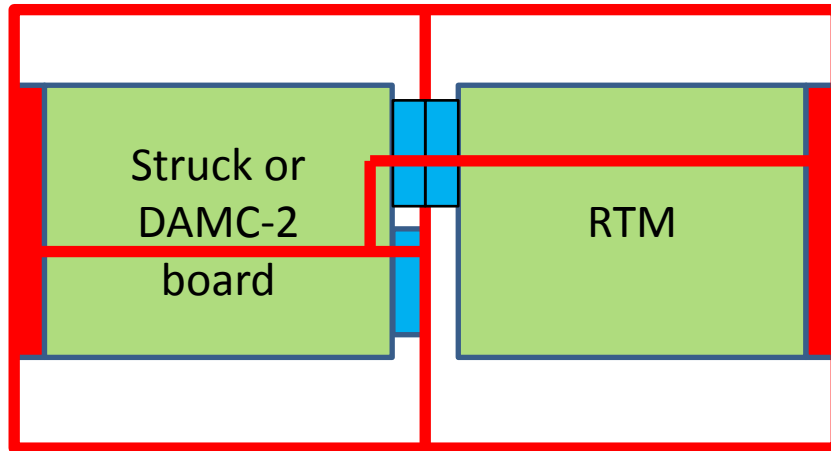


EMI considerations for Toroids (and other devices?)

M.Werner, MDI

26 March 2012

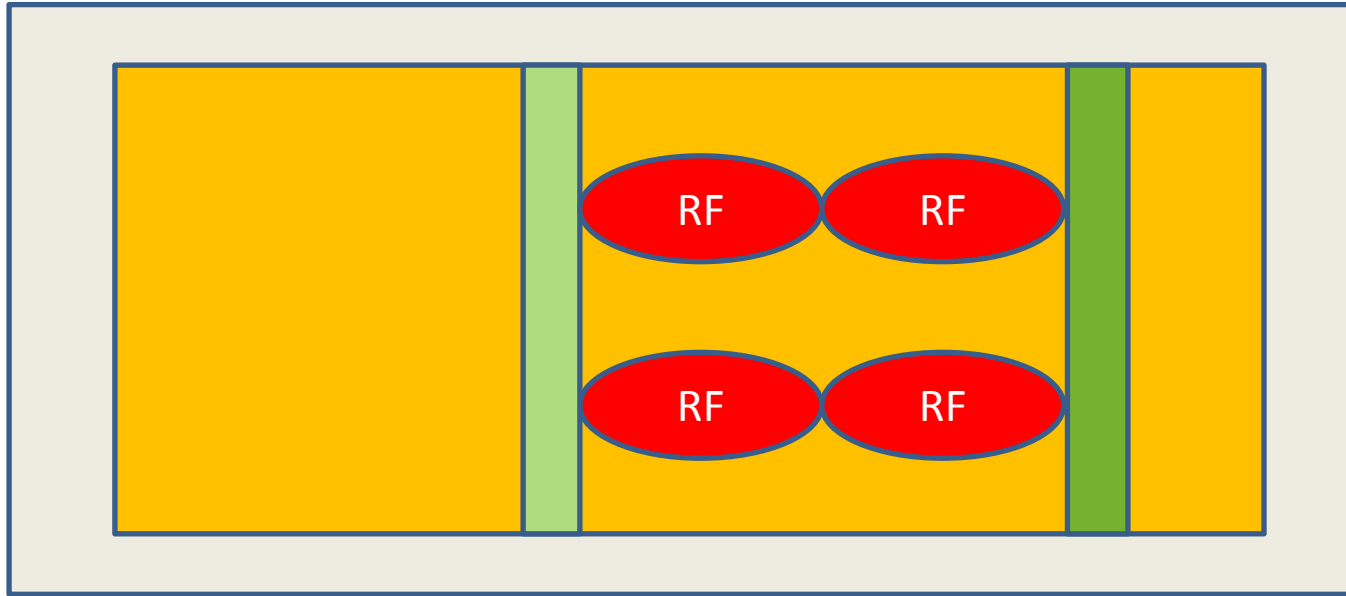
Crate concept



Which RF modes are possible in the crate?

