Service feature of ISDB-T
Current and Future

SET 2006 Congresso

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DiBEG Japan
Yoshiki MARUYAMA
tv asahi

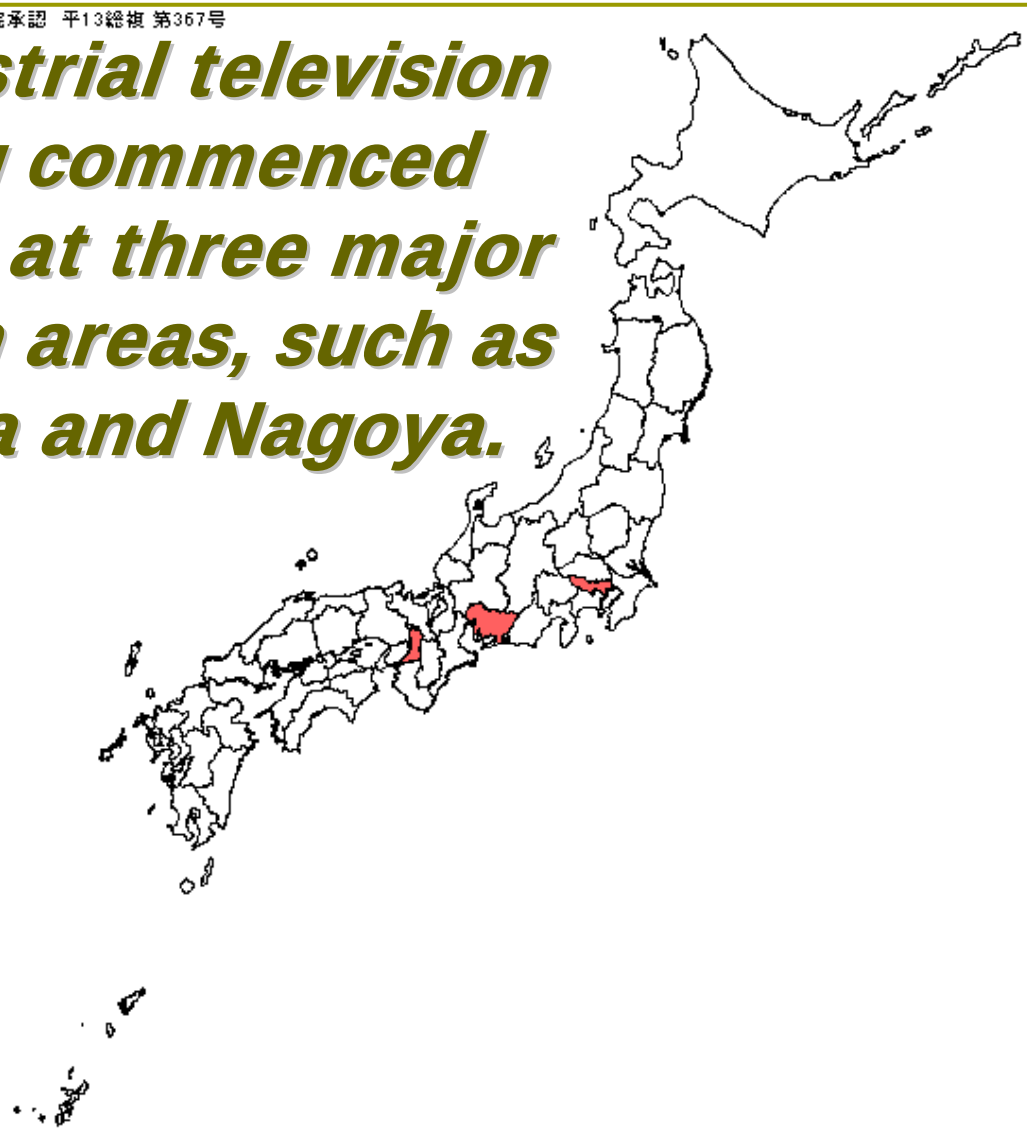
Contents

- *Current situation of ISDB-T*
- *Current service of ISDB-T*
- *Future service of ISDB-T*

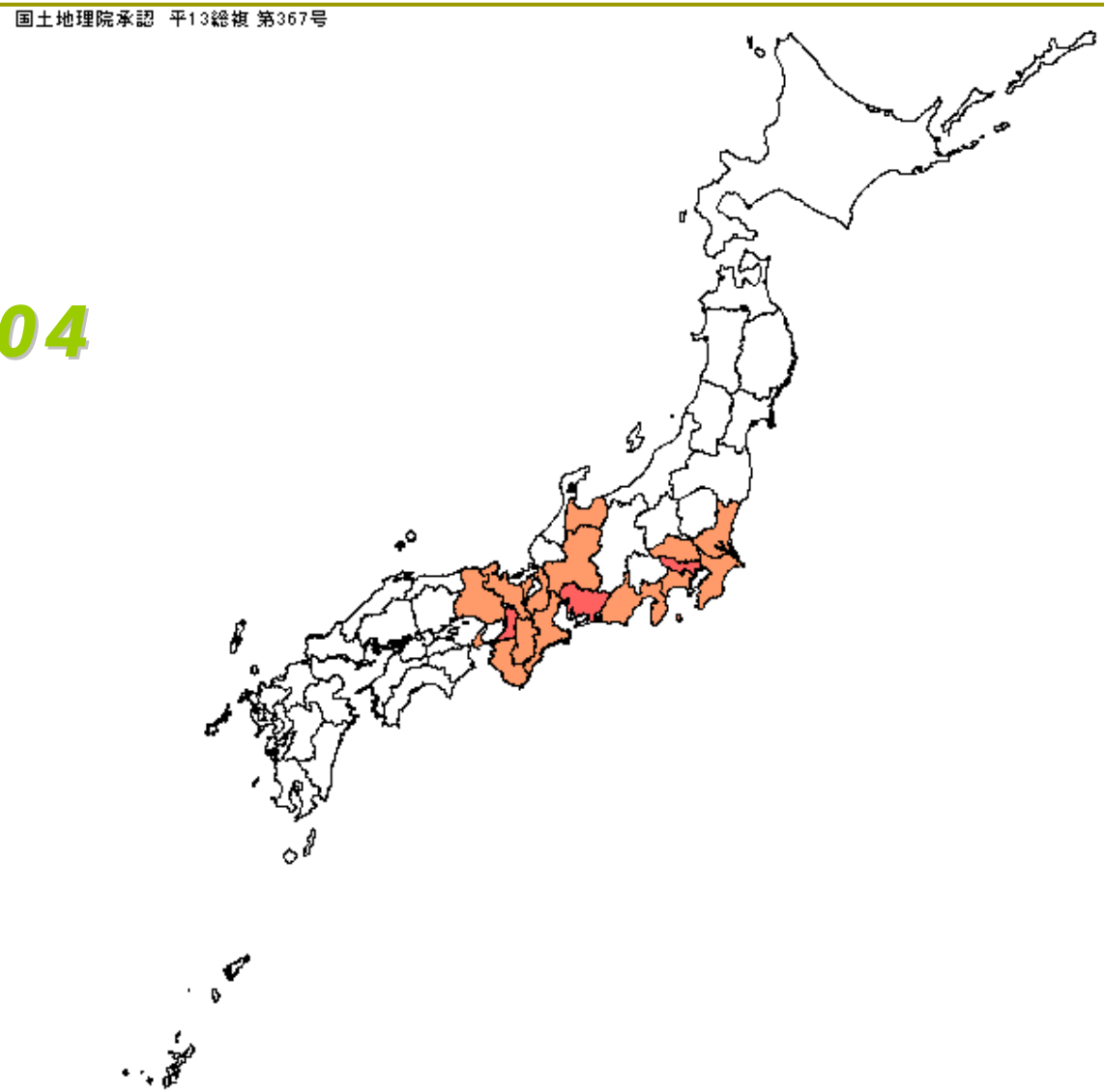
Current situation of ISDB-T

Expanding Service Area

Digital terrestrial television broadcasting commenced on Dec.2003 at three major metropolitan areas, such as Tokyo, Osaka and Nagoya.

