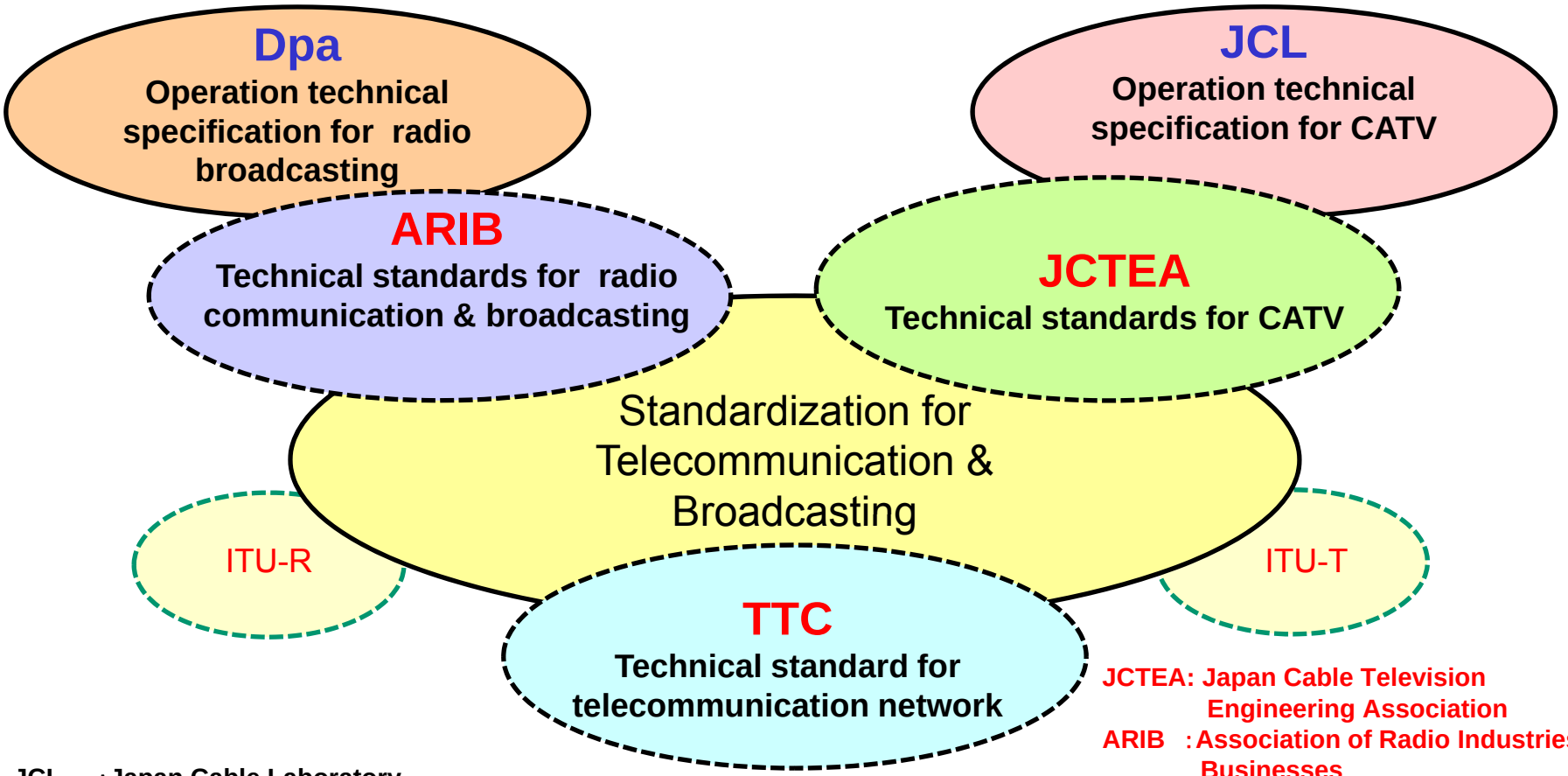
Digital Cable Television Broadcasting

Jan.29th 2010

Japan Cable Television Engineering Association
(JCTEA)

