

The Trend of Digital Broadcasting in Japan

February 12th 2004

**Broadcasting Technology Division
Information and Communications Policy Bureau
MPHPT**

Digital Terrestrial Television Broadcasting

Topics now

- **Dec. 1st 2003 Start of Digital Terrestrial Television Broadcasting (DTTB) in Japan (Tokyo, Nagoya, Osaka)**
- **Viewers of DTTB (households)**
 - available to direct receive DTTB 12 million
(Tokyo 6.9million Nagoya 2.3million Osaka 2.8million)
 - available to receive via CATV 7.1million
(Tokyo 3.9million Nagoya 1.1million Osaka 2.1million)
- **The number of shipment DTTB receivers**
0.5million sets end of Dec. 2003

The Merits of Digital Broadcasting

HDTV



- High quality image and sound services

Multiple programs



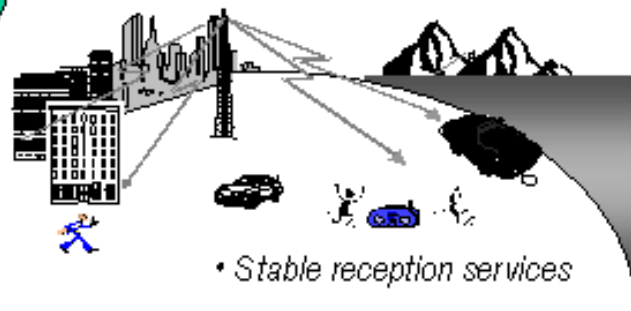
- Realization of multiple channels

Data broadcasting



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

Mobility



- Stable reception services

Advanced caption etc.

