

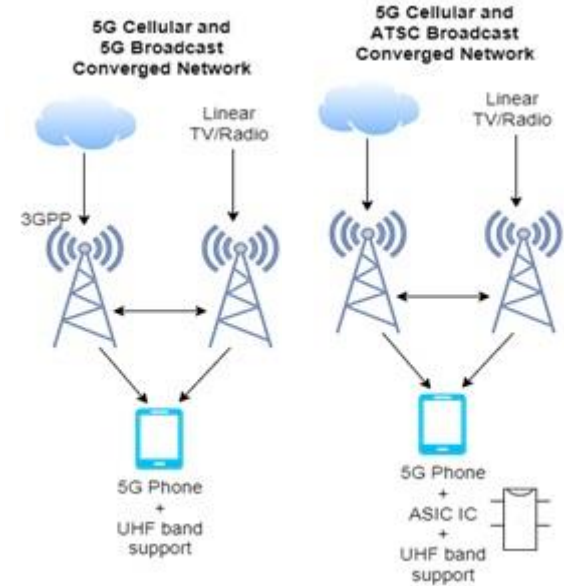
# **Direct to Mobile**

**by**

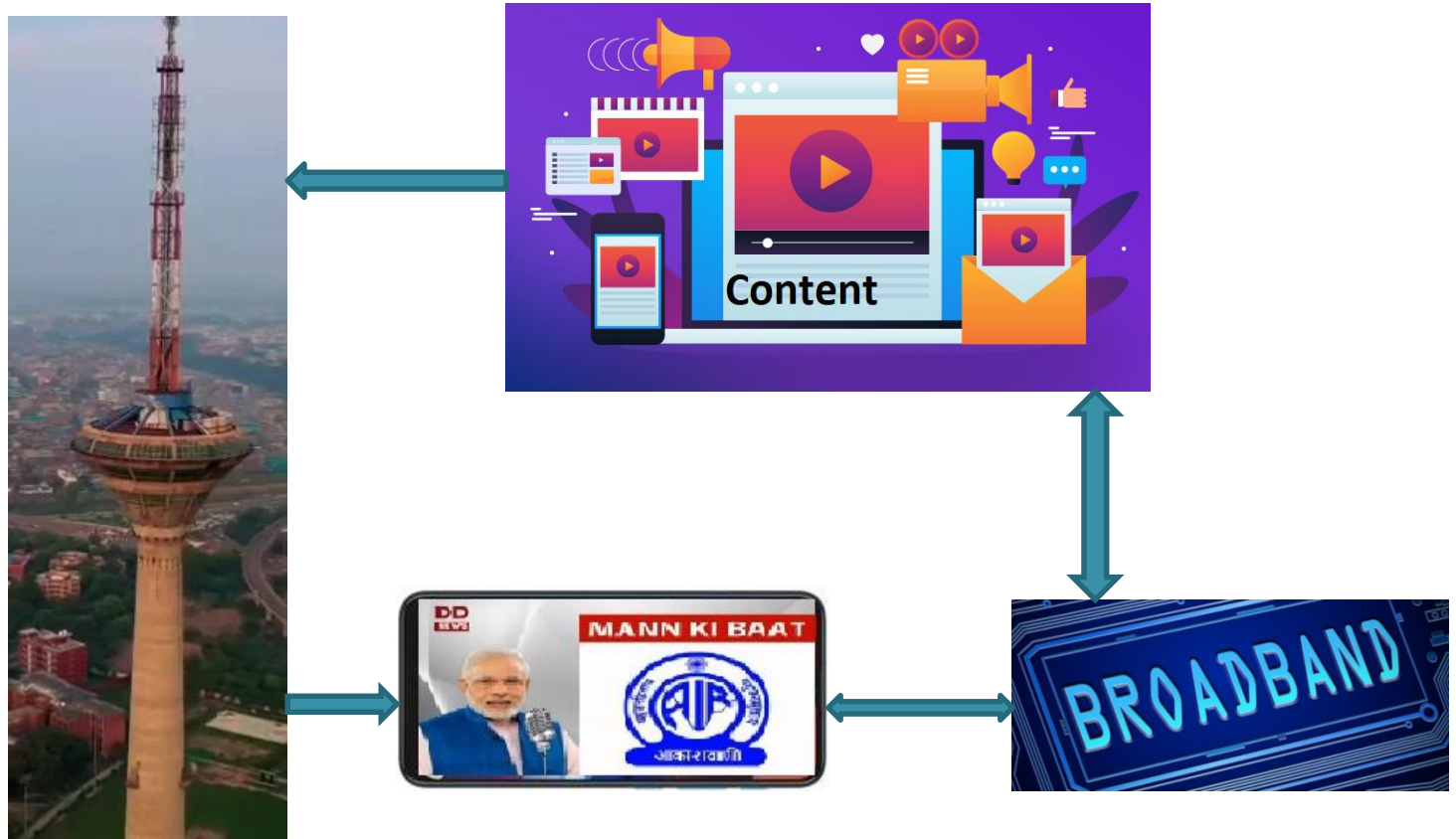
**S Vadivazagan, Prasar Bharati**

# What is