

Presentation 10

Broadcasting Station Facility

27th - 28th.February.2008

Manila, Philippines

DiBEG JAPAN

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(TOSHIBA)

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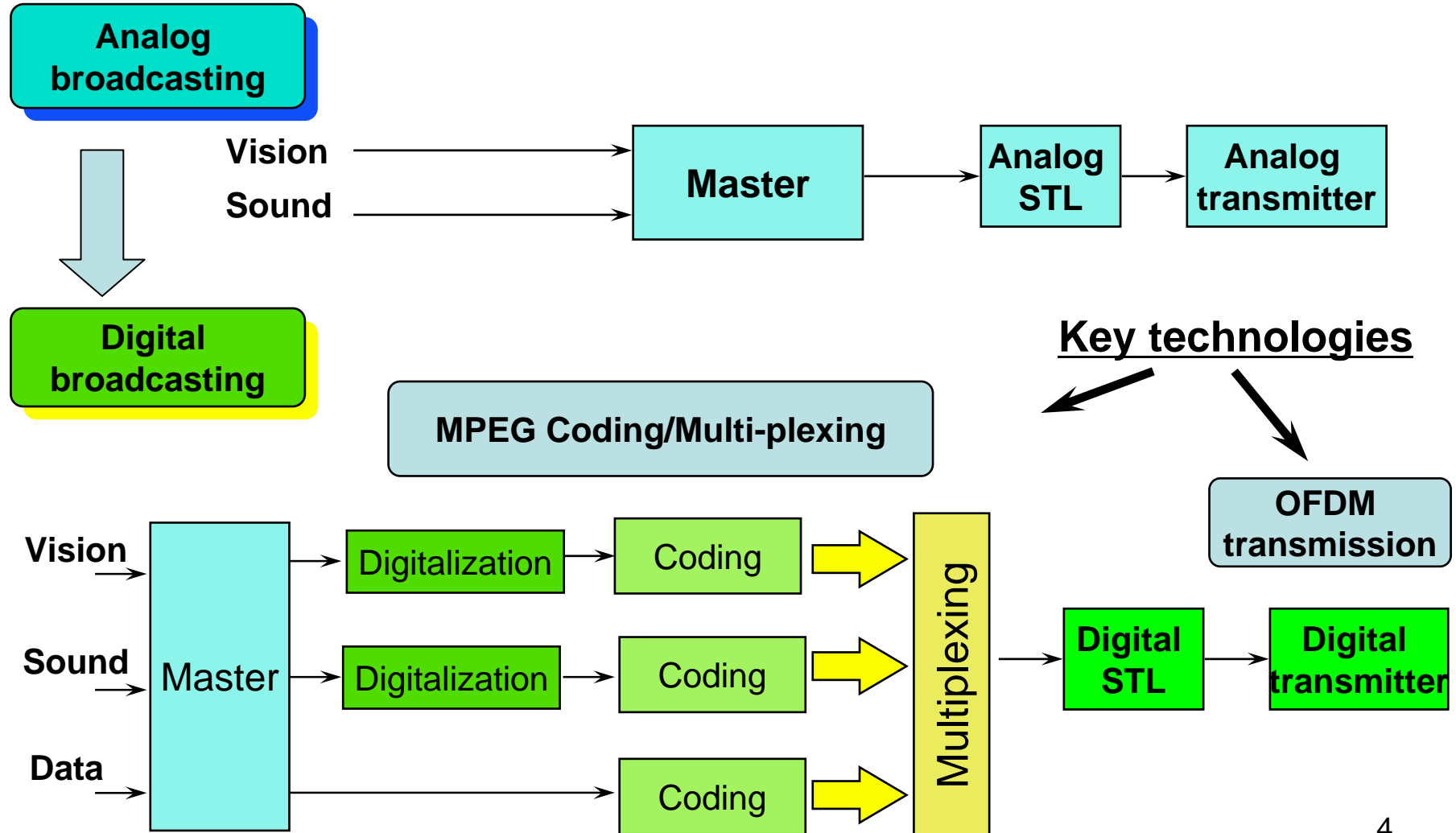
1. Broadcaster's Infrastructure (Studio System)
2. Broadcaster's Infrastructure (Transmission System)
3. ISDB-Tsb; Digital Sound Broadcasting
(Family of ISDB-T)

1. Broadcasters Infrastructure (Studio System)

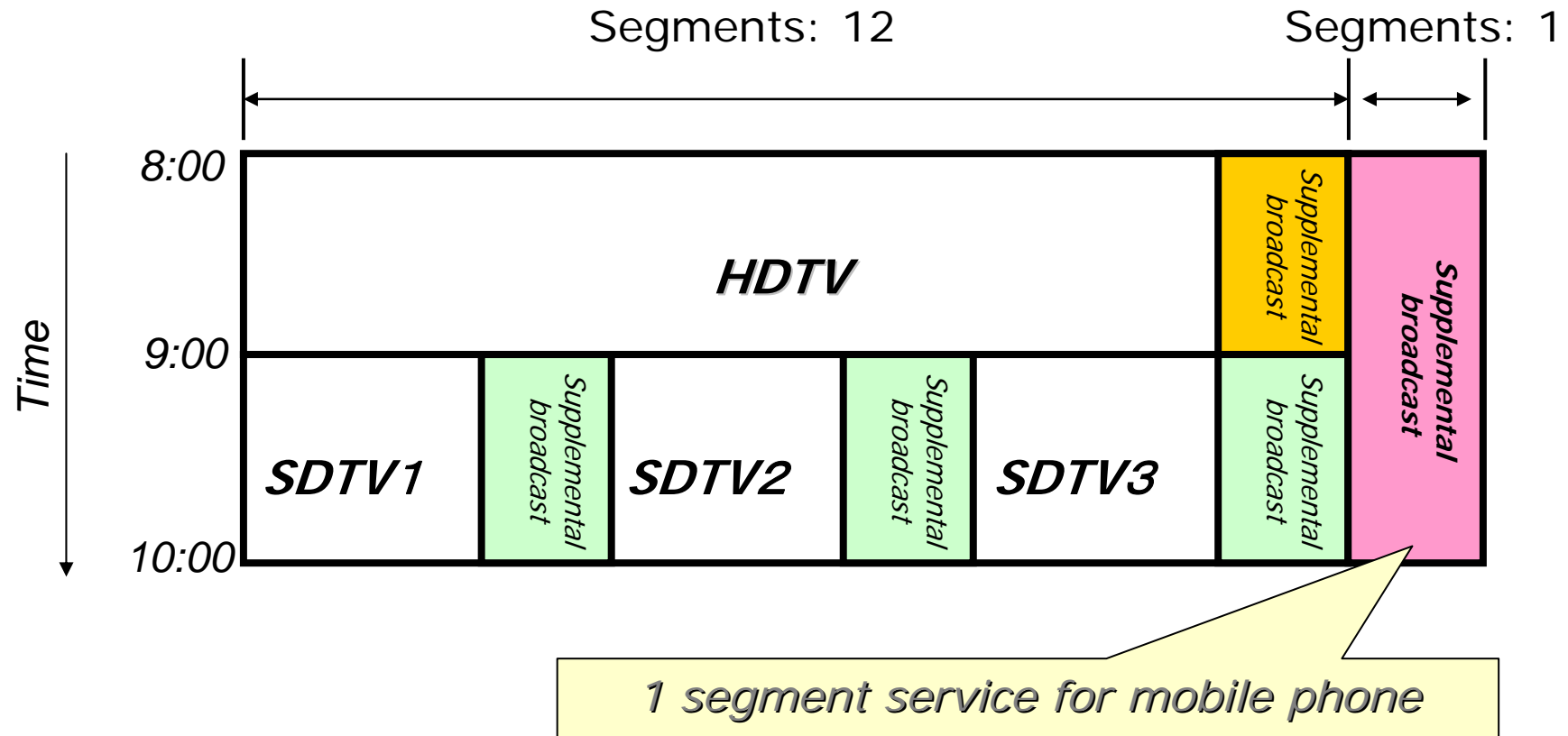
- Analog to Digital
- System Block Diagram
- Example of Master System

Analog to Digital

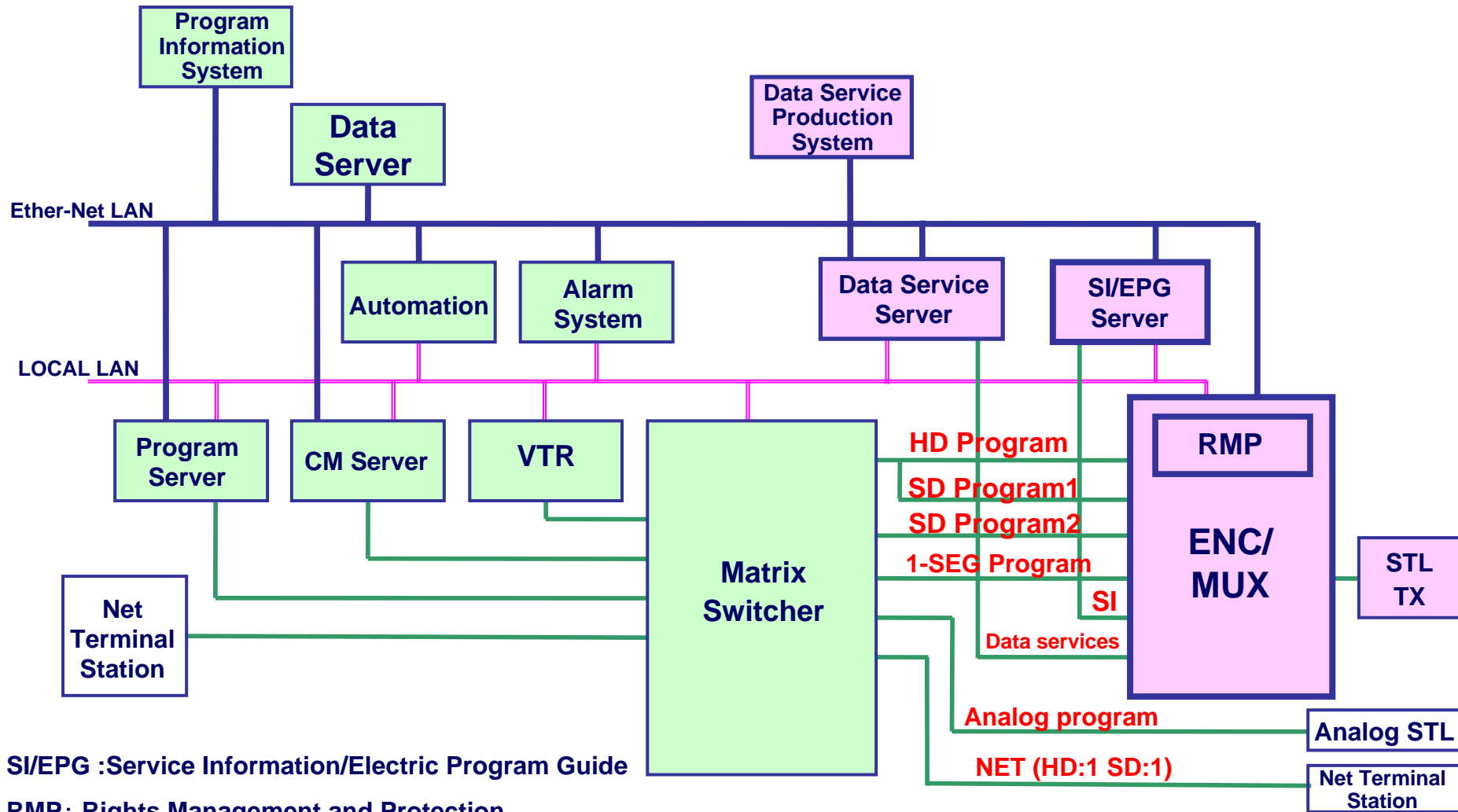
Differences Between Analog and Digital Broadcasting



