

8K Broadcasting Toward 2020 Tokyo Olympics

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8K Super Hi-Vision (Ultimate TV)

8K
SUPER HI-VISION

NHK

- Ultimate TV format in the future
- As if you are in the venues..



8K Super Hi-Vision



Images

8K UHDTV
3,300 million pixels



4K UHDTV
800 million pixels

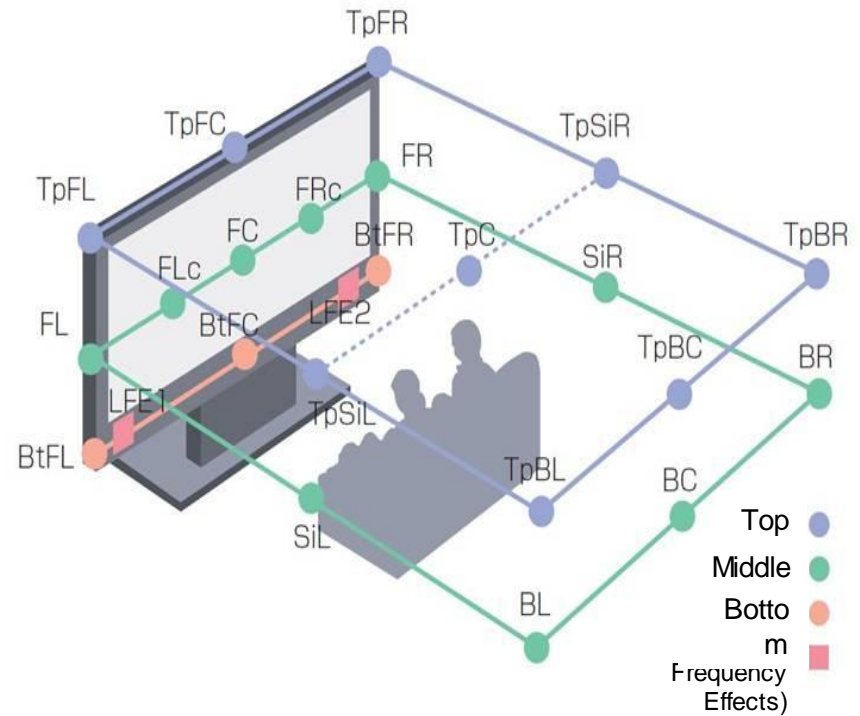


2K HDTV
200 million pixels



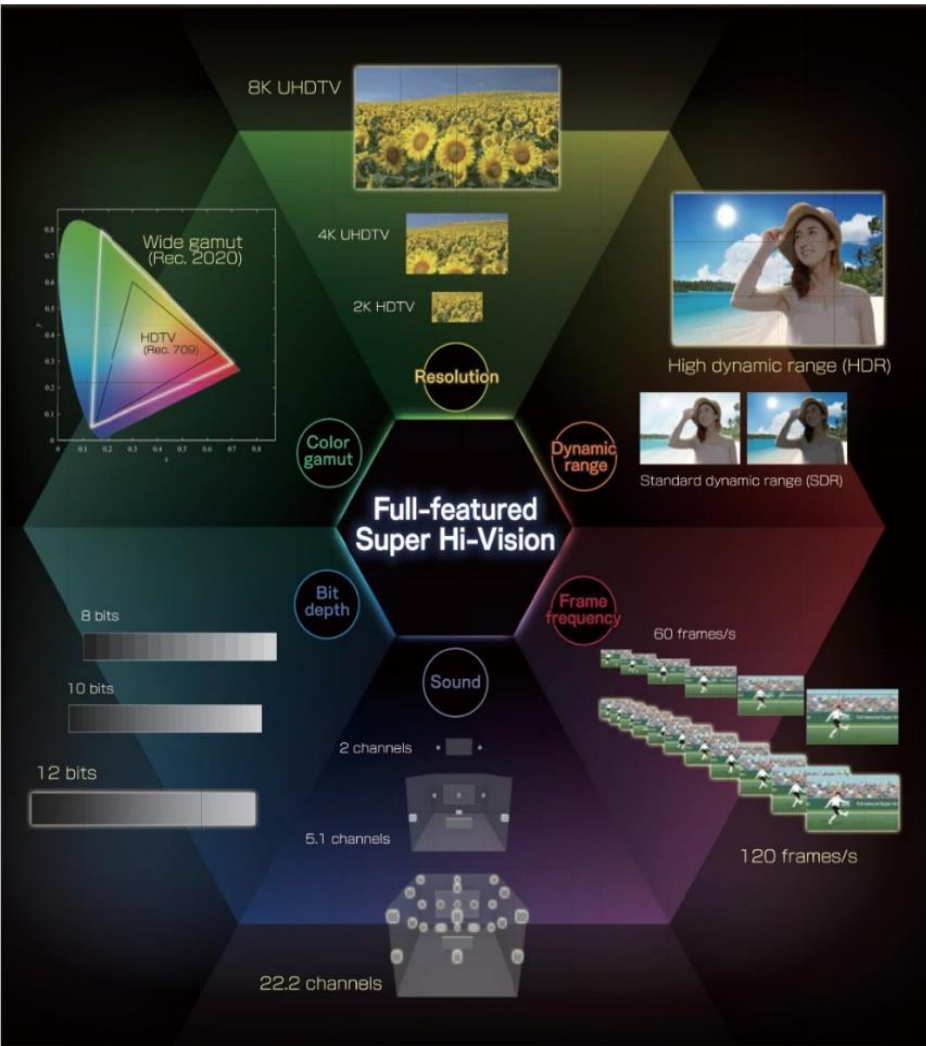
Ultrahigh-definition images with 7680 X 4320 pixels

Sound



22.2 multichannel sound system with 3 layers

Full-featured 8K Super Hi-Vision



- Ultimate format of 8K Super Hi-Vision
 - Featuring
 - HDR (High Dynamic Range)
ITU-R BT.2100
 - WCG (Wide Color Gamut)
ITU-R BT.2020
 - HFR (High Frame rate)
120 frame/s
Hybrid Log-Gamma (HLG)
*ITU-R BT.2020 recommended
 - High Bit depth
12 bits
ITU-R BT.2020
 - 22.2 multichannel system
ITU-R BS.2051
- 8K test satellite broadcasting covers
 - 8K HDR & WCG for images
 - 22.2 multichannel sound