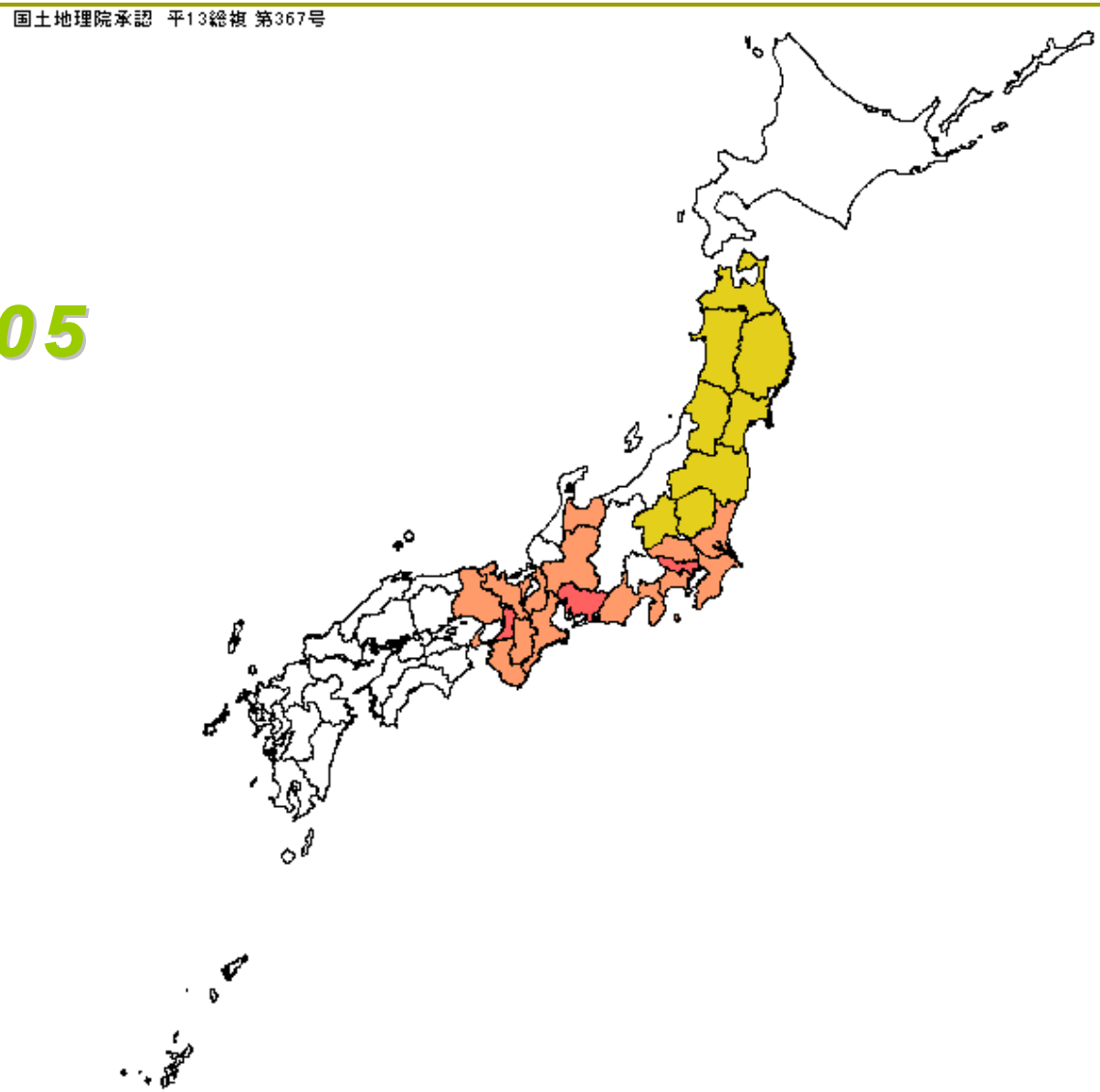


Expanding Service Area



Dec.2004

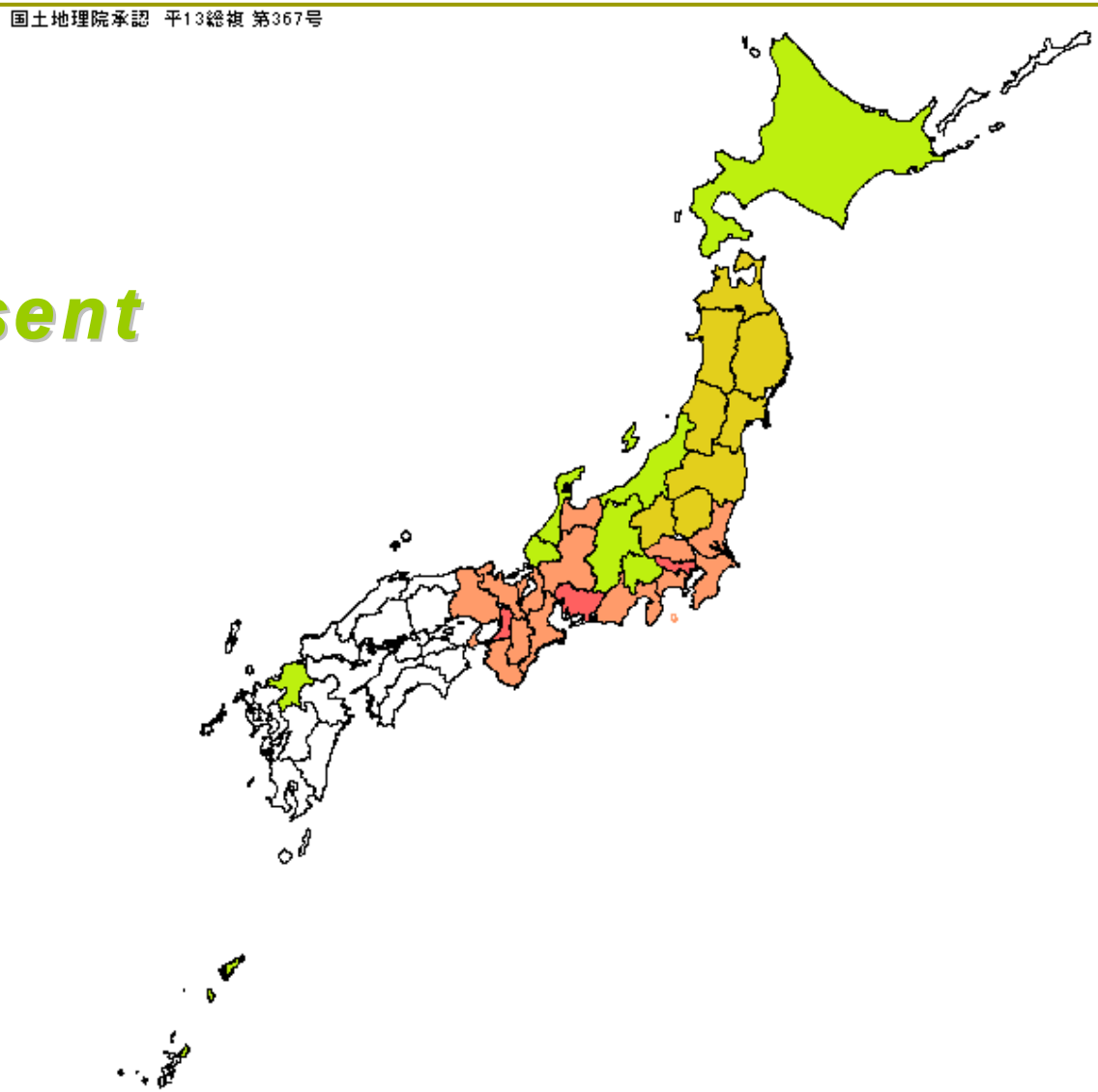
Expanding Service Area



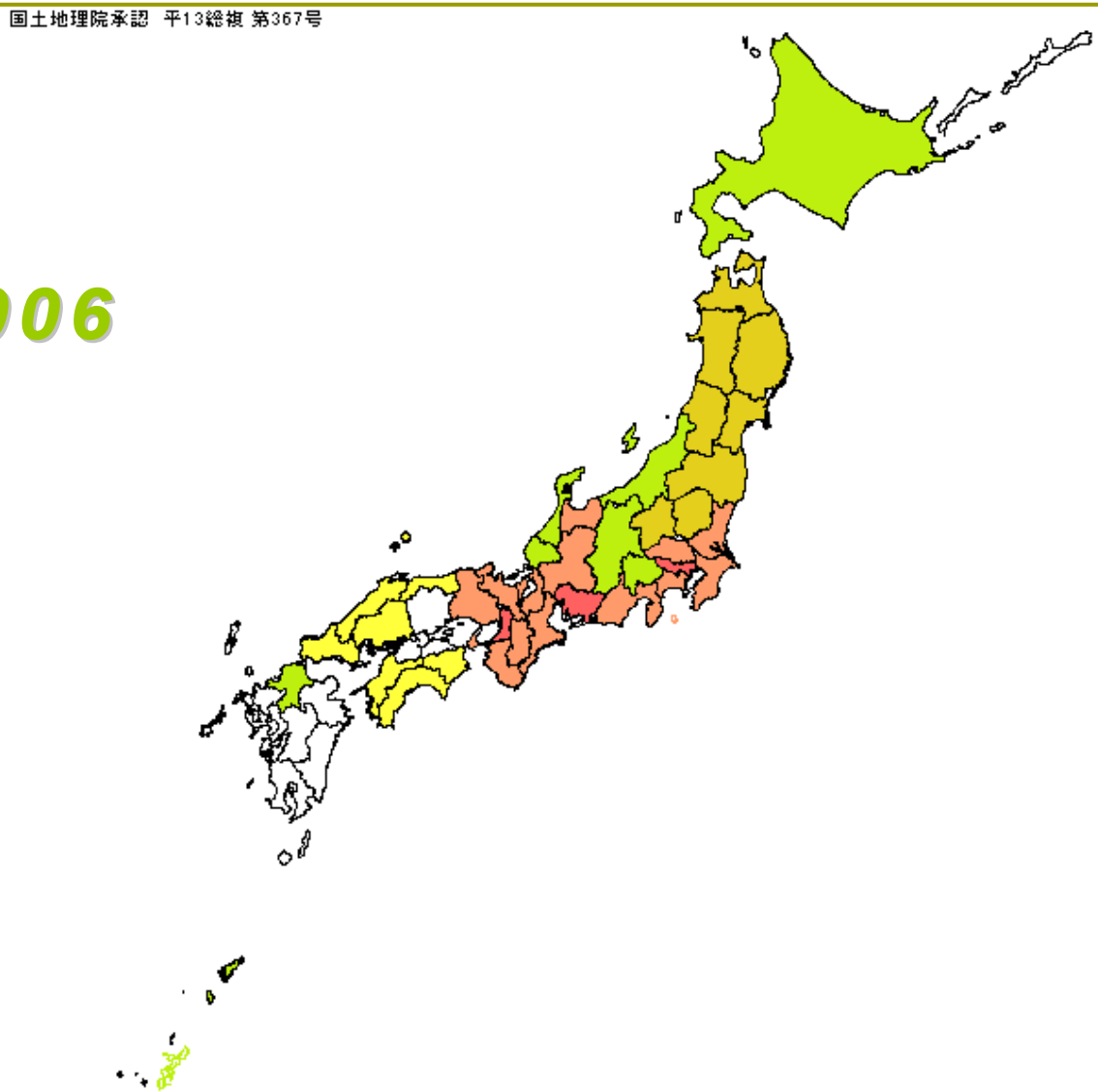
Dec.2005

Expanding Service Area

At present

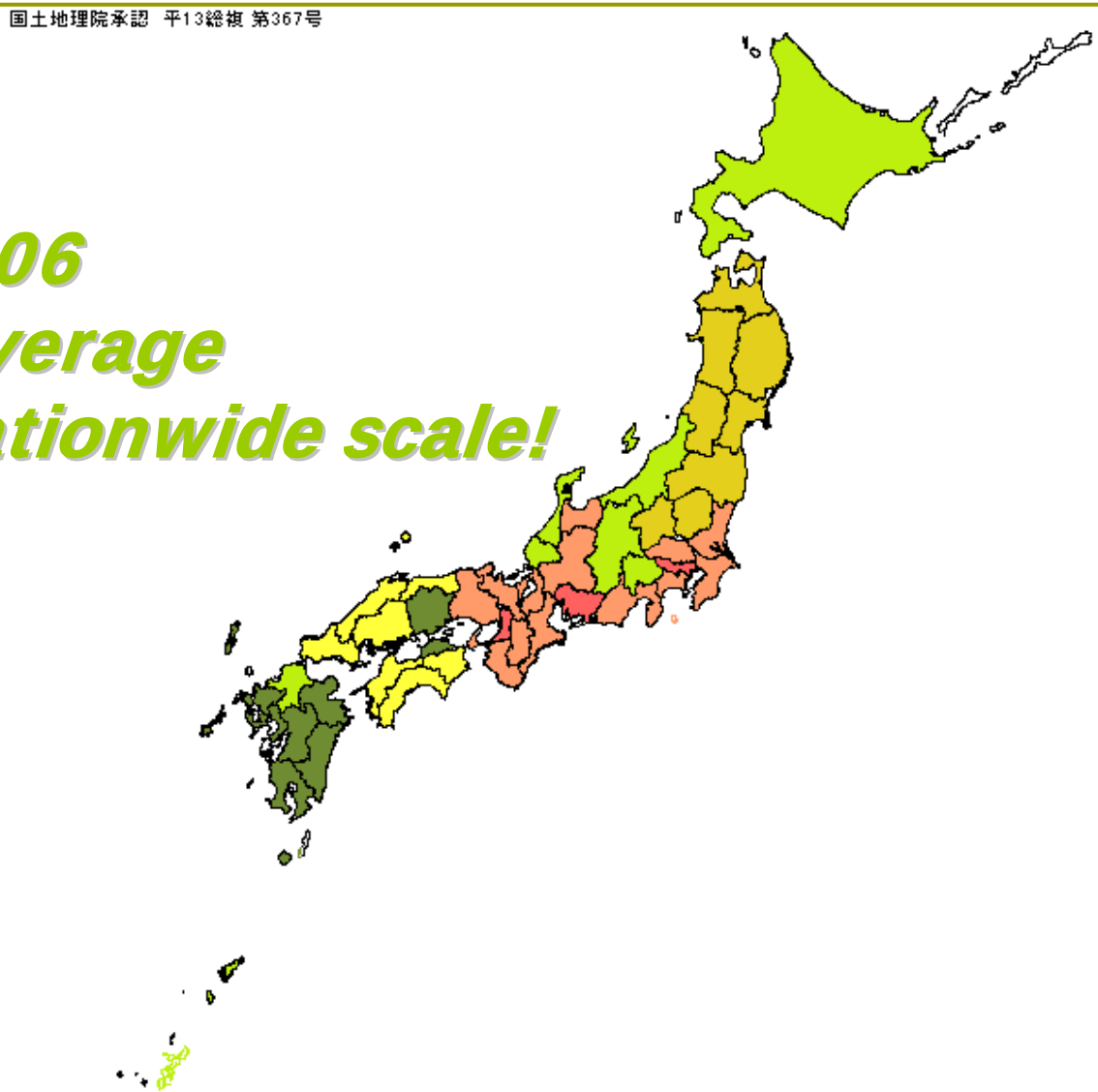


Expanding Service Area



Oct.2006

Expanding Service Area



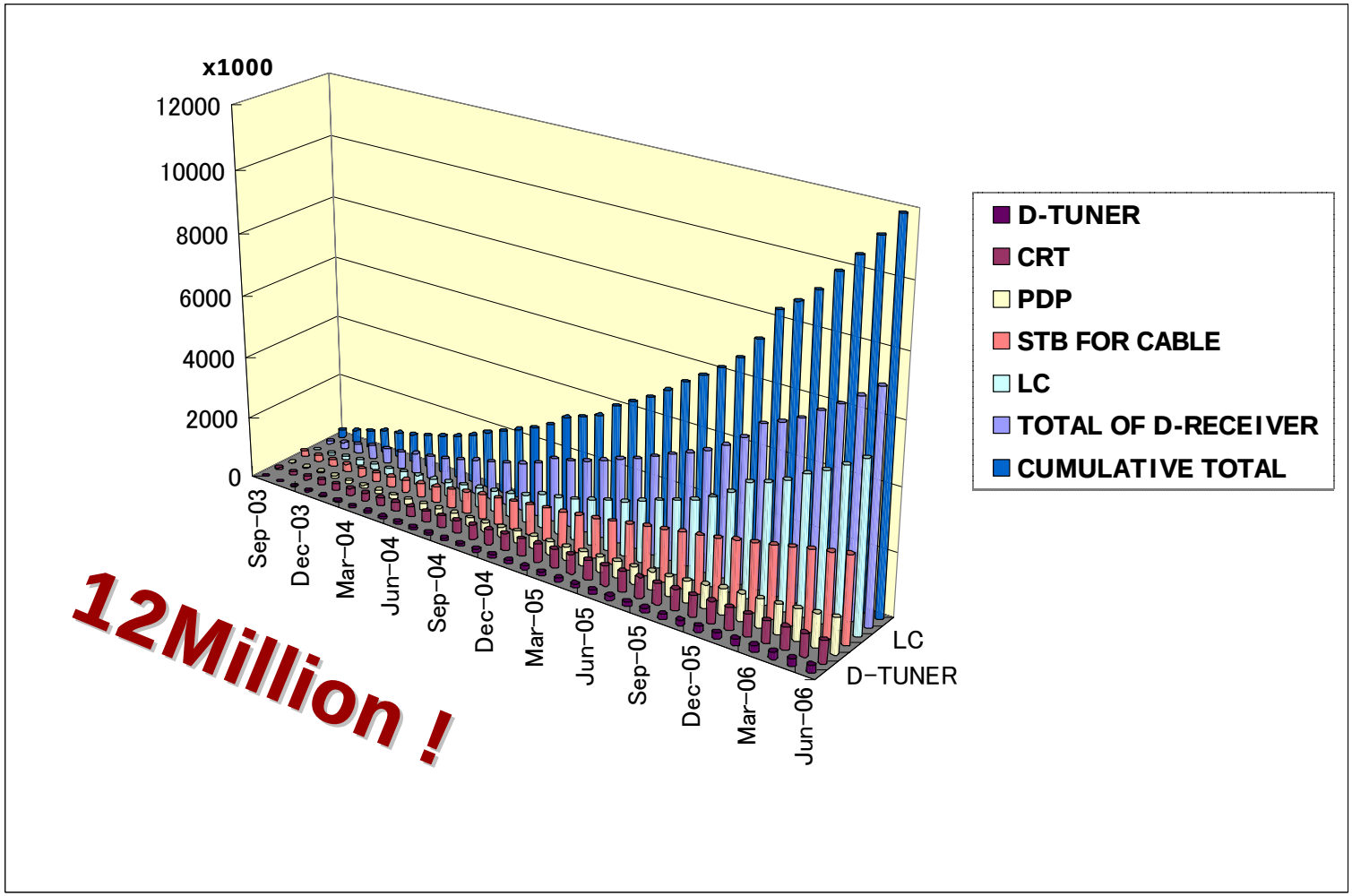
Dec.2006
Full coverage
on a nationwide scale!

Households coverage

Households coverage which can receive DTTB increase every year as shown below.

In December 2004 : 18.0 million 38%
In December 2005 : 28.4 million 60%
In December 2006 : 38.5 million 82%

Volume of shipment for DTTB receiver



Current service of ISDB-T

Unique Features of Japan's Digital Broadcast

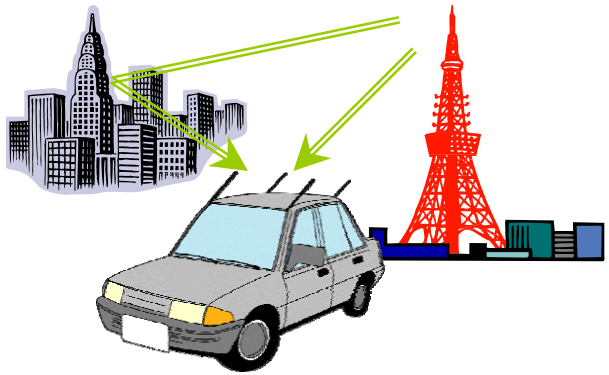
HDTV

- *High quality image and sound service.*

Data broadcasting

- *Simple program searching and retrieval of information at any time.*

