

Radio Broadcasting Systems: Digital Audio Broadcasting (DAB+) to mobile, portable and fixed receivers

Author:

Eng. Iván Rodríguez Portas

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GOAL

- Presentation of a **technical overview** and **main features** of the **DAB standards** family

OUTLINE

- DAB+ features.
- Technical Specifications.
 - Conceptual Block Diagram.
 - Transmission Frame.
- DAB+ service Structure.
- Conclusions

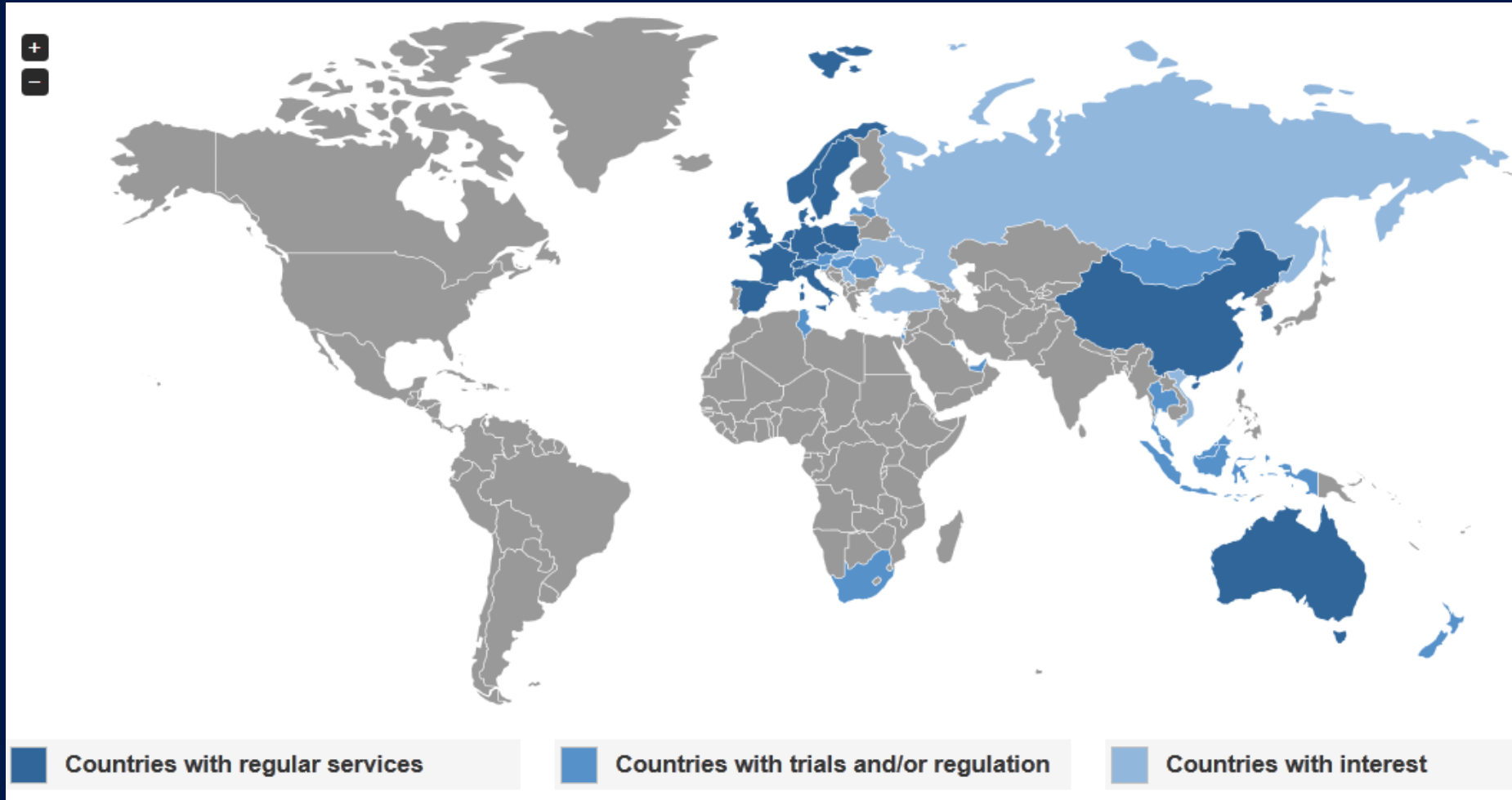
DAB STANDARDS FAMILY

- **DAB:** 1995 – Original audio with PAD and data services standard.
