

# **ELQ 30 / ELQ 30A**

**PC Control Program  
(ELQ30c.exe / ELQ30Ac.exe)  
for Data transfer, Parameter Edition  
and Spectrogram measurements**

**SW 409-510-000 / SW 433-510-000  
SW 409-520-000 / SW 433-520-000  
SW 409-570-000 / SW 433-570-000**

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Operating Manual

OM-409-530-013 E

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# CONTENTS

<b>1</b>	<b>Introduction .....</b>	<b>1-1</b>
<b>2</b>	<b>Changing The Program Language.....</b>	<b>2-1</b>
<b>3</b>	<b>Test Result Processing Function .....</b>	<b>3-1</b>
3.1	Test Result Transfer between ELQ 30/ELQ 30A and PC.....	3-1
3.2	Display of Test Results.....	3-2
3.3	Test Protocol Format Selection .....	3-8
3.4	Printing of Test Protocols .....	3-10
<b>4</b>	<b>Parameter Set Processing Function.....</b>	<b>4-1</b>
4.1	Creating System Dependent Parameter Sets .....	4-1
4.2	Creating System Independent Parameter Sets.....	4-6
4.3	Creating Modified Parameter Sets .....	4-7
4.4	Parameter Set Transfer between ELQ 30/ELQ 30A and PC.....	4-9
<b>5</b>	<b>Checking The Status And Options .....</b>	<b>5-1</b>
<b>6</b>	<b>SPECTROGRAM .....</b>	<b>6-1</b>
6.1	General introduction.....	6-1
6.2	Settings before start .....	6-3
6.3	Start the measurement.....	6-5
6.4	Evaluation of test results .....	6-8

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## 1 INTRODUCTION

**ELQ 30/ELQ 30A PC Control Program** provides data transfer between ELQ 30/ELQ 30A and PC. ELQ 30/ELQ 30A can be connected to a PC via USB B interface. When you first connect ELQ 30/ELQ 30A to a PC, you need to install a device driver supplied with ELQ 30/ELQ 30A.

**ELQ 30/ELQ 30A PC Control Program** has three functions:

- Test result transfer and post processing.
- Parameter set transfer and edition.
- Checking the features of ELQ 30/ELQ 30A.

The purposes of result transfer function:

- Result transfer between ELQ 30/ELQ 30A and PC
- Display of test results in numeric and graphic forms
- Production of protocols in selectable size and file format
- Printing of test protocols

The purposes of parameter editor function:

- To create new parameter sets for system dependent tests
- To create new parameter sets for system independent tests
- To create modified versions of existing parameter sets.
- Direct communication with the test parameter memory of ELQ 30/ELQ 30A

The purposes of checking function:

- Checking the HW version
- Checking the SW version
- Checking the calibration time etc.

**Important note:**

**The result transfer, editor and spectrogram functions can be used only if one or all of the following programs are activated in ELQ 30/ELQ 30A**

PC Software for test result transfer.....	SW 409-510-000 or SW 433-510-000
PC Software for parameter set edition.....	SW-409-520-000 or SW-433-520-000
PC Software for spectrogram .....	SW-409-570-000 or SW-409-570-000

For activation please turn to the supplier!

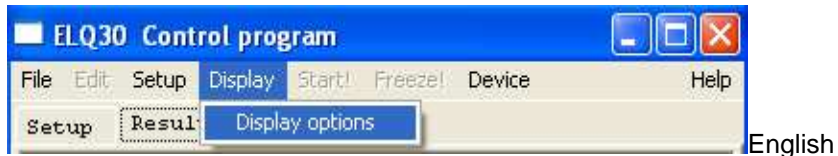


## 2 CHANGING THE PROGRAM LANGUAGE

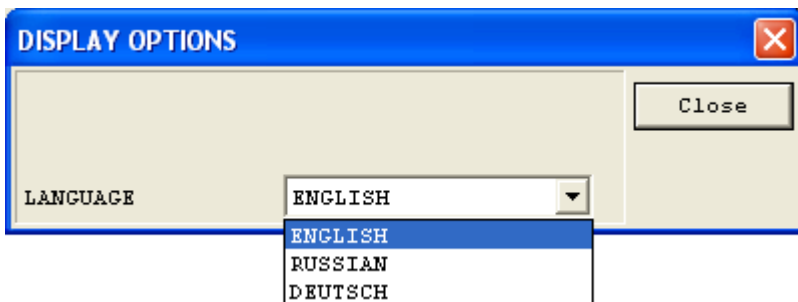
The user can change the display language of the **ELQ 30/ELQ 30A Control Program**. After the first program start the language is English.

To change the language do following:

- Open the **ELQ 30c.exe/ ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Display (English) / Anzeige (German)**
- After this click on **Display options (English) / Anzeigeeoptionen (German)**



Now following appears on screen:



- Choose the required language in the Combobox **LANGUAGE** by clicking on the ▼ button and the language
- Clicken on **Close (English) / Schliessen (German)**

Before exit the program saves its current settings (i.e. also display language) into the file **ELQ30c.ini/ELQ 30Ac.ini**, so it can start next time using these settings. This means you have to set the language only once at the first program start.





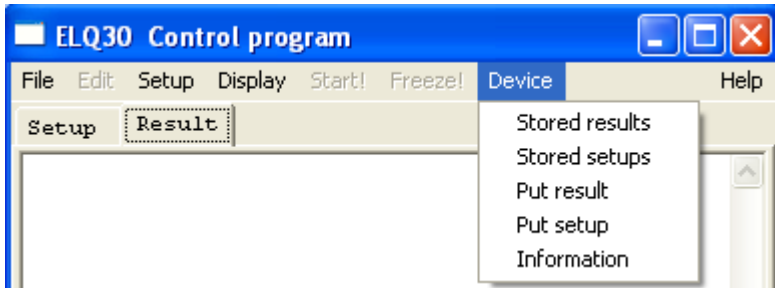
### 3 TEST RESULT PROCESSING FUNCTION

The ELQ30c.exe/ELQ 30Ac.exe Control Program file offers useful tools for the user:

- Result transfer between ELQ 30/ELQ 30A and PC
- Display of test results in numeric and graphic forms
- Test protocols in selectable size and file format
- Printing of test protocols

#### 3.1 Test Result Transfer between ELQ 30/ELQ 30A and PC

- Enter the **PC CONTROL** option of **MAIN MENU** of ELQ 30/ELQ 30A
- Interconnect the **USB Device Port** of ELQ 30/ELQ 30A with the PC
- Open the **ELQ 30c.exe/ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Device**



- Click on **Stored results** and the list of stored results appears

Stored results in device		
RESULT NAME	MEASURING MODE	START TIME
NAME 1	RECEIVING	15/07/2006-09:45:08
NAME 2	BALANCE	15/07/2006-09:45:42
NAME 3	RETURN LOSS	15/07/2006-09:46:31
NAME 4	IMPEDANCE	15/07/2006-09:47:09
NAME 5	WIDEBAND NOISE	15/07/2006-09:48:08
NAME 6	SPECTRUM	15/07/2006-09:48:46

Get    Get all    Delete    Clear    Close

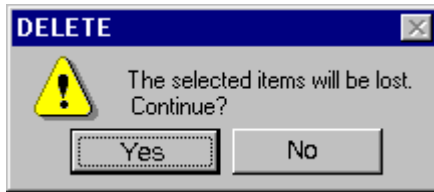
Getting test results from ELQ 30/ELQ 30A

- Select the result or files to be transferred to PC
- Click on **Get** or **Get all** button
- Save the result file or files (\*.res) to the required folder of PC

Deleting of test result from the result memory of ELQ 30/ELQ 30A

- Select the result to be deleted and click on the **DELETE** button or
- To delete all the result files click on the **EMPTY** button

