

HDTV Mobile Reception Performance for ISDB-T

SET 2006 CONGRESS

24th ,August, 2006

DiBEG JAPAN

Yasuo TAKAHASHI
(Toshiba)

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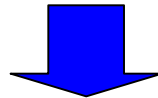
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What is ISDB-T?

- Integrated Service Digital Broadcasting – Terrestrial
- Standard system of Japanese DTTV (Digital Terrestrial TV broadcasting)
- Based on Band segmented OFDM transmission technology
- Adopt the time interleave technology for mobile reception
- Adopt MPEG2-Systems for Multiplexing



- **Flexibility of reception style**

Fixed reception, Mobile reception, Portable reception within same channel

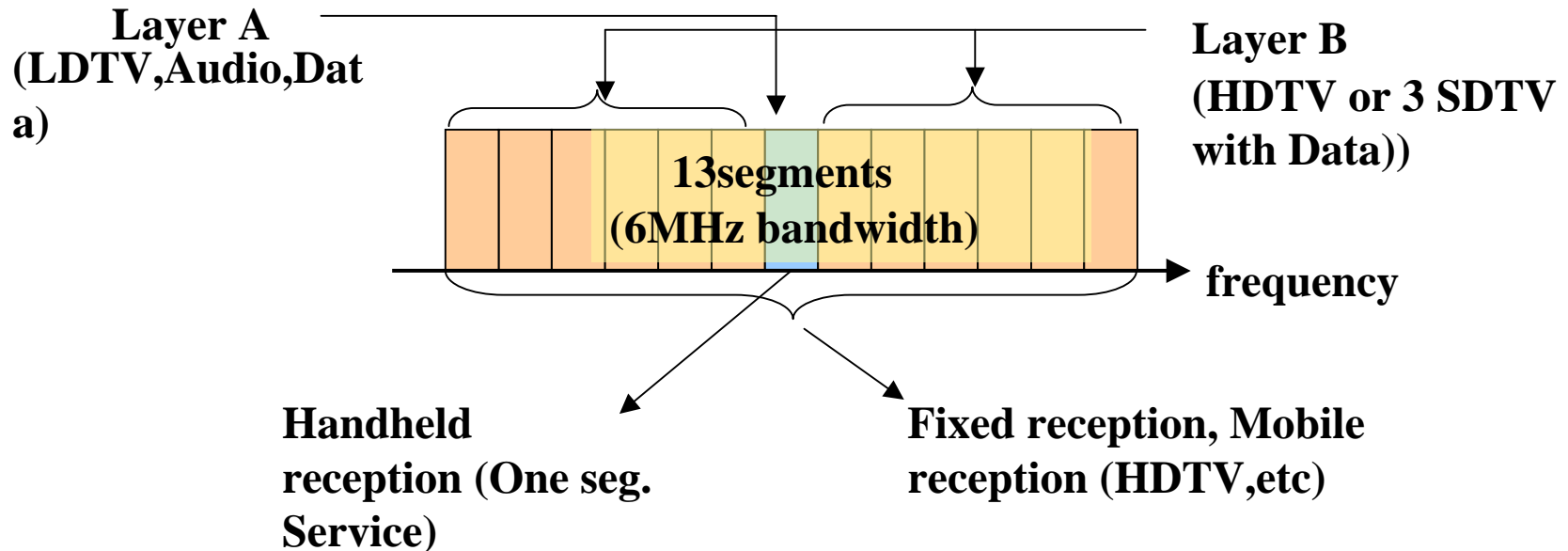
- **Flexibility of service**

HDTV, SDTV, Small picture for portable receiver, data-casting, etc

- **Inter-operability, etc.**

What is Band Segmented OFDM with time interleave?

(Example; 1seg + 12 seg)



- **Segmented OFDM**; Possible to support fixed/mobile/handheld reception service

- **Time interleave**; reduce impulse noise and reduce the degradation caused by fading (tested in Brazil by Mackenzie and TV GLOBO)

