“Digital Radio Mondiale – clever solution for smart countries”

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Lagos
DIGITAL RADIO MONDIALE
Greener, feature-rich broadcasting
The DRM Consortium

• Founded in 1998 by international organizations in China to promote the adoption of the DRM standard worldwide

• Not-for-profit

• Around 100 international members
  (broadcasters, manufacturers, network operators, regulators, research institutes, etc.)

• Experts and technologists
  ready to give expert, objective advice on the technology

• Open to companies, organisations, associations and individuals who can join at any time

For joining the DRM Consortium, write to: projectoffice@drm.org
Selection of DRM Consortium Members

The not-for-profit DRM Consortium supports and promotes the DRM Standard and its take-up globally.
DRM – Key Facts

• Global **standard** for terrestrial Digital Radio

• Enables local, regional, national, international **coverage**
  (in broadcast bands AM & FM/VHF)

• Digital-only or **simulcast** operation (with AM or FM analogue signal)

• Transmission equipment and multi-standard receiver chips / car model **readily available**, with **upgrade path** for existing AM/FM transmitters!

• **ITU endorsed** for worldwide operation

• All details **openly standardized** (ETSI) and published,
  Not controlled by a single company/organisation – No licenses required

• **Recommended by EBU** (R138: DRM / DAB+ complementing each other)

• Works **seamlessly with DAB(+)**: shared apps, service linking, etc.

www.drm.org
DRM is the Global Digital Radio Standard for all Bands Below and Above 30 MHz!

For AM broadcasting bands up to 30 MHz:
- Large coverage areas
- Robust against fading and interference

For all VHF broadcasting bands above 30 MHz:
- Large/ regional coverage
- Option to enhance radio spectrum (bands I/III)

DRM30

FM

100 kHz 1 MHz 10 MHz Frequency 100 MHz 10 GHz
DRM for all Bands! Below and above 30 MHz!

DRM for local / regional coverage (DRM+ mode)
(Band I, II – FM band, III)

DRM for medium/large area coverage (DRM30 mode)
(or LW, MW, SW) – the AM bands

DRM Digital Radio standard – One single standard:
Same key features throughout
DRM for Large-Area Coverage (DRM30 Mode)

- Offering **FM like sound quality** with large-area coverage (no more fading, crackling, distortions)

- The only standard for all the AM bands:
  - Using similar techniques developed for Digital Terrestrial Broadcast TV (DVB-T)
  - **ETSI standard ratified** in 2003
  - **Endorsed by the ITU** in 2002
- **Worldwide spectrum compatibility**: 9/10, 18/20 kHz bandwidth
- **Useful content bit rate**: up to 72 kbps
- **Worldwide in operation**
- **Covers large areas using a single frequency**: good for rural coverage and on the move
- **Significant Cost Savings**: Green and energy efficient

[www.drm.org](http://www.drm.org)
Coverage AM Analog vs DRM30

AM analog vs. DRM – same coverage, 1 tx

AM Coverage
100kW MW transmitter

600km

235 000 km²

DRM Coverage
100kW MW transmitter
-> 40kW DRM

600km

235 000 km²

Note: Conservative calculation! ITU suggests 20 kW DRM for same coverage.
Energy used – Same Coverage

TX on air power in kW:
- **AM**: 142 kW
  - Based on AM Modulation 70%
  - Efficiency = 90%
  - 1 Audio channel
- **DRM**: 50 kW
  - DRM30 operation: same coverage, 1-3 Audio channels + Data (Multimedia)

Energy Saving:
- 92 kW or 64% less
AM analog vs. DRM – same coverage, 1 tx

AM analog MW: 142 kW, 1 service

DRM on MW: 50 kW, 1–3 services
(4 max)

Note: Conservative calculation! ITU suggests 20 kW DRM for same coverage.
Same coverage – FM vs DRM30

Min. 15 FM transmitter

FM Coverage
Min. 15 x 10kW FM

1 2
3 4 5
6 7 8 9
10 11 12
13 14

600km

1 DRM transmitter (MW)

DRM Coverage
100kW MW transmitter
-> 40kW DRM

600km

www.drm.org
Same coverage – FM vs DRM30

Min. 15 FM transmitter

FM Coverage
Min. 15 x 10kW FM

FM analog:
15+ tx,
250 kW total,
1 service!

