG OFFSET* softkey is identical to the softkey of the same name in the vector analyzer mode.
It is available in the submenu:
SWEEP – TRIGGER – TRIGGER OFFSET.
This function can be used to compensate for the analog trigger delay in the measurement of the *PILOT TIME ALIGNMENT* with the aid of a trigger signal from the base station (*EVEN SECON TRIGGER*).

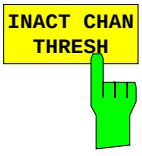
IEC/IEEE-bus command: `:TRIGger:SEQuence:HOLDoff <num_value>`



The *PN OFFSET [CHIPS]* softkey opens a window for entering a correction value (CHIPS) for the calculation of the *PILOT TIME ALIGNMENT*.
Each base station in the cdmaOne DMA network can be operated with a different PN offset referred to the *EVEN SECOND TRIGGER*.

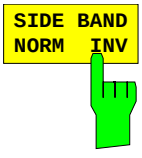
During demodulation, the nominal zero crossing of the PN sequence (*PN ROLL OVER*) is determined and referred to the trigger input. The BTS-specific PN offset can be entered here and is automatically considered by the software in the calculation of PILOT TIME ALIGNMENT.

IEC/IEEE-bus command: `:SENSe:CDPower:PNOffset 5`



The *INACT CHAN THRESH* softkey sets a threshold value in the cdmaOne demodulator above which a code channel is assumed to be active.
The set value is referenced to the total power (*TOTAL POWER*).
While further modulation errors such as *PHASE ERROR* and *TIMING ERROR* are calculated for the first 9 active channels, they are not calculated as channels that are recognized as inactive.
A nominal power distribution in line with the test model of TIA/EIA-97-B is calculated and displayed in the *ERROR SUMMARY* under *NOM PWR*.

IEC/IEEE-bus command: `:SENSe:CDPower:ICTReshold -23 dB`



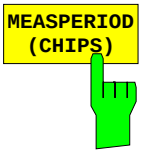
The *SIDE BAND NORM / INV* softkey is used to perform the cdmaOne demodulation both in the normal (NORM) and inverted position (INV).

NORM The normal position allows the measurement of RF signals from the base station.

INV The inverted position is useful for measurements on IF modules or components in case of spectral inversion.

The default setting is NORM, ie the spectral normal position.

IEC/IEEE-bus command: `:SENSe:CDPower:SBANd NORMal | INVers`

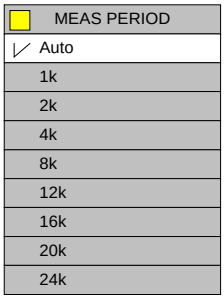


The *MEASPERIOD* softkey sets the demodulation period of the cdmaOne demodulator. The function of this softkey is identical to the function with the same name in the DISPLAY MODE CDP menu.

The settable values are: AUTO, 1k, 2k, 4k, 8k, 12k, 16k, 20k, 24k
The default setting of the instrument is 4k, ie the demodulator uses a data set length of 4k CHIPS for the demodulation and error calculation.

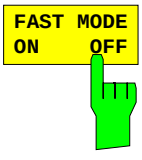
In the AUTO mode, the demodulator automatically calculates the required MEASPERIOD using the signal/noise ratio of the applied signal and indicates the selected setting in DISPLAY ERROR SUMMARY under MEASPERIOD.

For measurements conforming to IS95 and TIA/EIA-97-C, a MEASPERIOD of at least 2K should be set (64CHIPS * 20 = 1280 CHIPS, TIA/EIA-97-C chapter CDMA Standard Test Conditions, section Code-Domain Measurement Equipment).



IEC/IEEE bus commands:

```
:SENSe:CDPower:MPERiod:AUTO ON | OFF
:SENSe:CDPower:MPERiod 1|2|4|8|12|16|20|24
```



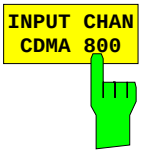
The *FAST MODE* softkey switches the calculation of timing and phase errors on and off for the channels recognized as being active.

Since the calculation of such errors involves high computation for long measurement periods, activating this function can increase the measurement speed.

With *FAST MODE ON*, the corresponding measured values are not displayed in the *ERROR SUMMARY*, the *TIME ERROR* and *PHASE ERROR* softkeys in the *DISPLAY MODE* can no longer be selected.

IEC/IEEE-bus command:

```
:SENSe:DETector:CDPower:FUNCtion:MODE FAST| NORMal
```



The *INPUT CHAN CDMA 800* softkey opens a window for entering a channel number in the CDMA 800 MHz frequency band. The corresponding center frequency of the analyzer is calculated from it and indicated in the display:

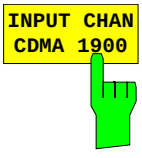
Base station (869 to 894 MHz)

F_{TX} = 870 MHz + N x 0.03; N = 1 to 799
or
F_{TX} = 870 MHz + (N - 1023) x 0.03; N = 991 to 1023

The channel assignment is obtained from TIA/EIA-97-C (chapter CDMA Receiver Minimum Standards, table CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 0).

IEC/IEEE bus commands:

```
:CONFigure:CDPower:PRESet FWCDMA8 | NONE
:CONFigure:CDPower:CHANnel 1
```



The *INPUT CHAN CDMA 1900* softkey opens a window for entering a channel number in the CDMA 1900 MHz frequency band. The corresponding center frequency of the analyzer is calculated from it and indicated in the display:

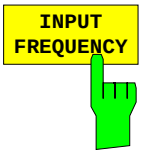
Base station (1930 to 1990 MHz)

F_{TX} = 1930.000 MHz + N x 0.05; N = 1 to 1199

The channel assignment is obtained from TIA/EIA-97-C (chapter CDMA Receiver Minimum Standards, table CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 1).

IEC/IEEE bus commands:

```
:CONFigure:CDPower:PRESet FWCDMA19 | NONE
:CONFigure:CDPower:CHANnel 1
```



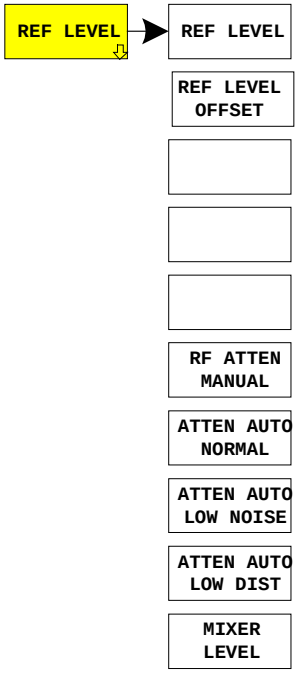
The *INPUT FREQUENCY* softkey activates the direct entry of the center frequency.