- Enrichment of services that are kind to the elderly and handicapped



Program selection and processing

Interactive TV

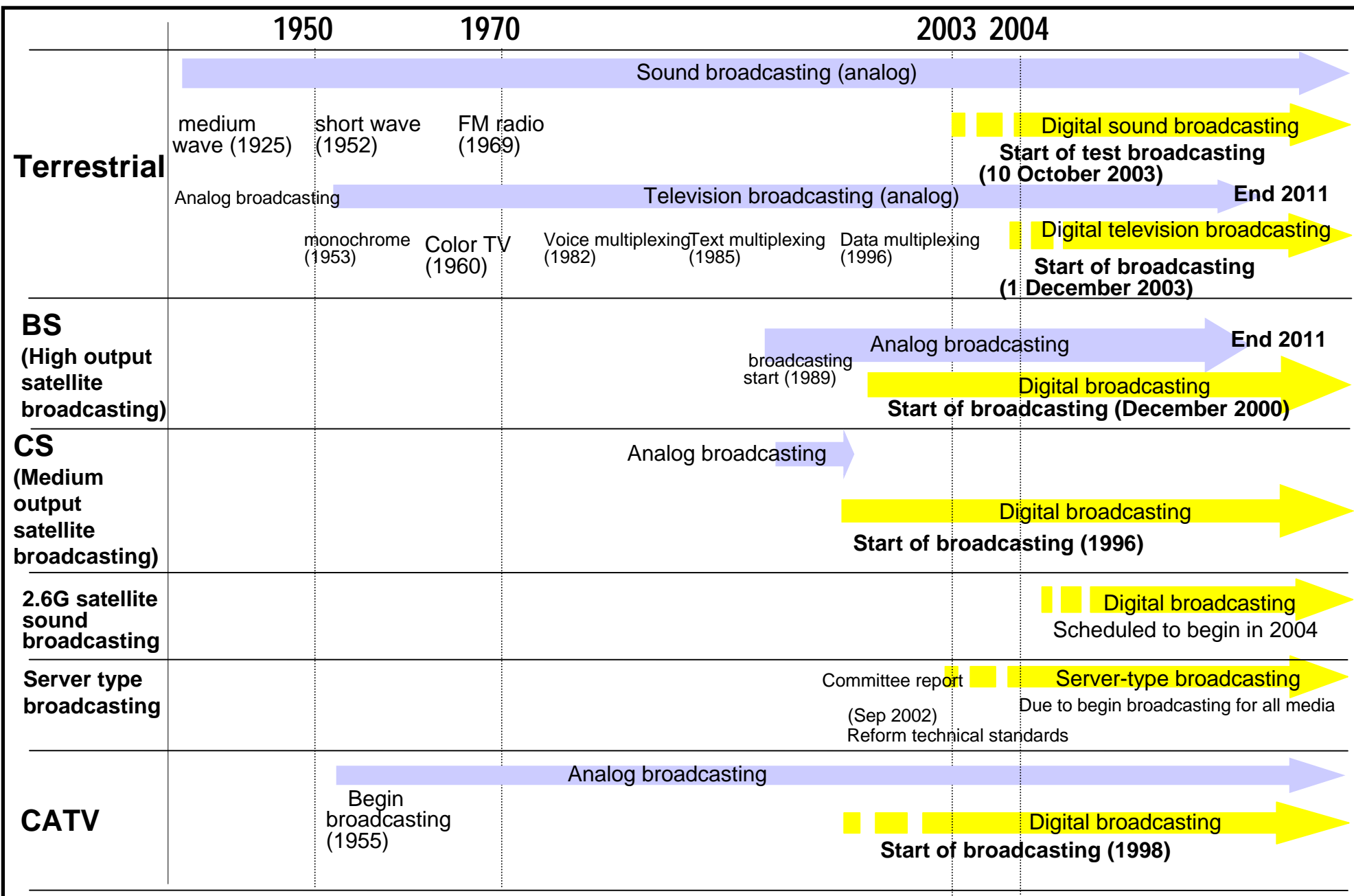


- Communication services and linked services

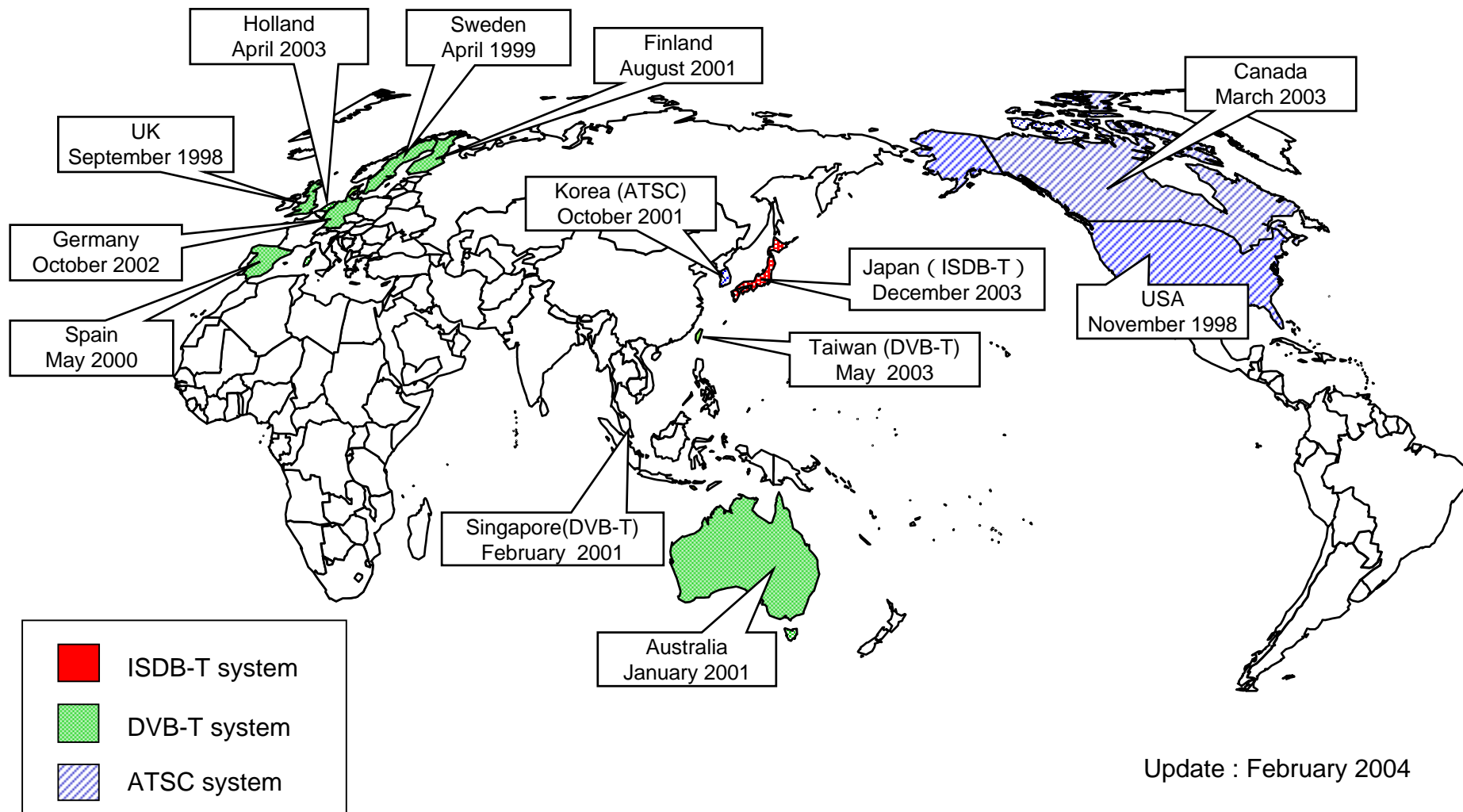
Communication networks



Schedule for Digital Broadcasting in Japan



Current Situation of Implementing Digital Terrestrial Television Broadcasting

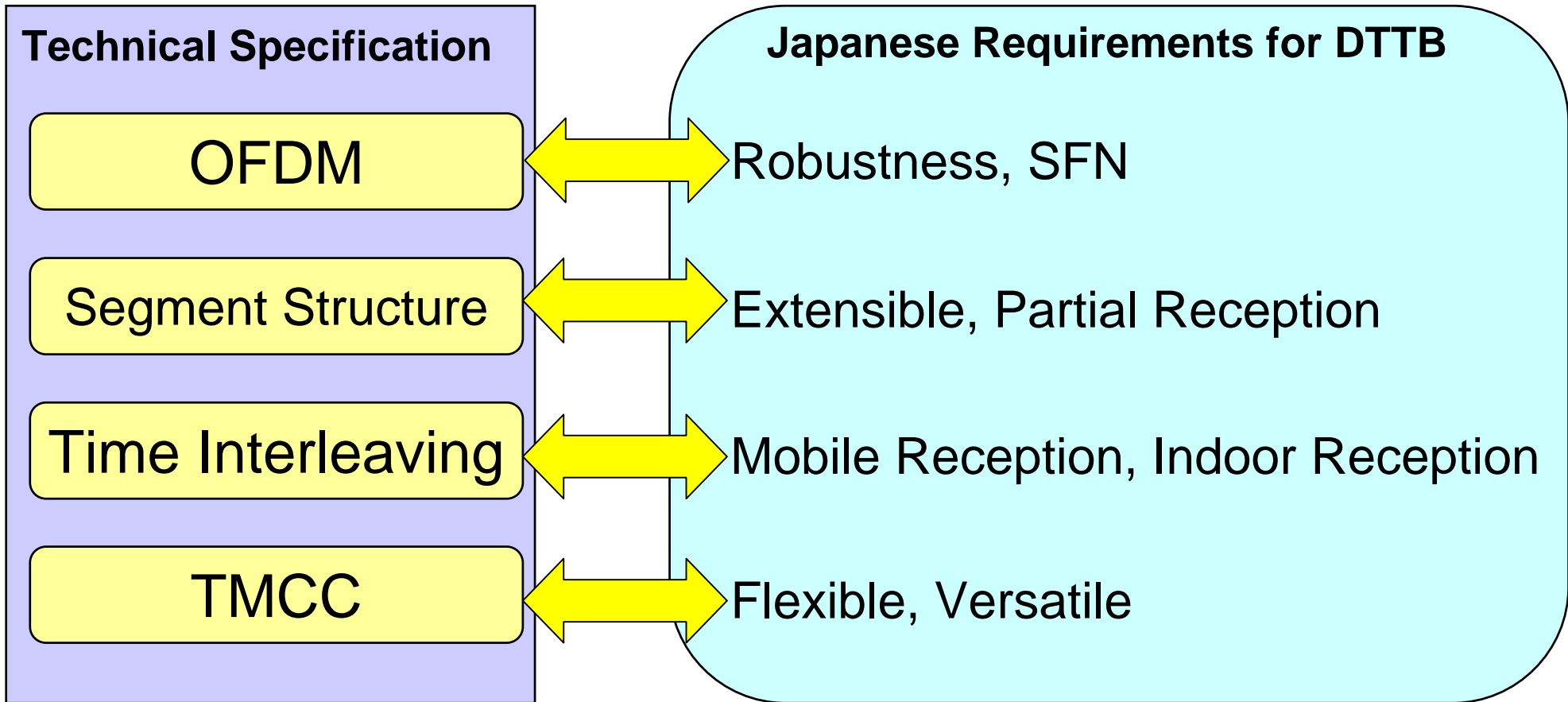


Comparison of ISDB-T, DVB-T, ATSC

Systems	ISDB-T	DVB-T	ATSC
Transmission system	Multiple carrier (OFDM)		Single carrier (8VSB)
Bandwidth	6/7/8 MHz		6/7/8 MHz
Modulation Scheme	DQPSK/QPSK/ 16QAM/64QAM	QPSK/16QAM/ 64QAM	8VSB
Error control	Convolutional code/ RS		Trellis code + RS
Characteristic	SFN capability Effective against ghost Segmented OFDM Time interleaving	SFN capability Effective against ghost	Analog based format
Proposing country	Japan	Europe	U.S.A.