Mobile reception

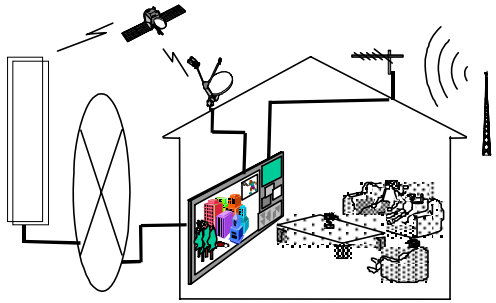


- *Stable reception service*

Multi-channel service

- *Realization of multiple channels*

Interactive TV



- *Communication services and linked TV service*

HDTV

High Definition Broadcast

- ✓ *Most powerful application*
- ✓ *The quality images on the wide, 16:9 aspect ratio screen and CD-quality sound make you feel as if you were there.*
- ✓ *European broadcasters have opted for "multi-channel" strategy, Japanese broadcasters have chosen to take advantages of "high definition" pictures.*

✓ **Pure HDTV : 16x9 1080i**

Multi channel SDTV

- *The bandwidth of a single digital channel can be used to transmit two or three programs with standard definition simultaneously.*
- *Multi-channel approach is presently positioned as an "experimental" .*

SD-1

SD-2

SD-3

Data broadcasting (1)

Data broadcasting is now on service.

- ✓Weather information
- ✓Anytime news
