

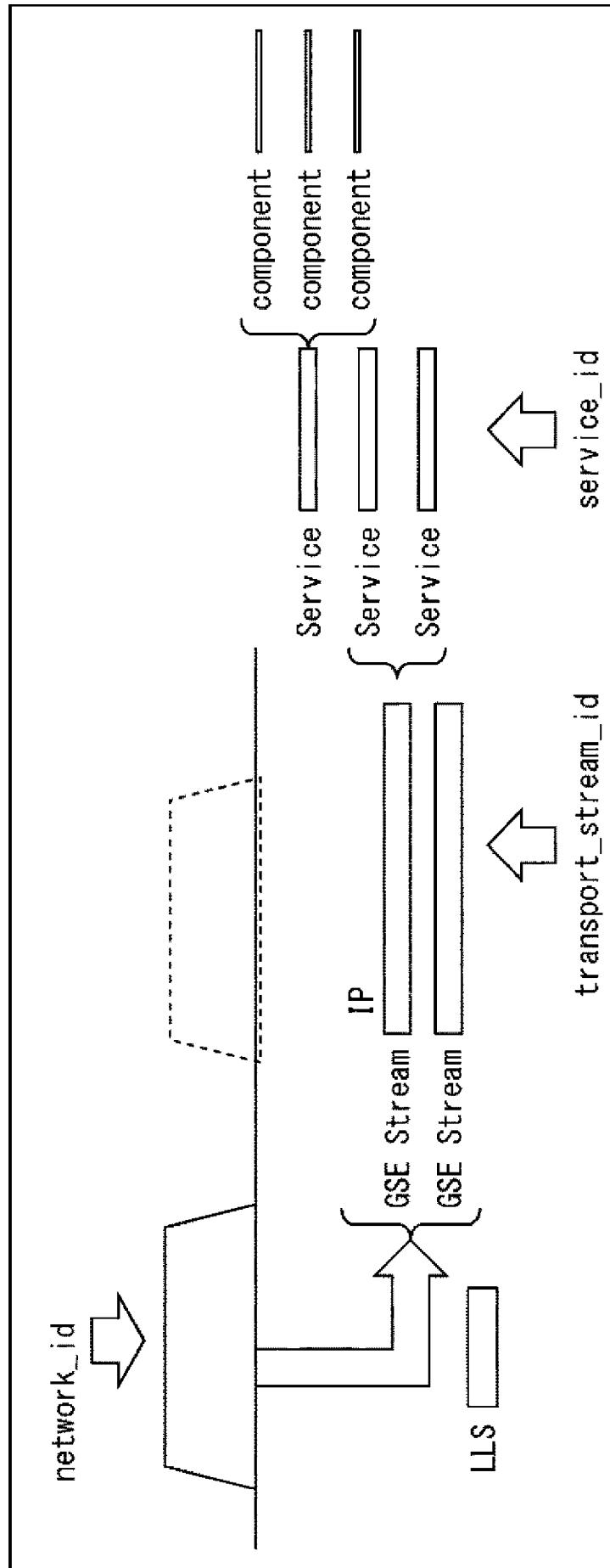
[Fig. 1]

FIG. 1

AV (HEVC, AAC, etc.), SubTitle, RealTimeEvent		Interactive, Meta, etc.	HLS (ESG)	MLS (SCS)	LLS
RTP	fMP4				
	FLUTE/ALC/LCT				
UDP					
IP					
GSE					
Phy					

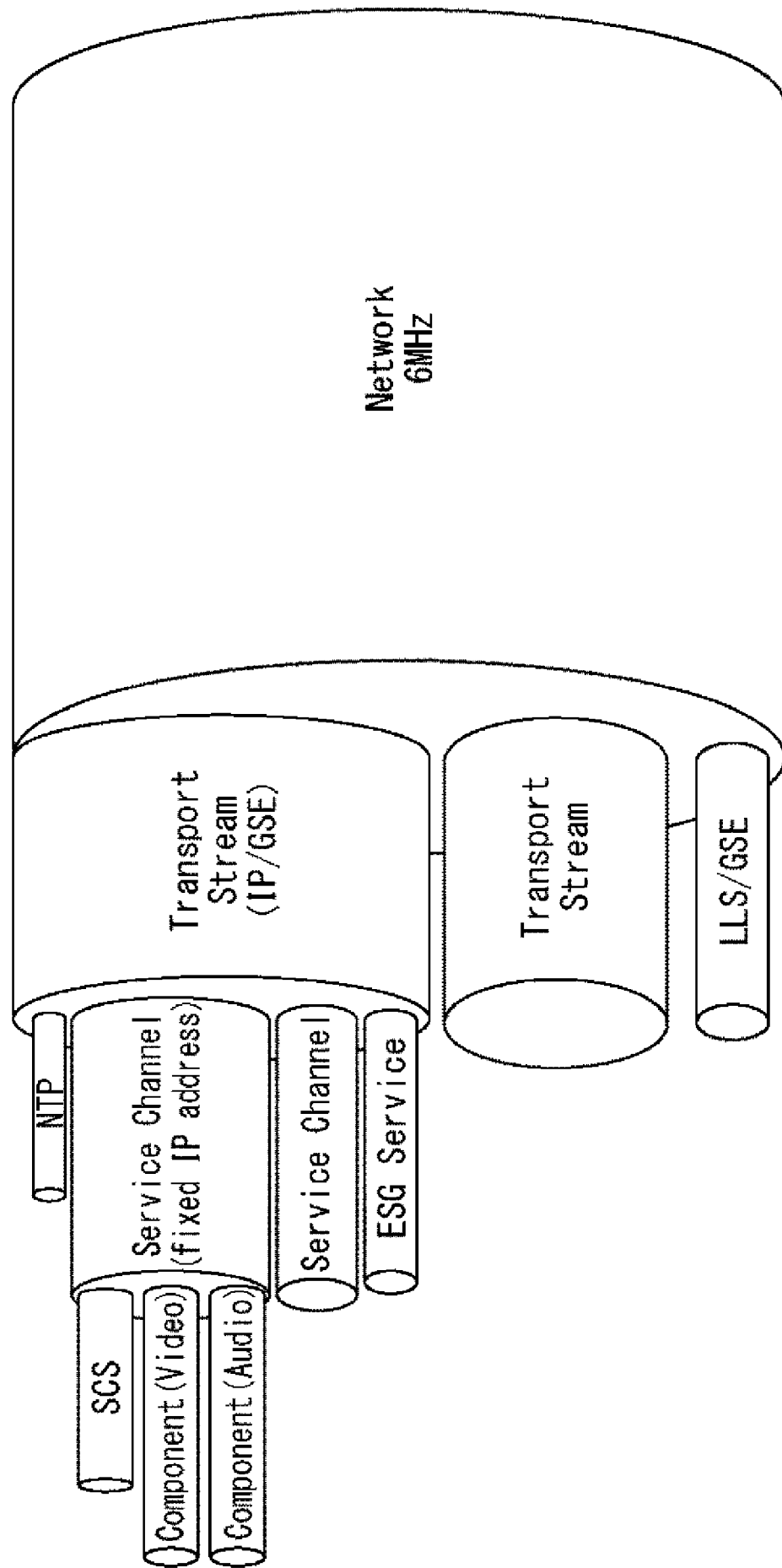
[Fig. 2]

FIG. 2

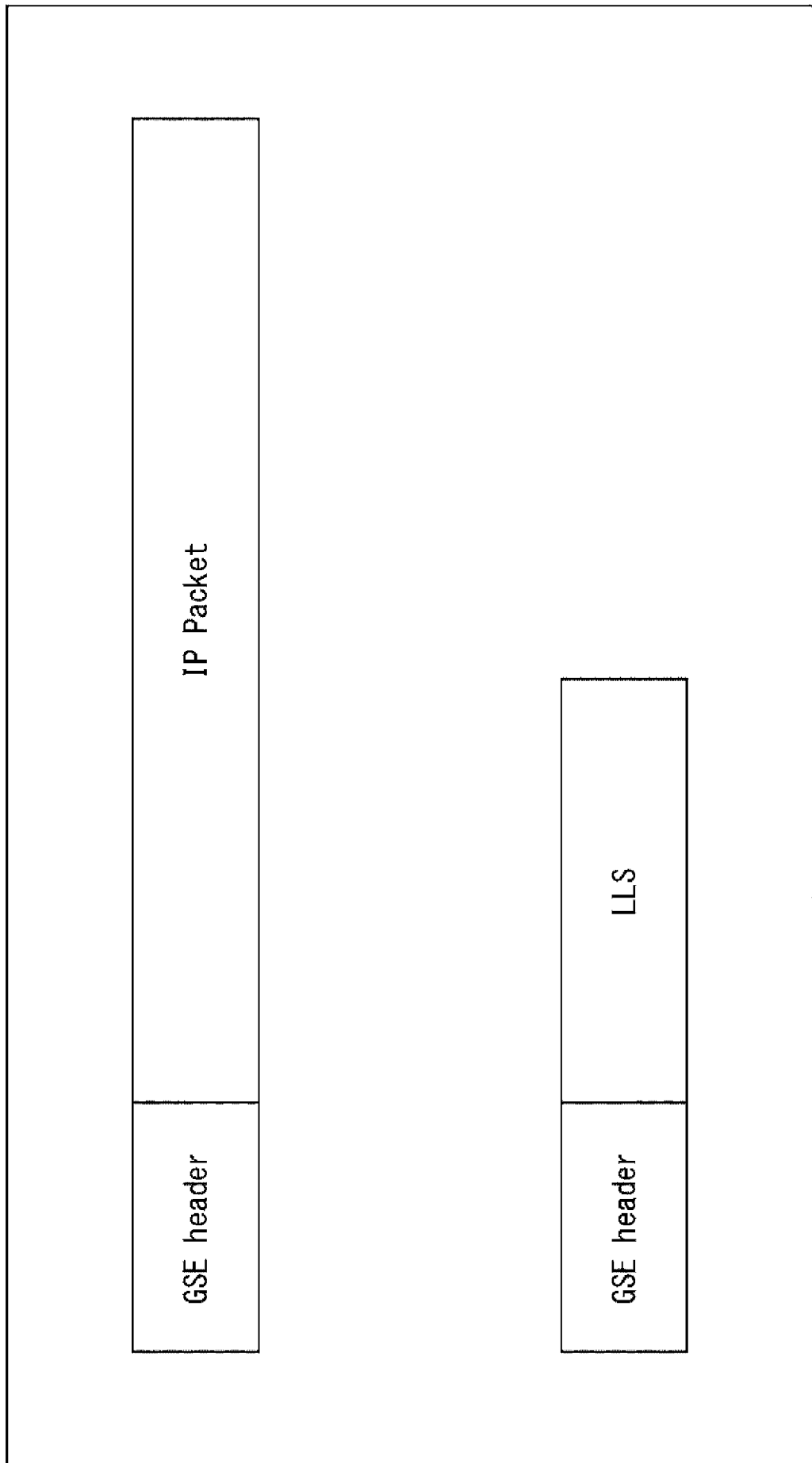


[Fig. 3]

FIG. 3

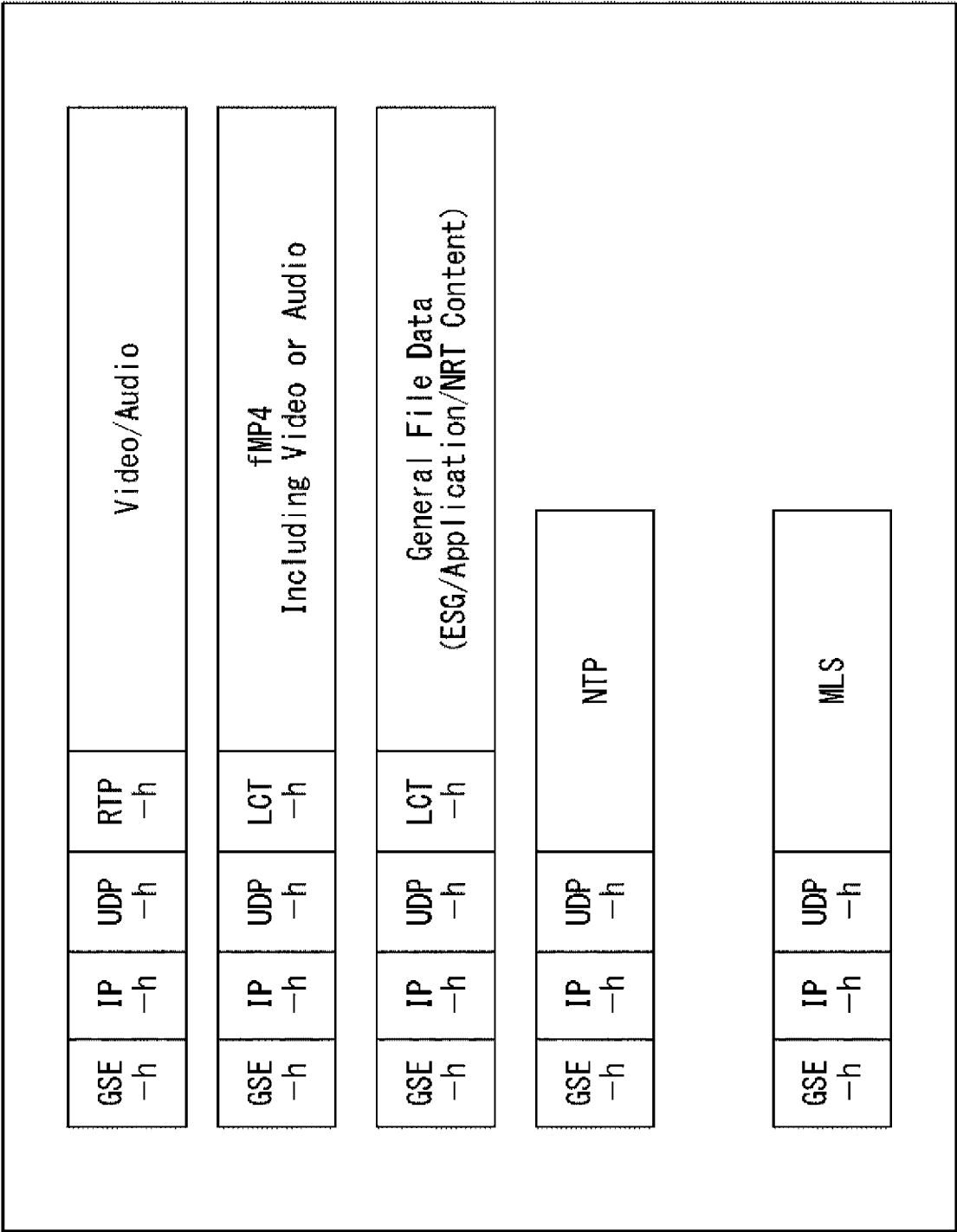


[Fig. 4]

FIG. 4

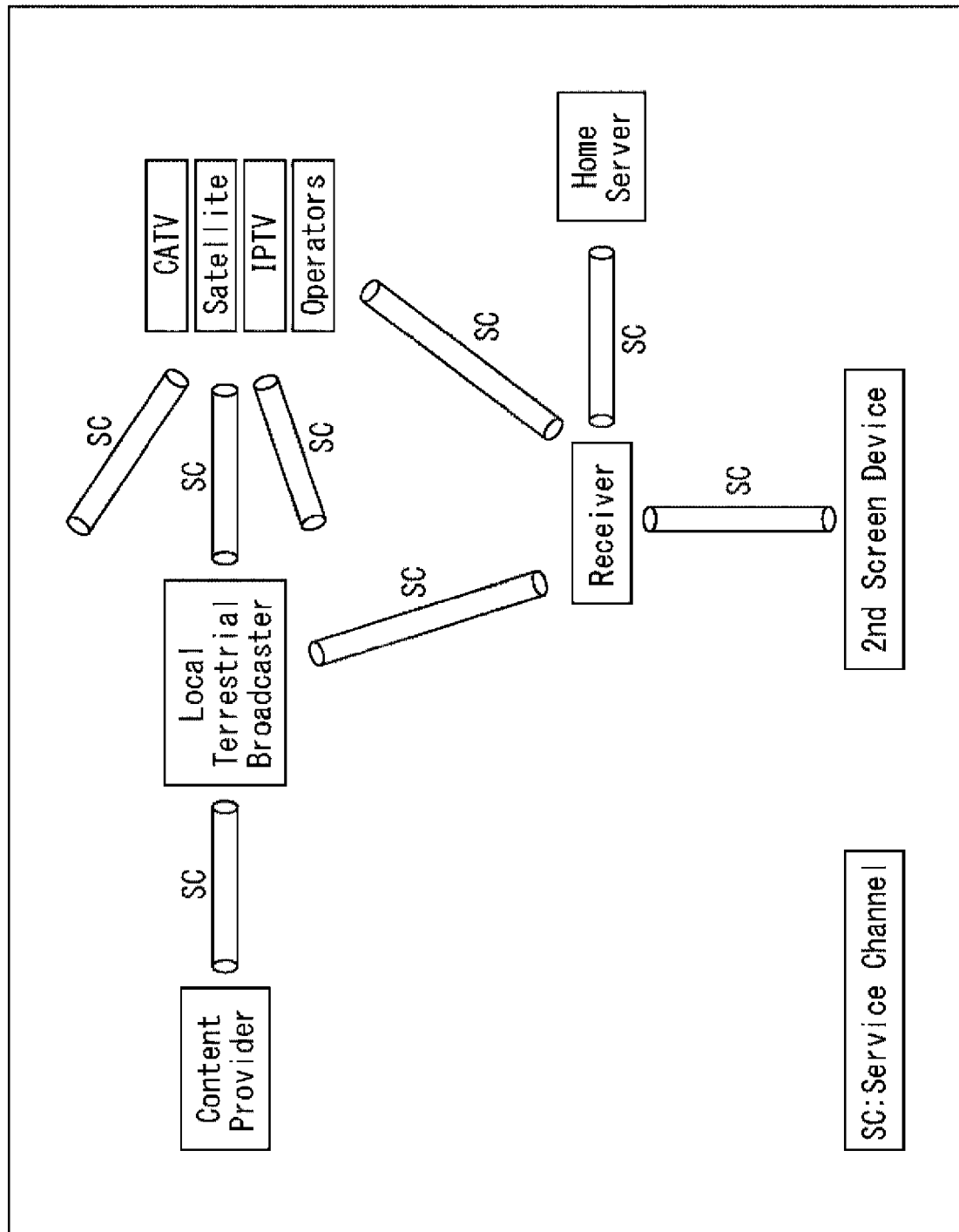
[Fig. 5]