600km

150kW @ 60% efficiency
-> 250kW (+ modulation)

1 DRM transmitter (MW)

DRM Coverage
100kW MW transmitter
-> 40kW DRM

DRM on MW:
1 tx,
50 kW total,
1–3 services
(4 max)

600km

40kW @ 80% efficiency
-> 50kW (up to 3 service)

www.drm.org
Same coverage – FM vs DRM30

**Coverage of 1 Tx (km²)**

- **AM / DRM (100 kW tx)**: 235,000
- **FM (10 kW tx)**: 4,418

**# Tx (same coverage)**

- **50kW DRM ↔ 250kW FM**: 1
- **FM**: 15

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**5 times more energy for same coverage**

- FM area not complete covered (still gaps between the circles)

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[www.drm.org](http://www.drm.org)
DRM for Local/Regional Coverage (DRM+ Mode)

- **Most recent** global digital radio standard in **all the VHF bands:** Band I, Band II (FM-Band), Band III

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

- **ETSI standard ratified** in 2009

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

- **Useful content bit rate:** 37—186 kbps

- **Worldwide tests & in regular operation:** already tested in Asia Pacific, Europe and Latin America

- **Significant Cost Savings:** Green and energy efficient

- Transition path for established FM networks
Implementation of DRM+
Example:

- Gatesair Flexiva Digital Modulator Card
- Can be retrofit afterwards
- into each existing Flexiva FM Transmitter
Migration Costs FM to DRM+
# Typical Generic Cost Scenario – High Power

<table>
<thead>
<tr>
<th>Scenario: network with 10 tx sites</th>
<th>FM replacement</th>
<th>DRM+ on existing FM site</th>
<th>DRM+ upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power level (TX)</td>
<td>10 kW</td>
<td>1 kW</td>
<td></td>
</tr>
<tr>
<td>Transmitter</td>
<td>$ 40,000</td>
<td>$ 20,000</td>
<td>$ 10,000</td>
</tr>
<tr>
<td>Mask Filter</td>
<td>$0</td>
<td>$ 1,000</td>
<td>$ 1,000</td>
</tr>
<tr>
<td>Cooling System</td>
<td>$ 5,000</td>
<td>$ 2,000</td>
<td>$ 0</td>
</tr>
<tr>
<td>Antenna &amp; RF Line, Installation</td>
<td>Exists</td>
<td>Exists</td>
<td>Exists</td>
</tr>
<tr>
<td>TX Installation</td>
<td>$ 5,000</td>
<td>$ 2,000</td>
<td>$ 2,000</td>
</tr>
<tr>
<td><strong>Total site cost (per site)</strong></td>
<td><strong>$ 50,000</strong></td>
<td><strong>$ 25,000</strong></td>
<td><strong>$ 13,000</strong></td>
</tr>
<tr>
<td>Head-End (1x for network)</td>
<td>$ 0</td>
<td>($ 20,000)</td>
<td>($ 20,000)</td>
</tr>
<tr>
<td>No. of programs</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Cost per programme &amp; site</strong></td>
<td><strong>$ 50,000</strong></td>
<td><strong>$ 8,300</strong></td>
<td><strong>$ 4,300</strong></td>
</tr>
</tbody>
</table>
Energy Costs – High Power

- Energy is stated as largest position of Operational Costs for Broadcaster
- DRM+ with significant energy costs savings!

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>FM</th>
<th>DRM+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>10 kW</td>
<td>1 kW</td>
</tr>
<tr>
<td>Efficiency</td>
<td>72 %</td>
<td>50 %</td>
</tr>
<tr>
<td>Energy consumption per Transmitter</td>
<td>13.9 kW</td>
<td>2 kW</td>
</tr>
<tr>
<td>Annual Energy Bill per Transmitter</td>
<td>18 250 USD</td>
<td>2 640 USD</td>
</tr>
<tr>
<td>Programmes per Transmitter</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Annual Energy Bill per Programme</strong></td>
<td><strong>18 250 USD</strong></td>
<td><strong>880 USD</strong></td>
</tr>
</tbody>
</table>

Assumes 0.15 USD per kWh
Reduced Service & operational costs with DRM+

- Maintenance seen as 2\textsuperscript{nd} largest cost factor after energy bill
  - Reduced part diversity
  - Reduced maintenance effort
  - Reduced heat load / cooling effort
  - Reduced space

\textbf{Significant savings in Service & Operation with DRM+ compared to FM !}

9 x FM Transmitter
@ high power

3 x DRM+ Transmitter
@ low power

Scenario with 7x nation wide stations + 2x new future radio programmes
DRM Features

• **More choice** for listeners:
  Up to 4 programs 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

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

• **Emergency warning and alert**
  All stations switch, present audio and text information
More DRM Features

MULTIMEDIA Applications (rich information sent along with audio)

- **Text Messages**
  Programme accompanying labels (Unicode)

- **EPG (Electronic Program Guide).**
  What’s up now and next; search for programmes and schedule recording

- **Journaline**
  Text based information service (Unicode), supporting all classes of receivers, triggers interactivity and geo-awareness

- **MOT Slideshow**
  Programme accompanying images and animation

- **TPEG / TMC** Traffic Information

[Image of digital radio device and various multimedia icons]
Nearly half of the world population can listen to DRM

