

Policy and Digitalization Process in Japan

**28th-29th August, 2006
In Caracas**

DiBEG JAPAN

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Topics

- 1. Outline of Broadcasting in Japan**
- 2. Schedule and Policy for Digitalization**
- 3. Standardization Process and Structure of ISDB-T Standard**
- 4. Experimental Broadcasting in Japan**
- 5. Outline of Service Features of ISDB-T**
- 6. Outline of Narrow Band ISDB-T(ISDB-Tsb)**

Outline of Broadcasting in Japan

Japan's Profile

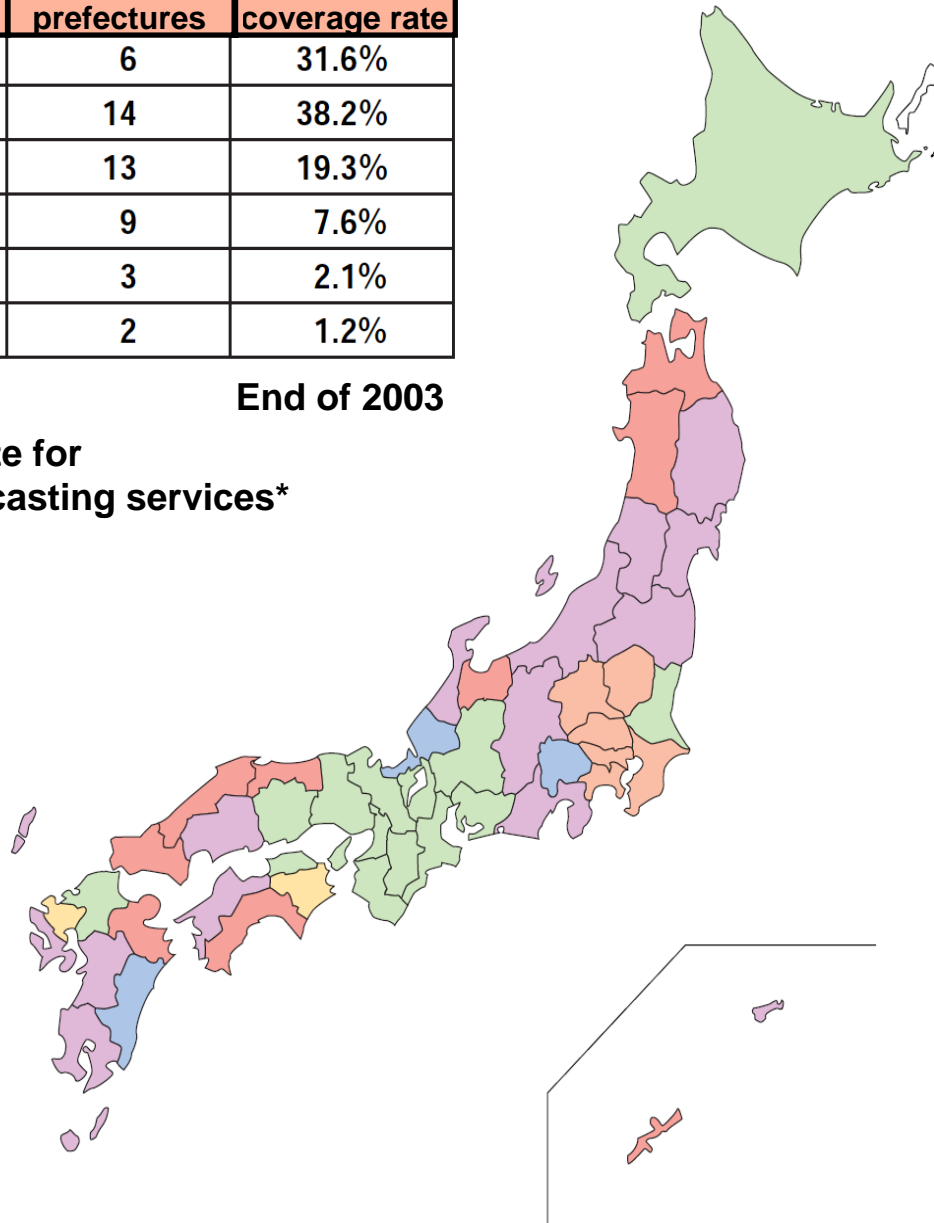
- **Population** **127 million**
- **Number of households** **48 million**
- **Area of Japan** **378,000 km²**
- **TV receivers** **100 million**
- **Terrestrial TV networks**
 - **3-9 stations/region with many relay stations (including 2channels by public broadcaster, NHK)**
 - **NHK: reception license 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%

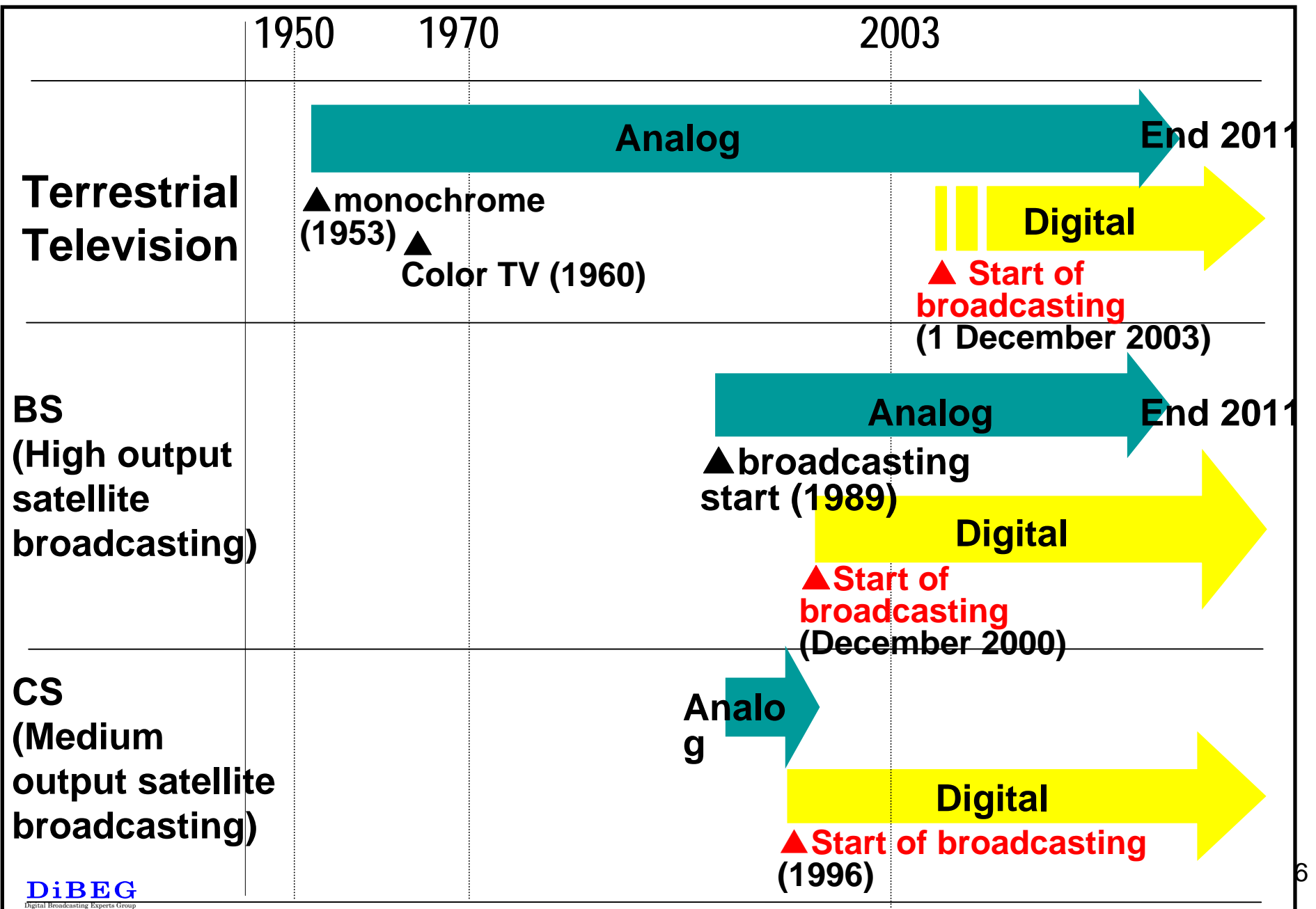
End of 2003

(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



Cable Televisions Broadcasting

- **Cable and community reception penetration 47%**
- **Cable TV with own programming penetration 32%**
- **Cable TV operators are shifting full service; more channels, internet services**
- **Legislation**
- **Cable TV law: must carry rule of terrestrial TVs.**
- **Internet service subject to Telecommunication business law**

Satellite Television Broadcasting

- **Analog Satellite BS, SDTV 3ch 12 million subscribers**
(25% penetration)
- **Digital BS Satellite, HDTV 7ch 5.25 million subscribers**
(10%) since 2000 including cable reception
- **SkyPerfecTV, digital SDTV 200plus ch**
3.5 million (7%) subscribers since 1996

Schedule and Policy for Digitalization

Policies and Bottleneck for DTTB

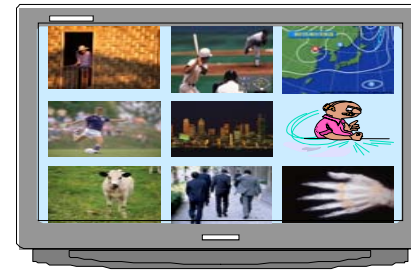
- Assign 6MHz channels for incumbent terrestrial broadcasters
- Simulcast of Analog, but something more values ;
i.e. HDTV, SDTV multichannels, datacast, etc
- Different and additional value more than satellite digital TV (SDTV more channel)
- Digital Television set as integrated home information terminal
- Massive reallocation of existing relay station channels

