

# ABU RadioAsia DAB+ Workshop

## Technical Developments and Hybrid Radio

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Bangkok, 26 April 2017

# Technical developments

Adapted from Lindsay Cornell, Chair of WorldDAB Technical Committee presentation March 2017

# Technical Committee

- In the last year, the WorldDAB TC has discussed
  - Cleaning up the DAB standards
  - Developing the ETI library
  - Extending the reach of the DAB receiver “Tick Mark”
  - Automotive applications
  - Announcement handling
  - OMRI
  - ... and more!

## Technical Committee (TC)

The Technical Committee oversees the standardisation of Eureka 147, which is the basis for both DAB/DAB+ and DMB technology. It ensures that receiver equipment and broadcast technologies are compatible. The TC also upgrades and advances the standard in line with other technical developments. Finally, the Technical Committee looks to future-proof all DAB equipment (both receiver and broadcast based).



Chair:  
Lindsay Cornell

### Next Meeting

**56th TC meeting**  
7th - 8th June 2017  
Zurich, Switzerland

[All meetings...](#)

### Task Forces

There are currently four Task Forces active in this committee.

- [TF Clean](#)
- [Announcements](#)
- [ETI Files](#)
- [OMRI](#)

### Members

This committee has 140 members

### Mailing List

[tc@lists.worlddab.org](mailto:tc@lists.worlddab.org)

[View archive...](#)

# ETSI EN 300 401 V2.1.1 standard

- DAB audio coding has its own spec, just like DAB+
- The signalling has been streamlined by deleting unused elements and simplifying some complex parts
- The unused transmission modes (for satellite, L-band) have been removed
- Additional rules and guidance have been added to formalise existing practice and enhance consistency

Draft ETSI EN 300 401 V2.1.1 (2016-10)



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

## What it means...

- All existing transmissions and receivers already conform to the new standard, but updated software will allow additional benefits in the future
  - The standard is **completely backwards compatible**
  - The standard allows future developments



# Applying experience

- WorldDAB has taken stock of the whole standards base for DAB
  - Network interfaces
  - Data transport and applications
  - Rules of behaviour
- New “Guide to standards” approved for ETSI process
- Many specs developed in the early years but never used have been reclassified as “Historical”



Digital Audio Broadcasting (DAB);  
Rules of implementation;  
Service information features

## ETI Library

- WorldDAB has offered an ETI Library to its members for several years
- Efforts have begun to update this facility
  - Make it easier and quicker to upload files
  - Provide standard analysis to generate more metadata
- Helps manufacturers try out new products and services



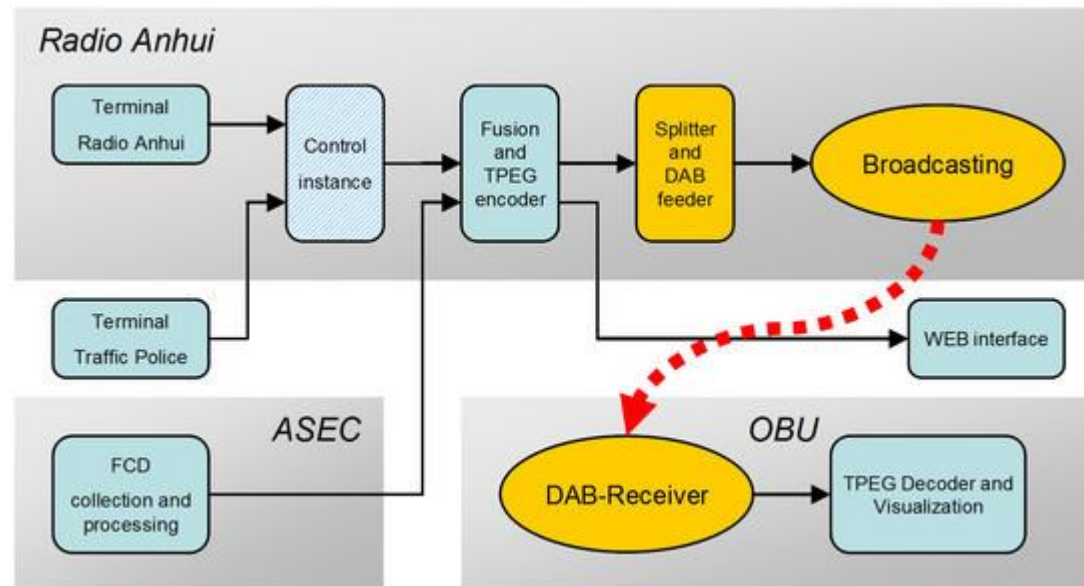
## Receiver “Tick Mark”

- UK had developed a set of tests for receivers to show they were “digital switchover ready”
  - But some aspects were UK centric
- WorldDAB TC identified the issues and helped develop the spec to be Europe-wide
  - Ensure all DAB frequencies are tested
  - Ensure all EBU Latin-based characters are tested
- Applies to other regions and countries too



# Automotive applications

- A new car-maker communication application has been studied
  - Allows car makers to send important information to their cars via DAB, thus reaching harder-to-find customers
- Standardisation of the transport adaptation for TPEG under review



# Announcements

- DAB has always offered mechanisms for audio announcements
  - Traffic, sport, news, ...
- But so far uptake has been low
- WorldDAB TC has reviewed and extended the signalling to enhance the feature
  - Detailed rules of behaviour are under development



# OMRI

- A standardised API for mobile devices to access broadcast and hybrid radio
- More later...



