TV2 Danmark

Transformative impact of 5G on content production

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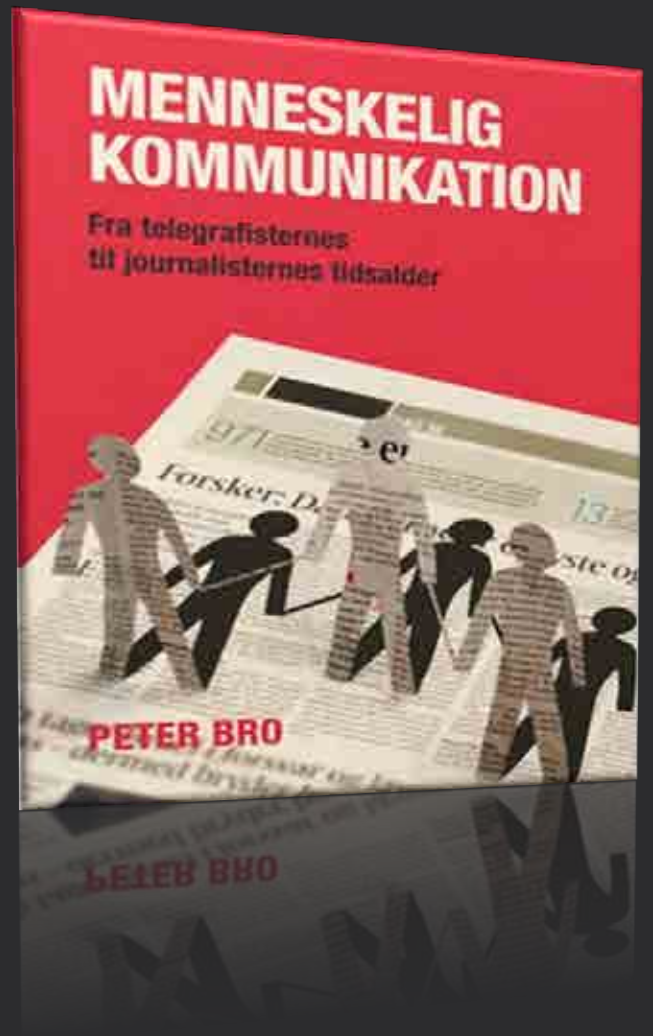
September 2023

FROM THE AGE OF TELEGRAPH OPERATORS TO THE AGE OF JOURNALISTS



"Journalism has evolved through technology. Technology and trends move journalism, not the other way around"

Af Professor Peter Bro, SDU

Lte
TM

/ 8xLTE
modem

4G HAS CHANGED JOURNALISM AND NEWS COVERAGE FOREVER

5G will

4G HAS CHAN

~~JOURNALISM~~

~~COVERAGE~~

Content production

FOREVER

4 reasons why 5G are interesting to content production

5G Private network

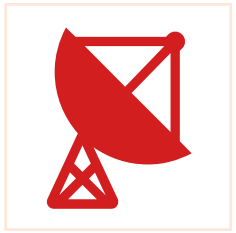
5G S-NPN

Standalone non -public - network

5G public mobile network

5G PN

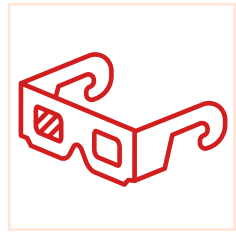
Public network



5G Broadcast

one-to-many

Media production and distribution



New services and experiences

AR/VR/XR

Think Snap or TikTok, what will be next?

