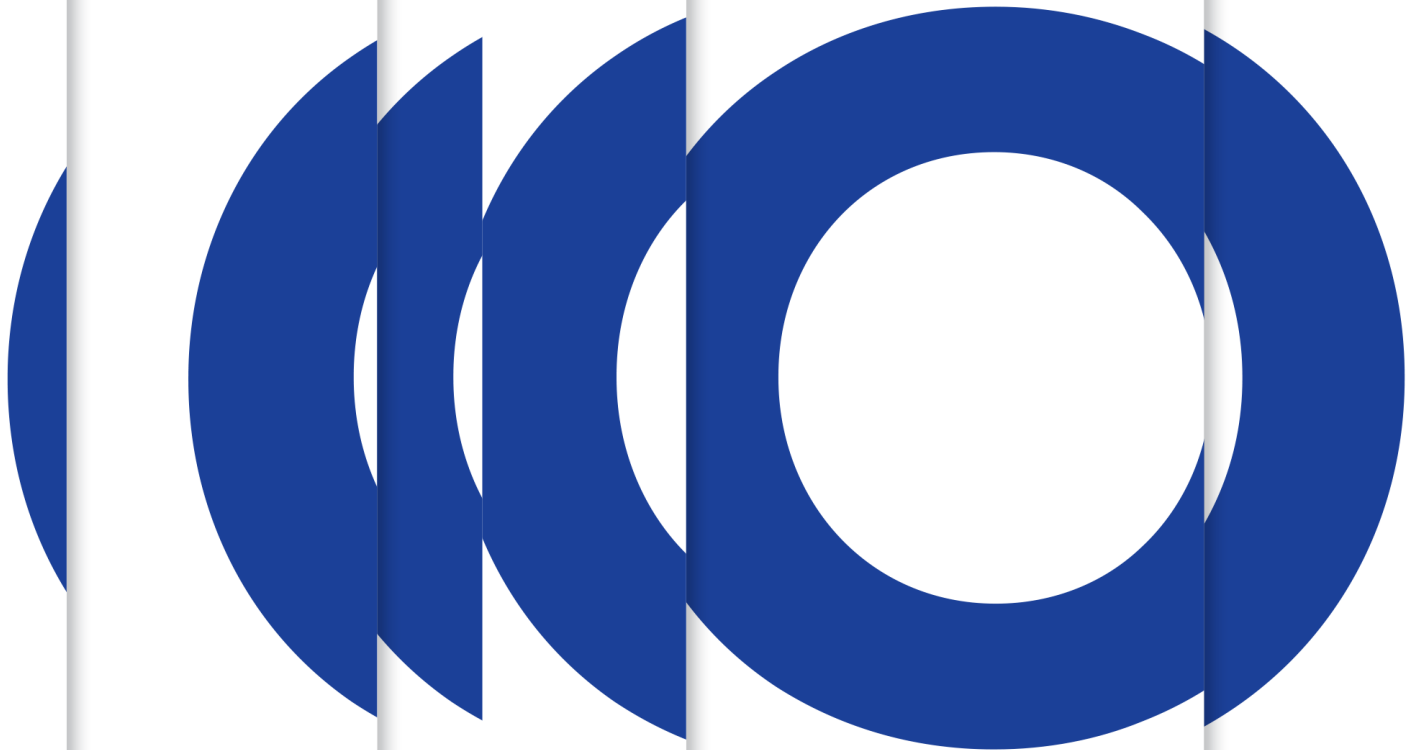


EBU

OPERATING EUROVISION AND EURORADIO



DAB+ TECHNICAL OVERVIEW

BENJAMIN POOR, PROJECT MANAGER DIGITAL RADIO
12TH APRIL 2018

01 OVERVIEW

DIGITAL RADIO

02 CORE FEATURES

BENEFITS OF DAB+ FOR DIGITIZATION

