
MPS
MPS EMI Expertise Updates
July 2019
rev 20180504

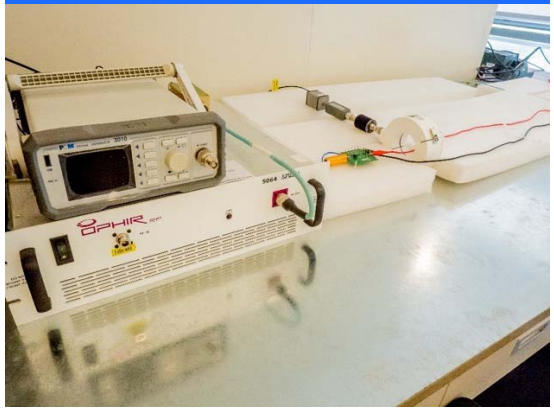
MPS Automotive Grade EMI Lab Equipment

Chamber

EMI Debug station

3D EM Field Scanner

Buck Current Injection



ESD

Input Transient (ISO7637)

MPS EMI Expert Team

China

China

China

China

China

Germany

Germany

Germany

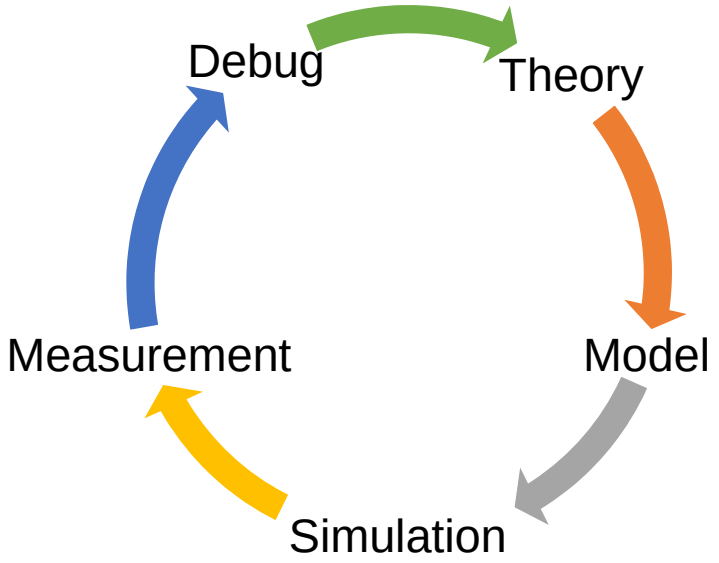
