# Digital broadcast radio in India

## Perspectives on the opportunity and requirements for a successful implementation

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ICEA
INDIA CELLULAR & ELECTRONICS ASSOCIATION
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# FOREWORD

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सत्यमेव जयते
आज़ादी का अमृत महोत्सव

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MINISTRY OF INFORMATION & BROADCASTING
SHASTRI BHAWAN, NEW DELHI - 110001

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## FOREWORD

Digital radio can provide a much-needed boost to the Indian radio segment.

As a free-to-air medium, radio plays a very important role in India to inform and educate its people. However, COVID-19 severely impacted the Indian radio segment with falling revenues and shrinking opportunities. In addition, systemic issues around measurement, reach, operating models and competing products have continued to affect the industry for several years.

Digital radio provides several benefits compared to analogue radio transmission. It uses scarce spectrum more efficiently, allowing it to provide 4x the number of channels, increased choice for listeners, segmented audiences to advertisers, listenership data and consequently more revenues to the government.

Digital radio can help grow the radio segment in India by 3x over 5 years, if implemented keeping in mind the requirements of various stakeholders and with the correct policy support. Ability to simulcast in analogue and digital modes, migration period sops, mobile phone chipset integration and license fee pragmatism can help migrate the Indian FM radio segment towards a more modern technology.

I hope you find this brief study insightful. I would like to thank ICEA and all those who participated with their time and insights.

(Apurva Chandra)

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# Current state of digital radio

1

## Globally, 1.4 billion people can access digital radio services

- UK, US, China, Australia, and many European countries transitioned to digital radio almost a decade ago
- Consumers experience high quality services and the industry enjoyed profitable growth

2

## In India, digital radio launched over 10 years ago but is languishing

- A limited service is currently available in AM - approximately 3 hours per day by All India Radio (AIR), which broadcasts across 35 medium wave and 5 short wave transmitters
- Digital radio has not been rolled-out on FM transmitters and has no private participation

# Different **technologies** can be considered for India

1

## There are four key digital radio technologies adopted globally

- Digital Audio Broadcasting (DAB/DAB+) - for AM and FM across Great Britain and European countries
- Digital Radio Mondiale (DRM) - for AM across India, Germany and South Africa
- HD Radio (HDR) - for AM and FM across United States of America, Canada, Mexico, Panama and Philippines
- Convergent Digital Radio (CDR) - in the China Region

2

## Different technologies have different strengths

- DRM works across all broadcast bands unlike other technologies
- DAB/ DAB+ provide the ability to run up to 16 programs/ channels in digital only mode while HD Radio can run up to 15 programs/ channels in digital only mode
- Radio transmitters can cover distances between 50 and 600 kilometres
- A return path is available using an IP connection

# Digital FM radio has **benefits** for the entire ecosystem

1

## Listeners

- 4x more channels are possible within the same frequency which can provide more options to listeners
- The technology is broadcast-centric and hence there are no data charges for consumers
- It provides a better listening experience than analogue transmission – across both audio quality and user interface

2

## Broadcasters

- More ad inventory to sell with the ability to charge higher rates based on segmented audiences
- The system can provide listenership data, which can help build trust and grow revenues
- The segment's revenues can double within five years of implementation and can generate additional revenues of INR123 billion during this period
- Transmitters use significantly less power as compared to analogue radio transmitters

3

## Advertisers

- Ability to buy segmented audiences at scale, with regional language bifurcation
- Ability to use programmatic ad delivery across national networks
- Comfort on listenership to drive media planning

4

## Regulator

- Optimum use of scarce spectrum in the middle and long term
- Increased taxes from increased revenues
- Ability to use digital radio infrastructure for emergency warnings and traffic information

# Challenges for a successful transition

1

## Transitioning to digital radio requires capital investment

- A one-time cost to install transmitters to cover the desired population will be required, and this could be prohibitive given that radio companies have faced significant revenue pressures due to COVID-19 and hence may not be able to invest in the near term

2

## The mobile phone ecosystem is critical for successful roll-out

- Of the 500 million mobile smart phones in India in 2021, and 200 million feature phones, most do not have the required chipset and/ or antenna to receive digital broadcast radio - replacing the large phone ecosystem with the same can take several years
- Current incremental cost of the chipset is estimated at US$1-2, which would need to be passed-on to end customers
- Just as FM receivers were an important feature for phone purchasers, digital receivers can play a similar role and enable quick adoption

3

## Transition will take 3-5 years

- Radio broadcasters cannot enable a switch-on-switch-off transition to digital radio as they are dependent on linear FM reach for their revenues; hence analogue and digital broadcasting will need to exist in parallel till adequate reach is achieved; consequently, for some years there would be no spectrum saving

4

## Competing advanced products already exist

- Online audio and radio (OTT) has achieved a reach of around 200 million in 2021 based on its ability to unicast, recommend songs, and build custom playlists
- YouTube is India's largest music consumption platform and provides free access to all types and genres of music
- As long as data prices remain low, these options can be considered as competition for digital radio

5

## Lack of clarity on music royalties

- There is currently lack of agreement amongst stakeholders on whether music royalty (which is at a far lower rate on linear radio) classifies for the linear rate or the streaming rate; if the latter, business models may not be re-looked at

6

## License fees at current levels may not be tenable in the short run

- Given that the digital radio ecosystem will take 3-5 years to gain scale, radio broadcasters will not be willing to pay similar license fees during that period, and this could reduce their interest in investing in digital radio

# Key **imperatives** for uptake of digital radio in India

1

## Regulatory

- Approve digital radio rollout by all FM operators in a simulcast mode to protect ad revenues enabled within the existing spectrum mandate
- Bundle digital radio with other proposed technologies (eg, digital video broadcast) to optimize costs and reduce the capex burden
- Permit sharing infrastructure costs between AIR and private FM companies to reduce the capex burden
- A formal policy mandating automobiles/ mobile phone manufacturers to include the required hardware in devices is required

2

## Technology

- Bring the incremental cost of chipsets and antennas to a reasonable level so that the all -important mobile phone ecosystem comes into being at scale

