Technical Information

ArgusMon
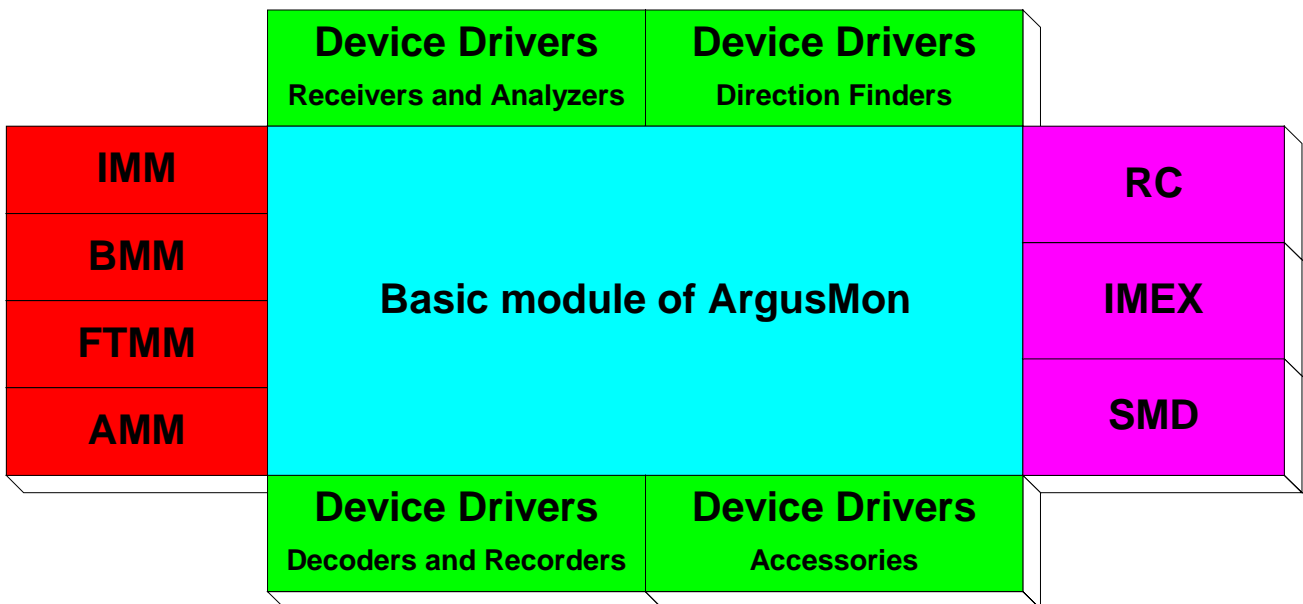
Measurement Software

The ArgusMon measurement software is the most important and powerful part of the ARGUS software package. It comprises numerous facilities for measuring, monitoring and direction finding for manned stations or mobiles or for unmanned remote-controlled stations.

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

ArgusMon 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.

ROHDE & SCHWARZ

Introduction

The basic module of ArgusMon consists of one license for ArgusMon, data administration, graphics, configuration, help functions, standard software interfaces, direct measurement mode, 20 device drivers for fixed antennas and 20 device drivers for movable antennas. Additional measurement modes (interactive measurement mode (IMM), bearing measurement mode (BMM), FMTV measurement mode (FTMM) and automatic measurement mode (AMM)), additional software interfaces (remote control (RC), standard data interface (IMEX) and spectrum management database interface (SMD)) and device drivers for receivers, analyzers, direction finders, decoders, recorders and accessories can be easily added to the basic module. This modularity makes the software extremely flexible.

Device Drivers	Device Drivers	
Receivers and Analyzers	**Direction Finders**	
IMM	**Basic module of ArgusMon**	**RC**
BMM		**IMEX**
FTMM		**SMD**
AMM		
Device Drivers	**Device Drivers**	
Decoders and Recorders	**Accessories**	

Modules of ArgusMon

Client-server concept

ArgusMon is a straight client-server application comprising a measurement unit (server) and a control unit (client).

The control unit provides the ArgusMon user-friendly graphical user interface. This user interface can be used to configure measurement units, define measurement jobs and transfer them to measurement units, to receive, display and store measurement results and transfer these results to other applications. The control unit menu always presents the settings and measurement options of one measurement unit. One control unit can access up to eight stations simultaneously.

The ArgusMon measurement unit is controlled by a measurement processor which is either identical to the control processor or can be accessed via WAN (wide area network) or LAN (local area network). The measurement unit receives the measurement jobs from all the connected control units, coordinates them and processes them. Measurement devices are controlled and measurement results and alarm conditions are determined, buffered and transferred to the control units.

This approach has the following advantages over remote-control packages such as pcAnywhere:

♦ Simpler to use software

♦ Faster implementation of measurement jobs because only information relevant to the measurements is transferred. There is no need to fiddle about with files

♦ Cost-effective solution as the connection to the measurement section can be interrupted during a measurement, so cutting costs

♦ Only one measurement unit is occupied during the connection and not the whole PC

Security concept

Besides the password protection already implemented in Windows, the security concept of ArgusMon 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

ArgusMon 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. ArgusMon stipulates that users wishing to measure with the definition files of another user must belong to the same user group as the other user.

User Groups are the current owners of ArgusMon 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 can only be read by users from other groups but cannot be edited by them. 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 soft-

ware. Those in the user class User can access all the software except the configuration part. 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 ArgusMon.

Measurement modes

All measurement tasks being run by the measurement software can share the same hardware, i.e. measurement devices and accessories. Naturally, the hardware can be available to one task for a certain time only. Nevertheless, thanks to sophisticated task scheduling within the software, the different measurement modes are able to consecutively use the hardware resources according to the time and priorities the operator has set for each. As long as the number and duration of the tasks are within reasonable bounds, it is easy to arrange for several measurement modes to use the same hardware. All this is available under a single license with ArgusMon running on the system process controller.

Different ArgusMon measurement modes offer the various monitoring, measuring and direction finding activities in a very dedicated way. These measurement modes are:

◆ Direct Measurement Mode (DMM)

◆ Interactive Measurement Mode (IMM)

◆ Bearing Measurement Mode (BMM)

◆ FMTV Measurement Mode (FTMM)

◆ Automatic Measurement Mode (AMM)

The measurement modes, available priorities and the measurement modes that can run simultaneously are shown in the following table:

Measurement Mode / Available Priorities	Simultaneously Running Measurement Modes				
	DMM	IMM	BMM	FTMM	AMM
DMM / Middle	Possible *	Possible *	Possible *	Possible *	Not possible
IMM / Middle	Possible *	Not possible	Possible *,**,***	Not possible	Not possible
BMM / Middle ***	Possible *	Possible *, **	Not possible	Not possible	Not possible
FTMM / Middle	Possible *	Not possible	Not possible	Not possible	Not possible
AMM / High, Low	Not possible	Not possible	Possible **, ***	Not possible	Possible ****

*: Only possible, if the system paths (antenna – receiver – combination) can be activated simultaneously. In the measurement modes, the same system path is not allowed.

**: In the IMM or AMM, the selection of location is not allowed.

***: If the BMM was called from the IMM or AMM, the BMM can be active at the same time, though the measurement modes are executed one after the other. Then the BMM cannot be controlled interactively. The BMM takes the priority of the calling measurement mode.

****: For AMMs with low priority the time slot method is valid. For all other combinations the AMMs must be defined in different time intervals.

ArgusMon can simultaneously execute several, low-priority AMMs and process them in parallel using the time slot method. This is done as follows:

All AMMs which are running are processed one after the other depending on the time interval. To prevent measurements waiting to be executed forming a queue, single measurements are occasionally skipped. The last measurement determines which new measurement is first in the queue.

Some receivers can measure several measurement parameters simultaneously, such as the ESMB from Rohde & Schwarz. This happens under the following conditions:

◆ The entries in the measurement definition have the same range definition and are ordered.
◆ The measurement parameters all refer to one device.
◆ The timings for the measurements are the same. These are set in the Timing Definition.

The following examples illustrate the **time slot method**.

Example 1: A measurement with a duration of 5 s is to be performed every 20 s

Graphic see next page.

Measurement 1 is performed as per pre-setting.

Example 2: A measurement with a duration of 25 s is to be repeated every 20 s

Graphic see next page.

Since the duration of the measurement is greater than the repetition time, the measurement is per-formed almost continuously. At the 80-second mark, measurement 1 is skipped.

Example 3: Measurement 1 has a duration of 10 s and is to be repeated every 20 s while measurement 2 has a duration of 5 s and is to be repeated every 15 s

Graphic see next page.

The measurements are performed as per pre-setting. ArgusMon shifts a few measurement times so that all measurements can be performed.
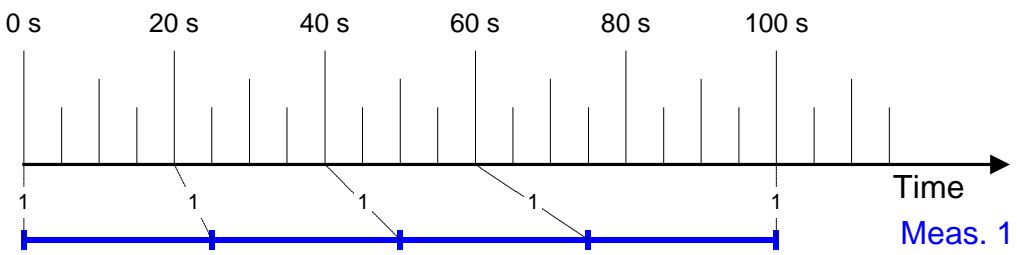
Example 4: Measurement 1 has a duration of 20 s and is to be repeated every 25 s while measurement 2 has a duration of 5 s and is to be performed every 15 s
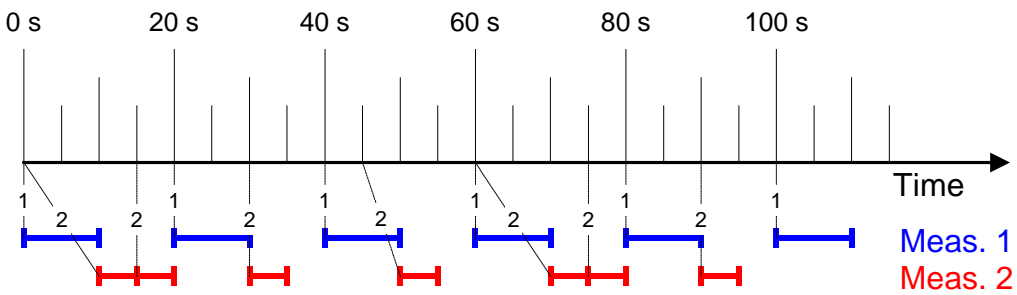
Graphic see next page.

Not all measurements can be performed in this example. Measurement 2 is skipped at 0 s, 30 s, and 75 s.
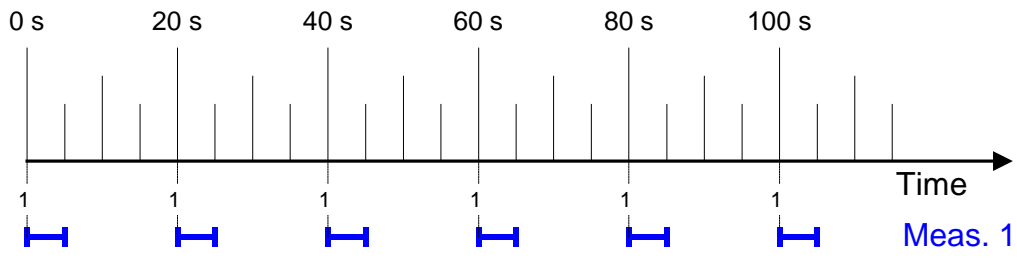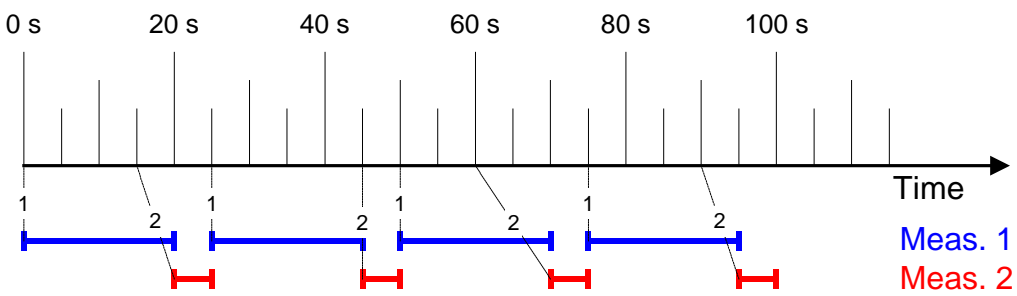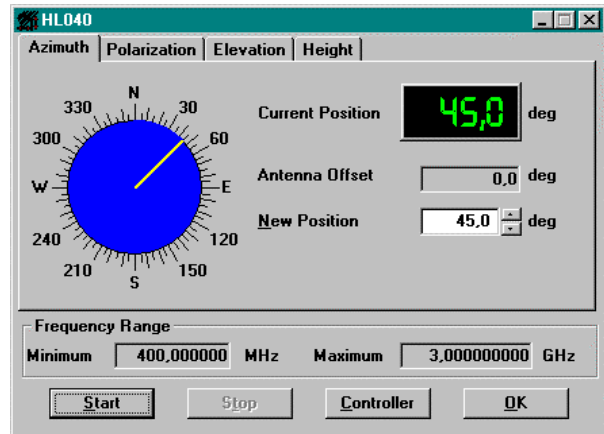
Example 1

Example 2

Example 3

Example 4

Direct Measurement Mode

The direct measurement mode is used to control the measurement equipment directly via virtual control panels. This mode provides the operator with a fast way to monitor, measure, locate and identify emissions.