The Merits of Digital Broadcasting

HDTV



Multiple programs



**Data
broadcasting**

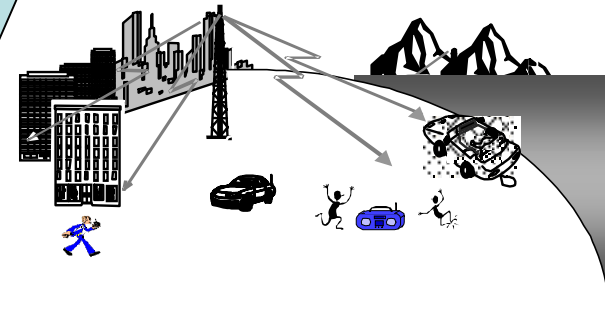


**Advanced caption
etc.**

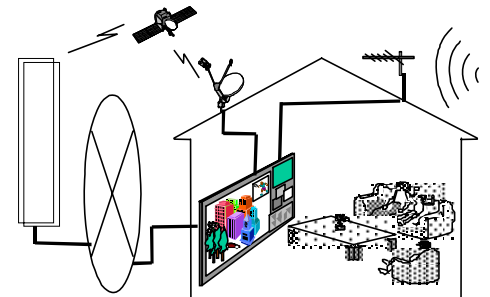


Merits

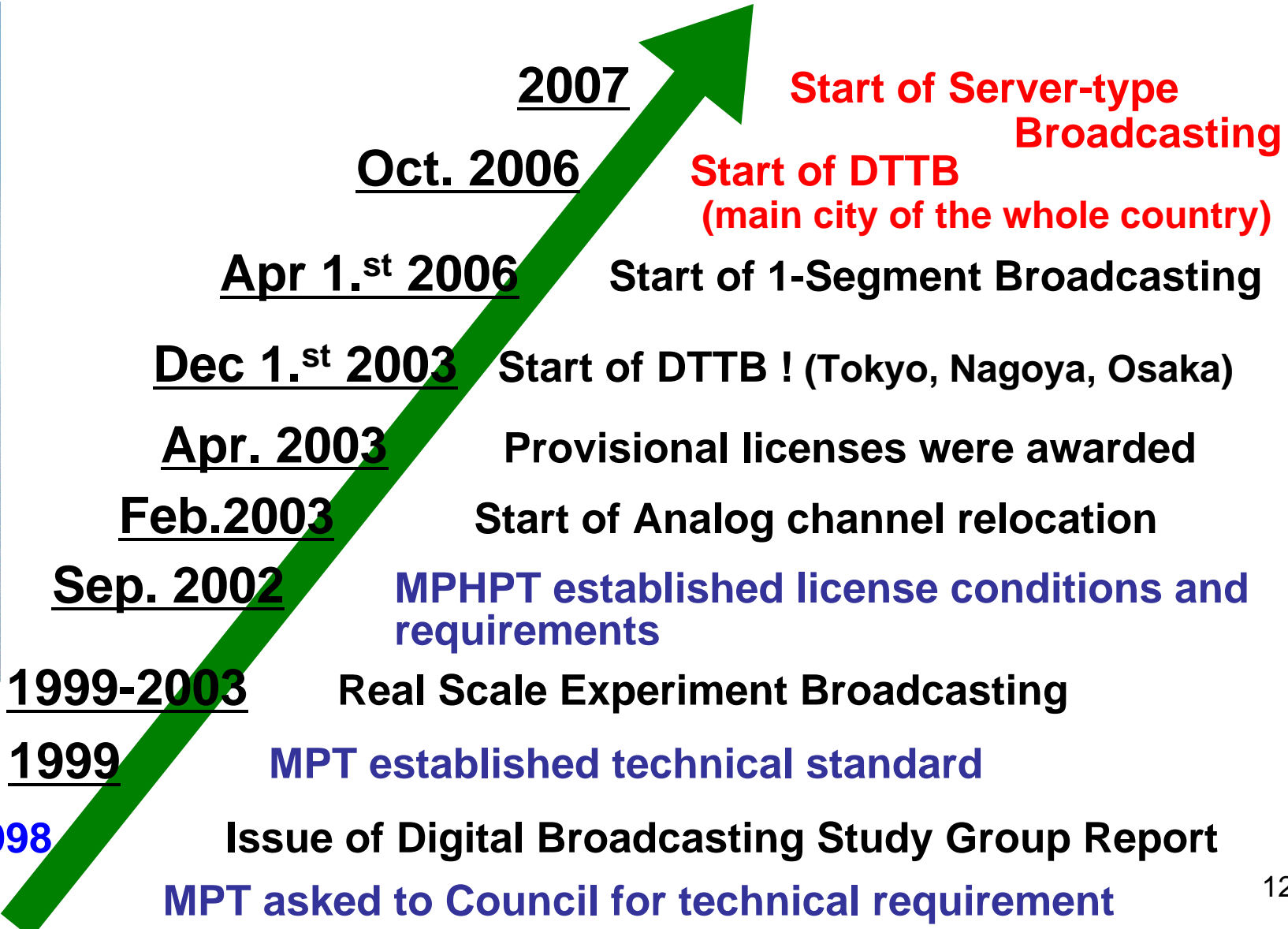
Mobility



Interactive TV



Implementation Schedule of Digital Terrestrial Television Broadcasting in Japan



Expansion Schedule for DTTB in Japan

In the seat of Prefectural Government,
DTTB . . .



