

Digital Broadcasting in India

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I INTRODUCTION

There are two main elements of Radio Broadcasting namely content and carrier. *Also, there are three main processes of Radio Broadcasting*

1. Content Production
2. Content Distribution
3. Content Transmission

Technically Radio Broadcasting may be classified as follows:

1. Medium Wave (MW) Broadcasting,
2. Short Wave (SW) Broadcasting,
3. Frequency Modulation (FM) Broadcasting ,
4. Satellite Broadcasting ,
5. Internet Broadcasting

Based on Modulation Techniques Radio Broadcasting may be classified as:

Amplitude Modulation (AM) Broadcasting and Frequency Modulation (FM) Broadcasting

MW carrier travel along the ground. It may cover good distance depending upon the condition of the ground. MW carrier is very reliable and before FM it was popular.

There are 145 medium wave transmitters in India. Range 520 KHz to 1605 kHz

SW type of carrier travel in the sky. The carrier is reflected back to earth by ionosphere. It may cover very large distance depending upon the condition of ionosphere but SW carrier is unreliable. SW carrier is not very popular among people. Range- 3 MHz to 30 MHz There are 48 short wave transmitters in India.

FM of carrier travel in the line of sight in air. FM carrier may cover good distance, if there is no obstruction in its path. It is very popular among

people. There are 396 FM transmitter in India. A transmitter of 10 KW and Height is 100 meter then range will be approx. 65 Kilometer. Quality is better than SW and MW.

In **Satellite broadcasting** the carrier travel in the sky penetrating the ionosphere. It is reflected back to earth by the satellite in the space. This carrier is very popular communication and broadcasting. Satellite broadcasting is a system of content distribution using broadcast signals relayed to and from communication satellites, which are then received by parabolic antennae better known as satellite dishes. The signals are then passed through a low-noise block converter for conditioning.

Internet is the cheapest and fastest medium of communication. It is also being used for radio broadcasting. Internet broadcasting may define as media presentation distributed over the Internet using streaming media technology.

Comparison of Analog and Digital Transmission

An **Analog signal** is any continuous signal for which the time varying feature (variable) of the signal is a representation of some other time varying quantity, i.e., analogous to another time varying signal. It differs from a digital signal in terms of small fluctuations in the signal which are meaningful.

A **digital signal** uses discrete (discontinuous) values. By contrast, non-digital (or analog) systems use a continuous range of values to represent information. Although digital representations are discrete, the information represented can be either discrete, such as numbers or letters, or continuous, such as sounds, images, and other measurements of continuous systems.

Digital information has certain properties that distinguish it from analog communication methods. These include

Synchronization – digital communication uses specific synchronization sequences for determining synchronization.

Language – digital communications requires a language which should be possessed by both sender and receiver and should specify meaning of symbol sequences.

Granularity or Quantization error – for a continuously variable analog value to be represented in digital form there occur quantization error which is difference in actual analog value and digital representation and this property of digital communication is known as granularity.

Many devices come with built in translation facilities from analog to digital.

Microphones and speaker are perfect examples of analog devices. **Analog technology** is cheaper but there is a limitation of size of data that can be transmitted at a given time.

Digital technology has revolutionized the way most of the equipments work.

Data is converted into binary code and then reassembled back into original form at reception point. Since these can be easily manipulated, it offers a wider range of options. Digital equipment is more expensive than analog equipment.

Comparison of Analog vs Digital Quality

Digital devices translate and reassemble data and in the process are more prone to loss of quality as compared to analog devices.

Computer advancement has enabled use of error detection and error correction techniques to remove disturbances artificially from digital signals and improve quality.

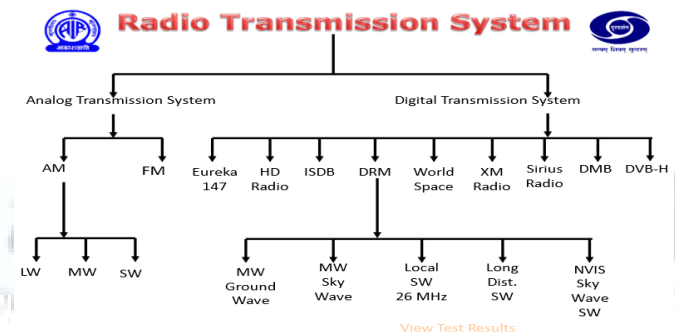
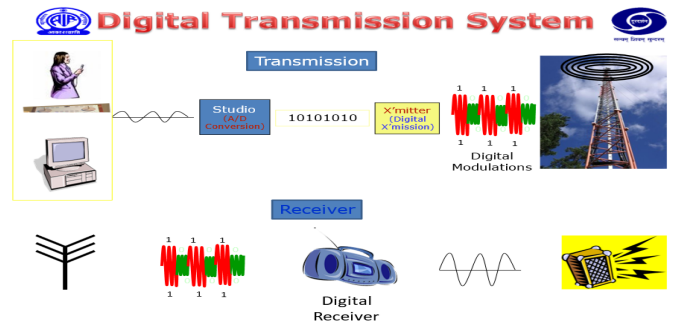
Differences in Applications

Digital technology has been most efficient in cellular phone industry.

