

EMI tests in MicroTCA.4

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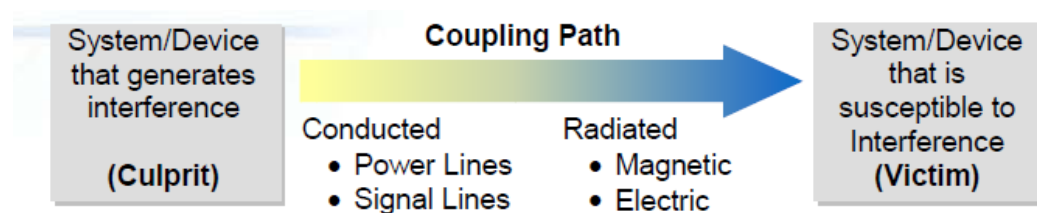
Area of interests

EMI (ElectroMagnetic Interference)

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

Two main interference ways:

- Conducted coupling
- Radiated coupling



DAMC-EMI R1.0 board

DAMC-EMI Board Functions

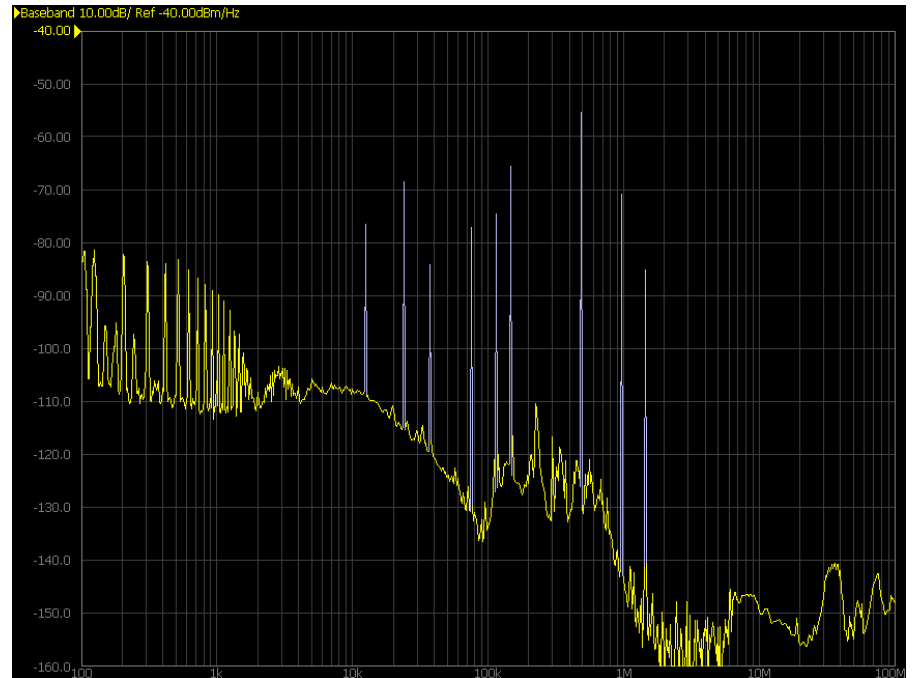
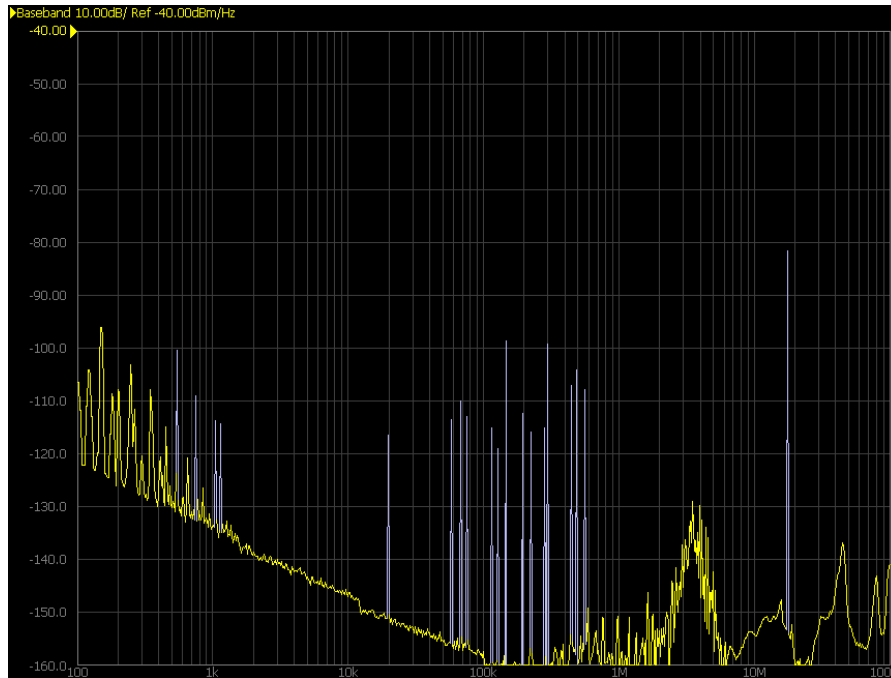
- Power supply voltages measurements (Payload +12V, Management +3.3V)
- +12V power interfering
- GND to Chassis voltage interfering and measurement
- Low voltage (μV) drop measurements (e.g. on GND plane)
- Vibration measurement
- Measurement of distortions influence on signal quality from Class A1.1 compatible RTM module



