NoiseKen

INSTRUCTION MANUAL

Space-Magnetic Field Visualization System

MODEL EPS-02Ev2

NOISE LABORATORY CO., LTD.

Edition 1.04
AEA00082-00E-0E

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   Please use the Software for the purposes described in the instruction manuals or the specifications. Do not use the Software for purposes other than these.

2. Intended Users
   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.

3. Ability to Make Copies
   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.

6. Usage Termination Conditions
   If the Customer has violated any of the provisions in this document, or has infringed on the copyrights or other intellectual property rights of NoiseKen, NoiseKen shall have the ability to revoke the Customer's license to use the Software.

7. Procedures Upon Usage Termination
   The Customer shall promptly uninstall the Software. (If other instructions have been issued by NoiseKen, these shall be followed by the Customer.)

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   (4) Storing the Software, or the information, documentation, and the like provided by NoiseKen for the Software, on a network in a state wherein it may be conveyed to a third party

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 electromagnetic 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.**

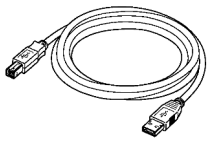
3. Item Check List

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

A

B

C



D

E

F

G

H

I

A: Web camera
- Main part 1
- Warranty 1

B: LAN cable (2 m) 1
C: USB extension cable (2 m) 1
D: USB GPIB controller
- Main part 1
- Installation guide 1
- Installation media 1

E: USB protect key 1
F: Camera tripod
- Main part 1
- Storage bag 1
- Manual 1

G: Installation CD (EPS-02Ev2) 1
H: User Guide (This Manual) 1
I: Storage case 1

* The key of A, G and H are included in the upgrade version.
* The key of E, G and H are included in the secondary license version.

4. Introduction

Thank you for purchasing the EPS-02Ev2 Space-Magnetic Field Visualization System. Before using the EPS-02Ev2, be sure to carefully read this manual to ensure that you maximize its performance when operating the EPS-02Ev2.

- **This User Guide is provided to ensure that people who follow the operating procedures and safety information can safely use the EPS-02Ev2 and maximize its performance.**
- **Place this User Guide in a location where it is easily accessible whenever operating the EPS-02Ev2.**

4－1. Features

Enabling visualization of electromagnetic field emissions in space

- An electromagnetic field measurement sensor is used to perform frequency analysis with a spectrum analyzer and to map 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 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.

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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-02Ev2 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 control of the spectrum analyzer 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.

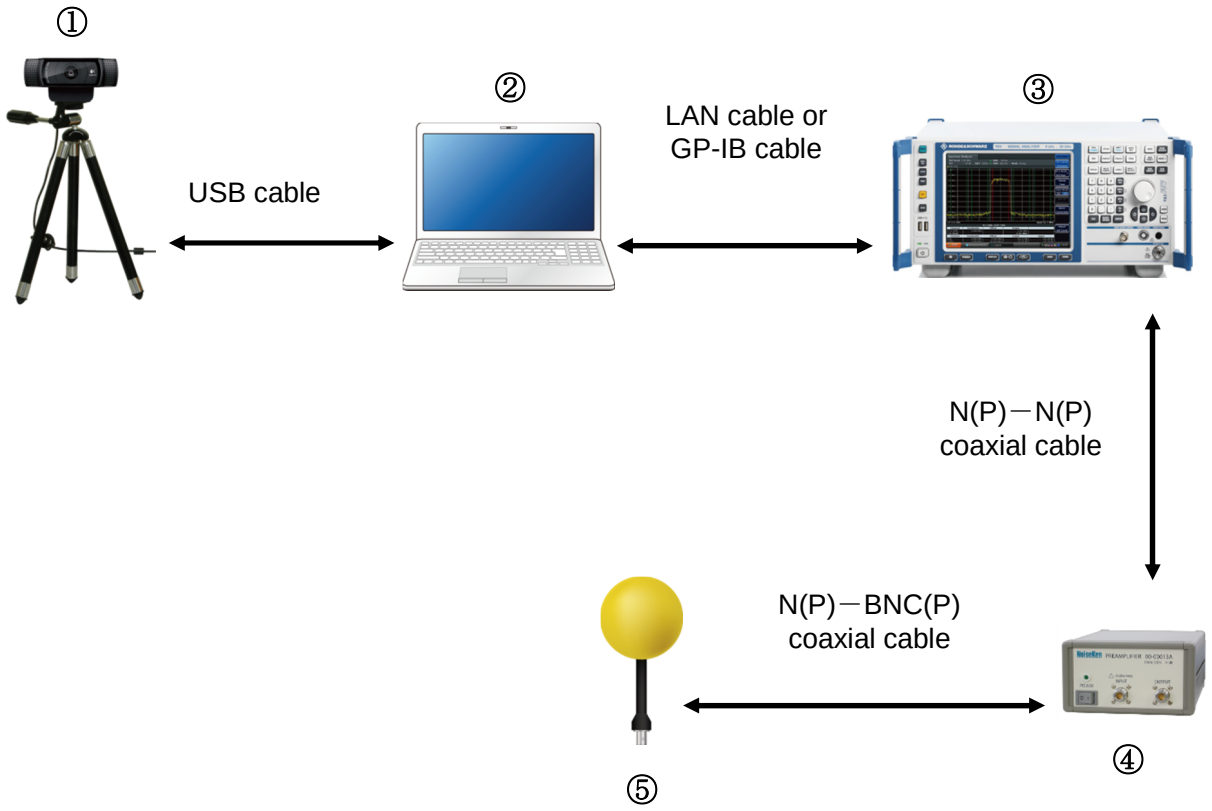
If an object with the same color as the specified color, but that is not the measurement sensor, appears in the image, the measurement sensor location cannot be recognized correctly because the focal point of all objects of this color is calculated. Therefore, the parameter settings for "hue", "brightness", 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. Also, the cover of the measurement sensor must be adjusted based on the color of the measurement object.
Substances suitable for the measurement range are used for the measurement sensor, and a spectrum analyzer is used as the measuring instrument for enabling measurement of the electromagnetic field area. The spectrum import count and frequency range vary depending on the measurement sensor and measuring instrument. The measurement data is mapped to a position specified by image recognition. The method of capturing data at the same position can be selected from MAX HOLD, PEAK HOLD, FREE RUN, and SINGLE.

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

There are no guidelines or restriction values for the electrical field strength of the proximity field.

7. System Configuration Diagram

7－1. System Configuration Diagram



① Web camera
This captures the image of measurement object.

② Control PC
This controls the various devices and conducts electromagnetic field measurement.

③ Spectrum analyzer
Support is provided for some spectrum analyzers described in [12－3.Supported Spectrum Analyzers] on page 41. Please consult with NoiseKen for use of spectrum analyzers that are not supported.

④ Preamplifier (Optional)
EPS-02 series or other high performance preamplifier which can be used for various applications.

⑤ Measurement sensor (Optional)
The electrical field probe, magnetic field probe, and other measurement sensors are selected based on the frequency application. NoiseKen optional probes and commercially-available electromagnetic field probes can be used.

7－2. Functions of Each Device

① Web camera

This is a general-purpose web camera. The image of measurement object is captured 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. After frequency analysis is performed by the spectrum analyzer, the control PC receives the measurement results and maps them to that location.

③ Spectrum analyzer

This performs frequency analysis of the signals from the measurement sensor and sends the spectrum data to the PC. The spectrum analyzer is connected to the PC using the supplied GP-IB or LAN cable.

④ Preamplifier (Optional)

This amplifies the signal detected by the measurement sensor by 41 dB. Connect the measurement sensor to the INPUT terminal and the spectrum analyzer to the OUTPUT terminal.

⑤ Measurement sensor (Optional)

A sensor (probe) is used based on the measurement target frequency and electrical or magnetic field. Attaching a special cover to the sensor is recommended for improving the recognition rate.

8. Preparation

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.

8－1. System Backup

NoiseKen provides an optional service (additional charges apply) for installing the EPS-02Ev2 program in your PC before providing the program, but if the program is erased, install it from the supplied CD. The installation procedure is included in the "Readme.txt" file. Copy the content of the CD to a hard disk, removable disk, or other location and store it there in case of loss.
The CD included with the web camera mounted on the PC is provided to the customer, but it is also recommended that you create a backup of this CD in the same way and store it in a separate location from the original disk.
For details of setup, see "10. Setup" (P33).

8－2. 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 spectrum analyzer and PC are connected by a GPIB or 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.

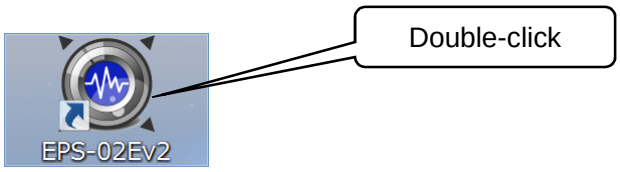
③ Connect the measurement sensor and spectrum analyzer. Use the proper conversion cable that matches the sensor output connector.

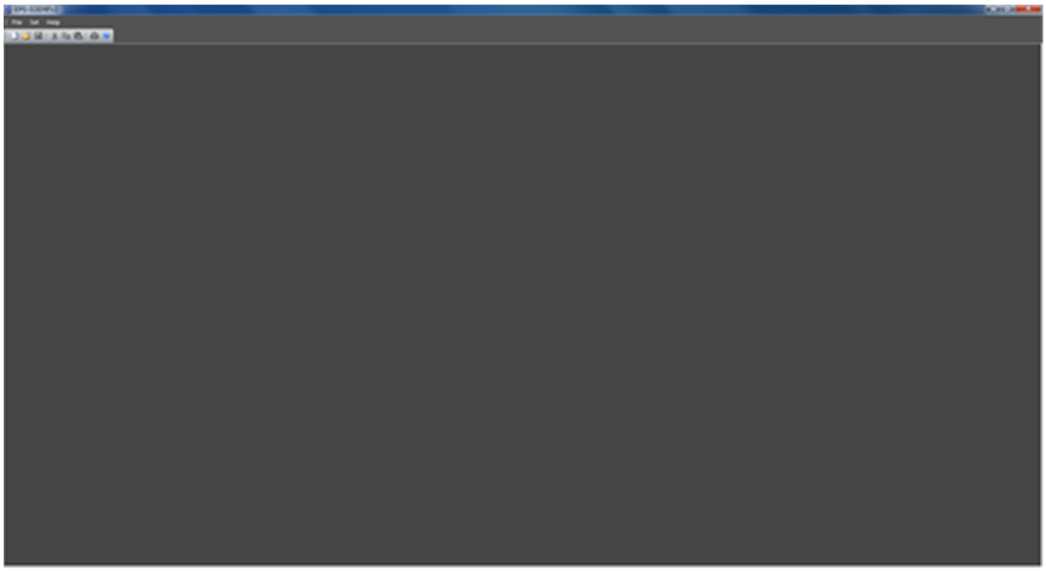
9. Operation Procedure

9－1. Starting and Exiting the Software

Starting the Software

To start the software, double-click the EPS-02Ev2 shortcut icon on the desktop.



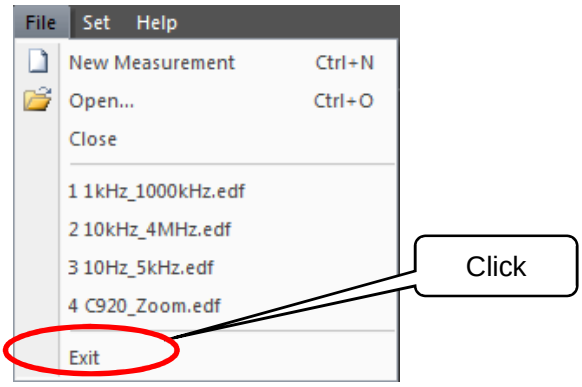


Screen displayed immediately after the software is started

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.

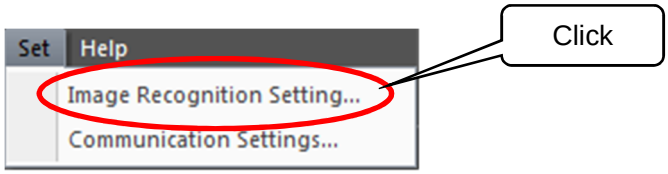
Because the software cannot be closed during measurement, finish measurement before exiting the software.



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.



