KURTH ELECTRONIC

Your *xDSL MULTITEST* guideline

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Introduction *xDSL MULTITEST*

KE3700 KE3550

- Wi-Fi antenna *(optional)*
- Ethernet 10/100/1000 Management, Ethernet 10/100/1000 Test port, USB 2
  *ISDN analogue interface, SFP port**
- Speaker (Telephony)
- Display connection status SHDSL
- Status LEDs
- Battery indicator
- Sunlight readable TFT colour display
- Connection: USB 1
  optional KECT interface
- ESC (back) button
- Menu-sensitive function keys F1 – F4
- Menu UP - DOWN / LEFT - RIGHT buttons
- Select (enter) button
- Shift button: Function keys F5 – F8
- View button: Back to main menu
- Speaker button: Speakerphone
- Vol button: Increase volume (3 levels)
- 💡 button: Increase brightness (3 levels)
- Help button: Open the help function
- ON / OFF button
- Microphone (Telephony)
- Alphanumeric keypad
- xDSL test port, power supply connection

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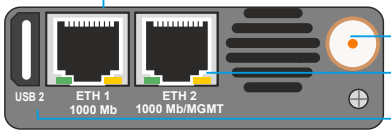
Interfaces DSL and Ethernet

Ethernet ports (device upper side)



1 GBit/s connection:
Ethernet tests 10/100/1000 MBit/s

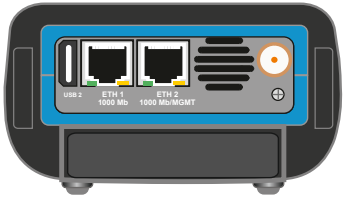
Wi-Fi antenna port

Device management connection:
10/100/1000 MBit/s

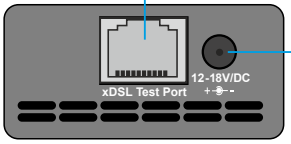
USB connection: Feature extensions
(e.g. external Keyboard, external Data storage ...)

Yellow LED link/data: Physical connection layer 1 active
Green LED: Send/Recieve activity

Device upper side



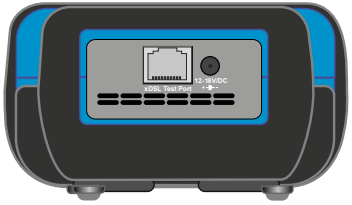
xDSL ports (device bottom)



xDSL test connections: RJ11 / RJ45

External power cable connection

Device bottom side



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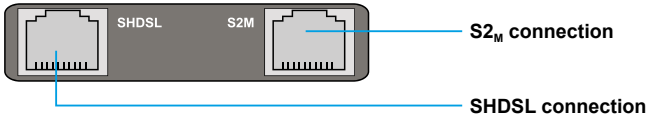
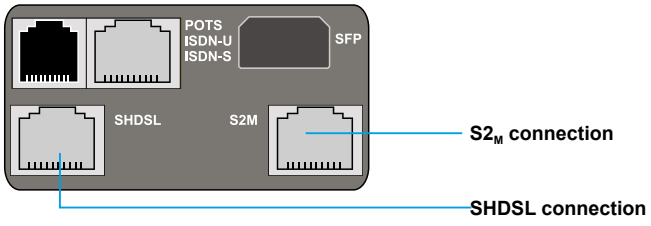
Interfaces SHDSL and $S2_M$ (KE3700 only)

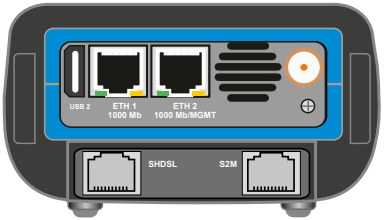
Device upper side



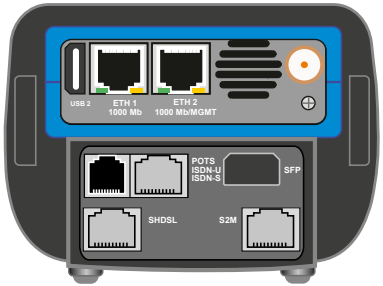
Alternate device upper side



Device upper side



Alternate device upper side



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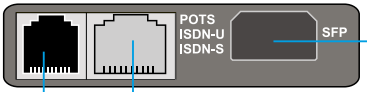
Interfaces ISDN/analogue and SFP port (SFP KE3700 only)

Device upper side

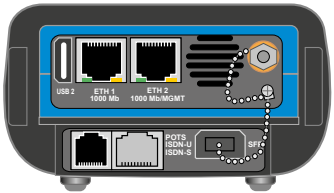


SFP module slot copper/fiber for GPON and ethernet measurements
Warning: Do not perform a software update with a slotted SFP module!

RJ45 – **S_0 connection**

RJ11 – **Analogue telephone connection (POTS)**
– **U_{K0} connection**

Device upper side



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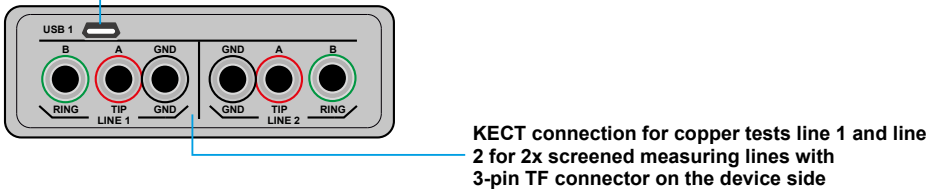
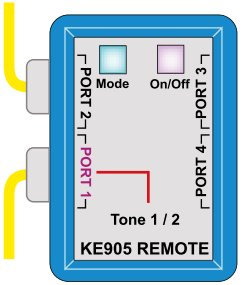
Interfaces for fully-fledged copper tests

Fully-fledged copper test module for qualification and fault detection on coax cables

Creation of automatic tests including control function for the KE905 loop test assistant

KECT copper test module / optional (right device side)





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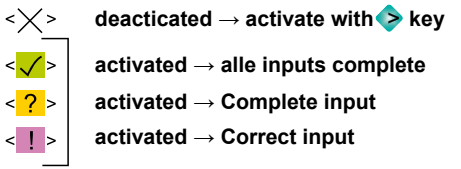
The innovative operating concept



< > **deacticated → activate with > key**

< ✓ > **activated → alle inputs complete → Test possible**

< ? > **activated → Complete input → Test possible**

< ! > **activated → Correct input → Test not possible**

Attention:
Red background = input / verification absolutely necessary!

The symbols and signal colours help with the configuration of the tests and furthermore indicate missing settings.

The tests are activated through the left/right keys on the device.

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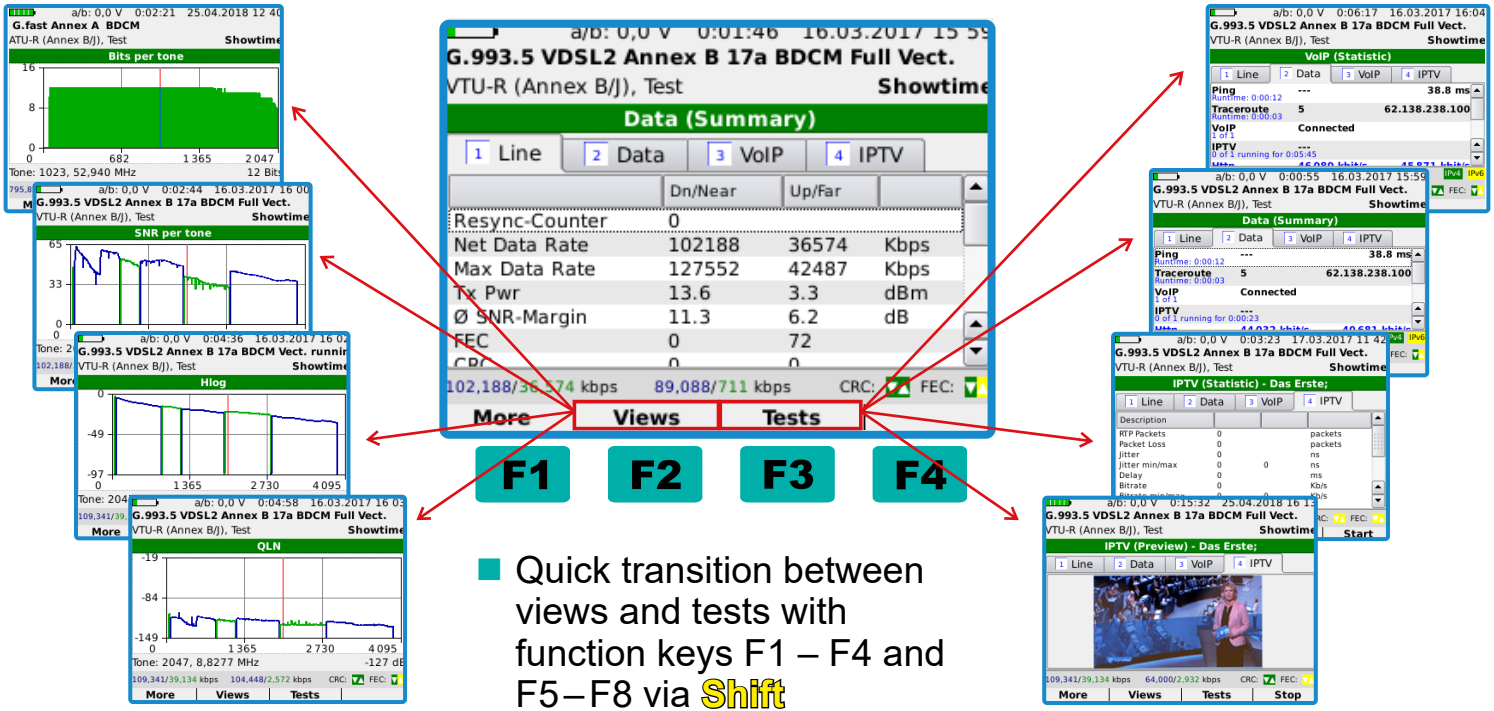
Multitasking and 1-click-operation



- Quick transition between views and tests with function keys F1 – F4 and F5–F8 via **Shift**

