



5GIA-TSDSI Webinar on “5G Trials and Pilots”

22 September 2021 1100-1300 CET / 1430-1630 IST



5GIA-TSDSI Webinar on “5G Trials and Pilots”

5G for Media Production

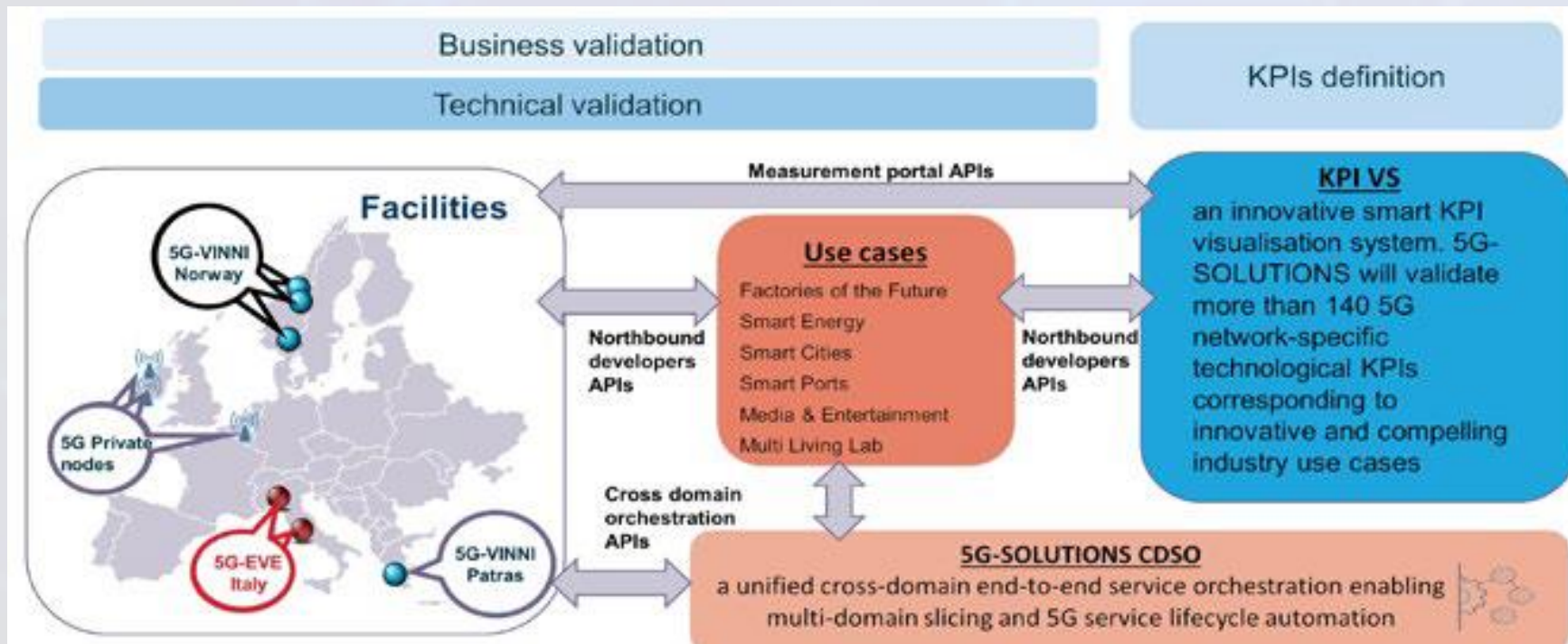
Ran Rahav

LiveU

EU Horizon 2020 Project Grants: 5G-SOLUTIONS (#856691), 5G-TOURS (#856950), 5G-RECORDS (#957102)

