DPA Microphones

Optimal headset positions and placement

Optimal headset placement

Voice test in semi-damped studio. 2 matched microphones were used for comparison. Germans words with focus on [S] and [Sch-] sounds.
3 positions are recorded with a hardwired connection and a wireless for comparison, as we expect some wireless system may add harshness to [S] sounds if not adjusted correctly to the level of the voice relative to the sensitivity of the microphone.

- Considerations
  - Level- gain before feedback
  - Frequency response
  - Plosives – Pop noise
  - Nasal airflow
- Wireless
  - Gain setting / Preset
  - Pre-emphasis
  - Compander setting

Position 1 (1 cm in front)

- Wired
- Wireless (unity gain)

This placement almost in front of the mouth suffers from nasal airflow and plosives from the mouth
The level of the voice is loud and sounds natural but microphones would need a foam windscreen or maybe even fur in order to be functioning in this position.

Regardless of the transmitter settings.

NOT recommended

Position 2 (corner of your smile)

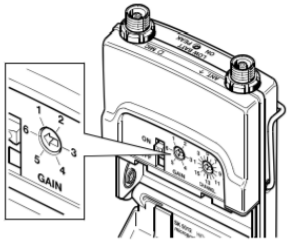
- Wired
- Wireless (unity gain)
- Wireless (Hard gain)

This position, at the corner of your smile is optimal.
Some nasal airflow may be experienced but if the microphone is placed close to the cheek, sometimes even touching, the wind from body movement and airflow from the nose, has limited effect on the sound.
The sound is somewhat direct and still relatively loud, so transmitter gain setting must be considered.
If the transmitter is gained to hard/high, the sound is compressed and may appear distorted.
With microphones like 6066 (Sensitivity 6mV/Pa; -44dB re 1 V/Pa) we recommend the setting 2 or 3 on Sennheiser 5012. This will allow headroom for the transmitter to handle most voices.

From 5012 manual

Adjusting the sensitivity

Use the 6-step sensitivity switch (GAIN) to adapt the gain of the microphone input to the expected sound levels.



English

In practice, the following settings have proved their worth for adjusting the sensitivity:

Position 1 = high-frequency, loud audio material with many plosives
Position 2,3 = loud voices, vocals (close-miking)
Position 3,4,5 = normal voices, talkshows
Position 6 = soft voices

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https://assets.sennheiser.com/global-downloads/file/12001/SK_5012_US_082568A03_0405.pdf

Position 3 (3 cm behind)

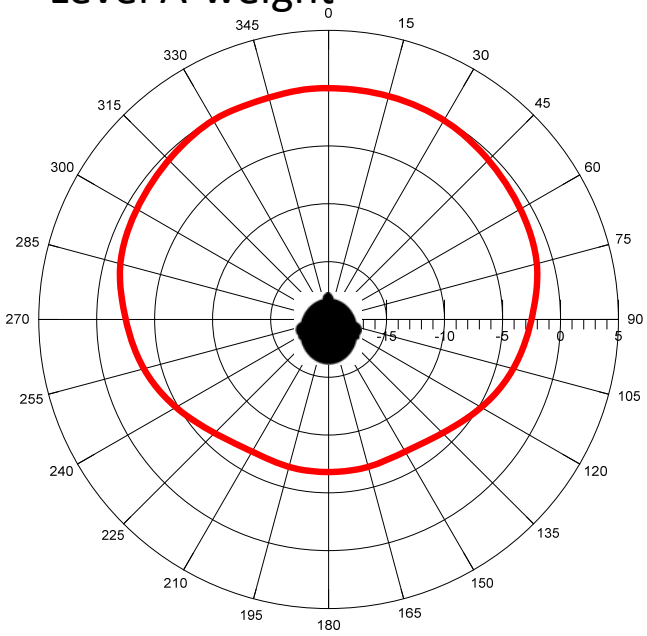
- Wired
- Wireless

If nasal airflow, pops and plosives are still an issue Position 3 is good alternative.
But due to the radiation pattern of the human voice, the higher frequencies and the overall level is reduced a bit.

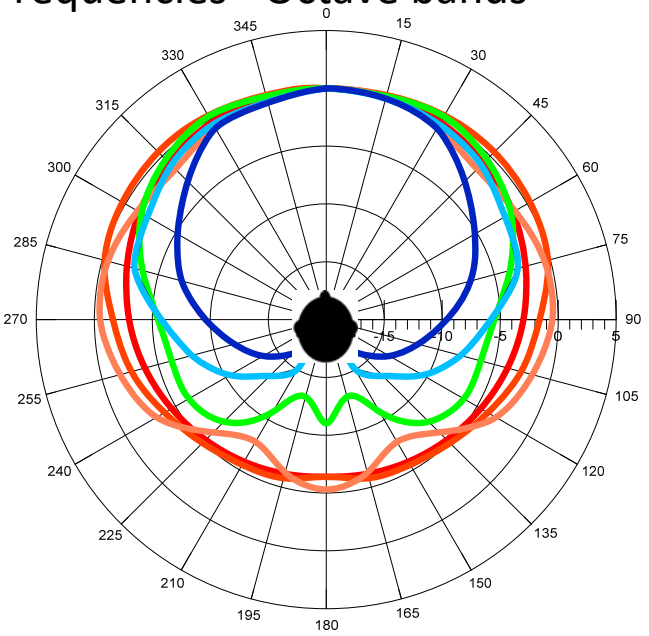
Therefore some compensation is needed.

Directivity of the human voice

Level A-weight



Frequencies - Octave bands



source: Chu & Warnock, 2002

CONCLUSION

Position 1 –
Most natural sound. But too sensitive to nose wind

Position 3
Loss of level and higher frequencies

Position 3
Compensated

In the example here I have EQ’ed the voice with a graphic EQ for better visualization

The overall level is increased with 2,4dB and this is my EQ.
We hear the room sound more clearly, but the speech intelligibility is preserved

The figures below illustrates the loss of high frequencies relative to a reference position 1 meter in front of the person speaking.
We see that microphones placed further behind the mouth results in loss of high frequencies. We do not see the variations in levels in this graph. Only frequencies