NoiseKen

INSTRUCTION MANUAL
Space-Magnetic Field Visualization System

MODEL   EPS-02EMFv2

NOISE LABORATORY CO., LTD.

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   Please ensure that individuals who use the Software have received the appropriate training and practice with regard to the entire system in which the Software runs, including the usage environment, equipment safety, and operating methods.

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   The Software may be installed and used on multiple personal computers by individuals who are members of the business location (factory, branch office, business office, etc.) that purchased the Software.

4. Handling of Intellectual Property Rights
   The Software and the intellectual property rights including copyrights for the Software belong to NoiseKen.

5. Usage Period
   The usage period designated by NoiseKen shall take effect when the installation of the Software or the prescribed procedure for use, whichever is later, has been completed by the Customer, and the Customer's right to use the Software shall be deemed to have expired at the end of this usage period.

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10. Handling of USB and other protection keys
    The software provided by NoiseKen may require USB or other protection keys.
    (1) If a protection key is included in the accessories, the protection key must be mounted in the computer where the software is used.
    (2) As a general rule, the protection key is not reissued. In the event that the protection key is damaged or lost, please contact the NoiseKen Sales (or Repair) Division.

2. IMPORTANT SAFETY PRECAUTIONS

This software performs visualization of magnetic field emissions in space. Important information for safe operation when performing visualization using this software is provided below, and so be sure to read it carefully before use.
Also, be sure to carefully read this manual and the instruction manual for each device to be used before using this software.

1. **Incorrect or careless operation could result in a fatal injury.**

2. **Avoid use in locations exposed to high humidity and large amounts of dust.**

3. **When making connections, electric shock can occur due to contact with the supply voltage, and so before performing any connection work, be sure to turn off the power to the each device, and check that no power is flowing.**

4. **Do not turn off the power to the each device or disconnect any cables while this software is running. This could cause PC operation to become unstable or the OS to malfunction. Be sure to always exit this software before turning off the power to the each device.**

3. Item Check List

Before starting use, check that the parts and accessories below are included with the product.

A

B

C

D

E

F

G

H

I

J
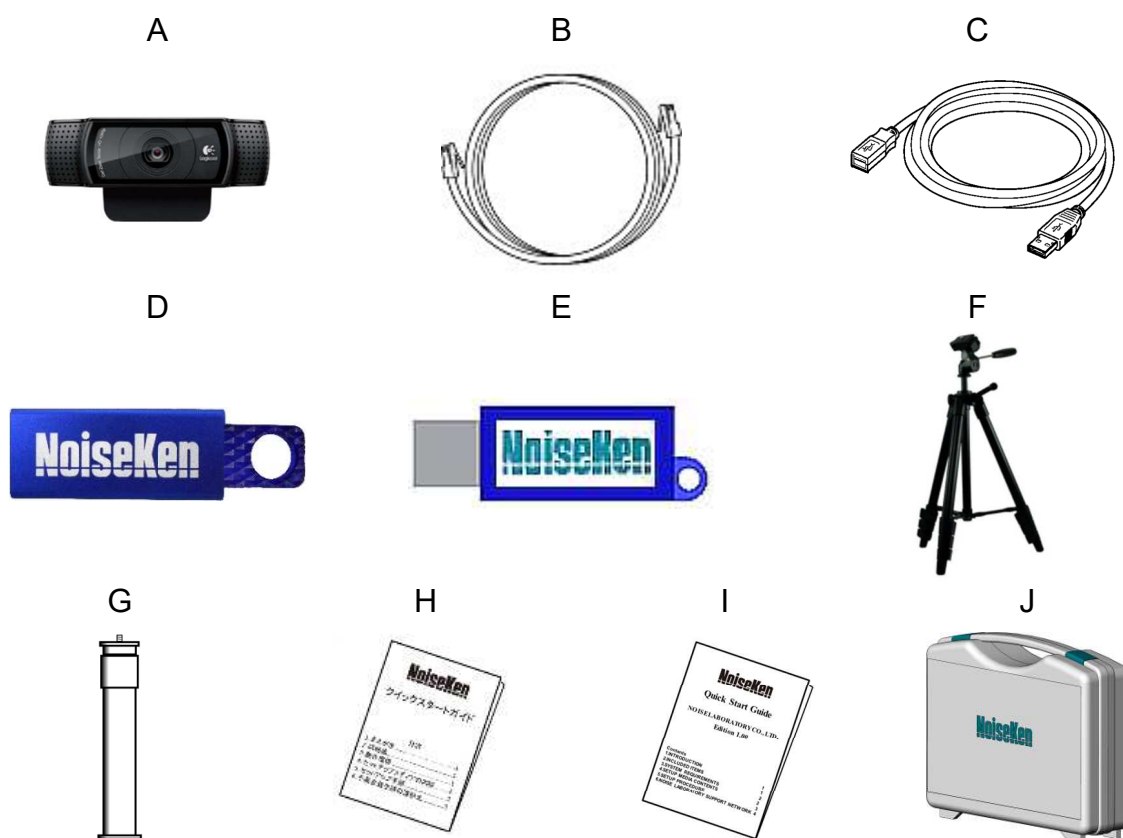
A: Web camera
 ・ Main part ·· 1
 ・ Warranty ·· 1
B: LAN cable (2 m) ·· 1
C: USB extension cable (2 m) ······························· 1
D: Setup media (EPS-02EMFv2 / EPS-02Hv2) ············· 1
E: USB protect key ·· 1
F: Camera tripod
 ・ Main part ·· 1
 ・ Storage bag ··· 1
G: Extension pole··· 1
H: Japanese Quick Start Guide ······························ 1
I: English Quick Start Guide··································· 1
J: Storage case··· 1

* The key of A, D, H and I are included in the upgrade version, and the key of D is disk media.
* The key of D, E, H and I are included in the secondary license version, and the key of D is disk media.
* If the software version at the time of purchase is earlier than Ver.1.0.3.0, refer to the instruction manual at the time of purchase.

4. Introduction

Thank you for purchasing the EPS-02EMFv2 Space-Magnetic Field Visualization System. Before using the EPS-02EMFv2, be sure to carefully read this manual to ensure that you maximize its performance when operating the EPS-02EMFv2.

- **This User Guide is provided to ensure that people who follow the operating procedures and safety information can safely use the EPS-02EMFv2 and maximize its performance.**
- **Place this User Guide in a location where it is easily accessible whenever operating the EPS-02EMFv2.**

4－1. Features

Enabling visualization of magnetic field emissions in space

- With the FT3470-91 magnetic field measuring instrument by Hioki as a measurement sensor, high-speed FFT processing of the supported oscilloscope by Rohde & Schwarz is used to perform frequency analysis of the magnetic field for mapping to the emission location of the actual image.
- The emission location is mapped relative to the sensor location recognized using the web camera.
- An area of up to 64 blocks × 48 blocks can be measured.
- A superimposed image of the measurement strength distribution diagram and web camera image are displayed for enabling easy identification of the emission source. The density of the strength distribution and frequency range can be specified.
- Measured results can be saved to a file, and the content of the measurement results and saved file can be compared for enabling visualization of the effects of corrective actions.
- Measurement sensor location detection by hand instead of using a positioner is possible for enabling easy measurement in cramped spaces, outdoors, and other difficult-to-access locations.

5. Contents

6. Overview

6－1. Notation Used in This Guide

The marks used in this guide and their meanings are provided below.

◇	Provides an additional explanation.
🔍	Indicates a location for further reference.
『！』	Indicates a setting restriction.
⚠	Indicates that you must check before usage.
【　】	Indicates information inscribed on the panel of this testing device.

6－2. EPS-02EMFv2 Features

∗ **Measurement sensor is detected from the image for recognizing the measurement location**
The measurement object and measurement sensor are captured by a camera, and the measurement sensor is found within the image for identifying the measurement location. The recognized measurement location is a relative location within the camera image.
Any user-selected color can be specified for the measurement sensor. However, selecting a color with the same tone as the background color will result in a reduced rate of recognition and even mistaken recognition in certain cases.
The measurable range is the area shown in the camera, but it is restricted to a range that can be recognized by the measurement sensor.

∗ **Automatic control by software**
Measurement sensor recognition from the camera image and oscilloscope control are performed automatically. The measurement results can be output as a CSV file, and the image can be output in BMP format.
Also, because the software is a Microsoft Windows application, it provides an easily-accessible interface that uses mouse operations while viewing the screen.

∗ **Visual display of measurement results**
The measurement strength distribution and camera image are displayed as a superimposed image on the computer screen. Also, the mouse pointer in the image can be used to confirm measurement results for any selected position.
In addition, an interpolation view of the surrounding strength can be used to provide easier assessment of the generation points.

∗ **Full emission analysis function for measurement points**
Data can be collected for the entire measurement frequency range generated from the measured object in a single measurement. The emission map for each frequency band is also redisplayed by simply specifying the frequency band.

6－3．Measurement Principle

The EPS-02 system performs two main operations for enabling visualization of the electromagnetic field. First, it performs image recognition that identifies the measurement sensor location from the recording image. Second, it provides a color-coded distribution on the image indicating the strength of the signals detected by the measurement sensor.

In image recognition, 640 x 480 pixel video from the camera is monitored in real time, and a specific color only is extracted based on the specified parameters for "hue", "brightness", and "saturation". By finding the focal point of the area with the specific color, the location of the specific object (measurement sensor) can be found in the image.

If an object with the same color as the specified color, but that is not the measurement sensor, appears in the image, the measurement sensor location cannot be recognized correctly because the focal point of all objects of this color is calculated. Therefore, the parameter settings for "hue", "brightness", and "saturation" that are used to detect the measurement sensor, the brightness and light exposure in the recording location, and selection of the lighting are important factors. Depending on the color of the measurement object, in certain cases, measurement sensor covers that are provided as standard for magnetic field measuring instruments cannot be used.

The magnetic field strength is measured using a configuration with the FT-3470-91 magnetic field measuring instrument by Hioki, which is compliant with the IEC-62233:2005 (JIS TS C0044:2010) standards for protecting from human exposure due to household appliances. The magnetic field sensor consists of 100 cm^2 loop coils combined as the X, Y, and Z rectangular coordinates for capturing the magnetic flux of the respective field. (This magnetic field sensor is a specially-order model for this system, and other models may not work correctly in this system.)

Magnetic field measurement has two modes.

EPS-02Hv2 Processing

The FT3470-91 is connected to the PC by a USB cable. This connection is used by the FT-3470-91 to output 10 Hz to 400 kHz magnetic field strength data at four times per second. This strength is superimposed on the PC image for creating a magnetic field strength distribution diagram. If data arrives at the same image location, it is overwritten or written by Max Hold.

The magnetic field data can be displayed by selecting the units of magnetic flux density T (tesla) or G (gauss), or magnetic field strength A/m (ampere per meter) in magnetic field strength mode. In human exposure mode, the limit value can be displayed as a percentage (%) based on the reference level for general public exposure and reference level for occupational exposure specified in the ICNIRP Guidelines* for 2010.

