Presentation 1

Digital TV Broadcasting in Japan

13th June – 14th June, 2007

Bangkok, Thailand

Ministry of Internal Affairs and Communications

Japan

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Today's Topics

- **Advanced Features of Japans' Digital Terrestrial TV Broadcasting System (named ISDB-T).**
- **Implementing Schemes for Expanding Digital Terrestrial TV in Japan.**
- **Special Advantages of Japan's System for Mobile Reception.**
- **Summaries.**

Advanced Features of Japans' Digital Terrestrial TV Broadcasting System (named ISDB-T).

Process of Digitization of Terrestrial Television Broadcasting

1997 ・Technical Standards for DTTB were established in E.U (DVB-T) and U.S.(ATSC)

1998 ・DTTB started in E.U (DVB-T) and U.S.(ATSC)

1999 ・**Technical Standards for DTTB were established in Japan (ISDB-T).**
- ・Support center for R&D of DTTB in Japan opened.
(Shared use of facility, Organization of Communications and Broadcasting)

2000
- ・Technical standards for Digital Terrestrial Sound Broadcasting were established in Japan.
- ・Planning of DTTB station channels.

2001 ・Development of institutions for digitization of Terrestrial Television Broadcasting.
(Revised part of Basic Plan Popularization of Broadcasting and Use of Broadcasting Frequency)

2003 ・**DTTB started in Japan** (in three metropolitan areas).
- ・Start of trials for practical application of Digital Terrestrial Sound Broadcasting in part of Kanto and Kinki areas.

ISDB-T is the newest DTTB system and as such includes the latest technology

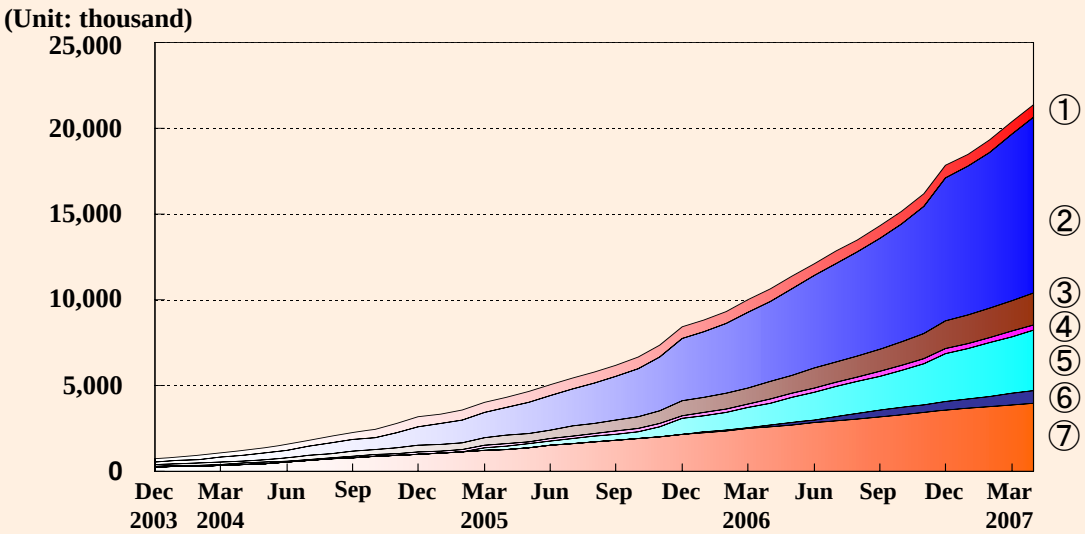
Diffusion of Digital Broadcasting Receivers

Digital Terrestrial Broadcasting Receiver Shipments

21,360,000

Source: Japan Electronics and Information Technology association (JEITA), Japan Cable Laboratory

① CRT	720	(± 0)
② LCD	10,229	(+518)
③ PDP	1,857	(+ 89)
④ Tuner	327	(+ 7)
⑤ Digital Recorder	3,530	(+229)
⑥ Personal Computer	700	(+ 44)
⑦ CATV STB	3,994	(+ 99)



Access to Digital Broadcasting Satellite

24,740,000

Apr 2007 Source: NHK

Digital Broadcasting Satellite Receiver Shipments

23,120,000

CRT	1,860	(± 0)
PDP & LCD	12,610	(+ 60)
Tuner (including Digital Recorder)	4,680	(+ 21)
CATV STB	3,970	(+ 10)

