EMI test board

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2nd MTCA Workshop
DESY , 11-12.12.2013

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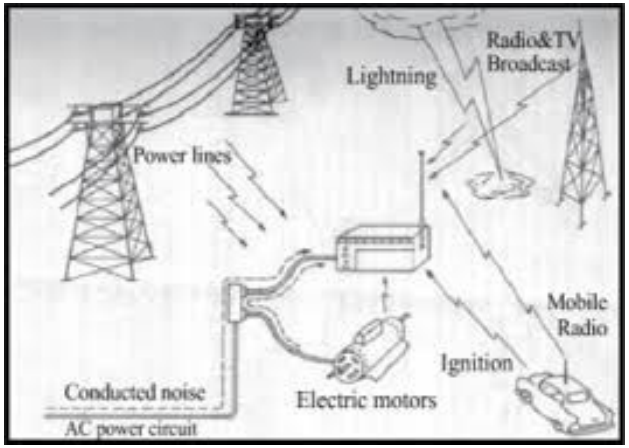
What EMI mean?

EMI (ElectroMagnetic Interference)

Electromagnetic emissions from a device or system that interfere with the normal operation of another device or system.



EMC (ElectroMagnetic Compatibility)

The ability of equipment or system to function satisfactorily in its Electromagnetic Environment (EME) without introducing intolerable electromagnetic disturbance to anything in that environment, means:

- Tolerate a specified degree of interference,
- Not generate more than a specified amount of interference

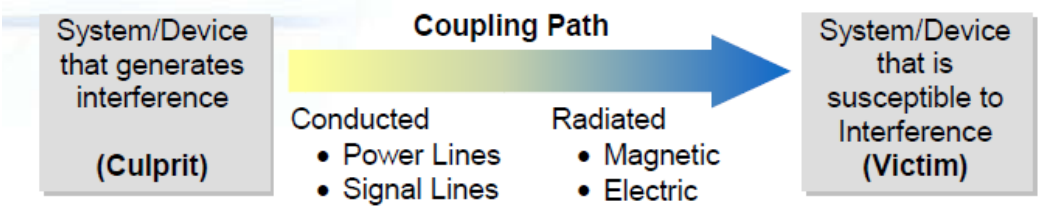
EMC importance

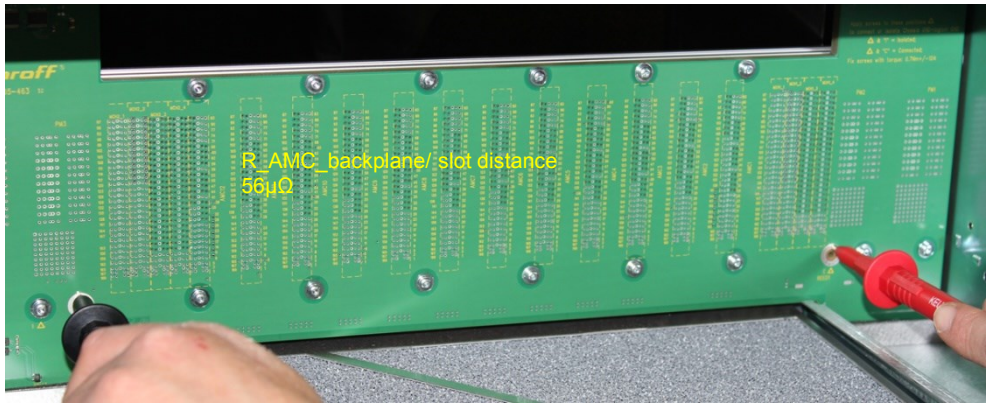
- Lower supply voltages
- Increasing clock frequencies, faster slew rates
- Increasing packaging density
- Demand for smaller, lighter, cheaper, lower-power devices

Interference paths

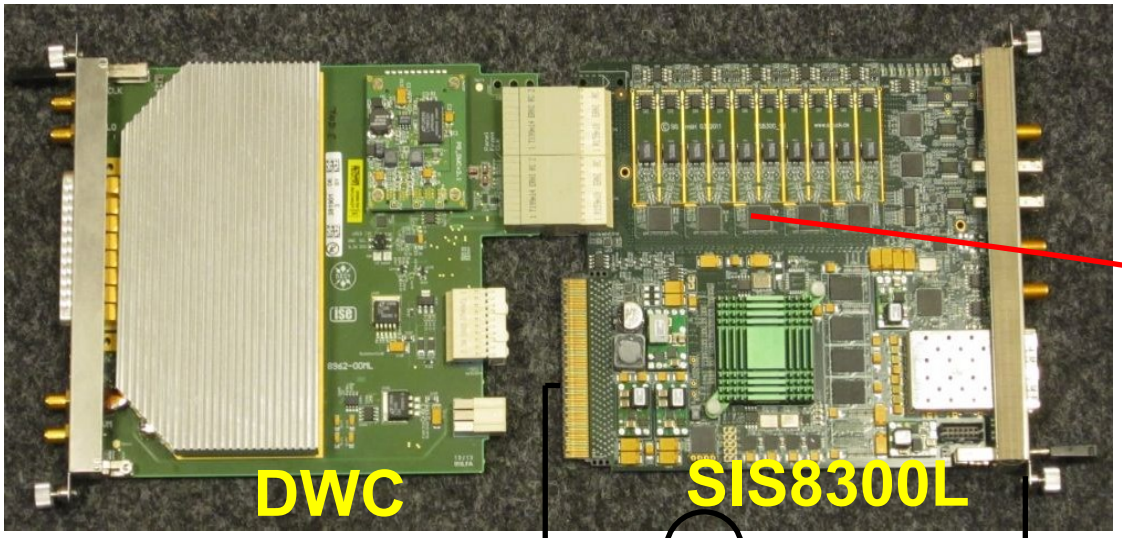
Two main interference ways:

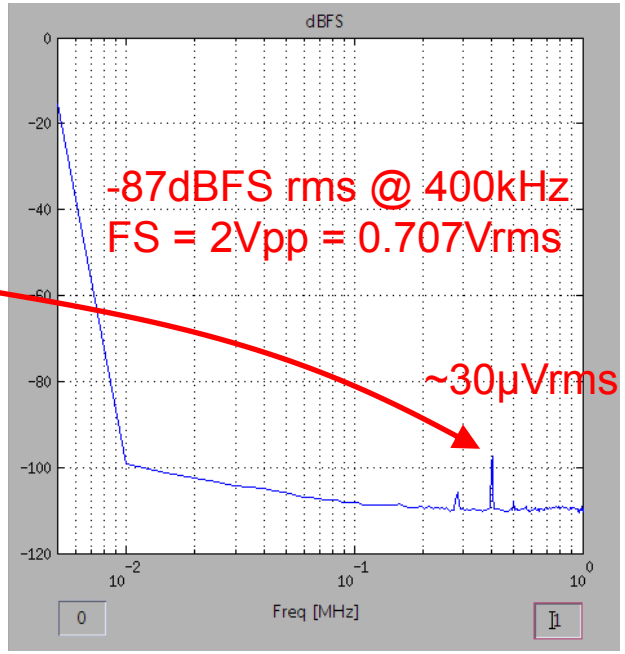
- Conducted coupling
- Radiaded coupling

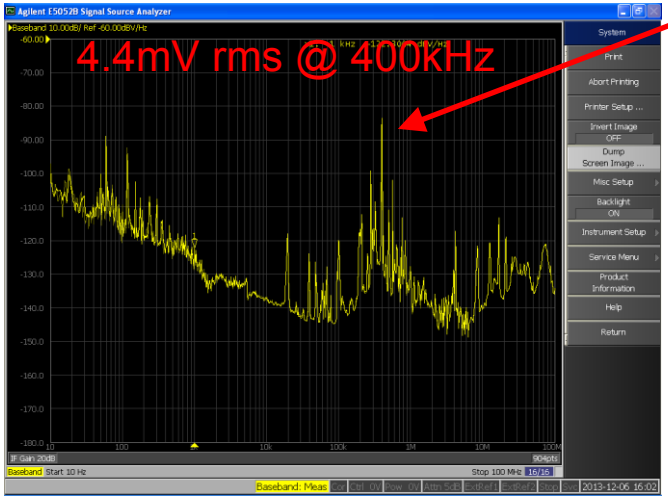


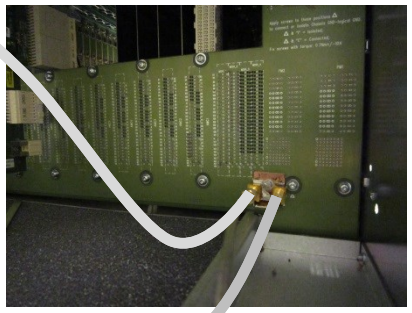


Is it important?

