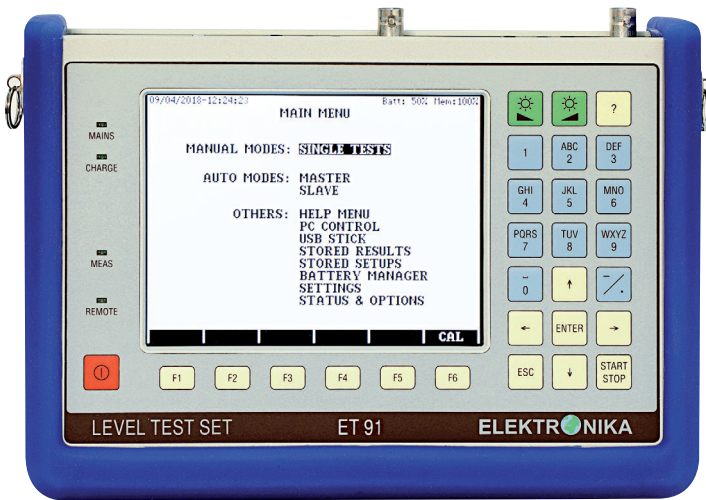


## ET91 2.4 MHz LEVEL TEST SET

Tester of analog links low frequency



### APPLICATIONS

The **LEVEL TEST SET ET 91** is a hand held battery operated, multifunction measuring instrument, intended test of Carrier Frequency Systems up to 600 channel capacity, Power Line Carrier, Audio Tone, and FSK Communications Systems.

In selective receiving mode four special bandwidths provided for the measurement of noise, carrier leak, cross-talk and non-linear distortion.

### Comfortable Frequency Setting Modes

Test instructions of FDM systems often specify the test frequency in format: Carrier  $\pm$  Channel Frequency.

In compliance with the mentioned format ET 91 provides the separate setting of carrier and audio frequencies and so:

**No frequency calculation is required!**

### Comfortable Frequency Tracking Modes

The test procedure of FDM equipment usually requires different generator and level meter frequency settings. For example:

Feeding audio frequency test signal to the input of the tested channel on the following frequencies:

1000, 1200, 1400, 1600, etc Hz.

Selective level measurement at a designated test point of the tested equipment on the following frequencies:

Carrier + 1000, 1200, 1400, 1600, etc Hz or

Carrier - 1000, 1200, 1400, 1600, etc Hz

Using up the advantageous feature of ET 91 that the generator and the level meter are in the same instrument extremely comfortable tracking modes are provided. In these modes the selective level meter is controlled by the generator according to the above mentioned rules.

**No frequency calculation is required !**

**Only one frequency setting is required !**

### FOUR INSTRUMENTS IN ONE

#### 100Hz to 2400 kHz Level Generator

For the generation of measuring voltage for the test of FDM transmission systems up to 600 channels

#### 100Hz to 2400 kHz Level Meter

For selective and wideband level measurements with auto ranging

#### Spectrum Analyzer

For the measurement of transmission characteristics as well as cross-talks and other interference signals.

#### Psophometer

For noise measurement in the speech channels according to ITU-T Rec. O.41

### Comfortable End to End Measurements

For the test of carrier frequency cables and voice channels in Master-Slave mode.

The Master initializes the measurements and collects the results. The Slave performs the measurements according to the Master's commands and sends back the results. The two instruments communicate over the tested line.

### High Resolution Spectrum Analyzer

ET 91 provides a high sensitivity spectrum analyzer suitable for the measurement of transmission characteristics as well as cross-talks and other interference signals.

The obtained spectrum trace can be evaluated in four modes like: NORM, PEAK, AVG, SAVG and interpreted in dBm or dBm/Hz.

### Measuring Bridge

ET 91 provides a built in bridge to perform the measurement of Return Loss, Impedance and

LCL Balance according to ITU-T Rec. O.9.

Memory Locations for Test Setups

To speed up routine tests ET 91 provides memory locations for 100 user defined test setups containing generator, level meter test parameters and limit values for PASS/FAIL indication.

