

# EMC Test Equipment Catalog



- Electrostatic Discharge Simulator
- Impulse Noise Simulator
- Fast Transient / Burst Simulator
- Lightning Surge Simulator
- Voltage Dip & Swell Simulator
- Damped Oscillatory Wave Simulator
- Emission Measurement System
- Broadband Sleeve Antenna
- TEM Horn Antenna
- EMC Test Systems for Automotive Electronics

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www.noiseken.com

EPS-02Ev3

# Electromagnetic Field Visualization System

## Three-Dimensional Indication (Time, Frequency, Amplitude) Simplifies EMC/EMI Debugging

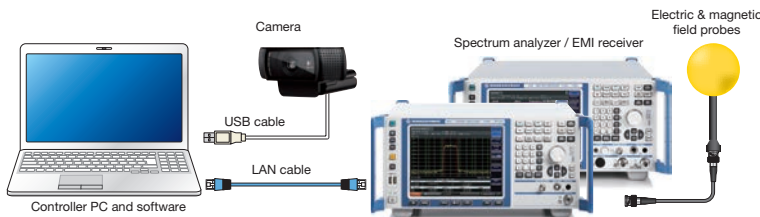
EPS is a EMC/EMI debugging tool enabling designers to rapidly perform pre-measurement, failure point identification, and improvement efficiency confirmation in EMC/EMI countermeasure process of product design.

How does it work? The software detects locations of probes by color discrimination through camera's image sensors\*, real time analysis measured signal frequency, shows a heat map by overlapping electromagnetic field strength and real images of measured objects.



Image recognition (recognized the yellow color at the tip of the probe)

- A real-time diagnostic tool supports EMC/EMI debugging.
- Fast visualize EMC/EMI problems.
- Enables easy comparison of countermeasures before and after.
- Capable of measurement from entire products to single components.
- Factor-editor function provides correction of antenna characteristics, cable loss and pre-amplifier.
- User friendly compact design.
- Customer supplied spectrum and probes acceptable (Please consult)



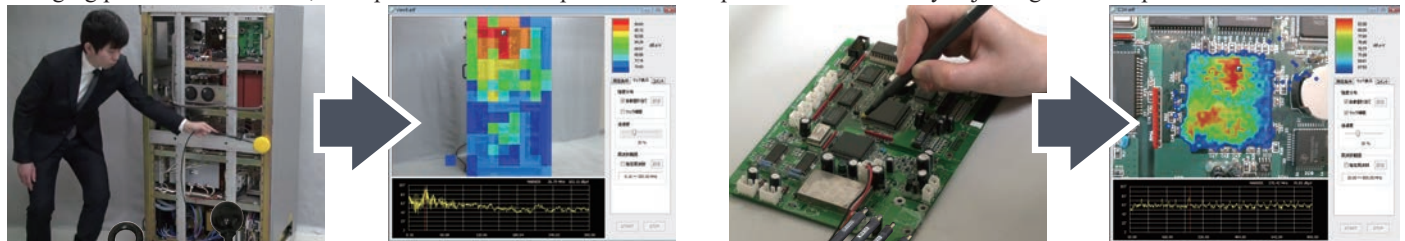
### Easy to carry at a lower price!



The RSA306B spectrum analyzer makes it easy to carry on-site measurements. Also, you can build a system at a lower price.

## Capable of Measurement of Various product sizes various probes applicable

Various probes are applicable regardless of manufactures. Not only small components, but also big equipment are available to measure by changing probes. Furthermore, even products with complex surface shape are measurable by adjusting camera's positi



Large probes measure large equipment



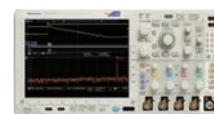
Small probes measure small components, PCBs

## A wide variety of standard-compliant spectrum analyzer drivers

Type of standard spectrum analyzer has included, for that already you using spectrum analyze use to build became easier.

Rode Schwartz	Spectrum analyzer	FSV series, FSV3000 series, FPL series
	EMI receiver	ESR series, ESRP series
Key sight Technology	Signal analyzer	N9010A, N9010B
Tektronix	Oscilloscope	MDO4000 series
	Spectrum analyzer	RSA306B

Tektronix MDO4000 series

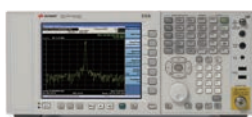


Tektronix RSA360B

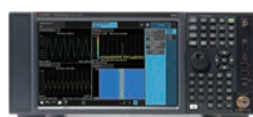


Please inquire about other spectrum analyzers.

Key sight Technology N9010A



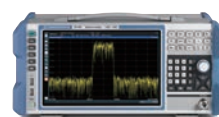
Key sight Technology N9010B



Rode Schwartz FSV



Rode Schwartz FPL

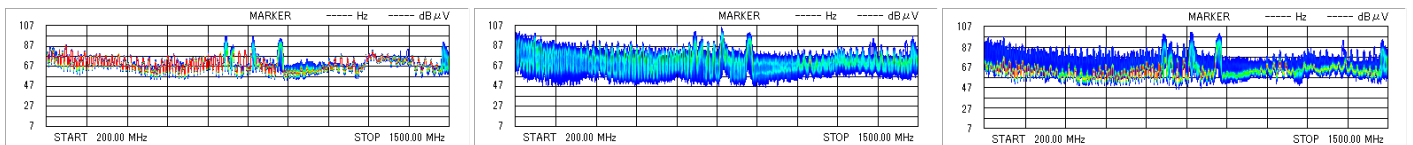
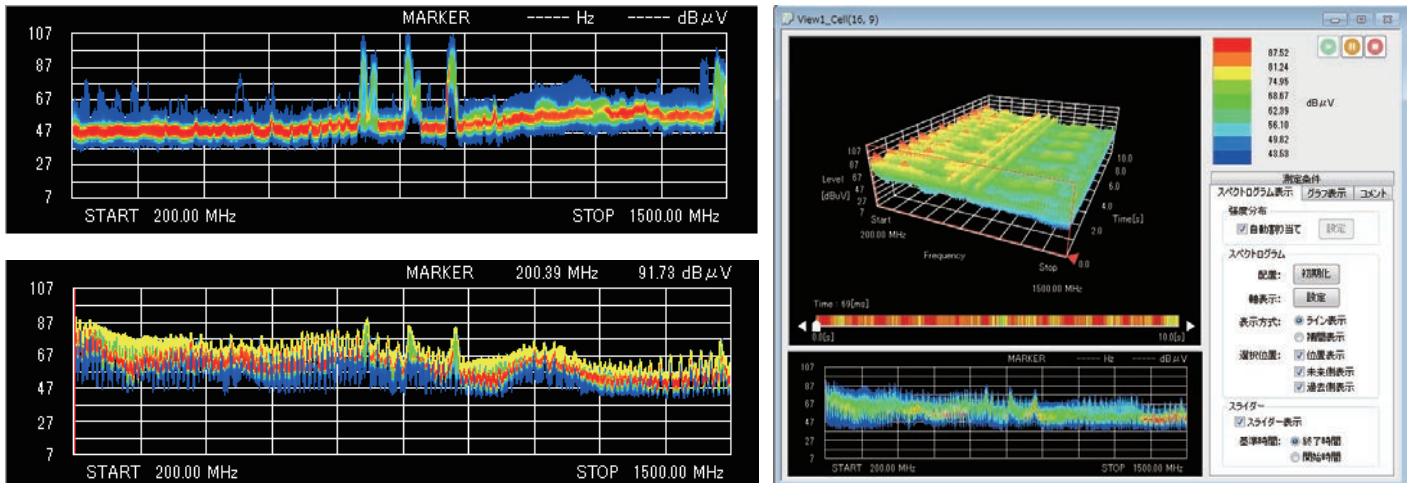


