5G for Live Audio Production

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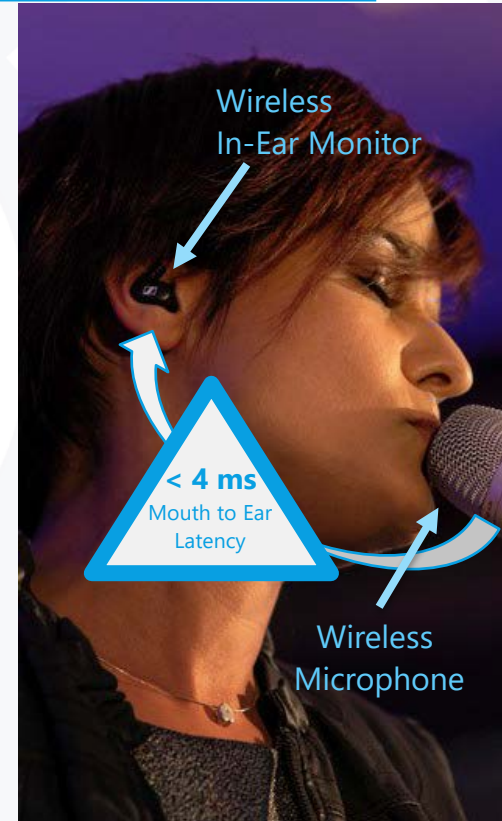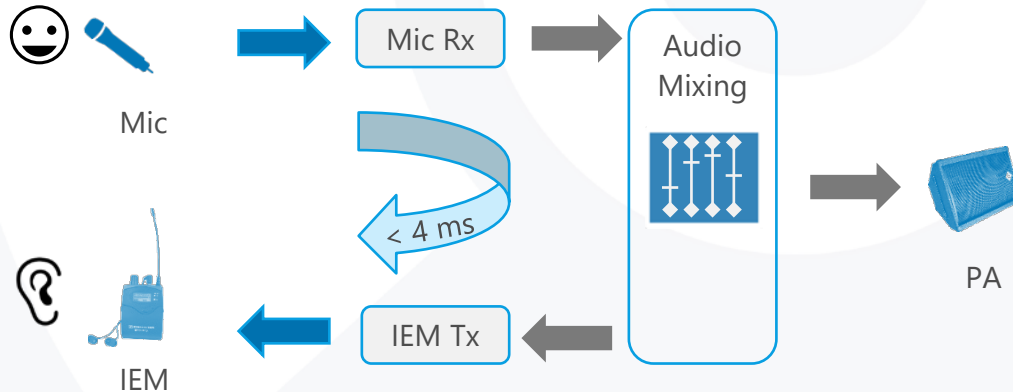**Sennheiser**

Live Audio Production

Live on-stage
URLLC
SNPN
Remote production

Use Case Requirements

- The **wireless mouth to ear latency**
  - Artist is source and sink of audio!
  - Sound is also traveling directly via the bone and body, and indirectly via room reflections (isolating headphones required)
  - **Jitter-free turn-around streaming latency < 4 ms on application layer**
  - **Network latency < 1ms**

Mic

Mic Rx

< 4 ms

Audio Mixing

PA

IEM

IEM Tx

Wireless In-Ear Monitor

< 4 ms
Mouth to Ear Latency

Wireless Microphone

Use Case Requirements

Reliability
99,9999%

Synchronicity
< 500 ns

X
hrs

Power Consumption
> 6 hrs

Spectral Efficiency
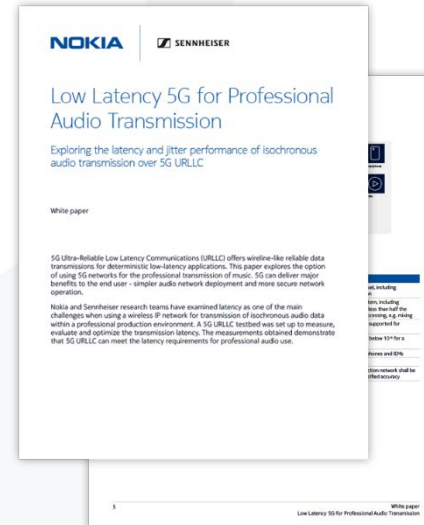200 KHz/audio link

5G RECORDS Goals

Goal

- Research the feasibility of utilizing 5G as technology for wireless ultra-low latency audio devices

Focus

- Latency in multi-devices setups (< 10)
- Synchronisation

https://www.bell-labs.com/institute/white-papers/low-latency-5g-professional-audio-transmission/

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Low Latency 5G for Professional Audio Transmission

Exploring the latency and jitter performance of isochronous audio transmission over 5G URLLC

White paper

5G Ultra-Reliable Low Latency Communications (URLLC) offers wireline-like reliable data transmissions for deterministic low-latency applications. This paper explores the option of using 5G networks for the professional transmission of music. 5G can deliver major benefits to the end user - simpler audio network deployment and more secure network operation.

