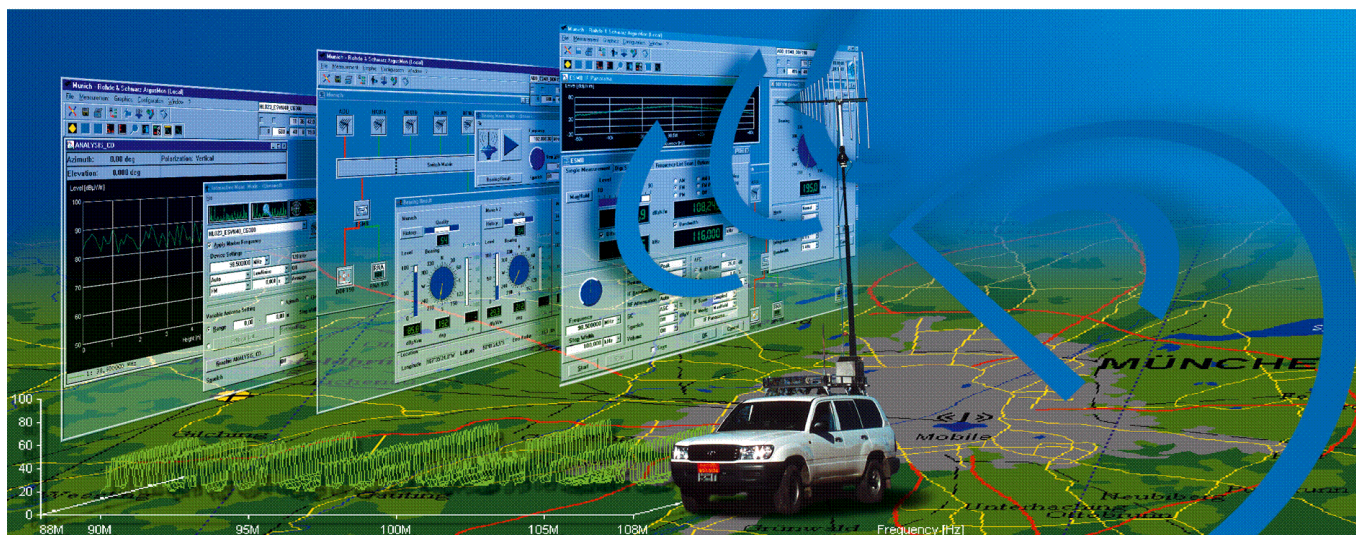


# Technical Information

Subject to change [08-March-2002, 8SPM-pf, Version 4.4.0]



## ArgusEval

### Evaluation Software

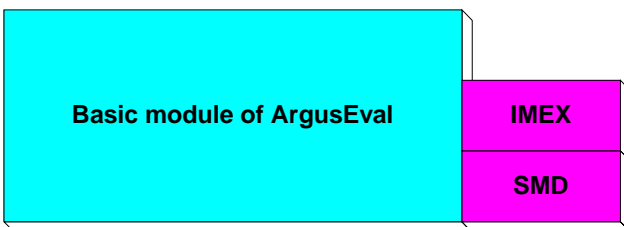
The ArgusEval evaluation software is used to perform a comprehensive statistical evaluation of measurement results to ITU Recommendations. Measurement results can be displayed alphanumerically or graphically. Measurement results, their definitions and evaluation results can also be documented in reports.

Thanks to its modular design, ArgusEval can be easily configured to meet customer requirements.

ArgusEval runs under Windows 2000 / Windows NT 4.0 operating systems, which provide great ease of operation, operational safety and networking. Uniform operation, pre-emptive multitasking and versatility in integrating additional software (e.g. MS Office) are further benefits.

## Introduction

The basic module of ArgusEval comprises one license for ArgusEval, data administration, graphics, configuration, help functions, standard software interfaces, statistics and report generation. Additional software interfaces (standard data interface (IMEX) and spectrum management database interface (SMD)) can be easily added to the basic module. This modularity makes the software flexible.



Modules of ArgusEval

## Security concept

Besides the password protection already implemented in Windows, the security concept of ArgusEval comprises four areas:

- ◆ Security through special access rights to files
- ◆ Security through user groups as owners of the files
- ◆ User class concept with grading of access rights
- ◆ Password protection

ArgusEval has a security concept that authenticates users via a user name and password in different security areas. This ensures that data cannot be edited or deleted by every user.

Users generally have different measurement and evaluation interests. It is assumed that users with

similar interests are grouped together in a User Group. ArgusEval stipulates that users wishing to evaluate the data of another user must belong to the same user group as the other user.

A set of data which is to be evaluated must be comparable. ArgusEval requires that any set of data which is to be evaluated must come from the selected Measurement Units.

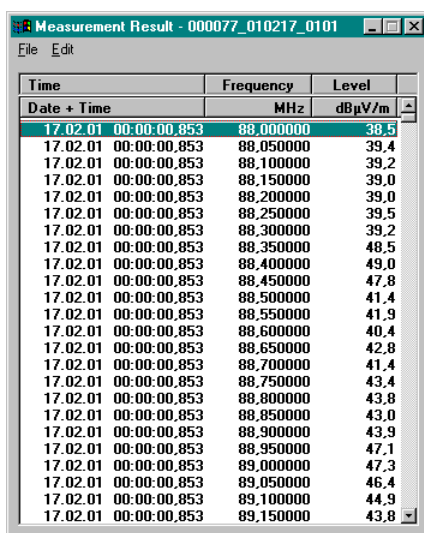
User Groups are the current owners of ArgusEval files. These user-selectable user group names are assigned to each user. All files are stored with the user group name of the user. They are invisible to members of other groups. Every user is assigned to one user group. In a file he has generated, the user can set the user group to Public. This allows users in other user groups to read and edit this file. A file with the user group set to Public cannot be assigned to a user group.

The software recognizes two user classes with different access rights: Administrator and User. Every user must be assigned to a user class. These user classes have different rights. The users of the user class Administrator can access all the software. Those in the user class User can access all the software except the configuration section. Every user is assigned to one user class.

Every user authenticates himself in his user group and user class by entering a password when logging on to ArgusEval.

