



## Update on Digital Radio Mondiale (DRM)

The broadcasting industry's transition to digital radio is a global one. Here in the U.S., broadcasters are implementing the HD Radio in-band/on-channel (IBOC) digital radio system, and recent statistics compiled by iBiquity Digital Corporation (Columbia, Md., [www.ibiquity.com](http://www.ibiquity.com)), developers of HD Radio technology, suggest that this transition is steadily moving forward – as of June 2010:

- More than 2.5 million HD Radio receivers are in the marketplace;
- A total of 15 automakers have publicly announced their plans to incorporate HD Radio Technology in 86 separate vehicles, 36 featuring HD Radio receivers as standard equipment by year end;
- Nearly 2,000 HD Radio stations are on the air in the U.S.;
- More than 1,200 new HD2/HD3/HD4 multicast channels are on the air;
- More than 100 unique HD Radio receivers are available at retail;
- More than 14,000 stores and online outlets offer HD Radio products.

Another digital radio technology currently being implemented is called Digital Radio Mondiale (DRM, [www.drm.org](http://www.drm.org)). The DRM system was developed in Europe by a consortium of broadcasters, network providers, transmitter and receiver manufacturers, universities, broadcasting unions and research Institutes. The original system, standardized in 2001 (now called "DRM30") by the European Telecommunications Standards Institute (ETSI, [www.etsi.org](http://www.etsi.org)), was designed primarily for shortwave and international broadcasting operating in the frequency bands below 30 MHz. In 2008 the DRM standard was augmented with what is called "DRM+", providing support for operation in the VHF band at frequencies up to 174 MHz, which includes the FM broadcasting band (88-108 MHz).

MODE	MODULATION TYPES	BANDWIDTH OPTIONS (kHz)	BIT RATES SUPPORTED (kbps)	TYPICAL USES
A (DRM30)	16 QAM, 64 QAM	4.5, 5, 9, 10, 18, 20	6 - 72	LF & MF groundwave, 26 MHz band line-of-sight
B (DRM30)			5 - 56	HF & MF transmission on skywave
C (DRM30)		10, 20	9 - 46	Difficult skywave channels on HF
D (DRM30)			6 - 31	Near vertical incidence skywave (NVIS)
E (DRM+)	4 QAM, 16 QAM	100	37 - 187	VHF transmission 30-174 MHz

Both the DRM and the HD Radio systems are considered to be "in-band" systems since they can be used within existing broadcast bands (as contrasted with "new-band" systems like the Eureka-147 DAB system, which does not fit within existing bands), and they both use coded orthogonal frequency division multiplexing (COFDM) for transmission of digital audio and associated data. For DRM, the COFDM signals consist of hundreds of subcarriers with each subcarrier being modulated using either 4-, 16-, or 64-QAM (quadrature AM) modulation. As is typically the case with digital broadcasting systems, the DRM system is extremely flexible and supports a host of operating modes. Five specific modes (A through E) are identified and summarized in the table above.

Presently, the principal drawback of the DRM system is the near-total lack of compatible receivers. Shown in the photo is one of the few DRM receivers, the Uniwave Di-Wave 100. This receiver only supports DRM30 and not DRM+. It is a "multimedia" receiver and has a 3.5" color LCD display which can support DRM data broadcasting features such as Electronic Program Guide (EPG). This receiver was at one time available for purchase on the Internet at [www.universal-radio.com/catalog/portable/0023.html](http://www.universal-radio.com/catalog/portable/0023.html), however currently it is showing as "unavailable" with more units arriving in July 2010 (no orders are being taken at this time).

Last week, the DRM Consortium released a new, up-to-date 88-page *Broadcasters' User Guide* intended to provide a source of relevant and authoritative information on the DRM system. It is aimed at broadcasters considering the transition from analog to digital broadcast in the AM and VHF broadcasting bands and should also be of interest to manufacturers, service-planners, administrations and regulatory bodies involved with broadcasting systems and policy. The Guide describes the basic operation of the DRM system (DRM30 and DRM+), provides a definitive source of references to key technical standards, including regulatory, coordination and planning information for DRM broadcasting.



