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Paulson

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(54) **SONIC RECEIVER AND METHOD FOR RECEIVING DATA THAT USES MODULATION FREQUNCIES THAT REDUCE THE PROBABILITY OF CONFLICT WITH AMBIENT NOISE IN THE ENVIRONMENT**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 5 days.

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(51) **Int. Cl.**
H04B 1/06 (2006.01)
H04B 11/00 (2006.01)

(52) **U.S. Cl.**
CPC . ***H04B 1/06*** (2013.01); *H04B 11/00* (2013.01)
USPC **367/135**

(58) **Field of Classification Search**
USPC 367/135
See application file for complete search history.

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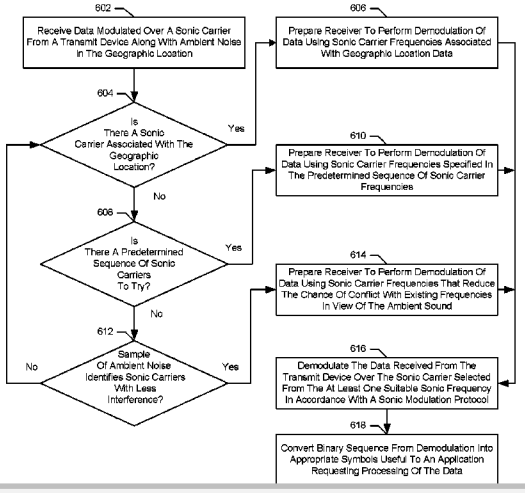
(57) **ABSTRACT**

A method, apparatus and computer program product is provided for wirelessly transmitting and receiving data through sonic communication. A method and system is provided for devices to exchange data over the air using a sonic carrier signal. The transmit device has at least one sonic transducer that transmits a sonic carrier signal through the air in accordance with aspects of the present invention. A digital representation of the data is modulated consistent with a modulation protocol using one or more sonic transmission frequencies in accordance with present invention. The sonic transducer transmits the one or more sonic carrier signals carrying the modulated data over the air. Each sonic carrier signal has sufficient gain to carry the signal to a receiver device where the data from the one or more sonic carrier signals is demodulated. Aspects of the present invention receive modulated data through the air using at least one sonic transducer of a receive device. Prior to demodulation, the receive device may be configured to perform the demodulation of the data at one or more sonic transmission frequencies. Sonic carrier signals at these sonic transmission frequencies are demodulated in accordance with a sonic modulation protocol providing a binary representation of the data. Ambient noise captured by the receiver device is processed along with the data transmitted over the sonic carrier signals.