Consumer

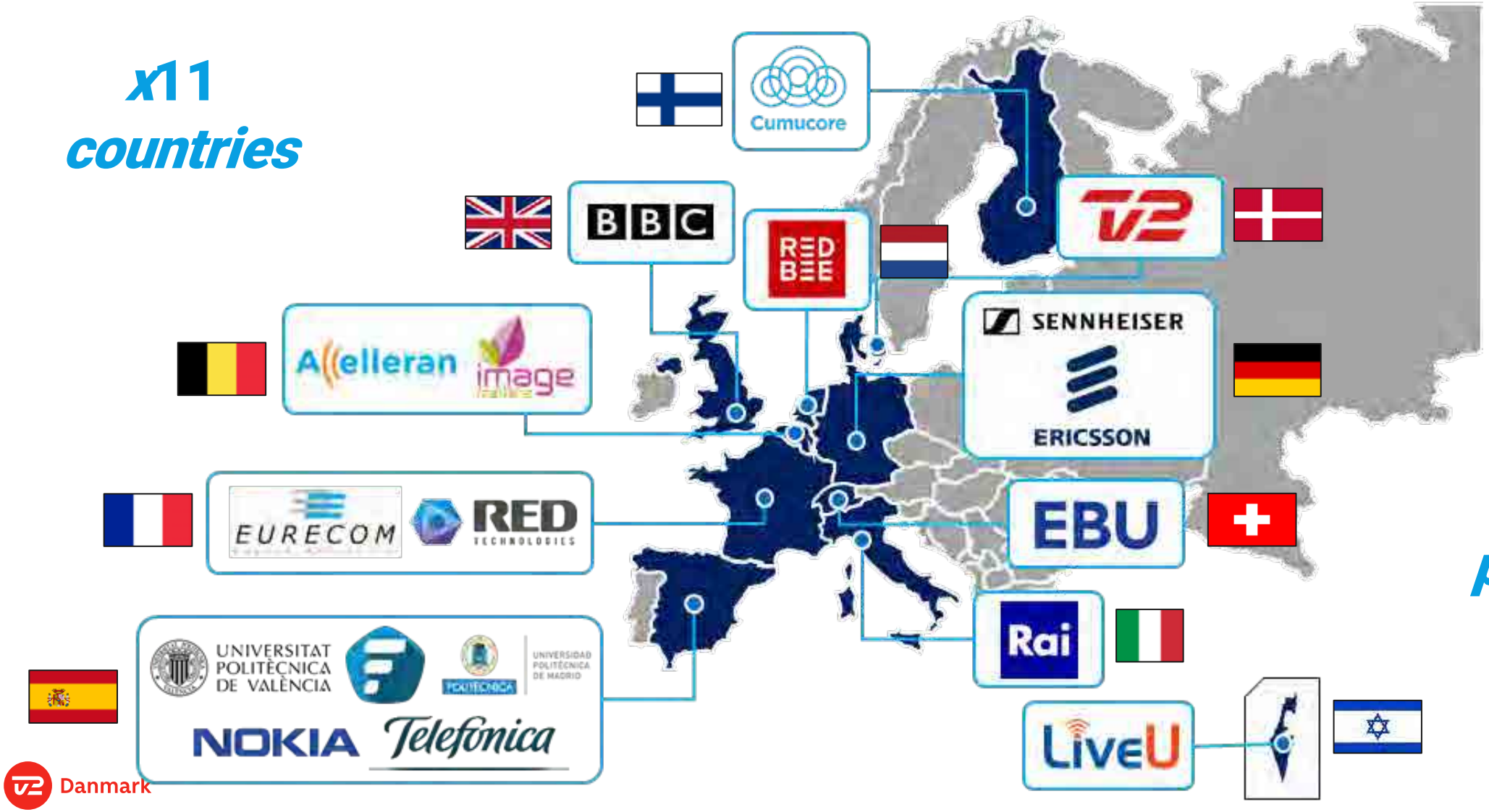
5G SA NPN

or “Privat Network”

5G Stand Alone Non -Public -Network

Consortium

x11 countries



x18 partners

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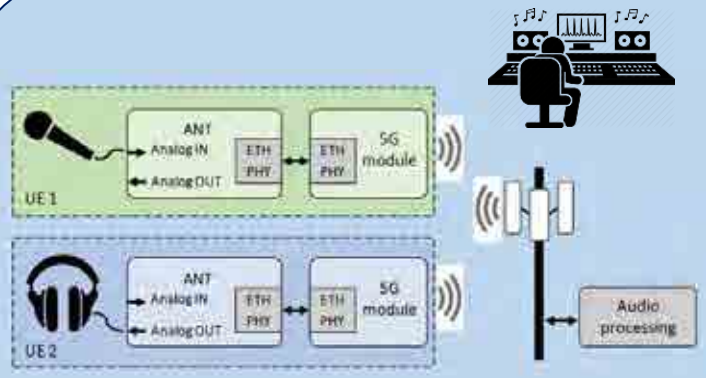
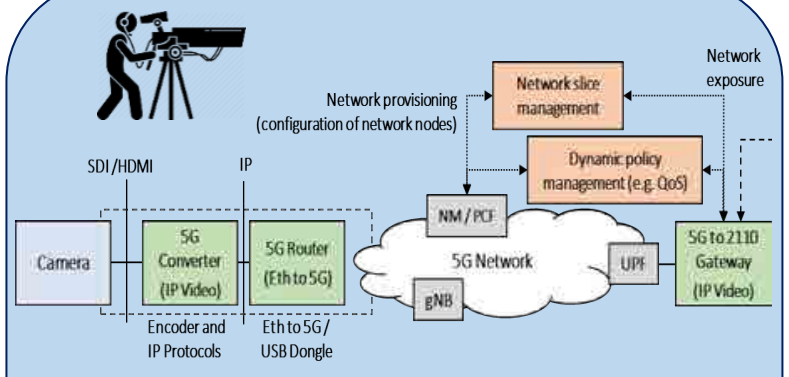
Live Audio Production



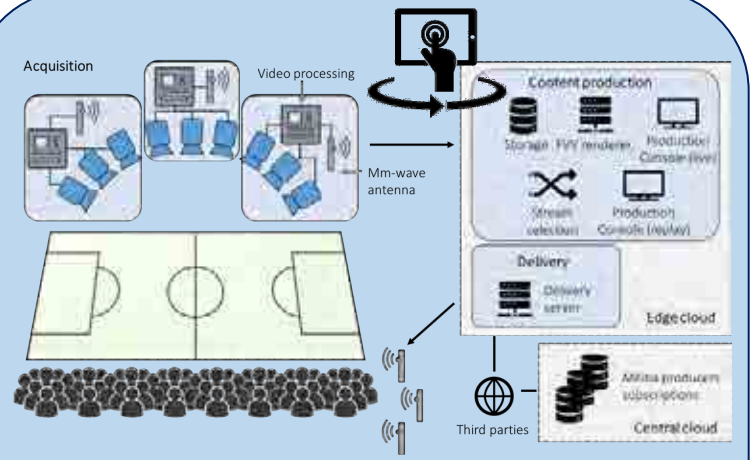
- Open and Virtualised RAN
- NR-RedCap & URLLC
- Software Defined Radio
- Dynamic Spectrum Access

