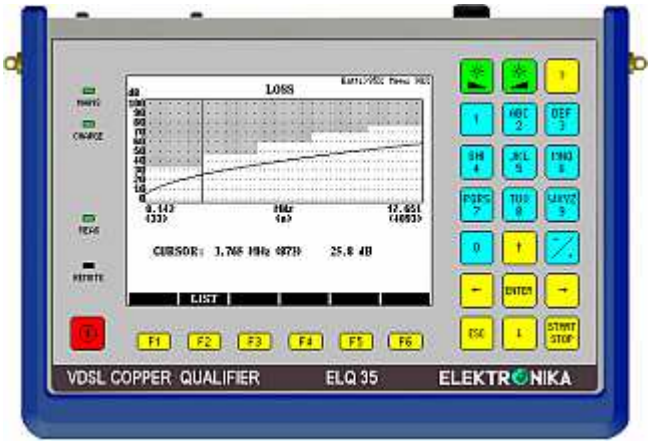
IS THIS PAIR SUITABLE FOR YOUR SYSTEM?

ELQ 35 VDSL COPPER QUALIFIER GIVES THE ANSWER!



FIVE INSTRUMENTS IN ONE

- **200 Hz to 35 MHz Transmitter**

Generating Sinus and MTTS test signals.

- **200 Hz to 35 MHz Receiver**

For selective and wideband measurements.

- **Spectrum Analyzer**

For disturbing noise and PSD measurement

- **High Resolution TDR**

For the location of bridged taps, splits etc.

- **AC bridge for the measurement of**

Impedance, Return Loss and LCL Balance

MAIN FEATURES

ELQ 35 is a hand held battery operated, multifunction measuring instrument, intended for pre-qualification, installation, fault location and maintenance of balanced copper pairs

- **Pre-qualification in Master Slave mode**

Just one person, thanks to the communication between the two instruments, can perform such measurements. Operation is made extremely simple by means of predefined automatic test sequences. ELQ 35 can be programmed as MASTER and SLAVE as well.

- **Pre-programmed Tolerance Masks**

Tolerance masks of cable parameters as Loss, LCL, Return Loss, Impedance, and the principal system parameters are pre-programmed for several ADSL and VDSL systems. User defined template sets can be created with the parameter editor of ELQ 35 without PC.

- **Automatic Data Rate Calculation**
- **Immediate PASS/FAIL indication**

When the automatic test sequence is ready ELQ 35 provides an immediate PASS/FAIL indication by comparing the test results with the tolerance masks and the required data rate with the calculated theoretically achievable rate. The test results can be stored in memory and transferred to PC.

- **Single Sided Measurements**

ELQ 35 provides numerous single sided measuring modes like: Transmitter, Receiver, Spectrum Analyzer, Wide Band Noise, Impulsive Noise, Impedance, Return Loss, Balance and NEXT (Loss) measurements.

- **Service Telephone Function**

With built in microphone and laud speaker.

- TDR Option

- **New !! ESEL Measurement up to 120 dB**

The Exchange Side Electrical Length (ESEL) measurement is a useful tool for the programming of local DSLAM-s when power shaping is required.

- **New !! DPBO Dependent Templates**

ELQ 35 provides ESEL, MUS dependent templates and achievable rate calculation for the local subscriber lines when the local DSLAM is working with reduced transmit power

- **New !! UPBO Dependent Templates**

For the qualification of VDSL2 lines when the modems are working with distance dependent transmit power

- **New !! Measurement beside Vectored Groups**

ELQ 35 provides special non-disturbing Master-Slave test for Cables Containing Vectored Groups.

- **PC Supported Spectrogram**

The purpose of Spectrogram PC program is to discover the disturbers causing considerable service impairment to communication systems. In this mode ELQ 35 performs spectrum measurements in every second for a long time up to 72 hours. The PC displays the results on “water-fall” diagram.

- **Long Time Micro Interruption Measurement**

ELQ 35 detects the micro interruptions according to ITU O.62 and provides detailed information about the number and relative duration of interruptions

- **Long Time Impulse Noise Measurement**

ELQ 35 displays the counted impulses in histogram form with 60 time slots providing information about the time distribution.

