

Presentation 1

Digital TV Broadcasting in Japan

25th. July. 2007

Caracas, Venezuela

**Ministry of Internal Affairs and Communications
Japan**

Hideo FUSEDA

- **Digitization of Terrestrial TV broadcasting.**
- **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.**

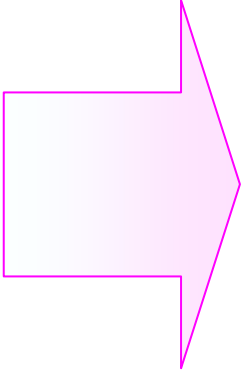
Digitization of Terrestrial TV broadcasting



1. High information capacity broadcasting



Analog TV



...



Multi-channel SDTV



HDTV



2. Robustness

Analog TV



Ghost and Noise

Digital TV



High quality image and sound



3. High functionality

Data Broadcasting

Interactive TV, e.g. interactive shopping

Weather forecast

News

Information linked to on-air program

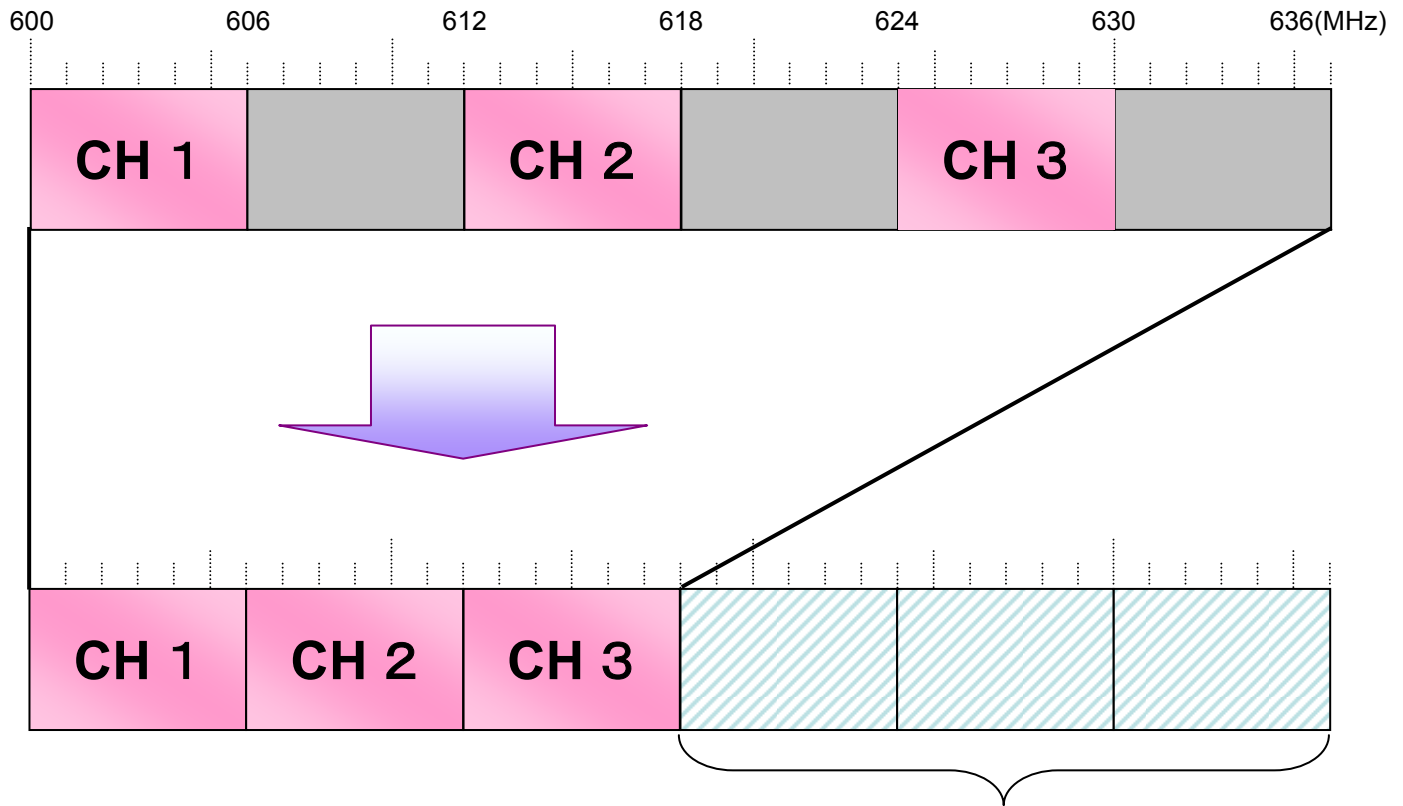


You can see the products and you can buy them directly.



4. Efficient use of radio frequencies

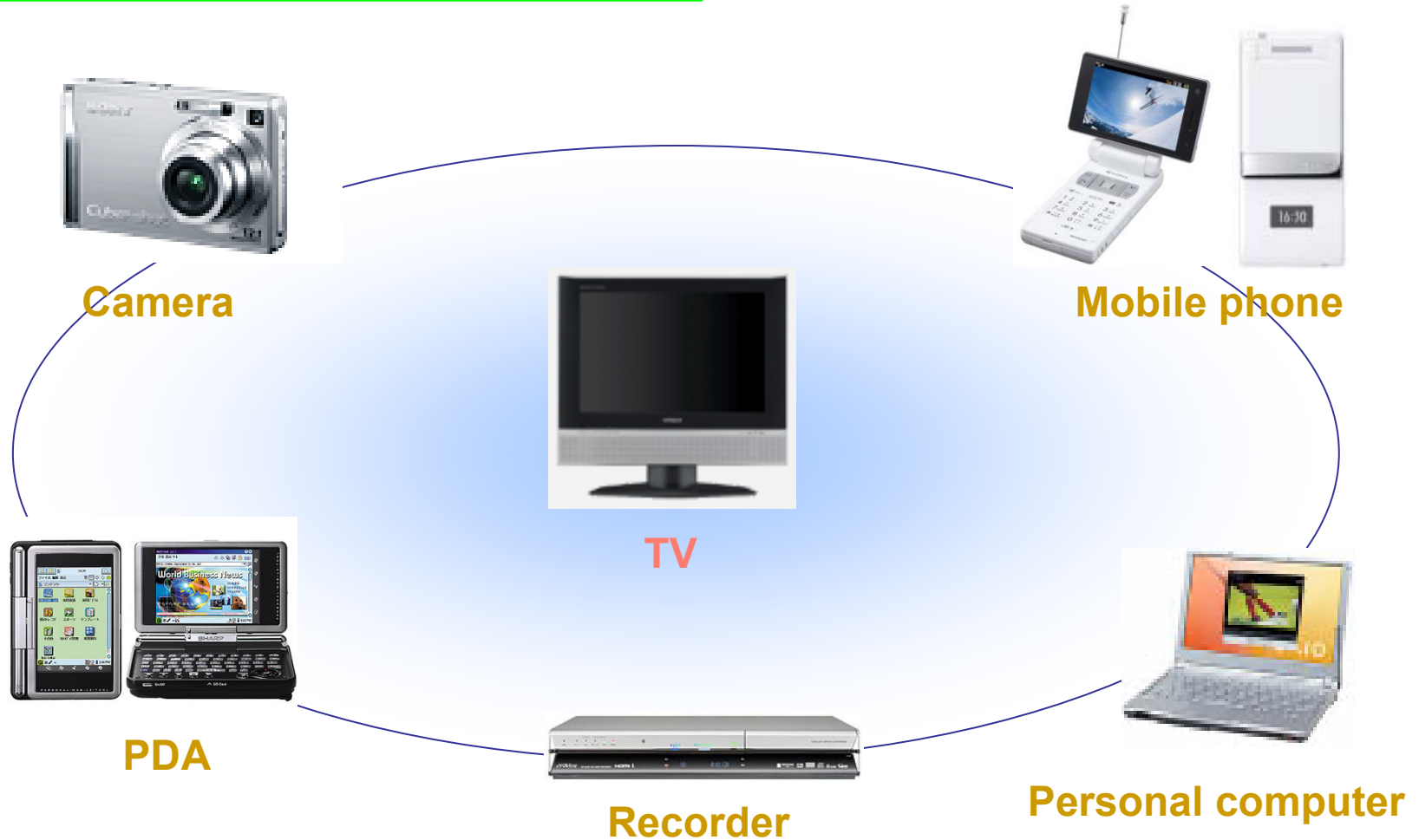
Frequency (UHF)



Another system can use this bandwidth.



