

# Proposed list of services

*- For the DigitalRadio launch in Germany -*

**- EDITION 1 -**

version 1.0

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## 0. Change history

version/ revision	date	author	Description
0.1	2011-02-23	Sebastian Kett	Initial document
0.2	2011-02-24	Achim Quellmalz/ Sebastian Kett	Minor changes in section 2 (receiver requirements)
0.3	2011-02-28	Achim Quellmalz/ Sebastian Kett	Changes in section 1, sections 3 and 4 added
0.4	2011-03-02	Sebastian Kett	Minor changes after ARD-meeting
0.5	2011-03-03	Olaf Korte	Changes in section 2 (technical amendments)
0.6	2011-03-04	Sebastian Kett	Receiver categories added
0.7	2011-03-09	Sebastian Kett/ Helmut G. Bauer/ Carsten Friedrich/ Achim Quellmalz	Feedback from working group added and table for national DAB-mux added
0.8	2011-03-09	Chris Weck	Adding services from Deutschlandradio
0.9	2011-03-16	Sebastian Kett	Feedback from Fraunhofer (Markus Prosch) included
0.10	2011-03-22	Sebastian Kett	Intended TPEG services of ARD-group amended, intended services of Neue Welle added
0.11	2011-03-31	Sebastian Kett	Split requirements into "functional requirements" and "requirements relating to the user experience". Table "further helpful features" and minor changes added.
0.12	2011-04-07	Sebastian Kett Chris Weck	Mandatory receiver requirements according to ETSI TR 101 496 part 2. Also clarification on BWS and addition of Intellitext™ added.
0.13	2011-04-14	Sebastian Kett	Minor changes in Basic data sections
1.0	2011-04-18	Sebastian Kett/ Joachim Kraus/ Christoph Kruse/ Markus Prosch/ Andreas Schneider/ Frank Nowack	Various input from working group included  <b>### feature-freeze as Edition 1 ###</b>

# 1. Foreword

Public and commercial broadcasters, system operators, network providers, receiver manufacturers and authorities in Germany are working together on the start of Germany's first national digital terrestrial radio multiplex by August 1st 2011 as well as on the subsequent roll-out or extension of regional digital terrestrial radio multiplexes.

Hosted by the German Federal Ministry of Economics and Technology (BMWi) a device working group addresses broadcast receiver related (technical/technology standard) matters since February 2011, to ensure appropriate decoding and provision of broadcasted services by the receivers and a consistent media experience for the customer. This working group consists of all interested stakeholders in the digital radio ecosystem.

This document describes the results of the mutual discussions in the device working group. It contains the intended list of services from those broadcasters who are involved in the digital radio launch in Germany and derives necessary receiver requirements out of these intentions.

The implementation of the listed services is structured in 3 stages whereas stage 1 services will be launched as of August 1st; stage 2 services will be investigated as of late 2011/early 2012 and stage 3 services represent long-term goals.

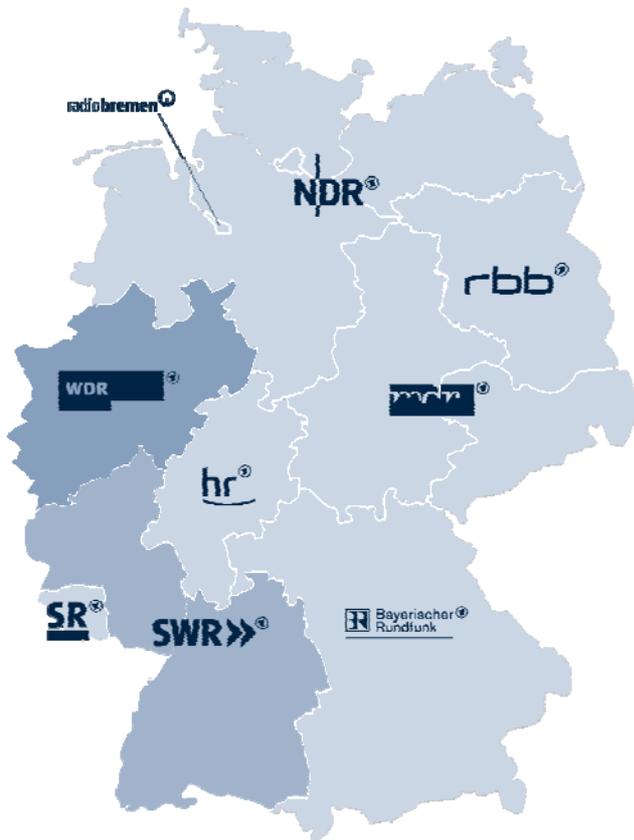
This 1st edition of the 'Proposed list of services' is intended to be kept as stable document until August 2011. Gained experiences of both broadcasters and receiver manufacturers shall then be introduced in the revision work towards a 2nd edition. Please note that any information contained in this document may be subject to change without notice to address errata.