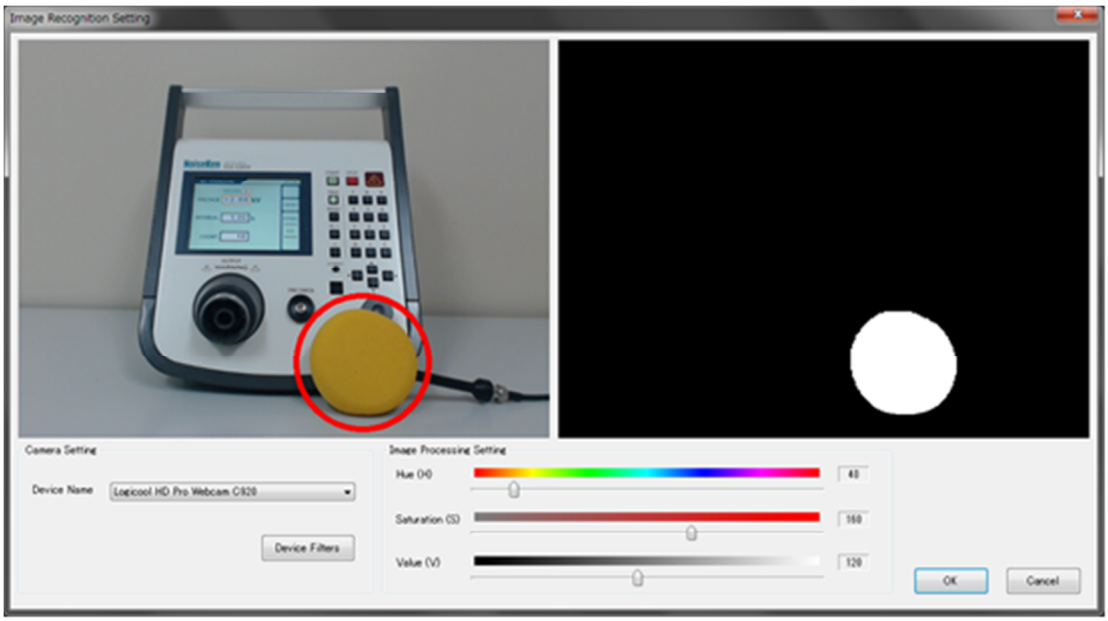


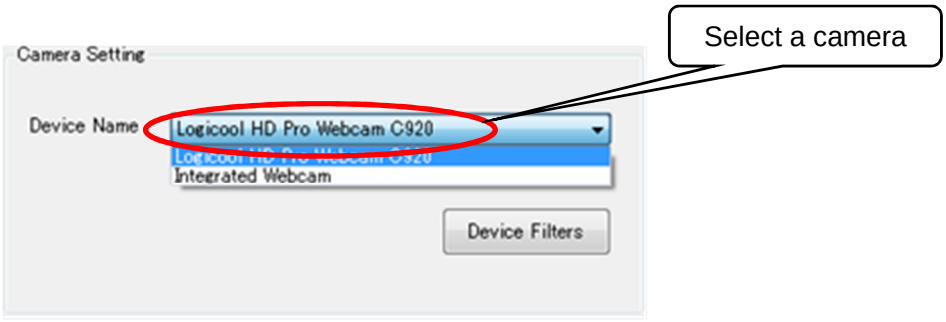
Image Recognition Setting dialog box

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

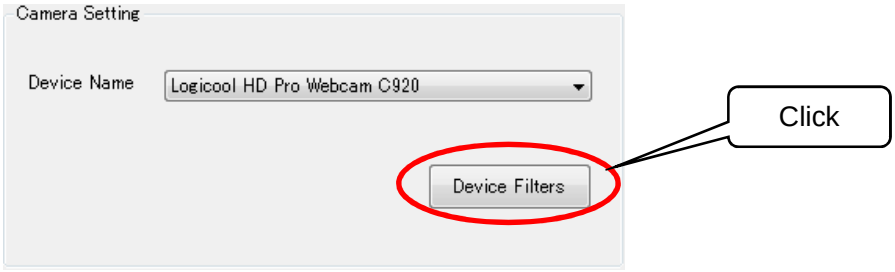
Camera names are displayed in the **Device Name** list. If multiple cameras are connected, select the camera to be used from the device name list.

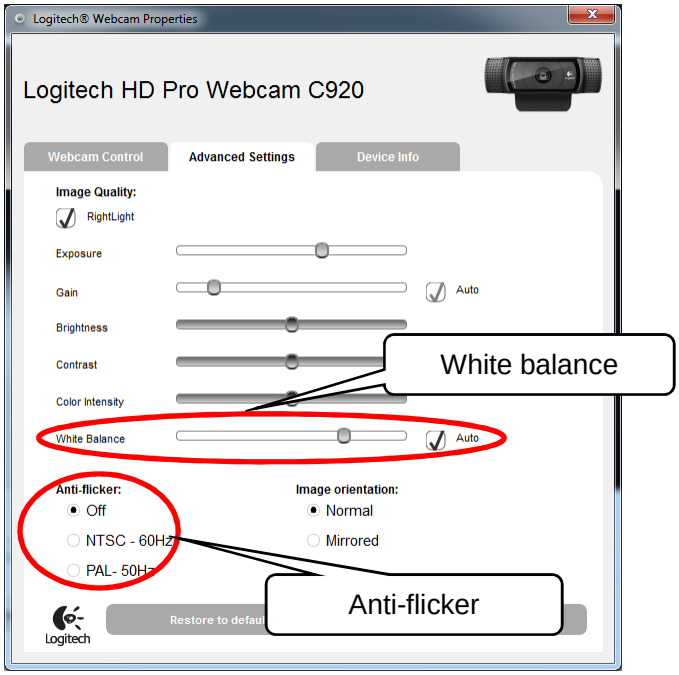


Device Filters

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.





- 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

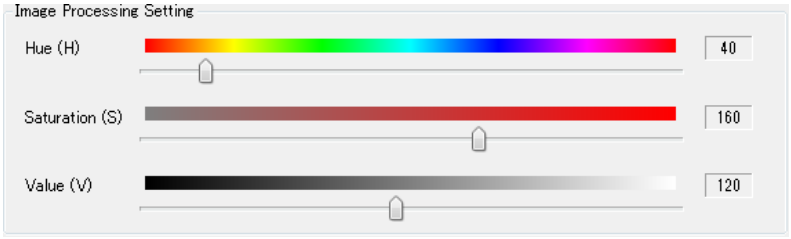
  Anti-flicker is a function to reduce flicker in images.

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

Image Recognition Setting

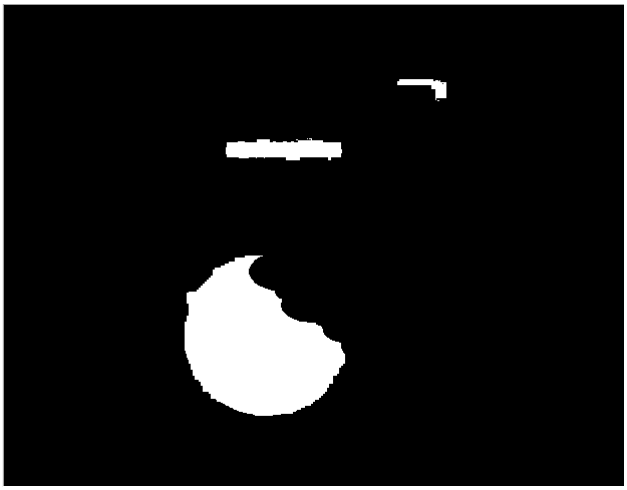
Adjust the three parameters, **Hue**, **Saturation**, and **Value**, in the **Image Processing Setting** so that the color of the electromagnetic sensor can be recognized. The binarized image on the right side can be changed by moving the slider of each parameter.

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 electromagnetic 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

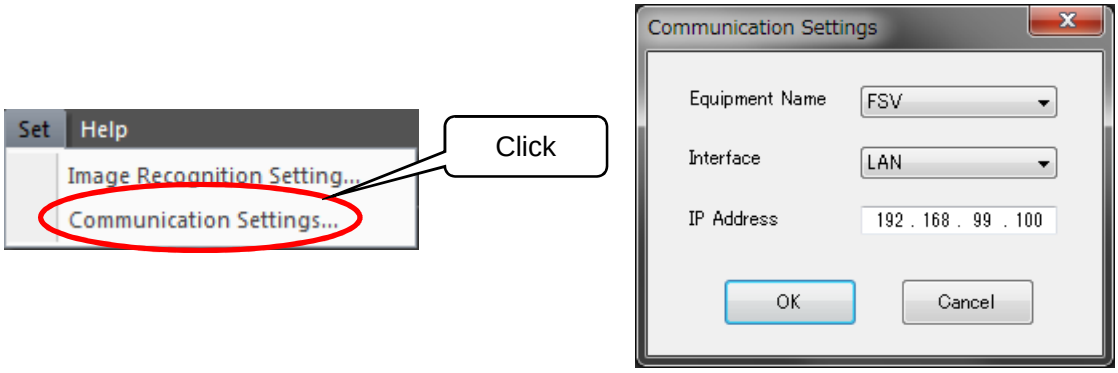
1. Set the **Saturation** and **Value** to 0.
2. Adjust the **Hue** so that the sensor is most clearly recognized.
3. Increase the **Saturation** gradually to remove other recognized areas around the sensor. Do not increase the **Saturation** excessively to prevent the recognized sensor area from being 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 spectrum analyzer can be set up.

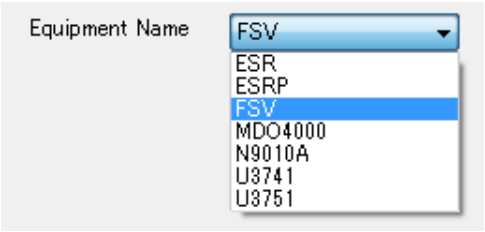


Communication Settings dialog

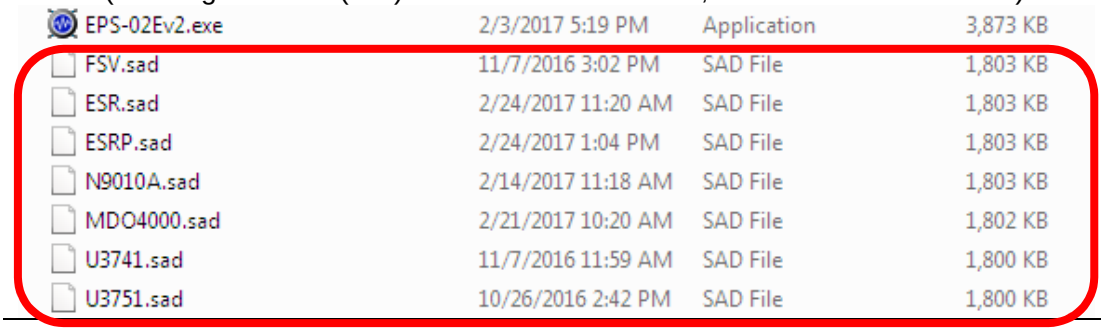
Equipment Name

Select the equipment name of the connected spectrum analyzer.

The following seven drivers are available as standard options: FSV, U3741, U3751, ESR, ESRP, MDO4000, and N9010A. Customized spectrum analyzer drivers are also included in this list.



If the **Equipment Name** list is blank, no spectrum analyzer driver may exist. Check to see that spectrum analyzer drivers (*.sad) are stored in the folder where the EPS-02Ev2 executable file is stored (C:¥Program Files (x86)¥NoiseKen¥EPS-02Ev2, under normal conditions).

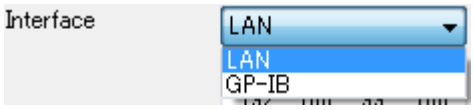


When NI-VISA (National Instruments) has not been installed, the **Equipment Name** list is blank even if spectrum analyzer drivers exist. In such cases, install NI-VISA according to “10－4.Installing the Software” in page 34.

Interface

Selectable interface types vary depending on the selected equipment.

Equipment supports GP-IB only, LAN/GP-IB, or LAN/GP-IB/USB.



IP Address

The **IP Address** is displayed when **LAN** is selected as the interface with the analyzer.

For how to set the IP address, see “10－3.Network Address Settings” in page 33.

GP-IB Address

The **GP-IB Address** is displayed when **GP-IB** is selected as the interface with the analyzer.

Set the address to the same value as the GP-IB address of the selected equipment.

Serial Number

The **Serial Number** is displayed when **USB** is selected as the interface with the analyzer.

Check the serial number of the selected equipment using the system confirmation screen for the equipment.