5. Affinities with other ICTs



All other ICT products are digitized.

During the transition period from analog TV to digital TV, both analog and digital TV programs are simulcasted.



The bandwidth of analog TV channel and digital TV channel must be the same.



A 6MHz bandwidth is assigned to one analog TV channel in South American countries as well as in Japan and the USA.



ISDB-T is the most popular system in countries where the bandwidth of one analog TV channel is 6MHz.

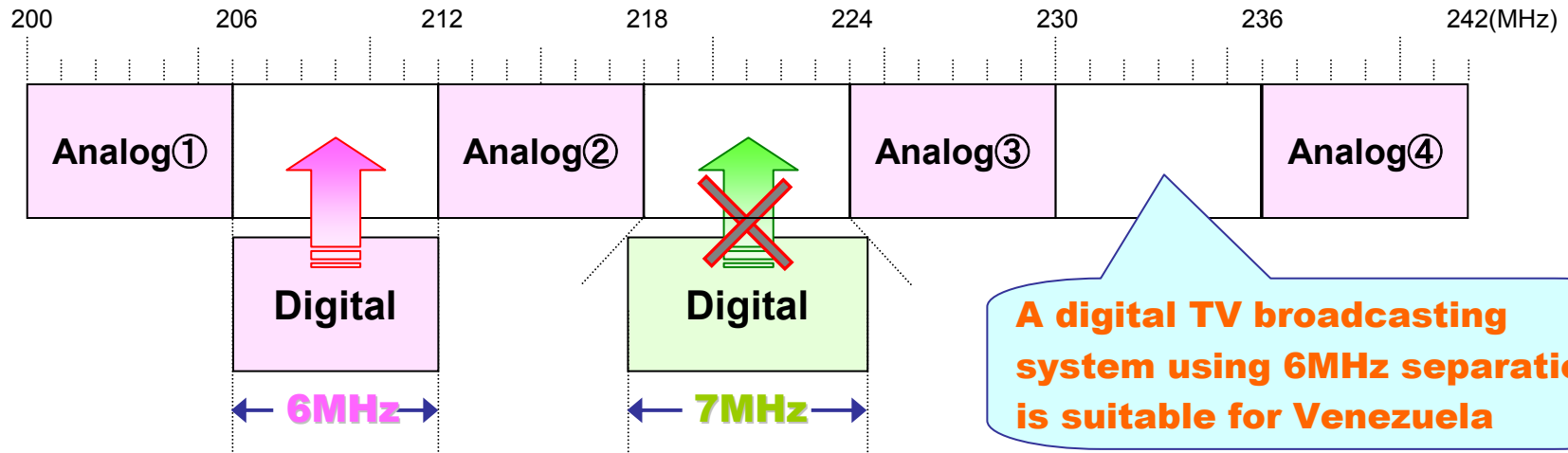


TV Channel Separation 2

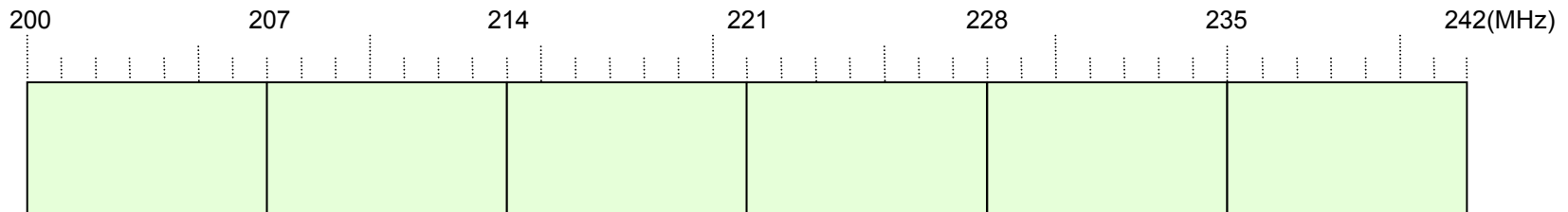


- The analog TV broadcasting system of Venezuela is **M / NTSC**.
- The bandwidth of one analog TV channel in Venezuela is **6MHz**.

6MHz Separation : South American countries, Japan, USA, Philippines etc.






7MHz Separation : Europe (DVB-T) etc.





The countries using 6MHz channel bandwidth

As of in December 2007

Usage situation Digital Broadcasting Type	Countries	
	Adopted	Adopted & Launched
ATSC 	<u>United States</u> <u>Canada</u> <u>Mexico</u> <u>Korea</u> <u>Honduras</u>	<u>United States</u> <u>Canada</u> <u>Mexico</u> <u>Korea</u>
DVB-T 	<u>Myanmar</u> <u>Taiwan</u>	<u>Taiwan</u>
ISDB-T 	<u>Japan</u> <u>Brazil</u>	<u>Japan</u> <u>Brazil</u>



Reason for adopting ISDB-T in Brazil

- The channel separation of Brazil is 6MHz.
- Brazil confirmed the advantage of ISDB-T by fair technical tests.
- ISDB-T has the highest robustness to interference and can provide a mobile reception service.
- Only ISDB-T can provide stationary and mobile reception services using the same TV channels and transmitters.

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



- 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

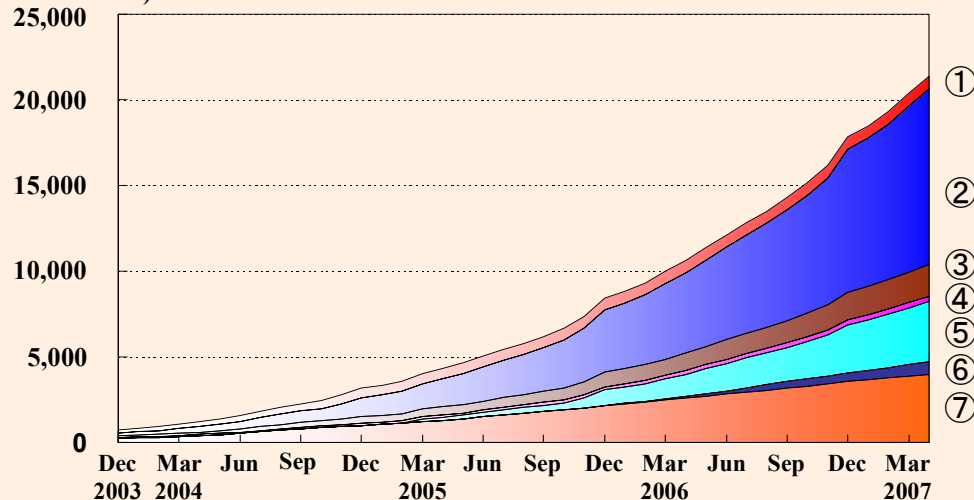
Digital Terrestrial Broadcasting Receiver Shipments