The selected result will be removed only after confirmation

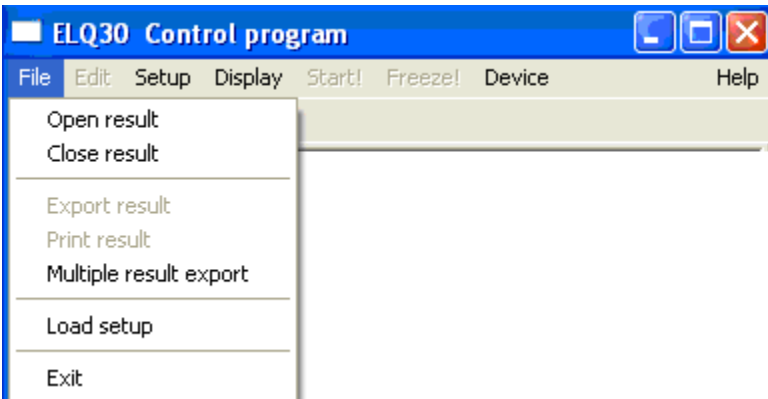


- For confirmation click on the **Yes** button

### 3.2 Display of Test Results

Displaying of ELQ 30/ELQ 30A result files stored on PC

- Run the **ELQ 30c.exe/ELQ 30c.exe** file
- When the initial screen appears click on **File**

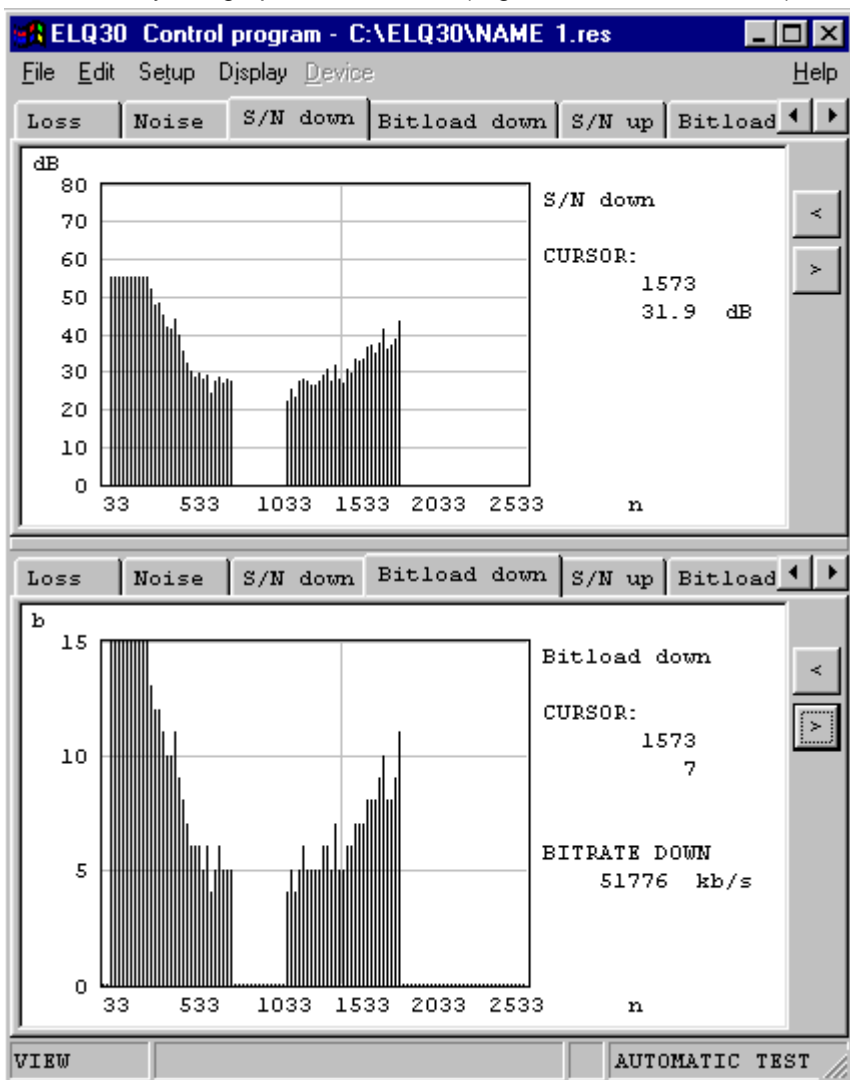


- Click on **Open results**
- Select and open the result file to be displayed.

### Test results of automatic test sequences

The automatic test sequences consist of numerous test results. All of them can be displayed in list and graphic form as well. The ELQ 30/ELQ 30A Control Program provides two independent windows:

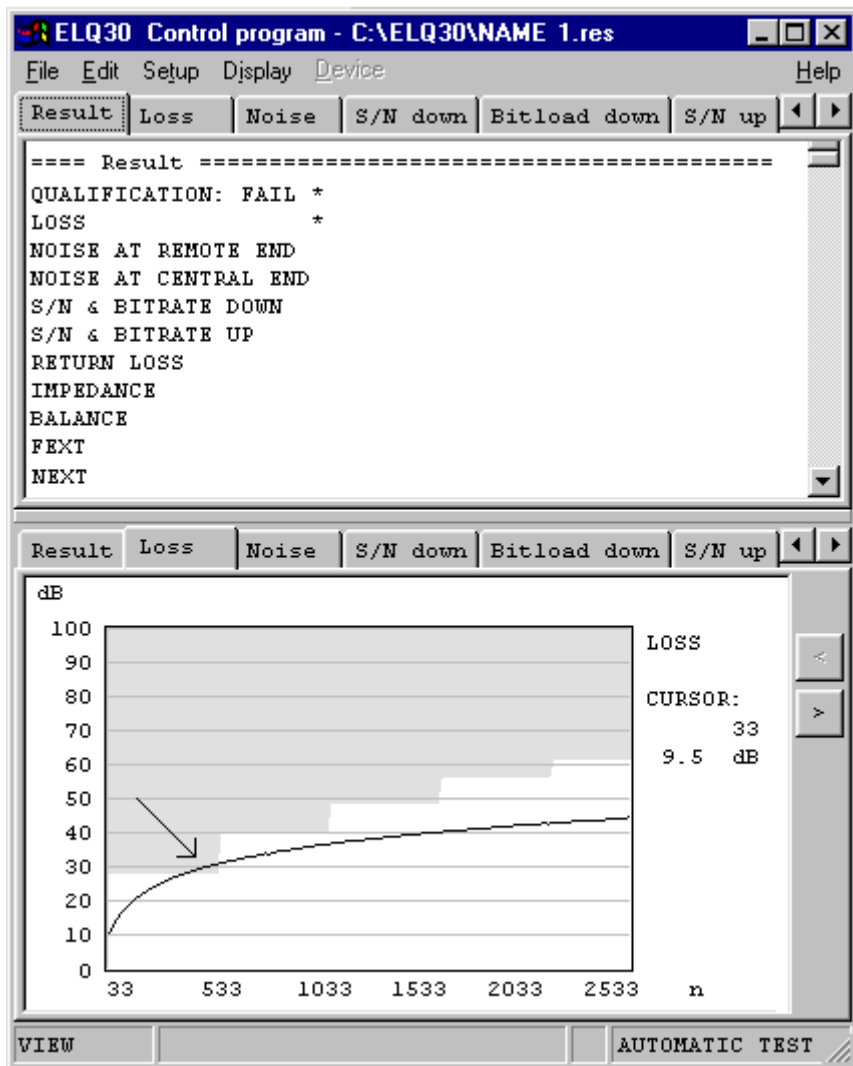
- To study the list and graphic form results together
- To study two graphic form results (E.g. S/N and bit load down)



Clicking on the **Result** key of the upper window short test report appears containing the **PASS/FAIL** qualification.

