

# Digital Audio Broadcasting in the UK

ITU Conference

28 June 2021

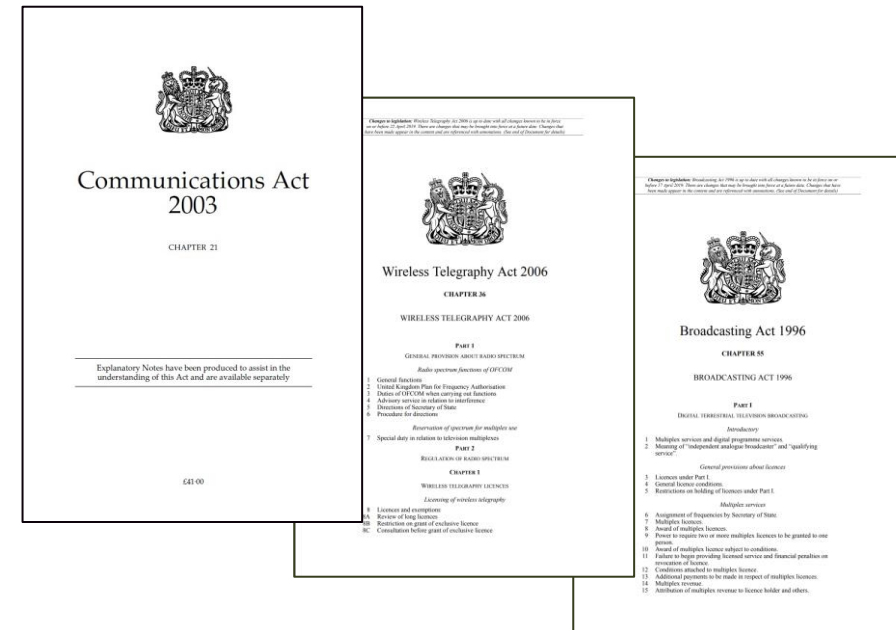
# Agenda

1. Background
2. System Characteristics of DAB family/DAB+ vs. FM
3. An overview of DAB standard and spectrum use
4. Digital Radio licensing approach and take-up
5. DAB coverage
6. Technical Specifications of DAB receivers

# 1. Background

# About Ofcom

- Ofcom is the regulator for the communications services
- We make sure people get the best from their broadband, home phone and mobile services, as well as keeping an eye on TV and radio.
- We also oversee the universal postal service, which means Royal Mail must deliver and collect letters six days a week, and parcels five days a week, at an affordable and uniform price throughout the UK.
- We look after the airwaves used by wireless devices like cordless phones, walkie talkies and even some car keys and doorbells.
- We also help to make sure people don't get scammed and are protected from bad practices. This is particularly important for vulnerable or older people.
- Our duties come from Parliament. Our priority is to look after UK citizens and consumers, and we sometimes do this by promoting competition among companies we regulate.



## UK statistics

- **Four nations:** England, Northern Ireland, Scotland and Wales
- **Population: 66.8 million** (January 2021, UK Office of National Statistics)
- **Land area:** approximately 250,000 km<sup>2</sup> (95,000 sq. miles)
- **Position:** between 50°N to 61°N and 2°E to 8°W



## 2. System Characteristics of DAB family/DAB+ vs. FM

# DAB vs FM characteristics

High level comparison

	FM	DAB/DAB+
Carrier system	Single carrier	1,536 carriers
Frequency band	88 - 108 MHz	174 - 230MHz
Bandwidth	c. 300 kHz	1.5 MHz
Modulation	Frequency Modulation	Coded Orthogonal Frequency Division Multiplex (COFDM)
Number of programme services	1	10-15 (DAB) 20+ (DAB+)

# DAB vs FM characteristics – field strengths

## FM

Minimum field strength <sup>[1]</sup>	Environment	FM coverage type	Assumptions
54 dBµV/m	Rooftop aerial	Stereo	Receiver antenna directivity (as per ITU Rec. BS 599) Protected from interference for both 50% and 5% time conditions
	Indoor portable	Robust mono	No antenna directivity Protected from interference for both 50% and 5% time conditions
48 dBµV/m	Indoor portable	Variable mono	No antenna directivity Protected from interference for both 50% and 5% time conditions
	In-vehicle	Robust mono	No antenna directivity Protected from interference for both 50% and 5% time conditions

<sup>[1]</sup> At 10m above ground level in the absence of interference and calculated for 50% time propagation conditions.