**Metadata**

**Visuals**

**Interactivity**

ETSI TS 103 270 v1.1.1 (2015-01)



ETSI TS 102 818 v3.1.1 (2015-01)



ETSI TS 101 499 v3.1.1 (2015-01)



# Hybrid developments

Adapted from Nick Piggott, Project director, RadioDNS presentation March 2017

# **Broadcast or Internet?**

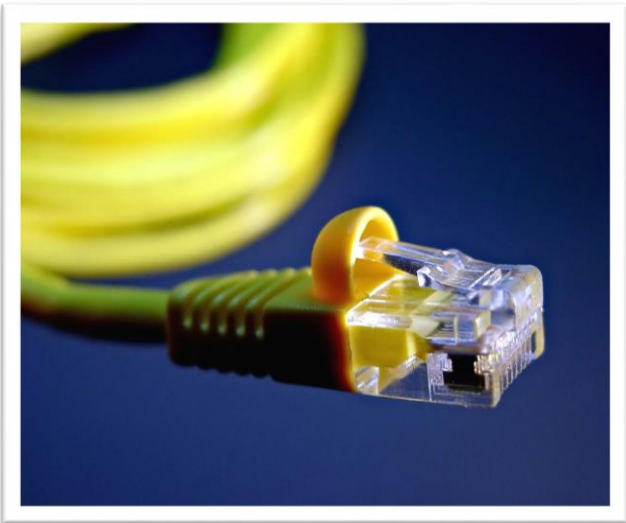
# Broadcast and Internet?

# Strengths



**Free for the listener**

**Stable regulation**



**Bi Directional**

**Flexible**

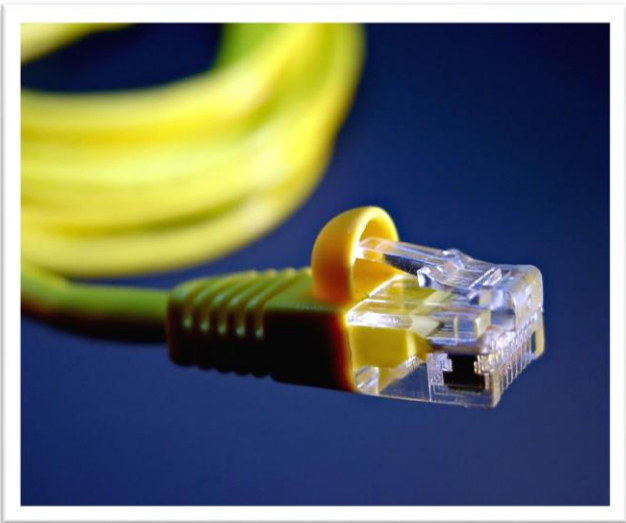


# Weaknesses



**One way**

**Inflexible**



**Reliability**

**Costs, Neutrality**

# Hybrid Radio



**Deliver audio using broadcast**

Reliable, ubiquitous, free, economic

**Enhance radio using IP**

Add a richer experience & interactivity



# Open Standards

# Decentralised

# Open Standards

- Anyone can build a DAB+ transmitter
- Anyone can build a DAB+ radio
- Anyone can build a RadioDNS device or platform
- Everything works together
- Encourages innovation and affordable price points

# Decentralised

- Radios receive signals directly from transmitters
- Failure of one operator does not affect others
- RadioDNS devices connect directly to radio stations
- RadioDNS has no control / visibility of connections



DS AUTOMOBILES



HOLDEN



HONDA



HYUNDAI



INFINITI.