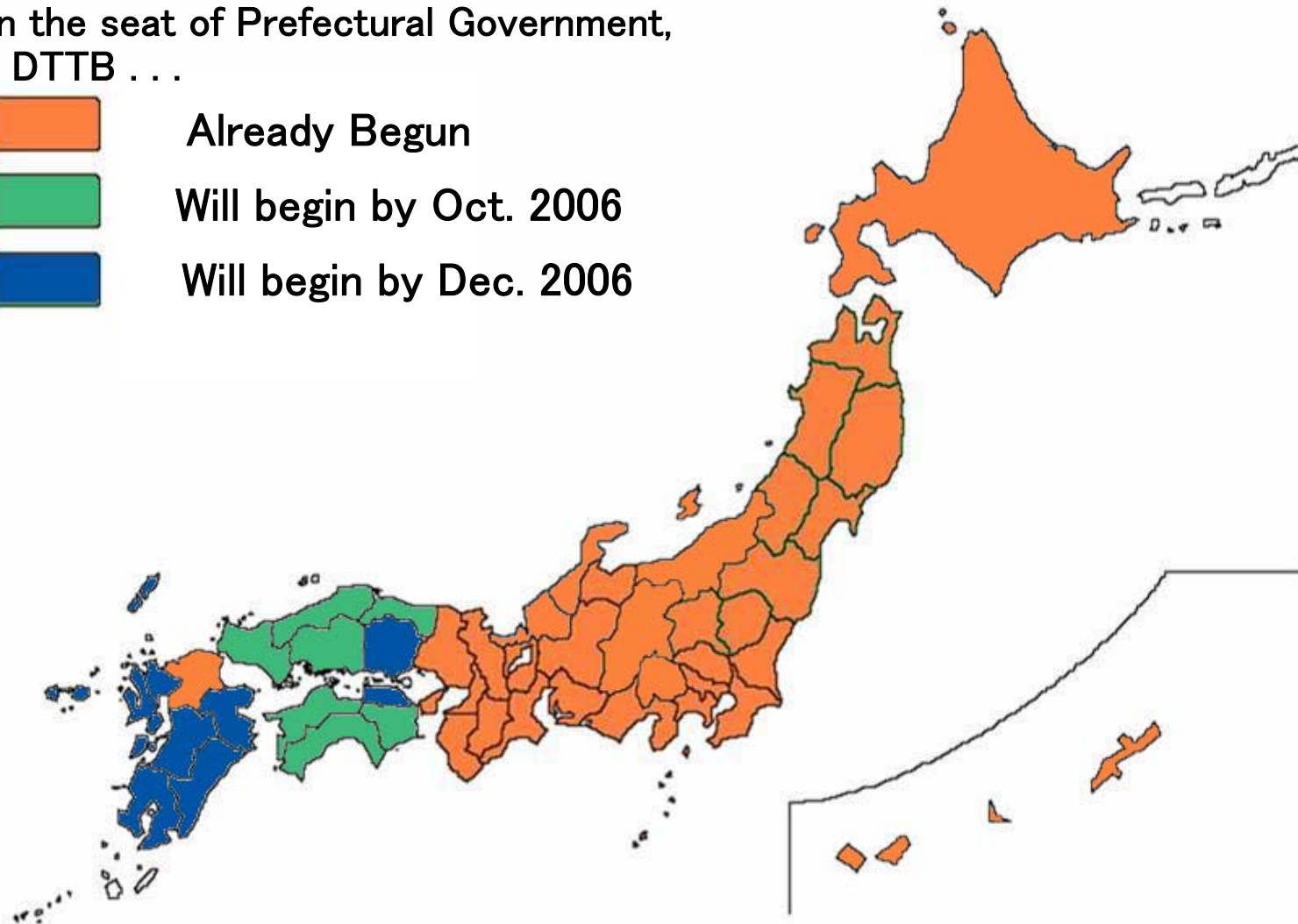
Already Begun



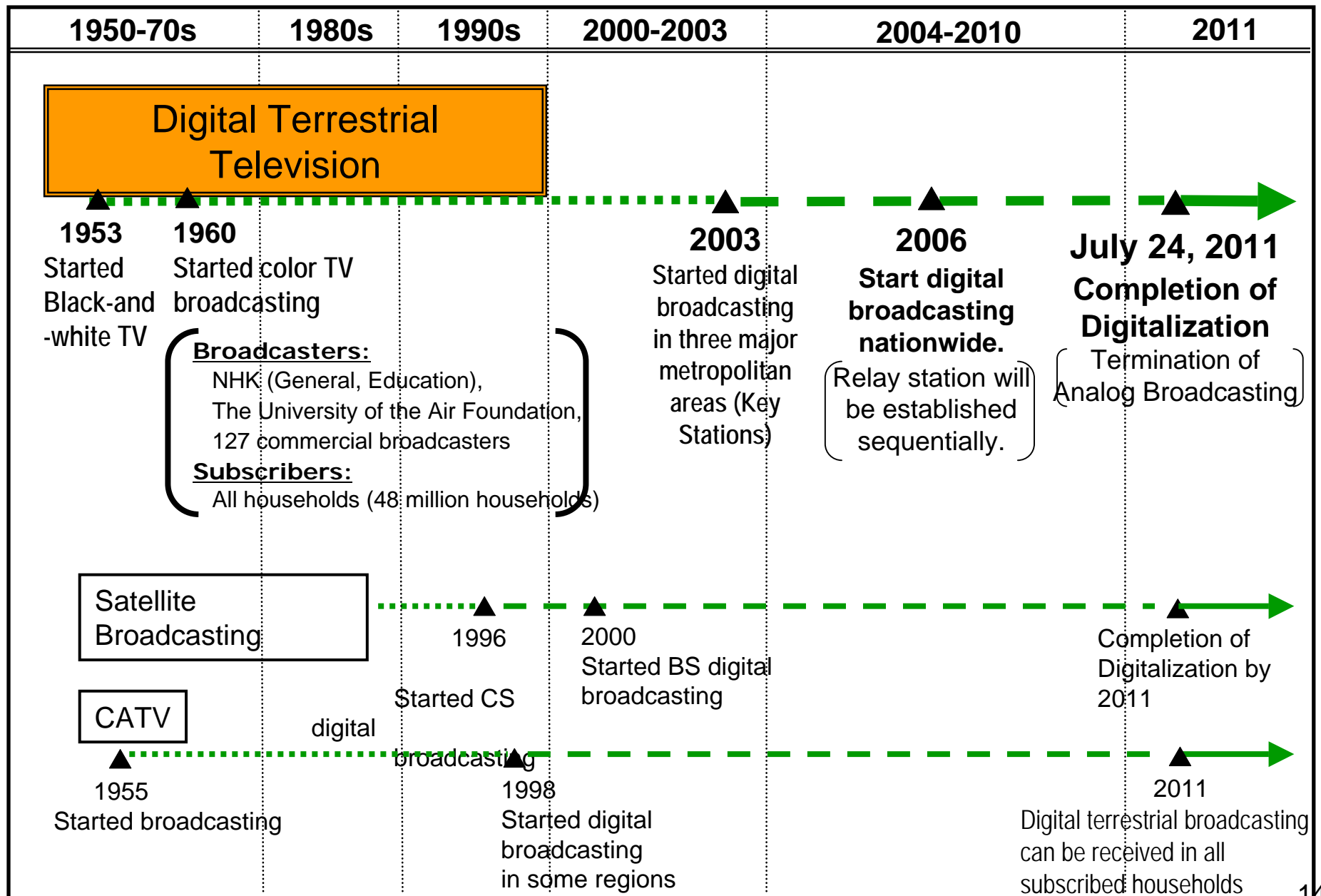
Will begin by Oct. 2006



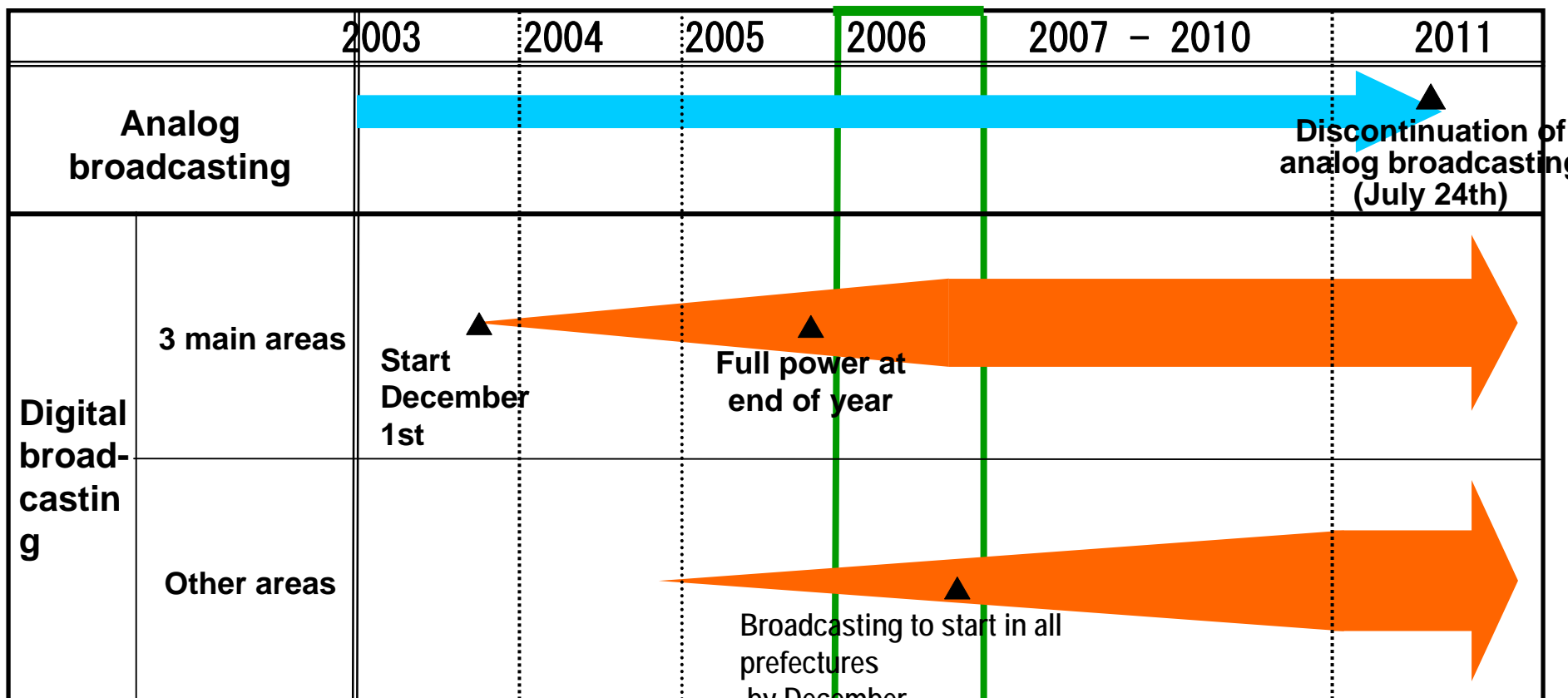
Will begin by Dec. 2006



Schedule of Digitalization of Broadcasting in Japan



Terrestrial Digital Broadcasting Schedule

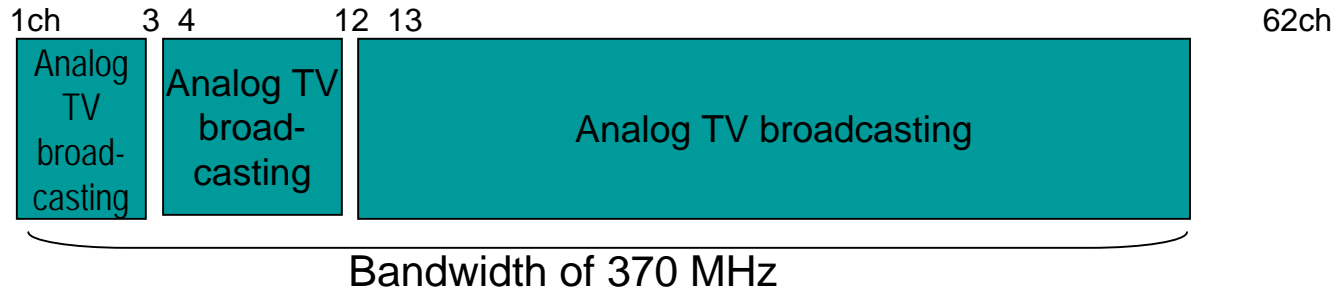


【Number of potential households nationwide】

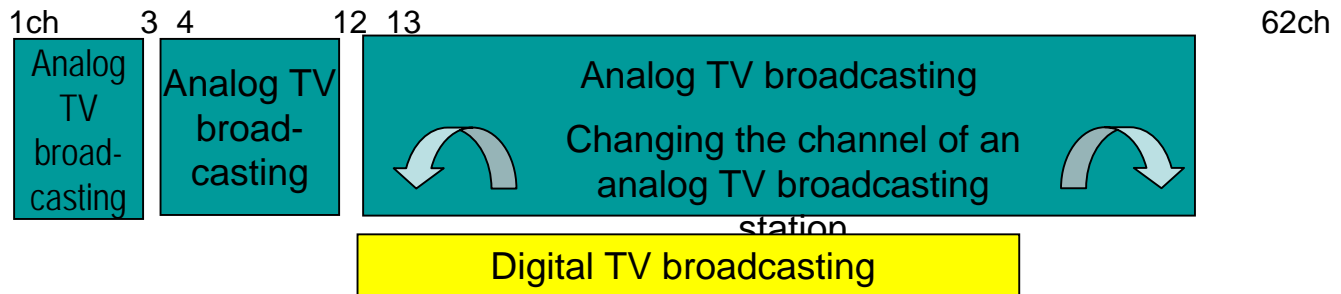
	(End of 2003)	(End of 2004)	(End of 2005)	2006 Germany World Cup	2008 Beijing Olympics	
Number of potential households	approx. 12 million	approx. 18 million	approx. 27 million	approx. 37 million		All households (approx. 48 million)
Number of potential households through CATV	approx. 7 million			Approx. 12 million	Approx. 17.5 million	approx. 23 million

Image of Effective Use of Frequencies by Digitization of Terrestrial Broadcasting