## 2. German radio market

According to the German constitution both public as well as commercial broadcasting are under the jurisdiction of the German Bundesländer (federal states). For this reason the organisation broadcasting is regulated not only by the interstate broadcasting treaty but also by individual state media laws.

### Public radio

Public broadcasters in Germany are the ARD-group and Deutschlandradio. The ARD-group is the association of public broadcasters in the federal republic of Germany and consists (due to the federal structure of Germany) of nine affiliates (see picture 1) with corresponding regional distribution areas. All together these affiliates are broadcasting more than 60 radio brands. Deutschlandradio is the national public radio broadcaster in Germany and provides 3 radio brands.



Picture 1: ARD group and its affiliates of regional public broadcasters.  
Deutschlandradio in comparison is the national public broadcaster

### Commercial radio

In every German Bundesland (federal state) commercial and private radio is only broadcasted local and/or regional. Germany has about 210 commercial radio stations.

### German Radio market

The radio market in Germany is an extensive market and a key market for Digital Radio in Europe:

- a. 58.71 Mio. people are listening to radio every day (79,3 % of all Germans)\*
- b. Average listening per hour 199 minutes per day (3 h 19 min)\*

The market share of the public broadcasters is continuing stable around 55%.  
45% are listening to commercial radio.

\* media analysis Mar 2011; <http://agma-mmc.de>; biannual survey of attendance figures

### 3. Proposed list of DAB services

#### 3.1 National DAB-ensemble of commercial broadcasters and Deutschlandradio

National DAB-ensemble of commercial broadcasters and Deutschlandradio (stage 1 – starting on Aug 1, 2011)		
Service	Details/status-quo	Receiver requirements
Audio	<p>The already licensed private broadcasters on the national multiplex will broadcast around 10 new live audio services (brands) with additional services.</p> <p>Deutschlandradio will broadcast 2 brands in DAB (MPEG-1 Layer II), one digital only brand in DAB+ as well as one special brand/channel.</p> <p>A separate data channel will be also an available on the national multiplex.</p>	<p>(Mandatory for Profile-1 devices according to WorldDMB Receiver Profiles)</p> <p>See description and requirements in section ARD</p>
MPEG Surround	<p>Deutschlandradio is prepared to broadcast MPEG Surround.</p> <p>However, for the time being only few contents will be available.</p>	<p>Requirements:</p> <ul style="list-style-type: none"> <li>• MPEG Surround should be supported for receivers with surround capabilities</li> </ul>
Basic data and announcements	<p>Deutschlandradio will provide basic data which are fixed information triggers (e.g. which FM-frequency corresponds to which DAB audio service) as well as bit-signalisation (e.g. TA/TP (road-traffic-flash announcements), service label etc.) and EWS (emergency warning system).</p> <p>Multiplex reconfigurations should no longer be seen as an exeptional event. In the context of temporary regionalisation</p>	<p>(Mandatory for Profile-1 devices according to WorldDMB Receiver Profiles)</p> <p>See description and requirements in section ARD</p>