ISUZU



JAGUAR

Jeep



LEXUS



MASERATI



mazda



Mercedes-Benz



MITSUBISHI



PEUGEOT



RENAULT



SEAT

ŠKODA



TOYOTA

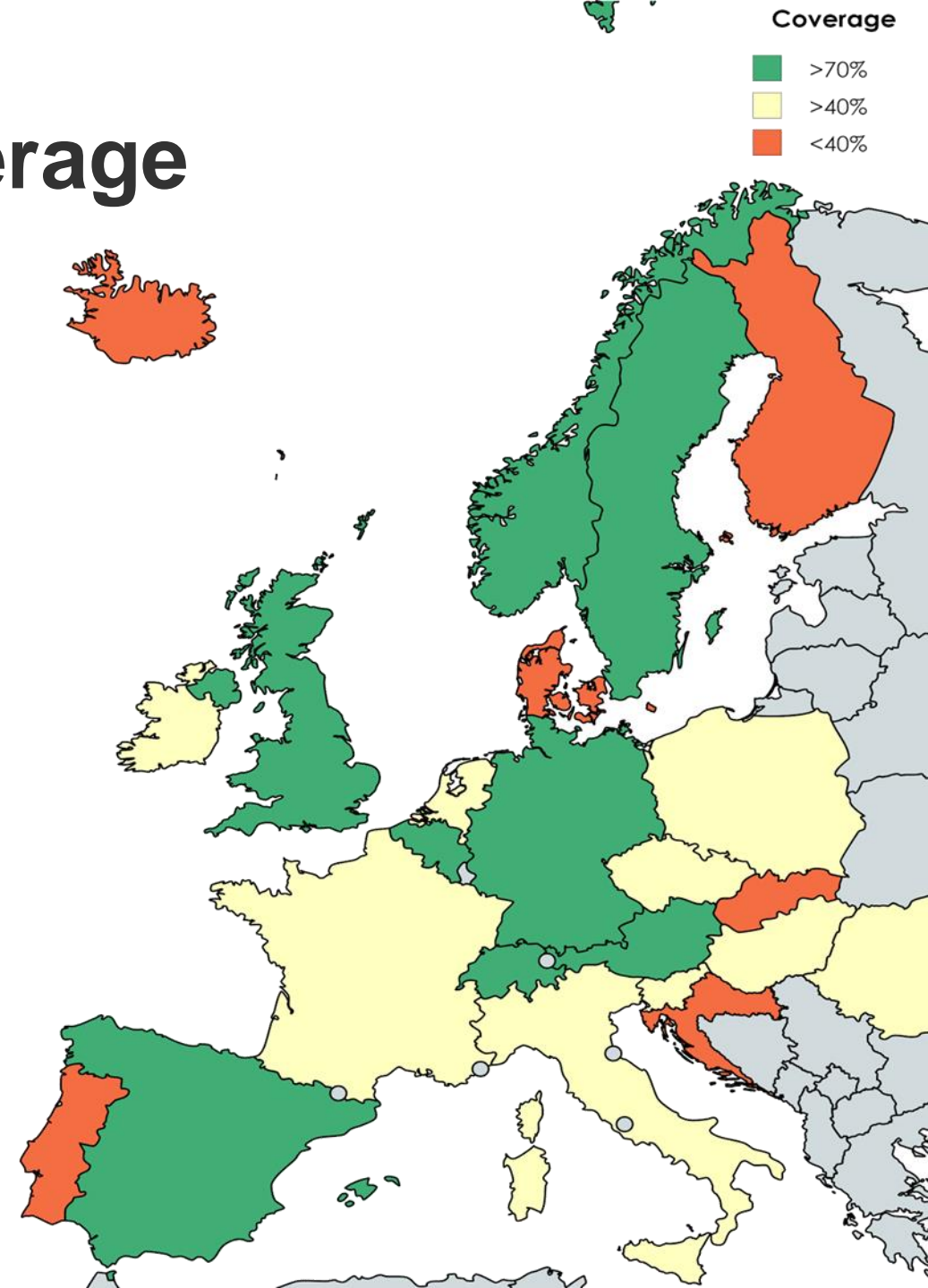


UD TRUCKS



# European Coverage

- European Broadcasting Union (EBU) recommends RadioDNS for Hybrid Radio in Europe
- Over 70% of listening is RadioDNS enabled in UK, Germany, Spain, Switzerland, Austria, Sweden, Norway, Belgium



# Service & Programme Metadata

## Station listing with logos



## Service Linking

Additional channel link if reception is lost

**FM** FM PID LINK

 Internet Stream

## Additional Station information

### Larger Logo

104.1 **2Day** FM. The home of Hamish & Andy. The place to get the hottest celebrity gossip, photos and win amazing prizes.