### USB Ports for Result and Setup Transfer

ET 91 has two USB ports for data transfer: USB A host port for USB stick USB B device port for PC connection

The USB stick provides data transfer between a PC and ET 91 without installing a special device driver to the PC. This solution is advantageous for the user who does not have administrative right to install a special driver to his PC.

PC program for data transfer is provided.

## ET91 - 2.4 MHz LEVEL TEST SET

### SPECIFICATIONS

#### Transmitter

Transmitting Modes  
 1 FREQ (Transmitting one single frequency)  
 MTTTS (Transmitting Multi Tone Test Signal)  
 Frequency Range ..... 100 Hz to 2400 kHz in 1 Hz steps  
 Frequency Accuracy .....  $2 \times 10^{-6} \pm 1$  Hz  
 Balanced and Coaxial Outputs  
 10 to 2400 kHz ..... ~0, 75, 135 (125), 150  $\Omega$   
 100 Hz to 10 kHz ..... ~0, 600  $\Omega$   
 Level Range of Balanced Output  
 For all impedances ..... +10 to -40 dBm, dB  
 Level Range of Coaxial Output  
 ~0,  $\Omega$  ..... +10 to -40 dBm, dB  
 75, 135(125), 150  $\Omega$  ..... +10 to -40 dBm  
 600  $\Omega$  ..... +4 to -40 dBm  
 Level Resolution ..... 0.1 dB  
 Level Accuracy at 0 dBm Freq.>200Hz .....  $\pm 0,3$  dB

#### Selective receiver

Receiving Modes  
 1 FREQ (Receiving one single frequency)  
 MTTTS (Receiving Multi Tone Test Signal)  
 Frequency Range ..... 100 Hz to 2400 kHz  
 Frequency Accuracy .....  $2 \times 10^{-6} \pm 1$  Hz  
 Direct Frequency Setting ..... in 1 Hz steps  
 Frequency Setting in Carrier  $\pm$  Tone Format  
 Carrier Frequency ..... 4 to 2396 kHz in 1 kHz steps  
 Tone Frequency ..... 100 Hz to 3,9 kHz in 1 Hz steps  
 Band width  
 200 Hz to 10 kHz ..... 20 Hz  
 10 to 2400 kHz ..... 20, 200 Hz, 1,74, 1,95, 3,1 kHz  
 Balanced and Coaxial Inputs  
 10 to 2400 kHz ..... 75, 135 (125), 150  $\Omega$  or high  
 100 Hz to 10 kHz ..... 600  $\Omega$  or high  
 Measuring Range  
 With 20 Hz band width ..... -12 to +10 dB 0  
 Level Resolution ..... 0.1 dB  
 Level Accuracy at 0 dBm, Freq.>200Hz .....  $\pm 0,3$  dB

#### Wideband Receiver

Balanced and Coaxial Inputs  
 10 to 2400 kHz ..... 75, 135 (125), 150  $\Omega$  or high  
 100 Hz to 10 kHz ..... 600  $\Omega$  or high  
 Selectable 3 dB Band Filters Measuring Ranges  
 100 Hz to 4kHz ..... -100 to +10 dB  
 1200 Hz to 120 kHz ..... -90 to +10 dB  
 3 kHz to 300 kHz ..... -90 to +10 dB  
 6 kHz to 600 kHz ..... -80 to +10 dB  
 12 kHz to 1200 kHz ..... -70 to +10 dB  
 24 kHz to 2400 kHz ..... -70 to +10 dB  
 Level Resolution ..... 0.1 dB  
 Level Accuracy at 0 dBm, Freq.>200Hz .....  $\pm 0,3$  dB

#### Receiver - Transmitter Tracking Mode

The receiver is controlled by the transmitter  
 Tx Frequency ..... 100 Hz to 3,9 kHz in 1 Hz steps  
 Carrier Frequency ..... 4 to 2396 kHz in 1 kHz steps  
 Receiver Frequency = Carrier  $\pm$  Tx Frequency

#### Wideband Noise Measurement

Frequency Range ..... 100 Hz to 2400 kHz  
 Filters ..... Psophometer, 3,1, 4, 20, kHz  
 120, 300, 600, 1200, 2400 kHz  
 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