	of an audio service the re-configuration mechanism is expected to be used more frequently (e.g. by Regiocast's brand 90elf).	
Categorized DL/DL Plus (Intellitext™)	Deutschlandradio will use Intellitext™, a simple, categorized version of Dynamic Label, for newsticker and other specific information.	(Mandatory for Profile-2 devices according to WorldDMB Receiver Profiles)  Please see: ETSI TS 102 652
DL/DL Plus	Deutschlandradio will broadcast Dynamic Label services and presumably DL Plus.  Neue Welle will presumably broadcast DL services.	(Mandatory for Profile-1 devices according to WorldDMB Receiver Profiles)  See description and requirements in section ARD
TMC/TPEG	MEDIA BROADCAST is also planning to start a TMC transmission.	(Mandatory for Profile-2 in-car products according to WorldDMB Receiver Profiles)  See description and requirements in section ARD
EPG	Deutschlandradio will provide an EPG as key information for time sovereign listening in the future.  Some commercial broadcasters haven't yet decided if they will use an EPG.	(Recommended for Profile-1 devices according to WorldDMB Receiver Profiles) (Mandatory for Profile-2 devices)  See description and requirements in section ARD
Journaline	Deutschlandradio will broadcast structured text services (e.g. news) using Journaline. This includes also information like a geo referenced DAB service list for automatic tuning (Ensemble Guide).  Deutschlandradio plans to provide a complete list of ensembles, so that – owing to the nationwide single frequency network – there will be no need of a frequency scan if this information is used.	(Recommendation for Profile-2 receivers according to WorldDMB Receiver Profiles)  Please see: ETSI TS 102 979  Functional Requirements: <ul style="list-style-type: none"> <li>• The receiver must be able to filter Journaline content depending on the lon/lat info (i.e. present only content which is relevant to the listener at a given place).</li> </ul>

	<p>Regiocast is currently evaluating the features and usability of Journaline. In the case of a positive evaluation, a Regiocast Journaline service could start on Aug 1<sup>st</sup> 2011.</p> <p>Also 'Die Neue Welle' will presumably broadcast a Journaline service by Aug 1<sup>st</sup>. Whenever possible Journaline content which is being broadcasted will carry lon/lat information for geo referencing.</p>	<ul style="list-style-type: none"> <li>• The receiver must support interactivity features (e.g. SMS-linking, email, hot-button, depict on a map, calculate route/destination)</li> <li>• The receiver must be able to bookmark Journaline pages.</li> <li>• The receiver should support keyword search in the whole Journaline tree.</li> <li>• The receiver must support the extended RDS character set on products with a suitable display (as defined in the RDS Forum proposed revision to ISO EN 62106; see <a href="http://www.rds.org.uk">www.rds.org.uk</a>).</li> </ul>
SLS	<p>Deutschlandradio will provide SLS (e.g. accompanying pictures to the live audio service)</p> <p>MPEG-1 L2 services as well as DAB+ services will carry SLS. SLS is intended to being transmitted as NPAD-service in enhanced packet mode (approx. 4- 12 kbit/s).</p> <p>Neue Welle will presumably broadcast SLS.</p> <p>All slides will be 320x240px in size (PNG or JPEG format).</p>	<p>(Mandatory for Profile-2 devices according to WorldDMB Receiver Profiles)</p> <p>Please see: ETSI TS 101 499 V2.2.1</p> <p>See description and requirements in section ARD</p>
BWS	<p>Deutschlandradio will start broadcasting a simple html-page for test purposes, when DAB is received using a smartphone or a Tablet-PC in order to pave the way for hybrid services. Deutschlandradio will support the development of an HbbTV-like standard for radio.</p> <p>The goal is to develop applications for local interactivity as well as for hybrid content-provision.</p> <p>Detailed use-cases will be developed.</p>	<p>BWS is recommended for Profile-2 devices according to WorldDMB Receiver Profiles; however the "integrated receiver" profile seems really outdated. Therefore the goal is to use a standard html solution which is currently in development for HbbTV.</p> <p>Please see: ETSI TS 101 498-1 V2.1.1 Please see: ETSI TS 101 498-2 V1.1.1 Further standardisation work required</p>
RadioVIS	<p>Deutschlandradio is currently using RadioDNS for testing and</p>	<p>No standard yet existing, hence not yet included in a Receiver</p>

	trials using simple slides and text.	Profile.  See also description in section ARD
<b>National DAB-ensemble of commercial broadcasters and Deutschlandradio (stage 2 – investigation will start in late 2011)</b>		
FileCollector	Deutschlandradio may use FileCollector in combination with BWS and control functions of Dynamic Label Plus.	Not yet included in Receiver Profiles  See description and requirements in section ARD

