5G BROADCAST – NEW ERA OF MEDIA DELIVERY

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ROHDE&SCHWARZ
Make ideas real

AGENDA

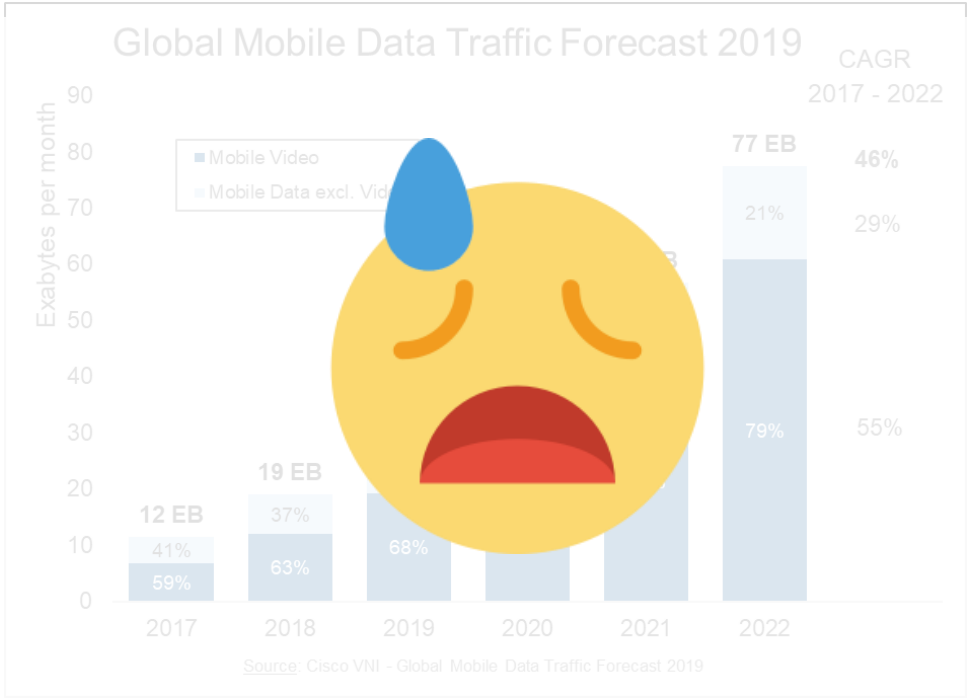
- The Future of Media delivery
- 5G Broadcast Business Cases
- 5G Broadcast: What technology behind?
- How to make it a reality?
- Other Trials?

CURRENT SITUATION OF BROADCASTING INDUSTRY

- **Consumer behavior changes**
  - Streaming services are competing with linear TV
  - Smartphones/Tablets more and more important
- **No access to smartphones**
  - No support of Broadcast standards by most Smartphones

How to get access to Smartphones?

MNO CHALLENGES



- Exponential increase of Mobile Video
- Smartphone users desire to consume **HD videos anytime – anywhere**
- **4K smartphones** now available
  → rising demand for 4K video quality

Heavy investments …

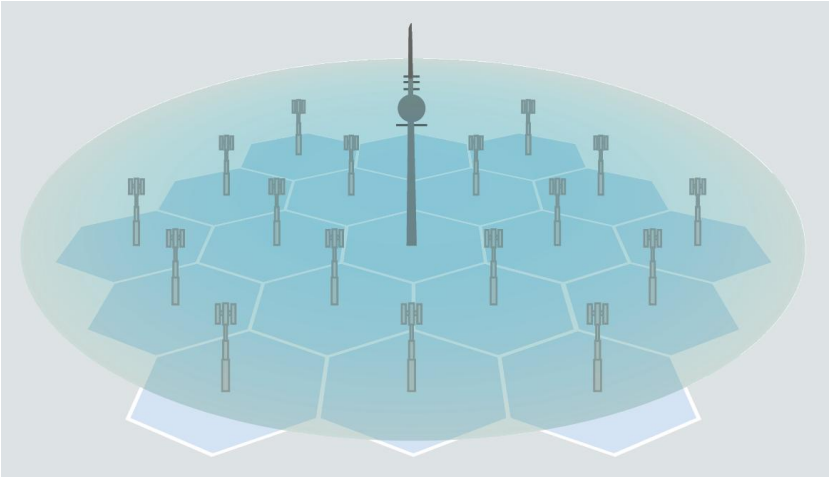
But hardly additional revenues

R&S VISION: EFFICIENT DISTRIBUTION OF MOBILE TV

- **R&S Solution:**
  Utilization of Broadcast/Multicast concepts
  - Broadcast/Multicast together with unicast
  - Large-scale cells
  - High Power High Tower (HPHT)
  - Frequencies < 1 GHz

- **It‘s all about efficiency**
  Efficient spectrum use by Multicast data distribution just once

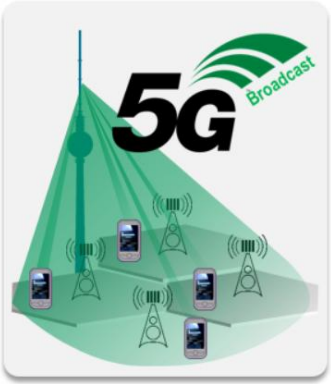
5G BROADCAST



→ **Increase of profitability**

POTENTIAL OF 5G BROADCAST

- Large-scale HPHT network
- Nation wide coverage
- New Business models
- Very low latency
- Cost & Spectrum Efficiency
- Higher QoS, Better QoE



Mobile streaming

- Live TV and Live streaming (e.g. sport events)
- Data offloading

Automotive

- Autonomous driving information
- Software & firmware updates
- Signage information

Internet of things

- Software & firmware updates
- Common control messages to devices

Public safety

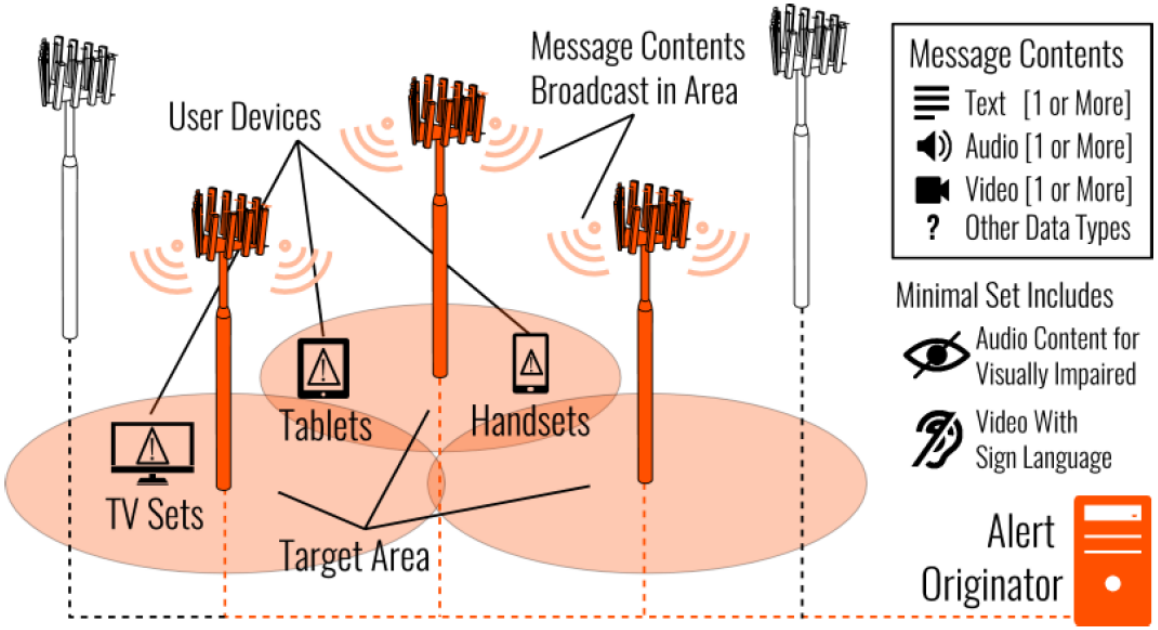
- Disaster alerts (e.g. tsunami, earthquake)
- Emergency alerts (e.g. hazard, amber alert)