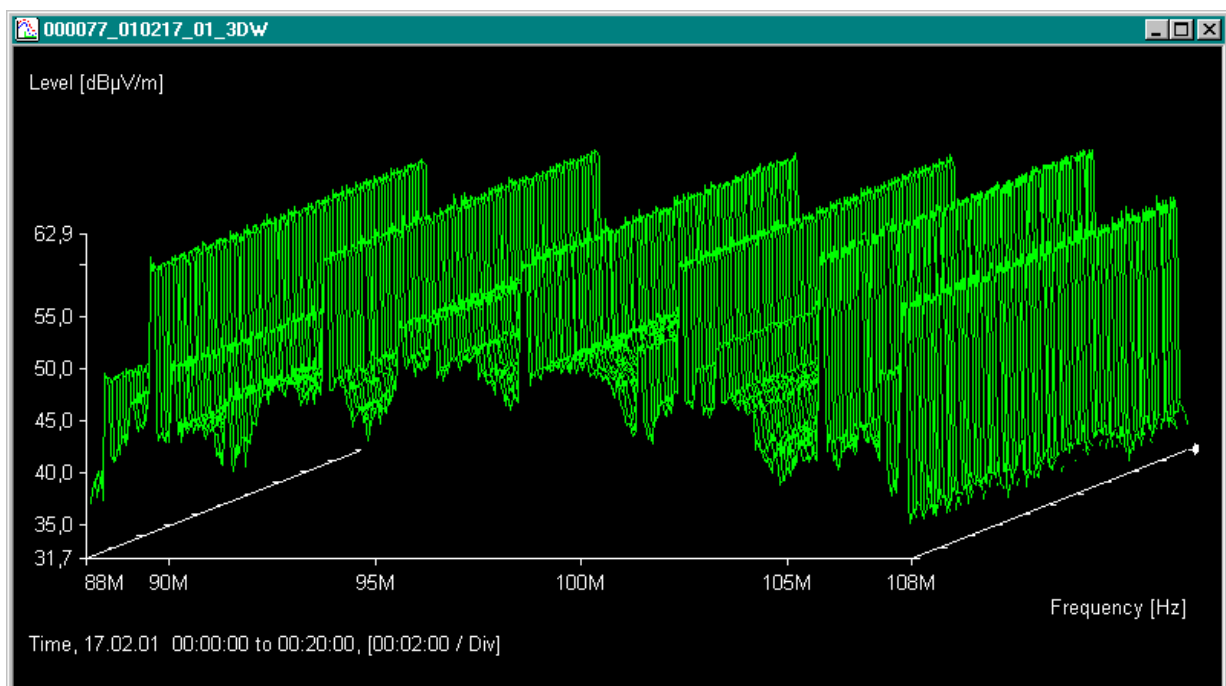
## Displaying measurement results

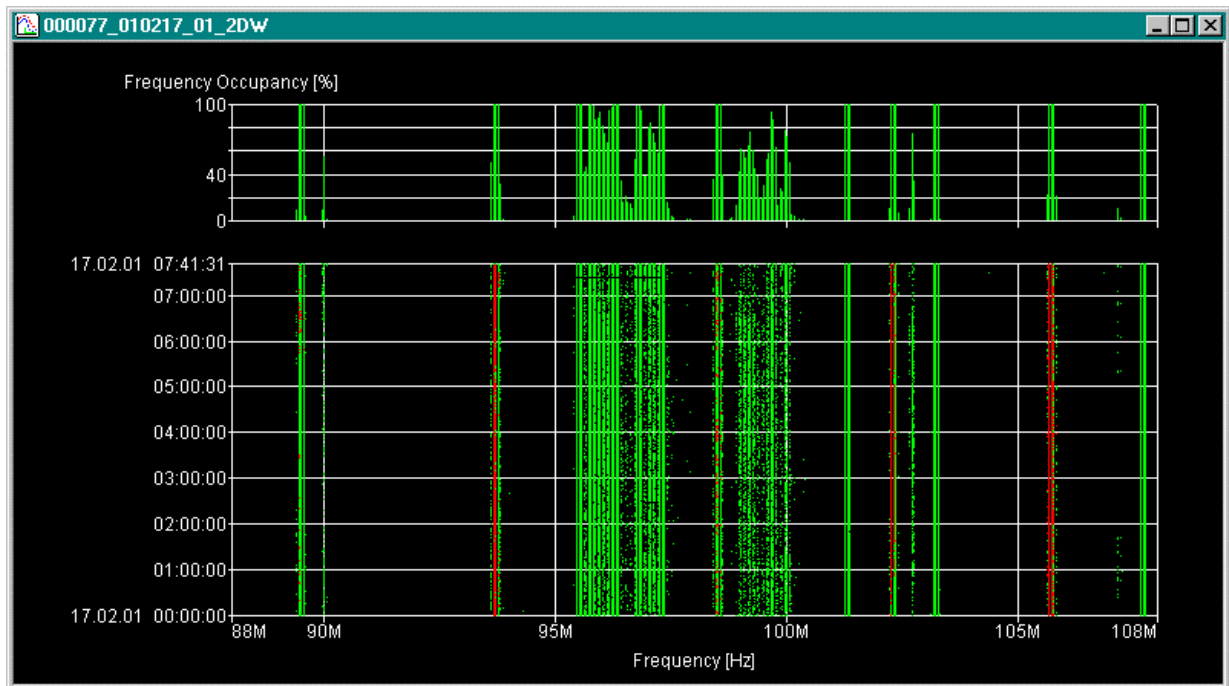
The measurement values can be displayed in several formats: alphanumeric as well as graphical. Depending on the type of measurement, the following graphic types can be selected: yt plot, cartesian diagram, 3D waterfall diagram, polar diagram and 2D waterfall diagram with frequency occupancy diagram.