DAMC-EMI Board status

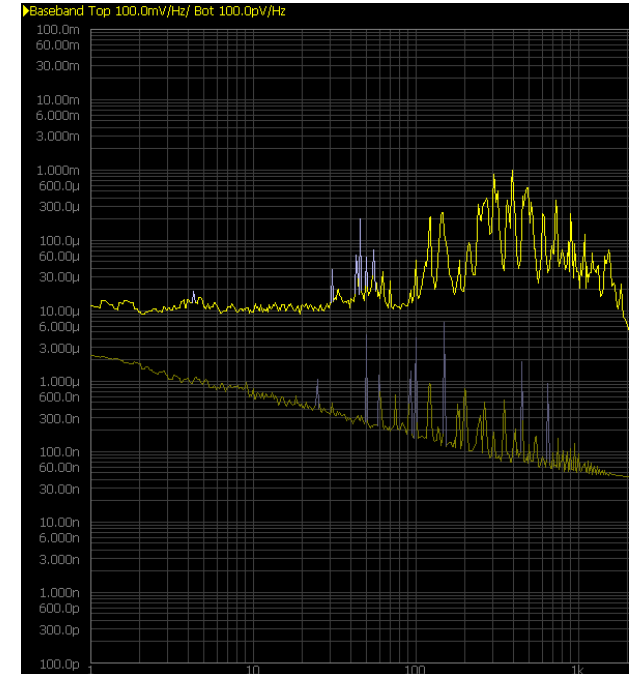
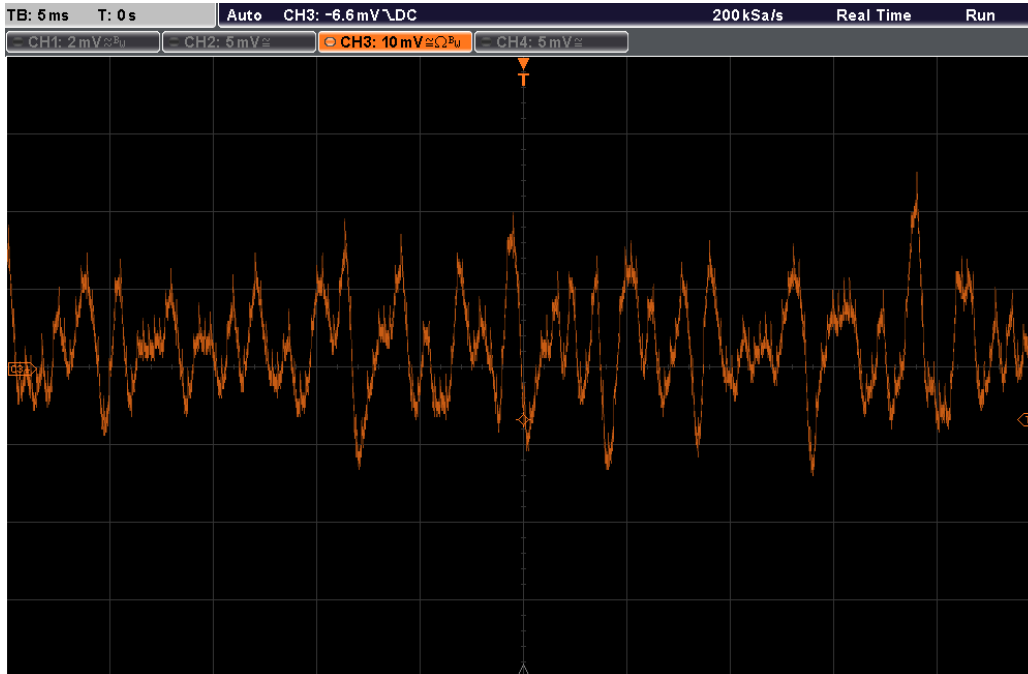
- The board was tested and characterized
 - some errors and limitations were found
 - workarounds were applied
 - new solutions were made and tested (for differential amplifiers)
- Some measurements in MTCA.4 systems were made
- A new revision is in production

PP (+12V) and MP (+3.3V) measurements



Measurements of backplane voltages shows that PP voltage is much better quality than MP voltage. Remark: The voltages were measured at low load condition ($< 10\text{mA}$).

