



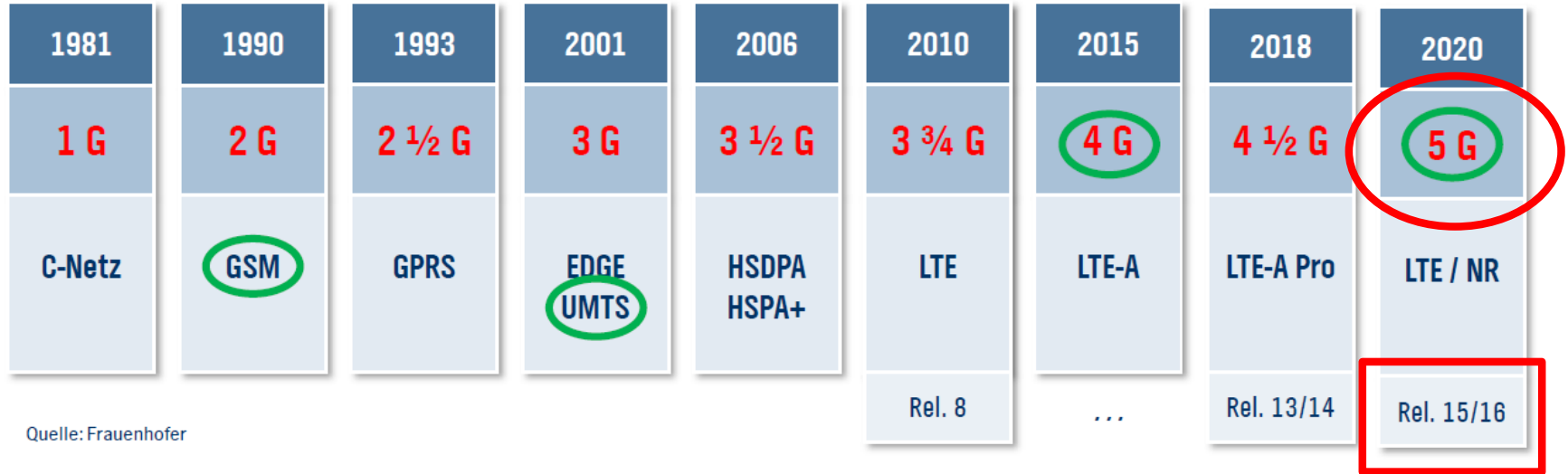
EBU NEW RADIO DAY - ROME 2019

Bavarian Radio 5G Pilot Project

Helwin Lesch

25.10.2019

Introduction: Development of Cellular Radio Standards



Quelle: Fraunhofer

- **standardization advances** in small steps (so-called **releases**) about every 18 month
- after several releases the technology is supplied with a new **(marketing-) name** for the public

5G Timeline ?