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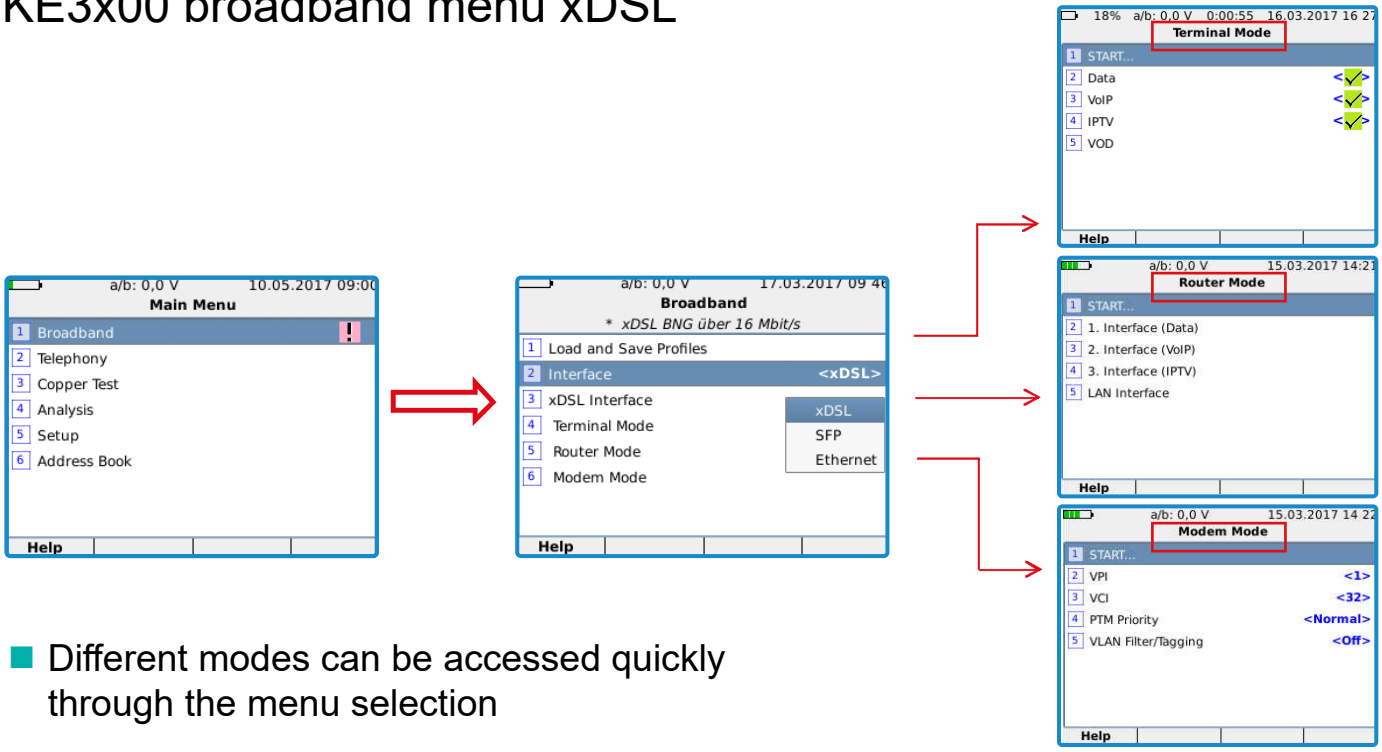
KE3x00 broadband menu xDSL



- Different modes can be accessed quickly through the menu selection

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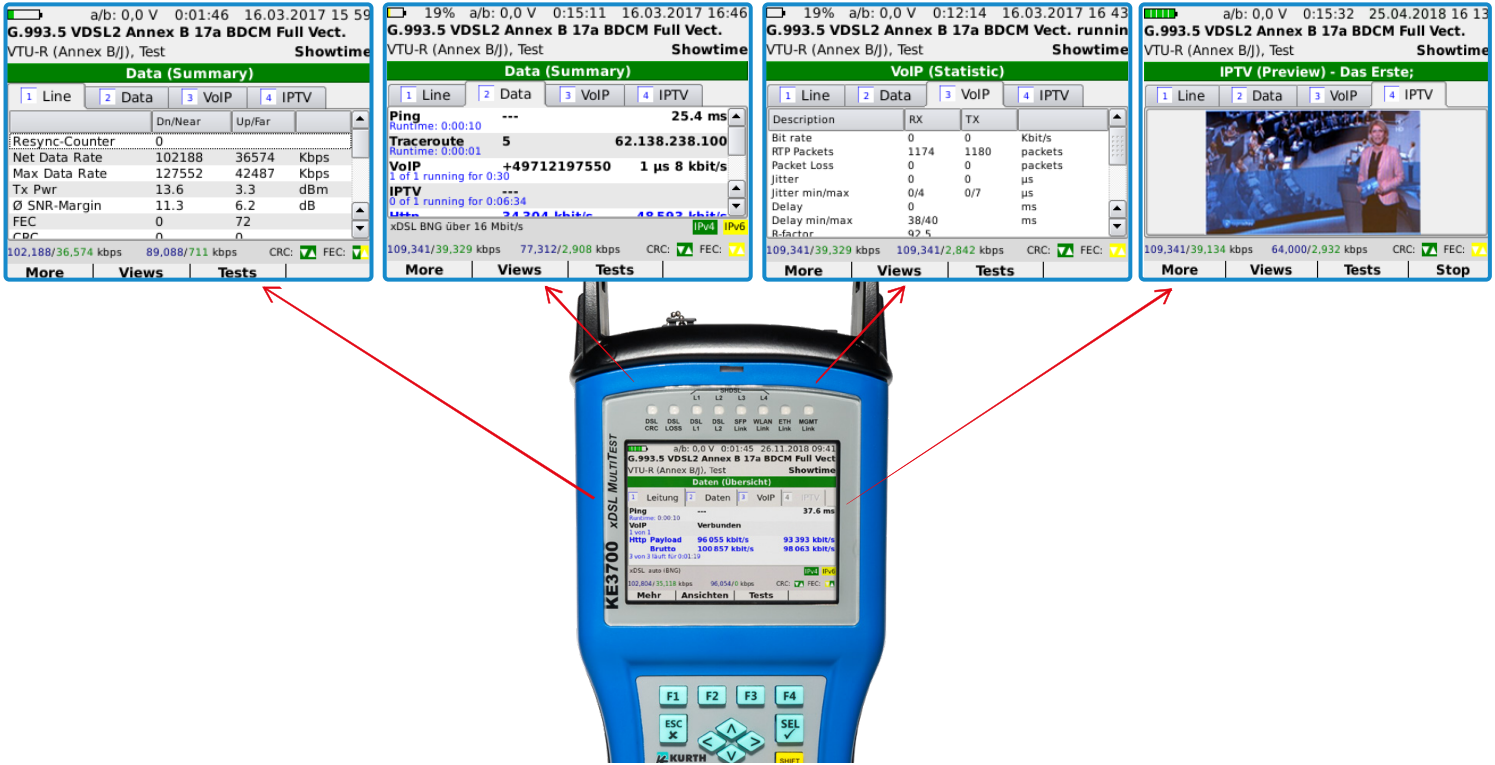
KE3x00 – xDSL measurements



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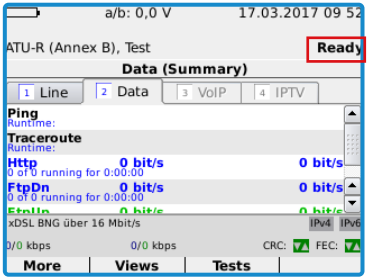
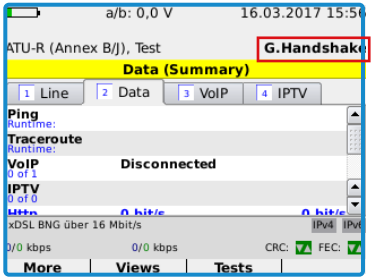
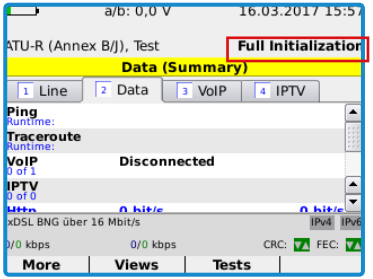
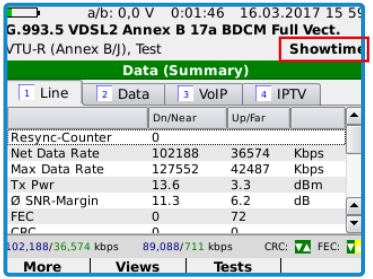
xDSL connection setup (autotest)

xDSL connection setup (autotest)









Ready – Tester is ready for a connection setup.

G.Handshake – G.hs signal from the DSLAM recieved at the far end.

Full Initialization – Information exchange and training phase.

Showtime – active connection/synchronization. The connection between the DSLAM and the test device has been successfully established.

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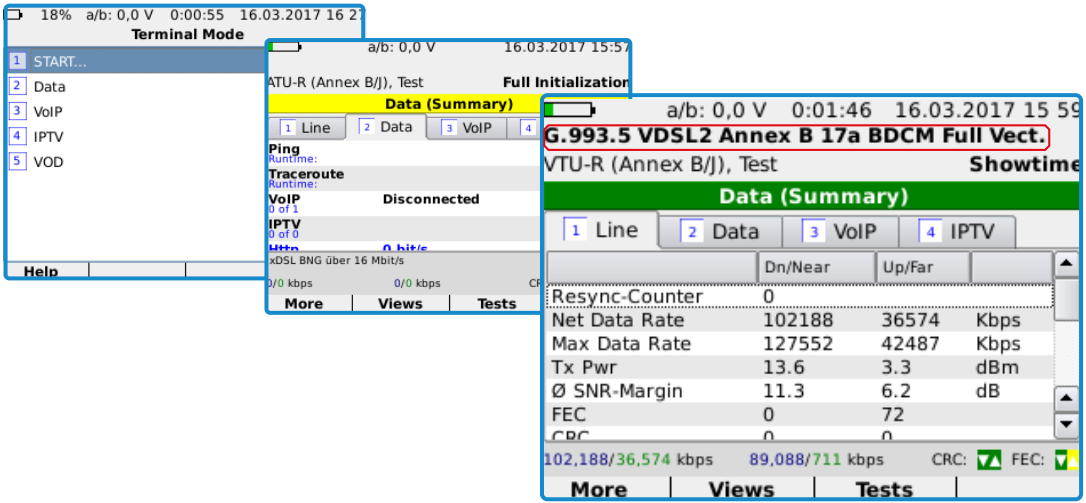
Autotest at customer connection

Autotest at customer connection

Initial test to detect the xDSL service (ADSL, VDSL and VDSL vectoring)

Turn on device → Broadband → Terminal Mode → Press START



Important info at a glance:

- DSL type and Annex/variant
- Bandplan/Profile
- External voltage
- Net data rate
- SNR margin
- FEC
- CRC

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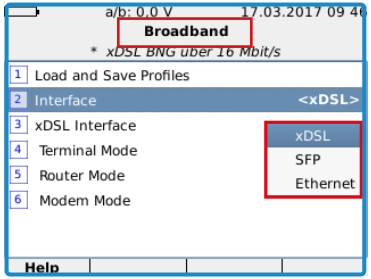
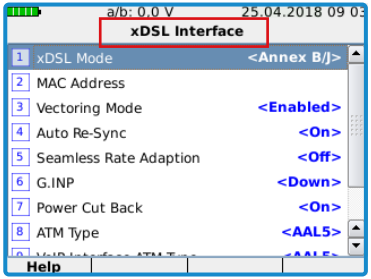
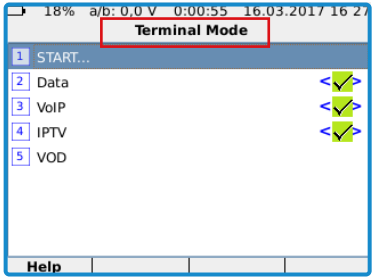
Configuration dial-in & data tests I (PPPoE)



The functions of the terminal mode (Data / VoIP / IPTV) are available via all broadband interfaces active in the unit.