In case of **FAIL** indication the reasons of failure are indicated with asterisks (E.g. Loss on the next picture)

Clicking on the **Loss** key of down window the result of loss measurement appears in graphic form showing the template violation.



The list form results of the different measurements are collected together and they are displayed above each other. The required one can be reached by scrolling up and down with the vertical cursor keys.

The actually active window can be quickly:

- Copied to the clipboard of PC.
- Printed out
- Exported in txt or rtf output format

These quick services can be reached by clicking on **Edit**

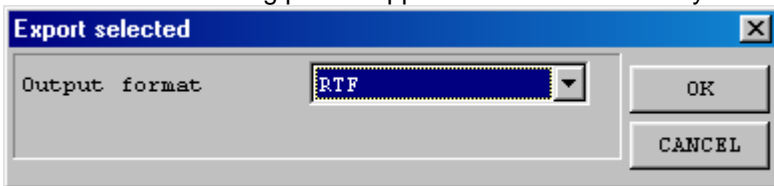


The output file format depends on the content of the actual windows. Selectable output file formats:

- **RTF** when the actual window shows a graphic result
- **RTF** or **Text** when the actual window shows a list

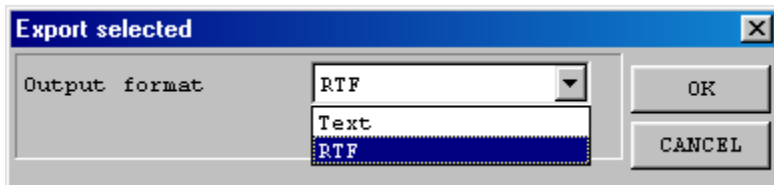
To perform a file export when the active window is graphic:

- Click on Export
- When the following picture appears click on the **OK** key



To perform a file export when the active window is text

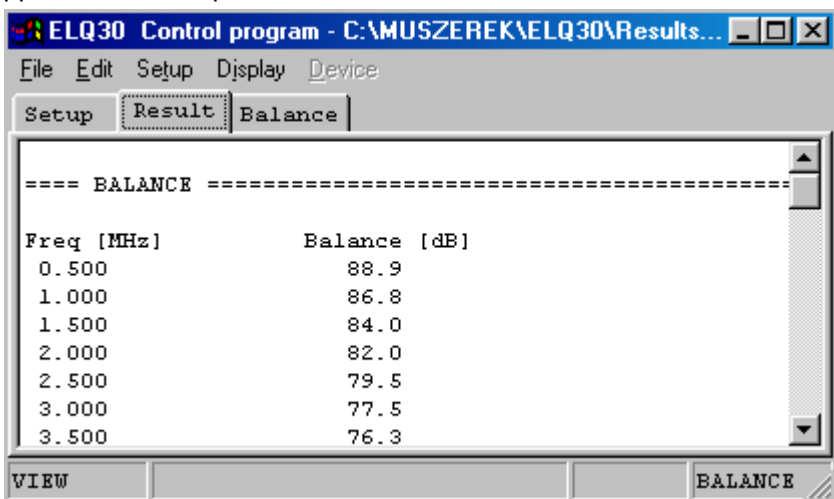
- Select the part of text to be exported
- Click on Export
- When the following picture appears select the output format



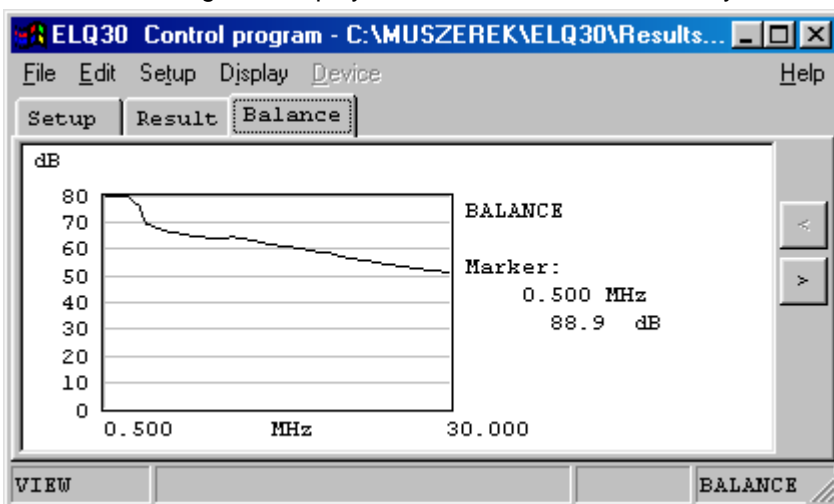
- Click on the **OK** key

### Test results of single measurements

The test results are available in list and graphic form. First the list form appears. For example at balance measurement:



To change the display mode click on the **BALANCE** key.



To return to list form display mode click on the **Result** key

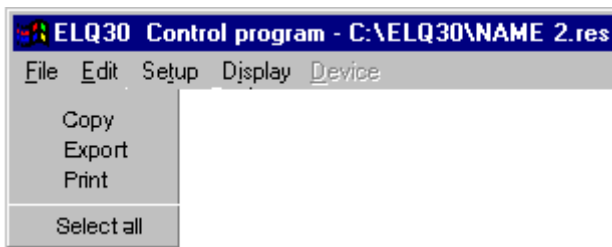
For evaluation of the test result a vertical cursor line can be placed to the diagram by clicking on any point of the result area. The result belonging to the cursor position is displayed beside the diagram.

The marker can be shifted by clicking on the < > keys.

The actually active window can be quickly:

- Copied to the clipboard of PC.
- Printed out
- Exported in txt or rtf output format

These quick services can be reached by clicking on **Edit**



### 3.3 Test Protocol Format Selection

The ELQ 30/ELQ 30A **Control Program** produces test protocols of different file formats and sizes.

Selectable file formats:

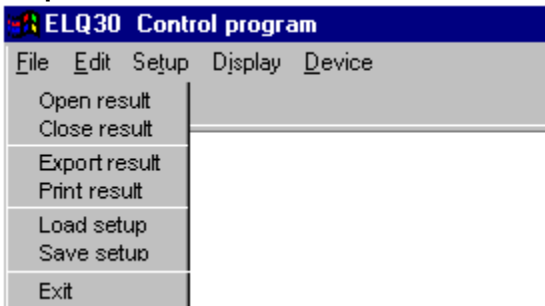
- **RTF** for Microsoft Word containing text and graphics
- **CSV** for Microsoft Excel containing text
- **Text**

The test protocol consists of four selectable parts:

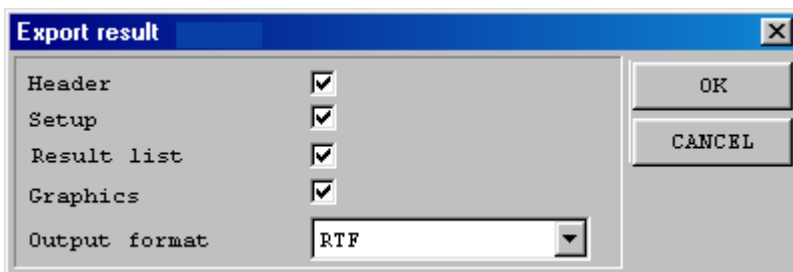
- **Header** (File name, measuring mode, start time, operator's name)
- **Setup** (Device serial number, SW version, templates in auto mode)
- **Results in list form** (Result lists, Pass/Fail report in auto mode)
- **Results in graphic form**