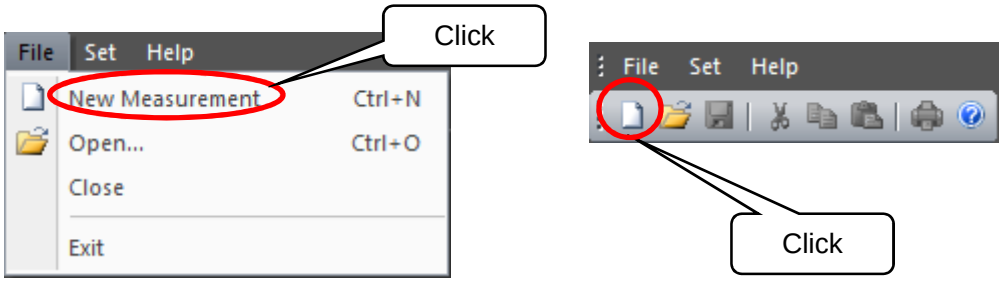
9－4. New Measurement (Setting Measurement Conditions)

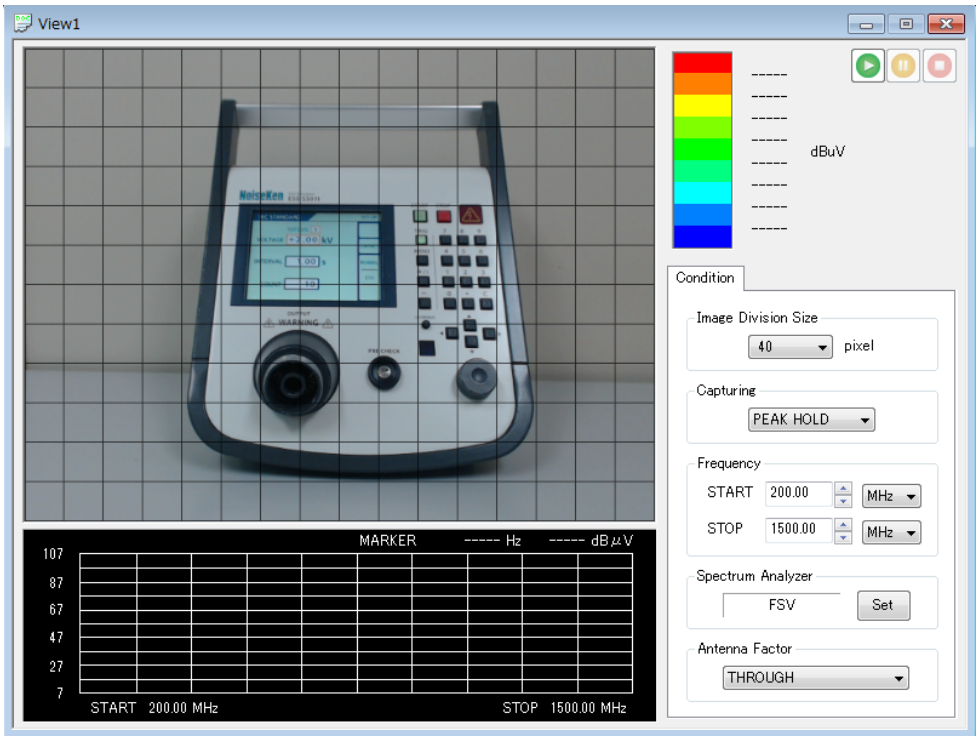
View Window

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 spectrum analyzer, and other conditions in the **View** window.





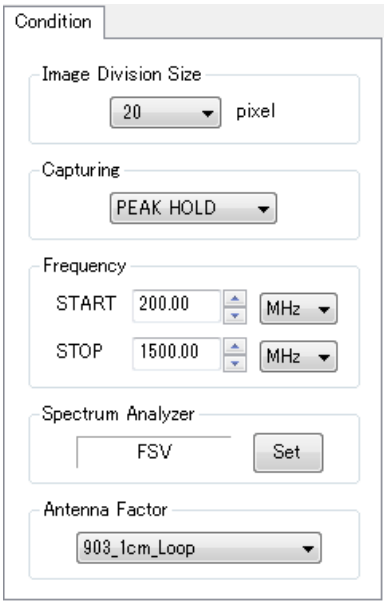
View window (before measurement)

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

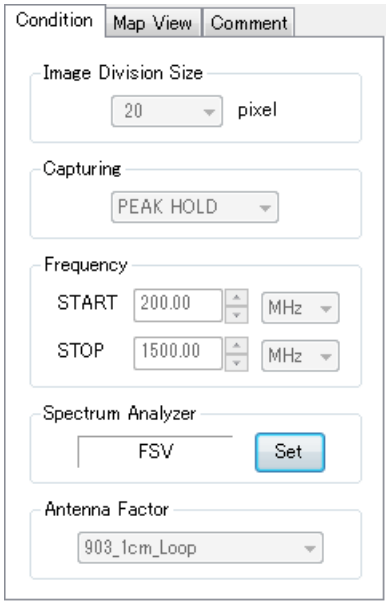
Condition Tab

In the **Condition** tab, set the image division size, properties for the spectrum analyzer, 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.

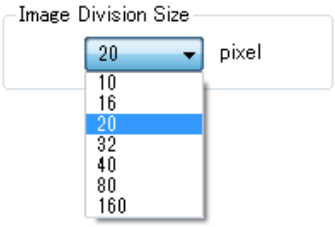
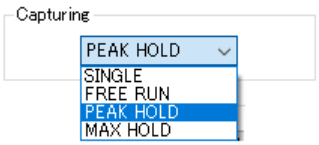


Image division size: 10 pixels

Image division size: 160 pixels

Capturing

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

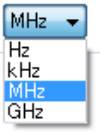


SINGLE	Performs measurement only one time.
FREE RUN	Always overwrites the data.
PEAK HOLD	Compares the maximum values of the spectrum waveforms, and overwrites the retained value if it is not the largest.
MAX HOLD	Compares the maximum values of the spectrum waveforms on a point basis, and overwrites the retained values if it is not the largest.

Frequency

The measurable frequency range depends on the spectrum analyzer and electromagnetic field measurement sensor.

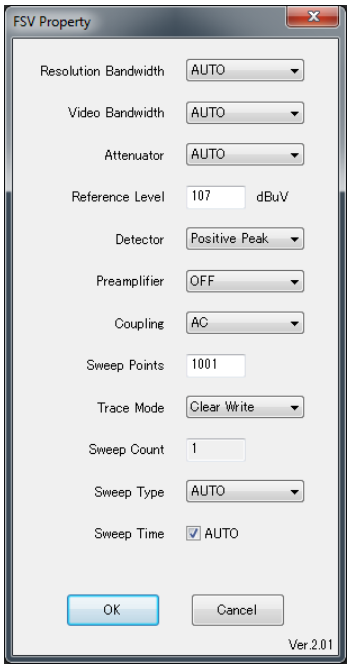
The frequency unit can be selected from Hz, kHz, MHz, and GHz.



Spectrum Analyzer

To configure advanced settings for the spectrum analyzer, click the **Set** button next to the equipment name of the analyzer to open the **Property** dialog box.

For details of each item, refer to the instruction manual for the spectrum analyzer.



Items shown in the **Property** dialog box may vary depending on the selected spectrum analyzer driver.

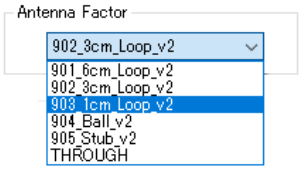
Notes for property settings

- Resolution Bandwidth (RBW)
  The bandwidth of the IF filter. The smaller the bandwidth becomes, the sharper the spectrum waveform becomes, lowering the noise floor.
- Video Bandwidth (VBW)
  The bandwidth of the averaging filter. The smaller the bandwidth becomes, the less the waveform fluctuates, lowering the noise floor.
- Sweep time
  The RBW and VBW filters have their response times. The slower the sweep time is, the higher the resolution becomes, lowering the noise floor.
- Span
  The range between the START and STOP frequencies. The narrower range results in the sufficient response speed of each sweeping frequency, the higher resolution, and the lower noise floor.

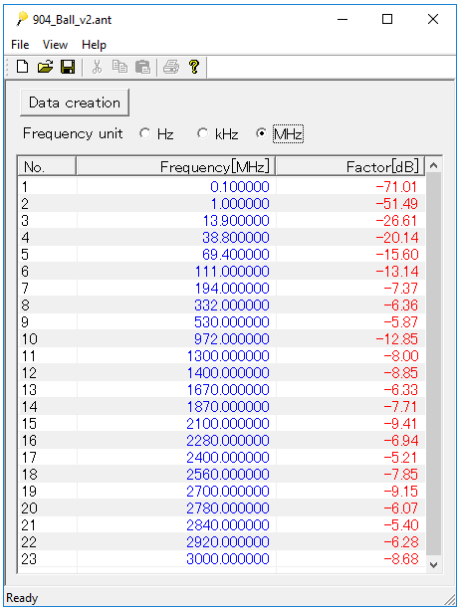
Note: If the noise floor is lowered, the sweeping speed becomes slower, resulting in a longer measurement time. If RBW, VBW, and the sweep time are set to AUTO, the noise floor becomes higher, while the measurement time becomes shorter.

Antenna Factor

Select the file with the same name as the electromagnetic field measurement sensor to be used.
This factor file is used for correction to make the frequency characteristics of the sensor linear.
When the **THROUGH** file is selected, the spectrum data from the spectrum analyzer will be acquired as it is, without interpolation.



If the original sensor is used, a factor file can be created using Antenna Factor Editor. For details, see “11. Antenna Factor Editor” on page 36.



Antenna Factor Editor Screen

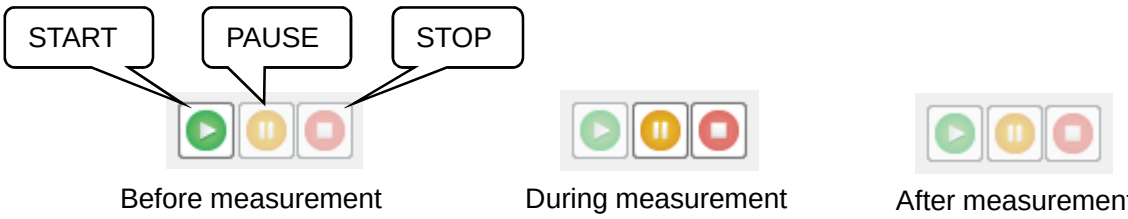
9－5. New Measurement (Performing Measurement)

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.

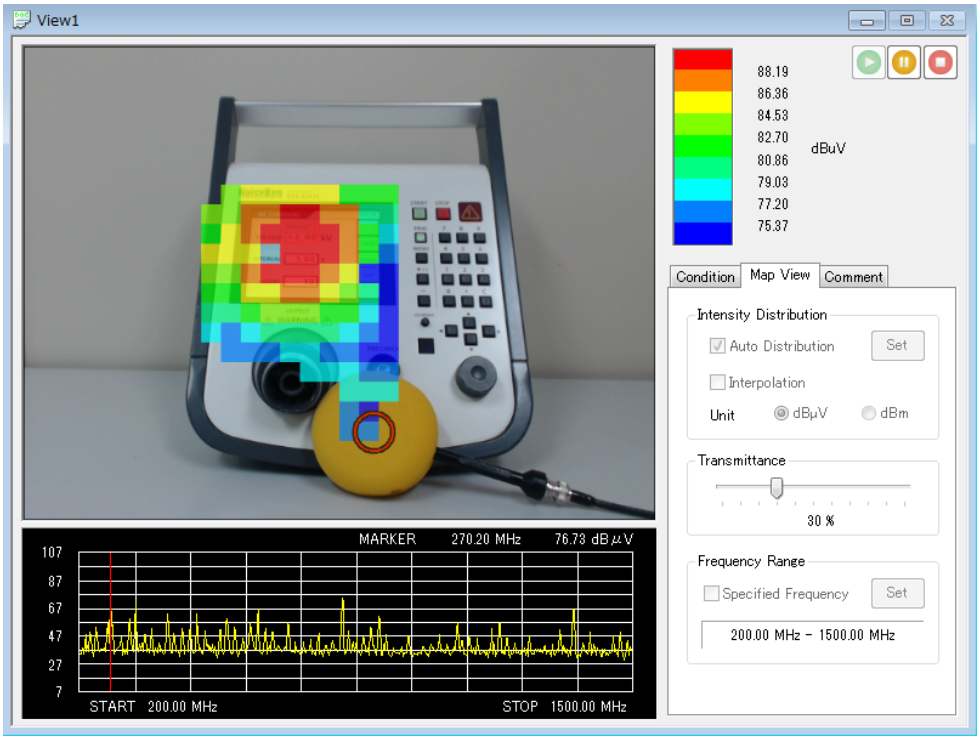
To suspend measurement, click the **PAUSE** button to suspend measurement, and to finish measurement, the **STOP** button.

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.



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 spectrum analyzer is displayed in the spectrum graph area located in the lower part of the **View** window, on a point-by-point basis.