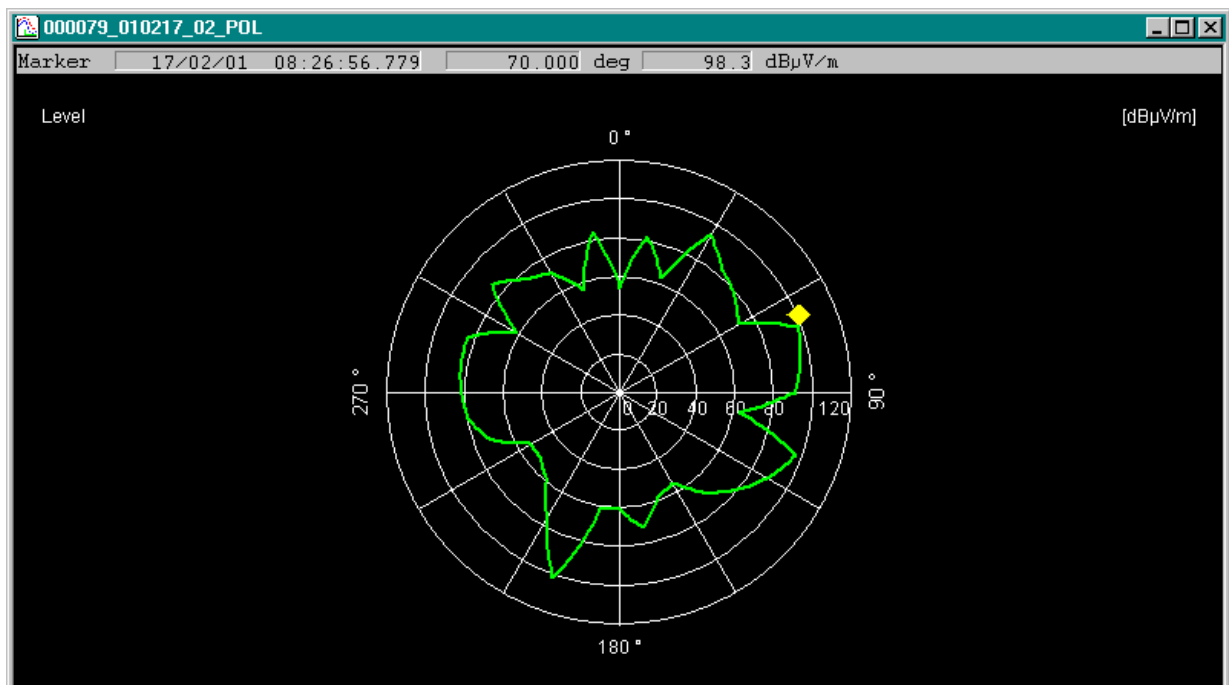
Time	Frequency	Level
Date + Time	MHz	dBµV/m
17.02.01 00:00:00.853	88,000000	38,5
17.02.01 00:00:00.853	88,050000	39,4
17.02.01 00:00:00.853	88,100000	39,2
17.02.01 00:00:00.853	88,150000	39,0
17.02.01 00:00:00.853	88,200000	39,0
17.02.01 00:00:00.853	88,250000	39,5
17.02.01 00:00:00.853	88,300000	39,2
17.02.01 00:00:00.853	88,350000	48,5
17.02.01 00:00:00.853	88,400000	49,0
17.02.01 00:00:00.853	88,450000	47,8
17.02.01 00:00:00.853	88,500000	41,4
17.02.01 00:00:00.853	88,550000	41,9
17.02.01 00:00:00.853	88,600000	40,4
17.02.01 00:00:00.853	88,650000	42,8
17.02.01 00:00:00.853	88,700000	41,4
17.02.01 00:00:00.853	88,750000	43,4
17.02.01 00:00:00.853	88,800000	43,8
17.02.01 00:00:00.853	88,850000	43,0
17.02.01 00:00:00.853	88,900000	43,9
17.02.01 00:00:00.853	88,950000	47,1
17.02.01 00:00:00.853	89,000000	47,3
17.02.01 00:00:00.853	89,050000	46,4
17.02.01 00:00:00.853	89,100000	44,9
17.02.01 00:00:00.853	89,150000	43,8

Measurement result displayed in the table editor and displayed as 3D waterfall diagram





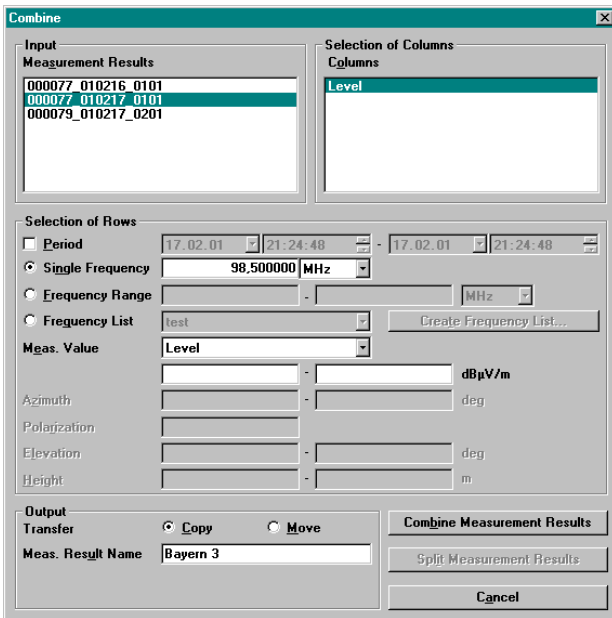
Measurement result displayed as 2D waterfall diagram with frequency occupancy diagram



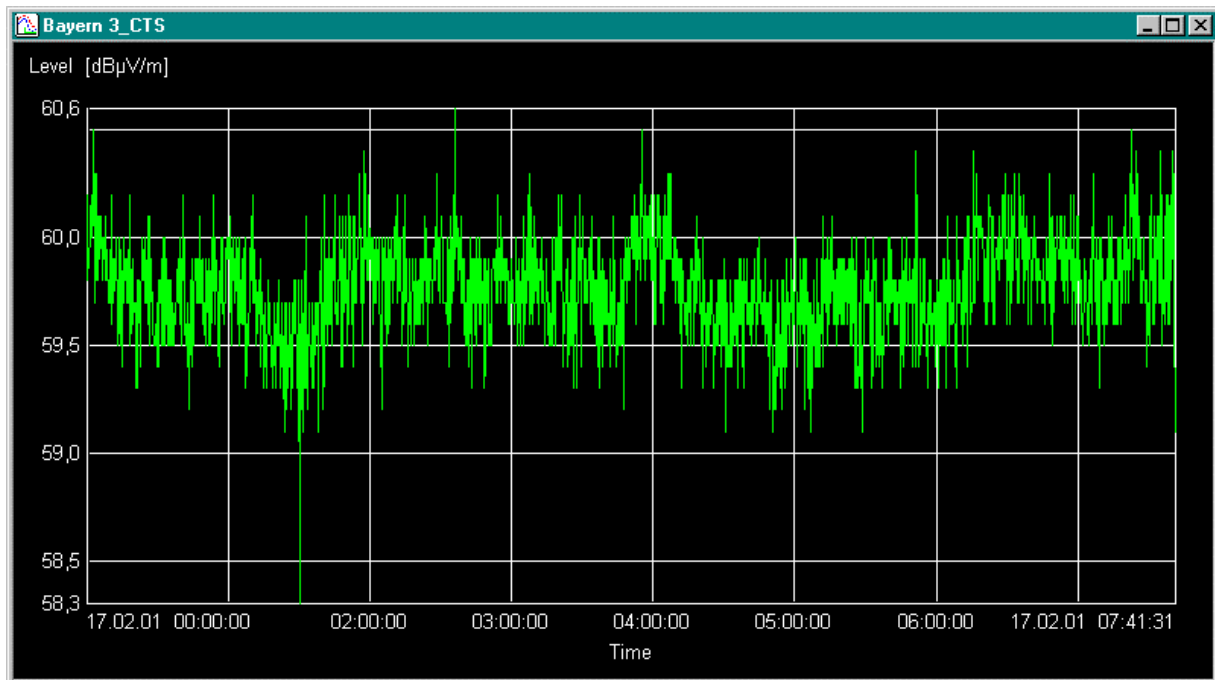
Measurement result displayed as polar diagram

