-EMS CONTROL-

USER'S GUIDE

C O N T E N T S

PART 1. CONNECTION

Introduction

In this part of the guide it will be shown how to adjust a new PPC for work with NEMFIS instrument and establish a connection. It is supposed that you have basic skills of work with PPC.

Hardware

NEMFIS is controlled by PPC (or communicator) using Window Mobile 5 or 6 operating system (OS) and Bluetooth module. To check OS version, open *«Start → Settings → System → About»*. We will assume that the version is localized.
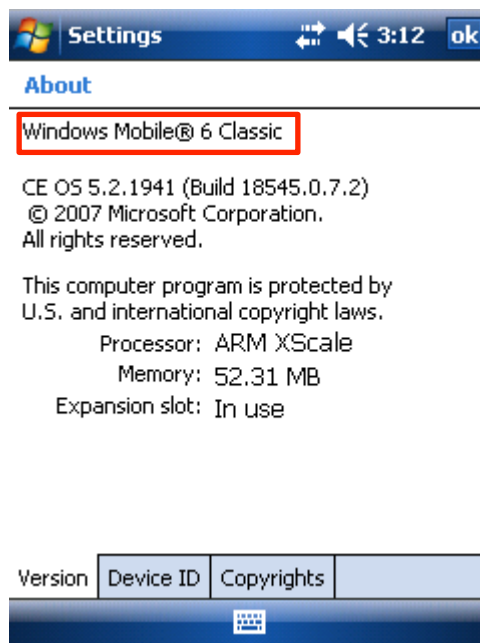
To work in «GPS track» mode a GPS receiver is required. There are several connection types of GPS receiver: Bluetooth, Compact Flash, wired serial interface, built-in receiver.

Windows Mobile uses two Bluetooth stack types depending on OS version: Microsoft and Broadcom. If Broadcom stack is used, then GPS receiver which connects over Bluetooth will be inaccessible due to stack realization.
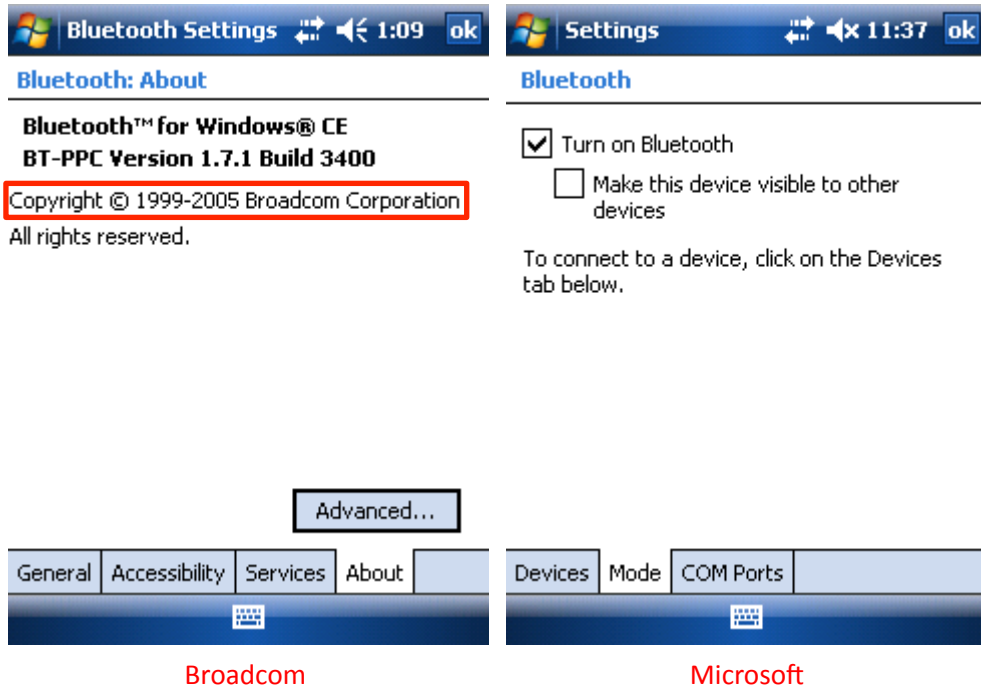
To check Bluetooth stack of your Windows Mobile version, open *«Start → Settings → Connections → Bluetooth»*. Below you will see tab menu.

Broadcom   Microsoft

Using of Microsoft stack is recommended due to ease of connection establishing and possibility of working with GPS receiver of any type. If it is necessary to use Broadcom stack and Bluetooth GPS receiver, NEMFIS has to work in Master mode:

NEMFIS	Stack	GPS receiver interface			
		Bluetooth	Compact Flash	Wired	Built-in
Master	Microsoft	**Not used**			
	Broadcom	Yes	Yes	Yes	Yes
Slave	Microsoft	Yes	Yes	Yes	Yes
	Broadcom	**No**	Yes	Yes	Yes

To use NEMFIS in Master mode, see appropriate section.

Broadcom stack connection adjustment

Open *«Start → Settings → Connections → Bluetooth → Services»*. Choose service «Serial port». Adjust parameters as follows:
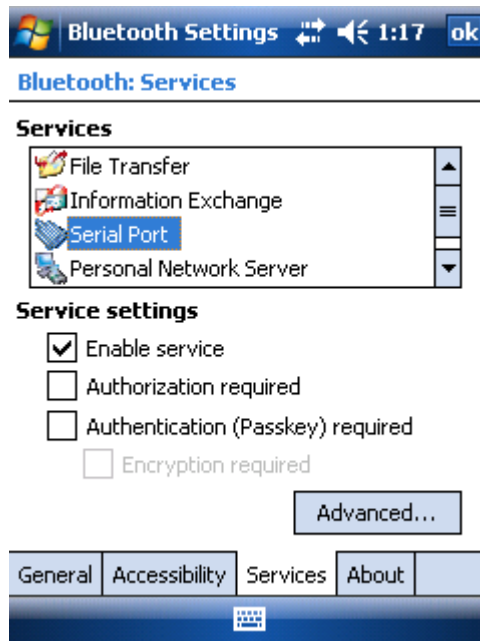
Then press the button «Advanced ...». Remember outbound port number for instrument connection adjustment. Keep in mind that your port number can differ:
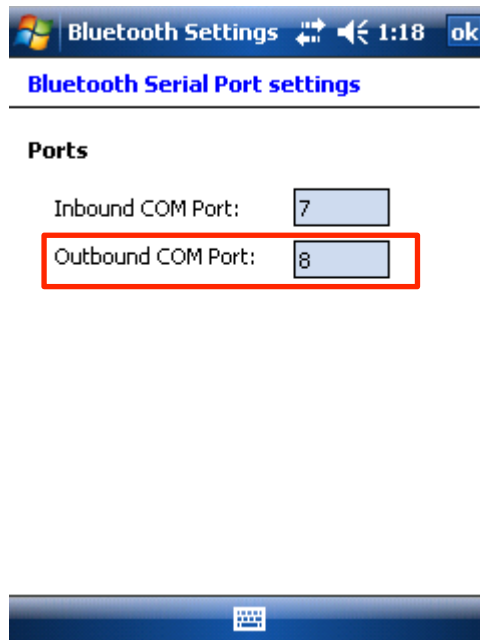
Run EMS Control, choose any work type excluding «GPS track» and go to «Advanced» tab. Write the right port number for instrument.
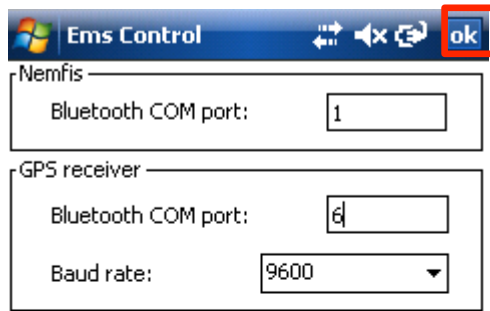
When measurement is started («Next >>», «Start») the system shows a list of devices accessible over Bluetooth. Choose you NEMFIS device, tapped «Always use selected device»:

If connection is establishing for the first time, the access code query appears, enter four zeroes (0000). Push *«Session → Close»*. Setup is completed. Since this moment, to work with NEMFIS you need to turn it on and run EMS Control, the connection will be established automatically.

If you made a mistake choosing the device, it is possible to switch on device discovery again in *«Start → Settings → Connections → Bluetooth → Services → Serial Port → Advanced»*:
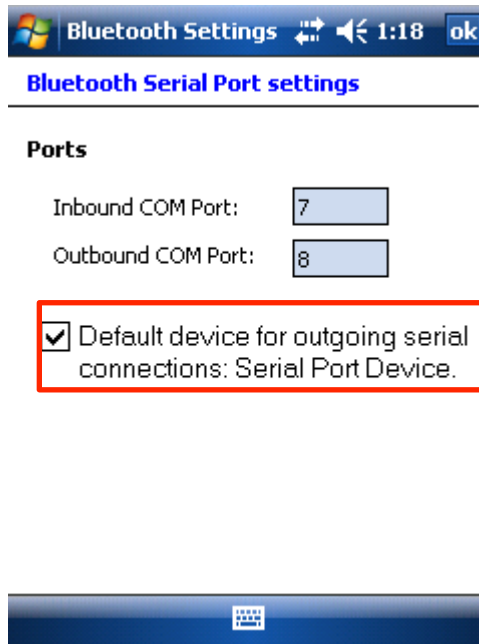
This option becomes accessible after you selected the default device to connect.

