

KAIST develops a low-power 60 GHz radio frequency chip for mobile devices

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As the capacity of handheld devices increases to accommodate a greater number of functions, these devices have more memory, larger display screens, and the ability to play higher definition video files. If the users of mobile devices, including smartphones, tablet PCs, and notebooks, want to share or transfer data on one device with that of another device, a great deal of time and effort are needed.

As a possible method for the speedy transmission of large data, researchers are studying the adoption of gigabits per second (Gbps) wireless communications operating over the 60 [gigahertz](#) (GHz) frequency band. Some commercial approaches have been introduced for full-HD video streaming from a fixed source to a display by using the 60 GHz band. But mobile applications have not been developed yet because the 60 GHz [radio frequency](#) (RF) circuit consumes hundreds of milliwatts (mW) of DC power.

Professor Chul Soon Park from the Department of Electrical Engineering at the Korea Advanced Institute of Science and Technology (KAIST) and his research team recently developed a low-power version of the 60 GHz radio frequency integrated circuit (RFIC). Inside the circuit are an energy-efficient modulator performing amplification as well as modulation and a sensitivity-improved receiver employing a gain boosting demodulator.

The research team said that their RFIC draws as little as 67 mW of power in the 60 GHz [frequency band](#), consuming 31mW to send and

36mW to receive large volumes of data. RFIC is also small enough to be mounted on smartphones or notebooks, requiring only one chip (its width, length, and height are about 1 mm) and one antenna ($4 \times 5 \times 1 \text{ mm}^3$) for sending and receiving data with an integrated switch.

Professor Park, Director of the Intelligent Radio Engineering Center at KAIST, gave an upbeat assessment of the potential of RFIC for future applications:

"What we have developed is a low-power 60-GHz RF chip with a [transmission speed](#) of 10.7 gigabits per second. In tests, we were able to stream uncompressed full-HD videos from a smartphone or notebook to a display without a cable connection. Our chip can be installed on [mobile devices](#) or even on cameras so that the devices are virtually connected to other devices and able to exchange large data with each other."

Provided by The Korea Advanced Institute of Science and Technology (KAIST)

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