

3/21/2024  
CHRISTIAN WERNER

# Monitoring a national commercial/public DAB+ network

# Media Broadcast

- Media Broadcast is part of the freenet Group
- Germany's largest service provider in the broadcast and media industry for more than 70 years
- Corporate headquarters in Cologne
- More than 600 employees across Germany
- More than 8.000 End-to-end connections for data transmission
- Market leader with over 700 transmitters in radio (DAB+) and TV (DVB-T2 HD) and markets the platform freenet TV
- Multiple ISO certifications



# About Us

## We create platforms for media.

The company designs, builds and operates multimedia transmission platforms for TV and radio based on state-of-the art transmitter, line and satellite networks.

## Our focus is squarely on digital terrestrials.

Media Broadcast is the market leader in DAB+ and DVB-T2 HD and markets the freenet TV platform. Working with our DAB+ platform operator audio.digital NRW and our shareholding in the nationwide platform operator Antenne Deutschland, we are pushing the boundaries of terrestrial transmission.

## We are the backbone of the media.

Moreover, the company connects broadcasters with its high-availability fiber-optic network and executes productions and broadcasts of live events for TV stations and companies.

## We are pioneers in 5G.

5G is the new communication standard for industry and media companies. We were one of the first companies in Germany to put a 5G campus network into operation.

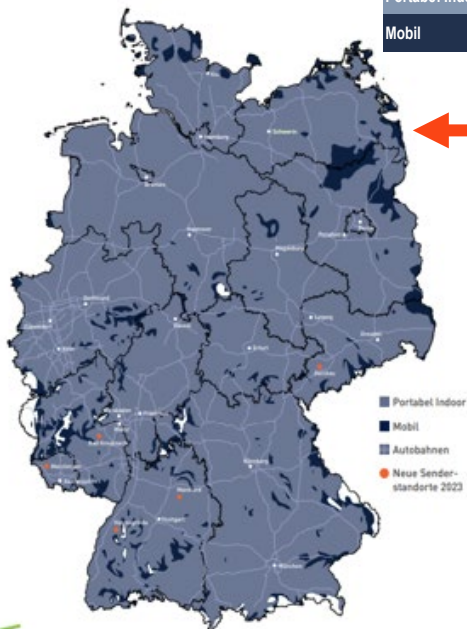


# First national Mux coverages nearly complete Germany – Second national Mux focused on metropolitan areas

MEDIA  
BROADCAST

First national Mux 5C (SFN)  
165 transmitters in 2023

1. Bmux	vers. Einwohner in Tsd.	in %	vers. Fläche in km <sup>2</sup>	in %	Autobahn in km	in %
Portabel Indoor	> 75 Mio.	>91%	>337.000	>85%		
Mobil	> 81 Mio.	>98%	>419.000	>97%	ca. 12,84 Tkm	99%