The DTTB systems are recommended in ITU-R Rec.BT.1306.

Features of ISDB-T



Actual schedule of implementing Digital Terrestrial Television Broadcasting in Japan



Jun 1994	MPT asked to Council for technical requirement for DTTB
May 1999	Council decided technical conditions for DTTB
Nov 1999	MPT established technical standard for DTTB
Sep 2002	MPHPT established license conditions and requirements for DTTB
Apr 2003	Provisional licenses were awarded to broadcasters for DTTB in three major areas
Aug-Oct 2003	Trial DTTB (Tokyo, Nagoya, Osaka)
Nov 2003	Licenses were awarded to broadcasters after examination to certify completion of construction
Dec 1 st 2003	Start of DTTB (Tokyo, Nagoya, Osaka)

The Process of Establishing Technical Standard for DTTB System

1 Study of the technical conditions for DTTB system

- Jun. 1994 MPT submitted an inquiry to the Telecommunications Technology Council concerning technical requirements for Digital Broadcasting system including DTTB system.
The council set up the committee which was composed by the following entities (broadcasters, manufacturers and private standard organization and technical experts etc.) in order to discuss the technical requirements.
- May. 1999 The Committee made the draft technical conditions and reported it to the Council. Consequently, the Council decided the appropriate technical conditions for DTTB system and reported it to MPT.

2 Establish technical standard for DTTB system

- Aug. 1999 MPT prepared a draft regulatory text for establishing technical standard, based on the report from the Telecommunications Technology Council concerning the technical conditions for DTTB system.
- Sep. 1999 MPT submitted inquiry to Radio Regulatory Council on a draft regulatory text.
- Nov. 1999 The Council held a hearing from the interested parties. Consequently, the Council reported to MPT the appropriate regulations for establishing technical standard concerning advancement of DTTB system.

DTTB Structure of the ARIB Specification

ARIB: Association of Radio Industries and Businesses

Activities

- to conduct investigation, R&D in the field of telecommunications and broadcasting
- consultation of utilization of radio waves from the view of developing radio industries
- to promote realization and popularization of new radio systems

ARIB standards (ARIB STD)

private technical standards which are to supplement the MPHPT regulations for telecommunications and broadcasting radio systems and are set for the purpose of guaranteeing compatibility of radio facilities and transmission quality as well as offering greater convenience to radio equipment manufacturers and users.

Technical Standards for DTTB

	established
ARIB STD-B32 image encoding, sound encoding and multiplexing formats	2001.5
ARIB STD-B24 Data broadcasting encoding formats and transmission formats	1999.10
ARIB STD-B25 Restricted reception formats	1999.10
ARIB STD-B10 Program lineup information	1997.6
ARIB STD-B31 transmission formats	2001.5
ARIB STD-B21 receiver device	1999.10
ARIB TR-B14 Terrestrial TV operation specification	2002.1

Conditions and Requirements for DTTB in Japan

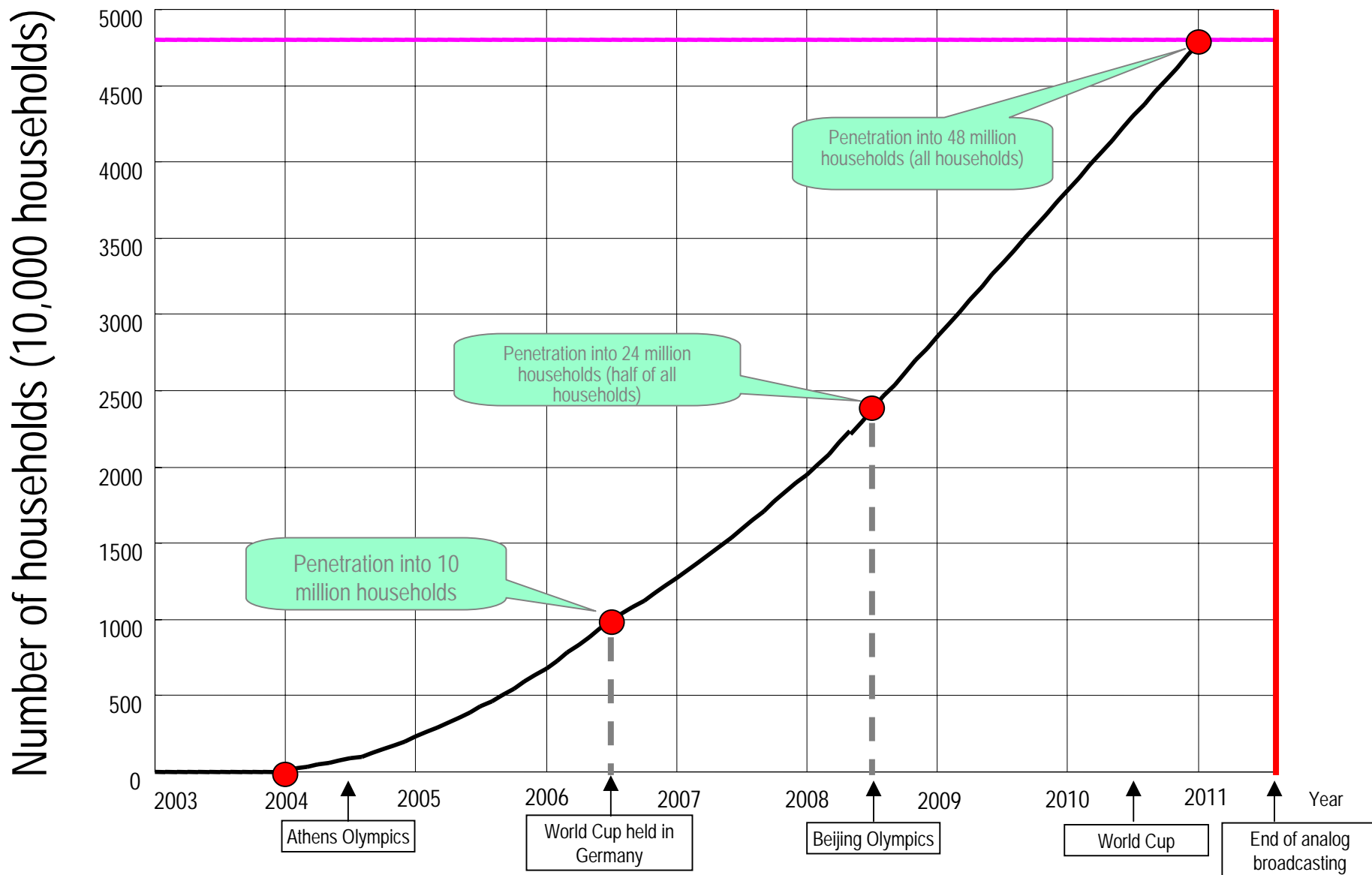
- Over 2/3 simultaneous analog broadcasting per day.
- **Half of all broadcasting per week should be providing HDTV.**
- Broadcasting should consider handicapped and elderly viewers, with broadcasting using subtitles and commentary.
- Strive to enable broadcasting in the same areas as analog broadcasting as soon as possible after the end of analog.
- Engineering services which are providing information data to identified the TV program and update the receiver's function must be possible within the license range.