Pulse width ..... >500 ns  
 Interval size ..... 10 ms  
 Threshold range ..... 1 to 500 mV  
 Maximum count ..... 65000  
 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

#### Spectrum Analyzer

Frequency Range ..... 100 Hz to 2400 kHz  
 Line impedances  
 10 to 2400 kHz ..... 75, 135(125), 150  $\Omega$  or High  
 100 Hz to 10 kHz ..... 600  $\Omega$  or High

Frequency Range	Bandwidth & Freq. Step
2,4 MHz	500 Hz to 8 kHz
1,2 MHz	500 Hz to 4 kHz
600 kHz	500 Hz to 2 kHz
300 kHz	500 Hz to 1 kHz
20 kHz	50 Hz to 100 Hz
4 kHz	10 Hz to 20 Hz

Display range ..... down to -140 dBm/Hz  
 Number of displayed frequencies ..... 300  
 Saving of result ..... the actual content of display  
 Evaluation ..... NORM, PEAK, AVG, SAVG  
 Units ..... dB, dBm, dBm/Hz

#### LCL Balance Measurement

Impedance  
 10 to 2400 kHz ..... 75, 135 (125), 150  $\Omega$   
 200 Hz to 10 kHz ..... 600  $\Omega$   
 Display range ..... 0 to 70 dB  
 Accuracy at 40 dB  
 200 Hz to 10 kHz .....  $\pm 2$  dB  
 10 to 2400 kHz .....  $\pm 1$  dB

## ET91 - 2.4 MHz LEVEL TEST SET

### Return Loss Measurement

Nominal Impedance (Z)	
10 to 2400 kHz	75, 135 (125), 150 $\Omega$
200 Hz to 10 kHz	600 $\Omega$
Impedance limits	Z/2 to 2Z
Display range	0 to 40 dB
Accuracy at 20 dB	
200 Hz to 10 kHz	$\pm 2$ dB
10 to 2400 kHz	$\pm 1$ dB
500 to 2400 kHz	$\pm 2$ dB

### NEXT / LOSS Measurement

Frequency	
Frequency Range	100 Hz to 2400 kHz
Resolution	Automatically changed with range
Output Impedances	
10 to 2400 kHz	75, 135 (125), 150 $\Omega$
100 Hz to 10 kHz	600 $\Omega$
Input Impedances	
10 to 2400 kHz	75, 135 (125), 150 $\Omega$ or High
100 Hz to 10 kHz	600 $\Omega$ or High
Measuring range	up to 80 dB

### Impedance Measurement

Measuring range	
10 to 2400 kHz	50 to 400 $\Omega$
200 Hz to 10 kHz	300 to 1600 $\Omega$
Accuracy	
200 Hz to 10 kHz	$\pm 10\% \pm 5$ $\Omega$
10 to 2400 kHz	$\pm 5\% \pm 5$ $\Omega$

### Group Delay Distortion Measurement (SW Option)

Test signal	37MTT, 200 to 3700 Hz
Resolution	100 Hz
Z output / input	600 $\Omega$
Output level	30 dB/tone (-7dB peak)
Input level range	-60 to -20 dB/tone
Group delay distortion range	0 to 10 ms
Resolution	1 $\mu$ s
Accuracy	According to ITU.O.81

### Phase Jitter & Freq Error Meas. (SW Option)

Test signal	1020 Hz, 0 to -30 dBm
-------------	-----------------------

### Phase Jitter measurement (O.91)

Measuring range	0.2 to 30.0 degrees p-p
Filter	4 to 300 Hz

### Frequency Error Measurement

Measuring range	$\pm 30$ Hz
Resolution	0.1 Hz

### External Attenuator (HW Option)

Attenuation	40 dB
Frequency Range	10 kHz to 2400 kHz
Accuracy	$\pm 0.5$ dB
Max. input level	+40 dB
Input Impedance	>3.7 k $\Omega$ Coax
Output connector	Balanced
ET91 settings	Balanced, Unterminated, dB