Feature of Japanese DTTB system

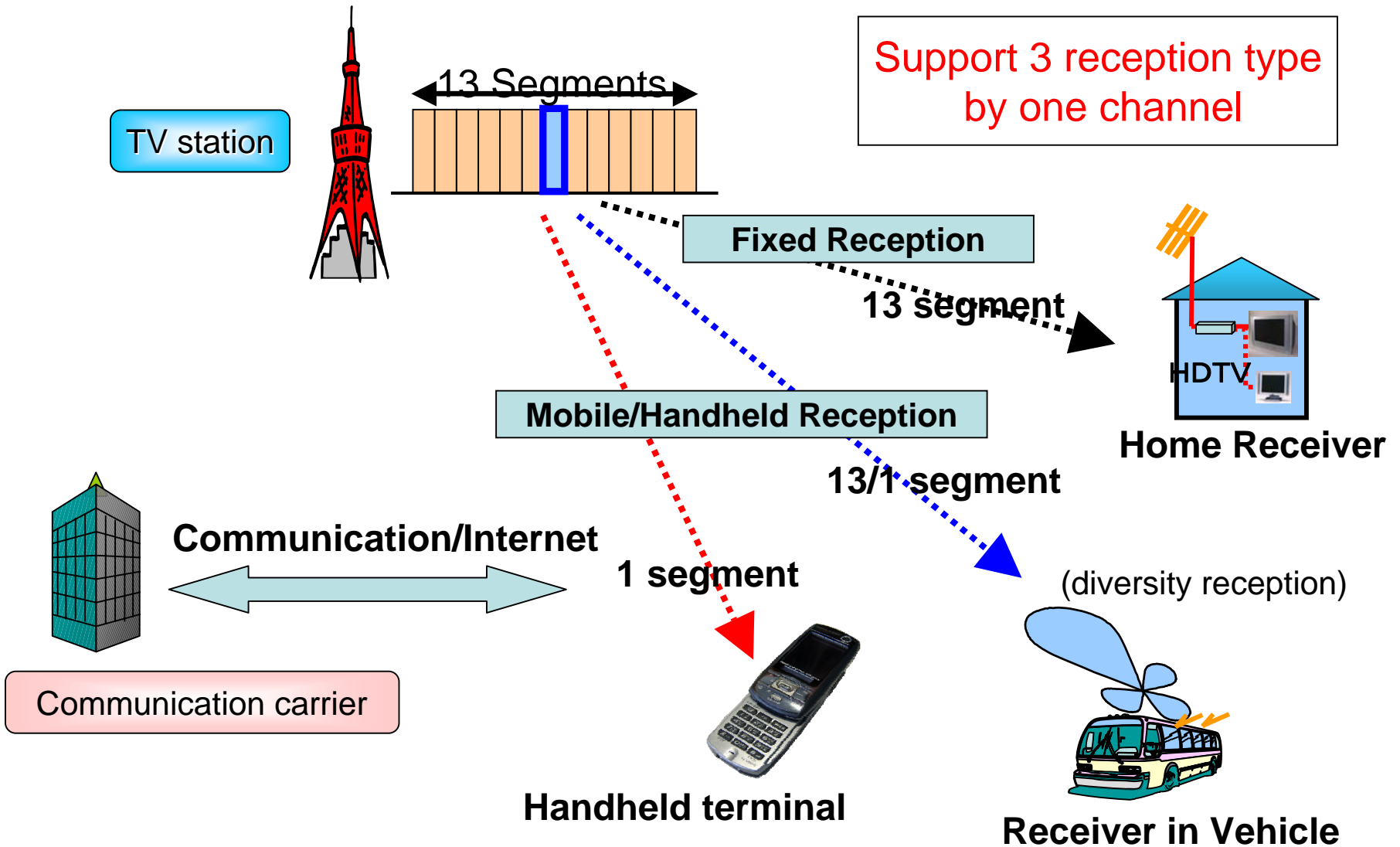
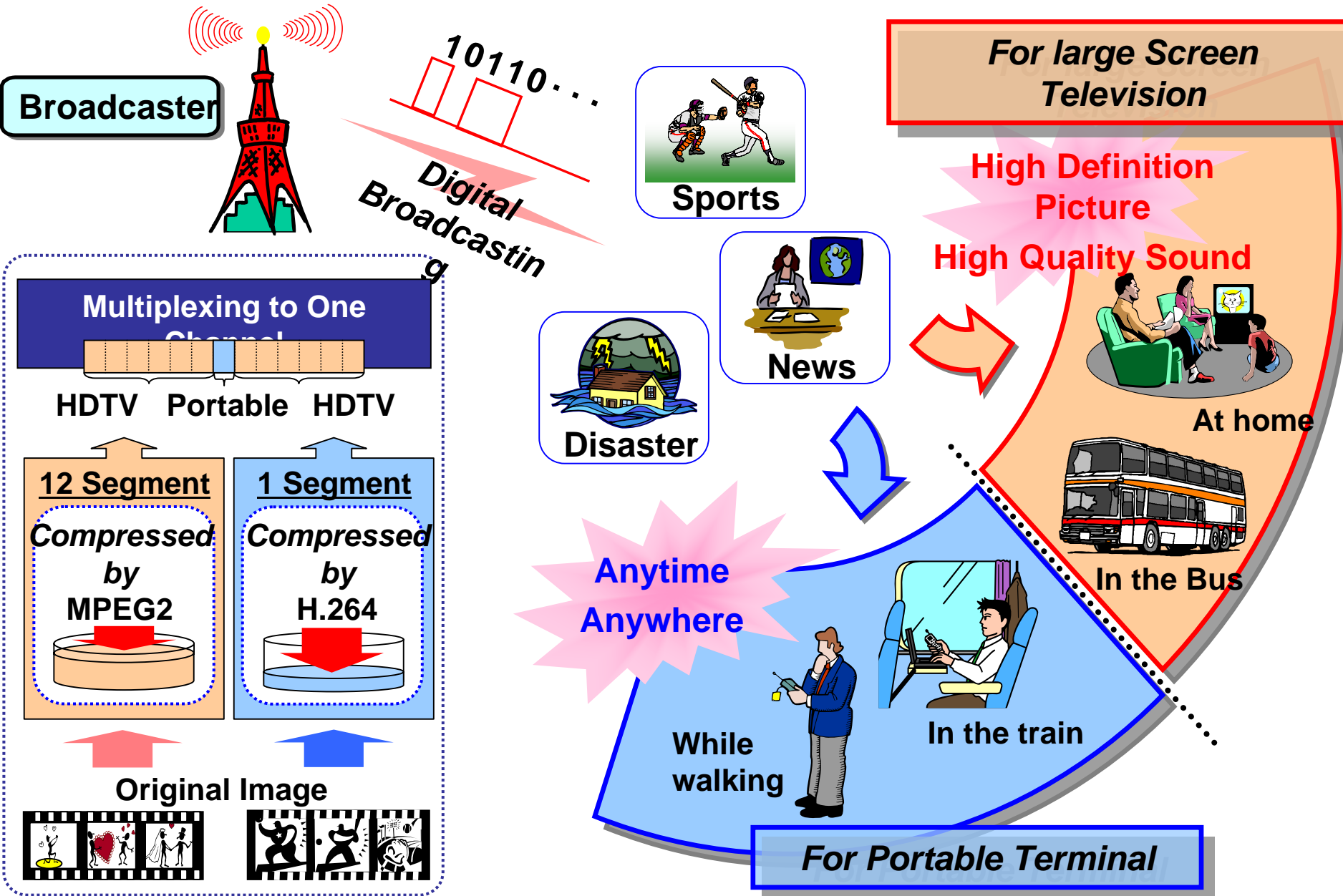
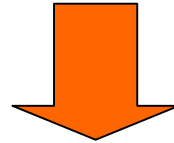