Analog phones have become redundant even though sound clarity and quality was good.

Analog technology comprises of natural signals like human speech.

With digital technology this human speech can be saved and stored in a computer. Thus digital technology opens up the horizon for endless possible uses.



II DIGITAL TRANSMISSION SYSTEM – ADVANTAGES

- Delivers excellent reception quality
- provides larger area of radio coverage
- requires lesser transmitting power for providing similar coverage
- makes utilization of spectrum more efficient by adopting Single Frequency Networking
- supports data broadcasting
- can accommodate more no. of radio channels on a single transmitter

III DIGITAL RADIO BROADCASTING IN INDIA

- All India Radio (AIR), the public service broadcaster in India, has adopted the international DRM (Digital Radio Mondiale) standard for the

digital terrestrial radio transmissions in the MW and SW bands.

- DRM allows for multiple FM-like radio services plus associated data such as multi-lingual news articles to be carried in place of or as an extension to the former analogue radio services, while maintaining the large-area service coverage of the AM bands.

DRM Transmissions in India

All India Radio adopted DRM for digital broadcasting.

- Digital Radio Mondiale (DRM) is the universal, openly standardized, digital radio system. The DRM standard has been used for several years to broadcast digitally on Frequencies below 30 MHz (shortwave, mediumwave and longwave). Also there is now the extended standard DRM+ which make it possible to broadcast on frequencies above 30 MHz. This will make it possible to digitalize transmission on the FM-band. Successful tests of DRM+ has been made in several countries
- DRM has near-FM sound quality plus the ease-of-use that comes from digital transmissions. The improvement over AM is immediately noticeable. DRM can be used for a range of audio content, and has the capacity to integrate text and data. This additional content can be displayed on DRM receivers to enhance the listening experience.

DRM Transmissions in India

- DRM is compatible with existing AM bands (spectrum usage) and services and with other radio services . DRM operates within existing spectrum allocations.
- DRM provides an easy path of migration from analogue to digital broadcasting for a significantly large number of DRM compatible medium and shortwave transmitters in the AIR network which can be easily converted for DRM operation
- DRM thus maximizes re-use of existing transmitters and transmission facilities

DRM Transmissions in India

- ▶ DRM Trials in India were carried out in Delhi from 8th to 12th May, 2007 in MW band. Encouraged by the trial results, All India Radio decided to go for DRM trials in shortwave band also.
- ▶ For the implementation of DRM in Shortwave, Thales make 250 Kilowatt short wave transmitter at High Power Transmitter Complex of All India Radio at Khampur (near Delhi) was modified to make it DRM compatible. And service has been formally launched on 16th January, 2009
- ▶ Approximately five hours of transmission are beamed towards listeners in the UK and Europe between 2315 to 0400 IST on 9950 KHz, with an additional three hours of local transmission within India from 1430 to 1730 IST on 6100 kHz.

IV DRM- DIGITAL RADIO MONDIALE

What is Motivation?

There is gradual decline in the AM listening.

What are the reasons?

Listeners often compare the AM quality with FM and other digital audio mediums and find it to be inferior, which is quite true. Need to remember frequency and time schedules, often mind boggling, particularly for SW broadcasting. Fading.

AM bands have unique propagation advantages not available in other parts of the spectrum.

The transmission technology for delivery is well established, reliable and has long lifetime.

Transmitters are terrestrially based, hence easily maintainable.

Reception can be achieved using small low cost portable or mobile receivers providing virtually universal coverage.

Extremely cost-effective means of broadcasting, particularly for *public service broadcasting*.

Digital Radio Mondiale (DRM)

DRM is a international consortium for establishing non-proprietary standards for Digital Radio formed by:

- broadcasters.
- transmitter manufacturers.
- broadcast R&D organizations.
- device developers.

What are the problems with the existing terrestrial sound broadcasting methods?

FM

- Spectrum congestion in FM band
- Limited to line of sight
- Quality affected by *multi path* signals

Limitations of existing analog transmission modes

- *Multi path*
- Poor quality of receivers
- Need to remember frequency schedules

- Rise in manmade noise
- Congestion in AM/FM bands

Listener's expectations

- CD quality audio
- No need to remember frequency schedules
- Wide coverage both static and mobile
- Portable and economical receivers **Solution**

Digitalization of terrestrial radio transmission

- Digital Radio Mondiale (DRM)
- Digital Audio Broadcasting (DAB)
- HD Radio

Digital Broadcasting in India
Introduction of DRM transmitters in AIR

- About 40 DRM transmitters have been installed At various stations of All India Radio.
- These transmitters can operate in both Analog and Digital mode.
- These Digital transmitters with modern technology have excellent protection devices and Safety measures.



Digital Radio Mondiale (DRM) advantages

- CD quality audio
- No need to remember frequency schedules
- Wide coverage both static and mobile
- Portable and economical receivers