Presentation 3

Current Situation and Prospect of Digital Terrestrial Broadcasting in Japan

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Outline of Digital Broadcasting Service

• High quality TV (no ghost, no noise)
• 1 channel HDTV service
• Multi-channel SDTV
• High quality Sound/Multi-lingual service
• Data Broadcasting
• EPG: Check program guide easily
• Mobile reception - now on development stage
• Portable reception service - in near future
Digital Terrestrial Broadcasting Licensing Policy

- Form of Broadcasting
  - HDTV/SDTV + supplemental broadcasts (data broadcasting)
- HDTV programming ratio
  - 50% or higher (in one week)
- Simulcast ratio
  - Over 2/3 of programming is shared with analog broadcasting.

An example of a broadcast form is shown on right.
### Examples of Business model of terrestrial digital broadcasting

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**Conventional TV broadcast**
- Clear picture quality even though SD and high-quality sound for CM and TV program
- Home-theater with wide screen/high quality picture and sound
- Multi-lingual and/or stereo
- Movie and sports event with 5.1 surround audio

**Digital cinema business**
- The digital cinema production by 24P and/or 30P
- Contents production for multi-use (movie, TV and DVD, broadband, etc.)
- e-cinema theater business

**Data-broadcasting business**
- (a supplemental broadcasting, CM linkage data service, Program-linkage data service)
- Mobile broadcasting business (mobile-phone, portable terminal)

**Internet broad-band business**

**Mobile phone information service business**

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**The world of cellular phone**
- 70 million users in Japan
- Anytime, anywhere
- I-mode, FOMA
- Co-operate with Internet

**The world of the Internet**
- Bi-directional/multi-functional service
- Broad-band (ADSL, fiber to the home)
Example of Menu Screen (BS Digital)

- HDTV main channel
- Favorite channels
- Programs in home server
- Audio services
- Program table
- E-mail
- Weather
- TV newspaper headlines
Multimedia EPG
(Electronic Program Guide)
Program Related Information
Anytime News
Service image of TV-asahi bi-directional trial data service

TV-asahi com.Plete! is the official portal site access from mobile phone. From this site, contents/information of TV-asahi TV program can be downloaded and participate to some variety program to which audience can be joined.
Dec. 2003 Launch the Digital Terrestrial Broadcasting in 3 area
Step by Step Enlargement of Cover Area

Digital Terrestrial Broadcasting has started in 3 areas (Tokyo(Kanto), Nagoya(Tyukyo), Osaka(Kansai) on Dec. 1, 2003.

At early stage, transmitter power is suppressed to avoid interference to analog TV channel, but step by step increase the transmitter power and finally reach to full power operation.

In other area, Digital terrestrial broadcasting will start during 2004-2006.
The area which will start terrestrial digital television broadcast in December, 2003
Stage by Stage Enlargement of DTTB Service Area (1/3)

Kanto wide Area

Dec. 1st, 2003

- NHK General
- NHK Educational
- Private Network (6)

End of 2004

- NHK General
- NHK Educational
- Private Network (6)

End of 2005 (maximum output)

- All Broadcasters

Should be covered by translator by 2008-2009

Tokyo Tower
Stage by Stage Enlargement of DTTB Service Area (2/3)

Chukyo wide Area

Seto tower

Dec.1st, 2003
NHK and Private Network

End of 2005
(maximum output)
NHK and Private Network

Should be covered by translator by 2008-2009
Stage by Stage Enlargement of DTTB Service Area (3/3)

Kinki wide Area

- Dec. 1st, 2003
  - NHK and Private Network

- End of 2004
  - NHK and Private Network

- End of 2005 (maximum output)
  - NHK and Private Network

Should be covered by translator by 2008-2009.

Ikoma Mt.
Examples of Broadcasterer’s equipment

**Master system**: During analog simulcast period, Master system should treat both analog TV program and Digital TV program simultaneously. -Show the outline of TV Tokyo master system as an example

**Transmitter**: Digital Transmitter should be separately prepared. - Show the block-diagram and out-of-view of Tokyo tower transmitter as an example

**Antenna**: 3 area starting at Dec. 2003, analog TV channels are mainly located in VHF Band, therefore, antenna for Digital Broadcasting should be prepared separately. -Show the out-of-view of Tokyo tower as an example
Equipment design concept (TV Tokyo)

- Total system correspondent to both terrestrial digital and analog broadcasting service
- Correspondent to variety of service and flexible program
- Correspondent to variety of many kind of program
- Network operation with group broadcasters
- High cost performance
Concept master system (TV Tokyo)

- HD studio, Tennozu studio
- OB van for HD, FPU, SNG
- WDM multiplex and distribution (controlled by APS)
- Master equipment, such as, Program Bank, CM Bank, VAF VTR
Master baseband system construct
(TV Tokyo)