Applications



Overall Block Diagram

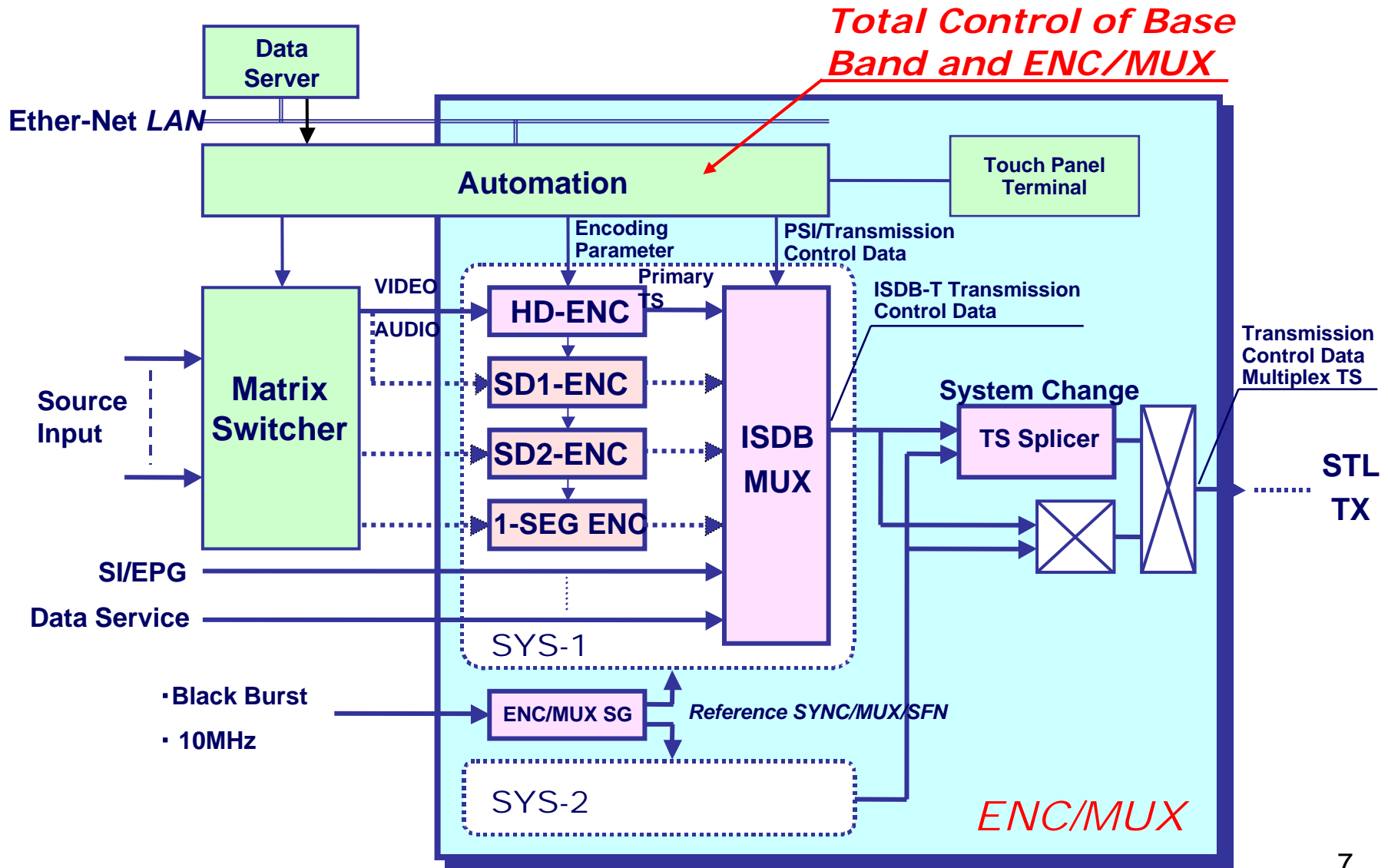


SI/EPG :Service Information/Electric Program Guide

RMP: Rights Management and Protection

ENC/MUX: Encoder / Multiplexer

Block diagram of ENC/MUX



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)

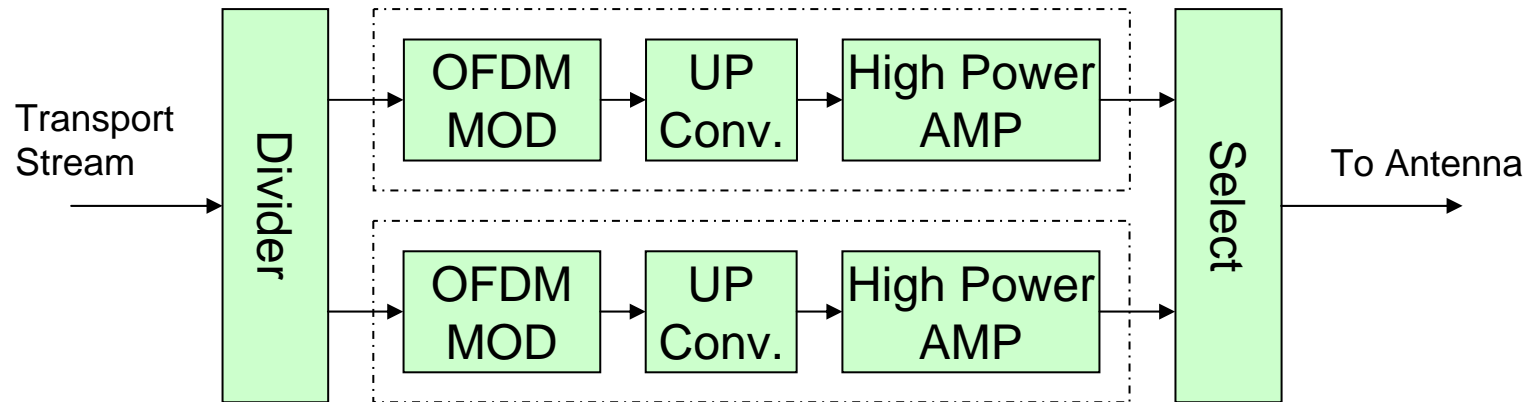


2. Broadcasters Infrastructure (Transmission System)

- (1) High Power Digital Transmitter System
- (2) Transmission Network System
- (3) Trans-poser of Digital Terrestrial Broadcasting and new technology
- (4) Peripherals

(1) High Power Digital Transmitter system

(a) An Example of Conceptual block diagram (Full redundant system)



(b) Power Line-up in Japan

Area	Digital TX	Analog TX	note
Tokyo	UHF 10 kW	VHF 50 kW	wide area key station
Osaka	UHF 3 kW	VHF 10 kW	same as above
Nagoya	UHF 3 kW	VHF 10kW	same as above

(c) Examples of Hardware; see following pages

Examples of High Power Digital Transmitter (Toshiba)



**10 kW digital
Transmitter(2/3 type)**

Output power series;

- 10kW(2/3) type; for Kanto area
- 3kW dual type; for Kansai and Chukyo
- 1kW dual type; for medium cover area



**3 kW digital
transmitter rack**



**1 kW digital
transmitter rack**

Feature;

- Any of cooling type (water or air)
- Equipped high performance non-linear distortion compensator

Examples of Digital Transmitter (NEC)

Features

- 1) Both liquid cooling / air cooling available
- 2) Compact size / Minimized footprint
- 3) Adaptive Digital Corrector to maintain optimal signal quality
- 4) Color LCD to monitor detailed parameters



