





# SG REC©RDS

# 5G key technology enablers for emerging media content production services

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> ICT-42-2020 5G core technologies innovation



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### **Project Overview**



- 5G-RECORDS is about the development, integration, validation and demonstration of **5G** components for professional media content production.
  - Developed within previous 5G-PPP projects and earlier R&D investments
  - To be deployed specifically for content production
  - Business-to-business (B2B) perspective





### Project goals & key technology enablers





# Use case 1: Live audio production

Main partners:





- In a live audio production setup (e.g. music concerts, music festivals, TV shows), the artists are equipped ٠ with professional Programme Making and Special Events (PMSE) equipment
  - 5G wireless microphones
  - In-Ear Monitor (IEM) systems
  - **Control tools** and gateways between 5G and traditional audio infrastructure domains.

### 4 main areas of work:

- Capturing of live audio data
- Temporary spectrum access
- Automatic setup of wireless equipment
- Use of a local NPN

### **Requirements**:

- End-to-end delay < 4 ms
- User data rate ~500 kbps
- Synchronization of all audio sources ± 500 ns





# UC1 High Level Architecture



# dRAX cloud native openRAN







Figure 1: O-RAN Alliance Reference Architecture

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# dRAX solution benefits

- Cloud Native
- 4G/5G coexistence
- Scalability
- Openness
  - Data
  - Orchestration
  - RIC platform
- Minimises Capex and Opex





- Accelleran provides dRAX 5G solution, a cloud native RAN (vRAN) solution delivering true multi-vendor, disaggregated and open RAN intelligent control services aligned to O-RAN Alliance reference architecture
- dRAX 5G capabilities will be extended to support the live audio production use case and enhance its commercial exploitation in private network markets demanding low latency use cases similar to media production ones
- Since Accelleran currently sells dRAX 4G with eNBs for innovative US CBRS regulatory framework, dRAX spectrum sharing capabilities will be enhanced to include 5G-NR technology



- Accelleran is a very innovative European SME playing right at the centre of true 4G and 5G openRAN ecosystem disaggregation
- As an SME, the R&I projects enable the innovation needed to deliver commercial products such as dRAX 4G and 5G to diverse markets and industries
- The R&I projects we participate in are always aligned to the technological roadmaps we seek to achieve for the commercial exploitation of our solutions



### Components: compact 5G Core



Cumucore **5G Core (5GC)** will provide the 3GPP Rel 15 compliant 5G Core functionalities needed for this use case and integrate them into a new combined module.

5GC includes all the required functionality for **interoperability** with 3GPP Rel 16 and has been tested with different RAN vendors.





# Components: compact 5G Core

### **Network Slicing Manager**

- Enables the delivery of several virtual networks from one physical.
- o Defines

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- slice sizes,
- different quality of service per slice,
- traffic rules per slice including prioritization,
- pre-emption rules.
- Through Network Slicing Manager you can manage access right to the network slices in the multitenant use case.





## Components: compact 5G Core



### RECORDS Use case 2: Multiple camera wireless studio

Main partners:

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- The best of an **IP studio** combined with the super-fast and highly reliable wireless 5G connections
- 5G will facilitate new types of workflows addressing 3 core requirements: •
  - Flexibility and reduction cost in setting up productions.
  - Scalability from small to large events.
  - Shareability of content along the production chain and between creative stages.

#### 3 sub use-cases:

- Multiple cameras (~5) within a wireless production studio.
- 2. Remote contribution scenario using PLMN.
- Integration of cloud-based distributed production 3.

### **Requirements:**

- Bandwidth: 50 Mbps per camera (5 cameras) in UC1, 15 Mbps in UC2/3.
- Glass-to-glass (E2E) latency: 20-300 ms (ideal <40ms) in UC1, 5 seconds in UC2/3.
- Mobility <10 km/h in UC1, 100 km/h in UC2/3.



# **Fivecomm Contribution**



- Contribute to the specification of the requirements and KPIs for the use cases in WP2.
- **T4.2 Leader** (*Test-bed measurement and feedback*):
  - To monitor and measure the necessary KPIs associated with the requirements defined in WP2
- 5G Modem development and integration to enable professional production 5G wireless studio.
- Participation in UC2 trials.

### Fivecomm 5G Modem (F5GM):

- To be integrated in UC2, in an E2E infrastructure as part of the UE.
- Particularized for the connection link between the cameras and the 5G network, depending on the specific needs of the use case.
- It is a powerful, versatile, and compact device designed to bring all the advantages of the new 5G technology to the media industry.
- Compact and flexible module solution that provides 5G wireless connectivity.
- Simplified electronics to make the most of the 5G modules in the market while minimizing power consumption and cost.



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# Fivecomm 5G Modem (F5GM)



• **Easy deployment**: in a 'plug and play' fashion. It only needs to connect the cables from the video encoder to the digital connectors, fix the device to the infrastructure and press the 'ON' button.

- **Customization**: Different IP protection degrees are available, with up to 4 internal antennas or external ports to provide the best experience even in low coverage scenarios.
- **Remote management**: It will include a management platform that allows to configure, monitor, and perform software updates remotely.

### Some technical features:

- **5G native mode**: both 5G **Non-Standalone (NSA)** and **5G Standalone (SA)** modes are supported. Option 3x, 3a and 2 network architectures. 3G/4G connectivity is additionally supported.
- 5G New Radio (NR) Rel-15 support.
- Sub-6 GHz frequency bands: n41, n28, n77, n78, n79, n40, among others.
- Up to 4 antennas (external or integrated) to provide the best experience even in low coverage scenarios.
- Dual SIM.
- Up to 5 Ethernet (on-demand) and 1 USB connections.



# Setup



# Use case 3: live immersive media







• Real-time end-to-end free-viewpoint video (FVV) system that includes capturing, 5G contribution, virtual view synthesis on an edge server, 5G delivery and visualization on user terminals.

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- The 5G connectivity allows a portable FVV system to operate in real time with reduced deployment cost and high flexibility.
- Video workflow in 3 stages:
  - Capturing.
  - Encoding and transmission.
  - Synthesis and visualization.

### Requirements:

- Media acquisition: up to 1.5 Gbps per camera.
- Radio uplink speeds of 20-200 Mbps.
- Downlink speeds of 2-20 Mbps per user.
- Connected end-users: 10-100 per 1000 m<sup>2</sup>.
- Reliability: 1 error every 10 min.







### www.5g-records.eu



# 5G REC©RDS



### 5G-RECORDS Channel

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