Guidelines and results for measuring **noise** and **electrode faults** with BioSemi ActiveTwo

Center for Visual Cognition
Department of Psychology
University of Copenhagen
Tuesday 24 March 15

One-bucket test:
Identifying internal errors

Quantify internal noise sources:
- Electrode noise
- Shorted nose (amplifier)

Diagnose system faults
- Corrosion of electrodes
- Damaged wire insulation
- Bad connectors
- Internal faults

Bucket of water with a spoon of table-salt added.

Procedure:

1. CMS/DRL is dumped in the water. Blue light should be constant on (if not, CMS/DRL are faulty)
2. Electrodes added one by one – if blue light starts blinking this means that the added electrode is faulty (kinked wire, etc.)

Two-bucket test:
Identifying impact of environmental noise

10 k-ohm resistor between CMS/DRL and leads

- Characterize environmental noise
- More sensitive with higher ohm's

Two buckets of water with a spoon of table-salt added.

Procedure:

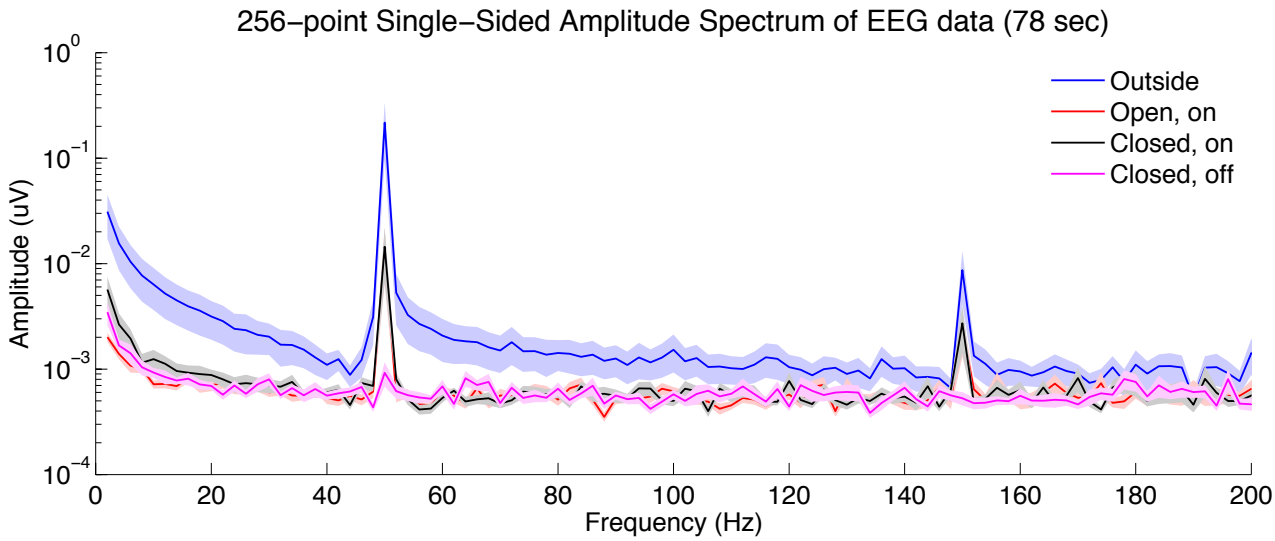
1. CMS/DRL is dumped in the first bucket.
2. A healthy electrode set is added to the second bucket and the two buckets are connected through a 10/100 k resistor.
3. To better pick up the ambient noise, an antenna could be added to the second bucket.

Test 1: Environmental noise in room 4 and faraday cage

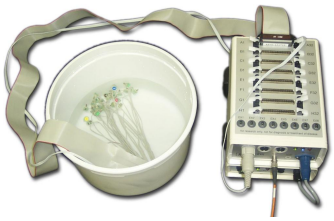
10 k-ohm resistor between CMS/DRL and leads

Two-bucket test, testing conditions

1. Outside: EEG acquisition outside of cage close to noise sources (acquisition PC)
2. Open, on: EEG acquisition inside cage with open door and with experimental computer on
3. Closed, on: EEG acquisition inside cage with door closed and with experimental computer on
4. Closed, off: EEG acquisition inside cage with door closed and with experimental computer off



Test 2: Electrode testing, all sets



One-bucket test, testing procedure

1. CMS/DRL in same bucket as the tested electrode set

Following electrodes tested as faulty:

Set B, electrode; B11 B12 B13
Set E, electrode; E8 E19 E20
Set F, electrode; F7 F12 F15
Set H, electrode; H19

Thus, the above electrodes should not be connected to the cap