Rode Schwartz ESR



## Easily Check the Noise Occurrence Frequency. Add density display function.

Added a function to display colors according to the frequency of occurrence (density display function) to the conventional spectrum display function. This makes it possible to easily check the noise occurrence frequency and the amplitude at the measurement frequency.



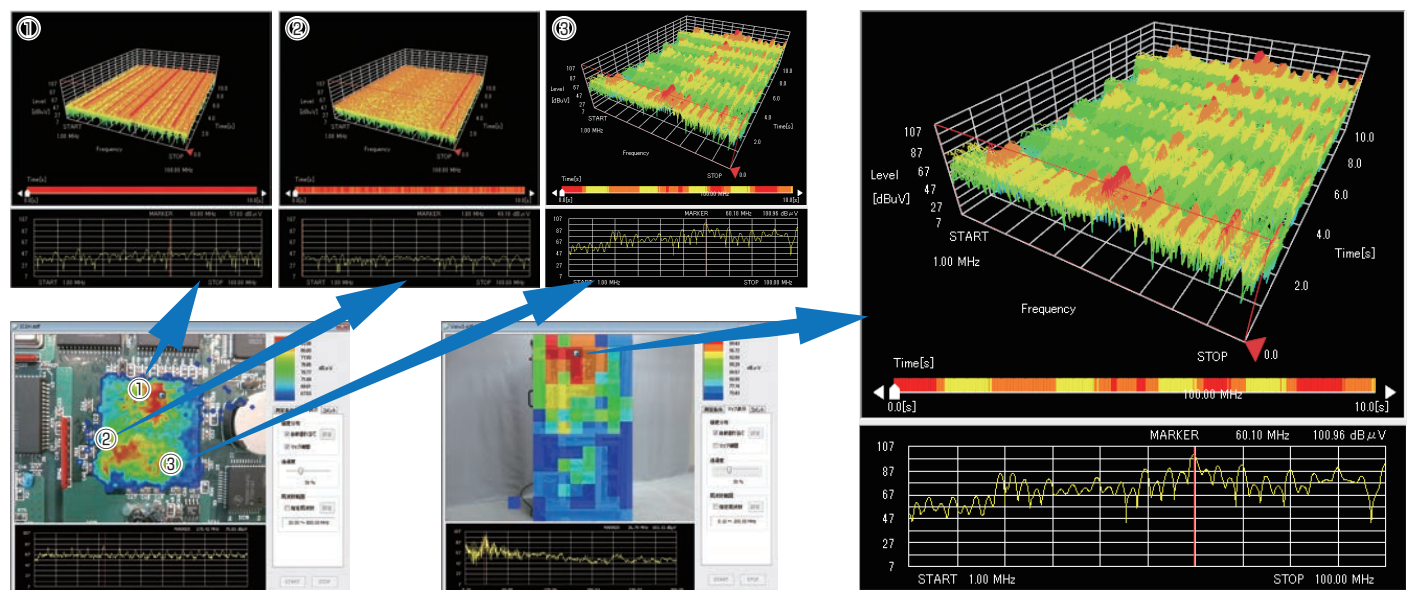
Example of noise with little change

Example of noise with large fluctuation

Example of intermittent noise

## Simplifies EMC/EMI Debugging Three-Dimensional Indication (Time, Frequency, Amplitude)

Three-Dimensional Indication (Time, Frequency, Amplitude) pinpoint design failure even when the noise is intermittent.

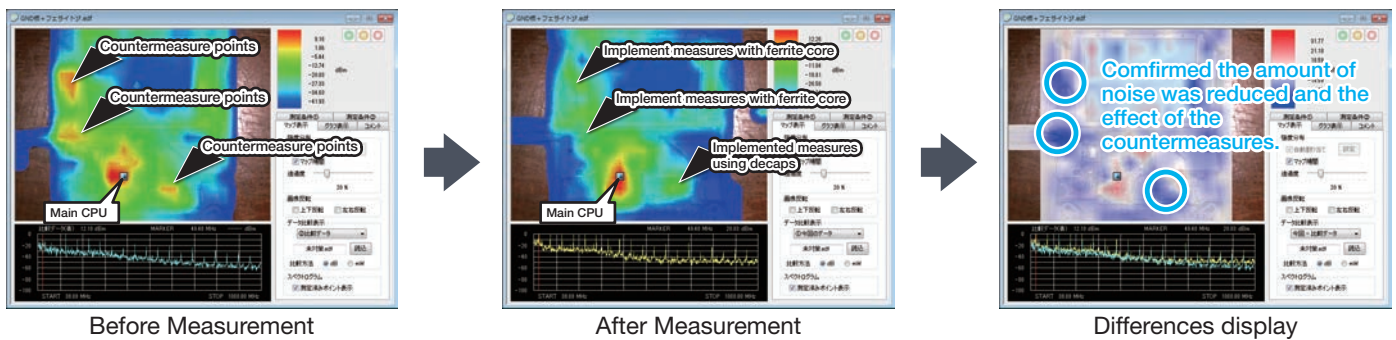
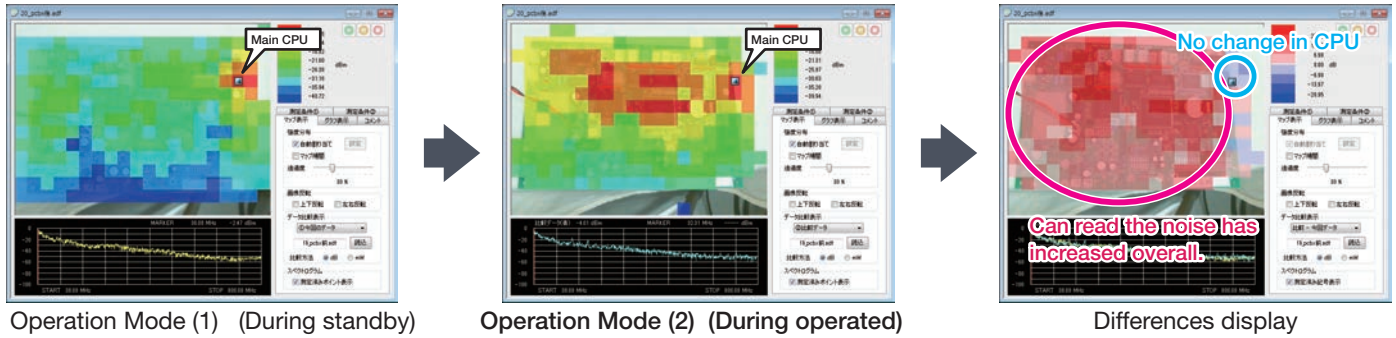