France

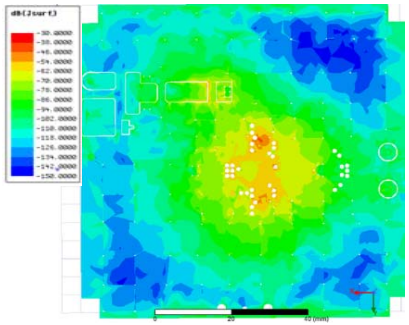
USA

USA

USA

What Our EMI Expert Do…

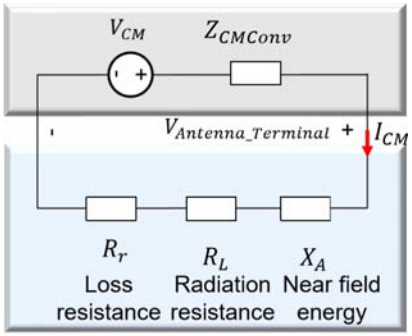




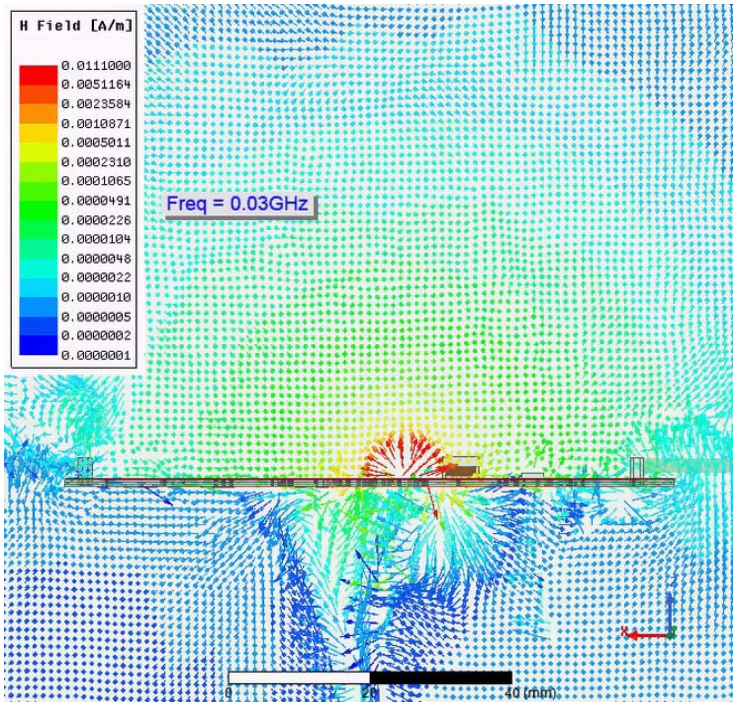
$$E_{max} = \sqrt{\frac{\eta D_o P_r}{2\pi r^2}}$$

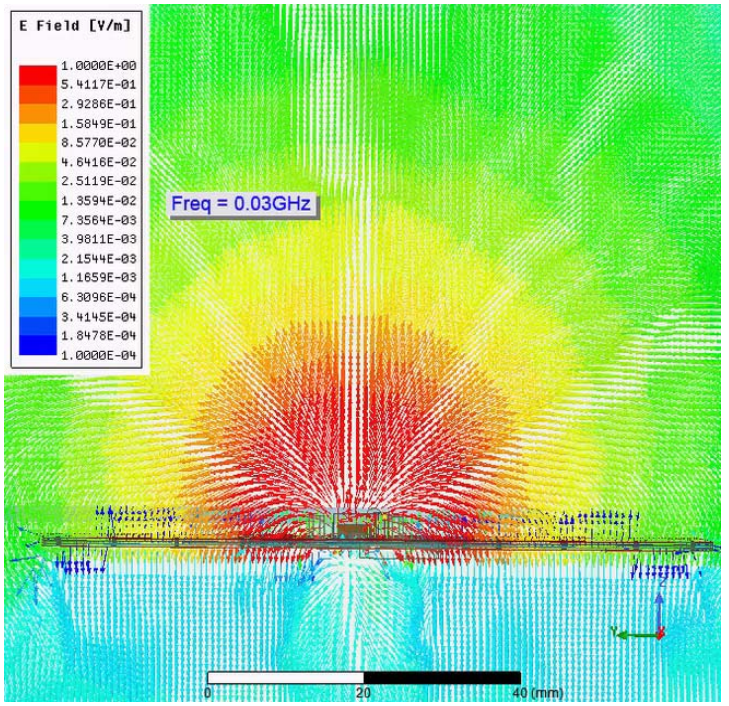
$$= \sqrt{\frac{\eta e D_o}{4\pi r^2}} \times |I_A| \sqrt{R_A}$$