Roadmap of 4K and 8K broadcasting in Japan



4K broadcasting with Communication satellite Started Mar 2015

4K/8K Satellite broadcasting 2018

2018

2020

4K/8K broadcasting and programs viewed on commercial TV sets

2016
8K test broadcasting

2014
4K test broadcasting

2013
Set up 4K/8K-test broadcasting

August 1st, 2016 110° BS



SHV public viewing



FIFA WORLD CUP Brasil
SHV public viewing



SHV experimental service



SHV full operation



2K Terrestrial broadcasting

2003 ISDB-T

2011

2012

2013

2014

2016 ISDB-S3

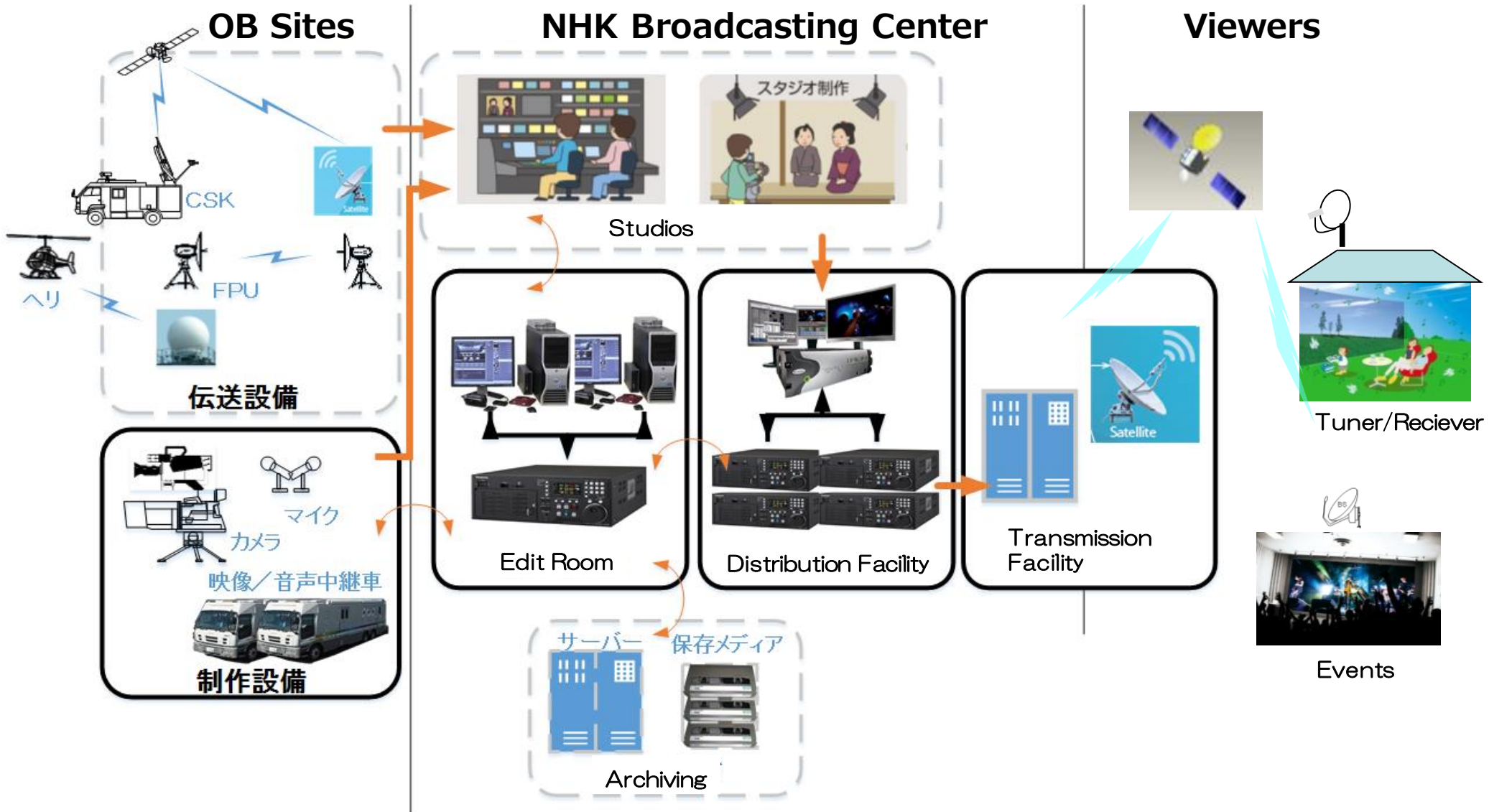
2018

2020



Test Broadcasting started 2016 Aug 1st
Mon-Sun AM10:00-17:00

8K Broadcasting Facility



8K Camera System

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NHK

Handy Live Camera	ENG Camcorder
S35mm 3,300million pixels CMOS	
F8 @ 2000 Lux、S/N 約60dB (HD Downconvert)	
PL mount、 4K VF、 Focus Assist	

Ikegami Handy Camera



Hitachi ENG Camcorder



録再モジュール搭載時

8K P2 Recorder/Player



Size : 1/3
Pw Consumption : 1/2



Old



New

Video	Signal format	Input : 8K 3G-SDI x 8 Output : 8K 3G-SDI x 8 4K 3G-SDI x 4
	compression	AVC-Intra 4K/10bit
	memory	8K : P2 Express x 4
Audio	input	SDI embeded/MADI (max 32ch)
Recording time		65分 (256GB x 4)
size (mm)		W424 x H176 x D500
weight(kg)		18
Power (W)		152

8K Display



(フレキシブルOLED)



8K OB Truck

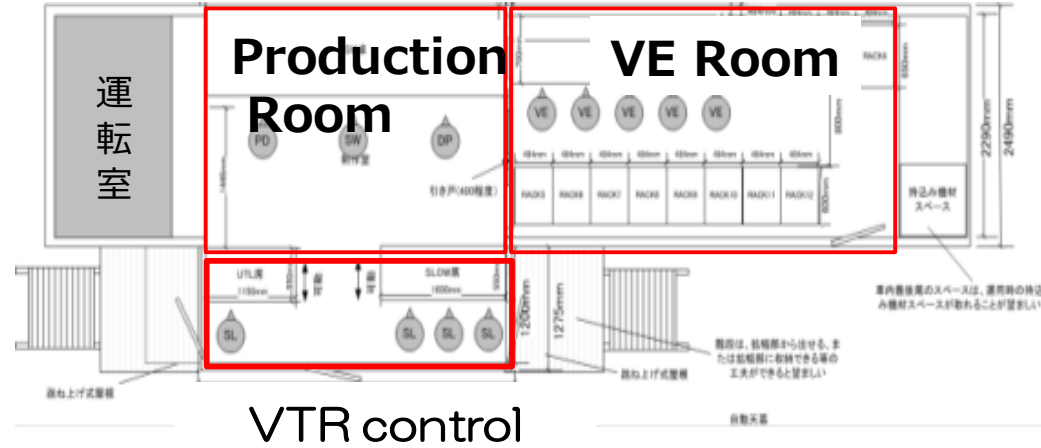


8K OB Truck



Production Room

Spec	
SHC1	SHC2
L11.9m x H3.3m x W2.5m	
10 cameras、VTR x 4 Slow Player x4	
16 input videomixer	20input videomixer