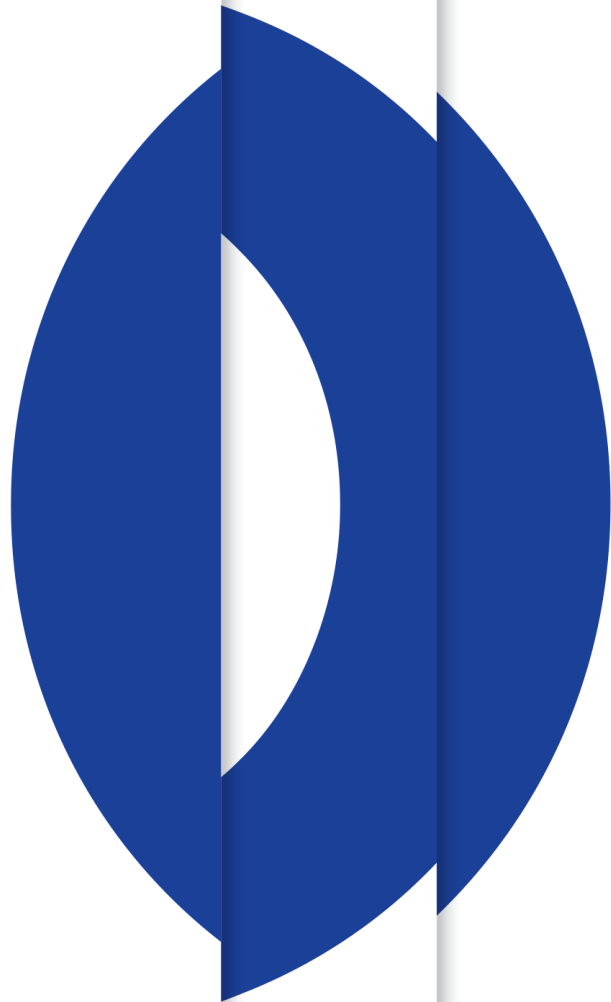
03 ADDITIONAL FEATURES

DATA SERVICES BEYOND AUDIO

04 EBU DIGITAL RADIO ACTIVITIES

RECOMMENDATIONS, EVENTS, PROJECTS

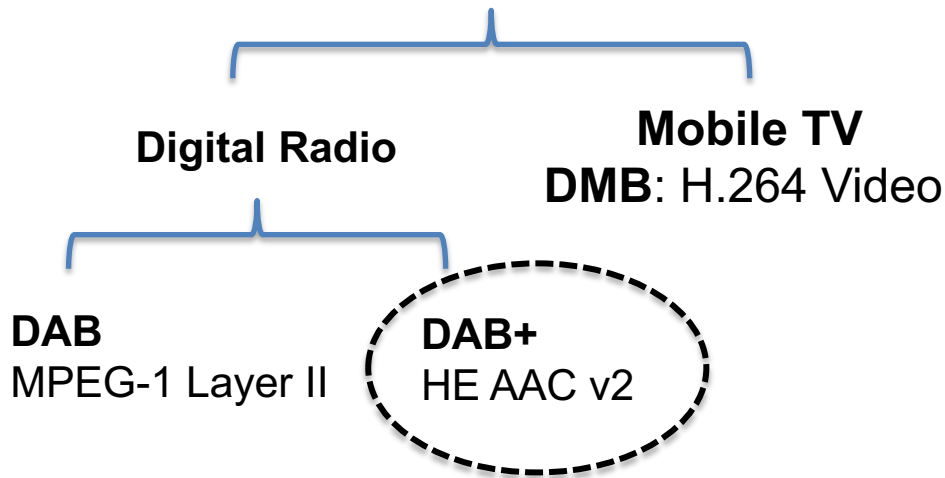
OVERVIEW



THE DAB “FAMILY”

