

Karlsruhe / Germany
10.Nov.2024

Shri Deepak Sharma
Advisor,
Telecom Regulatory Authority of India (TRAI)

Subject: RDS-Forum views | Consultation paper on formulating a Digital Radio Broadcast Policy for private Radio broadcasters

Dear Sir

As a member of the board of the RDS-Forum, I am pleased to be able to provide some comments on the consultation paper.

RDS-Forum is the industry association for the **Radio Data System** based in Geneva, Switzerland. We have been working on the standard for digital services in radio broadcasts since 1999. RDS is primarily used in FM radios worldwide.

RDS was the first standardized digital service, developed under the auspices of the EBU (European Broadcast Union) starting in 1984.

RDS services have been partially adopted in later digital systems, unfortunately without the improvements that have since been made and that can only be experienced in FM and have recently been discussed for DRM.

RDS2, the current standard, has been freely available since 2018 without license fees or payments. If one wants to benefit from it and influence the development oneself, one can become a member of the RDS forum. This applies equally to governmental organizations and private companies. The world standard will be adapted to the technology and wishes of the users every 2 to 4 years.

After 1945, FM radio proved to be the best local broadcasting technology, and was introduced in all 193 ITU countries. There is no car without an FM receiver from the manufacturer. Digitization began in Europe in 1984 and continues today. Together with RDS, it is a hybrid system that shows the way to the future. All other systems are based on this BAND II solution, or have no international relevance. India has also done a great job in establishing FM, but has so far overlooked the digital part.

Our association has the longest experience in radio technology with digital content and our members were also involved in the development of DAB and DRM. So, I would like to give you a few answers and comments on some of the questions.

Sincerely

Attila Ladanyi

RDS-Forum board member
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The following systems are compared:

- i. Digital System A (DAB/DAB+)
- ii. Digital System C (HD Radio)
- iii. Digital System F (ISDB-TSB)
- iv. Digital System G (DRM/DRM+)
- v. Digital System H (CDR)
- vi. Digital System I (RAVIS)
- vii. ?!?

Even if it may come as a surprise to some, the most widespread, most important system is missing here: FM.

In general, the word "digital" is not used optimally, because today's FM/RDS system is just as digital as all the other systems mentioned from 1 to 6.

Modern radio systems have exclusively digital transmission between the song database or microphone over the transmitter to the amplifier and loudspeaker in the receiver.

FM with RDS differs from so called "fully digital" systems only in that the audio signals are transmitted completely without compression between 40 Hz and 15 kHz. With good reception, the audio quality is better than with DAB or other lossy compressed systems. FM with RDS is also a multiplex signal. According to the current standard (IEC 62106, since 2018), an FM transmitter has up to 4.4 kbit data channel included. Modern FM transmission technology reduces energy costs enormously, allows single transmitters as well as SFN (Single Frequency Network) and logical transmission chains using RDS2.

Contrary to FM with RDS, which is widespread in 193 countries, RAVIS and ISDB-TSB play hardly any role internationally and DAB(+) has not been widely accepted even in the EU. HD-Radio and CDR are closed systems that have never been accepted outside of a single country.