Direct to Mobile (D2M)

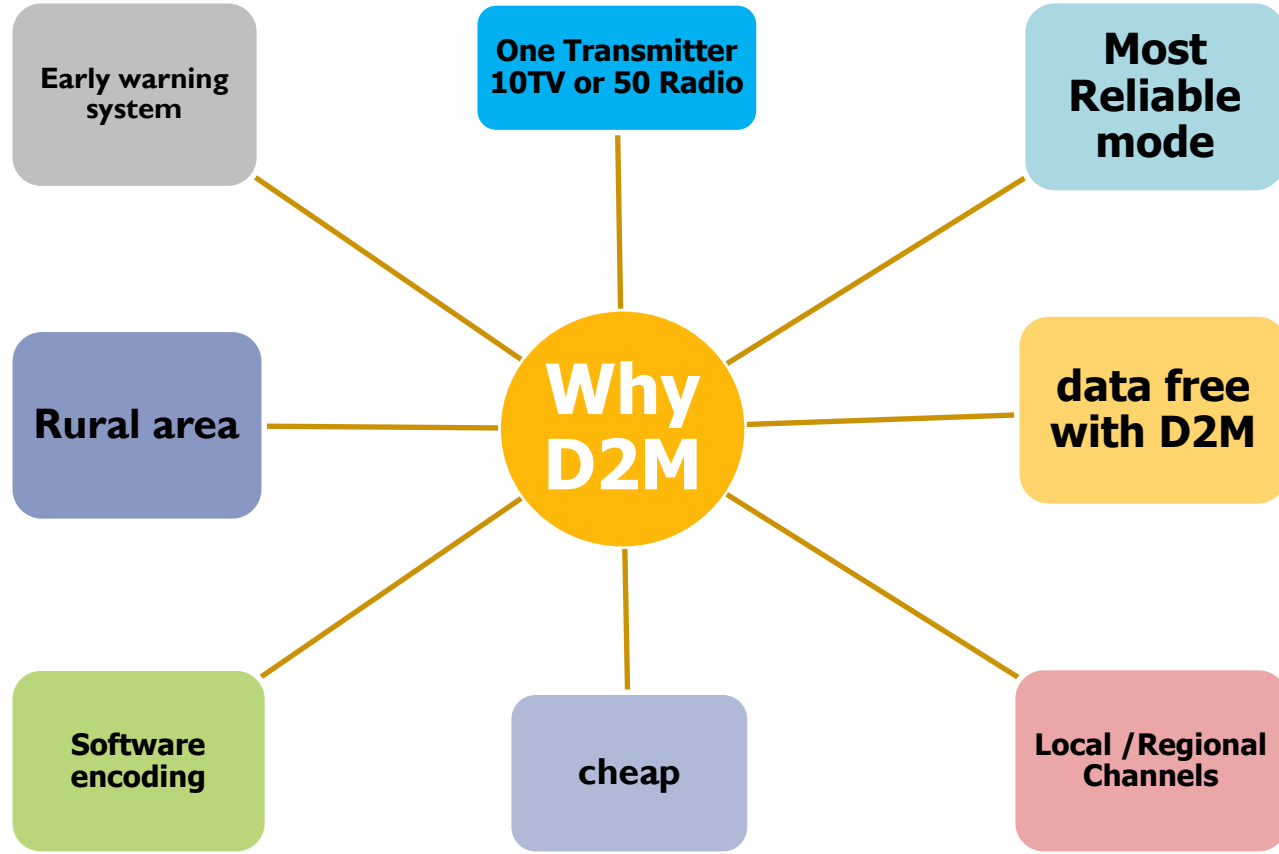
- D2M is
  - Broadcasting
    - video and
    - multimedia content
  - directly to mobile phones