EMI Measure  
EPS

EPS-02Ev3

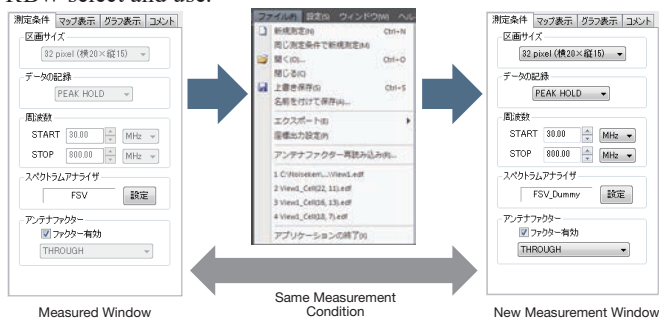
## Easy comparison before and after countermeasures.

Three-Dimensional Indication (Time, Frequency, Amplitude) pinpoint design failure even when the noise is intermittent.



### Easy measurement under the same conditions as past data

Newly measurement time, before measured option can also use in this new version. Before measured data if you save, then from Spectrum analyzer's setting menu the range of frequency or RBW select and use.



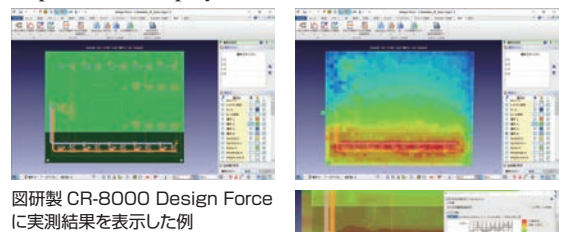
### Simplify image recognition settings

By clicking on the part of the screen where you want to recognize the color (tip of the probe), automatically adjusts the hue, saturation, and brightness optimal for color recognition.



### Designated coordinate output function

Measurement results can be imported to external CAD software and CAD drawings and actual measurement data can be superimposed and displayed.

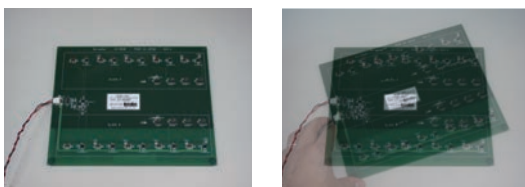


### Camera image ghost function

Overlaid the previous image for position adjustment.

Example of use ①: To match the camera position with the previous image before the test

Example of use ②: When re-adjusting when the camera position shifts during the test

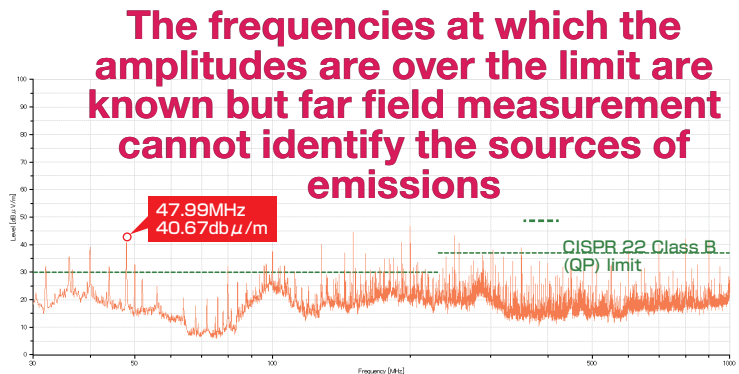
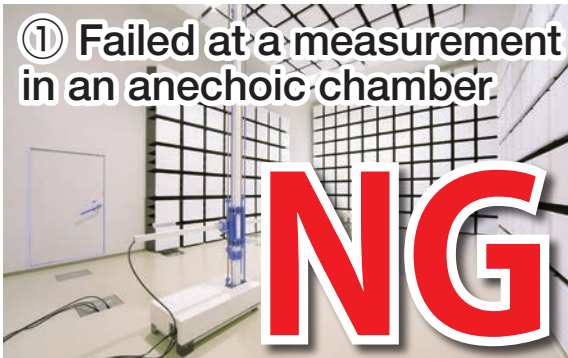


### Others

- Highlighting unmeasured points: Unmeasured area highlights by flashing black and white. During measurement, it prevents unmeasured.
- Excess limit detection function: A function to display a message or stop measurement to protect the measuring instrument due to excessive input when the set limit value is exceeded.

**Locates possible interference sources for pre- and post-compliance measurements**

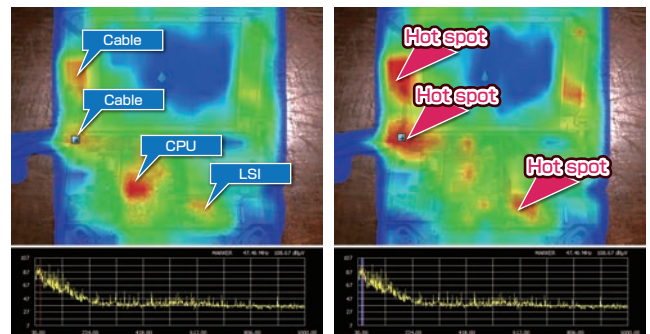
A product failed in a compliance measurement at some frequencies. The frequency of 47.99 MHz is one of the target frequencies to which a solution is looked for.



**② Near-field measurement by EPS-02**

An intensity distribution map shows "hot spots", which are the target areas. Furthermore, narrowing down to the desired range of frequencies lets you know the relevant spots of the frequencies in interest.

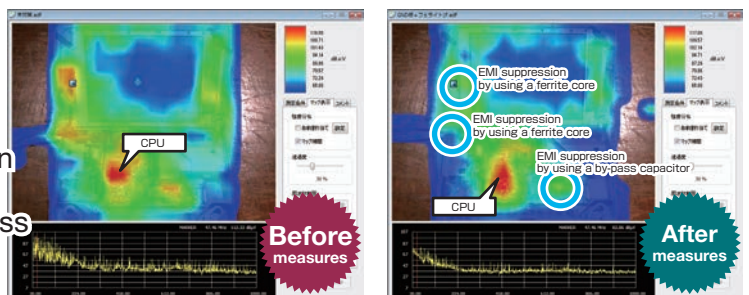
- Incorporating suppression measures and verifying their effectiveness
- An amplitude versus frequency plot for each probe position gives the users the power to evaluate the EMI properties in depth.