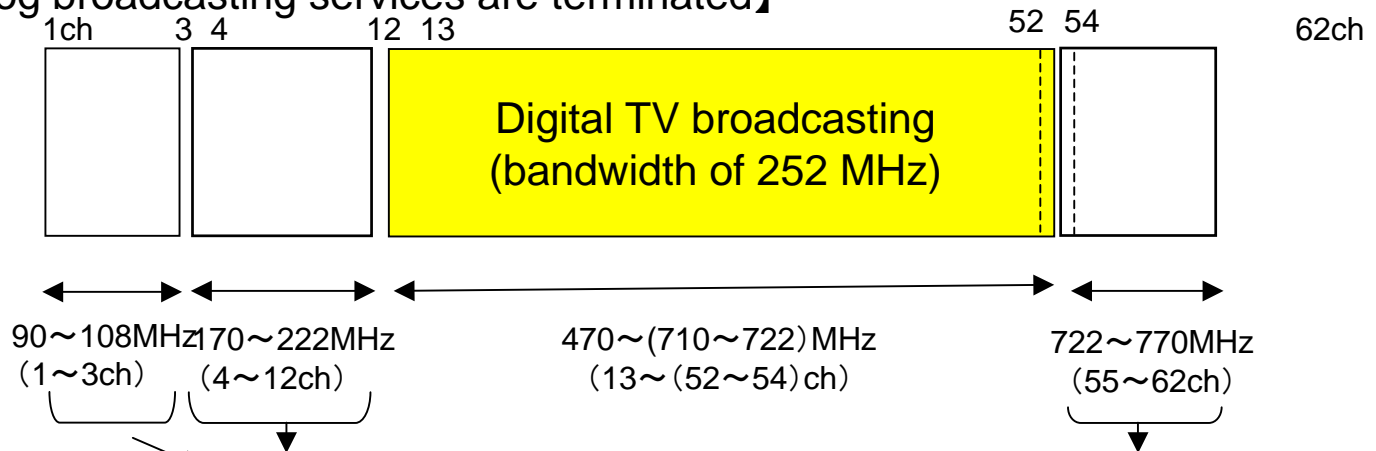
【Before measures for changing analog frequencies are taken】



【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.

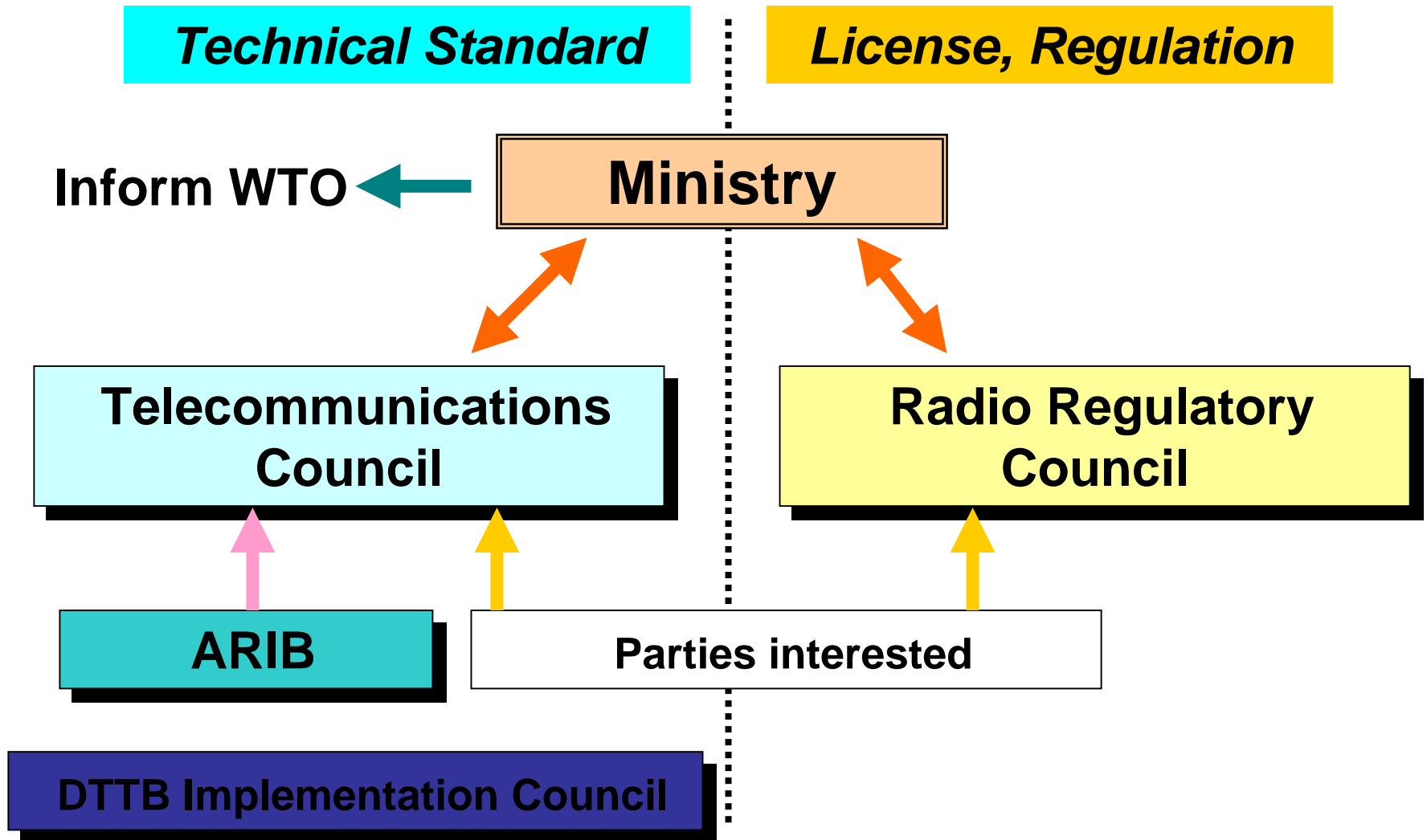
- Preference for the national tax (corporate tax)
- Preference for the local tax (fixed property tax, *real-estate acquisition tax**)
- Supply of no- or low-interest funds by policy-based financial institutions
- Supply of low- or *super-low**-interest funds by the Development Bank of Japan

**newly installed in FY2005*

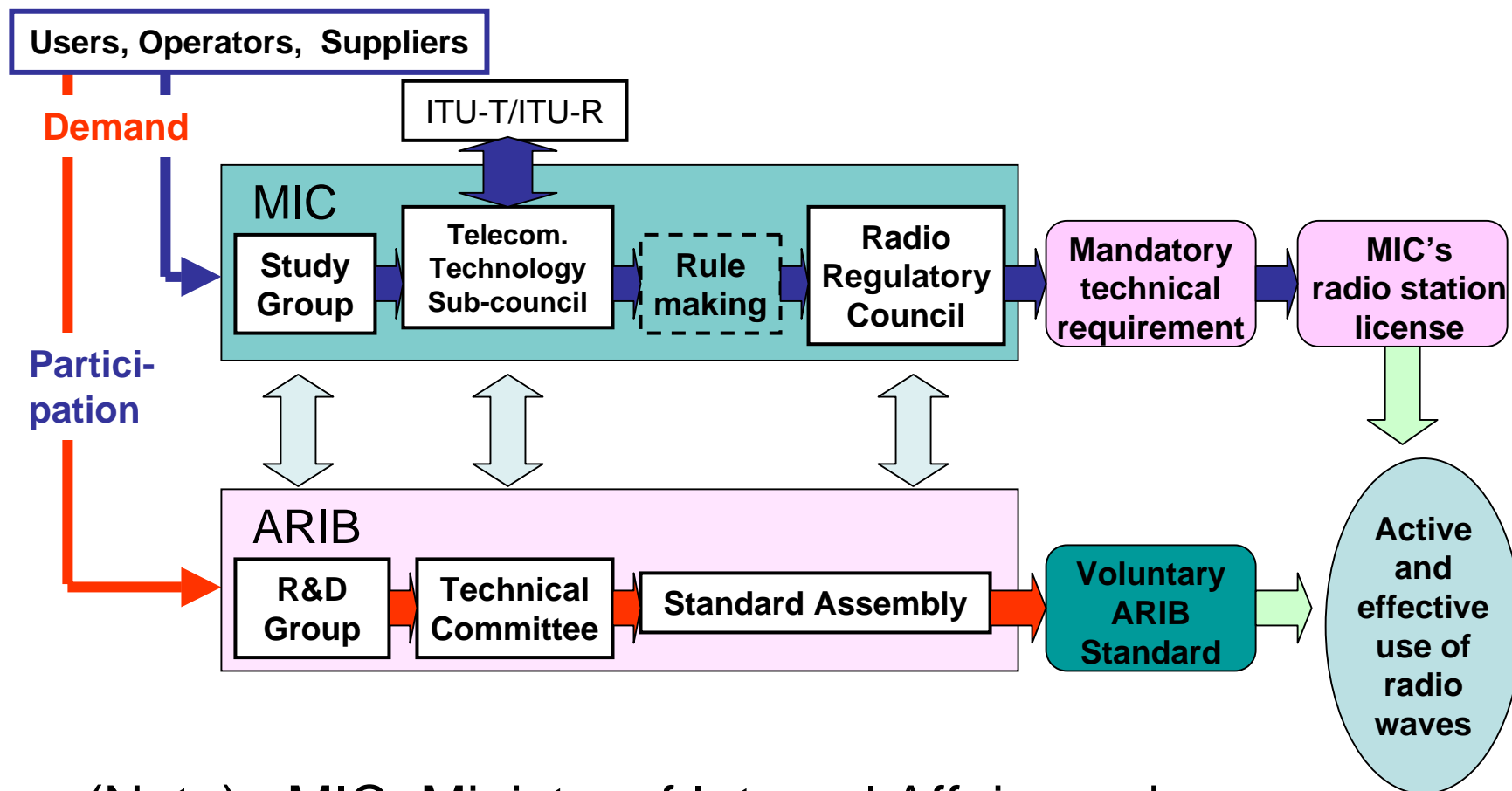
Standardization Process of DTTB in Japan

Note; Details of structure for ISDB-T standard are explained in 2nd session

Decision Making Process



Standardization Flow in Japan



(Note) MIC: Ministry of Internal Affairs and Communications

Government Regulations and ARIB Standards for radio systems

	Government Regulations	ARIB Standards
Nature	Mandatory	Voluntary
Purpose	<ul style="list-style-type: none"> ♦ To promote efficient use of frequency ♦ To avoid interference ♦ etc. 	<ul style="list-style-type: none"> ♦ To ensure common air interface ♦ To ensure suitable quality ♦ For greater convenience to manufacturers and users ♦ etc.
Technical items	<ul style="list-style-type: none"> ♦ Frequency band ♦ Spurious emission ♦ Frequency tolerance ♦ Occupied bandwidth ♦ etc. 	<ul style="list-style-type: none"> ♦ Communication protocol ♦ Sencitivity ♦ Carrier to Noise ratio ♦ Bit error rate ♦ Measurement method ♦ etc.

