ROHDE&SCHWARZ

Test & Measurement
Division

Operating Manual

MobiDemo

Application Software

1MA11_1E

Contents

1 Introduction

1.1 Overview

MobiDemo is an application program supporting the sales engineer in the demonstration of a combination of Signal Generator **SMIQ** and Signal Analyzer **FSIQ** or **FSE** with **FSE-B7** for various mobile radio standards.

The program provides a convenient user interface by means of which complex settings can be made on SMIQ and FSE/FSIQ with a few keystrokes and mouse clicks. FSE/FSIQ can be operated in the modulation analysis and adjacent-channel power measurement modes. The settings for SMIQ and FSE/FSIQ are transferred via IEC/IEEE bus. Settings can be stored and reloaded if necessary.

A keystroke or mouse click is sufficient to adapt the setting of the instruments optimally to the measurement task at hand.

The software can handle the mobile radio standards **PHS**, **IRIDIUM**, **IS-95**, **WCDMA** and **GSM**.

1.2 Hardware and Software Requirements

1.2.1 Controller Requirements

Hardware

The program runs on any IBM-AT-compatible PC.

* CPU: 486, Pentium or better, clock rate >100 MHz
* RAM: $\geq$32 Mbyte
* GPIB: Rohde & Schwarz IEEE 488.2 Bus Interface PS-B4, 1006.6207.04 or National Instruments AT GPIB/TNT.

Software

The program runs under Windows 95 as well as Windows 95 or Windows NT. It can also be operated on the computer function of FSIQ (not on the FSE!). Moreover, the GPIB (IEC/IEEE) bus drivers for Windows from National Instruments are required.

1.2.2 SMIQ Requirements

The **SMIQ 02/03(B)** models equipped with the following minimum of options are suitable: **SMIQB10**, **SMIQB11, SMIQB42** (only needed if IS-95 signals are to be generated) and **SMIQB43** (only needed if WCDMA Signals are to be generated).

Software version: 3.91IQ or more recent

1.2.3 FSE/FSIQ Requirements

The following FSE models can be used: **FSEA20/30**, **FSEB 20/30**, **FSEM 20/30**, **FSEK 20/30**. FSE must be equipped with the optional Vector Signal Analyzer **FSE-B7**. All FSIQ models **FSIQ3**, **FSIQ7** and **FSIQ26** can be used too. If the program is to be run on FSIQ itself option **FSE-B17** is also required.

Software version: 1.71 for FSE or 2.03 for FSIQ or more recent.

1.3   Installation

Application Software MobiDemo is available as a self-extracting .EXE file.
When ***MOBIXX.EXE* (XX = version)** is started, the subdirectories Disk1 and Disk2 with the associated files are generated in the selected directory (default: C:\Install).

Installation from hard disk:
To install MobiDemo from the hard disk use the file manager and call up ***SETUP.EXE*** from the Disk1 directory. The program and some files for SMIQ data and control lists for special standards are installed on the PC. To continue, follow the instructions of the setup program.

Installation by means of disks:
Two disks are needed. To generate installation disks, copy the contents of the Disk1 directory onto disk No. 1 and the contents of the Disk2 directory onto disk No. 2.

To install MobiDemo from the disks, insert disk No. 1 into the disk drive and execute ***a: SETUP.EXE*** using the Windows file manager. The program and some files for SMIQ data and control lists for special standards are installed on the PC. To continue, follow the instructions of the setup program.

1.4   Connecting the Instruments and the Controller

The RF output of SMIQ has to be connected to the RF input of FSE/FSIQ (preferably using a short cable with N connectors).
Depending on the configuration, connect furthermore two IEC/IEEE-bus cables as shown below.

a) MobiDemo runs on an external PC.
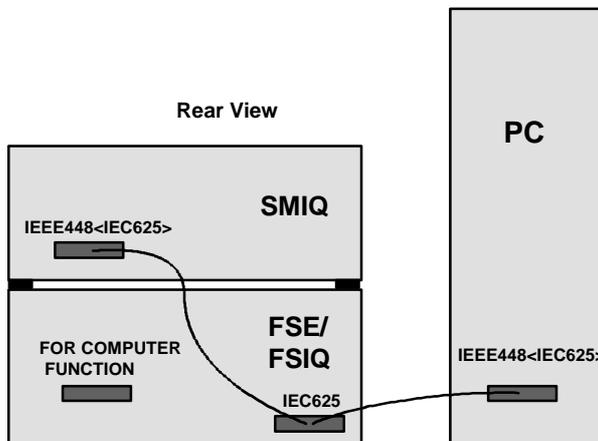
b) MobiDemo uses the computer function of FSIQ (not possible with FSE!).
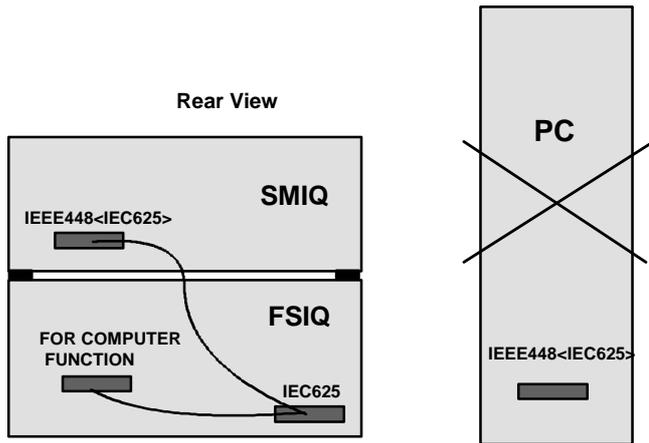
c) MobiDemo uses the computer function of FSIQ involving internal control via DDE interface (not possible with FSE!).
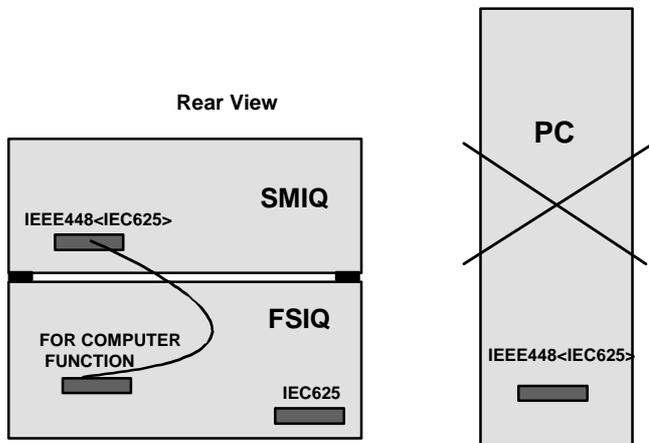