MOBILE TV

- Efficient distribution of media & entertainment
- Consistent Quality of Service
- Very low latency and higher availability
- Best experience ever for consumers
- Offloading via leasing concept (IaaS)

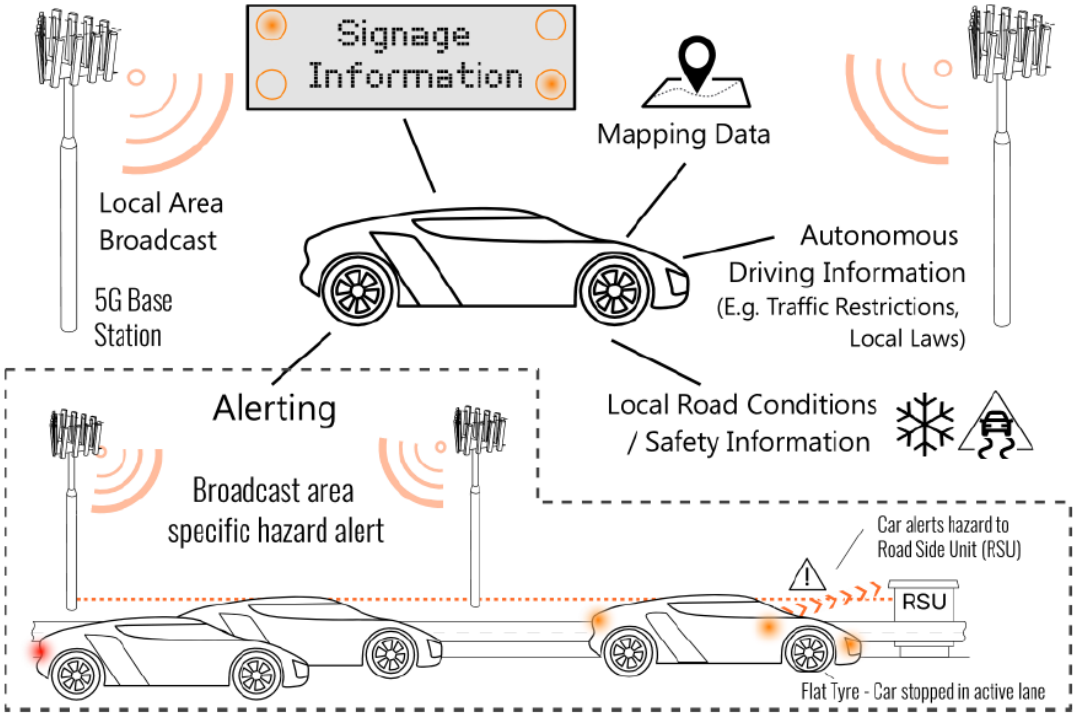
MULTIMEDIA PUBLIC SAFETY

- For an affected child and family, a potential faster and positive outcome
- Community and authorities support
- Improved communication between these two parties
- The operator is demonstrating its social responsibility.



Source : 5GXCAST

AUTOMOTIVE BROADCAST SERVICES

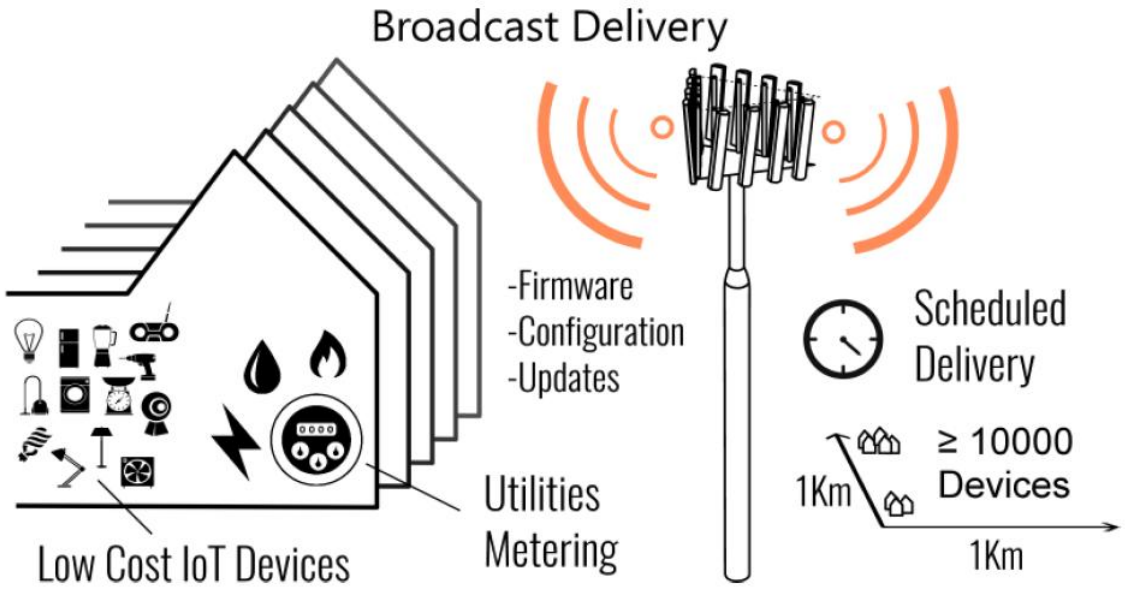


Source : 5GXCAST

- Increased safety and awareness
- Reduce energy consumption and emissions as well as traveling time
- Improved safety means less disruption of traffic and fewer emergency vehicle callouts
- New market segment and opportunities

IOT

- Single broadcast session to deliver the software update to a large number of IoT devices.
- Bandwidth usage optimization for the software update event.
- *IoT devices* are informed to wake up to receive the software update and then go back to sleep mode to **save the battery**