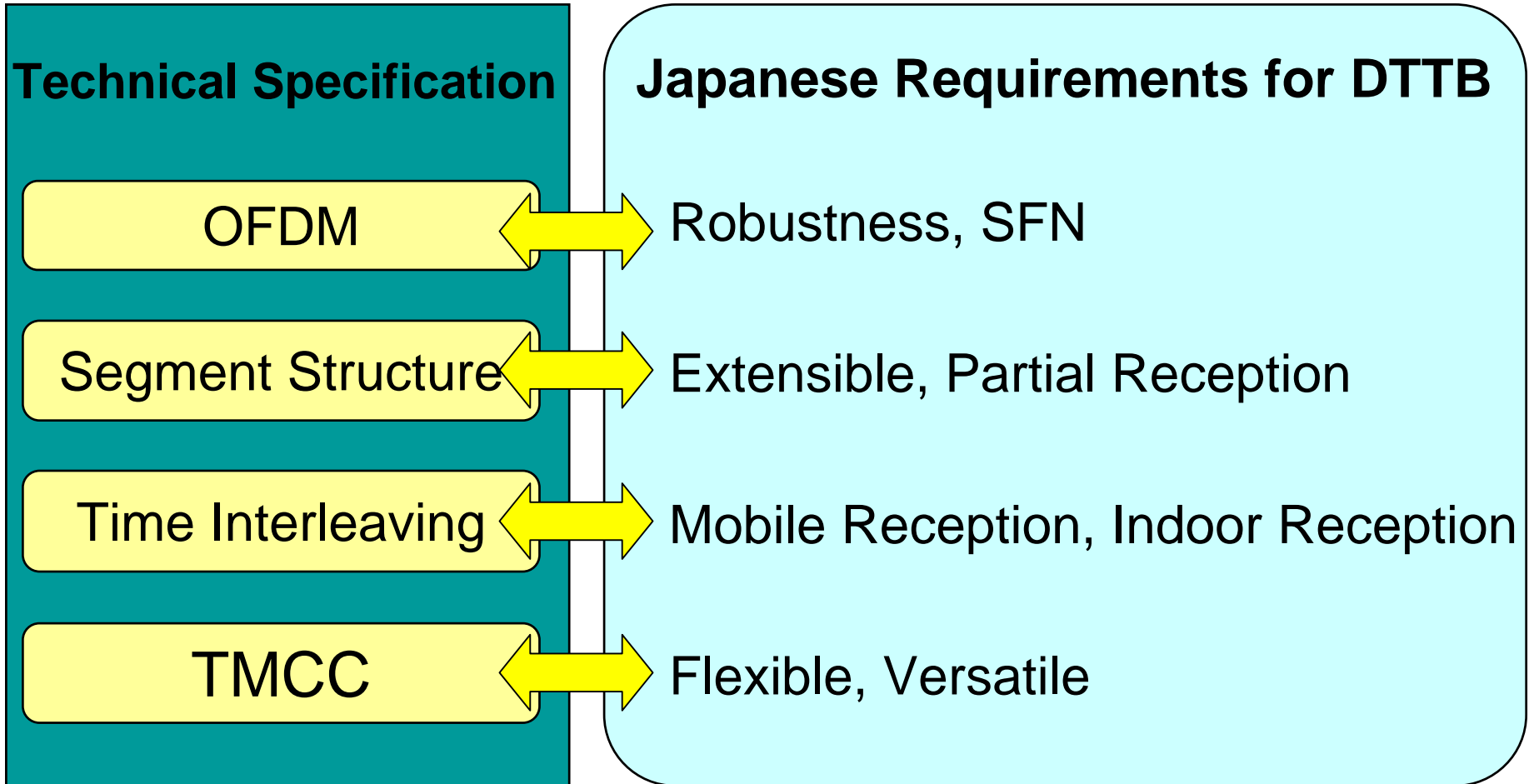
Comparison of ISDB-T, DVB-T and ATSC

Systems	ISDB-T	DVB-T	ATSC
Transmission System	Multiple carrier (OFDM)		Single carrier (8VSB)
Bandwidth	6/7/8 MHz		
Modulation scheme	DQPSK/QPSK/ 16QAM/64QAM	QPSK/ 16QAM/64QAM	8VSB
Error control	Convolutional code / RS		Trellis code + RS
Characteristics	<ul style="list-style-type: none"> - SFN capability - Effective against ghost - Segmented OFDM - Time interleaving 	<ul style="list-style-type: none"> - SFN capability - Effective against ghost 	<ul style="list-style-type: none"> - Analog based format

Proponent	Japan	Europe	U.S.A.
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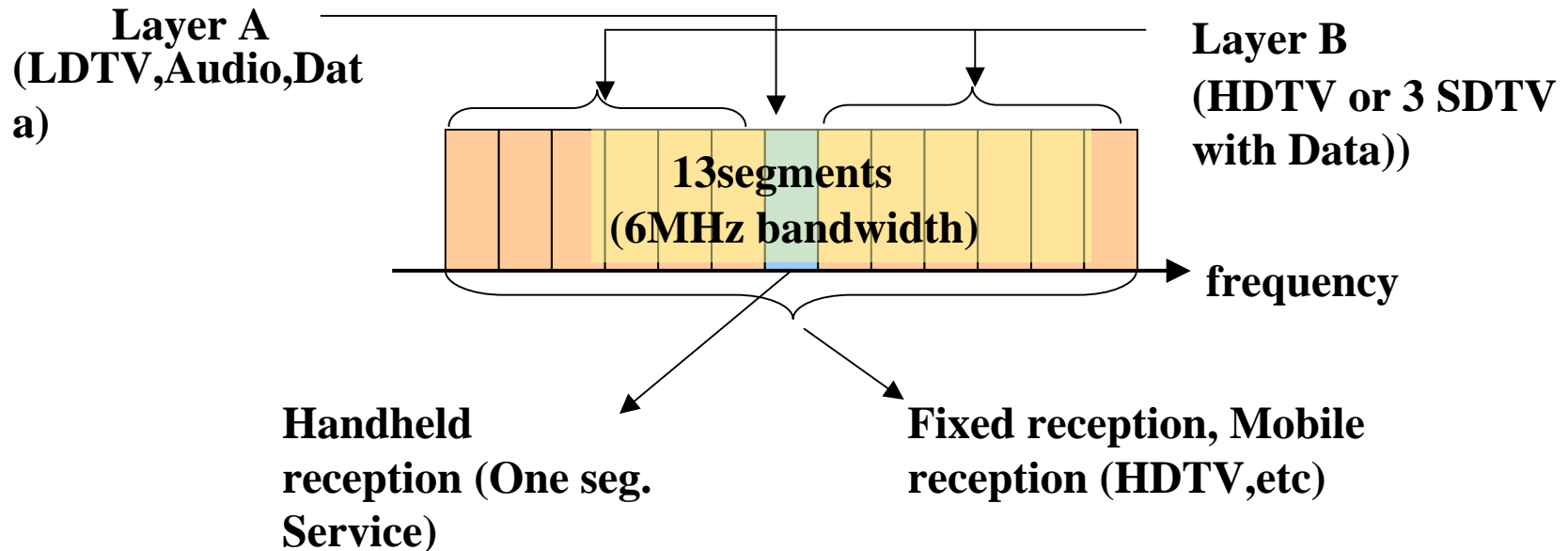
Note; Details are presented in session 2