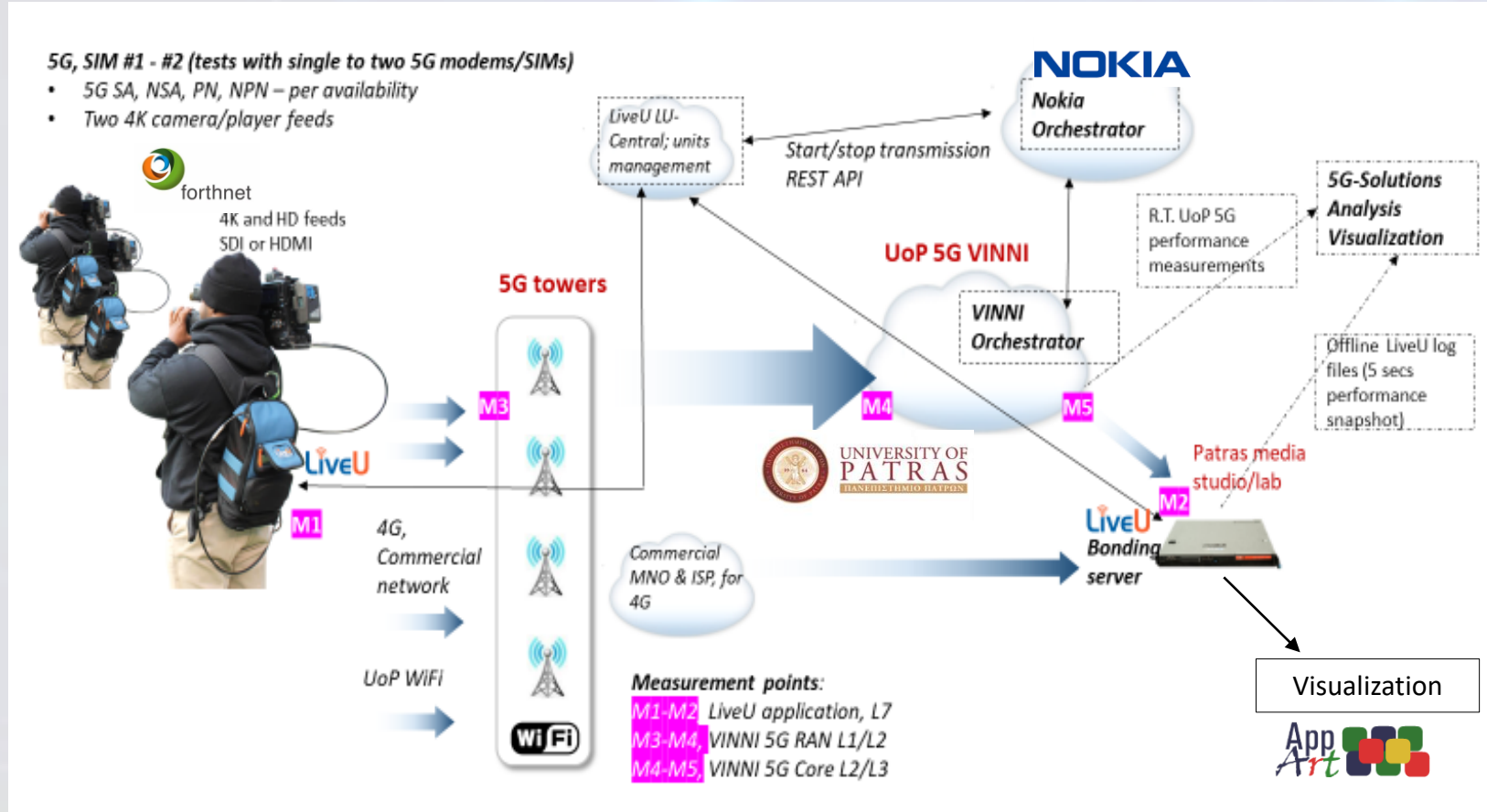
5G-Solutions – project introduction

The overall objective is to conduct advanced **field trials of innovative and thematically diverse digital services that require 5G capabilities and performance**