3

## Implementation

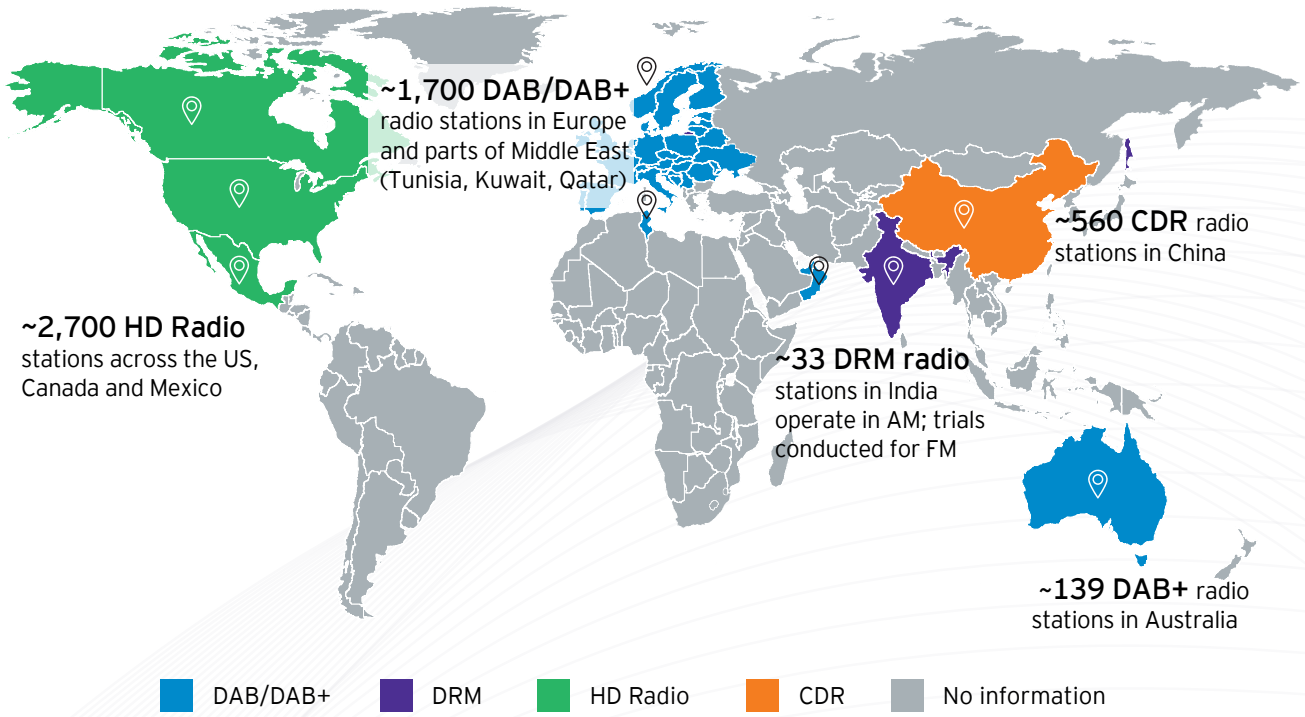
- Parallel roll-out along with linear FM for a few years till scale is achieved
  - Enable existing linear companies to transmit on digital frequencies without additional license fees in the short term to build the consumer base
  - Government continues to earn license fees for the frequencies auctioned
  - Additional ad inventory sales will earn additional license fees and taxes for the government
  - No disruption to listeners
- Permit new players to bid for additional or not utilized frequencies to support the transition but in a manner that is not detrimental to the interests of the existing licensees

# Current state of digital radio

2

# Globally, **1.4 billion people** can access digital radio services

UK, US, China, Australia, and many European countries had transitioned to digital radio almost a decade ago

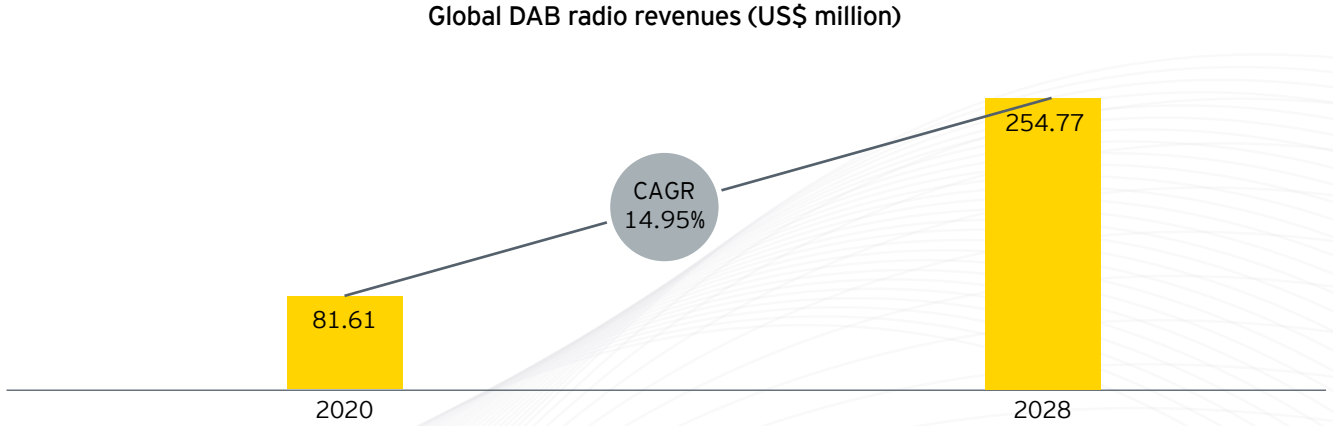



Source: World Dab, Industry discussions

- As of 2021[1], DRM claimed a reach of 600 million[2] predominantly in the AM and SW bands,while DAB claimed a coverage of 420 million[3] and HD Radio of 400 million[4]
- CDR has achieved large scale rollout in China and is exclusively for the country
- DAB has large scale digital rollout across EU and Australia. Its available on 109 million receivers
- DRM has achieved limited rollout of digital radio under AM in India and is available in 4.3 million devices
- HD Radio has achieved large scale rollout across North Americas and available in 85 million recievers

[1]World Dab, EY analysis - Digital Radio_Global section
[2]"DRM in India", DRM press release, https://www.drm.org/drm-india-page/, ICEA and industry discussions
[3]Digital DAB Radio- Europe and Asia Pacific", World Dab, Nov 2021, p. 1
[4]HD Radio technology expands to over 200 digital channels in Mexico", HD Radio, https://hdradio.com hd-radio-technology-expands-to-over-200-digital-channels-in-mexico/

# DAB is the European standard[7]

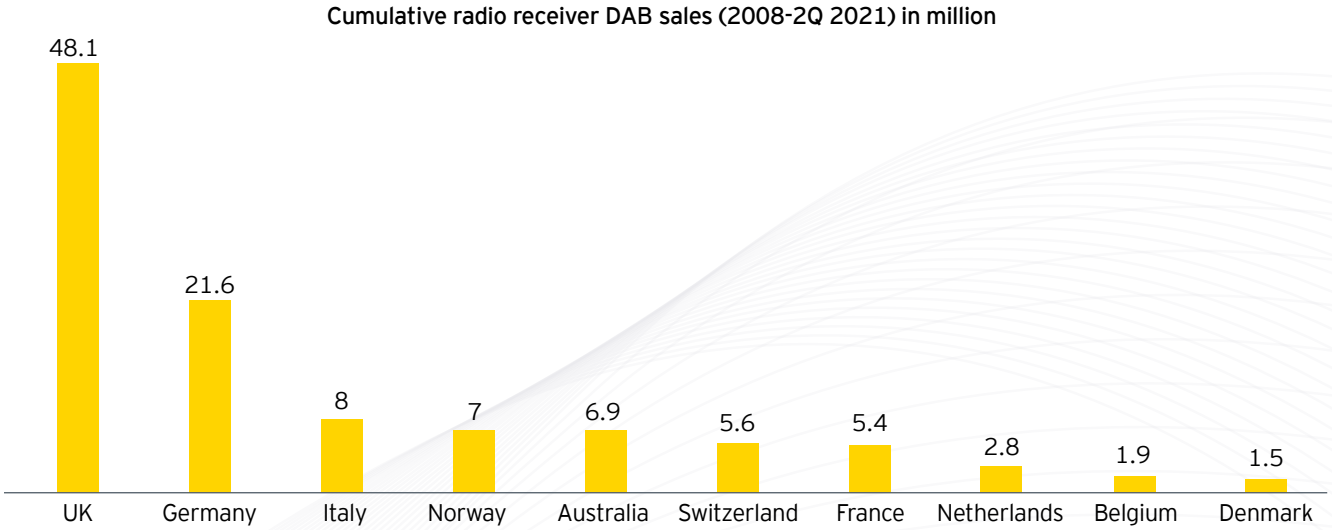



Source: Verified Market Research

- DAB is a digital radio broadcasting system that, through the application of multiplexing and compression, combines multiple audio streams onto a relatively narrow band centred on a single broadcast frequency called a DAB ensemble[8]
- DAB radio market size was valued at $83.61 million in 2020 and is projected to reach $254.77 million in 2028, growing at a CAGR of 14.95% from 2021 to 2028
- DAB was initially deployed by the United Kingdom in 1995, when the European Telecommunications Standards Institute (ETSI) adopted the DAB system as the only European standard (ETS 300 401)[9]
- Since then, it has been firmly established as the core digital platform for radio throughout Europe, underlined by several regulatory initiatives along with the growing popularity of consumer and automotive DAB+ receivers