Features of ISDB-T



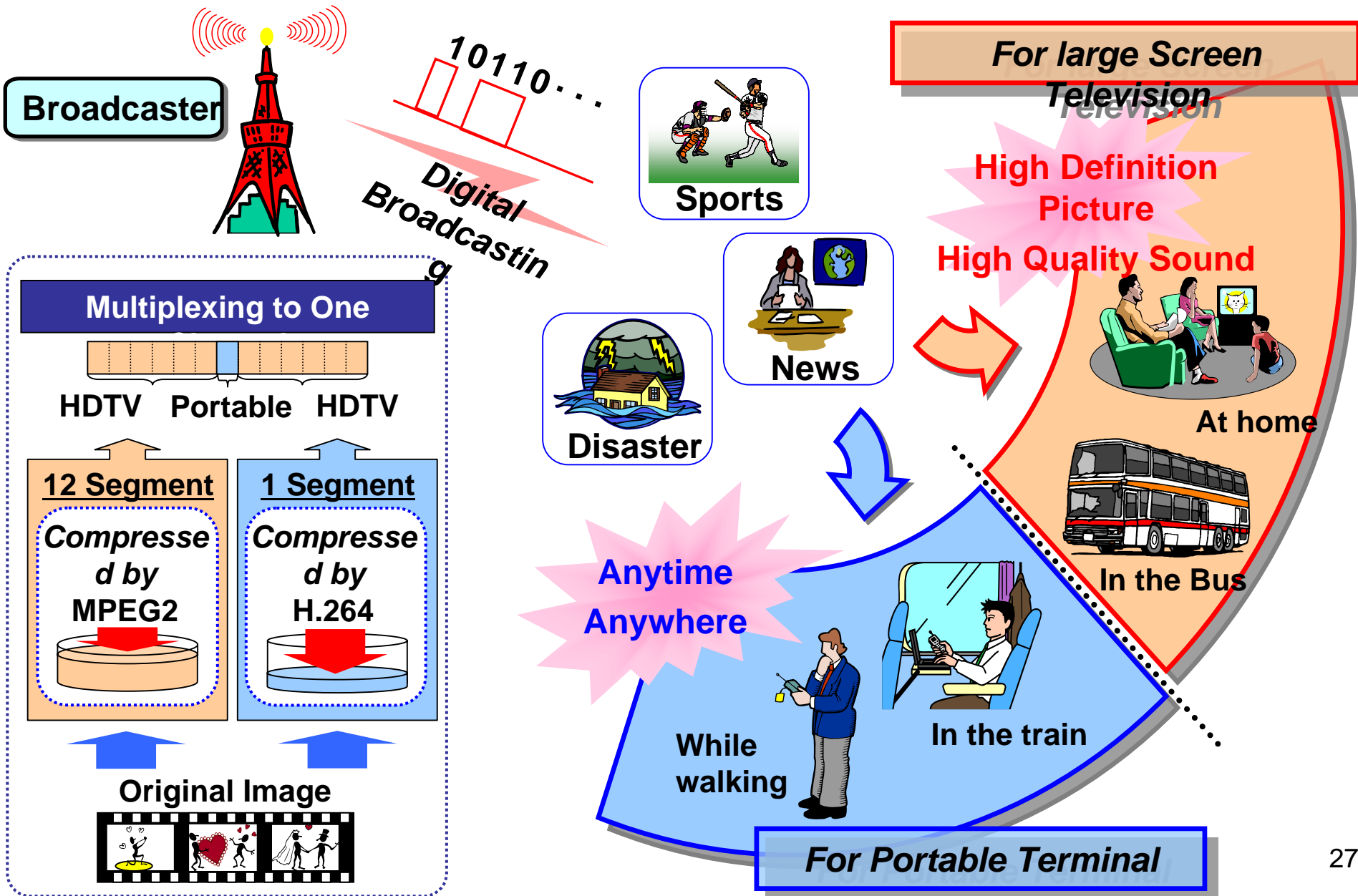
What is Band Segmented OFDM with time interleave?

(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



Experimental Test for DTTB in Japan

During 1998 -2003, Experimental Test for DTTB was held in Japan.

The purpose of Experimental Test were,

- To Evaluate the ISDB-T System (mainly 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

Laboratory Test(1/2)

Purpose;(following documents are attached on DiBEG Home Page)

- Transmission Performance of ISDB-T(note 1)
- Protection ratio



Fundamental Data for Channel Planning

(note 1) Japan submitted to ITU-R SG-11 as an Input Document

Transmission Performance Test

- BER(Bit Error Rate) vs. C/N in a Gaussian Channel**
- BER(Bit Error Rate) vs. C/N in a Multipath Channel**
- BER(Bit Error Rate) vs. C/N in a Rayleigh Channel**
- Others**

Laboratory Test(2/2)

Protection Ratio

Measure the protection ratio for following Combinations

Undesired Desired	Lower Adjacent	Co-channel	Upper Adjacent
Analog	Digital	Digital	Digital
Digital	Analog	Analog	Analog
Digital	Digital	Digital	Digital