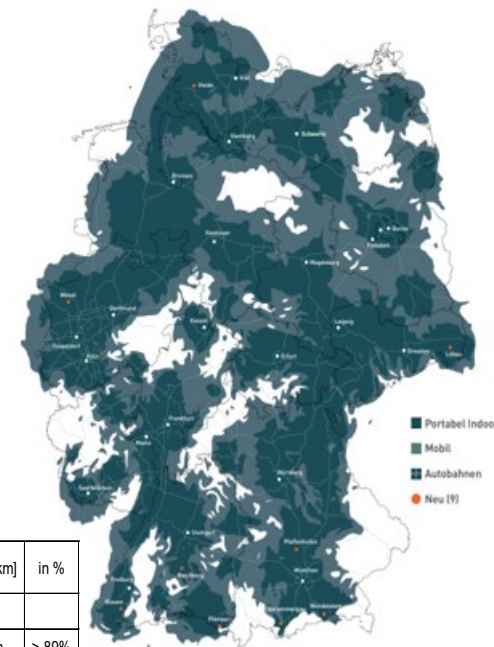
+5 sites in 2024

Further roll-out  
planned

+9 sites in 2024

MEDIA  
BROADCAST

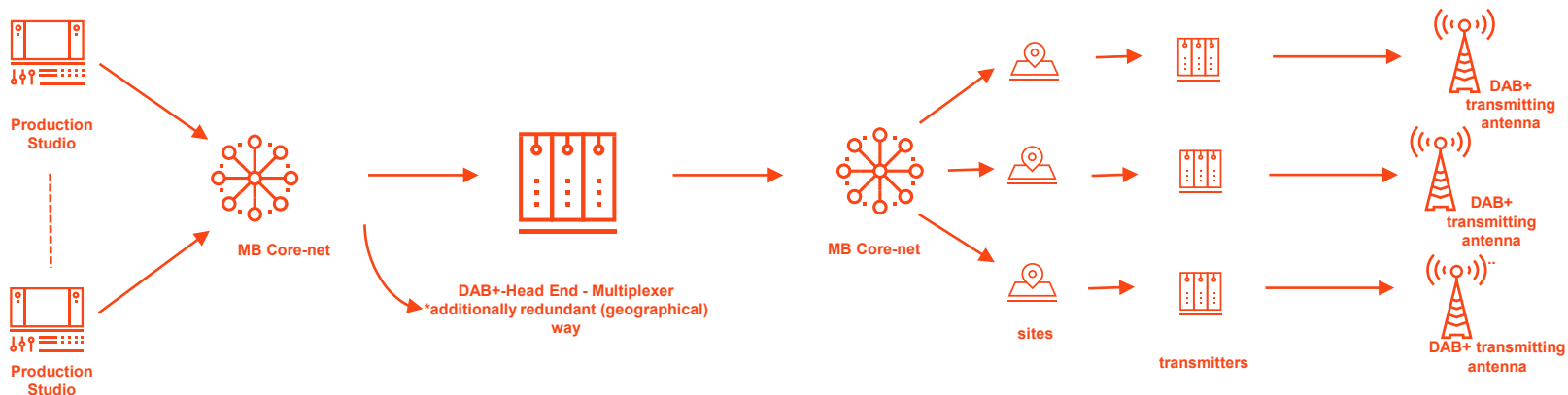
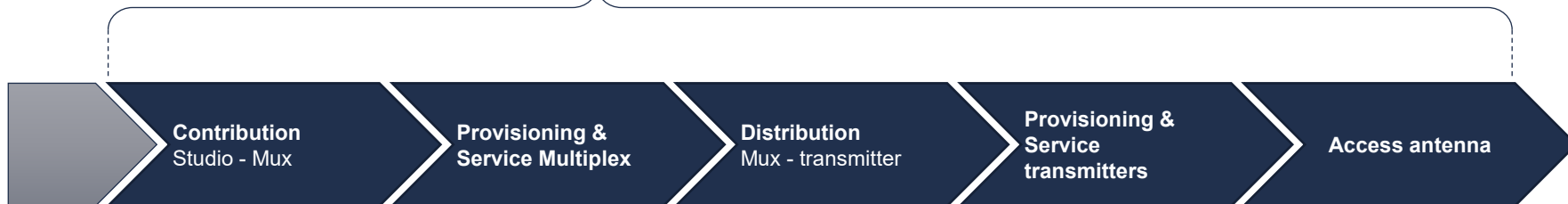
Second national Mux  
82 transmitters in 2023



2. Bmux	vers. Einwohner	in %	vers. Fläche [km <sup>2</sup> ]	in %	Autobahn [km]	in %
Portabel Indoor	> 55 Mio.	> 67%	> 180.000,00	> 47%		
Mobil	> 72 Mio.	> 87%	> 314.000,00	> 78%	> 11 Tkm	> 89%

# Service Level: Operational availability for DAB+ >99,99%

SLA availability:  $\approx 99,8\%$



Network operation (NOC), monitoring, service, trouble tickets & incident communication



# NOC - Application OSS

## Facts & Figures

### Line-up

- 1st level support
  - for troubleshooting and incidents in 3-shift-operations (24/7) in early-, late- night-shifts, >15 FTE
- 2nd level support
  - for incident analytics in 2-shift operations from 6:00 am to 11:00 pm, 16 FTE
- Service desk for fault hotlines in 2-shift operations from 7:00 am to 9:30 pm, 4 FTE
- Allocation of the monitoring in the single service areas such as core net/backbone and transmitters/antenna

### KPIs

- Call solutions (per month)
  - approx. 4.000
- Incidents (per month)
  - approx. 3.200
- Hotlines reachability
  - approx. > 97% (within 30 sec)
- Monitored components
  - approx. 26.800 (for about 400 customers)
- Monitored services
  - approx. 96.000
- Monitored sites
  - approx. 2.600

### Staff qualifications

- Cisco CCNA/CCNP
- ITIL Foundation, Service Transition, Service Operation
- Health and safety measures
- Training and qualification to vendor specifications
- Ongoing training of internal processes

### Consistent quality loops with providers and customers

- Deutsche Telekom, Versatel, Deutschlandradio / NDR / SWR / MDR / WDR (...) / Absolut Group, ffh (...), Vodafone, et cetera...