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)

(Unit: thousand)



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

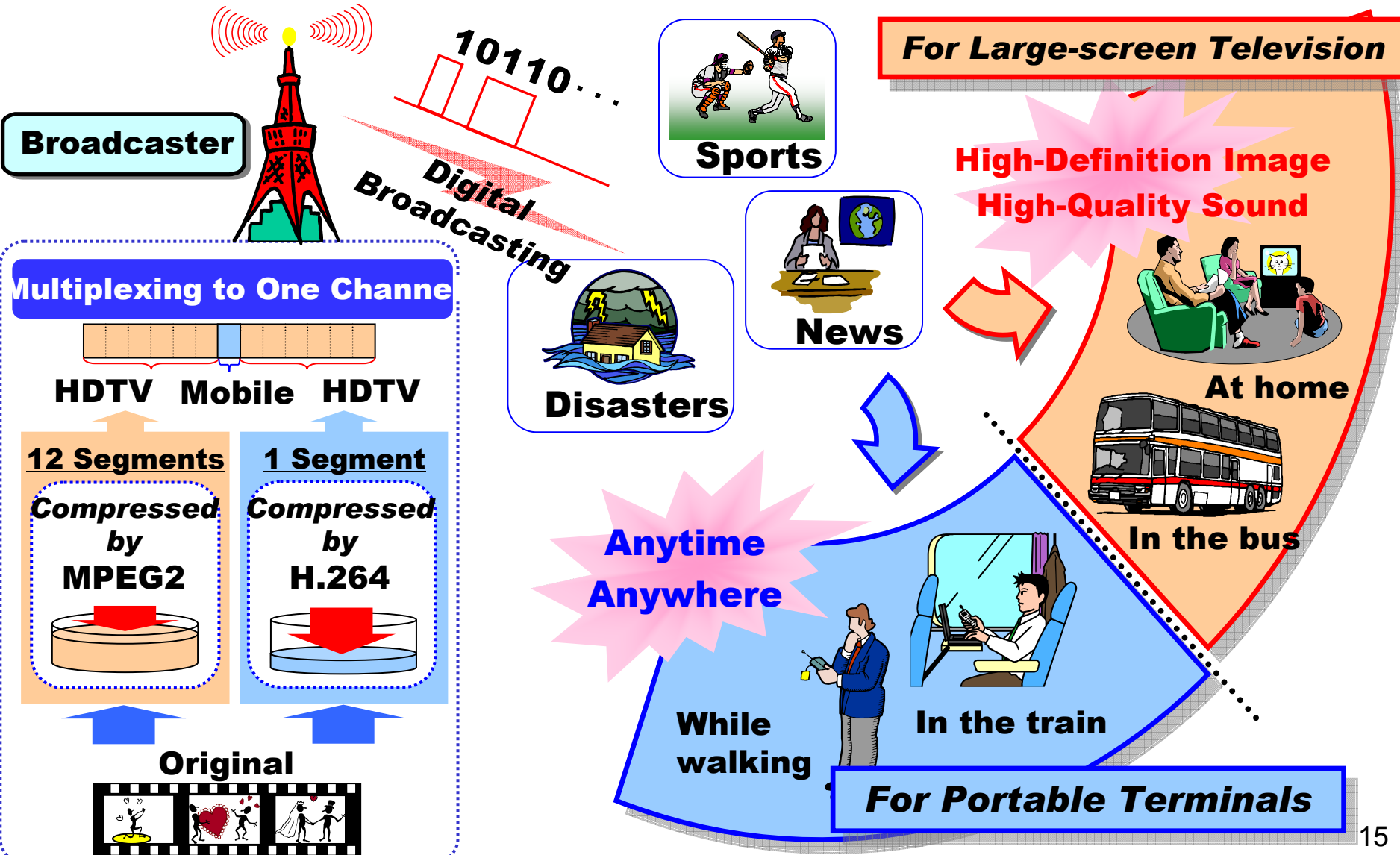
In-car DTTB Receiver Shipments

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



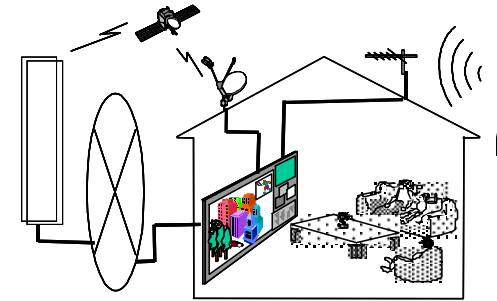
High quality image and sound service

Multi-Channel Service



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

Interactive TV



Communication linked services with TV

High quality image

Data Broadcasting

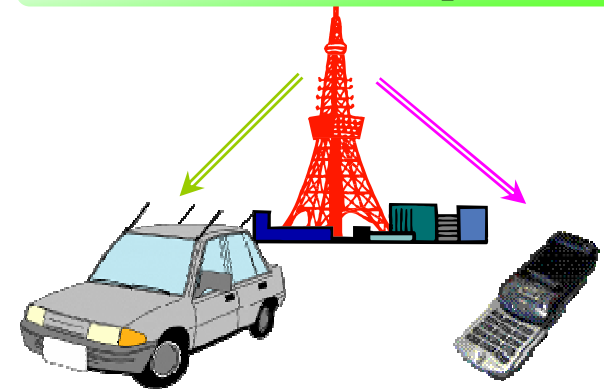
Mobile Reception



High Robustness to ghost image interference



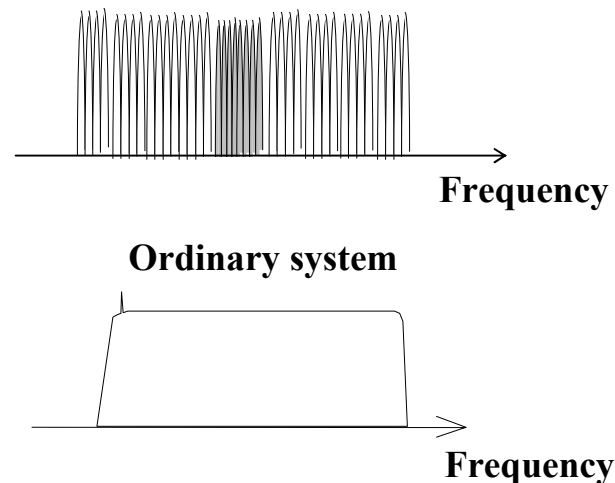
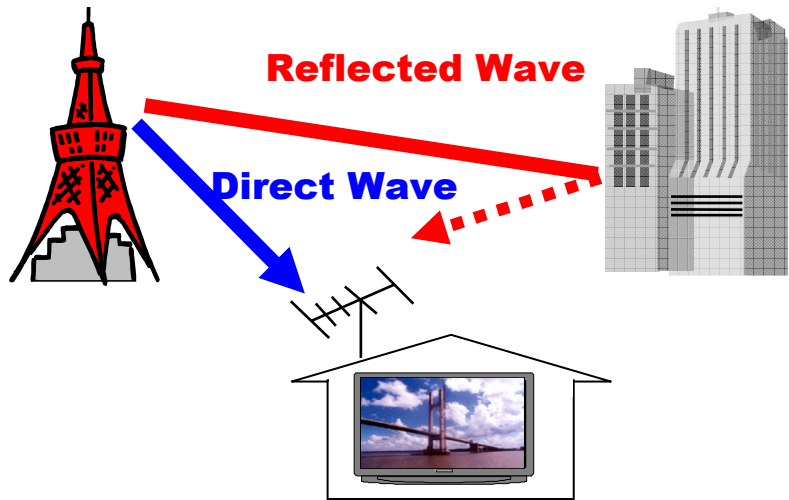
Simple retrieval of program and information at any time



TV service to In-car DTTB Receiver and cell-phone

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

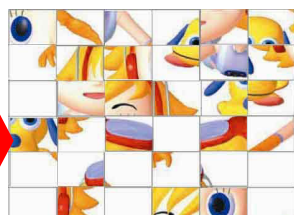
OFDM: Orthogonal Frequency Division Multiplex



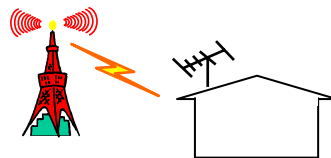
Stability of reception for mobile HDTV reception !

