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6.54 Frequency sweep linearization of FM reflectometry

Tuesday, 17 April 2018 10:31 (120)

Frequency Modulation reflectometer requires that the whole frequency range is linearly swept. For this purpose, Voltage Controlled Oscillator (VCO) is finely tuned to accomplish the linear frequency sweep. However many components such as frequency multiplier, power amplifier, filter, etc, distort the frequency sweep characteristics. In addition, the frequency dispersion of the wave guide also distorts the frequency sweep. In KSTAR Q band reflectometer, a slightly over-sized wave guide (Ka band) is used for the microwave transmission. So the frequency sweep is significantly affected by the frequency dispersion of the wave guide. Although this distortion can be avoided by using a sufficiently over-sized wave guide, it is not easy to replace the existing wave guide installed inside of a heavily packed port of super conducting magnet tokamak. In this presentation, the distortion of frequency sweep due to the wave guide is quantitatively assessed and a compensation algorithm is devised. The algorithm is explained in detail and the compensated and non-compensated results are compared.

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