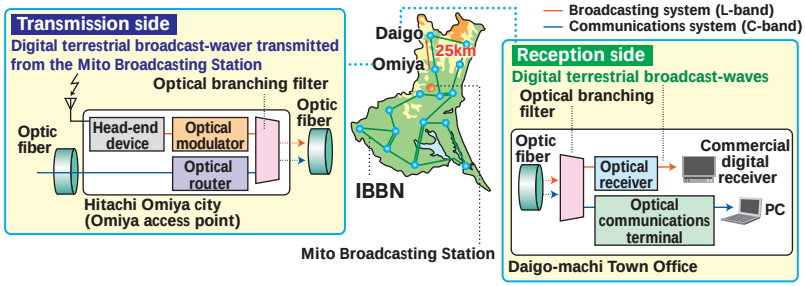
Successful Experiment to Re-transmit Digital Terrestrial Broadcast-waves Using Optical Communications Networks

One effective way to expand the digital terrestrial broadcasting service area into mountainous regions with poor radio-wave reception is to complement the radio-wave network with an optical fiber network. This is accomplished by using an optical transmission system to re-transmit digital terrestrial service using optical wavelength-division multiplexing over existing optical communications networks.

Current optical communications networks mainly employ the C-band wavelength band[1] for the downlink circuit to users. Thus, using the C-band to multiplex digital terrestrial broadcasting signals for transmission will generate interference with communications signals. To avoid this problem, our newly developed system is designed to transmit a broadcast over the L-band[2], realizing an optical wavelength-division transmission with no interference with communications.

A verification experiment was conducted in December 2004, using an optical communications network in Ibaraki prefecture, the "Ibaraki Broadband Network (IBBN)." During the experiment, digital terrestrial broadcast-waves from the Mito Broadcasting Station received in Hitachi Omiya city were transmitted over IBBN using wavelength division multiplexing to the Daigo-machi Town Office, which is located approximately 25-km away. The transmitted Hi-Vision (HDTV) video signal was of good quality and could be viewed with a commercial digital receiver. The application of this re-transmission based on an optical communications network should contribute to an early nationwide rollout of digital terrestrial broadcasting in Japan.



Digital terrestrial broadcast-wave re-transmission experimental system using IBBN

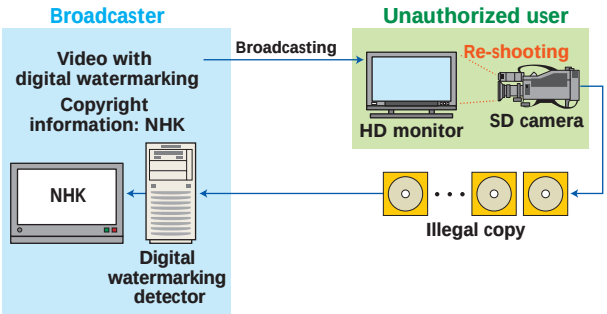
[1]: Wavelength 1530 to 1565 nm

[2]: Wavelength 1565 to 1625 nm

Digital Watermarking Compliant with Re-shot HDTV Video

Digital watermarking is a technology that embeds information into a video image by changing values in an image to an extent that is undetectable to the eye. The embedded information can be detected using a digital watermarking detector. The embedding of data such as copyright information can deter illegal distribution of content and protect rights related to copyright. This promise has driven research on digital watermarking so that today, watermarks can be detected even in compressed video images.

One of the illegal content distribution methods involves re-shooting images on a movie theatre screen. To compound this problem, in recent years, the picture quality of images projected on a home monitor has greatly improved and this is making it practical for illegal distributors to obtain high-quality video even from re-shot images on TVs. This trend motivated us to promptly establish countermeasures to such illegal activities.



Digital watermarking detection from re-shot HDTV images

We developed a technology that can detect embedded digital watermarking in real-time, in images generated by re-shooting HDTV video displayed on a plasma display panel or CRT display. We believe this technology would help authorities to detect and deter unauthorized distribution of content re-shot at home.

Future work will involve making watermarks detectable in re-shot video of projected and movie theatre screen images.