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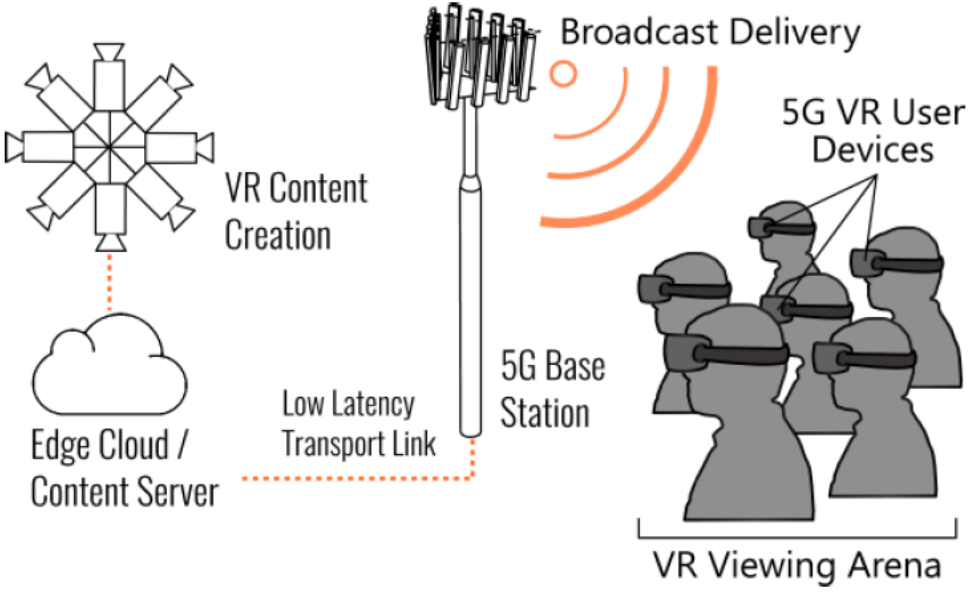
VR/AR BROADCAST SERVICES

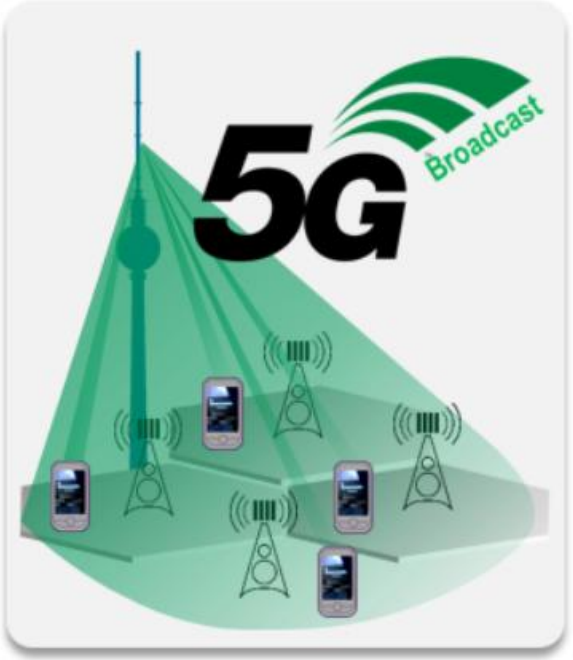


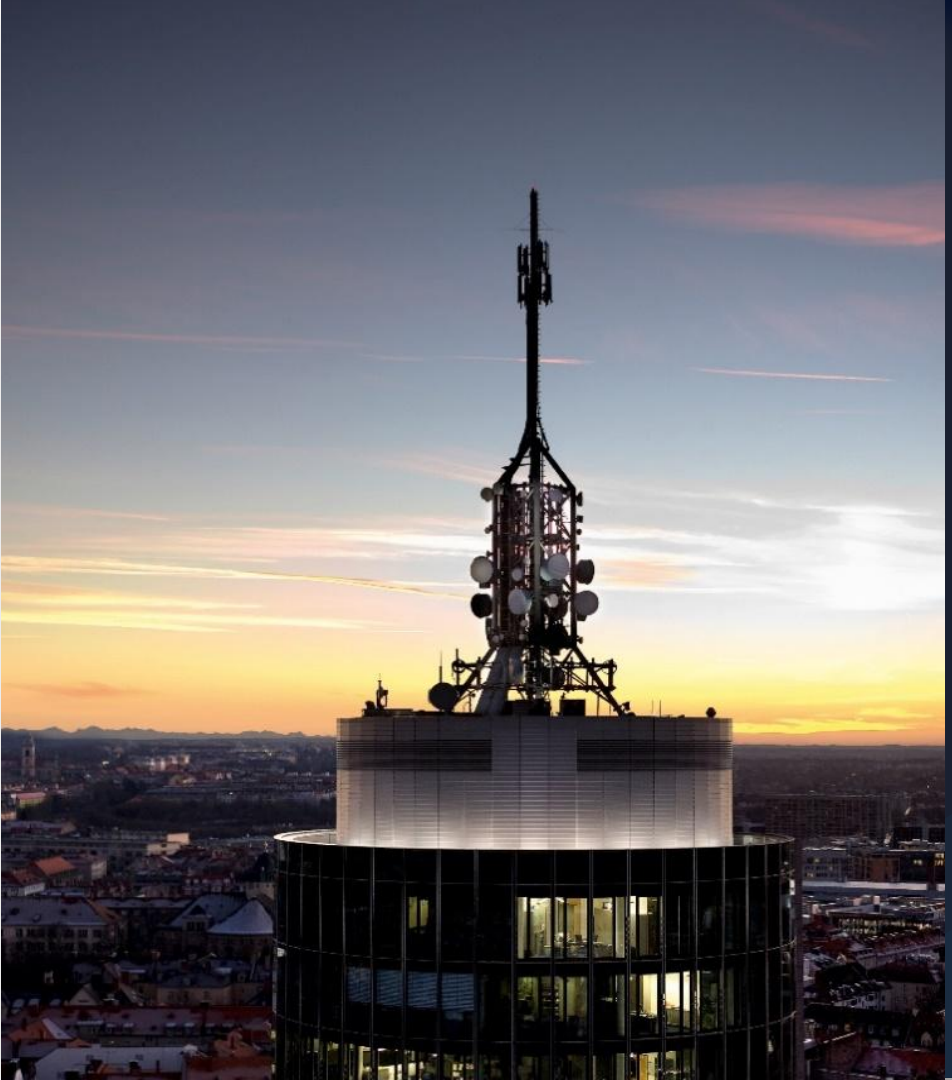
Source : 5GXCAST

- Enhanced user experience
- New business verticals in media and entertainment
- Faster 5G technology adoption
- Targeted/Location based Ads

FEMBMS

- **Further Enhanced** Multimedia Broadcast/Multicast Service
- Definition as **MBMS in UMTS** (Release 5/6) and Re-appearance with LTE Release 8 as **eMBMS**
- Known as **LTE enTV** (enhanced TV) in **3GPP Release 14**
- **Broadcast/Multicast** Premium content **anywhere/anytime**