1.5 Starting the Program

The program is started by executing MOBIDEM.EXE. To do so, click the MobiDemo icon in Windows 3.X, for example.

If MobiDemo runs on an FSE / FSIQ, a window is displayed upon start of the program to inform the user that FSE / FSIQ will be controlled internally via the DDE interface if YES is clicked. If NO is clicked, control will be via the IEC/IEEE bus interface. See also sections 1.4 and 2.4.
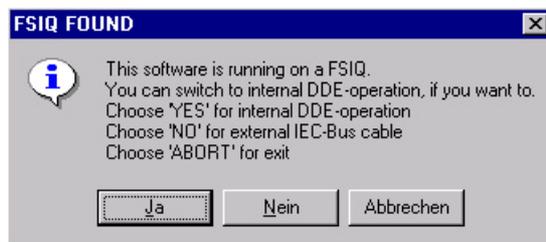
2   User Interface

2.1   Main Menu in Default Setting
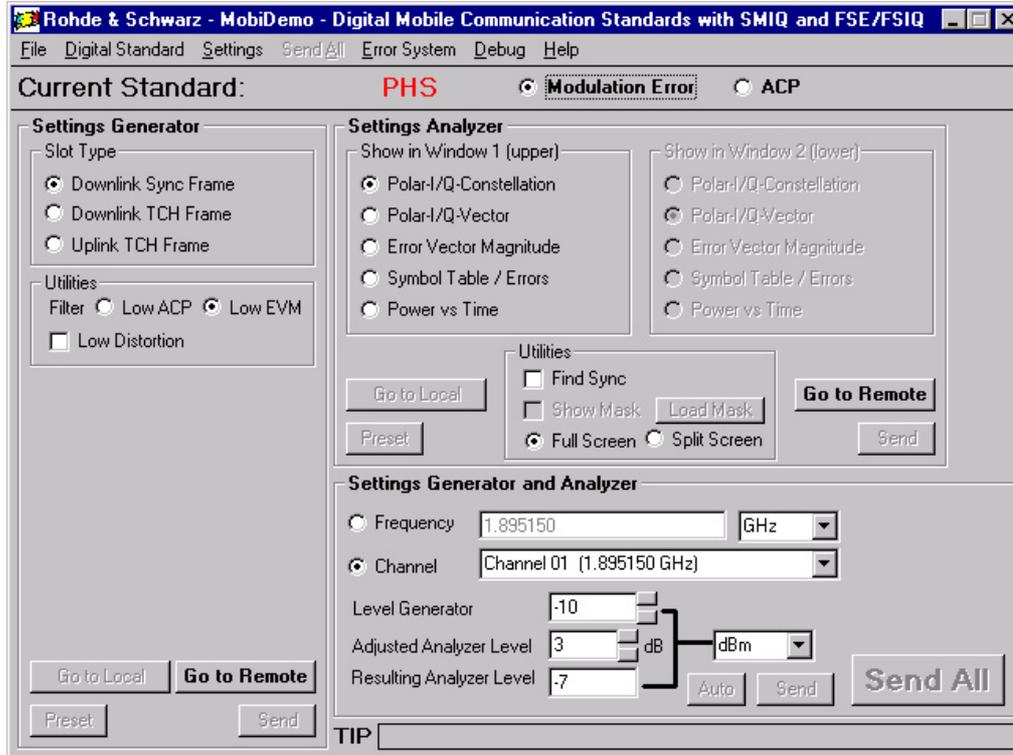
2.2   File Menu
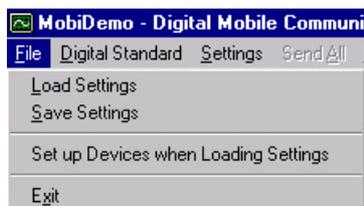
2.2.1   Load Settings

This function allows settings stored in files to be called up again. If "Set up Devices when Loading Settings" is active, the settings are transferred to the instruments immediately after loading without the user having to make additional entries.