5G-Solutions – Remote Production

User and Machine Generated Content



Cooperative Media Production

5G-Solutions – media use cases



UoP Lab Testbed



Outdoor antenna



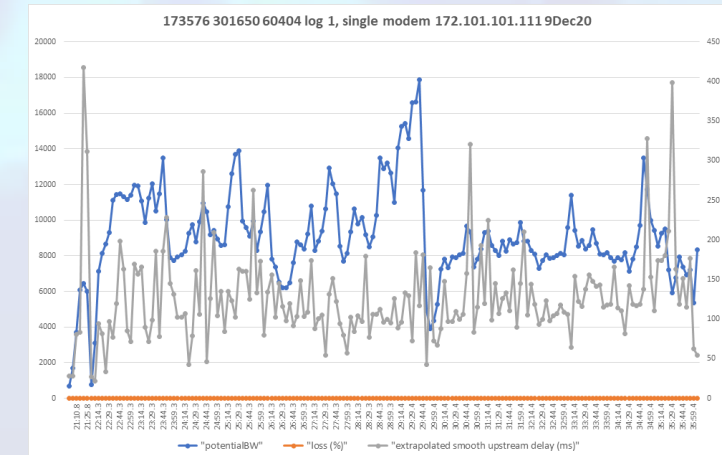
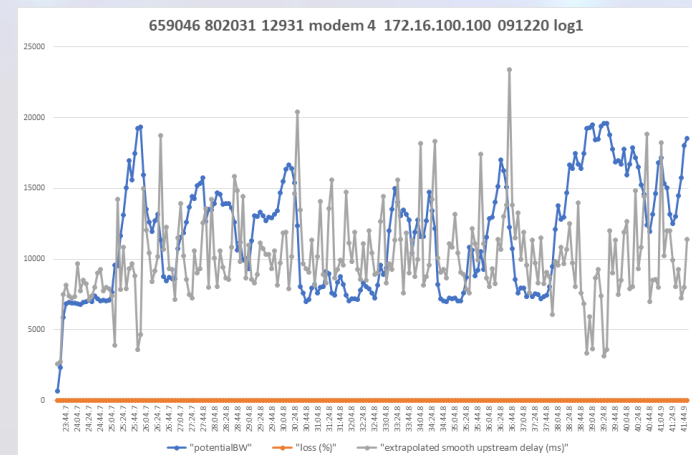
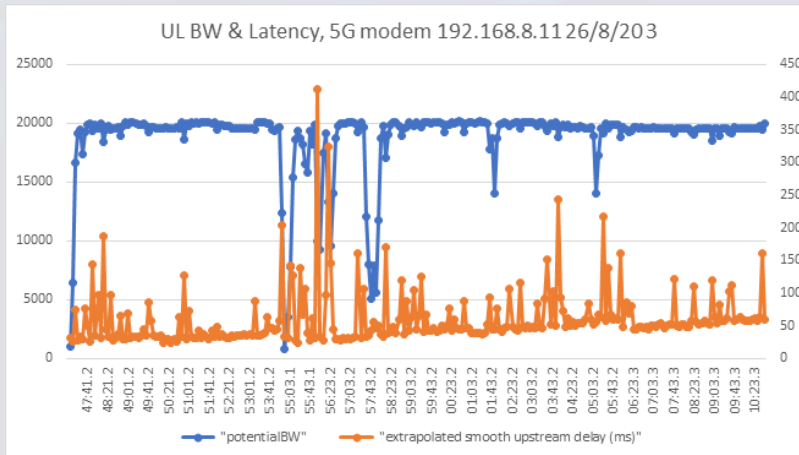
5G-Solutions Remote Production - Main 5G technologies

- 5G modules, modems and CPEs
 - Single and bonding
 - Mimo
- Mainly upload
- NSA & SA networks
- Generic/special slices
- Different params in UL in generic slice
- Load generator as a VNF
- Nokia orchestration
- NR
- 100 MHz bandwidth

5G-Solutions Remote Production - Main current results

- 5G single uplink connection can maintain high bandwidth but not all the time which makes bonding an important technology to develop
- Delay can be maintained but has a lot of fluctuations
- 2 x 5G modems streaming together are affecting each other dramatically