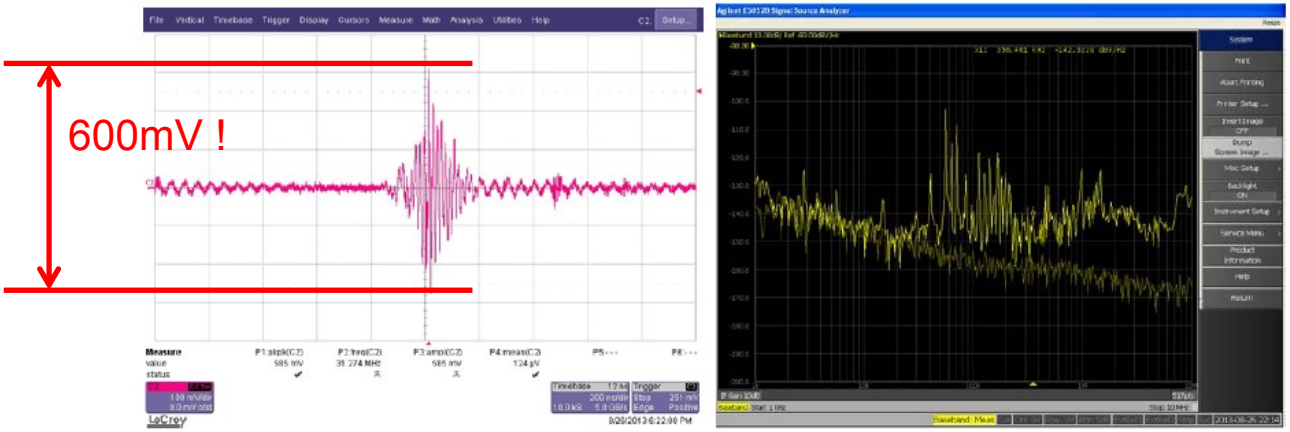






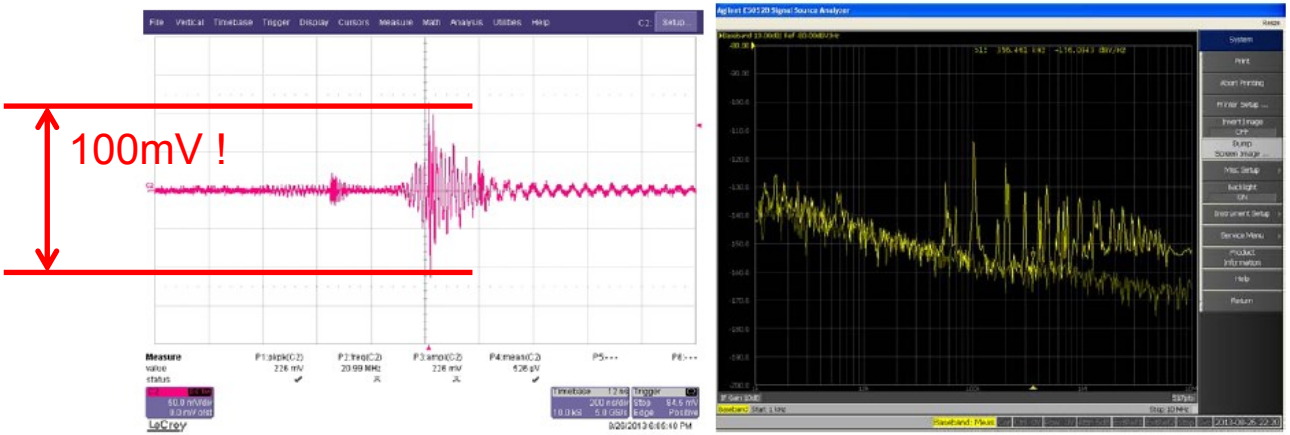


Real interferences



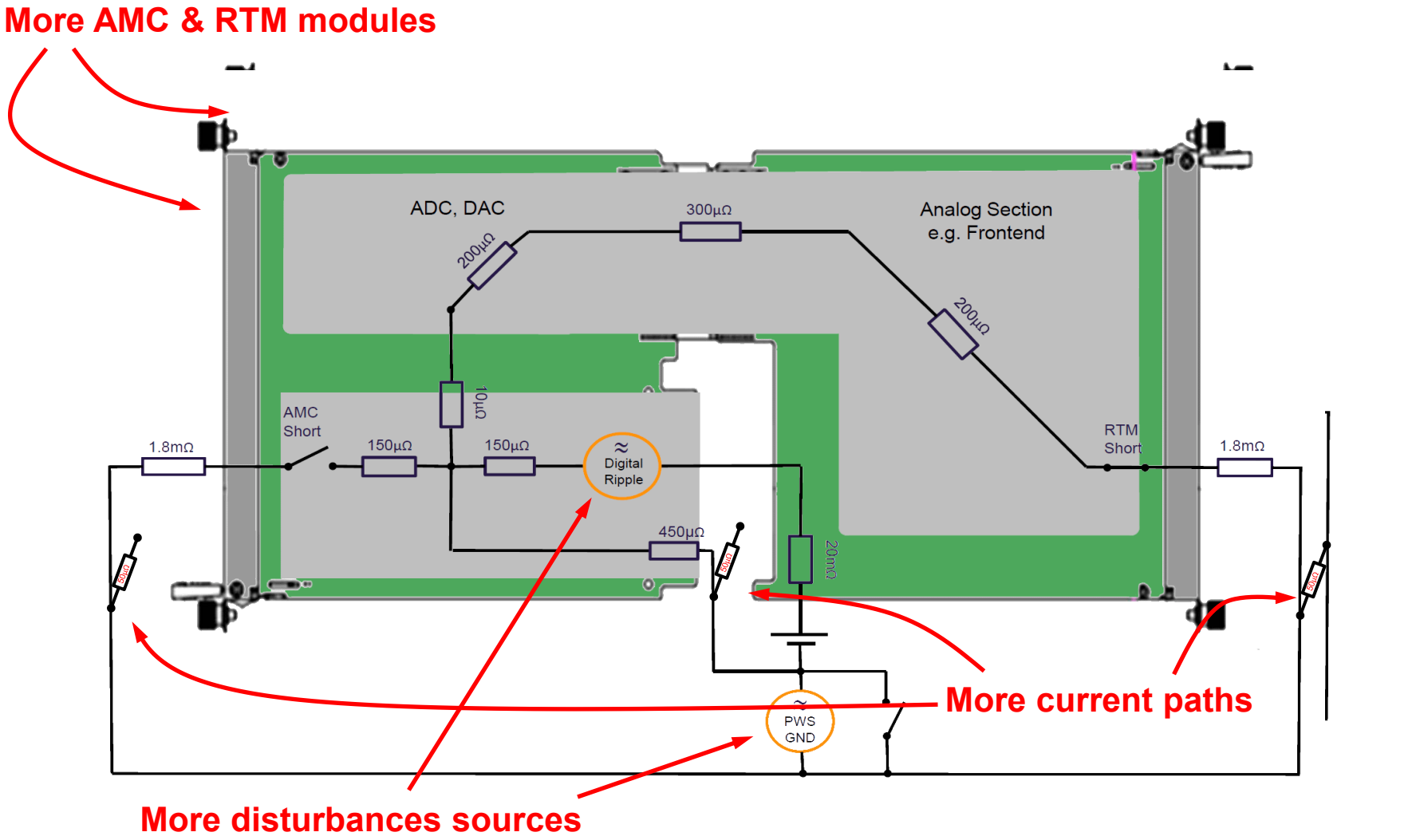
Time trace and spectrum ground-chassis distortion using vendor 1 power supply

