Comments of the Digital Radio Mondiale (DRM) Consortium on TRAI's Consultation Paper No 14/2024 dated 30th September 2024 on 'formulating a Digital Radio Broadcast Policy for private Radio broadcasters.

Introduction

With reference to Consultation Paper No. 14/2024 dated 30th September 2024 from the Telecom Regulatory Authority of India (TRAI), inviting comments on the 'formulating a Digital Radio Broadcast Policy for private Radio broadcasters', the Digital Radio Mondiale (DRM) Consortium is pleased to submit the comments for consideration.

Prasar Bharati/All India Radio (AIR) has already adopted and rolled-out nation-wide the DRM standard for its large-area services in the MF and HF bands, after conducting extensive tests/experiments with DRM in MF and HF bands during 7-11 May 2007.

AIR had conducted a very successful showcase of DRM in VHF band-II (FM band) during 23-27 May 2011. The DRM signal was broadcast at 100.1 MHz with ERP of approx. 500 W. Both the applicable modulations, 4 & 16 QAM were tested. A Nautel VS-1 transmitter was deployed at Akashvani Bhavan, New Delhi, for this. At the time, AIR concluded in the joint report of this showcase: "The trial has shown that DRM in the FM band is capable of good coverage at reduced power levels compared to analogue FM." This report[1] is available at DRM website[2].

Trial of DRM in FM band was again carried out in Delhi and Jaipur in Feb-Mar 2021. As may be seen from the Report[3], during the trial it was confirmed that adding DRM transmissions to the FM band is fully compatible and does not interfere with on-going analogue FM services. Also, DRM as a pure-digital radio standard proved its ability to efficiently broadcast multiple DRM signals side-by-side from a single transmitter (DRM Multichannel transmitter configuration), and for operating in flexible configurations alongside an analogue FM signal from the same transmitter (simulcast transmitter configuration).

All the stakeholders in India can benefit from the myriads of services and broadcasting features made possible by DRM digital radio:

[1] https://www.drm.org/wp-content/uploads/2011/08/DRMplus-Report_AIR-DRM_August-2011.pdf
[2] https://www.drm.org/
[3] https://www.drm.org/wp-content/uploads/2021/09/2021-09-16_Results-of-DRM-FM-Trial-Delhi-Jaipur_v1.0.pdf

i. **Open standard** – DRM digital radio is the most modern, non-proprietary, open digital radio standard. It is recognized and endorsed by relevant organisations namely ITU and ETSI.

ii. **Works in all the broadcast bands** – As shown in Fig 1, DRM digital radio is the only approved standard which works, with the same features, in all the broadcast bands [AM bands (MW, and SW) and VHF bands (VHF band1, VHF band 2 {FM band} and VHF band 3]. This is very important as in large countries like India, MW band is important for large regional coverage, SW band for international coverage and VHF bands for local coverages.

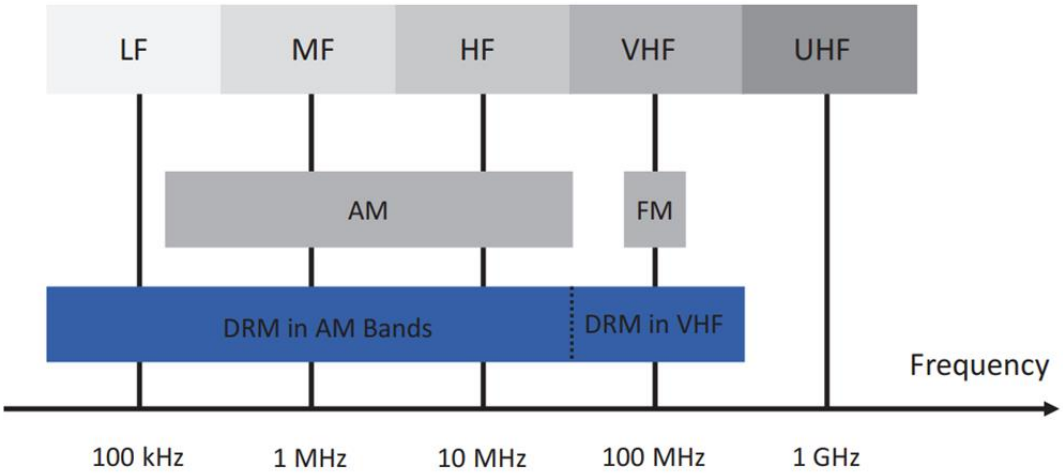

Fig 1: DRM is the only digital radio standard for all bands, and AM/FM successor.

iii. **Goes beyond just audio transmission** – Not only does DRM provide high-quality audio, but it also offers a range of additional services. Journaline, the advanced text-based service, allows listeners on-demand access to relevant information at the radio's screen without the need for Internet connectivity. It supports embedded images and graphics, enables listener targeting and listener-interactivity and engagement with the broadcaster and ad partners, and presents content in all Indian scripts thanks to Unicode support. DRM also supports the transmission of SlideShow images and traffic information.

iv. **Scalable** – DRM digital radio is scalable both in terms of service offering and spectrum usage. It offers up to 4 services (3 audio and 1 data) on a single transmission frequency (one DRM block) and allows for multiple DRM blocks side-by-side. This scalability makes DRM digital radio a highly spectrum-optimal and energy-efficient system.

v. **Flexible** – DRM is a pure digital standard and is designed to be the perfect radio solution to introduce digital radio services complementing the existing analogue FM spectrum & infrastructure scenarios. DRM offers the flexibility to operate as "Single Transmitter

Simulcast" with digital sidebands and analogue signal originating from the same transmitter (Fig 2).

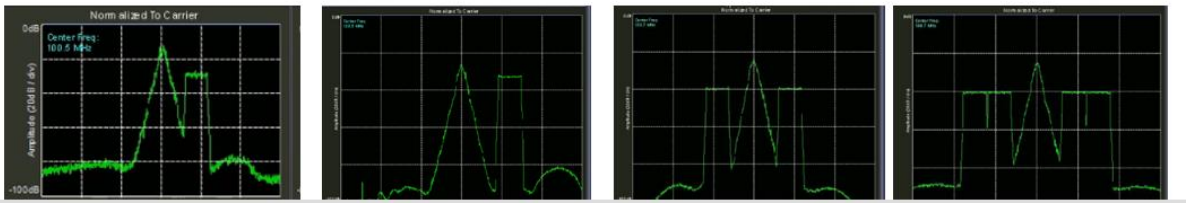

Fig 2: Same transmitter simulcast

vi. It works also as "Pure Digital Transmitter" while providing simulcast to existing analogue transmission via Alternative Frequency Signalling (AFS). The AFS can also achieve simulcast across bands too (e.g. Analogue FM & DRM Digital FM / DRM Digital FM & DRM Digital AM etc.). It also is future-proof in terms of features and a country's digitization process & regulations.

vi. **Utilisation of white space** – For interference-free reception, it is mandatory to give a frequency space of 600 kHz between two analogue FM stations. However, as shown in Fig 3, DRM digital transmitters can be installed by giving a gap of only 50 kHz and can even be installed in the FM band whitespaces.