**General remarks for basic list of services from Deutschlandradio:**

The list above shows the services which will be provided in the national DAB multiplex. However this does not mean that it is expected that every receiver should be able to present all the textual and visual services to a user. It is understood that there is a hierarchy in the provided services:

Simple receivers should at least be able to show Dynamic Label text. The next group of receivers should be able to store some Dynamic Label information which is the idea behind Intellitext™. The next group of receivers should in addition show the EPG. The Journaline information, that allows much longer texts, completes the services for receivers with alphanumeric displays. The possibility of storing Journaline Information or audio programmes based on the EPG or using links (URLs) in the EPG for available podcasts would be an option too. The reason for all the different text services is to make digital radio very attractive for all the different Profile-1 receivers in the market. However, the goal should be to provide the user with as much data services as possible.

Slideshow is a service for Profile-2 receivers. With graphic displays the presentation of EPG and Journaline could be advanced too.

The BWS is the window to hybrid services and addresses receivers like smartphones and Tablet-PCs and also HbbTV receivers for radio usage. It provides with HbbTV-like solutions an open standard for different applications based on a simple browser. It should be the basis for applications with local interaction as well as interactive services via a return channel.

### 3.2 Regional DAB-ensembles of ARD-group

Regional DAB-ensembles of ARD-group (stage 1 – starting in Aug 2011)		
Service	Details/status-quo	Receiver requirements
Audio	<p>ARD group provides more than 60 radio brands in FM. For the start in August, the ARD will mainly broadcast its existing FM-brands in DAB (Simulcast).</p> <p>Mixed ensembles with MPEG-1 L2 and DAB+ services are currently planned – depending on the actual situation in the 16 federal states.</p> <p>Audio bitrates will differ in the regional MUXes. Exact bitrates are not yet specified.</p> <p>Secondary service components are intended for instance when it comes to EPG or FileCollector services (see below) in mixed multiplexes of public and commercial broadcasters. Mixed multiplexes may come up in several federal states.</p> <p>CA is not intended.</p>	<p>(Mandatory for Profile-1 devices according to WorldDMB Receiver Profiles)</p> <p>Please see: ETSI TR 101 496 part 2</p> <p>Functional Requirements:</p> <ul style="list-style-type: none"> <li>• The receiver must be able to decode DAB (audio) signals transmitted in Band III (blocks 5 to 12)</li> <li>• The receiver must support auto/manual scan of Band III (blocks 5 to 12) in order to find existing audio services</li> <li>• The receiver must decode MPEG-1 L2 and DAB+ audio signals with any bit rate defined in the standard.</li> <li>• The receiver must be able to decode and process mono and stereo audio signals.</li> <li>• The receiver must resynchronize automatically in case of signal-loss</li> <li>• The receiver must be capable of listing and decoding secondary audio service components.</li> <li>• The receiver must be capable of decode EEP protected audio signals</li> <li>• The receiver must decode a minimum of one sub-channel with at least 280 CU if this sub-channel contains DAB audio.</li> <li>• The receiver must decode a minimum of one sub-channel with at least 140 CU if this sub-channel contains DAB+ audio.</li> <li>• <i>For in-car products that have dual tuner capabilities: when a</i></li> </ul>

