Mitsubishi Electric’s New GaN HEMT Amplifier for C-band Satellites Achieves World’s Top PAE Rating of 67%

Tokyo, May 26, 2011 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today it has developed a gallium nitride high-electron mobility transistor (GaN HEMT) power amplifier for C-band satellites featuring the world’s highest power-added efficiency (PAE) rating, 67%, an increase of more than seven points compared to conventional amplifiers. The amplifier is expected to lead to smaller and lighter transmitter devices to help microwave communication satellites save power. Mitsubishi Electric will present its breakthrough at the International Microwave Symposium for 2011 (IMS 2011) at the Baltimore Convention Center in the U.S. city of Baltimore, Maryland from June 5–10.

Mitsubishi Electric’s new GaN HEMT Amplifier

Power-saving features to help make satellites more efficient and reliable
- The new amplifier’s record PAE of 67% PAE, more than seven points higher than conventional amplifiers, is enabled by the world’s first harmonic tuning circuit placed in front of each GaN HEMT cell on the substrate.
- The PAE was improved by second harmonic impedance of GaN HEMT with highly accurate input control.
- The harmonic tuning circuit comprises a MIM capacitor and a spiral inductor.

High output power
- High output power of 107W (50.3dBm)
Small and lightweight
- Small package size: 17.4 x 24.0 x 4.3 mm
- Lightweight: 7.1g
- Internally impedance-matched GaN HEMT amplifier

Figure 1: Simplified schematic of amplifier

Figure 2: Photo of amplifier

Figure 3: Comparison of output characteristics of GaN HEMT and conventional amplifier

As more satellites complete their operational lifespan, the demand is increasing for new microwave communication satellites with smaller, lighter and more efficient satellite transponders. Conventional transponder devices use traveling wave tube amplifiers (TWTAs) because solid-state power amplifiers with GaAs HEMTs, which lack sufficient output power and efficiency, require an additional amplifier to gain high output power. More efficient GaN HEMT amplifiers with high output power, high-field electron velocity and high-breakdown fields are expected to replace TWTAs in communication satellites.

Going forward, Mitsubishi Electric intends to further enhance the efficiency and power performance of GaN HEMT amplifiers for satellites and wireless communication systems.
About Mitsubishi Electric
With 90 years of experience in providing reliable, high-quality products to both corporate clients and general consumers all over the world, 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. The company recorded consolidated group sales of 3,645.3 billion yen (US$ 43.9 billion*) in the fiscal year ended March 31, 2011. For more information visit http://www.MitsubishiElectric.com
*At an exchange rate of 83 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2011