

# Approaching 5G Broadcast: Field Trials in Bavaria

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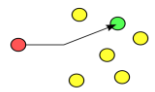
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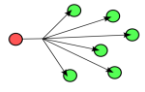
# 5G Broadcast: A Broadcast mode into a Mobile Standard

Mobile standards are commonly associated to Unicast / MNO-centric models

Unicast



models



Broadcast

- Point to point
- Lack of scalability for massive audiences
- Dependency on MNO infrastructure and network
- LPLT Networks with limited coverage
- Lack of control on delivery path and perceived QoS

- Point to area
- Unconstraint massive delivery of linear TV content
- Dedicated broadcast networks and spectrum
- Networks targeting universal coverage
- Pre-defined and predictable QoS



LTE Rel-14 includes for the first time features to support TV Services according to BROADCAST requirements

# 5G Broadcast: A Broadcast mode into a Mobile Standard



LTE Rel-14 offers the possibility to configure a Broadcast mode for linear TV delivery over dedicated broadcast networks

Enhanced SFN Coverage with 200µs CP

New Frame Structure: 100% Broadcast Capacity



Receive-only Mode (No SIM / No Uplink)

Transport-only Mode (Transparent delivery)

Standardized CSP Interface (xMB)



# 5G Broadcast: A Broadcast mode into a Mobile Standard

No SIM-card + No Uplink are key for re-using terrestrial broadcast infrastructure including HPHT in SFN

Dedicated Broadcast Networks and Spectrum to reach smartphones, tablets, cars... equipped with 3GPP chipsets

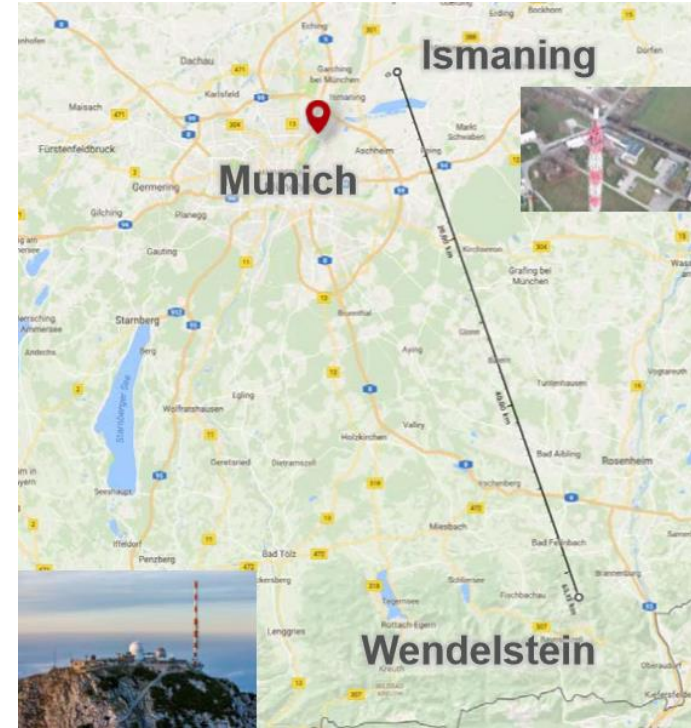


# Field Trials in Bavaria: 5G-Today Test Network

The new technology needs to be tested

Large-scale Release 14 broadcast network with:

- 2 transmitters in SFN:
  - Wendelstein
  - Munich Ismaning
- 100 kW ERP, Channel 56 UHF
  - 5 MHz BW, MCS 9 (QPSK)
- 1 TV channel: BR Fernsehen @ 3.2 Mbps (HEVC, HD)



# Wendelstein



Site height: 1838 m a.s.l, ant. height 53 m

- UHF antenna covered by GRP cylinder because of extreme icing in winter
- Vertically polarized