Links to other sources

Description



# Logos



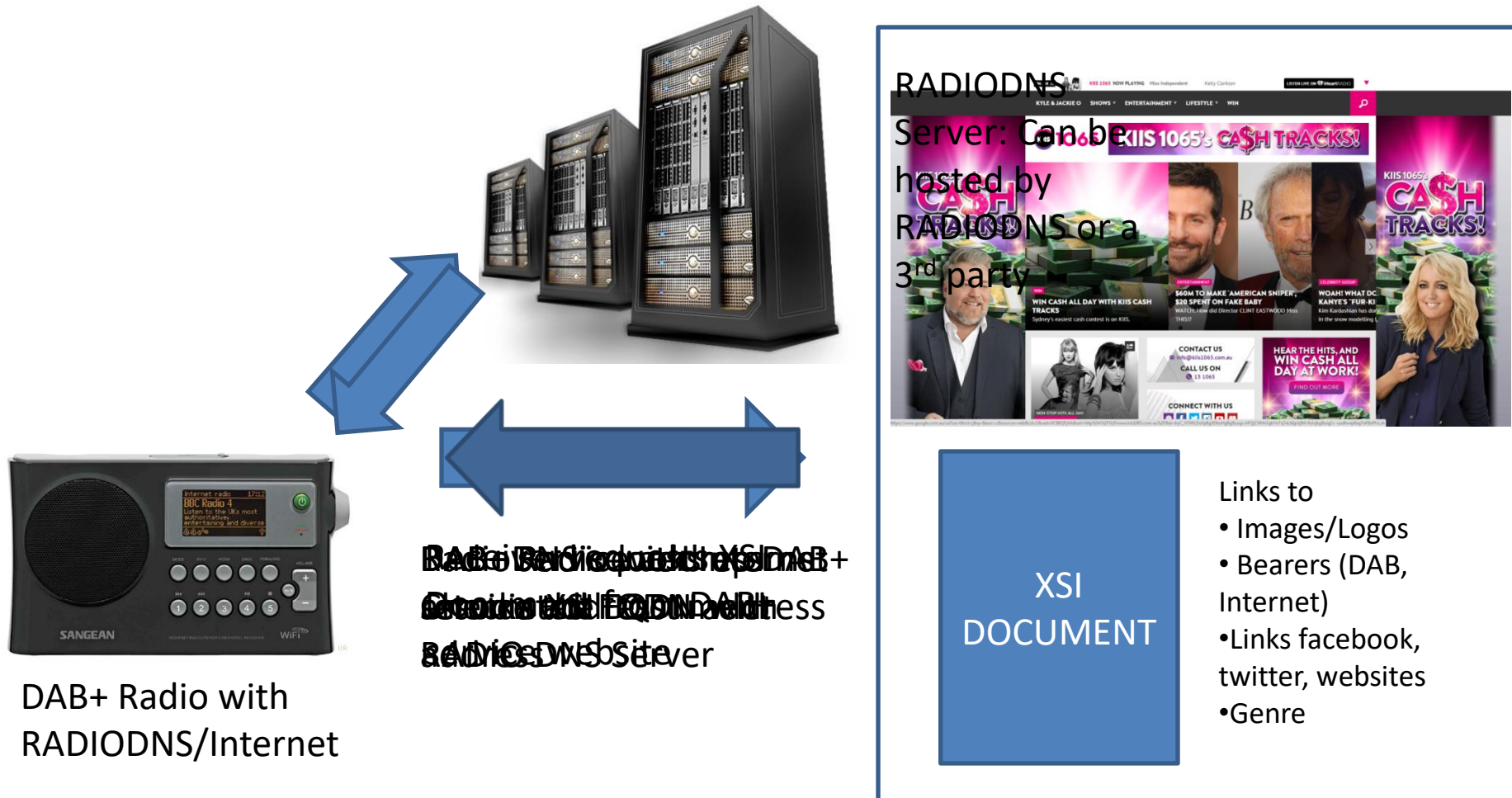


# Visuals

Making radio look great on great screens

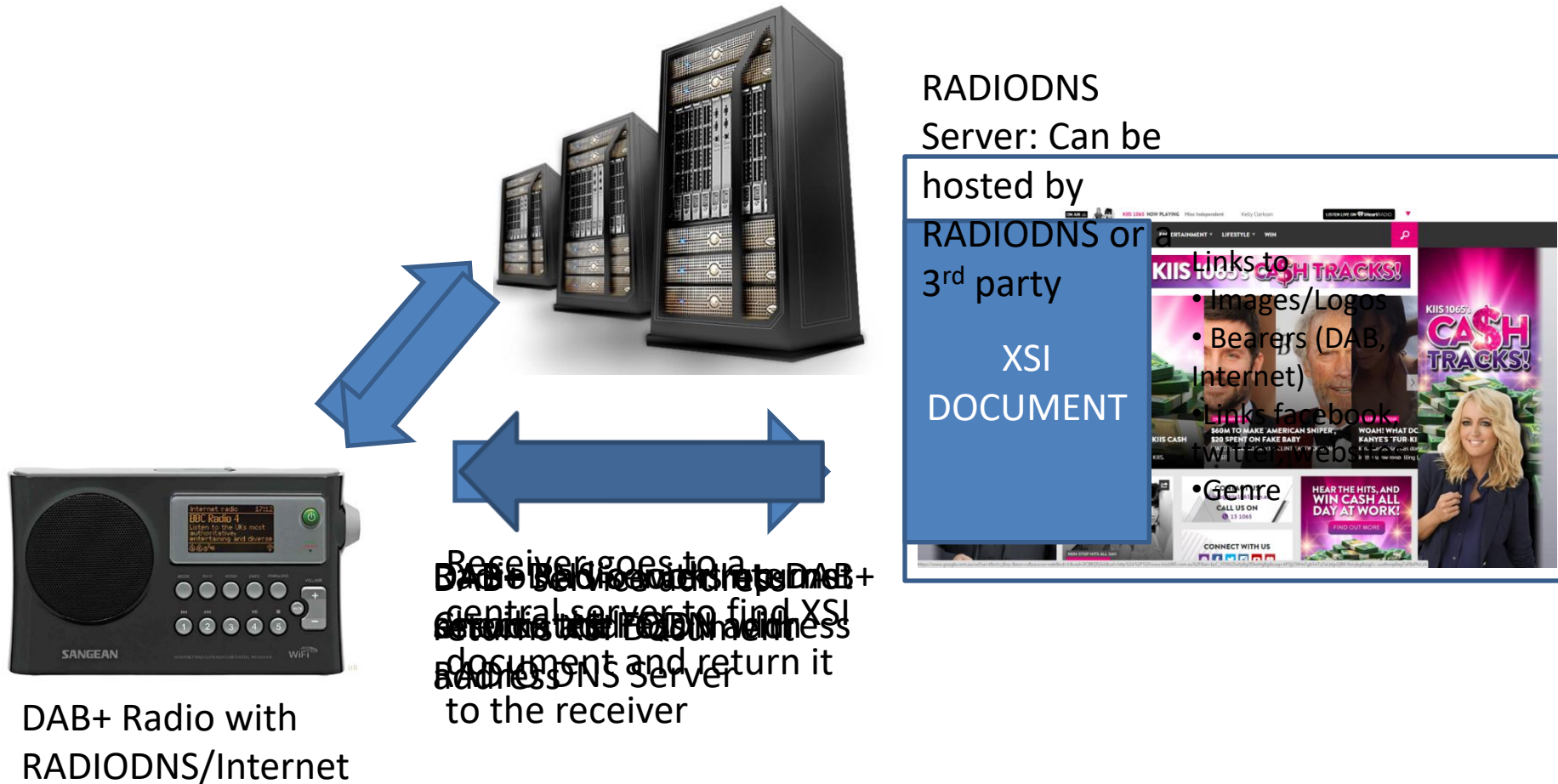
# RADIODNS XSI Data flow

## Scenario 1 – XSI and Images host by broadcaster



# RADIODNS XSI Data flow

## Scenario 2 – XSI and Images host by Central server



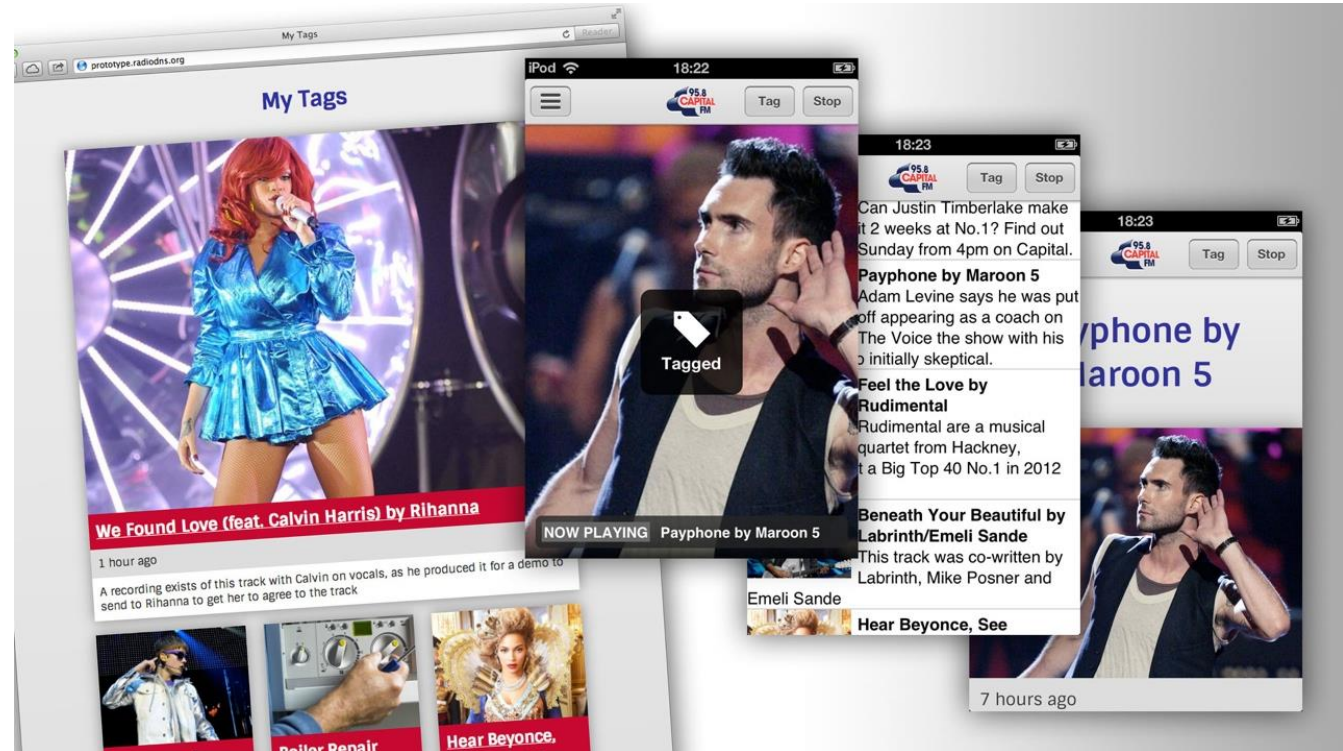


# Tagging

Remembering interesting things on the radio

# Tagging

- Hear something interesting
- Push one button
- Look it up later on your smartphone / tablet
- Listen again to the audio or interact
- Engagement measurement



