

The Digital Radio Mondiale (DRM) Standard at a glance

What is the Digital Radio Mondiale (DRM) Standard?

DRM digital radio is the global standard that can uniquely offer new broadcasting services to local, regional, national and international audiences. It is the newest, most complete, and internationally recognised system for digitising radio in all frequency bands. This means broadcasting radio programmes on short, medium and long waves (AM frequencies), as well as in the VHF frequencies – usually in the FM bands. DRM brings radio in the 21st century ensuring its continued future.

- ▶ DRM is a non-proprietary, open standard (no company owning the technology), which can be implemented by anyone. It is recommended and endorsed by relevant international organisations such as ITU and ETSI.
- ▶ The DRM standard allows for transmissions of up to three audio signals, plus data, within one single frequency as compared with the analogue system which only allows one programme per frequency. This means that DRM digital radio uses spectrum very efficiently.
- ▶ Broadcasters can operate their own independent transmitters without having to share with potential competitors a large multiplex, which is usually operated by a paid third-party organisation.
- ▶ In addition, the DRM standard in the FM band allows several broadcasters to share the same transmitter and antenna that can carry multiple DRM signals side by side, thus reducing the operating costs and becoming truly green. Those broadcasters still remain in control of their own broadcasts.
- ▶ Many existing analogue transmitters can be converted in some instances to digital DRM at relatively modest costs, while retaining all associated infrastructure, including antennas.
- ▶ Information, emergency warnings and alerts, education and entertainment can reach every single listener in a country, regardless of its size and geography, thus fulfilling governments' mandate to make information (and education) accessible to all citizens regardless of where they live.