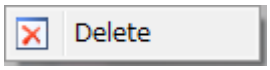
If a directional sensor is used, maintain the same direction.
In addition, move the sensor parallel to the measurement object.

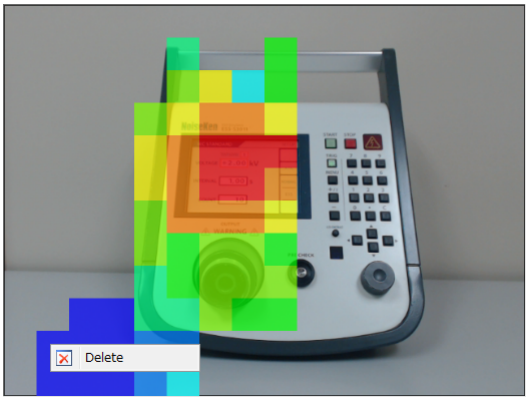
The EPS-02Ev2 software sends a sweep start command to the spectrum analyzer immediately after the sensor is recognized. After completion of sweeping, the software recognizes the sensor position again, and only when the sensor is found at the same point (position) where it was placed at the start of the analyzer sweeping, the spectrum data is stored.
If the sensor is moved quickly, the point at the start of sweeping differs from that at the completion of sweeping, and as a result, measurement data is not stored. For spectrum analyzers with slow response speed, move the sensor more slowly.

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

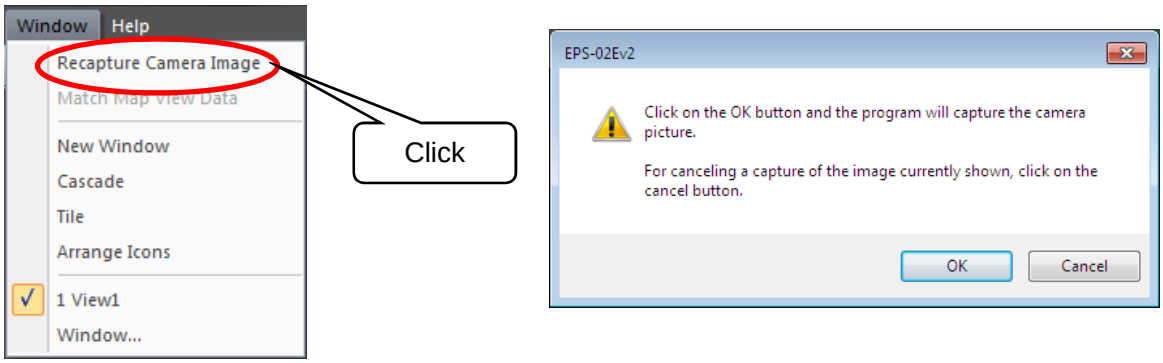
After deleting data

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

Recapturing Camera Image

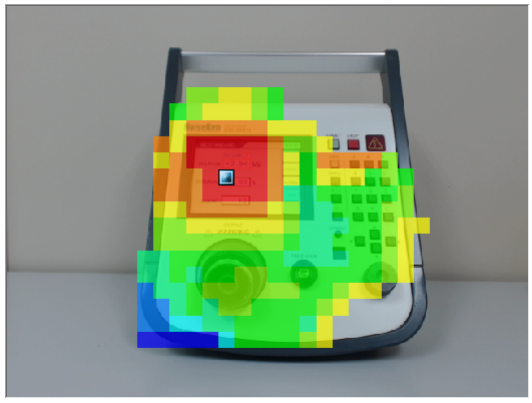
If the **STOP** button is clicked after completion of measurement, the camera image switches from video to still image. If the still camera image includes an unnecessary object, such as the sensor, the camera image can be recaptured.

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

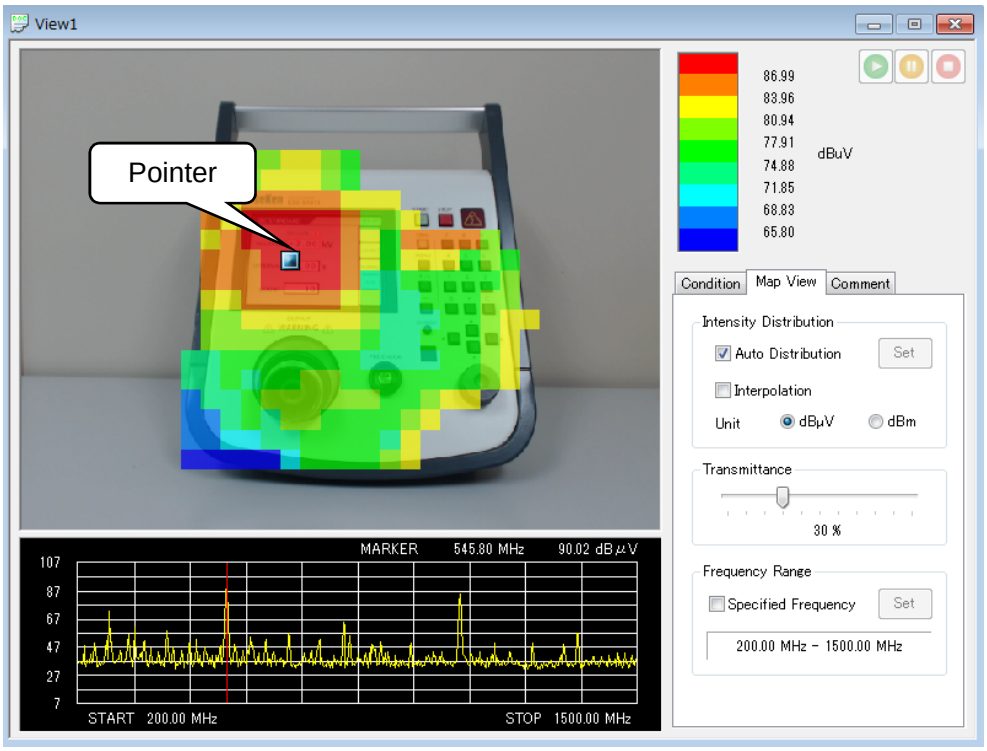
Recapturing is possible as many times as needed before the file is saved.
Note that recapturing is not possible once the file is saved.

9－6. Measurement Data Analysis

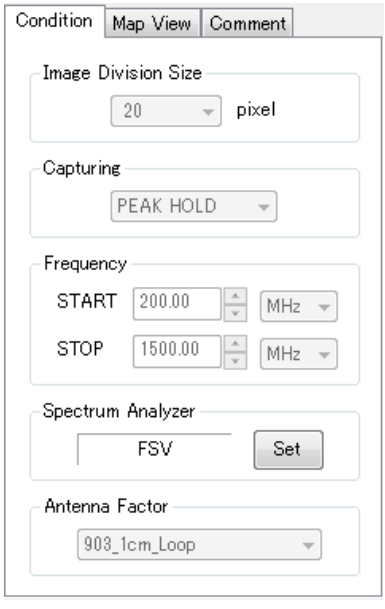
Measurement Data

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.

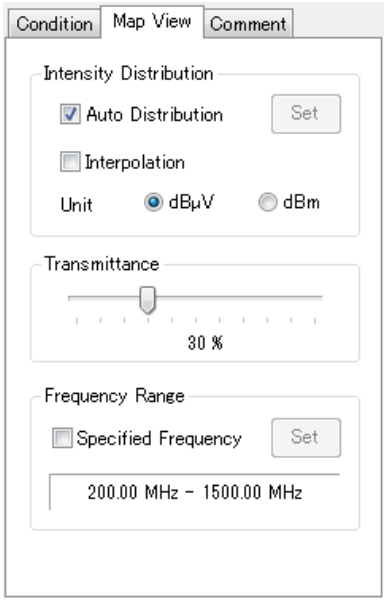
The pointer automatically moves to the highest level point immediately after measurement is complete or the file is opened.



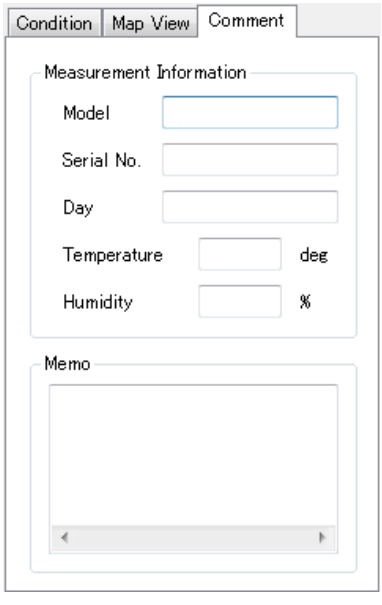
In the **Condition** tab, the conditions configured before measurement can be checked. The representation of measurement data can be changed in the **Map View** tab. In the **Comment** tab, measurement information and other comments can be entered.



Condition tab



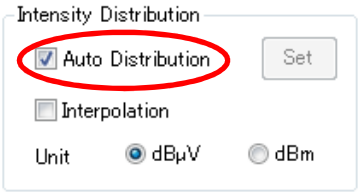
Map View tab



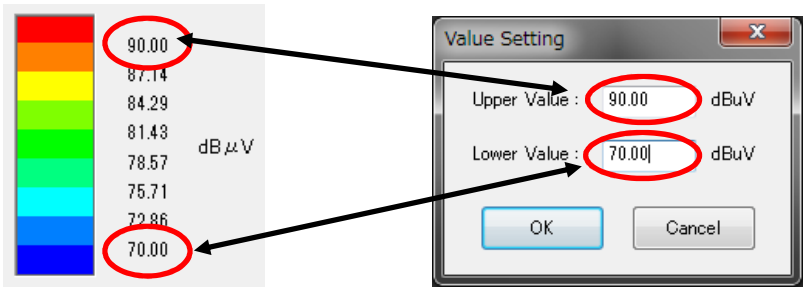
Comment tab

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.

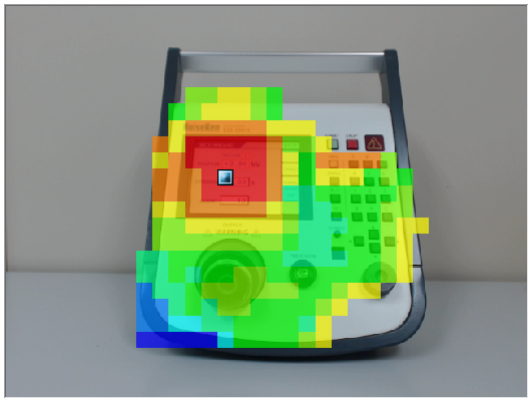


To change the **Upper/Lower Value** to desired values, uncheck the **Auto Distribution** checkbox and click the **Set** button. The set upper/lower value settings will be reflected applied to the map data color bar.

