



**ROHDE & SCHWARZ**

Test and Measurement  
Division

## **Release Notes**

# **TD-SCDMA Base Station Test Application Firmware R&S FS-K76**

## **Release 4.30**

for R&S FSP, FSU, FSQ, FSG, FSMR, FSUP  
Analyzer Firmware 4.3x

### **New Features:**

- Selectable Phase Reference (softkey SYNC TO SLOT) for repeater measurements.
- New Softkey RF INPUT AC / DC.
- New Ref Value Y Axis / Reference Level coupling simplifies grid scaling configuration for Code Domain measurements.

**Release Note Revision: 1**

Printed in the Federal  
Republic of Germany

# Contents

<b>History .....</b>	<b>3</b>
<b>General Topics .....</b>	<b>3</b>
Compatibility of R&S FS-K76 TD-SCDMA BTS Application Firmware .....	3
Firmware Update of R&S FS-K76 TD-SCDMA BTS Application Firmware.....	4
Enabling the Application Firmware via License Key Code Entry .....	4
<b>New Functions in version 4.30 .....</b>	<b>5</b>
<b>Modified Functions.....</b>	<b>5</b>
<b>Problems Eliminated .....</b>	<b>7</b>
<b>Known Problems with R&amp;S FS-K76 .....</b>	<b>7</b>
<b>Modifications to the Operating Manual and Supplements .....</b>	<b>7</b>
<b>Modified Chapters .....</b>	<b>8</b>
Menu MEAS – POWER VS TIME .....	8
Menu CHAN CONF .....	8
Menu SETTINGS - NEXT .....	8
Menu MEAS – SPECTRUM EM MASK.....	9
Menu MEAS – MULT CARR ACLR .....	10
Menu MEAS - ACLR.....	13
Menu TRACE.....	13
<b>Remote Control Commands.....</b>	<b>14</b>
<b>Appendix: Contact to our hotline.....</b>	<b>14</b>

## History

Date	Rel Note Rev	Changes
08 April 2008	1	First revision for R&S FS-K76 Firmware 4.30.

## 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
4.30	4.30	4.31	4.35	-	-	4.39
4.20	4.20	4.21	4.25	-	-	4.29
4.10	4.10	4.11	4.15	-	4.17	.-
4.00	4.00	4.01	4.05	-	-	-
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 and the application firmware package is installed prior to entering the license key code.**

## New Functions in version 4.30

- **Softkey RF INPUT AC / DC is now available for the application.**

Note: AC /DC coupling is not provided by all instrument models.

- **New Ref Value Y Axis / Reference Level coupling simplifies grid scaling configuration for Code Domain measurements.**

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 10dB 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.

- **Selectable Phase Reference (softkey SYNC TO SLOT) for repeater measurements.**

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 new setting 'SYNC TO SLOT' the R&S FS-K76 determines the phase reference from the midamble of the selected slot. Thus the data slots can be phase rotated to each other without degrading the EVM results. The selected slot must contain at least one data channel with sufficient power for successful synchronization.

## 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 measurements.**

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.**

## Problems Eliminated

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

**1. [V4.20] A Reference Level Offset  $\neq$  0 dB is not taken into account when the dialog REF VALUE X AXIS is opened.**

A wrong REF VALUE X AXIS is displayed after changing the reference level offset. The problem is only visible on the input dialo. The grid scaling settings are correct. When a new value is entered the reference level is correctly taken into account.

**2. [V4.20] ACLR / MULTI CARR ACLR Measurement: A few softkeys are not visible but described in the manual.**

Following softkeys are not available:

ACLR measurement:

Menu ACLR: Softkey SWEEPTIME

MULTI CARR ACLR measurement:

Menu MULTI CARR ACLR: Softkey SWEEPTIME

Menu CP/ACP CONFIG: Softkey ACP REF SETTING

## Known Problems with R&S FS-K76

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

**1. [V4.30] Following restrictions currently exist for SYNC TO SLOT function.**

If SYNC TO SLOT is activated, the selected slot number must lie between 0 and 6. The capture length setting must exceed the selected slot number at least by 8.

## 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:

- 1300.7304.44-03 (German/English)

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

<http://www.rohde-schwarz.com>

## Modified Chapters

### Menu MEAS – POWER VS TIME

START  
MEAS

The softkey *START MEAS* starts a single sweep measurement.

IEC-Bus-command:  
INIT:CONT OFF;:INIT

HIGH  
DYNAMIC

The softkey *HIGH DYNAMIC* selects the high dynamic mode. The sweep mode is automatically set to single sweep.