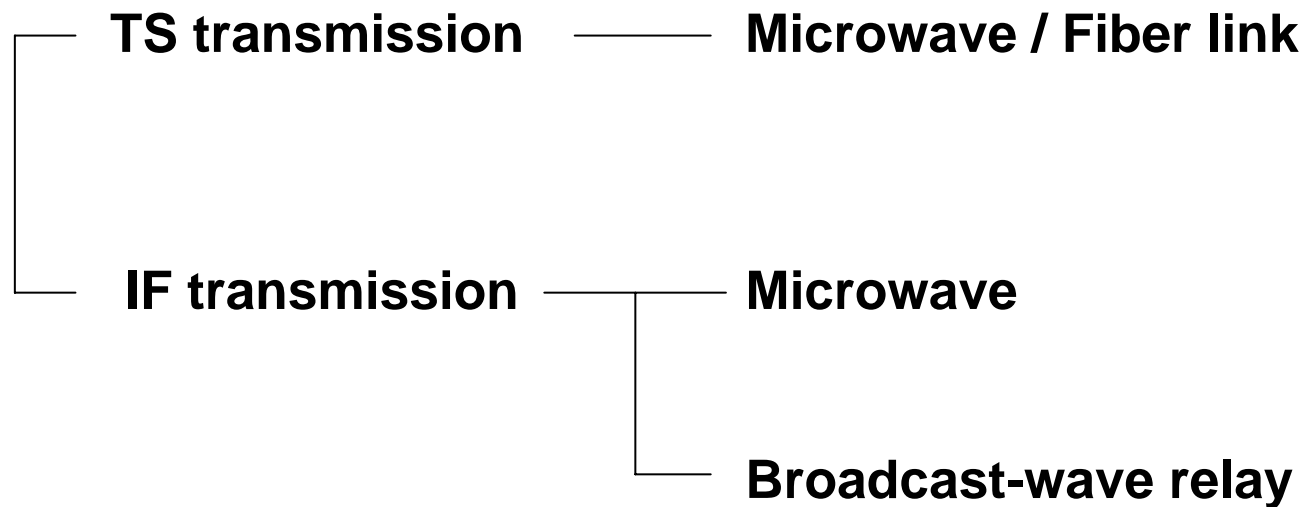
3kW Air Cooled
UHF Digital TV Transmitter
(in operation at Osaka & Nagoya stations)



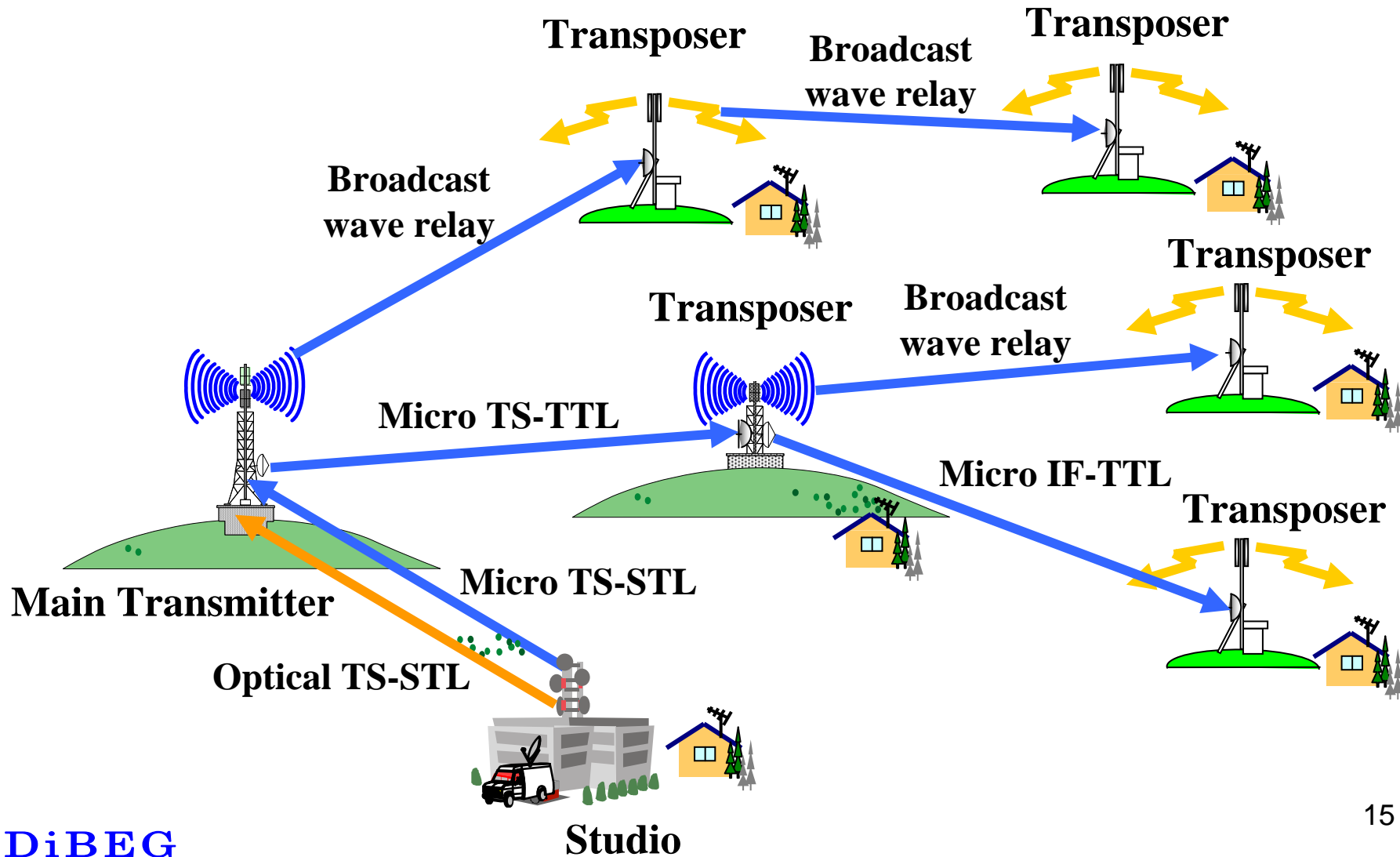
10kW Water Cooled
UHF Digital TV Transmitter
(in operation at Tokyo station)