- ✓Result of sports game
- ✓Information associated TV program

Players list

Ongoing games

Example of soccer game

Other games result

Other information

Data broadcasting (2)

Current programme screen

Notification of Data broadcasting.

Top menu of soccer game Data

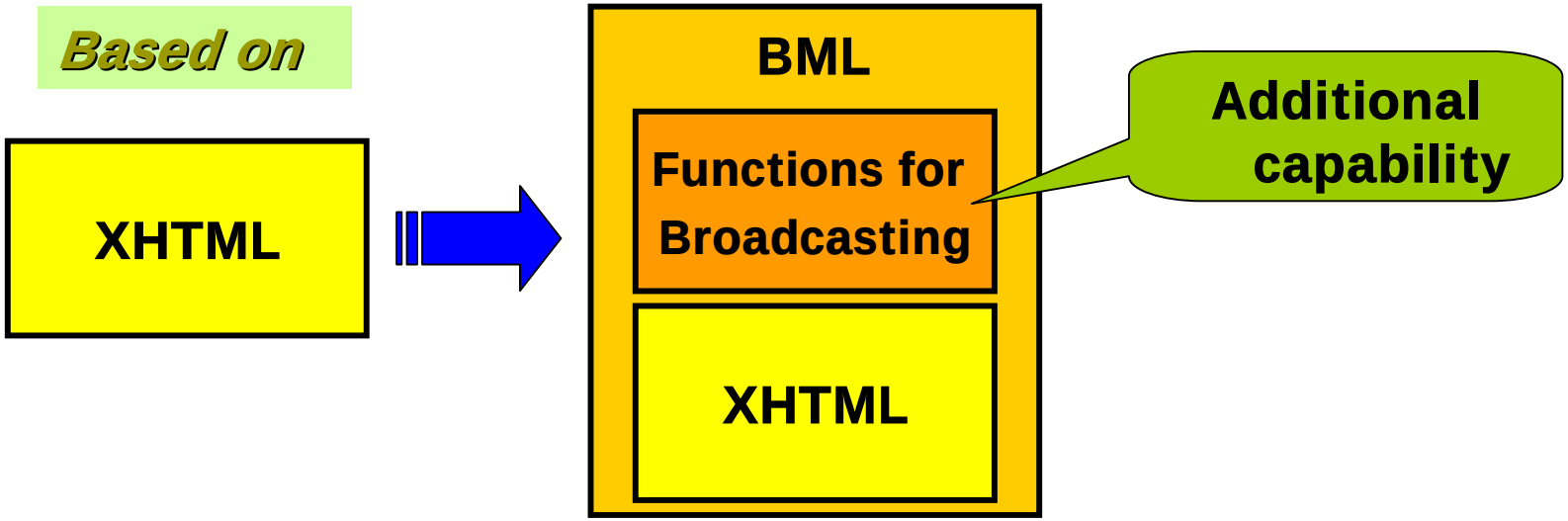
Player's list

Games schedule

Other games results

Data broadcasting (3)

- Description language is BML format
- Features:
  - ✓Easy creation of contents
  - ✓Affinity for internet



EPG

- **EPG (Electronic Program Guide)**
  - ✓ **An electronic programme guide (EPG) is a on-screen guide to scheduled broadcast television programs, allowing a viewer to navigate, select and discover content by time, title, channel, genre, etc, using their remote control.**

One-Seg service (1)

- One segment service launched from April 1,2006 .
- One-Seg is abbreviation of one segment service.
- Common logo was designed as shown below.