# Hybrid Radio makes radio discoverable Done right it makes radio prominent

- Relies on accurate meta-data and good content
- Open standards and low cost
- Central look up for receiver devices
  
- Offers new audience metrics to measure engagement with content



## New Hybrid Radio Ideas

- Programme and preset sync between home and car
- Replace broadcast audio with targeted IP audio
- Audience measurement
  
- The framework is open for new innovative ideas based on open standards



**UPLOAD**  
**RADIO**



Mar-17-2013 15:03



Bassman's on hand with the biggest hit music including  
Printh, David Guetta, Rita Ora, Calvin Harris and more.

AUDIO

FIND

TAG

SKIP

SET

**FIND**

Great music / speech that I'll love

**TAG**

I loved that!  
Tell me more about it

**SKIP**

I hate this!  
Give me something different

# Smartphone developments

**IDRAG**

**INTERNATIONAL DMB  
ADVANCEMENT GROUP**



31 members from 17 countries



DMB Mongolia  
RNI Radio, Latvia  
DigiBNetworks, Malta  
Mobile TV PTY, South Africa

Radloday  
Europe

**DIGITAL AUDIO BROADCASTING+**  
MORE STATION AND BETTER SOUND QUALITY

THE FIRST  
DAB+  
SMARTPHONE



Radloday  
Europe

Radloday  
Europe

# LG Stylus 2

The world's first  
DAB+ enabled  
smartphone  
went on sale  
in over 20  
countries  
in 2Q16



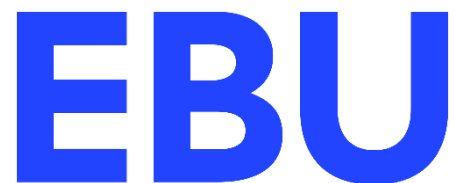
**WorldDAB, the EBU and IDAG  
have formally **teamed up** to  
better be able to incentivize  
more DAB+ enabled smartphones.**

**WorldDAB Task Force OMRI  
**Established 1/3/2017****


**OMRI is  
the open and universal  
smartphone “bridge”  
between  
the DAB+ chipset and the apps.**


Announced during IBC, 2016.





09:32

☰  ❤️ 🔊 🔊




**MIKE E & EMMA**  
WEEKDAYS 6-9AM


Now Playing... Dirty Talk, Wynter Gordon

[Click here for Station Website](#)

◀ ○ ◻

09:31

☰  ❤️ 🔊 🔊



**Now Playing on**  
**The Bad Touch**  
*Bloodhound Gang*

**Next**

**2DAY**  
hit 104.1

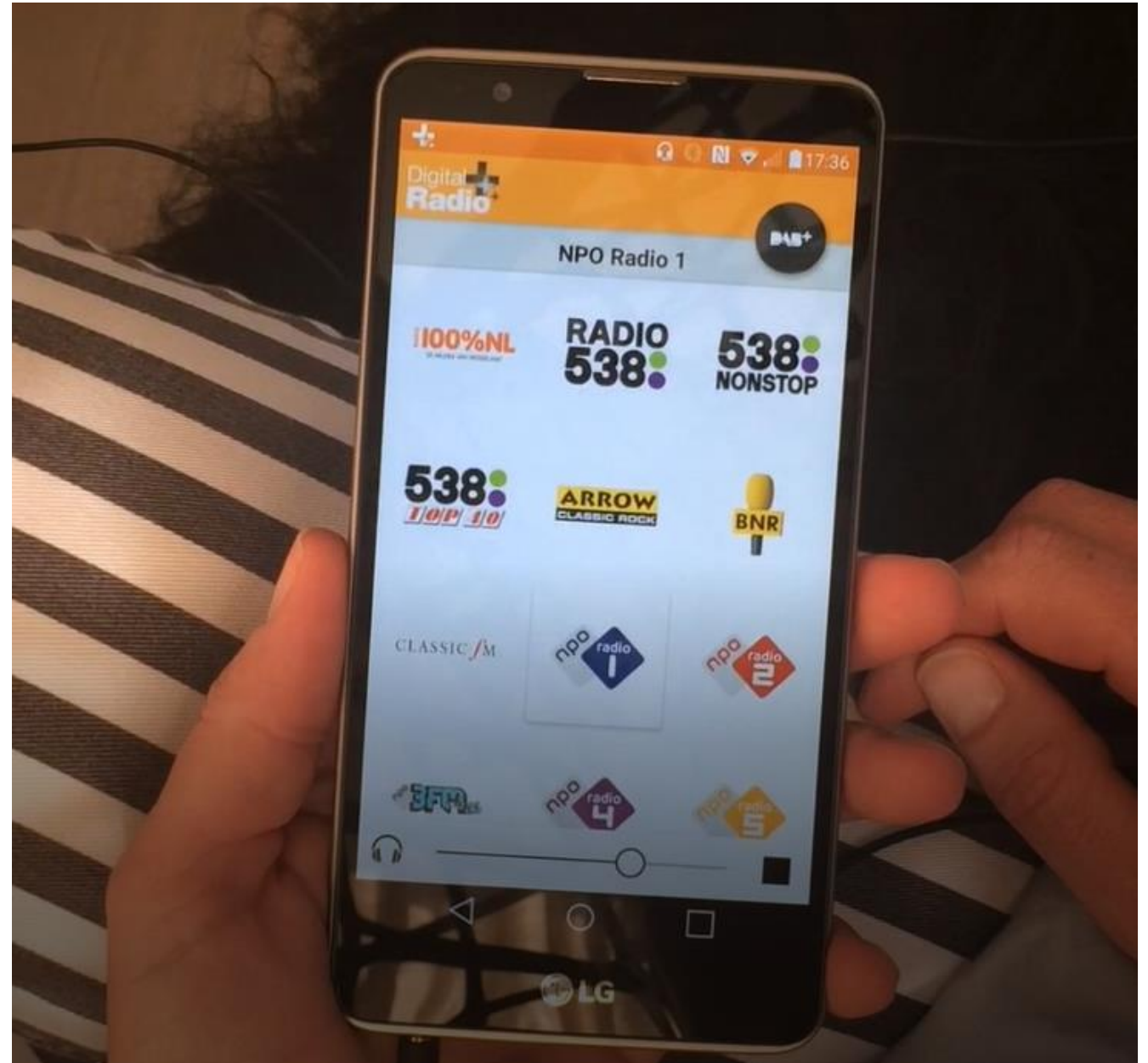
[Click for more information!](#)

