ROHDE&SCHWARZ

Test and Measurement
Division

Release Notes

TD-SCDMA Base Station Test

Application Firmware R&S FS-K76

Release 4.60

for R&S FSP, FSU, FSQ, FSG, FSMR, FSUP
Analyzer Firmware 4.6x

New Features:

- Optional code channel phase synchronization on associated midamble

Release Note Revision: **3**

Printed in the Federal
Republic of Germany

Contents

History

Date	Rel Note Rev	Changes
17 June 2010	1	First revision for R&S FS-K76 Firmware 4.60.
20 September 2010	2	Description for remote command "SENS:CDP:STAND:SEL" added. New hot line phone number for calls from Europe.
07 March 2011	3	New chapter "Customer Support".

General Topics

Compatibility of R&S FS-K76 TD-SCDMA BTS Application Firmware

The following table shows the compatible versions of the basic analyzer firmware version and the TD-SCDMA BTS application firmware:

Table of compatible versions:

R&S FS-K76 Application Firmware	R&S FSP Basic Firmware	R&S FSU Basic Firmware	R&S FSQ Basic Firmware	R&S FSMR Basic Firmware	R&S FSUP Basic Firmware	R&S FSG Basic Firmware
4.60	-	4.61	4.65	-	-	4.69
4.50	4.50	4.51	4.55	-	-	4.59
4.40 SP1	-	-	-	-	4.47	-
4.40	4.40	4.41	4.45	-	-	4.49
4.30	4.30	4.31	4.35	4.36	-	4.39
4.20	4.20	4.21	4.25	4.26	4.27	4.29
4.10	4.10	4.11	4.15	4.16	4.17	.-
4.00	4.00	4.01	4.05	4.06	-	-
3.90	3.90	3.91	3.95	3.96	3.99	-
3.80	3.80	3.81	3.85	3.86	-	-
3.70	3.70	3.71	3.75	-	-	-
3.60	3.60	3.61	3.65	3.66 SP1	-	-
3.50	3.50	3.51	3.55	-	-	-
3.40	3.40	3.41	3.45	-	-	-
3.30	3.30	3.31	3.35	-	-	-
3.28	3.20	3.21	3.25	-	-	-
2.80	2.80	2.81	-	-	-	-
2.60	2.60	2.61	-	-	-	-
2.40	2.40	2.41	2.45	-	-	-
2.30	2.30	2.31	2.35	-	-	-
2.28	2.20	2.21	2.25	-	-	-

Application firmware versions 3.xx are running on R&S FSPs with order # 1164.4391.xx or R&S FSU with order # 1166.1660.xx or R&S FSQ with operating system XP.
Application firmware version 2.xx are running on R&S FSPs with order # 1093.4495.xx or R&S FSU with order # 1129.9003.xx or R&S FSQ with operating system NT.

Firmware Update of R&S FS-K76 TD-SCDMA BTS Application Firmware

Since basic firmware version 4.2x a ZIP file with the update sets of the basic system firmware and all available applications is provided. This ZIP file is available in the instruments FIRMWARE section, e.g. R&S FSU of the Service Board on GLORIS.
Please follow the steps described in the instrument's basic firmware release note to perform a complete firmware update.

Enabling the Application Firmware via License Key Code Entry

This section can be skipped if the option key was entered once.

After installing the application firmware package a license key for validation must be entered. The license key is printed either on a label on the rear panel of the analyzer or delivered as a part of the R&S FS-K76 TD-SCDMA BTS application firmware package.
The key sequence for entering the license key is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

Use the numeric keypad to input the license key number and press ENTER.

- On a successful validation the message 'option key valid‘ will appear.

- If the validation failed, the application firmware is not installed.
  The most likely reason will be that the instrument is not equipped with the correct basic firmware version. In this case a message box will appear asking for installation of the correct basic firmware version.
  If the application firmware package was not installed prior to entering the license key code, a message will appear asking for installation of the application firmware package.
  In any case please make sure that the correct basic firmware version <u>and</u> the application firmware package is installed prior to entering the license key code.

New Functions in Version 4.60

- **Optional code channel phase synchronization on associated midamble**
  By default the R&S FS-K76 determines one phase reference for all midambles and code channels of a data slot. The new setting considers phase rotations between the code channels. Each code channel gets its own phase reference from the associated midamble according to section AA.2 of the standard document 3GPP TS 25.221.

