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DRM Update

Mike Adams, Far East Broadcasting Co

DRM in Asia

In the last 6 months there has been a lot of interest in DRM in Asia. Both Merlin and Thales have made visits in Singapore, Taiwan, Hong Kong and Mainland China. The Chinese broadcasters had a month-long DRM demonstration following the Euro-China exhibition in the Spring. This has generated interest in the DRM system and has renewed the interest of receiver manufacturers. The Asian Broadcast Union has invited DRM to give a presentation as part of their General Assembly in Tokyo at the end of October.

DRM at IBC in Amsterdam, Sept 13-17 2002

Six stations on air

There has been a lot of progress since IBC last September. This was evident by the increase in live broadcasts on the air and the number of new receivers. This year the number of stations increased from three to six with 29 hours of broadcasts a day from RNW, RCI, DWL, BBC and TSystems. These broadcasts covered a wide range from strong single-hop, to long distance multi-hop. The closest was 200 km and the farthest was from Bonaire in the Netherland Antilles (8000km) using the high robustness mode. RNW also had a local SW station on 26MHz which was received by ground wave. The local station had a very reliable signal which had a high data rate that included music and multimedia. This was to demonstrate the possibilities of using the 26MHz SW band for local radio.

Four new receivers and public release of Ham/DXer software receiver

In addition to the professional receivers on show in the past, there were four new receivers being shown this year. Although there is not a DRM chip set yet, there were two consumer type radios on display. Coding Technologies had integrated a BBC DSP decoding board and an RF front end into a commercial receiver enclosure. You will see that the case looks a lot like a Sangean 818. Although these will not be mass produced, they will be on sale when DRM launches in 2003. The price is not yet known. The BBC R&D department also integrated their DSP board into an existing AOR7030 using its own front end. It was good to see DRM signals being received over radios that are closer to what our listeners will have.

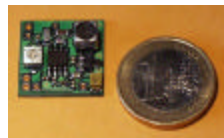


Coding Technologies shows the first Consumer type radio



BBC DSP board in an AOR 7030

There were also two new software receivers being shown for the first time. Thales has added a software receiver to their line of equipment and Fraunhofer has created a consumer version of their software receiver for Hams and DX listeners. Both software radios make use of regular commercial radios that have had a small IF modification installed. The regular 455 kHz IF signal is shifted down in frequency to be centered on 12 kHz. This is all done on a small PC card about the size of a quarter (or a Euro). The 12 kHz IF signal is then fed into the sound card of a PC which decodes the audio.



455 kHz to 12 kHz IF Modification

Beta Testers Needed

As DRM members, anyone in NASB can volunteer to be beta testers for the new software during October and November. Beta testers will need to be able to make the IF modification and install the software without much technical support. There is a web site for the software receiver with samples of four different radios that have already been modified. The Ham/DX version of the software will be released to the public in December 2002. Those who wish to be beta testers should place an order through me (Mike Adams, madams@febc.org) and those who can wait for the public release in December can register their interest on the web site now.

Cost

The software cost is about 60 USD (60 Euros) and the IF kit is about 35 USD, so the whole package is close to 100 USD.

What can you hear?

Most of the DRM tests are now beamed towards Europe, but because of the great interest in the software receivers, there will also be broadcasts from Radio Netherlands and Radio Canada aimed at North America. There are details of the DRM schedules and more about the software receiver on the web site at <http://www.drmtx.org>

Again, if you want to be a beta tester, contact me – or register your interest for the public release on the web site.

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| <p><i>The next four articles are summary reports of some of the sessions at the NASB 2002 Annual Meeting.</i></p> |
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Digital Transmission for Shortwave

Josef Troxler---Thales

The DRM approach to adoption of digital technology for shortwave broadcasting incorporates these objectives: significantly improved audio quality, more reliable reception, data service facility, compatibility with existing spectrum usage observances, provides for convenient transition from analog modes to digital, early availability of low cost receivers, and maximizing the re-use of existing transmitters and transmission facilities.

