Product Description

For WCDMA Measurements

NEMO OUTDOOR
1 NEMO OUTDOOR WCDMA OVERVIEW

Nemo Outdoor WCDMA is a portable engineering tool for measuring and monitoring the air interface of WCDMA (UMTS) wireless networks.

The supported network standards are:

- WCDMA (UMTS FDD mode) wireless networks

Nemo Outdoor is an effective tool for tracing the performance of UMTS wireless networks. Nemo Outdoor collects measurement results and geographical coordinates (when used with a GPS receiver) and stores them on a PC’s hard disk. Measurement results provide useful information for network tuning, verification, and maintenance purposes. The results can be easily and efficiently viewed with Nemo Analyze SW developed by Nemo Technologies. The open file format of Nemo Outdoor allows results to be exported to other third party software applications as well.

Nemo Outdoor offers various measurement options. When these different measurement options and hardware are combined, different kinds of measurements can be performed depending on the user’s needs. One of these options provides for fast frequency and pilot signal scanning receivers.

The supported mobile models are:

- Nokia 6650 WCDMA 900/1800 / GSM 900/1800
- Nokia 6651 WCDMA 1900 / GSM 1900
- Nokia 7600 WCDMA 2100 / GSM/GPRS 900/1800
- Motorola A835 UMTS 2100 / GSM 900/1800/1900

The supported scanner models are:

- DTI LX UMTS
- Anritsu ML8720B

Note that the parameters described in this product description are device specific. See the separate data sheets for the Nokia and Motorola mobiles and the DTI and Anritsu scanners for device specific functionalities.
2 MEASUREMENT WITH NEMO OUTDOOR WCDMA

When configured for WCDMA measurements, Nemo Outdoor consists of a WCDMA mobile or a scanning receiver with antennas, a PC with the Windows® operating system and the Nemo Outdoor measurement software, a connecting cable between the mobile/scanner and the PC, and an external GPS receiver.

During the measurement, the user will be able to monitor L1 parameters and L3 signaling messages and, with a scanner, parameters like received signal code power, the pilot EcNo, and pilot scrambling code number.

2.1 VOICE TESTING WITH NEMO OUTDOOR

The voice testing environment consists of a Nemo Outdoor compatible mobile and an IBM compatible computer (user provided or Nemo Technologies provided at an extra cost) with the Windows® operating system. The package also includes the connecting cable, a PCMCIA serial port adapter card, GPS receiver, and a (optional) fast frequency scanner.
2.2 CIRCUIT-SWITCHED DATA TESTING WITH NEMO OUTDOOR

The CS data testing environment consists of three parts: a measurement unit (Nemo Outdoor), an application server (Packet Data Tester, FTP server, HTTP server, POP3 server, or an SMTP server), and a dial-up server. The dial-up server is used to establish a data connection between the measurement unit and the application server.

The data measurement system has two modes: Send and Receive. In the Send mode, the measurement unit sends data packets to the application server; in the Receive mode vice versa. If you are using a FTP server, the measurement unit uploads (Send mode) or downloads (Receive mode) test files to or from the FTP server. If you are using an HTTP server, the measurement unit can only receive files.

The user can define the number of timeslots and the coding schemes, which in turn define the desired transfer rate. During the measurement, the user will be able to monitor data throughputs and error rates on different network layers, as well as certain parameters, such as, coding scheme and number of timeslots.
2.3 PACKET-SWITCHED DATA TESTING WITH NEMO OUTDOOR

The PS data testing environments consist of two ends: the measurement unit and an application server (Packet Data Tester, FTP server, HTTP server, POP3 server, or an SMTP server).

The data measurement system has two modes: Send and Receive. In the Send mode, the measurement unit sends data packets to the application server; in the Receive mode vice versa. If you are using a FTP server, the measurement unit uploads (Send mode) or downloads (Receive mode) test files to or from the FTP server. If you are using an HTTP server, the measurement unit can only receive files.

During the measurement, the user will be able to monitor data throughputs and error rates on different network layers, as well as certain parameters such as coding scheme and number of timeslots.
2.4 NEMO OUTDOOR MULTI

Nemo Outdoor Multi is a multiple test mobile holder and a general measurement device adapter to be used with Nemo Outdoor. It allows simultaneous connection and the use of up to four test mobiles, multiple scanners, and a GPS device. The test mobiles can be from different technologies. It is delivered in a heavy-duty case or with a car mounting kit that allows the unit to be semi-permanently mounted into a test car.