- **High Impedance Active Test Probe**

For PSD spectrum measurement on xDSL lines without disturbing the operation

- **PC Control Program**

Provided for result and setup transfer to PC

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PRE-PROGRAMMED STANDARD PARAMETER SETS

VDSL

VDSL 2 (ITU-T G.993.2) Over ISDN
- 998-M2x-B8
- 998-M1x-B
- 998-M2x-B
- 998-M2x-B-17
- 998-M2x-B-17V (Beside vectored groups)
- 998-ADE35-M2x-B
- 998-ADE35-M2x-BV (Beside vectored groups)

VDSL 2 (ITU-T G.993.2) Over ISDN without US0
- 998-M1x-NUS0
- 998-M2x-NUS0
- 998-E17-M2x-NUS0

VDSL 2 (ITU-T G.993.2) Over POTS
- 997-M1c-A7
- 997-M2x-A
- 998-M1x-A
- 998-M2x-A
- 998-E35-M2x-A
- 998-ADE35-M2x-A

VDSL 2 (ITU-T G.993.2) Over POTS, extended US0
- 998-M2x-M8
- 997-M1x-M8
- 997-M2x-M8
- 997-M1x-M
- 997-M2x-M
- 998-M2x-M-17
- 998-M2x-M-17V (Beside vectored groups)
- 998-ADE35-M2x-M
- 998-ADE35-M2x-MV (Beside vectored groups)

VDSL 1 (ITU-T G.993.1)
- 997-P1.M2
- 998-P1.M2
- 997-P2.M2
- 998-P2.M2

ADSL

ADSL2+ Over ISDN (ITU–T G.992.5 Annex B)
Spectrum: FDD/EC

ADSL2+ Over POTS (ITU–T G.992.5 Annex A)
Spectrum: FDD/EC

ADSL2+ Over POTS (ITU–T G.992.5 Annex M)
Spectrum: FDD/EC , ADLU selectable 32 to 64

ADSL2+ ALL DIGITAL (ITU–T G.992.5 Annex I)
Spectrum: FDD/EC

ADSL2+ Over POTS (ITU–T G.992.5 Annex J)
Spectrum: FDD/EC , ADLU selectable 32 to 64

ADSL2 Over ISDN (ITU–T G.992.3 Annex B)
Spectrum: FDD/EC

ADSL2 Over POTS (ITU–T G.992.3 Annex A)
Spectrum: FDD/EC

ADSL2 Over POTS (ITU–T G.992.3 Annex M)
Spectrum: FDD/EC , ADLU selectable 32 to 64

ADSL2 ALL DIGITAL (ITU–T G.992.3 Annex I)
Spectrum: FDD/EC

ADSL2 Over POTS (ITU–T G.992.3 Annex J)
Spectrum: FDD/EC , ADLU selectable 32 to 64

ADSL (ITU–T G.992.1 Annex A, B)
Spectrum: FDD/EC

ADSL G.LITE2 (ITU–T G.992.4 Annex A, I)
Spectrum: FDD/EC

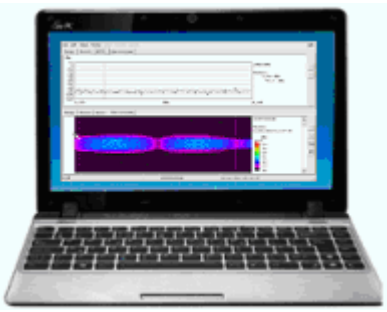
READSL2 (ITU–T G.992.3 Annex L)
Spectrum: FDD/EC Up band: wide/narrow

SYSTEM INDEPENDENT TEST SEQUENCES

ELQ 35 provides system independent test sequences to measure selected cable parameters:
- Over pre-programmed frequency ranges (10 selectable ranges are available)
- With a user defined fix frequency
- ESEL measurement up to 120 dB (option)

LONG TIME SPECTROGRAM MEASUREMENT

The **Spectrogram PC Program** is an excellent tool of ELQ 35 to discover the disturbers causing considerable service impairment to communication systems. The trouble shooting is usually very difficult because:
- **The disturbing signals appear in unpredictable times**
- **They appear in unpredictable frequency ranges**



In **Spectrogram** mode ELQ 35 performs spectrum measurements in every second. The results are directly transferred to PC via USB port or indirectly by means of a memory stick when the measurement is completed.
Utilizing the large memory capacity and large display of PC the spectrogram program shows the results in form of "Waterfall" diagram in which:
- **The time is displayed on the vertical axis**
- **The frequency is displayed on the horizontal axis**
- **The level is interpreted in form of colors**

