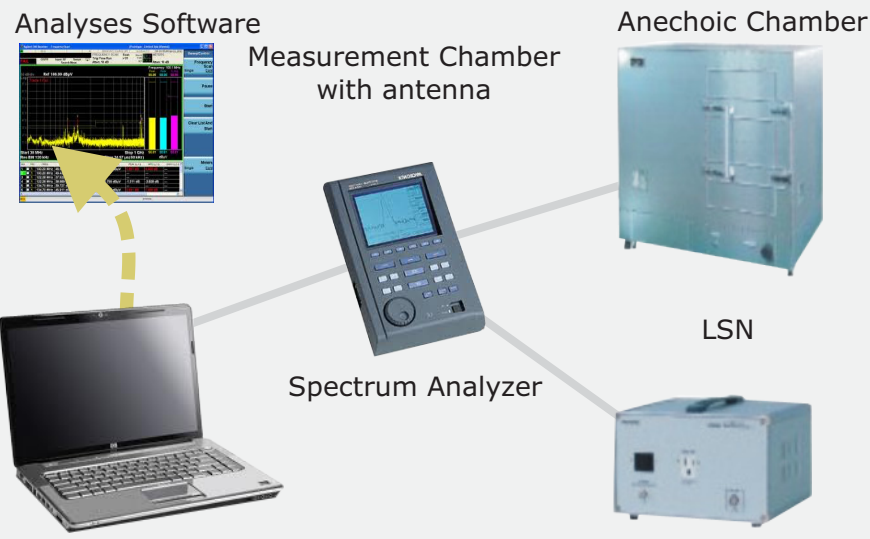


What is EMI ?

Electromagnetic interference or EMI is an unwanted disturbance that affects an electrical circuit due to electromagnetic radiation emitted from an external source. The disturbance may interrupt, obstruct, or otherwise degrade or limit the effective performance of the circuit. The source may be any object, artificial or natural, that carries rapidly changing electrical currents, such as an electrical circuit, the Sun or the Northern Lights. EMI is everywhere and it affects our equipment, business atmospheres, and even our health. As power densities and communication speeds increase in new system. EMI is created in normally compatible situations.



Measurement of EMI



What is EMC?

Electromagnetic Compatibility is related to the design of a product which will not get affected by external Electromagnetic radiation and it will also not affect any other product due to its own electromagnetic effects.

EMC pursues two issues

Electromagnetic Interference (EMI) Electromagnetic Susceptibility (EMS)

EMI Test: It is evaluated whether the radiated emission or the conducted emission discharged from the EUT (Equipment Under Test) exceeds the limit value set beforehand.

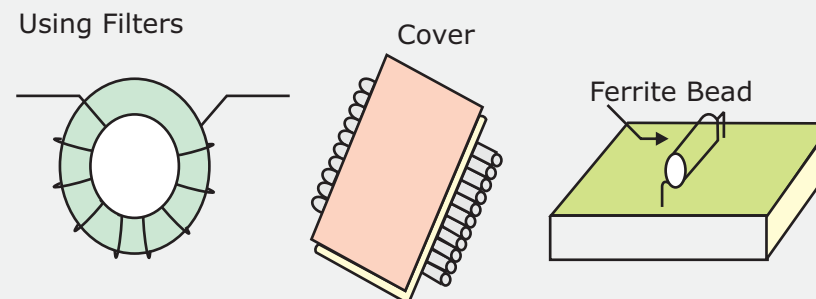
EMS Test: It evaluates whether EUT causes the malfunction by a peripheral electromagnetic radiation.

Interference Source	Three Factor EMI/EMC Path	Sensitive Device
Electronics	Conducted (Electric Current) Inductively coupled (magnetic field) Capacitively coupled (Electric Field) Radiated (Electromagnetic field)	Transistor
Grounding		Cell Phone
Cell Phone		Diode
Power Line		Antenna
Connector		People
Lightening		
Antenna		

Effects of EMI

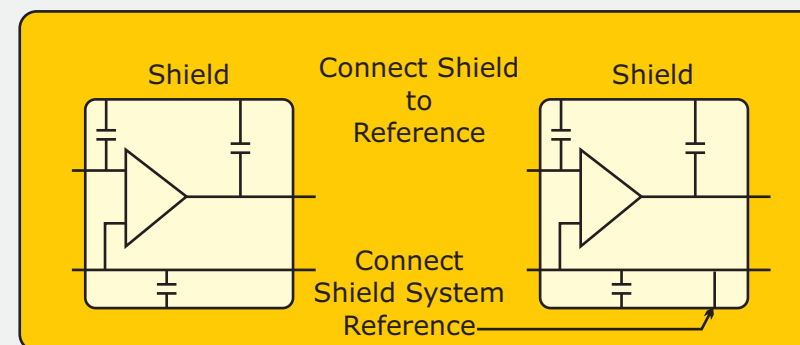
- ! A disturbing sound when talking on land line and your cell phone rings.
- ! A shaky computer screen when your cell phone rings
- ! Your system reboot's when you change the speed of overhead fan with electronic regulator.
- ! A passing airplane causing disturbance in radio or television transmission.
- ! Computer interfering with FM radio reception
- ! Operating vacuum cleaner causing 'snow' on TV.
- ! A buzzing car radio when you driver below a high power line.