- Backplane connected to chassis
- Struck and DAMC-2 board front panel (and electronic ground of the boards?) connected to chassis
- RTM front panel (and electronic ground?) connected to chassis

RF in the crate



For high frequencies (>100 MHz ?) resonant modes are possible in the crate

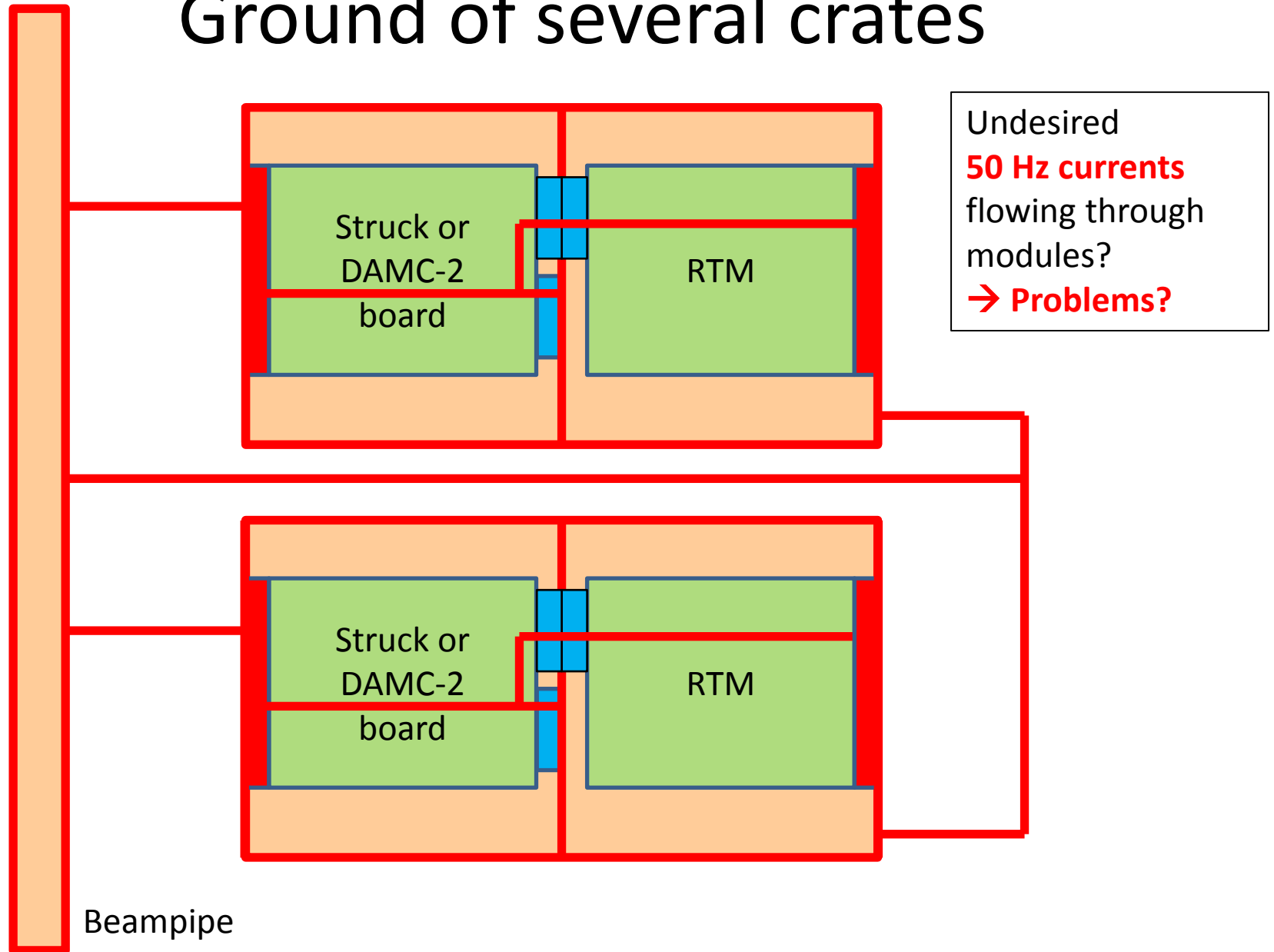
- → Strong coupling between modules possible especially if modules are connected to crate at front and back side (concept for Struck board, DAMC-2 board, RTM boards and backplane)

Which modules work in this frequency range?