$$= \sqrt{\frac{\eta G_o}{4\pi r^2}} \times |I_A| \sqrt{R_A}$$



What Our EMI Expert See…





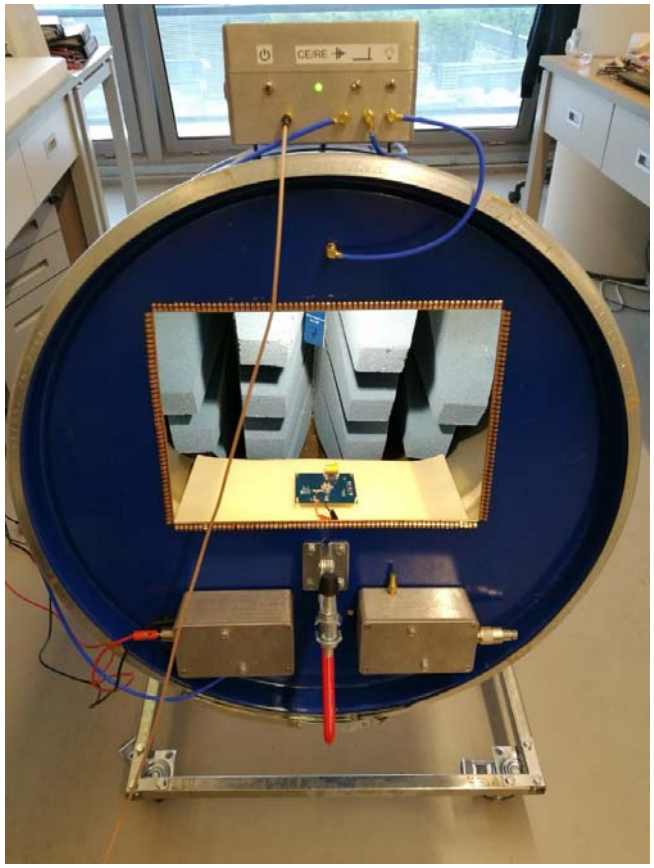
- Field flows in the invisible circuits
- The placement of the component shapes the circuits
- Circuits are different for different frequencies, so does the filed distribution

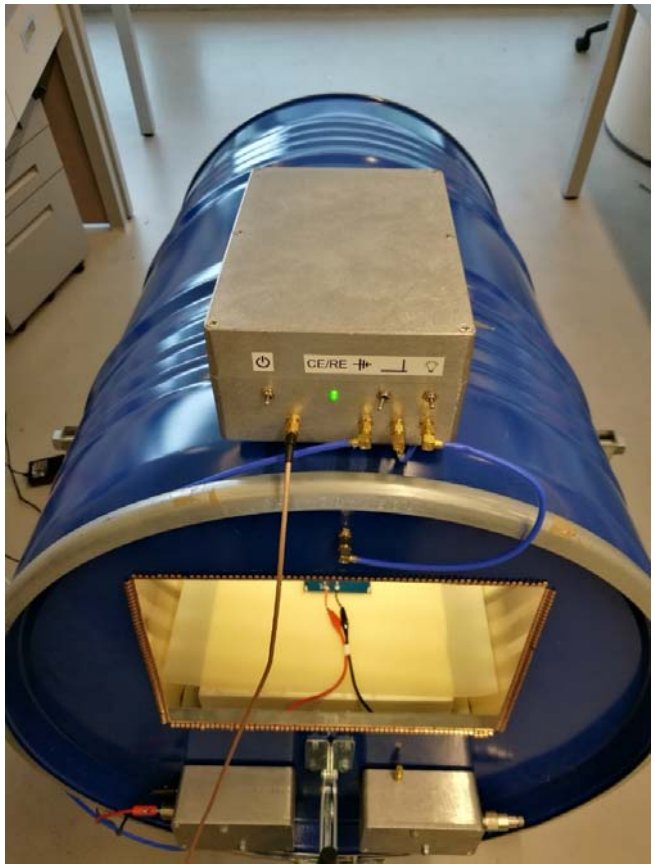
4 Auto Grade EMI Labs – $6M Invested

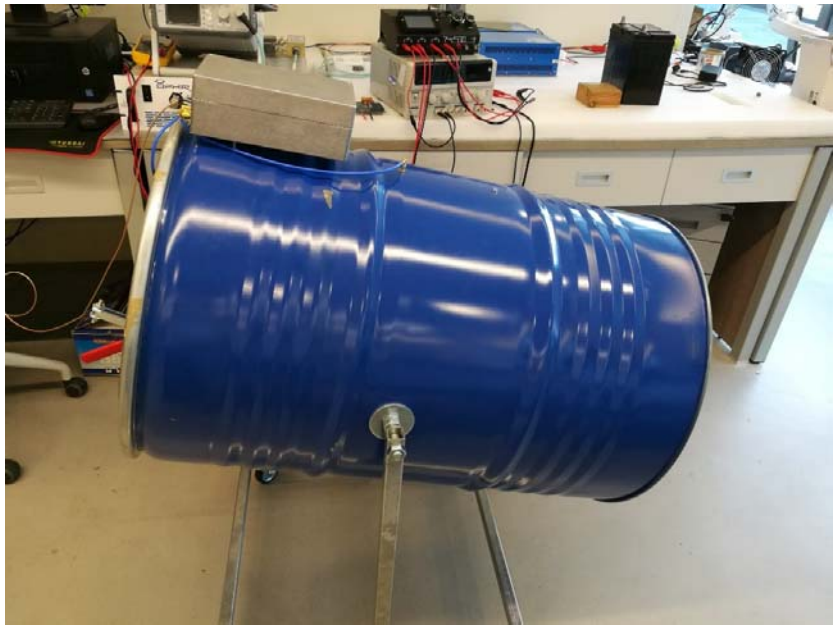
How About Rest of World?