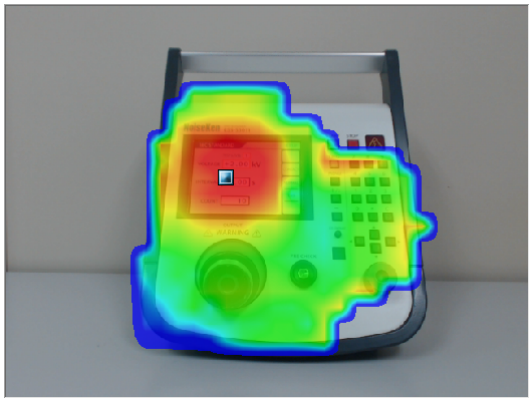


Interpolation

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



Without interpolation

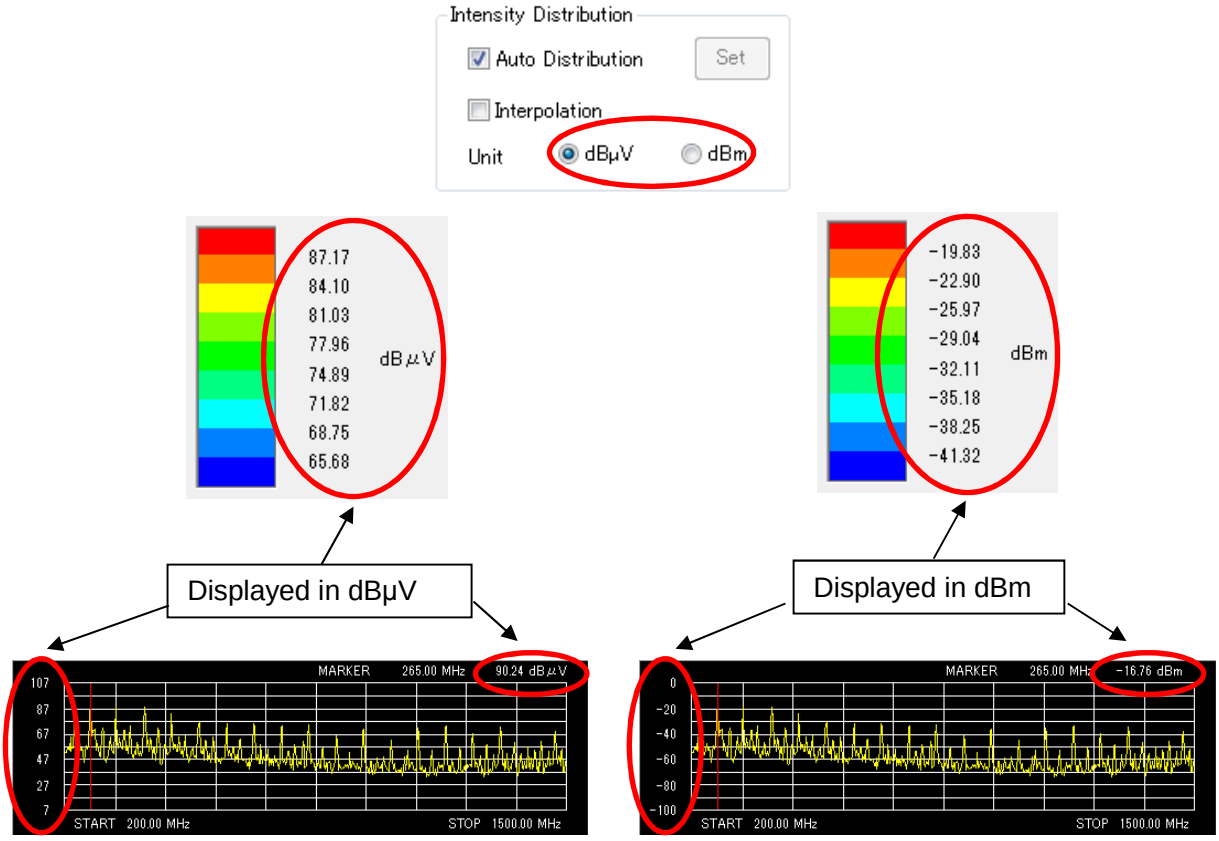


With interpolation

Unit

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

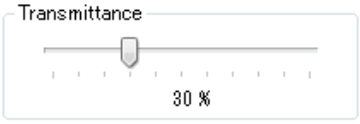
The change of unit will be applied to the color bar and spectrum graph.

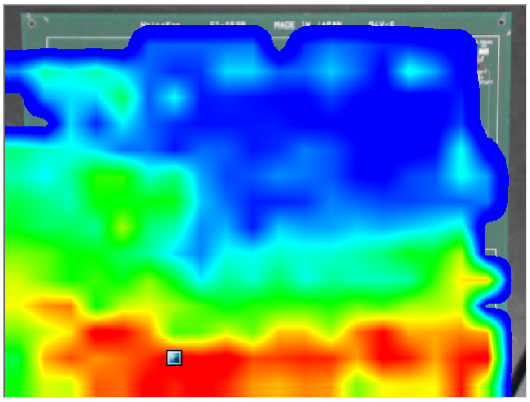


Transmittance

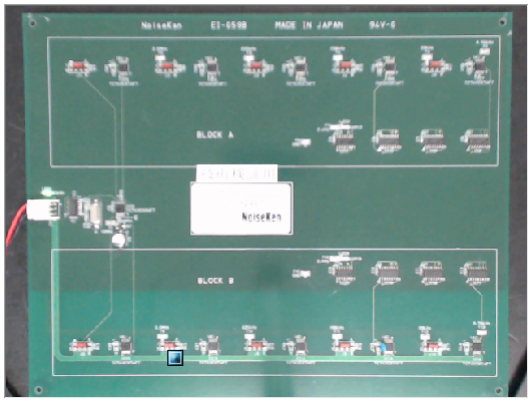
The transparency of the color map can be changed.

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.





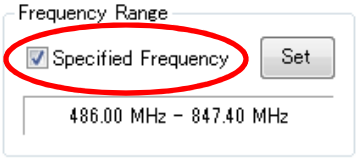
Transmittance: 0%

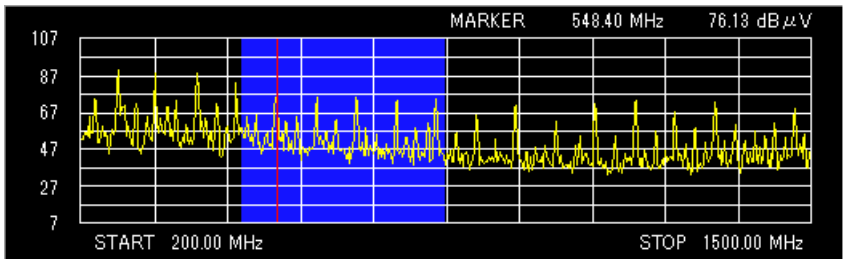


Transmittance: 100%

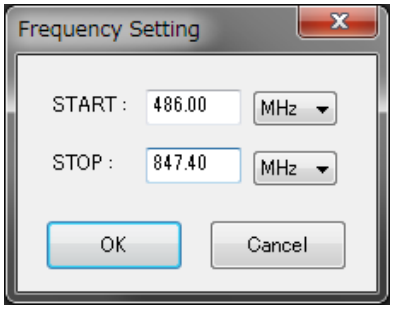
Frequency Range

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.



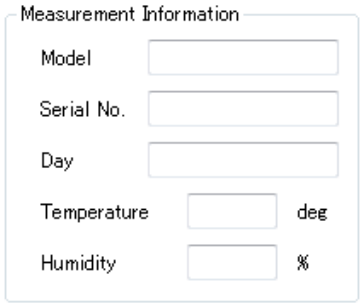


Clicking the **Set** button opens the **Frequency Setting** dialog box, where the frequency range for the zone band can be directly entered.



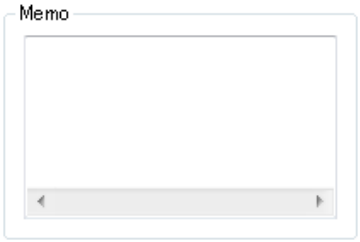
Measurement Information

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

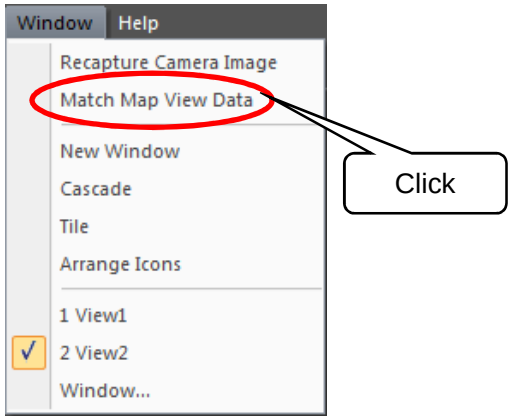
Any information about measurement can be entered freely. In the **Memo** field, there is no limit of the number of characters.

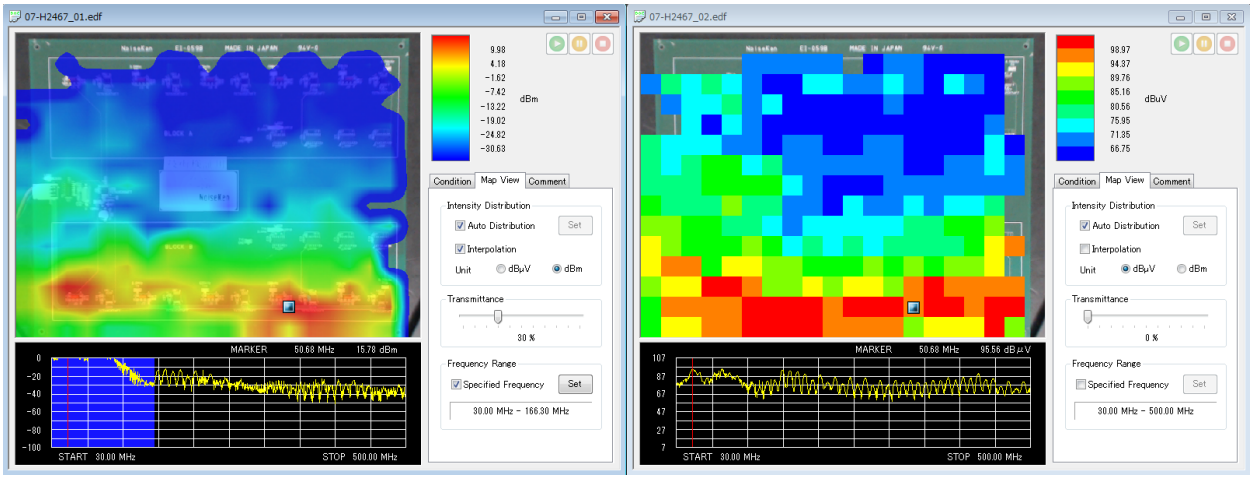


Matching Map View Data

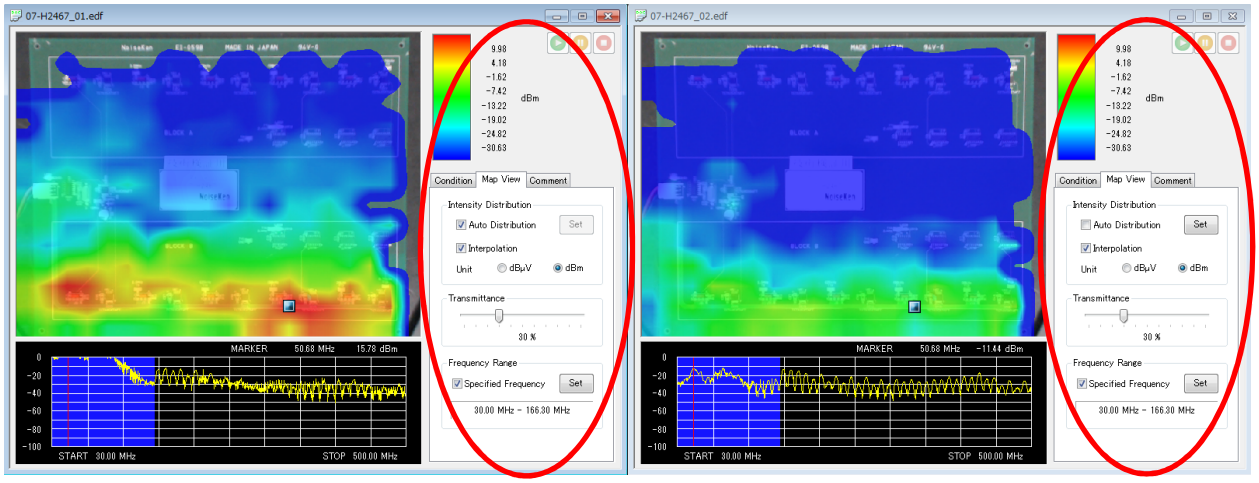
The same setting can be applied to all maps on the **View** windows that are currently open.

