

## DAB ContentServer™ Product Lines, Editions & Features

Symbols:	✓	Option is included in the package
	–	Option is not included but can be added to the package
	✘	Option can not be combined with the package

### Feature List / Functionality Overview

The RFmondial DAB ContentServer R6 is a highly reliable professional broadcast system for the DAB Digital Radio platform (Eureka 147 DAB) including DAB+, DAB Classic, and DMB (see [www.worlddab.org](http://www.worlddab.org)).

It supports the content and signalling options DAB offers and all interfaces for a smooth integration into the broadcast chain.

The RFmondial DAB ContentServer R6 provides triple functionality:

- **DAB AudioServer**  
with multi-stream real-time DAB+, DAB Classic, and DMB-Radio audio encoding
- **DAB Multimedia DataServer**  
supporting all standardized as well as broadcaster specific data services; covering import, processing, encoding and broadcast of data services, along with DMB Gateway functionality
- **DAB Ensemble/Service Multiplex Generator**  
managing the extensive DAB signalling capabilities, supporting STI-C input or output, generating the full digital DAB (Sub-)Multiplex and providing standard EDI/DCP output streams

#### The One-box DAB Broadcast Solution

The system is typically located in the studio, at a play-out center or at the transmitter site – with full remote control for administration and data provision, enabling cloud-based operation. The remote web interface featuring Fraunhofer's in-place-editing technology for quick and convenient system configuration can be accessed through any modern web browser, including individual user login via LDAP.

Depending on the selected Product Line, the output signal of the RFmondial DAB ContentServer R6 carries the complete DAB Ensemble or Service Multiplex signal (FIC, MSC) in EDI/DCP format according to ETSI TS 102 693 (Encapsulation of DAB Interfaces) and ETSI TS 102 821 (Distribution and Communications Protocol). This DAB Ensemble Multiplex can be fed simultaneously to any number of DAB Modulators/transmitter sites (with timing support for SFN single frequency network operation), and monitoring stations.

The RFmondial DAB ContentServer R6 is based on a highly reliable and secure operating system (Linux based), which remains invisible to the user.

#### RFmondial DAB AudioServer

This system component provides real-time encoding of multiple audio streams in parallel:

- Live analog and/or digital input
- File sources (mp3, wav, playlist)
- Audio over IP (AoIP) input: Livewire and AES67 (e.g. Ravenna)
- Backup Audio Source: auto-switch from missing live input to uploaded audio content
- DAB Classic encoding: MPEG Audio Layer-II, 24 or 48 kHz, mono, stereo, joint stereo, dual channel
- DAB+ and DMB-Radio encoding: MPEG-4 HE-AAC v2, all sample rates, mono, stereo, parametric stereo, incl. 5.1 surround
- Full PAD support
- MPEG Surround option with optional automatic real-time stereo-to-5.1 upmix using SX Pro®

#### RFmondial Multimedia DataServer

This component supports the import, collecting, merging, checking, conversion and encoding of data for all standardized DAB as well as broadcaster-specific individual data applications.

##### DAB data applications:

- DAB Dynamic Labels (incl. DL Plus, Intellitext)
- Journaline®
- MOT Slideshow (incl. categorized/interactive SLS)

- MOT Broadcast Website
- EPG/SPI (Electronic Progr. Guide)
- Filecasting
- TMC Traffic Message Channel
- TPEG Traffic Information

##### Open interfaces allow the transmission of any custom-tailored individual application at various protocol levels:

- Transparent File Transmission via MOT (with optional MOT Directory compression)
- IP Insertion (Internet Protocol tunneling)
- TDC Transparent Data Channel
- MSC Data Groups
- Packet Mode subchannel
- Synchronous / asynchronous stream mode subchannel (incl. audio subchannel)
- FIC Data Insertion (FIDC, SI, CA)

##### Versatile data import interfaces and automation features allow for a smooth integration into production environments:

- RSS/Atom import
- Customer-specific XML formats (option)
- Ftp, ftp-mirroring and http-mirroring (automatically scheduled or manually triggered)
- JSON-RPC and XML-RPC
- Web-interface for quick data editing using a standard web browser
- UECP, Funkhaustelegramm, Leitungsprotokoll and ZENON studio interfaces
- Socket interface for real-time data insertion (API + Win/Linux command line tools for data provision by clients)
- Protected connections for secure data import restricted to the

predefined data sources: ftps, ftps-mirroring, https-mirroring

#### DMB Gateway Functionality –

##### import methods comprise:

- live streams via real-time TCP/IP interface
- live streams via DMB UDP/IP unicast or multicast (Reed-Solomon calculated by ContentServer; bitrate adjustment)

Incl. support for DAB Enhanced Packet Mode (FEC protection) and MOT 2.1.1 (Multimedia Object Transfer) for enhanced file and directory structure transmissions.