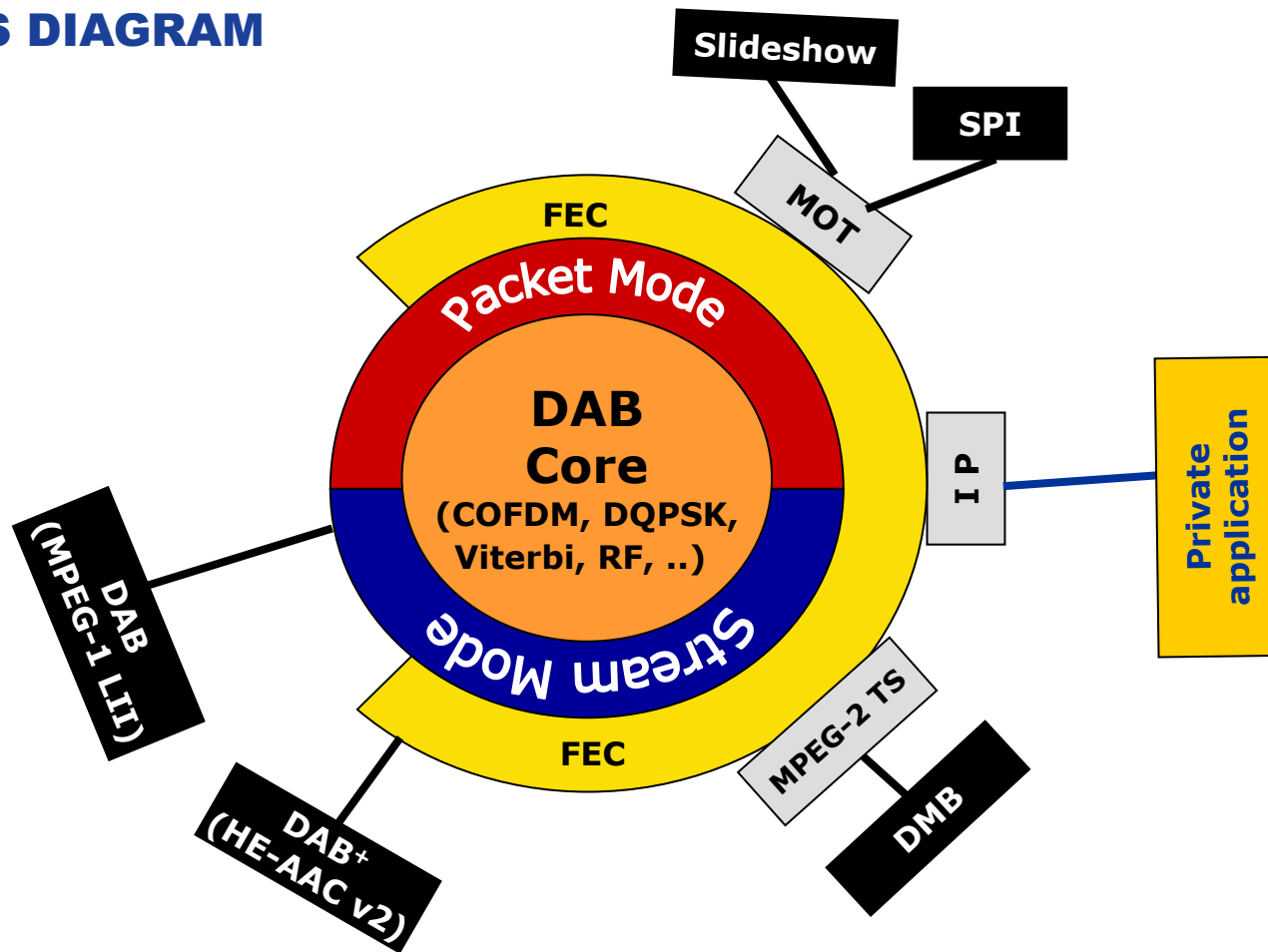
A set of complementary technologies that are based on the same underlying core.