Unique Advantages of the DRM Standard

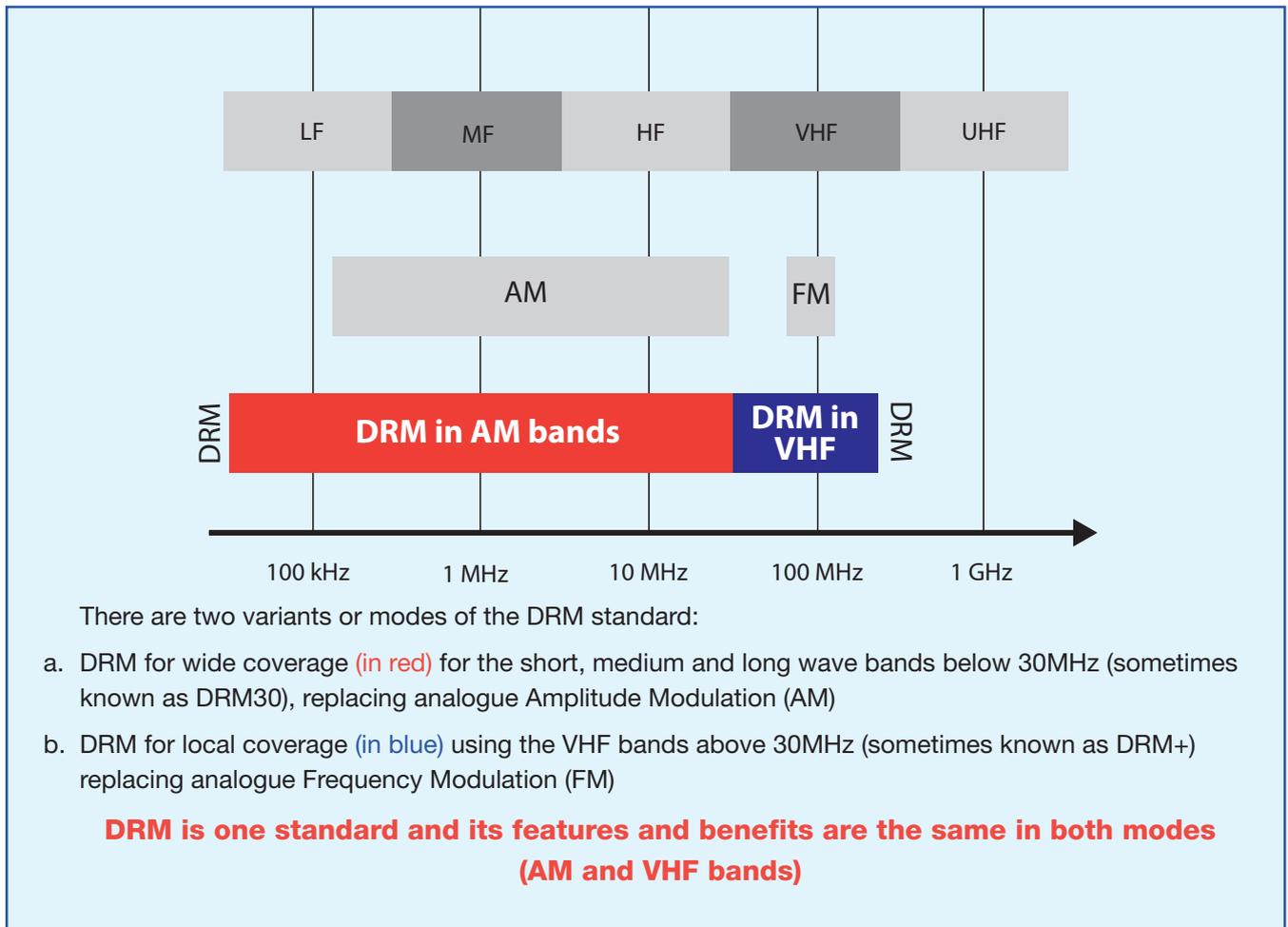
1 DRM IS AN OPEN STANDARD

Apart from the ability to fit in with existing spectrum requirements, the DRM system also benefits from being a non-proprietary open system, in all parts of the broadcast chain. This means that all manufacturers and interested parties have free access to the complete technical standard and can design and manufacture equipment on an equitable basis. This is a significant consideration for broadcasters investing in DRM infrastructure, manufacturers investing in receiver development and production, and even more so for the listeners who will need to invest in the new DRM-capable receivers.