The system visualizer in ArgusMon produces the schematic of a selected radio monitoring station: antennas, receivers, analyzers, decoders and re-cording equipment with all their connections are shown in graphical representation. The required connections between antennas and receivers can be selected and switched by mouse click.

A second mouse click on a device icon opens the interface from which the user can control the device and measure with it. This interface simulates the functions and the settings of the device.
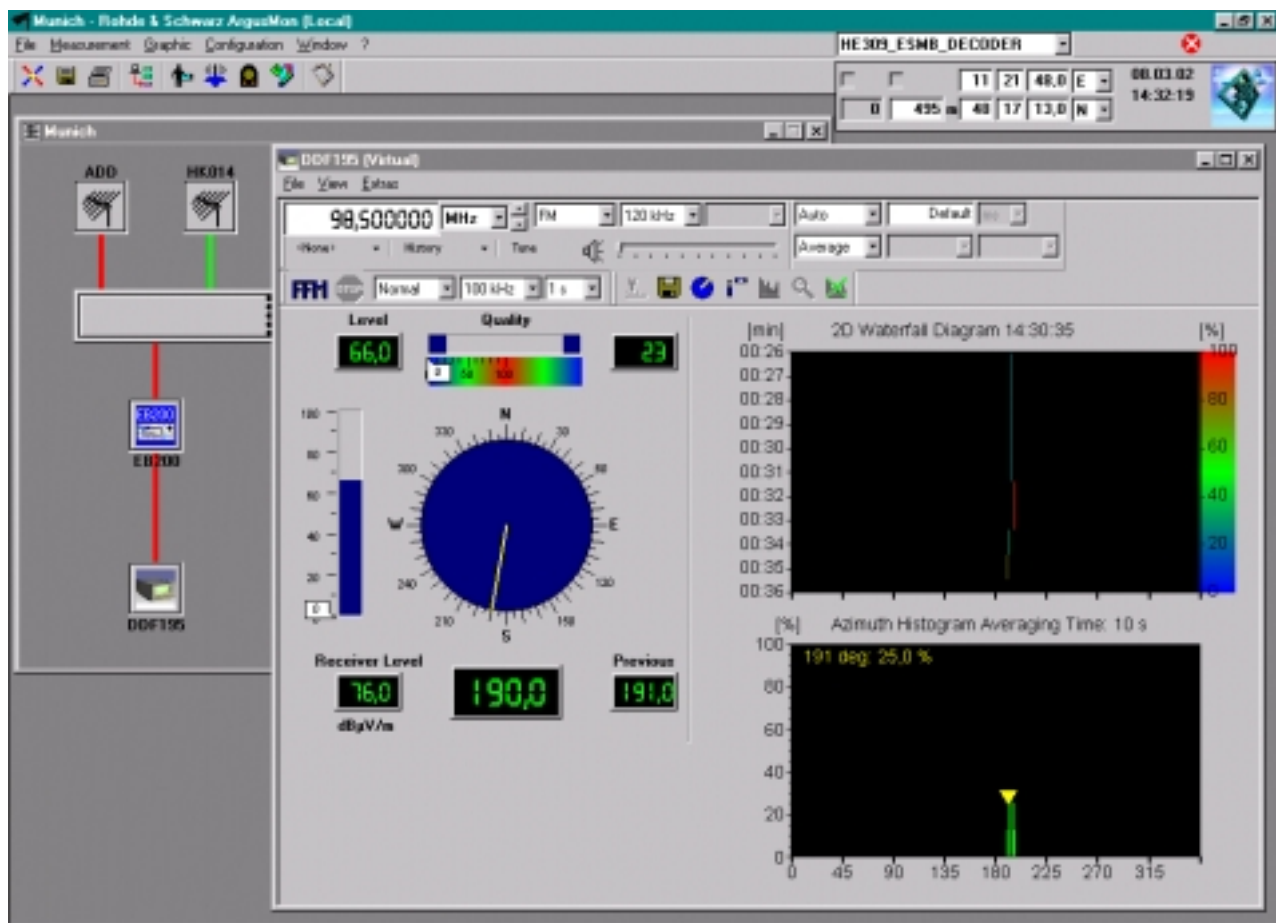

Example of direct measurement mode with Antenna HL040
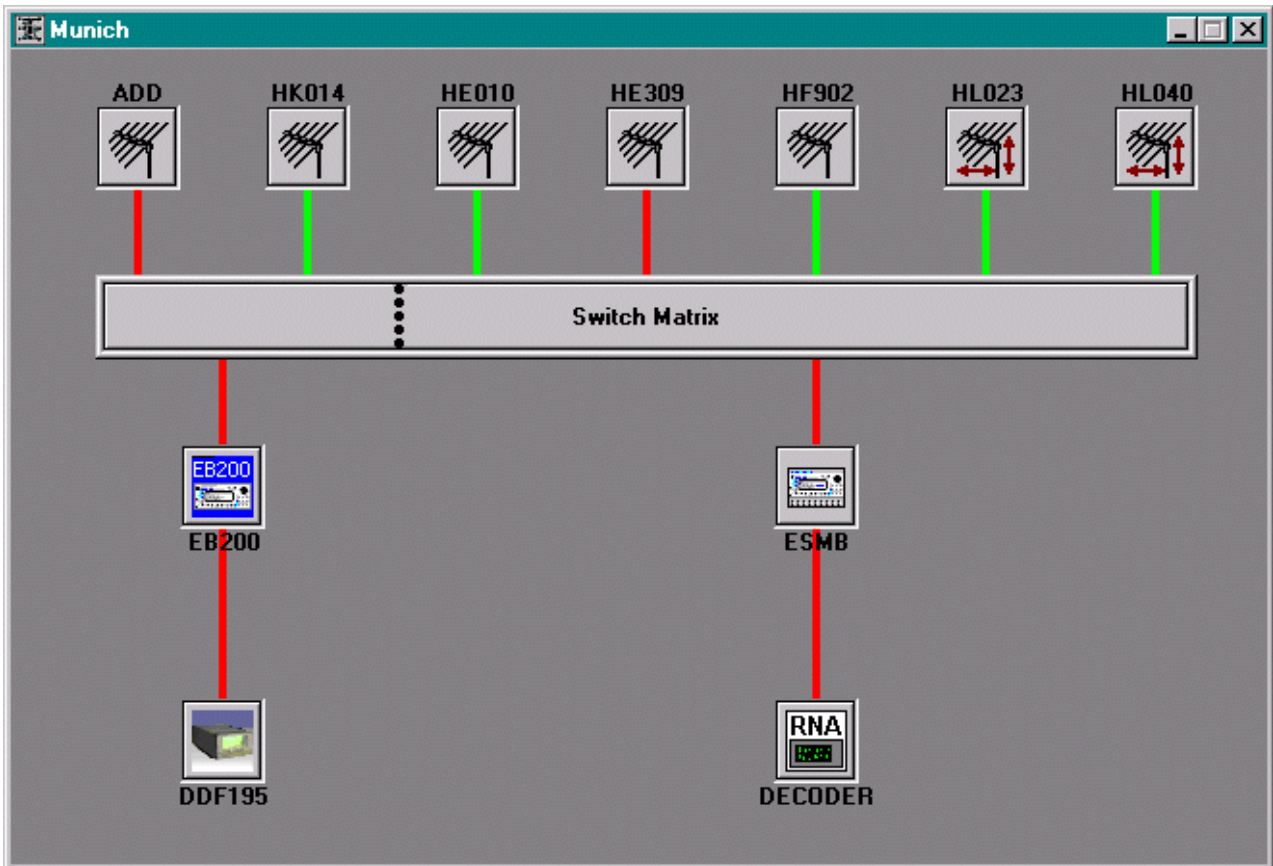
System visualizer in ArgusMon produces schematic of complete radio monitoring stations

Depending on the device driver, it contains several tabs each corresponding to a measurement type which can be performed by the device in question. Depending of the measurement type, the measurement results are shown using different types of graphics, tables or a numerical display. The measurement results can be saved for further analysis or for printing out.

Example illustrating the direct measurement mode with Direction Finder DDF195 connect to Receiver EB200
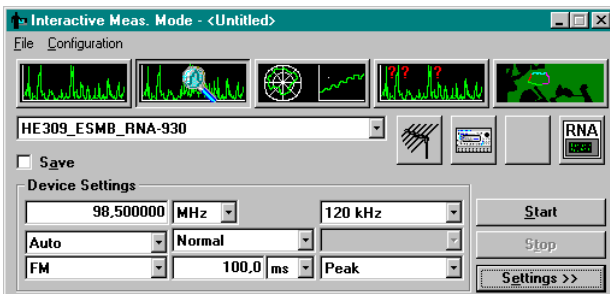
Interactive Measurement Mode

The interactive measurement mode is used to obtain an overview of a spectrum, for analyzing and identifying electromagnetic emissions, for obtaining results when an antenna is moved, for analyzing intermodulation and for coverage measurements.

Different IMM modes provide direct access to various activities. These modes are:

◆ Spectrum

◆ Signal Analysis

◆ Antenna Analysis

◆ Intermodulation Analysis

◆ Coverage Measurement

The dialog window is split in two parts. The upper part has the same settings for all modes. It contains the parameters for the selection of the mode, the selection of the devices, the most important device settings and the Start, Stop and Settings >> buttons. If the user wants to set special device settings, it is possible to open the device interfaces. With the Settings >> button the dialog window can be enlarged. The enlarged section contains the settings for the selected mode.
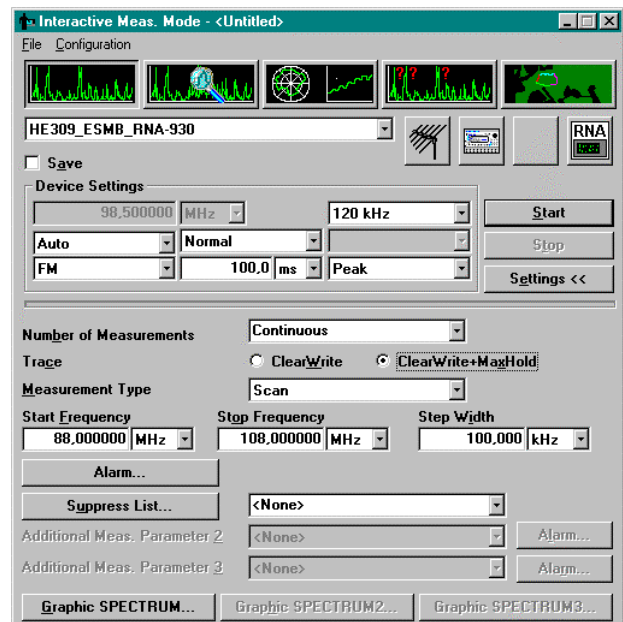

Interactive measurement mode dialog window

The **Spectrum** mode gives the user a quick overview (level) of a frequency spectrum.

This can be performed with Scan (scanning from start frequency to stop frequency using frequency

increments), Frequency List Scan (scanning using frequencies from a frequency list) or Transmitter List Scan (scanning using frequencies from a transmitter list). Additional measurements (e.g. the frequency offset or modulation) on all signals within the frequency band can also be made if the receiver has the necessary capability. Frequencies which are not of interest to the user can be suppressed for any measurement. If limits for a measurement parameter are defined, signal analysis can be started automatically if the parameter goes above or below the limit to identify the appropriate transmission.
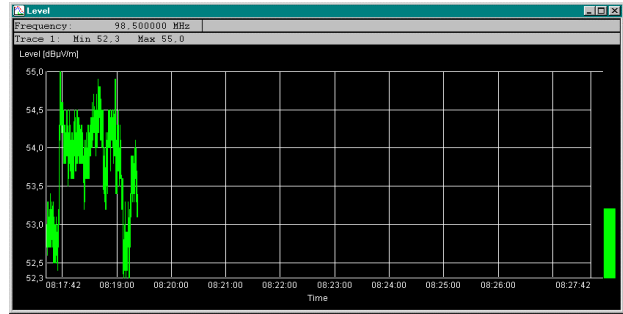

Example illustrating the spectrum mode in the interactive measurement mode

The measurement results are displayed using a cartesian diagram. The measurement results can be saved for further evaluation or printed out. A report can be printed out directly from the IMM.
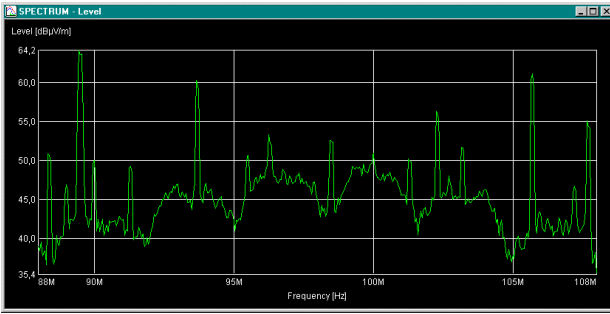
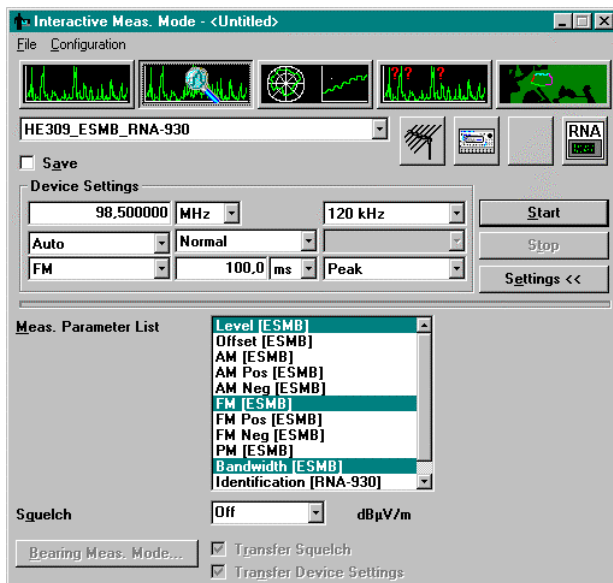Typical measurement result from the spectrum mode

Typical measurement result obtained in Signal Analysis mode

In the **Signal Analysis** mode electromagnetic emissions can be analyzed and identified.