- **DAB+:** 2007 – Enhanced audio service efficiency.

ETSI Standard Documents

- **EN 300 401** – Main Document
- **TR 101 496-1, -2, -3** – Guidelines of use and operation
- **TS 102 563** – Transport of AAC audio

DAB/DAB+ COVERAGE



Source: <https://www.worlddb.org/country-information>

DAB+ FEATURES (1 of 5)

➤ Audio Coding Quality.

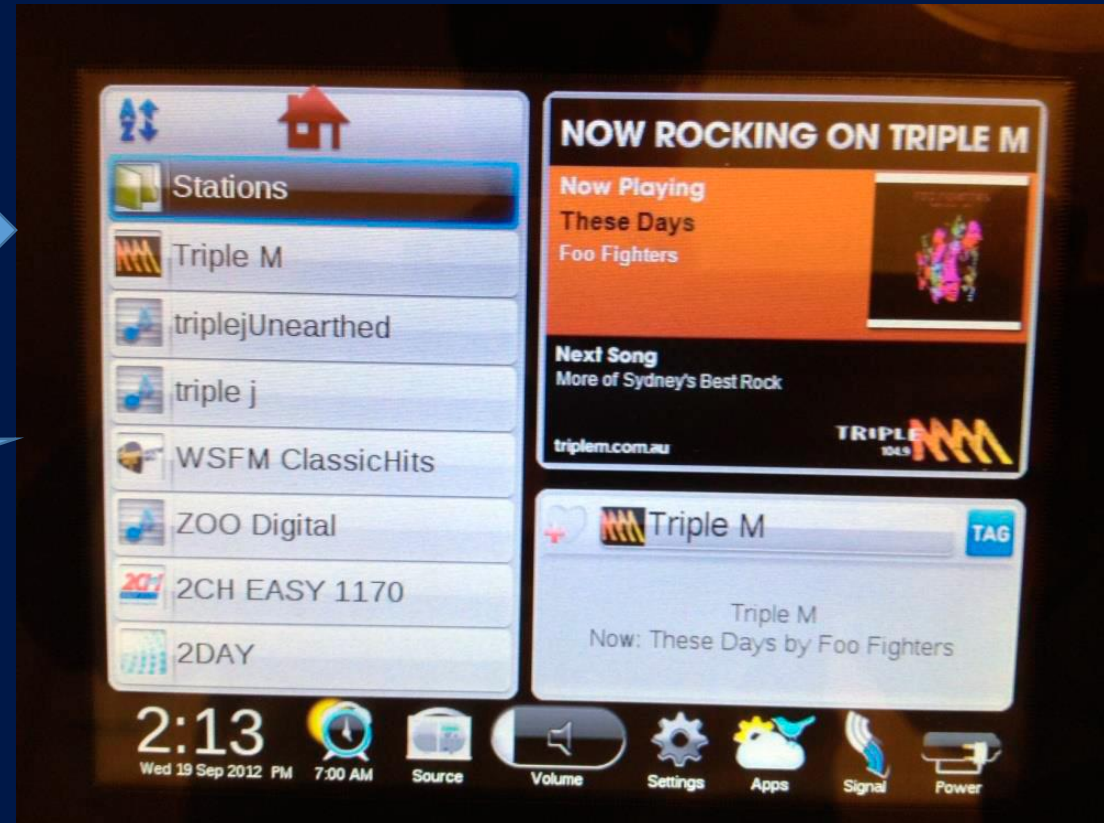
- DAB+ uses MPEG-4 High Efficiency AAC v2 profile (HE-AAC v2) audio codec.
- A 48 kbps subchannel with HE-AAC v2 provides a similar audio quality as MPEG Audio Layer II at 128 kbps.
- Up to 18 programs at 64 kbps in one ensemble.