IEC-Bus-command:  
:CONFigure:CDPower:BTS:PVTime:HDYNamic ON|OFF

### Menu CHAN CONF

HEADER  
VALUES

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

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

### 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 new setting 'SYNC TO SLOT' the R&S FS-K76 determines the phase reference from the midamble of the selected slot. Thus the data slots can be phase rotated to each other without degrading the EVM results. The selected slot must contain at least one data channel with sufficient power for successful synchronization.

The softkey *SYNC TO SLOT* changes the phase reference from DwPCH (OFF) to the midamble of the selected slot (ON).

IEC/IEEE-bus command:  
:SENSe:CDPower:STSLOT ON | OFF



## Menu MEAS – SPECTRUM EM MASK



The softkey *LIST EVALUATION* reconfigures the SEM output to a split screen. In the upper half the trace with the limit line is shown. In the lower half the peak value list is shown. For every range of the spectrum emission defined by the standard the peak value is listed. For every peak value the frequency, the absolute power, the relative power to the channel power and the delta limit to the limit line is shown. As long as the delta limit is negative, the peak value is below the limit line. A positive delta indicates a failed value. The results are then colored in red, and a star is indicated at the end of the row, for indicating the fail on a black and white printout.

If the list evaluation is active, the peak list function is not available.

**IEC/IEEE-bus command:**

```
:CALCulatel:PEAKsearch:AUTO ON | OFF
```

With this command the list evaluation which is by default for backwards compatibility reasons off can be turned on.

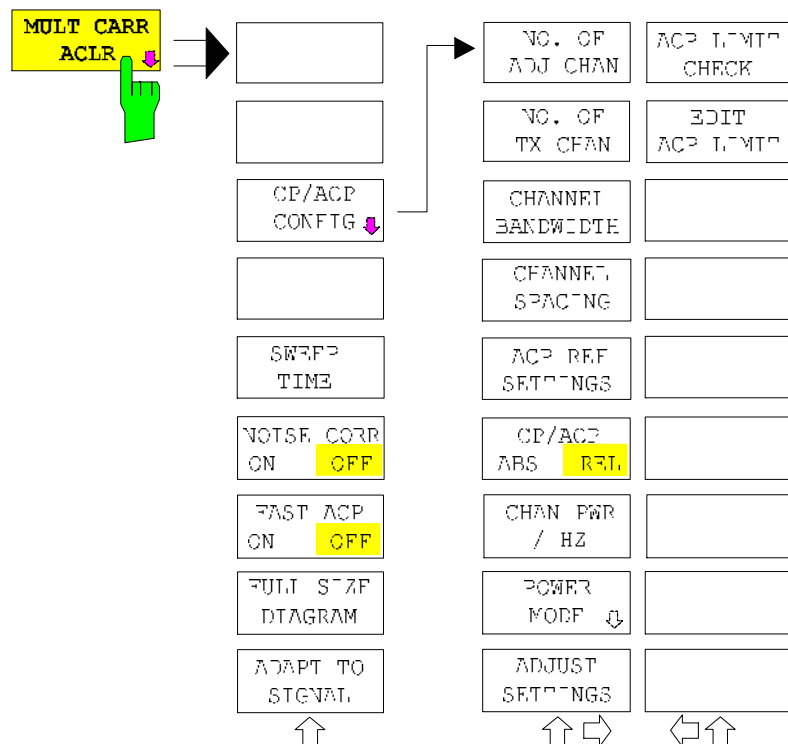
```
TRACel:DATA? LIST
```

With this command the list evaluation results are queried in the following order: <no>, <start>, <stop>, <rbw>, <freq>, <power abs>, <power rel>, <delta>, <limit check>, <unused1>, <unused2>

All results are float values.

no	: range number
start	: start frequency
stop	: stop frequency
rbw	: resolution bandwidth of range
freq	: frequency of peak
power abs	: absolut power in dBm of peak
power rel	: relative power in dBc (related to the channel power) of peak
delta	: distance to the limit line in dB (positive indicates value above the limit, fail)
limit check	: limit fail (pass = 0, fail =1)
unused1	: reserved (0.0)
unused2	: reserved (0.0)

