Digitalization Process in Japan

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DiBEG　JAPAN

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- **For Migration in Broadcaster; Other Sub-theme of This Presentation**
- **For Newest Broadcast service in Japan; Same as above**
- **For Receivers; Other Presentation on 25th.**
- **For Mobile/Portable performances; Other Presentation on 25th.**

Outline of Broadcasting in Japan

Japan's Profile

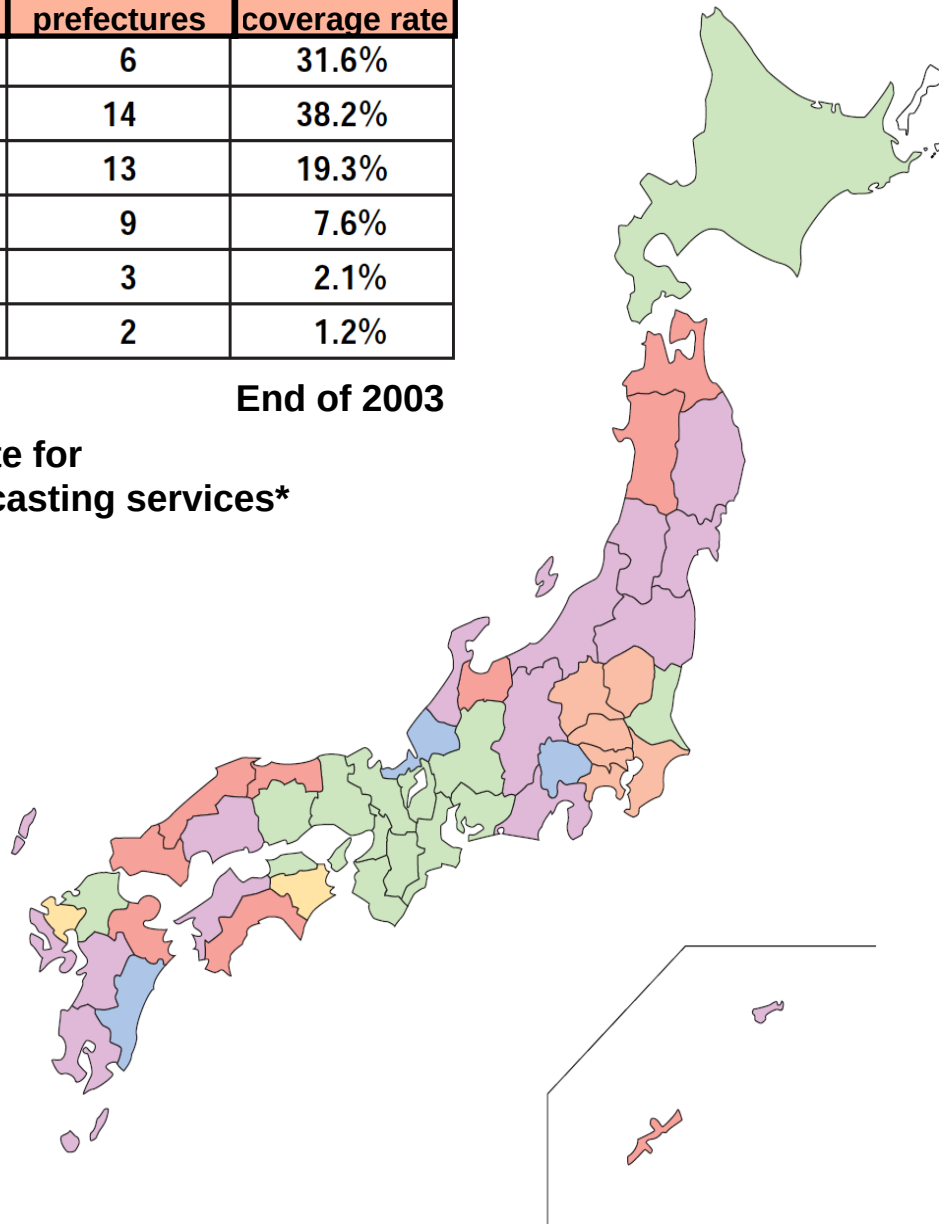
- Population 127 million
- Number of households 48 million
- Area of Japan 378,000 km^2
- TV receivers 100 million
- Terrestrial TV networks
  - 3-9 stations/region with many relay stations (including 2channels by public broadcaster, NHK)
  - NHK: reception license fee based, nation wide network
  - Private broadcasters: regional based (30 regions in Japan)
  - 5 major networks + independent stations

Number of Channels Available for Private Terrestrial Broadcasting (analog broadcasting)

Number of viewable channels	Number of prefectures	Household coverage rate
8 Channels	6	31.6%
7 Channels	14	38.2%
6 Channels	13	19.3%
5 Channels	9	7.6%
4 Channels	3	2.1%
3 Channels	2	1.2%

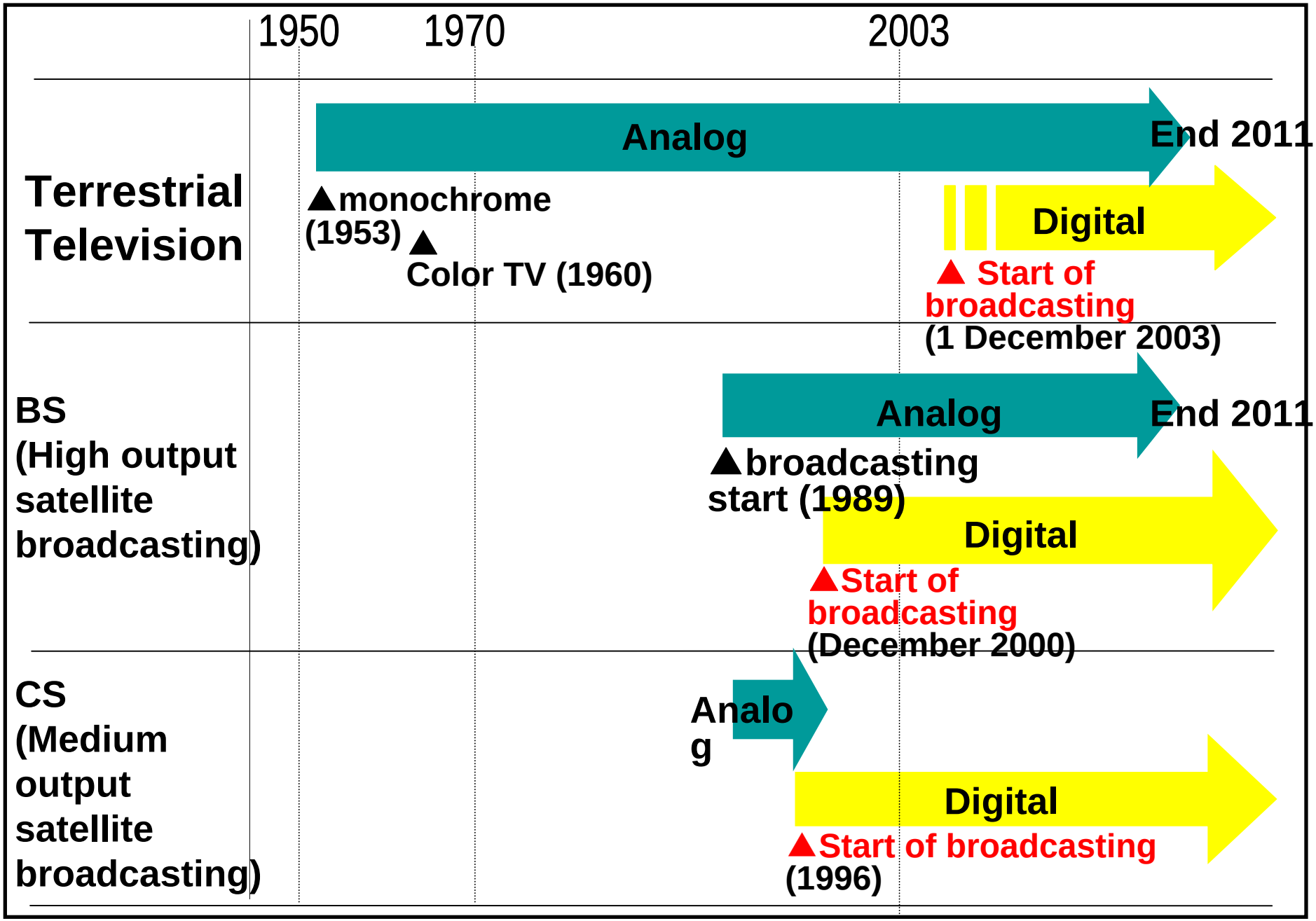
End of 2003

(Reference) Household coverage rate for terrestrial digital broadcasting services*