Access to Digital Broadcasting Satellite using CATV

1,620,000 households

One-Seg Mobile Phone Shipments

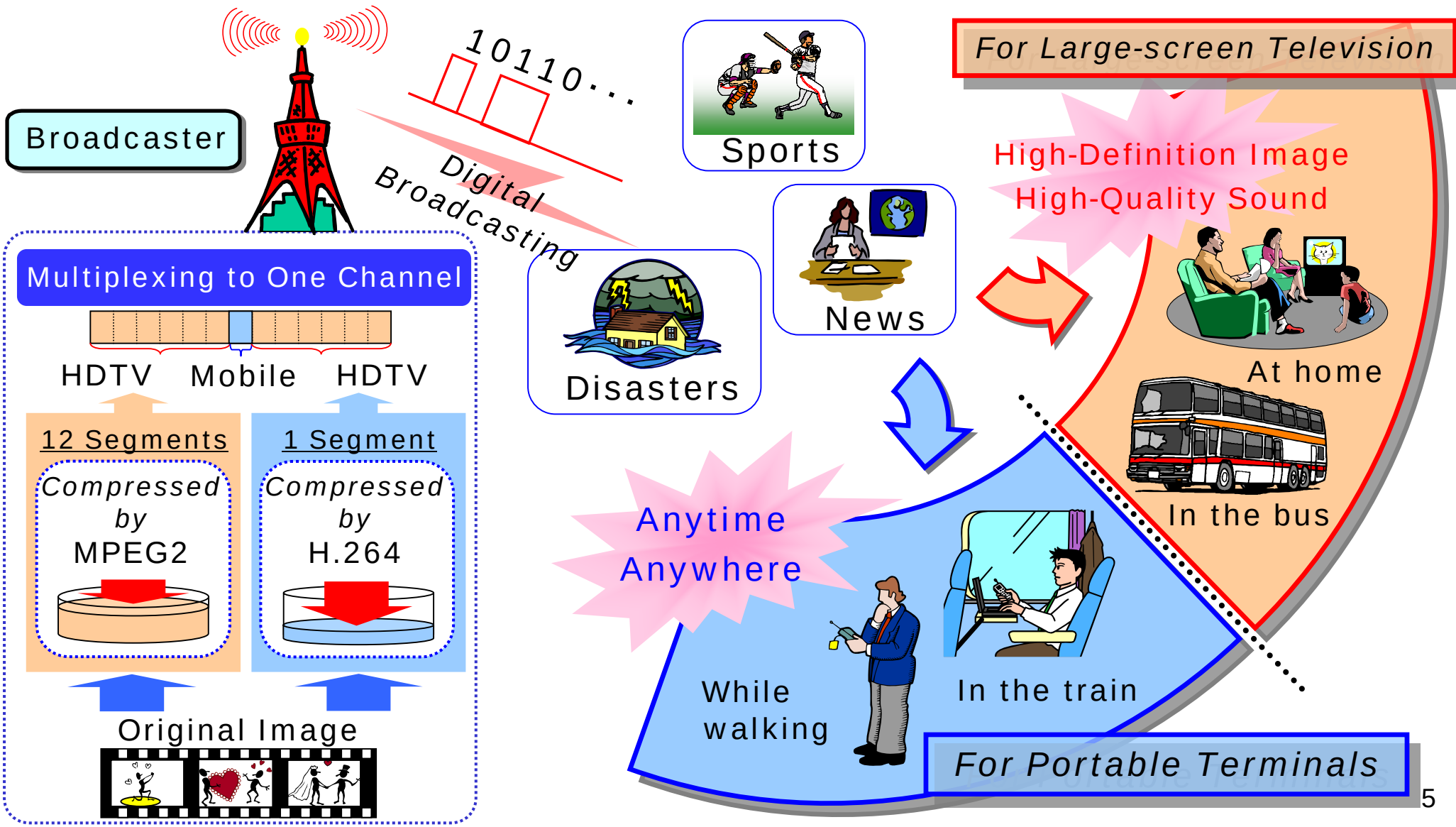
7,370,000

In-car DTTB Receiver Shipments

410,000

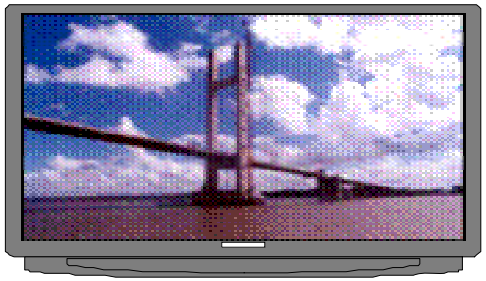
Source: Japan Electronics and Information Technology association (JEITA)

HDTV, Mobile Reception, and Data (Multimedia) Broadcasting are necessary for Next Generation Broadcasting.



Features of ISDB-T

HDTV

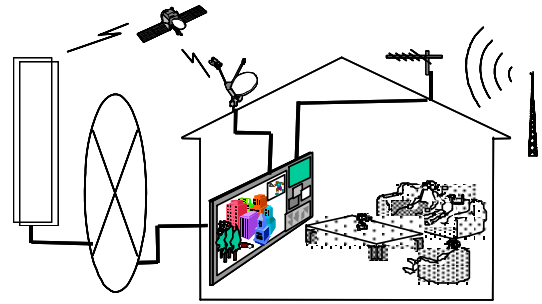


High quality image and sound service

Multi-Channel Service

Realization of multi-SDTV program service on 1ch bandwidth (6MHz)

Interactive TV

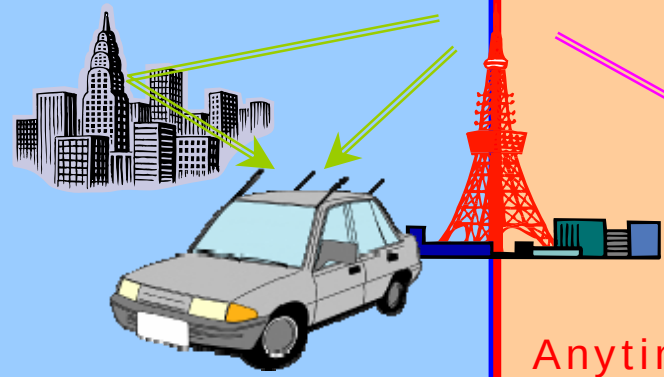


Communication linked services with TV

Data Broadcasting

Simple retrieval of program and information at any time

Mobile Reception

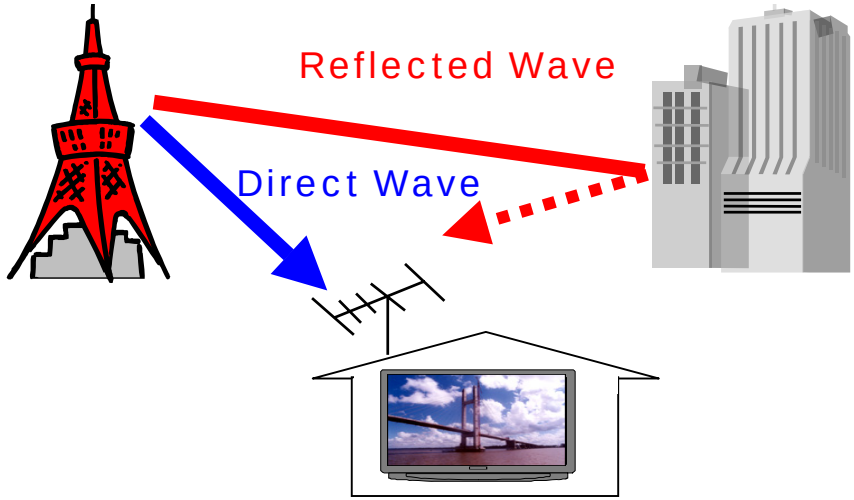


Stable mobile reception service

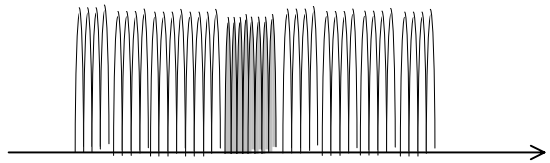
Anytime, Anywhere, TV service to cell-phone

Technical Features of ISDB-T ① & ②

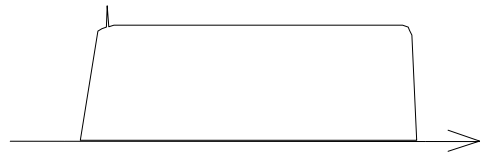
①Robustness to Radio Interference by Multi Path.
Because of OFDM system is adopted .



OFDM: Orthogonal Frequency Division Multiplex



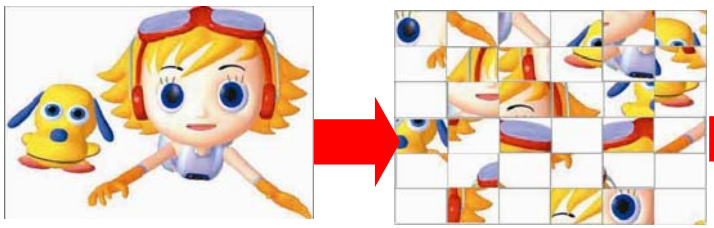
Ordinary system



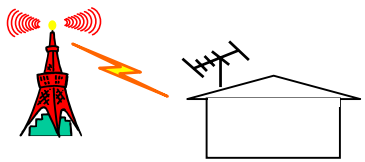
Stability of reception for mobile HDTV reception !

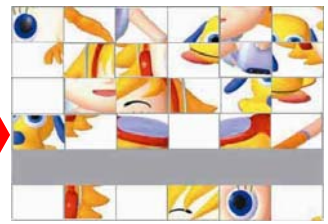
②Frequency and Time Interleaving

TV Station

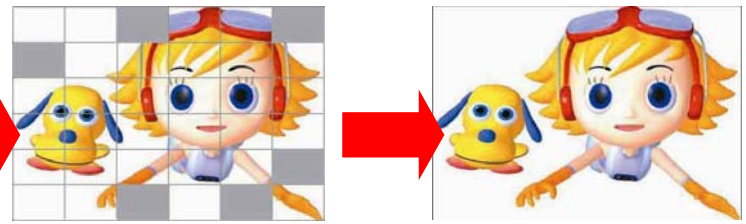


Transmission Path





Receivers



[Reference]

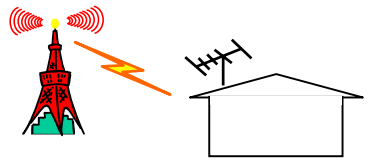
Comparison of Interleaving and No-Interleaving

TV Station

Transmission Path

Receivers

No-Interleaving

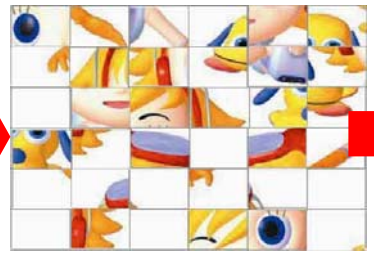


Original date

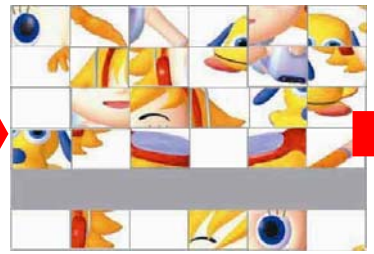
Errors occur as a result of radio interference

Difficult to correct continuous errors.

