

New DRM digital radio system for AM / FM / Shortwave and Tropical Waves arrives in Brazil

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The AM band ranges from 540 kHz to 1610 kHz, in the medium wave band, this range has very interesting propagation characteristics, allowing a station to broadcast its signal in areas with rugged topography, because the broadcast tends to follow the profile of the ground. At night a medium wave signal reflected by the ionosphere, allows a station to increase its range and cover hundreds of kilometres.

The FM band ranges between 88 MHz and 108 MHz (in VHF). Its main feature is the directionality, which can be good or at times may even harm the broadcasts. This frequency range means that broadcasts are propagated analogously, always straight, and can be blocked or reflected by natural or artificial obstacles, like mountains, large buildings, etc. This behaviour does not vary significantly from day to night.

With the use of digital radio standard, Digital Radio Mondiale (DRM), it is possible to cover all radio bands, delivering the same quality and making the transition from AM to FM completely unnecessary.

In the context of Decree 8139, one AM station that chooses not to migrate to FM, could start using to broadcast in digital using the DRM standard. It could broadcast simultaneously (analogue AM and DRM). This means that the analogue signal remains, the antenna can be reused as well as the rest of the studio and other equipment. The DRM signal in simulcast mode is positioned on a single channel adjacent to the AM signal.

Many AM stations using Nautel or BT transmitters, for example, are DRM ready. India broadcasters in medium wave are already broadcasting in the simulcast AM / DRM mode which is compatible with DRM receivers starting to be manufactured nationally. Soon there will be over eight hundred million people in India covered within the range of stations broadcasting in the AM band (medium wave) in DRM.

A radio station in medium wave (AM) broadcasting in DRM would benefit from a higher audio quality than an analogue FM station. Furthermore, digital radio allows multiprogramming, 5.1 audio, features such as sending text and images, multimedia content, Emergency Alert (EWF) and other services such as interactive applications to Ginga, which is the platform used for interactivity in digital TV in Brazil, and has also been defined to be used with DRM.

While some countries are already turning off the analogue FM, Brazil is going against the grain of technological change, proposing the migration of an analogue system in medium wave (AM) to another analogue system on VHF (FM). And all this while there is another aggravating factor: in large

urban centres the FM spectrum in the VHF is overcrowded. So why not develop the AM system, the transition from analogue to digital at a much lower cost, while preserving a great part of the existing equipment in order to deliver an excellent audio quality and consuming much less energy? Why not repeat the success of the Brazilian Digital TV System, which is already being adopted by many countries?

Another very important point that we cannot omit is that many stations in medium wave (AM) have their own local character, serving many communities made up of diverse minority groups. Their migration to VHF (FM) or any increase of power, in order to become regional, would be uneconomical and technically unfeasible especially for complex geographical sites. Therefore, if the current decree is being applied in its current form, many communities will remain "in the dark". It is therefore proposed that if the local radio MW stations wish to maintain their coverage, they should do so by simulcasting in analogue AM and DRM.

However, it would have been much more interesting, from a technical point of view, for broadcasters who really wish to migrate to FM (VHF), to have done so in DRM. Then we would indeed have technological evolution in the Brazilian radio system.

There is an urgent decision which could help and offer digital radio dollars for the dying industry of manufacturing transmitters and receivers which might help bring nationally produced digital equipment to the market.

The best option for the Brazilian system of digital radio is DRM, as technically it is the only system that meets all frequency bands, (SW, MW Tropical waves and VHF) and in terms of business model, is the one that is "open" with the codes freely available without requiring licenses for developing and manufacturing transmitters and receivers locally. You can also use DRM to digitise community radio stations because the DRM standard allows for use in low, medium and high power. The energy saving is important, and the same area can be covered with less than half of the current energy consumption.

The DRM was developed by a consortium of organisations, broadcasters, private companies operating in the transmission and reception sector, universities, research centres, among other agencies and institutions. DRM is a completely open standard, and all standards are available on the Internet, as well as the ISDB-Tb (used in Brazil by the digital TV).

In addition, the DRM audio encoder is the same as used for Digital TV, MPEG4 AAC. The Ginga middleware platform for interactivity, that was Brazil's contribution to the Brazilian Digital TV System, has been supported by PUC-Rio so it can be used in DRM, too. The other system being considered for adoption by the country is the HD Radio (HD means Hybrid Digital), developed and owned by US company Ibisquity. Because it is a proprietary closed system and all its operating codes are trade secrets and known only by their owners.

Among its known features are the following:

* It occupies twice the DRM bandwidth, without providing a superior transmission quality. The HD Radio, and a hybrid pattern designed to stay with the analogue signal will not allow a future spectrum optimisation when transiting to full digital.

* While urging in medium wave and VHF stations to use HD Radio, the HD performance in medium wave in the United States is not always optimal and sometimes has a very bad performance. Currently, there are more stations abandoning HD Radio than those who are adopting the default.

* Much of the HD Radio is a trade secret, including the audio encoder, known as HDC, as well as protocols for transmission multimedia content and other digital services.

