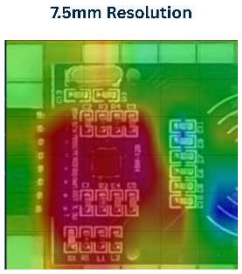
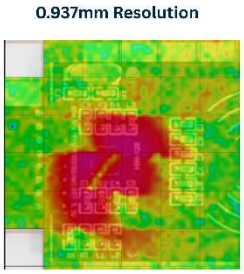
V092026

EMScanner & EMScannerR
User Manual







DISCLAIMER

Warranty

The material contained in this user manual is provided “as is” and is subject to being changed, without notice, in future editions. Further to the maximum extent permitted by applicable law, YIC Technologies disclaims all warranties, either expressed or implied, with regard to this user manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. YIC Technologies shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or any information contained herein. Should YIC Technologies and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Safety Notices

Caution

A CAUTION notice denotes a hazard. It calls attention to operating procedure, practice, or the like. Not correctly performing or adhering to the notice could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

Warning

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like. Not correctly performing or adhering to the notice could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

ABOUT THE EMSCANNER PRODUCTS

The **EM**Scanner product family provides board-level design teams with much faster ways to obtain nearfield magnetic data to help diagnose EMC design issues.
These instruments rapidly capture the data through spectral and spatial scans and display the result to the user through the **EM**Viewer software. This allows the design team to immediately analyse and compare design iterations.
PCB designers can scan any board to identify both constant and time-based emission sources in the range of 150 kHz to 8 GHz.

The **EM**Scanner system consists of a scanner and adapter, a customer-supplied spectrum analyzer and a PC running **EM**Viewer software. The scanner consists of an array of 1,218 H-field (magnetic) probes spaced every 7.5mm. The system operates from 150 kHz to 8 GHz.

The **EM**Scanner**R** is a self-contained high resolution near-field scanning device with a built-in spectrum analyzer. Simply connect the **EM**Scanner**R** into the PC with an Ethernet connection, install the **EM**Viewer software on the customer-supplied PC and begin measurements. The system operates from 150 kHz to 8 GHz. The **EM**Scanner**R** stepper motors provide 0.06 mm incremental measurement steps.

MINIMUM SYSTEM REQUIREMENTS

Operating System: Windows 11 / Windows 10 (latest update)
CPU: 1 GHz or faster with two or more cores, on a compatible 64-bit processor
Memory: 8 GB or more
Storage: 200 MB for installation, and 1 GB for project saves
Graphics card: Compatible with OpenGL 4.2

TECHNICAL SUPPORT

For fast and seamless technical support, please gather the following information and contact Y.I.C. Technologies technical support as instructed further below:
(support@yictechnologies.com)

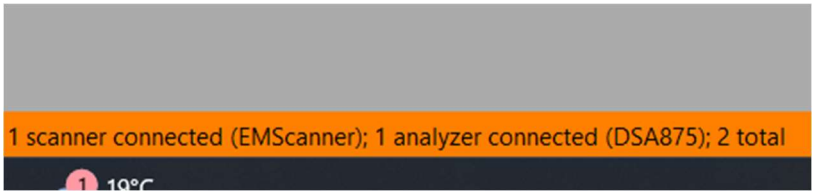
1. *Serial number of your unit (Shown in the device list).*
2. *Software version (Menu: Help -> About).*
3. *Your analyzer control software (e.g., NI-MAX or Keysight Connection Expert)*
4. *Spectrum Analyzer model and manufacturer (or *IDN)*
5. *The log file stored in %appdata%/YIC Technologies/EMViewer2/log.txt*
6. *A detailed description of the problem, including screenshots and video footage.*

ESTABLISHING A CONNECTION

For detailed information regarding the setup of the **EM**Scanner/**R** and **EM**Viewer, refer to the setup guide provided with your **EM**Scanner. You can also download any documents you need from the yictechnologies.com website or our Partner Portal.

The remainder of this user manual assumes you have connected all devices as stated in the setup guide.

Once you have connected your scanner and spectrum analyzer, and launched the **EM**Viewer software, it will appear on the bottom-left of the screen.



The **EM**Viewer software automatically searches for devices. If a device is not connected properly, **EM**Viewer will not display it.



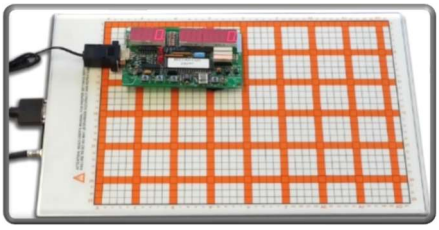
If you are having trouble connecting to the scanner or spectrum analyzer, try closing the **EM**Viewer software, ensure the connection is stable, and then start the **EM**Viewer software again.

METHODS OF OPERATION

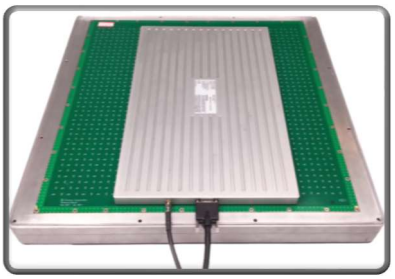
EMScanner is a very-near-field scanning system. It is composed of 1,218 H-field probes that operate between 150 kHz and 8 GHz. Probes are wideband but not very sensitive across this band thus they are very good at rejecting background noise.

EMScanner does not require a special setup like a shielded room. However, the Device Under Test (DUT) may sometimes however pick up strong ambient signals like those present in the cell band (850 MHz - 2100 MHz) or radio FM band.

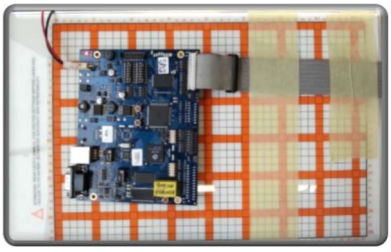
1. PCB testing (smaller than the scan area)
Place the PCB directly anywhere on the grid of the scanner. If there are tall components that prevent the PCB from touching the surface of the scanner, use of an LNA is strongly suggested. If the other side of the PCB does not have any high components, you should scan this side.



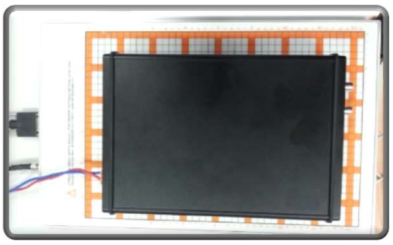
2. PCB testing (larger than the scan area)
You can take snapshots of the DUT by using the scanner like a hand-held probe. You can either move the scanner over the DUT or vice versa. Scan one area on the PCB and then move the scanner to the next position.



3. Cable testing
Cables from and to the PCB can be tested for emissions. Place the DUT on the scanner and tape the cables on the scanner or simply tape only the cables on the scanner.



4. System testing
EMScanner will help detect any leakages from a system under test for both frequency and location.



5. In situ testing

EMScanner is light and compact. The bottom part of **EM**Scanner is made of anodized aluminium making it non-conductive. Care must be taken to not pierce the anodized surface since the underlying aluminium is conductive.

The Scanner can easily be placed in a rack-mount system to test the PCBs in their working environment. A mechanical arm may be required to fix the scanner for ease of testing.