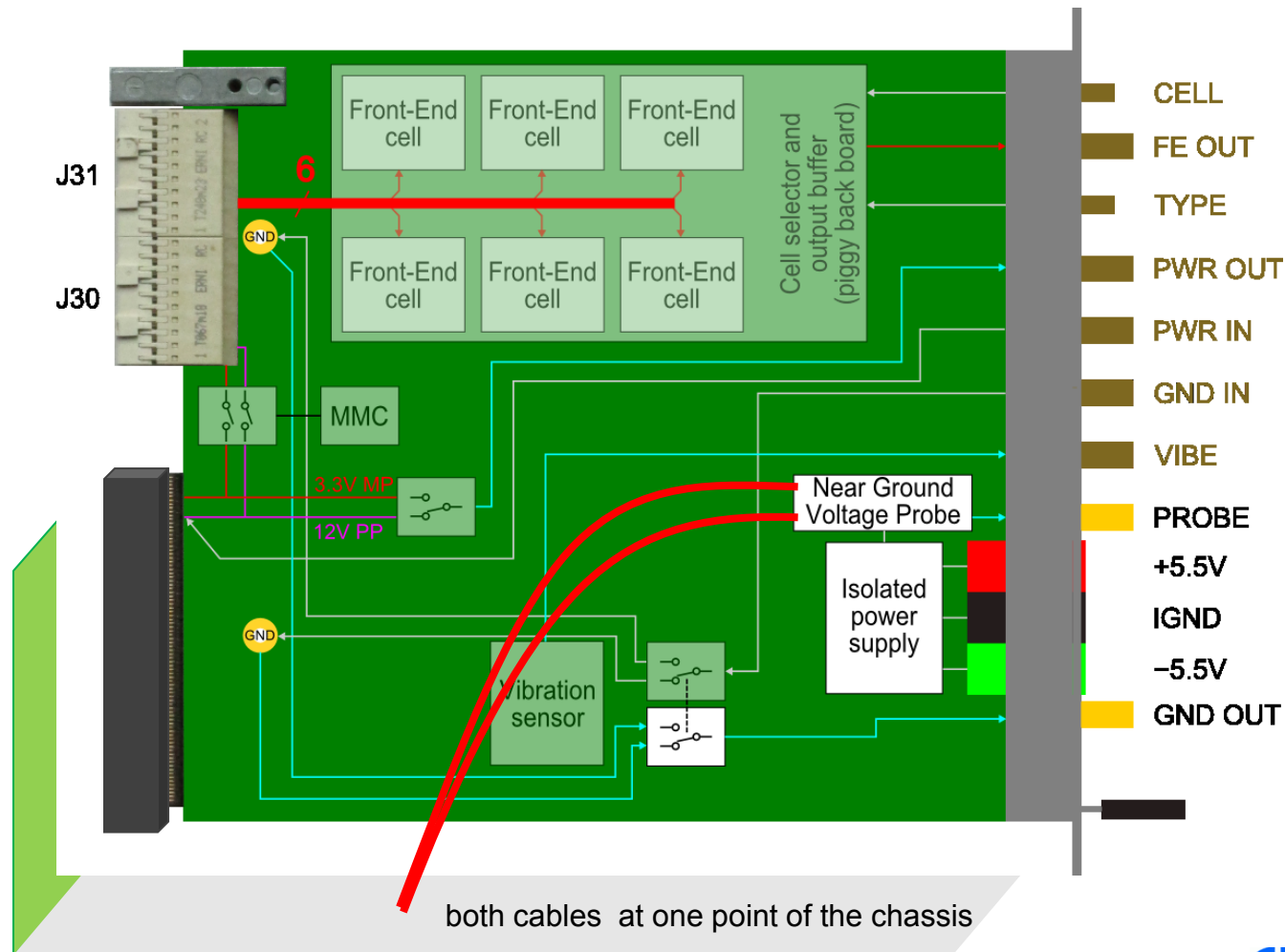
Vibration measurements



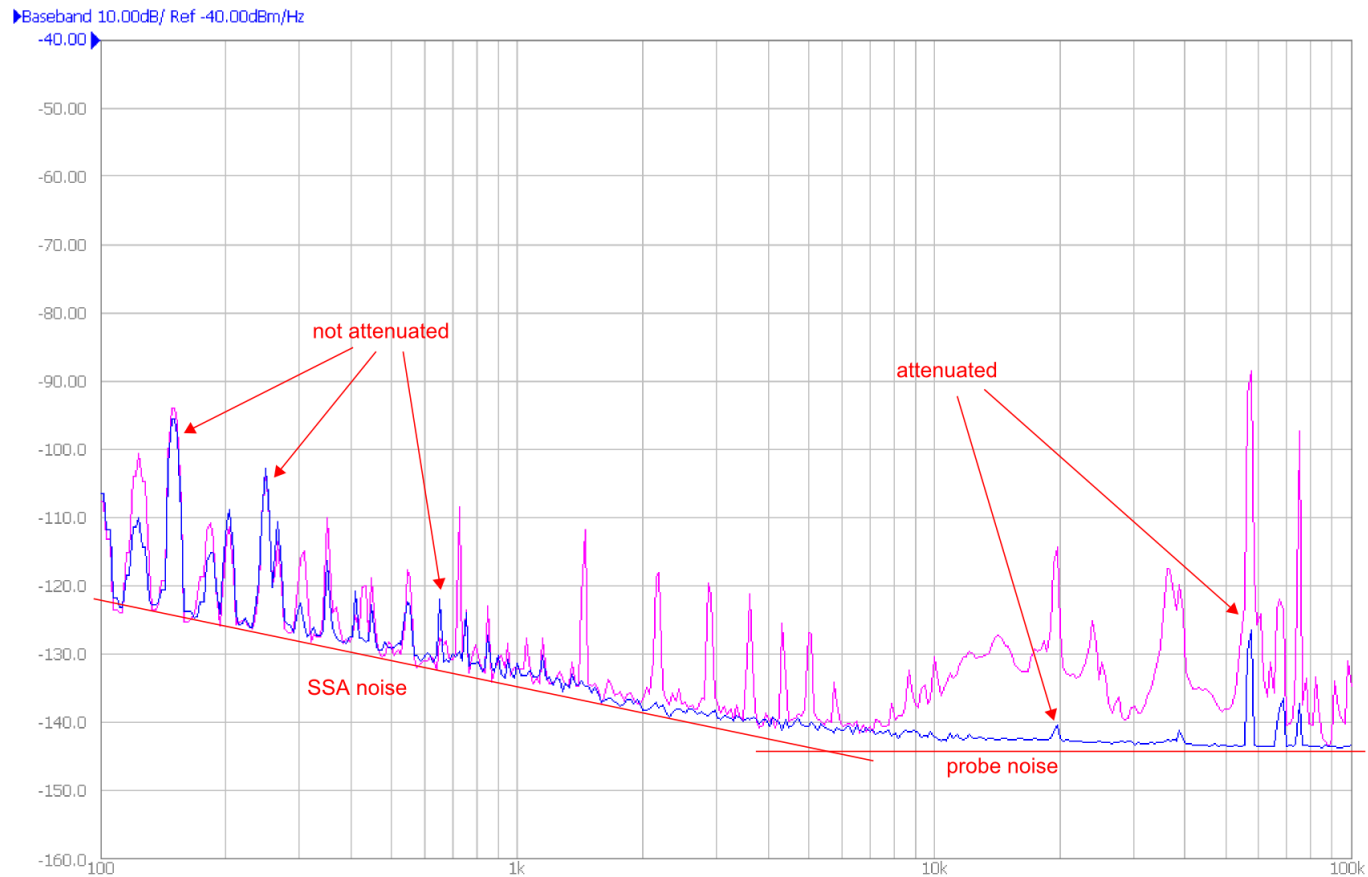
The measurement shows maximum output signal level 25 mV which corresponds to acceleration $0.1g \approx 1 \text{ m/s}^2$. Most of vibration components are in frequency range 100 Hz to 1 kHz. Remark: The measurement was made for low speed of fans. At highest fan speed the acceleration level is even 3 times larger.

