

## DRM Modes

Digital Radio Mondiale (DRM) has been designed to operate in one of four modes to reflect the transmission conditions. Other digital systems such as DTT and DAB operate at high frequencies where the ionosphere usually plays an insignificant role. On the lower bands up to 30 MHz there are daily, monthly and longer cycles of change driven by the solar output that affects the geomagnetic conditions on earth.

Mode  
Application

A

Used for long and medium transmissions during the day where the signal will reach the listener via a surface wave that basically follows the contours of the earth. Can be used for sky wave on short wave if propagation conditions allow it. Also used at 26 MHz for VHF like propagation. Also used for stable shortwave paths such as Wertachtal - UK.

B

Used for transmissions that propagate via a sky wave. This will be used for most short wave transmissions and for medium wave during the hours of darkness.

C

Also for transmissions via sky wave that need to be more robust. Typically a transpolar broadcast would use this mode although Vatican Radio has been logged in this Mode testing to North America.

D

For use in the tropics where signals hit the ionosphere almost vertically from the transmitter.

E

Possible new mode for DRM+.

### DRM Features:

There are a number of design features built into Digital Radio Mondiale and most are now being used by at least one broadcaster.

### ALTERNATIVE FREQUENCY SWITCHING (AFS)

A Digital Radio Mondiale multiplex is able to link to other DRM multiplexes or other broadcast bands such as FM , DAB or AM. It can do this in a number of ways:

By finding another copy of the multiplex broadcasting on another frequency with the same channel parameters and synchronous with the tuned multiplex. The receiver will only switch if it determines that the reception is good.

By finding another copy of the whole multiplex but with different channel parameters such as a multiplex using mono rather than stereo for the same audio channels.

By finding a single service from the tuned multiplex in another DRM multiplex or on an AM, FM or DAB frequency.

Valid alternative frequencies can be restricted by geographical area. This depends on the receiver having a copy of broadcaster's frequency and program schedule. The BBCWS, and RTL French are now carrying AFS data that links to AM broadcasts that have the corresponding AMSS system installed. Deutsche Welle, RTL and the BBCWS both carry AFS data about other DRM transmissions.

## ANNOUNCEMENT FEATURE

This can be used to interrupt the current audio service by another providing a short clip of information. This could be achieved by a DRM Multiplex with two channels, one of which is carrying headline news or weather information. It is also possible to switch to a DAB or FM service.

## SIMULCASTING FEATURE

As you might imagine Digital Radio Mondiale just cannot be deployed in an instant and it will have to coexist with analogue transmissions for some time. Also broadcasters may not be able to afford to deploy new transmitters for technical, political or financial reasons and listeners will have to be convinced that adopting DRM is worthwhile and so the concept of simulcasting has been built into DRM. Simulcasting means that the analogue and digital components are transmitted at the same within the same bandwidth.

Currently there is just one Digital Radio Mondiale simulcast transmission on 693 kHz from the Voice of Russia but this may end sometime during 2007. This is not very pleasant to listen to as the analogue and digital signals mix together on a conventional receiver and the listener receives a poor quality audio with a high level of background noise from the Digital Radio Mondiale (DRM) signal.

## ELECTRONIC PROGRAMME GUIDE

The BBCWS is now carrying regular EPG data in its DRM broadcasts that is transported as binary files and stored on the target device, which is usually a PC or PDA.