Suppression of EMI



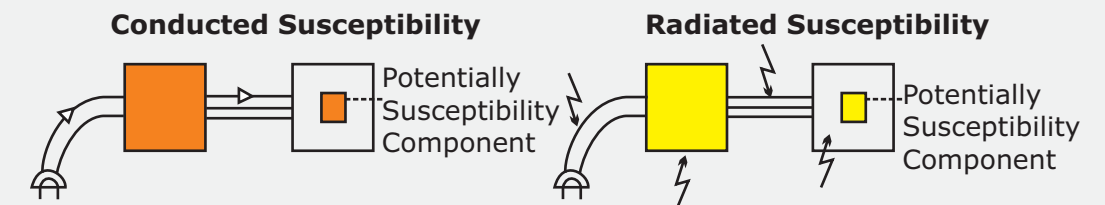
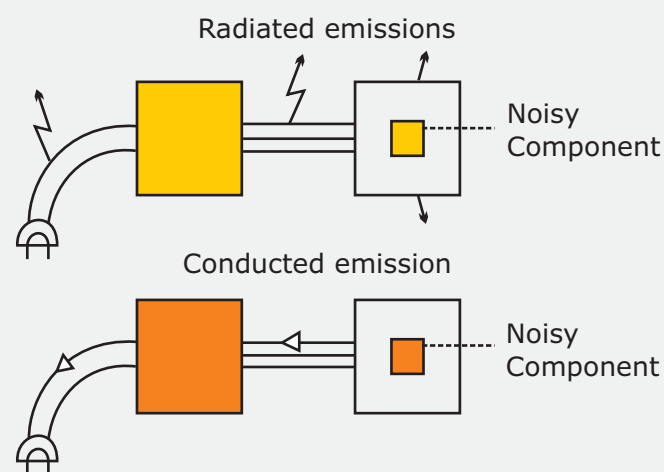
Using Shielding

- ! Use a low impedance over
 - ! Make good connections between different parts of cover
 - ! Make may smaller holes instead of one big
 - ! Use conductive foil with a plastic cover
- No Paint Low 2
- Use smaller holes

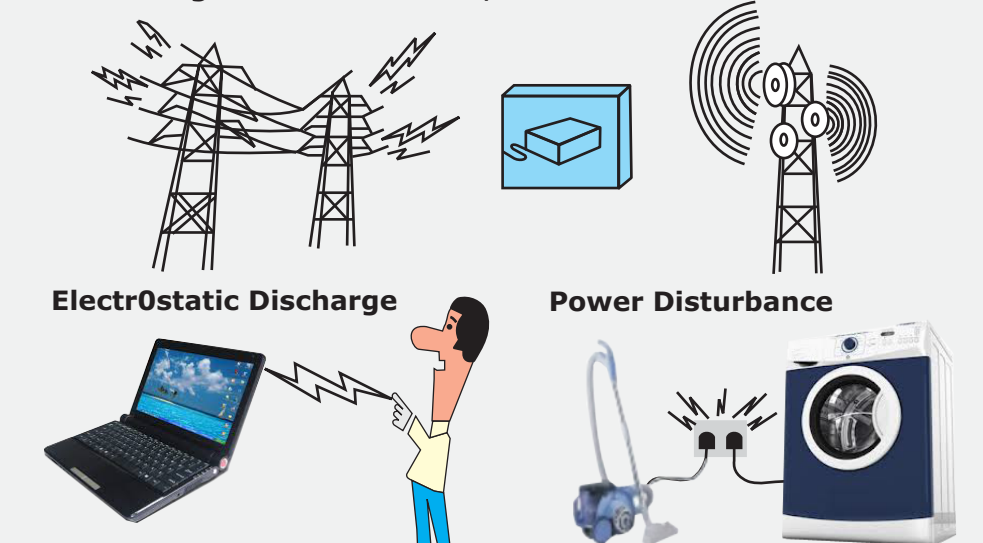


Classification of EMI

- ! Narrow band
- ! Broadband
- ! Intentional
- ! Unintentional
- ! Conducted
- ! Radiated
- ! Inter-system
- ! Intra System
- ! Natural
- ! Man made



Protect against Radio Waves, Microwaves & Power Lines



Flicker and Harmonics



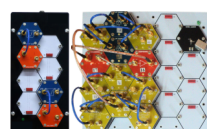
Regulations

Cost of Addressing EMC

Cost of Addressing EMC Issues

Concept, Design, Layout, Prototype, Testing, Production

FCC-Federal Communications Commission
IEC-Internationa Electrotechnical Commision
 Military, Medical, Vehicular, Other



10209A
RF Prototyping & Education Platform



10401
Klystron Microwave Test Bench



10411
Microwave Integrated Circuits Trainer



10412
Wave & Propagation Trainer



46507
Three Phase Induction Motor Trainer



46624A
Fire Alarm Trainer



46609A
Power Distribution Trainer



46800
Electrical Machine Trainer