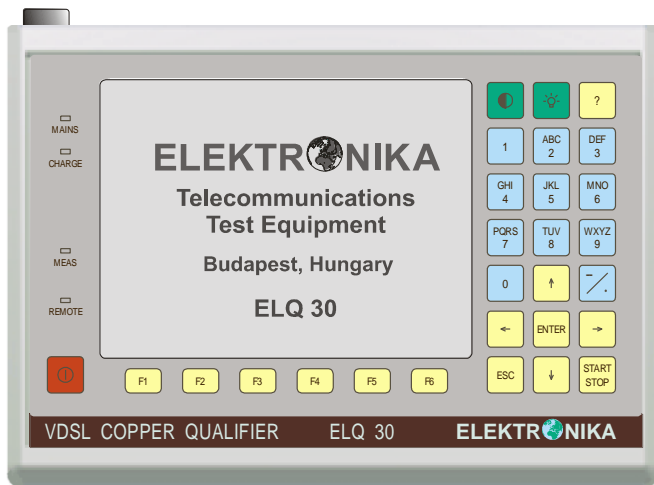


IS THIS PAIR SUITABLE FOR YOUR SYSTEM ?



ELQ 30 VDSL COPPER QUALIFIER GIVES THE ANSWER !



FEATURES

- **Physical parameter measurements**
To pre-qualify copper wire pairs for high bit rate ADSL, ADSL 2+ and VDSL services before the installation of modems
- **Spectrum Analyzer**
To locate disturbing signal sources on the line
- **High Impedance Active Probe**
To perform spectrum measurement on operating systems without disturbing it.
- **TDR option**
To locate cable faults like:
Loose contacts causing interruptions
Splits causing XTALK between the pairs

APPLICATIONS

The **xDSL LINE QUALIFIER ELQ 30** 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 pre-defined automatic test sequences. ELQ 30 can be programmed as MASTER and SLAVE as well. ELQ 30S the simplified slave version of ELQ 30 is also available.

- **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 30 without PC.

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

When the automatic test sequence is ready ELQ 30 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 30 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 loud speaker.

- **TDR**

SW OPTIONS

- **Micro Interruption Measurement**

ELQ 30 detects the micro interruptions according to ITU O.62 and provides detailed information about:

- Number of interruptions divided into categories.
- Relative duration of interruptions
- Errored seconds
- Time distribution of interruptions in 240 time slots

- **PC supported Spectrogram**

The purpose of Spectrogram PC program is to boost the spectrum measurement abilities of ELQ 30 utilizing the memory capacity of a PC. Spectrum measurements are performed in every second and the obtained results are continuously transferred to the PC via USB port to store and to display them. The large memory capacity of PC allows the storage the results of long test sequences up to 72 hours. The spectrum is displayed on a 3 dimension picture

- **Spectral Trace as Reference**

The obtained result of spectrum measurement can be stored and used as a reference for the subsequent measurements. The actual spectral trace and the reference are displayed together

- **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 Downstream Power Back Off (DPBO) is applied

- **ESEL Dependent Templates for Local Lines**

ELQ 30 provides proper templates and achievable rate calculation for the local subscriber lines when the local DSLAM is working with reduced transmit power (DPBO is applied)

- **Parameter Set Editor PC Software**

To edit user defined system and cable parameters.

MEASUREMENTS**Automatic Measurements with two instruments**

- Loss
- Noise spectrum
- Bit load calculation
- Achievable bit rate calculation
- LCL
- Return loss
- Impedance
- NEXT
- FEXT
- ESEL (option)

Manual Measuring Modes

- Transmitting/ Receiving
- NEXT
- LCL
- Impedance
- Return loss
- Weighted noise
- Spectrum
- Impulse noise
- Fault Location with TDR (option)
- Micro interruption measurements (option)

REPROGRAMMED VDSL PARAMETER SETS**VDSL 2 (ITU-T G.993.2)****OVER ISDN**

998-M2x-B8 with 9 speed combinations
 998-M1x-B with 9 speed combinations
 998-M2x-B with 9 speed combinations
 998-M2x-B-17 with 9 speed combinations