Multiple Camera Wireless Studio



- Non-Public Networks
- Timing and Synchronization
- Network Slicing
- Media Orchestration

Live Immersive Media Production



- Edge Computing
- mm-Wave Antennas/Devices
- Centralized/Distributed 5GC

Design
of 5G components for professional content production

Development
of state-of-the-art 5G prototypes

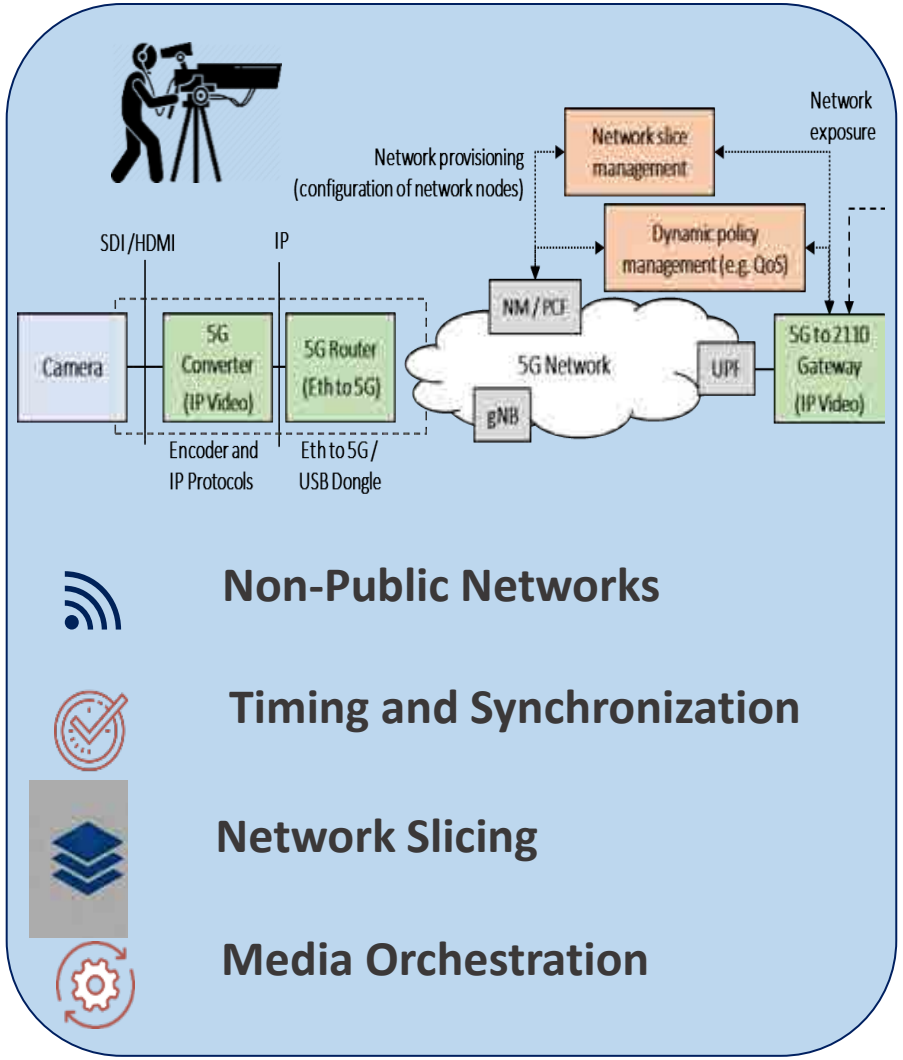
Integration
into end-to-end 5G infrastructures

Validation
in the context of real production use cases

Demonstration
of the potential value for the sector

Multiple Camera Wireless Studio

5G RECORDS



One camera unit

- PGM video →
- Return video ←
- Teleprompter ←
- Tally ←
- Telemetric – camera control ←
- Follow Focus ←
- Light control ←
- Intercom ←
- Timing – sync ←
- Audio ←
- AR/VR tracking ←

5G

From SDI to IP

5G privat network

GO' studiet - TIVOLI

5G production

100Mhz – n77
5G SA NPN

2x 5G camera &
Wireless audio

Danish Election night, 1st November 2022

5G SA NPN production

- 5G SA NPN
- N77 100Mhz test-licens
- 2 Camera, Havision PRO unit
- 2 RAN – 1 core
- Layer2 – Xborg<->Odense MCR
- 2 live report cam to OB production