To split a measurement result, or to combine two or more measurement results in one measurement result file, the Combine dialog window can be used.

For example: the results at 98.5 MHz are extracted from the above measurement result in the 3D waterfall diagram and saved to the “Bayern 3” file. These results are shown below as a yt plot.



Combine dialog window



Measurement results displayed as yt plot

## Statistics

A comprehensive statistical analysis of measurement results can be made to ITU Recommendations. The following statistics are available:

- ◆ Frequency band occupancy
- ◆ Frequency channel occupancy
- ◆ Measurement value statistics
- ◆ Channel occupancy
- ◆ Transmission statistics
- ◆ Sub-audio tone statistics

- ◆ The frequency occupancy diagram shows frequency along the x-axis and frequency occupancy values in [%] along the y-axis. The frequency occupancy is calculated for every frequency as follows:

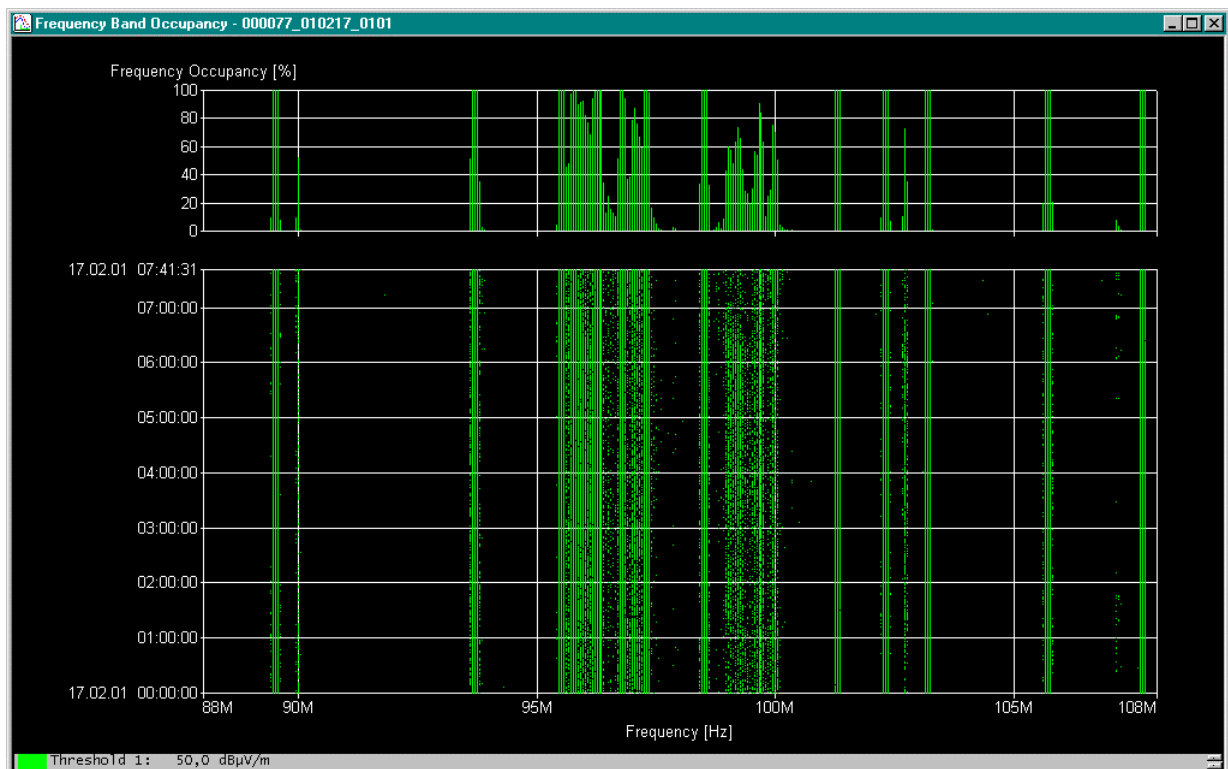
$$\frac{\text{Number of meas. values} \geq \text{Threshold}}{\text{Total number of meas. values}} \times 100$$

## Frequency Band Occupancy

Frequency band occupancy involves the calculation of the occupancy for the whole measurement frequency band. Two graphics are opened:

- ◆ The 2D waterfall diagram shows frequency along the x-axis and time along the y-axis. A symbol type represents the measurement values that exceed a user-defined threshold.

