\Orchestrating a brighter world

NEC

EMI Suppression Support Tool

EMIStream

Includes EMI Rule Check function verified by research institutes around the world and Power/Ground Resonance Analysis function. EMI suppression measures for maintaining consistently high quality in PCB design.

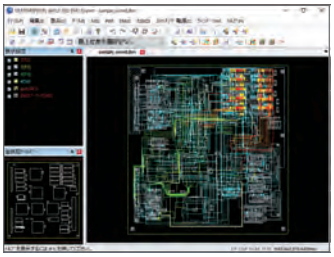
In the face of even stricter standards and regulations for undesirable electromagnetic waves, EMI suppression measures for equipment have become an important issue for improving system quality. EMIStream includes a Rule Check function and a Power/Ground Resonance Analysis function to suppress undesirable electromagnetic waves at the PCB design stage for enabling shorter development times and lower costs for suppression measures.

EMI Rule Check Function

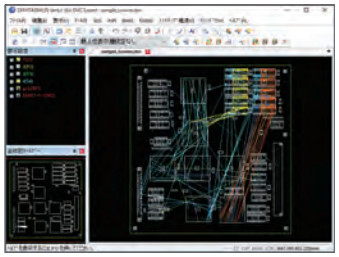
This function identifies the component placement, trace, and plane areas that cause EMI and proposes suppression measures for these areas.
The rule check items in EMIStream were carefully selected because of their strong theoretical basis for generating EMI and were verified by NEC's research laboratories and by universities around the world based on a vast knowledge base of past EMI suppression measures.
This was used to narrow down to 15 key design items.

Key EMI Rule Check Items

1. Trace Length
2. Via Count
3. Reference Change
4. Return Current Path Discontinuity
5. Traces Near Plane Edge
6. Estimated Radiation
7. SG Trace
8. SG Via Spacing
9. Grounding Vias Along Plane Outline
10. Filter
11. Decoupling Capacitor
12. Differential Signal
13. XTalk
14. Digital/Analog Interference
15. IC Ground Split



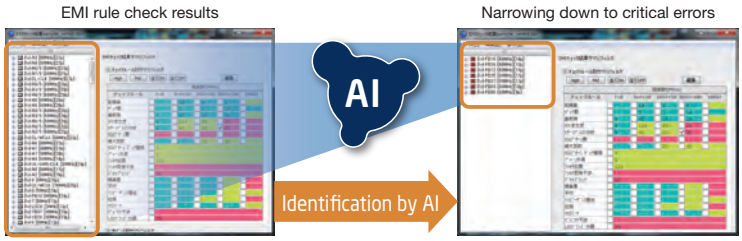
(Data check after tracing)



(Data can also be checked at the placement review stage)

AI display function

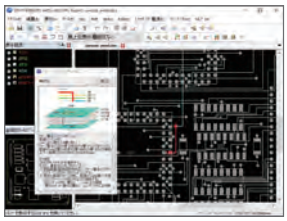
An AI engine, which incorporates the know-how of EMC experts, detects and displays errors cited as important by the experts. This function is used to detect fatal errors.



(Error screening function)

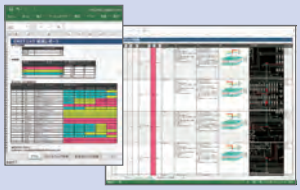
EMI rule check advice function

This function lists the nets containing large numbers of EMI rule check errors in order. Error marks are displayed at each error location in the nets for enabling the user to visually assess the problem areas.
For each error location, the error details are explained using pictures and text, and the proposed corrective action for the error is also provided.



Check result report function (option)*

*Included as standard in EMIStream EMC Expert
This function exports the error details and correction procedures to an Excel file, which can be used as a design correction instruction.



ESD Rule Check Function (Option)

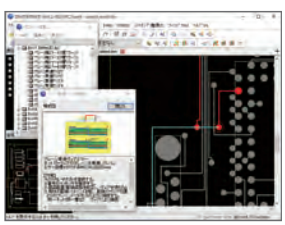
The ESD rule check consists of 10 rule check items for detecting areas on the PCB where ESD noise problems are likely to occur and provides advice on how to correct them. Based on the ESD suppression measures developed from real-world cases by high-tech companies and research institutes around the globe, NEC Laboratories verifies the results of the check and determines the check contents and threshold values.

Check groups with proven results

- Signal trace check group
  This detects structural problems in signal lines that are susceptible to ESD noise.
- Suppression measure component placement validity check group
  This identifies missing ESD suppression measure components and their improved placement.
- Frame ground (FG) pattern check group
  This identifies structures that increase ESD noise in the FG pattern by acting as an ESD current discharge path.

