Digital Radio Mondiale

WEBINAR
June 24th 2013

The Flexible Way from FM to Digital
Ruxandra Obreja
Chair of the DRM Consortium, Head of Digital Radio Development, BBC World Service, UK
Moderator

Hal Kneller
Digital Radio Consultant
1 – What is DRM?

Hermann Zensen
Sales Manager, Digidia, France
3 – Brittany and Agora DRM+ Trials

Eivind Engberg
Chief Engineer, Radio Metro, Norway
4 – Norway DRM+ Trial

Alexander Zink
DRM-SB, Vice Chair DRM Technical Committee
Senior BDM Digital Radio Digital Radio at Fraunhofer IIS, Germany
2 – Key Features of DRM
5 – How To Introduce DRM+ – Considerations
6 – Compatibility with other standards – Seamless digital solution

www.drm.org
1 – What is DRM?

Speaker

Hal Kneller
Digital Radio Consultant
• **Digital Radio Mondiale (DRM)** is the only global open digital radio system which can be used in all frequency bands *(AM and VHF)*.

• **DRM system** can be used to cover large geographic areas as well as rural and local markets and when on the move. A low power local service option is also available.

• **DRM receivers** are simple and easy to use with better audio quality and Multimedia applications.

• DRM fits with **existing broadcast channelization** and enables broadcaster-controlled infrastructure.

• The DRM standard is **ITU recommended** for worldwide adoption on all frequencies.

• DRM complements and **works seamlessly with other digital radio standards**
Global Digital Radio standard endorsed by ITU
Only global open standard recognised worldwide
Applies equally for AM and FM → in HF and VHF high quality audio
Can cover large geographic areas as well as rural and local markets
Up to 4 programmes on 1 frequency
Option for stereo and even 5.1 Surround sound (Bollywood content!)
Offers more than audio: Data and Multimedia (images, text, news, …)
Emergency & Disaster Warning Alerts
DRM above 30 MHz VHF
(Band I, II – FM band, III)

DRM below 30 MHz LF, MF, HF
(or LW, MW, SW) – the AM bands

BOTH MODES (DRM30 and DRM+) SHARE ALL DRM FEATURES!
Where DRM fits – Coverage Needs

- HF, (MF at night) – many 1000’s km
- MF daytime – many 100’s km
- VHF band III – line of sight
- VHF band II (FM) – many 10’s km
• **ETSI standard ratified** in 2009

• **Endorsed by the ITU** in 2011 “ITU-R Rec. BS.1114 (system) and ITU-R Rec. BS.1660 (planning parameters)

• **More content and choice**: up to four programmes on one frequency
  The new digital transmissions can also co-exist with the current analogue broadcasts.

• **Worldwide spectrum compatibility**: 100 kHz bandwidth

• **Useful content bit rate**: 37-186Kbps

• **Easier tuning and selection of programming**: e.g. station selection by brand not frequency and automatic switching between different transmitters and standards to give continuous service.

• **Worldwide tests**: Already tested in Asia Pacific, Europe and Brazil
2 – Key Features of DRM

Speaker

Alexander Zink
DRM-SB, Vice Chairman DRM
Technical Committee
Senior BDM Digital Radio,
Fraunhofer IIS, Germany
The DRM Key Features are common to the full DRM Standard – whether DRM30 and DRM+
**More choice for listeners**
- Up to 4 programmes on 1 frequency
- Simulcast analog / digital

**Excellent audio quality**
- No distortion
- Stereo and 5.1 surround sound

**Good coverage area and robust signal**
- Supporting SFN (Single Frequency Networks)
- Green and energy efficient

**Multimedia Applications**
- Great listener benefits
- Extra revenue opportunities for broadcasters

**Automatic tuning**
- by station name, no longer by frequency
- re-tunes when leaving coverage area

**Emergency warning & alert**
- All stations switch, present audio and text information
MPEG Surround

- Enables true 5.1 surround services (sports, jingles, ads, concerts, ...)
- Very small embedded audio-data channel
- Compatible with all stereo/mono receivers

Mono → Stereo → 5.1 Surround
past       present      future!
DRM – More than Audio

- **DRM Text Messages** – Programme accompanying labels (Unicode)
- **Journaline** – Text based information service (Unicode)
  Easy access & “Hot Button triggers” interactivity:
  - Web pages (sites)
  - Phone numbers
  - SMS / E-mail
  - Links to other Journaline or DRM services pages
- **MOT Slide Show** – Graphics with Animation
- **EPG** – Electronic Programme Guide
- **TPEG / TMC** – Traffic Information

→ Great potential for new revenue sources!