Standardization Organization For Telecommunication & Broadcasting



JCL : Japan Cable Laboratory
Dpa : The Association of Promotion for Digital Broadcasting

JCTEA: Japan Cable Television Engineering Association
ARIB : Association of Radio Industries of Businesses
TTC : The Telecommunication Technology Committee
(: Standardization Organization)

JCTEA Standards About Network, Equipment, STB & Measuring Method For Digital, FTTH & Internet

Japanese edition only now

- STD-001 Conditional Access for Digital Cable Television*
- STD-002 Multiplex System for Digital Cable Television*
- STD-003 Service Information for Digital Cable Television*
- STD-005 Data Transmission Equipment for Cable Television Network
- STD-006 Symbolmark for Cable Television System
- STD-007 Receiver for Digital Cable Television *
- STD-008 BS Digital Broadcasting Pass-through System for Cable Television
- STD-009 Method of Measurement for Cable Modem System
- STD-010-OFDM Method of Measurement for OFDM Signal Transmission system*
- STD-010-PSK Method of Measurement for PSK Signal Transmission system*
- STD-010-QAM Method of Measurement for QAM Signal Transmission system*
- STD-011 Pass-through Method for Digital Terrestrial Television Broadcasting signal over Cable Television System*
- STD-012 Head-amplifier for Retransmitting Digital Terrestrial Broadcasting over Cable Television System
- STD-013 Transmission System for MDU
- STD-014 Optical Network and using Equipments for FTTH Cable Television System
- STD-015 Method of Measurement for FTTH Cable Television System
- STD-016 Method of Interference Measurement for Cable Television Signal Transmission System
- STD-017 Examination Facilities equaled with Actual Cable Television Network for Cable Television Signal Transmission System
- STD-018 Optical Network Specification for FTTH Cable Television System
- STD-019 Gap-Filler System and its Equipments for Digital Terrestrial Television Broadcasting
- STD-020 Method Of Measurement for Gap-filler System and its Equipments

*Regarding STDs for Digital Cable Television

Transmission Signals Of FTTH or HFC

Television Signal	Modulation	Freq. Band		
Standard Television Broadcasting（Analog Television）	NTSC-VSB-AM	90～770MHz	HFC	FTTH
Std. Digital Television Broadcasting（Digital Terrestrial Television）	ISBD-T OFDM			
Digital Cable Television Broadcasting	64QAM 256QAM			
Std. Satellite Broadcasting（Analog BS Television）	FM	BS-IF (1032-1489MHz)	—	
Std. Digital Satellite Broadcasting（Digital BS Television）	TC8PSK			
Digital Communication Satellite Broadcasting (Digital CS Television)	QPSK	CS-IF (1595-2072MHz)		

Retransmission method over Cable-television system for Terrestrial Broadcasting

1. Pass-through method

① Received ISDB-T(OFDM) signals are transmitted through cable without any adjustment(same frequency).

② Received ISDB-T(OFDM) signals are transmitted after filtering out individually and adjusting each level.

③ Received ISDB-T(OFDM) signals are transmitted after filtering out, converting frequency and adjusting level, changing channel frequency. (Frequency converted pass-through)

④ Digital TV sets on the market are available, its most convenient.

2. Trans-modulation method

① TS (on terrestrial broadcasting) is transferred on QAM signals over cable-television system without changing of contents, functions, etc.

