WP4 – Quick Method

Development of a new equipment for measuring sound absorption / reflection and sound insulation in a **quick and safe** way

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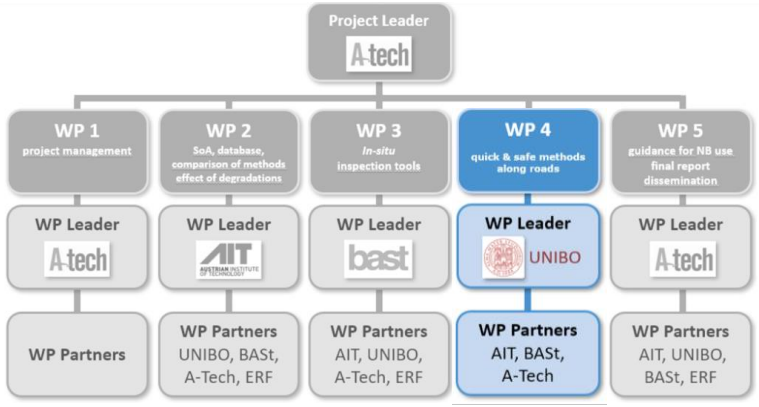


WP4 – Quick method – Step 2 of the 3-step SOPRANOISE approach

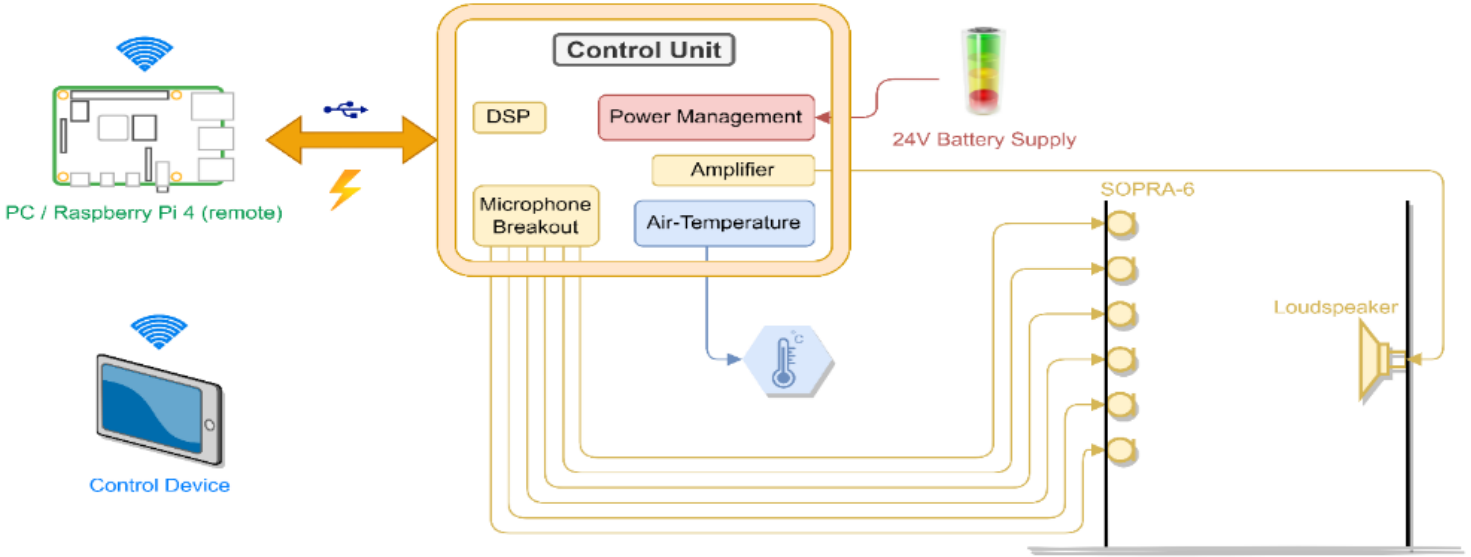
Objective: Develop a **quick measurement method** to fill the gap between in-situ visual inspections (step 1) and full testing according to EN 1793-5 and EN 1793-6 standards (step 3)

- skilled operators not required → **simplification of EN 1793-5, -6 procedure**
- equipment **lighter and easier to operate** than for EN 1793-5, -6 tests → **designed ad hoc**

