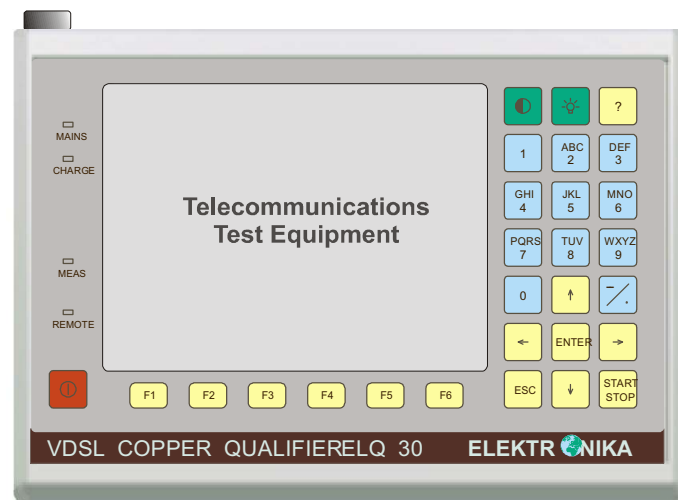
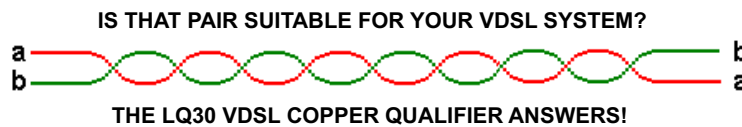


VDSL COPPER QUALIFIER

KE-LQ30



**KURTH
ELECTRONIC**



USAGE

The VDSL copper qualifier ELQ30 is a handheld battery operated, multifunction measuring instrument, intended for pre-qualification, installation, fault location and maintenance of balanced copper pairs.

To qualify a pair, end-to-end measurements with two instruments with two instruments have to be used in a master-slave arrangement. Thanks to the communication between the two instruments, just one person can perform such measurements. Operation is made extremely simple by means of pre-defined automatic test sequences. LQ30 can be programmed as master and slave as well.

Tolerance masks of capable parameters as Loss, LCL, Return Loss Impedance and the principal system parameters are pre-programmed for numerous DSL systems. New user defined template sets can be created with the parameter editor PC program.

When automatic test sequence is ready, LQ30 provides an immediate PASS/FAIL indication by comparing the test results with the tolerance masks and required data rate with the calculated theoretically achievable rate. Detailed test results are available in graphic and numeric forms. In case of FAIL indication, the reason of failure is marked with asterisks. For fault location, TDR measurement is provided.

At a glance

- Physical parameter measurements to prequalify copper wire pairs for high bit rate VDSL services before the installation of modems
- Automatic test sequences with preprogrammed or user defined test parameter sets belonging to different VDSL systems
- Bit rate calculation for each VDSL system
- PASS/FAIL indication
- Parameter set edition with PC
- TDR for fault location (optional)
- Single end measurements
- 30 MHz frequency range for fix-frequency and spectrum measurements
- Test results can be stored in memory and transferred to PC
- PC program is provided to produce detailed test protocols in excel format
- 320 x 240 pixel LCD display with backlight
- Internal rechargeable battery with approx. 8 hours of operating time
- Processor controlled battery manager with three hour fast charging capability
- English, German or Russian language selectable
- Acoustic pair detection capability
- Service telephone capability



KE-LQ30 VDSL COPPER QUALIFYER

MASUREMENTS

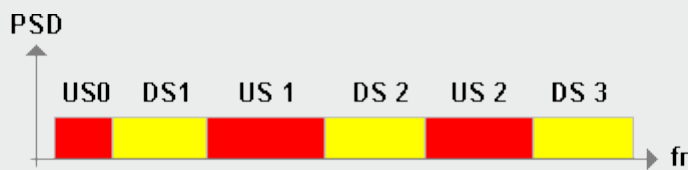
Automatic Measurements with two units

- Loss
- Weighted noise
- Spectrum
- Bit load calculation
- Achievable bit rate calculation
- Return loss
- Impedance
- NEXT
- FEXT