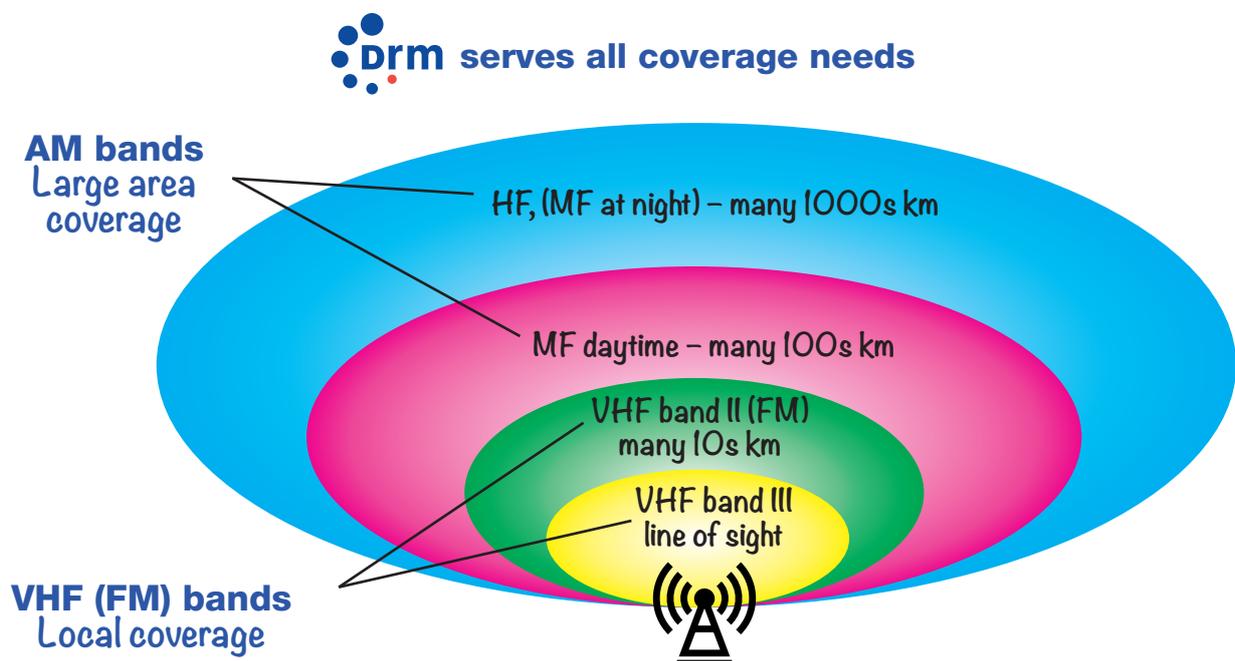
2 DRM COMPATIBILITY WITH EXISTING FREQUENCY ALLOCATION AND REGULATION

The DRM broadcasting system has been designed specifically as a digital high-quality audio replacement for current analogue radio broadcasting in all the AM and FM/VHF bands; as such it can be operated using the same existing channel and spectrum allocations as currently used by broadcasters in the analogue environment.

An overview of the frequency-bands where DRM operates is shown in the figure below.



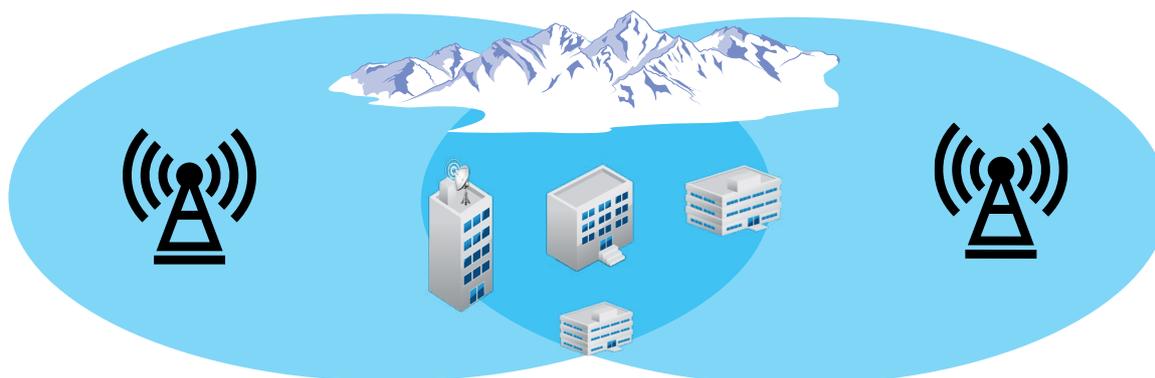
The way in which signals propagate at different frequencies is the same for DRM as for existing analogue transmissions. This will range from short wave frequencies that can cover very long distances over any type of terrain, to VHF that is meant for local coverage. This is illustrated below:



The diagram illustrating the coverage needs can be summarised in the following way:

- a. **Medium and Long Wave.** Depending on transmitter power, local and regional transmission can be provided for longer distances of up to 1000km.
- b. **Short Wave** supports large areas for both national and international transmission. See the schedules at www.drm.org for details of current international and some national broadcasts.
- c. In the **VHF bands** (mainly in FM Band II, but bands I and III can be utilised as well) DRM allows local broadcasters to be highly focused on smaller areas addressing local communities. In the VHF frequencies, DRM for local coverage can support two or more transmitters with overlapping coverage using the same frequency. This greatly enhances coverage while not using more spectrum. It is a technique (not available in analogue) known as the **Single (or Multiple) Frequency Network (SFN or MFN)**, as illustrated below

SFN – Single Frequency Networks with DRM in VHF Demonstrating uninterrupted coverage



Two or more transmitters broadcasting:

- 1 The same content
- 2 At the same time
- 3 On the same frequency

3 SMOOTH TRANSITION FROM ANALOGUE TO DRM DIGITAL TRANSMISSION

During the transitional period from analogue to digital, transmitters can broadcast in DRM while still putting out existing analogue signals for existing analogue radio sets. This dual transmission method is called Simulcast. It is highly recommended that this period be as short as possible.