DAB Family



- **Open, Mature** Digital radio standards with a host of additional features
- **Flexible**, giving broadcasters and regulators choices about how broadcast services should be delivered
- **Robust** in all environments; delivering content reliably to mobile, portable and fixed receivers

DAB SYSTEMS DIAGRAM



BROADCAST EVOLUTION



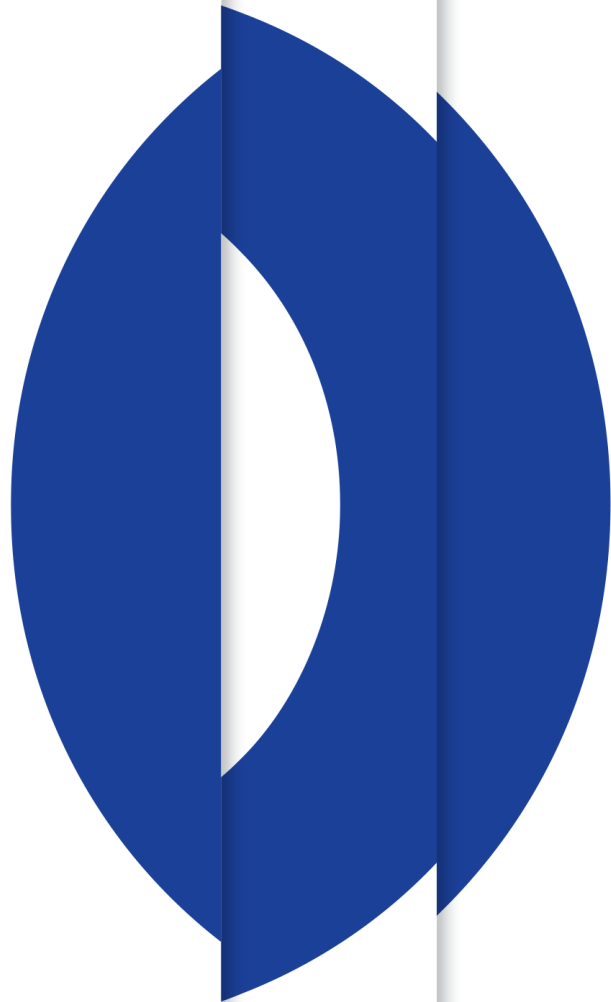
BBC Radio 3
usic from the BB



DAB FAMILY KEY FEATURES

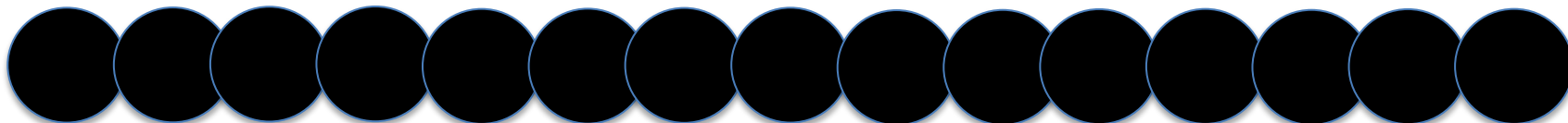
- Designed for robust mobile reception, particularly important for automotive listening
- Uses Band III spectrum – 174 MHz to 240 MHz.
- Wideband technology arranges a number of services in a multiplex, each typically delivering around 1.2Mbps of total bandwidth.
- Possibilities for additional multimedia and data services, including mobile TV.

CORE FEATURES



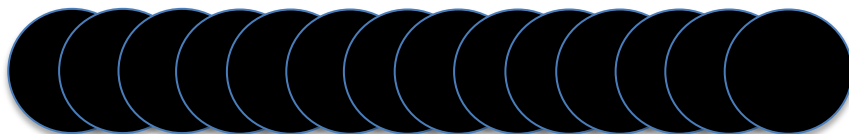
SPECTRUM EFFICIENCY

Analogue Radio (AM/FM)



15 radio stations = 15 frequencies used (min. total 3 MHz w/200 KHz separation)