VTR control

22.2ch Audio Production Truck

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Spec

L11.5m、車H3.5m、expansion body

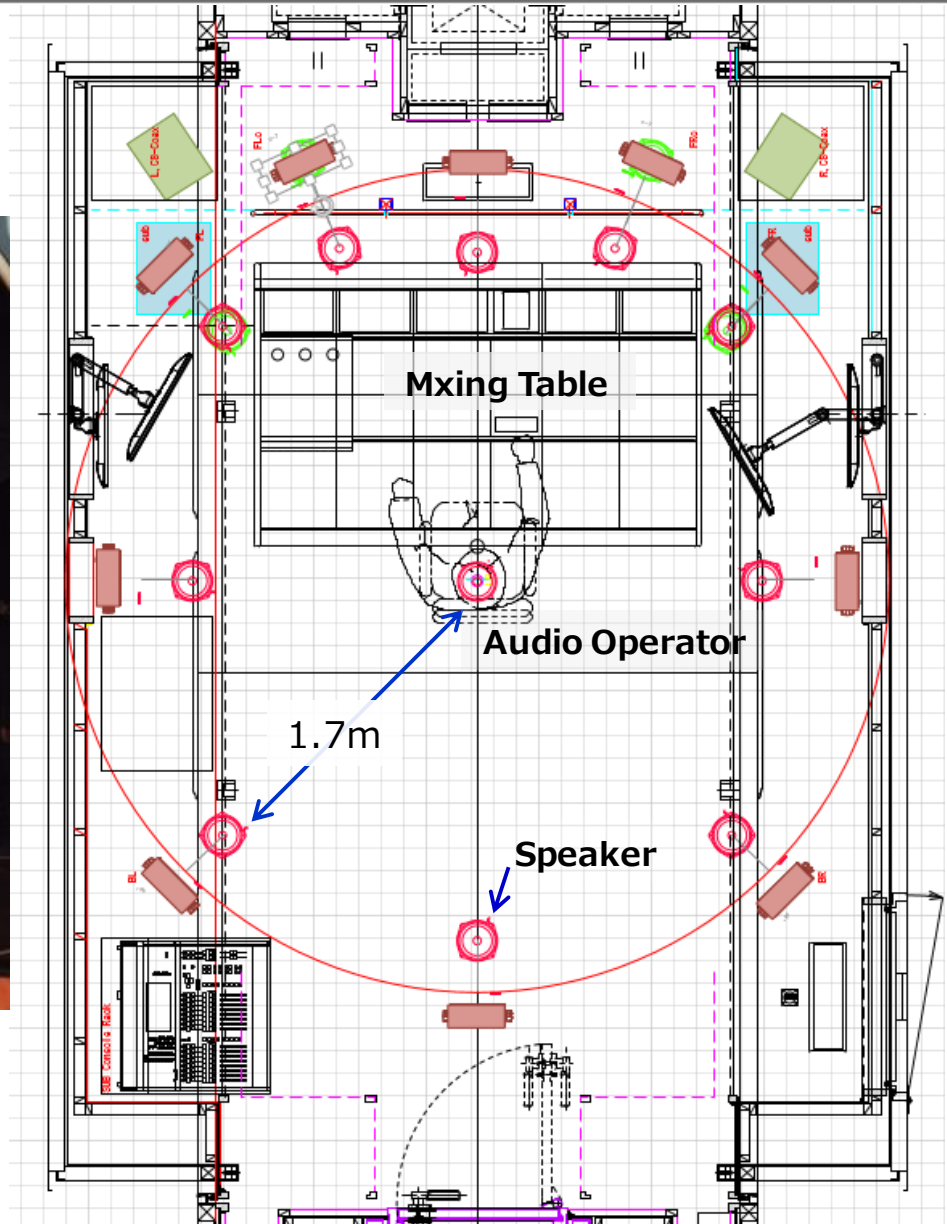
22.2ch Mixer
22.2ch Speaker

22.2ch/5.1ch/2ch

22.2ch Audio Production Truck



Mixing Room



8K Production Editing Room

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8K Video Editing Room



Dubbing Studios for 22.2 ch

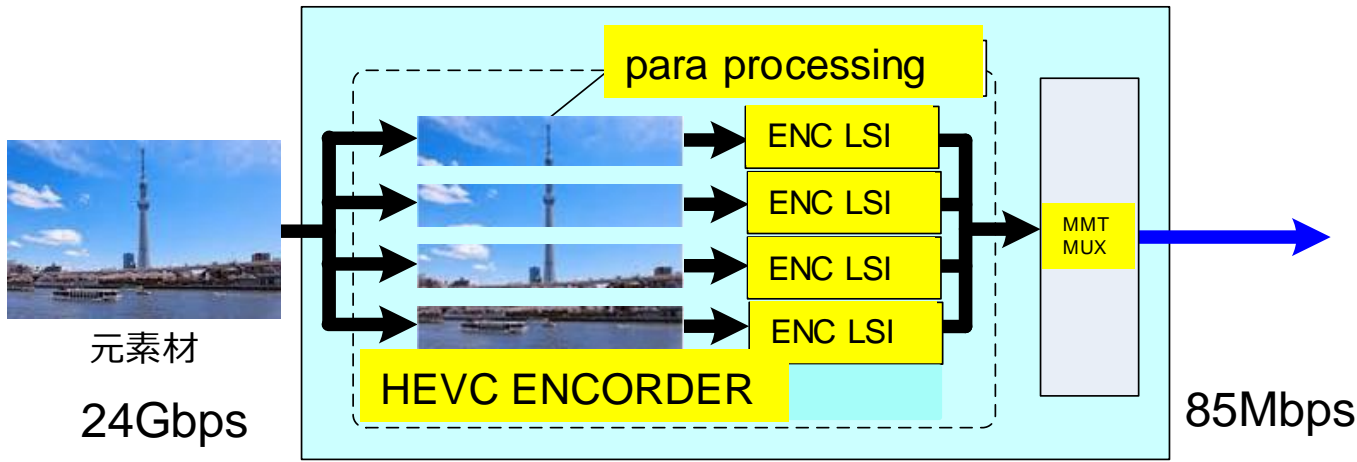
8K Technical Operation Center

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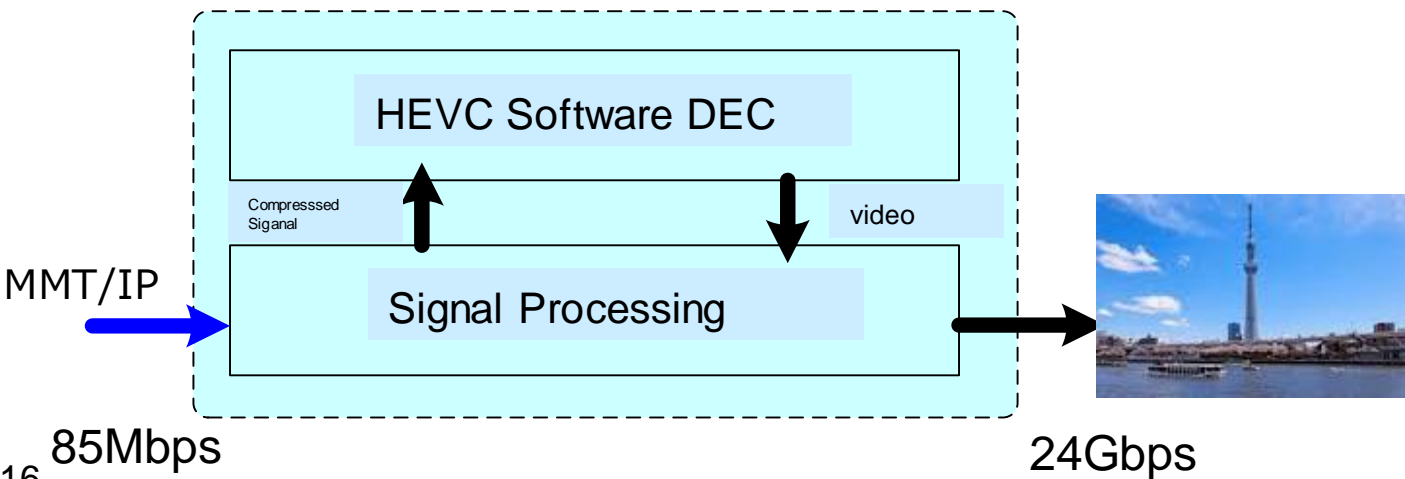


