ISDB-T applications
Present and Future

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Digital broadcasting experts group
ISDB-T is filled with leading-edge technologies to make your dreams come true!
Contents

- Present services of ISDB-T
- Future services of ISDB-T
Present services of ISDB-T
**Powerful applications**

**HDTV**
- High quality image on wide screen and CD quality sound.

**Data broadcasting**
- Local news and weather forecast for viewers at any time.

**Mobile accesses**
- Transmission service to Mobile accesses

**Multi-channel program**
- Standard quality multi-channel service

**Interactive TV**
- Offers Interactive service
HDTV

High Definition Television Program

- The high quality images on a 16x9 wide screen and CD-quality sound make you feel as if you were at the theater.
- European broadcasters have opted for “multi-channel” strategy, but Japanese broadcasters have chosen to take advantages of “high definition” pictures.
- HDTV is a killer application.
More than 90% of TV sets in the market have a 16x9 wide panel.

Wide panel TV sets have been the mainstream.
HDTV (3)

- On a wide panel TV set, standard definition programs are displayed either with side panels or trims.

Side panels

Trims
Multi channel program

ISDB-T can transmit multiple SD programs simultaneously on a single digital spectrum.

SD-1

SD-2

SD-3
Data broadcasting (1)

Data broadcasting is an additional service.

By clicking on d-button of a remote control unit, you can access your requested information such as local weather forecast, 24H news and information linked to on-air program.

Local weather forecast  Local news  Information linked to on-air program
Data broadcasting (2)

Basic page format

- Present time and date
- Today’s recommendation
- Weather forecast
- News
- Fortune-telling service
- Local weather information
- News banner
- TV station ad banner
Data broadcasting (3)

- 2 types of data services:
  - **Program-linked contents**
    - Information service linked to on-air programs
    - Accessible during on-air
  - **Non-linked contents**
    - Information service not linked to on-air programs
    - Accessible any time
Data broadcasting (4)

Program-linked data contents

On-air program

Basic page format

Click on d-button

Linked data page format

Click on a program title

Contents
Menu
Data broadcasting (5)

Non-linked contents

Today's recommendation

Weather forecast

News

Fortune-telling service
An Electronic Program Guide (EPG) is an interactive schedule of current and upcoming programs that a viewer can display on-screen simply by pressing a button on his remote control unit.
**One-Seg service (1)**

- **One-Seg** is abbreviation for “one segment service”.
- **One-Seg launched on April 1, 2006**.
- **More than 3.4 million cell phones with One-Seg service have been sold in the market according to JEITA statistics of Nov. 2006.**

![Graph showing domestic shipments of One-Seg cell phones in 2006](image)
One-Seg service (2)

- The One-Seg service is transmitting moving images to cell phones, car TVs, personal computers etc. so that you can enjoy digital terrestrial television programs anytime anywhere.

- Merits
  - Stable reception in a mobile environment.
  - High quality video & audio in a mobile environment.
  - Robustness against noise and multi-pass.
One-Seg service (4)

- Video (H.264)  
  *approx. 180-256kbps*

- Audio (AAC-SBR)  
  *approx. 32-64kbps*

- Data-cast (BML)  
  *approx. 20-80kbps*
**One-Seg service (5)**

**Example parameter**
- Modulation: QPSK
- Code Ratio: 2/3
- Guard Interval: 1/8
- Bit Rate: 416 Kb/s

**On-air program**

**Data service**
One-Seg service (6)

No subscription fee and Powerful television contents

Unique & Unparalleled Feature in the world
Example of business model

- Additional information service
  The service can show additional information linked to on-air programs such as information on athletes and celebrities, recipes, questionnaire and quiz.

- TV shopping
  The service enables viewers to purchase commercial goods shown on shopping program.