USER INTERFACE

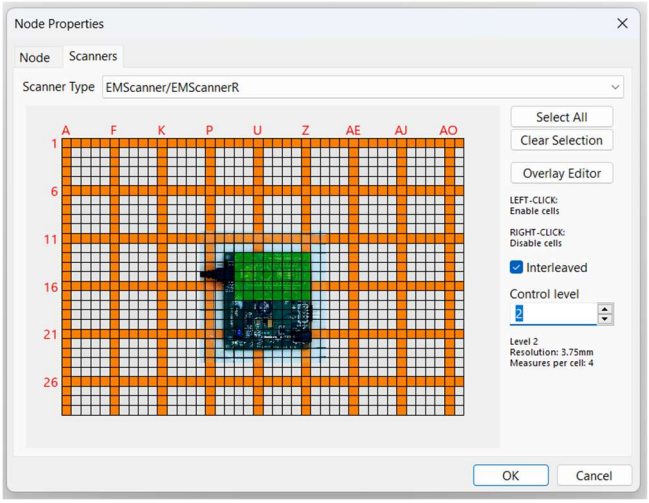


The toolbar is located at the top of the screen. Controls are from left to right:

- Creating a new project.
- Opening an existing project.
- Saving your project.
- Starting a scan.
- Starting a continuous (repeating) scan.
- Stopping scans.
- Modify node properties.
- Create a module node.
- Create a spectral node.
- Create a spatial node.
- Create a combined node.
- Create an immunity node.

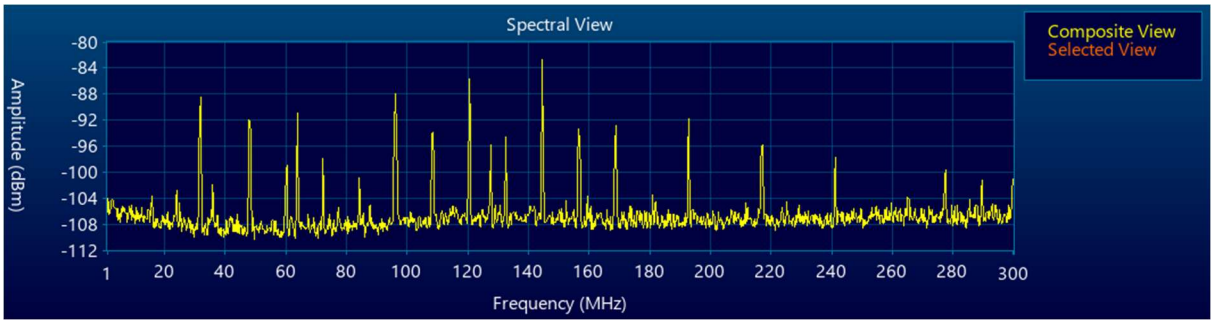
MODULE NODES

Module nodes, like project nodes contain scanner and analyzer options. Create a spectral, spatial, or combined node under a module node to inherit the module node's settings, analyzer settings and overlay information. This is helpful if you want to make multiple nodes with similar settings and overlays quickly. Below, we adjust the project node settings, which will be copied by future nodes.



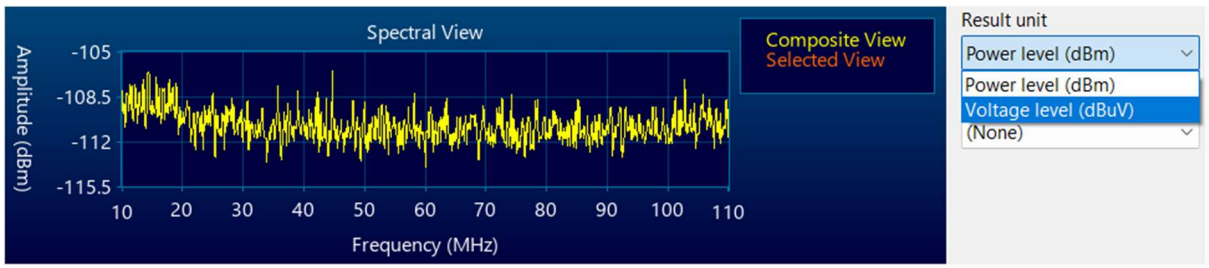
Spectral

Spectral scans show you what frequencies are present in the selected area. Here is an example of some spectral scan data:

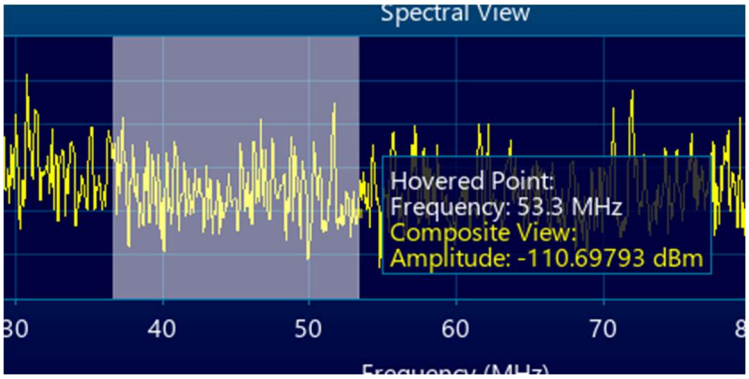


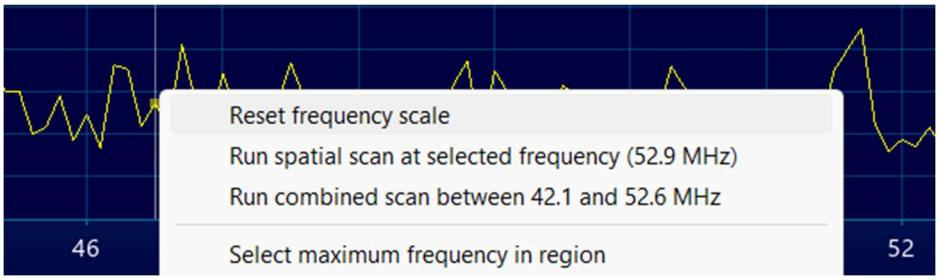
Mouse over the graph to display the frequency and amplitude values. To select a peak, mouse over the peak and left click.

The spectral view can be adjusted by the checkboxes and dropdowns to the right of the graph. You can change the unit of amplitude between dBm and dBuV or apply a compensation file.



Left click and drag to zoom in. Right click and select “Reset frequency scale” to return to the original view.

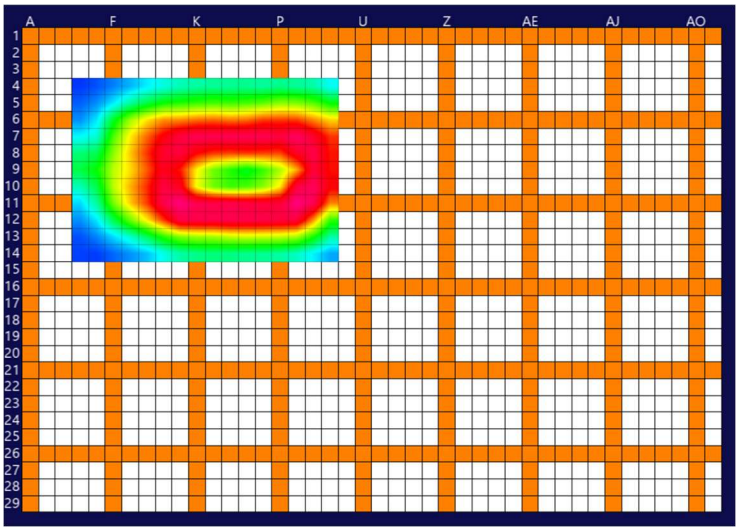




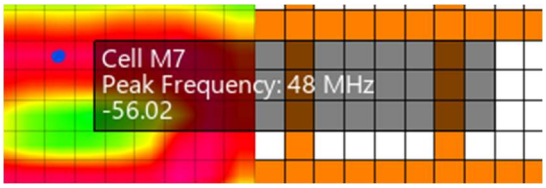
You can also run a spatial scan or combined scan directly from a spectral by selecting “Run spatial scan at selected frequency (X MHz)” or “Run combined scan between X and Y MHz”.

