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DR. RONALD LORENZ

# Planning for 5G Broadcast A Case Study for Germany

# Overview

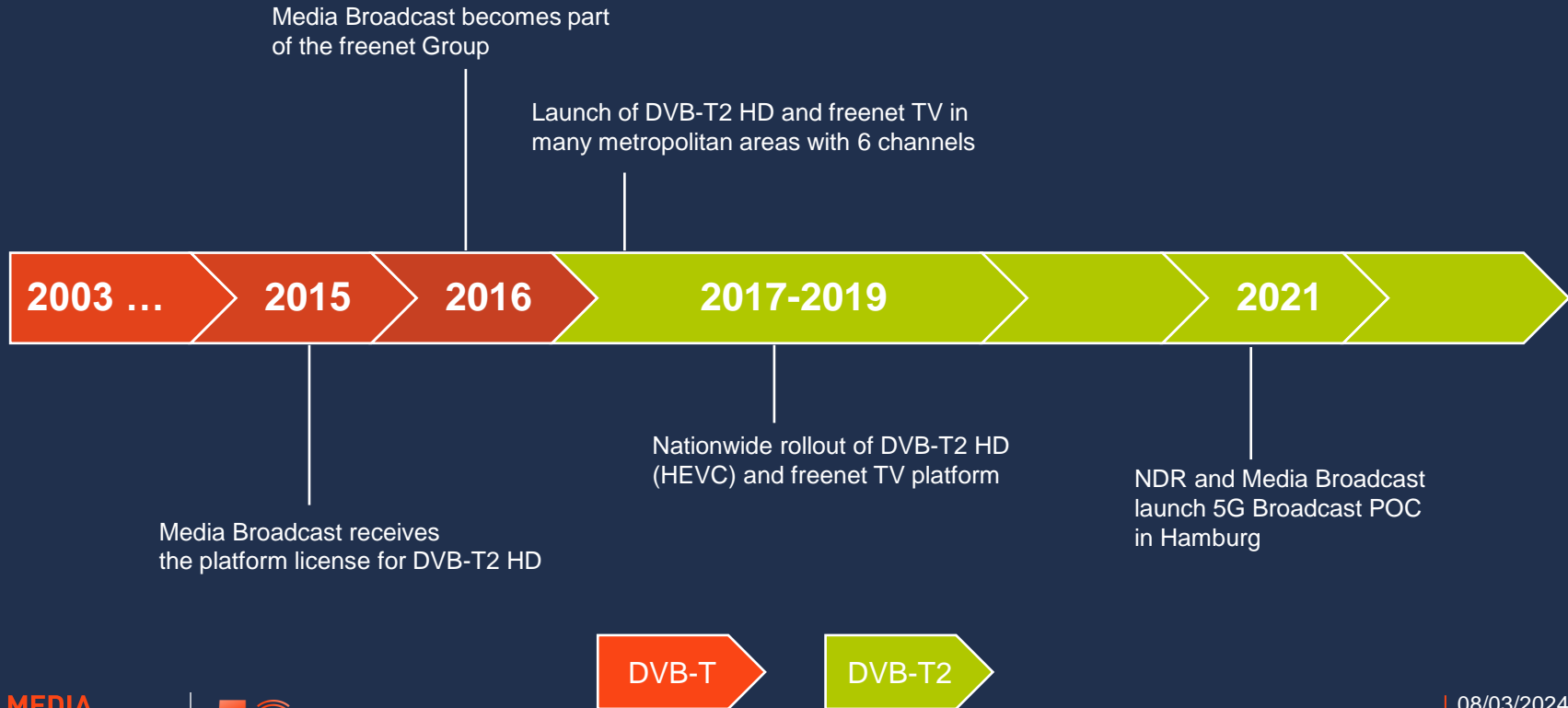
1. Background – DTT in Germany
2. Planning Parameters (general)
3. Case Study – Motivation and Examples
4. Results
5. Conclusion

## About Us

- Media Broadcast is a member BNE
- Germany's largest service provider in the broadcast and media industry for more than 70 years
- Corporate headquarters in Cologne, with more than 600 employees throughout Germany
- Market leader with more than 700 transmitters in radio (mainly DAB+) and TV (DVB-T2 HEVC) and markets the commercial DTT platform freenet TV
- More than 8.000 end-to-end connections for data transmission
- Multiple ISO certifications



