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## **Mitsubishi Electric Develops 28GHz Massive-element Antenna and RF Module for 5G Base Stations**

*Compact module achieves wide bandwidth and wide-angle beam forming*

**TOKYO, April 18, 2017** – [Mitsubishi Electric Corporation](http://www.mitsubishielectric.com) (TOKYO: 6503) has developed a compact massive-element antenna and RF module that achieves a wide 800MHz bandwidth and wide-angle beamforming for 28GHz communications in fifth-generation (5G) radio base stations. Going forward, Mitsubishi Electric will confirm the module's performance for high-speed, large-capacity communication, aiming at early commercialization. The status of development will be presented at the Brooklyn 5G Summit\* to be held in New York City from April 19 to 21.

\*Forum for discussing 5G wireless technologies organized by NOKIA and NYU WIRELESS, a research center, at NYU Tandon School of Engineering



28GHz massive-element antenna and RF module for 5G base stations (120×240×28mm)

### **Key Features**

**1) *Wide bandwidth achieves high-speed, large-capacity communication***

- Wideband high-frequency circuitry enables communication with a wide 800MHz bandwidth.

2) **Wide-angle beamforming expands area coverage**

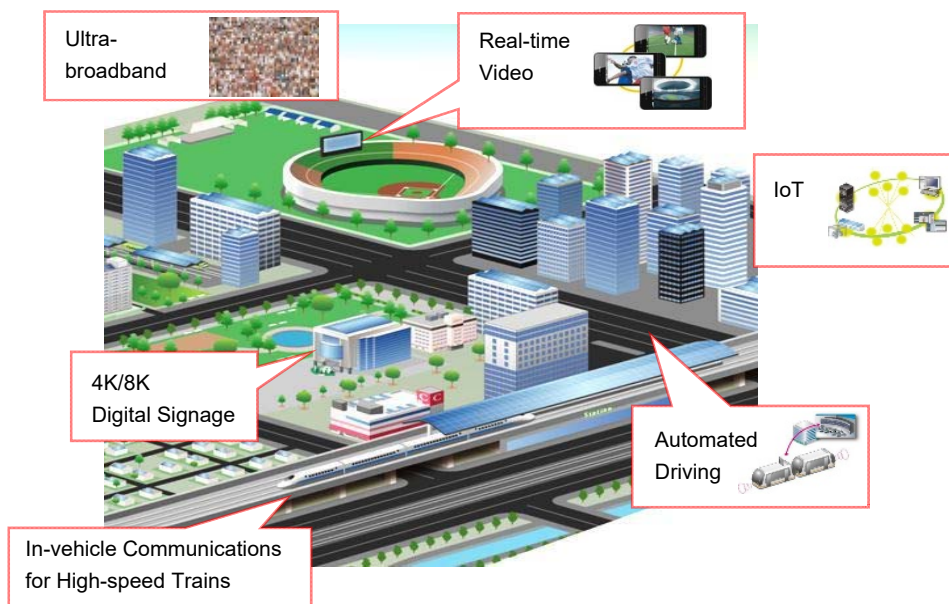
- Beam control technology is combined with a proprietary massive 256-element antenna and RF device.
- Wide-angle beam forming at  $\pm 45$  degrees horizontally contributes to expanded area coverage.

3) **Compact antenna and RF module for easy installation**

- Highly efficient integration of RF device realizes compact size

**Development Background**

To accommodate the rapid increase in mobile traffic, and realize advanced services and applications, 5G technologies are being developed worldwide with the expectation of commercialization as early as 2020. 5G will deliver ultra-high-speed transmission of 20Gbps, far exceeding the 3Gbps rate specified for 4G. Two key technologies are Massive Multiple-Input Multiple-Output (MIMO), which use high frequency bands to secure wide bandwidth, and MIMO, which spatially multiplexes multiple signals at the same time in the same frequency while compensating for large propagation loss in higher frequencies through the use of multi-element antennas. Mitsubishi Electric’s new antenna and RF module for 5G base stations will be used for Massive MIMO. This work includes a part of the results of “The research and development project for realization of the fifth generation mobile communications system” commissioned by Japan’s Ministry of Internal Affairs and Communications.



**Module Specifications**

Specification	Value
System frequency range	28GHz band (27.5 – 29.5GHz)
Bandwidth	800MHz
Antenna elements	256 elements
Antenna system	Printed patch antenna**
Array size (N×M)	16×16
Antenna gain	$\geq 28$ dB <sub>i</sub>
Beam steering adjustment	Vertical: $\pm 12$ degrees Horizontal: $\pm 45$ degrees
Module size	120×240×28 mm (without heatsink)

\*\* Patch antenna elements are directly mounted and arranged in an array on a print substrate.

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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 4,394.3 billion yen (US\$ 38.8 billion\*) in the fiscal year ended March 31, 2016. For more information visit:

[www.MitsubishiElectric.com](http://www.MitsubishiElectric.com)

\*At an exchange rate of 113 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2016