

EMC ad hoc Test Adapter Considerations

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overview

1. Unified test-adapter/measurement setup
2. Proposal for definition of “extended link segment”

motivation and background

- We gathered a lot of valuable input from different vendors, however due to slight differences in the test setup there is still room for optimization.
- Also different vendors showed influences of different parameters of the test setup especially to the balance parameters of connectors or complete harnesses.
- To further improve the measurements and as a common basis for measurements adapter and test setup could be unified.
- ***NOTE: This should NOT be a proposal for a testadapter or measurement setup in this stage, it should be a summary document of measurement experiences and proposals how a common testadapter and test setup could be realized to get reliable results. Everyone can add additional notes to this document, based on his measurement experiences.***

Considerations for a test adapter/test setup

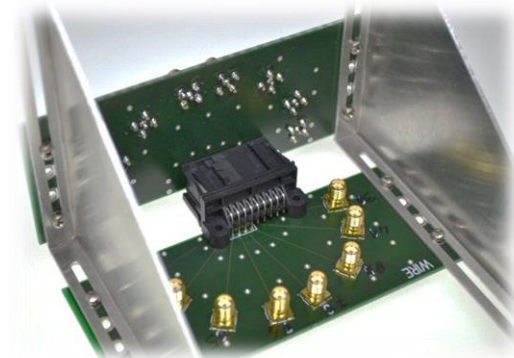
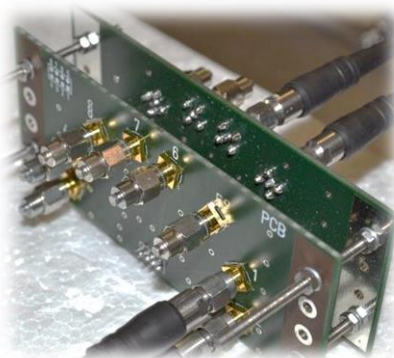
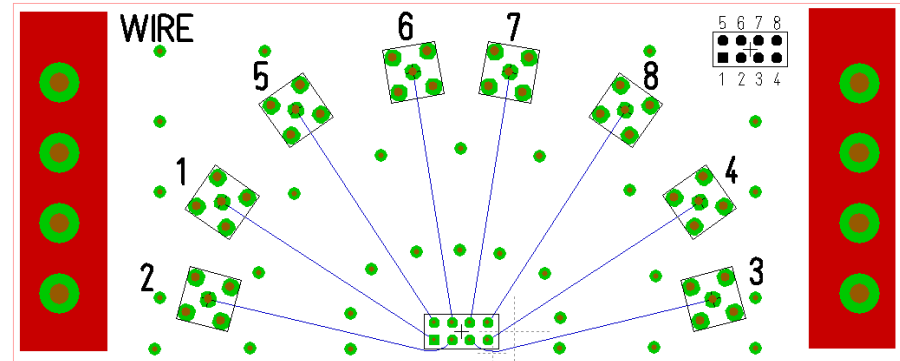
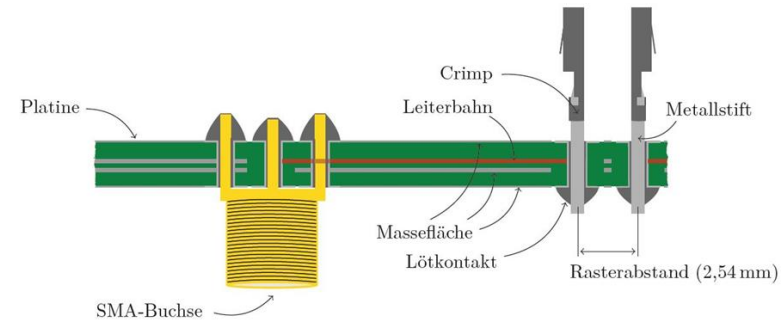
- Identical PCB (till MDI solder pads/pins)
 - Material (Rogers), Multi-Layer (buried traces?)
 - Same trace length and identical trace impedance (width, spacing)
 - simple de-embedding of 50ohm-traces
 - Same SMA connectors (best RF-parameters)
 - RF-characterization of test adapter?
- Possibility to have low impedance GND connection or low-impedance PCB-to-PCB connection.
- Possibility to use it for DUT (cable or connector) tests as well as for system tests (cable and connector, maybe Stripline- or BCI-like test setup)
- Test adapter suitable for measurements of cables/connectors/assemblies and also systems (BCI-like, stripline-like) and vehicle harnesses
- Commonly shared layout (gerber file?)

Considerations for a test adapter/test setup

- Test harness has to be placed $h=50\text{mm}$ above GND plane (one piece of metal!)
- Distance between meander of cables need to have a distance of at least $d>3xh=150\text{mm}$
- Proper GND-connection of test adapter realized by low impedance connection to GND plane.

example of a test-adapter (*no proposal!*)

- Usable for connector measurements, but also for cable/system measurements
- Capable of measuring 90°/180° connectors
- Low impedance GND connection possible
- Burried traces
- Identical trace length from SMA to solder pad/pin – however de-embedding due to long traces
- FR4 - could maybe be replaced by Rogers
- Right angled SMA – high quality needed!



notes

- Edge soldered SMA connectors perform better than 90° angled SMA connectors.
- However, with 90° angled SMA connectors you have more freedom to build a PCB with identical trace length.
- There are huge differences in the performance of 90° angled SMA connectors

things to define

- **Size:** t.b.d.
- **Material:** t.b.d. (*FR-4 or RF laminate, e.g. Rogers RO4003*)
- **Layers:** t.b.d. (*e.g. 4 and traces in layer 2*)
- **Trace length of 50ohm traces:** t.b.d. (*e.g. 50mm*)
- **RF connecors:** SMA, details t.b.d.
- **Layout specifications:** t.b.d. *e.g. 10mm GND contact edge at left/right/back (no solderstop, holes for screws to enable GND connections)*
- **Layout:** *proposal? (all identical except MDI)*

Definition of „extended link segment“?

- Definition of „extended link segment“ to clarify our discussion:
- From MDI solder pin/pad on the PCB to the MDI solder pin on the second PCB
- Connector vendors will offer both parts of the MDI, so both is covered in the Link segment measurements.
- CMC and other filtering/termination does still NOT belong to the link segment

