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(54) **SYSTEM HAVING AN ANALOG TO DIGITAL CONVERTER (ADC) AND A DIGITAL SIGNAL PROCESSOR**

(71) Applicant: **NXP USA, Inc.**, Austin, TX (US)

(72) Inventors: **Andrei Alexandru Enescu**, Bucharest (RO); **Wim Joseph Rouwet**, AUSTIN, TX (US)

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(57) **ABSTRACT**

A system includes an ADC configured to generate a superposition signal by the ADC being configured to undersample an input signal at a sampling frequency in which the input signal that is input to the analog to digital converter has a bandwidth and the sampling frequency is less than a Nyquist rate for the bandwidth of the input signal. The system includes a digital signal processor (DSP) configured to digitally process the superposition signal to separate the superposition signal into a plurality of bitstreams, where each of the plurality of bitstreams corresponds to information in a different one of a plurality of separable, distinct frequency bands within the input signal. The information in the superposition signal for at least one of the said plurality of bitstreams is present in the input signal at frequencies greater than the sampling frequency, and the DSP is configured to output said plurality of bitstreams.