Multi-Data allows up to four concurrent data measurements with a single laptop. It is the first truly portable multi data measurement solution. It supports circuit-switched and packet data connections, as well as simultaneous voice measurements and any combinations of technologies, such as, GPRS, EDGE, and WCDMA. Nemo Datatest Server is an administration-free server with fixed and user-definable test files and pages. In addition, it supports all common test protocols, such as, FTP, HTTP, SMTP, and ICMP. Combined with Nemo Datatest Server, Nemo Outdoor Multi-Data makes it easy to carry out, not only casual data benchmarking test cases that can be used to compare the performance of different technologies or operators, but also long-term network performance measurements.
3 HARDWARE AND SOFTWARE REQUIREMENTS

- IBM-PC compatible computer with Windows® 2000 and Windows® XP
- Pentium III processor, minimum 850 MHz, preferably 1 GHz
- 128 MB RAM minimum, 512 MB RAM recommended
- 100 MB of free hard disk space for installation and use; 1 GB recommended
- Display resolution 1024 x 768 or higher with 256 colors
- Internet Explorer 4.0 or higher for viewing the help file
- Two RS232 serial ports, if an external GPS receiver utilizing a serial port is used (if computer has only one serial port the PCMCIA slot can be converted to serial port by using PCMCIA serial I/O adapter card or a USB serial converter, supplied with the GPS)
4 NEMO OUTDOOR USER INTERFACE

The Nemo Outdoor user interface is compatible with common Windows® standards. During measurement, you can easily monitor the results and the progress of the measurement process.

The Nemo Outdoor menus offer, for example, the following features:

- Setting the configuration to suit your environment
- Playing back files
- Placing markers in the file
- Customizing audio, text, and graphical alerts
- Opening desired measurement windows
- Arranging windows and adjusting window settings
4.1 NEMO OUTDOOR MEASUREMENT WINDOWS

The measurement windows in Nemo Outdoor can be monitored during the measurement process. They are easy to open and close, and they can be adjusted and arranged to suit the user’s working environment. Nemo Outdoor permits the user to display measurement results (limited number) in any one of five methods. Results can be displayed in text, on a map, in line graphs (single or multiple lines), in bar graphs (single or multiple), and in scatter graphs.

4.1.1 VIEW GROUPS

View Groups is a function that allows you to organize measurement windows into different tabs for easier viewing. This is especially useful if you have several graphs and maps open at the same time and you have to overlap them to fit them all in the Nemo Outdoor main window. Now you can create view groups and organize the measurement windows into several groups. Each view group appears at the bottom of the main window as a tab that you can view by clicking the tab.
4.1.2 LINE GRAPHS

Measurement results from Nemo Outdoor can be displayed in a Line Graph in a variety of ways to allow the user to accurately observe the measurement information. It is possible for the user to display results on single and multiple line graphs. Multiple line graphs are useful in displaying results, such as Ec/N0 for multiple pilots simultaneously. The user can also select the parameters that are displayed in the numerical data table.

The zoom buttons can be used to view the results in more detail. The threshold function can be used to set a threshold level. When the values exceed that level, the line will be drawn in a different, user-defined, color. Furthermore, the scales are fully user-configurable.
4.1.3 BAR GRAPHS

Measurement results from Nemo Outdoor can be displayed in a Bar Graph in a variety of ways to allow the user to accurately observe the measurement information. It is possible for the user to display results on single and multiple bar graphs. Multiple bar graphs are useful in displaying results, such as Ec/N0 for multiple pilots simultaneously. The user can also select the parameters that are displayed in the numerical data table.

The zoom buttons can be used to view the results in more detail. The threshold function can be used to set a threshold level. When the values exceed that level, the bar will be drawn in a different, user-defined, color. Furthermore, the scales are fully user-configurable.
4.1.4 DELAY PROFILE GRAPHS

The results of the delay profile measurement can be displayed as a delay profile graph. The zoom buttons can be used to view the results in more detail. The threshold function can be used to set a threshold level. When the values exceed that level, the line will be drawn in a different, user-defined, color. Furthermore, the scales are fully user-configurable.
4.1.5 MAPS

Nemo Outdoor supports MapInfo® raster and vector maps. It also supports MapX Geoset files (.gst) which enable the user to open several layers on a map and then save them all in a .gst file to be opened later on. All user-defined map settings, such as, the order of the different map layers and the zoom factor are stored in the .gst file.