Ground-chassis voltages in working MTCA.4 system are much higher than 4mV



Time trace and spectrum ground-chassis distortion using vendor 2 power supply

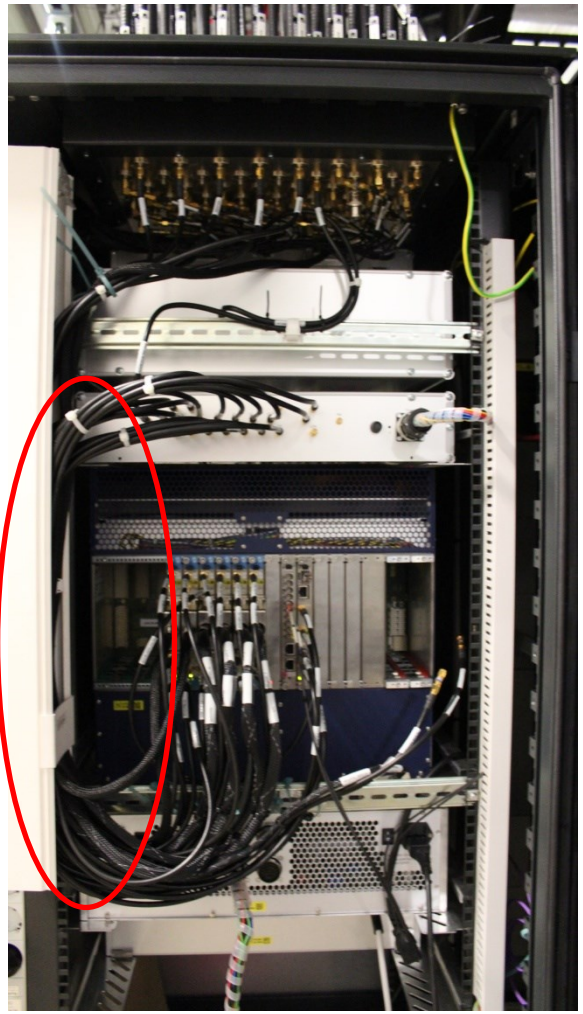
Reality is more complicated



... actually even more complicated

External signals

other racks