Microsoft stack connection adjustment

Open *«Start → Settings → Connections → Bluetooth → Devices»*, push «*Add new device*»:

Bluetooth devices discovering will start. Choose your NEMFIS device and push «Next»:
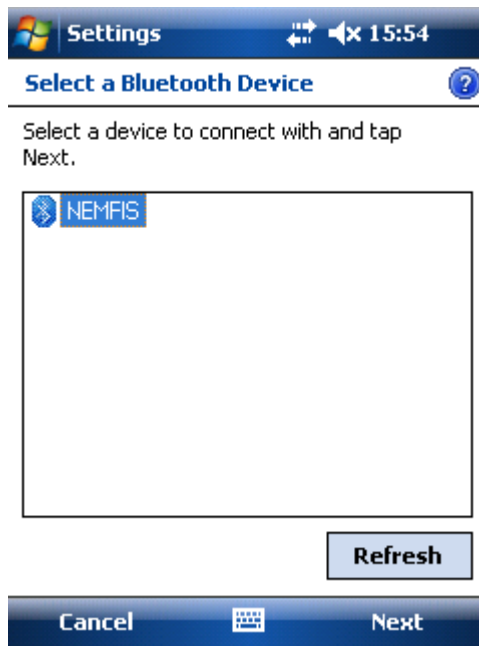
The system will ask an access code, enter four zeroes (0000). Choose Serial Port service (Serial Port / COM1 / SPP slave), push «Finish»:
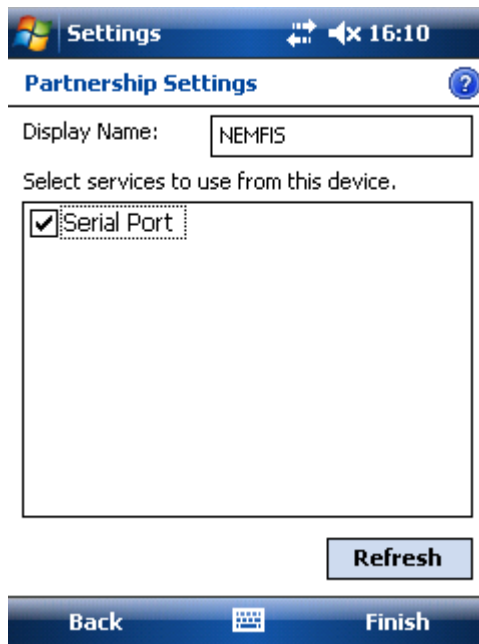
Go to «COM Ports tab», push «New Outgoing Port», choose the device and assign any port number, switch «Secure Connection» off:
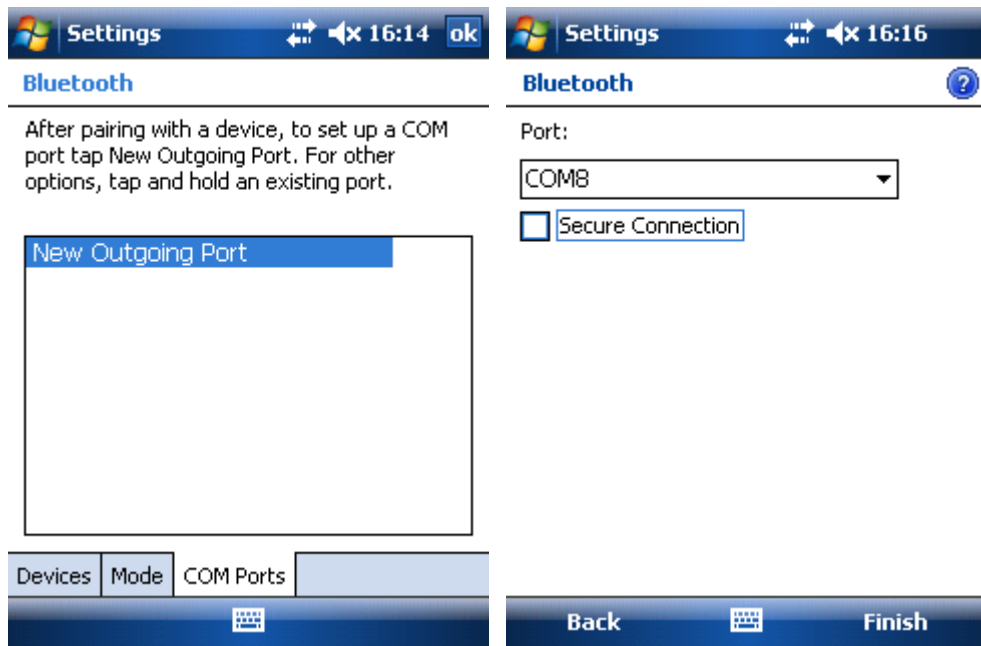
Run EMS Control, choose any work type excluding «GPS track» and go to «Advanced» tab. Write the right port number for instrument.
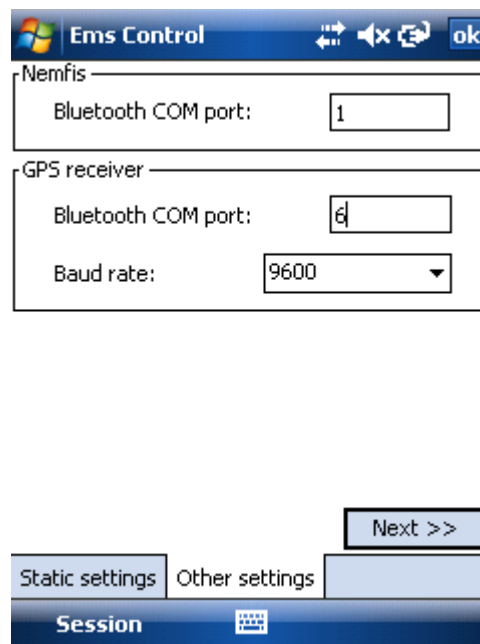

Push «Session → Close». Setup is completed. Since this moment, to work with NEMFIS you need to turn it on and run EMS Control, the connection will be established automatically.

Broadcom stack master mode connection adjustment

This section is usable if only you have to use Broadcom stack and work in «GPS track» mode with Bluetooth GPS receiver.

First of all it is necessary to make primary adjustment of PPC. Open *«Start → Settings → Connections → Bluetooth»*. As you can see, we are in tab «General». If Bluetooth is switched on, you must switch it off.
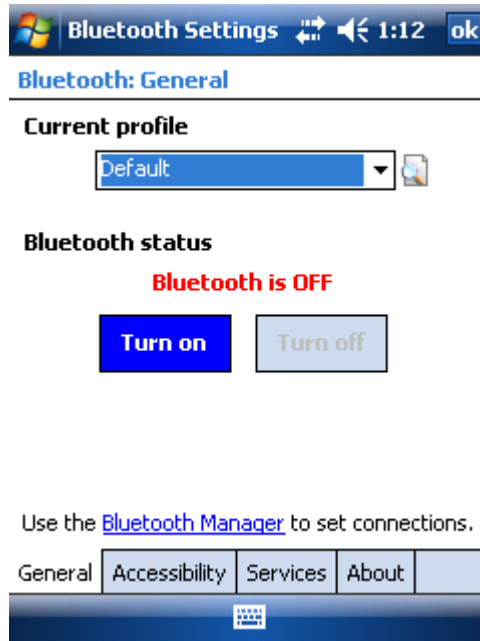
Now we will set accessibility options: *«Start → Settings → Connections → Bluetooth → Accessibility»*. Establish parameters like on the following view:
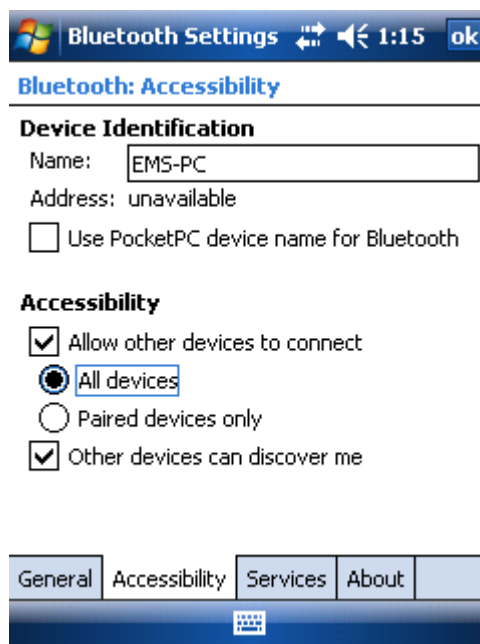
In this window it is possible to set the name used for identification of PPC by other devices. Rename it (for example) to «EMS-PC». Remember this name, it will be required later for NEMFIS instrument connection. It is desirable that the name was short and clearly characterized your PPC.