DAB+ FEATURES (2 of 5)

- Choose the station from a list.

Station List

Easy to choose a station, listener has more information about the services available



DAB+ FEATURES (3 of 5)

- Program Associated Data (PAD): **Dynamic Label Segment – Text Delivery.**
 - Up to **128 characters** per text segment.
 - All DAB+ receivers have **DLS text display.**



DAB+ FEATURES (4 of 5)

- Program Associated Data (PAD): **Slideshow (SLS) Images.**
 - The **audio message** can be **strengthen.**
 - **Traffic** and **weather reports.**
 - **Sport results.**
 - **Local news, happenings, community events.**

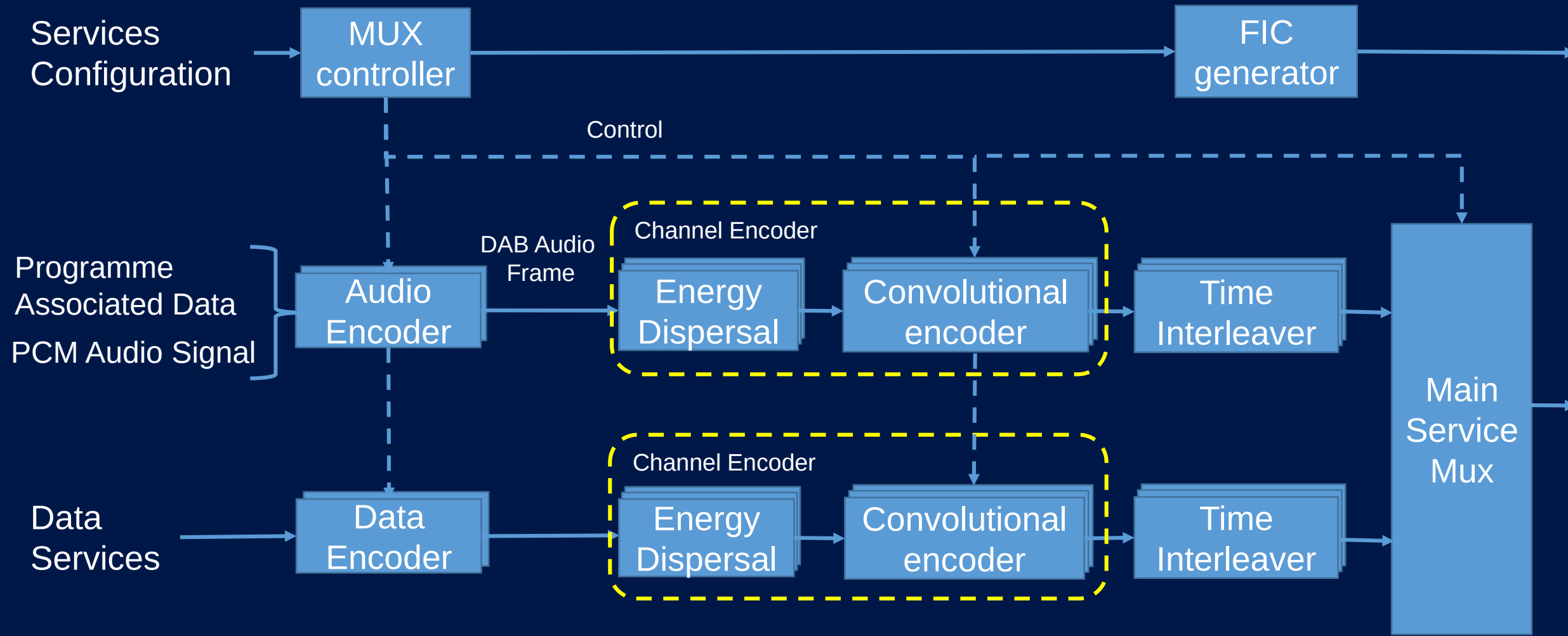
DAB+ FEATURES (5 of 5)

➤ Data Services: **Electronic Program Guide (EPG)**.