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**, 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

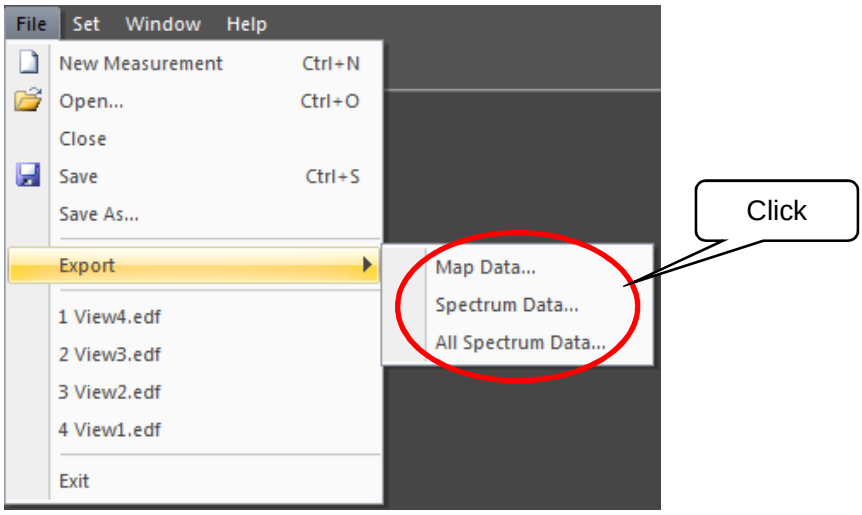


After matching map view data

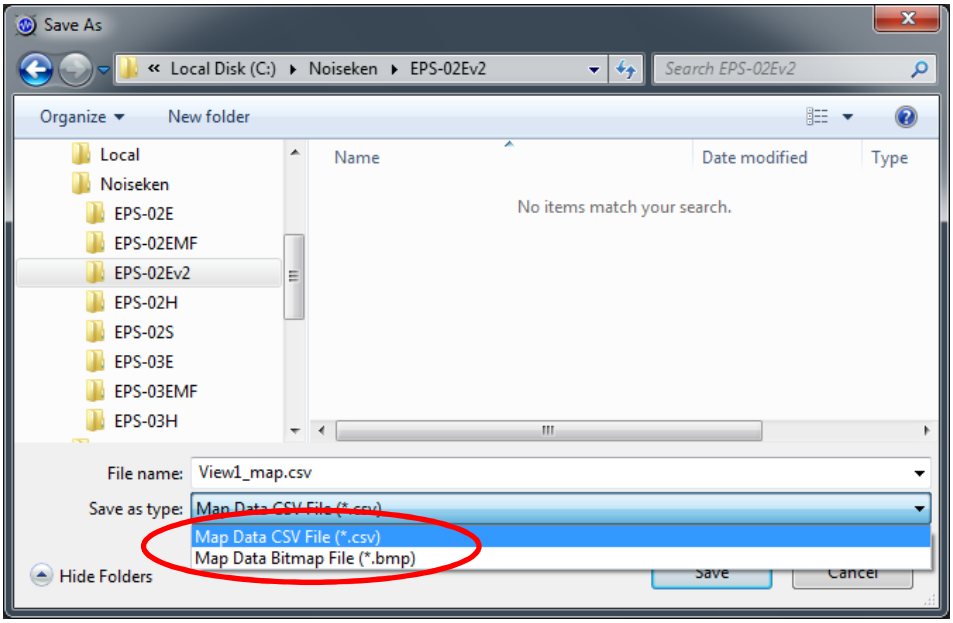
Exporting Measurement Data

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.

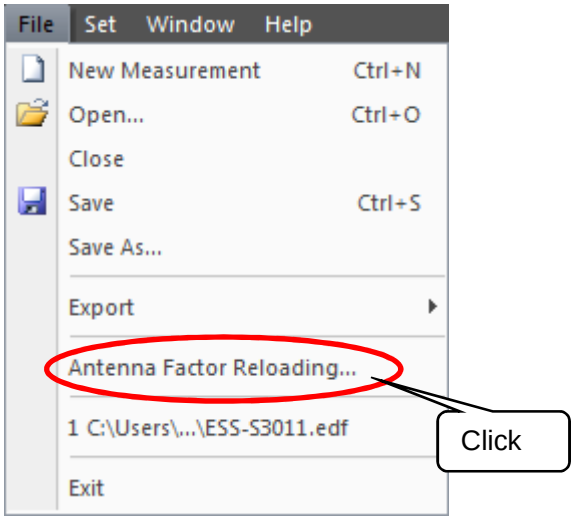
- **All Spectrum Data**

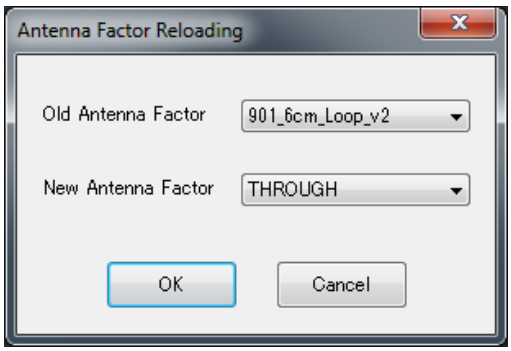
  CSV file: The spectrum data for all measurement points are exported.

Antenna Factor Reloading

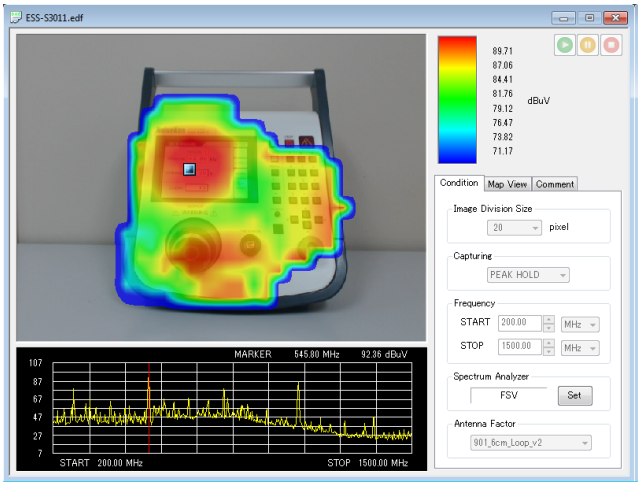
The Antenna Factor of the measured data can be reloaded.

Click **Antenna Factor Reloading...** from the **File** menu. The Antenna Factor Reloading dialog box will appear and allow the desired Antenna Factor to be specified.

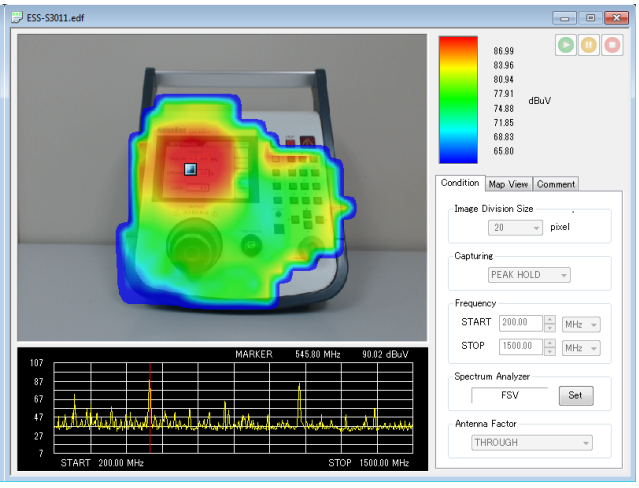




To save the reloaded Antenna Factor, click **Save As...** from the **File** menu and save the file under a different name.



Old Antenna Factor: 901_6cm_Loop_v2



New Antenna Factor: THROUGH

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. Installation of Camera Driver

1) Installation of Driver

Attached CD is set to a personal computer and the camera folder of relevance is chosen from a CAM folder.

Perform Setup.exe and install a driver.

Please install only a driver by custom installation in the case of installation implementation.

The procedure of installation should follow the wizard of a setup.

Installation of a camera driver is completion above.

10－3.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>
[Windows 10]

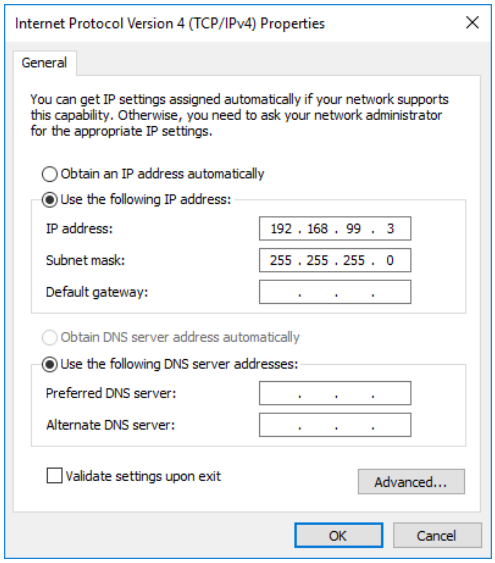
In the search box on the taskbar, type **Control Panel,** and then select **Control Panel**.

[Windows 7]

Click the Start button, and then click **Control Panel.**

The adapters that can connect to the network are displayed. Double-click the adapter (local area connection) that is connected to the spectrum analyzer 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) Set the IP address of the spectrum analyzer
For details on the spectrum analyzer settings, see the instruction manual for the spectrum analyzer.
Set the IP address to "192.168.99.100" and the subnet mask to "255.255.255.0".

10－4.Installing the Software

1) Installing NI-VISA
Please carry out the installation according to the installer to set the DVD-ROM that comes with the product National Instruments, is automatically executed. When installing, please make sure that you have included in the NI-VISA installed items.

2) Installing the EPS-02Ev2 Software
Load the supplied CD, and open the "EPS-02Ev2" folder.
Run EPS-02Ev2_En.msi to start the installation process. Then, perform installation by following the instructions from the installer.

3) Use of the supplied USB protect key
When the software is used as a viewer, the supplied protect key is not required. 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 attached CD. After you insert the USB protect key into a USB port of the PC where EPS-02Ev2 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.

Note: This software can be installed on only one PC. However, this limitation does not apply when using the viewer only (measurement is not performed). When using the viewer, install NI-VISA and EPS-02Ev2 Software.

11. Antenna Factor Editor

11－1.Overview

Antenna Factor Editor is a Windows application by which an Antenna Factor file can be created and edited in the EPS-02Ev2 Space-Magnetic Field Visualization System.

11－2.Starting and Exiting the Software

Starting the Software

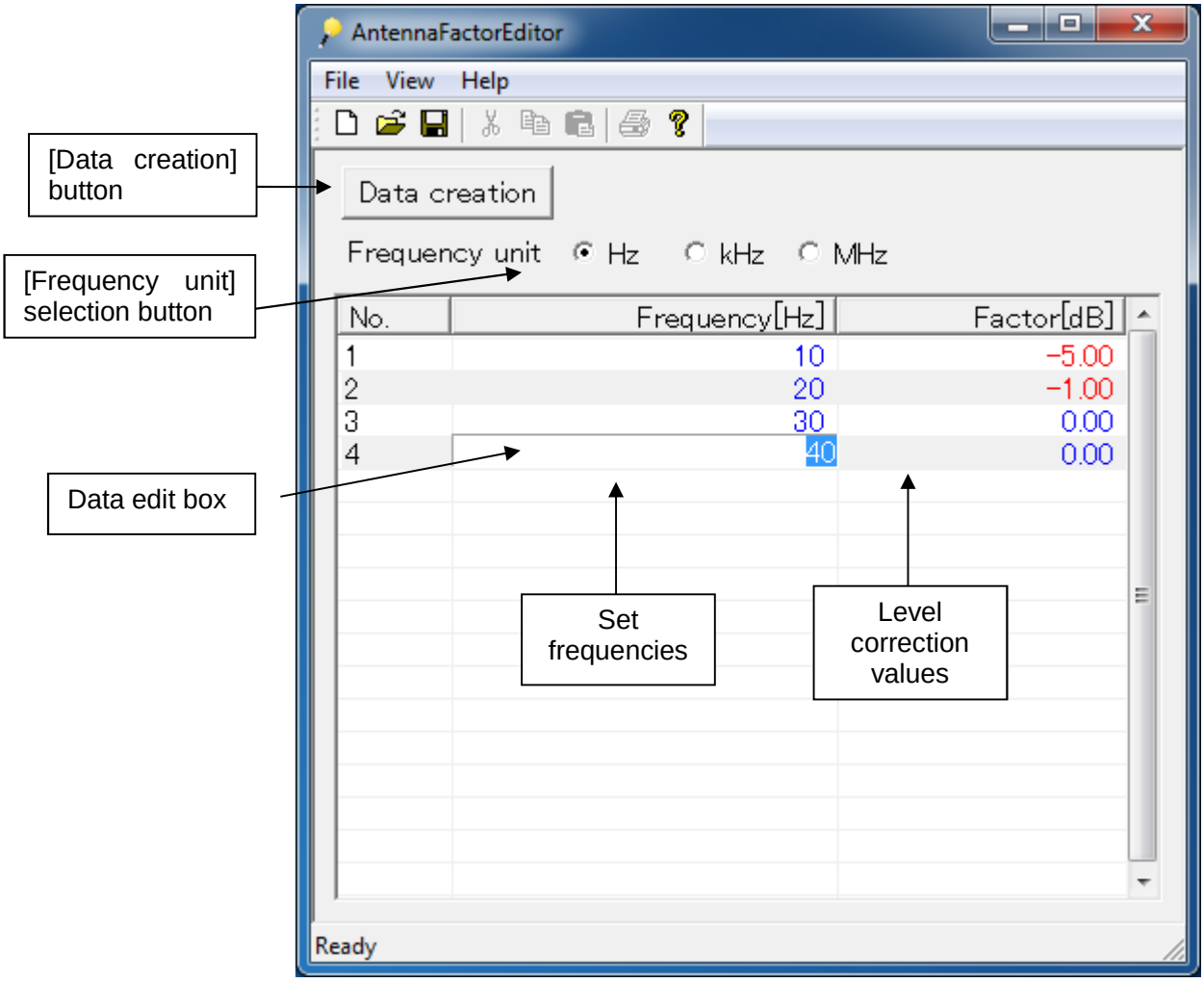
Double-click FactorEditor.exe stored in the folder where the EPS-02Ev2 executable file is stored (C:¥Program Files (x86)¥NoiseKen¥EPS-02Ev2, under normal conditions).