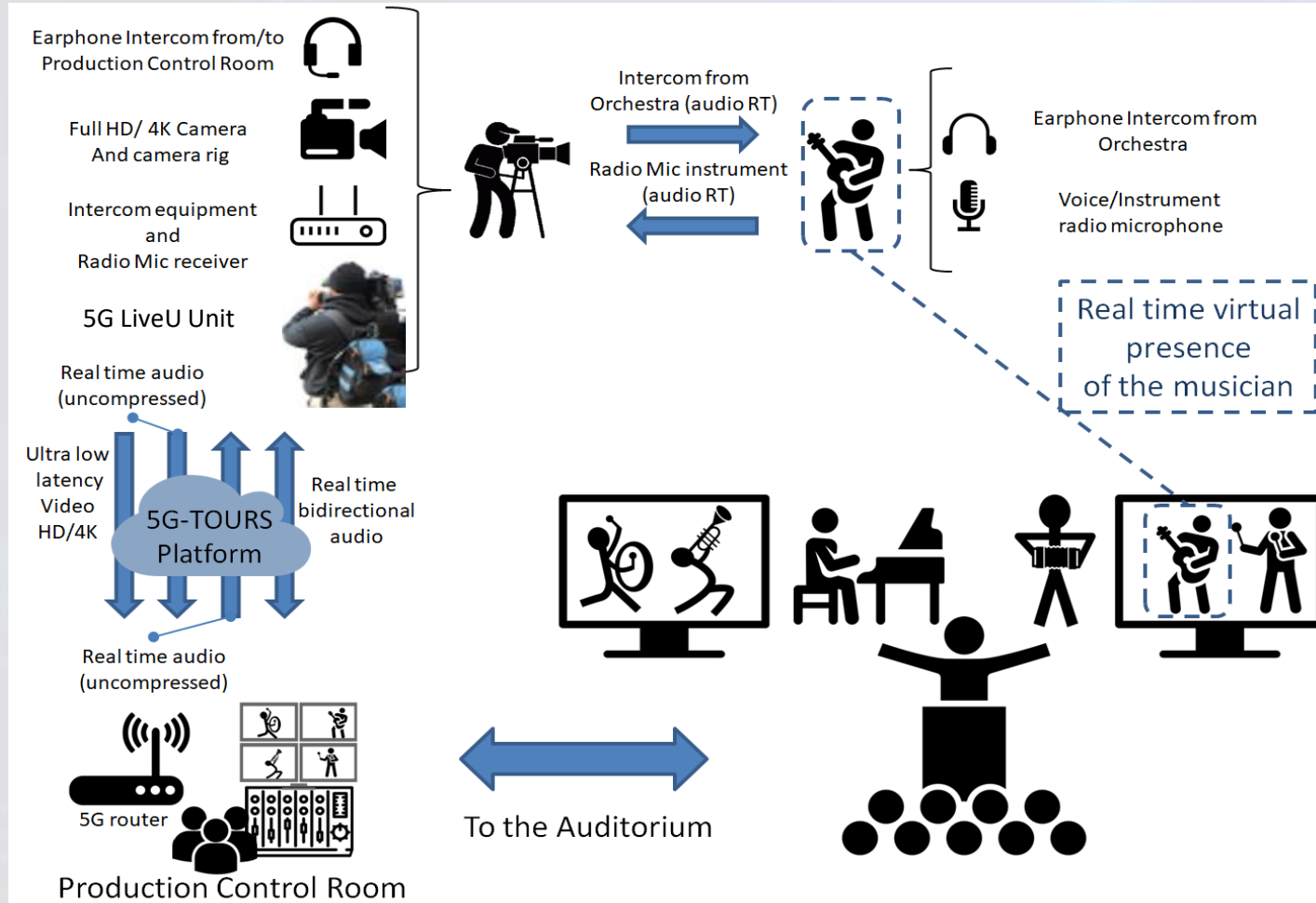
LIVEU



5G-Solutions Media WP – lessons learnt

- Single connection is risky for important media use cases
- Noisy 5G environment is more prone to fluctuated performance
- Bonding can help reduce the risk
- General lessons:
 - It is very hard to test load on networks as minor changes can affect the results dramatically
 - Multi-camera use case is valid, feasible, growing, and accelerating in COVID era
 - Testing methodology with many partners is complex but possible – integrations, definitions, KPI, Timing, COVID...