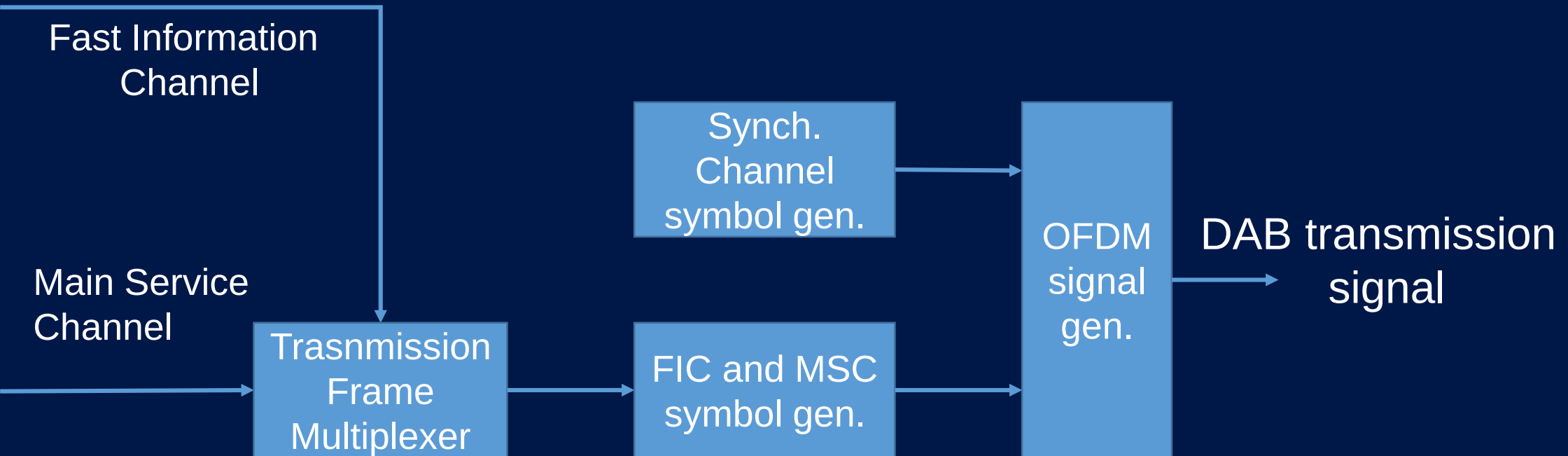
- Is **flexible**, can be station, network or ensemble based.
- Some receivers can **record programs** for later listening.



