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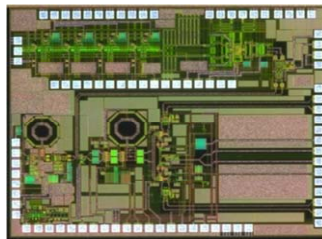
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## **Mitsubishi Electric and Tohoku University Develop 5GHz/60GHz Dual-Band Receiver Front-End Si-CMOS IC for Wireless Communication**

*Contributions to highly dependable and high-speed communications*

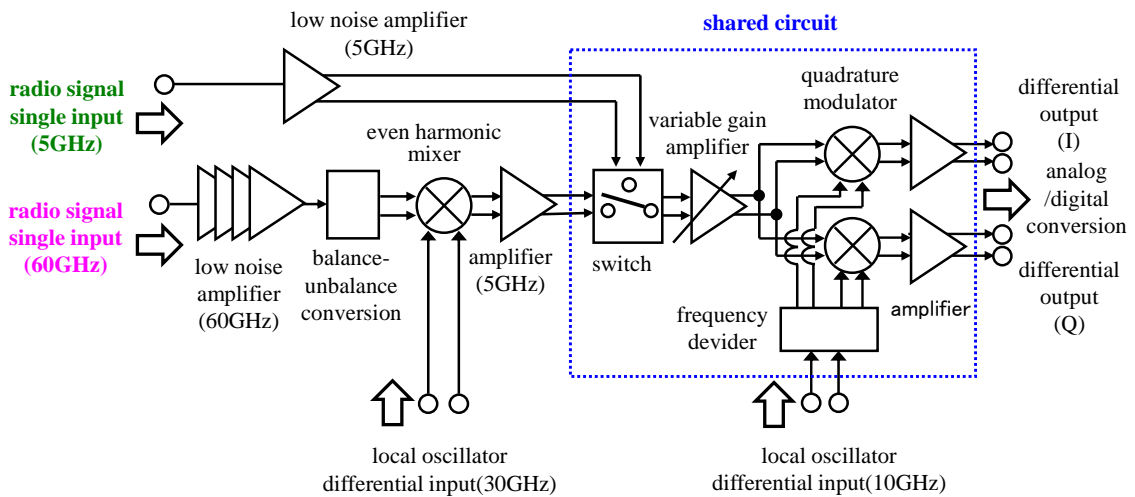
**TOKYO, October 3, 2014** – Mitsubishi Electric Corporation (TOKYO: 6503) and Tohoku University announced today their development of a 5GHz/60GHz dual-band receiver RF front-end Si-CMOS IC for a highly dependable and high-speed wireless communication system that Tohoku University has proposed as the “Dependable Air.” Technical details of new Si-CMOS IC will be announced during European Microwave Week 2014 from 5-10 October 2014.



5GHz/60GHz dual-band receiver RF front-end Si-CMOS IC

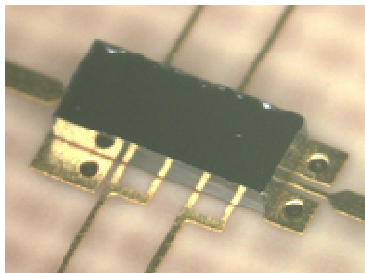
Wireless communication is greatly dependent on high dependability and high speed. But since high-speed wireless communication normally uses millimeter-scale radio waves, communication can be established only in line of sight. In the 5GHz band used for wireless LANs, however, communication is possible over the horizon. Tohoku University is proposing its Dependable Air with wireless handsets that use multiple standards (heterogeneous) to conduct seamless handovers according on the environment.

Mitsubishi Electric’s new RF front-end IC is a miniaturized multiband model that uses the 5GHz and 60GHz bands. Size was reduced about 30% by sharing parts of the 5GHz and 60GHz RF front-ends.

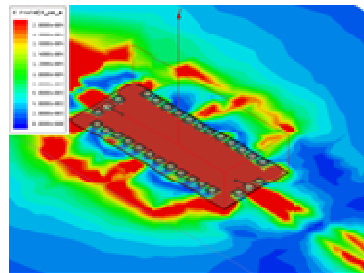


Circuit configuration of new RF front-end IC

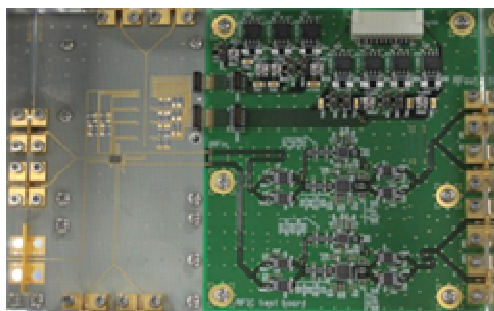
Mitsubishi Electric also reduced the extent of trial IC manufacturing by introducing electro-magnetic simulation of performance effects in millimeter-wave bands for assembled ICs.



Assembled millimeter-wave IC



Electro-magnetic simulation result



5GHz/60GHz dual-band receiver module

Going forward, Mitsubishi Electric plans to pursue standardization of this wireless communication, including IEEE802.11 and other standards, as well as develop RF-IC business for millimeter-wave communication devices.

## **Basic Specifications**

### **5GHz/60GHz dual-band receiver RF front-end Si-CMOS IC**

	Gain (dB)	Noise Figure (dB)	IP <sub>1dB</sub> * (dBm)
5GHz band	32	5	-42.2
60GHz band	32	8	-43.5

\* Input power at 1dB gain compression point

The Dependable Air by Tohoku University is supported by the CREST funding program of the Japan Science and Technology Agency. Under the CREST project named “Fundamental Technologies for Dependable VLSI System” (research supervisor: Dr. Shojiro Asai), research into the “Development of Dependable Wireless Systems and Devices” (principal investigator: Prof. Kazuo Tsubouchi, Tohoku University) is being carried out.

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## **About Mitsubishi Electric Corporation**

With over 90 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 4,054.3 billion yen (US\$ 39.3 billion\*) in the fiscal year ended March 31, 2014. For more information visit <http://www.MitsubishiElectric.com>

\*At an exchange rate of 103 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2014

## **About Tohoku University**

Tohoku University, formerly known as the Tohoku Imperial University, was founded in 1907. From its start, it displayed to the world an unswerving commitment to an "Open Door" policy. Departing from the norms of other imperial universities, it accepted graduates from technical schools and higher normal schools, and despite opposition from the government at that time, became Japan's First University to admit female students in 1913.

Tohoku University has been committed to the "Research First" principle and "Open Door" policy since its foundation, and is internationally recognized for its outstanding standards in education and research. The university contributes to world peace and equity by devoting itself to research useful in solving societal problems, and educating human resources in leadership skills.

## **About Japan Science and Technology Agency**

The Japan Science and Technology Agency (JST) is one of the core institutions responsible for the implementation of science and technology policy in Japan, including the government's Science and Technology Basic Plan. From knowledge creation—the wellspring of innovation—to ensuring that the fruits of research are shared with society and Japan's citizens, JST undertakes its mission in a comprehensive manner. JST also works to provide a sound infrastructure of science and technology information and raise awareness and understanding of science and technology-related issues in Japan.