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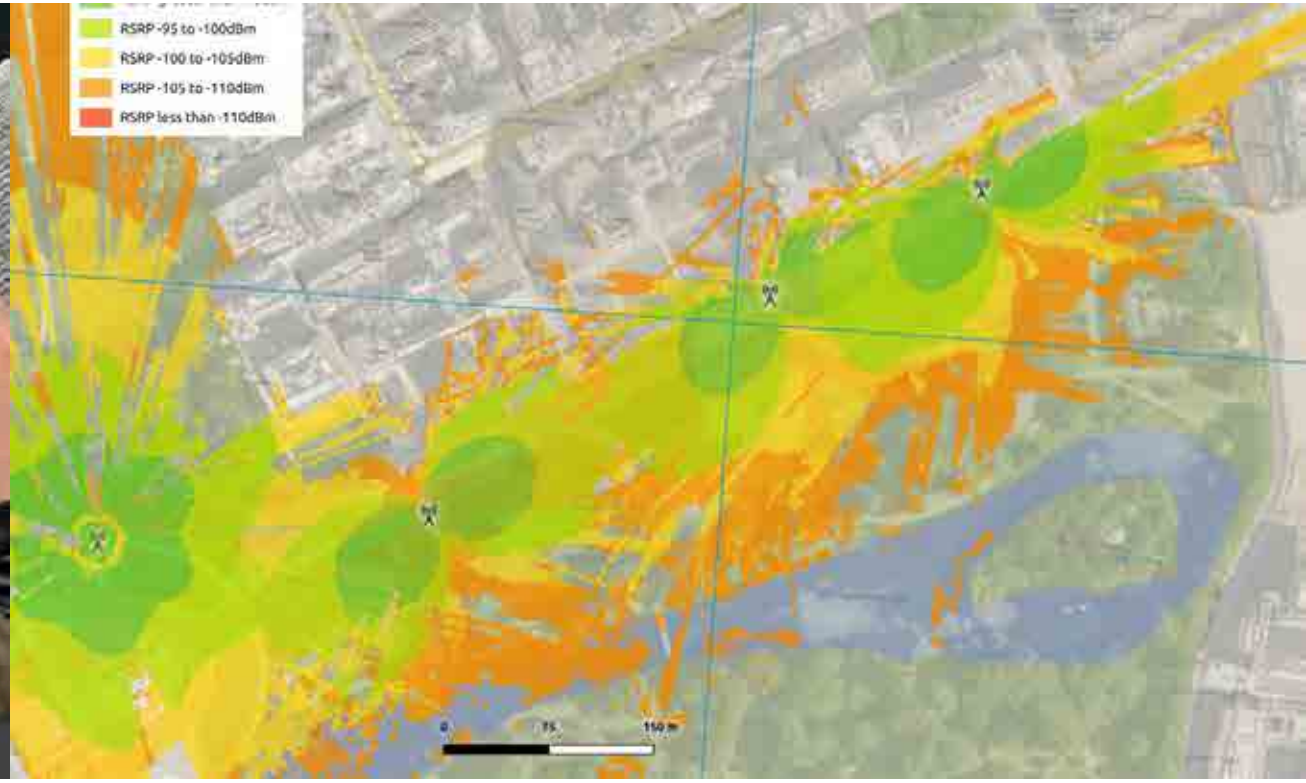
London, May 2023

Coronation & *Shared* 5G SA NPN

5G Coronation – project by BBC and Neutralwireless

London 6.+7. maj 2023
25 broadcast unit sharing one 5G network – 100Mhz n77

Pre-test workshop



Map of coverage – 4 cells

Gaderne omkring Buckin
prydet med Storbritannie

Smartphone streaming live !