[www.drm.org](http://www.drm.org)
DRM is Excellent in Multimedia

Main menu

DRM Radio menu

Journaline, live information

Pictures menu

Videos

www.drm.org
Application: Emergency Information

- Natural disaster strikes → local communications infrastructure is OFF
- Digital radio broadcast → reaching trouble spots from a distance – no dependency on local infrastructure
Emergency Warning & Alert

DRM Emergency & Disaster Warning
- All receivers switch, present audio and text information
- Should be mandatory feature for all radios

Use case:
- Immediately spreads urgent information
- E.g. to be used in case of natural disasters or pending catastrophes (earthquakes, tsunamis, …)

Benefits:
- Deploys wide-spread radio sets
- Provides spoken announcements on alert channel
- Provides detailed textual information (Journaline) for immediate look-up by listeners, explaining alert reason and behaviour recommendat.
- Textual information to be multi-lingual/-script
AIR Emergency Broadcast

What is going on?
A major tsunami is expected for the Mumbai region at 16:00 today.
The tsunami will hit the

What do I need to do?
1. Move away from shore!
2. Evacuation has started.
Find the nearest meeting point: Look for green

Information in English

What is going on?
What do I need to do?
Where can I get help?

What is going on?
A major tsunami is expected for the Mumbai region at 16:00 today.
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What do I need to do?
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Find the nearest meeting point: Look for green
3 – Brittany and Agora DRM+ trials

Speaker

Hermann Zensen
Sales Manager, Digidia, France
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<td>Kroas Ar Vossen</td>
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<tr>
<td>Code postal</td>
<td>29470</td>
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<td>Latitude GPS</td>
<td>48° 21’10&quot; W</td>
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<tr>
<td>Longitude GPS</td>
<td>04° 24’02&quot; N</td>
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<tr>
<td>Height</td>
<td>95 meters above sea level</td>
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<td>Autosupporting power (see photo)</td>
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<td>Bande II Antenna</td>
<td>Used frequency: 107.7</td>
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<td>Type</td>
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<td>Polarisation</td>
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Operators: DIGIDIA and Telecom Bretagne (Engineer University in Brest)
DIGITAL radio mondiale

The FUTURE of global radio

Dipôle Simple Bande II

Feeder Câble 7/8

Abri Technique Cougnau
DRM+ Transmission Chain

ALTO+ Content Server DIGIDIA

Soprano+ Modulator DIGIDIA

FlexStar RF Booster Harris

ZX1000 HD/FM TX Harris

Cavity Filter

MDI UDP/IP

RF 107.7MHz 0dBm

RF 107.7MHz 0.4 W

RF 107.7MHz 100 W
Serveur de contenu DRM+ ALTO+ de la société DIGIDIA

Modulateur DRM+ SOPRANO+ de la société DIGIDIA

Pré-amplificateur FM/HDRadio FlexSTAR de la société HARRIS

Amplificateur FM/HDRadio ZX 1000 de la société HARRIS
Coverage Planning Tool with Atoll

Projet OCEAN
Site: Plougastel Daouglas
300 W RMS PAR - Bande II

Couverture par niveau de champ
- >=80 Seuls en dBuV/m
- >=53 Seuls en dBuV/m
- >=48 Seuls en dBuV/m
- >=42 Seuls en dBuV/m
- >=37 Seuls en dBuV/m
- >=32 Seuls en dBuV/m
DIGITAL radio mondiale

The FUTURE of global radio

DRM Plus

Drm Plus Control Interface

UART COM Port: COM5
USB Connect
Version: KETI:DrmPlusV100824
PckCNT:186828[E:2]

Service Frequency Tune
107700 kHz

RF Status
LNA ON
RSSI: -31.0 dBm
-58 dB

Receiver Status
Symbol Sync
Frame Detection
Equalizer
OFDM Lock
FAC CRC
SDC CRC
MSC Decoding
Source Decoding

Synchronization Status
Robustness Mode: E [FrmCnt: 0]
Spectrum BW: 100kHz
Frequency Offset: 2446.465 Hz
Sampling Offset: 1.018 ppm
Estimated SNR: 29.600 dB

SDC Mode: 4-QAM r=1/4
MSC Mode: 16-QAM SM
Data Rate: 149.070 kbps

Stream Information
Num of Stream: 3
Total Data Rate: (105.26 kbps)

Part A
Protection Level: One Protection Level (EEP), MSC Code Rate All = 0.50
R0 = 1/3, R1 = 2/3

Service Select
Audio [ DIGIDIA Radio+ ] Stereo 48kHz (45.26 kbps)
Application [ SlideShow ] Packet Mode (20.00 kbps)
Audio [ ] Stereo 48kHz (40.00 kbps)
No Service

Text Message
Welcome to DIGIDIA training.
Audio Frame Rate: 0.0000e+000
[ 0 / 44,225 ]

www.drm.org
Masque DRM+ défini par la norme

Center 107.7 MHz
100 kHz/
Span 1 MHz

Date: 7.MAR.2013 06:12:05
1. perfect

2. multi traject

3. can still be heard

4. High Power Interferer

www.drm.org
Coverage in 4 QAM and 16 QAM

16QAM
10 km coverage

4QAM
15 km coverage
Nice DRM+ Trials in Band I (60 MHz)
Name of site: Mont de l'Ubac
Operator: Agora FM
Head Engineer: Andre Scandale
Multi Antenna Tower