### Micro Interruption Measurement (SW Option)

Test Signal	
Frequency	1020 Hz
Input level	from 0 to -30 dBm
Impedance	600 $\Omega$
Selectable Threshold	
Below the normal input level	3, 6, 10, 20 dB
Accuracy of Threshold	
For 3, 6, 10 dB	$\pm 1$ dB
For 20 dB	$\pm 2$ 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	0.6 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	

## GENERAL SPECIFICATIONS

### Power supply

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

### Charging

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

### Connectors

For mains or 12V car adapter	2.1/5.5 mm coaxial
Balanced connectors	4 mm banana sockets
Coaxial connectors	BNC 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

## ET91 - 2.4 MHz LEVEL TEST SET

### Over voltage protection

Between a and b or ground..... 200V DC

### 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<sup>3</sup>)

Limits of operation.....-5 to +45°C

Rel. humidity 5% to 95% \*(<29g/m<sup>3</sup>)

Storage and transport.....40 to +70°C

Rel. humidity 95% at +45°C \*(<35g/m<sup>3</sup>)

\* without condensation

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

**Weight** ..... approx. 1.5 kg

### ORDERING INFORMATION

**LEVEL TEST SET ET 91** ..... 437-000-000

#### Including:

Operating Manual

Calibration Certificate

CD (xxx version)

2 Balanced Measuring Cables

2 Coaxial Measuring Cables

USB cable

Mains adapter 100 to 264 VAC

Carrying case

#### OPTIONS

40 dB External Attenuator ..... Y 107-439

Group Delay Distortion

Measurement ..... SW437-570-000

Phase Jitter and Freq. Error Meas. SW437-560-000

Micro Interrup-  
tion Measurement ..... SW437-530-000

Spectrum referencia result ..... SW437-590-000

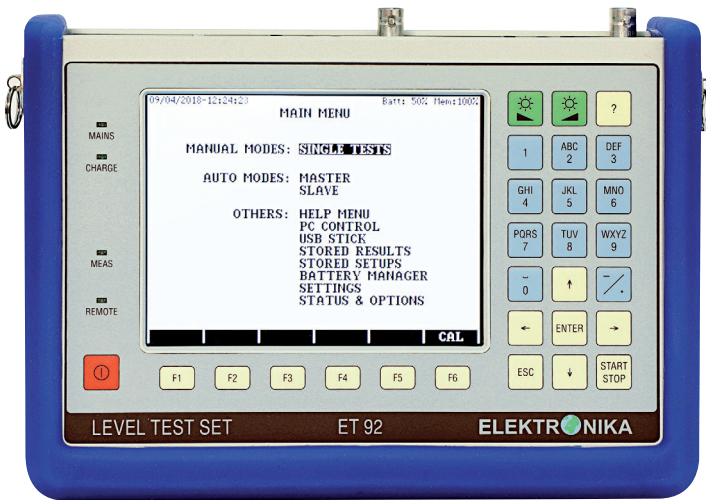
Spectrogram SW set ..... SW437-580-000

PC control program (result transfer

and parameter editor) ..... SW 437-100-000

## ET92 6 MHz LEVEL TEST SET

Tester of analog links low frequency



### APPLICATIONS

The **LEVEL TEST SET ET 92** is a hand held battery operated, multifunction measuring instrument, intended for the test of Carrier Frequency Systems, Power Line Carrier, Tone, and FSK Communications Systems. In selective receiving mode five special bandwidths are provided for the measurement of noise, carrier leak, cross-talk and non-linear distortion. Numerous useful software options are provided to make ET 92 more effective.

#### Comfortable Frequency Setting Modes

Test instructions of FDM systems often specify the test frequency in format: Carrier  $\pm$  Channel Frequency.

In compliance with the mentioned format ET 92 provides the separate setting of carrier and audio frequencies and so:

**No frequency calculation is required!**

#### Comfortable Frequency Tracking Modes

The test procedure of FDM equipment usually requires different generator and level meter frequency settings. For example:

Feeding audio frequency test signal to the input of the tested channel on the following frequencies:

1000, 1200, 1400, 1600, etc Hz

Selective level measurement at a designated test point of the tested equipment on the following frequencies:

Carrier + 1000, 1200, 1400, 1600, etc Hz or

Carrier - 1000, 1200, 1400, 1600, etc Hz

Using up the advantageous feature of ET 92 that the generator and the level meter are in the same instrument extremely comfortable tracking modes are provided. In these modes the selective level meter is controlled by the generator according to the above mentioned rules.

