

SHAPING THE FUTURE WITH "TSUNAGU" TECHNOLOGY.

FUJIKURA NEWS

R&D

Fujikura obtains license to use IBM 5G technology to support their development of next-generation of millimeter-wave RF-ICs.



Fujikura announced on August 7, 2019 that they signed an agreement to obtain licenses to use IBM's phased-array 5G designs to develop their next generation of millimeter-wave radio frequency integrated circuit (RF-IC) products. Under the Agreement, Fujikura will develop next-generation 28 GHz band RF-IC technology by combining the chip and packaging designs from IBM with Fujikura's material and antenna expertise. Fujikura plans to accelerate the development of high-performance 5G millimeter-wave wireless communication devices by establishing its own RF-IC product line. Fujikura will provide RF-ICs and RF modules (Figure 1) to mobile base stations and customer premise equipment (CPE) vendors, under the Licensing Agreement on IBM's RF-IC patents.

IBM's designs have the potential to help Fujikura create prototype systems designed so that mobile base stations can serve more mobile users on the same frequency and offer data speeds that are orders of magnitude faster than today – competitive to existing cable and wired internet access speeds.

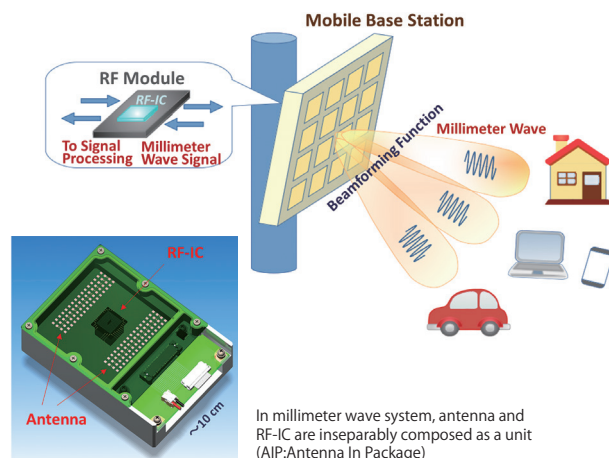
5G is a next-generation mobile communication system with new functions such as "massive connections" and "ultra-low latency", in addition to "ultra-high speed", which is an extension of conventional mobile communication system, and is expected to play an increasing role as the key ICT platform in the IoT era. Expected services for 5G include the transmission of high-definition images, the utilization of a large number of sensors, and various applications in the automotive industry.

In order to realize the benefits of 5G, the use of millimeter-wave bands such as 28 GHz band, which help enable high-speed and large-capacity communication, has been allotted for cellular use across the world. In the United States, major mobile communication companies have already launched commercial services using millimeter wave, and in Japan, the government has allocated frequency bands including millimeter wave for 5G,

with commercial services planned to launch next year. In the years to come, it is expected that the demand for millimeter-wave RF-ICs and RF modules, which is an important component (Fig. 1) for mobile base stations and CPE will be dramatically expanded. According to the Ministry of Internal Affairs and Communications document in 5G frequency allocation in Japan (April 2019), the cumulative investment related to 5G base stations in Japan will exceed 1.6 trillion yen by the end of 2024 and the number of 28 GHz base stations is planned to be 34,781.

IBM has been researching and developing millimeter-wave RF-ICs for more than 14 years and has received multiple design awards in this field. Fujikura has been promoting development of optical fibers and flexible printed circuit board, and based on the technological advantages for materials and board packaging it has been researching and developing RF circuit design, and packaging to realize high-performance millimeter-wave wireless communication devices.

● Figure 1: Product image of RF-IC and RF module



Exhibition **Fujikura to Exhibit at CEATEC 2019**



Dates **October 15 (Tue)-18 (Fri)**
10:00-17:00

Venue **Fujikura Booth G043,**
Hall 5, Makuhari Messe

Fujikura is pleased to announce that we will be exhibiting at CEATEC 2019 to be held from October 15 to 18 at Makuhari Messe. Our products will be on display in an easy-to-understand manner to show how they can contribute to the realization of Super-smart Society with a slogan, "Fujikura's Tsunagu (connecting) Technology accelerates the realization of super-smart society (Society 5.0)."