TV 2 - 5G camera

International host feed

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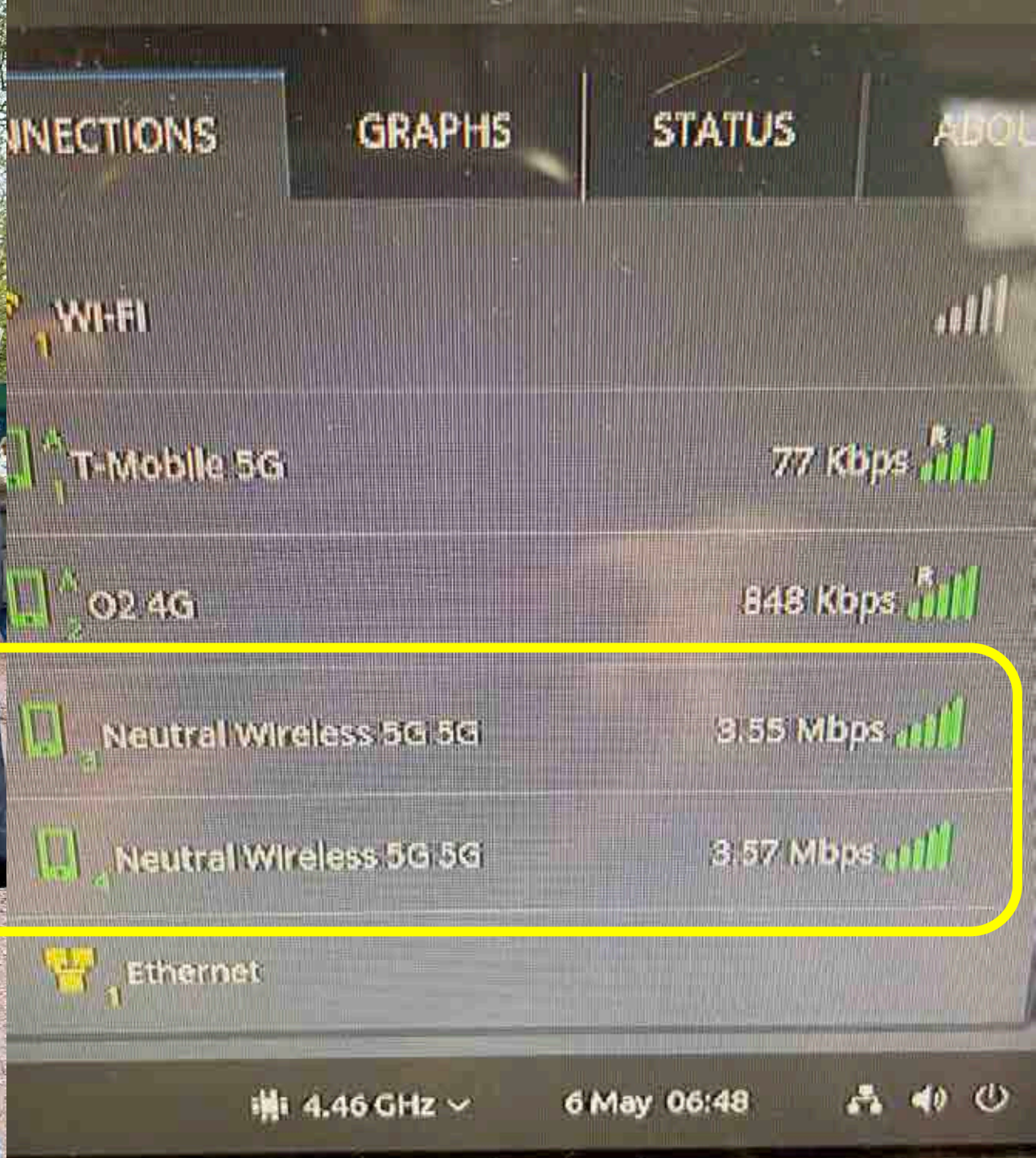
NANLITE


NNECTIONS
GRAPHS
STATUS
ABOU
Wi-Fi
T-Mobile 5G
77 Kbps
O2 4G
848 Kbps
Neutral Wireless 5G 5G
3.55 Mbps
Neutral Wireless 5G 5G
3.57 Mbps
Ethernet
4.46 GHz
6 May 06:48

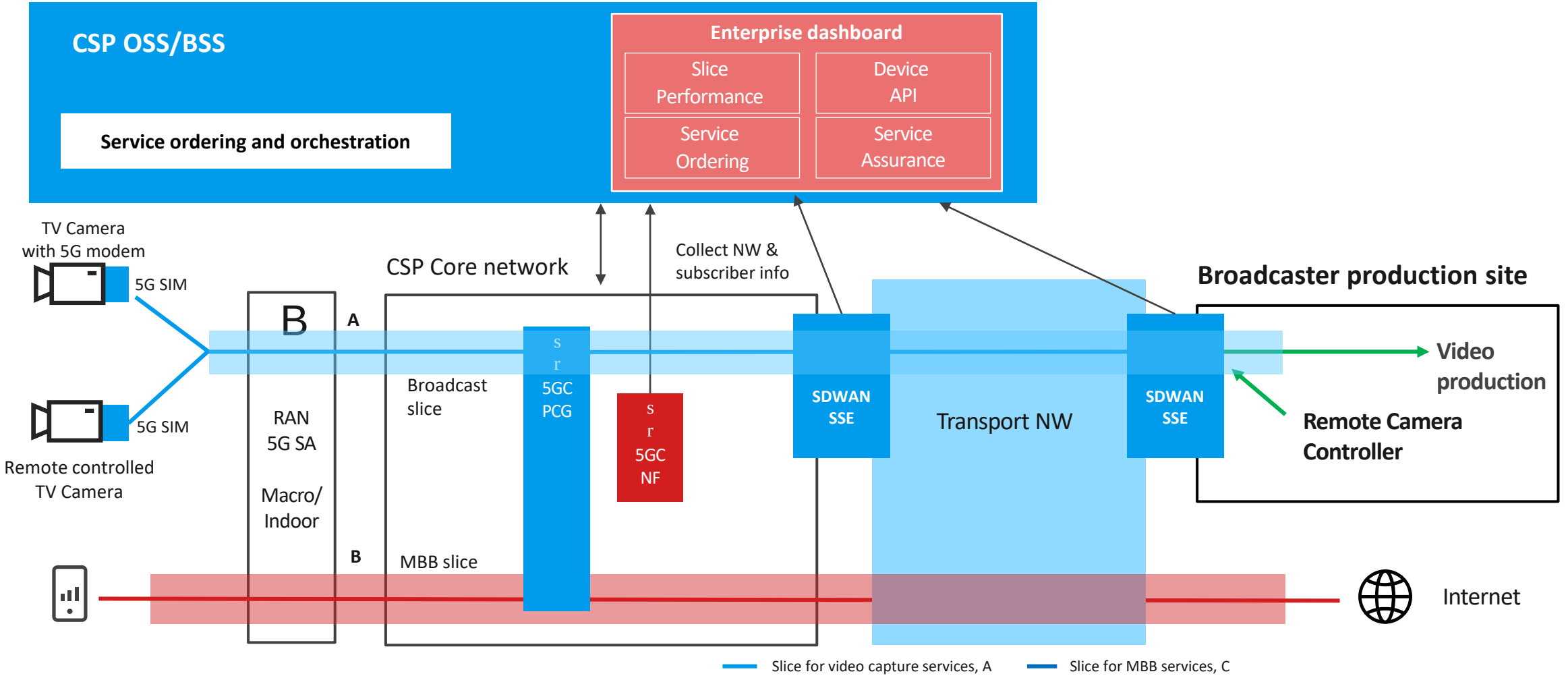
Why is QoS SLAimportant to content production ?