OVER POTS

997-M1c-A7 with 9 speed combinations
 997-M2x-A with 9 speed combinations
 998-M1x-A with 9 speed combinations
 998-M2x-A with 9 speed combinations

OVER POTS WITH EXTENDED USO

998-M2x-M8 with 9 speed combinations
 997-M1x-M with 9 speed combinations
 997-M2x-M8 with 9 speed combinations
 997-M1x-M with 9 speed combinations
 997-M2x-M with 9 speed combinations
 998-M2x-M with 9 speed combinations
 998-M2x-M-17 with 9 speed combinations

OVER ISDN WITHOUT USO

998-M1x-NUS0 with 9 speed combinations
 998-M2x-NUS0 with 9 speed combinations

VDSL 1 (ITU-T G.993.1)

997-P1.M2 with 9 speed combinations
 998-P1.M2 with 9 speed combinations
 997-P2.M2 with 9 speed combinations
 998-P2.M2 with 9 speed combinations

PREPROGRAMMED ADSL PARAMETER SETS**OVER ISDN FDD****ITU-T G.992.1 Annex B**

ADSL 6 MBPS
 ADSL 4 MBPS
 ADSL 2 MBPS

ETSI TS 101 388

ADSL 6 MBPS
 ADSL 4 MBPS
 ADSL 2 MBPS

ITU-T G.992.3 Annex B

ADSL2 8 MBPS
 ADSL2 6 MBPS
 ADSL2 4 MBPS

ITU-T G.992.5 Annex B

ADSL2+ 24 MBPS
 ADSL2+ 16 MBPS
 ADSL2+ 8 MBPS

OVER POTS FDD**ITU-T G.992.1 Annex A**

ADSL 6 MBPS
 ADSL 4 MBPS
 ADSL 2 MBPS

ETSI TS 101 388

ADSL 6 MBPS
 ADSL 4 MBPS
 ADSL 2 MBPS

ITU-T G.992.3 Annex A

ADSL2 8 MBPS
 ADSL2 6 MBPS
 ADSL2 4 MBPS

ITU-T G.992.5 Annex A

ADSL2+ 24 MBPS
 ADSL2+ 16 MBPS
 ADSL2+ 8 MBPS

SPECIFICATIONS

Transmitter

Frequency range..... 25 kHz to 30 MHz
 Resolution4.3125 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 30 MHz±1 dB

Receiver

Frequency range..... 25 kHz to 30 MHz
 Resolution4.3125 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 30 MHz±1 dB

LCL Measurement

Frequency range..... 25 kHz to 30 MHz
 Impedance 100, 120, 135 or 150 Ohm
 Display range0 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 30 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 30 MHz
 Impedance 100, 120, 135 or 150 Ohm
 Measuring rangeup to 40 dB
 Accuracy at 20 dB
 100 kHz to 5 MHz±1 dB
 5 MHz to 18 MHz±2 dB

NEXT, FEXT, Loss Measurement

Frequency range..... 25 kHz to 30 MHz
 Resolution4.3125 or 5 kHz
 Impedance 100, 120, 135 or 150 Ohm
 Measuring range
 NEX, FEXTup to 80 dB
 LOSSup to 90 dB

Spectrum Analyzer

Frequency range 25 kHz to 30 MHz
 Display rangedown 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					
	100/100	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 frequencies300
 Saving of result.....the actual content of display
 Evaluation..... Normal, Peak, Average
 Units dBm, dBm/Hz

Wideband Noise Measurement

Frequency range 25 kHz to 30 MHz
 Impedance.....100, 120, 135, 150 Ohm
 Filters for noise measurement..... ADSL
 ADSL 2+
 VDSL
 VDSL2-8
 VDSL2-17
 VDSL2-30
 NO FILTER
 Measurement times 1, 5, 10, 30 sec
 1, 5, 10, 30 min
 1, 2, 4, 8, 12, 24, 48, 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 count65000
 Measurement times 1, 5, 10, 30 sec
 1, 5, 10, 30 min
 1, 2, 4, 8, 12, 24, 48, 72 hours