In this case, the total amount of the magnetic field for the X, Y, and Z axes for 10 Hz to 400 kHz is combined and displayed, and no information about the frequency is provided.

EPS-02EMFv2 Processing

The analog output for the X-Y-Z magnetic fields of the FT-3470-91 is connected to the supported oscilloscope by Rohde & Schwarz. (Disconnect the USB cable of the magnetic field sensor.) The FT3470-91 magnetic field sensor is set to magnetic flux density mode.

The realtime signals of the three axes detected by the magnetic field sensor are connected to the respective channels of the oscilloscope, frequency analysis (FFT) processing is performed simultaneously with waveform input, the frequency spectrum of each axis is imported to the PC using real time processing at 4 times per second, and this is saved as position data identified by image recognition. Data acquired at the same position is overwritten or written by max hold.

After measurement is completed, the frequency range that you want to view can be selected for creating a strength distribution combined with the image.

*ICNIRP Guidelines

These are guidelines provided by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and they are available in a 1998 version and 2010 version. Most of the current restrictions and standards for human health protection are based on these guidelines. These guidelines are available for download free of charge from the websites below.
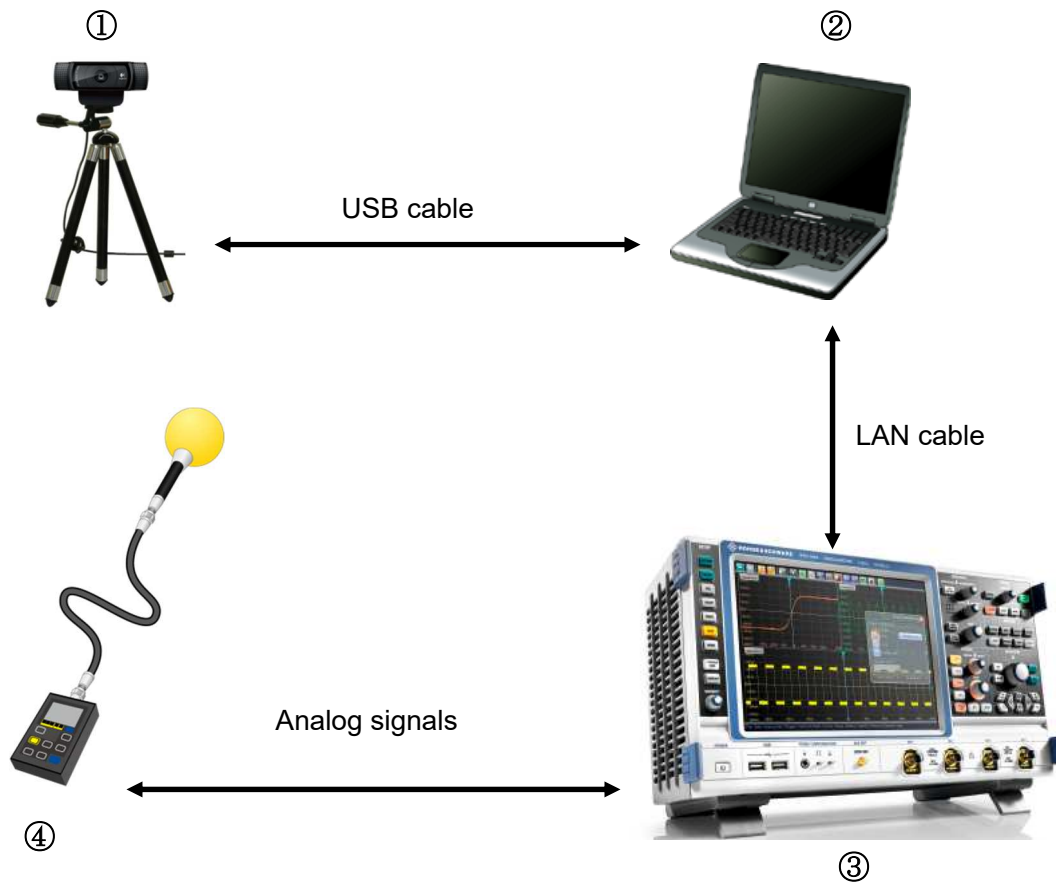
http://www.icnirp.de/   ICNIRP website

http://www.jeic-emf.jp/social/icnipr.html   Japan EMF Information Center website

7. System Configuration Diagram

7−1. System Configuration Diagram

① Web camera

   This displays the measurement object.

② Control PC

   This is used to control various devices and perform magnetic field frequency measurement.

③ Oscilloscope

   The RTO2004-NSL or RTO6 oscilloscope by Rohde & Schwarz is used. The RTO2004-NSL was specially adjusted for this system, and so its specifications are different from the typical product. For details, please contact NoiseKen or Rohde & Schwarz Japan.

④ Magnetic field measuring instrument and measurement sensor

   The FT3470-91 magnetic field measuring instrument and FT3471-91 measurement sensor by Hioki are used. The magnetic field measuring instrument was specially adjusted for this system, and so its specifications are different from the typical product. For details, please contact NoiseKen or Hioki.

7－2. Functions of Each Device

① Web camera

This is a general-purpose web camera. The measurement object is displayed and transferred to the PC. The web camera is connected to the PC by a USB cable. If necessary, the connection can be extended by a USB extension cable.

② Control PC

This enables running of system control software. This software imports images from the web camera, identifies the measurement sensor within the image, and finds its location. Measurement results that have undergone high-speed FFT processing are received from the oscilloscope and mapped to the location.

③ Oscilloscope

This is the supported oscilloscope by Rohde & Schwarz. This performs high-speed FFT processing of the waveforms of the X, Y, and Z axes sent from the measuring instrument.

The oscilloscope is connected to the PC using the supplied LAN cable.

④ Magnetic field measuring instrument and measurement sensor

This is the FT3470-91 magnetic field measuring instrument and FT3471-91 measurement sensor by Hioki. These are used to measure the magnetic field component emitted from the measurement object. The waveform outputs for the X, Y, and Z axes in the measurement results are transferred to the oscilloscope using an output cable.

To increase the recognition rate, a special cover provided with the magnetic field measuring instrument is attached to the sensor.

A 5-meter sensor extension cable is also included for easier measurement. The measurement path including the extension cable was calibrated at factory shipping.

8. Preparation

<div>
⚠ **CAUTION**
Environments having poor signal reception
In environments exposed to extremely large amounts of external noise, the equipment may be unable to realize its maximum performance.
Even when indoors, the equipment can be affected by lighting and other electronic devices. During measurement, try to minimize the effect of the electromagnetic environment to prevent external noise from affecting the equipment. Also, certain PCs may generate large amounts of noise emissions and may not be suitable for measurement systems.
</div>

8－1. System Backup

NoiseKen provides an optional service (additional charges apply) for installing the EPS-02EMFv2 program in your PC before providing the program, but if the program is erased, install it from the supplied setup media. The installation procedure is included in the "Readme.txt" file. Copy the content of the setup media to a hard disk, removable disk, or other location and store it there in case of loss.
For details of setup, see "10.Setup" (P34).

8－2. Magnetic Field Measuring Instrument Settings

① A sphere-shaped cover for improving the rate of recognition is attached to the measurement sensor section. When attaching the cover, align the sensor X/Y/Z with the cover X/Y/Z. The measurement sensor and measuring instrument are connected by the extension cable included with the measuring instrument.

② Press the "POWER/BATT" button on the magnetic field measuring instrument to turn on the instrument power. The instrument startup process takes several seconds.

③ Check that the magnetic field measuring instrument is started, press the OUTPUT button, and check that "MON" appears on the measuring instrument screen.

⚠ This operation is necessary whenever turning on the magnetic field measuring instrument.

④ To turn off the power for the magnetic field measuring instrument, hold down the "POWER/BATT" button for about two seconds.

⑤ For further details, see the instruction manual for the magnetic field measuring instrument.

8－3. System Connections

① Connect the web camera to the PC using the USB cable. Any commercially-available USB cable can be used, but it must be a cable that supports the USB 2.0 standards. Be aware that the USB 2.0 standards limit the cables to a maximum of 1 extension and maximum length of 5 m.

② The oscilloscope and PC are connected by a LAN cable. A commercially-available cable can be used for the LAN cable. Use a one-to-one local connection without passing through the site LAN or hub.

③ The magnetic field sensor and magnetic field measuring instrument are connected by the 9758 extension cable included with the magnetic field measuring instrument. The magnetic field measuring instrument and oscilloscope are connected by the 9759 output cable.
In this configuration, never connect the magnetic field measuring instrument and PC using a USB cable. This could result in damage to the instruments.

⚠ Do not connect magnetic field measuring instruments to an oscilloscope (BNC) and PC (USB) at the same time.
Doing so could damage the instrument.

9. Usage Procedure

9－1. Starting and Exiting the Software

Starting the Software

To start the software, double-click the EPS-02EMFv2 shortcut icon on the desktop.

Double-click

EPS-02EMFv2
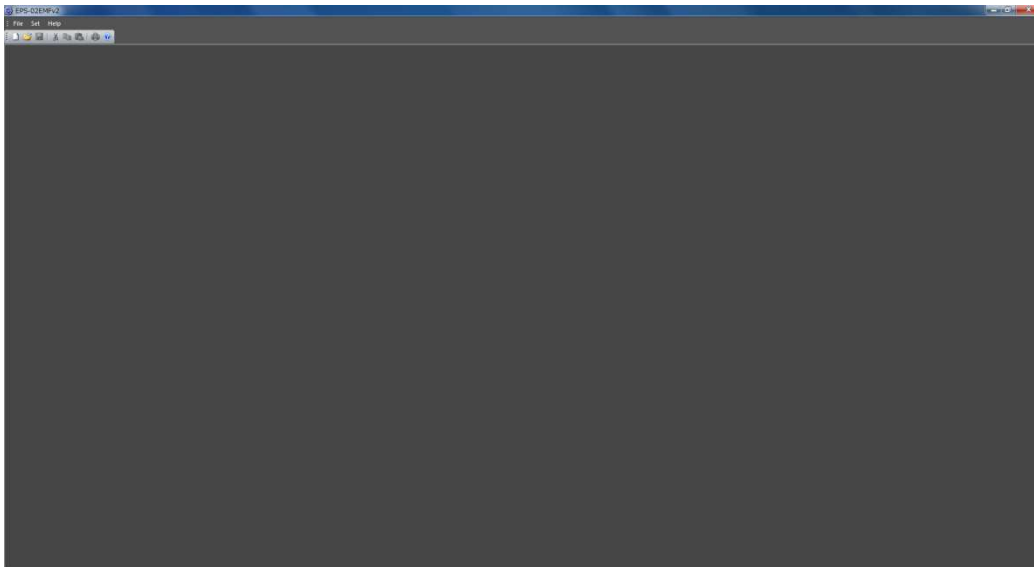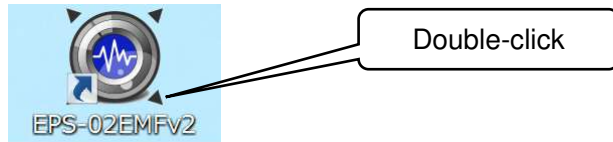
Screen displayed immediately after the software is started

Exiting the Software

To exit the software, click the close button on the right end of the title bar or click **Exit** from the **File** menu.