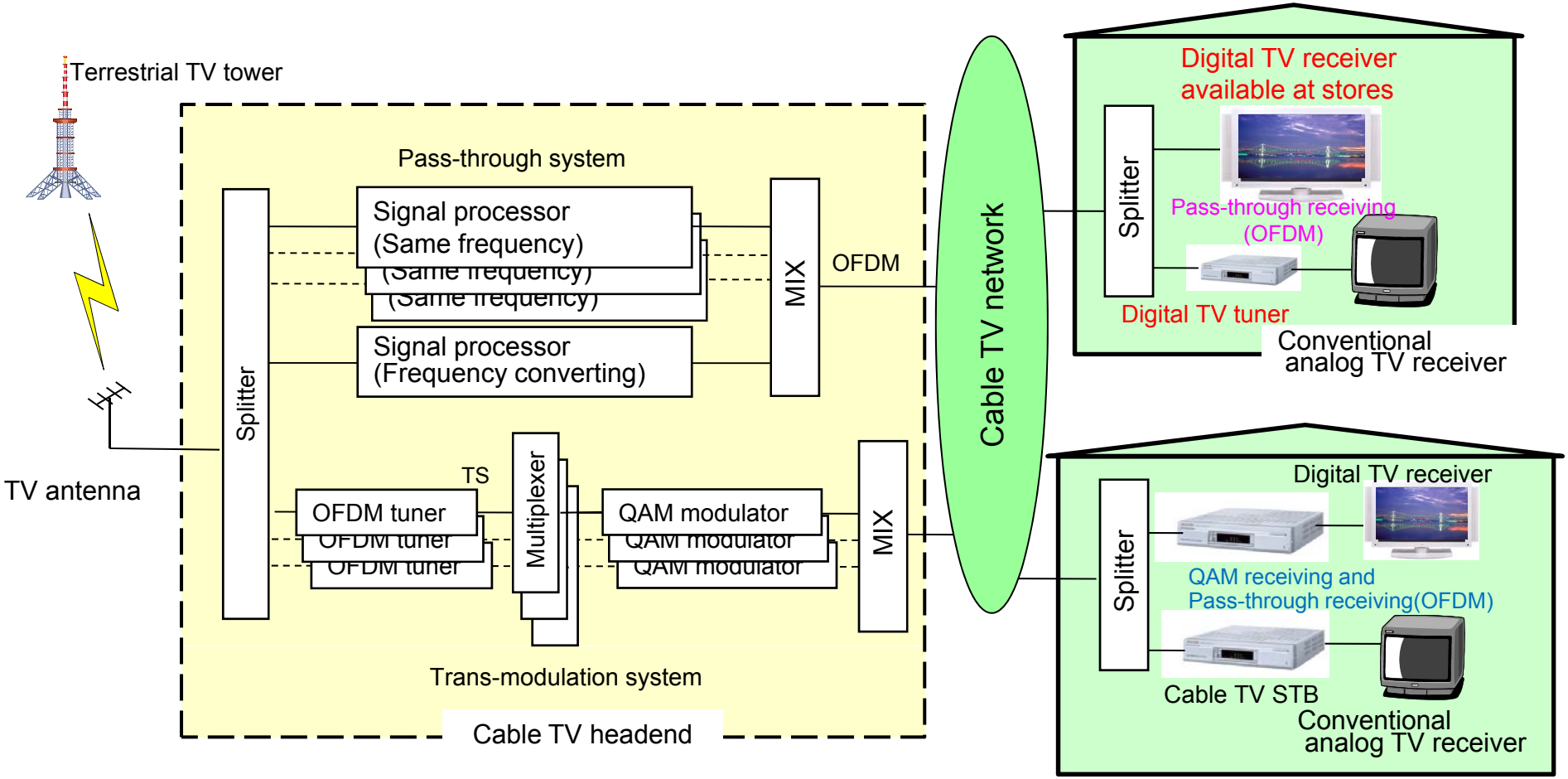
② Only cable television STB is available.

3. Dig-Ana transfer method

① Digital audio/video signal is transferred into traditional analog signal(NTSC-VSB-AM) for conventional analog TV sets.

