Digital TV Broadcasting in Japan

25th. July. 2007
Caracas, Venezuela
Ministry of Internal Affairs and Communications
Japan

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Today’s Topics

➢ Digitization of Terrestrial TV broadcasting.

➢ Advanced Features of Japan’s 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**
- Weather forecast
- News
- Information linked to on-air program

**Interactive TV, e.g. interactive shopping**
You can see the products and you can buy them directly.
4. Efficient use of radio frequencies

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.
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.

A digital TV broadcasting system using 6MHz separation is suitable for Venezuela.
### DTTB System of Countries adopting 6MHz separation

The countries using 6MHz channel bandwidth as of December 2007.

<table>
<thead>
<tr>
<th>Digital Broadcasting Type</th>
<th>Adopted</th>
<th>Adopted &amp; Launched</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATSC</td>
<td>United States, Canada, Mexico, Korea, Honduras</td>
<td>United States, Canada, Mexico, Korea</td>
</tr>
<tr>
<td>DVB-T</td>
<td>Myanmar, Taiwan</td>
<td>Taiwan</td>
</tr>
<tr>
<td>ISDB-T</td>
<td>Japan, Brazil</td>
<td>Japan, Brazil</td>
</tr>
</tbody>
</table>

ATSC homepage, DVB-T homepage, World Population statistics
Brazil adopted ISDB-T during last year, 2006

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 Japan’s 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

<table>
<thead>
<tr>
<th>Receiver Type</th>
<th>Shipments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT</td>
<td>720 (+0)</td>
</tr>
<tr>
<td>LCD</td>
<td>10,229 (+518)</td>
</tr>
<tr>
<td>PDP</td>
<td>1,857 (+89)</td>
</tr>
<tr>
<td>Tuner</td>
<td>327 (+7)</td>
</tr>
<tr>
<td>Digital Recorder</td>
<td>3,530 (+229)</td>
</tr>
<tr>
<td>Personal Computer</td>
<td>700 (+44)</td>
</tr>
<tr>
<td>CATV STB</td>
<td>3,994 (+99)</td>
</tr>
</tbody>
</table>

**Access to Digital Broadcasting Satellite**

24,740,000

Apr 2007 Source: NHK

<table>
<thead>
<tr>
<th>Receiver Type</th>
<th>Shipments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT</td>
<td>1,860 (+0)</td>
</tr>
<tr>
<td>PDP &amp; LCD</td>
<td>12,610 (+60)</td>
</tr>
<tr>
<td>Tuner (including Digital Recorder)</td>
<td>4,680 (+21)</td>
</tr>
<tr>
<td>CATV STB</td>
<td>3,970 (+10)</td>
</tr>
</tbody>
</table>

**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)
ISDB-T is a suitable system for next generation broadcasting.

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

For Large-screen Television
High-Definition Image
High-Quality Sound

For Portable Terminals
Anytime
Anywhere

At home
In the bus

While walking
In the train

12 Segments
Compressed by MPEG2

1 Segment
Compressed by H.264

Original
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

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**High quality image**

- High Robustness to ghost image interference

**Data Broadcasting**

- Simple retrieval of program and information at any time

**Mobile Reception**

- TV service to In-car DTTB Receiver and cell-phone
Technical Features of ISDB-T ① & ②

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
Comparison of Interleaving and No-Interleaving

**TV Station**

- **No-Interleaving**
  - Original date
  - Sort data in accordance with set rules

- **Interleaving**
  - Sort data in accordance with set rules

**Transmission Path**

- Errors occur as a result of radio interference

**Receivers**

- Difficult to correct continuous errors.
  - Reconstruction of data
  - Dispersed errors can be corrected.

**Reference**

Errors occur as a result of radio interference.
Technical Features of ISDB-T ③

③ Guard Interval

Broadcast wave from X station (Required)

Broadcast wave from Y station (Not required)

Delay at Reception Point

Reception Time

Time

Same Time

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
④ Segmented Frequency

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

Ex.1 One HDTV and Mobile Reception.