8K Encoder/Decoder

8K Encoder



8K Decoder

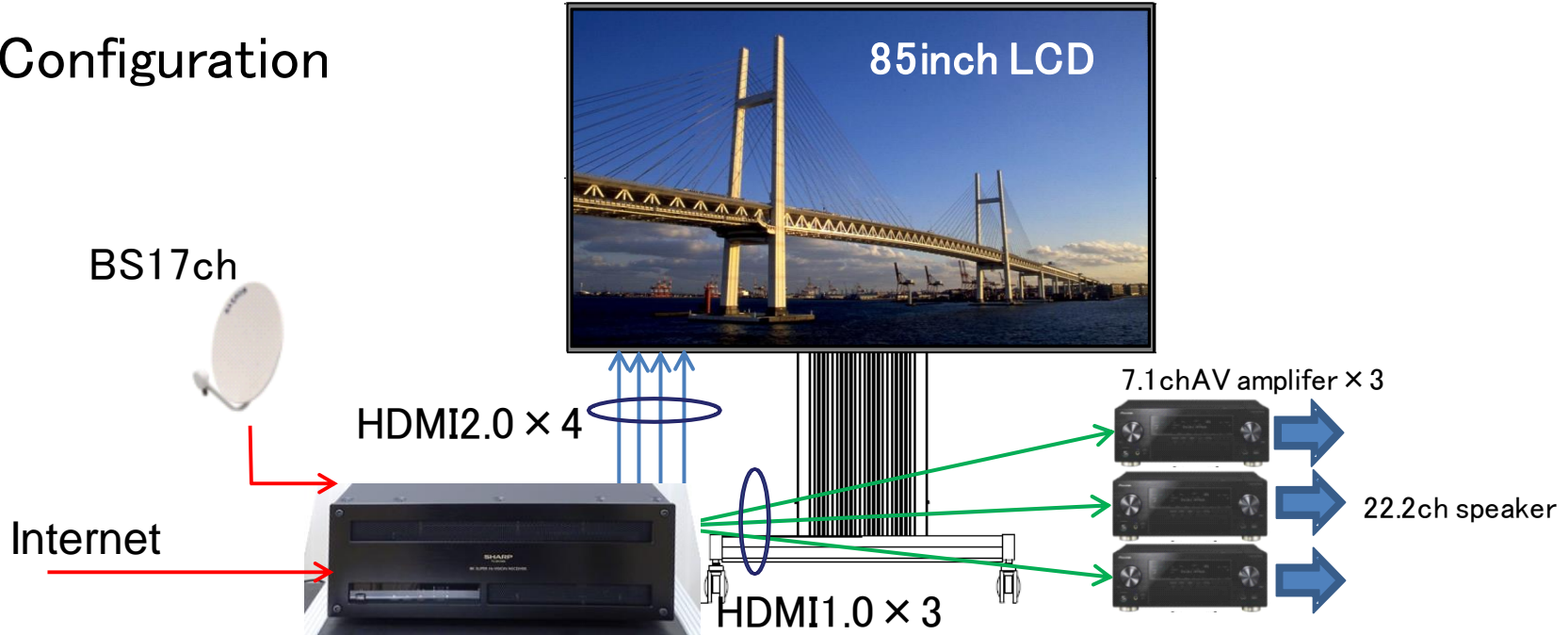


8K Receiver

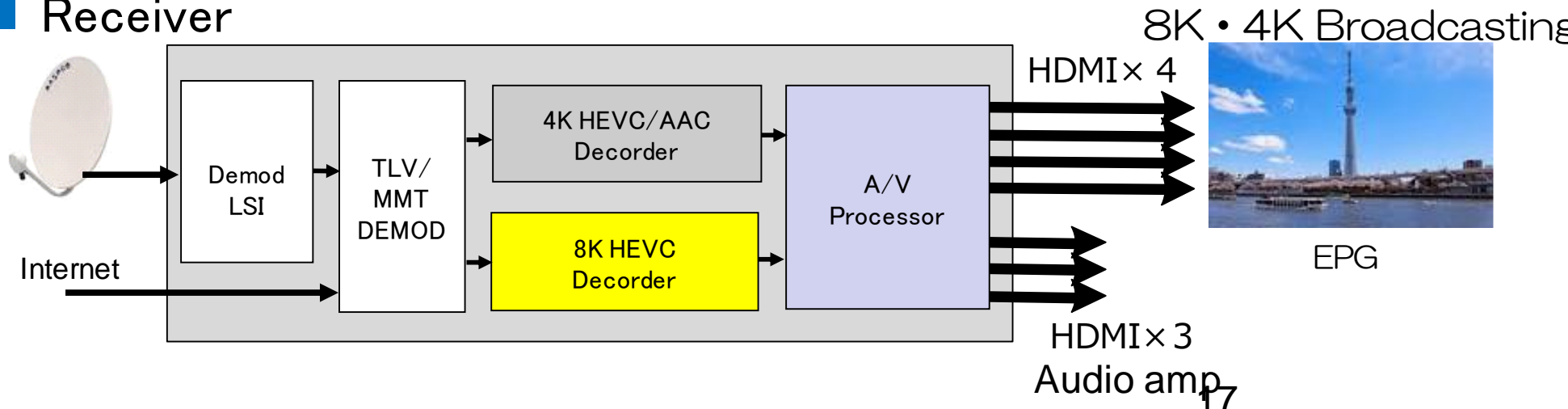


Confidential/NHK

■ Configuration



■ Receiver

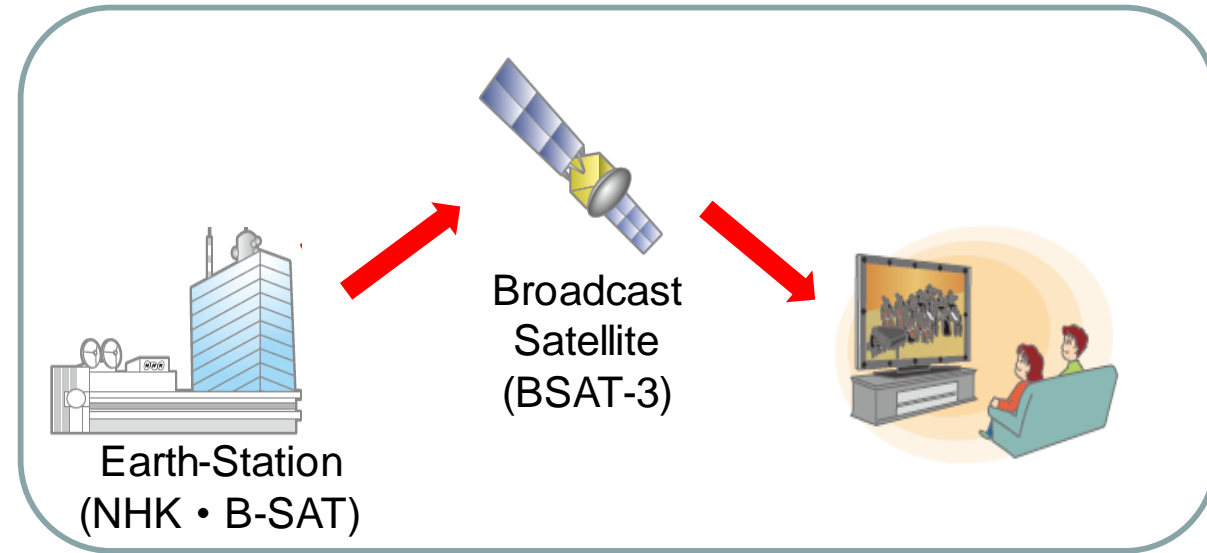


8K Satellite Transmission System

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Transmission Parameter	8K Test Satellite Broadcasting
Modulation	16APSK
Frequency bandwidth	34.5 [MHz]
Roll-off rate	0.03
Symbol rate	33.76 [Mbaud]
Bit rate	about 100 [Mbps]