*Household coverage rate is calculated
based on MCI “Residents basic ledger” (end of 2002)

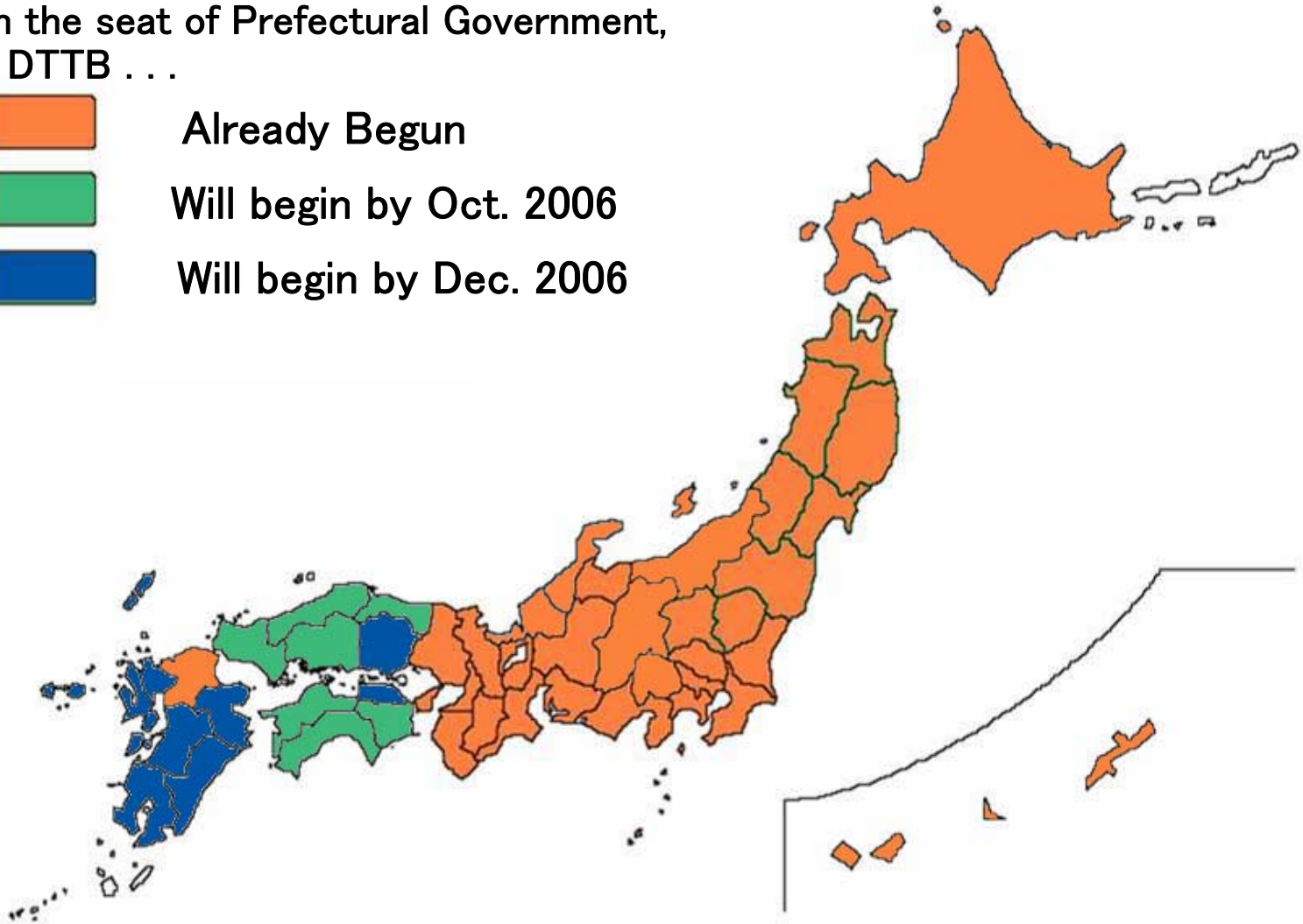
Schedule for Digital Broadcasting in Japan



Expansion Schedule for DTTB in Japan

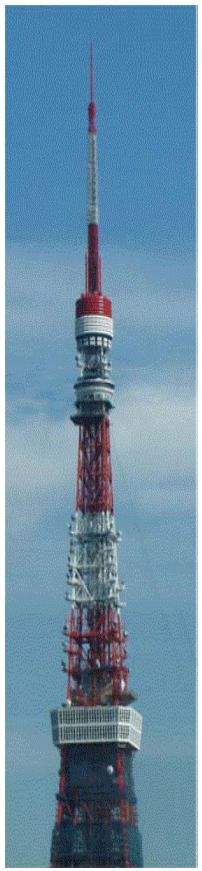
In the seat of Prefectural Government,
DTTB . . .

- Already Begun
- Will begin by Oct. 2006
- Will begin by Dec. 2006



Schedule and Policy for Digitalization

Implementation Schedule of Digital Terrestrial Television Broadcasting in Japan



2007 — Start of Server-type Broadcasting

Oct. 2006 — Start of DTTB (main city of the whole country)

Apr 1.st 2006 — Start of 1-Segment Broadcasting

Dec 1.st 2003 — Start of DTTB ! (Tokyo, Nagoya, Osaka)

Apr. 2003 — Provisional licenses were awarded

Feb.2003 — Start of Analog channel relocation

Sep. 2002 — MPHPT established license conditions and requirements

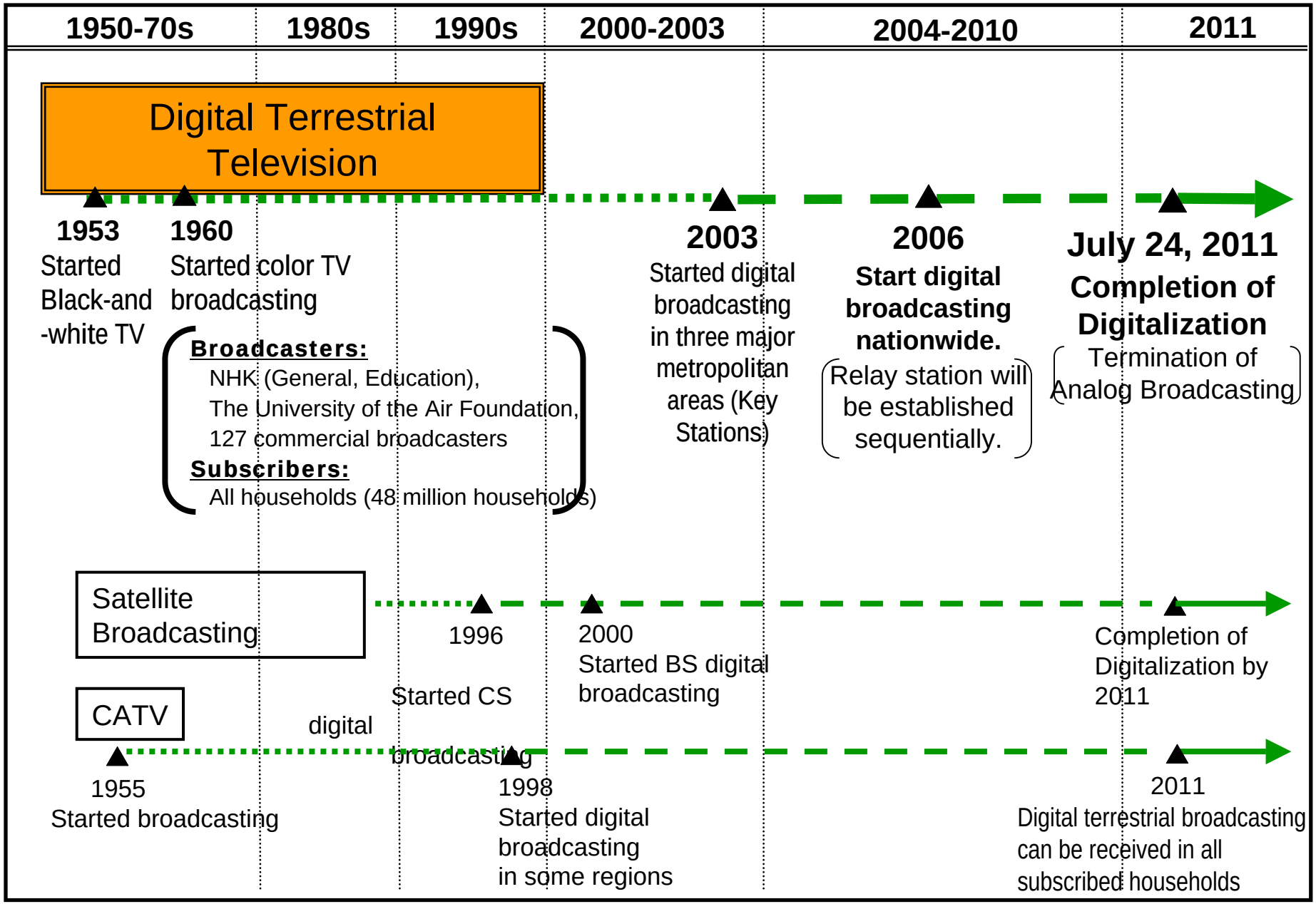
1999-2003 — Real Scale Experiment Broadcasting