UNIBO ↓ **AIT**

- Lightweight loudspeaker
- Linear microphone antenna
- Battery power supply
- Operated by few buttons
- Wireless connection with loudspeaker

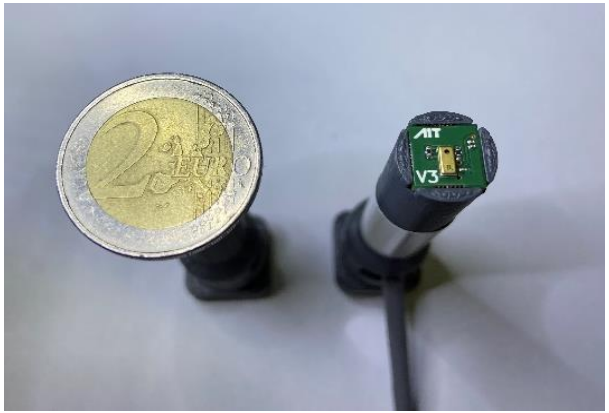
General Layout of the AIT Equipment

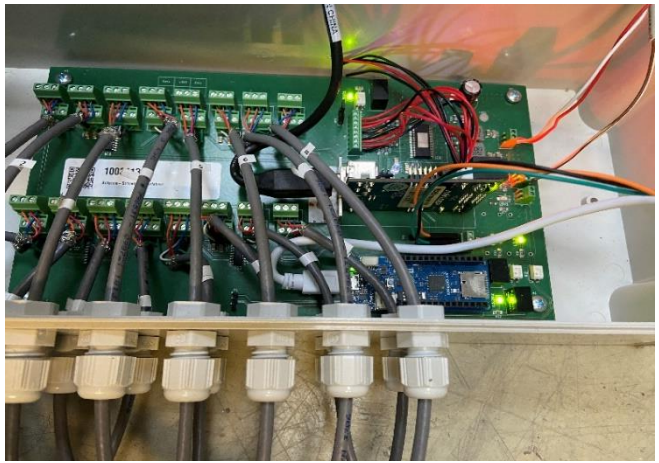


- Separate control and processing unit
- Any general-purpose computer can be used as processor

AIT Measurement Equipment

- **Simultaneous** 16-channel **recording system**
- 6 microphones used for SOPRANOISE
- Digital **MEMS-microphones** in use
- AIT built integrated power amplifier
- Battery powered (optional)





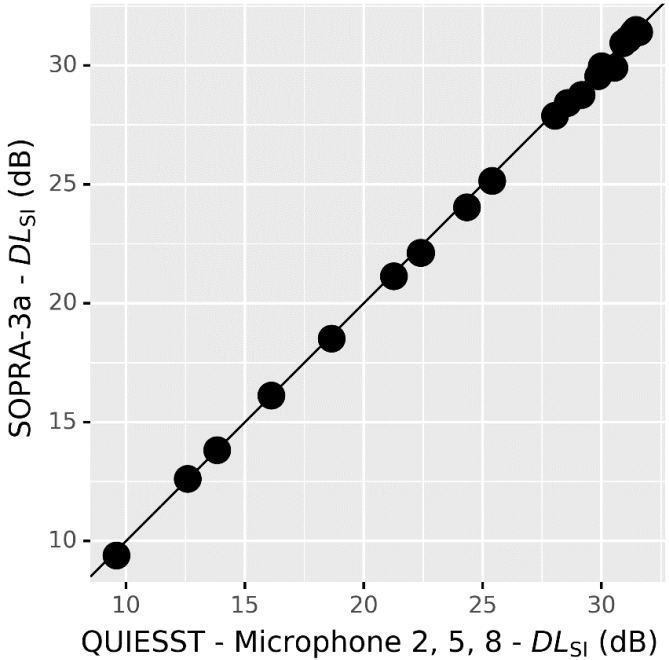
Equipment used for SOPRANOISE Quick Method