# What is D2M



# Why D2M



Early warning system

One Transmitter  
10TV or 50 Radio

Most  
Reliable  
mode

data free  
with D2M

Local /Regional  
Channels

cheap

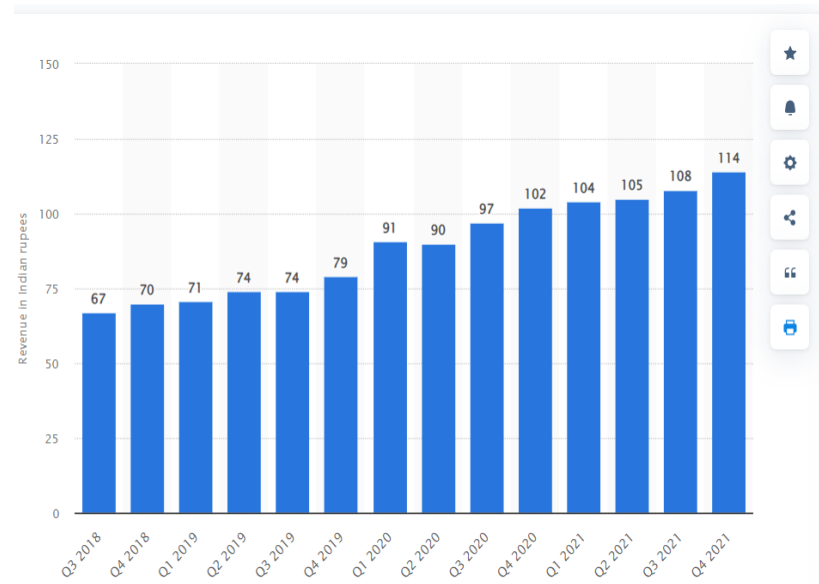
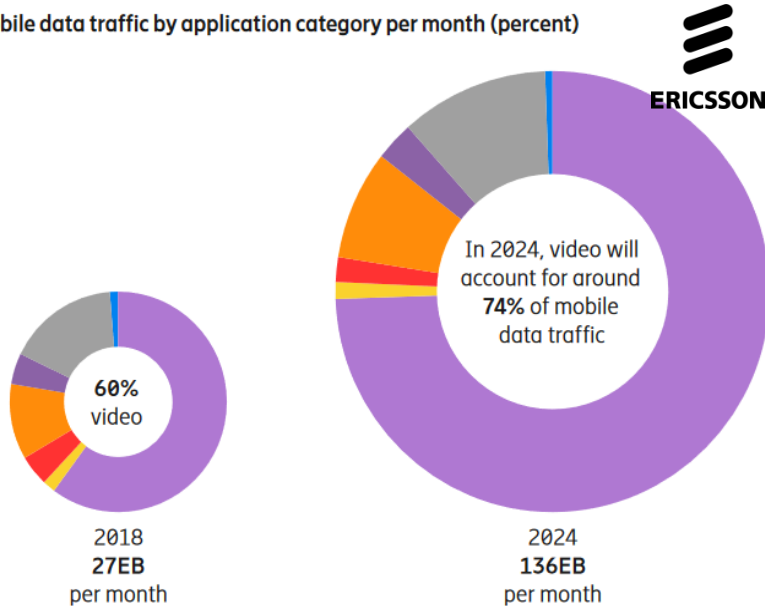
Software  
encoding

Rural area

Why  
D2M

# Why Direct to Mobile (D2M)

Mobile data traffic by application category per month (percent)



<sup>1</sup> Traffic from embedded video in web browsing and social media is included in the application category "Video"

❖ 240 EB consumed per month in 2022

❖ ARPU is steadily increasing and will continue to increase.

# Why Direct to Mobile (D2M)

## Nationwide Rollout



ATSC 3.0

600 Million \$

ATSC3.0 Instantaneous throughput  
– **20 Mbps**

5 

20 Mbps aggregate throughput  
per channel = **0.02 Mbps**

4G LTE

3665 Million \$

Instantaneous throughput

### Assumptions -

- Backhaul Cost (fiber/microwave) not included for LTE / ATSC3.0
- Spectrum Cost not included for LTE / ATSC3.0.