② Frequency and Time Interleaving

TV Station



Transmission Path



Receivers

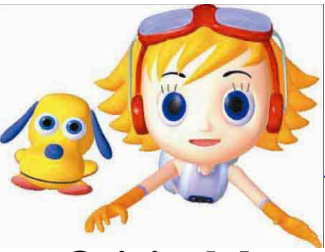
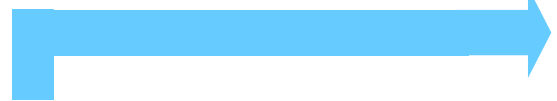




TV Station



No-Interleaving



Original data

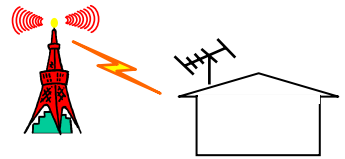


Interleaving



Sort data in accordance with set rules

Transmission Path



Errors occur as a result of radio interference



Errors occur as a result of radio interference

Receivers



Difficult to correct continuous errors.

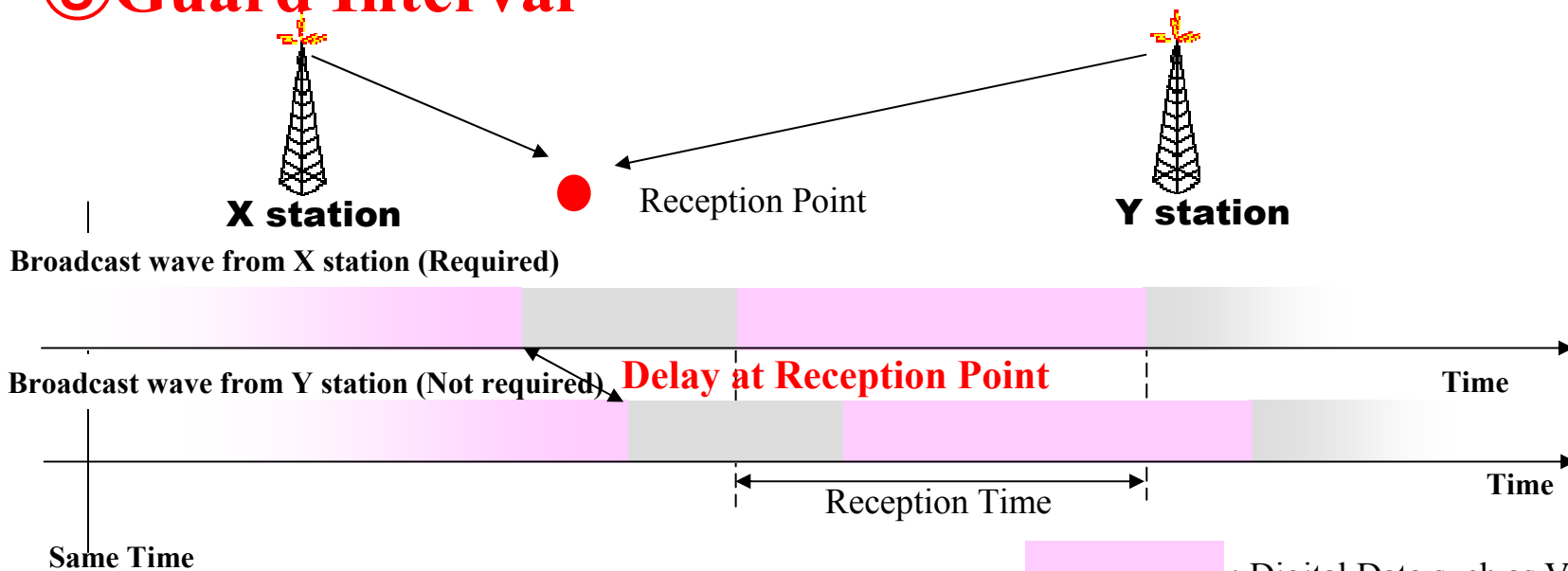


Reconstruction of data



Dispersed errors can be corrected.

③ Guard Interval



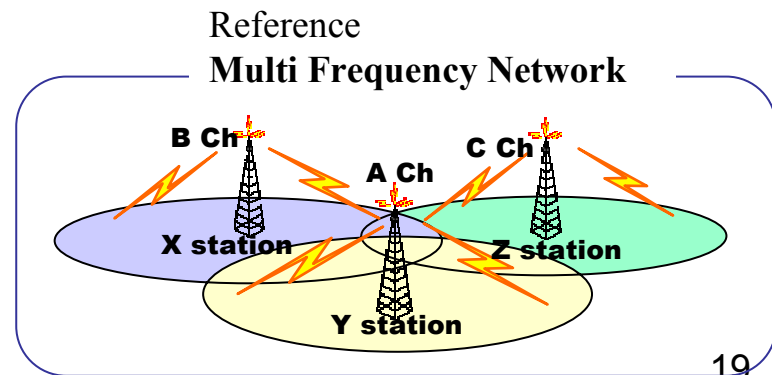
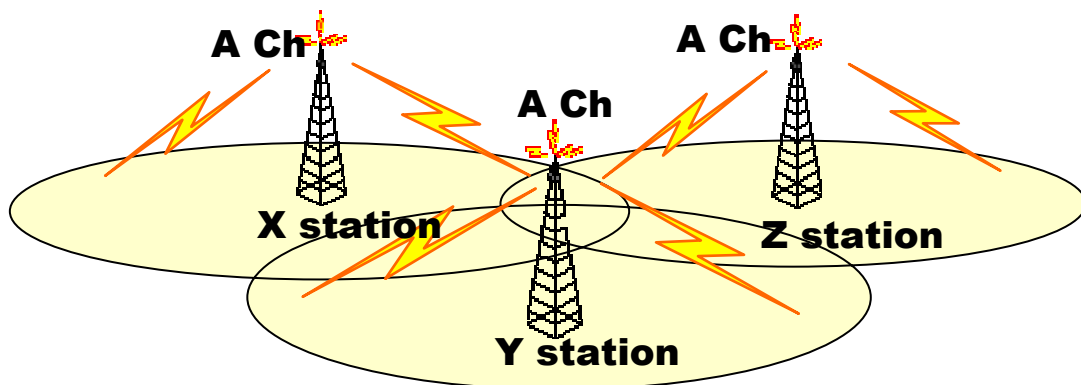
: Digital Data such as Video and Audio