If deviating from the presettings, the interface can be configured in this menu.



Terminal mode emulates PC, Smartphone, SIP telephone for VoIP or an IPTV set-top box including TV picture.

Dial-in configuration with input of the DSL access data of the connection holder or the TR069 settings, for automatic dial-in at BNG connections.

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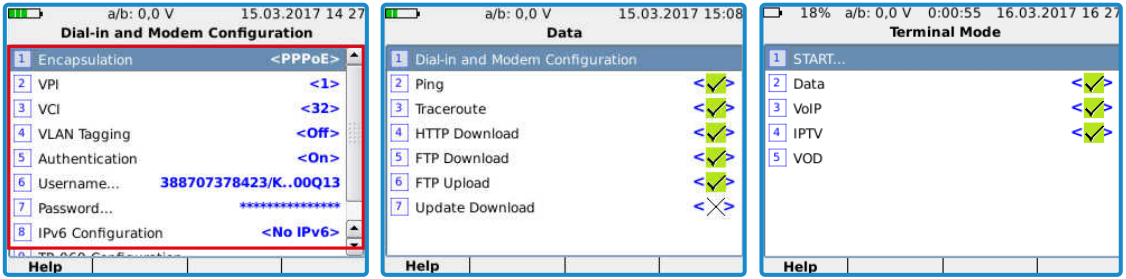
Configuration dial-in & data tests II (PPPoE) using the example of a telecom connection

Configuration dial-in & data tests II (PPPoE) telecom connection



PPPoE dial-up.
VPI: 1/VCI: 32.
VLAN tagging on, ID 7,
for the tests:
- Data
- VoIP
- IPTV

Example shows the execution of the data tests: Ping, FTP up- and download. Optionally, further tests can be configured and set.

After configuring and activating the tests, press „1“ or „Start“ to start measurement.

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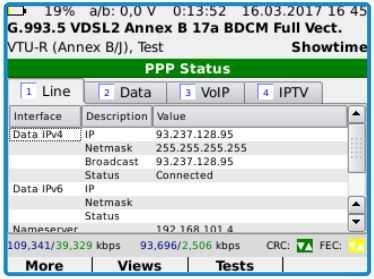
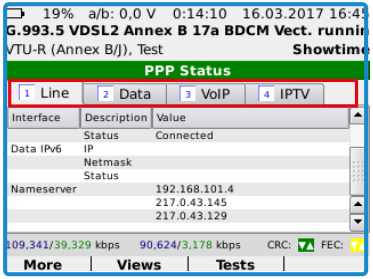
Evaluation dial-in & data tests I (PPPoE)

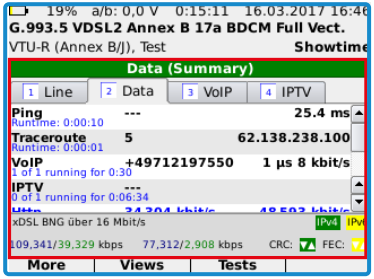
Evaluation dial-in & data tests I (PPPoE)



Overview of the status of the PPP connection (DSL). Clear display of whether the server connection was successful. In the example, a PPP connection that is still inactive.



Status shows active PPP connection. Switch between
1. DSL line values
2. Data tests (Data)
3. VoIP tests (VoIP)
4. IPTV tests (IPTV)
via the arrow keys </>.



Convenient overview page, summary of tests from
1. Data
2. VoIP
3. IPTV
Individual results can be viewed via F3 „Tests“.

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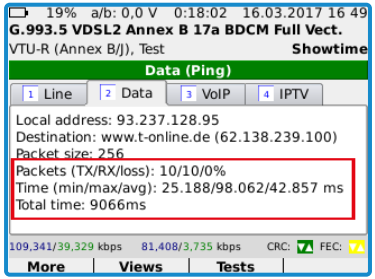
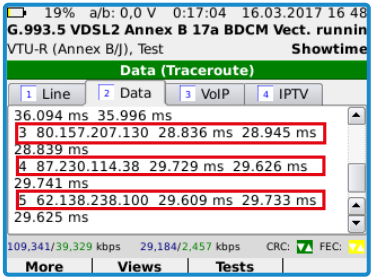
Evaluation dial-in & data tests II (PPPoE)

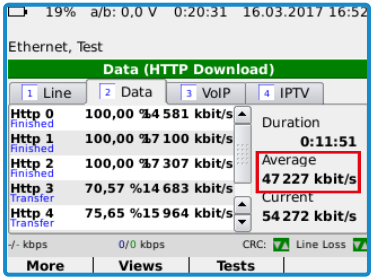
Evaluation dial-in & data tests II (PPPoE)



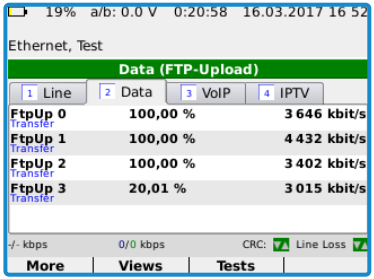
A visual display of the ping showing the transmitted packets, packet loss and transmission times



Traceroute displays the different routes to the destination server (destination host).
In the example:
www.t-online.de



Overview of running HTTP downloads.
In the example:
5 parallel downloads with an average rate of 47 Mbps.



Example of 100% uploaded FTP uploads with 3.4 to 4.4 Mbps upload speed.

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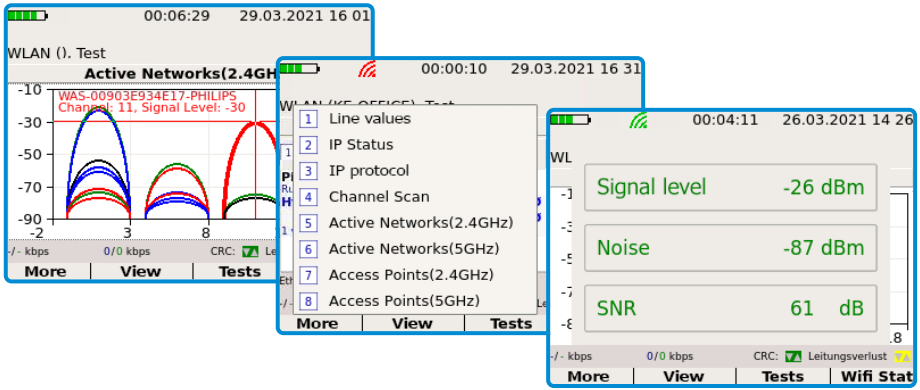
Wi-Fi function and quality test

Wi-Fi quick test

Initial test to detect the function and quality of the network
Broadband -> Wi-Fi -> select & join network -> enter test mode



Important information accessible directly via function key:

- Connection values
- Overview of active networks
- Channel assignment
- Signal power
- Noise
- Signal-to-noise ratio
- Wi-Fi monitor

- Functional testing and qualification of the network
- Automatic good/bad Evaluation of the parameters

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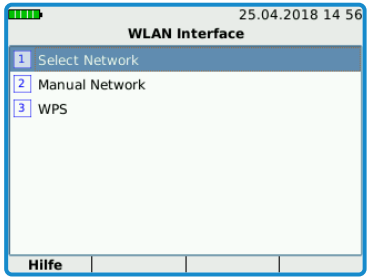
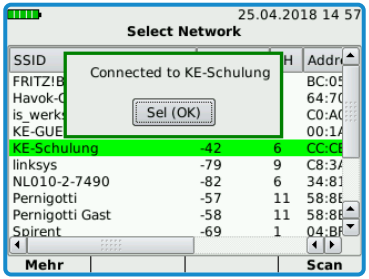
Configuration data tests I (Wi-Fi)

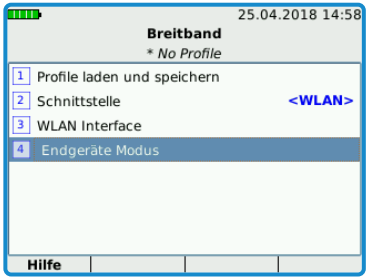
Activated Wi-Fi interface. The supplied WLAN USB adapter is plugged into the top of the device. Select Wi-Fi interface to join a wireless network.



Selection whether Wi-Fi scan (Select), manual configuration or WPS should be used.



Overview list of available wireless networks with channel, MAC address and signal strength. Joining via key input.



Then select terminal mode for configuring test: Configure and select
- Data
- VoIP
- IPTV tests.