## DAB

Environment	Coverage type	Equivalent field strength dB(µV/m) measured at 10m above ground level	
		Rural & suburban	Dense urban
Indoor portable	Robust service	68	75
	Useable service	62	70
In-vehicle	Robust Service	54	

All field strengths are at 10m height for 99% time availability

Location availability:

- 95% for robust indoor
- 80% for useable indoor
- 99% for in-vehicle

Based on 4dB location standard deviation

Further information available at [https://www.ofcom.org.uk/data/assets/pdf\\_file/0020/37190/dab\\_statement.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0020/37190/dab_statement.pdf)



### 3. An overview of DAB standard and Spectrum use

## Relevant standards

*ETSI EN 300 401 Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to Mobile, Portable and Fixed receivers.*

*ETSI TS 101 756 Digital Audio Broadcasting (DAB); Registered Tables.*

*ETSI TS 102 563 Digital Audio Broadcasting (DAB); Transport of Advanced Audio Coding (AAC) audio.*

*ETSI TR 101 496 Digital Audio Broadcasting (DAB); Guidelines and rules for implementation and operation; (Parts 1 and 2).*

*ETSI 300 384 Radio broadcasting systems; Very High Frequency (VHF), frequency modulated, sound broadcasting transmitters*

*BS EN 62104:2007 Characteristics of DAB Receivers.*

*ETSI TS 103 176 Digital Audio Broadcasting (DAB); Rules of implementation; Service information features*

*ETSI standards are available, free of charge, from [www.etsi.org](http://www.etsi.org).*

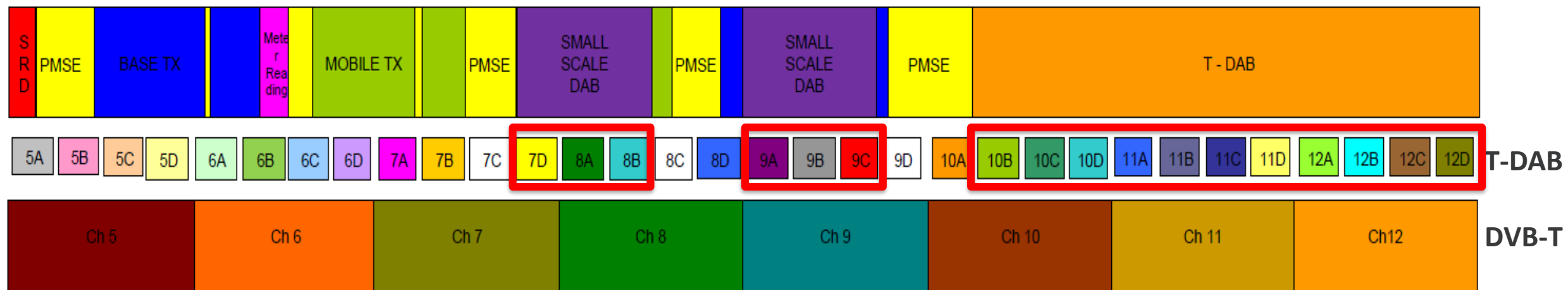
## DAB features

- Multi carrier system – resistant to multipath fading
- Choice of audio codecs MPEG1 Layer II (DAB) or MPEG-4 HE-AAC (DAB+)
- Choice of error protection levels – Level 1 (most robust) to Layer (least robust).
- 1.184 Mbit/s net capacity (for Level 3 protection as used in the UK)
- Can use single frequency networks
- Ability to carry flexible content – audio, video, EPG, slideshow, other data
- Programme services share multiplexing and transmission infrastructure - multiplex operator has a controlling role