1999 — MPT established technical standard

1998 — Issue of Digital Broadcasting Study Group Report

1994 — MPT asked to Council for technical requirement

Schedule of Digitalization of Broadcasting in Japan



Terrestrial Digital Broadcasting Schedule

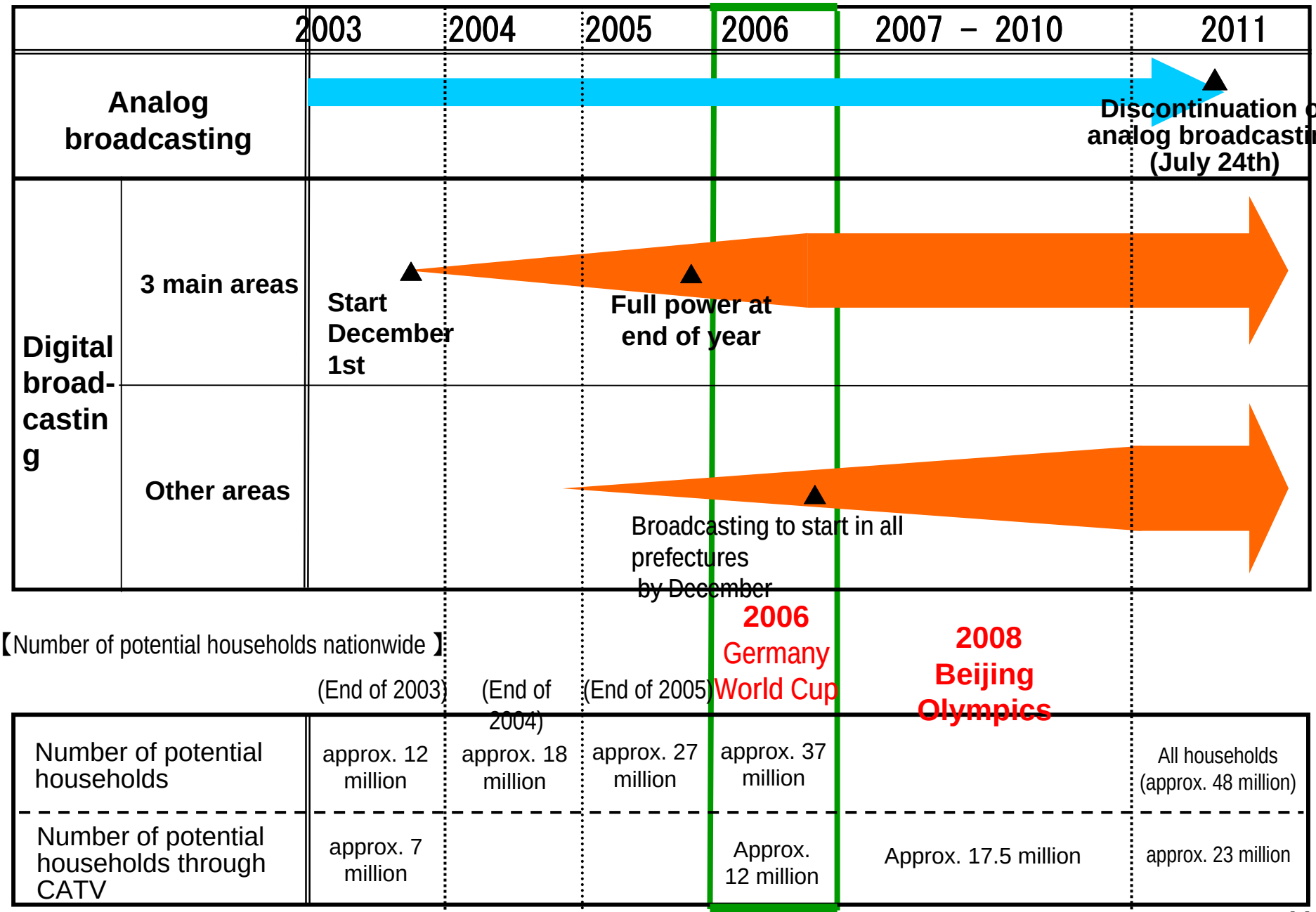
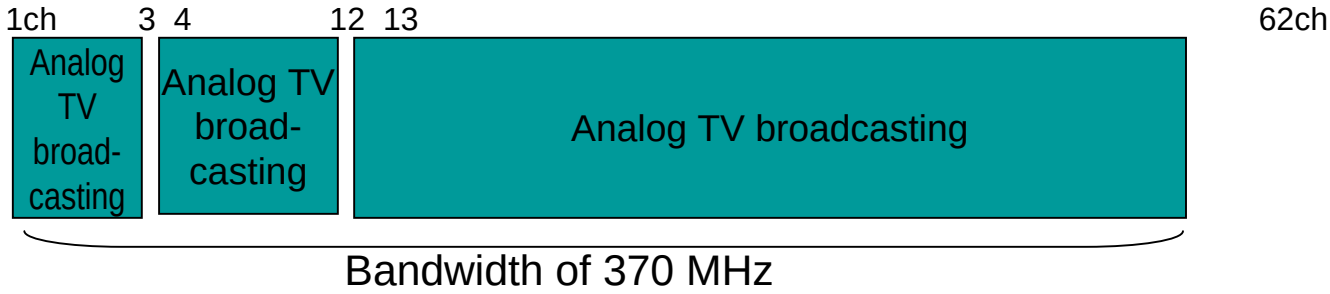
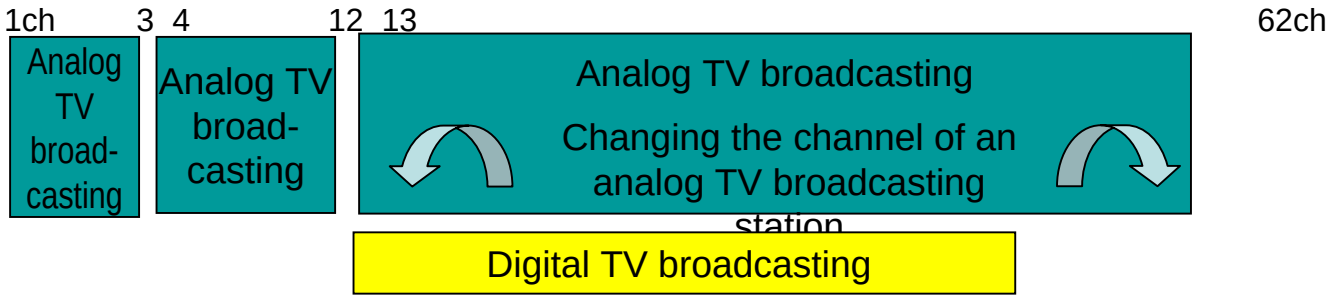