The user can select the frequency and the measurement parameters (e.g. level, frequency offset, bandwidth, modulation or location) which the selected devices can measure.

Example illustrating the signal analysis mode in the interactive measurement mode

The measurement results are displayed using a yt plot. The measurement results can be saved for further evaluation or printing out. A report can be printed directly from the IMM.

If the user wants to change the frequency during measurement, the position of the marker can be changed in the SPECTRUM display. The receiver is automatically set to that frequency. The use of this method means that the measured spectrum can be analyzed very quickly.
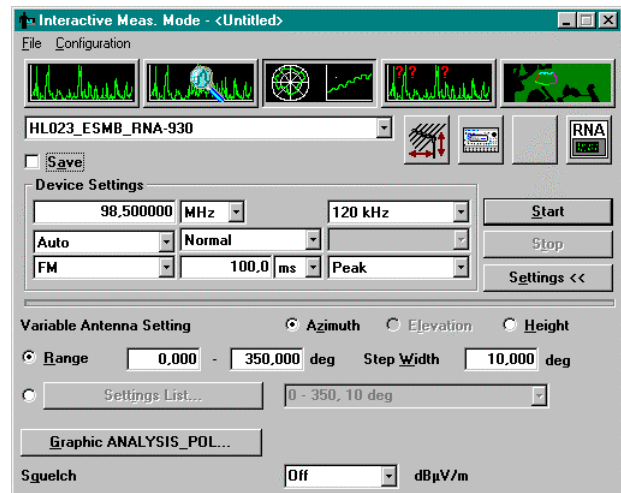
In the **Antenna Analysis** mode, level measurements are performed at one frequency while the azimuth or the elevation of a directional antenna is varied. This mode is only activated for steerable antennas.

The user can make the antenna settings in two ways: he can select a range for the antenna and the antenna covers this range using the selected step width or he can select a settings list. In this list, he can enter antenna settings.

Example illustrating antenna analysis in the interactive measurement mode

The measurement results are shown as a polar diagram (azimuth and elevation) or as a cartesian diagram (height). The measurement results can be saved for further evaluation or to be printed out. A report can be printed directly from the IMM.

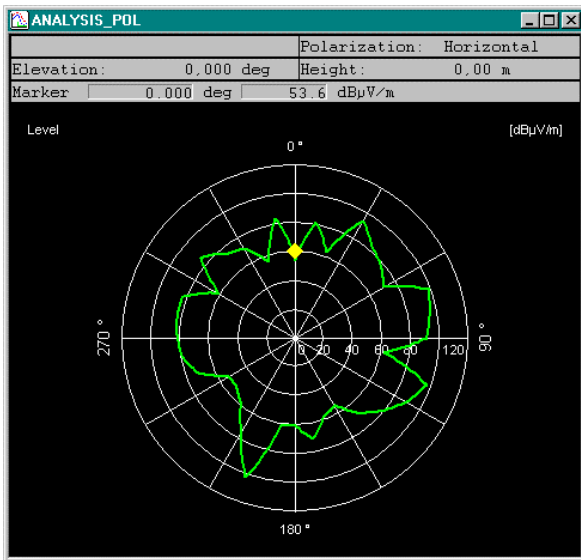Typical measurement result from the Antenna Analysis mode

The **Intermodulation Analysis** mode is used to track the signals producing an intermodulated signal. Intermodulations with up to three source signals are taken into account.

There are four steps:

First, the spectrum associated with the frequency range to be investigated is analyzed in the spectrum mode.

Second, the number of frequency values is restricted to a reasonable number by setting a threshold. Only frequencies with levels above the threshold are used. It is assumed that only strong transmitters are causing intermodulation.

Third, after the Calculate... button has been clicked in the Interactive Measurement Mode dialog window, the dialog window Calculate Intermodulation Products appears. The formula for calculating the original frequencies is $I = \pm X \times A \pm Y \times B \pm Z \times C$, where A, B and C are the original frequencies and

the coefficients X, Y and Z the given harmonics. The maximum number of original frequencies, the maximum harmonics if there are two original frequencies and the maximum harmonics if there are three original frequencies are entered by the user. The maximum harmonics if there is one original frequency is 10.

Some examples:

Max. Number of Original Frequencies: 1
Formulas: 2A, 3A, 4A, ..., 10 A

Max. Number of Original Frequencies: 2
Max. Harmonics with two Original Frequencies: 2
Formulas: 2A, 3A, 4A, ..., 10 A, A+B, A-B, -A+B, 2A+B, 2A-B, -2A+B, A+2B, A-2B, -A+2B, 2A+2B, 2A-2B, -2A+2B

Max. Number of Original Frequencies: 3
Max. Harmonics with two Original Frequencies: 1
Max. Harmonics with three Original Frequencies: 1
Formulas: 2A, 3A, 4A, ..., 10 A, A+B, A-B, -A+B, A+B+C, A-B+C, A-B-C, -A+B+C, -A-B+C

All selected frequencies are in the Possible Original Frequencies list. The user can add or delete frequencies from that list. The calculation is performed when the OK button is clicked. The original frequencies are determined as follows:

♦ Max. Number of Original Frequencies = 1:
A is calculated from the formulas and then a check is made to determine if this frequency ($\pm$ IF Bandwidth / 2) is in the Possible Original Frequencies list

♦ Max. Number of Original Frequencies = 2:
B is directly determined from the Possible Original Frequencies list. A is calculated from the formulas and then a check is made to determine if this frequency ($\pm$ IF Bandwidth / 2) is in the Possible Original Frequencies list

♦ Max. Number of Original Frequencies = 3: The B and C combinations are calculated from the Possible Original Frequencies list. A is calculated from the formulas and then a check is made to determine if this frequency ($\pm$ IF Bandwidth / 2) is in the Possible Original Frequencies list

The results are stored in an IMA Result file, sorted in the order of descending probability. The most probable results are those with the fewest original frequencies and the lowest order. The calculation results can be saved to an IMA Result file and re-loaded at a later date.

In the fourth step, the intermodulation products calculated in this way can now be investigated by clicking the Start button in the IMM dialog window. All calculated frequencies are compared acoustically with the intermodulation using the receiver's built-in demodulator.

IMA Result - IMA				
File Edit				
Intermodulation I	Frequency A	Frequency B	Frequency C	Formula
MHz	MHz	MHz	MHz	
98,500000	95,966667	94,700000		* I= 3A - 2B
98,500000	98,566667	98,600000		* I= 3A - 2B
98,500000	99,566667	100,100000		* I= 3A - 2B
98,500000	99,900000	100,600000		* I= 3A - 2B
98,500000	102,900000	105,100000		* I= 3A - 2B
98,500000	99,000000	88,100000	88,600000	I= A + B - C
98,500000	99,600000	88,100000	89,200000	I= A + B - C
98,500000	99,900000	88,100000	89,500000	I= A + B - C
98,500000	100,100000	88,100000	89,700000	I= A + B - C
98,500000	100,600000	88,100000	90,200000	I= A + B - C
98,500000	105,100000	88,100000	94,700000	I= A + B - C
98,500000	105,900000	88,100000	95,500000	I= A + B - C
98,500000	106,400000	88,100000	96,000000	I= A + B - C
98,500000	107,800000	88,100000	97,400000	I= A + B - C
98,500000	99,600000	88,400000	89,500000	I= A + B - C
98,500000	101,000000	88,400000	90,900000	I= A + B - C
98,500000	101,500000	88,400000	91,400000	I= A + B - C
98,500000	105,300000	88,400000	95,200000	I= A + B - C
98,500000	105,700000	88,400000	95,600000	I= A + B - C

Input Field

| 98,500000 | 93,300000 | 88,100000 | | * I= 2A - B |

Insert   Modify   Delete

Example illustrating intermodulation analysis in the interactive measurement mode with typical IMA result calculated in the intermodulation analysis mode

In the **Coverage Measurement** mode, level measurements are performed during driving. This mode is only activated if a GPS is available.

Measurements can be performed with Fixed Frequency Mode (measurement using one frequency) and Frequency List Scan (scanning using frequencies from a frequency list).

With Frequency List Scan, the results of one frequency are displayed in MapView. After the measurement the results of the other frequencies can be displayed one by one.

The user can set the time interval parameter. This is the time interval between two measurements.
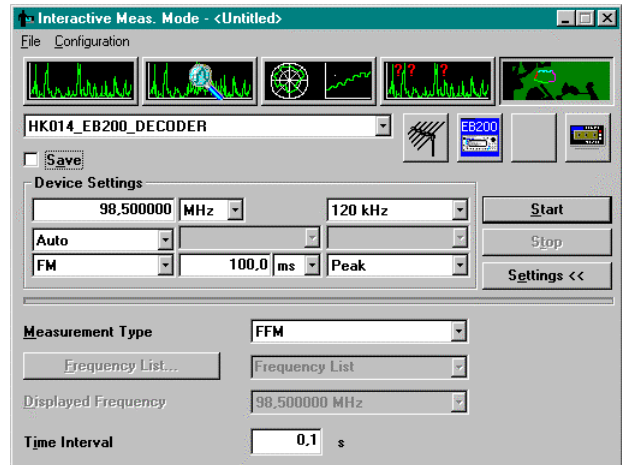
Example illustrating coverage measurement in the interactive measurement mode
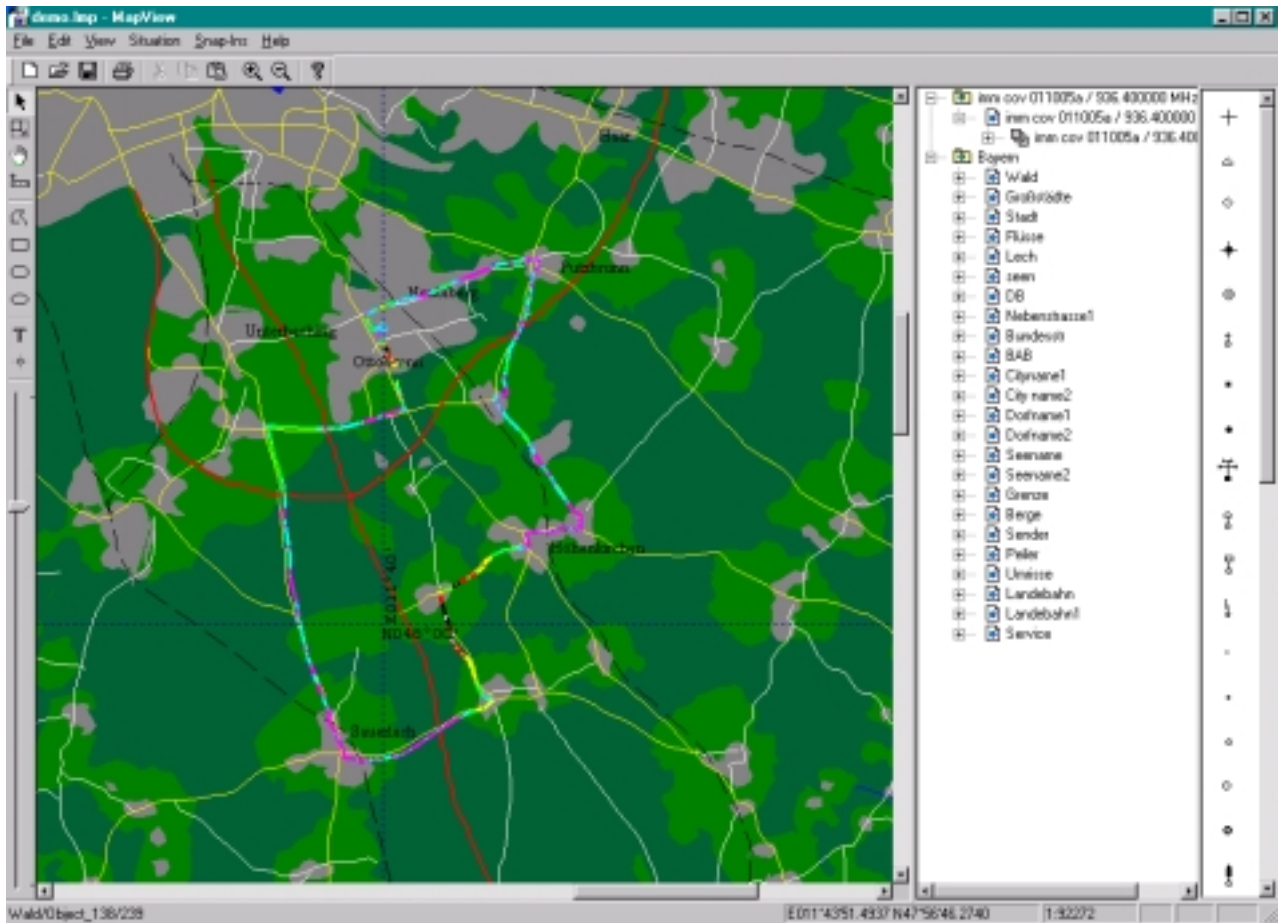
Example illustrating a measurement result of a coverage measurement displayed in MapView
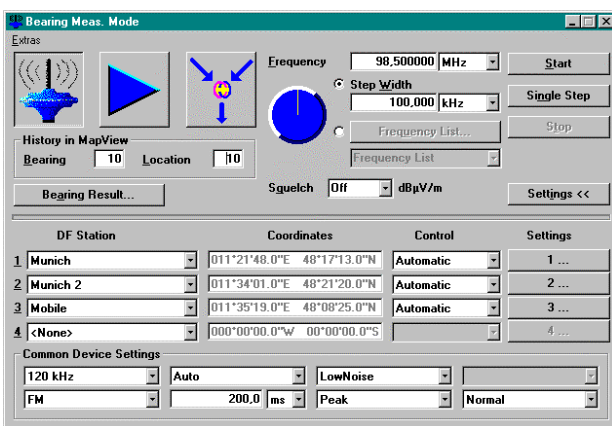
Bearing Measurement Mode