→ HOM modules? Cavity BPM modules?

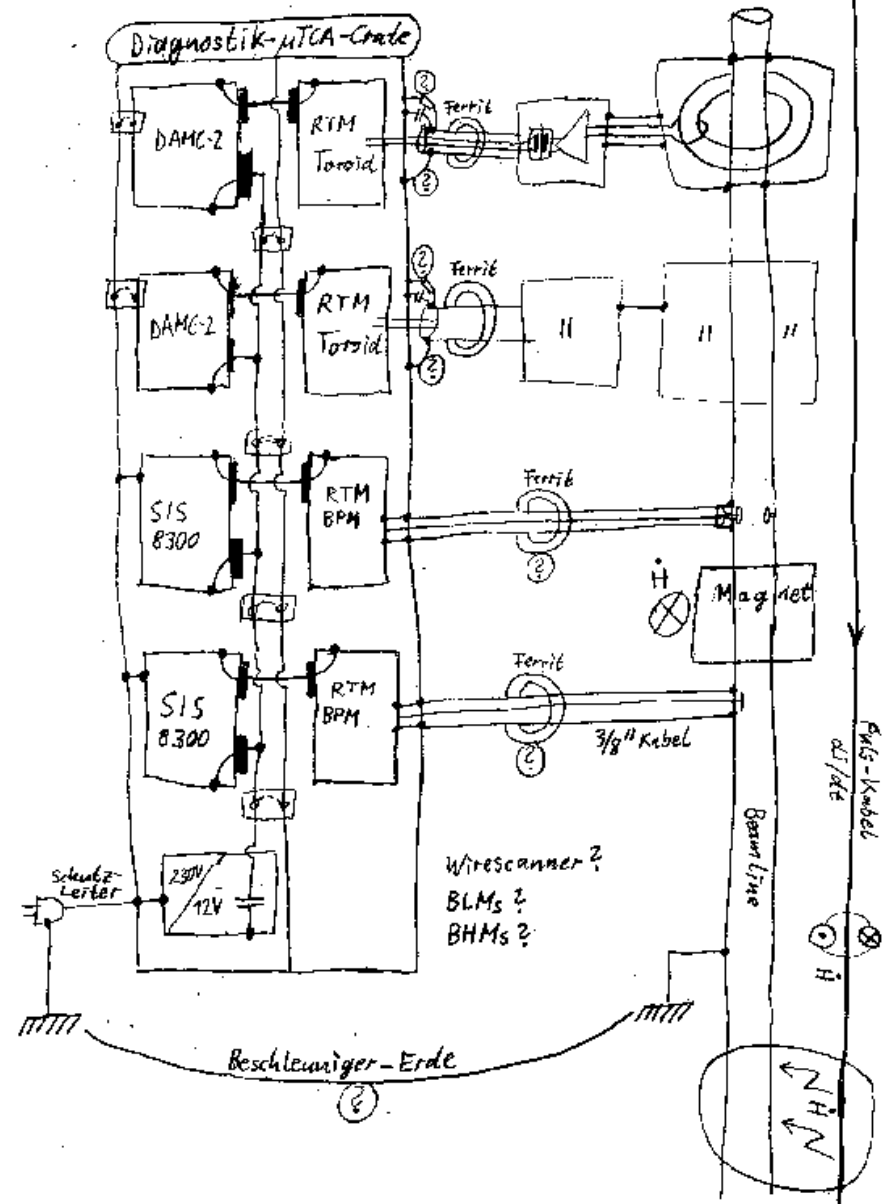
→ **Problems expected?**

Ground of several crates

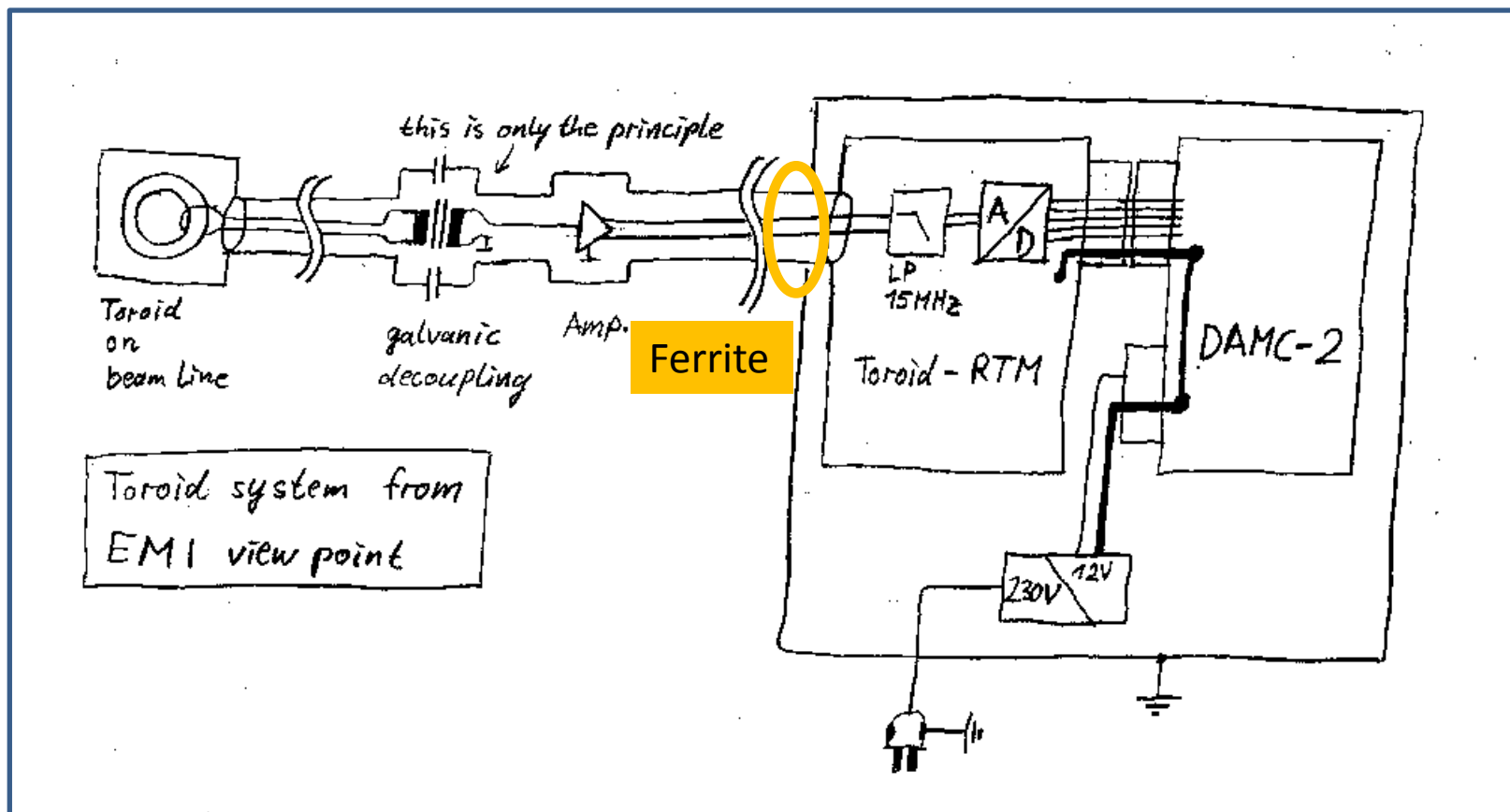