[7] https://www.verifiedmarketresearch.com/product/dab-radio-market/
[8]Glomeasy Line Dab Antenna - 1,2m - Term. Fme - Glomex Store
[9]Glomeasy Line DAB Antenna - 1,2m - TERM. FME - Glomex Store

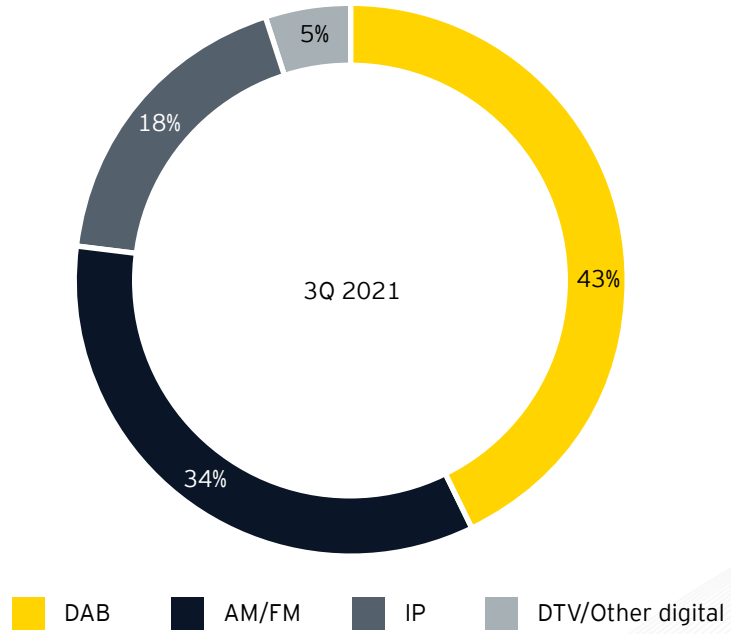
# Cumulative DAB/DAB+ receiver sales across Europe and Asia pacific




Source: World DAB

- As of Q2 2021, 109 million cumulative DAB/ DAB+ receivers including consumer and automotive, had been sold in Europe and the Asia Pacific, driven by markets such as the UK, Germany, Italy, Norway, and Australia[10]
- DAB/ DAB+ radio is the prominent medium of radio broadcasting in the UK with 43% of total listening hours[11]

[10] "Digital DAB Radio- Europe and Asia Pacific", World Dab, Nov 2021, p. 1.
[11] "Digital Radio and Audio review", Survey, Oct 2021,p. 28. ; "Digital DAB Radio- Europe and Asia Pacific", World Dab, Nov 2021




Source: World DAB

- Other European countries are also witnessing growth in terms of DAB implementation post the EU regulator's mandate on DAB adoption in all new cars in the region:
  - Italy was the first country to introduce a regulation mandating all new consumer and automotive receivers to include DAB+ from January 2020 onwards
  - Germany has launched its second national multiplex in late 2020
  - In October 2021, France has launched two new national multiplexes broadcasting 25 DAB+ stations, including national services from Radio France and leading private broadcasters
- DAB is also seeing significant activity across Asia and the Middle East with interests growing beyond the borders of Europe, towards Asia and parts of Africa and the Middle East
- Feasibility of the DAB and DAB+ would need to be evaluated keeping in mind India`s spectrum allocation policy

# US, Mexico and Canada have adopted HD Radio

- HD Radio (HDR) is a trademarked term for an in-band on-channel (IBOC) digital radio broadcast technology. It generally simulcasts an existing analogue radio station in digital format with less noise and with additional text information[12]
- HD Radio is predominantly used by AM/FM stations in the US, Canada and Mexico owing to the advantages of not requiring new spectrum and backward compatibility with existing AM and FM receivers
- HD Radio coverage currently spans over 400 million people, with more than 4,700 channels of programming across these countries[13]
- North America has over 85 million cars with HD Radio (22% of all cars in the USA are equipped with HD Radio receivers)
- The Canadian Radio-television and Telecommunications Commission (CRTC) stopped renewing licenses for DAB post 2012, after which several Canadian FM stations have been testing HD Radio. Currently, 34+ Canadian FM stations in 14 markets are broadcasting in HD Radio catering to more than 50% of the population
- Almost 3.3 million cars in Canada are equipped with HD Radio receivers, representing about 13% of vehicles on the road. More than 33% of new vehicles sold include an HD Radio receiver[14]
- In 2011, the Mexican communications regulator (CoFeTel) has adopted HD Radio as a voluntary standard for the transmission of digital radio nationwide. Currently, there are 119 FM stations in Mexico carrying 192 program services on HD Radio
- In Mexico, digital stations cover 41% of the population, reaching approximately 51 million people, with more than 22 brands and 115 models that offer HD Radio receivers in new vehicles[15]

[12]https://dbpedia.org/page/HD_Radio
[13] "HD Radio technology expands to over 200 digital channels in Mexico", HD Radio, https://hdradio.com/hd-radio-technology-expands-to-over-200-digital-channels-in-mexico/
[14]"CAB Technical Report: CRTC Radio Policy Review 2021", Xperi, pg.5.
[15]"HD Radio technology expands to over 200 digital channels in Mexico" HD Radio.com, Jun 2021

## Digital Radio Mondiale (DRM) has wide reach through AM/MW/SW services

- DRM was developed in 1997 as a digital broadcasting technology for shortwave and mediumwave radio. It requires transmission of a digital-only signal on a separate frequency inside the existing bands. The DRM+ variation was developed to support FM and VHF broadcasting
- DRM is a universal, openly standardised digital broadcasting system for all broadcasting frequencies, including the AM bands (LW, MW, SW), as well as VHF Bands I, II (FM) and III[16]
- As an open standard, manufacturers do not need to pay any royalties for the use of DRM but one time IP royalties are charged from receiver/equipment manufacturers for the use of two technology components (MPEG xHE-AAC and Journaline)
- Apart from India, countries such as South Africa, Russia and Brazil are also conducting trials for DRM; Pakistan is planning DRM in all bands in 2021
- DRM is rolled out predominantly in the AM band and the technology currently does not have any large scale commercial execution in the FM band