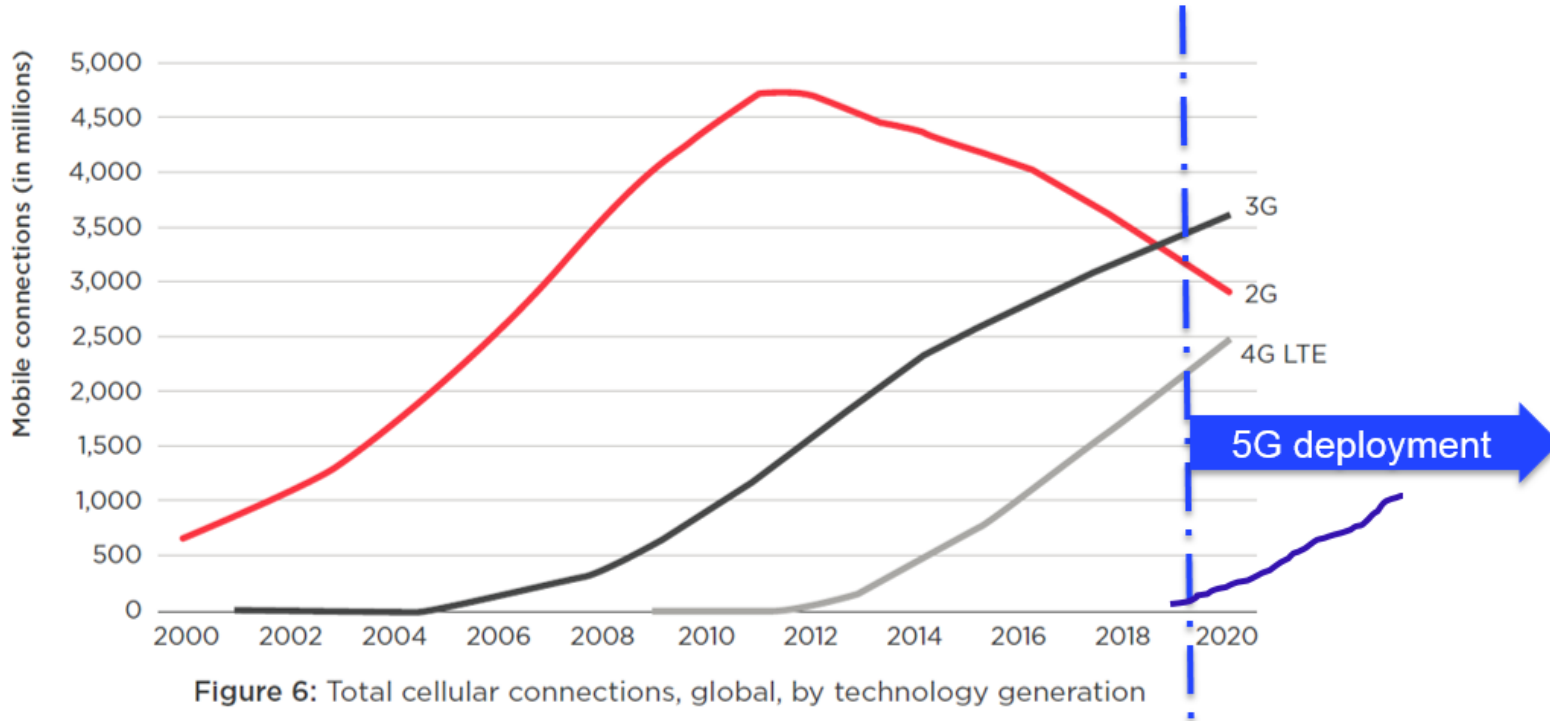


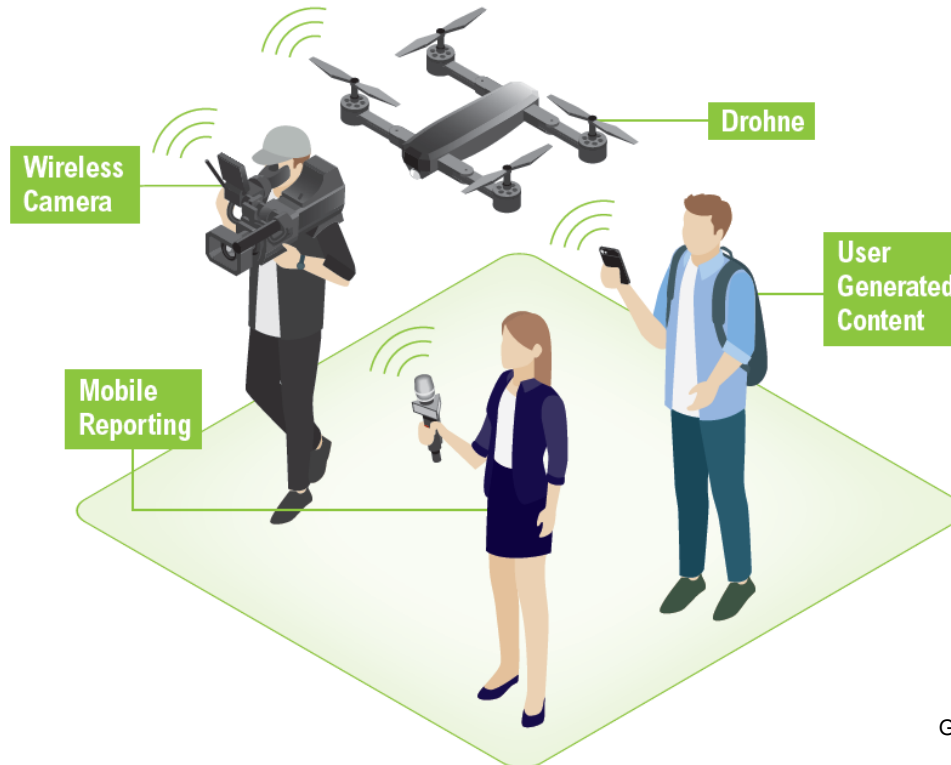
Figure 6: Total cellular connections, global, by technology generation