Open *«Start → Settings → Connections → Bluetooth → Services»*. Choose service «Serial port». Adjust parameters as follows:
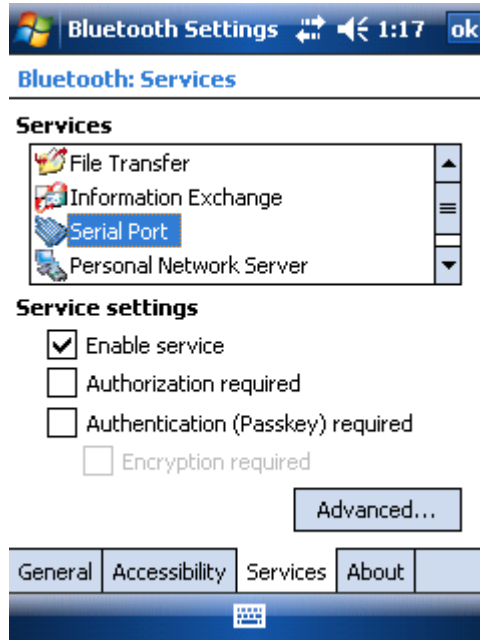
Then press the button «Advanced …». In the appeared window the virtual serial ports that used for Bluetooth connection will be shown. They should be remembered for adjustment the program EMS Control. Remember that your port numbers can differ:
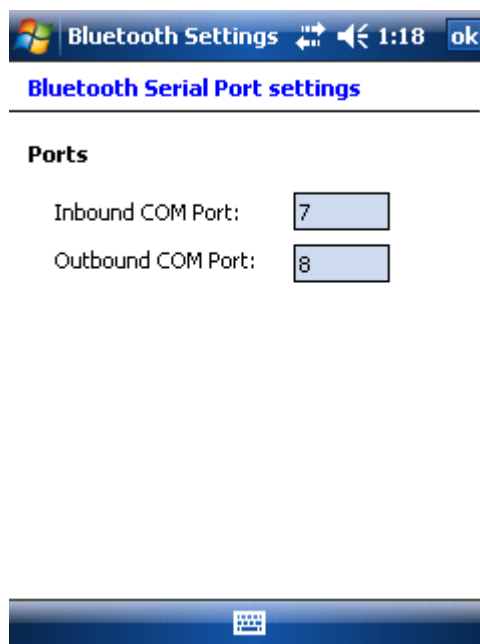
Now turn Bluetooth on. PPC preparation is completed. You have to make it only once, further operation procedure will be much simpler. Now we will pass to the instrument. Before switching on the device always check that PPC is switched on and it has activated Bluetooth. The instrument should be switched on only after that.

Now switch on the NEMFIS. In a bottom line it is possible to see blinking character «*****». It means that the instrument searches the devices accessible on Bluetooth. Search will complete and instead «*****» - «**@**» character will be represented. If search could not completed for a long time, push «2 → F3» on the keypad of the NEMFIS to restart the searching.

Then push «2 → F1» to view the list of found devices. Using keys «3» and «0» it is possible to change units of list. Find the name used for identification of your PPC and push Enter.

PPC will query an access key. Input four zeroes: «0000».
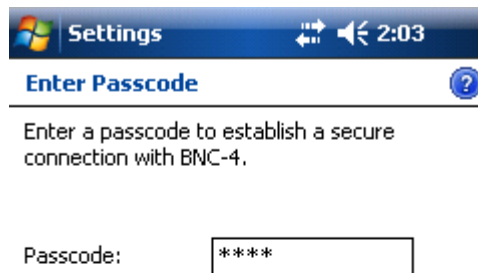
After that current PPC is chosen as default device. Now turn off NEMFIS and turn it on again. Wait until device searching is completed. Push «2 → F2». Input the same access code if such inquiry appeared. Since this moment every time after switching on NEMFIS and completing device searching (from the moment of character «@» representation) it is possible to connect to default device by pushing on the NEMFIS keyboard «2 → F2».

Remember that automatic connection is not present, it is necessary to install connection manually every time you turn on NEMFIS.

It is also necessary to push «2 → F2» for re-connection after loss of link with PPC. Connection can be lost because of three reasons:

a) NEMFIS instrument has been switched off;
b) PPC has been switched off or it has been gone into a sleep mode;
c) PPC has been moved away from NEMFIS on a considerable distance (10 m and more).

To check that connection is ok, open the menu of Windows Mobile *«Start → Settings → Connections → Bluetooth →General → Bluetooth Manager → Active Connections»*. You must see «BNC4 - Serial Port», it is a NEMFIS connection. Keep in mind, that it can be named otherwise.

So, connection has passed successfully. It is necessary to customize the program EMS Control. Start it and open tab «Other settings». Here it is necessary to customize numbers of incoming and outgoing virtual serial ports which we already met at PPC customization. Set incoming port number in the upper cell and outgoing port number in the lower. Remember that your numbers can be different than on illustrations.
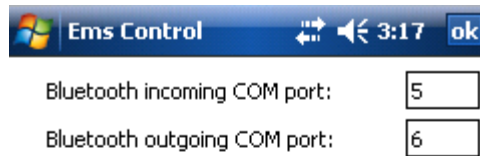
Customization is completed. Since this moment the operating procedure is simple:

    a) turn on PPC;
    b) activate Bluetooth (if it is not activated);
    c) turn on NEMFIS;
    d) wait for character «@» ;
    e) press «2 → F2»;
    f) input access code (if needed);
    g) start EMS Control.

After you created the session «GPS track» and tried to start measurement, system suggests to choose GPS receiver from the list of accessible Bluetooth devices. In following figure GPS receiver is identified as «BT-GPS». It is required to push on a device tag and then measurement will be started.
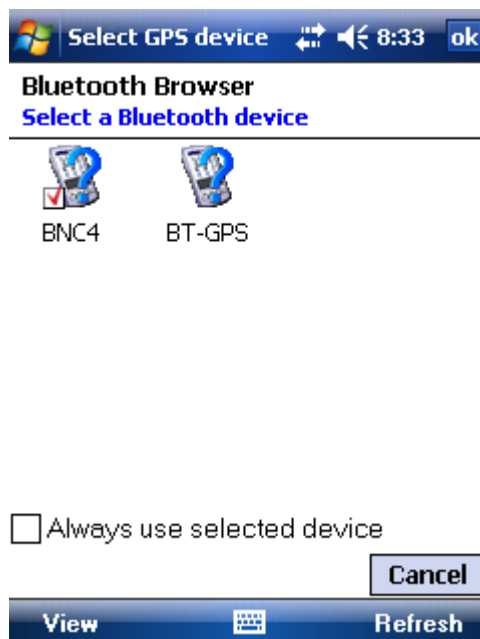
Make sure that «Always use selected device» is switched off. If it is switched on, at the next starts of the program the system will try to connect to the chosen device automatically. Probably, there will be not any problems, if only:

a) you wish to use another GPS receiver;
b) you have chosen other device which is not GPS receiver.

Nevertheless if it has occurred, and serch of devices is not started, and at once there is a message «Error connecting to the device», it is necessary to go into *«Start → Settings → Connections → Bluetooth → Services → Serial port → Advanced …»* and to switch on search of devices at trying to make the connection:
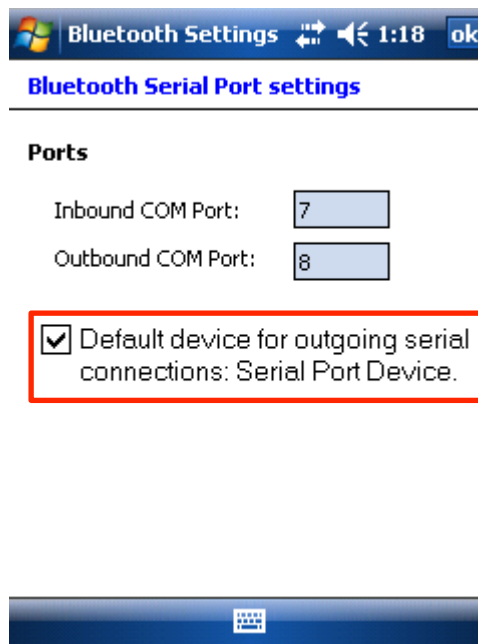
It is possibly that you didn't saw this option early, but after you choose some device by default it appears. After that close Bluetooth settings and return to EMS Control, try to start measurement again.

You can understand that GPS receiver is connected and works normally if you look at the tab «GPS info»: plausibility of current geographical co-ordinates, correct date and time, and also step-by-step increasing quantity of the accepted packets testify that everything is all right:

| GPS receiver works ok. | GPS receiver doesn't work. |

If values of latitude and a longitude are equal to zero, but other information make sense, it is probable that GPS receiver has not come yet to an operational status.

Also there can be one more problem: all features of normal work of the receiver are observed, but values of latitude and a longitude remain invariable therefore all GPS track consists of one point. Such behavior may be a result of static navigation mode of the GPS receiver that applied to car navigation systems at which moving with a speed less than 5 km/h are ignored. It is easy to check, it's enough to try to move with a speed more than 5 km/h.

To disable static navigation mode in your GPS receiver you might use special programs (SirfTech for example), which are not observed here. To find more information please search «SirfTech» and «static navigation» in the Internet.

Other options of PPC

Screen turn

EmsControl works correctly in the portrait mode of the screen only, as it shown on illustrations in this guide. If your PPC uses the landscape mode of the screen, switch it to portrait, open *«Start → Settings → System → Screen»*.

Options of power and backlight

PPC goes in a sleep mode by pressing the power button:

However, after long idle time PPC also can go into a sleep mode. We remind that after computer goes into a sleep mode the connection with NEMFIS will lose. To customize demanded parameters, open *«Start → Settings → Power → Advanced»*.

Also after long idle time the screen backlights could be turned off. Customize the convenient time for operation, open *«Start → Settings → Backlight»*.

Date and time adjustment

When you save the data on EMS Control it will offer templates of filenames with a current date and time that helps the user to retrieve and systematize files further. We recommend to customize correct date and time, open *«Start → Settings → System → Clock & Alarms»*.