Is there a portable or bench top equipment that won't take that much space?

We Are Making Our Own...

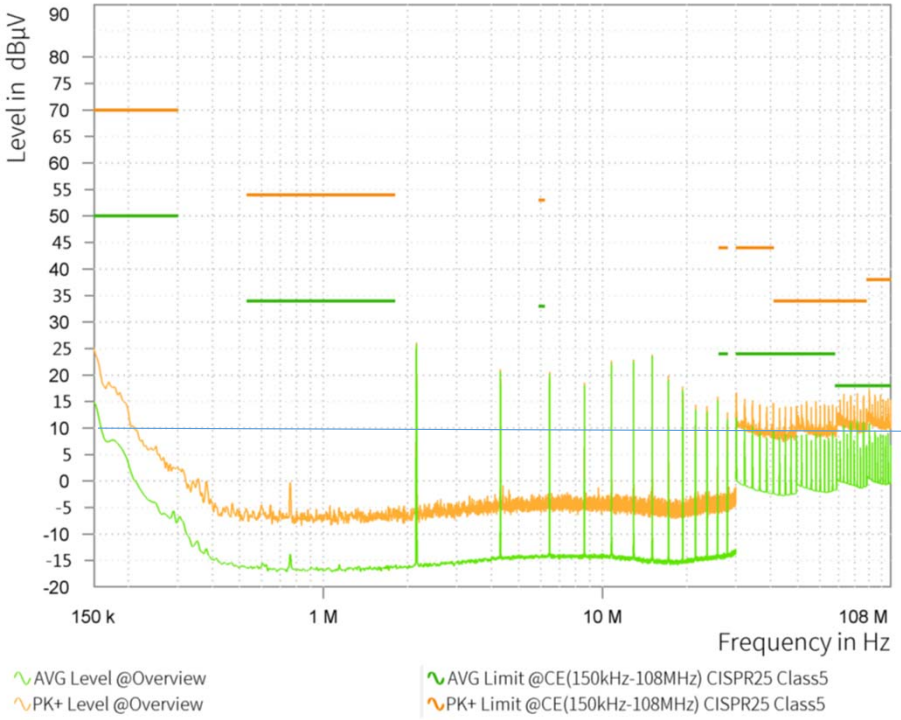




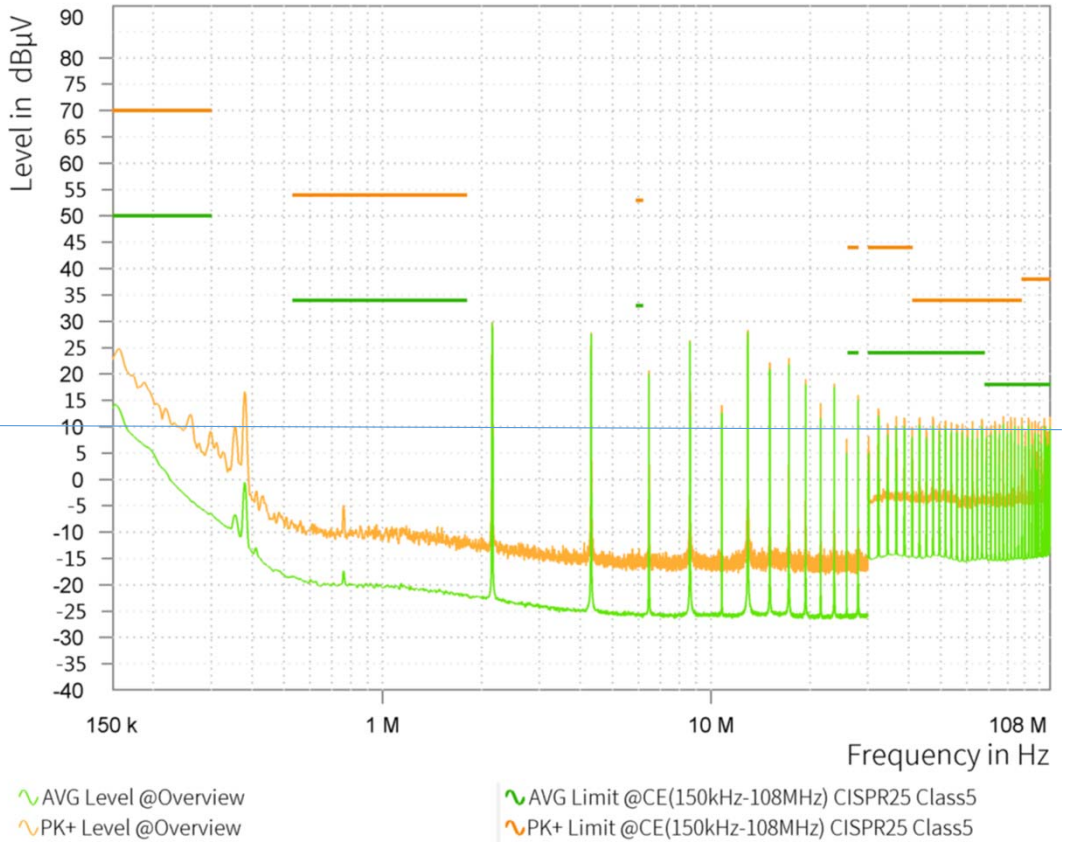


CE Result Comparison

Full Size EMI Lab