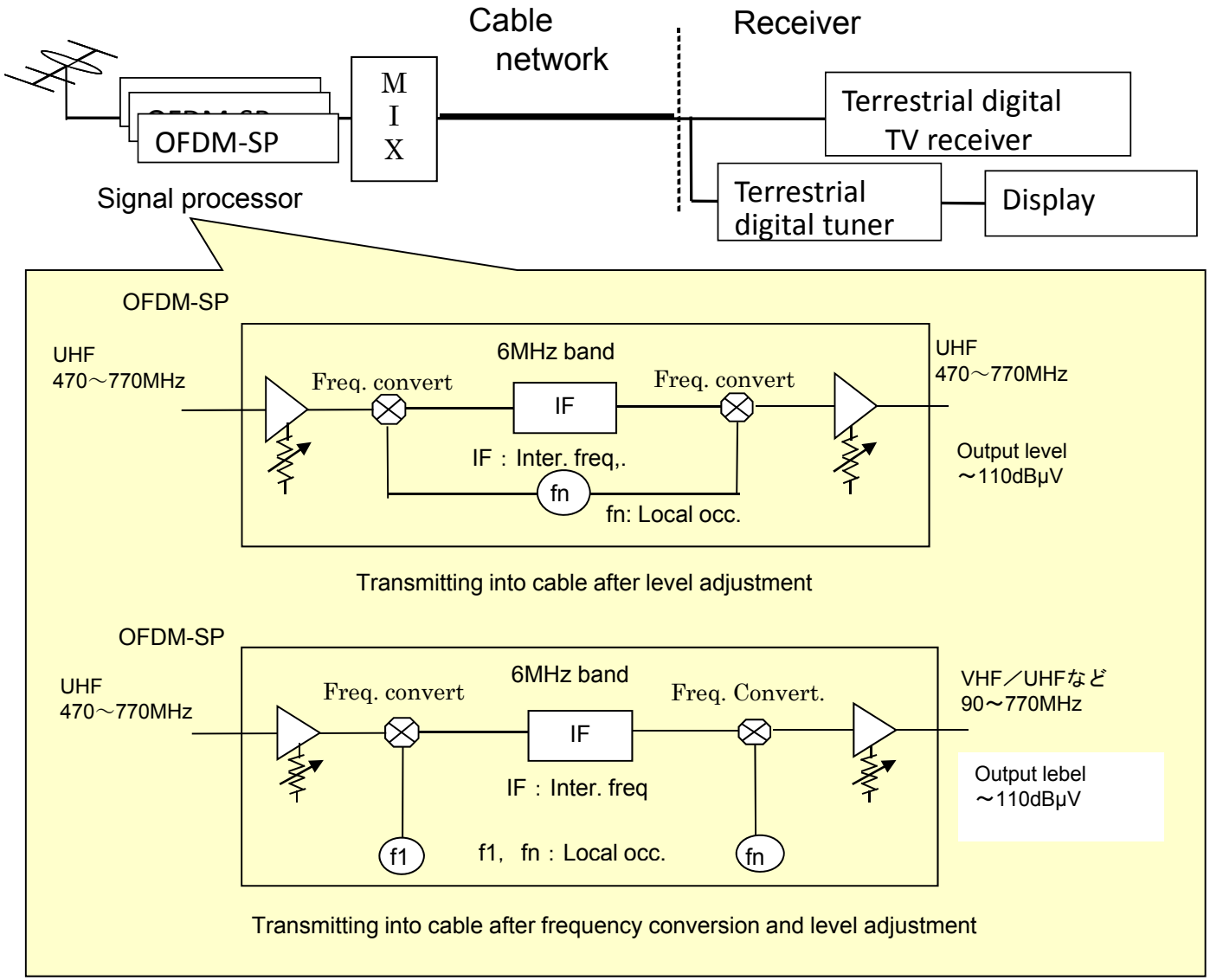
② HD video, data service, EPG etc. are not available.

Retransmission method over Cable-television system for Terrestrial Broadcasting



・Digital TV receiver equips terrestrial OFDM tuner, BS tuner, CS tuner
・STB equips terrestrial OFDM tuner, QAM tuner, and/or Hard disk memory

Pass-through Retransmission Method(JCTEA STD-011)



Pass-through Method for Digital Terrestrial Television Broadcasting Signals over Cable Television System
(JCTEA STD-011)

BER for received signal at receiver terminal:

BER before error correction by Reed Solomon (204,188): less than 1×10^{-4}

* Desirable BER is not more than 1×10^{-8}, meaning that about 3dB margin added to 1×10^{-4}, because some equipments, example indoor booster etc. will be connected on receiver terminal.