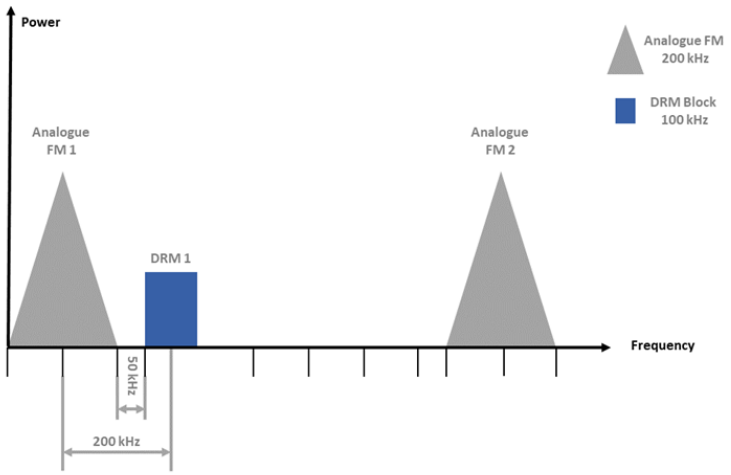

Fig 3: Insertion of DRM block from a separate transmitter in the white space between existing FM transmissions, showcasing an exemplary frequency gap of 50 kHz

Fig 4 represents a typical scenario where a side-by-side combination of multiple DRM blocks fills the gap between the analogue FM transmissions. All these DRM blocks are jointly amplified by a single FM-band transmitter for maximum efficiency and cost-saving. Each DRM block – the transmission signal created from one independent MDI input – represents a single

broadcaster or user with full ownership of the transmission content and configuration. Each of these DRM blocks offers up to 3 audio programs and additional multimedia services like Journaline. Up to 5 DRM blocks can be provided in the white space of 600 kHz between two high-power analogue FM transmitters. This DRM Multichannel approach allows the effective use of spectrum, which is currently technically not usable by analogue FM transmissions.

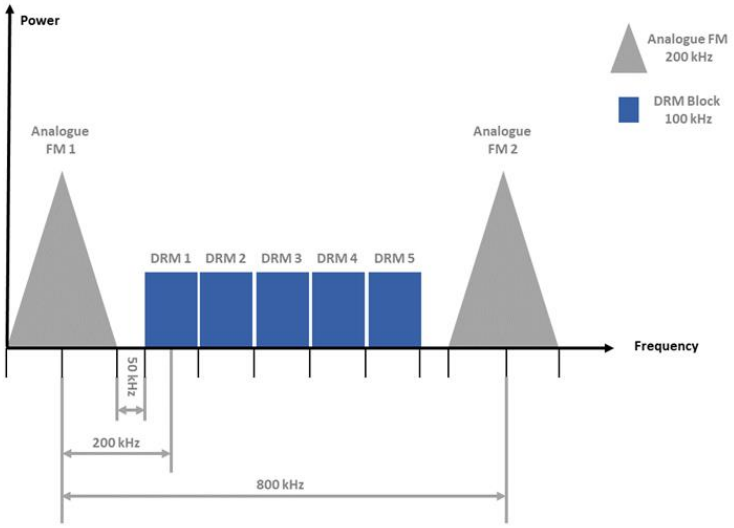

Fig 4: Insertion of side-by-side 5 DRM blocks (representing for example 5 independent broadcasters) from a single transmitter in the white space between two existing FM transmissions

vii. **Improved coverage with minimal interference** – DRM digital radio delivers improved coverage with minimal interference. DRM digital radio utilizes digital modulation and sophisticated error correction techniques and incorporates efficient audio coding with xHE-AAC. These mechanisms ensure robust and reliable reception.

viii. **No licences required by the manufacturers** – DRM can be implemented by anyone. Manufacturers do not request licenses (i.e., ask any single entity for permission – which could then be rejected), resulting in free & full access to technology including Indian companies.

ix. **Emergency Warning Functionality (EWF)** – Analogue FM transmitters are generally utilised to carry the emergency warnings signals too but this is possible only by substituting the normal broadcast with emergency programmes. Also, only the FM receivers who happen to be currently switched on and are tuned to the specific frequency can get the emergency signals. DRM offers EWF (Emergency Warning Functionality) as a native core feature. The EWF alarm signal allows authorities to demand the switch-over by DRM receivers in the affected area to the emergency programme (typically provided by a public broadcaster), and to automatically

switch on a DRM receiver in standby mode. A user who is outside the disturbed area can continue to enjoy the normal programme in DRM digital. Secondly, the EWF emergency programme comprises both audio and text/visual information via Journaline, with the text component enhancing the audio component, providing detailed information for on-demand look-up on the radio set (without the need for the Internet), and all this in multiple languages simultaneously. Thereby, Journaline ensures the inclusion of hearing-impaired users as well as non-native speakers as part of the emergency programme content.

It is learnt that keeping in view the plan of the Govt of India to provide emergency warnings on all types of platforms, the National Disaster Management Authority (NDMA) is considering the possibility of using AIR DRM transmitters network also for dissemination of emergency warning signals. Once the AIR DRM transmitter network starts broadcasting the emergency signals, all types of DRM receivers in use including the ones for private FM broadcasters and low-power small-range FM broadcasts, irrespective of whether they are ON, are in standby mode, or tuned to any frequency) will also be able to receive emergency warning signals automatically.

x. **Timing is right** – It is the perfect time to introduce digital radio services in India in the FM band too using the DRM standard, already in use in India. This will enable availability of digital radio services without disturbing the existing analogue FM services, as already recommended by TRAI. With innovative applications such as EWF, public signage and Radio Schooling etc using the DRM FM transmission, users will be quickly introduced to DRM digital radio giving a boost to the receiver market and Indian industry.

Clarification regarding "DRM", "DRM30", "DRM+"

DRM – Digital Radio Mondiale – is the single ITU-endorsed digital radio standard suitable for all broadcast frequency bands and coverage scenarios, with an identical feature set and user experience across all bands. DRM therefore is the direct digital successor of both the former analogue transmission standards AM and FM.

In the past, the terms "DRM30" and "DRM+" were used to technically distinguish between the modulation parameters optimized for the different bands. However, this led to great confusion as "DRM+" was either seen as an independent new standard, or as a 'newer' version of the "old DRM standard", or even as providing an updated audio codec (similarly to "DAB+"). Since none of these impressions are true, DRM is now universally referred to as the single "DRM" standard. The terms "DRM30" and "DRM+" have been deprecated. Where technically required, it can be clarified as "DRM applied in the AM bands" or "DRM applied in the FM band/VHF bands", respectively.