## Menu MEAS – MULT CARR ACLR

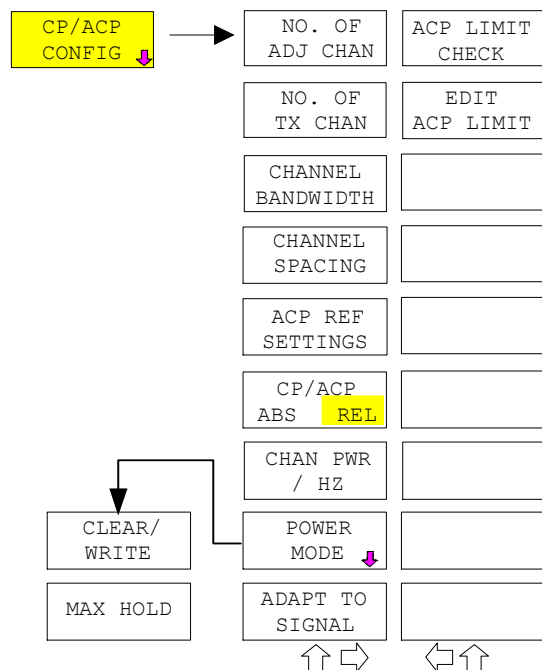


The **MULT CARR ACLR** (Multi Carrier Adjacent Channel Leakage Power Ratio) softkey enables measurement of the multi carrier adjacent channel power.

The analyzer measures the power of the 4 useful channels and of the adjacent channels on the left and right sides. In the default setting, only two adjacent channels are taken into account. Measurement results are displayed beneath the measurement screen.

The ACLR limit check can be enabled or disabled by means of the **ACLR LIMIT CHECK** softkey.

IEC/IEEE bus command: :CONFigure:CDPower:MEASurement MCAClr  
 Query of results: :CALCulate:MARKer:FUNctioN:POWer:RESult? MCACpower




The **CP/ACP CONFIG** softkey opens a submenu for configuration of the multi carrier adjacent channel power measurement.

The channel configuration includes the number of channels to be measured, the channel bandwidths (**CHANNEL BANDWIDTH**), and the channel spacings (**CHANNEL SPACING**).


Limit values can additionally be specified for the adjacent-channel power (**ACP LIMIT CHECK** and **EDIT ACP LIMITS**) which are checked for compliance during the measurement.

NO. OF  
ADJ CHAN



This softkey behaves as in the adjacent channel power measurement – ACLR. Refer there.

NO. OF  
TX CHAN




The *NO. OF TX CHAN* softkey enables the entry of the number of carrier signals to be considered.

Numbers from 1 to 12 can be entered.

IEC/IEEE–bus command: `SENS:POW:ACH:TXCH:COUN 4`


CHANNEL  
BANDWIDTH



The *CHANNEL BANDWIDTH* softkey opens a table for defining the channel bandwidths for the transmission channels and the adjacent channels.

IEC/IEEE–bus command: `POW:ACH:BWID:CHAN 1.28MHz`  
`POW:ACH:BWID:ACH 1.28MHz`  
`POW:ACH:BWID:ALT1..11 1.28MHz`

CHANNEL  
SPACING




The *CHANNEL SPACING* softkey opens a table for defining the channel spacings of the TX channel and the adjacent channels.

**Note:** *The channel spacing can be set separately by overwriting the table from top to bottom.*

IEC/IEEE–bus command: `SENS:POW:ACH:SPAC:CHAN 1.6MHz`  
`SENS:POW:ACH:SPAC:ACH 1.6MHz`  
`SENS:POW:ACH:SPAC:ALT1 1.6MHz`  
`SENS:POW:ACH:SPAC:ALT2 2.3MHz`

ACP REF  
SETTINGS



The *ACP REF SETTINGS* softkey opens a table for selecting the transmission channel to which the adjacent–channel relative power values should be referenced.

ACP REFERENCE CHANNEL
✓ TX CHANNEL 1
TX CHANNEL 2
TX CHANNEL 3
TX CHANNEL 4
TX CHANNEL 5
TX CHANNEL 6
TX CHANNEL 7
TX CHANNEL 8
TX CHANNEL 9
TX CHANNEL 10
TX CHANNEL 11
TX CHANNEL 12
MIN POWER TX CHANNEL
MAX POWER TX CHANNEL
LOWEST & HIGHEST CHANNEL

TX CHANNEL 1 – 12

Selection of one of channels 1 to 12.

MIN POWER  
TX CHANNEL

The transmission channel with the lowest power is used as a reference channel.

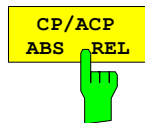
MAX POWER  
TX CHANNEL

The transmission channel with the highest power is used as a reference channel.

## LOWEST & HIGHEST CHANNEL

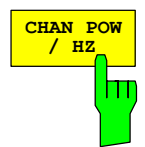
The outer left-hand transmission channel is the reference channel for the lower adjacent channels, the outer right-hand transmission channel that for the upper adjacent channels.

IEC/IEEE-bus command: `POW:ACH:REF:TXCH:MAN 1`  
`POW:ACH:REF:TXCH:AUTO MIN`  
`POW:ACH:REF:TXCH:AUTO MAX`  
`POW:ACH:REF:TXCH:AUTO LHIG`

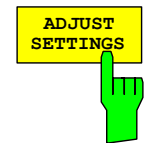


The *CP/ACP ABS/REL* softkey (channel power absolute/relative) switches between absolute and relative power measurement in the adjacent channels.

