資料DF100-3-3

NHK

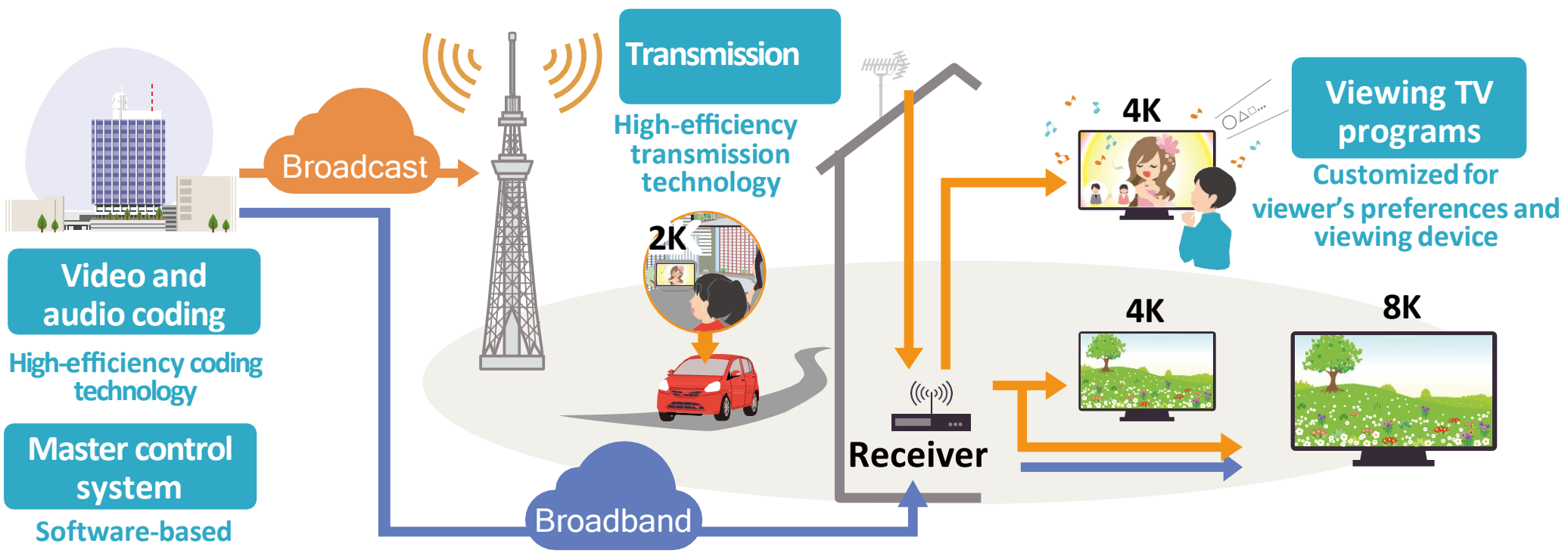
Immersive Media

Short term

Advanced Terrestrial Broadcasting

High-quality and multi-functional broadcast services using the latest video/audio coding, master control system and transmission technologies

The new terrestrial broadcasting system shown here uses the latest video/audio coding, master control system and transmission technologies, that the standardization is currently in progress in Japan.



New terrestrial broadcasting system using latest technologies

- The latest video- and audio-coding technologies allow viewing services to be customized for individual preferences, including 8K services combining 4K broadcast and broadband, etc.
- Program-control functions are built using software on a cloud server, which saves space and improves scalability.
- The latest transmission technology can achieve 1.7 times the transmission capacity of existing DTB, helping to improve broadcasting services and achieve efficient use of frequency.