#### DAB Ensemble Multiplex Generator

DAB signalling features are supported according to ETSI EN 300 401 (v.1.4.1) including the DAB dynamic reconfiguration feature.

##### General configuration options:

- Standard (FIG1/x) and Extended (FIG2/x) DAB labels
- Label character encodings: EBU Latin based set, UCS-2, UTF-8 (i.e. support for all international characters); general and per-label definition
- Unused MSC-CUs handling rules
- PAD Encoder flags for enhanced legacy-receiver compatibility
- DAB time signal format (short/long)
- STI-D/ETI subchannel extraction
- STI-C input or output option for autonomous and dynamic sub-multiplex management
- Extended STI-C: links one (redundant) Service multiplexer to multiple independent (redundant) Ensemble Multiplexers while maintaining full STI-C flexibility
- Resource management for Service Multiplexer input (CUs, FIC bitrate, DAB-IDs)
- Configuration of delay/ flags for individual modulators (MNSC)
- External remote audio encoders (including redundant setups) with full dynamic reconfiguration and PAD support

##### Multiplex configuration options:

- Ensemble ID, label (full/short), country, time zone
- Ensemble time zone (automatic daylight saving time adjustment)
- Transmission Modes I–IV
- Alternative frequency signalling (AFS) for the Ensemble
- Alarm announcement signalling

##### Service signalling options:

- Primary / Secondary service components
- Multiple audio PAD components
- Service ID, country (audio/data)

- Service Label, Primary and Secondary Service Component DAB Label (full/short)
- Program type (standard/ complementary, static/ dynamic)
- Dynamic PTy signalling (e.g. UECP)
- Service Component ID
- Service Component language (primary/secondary static/dynamic)
- Announcement Signalling (alarm, road traffic, transport, warning/service, news, area weather, event, special event, programme, sport, financial, proprietary IDs)
- Service AFS (alternative frequencies individual DAB service, service linking to DAB, DRM, AM, AMSS, FM, FM-RDS services)
- Signalling of (in-)active Linkage Sets

##### Output Signal Management:

- Extended broadcast info (Ensemble configuration, FIG layout)
- Live monitoring of the DAB Ensemble Multiplex Generator output signal through the web interface, as a receiver would decode and present the data (Dynamic Labels (incl. DL Plus, Intellitext), Journaline, Slideshow decoding incl. transmission statistics; audio streams via HTTP)
- Recording of the DAB Ensemble Multiplex Generator output signal (ETI/STI) and file-download through the web interface; the duration can be pre-defined
- Powerful and complete in-depth analysis of any EDI, RDI, STI, ETI file, including format conversion and subchannel extraction

#### Advanced System Features

##### Redundancy Group Feature

- Connects two or more ContentServers to one Redundancy Group
- Full failover – each group member independently generates frame-synchronous and co-timed EDI
- Group-wide synchronized dynamic reconfigurations
- Single user interface – automatic internal replication of broadcast configurations, schedules, and uploaded broadcast content
- Mutual system health and availability checks among members
- Audio Cross-Redundancy: the encoded audio stream from another Redundancy Group member replaces a failing/missing audio source

##### EFW – Emergency Warning

##### Functionality:

- Full support of EFW for immediate mass-notification of listeners via DAB in cases of pending disasters: emergency audio programme via DAB+/DAB Classic, Journaline for detailed multilingual text instructions and geo-region definition, alarm

announcement, AFS and TII signalling, dynamic reconfigurations

##### Automatic broadcast configuration scheduling:

- Global broadcast calendar
- Multiple weekly calendars
- Manual, SNMP triggered, URL triggered, JSON/XML-RPC triggered or pre-scheduled broadcast activation / reconfiguration