Because the software cannot be closed during measurement, finish measurement before exiting the software.

Click

File	Set	Help	
New Measurement			Ctrl+N
Open...			Ctrl+O
Close			
1 C:\data\Test01.edf			
2 C:\data\Test02.edf			
3 C:\data\Test03.edf			
4 C:\data\Test04.edf			
Exit			
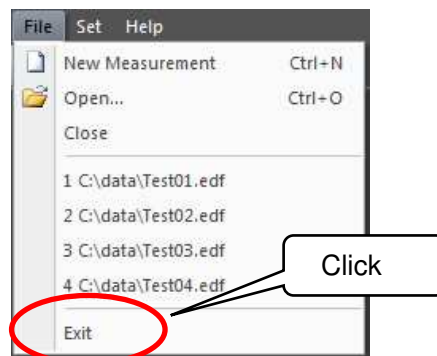
Click

9－2．Image Recognition Settings

Image Recognition Setting Dialog Box

To open the **Image Recognition Setting** dialog box, click **Image Recognition Setting** from the **Set** menu.
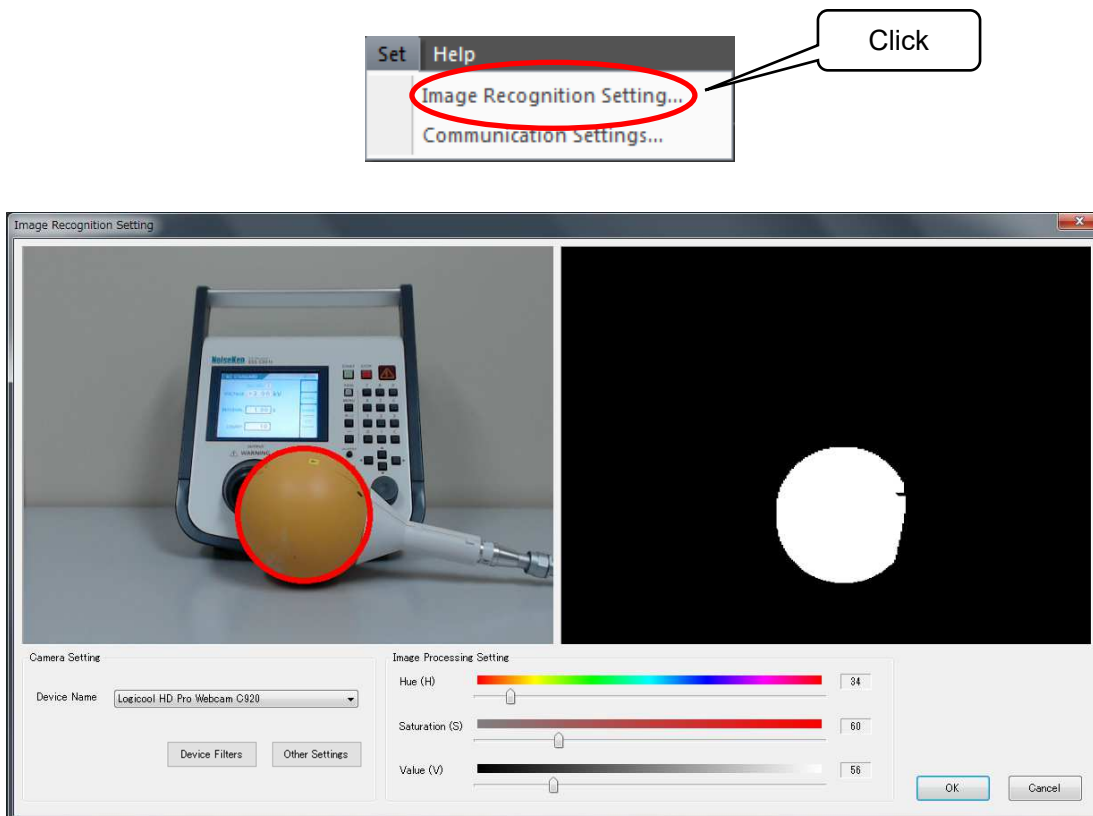
Image Recognition Setting dialog box

◇ Adjust the camera position so that the measurement object can be captured by the camera. Take the following conditions into account during adjustment. Changing camera properties or adjusting the lighting may be required depending on the circumstances.
・Sufficient brightness is provided so that the measurement object and the measurement sensor can be fully recognized.
・There is no object whose color is similar to that of the measurement sensor.

Device Name

Camera names are displayed in the **Device Name** list. If multiple cameras are connected, select the camera to be used from the device name list.
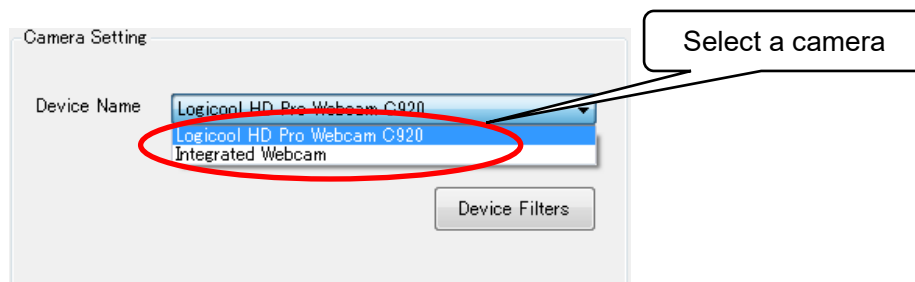
Device Filters

To open the **Webcam Properties** dialog box, click the **Device Filters** button.

In the dialog box, the camera properties, such as zoom, white balance, and anti-flicker, can be set.
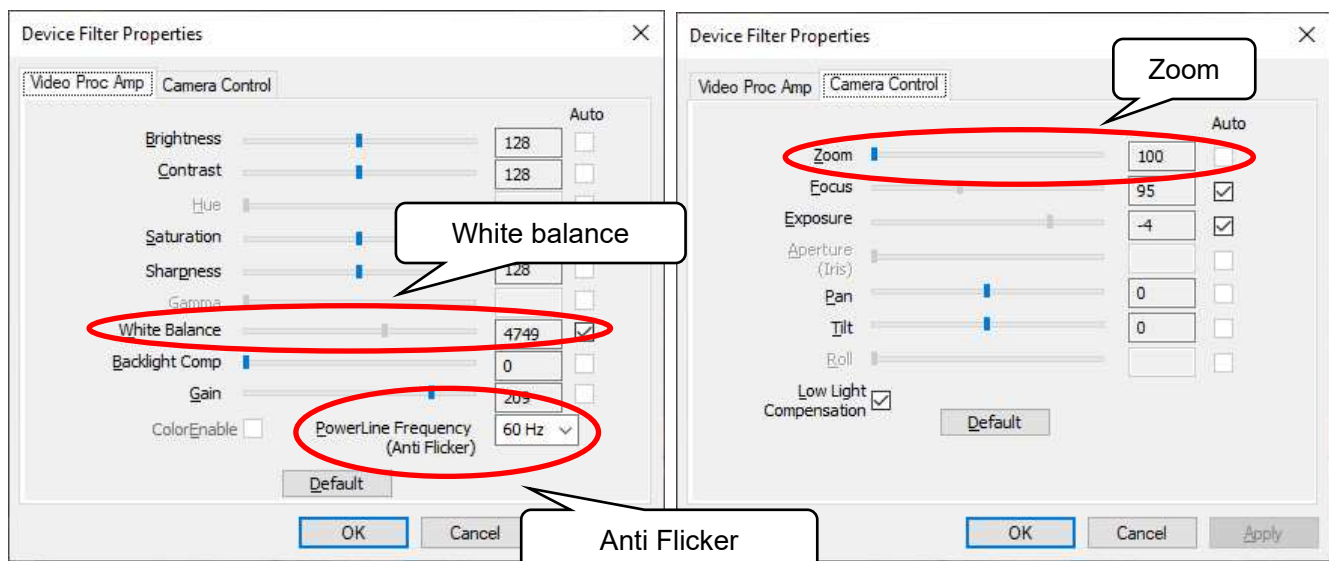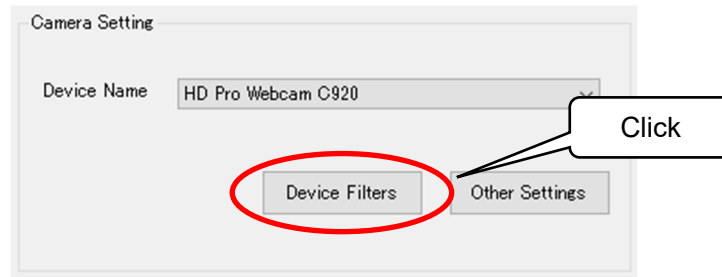
Video Proc Amp screen

Camera Control screen

➢ White balance

White balance is a function to perform color correction so that a white object appears white. If the light source, such as sunlight, light bulb, or fluorescent, makes the white object look bluish or reddish, adjust white balance.

➢ Anti Flicker

Anti Flicker is a function to reduce flicker in images.

➢ Zoom

Zooming may not be possible depending on the model, driver, or color space / compression settings. Refer to "Other Settings" on page 17 for the color space / compression.

◇ The Properties screen may vary depending on the model or driver version of the connected camera.

Other Settings

To open the **Other Settings** dialog box, click the **Other Settings** button.
In the dialog box, the color space / compression and camera processing can be set.
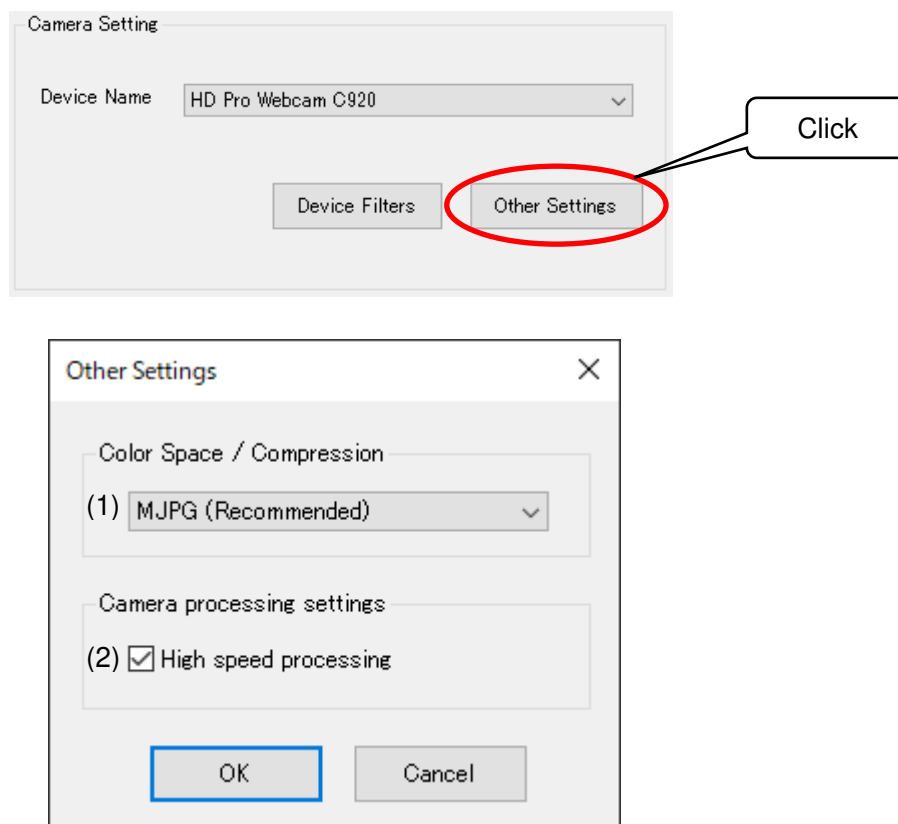
Other Settings dialog box

(1) Color Space / Compression

The color space / compression of the camera can be changed. If the camera is not working properly, changing it may improve the situation. The first item in the list is the recommended method.