The DRM system provides for a number of modulation modes, according to the propagation conditions of the transmission path. In general, these adaptations result in reduced audio quality and increased robustness when adjusted for difficult propagation conditions. In favorable conditions, the choice can be made which gives higher audio quality with a drop in robustness.

Launched in March of 1998, the DRM Consortium expects to see the beginning of regular digital services on shortwave (with a limited initial availability of consumer receivers) in mid-2003.

Josef gave a number of statistics relating to shortwave broadcasting. Among them were these: approximately 1200 shortwave transmitters worldwide; most daily shortwave transmission hours are directed to Asia and Europe, with Africa third and the Middle East fourth; the five major international broadcasters in terms of daily program hours are China International, BBC World Service, VoA, DW, and VoR respectively; in terms of listeners, the top three are BBC World Service, VoA, and DW, respectively; for estimated numbers of households with at least one shortwave set in working order, Asia led with a large majority, followed by Europe, Sub Saharan Africa, and the former Soviet Union, respectively. (The total estimated number of households worldwide with at least one shortwave set in working order is 600,000,000.)

Transmitter capabilities are a major challenge in regard to proper DRM operation. The performance requirements are much more stringent than what is called for in regular AM operation. One major concern for broadcasters is whether or not their existing transmitters can be adapted for proper DRM operation. Transmitters operating in a linear mode (not many used in shortwave broadcasting), and newer transmitters with PDM/PSM type modulators should be readily convertible with the addition of a digital exciter and tweaking of the modulator bandwidth, and with

provision for optimization of neutralization for each frequency of operation. Required bandwidth for the modulator is 35-40 kHz. The required RF path bandwidth is in the order of 180 kHz. The system must accommodate phase modulation acceptably as part of the DRM modulation process. Older shortwave transmitters may be modified to operate in a linear mode, but at reduced efficiency. Meeting the limitations on out-of-band emission is the most difficult hurdle in adapting older transmitters to DRM operation.

An anticipated technique of the near future for DRM operation will be the incorporation of digital pre-correction measures to compensate for transmitter performance deficiencies.

Besides delivering a more listenable service, DRM operation will provide for reduced energy consumption by transmitters.

The DRM standardization process is almost completed. This will provide a single worldwide standard for digital shortwave broadcasting. Extensive field tests have proven that the DRM approach fulfills expectations. Test broadcasts during 2002 build the confidence of all involved parties (broadcasters, operators, equipment manufacturers, investors). The first receivers for consumer use are expected to be available in 2003, and it is expected that regular DRM broadcasts will commence in 2003.

NASB Report

Ed Evans --- NASB

A year ago concern developed about the status of NASB incorporation in Washington, DC. NASB incorporation had been at the address of the law offices of Fisher-Wayland, which no longer existed as an entity. Research showed that Fisher-Wayland had been absorbed by Shaw-Pittman. Some follow-up work with Shaw-Pittman resulted in the NASB retaining the CT Corporation to provide incorporation in Washington, DC. After representation by Shaw-Pittman on several matters, it became evident to the NASB board that the fee structure of Shaw-Pittman exceeded the amounts that the NASB could allocate for this service. The Board disassociated the NASB from Shaw-Pittman and has retained the services of attorney Ed Bailey as legal counsel for the NASB. The NASB has participated in the last two HFCC meetings (Montreal and Bonn).

[Update: Since our 2002 Annual Meeting, we also participated in the Bangkok HFCC.] This participation has proven beneficial in several ways.

Since the last Annual Meeting, WINB and WTJC have been added to the NASB membership.

Ted Haney, Ed Evans, Doug Garlinger, and George Jacobs have represented the NASB at IWG-6 meetings.

The NASB commented on behalf of NASB members on the recent FCC NPRM that has some points affecting shortwave broadcasters (changing frequency tolerance to + or -10 Hz, reducing the highest audio modulating frequency to 4.5 kHz, elimination of the 26 MHz broadcasting band, and formal adoption of a two-season approach).

