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(54) **RADIO DEVICE WITH RESONATOR**

(71) Applicant: **Nordic Semiconductor ASA**, Trondheim (NO)

(72) Inventors: **Markus LITTOW**, Oulu (FI); **Esko NIEMINEN**, Oulu (FI)

(73) Assignee: **Nordic Semiconductor ASA**, Trondheim (NO)

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(57) **ABSTRACT**

A radio device comprises a radio transceiver, a resonator, a temperature measurement unit, a frequency synthesiser and a processing system. A temperature signal from the temperature measurement unit, representative of a measured temperature of the resonator, is used to determine an estimated frequency offset for the resonator at the measured temperature using a model stored in a memory of the processing system that relates frequency offset to temperature. A periodic signal from the resonator is provided to the frequency synthesizer, which, in dependence on the estimated frequency offset, is used to generate a periodic local signal. The radio transceiver receives a radio signal comprising a periodic component at a received signal frequency. An error value representative of a difference between the received signal frequency and a frequency of the periodic local signal is determined and used to update one or more parameters of the model stored in the memory.