ITU/NBTC Conference on Digital Broadcasting 2017

Bangkok, Thailand

Dr. AMAL Punchihewa

Director of Technology & Innovation, ABU

Vice-Chair of World Broadcasting Union – Technical Committee (WBU-TC)

Co-Chair of IRG-AVA SG-9 in ITU-T

Distinguished Lecturer of IEEE Broadcast Technology Society

Digital Television Global Update, Technologies and Development

DTTB in Thailand

Dr. AMAL Punchihewa

Director of Technology & Innovation, ABU

Asia-Pacific Broadcasting Union

A Vice-Chair of World Broadcasting Union – Technical Committee (WBU-TC)

Co-Chair of IRG-AVA SG-9 in ITU-T

Distinguished Lecturer of IEEE Broadcast Technology Society

Digital Television Global Update, Technologies and Development

DTTB in Thailand

Dr Amal Punchihewa

PhD, MEEng, BSC(Eng)Hons, CEng, FIET, FEngNZ, SMIEEE, MSLAAS

Postgraduate Studies in Business Administration

Director Technology & Innovation of ABU

A Vice-Chair of World Broadcasting Union – Technical Committee (WBU-TC)

Co-Chair of IRG-AVA SG-9 in ITU-T

Distinguished Lecturer of IEEE Broadcast Technology Society

Outline

- Information Engineering
- DTV standards
- DVB in Broadcasting
- ATSC 3.0
- ISDB-S3
- Summary

Information Engineering

- Channel capacity
- Shannon limit

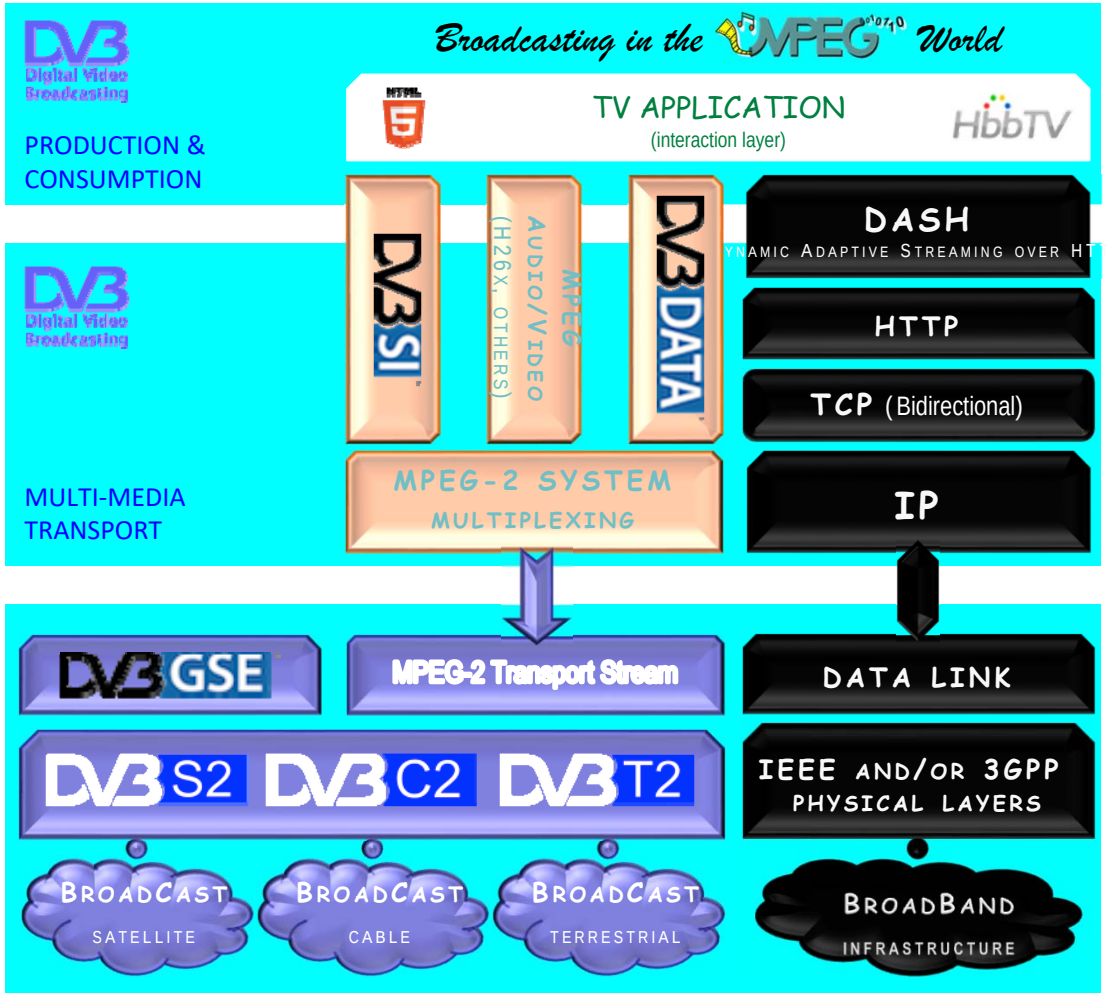
$$C = B \log_2 \left(1 + \frac{S}{N}\right)$$