(2) Transmission Network System

Classification of network system

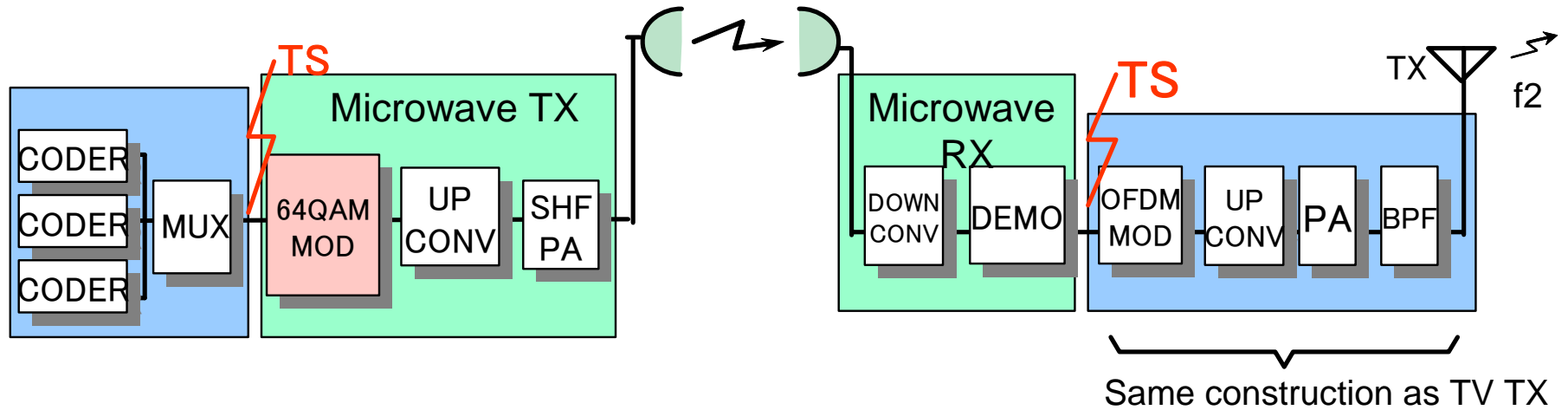


An Image of transmission network chain

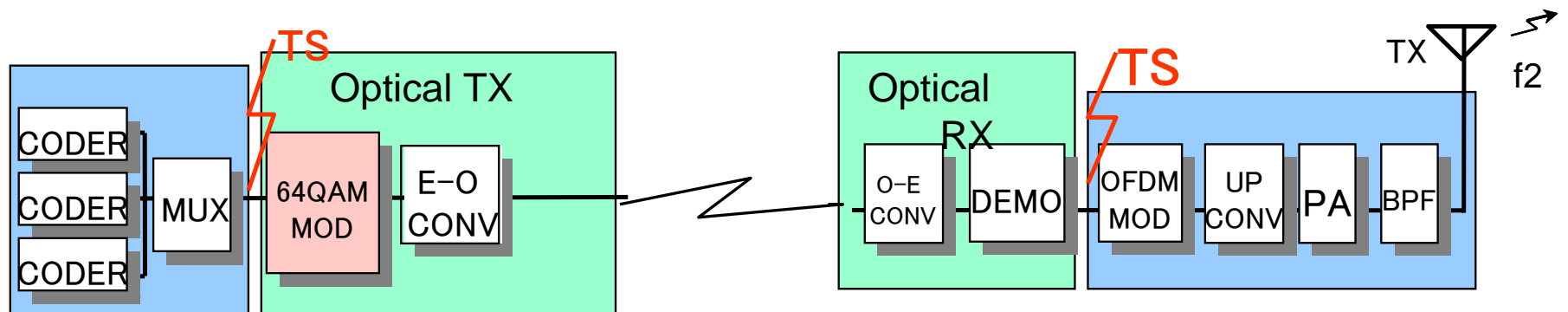


Classification by Transmission measures

1. TS transmission system by microwave link

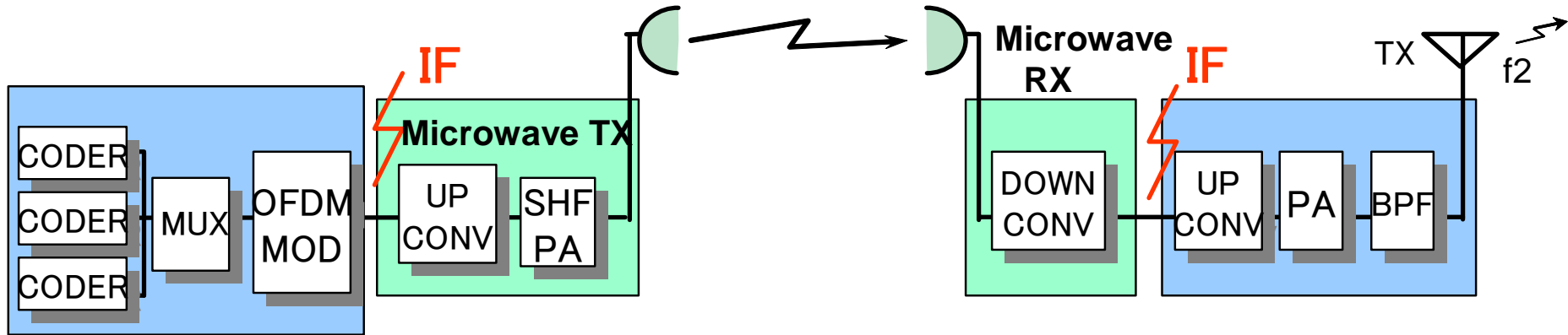


2. TS transmission system by fiber link

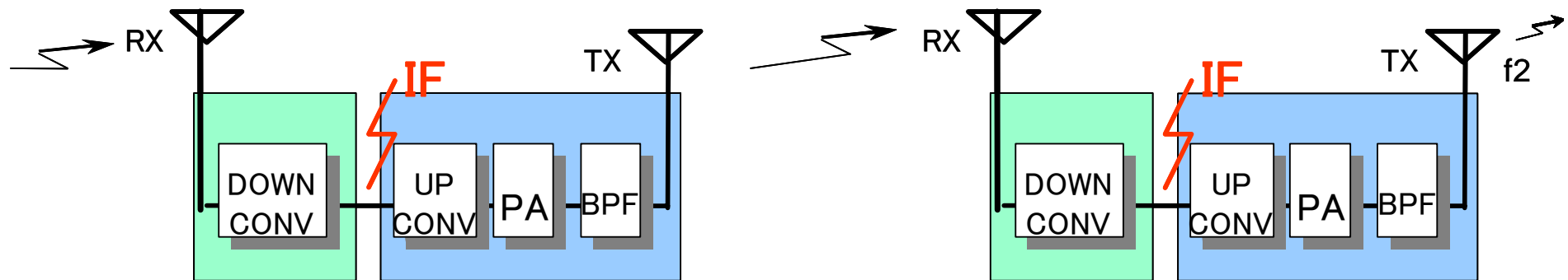


Classification by Transmission measures

3. IF transmission system by microwave link



4. Broadcast-wave relay system



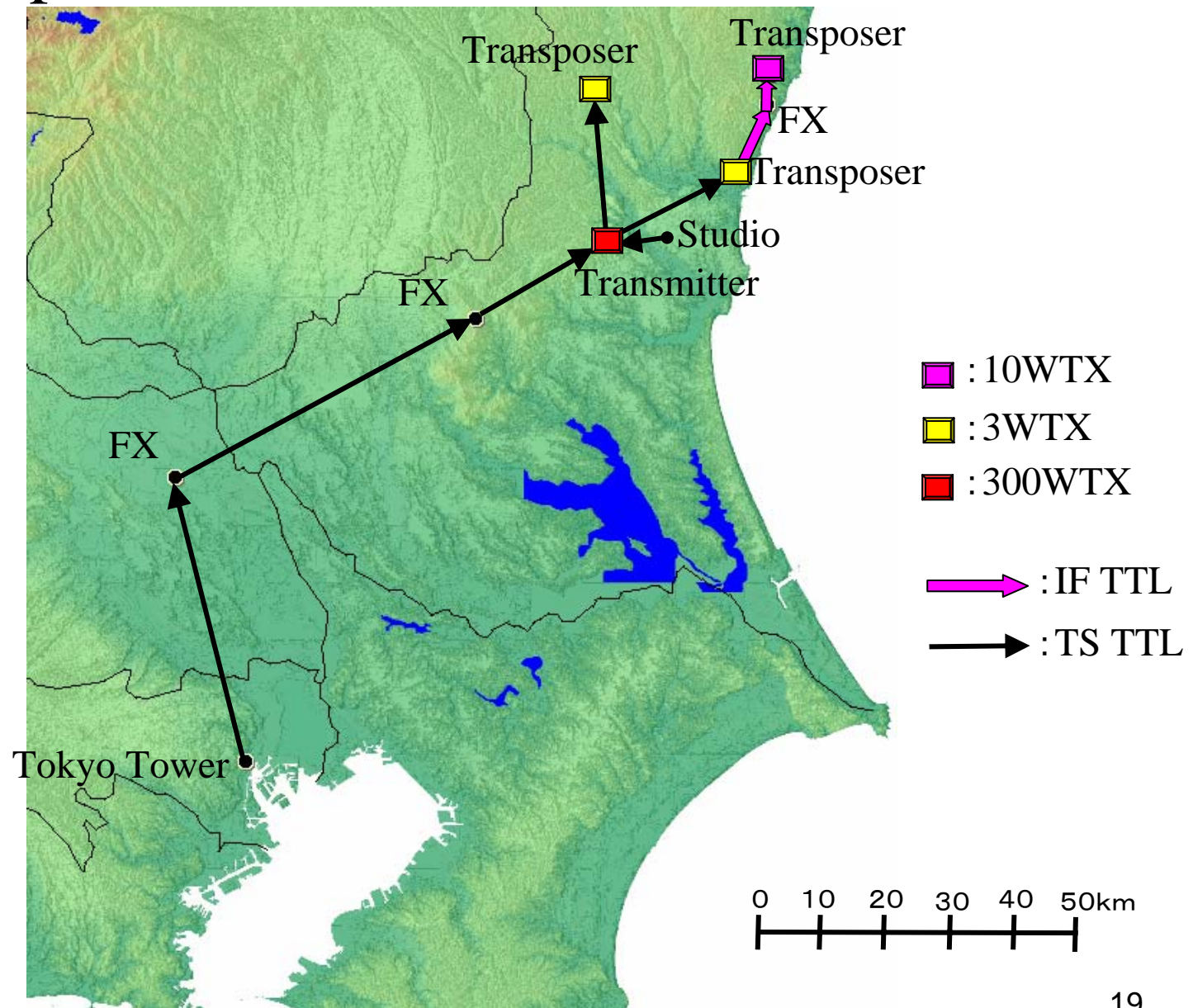
Comparison of network system

Network type	Infrastructure & maintenance costs	Signal quality	SFN timing adjustment	Saving of microwave frequency resource
TS transmission- Micro wave/ Fiber	3	1	1	2
IF transmission- Micro wave	2	2	1	2
Broadcast- wave relay station	1	3	2 (note-1)	1 (note-2)

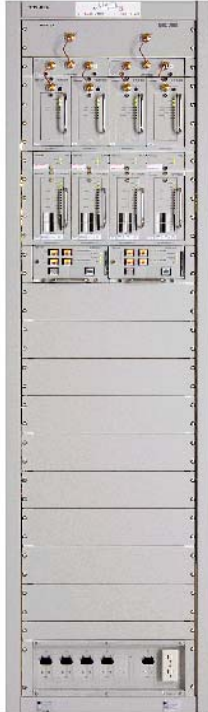
(note-1) For Broadcast-wave relay system, the range of transmission timing is limited.

(note-2) Broadcast wave relay system dose not require micro-wave frequency.

Example of Wide KANTO area Network



Examples of Microwave STL/TTL (Toshiba)



TS STL/TTL TX TS STL/TTL RX

- Dual type, seamless switching
- DVB-ASI digital interface
- Equipped automatic multi-path equalizer

IF TTL TX/RX

- Dual type, TX/RX are installed in 1 rack
- OFDM IF signal interface
- Phase noise compensation technology with pilot signal

Examples of Digital Studio to Transmitter Link for TS Signal Transmission (Hitachi KokusaiElectric)



2 channels dual system

- Seamless SHF Output Signal Switching
- DVB-ASI Digital Signal Interface
- High-performance automatic equalizer diminishes multi-path distortion

Example of Optical STL/TTL (Toshiba)



Optical TX

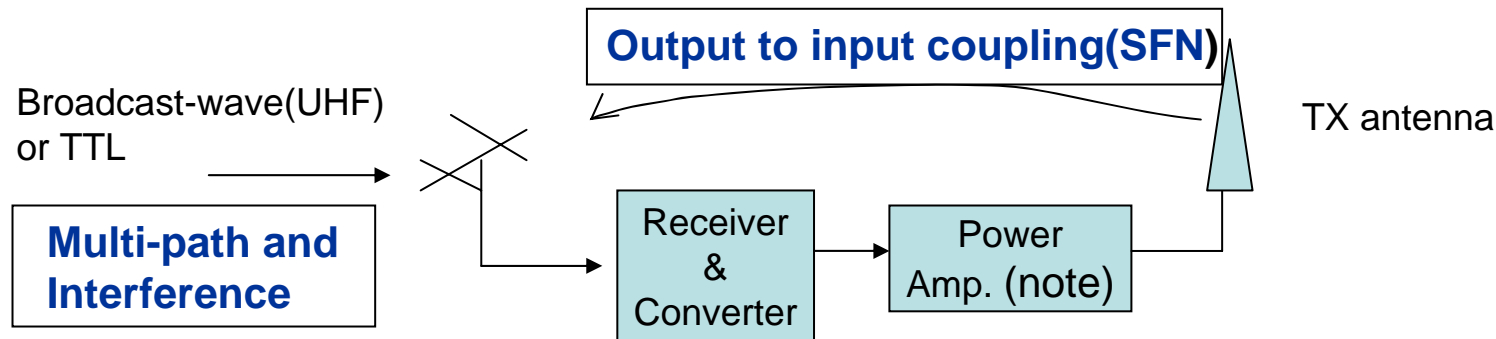
Optical RX

Ratings

- Signal Input: DVB-ASI
- Output Wave Length: 1.5um band
- Output Power: +6dBm
- Transmission Bit Rate: 33.464Mbps