Ex.2 3 SDTV and Mobile Reception.
### Comparison of Three DTTB Systems

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

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

- 6MHz bandwidth
- 7 or 8MHz bandwidth
- For fixed reception
- Bandwidths of 6, 7 or 8MHz.
- For mobile reception

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**Note:**

- Solid black circle (○): Positive
- Inverted black triangle (△): Neutral
- Black cross (×): Negative
This converter is now under developing!

[main spec]

<table>
<thead>
<tr>
<th>Item</th>
<th>Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal output</td>
<td>Video; Standard Definition Audio; (L, R) two devices (close-captioned)</td>
</tr>
<tr>
<td>Frequency band</td>
<td>VHF and UHF</td>
</tr>
<tr>
<td>Electric power</td>
<td>21W</td>
</tr>
<tr>
<td>Size</td>
<td>H100 × W25 × D131 (mm)</td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital Terrestrial Television</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1953 | | | | | | **Completion of Digitalization !!**
| | **Started black-and-white TV broadcasting** | | | | | **Termination of analog broadcasting** |
| 1960 | | | | | | |
| | **Started color TV broadcasting** | | | | | |
| 2003 | | | | | | **July 24, 2011**
| | **Started digital TV broadcasting in three metropolitan areas (Key Stations)** | | | | | |
| 2006 | | | | | | **Completion of Digitalization**
| | Start digital broadcasting nationwide Relay station will be established sequentially | | | | | |
| Broadcasters: | NHK (General, Education), The University of the Air Foundation, 127 commercial broadcasters | | | | | |
| Subscribers: | All households (48 million households) | | | | | |
| **Satellite Broadcasting** | | | | | | |
| 1955 | | | | | | **Completion of Digitalization**
| | **Started broadcasting** | | | | | |
| 1996 | | | | | | **2011**
| | **Started CS digital broadcasting** | | | | | |
| 2000 | | | | | | **2011**
| | **Started BS digital broadcasting** | | | | | |
| 1998 | | | | | | |
| | **Started digital broadcasting in some regions** | | | | | |
| 2003 | | | | | | **2011**
| | **Started digital broadcasting in some regions** | | | | | |
| 2006 | | | | | | **2011**
| | **Started digital broadcasting in three metropolitan areas (Key Stations)** | | | | | |
| 2007 | | | | | | **2011**
| | **Started digital broadcasting nationwide Relay station will be established sequentially** | | | | | |
| 2011 | | | | | | **2011**
| | **Completion of Digitalization** | | | | | |
| | Digital terrestrial broadcasting can be received in all subscribed households | | | | | |
Expansion Schedule for DTTB 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
Implementing Scheme for Expanding Digital Terrestrial TV Nationwide

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.
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
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.

**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.

**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.

**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.
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.

**Receivers**

**Mobile terminal receivers**

**Fixed receivers**

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)

7.4 million One-Seg Mobile Phones were Shipped (by the end of Apr. 2007).
**Mobile Phones**

<table>
<thead>
<tr>
<th>Model</th>
<th>Release Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>W33SA</td>
<td>Dec 2005</td>
</tr>
<tr>
<td>W41H</td>
<td>Feb 2006</td>
</tr>
<tr>
<td>W33SA II</td>
<td>Jun 2006</td>
</tr>
<tr>
<td>W43H</td>
<td>Sep 2006</td>
</tr>
<tr>
<td>W43SA</td>
<td>Oct 2006</td>
</tr>
<tr>
<td>W43H II</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>MEDIA SKIN</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>W51CA</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>W51K</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>W51SA</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>W51SH</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>W51T</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>W52T</td>
<td>Jan 2007</td>
</tr>
<tr>
<td>KDDI</td>
<td></td>
</tr>
<tr>
<td>P901iTV</td>
<td>Mar 2006</td>
</tr>
<tr>
<td>D903iTV</td>
<td>Jun 2007</td>
</tr>
<tr>
<td>NTDoCoMo</td>
<td></td>
</tr>
<tr>
<td>D903iTV</td>
<td>2007</td>
</tr>
<tr>
<td>P903iTV</td>
<td>2007</td>
</tr>
<tr>
<td>SH903iTV</td>
<td>2007</td>
</tr>
<tr>
<td>SoftBank</td>
<td></td>
</tr>
<tr>
<td>905SH</td>
<td>May 2006</td>
</tr>
<tr>
<td>911SH</td>
<td>Nov 2006</td>
</tr>
</tbody>
</table>