【Future plans】

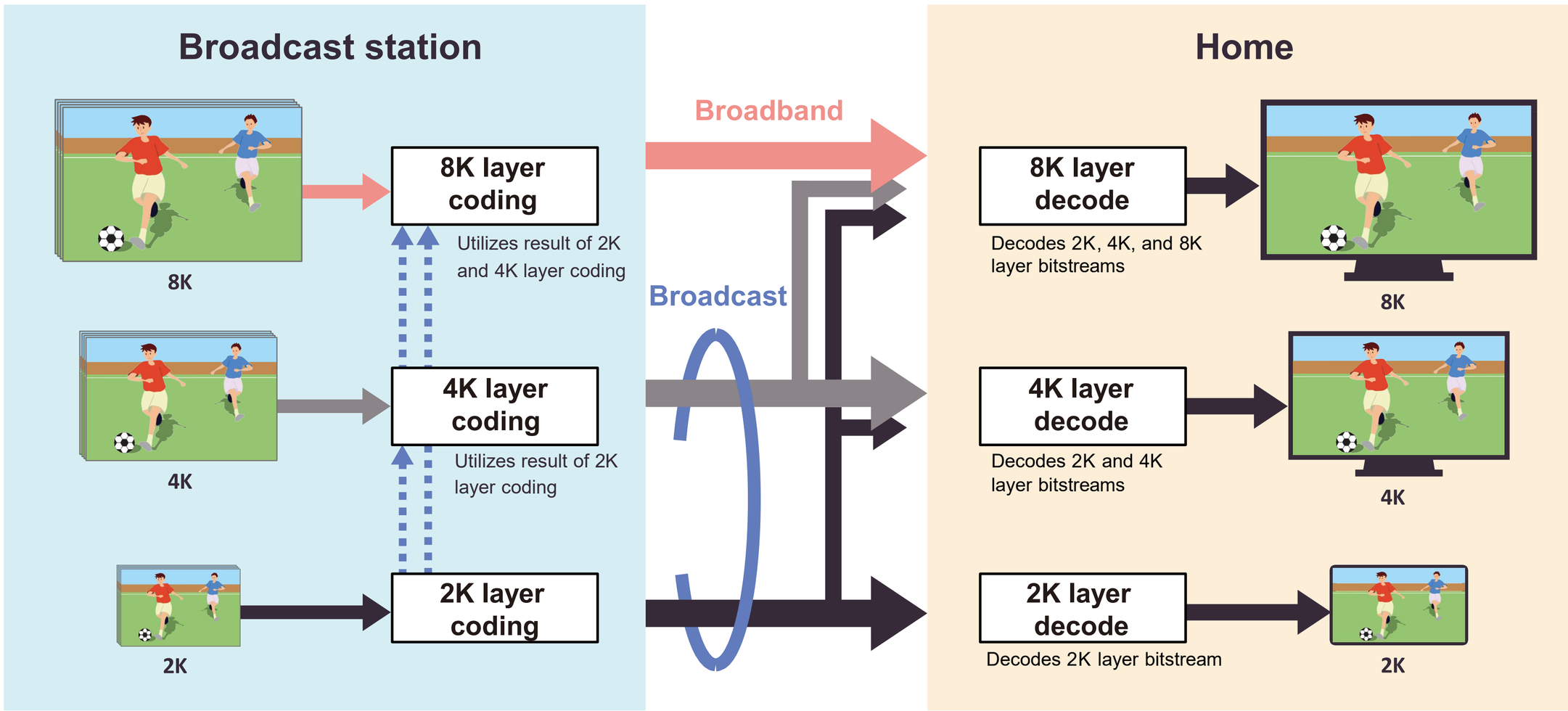
Focusing on the benefits to viewers as the top priority, STRL will investigate specific measures in order to successfully migrate to next-generation DTB, enabling efficient use of frequency as well as high quality and multi-functionality.

● Part of this research was conducted as part of the "Study on technical measures for effective utilization of broadcasting frequencies" for the Technical Examination Services Concerning Frequency Crowding of the Ministry of Internal Affairs and Communications.

資料DF100-3-3

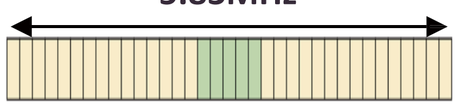
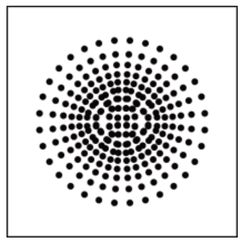
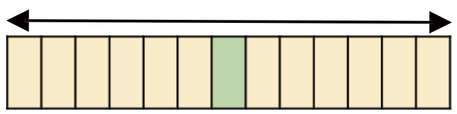
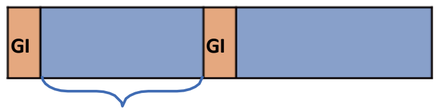
8K/4K/2K VVC Multilayer Service Through Integration of Broadcast and Broadband

- With using VVC multilayer coding, we have demonstrated the transmission of 8K video with an integration of broadcast and broadband. This technology enables to enhance the video quality to ultra-high-definition without affecting broadcasting frequency band.



Transmission Technology of Advanced Terrestrial Broadcasting System —Improving Transmission Performance—

Improved spectral efficiency through introduction of new component technologies and improved signal structure

Bandwidth No. of segments	FFT size Guard interval (GI) ratio	Error correction code	Carrier modulation
Advanced terrestrial broadcasting system: Transmission capacity 30.6 Mbps @ 35 segments (around 1.7 times the capacity under same conditions as the current method)			
5.83MHz  No. of segments: 35 Increased flexibility of service allocation through division into finer segments (bandwidth can also be allocated in units of one-third of a segment)	8k(8,192), 16k(16,384), 32k (32,764) (Ex.) 16k,GI= 800/16384(126μs)  Effective symbol length 2592 μs GI ratio is further reduced by increasing the FFT size ⇒ Increased transmission capacity	Inner code: LDPC code Code rate: 13 types 2/16～14/16 Outer code: BCH code	QPSK,16QAM,64QAM 256QAM,1024QAM,4096QAM Non-uniform constellation (NUC)  (Ex.) 256NUC Code rate 12/16
Current terrestrial digital broadcast system: Transmission capacity 18.2 Mbps @ 13 segments			
5.57MHz  No. of segments: 13 (bandwidth allocated in units of 1 segment)	2k (2,048), 4k (4,096), 8k(8,192) ※Current operation is 8k, GI=1/8(126μs)  Effective symbol length 1008 μs	Inner code: Convolutional code Code rate: 5 types 1/2, 2/3, 3/4, 5/6, 7/8 ※Current operation is 3/4 Outer code: Reed-Solomon code	QPSK, 16QAM, 64QAM ※Current operation is 64QAM