The bearing measurement mode is used to locate transmitters. Up to four direction finders can be controlled simultaneously. The DF stations, bearings and locations can be displayed on digital maps within the geographical information software Map-View.

The following three BMM modes handle the activities in question:

♦ Bearing

♦ Replay

♦ Combine

The dialog window is split into two sections. The upper section has the same settings for all modes. It contains the parameters for mode selection, frequency selection, squelch and the Start, Single Step, Stop, Bearing Result... and Settings >> buttons. With the Settings >> button the dialog window can be enlarged. The enlarged section contains the settings for the selected mode.

Example illustrating the bearing mode in the bearing measurement mode

In the **Bearing** mode, single-shot or continuous bearing measurements are performed on all emissions at one selected frequency within a range of 360 degrees or within sector(s) defined by the operator.

The controlled devices can be direction finders or directional antennas on an azimuth rotator. The directional antenna is rotated step-by-step through the angle range and the level is measured. The measurements are displayed as a polar diagram. The results are evaluated after all azimuth steps have been performed. The angle with the maximum or minimum level (depending on the selection) is displayed as a bearing result. It is also possible to select another result in the polar diagram.

Up to four measurement stations can be used simultaneously. The bearing results from every station involved, together with the level, bearing, quality and recording time of the bearing, are directly displayed within the Bearing Result dialog window, along with the longitude and latitude (if there are at least two stations) and the error radius of the target location (if there are at least three stations). These results are then automatically transferred to Map-View where the bearing results are displayed on a digital map. The bearing results can be displayed singly or continuously. A result history is provided in the Bearing Result dialog window and in MapView to determine the best transmitter bearing.

If, for any reason, it is not possible to set up a connection to the measurement station, the results can be transmitted verbally from the remote station and entered manually on to the system by the user.

The bearing results can be saved for further evaluation, replayed, combined or printed.

This mode can be included in the interactive measurement mode and in the automatic measurement mode.
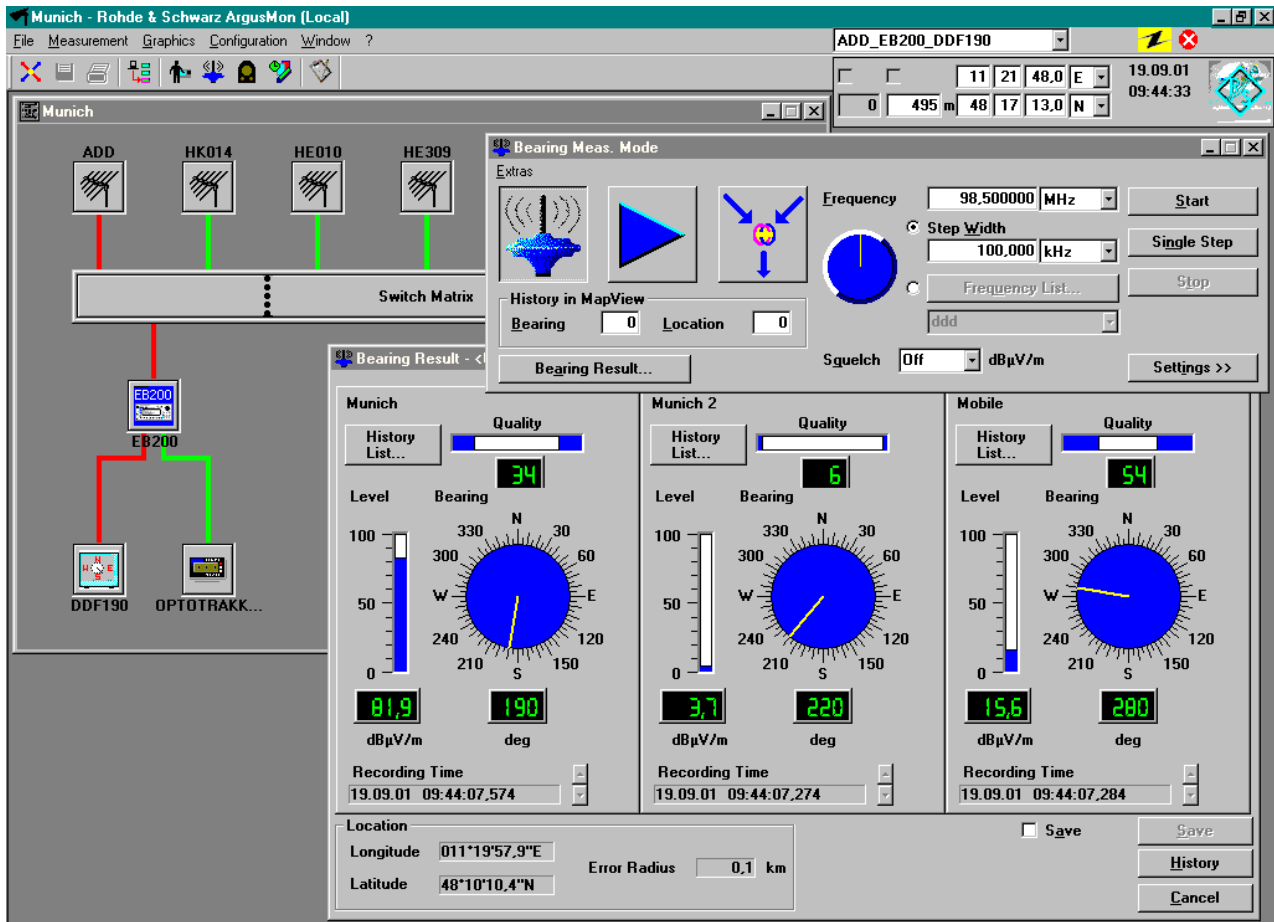
Example illustrating the bearing measurement mode (three stations connected) with results shown in the Bearing Result dialog window and in MapView
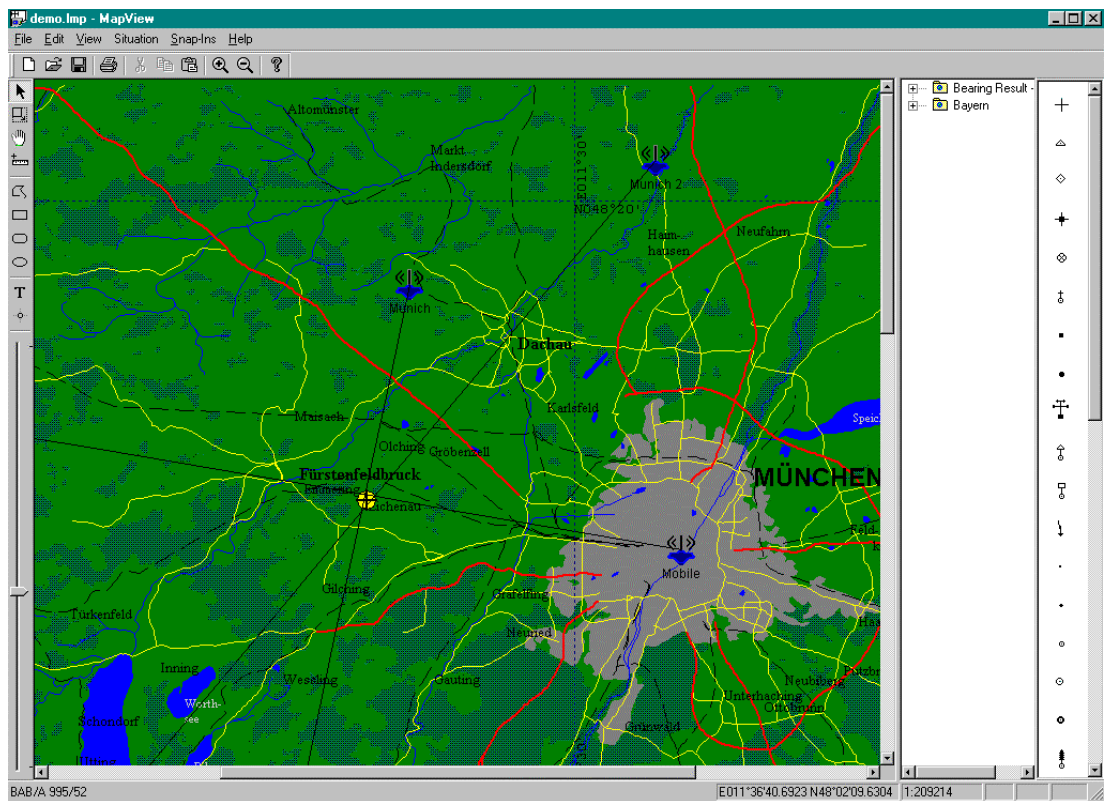
In the **Replay** mode, previously recorded bearing results are displayed in the Bearing Result dialog window and/or in MapView.

After the bearing result and the time period have been selected, the bearing results can be displayed singly or continuously.

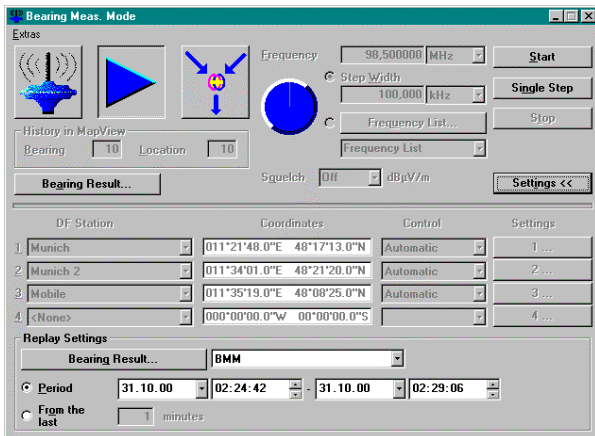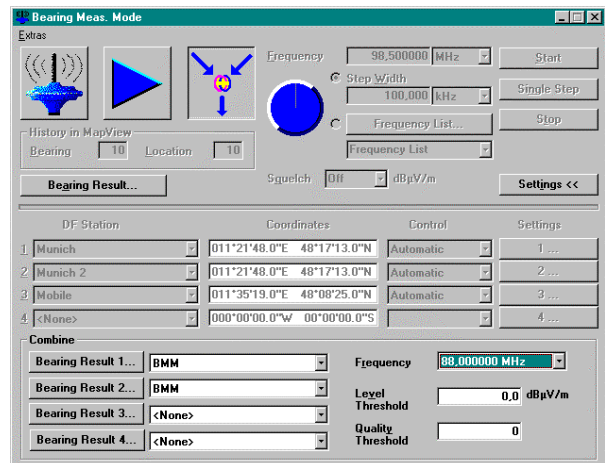Example illustrating replay mode in the bearing measurement mode

The **Combine** mode is used to combine previously recorded bearing results. The results are displayed in the Bearing Result dialog window and/or in Map-View.

This is very useful for users without any connection to the stations. The bearing measurements can be performed in each station. Later, the bearing results can be combined somewhere else and the location of the transmitter calculated.