One-seg

One-Seg service (2)

- The One-Seg service sends images to mobile phones, car TV's, personal computers etc. so that you can enjoy digital terrestrial television broadcasting program anytime anywhere.

- Merits
  - ✓ Stable reception in a mobile environment.
  - ✓ High quality of video & audio in a mobile environment.
  - ✓ Robust to noise and multi-pass.

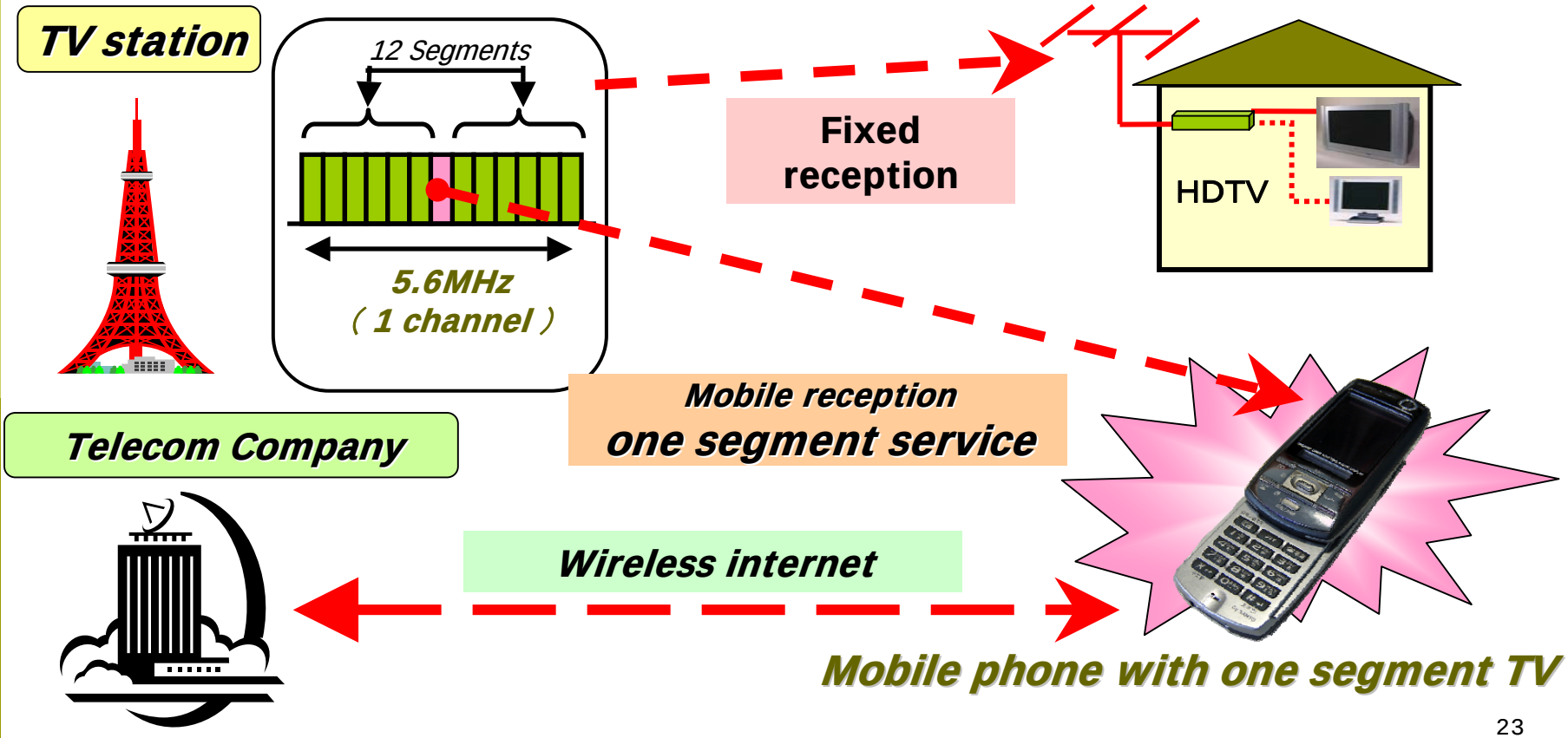
One-Seg service (3)

Comparison between ISDB-T and other systems

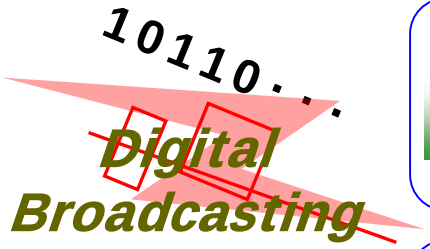
	ISDB-T	Other Systems
Transmission method	ISDB-T One-seg service	・T-DMB (KOR) ・DVB-H (mainly EU) ・Media FLO (US)
Service application	Video / Audio / Data	Video / Audio / Data
Assignment of new spectrum	Not necessary	Necessary
Additional license	Not necessary	Necessary
Service provider	Broadcaster	Broadcaster / Carrier / Other company

One-Seg service (4)

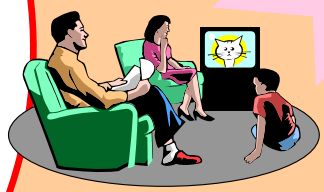
- *ISDB-T has a capability of segmentation in a channel and one seg TV uses only one segment as partial reception.*



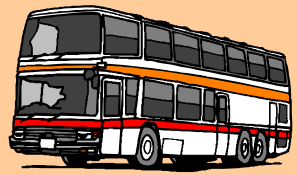
One-Seg service (5)



High definition picture
High quality sound



At home



In the Bus

For large screen television

Anytime
Anywhere

In the train

While
walking

For portable terminal

One-Seg service (6)

Video

Display Image

12:50 playback

Data Broadcasting
- Program information
- Today's news
- Forecast
- local information

Data

Example

Modulation	QPSK
Code Ratio	2/3
Guard Interval	1/8
Bit Rate	416 Kbps

One-Seg service (7)