Example illustrating frequency band occupancy



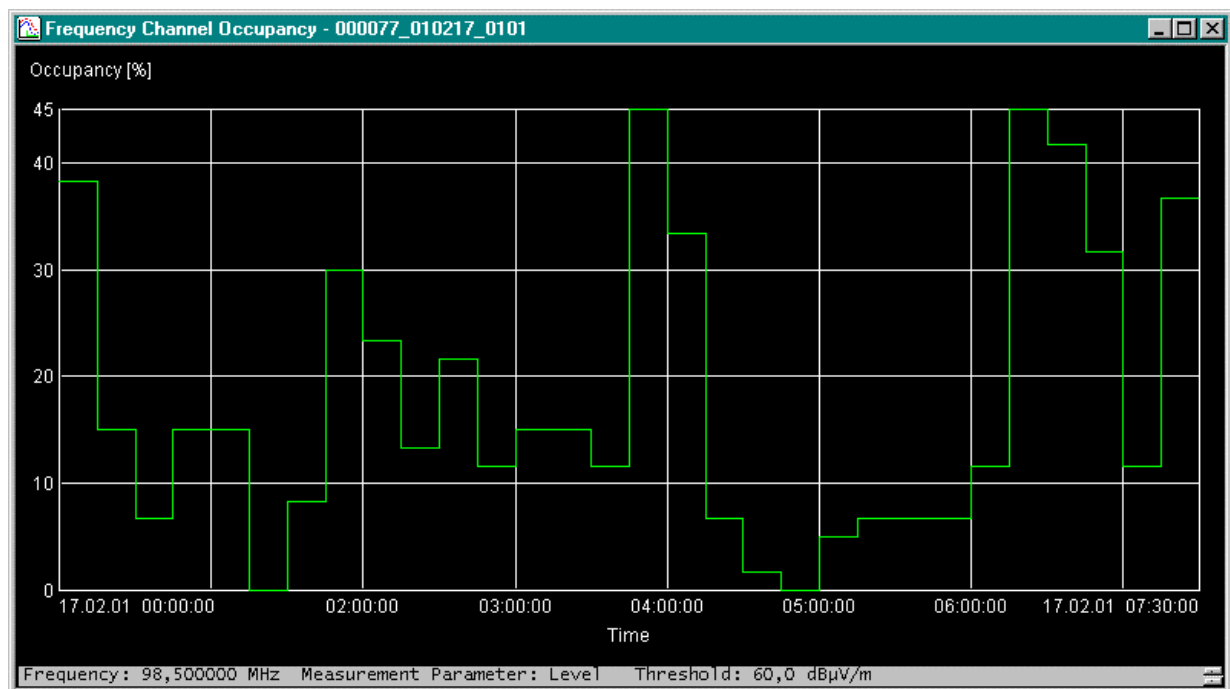
## Frequency Channel Occupancy

Frequency channel occupancy involves calculating the occupancy for one frequency for all measured intervals. The graph has time along the x-axis and occupancy in [%] along the y-axis. The occupancy is calculated for every interval as follows:

$$\frac{\text{Number of meas. values} \geq \text{Threshold}}{\text{Total number of meas. values}} \times 100$$

Two options are available:

- ◆ Basis Over time: the frequency occupancy is displayed in [%] along the time axis. The time axis begins with the start date and time of the measurement result and ends with the stop date and time of the measurement result.
- ◆ Basis 24 Hours: this option is only available if the measurement took longer than 24 hours. Then the maximum, mean and minimum occupancy is calculated and displayed for each time interval from 00:00 h until 24:00 h. Only the selected days of the week are considered.



Example illustrating frequency channel occupancy

## Measurement Value Statistics

The Measurement Value Statistics indicate how often each measured value occurs and how often each measured value has been exceeded. These calculations can be used to provide information about the variance of measured values, the stability of measured values, the environmental noise component and cross-modulation and intermodulation effects. Two graphics are opened:

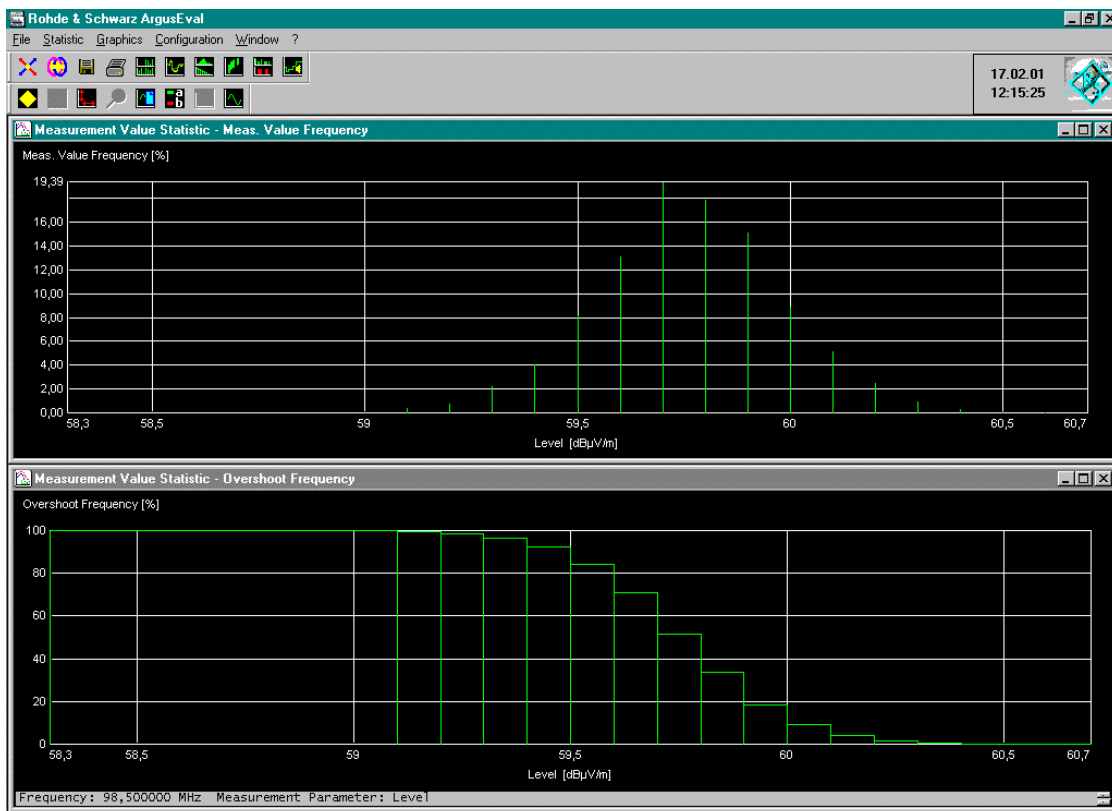
- ◆ The measured value frequency graph has the measurement value along the x-axis and the frequency [%] along the y-axis. The measured value frequency is calculated for every measurement value as follows:

$$\frac{\text{Number of meas. values for a measured value}}{\text{Total number of meas. values}} \times 100$$

- ◆ The overshoot frequency graph has the measured value along the x-axis and the overshoot frequency in [%] along the y-axis. The overshoot frequency is calculated for every measurement value as follows:

$$\frac{\text{Number of meas. values} \geq \text{a measured value}}{\text{Total number of meas. values}} \times 100$$

An overshoot frequency of 100% means that all measured values are greater than or equal to a particular measured value. It therefore follows that this is the lowest measured value. An overshoot frequency of 0% means that no measured value is greater than or equal to a particular measured value. This value is the greatest measured value plus a value corresponding to the smallest step width of the measured value unit. The overshoot frequencies 0%, 10%, 50%, 90% and 100% are important representative values.