Image of DTTV service in Japan



Why is mobile reception available?

What kinds of technologies are used ?



1. Feature of transmission system

→ **Time interleave** (see next page)

2. Adopt new technology for reception

→ **Space diversity reception**

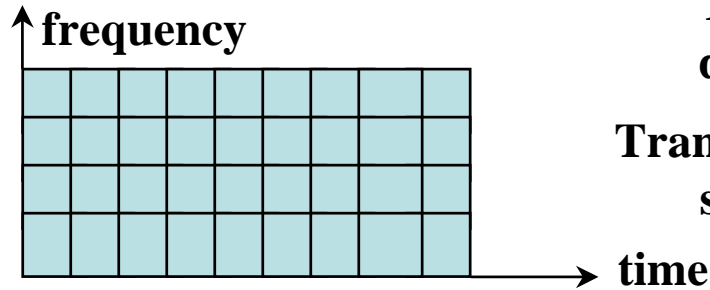
Space diversity reception technology for OFDM signal;

Very unique technology is used ,that is, “maximum ratio combining for each OFDM subcarriers”.

This technology is very effective against frequency-selective fading

Effect of time interleave

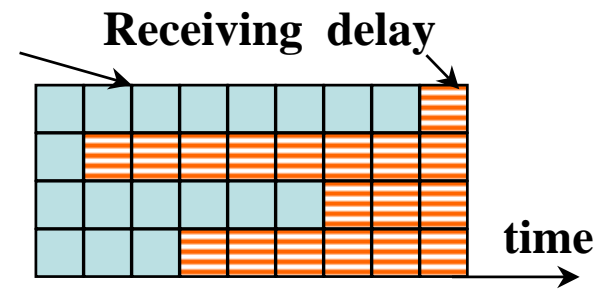
no time interleave



Transmitting
delay

Transmitter
side

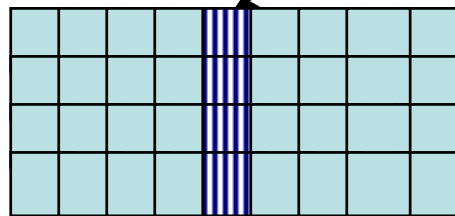
With time interleave



**field strength
varied**



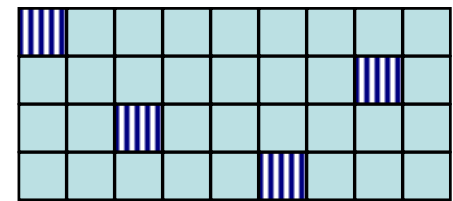
Error symbol



Burst error



receiver side
(After de-interleave)



Error randomized

For diversity reception, quote NHK laboratory's presentation

- Video on HDTV mobile reception
- Mobile reception environment
- Diversity technology for mobile reception
- Performance evaluation
 - Laboratory experiments
 - Mobile reception experiment in Nagoya
 - Experimental results of diversity receiver
 - Coverage prediction for the mobile reception

Receivers on the market

Digital Tuners of ISDB-T for car TV system

Panasonic TU-DTV100



車載用地上・BS・110度CS
デジタルチューナー
TU-DTV100

Pioneer GEX-P7DTV



Alpine TUE-T300



These receivers use 2-branch carrier diversity.

Note : These pictures come from each company's web site.

Obrigado

Thank You for Your Attention!

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