(3) Trans-poser of Digital Terrestrial Broadcasting And new technology

(a) Conceptual Block diagram



(note) to save the cost, common amplifier is expected

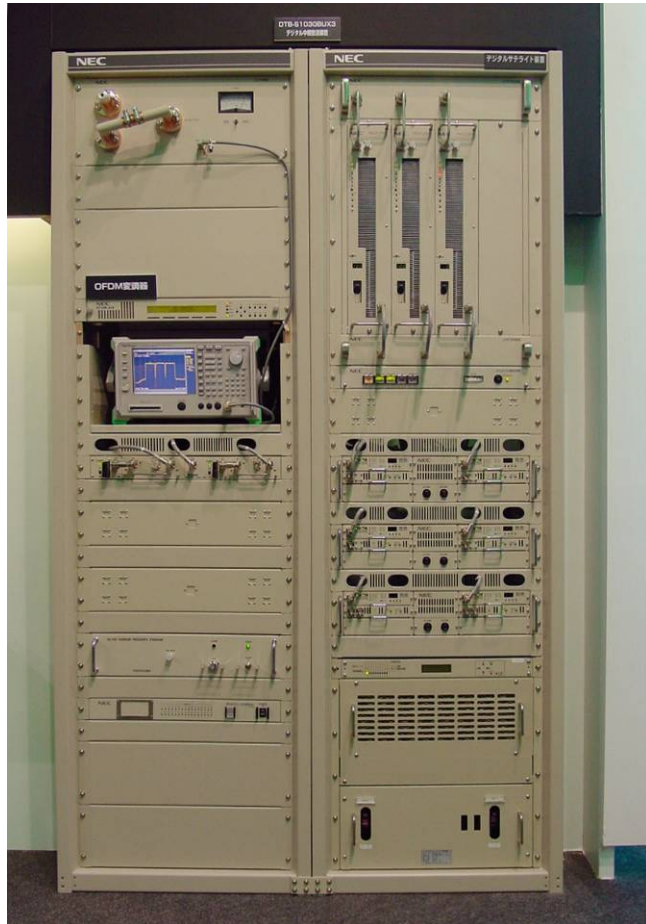
(b) Key factors of digital terrestrial trans-poser

1. To reduce the cost, common wideband amplifier for plural channel is expected
2. In some cases, degradation caused on transmission link should be improved (Multi-path, interference canceller, diversity reception, etc)
3. For SFN, receiving and transmitting frequency is same, coupling of input and output should be decreased (coupling loop canceller)

(c) Examples of Hardware; see following pages

Examples of Digital Transposer (NEC)

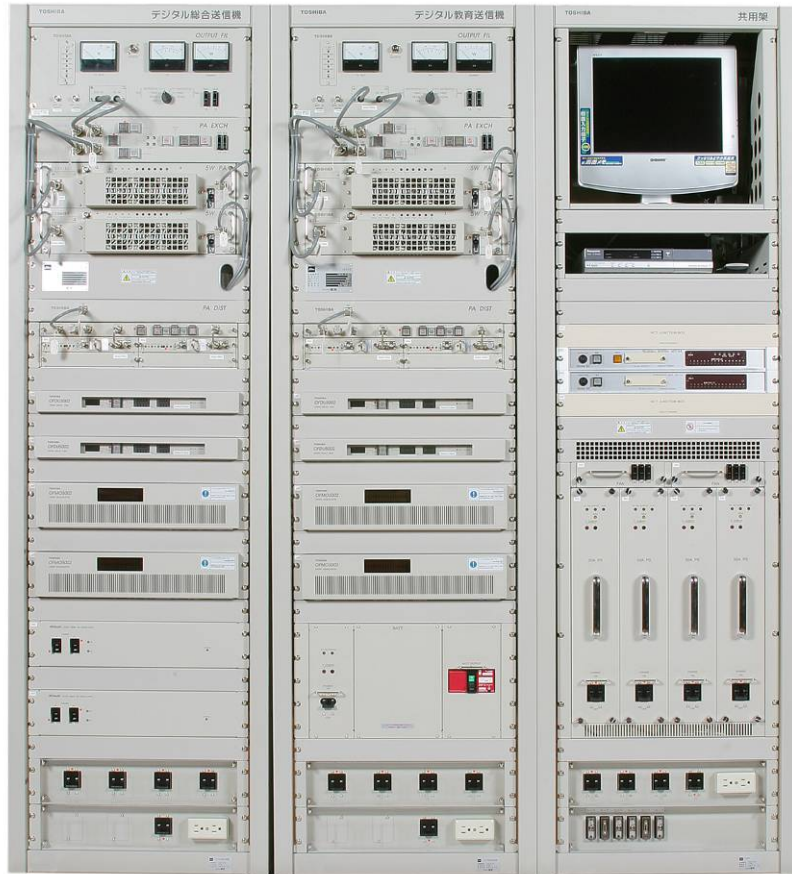
30W x 3-channels common amplification System



Features

- 1) Excellent IM (less than -50dB) using Feed-forward technology.
- 2) MCPA (Multi Channel Power Amplifier) is available.
No required of Channel combiner, especially, in the case of adjacent channel transmitting.
- 3) END (Equivalent Noise Degradation) improving equipment for on air receiving system is provided.
 - Loop canceller
 - Diversity receiver
 - Noise reduction (Re-mapping) Equipment.

Examples of Digital Transposer (Toshiba)

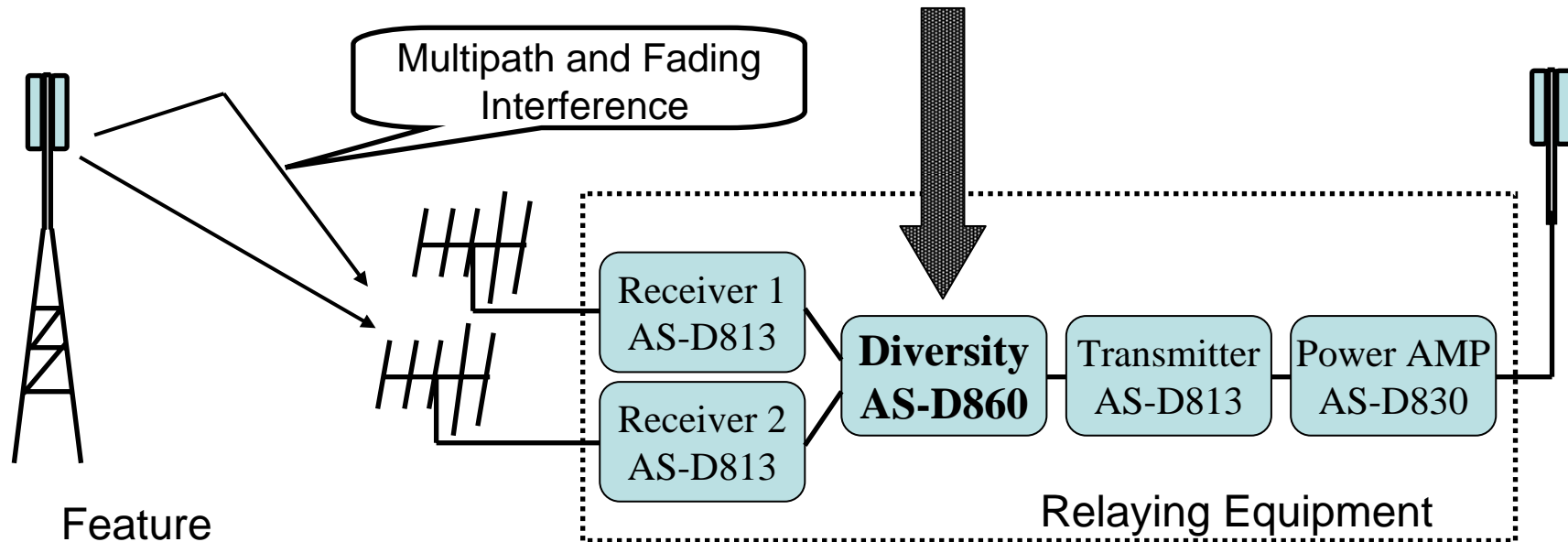


TS-TTL 3W TX



TS-TTL 50W TX

Signal quality compensate equipment for Terrestrial Digital Broadcasting Relay Station MODEL AS-D860 (Panasonic).

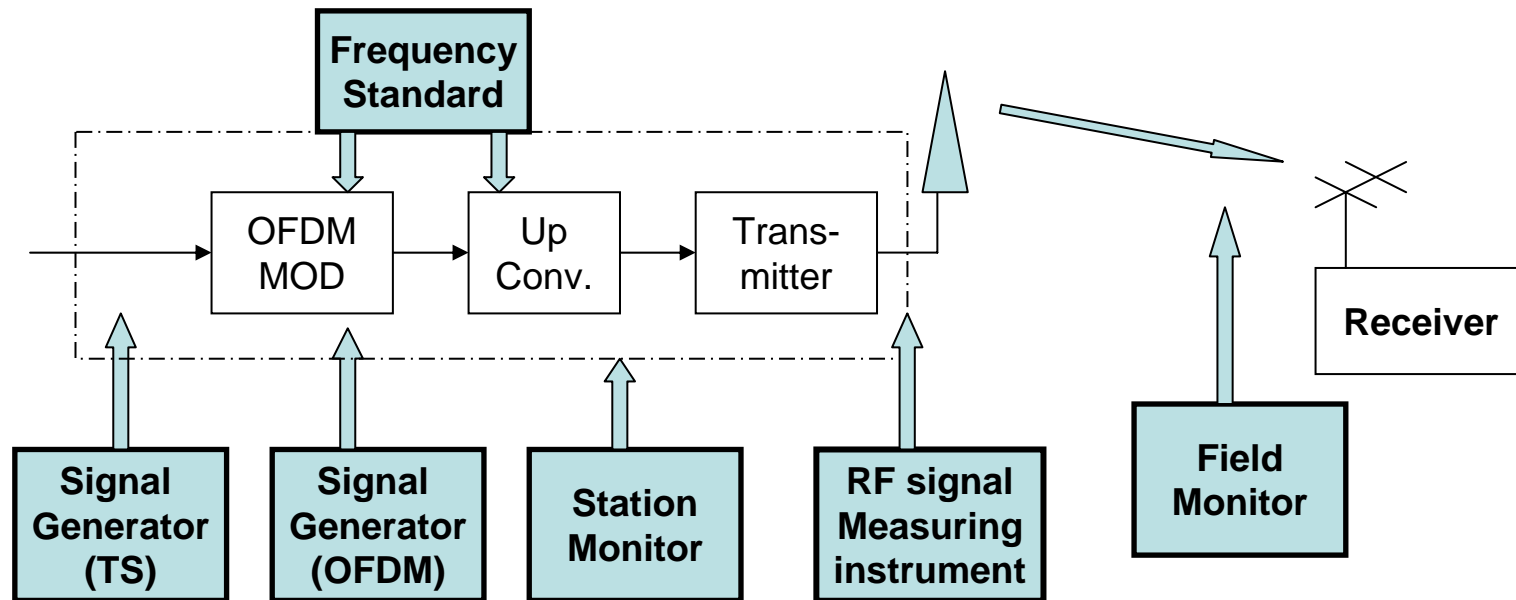


- ★ Signal quality degradation by the multipath and fading is compensated.
- ★ Adopted to maximum-ratio-combined method.
- ★ Miniaturization Size : 480mm(W) × 400mm(D) × 50mm (H)