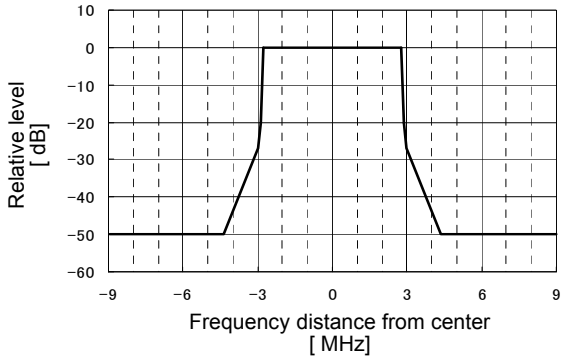
OFDM signal processor (SP) performance is specified on the following items (Example)

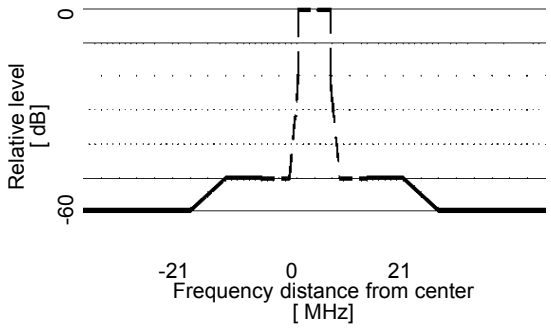
1) Quality of OFDM-SP output

1 Frequency spectral mask : Right upper figure
2 BER : 1×10^{-4}
3 Out-band noise : Right lower figure

2)Rating of OFDM-SP

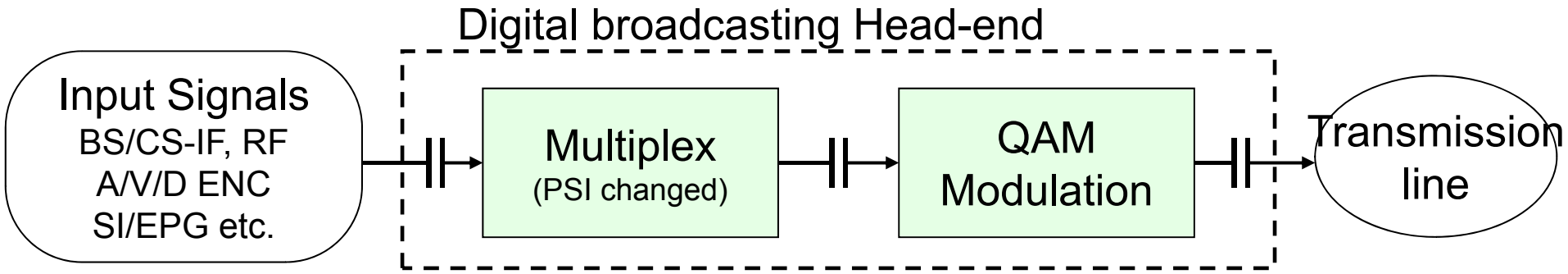
1 Amplitude deviation in passing band : ±1 dB
2 Group delay deviation in passing band : ±200 ns
3 Signal suppression out of band : ≥ 10 dB
4 Phase noise of frequency converted carrier : ≤0.5° rms
5 Spurious of frequency converted carrier : -60dB(±6MHz)