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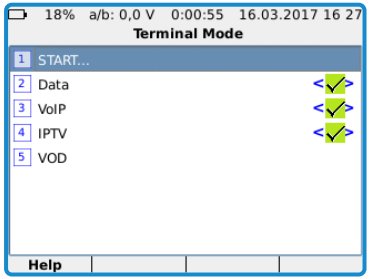
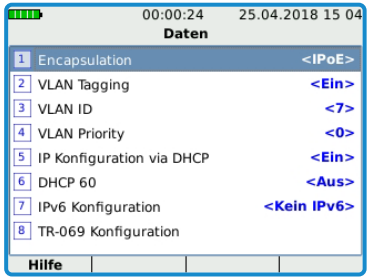
Configuration data tests II (Wi-Fi)

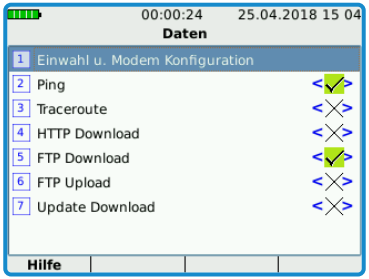
Configuration data tests II (Wi-Fi)



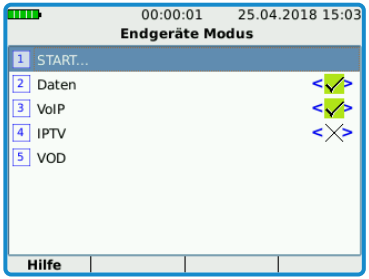
Data: Configuration menu for ping, traceroute, upload tests, download tests and settings of the general IP connection.



Adjust the configuration of the connection. In the example: IPoE connection VLAN (On / 7), obtaining the IP address via DHCP



In the example: Ping test activated and FTP download. Further tests can be configured / selected.



After configuring and activating the tests to start the measurement, select „1“ or „Start“.

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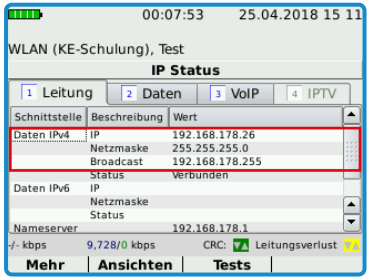
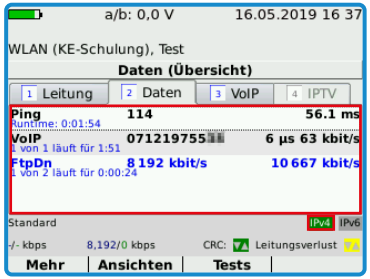
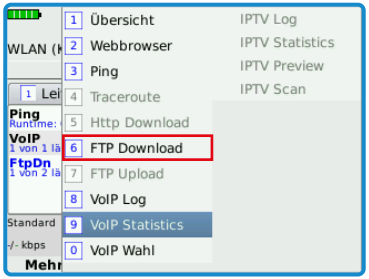
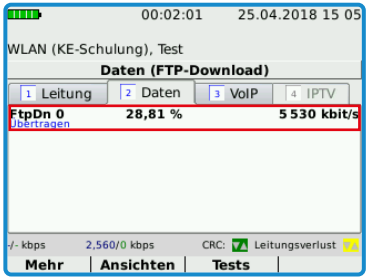
Evaluation in detail I (Wi-Fi)

Evaluation in detail I (Wi-Fi)









IP status (F2 key) reports „Connected“. The assigned IP address is displayed. In the example IPv4 with 192.168.178.26

Overview of ongoing data tests. In the example ping test, FTP download test and VoIP call to 071219755xx.

F3 shortcut key for a detailed view of active tests. Select FTP download.

FTP download detail page with display of the completed download in % (28.81) and the current download rate (5.5 Mbps).

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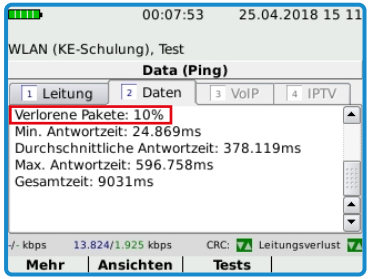
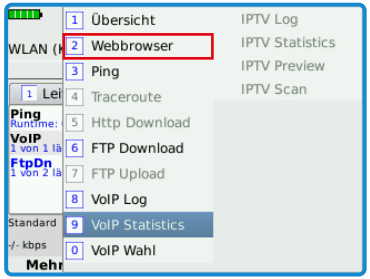
Evaluation in detail II (Wi-Fi)



Ping: Loss rate 0%, otherwise repeat test because of packet loss. Select an alternative destination for comparison.



F3 shortcut key for detailed viewing of the active tests.
Tests highlighted in black are selectable.

Example: Web browser for visual confirmation of successful Internet access or access to a landing page.

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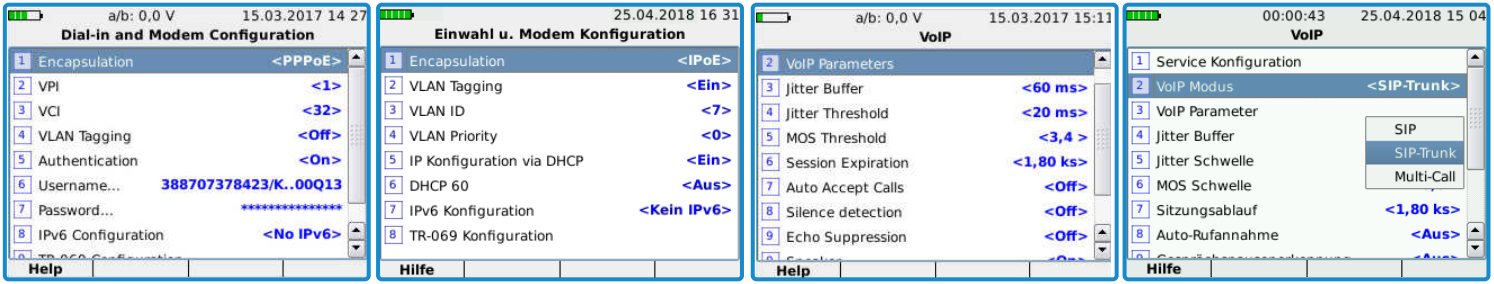
Configuration VoIP test I (PPPoE)



First, the virtual interface must be configured in the terminal mode under Data → Dial-in & Modem configuration. In the example DSL dial-up (PPPoE) + VoIP

Alternatively for Ethernet / SFP / WLAN: IPoE connection. Setting whether VLAN is active and how IP configuration is performed (DHCP or static)

Setting of threshold values for jitter and MOS as well as other general settings for the VoIP connection. Setting whether speech, signal tone or announcement.

SIP: Device administers a call number.
SIP trunk: Device manages trunk with up to 99 call numbers. Multi-Call: Up to 10 VoIP calls in parallel.

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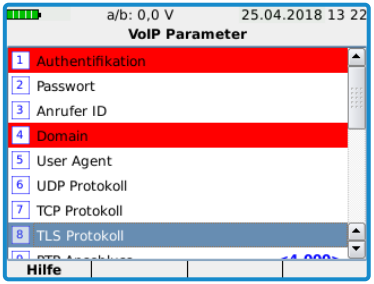
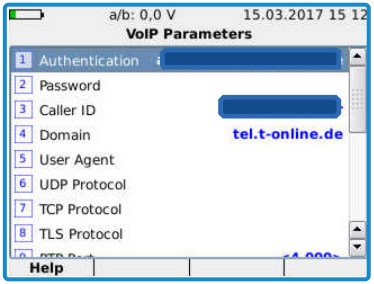
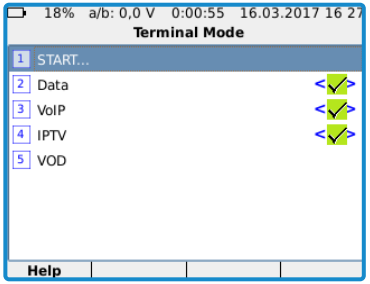
Configuration VoIP test II (PPPoE)



SIP default configuration
Enter the data for the connection to the SIP server.
Login
Password
Single phone number…



In addition to the domain and the registrar, protocol settings, codecs and settings for STUN and proxy servers as well as for QOS can be made.



After configuring and activating the tests, press „1“ or „Start“ to start measurement.

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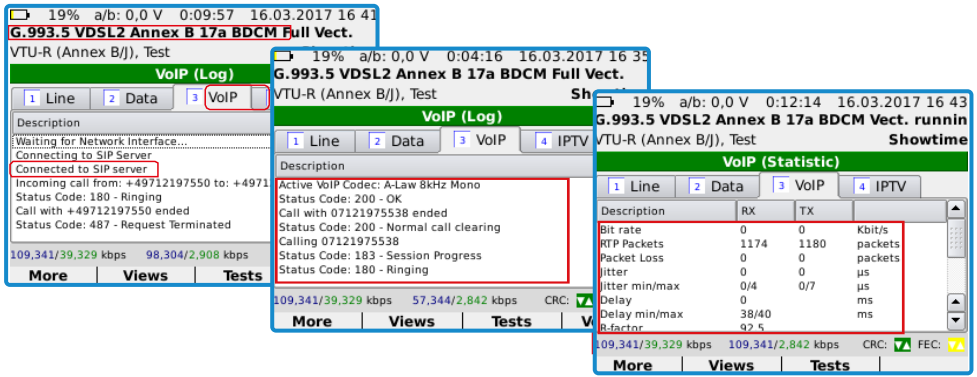
Evaluation VoIP test (PPPoE)

Evaluation VoIP test (PPPoE)

Example Customer connection with VoIP telephony: **Select terminal device mode → Configure VoIP customer recognition → Start test**



- Functional testing and qualification of the VoIP service
- Quality assessment based on the most important parameters

Important info at a glance:

- Registration at the SIP server
- RTP packet transfer
- Voice connection (acoustic)
- MOS value above limit
- R-factor value (as alternative to MOS)
- Delay time
- Packet loss rate