		<p><i>given service can be received on two different ensembles, the receiver should decode the service from the ensemble with better reception quality.</i></p> <p>Requirements relating to the user experience:</p> <ul style="list-style-type: none"> <li>• The receiver must provide a service listing of available audio services, preferably including the (long) service labels. <u>Note:</u> this is only valid for dual tuner solutions. For single tuner solutions only the services out of the currently tuned ensemble must be provided.</li> <li>• If secondary service components are signalled, the receiver must provide (preferably) the (long) service component labels.</li> <li>• The receiver should provide an ensemble listing of available ensembles, preferably including the (long) ensemble labels.</li> </ul>
<p>Basic data and announcements</p>	<p>Basic data describes all information which are fixed triggers (e.g. which FM-frequency corresponds to which DAB audio service) as well as bit-signalisation (e.g. TA/TP (road-traffic-flash announcements)/service label etc.)</p> <p>Basic data also includes the service and ensemble information as described in ETSI TR 101 496 part 2 (chapter 3.6) which provide supplementary information.</p> <p>Depending on the different media laws/authorities/etc. in the 16 Bundesländer different situations concerning frequency allocation will occur. At least in a few Länder two DAB-ensembles will be operated in parallel over a period of a few years. Thus service following from 'DAB to DAB' as well as 'DAB to FM' and vice-versa is a crucial requirement.</p> <p>Also multiplex reconfigurations should no longer be seen as</p>	<p>(Mostly mandatory for Profile-1 devices according to WorldDMB Receiver Profiles)</p> <p>Please see: ETSI EN 300 401 V1.4.1</p> <p>Functional Requirements:</p> <ul style="list-style-type: none"> <li>• The receiver must support traffic announcement signalization and announcement switching for in-car, smartphone and desktop receivers.</li> <li>• In-car and smartphone receivers must support service following to DAB by decoding implicit links (i.e. DAB/SId equals DAB/SId) and should support service following to DAB by decoding explicit hardlinks (i.e. decoding FIG 0/6 and SId comparing).</li> <li>• Portable and desktop receivers should support service following to DAB by decoding implicit links (i.e. DAB/SId equals DAB/SId) and explicit hardlinks (i.e. decoding FIG 0/6).</li> </ul>

	<p>an exceptional event. In the context of temporary regionalisation of an audio service the re-configuration mechanism is expected to be used more frequently.</p> <p>Not all brands are carrying traffic information. TA/TP (road-traffic-flash announcements) are to be specified – depending on the actual situation in the 16 federal states.</p>	<ul style="list-style-type: none"> <li>• In-car, smartphone, desktop and portable receivers types should support service following to FM if they support FM-RDS. In such case the receiver must decode implicit links (i.e. FM/RDS/PI equals DAB/SId codes) as well as explicit hardlinks (i.e. decoding FIG 0/6). <u>Note:</u> There is currently a TaskForce in WorldDMB working on providing clarification and guidelines for service following in general (should be observed!?). Also see ETSI TR 101 496 part 2 (chapter 3.6.23) for further details.</li> <li>• Softlinking may be supported but is not required.</li> <li>• Any receiver must decode mandatory and/or necessary FIG's carried in the Fast Information Blocks as described in and according to ETSI TR 101 496 part 2 (chapter 3.3).</li> <li>• The receiver must be able to handle Multiplex re-configurations as described in ETSI TR 101 496 part 2 (chapter 3.3.5).</li> <li>• The receiver must handle service continuity even if it is not seamlessly possible (the SId indicates that e.g. the audio service is being continued).</li> </ul> <p>Requirements relating to the user experience:</p> <ul style="list-style-type: none"> <li>• The receiver should present the long service label and must present at least the short service label</li> <li>• The receiver should present the ensemble service label</li> <li>• The receiver should present Date/Time information</li> <li>• The receiver should present the Programme Type (PTy) information</li> <li>• The receiver must support extended RDS character set on products with a suitable display (as defined in the RDS Forum proposed revision to ISO EN 62106; see <a href="http://www.rds.org.uk">www.rds.org.uk</a>).</li> </ul> <p><u>Note:</u> This section needs more clarification and will be reviewed</p>
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		<p>and edited soon. Especially announcements (e.g. EWS, road-traffic-flash etc.) and MUX-reconfigurations are an issue that has to be verified (maybe also under regulatory conditions).</p> <p>Please also note that not all requirements in this column are mandatory for WorldDMB Profile-1 receivers.</p>
DL/DL Plus	<p>Dynamic Label services and presumably DL Plus will be broadcasted from every brand/station.</p> <p>For stage 1 it can be assumed that all ARD brands are at least "DL ready".</p>	<p>(Mandatory for Profile-1 devices according to WorldDMB Receiver Profiles)</p> <p>Please see: ETSI EN 300 401 V1.4.1 for DL Please see: ETSI TS 102 980 V1.1.1 for DL Plus</p> <p>Functional Requirements:</p> <ul style="list-style-type: none"> <li>• The receiver must support DL including the specified control characters</li> <li>• The receiver should support DL Plus</li> <li>• The receiver must support extended RDS character set on products with a suitable display (as defined in the RDS Forum proposed revision to ISO EN 62106; see <a href="http://www.rds.org.uk">www.rds.org.uk</a>).</li> <li>• <u>Note:</u> DL Plus is not mandatory for Profile-1 receivers.</li> </ul> <p>Requirements relating to the user experience:</p> <ul style="list-style-type: none"> <li>• The receiver should present DL/DL Plus information automatically as soon as data is received</li> </ul>
TMC/TPEG	<p>Traffic information is one of the most important additional services which are requested by the listeners and which public radio has great expertise in.</p> <p>Status-quo:</p> <ul style="list-style-type: none"> <li>• TMC-messages can be converted into TPEG-messages</li> </ul>	<p>(Mandatory for Profile-2 in-car products according to WorldDMB Receiver Profiles)</p> <p>Please see: ETSI TS 102 368 V1.1.1 for TMC Please see: ISO TS 18234 for TPEG 1 Please see: ISO TS 21219 for TPEG 2</p>