5G SA PN
or “commercial network”

5G Stand Alone Public -Network

Sync. 16
Sync. 5
HD Black
SONY
SONY
TEKO 2

LIVE VIDEO CAPTURE ON 5G SLICING E2E TECHNICAL SETUP



And the winner takes it all...

MWC2023 Barcelona

5G SA Public Network

QoS demonstration at Ericsson

Danmark

Broadcast Enterprise Portal

Subscriber Service Type | Camera Performance | Service Ordering

Camera 2, MSISDN: 34600001058

Live streaming Premium

High UL bandwidth estimated upto 20 Mbps

Low latency: 100 ms

Bi-direction Control Premium

Low bandwidth: 100 Kbps

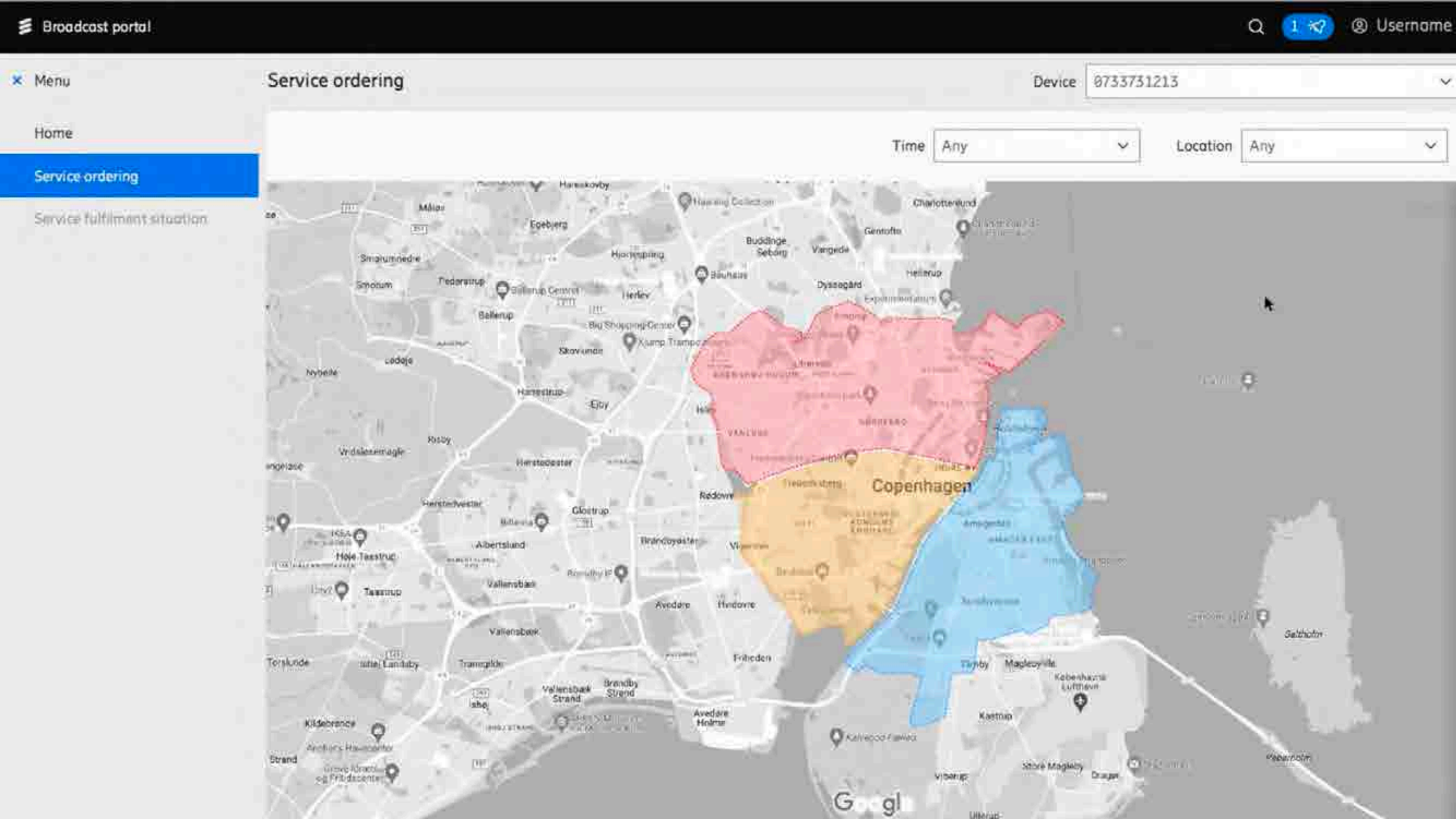
Low latency: 100 ms

API:

http://networkobservability.com/camera2/liveperformance

Below 200ms latency

Glass-to-glass


Broadcast portal
1
Username
Menu
Service ordering
Device
0733731213
Home
Service ordering
Service fulfilment situation
Time
Any
Location
Any
Copenhagen
Google

Menu
Home
Service ordering
Service fulfilment situation

Home

Device 0733731213

Device type | Device API

Model
Sony PXW-Z150

Sensor
1.0-type Exmor RS CMOS sensor

Resolution
4K (3840 x 2160)

IP
Ip address

Connectivity
SDI (3G/HD/SD), HDMI, Wi-Fi, NFC

Subscribed service type

Live streaming premium

Starts on
1 May 2023

Expires on
20 May 2023

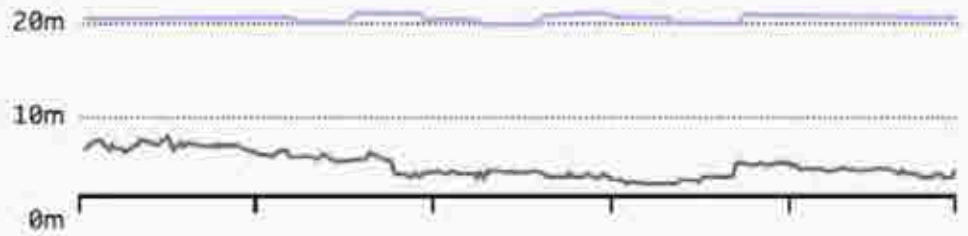
Strandgade 95, 1401 København K

Performance data

Uplink | Downlink

22.6 Uplink (Mbps)

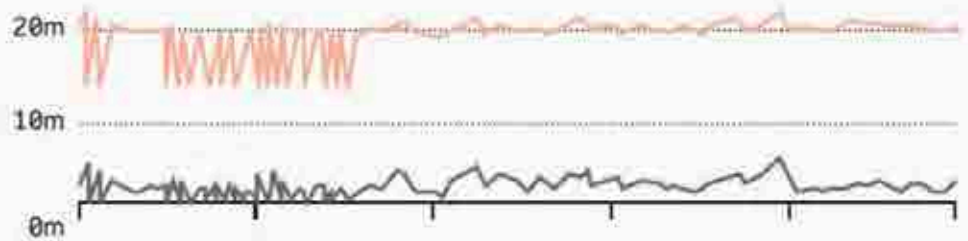
1.0 Downlink (Mbps)



End-to-end latency | End-to end jitter

15.9 End-to-end latency (ms)

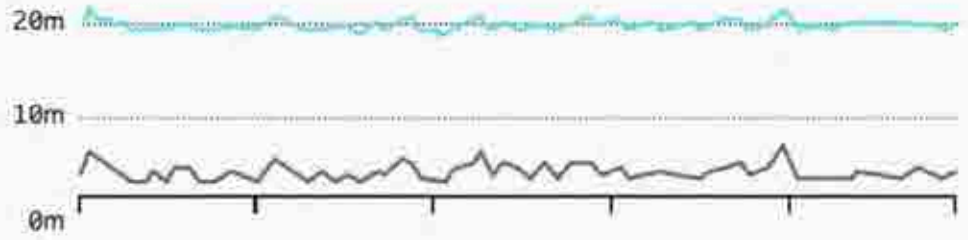
3.2 End-to end jitter (ms)