To produce a test protocol file:

- Click on **File**
- Click on **Export result**



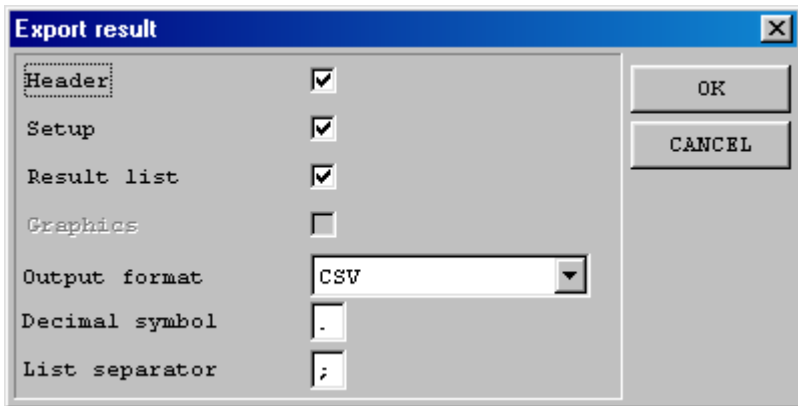
Doing so the following display appears:



- Specify the file format and the size of test protocol
- Click on the **OK** key
- Save the test protocol file



If output format is set to **CSV** (Microsoft Excel file), there will appear two additional fields after the field **Output format**:



**Decimal symbol** is the character that separates the integer part from the fractional part in a number, e.g here the point: so three point fourteen is 3.14.

**List separator** is the character that separates numbers in a row, e.g. here the semicolon: so one row looks like this: 3.14;5.22;6.33;...

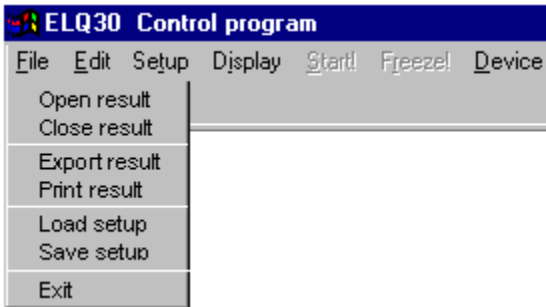
### 3.4 Printing of Test Protocols

The printed test protocol consists of four selectable parts with different sizes. In case of long program at auto mode the page numbers:

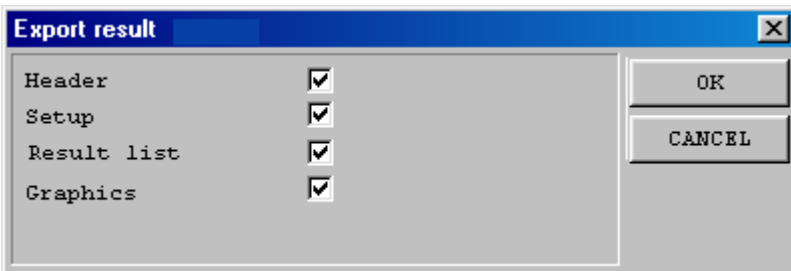
- Header** ..... a few rows
- Setup** ..... ~ 2 pages
- Result in list form** ..... ~20 pages
- Results in graphic form** ..... ~5 pages

To print a test protocol:

- Click on **File**
- Click on **Print result**



Doing so the following display appears:



- Specify the content of test protocol
- Click on the **OK** key
- Perform the printing

## 4 PARAMETER SET PROCESSING FUNCTION

The parameter editor function of the **Control Program** is for processing setup files (\*.set) containing test parameter sets for automatic tests.

There are two types of automatic tests:

- VDSL system dependent tests with data rate calculation
- System independent tests without data rate calculation

The purposes of Parameter Editor:

- To create new parameter sets for system dependent tests
- To create new parameter sets for system independent tests
- To create modified versions of existing parameter sets.
- Direct communication with the test parameter memory of ELQ 30

### 4.1 Creating System Dependent Parameter Sets

The test parameter set of a VDSL system can be included in four groups therefore the Parameter Editor provides four forms to be filled:

- **SYSTEM PARAMETERS**
- **CABLE PARAMETERS**
- **UPSTREAM PSD TEMPLATE**
- **DOWNSTREAM PSD TEMPLATE**

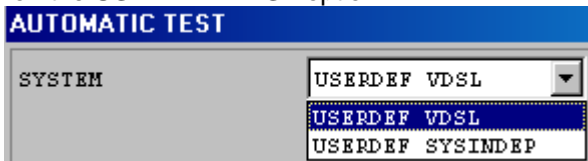
Having these forms properly filled the new parameter set is defined.

To reach the forms:

- Open the **ELQ 30c.exe/ ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Setup**
- Click on **Test setup-Editor**



- When the next window appears click on the system selector ▼
- Click on the **USERDEF VDSL** option



Doing so the following system parameter form appears (Other pages can be reached by clicking on the appropriate button):

#### Definition of system parameters

The screenshot shows a dialog box titled "AUTOMATIC TEST" with a close button (X) in the top right corner. The dialog is divided into two main sections. The left section contains a list of system parameters, each with a corresponding input field and unit. The right section contains three buttons: "Close", "Get Std", and "Save setup".

Parameter	Value	Unit
SYSTEM	USERDEF WDSL	
MIN RATE UP	0	kb/s
MIN RATE DOWN	0	kb/s
MAX TX POWER UP	0.00	dBm
MAX TX POWER DOWN	0.00	dBm
MAX BITLOAD UP	2	
MAX BITLOAD DOWN	2	
CODING GAIN UP	0.00	dB
CODING GAIN DOWN	0.00	dB
NOISE MARGIN UP	0.00	dB
NOISE MARGIN DOWN	0.00	dB
SUB-CHANNEL SPACING	4.3125 kHz	

Buttons on the right side of the dialog:

- Close
- Get Std
- Save setup

Buttons at the bottom of the dialog:

- UPSTREAM TX PSD
- DOWNSTREAM TX PSD
- CABLE PARAMETERS
- MEAS SETTINGS

**Important note: All the cells of the form should be filled in!**

Definition of cable parameters

- Click on the **CABLE PARAMETERS** button and the next form appears:

CABLE PARAMETERS							
FREQ	LOSS	IMPED	IMPED	BAL	RETL	NEXT	FEXT
n	dB	Ohm	Ohm	dB	dB	dB	dB
	MAX	MIN	MAX	MIN	MIN	MIN	MIN
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0
0	0.0	0	0	0.0	0.0	0.0	0.0

Filling the cells of the form **LOSS, IMPEDANCE, LCL, REFL, NEXT** and **FEXT** templates can be specified for **PASS/FAIL** indication.

The next figure shows the way of template definition

CABLE PARAMETERS				
FREQ	LOSS	IMPED	IMPED	BAL
n	dB	Ohm	Ohm	dB
	MAX	MIN	MAX	MIN
20				
150	VALUE	VALUE	VALUE	

Between these frequencies these values are used for PASS/FAIL decision. Having the form filled click on button **Close**.

### Definition of up and downstream TX PSD

The data transfer speed calculation is based on the S/N ratio.

Testing a passive line the noise can be measured but the signal not because there is no operating modem connected. The signal level should be calculated.

For this calculation we have to define the Tx PSD masks of the modem by filling the PSD template forms.