One-seg receiver

au by KDDI

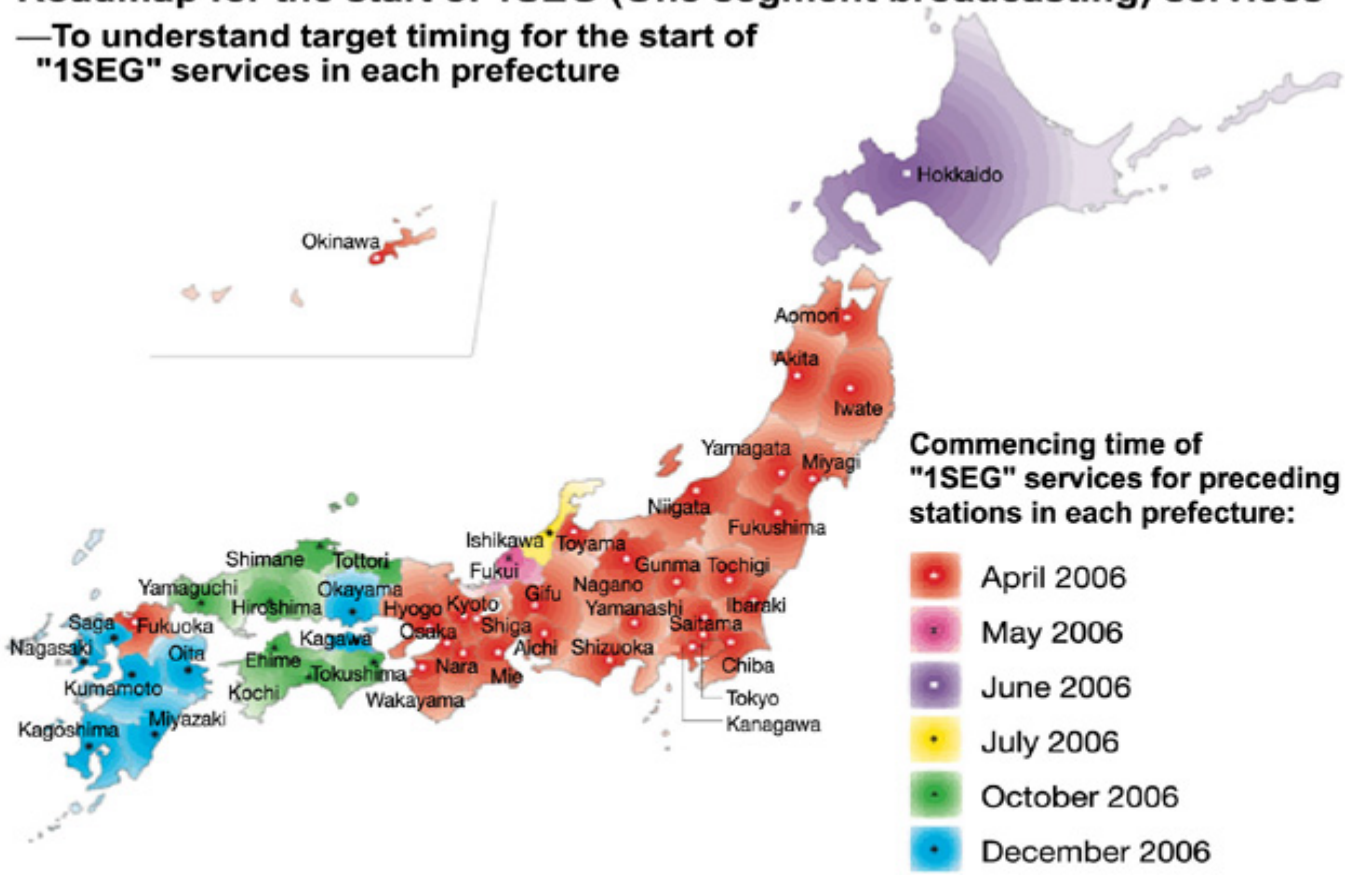
NTT DoCoMo

vodafone

One-Seg service (8)

Roadmap for the start of 1SEG (One segment broadcasting) services

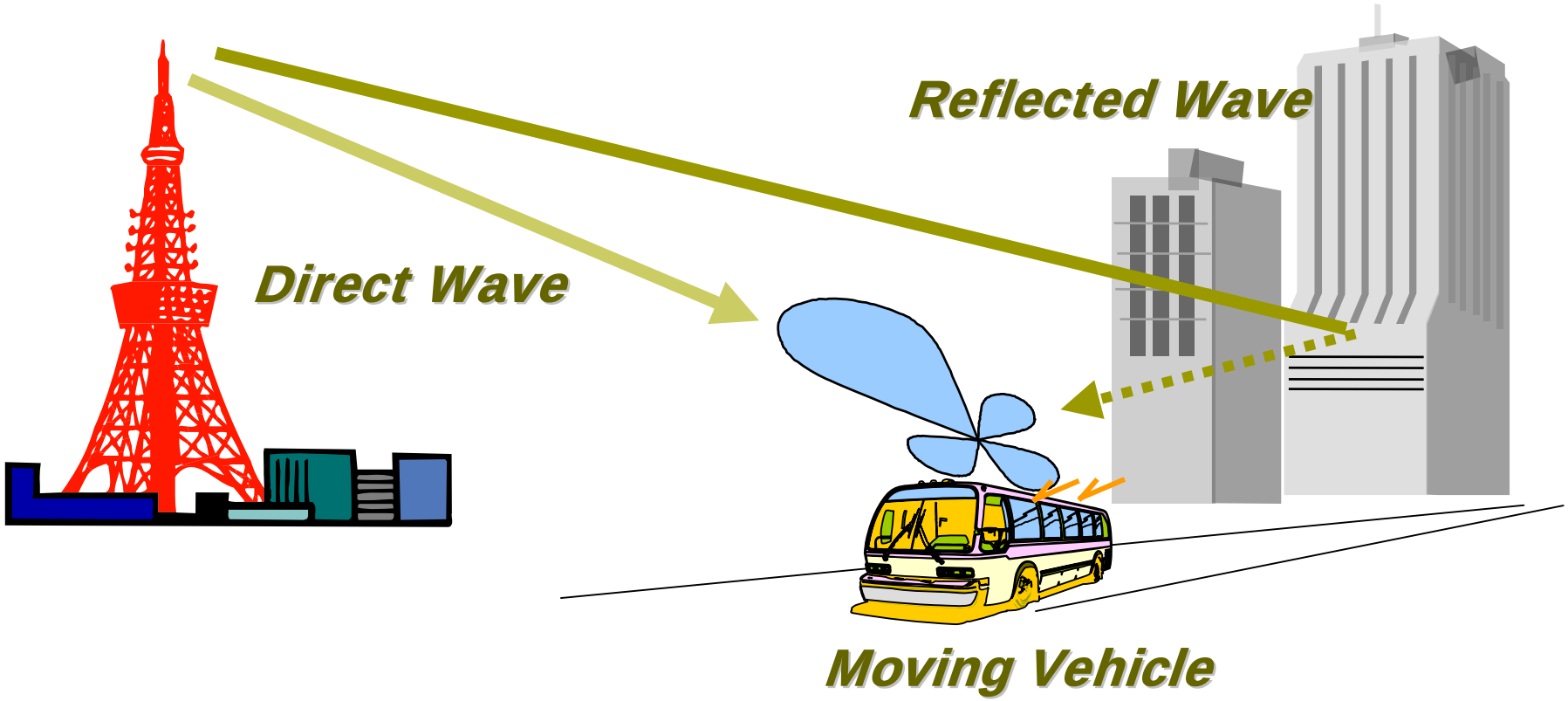
—To understand target timing for the start of "1SEG" services in each prefecture



Note:
The above roadmap shows target timing for the start of "1SEG" services in each prefecture as of November 2005.
Color cording on the map is according to the commencing time of "1SEG" services for preceding stations.

Future Service of ISDB-T

HDTV mobile reception (1)

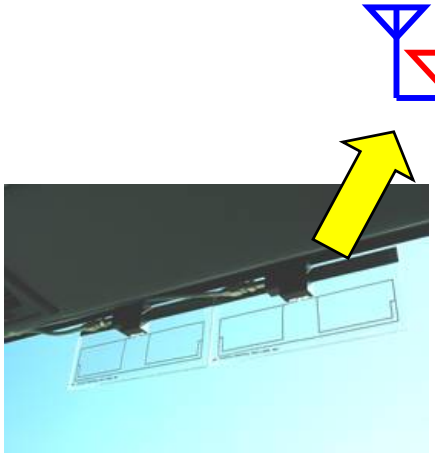


HDTV mobile reception (2)

Adaptive Array Antenna on the vehicle's window

Receiving device

HD receiver



Antenna Direction Control Doppler Shift Compensation

Decoder

Adaptive Array Antenna

HDTV mobile reception (3)

Comparison test for HD mobile reception

Digital Broadcasting

Analog Broadcasting

HDTV mobile reception (4)

World's first HDTV reception on public transport system

HDTV mobile reception on the tram

HD program was displayed

Complimentary photo by KNB , Kita Nihon Broadcasting Co.,

HDTV mobile reception (5)

In-vehicle HDTV tuner

Panasonic
ideas for life

Digital terrestrial television broadcasting tuner for automobile use

LCD for automobile use

High image quality wide LCD panel. Faithful reproduction DVD and digital terrestrial television broadcasting image

Mobile reception in a train (1)

Experimental test result for mobile reception on the train.

