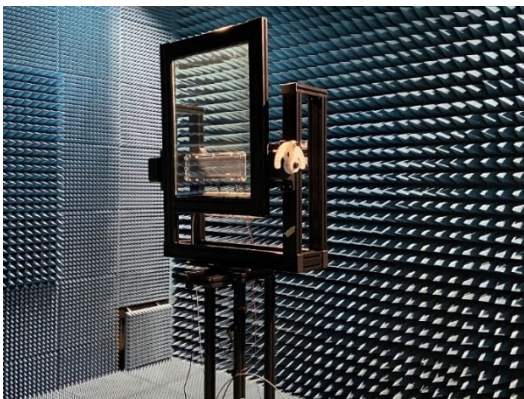


AGC Develops 5G Millimeter Wave Transparent Antenna for FWA that Can Be Installed on Windows

Tokyo, March 29, 2022-AGC Inc. (AGC), a world-leading manufacturer of glass, chemicals, and high-tech materials, has developed a transparent antenna for Fixed Wireless Access - Customer Premises Equipment (FWA-CPE) that can be installed on indoor window glass for the improvement of indoor communication areas in the 5G millimeter wave (28GHz) band. AGC will continue to optimize performance and confirm the reliability, aiming to commercialize the antenna in 2024.



Scene from a demonstration experiment



5G millimeter wave transparent antenna for FWA

High-frequency radio waves, such as 5G millimeter waves, can receive and transmit large amounts of data at high speeds, but their high linearity and attenuation make it difficult for them to reach indoor areas. This hampers the creation of communication areas inside buildings using outdoor base stations. One proposed solution has been to install FWA-CPE with a built-in antenna directly on the window glass, but this compromises the landscape and causes the risk of "thermal breakage," where the heat generated by the product causes the window glass to break, especially in colder climates area.

AGC has now developed a transparent antenna for FWA-CPE for 5G millimeter wave by combining its ultra-low-loss glass substrate and ALCAN Systems' liquid crystal phased array antenna*¹. The new design separates the FWA-CPE from the antenna module and mounts the transparent antenna on the window glass, enabling the indoor Wi-Fi area to be created while maintaining a high level of lighting without compromising the landscape. Furthermore,

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*Personal information is handled in accordance with our Privacy Policy.

the design reduces the heat generated by the antenna module, lowering the risk of thermal breakage of the window glass.

Under its **AGC plus-2023** medium-term management plan, the AGC Group has positioned Mobility and Electronics as strategic businesses. In particular, AGC views the practical application of 5G as a business opportunity and will continue to develop and propose products that contribute to the development of next-generation high-speed communications.

*1 Liquid crystal phased array antenna: An antenna that can control the direction of radio waves by changing the electrical characteristics of liquid crystal layer in a liquid crystal panel.

< Reference >

■About AGC's 5G solutions

AGC is developing a variety of solutions that contribute to the indoor and outdoor areas of next-generation high-speed communications.

Solutions to improve indoor communication areas from outdoor



5G millimeter-wave transparent antenna for FWA

A product developed to be attached to the window glass (inside a room) of a building to create a Wi-Fi communication area inside the room while maintaining a high level of lighting without compromising the landscape.



WAVETHRU™

A technology that performs a special treatment on Low-E glass coated with a special thermal barrier coating that reflects radio waves, while maintaining the thermal insulation performance and appearance of existing window glass.

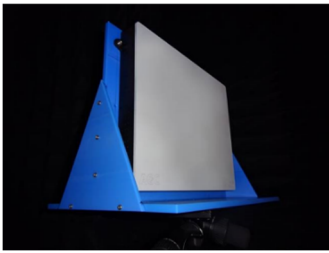
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Solutions to improve indoor areas and/or outdoor areas



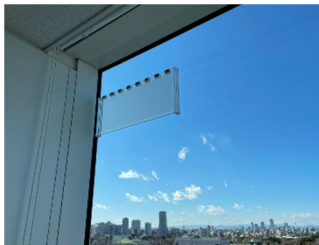
Reflector

Technology for reflecting indoor and outdoor radio waves in the desired direction. Our proposals are according to the application, such as

- A passive reflector that reflects radio waves in a specific direction designed in advance
- RIS^{*2} which can electrically control the reflection angle as desired.

^{*2} RIS = Reconfigurable Intelligent Surface

Solutions to improve outdoor communication areas from indoor



WAVEATTOCH[®]

The world's first "antenna that converts windows into base stations" that can be attached to the window glass (inside of a room) of a building to turn the outdoors into a communication area without compromising the landscape or the appearance of buildings. It is compatible with all 5G Sub6 band frequencies in Japan.

■ALCAN Systems profile

Name	ALCAN Systems GmbH
Location	Gräfenhäuser Straße 85, 64293 Darmstadt
Representative	Onur Hamza Karabey
Business overview	A German start-up that owns proprietary phased array antenna technology using liquid crystal materials. By utilizing existing LCD panel processes, ALCAN Systems proposes high-performance, low-cost, low-power consumption flat panel antennas for satellites communications and high-speed communications.
URL	https://www.alcansystems.com

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