Click on the **UPSTREAM TX PSD** or **DOWNSTREAM TX PSD** button and one of the following forms appear

**DOWNSTREAM TX PSD** [X]

FREQ n	DS1 dBm/Hz	DS2 dBm/Hz	DS3 dBm/Hz

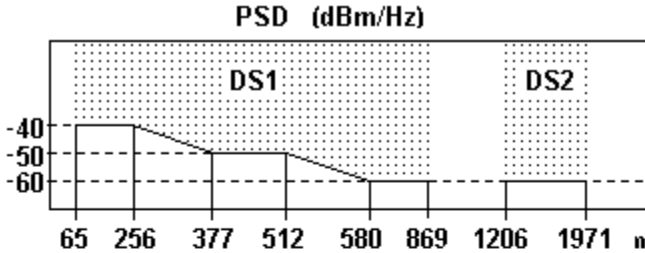
Close

**UPSTREAM TX PSD** [X]

FREQ n	US0 dBm/Hz	US1 dBm/Hz	US2 dBm/Hz	US3 dBm/Hz

Close

The next example shows the way of PSD definition



**DOWNSTREAM TX PSD**

FREQ n	DS1 dBm/Hz	DS2 dBm/Hz	DS3 dBm/Hz
65	-40.0		
256	-40.0		
377	-50.0		
512	-50.0		
580	-60.0		
869	-60.0		
1206		-60.0	
1071		-60.0	

Close

#### Saving the new parameter set

Having all the four forms properly filled the new parameter set is defined and can be saved into a file.

- Return to the system parameter window by closing the others.
- Click on the **Save setup** button

**Save setup**

SETUP NAME: USERDEF 12

OK

CANCEL

- Type in the name of the parameter set (ELQ 30/ELQ 30A will use this name)
- Click on the **OK** button
- Save the new setup file

## 4.2 Creating System Independent Parameter Sets

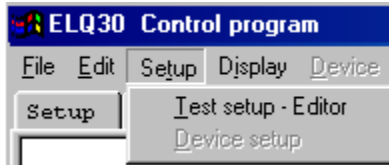
The test parameter set of a system independent test sequence can be included in two groups therefore the Parameter Editor provides two forms to be filled:

- **FREQUENCY RANGE**
- **CABLE PARAMETERS**

Having these forms properly filled the new parameter set is defined.

To reach the forms:

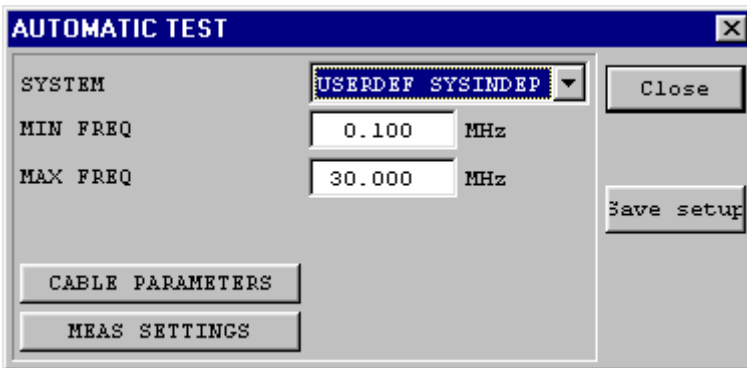
- Open the **ELQ 30c.exe/ ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Setup**
- Click on **Test setup-Editor**



- When the next window appears click on the system selector ▼
- Click on the **USERDEF SYSINDEP** option



Doing so the next window appears:



- Type in the limits of the frequency range (Frequency raster=5kHz)



ELQ 30/ELQ 30A divides the specified range into:

- 300 frequency steps at **LOSS** and **NOISE** measurements
- 60 frequency steps at the rest of the measurements

Note: However ELQ 30/ELQ 30A accept any **MIN FREQ** and **MAX FREQ** values the best quality result display can be reached when the measuring range (MAX FRQ-MIN FREQ) is the integer multiple of 300 kHz.

Definition of cable parameters and saving of the new parameter set can be done on the same way as in case of system dependent test

### 4.3 Creating Modified Parameter Sets

#### Modified versions of standard parameter sets

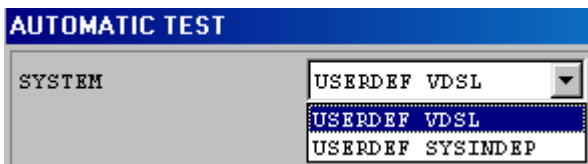
ELQ 30/ELQ 30A control program provides a useful tool for the users who want to modify only a few parameters of a standard parameter set. The standard parameter sets are available in the program and they can be used as sources. The only task is to modify the required cells of source and to save the modified parameter set under a new name.

To load the source parameter set

- Open the **ELQ 30c.exe/ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Setup**
- Click on **Test setup**



- When the next window appears click on the system selector ▼
- Click on the **USERDEF VDSL** option

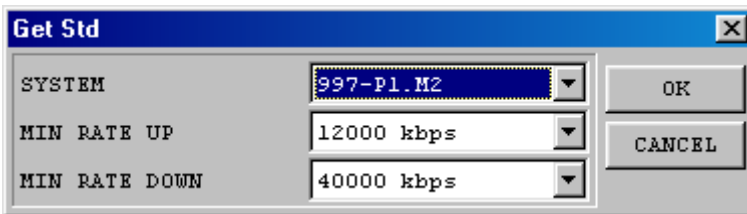


- Click on the **Get Std** button



When the **Get Std** window appears:

- Click on the **SYSTEM** selector ▼ and select the required source
- Click on the **MIN RATE UP** selector ▼ and select the rate up
- Click on the **MIN RATE DOWN** selector ▼ and select the rate down
- Click on the **OK** button



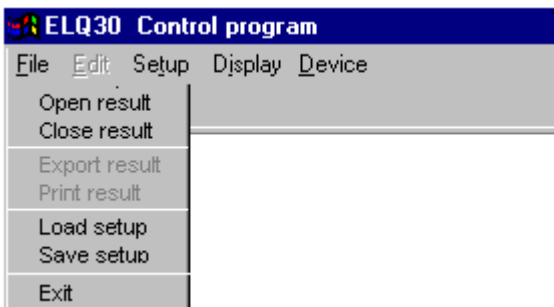
Doing so the source parameter set is ready for modification.

- Do the modifications
- Save the new parameter set under a new name

#### Modified version of user defined parameter sets

User defined parameter sets (set files) can be loaded for modification.

- Run the **ELQ 30c.exe/ELQ 30Ac.exe** file
- When the initial screen appears click on **File**

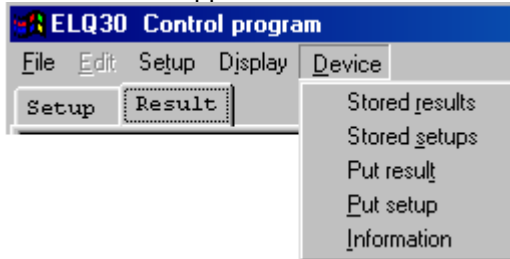


- Click on **Load setup option**
- Select and open the setup file to be modified

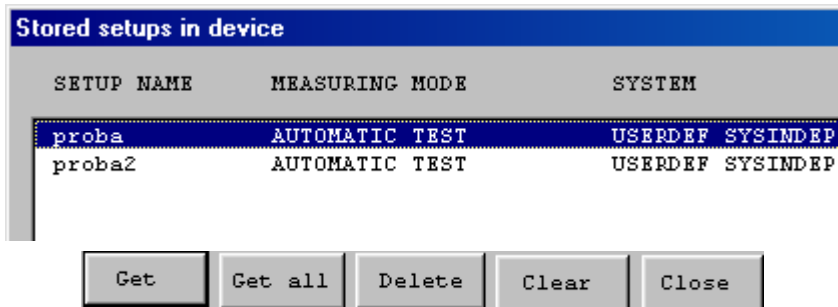
#### 4.4 Parameter Set Transfer between ELQ 30/ELQ 30A and PC