Ground overview diagnostic crates

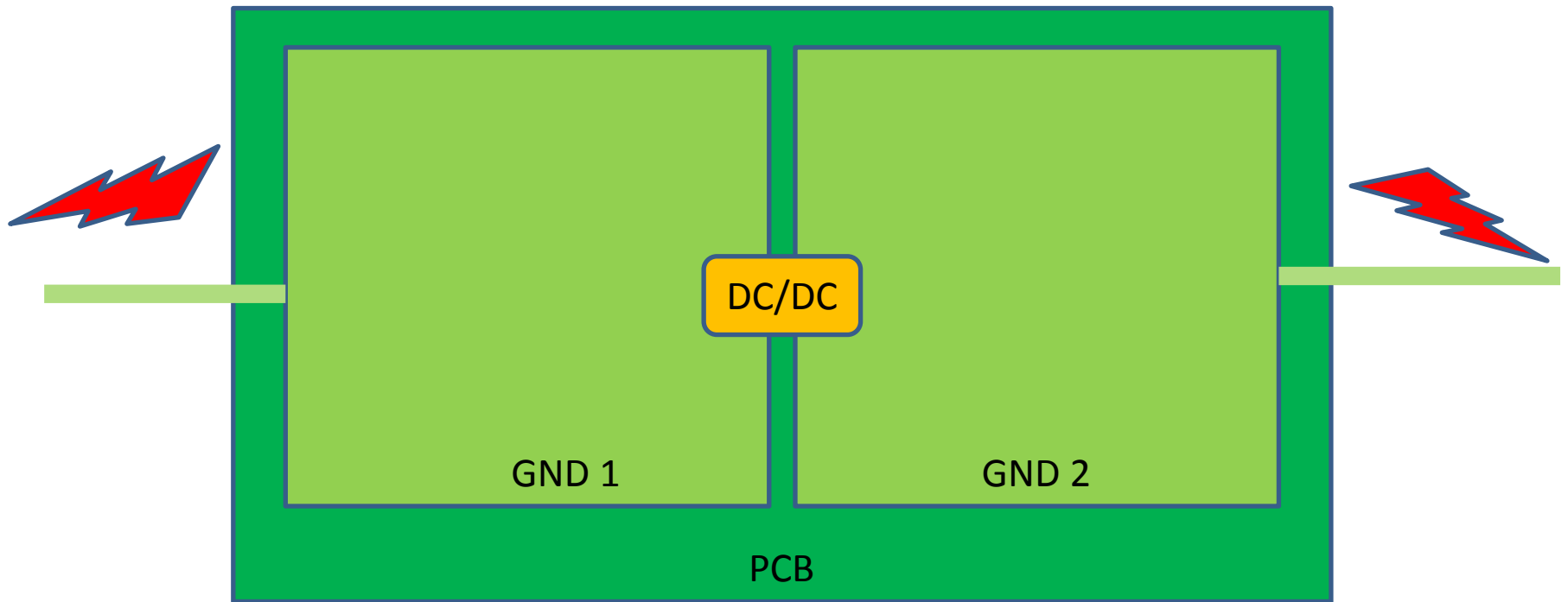
EMI: Masse-Überblick für Diagnostik-Crates 24.1.12
in XFEL FLASH (Beispiel) M.W.