## Convergent Digital Radio (CDR) is used in China

- The Chinese Government's Academy of Broadcast Science (ABS) has developed their own FM digital radio standard called Convergent Digital Radio (CDR). CDR has similarities with HD Radio, in that it is a hybrid analogue/ digital system using upper and lower OFDM subcarriers.[17] As CDR is a China centric technology, we have not covered the same in detail. This report only covers DRM, DAB and HD Radio which are used globally

[16]https://www.drm.org/what-is-drm/
[17]https://www.gatesair.com/documents/slides/2015-09-Anderson-Advanced-Digital-Radio-HD-Radio-DRM-DAB-CDR.pdf

# In India, **digital radio** launched over 10 years ago but is languishing

## A brief history of digital radio in India[18]

**2007**
- DRM trials on MW and SW by All India Radio (AIR)

**2009**
- Regular DRM services by AIR on SW from Delhi

**2010**
- Indian government approved AIR's digitization plan on MW and SW using DRM transmitters

**2011**
- AIR increased DRM SW service from Delhi to Nepal, Sri Lanka, NE Asia, Mauritius and East Africa
- Trial of DRM in VHF Band II by AIR

**2012**
- AIR commissioned 1000 kW MW DRM transmitter at Rajkot/ Gujarat in simulcast mode
- 27 high power MW DRM transmitters ordered from Nautel by AIR

**2014**
- Report of expert committee on Prasar Bharati by Dr Sam Pitroda
- 9 DRM Nautel transmitters installed and commissioned by AIR

**2015**
- 20 kW MW transmitter in Delhi started operating in pure DRM
- 3 programs were carried out from Rajkot using 1000 kW MW DRM transmitters
- 17 more DRM transmitters installed and commissioned by AIR

**2016**
- 20 kW MW transmitter in Chennai started operating in pure DRM
- 9 remaining DRM transmitters were commissioned by AIR

**2018**
- TRAI recommendations report was issued on 'Issues related to Digital Radio Broadcasting in India'
- DRM Consortium and Gospell receiver launched in BES Expo 2018
- Emergency warning functionality trial and seminar organised by AIR using the 200 kW MW DRM AIR transmitter in Delhi
- 1 million cars with line-fit DRM receivers
- Content servers at 5 MW DRM transmitters were replaced with new content servers (Fraunhofer IIS)
- AIR carried out tests on 100 kW SW transmitters in Delhi

**2020**
- HD Radio transmission configured on 100.5MHz at Akashvani Bhawan transmission tower in New Delhi
- Digital FM broadcast was operated in simulcast mode between January 2020 to February 2020 (with interruptions from COVID-19 lockdown)
- Test in New Delhi was conducted during January 2020 to mid-March 2020 and then resumed in January 2021 due to COVID lockdown

**2021**
- Jaipur testing was establish by All India Radio and evaluated at the Jaipur CTI facility from March 20 – 22, 2021

Source: drm.com ICEA, TRAI, industry discussions

- Currently in India, digital radio is only available 3 hours per day across a few cities using DRM technology[19]
- Digital AM has been impacted by a lack of consumer receivers, no clear and affordable product roadmap or mobile phone integration
- HD Radio has been tested and evaluated for the FM band in the cities of Delhi and Jaipur[20]
- DRM radio has been evaluated and tested for AM band in Dhanbad in 2007 and for the FM band in Delhi and Jaipur

[18]PowerPoint Presentation (drm.org)
[19]Prasar Bharti
[20]Industry discussions

# TRAI issued a recommendation on Digital Radio broadcasting in 2018[21]

- It identified a need to facilitate digital radio broadcasting in India to effectively utilize spectrum in VHF-II band for Radio broadcasting, to provide diverse content and other value-added services to radio listeners
- It recommended a managed introduction approach, due to lack of ecosystem for digital radio broadcasting in India
- It specified that unless a clear policy framework was defined and unified efforts were made, it would not be possible to develop the required ecosystem for digital radio broadcasting
- It recommended that the Wireless Planning and Coordination wing (WPC) should notify the channel plan for each type of digital radio broadcasting technology for increasing content on digital radio broadcasting
- During the initial three years after declaration of Digital Radio Broadcasting Policy, it suggested the Government should grant fiscal incentives in the form of lower tax rates to manufacturers of digital radio receivers
- Auction should be carried out in phases – starting with cities of category 'A+' and 'A' and subsequently in cities of other categories
- The auction of remaining channels of Phase-III should be done by delinking them from technology. Broadcasters should be permitted to use any technology (analogue or digital or both) for radio broadcasting on the frequency allocated to them through auction in future.
- In case Radio broadcasters opt for digital technology, they should be permitted to broadcast more than one channel subject to technical feasibility on single frequency allocated to them
- Private sector should be permitted to provide digital radio broadcasting services within the existing frequency band of 88 – 108 MHz used for FM radio broadcasting
- The broadcasters should be allowed to make use of any available digital technology, recognized by ITU, within the allocated/liberalized spectrum for providing digital radio broadcasting services subject to adaptation, if any, recommended by MIB/TRAI from time to time
- In case market determined price of 200 KHz for digital radio broadcasting is less than or equal to the price paid by FM radio broadcasters then FM radio broadcasters will not be required to pay any additional amount and will be permitted to provide digital radio broadcasting services also for the remaining period of permission

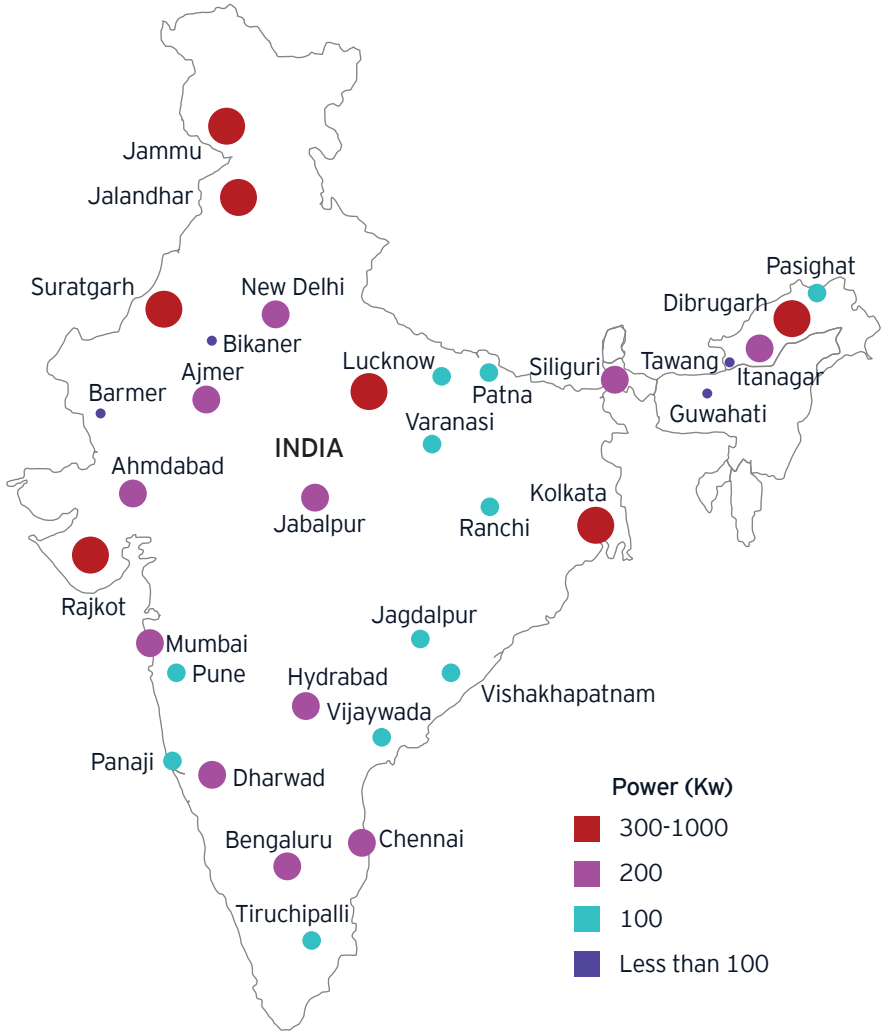
[21] TRAI Recommendation Digital Radio Report 2018