The entered center frequency is checked whether it is within the channel spacing of the CDMA 800 or CDMA 1900 band. In case of compliance, the associated band (CDMA 800 or CDMA 1900) and the corresponding channel number are also indicated in the display.

IEC/IEEE-bus command: `:SENSe:FREQuency:CENTer 870.03 MHz`

Level Settings - REF LEVEL

Submenu: *CONFIGURATION- MODE – cdmaOne BTS – REF LEVEL*



The *REF LEVEL* softkey opens a submenu for level setting.

The softkeys and their function are identical to the *REF LEVEL* menu in the basic unit and are described in the FSIQ operating manual.

Automatic Adaptation to the Input Level - LEVEL AUTO ADJUST

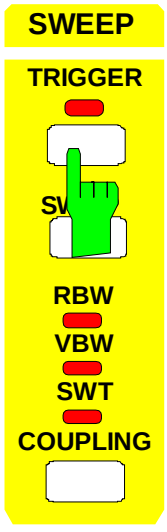
Submenu: *CONFIGURATION- MODE – cdmaOne BTS – LEVEL AUTO ADJUST*

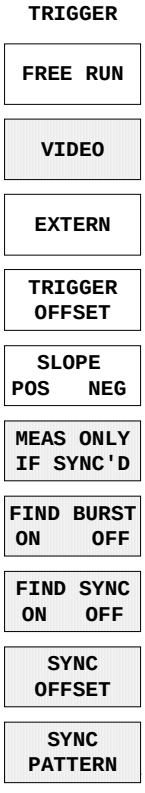
The *LEVEL AUTO ADJUST* softkey is used for setting automatically the RF attenuation and IF gain to the level of the applied signal. Manual re-adjustment is permissible with the *REF LEVEL* softkey.

The instrument is to be switched to the *ATTEN MANUAL* mode so as to set the RF attenuation and IF gain to optimum values independently of each other. This mode is maintained after changing from code-domain power measurements to the analyzer or vector analyzer mode.

IEC/IEEE-bus command: `:SENSe:CDPower:LEVel:ADJust`

Setting the Trigger - TRIGGER Key





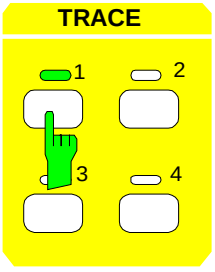
The softkeys *FREE RUN, EXTERN, TRIGGER OFFSET* and *SLOPE POS/NEG* are available in the *TRIGGER* menu.

For measurements with exact time reference, such as *PILOT TIME ALIGNMENT*, the trigger output of the base station (*EVEN SECOND TRIGGER*) is to be connected to the rear panel trigger input and activated with *SWEEP-TRIGGER-EXTERN*.
Any delays of the signal source can be compensated with the *TRIGGER OFFSET* softkey (step width of 40 ns).

IEC/IEEE bus commands:

```
:TRIGger:SOURce IMMediate|EXTernal
:TRIGger:HOLDoff  <num_value>
:TRIGger:SLOPe  POSitive | NEGative
```

Setting the Trace - TRACE 1 Key



TRACE 1

- CLEAR/ WRITE
- VIEW
- BLANK
- CONTINUOUS WRITE
- AVERAGE
- MAX HOLD
- MIN HOLD
- SWEEP COUNT

The *TRACE1* menu provides the softkeys for selecting the display mode (*CLEAR/WRITE*, *VIEW*, *BLANK*, *CONTINUOUS WRITE*) and for selecting the evaluation of the trace (*AVERAGE*, *MAX HOLD*, *MIN HOLD*).

In case of averaging, the maximum values are indicated on displaying the error table for measured peak values, for RMS values quadratic averaging is performed, and linear averaging for other displays.

In the *ERROR SUMMARY* table, it is indicated whether averaging is activated or not.

The *SWEEP COUNT* softkey activates the entry of the number of sweeps over which averaging is to be performed.
In contrast to the analyzer mode, **No** averaging is performed in the setting SWEEP COUNT = 0; the setting acts like SWEEP COUNT = 1.

IEC/IEEE bus commands:

```
:DISPlay:WINDow:TRACe:MODE  WRITe | VIEW |
                    AVERage | MAXHold | MINHold
:DISPlay:WINDow:TRACe:MODE:CWRite ON | OFF
:DISPlay:WINDow:TRACe:STATe ON | OFF
:SENSe:SWEep:COUNt 1
```

Overview of the Other Menus

SYSTEM Key Group

The *PRESET; CAL* and *INFO* menus in the code-domain measurement mode are identical to the corresponding menus in the basic unit and are described in the FSIQ operating manual.

The parameters marked with grey are not available in the *DISPLAY* menu. The screen display is set to *FULL SCREEN* in the code-domain measurement mode. The remaining softkeys are identical to those of the basic unit and are described in the FSIQ operating manual.

CONFIGURATION Key Group

The *MODE* menu enables selection of the mode. The Analyzer, Vector Analyzer and Tracking Generator modes are described in the operating manual for the FSIQ basic unit. The code-domain measurement mode is described in the present manual.

The *SETUP* menu in the code-domain measurement mode is identical to the corresponding menu in the basic unit and is described in the FSIQ operating manual.

FREQUENCY Key Group

In the *CENTER* menu, the center frequency can be set for synchronization with the DUT and a frequency offset entered.

The *SPAN, START* and *STOP* keys have no function in the code-domain measurement mode.

LEVEL Key Group, INPUT Key

The *REF, RANGE* and *INPUT* menus in the code-domain measurement mode are identical to the corresponding menus in the basic unit and are described in the FSIQ operating manual.

MARKER Key Group

The *NORMAL* menu in the code-domain measurement mode is identical to the *CONFIGURATION MODE - cdmaOne BTS - CDP MEAS – MARKER* submenu.