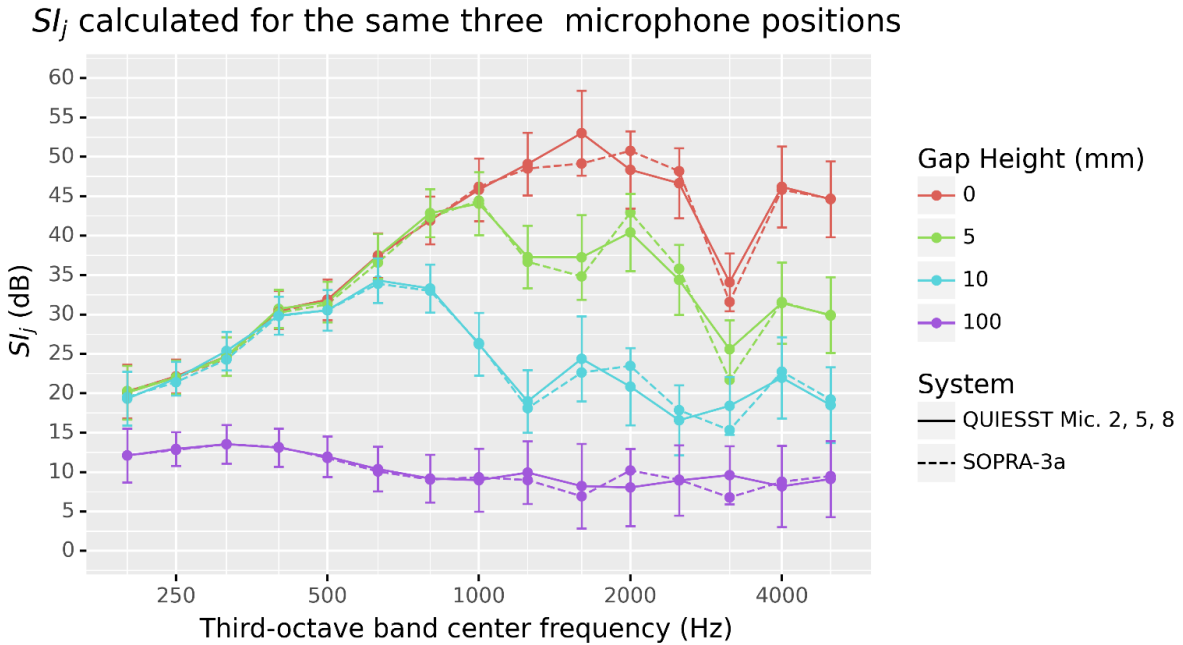
- AIT equipment has been used for measuring **airborne sound insulation** developed in SOPRANOISE with the following variations:
  - **SOPRA-6**: 6 microphones of the Antenna are used (1 to 6)
  - **SOPRA-5**: 5 microphones of the Antenna are used (1 to 5)
  - **SOPRA-3a**: 3 microphones of the Antenna are used (2-3-4)
  - **SOPRA-3b**: 3 microphones of the Antenna are used (1-3-5)
  - **SOPRA-1**: only 1 microphone of the Antenna is used (3)

- AIT equipment used also for measuring airborne sound insulation and sound reflection according to **EN 1793-5** and **EN 1793-6**
- 4x4 aluminium NB with absorptive material on loudspeaker side

Testing the AIT Equipment for the SOPRANOISE Quick Method for Sound Insulation

- Very high correlation between measurement system used for QUIESST and SOPRANOISE
- **Good accordance** between **QUIESST and SOPRANOISE** systems
- Microphone position for SOPRA-3a are at the same positions as for QUIESST grid
- **AIT equipment** tested and **validated**

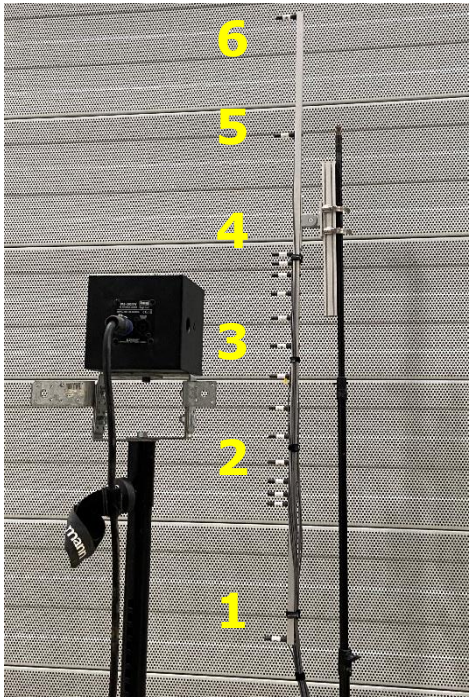




- **Good accordance between QUIESST and SOPRANOISE also in frequency range**
- **Results within uncertainty U according to the EN standard**