FIG. 5



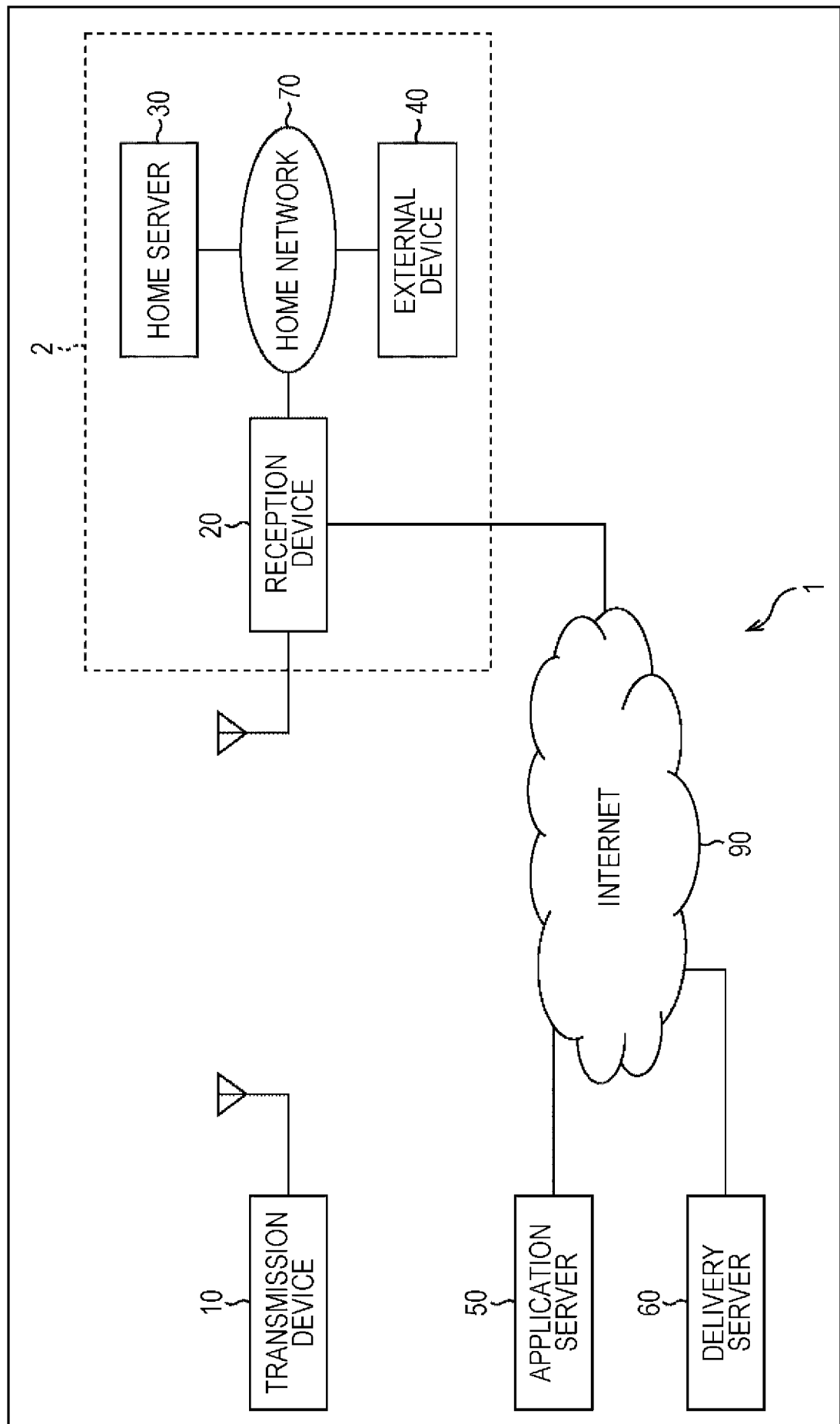
[Fig. 6]

FIG. 6



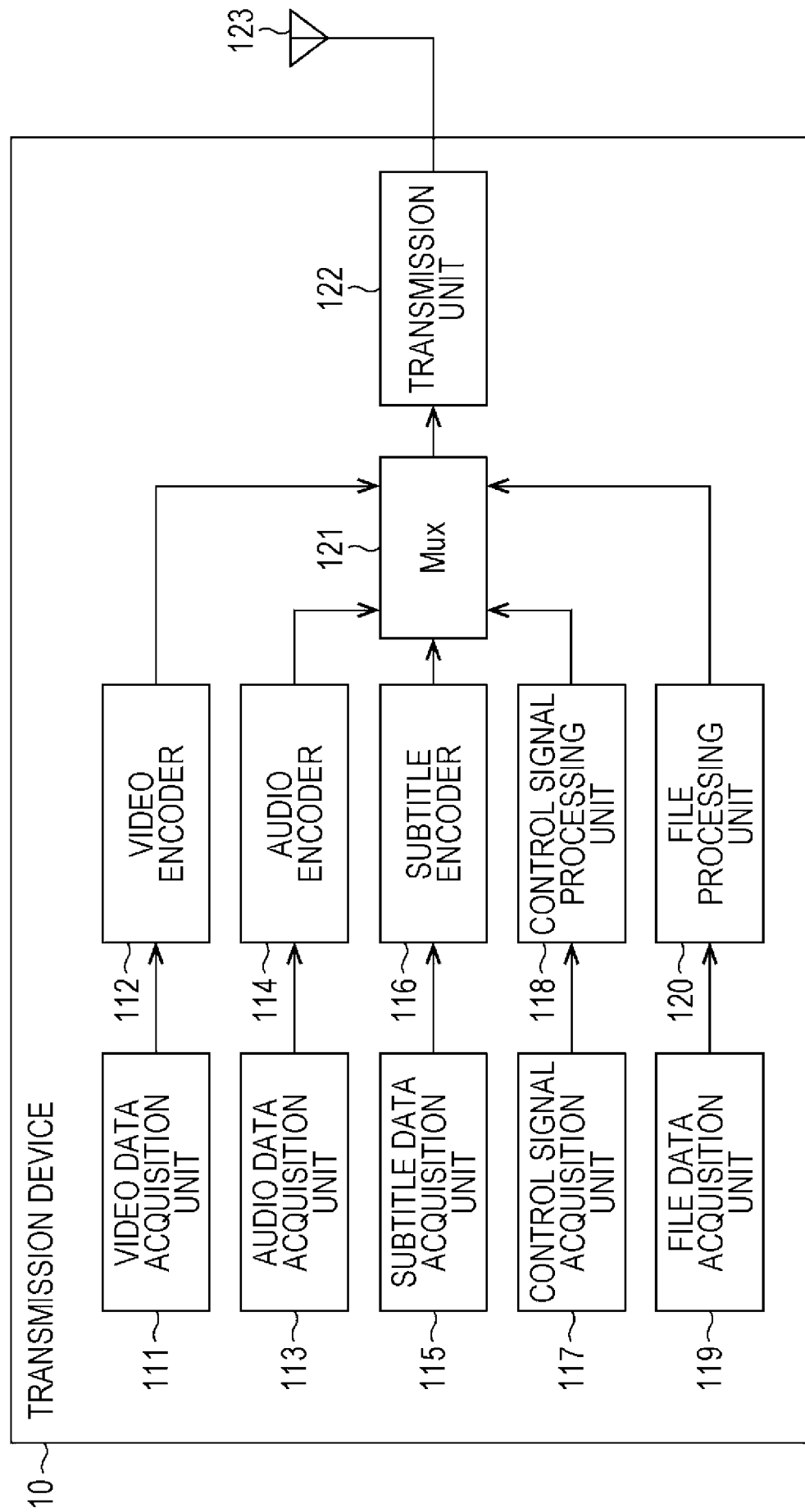
[Fig. 7]

FIG. 7

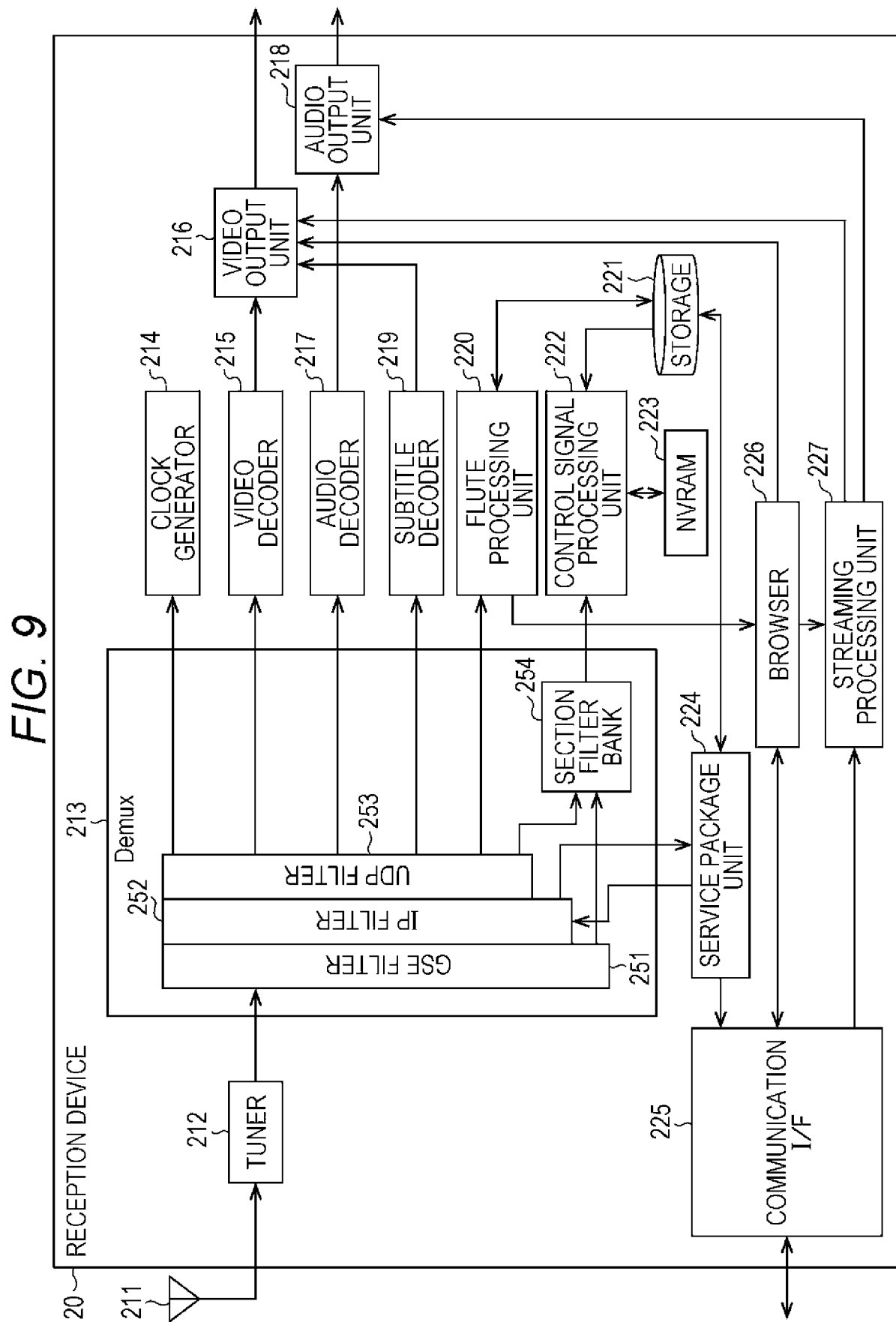


[Fig. 8]

FIG. 8

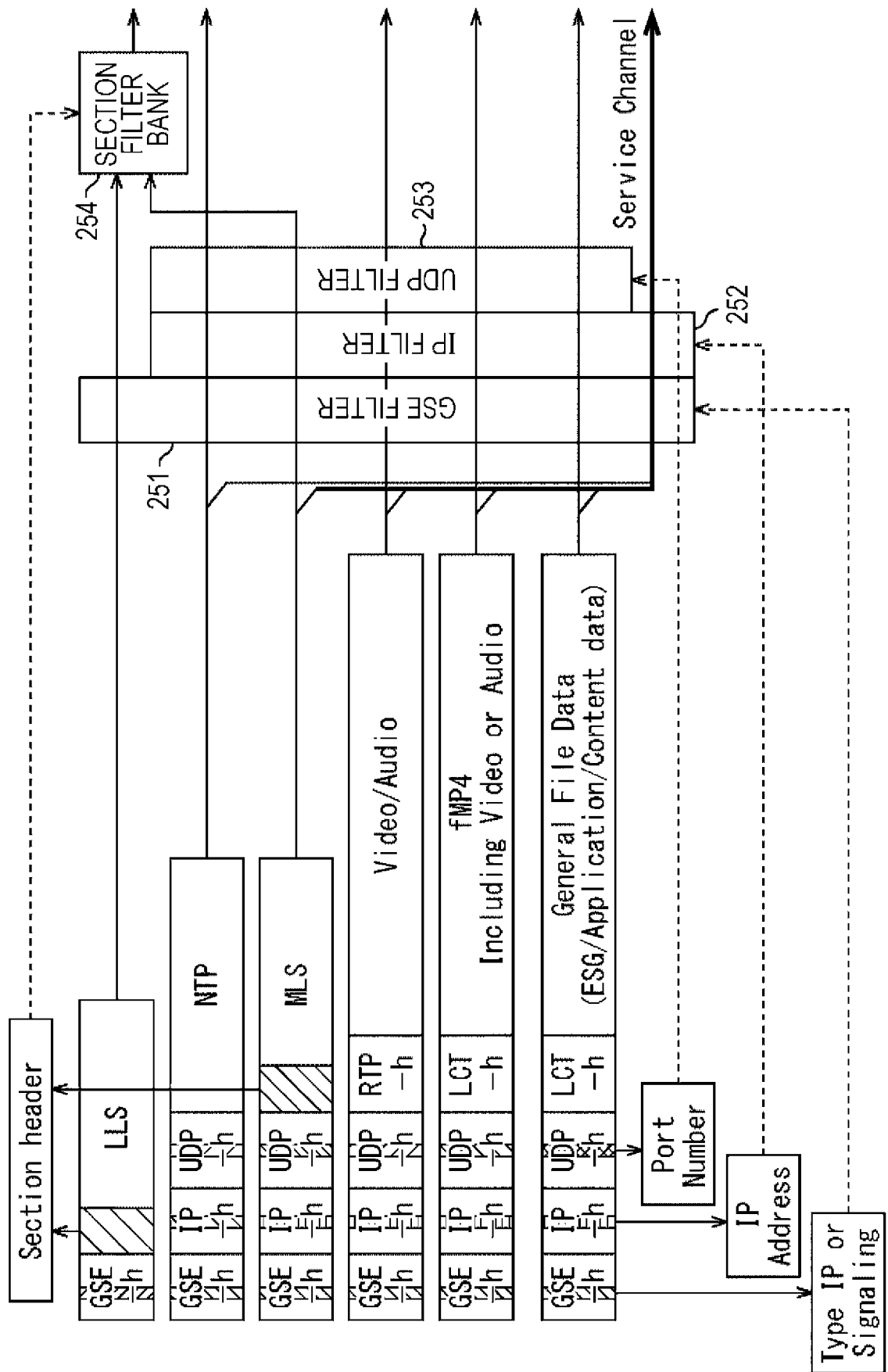


[Fig. 9]



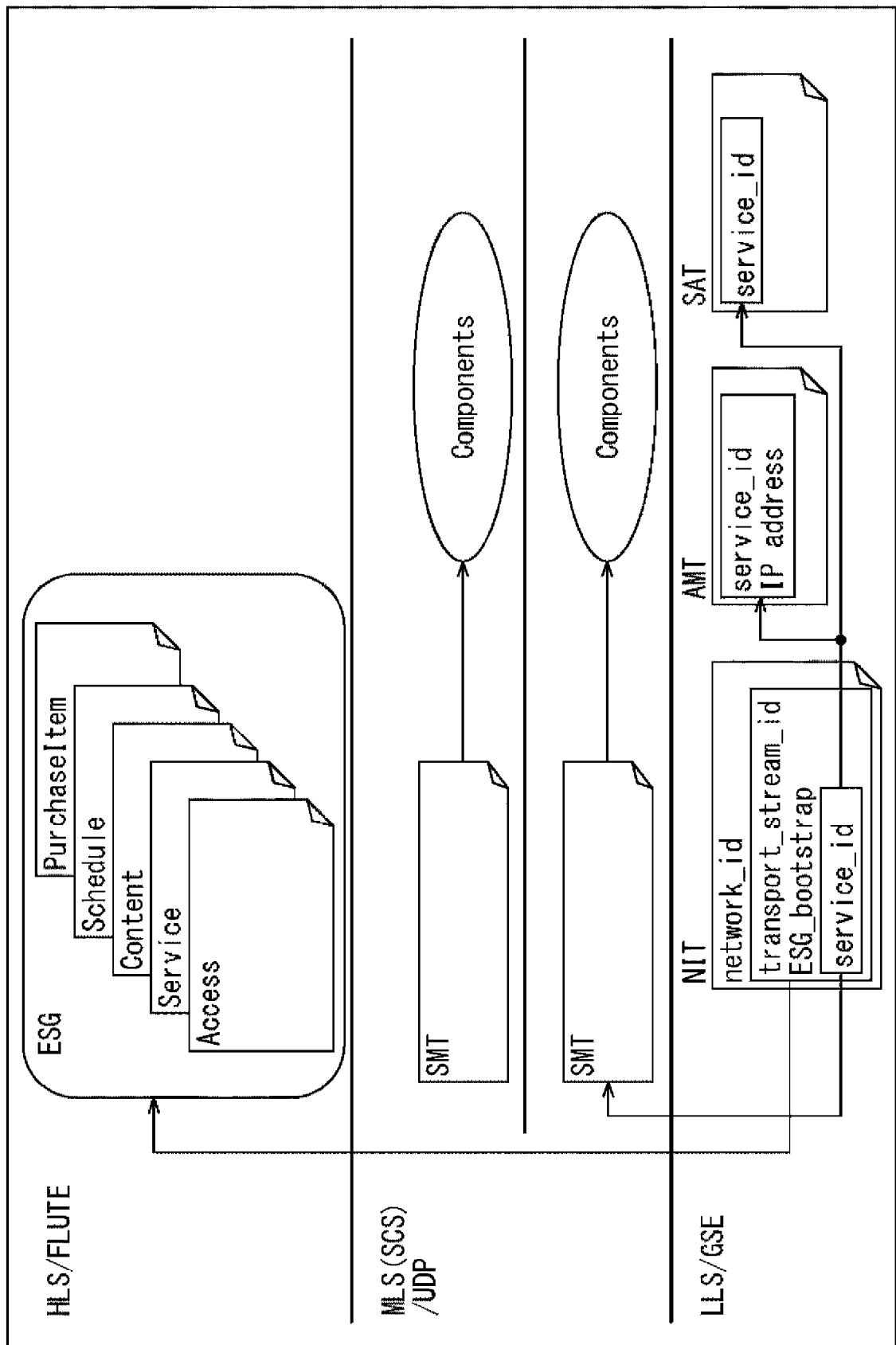
[Fig. 10]

FIG. 10



[Fig. 11]

FIG. 11



[Fig. 12]