The *SEARCH, DELTA, MKR* → keys have no function in the code-domain measurement mode.

LINES Key Group

The *LIMITS* menu in the code-domain measurement mode is identical to the *CONFIGURATION MODE - cdmaOne BTS - CDP MEAS – LIMIT SETTINGS* submenu.

The *DLINES* key has no function in the code-domain measurement mode.

SWEEP Key Group

The softkeys *FREE RUN, EXTERN, TRIGGER OFFSET* and *SLOPE POS/NEG* are available in the *TRIGGER* menu (see above).

In the SWEEP menu, the parameter *RESULT LENGTH* marked in grey is not available, it is replaced by the parameter *MEASPERIOD (CHIPS)* in the *CONFIGURATION MODE - cdmaOne BTS - CDP MEAS - MEAS SETTINGS* menu.

The remaining softkeys of the *SWEEP* menu in the code-domain measurement mode are identical to the softkeys of the *CONFIGURATION MODE - cdmaOne BTS - CDP MEAS* submenu.

The *COUPLING* menu in the code-domain measurement mode is identical to the *COUPLING* menu in the *VECTOR ANALYZER* mode and is described in the FSIQ operating manual.

HCOPY and MEMORY Key Group

The *SETTINGS, SAVE, RECALL* and *CONFIG* menus in the code-domain measurement mode are identical to the corresponding menus in the basic unit and are described in the FSIQ operating manual.

7 Remote-Control Commands for the CDP Measurement

The following chapter describes the remote-control commands for the code-domain measurements. An alphabetical list at the end of this chapter provides an overview of the commands.

The commands, which are also valid for the basic unit in the signal analysis and vector signal analysis modes as well as the system settings, are described in the FSIQ operating manual.

CALCulate -Subsystem

The display is always set to full screen in code domain measurements. Therefore, only numeric suffix 1 is valid for `CALCulate`.

:CALCulate<1>:FEED <string>

This command selects the measured data that are to be displayed.

Parameter: <string>::= ‘XPOW:CDP’
‘XPOW:CDP:RAT’
‘XTIM:CDP:ERR’
‘XTIM:CDP:ERR:PHAS’
‘XTIM:CDP:ERR:SUMM’

Example: `":CALC:FEED ‘XTIM:CDP:ERR’"`

Features: *RST value: `‘XTIM:DDEM:MEAS’ (vector signal analysis)`
SCPI: conforming

The string parameters have the following meaning:

‘XPOW:CDP’	Result display of code domain power as bargraph
‘XPOW:CDP:RAT’	Result display of code domain power ratio as bargraph
‘XTIM:CDP:ERR’	Result display of timing error as bargraph
‘XTIM:CDP:ERR:PHAS’	Result display of phase error as bargraph
‘XTIM:CDP:ERR:SUMM’	Result display in tabular form

CALCulate<1>:MARKer<1>:FUNCtion:CRESt?

This command queries the Crest factor in the time domain measurement.

Example: `"CALC:MARK:FUNC:CRES?"`

Features: *RST value: `--`
SCPI: conforming

:CALCulate<1>:MARKer<1>:FUNCtion:PILot

This command sets the marker1 to Walsh channel 0.

Example: `":CALC:MARK:FUNC:PIL"`

Features: *RST value: _
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

:CALCulate<1>:MARKer<1>:FUNCtion:PAGing

This command sets the marker1 to Walsh channel 1.

Example: `":CALC:MARK:FUNC:PAG"`

Features: *RST value: _
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

:CALCulate<1>:MARKer<1>:FUNCtion:SYNC

This command sets the marker1 to Walsh channel 32.

Example: ":CALC:MARK:FUNC:SYNC"

Features: *RST value: _
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

:CALCulate<1>:MARKer<1>:FUNCtion:TERRor

This command sets the marker to the Walsh channel with the largest timing error.

Example: ":CALC:MARK:FUNC:TERR"

Features: *RST value: _
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

CACulate<1>:MARKer<1>:FUNCtion:PERRor

This command sets the marker to the Walsh channel with the largest phase error.

Example: ":CALC:MARK:FUNC:PERR"

Features: *RST value: _
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

:CALCulate<1>:MARKer<1>:FUNCtion:CDPower:RESult? PTOTal | FERRor | ACHannels | PTALignment | ACOunt | TERRor | PERRor | CPOWer

This command queries the measured and calculated code domain power values.

Example: ":CALC:MARK:FUNC:CDP:RES? PTOT"

Features: *RST value: -
SCPI: device-specific

PTOTal	Total power
FERRor	Frequency error in Hz
ACHannels	Number of active channels
PTALignment	Pilot time alignment, trigger offset relative to PN zero crossing in chips
ACOunt	Averaging count
TERRor	Timing error, up to 18 values in the following format: <channel 1> , <time error 2> , <channel 2> , <time error 2> , ... <channel N> , <time error N>
PERRor	Phase error, up to 18 values in the following format: <channel 1> , <phase error 2> , <channel 2> , < phase error 2> , ... <channel N> , < phase error N>
CPOWer	Channel power, up to 64 values separated by commas

The result of the CDP RATIO measurement can be calculated as follows:

CHANNEL POWER (in dB) - TOTAL POWER (in dB) = CDP RATIO

CONFigure:CDPower Subsystem

This subsystem comprises the commands for configuring the code domain power measurements.
The display is set to full screen in the code domain measurements. Therefore, only numeric suffix 1 is valid for `CONFigure`.

CONFigure<1>:IS95:MEASurement POWer | ACPR | MODulation | CDPower | FDOMain | TDOMain

This command selects the cdmaOne measurement.The settings of the predefined measurements are described for the associated softkey in chapter 6 .

Parameter:	POWer	Chanel Power Measurement with predefined settings
	ACPR	Adjacent Chanel Power Measurement with predefined settings
	MODulation	Measurement of RHO factor with predefined settings
	CDPower	Code Domain Power measurement.This selection has the same effect as command `INSTrument:SELect CDPower`.
	FDOMain	Overview measurement in the frequency domain with predefined settings
	TDOMain	Measurement of Crest factor in the time domain with predefined settings
Example:	`"CONF:IS95:MEAS MOD"`	
Features:	*RST value:	POWer
	SCPI:	device-specific

:CONFigure<1>:CDPower:PREset FWCDMA8 | FWCDMA19 | NONE

This command selects the CDMA standard.