Source: GSMA Intelligence

Quelle: Dr. Beutler / SWR

Why is 5G important für Broadcasters?

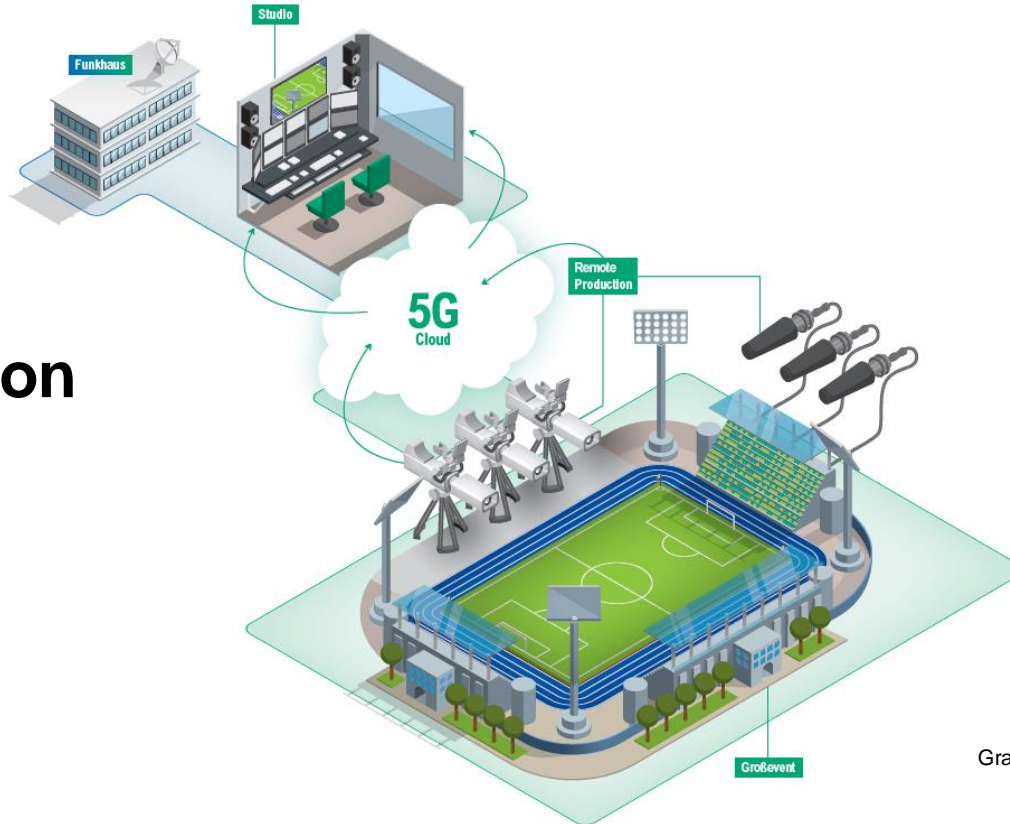
5G in production



Grafik: IRT

Why is 5G important für Broadcasters?