# UK Spectrum plan for Band III (174 – 230 MHz)

174 MHz

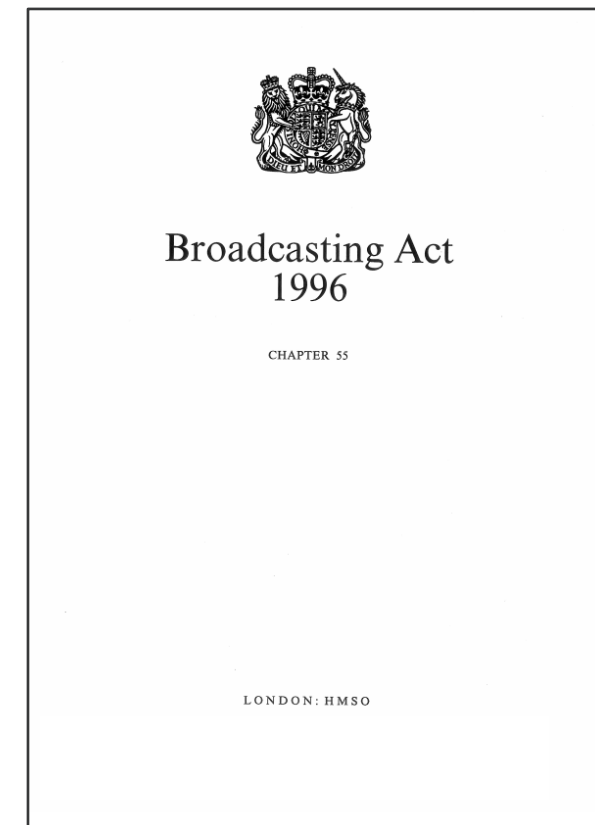
230 MHz



## 4. Licensing approach

## Licensing approach in UK

- Broadcasting legislation made by UK Parliament
- DAB radio services are licensed under the Broadcasting Act 1996
- Separate licences for DAB radio multiplexes and for Programme Services
- Multiplexes are advertised and selected by comparative selection process based on how well they meet the criteria set out in the legislation
- Sound programme services are available on demand, so long as applicants are not disqualified (eg criminals and political parties cannot hold Broadcasting Act licences)



Further information on Broadcasting Act 1996 is available at:

[https://www.legislation.gov.uk/ukpga/1996/55/pdfs/ukpga\\_19960055\\_en.pdf](https://www.legislation.gov.uk/ukpga/1996/55/pdfs/ukpga_19960055_en.pdf)

Ofcom radio licensing information: <https://www.ofcom.org.uk/manage-your-licence/radio-broadcast-licensing/apply-for-a-radio-broadcast-licence>

## Current status

### **National multiplexes** (covering most of the UK)

- Three networks are on air (two commercial and one public)
- No further licences to be advertised

### **Local multiplexes** (can serve defined, fairly large areas – UK counties)

- 55 on air
- Three awarded and being built
- Licensing mostly completed

### **Small-scale DAB** (smaller than local multiplexes, serving towns or parts of cities)

- Licensing commenced in 2020
- 19 licences awarded, first expected on air in 2021
- Approximately 200 licences expected to be advertised up to 2024

## Digital take-up and the future

- Digital listening now accounts for around 58% of UK radio listening, DAB forms the majority of that figure (*Rajar March 2021*)
- DAB receiver penetration in UK households is 67% (*World DAB Q4 2020*)
- No date set for any switching off analogue radio
- Some broadcasters are choosing to switch off analogue (AM) services and migrate to DAB
- Government is carrying out a review of Radio and Audio – report expected during 2021



## 5. DAB coverage in the UK

## DAB coverage

- There are 3 UK-wide DAB multiplexes and 55 local multiplexes

		BBC UK-wide	Commercial		
			Digital One	Sound Digital	Local DAB
UK	Homes	97.4%	91.7%	82.6%	91.0%
	Major roads	87.4%	80.2%	72.6%	75.2%
<b>Transmitters</b>		<b>417</b>	<b>231</b>	<b>73</b>	<b>c. 450</b>

## Digital and analogue radio stations

Digital (DAB)	BBC UK-wide	UK commercial 92% coverage (Digital One)	UK commercial 83% coverage (Sound Digital)	Local commercial services
Number of multiplexes	1	1	1	55
Number of services	11	21	21	466

Analogue	AM	FM	AM/FM total
Local commercial	50	235	285
UK-wide commercial	2	1	3
BBC UK-wide networks	1	4	5
BBC local and nations	19	46	46
Community radio stations	24	273	297

Figures correct as of March 2020

## 6. Technical Specifications of DAB receivers

# Receiver specifications

## Government minimum receiver specification

- **Frequency range:** entire Band III frequency range
- **RF performance:** sensitivity and selectivity
- **DAB and DAB+:** Both must be supported and
- **Analogue radio services:** must be capable of receiving FM (unless receiver is specifically an adapter)
- **Functional specifications:** behaviour when retuning, text display



Further information available at: <https://www.gov.uk/government/publications/minimum-specifications-for-dab-and-dab-personal-and-domestic-digital-radio-receivers-digital-radio-action-plan-report>

## Digital Radio Tick Mark scheme

Radios that meet the Government's minimum receiver specification can apply to carry the Tick Mark

### Digital Radio Tick Mark for Products

The Digital Radio Tick Mark is a certification mark for digital radios that requires the radio to be tested and approved.

The Tick Mark gives you reassurance that the radio you are buying is an approved product which is future-ready.

It means the radio is able to receive FM, DAB, and DAB+ stations so you'll receive all the stations that are available at your address.

If you're buying a digital radio, either for in your home or in your car, look for the Digital Radio Tick Mark.

You'll find the digital tick on a wide range of products from leading manufacturers including Pure, Ruark, VQ, Sony, Philips and Panasonic.



**Thank you for your attention**

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