In practice, the correct modulation parameter set on the broadcast side is automatically determined by the intended transmission frequency; and on receiver side the implementation of DRM for all bands is merely a software question, without any cost implication in terms of IP royalties. Therefore, there is

no need to artificially distinguish between the configurations of the DRM signal by applying different terms.

Comments on the issues raised in the Consultation Paper by TRAI

A. Technology to be used for Digital radio broadcasting

Q1. Do you agree that single digital radio technology adoption is preferable for entire country? If not, support your reply with justification.

Comments:

Yes, we strongly agree that only a single digital radio technology/standard should be operational throughout a country.

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.

Comments

Adopting a single digital radio technology can lead to cost savings, greater efficiency, improved user experience, and faster nationwide implementation. It simplifies the ecosystem for all stakeholders involved—broadcasters, regulators, and consumers alike.

DRM digital radio technology/standard only is the best possible obvious choice in India for the entire country for digital radio broadcasting in the FM band too.

Justifications:

DRM is the logical and compelling choice for rolling out digital radio services in India in the FM band as well since it is:

i. **Already in use in India** – Prasar Bharati/All India Radio (AIR) is already broadcasting in DRM digital in the SW and MW bands. 37 high-power MW and 2 SW transmitters of AIR are already operating in DRM and 4 more MW, and 2 SW transmitters are ready for DRM digital transmissions. Most of these transmitters are operating in simulcast mode, with an hour in pure DRM digital. Over 90 crore people of India (and many neighbouring countries) can receive signals in DRM digital when all these transmitters work in pure digital mode by AIR.

ii. **Developed Receiver Infrastructure** – DRM digital radio in India has seen the fastest market penetration for digital radio technology.

Automotive – The Indian automotive industry has achieved the fastest digital radio adoption of any national digital radio deployment around the world, with around 30% of new cars on the road currently being equipped with a DRM digital radio receiver, totalling over 60 lakh passenger cars as of mid-2023.

Automotive DRM receivers are part of the default radio setup in new cars without any extra cost to the consumer.

As already demonstrated to Prasar Bharati, most of these receivers are software upgradable (without any extra cost) to receiver DRM in FM band too.

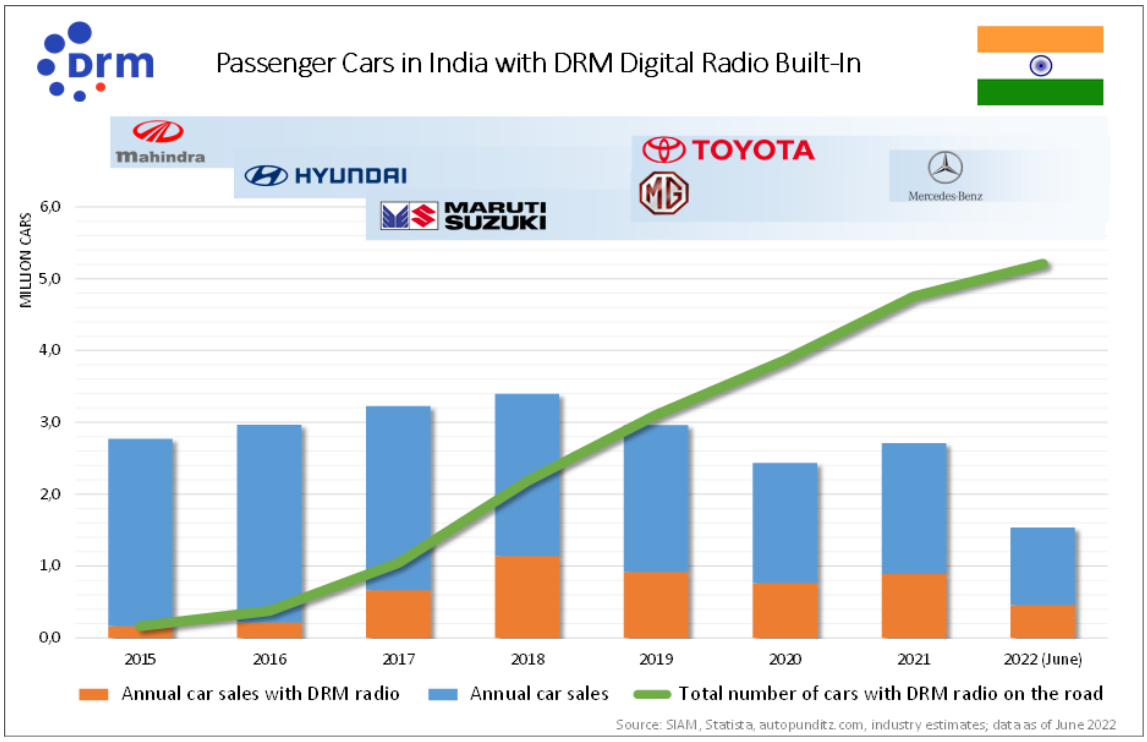

Fig 5: Passenger cars in India with DRM Digital Radio built-in

Mobile Phones – The current built-in FM antenna or earphone jack antenna can receive DRM FM signals in mobile phones. In addition, support for DRM FM-band reception on phones does NOT require dedicated or special hardware or chips, as existing FM front ends may be configured to capture the DRM on-air signal. This is enabled by DRM's overall transmission bandwidth of just 100 kHz. The digital processing and decoding of the DRM

services can then be carried out in software, using the "STARWAVES DRM SoftRadio"[4] app which is already available on Android app stores (Google, Amazon, Huawei).

The announcement by the Indian Government to adopt the DRM in FM band by the Private Broadcasters and for low power small range purposes will motivate mobile manufacturers to invoke this feature by default on their future mobile phone models.

In addition, even existing mobile phones can easily be upgraded to full DRM reception capability, simply by connecting an existing off-the-shelf (analogue) RF tuner dongle via USB. These dongles are available at very low-price points, and the required DRM receiver app can be downloaded from the Android app stores listed above. For the future, DRM FM-band reception can be integrated into new mobile phones without extra hardware cost as a default feature alongside analogue-FM reception (with the xHE-AAC audio codec already included in Android by default today).

Desktop/Home radios – Desktop/Home radios play a marginal yet still important role in today's radio consumption. Gospell and Starwaves have come out with a variety of models of desktop DRM receivers.

CML Micro UK (CML) and Cambridge Consultants (CC) have jointly developed a low cost to produce low-cost DRM receivers. Ready-to-deploy and full-featured DRM tuner and receiver modules are available also from Starwaves.

The cost of desktop/home radios almost exclusively depends on the production volume. As the previous adoption of analogue FM receivers has proven, we can expect very low desktop radio prices particularly once private FM broadcasters and Prasar Bharati starts broadcasting DRM services in FM band and informing/educating their listeners on the new radio capabilities. Deployment of DRM by private broadcasters will further help in increasing the demand and as such further reduction in the price of desktop DRM receivers.

iii. Make in India – Based on the early adoption of DRM as the only digital radio standard in India, the country and its industry today are the hub of DRM chipsets and SDR solutions. In fact, DRM receiver chipsets, developed and made in India, are being exported for the world market and specifically also drive Chinese DRM receiver models. DRM is a true success story for cutting-edge technology "Make in India" for the world market.