##### Transfer of parameter sets from ELQ 30/ELQ 30A to PC

- Enter the **PC CONTROL** option of **MAIN MENU** of ELQ 30/ELQ 30A
- Interconnect the **USB Device Port** of ELQ 30/ELQ 30A with the PC
- Open the **ELQ 30c.exe/ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Device**



- Click on **Stored setups** and the list of stored parameter sets appears



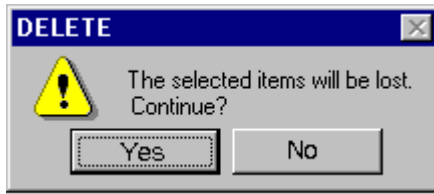
##### Getting parameter sets from ELQ 30/ELQ 30A

- Select the parameter set or sets to be transferred to PC
- Click on **Get** or **Get all** button
- Save the parameter file or files (\*.set) to the required folder of PC

##### Deleting of parameter set from the result memory of ELQ 30/ELQ 30A

- Select the parameter set to be deleted and
- Click on the **DELETE** key or
- To delete all the parameter sets click on the **EMPTY** key

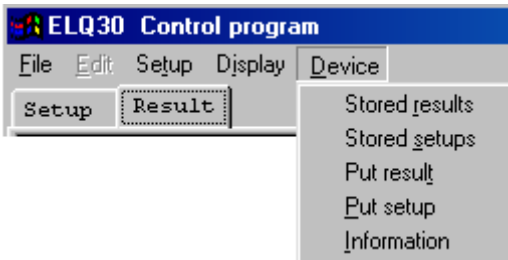
The selected result will be removed only after confirmation



- For confirmation click on the **Yes** key

#### Transfer of parameter sets from PC to ELQ 30/ELQ 30A

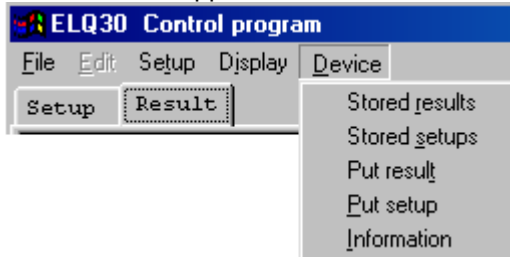
- Enter the **PC CONTROL** option of **MAIN MENU** of ELQ 30/ELQ 30A
- Interconnect the **USB Device Port** of ELQ 30/ELQ 30A with the PC
- Open the **ELQ 30c.exe/ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Device**



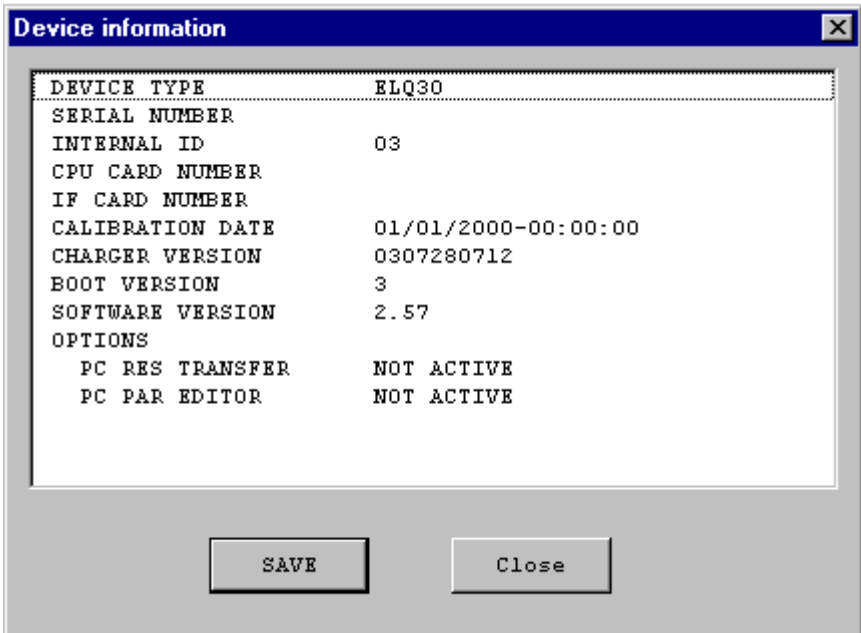
- Click on **Put setups** and the browser window of PC appears
- Select the parameter set or sets (\*set file) to be transferred
- Click on Open and the parameter set will be transferred

## 5 CHECKING THE STATUS AND OPTIONS

- Enter the **PC CONTROL** option of **MAIN MENU** of ELQ 30/ELQ 30A
- Interconnect the **USB Device Port** of ELQ 30/ELQ 30A with the PC
- Open the **ELQ 30c.exe/ELQ 30Ac.exe** file at the PC
- When the initial screen appears click on **Device**



- Click on **Information** and the and the following window appears:



To save the information in a txt file click on the **SAVE** button



## 6 SPECTROGRAM

### 6.1 General introduction

The purpose of Spectrogram PC program is to boost the spectrum measurement abilities of ELQ 30/ELQ 30A utilizing the memory capacity of a PC.

ELQ 30/ELQ 30A is remote controlled by the PC via USB port.

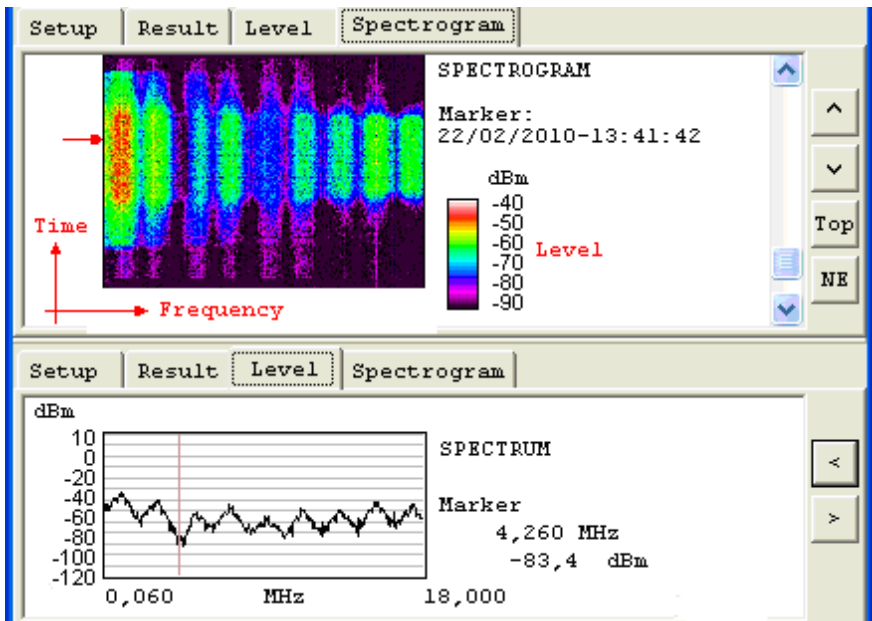
ELQ 30/ELQ 30A performs spectrum measurements in every second. The obtained results are continuously transferred to the PC to store and to display them. The large memory capacity of PC allows the storage the results of long test sequences up to 72 hours.

The spectrum is displayed on a 3 dimension picture.