FIG. 12

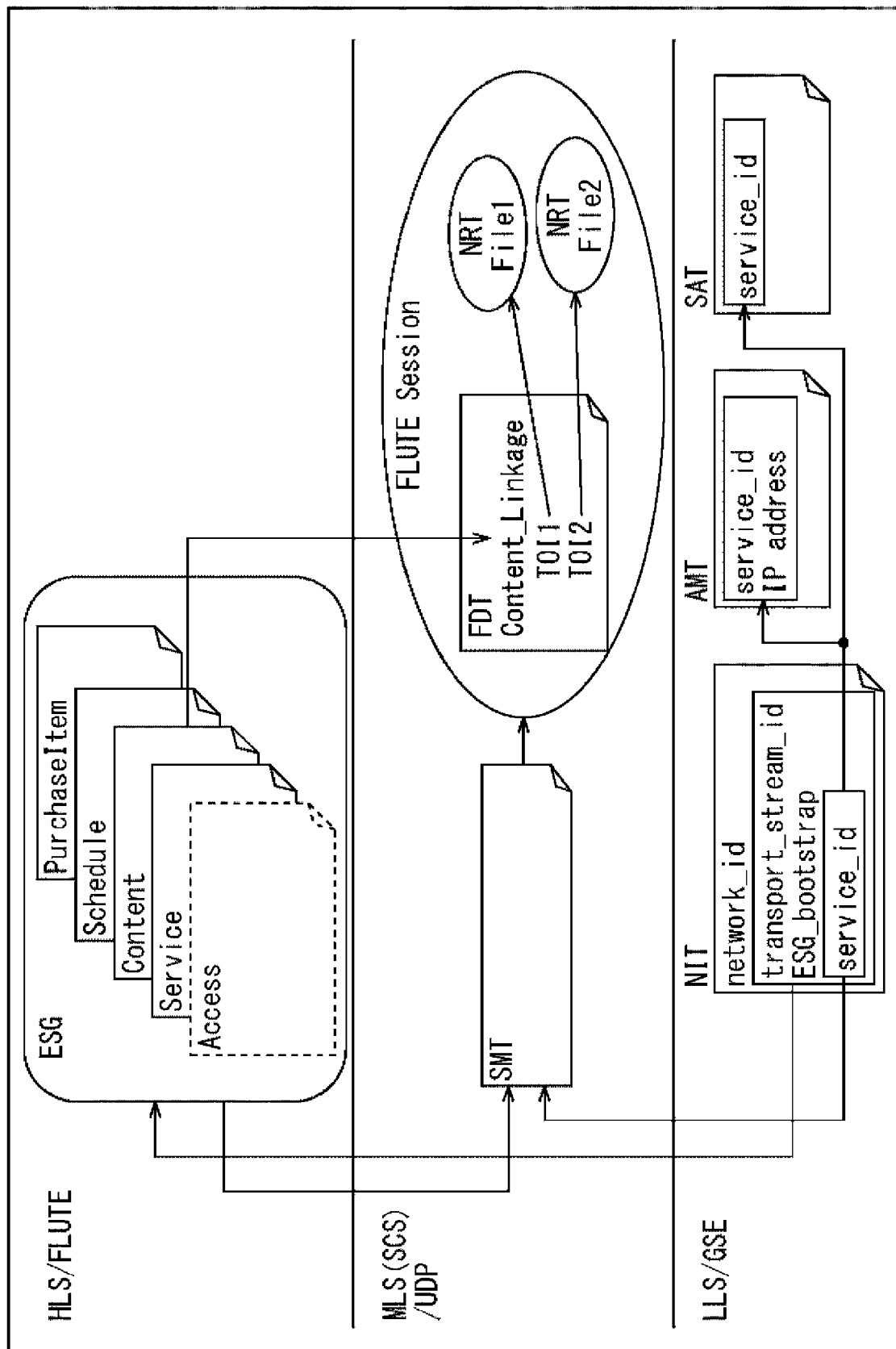
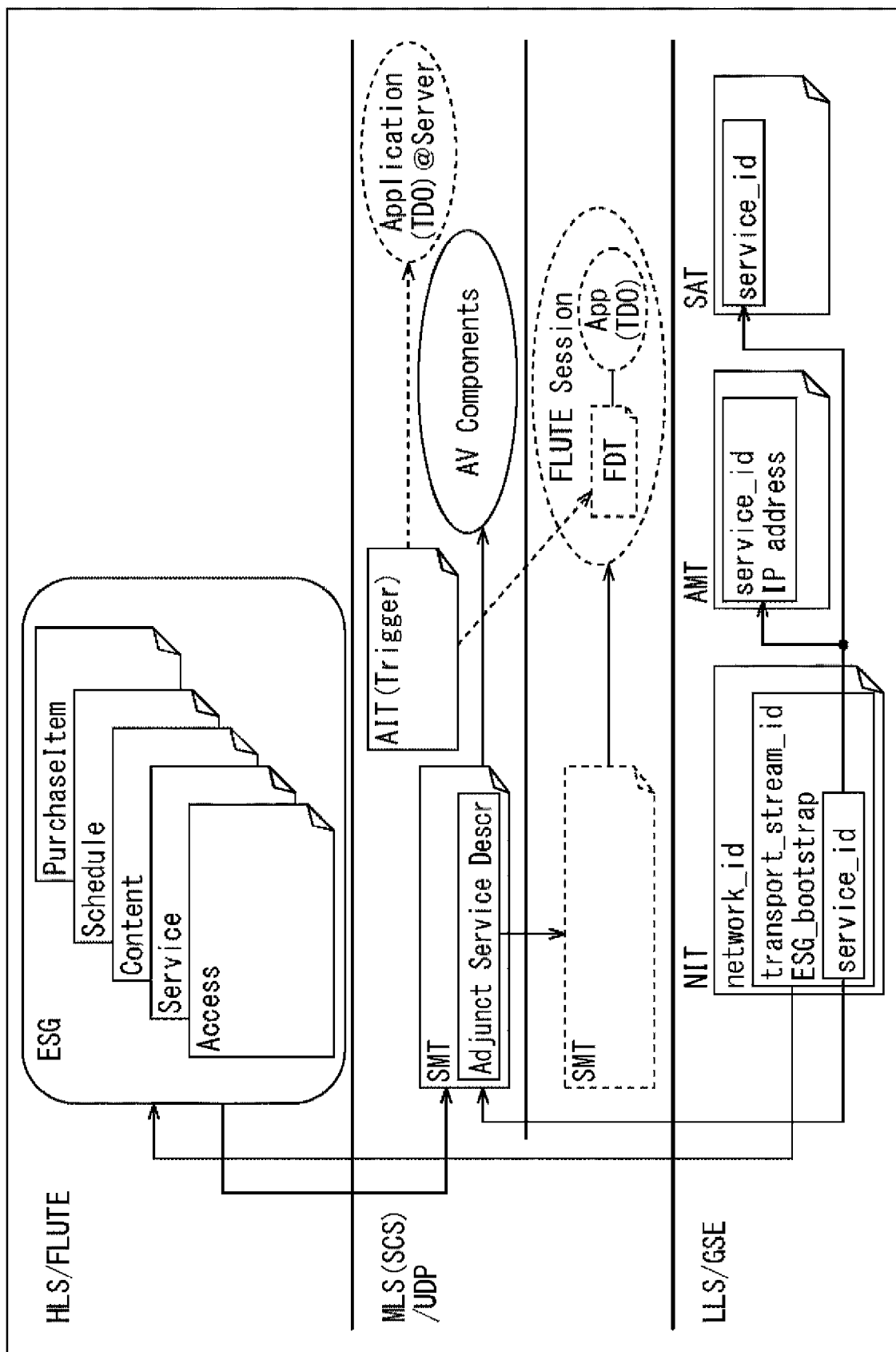


FIG. 13



[Fig. 14]

FIG. 14

NIT

	No. of Bits	Identifier
network_information_section() {		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved_future_use	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
network_id	16	uimsbf
reserved_future_use	2	uimsbf
version_number	5	uimsbf
current_next_indicator	1	
section_number	8	uimsbf
last_section_number	8	uimsbf
reserved_future_use	4	bslbf
network_descriptor_length	12	bslbf
for (i=0; i<N; i++) {		
descriptor()		uimsbf
}		
reserved_future_use	4	bslbf
transport_stream_loop_length	12	uimsbf
for (i=0; i<N; i++) {		
transport_stream_id	16	uimsbf
original_network_id	16	uimsbf
reserved_future_use	4	bslbf
transport_descriptors_length	12	uimsbf
for (j=0; j<M; j++) {		
descriptor()		
}		
}		
CRC_32	32	rpchof
}		

[Fig. 15]

FIG. 15

NIT Descriptors Usage

Descriptors	Network loop	TransportStream loop
Name_descriptor	○	○
Service_list_descriptor	—	◎
ATSC3_delivery_system_descriptor	—	◎
Transport_stream_protocol_descriptor		◎
ESG_bootstrap_descriptor	—	○

[Fig. 16]

FIG. 16

Name_descriptor		No. of Bits	Identifier
Name_descriptor() {			
descriptor_tag		8	uimbsbf
descriptor_length		8	uimbsbf
for (i=0; i<N; i++) {			
char		8	uimbsbf
}			
}			

[Fig. 17]

FIG. 17

Service_list_descriptor

	No. of Bits	Identifier
Service_list_descriptor () {		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
for (i=0; i<N; i++) {	8	uimsbf
service_id	16	uimsbf
service_type	8	uimsbf
}		
}		

[Fig. 18]

FIG. 18

ATSC3_delivery_system_descriptor		
	No. of Bits	Identifier
ATSC3_delivery_system_descriptor {		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
descriptor_tag_extension	8	uimsbf
plp_id	8	
T2_system_id	16	uimsbf
centre_frequency	32	uimsbf
}		

[Fig. 19]

FIG. 19

Transport_stream_protocol_descriptor

	No. of Bits	Identifier
Transport_stream_protocol_descriptor () {		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
protocol_type	8	uimsbf
}		

[Fig. 20]

FIG. 20

ESG_bootstrap_descriptor		No. of Bits	Identifier
ESG_bootstrap_descriptor() {			
descriptor_tag		8	uimsbf
descriptor_length		8	uimsbf
source_IP_address		32	uimsbf
destination_IP_address		32	uimsbf
UDP_port_num		32	uimsbf
TSI		16	uimsbf
}			

[Fig. 21]

FIG. 21**AMT**

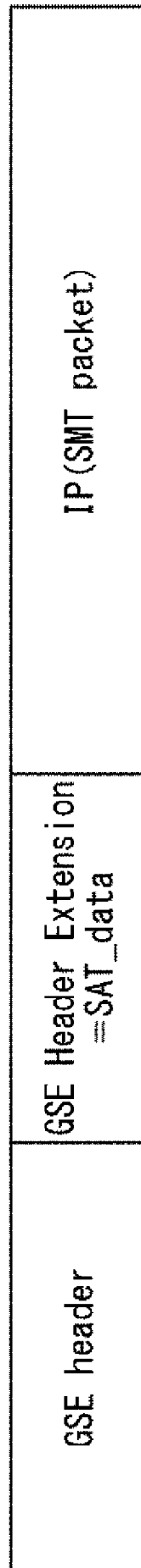
	No. of Bits	Identifier
address_map_section() {		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved_future_use	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved_future_use	2	uimsbf
version_number	5	uimsbf
current_next_indicator	1	
section_number	8	uimsbf
last_section_number	8	uimsbf
reserved_future_use	6	bslbf
number_of_services	10	uimsbf
for (i=0; i<N; i++) {		
service_id	16	uimsbf
IP_version_flag	1	bslbf
reserved_future_use	7	bslbf
if (IP_version_flag==0) {		
source_IP_address_for_v4	32	uimsbf
destination_IP_address_for_v4	32	uimsbf
}		
else {		
source_IP_address_for_v6	128	uimsbf
destination_IP_address_for_v6	128	uimsbf
}		
}		
CRC32	32	rpchof
}		

[Fig. 22]

FIG. 22
SAT

	No. of Bits	Identifier
service_association_section0 {		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved_future_use	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved_future_use	2	uimsbf
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
for (i=0; I<N; i++) {		
service_id	16	uimsbf
}		
CRC32	32	rpchof
}		

[Fig. 23]

FIG. 23

[Fig. 24]

FIG. 24

	No. of Bits	Identifier
SAT_data() {		
SAT_length	8	uimsbf
for (i=0; i<SAT_length; i++) {		
active_service_bitmap	8	bslbf
}		
}		

[Fig. 25]

FIG. 25

SMT

	No. of Bits	Identifier
service_map_section() {		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
reserved_future_use	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
service_id	16	uimsbf
reserved_future_use	2	uimsbf
version_number	5	uimsbf
current_next_indicator	1	
section_number	8	uimsbf
last_section_number	8	uimsbf
service_category	8	uimsbf
reserved_future_use	4	bslbf
service_descriptor_length	12	bslbf
for (i=0; i<N; i++) {		
descriptor()		uimsbf
}		
for (i=0; i<N; i++) {		
component_tag	8	uimsbf
base_UDP_port_number	16	uimsbf
reserved	4	bslbf
component_info_length	12	uimsbf
for (j=0; j<M; j++) {		
descriptor()		
}		
}		
CRC32	32	rpchof
}		

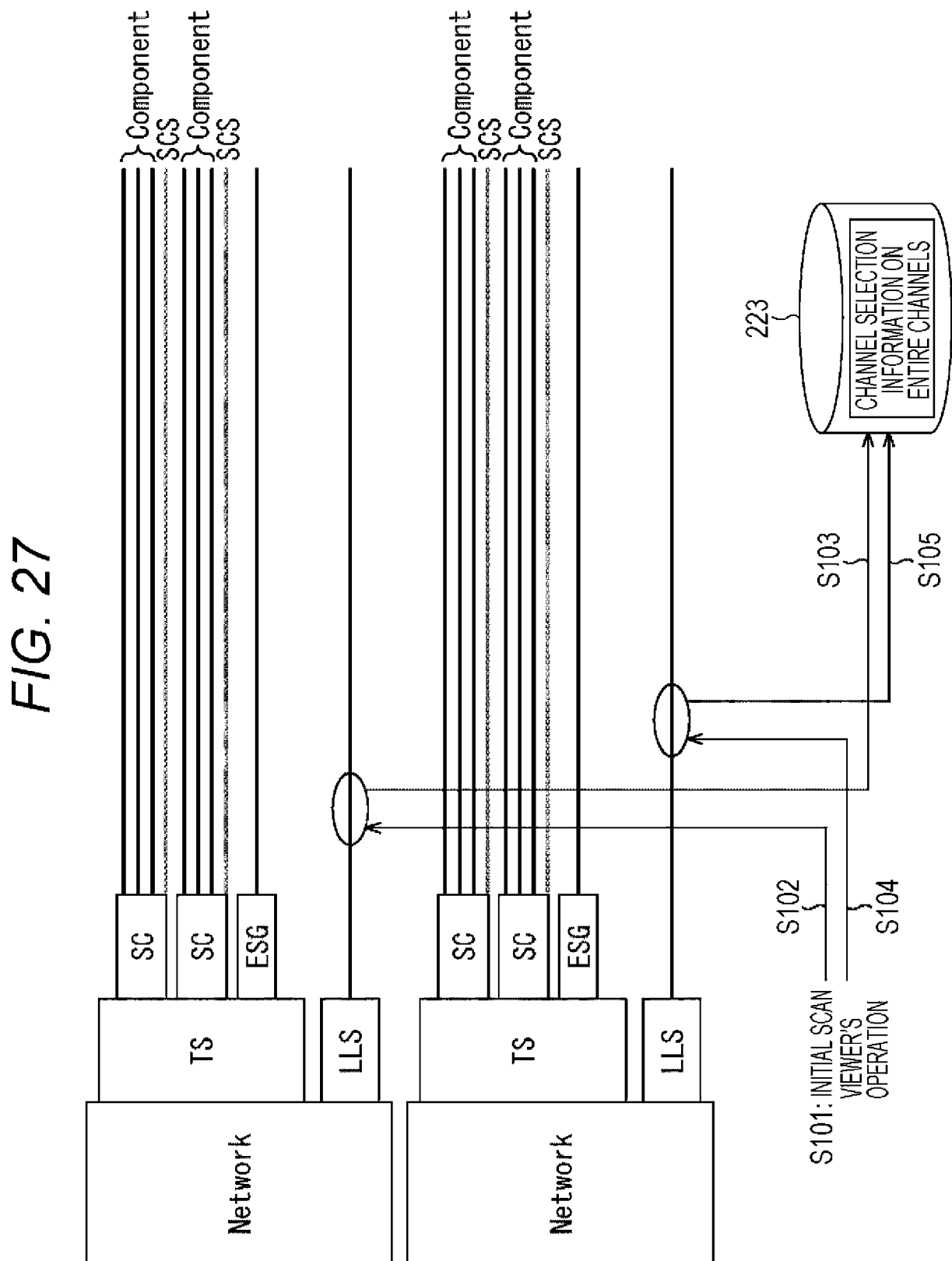
[Fig. 26]

FIG. 26

SMT Descriptors Usage

Descriptors	Service loop	Component loop
Name_descriptor	O	
Protocol_version_descriptor	Ofor NRT	
NRT_service_descriptor	Ofor NRT	
Capabilities_descriptor	Ofor NRT	
Icon_descriptor	Ofor NRT	
ISO-639 language_descriptor	Ofor NRT	
Receiver_targeting_descriptor	Ofor NRT	
Adjunct_service_descriptor	O	
Genre_descriptor	O	
Component_descriptor	—	©

[Fig. 27]



[Fig. 29]