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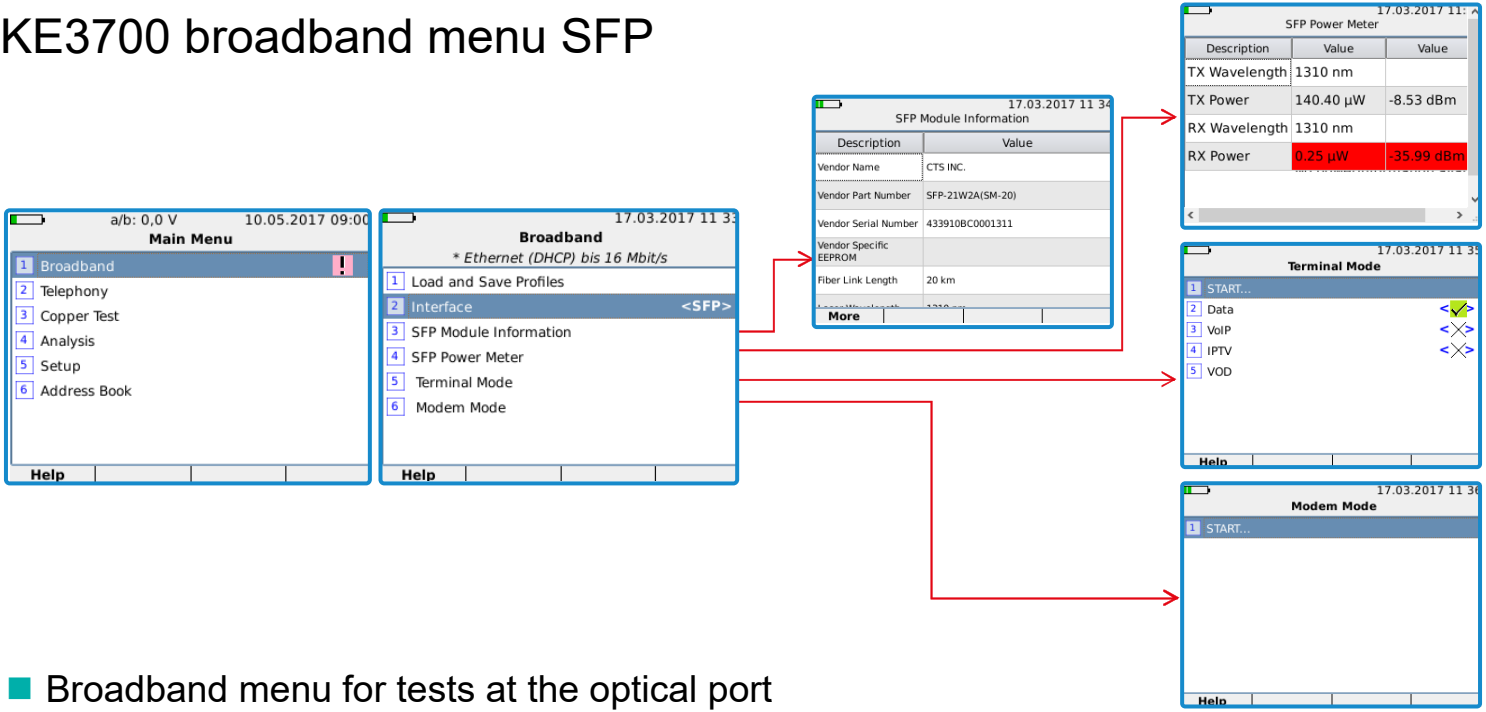
KE3700 broadband menu SFP



- Broadband menu for tests at the optical port
- SFP level measurement, terminal and modem mode (conv.)

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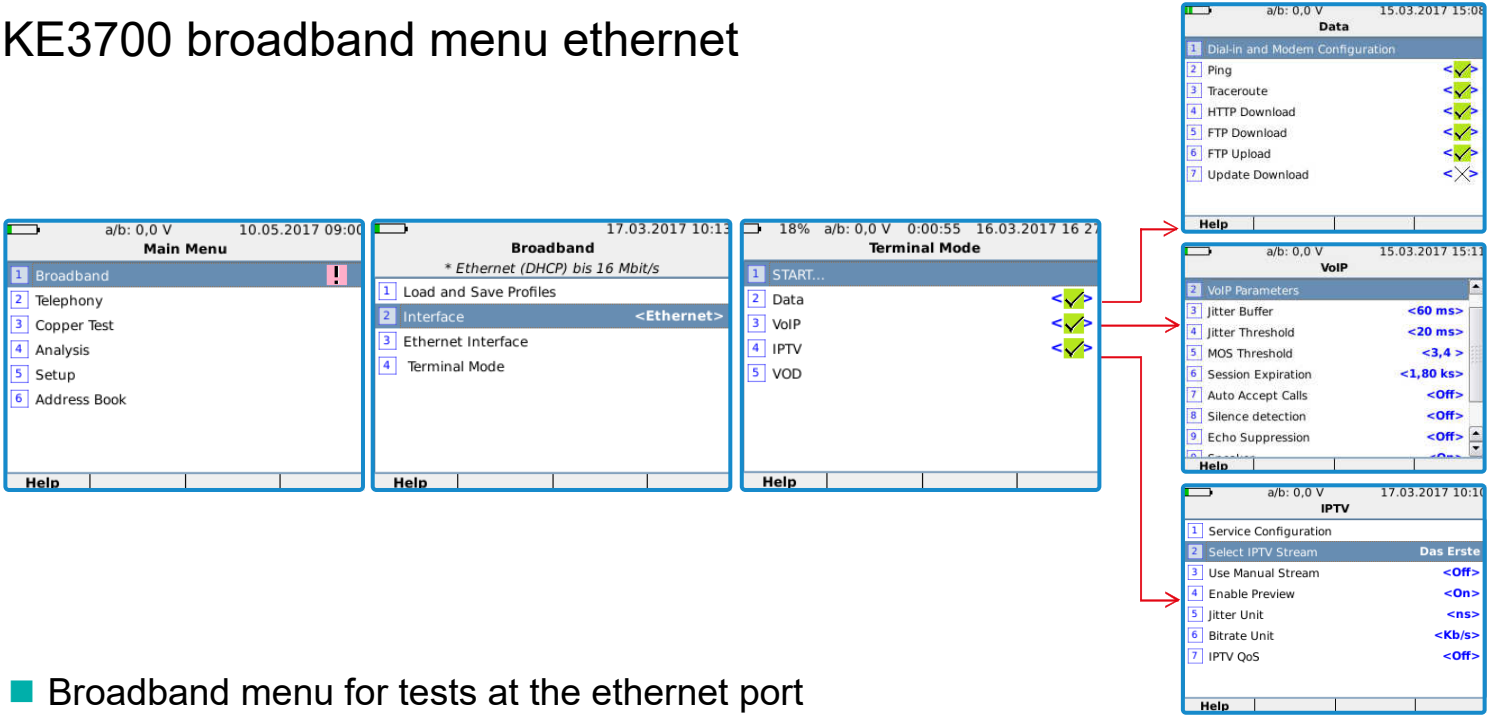
KE3700 broadband menu ethernet

KE3700 broadband menu ethernet



- Broadband menu for tests at the ethernet port
- Terminal mode for IP test data, VoIP and IPTV

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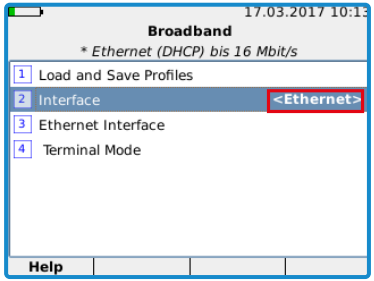
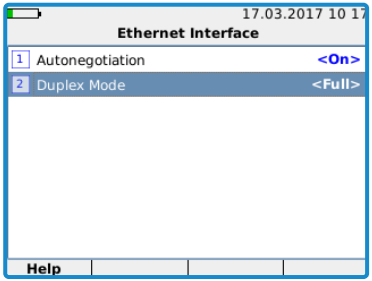
Configuration data tests I (Ethernet)

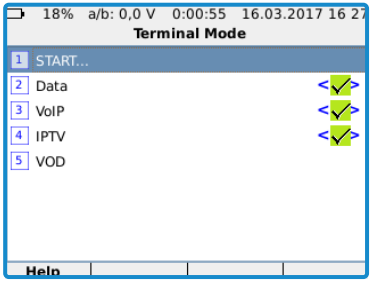
Configuration data tests I (Ethernet)



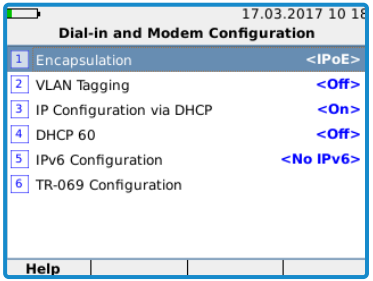
Activated ethernet interface. Subsequently, terminal mode is selected for the IP tests.



The default settings of the ethernet interface can usually be adopted.



Terminal mode emulates PC, Smart-phone, SIP telephone for VoIP or an IPTV set-top box including TV picture.



Dial-in configuration with input of the definition whether to use DHCP or fixed IP address range. VLAN setting possible.

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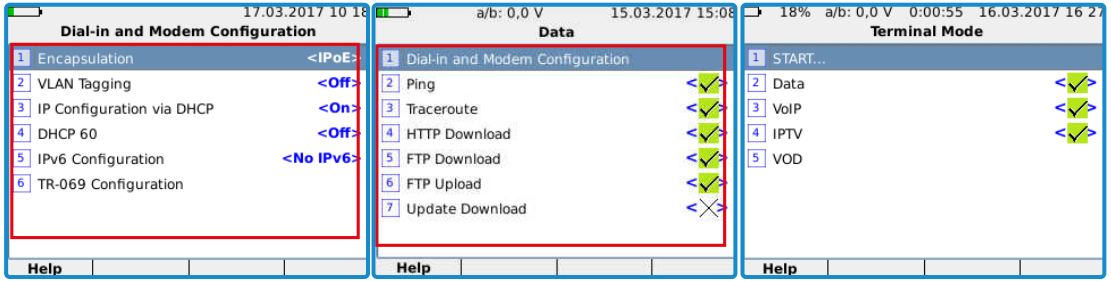
Configuration data tests II (Ethernet)



Example: Test directly behind a Telekom Speedport (router). LAN port of the KE3x00! IPoE connection, IP address via DHCP

Example shows the execution of all available tests. Recommendation: Ping test as well as FTP up- and download tests

After configuring and activating the tests, press „1“ or „Start“ to start measurement.