**③ Incorporating suppression measures and verifying their effectiveness**

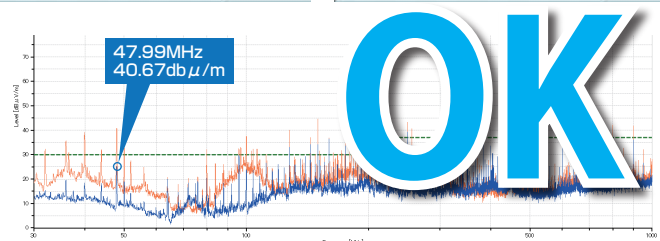
Measurement after modification indicated that the emission level lowered. This makes it easier to establish the countermeasure strategy for problem areas such as circuit traces, components, cables and housing

- Enables the users to evaluate suppression methodologies
- Enables the users to verify the effectiveness of the selected methodology



**④ Far-field measurement**

A compliance measurement after debugging verified the product emission was within the limit. Data can be saved, accumulated and shared for future occasions.



**Accumulated measurement data can be the basis of optimized design and debugging method rules, and improving and sharing how-hows, which contributes to engineering time and cost reduction, and reliability and safety improvements.**

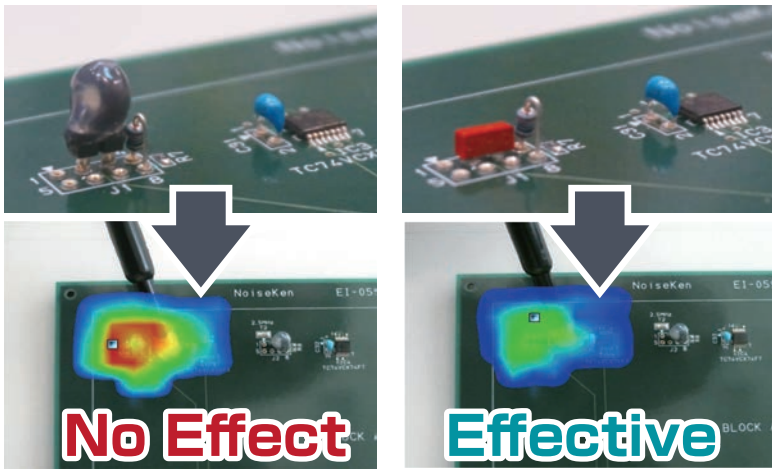
EMI Measure  
EPS

EPS-02Ev3

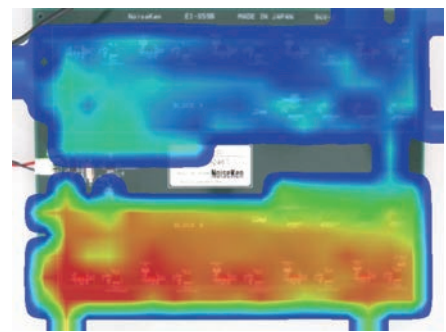
**Helpful for the users to design good EMI performance circuit boards and to choose the best suited EMI suppression components**

Since all spectrum charts can be saved, the users can evaluate and compare the effectiveness of EMI suppression measures referring to the stored and accumulated data.

**Measures as ferrite core    Measures such as resistance**



When designing a board, a comparison between the case where the ground routing is made into a pattern and the case where it is made a solid ground (Design of ground wiring)

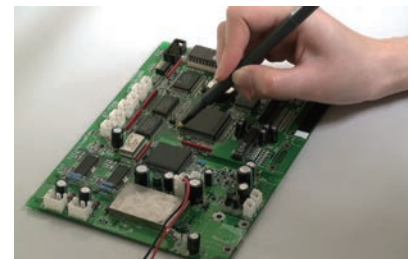


**Customer Credentials**

The frequency of failures at measurements in a chamber has been reduced

"Our company chamber is used only for a complete finished product testing stressing there is no meaning for PCB or internal unit testing. PCB and unit basis measurements were R&D department's objective. As a valuable pre-compliance tool, this system helps us to visualize quickly and locate problems areas, thus dramatically improve debugging works. Before the introduction of this system, one prototype sample failed 4 to 5 times at chamber measurements. Now the number has dropped to 2."

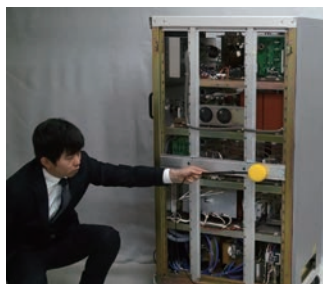
Design Engineer, R&D Department, "T" company



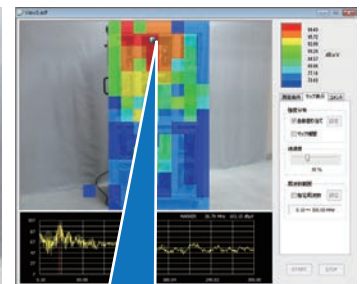
Now EMI debugging is my job

"The situation was like that before: when a product failed at a test house, the person in charge of the product asked for help from a trained and skillful engineer. Now the situation has dramatically changed like that: Even untrained or inexperienced engineers intensively tackle EMI debugging by using the EPS-02 system providing the visualization of the EMI properties of the test object. This can-do attitude is the greatest result of the introduction of the system."

Quality Assurance Engineer, Quality Assurance Dept, "A" company



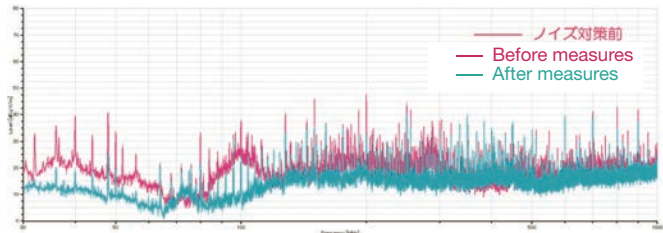
**On-site measurement**



**Locating hot spots**

## An amplitude versus frequency plot for each probe position is helpful for effective EMI debugging

"The objective is pre-compliance measurement. Only a combination of near-field probes and a spectrum analyzer was available before, which I thought was a time consuming debugging tool, if I can do it anyway. With the EPS-02, the way the data is stored and reviewed is much more convenient, as an amplitude versus frequency plot for each probe position can be seen. The benefits we are enjoying now are smoother EMI debugging, and the resultant reduced failures at a compliance measurement.



Design Engineer, Electrical Engineering Dept. "S" company

## Quick results are very helpful.

"Our department is a user of the NoiseKen EPS-3000 EMI Board Scanner System. Compared to EPS-3000, this newly introduced EPS-02E provides a faster result. Portability is also a point. I'm very satisfied with measurement data, which I think, are more accurate than I expected."