: Guard Interval

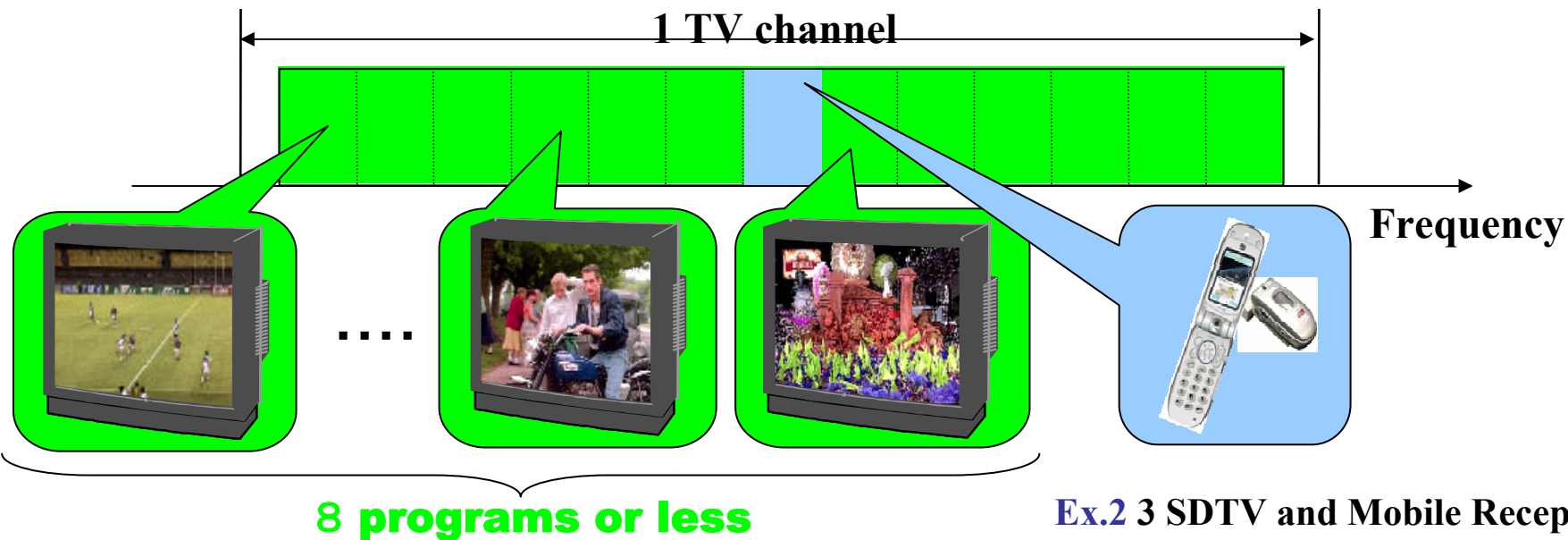
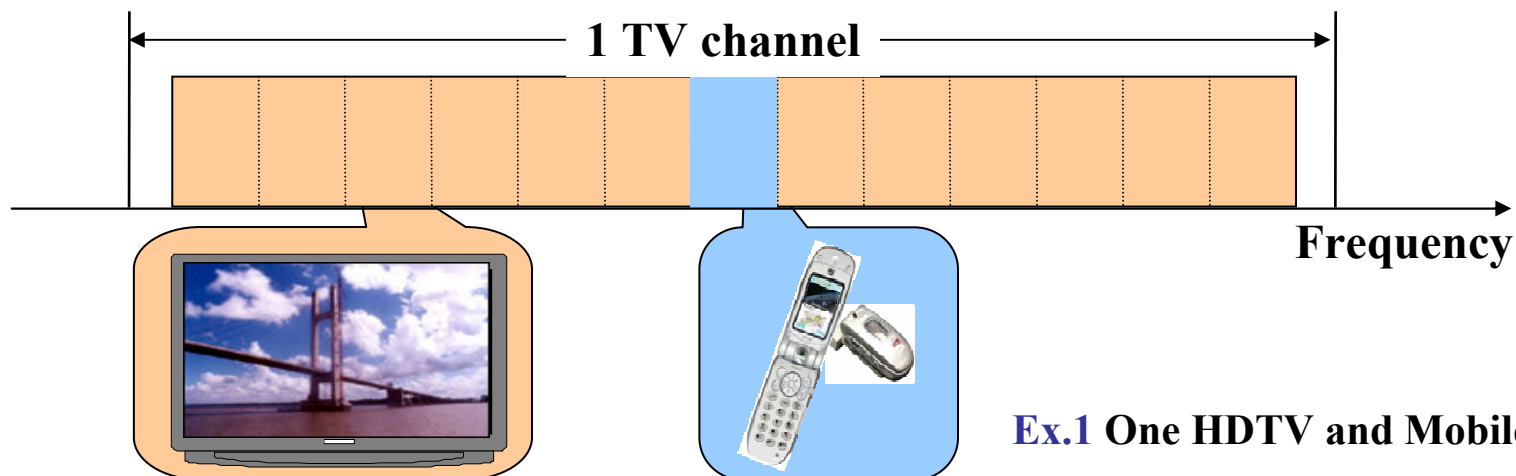
Realization of Single Frequency Network

Effective Utilization of Radio Frequency

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



④ Segmented Frequency

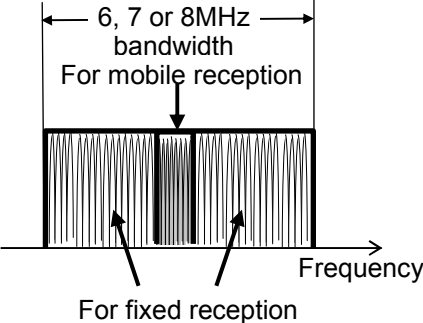
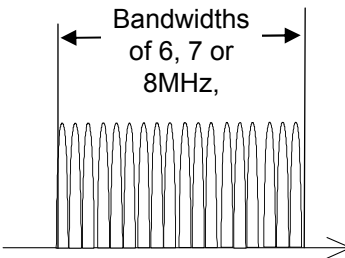
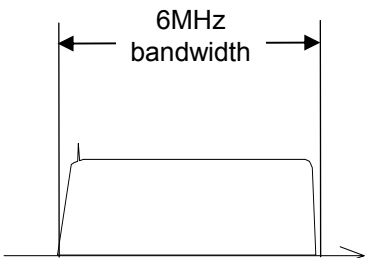


The segmented frequency structure is unique system of ISDB-T. 20

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	 <p>It is possible to designate the modulation system of the segment group unit according to the service purpose.</p>		 <p>Improved system based on analog TV broadcasting system.</p>

This converter is now under developing !



[main spec]

Item		Spec
Signal output	Video Audio	Video; Standard Definition Audio; (L, R) two devices (close-captioned)
Frequency band		VHF and UHF
Electric power		21W
Size		H100 × W25 × D131 (mm)



- There is no difference in price of the television receivers among DTTB systems.