Error locations display and advice

This function lists the nets containing large numbers of ESD rule check errors in order.
Error marks are displayed at each error location in the nets for enabling the user to visually assess the problem areas. Also, for each error location, the error details are explained using pictures and text, and the proposed corrective action for the error is also provided.

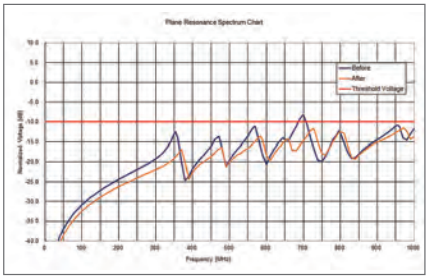


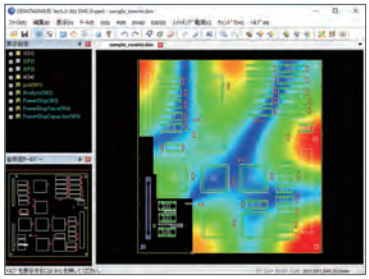
EMIStream Features

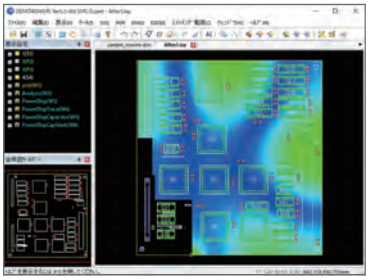
- Enables checking and analysis with just simple settings without the need for electrical libraries.
- Error screening function allows easy detection of key correction items for suppression measures.
- EMI suppression measures can be incorporated in the early design stages for enabling rapid time-to-market.
- High-speed calculations allow quick identification of harmful locations where EMI occurs.
- Automatically performs design checks that used to be done manually.
- Functions that calculate radiated electric field values and other features enable confirmation of EMI phenomena specific to the product.

Power/Ground Resonance Analysis Function

This function analyzes resonance between the power supply and ground plane, which is a major cause of EMI. The analysis results can be confirmed by frequency characteristics and voltage distribution. The frequency characteristics allow the user to confirm the harmful frequencies and the magnitude of the resonance voltage. In the voltage distribution display, locations with large resonance voltages are indicated in warm colors, making it easy to determine the placement of suppression measure components. The automatic capacitor placement function automatically places capacitors of the optimum capacitance at the appropriate locations.

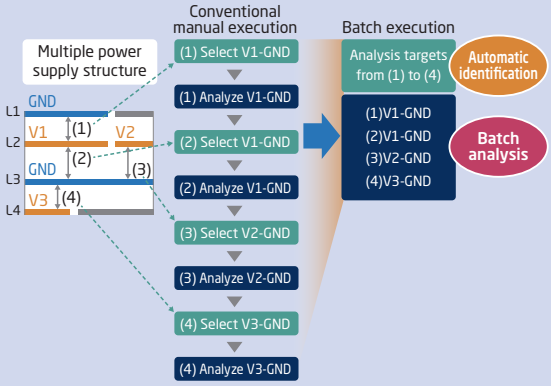






Resonance Analysis Batch Execution Function

This function automatically identifies power-ground pairs within a board to automate analysis of multiple power supply boards.



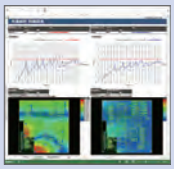
Report Generation Function (Option)*

*Included as standard in EMIStream EMC Expert

This function can generate a report file of the standard analysis results.

A report can be created that collects multiple analysis results, including analysis results before and after plane resonance suppression measures and the analysis results of each power supply in the board.

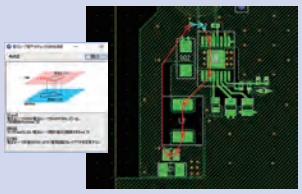
The report can be used as evidence of the resonance suppression effect from plane resonance suppression measures and the results of resonance analysis for each power supply plane.



Switching Power Supply Check Function (Option)*

*Included as standard in EMIStream EMC Expert

This function is used to visualize the current paths in power circuits and to assist in layout design for suppressing noise generation and diffusion based on 9 design rules.

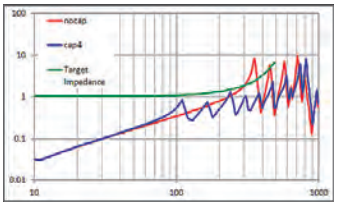


Power Integrity Analysis Function (Option)

This function analyzes power integrity (PI), which has been attracting growing attention in recent years. This function can examine the location and value of capacitors to prevent IC malfunctions. This enables capacitor design that takes into account both EMI and PI.