# Tasks

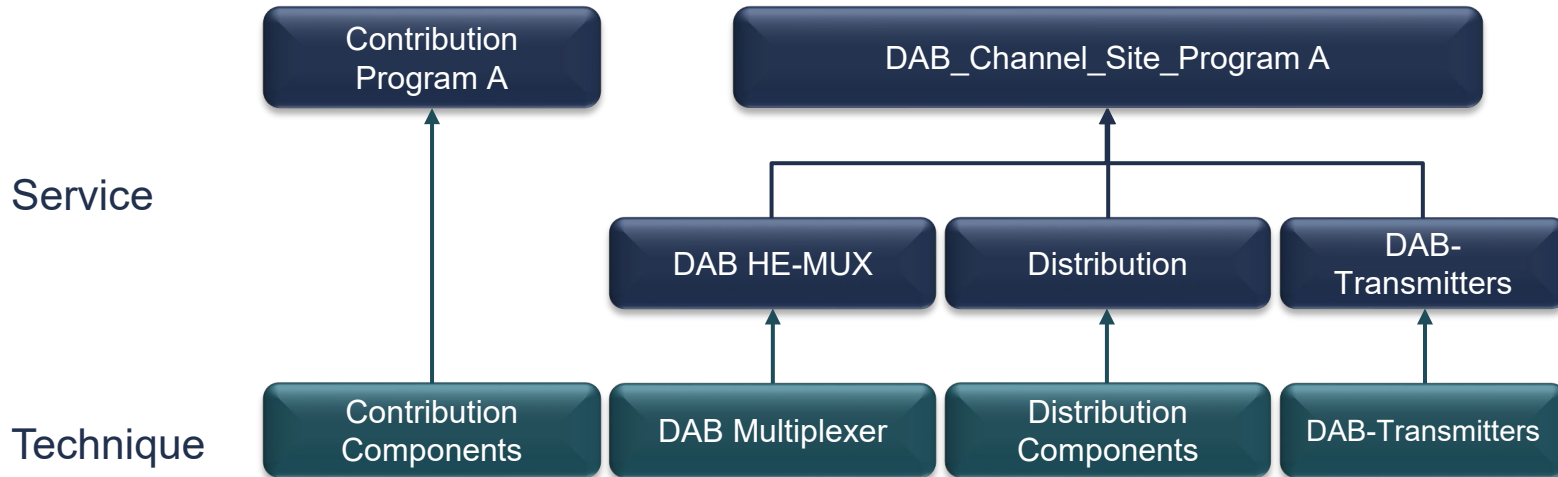
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- Service oriented network management for (national) automated remote monitoring...
- ...as for business-critical contribution & distribution lines (Disnet), regional networks, headends, Freenet TV, the entire terrestrial infrastructure (DAB+ and DVB-T2) as well as directional radio, FM etc.
- Reception, analysis and qualification of faults according to operational-/business and customer relevance
- Incident- and problem management according to defined guidelines (ITIL)
- Understanding of critical situations, starting promptly internal escalation- and communication ways
- Documentation of affected products and components in our TTS-system
- Draw-up „fault-clearance-orders“ to the service professionals and follow-up
- Ongoing communication with the customer (information flow – initial, intermediate, closing)
- Customer complaint management



## DAB Service Model

- Service Model for the evaluation of the service status
- Service Model provides information/overview of all relevant components of the production line including their respective critical elements as well as complete documentation
- That means: Monitoring of contribution, head-end, distribution and transmitter/antenna of every single program for every single site



# Services in the NOC / UFM

Every single component in the production process is displayed – including redundant components