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Improvements

The version numbers in brackets indicate the version in which the issue was observed for the first time.

1. [4.50] Synchronization at low DwPTS power.
The frame synchronization of the R&S FS-K76 uses the DwPTS as time reference. In prior versions synchronization could fail if the DwPTS power falls below -6 dB of the data slot power. This version allows synchronization at much lower levels. The actual value depends on the signal to noise ratio and can be down to -50 dB.

2. [V4.50] Bitstream for 64QAM modulated code channels incorrect.
The bitstream result for 64QAM code channels has been corrected.

3. [V4.50] Bad EVM results or discarded code channels using 64QAM modulation.
The detection and demodulation of 64QAM code channels has been improved.

Known Issues with R&S FS-K76

None

Modified Functions

1. [V3.30/V2.30] "Signal Statistics" measurements CCDF and APD are supported.

2. [V3.30/V2.30] For all code domain analyzer measurements, the maximum capture length has been extended from 35 to 63 slots.

3. [V3.30/V2.30] "Composite Constellation" is available within the code domain analyzer.

4. [V3.30/V2.30] The China Wireless Telecommunication Standard "TSM" is supported.

5. [V3.30/V2.30] Unit circle display in constellation diagrams is shown.

6. [V3.50/V2.60] Change of default node for `CALC2:FEED 'XTIM:CDP:PVSL'`
For compatibility reason with other 3G applications the default node for the IEC/IEEE bus command
`CALC2:FEED 'XTIM:CDP:PVSL[:ABS]'` is changed to
`CALC2:FEED 'XTIM:CDP:PVSL[:RAT]'`.

7. [V3.60/V2.60] External trigger level adjustable from 0.5 to 3.5V .

8. [V3.60/V2.60] Center Frequency Stepsize softkey available.

9. [V3.60/V2.60] Changed SCPI commands.
In order to limit to 12 chars the :CALCulate2:FEED 'XTIMe:CDPower:SYMBol:CONStellation' and :CALCulate2:FEED 'XTIMe:CDPower:COMPosite:CONStellation' are changed to :CALCulate2:FEED 'XTIMe:CDPower:SYMBol:CONSt' and :CALCulate2:FEED 'XTIMe:CDPower:COMPosite:CONSt'.

10. [V3.70/V2.80] ACP: number of adjacent channels increased to 12.

11. [V3.70/V2.80] ACP: power mode to max holds the power results.

12. [V3.80/V2.80] Trace view available within code domain analyzer.

13. [V3.90] Support for noise correction in ACLR measurement with power trigger.

14. [V4.00] High Dynamic Mode for Power vs. Time Measurement.

15. [V4.00] Support for High Speed Physical Downlink Shared Channel (HS-PDSCH) using 16QAM modulation symbols.

16. [V4.00] Spectrum emission mask: List evaluation in lower screen now supported.

17. [V4.00] Multicarrier ACP measurement support.

18. [V4.20] Support for instrument R&S FSG.

19. [V4.20] Softkey REF VALUE Y AXIS available for CDP measurements.

20. [V4.20] Power vs Time: Sweep Mode SINGLE/CONTINUOUS is now restored to it's previous state, when HIGH DYNAMIC is switched off.

21. [V4.30] Softkey AC / DC Coupling available.

22. [V4.30] New Ref Value Y Axis / Reference Level coupling simplifies grid scaling configuration for Code Domain measurments.
Since version 4.20 the Reference Level and the grid scaling (REF VALUE Y AXIS) with unit dBm can be independently set for Code Domain measurements. In previous versions changing the Reference Level and changing the Ref Value Y Axis were independent. If the Reference Level value is changed the Ref Value Y Axis is now automatically adjusted to keep the difference between Reference Level and Ref Value Y axis constant.
Example:
Ref Level set to 0 dBm
Ref Value Y axis set to -10 dBm (at Y Axis Position 100%)
► The upper Y limit of the grid scaling is now at 10 dB below reference level.
Change Reference Level to -10dBm
The Ref Value Y Axis is now adjusted to -20 dB
► The upper Y limit of the grid scaling is at 10 dB below reference level as before.
Note: The internal reference level change with function ADJUST REF LEVEL is treated in the same way.