Interleaving



Sort data in accordance with set rules

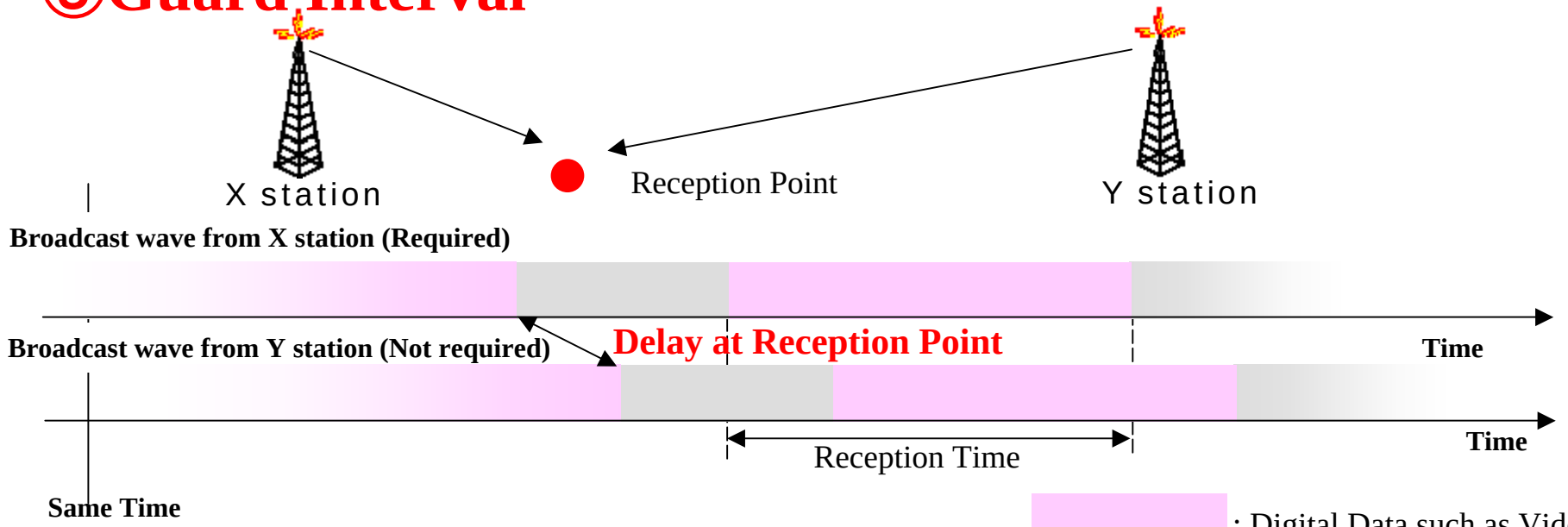


Errors occur as a result of radio interference

Reconstruction of data

Dispersed errors can be corrected.

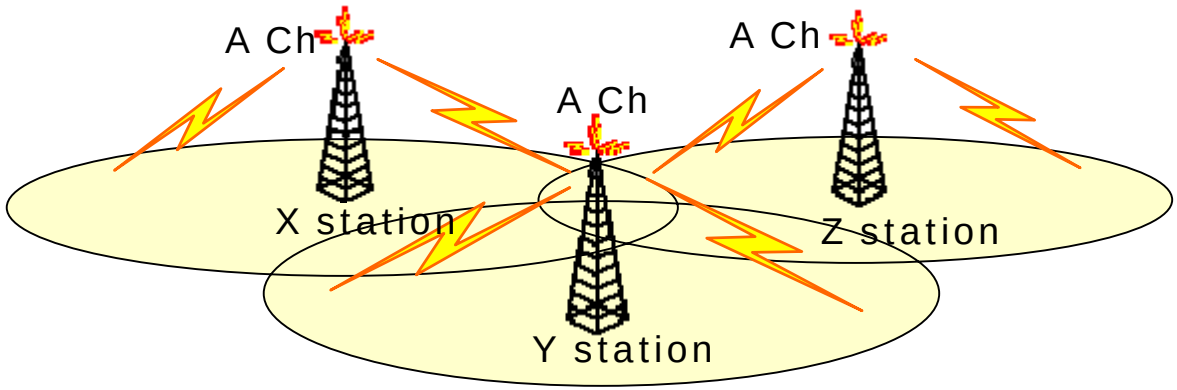
③Guard Interval



Realization of Single Frequency Network

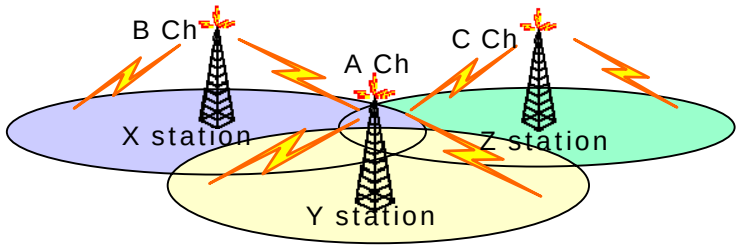
Effective Utilization of Radio Frequency