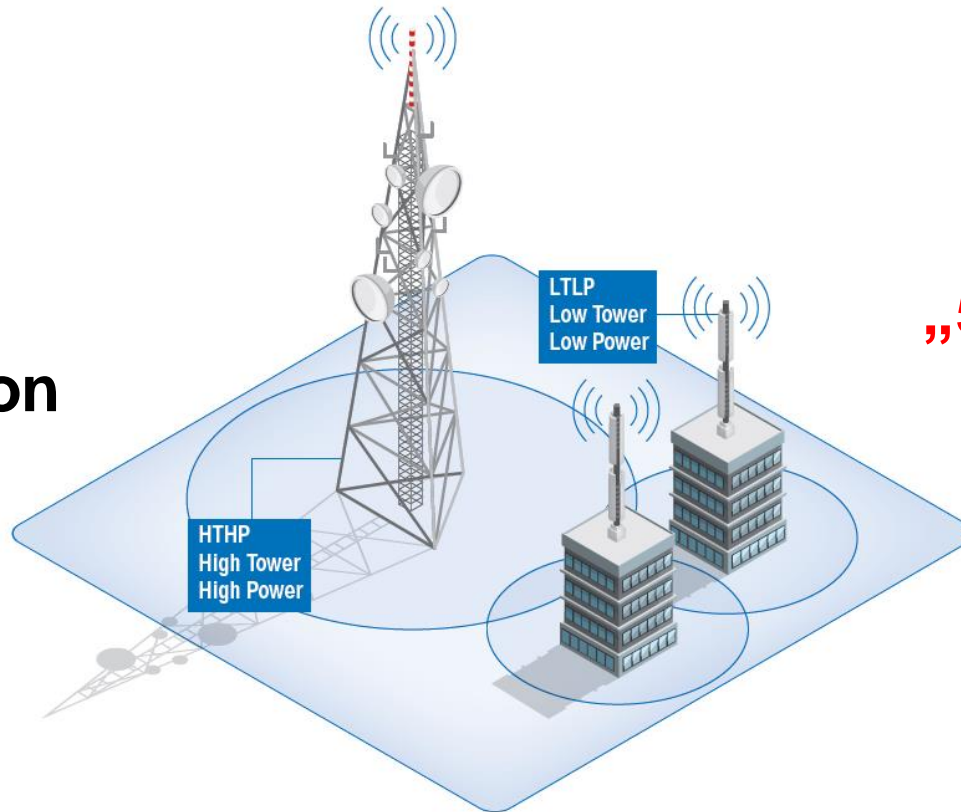
5G in contribution



Grafik: IRT

Why is 5G important für Broadcasters?

**5G in
distribution**

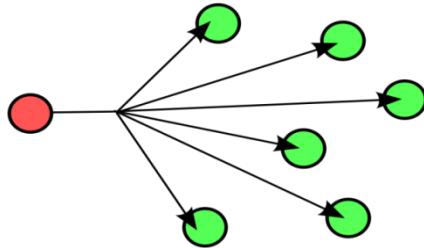


„5G Broadcast“

Grafik IRT

Some differences between broadcast networks and mobile networks

Broadcast

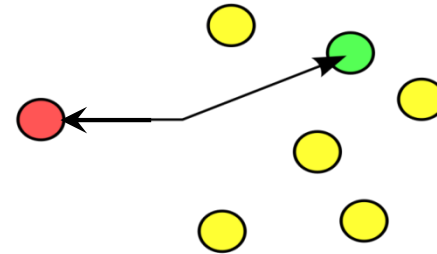


Broadcast:

permanent uni-directional
transmission to everyone

„one to many“

Cellular Radio



Internet:

dedicated bi-directional connection
for every single user

„one to one“

Some differences between broadcast networks and mobile networks

Broadcast

HHP

High Tower High Power

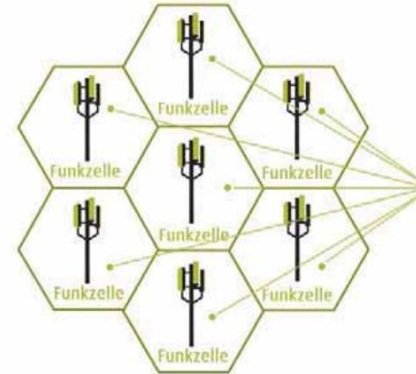


- high power
- covering large areas
- cost effective infrastructure
- no back channel