FIG. 29

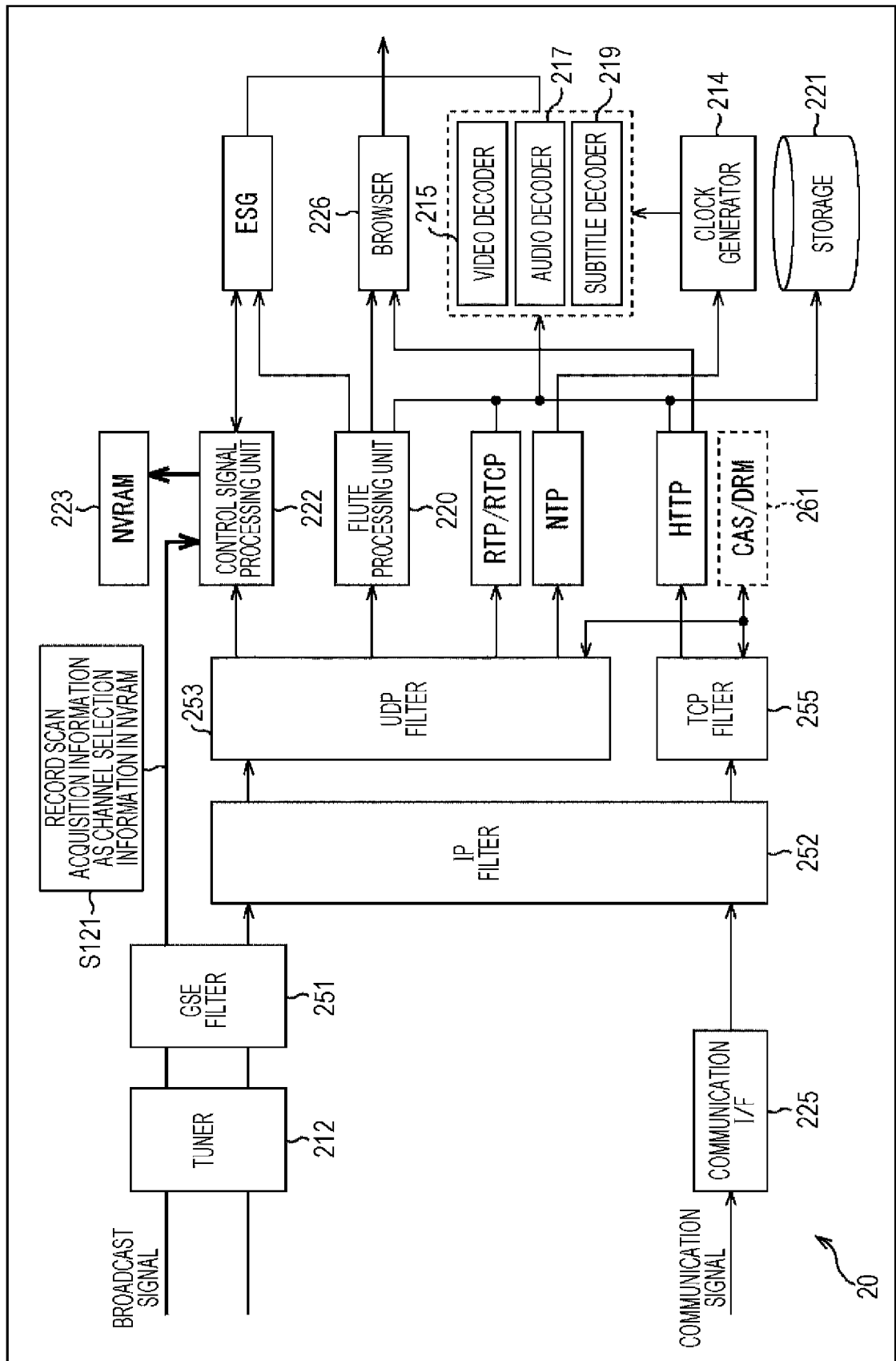
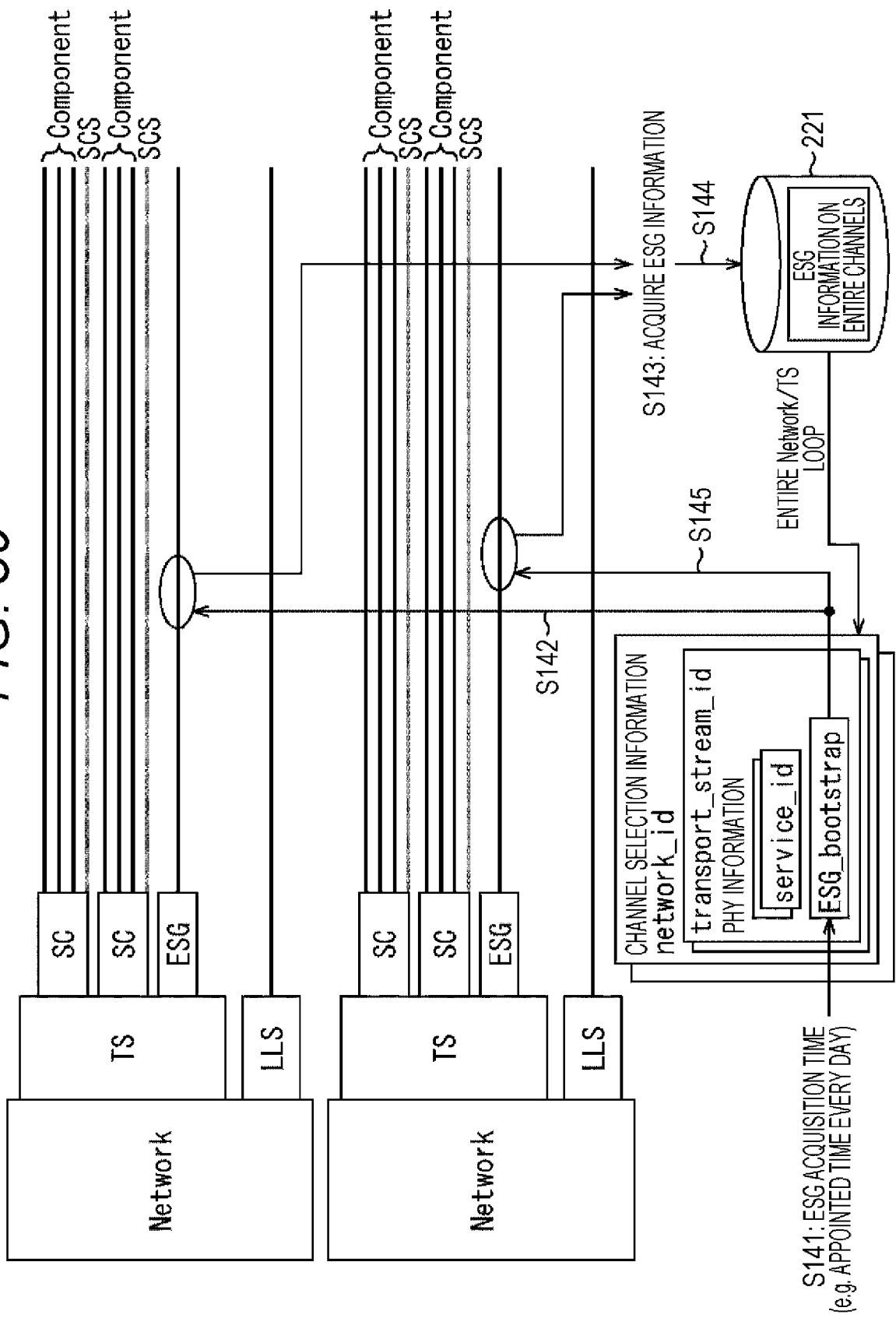
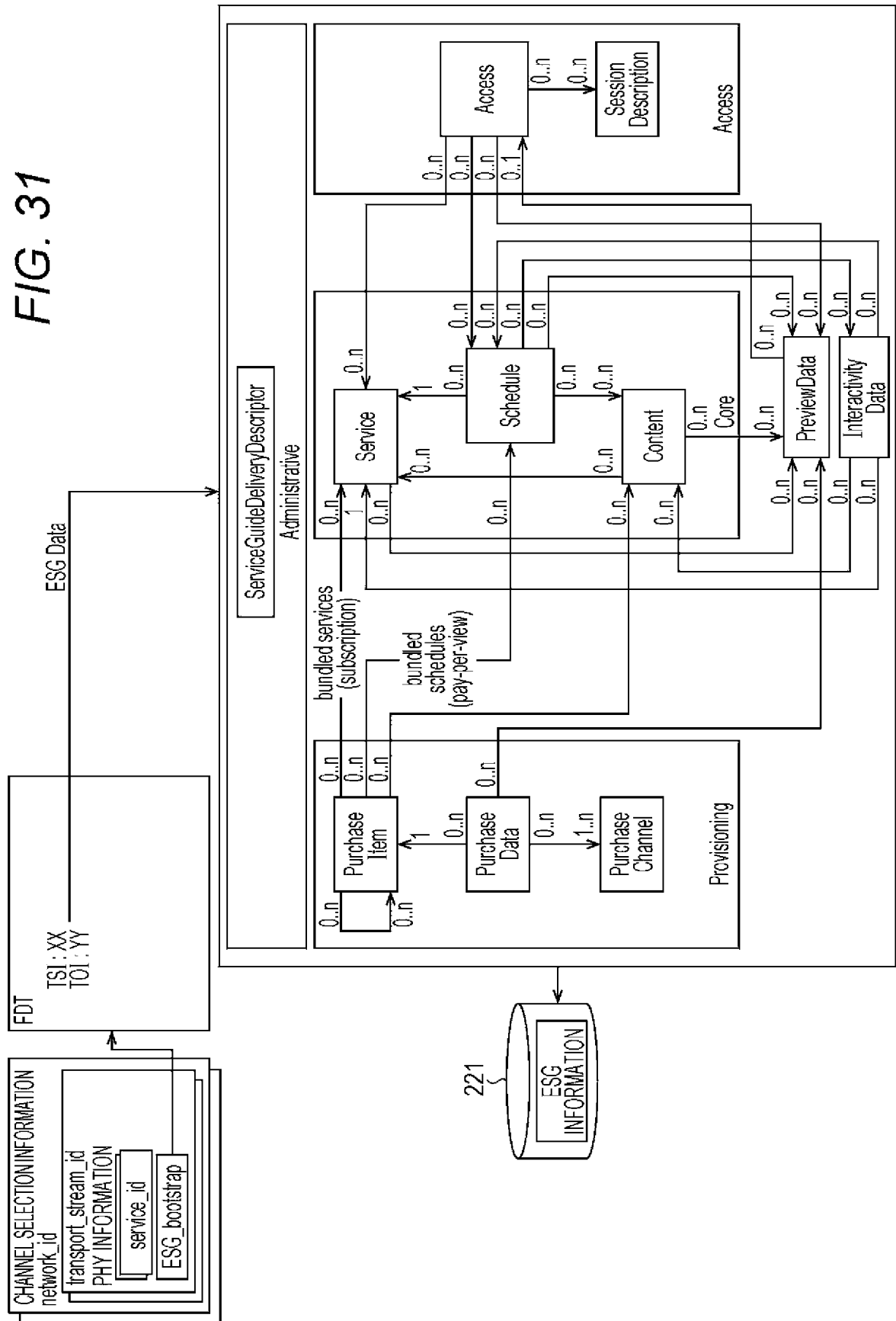


FIG. 30



[Fig. 31]



[Fig. 32]

FIG. 32

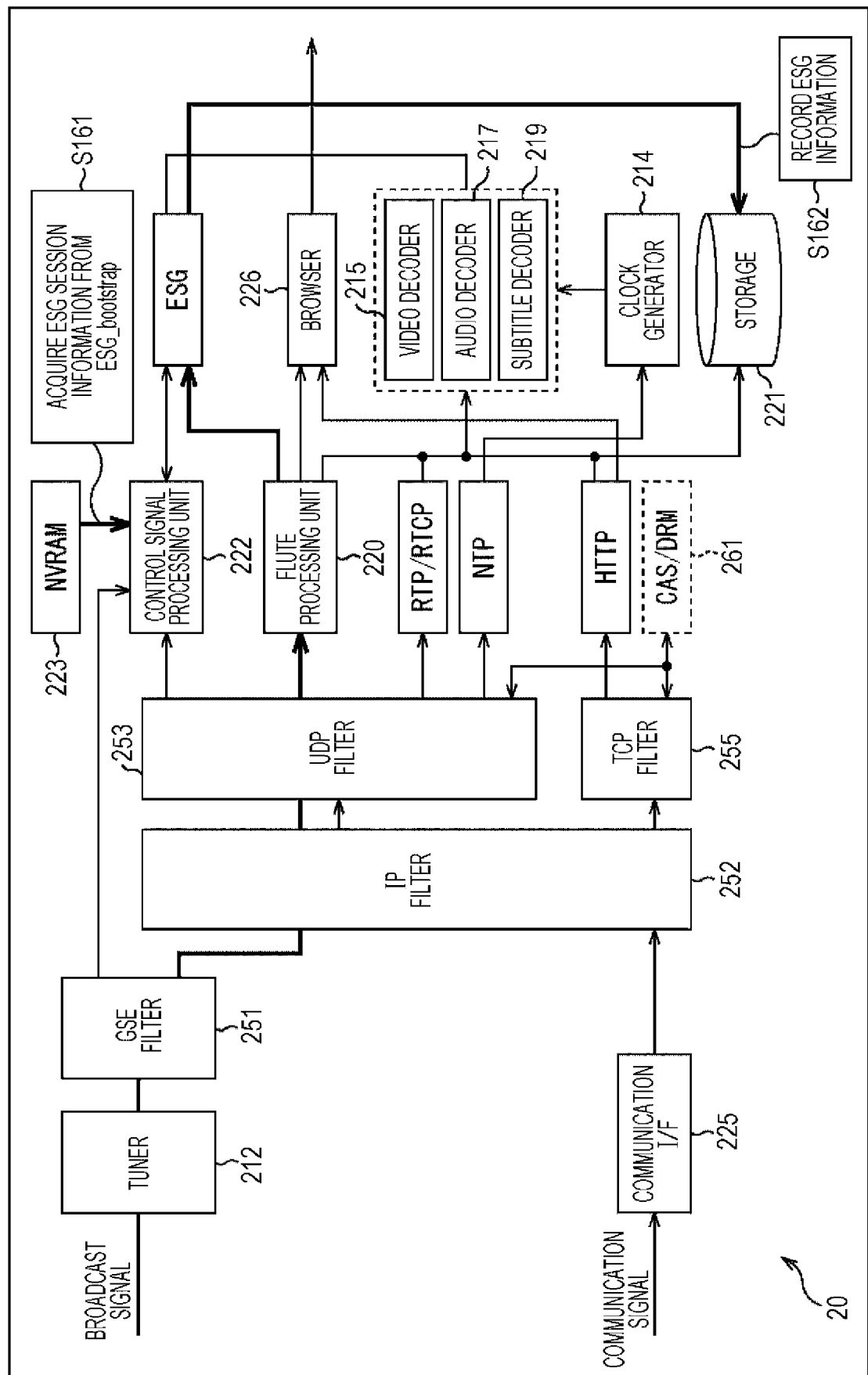
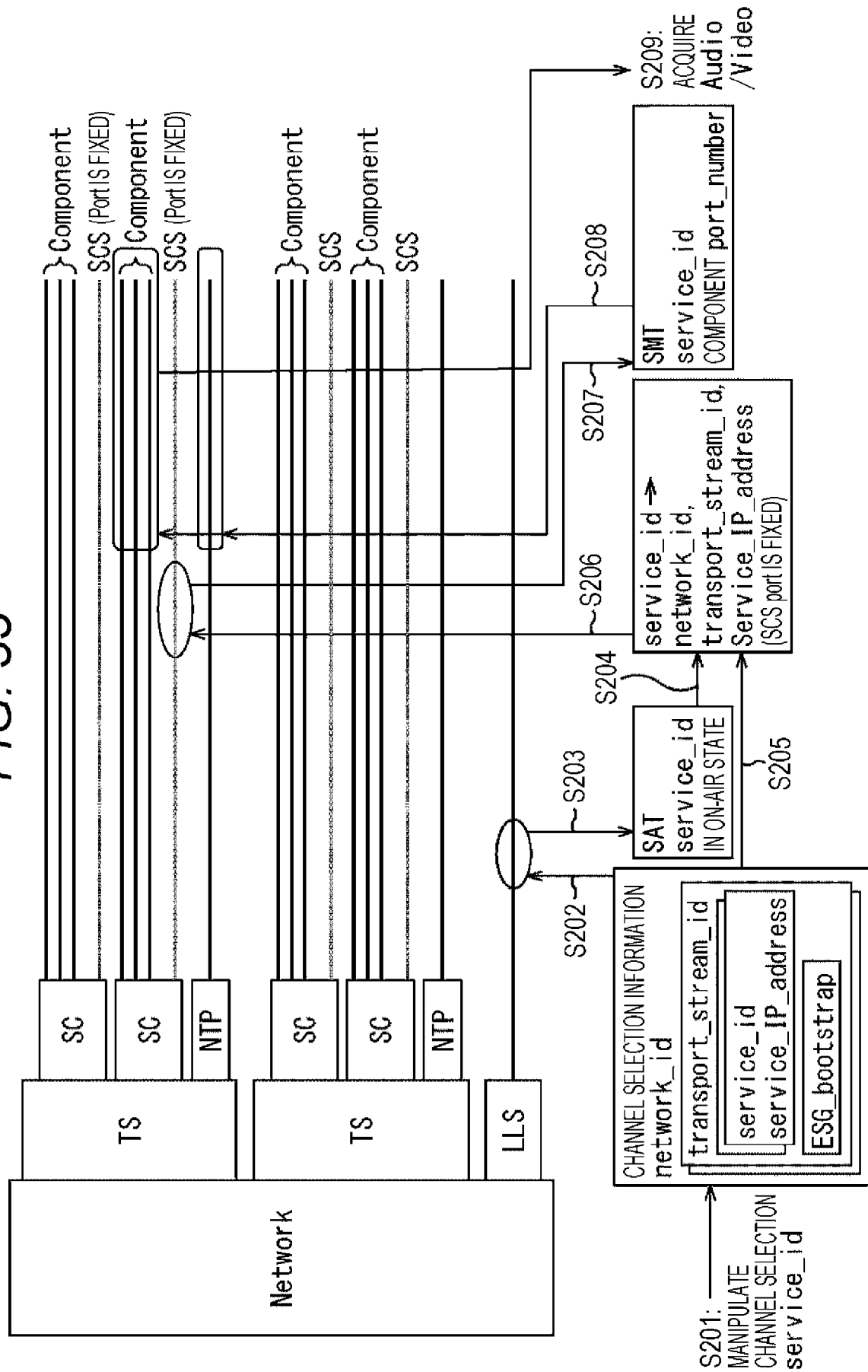


FIG. 33



[Fig. 34]

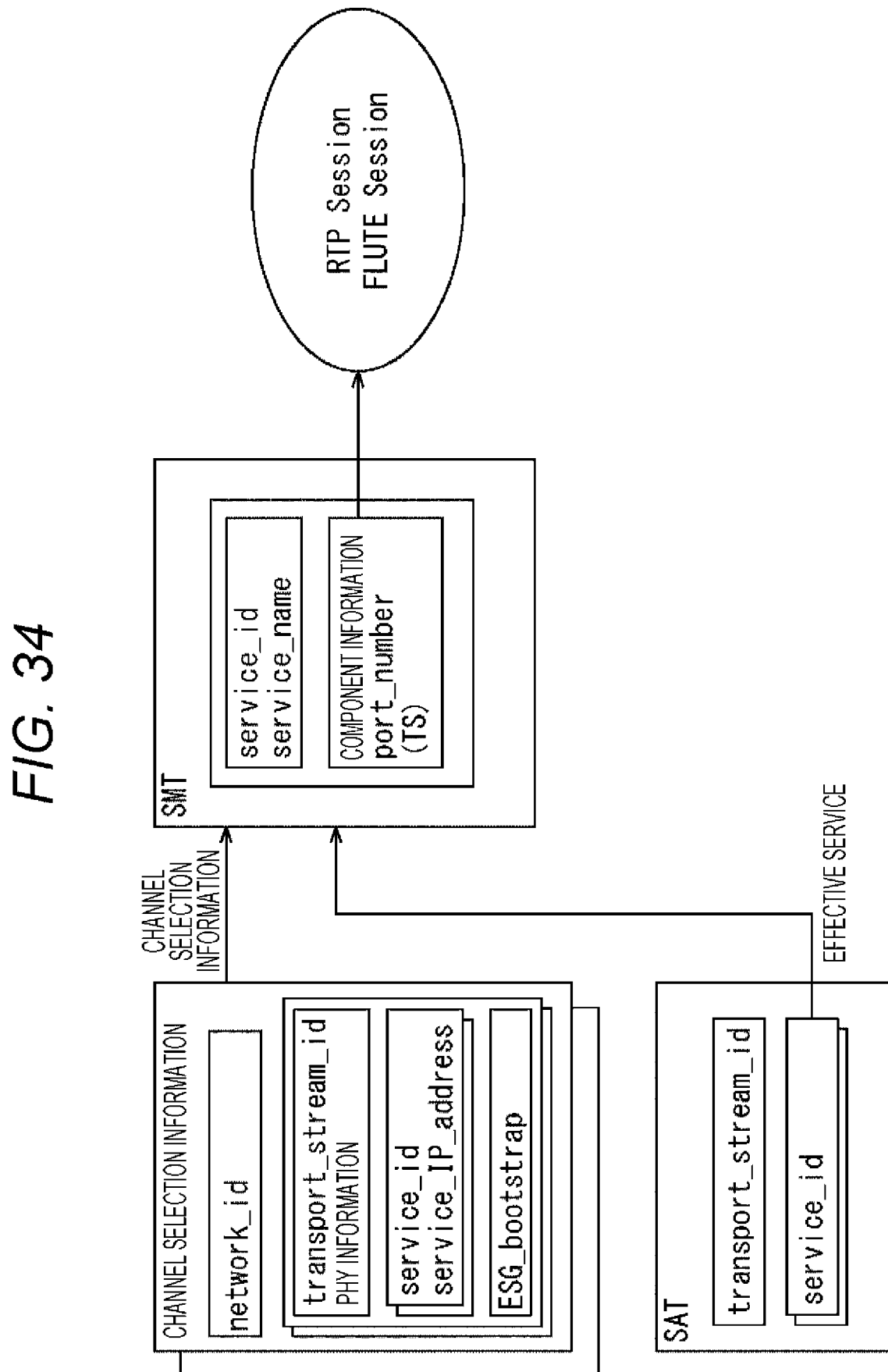
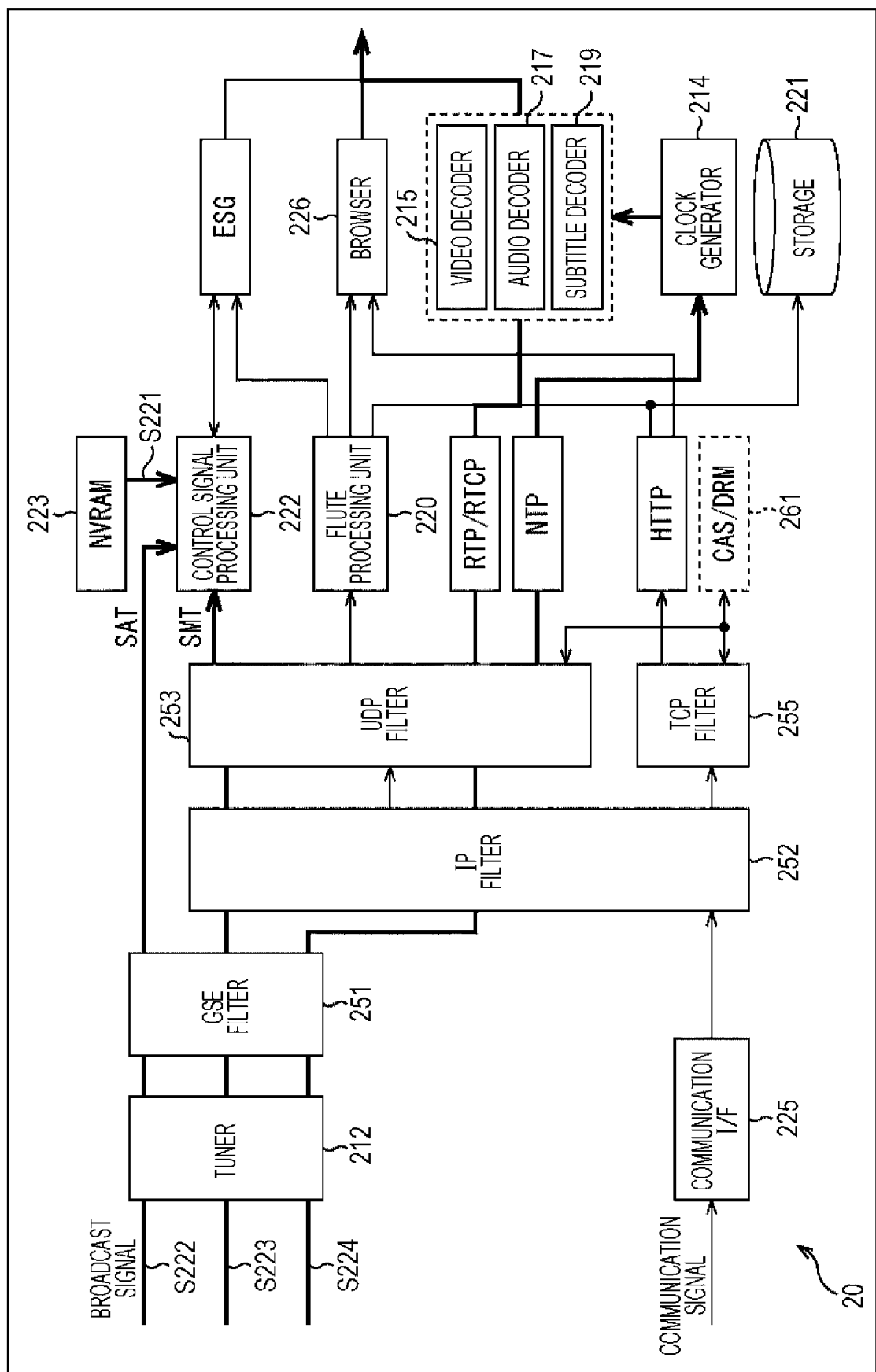
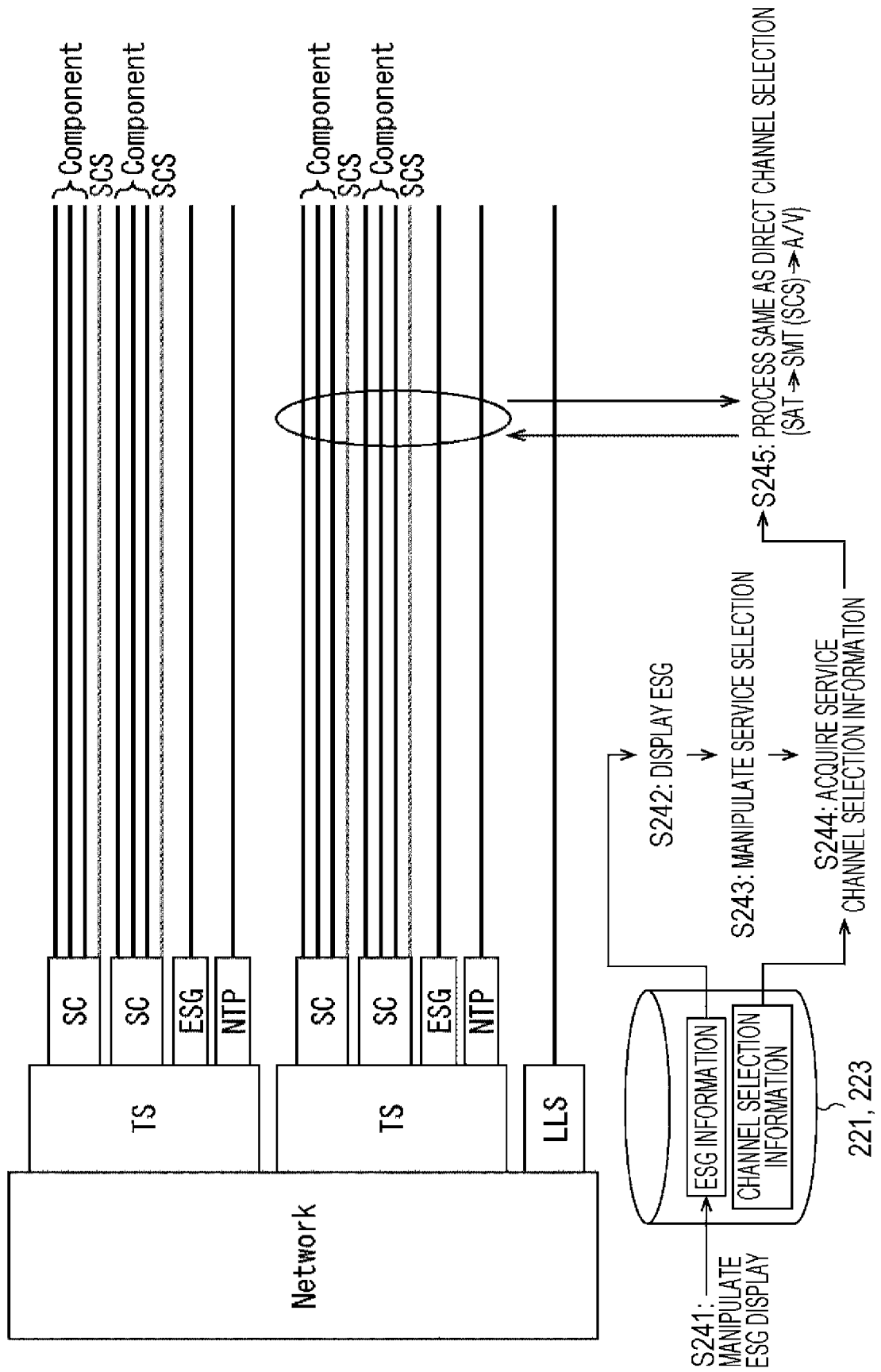