Over 10,000 stations can be set up using 40 Ch in Japan



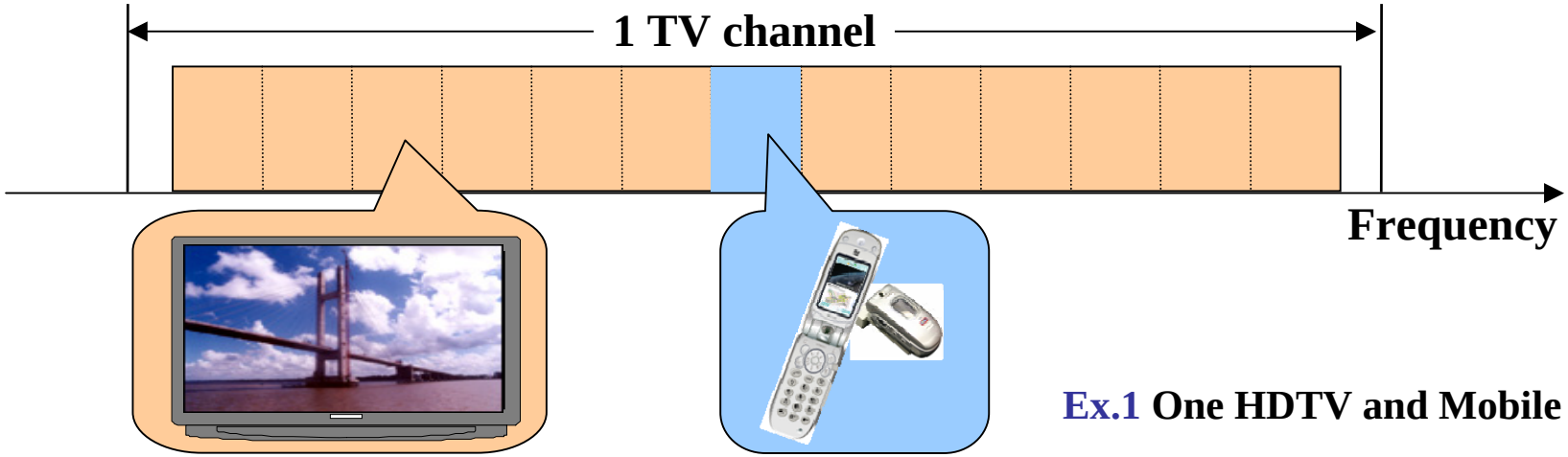
Reference

Multi Frequency Network

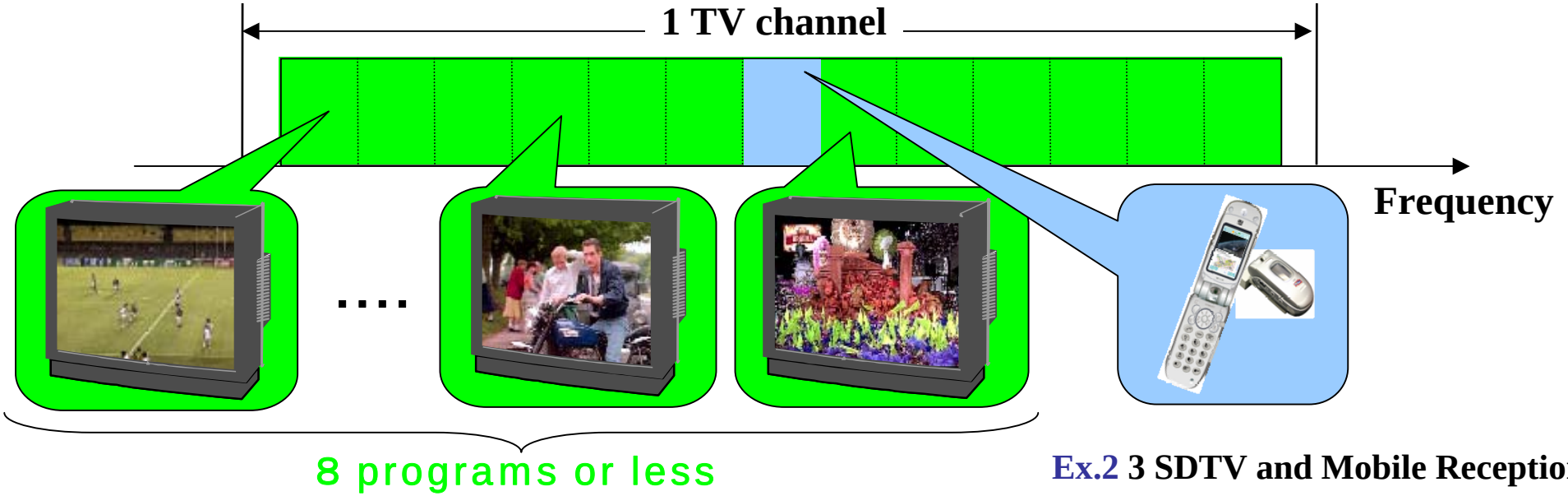


Technical Features of ISDB-T ④

④Segmented Frequency



Ex.1 One HDTV and Mobile Reception.

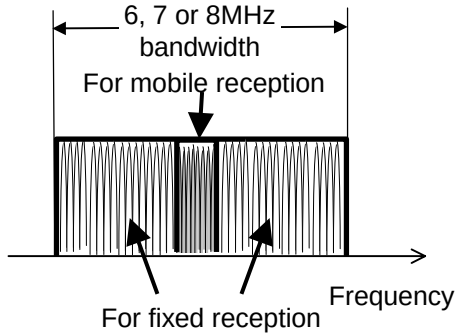
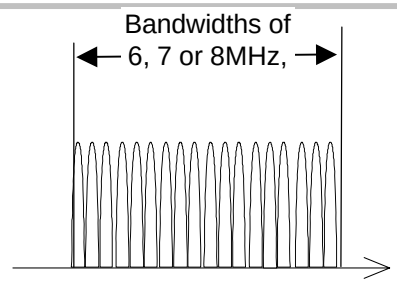
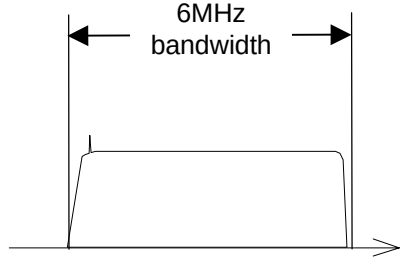


Ex.2 3 SDTV and Mobile Reception.

The segmented frequency structure is unique system of ISDB-T.