Spatial View

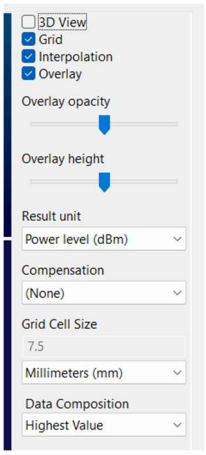
The spatial view displays a scanner grid with the maximum amplitude of each cell displayed as a colour. The lowest values of the scan are displayed as blue, and the highest values are displayed as red.



Mouse over the graph to display row / column coordinates, frequency, and amplitude values.

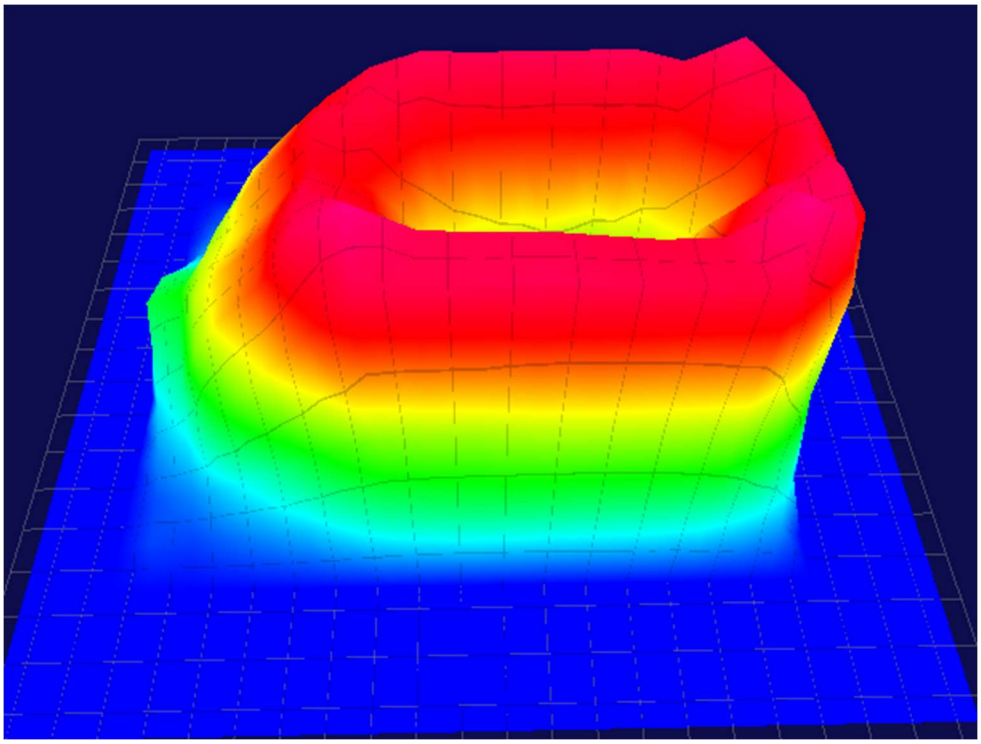


Spatial view can be adjusted by the checkboxes and dropdowns to the right of the graph.

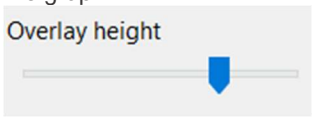


Grid and Overlay can be shown or hidden. Interpolation (data smoothing) can be disabled. You can also change the unit of amplitude or apply a compensation file.

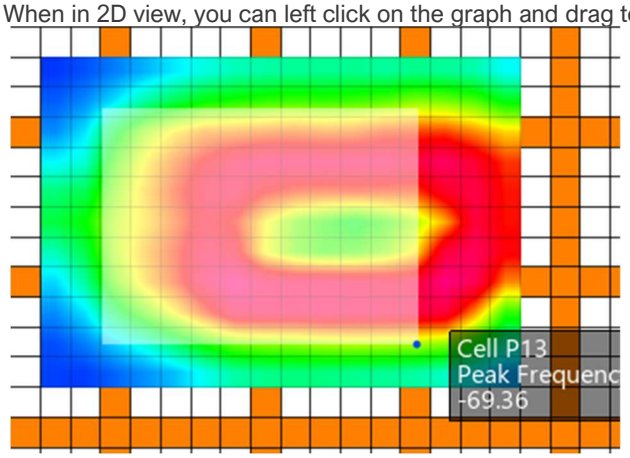
View can be changed to 3D by clicking on the check box. You can rotate the 3D view by left clicking on the graph and moving the mouse.



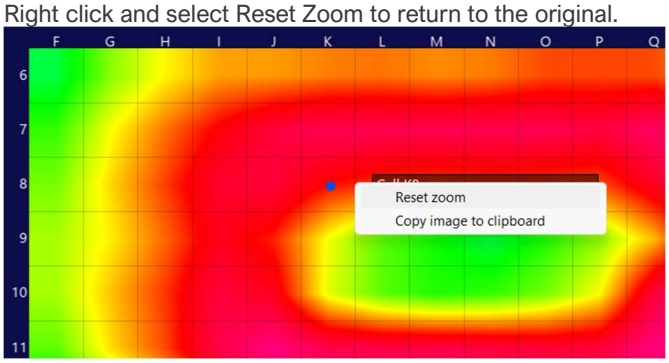
When Overlay is checked in 3D view, you can use the overlay height slider to move the overlay up and down on the graph.



When in 2D view, you can left click on the graph and drag to zoom in.



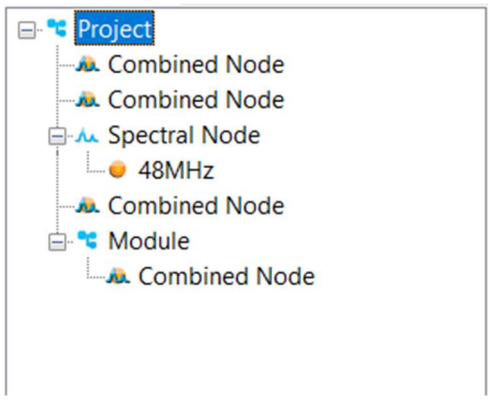
Right click and select Reset Zoom to return to the original.



NODES

All scan types in a project are called nodes.