Design Engineer, Electrical Engineering Dept. "N" company

Drawings are for image only. (Not for actual use)

### Specifications

Frequency range	100 kHz ~ 3 GHz *Depends on the electromagnetic field probe specifications (The above is for ETS probes)
Measurement unit	dB $\mu$ V, dBm
Sensor/probe	$\phi$ 60 / 30 / 10 mm loop coil (magnetic field), $\phi$ 36 mm ball (electric field), $\phi$ 6 mm tip (electric field) Total 5 types *Depends on electromagnetic probe specifications (Probe by ETS-Lindgren)
Probe cable length	2m (N(P)-BNC(P)) (Coaxial connector cable)
Data recording method	Single / Free Run / Max Hold / Max Peak Data*
Auxiliary function	Save / load / export / comment input / factor re-read / camera image retake / Save / load / export / comment input / factor re-read / camera image retake / up-down & right-left inversion of camera image / ghost display of camera image / Screen enlargement-reduction
Compatible operating system	Windows 7 / 10
System configuration	Electromagnetic field probe (PN 7405) , BNC (P) -N (P) connector coaxial cable (02-000150A), Three Color Probe Head Cover (03-00111A), RF preamplifier (00-00019A), Spectrum analyzer, Control PC
accessories	LAN cable, NI-GPIB-USB-HS GPIB Controller, Camera, USB cable extension 2 m for camera, Tripod for camera, Software, USB protect key, Instruction manual

\*Peak Hold: Displays the trace data with the largest peak value from the trace data measured at each measurement point.

### Electromagnetic Field Probe (PN 7405) Frequency Specialization

Model	Type	Electric field / Magnetic field	Construction	Recommended Frequency Band
901	6 cm Loop	Magnetic field	Sealed loop	3 MHz ~ 500 MHz
902	3 cm Loop		Sealed loop	5 MHz ~ 1 GHz
903	1 cm Loop		Sealed loop	10 MHz ~ 3 GHz
904	3.6 cm Ball	Electric field	Spherical dipole	10 MHz ~ 3 GHz
905	6 mm Stub Tip		Short monopole	50 MHz ~ 3 GHz

#### ■ Magnetic field probe

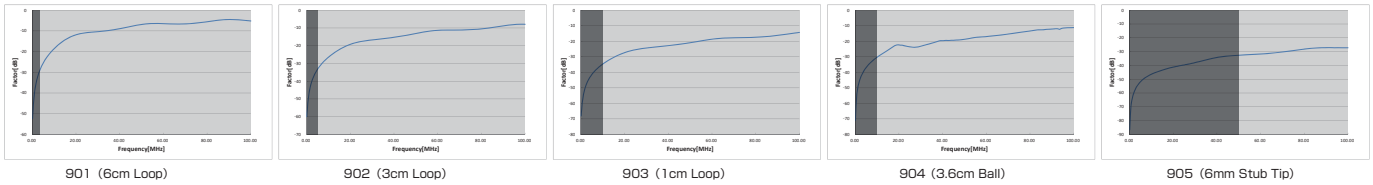


#### ■ Electric field probe

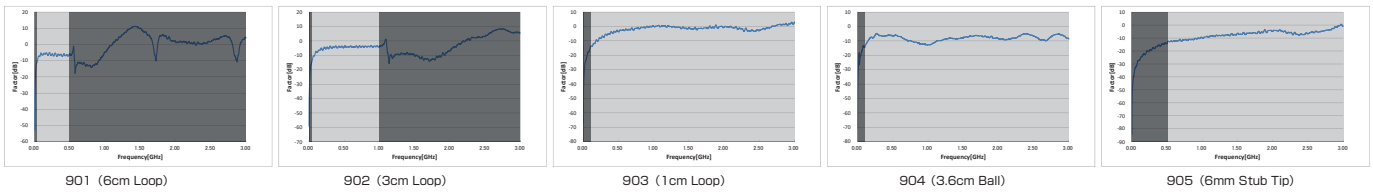


## EPS-02Ev3

### ■ 100 kHz ~ 100 MHz



### ■ 100 kHz ~ 3 GHz



\*The frequency characteristics of the above probes are data using strip lines.  
 \*The gray area is outside the recommended frequency band.

### Recommended PC specifications

Item	Specification
OS	Microsoft® Windows® 7 32 bit / 64 bit (Eng/Jap) Microsoft® Windows® 10 32 bit / 64 bit (Eng/Jap)
CPU	Intel Core™ i5 or higher (i7 or higher recommended)
Memory	8 GB or more recommended
Hard Disc	min. 20 GB of free space
Display	over 1366 × 768 pixels

- A pointing device such as a mouse must be available.
  - Existed DVD Drive.
  - There is a free USB port. (Use 2 or 3 ports by using dongle, web camera, mouse etc.) \*
- \*The operation guarantee for using of an external USB-HUB is not covered.

### Standard spectrum analyzer

Rode Schwartz	Spectrum analyzer	FSV series, FSV3000 series FPL series,
	EMI receiver	ESR series, ESRP series
Key sight Technology	Signal analyzer	N9010A, N9010B
Tektronix	Oscilloscope	MDO4000 series
	Spectrum analyzer	RSA306B

Please inquire about other spectrum analyzers.

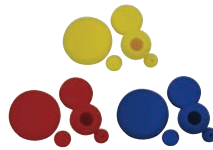
## Options

### Three Color Probe Head Cover MODEL : 03-00110A



Various type of probe head cover set. Camera image recognition is better in EPS-02 series by using probe head cover.  
 The case accommodates an electromagnetic field probe (Model: PN7415) with the probe cover head attached. Also stored unused probe cover heads.

### Replacement Three Color Probe Head Cover MODEL : 03-00111A



Replacement probe head cover for "3-color probe cover head Model: 03-00110A."

### Pre-amplifier MODEL : 00-00012A/14A/16A/19A



It is a high performance pre-amplifier that can be used for various applications such as the EPS-02 series.

Item	Specifications/Performance	
Operating Frequency Range	00-00012A : 9 kHz ~ 1 GHz	00-00014A : 500 MHz ~ 8 GHz
	00-00016A : 9 kHz ~ 1 GHz	00-00019A : 10 kHz ~ 3 GHz
GAIN	00-00012A : 36 dB (typ)	00-00014A : 47 dB (typ)
	00-00016A : 46 dB (typ)	00-00013A : 43 dB (typ)
Input/Output Connector	N-Female	
Size/Weight	W160 × D230 × H94 mm / 約 3 kg	
Accessories	N(P)-N(P) connector coaxial cable 1 m (00-00013A only)	

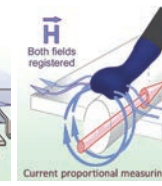
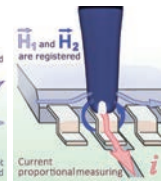
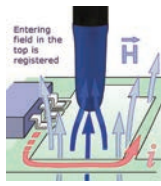


## Introduction of LANGER's Near Field Probe

The electromagnetic field probe guiding as standard in the EPS-02Ev3 system is a near-field electromagnetic field probe manufactured by ETS-LINDGREN (MODEL: PN7405), but in this system, various other types of electromagnetic field probes can be used in combination. The electromagnetic field probe introduced below is a near-field probe manufactured by LANGER, Germany. A variety of probes; measurement of large components, single pin level, and assemblies. And also probes for low frequency and higher frequency both can measurements. Combination with EPS-02Ev3 very easy to use. Please contact our sales office for detailed specifications of various near-field probes and combinations with EPS-02Ev3.