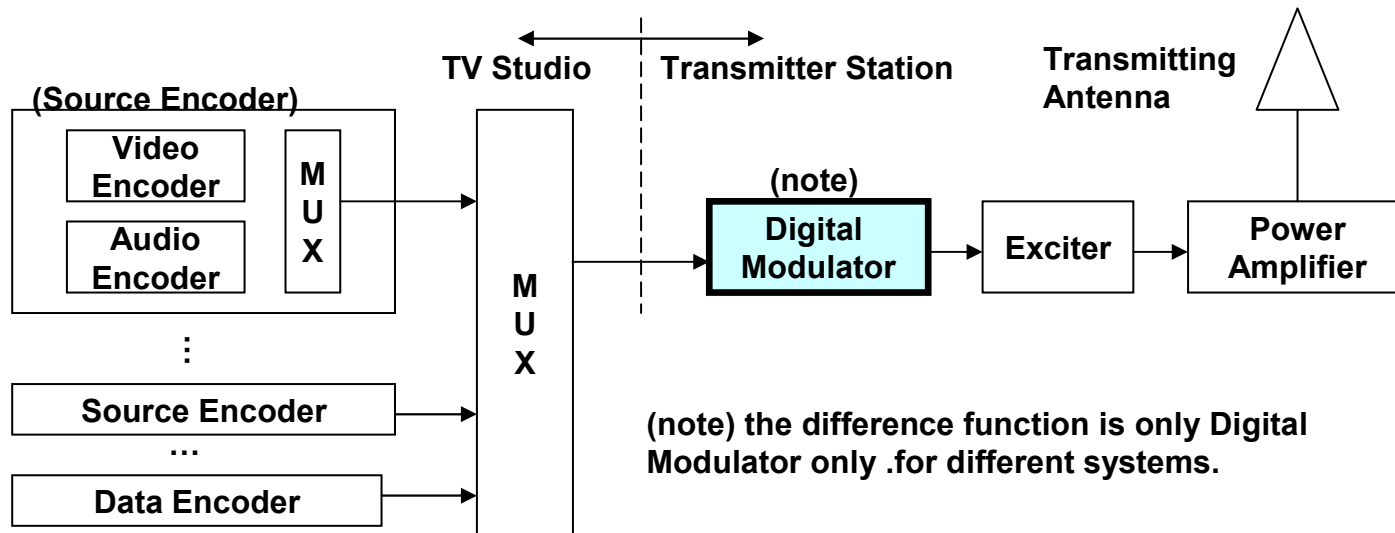
Because almost component of digital television receivers are same.

As for the difference depend on DTTB systems is just modulation part which is negligible against price of TV set.

As proof, price of the television receivers are same among PAL, NTSC and SECAM.

- Price of the television receivers is depend on functions.

e.g. High Definition TV, Multi SD, Date broadcasting, interactive function. etc

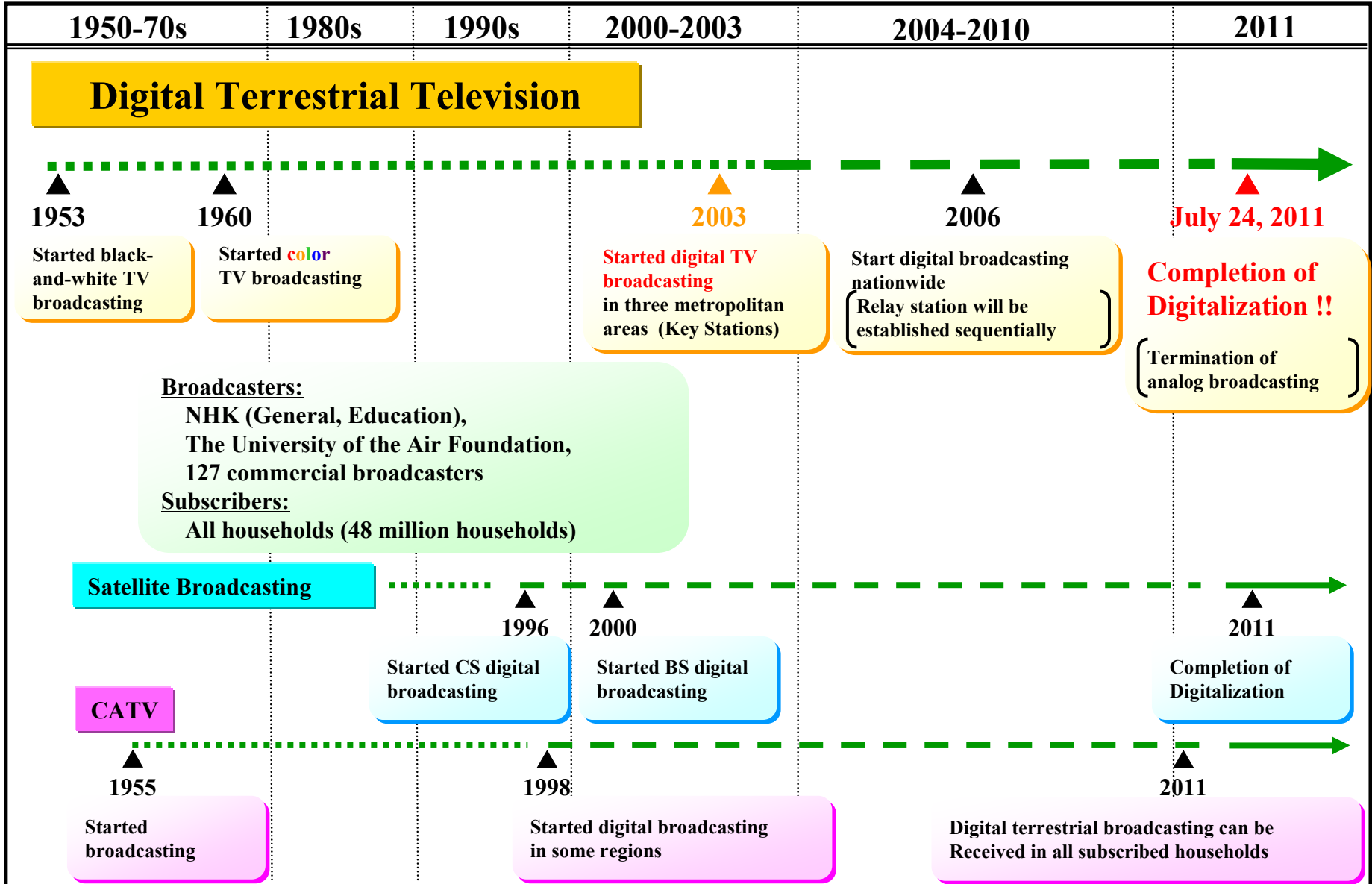


General Block diagram of Digital Broadcasting

Implementing Schemes for Expanding DTTB in Japan



Schedule for Digitalization of Broadcasting in Japan





➤ **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



- 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.

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

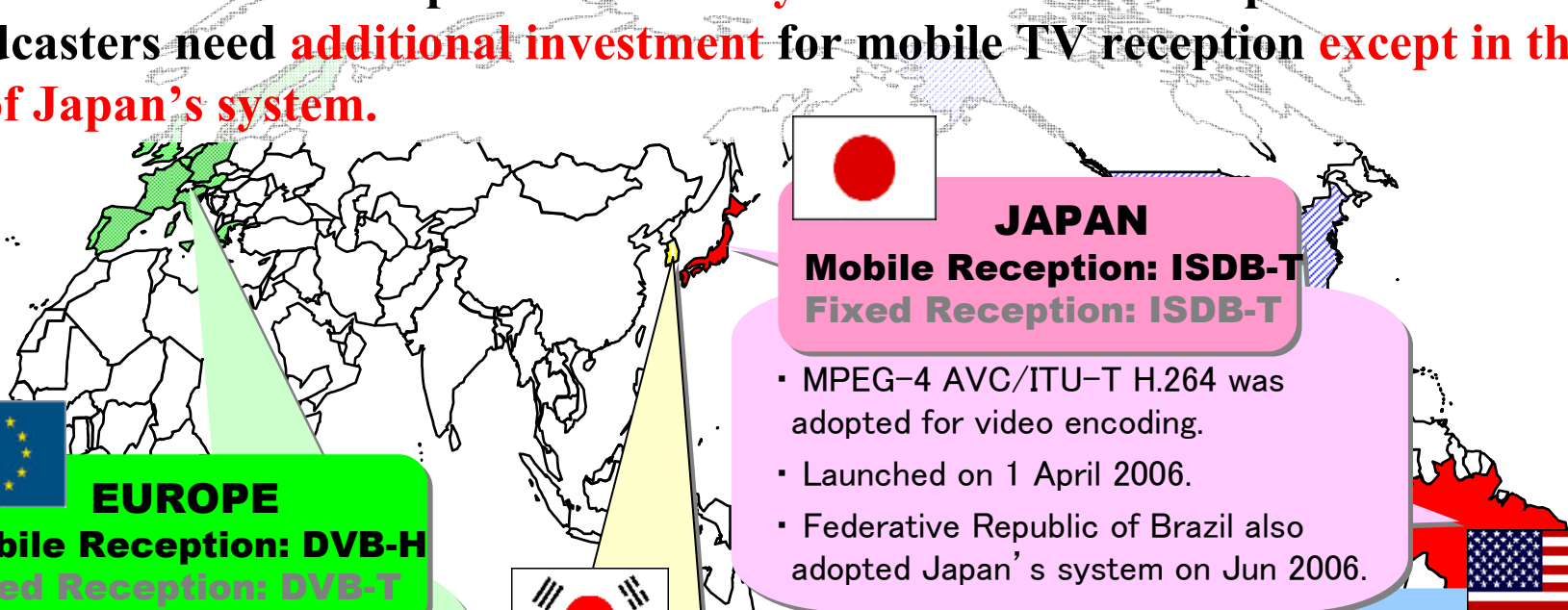
Special Advantages of Japan's System for Mobile Reception