Each company's press released merchandise in Japan.
# One-Seg Broadcasting Receivers Introduced to the Market (2/3)

**Personal Computers**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sony</td>
<td>VGN-TX91PS, etc. (from Jan 2006)</td>
</tr>
<tr>
<td>Aro System</td>
<td>LesanceNB CL206GW-GT/TV etc (from Jul 2006)</td>
</tr>
<tr>
<td>NEC</td>
<td>PC Card (Mar 2006 OEM Supply)</td>
</tr>
<tr>
<td>PIXERA</td>
<td>USB connective Tuner (DH-ONE/U2) (Oct 2006)</td>
</tr>
<tr>
<td>BUFFALO</td>
<td>PC Card MonsterTV 1D (Nov 2006)</td>
</tr>
<tr>
<td>Fujitsu</td>
<td>T70S/V, etc. (from Apr 2006)</td>
</tr>
<tr>
<td>Logitec</td>
<td>USB connective Tuner (LDT-1S100U) (Sep 2006)</td>
</tr>
<tr>
<td>ZENTEK</td>
<td>SDIO Tuner (2007 OEM supplied)</td>
</tr>
<tr>
<td>DELL</td>
<td>USB connective Tuner MonsterTV 1D for DELL (Nov 2006)</td>
</tr>
<tr>
<td>LOGFARM</td>
<td>USB connective Tuner (LDT-1S100U) (Sep 2006)</td>
</tr>
<tr>
<td>SanwaSupply</td>
<td>USB connective Tuner (GV-1SG/USB) (Dec 2006)</td>
</tr>
<tr>
<td>SKnet</td>
<td>USB connective Tuner (LC-1SEGU) (Dec 2006)</td>
</tr>
<tr>
<td>EXPRESS CARD</td>
<td>USB connective Tuner QOT-W100 (Dec 2006)</td>
</tr>
<tr>
<td>LOGFARM</td>
<td>USB connective Tuner (GV-1SG/USB) (Dec 2006)</td>
</tr>
<tr>
<td>I.O.Data</td>
<td>USB connective Tuner (LC-1SEGU) (Dec 2006)</td>
</tr>
<tr>
<td>Live Creator</td>
<td>USB connective Tuner QOT-W100 (Dec 2006)</td>
</tr>
<tr>
<td>QOT-W100</td>
<td>USB connective Tuner (LC-1SEGU) (Dec 2006)</td>
</tr>
</tbody>
</table>

Each company’s press released merchandise in Japan
One-Seg Broadcasting Receivers Introduced to the Market (3/3)

**Portable DVD Players**

<table>
<thead>
<tr>
<th>Model</th>
<th>Release Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD-LX97</td>
<td>Mar 2006</td>
</tr>
<tr>
<td>SD-P90DT</td>
<td>Dec 2006</td>
</tr>
<tr>
<td>SD-P50DT</td>
<td>Dec 2006</td>
</tr>
<tr>
<td>ROSSINI RPD7100SN-SV</td>
<td>Nov 2006</td>
</tr>
<tr>
<td>axion AXN6709TD</td>
<td>Dec 2006</td>
</tr>
</tbody>
</table>

**Electronic Dictionary**

- Papyrus PW-TC900 (Dec 2006)
- NAGASE
- SHARP
- Nintendo DS (scheduled in 2007)

**Digital Audio Player**

- gigabeat V30T (Jul 2006)
- gigabeat V30E & V60E (Nov 2006)

**Exclusive Terminals, etc.**

- BTV-400K (Feb 2007)
- BLUEDOT
- One-segment unit Produced by Wilcom (Dec 2006)
- PIXERA
- Prodia (Sep 2006)

**Game Terminal**

- Nintendo DS-TC900

**Others**

- Radio
  - XDV-100 (Apr 2007) *SONY*
- Super One-seg TV Watch (campaign prize)
- Original One-seg TV (G I Challenge campaign prize)
- Asahi Beer
- Georgia

Each company's press released merchandise in Japan
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.

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

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

Both in and outside the home.
## Comparison of Mobile Reception Systems

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

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

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