PART 2. EMS CONTROL

Introduction

This part of a manual is devoted to the detailed description of program EMS Control which is responsible for controlling of NEMFIS by PPC. Its usage gives following possibilities:

a) visualization of data in real time in the form of obvious graphical forms;
b) convenient customization of measurement and visualization parameters;
c) several operating modes, including GPS track mode.
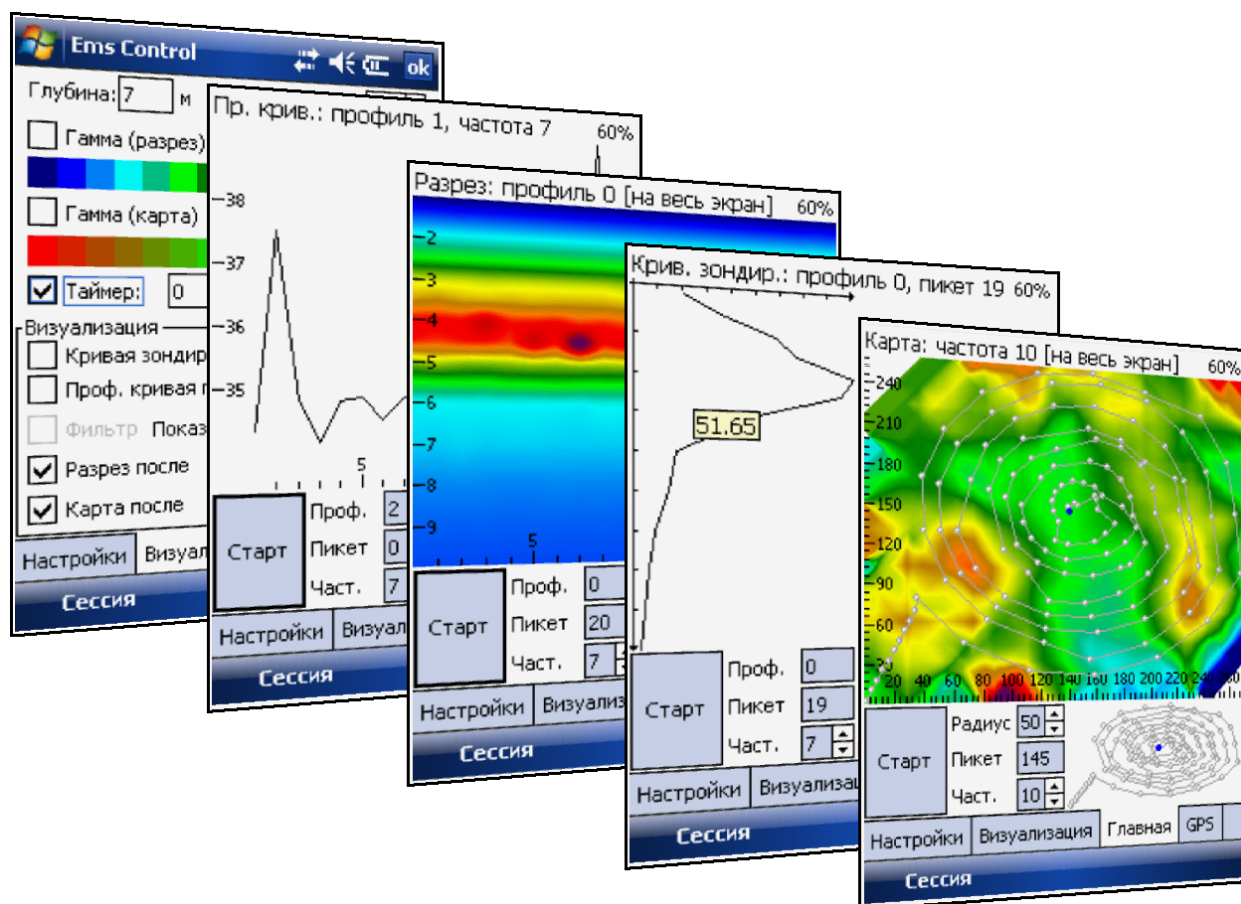
The program does not demand special installation, it is enough to write a program executable file (EmsControl.exe) to root directory of an internal storage of PPC. For review of its contents by means of the PC you have to install Microsoft ActiveSync. It is not needed for Microsoft Windows Vista or later Microsoft OS.

To achieve a full functionality of EMS Control you need the configuration file of your NEMFIS instrument that will be included with all software on CD. It has the aspect name «ISystem_EMS#XX.ini», where XX is number of your instrument. This file should be written to directory «My Documents» on PPC.

Primary adjustment of session parameters

Start an executable file. You will see page of customization of new measurement session:
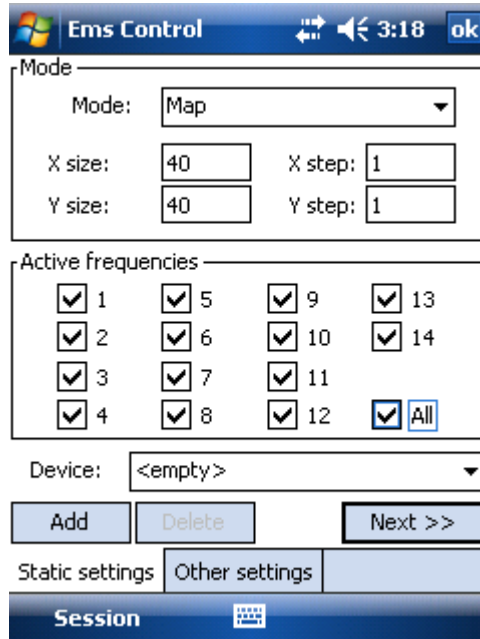
First of all, we need to load the configuration file of your instrument. As you can see above, in a list «Device» appears «<empty>». It means that the configuration file of the device is absent, so approximate device parameters will be used by default. Let's fix this issue. Push «Add» button and choose the configuration file of the instrument. If you use several NEMFIS devices, you may load several configuration files for them.

When loaded it is possible to choose the list item corresponding to the instrument that you are using:
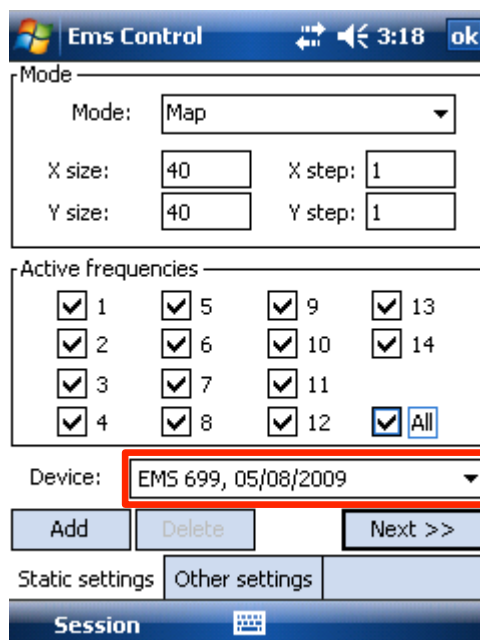
The date in the end of string means the date of calibration. To delete unused calibration files from list, press button «Delete». The list of calibration files will be saved for further EMS Control starts, so you don't need to load calibration file every time.

We will not discuss the tab «Other settings», see part 1, step 4.

You can switch on the working frequencies of the instrument that will be used in the current measurement session on the panel «Active frequencies». At least one of 14 frequencies should be switched on. Using «All» item allows to switch on all frequencies by single push.

The first frequency is the lowest and matches the biggest depth of sounding and the last one matches accordingly to the smallest depth. Decreasing number of used frequencies leads to lower information on appropriate depths and decrease the time of one measurement.

Frequencies of NEMFIS instruments are so, that appropriate sounding depths of frequencies differ in the same H distance:
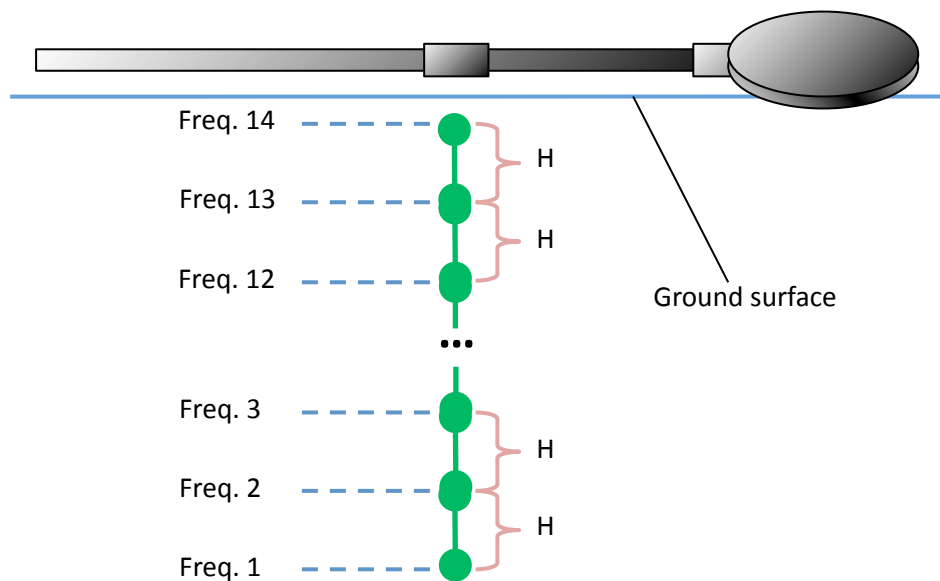
Next in guide we will deal with so called apparent depth of sounding. The method of sounding that realized in NEMFIS, does not allow defining precisely a depth of the burred objects, because as depending on ground properties value H is a variable. Nevertheless, the ratio between closed frequencies is invariably remained.