[4] https://play.google.com/store/apps/details?id=com.starwaves.drmsoftradio.drm
https://www.amazon.de/STARWAVES-GmbH-DRM-SoftRadio/dp/B08X3T8TGV/

- NXP's world-leading DRM chipset is developed and designed in India, with all the worldwide technology know-how centred in Bengaluru.
- Inntot Technologies (www.inntot.com), a start-up enterprise in India, which has already won several awards/recognitions, has developed a software-based DRM receiver, which is based on a generic processor. Over 8 lakh cars (10 models and 25 variants) by two dealing car manufacturers in India are already having DRM receivers developed based on Inntot design.
- OptM Media Solutions Private Ltd (www.optmsol.com) based out of Bengaluru is developing both transmission and receiver solutions.

iv. Unified Digital Radio System – Implementing DRM in FM band too provides a unified digital radio system across the country. This ensures that broadcasters, listeners and manufacturers have a single, standardized platform for digital radio, avoiding the complexity of managing multiple digital systems.

v. Seamless Transition for Listeners – With DRM already implemented in AM bands, many listeners have DRM-enabled devices. Expanding DRM to FM means those devices can be used across FM band too, offering seamless access to digital content without requiring new hardware.

vi. Efficient spectrum usage – A DRM block in the FM band requires just 100 kHz bandwidth offering up to 3 audio services of superior quality and an additional data service. Two separate DRM transmitters can be placed just at a gap of 50 kHz. However, is interleaving gap is required between the various DRM blocks from a single transmitter. Also, these DRM blocks can be fitted in the available whitespaces between the analogue transmitters. As such DRM results in the most efficient use of the FM band spectrum.

vii. Ease of Implementation during transition – DRM Digital services in the FM band can be started without disturbing the existing analogue services and also in simulcast with AFS. As such it presents a compelling case for broadcasters, especially during the transition from analogue to digital radio.

viii. Simulcast Capability without Infrastructure changes – DRM enables broadcasters to operate both analogue and digital services in the FM band simultaneously without replacing and/or upgrading the existing FM transmitters and combiner chain (existing CTI). This seamless integration enables broadcasters to offer digital services while maintaining their analogue offerings, making the transition smoother and cost-effective.

ix. Alternative Frequency Signalling (AFS) for Seamless Simulcast – DRM digital and analogue FM services can be linked using AFS, ensuring smooth transitions between the two signals. This is particularly useful for listeners, as it guarantees an uninterrupted experience, whether they're

receiving the analogue or digital version of the service. It allows broadcasters to reach both analogue and digital audiences during the transition phase.

x. Shared Infrastructure for Cost Efficiency – DRM Multichannel allows placing of a large number of DRM blocks from a single FM transmitter, without interleaving gap, in the existing spectrum, optimizing the use of available bandwidth. Hence, multiple broadcasters can share a single DRM transmitter, significantly reducing the initial investment for each broadcaster. This collaborative approach allows broadcasters to benefit from digital transmission without each one needing to invest in separate infrastructure. Despite sharing the DRM infrastructure, each broadcaster retains complete control over their content through the DRM ContentServer, which functions as the studio head-end encoder and multiplexer. This ensures flexibility and autonomy in content management.

xi. Cost-Effective Transition – Since existing analogue FM transmitters and the CTI, including the combiner chain, remain untouched and a shared infrastructure suffices for DRM FM, the cost of introducing DRM is minimal, and rollout is quick. This solution adheres to current spectrum regulations and requires no major infrastructure overhaul, making it a practical and financially sound approach for broadcasters looking to adopt digital services incrementally.

xii. Future-Ready with Full Digital Conversion Potential – Analogue FM transmitters can often be easily upgraded or reconfigured to operate in full-digital DRM mode when needed. This future-proofs the broadcaster's investment, allowing them to eventually offer one or two blocks of DRM content within the allocated 200 kHz FM bandwidth for analogue FM.

xiii. Win-win situation to all stakeholders – By going DRM digital in FM band, the users of the technology can offer more content choices, complemented with multimedia content, to their listeners at much-reduced power consumption, thereby increasing the opportunity for revenue generation and meeting the aspirations of many of their audiences. Governments immensely benefitted as digital technology is green technology, in getting extra income from the increased revenue generated by the broadcasters and in using radio networks for providing Emergency Warning alert signals. Listeners get excellent quality sound in stereo along with pictures and text in multiple languages.

xiv. Large number of neighbouring Asian countries have also adopted DRM – **Indonesia** has issued notification[5] adopting DRM in AM and FM bands. **China** is already broadcasting in in DRM in SW band and has notified[6] for DRM broadcast in the MW band for domestic coverage. **South**

[5] https://jdih.kominfo.go.id/produk_hukum/unduh/id/872/t/peraturan+menteri+komunikasi+dan+informatika+nomor+5+tahun+2023

[6] http://www.nrta.gov.cn/art/2023/9/14/art_113_65535.html

Africa has issued Regulations[7] adopting DRM. **Nepal** is carrying pilot service in DRM in FM band; and are planning for regular countrywide service in DRM digital in SW band and for valley in the FM band. **Pakistan** is in the process of procuring DRM MW and FM transmitters.

Q3. In case multiple digital broadcasting technologies are to be adopted, please specify whether it should be left to the market forces to decide the appropriate technologies and what could be the potential problems due to adoption of multiple technologies? Please suggest probable solutions to the problems, with detailed justification.

Comments:

Digital Radio is a classic network technology, where all market players depend on a single on-air standard to successfully launch their own transmissions and broadcast services, or receivers, car models and mobile phones etc. Good examples are GSM/LTE, where everybody works towards the common platform, while competing as network operators, device manufacturers or even OS environments on device side. Therefore, only a single standard must be adopted by all the radio broadcasters in a country, including the public service broadcaster, private broadcasters and the community radio stations. Govt. must mandate to use the notified digital radio standard. DRM is the ideal choice for India, as it is an open standard, works in all the broadcast bands, receiver infrastructure is already being developed and know-how is available in the country.
Permitting multiple digital radio standards and leaving the choice to market forces can lead to many problems, some of which are outlined below:

i. **Market Fragmentation**
   Problem: If different broadcast standards are used, the radio market can become fragmented, leading to incompatibility between devices and stations. For example, a listener may have a radio that only supports one technology, but not another, which restricts access to content.
   Impact: This limits the consumer base for broadcasters, creates confusion among listeners, and discourages consumers from adopting digital radio due to the fear of obsolescence or limited choices.
ii. **Higher Costs for Broadcasters**
   Problem: Broadcasters may need to invest in infrastructure for multiple technologies to reach all audiences, which will increase capital and operational costs. Smaller stations may struggle to bear these costs, leading to reduced participation in digital radio.