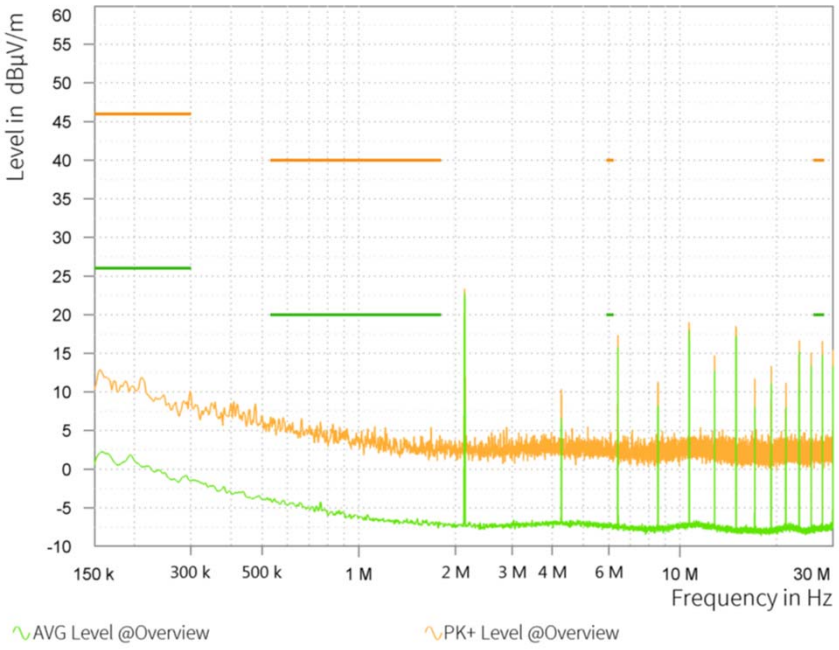


Setup Made by MPS

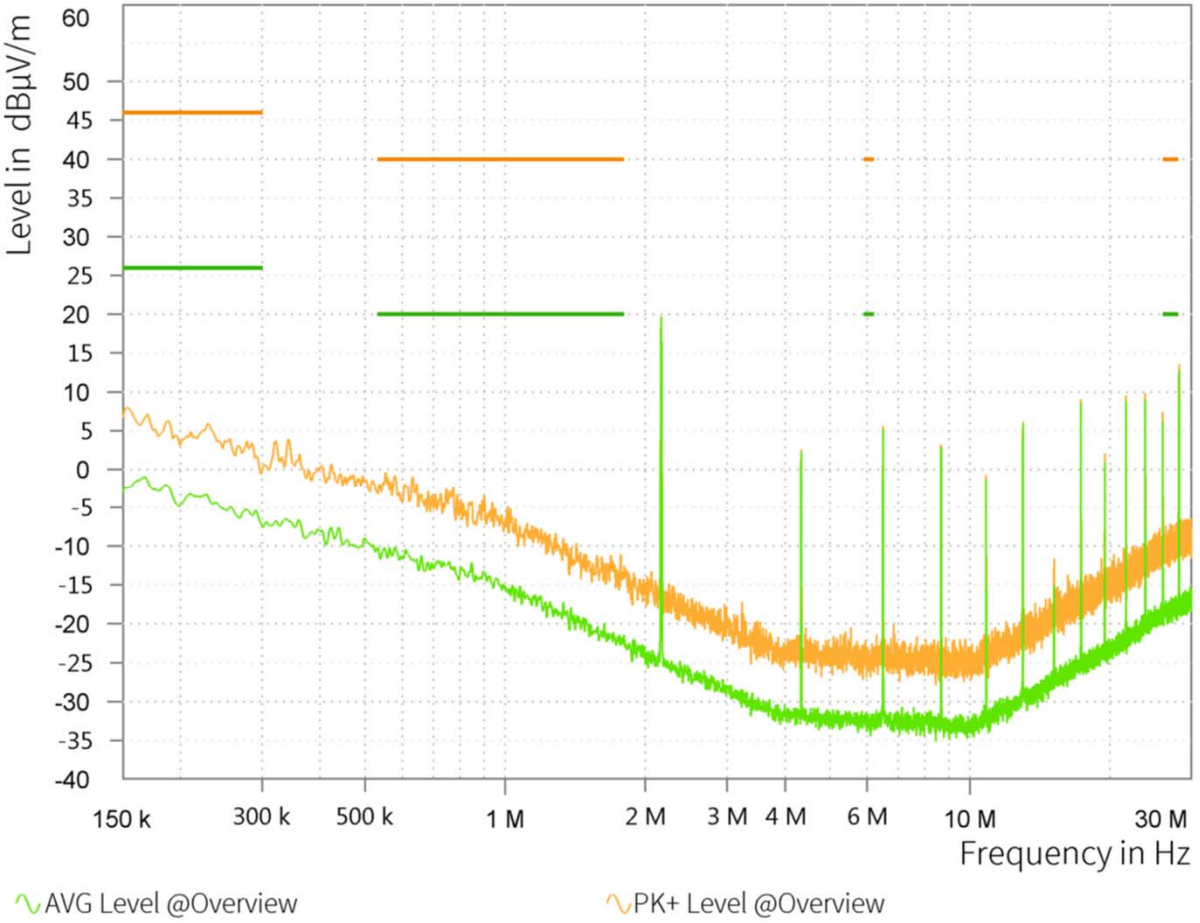


Monopol Radiated EMI Comparison

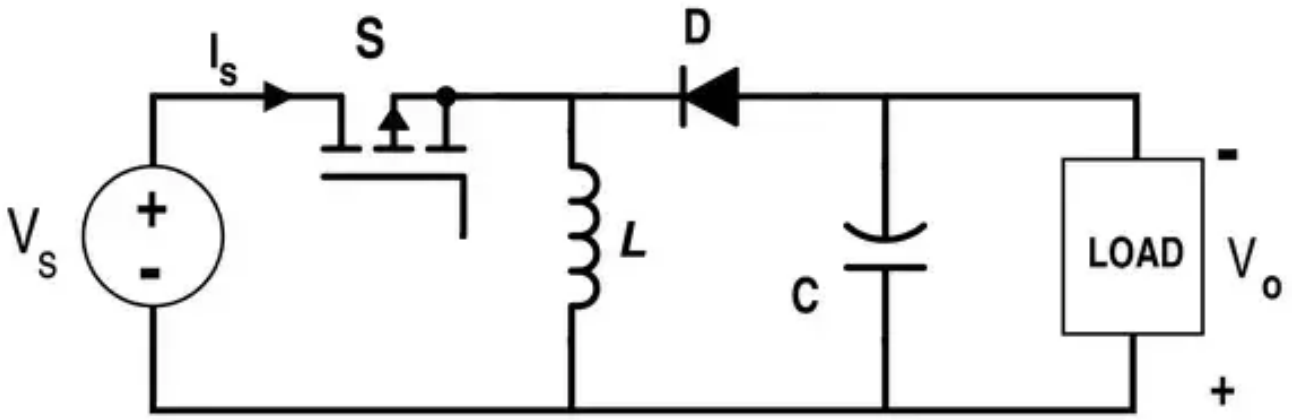
Full Size EMI Lab



Setup Made by MPS



Example of Our Achievement