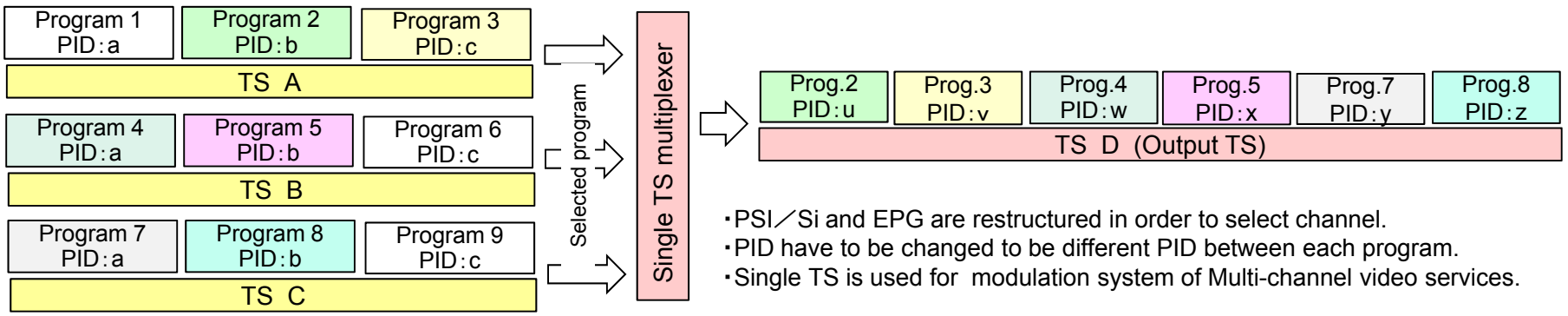


Multiplex System for Digital Cable Television(JCTEA STD-002)

JCTEA STD-002 describes digital multiplex and digital modulation of digital cable television broadcasting methods by Cable Television Broadcasting Law Enforcement Regulations

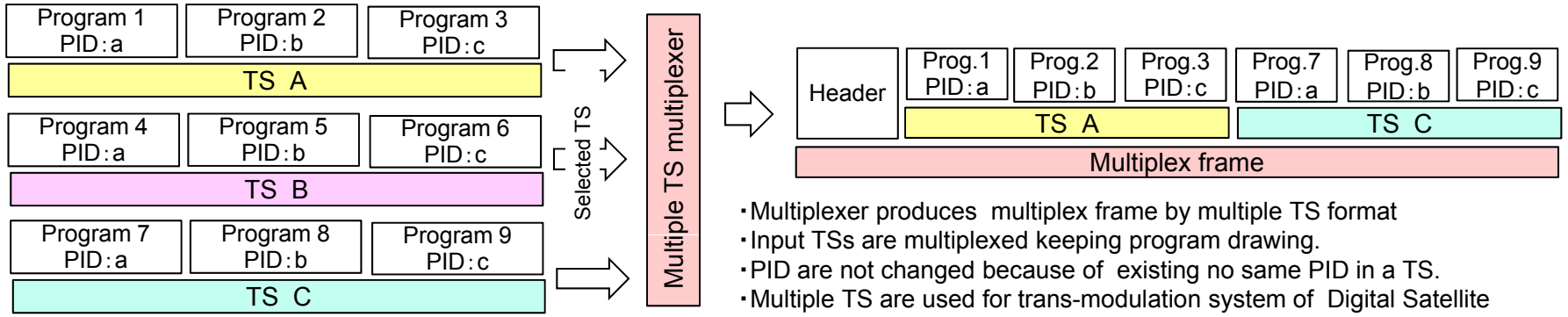


Single TS & Multiple TS Multiplexer (JCTEA STD-002)



・PSI／Si and EPG are restructured in order to select channel.
・PID have to be changed to be different PID between each program.
・Single TS is used for modulation system of Multi-channel video services.