##### Sound system configuration:

- Live audio level monitoring
- Live audio playback via web browser
- Audio amplification setup
- Continuous and configurable clipping and silence detection for all audio input signals
- Opt'1 mp3 normalization on import

##### Powerful security features:

- Professional firewall to separate the potentially public content contribution from the protected system administration and DAB Ensemble Multiplex distribution to DAB Modulators/transmitters
- Secure connections for system administration and data contribution access

##### Continuous system self-monitoring & status reports

- Detailed system status information via HTML web interface
- System status signalling via e-mail report system, local console and SNMP
- Web interface access to detailed log files for inspection and download
- System configuration backup and restore mechanism (remote / local)
- Monitoring of attached uninterruptible power supplies (UPS)

##### Contribution Network Monitoring:

- Short- and long-term statistics of incoming and outgoing data streams
- Covers EDI based in- and output (STI, ETI) & external audio encoders
- Validity checks and comparisons for redundant input/output streams

#### Infrastructure and Setup

The RFmondial DAB ContentServer is typically deployed as a highly reliable and redundant 24/7 server hardware system.

Administration, system configuration and data provision are based on Ethernet network or modem dial-in connections for a **completely remote operation**. A detailed user management (incl. LDAP integration) is provided to control system access and data contribution sources.

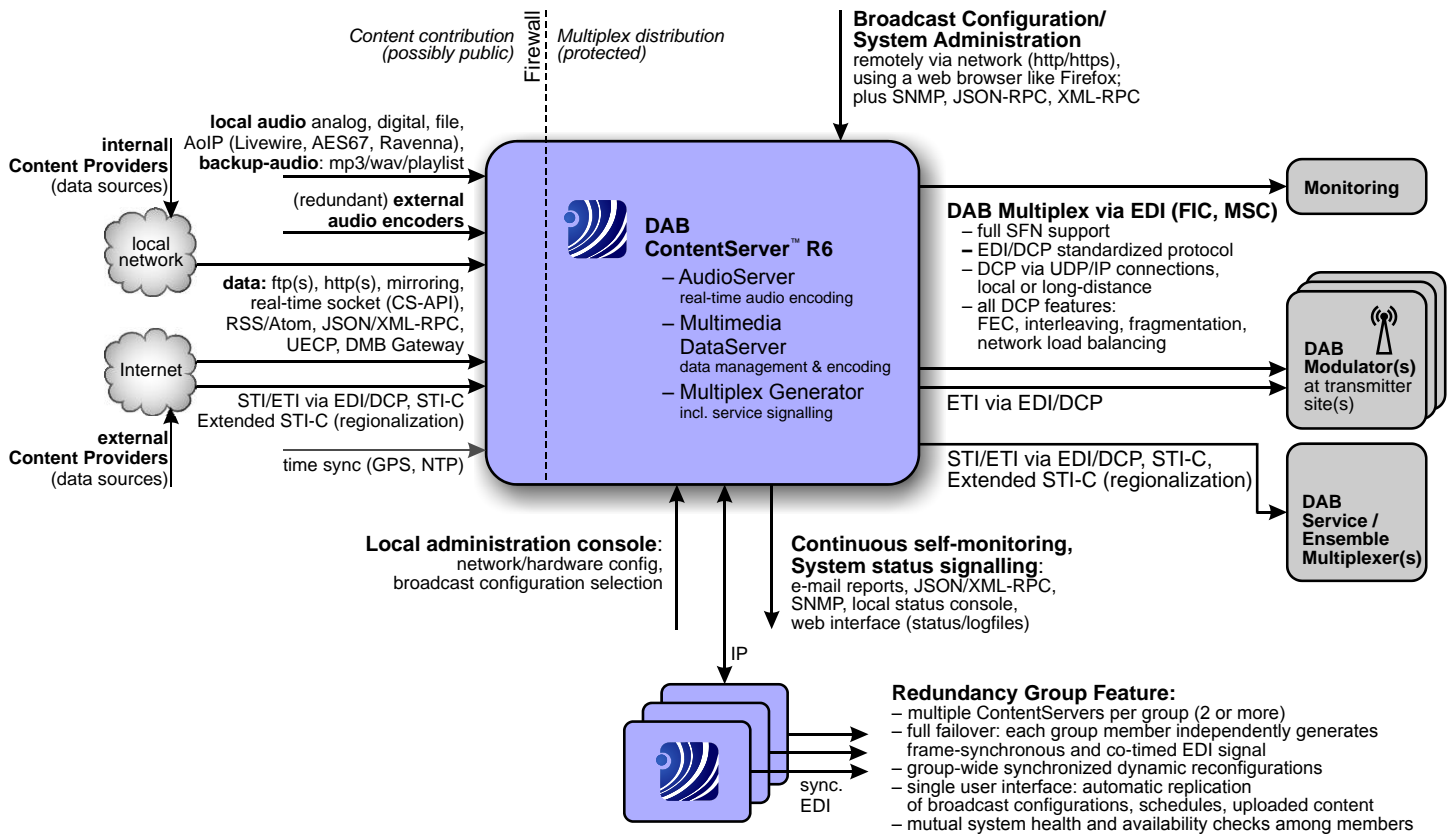
The strong firewall functionality guards access to the system. The Professional Firewall option enables the configuration of multiple network cards, VLAN, multi-homing, and port bonding.