Popular Buck-Boost Topology:

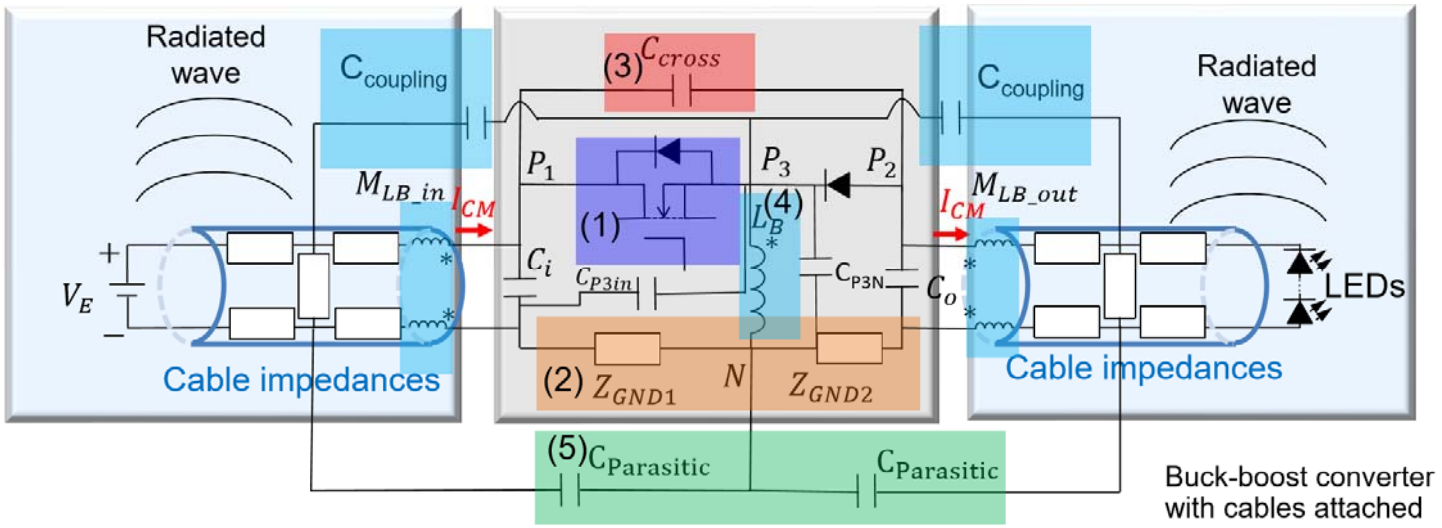
- - Lowest BOM Cost
- - Smallest PCB Size
- - Relative Simple Control
- - Can Generate Negative Vout

But…

The EMI is usually considered difficult to deal because:

- - Input GND is not same as power GND
- - Vin decoupling is not obvious
- - Switching voltage is higher compare to Buck
- - Inductor is bigger compare to Buck

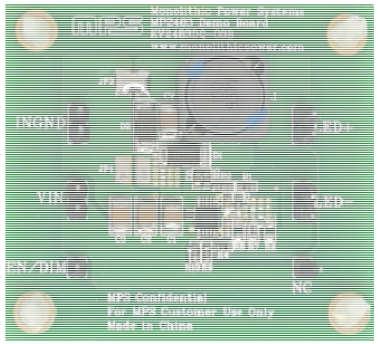
Radiated EMI Model of Buck-Boost Converter

