Presentation 1
Digital TV Broadcasting in Japan

28th February - 1st March, 2007
Jakarta, Indonesia
Ministry of Internal Affairs and Communications
Japan
Akira OKUBO
Today’s Contents

➢ Advanced features of Japan’s Digital Terrestrial Television Broadcasting (DTTB) system.

➢ Special advantages of Japan’s system for mobile reception.

➢ The mobile reception service is much more feasible and cost effective than compared with the fixed reception service in some case.
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**

**17,830,000**

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Shipments (Unit: thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT</td>
<td>720 (± 0)</td>
</tr>
<tr>
<td>LCD</td>
<td>8334 (+893)</td>
</tr>
<tr>
<td>PDP</td>
<td>1613 (+137)</td>
</tr>
<tr>
<td>Tuner</td>
<td>296 (+ 18)</td>
</tr>
<tr>
<td>Digital Recorder</td>
<td>2817 (+419)</td>
</tr>
<tr>
<td>Personal Computer</td>
<td>481 (+ 89)</td>
</tr>
<tr>
<td>CATV STB</td>
<td>3569 (+150)</td>
</tr>
</tbody>
</table>

**Access to Digital Broadcasting Satellite**

**21,520,000**

Dec 2006 Source: NHK

<table>
<thead>
<tr>
<th>Type</th>
<th>Shipments (Unit: thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT</td>
<td>1,860 (± 0)</td>
</tr>
<tr>
<td>PDP &amp; LCD</td>
<td>10,490 (+103)</td>
</tr>
<tr>
<td>Tuner (including Digital Recorder)</td>
<td>3,960 (+ 44)</td>
</tr>
<tr>
<td>CATV STB</td>
<td>3,550 (+ 15)</td>
</tr>
</tbody>
</table>

**Access to Digital Broadcasting Satellite using CATV**

**1,680,000 households**

**One-Seg Mobile Phone Shipments**

**3,410,000**

**In-car DTTB Receiver Shipments**

**260,000**

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.

Multiplexing to One Channel

- HDTV
- Mobile
- HDTV

12 Segments
Compressed
by
MPEG2

1 Segment
Compressed
by
H.264

Original Image

While walking

Digital Broadcasting

10110...

Sports

News

Disasters

For Large-screen Television

High-Definition Image
High-Quality Sound

At home

In the bus

Anytime
Anywhere

For Portable Terminals

In the train

Anytime
Anywhere

While walking
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

② Frequency and Time Interleaving

Stability of reception for mobile HDTV reception!

Direct Wave

Reflected Wave
Comparison of Interleaving and No-Interleaving

TV Station

No-Interleaving

Original date

Interleaving

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.
Technical Features of ISDB-T

③ Guard Interval

Realization of Single Frequency Network
Effective Utilization of Radio Frequency
Over 10,000 stations can be set using 40 Ch in Japan

Reference
Multi Frequency Network
④ Segmented Frequency

Ex.1 1 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></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>
</tr>
<tr>
<td>Feasibility of Single Frequency Network (SFN)</td>
<td></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>
</tr>
<tr>
<td>Feasibility of portable reception</td>
<td></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>
</tr>
<tr>
<td>Transmission system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><img src="image" alt="Diagram" /> It is possible to designate the modulation system of the segment group unit according to the service purpose.</td>
<td><img src="image" alt="Diagram" /> Bandwidths of 6, 7 or 8MHz, For mobile reception</td>
<td><img src="image" alt="Diagram" /> Improved system based on analog TV broadcasting system.</td>
</tr>
</tbody>
</table>

- ◎: Good
- ○: Slightly Good
- △: Slightly Fair
- ×: Poor
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.

**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.

**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 2005
    - ※ MPEG-4 AVC/ITU-T H.264 was adopted for video encoding.

**KOREA**
- **Mobile Reception:** T-DMB
- **Fixed Reception:** ATSC

**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.

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

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

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

**Portable DVD Players**
- DVD-LX97 (Mar 2006) *Panasonic*
- SD-P90DT (Dec 2006) *TOSHIBA*
- SD-P50DT (Dec 2006) *TOSHIBA*
- ROSSINI RPD7100SN-SV (Nov 2006) *NAGASE*
- axion AXN6709TD (Dec 2006) *NAGASE*

**Digital Audio Player**
- gigabeat V30T (Jul 2006) *TOSHIBA*
- gigabeat V30E & V60E (Nov 2006) *TOSHIBA*

**Electronic Dictionary**
- SD-PDT1 (Jul 2006) *TOSHIBA*
- DVF-DTV100 (Dec 2006) *SANYO*
- Papyrus PW-TC900 (Dec 2006) *SHARP*
- Nintendo DS (scheduled in 2006) *Nintendo*