* The HD Radio, unlike any other ITU (International Telecommunication Union) broadcasting standards, uses system licensing. By the time the network goes live in HD, thousands of dollars have to be paid annually and broadcasters have to pay Ibiqity usage fees.

* The HD Radio features short setting modes, and a system in which only one company controls its development. That company is the North American Ibiqity Digital. The digital radio guidelines in Brazil are given by the Decree 290/2010 of the Ministry of Communications, which clearly indicates that the only standard that can be adopted in Brazil is the Digital Radio Mondiale, as the HD Radio contradicts several paragraphs of the decree. Art. 3 of Decree 290/2010 of March 30, 2010, which guides radio broadcastings in Brazil, says:

I - promote social inclusion, the cultural diversity of the country and the national language through access to digital technology, aiming at democratising the information;

* DRM: Works on shortwave, essential to the distant regions as a means of national integration. Easy installation and no need for complex infrastructure, just a piece of wire, and one can listen to a radio station. Also the community radios benefit from the adoption of DRM, because this system offers great performance at low power, which is not the case with HD radio. Can transmit up to 4 programs on the same frequency. This is a very interesting option for the radio frequency spectrum optimisation. MEETS this requirement;

* HD Radio: It does not promote national integration because it does not work in short wave, so digital is being restricted to large centres. Does not work in low power. Does NOT Tick this box. IV - foster technology transfer to the Brazilian industry (transmitters and receivers) guaranteeing, where applicable, royalty payment exemption;

* DRM: Being an open system, all published standards and norms of DRM are available publicly (Internet) and can be used by anyone without need to pay licenses. MEETS this requirement.

* HD Radio: system owned and is a closed technology. Access to technology, if any, will be restricted and limited. It is a "black box" (secret). There is need for payment of licenses for transmitters and receivers, burdening the manufacturers. There is also obligation for the station adopting DRM to pay fees for the use of HD. These rates can increase according to the features implemented. DOES NOT MEET REQUIREMENT.

V - enable the participation of Brazilian educational institutions and allow adjustment and improvement of the system according to the needs

* DRM: Open system, standardized by international organisations, enables improvement by researchers and developers. An example is the Brazilian contribution, with the inclusion of interactivity through GINGA. MEETS REQUIREMENTS

* HD Radio: There is no access to the technology and therefore not accessible to researchers. Nothing can be added to the system. DOES NOT MEET REQUIREMENT

VI - encourage regional and local industry in producing products and digital services;

* DRM: user fees exemption. Lower cost for the entire chain, from transmitters to receivers, making the whole chain productive and cheaper. MEETS REQUIREMENTS

* HD Radio: Higher cost for payment of the licenses and maintenance of the stations. The more features implemented, the higher the cost DOES NOT MEET REQUIREMENT

VIII - provide efficient use of radio frequency spectrum;

* DRM: Digital Single Channel, occupying the same channel as the analogue signal, can transmit up to four different programs. MEETS REQUIREMENTS;

* HD Radio: Uses two digital side carriers, as well as analogue centre, thus occupying the space of 3 channels. Difficulty is clear - interference between digital and analogue signals. Does not work without the analogue signal, that is, it can never be fully digital. It will always depend on the analogue carrier. The "delay" between analogue and digital is great and can disturb the listener. DOES NOT MEET REQUIREMENT;

XI - provide several configuration modes considering the particularities of signal propagation for each region.

* DRM: By allowing several modes of transmission, it can operate in medium wave, Tropical waves, shortwave and VHF and can be configured in order to adapt the transmission according to the needs of a particular area MEETS REQUIREMENTS

* HD Radio: It is a "cast" system not allowing changes in the transmission modes. Insufficient performance in medium wave and non-existent in tropical and short waves. DOES NOT MEET REQUIREMENT Radio in Brazil suffers from the continued decline in investments, audience, industrial production and consistent public policies. Decree 8139, which deals with migration the migration from AM to FM pushes the industry to the past and bankruptcy. The entire broadcasting industry urgently needs the reference model the Brazilian Digital Radio System (SBRD) which needs to be defined as soon as possible by the government, mainly in order to give options to broadcasters in medium wave, tropical shortwave and VHF (FM), in this difficult economic times. These actions will enable the Brazilian industry to develop and place on the market 100% domestic products so that society can enjoy the greatest comfort and convenience from such an important means of communication like the radio, keeping in line with the convergence digital media, without abandoning the autonomy that terrestrial broadcasting provides (no use of internet and IP). It is, therefore, a low-cost way of contact, direct from the content source to the listener, without intermediaries and without complex infrastructure. Here's the radio, be it powered by batteries, automotive, or tablet. Faced with the immense potential that radio offers to broadcasters, society and government to implement a new generation of content and services, we expect the Brazilian government, as done for digital TV, to invest in research and policies leading Brazilian radio to the future, not to the past and stagnation.

A current and interested reflection on the digital radio implementation in the world and in Brazil, entitled "The Future of Radio in Brazil," was sent to us after the publication of the above text, by John Rose Ottoni, of the EBC (Brazil Communications Company). The text criticises the unwelcome

migration from AM to FM and warns of extremely important issues linked to the infrastructure and preparation for the new digital radio system.

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