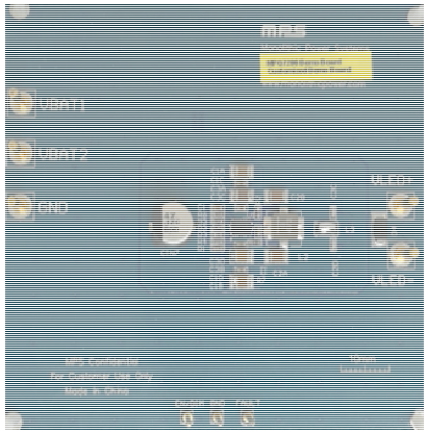


Invisible circuits in the Buck Boost for radiated EMI:

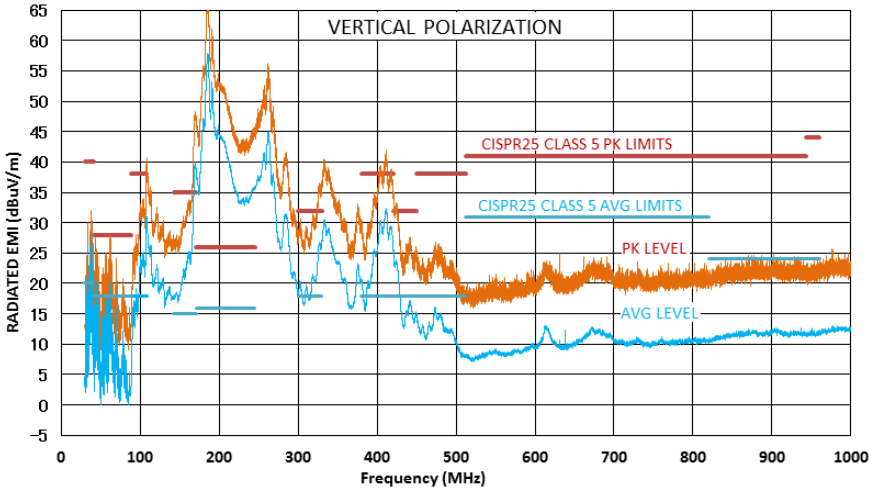
- H-field Coupling from Ccross decoupling Cap to Cable
- E-field Coupling from Inductor winding
- Switching Node to Input and Output Cable Coupling
- Noisy GND to Input and Output Cable Coupling
- Input and Output Cable Impedances
- Converter input and output Impedances
- GND Impedance from Inductor to Input and to Output Terminals

Buck-Boost EMI Comparison – 1st Gen vs. 2cnd Gen

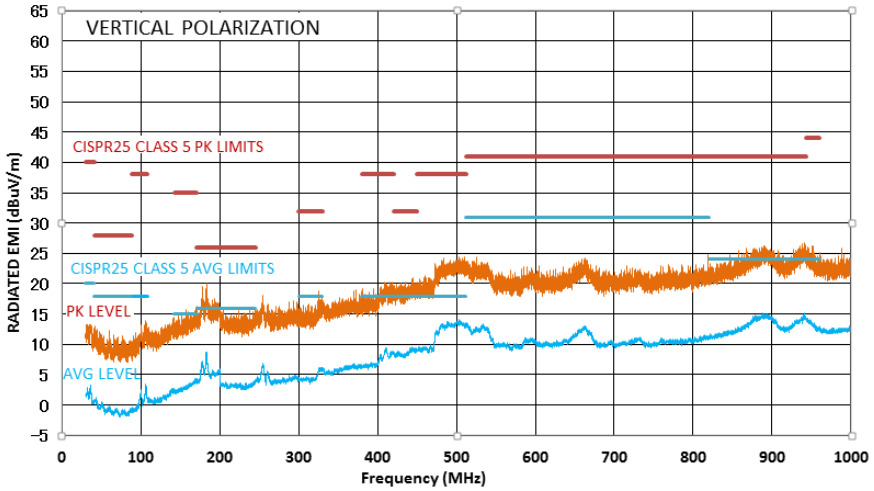




1st Gen, not optimized for EMI



2nd Gen, optimized for EMI



Summary

MPS has:

- Deep understanding of EMC
- Lots of field experience
- Culture of innovation
- High performance ICs
- State of art EMC equipment
- Experienced EMC expert team

Work with us to achieve mutual success!

如有任何疑问，请联系：mpssupport@monolithicpower.com