Action Plan to Promote the Digitalization of Broadcasting (forth)

*Decision of the "Nationwide conference for promotion of terrestrial digital"
(Oct 31th 2003)*

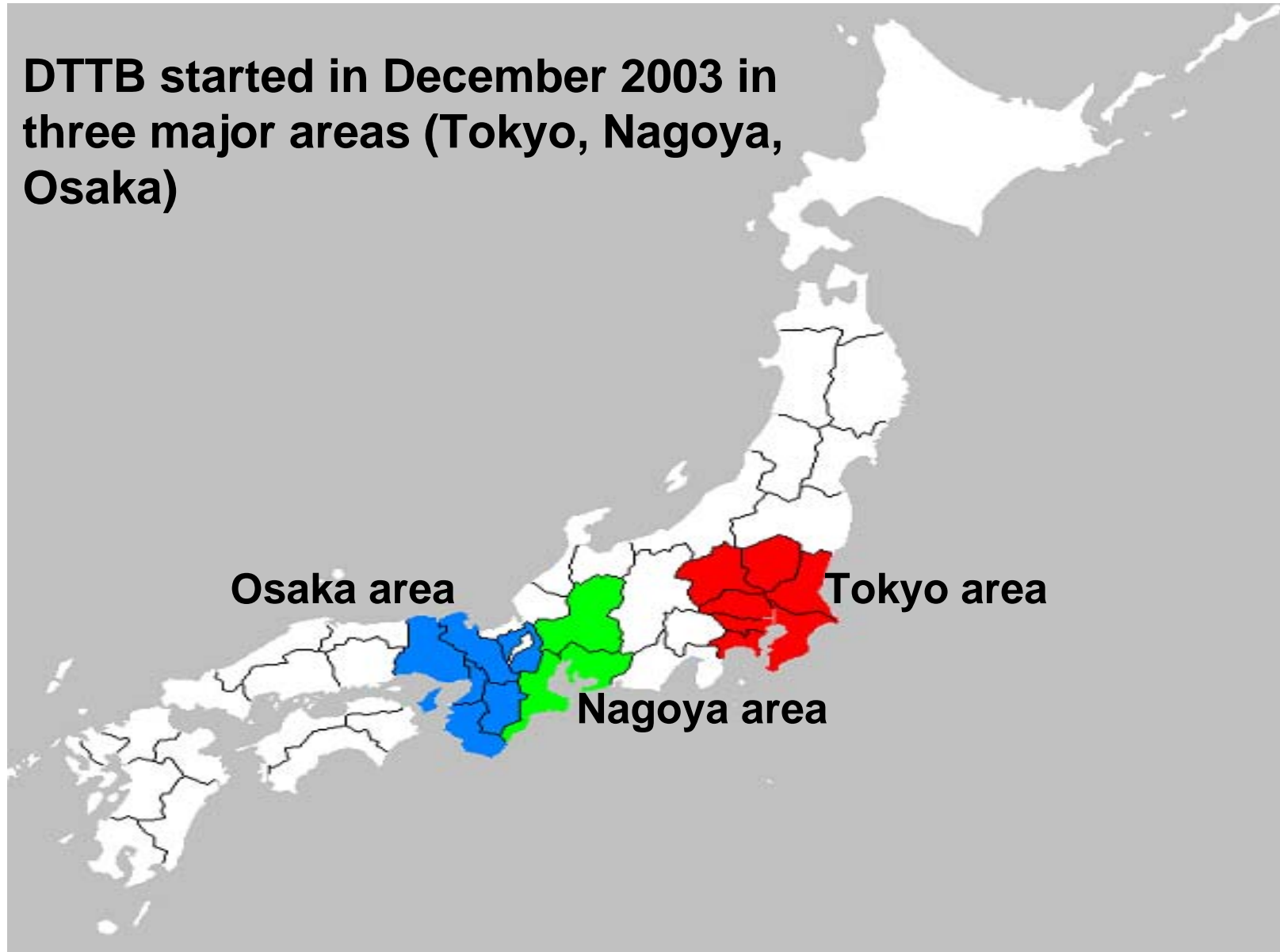
- **Set objectives for the penetration of DTTB receivers**
- **Set objectives for the penetration of DTTB through cable television.**
- **Set objectives for expansion in the coverage rate of digital broadcasting in the three main areas (Tokyo, Osaka, Nagoya)**

Objectives for the penetration of terrestrial digital broadcasting receivers (households)