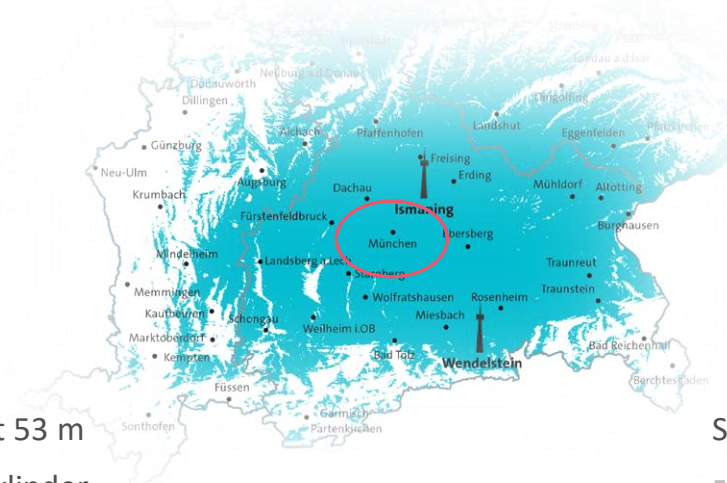
# SFN

UHF Channel 56 (750 – 758 MHz)

5 MHz Channel Width

100 kW ERP each transmitter

FeMBMS according to 3GPP Release 14



# Ismaning



Site height 483 m a.s.l, ant. height 215 m

- UHF antenna on top-mount spine
- Polarisation switchable, H / V / RHC for Tx diversity trials

# Field Trials in Bavaria: 5G-Today Test Network

Two main new standardized features under investigation:

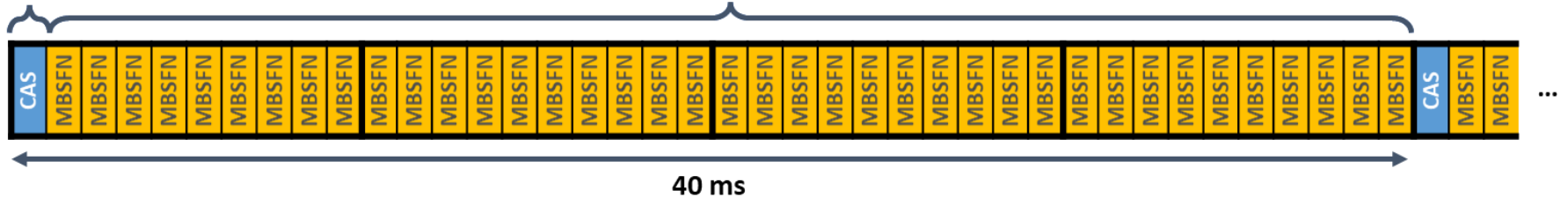
Is 200us CP sufficient for HPHT SFN with reasonable spectral efficiency?

New MBSFN subframe containing a non-SFN preamble (CAS)



Non-MBSFN subframe  
(CAS)

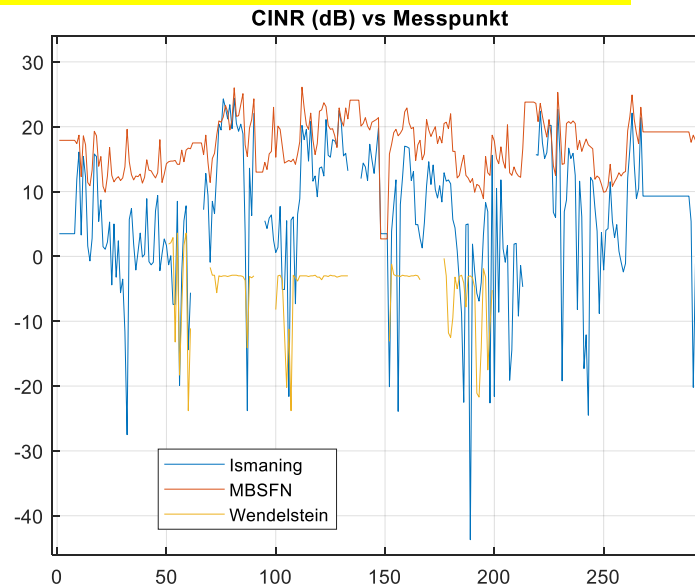
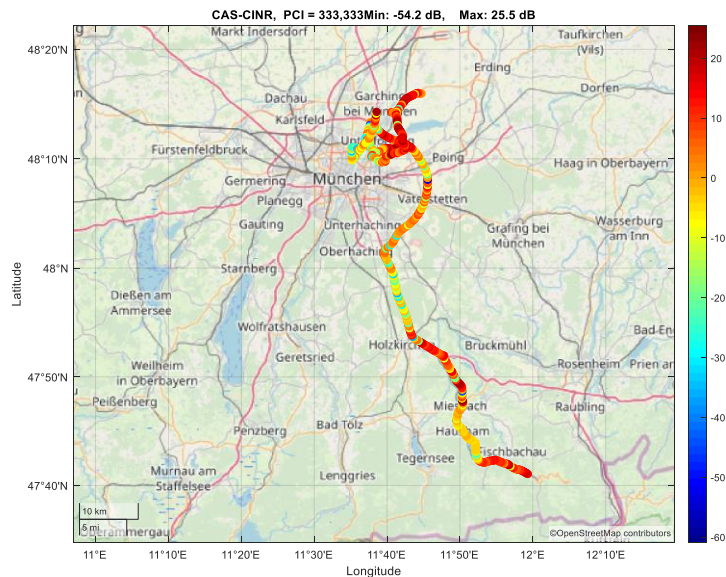
39 ms MBSFN region