Indoor test result

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

Field test result

Experimental test has tried on 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 (without tunnel area)

- ***QSPK 90.3 %***
- ***16QAM 74.5 %***

Mobile reception in a train (2)

Time Interleaving advantage

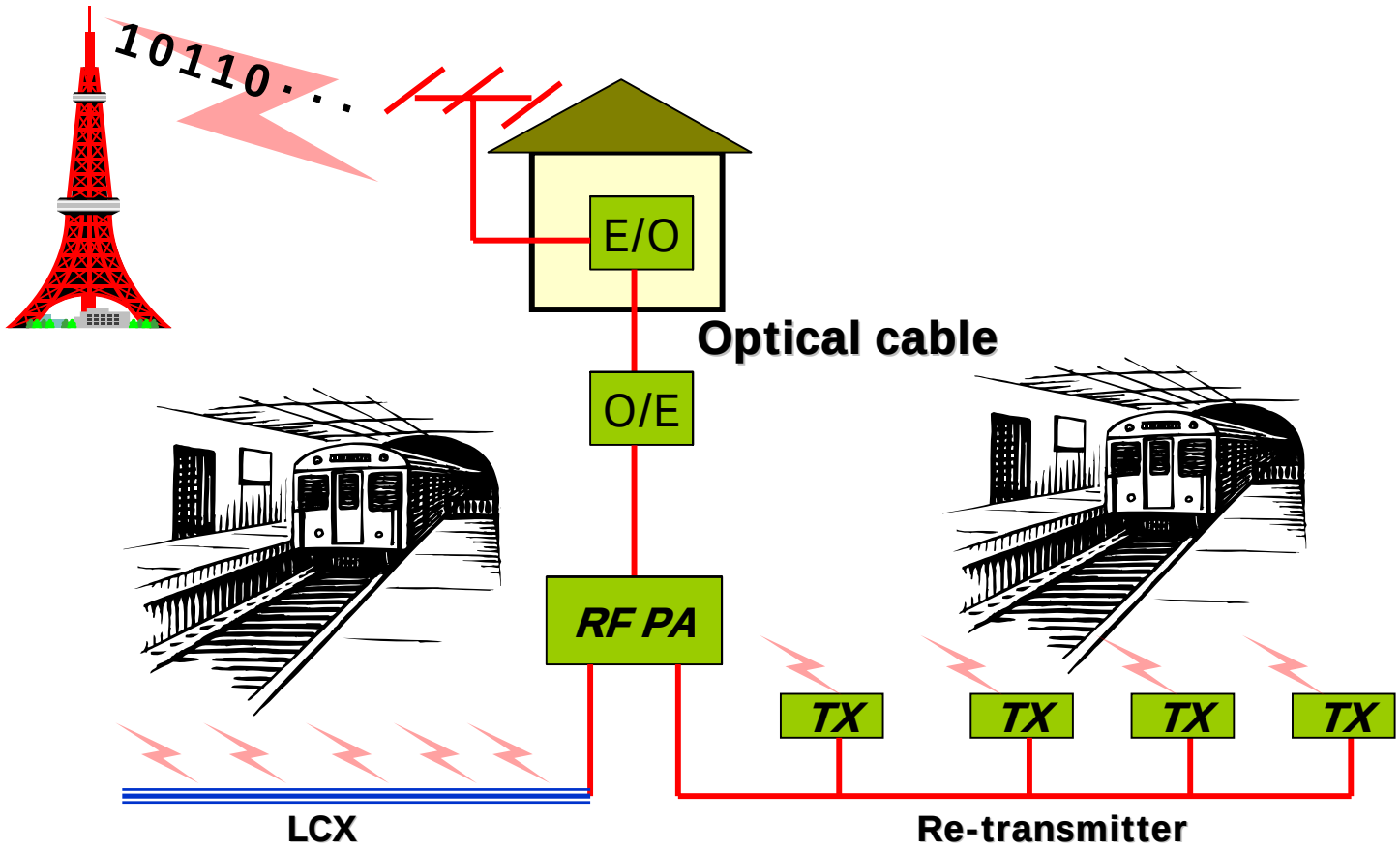
- As the experimental result, time interleaving improve required CN ratio about 7 dB in mobile environment on 16QAM.
- Diversity system improve about 7dB on 16QAM.
- Time interleaving (time diversity) work independently from space diversity.
- That is the reason for advantage of ISDB-T in mobile environment.
- Time interleaving improve robustness against impulse noise interference that come from power line and motor cycle engine.

One-Seg service in a subway car (1)

- 6 major broadcasters and Tokyo metropolitan subway demonstrated the fact that to receive one seg service in a subway car on March 2006.
- Re-transmission service in subway is convenient for passenger, and realize stable reception of one-seg service information is helpful for passenger even in times of emergency or disaster.

One-Seg service in a subway car (2)

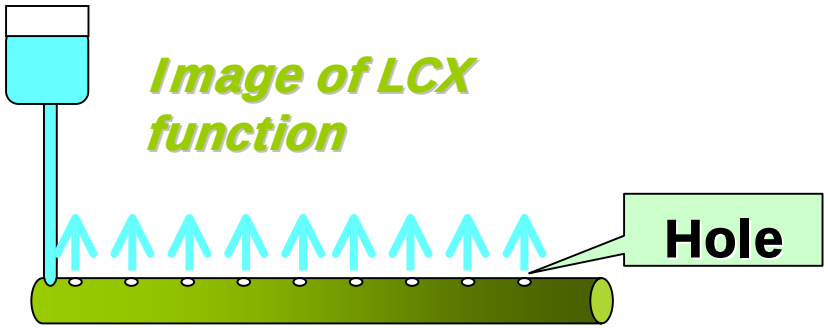
Conceptual diagram

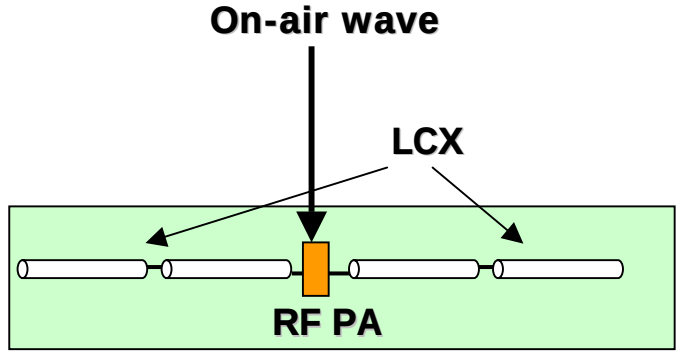


One-Seg service in a subway car (3)

Two solutions

- Deployment of re-transmitter
- Laying LCX, leakage coaxial cable





One-Seg service in a subway car (4)

Antenna for re-transmitter mounted on ceiling of station

Reception antenna for re-transmit in a subway car

One-Seg service in a subway car (5)

Re-re-transmition antenna in a subway car

Local government service on DTTB (1)

Background

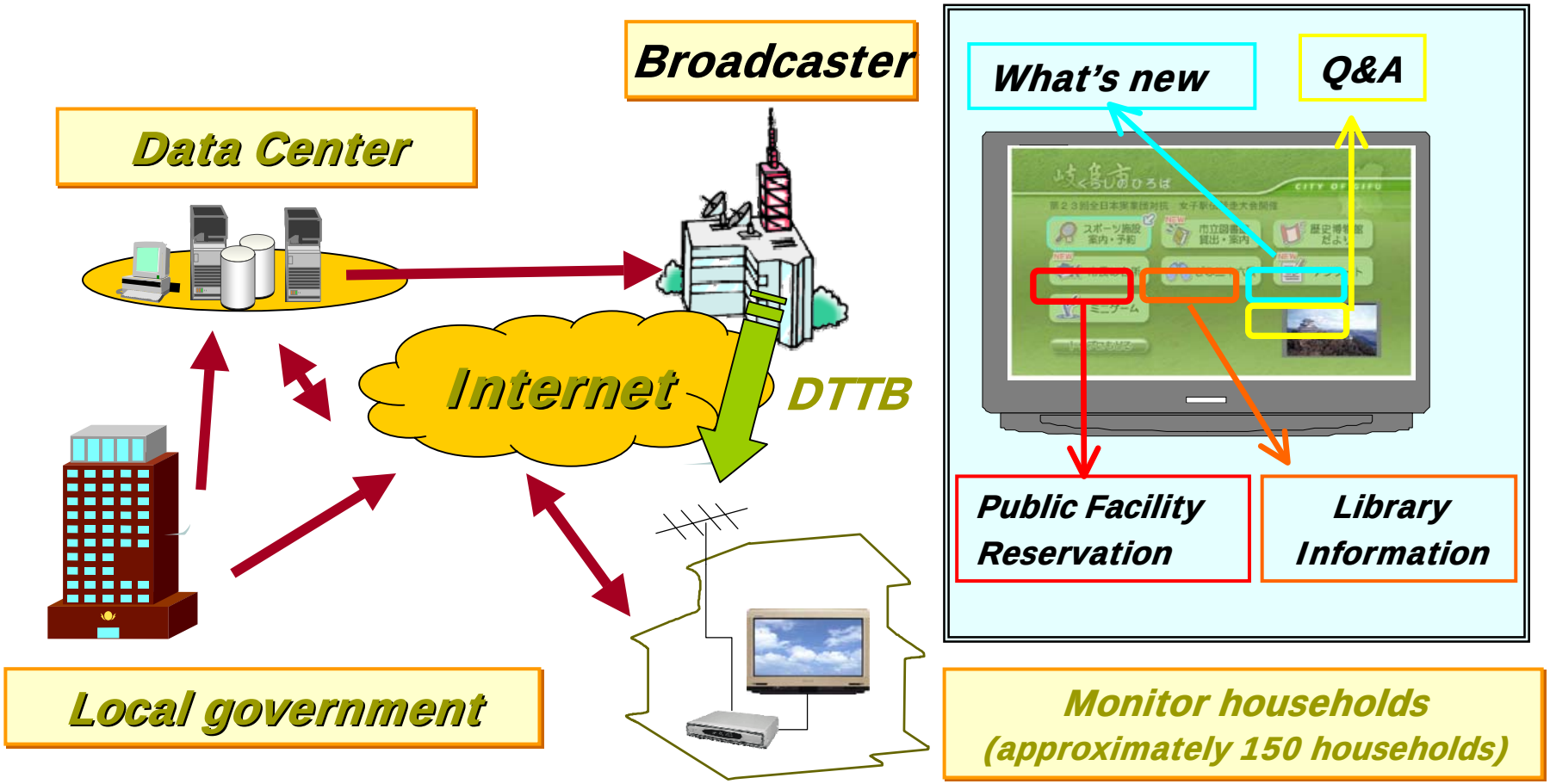
(1) Integrated service of DTTB/Communication is expected for administrative service.