CONCEPTUAL DAB+ EMISSION BLOCK DIAGRAM

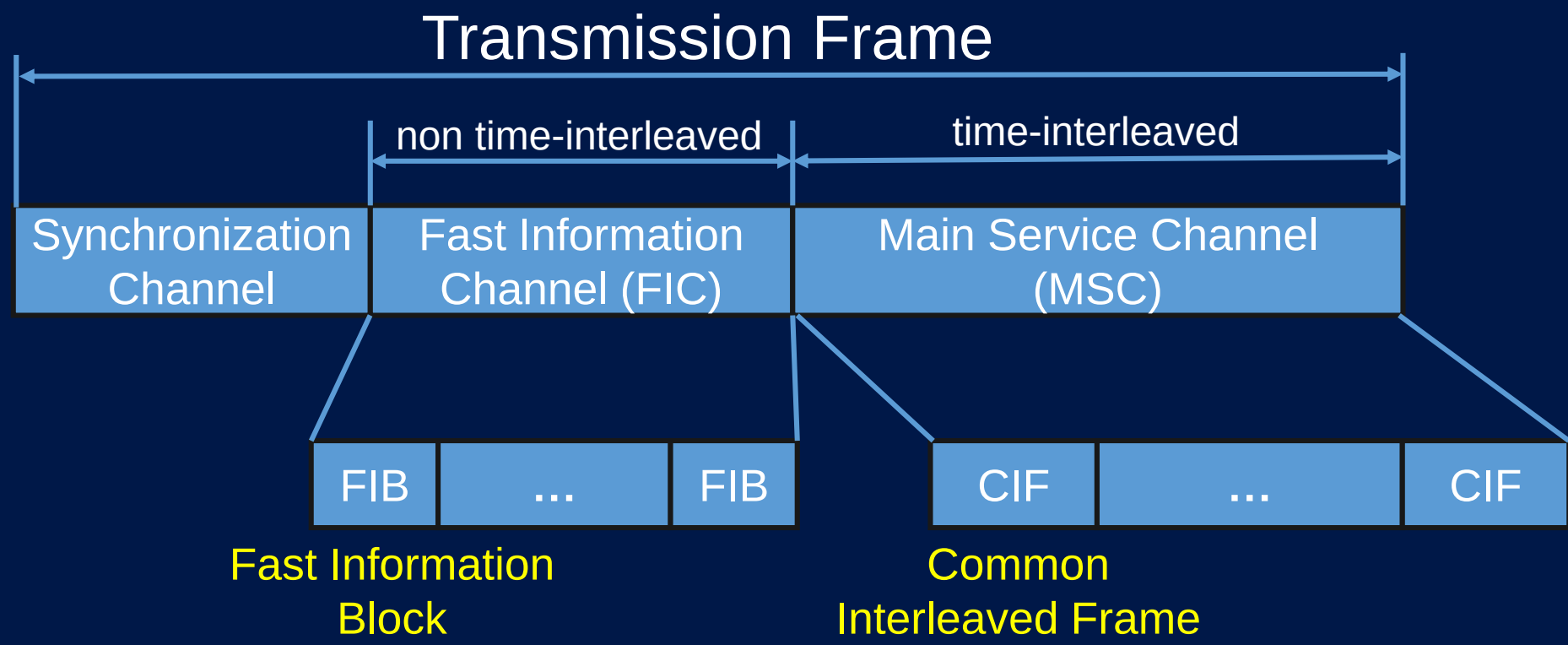


CONCEPTUAL DAB EMISSION BLOCK DIAGRAM



TRANSMISSION FRAME

The duration of the transmission frame depends of the transmission mode



TRANSMISSION MODES (1 of 2)