### Near Field Probe Model: LF1 set

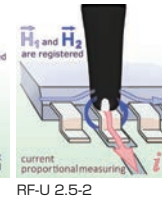
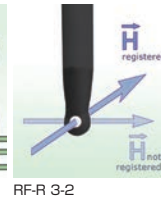
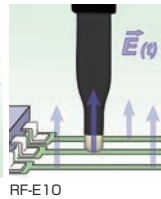
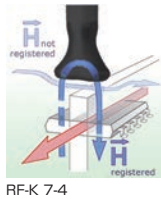
100 kHz ~ 50 MHz Magnetic Field



The LF1 set is a set of 4 types of shielded probes for measuring magnetic fields from 100 kHz to 50 MHz on electronic assemblies. The probe head is designed for detection of single pins, larger components, and electromagnetic interference sources on the assembly. First, identify the large-scale sources with the LF-R 400 probe, and then use high-resolution probes such as LF-B 3, LF-U 5 and LF-U 2. 5 The magnetic field probe has a structure that suppresses the electric field component. \*EPS-02Ev3 to be connect need conversion connector (MODEL: 02-00050A).

### Near Field Probe Model : RF1 set

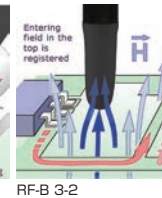
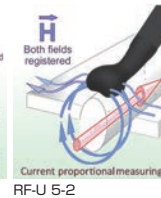
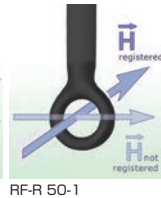
30 MHz ~ 3 GHz Electric Field/ Magnetic Field



RF1 set is a set of 4 probes for measuring electric and magnetic fields from 30 MHz to 3 GHz on electronic assemblies. Each probe is suitable for measurements very close to the electronic assembly. Single IC pins, conductive paths, components to identify electromagnetic interference sources connect the connector and measure. By using these probes can check the direction of the magnetic field and the electric field distribution. The magnetic field probe has a structure that suppresses the electric field component. \*EPS-02Ev3 to be connect need conversion connector (MODEL:02-00050A).

### Near Field Probe Model : RF2 set

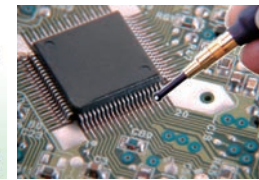
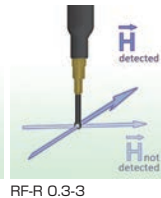
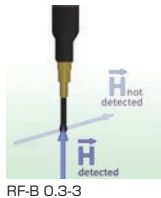
30 MHz ~ 3 GHz Electric Field/ Magnetic Field



RF2 set is a set of 4 probes for measuring electric and magnetic fields from 30 MHz to 3 GHz on electronic assemblies. The probe head can step through the sources of interference from the RF magnetic field on the assembly. Initially, RF-R 400-1 and RF-R 50-1 probes can be used to detect far-field electromagnetic interference. Next, the higher resolution RF-B 3-2 and RF-U 5-2 probes allow for more accurate detection of interferers. By using these probes, can check the direction of the magnetic field and the electric field distribution. The magnetic field probe has a structure that suppresses the electric field component. \*EPS-02Ev3 to be connect need conversion connector (MODEL:02-00050)

### Near Field Probe Model : RF3 mini set

30 MHz ~ 3 GHz Magnetic Field

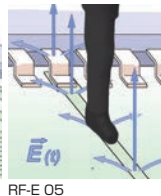
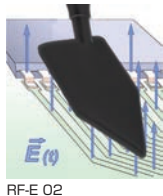


The RF3 mini set are two probes with a resolution of 1 mm or less to measure the magnetic field of 30 MHz to 3 GHz on the electronic assembly at the development stage. The probe head is designed for measurements. These probes can be used to detect the directivity and distribution of the magnetic field on the electronic assembly. The probe has a sheath structure and shields the electric field component. And also recommend using a 20 dB or 30 dB pre-amplifier when measuring this probe.

\*EPS-02Ev3 to be connect need conversion connector. (MODEL:02-00050A)

### Near Field Probe Model : RF4-E set

30 MHz ~ 3 GHz Electric Field

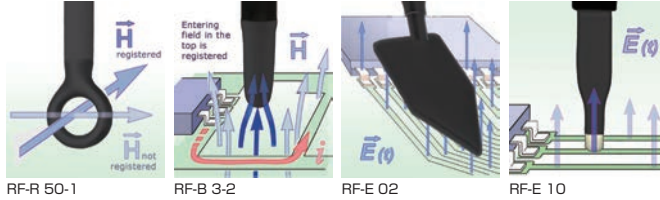


The RF4-E set is a set of two probes for measuring electric fields in the frequency range 30 MHz to 3 GHz. This probe detects the electric field by capacitive coupling and the steep rise and falls of the digital pulse of the signal pin (foot and lead) of the IC, and detects a sharp switching (voltage) component generated on the power supply pin of the IC. This probe has a function to suppress detection of current components (magnetic field components). \*EPS-02Ev3 to be connect need conversion connector. (MODEL:02-00050A)

## Introduction of LANGER's Near Field Probe

### Near Field Probe Model : RF6 set

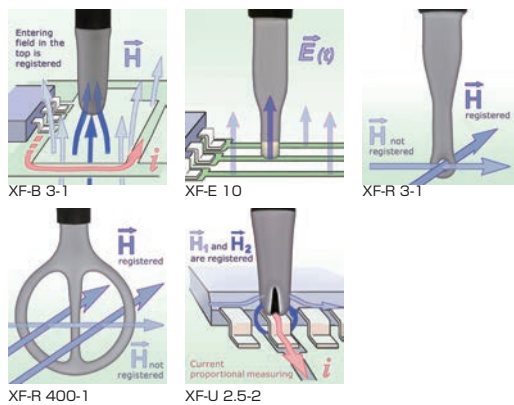
### 30 MHz ~ 3 GHz Electric Field/ Magnetic Field



The RF6 set is for the generation of electric and magnetic fields in the range 30 MHz to 3 GHz of the electronic assembly set of 4 probes for measurement. The probe head enables step-by-step localization of RF magnetic and RF-E magnetic interference sources on the assembly. From larger distances, use RF-R50-1 for magnetic fields and RF-E02 for electric fields to detect electromagnetic interference. The higher resolution RF-B 3-2 and RF-E 10 probes can better detect magnetic field and E-field interferers. By using these probes, it is possible to detect the direction of the magnetic field and the electric field distribution on the electronic assembly. The magnetic field probe has a structure that suppresses the electric field component.  
\*EPS-02Ev3 to be connect need conversion connector.  
(MODEL:02-00050A)