## 3 Million Subscribers

## 2. D2M Broadcasting Implementation

Three options to implement as on today

- ❖ **Option I:** HPHT (High Power High Tower)
- ❖ **Option II:** LPLT (Low Power Low Tower)
- ❖ **Option III:** Hybrid (HPHT+LPLT)

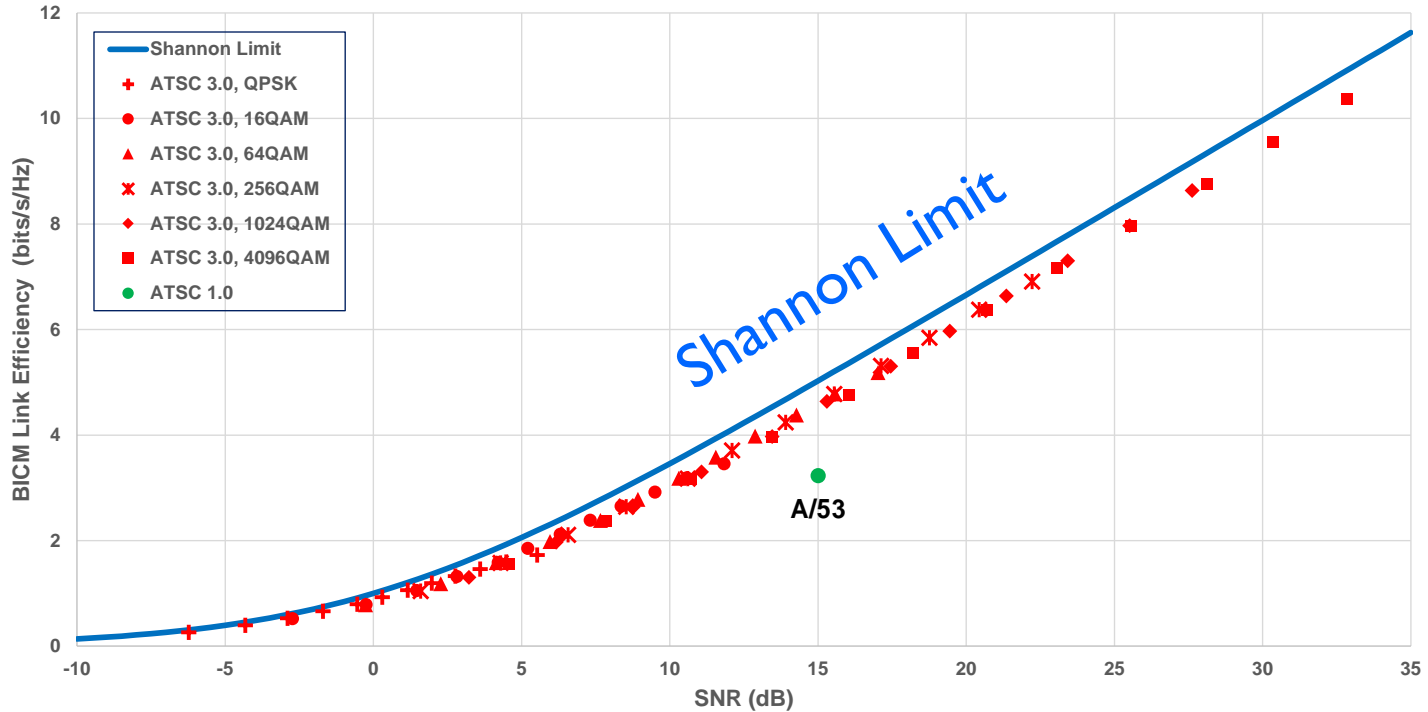
# Prasar Bharati D2M Initiative

- ❖ Prasar Bharati revamp of Existing DTT .
- ❖ IITK, for the Next Gen Broadcast Technology trials.
- ❖ Experiment D2M with ATSC 3.0 and PoC
- ❖ Hybrid model PoC at Delhi up to October 2023
- ❖ Based on the results, launch of D2M like Free DTH



# Why ATSC for First PoC

Bit Interleaving, Coding, and Modulation Performance



No technology comes closer to the theoretical Shannon Limit for broadcast mode  
ATSC 3.0 is the only D2M standard readily convergent with LTE/5G

