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## NHK Technology

### Successful Long-distance Terrestrial Transmission of 8K Super Hi-Vision

Digital terrestrial broadcasting was launched in Tokyo, Nagoya, and Osaka in December 2003. About a decade later, in January 2014, NHK succeeded in carrying out the world's first long-distance terrestrial transmission of 8K Super Hi-Vision (8K). Current digital terrestrial broadcasting transmits one Hi-Vision (HDTV) program over a single channel (a bandwidth of 6 MHz). Transmitting the larger amount of data needed for 8K over a single terrestrial radio-wave channel necessitates a technology that can dramatically increase the per-channel transmission capacity. A recent experiment was conducted using one UHF-band channel and achieved a large-capacity transmission at up to 91.8 Mbps, which is equivalent to approximately four times the capacity of current digital terrestrial services. This large-capacity transmission employed dual-polarized MIMO<sup>1</sup> technology, which incorporates both horizontally polarized and vertically polarized waves, along with an "ultra

multi-level" OFDM<sup>2</sup> technology capable of sending a maximum of 12 bits of data at a time (4096 signal points).

The Science & Technology Research Laboratories has already demonstrated an 8K large-capacity transmission capability over a short distance (approx. 4.2 km). The new experiment was conducted to simulate an actual 8K broadcast, using a 10 W output experimental test station established at the NHK Hitoyoshi TV relay station in Hitoyoshi city, Kumamoto prefecture. It verified that good reception of 8K video and audio signals transmitted from the station could be obtained even at a distance of 27 km, which is nearly equivalent to the current broadcasting service area.

NHK will continue its research and development, with the goal of realizing the early implementation of 8K terrestrial broadcasting services.

This research and development is being performed under the auspices of "Research and Development of Basic Technology Encouraging Effective Utilization of Frequency for the Next Generation Broadcasting System" program and it funded by the Ministry of Internal Affairs and Communications, Japan.



Reception of 8K video

1 Multiple-Input Multiple-Output: wireless communications technology that employs multiple transmission/reception antennas for data transmission

2 Orthogonal Frequency Division Multiplexing (OFDM)

## From the Editors

The 2014 FIFA World Cup soccer tournament in Brazil has drawn to a close.

Regrettably, the Japanese team was eliminated, but the image of Japanese supporters picking up trash after the game was featured in the media, adding a nice touch to the tournament.

For this tournament, which ended with Germany's fourth World Cup championship, NHK held 8K Super Hi-Vision public viewing events in Brazil and Japan. In joint production with FIFA, 8K Super Hi-Vision scenes from the game were transmitted live to three locations in Brazil and four in Japan. Many viewers were able to experience the clarity and dynamism of 8K. We will continue working to further expand consumer awareness of 8K.

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