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 Jun 2006.



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.*



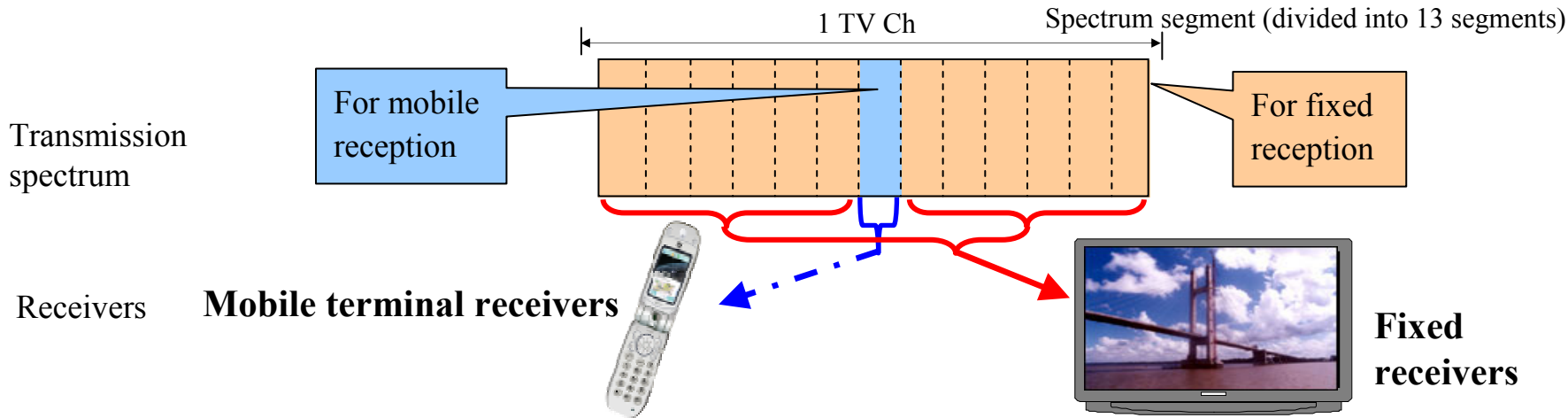
U.S.A

Mobile Reception: Under Consideration
Fixed Reception: ATSC

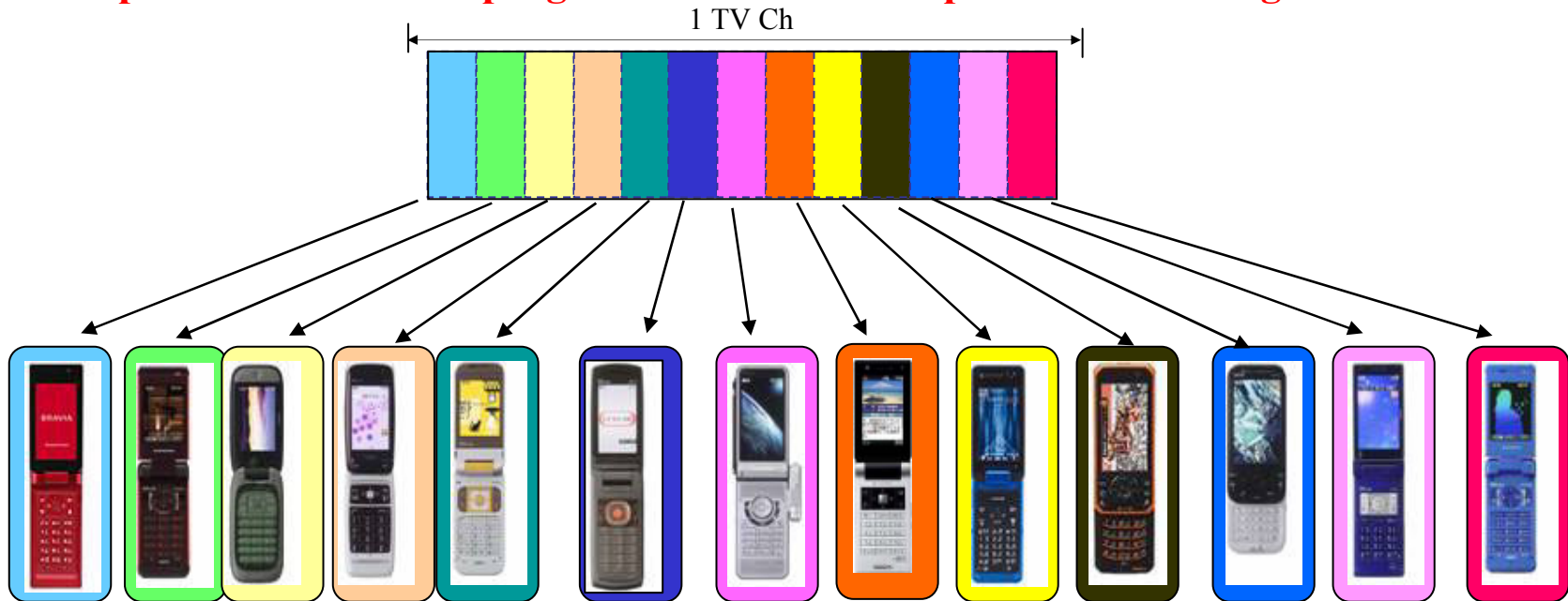
- Stream distribution services using mobile networks instead of terrestrial broadcasting have been started.
- In addition to DVB-H, new technologies such as Media-FLO are being considered.

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.