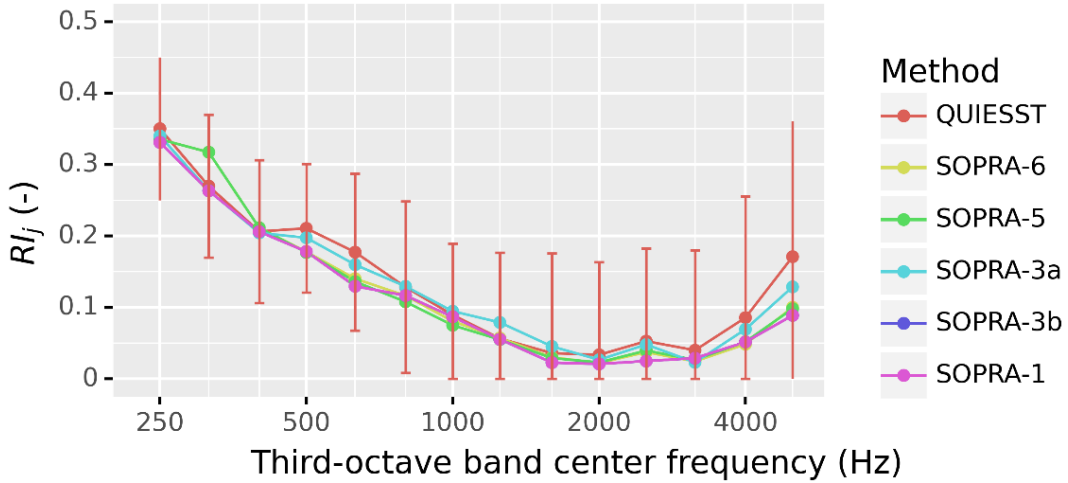
Testing the AIT Equipment for the SOPRANOISE Quick Method for measuring Sound Absorption / Reflection

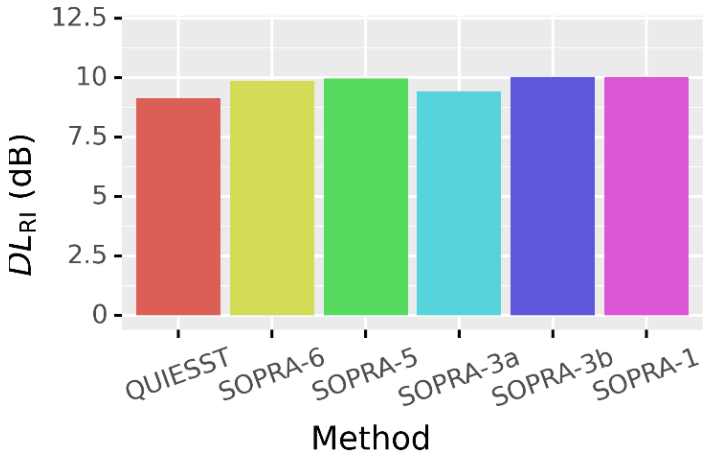
- QUIESST method according to **EN 1793-5**
- Application of all SOPRANOISE variations: SOPRA-6, SOPRA-5, SOPRA-3a, SOPRA-3b, SOPRA-1
- Window length and frequency range adapted to disturbing components
- High precision of the equipment
- **AIT equipment** tested and **validated**
- 4x4 aluminium NB with absorptive material on loudspeaker side



Testing the AIT Equipment for the SOPRANOISE Quick Method for measuring Sound Absorption / Reflection

- **Very good accordance** between QUIESST and SOPRANOISE method(s)
- All methods are by far **within** the **measurement uncertainty** s_R of EN standard





Conclusion on the AIT Equipment for SOPRA Quick Method

- A **brad new equipment** has been **developed** and **built** by **AIT**
  - Simultaneous 16-channel recording system with digital MEMS-microphones and integrated power amplifier
  - 6 microphones used according to SOPRANOISE application
- AIT equipment used for measuring **airborne sound insulation** and **sound absorption** / reflection in a **quick** and **safe** way
- Measurement time: around **5 minutes** in the laboratory
- High precision of the equipment for both applications
- **Very good accordance** between **QUIESST and SOPRA** methods
- AIT equipment tested and validated