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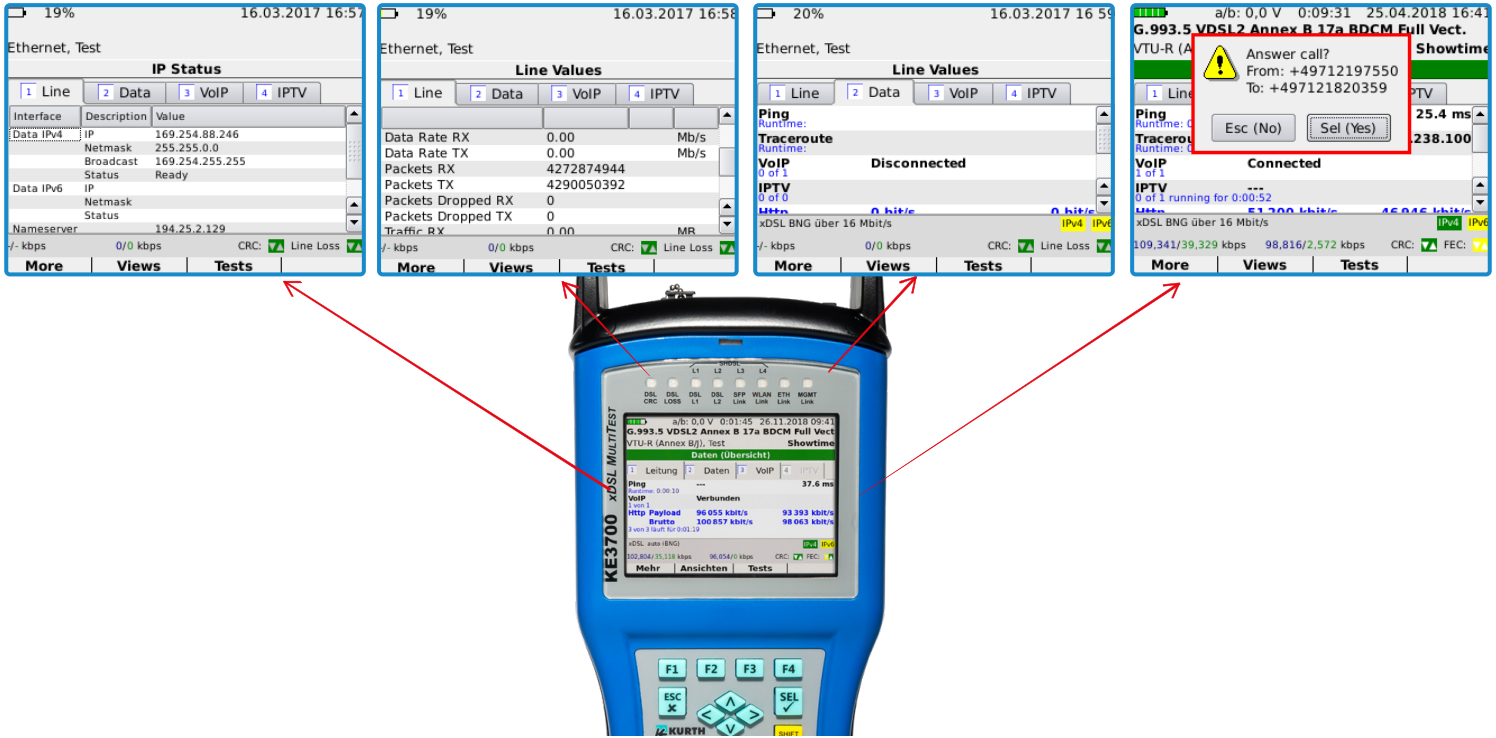
KE3x00 – ethernet tests



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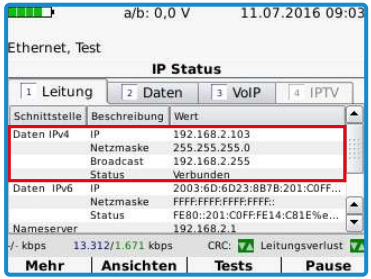
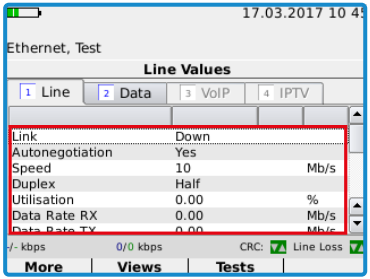
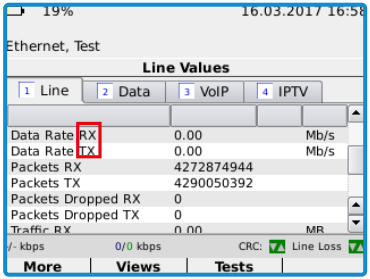
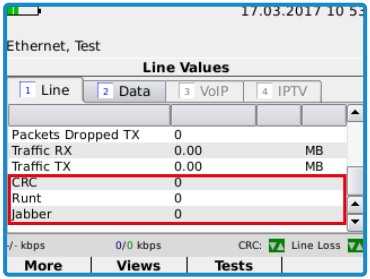
Evaluation Data tests I (Ethernet)

Evaluation Data tests I(Ethernet)









IP interface connected and with received IP address.
In the example IPv4 with 192.168.2.103.

Link Up (active), Gigabit Link. Tests are started, line values displayed. Display of Data rate, packets and data volume, etc.

Data rate details RX = recieved, TX = sent are displayed

Display of checksum errors CRC, run (smaller bytes than allowed) and Jabber (interrupt procedure for stations that are too long).

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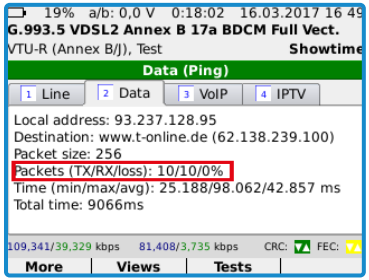
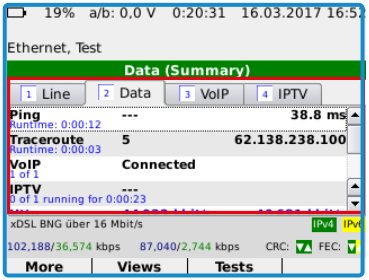
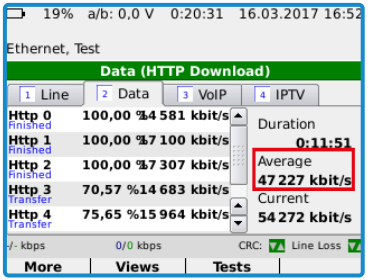
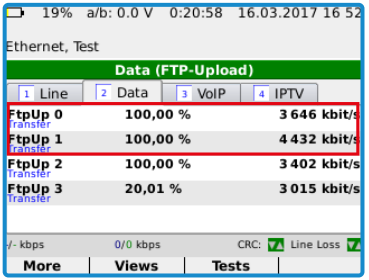
Evaluation Data tests II (Ethernet)









Estimated Ping times:
ADSL < 100 ms
VDSL < 30 ms
FTTH < 20 ms
Loss rate 0%, repeat the test otherwise!

Overview of ongoing data tests. In the example Ping test, traceroute test, one VoIP test and one IPTV test.

Overview of the current FTP downloads with an average download rate of approx. 47 Mbps.

View of 3 transmission that are already transferred to 100% and an upload of about 20% with an average of approx. 3 Mbps.

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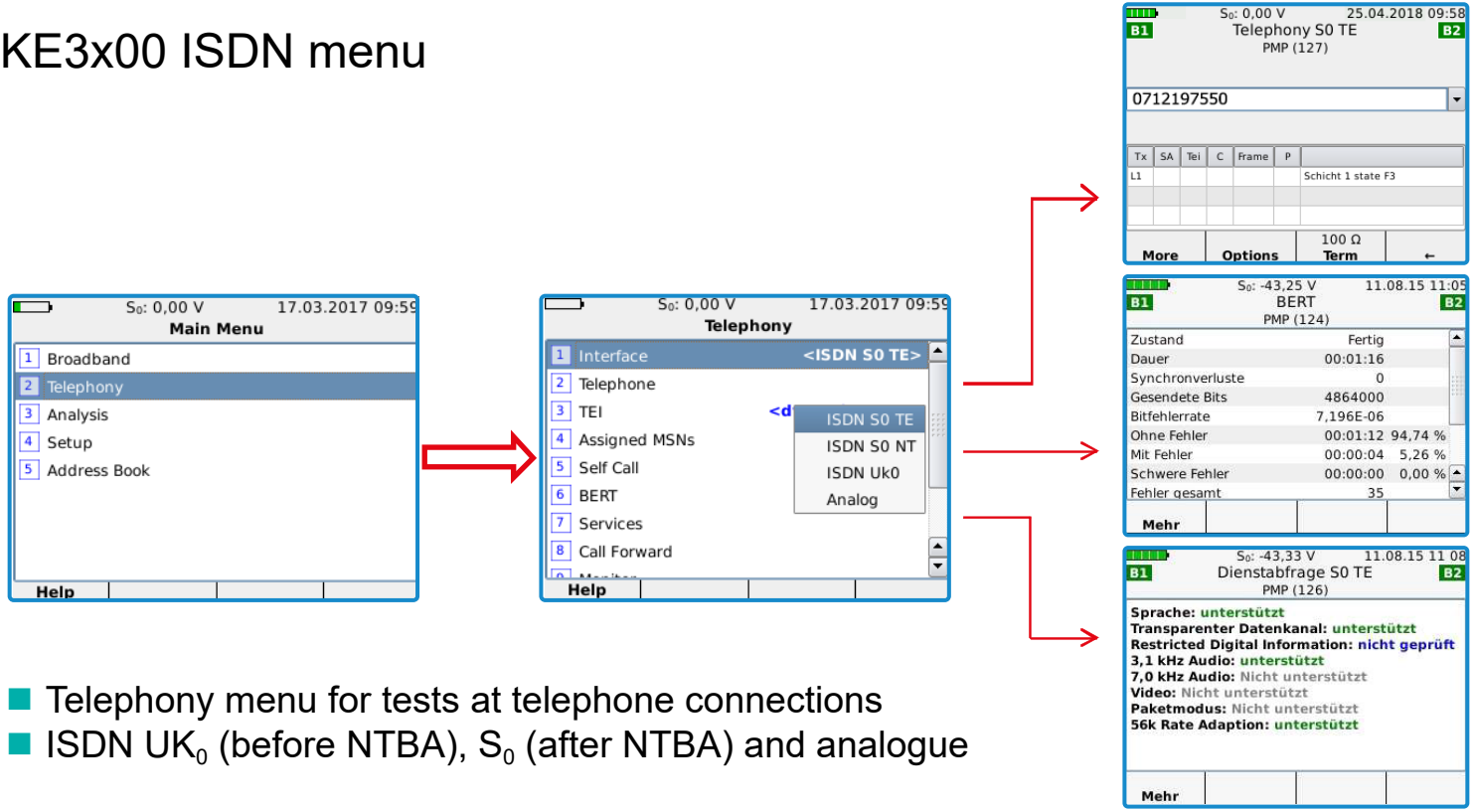
KE3x00 ISDN menu