23. [V4.30] Selectable Phase Reference (softkey SYNC TO SLOT) for repeater measurements.

24. [V4.50] The Relative Code Domain Error (RCDE) is displayed in the result summary.

25. [V4.50] Support for High Speed Physical Downlink Shared Channel (HS-PDSCH) using 64QAM modulation symbols.
64QAM constellations are fully supported as code channel modulation. An improved robust channel search algorithm classifies the modulation automatically from QPSK up to 64QAM. For bad SNR environments the automatic search can optionally be limited to lower constellations.

26. [V4.50] New midamble based synchronization mode.
By default the R&S FS-K76 determines the phase reference for all downlink data slots from the downlink pilot channel (DwPCH). For e.g. beamforming or repeater measurements it might be necessary to apply different phase offsets to each time slot. Using the DwPCH as phase reference leads to rotated constellation diagrams and bad EVM values in these time slots.

Since version 4.30 the R&S FS-K76 provides the optional synchronization on the selected slot. This synchronization needed at least one code channel with QPSK or 8PSK modulation within the slot. The new midamble based synchronization mode is independent of the code channel modulation and thus allows synchronization on slots with arbitrary code channel modulation.

27. [V4.50] Optional code channel phase synchronization on associated midamble.
By default the R&S FS-K76 determines one phase reference for all midambles and code channels of a data slot. The new setting considers phase rotations between the code channels. Each code channel gets its own phase reference from the associated midamble according to section AA.2 of the standard document 3GPP TS 25.221.

Modifications to the Operating Manual and Supplements

For the R&S FS-K76 TD-SCDMA Base Station Test Application Firmware manuals please refer to the following order numbers:

- 1300.7304.44-04 (German/English)

They can be downloaded from R&S internet – search: FS-K76:

http://www.rohde-schwarz.com

Modified Chapters

Menu CHAN CONF

HEADER VALUES

MODULATION TYPE:
Modulation type of the channel. You can choose between QPSK, 8PSK, 16QAM and 64 QAM

IEC-Bus-command:
`:CONFigure:CDPower[:BTS]:CTABle:DATA 1..6, 0..4, 1..16, 0..3, 1..16, 0 | 1, 0, 0...`
< Channel type >, <Code class>, <Code number>, <Modulation type>, <Midamble shift>, <Status>, <Reserved 1>, <Reserved 2>, ...

Modulation type:
0 = invalid (for midamble)
1 = QPSK
2 = 8PSK
3 = 16QAM
4 = 64QAM

MAX MOD <64QAM>

The MAX MOD setting defines the highest modulation to be considered in the automatic channel search. In low SNR environments it may be necessary to limit the channel search to lower modulations than 64QAM.

IEC/IEEE-bus command:
`SENSe:CDPower:MMAX QPSK | PSK8 | QAM16 | QAM64`

Menu RESULTS

RESULT SUMMARY

The RESULT SUMMARY softkey selects numeric evaluation of all measured results. Evaluation is subdivided as follows:

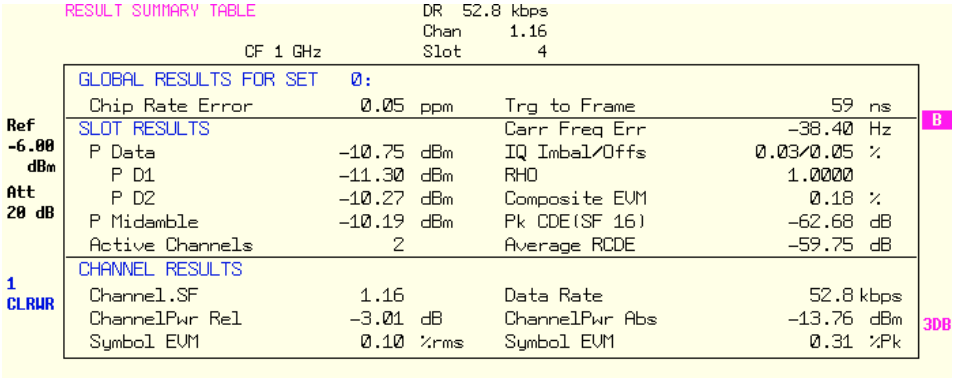

Fig. 1 Result summary

The second part shows measured results relating to all channels for the slot selected with the SELECT SLOT softkey:

Average RCDE: Average relative code domain error of the active channels

IEC/IEEE bus command:

```
:CALC2:FEED "XTIM:CDP:ERR:SUMM"
:CALC2:MARK1:FUNC:CDP:BTS:RES? SLOT | PDAT | PD1 | PD2 |
                               PMID | RHO | MACC | PCD |
                               FERR |CERR | TFR | IQIMB |
                               IQOF | ACT | SRAT | CHAN |
                               SFAC | CDPR | CDP | EVMR |
                               EVMP | ARCD
```

Menu SETTINGS - NEXT

SYNC TO SLOT

By default the R&S FS-K76 determines the phase reference for all downlink data slots from the downlink pilot channel (DwPCH). For e.g. beamforming or repeater measurements it might be necessary to apply different phase offsets to each time slot. Using the DwPCH as phase reference leads to rotated constellation diagrams and bad EVM values in these time slots.

By activating the setting 'SYNC TO SLOT' the R&S FS-K76 determines the phase reference within the selected slot. Thus the data slots can be phase rotated to each other without degrading the EVM results. The actual part of the selected slot used as phase reference is determined by the SYNC TO CODE | MA softkey.

IEC/IEEE-bus command:

```
:SENSe:CDPower:STSLot ON | OFF
```

SYNC TO CODE MA

This softkey selects the slot synchronization mode. It is effective only if SYNC TO SLOT is activated.
If CODE is selected, the phase reference is determined by a multi-stage algorithm involving code channels and midambles. At least one code channel within the selected slot must be QPSK or 8PSK modulated.
If MA is selected, the phase reference is determined by the midamble area of the selected slot. Hence there is no requirement about the code channel modulation.

IEC/IEEE-bus command:
`:SENSe:CDPower:STSLot:MODE CODE | MA`

ROTATE CODE TO MA

By default the R&S FS-K76 determines one phase reference for all midambles and code channels of a data slot. If ROTATE CODE TO MA is selected, phase rotations between the code channels are allowed. Each code channel gets its own phase reference from the associated midamble according to section AA.2 of the standard document 3GPP TS 25.221. If the associated midamble is missing, the common phase reference is used for this code channel.

IEC/IEEE-bus command:
`:SENSe:CDPower:STSLot:ROTate ON | OFF`

Remote Control Commands

CALCulate subsystem

:CALCulate<1|2>:MARKer<1>:FUNCtion:CDPower[:BTS]:RESult? SLOT | PDATa | PD1 | PD2 | PMIDamble | RHO | MACCuracy | PCDerror | FERRor | CERRor | TFRame I IQOFfset | IQIMbalance | ACTive | SRATe | CHANnel | SFACtor | CDPabsolute | CDPRelative | EVMRms | EVMPeak | ARCDError

This command polls the measured and calculated values of code domain power analysis. The results are provided for the channel to which the code selected by the `CDPower:CODe` command belongs.

Parameters:

Global results of selected slot:

SLOT	Slot number
PDATa	Power data fields in dBm
PD1	Power data field 1 in dBm
PD2	Power data field 2 in dBm
PMIDamble	Power midamble in dBm
RHO	RHO
MACCuracy	Composite EVM in %
PCDerror	Peak code domain error in dB
FERRor	Frequency error in Hz
CERRor	Chip rate error in ppm
TFRame	Trigger to frame
IQIMbalance	IQ imbalance in %
IQOFfset	IQ offset in %
ACTive	Number of active channels
ARCDError	Average RCDE of active channels

Channel results:

SRATe	Data rate in kbps
CHANnel	Channel number
SFACtor	Spreading factor of channel
CDPRelative	Channel power relative in dB
CDPabsolute	Channel power absolute in dBm

EVMRms Error vector magnitude RMS in %
EVMPeak Error vector magnitude Peak in %

Note: *The trigger to frame (`TFRame`) value produces a "9" if the trigger is set to FREE RUN.*