- Sharing medium - Media Access Control - MAC
- TV – TDM
- DTH – FDM
- Mobile – CDM
- Fibre – WDM
- Air interface - LDM – Layered Division Multiplexing
- Air interface - WiB - a new system concept for digital terrestrial television (DTT) - wideband reuse-1

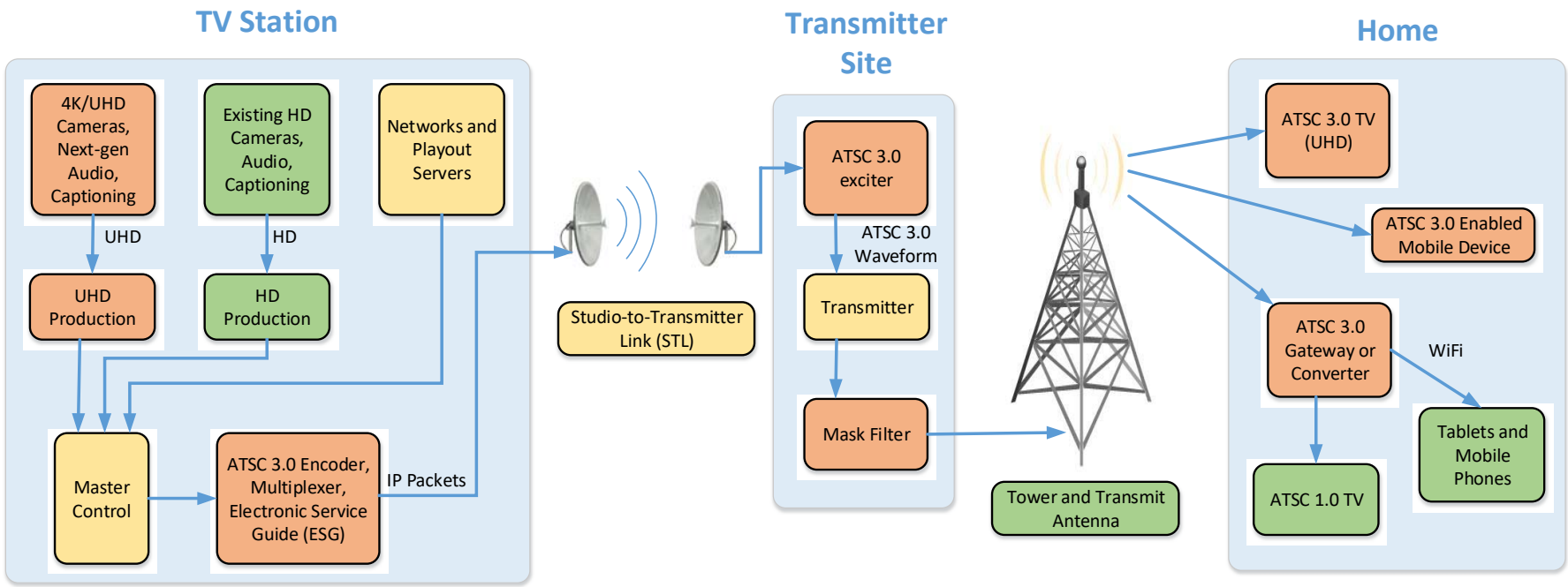
DTV Standards

- ATSC - Advanced Television System Committee in USA
  - Currently in Korea, USA and Canada
  - Mainly Terrestrial standard, extended to other forms such cable
- ISDB – Integrated Services Digital Broadcasting
  - Mainly in Japan, Brazil and some other south American countries
  - Extended to forms such as terrestrial, cable and satellite standard
- DVB – Digital Video Broadcasting
  - Most of the countries in the world
  - Developed through a consortium known as DVB in Europe