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SPECIFICATIONS

Transmitter

Frequency range ..... 25 kHz to 35 MHz
Resolution ..... 4.3125 or 5 kHz
Impedance ..... 100, 120, 135 or 150 Ohm
Transmitting modes:
  Generation of 1 single frequency
  Generation of 30 frequencies at the same time
Output level
  In 1 frequency mode ..... -10 to +10 dBm
  In 30 frequency mode ..... -12 dBm/fr
Accuracy at 0 dBm
  25 kHz to 100 kHz ..... ±1 dB
  100 kHz to 5 MHz ..... ±0.3 dB
  5 MHz to 35 MHz ..... ±1 dB

Receiver

Frequency range ..... 25 kHz to 35 MHz
Resolution ..... 4.3125 or 5 kHz
Impedance ..... 100, 120, 135, 150 Ohm
Receiving modes:
  Receiving of 1 single frequency
  Receiving of 30 frequencies at the same time
Measuring range ..... +10 to -100 dBm
Accuracy at 0 dBm
  25 kHz to 100 kHz ..... ±1 dB
  100 kHz to 5 MHz ..... ±0.3 dB
  5 MHz to 35 MHz ..... ±1 dB

LCL Measurement

Frequency range ..... 25 kHz to 35 MHz
Impedance ..... 100, 120, 135 or 150 Ohm
Display range ..... 0 to 70 dB
Accuracy at 35 dB with special balanced cable
  25 kHz to 100 kHz ..... ±2 dB
  100 kHz to 5 MHz ..... ±1 dB
  5 MHz to 30 MHz ..... ±2 dB

Impedance Measurement

Frequency range ..... 25 kHz to 35 MHz
Measuring range ..... 50 Ohm to 400 Ohm
Accuracy
100 kHz to 30 MHz ..... 5% ±5 Ohm

Return Loss Measurement

Frequency range ..... 25 kHz to 35 MHz
Impedance ..... 100, 120, 135 or 150 Ohm
Measuring range ..... up to 40 dB
Accuracy at 20 dB
  100 kHz to 5 MHz ..... ±1 dB
  5 MHz to 18 MHz ..... ±2 dB

Next / Loss Measurement

Frequency range ..... 25 kHz to 35 MHz
Resolution ..... 4.3125 or 5 kHz
Impedance ..... 100, 120, 135 or 150 Ohm
Measuring range
  NEXT ..... up to 80 dB
  LOSS ..... up to 90 dB

Spectrum Analyzer

Frequency range ..... 25 kHz to 35 MHz
Display range ..... down to -140 dBm/Hz
Impedance ..... 100, 120, 135, 150 Ohm or
5kOhm // 5pF with high impedance probe

Bandwidth/ frequency step

Range MHz	Bandwidth / Frequency Step kHz					
35	120/120	50/50	20/20	10/10	5/5	5/2.5
30	100/100	50/50	20/20	10/10	5/5	5/2.5
18	60/60	20/20	10/10	5/5	5/2.5	
12	40/40	20/20	10/10	5/5	5/2.5	
9	30/30	15/15	10/10	5/5	5/2.5	
3	10/10	5/5	5/2.5			
1.5	5/5	5/2.5				

Number of Displayed frequencies 300
Saving of result ..... the actual content of display
Evaluation ..... Normal, Peak, Average
Units ..... dBm, dBm/Hz

Wideband Noise Measurement

Frequency range ..... 25 kHz to 35 MHz
Impedance ..... 100, 120, 135, 150 Ohm
Filters for noise measurement ..... ADSL
ADSL 2+
VDSL, VDSL2-8, VDSL2-17, VDSL2-30, VDSL2-35
Measurement times ..... 1sec to 72 hours
Evaluation
For 1 sec to 1 min ..... Quasi analog
Over 1 min..... Histogram with 60 time slots

Impulse Noise Measurement

Impedance ..... 100, 120, 135, 150 Ohm
Pulse width ..... >500 ns
Interval size ..... 10 ms
Threshold range ..... 0 to –60 dBm
Maximum count 65000
Measurement times ..... 1sec to 72 hours
Evaluation
  For 1 to 30 sec ..... Numeric
  Over 30 sec..... Histogram with 60 time slots

Fault Location with TDR (Option)

Measuring Modes
  Single pair
  Single pair long time
  Comparison to memory
  XTALK
Measuring ranges ..... 100 m to 5 km
Accuracy ..... ±1% ±1m
Zoom ..... 1 to 4
Propagation velocity (V/2) ..... 45 to 150 m/µs
Gain range ..... 0 to 60 dB
Measuring pulse
  Amplitude ..... ~3V into 100 Ohm
  Width..... 10 ns to 2.5 µs