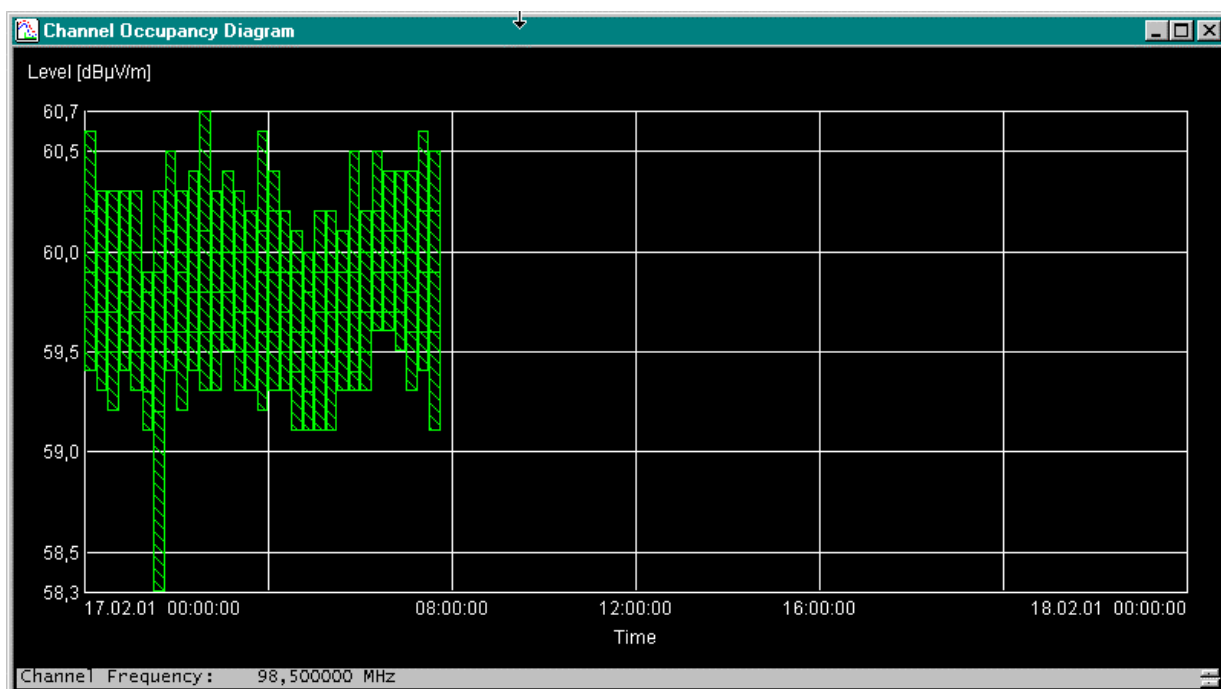
Example illustrating measured value statistics



## Channel Occupancy

Channel occupancy statistics enable the user to identify variations in measured values over a period (hour, day, month, year). When calculating the channel occupancy, the overshoot frequencies 0%, 10%, 50%, 90% and 100% are calculated for one measurement parameter and one frequency for one period at certain time intervals. Calculations are based on all the measured results for which the date, frequency and measurement parameter agree with the specifications.

The channel occupancy graph plots the period along the x-axis and the measured values along the y-axis. The graph consists of bars whose width represents the time interval. The overshoot frequencies 0% (maximum value), 10%, 50%, 90% and 100% (minimum value) are shown as lines within the bar at the corresponding measured value.



Example illustrating channel occupancy

## Transmission Statistics

Channel occupancy statistics enable the user to determine how often and how long a channel has been used for transmission. The threshold for these statistics is settable. The following definitions apply:

**t(tot):** Total observation time (t(on) + t(off)).

**t(on):** Sum of all times during which the measured value is above the threshold.

**t(off):** Sum of all times during which the measured value is below the threshold.

**t(Trans):** Sum of all times during which the measured value is above the threshold. Only times at which the value exceeds the threshold and then drops below it again are counted. t(Trans) can only be calculated if the threshold is exceeded twice within t(tot).

**t(Gap):** Sum of all times during which the measurement value is below the threshold. Only times at which the value drops below the threshold and then exceeds it again are counted. t(Gap) can only be calculated if the threshold is overshoot or undershot twice t(tot).

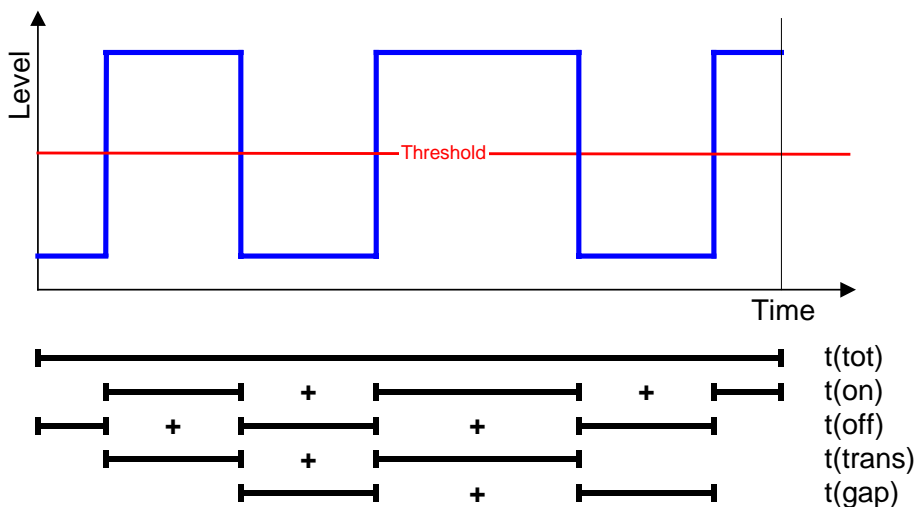
Two graphics are opened:

- ◆ The Transmission Statistics - Transmission graph shows transmission time along the x-axis and transmission in [%] along the y-axis. The transmission times are displayed using 1-second grids. The graph is not displayed if the threshold is not exceeded twice within the entire measurement time.