  - Many variants or forms of DTV operations
- DTMB – Digital Television Broadcasting System - China

DVB in Broadcasting



ATSC 3.0



[Courtesy of ATSC]

Start of Terrestrial UHDTV in Korea

- Terrestrial UHDTV(4K): started in May 31, 2017
  - Broadcasting area: the Seoul Metropolitan area
  - The government has allocated 5 frequency channels (KBS 1TV, KBS 2TV / EBS / MBC / SBS)
  - Frequency band: 700MHz, Frequency Bandwidth: 6MHz

- Korean UHD broadcasting standard: ATSC 3.0
  - use all IP(IP packaging, bi-directional service)
  - SFN (Single Frequency Network) is possible
  - high quality video and realistic audio

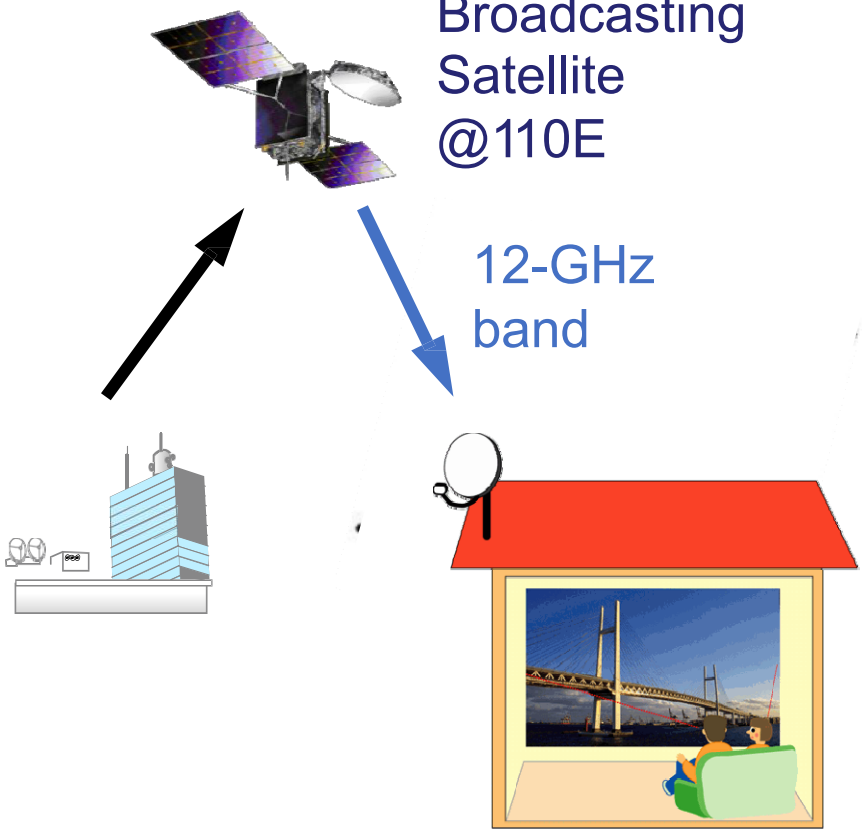
- UHD / HD simultaneous broadcasting(same contents)
  - UHD content obligation rate is 5% (in 2017)