Broadcasters can determine their own migration path to digital transmission by exploring how the simulcast mode will work best for them. One of the options is to broadcast from the same transmitter in both the analogue and digital modes at different times of the day. The other option is to broadcast the same programme both in analogue, as well as in DRM, during the same period of the day by splitting the transmission power between analogue and digital. This may affect the coverage area. Therefore, in the transition period, it is recommended to use option one, so that the coverage area is not affected.

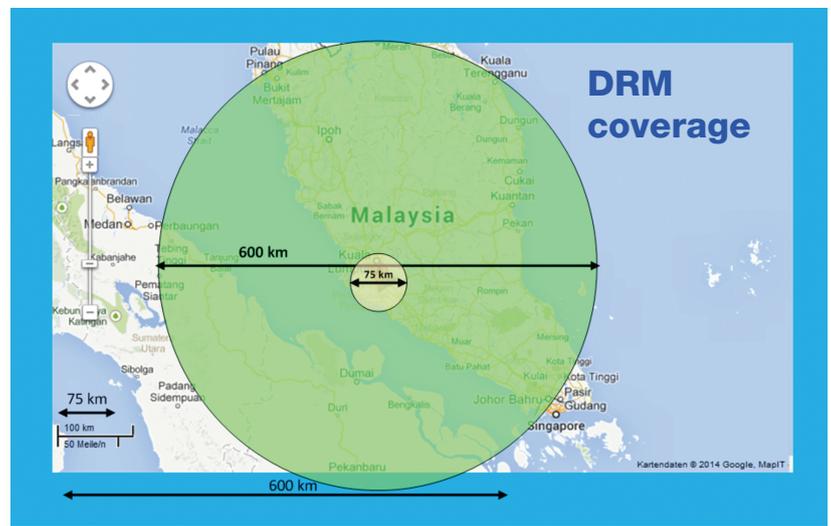
The Benefits of the DRM Standard

1 COVERAGE FLEXIBILITY

DRM, by using all frequencies, allows large, medium sized and smaller broadcasters to use effectively the frequencies best suited to target their interest region and audiences. No other digital open standard can do that.

- a. Therefore, DRM is ideal for smaller broadcasters wishing to transmit programmes to listeners in certain areas of choice and in a certain language or dialect, whereas another 'neighbouring' broadcaster can target a different area and listener group using the other languages or dialects of that region without interference. This scenario is true for communities being serviced by community stations using the DRM standard in the FM band.

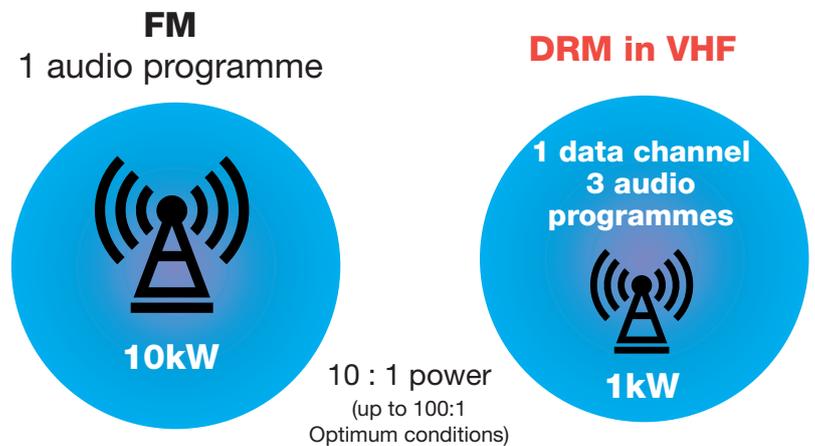
b. By contrast, larger commercial broadcasters or national broadcasters may use DRM in the AM bands (like medium wave and shortwave) to cover large to very large areas of a country. It can be very expensive to equip and maintain many FM transmitters deployed for covering large areas. Therefore, one DRM shortwave or medium wave transmitter can provide the necessary large area coverage, as illustrated here. The small circle shows the localised FM coverage, whereas the large circle illustrates the very large area by using DRM in medium wave.