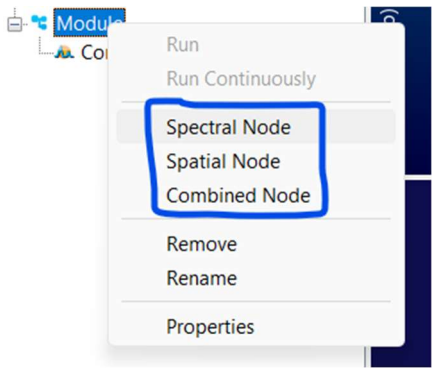
A project is the root node. It can be considered a folder like in Windows directories to store related data. You can add different types of scans and/or notes to a project node. You can rename, copy, and paste a node or node settings only. Project's settings are inherited throughout the entire project tree.
A module is the sub-root node. It can be considered as a subfolder like in Windows directories to store related data. You can add different types of scans and/or notes to a project node. Module's settings are inherited throughout the module tree only. Modules can be used to store data for different revisions of the PCB.



How to Add a Node?

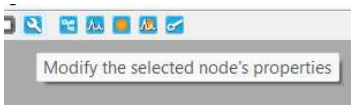
To add a node either right click on the Project node, click on Spectral/Spatial/Combined node, and then select one of the scans, or click the relevant icon on the tool bar.

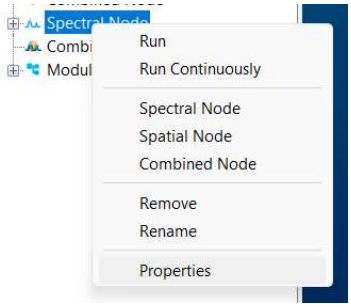


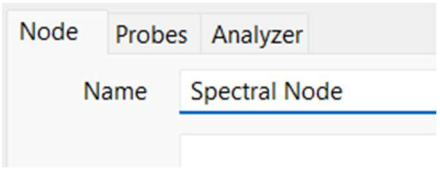


How to Name a Node?

To name a node open the Properties of the node and click on the Node tab. When you add a node for the first time, the Settings window opens automatically. By default, the node name is blank, which means a name will be automatically selected. If you want to rename a node after it has already been added, either right click on the node and select Properties or select the node and then click the properties button on the task bar.

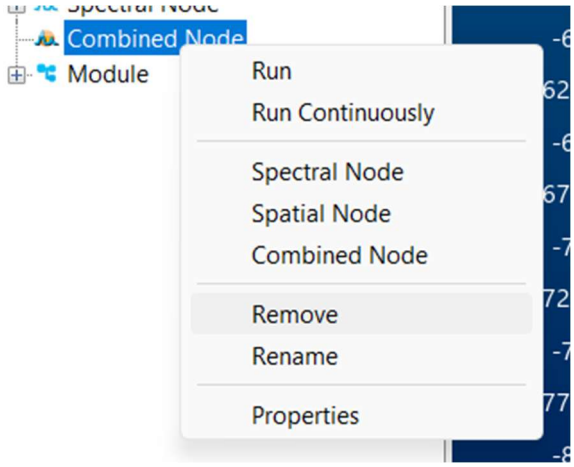






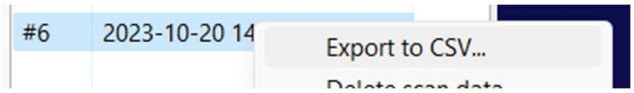
How to Delete a Node?

Double click on the node that you want to view.
Right click on the node that you want to delete and then select “Remove”



How to Export Data?

You can export any data in .csv format. To export data right click on a scan data and select Export to CSV.



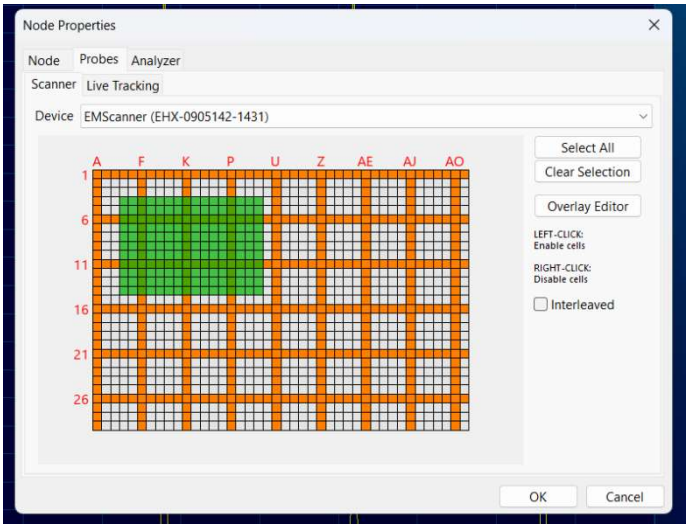
Node Settings

Probes Tab

The Probes/Scanner tab is where you will select your scanning device, scanning location and scanning method. Devices such as the EMScanner, EMScannerR, EMProbe and NFPKit are configured here.

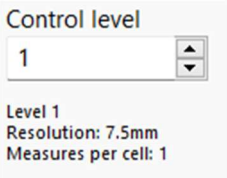
> **Note:**
>
> Importing design file or the picture of the DUT is highly recommended. Please refer to Overlay Editor section.

For the EMScanner and EMScannerR, you can select your scan area by left click and dragging across the grid. You can right click and drag to remove cells.



Interleaved: The scan will be performed twice to cover the blind spots of the scanner. For the EMS original model, the user will have to move the DUT down by 1 cell when the software prompts them to do so. For the EMSR, this movement is done automatically by the internal motors. For details on the interleaved mode, refer to the Interleaved Scan section below.

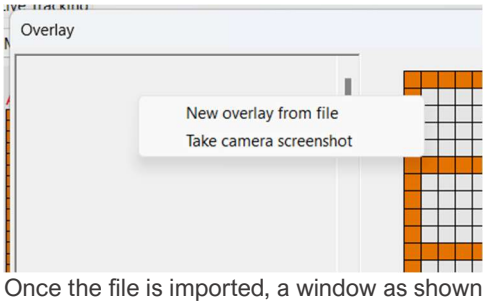
Control level (EMSR only): You can perform a high-resolution scan by increasing the control level. Each control level performs 4x the number of sweeps than the previous level. The resolution of the scan and how many measurements taken per cell is shown below the control level control.

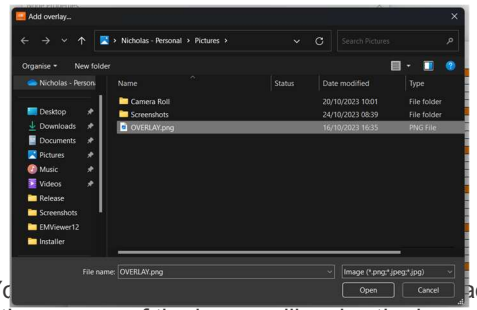


Overlay Editor (How to Superimpose Image of a DUT)