(2) High speed processing

Speed up camera processing. If the camera is not working properly, unchecking the checkbox may improve the situation.

Image Recognition Setting

Adjust the three parameters, **Hue**, **Saturation**, and **Value**, in the **Image Processing Setting** so that the color of the magnetic sensor can be recognized. The binarized image on the right side can be changed by moving the slider of each parameter.

    Hue: Sets the hue, such as red, blue, or yellow
    Saturation: Sets the intensity and purity of a hue
    Value: Sets the lightness of a color.
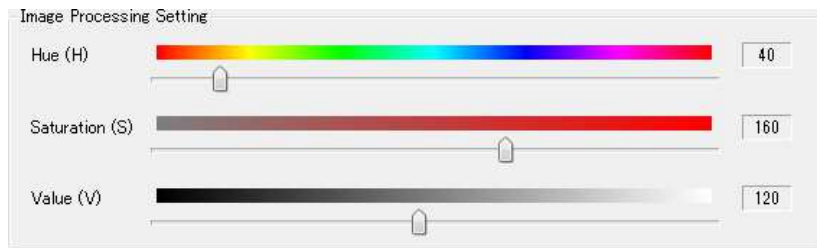
Adjust the parameters until the magnetic field measurement sensor is recognized as a circle and no other object is recognized. If there is any object whose color is similar to that of the sensor in the background, hide the object or change the color of the sensor.
Once the sensor is recognized as a circle, click **OK** to complete adjustment.

Desirable recognition state
The shape of the sensor is almost circular.
There are no recognized areas in the background.

Not desirable recognition state
The shape of the sensor is not circular.
There are recognized areas in the background.

Procedure for successful sensor recognition setting
    1. Set the **Saturation** and **Value** to 0.
    2. Adjust the **Hue** so that the sensor is most clearly recognized.
    3. Increase the **Saturation** gradually to remove other recognized areas around the sensor.
       Do not increase the **Saturation** excessively to prevent the recognized sensor area from being impaired.
    4. Increase the **Value** in the same manner.
    5. Finally, move the sensor outside of the camera view, and make sure that there is no object to be recognized.
       If any other object is recognized, repeat steps 3 and 4.
       When the mal-recognition is not solved even if steps 3 and 4 are repeated, start over from step 1.

9－3. Communication Settings

Communication Settings Dialog Box

To open the **Communication Settings** dialog box, click **Communication Settings** from the **Set** menu.

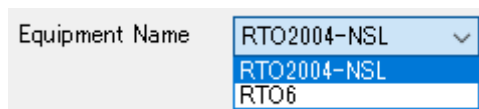In this dialog box, a remote-controlled oscilloscope can be set up.
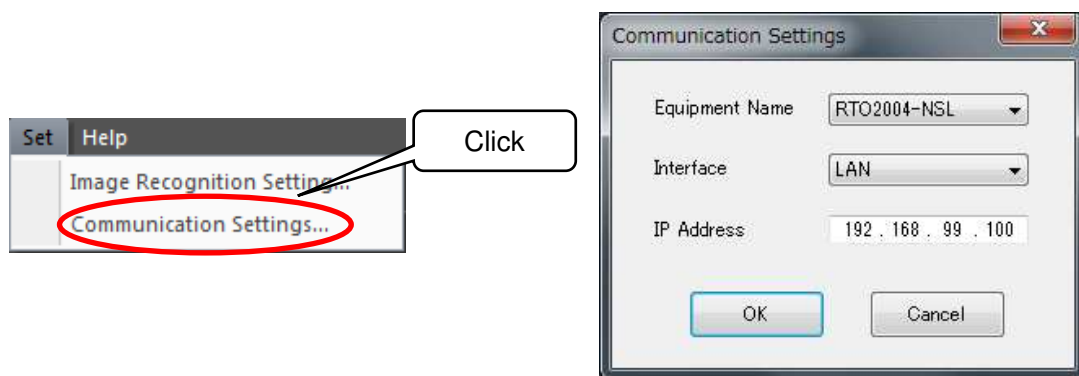
Communication Settings dialog

Equipment Name

Select the equipment name of the connected oscilloscope.

The RTO2004-NSL or RTO6 is available.

◇ When NI-VISA (National Instruments) has not been installed, the **Equipment Name** list is blank even if oscilloscope drivers exist. In such cases, install NI-VISA according to "10－3.Installing the Software" in page 35

Interface

Selectable interface types vary depending on the selected equipment.

Only LAN is available.

IP Address

Set the IP address.

For how to set the IP address, see "10－2.Network Address Settings" in page 34.

9－4. New Measurement (Setting Measurement Conditions)

View Window

To open a **View** window, click **New Measurement** from the **File** menu or click the **New Measurement** button on the toolbar.

Whenever a **View** window is newly opened, it is numbered as follows: View1, View2, View3 ... These names can be changed freely when the file is saved after measurement.

Before starting measurement, set an image division size, properties for the oscilloscope, and other conditions in the **View** window.
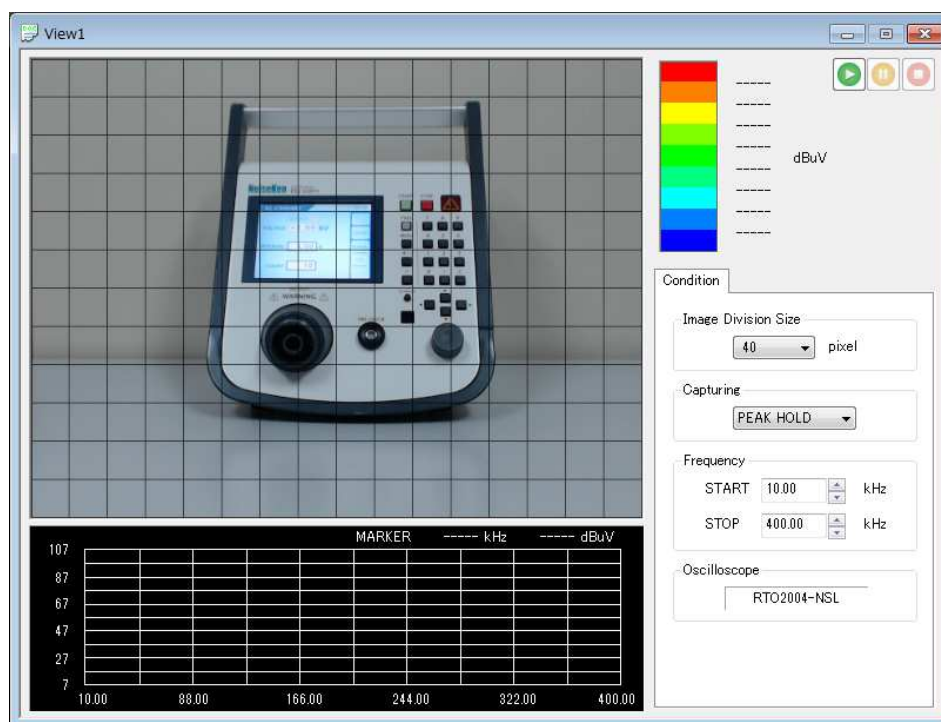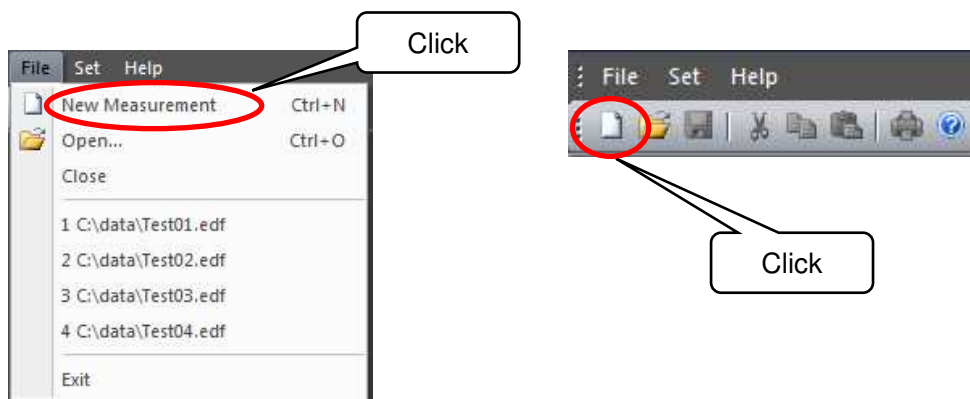
View window (before measurement)

If a web camera or USB protect key is not connected, new measurement is not possible.

Condition Tab

In the **Condition** tab, set the image division size, properties for the oscilloscope, and other conditions.

Condition items can be set only before measurement. After completion of measurement, all items are displayed but cannot be changed.

Conditions (before measurement)   Conditions (after measurement)

Image Division Size

Set the division size by which a camera image of 640 × 480 pixels is divided.

The image division size can be selected from 10 pixels (H: 64 × V: 48 squares), 16 pixels (H: 40 × V: 30 squares), 20 pixels (H: 32 × V: 24 squares), 32 pixels (H: 20 × V: 15 squares), 40 pixels (H: 16 × V: 12 squares), 80 pixels (H: 8 × V: 6 squares), or 160 pixels (H: 4 × V: 3 squares).

Select 20 or 32 pixels normally.

Image division size: 10 pixels   Image division size: 160 pixels

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Capturing

How to store spectrum data at the same measurement point (the same square of the grid) can be selected from **SINGLE**, **FREE RUN**, or **PEAK HOLD**.

SINGLE: done only one time

FREE RUN: overwritten and the latest data is retained

PEAK HOLD: overwritten and the spectrum with the maximum value (intensity) is retained

Frequency

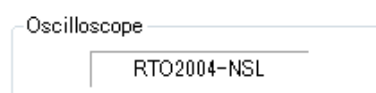The measurement frequency range is 10 Hz (0.01 kHz) to 400 kHz.

The unit is fixed at kilo Hz.
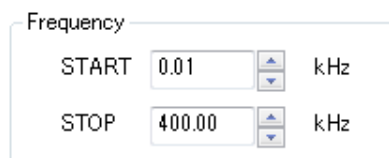
Oscilloscope

The model number of the connected oscilloscope is shown.