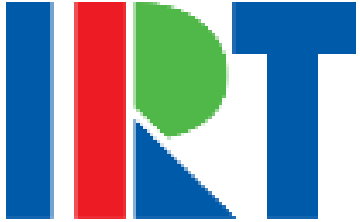
Now playing on 1041 2DayFM: The Bad Touch  
by Bloodhound Gang

[Click here for Station Website](#)

◀ ○ ◻








WORLD DAB Digital Audio Broadcasting

11.10.2016 09:50

BAYERN 3



Mark Forster: Chöre [Frühaufdreher-Hittipp]

12.10.2016 09:00:00

**BAYERN 3 - Mein Lieblingsmix im Radio**

Popmusik

WORLD DAB Digital Audio Broadcasting

11.10.2016 09:52

Bayern 2 Sued

11.10.2016 09:05:01

**Liselotte von der Pfalz - Ungeschminktes aus Versailles - 11.10.2016**

Liselotte von der Pfalz wird 1671 mit dem Bruder des Sonnenkönigs verheiratet. Über das Leben in Versailles verfasst sie jede Menge Briefe: intelligent, humorvoll, schonungslos. Historisch und Weltliteratur! Autorin: Prisca Straub

10.10.2016 09:05:01

**Symbol griechischer Volkskultur - Digenis Akritis - 10.10.2016**

Digenis Akritis, der Held aus der byzanti.....

10.10.2016 09:05:01

**Das moderne Griechenland - Das moderne Griechenland - 10.10.2016**

Am Anfang stand eine "große Idee", der Tr....

09.10.2016 17:45:01

**Der Sachsenspiegel - Gesetzgebung und Rechtsprägung - 09.10.2016**

# OMRI Technical Approach

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- Open API – to be published by ETSI
  - Currently available as Open Source on EBU gitlab :  
<https://github.com/ebu/OpenMobileRadioInterface>
- Provide Open Source example code
  - To help smartphone manufacturers and App developers
- Current status
  - Focus has been on LG Stylus 2 DAB implementation
  - Currently using the IRT shim layer between LG API and OMRI API
  - Minimum requirements drafted
  - New WorldDAB Technical Committee Task Force established

# OMRI – Minimum Requirements - Core

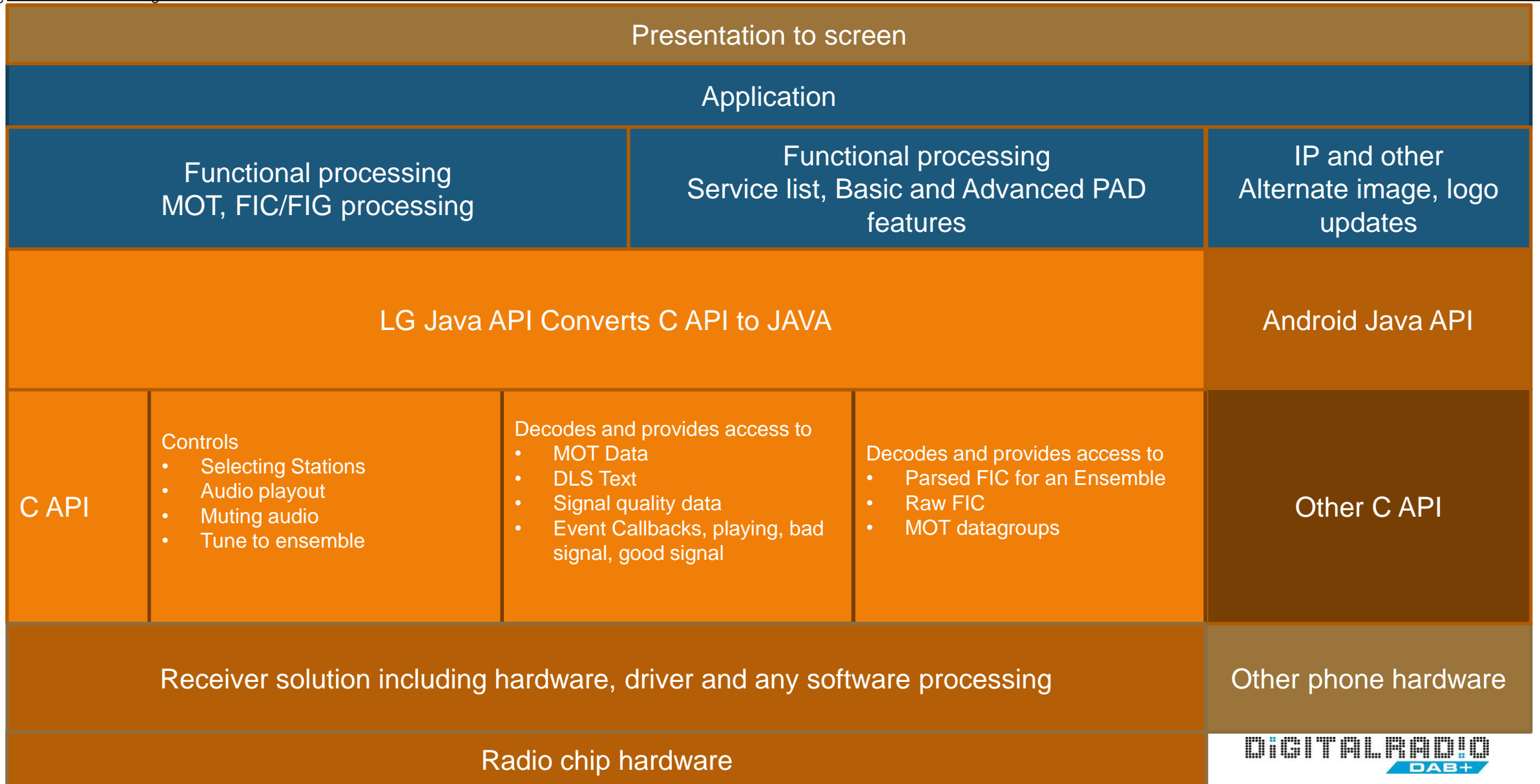
Profile	General DAB requirements	Metadata/Data services (User applications)	API Classes
<b>Core Profile</b> <b>(mandatory minimum requirement)</b>	<p>Band 3 reception (174 to 240 MHz);</p> <p>Mode 1 operation</p> <p>API permits 'band scan' and 'tune to specific frequency' returning available ensemble(s), services, service components including basic parameters (audio (DAB/DAB+), data (UATy), etc).</p> <p>DAB audio</p> <ul style="list-style-type: none"> <li>MPEG layer 2</li> <li>MPEG-4 HEAACv2</li> </ul> <p>One sub-channel with minimum 144 Capacity Units (e.g.192 kbps@EEP-3A/UEP-3)</p> <p>All FEC code rates (UEP and EEP)</p> <p>Additional sub-channel,</p> <ul style="list-style-type: none"> <li>Minimum additional 24 Capacity Units (e.g. 32kbps@EEP-3A)</li> </ul>	<p>Text:</p> <ul style="list-style-type: none"> <li>Character set decoding             <ul style="list-style-type: none"> <li>Complete EBU Latin based repertoire</li> <li>UTF-8</li> </ul> </li> <li>Service label and service component label</li> </ul> <p>User Applications:</p> <ul style="list-style-type: none"> <li>Dynamic Label</li> <li>Slideshow</li> <li>Categorised SlideShow</li> <li>ClickThroughURL</li> <li><u>Dynamic Label+</u></li> </ul> <p><u>Packet Mode:</u></p> <ul style="list-style-type: none"> <li>Multiple packet mode streams (minimum 4) (i.e. can access SlideShow / SPI data on extra sub-channel).</li> <li>Enhanced Packet Mode FEC protection</li> </ul>	<p>Packages/Classes/Interfaces:</p> <p>org.universalfactory.radio.*</p> <p>org.universalfactory.radioservice</p> <p>org.universalfactory.tuner</p> <p>org.universalfactory.radioservice.metadata</p> <ul style="list-style-type: none"> <li>Textual</li> <li>TextualDABDynamicLabel</li> <li>TextualMetadataListener</li> <li>Visual</li> <li>VisualDABSlideShow</li> <li>VisualMetadataListener</li> <li>TextualDABDynamicLabelPlusItem</li> <li>VisualIPRdnsRadioVis</li> </ul>