USIN 2-NRBC 5  
E101500  
0000000000001748428

HLES 63-GEYR 1  
E10001  
000000000001740453

HMBG 20-STSD 0  
E10001 DABMV  
000000000001748508

USIN 2-MZKA 1  
E101500  
000000000001748428

USIN 2-SYLT 0  
E101500  
000000000001751175

BREM406-SFFD 2  
E101003 DABRB  
000000000001748380

HMBG 20-GHDR 2  
E101001 DABNDS  
000000000001740723

USIN 2-ASTT 1  
E101500  
000000000001748495

USIN 2-BTH 1  
E101500  
000000000001748402

USIN 2-OTMD 3  
E101500  
000000000001748448

BREM 38-BREM 38  
E101700  
000000000001748353

BREM 38-SFFD 2  
E101700  
000000000001750358

BREM406-BREM 38  
E101003 DABRB  
000000000001741271

BRLN 0-AZDF 3  
E10120  
000000000001748497

BRLN 0-BRLN 501  
E10120  
000000000001748495

BRLN 0-BRLN 501  
E101700  
000000000001748493

BRLN 0-CALU 2  
E10120  
000000000001748496

Ausgewählt: 0 Ressourcen: 13 Beziehungen: 12 Gefiltert: 0

13.02.20 17:40:5

**Ereignisanzeige**

BSM\_ServiceName:000000000001748428

Plattform	O	Endstelle	Netzelement	Anzahl	Erster Alarm	Letzter Alarm	Meldungstext	TT id	TT Status	Benutzername
UFM	K	MZKA 1:5400	VS101-3-AC-1348_3_OUTPUT2	1	29.12.19, 14:07	29.12.19, 14:07	Flow A Loss - Output 2			
UFM	K	MZKA 1:5400	VS101-3-AC-1348_3_OUTPUT2	1	29.12.19, 14:07	29.12.19, 14:07	Output Loss - Output 2			

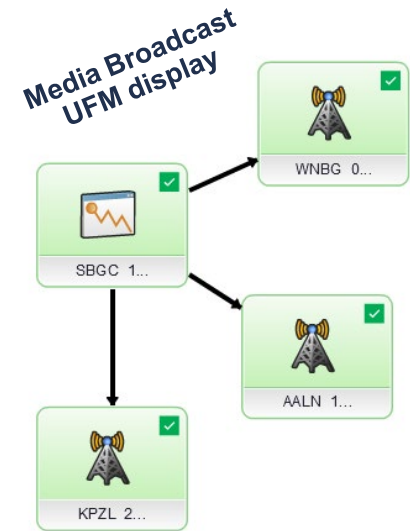
Component	Monitoring-parameter
Encoder/Decoder	Input Signal
Encoder/Decoder	Network Port: link up/down
Router/Switch	Network Port: link up/down
DAB HE-Multiplexer	Input Signal Program
DAB HE-Multiplexer	Output Signal Multiplex
Redundancy Switches	Input Signal
Redundancy Switches	Switch Setting
DAB-Transmitter	Input Signal
DAB-Transmitter	Broadcast Signal Status

# Monitoring synchronisation and signal quality with monitoring receivers in the coverage area

Each transmitter is monitored.  
Any deviation from the set value is signalled.



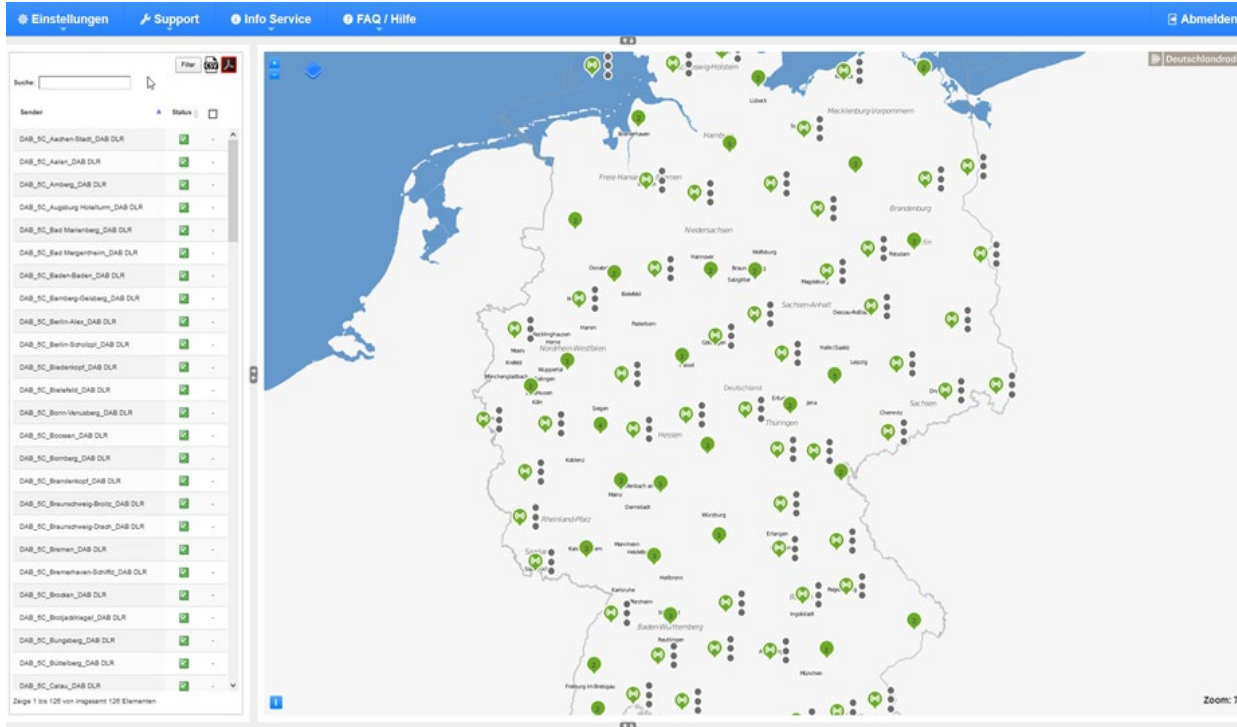
Example of live reception of 8 DAB transmitters (timing and signal level)