- DAB
- FM
- Band 1 Antenna for DRM+
Transmission Set up
Own developments
- ¼ L Groundplane antenna
- Up converter in front of KETI Receiver from 60 MHz to Band 2, with 3 cavities of 60 MHz, 2 Mos FETs and 1 Oscillator of 4 to MHz
Measurements Nice - St Laurent du Var - Cagnes - La Fontonne - Antibes
Find more information in French language under

http://agoradrmplus.canalblog.com/

Andre Scandale
4 – Norway DRM+ trial
In Band II

Speaker
Eivind Engberg
Chief Engineer
Radio Metro, Norway
DRM+ Transmission in Norway

- Transmits from the Tyholt tower in Trondheim
  FM 94,0 MHz
- Transmitter in use: Nautel VS300+VSDRM
- Current output power: 25W
- Antenna in use: Sira FMC-01
- Combiner in use: Delta Meccanica star point combiner
Using Fraunhofer DRM ContentServer in two modes:
- 4QAM – One audio channel and three Journaline services
- 16QAM – Three audio channels and one Journaline service
• Journaline Service provides news via the DRM system
• Simple RSS feed from internet feeds the receiver, can also be used to send newspapers on DRM

Tom Morello Joins Agit8 With 'Flesh Shapes the Day' Live

"I don't have 10 more woot-woots in me" Tom Morello jokes after banging through a ferocious version of his "Flesh Shapes the Day" at the YouTube Studios in LA. It's a Tuesday afternoon middle of the day and Morello has fought through traffic to get to the Playa Del Rey...
Planned coverage analysis during the fall of 2013

- Applied license to increase output power to 100W
- Adjustments need to be done in combiner/transmitter
- With help from BBC and Delta Meccanica
5 – Considerations for Introducing DRM+

Speaker

Alexander Zink

DRM-SB, Vice Chairman DRM
Technical Committee
Senior BDM Digital Radio,
Fraunhofer IIS, Germany
Why Digital Radio?

A – Public Broadcaster:

- Additional radio programs / audio content
  (e.g. special-interest content)

- Internet news
  get text content into radio sets

- Disaster Warning feature
  to quickly alert the public through all radio sets
B – Private Broadcasters:

→ Secure radio future in **Digital Era**

→ Benefit from **new revenue opportunities**

→ Link with **online resources**
  (web sites, social media, etc.)

→ Linking with **Disaster Warning**
  (typically provided by public service)
Considerations for DRM+ Introduction

- **Simulcast** during transition period
- Fits with *existing frequency assignment*
- No change in *frequency licensing* required
- Complete *planning parameters* @ ITU

**Recommended values:**

\[ \Delta f = \text{min.} \ 150 \ \text{kHz} \]
\[ \Delta P > 20 \ \text{dB for } \Delta f = 150 \ \text{kHz} \]
1. **Communication !**
   - Decide upon a **fixed launch date**
   - Communicate launch date in advance to receiver manufacturers
   - Educate + excite public & listeners

2. **Political support !**
   - Make **DRM Disaster Alert** feature mandatory for all new radio sets
   - In future potential decision for analog sunset date

3. **Content !**
   - Create **exclusive audio + data** offers
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**Public Launch: Digital Radio**
- DRM & content on air
- Receivers in stores
- Consumer info (broadcast, retail)
6 – DRM & DAB+
The Open Standard Digital Radio Family

Speaker

Alexander Zink
DRM-SB, Vice Chairman DRM
Technical Committee
Senior BDM Digital Radio,
Fraunhofer IIS, Germany
DRM is the digital radio standard that complements and works seamlessly with other digital radio standards.
• **DAB+** is an efficient solution for local/regional terrestrial broadcast in case of many services with identical coverage area (multiplex transmissions)

• **DRM+** is the efficient local/regional terrestrial broadcast solution for individual services or coverage needs, with broadcaster-controlled transmissions (individual-service transmissions)

• **DRM30** is the terrestrial broadcast solution for large-area MW or SW coverage (individual-service transmissions)

⇒ **DRM and DAB+ provide complementary solutions**
Most core functionality is shared:

- Mobile terrestrial broadcasting with SFN
- Audio codec (MPEG-4 HE-AAC v2)
- Data applications
- Mutual service linking (AFS)
- Open & ITU recommended standards

✓ Listener + broadcaster perspective:
  DAB+ and DRM offer equivalent functionality

✓ Efficient implementation of combined receivers + chipsets
  (Frontier Silicon, NXP, PNP, Parrot, …)

✓ DRM+ does not add any IP royalty on top of DAB+ & DRM30 receivers!

www.drm.org
DRM and DAB+ offer identical features:
- One Digital Radio Family

DRM+ adds the individual-service perspective:
- Complementing DRM30 and DAB+

DRM & DAB+ are open standards:
- ITU recommended

Combined receiver implementations are cost-efficient and straightforward:
- DRM+ does not add IP royalty cost to a DAB+ / DRM30 receiver

DRM and DAB+ combined serve all digital radio broadcast scenarios
Leaves individual choice to broadcaster
Ruxandra Obreja  
DRM Chair,  
Head of Digital Radio Dev.  
BBC World Service, UK

Hal Kneller  
Digital Radio Consultant,  
USA

Hermann Zensen  
Sales Manager  
Digidia, France

Eivind Engberg  
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projectoffice@drm.org
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