- Telephony menu for tests at telephone connections
- ISDN UK_0 (before NTBA), S_0 (after NTBA) and analogue

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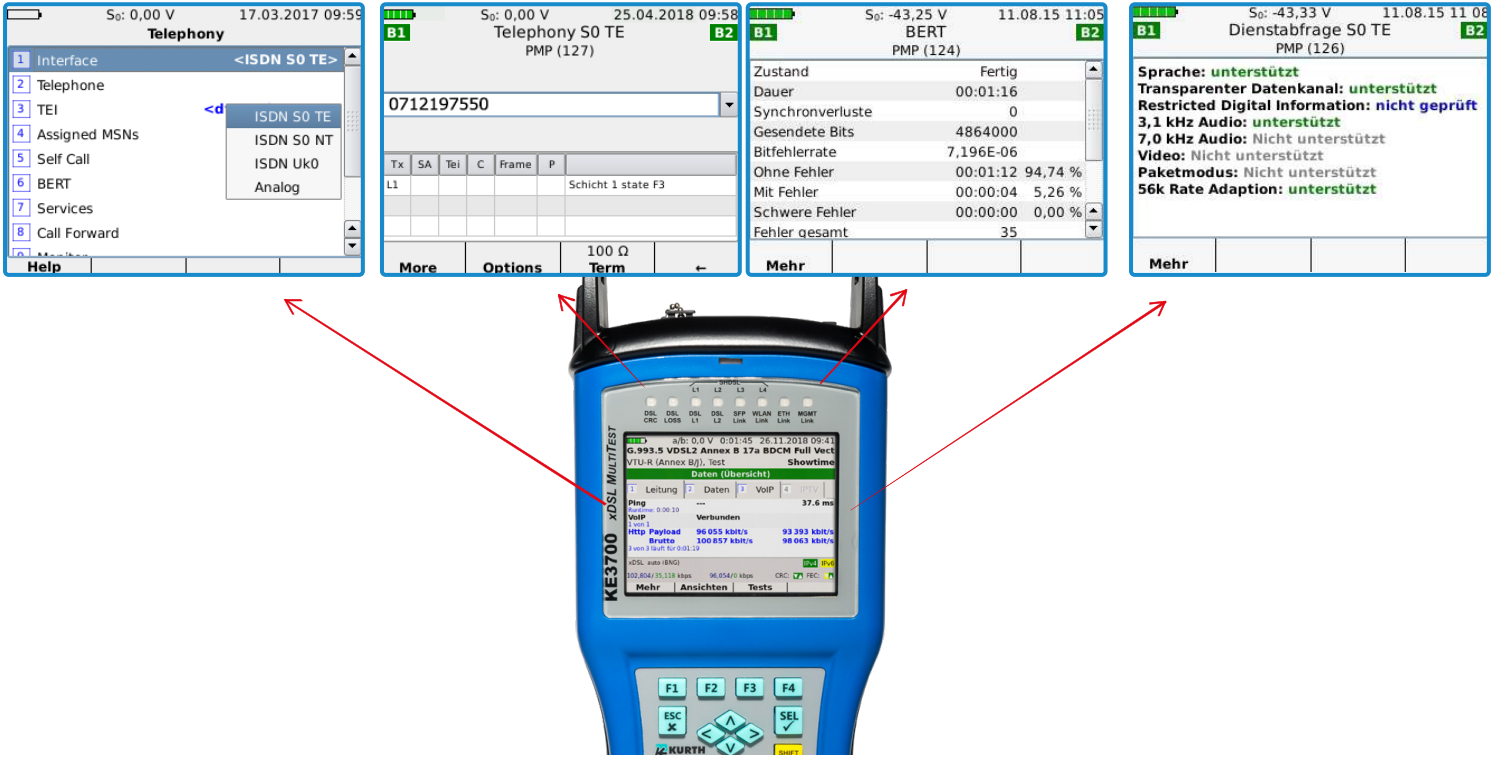
KE3x00 – ISDN/Analogue



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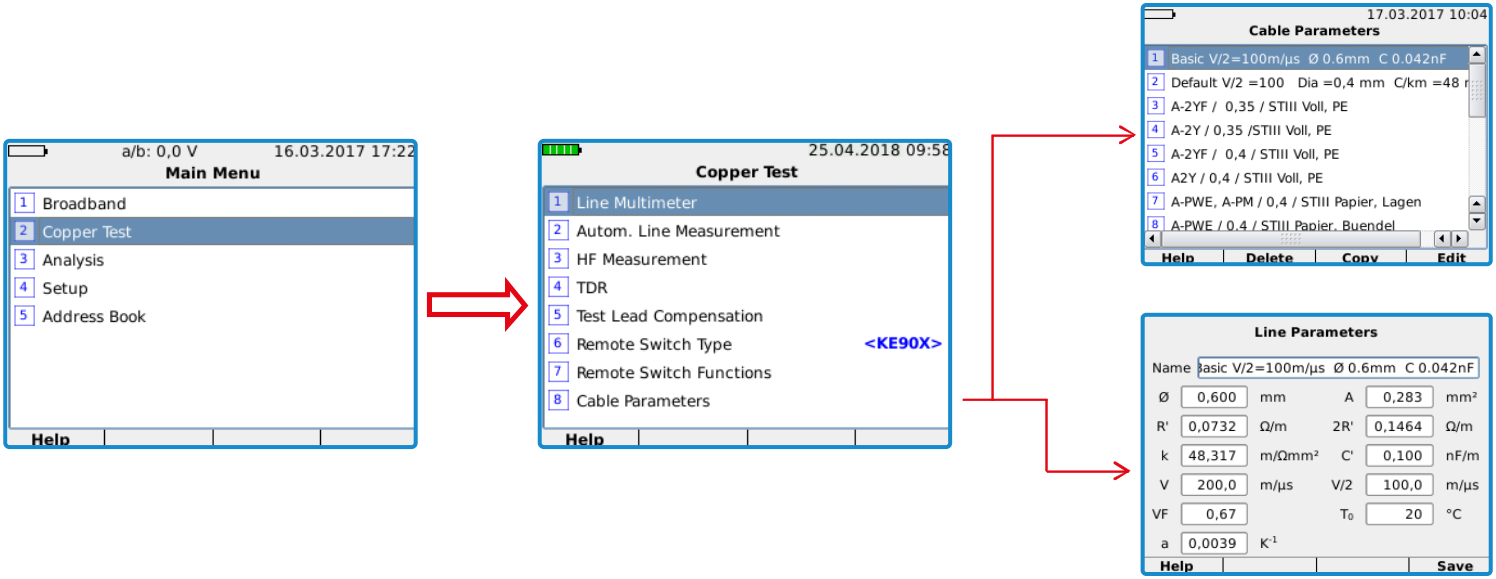
Coppertest menu cable parameters

Coppertest menu cable parameters



- Coppertest menu for cable measurement for suitability and errors
- Select cable parameters or edit them manually

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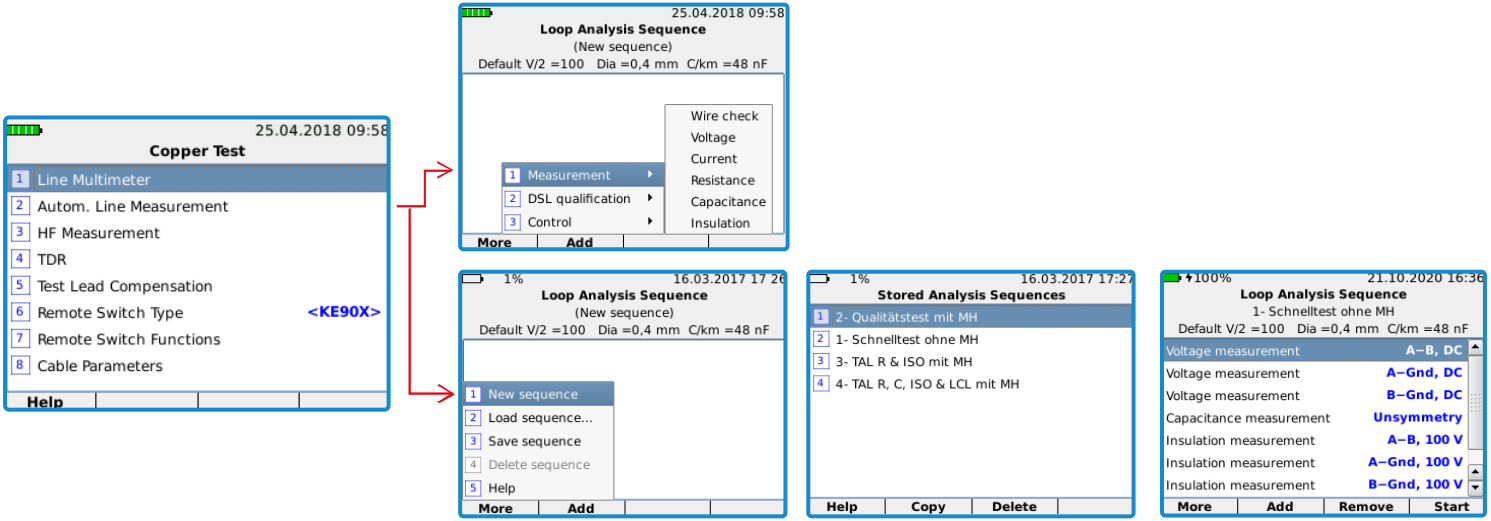
Coppertest menu autotest

Coppertest menu autotest



- Coppertest menu for cable measurement for suitability and errors
- Select defined autotest or edit a new test