Example of a network with 3 transmitters and a monitoring receiver (edge probes)

-> Frequency faults (SFN) are detected and signalise immediately

# The „Netzwerkmonitor“



Customers can check the status of each single site in terms of:

- Contribution
- Head-End (Multiplexer)
- Distribution
- Transmitter

...green „everything is fine“,  
red means „no signal“



## contact:

[christian.werner@media-broadcast.com](mailto:christian.werner@media-broadcast.com)

## Lets stay connected



[media-broadcast.com](https://www.media-broadcast.com)



# BACKUP DAB+ Service Monitoring

# Web ticket

**MEDIA BROADCAST**

Web-Ticket

Startseite  
Hilfe  
Logout

Überblick

offene Tickets  
Ticketarchiv

Neues Ticket

anlegen

**vorhandene Tickets - geöffnet**

Ticket-ID	Beginn	Produkt-Name	Produkt-Nr.	Ticket-Status
K20200100592	30.01.2020 00:00:00	KOLN	0000000000017409	in Bearbeitung
K20200100592	30.01.2020 00:00:00	KOLN	0000000000017409	in Bearbeitung
K20200100592	30.01.2020 00:00:00	KOLN	0000000000017498	in Bearbeitung
K20200100592	30.01.2020 00:00:00	KOLN	0000000000017409	in Bearbeitung
K20200100592	30.01.2020 00:00:00	KOLN	0000000000017409	in Bearbeitung
K20200100592	30.01.2020 00:00:00	KOLN	0000000000017498	in Bearbeitung
K20200100575	16.01.2020 05:33:00	KOLN	0000000000017498	in Bearbeitung
K20200100441	14.01.2020 04:23:40	KOLN	1 0000000000017498	in Bearbeitung
K20200100427	13.01.2020 14:23:45	KOLN	0000000000017498	in Bearbeitung

**Allgemeine Angaben**

Ticket-ID: K202001004-  
KundenTicket-ID: gemeldet von:  
Beginn: 13.01.2020 14:23:45 Ende:  
Schadensbild: Eingeschränkte Betriebssicherheit  
Störursache: Fehler Kunde  
Problembeschreibung:

**Produktdaten**

Produkt-Nr.: 0000000000017498 Produkt-Name: KOLN  
Objektart:

**Kundeninformation**

Zeitstempel	Versendart, Meldetext
13.01.2020 14:28:55	
13.01.2020 21:29:26	E-Mail weiterhin Port den Kunden an der Endstelle Düsseldorf 10 Down, bitte überprüfen Sie Ihr daran angesch
14.01.2020 08:31:58	E-Mail Port immer noch down. Bitte überprüfen Sie ihr Equipment.

**Abgestimmte Zeit**

Beginn: Ende: Bewertung: %

## Ticket creation & investigation (TTS)

- Client structure:  
A single ticket can be created/filtered for each customer/sub-customer.

## Fully automated TTS

- For each incident/fault, a ticket is automatically created and delivered to the affected customer

# Contact

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