Modulator



Earth-Station Transmitter



Earth-Station Transmitting antenna

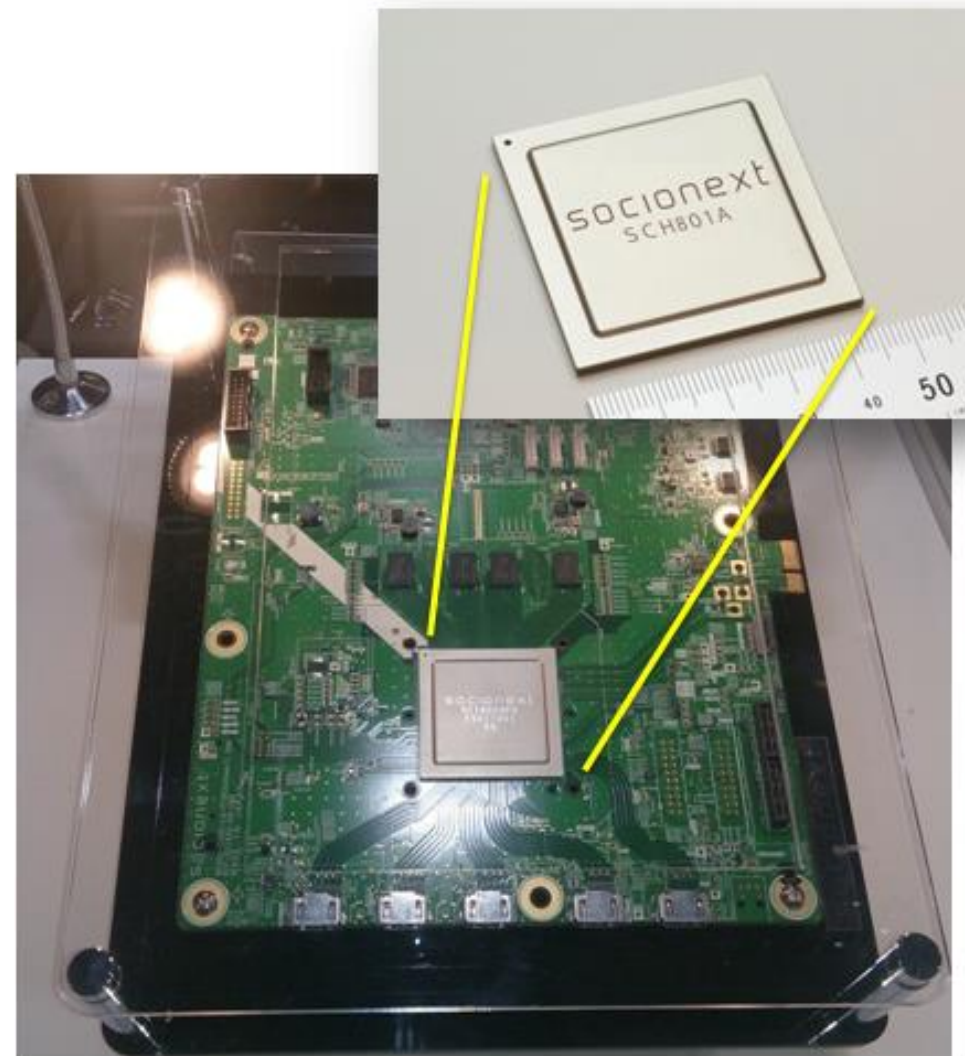
HEVC Decoder

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Input	7680 x 4320, 60P
Interface (input)	PCI Express Gen 2
Interface (output)	HDMI 2.0 x 4ch
Size	45 mm x 45 mm



8K Receiver

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4K/8K receiver

Items	Specifications
Receivable channel	BS channel 17 (4K & 8K programs)