Exiting the Software

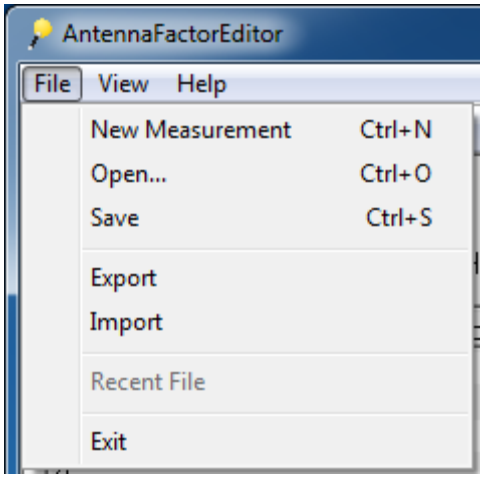
Click the close button on the right end of the title bar or click **Exit** from the **File** menu.

11－3.Description of the Screen

Entire Screen



File Menu



① New Measurement
Creates a new correction data file.

② Open...
Opens an existing correction data file (*.ant).

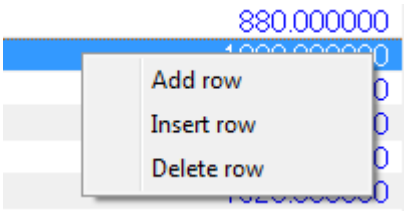
③ Save
Saves the correction data file being edited.

④ Export
Exports the correction data being edited to a CSV file.

⑤ Import
Imports correction data from a CSV file.

⑥ Exit
Exits the application.

Pop-up Menu (Right-Click)



① Add row
Adds a row to the end of the correction data list.

② Insert row
Adds a row to the front of the selected correction data list.

③ Delete row
Deletes a row of the selected correction data list.

11－4.Operation Procedure

New Measurement

On the menu bar, select **File** → **New Measurement**. By double-clicking on the empty list, one record can be added. Then, set Frequency and Factor to the desired values. Up to 99 records can be added.

When the necessary data input is complete, click the **Data creation** button to create a data file. The file is only available by putting it in the folder where the EPS-02Ev2 executable file is stored (C:¥Program Files (x86)¥NoiseKen¥EPS-02Ev2, under normal conditions).

Open...

On the menu bar, select **File** → **Open...**, and select a file with the extension .ant in the Open dialog box to display the data list.

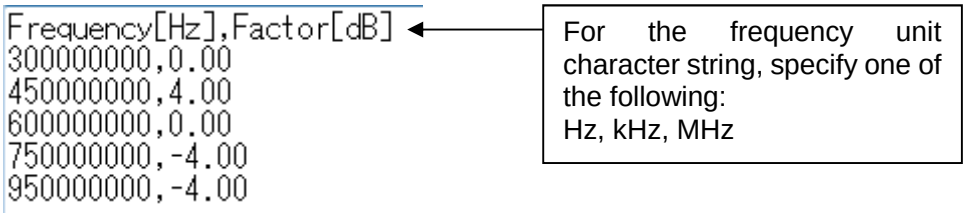
By double-clicking a data item, the data can be edited. By clicking the **Data creation** button after editing, a data file with the edited data can be created.

Import

This tool can import a CSV file that was edited by another editor.

On the menu bar, select **File** → **Import**, and select a file with the extension .csv in the Open dialog box to display the data list. By double-clicking a data item, the data can be edited. By clicking the **Data creation** button after editing, a data file with the edited data can be created.

The first row of the file to be imported must be a header row including the frequency unit character string.



Export

This tool can export Antenna Factor correction data to a CSV file.

On the menu bar, select **File** → **Export**, and specify a file name in the Save as dialog box to export the data in a CSV file. In addition, the tool can import and edit the Antenna Factor correction data that was once exported.

The first row of the file to be exported is a header row including the frequency unit character string. (Note: Refer to “Import.”)

11－5.Editing Correction Data

Set frequencies

① Checking Consistency Between Records
Since the frequencies set for the records are checked when creating a data file, be sure to set the frequency of the following record to a larger one than that of the previous record.

Frequency[Hz]
10
20
30
40
50

Set the frequency of the following record to a larger one than that of the previous record.

② Treatment of fractions
If the number of significant digits of a set frequency is seven or more, the first seven digits can be rounded to six digits.

③ Checking the maximum and minimum settings
The maximum and minimum set frequencies are checked.
The minimum and maximum set frequencies are 1 Hz and 32 GHz, respectively.

Level correction values

① Positive/negative numbers
Specify plus or minus relative values to the reference level (usually 0 dB) for level correction values. Plus and minus values are displayed in blue and red, respectively.

Factor[dB]
-10.00
-5.00
0.00
5.00
10.00

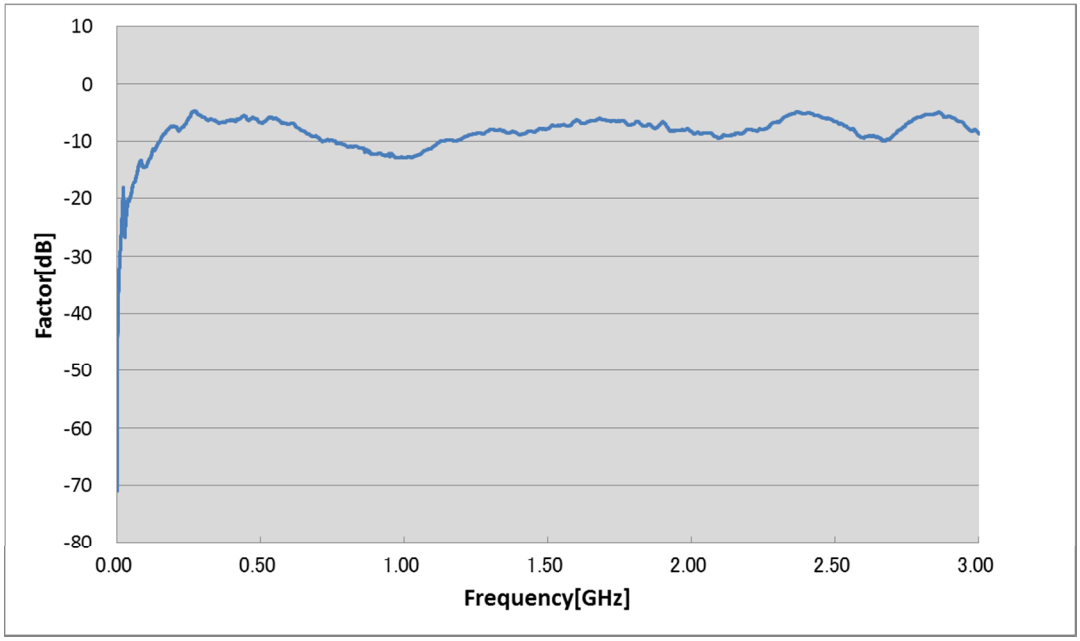
② Treatment of fractions
Level correction values can be rounded to two decimal places.

③ Checking the maximum and minimum settings
The maximum and minimum level correction values are checked.
The minimum and maximum level correction values are -320 dB and 32 dB, respectively.

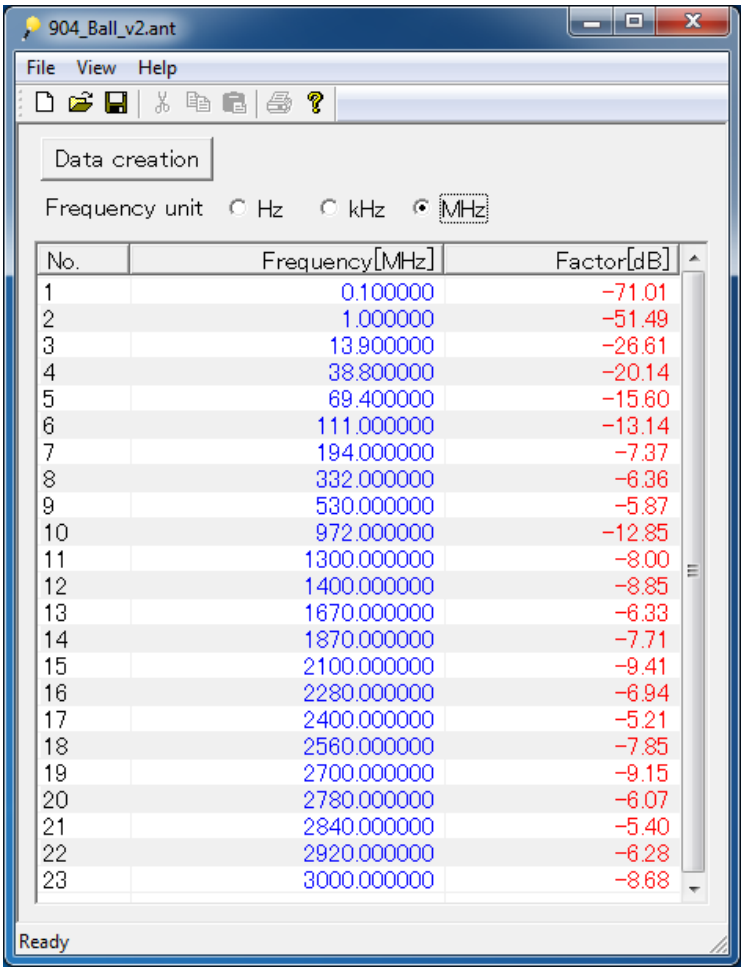
11－6.Sample Antenna Factor

The following is a sample Antenna Factor corresponding to characteristic curve data.

Frequency characteristic curve



Antenna Factor corresponding to the above



No.	Frequency[MHz]	Factor[dB]
1	0.100000	-71.01
2	1.000000	-51.49
3	13.900000	-26.61
4	38.800000	-20.14
5	69.400000	-15.60
6	111.000000	-13.14
7	194.000000	-7.37
8	332.000000	-6.36
9	530.000000	-5.87
10	972.000000	-12.85
11	1300.000000	-8.00
12	1400.000000	-8.85
13	1670.000000	-6.33
14	1870.000000	-7.71
15	2100.000000	-9.41
16	2280.000000	-6.94
17	2400.000000	-5.21
18	2560.000000	-7.85
19	2700.000000	-9.15
20	2780.000000	-6.07
21	2840.000000	-5.40
22	2920.000000	-6.28
23	3000.000000	-8.68

12. Specifications

12－1.Specifications

Control software, PC, and 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 / Max Hold
Measurement unit	dBμV / dBm
Camera image display	Still image / Video
Secondary functions	Save / Import / Export / Comment
Supported OS	Windows 7 / 8.1 / 10

12－2.System Requirements

OS	:	Microsoft® Windows® 7, 32 bit / 64 bit (Japanese / English version) Microsoft® Windows® 8.1, 32 bit / 64 bit (Japanese / English version) Microsoft® Windows® 10, 32 bit / 64 bit (Japanese / English version)
CPU	:	Dual Core 2.4 GHz or faster recommended
Memory	:	4 GB or more recommended
Hard disk	:	1 GB or more
Display	:	1366 × 768 dots or more

Other requirements:

- 1 pointing device, such as a mouse
- 1 DVD drive
- 2 or 3 empty USB ports

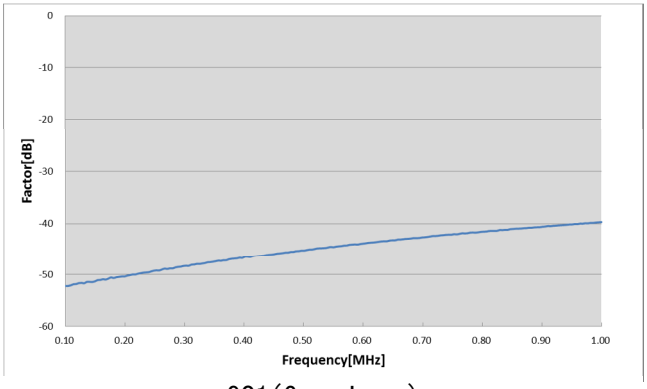
12－3.Supported Spectrum Analyzers

Rohde & Schwarz	FSV
	ESR
	ESRP
Advantest	U3741
	U3751
Keysight	N9010A
Tektronix	MDO4000series