# Current state of digital radio in India

1

## Transmission

- Currently, India has a limited digital radio service in the AM band - approximately 3 hours per day are broadcast by AIR across 35 medium wave and 5 short wave transmitters[22]
- HD radio and DRM + FM trials have been completed in New Delhi and Jaipur in 2021 and a report has been submitted by Prasar Bharti to the Ministry of Information and Broadcasting
- The Indian Government has not rolled out any policy mandating digital radio adoption




The size of the bubble represents the power of the transmitters in Kw

[22]https://www.qsl.net/vu2jos/drm/mwk.html

## 2

## Car receivers

- India has over 4.3 million cars with line-fit DRM digital radio support already[23]
- 28% of new cars on the road are currently equipped with a DRM digital radio receiver
- 20,15,000 cars were sold in 2021 by major car brands across India with DRM radio support[24]

## 3

## Mobile phone receivers

- India has 500 million smart phones and 200 million feature phones[25]
- The chipset to receive digital radio is not configured in almost all the mobile phones sold in India

## 4

## Standalone receivers

- The receiver required to receive the signals in standalone devices is in the testing phase

## 5

## Testing digital radio technologies in India

- Currently in India, both the DRM and the HD Radio technologies are being evaluated for better feasibility considering the highly fragmented radio listenership
- AIR is in an advanced stage of testing both digital radio broadcast options for FM channels, and a standard is expected to be announced soon to start the rollout of digital FM radio in India
- The major solution that the Government is looking for is on the proper choice of technology for the expansion of digital radio to newer bands, particularly FM. We understand that most digital ready transmitters can incorporate FM across technologies [26]

[23]https://www.radioworld.com/columns-and-views/guest-commentaries/drm-radios-going-strong-in-indian-cars
[24]https://www.statista.com/statistics/1090709/india-car-sales-volume-by-oem/
[25]EY-FICCI M&E sector report; TRAI, ICEA
[26]"Xperi Completes Successful HD radio Tests in Delhi", Radio World, Jan 2022, Xperi Completes Successful HD Radio Tests in Delhi - Radio World, Industry discussion

# Technology comparison


3

We have compared different digital radio technologies across certain parameters. The analysis has been provided by various associations dealing with the technologies and has not been independently verified by EY.

| Parameter | HD Radio | DRM/ DRM+ | DAB/ DAB+ |
|---|---|---|---|
| **Definition** | HD Radio (HDR) is a trademarked term for an in-band on-channel (IBOC) digital radio broadcast technology. It generally simulcasts an existing analogue radio station in digital format with less noise and with additional text information.<br>DRM is the universal, openly standardised digital broadcasting system for all broadcasting frequencies. | India has adopted to DRM as broadcast standard for digital radio in the AM band. It works in every band available and can also work hybrid model with simulcast. | DAB is a digital radio broadcasting system that, through the application of multiplexing and compression, combines multiple audio streams onto a relatively narrow band centred on a single broadcast frequency called a DAB ensemble. |
| **Global coverage** | HD Radio is used primarily by AM and FM radio stations in the United States, Canada, and Mexico, with a few implementations outside North America. | DRM has been adopted by India (for AM transmissions), Germany, Hungary, Romania, Nigeria, France, and a few other nations. Russia, Brazil, and South Africa are currently under the testing phase. | The European and Arab States Broadcasting Unions have adopted DAB+ as the preferred digital radio standard and there is widespread interest in rolling out DAB+ in the Asia-Pacific and Southern Africa. |
| **Current status in India** | The HD Radio digital FM broadcast system has been tested in New Delhi, India. The HD Radio team set up transmission on 100.5MHz at AIR's Akashvani Bhawan transmission tower in New Delhi. The digital FM broadcast has been operating in a simulcast mode (hybrid operation of analogue and digital) since January 13, 2020. | Currently, India has 35 Medium Wave transmitters and 2 short wave transmitters of DRM through which Digital radio broadcast can be done.<br>28% of new cars on the road currently are equipped with a DRM digital radio receiver. | Currently, not available in India. |
| **Frequency range for analogue radio - Long, Short & Medium range** | HD Radio works on medium wave band in hybrid or simulcast mode and as digital-only mode | DRM/ DRM+ works on all broadcast bands available on analogue mode | DAB/ DAB+ does not work in analogue broadcast band |
| **Frequency range for Digital FM radio - VHF I, VHF II, VHF III (Very High Frequency)** | HD Radio can work in VHF II FM band and can work in the other VHF bands | DRM works on all FM VHF bands available i.e., VHF I, VHF II and VHF III | DAB/ DAB + works in VHF III in FM band. In India, VHF III band is used by TV broadcasters |

| Parameter | HD Radio | DRM/ DRM+ | DAB/ DAB+ |
|---|---|---|---|
| **Analogue simulcast** | Simulcast is currently operational. This is the main operation mode adopted by HD Radio countries to manage their digital transition. | It is possible to broadcast DRM in simulcast mode.<br>Additionally, DRM's AFS (Alternate Frequency Signalling) feature allows the receiver to switch between analogue and DRM services independent of their actual transmission frequency – even across multiple broadcast bands. This allows for DRM network planning. | DAB/DAB+ does not support analogue simulcast. |
| **Single frequency network (SFN)** | HD Radio supports SFN. It has been successfully demonstrated in the USA. | DRM supports SFN in all frequency bands hence offers flexibility for frequency/ coverage planning. | DAB/ DAB+ supports SFN |
| **Usability in cars** | HD Radio can be used in cars. It is currently in the trial phase in India (New Delhi). | DRM can be used in cars | DAB can be used in cars. |
| **Usability in congested cities with tall buildings** | Blockages could be possible if the path contains barriers. | Blockages could be possible if the path contains barriers. | Blockages could be possible if the path contains barriers. |
| **Signal loss** | When HD Radio tuner loses the station's digital signal, it will automatically switch over to the analogue signal broadcast at the same frequency. | When DRM loses the station's digital signal, it will automatically switch over to the analogue signal broadcast at the same frequency. | A complete loss of signal is possible if the digital signal transmitted is too weak. |
| **Ability to use inside home/ office** | HDR can be used inside homes and offices | DRM can be used inside homes and offices | DAB cannot be always used inside offices like other radio services (cellular, GPS, Iridium), but this can be resolved by installing DAB repeater kits. |

| Parameter | HD Radio | DRM/ DRM+ | DAB/ DAB+ |
|---|---|---|---|
| **Sound quality (HD/ Stereo/ Dolby)** | HD Radio brings FM radio quality to about the level of CD quality sound, while AM Radio in HD is about the same as conventional FM Radio broadcasts in terms of quality.<br>HD Radio technology can deliver surround sound programming to automobiles. | DRM supports mono, stereo and surround sound transmissions. Surround sound is supported by DRM by using the "MPEG Surround" technology. MPEG Surround allows for 5.1, 7.1 and higher speaker setups. | Not tested in india. DAB+ is able to transmit audio by compressing it by means of the MPEG-4 HE AAC V2 audio codec. |
| **Subscription model** | Yes | Yes | Yes |
| **Make in India capability** | Yes | Yes | Yes |
| **Emergency alerts** | Yes | Yes | Yes |