2.2.2   Save Settings

This menu item allows the current settings to be stored in the selected file.

2.2.3   Set up Devices when Loading Settings

If this menu item is active (shown by a tick on the left of the item), the instruments are set automatically after the settings have been loaded (under File - Load Settings). The function can be switched on and off by clicking this menu item with the mouse.

2.2.4 Exit

This function exits the MobiDemo program and switches the instruments to local mode after the user has been asked to confirm whether the settings are to be stored.

2.3 Digital Standard Menu

This menu allows the user to select the standard and to load the stored default settings. PHS is the standard that is active by default (marked by ✓):
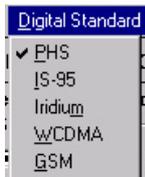
The following standards are available:

PHS	(**P**ersonal **H**andy Phone **S**ystem)
IS-95	(Qualcomm CDMA)
IRIDIUM	(digital satellite mobile radio standard)
WCDMA	(wideband CDMA)
GSM	(digital mobile radio standard, **G**lobal **S**ystem for **M**obile Communication)

2.4 Settings Menu

2.4.1 GPIB Adapter

Clicking this menu item opens a window in which the GPIB address of the generator and the analyzer can be set.

The default values are 28 for the generator and 20 for the analyzer.
The settings do not become active until the instrument is again switched to the remote mode.

2.4.2   Set all Devices Remote

Generator and analyzer are set to remote (which corresponds to selecting "Go to Remote" on the generator and on the analyzer).

2.4.3   Set all Devices Local

Generator and analyzer are set to local.

2.4.4   Set all Elements Default

This function replaces all settings in the program by the internally stored default settings that are also used when the program is started or another standard is selected.

2.4.5   FSE / FSIQ Internal

This function sets the FSE / FSIQ (depending on the connected device) to internal control via DDE driver. It can only be activated if MobiDemo runs on an FSE / FSIQ. An error message is displayed if the user tries to activate this option on an external PC.

2.5   Send All Menu

This menu is equivalent to the SEND ALL button provided by the MobiDemo user interface. All generator and analyzer settings are transferred to the instruments connected.
SEND ALL can only be operated if generator and analyzer are in the remote mode.

2.6   Help Menu
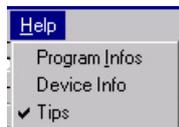
2.6.1   Program Infos

General program information such as version number and supported standards are displayed.
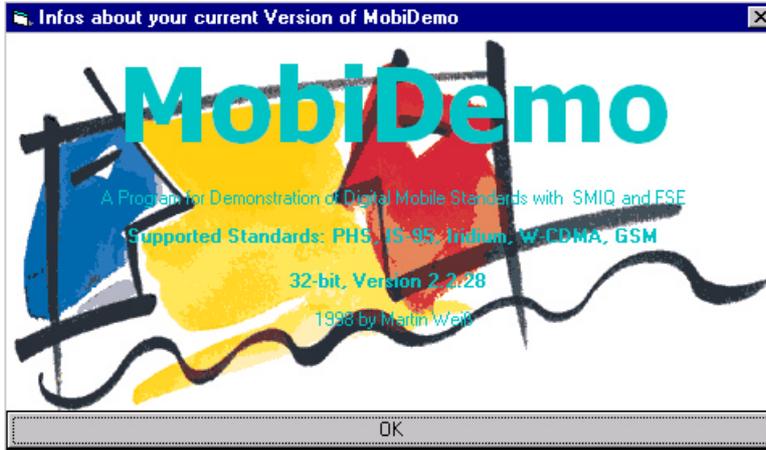
2.6.2   Tips

If this function is active (marked by ✓), an information line appears at the bottom right which briefly comments on the function panel on which the mouse pointer is located. Example: mouse pointer on PHS.


2.6.3   Device Info

Informations about the current connected devices (such as Typ, Firmware Version or installed options) are displayed.
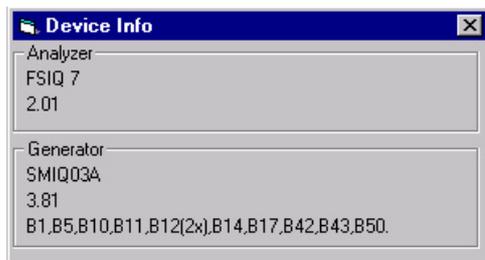
2.7   Error System Menu
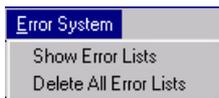
2.7.1 Show Error Lists

This menu item activates a window in which all generator and analyzer errors are displayed which occurred since the program has been started. The time at which the error occurred is indicated as well. It is not possible to differentiate errors from warnings.
CAUTION:
If there is an entry in the list, this does not necessarily mean that the instrument has produced an error. The message "Oven cold", for example, only indicates that the crystal oscillator (10 MHz reference oscillator) has not yet reached its nominal temperature.

2.7.2 Delete All Error Lists

This command allows all listed errors to be deleted.