The exhibits include a demonstration of superconduction, energy-harvesting sensor systems, which leads to IoT technology, fiber lasers, smartphone-related products, and table-top small fuel cells. These exhibits cover many of those still in the research and development stage as well as our ordinary products. We look forward to seeing many visitors

including our clients, general visitors, and students at our booth.



● mage of Fujikura's exhibition booth

Corporate R&D Management Department wwwadmin@jp.fujikura.com

Exhibition **Joint Exhibition with NTT West at Heat Solution Kyushu**



Fujikura and NTT West Corporation jointly presented a heat index visualizing system at Heat Solution Kyushu, which was held at Marine Messe Fukuoka on June 26 and 27.

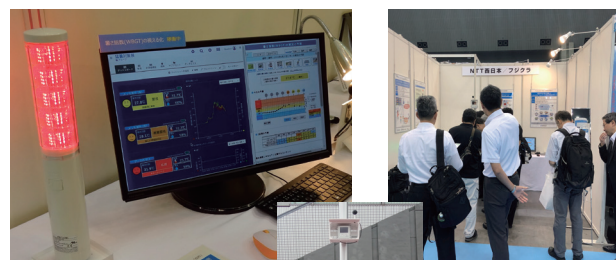
Connecting a black bulb temperature sensor to Fujikura's battery-less radio sensor node with a dye-sensitized solar cell (DSC) allows the measurement of the bulb globe temperature (WBGT), which is an index to prevent heatstroke.

Moreover, this system can be easily installed because it has no need to secure an electric supply. This sensor node was placed at the heights of 80 cm for children and 180 cm for adults outside the exhibition building on the assumption that the system is used in kindergartens, nurseries, or elementary schools, and WBGT values were measured in real time. The measured data can be checked from PC or smartphones using an application to visualize the data.

In addition, we also held demonstrations of displaying warnings using an alarm light. The booth attracted keen interest from a large number of visitors from municipalities, the manufacturing,

construction, and agriculture industries.

We will continue to provide solutions for visualization using IoT along with the simplification of installation and maintenance of the sensor systems using DSCs as the key devices to contribute to solving various social challenges.



● Visualization of data and alarm light

● Black bulb temperature sensor outside building

● Exhibition booth

Total Solution Business Development Department ask-dsc@jp.fujikura.com

Air Blown Wrapping Tube Cable™ to Be Fully Introduced by British Telecommunications plc for First Time

The UK's largest carrier, British Telecommunications plc, has decided to use Fujikura-made air-blown thin high-density fiber-optic ribbon cable, Air Blown Wrapping Tube Cable WTC™ (hereafter AB-WTC™) using unique 12-fiber ribbons, Spider Web Ribbon® (hereafter SWR).

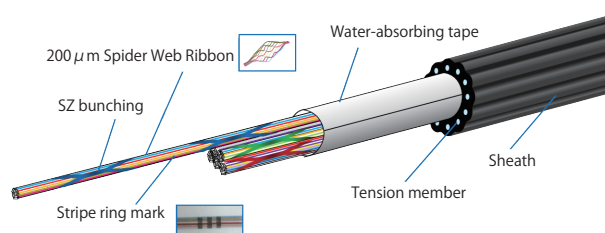
An AB-WTC features a small diameter and lightweight by using an SWR consisting of 200 μm fibers to enable long-distance installation by compressed air. In addition, this cable is designed to minimize the friction between the inside of the conduit line and the cable surface by the creation of unique asperities on the surface of the cable.

An AB-WTC also facilitates fusion splicing of its 200 μm-diameter SWR to a 250 μm-diameter SWR because a 200 μm fiber ribbon has the same pitch as that of the V ditch (250 μm). The pitch of the ditch is standardized as the arrangement system of one-time multi-fiber fusion splicers.

