

## High-speed and Accurate Design Rule Check Enables Realistic EMI Countermeasures in the Design Flow

# EMI Design Rule Checker

## Overview

During the PCB layout design phase, satisfying electric design rules can reduce rework after EMC testing. This results in minimized design time and cost.

The EMI Design Rule Check enables you to front-load EMI countermeasures, and has the following effects:

1. Improves design quality (automatic error detection prevents human error)
2. Reduces design costs (reduces the number of EMC countermeasure components. Automatic detection improves efficiency of design review)
3. Meets product delivery dates (reduces rework from failures in EMC testing)

The tool is essential for high-end printed circuit board design, particularly because visually checking high-speed signals and LSIs on a multi-layer PCB is difficult.

## Issues at Design Sites

Recently, design has become more complicated due to higher-speed circuits. This has resulted in frequent EMI problems. If designers visually check the layout patterns one by one as EMI countermeasure, it may increase work-hours and human error may occur. Another problem is inconsistent design quality due to relying on the expertise of design engineers.

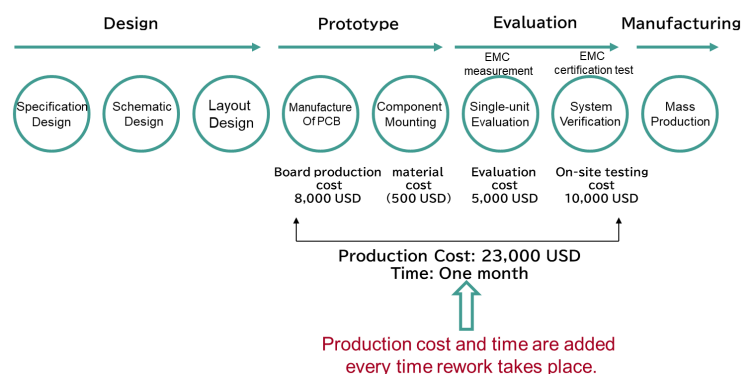
Known issues

- Design has become complicated due to higher-speed circuits.
- EMI problems are prominent.
- Engineers in charge of EMI countermeasures check the patterns manually.
- Excessive EMI-prevention components increase costs.
- EMI countermeasures rely on rules of thumb.

In addition, when a PCB fails the EMC test during the evaluation phase after prototyping, it is necessary to go all the way back to the PCB Layout Design or Schematic Design to take EMI countermeasures. Longer TAT caused by rework generates problems such as failure to meet product delivery dates, lost opportunities for product sales, and increasing countermeasure costs.

As such, EMI countermeasures need to be front-loaded in the design flow.

### ◆ Case of rework on a 6-layer PCB



# Characteristics of the EMStream EMI Check

EMStream EMI Design Rule Check enables you to front-load EMI countermeasures in the design phase. Using the EMI Check can reduce work-hours, eliminate human error, and improve design quality.

## NEC's design expertise and research results come as standard.

The EMI Check has 15 design rules verified by NEC Laboratory and local and overseas university researchers with a logical background. There are six design rules for checking the trace, five for checking the return current paths, and four for checking the power plane. They cover the design rules required for high-end PCB. The necessary parameters and thresholds for the Design Rule Check are set with efficient default values through product development experience and research results. This means you can use it immediately without the need for specialized EMC preconfiguration.

## Check Items (15 Rules)

### Trace Check

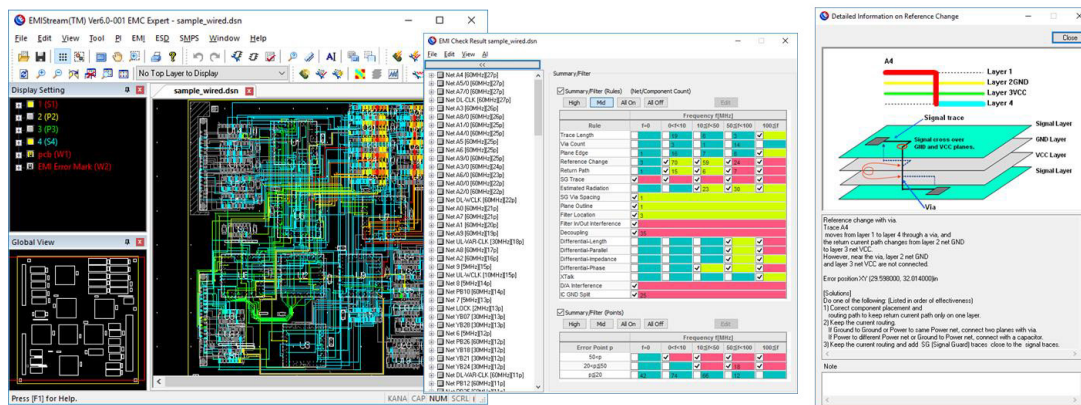
1. Trace Length
2. Via Count
3. Estimated Radiation
4. Differential Signal
5. XTalk