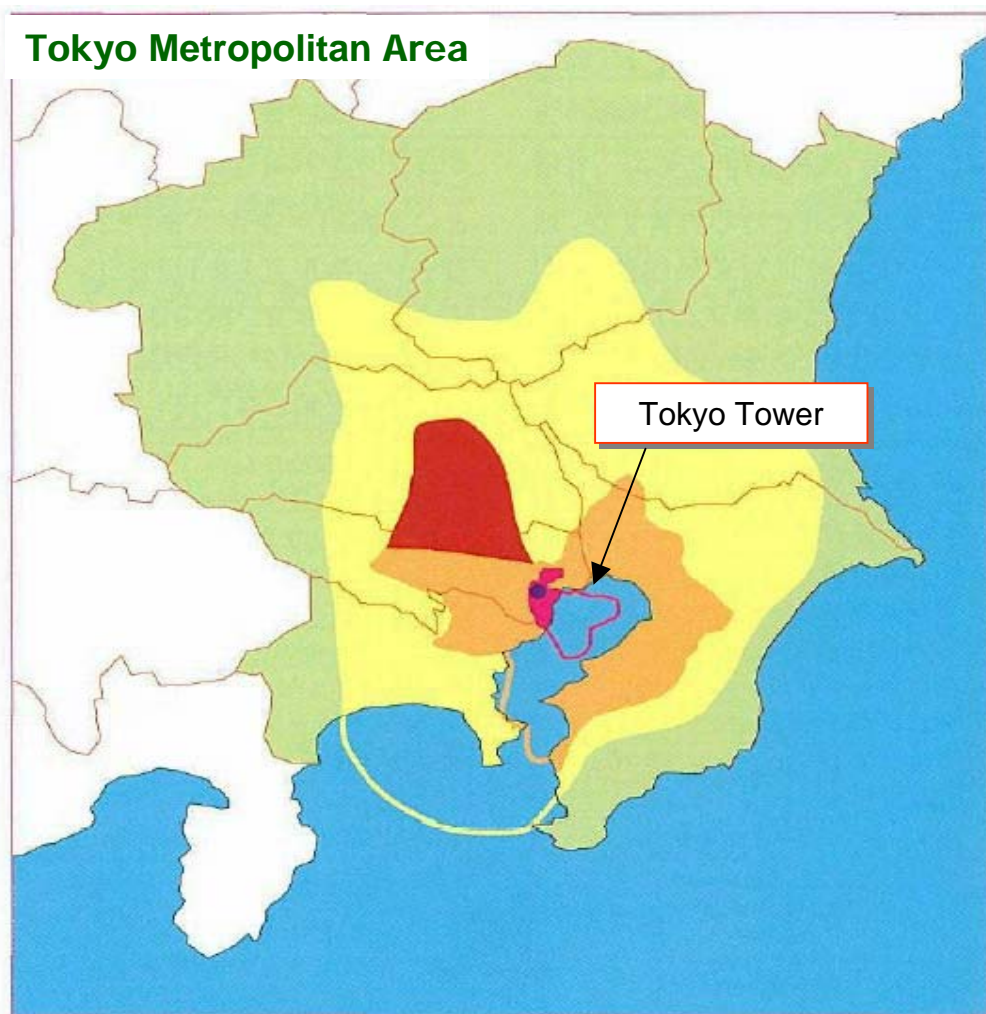


Current status of service area of DTTB in Japan

DTTB started in December 2003 in three major areas (Tokyo, Nagoya, Osaka)



Approach to the DTTB in Tokyo



Dec.1st,2003

NHK General

NHK Educational
Private Network (6)

End of Dec,2004

NHK General

NHK Educational
Private Network (6)

**End of Dec,2005
(maximum output)**

All Broadcasters

Status of sale of digital TV Products



TOSHIBA



SHARP



SANYO



Panasonic



HITACHI



SONY



STB type

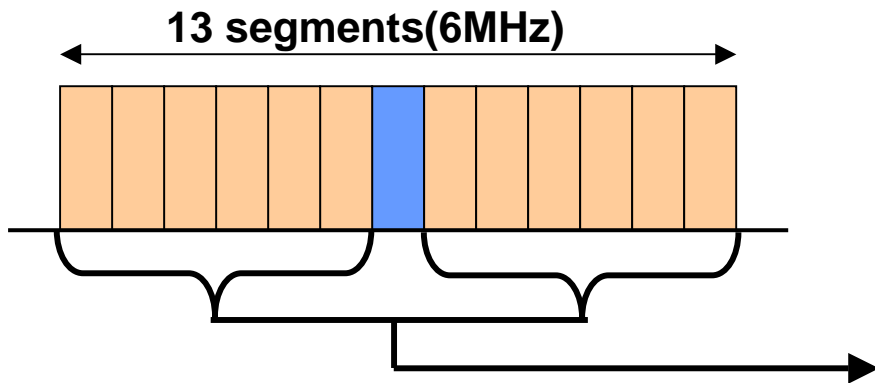
All products are compatible with terrestrial digital broadcasting, terrestrial analog broadcasting, satellite digital broadcasting (BS, CS). Displays are high definition (HD) compatible.

The main types of large screen televisions are plasma displays (PDP) and liquid crystal.

HDTV service

HDTV services

- Wide screen
- High quality image



Example :