Probe testing measurements

Near ground voltage probe test setup

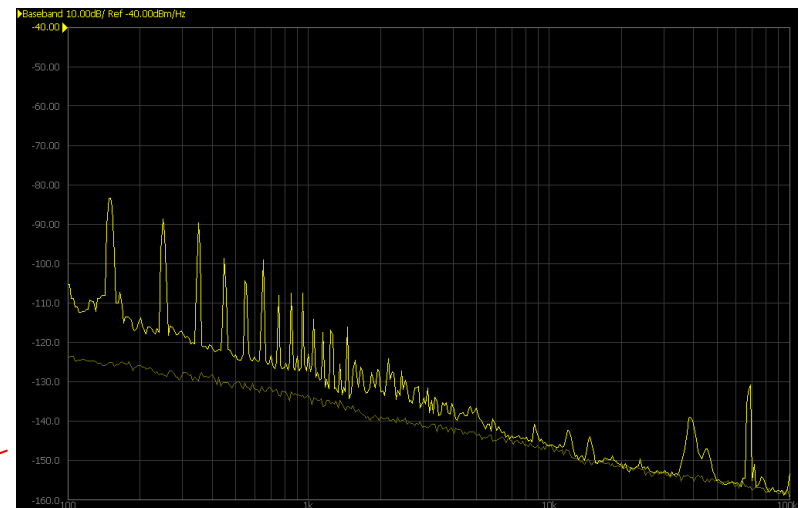
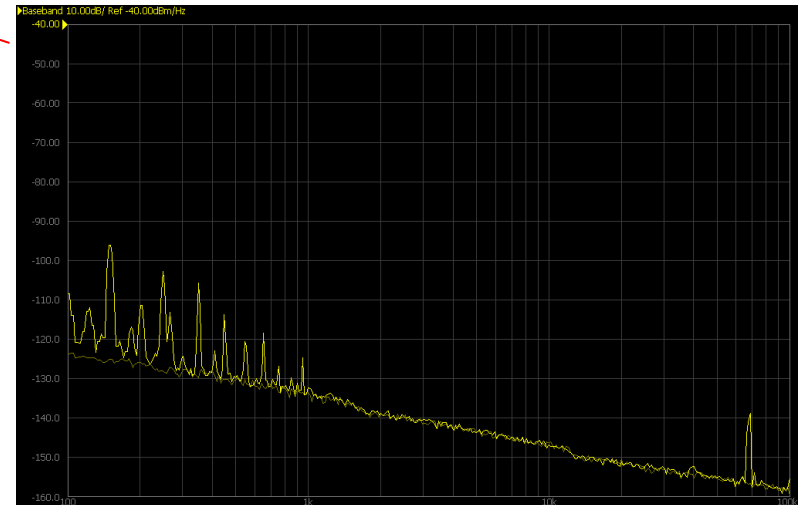
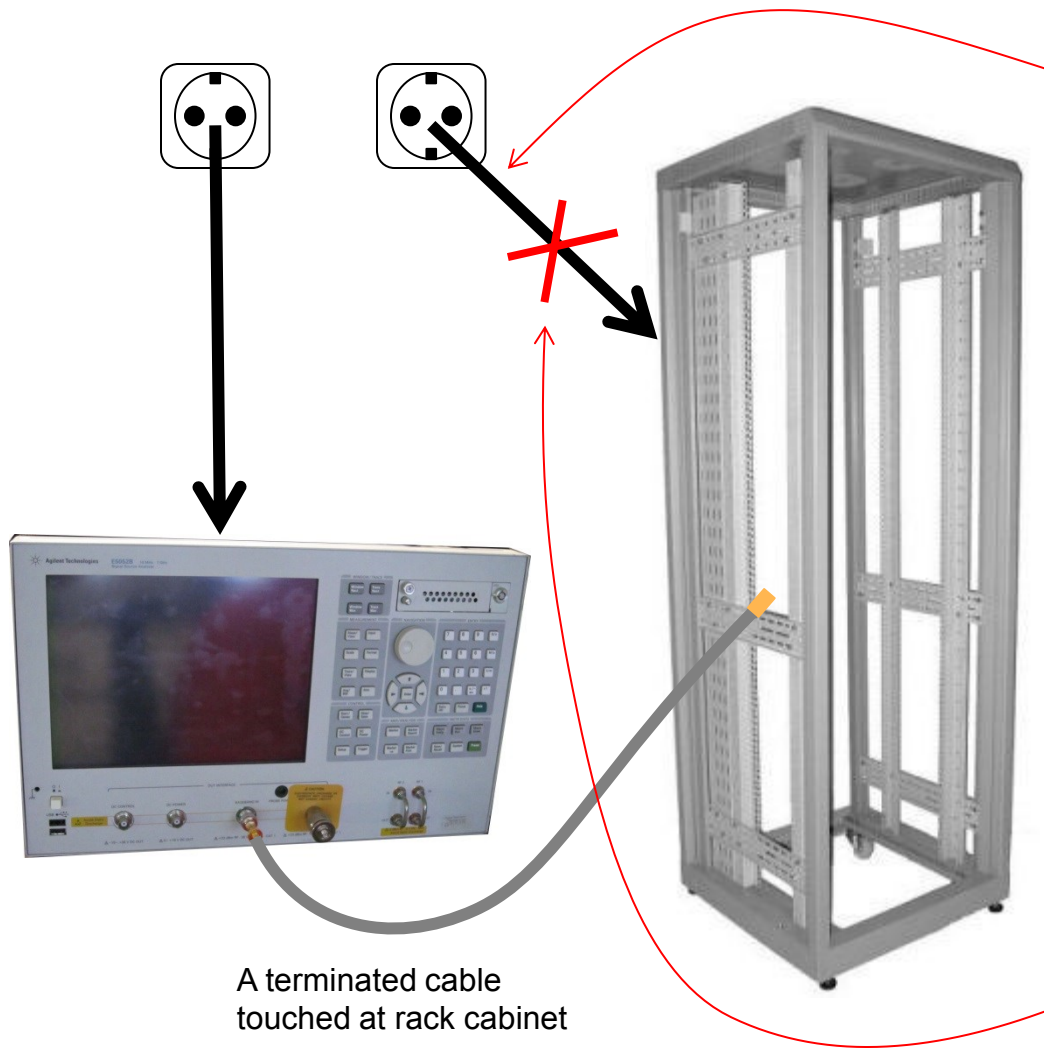