9 Claims, 7 Drawing Sheets



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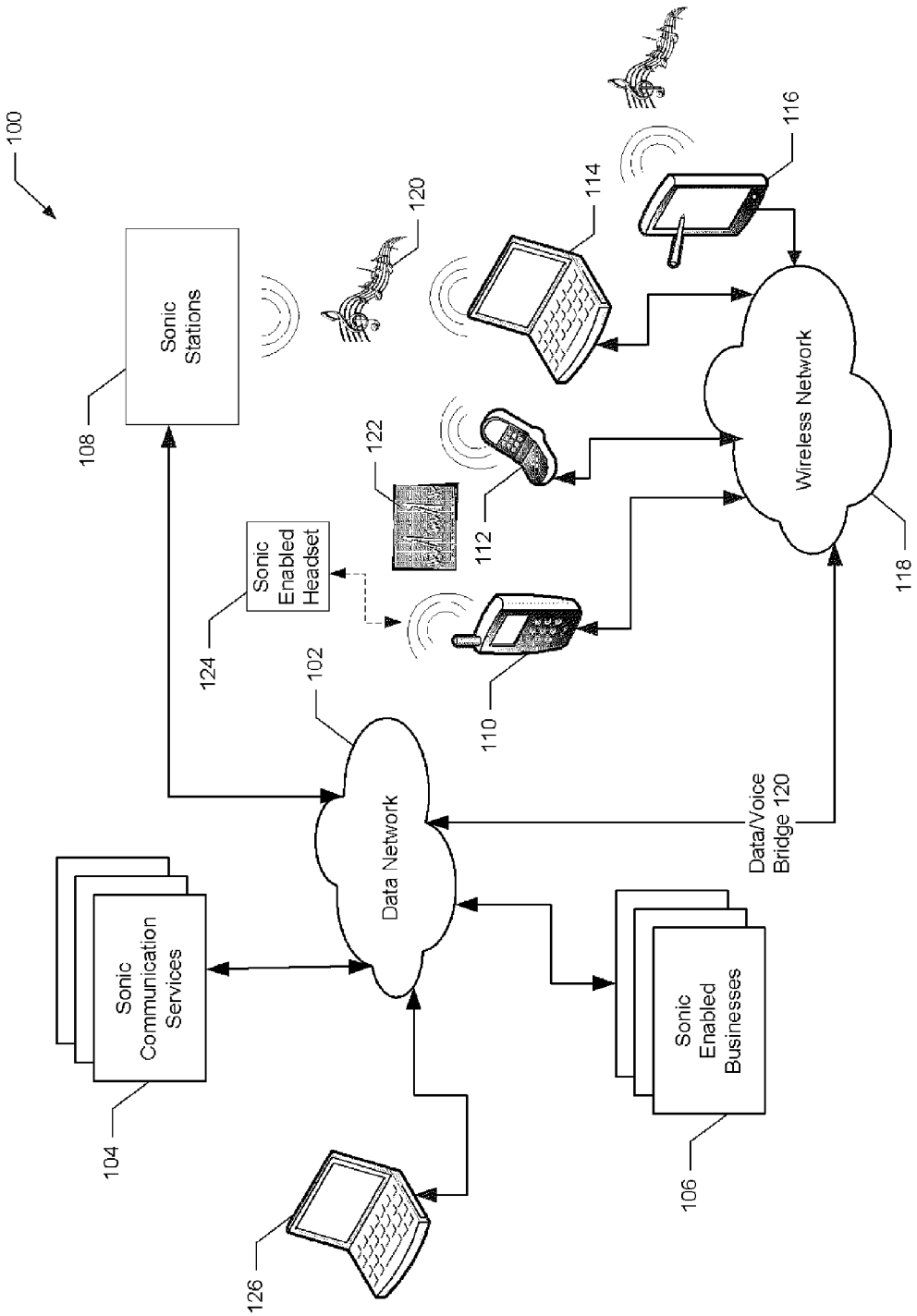

FIG. 1

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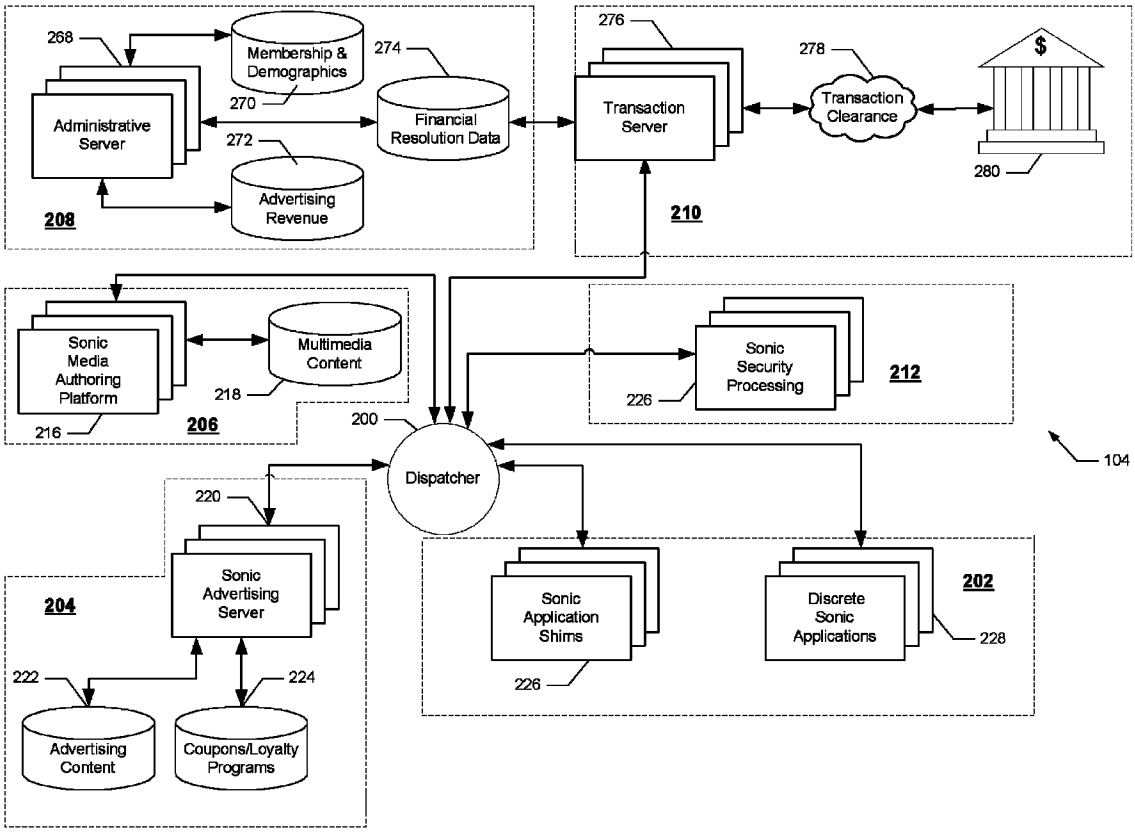