5G-Tours, Multi-site remote production



WP4 UC5 Partners:



5G-Tours, Multi-site remote production

<https://www.youtube.com/watch?v=mqs5MFrWB8c>

Use case introduction

WP4 UC5 Partners:



5G-Tours, Multi-site remote production

<https://www.youtube.com/watch?v=mqs5MFrWB8c>

The use case experiment

WP4 UC5 Partners:



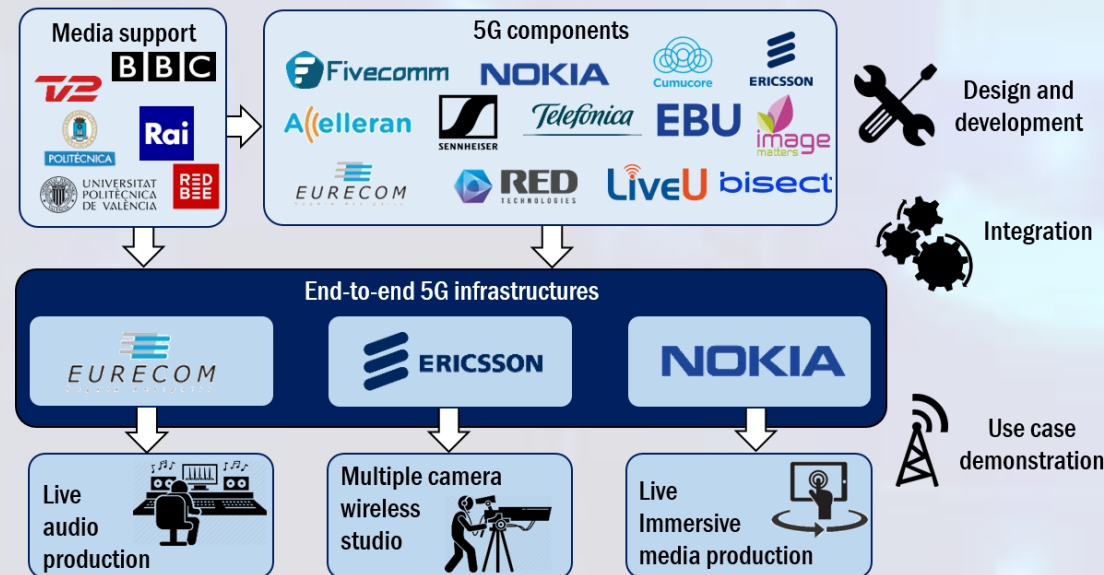