Probe testing measurements

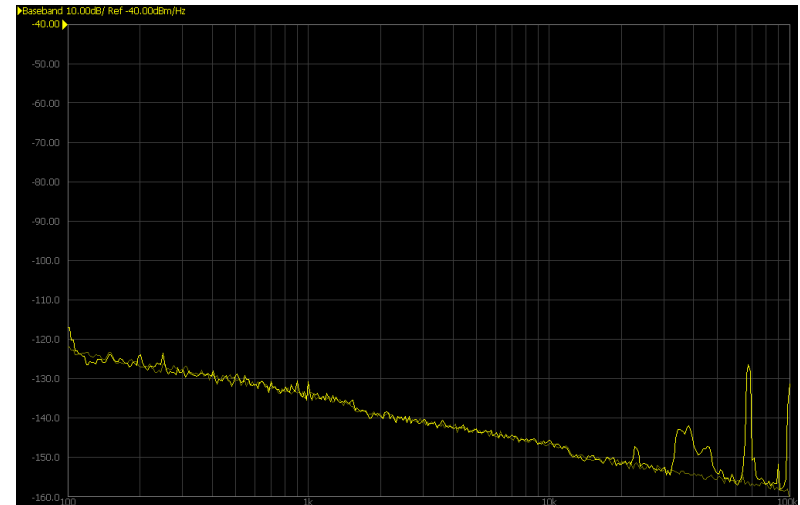
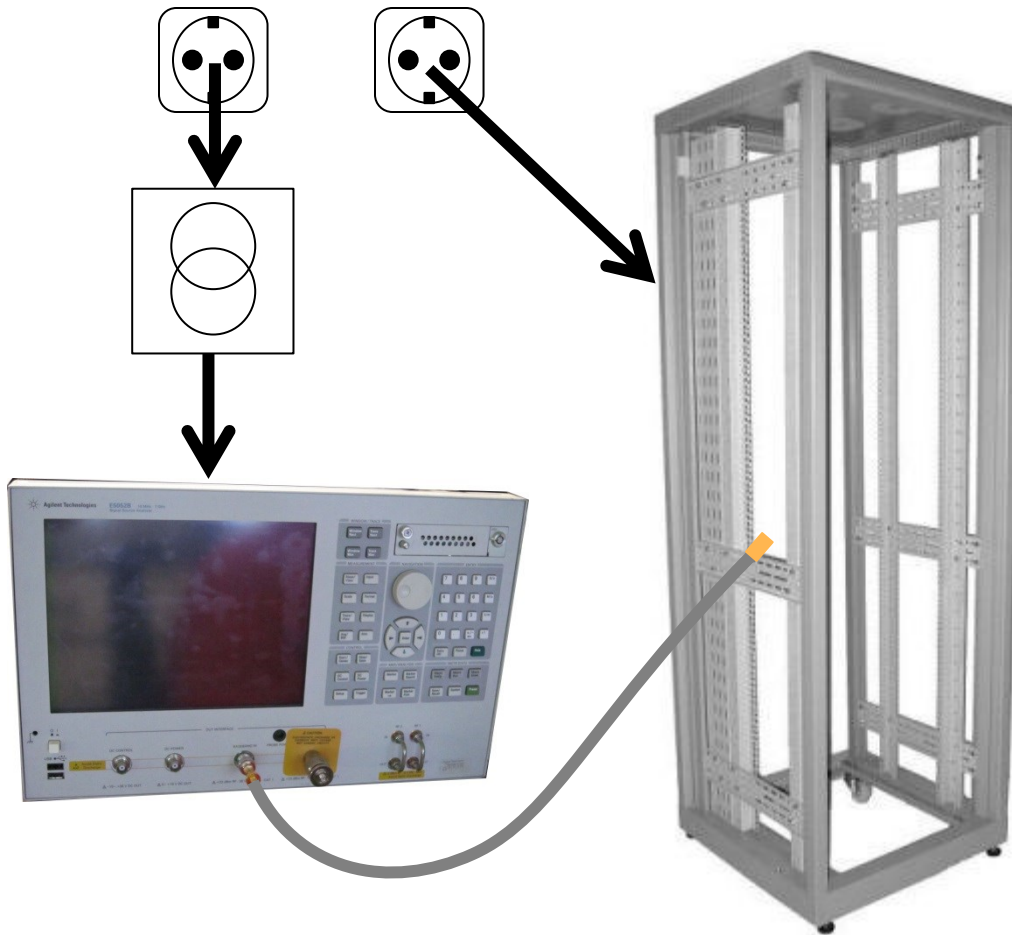