Color gamut	Rec. BT 2020
Dynamic range	SDR / HDR (HLG)

Input	RF	1
	LAN	1
	USB	3 (Only for maintenance)
Output	Video	8K (HDMI 2.0 x 4)
	Audio	22.2 chs (HDMI x 3)

8K Contents Productions



8K Contents Productions

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RIO Carnival



Under Water



Short Movie

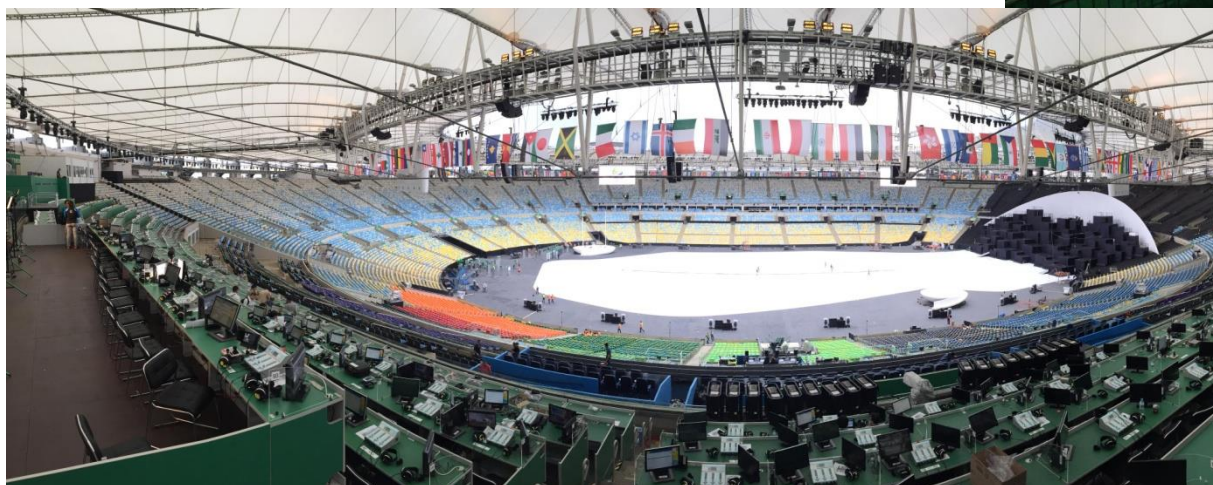
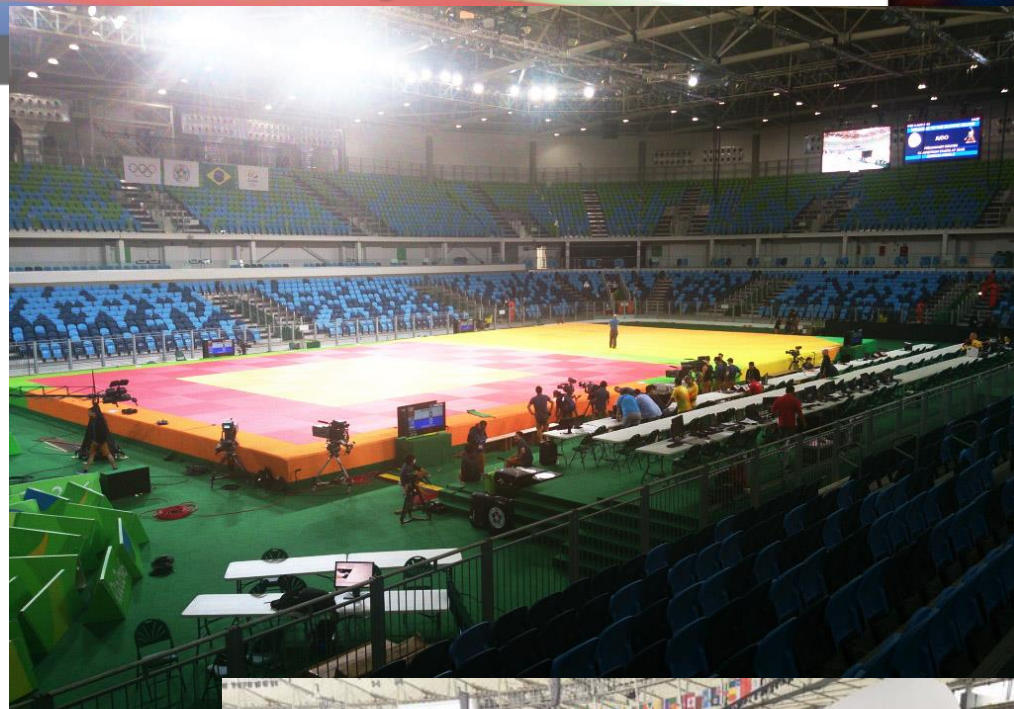


SHV Drama



8K LIVE Productions (RIO Olympics)