Maximum possible value of apparent depth of sounding is 7-10 meters for the first frequency.

Operating modes

Observation network is a union of points on a ground surface where measurements are made. NEMFIS has several operating modes, which differ in their observation networks.

In modes «Map», «Profile» and «Line» you install NEMFIS on points of the observation network, one point will consist of the measurements on the chosen frequencies (from one to fourteen), then you move the instrument to next point of sounding:

Point 1   Point 2   Point 3   …

Observation network
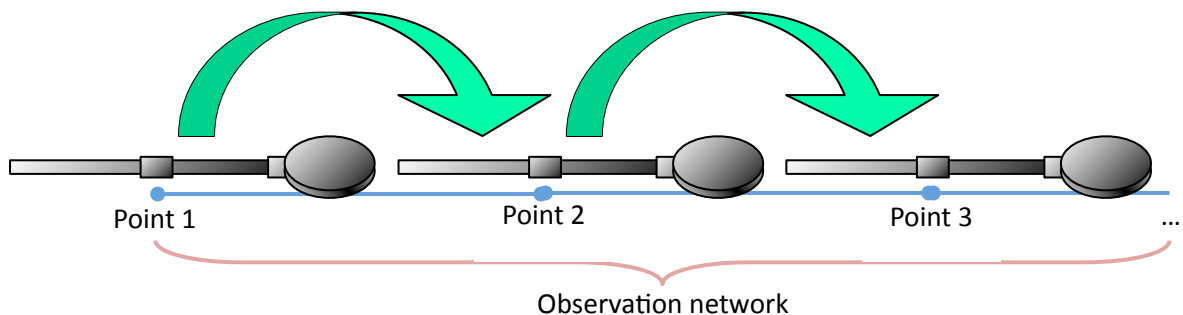
It is important to scan area with remaining of the same orientation of NEMFIS!

It is allowed to keep NEMFIS at altitude about 20 cm over a surface. In the mode «GPS track» the network of observations is formed automatically while moving the device above the surface. Further points of sounding will be mentioned as stations. The record point is in a middle of the device as is shown in a figure above.

Operating mode «Profile»

This mode assumes that operator will go with instrument on the certain line divided on equal gaps by known quantity of points. The first point marks the start of line, and the last one marks the end of line.

Thus it is required to set two parameters: a number of points (X size) and a distance between them in meters (X step). Recommended value for distance between points is 1 meters. Decreasing of this value does not make measure results more detailed.
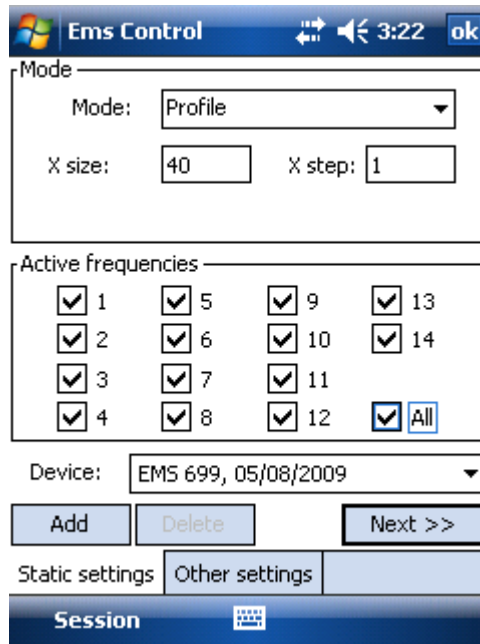
Foliation of points starts from zero. If you use a measuring tape, the beginning of profile (the point with number 0) corresponds to mark «0» on a measuring tape and a point with number N corresponds to mark «N · X step». Use only nonmetallic measuring tapes!

X step
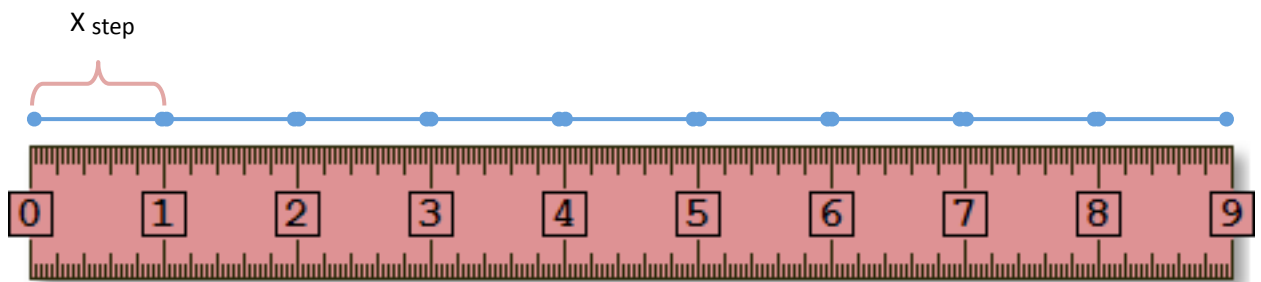
For this example number of measurement points is ten, and the distance between points is one meter.

It is not necessary that the line must be straight, however keep in mind that the resulting geoelectrical section will be presented in the form of flat slice, which most precisely conforms to a straight line.

Operating mode «Line»

The difference between this mode and mode «Profile» is that the number of the points dividing an observation line is not known in advance. We input only distance between measurement points in meters (X step).
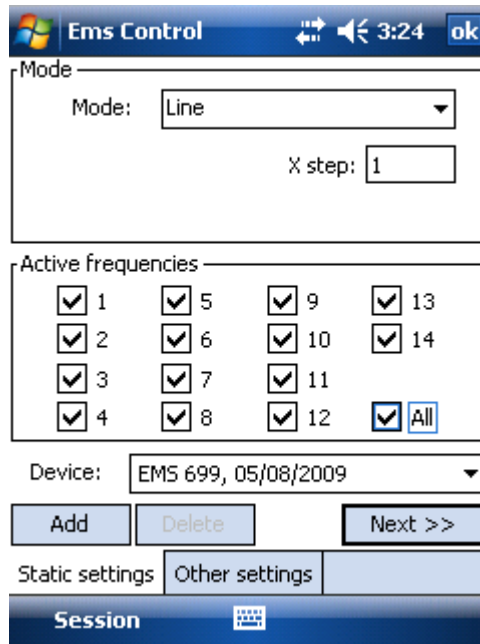
Operating mode «Map»

    This mode assumes that it is required to research an area covered with the rectangular grid of observations. It is possible to represent this grid as a collection of direct profiles.

    Thus it is required to set a quantity of profiles (Y size), quantity of the points for each profile (X size), distance between profiles in meters (Y step) and distance between points of a profile (X step). Recommended values for distances between profiles and points are 1 meter. Decreasing of these values does not make measure results more detailed.
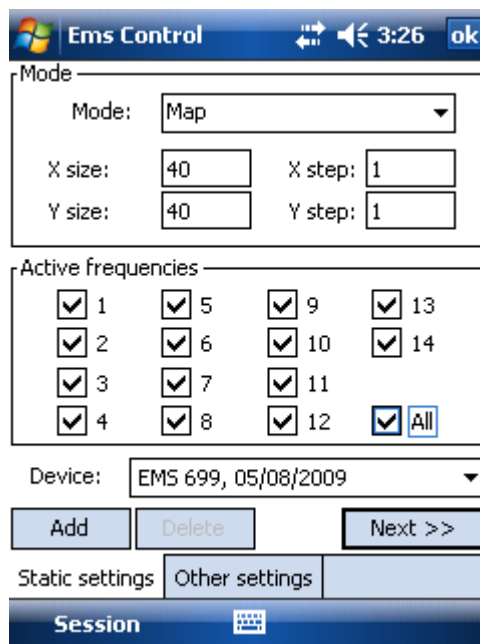
    Foliation of profiles and stations starts from zero. The explanation of such approach to foliation is given in section «Profile».
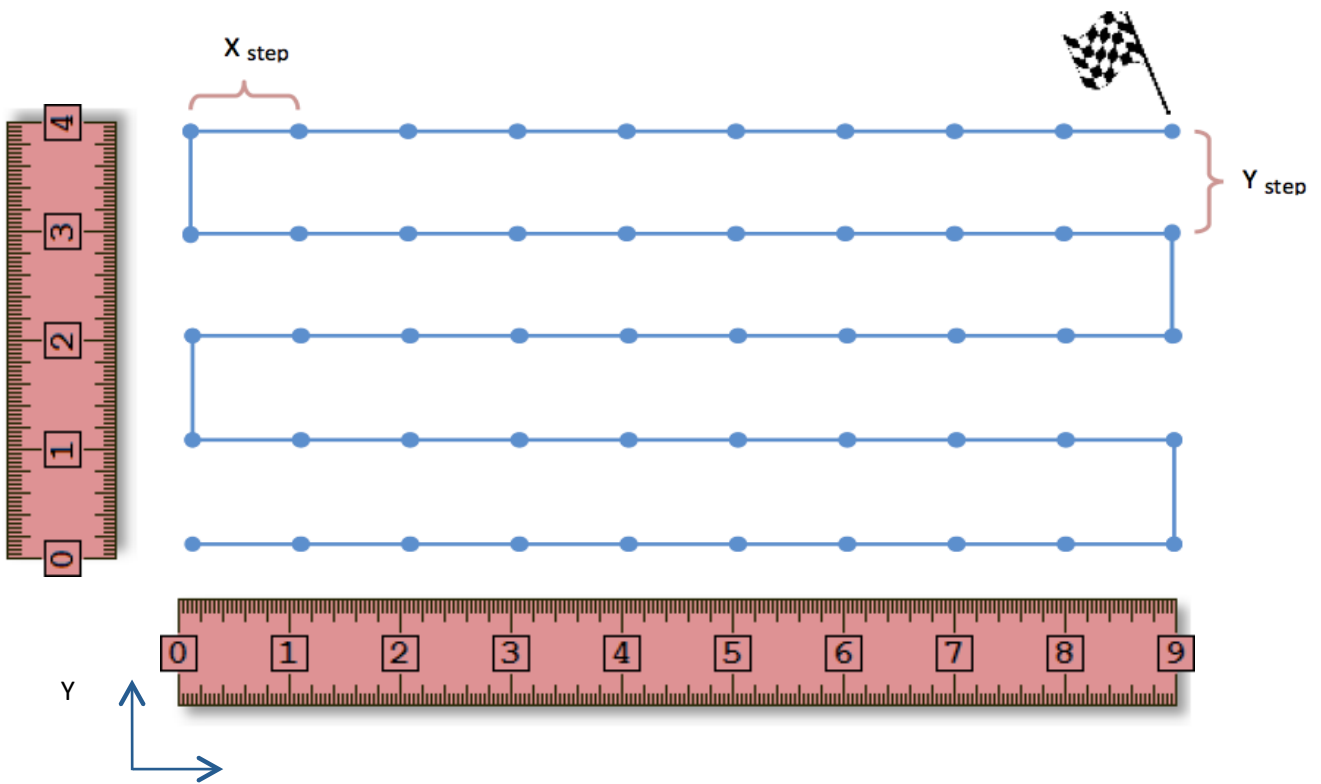
For this example number of profiles is five, every profile consists of ten points, distances between profiles and points of profile are equal to one meter.