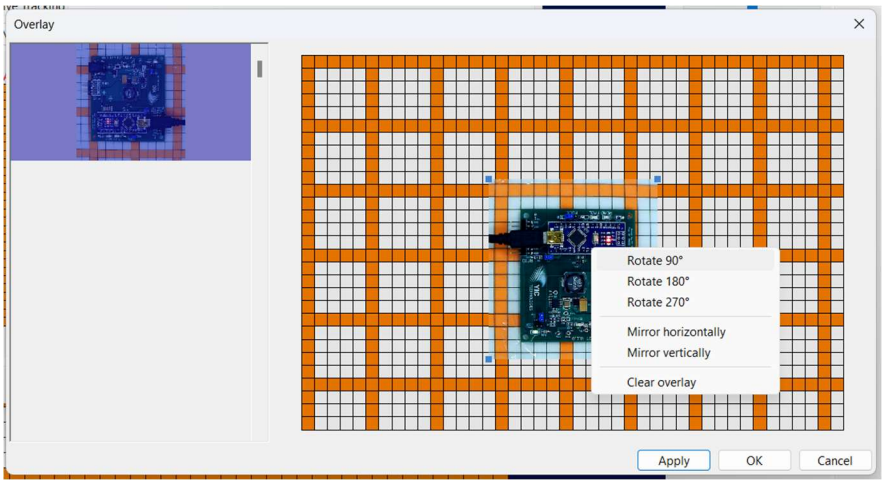
Overlay Editor superimposes a graphical image of the device under test (DUT) onto the scan pattern to guide you in activating the probes. EMViewer supports popular image formats: PNG, JPEG, TGA, etc. Once you import the design file, you can scale, rotate, mirror, and/or drag it to a desired position. It is recommended that you apply the overlay to the project node and module nodes, as child nodes will inherit the overlay.

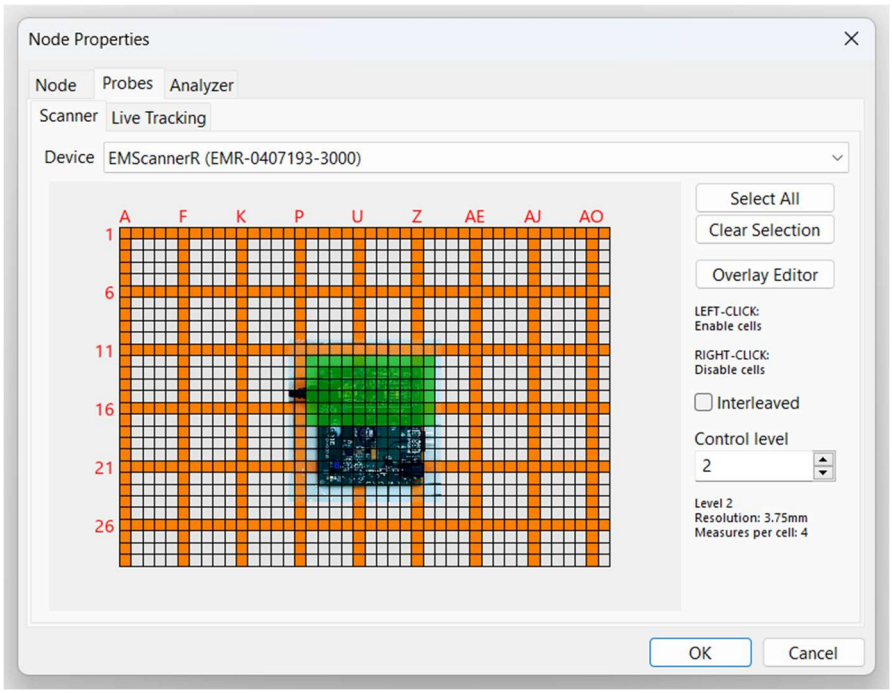
To import an overlay file, click Overlay Editor, right-click the overlays panel and click “New overlay from file”. Find the image you want to add and click open.



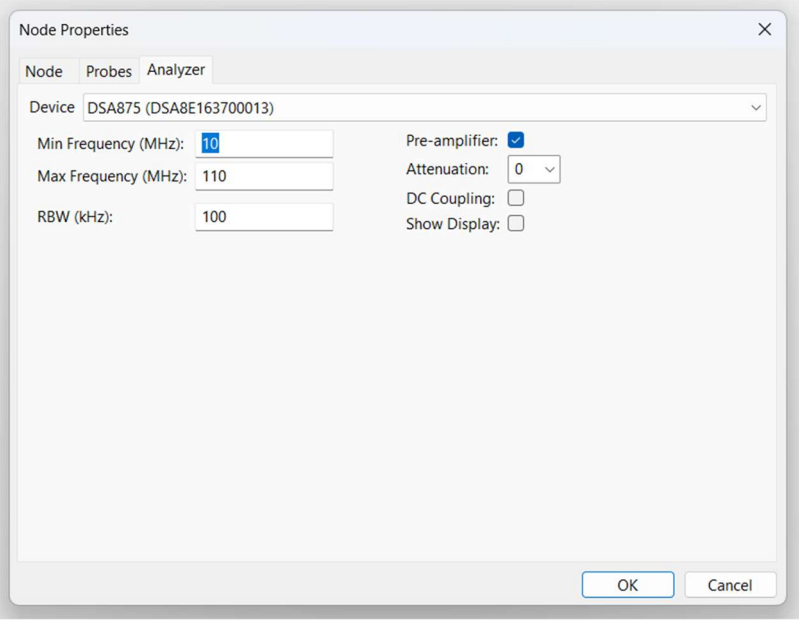


Once the file is imported, a window as shown below will open. Yo actual DUT position on the EMScanner. Dragging the blue squares on the corners of the image will resize the image. You can right-click on the overlay to show additional options for rotation and mirroring.


Overlay
Rotate 90°
Rotate 180°
Rotate 270°
Mirror horizontally
Mirror vertically
Clear overlay
Apply
OK
Cancel


Node Properties
Node
Probes
Analyzer
Scanner
Live Tracking
Device
EMScannerR (EMR-0407193-3000)
A F K P U Z AE AJ AO
1
6
11
16
21
26
Select All
Clear Selection
Overlay Editor
LEFT-CLICK:
Enable cells
RIGHT-CLICK:
Disable cells
Interleaved
Control level
2
Level 2
Resolution: 3.75mm
Measures per cell: 4
OK
Cancel

Analyzer Tab



Enter *Start Frequency* and *Stop Frequency* to identify the span of the scan to be implemented. *RBW (Resolution Bandwidth):* It is set by default at 100 kHz and can be reduced to the lowest level allowed by the spectrum analyzer. Decreasing the bandwidth will improve the amplitude accuracy and increase the sensitivity; the scan will however take more time to complete. The bandwidth you choose should not be disproportionate to the span. The suggested ratio of Span/RBW should be <10,000 e.g., 10 kHz bandwidth with a 100 MHz span, 100 kHz bandwidth with a 1 GHz span so that the scan can finish in a reasonable time.

Pre-amplifier: This will enable the pre-amplifier during the scan. Enabling this option improves the signal-to-noise ratio.

Attenuation: Can set to 0, 10, 20 or 30 dB. Attenuates input signals going to the spectrum analyzer.

Reference Level: The maximum signal intensity that the spectrum analyzer can acquire at a given frequency without clipping, this setting does not need to be changed except when measuring very strong signals.

Peak Hold: Also known as Max-Hold this is a very important feature as it allows you to run a Spectral Scan continually replacing the peak amplitude with each successive higher measurement. This is an excellent way to find the frequency of an intermittent or random signal.

DC Coupling: When this option is checked, the analyzer goes from the protected AC mode to the unprotected DC mode. This enables a much lower noise floor in the low frequency range, usually below 10 MHz, depending on the spectrum analyzer. DC voltage applied to the spectrum analyzer input can however cause damage to the internal circuitry.