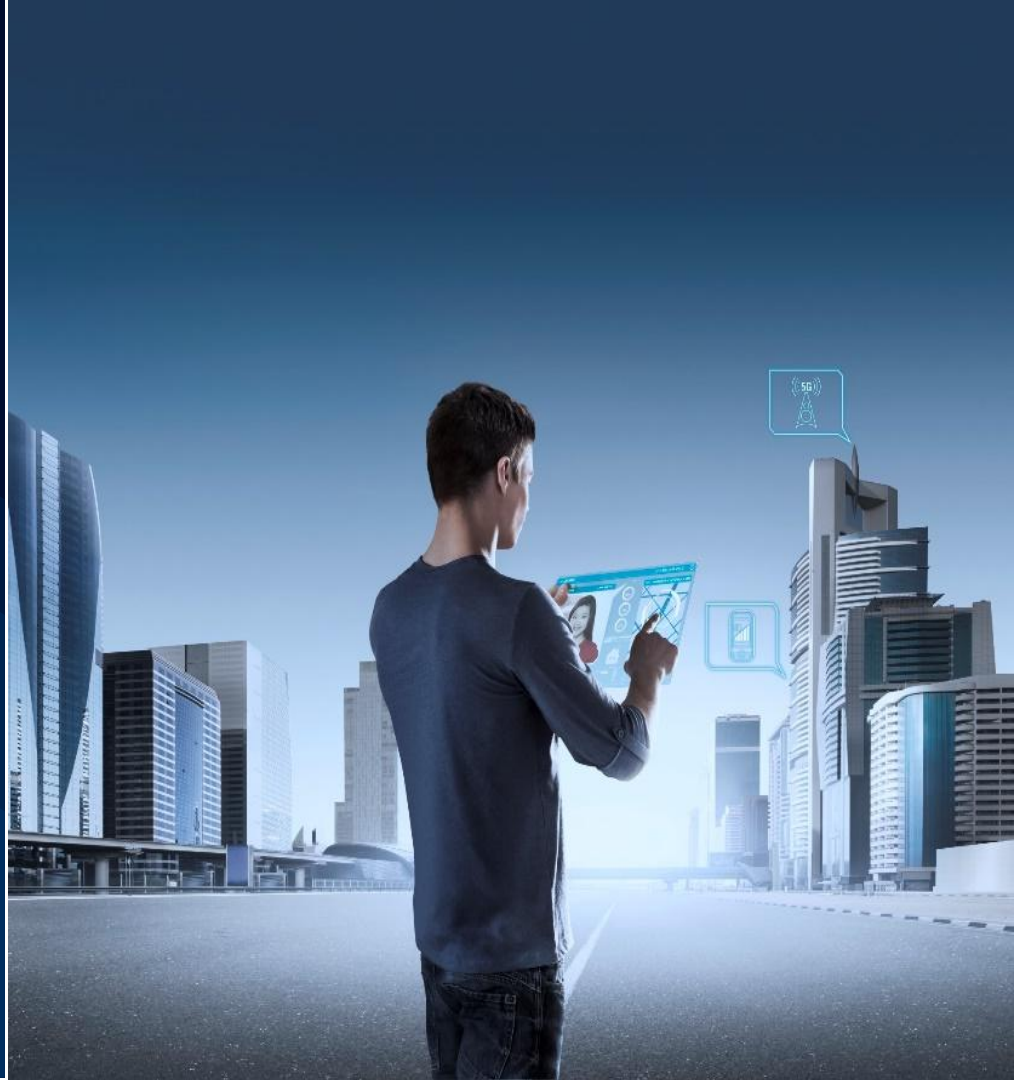


EMBMS: PREVIOUS LIMITATIONS

- **Only 60%** of subframes can be allocated to eMBMS
- **Complex** admission control and user subscription
- **Limited Customer QoE**
- **No support** of Higher Quality of Media
- **No continuity** between Broadcast & Unicast worlds
- **Lack** of wide deployment

ENHANCING SYSTEM ARCHITECTURE & MEDIA FORMATS

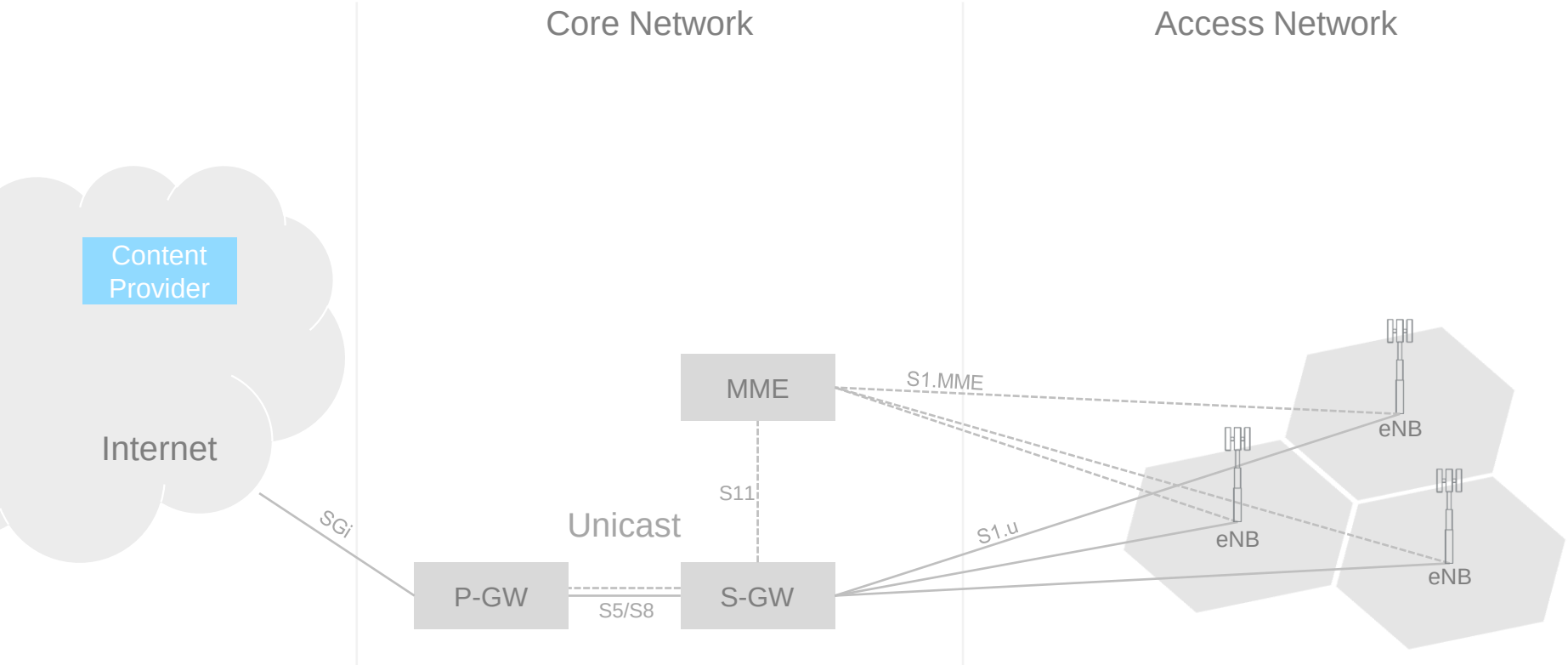
- **Receive-Only Mode** (ROM) for devices
- **Free-to-air** content broadcast
- **Simplified Architecture**
- **UHD, HDR & 4K Full Support**
- **Transport-only (pass-through) FeMBMS bearer** to use the network as content delivery platform