2.8 Layout of User Interface
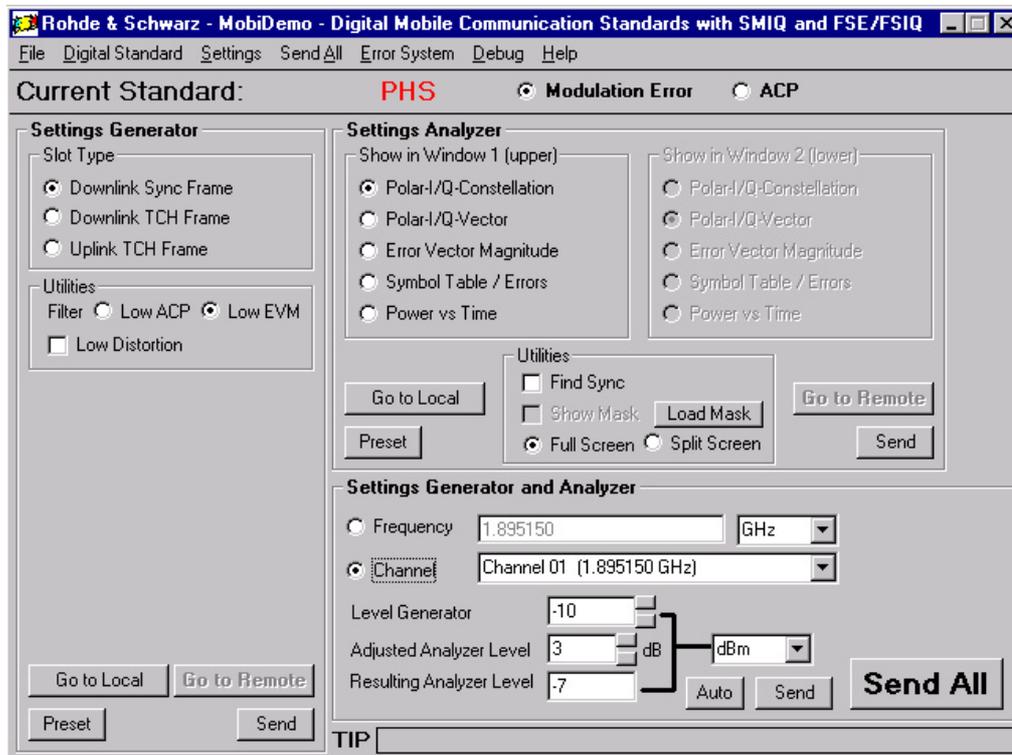
The interface is subdivided into three panels described below. The individual elements are interconnected in such a way that the options used are shown depending on the standard selected. If an element has a grey background and cannot be selected, this means that a specific setting cannot be made because of other settings.

2.8.1   Status Line

The status line right beneath the menu bar is for indicating or selecting the current standard and the FSE/FSIQ measurement mode (modulation error or ACP measurement).

Current Standard:	**PHS**	⦿ Modulation Error	○ ACP

ACP (adjacent-channel power) is permitted for all standards, whereas the modulation error measurement can neither be selected for IS-95 Forward Channel (except for Pilot Only) nor for WCDMA.

2.8.2   Settings Generator and Analyzer Panel

This panel is for setting the frequency and level of generator and analyzer simultaneously.
The level of the analyzer (Ref Level) can have an offset from the generator level.
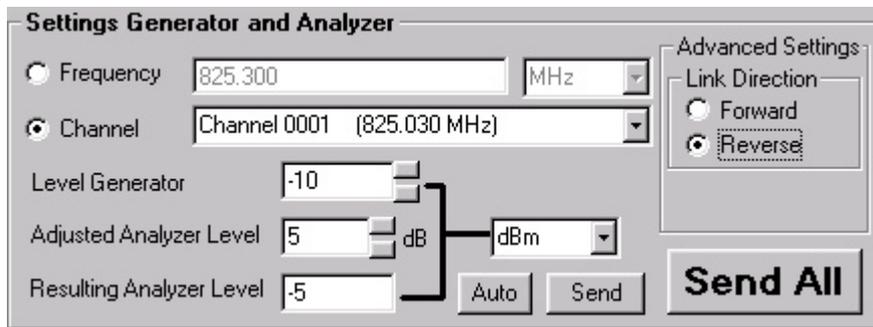
2.8.2.1   Frequency / Channel

The buttons to the left of these two fields allow the user to select whether the frequency is to be set in numerals or via the channel.
The listed channel entries depend on the selected standard.
If the frequency is entered directly, the unit can also be selected (kHz, MHz or GHz).
Only numerals can be entered in the frequency field, numerals with exponents are rejected as errors.

No channel can be entered for WCDMA.

Caution:
The software does not check whether the selected frequency is permissible for generator and analyzer.

2.8.2.2   Level

The entry in the field " Resulting Analyzer Level" is calculated from the sum of values entered in the fields "Level Generator" and "Adjusted Analyzer Level". The calculated value cannot be modified.
The desired unit can be chosen using the list beside the text fields (dBm, dBuV, uV or mV).
Only numerals can be entered in the level fields, numerals with exponents are rejected as errors.

Caution:
The software does not check whether the selected levels are permissible for generator and analyzer.

2.8.2.3   Auto
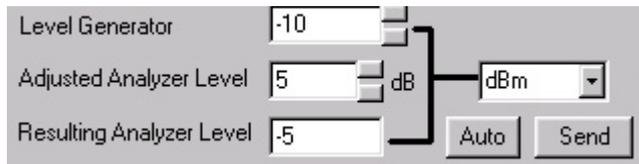
In case of ACP measurement the Auto button allows the analyzer to be set to the optimum reference level. A test sequence is carried out in the analyzer for this kind of optimization.