SYSTEM MTX
- Multi-format router
- 8 ch. Audio embedded, channel mapping -
- Format converter control corresponding to conversion mode
- Q receiving control by VBI, ANC
- Change to different line by re-entry signal (for example SD2, SD3 to N12, N13)

Each systems, such as NET, BS, and On-air recording
The example of coding and multiplexing service form (TV Tokyo)

- Monitor at each point
- Monitor by commercial receiver verification
- Check data broadcasting
- Recording Broadcast TS and Reproducing

- 1080 ENC
  - 480p ENC
  - 480i ENC
- SI
- Text super
- Data broadcasting

- MUX

- SCRAMBLER (ECM)

- SYS CHANGE

- OFDM MOD

- Receiver A
  - Receiver B
  - Receiver C
  - Receiver D

- MOD for check
  - TS monitor analysis, record/re-produce
- Data-broadcasting

- Monitor, verification system
  - TS MTX
The example of service configuration (ex. 1)

**HD, SD multi-CH, Multi-view, Extraordinary service**

- Data broadcasting, Tele-text, Character super-impose, Portable receiving service

![Diagram showing service configuration](image-url)
The example of service configuration (ex. 2)

HD, SD 2-CH, Multi-view, Extraordinary service  Data broadcasting, Tele-text, Character super-impose, Portable receiving service

SV1(HD)  ANC INS  1080 ENC  MUX
  |   |   |   |
  |   |   |   |
  |   |   |   |
  |   |   |   |
  Tele-text

SV2(SD)  ANC INS  480p ENC
  |   |   |   |
  |   |   |   |
  |   |   |   |
  |   |   |   |
  Tele-text

SV3(SD)  ANC INS  480i ENC
  |   |   |   |
  |   |   |   |
  |   |   |   |
  |   |   |   |
  Tele-text

I/P conv  Down conv  480i ENC  480i ENC

Text super, SI/EPG, ECM
Data broadcasting (VBR, CBR)

071ch  072ch  073ch  077ch
The example of service configuration

**HD, SD multi-CH, Multi-view, Extraordinary service**
- Data broadcasting, Tele-text, Character super-impose, Portable receiving service

**Diagram:**
- SV1(HD)
  - ANC INS
  - I/P conv
  - Down conv
  - 1080 ENC
  - 480p ENC
  - 480i ENC
  - Mix
- SV2(SD)
  - ANC INS
  - Title
  - Down conv
  - 480i ENC
- SV3(SD)
  - ANC INS
  - Title
  - Down conv
  - 480i ENC
- Text super, SI/EPG, ECM
  - Data broadcasting (VBR, CBR)

Channels:
- 071ch
- 077ch
- 072ch
- 073ch
Concept of Data-broadcasting equipment

Contents
- Schedule management server
- Sending-out management server
- Carousel-generator
- Contents management server
- Automatic program server
- Play list for program, CM, etc.
- Real-time information, weather, market, news
- Carousel - transmission by APS
- Full redundant system

Contents are registered by BCML.
Example of Master system
(TV Tokyo)

- Operation by few clues
- Efficient positioning
- Multi-view and/or selection on wide screen LCD, PDP
- Use touch panel for operation
- Monitoring another line at monitoring booth
Example of Master system (TV-asahi)
Example of Video Server

VIDEOS™ (note)

Console

Equipment Racks

(note) Flash memory video server (Toshiba commercial model)
Example of Broadcasterer’s equipment (Transmitter and Antenna)

(5kW 3/2 system digital Transmitter)

Example of Tokyo Tower Transmitter/Antenna System
Example of digital terrestrial transmitter

5kW, 3/2 system (10kW output) in Tokyo Tower

(Toshiba)
TV Broadcasting Antennas Installed on the Tokyo Tower

- A number of analogue TV broadcasting antennas are already installed on the Tokyo Tower, leaving only a limited space for mounting of digital broadcasting antennas.

Digital TV antennas to be mounted here
Mounting Space for Digital TV Antennas on the Tokyo Tower

- The mounting space for the digital TV antennas is limited to a small space of 6 meters in width and 12 meters in height on the tower structure.