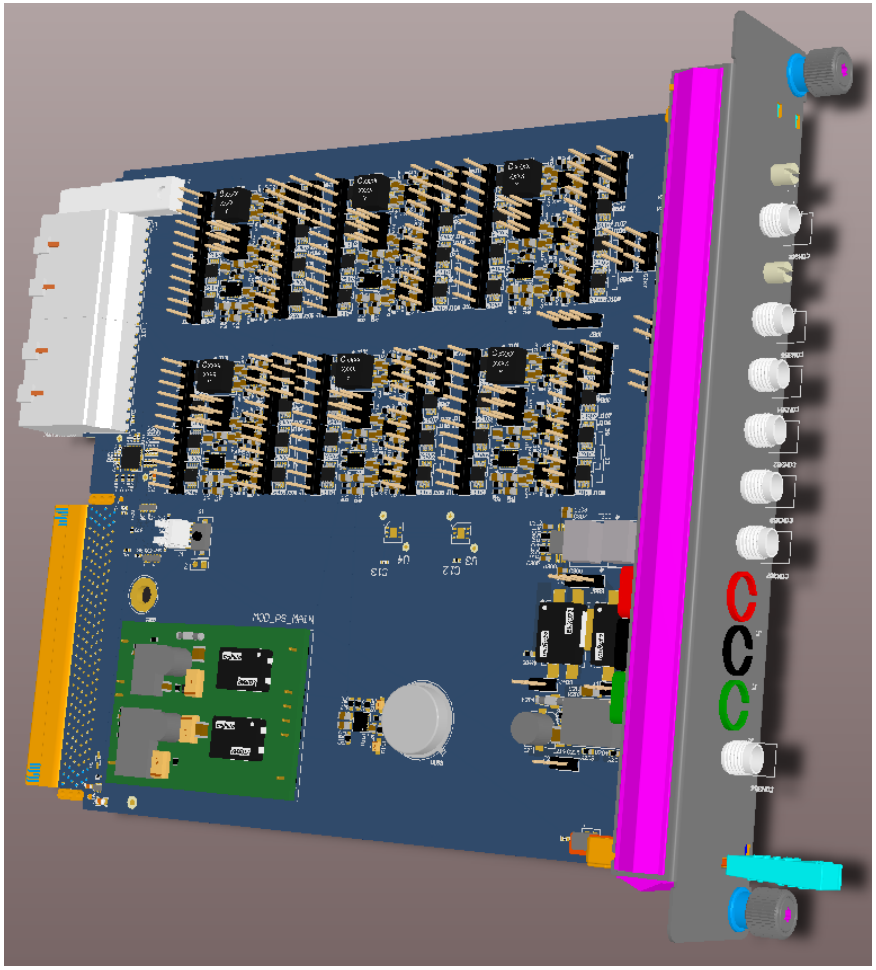


other crates

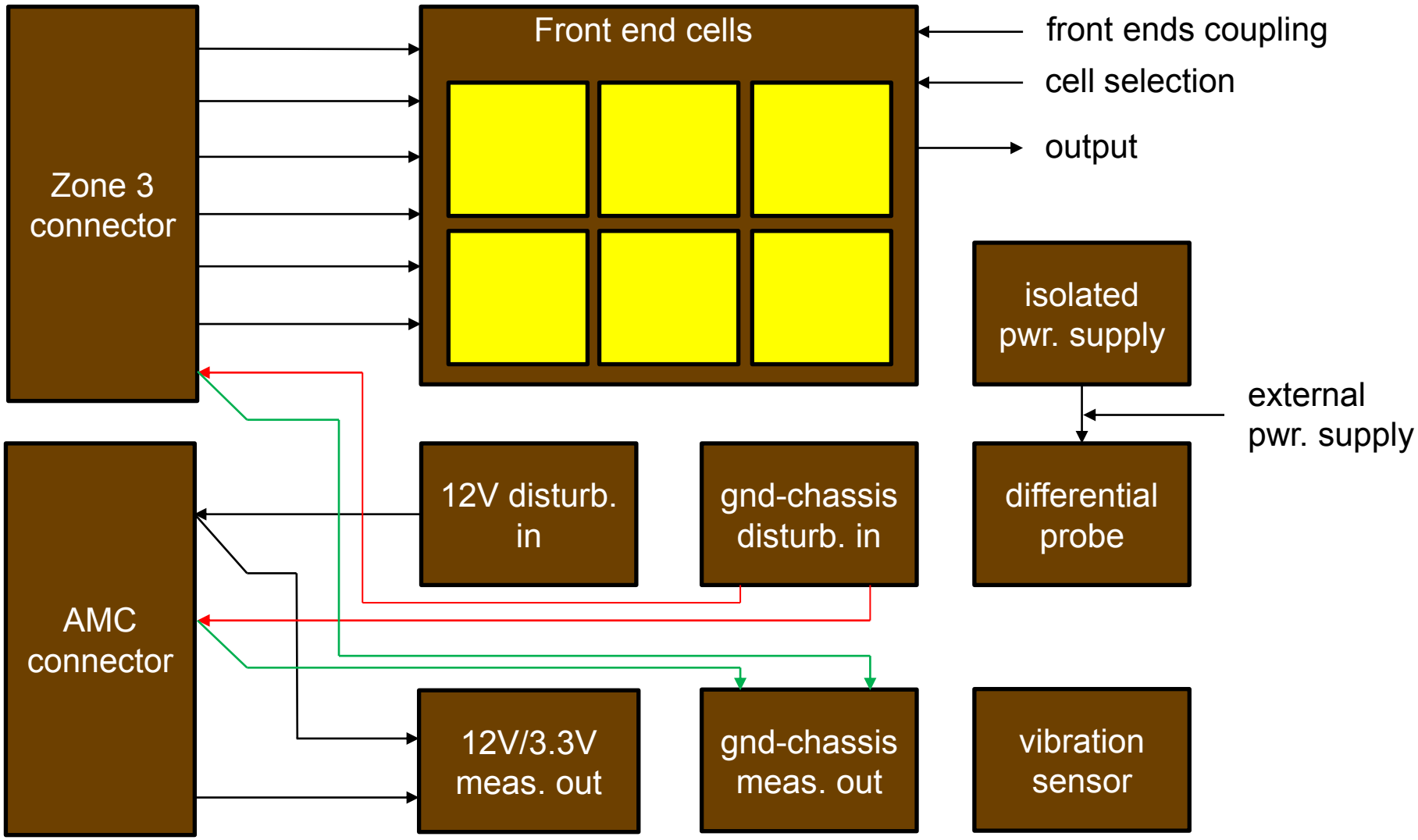
DAMC-EMI board

DAMC-EMI Board Functions

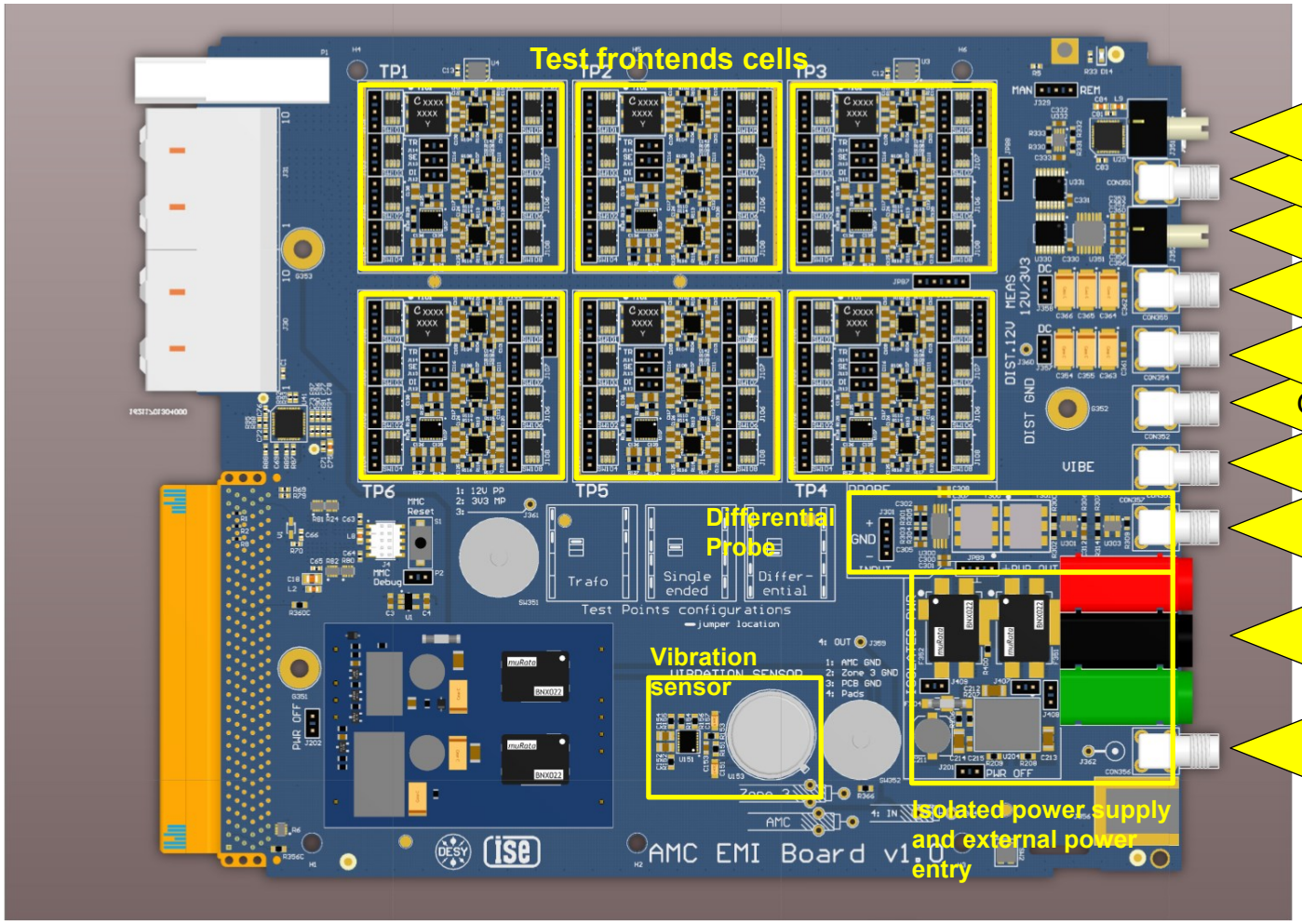
- Power supply voltages measurements (Payload +12V, Management +3.3V)
- +12V power disturbances introducion
- GND to Chassis voltage introduction and measurement
- Low voltage (μV) drop measurements (e.g. on GND plane)
- Vibration measurement
- Measurement of distortions influence on signal quality from DWC



DAMC-EMI board block diagram



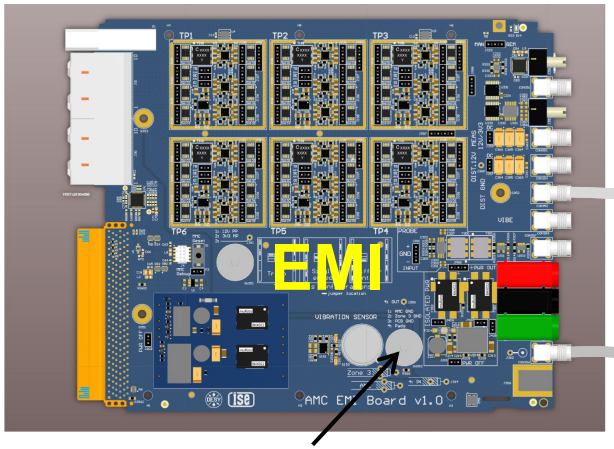
DAMC-EMI board view



Measurement example 1

no crate dissassembly !