FIG. 35



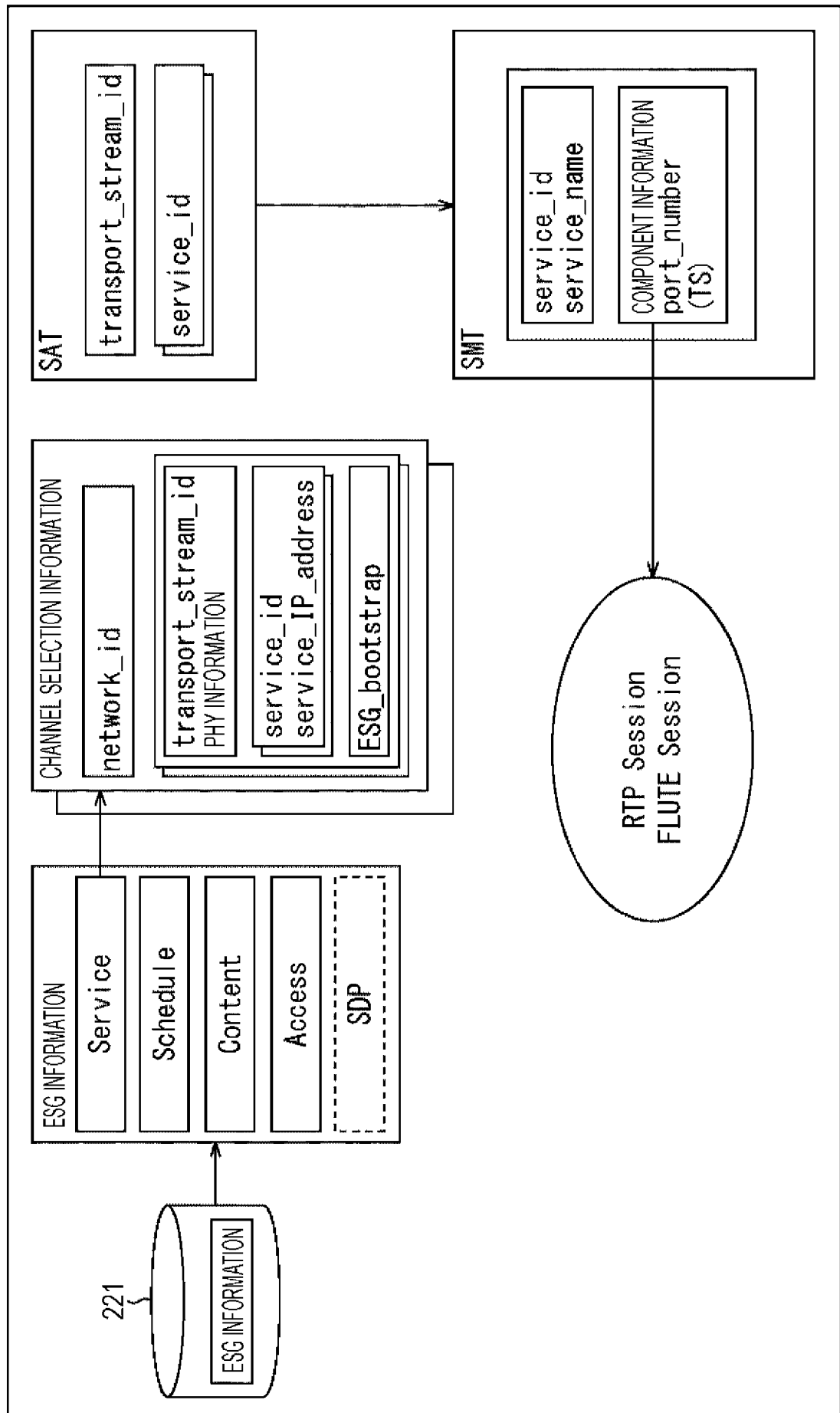
[Fig. 36]

FIG. 36



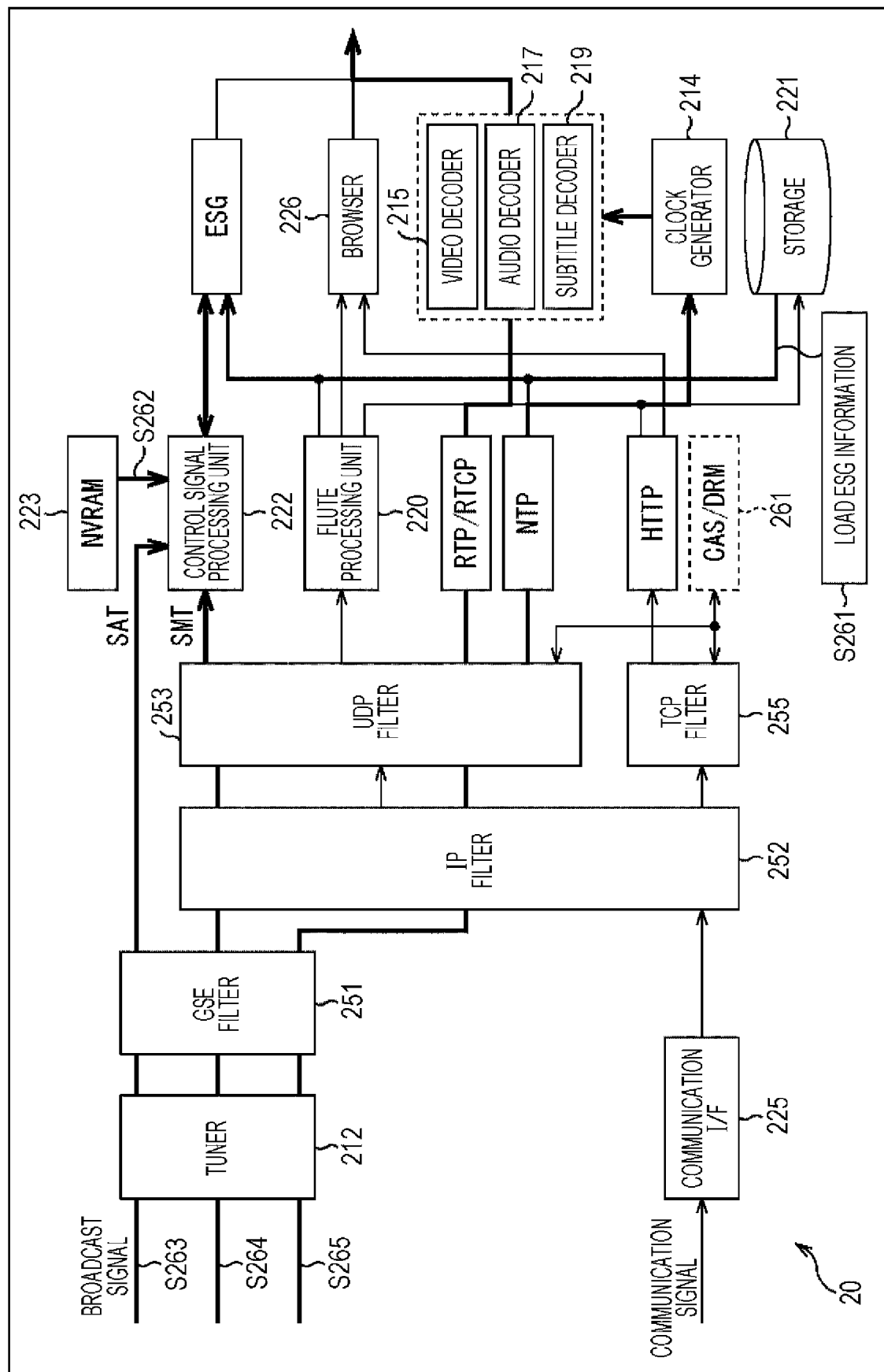
[Fig. 37]

FIG. 37

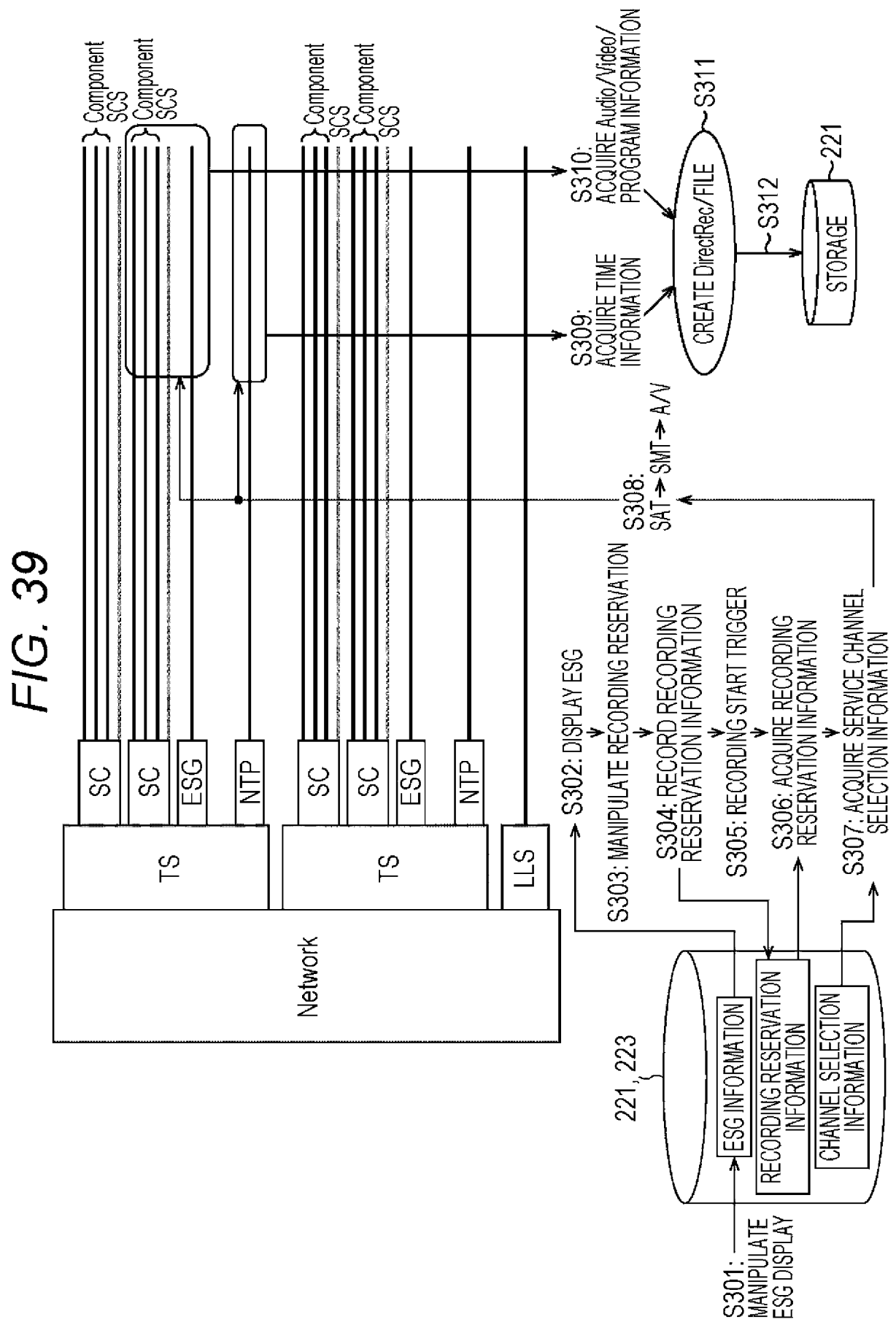


[Fig. 38]

FIG. 38

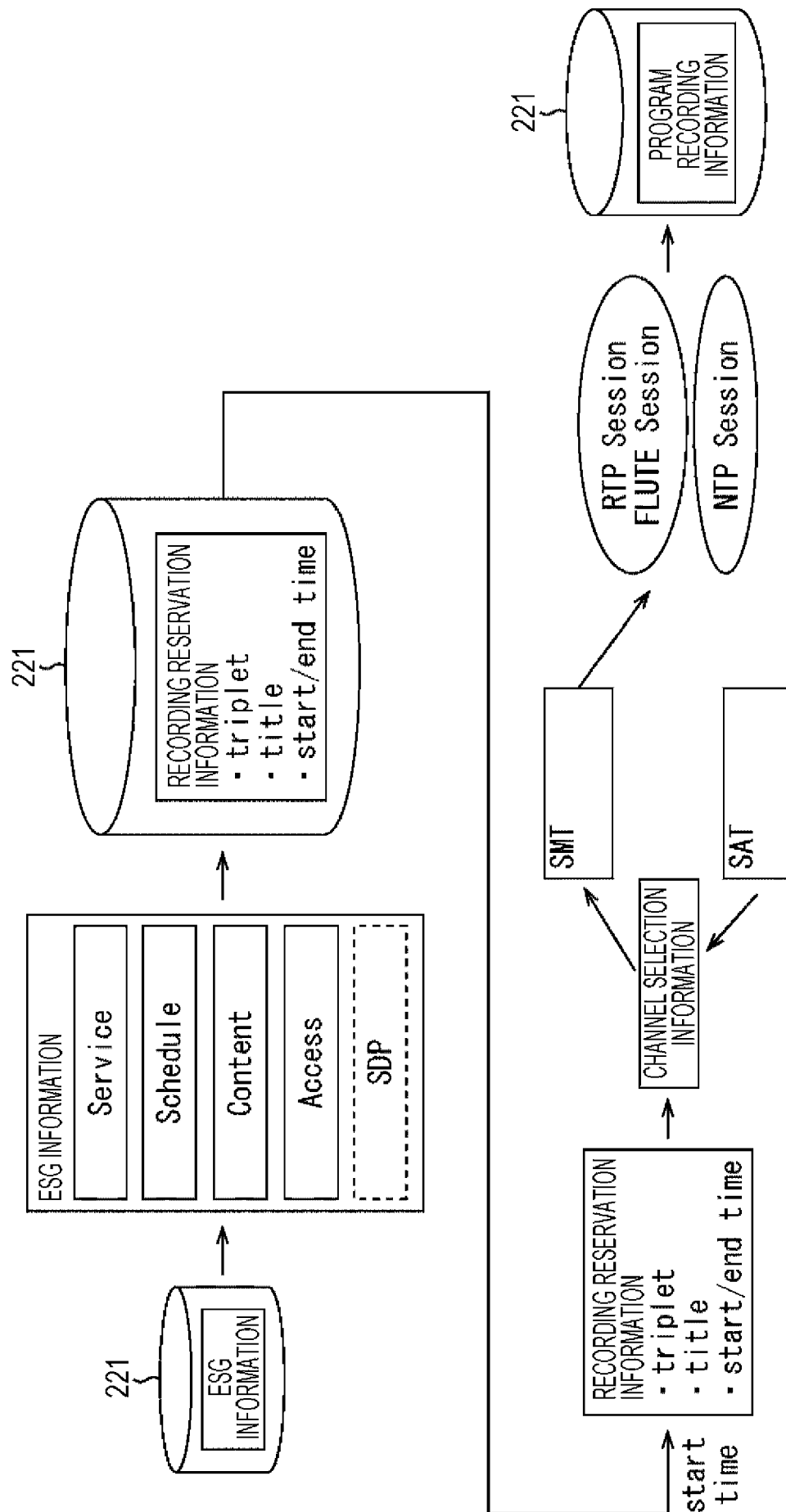


[Fig. 39]