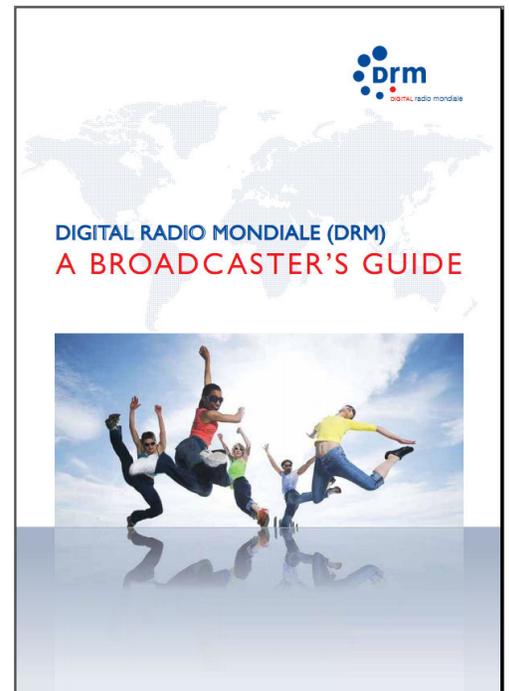
While primarily focusing on the DRM system, the Guide also includes somewhat generalized information on the transition to digital radio, including an explanation of how and why a broadcaster might go digital, from both technical and commercial perspectives. In addition, detailed information on other useful features, such as commercial applications designed to run on the DRM platform, is included. The Guide has eleven chapters with illustrations and clear explanations on themes such as the DRM technology and content, the network infrastructure, receivers, IPR and references to

DRM system related papers and published articles.

A copy of the *DRB Broadcasters' User Guide* is available for download from the DRM webpage free-of-charge – go to [www.drm.org/uploads/files/broadcast\\_manual.pdf](http://www.drm.org/uploads/files/broadcast_manual.pdf). The full ETSI DRM Standard, ETSI ES 201 980 V3.1.1 (2009-08), is also available free-of-charge on the Internet – go to the ETSI website at [http://webapp.etsi.org/workprogram/Report\\_WorkItem.asp?WKI\\_ID=30464](http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=30464).

Another topic of current interest within the DRM community is establishing the compatibility (that is, the ability to co-exist without causing objectionable interference) of DRM+ with other transmissions, most notably with analog FM transmissions in the FM band, and with Eureka-147 DAB transmissions in VHF band III (174-230 MHz). In May 2010 a symposium was held in Germany to discuss DRM+ / DAB compatibility. A number of European broadcasters are interested in this possibility because of the broadcasting allocations that exist in VHF band III in Europe (and where a number of DAB services are presently located), however this goes beyond the range of frequencies for which DRM+ was intended.

Lab measurement and field trial results discussed at this symposium demonstrate the feasibility of DRM+ / DAB coexistence. In addition to the test results, information on network infrastructure and frequency planning approaches for DRM+ in VHF band III, and implementation of DRM+ in DAB receivers was covered as well. Additional information on the symposium, including PowerPoint slides of the test results, are available from the symposium website at <http://drm-radio-kl.eu/symposium2010/symposium2010en.htm>.



## Still Time to Save \$100 on Radio Show Registration

There is still time to save \$100 on your [Radio Show registration](#). Today through July 4, the registration rate which includes access to all Radio Show sessions, The Marketplace and both luncheons is just \$395 for NAB/RAB members. Additionally, If your company is interested in the Group Promotion (register four individuals from one company, get one free, must register at same time) you can send an email to <mailto:register@nab.org> to get a group registration code for your company. Included in the Radio Show sessions is *Ask the Experts*, a series of sessions specifically designed by NAB Science and Technology for radio engineers and others interested in the future for radio broadcasting from a technology perspective. You can check out the schedule for *Ask the Experts* [online](#). The Radio Show will be held September 29 through October 1 in Washington, D.C. Additional information on registration and housing for the Radio Show is available on [radioshowweb.com](http://radioshowweb.com).

## 2010 NAB Satellite Uplink Operators Training Seminar

Instructor:  
Sidney Skjei, Skjei Telecom

October 4-7, 2010  
Washington, D.C.



[REGISTER NOW](#)

Share Knowledge  
Discover Innovations  
Explore Strategies  
Network With Leaders

***Radio TechCheck***  
will not be published  
on July 5, but will  
return July 12, 2010.