# OMRI – Minimum Requirements - Optional

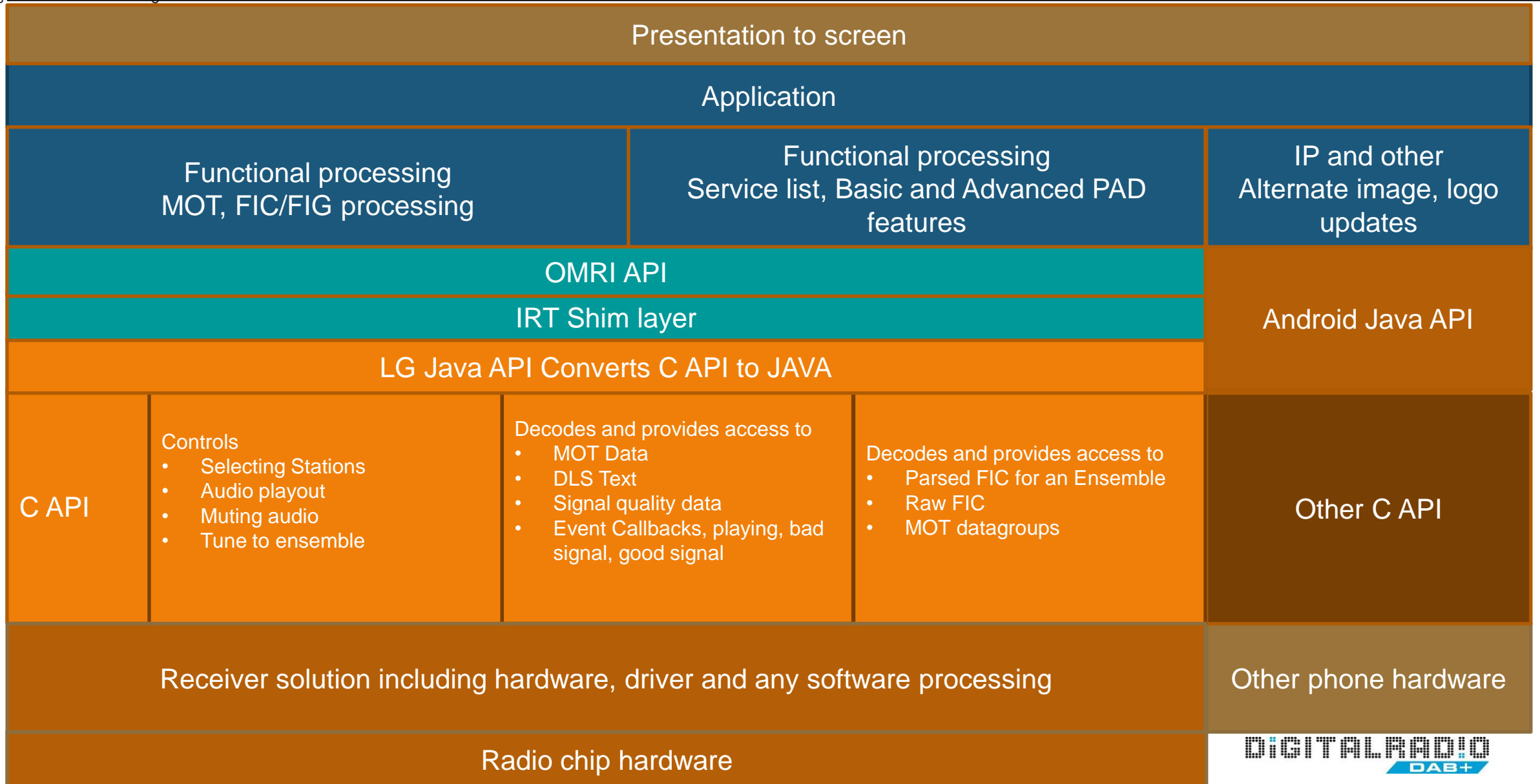
Profile	General DAB requirements	Metadata/Data services (User applications)	API Classes
<b>Advanced receiver profile</b> (optional in whole or part)	Additional sub-channels to make the total simultaneous sub-channels 3 or more (e.g. to allow additional simultaneous decoding of other data services e.g. TPEG or Journaline)  DMB video service decoding	User Applications: <ul style="list-style-type: none"> <li>• SPI (with delivery in MOT directory mode)</li> <li>• Announcements</li> <li>• Hybrid functionality               <ul style="list-style-type: none"> <li>○ SI, Logos</li> <li>○ PI</li> <li>○ RadioDNS</li> <li>○ Alternative Image</li> </ul> </li> <li>• Service Linking</li> <li>• Additional character set decoding</li> <li>• Other Ensemble functionality</li> <li>• TII decoding</li> </ul>	Packages/Classes/Interfaces: <ul style="list-style-type: none"> <li>org.universalradio.radioservice.metadata</li> <li>• Group</li> <li>• Location</li> <li>• ProgrammeInformation</li> <li>• ProgrammeServiceMetadataListener</li> <li>• ServiceInformation</li> <li>• SPIProgrammeInformation</li> <li>• TermID</li> </ul>