FIG. 2

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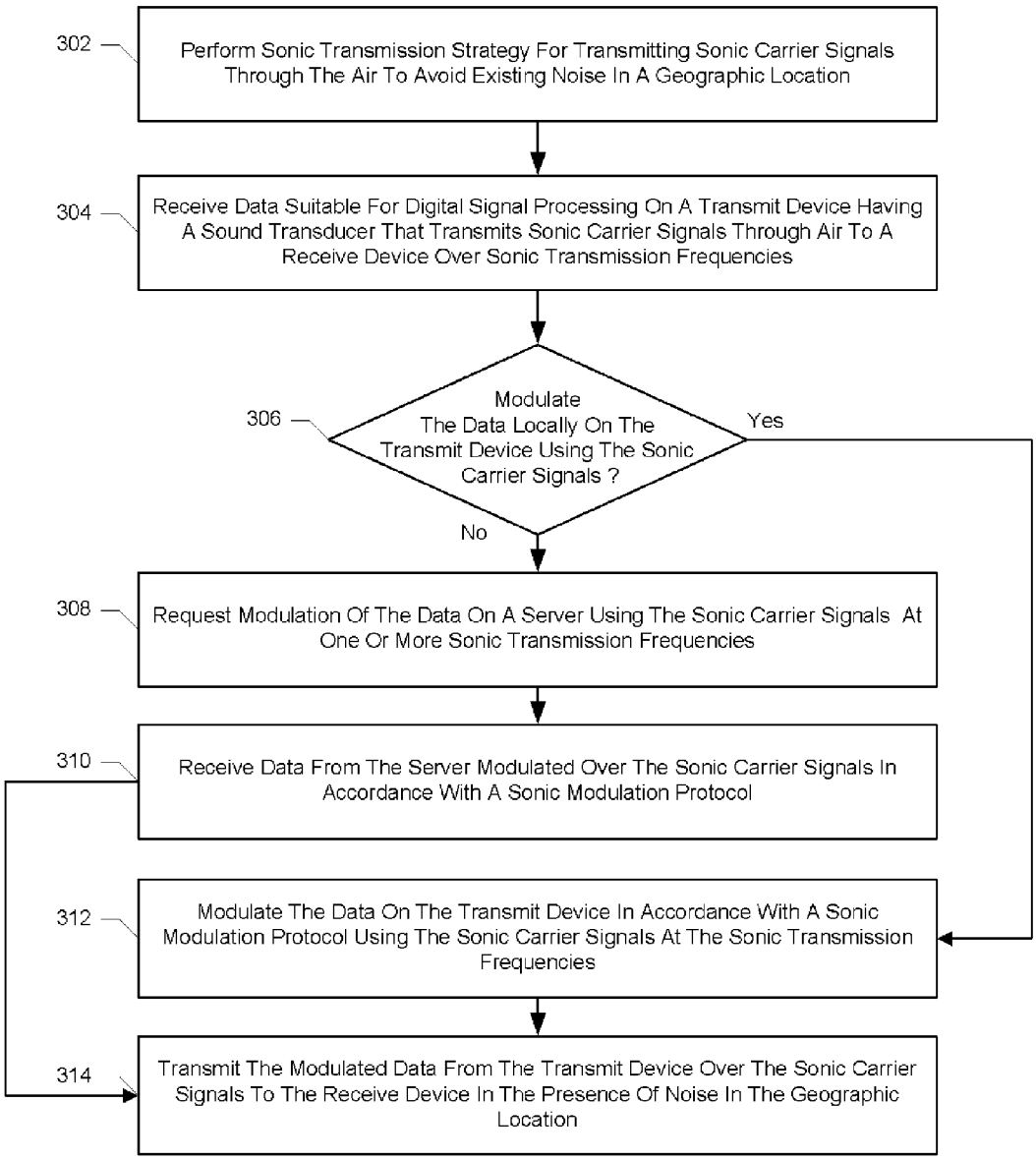