Terrestrial UHDTV Broadcasting progress

- 2012~2015
  - conducted terrestrial UHDTV experimental broadcasting based on DVB-T2
- March 2015
  - Government announces introduction of terrestrial UHDTV broadcasting
- 2016
  - conducted UHDTV experimental broadcasting based on ATSC 3.0
- September 2016
  - decided to use terrestrial UHD broadcasting standard ATSC3.0
- May 2017
  - UHDTV terrestrial broadcasting started (KBS 1TV, KBS 2TV, MBC, SBS)

Broadcasting in UHD-2

Test broadcasting started on Aug. 1st, 2016

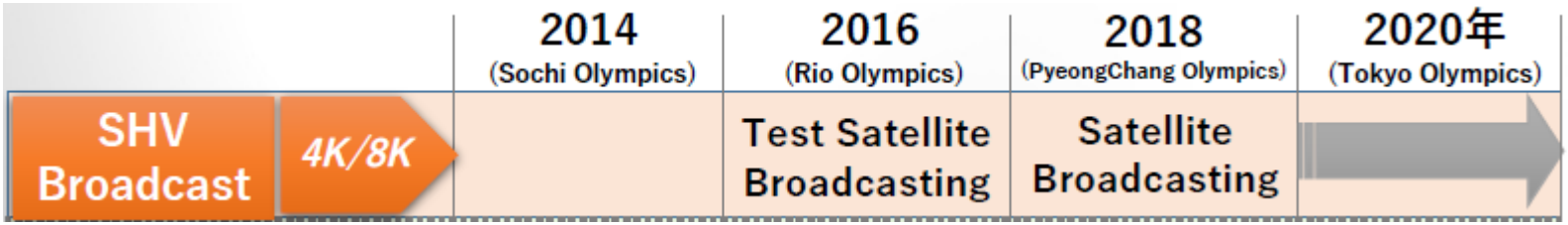


Specifications of UHD-2 8K Satellite Broadcasting

Modulation	π/2-shift BPSK, QPSK, 8PSK, 16APSK, 32APSK
Frequency	12-GHz band
Bandwidth	34.5 MHz
Compression	Video : HEVC Audio : MPEG-4 AAC
Bit rate	About 100 Mbit/s

[Courtesy of NHK]

UHD-1 and UHD-2



Commencement of 4K/8K broadcasting

- Start date: Dec. 2018
- Operation: BS, CS
- Service channel: 8K/60p 1ch, or 4K/60p 1ch for each broadcaster
- Gamut: WCG (BT. 2020), HDR(HLG) or BT. 709, SDR
- Broadcasters: NHK, 10 BS/CS commercial broadcasters
- Receiver: Consumer 4K/8K TV

Progress on SHV technology

- SHV – Super High Vision

Summer Olympics in Rio de Janeiro

2012
4K cable TV
4K IPTV

2016
4K/8K test broadcasting

2018
4K/8K broadcasting
Winter Olympics in Pyeongchang

2020
Summer Olympics in Tokyo

Summary

- Broadcasting is still the most efficient way to deliver content to masses
- Digital broadcasting plays a vital role in the media delivery
- ATSC 3.0 has been deployed as a step forward in DTT
- ISDB-S3 has been standardised as a technology for UHD-2
- Services are continually evolving DTH markets especially for UHD-1 and UHD-2

Thank you for your patience