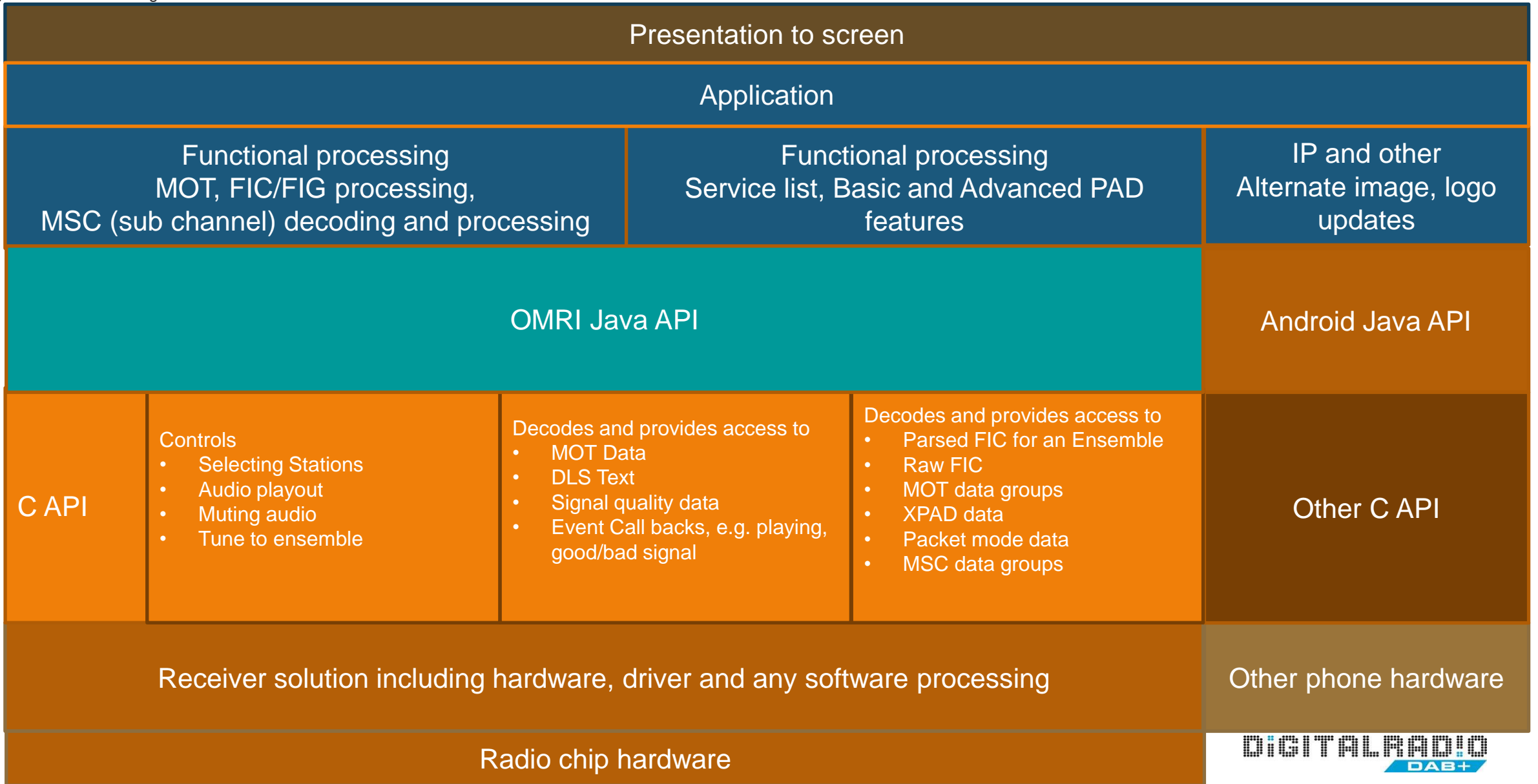
# LG Software stack



# OMRI-LG Software stack



# OMRI Software stack



[github.com/ebu/OpenMobileRadioInterface](https://github.com/ebu/OpenMobileRadioInterface)

# TF OMRI next steps

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## Next steps under the WorldDAB “OMRI” Task Force

- TF chairman is Alex Erk, IRT
- Terms of Reference established
- Work programme drafted – in progress
  - OMRI API specification updates including functional enhancements
  - API and example App code
  - Standardisation route focused on ETSI

**Please get involved!**

[www.worlddab.org](http://www.worlddab.org)