In addition a local console display is supported to locally activate configurations, to monitor the system

status and to setup the basic hardware parameters (such as network settings).

If the EDI/DCP output signal of the DAB ContentServer shall be fed simultaneously to a virtually unlimited number of DAB Modulators/transmitters operating in SFN mode (single frequency

networking), the system must be time-synchronized. Supported synchronization methods are direct GPS receiver input via serial line (see list of supported models), or NTP access (network timing protocol) via IP network.



## Product Lines

To complement individual needs and infrastructure requirements, the RFmondial DAB ContentServer is available in various configurations to allow for a most flexible combination and individual setup of the broadcast chain.

A DAB ContentServer can either be operated as a **DAB Ensemble Multiplexer** or as a **DAB Service Multiplexer** (each option with or without integrated audio and data encoders).

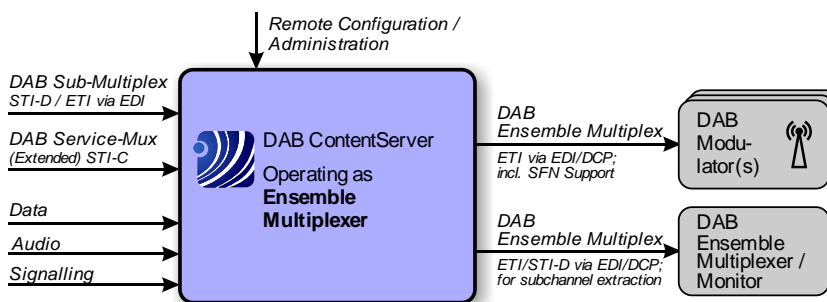
- **RFmondial DAB ContentServer R6 – Ensemble Multiplexer**

Combines audio encoding, multimedia and data service management, and DMB gateways with a DAB Ensemble Multiplex generator to a **full single-server DAB head-end solution**. The output format is a complete DAB ensemble multiplex signal (ETI) via standard EDI/DCP interface for direct delivery to DAB modulators.

Optionally DAB subchannels can be extracted from ETI or STI-D input streams provided via EDI.

Optionally STI-C is available as an input option to accept autonomously generated DAB sub-multiplex signals from DAB Service Multiplexers.

Multiple Ensemble Multiplexers can operate as a Redundancy Group, i.e. offering a single configuration and data upload interface, while generating frame-synchronous EDI output signals with enhanced status signaling for instant switching by the EDI/ETI converter or DAB Modulator – keeping a continuously modulated signal on-air.

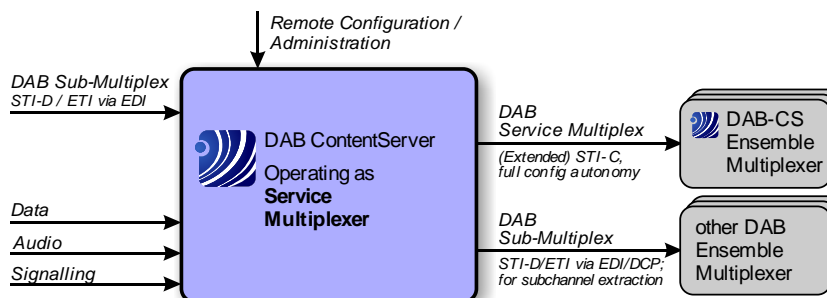


- **RFmondial DAB ContentServer R6 – Service Multiplexer**

Combines audio encoding, multimedia and data service management, and DMB gateways with a DAB Service Multiplex generator. The output format is a DAB sub-multiplex signal (ETI or STI-D) via standard EDI/DCP interface for direct delivery to a DAB Ensemble Multiplexers.