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Shipping and Setting up

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Cameras

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8K Ikegami SHK-810



4K SSM SONY HDC-4800



4K SSM FOR-A FT-One



RIO Olympics 8K Live Broadcasting



Crew-A

Opening Ceremony, Swimming, Basketball



SHC-1



TA-1

Crew-B

Judo, Athletics, Soccer, Closing Ceremony



SHC-2



SA-1


Beach Volleyball/Gymnastics



(HDR-ready)

ENG Crew

※HDR Production in Opening Ceremony



IBC

IBC PV theatre
350 inch PJ
85 inch LCD

Via Pacific Route
KDDI 280Mbit/s

Via Russia
KDDI 280Mbit/s

NHK Tokyo
Network Center


RX Studio

Recording, Editing

SHV TOC

LIVE

Playout



BSAT-3

NHK Branch Stations

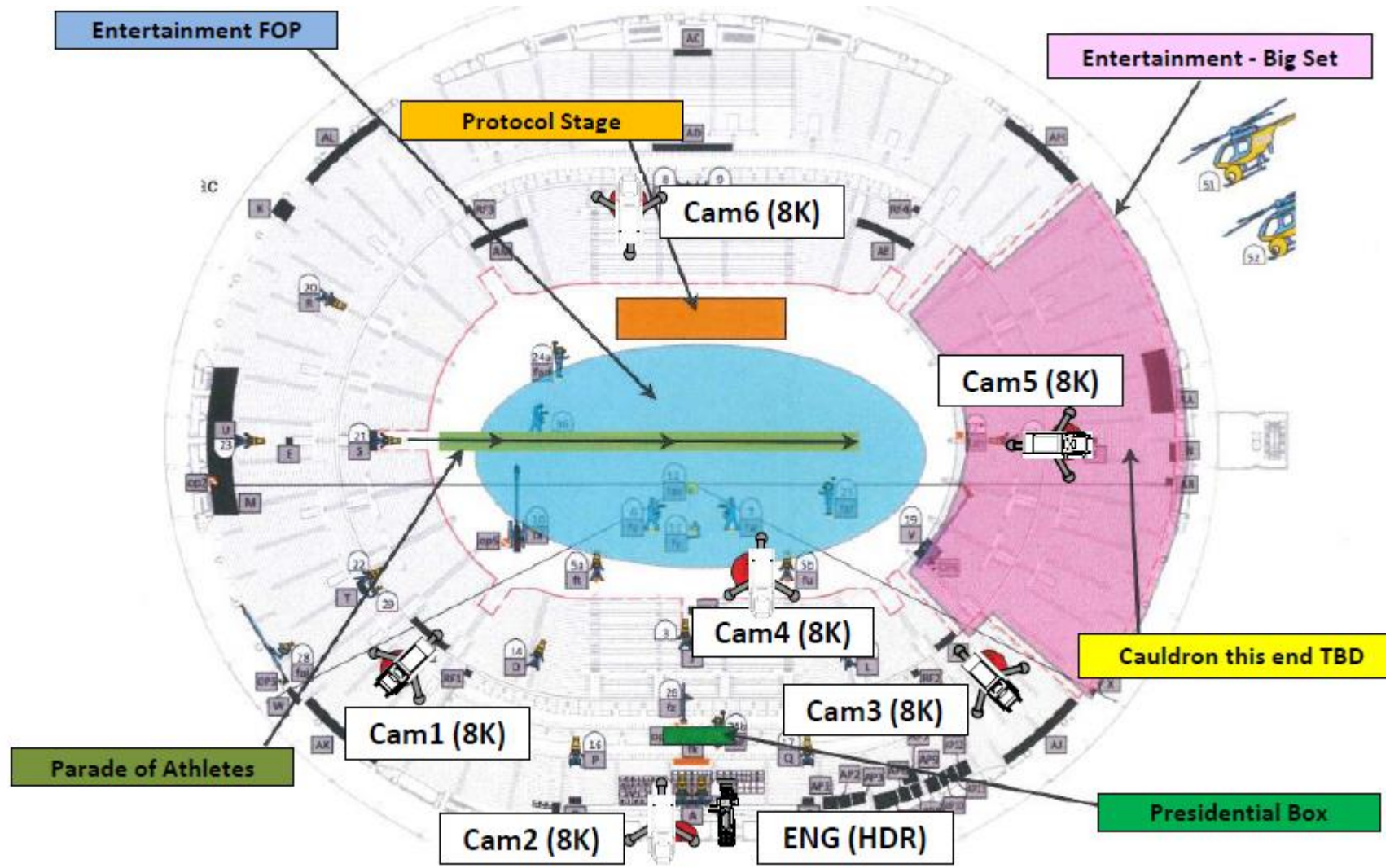
5 PV locations
in Tokyo and Osaka

Globo.com

350 inch PJ at Museu do Amanhã

Terrestrial Transmission Trial

Camera Plan (Opening Ceremony)



Rio Olympics (Production Trucks)



SHC-1
Production Truck
Production Room



TA-1 Audio Truck
Mix Room



SHC-1
Production Truck
VE Room

Public Viewing (Brasil)

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IBC 350inch Thertre



TOKYO2020 JAPAN HOUSE 85inch LCD

Rio Terrestrial Test Broadcasting



→ Wired
--> Wireless

8K International Transmission

- Pacific route(x2) and Russia route(x2) = 4 routes
- 140Mbit/s stream x2 = 280Mbit/s using AVC compression



Public Viewing(NHK Japan)



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NHK Fureai Hall 480inch Projector