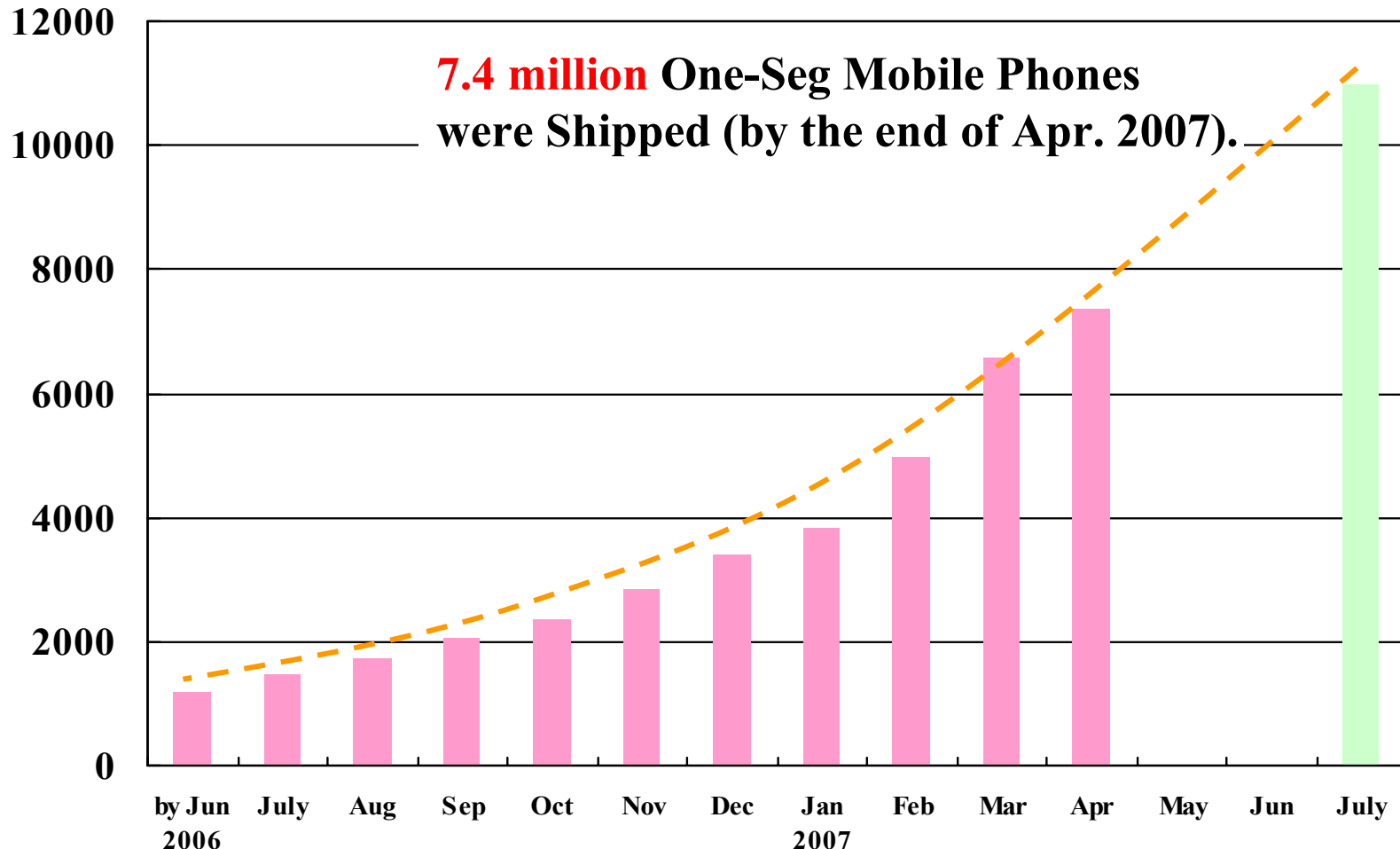
ISDB-T can provide over 10 TV programs for mobile reception service using one TV Channel !





- **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)





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)

KDDI



W51SH
(Jan 2007)
Usable also as digital radio



W51T
(Jan 2007)
Usable also as digital radio



W52T
(Jan 2007)
Usable also as digital radio



P901iTV
(Mar 2006)



D903iTV
(Jun 2007)



D903iTV
(2007)



P903iTV
(2007)



SH903iTV
(2007)

NTTDoCoMo



905SH
(May 2006)



911SH
(Nov 2006)

SoftBank



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)
Logitech



SDIO Tuner
(2007 OEM supplied)

ZENTEK



Express Card
MonsterTV 1D for DELL
(Nov 2006)

DELL



USB connective Tuner
PCTV-hiwasu (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



Portable DVD Players



DVD-LX97
(Mar 2006)
Panasonic



SD-P90DT
(Dec 2006)



SD-P50DT
(Dec 2006)

TOSHIBA



ROSSINI RPD7100SN-SV
(Nov 2006)



axion
AXN6709TD
(Dec 2006)

NAGASE

※ 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 2007)

Nintendo

Digital Audio Player



gigabeat V30T
(Jul 2006)



gigabeat V30E & V60E
(Nov 2006)

TOSHIBA

Exclusive Terminals, etc.

※ Usable also as
digital radio



BTV-400K
(Feb 2007)

BLUEDOT



One-segment unit
Produced by Wilcom
(Dec 2006)

PIXERA



Prodia
(Sep 2006)

Others

Radio



XDV-100
(Apr 2007)

SONY



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



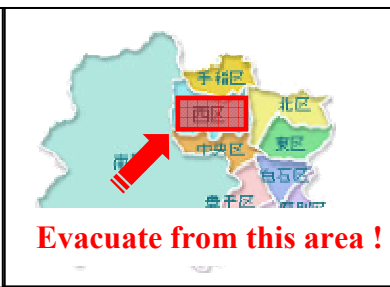
Original One-seg TV
(G I Challenge campaign prize)
Georgia

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

Possibility of xxx river flooding has increased. Residents in the surrounding areas should evacuate. Areas affected are as follows.

Image



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



Server

TV Station

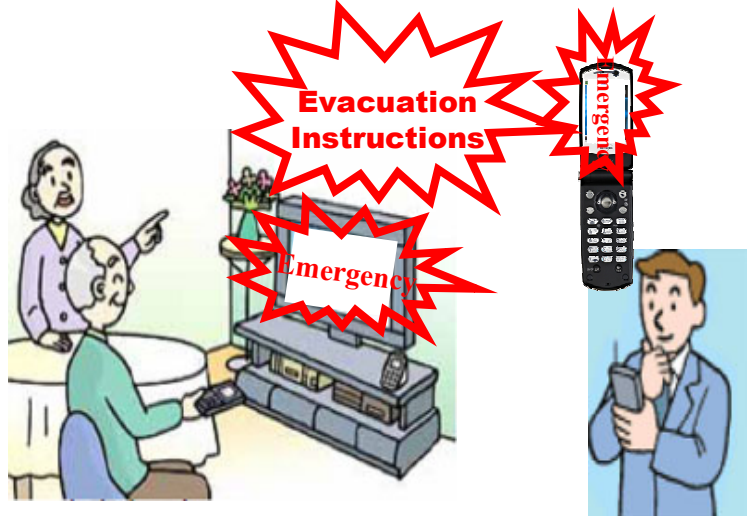


Master Room
(on-air button)

Translate to Broadcasting Markup Language

Activation control signal
&
Text and Image

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. 38

Summaries



Technical Cooperation

JICA has existence schemes for dispatching engineers for transfer of technologies to promote implementation of digital broadcasting.

JICA: Japan International Cooperation Agency

URL: <http://www.jica.go.jp/english/index.html>

Human Resource Development

JICA has existence schemes for dispatching experts and receiving trainees in the field of Information and Communications Technology.

Financing Plan

JBIC has existence schemes for financial support to import facilities which accompanies the implementation of digital broadcasting.

JBIC: Japan Bank for International Cooperation

URL: <http://www.jbic.go.jp/english/index.php>

- 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 .

➤ **Ministry of Internal Affairs and Communications (MIC) :**

http://www.soumu.go.jp/joho_tsusin/eng/index.html

➤ **Presenter:**

FUSEDA Hideo

Director for Digital Broadcasting Technology,
Information and Communications Policy Bureau, MIC

➤ **Contact us:**

btd_i@ml.soumu.go.jp