2.8.2.4   Link Direction (only with Digital Standard IS-95)

Link Direction activates the downlink channel (Forward - from base station to mobile station) or the uplink channel (Reverse - from mobile station to base station). The setting influences both channel frequencies and slot type.

Link Direction cannot be used with WCDMA.

2.8.2.5   Send (Settings Generator and Analyzer Panel)

Clicking the Send button transfers the selected level settings to the generator and the analyzer.

2.8.3　Settings Generator Panel
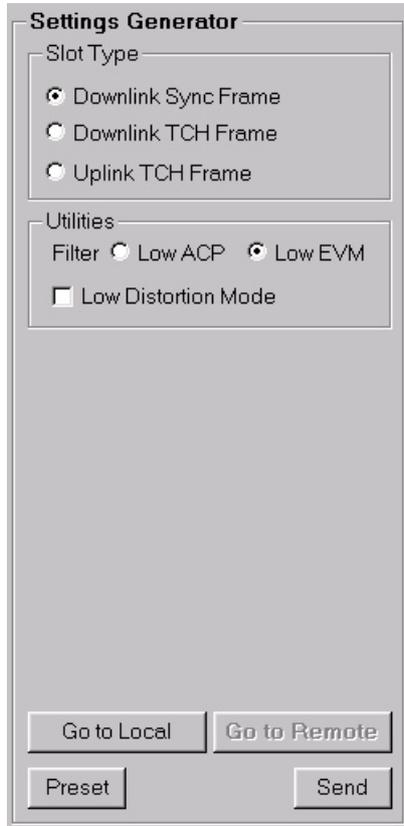
2.8.3.1　Slot Type

With this menu item predefined slot assignment settings which are stored in SMIQ as standard can be activated. The permissible settings depend on the standard selected.

PHS:
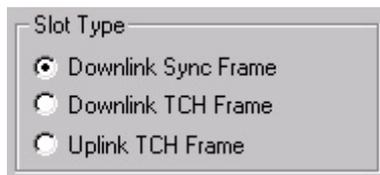
With Downlink Sync Frame 1 downlink synchronization slot (control slot) per frame is sent with the associated Unique Word.
With Downlink TCH Frame 1 downlink communication slot per frame is sent with the associated Unique Word.
With Uplink TCH Frame 1 uplink communication slot per frame is sent with the associated Unique Word.

IS-95:

Forward channel:
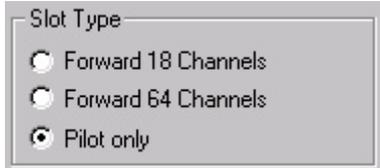
The following standard configurations of SMIQ (DIGITAL STANDARD:IS95:MODE) are available:
18 code channels active (FWD_LINK_18),
64 code channels active (FWD_LINK_64),
or pilot channel (FWD_LINK_18, all channels except pilot channel disabled).

Reverse channel:
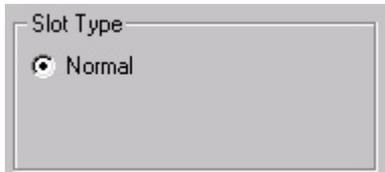
If the reverse channel has been selected, the standard REV_LINK configuration of SMIQ will be used.

IRIDIUM and WCDMA:
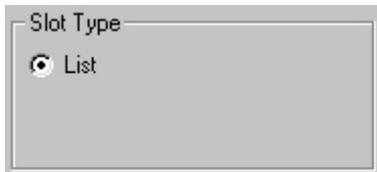
At present, IRIDIUM is not available in SMIQ as digital standard (may change in the future). Therefore SMIQ is used in the DIGITAL MODULATION mode in conjunction with data lists (DIGITAL MODULATION: SOURCE: DATA_LIST).
See section 2.9.

2.8.3.2   Utilities

2.8.3.2.1 Filter

This menu item allows the user to choose whether the generator's modulation filter is to be set for low ACP (adjacent-channel power) or low EVM (error vector magnitude).

2.8.3.2.2 Low Distortion Mode

In the low distortion mode the baseband signal of SMIQ is 3 dB less than the normal level. Unwanted intermodulation products which are generated in the IQ modulator can thus be attenuated. As a rule, OFF is the setting to be preferred.

2.8.4   Settings Analyzer Panel for Modulation Error
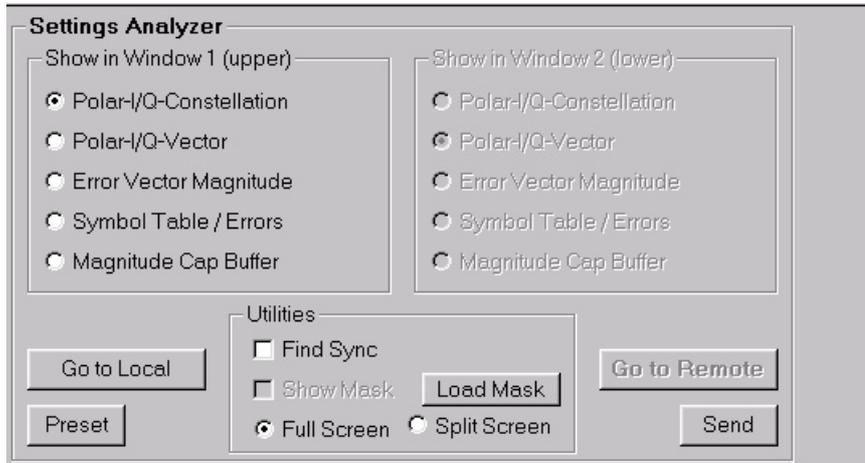
2.8.4.1   Show in Window 1 (upper)

The buttons allow the user to select the view that is to be activated for the main window (or the upper window in case of split screen display).