5G-RECORDS – production over 5G

Main 5G Technologies

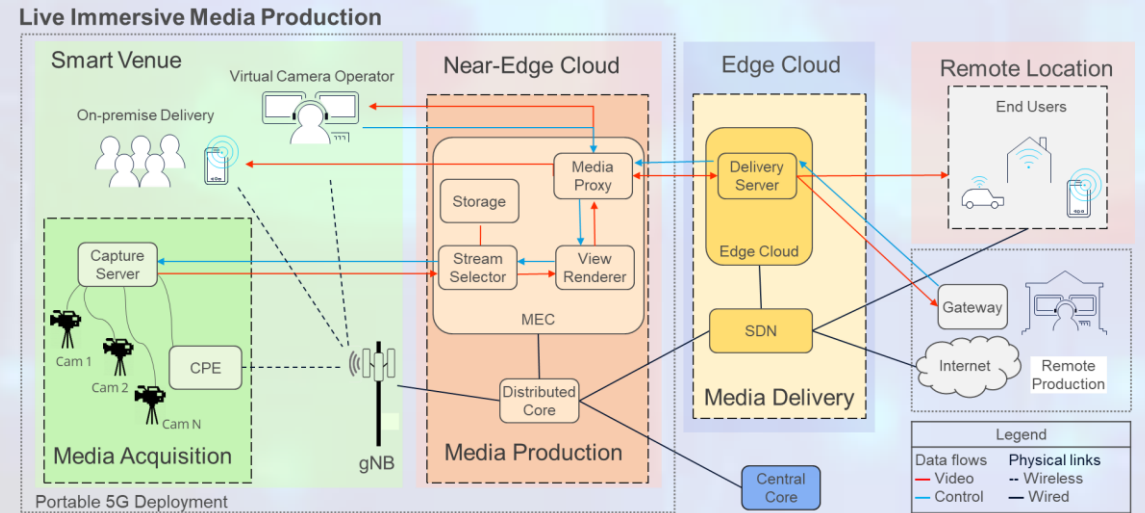
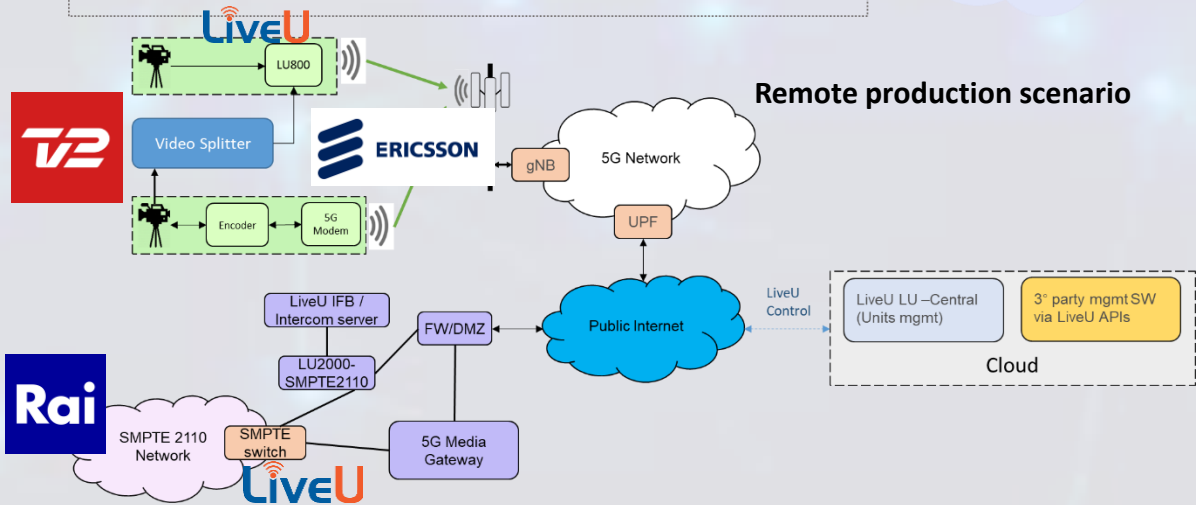
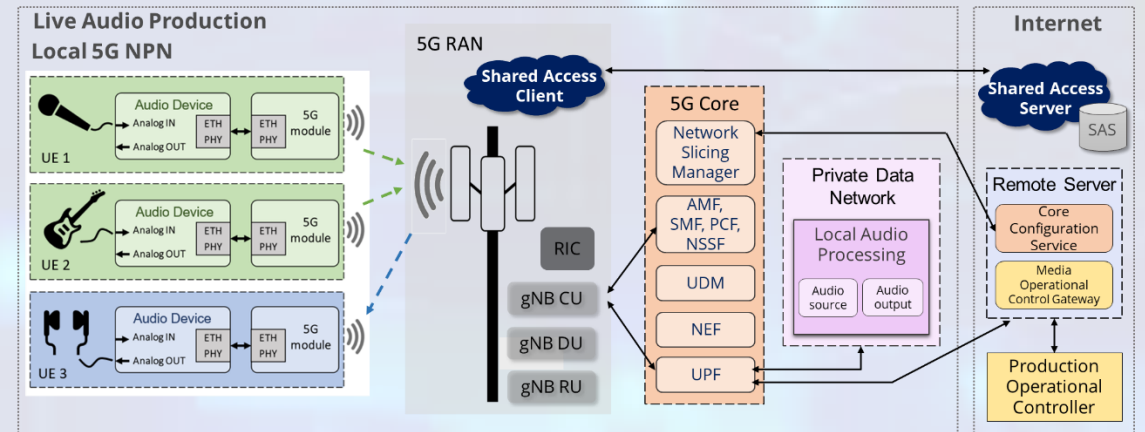
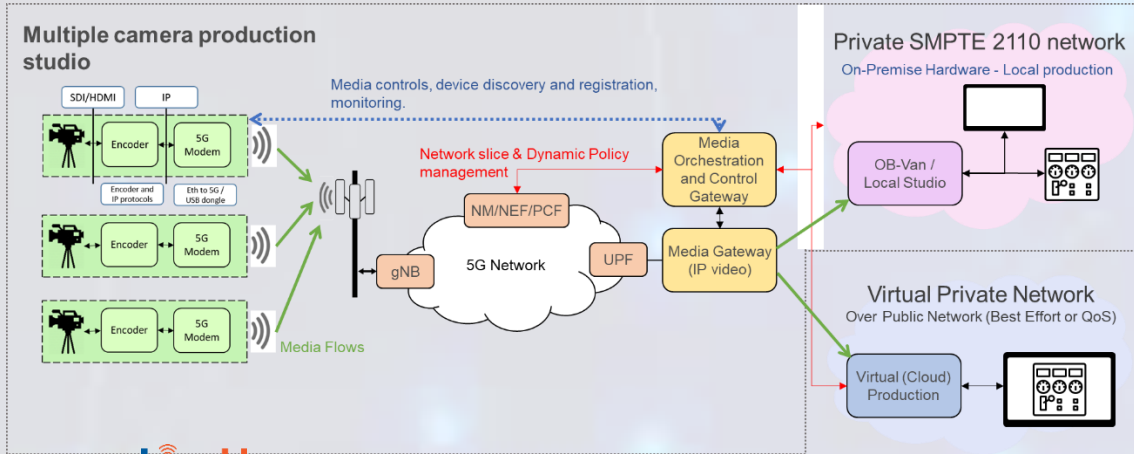
- SA, NR (Rel 15-16, some 17)
- NPN, PLMN
- Slices – URLCC, eMBB
- TDD scheduling and transmission control (for audio)
- mmWave
- Edge-cloud hybrid
- VNF/SDN