**Game Terminal**
- BT-400K (Feb 2007) *BLUEDOT*
- One-segment unit Produced by Wilcom (Dec 2006) *PIXERA*
- Prodia (Sep 2006) *Asahi Beer*
- Super One-seg TV Watch (campaign prize) *Asahi Beer*
- Original One-seg TV (G I Challenge campaign prize) *Georgia*

**Exclusive Terminals, etc.**
- ※ One-Seg tuner only for portable DVD player
- ※Usable also as digital radio

**Others**

Each company's press released merchandise in Japan
Utilization of diffusibility of mobile phones.
And also One-Seg service speed up diffusion of mobile phones.
Win-Win situation!
### 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</strong></td>
<td>Not necessary</td>
<td>Necessary</td>
</tr>
<tr>
<td><strong>frequency bandwidth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional license</strong></td>
<td>Not necessary</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</strong></td>
<td>Implementable</td>
<td>Cannot implement</td>
</tr>
<tr>
<td><strong>Broadcasting System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Thrifty Power Consumption</strong></td>
<td>Excellent</td>
<td>Depend on systems</td>
</tr>
</tbody>
</table>

Obviously ISDB-T is an excellent system for mobile reception.
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 objective.

Possibility of a flood in the xxx river 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

Evacuate from this area!

Both in and outside the home.
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.
Outline of Technical Cooperation Project

Project Title
“The Project on the Capacity Development of the Ministry of Communication and Information Technology concerning Broadcasting Strategy Formulation and Planning”

Overall Goal
Broadcasting administration is properly conducted in Indonesia.

Project Purpose
The Ministry of Communication and Information Technology’s function concerning strategy formulation and planning on broadcasting is strengthened.

Outline of Project
1. The Project aims toward the capacity development of the Ministry of Communication and Information Technology concerning the strategy formulation and planning on broadcasting.

2. The strategy and plan on broadcasting will be considered taking account of the following policies:
   1) Policies for the introduction of digital broadcasting in Indonesia,
   2) Policies for the nationwide dissemination of broadcasting in Indonesia.

3. The Project will be implemented through dispatch of experts, training for counterparts in Japan, and provision of equipment.
**Results of Official Development Assistance (ODA) in Broadcasting**

### Technical Cooperation
From 1983 to 1992, the Technical Cooperation Project which aims for the capacity development of the Multimedia Training Center (MMTC) for training the broadcasting technicians were implemented. From 1999, 4 experts on broadcasting policy adviser have been dispatched.

### Grant Aid
From 1973, 10 projects (Total 6,282 million yen) was implemented to establish Multimedia Training Center (MMTC) and to introduce broadcasting equipment.

### Yen Loan
From 1985, 5 projects (Total 28,614 million yen) was implemented for enhancement of broadcasting networks and for rehabilitation of broadcasting facilities.

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### Japan is promoting Asia Broadband Program. Recent cooperation projects for Indonesia are as follows.

**Experts on Broadcasting Policy Advisers**
- From 1999, 4 experts on broadcasting policy adviser have been dispatched for the development of broadcasting policy in Indonesia.

**Technology concerning Broadcasting Strategy Formulation and Planning in Indonesia**
- Conduct capacity development of the Indonesian government to formulate strategies and plans in the field of broadcasting such as digital broadcasting and nationwide dissemination of broadcasting.

**Adopted a Ministerial joint declaration (Sep. 2003)**
- Support for the spread of an e-government
- Support for human resource development

**Adopted a revised Ministerial joint declaration (Jan. 2007)**
- In addition to the items above, holding an international seminar, forum, conference, workshop, etc. in the following areas was included:
  - Next Generation Network
  - Technologies for Mobile Communications
  - Broadcasting

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**Project for Improvement of Broadcasting Equipment for Television of the Republic of Indonesia (TVRI) Jakarta News Division (540 million yen)**
- Establish broadcasting facilities for Jakarta Broadcasting Station of public television station (TVRI) in Indonesia.

**Project for Improvement of Training Equipment for Multimedia Training Center (590 million yen)**
- Establish equipment in Multimedia Training Center for human resource development of broadcasting technicians.

**Project for Improvement of Broadcasting Equipment for Television of the Republic of Indonesia (TVRI) Makassar Station (460 million yen)**
- Establish broadcasting facilities for Makassar Broadcasting Center of public television station (TVRI) in Indonesia.
Rapid diffusion of mobile phones indicates that diffusion of terminals coupled with mobile phones is sooner than renewing fixed TV receivers.

Additional TV channel is not necessary, in the midst of the growing expansion of demand for frequency in the case of ISDB-T.

High-quality audio broadcasting and/or data broadcasting can be provided together with One-Seg broadcasting in the same investment (transmitter, network Terminals etc.).

→ ISDB-T can be the most suitable DTTB system for Indonesia.
Ministry of Internal Affairs and Communications (MIC):

Presenter:
OKUBO Akira
Director, Broadcasting Technology Division,
Information and Communications Policy Bureau, MIC

Contact us:
btd_i@ml.soumu.go.jp