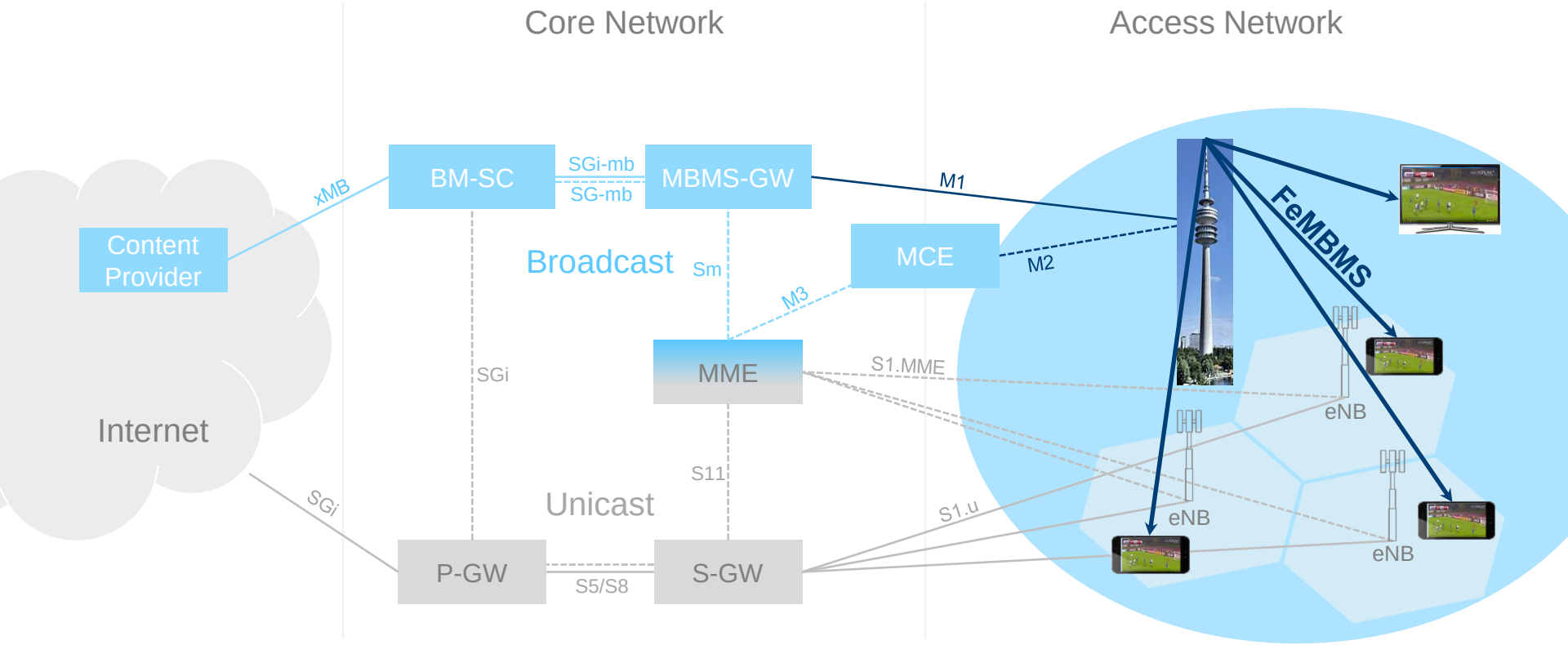
ENHANCING USER EXPERIENCE

- Smartphone users can consume **UHD & 4K videos anytime/anywhere**
- Improved **coverage and bandwidth efficiency**
- **Lower Latency & Higher Flexibility**
- **More Real-Time focused Apps**