OVER 100 DRM30 services

- All India Radio
- BBC World Service
- Radio France
- KBS World
- NHK Japan
- Public Broadcaster Slovakia
- Radio Australia
- Radio Communicatii Moldova

Visit our website for the broadcast schedules http://www.drm.org/?page_id=151
DRM in the World
Some Key Markets

- India
- (Southern) Africa
- Brazil
- Russia
- Asia
• Significant interest in DRM in (Southern) Africa in last 2 years

• **DRM tests in AM** started or in preparation in several countries

• SW DRM transmissions in South Africa October 2011, July 2013, April 2014

• **Increasing number of African countries** attracted to DRM broadcasting benefits (such as Mozambique, Botswana, Zambia)

**Zambia announced its decision to got for DRM**

**Nigeria** adopted DRM and is broadcasting for abroad from Abuja since March 2012 with increased DRM output since May 2014

**Botswana** currently installing transmitters for digital AM, domestic broadcasts

**Mozambique (adopted DRM), Zambia, (Tanzania** showing great interest)

**Algeria** adopted DRM and installed transmitters in 2013

[www.drm.org](http://www.drm.org)
Southern Africa


- Radio Pulpit has made history by leading the South African radio broadcasting industry into the digital era with the first LIVE digital medium wave Test Broadcast in South Africa in July 2014 in Pretoria and part of Johannesburg

- Second Channel with BBC content launched on February 1st 2015 with extra features (RSS, Journaline, text - Pretoria News Update) contributed to a S. Africa government consultation including holding a comprehensive workshop with live BBC broadcast from Ascension Island in July 2013 and April 2014
DRM Trial Radio Pulpit/Pretoria - Predicted Coverage (10kW)
25 kW DRM MW Transmitter and Equipment Installed
DRM Trial South Africa: Two Services One AM Frequency
BBC and Radio Pulpit
Kofifi – One Great Innovation Hub in South Africa

- Kofifi – “Let’s go to Sophiatown” – is a place with a vibrant history and an exciting future. Always at the top of innovations specifically in media technologies, Kofifi has been exploring digital transmission since years.

- In 2012, Kofifi has developed and built the world’s first independent DVB-T2 based DTT transmission system for community TV in the L-Band.

- As a DRM member, Kofifi Broadcast is now looking at DRM+ to gain practical experiences.
Future Developments

• (SA) Kofifi DRM + - transmitter under installation 2016(Nautel Transmitter in the country)

• (SA) Radio Pulpit/Kameeldrift - DRM license to migrate pursued

• 3 channels; BBC and Radio Pulpit on 2\textsuperscript{nd} and 3\textsuperscript{rd} channels

• Botswana - DRM tests broadcasts will commence soon (freq?)
"One of the world’s largest digital radio deployments"

Transmitters  39  
(MW – 35, SW – 4)
Investment  Over 3 Billion INR
Power  8,000 kW
Coverage  0.6 Billion people
AIR MW Transmitters

✓ DRM MW transmitters to work in **simulcast mode** everyday

✓ **Type of content** for analogue as well as digital modes has been **defined** for each transmitter
  
  - **Analogue** - Existing service
  
  - **Digital** - Popular, mainly film based content

✓ 2 transmitters to work only in **pure DRM** and one transmitter to carry pure DRM services for some time everyday
✓ Rajkot 1000 kW MW at 1071 kHz

✓ **Order** issued for **3 services** – 0545 to 1000 & 1400 to 0100 Hrs

  • Analogue - 1
  • Digital - 2
    ▪ Urdu
    ▪ Vividh Bharati

✓ Pure DRM - **2 services** from 1200 to 1345 Hrs
Information On AIR’s Digital Transmission (Both In Medium Wave & Short Wave)
External & Home Frequency Schedule
Information on AIR’s DTH Channels
Reception Report/ Feedback from Listeners along with mandatory one time Listener Registration
List/ Link of Channels available through Live Streaming
Mobile Apps with link for various AIR Channels
AIR website www.allindiaradio.org

FREQUENCY SCHEDULE
(25th October, 2015 to 27th March, 2016)

Digital Radio Transmission (DRM) of AIR in MW

Digital Radio Transmission (DRM) of AIR in SW

Home Services

External Services
Highway Advisory Service (HAS) launched on 10th Mar 2016 by Ministry of Road Transport & Highways, Government of India.
## Pilot project in 3 Phases

| Phase 1 | In **Analogue** from existing AIR FM Transmitters at Jaipur, Delhi & Alwar  
|         | Hourly information from existing control rooms |
| Phase 2 | Dedicated transmitters in **simulcast** – Analogue & Digital, with limited data  
|         | Collection of information along the Highway |
| Phase 3 | **Service only in Digital** (DRM+)  
|         | Multilingual  
|         | Full data |
DRM+ Receiver prominently displayed on stage & its features outlined during launch
All Major Chipsets Manufacturers have Multi-Standard chipsets ready or announced with DRM!