Telco network latency | Telco network jitter

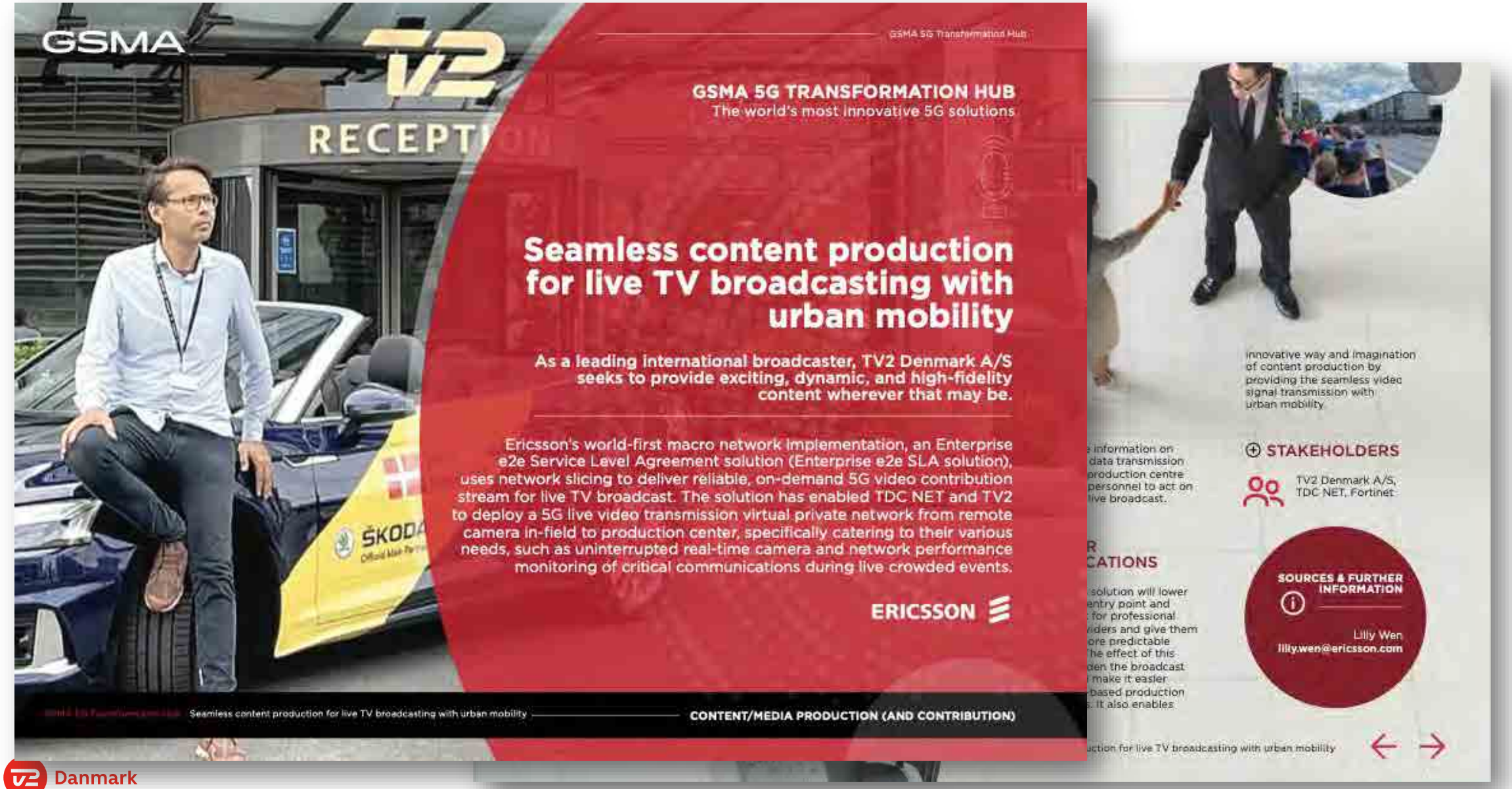
15.9 Telco network latency (ms)

3.2 Telco network jitter (ms)



Uplink | Downlink

GSMA paper


GSMA
TV2
RECEPTION
GSMA 5G Transformation Hub
GSMA 5G TRANSFORMATION HUB
The world's most innovative 5G solutions
Seamless content production for live TV broadcasting with urban mobility
As a leading international broadcaster, TV2 Denmark A/S seeks to provide exciting, dynamic, and high-fidelity content wherever that may be.
Ericsson's world-first macro network implementation, an Enterprise e2e Service Level Agreement solution (Enterprise e2e SLA solution), uses network slicing to deliver reliable, on-demand 5G video contribution stream for live TV broadcast. The solution has enabled TDC NET and TV2 to deploy a 5G live video transmission virtual private network from remote camera in-field to production center, specifically catering to their various needs, such as uninterrupted real-time camera and network performance monitoring of critical communications during live crowded events.
ERICSSON
Seamless content production for live TV broadcasting with urban mobility
CONTENT/MEDIA PRODUCTION (AND CONTRIBUTION)
innovative way and imagination of content production by providing the seamless video signal transmission with urban mobility
STAKEHOLDERS
TV2 Denmark A/S, TDC NET, Fortinet
SOURCES & FURTHER INFORMATION
Lilly Wen
lilly.wen@ericsson.com

Nordic 5G Consortium
YLE, MCB, SVT, NRK, TV2NO, SR, DR, TV 2
Danmark

Next step and future plans

We want to establish a national innovation center, that enables Denmark to get a leading role within 5G technology.

You can show your support by signing the LoI for "Dansk 5G Innovation Hub“.

FORCE Technology takes a leading role in coordination and facilitation of the 5G Innovation Hub.

We look forward to continue our work in supporting the 5G technology development in Denmark and contribute to realization of the positive contributions it can provide society and the Danish industry.

Our contact information:
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FORCE TECHNOLOGY

TV2 Danmark

Learnings and take-ways

- 5G SA NPN are ready to be used for ULL live production and devices and components are commercially available
- Spectrum is king – ask your regulator to assign spectrum for 5G SA NPN
- 5G SA PN will be a great tool, but QoS (or slicing) are needed services, to get Low Latency and control
- 5G commercial network are designed to provide DOWNLOAD, typical in ration 8:2. For content production, it’s all about UPLOAD and ration 2:8 needed.

Q&A

MOBR@TV2.DK

Danmark