Pay special attention on the following:

a) it is «Y size», not «X size», that sets quantity of profiles;
b) orientation and direction of increase in marks of measuring tapes rather each other;
c) order of transition from one profile to another and directions of their detour.

Operating mode «GPS track»

For operation in this mode it is required GPS receiver that works with Bluetooth. Co-ordinates of measurement points will be automatically determined by the GPS data. For this mode it is not required any customizations of an observation grid.
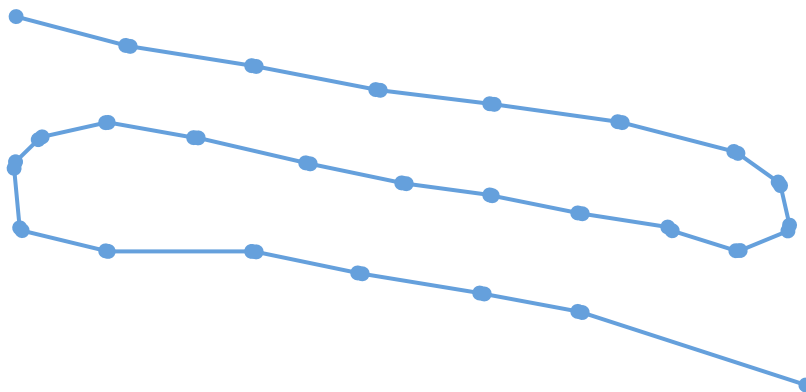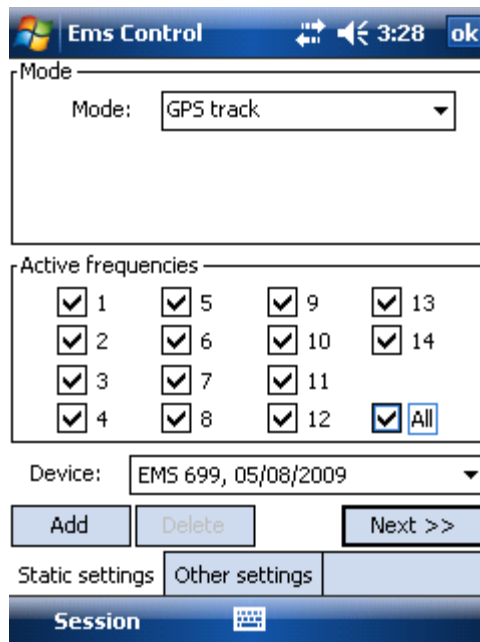
Recommended value for distances between record points is 1 meter (in this mode it depends on operator's speed). Decreasing of this value does not make measure results more detailed. It is recommended to collect data in the mode «GPS track» by «snake» movement, i.e. like as it occurs by operation in a mode «Map».

Working with EMS Control

So we have customized ports in the tab «Other settings», have loaded an instrument configuration, have chosen used frequencies and operating mode and have customized a network of observations in the tab «Static settings».

Now push the button «Next >>», and we will be in one of three (and in a «GPS track» mode four) tabs which is named «Main». In this tab there is a basic process control of operation a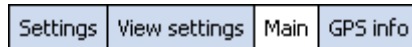nd visualization of data. However, before it to observe, it is necessary to clear up with the others. Options in tabs «Settings» и «View settings» do not depend on measure session, they remain since last session. You can go through tabs any time you want.

Tab «Settings»

Go into the tab «Settings». On the panel «Measure units» it is possible to choose signal measurement units. It can be (1) ADC quantums of the instrument or (2) its converted to apparent magnitudes indications. In the first case following options of signal correction are accessible: null subtraction, phase correction, normalization to a current, normalization to frequency in power. In the second case it is possible to choose apparent magnitude: a specific electrical resistance in Ohm · m or specific conductance in mSiemen/m and to switch on smoothing sharp ejections in the signal.
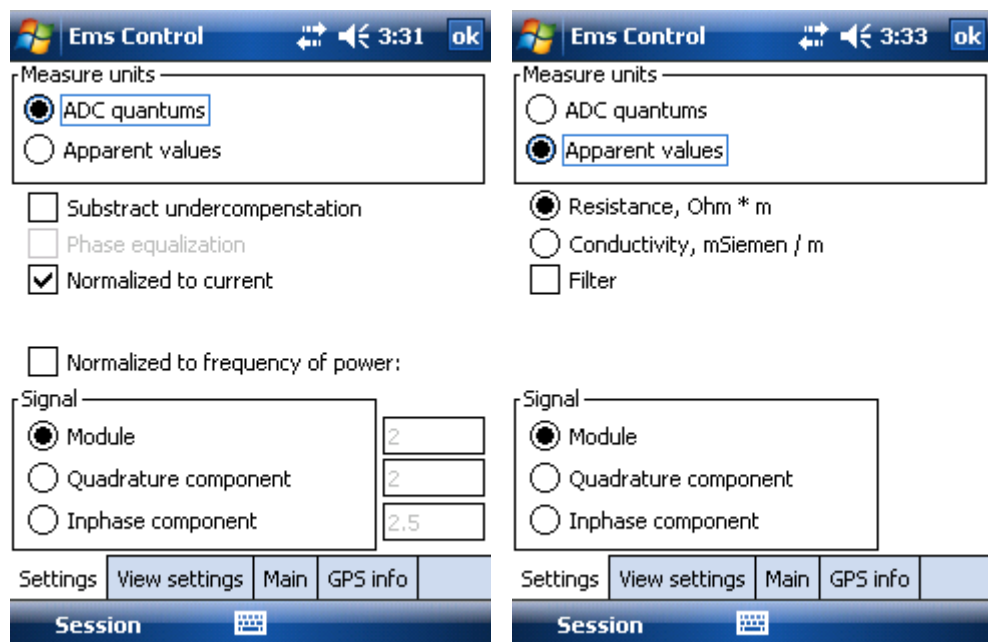
On panel «Signal» it is possible to choose the signal component (quadrature / real or inphase / imagine) or its module value. It is recommended to use module of the apparent magnitudes.

Tab «*View settings*»

Visualization occurs in the tab «Main» and most of customization of representation parameters occurs here. The parameter «Depth scale» sets the maximum apparent depth of sounding. Pixel size allows controlling detail of visualization of sections and maps. More pixel size gives less detail but increase speed of visualization.
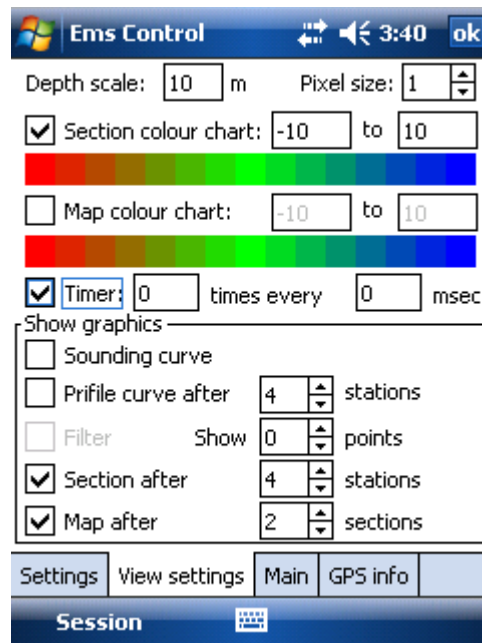
Then you can see two color scales: one for sections and one for maps. If the parameter «... color chart» for sections or maps doesn't noted by a tick, then their coloring occurs automatically. The least value of the signal corresponds the left color of a scale, and for the highest corresponds the most right. Other values of colors are gained by a linear interpolation. If parameter «... color chart» is noted by a tick, it is possible to assign the minimum and maximum values of a signal (... to ...) which will be visualized according to the chosen color scale. All values which are getting out for this range will be considered to equal its boundary values.