(4) Peripherals

(a) Peripherals for digital transmitter system

Peripherals for digital transmitting system are quite different from the ones for analog system. Many types of peripherals for digital have been developed and commercialized

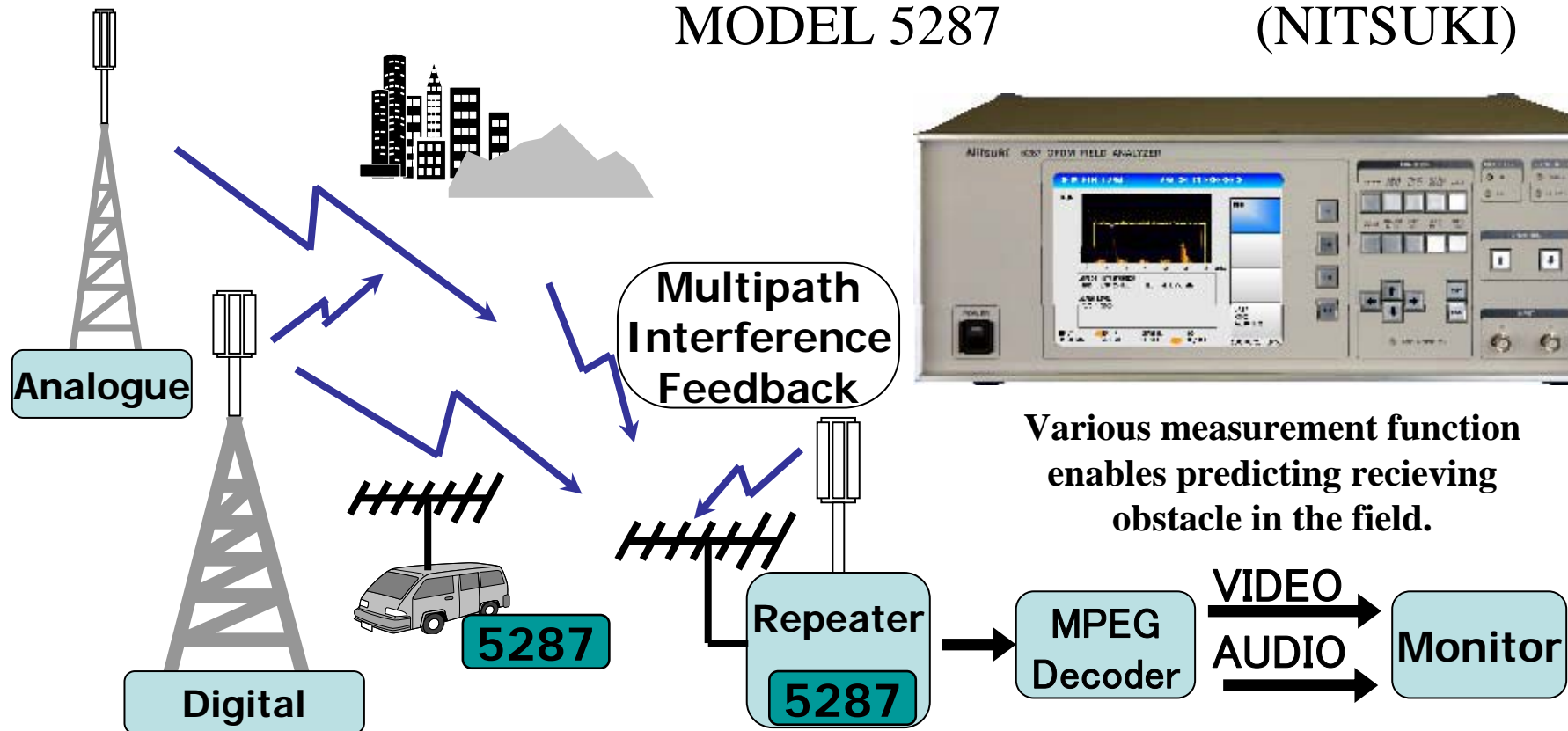


(b) Examples of Hardware; see following pages

OFDM FIELD ANALYZER

MODEL 5287

(NITSUKI)



- * Equipped with built-in very low noise UHF all channel down converter.
- * Output MPEG2-TS from demodulated OFDM signal.
- * Measured results are displayed on LCD and can be stored in memory card.
- * Displays transmission parameters at each hierarchical level, according to TMCC information.
- * In case measured value exceed normal range, alarm signal will be issued.

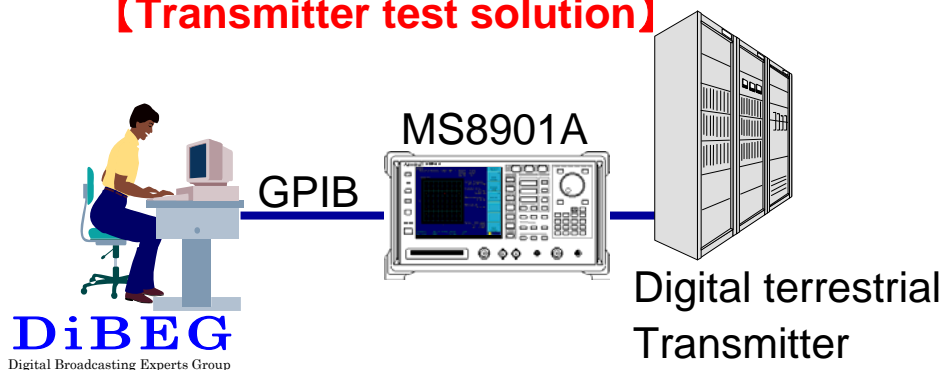
Introduction of measuring instrument for digital broadcasting

MS8901A(Anritsu) Digital Broadcast Signal Analyzer

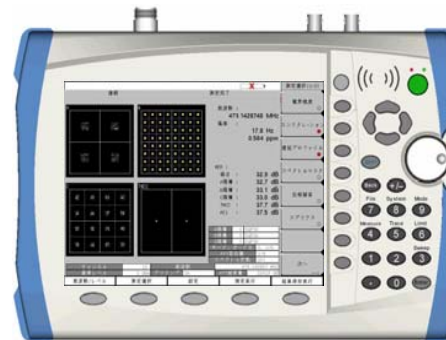


This is a digital broadcasting signal analyzer that makes the base of high performance Spectrum Analyzer (9kHz~3GHz). Using High-speed DSP, and you will be able to do some diverse measuring functions by installing the measurement software.

【Transmitter test solution】

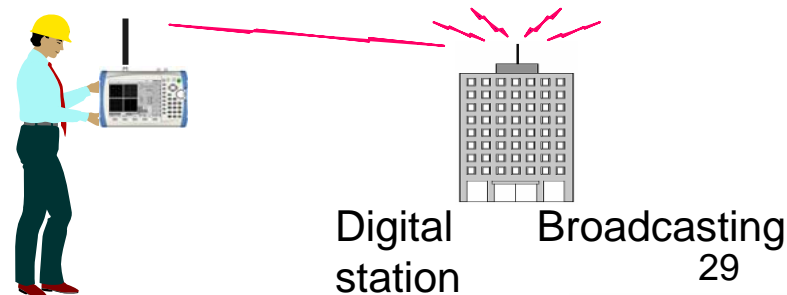


MS8911A(Anritsu) Digital Broadcast Field Analyzer



MS8911A is a suitable and optimal measuring instrument for Digital Broadcasting Signal Wave (ISDB-T). This has the most advanced ultra-portable spectrum analyzer on the market, featuring unparalleled performance and size at a modest price.

【Field measurement solution】



3. ISDB-Tsb; Terrestrial Sound Broadcasting (Family of ISDB-T)

Features of ISDB-Tsb

(1) What is ISDB-Tsb

ISDB-Tsb transmission system is unique in ISDB-T family. This transmission system has been standardized for narrow band ISDB-T transmission system, which is focused to audio and data service, therefore, called ISDB-Tsb.

