

SERDES Case Study

EMI Near-Field Emissions Profiles: Reducing Time-to-Market

BACKGROUND

A major semiconductor manufacturer had already developed a point-to-point solution (half-duplex) between Serializer/Deserializer (SerDes) devices. In the next generation, the SerDes interface was upgraded by embedding a bidirectional control channel together onto the high-speed serial link for a two-way transmission (full-duplex).

Research Objective:

Quantify the EMI emissions profile by comparing the half-duplex deserializer to the next generation full-duplex design. Determine whether the full-duplex design impacts the EMI profile and, if so, quantify the difference.

Test Method:

The design team utilized the on-site EMxpert near-field EMI scanner. They placed the original half-duplex board on the scanner to generate a baseline measurement. After connecting power to the device under test (DUT), they activated the scan on a PC. (Fig. 1)

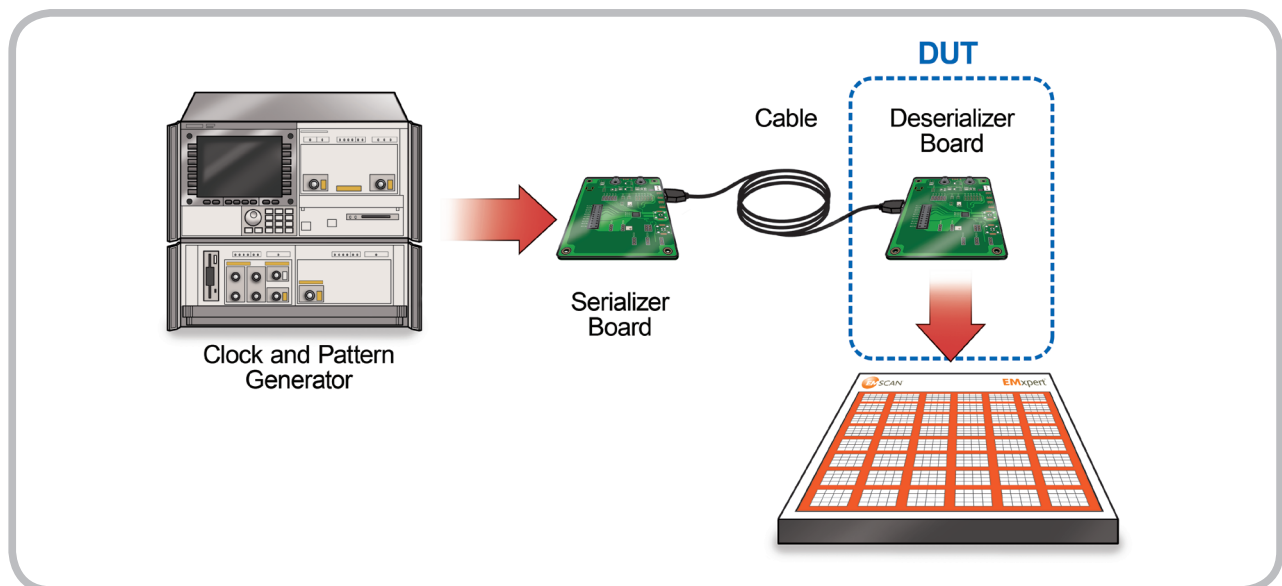


Fig. 1 Test setup for EMI scan

Using the identical test setup, the team replaced the baseline board with the new generation full-duplex board.

Test Results:

The **EMxpert** system generates and displays emissions profiles in real-time and includes both spatial and spectral results. The profile of the baseline system appears in Fig. 2.

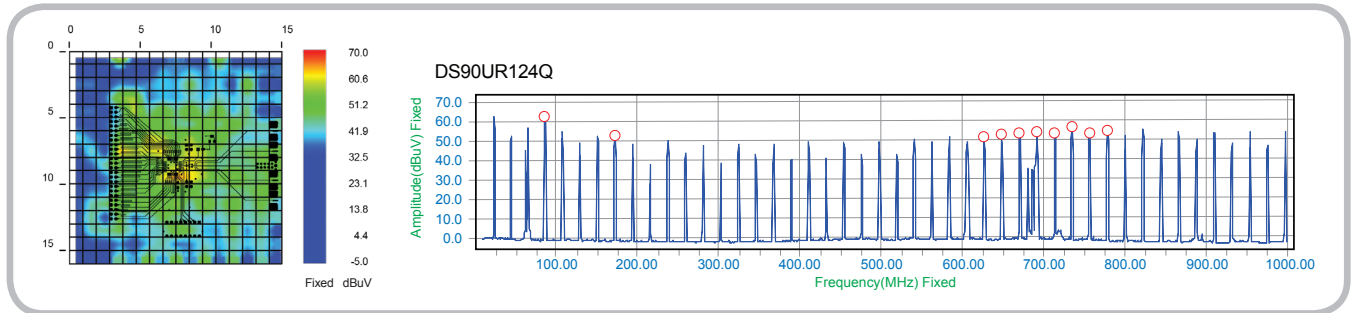


Fig. 2 Baseline results - SERDES in half-duplex mode

By comparison, note the emissions scan for the full-duplex scan in Fig. 3.

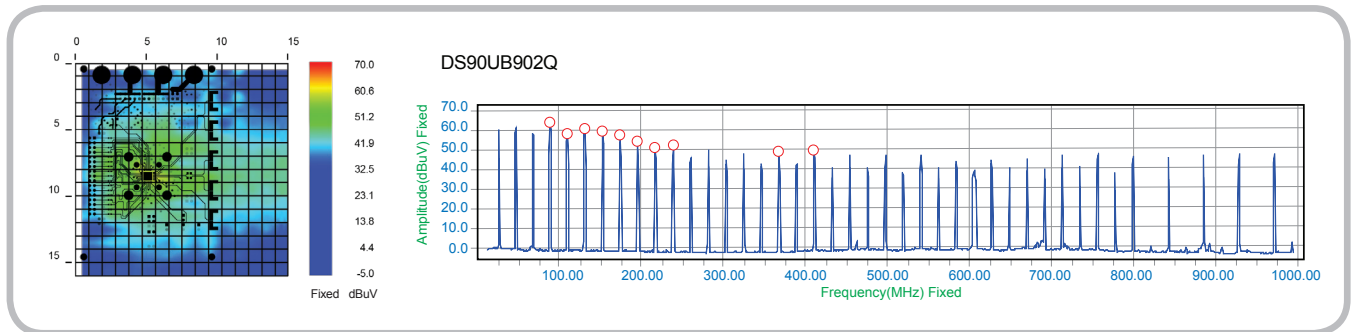


Fig.3 Emissions profile – SERDES in full-duplex mode

Conclusions:

The team carefully compared the spatial and spectral scan results. They observed no spikes, very similar peak emissions, and a slightly better EMI profile (more blue in the spatial scan) in full-duplex mode than the baseline. By quantifying that no appreciable change occurred in full-duplex mode, (Fig. 3) the team implemented the full-duplex feature with no additional mitigation measures.

SUBSTANTIALLY REDUCED DESIGN TIME

The design team conducted the scans on the EMxpert system in their offices. *In a matter of minutes*, they obtained the results shown above. Because the emissions profile clearly demonstrated a superior emissions profile, the design required no additional mitigation. To test the new design in a third party chamber would have required that an engineer travel to an off-site test facility for the better part of a day. Access to a chamber could have been weeks away.

To learn more: info@emscan.com

Acknowledgement: Images and scan results provided by National Semiconductor / Texas Instruments.