To customize color scale, it is necessary to push by stylus on certain color of a scale and hold pressure until the sub-menu appears. Choose «Change» for calling a color box where it is possible to reassign the chosen color to another. Choose «Append» item for adding color in the scale end. «Reverse» item will turn over a scale from left to right. «Delete» item will delete the chosen color from a scale. «RGB» item will assign a standard tricolored scale (red, green, dark blue colors, as is shown in illustrations), and «RES2DINV» item will assign the color scale that used in the program with the same name.
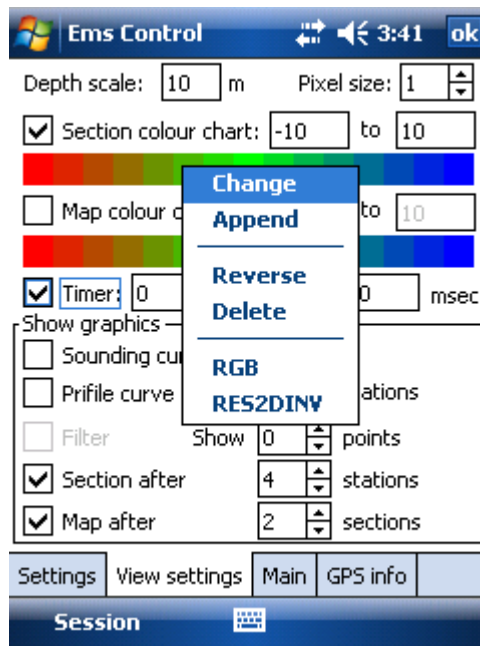
The timer mode allows starting by one pressure a cycle of measurements with a certain time window between measurements. To switch this mode on it is necessary to note by a tick «Timer» and to install parameters («Timer: … times every … msec»):

      a) quantity of measurements (if to install 0, the quantity is unlimited);
      b) interval between measurements in milliseconds.

Use timer to operate in mode «GPS track». If timer is off, a single measurement will be made.

On the panel «Show graphics» it is possible to choose variants of data representation: sounding curve, profile curve, section and map. They can be switched in the course of operation.

At sampling of a profile curve following options become accessible:

      a) the smoothing of sharp ejections (a tick «Filter»);
      b) the quantity of last shown points (Show … points), 0 means all points;
      c) minimum quantity of stations for construction of a profile curve (Profile curve after … stations).

At sampling of section it is possible to set a minimum quantity of stations of a profile for start representation (Section after … stations).

At sampling of map it is possible to set a minimum quantity of profiles for map representation in an operating mode «Map» («Map after … sections»). In an operating mode «GPS track» the map will be automatically represent while collecting data.

Tab *«Main»*

In the upper right corner there is information about charge of the battery of PPC in percentage. It is necessary to observe the charge of battery: turning off of PPC because of a power supply will result in loss of unsaved data.
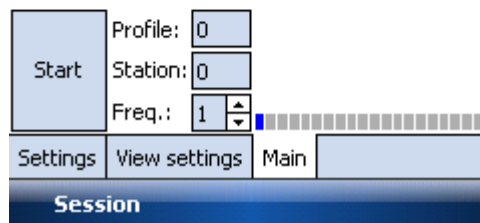
«Start» button begins measurement. If the timer mode is switched off it will be one measurement, and if it will be switched on, then a series of measurements will be made, in this case the button will turn to button «Stop» which pressing shuts down measurements. If your PPC has «Dictaphone» button, it can be used as the button «Start / Stop» if the tab «Main» is active at moment. HP iPAQ 114 Classic Handheld has this button here:


Now we will figure out how to control the visualization (to switch signal visualization modes). As you remember tab «View settings», you can turn on several signal visualization modes. You can switch visualization mode by pressing the central button of the joystick of PPC:

Also this button should be pushed if representation parameters (parameters in the panel «View settings» or number of a station or profile or frequency) have been changed and it is required to redraw image according to these parameters.

Let's observe different variants of the information representation in the tab «Main».

The sounding curve is built for each station and represents dependence of a signal on a depth. For each point it is possible to view a sounding curve in any operating mode. The sounding curve looks approximately so (for example):
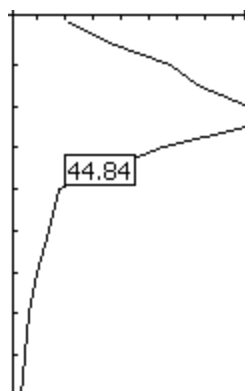
The horizontal axis corresponds to a signal, and vertical one corresponds to a depth. Moving stylus along the diagram of the sounding curve it is possible to check values of a signal, as is shown in a figure. If you choose representation of signal in apparent resistance or apparent conductivity - you can understand by the sounding curve, how do current magnitude changes with depth on a certain station. Holding pressure in an empty place of the diagram, it is possible to call the menu:
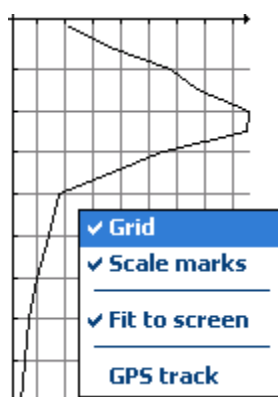
With this menu you can do the following:

     a) to switch on / off a grid (see the figure above);
     b) to switch on / off marks on axes;
     c) to stretch an image on all screen or to save image geometry;
     d) to show GPS track (it is accessible only in an operating mode «GPS track»).

The menu is accessible not only to a sounding curve, but also for other variants of the signal visualization.

The profile curve shows dependence of a signal on certain frequency on measurement number. Review of a profile curve is accessible in any of operating modes. The profile curve is represented as follows:
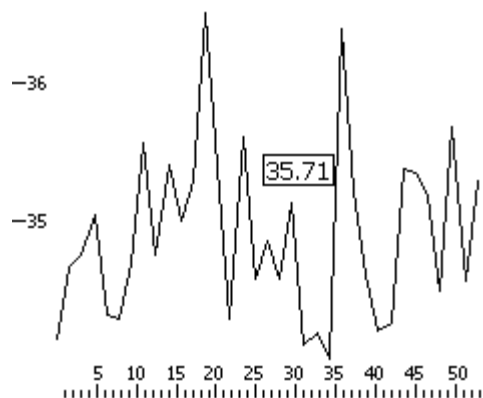
The horizontal axis complies with measurement number, the vertical one corresponds to a signal on the chosen frequency. It is necessary to understand, that in an operating mode «Map» the left edge of the profile curve corresponds to a left edge of current profile according to the map scheme (see the operating mode «Map»).

Moving stylus along the diagram of a profile curve, it is possible to check values of a signal, as is shown in a figure. If you choose representation of signal in apparent resistance or apparent conductivity, you can understand by the profile curve, how current value changes along the profile line on a certain depth.

The section represents distribution of a signal along a profile depending on depth. Its visualization is accessible in all operating modes. The section looks like this:
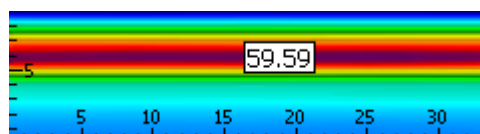
The horizontal axis complies with measurement number, and vertical one corresponds to a depth (in a figure this axis is routed downwards). In an operating mode «Map» left edge of the section corresponds to a left edge of current profile according to the map scheme (see the operating mode «Map») irrespective of a direction of moving from one point of measurement to another, but in a mode «GPS track» it represents horizontal reaming of all measurements.

Moving stylus on the profile map, it is possible to check values of a signal, as is shown in a figure. If you choose representation of signal in apparent resistance or apparent conductivity, you can understand by the section, how current value change with depth along profile line.

The map represents horizontal distribution of a signal on certain depth (we will remind, that depth is determined by frequency). The map is represented as follows:

In the mode «Map» horizontal and vertical axes correspond to axes of map scheme (see the operating mode «Map»), and in a mode «GPS track» axes correspond to directions to the east and to the north accordingly. In other modes map review is unavailable.

Moving stylus within the map, it is possible to check values of a signal, as is shown in a figure. If you choose representation of signal in apparent resistance or apparent conductivity - you can understand by the map, how current value changes on a map area on a certain depth.
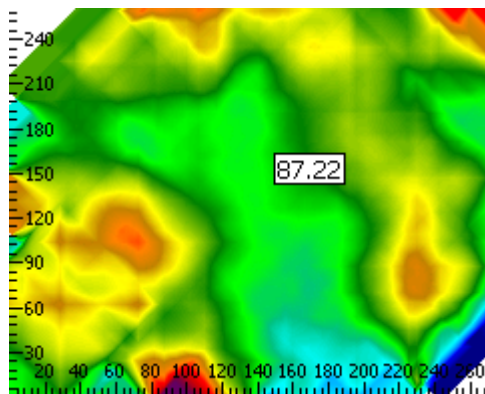
There are some controls to the right of «Start» button, we will observe them next.