FWCDMA8	CDMA forward 800
FWCDMA19	CDMA forward 1900
NONE	No standard selected

Example:	`":CONF: CDP:PRE RWCDMA19"`	
Features:	*RST value:	FWCDMA8
	SCPI:	device-specific

:CONFigure<1>:CDPower:CHANnel 1...1199

This command determines the channel frequency.

Example:	`":CONF:CDP:CHAN 799"`	
Features:	*RST value:	1
	SCPI:	device-specific

:CONFigure<1>:CDPower:LIMit:POWer:NOMinal <numeric_value>

This command selects the nominal power of the transmitter.

Example:	`":CONF:CDP:LIM:POW:NOM 3"`	
Features:	*RST value:	0dB
	SCPI:	device-specific

:CONFigure<1>:CDPower:LIMit:STANdard ON | OFF

This command switches the limit values to default values (ON) or to user-defined values (OFF).

Example:	`":CONF:CDP:LIM:STAN OFF"`	
Features:	*RST value:	ON
	SCPI:	device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:POWer:TOLerance <numeric_value>

This command sets the upper limit value for the power tolerance.

Example: ":CONF:CDP:LIM:UPP:POW:TOL 10"

Features: *RST value: 2 dB
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:POWer:PRATio <numeric_value>

This command sets the upper limit value for the pilot power ratio.

Example: ":CONF:CDP:LIM:UPP:POW:PRAT -1"

Features: *RST value: 0.5 dB
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:POWer:ICRatio <numeric_value>

This command sets the upper limit value for the inactive channel power ratio.

Example: ":CONF:CDP:LIM:UPP:POW:ICR 4"

Features: *RST value: -27 dB
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:TIME:PALignment <numeric_value>

This command sets the upper limit value for the pilot time alignment.

Example: ":CONF:CDP:LIM:UPP:TIME:PAL 4us"

Features: *RST value: 3 µs
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:ERRor:CTIMe <numeric_value>

This command sets the upper limit value for the channel timing error.

Example: ":CONF:CDP:LIM:UPP:ERR:CTIM 4ns"

Features: *RST value: 50 ns
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:ERRor:CPHase <numeric_value>

This command sets the upper limit value for the channel phase error.

Example: ":CONF:CDP:LIM:UPP:ERR:CPH 52e-3"

Features: *RST value: 50 mRad
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:UPPer:ERRor:FREQuency <numeric_value>

This command sets the upper limit value for the frequency error.

Example: `":CONF:CDP:LIM:UPP:ERR:FREQ 220"`

Features: *RST value: 200 Hz
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:LOWer:POWer:TOLerance <numeric_value>

This command sets the lower limit value for the power tolerance.

Example: `":CONF:CDP:LIM:LOW:POW:TOL -10"`

Features: *RST value: -4 dB
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:LOWer:POWer:PRATio <numeric_value>

This command sets the lower limit value for the pilot power ratio.

Example: `":CONF:CDP:LIM:LOW:POW:PRAT -1"`

Features: *RST value: -0.5 dB
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:LOWer:TIME:PALignment <numeric_value>

This command sets the lower limit value for the pilot time alignment.

Example: `":CONF:CDP:LIM:LOW:TIME:PAL -4us"`

Features: *RST value: -3 µs
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:LOWer:ERRor:CTIMe <numeric_value>

This command sets the lower limit value for the channel timing error.

Example: `":CONF:CDP:LIM:LOW:ERR:CTIM -500ns"`

Features: *RST value: -50 ns
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:LOWer:ERRor:CPHase <numeric_value>

This command sets the lower limit value for the channel phase error.

Example: `":CONF:CDP:LIM:LOW:ERR:CPH -52e-3"`

Features: *RST value: -50 mrad
SCPI: device-specific

:CONFigure<1>:CDPower:LIMit:LOWer:ERRor:FREQuency <numeric_value>

This command sets the lower limit value for the frequency error.

Example: `":CONF:CDP:LIM:LOW:ERR:FREQ -220"`

Features: *RST value: -200 Hz
SCPI: device-specific

INSTrument Subsystem

The display is set to full screen in the predefined time domain measurement. Therefore, only numeric suffix 1 is valid for `INSTrument`.

:INSTrument<1>[:SELect] SANalyzer | DDEMod | ADEMod | BGSM | MSGM **| CDPower**

This command switches between the operating modes by means of text parameters.

Selection CDPower presets the instrument as described in Chapter 2, Section "Basic settings in the Code Domain Measurement Mode".

Example: `":INST CDP"`

Features: *RST value: SANalyzer
SCPI: conforming

SENSe:CDPower Subsystem

This subsystem controls the parameters for the code domain power (option FSIQK71). The suffix in `SENSe<1|2>` is not significant in this subsystem.

:[SENSe<1|2>:]CDPower:PRESet

This command is for CDP presetting.

Inactive Channel Threshold	-23 dB
Limits	set to standard
Result display	CDPR

Example: `":CDP:PRES"`

Features: *RST value: -
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

:[SENSe<1|2>:]CDPower:LEVel:ADJust

This command is used for setting automatically the RF attenuation and IF gain to the level of the applied signal. The instrument is to be switched to the *ATTEN MANUAL* mode so as to set the RF attenuation and IF gain separately to optimum values. This mode is maintained after changing from code-domain power measurements to the analyzer or vector analyzer modes.

Example: `":CDP:LEV:ADJ"`

Features: *RST value: -
SCPI: device-specific

This command is an <Event> and has therefore neither *RST value nor query.

:[SENSe<1|2>:]CDPower:MPERiod 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24

This command sets the processing width of the DSP.

Example: `":CDP:MPER 16"`

Features: *RST value: 8
SCPI: device-specific

:[SENSe<1|2>:]CDPower:MPERiod:AUTO ON | OFF

This command activates (ON) the automatic determination of the optimum demodulation period. The demodulator calculates the signal/noise ratio of the cdmaOne signal and automatically selects a suitable setting.

Example: ":CDP:MPER:AUTO ON"

Features: *RST value: ON
SCPI: device-specific

:[SENSe<1|2>:]CDPower:PNOFfset <numeric_value>

This command sets the nominal offset value of the base station (in chips).