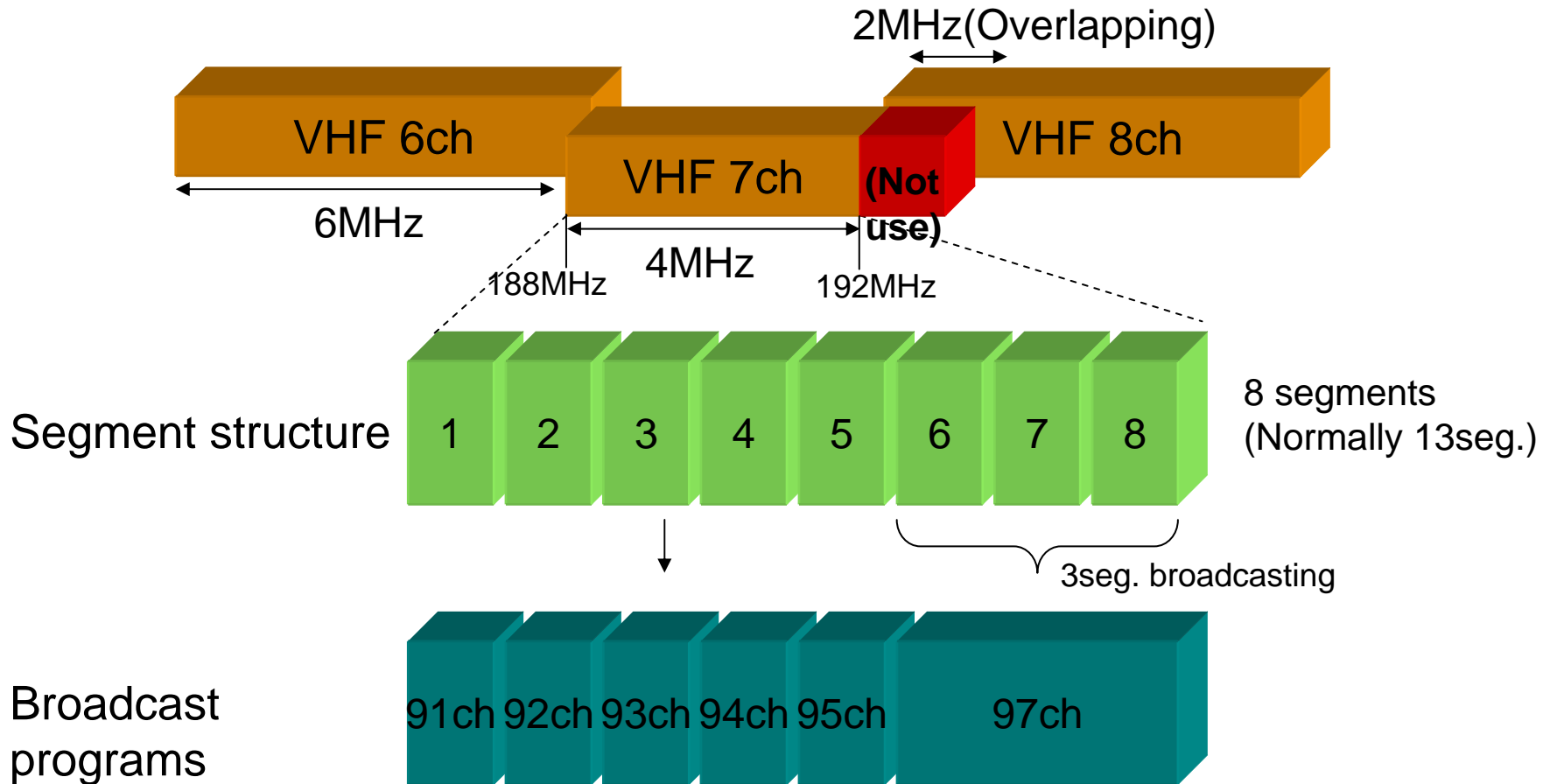
(2) Commonality with ISDB-T

- (a) Same segment transmission construction. But ,considering narrow band reception, only 1 segment and 3 segment transmission systems are standardized
- (b) Adopt same transmission parameters as ISDB-T.
- (c) Commonality of 1 segment receiver with ISDB-T partial reception

(3) Efficient use of frequency resource

- (a) Consecutive transmission system. This system is unique for ISDB-Tsb, this transmission system is to transmit plural channel without guard band
- (b) To achieve consecutive transmission, phase compensation technology at transmitter side is adopted

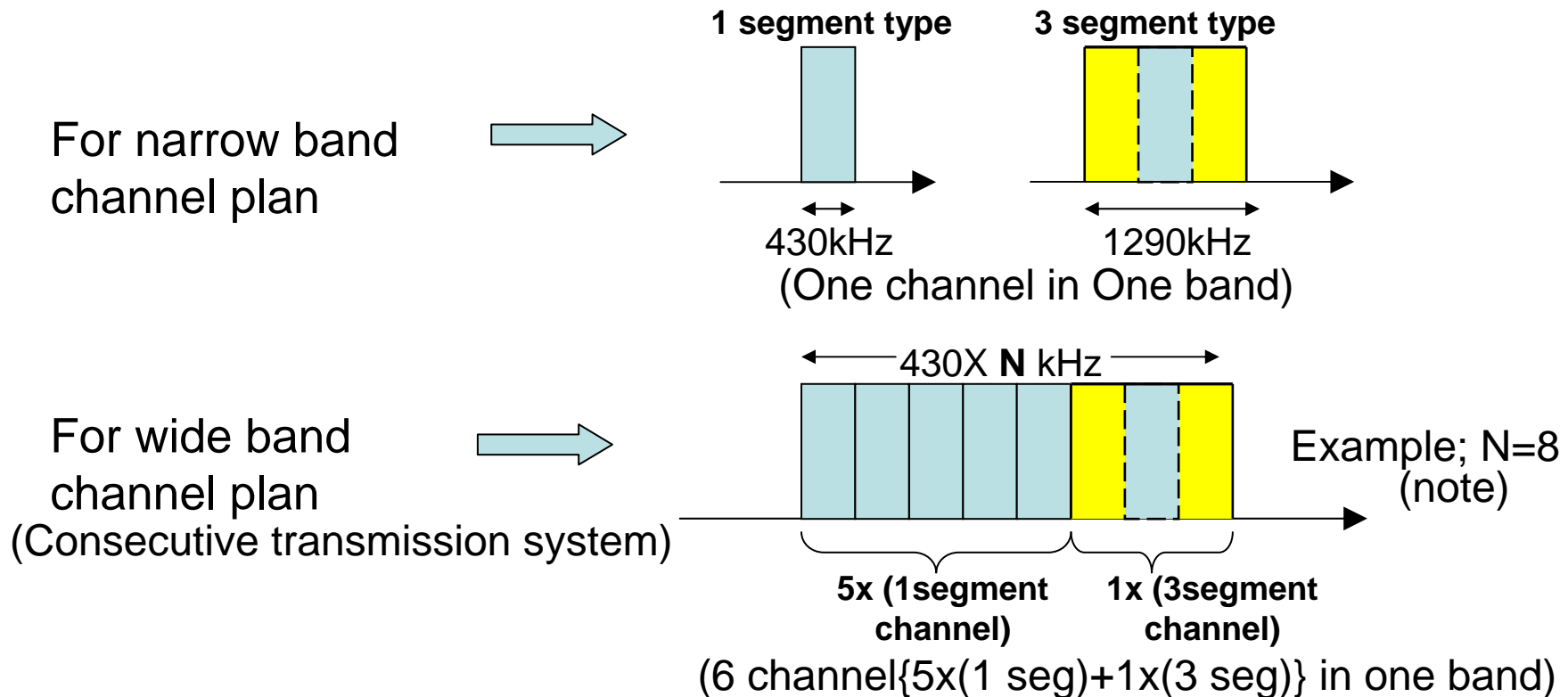
VHF television band assignments



Above example is Tokyo station , Osaka's all programs are 1seg. broadcasting.

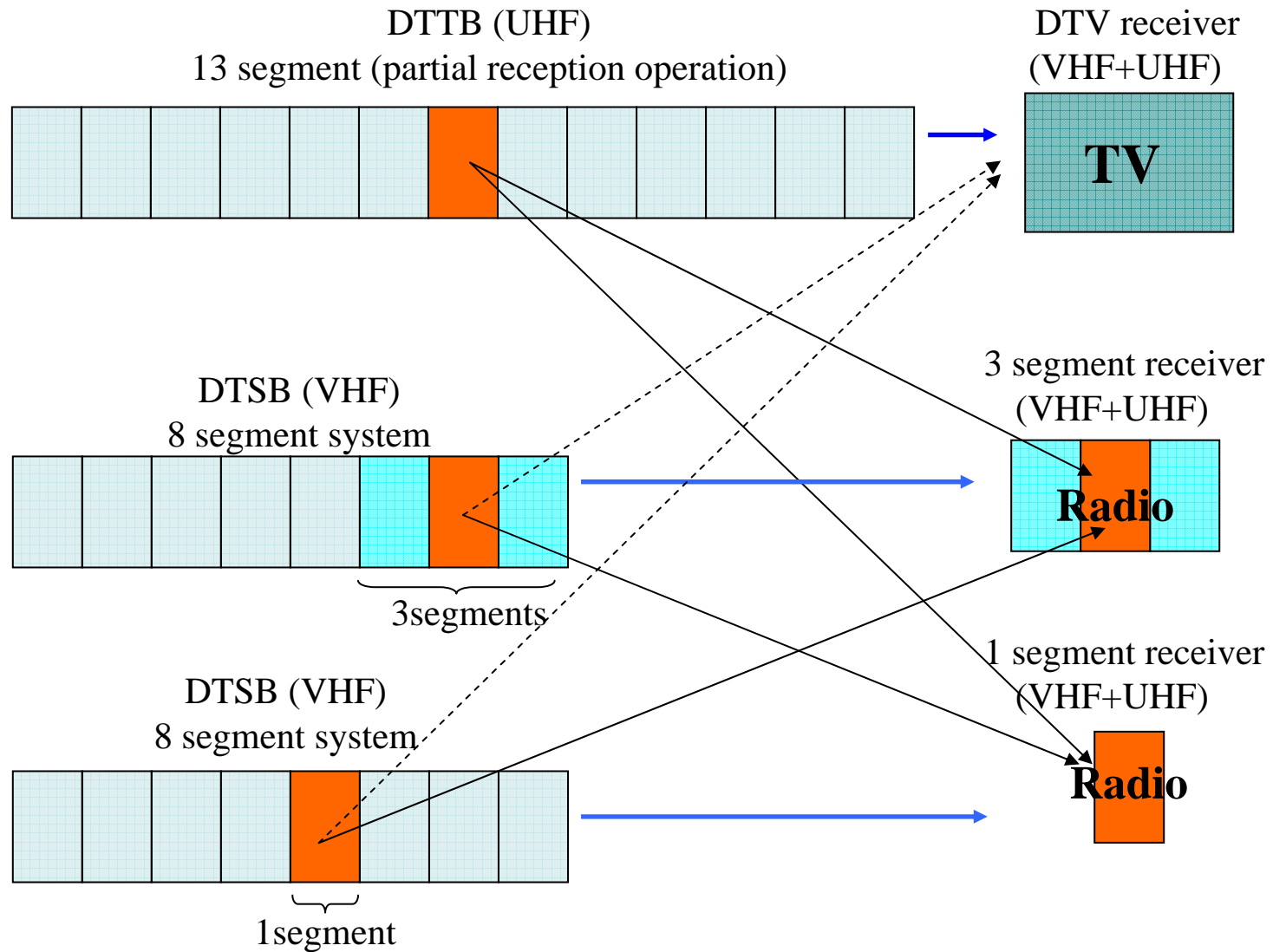
Efficient use of frequency resource (Flexibility of channel plan)