Main Production Technologies

- IP-based, SMPTE-2110
- Media Operation Control & Gateway (NMOS)
- Dedicated, guaranteed, URLCC design for audio production
- 5G-based Control
- Time-service for Synch (PTP)
- Remote, multi-link Bonding



5G-RECORDS - Production Use Cases



5G-RECORDS - Lessons thus-far (LiveU perception)

- **Reality check ?**
 - Keep the UC, requirements, KPIs, testbed and scenarios as close as possible to reality rather than to “hype”, “desirable”, “synthetic” ///
 - E.g., desired req. >200 mbps & < 100 msec E2E incl. encoding-decoding, per camera feed; current: not achievable even in indoors NPN
 - Difficulties: Audio production guaranteed Synch & latency (<5msec) requires special local NPN and Slice design
 - Multi-cam remote production over single modem – not yet proven even at low BW, bonding is still a solution (multi-cam BW, stability, synch, BW, latency)
- **Maturity ?**
 - MMwave devices
 - Modems/modules
 - Labs (Rel X, equipment, configurations, ...)
 - NPN spectrum licensing and business models
 - Ultra low latency, high quality, encoders/decoders
- **Lab vs. real world ?**
 - Synthetic vs. real world scenarios, conditions
- **Multi-players tests !**
 - Broadcasters, vendors, mobile operators
 - Extremely important. To generate evolutions, new use cases, innovation, discovery.

Thank You

Ran Rahav
Baruch Altman

SOLUTIONS (#856691), 5G-TOURS (#856950), 5G-RECORDS (#957102)