Image of Effective Use of Frequencies by Digitization of Terrestrial Broadcasting

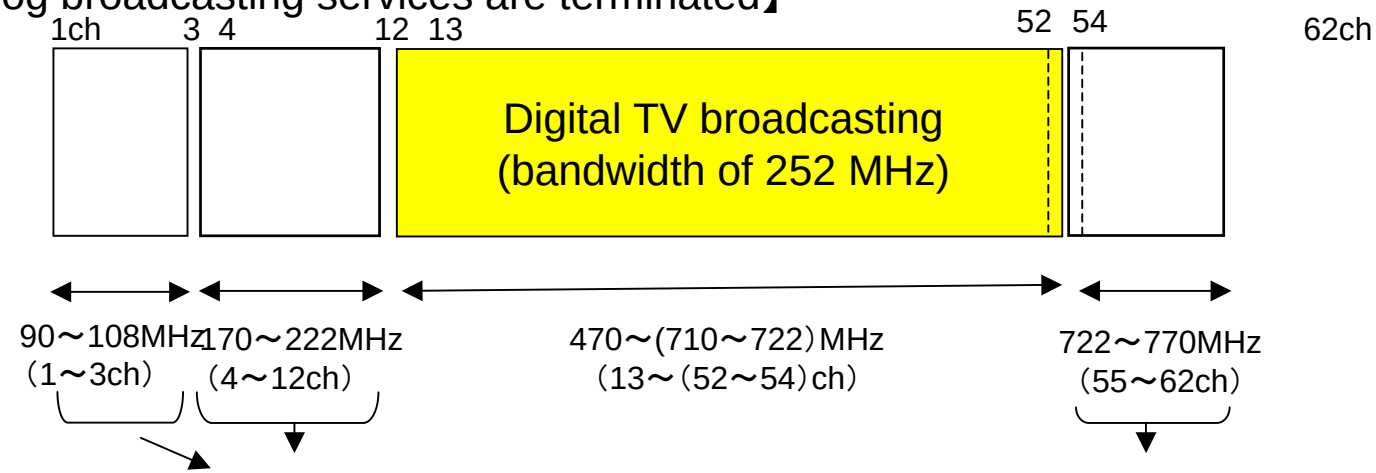
【Before measures for changing analog frequencies are taken】



【While measures for changing analog frequencies are taken】



【After analog broadcasting services are terminated】



1/4 or more of the frequency band which was used for broadcasting in the past can be used for new applications (bandwidth of 118 MHz)

Licensing Policy for Digital Terrestrial Television Broadcasting

- Over 2/3 simultaneous broadcasting of analog programs per day
- HDTV program time quota of more than 50% for all Digital terrestrial television broadcasters
- Broadcasting using subtitles and commentary

Strategy to Promote Digital Terrestrial Television Broadcasting

- End of Analog Broadcasting; July 2011 mandated by Radio Law
- Promote Digital terrestrial television broadcasting receivers
- DTV as integrated home information terminal
- Need of collaborative work among government, broadcasters and industry

Official support for broadcasters

Support by the "Extraordinary Law for Measures to Promote the Construction of Advanced TV Broadcasting Facilities" etc.

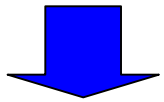
- **Preference for the national tax (corporate tax)**
- **Preference for the local tax (fixed property tax, *real-estate acquisition tax**)**
- **Supply of no- or low-interest funds by policy-based financial institutions**
- **Supply of low- or *super-low**-interest funds by the Development Bank of Japan**

**newly installed in FY2005*

ISDB-T and it’s Standard

Japan adopted ISDB-T

- Integrated Service Digital Broadcasting – Terrestrial
- Standard system of Japanese DTTV (Digital Terrestrial TV broadcasting)
- Based on Band segmented OFDM transmission technology
- Adopt the time interleave technology for mobile reception
- Adopt MPEG2-Systems for Multiplexing



- Flexibility of reception style

  Fixed reception, Mobile reception, Portable reception within same channel

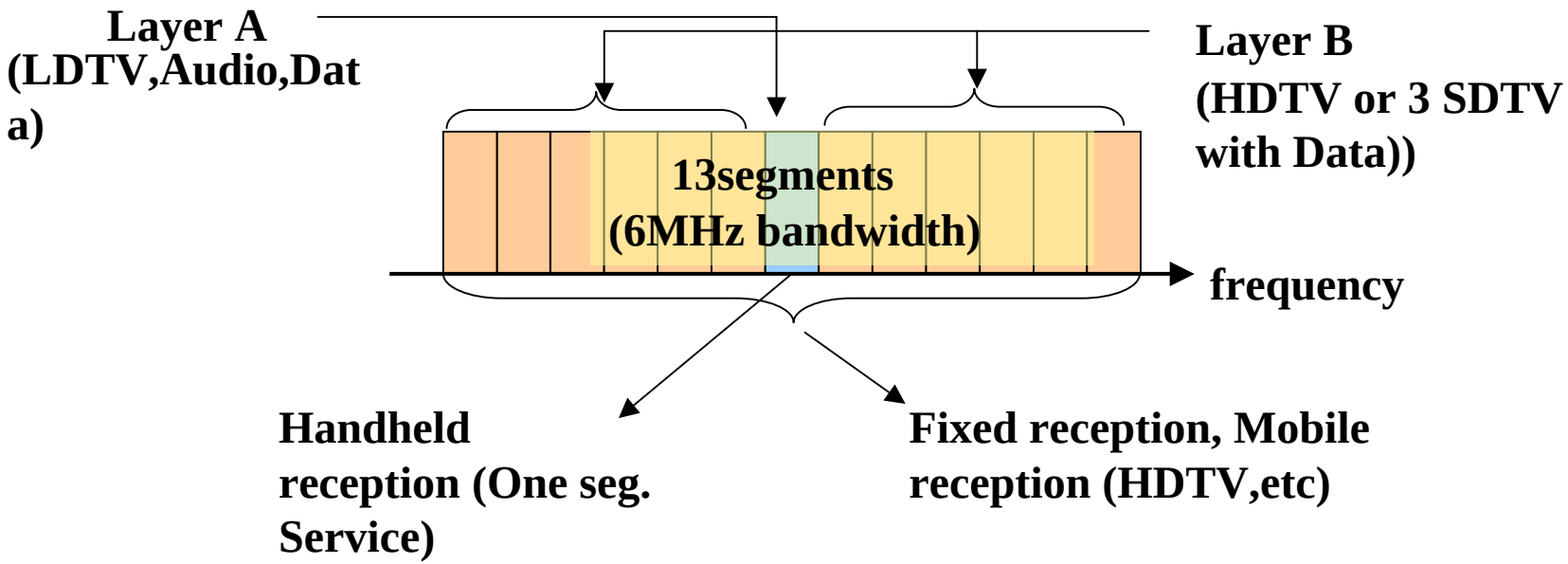
- Flexibility of service

  HDTV, SDTV, Small picture for portable receiver, data-casting, etc

- Inter-operability,etc.

What is Band Segmented OFDM with time interleave?