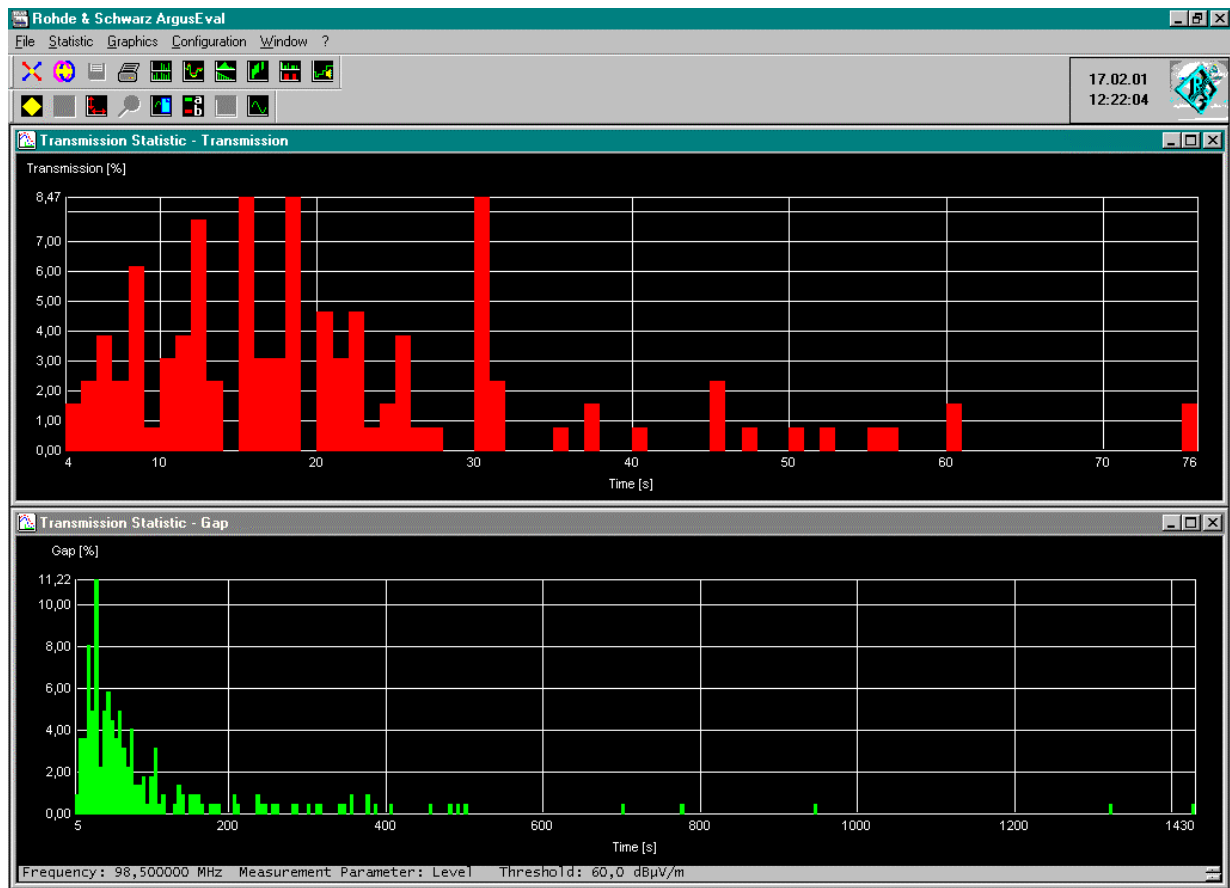
$$\frac{\text{Number of transmission times within a second}}{\text{Total number of transmission times}} \times 100$$

- ◆ The Transmission Statistics - Gap graph shows pause time along the x-axis and the gap in [%] along the y-axis. The pause times are displayed over 5-second grids. The graph is not displayed if the threshold is not undershot twice within the entire measurement time.

$$\frac{\text{Number of pause times within 5 seconds}}{\text{Total number of pause times}} \times 100$$



Example illustrating the bearing mode in the bearing measurement mode



Example illustrating transmission statistics

## Sub Audio Tone Occupancy

Sub-audio tone occupancy statistics enable the user to ascertain how often and how long transmissions have been made with a sub audio tone.

The result is shown as a table. The entire transmission time (column t(on)) is given for every sub-audio tone (Theo. Sub Audio Tone column). How often the tone has been measured (Number column) is also specified.

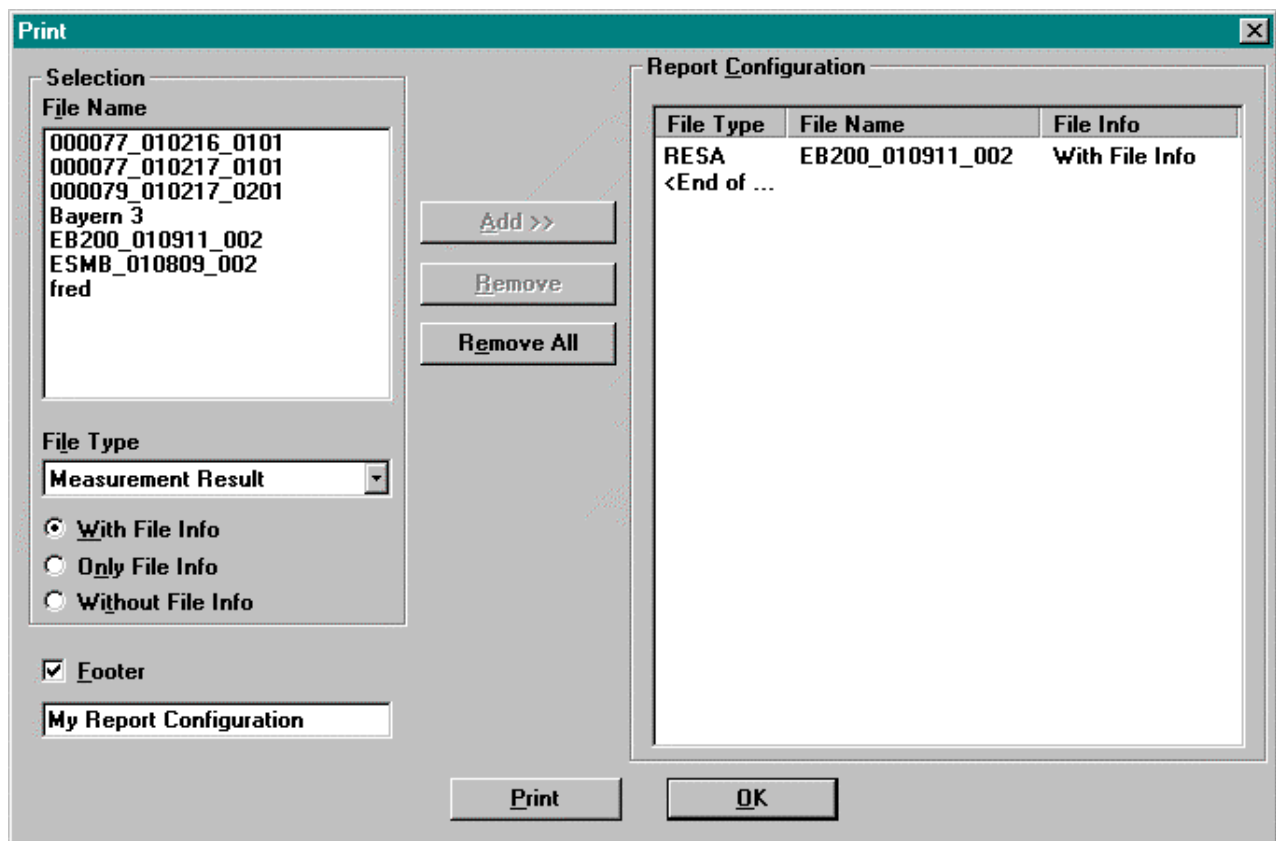
The screenshot shows a window titled "Sub Audio Tone Occupancy - IMM" with a menu bar (File, Edit) and a table. The table has three columns: "Theo. Sub Audio Tone", "t(on)", and "Bits". The data rows are:

Theo. Sub Audio Tone	t(on)	Bits
21.5	3	18
203.5	3	6
(<End of table>)		

Example illustrating sub audio tone occupancy

## Generation of reports

ArgusEval gives the user comprehensive documentation options. Measurement results, measurement definitions and statistical evaluations in the form of graphs or tables can be compiled and configured by the user for reports. These reports can be printed out on the operating-system printer or in an RTF format file.



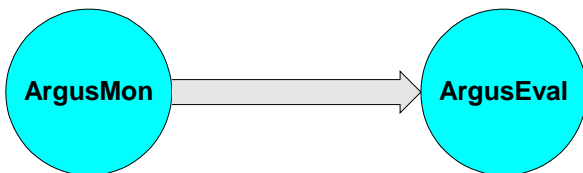
Print dialog window for generation of reports

## ArgusEval standard interfaces

The basic module of ArgusEval has the following interfaces:

- ◆ ArgusMon ↔ ArgusEval
- ◆ ArgusEval ↔ Backup files

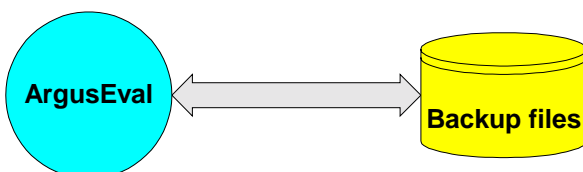
The **ArgusMon → ArgusEval interface** transfers files directly from ArgusMon to ArgusEval.



Prerequisite: Both software packages must be running simultaneously on one computer during the transfer.

The files can be read by clicking the Read ArgusMon Files... button in the Navigator – ArgusMon System Files dialog window.

The **ArgusEval ↔ Backup files interface** saves ArgusEval files to hard disk, or other media, and transfers files between ArgusMon and ArgusEval.



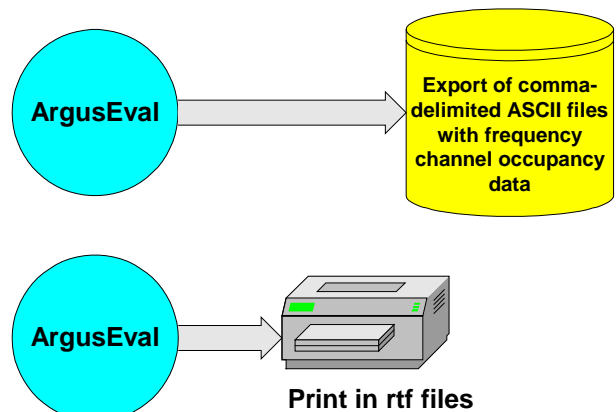
The files are created by clicking the Create Backup Files... button in the Navigator – System Files dialog window. Files are read and deleted by clicking the appropriate buttons in the Navigator – Backup Files dialog window.

## Additional ArgusEval interfaces

ArgusEval has the following additional interfaces:

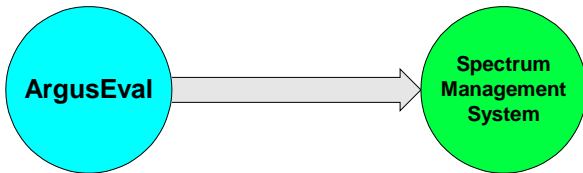
- ◆ Standard Data Interface (IMEX)
- ◆ Spectrum Management Database Interface (SMD)

The **Standard Data Interface (IMEX)** has the task to transfer frequency channel occupancy data from ArgusEval to files. The files can be in comma-delimited ASCII (comma separated value – csv) format. In addition the printer setup is extended with “RTF Document”. Therefore the prints can be done on a RTF document.



Data is exported by clicking the Export... button in the Navigator – System Files dialog window.

The **Spectrum Management Database Interface (SMD)** transfers characteristic values (compressed measurement results) from ArgusEval to the spectrum management system.



Prerequisites: The spectrum management system must be able to handle Open Database Connectivity (ODBC). Open Database Connectivity must be installed. Both software packages must be running simultaneously during the transfer.

Open Database Connectivity is a standard Microsoft interface for data exchange between databases.

The interface between ArgusEval and the spectrum management system is used to:

- ◆ update the database with measurement results that are compared with data in the database

The connection is set up by selecting the File → Select Database... menu command in ArgusEval.

The characteristic values are created in the Navigator – System Files dialog window by selecting the Characteristic Values file type and clicking the New button.

Characteristic files can be exported by clicking the Export... button in the Navigator – System Files dialog window.

## Ordering Information

### Basic module

Basic Module of Evaluation Software ArgusEval	RMSEVAL	4049.9865.02
ArgusEvalBasic contains one license for ArgusEval, data administration, graphics, configuration, help functions, standard software interfaces, statistics and report generation		

### Options: Additional ArgusEval software interfaces

Standard Data Interface (IMEX)	RMSEVAL	4049.9865.11
Spectrum Management Database Interface (SMD)	RMSEVAL	4049.9865.12