**No frequency calculation is required !**  
**Only one frequency setting is required !**

### FOUR INSTRUMENTS IN ONE

#### 100Hz to 2400 kHz Level Generator

or the generation of measuring voltage for the test of different FDM and tone frequency transmission systems.

#### 100Hz to 2400 kHz Level Meter

For selective and wideband level measurements with auto ranging

#### Spectrum Analyzer

For the measurement of transmission characteristics as well as cross-talks and other interference signals.

#### Event Counter

For the simultaneous counting of Amplitude hits, Phase hits, Interruptions and Noise Impulses.

#### Comfortable End to End Measurements

For the test of cables and voice channels in Master-Slave mode. The Master initializes the measurements and collects the results. The Slave performs the measurements according to the Master's commands and sends back the results. The two instruments communicate over the tested line.

#### High Resolution Spectrum Analyzer

ET 92 provides a high sensitivity spectrum analyzer suitable for the measurement of transmission characteristics as well as cross-talks and other interference signals.

The obtained spectrum trace can be evaluated in four modes like: NORM, PEAK, AVG, SAVG and interpreted in dBm or dBm/Hz

#### PC supported Spectrogram (Option)

The purpose of Spectrogram PC program is to boost the spectrum measurement abilities of ET 92 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.

#### USB Ports for Result and Setup Transfer

ET 92 has two USB ports for data transfer: USB A host port for USB stick USB B device port for PC connection

The USB stick provides data transfer between a PC and ET 92 without installing a special device driver to the PC. This solution is advantageous for the user who does not have administrative right to install a special driver to his PC.

#### Memory for Test Setups

ET 92 provides 100 memory locations for user defined test setups and limit values for the evaluation of test results.

## ET92 - 6 MHz LEVEL TEST SET

## SPECIFICATIONS

### Transmitter

Transmitting Modes..... 1 FREQ, MTTs or SWEEP  
 Frequency Range..... 100 Hz to 6 MHz in 1 Hz steps  
 Frequency Accuracy.....  $2 \times 10^{-6} \pm 1$  Hz  
 Balanced and Coaxial Outputs  
 10 kHz to 6 MHz..... ~0, 75, 135, 150  $\Omega$   
 100 Hz to 10 kHz..... ~0, 600  $\Omega$   
 Level Range of Balanced Output  
 For all impedances..... +10 to -50 dBm, dB  
 Level Range of Coaxial Output  
 ~0,  $\Omega$ ..... +10 to -50 dBm, dB  
 75, 135, (125) 150  $\Omega$ ..... +10 to -50 dBm  
 600  $\Omega$ ..... +4 to -50 dBm  
 Level Resolution..... 0.1 dB  
 Level Accuracy at 0 dBm Freq.>200Hz.....  $\pm 0,3$  dB

### Selective receiver

Receiving Modes..... 1 FREQ, MTTs or SWEEP  
 Frequency Range..... 100 Hz to 6 MHz  
 Frequency Accuracy.....  $2 \times 10^{-6} \pm 1$  Hz  
 Direct Frequency Setting..... in 1 Hz steps  
 Frequency Setting in Carrier  $\pm$  Tone Format  
 Carrier Frequency . 4 to 5996 kHz in 1 kHz steps  
 Tone Frequency 100 Hz to 3,9 kHz in 1 Hz steps  
 Band width  
 200 Hz to 10 kHz..... 20 Hz  
 10 kHz to 6 MHz. 20, 200 Hz, 1,74, 1,95, 3.1 kHz  
 Balanced and Coaxial Inputs  
 10 kHz to 6 MHz..... 75, 135, (125), 150  $\Omega$  or high  
 100 Hz to 10 kHz..... 600  $\Omega$  or high  
 Measuring Range  
 With 20 Hz band width..... -120 to +10 dB  
 Level Resolution..... 0.1 dB  
 Level Accuracy at 0 dBm, Freq.>200Hz.....  $\pm 0,3$  dB