Show Display: You can toggle whether the spectrum analyzer will have its display enabled during a scan. Most spectrum analyzers will perform sweeps faster with this option toggled **off**. The display will always be turned back on after a scan is complete (unless connection is lost).

SCAN TYPES

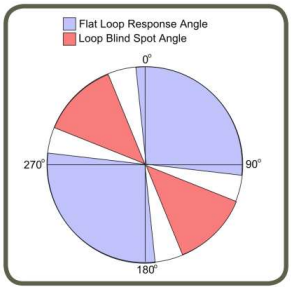
There are four scan types:

- **Spectral Scan:** measures and displays the maximum amplitude vs. frequency of the magnetic field strength over the scanned area.
- **Spatial Scan:** measures the magnetic field of radiated electromagnetic emissions from the DUT at a single frequency as a function of position.
- **Combined Scan:** measures the magnetic field strength of radiated electromagnetic emissions from an object as a function of both frequency and position on the PCB. It collects a series of scans over the entire frequency range and area of interest as opposed to a Spatial Scan (which gathers data at single frequency) or a Spectral Scan (which saves only the composite maximum data set over the scan area).
- **Immunity Test:** for testing a device's shielding by emitting from the scanner instead of receiving.

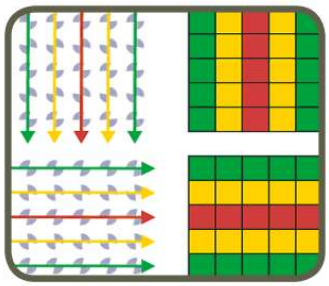
INTERLEAVED SCAN- SPECTRAL BLIND SPOT REDUCTION

For EMScanner & EMScannerR

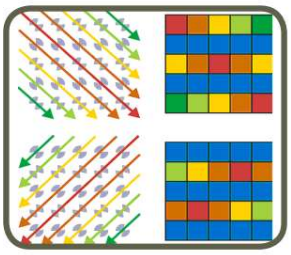
The Interleaved Scan is meant to overcome the limitations of the probe polarizations. Magnetic probe does not respond well to magnetic fields parallel to it, essentially creating a blind spot. The response of each probe from different orientations is shown below.



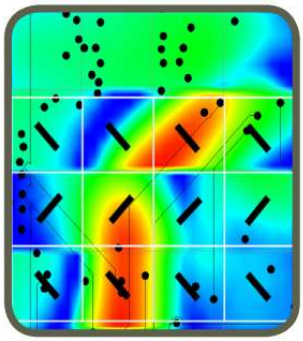
It was chosen to orient this blind spot at 45° and further to rotate every other row by 90° so that consecutive rows do not have the same blind spots. Because of this arrangement the blind spot can be eliminated by measuring a DUT twice with a small physical shift between scans.
If the device has only H-field components, the scan results will be as shown in the top right of the graphon the right. If this device is rotated 90° then results are as expected and as shown below.

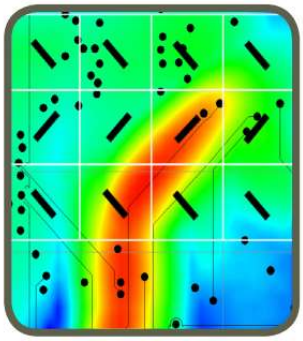


However, if the device has H-field components then every other row will have very low reception sensitivity. The scan results are shown below in the top right. Now if this device is rotated 90° then dead spots will switch to the alternate row. Although the high-level results are as expected, the presence of these low values distracts the eye. Furthermore, since the dead spots do not rotate, they may give the impression that the scan results are completely different.



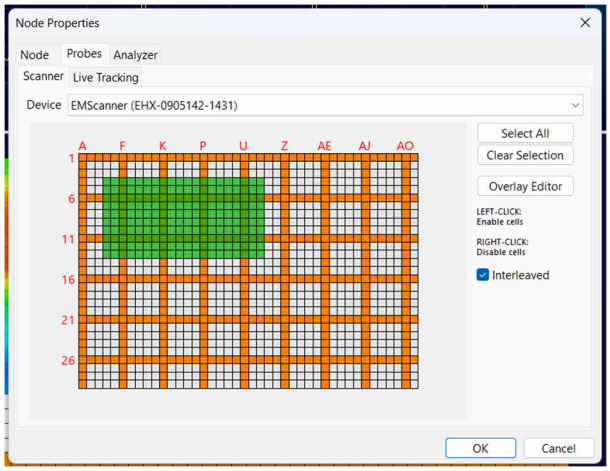
In certain situations, the presence of dead spots can create misleading results. An example of this is shown below. The image on the left shows a diagonal trace with one standard scan. The image on the right shows the same trace after two interleaved scans.



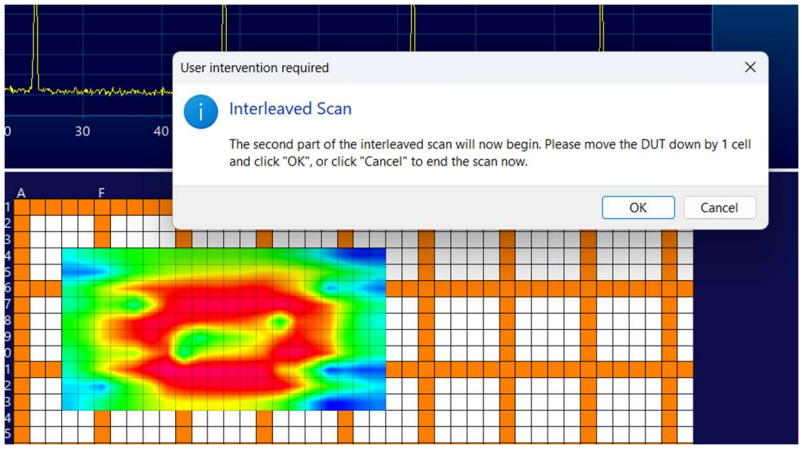


Using the Interleaved Scan

a. Right click on the project node and add a Spatial or Combined. In the probes tab, select Interleaved.

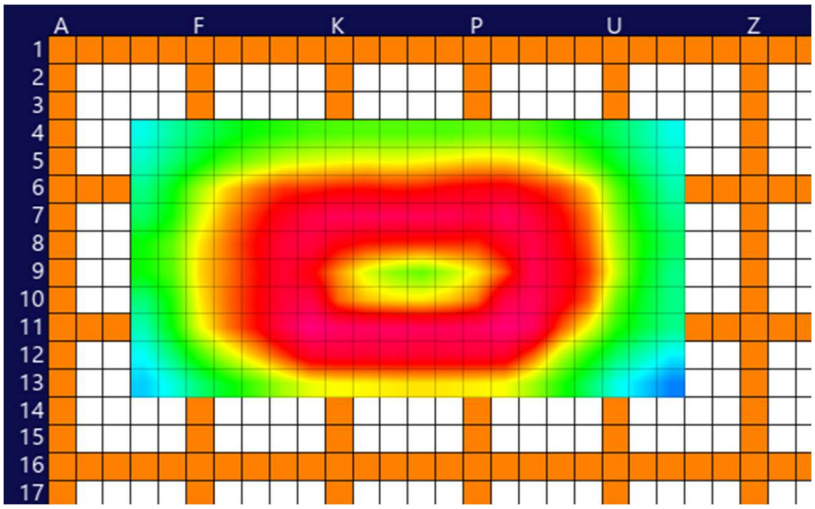


b. Run the first scan: Place the DUT on the scanner at the desired position. Run the first scan.



c. After the first scan, a message box will pop-up indicating to move the DUT down by exactly 1 row. Another way to describe the direction up is along the shorter axis towards the higher row numbers. Do not change the orientation or position along the longer axis of the board. After you move the DUT, click OK to run the second scan.