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

The display field is vertically shared in to two parts to show different things at the same time. For example:

- The upper part shows the **spectrogram** itself
- The lower part shows the **level** versus frequency at the marker selected time



The test setup and the level in numeric form also can be displayed by clicking on the related name

The screenshot shows the 'ELQ30 Control program' window. The 'Result' tab is selected, displaying the following data:

```

==== ELQ30c V3,52 result =====
Result file name          Proba.res
MEASURING MODE           SPECTROGRAM
START TIME                22/02/2010-13:37:15
DURATION                  0-00:06:07
OPERATOR'S NAME
Auxiliary information
Customer name
Location of test
Object under test
Comment
  
```

Below this, the 'SPECTRUM' tab is selected, showing a table of frequency and level data:

```

==== SPECTRUM =====
MAX           0,960 MHz           -44,7 dBm
Freq [MHz]    Level [dBm]
0,060         -59,9
0,120         -54,3
  
```

At the bottom of the window, there are two buttons: 'VIEW' and 'SPECTROGRAM'.



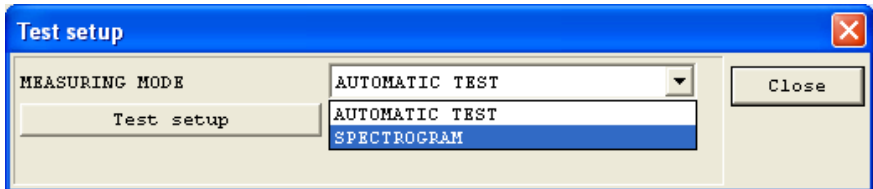
## 6.2 Settings before start

Open the ELQ30c.exe/ELQ 30Ac.exe file on your PC and when the opening picture appears

- Click on **Setup** and
- Select the **Test setup - Editor** option.

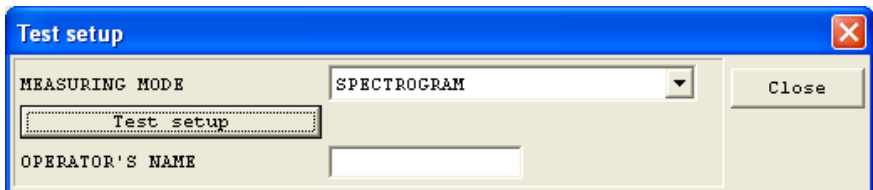


- Select the **SPECTROGRAM** option.

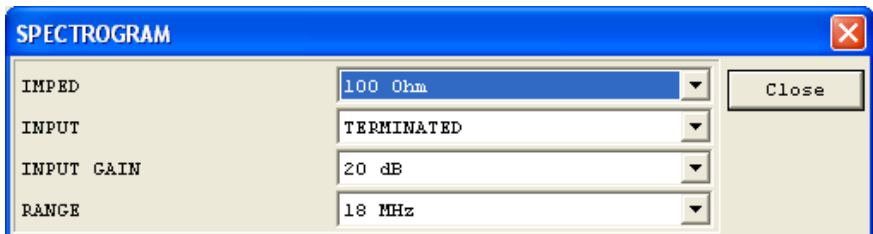


Having the **SPECTROGRAM** option selected

- Type in the **operator's name**
- Click on the **Test Setup** key

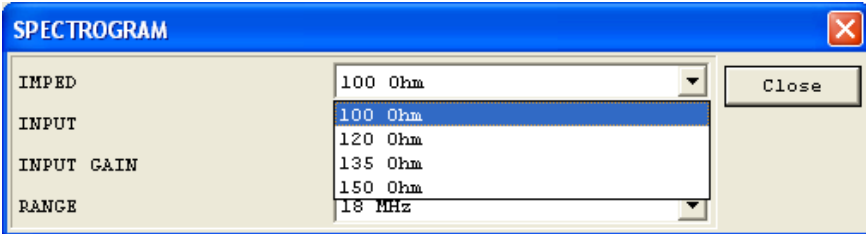


Doing so the actual test setup appears and it can be changed.



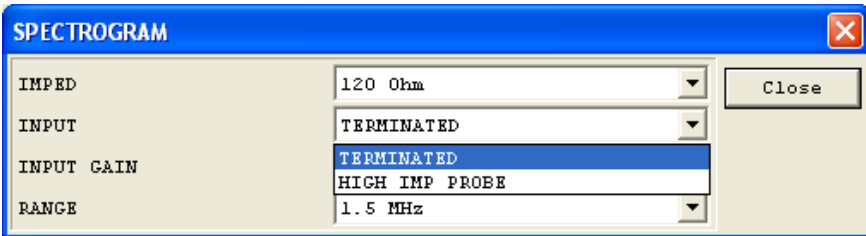
To change the input impedance of ELQ 30/ELQ 30A

- Click on the ▼ sign beside the actual impedance
- Click on the required value



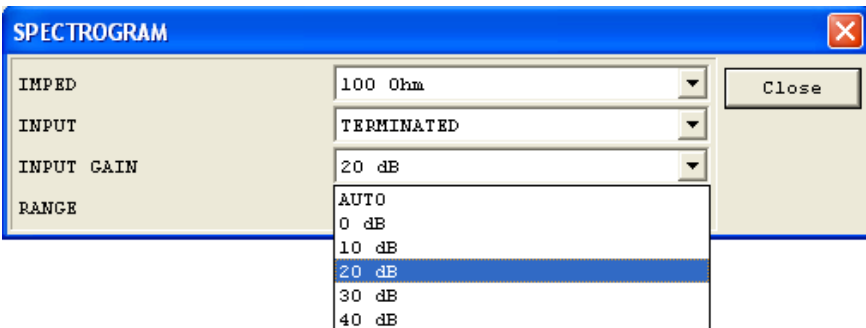
To change the input termination of ELQ 30/ELQ 30A

- Click on the ▼ sign beside the actual input
- Click on the required option



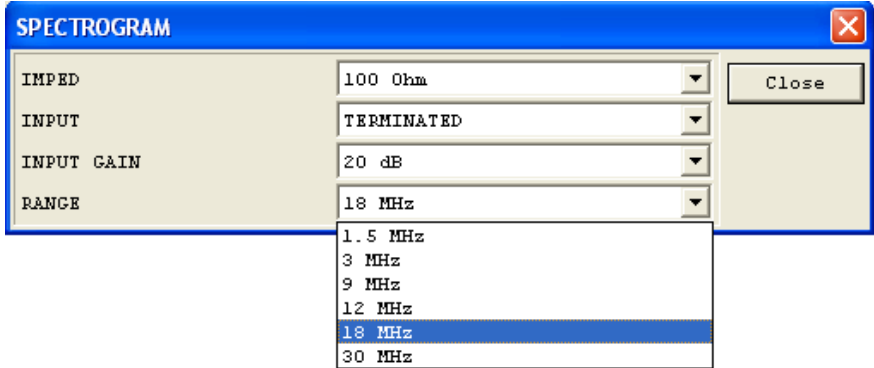
To change the input gain of ELQ 30/ELQ 30A

- Click on the ▼ sign beside the actual gain
- Click on the required option



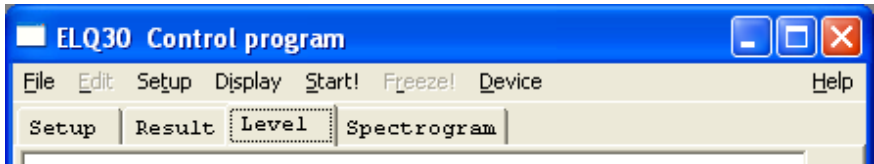
To change the input gain of ELQ 30/ELQ 30A

- Click on the ▼ sign beside the actual frequency range
- Click on the required option