Cellular Radio

LTLP

Low Tower Low Power

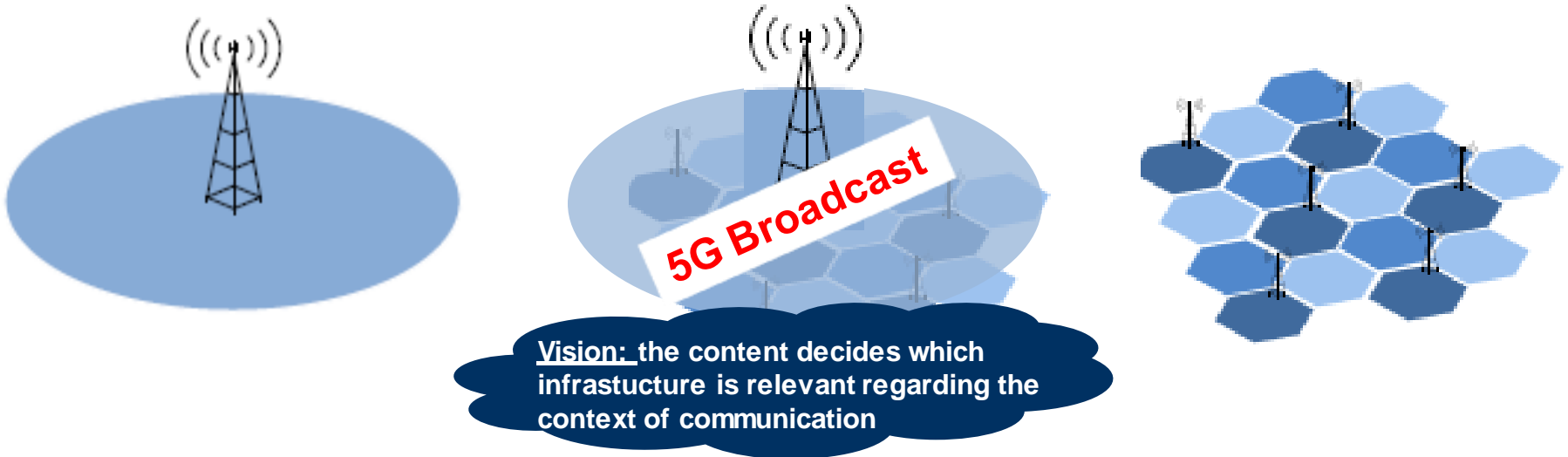


- low power
- small cell network
- elaborate infrastructure
- back channel

Our vision: flexible mix of infrastructures

Broadcast: covering large areas, downlink only, Point-to-Multipoint, single transmission of the same content

Cellular Radio: back channel, elaborated network with higher costs, Point-to-Point, multiple transmission of the same content



„5G Broadcast“ - A Broadcast mode into a Mobile



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

Enhanced SFN Coverage with 200 μ s CP

New Frame Structure: 100% Broadcast Capacity

Receive-only Mode (No SIM / No Uplink)

Transport-only Mode (Transparent delivery)

Standardized CSP Interface (xMB)



„5G-Today“ – Field Trials in Bavaria

Wendelstein

Site height: 1838 m
ant. height 53 m

- UHF antenna covered by GRP cylinder
- 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
ant. height 215 m

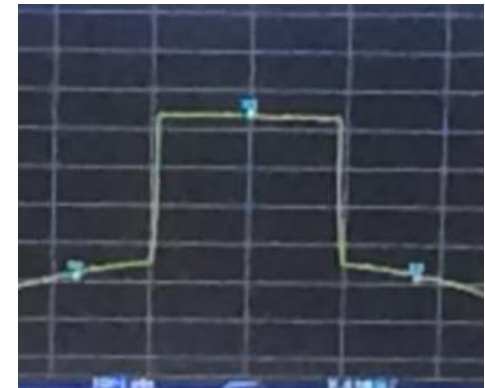
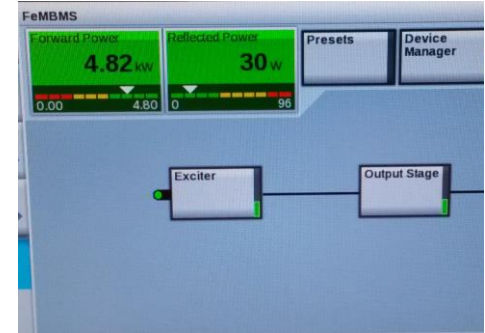
- UHF antenna on top-mount spine
- Polarisation switchable, H / V / RHC for Tx diversity trials