The resultant scan:

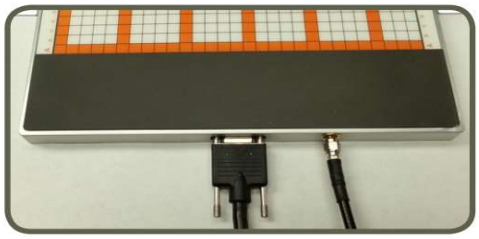


MEASUREMENT TYPES

Scanning a PCB

Place the PCB on the scanner aligning it as closely as possible to the vertical and horizontal guidelines. Lining it up squarely assists you when importing overlays or images (JPG).
When analyzing the emissions produced by a printed circuit board or device (DUT), verify that the signals are being emitted from the DUT and are not ambient background signals being retransmitted by the DUT:

1. Run a Spectral Scan over the frequency range of interest with the unpowered PCB on scanner. This is to eliminate the possibility that the DUT is acting like an antenna or signal conduit for non-local sources.
2. Power on the PCB and go through step 1.
3. Compare the powered and unpowered scans taken with the DUT in the identical positions and with identical scanning parameters to identify frequencies that have emissions emanating from the DUT. To determine the significant emission areas on the DUT at the frequencies of interest:
4. Perform a wide-frequency range Combined Scan or several Combined Scans to cover the entire frequency range of interest. Run Spatial Scans at the same frequencies used in Steps 1 and 2. If the peaks have not been measured accurately:
5. Run narrow Spectral Scans so that the frequency error of the spectrum analyzer is less than the bandwidth used for the Spatial Scan; e.g., for a spectrum analyzer with a frequency error of 1% of a scan, a Spectral Scan with a span of less than 10 MHz should be used for a Spatial Scan using a bandwidth of 100 kHz.
6. When measuring emissions above 6 GHz there is the possibility that surface waves on the scanner will degrade the rated isolation. To combat this effect a small surface wave absorber must be placed on the edge of the scanner.



Scanning Best Practices

1. Choosing which scan to use. Is the device expected to have continuous emissions or intermittent activity? All devices have software-based activity and EMScanner ability to capture time-based feature can be very helpful.
  a. If the device has some intermittent activity, select Continuous Spectral Scan with Peak Hold ON followed by a Continuous Spatial Scan with Peak Hold applied for each of the frequencies of interest.
  b. If the device emits continuously, select Combined Scan.
2. Choosing Spans and Resolution Bandwidths (RBW). It is recommended that you scan a small frequency span with an RBW in the 120 kHz to 10 kHz range as it provides you with more immediate feedback. EMScanner has the capability of scanning all 1218 probes at a large span and a tight RBW but such scans can take a long time to complete.
3. Tips:
  a. Import an image overlay whenever possible. Carefully locate the overlay to coincide with the DUT as slight variations can be misleading. Make sure that the overlay is properly oriented. If the overlay file will be added afterwards take careful notes regarding the DUT placement on the scanner (coordinates), its orientation and the side of the DUT being scanned.
  b. Set up a separate module or project for your DUT and use the 'Description' portion of the setup to identify the purpose of the scan quickly and easily.
  c. If you already have visited a compliance facility and have a report, it is a good idea to include this data in the notes and conduct the EMScanner scans at the same frequencies. There will be differences in the far-field and near-field values, but they will be relative.
  f. If the scan amplitudes are below 20 dBuV and the noise floor is high, use a low noise amplifier (your own or one provided by Y.I.C. Technologies) and reduce the Resolution Bandwidth.
  g. We take measures to compensate for spectrum analyzer noise.
  h. Make special note of low amplitude current loops that are coupling onto the connectors.
  i. Conduct Spatial Scans using continuous scan and peak hold at some of the frequencies of interest, even if a Spectral/Spatial Scan was used. The Continuous Spatial with peak hold will almost always provide a different picture than a single Spatial or a single User Spatial of a Combined Scan (as all boards have time variances). The ability to capture time-based events is a benefit unique to Y.I.C. Technologies.
  j. If you have a very strong intentional radiator, it may be advantageous to either conduct scans excluding this frequency (a scan below the frequency and a scan above the frequency) or add a passband filter (customer-provided) that selectively excludes this frequency.
  k. If you are scanning very high amplitude intentional radiator an attenuator may be required.

APPENDIX- F&Q'S

1. How can I correlate the scan results to PCB design?

EMViewer supports image overlays that you can place on the scanner pattern.

2. Does the system require annual calibration?

The EMScanner does not require calibration after shipment. The scanner elements are passive and will not require further calibration. If you believe that one or more of the probes have been damaged, the unit can be returned to Y.I.C. Technologies for verification and repair.

3. What is the frequency and amplitude accuracy of the EMScanner measurements?

Frequency Accuracy: Marked Peaks – Typically accurate to 1 kHz
A calibrated spectrum analyzer or EMC analyzer normally has a frequency error of between 1% and 2% of span. During the process of marking peaks, EMScanner conducts several rescans of identified peaks after the initial scan is completed. The final accuracy is 1-2% of the final scan bandwidth shown on the spectrum analyzer display.
Some supported models of spectrum analyzer provide higher accuracy frequency measurements using an internal counter. For these spectrum analyzers the final accuracy is the specified accuracy of the counter.
Amplitude Accuracy: Spectral or Spatial Scans: approximately +/- 3 dB This is a combination of spectrum analyzer accuracy and probe factor responses from cell to cell across all frequencies from scanner to scanner.

4. How do I achieve higher frequency accuracy?

Frequency accuracy is compromised by the spectrum analyzer frequency measurement accuracy of 1% to 2% of span, unless the spectrum analyzer is equipped with a higher accuracy frequency counter. Therefore, by decreasing the span, the user can increase the frequency accuracy. Since EMScanner final rescan for peak detection is set at a span of 5 x RBW, reducing the RBW has the effect of improving the frequency accuracy.

5. I have a spectrum analyzer that is not on the list of supported analyzers. Can it be supported?
If your spectrum analyzer is not on the supported spectrum analyzer list, please contact Y.I.C Technologies (support@yictechnologies.com) to discuss the development of a custom driver.
Spectrum Analyzer must be configured with the following options to be supported: gated sweep, preamplifier, LAN or USB port, external trigger port with BNC connector and VISA support.

6. How do I make sure that I see all the peaks that might cause me problems in the far field?
There are instances where components of the DUT are some distance away from Y.I.C. Technologies scanner, and signals from these devices may be mixed with the noise floor. We recommend that a low noise amplifier be placed in series between the scanner and the spectrum analyzer to differentiate the signal from the noise floor. We also recommend that you reduce the RBW to improve the signal to noise ratio. It is important to recognize that some of the emissions may originate within the DUT, and then couple onto the connectors and cables (which may act as an antenna). The signals, at the DUT level, can be of low amplitude, while their far-field value (when conducted out and radiated), could be
up to 100,000 times as large

7. What are the Minimum System Requirements?
See "Minimum System Requirements" section.

8. What is the maximum power level that The EMScanner can receive without being damaged?
The surface of the scanner can handle thousands of volts. The scanner is rated for a radiated load of 10 W or 40 dB. If a transmission line carrying RF power of more than 10 W / 40 dBm is placed close to the scanner probe for extended periods, it is likely to damage the scanner.