	<p>(TMC to TPEG)</p> <ul style="list-style-type: none"> <li>• Editorial systems for TPEG generation are to be implemented in 2011/2012.</li> <li>• Currently new sources are going to be integrated for higher accuracy</li> </ul> <p>For stage 1 it can be assumed that ARD-group will start with TMC transmission in the regional MUXes.</p> <p>TMC is planned as a service signalled in the FIC.</p> <p>TPEG services which are planned:</p> <ul style="list-style-type: none"> <li>• asap: TEC with TMC-Loc</li> <li>• later: TFP, PKI (using ADAC as information source)</li> </ul> <p>TPEG is planned using TPEG TEC. ARD group will also participate in the TPEG loc 2 development.</p>	<p>Also see report of BMWi working group 'Data &amp; Traffic'</p> <p>Functional Requirements:</p> <ul style="list-style-type: none"> <li>• For in-car products: if the receiver is linked to an external host (i.e. navigation system) the receiver must support TMC/TPEG decoding and/or forwarding to the external host.</li> </ul>
EPG	<p>All brands of the ARD group are publishing up-to-date EPG-data in DVB-S and on the Internet (since 2005).</p> <p>Tools for converting the DVB-S EPG-data into DAB-EPG-data are available.</p> <p>DAB-EPG is planned as N-PAD service (approx. 16 kbit/s)</p>	<p>(Recommended for Profile-1 devices and mandatory for Profile-2 devices according to WorldDMB Receiver Profiles) Please see: ETSI TS 102 818 V1.4.1 for EPG-XML Please see: ETSI TS 102 371 V1.3.1 for EPG binary</p> <p>Functional Requirements if EPG is supported:</p> <ul style="list-style-type: none"> <li>• The receiver must support DAB-EPG base profile</li> <li>• The receiver should support DAB-EPG extended profile</li> <li>• The receiver must process an EPG which is transmitted as a secondary service component</li> <li>• Timer/wake-up/recording functions may be supported but are not required</li> </ul> <p>Requirements relating to the user experience if EPG is supported:</p>

		<ul style="list-style-type: none"> <li>• The receiver should display available EPG-data per brand and in an appropriate listing which is left to the implementer</li> <li>• The receiver should be able to start EPG-navigation out of the running live audio service.</li> <li>• The receiver should display the brand logo if transmitted via EPG and if the receiver has an appropriate display</li> </ul>
SLS	<p>SLS is intended to be one of the key benefits for the listeners. ARD's recent media research confirms that accompanying pictures to the live audio service (e.g. CD cover of current track/title) is one of the most requested information.</p> <p>MPEG-1 L2 services may not be able to carry SLS due to bandwidth limitations. However the DAB+ services are expected to carry SLS</p> <p>SLS is intended to being transmitted as PAD-service (approx. 16kbit/s).</p> <p>All slides will be 320x240px in size (PNG or JPEG format).</p>	<p>(Mandatory for Profile-2 devices according to WorldDMB Receiver Profiles)</p> <p>Please see: ETSI TS 101 499 V2.2.1</p> <p>Functional Requirements:</p> <ul style="list-style-type: none"> <li>• The receiver must support the MOT SLS when an appropriate display is available</li> <li>• SLS shall only be broadcasted using TriggerTime now and TriggerTime present in the MOT header of each slide so the receiver may support absolute Trigger Times but it is not required.</li> </ul> <p>Requirements relating to the user experience:</p> <ul style="list-style-type: none"> <li>• The receiver must present a slide automatically as soon as it is successfully received</li> <li>• The receiver should present the last received slide and as long as the next slide is received successfully</li> </ul>
<b>Regional DAB-ensembles of ARD-group (stage 2 – investigation will start in late 2011)</b>		
TMC/TPEG	<p>Continuation of stage 1 TMC/TPEG services:</p> <p>For stage 2 it can be assumed that ARD-group will implement the following TPEG-services:</p> <ul style="list-style-type: none"> <li>• later: TEC with TPEG-Loc 2 (not specified yet)</li> </ul>	<p>(Mandatory for Profile-2 in-car products according to WorldDMB Receiver Profiles)</p> <p>Please see: ISO TS 18234 for TPEG 1 Please see: ISO TS 21219 for TPEG 2</p>