Controls in mode «Profile»

The upper cell with profile number is not used. The cell «Station» shows number of a current point of measurement (foliation starts with null, see the operating mode «Profile»). The lower cell shows a number of frequency (current representation depend on frequency only for a profile curve, but the curve of sounding and a section do not depend on it) is represented.
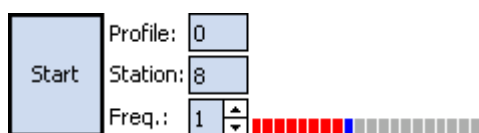
To the right of cells the profile scheme is represented. The first point of a profile is on the left. The quantity of rectangles matches to quantity of points in a profile. Grey color marks out points without measurement, red ones mean already completed measurement points. Dark blue color notes a current point. The current point can be described so:

a) in a current point (or since a current point in a timer mode) measurement will be made by «Start» button;

b) the sounding curve is represented for a current point;

c) the profile curve and section are represented for a profile which include current point; in «GPS track» mode all measures are considered as one profile.

These features works also in other operating modes. Number of a current point can be switched by pressing the keys of the PPC joystick «left» and «right»:

After measurement in last point (the most right) the message «Measure completed» will appear.

Controls in mode «Line»

Difference between this mode and «Profile» consists of indefinite quantity of points on a profile. At opening of new session the quantity will be installed equal 20, but will extend as required.

Controls in mode «Map»

Foliation of profiles and station starts with zero (see the operating mode «Map»). Station number can be changed by pressing the keys of the PPC joystick «left» and «right», and number of a profile by pressing the keys «up» and «down»:
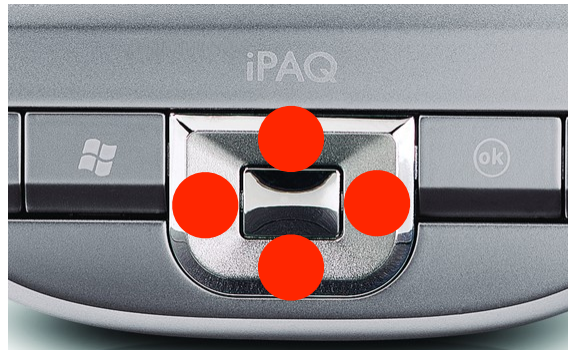
In this operation mode the profile curve and a map (frequency corresponds to some depth) depend on frequency.
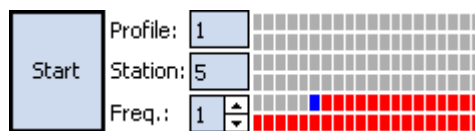

The map scheme (see the operating mode «Map») is represented to the right of cells. If number of profiles in a map more than six, they are represented in several pages i.e. at the end of operation with the first six profiles and transition to a profile with number 6 (foliation starts with zero) you will see next six profiles.

PPC informs about it with sound signal, if sound is on, at end of each profile. After measurement in the last point the message «Measure completed» will appear.

Controls in mode «GPS track»

To the right of the «Start» button it is possible to see a cell «Radius». This value sets (in pixels) the limit for the interpolation of the value gained in a point for neighborhood measured. To the right from the cells GPS track is represented, the dark blue point notes a current position. Directions «upwards» and «to the right» match to directions to the north and the east accordingly.
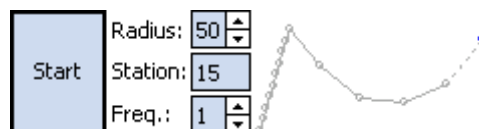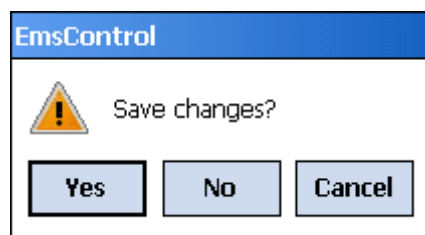

Menu «Session»

The menu «Session» in the lower left corner is for control of measurement sessions.

Item «New» is for creation of new session, if you choose it, the page of primary customization of session parameters will be opened. If other session is not saved, the program will ask what to do: to save data (Yes), do not save data (No) or to cancel creation of new session (Cancel):

Item «Open» loads the saved session. The system will suggest to choose a file from the list of accessible *.ems files in a memory of PPC. If other session is not saved, there will be an appropriate warning.

Item «Save» writes session in a file, the filename will be offered for editing. The filename will be in a format «YYMMDD _HHmm.ems» by default, where Y - year, M - month, D - day, H - hour, m - minute of a current time. To retrieve and systematize files, it is recommended to set correct date and time (see the section «Other adjustments of PPC») and to add remarks after offered file name template:

091212_1455_<remark>.ems

In the course of operation it is recommended to save data time after time to prevent their undesirable loss. When you re-save the session, the filename will not be offered, data will be written in an old file.

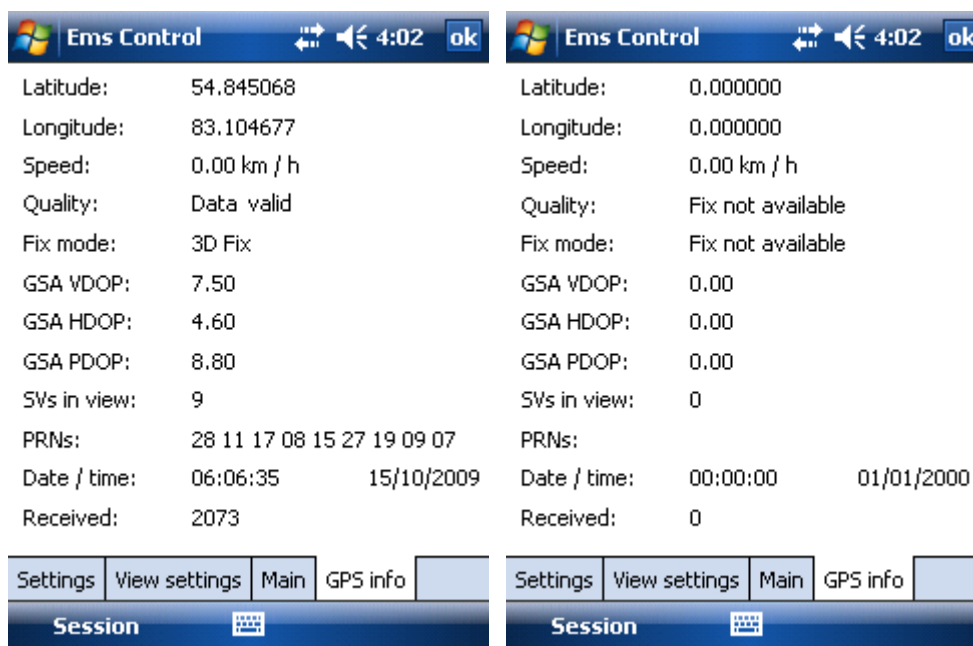Item «Close» closes program EMS Control, suggesting to write unsaved data.

Connecting of GPS

A Bluetooth GPS receiver is required to operate in mode «GPS track». It is recommended to use receivers with SiRF STAR III chipset. For good signal fix the receiver on an operator's head.

Bluetooth GPS receiver connection is possible only with Microsoft Bluetooth stack due to Broadcom stack realization. The usual baud rate for Bluetooth receivers is 9600 baud per second. Add GPS receiver to device list and assign port number the same way you made NEMFIS connection. (see «*Microsoft stack connection adjustment*»).

To discover built-in GPS receiver options, go to «Start → Settings → System → GPS → Hardware» or refer to PPC manual.

Switch on the receiver and wait when it will come to an operational status. Start EMS Control, set the right port number for GPS receiver («Additional» tab), create the session «GPS track», Start measurement. You can understand that GPS receiver is connected and works normally if you look at the tab «GPS info»: plausibility of current geographical co-ordinates, correct date and time, and also step-by-step increasing quantity of the accepted packets testify that everything is all right:

GPS receiver works ok.   GPS receiver doesn't work.

If values of latitude and a longitude are equal to zero, but other information make sense, it is probable that GPS receiver has not come yet to an operational status.

Also there can be one more problem: all features of normal work of the receiver are observed, but values of latitude and a longitude remain invariable therefore all GPS track consists of one point. Such behavior may be a result of static navigation mode of the GPS receiver that applied to car navigation systems at which moving with a speed less than 5 km/h are ignored. It is easy to check, it's enough to try to move with a speed more than 5 km/h.

To disable static navigation mode in your GPS receiver you might use special programs (SirfTech for example), which are not observed here. To find more information please search «SirfTech» and «static navigation» in the Internet.

PART 3. EMS TEST

Introduction

The program Ems Test serves for a NEMFIS successful performance fast check. Put folder «Ems Test» into folder «Program Files» on your PPC. Then put files EmsTest.inf и EmsTest.ems to a root folder of PPC. Also you need a copper ring, this accessory is included to CD.

Check operation

Before starting, lock in your NEMFIS instrument at certain position and make sure you have not any objects with high electrical conductivity nearly. Put copper ring to an edge of NEMFIS, mark «TOP» must be at the top, and mark «EDGE» must be at edge:

Open EMS Control, create «Profile» session with 20 stations, use all 14 frequencies. Set timer mode to 10 times. Start measure (so you will make 10 measures). Then put off ring, take it away from NEMFIS to a distance of 2 meters or more. Make last 10 measures. Save your session. Then open EMS Test, open just created file with it. Program will show the standard deviation (in percent) of a signal increase, which is made by ring for every of 14 frequencies. Values up to 10 % are excellent.