Experimental Broadcasting in Japan

for System finalization of ISDB-T

Transmitting started
since Oct.'98

Tokyo Tower

Height 210m

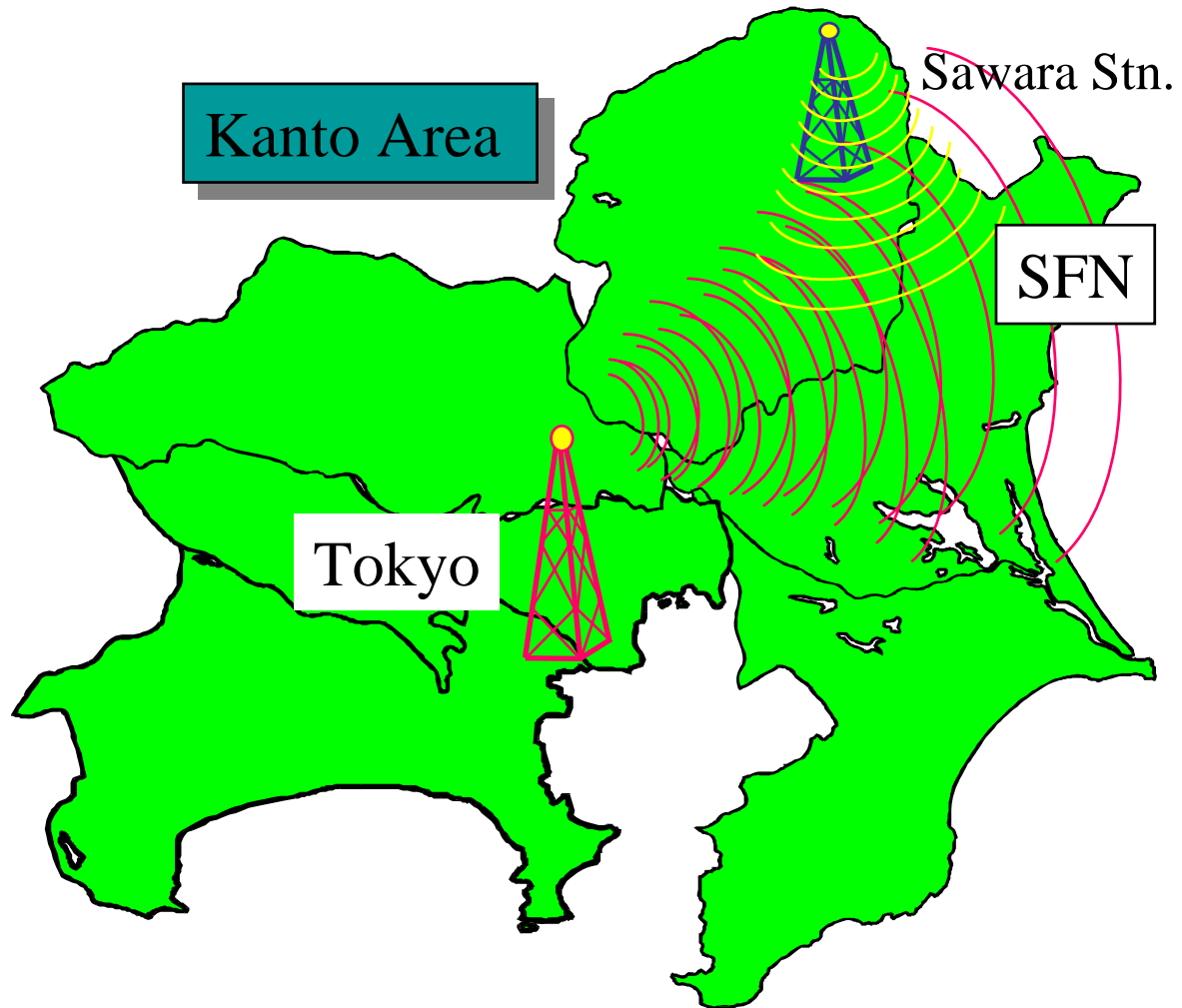
CH UHF-15

Power 500W

Existing Analog TV

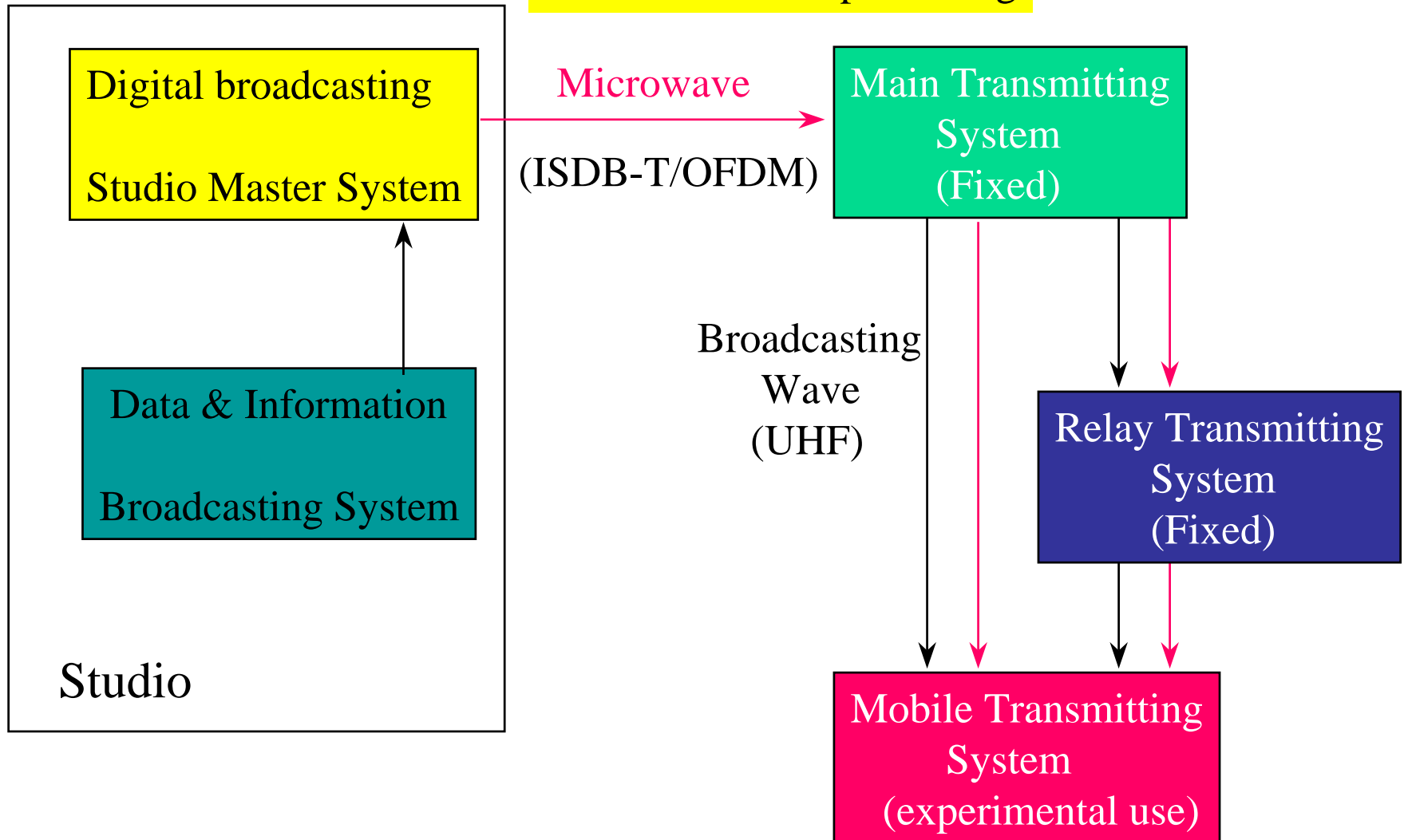
Ch-14 50kW

Ch-16 10kW



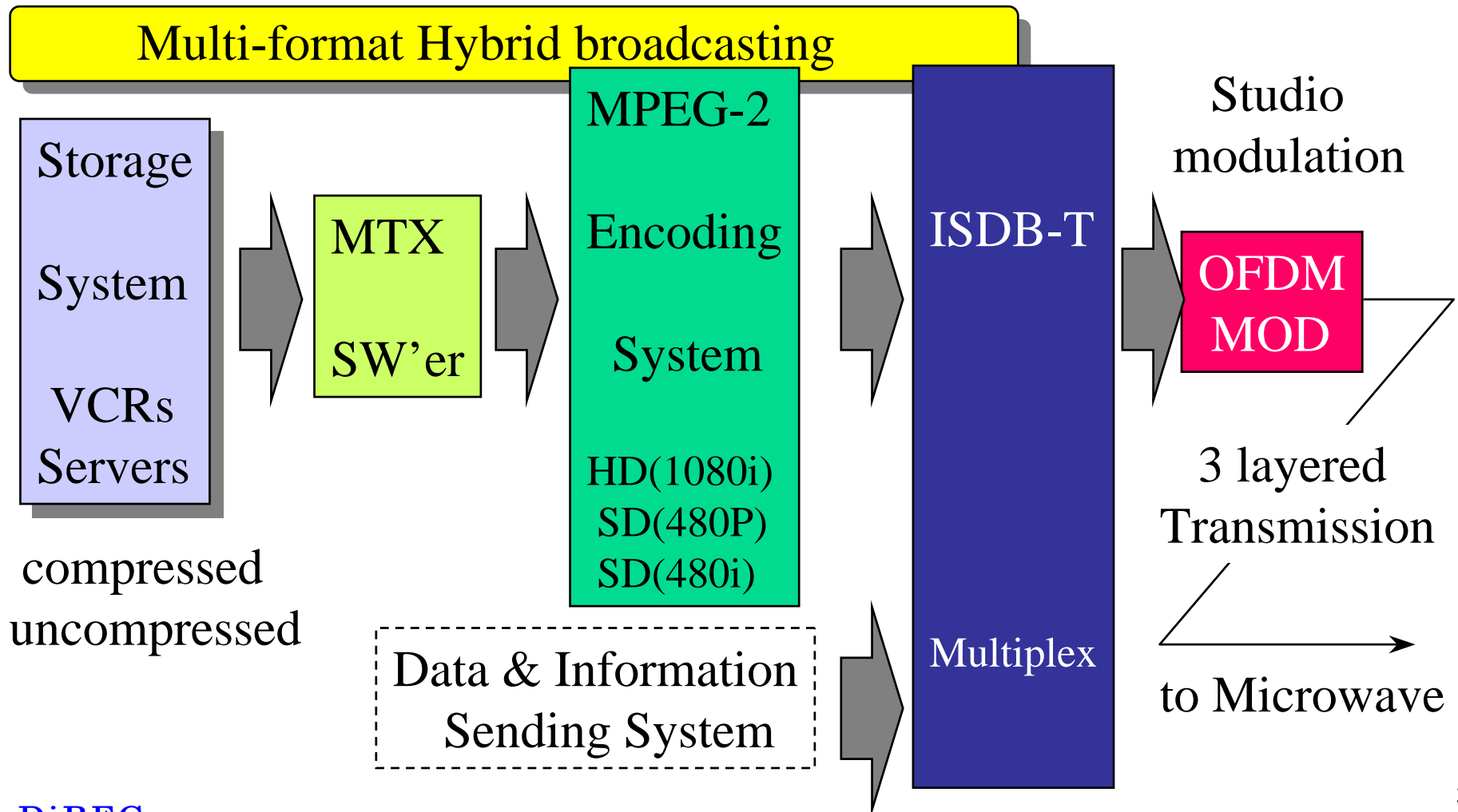
System configuration of experimental Broadcasting

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 multimedia services

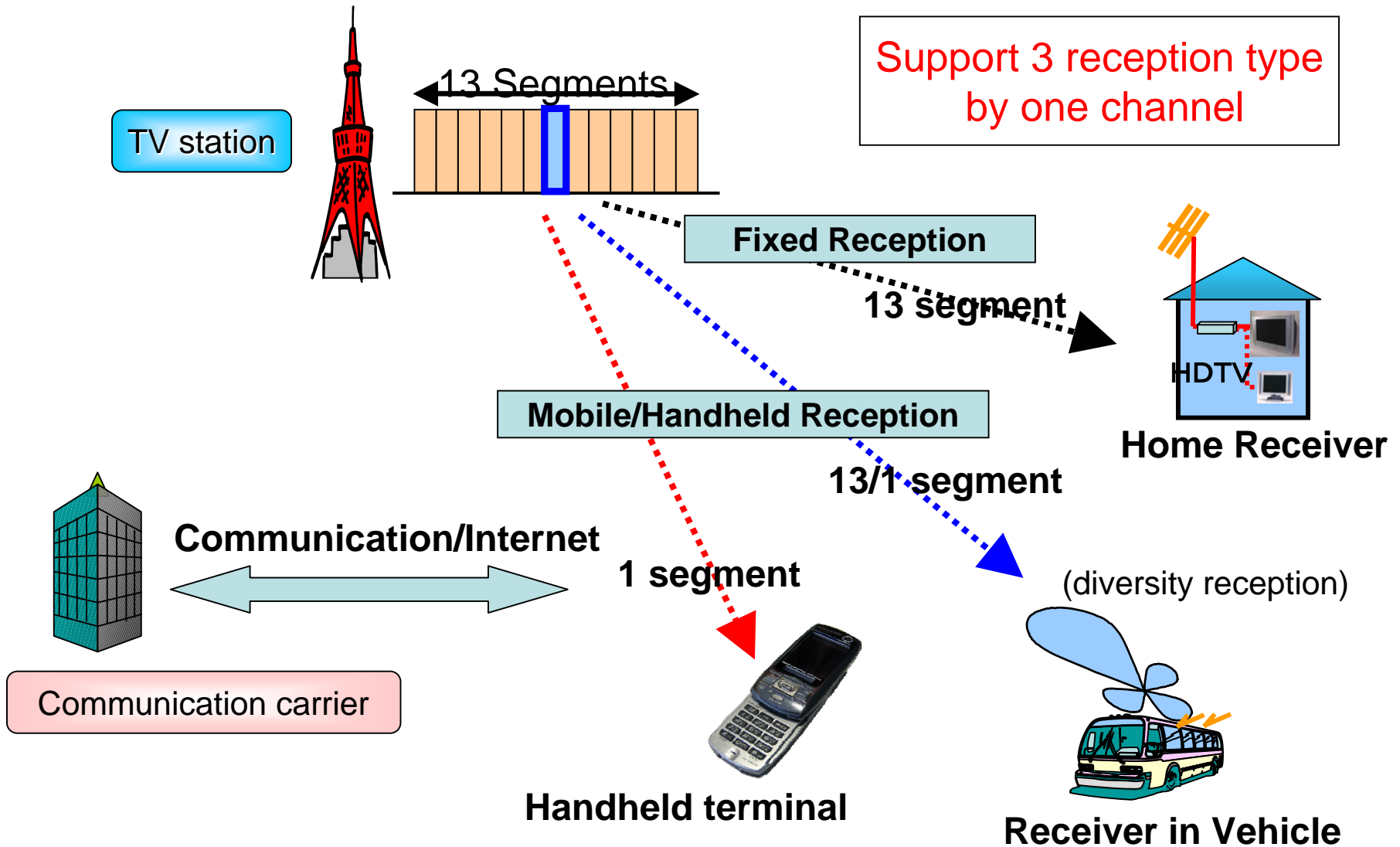
Broadcasting of Community services for limited area

Stored and rendered services of multimedia broadcasting

4. Current DTTB service in Japan

Note 1; Details of DTTB service are presented in session 3.
For mobile/portable service, presented in session 5

