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[54] FREQUENCY ANALYZER FOR SUB-MICROSECOND TESTING

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[57] ABSTRACT

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A method and apparatus for measuring the settling time of frequency changes in a voltage controlled oscillator (VCO) are disclosed. A signal splitter is responsive to the VCO for splitting the output signal between first and second channels. A delay circuit in one of the channels introduces a delay and corresponding phase shift of one signal relative to the other, and a phase detector produces a phase signal proportional to the phase shift indicative of the settling time of the VCO. A control circuit coupled to the phase detector and the VCO produces a step voltage initiating signal for changing the VCO output frequency. A detector responsive to the initiating signal and the phase signal produces an output indicative of the settling time with respect to the control signal in the modulation domain.

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[58] Field of Search 324/617, 618; 341/120; 331/DIG. 2, 179, 44

[56] References Cited

U.S. PATENT DOCUMENTS

3,852,681 12/1974 Underhill 331/179
4,578,641 3/1986 Tiedje 324/617

FOREIGN PATENT DOCUMENTS

576121 5/1959 Canada 331/44

12 Claims, 3 Drawing Sheets