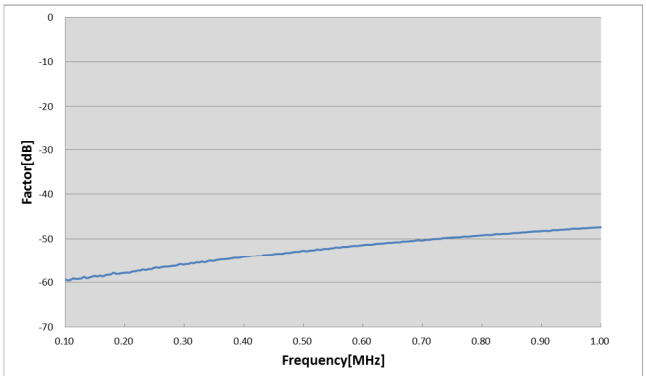
12－4.Antenna Frequency Characteristics

Model	Probe Type	Primary Sensor	Structure	Recommended Frequency Band
901	6 cm Loop	H-Field	Shielded Loop	3 MHz ～ 500 MHz
902	3 cm Loop		Shielded Loop	5 MHz ～ 1 GHz
903	1 cm Loop		Shielded Loop	10 MHz ～ 3 GHz
904	3.6 cm Ball	E-Field	Spherical Dipole	10 MHz ～ 3 GHz
905	6 mm Stub Tip		Short Monopole	50 MHz ～ 3 GHz

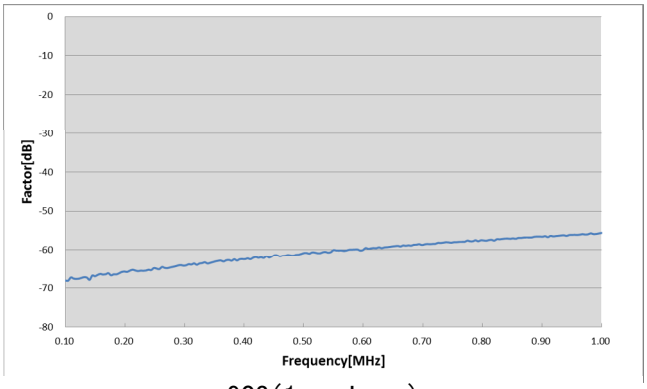
■100 kHz ～ 1 MHz



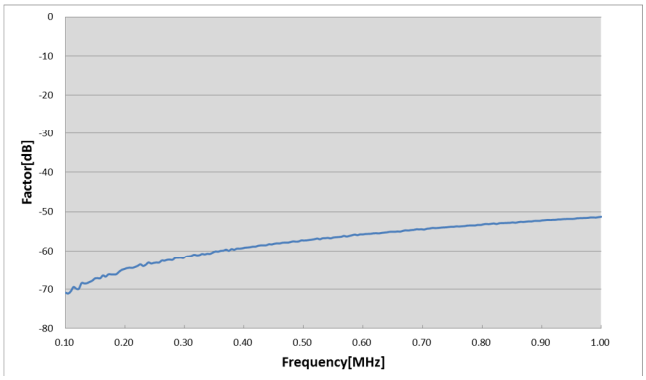
901（6 cm Loop）



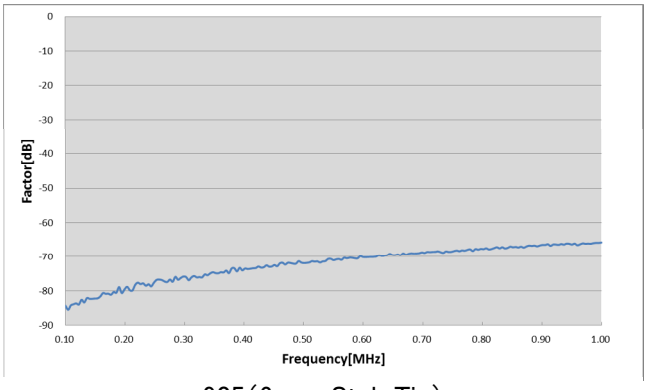
902（3 cm Loop）



903（1 cm Loop）

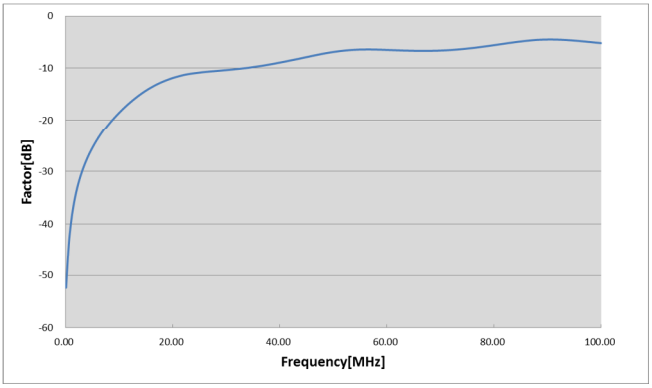


904（3.6 cm Ball）

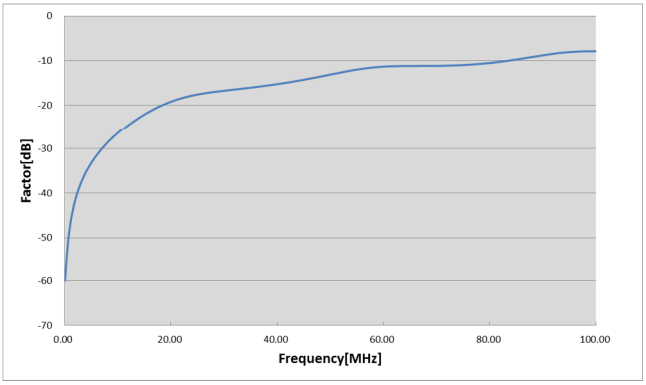


905（6 mm Stub Tip）

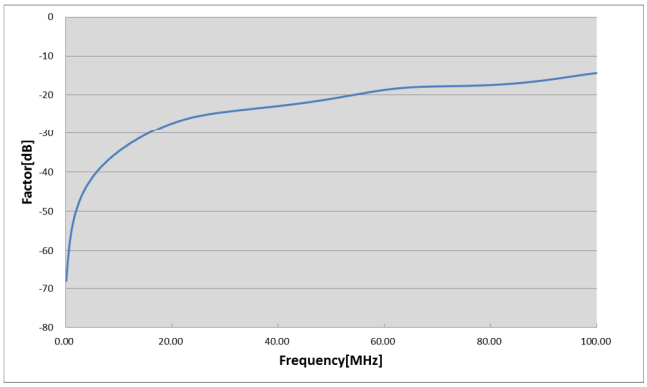
■100 kHz ～ 100 MHz



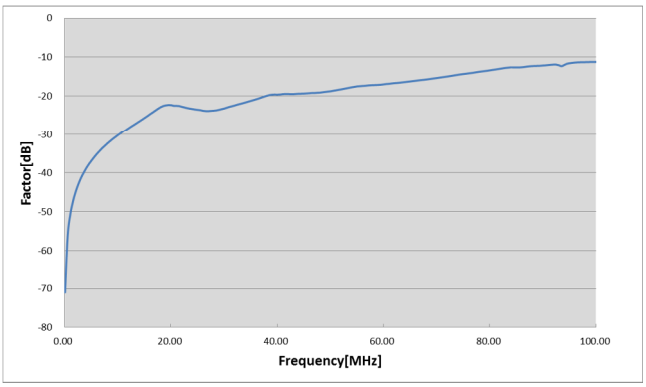
901（6 cm Loop）



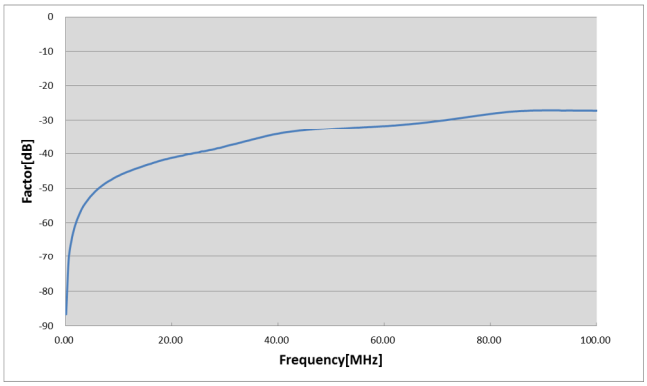
902（3 cm Loop）



903（1 cm Loop）

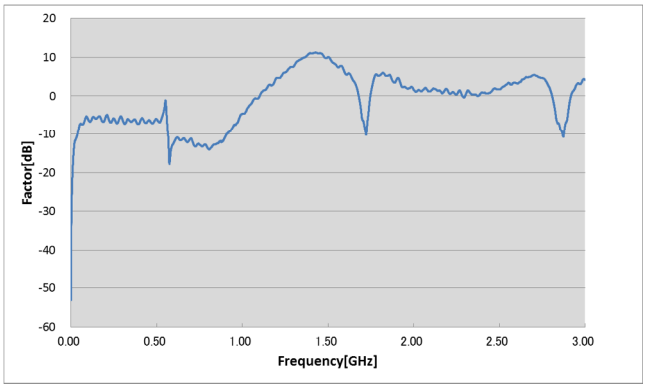


904（3.6 cm Ball）

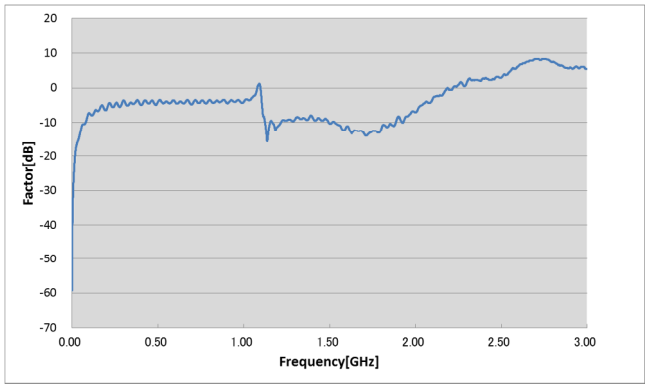


905（6 mm Stub Tip）

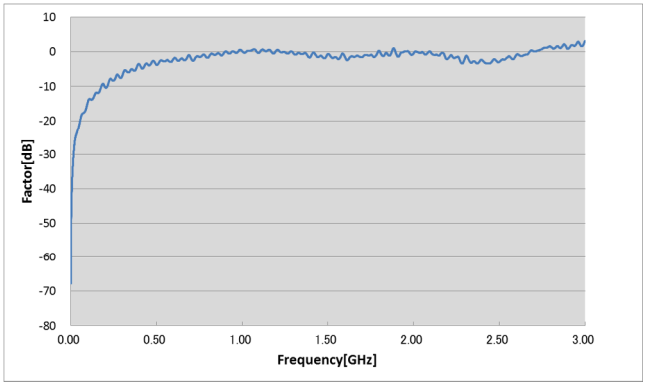
■100 kHz ～ 3 GHz



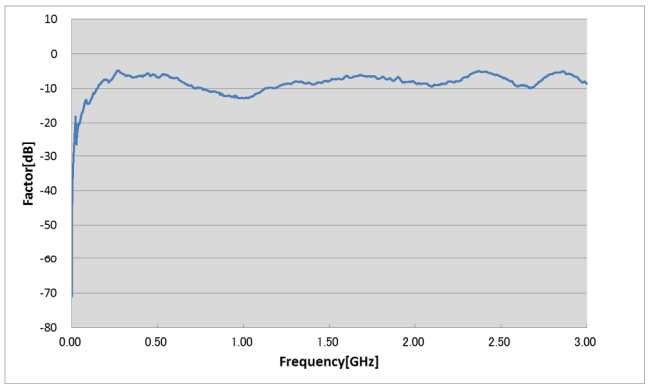
901（6 cm Loop）



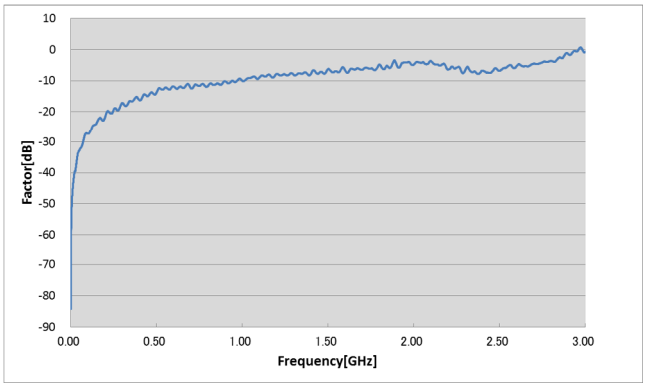
902（3 cm Loop）



903（1 cm Loop）



904（3.6 cm Ball）



905（6 mm Stub Tip）

13. Warranty

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.
   Support for the target software will also end when manufacturing of this NoiseKen product is 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 other than those recommended by NoiseKen]
   Although every effort will be made to provide comprehensive software support, 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.
   [Added functions and OS upgrades]
   Please note that support for added functions and OS upgrades are outside the scope of free support.

14. 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.

Note

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