For scope settings, refer to [9－3.Communication Settings] on page 19.

9-5. New Measurement (Performing Measurement)

Performing Measurement

To start measurement, click the **START** button in the upper right of the **View** window. During measurement, the **PAUSE** and **STOP** buttons are enabled.

To suspend measurement, click the **PAUSE** button to suspend measurement, and to finish measurement, the **STOP** button.

After completion of measurement, all buttons are disabled. When performing measurement again, click **New Measurement** from the **File** menu or click the **New Measurement** button on the toolbar.

Before measurement   During measurement   After measurement
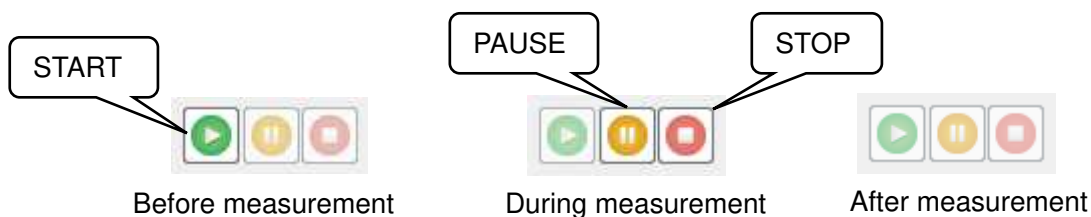
Once measurement is started, the **Map View** and **Comment** tabs appear next to the **Condition** tab. In the **Map View** tab, only **Transmittance** can be changed during measurement, and all items can be set after completion of measurement. Items in the **Comment** tab can be set even during measurement.

Points (squares of the grid) that have been measured are color-coded according to the peak value and overlaid on the camera image during measurement. In addition, the spectrum data measured by the oscilloscope is displayed in the spectrum graph area located in the lower part of the **View** window, on a point-by-point basis.
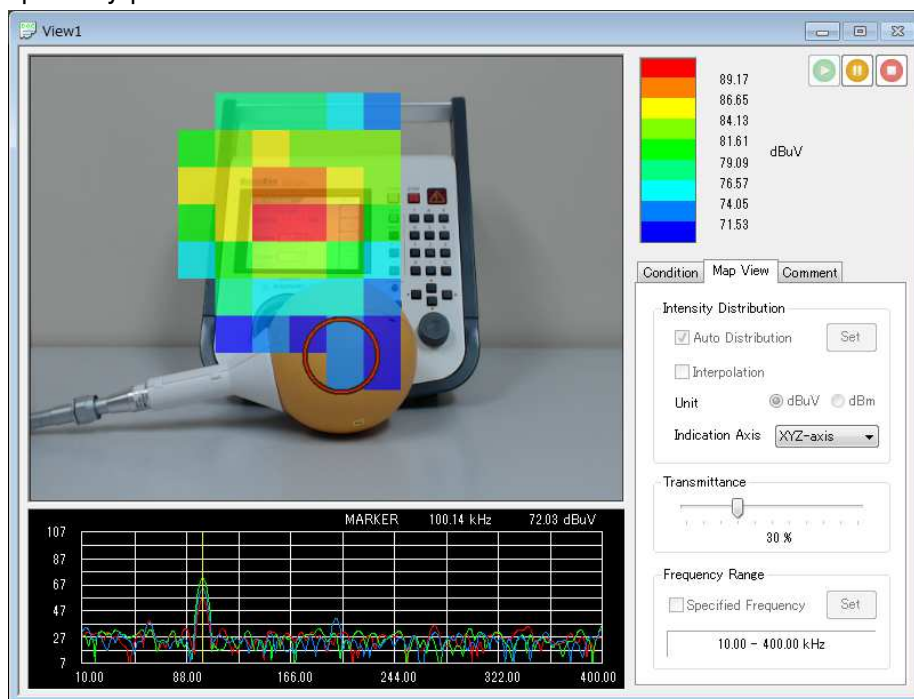
◇ Move the measurement sensor while keeping the same direction and maintaining a constant distance from the object to be measured.
Also, align X/Y/Z of the measurement sensor with the vertical and horizontal axes.

The EPS-02EMFv2 software sends a command for acquisition of the spectrum graph to the scope immediately after the sensor is recognized. After completion of acquisition, the software recognizes the sensor position again, and only when the sensor is found at the same point (position) where it was placed at the start of acquisition, the spectrum data is stored.

If the sensor is moved quickly, the point at the start of acquisition differs from that at the completion of acquisition, and as a result, measurement data is not stored. When spectrum graphs are not obtained smoothly, move the sensor more slowly or set to a larger image division size.

If the sensor is not recognized or other object is falsely recognized, reconfigure the image recognition setting. Click **Image Recognition Setting** from the **Set** menu to change the setting. Please note that it is possible during measurement.

Deleting Measurement Data

Stored measurement data can be deleted on a point-by-point basis.

When data to be deleted is right-clicked during measurement, the **Delete** menu will appear. Click this menu to delete the measurement data for the corresponding point.
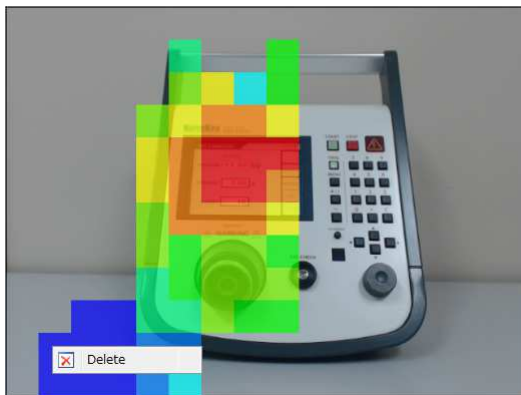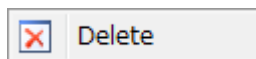

| Before deleting data | After deleting data |

Data can be deleted only during measurement and cannot be deleted after completion of measurement.

Recapturing Camera Image

If the **STOP** button is clicked after completion of measurement, the camera image switches from video to still image. If the still camera image includes an unnecessary object, such as the sensor, the camera image can be recaptured.

Click **Recapture Camera Image** from the **Window** menu. The still image will switch to video and the following message will be displayed.
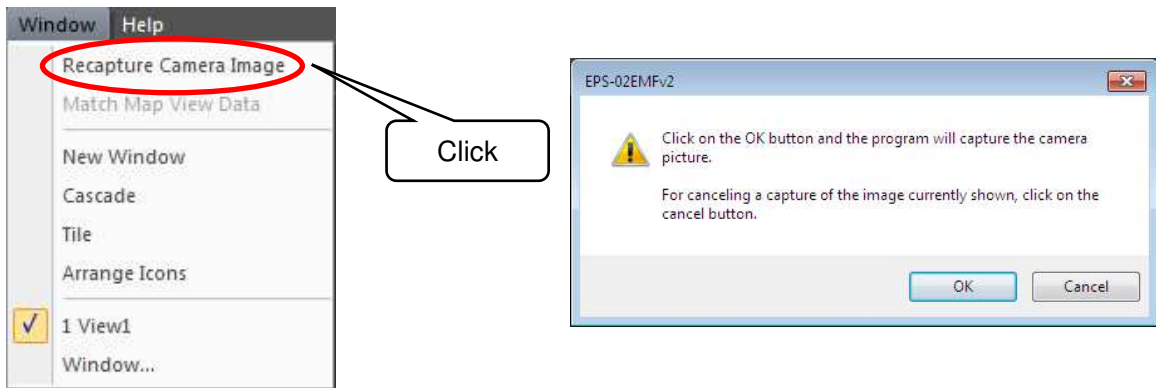
Clicking the **OK** button switches the camera image from video to still image to capture a new camera image. To return the original camera image, click the **Cancel** button.
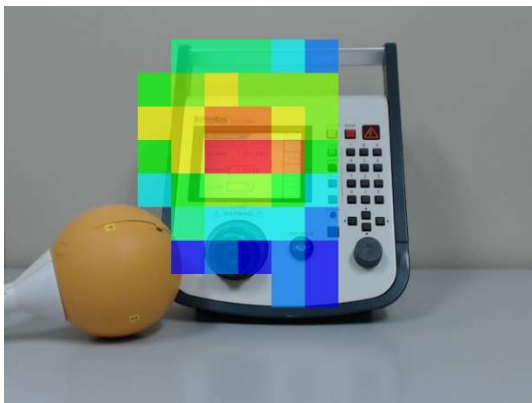
Before recapturing	After recapturing

Recapturing is possible as many times as needed before the file is saved.
Note that recapturing is not possible once the file is saved.

9－6. Measurement Data Analysis

Measurement Data

After completion of measurement, a square pointer ▣ will be displayed on the camera image. Dragging this pointer to the desired point can display the spectrum data at the relevant point.

The pointer automatically moves to the highest level point immediately after measurement is complete or the file is opened.
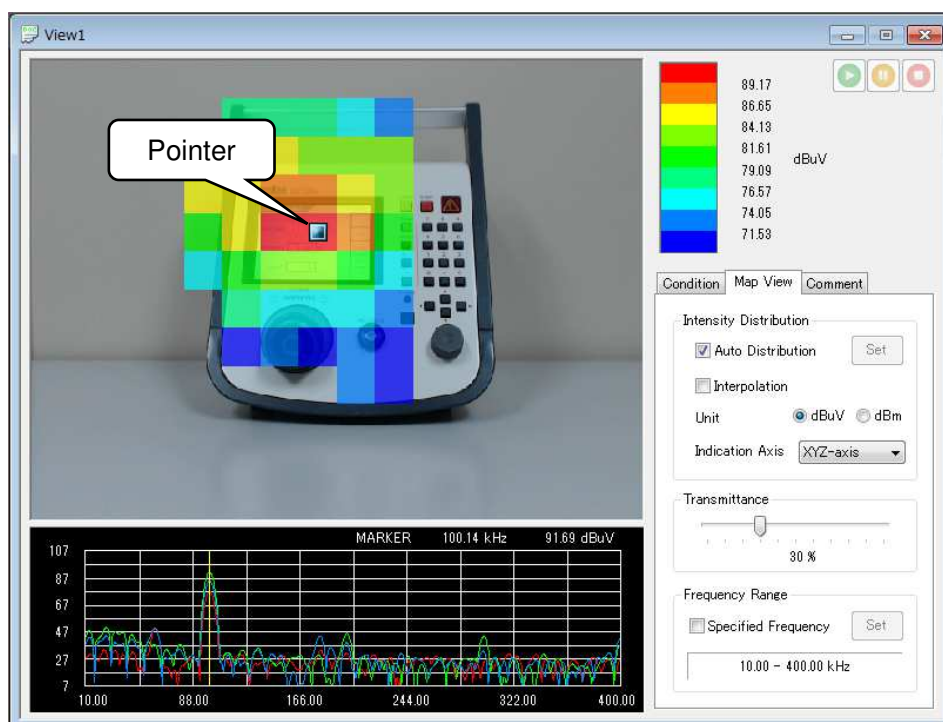
In the **Condition** tab, the conditions configured before measurement can be checked. The representation of measurement data can be changed in the **Map View** tab. In the **Comment** tab, measurement information and other comments can be entered.