2.8.4.2   Show in Window 2 (lower), only for Split Screen Display
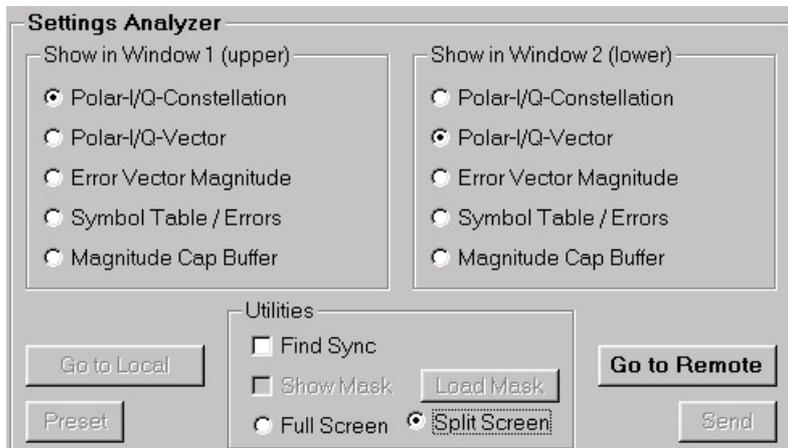
The buttons allow the user to select the view that is to be activated for the lower window in case of split screen display. This window is blanked if full screen display has been selected.

2.8.4.3   Utilities

2.8.4.3.1 Find Sync

If this field is active, the analyzer synchronizes onto the sync sequence of the applied signal. This is only possible, however, if the signal really has a correct sync sequence.

2.8.4.3.2 Find Burst (only for IRIDIUM and GSM)

If this field is active, the analyzer demodulates the signal within the burst limits (provided that the signal really is a burst signal). Otherwise the analyzer outputs the message "Burst Not Found" on its screen.

2.8.4.3.3 Load Mask

If the selected standard allows masks to be evaluated (with PHS standard and Mag Cap Buffer representation), clicking this button loads the power-versus-time template defined in this standard.

2.8.4.3.4 Show Mask

If the selected standard allows masks to be evaluated (with PHS standard and Mag Cap Buffer representation), clicking this button activates a mask. This only makes sense if the mask is already available in the analyzer (execute Load Mask function beforehand).

2.8.4.3.5 Full Screen / Split Screen

This setting determines whether one or two windows are displayed on the FSE/FSIQ screen.

## 2.8.5 Settings Analyzer Panel for ACP Measurement
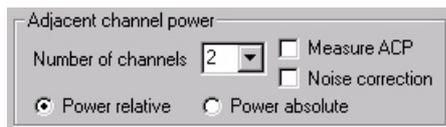
With ACP selected, FSE/FSIQ is configured for adjacent-channel power measurement in line with the standard and the analyzer settings selected. The number of adjacent channels is entered under "Number of channels". One, two or three adjacent channels can be selected each below or above the useful channel. The adjacent-channel power can be displayed on FSE/FSIQ relative to the channel power (Power relative) or as an absolute power value (Power absolute)

Note regarding IS-95:

The adjacent-channel spacing (1st adjacent channel) is different for downlinks and uplinks. Measurements on the base station (downlink) have to be performed at a spacing of 750 kHz, those on the mobile station (uplink) at a spacing of 885 kHz.

2.8.5.1   Measure ACP (only for WCDMA)

With WCDMA MobiDemo determines the adjacent-channel power in an automatic test run. First the useful channel and then the adjacent channels are measured, and the measurement results are displayed in a window.

MEASUREMENT RESULTS

Main Channel	-6.35	dBm
1. upper Channel	-61.49	dB
1. lower Channel	-61.6	dB
2. upper Channel	-63.06	dB
2. lower Channel	-63.48	dB

Draw the results now?