Dec 2014: Parrot launches ready-to-use multi-standard Radio modules for Automotive Based on SDR Octopus chip supporting DRM30/DRM+, DAB/DAB+, DVB-T2Lite, ISDB-Tsb, AM/FM


New DRM Receiver AV DR1401
On Amazon

Made in India DRM Receiver successfully launched by Communications Systems Inc., with brand name - AVION

All DRM advanced functionalities
Communication Systems Inc (Avion)

DRM Radio Receiver

EXCLUSIVELY AVAILABLE ON AMAZON IN

amazon
Value Added Features

**DRM TextMessages**
programme accompanying labels (Unicode), max. 128 characters, max. every 20 sec.

**Journaline**
text based information service (Unicode), supporting all classes of receivers, triggers interactivity and geo-awareness

**MOT Slideshow**
programme accompanying images + animation

**EPG – Electronic Program Guide**
What’s up now & next; Search for programs and schedule recording

**TPEG / TMC Traffic Information**

→ Great listener benefits & revenue source!
Working on 2 new models

- 1\textsuperscript{st} model:
  - A cheap low end receiver which will be for full DRM
  - 2 line display
  - 1 mono speaker
  - No built in battery
  - A hand palm sized radio
  - Detailed specs will be released later
Working on 2 new models

- 2\textsuperscript{nd} model:
  - A high end car module with color display.
  - Can fit in any existing car.
  - Specs will be released later.
One leading Indian automobile manufacturer have successfully demonstrated working of MW DRM reception in factory fitted DRM receiver in a SUV.
Why Digital Radio?

A – Public Broadcasters are able to:

→ Have additional radio programs / audio content (e.g. special-interest content)

→ Upgrade their transmitter infrastructure

→ Cover large territories through digital AM frequencies

→ Internet news (text content into radio sets)

→ Disaster Warning feature to quickly alert the public through all radio sets
Why Digital Radio?

B – Private Broadcasters are able to:

- Secure radio future in **Digital Era**
- Upgrade existing transmitter infrastructure easily
- Broadcast to areas in which **targetted listener groups** live
- Benefit from **new revenue opportunities**
- Link with **online resources** (web sites, social media, etc.)
- Linking with **Disaster Warning Functionality** (typically provided by public service)
Decision for DRM taken + published

Transmitter & receiver manufacturers start preparation

Setup of national **Digital Implementation Body** (all stakeholders)

Launch Date (!) agreed + announced

Broadcasters prepare (transmitters & content!)

B2B communication starts, training of retailers

Basic consumer informat. starts

---

Public Launch: Digital Radio

DRM & content on air

Receivers in stores

Consumer info (broadcast, retail)

---

1. Decision for DRM taken + published
2. Setup of national **Digital Implementation Body** (all stakeholders)
3. Launch Date (!) agreed + announced
4. Broadcasters prepare (transmitters & content!)
5. B2B communication starts, training of retailers
6. Basic consumer informat. starts
7. Public Launch: Digital Radio
8. DRM & content on air
9. Receivers in stores
10. Consumer info (broadcast, retail)
## DRM Benefits

<table>
<thead>
<tr>
<th><strong>LISTENERS</strong></th>
<th><strong>MANUFACTURERS</strong></th>
<th><strong>BROADCASTERS</strong></th>
<th><strong>REGULATORS</strong></th>
</tr>
</thead>
</table>
| • Excellent quality sound in stereo DRM30, CD quality in DRM+  
• Data such as text, pictures and Journaline  
• Easy tuning on station name | • Replace receivers with new digital receivers  
• Increase the market potential  
• Increase possibilities for new areas of interest and content | • Multilingual programme are possible plus extra information  
• Reduced power consumption of up to 40-50%  
• Increased opportunity for revenue generation streams  
• Full coverage in DRM maintained | • Uses less spectrum and release spectrum for other use  
• An international standard  
• Lower power costs – green broadcasting  
• Emergency warning alert |

[www.drm.org](http://www.drm.org)
DRM Membership Benefits

Privileged Information
- Receive general and extra information alongside the monthly DRM and Indian Newsletters
- Enjoy access to the ftp server where members only documents on the latest DRM developments are posted

Marketing and PR Support
- Use the DRM logo, have your own company logo and products on the DRM Website
- Get the support of the DRM Project Office for related DRM communication and events
- Get exclusive give-aways, DRM marketing support and exhibition kits

Networking Opportunities
- Get the best B2B platform to meet and build contacts related to the DRM business
- Enjoy a presence at big international media events and represent both the Consortium and your own companies

For more information contact: projectoffice@drm.org
All you need to know about DRM - Free

**DRM Introduction and Implementation Guide** *(DIG)*

Download from: [www.drm.org](http://www.drm.org)
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