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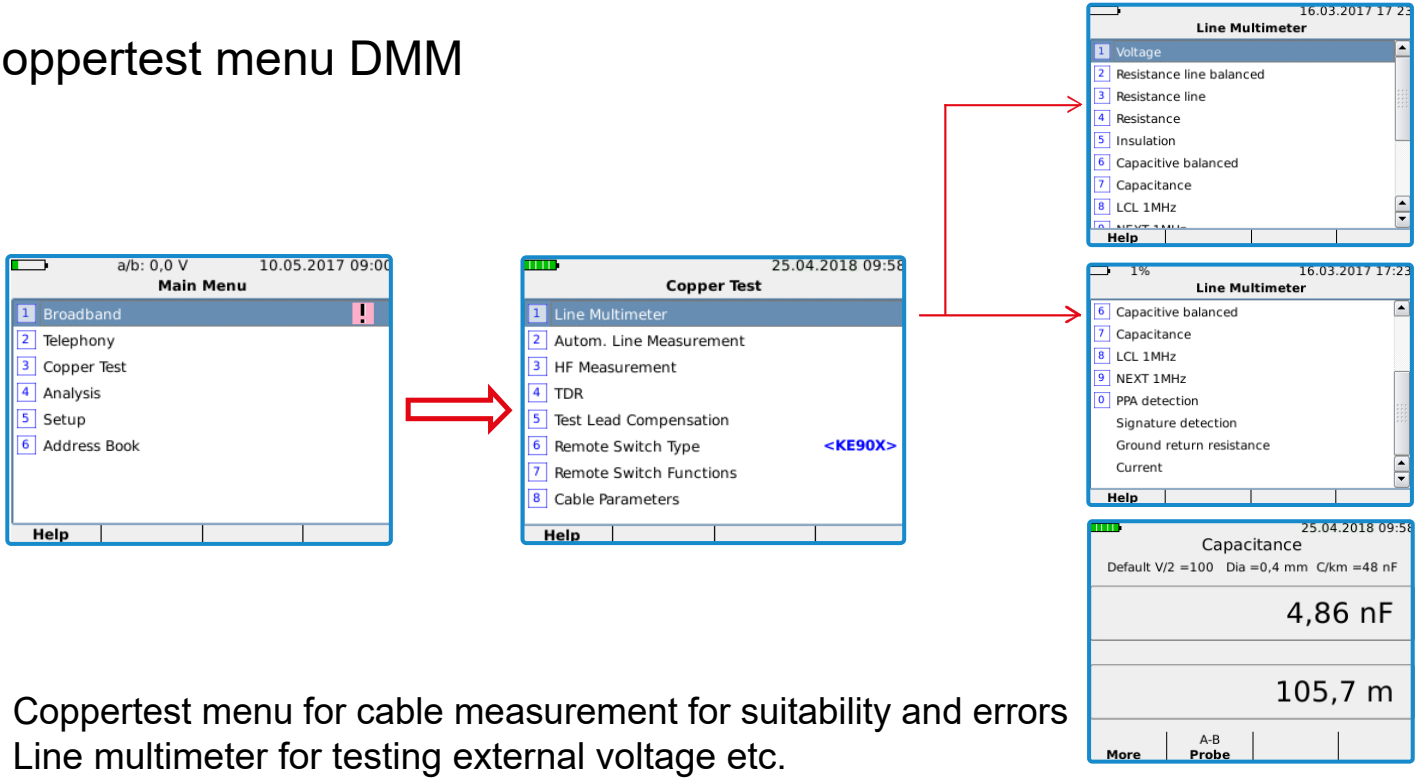
Coppertest menu DMM



- Coppertest menu for cable measurement for suitability and errors
- Line multimeter for testing external voltage etc.

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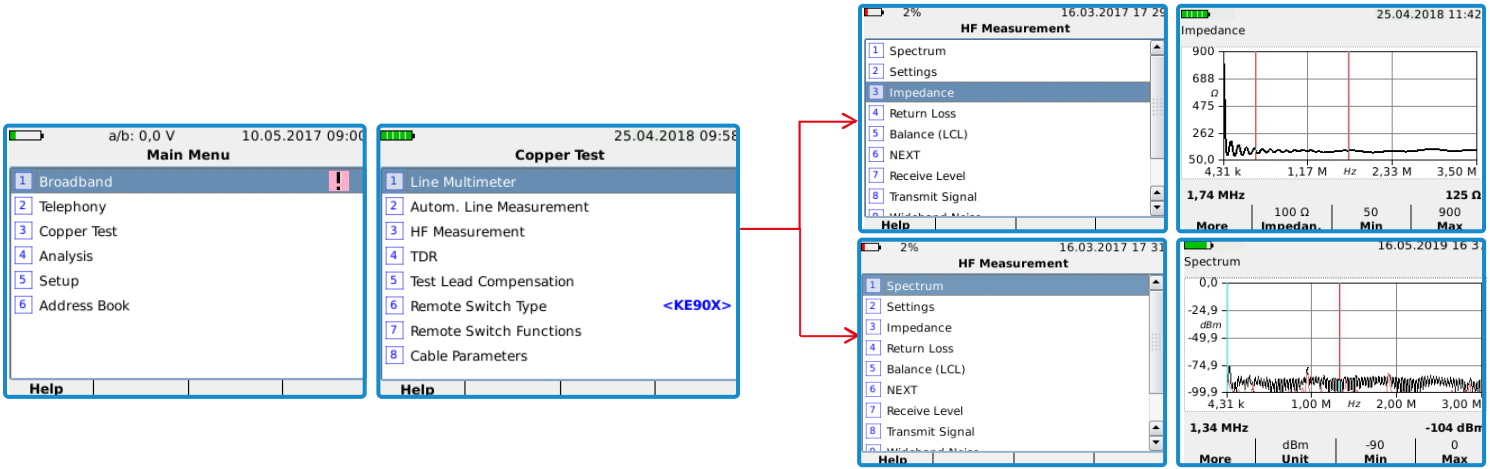
Coppertest menu HF measurement



- Coppertest menu for cable measurement for suitability and errors
- RF measurement for evaluation of the transmission quality and detection of interferences

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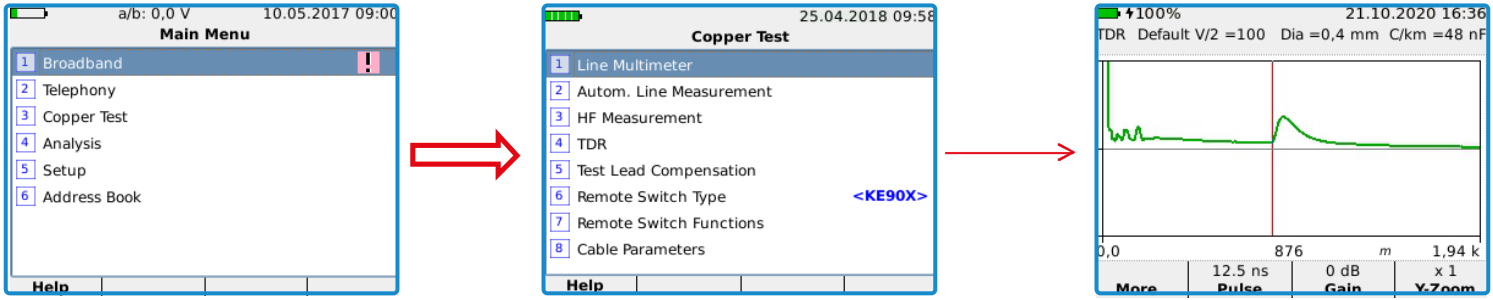
Coppertest menu TDR measurement



- Coppertest menu for cable measurement for suitability and errors
- TDR measurement for meter-accurate localization of cable errors and damage

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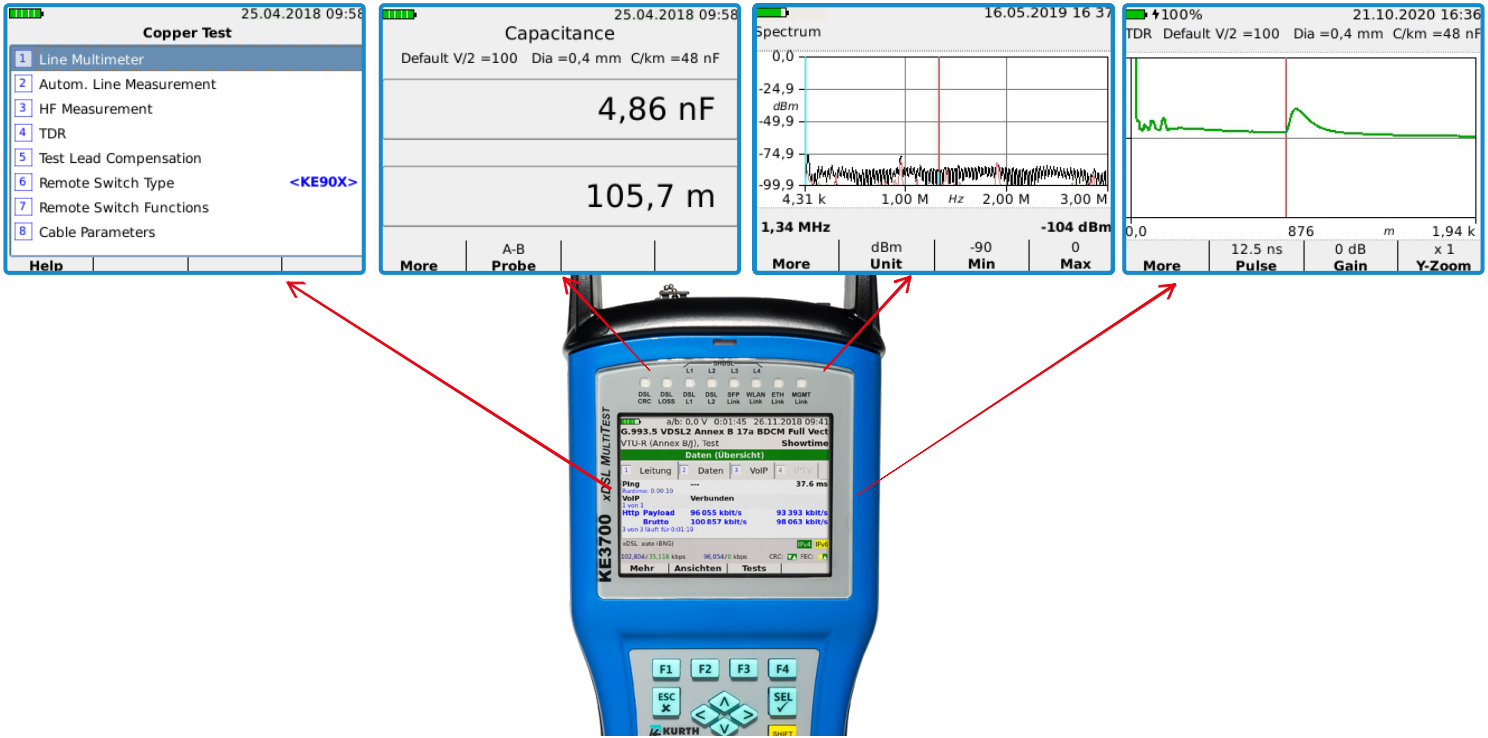
KE3x00 – Coppertests



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