### Near Field Probe Model : XF1 set

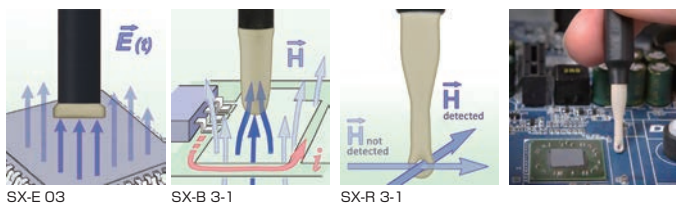
### 30 MHz ~ 6 GHz Magnetic Field



The XF1set consists of four magnetic field probes and one E field probe, can measure within magnetic fields from 30 MHz to 6 GHz. The probe head enables step-by-step localization of magnetic field interference sources on the assembly. First, use the XF-R 400-1 probe to detect electromagnetic interference from a distance. Second, you can use a high-resolution probe to detect interference sources more accurately. E-field probes are used to detect electrical interference fields near the assembly. By using these probes, it is possible to detect the direction of the magnetic field and the electric field distribution on the electronic assembly. The magnetic field probe has a structure that suppresses the electric field component.  
\*EPS-02Ev3 to be connect need conversion connector.  
(MODEL:02-00137A)

### Near Field Probe Model : SX1 set

### 1 GHz ~ 10 GHz Electric Field/ Magnetic Field



The SX1 set consists of three passive type near-field probes for measuring magnetic fields and also magnetic fields with high clock frequencies of 1 GHz to 10 GHz on electronic components and ICs at development stage. The probe head allows measurements at distances very close to the electronic assembly. They can be placed on single IC pins, conductive paths, components and connectors to identify sources of interference. By using these probes, the direction of the magnetic field and the electric field distribution of the electronic assembly can be detected.  
\*EPS-02Ev3 to be connect need conversion connector.  
(MODEL:02-00137A)

*LANGER near-field probes are not using probe cover. At the time of use probe, wrapped with vinyl tape or other on the tip of the probe that can make color recognition. In addition, a coaxial conversion connector is required to connect to EPS-02Ev3. (See below)  
Please contact our sales in charge for details.*

### Conversion Connector Model : 02-00050A/137A



It is a conversion connector for connecting LANGER near field probe to EPS-02Ev3.

Model	Connector	Support Model
02-00050A	N(P)-BNC(J)	LF1 set, RF1 set, RF2 set, RF3 mini set, RF4-E set, RF6 set
02-00137A	N(P)-SMA(J)	XF1 set, SX1 set

Model : NKU07M32G / NKU07M60G

# Broadband Sleeve Antenna

Broadband sleeve antenna has been developed for efficient immunity testing against hand-held transmitters and cellular phones. Many pieces of spot frequency antennas had to be used in turn thus far. This new Broadband sleeve antenna is a single antenna solution eliminating the need for antenna changes and dramatically reducing the test time. Furthermore, this antenna with its small-size and lightWeight properties and a flexible handle is suitable for testing in narrow spaces.

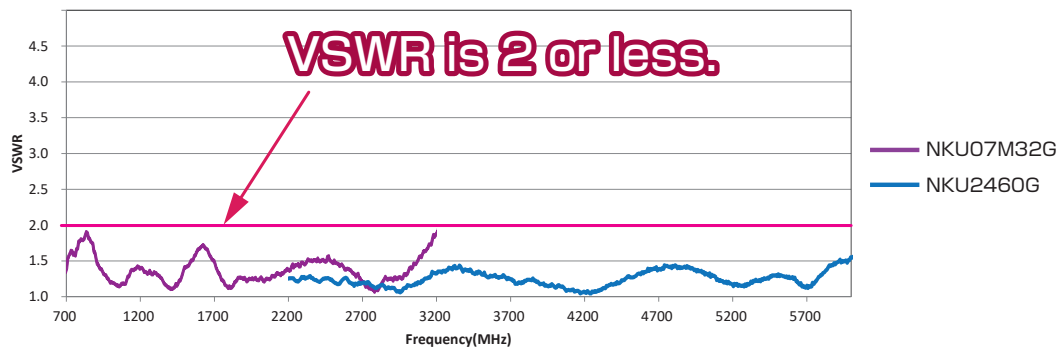
- A wide frequency range eliminating the need for antenna changes
- 30 W maximum power input allows high field strengths
- High efficiency due to a low VSWR and high gain
- Suitable for broadband digital modulation thanks to a good VSWR flatness
- Small, light-Weight and flat antenna easy to use in narrow spaces
- Easy handling with a flexible arm
- A wide radiation pattern makes directivity of the fields no longer an issue



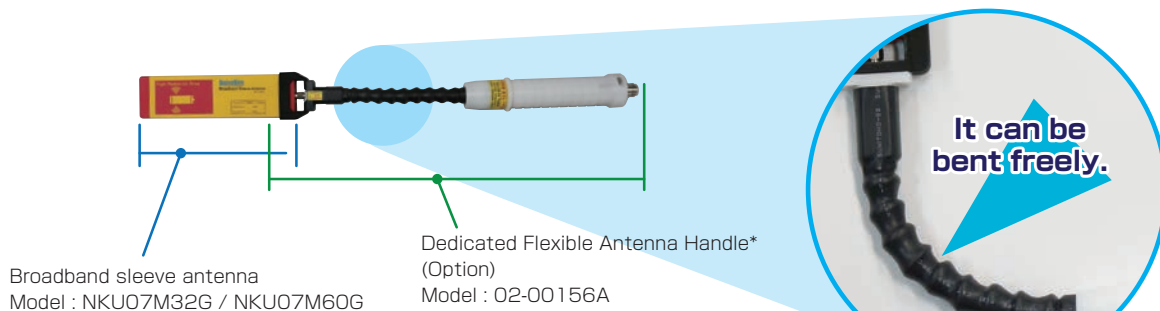
## Specification

Model	NKU07M32G	NKU2460G
Frequency range	700 MHz ~ 3.2 GHz	2.4 GHz ~ 6 GHz
VSWR	$\leq 2$	
Maximum power input	20 W (continuous) 30 W (continuous 10 minutes)	10 W (CW)
Input impedance	50 $\Omega$	
Connector	SMA(J)	
Dimensions	W50 × D8 × H186 mm (projection excluded)	W35 × D10 × H108 mm (projection excluded)
Weight	73.5g	20 g

