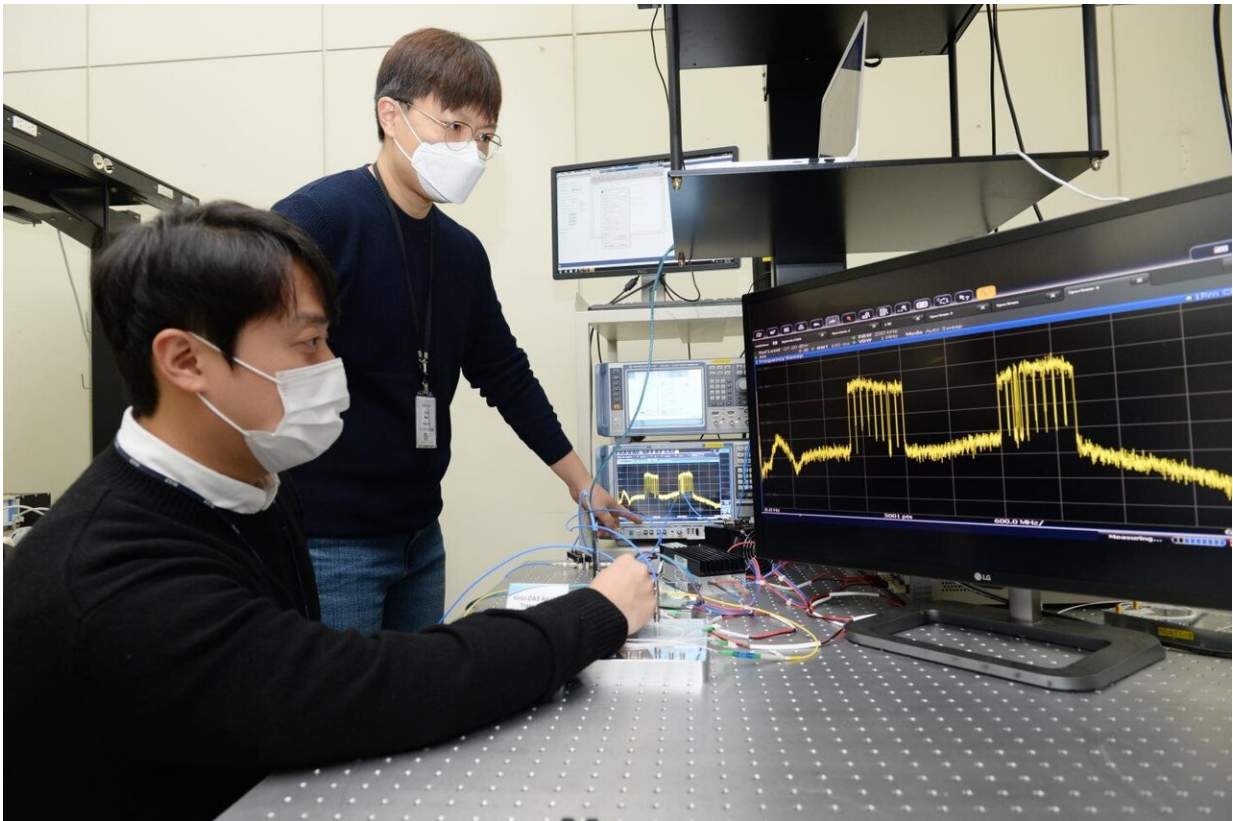


# Team develops the world's first 5G indoor distributed antenna system

January 26 2021

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Researchers from ETRI are verifying the 5G indoor optical repeater's performance. Credit: Electronics and Telecommunications Research Institute(ETRI)

Researchers in Korea have developed an important network technology that allows users to enjoy 5G services seamlessly in an indoor

environment. It is expected to be of great help in expanding the 5G coverage area and further improving the domestic telecommunications infrastructure.

Electronics and Telecommunications Research Institute (ETRI) announced that it has successfully developed the world's first 5G indoor distributed antenna system that can receive [millimeter wave](#) (28GHz)—based broadband 5G signals from base stations and transmit them into buildings.

About 80% of mobile data used in daily life is consumed indoors. This new technology allows accessing 5G technology at its peak speed of 20Gbps in indoor environments such as airports, stations and large shopping malls. In particular, this new technology significantly improves transmission capacity, equipment size and deployment costs compared conventional technology, and is expected to have a diverse range of applications.