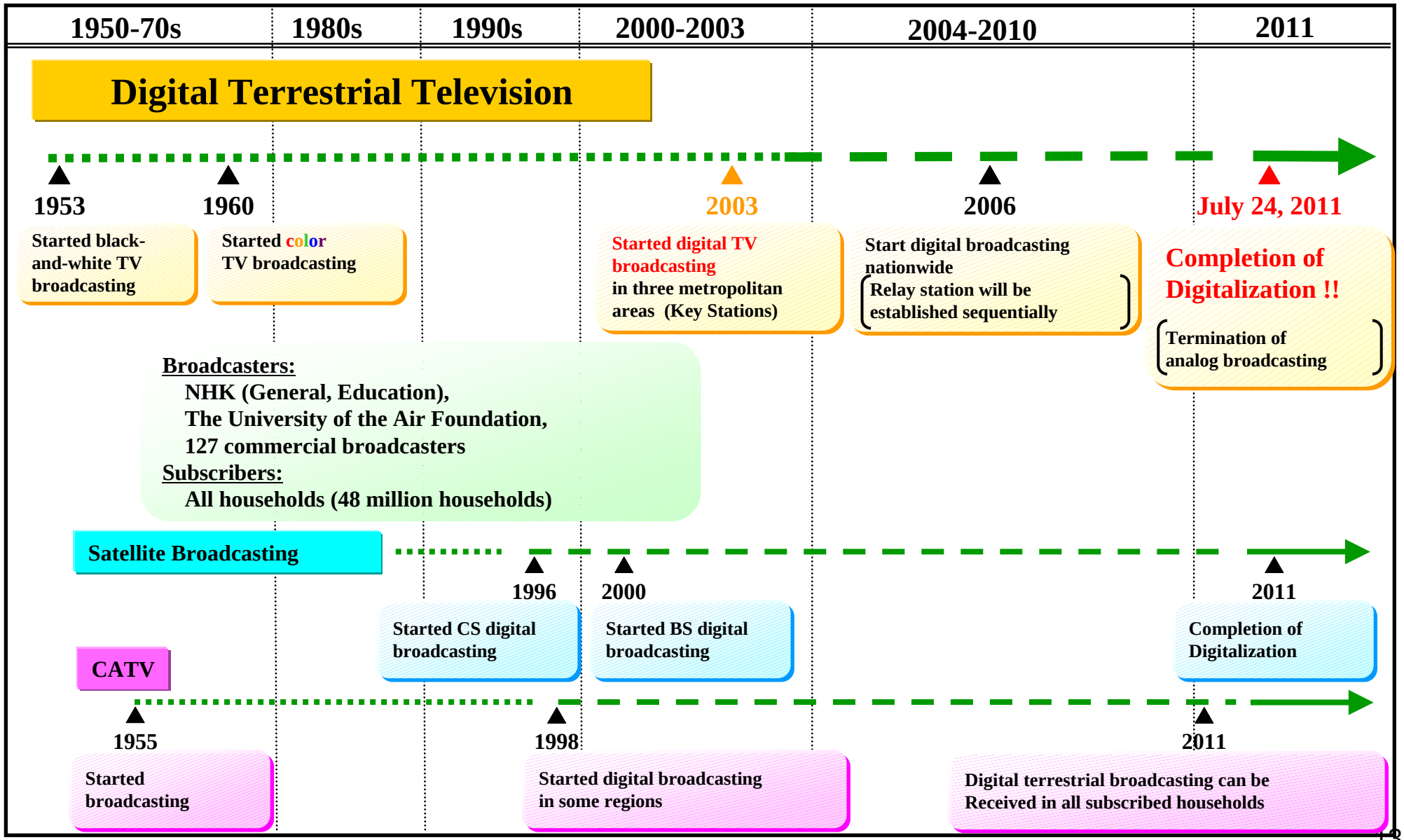
Comparison of Three DTTB Systems

Results of fair evaluation by a third country (Federative Republic of Brazil)

System / Items	Japan (ISDB-T)	EU (DVB-T)	U.S (ATSC)
Robustness to ghost image interference	**Effective against ghost image interference using advanced technique.** ◎	**Effective against ghost image interference.** ○	**The same degree of analog TV broadcasting.** △
Feasibility of Single Frequency Network (SFN)	**A channel plan including SFN has already been prepared.** ◎	**Some countries such as Germany, Australia, and Singapore, are operating this.** ◎	**Being tested in the U.S. and Canada. However, no prospect for commercialization has emerged.** ×
Feasibility of portable reception	**<u>One channel</u> can carry portable reception service simultaneously with HDTV service.** ◎	**DVB-H, <u>another channel</u> is necessary for portable reception.** △	**Portable reception is not available in the current system. Other systems are not being considered.** ×
Transmission system	 **It is possible to designate the modulation system of the segment group unit according to the service purpose.**		 **Improved system based on analog TV broadcasting system.**

Implementing Schemes for Expanding DTTV in Japan

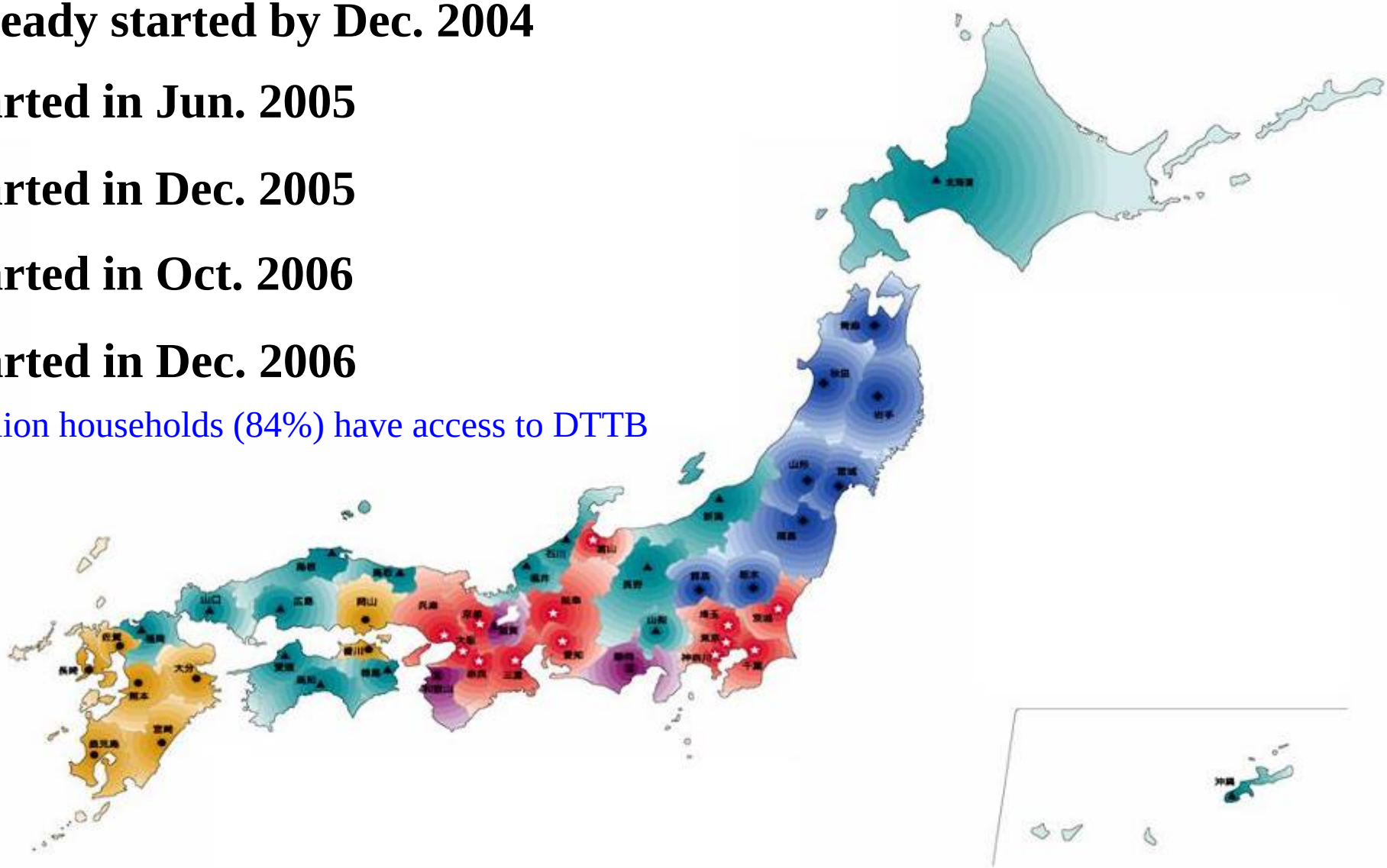
Schedule for Digitalization of Broadcasting in Japan



Expansion Schedule for DTTV in Japan

- **already started by Dec. 2004**
- **started in Jun. 2005**
- **started in Dec. 2005**
- **started in Oct. 2006**
- **started in Dec. 2006**

39.5 million households (84%) have access to DTTB



➢**The National Council for Promotion of Terrestrial Digital Broadcasting (Broadcasters and MIC)**

- Studying challenges (both institutional and technical) involved in the transition to digital television broadcasting

➢**The National Conference for Promotion of Terrestrial Digital Broadcasting (broadcasters, manufactures, electrical appliance shops, consumer organizations, local governments, MIC, etc.)**

- Updating/revising "Action Plan for Promotion of Digital Broadcasting," describing items to be implemented by its members and the schedule thereof
- Developing/updating and publicizing "Roadmap of Construction of Broadcasting Stations" with the cooperation of the above mentioned Council
- Driving forward the activities for promoting digital broadcasting by announcing December 1st as "Digital Broadcasting Day"

➢**The Association for Promotion of Digital Broadcasting (Dpa) (broadcasters, Manufactures, etc.)**

- Publicizing broadcasting areas
- Responding to questions and inquiries from viewers

Outline of Seventh Action Plan to Promote Digital Broadcasting

○ **All parties concerned work together based on this action plan. "National Conference on Promoting Terrestrial Digital Broadcasting" (Established in May 2003) promotes this plan. The Conference finalized the " Seventh Action Plan for Promotion of Digital Broadcasting" on December 2006.**

Specific efforts by concerned organizations

■Terrestrial TV Broadcasters

○Development of a road map for DTTB Stations.