- A pattern synthesis technology is required to realize an omnidirectional radiation pattern using such a difficult space for mounting.
Future Plan & Expectation for digital broadcasting service in Japan

• Step by Step enlargement of broadcasting area
  ➞ Main Transmitter Construction in Other Area
  ➞ Transposer(repeater) Construction

• Expectation for new service style
  Commercialization of mobile receiver by development of receiving technology
  Portable reception service
  Home-server Broadcasting service
  Bi-directional service by Collaboration of communication and broadcast
Digital Broadcasting Experts Group

Server-type Broadcasting System

Program by Air transmitting

Broadcasting station

Home

Pick up favorite Pictures

Home server with large capacity storage

External storage
Interactive Broadcasting

Broadcasting station

Internet

Contents server / Portal server

Program + data

Response

Request

Interactive

Home

Send a request

Join the Quiz show by voting
Purchase on TV shopping
Future deployment

• Prediction of Digital Receiver Market
• Influence to Business, Industry and Life Style
Digital Broadcasting Experts Group

Cumulative Total of shipments of Digital Receiver

The accumulative Total of Shipments (Ksets)

- CRT
- PDP
- LCD
- STB

The World Cup

As of Dec 31, 2003

Total: 2,805Kset
Set Top Box: 880Kset
Integrated TV (CRT): 1,301Kset
Integrated TV (Plasma): 390Kset
Integrated TV (LCD): 234Kset

BS broadcasting launched
Panasonic Announced the Sale of PDP and LCD TV Sets

- ISDB-T tuners are installed in 37”, 42”, 50” PDP TV and 32”, 26”, 22” LCD TV.
Sony Announced the Sale of New Digital TV Sets

- New models
  - PDP 61”, 50”, 42”
    9 models
  - LCD 42”, 37”, 32”
    3 models
  - CRT 28”, 32”, 28”
    3 models
Ratios between Flat Panel Displays TV and CRT TV

Source: JEITA Electronics and Statistics Committee AV Forecast Working Group
Roundtable Conference on the Future Aspects of Broadcasting in the Broadband Age formulated the Targets of diffusion of terrestrial digital TV receiver units on April 15.
Targets of Diffusion of Digital Terrestrial TV receiver units

Roundtable Conference on the Future Aspects of Broadcasting in the Broadband Age formulated the Targets of diffusion of terrestrial digital TV receiver units on April 15.
Digital Broadcasting Receiver is the Core of Digital Consumer’s Products

- PDA
- Portable Receiver
- Car Receiver
- Home Server
- Wide-Screen display (home theater)
- Internet terminal
Fundamentals of Industry/Technology for Digital Broadcasting

- Video/audio Compression
- Meta-data
- Communication Protocol-Software
- Large-scale Video memory
- Digital Broadcasting
- Radio-wave core product
- Wide screen display
- High definition Small display (portable terminal)
- LSI (High speed digital process)
Reference: Scenario for digitalization of Broadcasting

1. Planning & estimation of digitalization (general)
2. Selection of standard system & evaluation
3a. Planning & estimation of digitalization (details)
3b. Development of Hardware & Software technologies
4. Start the digital broadcasting & move from analog to digital
Step 1: Planning & estimation of digitalization (general)

• Prediction for the effect of broadcast digitalization
  - Influence to Life-style of Citizens in future
  - Economical effect to market & industry
  - Harmonization with communication and information policy
  - Others

• Set up the long-term scenario
  - Long term migration from analog to digital
    (Spectrum planning etc)
  - Final image of broadcast service for citizens
  - Others
Step 2-b: Selection of standard system & evaluation

• Select the Standard for DTTB
  - Trial first! At first, Check its own performances and functions (HDTV and/or SDTV, fixed, mobile & portable use, Inter-operability with communication network, etc)
  - Commonality between other broadcasting-media
    Digital satellite, DTTB, Digital Audio, Cable, etc
  - Harmonize to Spectrum planning, Spectrum utilization efficiency

• Study, evaluation, proto-type test & technical evaluation

  Decide the standard system
Step 3-a: Planning & estimation of digitalization (details)

• Select the spectrum:
  - Which frequency band? - Bandwidth/channel, - Period of simulcast both analog and digital,

• Movement scenario from analog to digital

• Channel planning
  - Transmitter site locations and frequency allocation

• Service configuration in digital broadcasting system
  - Which types of Video/Audio format
  - Data-broadcasting
  - Receiving type; fixed, mobile, portable
  - Commonality and Inter-operability with Communication
Step 3-b; Development of Hardware & Software technologies

• Make up the operation guideline both broadcasters and consumer makers

• Development core technologies
  - Modem, Codec, Data-broadcasting Software, etc
  - Receiver commercialization (cost, performances, size, etc)

• Design and estimation for Broadcasterer’s equipment
  - Master system
  - Transmitter, transposer & transmitter network
Conclusions

• ISDB-T is the most flexible DTTV standard

• ISDB-T showed the best results in Brazil’s comparison test. The similar results were obtained in Singapore and Hong-Kong trials

• The sales of Digital TV receivers reached more than two millions and will increase rapidly around 2006 in Japan

• The analog channel re-arrangement is the first big challenge

• Developments of ISDB-T one-segment receiver and its components were announced in the end of 2003 in Japan. Mobile TV broadcasting will be launched in 2005.
Thank you for your attention!