Example:

```
"INST:SEL BTDS"                    ' Activate TD–SCDMA BTS meaning
                                   ' CDP relative on screen A and
                                   ' Result Summary active on screen B
"INIT:CONT OFF"                    ' Select single sweep
"INIT;*WAI"                        ' Start measurement with
                                   ' synchronization
"CALC:MARK:FUNC:CDP:RES? PDAT"     'Read out power of data fields
"CDP:SLOT 5"                       'Selects slot 5
"CDP:CODE 11"                      'Select code number 11
"CALC:MARK:FUNC:CDP:RES? EVMR"     'Read out EVM RMS of code with
                                   'number 11 in slot 5
```

Characteristics: *RST value: –
SCPI: instrument–specific

:CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:RESult? ACPower | AOBandwidth | AOBWidth | CPOWer | MCACpower | OBANdwidth | OBANdwidth

This command queries the result of the power measurement performed in the selected window. If necessary, the measurement is switched on prior to the query.

The channel spacings and channel bandwidths are configured in the `SENSe:POWer:ACHannel` subsystem.

To obtain a valid result, a complete sweep with synchronization to the end of the sweep must be performed before a query is output. Synchronization is possible only in the single-sweep mode.

Note: The parameters AOBandwidth and AOBWidth are available only from firmware version 4.5x

Parameters:

ACPower: adjacent channel power measurement

Results are output in the following sequence, separated by commas:

1. Power of transmission channel
2. Power of lower adjacent channel
3. Power of upper adjacent channel
4. Power of lower alternate channel 1
5. Power of upper alternate channel 1
6. Power of lower alternate channel 2
7. Power of upper alternate channel 2

The number of measured values returned depends on the number of adjacent/alternate channels selected with `SENSe:POWer:ACHannel:ACPairs`.

With logarithmic scaling (RANGE LOG), the power is output in the currently selected level unit; with linear scaling (RANGE LIN dB or LIN %), the power is output in W. If `SENSe:POWer:ACHannel:MODE REL` is selected, the adjacent/alternate-channel power is output in dB.

AOBandwidth
AOBWidth

Measurement of occupied bandwidth, all results

The results include the left and right frequency/level information

Results are output in the following sequence, separated by commas:

1. Occupied bandwidth in Hz
2. T1 marker position in Hz (left marker)
3. T1 marker level
4. T2 marker position in Hz (right marker)

5. T2 marker level

Note: The Occupied Bandwidth is marker position T2 – T1

CPOWer: Channel power measurement

With logarithmic scaling (RANGE LOG), the channel power is output in the currently selected level unit; with linear scaling (RANGE LIN dB or LIN %), the channel power is output in W.

MCACpower: Channel/adjacent channel power measurement with several carrier signals

Results are output in the following sequence, separated by commas:

1. Power of carrier signal 1
2. Power of carrier signal 2
3. Power of carrier signal 3
4. Power of carrier signal 4
5. Power of carrier signal 5
6. Power of carrier signal 6
7. Power of carrier signal 7
8. Power of carrier signal 8
9. Power of carrier signal 9
10. Power of carrier signal 10
11. Power of carrier signal 11
12. Power of carrier signal 12
13. Total power of all carrier signals
14. Power of lower adjacent channel
15. Power of upper adjacent channel
16. Power of lower alternate channel 1
17. Power of upper alternate channel 1
18. Power of lower alternate channel 2
19. Power of upper alternate channel 2

The number of measured values returned depends on the number of carrier signals and adjacent/alternate channels selected with `SENSe:POWer:ACHannel:TXCHannel:COUNt` and `SENSe:POWer:ACHannel:ACPairs`.

If only one carrier signal is measured, the total value of all carrier signals will not be output.

With logarithmic scaling (RANGE LOG), the power is output in dBm; with linear scaling (RANGE LIN dB or LIN %), the power is output in W. If `SENSe:POWer:ACHannel:MODE REL` is selected, the adjacent/alternate-channel power is output in dB.

OBANdwidth | OBWidth: Measurement of occupied bandwidth

The occupied bandwidth in Hz is returned.

Characteristics: *RST value: –
SCPI: device –specific

This command is a query and therefore has no *RST value.

CONFigure subsystem

:CONFigure:CDPower[:BTS]:CTABle:DATA 1..6, 0..4, 1..16, 0..2, 1..16, 0 | 1, 0, 0...