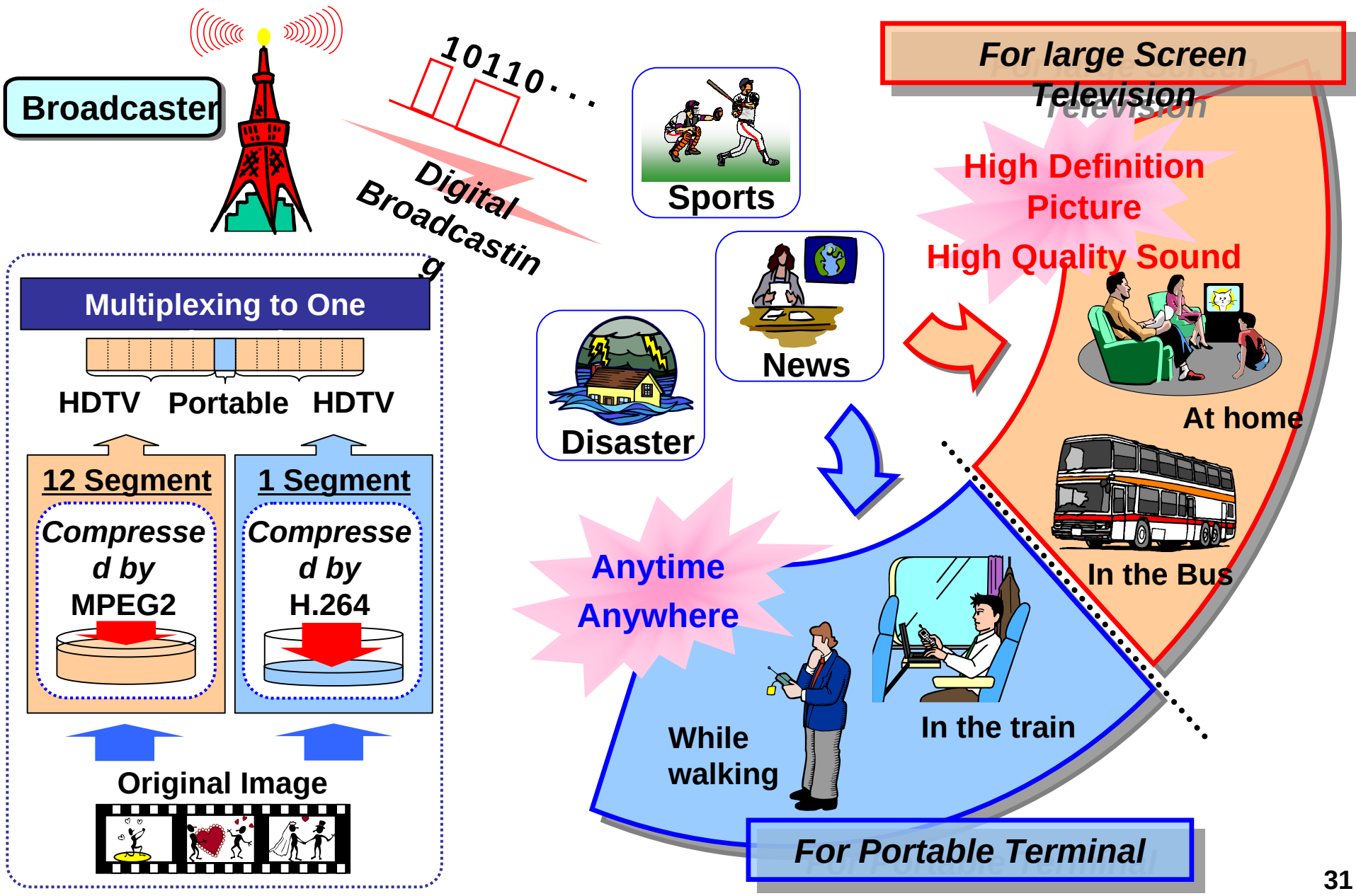
(Example; 1seg + 12 seg)



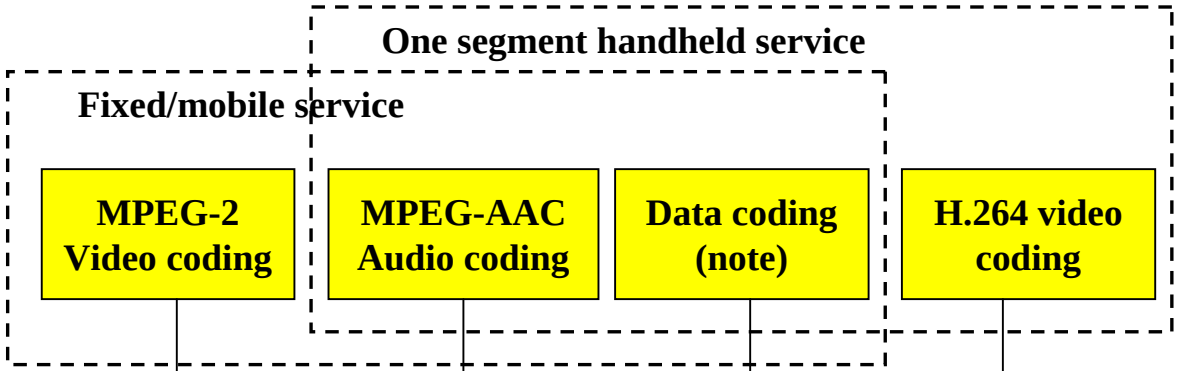
- **Segmented OFDM; Possible to support fixed/mobile/handheld reception service**

- **Time interleave; reduce impulse noise and reduce the degradation caused by fading (tested in Brazil by Mackenzie and TV GLOBO)**

Service Image of ISDB-T



Structure of Japan's Digital Broadcasting system



Source coding
(any of service are available)

Common interface (Transport Stream interface)

Multiplex(Based on MPEG-2 systems)

Mulitplex

Common interface (Framed Transport Stream interface)

Single carrier 8-PSK/PSK

Single carrier 64QAM

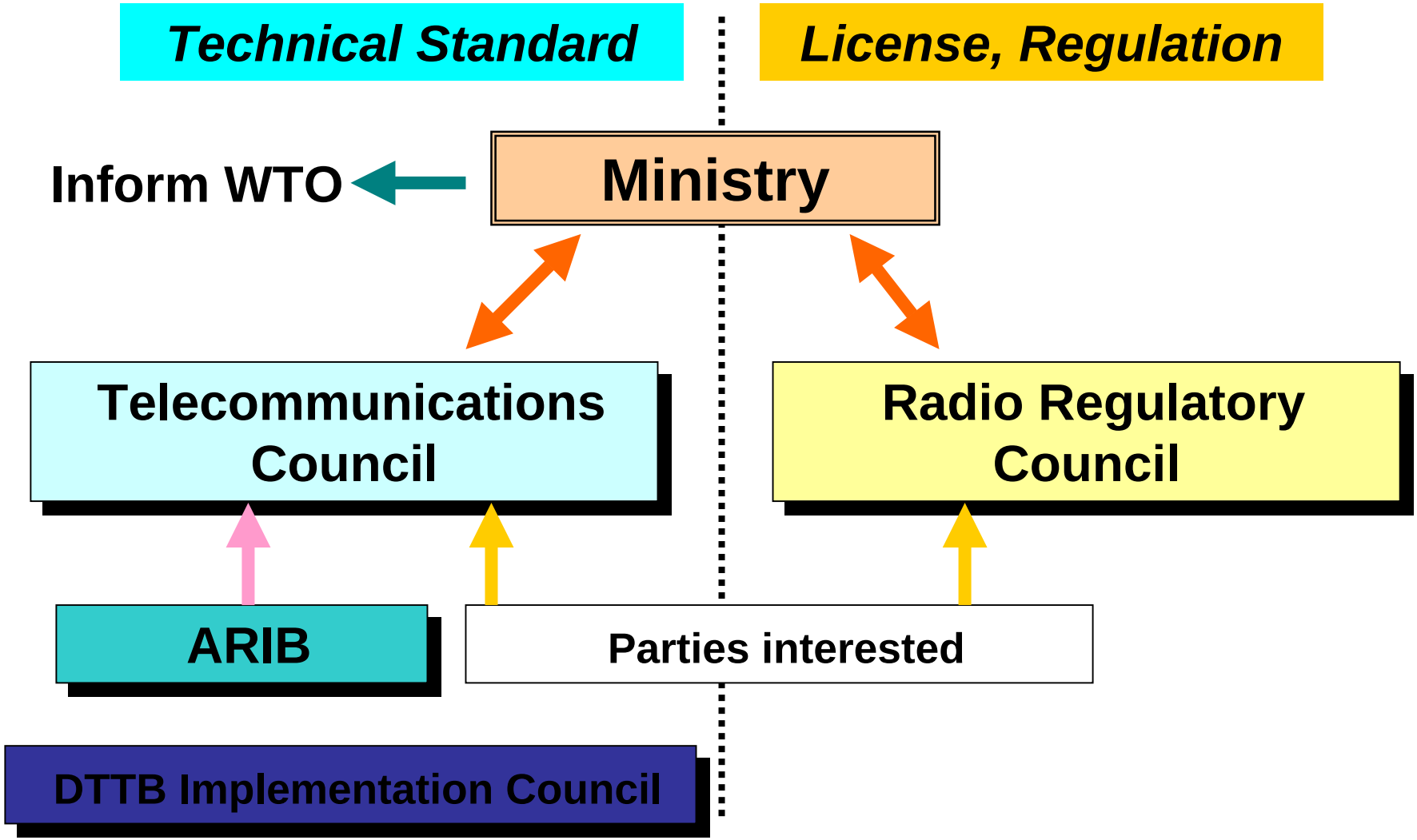
Segmented OFDM QAM/DQPSK With time interleave

Transmission coding

(satellite) **(cable)** **(terrestrial)**

(note) both BML and MHP are available,
But in Japan now BML is only service in.