Fig. 1 Conceptual illustration of single TS multiplexer

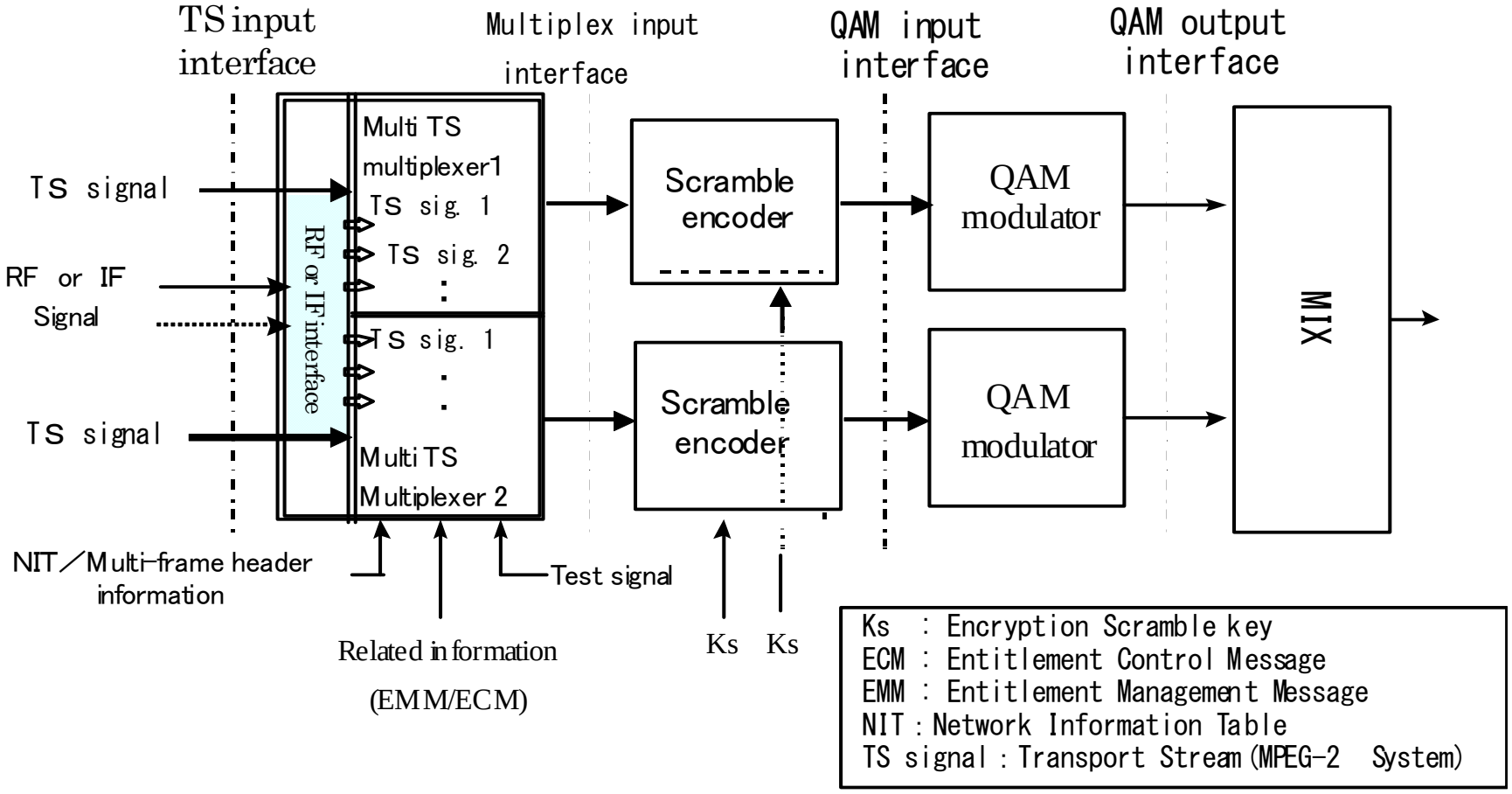


・Multiplexer produces multiplex frame by multiple TS format
・Input TSs are multiplexed keeping program drawing.
・PID are not changed because of existing no same PID in a TS.
・Multiple TS are used for trans-modulation system of Digital Satellite Broadcasting and Digital Terrestrial Broadcasting

Fig.2 Conceptual illustration of multiple TS multiplexer

Basic Configuration Of Multiple TS Multiplexer

This multiplexer have a function to multiplex streams of various programs including digital television broadcasting, data broadcasting and on-demand audiovisual services using the MPEG-2 transport stream format as a logical format together with service information containing MPEG-2 program specific information(PSI) into multiple transport stream. It may include another function to multiplex NIT suitable for cable TV network and the related information signal for conditional access with the transport stream.



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