Toroid EMI principle



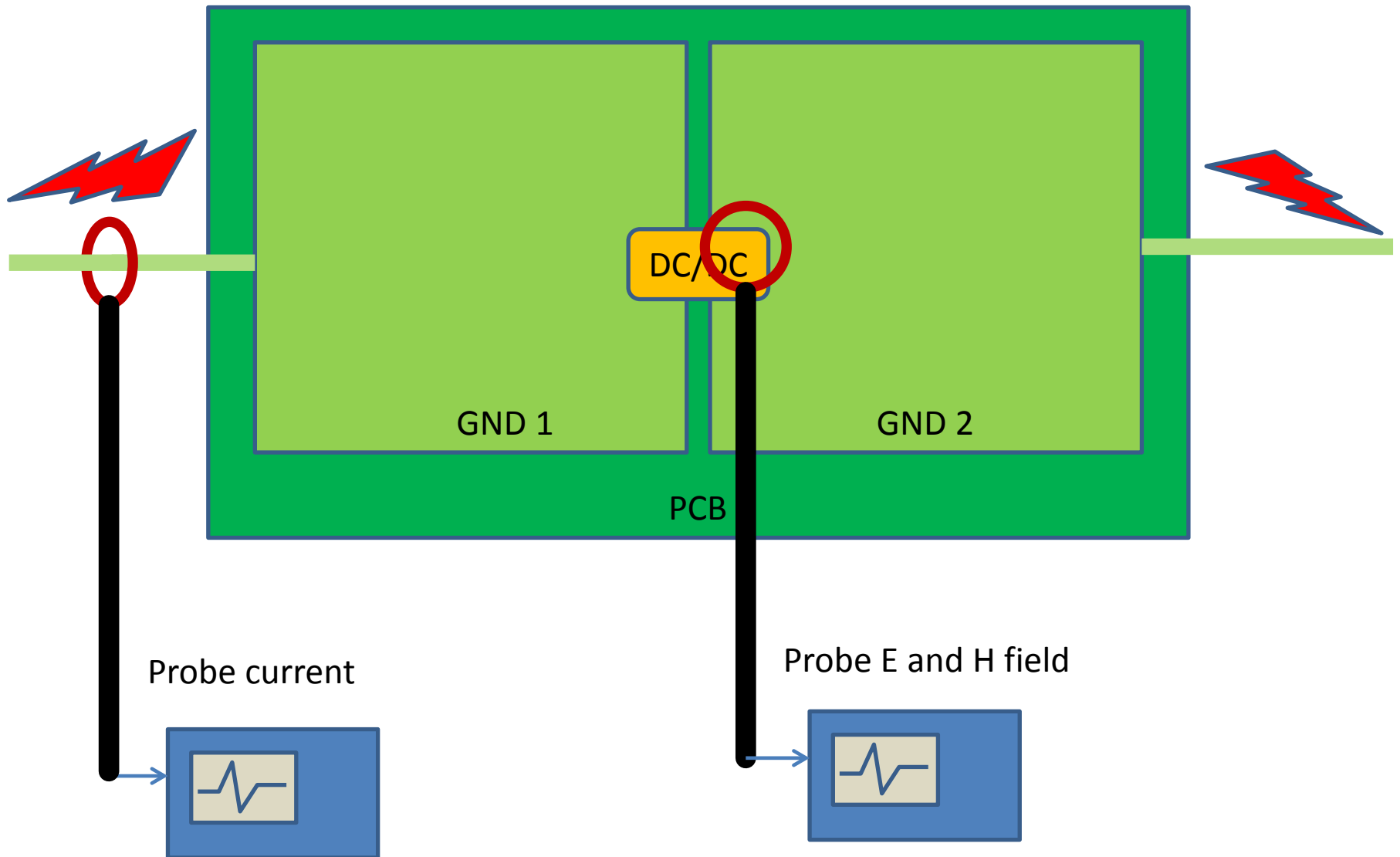
DC/DC converter noise



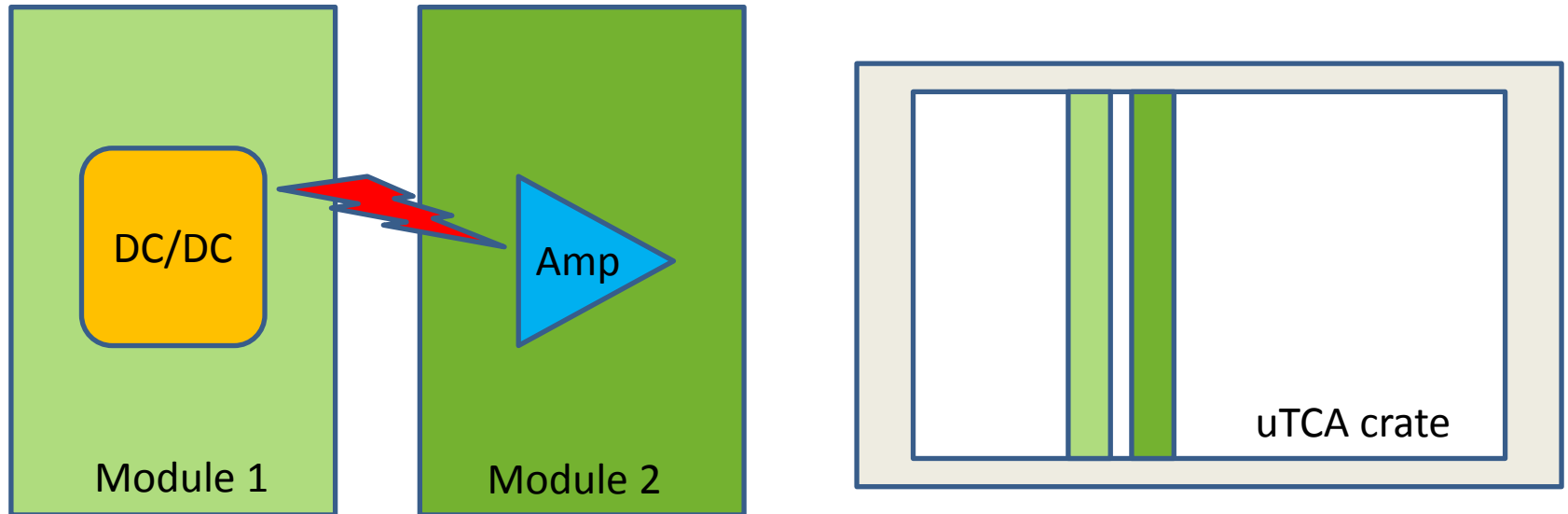
A device can disturb other devices by

- **E**-field noise
- **H**-field noise
- E/H far field noise
- **Conducted** noise