Decision Making Process



Standardization for Broadcasters / Receivers

(Broadcasters)

- Service contents
- Segment utilization
- Transmission parameters
- SI
- CAS
- Network configuration
- Down load data
- Test stream

(Receivers)

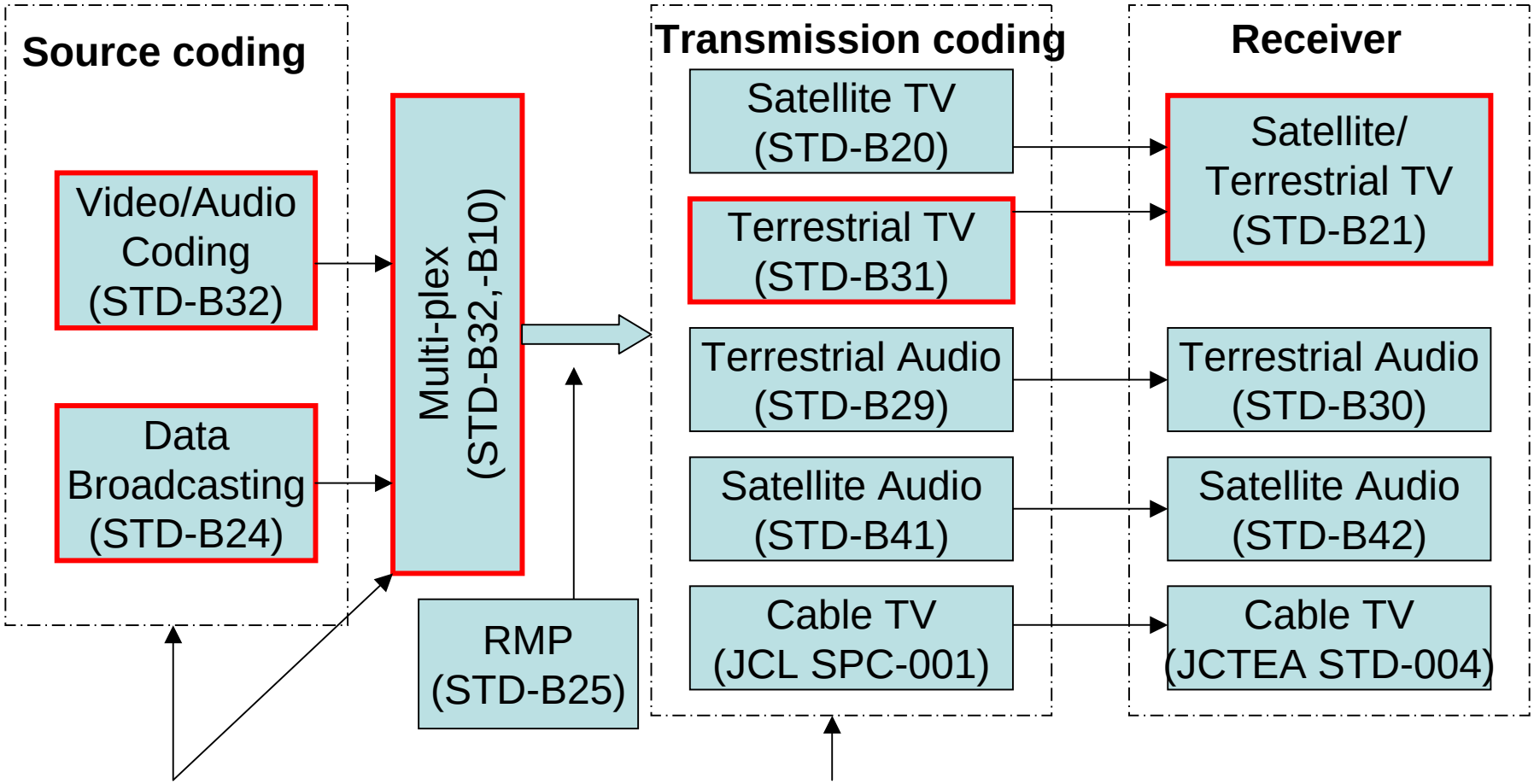
- Signal Interface
- Tuner characteristic
- EPG
- Copy-right treatment
- Hardware size
- Interactive link
- Human interface

2. Standardization Structure of Digital broadcasting

ARIB standards (ARIB STD)

private technical standards which are to supplement the MPHPT regulations for telecommunications and broadcasting radio systems and are set for the purpose of guaranteeing compatibility of radio facilities and transmission quality as well as offering greater convenience to radio equipment manufacturers and users.

Digital Broadcasting Standard in Japan



Note: Cable transmission system standards are defined at another consortium

Outline of ARIB Standards

Source coding & Multi-plex

Name	Outline	note
Video/Audio coding (STD-B32)	-Based on MPEG-2 video coding -Cover 1080i,720p,480p,480i -Based on MPEG AAC audio coding -Up to 5.1 Stereo audio -Based on MPEG systems multi-plex	
Data Broad-casting (STD-B24)	-Data broadcasting description -Data transmission format -Small size Video coding(MPEG-4,H.264)	
Program line-up information (STD-B10)	-PSI/SI description -EPG description -Necessary for program selection	

Outlines of Standards (continued)

Transmission coding

Name	Outline	note
Satellite TV (STD-B20)	-Slot structure -Trellis+RS(Concatenated coding) -Single carrier 8 PSK modulation	2 HDTV programs are muliti-plexed into 1 transponder
Terrestrial TV (STD-B31)	-Segment structure -Viterbi+RS (Concatenated coding) -Multi-carrier(OFDM) transmission	1 segment transmission is available
Terrestrial Audio (STD-B29)	-1 and 3 segment transmission -Others are almost same as STD-B31	1 segment system is compatible to 1 segment of TV
Satellite Audio (STD-B42)	-Multiplex 64 CDM channel -Viterbi+RS (Concatenated coding) -CDM-BPSK/QPSK transmission	Adopt “AAC+SBR” 2.6GHz Band

Outlines of Standards (continued)

What is the operational guideline?

All the technical elements required are written in ARIB STD. But, the details for operation of broadcasting are defined separately, even though based on ARIB STD. These documents are called “Operational Guideline”

Examples

ARIB TR-B13; Terrestrial Audio broadcasting operational guideline

ARIB TR-B14; Terrestrial TV broadcasting operational guideline

ARIB TR-B15; BS/wideband CS broadcasting operational guideline

ARIB TR-B26; Satellite Audio broadcasting operational guideline

Experimental Broadcasting in Japan

During 1998 -2003, Experimental Broadcasting was held in Japan.

