

S310-44

Observation of plasma wave spectra by PWM

1. Instrument name

Plasma Wave Monitor (PWM)

2. Purpose

In S-310-37 experiment, plasma instability associated with electron heating and field-aligned acceleration of electrons around ionospheric Sq focus has been reported. The purpose of S-310-44/PWM is to observe plasma waves associated with those phenomena and clarify details of their spectra.

3. Method

Plasma waves in a frequency range from 300 Hz to 22 MHz are detected by the inflatable antenna and preamplifier of Electric field detector (EFD). The signal is fed to PWM and converted to spectrogram by applying Fourier transform.

4. Instrument

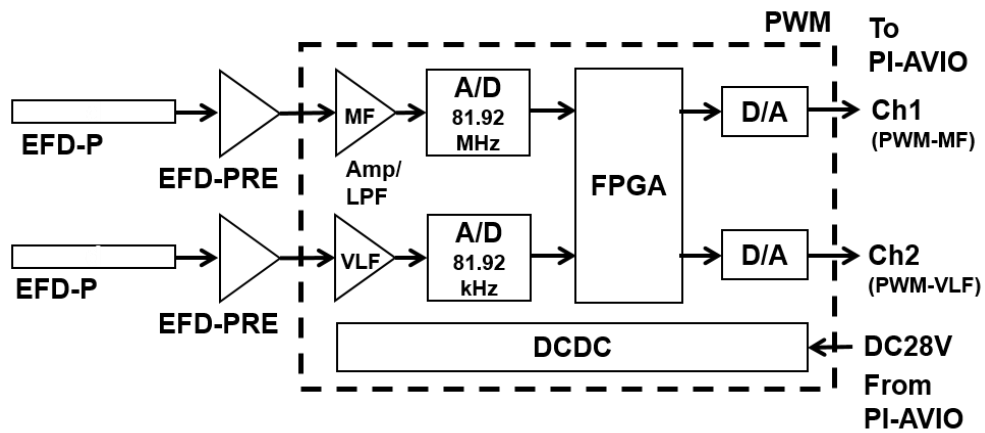
Plasma Wave Monitor (PWM) consists of MF-band receiver unit (PWM-MF) which covers 20 kHz - 22 MHz, and VLF-band receiver unit (PWM-VLF) which covers 300 Hz - 20 kHz. Antenna (2m) and preamplifier are shared with Electric Field Detector (EFD). Antenna was used as two monopole antennas. Signals from two antenna elements are fed to PWM-MF and PWM-VLF.

Specifications

PWM-MF	Sensor:	Inflatable antenna (EFD)
	Freq. span:	20 kHz - 22 MHz
	Interval:	129.7 msec
	Sensitivity:	-110 - 0 dBm (20 kHz - 7 MHz, 50 Ω input)
		-100 - 0 dBm (7 - 22 MHz, 50 Ω input)

PWM-LF	Sensor:	Inflatable antenna (EFD)
	Freq. span:	300 Hz - 20.3 kHz
	Interval:	129.7 msec
	Sensitivity:	-120 - 0 dBm (50 Ω input)

Block diagram



Definition of frequency step (PWM-MF)

0.02 - 7.0 MHz	20 kHz/step	0 - 349 step
7.3 - 22.0 MHz	300 kHz/step	350 - 399 step

Definition of frequency step (PWM-VLF)

0.30 - 20.25 kHz	50 Hz/step	0 - 399 step
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Telemeter

Double-speed super commutation channel (3200Hz)

PWM-MF	W006, W038	MF receiving level
PWM-VLF	W014, W046	VLF receiving level

Timer control

N/A

Mass

PWM-E (Electronics): 1.5 kg

Pawer consumption

+28V, 200mA

6. PI and manufacturer

A. Kumamoto (Tohoku Univ.)
System Keisoku Co.,Ltd.