Yes   No
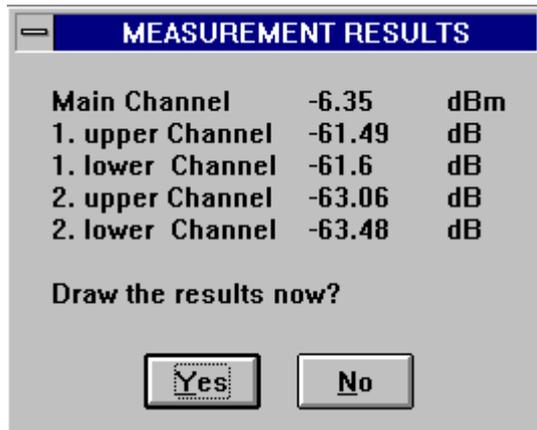
To obtain a graphical display of the adjacent-channel power click "Yes".
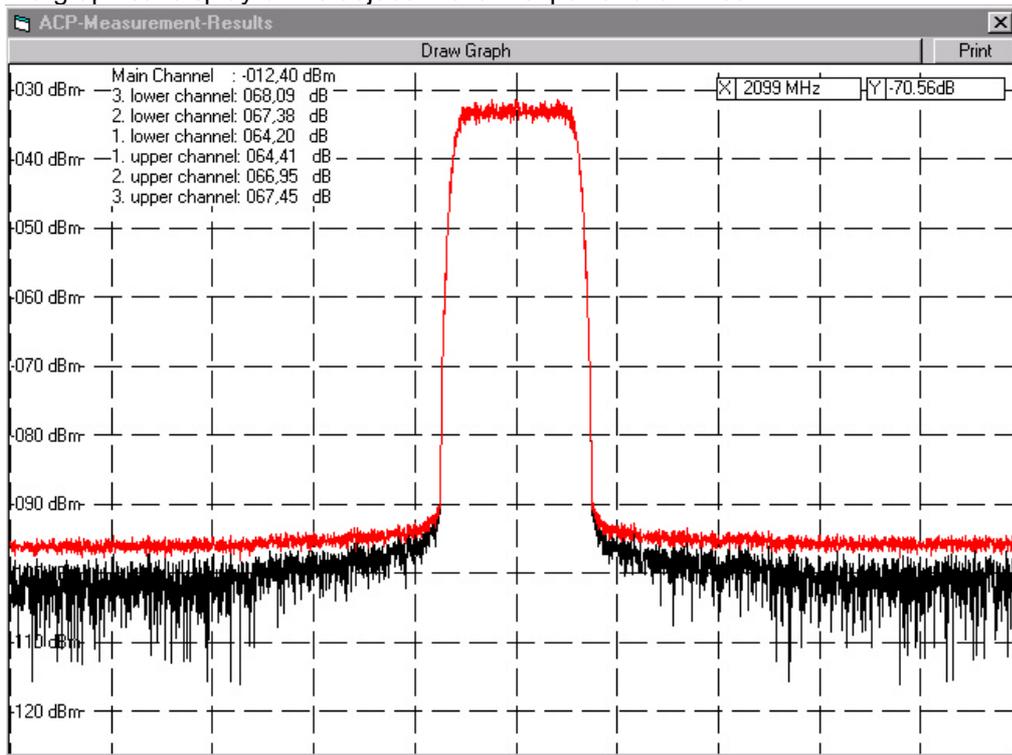
To print the results click "Print".
To return to the MobiDemo program interface close the draw window.

## 2.8.5.2 Noise Correction (only for WCDMA)

If the noise correction function is active during the ACP measurement, the FSE/FSIQ input is switched off before each sweep and the inherent noise of the analyzer is measured and taken into consideration in the subsequent channel measurement using a signal. This considerably expands the dynamic range of the analyzer.
The corrected ACP is displayed as a result.

2.9   Lists

At present, IRIDIUM is not yet available as digital standard for SMIQ. By way of the data lists, MobiDemo can nevertheless generate standard-conformal signals.
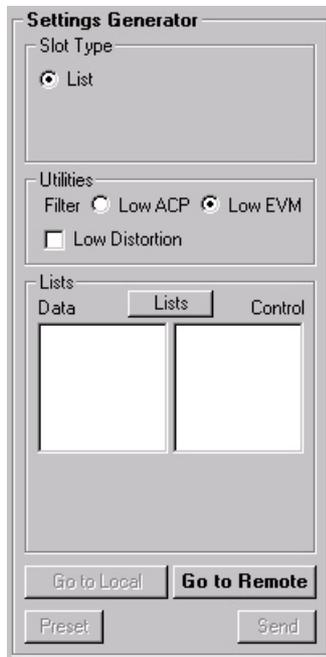
With IRIDIUM selected as standard, the additional field "Lists" appears in the Settings Generator panel. This field contains the data lists on the left and the control lists on the right.

## 2.9.1   Predefined Lists for Iridium

The following lists have been predefined:

IRID1DN: The downlink slot 1 (DL1) is active within a TDMA frame, all other slots being disabled.

IRID4DN: The downlink slots 1 to 4 (DL1, DL2, DL3, DL4) are active within a TDMA frame, all other slots being disabled.

IRIDPOW: The signal is not a burst signal, only its modulation meets the IRIDIUM specifications.

2.9.2   Activating Lists
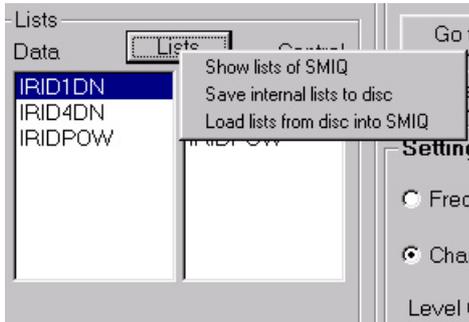
Clicking the List button displays a menu by means of which lists can be activated or transferred.

2.9.2.1   List already Existing in SMIQ
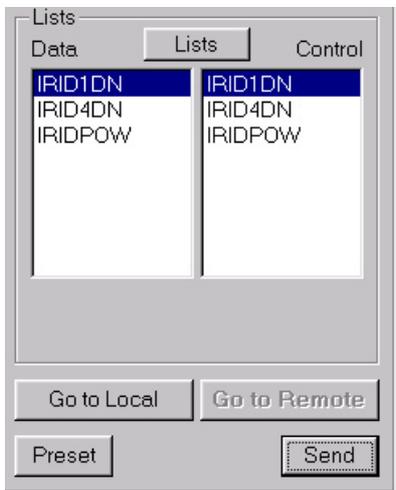
With "Show lists of SMIQ" active, the lists existing in SMIQ are displayed in the Data and Control panels. The list is selected by simply clicking the entry and will be activated when the generator is set the next time (via Send).