[7] https://www.gov.za/sites/default/files/gcis_document/202104/44469gen215.pdf

Impact: This can hinder the growth and sustainability of digital radio broadcasting, as not all broadcasters can afford to operate on multiple platforms. It may also result in monopolistic behaviour where only large players dominate the market.

iii. **Consumer Confusion and Reduced Adoption**

Problem: Consumers may be confused by the presence of multiple standards and may hesitate to purchase new digital radios if there's uncertainty about which standard to support. This can slow down the adoption of digital radio as a whole.

Impact: A confused market leads to lower consumer confidence, lower adoption rates, and a longer transition period from analogue to digital. This delay can further fragment the market as some consumers stick with analogue broadcasts longer.

iv. **Limited Economies of Scale**

Problem: With multiple technologies in place, manufacturers have to produce devices compatible with different standards, reducing economies of scale and driving up prices. This makes digital radios even more expensive for consumers.

Impact: Higher device costs slow down adoption, especially in developing markets or low-income segments, limiting the potential reach of digital radio.

v. **Interoperability Issues**

Problem: Different standards may not be interoperable, making it difficult to switch between broadcast regions or integrate services like emergency broadcasts. This limits the utility of digital radio and complicates national-level implementations.

Impact: Emergency services, traffic updates, and other nationwide services may not work uniformly across regions, reducing the effectiveness of these systems and potentially putting public safety at risk.

vi. **Lack of Regulatory Clarity**

Problem: Without clear regulatory guidance, the coexistence of multiple technologies can lead to legal and policy ambiguities. Broadcasters may be unclear about licensing, spectrum allocation, and compliance requirements.

Impact: This lack of clarity can create barriers to entry, reduce investment in digital broadcasting, and slow down the digital transition process.

vii. **No common Technical Infrastructure and Planning/implementation problems** – Each ITU approved digital radio standard has its unique characteristics, works in specific frequency bands, requires different spectrum bandwidth etc. As such a Common Technical Infrastructure (CTI) is not possible, as in the case of analogue FM, thereby further increase in the cost of implementation of digital radio services. Spectrum allocations and their auction is also a big problem due to different spectrum requirements for different standards.

Go for only open standards even if multiple – No country in the world has adopted open and proprietary standards simultaneously. If at all a second standard is to be permitted, it should also be open standard as in the case of Indonesia and South Africa, who have adopted DRM and DAB+, both open standards.

B. Roadmap for implementation of digital radio broadcasting

Q4. What should be the approach for migration of existing FM radio broadcasters to digital radio broadcasting?

Comments:

The existing CTIs which are designed for combining of a few analogue FM transmitters, need major expensive changes for operation in simulcast mode using any of the approved digital standards (of course, these can be used for pure DRM operation without any changes).

Digital radio services in India must thus be introduced without disturbing the existing CTI chain. This is possible by installing a wideband FM transmitter, with DRM Multichannel operation, in each city/town for digital radio services. The output of this wideband DRM FM transmitter may be fed on a separate antenna, installed on the same tower which has antenna for the CTI working in analogue. If there is no space for the antenna (for digital service) on the existing tower, it may be mounted on a separate tower.

One or more DRM blocks may be allocated to each of the broadcasters including Prasar Bharati. The services/programmes within a DRM block can also be linked with existing analogue FM programme via AFS (thus achieving simulcast with separate transmitter).

A separate DRM Multichannel transmitter may be planned and rolled out, concurrently with analogue, even in the new cities/towns where no private broadcasters are operating and for which new licences are being/will be granted.

DRM Multichannel transmitter set ups may be got installed by the broadcasters themselves within a specified period otherwise by a Govt. agency (like Prasar Bharati, BECIL etc) as in the case of the existing policy for analogue FM broadcasting.

DRM Multichannel transmitter set up for digital is even possible in the available whitespace between the analogue transmissions. This should be fully utilised for effective use of the spectrum.

Separate CTI for digital in a city/town – If more than one DRM Multichannel digital transmitter is required in a city/town, then a separate CTI for digital service may be created and all the transmitters for digital service in a city/town must use the same CTI chain for digital broadcasting.

Permit the existing licenced private broadcasters to go digital from the existing set up – Simultaneously all the existing licenced private broadcasters may be permitted to use the existing allocated band of 200 kHz for DRM digital, any time on permanent basis and/or on time shared basis (as it doesn't need any changes in the existing CTI chain), till their licenced period.

Q5. What should be the timeframe for various activities related to the migration of existing FM radio broadcasters to digital radio broadcasting?

Comments:

5 to 7 years' time may be given for switch off analogue FM services in India. This should be well publicised, and all the stakeholders involved in the decision-making process.

Q6. Please suggest measures that should be taken to encourage existing FM radio broadcasters to adopt digital radio broadcasting.

Comments:

To encourage the existing licenced FM radio broadcasters to go for digital radio broadcasting, several strategic measures need to be taken, and incentives granted to the broadcasters. Some of these measures/incentives are suggested below:

i. **No or nominal licence fee for digital broadcasting from the existing licensees for 5 years** – Allocate a 100 kHz frequency band to each of the existing licenced private broadcasters, in each city/town where they have licence for analogue broadcasting, for free for a period of 5 years, with the condition that they will start DRM digital broadcasting within a period of say 1 year, otherwise the free allocated frequency band will be withdrawn. If it's not possible allocate the spectrum free, then a very nominal fee, say 5 to 7 % of what is being paid by the broadcasters for analogue, may be charged.

ii. **DRM Multichannel digital setup in each city/town** – As shown in **Fig 6**, plan for a DRM Multichannel transmitter, feeding on a separate antenna but on the exiting tower, in each city/town and allocate 1 DRM block to each of the existing licenced private broadcaster in that city/town, including Prasar Bharati, if possible.