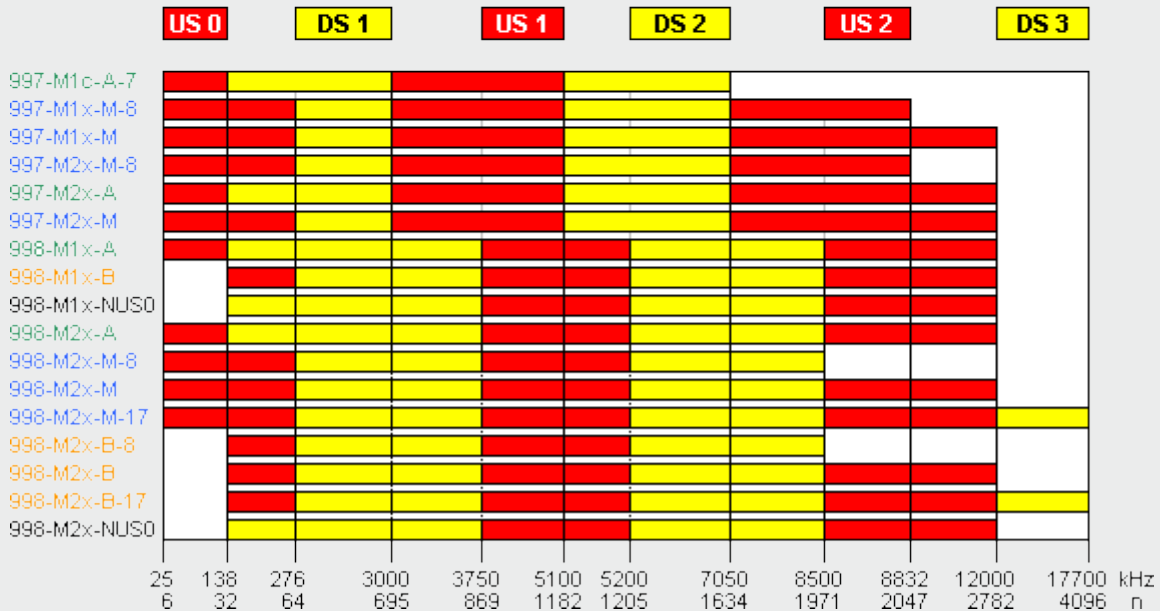
Manual measuring modes

- Transmitting
- Receiving
- NEXT
- LCL
- Impedance
- Return loss
- Weighted noise
- Impulse noise
- Fault location with TDR

PREPROGRAMMED VDSL 2 PARAMETER SETS



A=OVER POTS
 B=OVER ISDN
 M= EXTENDED US0
 NUS0=WITHOUT US0



KE-LQ30 VDSL COPPER QUALIFYER

SPECIFICATIONS

Transmitter

Frequency range.....25 kHz to 30 MHz
 Resolution.....4.3125 kHz or 5 kHz
 Impedance.....100, 120, 135 or 150 Ohm
 Transmitting modes:
 Generation of a single frequency
 Generation of a multi-tone signal (30 frequencies)
 Level:
 in 1Fr mode..... -10 to +10 dBm
 in 30 Fr 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
 Resolution.....4.3125 kHz or 5 kHz
 Impedance.....100, 120, 135, 150 Ohm
 Receiving modes:
 Receiving of a single frequency
 Receiving of a multi-tone signal (30 frequencies)
 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
 Measuring range..... 0 to 70 dB
 Accuracy at 35 dB
 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 18 MHz5% ±5 Ohm

Return loss measurement

Frequency range.....25 kHz to 30 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, FEXT, Loss measurement

Frequency range.....25 kHz to 30 MHz
 Resolution.....4.3125 kHz or 5 kHz
 Impedance.....100, 120, 135 or 150 Ohm
 Measuring range
 NEXT, FEXTup to 80 dB
 Loss.....up to 90 dB

Spectrum analyzer

Frequency range..... 25 kHz to 30 MHz
 Measuring range..... down to -140 dBm/Hz
 Impedance..... 100, 120, 135, 150 Ohm or
 5kOhm / 5pF with high impedance probe

Resolution / Bandwidth

Range MHz	Zoom / resolution & bandwidth 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 frequencies.....300
 Analysis..... Normal, Peak, Average
 Measuring units.....dBm, dBm/Hz