**Extensive set of measurements being currently conducted**

# Field Trials in Bavaria: 5G-Today Test Network

Extensive set of measurements being currently conducted



Professional Rel14 Analyser developed during the project

+

Software-defined Receiver developed by IRT



# Assisting Standardization

A GLOBAL INITIATIVE

**EBU** **BBC**  contributing to 5G Broadcast (Release 16)

Ensuring requirements originally input by broadcasters are met

New CP 300us for improved HPHT SFN support  
New CP 100us for extended mobility performance

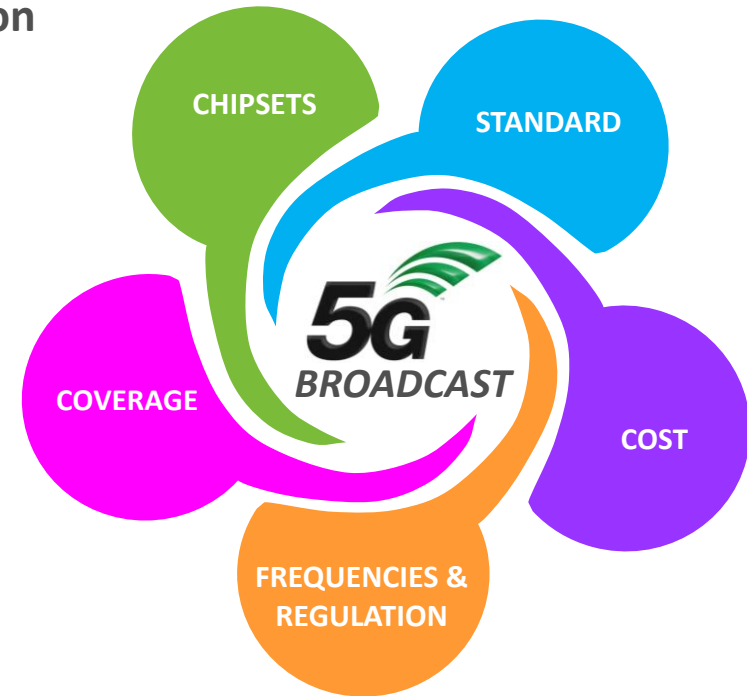
Enhancements in the CAS to increase demodulation robustness

Release 16 is also known as LTE-based 5G Terrestrial Broadcast  
(to be ready by mid-2020)

# But... are we ready?

The ecosystem for 5G Broadcast is yet under development

- 5G Broadcast (**Release 16**) is still under standardization
- **No chipsets are yet available** in the market (not even clear if in „production plans“)
- **Regulation to operate 5G Broadcast** in dedicated spectrum is not ready
- The **service layer for TV Services** has been developed but needs to be evaluated
- **Performance, Coverage and Spectral Efficiency** to be analysed according to broadcasters' expectations



# 5G Broadcast is still in a preliminary phase

Broadcasters need to evaluate the value proposition of using **5G Broadcast** technology to deliver **linear TV services to** smartphones, tablets, connected cars...

IRT will continue **investigating** 5G Broadcast and **contributing** to standards to ensure that these are shaped to meet **PSB requirements**

Follow our activities in the IRT-Lab: [lab.irt.de](http://lab.irt.de)



Visit our booth at IBC: **10.F 51**



Visit our joint demo with RAI at the EBU booth **10.F 20**

# Thank you for your attention

Experts in audio-visual media

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