Condition tab   Map View tab   Comment tab

Auto Distribution

When the **Auto Distribution** checkbox is checked, the color map is made according to automatic distribution between the highest and lowest intensity. Immediately after measurement is complete or the file is opened, the **Auto Distribution** checkbox is always checked.
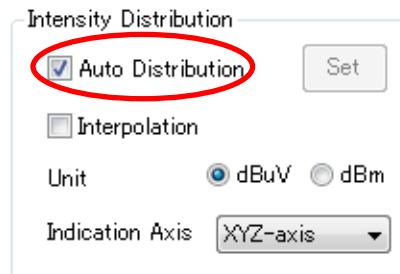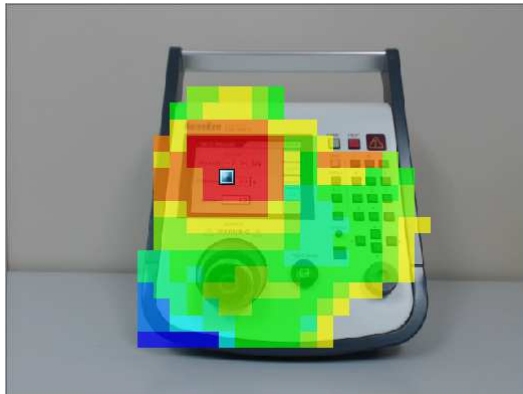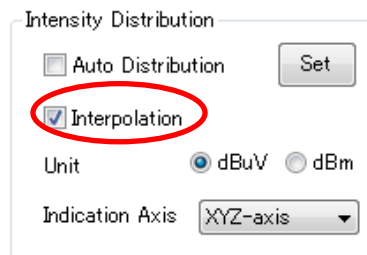

To change the **Upper/Lower Value** to desired values, uncheck the **Auto Distribution** checkbox and click the **Set** button. The set upper/lower value settings will be reflected applied to the map data color bar.
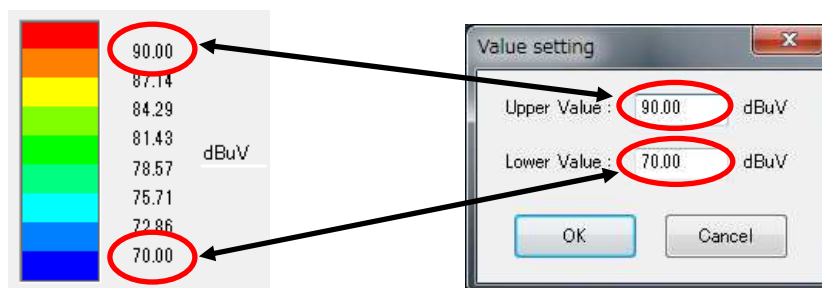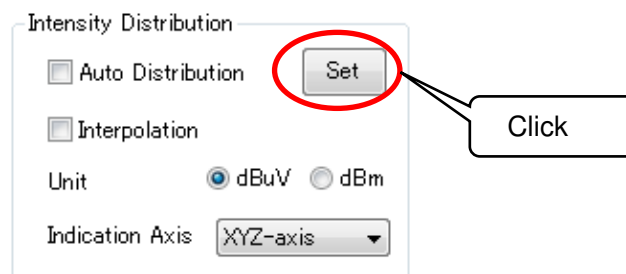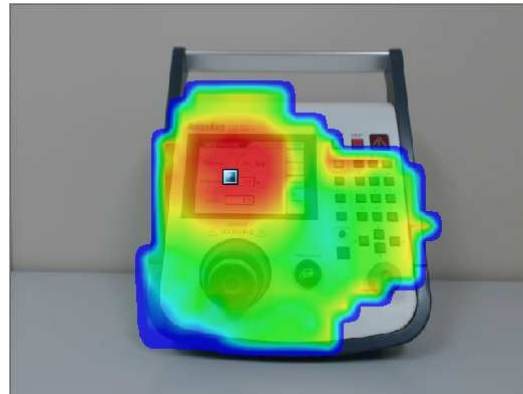
Interpolation

When the **Interpolation** checkbox is checked, the map data image is smoothly displayed by interpolation of the boundaries between divisions.

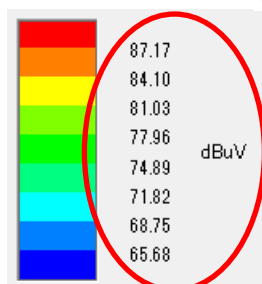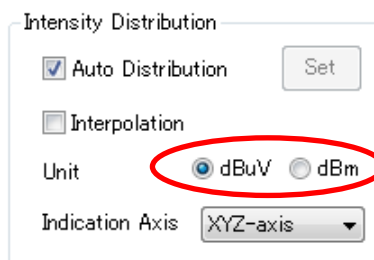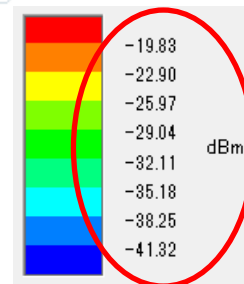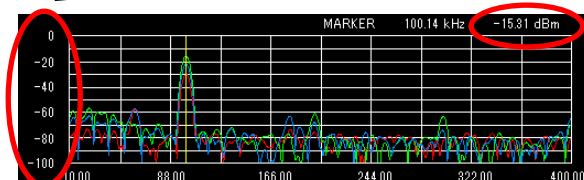| Without interpolation | With interpolation |

Unit

The unit used to display measured intensity can be selected from dBuV and dBm.

The change of unit will be applied to the color bar and spectrum graph.

Displayed in dBuV

Displayed in dBm
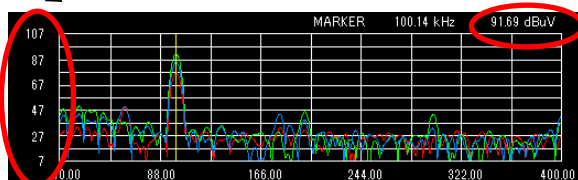
Indication Axis

Select the desired axis for measurement.

Intensity distribution map and spectrum graphs are shown according to the selected axis. Spectrum graphs for X, Y and Z axes are represented by red, green and blue, respectively.
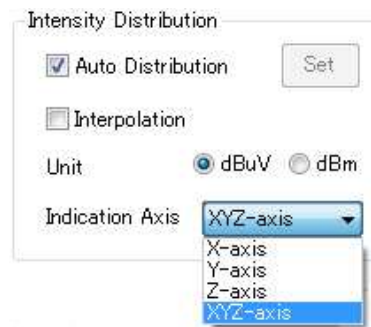
Transmittance

The transparency of the color map can be changed.

When **Transmittance** is set to 100%, the map is invisible and only the camera image will be displayed. When **Transmittance** is set to 0%, the camera image is invisible at the points where data exist.
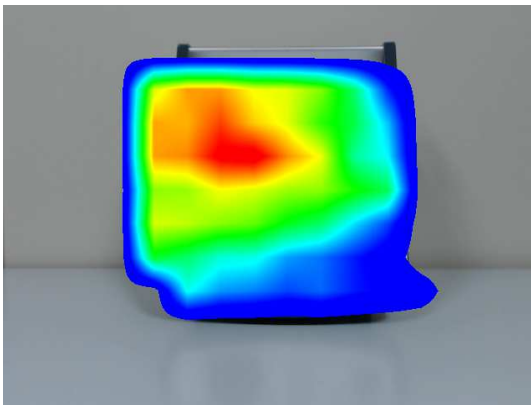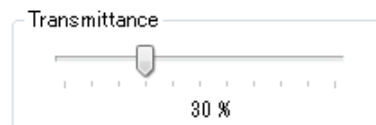
Transmittance: 0%	Transmittance: 100%

Frequency Range

If the **Specified Frequency** checkbox is checked under **Frequency Range**, the map is color-coded not using the peak values of the whole frequency range but using those of the specified frequency range, and the relevant blue zone band is displayed in the spectrum graph.

This zone band can be moved to the right or left by dragging it, and thereby the color-map on the camera image changes. In addition, the width of the zone band can be changed by dragging an end of the band to the right or left.
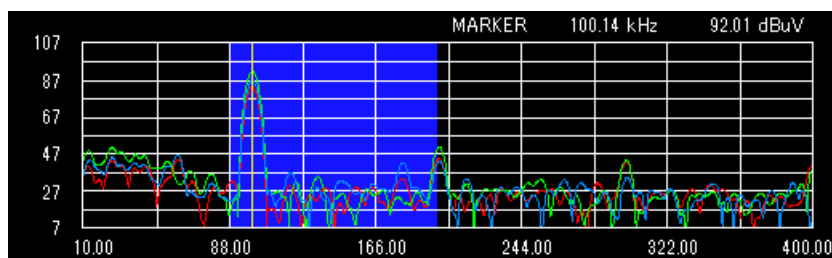
Clicking the **Set** button opens the **Frequency Setting** dialog box, where the frequency range for the zone band can be directly entered.

Measurement Information

The measurement date is automatically input in the **Day** field. For other items, enter information freely. If no information is required, leave the field blank.

Memo

Any information about measurement can be entered freely. In the **Memo** field, there is no limit of the number of characters.

Matching Map View Data

The same setting can be applied to all maps on the **View** windows that are currently open.