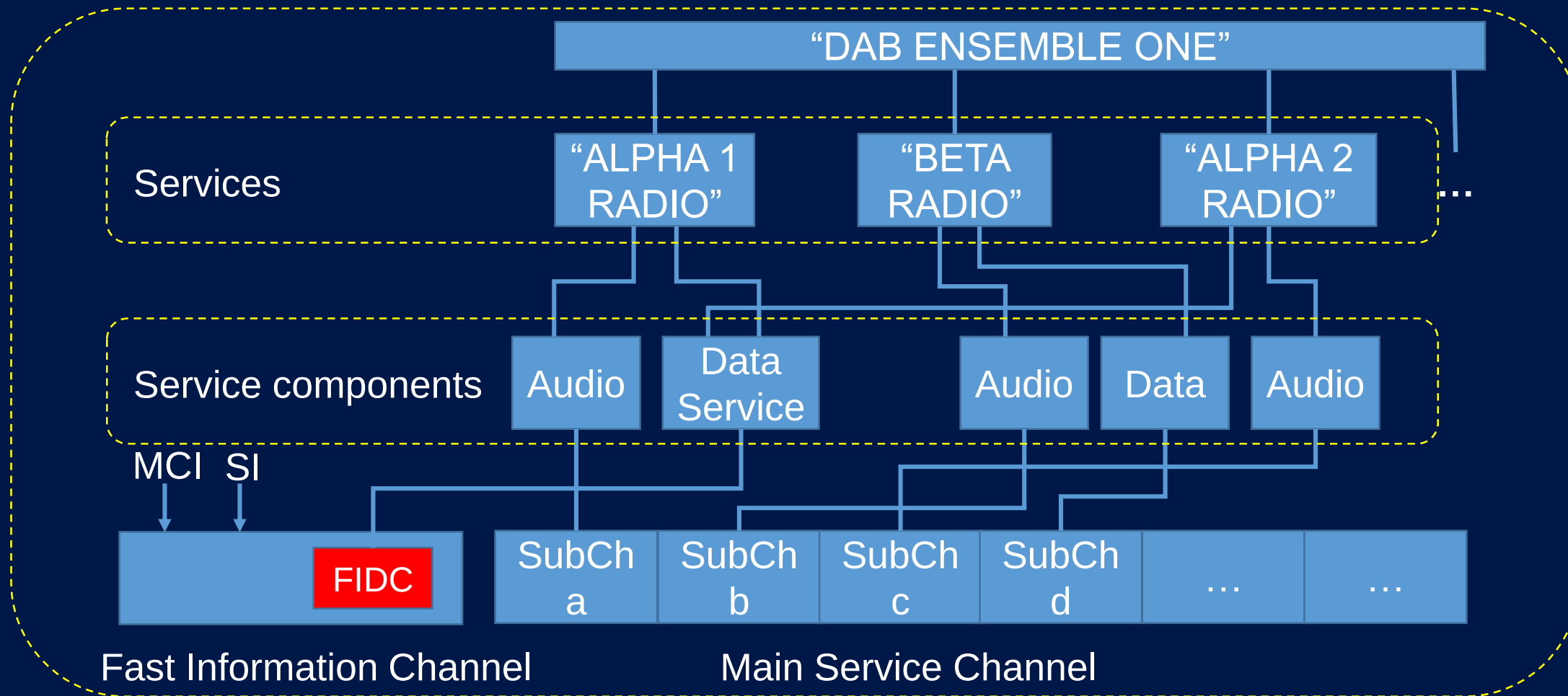
- **Transmission mode I**: intended for SFN in Bands I, II and III
- **Transmission mode II**: intended for local services in Bands I, II, III, IV, V and L-band
- **Transmission mode III**: intended for frequencies below 3 GHz and cable
- **Transmission mode IV**: intended for local services in Bands I, II, III, IV, V and L-band (for optimum SFN operation in L-band)

TRANSMISSION MODES (2 of 2)

- Transmission parameters that changes between transmission modes:
 - Number of carriers on the OFDM modulation.
 - Carriers spacing.
 - Symbol duration.
 - Symbol guard interval.

DAB+ SERVICE STRUCTURE

Ensemble



CONCLUSIONS

- DAB+ provides a variety of interesting features. This features may help to improve the audience of the radio broadcast service in our country.
- The DAB service multiplex is sufficiently flexible to provide a wide choice of service arrangements to suit programming needs.

BIBLIOGRAPHY

1. ETSI EN 300 401 V1.4.1 (2006-01). *European Standard (Telecommunications series) — Radio Broadcasting Systems: Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers.*
2. ETSI EN 300 563 V1.2.1 (2010-05). *Digital Audio Broadcasting (DAB); Transport of Advanced Audio Coding (AAC) audio.*
3. EBU Technical Review Spring 1994. *The DAB multiplex and system support features.* J.L. Riley.
4. 2011 Broadcast Fair Presentation. *El Nuevo plan de digitalización de la radiodifusión sonora terrestre y el DAB+ en España,* Fernando Almaraza Hernán-Pérez.



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