### 6.3 Start the measurement

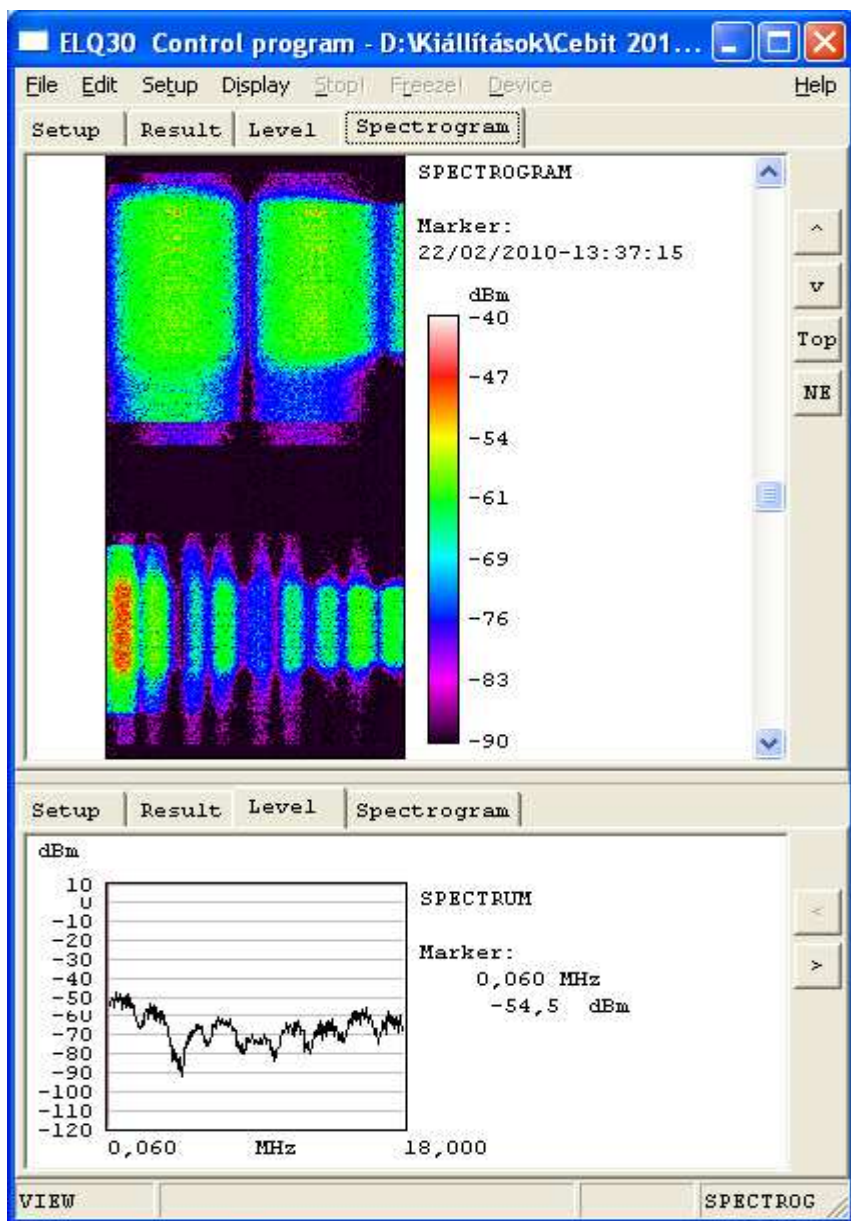
- To start the measurement click on **Start!**



Doing so, the following picture appears asking for the name and allocation of the file in which the test results will be stored during the measurement.



Having the result file saved the measurement automatically starts and runs until the **Stop!** or **Freeze!** command. The spectrum measurements are repeated and the results are displayed in every second. The running program provides continuous immediate information about the obtained test results.



## 6.4 Evaluation of test results

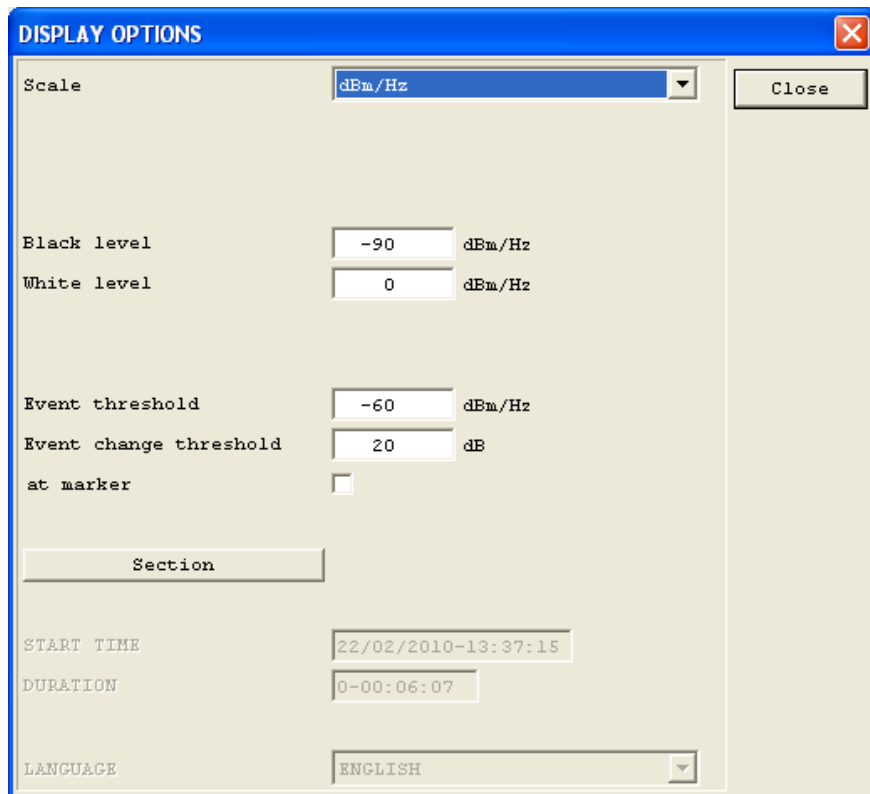
During the run time hundreds or thousands of spectrum measurements are performed. The Spectrogram program provides several display options making the evaluation of obtained test results easy.

To change the actual display form:

- Click on **Display** and
- Select the **Display options** item.



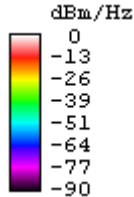
Doing so the following display appears:



To change the **level scale** mode (dBm or dBm/Hz)

- Click on the ▼ sign beside the actual level scale mode
- Click on the required option

The received level is characterized by colors from black to white



The **Color/Level relationship** can be assigned in compliance with the level range of the obtained test results here.

Black level	<input type="text" value="-90"/>	dBm/Hz
White level	<input type="text" value="0"/>	dBm/Hz

**Threshold level** can be set below which the results will be neglected

Event threshold	<input type="text" value="-60"/>	dBm/Hz
-----------------	----------------------------------	--------

**Event change threshold** can be set to find the quick and strong changes in the record by clicking on **NE** (Next Event) button

If you want to find the strong changes at a critical frequency:

- Set the frequency marker on the required frequency
- Switch the “**at marker**” option on

If you want to find the strong changes at any frequency

- Switch the “**at marker**” option off

Event change threshold	<input type="text" value="20"/>	dB
at marker	<input type="checkbox"/>	

A **section of the record** can be assigned and saved separately together with user-edited auxiliary information. The steps of section selection:

- Set the marker to the start of the section
- Click on **Display**
- Select the **Display options** item.
- Click on **Section** button

**Section** [X]

Section start: 22/02/2010-13:37:15

Section end: 22/02/2010-13:43:22

Section start at marker

Section end at marker

Auxiliary information

Save section

Close

- Click on **Section start at marker** button

Close the display selecting widows

- Set the marker to the end of the section
- Click on **Display**
- Select the **Display options** item.
- Click on **Section** button
- Click on **Section end at marker** button

Click on the auxiliary information button and type in the required text

- Save the section setting the **Save section** button