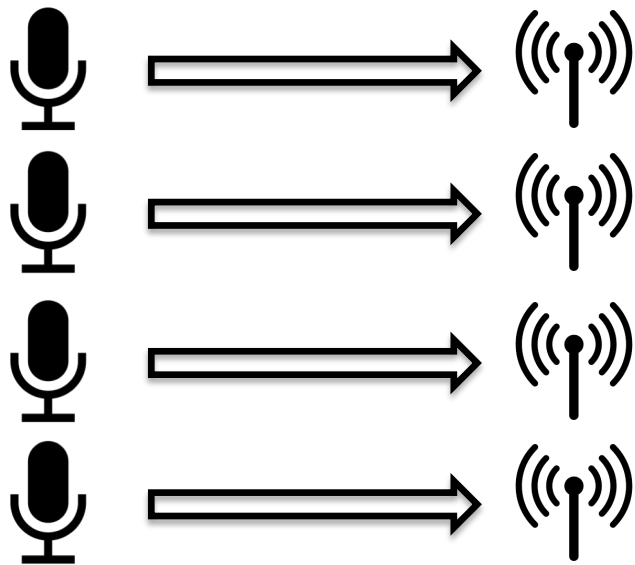
Digital Radio



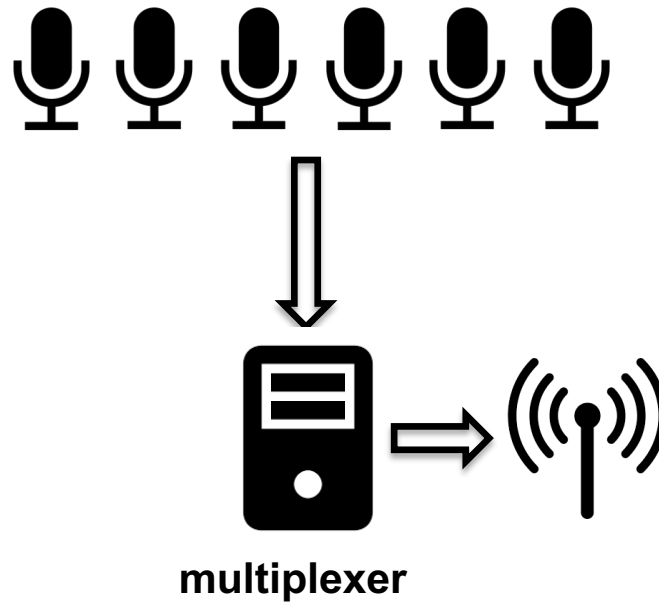
15 radio stations = 1 frequency used
(multiplex bandwidth 1.536 MHz)

DISTRIBUTION

Analogue Radio (AM/FM)



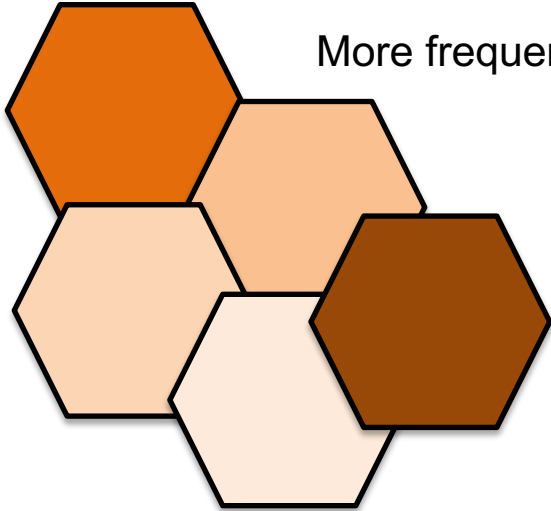
Digital Radio (DAB+)



SINGLE FREQUENCY NETWORKS

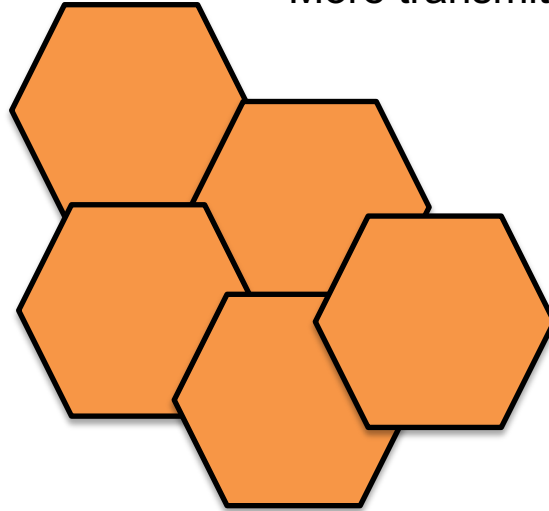
Analogue Radio (AM/FM)