Parameter	64QAM 3/4 12 segments
Bit rate	16.9 Mbps

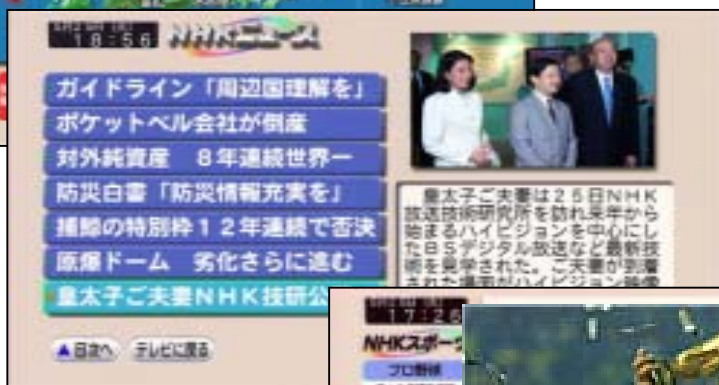


Example for Data Broadcasting

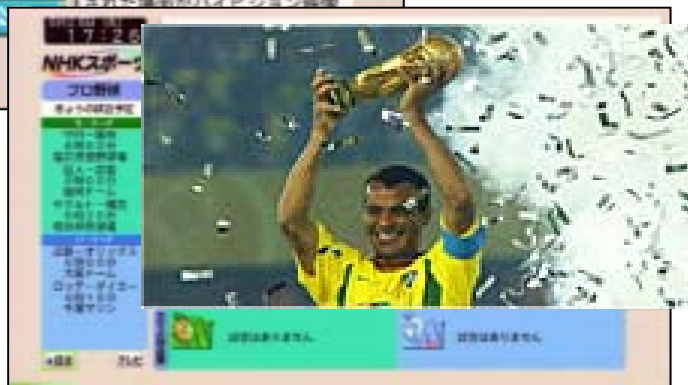
Weather information



Anytime news



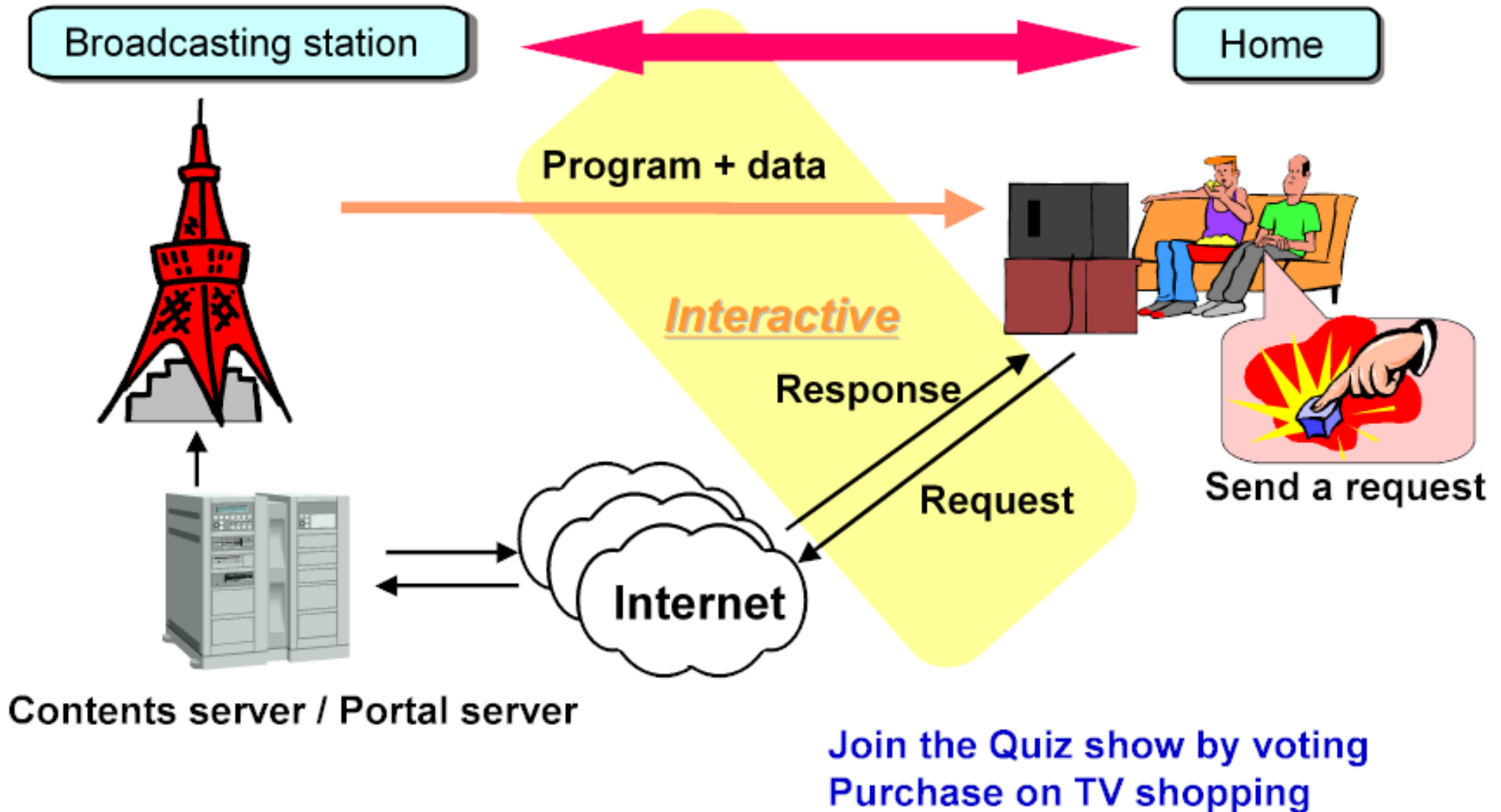
Statistics and Analysis of sports



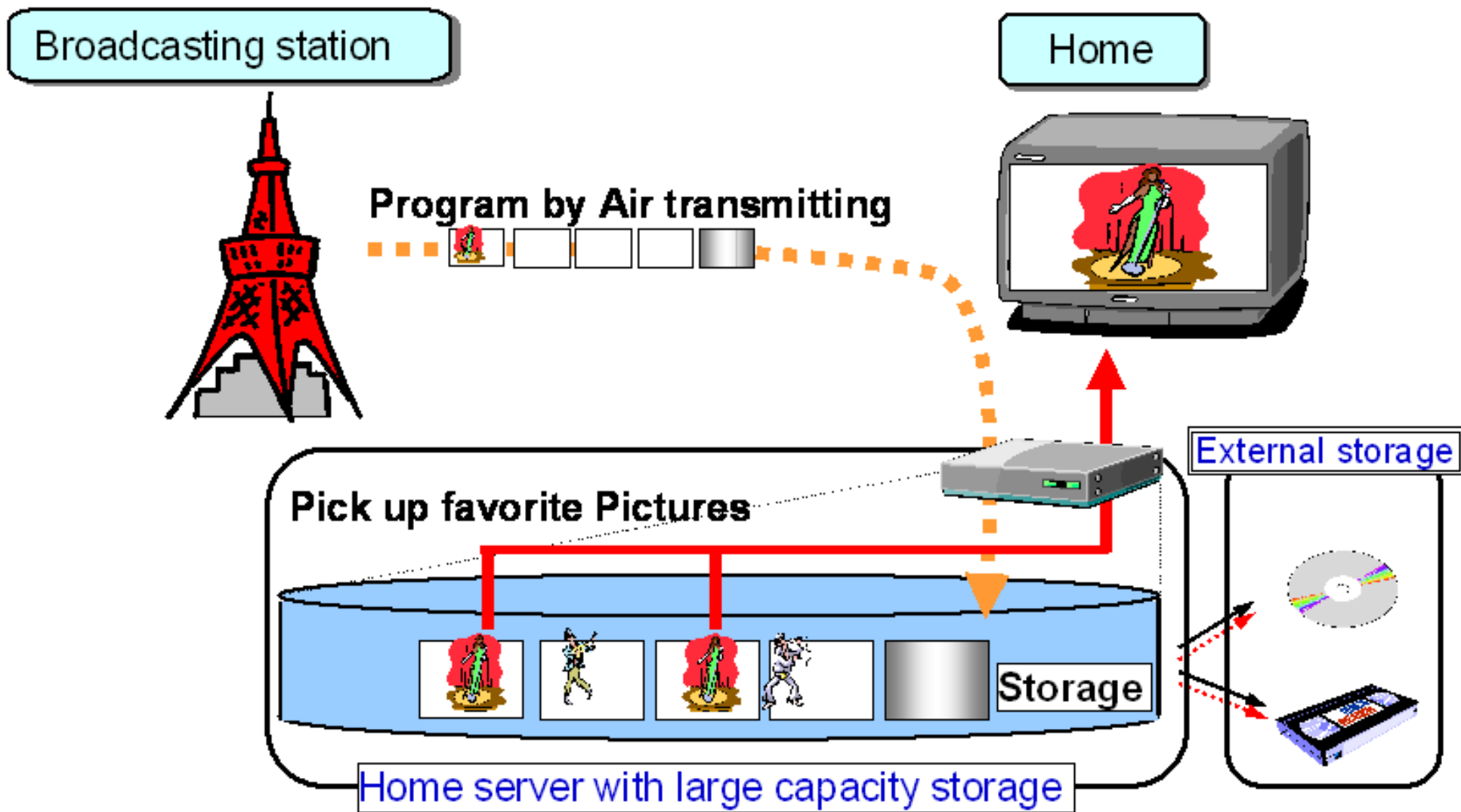
Program related information



Interactive Broadcasting

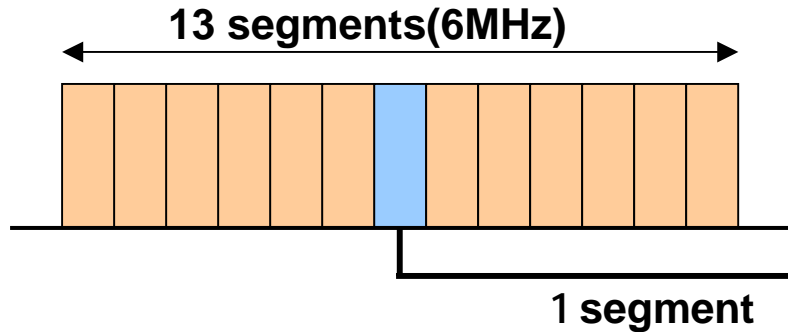


Server-type Broadcasting System



Broadcasting to Portable Terminals

Mobile reception



Mobile reception

Navigation system



Cellular phone



PDA



Example :

Parameter	16QAM 1/2 1 segment
Bit rate	630 kbps

Broadcasting to Portable Terminals (sample)

●SANYO



●NEC



●KDDI (developed with NHK)



●PANASONIC



DiBEG

Purpose

- The Digital Broadcasting Experts Group (DiBEG) was founded in September 1997 for the key forces to promote the Japanese Digital Terrestrial Broadcasting System ISDB-T and ISDB-T_{SB} into the world.
- Today, DiBEG has 25 members, including broadcasters, broadcast equipment manufactures and consumer electronics manufactures etc.
- DiBEG is one committee of ARIB.

Activities

- ◆ Research of the trend toward digital broadcasting in the world .
- ◆ Exchange of digital broadcasting technologies and facilitation of common understanding .
- ◆ Exchange of technologies and ways for interoperability toward smooth exchange of program .

Digital Terrestrial Sound Broadcasting