	<ul style="list-style-type: none"> <li>• later: PTI (airport data already available, local transport data is currently being organized)</li> <li>• later: WEA (not specified yet)</li> <li>• never: FPI</li> </ul>	<p>Also see report of BMWi working group ‘Data &amp; Traffic’</p> <p>Functional Requirements:</p> <ul style="list-style-type: none"> <li>• For in-car products: if the receiver is linked to (or has an integrated navigation system) the receiver must support TPEG decoding.</li> </ul>
FileCollector	<p>FileCollector is a not yet standardized user application which allows to transmit data files (e.g. mp3, videos etc.) on a separate N-PAD data channel in the background of a live programme.</p> <p>FileCollector will be trialled and investigated via media research as soon as it is implemented on a prototype receiver.</p> <p>FileCollector is currently being standardized by WorldDMB/ETSI – including the Filecasting Spec from UK (Channel4 initiative).</p> <p>The Filecasting TF at WorldDMB is chaired by the German institute for broadcasting technology (IRT, Alexander Erk).</p>	<p>Not yet included in Receiver Profiles hence not mandatory for Profile-1 devices according to WorldDMB Receiver Profiles.</p> <p>Requirements:</p> <ul style="list-style-type: none"> <li>• Pick up extended header parameters in MOT header</li> <li>• Store received files persistently in local memory</li> <li>• Allow access/playback of files by user (depending on receiver capabilities)</li> </ul> <p><i>Draft spec with use-cases available</i></p>
Categorized SLS	<p>Categorized SLS is a not yet standardized enhancement of the regular SLS, allowing the device to cache categorized slides in local memory for later call-up by the listener.</p> <p>ARD-group is collecting input and will come up to WorldDMB with a mutual position asking for supporters.</p>	<p>Not yet included in Receiver Profiles hence not mandatory for Profile-1 devices according to WorldDMB Receiver Profiles.</p> <p>Requirements:</p> <ul style="list-style-type: none"> <li>• Pick up extended header parameters in MOT header</li> <li>• Cache received slides in local memory</li> <li>• Allow access to slides by user interaction</li> </ul> <p><i>Draft spec with use-cases available</i></p>

Regional DAB-ensembles of ARD-group (stage 3 – investigation will start after stage 2 is completed)		
MPEG Surround	<p>MPEG Surround is currently being trialled by several broadcasters within ARD-group (e.g. at Bayerischer Rundfunk).</p> <p>The DAB+ standard already explicitly covers MPEG Surround. For DAB Classic, MPEG D standardizes how MPEG Surround is transported within Layer II and this will be explicitly covered by the next version of the DAB base standard (ETSI EN 300 401).</p> <p>Exact usage figures etc. are to come when trials are finished.</p>	<p>Requirements:</p> <ul style="list-style-type: none"> <li>• MPEG Surround should be supported for receivers with surround capabilities</li> </ul>
BWS	<p>BWS is a standardized DAB application which is only interesting for hybrid reception scenarios.</p> <p>The goal of BWS integration would be to develop methods for hybrid content-provision, i.e. to result in the ‘best-of-both-worlds’ (broadcast and internet). Detailed use-cases need to be developed.</p>	<p>Recommended for Profile-2 devices according to WorldDMB Receiver Profiles</p> <p>Please see: ETSI TS 101 498-1 V2.1.1 Please see: ETSI TS 101 498-2 V1.1.1</p>
RadioTAG	<p>RadioDNS is a collaborative project to enable the convergence of radio broadcasting and IP-delivered services. It aims to significantly enhance the experience of radio listening using scalable and resilient broadcast technology in tandem with additional information via IP.</p> <p>Three standards are in preparation:</p> <ul style="list-style-type: none"> <li>• RadioVIS is equivalent to DAB SLS</li> <li>• RadioEPG is equivalent to DAB-EPG</li> <li>• RadioTAG has no DAB equivalent yet hence it is interesting for testing and trialling</li> </ul>	<p>No standard yet existing, hence not mandatory for Profile-1 devices according to WorldDMB Receiver Profiles.</p>