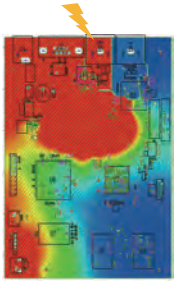
Input impedance analysis

S-Parameter is used to analyze the input impedance between the power supply and ground on the IC. This enables checks of whether the design meets the target impedance provided by the IC vendor and enables capacitors to be added automatically as a corrective measure.

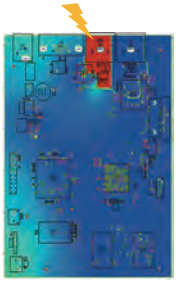


Transfer impedance analysis

This function calculates the transfer impedance of noise and displays harmful areas using gradations. ESD noise propagation can also be confirmed.



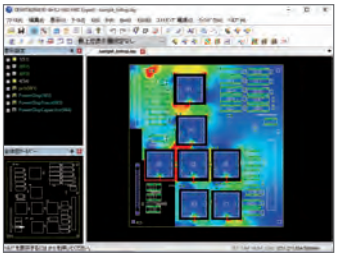
Short-circuit (1-point connection)



Bead connection

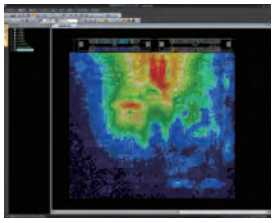
DC analysis (IR drop)

This function analyzes the voltage drop value and current density at any point on the plane from the power supply module (voltage regulator module) position based on the current usage value of the IC.



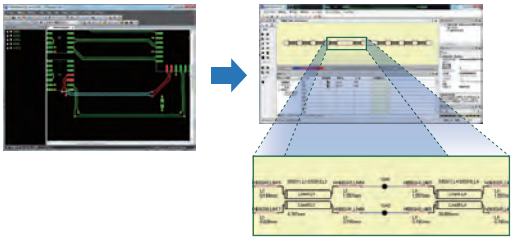
Magnetic field probe scanner interface: Noise visualization system link (option)

Measurement results from the noise scanning system can be imported into EMIStream and displayed as an overlay onto board CAD data.
This facilitates the identification of problem areas (components, patterns, pins, etc.).
This also enables identification of noise sources and problem areas not only on the measurement surface, but also on the inner and back surfaces.



SignalAdviser link

Signal integrity is essential for electrical design.
EMIStream can be linked with Fujitsu's SI analysis tool SignalAdviser to enable design that incorporates EMI and SI checks.



Product System

EMIStream

- EMI Rule Check function
- Resonance analysis function
- High performance analysis engine (option)
- Report generation function (option)

2-layer board EMI rule check (option)
Switching power supply check (option)
ESD Rule Check Function (Option)
PI analysis function (option)
SignalAdviser interface (option)

EMIStream EMC Expert

- EMI Rule Check function
- High-performance analysis engine
- Resonance analysis function
- Report generation function
- Radiated value graph display
- Far field EMI calculation
- Multilayer resonance analysis
- 2-layer board EMI rule check
- Switching power supply check

ESD Rule Check Function (Option)
PI analysis function (option)
SignalAdviser interface (option)

Operating Environment

OS	Windows 10 / Windows 11
CPU	Intel Core i3 or faster
Memory	1 GB or more
Disk SpaceSystem	200MB + Data area (200MB or more recommended)
Others	Microsoft Excel 2016/2019/2021 Microsoft Office 365 ProPlus version 2002-2102

Supported Layout CAD

Cadence Design Systems	Allegro / OrCAD
Zuken	CR-8000 Design Force / CR-5000 Board Designer/ CADVANCE
Siemens	Xpedition / PADS Layout / Board Station
Altium	Altium Designer
Other	CAD that supports ODB++ output

e-DesignSolution

NEC provides design system solutions such as EMIStream, EMI suppression measures and consulting, design support solutions that support actual design work such as circuit and PCB design, magnetic field probes, EMI certification services, and prototyping and evaluation solutions for prototypes and mass production.

Scanner measurement
We measure the magnetic and electric fields on the board by automatically scanning magnetic and electric probes on the board.

Prototyping and Evaluation Solutions

- Services from prototypes to mass production
- EMC measurement and certification
- Magnetic field probe / noise visualization system
- VCCI kit module interference measurement
- IC evaluation (IEC standard MP method) and evaluation board design

Design System Solutions

- EMI suppression design support tool (EMIStream)
- Power integrity design support tool (PIStream)
- IC package layer count estimation and design system (GENISSNX)
- PDM/ECM system construction
- Knowledge management and building of information systems

Design Support Solutions

- EMI suppression measures
- Consulting
- Circuit/PCB design
- SI/PI

EMI: Electro-Magnetic Interference
EMC: Electro-Magnetic Compatibility
ESD: Electrostatic Discharge

e-DesignSolution

NEC Global Enterprise Solutions for Manufacturing

For inquiries, please contact
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Product developer:
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