### Wideband Receiver

Impedance Balanced and Coaxial Inputs  
 10 kHz to 6 MHz..... 75, 135, (125), 150  $\Omega$  or high  
 100 Hz to 10 kHz..... 600  $\Omega$  or high  
 Selectable 3 dB Band Filters Measuring ranges  
 100 Hz to 4kHz..... -100 to +10 dB  
 1,2 to 120 kHz..... -90 to +10 dB  
 3 kHz to 300 kHz..... -90 to +10 dB  
 6 kHz to 600 kHz..... -80 to +10 dB  
 15 kHz to 1,5 MHz..... -70 to +10 dB  
 30 kHz to 3 MHz..... -60 to +10 dB  
 60 kHz to 6 MHz..... -50 to +10 dB  
 Level Resolution..... 0.1 dB  
 Level Accuracy at 0 dBm, Freq.>200Hz.....  $\pm 0,3$  dB

### Receiver - Transmitter Tracking Mode

The receiver is controlled by the transmitter  
 Tx Frequency..... 100 Hz to 3,9 kHz in 1 Hz steps  
 Carrier Frequency..... 4 to 5996 kHz in 1 kHz steps  
 Receiver Frequency = Carrier  $\pm$  Tx Frequency

### Wideband Noise Measurement

Frequency Range..... 100 Hz to 6 MHz  
 Weighting Filters..... Psophometer (O.41)  
 Psophometer & Notch (O.132)  
 3.1, 4, 120, 300, 600 kHz  
 1.5, 3, 6 MHz  
 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

Pulse width..... >500 ns  
 Interval size..... 10 ms  
 Threshold range..... to 500 mV  
 Maximum count..... 65000  
 Measurement times..... 1, 5, 10, 30 sec  
 1, 5, 10, 30 tmin  
 1, 2, 4, 8, 12, 24, 48, 72 hours

### Evaluation

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

### Spectrum Analyzer

Frequency Range..... 100 Hz to 6 MHz  
 Line impedances at Balanced and Coaxial Inputs  
 10 kHz to 6 MHz..... 75, 135, 150  $\Omega$  or High  
 100 Hz to 10 kHz..... 600  $\Omega$  or High

Frequency Range	Bandwidth. & Fr. Step
6 MHz	500 Hz to 20 kHz
3 MHz	500 Hz to 10 kHz
1,5 MHz	500 Hz to 5 kHz
600 kHz	500 Hz to 2 kHz
300 kHz	500 Hz to 1 kHz
20 kHz	50 Hz to 100 Hz
4 kHz	10 Hz to 20 Hz

Display range..... down to -140 dBm/Hz  
 Number of displayed frequencies..... 300  
 Saving of result..... the actual content of display  
 Evaluation..... NORM, PEAK, AVG, SAVG  
 Units..... dB, dBm, dBm/Hz  
 NEXT / LOSS Measurement  
 Frequency Range..... 100 Hz to 6 MHz  
 Frequency Setting Mode..... Fix frequ or sweep  
 Sweep Ranges. 4, 120, 300, 600 kHz 1.5, 3, 6 MHz Resolution.....  
 Automatically changed with range  
 Output Impedances  
 10 kHz to 6 MHz..... 75, 135, 150  $\Omega$   
 100 Hz to 10 kHz..... 600  $\Omega$   
 Input Impedances  
 10 kHz to 6 MHz..... 75, 135, 150  $\Omega$  or High  
 100 Hz to 10 kHz..... 600  $\Omega$  or High  
 Measuring range..... up to 80 dB

## ET92 - 6 MHz LEVEL TEST SET

### Micro Interruption Measurement (SW Option)

Test Signal	
Frequency.....	1020 Hz
Input level.....	from 0 to -30 dBm
Impedance.....	600 Ω
Selectable Threshold	
Below the normal input 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.....	0.6 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	

### PC Control Program (SW Option)

The purpose of the control program data transfer between ET 92 and PC via USB interface. The program provides four functions:

- Test result transfer and post processing
- Test setup transfer and edition
- Checking the features of ET 92
- Spectrogram control