When **Match Map View Data** in the **Window** menu is clicked, the map view settings of the last active **View** window will be applied to all of open **View** windows. The settings to be applied include **Upper**/**Lower Value**, **Interpolation**, **Unit**, **Indication Axis**, and **Transmittance**. **Specified Frequency** is also applied if the **START** and **STOP** frequencies are the same among Windows. Use this function to compare measurement data before and after corrective actions.
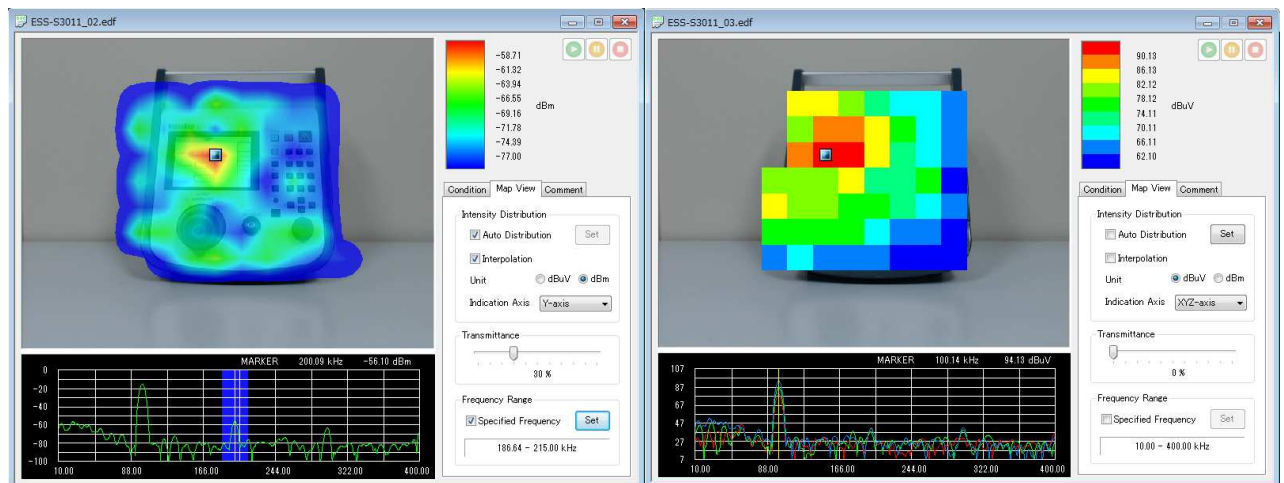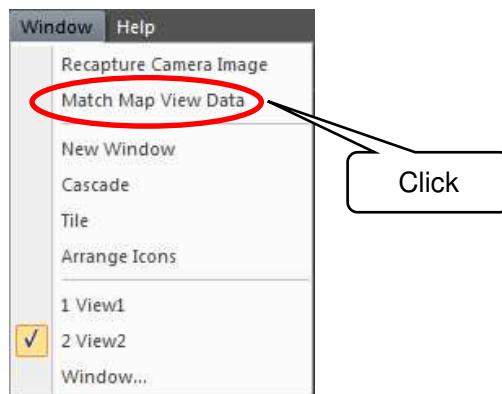
Before matching map view data
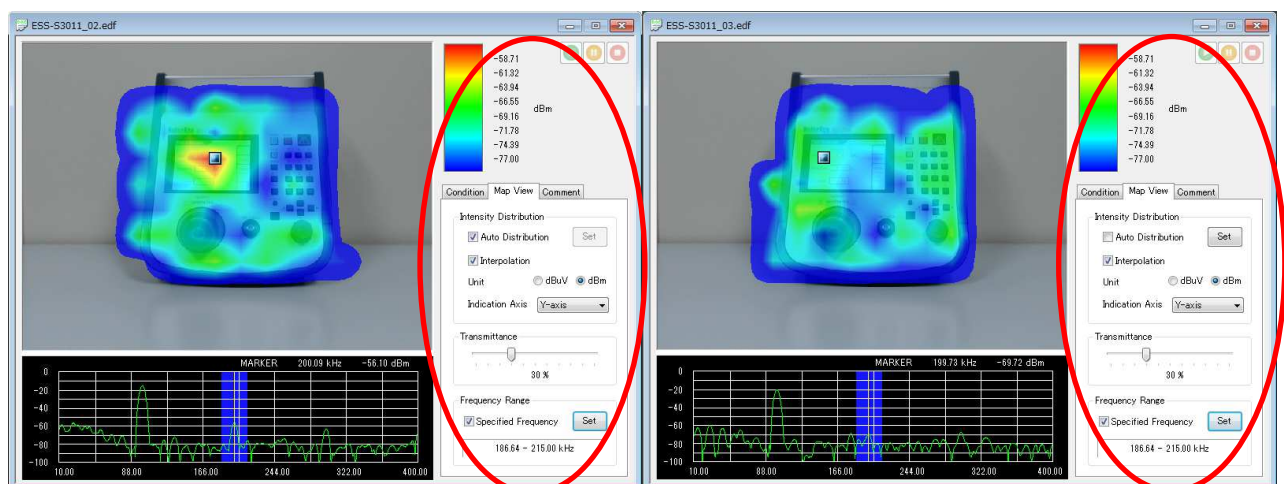
After matching map view data

Exporting Measurement Data

Measurement data can be exported to an external file.

Select **Export** from the **File** menu, and choose one from **Map Data**, **Spectrum Data**, and **All Spectrum Data**. The **Save As** dialog box will appear.
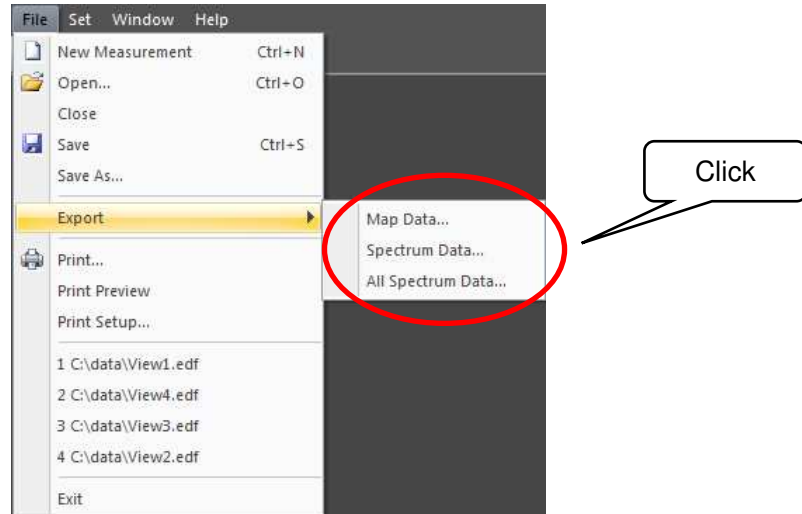
In **Save as type** on the **Save As** dialog box, either **CSV File** or **Bitmap File** can be specified.
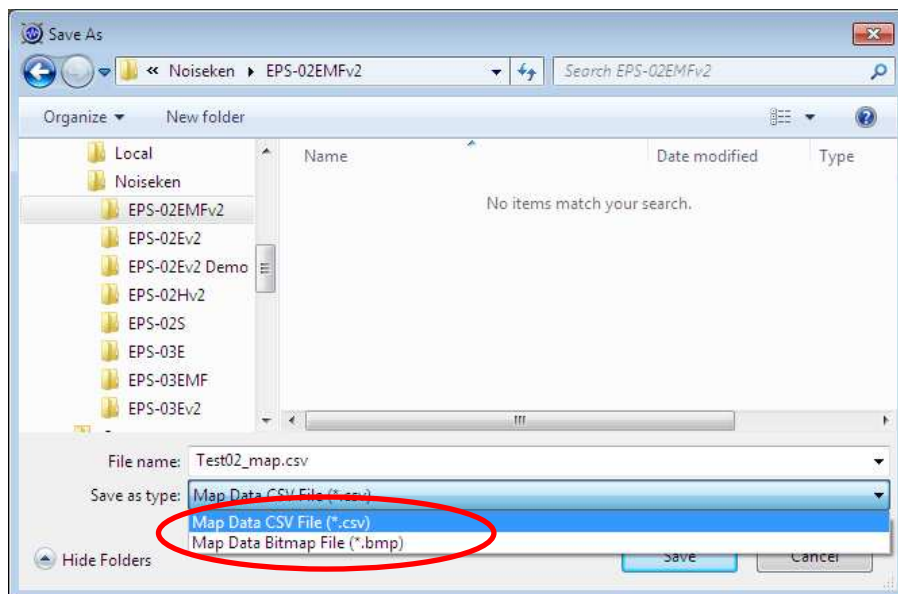
➢ **Map Data**
    CSV file: The peak values for each measurement point are exported.
    BMP file: The map data image pasted on the camera image is exported.

➢ **Spectrum Data**
    CSV file: The spectrum waveform data for the point indicated by the pointer ⬛ is exported.
    BMP file: The spectrum graph image for the point indicated by the pointer ⬛ is exported.

➢ **All Spectrum Data**
    CSV file: The spectrum data for all measurement points are exported.

Print

The measurement conditions, map image, and spectrum graph can be printed.

Select **Print** or **Print Preview** from the **File** menu or select the **Print** button on the toolbar.
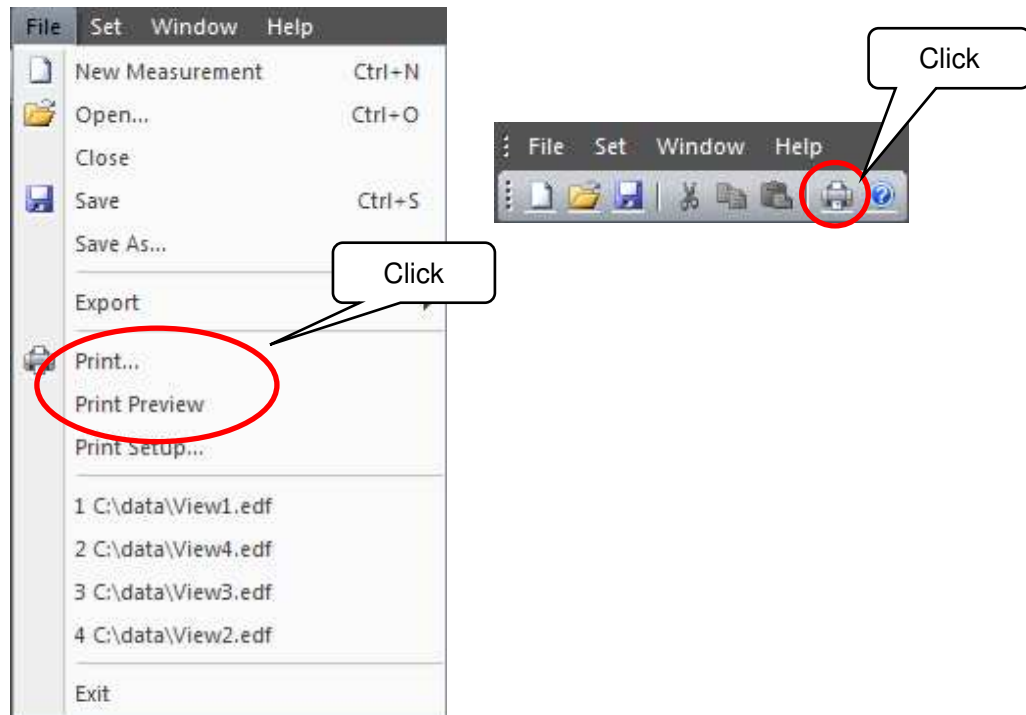
10. Setup

10－1. Important Notes on Setup

This section describes setup for the software and peripheral devices. To perform setup, you must be logged in with administrator privileges.
Also, it is recommended that setup be performed by some engineer with a certain degree of proficiency in computers, including having an understanding of Ethernet addresses and other terminology.
Be aware that some details may vary for different OS versions, PC display settings, and other environments.

10－2. Network Address Settings

1) Setting the IP Address of the PC
   From the **Control Panel**, select **Network and Sharing Center**, and click **Change adapter settings** from the list on the left side.

<How to open Control Panel>
In the search box on the taskbar, type **Control Panel,** and then select **Control Panel**.