This mode is also useful if a user has only one vehicle. The transmitter location can be found if the transmitter remains stationary. Firstly, the vehicle must move to the initial DF point. The bearing is taken. Then, the vehicle must move to the next DF point and again the bearing is taken. The two bearings are then used to determine the location of the transmitter.

When the bearing results, the frequency and, if required, the level and quality threshold have been selected, the bearing results can be combined.

Example illustrating Combine mode in the bearing measurement mode

FMTV Measurement Mode

The FMTV measurement mode is used to perform coverage measurements and analysis for FM and analog TV transmitters. This mode is not necessary for classic monitoring tasks.
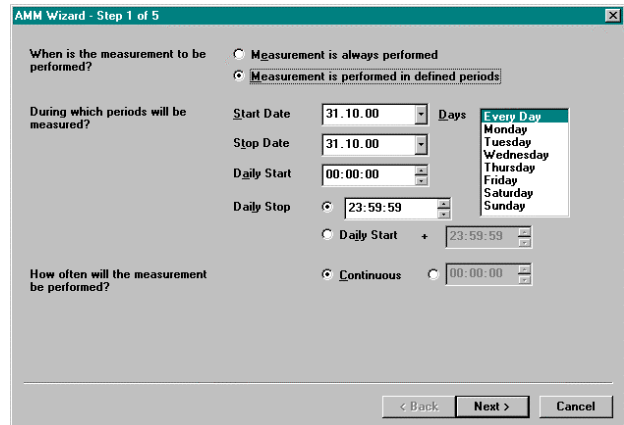
Automatic Measurement Mode

The automatic measurement mode is used to automatically perform measurements like spectrum occupancy, or to monitor bandwidth, field strength, frequency offset, modulation and location. The user defines the measurement parameters and then starts the measurement by clicking the Start button.

The measurement runs in the measurement unit. This means that the connection between the measurement unit and the control unit can be cancelled. The measurement will continue and the results will be saved in the measurement unit. When the control unit and the measurement unit are connected, the measurement results can be transferred.

Cyclic measurements can be performed at certain times of the day and over a period of days, months or years. If one of the parameters exceeds user-defined limits, an alarm is displayed on the screen at a manned station or passed to the central station if the alarm is at an unmanned station. Rotators and masts can also be controlled so that the measurements are also performed at certain azimuths, elevations and heights. The measurement results can be saved.

The user can set up an AMM procedure quickly and easily using the AMM Wizard. The AMM Wizard guides the user through the appropriate dialog windows where he can make the necessary entries to set up the AMM. The Wizard then generates the necessary definition files.

The first of the five AMM Wizard steps available

To provide a high level of flexibility, three definition files are used to define an automatic measurement task.

The first definition file is the range definition – the user can define the devices to be used and their settings for each frequency range. The available measurement parameters for all subranges are also displayed.
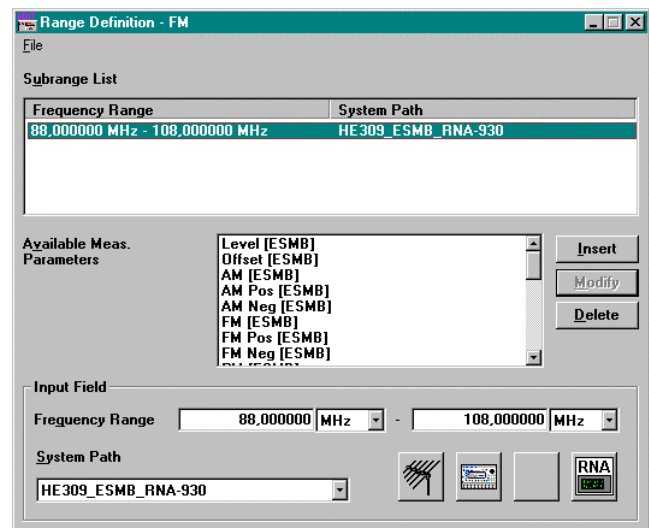
Example illustrating range definition

The second definition file is the measurement definition.

Example illustrating measurement definition

For each measurement, the user selects the range definition, the measurement type (Scan, Frequency List Scan, Transmitter List Scan or Fixed Frequency Mode) and the measurement frequency or frequencies. For location measurements, the parameters of the bearing measurement mode must be set. Measurements where the azimuth or elevation of a directional antenna is varied c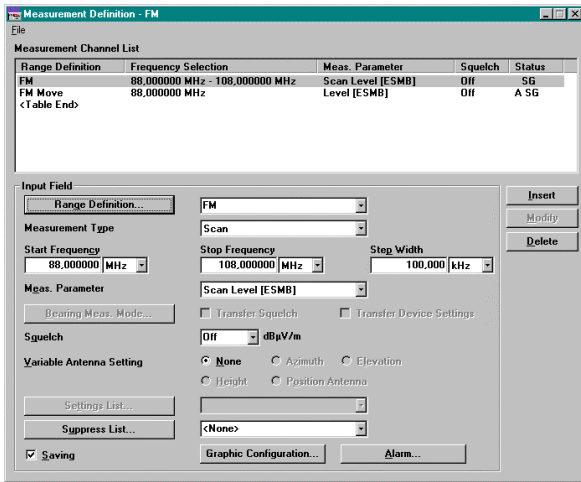an only be performed with steerable antennas. Frequencies which are not of interest to the user can be skipped. The measurement results can be saved for further evaluation; the type of graphic (yt plot, cartesian diagram, 3D waterfall diagram, polar diagram, 2D waterfall diagram) can be selected if appropriate for the measurement and alarm conditions can be set.

In the Alarm dialog window, the alarm conditions for a measurement parameter can be defined.

A limit can be defined by a limit value (limit value is constant over the frequency range) or by a limit line (limit values vary over the frequency range).

If Limit Monitoring is being performed and the Overshoot Limit is above the Undershoot Limit, the following happens: If a valid frequency measurement result is above the Overshoot Limit, the number of overshoots for this frequency is increased by one. If a valid frequency measurement result is below the Undershoot Limit, the number of undershoots for this frequency is increased by one. If the number of overshoots or undershoots for a specific frequency is reached, the alarm actions are triggered.

If Limit Monitoring is being performed and the Overshoot Limit is below the Undershoot Limit, the following happens: If a valid frequency measurement result is between the Overshoot Limit and the Undershoot Limit, the number of overshoots / undershoots for this frequency is increased by one. If the number of overshoots or undershoots for a specific frequency is reached, the alarm actions are triggered.

With Device Specific Monitoring, the following happens: If, for a valid measurement result, the trigger condition is present, the number of triggers is increased by one. If the number of triggers is reached, the alarm actions are triggered.

Three examples illustrating alarm triggering (Count for Triggering Alarm = 2):

Example 1: One overshoot and one undershoot point, otherwise within tolerances

Graphic see next page.

From each point 1, the measurement results overshoot the limit line. An alarm action is not initiated as the limit is undershot and overshot at only one measurement point.
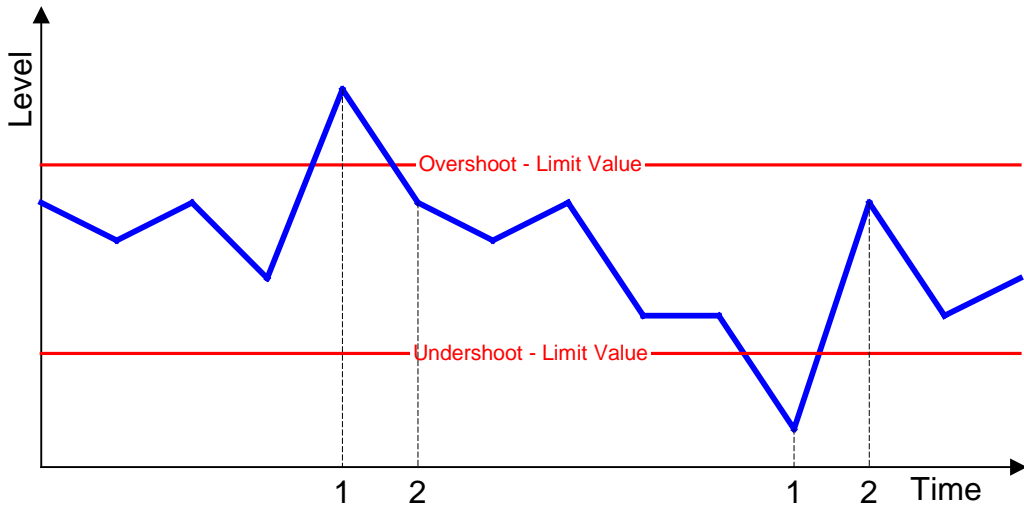
Example 1

Example 2

Example 3

Example 2: Many overshooting points, otherwise within tolerances

Graphic see previous page.

From point 1, the measurement results overshoot the limit line. An alarm action is initiated at 2. At 3 and 4, the measurement results are again within the limits. The OK action is performed at 4. Note: If message is selected for alarm action, this information refers to 1 and 3.

Example 3: Many overshoots and undershoots, otherwise within tolerances

Graphic see previous page.

From point 1, the measurement results overshoot the limit line. An alarm action is initiated at 2. At 3 and 4, the measurem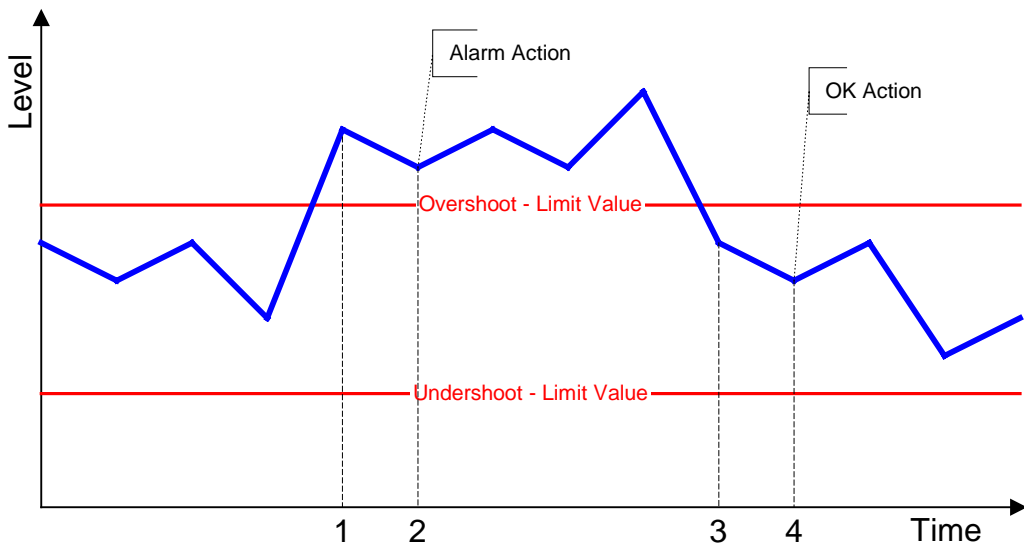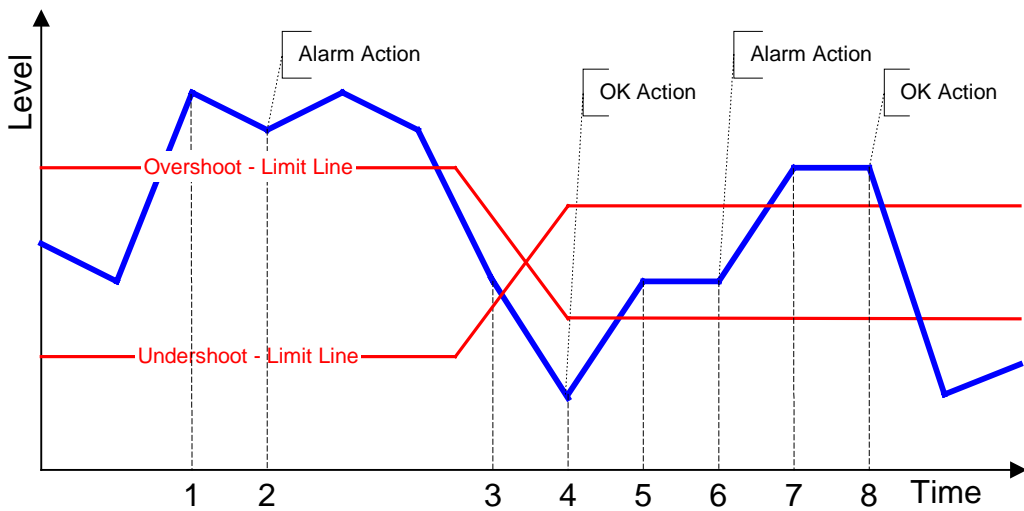ent results are outside the alarm zone. The OK action is performed at 4. At 5 and 6 the measurement results are within the alarm zone. The alarm action is initiated at 6. From 7 onwards, the measurement results are again within the alarm zone. At point 8, an OK action is performed. Note: If message is selected for an alarm action, this information refers to 1,3, 5 and 7.

The alarm actions can be a message, a signal tone or a measurement.