IEC/IEEE-bus command: `POW:ACH:MODE ABS`



This softkey behaves as in the adjacent channel power measurement – ACLR. Refer there.



The *ADJUST SETTINGS* softkey automatically optimizes the instrument settings for the selected power measurement (see below). All instrument settings relevant for a power measurement within a specific frequency range (channel bandwidth) are optimized for the selected channel configuration (channel bandwidth, channel spacing):

IEC/IEEE-bus command: `POW:ACH:PRES MCAC`



This softkey behaves as the *ACLR LIMIT CHECK* softkey in the adjacent channel power measurement – ACLR. Refer there.

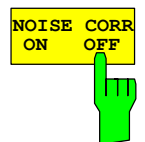


This softkey behaves as in the *EDIT ACLR LIMIT* softkey in the adjacent channel power measurement – ACLR. Refer there.

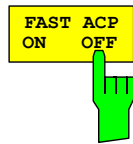


The function of the softkey is identical to the softkey *SWEEP TIME MANUAL* in the menu *BW*.

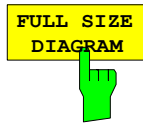
IEC/IEEE-bus command: `SWE:TIM <value>`



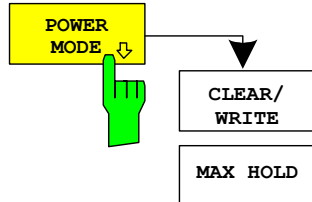
This softkey behaves as in the adjacent channel power measurement – ACLR. Refer there.



This softkey behaves as in the adjacent channel power measurement – ACLR. Refer there.



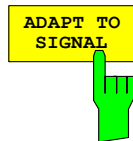
This softkey behaves as in the adjacent channel power measurement – ACLR. Refer there.



The *POWER MODE* sub menu allows to change between the normal (*CLEAR/WRITE*) and the max hold power mode. In the *CLEAR/WRITE* mode the channel power and the adjacent channel powers are calculated directly from the current trace. In *MAX HOLD* mode the power values are still derived from the current trace, but they are compared with a maximum algorithm to the previous power value. The greater value is remained.

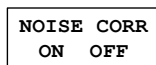
IEC/IEEE bus command:

```
:CALC:MARK:FUNC:POW:MODE WRIT|MAXH
```



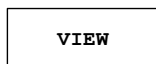
This softkey behaves as in the adjacent channel power measurement – ACLR. Refer there.

## Menu MEAS - ACLR



The softkey *NOISE CORR* is since firmware version 3.90 also available in IF or RF power trigger mode.

## Menu TRACE



The softkey *VIEW* freezes the trace.

IEC-Bus-command:

```
:DISP:WIND:TRAC:MODE VIEW
```

## Remote Control Commands

**:[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 new setting 'SYNC TO SLOT' the R&S FS-K76 determines the phase reference from the midamble of the selected slot. Thus the data slots can be phase rotated to each other without degrading the EVM results. The selected slot must contain at least one data channel with sufficient power for successful synchronization.

**Parameter:** ON: Selects the midamble of the selected slot as phase reference.  
OFF: Selects the downlink pilot channel (DwPCH) as phase reference.

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

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

## Appendix: Contact to our hotline

Any questions or ideas concerning the instrument are welcome by our hotline:

### USA & Canada

Monday to Friday (except US public holidays)  
8:00 AM – 8:00 PM Eastern Standard Time (EST)  
Tel. from USA 888-test-rsa (888-837-8772) (opt 2)  
From outside USA +1 410 910 7800 (opt 2)  
Fax +1 410 910 7801  
E-mail [Customer.Support@rsa.rohde-schwarz.com](mailto:Customer.Support@rsa.rohde-schwarz.com)

### East Asia

Monday to Friday (except Singaporean public holidays)  
8:30 AM – 6:00 PM Singapore Time (SGT)  
Tel. +65 6 513 0488  
Fax +65 6 846 1090  
E-mail [Customersupport.asia@rohde-schwarz.com](mailto:Customersupport.asia@rohde-schwarz.com)

### Rest of the World

Monday to Friday (except German public holidays)  
08:00 – 17:00 Central European Time (CET)  
Tel. from Europe +49 (0) 180 512 42 42  
From outside Europe +49 89 4129 13776  
Fax +49 (0) 89 41 29 637 78  
E-mail [CustomerSupport@rohde-schwarz.com](mailto:CustomerSupport@rohde-schwarz.com)