### Return Current Path Discontinuity Check

1. Reference Change
2. Return Current Path Discontinuity
3. Traces Near Plane Edge
4. SG Trace
5. SG Via Spacing

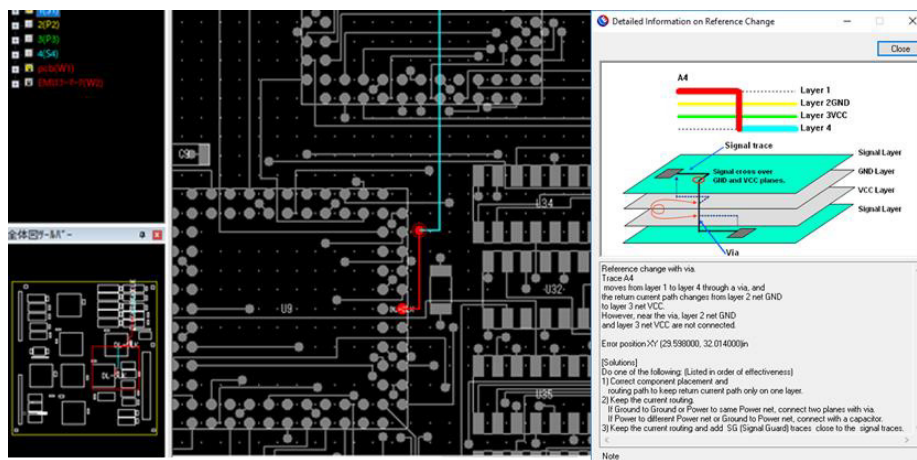
### Power Plane Check

1. Grounding Vias Along Plane Outline
2. Decoupling Capacitor
3. Digital/Analog Interference Check
4. IC Ground Split Check



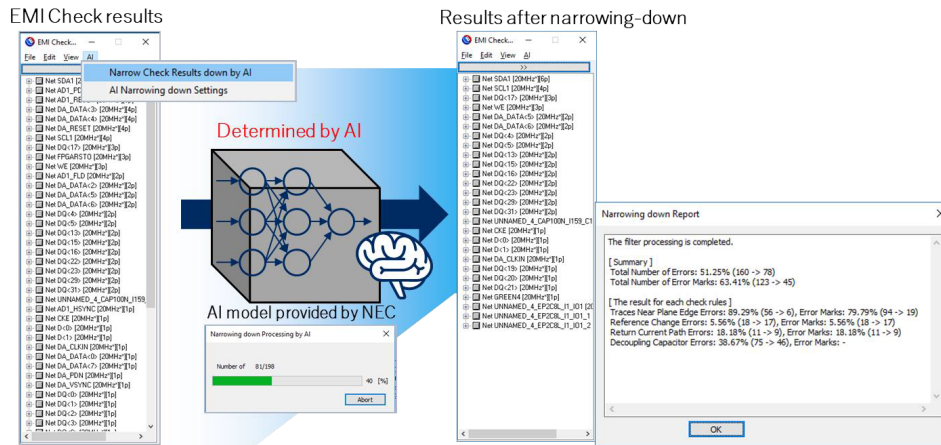
## Simple, User-friendly Operability

As for EMI Check results, errors are highlighted/zoomed. At the same time, descriptions of the errors and advice on preventing them make it easy to recognize defect points. Correcting the layout according to the provided advice makes it easy to prevent EMI.



The AI function, which has learned EMC consultants' specialist knowledge, also enables you to narrow down to the most important errors. This enables error screening and countermeasures equivalent to those employed by EMC experts.

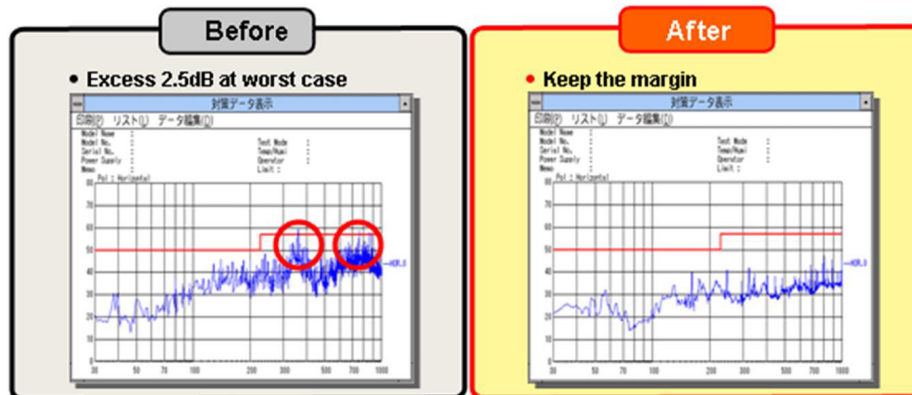
## Integrate the design review know-how of the EMC Expert into AI Narrowing EMI check results down only to be significant errors using AI



- The number of errors reduces by **75%** (Review time: **75% cut**).
- Design quality can be improved because the dependence on humans can be reduced.

## Effects of introduction

Case of reducing radiation noise as well as the cost and evaluation period.



EMI Countermeasure cost decreased to 1/10

Evaluation Term reduced from 10 days to 3 days

## Contact Us

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