Feature of Japanese DTTB system



Applications of Digital Terrestrial Television Broadcasting

HDTV



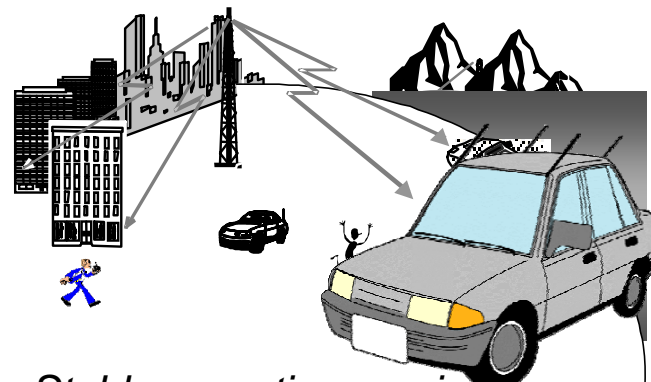
- *High quality image and sound services*

Data broadcasting



- *Simple program searching and retrieval of information at any time*

Mobile



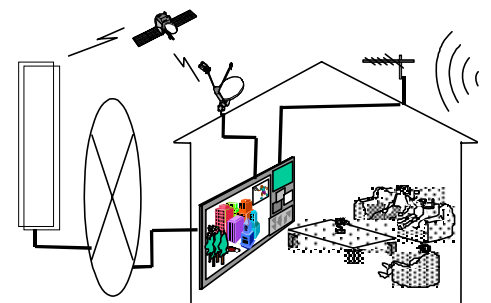
- *Stable reception services*

Multiple SDTV programs



- *Realization of multiple channels*

Interactive TV



- *Communication services and linked services*

HDTV is the main service of digital TV

HDTV services

- Wide screen
- High quality image
- High quality audio program
- 5.1ch surround audio program



Multiple SDTV programs within one channel

- Digital TV makes transmission of three different programs possible within one channel independently.

SD-1



SD-2



SD-3



Example for Data Broadcasting

Weather information

5月30日 (日) 14:17

天気情報

世田谷区

時刻	天気
12~18時	晴
18~0時	晴
0~6時	晴
6~12時	晴

目的地天気

1:2 3:4 5:6 7:8 9:0

▲目次 指数 全国 履歴

NHK データ放送 5月30日 (日) 14:06

天気情報

ニュース

スポーツ

暮らしと福祉

お知らせ

番組連動

テレビに戻る

ON 字幕

Anytime news

5月25日 (木) 18:56

ガイドライン「周辺国理解を」

ポケットベル会社が倒産

対外純資産 8年連続世界一

防災白書「防災情報充実を」

捕鯨の特別枠 12年連続で否決

原爆ドーム 劣化さらに進む

皇太子ご夫妻NHK技研公

▲目次へ

テレビに戻る

5月25日 (木) 17:26

NHKスポーツ

プロ野球

きょうの試合予定

1部

中日ー阪神

6時00分

福井県野球場

巨人ー広島

6時00分

福岡ドーム

ヤクルトー横浜

6時20分

明治神宮球場

2部

近鉄ーオリックス

6時00分

大宮ドーム

ロッテーダイエー

6時15分

千葉マリン

▲目次

テレビ

Statistics and Analysis of sports

世界音楽紀行

美しく青きドナウ

名曲誕生秘話

J.シュトラウス

ドナウ川

演奏家情報

放送予定

▲目次へ

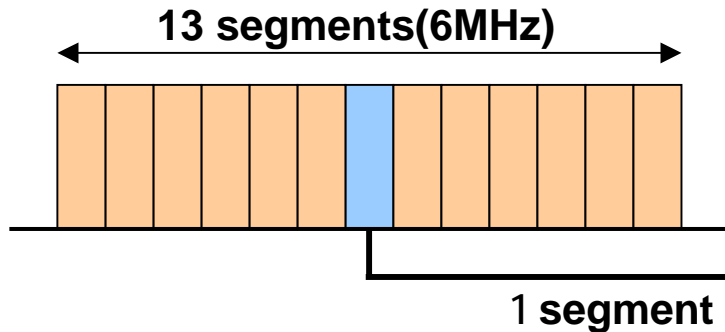
その他の代表作

- ウィーンの森の物語
- 喜歌劇「こもり」序曲
- 皇帝円舞曲

Program related information

Broadcasting to Portable Terminals

Mobile reception



Example :

Parameter	16QAM 1/2 1 segment
Bit rate	630 kbps

Navigation system



Cellular phone



PDA



Broadcasting to Portable Terminals (sample)

●SANYO



●NEC



●KDDI (developed with NHK)



●PANASONIC



5. Digital Terrestrial Sound Broadcasting (DTSB) in Japan

DTSB is based on ISDB-Tsb technology, which is the family of ISDB-T. Technical details are presented in session 2

Digital Terrestrial Sound Broadcasting (DTSB)

Status

- report of technical requirement for Digital Terrestrial Sound Broadcasting (DTSB) published in 1999
- ARIB STD-B29 "Transmitting system of DTSB and ARIB STD-B30 "Receiver for DTSB" established in 2001
- enforcement of revised radio law for DTSB in 2002
- Test licences for DTSB awarded to DRP in 2003
- Experimental DTSB services started at 10th Oct. 2003 in Tokyo and Osaka

Digital Terrestrial Sound Broadcasting System

Comparison of DTSB system

	Japan	Europe	USA
System	ISDB-T_{SB}	DAB	IBOC
Carrier modulation	OFDM (DQPSK,QPSK, 16QAM,64QAM)	OFDM (DQPSK)	OFDM
Error-correcting code	Reed-solomon + convolutional error correcting	convolutional error correcting	convolutional error correcting
Multiplex structure	MPEG-2 System	Original System	Original System
Audio coding	MPEG-2 Audio AAC	MPEG-1(Layer2)	MPEG-2 Audio AAC

Note; ISDB-Tsb has a commonality with ISDB-T “One-Seg” service

Promotion of the Digital Terrestrial Sound Broadcasting (DTSB) in Japan

1 Purpose

The Digital Radio Promotion Association (DRP) was established in October 2001 to promote the Digital Terrestrial Sound Broadcasting (DTSB) in Japan.

2 Activities

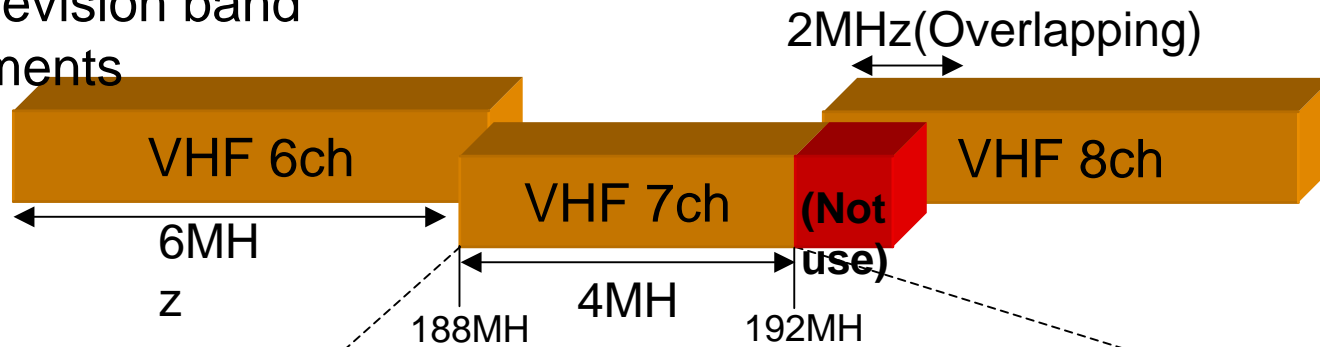
- Carry out the experimental DTSB services (started at 10 October 2003 in Tokyo and Osaka)
- Develop new application for DTSB
- Research of the demand for DTSB
- Promote the DTSB receivers

3 Members

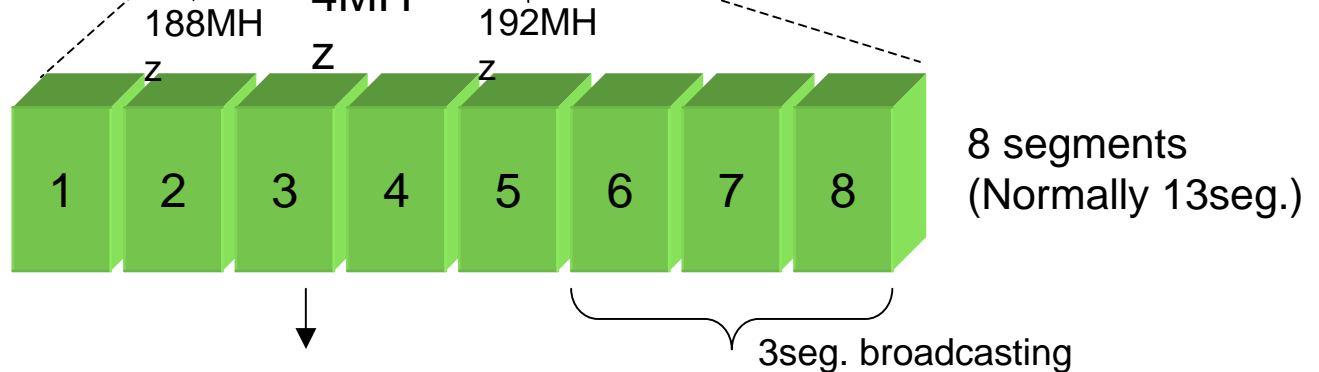
DRP has 76 members (Sound Broadcasters, manufacturers etc)

Trial Services of DRP

VHF television band assignments



Segment structure



Broadcast programs



Example of Tokyo station , Osaka's all programs are 1seg. broadcasting.

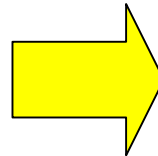
Development of receivers

Trial portable
receiver



DRP prepared digital
receivers for test monitor.

Near future



PC card type
(test product)



PDA type
(test product)

Thank You for Your Attention

Digital Broadcasting Expert Group

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