



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 6 MHz Level Generator

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

• 100Hz to 6 MHz 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.

SPECIFICATIONS**Transmitter**

Transmitting Modes
1 FREQ (Transmitting one single frequency)
MTTS (Multi Tone Test Signal) 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 Ω
100 Hz to 10 kHz ~0, 600 Ω
Level Range of Balanced Output
For all impedances +10 to -50 dBm, dB
Level Range of Coaxial Output
~0, Ω +10 to -50 dBm, dB
75, 135, (125) 150 Ω +10 to -50 dBm
600 Ω +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 (Receiving one single frequency)
MTTS (Multi Tone Test Signal) 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 Ω or high
100 Hz to 10 kHz 600 Ω 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 Ω or high
100 Hz to 10 kHz 600 Ω 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 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 6 MHz
Line impedances at Balanced and Coaxial Inputs
10 kHz to 6 MHz 75, 135, (125), 150 Ω or High
100 Hz to 10 kHz 600 Ω 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, (125), 150 Ω
100 Hz to 10 kHz 600 Ω
Input Impedances
10 kHz to 6 MHz 75, 135, (125), 150 Ω or High
100 Hz to 10 kHz 600 Ω or High
Measuring range up to 80 dB

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

Spectrogram (SW Option)

The purpose of Spectrogram Option is to boost the spectrum measurement abilities of ET 92 utilizing the memory capacity of a PC or USB stick.

In spectrogram mode ET 92 performs spectrum measurements in every second and the obtained results are continuously transferred to the supporting device.

If the supporting device is a PC then ET 92 is remote controlled by the PC. The spectrum is displayed on a 3 dimension picture.

- The time is on the vertical axis
- The frequency is on the horizontal axis
- The level is interpreted in form of colors

If the supporting device is an USB stick then ET 92 is not interconnected with the PC during the measurement. The results are stored in a user defined file of the USB stick and they can be transferred to the PC later.

The large memory capacity of PC or USB stick allows the storage of results up to 72 hours.

PC Control Program (SW Option)

The purpose of the control program is to establish 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

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.....	1 μ s
Accuracy.....	According to ITU.O.81

Phase Jitter & Frequ Error Meas. (SW Option)

Test signal.....	1020 Hz, 0 to -30 dBm
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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 \pm 25 ms
Dead time after interruption (>10 dB drop).....	1 s

Phase Hit Counter (O.95)

Threshold range.....	5 to 45 $^\circ$
Guard interval.....	4 ms
Dead time.....	125 \pm 25 ms

Interruption counter (O.61)

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

Impulsive Noise counter (O.71)

Filter.....	1020 Hz Notch
Guard interval.....	20 μ s
Dead time.....	125 \pm 25 ms
Threshold range.....	0 to -50 dBm

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 k Ω Coax
Output connector.....	Balanced
ET92 settings.....	Balanced, Underminated, dB

GENERAL SPECIFICATIONS**Power supply**

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

Charging

From 230V mainswith 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 adapter2.1/5.5 mm coaxial
 Balanced connectors4 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

Reference23±5°C
 Rel. humidity 45% to 75%
 Normal operation0 to +40°C
 Rel. humidity 30% to 75% *(<25g/m³)
 Limits of operation -5 to +45°C
 Rel. humidity 5% to 95% *(<29g/m³)
 Storage and transport-40 to +70°C
 Rel. humidity 95% at +45°C *(<35g/m³)
 * without condensation

Dimensions 224 x 160 x 44 mm

Weight approx. 1.5 kg

ORDERING INFORMATION

LEVEL TEST SET ET 92443-000-000

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)

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
 Micro Interruption MeasurementSW443-530-000
 Synchronous Event CounterSW443-540-000
 Group Delay Distortion
 MeasurementSW443-550-000
 Phase Jitter and Frequ. Error Meas.SW443-560-000
 Spectrogram SW setSW443-580-000
 Spectral Trace as ReferenceSW443-590-000
 PC Control Program.....SW443-100-000

DATA SUBJECT TO BE CHANGED WITHOUT PRIOR NOTICE
 PR443-014-004E

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