This command defines a channel table. The whole table is defined in one operation. The inactive channels (INACtive) do not have to be defined. Eight values are specified for a line of a table.

< Channel type >, <Code class>, <Code number>, <Modulation type>, <Midamble shift>, <Status>, <Reserved 1>, <Reserved 2>, ...

Channel type: The channel type is coded with numbers as follows:
1 = Midamble
2 = DPCH
3 = P–CCPCH
4 = S–CCPCH
5 = FPACH
6 = PRACH

Code class: 0–4

Code number: 1–16

Modulation type: 0 = invalid (for midamble)
1 = QPSK
2 = 8PSK
3 = 16QAM
4 = 64QAM

Midamble shift: 1–16

Status: 0: inactive, 1: active
Can be used in a setting command to disable a channel temporarily.

Reserved 1: Always 0, reserved for additions

Reserved 2: Always 0, reserved for additions

Before using this command, you must set the name of the channel table using the `CONF:CDP:CTAB:NAME` command.

Example:
```
"INST:SEL BTDS"                  'Activate TD–SCDMA BTS
"CONF:CDP:CTAB:NAME 'NEW_TAB'" 'Select table to edit
```

```
"CONF:CDP:CTAB:DATA 2,4,1,1,1,1,0,0,
                    2,4,2,1,1,1,0,0"
                                    'Defines two data channels with QPSK
                                    'modulation
```

Characteristics: *RST value: –
SCPI: instrument–specific

SENSe subsystem

:[SENSe<1|2>:]CDPower:STANDart[:SELect] GPP | TSM

This command switches between the standard 3GPP and TSM. At the moment, this affects the spectrum emission mask measurement only.

Example:
```
"INST:SEL BTDS"   'Activate TD–SCDMA BTS meaning
                  'CDP relative on screen A and
                  'Result Summary active on screen B
"INIT:CONT OFF"   'Select single sweep
"CDP:STAN TSM"    'Set TSM mode
"INIT;*WAI"       'Start measurement with synchronization
```

Characteristics: *RST value: GPP
SCPI: device-specific

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

This command selects the phase reference to be used.
By default the R&S FS-K76 determines the phase reference for all downlink data slots from the downlink pilot channel (DwPCH). For e.g. beamforming or repeater measurements it might be necessary to apply different phase offsets to each time slot. Using the DwPCH as phase reference leads to rotated constellation diagrams and bad EVM values in these time slots.

By activating the setting ‘SYNC TO SLOT’ the R&S FS-K76 determines the phase reference within the selected slot. Thus the data slots can be phase rotated to each other without degrading the EVM results. The actual part of the selected slot used as phase reference is determined by the SENS:CDP:STS:MODE command.

Parameter: ON: Uses the selected slot as phase reference.
OFF: Uses the downlink pilot channel (DwPCH) as phase reference.

Example:
```
"SENS:CDP:STSL ON"          'use selected slot as phase reference
```

Characteristics: *RST value: OFF
SCPI: instrument–specific

:[SENSe<1|2>:]CDPower:STSLot:MODE CODE | MA

This command selects the slot synchronization mode. It is effective only if SYNC TO SLOT is activated.

If CODE is selected, the phase reference is determined by a multi-stage algorithm involving code channels and midambles. At least one code channel within the selected slot must be QPSK or 8PSK modulated.

If MA is selected, the phase reference is determined by the midamble area of the selected slot. Hence there is no requirement about the code channel modulation.

Parameter: CODE: Uses code channels and midamble of the selected slot as phase reference
MA: Uses the midamble of the selected slot as phase reference.

Example: "SENS:CDP:STSL:MODE MA" ' use midamble in selected slot as
' phase reference

Characteristics: *RST value: CODE
SCPI: instrument–specific

:[SENSe<1|2>:]CDPower:STSLot:ROTate ON | OFF

By default the R&S FS-K76 determines one phase reference for all midambles and code channels of a data slot. If ROTATE CODE TO MA is selected (SENS:CDP:STSL:ROT ON), phase rotations between the code channels are allowed. Each code channel gets its own phase reference from the associated midamble according to section AA.2 of the standard document 3GPP TS 25.221. If the associated midamble is missing, the common phase reference is used for this code channel.