(2) In Gifu prefecture, central area of Japan, conducted experimental test started on Feb. 2004 to evaluate the effect of integrated service of DTTB/Communication for local government community services.

(3) Local government, local public body, communication carrier, broadcaster and MIC participated this experimental test.

Local government service on DTTB (2)

Outline of local government information service on DTTB



Local government service on DTTB (3)

Data editing flow & transmission image

Data editing & Pre-view

Authoring Terminal

Pre-view & Transmission

DTTB Tuner

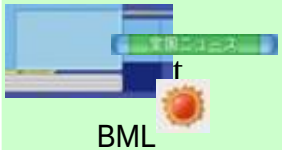
Receiver

Image of data broadcasting transmission

Text data

陸自後発部隊のサマワ入りに遅れ
放火で男性を殺害 出頭の女を逮捕
再選の豊田市長が初登庁…

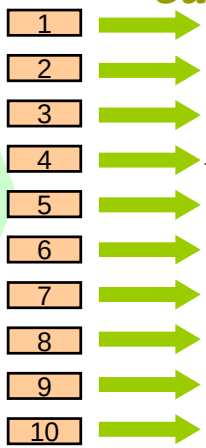
Picture data



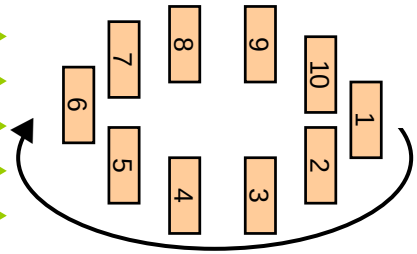
BML

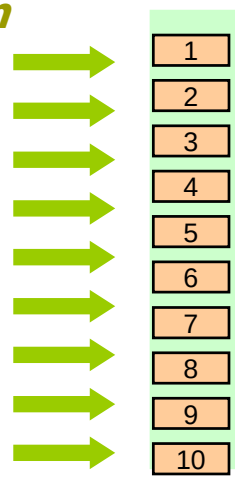
```
<body id="body">
<div id="divtv" class="tv">
  <object class="video" id="video"
  <object class="audio" id="audio"
</div>
<div id="op_box">
<div id="logo_box"> …
```

Packetize



Carousel Transmission





Receive all packets and decode

Local government service on DTTB (4)

Example of data broadcasting carousel contents

1.Guide & reservation of sports facilities

2.Guide & rental service of city library

3. Information of library

4.Information of foods market

5. Sightseeing guide

6.Questionaire

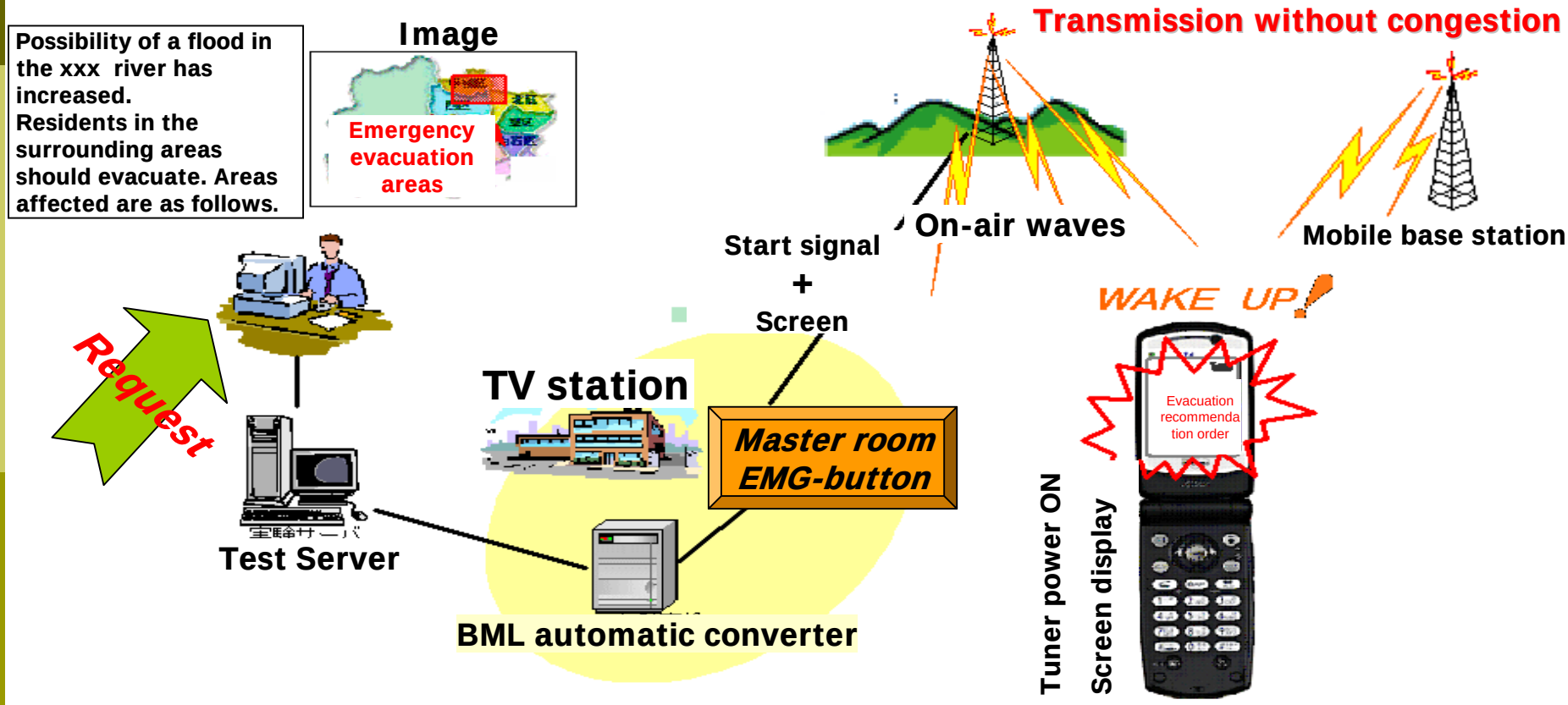
7. Mini-game

Application to Disaster Prevention(1)

- Realize a congestion-free transmission path even in times of disaster
- Realize stable information transmission even in times of emergency or disaster, through startup control.
- Realize communication paths according to areas and targets

Application to Disaster Prevention(2)

Schematic diagram for disaster prevention service



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Thank you
for your attention !
END

Digital Broadcasting Expert Group
http://www.dibeg.org
mail: info@dibeg.org