### Spectral Trace as Reference (SW Option)

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

### External Attenuator (HW Option)

Attenuation.....	40 dB
Frequency Range.....	10 kHz to 2400 kHz
Accuracy.....	±0.5 dB
Max. input level.....	+40 dB
Input Impedance.....	>3.7 kΩ Coax
Output connector.....	Balanced

### Group Delay Distortion Measurement (SW Option)

Test signal.....	37MTT, 200 to 3700 Hz
Resolution.....	100 Hz
Z output / input.....	600 Ω
Output level.....	30 dB/tone (-7dB peak)
Input level range.....	-60 to -20 dB/tone
Group delay distortion range.....	0 to 10 ms
Resolution.....	1μs
Accuracy.....	According to ITU.O.81

### Phase Jitter & Frequ Error Meas. (SW Option)

Test signal.....	1020 Hz, 0 to -30 dBm
------------------	-----------------------

### Phase Jitter measurement (O.91)

Measuring range.....	0.2 to 30.0 degrees p-p
Filter.....	4 to 300 Hz

### Frequency Error Measurement

Measuring range.....	± 30 Hz
Resolution.....	0.1 Hz

### Simultaneous Event Counting (SW. Option)

Measurement times.....	5, 15, 30, 60 min
Test signal.....	1020 Hz, 0 to -30 dBm
Maximum count for each counter.....	65000

### Amplitude Hit Counter (O.95)

Threshold range.....	2 to 9 dB
Guard interval.....	4 ms
Dead time.....	125± 25 ms
Dead time after interruption (>10 dB drop).....	1 s

### Phase Hit Counter (O.95)

Threshold range.....	5 to 45°
Guard interval.....	4 ms
Dead time.....	125± 25 ms

### Interruption counter (O.61)

Threshold.....	6, 10 dB
Guard interval.....	2 ms
Dead time.....	3± 1 ms

### Impulsive Noise counter (O.71)

Filter.....	1020 Hz Notch
Guard interval.....	20 μs
Dead time.....	125 ± 25 ms
Threshold range.....	0 to -50 dBm

The **Spectrogram PC Program** is an excellent tool of ET 92 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 ET 92 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.

## ET92 - 6 MHz LEVEL TEST SET

### GENERAL SPECIFICATIONS

#### Power supply

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

#### Charging

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  
 Balanced connectors.....4 mm banana sockets  
 Coaxial connectors.....BNC sockets  
 USB A .....USB 1.1 host port for USB stick  
 (FAT16, FAT32 file system supported)  
 USB B.....USB 1.1 device port to connect PC

#### Over voltage protection

Between a and b or ground..... 200V DC

#### Ambient temperature ranges

Reference ..... 23± 5°C  
 Rel. humidity 45% to 75%  
 Normal operation.....0 to +40°C  
 Rel. humidity 30% to 75% \*( $<25\text{g}/\text{m}^3$ )  
 Limits of operation ..... -5 to +45°C  
 Rel. humidity 5% to 95% \*( $<29\text{g}/\text{m}^3$ )  
 Storage and transport.....40 to +70°C  
 Rel. humidity 95% at +45°C \*( $<35\text{g}/\text{m}^3$ )

\* without condensation

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

**Weight**.....approx. 1.5 kg

**LEVEL TEST SET ET 92** ..... 443-000-000

#### Including:

Operating Manual  
 Short form operation instruction  
 Calibration Certificate  
 CD (xxx version)  
 2 Balanced Measuring Cables  
 2 Coaxial Measuring Cables  
 USB cable  
 USB stick  
 Mains adapter  
 Carrying case  
 Battery (built-in)

#### HW Options:

40 dB External Attenuator coax..... Y 107-439  
 40 dB External Attenuator balance ..... Y 107-448  
 Car lighter power adapter EAA 10..... 367-000-000

#### SW Options:

Micro Interruption Measurement..... SW443-530-000  
 Synchronous Event Counter..... SW443-540-000  
 Group Delay Distortion Meas ..... SW443-550-000  
 Phase Jitter and Frequ. Error Meas SW443-560-000  
 Spectrogram SW set..... SW443-580-000  
 Spectral Trace as Reference ..... SW443-590-000  
 PC Control Program ..... SW443-100-000