# Digital radio has benefits for the entire ecosystem

4

1

## Listeners

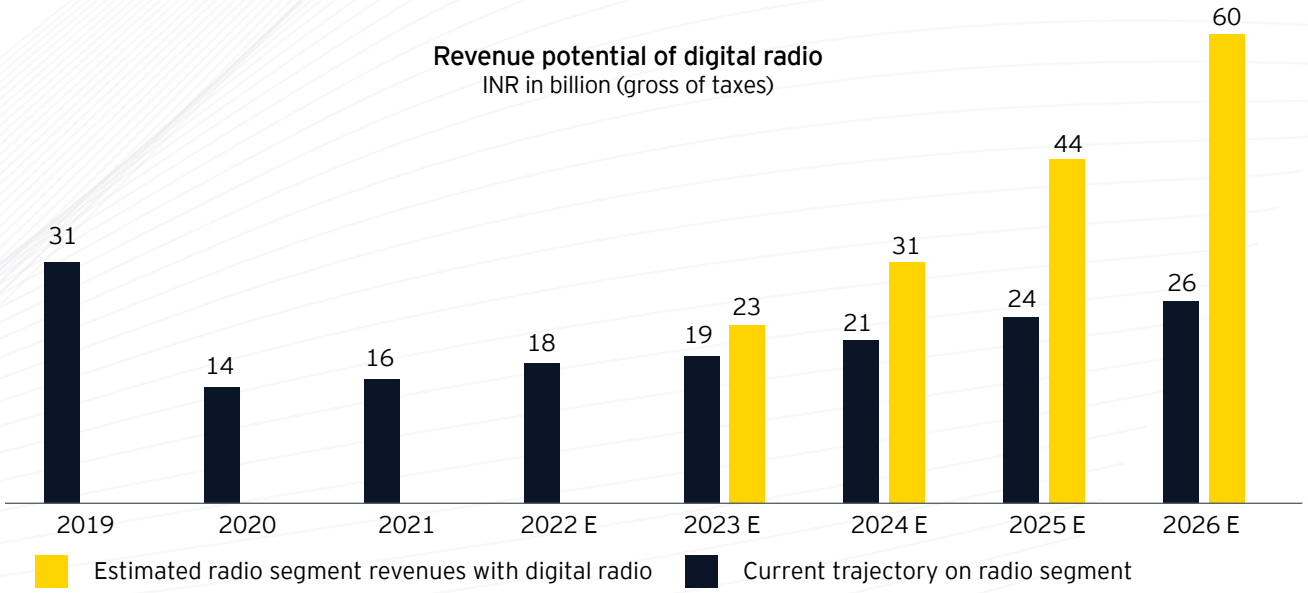
- **4x more channels:** As frequency is used more efficiently, there is greater choice for consumers, who get the option of increased genres both within and outside of music
- **No data charges:** Digital radio is a broadcast technology and hence does not use data. It has the potential to stream on mobile devices, computers, car radios, stand-alone radio receivers, sound bars, etc.
- **Improved experience:**
  - Listeners are not required to remember the frequency of their preferred radio stations as station names are displayed on the screen of the digital radio automatically, which helps in selecting the station of choice
  - Digital radios have small screens which can display program-related information, such as 'now playing' details, in text and - on some receivers – graphics
  - News headlines, weather details, traffic updates can also be provided on-screen
  - Digital radio is capable of providing hi-definition sound quality as well as MPEG surround sound effect

2

## Broadcasters

- **Increased ad inventory:** Broadcasters get more ad inventory to sell to a more finely targeted group of consumers, which can help increase effective ad rates
- **Listenership data:** Digital radio has the ability to capture listenership data through its return path feature, something the radio industry struggles with today
- **Digital radio can more than double radio segment revenues:** We estimate that the number of radio stations can increase from less than 300 today to over 1,100 by using the same spectrum. This will increase the amount of ad inventory and more than double revenues of the segment within 5 years of implementation, generating an additional INR123 billion during this period

**Revenue potential of digital radio**
INR in billion (gross of taxes)




Source: EY estimates

- **Increased coverage by up to 20%:** Digital technology can increase coverage by up to 20% over analogue transmission because the unwanted background noise is filtered out. Digital radios are also able to correct errors in weaker transmissions and therefore fill in the gaps
- **Efficient use of energy:** Digital radio is up to ten times more energy efficient than analogue FM radio broadcasting - it uses much less power than traditional FM Radio. Electricity charges constitute approximately 3% to 5%[27] of total costs today, which can result in a significant cost saving for broadcasters. In addition, from a consumer perspective, the use of two-slot Time Division Multiple Access (TDMA) technology can increase a radio's battery life by up to 40% compared with analogue terminals

3

## Advertisers

- **Ability to buy targeted audiences:** Advertisers get sharply targeted audience sets at scale, thereby reducing wastage and overflow
- **Programmatic ad delivery:** Digital radio can be served by a programmatic ad exchange (across one or more broadcasters), which can enable advertisers to schedule ads across channels, geographies and networks with increased efficiency
- **Comfort in media planning:** Programmatic advertising coupled with listenership data can reduce the effort in media planning for agencies, and build comfort on campaign delivery and efficiency

4

## Regulator

- **Increased revenue:** Digital radio helps in increasing revenue to the regulators in form of taxes and license fees due to increased number of channels and larger inventory
- **Optimal use of scarce spectrum:** In the middle and long run, spectrum can be saved as digital radio is more efficient than analogue, which can be monetized through other means
- **Emergency warnings and traffic Information:** In case of emergencies, the digital radio receiver gets tuned to the emergency warning channel automatically, creating an efficient means of communication over large areas

[27]EY estimates based on select radio broadcaster financial statements

# Key challenges for uptake of digital radio in India

5

1

## Transitioning to digital radio requires capital investment

- Implementing any digital radio technology requires radio station operators and end consumers to invest in infrastructure: transmitters[28] and studio equipment on the broadcaster side and the receivers and chipsets on the consumer side
- The current fall in radio segment revenues in India, and inability to measure radio listenership accurately at scale, may dampen the investment appetite in the near term
- Further, the FDI currently allowed in the Indian radio segment is just 49% making it difficult for players to raise capital to compete with digital products

2

## The mobile phone ecosystem is critical for success

- India listens of radio on its mobile phones, which are estimated to account for around 3/4th its listenership[29]
- Of the 500 million mobile smart phones in India in 2021, and over 200 million feature phones[30] , most do not have the required chipset integration and/ or antenna to receive digital broadcast radio
- Replacing the large phone ecosystem with the above can take several years – as high as 5 years per our interviews
- Current incremental cost of the chipset is estimated at US$1-2, which would need to be passed-on to end customers