# We have significant experience in DTT



# Coverage of terrestrial TV in Germany

Fixed reception




Public  
FTA, 130+ sites

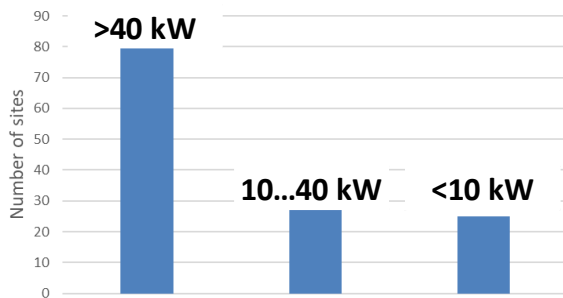


Commercial  
FTA +



 | freenet TV  
paid access  
at 63 sites

Transmission sites - distribution of ERP



Fixed reception





# Planning parameters

## Tool- and calculation specific

- Propagation, data base
- Height of receiving antenna

## System-specific parameters

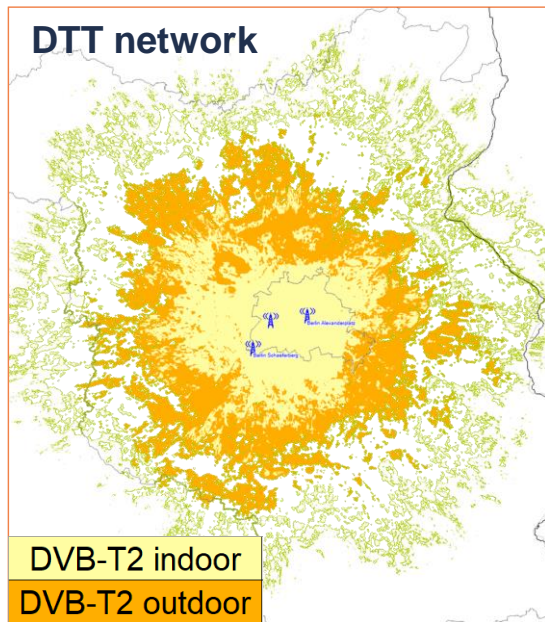
- C/N, bandwidth
- Cyclic prefix
- device-related (ant. gain, NF)

## Several aspects influence choice of system-specific parameters

- business model / # programs → required capacity → MCS
- infrastructure, network topology frequency resources → Cyclic Prefix
- Mobility (speed?) → C/N, also cyclic prefix

# What happens if we use all existing DVB-T2 sites for 5G Broadcast?

Goal: portable outdoor coverage for 5G Broadcast

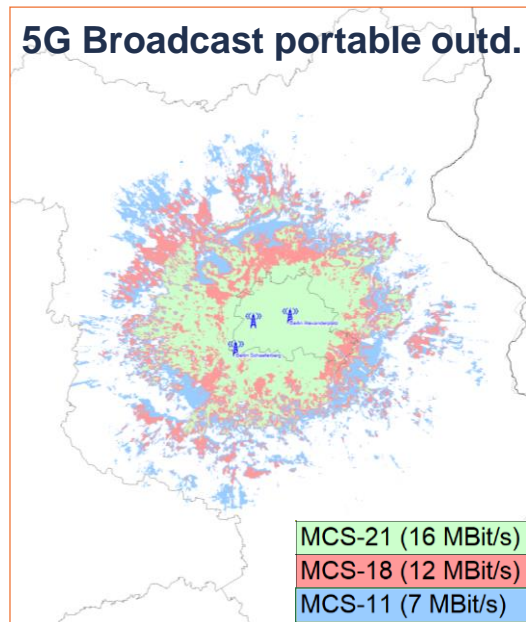


Example: Berlin

Link budgets - significant parts

Parameter	DVB-T2	5G BC
SINR [dB]	$\sim 17^2$	8.4/14.4/17.2 <sup>3</sup>
noise figure [dB]	6	$\sim 9$
antenna gain [dBd]	0	-9.5 (-8...-11)
BEL <sup>1</sup> [dB]	15 (13...17)	0
sum of losses [dB]	23(+4)	27/33/36
sum of losses [dB]	38	

5G Broadcast portable outd.



<sup>1</sup> Building entry loss

<sup>2</sup> C/N for commercial platform (freenet TV)