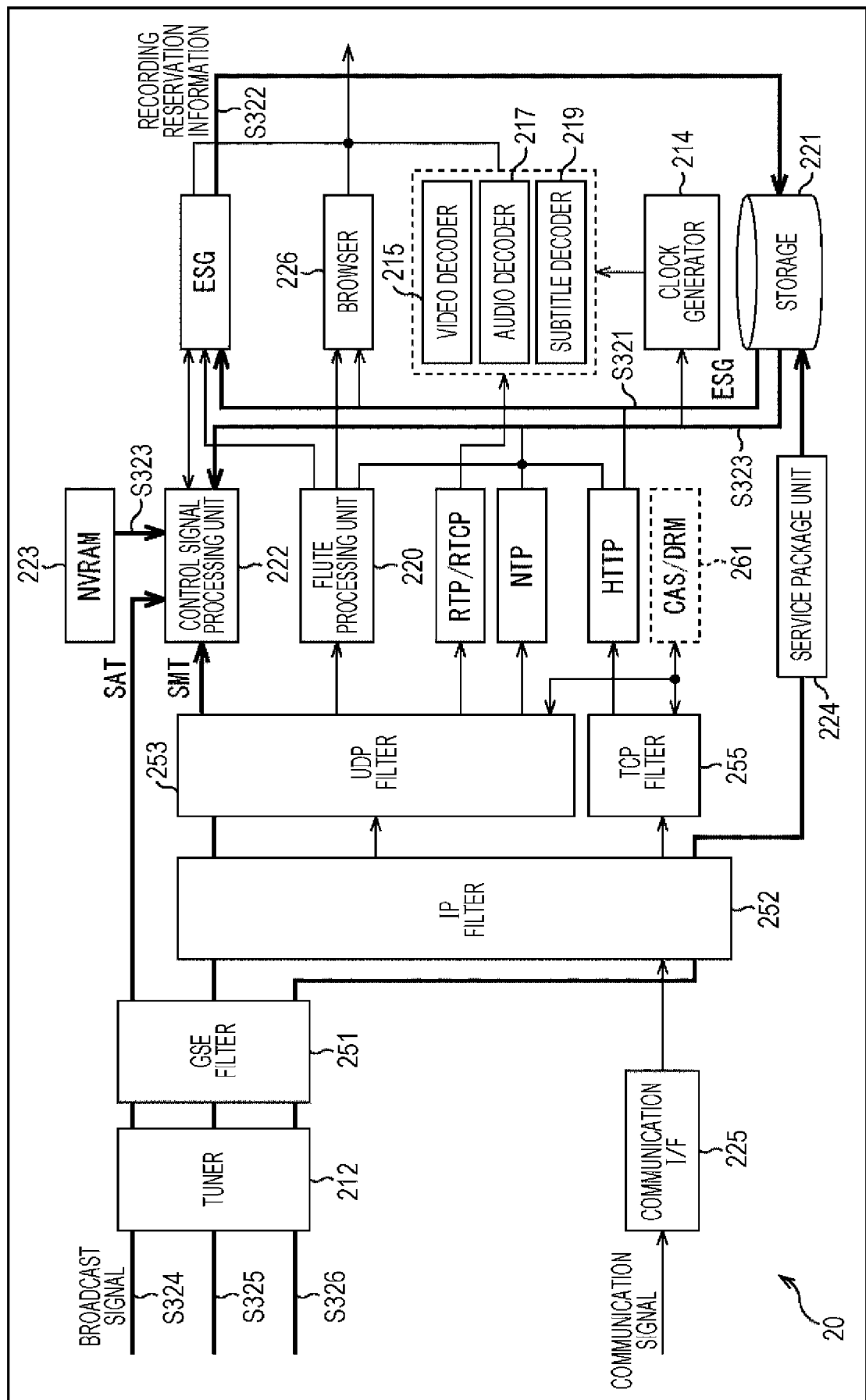
[Fig. 40]

FIG. 40



[Fig. 41]

FIG. 41



[Fig. 42]

FIG. 42

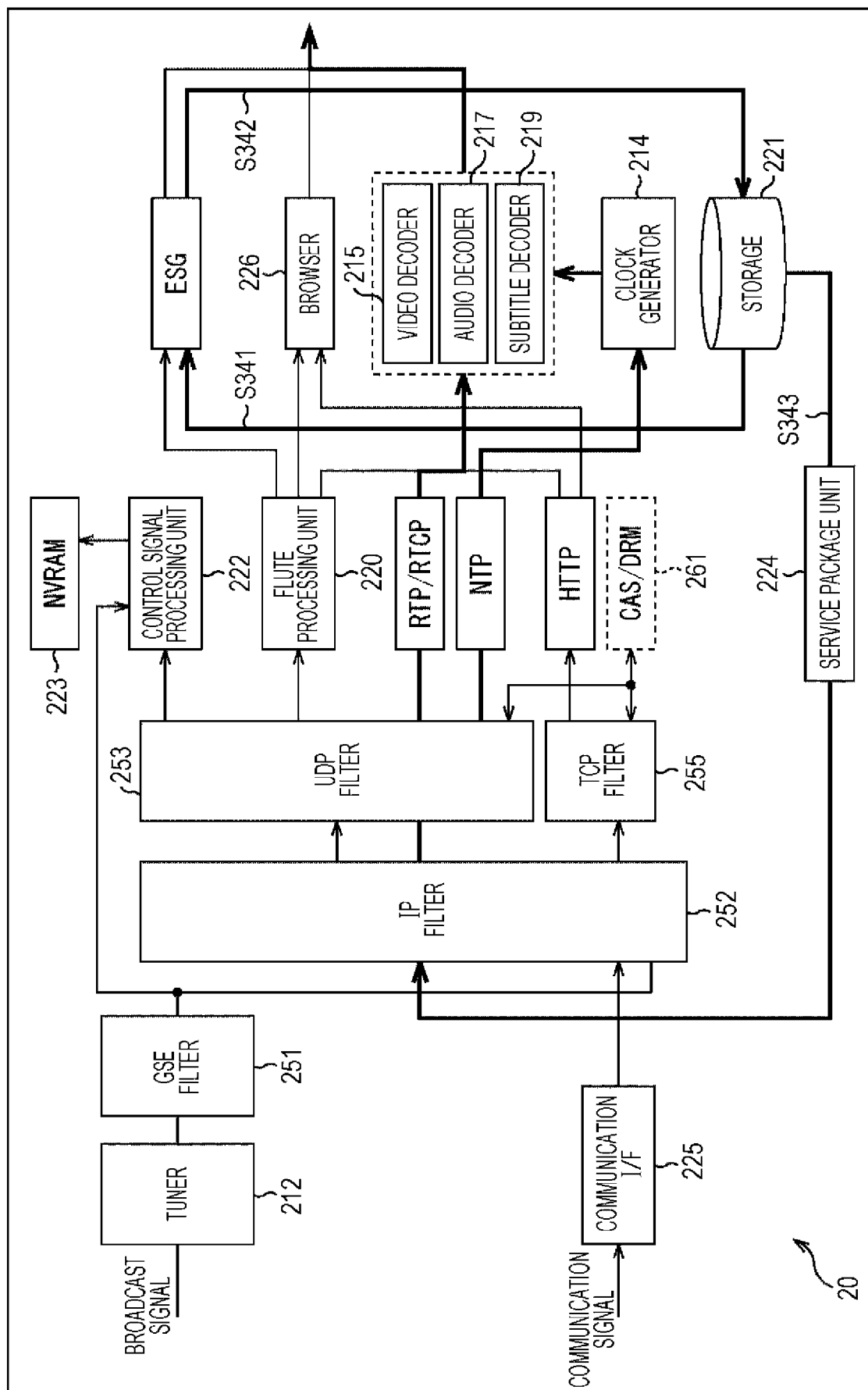
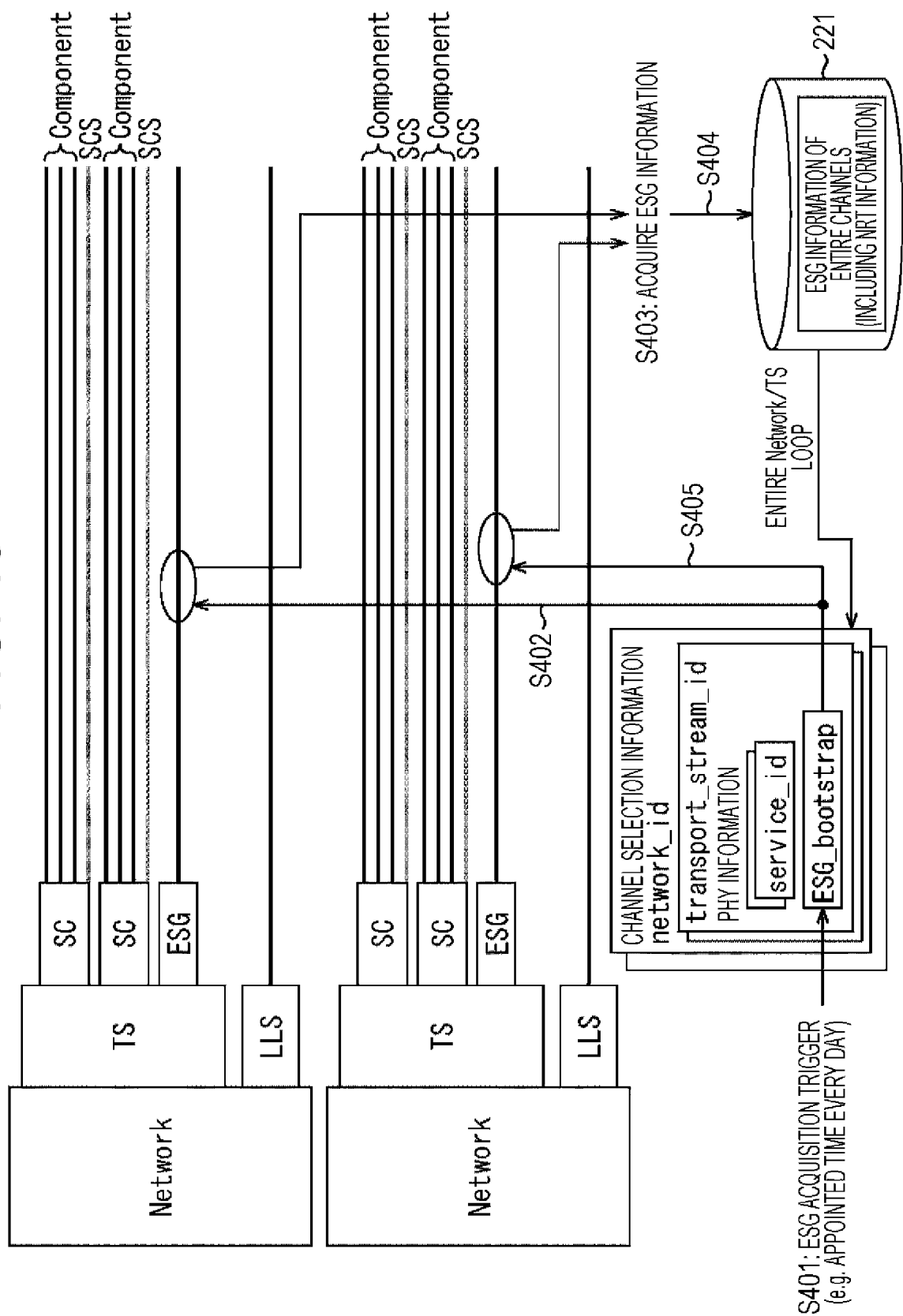
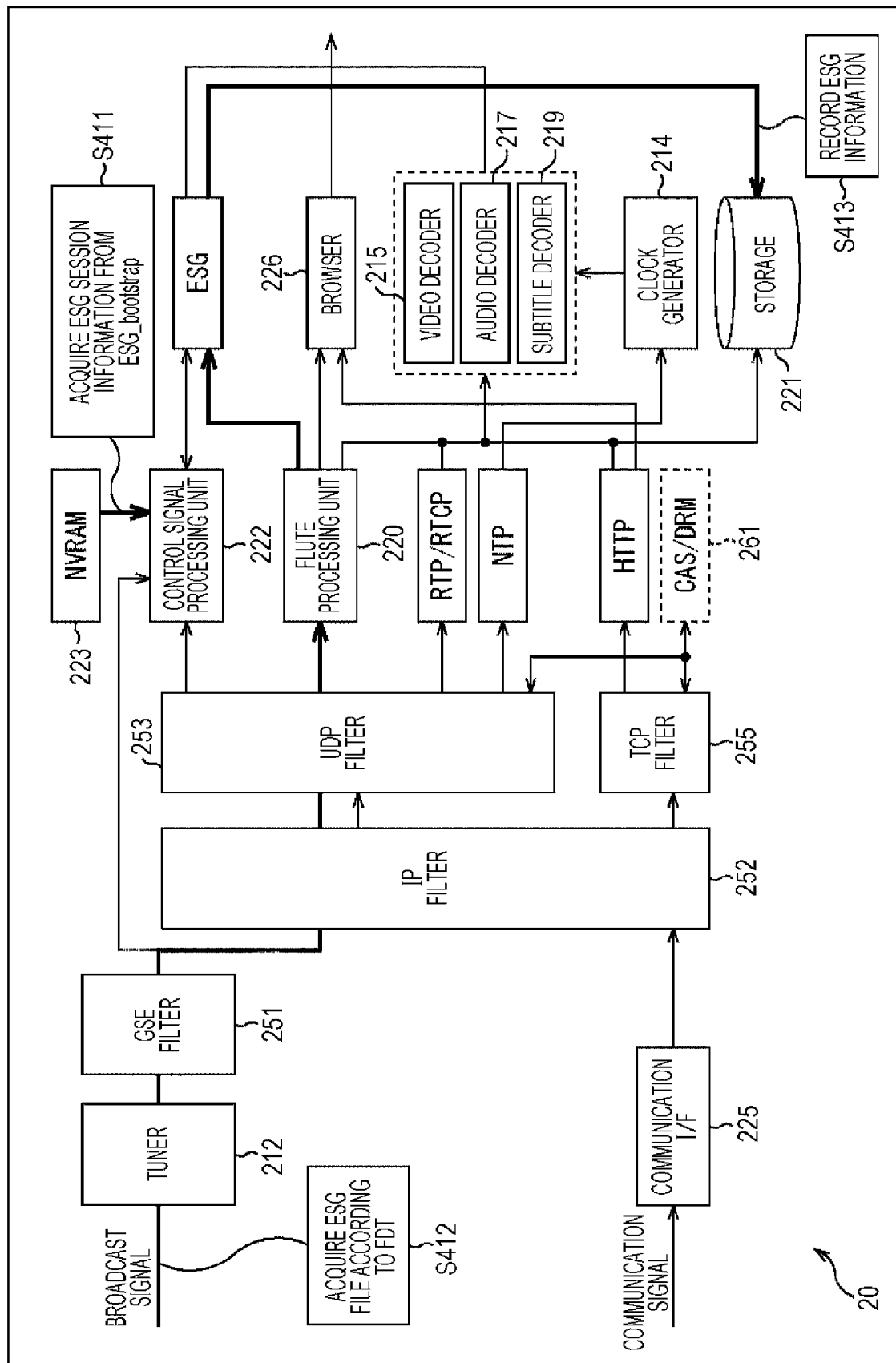


FIG. 43

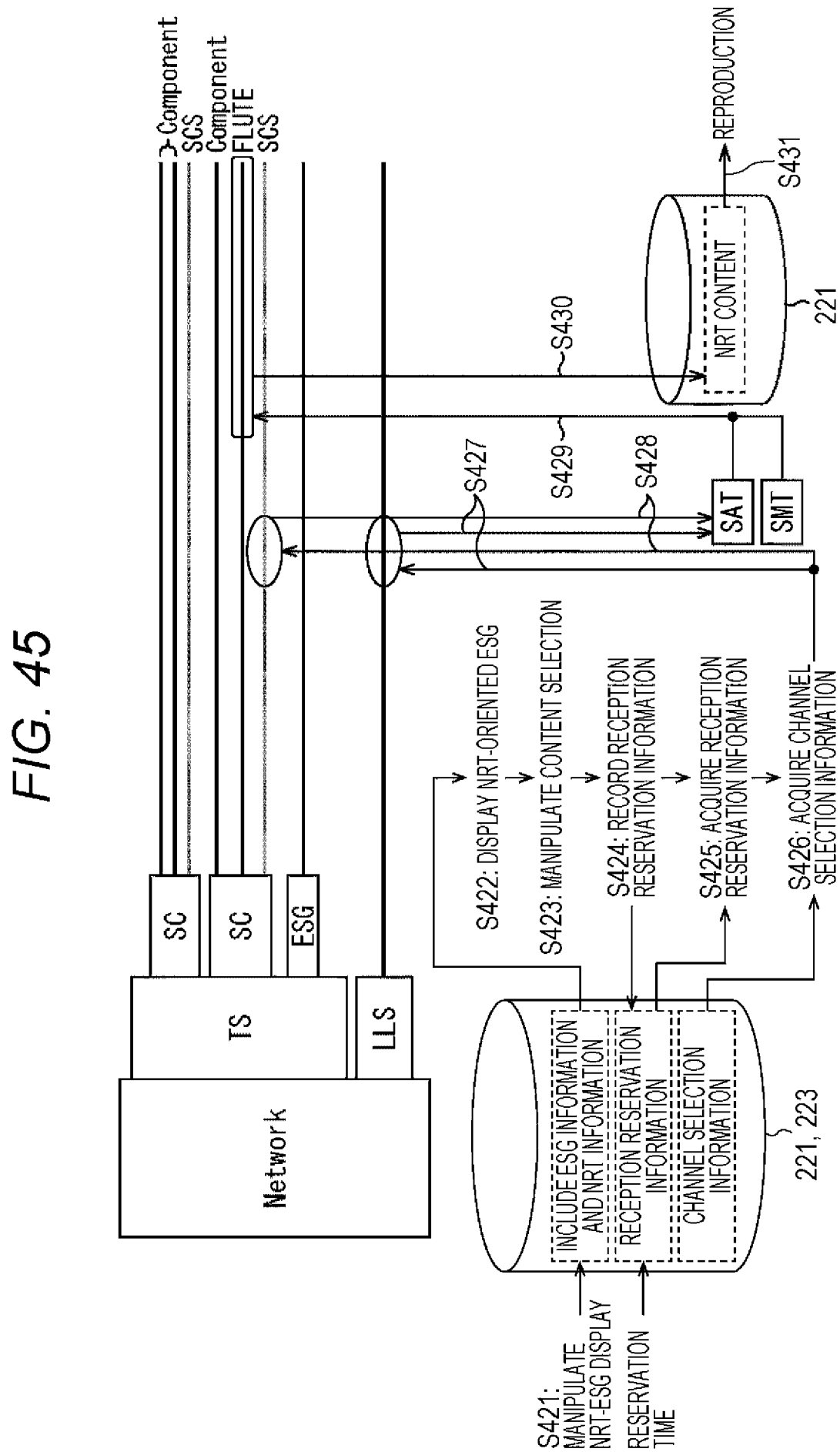


[Fig. 44]