Example: ":CDP:PNOF 5"

Features: *RST value: 0
SCPI: device-specific

:[SENSe<1|2>:]CDPower:ICTReshold -27 dB ...+ 6 dB

This command sets the threshold value in the CDPR diagram from which a channel is treated as active. The level entered refers to the total signal power.

Example: ":CDP:ICTR –10DB"

Features: *RST value: -23dB
SCPI: device-specific

:[SENS<1|2>:]CDPower:SBANd NORMal | INVers

This command is for interchanging the left and the right sideband.

Example: ":CDP:CDP:SBAN INV"

Features: *RST value: NORM
SCPI: device-specific

SENSe:DETector Subsystem

:[SENS<1|2>:]DETector:CDPower[:FUNCtion]:MODE FAST | NORMal

This command enables faster calculation. The timing error and phase error are not calculated in the fast mode.

Example: ":DET:CDP:MODE FAST "

Features: *RST value: NORMAL
SCPI: device-specific

TRACe Subsystem

TRACe[:DATA] TRACE1

This command transfers trace data from the controller to the instrument, the query reads trace data out of the instrument.

Example:
```
"TRAC TRACE1,"+A$   (A$: data list in the current format)
"TRAC? TRACE1"
```

Features: *RST value: -
SCPI: conforming

CDP Measurement

Only TRACE1 can be read out. Independently of the display mode (CDP, CDP Ratio, Error Summary, etc.), the following measured values are always transferred:

power	1 value, total power
no of active channels	1 value
frequency error	1 value, frequency error in Hz
pilot time alignment	1 value, trigger offset relative to PN zero crossing in chips
sub estimate	1 value, estimated length of sub-interval
mean count estimate	1 value
average count	1 value
active channels	9 values, non-active channels are marked with -1
time error	9 values
phase error	9 values
channel power	64 values

Alphabetical List of Commands

Command	Parameter	Page
:CALCulate:FEED	'XPOW:CDP' | 'XPOW:CDP:RAT' 'XTIM:CDP:ERR' | 'XTIM:CDP:ERR:PHAS' | 'XTIM:CDP:ERR:SUMM'	48
:CALCulate:MARKer:FUNCtion:CDPower:RESult?	PTOTal | FERRor | ACHannels | PTALignment | ACOunt | TERRor | PERRor | CPOWer	49
:CALCulate:MARKer:FUNCtion:CRESt?		48
:CALCulate:MARKer:FUNCtion:PAGing		48
:CALCulate:MARKer:FUNCtion:PERRor		49
:CALCulate:MARKer:FUNCtion:PILot		48
:CALCulate:MARKer:FUNCtion:SYNC		49
:CALCulate:MARKer:FUNCtion:TERRor		49
:CONFigure:CDPower:CHANnel	1 to 1199	50
:CONFigure:CDPower:LIMit:LOWer:ERRor:CPHase	<numeric_value	52
:CONFigure:CDPower:LIMit:LOWer:ERRor:CTIMe	<numeric_value	52
:CONFigure:CDPower:LIMit:LOWer:ERRor:FREQuency	<numeric_value	52
:CONFigure:CDPower:LIMit:LOWer:POWer:PRATio	<numeric_value	52
:CONFigure:CDPower:LIMit:LOWer:POWer:TOLerance	<numeric_value	52
:CONFigure:CDPower:LIMit:LOWer:TIME:PALignment	<numeric_value	52
:CONFigure:CDPower:LIMit:POWer:NOMinal	<numeric_value	50
:CONFigure:CDPower:LIMit:STANdard	ON | OFF	50
:CONFigure:CDPower:LIMit:UPPer:ERRor:CPHase	<numeric_value	51
:CONFigure:CDPower:LIMit:UPPer:ERRor:CTIMe	<numeric_value	51
:CONFigure:CDPower:LIMit:UPPer:ERRor:FREQuency	<numeric_value	52
:CONFigure:CDPower:LIMit:UPPer:POWer:ICRatio	<numeric_value	51
:CONFigure:CDPower:LIMit:UPPer:POWer:PRATio	<numeric_value	51
:CONFigure:CDPower:LIMit:UPPer:POWer:TOLerance	<numeric_value	51
:CONFigure:CDPower:LIMit:UPPer:TIME:PALignment	<numeric_value	51
:CONFigure:CDPower:PRESet	FWCDMA8 | FWCDMA19 | NONE	50
:CONFigure:IS95:MEASurement	POWer | ACPR | MODulation | CDPower | FDOMain | TDOMain	50
:INSTrument[:SELect]	SANalyzer | DDEMod | ADEMod | BGSM | MSGM | CDPower	53
:[SENSe:]CDPower:ICTReshold	–27dB to 6 dB	54
:[SENSe:]CDPower:LEVel:ADJust		53
:[SENSe:]CDPower:MPERiod	1 | 2 | 4 | 8 | 12 | 16 | 20 | 24	53
:[SENSe:]CDPower:MPERiod:AUTO	ON | OFF	54
:[SENSe:]CDPower:PNOFset	<num_value>	54
:[SENSe:]CDPower:PRESet		53
:[SENSe:]CDPower:SBANd	NORMal | INVers	54
:[SENSe:]DETector:CDPower[:FUNCtion]:MODE	FAST | NORMal	54
TRACe[:DATA]	TRACE1	55

Table of Softkeys with Assignment of IEC/IEEE Commands

CONFIGURATION Key Group

MODE

CDMA ONE BTS

POWER

```
:CONFigure:IS95:MEASurement POWer
```

Query of results `:CALCulate:MARKer:FUNCtion:POWer:RESult? CPOWer`

ACPR

```
:CONFigure:IS95:MEASurement ACPR
```

Query of results: `:CALCulate:MARKer:FUNCtion:POWer:RESult? ACPower`

MODULATION QUALITY

Leads to the menu for vector analyzer mode

```
:CONFigure:IS95:MEASurement MODulation
```

Query of results: `:CALCulate<1|2>:MARKer<1|2>:FUNCtion:DDEMod:RESult? RHO`

SPECTRUM

```
:CONFigure:IS95:MEASurement FDOMain
```

Query of results: `--` (visual evaluation)