# Why ATSC for First PoC

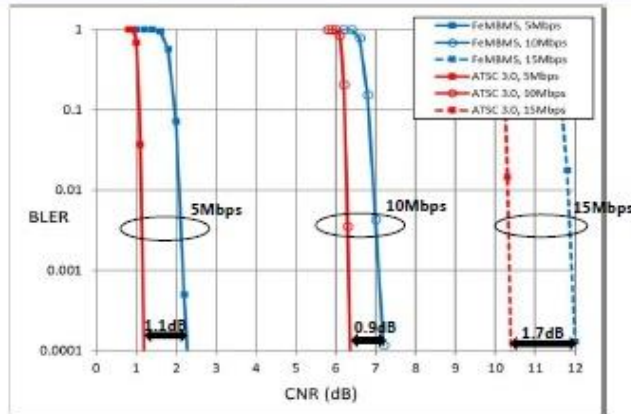


## Performance Comparison over AWGN channel



- Evaluation over AWGN channel

	Required CNR (5Mbps)	Required CNR (10Mbps)	Required CNR (15Mbps)
ATSC 3.0	1.2dB	6.4dB	10.4dB
FeMBMS (Rel-16/17)	2.3dB	7.3dB	12.1dB
<b>ATSC 3.0 gain over FeMBMS</b>	<b>1.1dB</b>	<b>0.9dB</b>	<b>1.7dB</b>



[AWGN channel]

ATSC 3.0 has better BCIM efficiency than FeMBMS

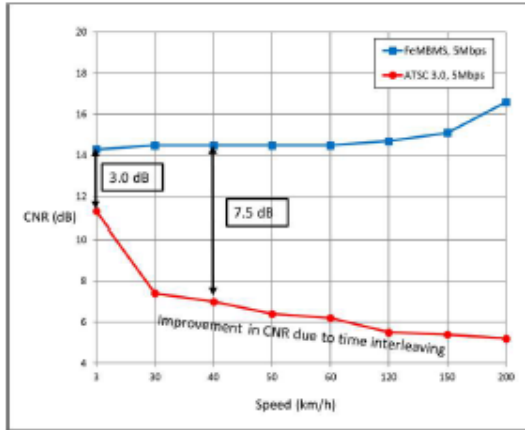
# Why ATSC for First PoC



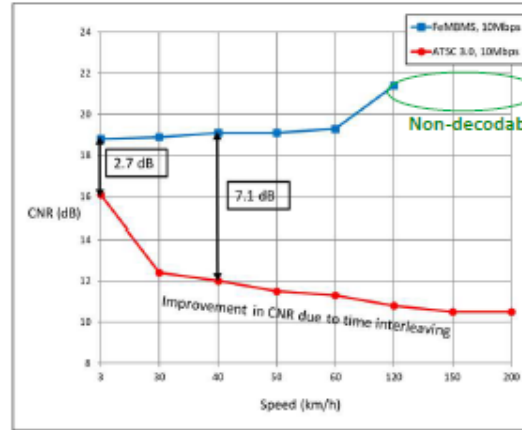
## Performance Comparison over India-Urban Channel



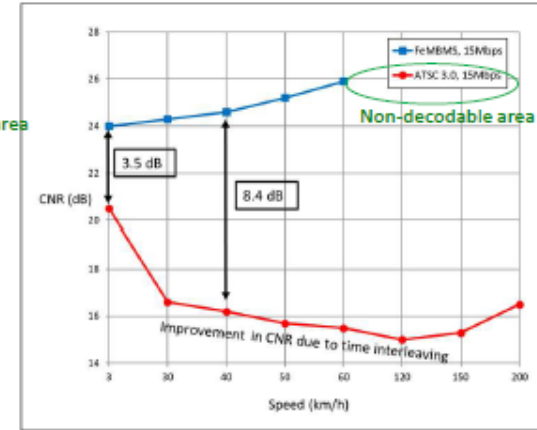
- Advantage for ATSC 3.0 compared to FeMBMS (Rel-16/17)



[5Mbps – From 3km/h to 200km/h]



[10Mbps – From 3km/h to 200km/h]



[15Mbps – From 3km/h to 200km/h]

Data rate / Mobility	ATSC 3.0 gain over FeMBMS (Rel-16/17)							
	3km/h	30km/h	40km/h	50km/h	60km/h	120km/h	150km/h	200km/h
5Mbps	3.0 dB	7.1 dB	7.5 dB	8.2 dB	8.3 dB	9.2 dB	9.7 dB	11.4 dB
10Mbps	2.7 dB	6.6 dB	7.1 dB	7.6 dB	8.0 dB	10.7 dB	FeMBMS non-decodable	
15Mbps	3.5 dB	7.7 dB	8.4 dB	9.5 dB	10.4 dB	FeMBMS non-decodable		

# Challenges/issues for D2M in India

- The PoC work
- For Broadcast target coverage
- Bringing mobile operators onboard for SFN.
- Implementation of a New technology

# Challenges/issues for D2M in India

- ❖ Regulatory recommendation on D2M
- ❖ Multiple Muxes from PB/Private players,
- ❖ **Huge investment is needed**
- ❖ **Participation of Private**

**Thanks**