

## Miniaturization and Integration of Analog Circuits of Plasma Wave Measurement System for Space Electromagnetic Environment

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Plasma wave receivers have contributed to the investigation of electromagnetic environments in space. To meet the grow of requirements for miniaturization and weight saving of spacecraft to realize a formation flight mission using multiple satellites or a small satellite mission in recent years, integration and miniaturization of instruments for observation such as the plasma wave receivers are not unavoidable. In the observation via spacecraft, observed data to be sent to the ground are treated as digital signals, however, observed data right after sensing any physical phenomena are analog signals. Hence it is necessary to miniaturize analog circuits to process the observed signals without deterioration and convert them into digital ones as well as miniaturization of digital circuits for communication and digital signal processing.

We have developed integrated and miniaturized analog circuits to measure plasma waves using ASIC (Application Specific Integrated Circuit). We have already developed some components of a measurement system for space electromagnetic environment such as a differential amplifier, or a low pass filter. In the present paper, we introduce an anti-aliasing filter, which had not been developed yet, using switched capacitor filter technology and a simple system combining the anti-aliasing filter combined and an amplifier. Moreover, onboard integrated circuits should not be affected by temperature change between -20 to 60 degrees Celsius since inside temperature of spacecraft changes in this range. The effect because of temperature change gives center frequency of a band pass filter temperature dependence property and undesirable results on spectrum observations. We also demonstrate a new band pass filter with less temperature dependence property. Furthermore, we will refer to their application to the monitor system for the space electromagnetic environments.