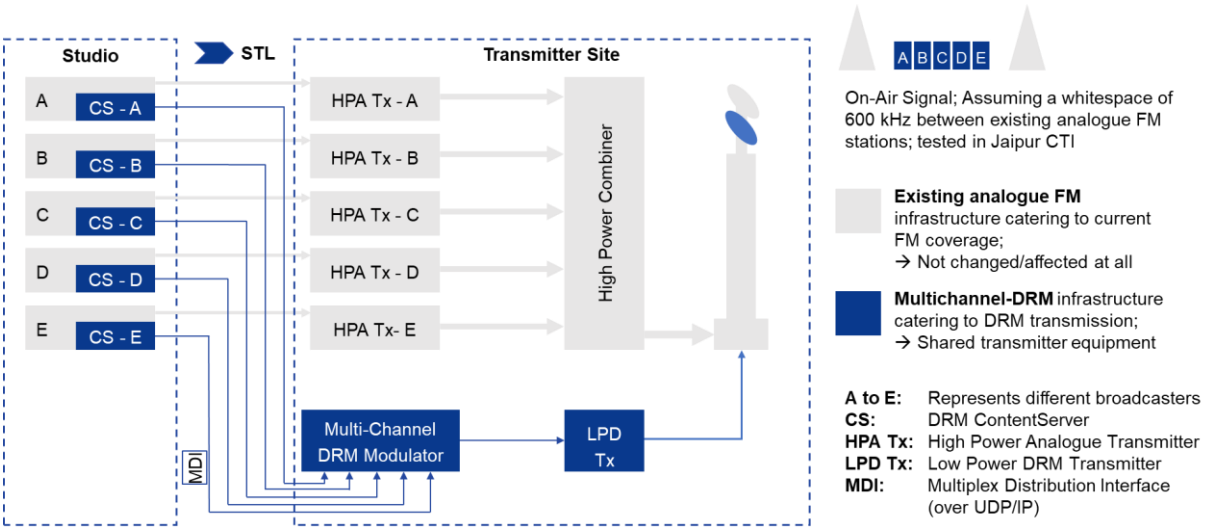

Fig 6. DRM Multichannel & Shared Transmitter Infrastructure - Compliant with existing CTI infrastructure

DRM Multichannel transmitter set up may be got installed by the broadcasters themselves within a specified period otherwise by a Govt agency (like BECIL) as in the case of the existing policy for analogue FM broadcasting.

A DRM Multichannel setup may be planned (along with analogue) and rolled out, concurrently with analogue, even in the new cities/towns for which new licences are being/will be granted.

Separate CTI for digital in a city/town – If more than one DRM Multichannel digital transmitter is required in a city/town, then a separate CTI for digital service may be created and all the transmitters for digital service in a city/town must use the same CTI chain for digital broadcasting.

iii. **Permit the existing licenced private broadcasters to go digital from the existing set up** – All the existing licenced private broadcasters may be permitted to use the existing allocated band of 200 kHz for DRM digital, any time on permanent basis and/or on time shared basis.

iv. **Royalty scheme by the music companies (fee for Music labels)** –

The same royalty scheme shall be applied to all terrestrial broadcast transmissions, whether analogue or digital; (digital terrestrial broadcasting is NOT equivalent to IP streaming services); Only a single royalty should be charged if the same radio service is carried both in analogue and digital at the same time in a given market (i.e. "simulcast"), given that any listener can only listen to one of the two technical options at a time, and receiver will be able to blend between those two transmissions effectively treating them as one.

v. **Nominal royalty for digital broadcasts** – Since listenership for digital broadcasts will be low initially and will pick up gradually, so the content providers (music companies) must be convinced to charge no or very nominal royalty, for few years, for the content exclusively being provided on digital.

C. Affordability of Digital Radio Receivers

Q7. What measures should be taken to facilitate the availability of affordable digital radio receivers?

Comments:

Several strategic measures need to be taken by the Govt to generate the demand of the digital radio receivers and to facilitate their availability at affordable prices in the country. These measures should address financial, technical, regulatory, and consumer-oriented challenges. Some of our suggestions are:

i. **Use of single digital radio standard for digital radio** – Only a single, non-proprietary, standard (DRM) must be mandated for use in the country for digital radio broadcasting.
ii. **Digital broadcasting by all the broadcasters** – All the broadcasters, be it Prasar Bharati, private broadcasters, Community radio stations, must be mandated to go digital, using DRM only. Even for the low power small range broadcasting it should be mandated to use DRM standard only.
iii. **All India digital radio rollout** – Digital radio services must be rolled out on all-India-basis.
iv. **Announce Policy for going digital** – Govt must take a take policy decision for radio to go digital, using DRM, and announce the same.
v. **Mandate EWF on digital radio** – Govt must mandate that Prasar Bharati will provide EWF functionality on digital radio and all the broadcasters/service providers will enable the same from their transmitting set up, so that listeners are motivated to have DRM digital radios for this important lifesaving function.
vi. **Digital radio for remote education** – Use of digital radio for remote education may be encouraged. DRM digital radio can be used for education without the need of internet.
vii. **Mandatory digital radio reception facility in all type of radio reception devices –** Govt must mandate that in future all type of radio reception devices, be it automobiles, mobile phones, standalone receivers – have built-in provision for digital radio reception, including EWF.
viii. **Tax holiday to receiver manufacturers** – Tax holiday for a few years (say 5 years) may be granted to all the digital radio receiver manufacturers in the country.
ix. **Reduced import duty on digital receivers** – Import duty on digital receivers may be reduced for a few (say 5) years.
x. **Regular interaction with all the stakeholders** – Govt must involve all the stakeholders – manufacturers/dealers/stockists and broadcasters – in the decision-making process, announce timelines for going digital and hold regular meetings with them.
xi. **Consumer Awareness programmes** – Governments, broadcasters and manufacturers must launch public campaigns to educate consumers on the benefits of digital radio (e.g., better sound quality, more channels, emergency alert features, text information in multiple languages etc). This increased awareness will drive demand and lower prices of receivers as more consumers would buy digital radios.

xii. **Free digital receivers for strategic agencies/locations** – Government must distribute a few thousand DRM digital receivers free in all the cities/towns (where digital radio signals are available) to schools/colleges/Community Centres/Govt offices etc. Some free digital radio receivers may also be distributed in the boarder and backward areas in the country.

D. Simulcast of live channel on Internet without any extra cost

Q8. Should private radio broadcasters be permitted to simulcast their live terrestrial channels on Internet? If yes, what should be the terms and conditions for such simulcast? Please provide your comments with detailed justification.

Comments:

Broadcasters may be permitted to feed the MDI streams created for the DRM digital service, on internet too, so that reach of their digital service is widened.

E. Provisions of FM Phase-III policy guidelines that may require review for inclusion in Digital Radio Broadcast Policy

E1. Eligibility Criteria

Q9. Should the provisions relating to eligibility criteria prescribed in FM Phase-III Policy guidelines be adopted for Digital Radio Broadcast Policy? If yes, is there any need to add or remove any criteria? If not, please suggest the plausible eligibility criteria for granting authorisation for digital radio broadcasting.

No comments.

E2. Financial Competence

Q10. Should the financial eligibility criteria provided in existing policy guidelines be adopted for digital radio broadcasting policy? If not, what should be the financial eligibility criteria for different categories of cities for digital radio broadcasting? Provide your suggestions with detailed justification.

No comments.

E3. Period of Permission

Q11. Should the provisions regarding the period of permission as per existing Policy Guidelines be adopted for the Digital Radio Broadcast Policy? If not, what should be the validity of the period of permission for Digital Radio Broadcasting? Provide your suggestions with detailed justification.

Comments:
Yes, we agree.

