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# 802.3CH REQUIRED EMC DATA

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**Fraunhofer**

**IIS**

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# 802.3ch NGAUTO

## Objective

- Automotive Environment considerations in Design of Physical Layer
  - EMC limit levels - 2022 and onwards
  - Practical high frequency component test method

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## EMC Limit Levels

- Current state of defined limit levels (to the best of my knowledge)
  - Maximum frequency for Emissions: 2690 MHz (LTE/UMTS Band)
    - Radiated emissions, stripline
  - Maximum frequency for RF interference: 3000 MHz
    - Antennas, BCI, magnetic fields, stripline

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## EMC Limit Levels

- What about:
    - Low latency variant of 5G - will be big for autonomous driving
      - Several candidate bands between 3100 MHz and 4990 MHz
        - Will they be used?
        - Certain ones selected ... to stay away from with NGAUTO PSD?
      - Repurpose/reframe „old“ bands (600 MHz, 700 MHz, 800 MHz, 900 MHz, 1.5 GHz, 2.1 GHz, 2.3 GHz and 2.6 GHz)?!
    - Car-2-Car Communication
      - 802.11p used? (5850-5925 MHz)
      - „Less shielding metal“ and „more electronics“ in the car
        - Trend of component level test limits in 2022/24?!
- OEMs should identify „vital“ frequency bands and limit baselines

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## EMC – Component Test Method

- Radiated Emissions (CISPR25) and RF interference (ISO 11452-2)
  - Using different antennas – works up to Multi-GHz range
  - Disadvantages:
    - Testing only in specific ALSE (Absorber Lined Shielded Enclosure) test chamber
    - (Very) Time-consuming
    - Transfer function (field to cable) difficult to determine and strongly dependent on test setup
- Stripline (CISPR25 ,ISO 11452-5)
  - Emissions and interference - limits up to 1GHz
  - Transfer function of apparatus limited (limits practically cannot extend further than current definition)

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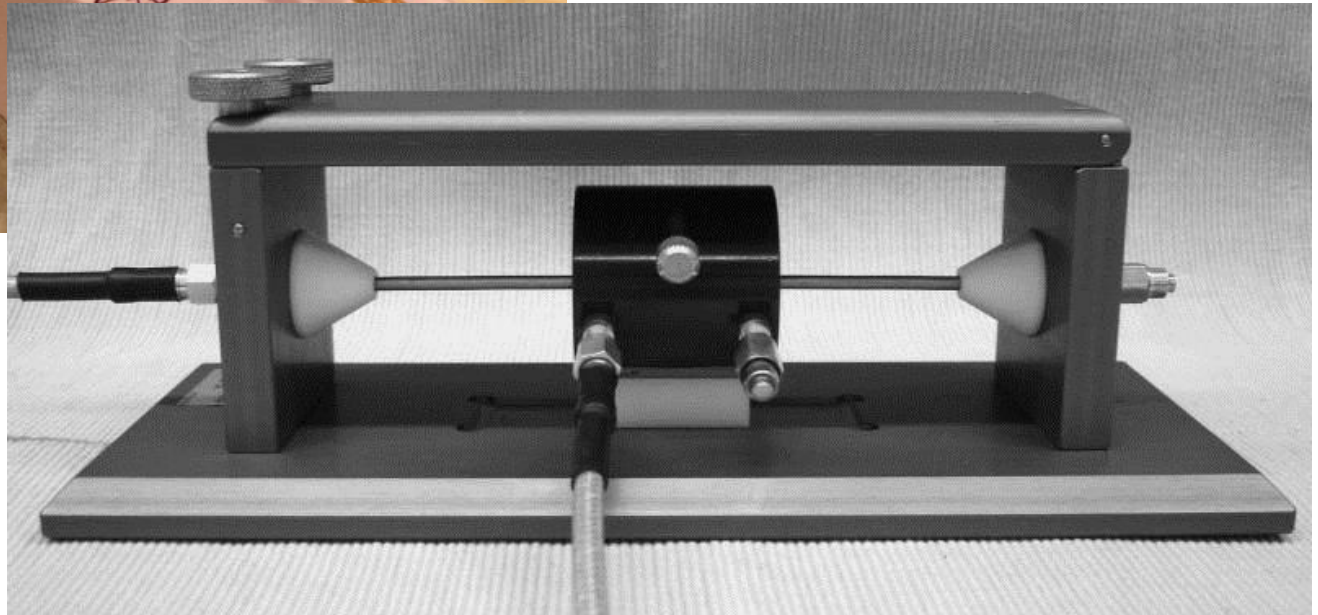
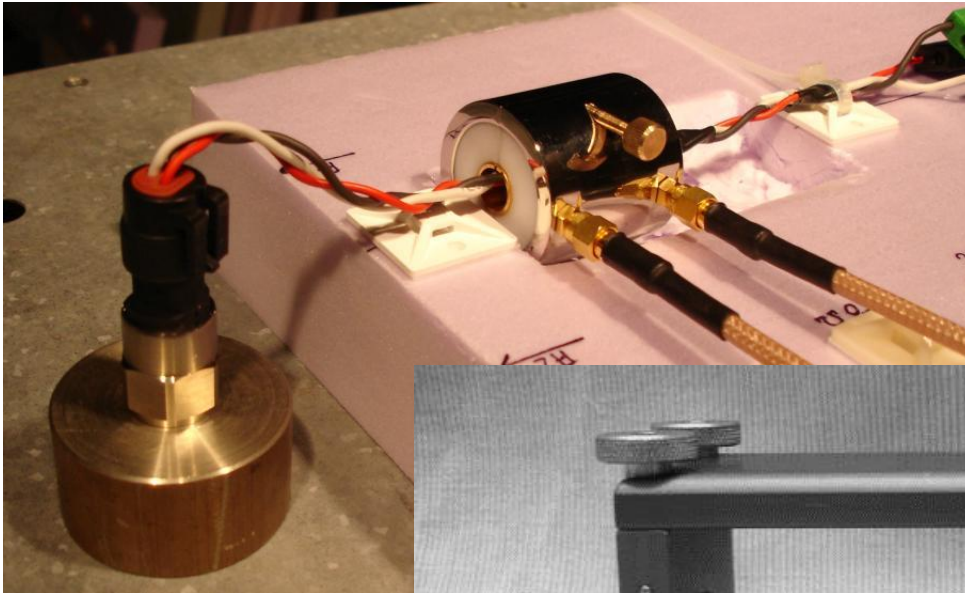
## EMC – Component Test Method

- Tubular Wave Coupler (TWC)
  - Described in ISO 11452-4 section 6.2
  - Was referenced previously by Daimler/VW
  - But (to the best of my knowledge) no limits in any current OEM standard defined for TWC
  - Advantages:
    - Compact equipment (smaller than stripline)
    - (More) repeatable measurements
    - Emissions and interference testable
    - Works in GHz range

→ Baseline limits for TWC test would help PHY developers

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## EMC – Component Test Method



Images: courtesy  
of FTZ

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## Required EMC Data - Conclusion

### Limits

- OEMs should identify „vital“ frequency bands and limit baselines for 2022 cars

### Test Method

- Baseline limits for TWC test would help PHY developers a lot



**Thank you for your attention!**