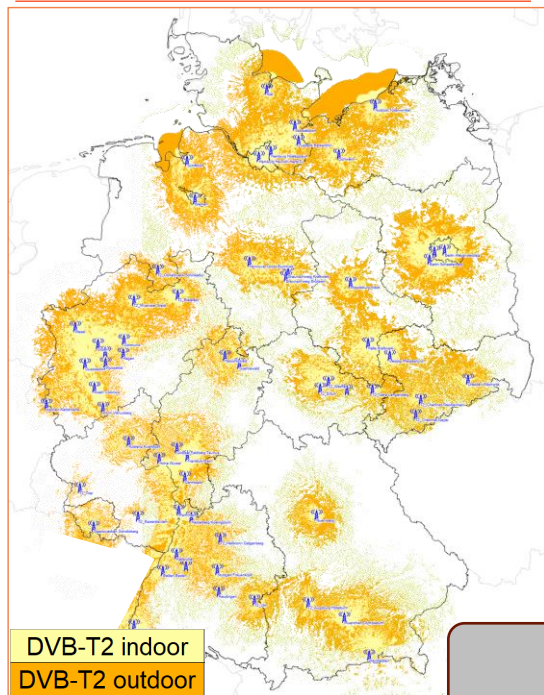
<sup>3</sup> for MCS-11, MCS-18 and MCS-21 (5 MHz) 8 MHz, Trial Stuttgart: 3 dB lower

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BROADCAST**



# Result: a network based on all DTT sites will cover current DTT population with 5G Broadcast portable outdoor – all or more (PI) or most of them (PO)

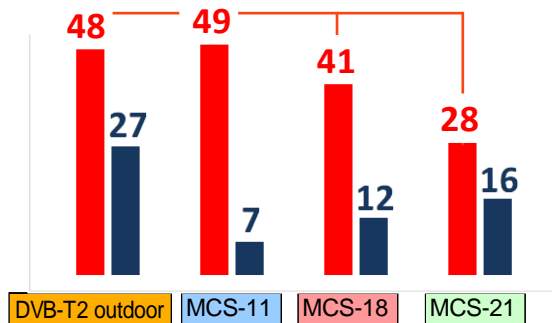
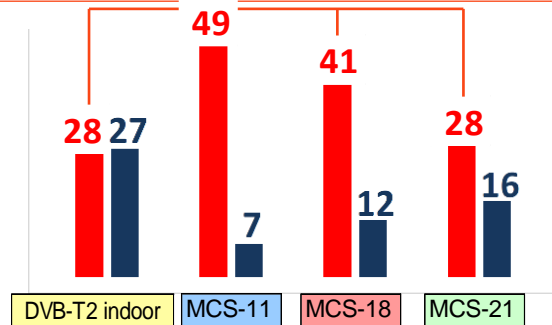
## DTT network



DVB-T2 indoor  
DVB-T2 outdoor

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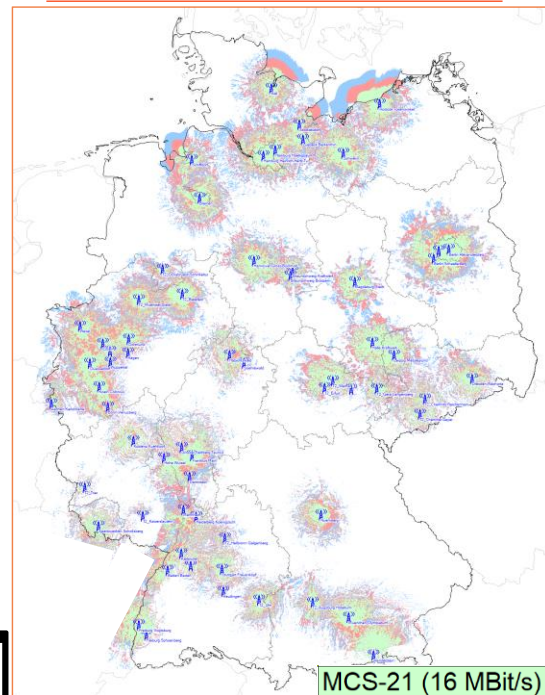
## Coverage 5GBC portable outdoor



Population [Mio.] bandwidth [Mbit/s]<sup>1</sup>

<sup>1</sup> bandwidth of one Mux

## 5G Broadcast portable outd.



MCS-21 (16 MBit/s)  
MCS-18 (12 MBit/s)  
MCS-11 (7 MBit/s)



## Conclusion: MCS index for 5G broadcast makes the difference

If we use the same sites as for DVB-T2, 5G Broadcast portable outdoor coverage (in Germany) will be

- similar or (much) better than portable indoor coverage DVB-T2
- similar or (much) smaller than portable outdoor coverage DVB-T2

**Task:** find best compromise between ...





**We believe there is a new potential by  
switching on 5G Broadcast ...**

**... if 5G Chips with 5G Broadcast  
are embedded in mobile devices!**

**This would be a game changer!**

## Contact

**Dr. Ronald Lorenz**

Broadcast Applications

Erna-Scheffler-Str. 1

51103 Köln

TEL +49 (0) 221 7101-5420

MOBIL +49 (0) 171 5613016

ronald.lorenz@media-broadcast.com

**Thank you very  
much for your  
attention!**