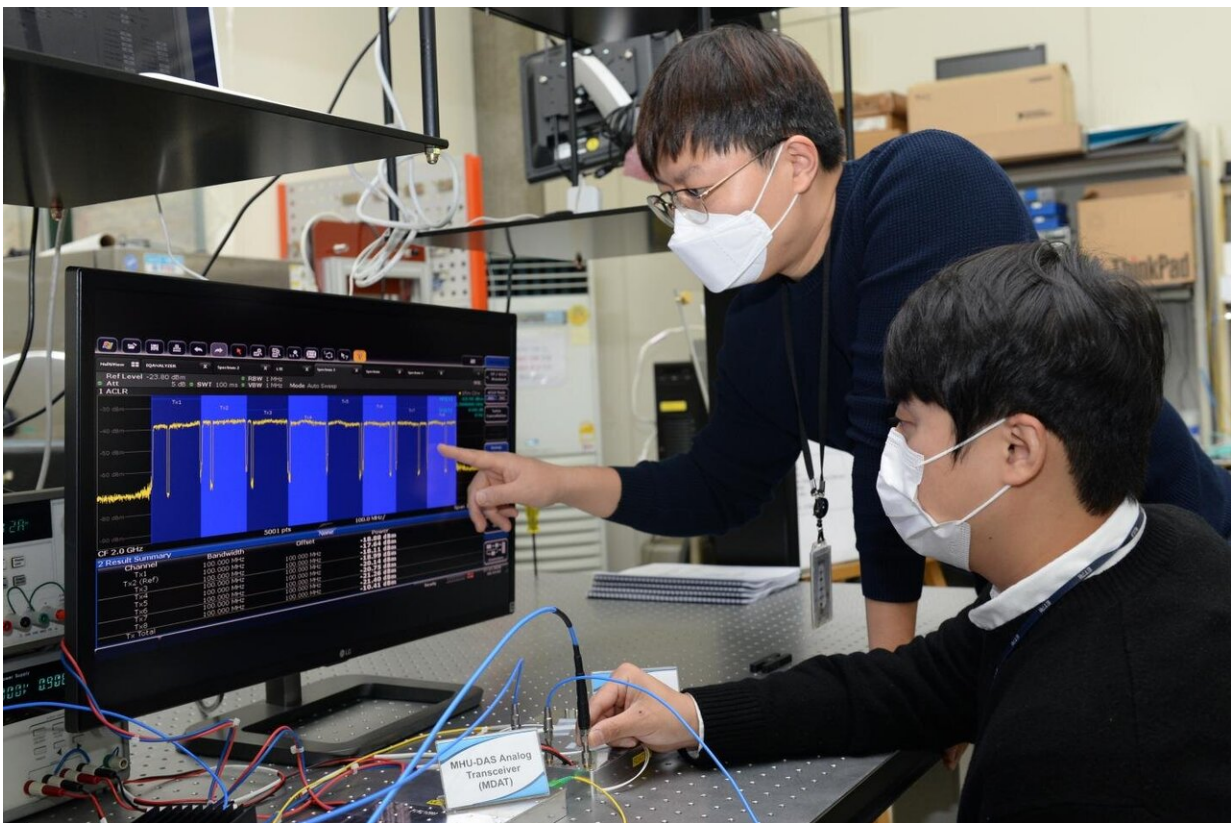
The core of the technology developed by the researchers includes RoF technology and 5G base station interface technology. The RoF technology that converts 5G wireless signals into optical signals and transmits them without distortion at the maximum distance of up to 5km. On the other hand, the 5G base station interface technology that connects a 5G base station located outdoors and an indoor distributed antenna system by using a OTA technique.

The 5G base station interface installed on the roof of the apartment receives 5G signals from nearby [base stations](#), converts them into optical signals in the apartment basement with the help of RoF technology, and then transmits them to multiple antennas distributed in all areas of each floor of the building.

As this technology can deliver 5G signals by multiplexing them into 32

bands, its transmission capacity is very high. The cost of construction can be decreased by 5 times compared to previous systems, as only relatively simple functions are required.

The researchers revealed that they developed RoF optical transceiver the size of a notebook and installed it in the host unit and antenna unit constituting the indoor distributed antenna system. The 5G base [station](#) interface technology was also developed in the form of an independent module the size of a laptop so that it can be easily linked with host unit.



Researchers from ETRI are verifying the 5G indoor optical repeater's performance. Credit: Electronics and Telecommunications Research Institute(ETRI)

According to the research team, the recent use of high-frequency bands and the rapid increase of high-capacity data have led to the employment of RoF technology, which has been studied since the 1990s, and they were able to achieve this feat based on accumulated original technology and know-how.

ETRI demonstrated the world's first millimeter-wave-based 5G pilot service on a 5G indoor distributed antenna system technology at the PyeongChang Winter Olympics in February 2018. At that time, it was at the level of multiplexing 5G signals into two bands but has been upgraded to reach the current level.

"We hope that this technology will contribute to the creation of an ecosystem of new convergent industries such as interactive entertainment and smart factory and the rejuvenation of the stagnant domestic industrial ecosystem related to repeaters for mobile communication, while ensuring quality of service and eliminating radio-wave shaded indoor areas," said Sunmi Kim, head of ETRI's Network Research Division.

The research team is also conducting studies on next-generation communication infrastructure construction technologies to provide 6G mobile networks beyond 5G in the future [indoor environment](#). It plans to secure future intellectual property rights and lead the development of related domestic industries while developing next-generation 6G communication network technology based on ultra-wide frequency bands.

Companies that have received technology from ETRI have now exported related products to Japan and the United States through active commercialization. As a result, ETRI's technology is contributing to the construction of 5G infrastructure around the world.

Provided by National Research Council of Science & Technology

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