NHK Kyoto 220inch



Public Viewing in Tokyo

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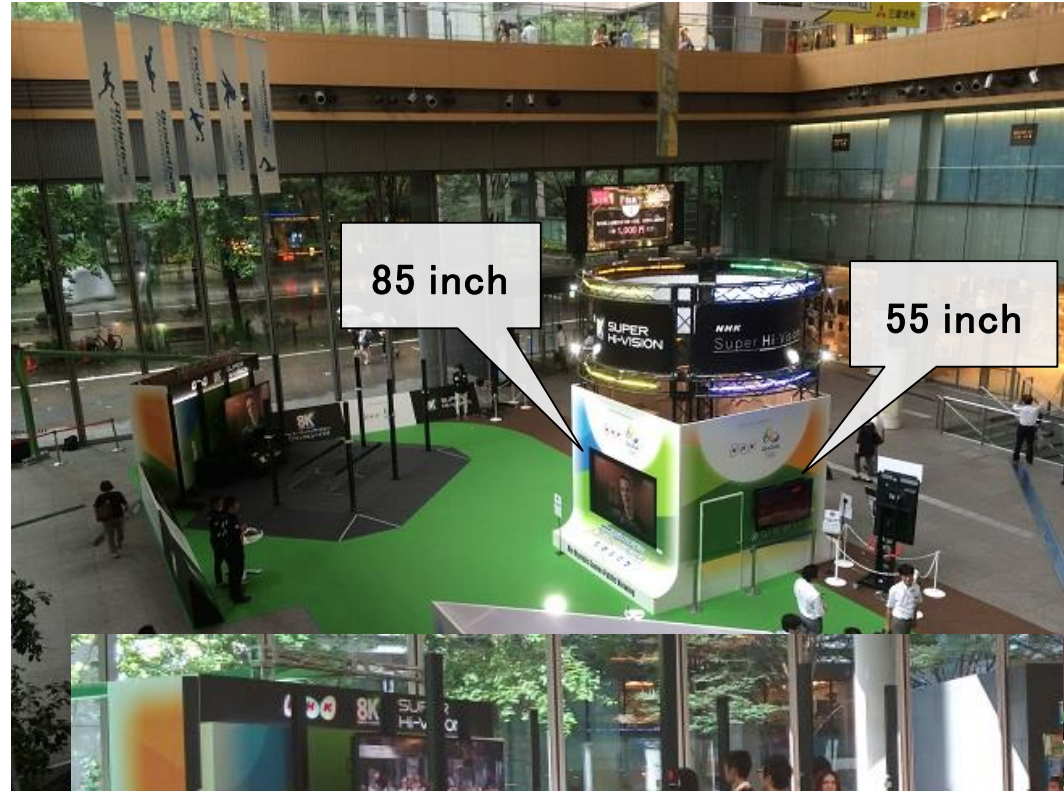
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Ariake Panasonic Tokyo Center
240inch Projector

Marunouchi
MARUCUBE
85inch LCD × 3
55inch LCD × 2

More than 80,000 audiences



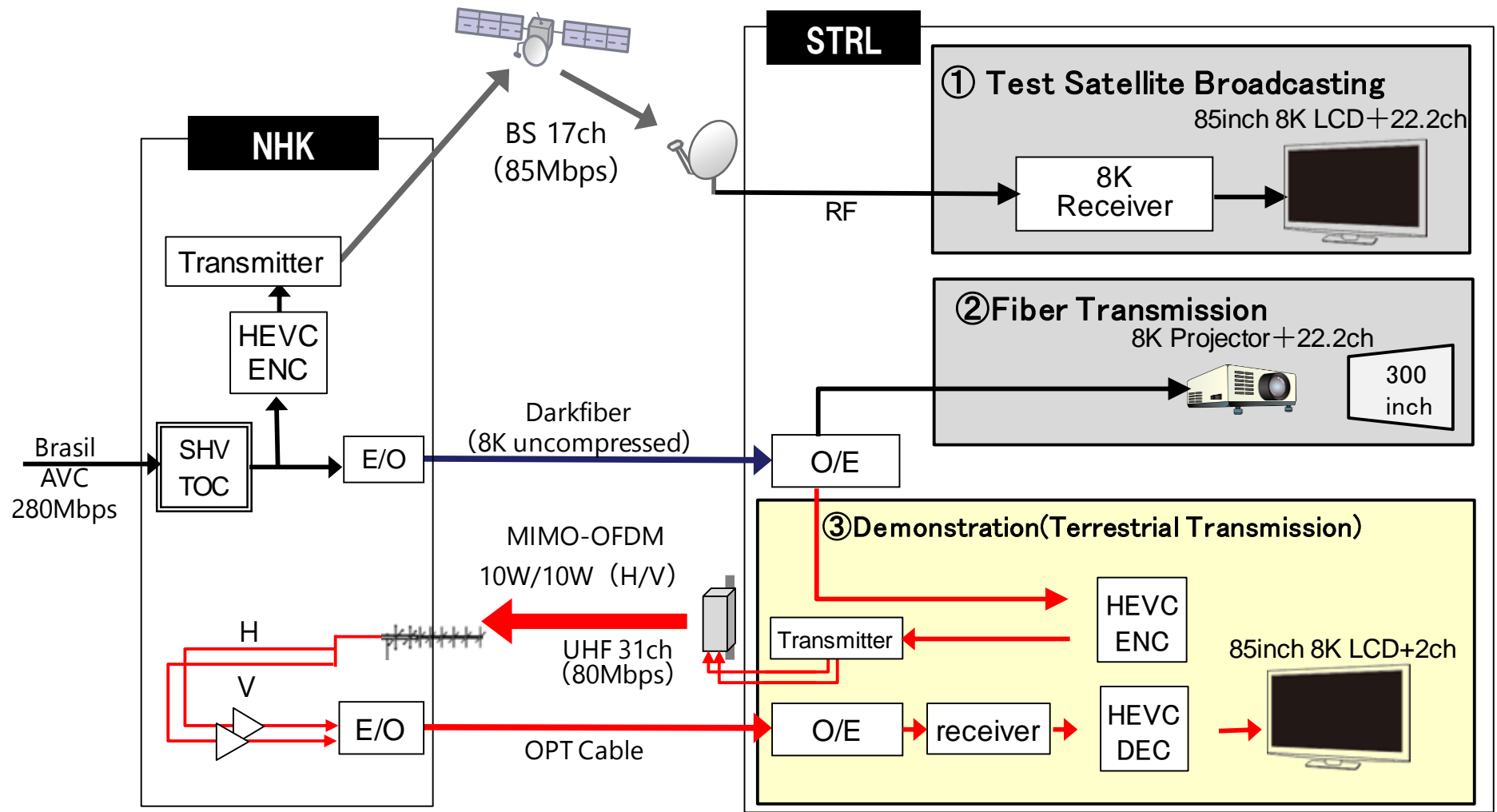
NHK local Stations



8K Terrestrial Transmission Test (NHK - Science & Technology Research Laboratory)



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8K Terrestrial Transmission Test (NHK - Science & Technology Research Laboratory)



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Progress of Broadcasting Technology



**1964
Tokyo**

Color TV



Satellite
Broadcasting



**1984
Los Angeles**

HDTV
Production



**1988
SEOUL**

HDTV Live



**2008
Beijin**

HDTV&5.1ch
with world feed



**2020
Tokyo**

SHV Production
Broadcasting



8K Applications in The Future



Signage



Education



Cinema



Thank You !!

8K

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Broadcasting



Medical



Art