9. How sensitive is the EMScanner?
EMS sensitivity: -135 dBm to 35 dBm (Dependant on spectrum analyzer performance)

Frequency (MHz)	0.05	1	300	696	1500	2000	2600	3000	3500	4000
Sensitivity	-3	-50	-100	-108	-107	-100	-95	-85	-85	-80
Sensitivity with 40 dB LNA	-20	-60	-135	-120	-135	-115	-115	-105	-100	-90

(* 30 dB LNA)
EMS sensitivity: -130 dBm to 35 dBm (Dependant on spectrum analyzer performance)

Frequency (MHz)	0.15	0.5	1	300	696	1500	2000	2600	3000	3500
Sensitivity	0	-15	-25	-68	-75	-79	-83	-85	-85	-86
Sensitivity with 40 dB LNA	-10	-25	-45	-90	-95	-100	-100	-130	-95	-100

Frequency (MHz)	4000	4500	5000	5500	6000	6500	7000	7500	8000
Sensitivity	-78	-68	-70	-75	-70	-65	-70	-60	-60
Sensitivity with 38 dB Power Amp.	-91	-85	-90	-88	-85	-90	-85	-70	-63

(* 40 dB LNA; ** 38 dB Power amplifier)

10. How can I find the frequency of an intermittent or random signal?
Run a continuous Spectral or Spatial Scan with Peak Hold. It will replace the peak amplitude with each successive higher measurement. Start with a large RBW to increase the speed of the spectrum analyzer. Once you have captured the signal, reduce the frequency span and decrease the RBW if you want to improve the accuracy of the measurements

11. I am designing multiple layer boards. How can the EMScanner help to diagnose EM problems?

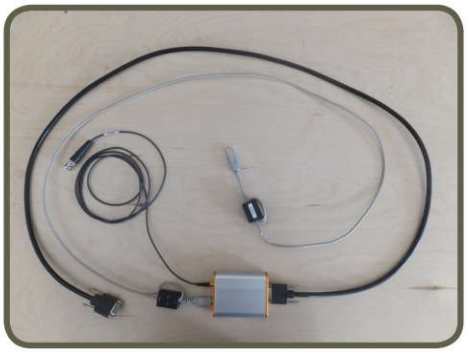
Currently, there are no measurement techniques on the market that can exactly see what is going on inside a multi-layer board. A chamber for example, will only deal with far-field and will not differentiate between what is coming from the edge, the most external layer, the internal layers, and the interaction between the layers. It is the most blind of all EMI test solutions to help design a better PCB with EMI reduction at the source. Automated single probe, handheld probe, and EMScanner can differentiate at least between the emission from the edge (where emissions from the internal layers will most likely escape and emit) and from the surface of the external PCB layers. If one uses a pre-amplifier, the scanner or probe could pick weaker signals from the internal layers leaking through the external layers. A comparison of the spectral and spatial analysis with or without amplification could then help point the source (frequency may help specify a component, and the location will do as well). Using the Gerber of the inner layers as overlay could help confirm the weaker emissions comes from a known PCB feature. The EMScanner and automated single probe could handle that; the handheld probe will not work. Clearly, the EMScanner and the automated single probe are the only adequate tools for multi-layer PCB EMI measurements. However, the fact that the EMScanner is much faster and can track intermittent events through peak hold with continuous scanning, makes it the best solution overall.

APPENDIX- ERROR MESSAGES

If you receive other error messages, please contact Y.I.C. Technologies Technical Support: support@yictechnologies.com

Safety and Regulatory Information

The Spectrum Analyzer connected with an Ethernet cable to the Personal Computer (PC) must all together comply with CE emission requirements.



• Read all the instructions listed here and/or in the user manual before you operate this device. Give attention to all safety precautions. Retain the instructions for future reference.
• This device must be installed and used in strict accordance with manufacturer's instructions, as described in the user documentation that is included with this device.
• User must comply with all warning and caution statements in the instructions. Observe all warning and caution symbols that are affixed to this device.
• To prevent shock or fire hazard, do not expose this device to rain or moisture. The device must not be exposed to dripping or splashing. Do not place objects filled with liquids or chemicals on the device.
• This device was qualified under test conditions that included the use of the specified cables, between system components. To ensure regulatory and safety compliance, use only the provided power and interface cables and install them properly.
• Different types of cord sets may be used for connections to the main supply circuit. Use only a main line cord that complies with all applicable device safety requirements of the country of use.
• Installation this device must be in accordance with national wiring codes and confirm to local power company instructions and guidelines.
• Do not overload outlets or extension cords, as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard.
• Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords where they are attached to plugs and convenience receptacles and examine the point where they exist from the device.
• Place this device in a location that is close enough to an electrical outlet to accommodate the length of the power cord.
• Place the device to allow for easy access when disconnecting the power cord of the device from the AC wall outlet.

• Do not connect the plug into an extension cord, receptacle, or other outlet unless the plug can be fully inserted with no parts of blades exposed.
• Place the device on a stable surface.
• It is recommended that the customers install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the device by local lightning strikes and other electrical surges.
• Postpone installation until there is no risk of thunderstorm or lightning activity in the area.
• Do not cover the device or block the airflow to the device with any other objects. Keep the device away from excessive heat and humidity and keep the device free from vibration and dust.
• Wipe the device with a clean, dry cloth. Never use cleaning fluid or similar chemicals. Do not spray cleaners directly on the device or use forced air to remove dust.
• Do not use this product near water: for example, near a washbowl, or a laboratory sink.
• Do not open the device. Do not perform any servicing other than that contained in the installation and troubleshooting instructions. Refer all servicing to qualified service personnel.
• This device should not be used in an environment that exceeds 40º C and lower than 15º C.

FCC Class B Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
• This device may not cause harmful interference.
• This device must accept any interference received, including interference that may cause undesired operation.
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a
installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
• Reorient or relocate the receiving antenna
• Increase the separation between the equipment and receiver
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
• Consult the dealer or an experienced radio/television technician for help

Modifications: Any modifications made to this device that are not approved by Y.I.C. Technologies may void the authority granted to the user by the FCC to operate this equipment. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this product not expressly approved by party responsible for compliance might cause harmful interference and void the FCC authorization to operate this product.

CE mark

EMScanner conforms to the following standards and other related normative documents:
• Electromagnetic emissions:
(Council Directive 2004/108/EC–EN61326-1 Ed 2.0 2012-07. CISPR 11:2009,A1:2010)
FCC Part 15 B
• Electromagnetic immunity:
(Council Directive 2004/108/EC–EN61326-1 Ed 2.0 2012-07 IEC61000-4-2:2008, IEC61000-4-3:2006 A1:2007, A2:2010, IEC61000-4-4:2004 A1:2010, EN61000-4-5:2005, EN61000-4-6:2008, IEC61000-4-8:2009)
• Safety:
(Council Directive 2006/95/EC-IEC/EN 61010-1) Marks of Compliance