[Update on the Notice of Proposed Rulemaking: In the 2002 NASB Annual Meeting, we discussed that the changes proposed in the NPRM were basically to put the FCC's Rules and Regulations in line with current ITU rules and policies on HF broadcasting. And we discussed that by changing to two seasons, this should, according to Tom Polzin at the FCC, effectively cut our Frequency Coordination Fees by 50 %. Reducing or eliminating these fees was a project we had considered taking on with the FCC last year, but got sidelined by our incorporation and legal hurdles.

NASB President Ed Evans has talked with Tom Mooring at the FCC Office of Engineering Technology in the past two weeks, and Mr. Mooring informed Ed that the NPRM was proceeding and that the NASB comments were the only ones received by the FCC on this NPRM. Mr. Mooring further stated that the one issue in the NPRM that the NASB had requested (grand-fathering for older transmitters with lower frequency tolerances) would probably be handled by individual waivers for those stations needing them. Otherwise, the NPRM would proceed as it was written. Mr. Mooring expected it to be acted on by the FCC Commissioners in the first quarter of 2003.

So we now have an FCC rulemaking that will accomplish our fee reduction for us, without the hassle and legal expenses we thought we were facing. And the other rules changes are not affecting the way we currently operate, so this NPRM will be a good change for us. The fee reduction, in particular, will come as a relief to a lot of our members.]

Preparation for WRC 2003

Walt Ireland---ARRL

Walt chairs two committees---IWG-6 (US Industry preparation for WRC-03) and US Working Party 6E (broadcasting below 30 MHz for ITU work). He's working with Agenda Items 1.2 (Introduction of Digital Modulation Techniques for HF broadcasting); 1.23 (Alignment of allocations in the 7 MHz band); and 1.36 (Allocations for broadcasting between 4 to 10 MHz). Preparatory work on Item 1.2 is completed. Work continues on the 1.23 and 1.36 Agenda Items. The preparatory work will be completed around the end of May or early June. The output of the preparatory meetings will be translated into 3 or 4 languages and then be distributed to all the administrations. The administrations will have the opportunity to respond with changes as they see necessary, up until around November.

[Update on the WRC2003 preparation: The Agenda Items for 1.2, 1.23, and 1.36 have all been accepted by the WAC (WRC Advisory Committee). The one hurdle remaining is the current situation with 1.36 --- the US Government spectrum users are currently opposed to any band expansion for the broadcasters. A compromise position between our 1.36 paper and the "No Change" position of the government users is being studied. A resolution to this is expected in early January 2003.]

What Goes On at the HFCC

Tom Lucey---FCC, Jeff White---Radio Miami International

Before the time of the HFCC meeting, a deadline is set for organizations to file their proposed requirements. The HFCC compiles these requirements into one big list. It also runs interference studies to generate 55 dbu and 65 dbu collision lists for each organization. This information is made available on the HFCC website. The FCC staff collects the information from the website and goes over these collision lists, reviews the history of use, and gets inputs from Frequency Managers George Jacobs and Stanley Leinwoll.

The first day of the HFCC meeting, revised requirements lists and re-compiled collision lists are distributed, which includes filings made after the deadline. One

of the first tasks is to look at the revised collision lists to see what new entries are there. Where collisions are identified which need resolution, contact is made with the appropriate organization to attempt to work it out. At the end of every day, the requirements list is edited to show the changes that have been determined necessary. Each organization then submits its revised requirements list to the HFCC. The HFCC runs collision studies on these new lists, and distributes revised information each morning. The process repeats each day until the end of the week. At the conference end, the last changes are submitted, reflecting the results of the conference. The HFCC then posts to their website the final requirements lists and the final collision lists.

The conference lasts five days. Around 150 delegates attend, meeting in February and August. Personal contacts made at these meetings enhance the collision resolution process, especially in regard to the collisions which must be resolved after the conference has taken place.

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