Check emission



DC/DC converter crosstalk

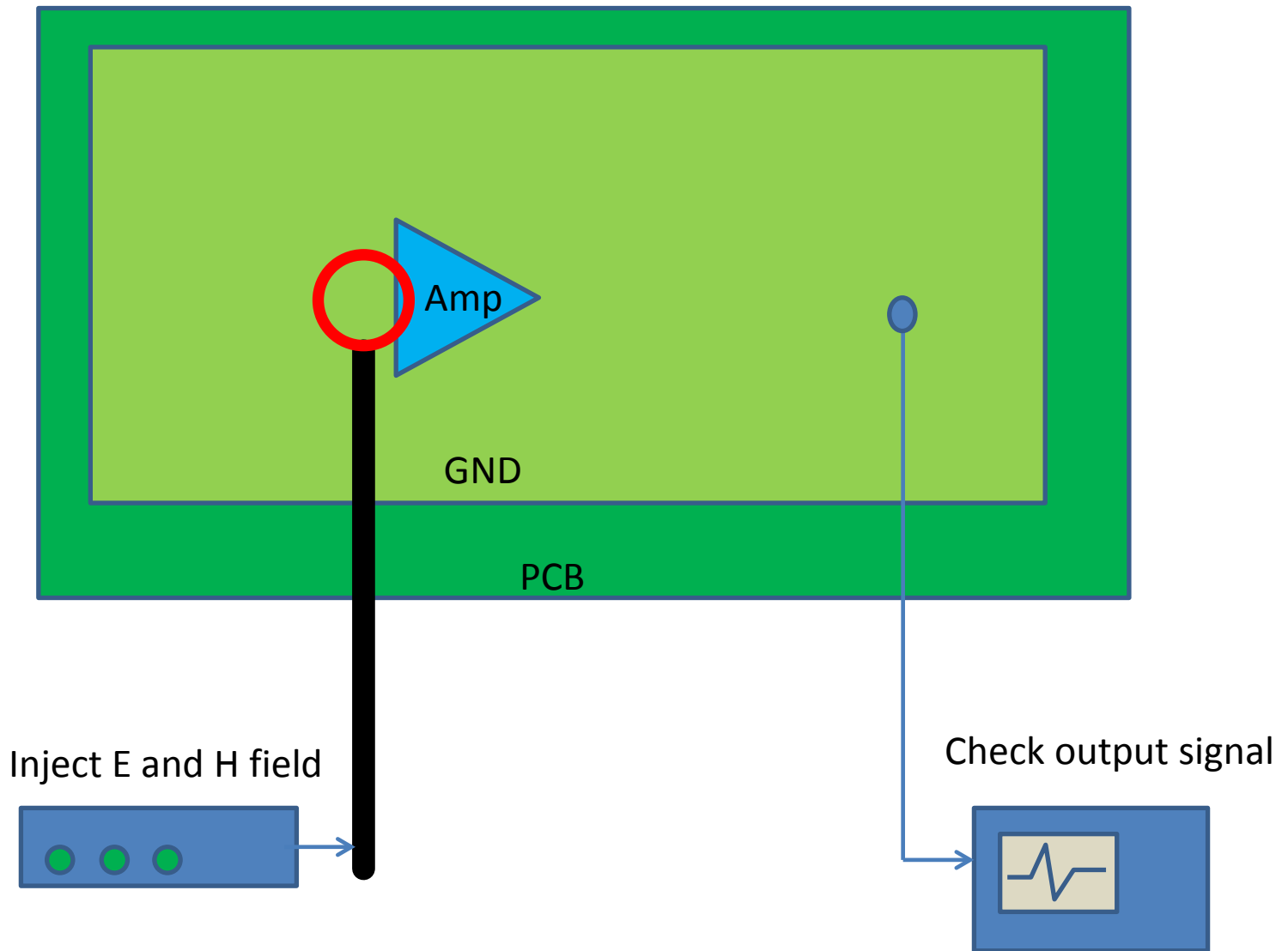


Crosstalk from DC/DC converter to sensitive signals on other module:

- E-field?
- H-field?
- conducted?

Insert separation plate or leave slot free?

Check sensitivity



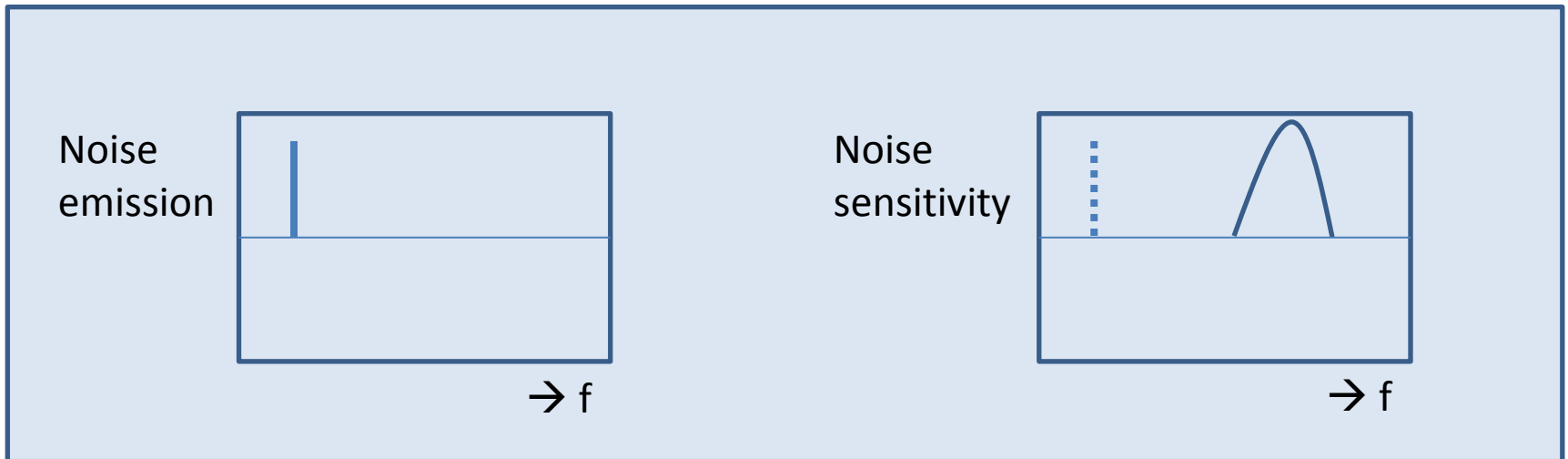
Systematic check?

To assure **correct functionality** of all components in a crate, we should check

- **Emission** of DC/DC-Converters and other components which are assumed to emit noise
- **Sensitivity** of delicate circuits like amplifier inputs

Frequency range

- Every device will emit noise in a certain frequency range
- Devices are sensitive in a certain frequency range



No frequency overlap $\rightarrow$ no problem!

Thank you!