

"Need for full-fledged EMI/ EMC Testing & HIL Software Testing for AES/ Sub-Systems"

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Spark Minda, the Ashok Minda Group is a leading Tier -1 Auto Components Supplier to all major OEM's in India & having an outstanding international presence in R&D, Manufacturing and Marketing. With more than 20 years of rich experience in the field of Engineering, Business Solutions, Research & Development and Product Development Mr. Suresh heads Spark Minda Technical Centre.

He was previously associated with Bosch Limited, Bengaluru as a Chief of R&D Gasoline Systems and two wheeler power train solutions. His expertise includes Automotive Embedded Systems, Power Train Systems, Electronic Fuel Injection & Transmission Systems, ECUs, BCMs, Control Units, Various Sensors, Genset Control Systems, Infotainment & Instrument Clusters, Telematics & Fleet management Systems etc. In a detailed discussion with MART, Mr.Suresh shares his views on testing and measuring in the automotive segment, Excerpts:-

How do you see the automotive trends in India?

Government of India aims to make automobiles manufacturing the main driver of 'Make in India' initiative, as it expects passenger vehicles market to triple to 9.4 million units by 2026, as highlighted in the Auto Mission Plan (called AMP) 2016-26. Government has formulated a scheme for Faster Adoption and Manufacturing of Electric and Hybrid Vehicles in India (called FAME), under the National Electric Mobility Mission 2020 to encourage the progressive induction of reliable, affordable and efficient electric and hybrid vehicles in the country.

In what can be seen as perhaps India's boldest move to curb air pollution, the government has decided to advance the standard for cleaner cars and leapfrog to Bharat Stage-VI emission (emission level similar to Euro VI) norms countrywide by April 2020. This step shows perhaps the strong initiative of India towards the vehicle emission reduction still ahead of the majority of the developed nations in the world.

Last but not least is the safety related, no one could have imagined that this country

will bring the introduction of Antilock Braking System (called ABS) mandatory for two wheelers of engine capacity 125 cc and above so soon. These systems are complex in nature in terms of its hardware and software architecture.

What does the complexity mean to automobile OEM's and buyers?

Proliferation of electronic systems in automobiles will increase the technical complexity, however the challenge is not only in the compatible design solution, much tougher is the detection of such faults early in development phase to avoid the safety critical risks in the field. Reliability of these electronic devices is key for safe driving.

General environmental tests are not able to detect the complex problems which are associated with either software or hardware or both. The latest cars have multiple microcontrollers / microprocessors working monolithic mode or with real time operating systems. Hence a reliable hardware testing and a proven software validation is important in achieving the overall reliability of the electronic systems.

What are the basis of electromagnetic interference and its influences?

Electromagnetic compatibility (EMC) is the branch of electrical engineering concerned with the unintentional generation, propagation and reception of electromagnetic energy which may cause unwanted effects such as electromagnetic interference (EMI) or even physical damage in operational equipment. The goal of EMC is the correct operation of different equipment in a common electromagnetic environment.

EMC pursues two main classes of issue. Emission is the generation of electromagnetic energy, whether deliberate or accidental, by some source and its release into the environment. EMC studies the unwanted emissions and the countermeasures which may be taken in order to reduce unwanted emissions. The second class, susceptibility is the tendency of electrical equipment, referred to as the victim, to malfunction or break down in the presence of unwanted emissions, which are known as Radio frequency interference (RFI).

Immunity is the opposite of susceptibility, being the ability of equipment to function correctly

in the presence of RFI, with the discipline of "hardening" equipment being known equally as susceptibility or immunity. A third class studied is coupling, which is the mechanism by which emitted interference reaches the victim.

New technologies and communication systems in vehicles demands an extensive testing and evaluation, before electronic modules are used in real-time installations, in order to ensure complete safety and reliability. EMC intended to avoid malfunctioning of the vehicles and their sub-systems due to electromagnetic interference between the different components and sub-systems, within the vehicle and its environment.

In view of the criticality of EMC compliance, world-wide full-vehicle EMC tests have become mandatory. Additionally, components and sub-systems are also subjected to regulations and need to be tested separately (Component level testing). Achievement of Electro Magnetic Compatibility (EMC) requirements shall be a time consuming and expensive Endeavour for the organizations. EMC compliance is highly critical for products' success and also



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