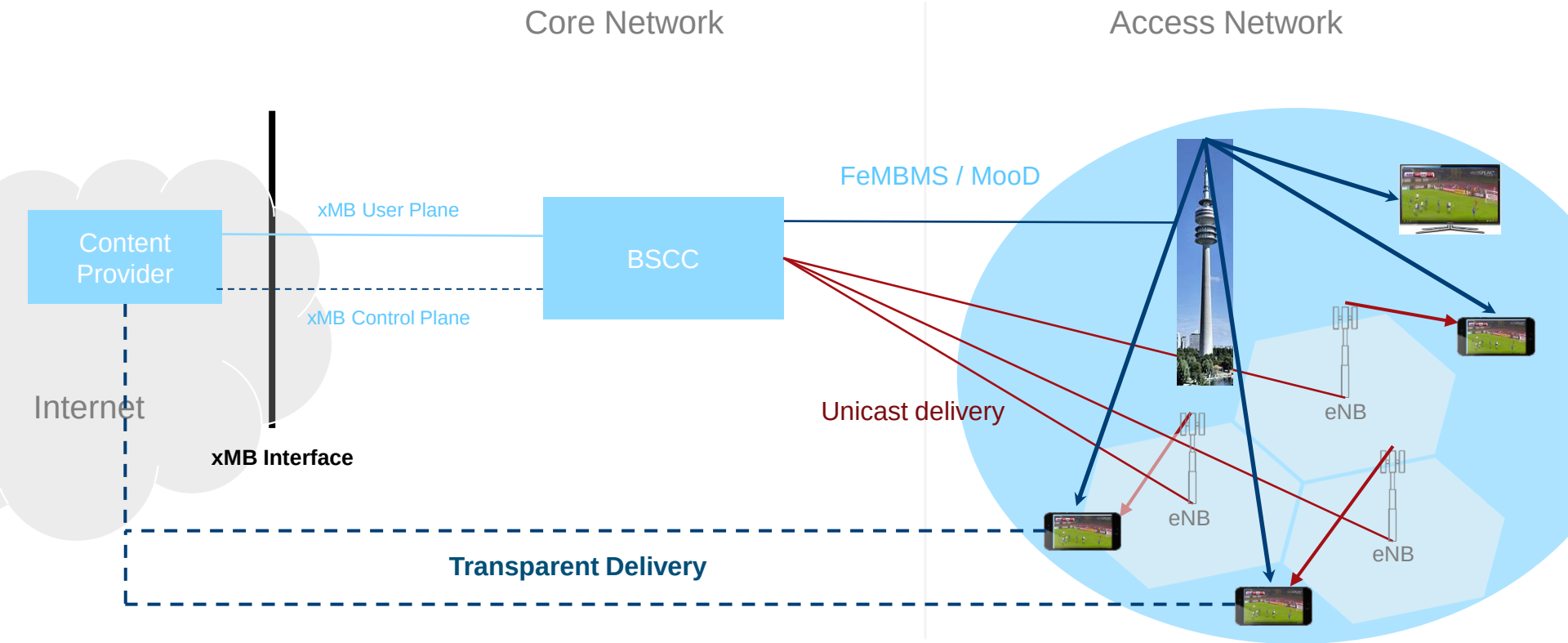
FEMBMS : LTE/EPC ARCHITECTURE



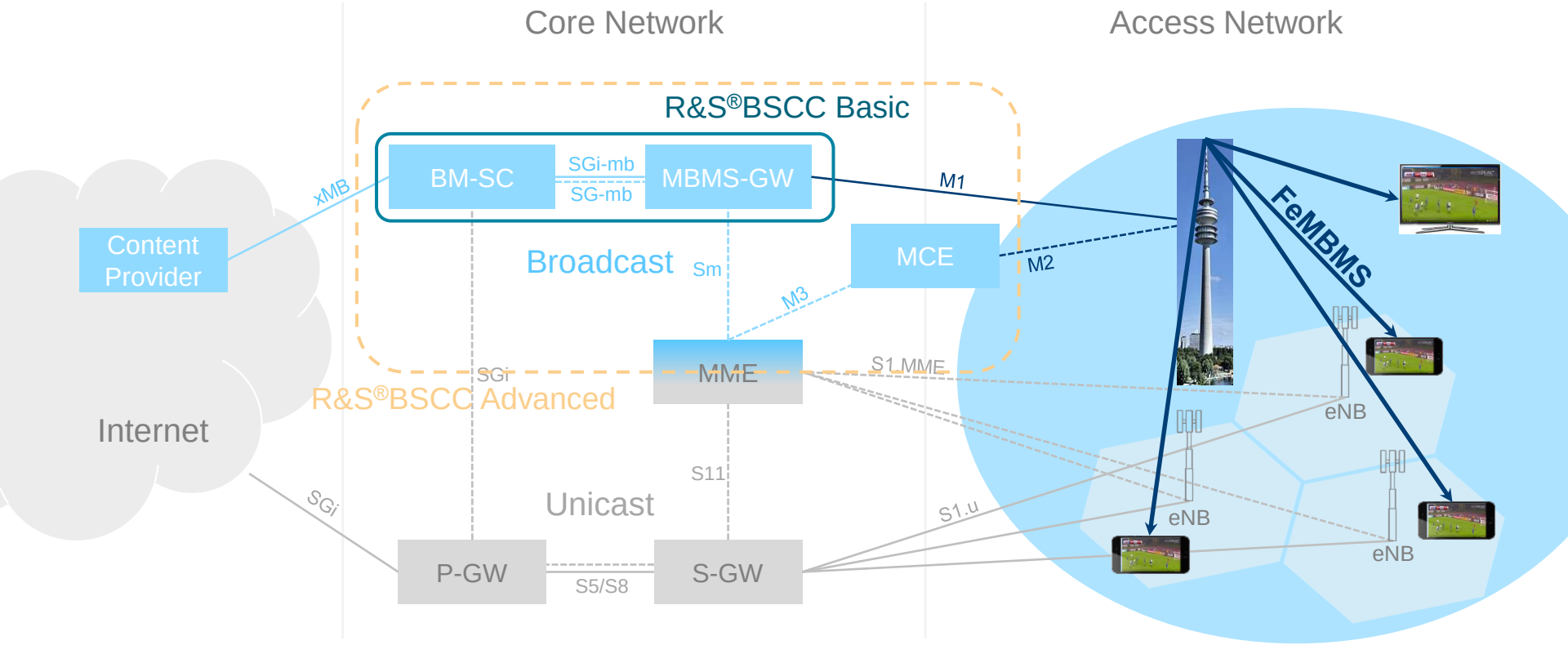
FEMBMS : LTE/EPC WITH HPHT ARCHITECTURE



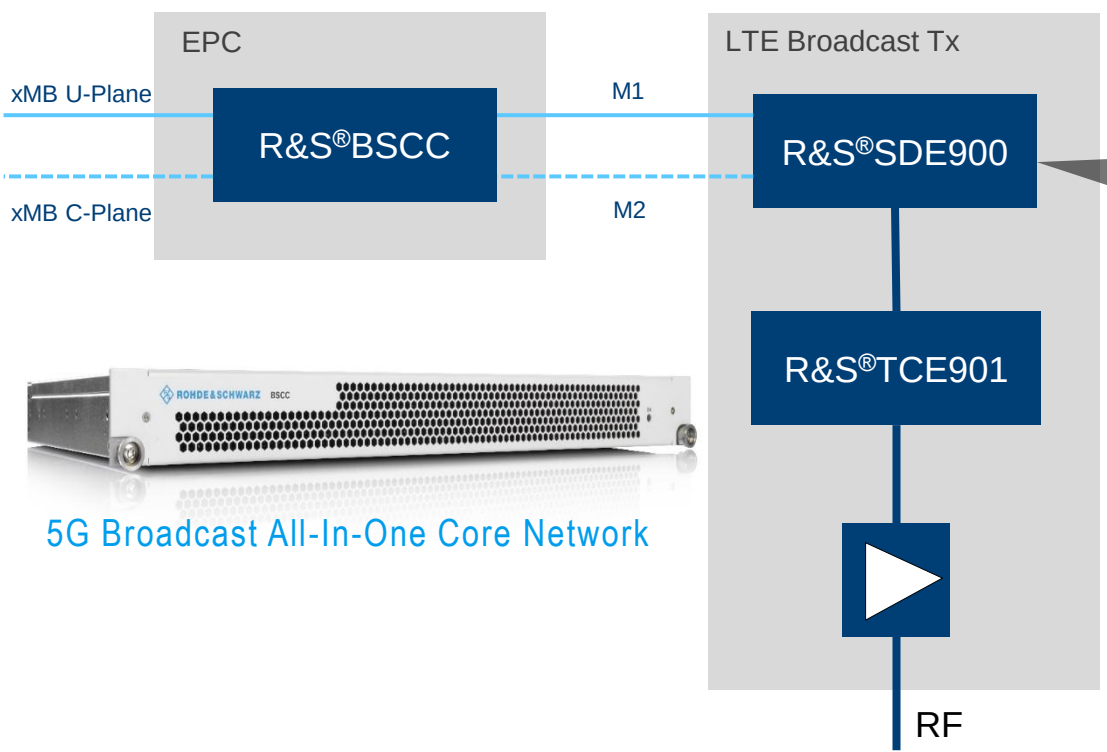
FEMBMS : HPHT SIMPLIFIED ARCHITECTURE



FEMBMS : LTE/EPC WITH HPHT ARCHITECTURE



5G BROADCAST SOLUTION



5G Broadcast All-In-One Core Network

PROJECT: 5G TODAY, GERMANY
FEMBMS HPHT FIELD TRIAL

- Research and implementation of the FeMBMS specification for the large-scale transmission of media content in broadcast mode based on mobile technology
- Funded by the Bavarian Research Foundation

- Duration 28 months (1st of July 2017 to 31st October 2019)

Project partners:

IRT KATHREIN ROHDE&SCHWARZ

Associated partners:

BR Telefónica O2

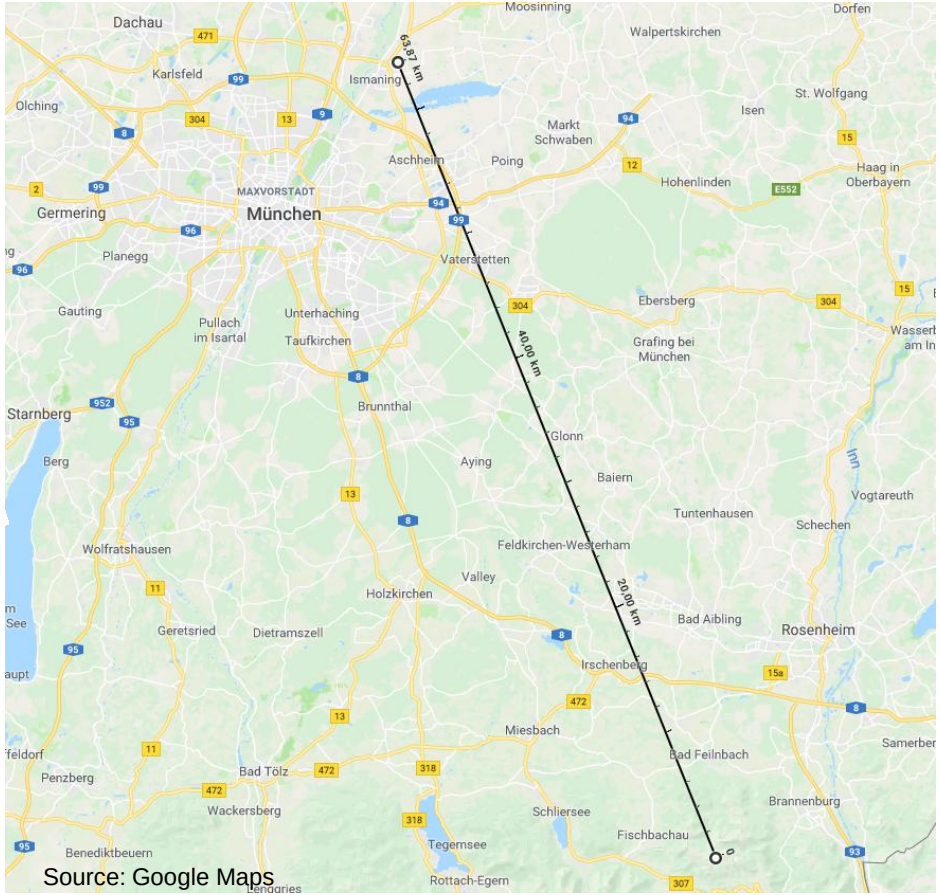
5G TODAY
CURRENT STATUS

- Frequency: 750 – 758 MHz
- Bandwidth: 5MHz (later 10MHz)