### VSWR



### Antenna and Dedicated Flexible Antenna Handle

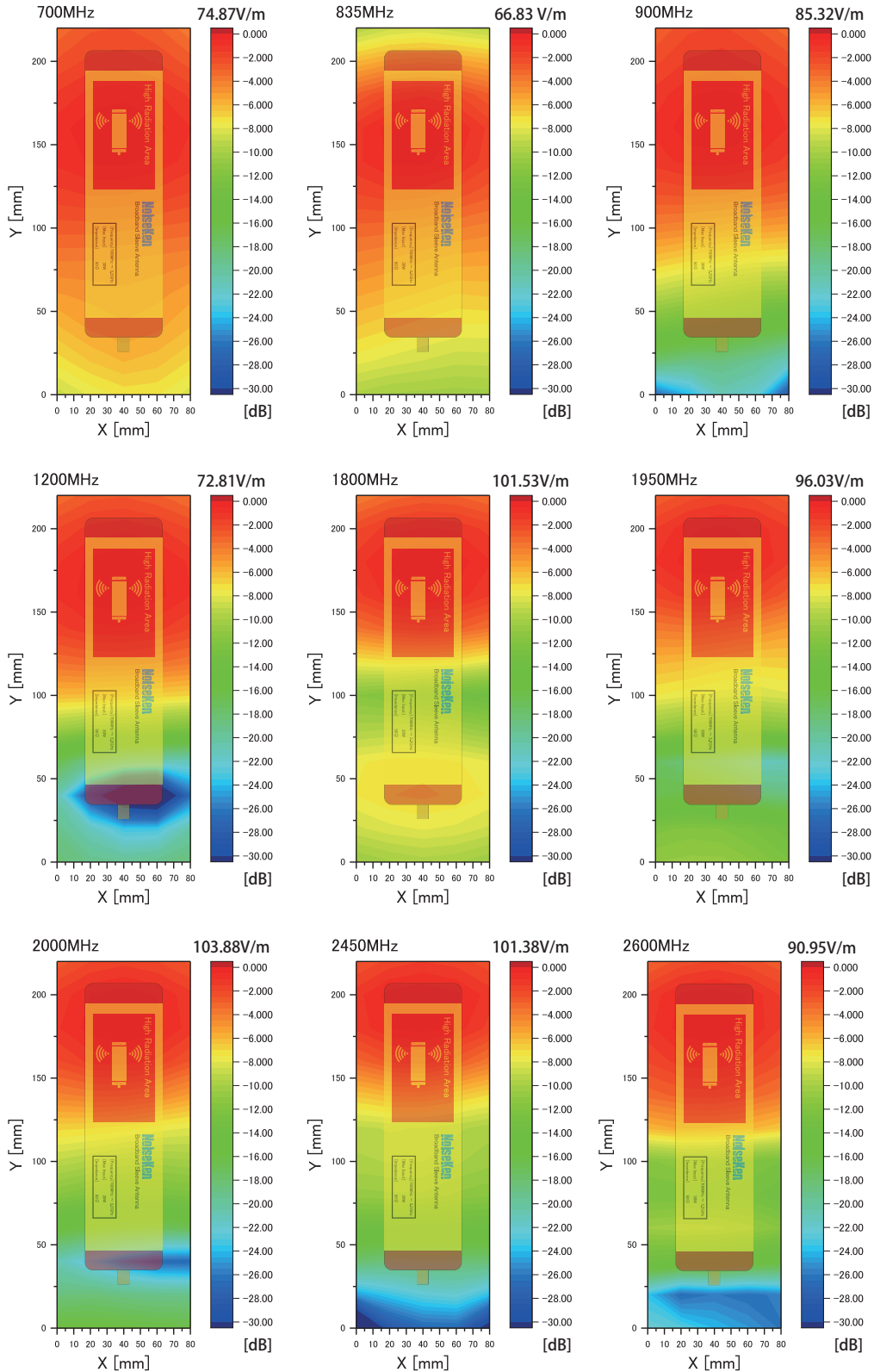


\*02-00154A is a dedicated flexible antenna handle for the NKU series, enables stable measuring reproducibility by incorporating sheath current choke technology to suppress unwanted surface waves.

# NKU07M32G / NKU07M60G

## Specifications

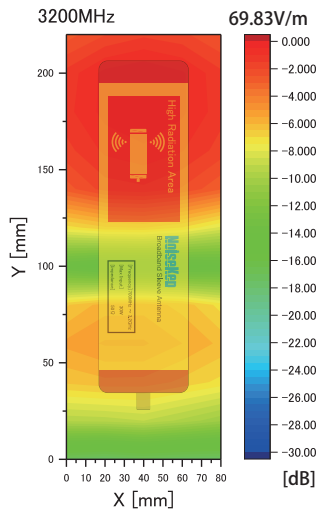
### ■ Near field distribution characteristics(NKU07M32G)



RF Immunity Test System

NKU07M32G / NKU07M60G

Specifications

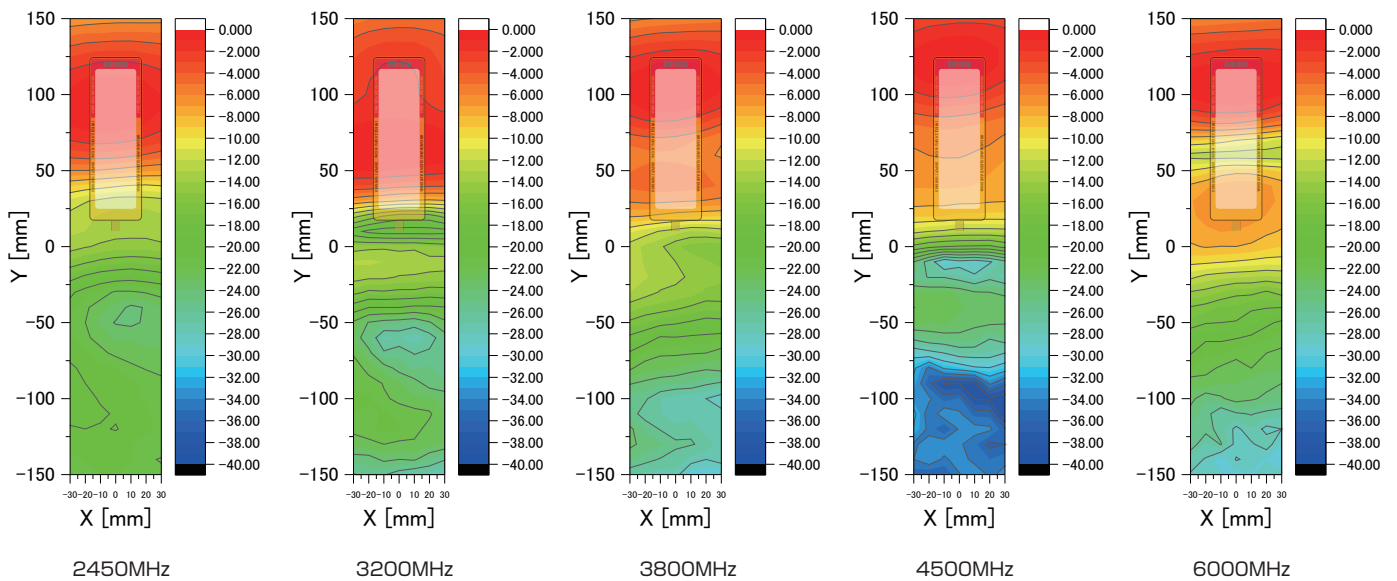


Electric field direction : y-axis (Single axis)

Input power / distance : 1W/50mm

The electric field strength is a reference value.

■ Near field distribution characteristics(NKU2460G)



RF Immunity Test System