The purpose of Experimental Broadcasting were,

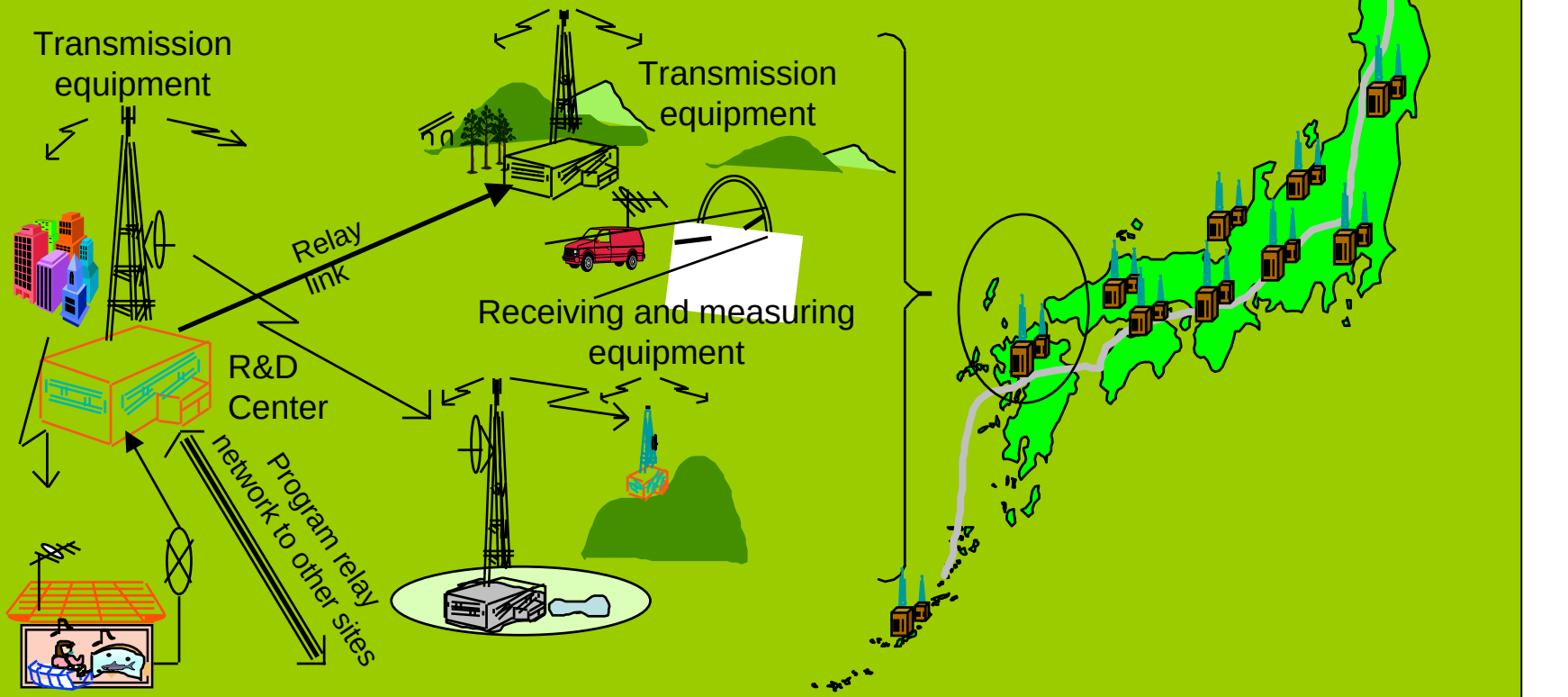
- To Evaluate the ISDB-T System8mainly in Tokyo Pilot Test)
- Develop and Test DTTB Transmission Network and It's technology
- Develop and Test Studio System
- Develop and Test New Service in Digital Broadcasitng