The third definition file is the timing definition where the user selects the measurement definition, the start and stop date, the daily start and stop, the measurement interval. The day of the week on which measurements are to be performed can also be selected.
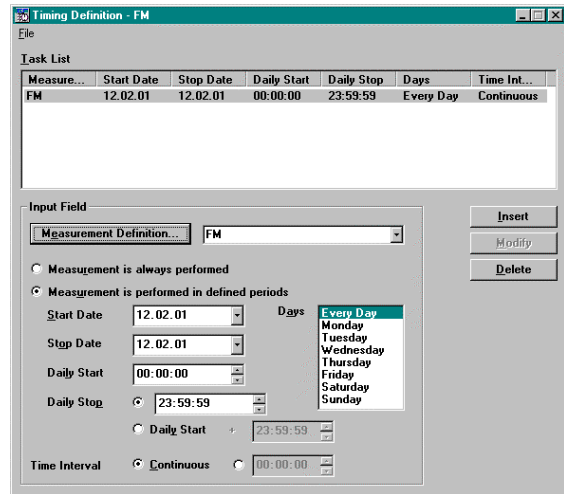
Example illustrating timing definition

The timing definition can be selected in the automatic measurement mode dialog window. The user can then start the measurement by clicking the Start button. The graphics are opened automatically.
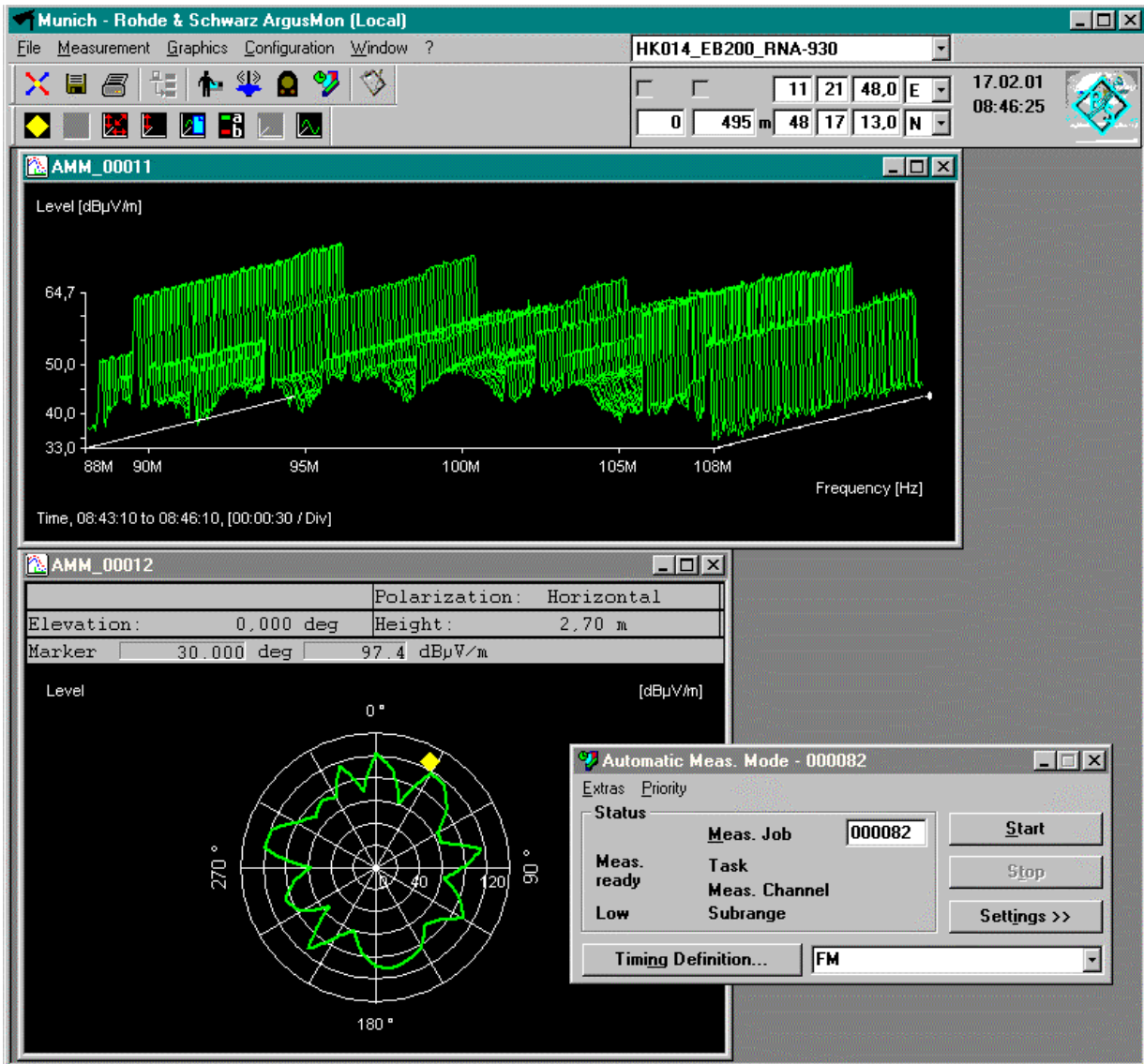
Example illustrating automatic measurement mode

Calculation and display of the North offset

In all measurement modes, the measured bearings of direction finders and antenna directions are corrected by adding the North offset.

The North offset is equal to the antenna offset, the vehicle offset (only for vehicles) and the offset between two antennas (only for direction finders with more than one DF antenna).

With vehicles, the antenna offset is the angle between the longitudinal axis of the vehicle and direction of the antenna (in the rotator home position). With stations, it is the angle between North and the direction of the antenna. With fixed antennas (ANTENNA device driver), the direction of the antenna is entered in the Position - Azimuth Offset field in the Properties <Device Name> dialog window of the antenna. With steerable antennas (SUPER-ANT device driver), the direction of the antenna is entered in the Azimuth – Antenna Offset field in the Properties <Device Name> dialog window of the antenna.

The vehicle offset is the angle between North and the longitudinal axis of the vehicle. With stations, it is set permanently to 0. If a compass is included in the device configuration the vehicle offset is automatically updated with the compass value at second intervals. This value is displayed in the vehicle-offset field in the auxiliary toolbar. It is also possible to enter the vehicle offset manually.

Some direction finders can be operated with two DF antennas for different frequency ranges. However, only one DF antenna is configured in the software and this covers the entire frequency range. Since an antenna offset must be specified for a DF antenna, an offset between the DF antennas must also be defined for the second antenna. The value is defined in the Offset field in the Properties <Device Name> dialog window of the direction finder.
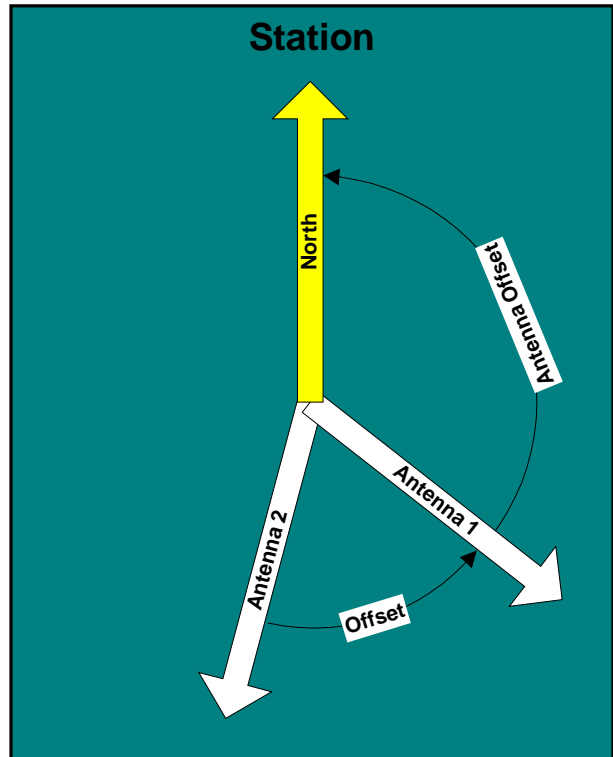
Calculation of the north offset in a station
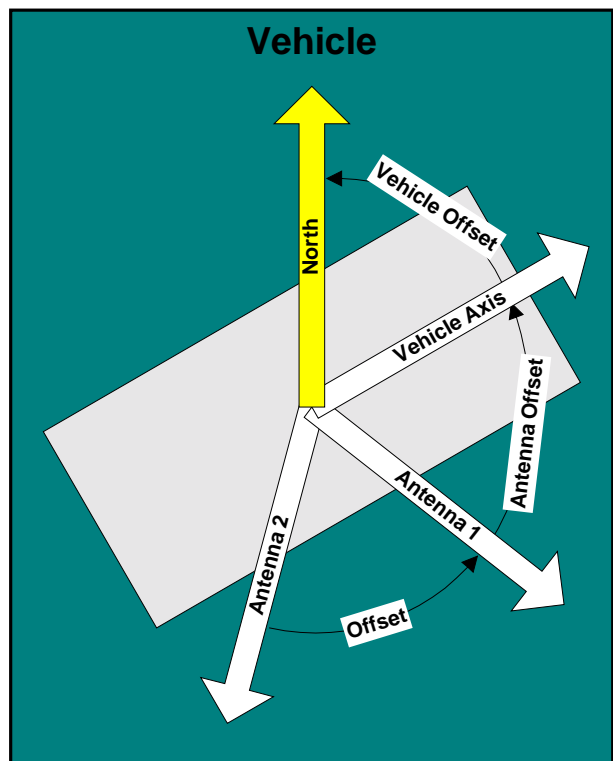
Calculation of the north offset in a vehicle

ArgusMon standard interfaces

The basic module of ArgusMon has the following interfaces:

♦ ArgusMon (Control Unit) ↔ ArgusMon (Local Measurement Unit)

♦ ArgusMon ↔ Backup files

♦ ArgusMon → MapView

The **ArgusMon (Control Unit) ↔ ArgusMon (Local Measurement Unit) interface** transfers data between the ArgusMon control unit and the local ArgusMon measurement unit.
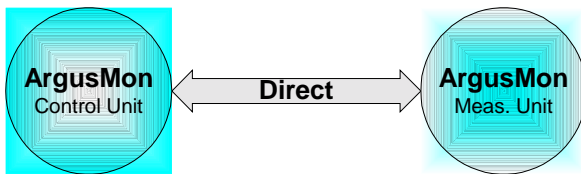
Prerequisite: Both software packages must be running simultaneously on one computer during the transfer.

The connection is made automatically by the software when ArgusMon is started. Data is transferred automatically by the software, if needed.

The **ArgusMon ↔ Backup files interface** saves ArgusMon files to hard disk, or other media, and transfers files between ArgusMon and ArgusEval.
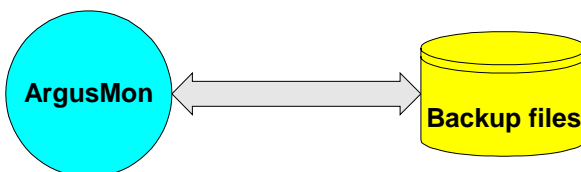
The files are created by clicking the Create Backup Files... button in the Navigator – System Files dialog window. Files are read and deleted by clicking the appropriate buttons in the Navigator – Backup Files dialog window.

The **ArgusMon → MapView interface** transfers bearing results, measurement results and transmitter lists from ArgusMon to MapView.
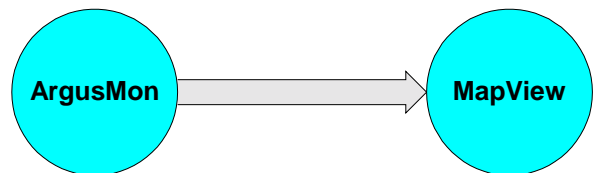
Prerequisite: Both software packages must be running simultaneously on one computer during the transfer.

Bearing results are transferred by clicking the Start button in the Bearing Measurement Mode dialog window. Transmitter lists are transferred by selecting the File → Display in MapView menu command in the transmitter list editor.

Additional ArgusMon interfaces

ArgusMon has the following additional interfaces:

- Remote Control (RC)
- Standard Data Interface (IMEX)
- Spectrum Management Database Interface (SMD)

The **Remote Control (RC)** transfers data between the ArgusMon control unit and the remote Argus-Mon measurement unit.
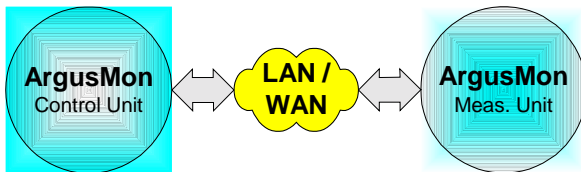
Prerequisites: A TCP/IP network must be installed. Both software packages must be running simultaneously during the transfer.

The connection is set up by selecting the remote measurement unit and clicking the Connect or Connect and Active button in the Select Meas. Unit dialog window. Data is transferred automatically by the software, if needed.

The **Standard Data Interface (IMEX)** has the task of transferring files with frequencies, radio or TV transmitter data to ArgusMon and transferring measurement results, bearing results, measurement processes and all types of transmitter lists from ArgusMon to files. The files can be in dBase, Excel, text, Access and html format. In addition the printer setup is extended with "RTF Document". Therefore the prints can be done on a RTF document.