TIME DOMAIN

```
:CONFigure:IS95:MEASurement TDOMain
```

Query of results:
```
:CALCulate<1|2>:MARKer<1..4>:FUNCtion:CRESt?
:CALCulate<1|2>:MARKer<1..4>:FUNCtion:SUMMary:RMS:RESult?
:CALCulate<1|2>:MARKer<1..4>:FUNCtion:SUMMary[:STATe] ON
```

INPUT CHAN CDMA 800

```
:CONFigure:CDPower:PRESet FWCDMA8 | NONE
:CONFigure:CDPower:CHANnel <numeric value>
```

INPUT CHAN CDMA 1900

```
:CONFigure:CDPower:PRESet FWCDMA19 | NONE
:CONFigure:CDPower:CHANnel <numeric value>
```

LEVEL AUTO ADJUST

```
:SENSe:CDPower:LEVel:ADJust
```

CDP MEAS

```
:INSTrument[:SELect] CDPower
```

Query of results:
```
:CALCulate:MARKer:FUNCtion:CDPower:RESult?  PTOTal |CPOWer |
        PERRor | FERRor | TERRor | ACHannels | PTALignment |
        ACOunt
```

or `:TRACe:DATA? TRACE1`

or marker functions (see marker submenu)

CONTINUOUS SWEEP

```
:INITiate:CONTinuous ON; INITiate[:IMMediate]
```

SINGLE SWEEP

```
:INITiate:CONTinuous OFF; INITiate[:IMMediate]
```

MARKER

```
--
```

MARKER

```
:CALCulate:MARKer<1>[:STATe]   ON | OFF;
:CALCulate:MARKer<1>:X <channel_number>;
:CALCulate:MARKer<1>:Y?
```

MKR-> PILOT CH	:CALCulate:MARKer<1>:FUNCtion:PILot; :CALCulate:MARKer<1>:Y?
MKR-> PAGING CH	:CALCulate:MARKer<1>:FUNCtion:PAGing; :CALCulate:MARKer<1>:Y?
MKR-> SYNC CH	:CALCulate:MARKer<1>:FUNCtion:SYNC; :CALCulate:MARKer<1>:Y?
MKR->MAX TIME ERR	:CALCulate:MARKer<1>:FUNCtion:TERRor; :CALCulate:MARKer<1>:X? ; :CALCulate:MARKer<1>:Y?
MKR->MAX PHASE ERR	:CALCulate:MARKer<1>:FUNCtion:PERRor; :CALCulate:MARKer<1>:X? ; :CALCulate:MARKer<1>:Y?
MARKER INFO	DISPlay:WINDow:MINFo ON | OFF (screen display)
DISPLAY MODE CDP	--
CDP	:CALCulate:FEED 'XPOW:CDP'; :CALCulate:MARKer:FUNCtion:CDPower:RESult? CPOWer
CDP RELATIVE	:CALCulate:FEED 'XPOW:CDP:RAT'
TIME ERROR	:CALCulate:FEED 'XTIM:CDP:ERR'; :CALCulate:MARKer:FUNCtion:CDPower:RESult? TERRor
PHASE ERROR	:CALCulate:FEED 'XTIM:CDP:ERR:PHAS'; :CALCulate:MARKer:FUNCtion:CDPower:RESult? PERRor
ERROR SUMMARY	:CALCulate:FEED 'XTIM:CDP:ERR:SUMM'; :CALCulate:MARKer:FUNCtion:CDPower:RESult? PTOTal |CPOWer | PERRor | FERRor | TERRor | ACHannels | PTALignment | ACOunt or :TRACe:DATA? TRACE1
MEASPERIOD [CHIPS]	:[SENSe:]CDPower:MPERiod 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 :[SENSe:]CDPower:MPERiod:AUTO ON | OFF
LIMITS ON OFF	:CALCulate:LIMit:STATe ON | OFF
FAST MODE ON OFF	:[SENSe:]DETector:CDPower[:FUNCtion]:MODE FAST | NORMal
LIMIT SETTINGS	--
LIMITS TO STANDARD	:CONFigure:CDPower:LIMit:STANdard ON
LIMITS TO USER SET	:CONFigure:CDPower:LIMit:STANdard OFF

EDIT USER LIMITS	:CONFigure:CDPower:LIMit:UPPer:POWer:TOLerance <numeric_value> :CONFigure:CDPower:LIMit:UPPer:POWer:PRATio <numeric_value> :CONFigure:CDPower:LIMit:UPPer:POWer:ICRatio <numeric_value> :CONFigure:CDPower:LIMit:UPPer:TIMe:PALignment <numeric_value> :CONFigure:CDPower:LIMit:UPPer:ERRor:CTIMe <numeric_value> :CONFigure:CDPower:LIMit:UPPer:ERRor:CPHase <numeric_value> :CONFigure:CDPower:LIMit:UPPer:ERRor:FREQuency <numeric_value> :CONFigure:CDPower:LIMit:LOWer:POWer:TOLerance <numeric_value> :CONFigure:CDPower:LIMit:LOWer:POWer:PRATio <numeric_value> :CONFigure:CDPower:LIMit:LOWer:TIMe:PALignment <numeric_value> :CONFigure:CDPower:LIMit:LOWer:ERRor:CTIMe <numeric_value> :CONFigure:CDPower:LIMit:LOWer:ERRor:CPHase <numeric_value> :CONFigure:CDPower:LIMit:LOWer:ERRor:FREQuency <numeric_value>
TOTAL PWR NOM	:CONFigure:CDPower:LIMit:POWER:NOMinal <numeric value>
MEAS SETTINGS	--
SET TO STANDARD	:[SENSe:]CDPower:PRESet
EXT TRG OFFSET	:TRIGger[:SEQuence]:HOLDoff <numeric value>
PN-OFFSET (CHIPS)	:[SENSe:]CDPower:PNOFfset <numeric_value>
INACT CHAN TRESH	:[SENSe:]CDPower:ICTReshold <numeric_value>
SIDE BAND NORM INV	:[SENSe:]CDPower:SBANd NORMal | INVerse
MEASPERIOD [CHIPS]	:[SENSe:]CDPower:MPERiod 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 :[SENSe:]CDPower:MPERiod:AUTO ON | OFF
FAST MODE ON OFF	:[SENSe:]DETector:CDPower[:FUNCtion]:MODE FAST | NORMal
INPUT CHAN CDMA 800	:CONFigure:CDPower:PRESet FWCDMA8 | NONE :CONFigure:CDPower:CHANnel <numeric value>
INPUT CHAN CDMA 1900	:CONFigure:CDPower:PRESet FWCDMA19 | NONE :CONFigure:CDPower:CHANnel <numeric value>
INPUT FREQUENCY	:[SENSe:]FREQuency:CENTer <numeric_value>
REF LEVEL	--
REF LEVEL	:DISPlay[:WINDow]:TRACe:Y[:SCALe]:RLEVel <numeric_value>
REF LEVEL OFFSET	:DISPlay[:WINDow<]:TRACe:Y[:SCALe]:RLEVel:OFFSet <num_value>
RF ATTEN MANUAL	:INPut:ATTenuation <numeric_value>
ATTEN AUTO NORMAL	:INPut:ATTenuation:AUTO:MODE NORMal; :INPut:ATTenuation:AUTO ON