„5G Today“ - HPHT LTE Broadcast



World's first HPHT transmitter on-air located at Wendelstein

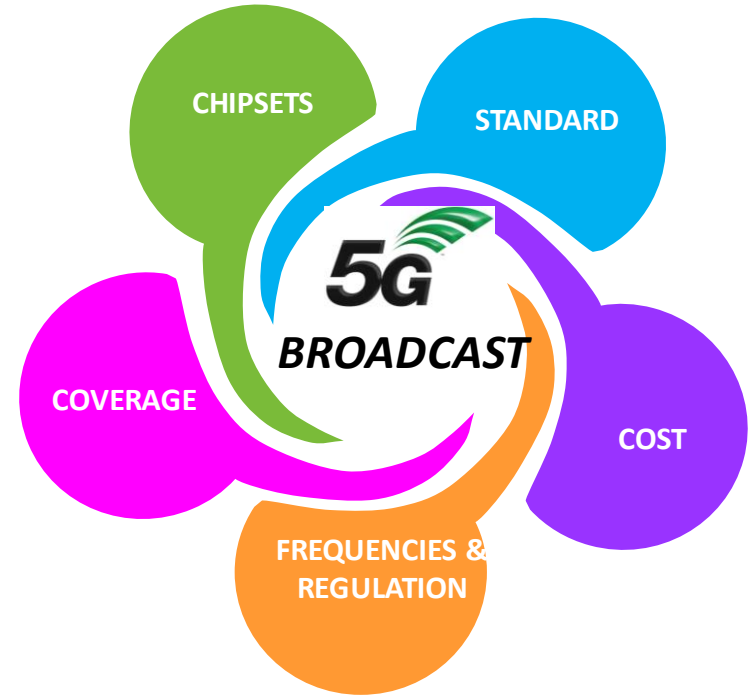


Quelle: ROHDE&SCHWARZ

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



And what about 5G and radio ? (1)

- **Digitalization of radio** is in full swing and generates **new services and partners** in the market.
- Listeners want to receive **linear and individual (non-linear) audio-services** anywhere and at any time. Therefore ARD is preferring a **hybrid model** with DAB+ and Internet-Radio.
- To **offload video-traffic** from cellular networks, some time ago work started to introduce a broadcast mode for TV services.
- „5G“ generally offers the possibility to transfer multimedia services with higher datarates. Now we see an **realistic chance to standardize a worldwide „5G- broadcastmode“** in mobile networks which fullfills the requirements of broadcasters and is supported by mobile network operators.
- EBU and Public Broadcasters and their research institutes are working in 3GPP for a „televisison-mode“ in 5G. No work is done for radio, radio providers are not involved in 3GPP. **There is no dedicated radio-broadcast-modus in 5G** for signaling and additional data... as we have it in DABplus.

And what about 5G and radio ? (2)

- There are **no business models** for „radio“ in cellular networks. In contrast video is a strong driver for new systems and uses the bigger part of mobile data rate.
- Radio needs a **very good coverage** and a very high availability. Public Broadcasters have the mandate to cover whole areas. In contrast cellular networks are designed to fulfill the needs of the business models of the MNOs. We do not expect a „99%“ coverage with 5G in Germany.
- Radio needs a **very low-threshold access to the listeners** without gate-keepers.
- In respect to the time to market for availability of 5G for the normal consumers: all cellular systems have **taken time (~10 years)** to penetrate the market
- **Radio can not risk to be dependent (chronological and technical) on a system (5G) on which broadcasters have only very limited influence.**

And what about 5G and radio ? (3)

- **Radio needs fixed costs** which are independent of the number of consumers
- Chris Weck (DLR) has recently done some work on the cost-aspect:

“Today, DAB radio receivers have an external antenna as well as car receivers. In comparison to a smartphone with a less sensitive built-in antenna. This means that in order to achieve the same coverage for radio reception by smartphones, 10 dB more transmitting power is required. Assume e.g. transmitting costs for a full area DAB network in Germany of about €25 million per year. In order to gain 10 dB more transmitting power for smartphone reception, the network will cost a nationwide broadcaster approximately €250 million per year.”

The DAB+ network with its low number of transmitters (in comparison to a cellular network) is the most efficient network to realize a full area coverage



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