① This road map indicates a schedule for the construction of as many DTTB stations as possible , including small scale stations. This road map shows when access becomes possible and in which areas.

② TV broadcasters make sure they can meet this schedule

○Diffusion and promotion of the unique DTTB service

① TV Broadcasters try to increase the ratio of HDTV programs.

② Clarification of plans to provide enhanced services, such as a DTTB service for mobile reception.

■Receiver Manufactures and Shops ..etc

○Promotion of development and diffusion of cheaper, more varied DTTB receivers.

○Response to enhanced services such as DTTB for mobile reception and server-type broadcasting.

○Promotion of development of easy-to-use DTTB receivers for all users.

○Training for shop clerks ..etc

■ Government

○Clarification and publication of specific policy to ensure realization of the road map for DTTB Station and establishment of technical standards that enable swift and easy building of broadcasting stations.

○Publication of accurate information and schedule about DTTB in a way ordinary people can easily understand.

Official Supports for Broadcasters

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

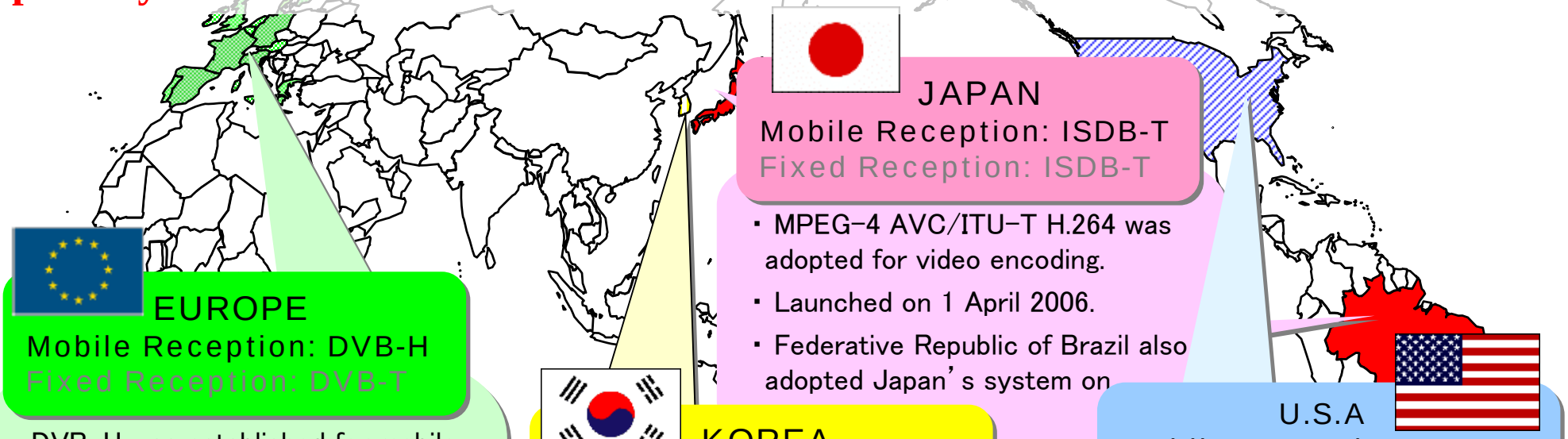
- **Preference for the national tax (corporate tax)**
- **Preference for the local tax (fixed property tax, real-estate acquisition tax)**
- **Supply of low- or super-low-interest funds by the Development Bank of Japan**

Financial support for the implementation of broadcasting stations in disadvantaged areas

Special Advantages of Japan's System for Mobile Reception

Worldwide Trend of Mobile Digital TV Reception

Importance of mobile reception is recognized worldwide.
Europe and U.S.A developed additional system for mobile reception.
Broadcasters need additional investment for mobile TV reception except in the case of Japan's system.



EUROPE
Mobile Reception: DVB-H
Fixed Reception: DVB-T

- DVB-H was established for mobile reception as series of DVB, European DTTB system.
- Trial Services have been provided in some countries, such as Finland, France, Spain, and Denmark.

※ MPEG-4 AVC/ITU-T H.264 will be adopted for video encoding.

- T-DMB was launched in Germany in May 2006.

JAPAN
Mobile Reception: ISDB-T
Fixed Reception: ISDB-T

- MPEG-4 AVC/ITU-T H.264 was adopted for video encoding.
- Launched on 1 April 2006.
- Federative Republic of Brazil also adopted Japan's system on

KOREA
Mobile Reception: T-DMB
Fixed Reception: ATSC

- T-DMB based on European Digital Audio Broadcasting (DAB) was adopted for mobile reception systems unlike fixed reception.
- Launched in Dec. 2005

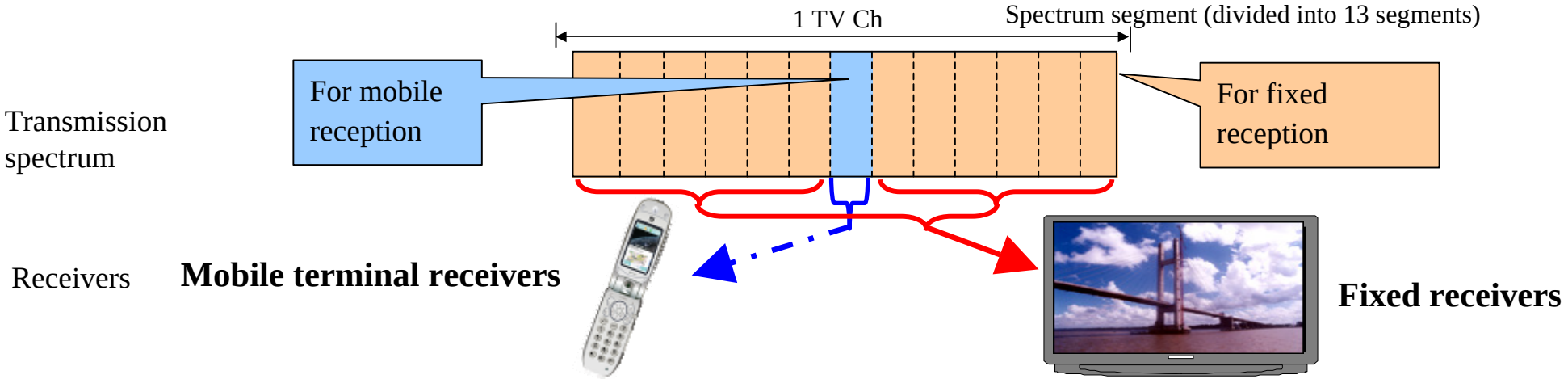
※ MPEG-4 AVC/ITU-T H.264 was adopted for video encoding.