Nokia and Sennheiser research teams have examined latency as one of the main challenges when using a wireless IP network for transmission of isochronous audio data within a professional production environment. A 5G URLLC testbed was set up to measure, evaluate and optimize the transmission latency. The measurements obtained demonstrate that 5G URLLC can meet the latency requirements for professional audio use.

High Level Architecture

IEEE BTS PULSE

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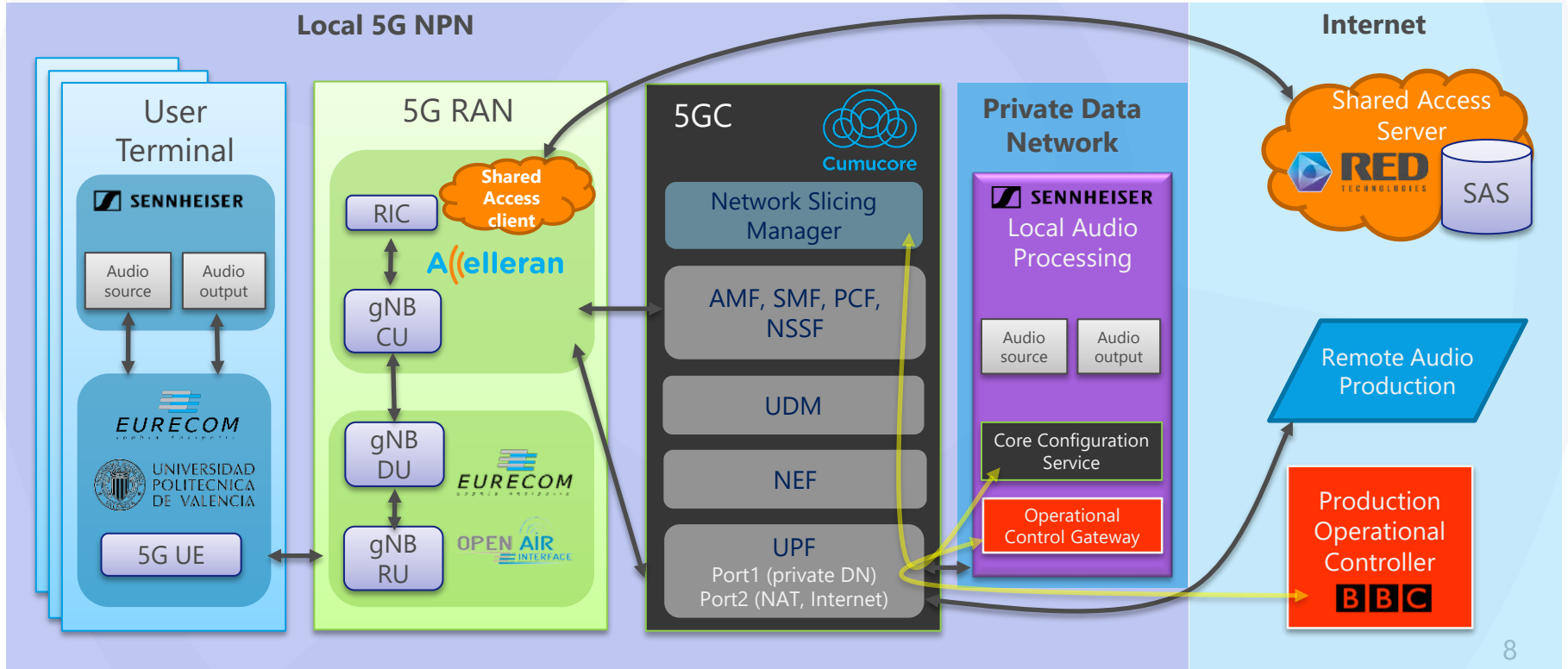
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Thanks for your attention!
Any questions?