2 ENERGY EFFICIENCY

Broadcasters benefit from reduced power consumption in digital DRM of between 50% and 80%. DRM transmitters use significantly **less power** than analogue ones in both the AM and FM frequencies. Here is an example of a comparison between the analogue and the digital DRM efficiency in the VHF band. If in the traditional analogue FM mode broadcasters need a 10kW transmitter for just one programme to cover some 70km of distance, in digital DRM 1kW transmitter is sufficient to broadcast three audio programmes, plus a data channel, to cover the same geographical area.

Coverage and Power Consumption DRM ↔ FM



3 SUPERIOR SOUND QUALITY WITH THE LATEST AUDIO CODING TECHNOLOGY

DRM delivers for the first time Short Wave and Medium Wave broadcasts in FM-like mono or stereo sound quality without the noise and distortion of analogue, in the home or in the car. Local digital broadcasts (of FM stations) also enjoy superior surround sound without fading or crackling. DRM is so far the only global digital standard which can use the **latest audio codec xHE-AAC** at low to very low bit rates being thus aligned to the mobile industry.

4 BROADCASTERS CAN OFFER MORE CONTENT CHOICE

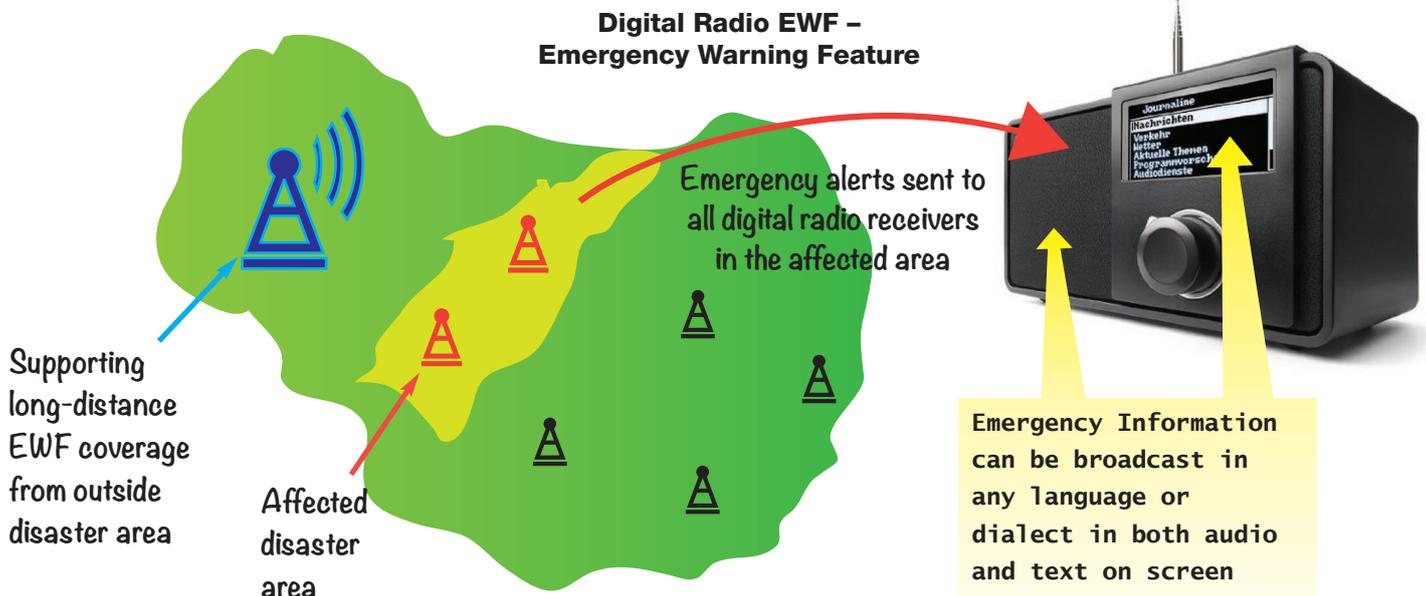
DRM has the potential to bring new, exciting content and more programmes on one single frequency while delivering spectrum savings, as already mentioned. In the FM bands for instance, DRM uses half the current stereo FM spectrum (**100 kHz and not 200 kHz**), whilst offering reduced transmission power, increased coverage, and additional programmes and services.

