A frequency sweeping heterodyne reflectometer in the Hanbit mirror
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A frequency sweeping heterodyne reflectometer is being developed for the density profile measurement of the Hanbit mirror. It consists of three Voltage Controlled Oscillators (VCO’s). The frequency range of VCO’s are 4-8 GHz, 8-12 GHz, and 12-18 GHz, respectively. Plasma density in the range between $0.2 \times 10^{12} \text{ cm}^{-3}$ and $4 \times 10^{12} \text{ cm}^{-3}$ can be measured by sweeping the VCO’s frequencies simultaneously. Each VCO’s output is mixed with a 30 MHz local oscillator’s output to generate an up-converted probing wave to form a heterodyne reflectometer. A phase comparator is used to measure the phase of the Intermediate Frequency (IF) signal. To avoid phase jump, the relative phase measurement technique is applied. The design of the reflectometer, the signal analysis technique, and the preliminary result of the plasma density profile measurements will be presented.