Parameter	FM	FM 2018	FM_Hybrid	HD Radio	China Digital	DRM+	DAB+	DVB-T2 Lite
Frequency	87.5 MHz – 108 MHz Band II	65 MHz – 108 MHz Band II	65 MHz – 108 MHz Band II	55kHz - 1705kHz 87.5 MHz – 108 MHz	87.5 MHz – 108 MHz Band II	47 MHz – 68 MHz 87.5 MHz – 108 MHz 174MHz – 230 MHz	174 MHz – 240 MHz Band III	47 MHz – 68 MHz 174 MHz – 240 MHz 470 MHz – 860 MHz
Programs / Channel	1	1	1 to 4 (max)	1 to 4 (max)	1 to 4 (or More)	1 to 4 (max)	Typically 16	Typically 44
Data / Channel	RDS 1.2 kBit/s	RDS2 4.8 kBit/s	RDS2+Flexible Program Associated and Non Program Associated Data rates	Flexible Program Associated and Non Program Associated Data rates	Flexible Program Associated and Non Program Associated Data rates	Flexible Program Associated and Non Program Associated Data rates	Flexible Program Associated and Non Program Associated Data rates	Flexible Program Associated and Non Program Associated Data rates
Analog Simulcast	N/A	N/A	No	Yes	Yes	Yes*	No	No
Channel	200 kHz	200 kHz	200 kHz + 48 kHz	400kHz	400kHz	96 kHz	1.7 MHz	1.7 MHz
BW Capacity	N/A	N/A	96 kBit/s	96/124 kBit/s	96 kBit/s-1.5 MBit/s	96 kBit/s	1.1 Mbit/s	3.5 Mbit/s
Modulation	Single Carrier FM 	Single Carrier FM 	Single Carrier FM + Multi Carrier (53) FM+OFDM 4or 16 QAM 	Multi-carrier (up to 524) OFDM, 4 QAM 	Multi-carrier (up to 524) 4.8,16,32,64 QAM 	Multi carrier (106) OFDM, 4 or 16 QAM 	Multi Carrier (1636) OFDM, type DQPSK 	Multi Carrier (1536) OFDM, QPSK,16QAM,64QAM

All of these systems are based on the same idea of frequency modulation and coding, such as BSPK, OFDM, xQAM, QPSK. Except for DAB and DVB, they all operate in BAND II, where FM can also be found. Internationally, the only free and license-free systems are FM/RDS2, DRM. and DAB. This is also mentioned in principle in Chapter II.

To be honest, it is therefore a matter of how to digitize the FM that has just been implemented in phases I to III without losing the investments already made

Q2. In case a single digital radio broadcast technology is to be adopted for the entire country, which technology should be adopted for digital radio broadcasting? Please give your suggestions with detailed justification.

If you read the appendix B. Roadmap with its desired functionalities, only one solution logically comes into question: Introduction of RDS2 in all FM stations with successive addition of DRM technologies.

Reason:

You already have comprehensive FM coverage. This is also reflected in vehicles, radios and smartphones. So, you will already have more than 1 billion FM receivers in the country. With increasing prosperity, people have more radios in their households, typically 2 to 3 per person in Europe. So, in the next 10 years, India will have around 3 billion FM receivers that cannot easily be replaced with something different. There is no reason to do without them; gigantic investments have been made that have also followed the global market.

Most receivers in vehicles and in smartphones can process RDS. Logically, it should also be used to enable the desired functions such as text messaging, alarm systems, receiver control and commercial uses. Initially, this will cost hardly anything. Nor is it necessary to replace the transmitter systems immediately.

RDS2 enables the connection between DRM and FM but also to the Internet.

This means that you can refer to programs not only between FM and DRM in Band II but also on any other frequency ranges (MW, SW). This way, you can build hybrid radio broadcasts and also fill the gaps between the FM frequencies with DRM content.

You can use RDS2-ODA technology to define **your own services**, just as you can write your own apps for your smartphone. These then also run via DRM. You can use public ODAs, such as Slideshow or TMC/TPEG, eRT; many car radios can already do some of this in India.

Simulcast should be avoided, and this would also avoid additional costs. It makes no sense at all to broadcast the same thing "analog" and "digital". This is not a good solution either in terms of energy or programming, as we have already seen in 25 years of simulcast broadcasting in Europe. Simulcast will only encourage a few to buy new and more expensive equipment, so you broadcast with simulcast in the void, and waste energy.

Listeners are only willing to buy or use something new if it offers added value. Digital transmission is not added value; their hearing remains analog. That is why neither DAB nor HD-Radio is particularly successful. Both also require higher investments from both broadcasters and listeners.

The better decision is to broadcast only new programs digitally. For commercial broadcasters, a direct switchover is unattractive because it loses listeners.

Most importantly, **India is keen to promote its own industry** and enable it to develop and manufacture everything itself.

This is only possible with the FM/RDS and DRM hybrid system.

Both are open standards, no license fees are due, no patents cost money.

The standardization bodies are open, companies and authorities can follow and participate in the development. This is not the case with HD-Radio, for example.

Furthermore, FM/RDS2+DRM together perfectly covers all the requirements mentioned in this paper.