FIG. 3

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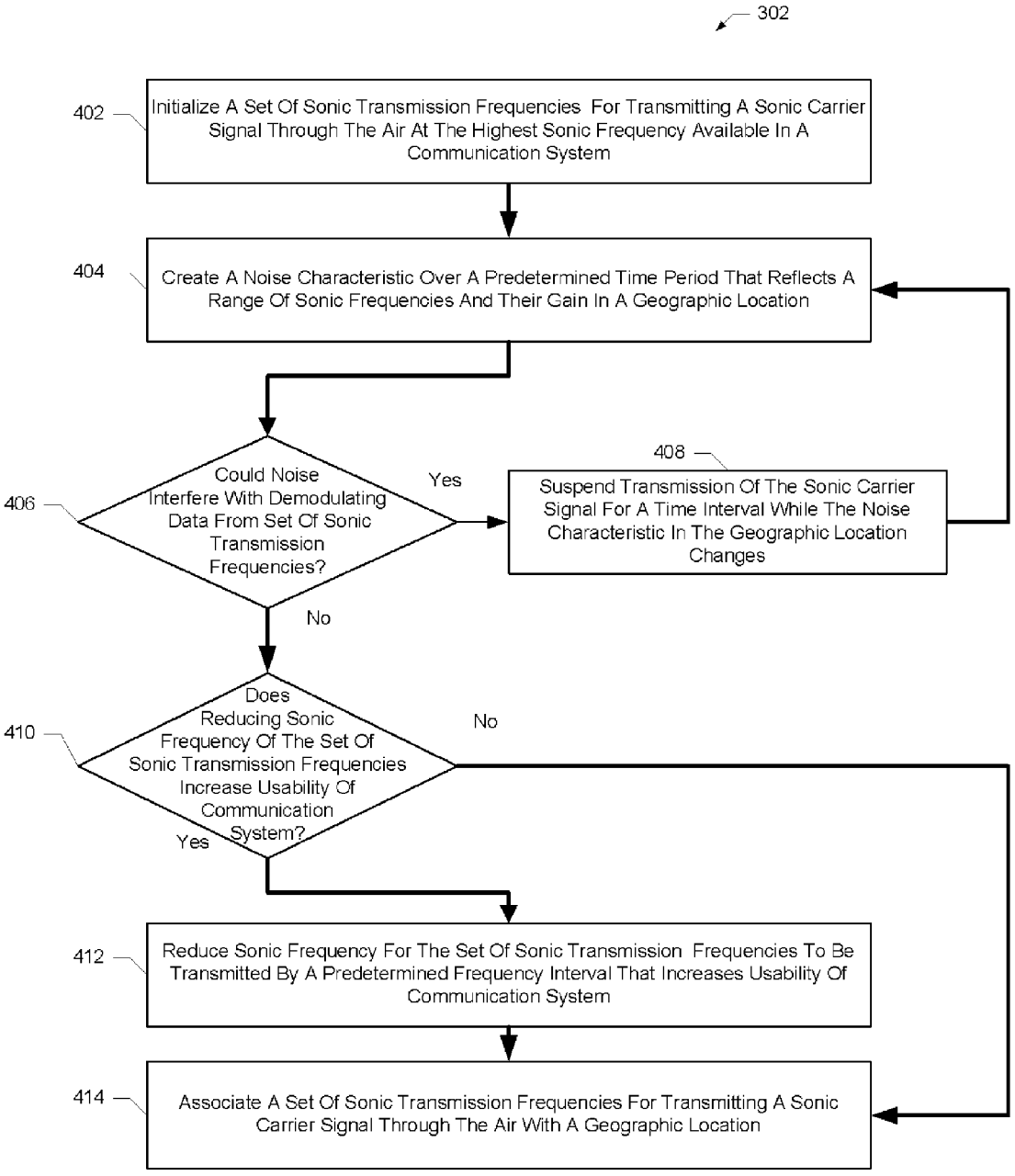

FIG. 4

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