U.S.A
Mobile Reception: Under Consideration
Fixed Reception: ATSC

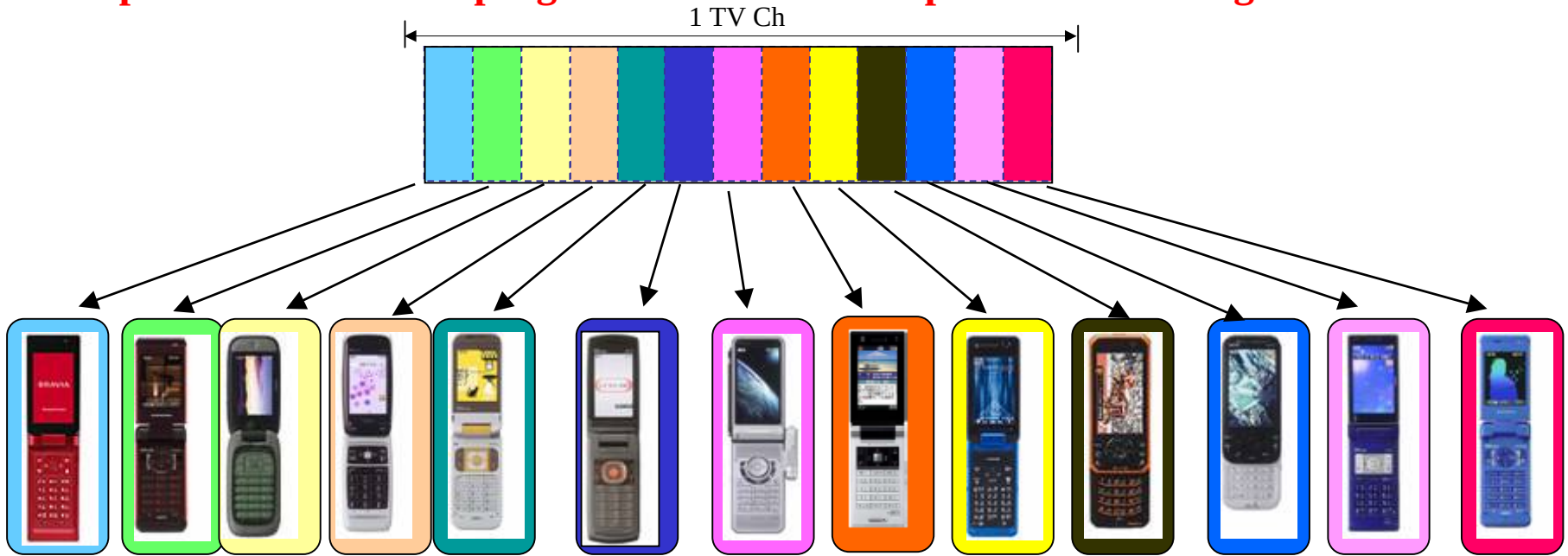
- Stream distribution services using mobile networks instead of terrestrial broadcasting have been started.
- In addition to DVB-H, new technologies such as Media-FLO are being considered.

DTTB for Mobile Reception

In the case of ISDB-T, broadcasters don't need additional investment for mobile TV reception.
Because One-Seg service can be provided using same investment for fixed TV reception.



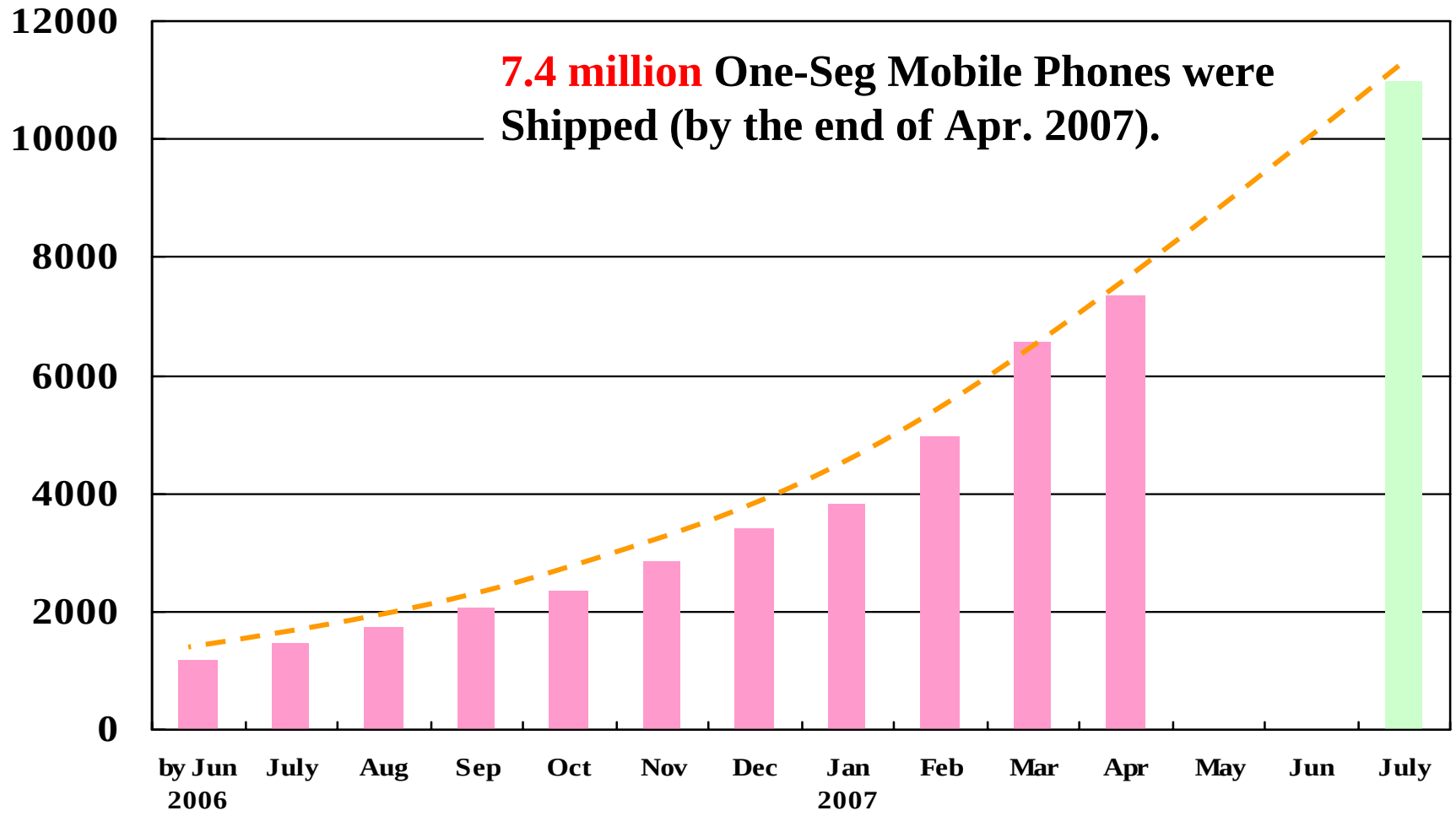
ISDB-T can provide over 10 TV programs for mobile reception service using one TV Channel !



Demand Expansion for One-Seg Mobile Phones

- **One-Seg Mobile Phone Shipments have been expanded and reached 500,000 for the first time in Dec 2006.**
- **Estimate of one in 30 mobile phones became One-Seg mobile phones in Japan.**

(Unit: thousand)



One-Seg Broadcasting Receivers Introduced to the Market (1/3)

Mobile Phones

W33SA
(Dec 2005)

W41H
(Feb 2006)

W33SA Ⅱ
(Jun 2006)

W43H
(Sep 2006)

W43SA
(Oct 2006)

W44S
(Dec 2006)
Usable also as digital radio

W43H Ⅱ
(Jan 2007)

MEDIA SKIN
(Jan 2007)

W51CA
(Jan 2007)

W51K
(Jan 2007)

W51SA
(Jan 2007)

W51SH
(Jan 2007)
Usable also as digital radio

W51T
(Jan 2007)
Usable also as digital radio

W52T
(Jan 2007)
Usable also as digital radio

KDDI

P901iTV
(Mar 2006)

D903iTV
(Jun 2007)

D903iTV
(2007)

P903iTV
(2007)

SH903iTV
(2007)