ISDB-T Experiment Broadcast Stations

a) Development of the most suitable and economical broadcasting network

b) Development of data broadcasting services, multimedia broadcasting service

c) Development of new services suitable for the regional requirement



Experimental Broadcasting in Japan

for System finalization of ISDB-T

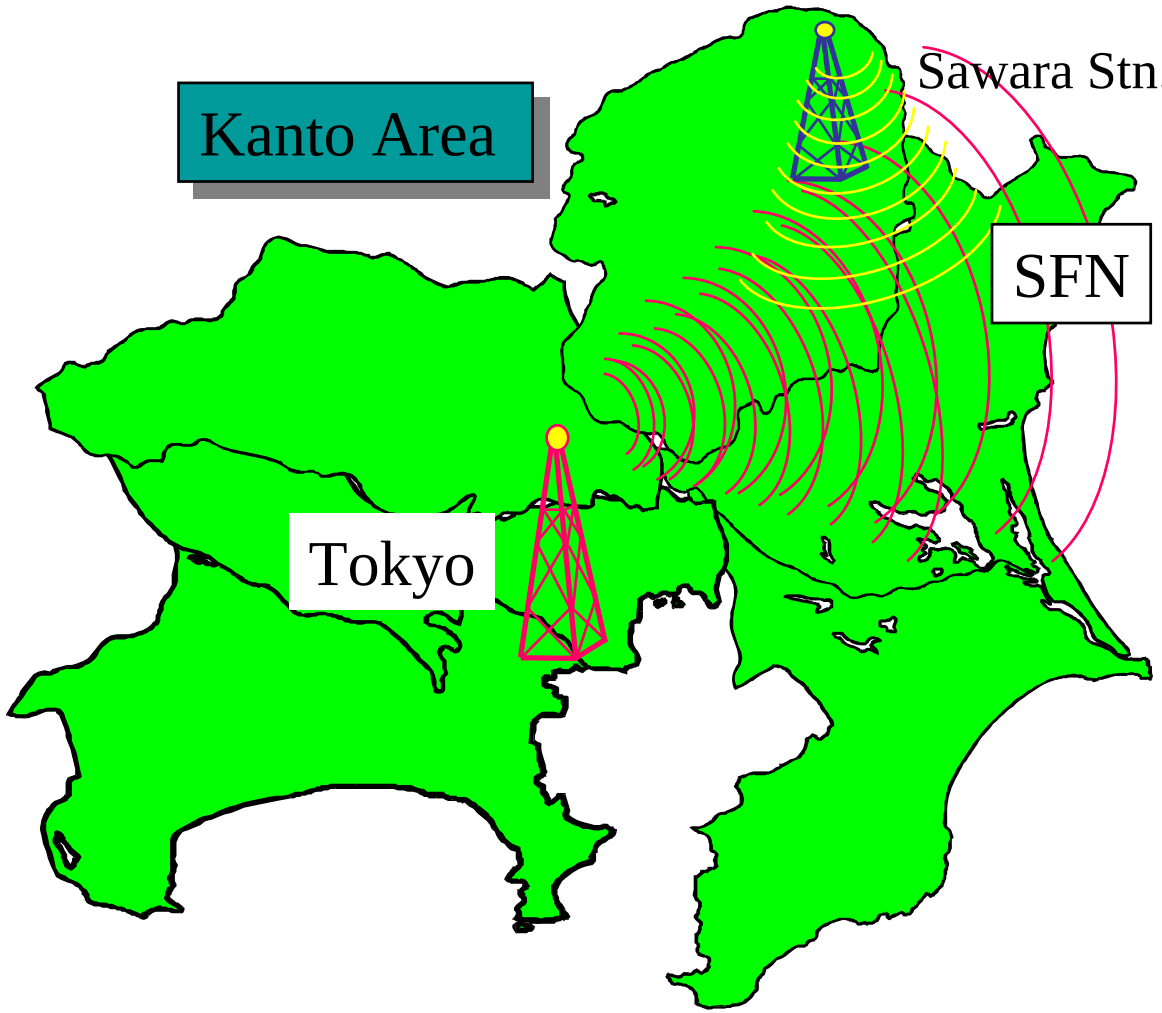
Transmitting started
since Oct.'98

Tokyo Tower

Height 210m
CH UHF-15
Power 500W

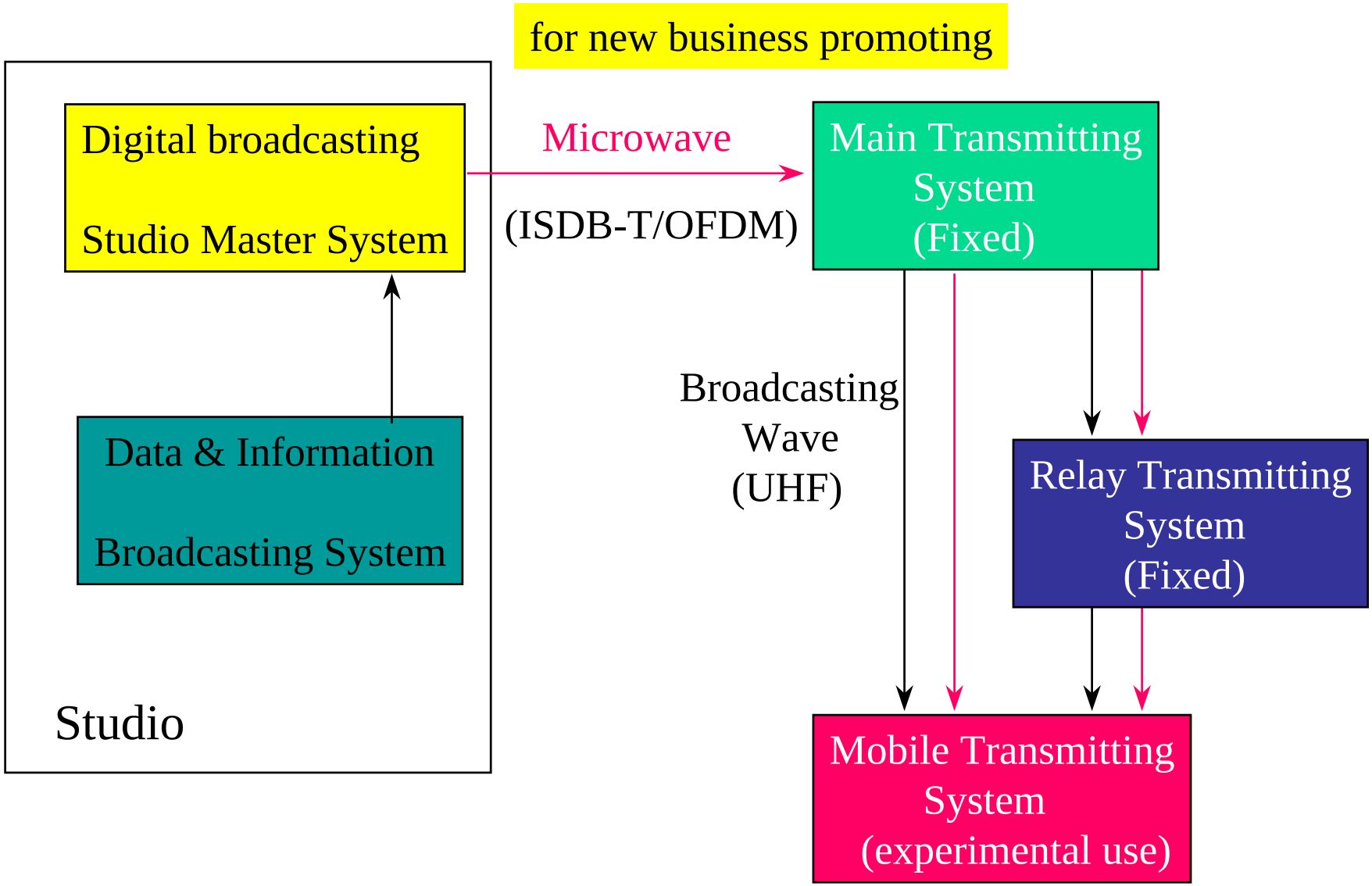
Existing Analog TV

Ch-14 50kW
Ch-16 10kW



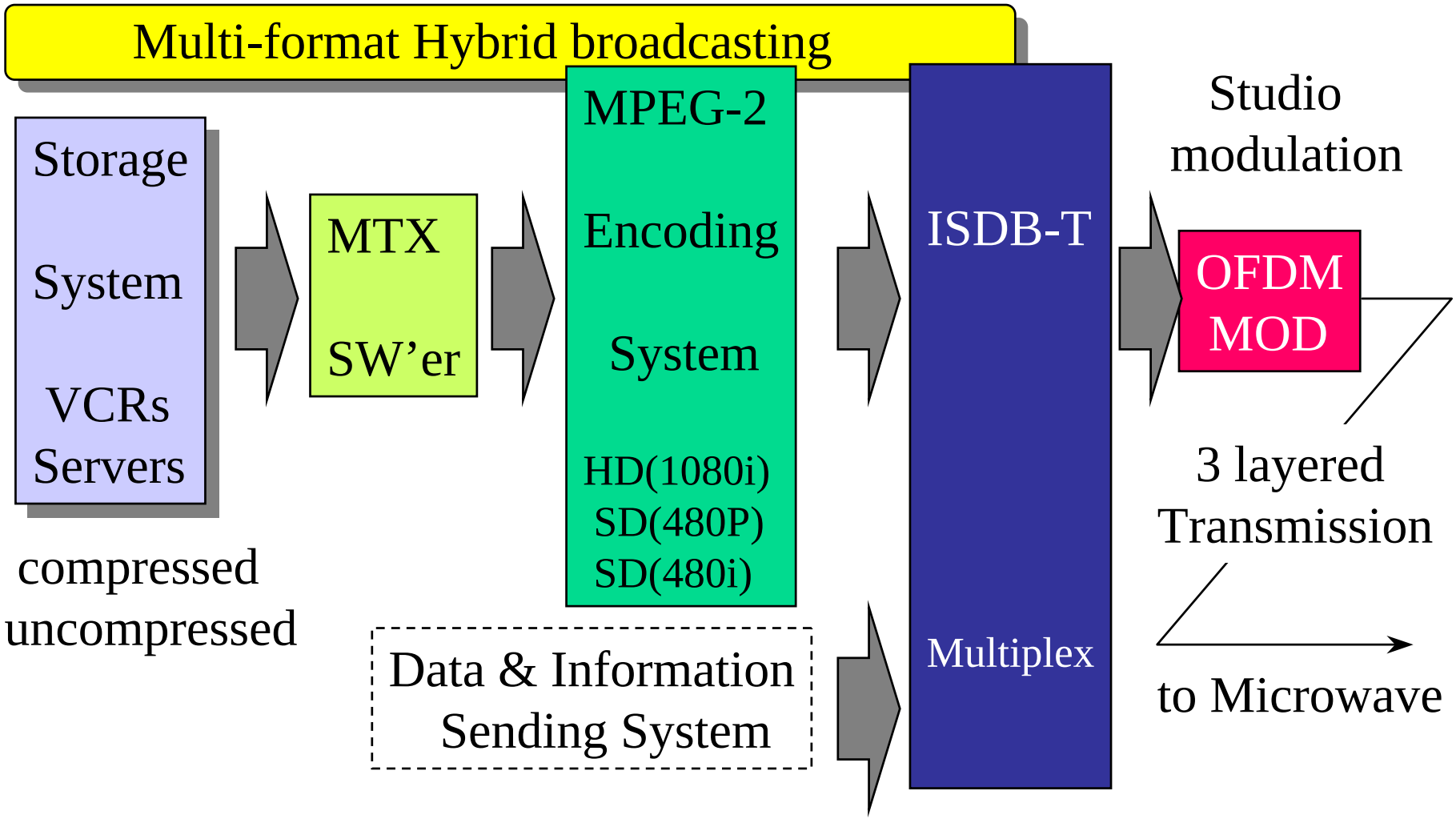
System configuration of experimental Broadcasting

for new business promoting



Features of Digital broadcasting Facilities Experimental

(1) Digital Studio System



Features of Digital broadcasting Facilities Experimental

(2) Digital Broadcasting Network

SFN(Single Frequency Network) constructed by UHF & SHF

Rx/Tx isolation and cancellation
Feasibility study of usage of 3.5G & 7G for SHF link

Mobile reception under SFN constructed network

Station allocation plan in economy
investigated by Mobile TX

Features of Digital broadcasting Facilities Experimental

(3) Multimedia Broadcasting Service

Bidirectional network of data and information services

Telephone line return

Handheld reception of 1 segment multimedea services

Broadcasting of Community services for limited area

Storaged and rendered services of multimedea broadcasting

Obrigado

Thank You for Your Attention

Digital Broadcasting Expert Group

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