Evaluation
 For 1 to 30 sec Numeric
 Over 30 sec..... Histogram with 60 time slots

High Impedance Active Probe (option)

Frequency range 25 kHz to 30 MHz
 Attenuation 15 dB
 Input Impedance:.....5 kOhm // 5pF
 Accuracy
 25 kHz to 5 MHz ±0.3 dB
 12 MHz to 30 MHz ±1dB



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

Micro Interruption Measurement (SW option)

Test Signal
 Frequency 25 kHz ± 100 Hz
 Input level..... from 0 to -30 dBm
 Impedance 100, 120, 135, 150 Ohm
 Selectable Threshold Level 3, 6, 10, 20 dB
 Accuracy of Threshold
 For 3, 6, 10 dB ± 1 dB
 For 20 dB ± 2 dB
 Measuring Time Adjustable. 4 min to 72 hours
 4, 8, 12, 24 min
 1, 2, 4, 8, 12, 24, 48, 72 hour

Interruption Categories 0.3 ms to 3 ms
 3 ms to 30 ms
 30 ms to 300 ms
 300 ms to 1 min
 >1 min
 Evaluation Relative duration, Errored sec
 Count & time distribution/category

Direction Coupler ER 30 (HW Option)

Frequency range..... 50 kHz to 18 MHz
 Impedance 100 to 150 Ohm
 Connectors..... 4 mm banana sockets
 Attenuation
 Between Input & Output
 50 kHz to 2,5 MHz 0,3 ± 0.1 dB
 2,5 to 18 MHz 0.3 +0.3/-0.1 dB
 Between Input & Instrument
 100 kHz to 3 MHz 12.2 ±0.1 dB
 50 kHz to 18 MHz 12.2 +0.1/-0.7 dB

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 with backlight

DATA SUBJECT TO BE CHANGED WITHOUT PRIOR NOTICE !

Connectors

For mains or 12V car adapter 2.1/5.5 mm coaxial
 Power supply for active probe Mini-din-4P
 For L1 and L2 line 4 mm banana sockets
 Ground connector..... 4 mm banana socket
 USB A..... USB 1.1 host port
 for USB stick
 USB B..... USB 1.1 device port
 to connect PC

Overvoltage 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% *($<25\text{g/m}^3$)
 Limits of operation -5 to +45°C
 Rel. humidity 5% to 95% *($<29\text{g/m}^3$)
 Storage and transport..... -40 to +70°C
 Rel. humidity 95% at +45°C *($<35\text{g/m}^3$)
 * without condensation
 Dimensions..... 224 x 160 x 44 mm
 Weight approx. 1.5 kg

ORDERING INFORMATION

VDSL COPPER QUALIFIER ELQ 30...409-000-000E

Including:

Operating Manual OM 409-000-000E
 Short form operation instructions ...ML 409-000-000E
 Calibration Certificate CC 409-000-000 E
 CD (xxx version)..... CD 409-000-000 EE
 SW for PC test result transfer..... SW 409-510-000
 Ground connecting cable (2 m)..... Y 107-421
 2 Special Balanced Measuring Cables Y 107-420
 USB cable Y 107-389
 USB stick Y 146-019
 EU Mains adapter Y 107-017
 or UK Mains adapter Y 107-021
 or US Mains adapter Y 107-024
 Battery (built-in) 355-140-000B
 Carrying case Y 147-014

Options

VDSL Copper Qualifier Slave..... 426-000-000
 SW for PC parameter set edition SW 409-520-000
 SW for interruption measurement .. SW 409-530-000
 SW Set for Spectrogram SW 409-570-000
 SW Spectral Trace as Reference .. SW 409-550-000
 ESEL Measurement SW 409-600-000
 ESEL Dependent Templates..... SW 409-610-000
 TDR measuring unit 409-210
 High Impedance Probe..... 410-000-000
 ER20 Directional coupler 4-2200 kHz 430-000-000
 ER30 Directional coupler 0,05-30MHz... 431-000-000
 Calibration Report CR 409-000-000 E

08.07.2010