Digital Terrestrial Sound Broadcasting (DTSB)

Status

- report of technical requirement for Digital Terrestrial Sound Broadcasting (DTSB) published in 1999
- ARIB STD-B29 "Transmitting system of DTSB and ARIB STD-B30 "Receiver for DTSB" established in 2001
- enforcement of revised radio law for DTSB in 2002
- Test licences for DTSB awarded to DRP in 2003
- Experimental DTSB services started at 10th Oct. 2003 in Tokyo and Osaka

Digital Terrestrial Sound Broadcasting System

Comparison of DTSB system

	Japan	Europe	USA
System	ISDB-T _{SB}	DAB	IBOC
Carrier modulation	OFDM (DQPSK, QPSK, 16QAM, 64QAM)	OFDM (DQPSK)	OFDM
Error-correcting code	Reed-solomon + convolutional error correcting	convolutional error correcting	convolutional error correcting
Multiplex structure	MPEG-2 System	Original System	Original System
Audio coding	MPEG-2 Audio AAC	MPEG-1(Layer2)	MPEG-2 Audio AAC

Promotion of the Digital Terrestrial Sound Broadcasting (DTSB) in Japan

1 Purpose

The Digital Radio Promotion Association (DRP) was established in October 2001 to promote the Digital Terrestrial Sound Broadcasting (DTSB) in Japan.

2 Activities

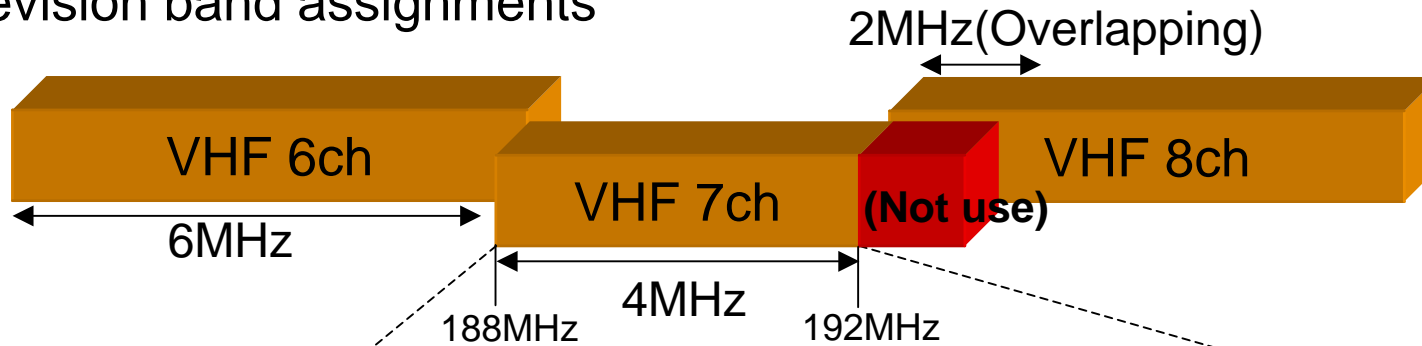
- Carry out the experimental DTSB services (started at 10 October 2003 in Tokyo and Osaka)
- Develop new application for DTSB
- Research of the demand for DTSB
- Promote the DTSB receivers

3 Members

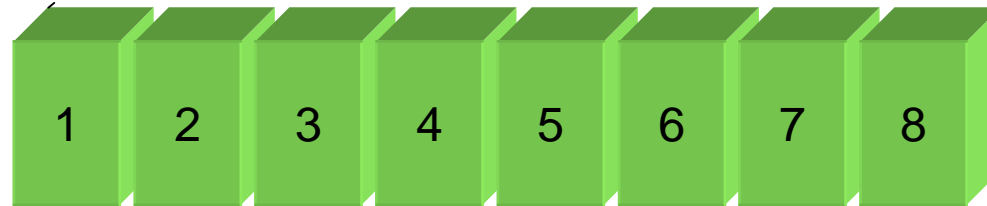
DRP has 76 members (Sound Broadcasters, manufacturers etc)