When Nemo Outdoor is used with a GPS receiver (positioning coordinates are collected) the user can easily correlate events to positioning coordinates. Thus, it is easy to see the positions at which key events have occurred.

The latest Nemo Outdoor version offers, as a new feature, parameter-based route coloring. This means that you can observe the values of certain network parameters from the route coloring on the map. You can define which color refers to which parameter value. This way it is easy to spot the problem areas on a map.
4.1.6 GRID (TEXT) DISPLAY

The user can easily select the events and parameters to be displayed in the grid table. Certain events can also be highlighted with color to improve the clarity of the presented results. Double-click on an event to view more information about that particular event.
5 NEMO OUTDOOR CONFIGURATION

Configuring Nemo Outdoor for your environment can be accomplished in the easy-to-use Configuration Manager dialog box. The Configuration Manager dialog box offers the Autodetect function, which can be used to detect measurement devices connected to the Nemo Outdoor system.
6 WORKING WITH NEMO OUTDOOR

Nemo Outdoor can be used in different measurement modes for network monitoring and optimization purposes, such as network troubleshooting and coverage analysis. The measurement modes with WCDMA scanners are Frequency Scan mode and Pilot mode.

6.1 FREQUENCY SCAN MODE MEASUREMENT WITH A SCANNER

Nemo Outdoor Frequency Scan mode is designed for basic frequency domain monitoring or spectrum analysis. The scanning receiver can be used in variable bandwidth modes to check the existence of wanted or unwanted radio signals in the defined frequency band. By using this mode, all the user-selected carrier frequencies of the current wireless system and their field strength values can be observed. In addition, if the Nemo Outdoor measurement system is equipped with a GPS receiver, the position information is also stored by the system. Frequency scanning results contain the field strength values for the carriers (and optionally location coordinates provided by GPS). These results are stored into a scanning measurement file. The data collected can be used, for example, for network planning and tuning and, furthermore, for interference measurements.

6.2 PILOT MODE MEASUREMENT WITH A SCANNER

Nemo Outdoor Pilot mode is designed for scrambling code domain analysis. In this mode, Nemo Outdoor is able to measure and decode the Pilot signal scrambling codes and their signal-to-noise ratios (Ec/No values). In addition, the Primary and Secondary Synchronization Channel Ec/No can be measured. Furthermore, Pilot Channel Time of Arrival and Absolute Timing (referenced to GPS) can be observed. The complete RF signal power (RSSI) can be measured as well as the signal code power (RSCP) for each individual scrambling code.

6.3 MEASUREMENTS WITH A MOBILE

A variety of WCDMA Layer 1 parameters can be measured with the supported WCDMA mobiles; such as, parameters related to open loop power control and closed and outer loop power control. Drawing line and bar graphs of active and neighbor cells is possible during measurements for soft and softer handover testing. During a measurement, L3 messages (NAS and RRC) are stored and they can be decoded to see the actual content of the L3 signaling. Scripting is possible for voice calls and for CS and PS data. Also services available from mobile can be used manually: the user can set up Nemo Outdoor for tracing and manually send MMS and SMS from the phone or surf in the web and simultaneously record L1 and L3 data. This way the user can test how the radio interface works when using different services that are possible to use by the terminal.
7 OTHER NEMO TECHNOLOGIES PRODUCTS

In addition to the previously described product, Nemo Technologies Ltd. has a range of tools and software that can be used for measuring and analyzing wireless networks.

**Nemo Outdoor**
A portable engineering tool for measuring and monitoring the air interface of GSM (HSCSD, GPRS, EDGE), WCDMA (UMTS), cdmaOne, and CDMA 2000 wireless networks. Based on the Nemo Prime platform.

**Nemo Indoor**
A portable engineering tool for measuring and monitoring the air interface of GSM (HSCSD, GPRS, EDGE), WCDMA (UMTS), cdmaOne, and CDMA 2000 wireless networks. Especially designed for indoor measurements. Based on the Nemo Prime platform.

**Nemo Analyze**
A software for analyzing measurements. Based on the Nemo Prime platform.

**Nemo TETRA**
A drive test tool for TETRA networks (1G and 2G).

**Nemo TETRA Playback**
Tool for playing back and analyzing TETRA network measurement files.
8 CONTACT INFORMATION

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