IoT enabled portable EMI meter

Problem Addressed

Electromagnetic Interference (EMI) disrupts electronic and IoT systems, leading to performance issues and communication failures. The growing density of IoT devices amplifies EMI risks, especially in critical sectors like railways and automotive systems. Existing EMI detection tools are bulky, costly, and unsuitable for real-time, compact applications.

Proposed Solution

A portable EMI meter integrated with IoT for real-time monitoring and analysis of electromagnetic interference using magnetic field detection sensors and a loop antenna. IoT connectivity enables remote data access for predictive maintenance and interference mitigation.

Key Features

- **Measurement of E and B:** Accurately detects electric and magnetic fields for precise EMI measurements using sensors
- **FFT analysis:** Performs detailed frequency spectrum analysis to identify and filter electromagnetic signals.
- **Real time monitoring:** Provides continuous, live tracking of EMI levels for instant detection and response.
- **EMC standards:** Ensures compliance with industry electromagnetic compatibility regulations.
- **User friendly interface:** Easy-to-navigate dashboard for clear and responsive data insights.

Technology and Procedure

- **Loop antenna:** Act as a sensor to capture electromagnetic interference, especially in the low-frequency range, used for measuring both electric and magnetic fields over a wide range of frequencies.
- **FFT Analysis:** The device applies FFT to convert time-domain EMI signals into the frequency domain, identifying specific interference frequencies and their intensity
- **Real-Time Monitoring:** continuous tracking of EMI levels and transmits data via IoT connectivity, providing instant access to interference information

Conclusion

The portable EMI meter with IoT integration provides real-time monitoring of EMI. It ensures EMC standards and with its user-friendly interface and remote data access, it enables efficient EMI management. This meter can offer a proactive approach to improving the performance and safety of electronic systems.