3

## Transition will take 3-5 years and simulcast will be required

- Radio broadcasters cannot enable a switch-on-switch-off transition from analogue to digital radio as they are dependent on linear FM reach for their revenues
- To sustain revenue broadcasters will need to broadcast both analogue and digital signals simultaneously till adequate reach is achieved – a period we estimate can be around 3 to 5 years
- Consequently, for some years there would be no spectrum saving, increased operating costs on one hand and a revenue lag on the other till digital radio gains scale

[28] ICEA estimates that 35% of transmitters (mainly those installed post 2017) are compatible with digital broadcasting
[29] Industry interviews
[30] EY-FICCI M&E report: Tuning into consumer, ICEA

4

## Competing advanced products already exist

- Online audio and radio (OTT) has achieved a reach of around 200 million in 2021 based on its ability to unicast, recommend songs and build custom playlists, and provide on-demand listenership across a wider range of genres
- YouTube is India's largest music consumption platform and provides free access to all types and genres of music
- As long as data prices remain low, these options can be considered as competition for digital radio
- In addition, private FM radio channels must carry the AIR news bulletins 'as is' and cannot make any sort of alterations to the same – a limitation which does not extend to online news

5

## License fees at current levels may not be tenable in the short run

- Private FM broadcasters are struggling with revenue reduction in 2020 and 2021
- As per the applicable Frequency Module (FM) broadcasting policy license fees are payable at the rate of 4%[31] of gross revenue or minimum fixed fee for the concerned city, whichever is higher
- Given that the digital radio ecosystem will take 3-5 years to gain scale, radio broadcasters will not be willing to pay similar license fees during that period, and this could reduce their interest in investing in digital radio

6

## Lack of clarity exists on music royalties

- There is currently lack of agreement between stakeholders on whether music royalty (which is at a far lower rate on linear radio) classifies for the linear rate or the streaming rate; if the latter, business models may not be viable unless mass scale is achieved

[31]ENIL Annual Report 2021

# Key imperatives for a successful transition of digital radio in India

6

1

## Regulatory imperatives

- The Government needs to prepare a formal policy that defines the approach to be adopted for the transition, the roadmap to be followed and the timelines for the transition, keeping in mind the issues faced by various stakeholders
- Permit sharing infrastructure cost between AIR and private FM companies to reduce the capex burden with a progressive license fee regime during transition which could consider a pure revenue share model in the short term
- Bundle digital radio with other proposed technologies (for example, digital video broadcast) to optimize costs and reduce capex burden
- A formal policy mandating automobile/ OEM/ mobile phone/ set-top box manufactures to include the required hardware in devices
- Permit community radio stations to broadcast in digital format

2

## Technology imperatives

- Bring the incremental cost of chipsets and antennas to a reasonable level so that the all-important mobile phone ecosystem comes into being at scale
- Enable possibility of software upgrade to enable digital radio on handsets

3

## Transition will take 3-5 years and simulcast will be required

- Parallel roll-out along with linear FM for a few years, till scale is achieved
- Enabling existing linear companies to transmit on digital frequencies without additional license fees in the short term to build consumer pull for digital radio product
  - Government continues to earn license fees for the frequencies auctioned
  - Additional ad inventory sales will earn additional revenue-based license fees and taxes for the government
  - No disruption to listeners
- Permit new players to bid for additional or not utilized frequencies to support the transition in a manner and at prices which do not create an unfair playing field vis a vis existing licensees

# Policy recommendations

*Suggested by ICEA*

Digital radio broadcasting is in the public interest and provides superior intrinsic features. Transition to digital radio broadcasting must be seamless and not disenfranchise existing (legacy) analogue service providers. A successful rollout necessitates that "Broadcasters transmit signals that are compatible with receivers that manufacturers are willing to produce, retailers are willing to stock and consumers are happy to purchase". If coordination between these stakeholders is lacking, there wont be adequate incentive to purchase and install the equipment necessary to establish a digital radio system in India.Ministry of Information & Broadcasting should allow experimental transmissions of digital broadcast for trial and evaluation purposes with no additional encumbrances.

1

## Key considerations

- The digital radio system should improve current FM sound quality to virtual CD quality
- The digital radio system should provide a rational transition path which affords broadcasters and listeners flexibility regarding when they upgrade to digital, and which avoids immediately rendering obsolete the existing base of radio receivers
- A digital signal must have minimal impact on co- and adjacent analog and digital stations
- A digital signal must have minimal impact on the host analog station
- A digital signal must serve an area comparable to a station's current analog coverage
- The digital radio system should minimize interference from multipath, adjacent channels, noise and grounded conductive structures
- Digital receivers and transmitters should be available at commercially reasonable prices
- The digital radio system should be able to accommodate future upgrades and features

2

## Recommendations

- Digital radio authorization for VHF II based on ITU Recommended standards
- Digital radio system must support simulcast of analogue and digital services during transition period
- Spectrum authorization must allow for increased RF spectrum to allow for digital carriers
- Policy must define digital use mask and out-of-band limits to minimize any interference
- Should establish rules that permit transition to full digital services at some time in the future
- Digital radio use must be authorized in mobile handsets (feature phone and smartphone)
- Mandate digital emergency alerting in handsets and all radio devices
- Integrated digital radio on mobile phones is an important requirement as technology will not be quickly adopted through external dongles or hardware which add cost and complexity for general use
- Authorize use of multiple audio channels on current frequency assignments
- Do not levy additional spectrum fees on private broadcasters. Allow for innovation in programming and increased station revenues to drive increase in government revenues

# Digital video broadcast

Digital broadcast video can also enable a new content distribution alternative for Indian content producers. Being a broadcast technology using transmitters across technologies like DVB-T / T2, DVB-C / C2, DVB-S, etc. it enables audio-visual content distribution in areas limited by the range of transmitters.

1

## Drivers of growth

- We believe that the following are some of the reasons which can drive the uptake of digital video broadcasting in India:
  - Growth in smartphones from around 500 million in 2021 to over 700 million by 2025
  - Expected increase in mobile data charges
  - Higher number of active mobile connections in tier 2 and 3 towns
  - Increased preference for content consumption in regional languages and for local news

2

## Benefits of digital broadcast video

- For consumers, there are no data charges for video consumption, saving cost
- For telco networks, the broadcast technology reduces the load on data networks, and can work effectively for mass consumption of news and live events
- For broadcasters, this provides a new audience base as well as additional in-transit video consumption opportunity which can be monetized through advertising – our estimates are a 10-15% growth in advertising revenues in the medium term[32]
- Video consumption on mobile handsets lends itself to additional monetization avenues like subscription, interactivity, gaming etc. and can provide viewership data using an IP-based return path