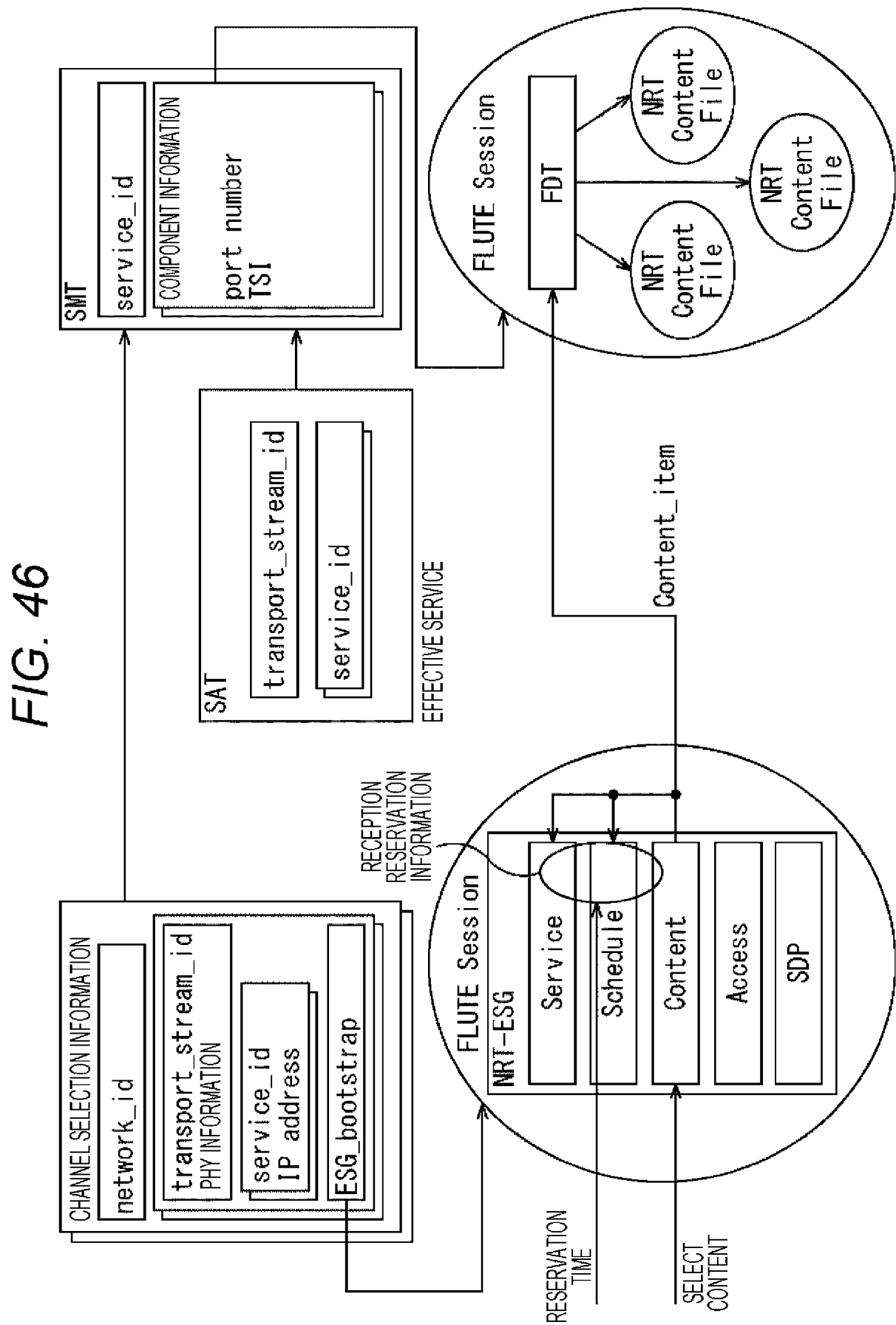
FIG. 44



[Fig. 45]

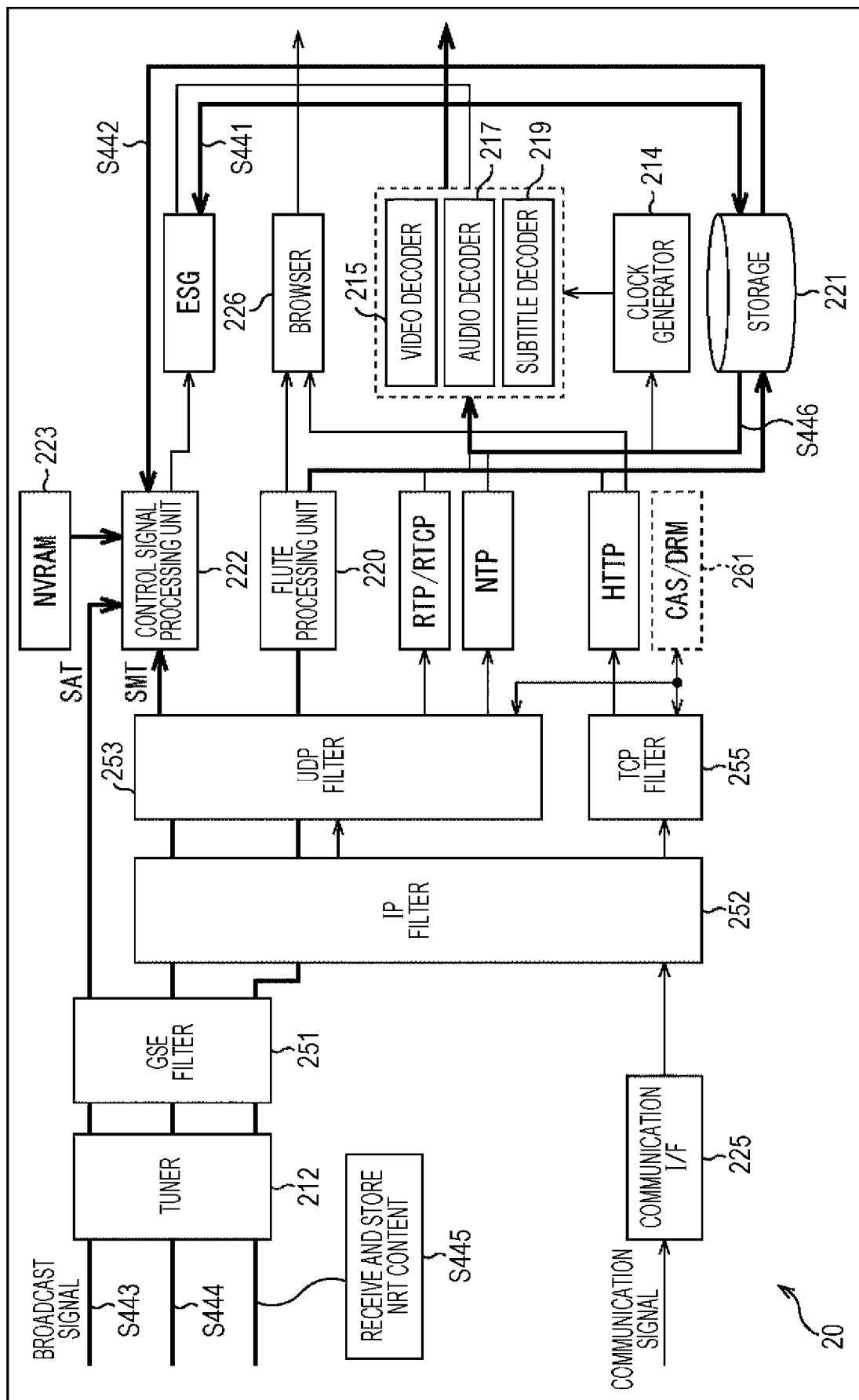


[Fig. 46]



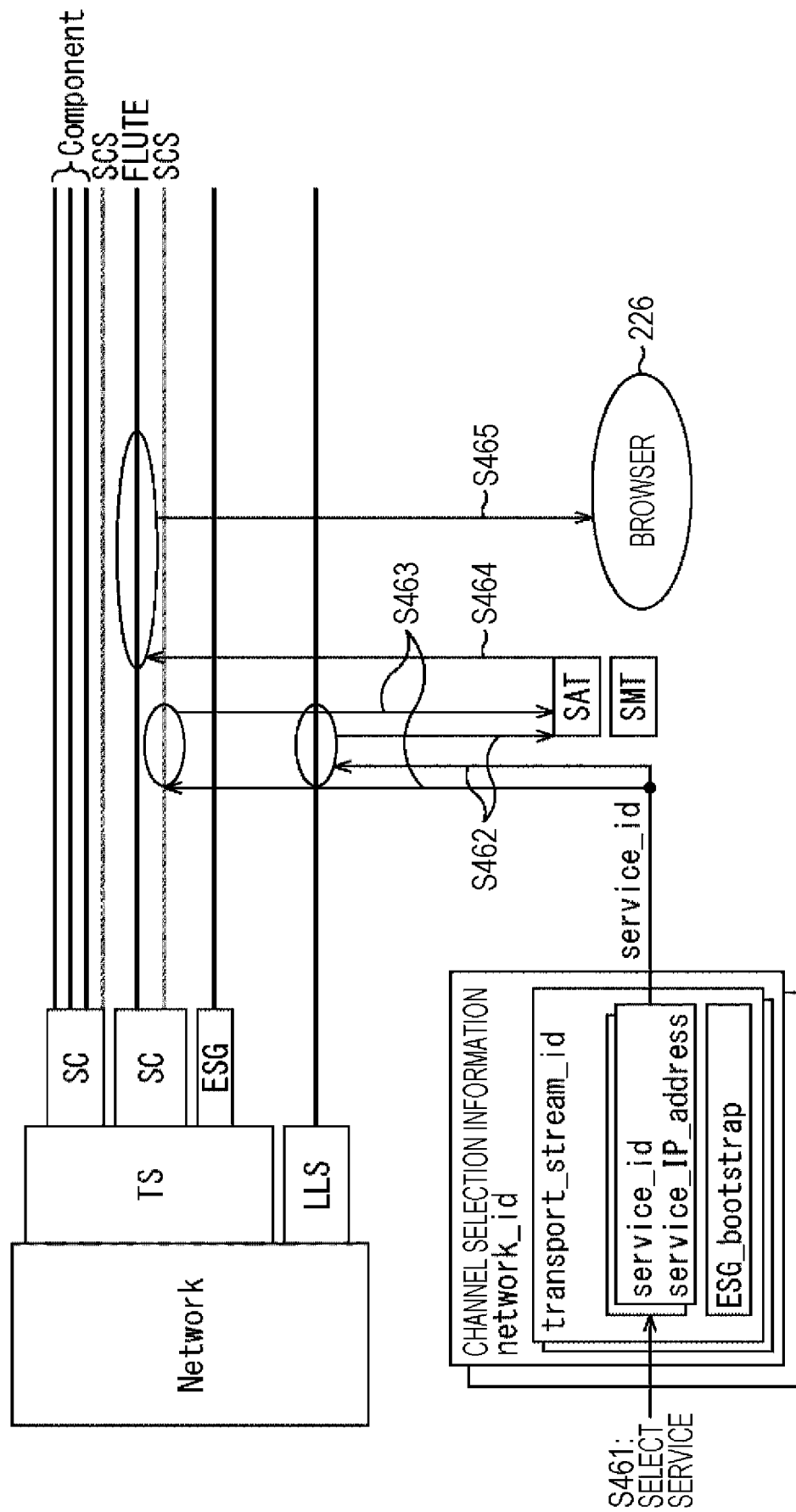
[Fig. 47]

FIG. 47



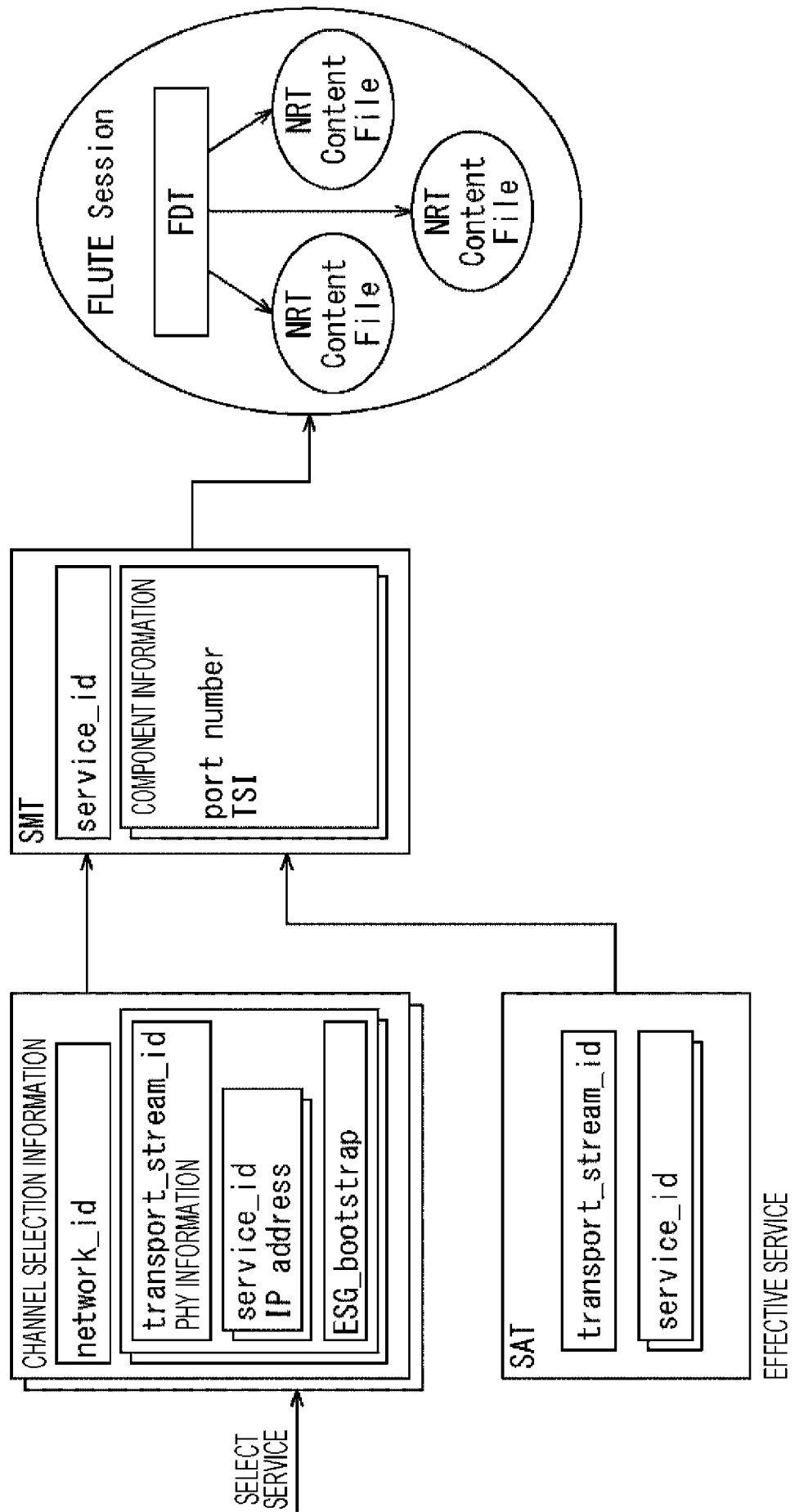
[Fig. 48]

FIG. 48



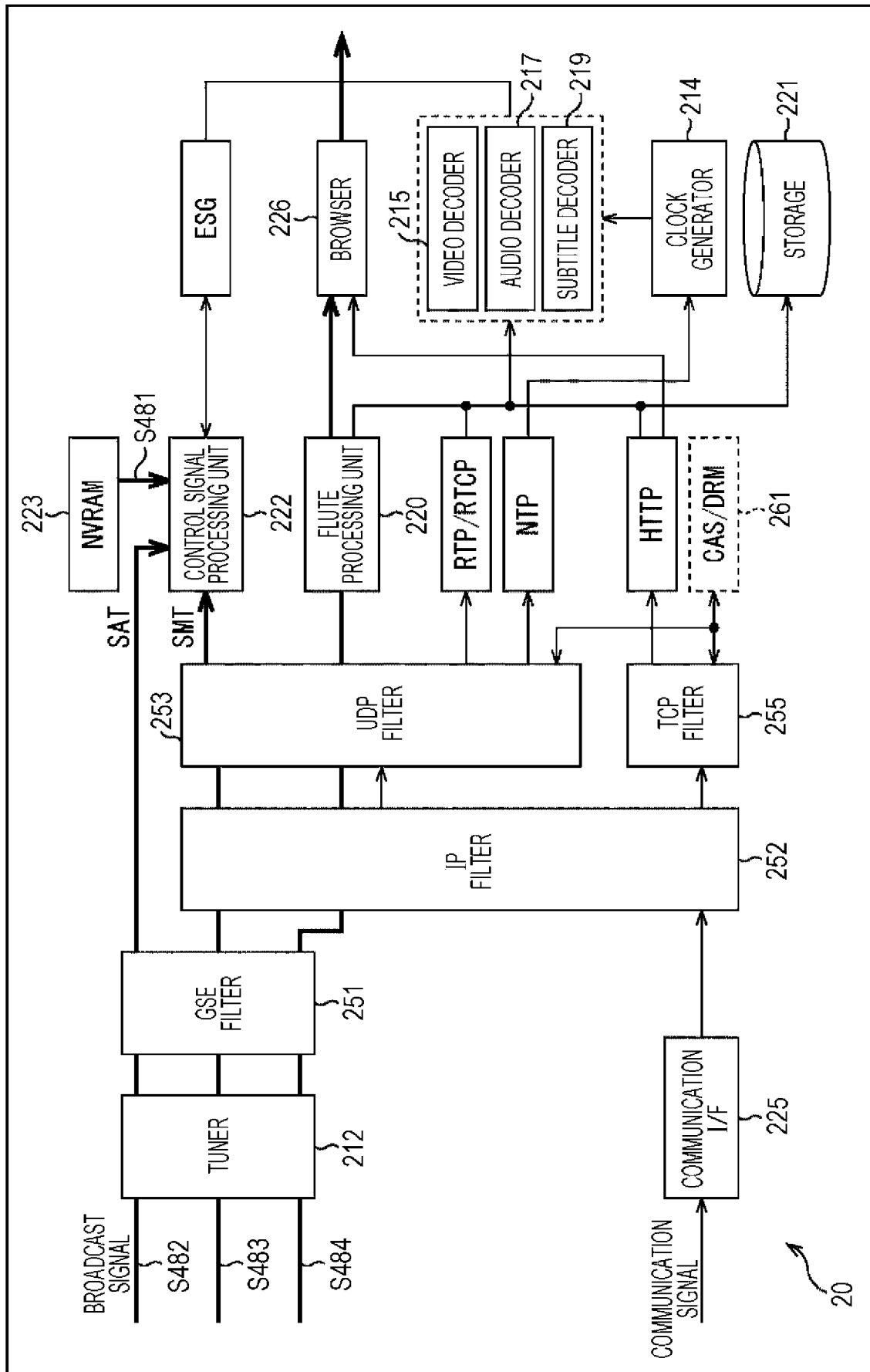
[Fig. 49]

FIG. 49

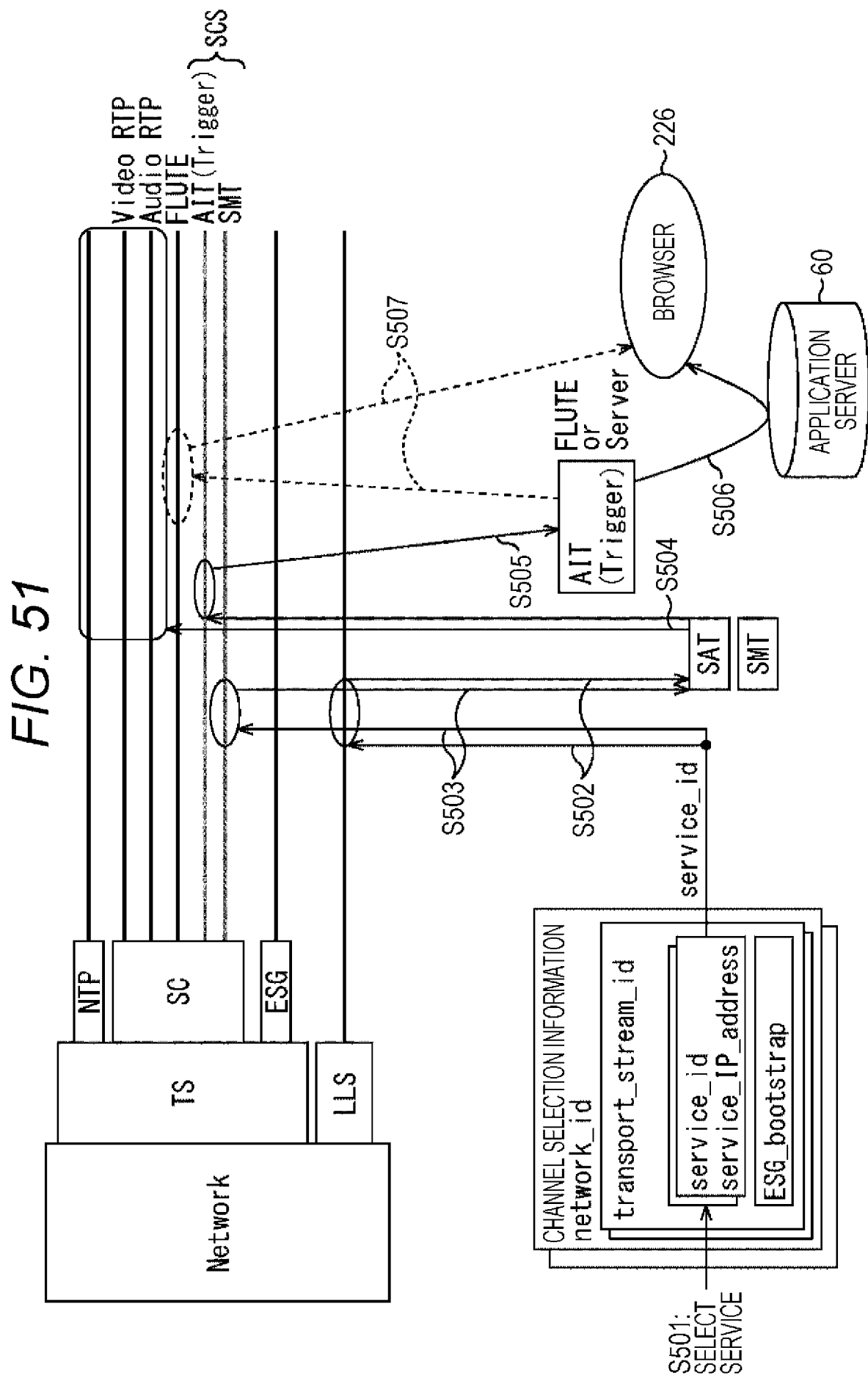


[Fig. 50]