E4. Earnest Money Deposit (EMD)

Q12. Should the provisions regarding the Earnest Money Deposit provided in existing policy guidelines be adopted for the Digital Radio Broadcast policy? If not, what should be the Earnest Money Deposit for digital radio broadcasting services?

No comments

E5. Application Processing Fee

Q13. What should be the amount of application processing fee for Digital Radio Broadcast services? Please provide your suggestions with justification.

Comments:

Application processing fee must be kept low so that broadcasters are motivated to adopt digital radio broadcasting.

E6. Performance Bank Guarantee (PBG)

Q14. Should the provisions regarding the Performance Bank Guarantee provided in existing policy guidelines be adopted for the Digital Radio Broadcasting services? If not, what should be the amount of Performance Bank Guarantee for digital radio broadcasting services?

No Comments

E7. Requirement to adhere to time schedule

Q15. Should the provisions regarding the time schedule for signing of authorisation and operationalisation of radio channel as prescribed in existing policy guidelines be adopted for Digital Radio Broadcasting services? If not, please suggest with justification the changes required in the time schedule for signing of authorisation and operationalisation for channels for Digital Radio Broadcasting services.

Comments:

As suggested above, broadcasters must be mandated to operationalise the digital service within 1 year of the permission.

E8. Annual Fee

Q16. What should be the provisions relating to annual fee including payment methodology be adopted for digital radio broadcasting services? Provide your suggestions with detailed justification.

Comments:

To give impetus to the digital radio broadcasting, if the same audio programme/service which goes on analogue service is provided on the digital service, then no additional annual fee for the digital service may be charged for few years (say 5 years) till the digital reception infrastructure gets developed. However, annual fee for the exclusive digital service may be charged as per the existing policy for analogue.

Q17. Should there be a minimum amount of annual fee for digital radio broadcasting services? What should be the criteria for deciding such minimum annual fee? Provide your suggestions with detailed justification.

Comments:

As suggested in response to Q16, to give impetus to the digital radio broadcasting, if the same audio programme/service which goes on analogue service is provided on the digital service, then no additional annual fee for the digital service may be charged for few years (say 5 years) till the digital reception infrastructure gets developed. However, annual fee for the exclusive digital service may be charged as per the existing policy for analogue.

Q18. Do you agree that the amended provisions of calculating annual fee as 4% of GR only and de-linking it from Non-Refundable One Time Entry Fee (NOTEF), be made applicable to existing operational FM radio channels, who migrate to digital radio broadcasting?

No comments

Q19. What should be the definition of Gross Revenue (GR) to be adopted for digital radio broadcasting services? Provide your suggestions with detailed justification.

No comments.

E9. Restrictions on Multiple permissions in a city

Q20. Should the provisions regarding the restrictions on multiple permissions in a city be adopted for Digital Radio Broadcasting services? Please provide your suggestions with detailed justification.

Q21. Should the frequency be considered, or multiple channels operated on single frequency be considered for the purpose of putting restriction on multiple channels in a city? Please provide your suggestions with detailed justification.

Comments on Q20 and Q21:

DRM in FM band enables broadcast of up to 3 audio and a text service (a single DRM block) in a bandwidth of 100 kHz. A broadcaster has full flexibility to control the bit rate allocation to each of the audio services for audio quality and/or robustness of received signal. He can even broadcast just a single audio channel of very high quality in 100 kHz. Broadcaster can control the bit rates and the number of channels dynamically.

At present, a broadcaster is licenced to transit one single audio channel using 200 kHz bandwidth. In the allocated 200 kHz bandwidth, a broadcaster can transmit 2 DRM blocks (up to 6 audio and 2 text services) from a single transmitter.

We suggest that a single DRM block of 100 kHz shall be the considered as the smallest unit for permission. Hence, introducing digital radio services in the FM band, allocation of a frequency of 100 kHz may be considered per broadcaster for determining channel restrictions in a city/town. However, till the expiry of their licence, they must also be permitted to use the allocated 200 kHz frequency for analogue only or digital only (as simulcast of analogue and digital is not possible within 200 kHz using any of the approved standards), as and when required, on time shared basis.

E10. Optimum number of channels for auction

Q22. Do you agree that the maximum number of channels that has been identified by MIB in category A+ and A cities as given in Table 3 should be put up for auction for digital radio broadcasting? If not, please give your suggestions with detailed justification and criteria for deciding the maximum number of channels in each of the cities mentioned in Table 3 above.

Comments:

All the additional channels required as per the demand in any city/town may be auctioned. However, as suggested earlier, along with analogue, each new channel must be given an additional slot of 100 kHz for DRM digital.

E11. Program Content/Genre

Q23. Should the provisions regarding the Programme Content provided in the existing policy guidelines be adopted for Digital Radio Broadcasting?

No comments

Q24. Should digital radio broadcasters be allowed to broadcast selfcurated news and current affairs programs as recommended by TRAI in its recommendations dated 5th September 2023? If yes, what should be the duration of such programs. Please give your suggestions with detailed justifications.

Comments:
We are of the opinion that to provide variety of rich content, private broadcasters must be permitted to carry news and current affairs programmes on their channels, not only in audio but also in text.

If there are any reservations of the Govt to permit self-curated news and current affairs programs by private broadcasters, then they must at least be allowed to carry the same in text in multiple languages.

Q25. Is there a need to prescribe the guidelines for genres of programmes that a broadcaster can provide on multiple channels available on a single frequency allocated to it for digital radio broadcasting? If yes, what should be the genres of channels permitted in digital broadcasting? Please give your suggestions with detailed justifications.

No comments.

E12. Provisions related to Penalties

Q26. Should the provisions regarding penalties prescribed in extant guidelines be adopted for digital radio broadcasting? If not, what are your suggestions for modifications? Please give your suggestions with detailed justification for each.

Comments:

As suggested above, existing licenced broadcasters must be mandated to operationalise the digital service within 1 year of the permission, otherwise the frequency allocation for digital may be cancelled. For the new licenses, it should be mandatory for the broadcaster to start digital service, along with analogue, failing which licence should be deemed to be cancelled.

E13. Co-location of Transmission Infrastructure

Q27. What should be the methodology for examination and creation of new Common transmission Infrastructure (CTI) setups required for new channels including their upkeep, given that existing CTI setups and towers may not have vacant space and apertures, respectively, for accommodating additional new channels in category A+ and A cities?

Comments:

Wideband FM transmitters (up to 800 kHz) are now commercially available in the market. Up to 8 DRM blocks can be transmitted from an 800 kHz bandwidth single FM transmitter. These 8 DRM blocks can: be allocated as required in any combination between the broadcasters and each broadcaster would have full control on their DRM block(s). These DRM blocks may have different power levels as required. It is also not necessary that all the DRM blocks are energised at the same time and/or operate together.