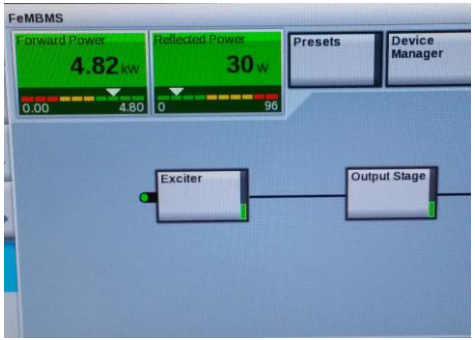
- Two transmitter sites:
  - Wendelstein
  - Ismaning
  - Inter-site distance 64km

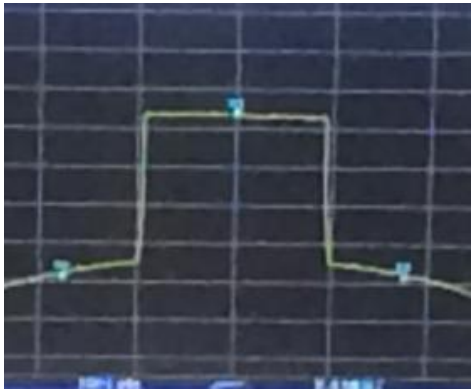
Since Dec. 2018

- Equipment installed:
  - THU9evo 5kW (Wendelstein)
  - THU9evo 7kW (Ismaning)