STI-C output allows for autonomous configuration and dynamic reconfiguration of the full service multiplex signal within the limits defined by the Ensemble Multiplexer.

Multiple Service Multiplexers can operate as a Redundancy Group and feed their output signal (including STI-C support) to a set of Ensemble Multiplexers (operating as a Redundancy Group themselves).



## Editions

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The RFmondial DAB ContentServer R6 in the form of multiple Editions:  
Basic and Professional for regular broadcasting,  
and Developer for receiver and broadcast equipment development and testing.

All Editions share all basic DAB functionalities, but each Edition provides a different level of enhanced system functionality as a starting point to accomplish typical user scenarios.

All editions can be extended easily with additional features at any time after the initial purchase.

- **Basic Edition**  
A starter kit for smaller broadcasters with the option of future extension to satisfy new requirements.
- **Professional Edition**  
Extends the Basic Edition by adding professional automation features, and provides the full range of broadcaster-specific data transmissions as well as standardized multimedia applications.
- **Developer Edition**  
In addition, the Developer Edition provides support for the quick and efficient development and testing of DAB receivers and broadcast equipment. Based on the **Ensemble Multiplexer product line**, it makes the complete functionality of the DAB system with regards to signalling and transmittable content available for laboratory use (including dynamic reconfigurations), enabling a close to 100% test coverage. A full broadcast chain with RF output can be setup easily in combination with a DAB Modulator.

Product Line	Edition (option package)		
	Ensemble Multiplexer or Service Multiplexer		
Available options	Basic	Professional	Developer
<b>General System Features</b>			
Firewall Basic	✓	✗	✗
Firewall Professional (configuration of multiple network cards, VLAN, multi-homing, network port bonding)	–	✓	✗
Support for serial devices (GPS receiver, modem, etc.)	✓	✓	–
Automatic leap second handling	✓	✓	✓
System checks (continuous self-monitoring)	✓	✓	✗
System config backup (at console)	✓	✓	✓
System configuration remote up-/download	✓	✓	✗
E-mail reports (admin & Content Providers)	✓	✓	✗
SNMP interface	✓	✓	✗
Security Summary (network config overview)	–	✓	✗
Remote System Update (via web GUI)	–	✓	–
Redundancy Group Feature	✓	✓	✗
Audio Cross-Redundancy (requires Redundancy Group)	–	✓	✗
ETI/STI/EDI/RDI Analyzer/Converter	–	–	✓
<b>Data Input / Output Options</b>			
STI-C output option [Service Multiplexer only]	✓	✓	✗
STI-C input option [Ensemble Multiplexer only]	–	✓	✗
Extended STI-C (requires STI-C)	–	✓	✗
Number of EDI (ETI or STI-D) inputs (subch. extraction)	–	2	–
DCP input/output monitoring (network analyzer)	–	–	–
<b>Multiplex Configuration &amp; Management</b>			
Unlimited simultaneous DAB Multiplex configuration definitions	✓	✓	✓
Broadcast Scheduler (weekly/calendar)	–	✓	–
Announcement support (via UECP, Funkhaustelegramm, Leitungsprotokoll, HTML interface, [JSON/XML-RPC])	–	✓	✓
AFS – Alternative Frequency Editor	–	✓	✓
TII & Region Definitions Editor	–	✓	✓
Extended broadcast info (Ensemble configuration, FIG Layout)	–	✓	✓
Multiplexer output live monitoring (audio/subchannel HTTP streaming; Dynamic Label, Journaline, Slideshow decoding)	–	✓	✓
Multiplexer output ETI / STI recording	–	✓	✓
Support for external audio encoders (MuxEnc)	–	✓	–
<b>DMB Gateway</b>			
DMB audio/video stream inputs (1, 3, or unlimited)	–	–	–