- Local service
  The service can provide local information such as emergency alerts, local events, notice from local government or hospital.
One-Seg service (8)

One-seg receiver

Cell phone

Car TV

E-Dictionary

USB Tuner

Audio player

PC
HDTV mobile access (1)

- Reflected Wave
- Direct Wave
- Moving Vehicle
HDTV mobile access (2)

Adaptive Array Antenna on the vehicle's window

Adaptive Array Antenna

Receiving device

HD receiver

Antenna
Direction
Control
Doppler Shift
Compensation

Decoder
HDTV mobile access (3)

Comparison test on HD mobile access

Digital Broadcasting

Analog Broadcasting
HDTV mobile access (4)

HDTV tuner for automobiles is now on sale.

Digital terrestrial television broadcasting tuner for automobiles

LCD for automobiles

High quality image wide-LCD panel. Faithful reproduction of DVD and digital terrestrial television broadcasting image
Future Services of ISDB-T
**Mobile access on the bullet train (1)**

Experimental test result on mobile access on the bullet train.

**Indoor test result**

*QPSK, FEC=1/2, GI=1/4, Mode3, Max Speed=494km/h*

**Field test result**

*Experimental test was carried on a Tohoku bullet train at Sendai city, northern part of Japan.*

*Constant speed 275km/h*

*Mode2, FEC=1/2, GI=1/4, T.I=0.43ms*

**Percentage of reception rate (excluding tunnel areas)**

- QSPK 90.3 %
- 16QAM 74.5 %
**Mobile access on the bullet train (2)**

**Time Interleaving advantage**

- According to the result of the experimental test;
- Time interleaving improves required C/N more than 7 dB in the mobile environment of a bullet train at 16QAM.
- Diversity antenna system improves also more than 7dB at 16QAM.
- ISDB-T has an advantage in mobile environment.
- Time interleaving improves the resistance against impulse noise interference that comes from power lines and motor cycle engines.
One-Seg service in a subway car (1)

- **SFP, Subway Filling Project, is organized by 6 major broadcaster, Hitachi, Panasonic, Sanyo, and Tokyo Metropolitan Subway. SFP carried out a One-Seg access test on a subway car inside the tunnel in March 2006.**
One-Seg service in a subway car (2)

One-seg service on the subway car is convenient for passengers, and in the case of emergencies or disasters, it can be used to provide emergency information to the passengers.
One-Seg service in a subway car (3)

Access test in two Methods

- Deployment of multiple re-transmitters
- Laying LCX, leakage coaxial cable

*Image of LCX function*
One-Seg service in a subway car (4)

Conceptual diagram on the test methods
One-Seg service in a subway car (5)

Conclusion

- More than 80% of reception rate was accomplished with re-transmitters with the power of less than 1W located 300m intervals through the tunnel.
- The method of multiple re-transmitters is cheaper than the method of LCX.
One-Seg service in a subway car (6)

- Antenna for re-transmitter mounted on the ceiling of station
- Reception antenna for re-transmission located within the car
One-Seg service in a subway car(7)
Local government service on DTTB (1)

Background

(1) Integrated service of DTTB/Communication is considered as a tool for administrative services.

(2) Gifu prefecture, central area of Japan, carried out an experimental test in Feb. 2004 to evaluate effects of the integrated service with DTTB/Communication for local government community services.

(3) The local government, local public organizations, communication carrier, broadcasters and MIC participated in this experimental test.
Local government service on DTTB (2)

Outline of local government information service on DTTB

Data Center

Broadcaster

Internet

DTTB

Public Facility Reservation

Library Information

Monitor households (approximately 150 households)

What’s new

Q&A
Local government service on DTTB (3)

Data editing flow & transmission image

Data editing & Pre-view

Main Terminal → Pre-view & Transmission → DTTB Tuner → Receiver

Image of data broadcasting transmission

Carousel Transmission

Packetize

Text data

Picture data

Receive all packets and decode

1 2 3 4 5 6 7 8 9 10
Local government service on DTTB (4)

Example of data broadcasting carousel contents

1. Guide & reservation of sports facilities
2. Guide & rental service of the library
3. Information on the library
4. Information on the food market
5. Sightseeing guide
6. Questionnaire
7. Mini-game
I SDB-T seminar in Jakarta

Thank you for your attention!

END