## **4. Further requirements which might be helpful**

### **Expert Menu**

The menu should provide (expert) information about details of the received audio signal (such as frequencies, audio bit-rate, bit-error rate, subchannel ID). The menu could therefore help in case of error-handling with broadcaster/manufacturer hotlines etc.

## 5. Hybrid radio approach

As it can be found in the table above, German broadcasters are following a hybrid approach when it comes to future transmission/broadcasting of live radio services (brands) and programmes.

This means that a future digital radio receiver should not be limited to one distribution channel only. Already today live audio services and additional data are also available on broadcasting systems like FM or over the Internet.

From the broadcaster perspective, a future digital radio receiver should offer the best of those worlds under one hood – offering the listeners a consistent radio experience without having to take notice or to make decisions about the best (or currently available) distribution channel.

For instance, if a listener is listening to DAB-radio while being on its way home from work, the radio should automatically switch to internet reception (e.g. using the indoor WiFi hotspot), when the listener steps into his house and DAB-signals may be breaking away. Also the device should switch to FM reception if the radio station isn't available on the Internet but can be received over FM (e.g. without additional data services).

In this sense a future radio receiver should also support service-following between DAB or FM to Internet radio services and vice versa. The mutual goal of both broadcasters and device manufacturers must be: to generate a consistent media experience for the listener. Therefore the work of international organisations like the Internet Media Device Alliance (IMDA) or RadioDNS should take up room in further conversations and deliberations.

On top of that aspect the next questions will soon arise: Which broadcasting technology should be preferred if more than one distribution channel is available? And how can broadcasters (the device manufacturers) tell the device how the ranking of should be in such a case?

Also broadcasters and device manufacturers should consider carefully which services are helpful and/or of strategic interest on a given hybrid receiver. For instance a DAB-enabled iPhone is basically a hybrid receiver but internet-based and broadcast-enabled in particular. A PURE Sensia is also a hybrid receiver but broadcast-based and internet-enabled. In the first case the listener can download interesting on-demand content from the internet using the corresponding data flat rate hence FileCollector may be superfluous here. In the second example the listener may also download on-demand content from the internet. But as the device has a fixed reception spot the strategic goal of using the broadcast channel and by implication decreasing the ISP/internet expenses predominates here.

## 6. Glossary

### **desktop receiver**

Describes a type of receiver that is part of a personal computer (e.g. USB-Stick, laptop with integrated radio receiver)

### **in-car receiver**

Describes a type of receiver that is (fixed) integrated in a car (e.g. car radio)

### **may**

This word, or the adjective "optional", means that an item is truly optional

### **must**

This word, or the terms "required", "mandatory" or "shall", means that the definition is an absolute requirement of the specification

### **must not**

This phrase, or the phrase "shall not", means that the definition is an absolute prohibition of the specification

### **portable receiver**

Describes a type of receiver that usually has a fixed location but could be moved to any other place and perhaps could be battery-operated (e.g. kitchen radio, bathroom radio, clock radio)

### **should**

This word, or the adjective "recommended", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course

### **should not**

This phrase, or the phrase "not recommended", means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label

### **smartphone receiver**

Describes a type of receiver which is integrated into a mobile/cell phone hence radio is not the primary function

### **stationary receiver**

Describes a type of receiver that is truly stationary (e.g. satellite radio receiver, entertainment cabinet)