Product Line	Edition (option package)		
	Ensemble Multiplexer or Service Multiplexer		
Available options	Basic	Professional	Developer
<b>DAB AudioServer<sup>(1)</sup></b>			
Audio input live analog and/or digital	✓	✓	✗
Audio-over-IP (AoIP) input: Livewire and AES67	✓	✓	✗
Audio file source: mp3, wav, playlist	–	✓	✓
Backup/Standby Audio Source	–	✓	✗
Silence/clipping detection and configuration	✓	✓	–
Audio input signal amplification/ mp3 normalization	–	✓	–
DAB Classic encoders (Layer II) [max. 64]	–	–	–
DAB+ encoders [max. 64]	–	–	1
DMB-Audio/Radio encoders [max. 64]	–	–	–
DAB Surround option incl. SX Pro (SX Pro enhances stereo signals on-the-fly to 5.1 for surround broadcast)	✓	✓	✓
<b>Multimedia DataServer</b>			
Data Application Types			
Dynamic Labels	✓	✓	✓
Dynamic Labels Plus (DL Plus), Intellitext	–	✓	✓
Journaline®	✓	✓	✓
MOT Slideshow (incl. categorized/interactive SLS)	✓	✓	✓
SPI / EPG – Electronic Programme Guide	–	✓	✓
MOT Broadcast Website/ Transparent File Transmission	–	✓	✓
Filecasting	–	✓	✓
TPEG Traffic Information	–	✓	✓
TMC – Traffic Message Channel	–	✓	✓
IP Insertion	–	✓	✓
TDC – raw data (broadcaster-specific data on various protocol level; incl. FIC signaling)	–	✓	✓
FIC Data Insertion (FIDC, SI, CA)	–	✓	✓
Support for multiple transmission priority classes	✓	✓	✓

Product Line	Edition (option package)		
	Ensemble Multiplexer or Service Multiplexer		
Available options	Basic	Professional	Developer
<b>Data Import Methods</b>			
Import via HTML interface (web GUI)	✓	✓	✓
Import via file FTP upload	✓	✓	✓
Import from existing RSS/Atom sources (Journaline <sup>®</sup> )	✓	✓	✓
Import from existing RSS/Atom sources (Dynamic Labels)	–	✓	–
Import via HTTP/FTP mirroring	–	✓	–
Import via JSON-RPC, XML-RPC	–	✓	–
Import via live socket connection (API)	–	✓	✓
Import from Funkhaustelegamm, UECP, Zenon, Leitungsprotokoll (Dynamic Labels + Journaline <sup>®</sup> )	–	✓	–
Automatic Scheduled Mirroring option	–	✓	–
Secure data import connections	–	✓	✘

<sup>(1)</sup> DAB AudioServer options are available when at least one (internal) audio encoder license is activated for the system



## Remarks

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### Software Maintenance Options

Every ContentServer license listed above **includes 24 months of free SUS – Software Update Support.**

After this period, the software maintenance can easily be continued on an annual basis.

If Software Update Support shall be enabled for a system that is not currently covered, please contact your OEM Partner for an individual quotation.

### Spare System License (Redundancy)

A spare system is a fully functional Fraunhofer DAB ContentServer standby system for backup purposes, typically operated as part of a Redundancy Group with a regular system. The spare system may be used to replace any standard system licensed to the same company. Depending on the backup philosophy of the company, one spare system may be sufficient to cover multiple standard systems.

The following license restrictions apply:

- Spare system licenses are not supported for the Developer Edition.
- The spare system must not be operated except as a replacement for a regularly licensed standard system. It must not be operated by another company than the one owning the standard system's license.
- The replaced standard system must be non-functional during the time of the replacement (e.g. hardware failure). It is not sufficient to just manually or temporarily switch off a standard system.
- The spare system must not be sold or lent to any third party.

### General Remarks

- The 'Editions' table only mentions those features that are different among the available Editions. The standard features shared between all Editions of the Fraunhofer DAB ContentServer are contained in the general product description above ('Feature List').
- All Editions can be installed on suitable server hardware.  
A list of required and recommended hardware components is available upon request.
- **All Editions can easily be extended by additional options (features).**
- **Special license restrictions apply to the Developer Edition:**
  - The system is licensed for development purposes only.
  - The system must not be used for regular or commercial broadcasts on air.
  - The system must not be sold or lent to any third party.
- **Customer training on the Fraunhofer DAB ContentServer,** on Eureka 147 DAB and Multimedia Services is available upon request.