2.9.2.2   Transferring Lists from SMIQ to PC (Storage on Hard Disk)

Lists can be transferred from SMIQ to the PC using " Save internal lists to disk", eg lists that were modified in SMIQ (direct in the SMIQ editor or by means of the editing function of MobiDemo, see 2.9.2).

2.9.2.3   Transferring Lists from PC to SMIQ

Any list with valid SMIQ-K1 format or generated by means of MobiDemo and stored on the PC can be loaded into SMIQ. Select "Load lists from disk into SMIQ". This opens a standard dialog by means of which the associated file can be selected. Afterwards the file is checked whether it is a valid SMIQ-K1 file, and the names under which the data and control lists are to be stored in SMIQ are queried.

2.9.3   Deleting, Copying, Renaming Lists

Caution: Lists supplied with MobiDemo are not protected from manipulation.

Lists stored in SMIQ can be deleted, copied or renamed fast and easily.
Simply select the list in question and click it with the **right** mouse button. A menu offering the available options opens.
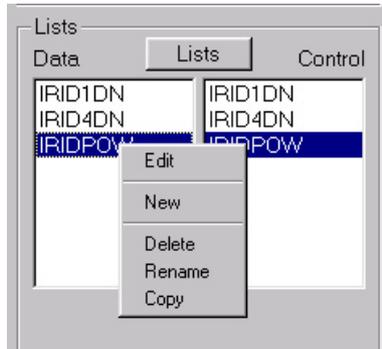

2.9.4   Editing Lists

See also section 2.10.2 of the SMIQ manual.
Caution: Editing lists can corrupt the lists supplied with MobiDemo.
Lists stored in SMIQ can be edited using MobiDemo. Just select the list, click the right mouse button and choose "Edit". This opens an editor that allows the list in question to be edited. A small window at the bottom of the editor window informs the user about the function of the elements when the mouse pointer is placed onto them and about how the settings can be modified.

Edit window for data lists:
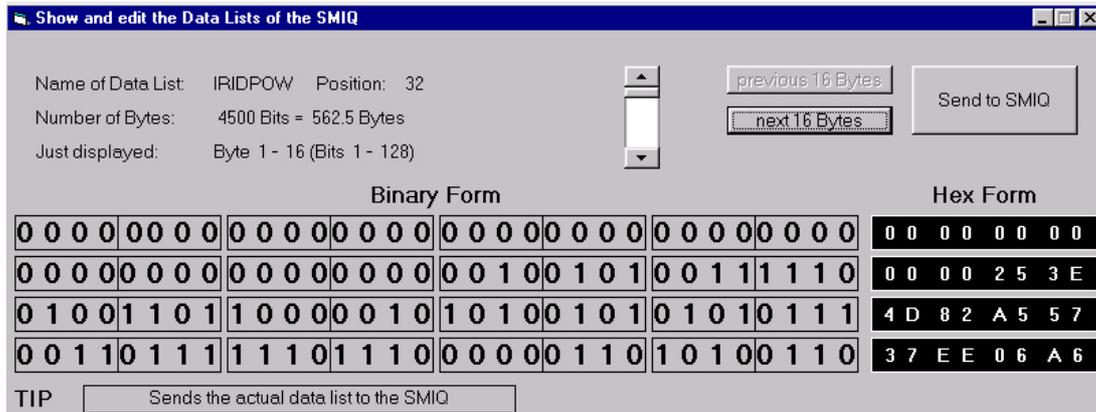
Edit window for control lists:

Symbol	Burst Gate	Level Attenuation	Continous Wave	Hopping	Trigger Output 2	Trigger Output 1
1	1	0	0	0	0	0
25	1	0	0	0	0	0
533	1	0	0	0	0	0
564	1	0	0	0	0	0
771	1	0	0	0	0	0
776	1	0	0	0	0	0
983	1	0	0	0	0	0
989	1	0	0	0	0	0
1196	1	0	0	0	0	0
1201	1	0	0	0	0	0

Name of Control List: IRIDPOW Position: 1
Number of Sets: 19
Just displayed: 1 - 10

TIP: Click to toggle

CAUTION:
TO ENSURE COMPATIBILITY WITH WINDOWS 3.1 ONLY LISTS WITH A MAXIMUM LENGTH OF 32 KBYTE = 256 KBIT MAY BE LOADED INTO THE PC:
If the user tries to load larger lists, a warning is issued.

Edited lists can be transferred to SMIQ using the "Send to SMIQ" function.
As described in section 2.9.1.2, they can also be stored on the hard disk of the PC.

3 Frequently Asked Questions

3.1 The settings of MobiDemo and the instrument settings do not match.

- The settings were not transferred to the instrument using SEND (SEND ALL).
- The instrument(s) is (are) not in the REMOTE mode (in this case no data are transferred to the selected instrument with SEND ALL).

3.2 The message "Please Select a <...> list to be sent!" is displayed.

- You tried to transfer data to SMIQ for the IRIDIUM and WCDMA standards without selecting a data/control/modulation data list beforehand. See section 2.9.