These new programmes, complemented with multimedia content, can be made available in several languages and/or dialects. Whether the programmes are broadcast in DRM in the AM or VHF bands, listeners can stay tuned to the same station, without loss of signal, as they cross regional or national or even international boundaries. DRM allows also important traffic information to be broadcast when necessary.

5 EMERGENCY WARNINGS AND ALERTS (EWF)

DRM enables the delivery of emergency and alert programmes containing both audio and text in several languages/dialects simultaneously. The Emergency Warning Functionality (EWF) is an integral part of the standard and radio receivers can also function as EWF alert points. The DRM digital radio can be woken up if in sleep mode by the emergency signal. The picture below illustrates how a transmitter (blue) outside of the disaster area (light green) can transmit information to the digital receivers about the situation in the disaster area.

DRM EWF – Functional Overview



- 1 Receiver switches on and/or retunes automatically
- 2 Visual/acoustic signalling
- 3 Alarm announcement and multi-lingual look-up text instructions via Journaline (serving non-native speakers and the hearing impaired)

6 DRM IS NOT DEPENDENT ON THE INTERNET OR ELECTRICITY SUPPLY

The DRM radio is an advanced modern product which does not require an internet connection or a Wi-Fi spot for tuning in. It is portable, therefore mobile, and can be used with long lasting batteries (up to 12 hours or more), too. However, DRM can bring to the listeners the content of internet (RSS feeds or through the enhanced text messages system called **Journaline**) on the larger radio screens.

7 DRM ALLOWS THE CREATION OF JOB OPPORTUNITIES AND OF REVENUE STREAMS FOR KEY STAKEHOLDERS

DRM means additional digital services, which can generate new revenue streams (through advertising, as well) without compromising the existing content offer. More varied content means also more journalistic and technical jobs at the actual radio stations. There are opportunities in software and R&D development, distribution, retailing and a new kind of journalism.

The DRM digital radio standard is a strategic opportunity for the local industry to increase their businesses and profits.

7

The local production of DRM radio receivers for desktops, tablets, laptops, for mobile phones and especially cars ensures new jobs and wealth creation.



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DRM Implementation Considerations

A clear decision needs to be taken about the introduction of the DRM standard in a country. Then the major stakeholders (the Ministry, the Regulator, the Public Broadcaster, the commercial and community broadcasters, the manufacturing industry) need to come all together and plan the roll-out of the DRM digital standard by first deciding a “launch-date” of digital radio in the country (not to be mistaken with a switch-off date, which may happen much later, meaning the complete replacement of analogue transmissions by the digital ones!).

The launch date needs to be communicated very clearly to the manufacturing industry first and then to retailers, as they need to have the certainty that DRM digital radio will be firmly launched and rolled out. The manufacturers need to plan the production of radio receivers (whether desktops, in cars or in mobiles), produce them and, in co-operation with retailers, make them available in shops. Listeners also need to be informed about the impending roll out of digital radio but only a few months before the actual digital radio launch, so that they get familiar with the new modern radio technology and learn about the benefits of digital radio. They need to get excited about the prospect of buying such advanced receivers in shops. And when they decide to do that, those receivers must be available.

For more information on the DRM standard, its features, and benefits, please visit our website at www.drm.org and access freely the full **DRM Handbook (handbook.drm.radio)**.

For a detailed technical insight and access to proprietary information, as well as additional benefits and implementation steps, we would recommend any potential stakeholder to join the DRM Consortium, thus being able to participate in our special events and network opportunities.

Please contact us by email at: projectoffice@drm.org