   The adapters that can connect to the network are displayed. Double-click the adapter (local area connection) that is connected to the oscilloscope to display its properties. Select "Internet Protocol Version 4", and click to display the properties.
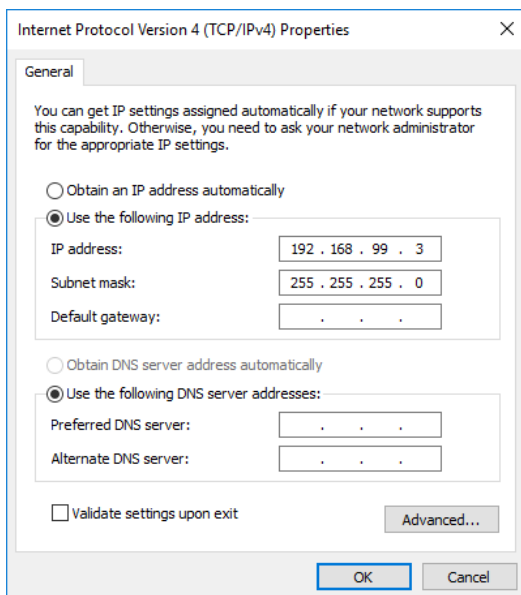
Enter "192.168.99.3" for the IP address and "255.255.255.0" for the subnet mask, and click **OK**.
This completes the IP address settings for the PC.

2) Setting the IP address of the Oscilloscope
   Start the oscilloscope, and press the SETUP button.
   The SYSTEM screen is displayed. From here, select **Network**.
   Select **Local Area Connection**, select **Internet Protocol (TCP/IP)**, and click **Properties**.
   Set "192.168.99.100" for the IP address, and set "255.255.255.0" for the subnet mask, and then click **OK**.

This completes the IP address settings for the oscilloscope.
When setting the IP address of the oscilloscope, be sure to refer to the oscilloscope instruction manual. Also, if the setting procedure is different from that shown here, the procedure shown in the oscilloscope instruction manual takes precedence.

10－3. Installing the Software

1) Installing NI-VISA
   Load the supplied setup media, and open the "NI-VISA" folder. Run Install.exe to start the installation process. Then, perform installation by following the instructions from the installer. When installing, make sure that the installation items include NI-VISA.

2) Installing the EPS-02EMFv2 Software
   Load the supplied setup media, and open the "EPS-02EMFv2" folder.
   Run EPS-02EMFv2_En.msi to start the installation process. Then, perform installation by following the instructions from the installer.
   * If a previous version of EPS-02EMFv2 software is already installed, uninstall it before performing the installation.

3) Use of the supplied USB protect key
   The supplied protect key is not required for checking the measurement data. For carrying out a measurement by controlling the peripherals, the supplied protect key is required.

   It is required to install the driver of the USB protect key before use. The driver file is in "JSP USB" folder in the supplied setup media. After you insert the USB protect key into a USB port of the PC where EPS-02EMFv2 software in installed, open Device Manager and select "unknown devices" or "HardKey" of "other devices" and install the driver.

   The program can run a measurement only when the USB protect key is inserted into the PC. The USB protect key can be plugged into any USB port.

11. Specifications

11－1.Specifications

1) Sensor Measurement Unit (FT3470-91 by Hioki)

Item	Specifications
Measurement frequency	10 Hz to 400 kHz
Sensor	Loop coil
Measurement axes	X, Y, Z
Rated magnetic flux density	2 mT
Measurement mode	Magnetic flux density: 10 Hz to 400 kHz, 10 Hz to 2 kHz, 2 kHz to 400 kHz Exposure levels: General Public / Occupational
Measurement range	Magnetic flux density: 2 µT / 20 µT / 200 µT / 2 mT *Rated magnetic flux density: 2 mT Exposure level: 20% / 200%
Measurement units	Magnetic flux density: T / Exposure level %
Display update rate	Approx. 250 ms
Interface	USB 1.1

2) Signal Processor (RTO2004-NSL by Rohde & Schwarz)

	Item	Specifications
Oscilloscope	Bandwidth	600 MHz
	Sampling rate	10 G samples per second
	ENOB	>7
	Rise time	583 ps
	Input sensitivity	1 mV or higher in base unit
	Channel-to-channel isolation	>60 dB
	RMS noise floor at 50Ω	280 µV or less at 200 mV (f.s.)
	Trigger jitter	1 ps or less (rms)
	Waveform acquisition rate	Max. greater than 1,000,000 waveforms per second
FFT calculation unit	Noise floor	-145 dBm/Hz (typical)
	Updating speed	Max. greater than 1200 waveforms per second (typical)

* Refer to the manufacturer's website for RTO6.

3) Control Software, PC, Camera

Item	Specifications
Image size	640 × 480 pixels
Image division size	10, 16, 20, 32, 40, 80, or 160 pixels
Capturing type	Single / Free Run / Peak Hold
Measurement unit	dBuV / dBm
Indication axis	X-axis / Y-axis / Z-axis / XYZ-axis
Camera image display	Still image / Video
Secondary functions	Save / Import / Export / Comment
Supported OS	Windows 10 / 11

11－2.System Requirements

OS	:	Microsoft Windows 10 (Japanese / English version)
		Microsoft Windows 11 (Japanese / English version)
CPU	:	Dual Core 2.4 GHz or faster recommended
Memory	:	8 GB or more recommended
Storage	:	5 GB or more
Display	:	1366 × 768 dots or more
		1920 × 1080 dots recommended

Other requirements:
- Operation cannot be guaranteed when using online storage or software that uses cloud services.
- 2 empty USB ports

* The upgrade version and the secondary license version require a DVD drive for installation.
* If software with high CPU utilization is running, the operation may become unstable.
* Refer to the manufacturer's website for the latest operation warranty of each device such as camera.

11－3.Supported Oscilloscope

Rohde & Schwarz   RTO1004-NSL
                         RTO2004-NSL
                         RTO6

12. Warranty

Repair Service Warranty

This repair service warranty applies to the repair services provided for maintaining the designated functions and performance of NoiseKen products.

1. Warranty Coverage
   This warranty covers NoiseKen products and their accessories.

2. Technology and Work Fees
   If a breakdown occurs in a NoiseKen product, NoiseKen will provide repair services free of charge based on the warranty terms and conditions as long as the warranty period is still valid. If the warrant period has expired, the customer will bear the actual costs associated with technology and work for the repair.

3. Ownership of Replacement Parts
   The ownership of all defective parts replaced in the course of performing the repair belong to NoiseKen. If the repair service fees are borne by the customer, NoiseKen will receive the replaced defective parts unless the customer specifically requests otherwise.

4. Limitation of Liability
   If the customer incurs any damages due to the repair service or breakdown of the NoiseKen product purchased by the customer, the liability of compensation for damages by NoiseKen to the customer is limited to the amount paid by the customer for the applicable NoiseKen product or the applicable non-NoiseKen product (product by other manufacturer) only if these damages are due to the willful intent or negligence by NoiseKen. However, for damages incurred by the customer due to the above-described repair service provided by NoiseKen or breakdown of the applicable NoiseKen product, under no circumstances will NoiseKen be liable for any loss of potential income occurring directly or indirectly or any direct or indirect damages due to compensation by the customer to a third party.

5. Wrong Parts, Missing Parts, or Breakage
   If the product cannot be used when a wrong part, missing part, or breakage occurs in a NoiseKen product purchased by the customer, NoiseKen will not be liable for any damages whatsoever for losses incurred by the customer due to loss of sales or other derived losses, special losses, or indirect or punitive damages, or any damages due to compensation by the customer to a third party.

6. Decline to Repair
   The company may not accept a repeair order in the following cases.
   ・ More than 5 years have passed since manufacture of a product discontinued.
   ・ More than 8 years have passed after delivery.
   ・ Required component for servicing already discontinued and no alternative is avaaiable.
   ・ Product changed, repaired or remodeled without obtaining a prior permission from the Company.
   ・ Product severely damaged to the extent it has lost its original form.

Product Warranty

For breakdowns that occur within the product warranty period, NoiseKen will repair or replace the product free of charge. The extent and content of the repair work for the equipment will be determined by NoiseKen. This product warranty is valid in Japan only.

1. Device Coverage
    This warranty covers NoiseKen products and their accessories.

2. Product Warranty Period
    - ・ This warranty is for one year starting from the delivery date of the product.
      If the same breakdown at the same location is repaired, the warranty period is six months from the date that the repair was completed.
    - ・ For non-NoiseKen products, the product warranty of the supplier (manufacturer) applies.

3. Exceptions
    Regardless of the above stipulations, the warranty does not cover breakdowns due to one of the following.

    - ✧ Replacement of consumable parts, including the replacement (for used products) of mercury relays, high-voltage relays, coaxial cords, coaxial connectors, automatic switchers, contactors, and other consumables
    - ✧ Damage or breakdowns that occurred due to failure to follow proper operating procedures.
    - ✧ Product failures resulting from damage or breakdowns due to modifications not involving NoiseKen
    - ✧ Product failures resulting from damage or breakdowns that occurred when someone unauthorized by NoiseKen attempted to perform repairs
    - ✧ Product failures resulting from damage or breakdowns caused directly or indirectly by natural disasters, war, riots, civil strife, or other force majeure
    - ✧ Product failures resulting from damage or breakdowns caused by transportation, vibrations, dropping, impact, or other misuse after delivery
    - ✧ Product failures resulting from damage or breakdowns caused by the usage environment
    - ✧ When the customer takes the product outside Japan

Software Warranty

A warranty is provided for the software produced by NoiseKen and its update files under the following terms and conditions. This warranty is valid in Japan only.

1. Scope of Warranty
   This warranty applies to the software produced by NoiseKen and its update files.

2. Free Support
   If a fault occurs in the system as a result of this software by NoiseKen, NoiseKen will provide support free of charge through software fixes and updates or other means only within the warranty period. However, please be aware that we may discuss when to implement corrective measures for minor issues.

3. Total Maximum Liability
   If the customer incurs losses or damages due to a fault of this NoiseKen software purchased by the customer, unless the losses or damages are the result of willful or negligent actions, the maximum amount of NoiseKen's liability for compensation for these losses or damages to the customer is equal to the amount that the customer paid for this NoiseKen software. But, NoiseKen assumes no liability for any losses or damages incurred by the customer due to faults arising from this software by NoiseKen, including but not limited to, direct or indirect potential lost earnings and direct or indirect damages due to third party claims for compensation against the customer.

4. Warranty Period
   The warranty period is the support period of the OS by the provider (including extended support periods) for the OS where operation is guaranteed by NoiseKen. When the support period of this OS ends, support for this software in this OS will also come to an end.
   The after service of the software ends support when the production and sales of the specific control equipment are discontinued.

5. Exclusions
   These terms and conditions do not constitute a full and complete guarantee of operation or compatibility with the customer's system. Also, the following situations are outside the scope of support.
   [Combining with products]
   Although every effort will be made to provide comprehensive software support, in combination with products other than those recommended by NoiseKen, some faults may be unable to be resolved due to lack of compatibility or conflicts with PCs, peripherals, and other hardware, and OS and other software. In addition, even in combination with products recommended by NoiseKen, faults may be unable to be resolved due to serious defects occurring in the recommended products.
   [Added functions and OS upgrades]
   Please note that support for added functions and OS upgrades are outside the scope of free support.

13. NOISE LABORATORY SUPPORT NETWORK

- If a symptom which seems a trouble is found, check the symptom, software version, model name of connected device, and serial number, and inform this information to Noise Laboratory or your nearest sales agent of Noise Laboratory.