Trial Services of DRP

VHF television band assignments



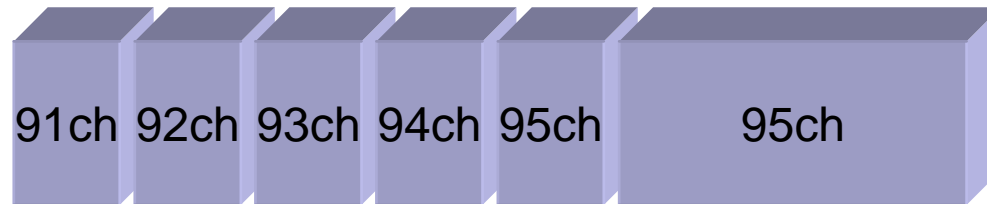
Segment structure



8 segments
(Normally 13seg.)

3seg. broadcasting

Broadcast programs



Example of Tokyo station , Osaka's all programs are 1seg. broadcasting.

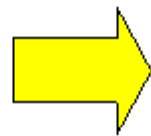
Development of receivers

Trial portable receiver



DRP prepared digital receivers for test monitor.

Near future



PC card type
(test product)



PDA type
(test product)

Digital Satellite Sound Broadcasting

Technical Features of Digital Satellite Sound Broadcasting (DSSB)

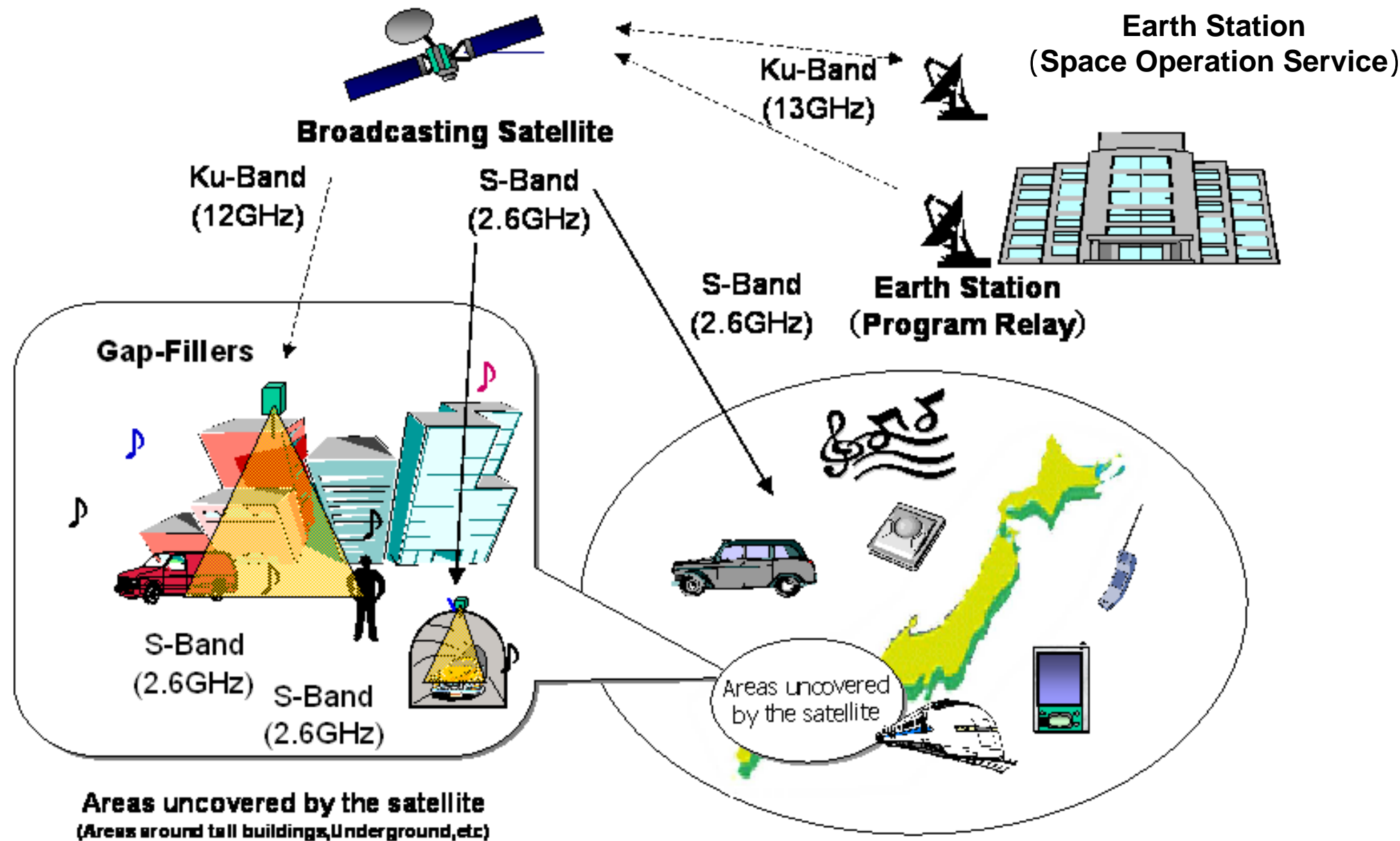
- Frequency
 - 2,630 ~ 2,655MHz (25MHz bandwidth)
- Modulation Method
 - CDM (Code Division Modulation)
- Capacity of Transmission
 - About 7Mbps
- Audio & Video coding
 - Audio: MPEG2 AAC+SBR
 - Video: MPEG4 Visual
- Strong power (e.i.r.p.)
 - The power (e.i.r.p.) of the transponder is 10 times stronger than one of the BS digital transponders. Therefore, the receivers are not required parabolic antennas.
- Gap-Filler (Terrestrial Repeater)
 - Receives programs from the satellite and rebroadcasts them for areas uncovered by the satellite like areas around tall building, underground, etc.



Prototype receiver

All of these features are for mobile use.

Overview (DSSB)



Japan's Profile

- **Population** **127 million**
- **Number of households** **48 million**
- **Area of Japan** **378,000 km²**
- **TV receiver** **100 million**

- **The number of subscribers (households)**
 - **Terrestrial(Analogue)** **48 million**
 - **CATV** **23 million**
 - **Satellite BS** **12 million**
(BS digital 4.8 million)
 - **Satellite CS(digital)** **3.5 million**

Reference

MPHPT

http://www.soumu.go.jp/joho_tsusin/eng/

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