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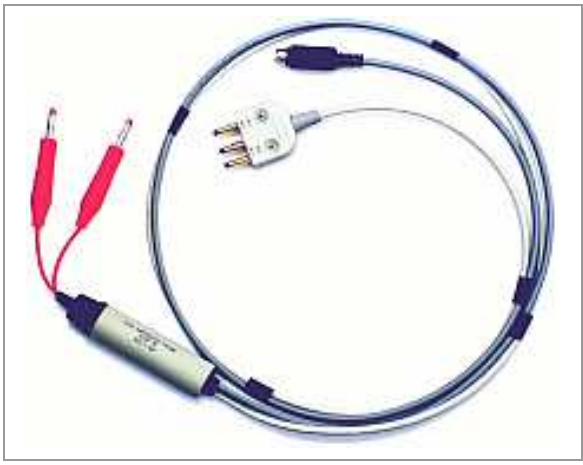
HIGH IMPEDANCE PROBE ELQP 30 (HW option)



Purpose

The ELQP 30 active probe is intended for PSD spectrum measurement on working lines when test instrument should be connected parallel with the operating modems and the regular measuring cables can not be used because the digital systems are extremely sensitive for the capacitive load

Specifications

Frequency range ..... 5 kHz to 35 MHz
Attenuation ..... 15 dB
Input Impedance ..... 5 kOhm II 5pF
Accuracy
5 kHz to 25 kHz ..... ±1dB
25 kHz to 5 MHz ..... ±0.3 dB
5 MHz to 35 MHz ..... ±1dB
Powered ..... from ELQ 35

GENERAL SPECIFICATIONS

Power supply

Internal rechargeable NIMH battery pack
Operation time ..... approx. 8 hours (Without backlight)

Charging

(Without taking the battery pack out)
From 230V mains ..... with mains adapter
From 12V car battery ..... with car adapter
Fast charging time ..... less than 3 hours

Display ..... 320 x 240 LCD -TFT

Connectors

For mains or 12V car adapter ..... 2.1/5.5 mm coaxial
Power supply for active probe Mini-din-4P
Line connectors ..... 4 mm banana sockets
USB A ..... USB 1.1 host port for USB stick
USB B ..... USB 1.1 device port to connect PC

Over voltage protection

Between a and b or ground ..... 500V DC
Longitudinal voltage ..... 60V AC

Ambient temperature ranges

Reference ..... 23±5°C Rel. humidity 45% to 75%
Normal operation ..... 0 to +40°C Rel. humidity 30% to 75% *(<25g/m^3)
Limits of operation ..... -5 to +45°C Rel. humidity 5% to 95% *(<29g/m^3)
Storage and transport ..... –40 to +70°C Rel. humidity 95% at +45°C *(<35g/m^3)
* without condensation

Dimensions ..... 224 x 160 x 44 mm

Weight ..... approx. 1.5 kg

ORDERING INFORMATION

VDSL COPPER QUALIFIER ELQ 35 463-000-000

Including:

Operating manual
Short form operation instructions
Calibration Certificate
Ground connecting cable (2m)
2 Special Balanced Measuring Cables
USB cable and USB stick
Mains adapter
Carrying case

HW Options

High Impedance Probe ELQ P30 410-000-000
TDR measuring unit (built in) 463-210-000
Car lighter power adapter EAA 10 367-000-000
ER20 Directional coupler 4-2200 kHz . 430-000-000
ER30 Directional coupler 0,05-18MHz 431-000-000

SW Options

Interruption measurement . ..... SW 463-530-000
SW Set for Spectrogram ..... SW 463-570-000
Spectral Trace as Reference SW-463-550-000
ESEL Measurement..... SW-463-600-000
ADSL ESEL Dependent Template SW 463-610-000
ADSL DPBOMUS Template. ..... SW 463-620-000
ADSL Annex J. ..... SW 463-700-000
VDSL DPBO Template. SW-463-810-000
VDSL MUS Template. SW-463-820-000
VDSL UPBO Template. SW-463-900-000
VDSL Vectoring. SW-463-910-000

Others

Calibration Report for ELQ 35 ..... CR 463-000-000 E

ELEKTRONIKA reserves the right to change specifications without prior notice !

02.01.2017

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