FIG. 50

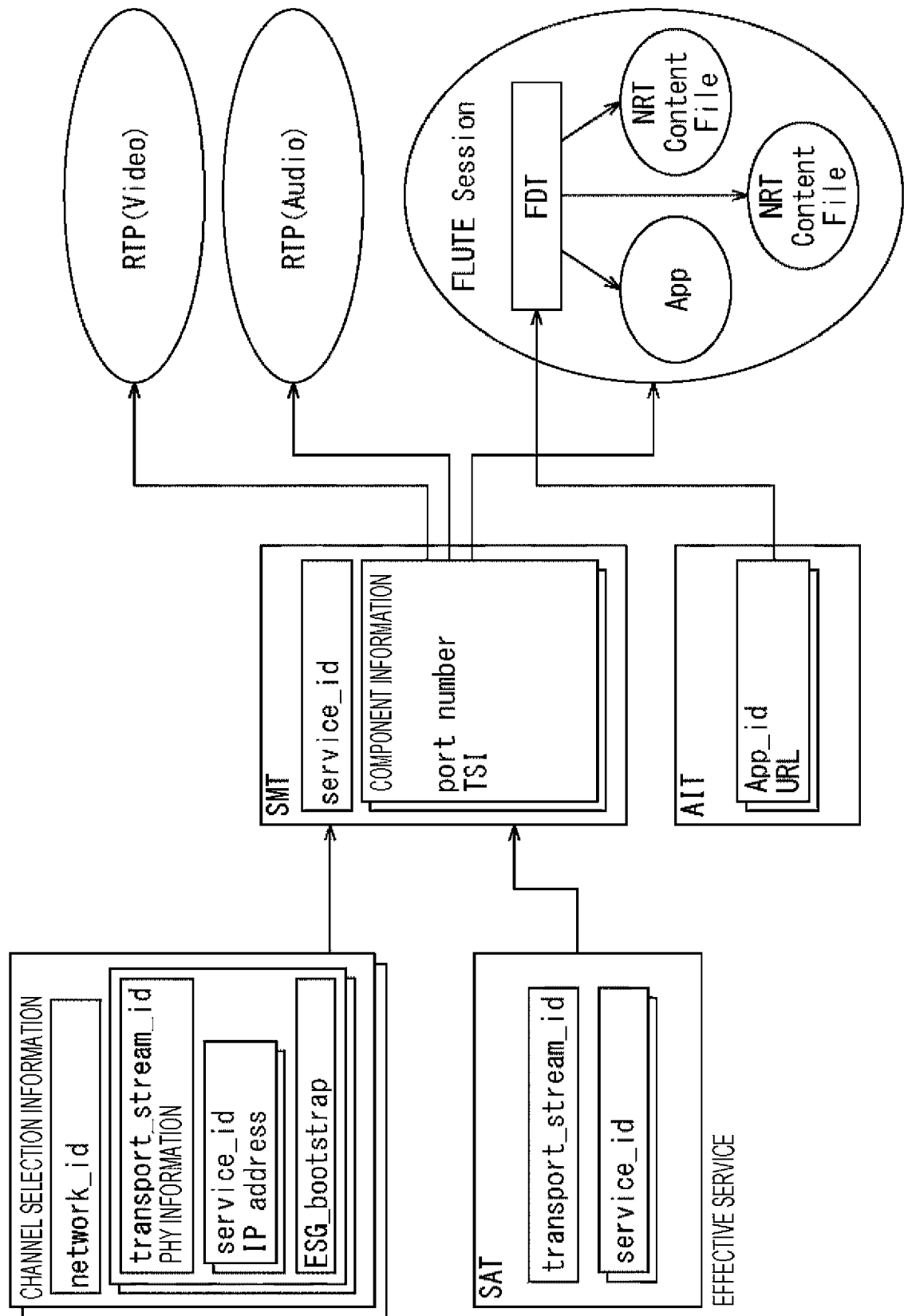


[Fig. 51]



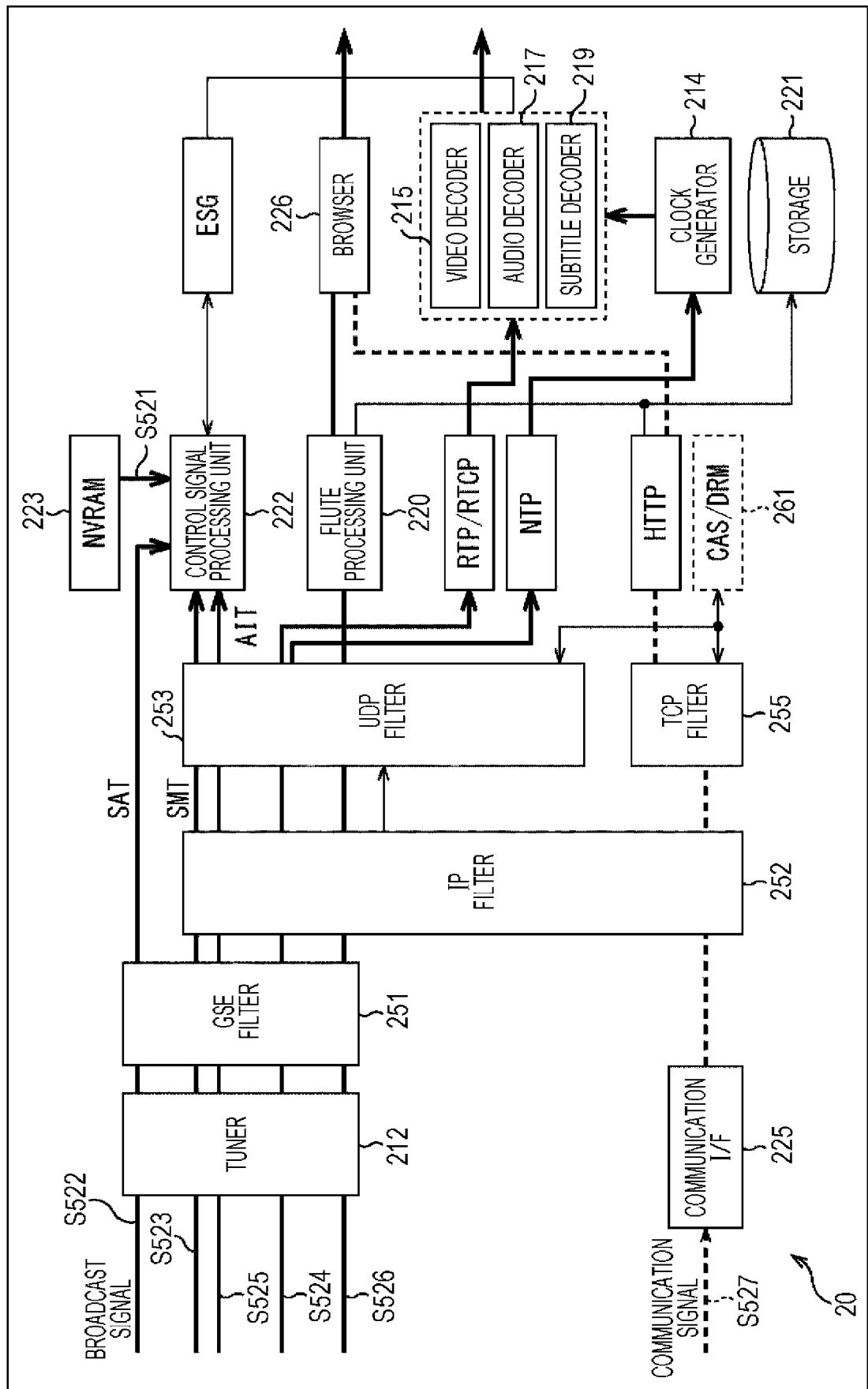
[Fig. 52]

FIG. 52



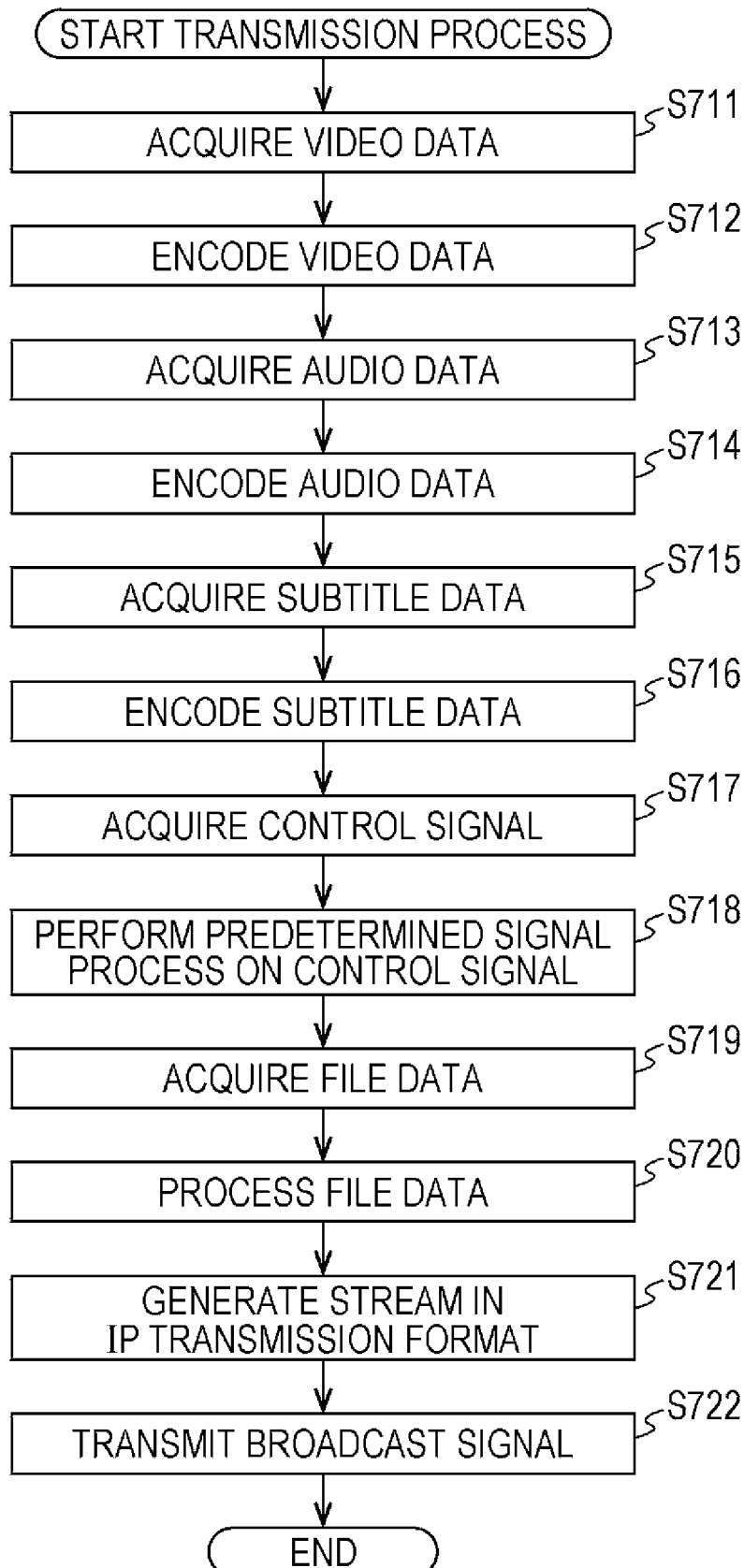
[Fig. 53]

FIG. 53

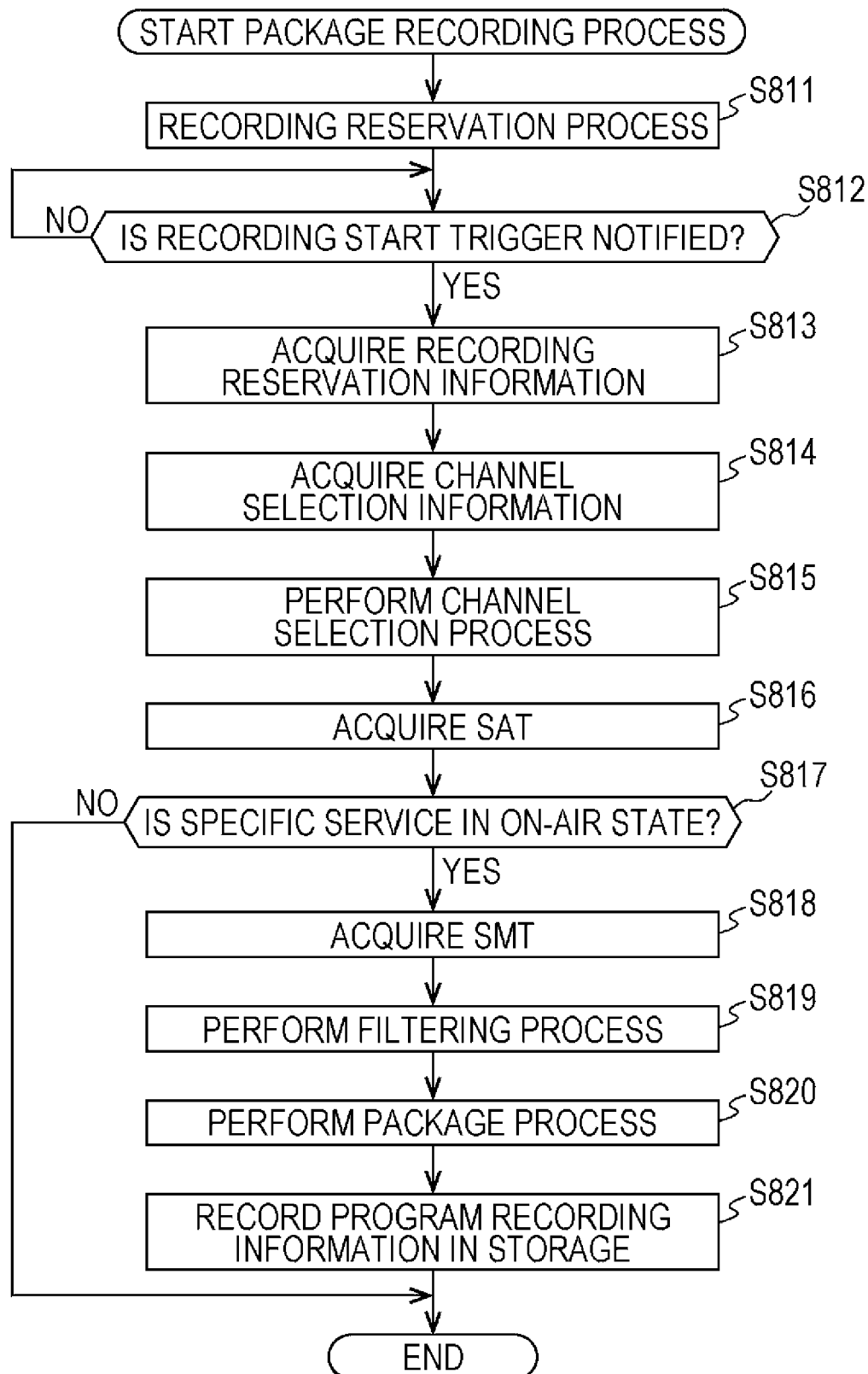


[Fig. 54]

FIG. 54

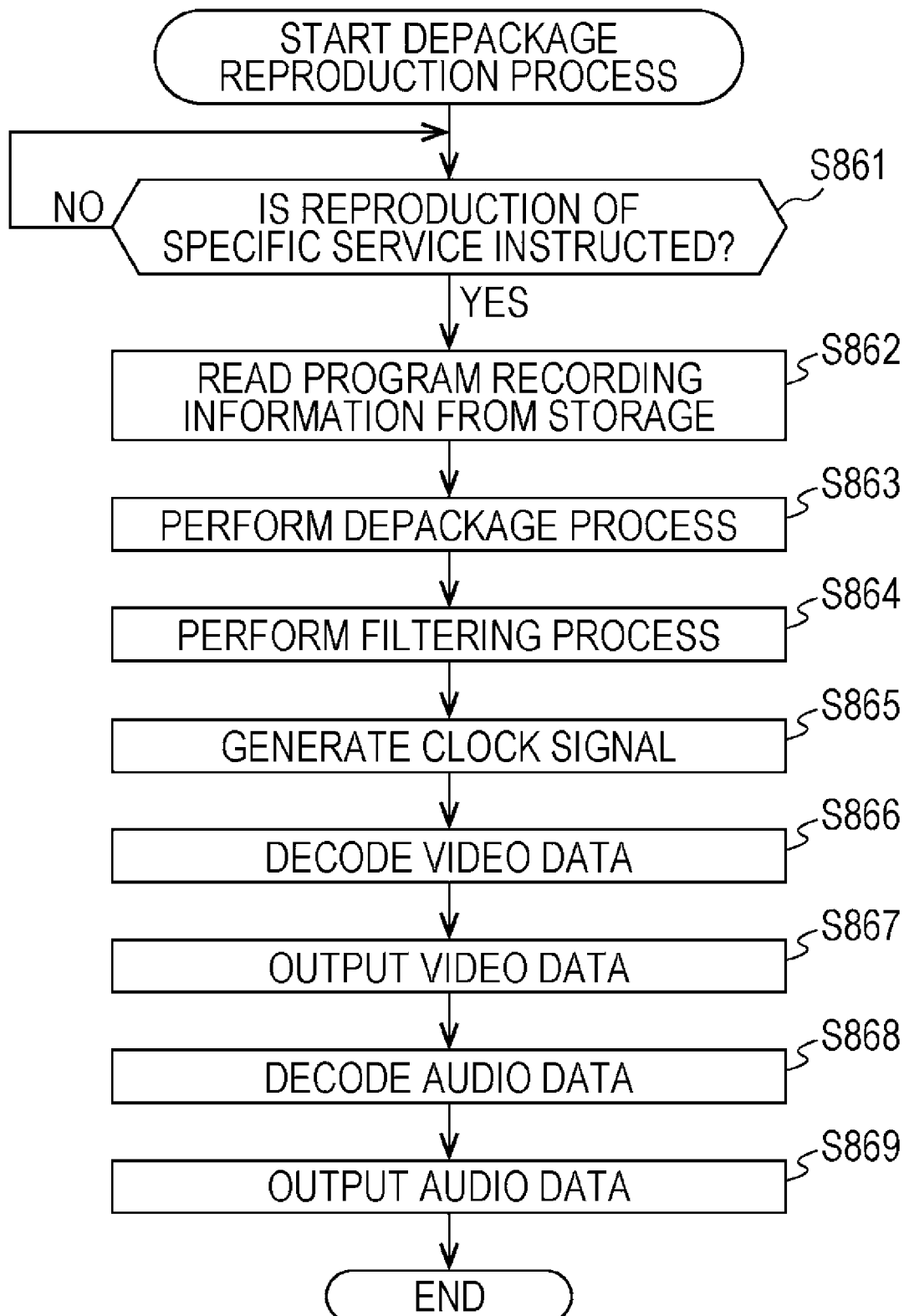


[Fig. 55]

FIG. 55

[Fig. 56]

FIG. 56



[Fig. 57]

FIG. 57