Import of dBase, Excel, text, Access and html files with
1. frequencies
2. radio transmitter data (only EN or DE)
3. TV transmitter data (only EN or DE)

Export of
1. measurement results
2. bearing results
3. measurement processes
4. general transmitter lists
5. radio transmitter lists (only EN or DE)
6. TV transmitter lists (only EN or DE)
in dBase, Excel, text, Access and html files

Print in rtf files

Prerequisite for Windows NT 4.0: Microsoft Data Access Components (MDAC) and Microsoft Jet Engine Service Pack 3 must be installed.

Prerequisite for Windows 2000: none.

Data Access Components is a standard Microsoft interface for data exchange between databases via files. Data is imported by selecting File → Import Frequency List... in ArgusMon. Data is exported by clicking the Export... button in the Navigator – System Files dialog window.

The **Spectrum Management Database Interface (SMD)** transfers transmitter data and frequencies (occupied or unassigned) from the spectrum management system to ArgusMon.
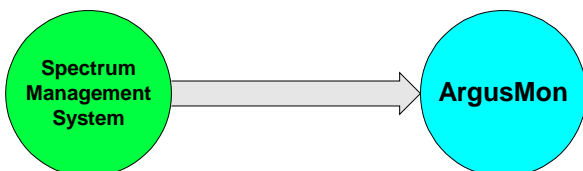
Prerequisites: Spectrum management database must be able to handle Open Database Connectivity (ODBC). The appropriate part of the spectrum management database must be implemented. Open Database Connectivity must be installed. Both software packages must be running simultaneously during the transfer.

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

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

◆ give inputs for engineering

◆ verify the results of engineering

◆ locate and identify unlicensed transmitters

◆ locate and identify harmful interference

◆ detect emissions with characteristics that do not meet license conditions

◆ verify the transmitter parameters of licensed stations

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

Transmitter data which is stored in a spectrum management system is transferred by selecting the File → Import Transmitter Data... menu command in ArgusMon.

The search criteria for the transmitter data are frequencies, service, signature, call sign and transmitter locations.

Frequencies (occupied or unassigned) which are stored in a spectrum management system are transferred by selecting the File → Import Frequencies... menu command in ArgusMon.

The search criteria for the frequencies (occupied or unassigned) are frequencies, service and transmitter locations.

Examples

The following examples illustrate typical configurations of ArgusMon:

Example 1: ArgusMon controls one receiver locally (minimum configuration)

Example 2: ArgusMon controls one receiver and one direction finder locally

Example 3: ArgusMon controls one receiver and one direction finder locally and has additional measurement modes and software interfaces
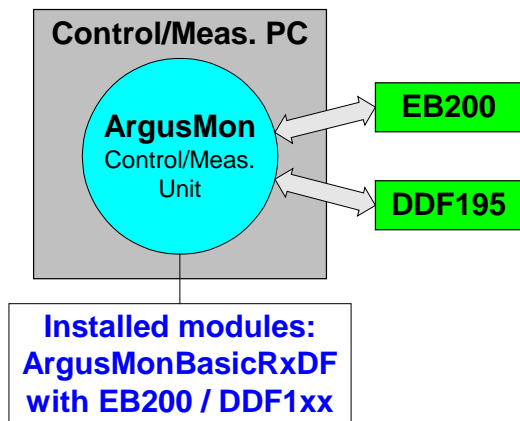
Example 4: ArgusMon controls one receiver and one direction finder remotely

```
┌─────────────────────┐              ┌─────────────────────┐
│      Control PC      │              │    Measurement PC   │        ┌─────────┐
│                      │              │                     │   ⇗    │  ESMB   │
│      ArgusMon        │   LAN /      │      ArgusMon       │◄──────►└─────────┘
│     Control Unit     │◄──► WAN ◄──►│     Meas. Unit      │
│                      │              │                     │   ⇘    ┌─────────┐
│                      │              │                     │◄──────►│ DDF195  │
└─────────────────────┘              └─────────────────────┘        └─────────┘
          │                                    │
┌─────────────────────┐          ┌─────────────────────────┐
│ Installed modules:  │          │   Installed modules:    │
│ ArgusMonBasicRC,    │          │   ArgusMonBasicRxDF     │
│ AMM, IMM, BMM,      │          │   with ESMB / DDF1xx    │
│ IMEX                │          │                         │
└─────────────────────┘          └─────────────────────────┘
```
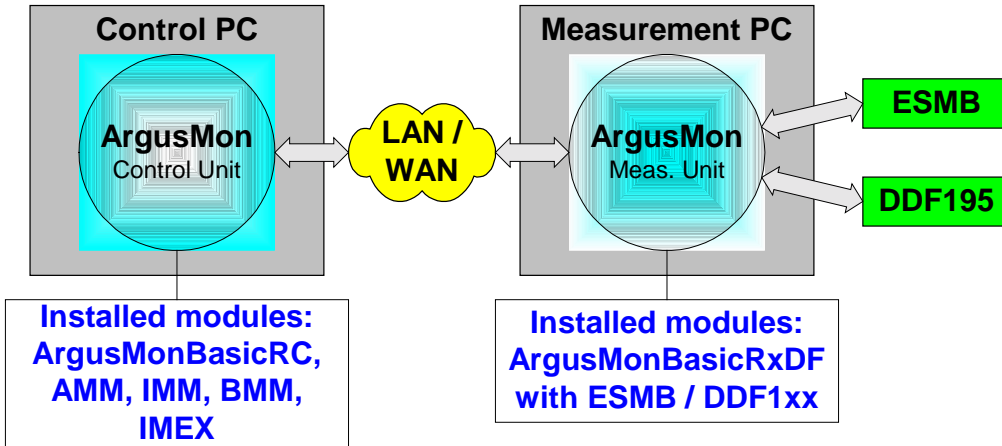
Example 5: ArgusMon controls one DDF0xM via DDF0xM or DDFARC device driver and other devices locally

```
                                    ┌──────────────────────┐
                                    │  Control/Meas. PC    │
┌──────────────────────┐           │                      │      ┌──────────────┐
│ Installed modules:   │           │     ArgusMon         │      │    Other     │
│ ArgusMonBasicRx      │           │   Control/Meas.      │◄────►│   devices    │
│ with DDF0xM or       │───────────│      Unit            │      └──────────────┘
│ DDFARC, device       │           │                      │
│ drivers for other    │           │         ⇕            │
│ devices              │           │                      │
└──────────────────────┘           │                      │   Transputerlink
                                    │     DDFMMI           │◄────────► ┌──────────┐
┌──────────────────────┐           │                      │           │ DDF 05 M │
│ Installed modules:   │───────────│                      │           └──────────┘
│ DDFMMI, LD_DDF       │           │                      │
└──────────────────────┘           └──────────────────────┘
```
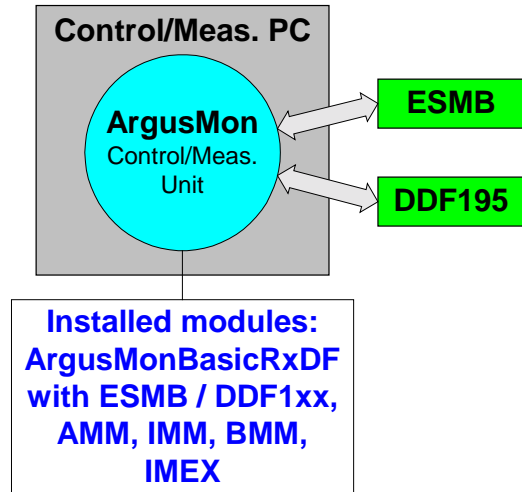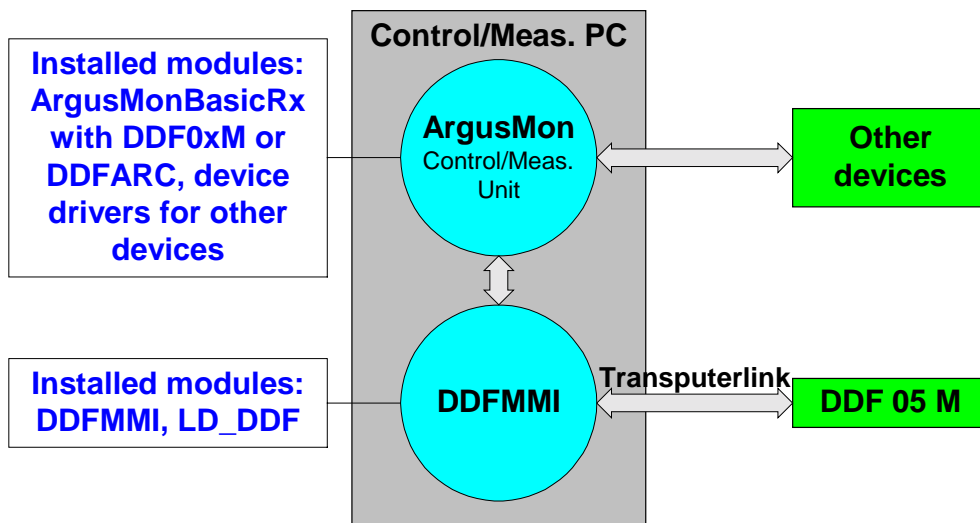
Example 6: ArgusMon controls one DDF0xM via DDF0xM device driver and other devices remotely
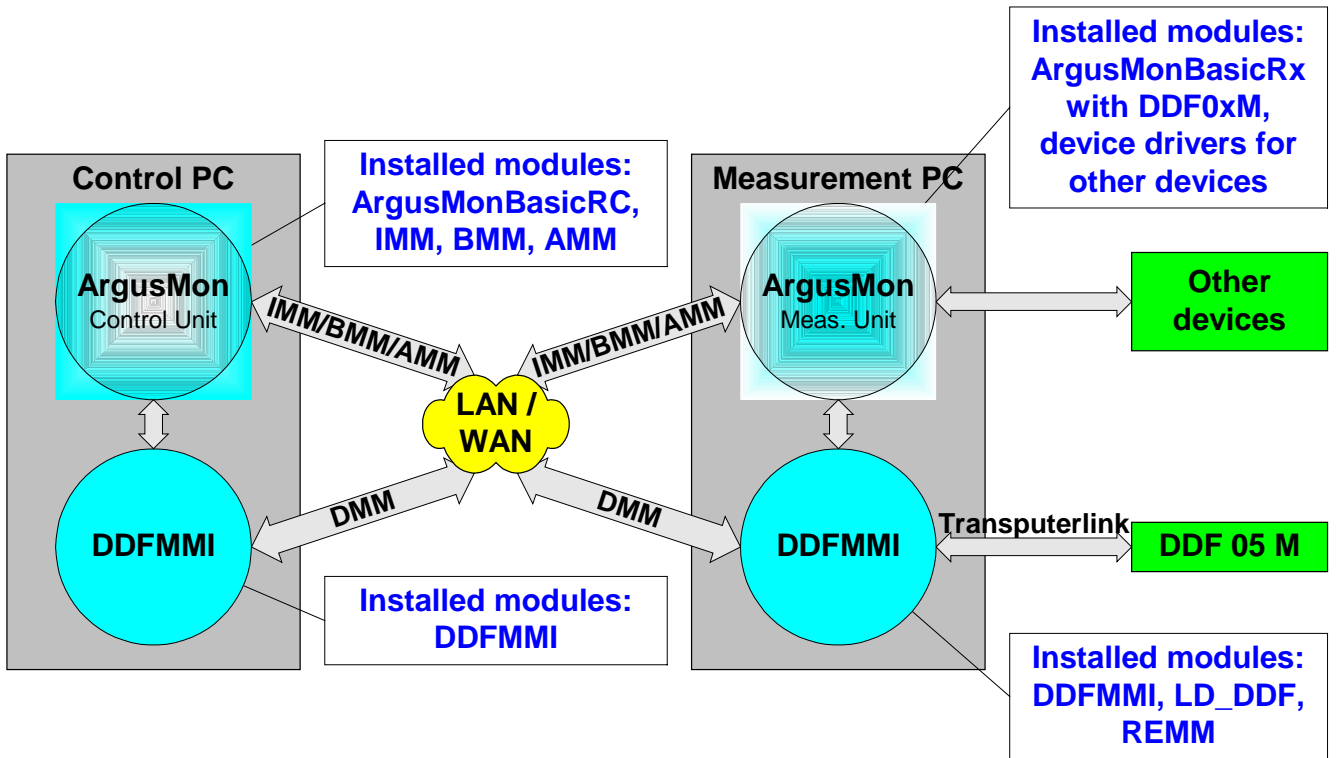
Example 7: ArgusMon controls one DDF0xM via DDFARC device driver and other devices remotely

Example 8: ArgusMon controls one DDF0xM via DDF0xM or DDFARC device driver remotely using the DDF PC

Ordering Information

Basic modules

Basic Module of Measurement Software ArgusMon and one Receiver Device Driver	RMSWIN	4049.9859.15