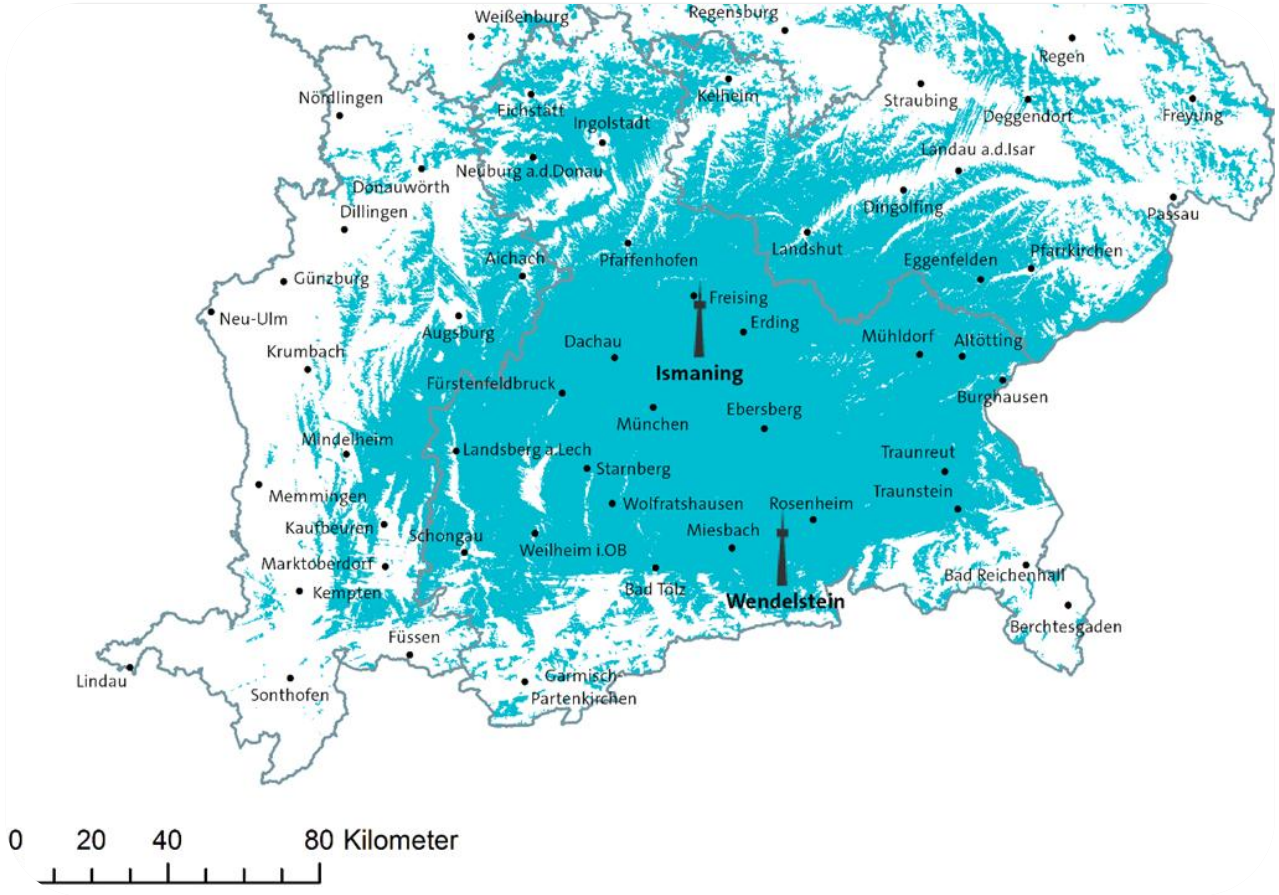


WORLD'S FIRST 5G BROADCAST HPHT TRANSMITTER ON-AIR

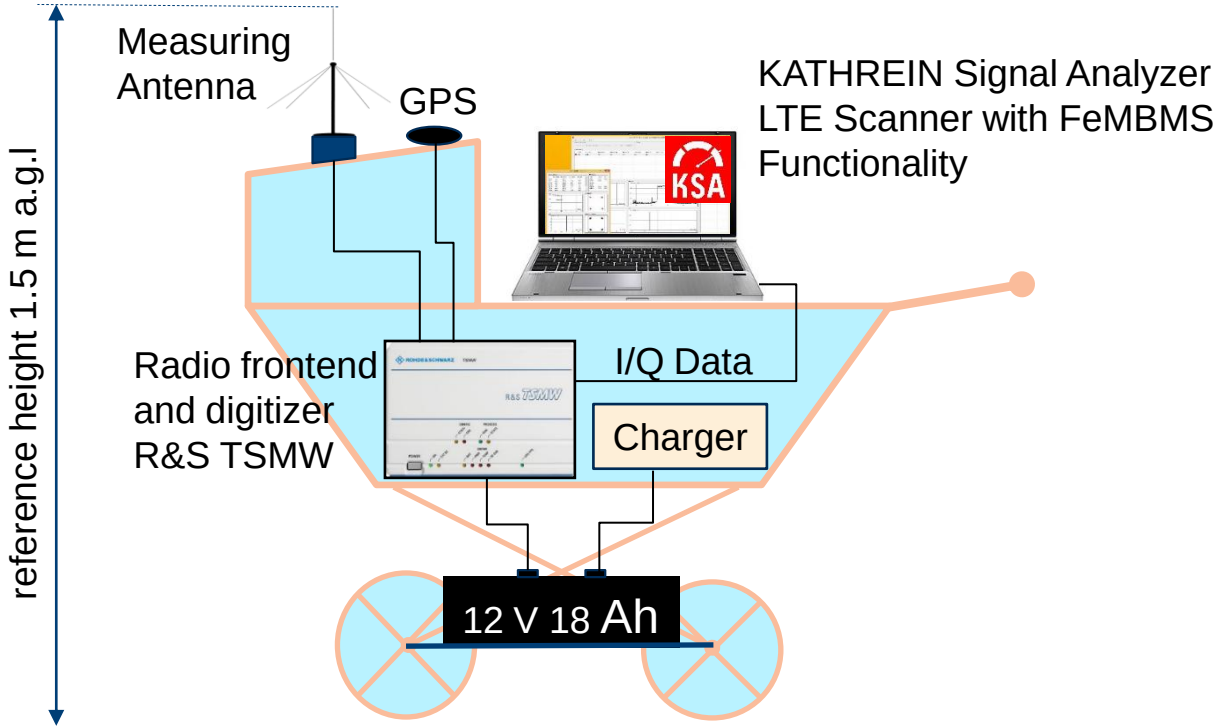




5G BROADCAST IN SFN MODE



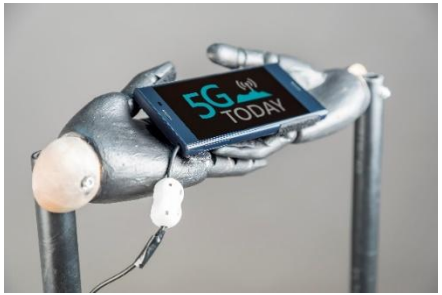
KSA: MEASUREMENT SYSTEM FOR PORTABLE 5G BC



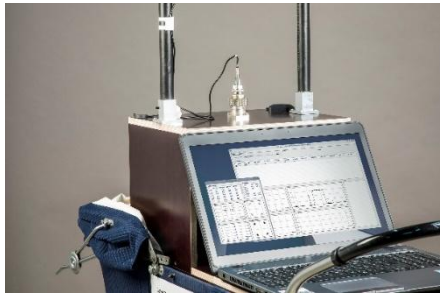
KSA MEASUREMENT SYSTEM INTEGRATED IN BABY BUGGY

Buggy in travelling mode

Buggy in measurement mode

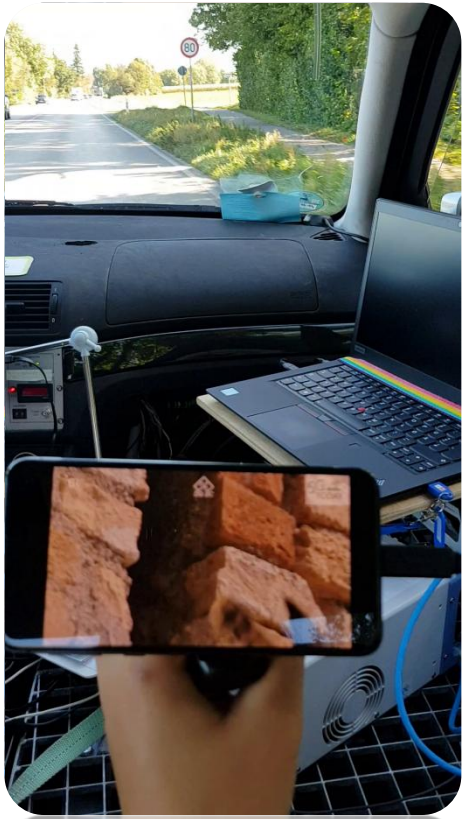


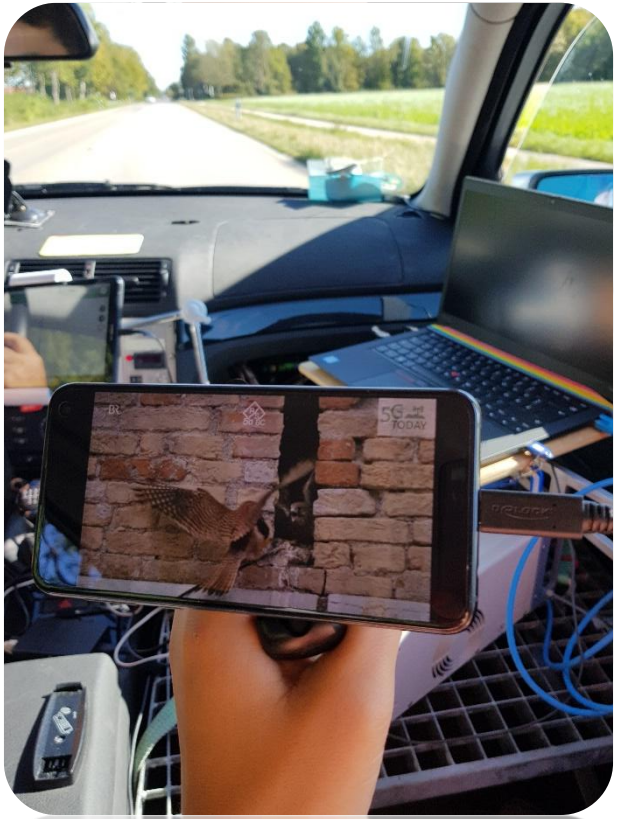
Dummy handphone and hands

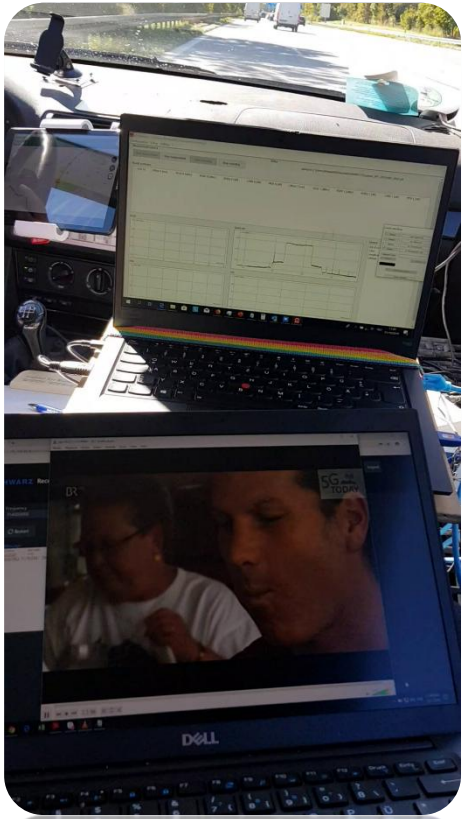


Kathrein Signal Analyzer

MOBILE RECEPTION







OTHER TRIALS?

Rohde & Schwarz exports 5G Broadcast to China

Technologie "5G Broadcast" : renouvellement d'une expérimentation accordée à la société TowerCast

Globo e Rohde & Schwarz fazem o primeiro teste brasileiro de 5G Broadcast durante o Rock in Rio

Who's next?

Teste 5G TODAY na Baviera no ar desde dezembro de 2018 / Foto: Divulgação