Noise measurement

Frequency range..... 25 kHz to 30 MHz
 Impedance..... 100, 120, 135, 150 Ohm
 Filters for noise measurements..... ADSL
 ADSL 2+
 VDSL
 VDSL 2-8
 VDSL 2-12
 VDSL 2-17
 VDSL 2-30
 NO FILTER

Tunable measurement times..... 1, 5, 10, 30 sec
 1, 5, 10, 30 min
 1, 2, 4, 8, 12 24, 48, 72 h

Analysis

for measurement times 1 s – 1 min..... quasi-analog
 more than 1 min..... histogram with 60 time slots

Impulse noise measurement

Impedance..... 100, 120, 135, 150 Ohm
 Pulse width.....>500 ns
 Intervall size.....>10 ms
 Treshold range.....0 to -60 dBm
 Maximum count65,000
 Tunable measurement times..... 1, 5, 10, 30 sec
 1, 5, 10, 30 min
 1, 2, 4, 8, 12 24, 48, 72 h

Analysis

for measurement times 1 s – 1 min..... numeric
 more than 30 sec..... histogram with 60 time slots

High impedance probe (optional)

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



KE-LQ30 VDSL COPPER QUALIFYER

Fault location with TDR (optional)

Measuring modes
 Single pair
 Single pair long time
 Comparison to memory
 XTALK
 Measuring range..... 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 ~3 V
 Width..... 10 ns to 2.5 μs

Interruption measurement (software option)

Measuring signal
 Frequency25 kHz to 100 Hz
 Entrance level range..... 0 to -30 dBm
 Impedance..... 100, 120, 135, 150 Ohm
 Treshold value
 under reverence level.....3, 6, 10, 20 dB
 Treshold value accuracy
 for 3, 6, 10 dB.....– 1 dB
 for 20 dB– 2 dB
 Measurement time..... from 4 mins up to 72 hours
 4, 8, 12 and 24 mins
 1, 2, 4, 8, 12, 24, 48 and 72 hours
 Interruption categories..... 0.3 ms to 3 ms,
 3 ms to 30 ms,
 30 ms to 300 ms,
 300 ms to 1 mins,
 > 1 Min.
 Analysis.....relative interruption time,
 disturbed seconds,
 allocation of relative interruption time,
 number and allocation
 of interruptions.

ADSL measurement (software option)

Pre-programmed parameter sets
 ADSL FDD Over ISDN and Over POTS
 ADSL (ITU-T G.992.1).....2, 4, 6 Mbps
 ADSL2 (ITU-T G.992.3)4, 6, 8 Mbps
 ADSL2+ (ITU-T G.992.5)8, 16, 24 Mbps

GENERAL SPECIFICATIONS

Power supply

Internal rechargeable NIMH battery pack
 Operation time.....approx. 8 hours
 (without backlight)
 Battery charging
 From 230V mainswith mains adapter
 From 12V car battery.....with car adapter
 Charging time.....max. 3 hours
 (with fast charging)
 Display320 x 240 LCD
 with backlight

Connections

Mains adapter connector.....2.1/5.5 mm koaxial
 Power supply for probe..... Mini-din-4P
 LINE1 or 2..... 4 mm banana connector
 Ground connection..... 4mm banana connector
 USB A USB 1.1 host connector for a
 USB stick
 USB B USB 1.1 host connector for a
 PC gonnection

Over voltage protection

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

Envorinmental conditions

Reference range..... 23±5 °C
 Rel. humidity 45% to 75% *
 Operational range.....0 to +40 °C
 Rel. humidity 30% to 75% *($< 25 \text{ g/m}^3$)
 Operational limit.....-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 ($< 35 \text{ g/m}^3$)

Dimensions.....224 x 160 x 44 mm
 Mass..... ca. 1.5 kg

* without thawing

Artikelnr.	Typ	Artikelbezeichnung
KE-LQ30	KE-LQ30	Line qualifier for ADSL and VDSL services. Big graphical display. built-in rechargeable battery. Includes test leads, power supply, PC software und carrying case. Optional: TDR measurements up to 5 km cable length and various software options.