ATTEN AUTO LOW NOISE	:INPut:ATTenuation:AUTO:MODE LNOise; :INPut:ATTenuation:AUTO ON
ATTEN AUTO LOW DIST	:INPut:ATTenuation:AUTO:MODE LDIStortion; :INPut:ATTenuation:AUTO ON
MIXER LEVEL	:INPut:MIXer <numeric value>
LEVEL AUTO ADJUST	:SENSe:CDPower:LEVel:ADJust

8 Checking Rated Specifications

- Switch off FSIQ before removing or inserting modules.
- Check the setting of the AC supply voltage selector (230 V) prior to switching on the unit.
- Measure the parameters after a warm-up time of at least 30 min. and the completion of system error correction of FSIQ and SMIQ. Only then is it ensured that the specifications are complied with.
- Unless specified otherwise all settings are made after a PRESET.
- Conventions for settings on FSIQ during the measurement:

[***<KEY>***]	Press a key on the front panel, eg [SPAN]
[<SOFTKEY>]	Press a softkey, eg [MARKER -> PEAK]
[<nn unit>]	Enter a value and terminate by entering the unit, eg [12 kHz]
{<nn>}	Enter values indicated in one of the following tables.

  Successive entries are separated by [:], eg [***SPAN***: 15 kHz].
- The values stated hereinafter are not guaranteed values. Only the data sheet specifications are binding.

Required Measuring Equipment and Accessories

Table 8-1 Required Measuring Equipment and Accessories

Item	Instrument type	Recommended characteristics	Recommended equipment	R&S Order No.	Use
1	Signal generator	Vector signal generator for generating cdmaOne signals	SMIQ with options: SMIQB42 SMIQB20 SMIQB11	1125.5555.xx 1104.7936.02 1125.5190.02 1085.4502.04	

Test Procedure

The performance test refers exclusively to results of the code-domain power and modulation quality. It is not required to check the POWER, ACPR and SPECTRUM results since they are covered by the performance test of the basic unit.

Default settings on SMIQ:

[PRESET]
[LEVEL : *0 dBm**]***
[FREQ: *870.03 MHz**]***
DIGITAL STD
IS95
STATE: ON
SAVE / RCL MAPPING:
MODE: FWD_LINK_18
GET PREDEFINED MAPPING: PILOT
MODULATION
FWD LINK FILTER: IS-95 + EQUALIZER
FILTER MODE: LOW EVM
LOW DISTORTION MODE: OFF

Set trigger output to *EVEN SECOND TRIGGER*.

Check set channels against the following table:

CHAN	WALSH Code	PWR	Data	State
0	0	-7	0000	ON
1	32	-13.3	PRBS	ON
2	1	-7.3	PRBS	ON
3	9	-10.3	PRBS	ON
4	10	-10.3	PRBS	ON
5	11	-10.3	PRBS	ON
6	15	-10.3	PRBS	ON
7	17	-10.3	PRBS	ON
8	25	-10.3	PRBS	ON
all other channels:				OFF

Perform a system error correction of SMIQ (menu *UTILITIES CALIB*).

Default settings on FSIQ:

[REF*:* *+15 dBm]*
*[**MODE****:* *cdmaOne BTS: Spectrum*
*[**CENTER****:* *870.3. MHz]*
[TRIGGER*:* *TRIGGER OFFSET: 0µs]*

Test setup and other settings

- Connect external trigger input of FSIQ to SMIQ

[TRIGGER*:* *TRIGGER OFFSET: 0µs]*

- Connect external reference output of FSIQ to SMIQ

SMIQ
UTILITIES
SOURCE: EXT

FSIQ
[SETUP*:* *REFERENCE INT]*

Code-Domain Power

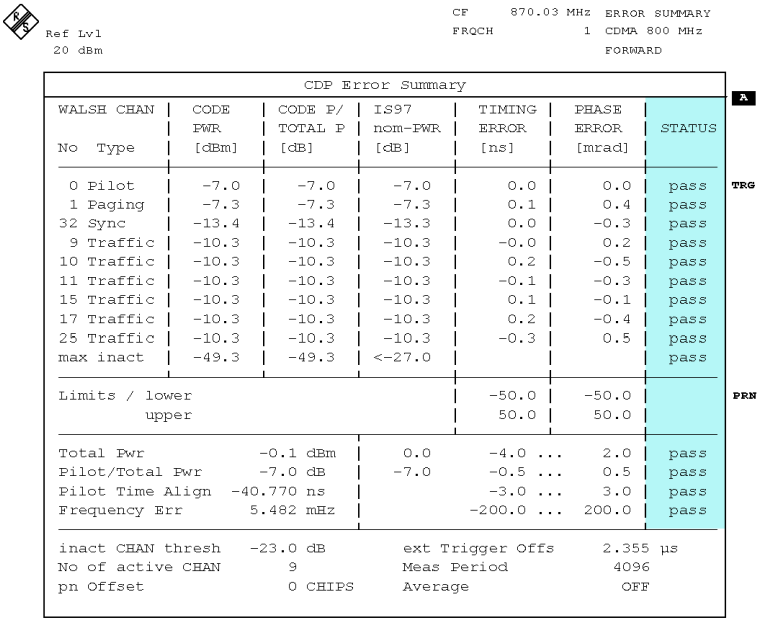
Setting on SMIQ: *Default setting*

Settings on FSIQ: ***Default setting and***
***[MODE**:* *cdmaOne BTS*
CDP MEAS *DISPLAY MODE CDP: CDP]*
[menu change key UP]
[LIMIT SETTINGS *EDIT USER LIMITS*]
CDP USER LIMITS to be set according to following table:

CDP USER LIMITS		
	Lower Limit	Upper Limit
Total PWR Tolerance	-0.5 dB	+0.5 dB
Pilot PWR Ratio	-0.5 dB	+0.5 dB
Pilot Time Alignment	-0.13 us	+0.13 us
Inact. Chan PWR Ratio		-27 dB
Chan Time Error	-10 ns	+10 ns
Chan Phase Error	-10 mrad	+10 mrad
Frequency Error	-10 Hz	+10 Hz

[menu change key UP]
[menu change key UP]
[MEAS SETTINGS *INACT CHAN TRESHOLD:* *-23 dBm*
EXT TRIGGER OFFSET:
SMIQ firmware version < 5 *1.35 µs]*
SMIQ firmware version ≥ 5.00 (HX)
SMIQB10 *1.35 µs]*
SMIQB20 *3.90 µs]*
[menu change key UP]
[LIMIT SETTINGS *TOTAL PWR NOM : 0 dBm*

Measurement on FSIQ: *[**MODE**:* *cdmaOne BTS*
CDP MEAS *DISPLAY MODE CDP: ERROR SUMMARY*



Ref Lvl
20 dBm

CF 870.03 MHz ERROR SUMMARY
FRQCH 1 CDMA 800 MHz
FORWARD

CDP Error Summary

WALSH CHAN No	Type	CODE PWR [dBm]	CODE P/ TOTAL P [dB]	IS97 nom-PWR [dB]	TIMING ERROR [ns]	PHASE ERROR [mrad]	STATUS
0	Pilot	-7.0	-7.0	-7.0	0.0	0.0	pass
1	Paging	-7.3	-7.3	-7.3	0.1	0.4	pass
32	Sync	-13.4	-13.4	-13.3	0.0	-0.3	pass
9	Traffic	-10.3	-10.3	-10.3	-0.0	0.2	pass
10	Traffic	-10.3	-10.3	-10.3	0.2	-0.5	pass
11	Traffic	-10.3	-10.3	-10.3	-0.1	-0.3	pass
15	Traffic	-10.3	-10.3	-10.3	0.1	-0.1	pass
17	Traffic	-10.3	-10.3	-10.3	0.2	-0.4	pass
25	Traffic	-10.3	-10.3	-10.3	-0.3	0.5	pass
max inact		-49.3	-49.3	<-27.0			pass
Limits / lower					-50.0	-50.0	
upper					50.0	50.0	

Total Pwr	-0.1 dBm	0.0	-4.0 ... 2.0	pass
Pilot/Total Pwr	-7.0 dB	-7.0	-0.5 ... 0.5	pass
Pilot Time Align	-40.770 ns		-3.0 ... 3.0	pass
Frequency Err	5.482 mHz		-200.0 ... 200.0	pass

inact CHAN thresh	-23.0 dB	ext Trigger Offs	2.355 µs
No of active CHAN	9	Meas Period	4096
pn Offset	0 CHIPS	Average	OFF

Date: 22.FEB.2000 12:10:32

Nominal value: ..... The measurement should give the STATUS PASS
.....for all measured parameters.

➢ Enter the displayed measured values in the test report.

Modulation Quality

Settings on SMIQ: Default setting and:
DIGITAL STD
IS-95
SAVE / RCL MAPPING:
GET PREDEFINED MAPPING: PILOT

➢ Check set channels against the following table:

CHAN	*WALSH Code*	*PWR*	*Data*	*State*
0	*0*	*-7*	*0000*	*ON*
all other channels:				*OFF*

.

Settings on FSIQ: Default setting and:
***[MODE**: cdmaOne BTS: MODULATION QUALITY*
[menu change key UP]
CDP MEAS REF LEVEL: -3 dBm

Measurement on FSIQ: ➢ Read the measured value for RHO and enter it in the test report.

Performance Test Report

Note: *The values specified in the data sheet are guaranteed limits. To these limits, the tolerances of the instruments used in the performance test must be added because of their measurement uncertainty. The attenuation of the connecting cables is to be taken into account as well.*

Table 8-2 Performance Test Report

Item	Parameter tested	Measure acc. to page	Min. value	Actual value	Max. value	Unit
1	Total PWR	63	-0,5	———	+0,5	dBm
2	Pilot PWR to Total PWR Ratio	63	-7,5	———	-6.5	dB
3	Pilot Time Alignment	63	-135	———	+135	ns
4	Frequency Error	63	-10	———	+10	Hz
5	Max Timing Error	63	-10	———	+10	ns
6	Max Phase Error	63	-10	———	+10	mrad
7	RHO	64	0.9995	———		

9 Glossary

EVEN SECOND TRIGGER	Trigger signal of base station generated every other second (even number). The BTS timebase is synchronized with the universal time (UTC).
PN-OFFSET	PILOT PN Sequence Offset: This index value indicates the number of CHIPS by which the 0 state of the PN generator is shifted with respect to the EVEN SECOND TRIGGER. The entered PN offset value is automatically taken into account for the calculation of the PILOT TIME ALIGNMENT.
PILOT CHANNEL	Unmodulated signal which is spread with Walsh code 0 and continuously sent by the base station. It is used for timing and phase synchronization of the receiver.
SYNC CHANNEL, PAGING CHANNEL	Code channel 32 is the synchronization channel (SYNC) and code channel 1 is the paging channel of the base station. They are used for synchronization and call setup.
TRAFFIC CHANNEL	Any code channel 2 to 63 without 32 (32 = SYNC channel). It contains the user data of the base station to the mobile station.
WALSH CODE	Spreading code of a channel in the cdmaOne system. The code has a length of 64, ie a symbol of the input data sequence is spread to a length of 64 output symbols. The 1/64 of the period of a Walsh code is known as a chip.
INA = Inactive Channel Threshold	Threshold below which all channels are considered as inactive.

10 Index

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