As outlines in response to the next question, the existing CTIs which are designed for combining of a few analogue FM transmitters, need major expensive changes for operation in simulcast mode using any of the approved digital standards (of course, these can be used for pure DRM operation without any changes). We therefore suggest that a wideband FM transmitter, with DRM Multichannel operation, may be installed in each city/town for digital radio services. The output of this wideband DRM FM transmitter may be fed on a separate antenna, installed on the same tower which has antenna for the CTI working in analogue. If there is no space for the antenna on the existing tower, it may be mounted on a separate tower.

One or more DRM blocks may be allocated to each of the broadcasters including Prasar Bharati.

A separate DRM Multichannel transmitter may be planned (along with analogue) and rolled out, concurrently with analogue, even in the new cities/towns where no private broadcasters are operating and for which new licences are being/will be granted.

DRM Multichannel transmitter setups may be installed by the broadcasters themselves within a specified period otherwise by a Govt agency (like Prasar Bharati, BECIL etc) as in the case of the existing policy for analogue FM broadcasting.

DRM Multichannel transmitter set up for digital may even be in the available whitespace between the analogue transmissions.

Q28. What should be the methodology for examination and modifications to existing CTI setups or creation of new CTI setups required for transmission of digital components/ simulcast operation by existing broadcasters including its upkeep given that existing CTI setups, including towers, may not support the addition of digital components without modifications?

Comments:

In the existing CTIs, outputs of several FM transmitters, operating in analogue mode, are fed to a combiner. The output of the combiner is fed to a common tower.

In some of the cities/towns, private broadcasters have their own exclusive CTI set ups. However, in number of cities, even Prasar Bharati shares the same CTI.

200 kHz bandwidth is used by every broadcaster for analogue signal.

Right now, FM license allocation is for 200 kHz; technically it not possible to do single-transmitter simulcast within this 200 kHz (with any of the ITU approved digital radio standards) which is fully occupied by analogue FM signal. (IBOC requires 400 kHz. DRM enables simulcast operation in 300 kHz bandwidth, by adding on DRM block before or after the analogue signal, without giving any interleaving gap).

Simulcast operation from the existing CTIs has several issues. Some of these are:

i. The existing combiners, which are designed for operation for operation with 200 kHz bandwidth signals, can't work with signals of more than 200 kHz bandwidth. For simulcast operation from a single transmitter, these combiners need to be thus replaced, which is expensive.

ii. The FM transmitters for analogue-only transmissions operate in high efficiency non-linear mode ('saturation'). As soon as a digital signal component is to be added, the whole transmitter needs to operate in linear mode, which decreases the maximum output power and thus results in reduced coverage for the analogue component. For simulcast

operation, since some output of the transmitter goes in digital too, so the analogue power of the transmitter gets reduced drastically, which results in the shrinkage of the coverage in analogue. This may not be acceptable to the private broadcasters, who have got the licenses after paying a huge license fee. Analogue power can be restored to the original value by replacing the transmitter with a higher rated power, which again involves large additional investment.

iii. All the broadcasters have contributed for the installation of the combiners in CTI. Each of these broadcasters may not be willing to go digital. They may as such may be unwilling to pay for the replacement of the combiners.

iv. Change of combiners and transmitters will result in the disruption of the FM analogue transmission for some time. This may not be acceptable to all the broadcasters sharing the CTI set up.

v. Every broadcaster requires additional frequency spectrum, adjacent to the allocated 200 kHz bandwidth for analogue, either on one side and/or on both the sides. Allocation of this additional adjacent spectrum by auction may not fetch any money as this spectrum is useful only to a licenced broadcaster.

Thus, upgrading an FM transmitter in the existing CTI to hybrid/simulcast mode transmission (single transmitter simulcast) is economically and practically NOT feasible, as it requires allocation of additional spectrum, replacement of transmitters to higher nominal power to add digital side-bands in linear mode (to maintain analogue FM coverage area), replacement of combiners to manage overall load increase and wider input bandwidth, service outage time and operational risks for *other* broadcasters on the combiner. As such, the whole required investment may lay on the shoulders of a few early movers going digital in a CTI.

In view of the above it is suggested that the existing CTIs may continue to be used for analogue and a separate set up may be created for digital, as outlined in response to **Q27** above. Using DRM however, a broadcaster may choose to replace in future an analogue FM signal with one or two DRM blocks (at overall lower power and same/smaller bandwidth as 1 analogue FM channel) for which no changes to CTI are required.

E14. Financial Accounting Reporting by Broadcasters

Q29. Are there any changes required in the format prescribed for reporting of Financial Accounting by radio broadcasters for the Digital Radio Broadcast Policy? If yes, please suggest changes with justification.

No comments

E15. Review of any other provision

Q30. Whether any other provision of the existing policy guidelines that may require review for their adoption in Digital Radio Broadcast Policy? If yes, please provide your comments with reasons thereof for amendments (including any addition(s)) required in the existing policy guidelines for FM Radio, that the stakeholder considers necessary. The stakeholders may provide their comments in the format specified in Table 4 explicitly indicating the existing clause, suggested amendment and the reason/ full justification for the amendment in the existing policy guidelines for FM Radio for inclusion in Digital Radio Broadcast Policy.

No comments

F. Methodology for estimation of Reserve price for Digital radio Channels

Q31. Do you agree that the methodology used in TRAI's recommendations dated 10th April 2020 for determining reserve prices of FM Radio channels should be used for determining reserve prices of digital Radio channels?
If yes, please provide detailed justification for your views.
b. If not, please suggest an alternative approach/ methodology with details and justifications.

Comments:

We have suggested above that frequency of 100 kHz may be allocated to each existing licensed broadcaster as well as new licensees, free or on a nominal fee for a period of 5 years. So, the question of reserve price for digital channels may be deferred for a few years, till the digital receiver infrastructure gets developed in the country.

Q32. Do you agree that due to non-availability of updated radio listenership estimates data and Market Intensity Index, whether the same data, as used in 2020 recommendation, can be used in the present exercise as well? In case the answer is no, which alternative data/methodology can be used for the same purpose?

Comments:

Our suggestion regarding reserve price shall be nil or nominal initially to promote FM digitization. We further suggest that this shall be reviewed after successful adoption and market penetration. At that time, DRM with its advanced text service with interactivity could provide more realistic data for such an exercise.

Q33. Do you agree that a multiplication factor of 0.7 be used for estimating the reserve price from average valuation of FM Radio channels or otherwise? Please provide your suggestions with detailed justification.

No comments.

G. Any other issue

Q34. Stakeholders may also provide their comments/ suggestions along with detailed justification on any other issue that may be relevant to the present consultation.

No comments.

Submitted for kind consideration, please.

(YOGENDRA PAL)
Hon Chairman India Chapter, DRM Consortium
Tel: 98115 72044, 79826 85313
Email: yogendrapal@gmail.com

(RUXANDRA OBREJA)
Chair DRM Consortium

(ALEXANDER ZINK)
Vice-Chair DRM Consortium,
Chief Business Development Manager Digital Radio & Broadcast Applications, Fraunhofer IIS