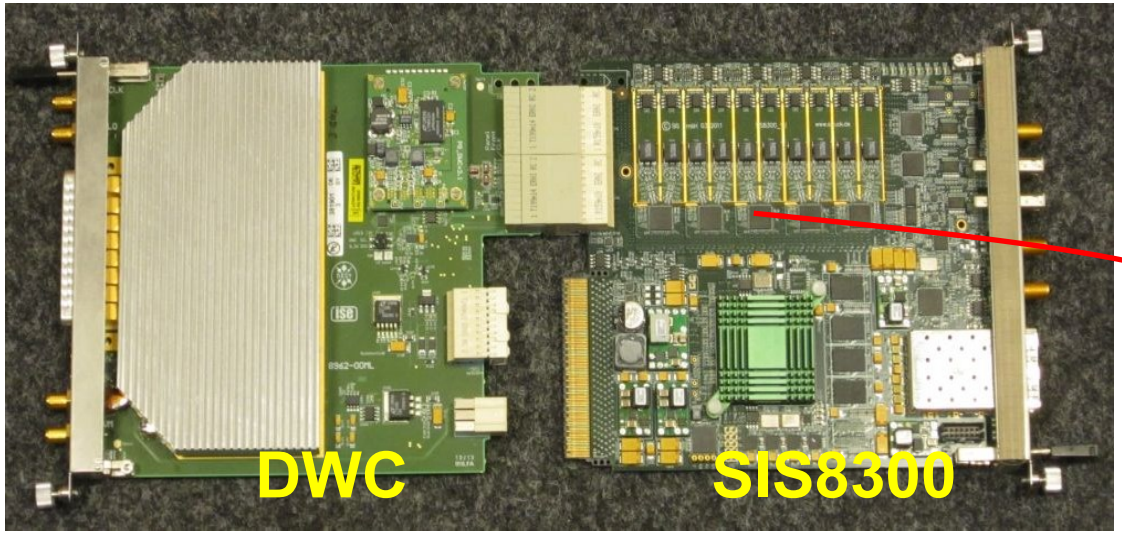
slot n



ground-chassis distortion inroduction

select distortion point as AMC connector

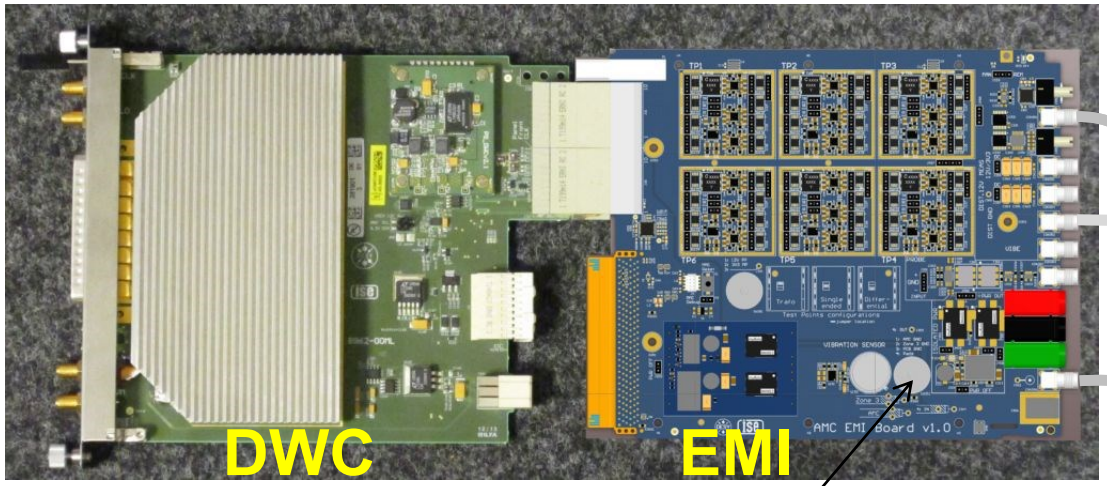
slot n+1



ground-chassis distortion measurement

signal values read by CPU board

Measurement example 2



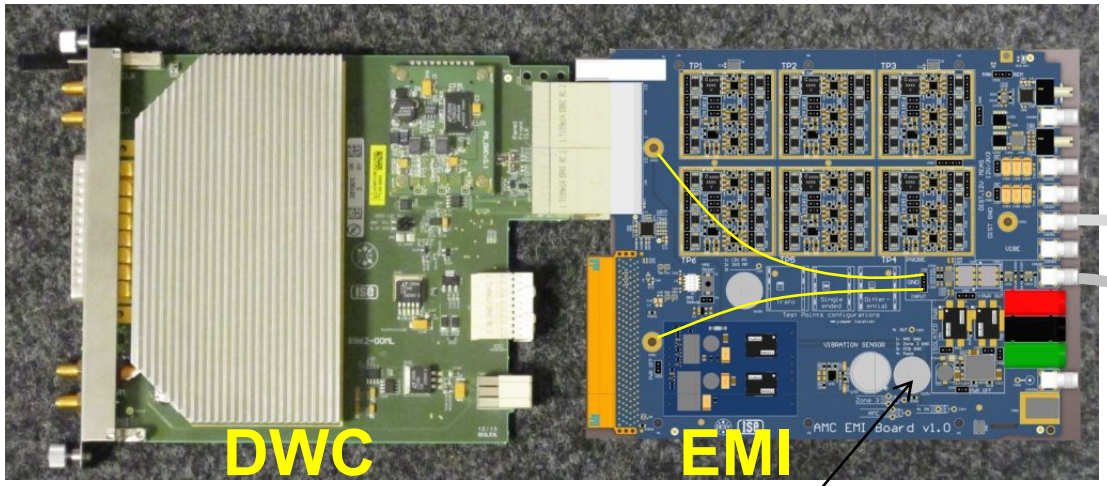
ground-chassis distortion inroduction

distortion point selection
e.g. AMC or Z3
connector

ground-chassis distortion
measurement

measurement of distortion
influence on front-ends
signals

Measurement example 2

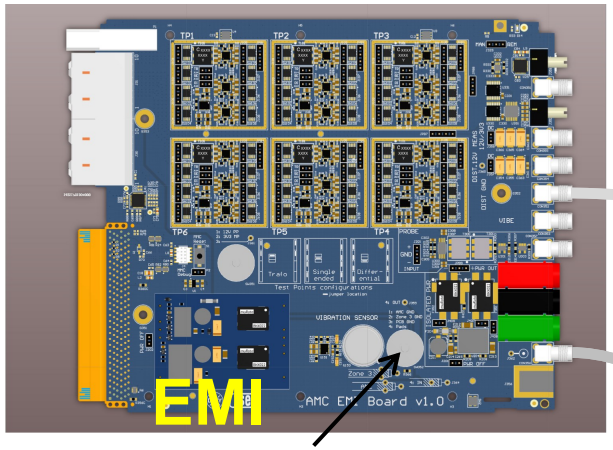