ArgusMonBasicRx contains one license for ArgusMon,
data administration, graphics, configuration, help functions,
standard software interfaces, direct measurement mode,
20 device drivers for fixed antennas,
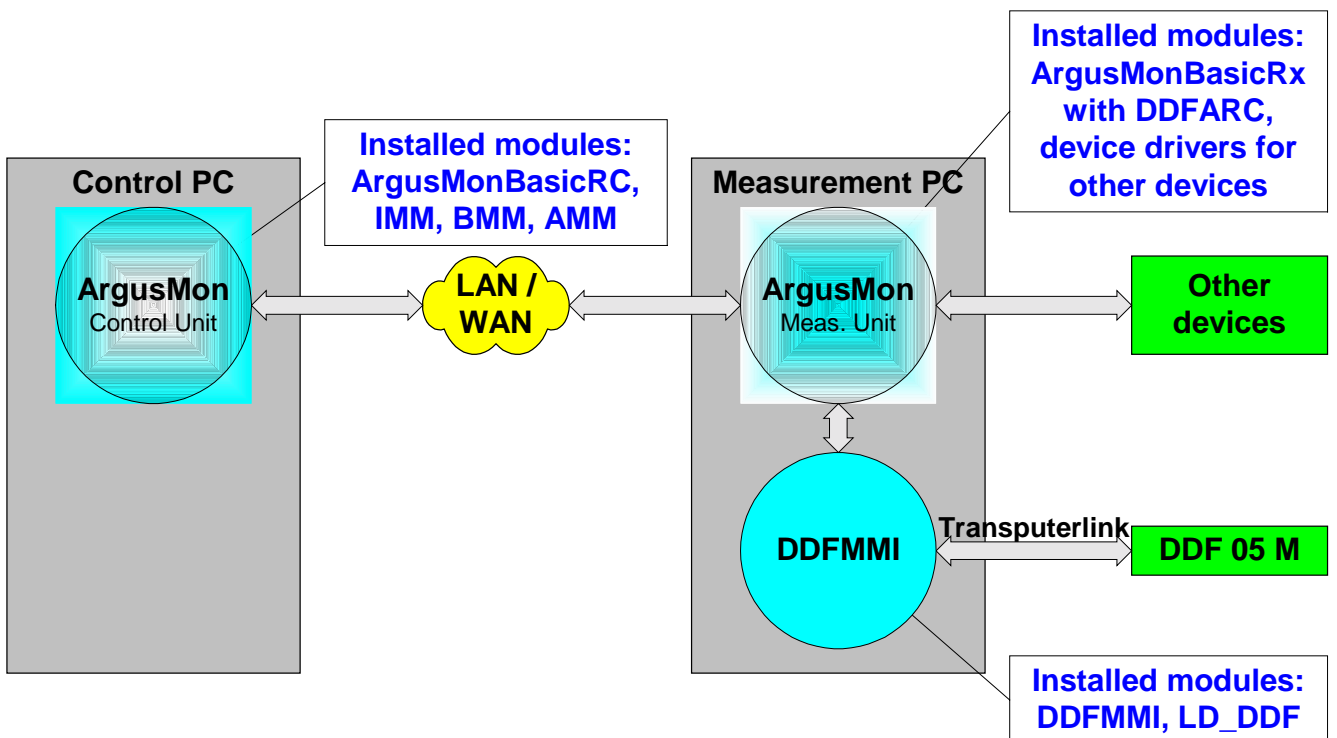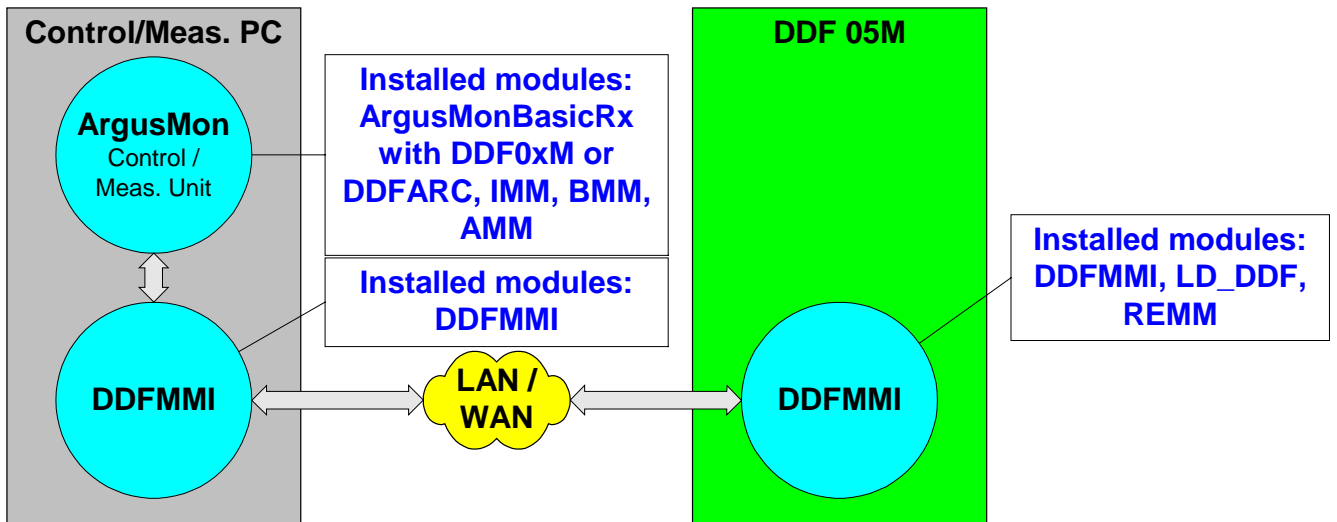20 device drivers for moveable antennas and
one receiver device driver (ESxN / ESH3 / ESVP / FAM /
FSx / ESxI / ESM / ESMC / ESxx / EB200 / EK89x / FSEx /
FMx / EFA / ESMB / FSPx / PA1555 / DDF0xM / DDFARC)

Basic Module of Measurement Software ArgusMon, one Receiver and one Direction Finder Device Driver	RMSWIN	4049.9859.16

ArgusMonBasicRx contains one license for ArgusMon,
data administration, graphics, configuration, help functions,
standard software interfaces, direct measurement mode,
20 device drivers for fixed antennas,
20 device drivers for moveable antennas,
one receiver device driver (ESxN / ESH3 / ESVP / FAM /
FSx / ESxI / ESM / ESMC / ESxx / EB200 / EK89x / FSEx /
FMx / EFA / ESMB / FSPx / PA1555 / DDF0xM / DDFARC)
and one direction finder device driver (PA025 / PAx55 / DDF1xx)

Basic Module of Measurement Software ArgusMon and Remote Control	RMSWIN	4049.9859.17

ArgusMonBasicRC contains one license for ArgusMon,
data administration, graphics, configuration, help functions,
standard software interfaces and remote control

Options: Additional ArgusMon measurement modes

Interactive Measurement Mode (**IMM**)	RMSWIN	4049.9859.03
Bearing Measurement Mode (**BMM**)	RMSWIN	4049.9859.04
FMTV Measurement Mode (**FTMM**)	RMSWIN	4049.9859.05
Automatic Measurement Mode (**AMM**)	RMSWIN	4049.9859.06

Options: Additional ArgusMon software interfaces

Remote Control (**RC**)	RMSWIN	4049.9859.10
Standard Data Interface (**IMEX**)	RMSWIN	4049.9859.11
Spectrum Management Database Interface (**SMD**)	RMSWIN	4049.9859.12

Options: ArgusMon device drivers for receivers and analyzers

Device Driver **ESxN** EsxN controls up to 5 Rohde & Schwarz ESVN / ESN	RMSWIN	4049.9859.20
Device Driver **ESH3** ESH3 controls up to 5 Rohde & Schwarz ESH3	RMSWIN	4049.9859.21
Device Driver **ESVP** ESVP controls up to 5 Rohde & Schwarz ESVP	RMSWIN	4049.9859.22
Device Driver **FAM** FAM controls up to 5 Rohde & Schwarz FAM	RMSWIN	4049.9859.23
Device Driver **FSx** FSx controls up to 5 Rohde & Schwarz FSA / FSB / FSM	RMSWIN	4049.9859.24
Device Driver **ESxI** EsxI controls up to 5 Rohde & Schwarz ESAI / ESBI / ESMI	RMSWIN	4049.9859.25
Device Driver **ESM** ESM controls up to 5 Rohde & Schwarz ESM500 / ESM1000 / Gigatune	RMSWIN	4049.9859.26
Device Driver **ESMC** ESMC controls up to 5 Rohde & Schwarz ESMC	RMSWIN	4049.9859.27
Device Driver **VSA** VSA controls up to 5 Rohde & Schwarz VSA (only 2T pulse measurement)	RMSWIN	4049.9859.28
Device Driver **ESxx** ESxx controls up to 5 Rohde & Schwarz ESHS / ESVS / ESS / ESVB / ESVD	RMSWIN	4049.9859.29
Device Driver **EB200** EB200 controls up to 5 Rohde & Schwarz EB200	RMSWIN	4049.9859.30
Device Driver **EK89x** EK89x controls up to 5 Rohde & Schwarz EK895 / EK896	RMSWIN	4049.9859.31
Device Driver **FSEx** FSEx controls up to 5 Rohde & Schwarz FSE / FSIQ / ESIB	RMSWIN	4049.9859.32
Device Driver **FMx** FMx controls up to 5 Rohde & Schwarz FMA / FMB	RMSWIN	4049.9859.33
Device Driver **EFA** EFA controls up to 5 Rohde & Schwarz EFA (only model 12)	RMSWIN	4049.9859.34
Device Driver **ESMB** ESMB controls up to 5 Rohde & Schwarz ESMB	RMSWIN	4049.9859.35
Device Driver **FSPx** FSPx controls up to 5 Rohde & Schwarz FSP	RMSWIN	4049.9859.36

Options: ArgusMon device drivers for direction finders

Device Driver **PA025** RMSWIN 4049.9859.40
  PA025 controls one Rohde & Schwarz PA025

Device Driver **PAx55** RMSWIN 4049.9859.41
  PAx55 controls one Rohde & Schwarz PA055 / PA555

Device Driver **PA1555** RMSWIN 4049.9859.42
  PA1555 controls one Rohde & Schwarz PA1555

Device Driver **DDF1xx** RMSWIN 4049.9859.43
  DDF1xx controls one Rohde & Schwarz DDF190 / DDF195

Device Driver **DDF0xM** RMSWIN 4049.9859.44
  DDF0xM controls one Rohde & Schwarz DDF01M / DDF05M /
  DDF06M

Device Driver **DDFARC** RMSWIN 4049.9859.45
  DDFARC controls one Rohde & Schwarz DDF01M / DDF05M /
  DDF06M via ARC interface (only FFM)

Options: ArgusMon device drivers for decoders and recorders

Device Driver **RNA-930** RMSWIN 4049.9859.60
  RNA-930 controls up to 5 Froitzheim RNA-930

Device Driver **DEF** RMSWIN 4049.9859.61
  DEF controls up to 5 Rohde & Schwarz DEF

Device Driver **DMC01** RMSWIN 4049.9859.62
  DMC01 controls up to 5 Rohde & Schwarz DMC01

Device Driver **CG300** RMSWIN 4049.9859.63
  CG300 controls up to 5 ATIS CG300

Device Driver **TELEVOX** RMSWIN 4049.9859.64
  TELEVOX controls up to 5 Kreutler Televox

Device Driver **SWS80** RMSWIN 4049.9859.65
  SWS80 controls up to 5 DataFusion SWS80

Device Driver **PCM-7010** RMSWIN 4049.9859.66
  PCM-7010 controls up to 5 Sony PCM-7010

Device Driver **OPTOTRAKKER** RMSWIN 4049.9859.67
  OPTOTRAKKER controls one Optoelectronics OPTOTRAKKER

Options: ArgusMon device drivers for accessories

Device Driver **RSU_T**	RMSWIN	4049.9859.81

RSU_T controls one TTL switch unit

Device Driver **RSU**	RMSWIN	4049.9859.82

RSU controls up to 5 Rohde & Schwarz PSU / PSN / RSU / PSHH-II

Device Driver **RSU_S**	RMSWIN	4049.9859.83

RSU_S controls up to 5 Rohde & Schwarz ZS125 - ZS129 / GB127x (switch unit)

Device Driver **HSRG**	RMSWIN	4049.9859.84

HSRG controls up to 5 Rohde & Schwarz HSRG / GB127x (rotator unit)

Device Driver **BG030**	RMSWIN	4049.9859.85

BG030 controls up to 5 Rohde & Schwarz BG030

Device Driver **ORBIT**	RMSWIN	4049.9859.86

ORBIT controls up to 5 Dornier ORBIT

Device Driver **BG016**	RMSWIN	4049.9859.87

BG016 controls up to 5 Elcom BG016

Device Driver **COMPASS**	RMSWIN	4049.9859.88

COMPASS controls one VDO LOGIC COMPASS / NAVPAC

Device Driver **GPS**	RMSWIN	4049.9859.89

GPS controls one GPS / DGPS with TSIP, TAIP, NMEA 0183, GPS129 protocol

Device Driver **ALLAUDIO**	RMSWIN	4049.9859.90

ALLAUDIO controls the audio swich functionality of one Rohde & Schwarz AllAudio

Device Driver **GX300**	RMSWIN	4049.9859.91

GX300 controls up to 5 Rohde & Schwarz GX300

Device Driver **XL-DC**	RMSWIN	4049.9859.92

XL-DC controls one Truetime XL-DC / XL-AK

ROHDE & SCHWARZ