NTTDoCoMo

905SH
(May 2006)

911SH
(Nov 2006)

SoftBank

One-Seg Broadcasting Receivers Introduced to the Market (2/3)

Personal Computers

VGN-TX91PS, etc.
(from Jan 2006)

Sony

LesanceNB
CL206GW-GT/TV etc
(from Jul 2006)

Aro System

PC Card
(Mar 2006 OEM Supply)

PIXERA

USB connective Tuner
(DH-ONE/U2)
(Oct 2006)

BUFFALO

PC Card
MonsterTV 1D
(Nov 2006)

SKnet

T70S/V, etc.
(from Apr 2006)

Fujitsu

LavieA (LA700/GD)
(Sep 2006)

NEC

USB connective Tuner
(LDT-1S100U)
(Sep 2006)

Logitec

SDIO Tuner
(2007 OEM supplied)

ZENTEK

Express Card
MonsterTV 1D for DELL
(Nov 2006)

DELL

USB connective Tuner
PCTV-hiwasa(LOG-J100)
(Dec 2006)

LOGFARM

USB connective Tuner
VGA-TV1S
(Dec 2006)

SanwaSupply

USB connective Tuner
SEG CLIP(GV-1SG/USB)
(Dec 2006)

I.O.Data

USB connective Tuner
DigiTVe (LC-1SEGU)
(Dec 2006)

Live Creator

USB connective Tuner
QOT-W100
(Dec 2006)

Quick Sun

USB connective Tuner
DT-007
(Dec 2006)

TRYWIN

USB connective Tuner
K-ONESEG/U2
(2007)

KEIAN

USB connective Tuner
W-one(GH-1ST-U2K)
(Dec 2006)

GREEN HOUSE

USB connective Tuner
ON TIME TV(IM-1ST0001U/S)
(Dec 2006)

IMJ

One-Seg Broadcasting Receivers Introduced to the Market (3/3)

Portable DVD Players

DVD-LX97
(Mar 2006)
Panasonic

SD-P90DT
(Dec 2006)

SD-P50DT
(Dec 2006)
TOSHIBA

ROSSINI RPD7100SN-SV
(Nov 2006)
NAGASE

axion
AXN6709TD
(Dec 2006)

※ One-Seg tuner
only for portable DVD player

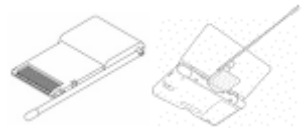
SD-PDT1
(Jul 2006)
TOSHIBA

DVF-DTV100
(Aug 2006)
SANYO

Electronic Dictionary

Papyrus
PW-TC900
(Dec 2006)
SHARP

Game Terminal



Nintendo DS
(scheduled in 2006)
Nintendo

Digital Audio Player

gigabeat V30T
(Jul 2006)

gigabeat V30E & V60E
(Nov 2006)
TOSHIBA

Exclusive Terminals, etc.

BTV-400K
(Feb 2007)
BLUEDOT

One-segment unit
Produced by Wilcom
(Dec 2006)
PIXERA

※Usable also as
digital radio

Prodia
(Sep 2006)

Others

Super One-seg TV Watch
(campaign prize)
Asahi Beer

Original One-seg TV
(G I Challenge campaign prize)
Georgia

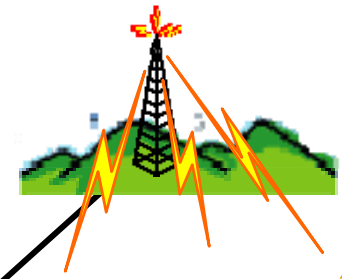
Each company's press released merchandise in Japan

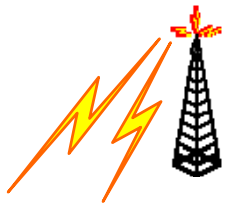
Utilization of Mobile Broadcasting for Disaster Prevention

1. Realization of non-congested communication even in times of disaster.
2. Ensure conveying information by automatic activation even in times of disaster and/or in emergency.
3. Able to convey information according to area and objectives.

Text	Image
Possibility of xxx river flooding has increased. Residents in the surrounding areas should evacuate. Areas affected are as follows.	 Evacuate from this area !

Activation Control by Broadcasting
Non-congested communication
Power-saving feature is necessary





(Cell Base Station)

Activation control signal
&
Text and Image

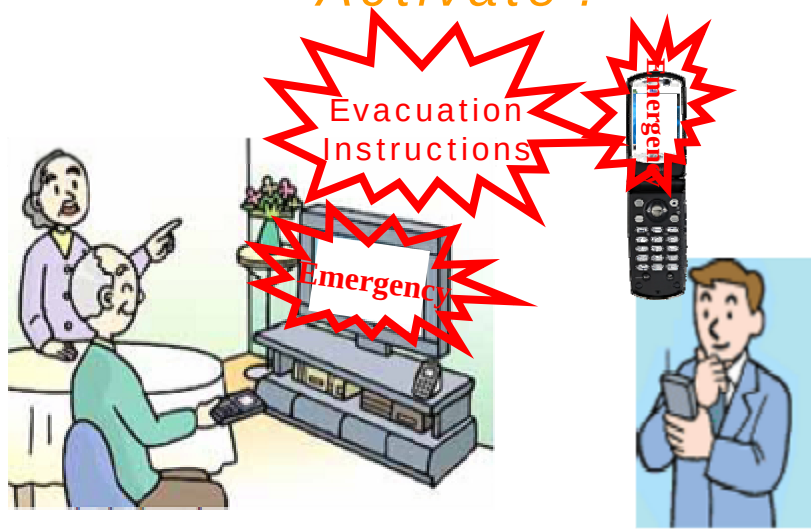
TV Station

Master Room
(on-air button)

Server

Translate to Broadcasting
Markup Language

Activate !



Both in and outside the home.

Comparison of Mobile Reception Systems

	Japan	Other Countries
Transmission system	ISDB-T (One-segment)	- T-DMB (KOR) - DVB-H (EU) - Media-FLO (U.S.A)
Service application	Video/Audio/Data	Video/Audio/Data
Assignment of new frequency bandwidth	Unnecessary	Necessary
Additional license	Unnecessary	Necessary
Service provider	Broadcaster (Free Service)	Broadcaster/Carrier/ Other company (Pay Service)
Emergency Warning Broadcasting System	Implementable	Cannot implement
Thrifty Power Consumption	Excellent	Depends on systems

The above data indicates that ISDB-T is an excellent system for mobile reception.

Summaries

Key Points for Introduction ISDB-T to Thailand

➢ Adaptability of ISDB-T

- In Japan, the 6MHz bandwidth is assigned to One Digital TV channel.
- Of course, ISDB-T technologically adapts the 8MHz bandwidth.

→If a market is established, then LSI encoder which is a key component to come into practical use to enable TV reception to adapt the 8MHz will be supplied.

➢ Technical Cooperation

- Dispatch a mission and implementation of demonstration with regard to broadcasting for mobile reception.
- Fostering of broadcasting technical experts.

→Cooperation to establish channel planning based on Japan's know-how.

Summaries

- Digitizing broadcasting consists of not only upgrading existing analog TV systems but also achieving attractive broadcasting service is the key to expand digital terrestrial TV for viewers.

- ISDB-T makes it possible to receive SDTV or HDTV while moving and provides the chance for enjoying new broadcasting service to users.

- ISDB-T can provide a “free” mobile TV reception service like ordinary TV broadcasting.

→ ISDB-T can be the most suitable system for expanding digital terrestrial TV .

ขอบคุณ ครับ !

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