ground-chassis distortion inroduction

distortion point selection
e.g. AMC or Z3
connector

measurement of voltage drop between AMC and Z3 connectors

Measurement example 3

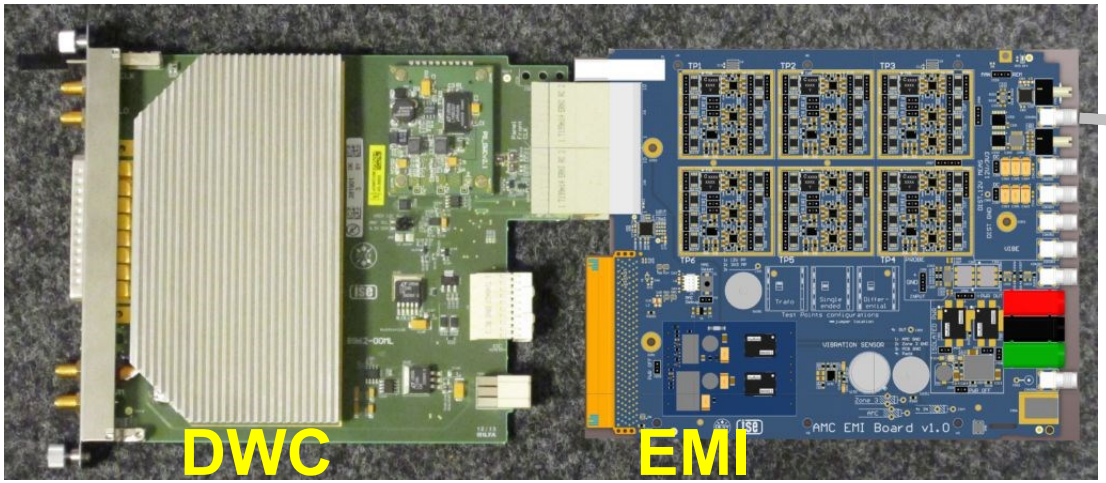


slot n

ground-chassis distortion inroduction

select distortion point as AMC connector

slot n+1



measurement of distortion influence on front-ends signals

Summary

The DAMC-EMI board allows to speed up process of

- investigation,
- modeling,
- and fighting against

EMI issues (for conductive coupling) in MTCA.4 based systems.

Thank you
for
your attention