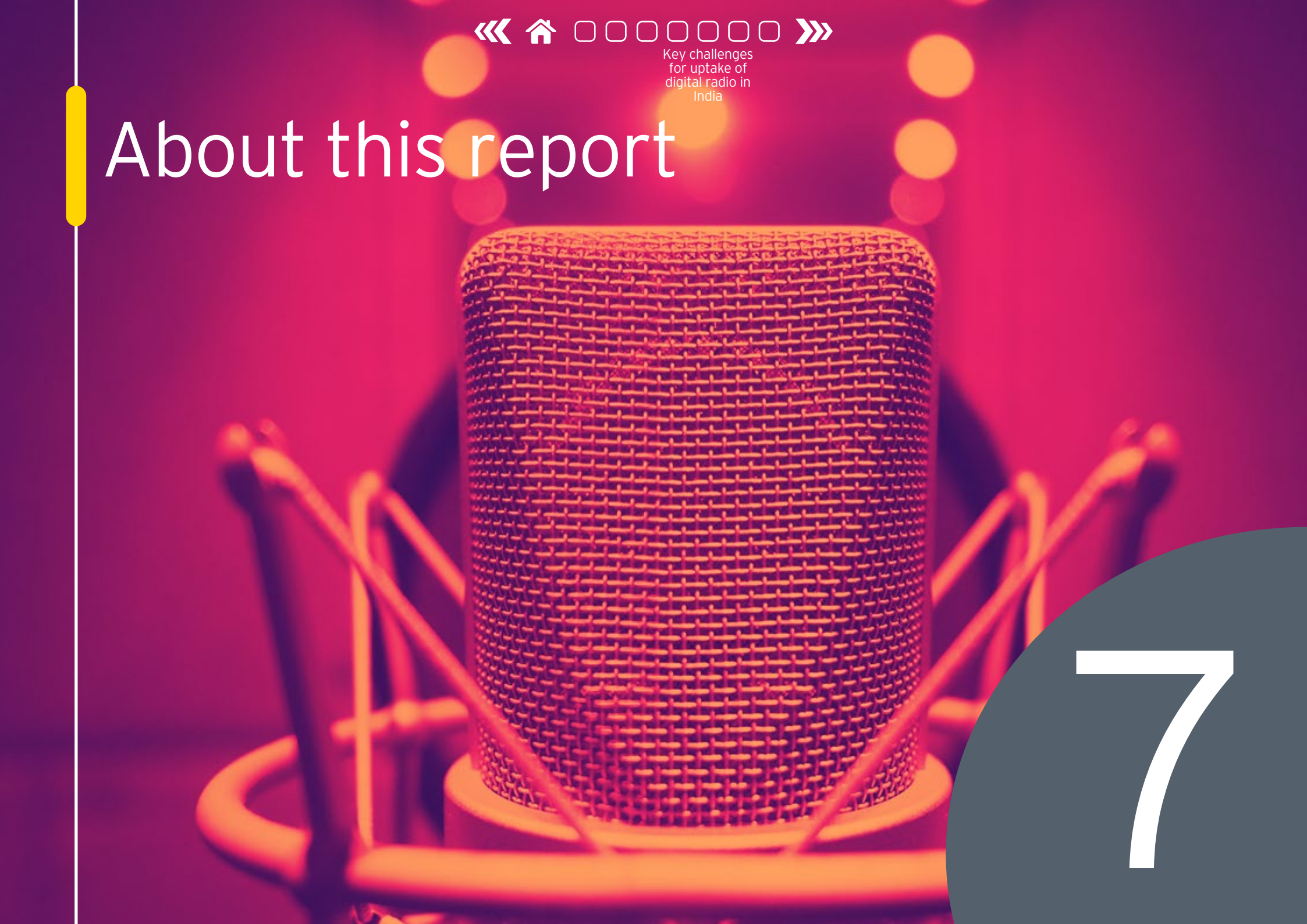
3

## Enabling a successful implementation

- Similar to radio, the key requirements for a successful implementation will be:
  - Clarity on standards / technology for broadcasting content
  - Mandating and building out a standardised chipset and antenna ecosystem on mobile phones, which will require 3 to 5 years at least
  - Sops during build-out phase to enable broadcaster / content producer interest
  - Infrastructure sharing between government and private players

[32]EY estimates

# About this report



# Glossary

| | |
|---|---|
| AAS | Alarm Announcement Switching |
| ABS | Academy of Broadcast Science |
| Ad | Advertisement |
| AFS | Alternate Frequency Signalling |
| AIR | All India Radio |
| AM | Amplitude Modulation |
| Approx. | Approximately |
| CAGR | Compound annual growth rate |
| CD | Compact disc |
| CDR | Convergent digital radio |
| COFDM | Coded orthogonal frequency division multiplex |
| CoFeTel | Federal Commission of Telecommunications- the regulator of Telecommunications in Mexico |
| COVID-19 | Coronavirus disease |
| CRTC | Canadian Radio-Television and Telecommunications Commission |
| DAB | Digital Audio Broadcasting |
| dBc | Decibels Relative to the Carrier |
| DRM | Digital Radio Monidale |
| DSB | Digital Sound Broadcasting |
| DTV | Digital television |
| ETS | European Telecommunications Standard |
| ETSI | European Telecommunications Standards Institute |
| EU | European Union |
| EWF | Emergency Warning Functionality |
| EY | Ernst & Young LLP |
| FDI | Foreign Direct Investment |
| FEC | Forward Error Correction |
| FM | Frequency Modulation |
| GPS | Global Positioning System |
| HDR | HD Radio |
| IBOC | In-Band on-Channel |
| ICASA | Independent Communications Authority of South Africa |
| ICEA | India Cellular and Electronics Association |
| IP | Internet protocol |
| ISDB-T | Integrated Services Digital Broadcasting - Terrestrial |
| kHz | Kilohertz |
| kW | Kilowatt |
| LW | Long wave |
| MPEG | Moving Picture Experts Group |
| MW | Medium wave |
| OFDM | Orthogonal Frequency-Division Multiplexing |
| OTT | Over-the-top |
| QAM | Quadrature amplitude modulation technique |
| QPSK | Quadrature phase shift keying |
| RTRN | Russian Television and Radio Broadcasting Network |
| SFN | Single frequency network |
| SW | Short wave |
| TDMA | Time Division Multiple Access |
| TRAI | Telecom Regulatory Authority of India |
| UK | United Kingdom |
| USA | United States of America |
| VHF | Very High Frequency |
| Wi-Fi | Wireless Fidelity |
| WPC | Wireless Planning and Coordination Wing |

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# Disclaimer

This report has been developed by conducting primary and secondary research, discussions with several companies and industry stakeholders, and cross referencing of available data points. To the extent possible, the data has been verified and validated. However, there can be no guarantee that such information is correct as of the date it is received or that it will continue to be correct in the future. EY does not take any responsibility for the veracity of the underlying data. Use of this report is at the discretion of the reader, and neither ICEA nor EY take any responsibility for the same in any manner. Please obtain professional guidance prior to using the information provided in this report for any decision making. This report does not aim to suggest or recommend any one of the several available digital broadcast radio technologies. There is no tax, operating, regulatory or other business advice provided in this report. This report does not provide a point of view around matters that are sub-judice. By reading this report, the reader shall be deemed to have accepted the terms and conditions of use mentioned in this paragraph.

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India Cellular and Electronics Association (ICEA) is the apex industry body of mobile and electronics industry comprising of manufacturers, brand owners, technology providers, VAS application and solution providers, distributors and retail chains of mobile handsets and electronics devices.

ICEA is widely recognized as the torch bearer for the mobile handset and the electronics industry in India. Its activities and contributions have enabled India to compete with other countries to become a preferred manufacturing destination for the world. Our goal is to establish a robust manufacturing ecosystem to complement the vision of ‘Make in India’, ‘Digital India’ and ‘Skill India’ programs by the Government of India.

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