More coverage =
More transmitters +
More frequencies



SFN: Digital Radio (DAB+)

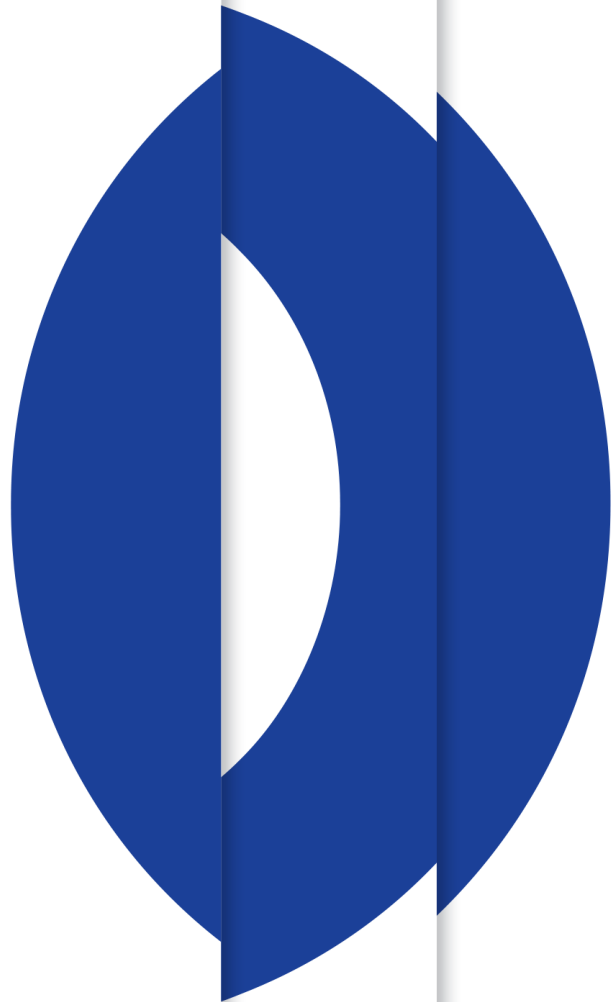
More coverage =
More transmitters only



MUTIPLEXING – SERVICE FLEXIBILITY

- Fast Information Channel (FIC) carries information about the entire ensemble
- Multiplex can reconfigure quickly and reliably, enabling rapid:
 - Station name and information updates
 - New stations (e.g. “popup” or temporary stations)
 - Emergency Channels
 - Variable bitrates
- Audio, Data components can be shared between services, either permanently or temporarily