Parameter: ON: Phase rotations between the code channels allowed
OFF: Phase rotations not allowed

Example: "SENS:CDP:STSL:ROT ON"

Characteristics: *RST value: OFF
SCPI: device-specific

:[SENSe<1|2>:]CDPower:MMAX QPSK | PSK8 | QAM16 | QAM64

This command defines the highest modulation to be considered in the automatic channel search. In low SNR environments it may be necessary to limit the channel search to lower modulations than 64QAM.

Parameter: QPSK: Consider QPSK modulation only
PSK8: Consider QPSK and 8PSK modulation.
QAM16: Consider QPSK, 8PSK and 16QAM modulation
QAM64: Consider QPSK, 8PSK, 16QAM and 64QAM modulation

Example: "SENS:CDP:MMAX PSK8" ' assume QPSK and 8PSK modulations
' only for the automatic channel search

Characteristics: *RST value: QAM64
SCPI: instrument–specific

TRACe subsystem

:TRACe[:DATA] TRACE1 | TRACE2

CHANNEL TABLE (TRACE1)

The following is output for each channel:
Channel type The channel type is coded by numbers as follows:
0 = inactive
1 = midamble
2 = DPCH
3 = P–CCPCH
4 = S–CCPCH
5 = FPACH
6 = PDSCH
7 = PICH

Code class	Code class of channel, values between 0 and 4
Code number	Code number of channel, values between 1 and 16
Modulation type	Modulation type of channel 0 = invalid (for midamble) 1 = QPSK 2 = 8PSK 3 = 16QAM 4 = 64QAM
Absolute level	In dBm
Relative level	In dB
Midamble shift	Values between 1 and 16
ΔMidD1	Power offset between sum power of channels (belonging to midamble(k), only data field 1) and midamble(k) Power
ΔMidD2	Power offset between sum power of channels (belonging to midamble(k), only data field 2) and midamble(k) Power
reserved 1	Reserved for additions
reserved 2	Reserved for additions

The class specifies the spreading factor of the channel
Class 4 is the highest spreading factor (16, data rate 17.6 kbps for QPSK, data rate 26.4 kbps for 8PSK), class 0 is the lowest spreading factor (1, data rate 281.6 kbps for QPSK, data rate 422.4 kbps for 8PSK).

Thus 11 values are transferred for all channels:
<Channel type>, <Code class>, <Code number>, <Modulation type>, <Absolute level in dBm>, <Relative level in dB>, <Midamble shift>, <ΔMidD1>, <ΔMidD2>, <Reserved 1>, <Reserved 2>

In code sorting (CONF:CDP:CTAB:ORD CODE), first all midambles are output, then the control channels, and finally the data channels in ascending order of code number.

In midamble sorting (CONF:CDP:CTAB:ORD MID), first the midamble is output and then its control and data channels.

Example:

The example shows the results of the poll for three channels in common midamble allocation with the following configuration:

```
Midamble m(3)       -3.0 dBm
DPCH   1.16         QPSK        -7.78 dBm
DPCH   2.8          QPSK        -7.78 dBm
DPCH   3.4          8PSK        -7.78 dBm

"INST:SEL BTDS"     'Activate TD–SCDMA BTS meaning
                    'CDP relative on screen A and
                    'Result Summary active on screen B
"INIT:CONT OFF"     'Select single sweep
"CALC2:FEED 'XTIM:CDP:ERR:CTAB'"
                    'Channel table evaluation
"INIT;*WAI"         'Start measurement with synchronization
"TRAC? TRACE1"      'Read out channel table
1, 0, 0, 0, -3.0, 0, 3, 0.005, 0.005, 0, 0
2 , 4, 1, 1, -7.78, -4.78, 3, 0, 0, 0, 0
2 , 3, 2, 1, -7.78, -4.78, 3, 0, 0, 0, 0
2 , 2, 3, 2, -7.78, -4.78, 3, 0, 0, 0, 0
0 , 4, 2, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 5, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 6, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 7, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 8, 1, -46.9, -43.9, 3, 0, 0, 0, 0
```

```
0 , 4, 13, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 14, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 15, 1, -46.9, -43.9, 3, 0, 0, 0, 0
0 , 4, 16, 1, -46.9, -43.9, 3, 0, 0, 0, 0
```

Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

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