Significant 50 Hz harmonics visible. Not attenuated by the probe.

Investigation of attenuation problem

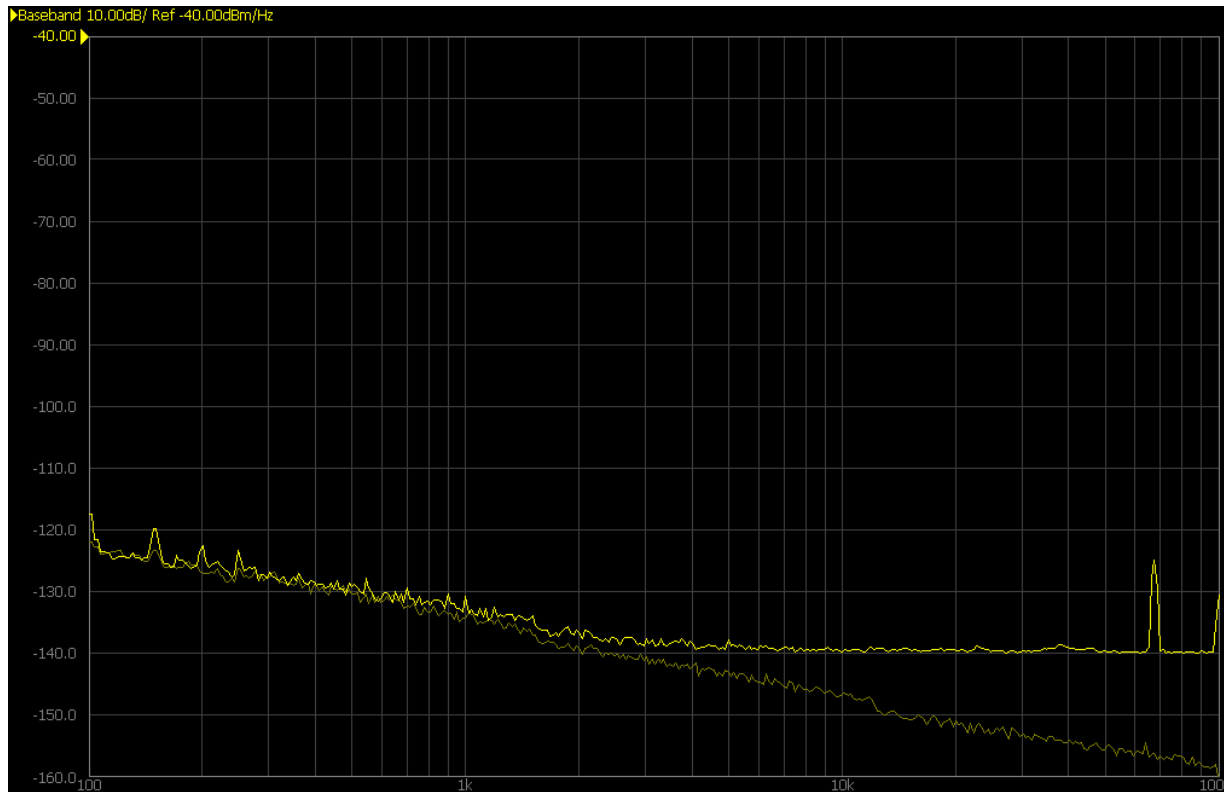


Investigation of attenuation problem



Probe testing measurements

Near ground voltage probe test with SSA power isolated



Much lower 50 Hz harmonics

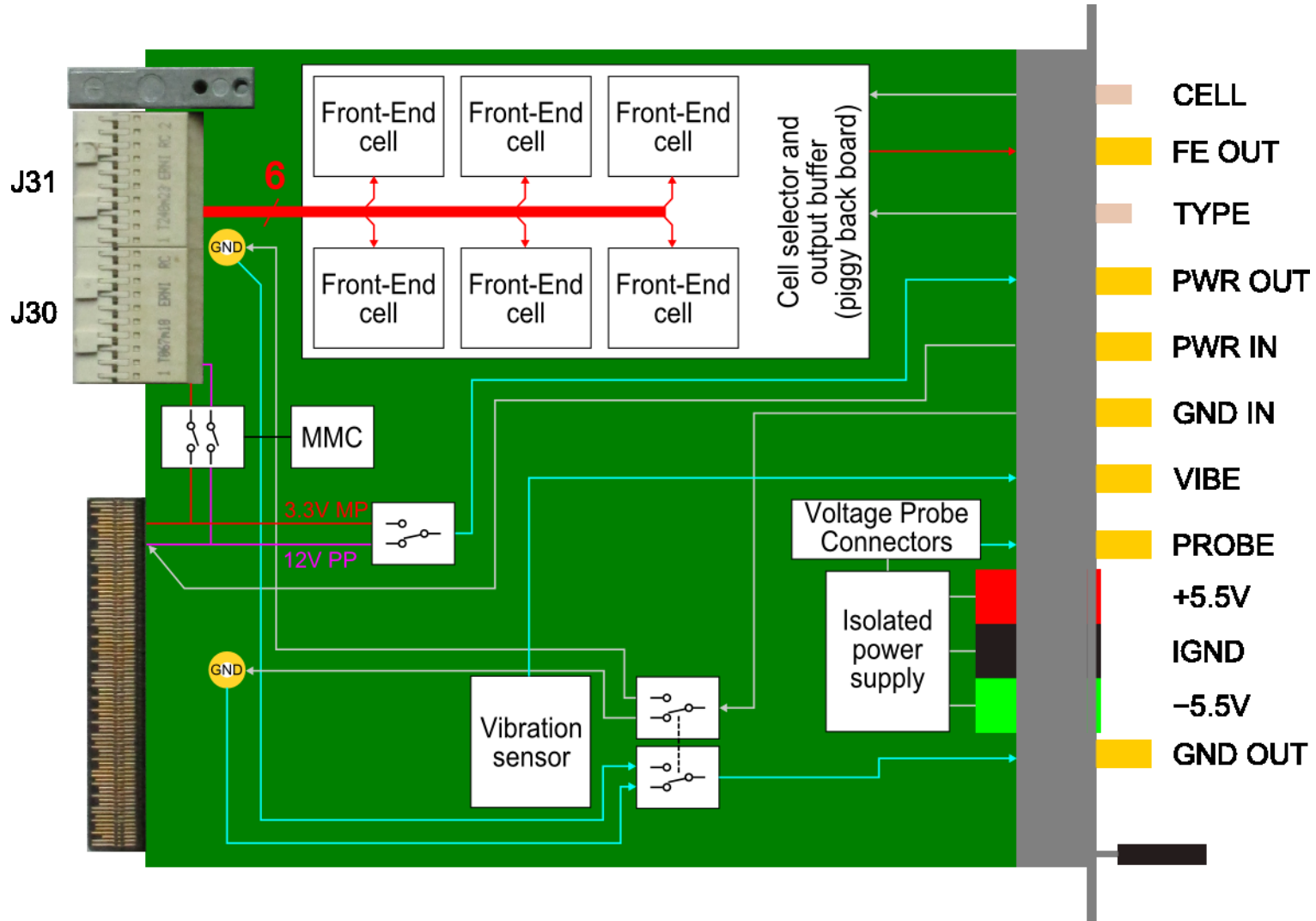
DAMC-EMI new revision: R1.1

DAMC-EMI R1.1 most important changes

- Errors corrections
- Improved differential amplifiers designs incl. Near Ground Voltage Probe
- Near Ground Voltage Probe made as off-board module
- PCB layout improvement

The DAMC-EMI board will be available from DESY since 2Q 2015

DAMC-EMI new revision: R1.1



Thank you
for
your attention