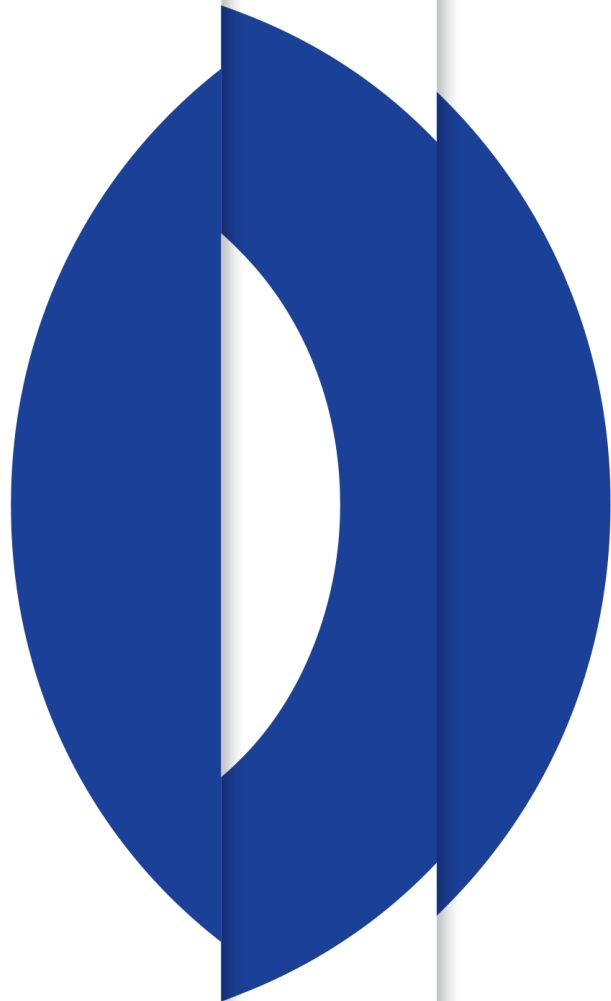
ADDITIONAL SERVICES



ADDITIONAL SERVICES – AT A GLANCE

- **Slideshow:** Dynamic images, either running as part of a carousel or triggered alongside audio content (e.g. current song, current show, advert)
- **Service and Programme Information:** Forward and Backward programme information, station logos and branding, descriptions
- **Traffic and Travel:** TPEG delivers traffic, incident, condition information
- **Emergency Warning:** Possibility to trigger devices to receive emergency broadcasts, show slides, scroll messages
- **Private Applications:** Carriage of arbitrary data – “bandwidth as a service”, e.g. bus stop information, OTA update for automotive information

EBU ACTIVITIES



EBU RECOMMENDATION ON DIGITAL RADIO DEPLOYMENT – R138



- **Recommends** DAB+ in VHF Band III
- **Recommends** Digitization of radio with additional features (dynamic text, visuals, information)
- **Recommends** Additional IP-delivered hybrid services using RadioDNS

<https://tech.ebu.ch/docs/r/r138.pdf>

DIGITAL RADIO WEEK – FEBRUARY, GENEVA

Range of events:

- EBU members and others
- Industry meetings
- Open Hackathon
- Workshops (this year – Radio Archives)
- 2019 – STREAMED ONLINE



LOW-COST DAB+

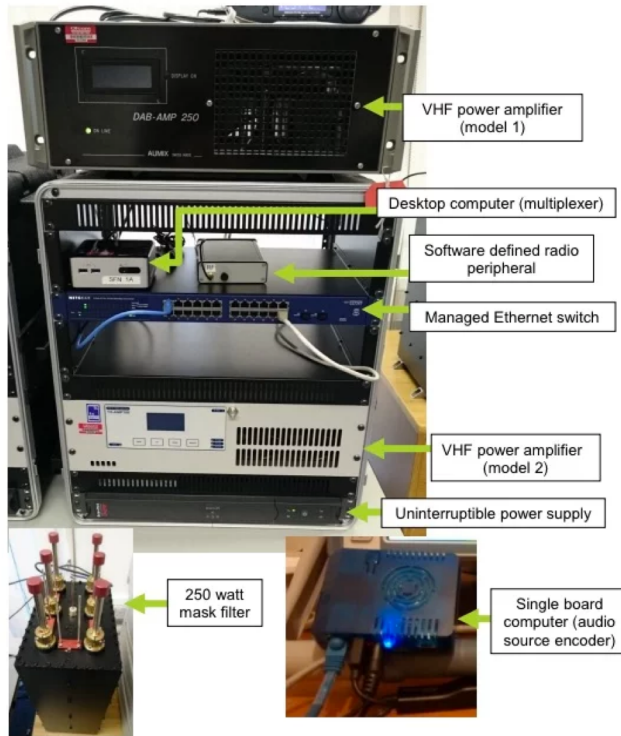


Figure 1: Trial transmitter equipment – main components

- Majority commodity hardware and freely-available opensource software
- Used in small-scale trials in UK, Poland, Germany, France, Denmark and for commercial services in Switzerland.
- Mature, community developed. Provides a wide range of additional functions.
- Can be used for 24/7 services, SFN
- Contribution, transmitter link, backup possible using consumer broadband
- Opensource – if you want to add a feature, you can!

Image © theregister.co.uk

Opensource software: <http://www.opendigitalradio.org>

THANK YOU

POOR@EBU.CH