For ISDB-Tsb transmission system, any type as follows are available according to usable bandwidth

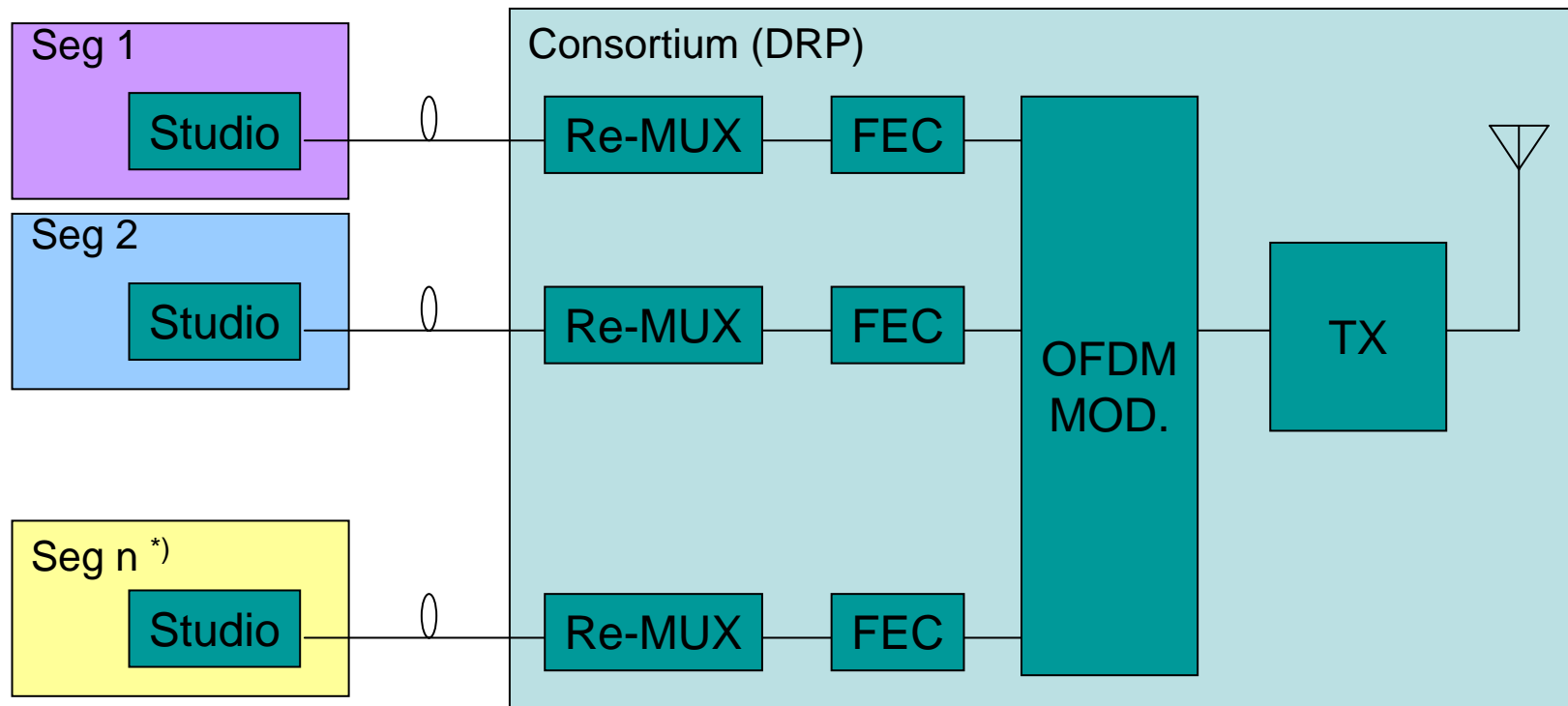


(note) Any number of segment(up to 13) are available

Commonality with ISDB-T (Digital radio/digital TV compatible receiver)



Block diagram of the Digital Terrestrial Sound Broadcasting system in Japan



note) $n=6$ for Tokyo (1seg x 5 + 3seg x 1 = 8 segments)

$n=8$ for Osaka (1seg x 8 = 8 segments)

DRP Tokyo master rack room



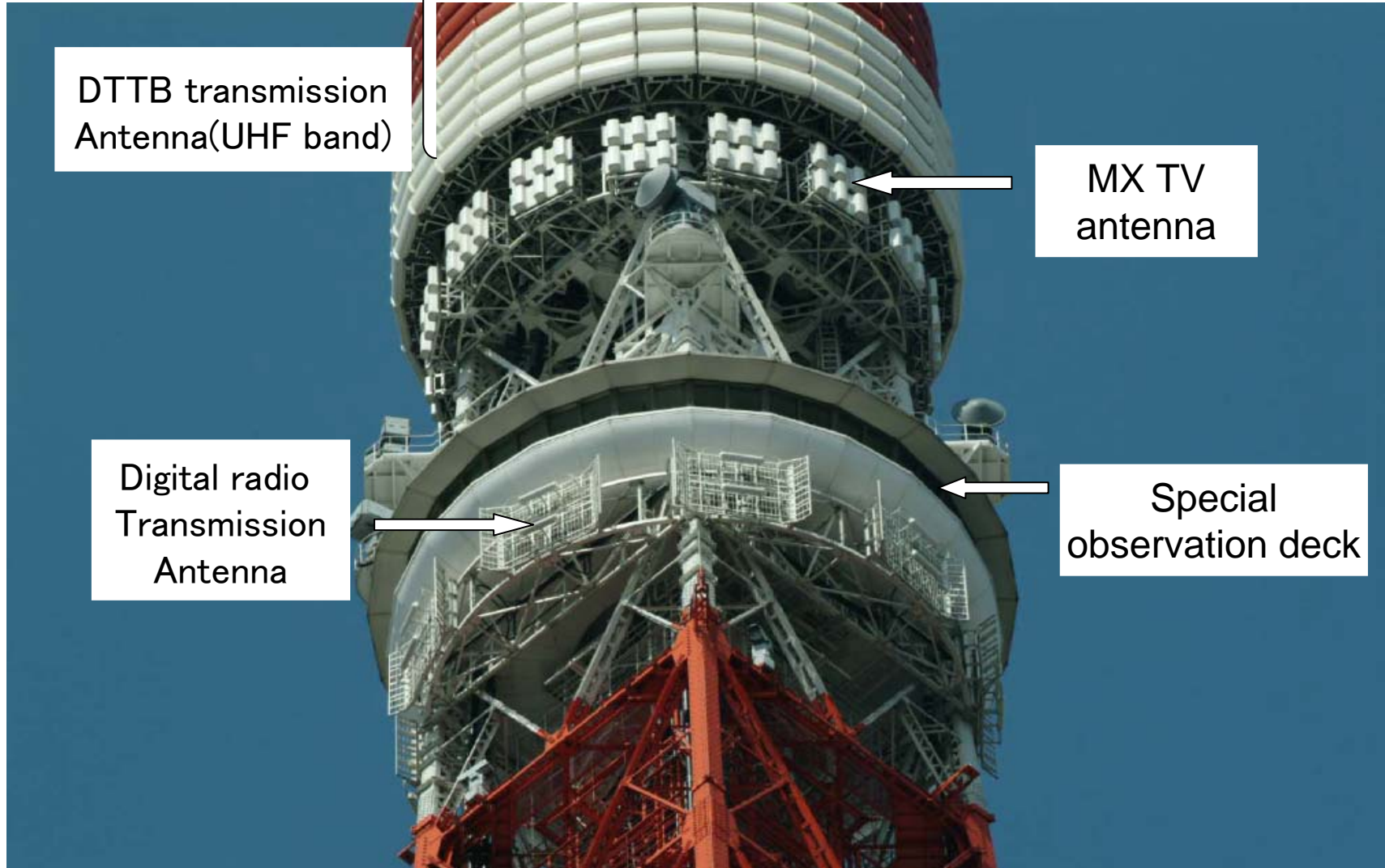


DRP Infrastructure for ISDB-Tsb(2/3)

DRP Tokyo digital radio transmitter room



Antenna



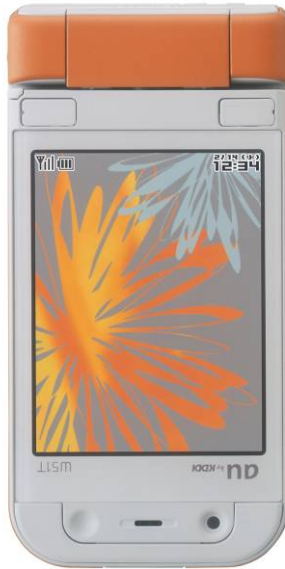


Examples of ISDB-Tsb Receiver

KDDI supports the diffusion of ISDB-Tsb service/receiver strongly



W44S
(SONY ERICSSON)



W51T
(TOSHIBA)



W52T
(TOSHIBA)



W51SH
(SHARP)



ISDB-T Seminar in Manila



Digital Broadcasting Expert Group

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