Furthermore, the product is also easily identifiable because of SZ bunching and stripe ring marking and has a structure that does not require any jelly. This results in a significant reduction

in installation working time and good workability compared to existing air-blown optical fiber cables. (Refer to Figs. 1 and 2)

● Fig. 1: Structure of AB-WTC



● Fig. 2: SWR with 200 μm fibers



Fujikura Receives The Seventh ICT Business Award from The Telecommunications Association

Regarding the practical application of Spider Web Ribbon® (hereafter SWR) and high-density Wrapping Tube Cable™ (hereafter WTC), Fujikura's Naoki Okada (Director of Optical Cable Systems Division) has received The Seventh ICT Business Award from The Telecommunications Association. This award is granted only organizations that have made major contributions for the technological promotion, proliferation, and development of ICT business and played a central and leadership role. In the past, the award was presented organizations for i mode, Suica, digital terrestrial broadcasting, and other achievements.

The award ceremony that was held at Meiji Kinenkan on May 20 also intended to recognize people for their long-time services in ICT business with The Telecommunications Association Award.

The ceremony was honored by the presence of many guests from the Ministry of Internal Affairs and Communications, Nippon Telegraph and Telephone Corporation, IT-related manufacturers, and telecommunication construction companies.



Information Fujikura Receives Technology Prize for WABE Package® from the Japan Institute of Electronics Packaging



We are pleased to announce that Fujikura's wafer and board level device embedded package, WABE Package®, received 2018 Technology Prize at the Japan Institution of Electronics Packaging held on May 23. This product was released onto the medical device market in 2014, and in 2018, multiple-chip-stack versions of the product produced by advanced ultra-miniaturizing technology was put into mass production. The prize was granted to Fujikura in recognition of our contribution to the advancement of device embedded technology, which attracts attention in these years, and to the academic society and industry. We will continue to find wider

application areas of products that contain our circuit boards by improving WABE technology.



New Business Development Center askwabe@jp.fujikura.com

Power & Telecom In-line Joint for High-voltage Heat-resistant Cables



Fujikura Dia Cable Ltd. and 3M Japan Ltd. (hereafter 3M) have jointly developed and commercialized a cold shrink inline joint kit for high-voltage fire-resistant cable (hereafter 6600 V NH-FPT), the S6Q2E series, to save labor in the field. This product has received a fire-resistance assessment prescribed in "Regulations for performance assessment criteria conformity to the Japanese Electric Wire and Cable Makers' Association specifications" as the designated connection method for Fujikura-made 6600 V NH-FPT cables. The most important feature of this product is a reduction in working time by 40% per phase compared to 3M's existing product, the S6KG series. Other than savings of working time, the product has the following features:

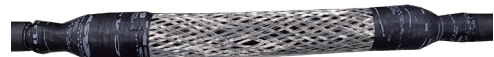
Features

- Use of cold contraction joint method for insulation and water proof treatment (Refer to Photo 1)
- Use of insulation mesh and solder-free spring method for insulation and connection
- No need of special tools or high skills
- Passing of current upon installation possible
- Composition of lead-free, halogen-free materials

● Photo 1: Insulation tube using cold shrink method



● Photo 2: Reinsulated area



[Fire-resistance Grade Number]

JFS2063: Conductor size 38-100 mm²

JFS2064: Conductor size 150-325 mm²

Fujikura Dia Cable <https://www.fujikura-dia.co.jp/contact/>



"Tunagu" Technology New Product News No.457
 1-5-1, Kiba, Koto-ku, Tokyo, Japan 135-8512
 TEL. +81 (0) 3 5606 1112 FAX. +81 (0) 3 5606 1501
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<http://www.fujikura.co.jp>

Market Research & Planning Department +81(0)3 5606 1092
 Kansai Office +81(0)6 6364 0373
 Chubu Office +81(0)52 212 1880
 Tohoku Office +81(0)22 266 3344
 Kyushu Office +81(0)92 291 6126