Claims

1. A watermark generator for providing a watermark signal in dependence on binary message data, the watermark generator comprising:

an information processor configured to spread the binary message data to a plurality of frequency bands or frequency subbands and to provide, in dependence on information units of the binary message data, a first time-frequency domain representation, values of which represent the binary message data for a plurality of frequency bands or frequency subbands and time blocks wherein b(i,j) is the bit for the i-th frequency band or frequency subband and j-th time block; and

a differential encoder configured to derive a second time-frequency domain representation from the first time-frequency-domain representation, such that the second time-frequency-domain representation comprises a plurality of values, wherein a value $b_{diff}(i,j)$ of the second time-frequency-domain representation is a function of a value $b_{diff}(i,j-1)$ of the second time-frequency-domain representation and of a value b(i,j) of the first time-frequency-domain representation and wherein a difference between two values of the second time-frequency-domain representation represents a corresponding value of the first time-frequency-domain representation, in order to obtain a differential encoding of the values of the first time-frequency-domain representation; and

a watermark signal provider configured to provide the watermark signal on the basis of the second time-frequency-domain representation.

2. The watermark generator according to claim 1, wherein the information processor is configured to provide the first time-frequency-domain representation such that the values of the first time-frequency-domain representation represent the binary message data in the form of a spread binary pattern; and

wherein the differential encoder is configured to derive the second time-frequency domain representation such that a phase change between two subsequent values of the second time-frequency domain representation is introduced, if a corresponding value of the first time-frequency-domain representation takes a first value, and such that there is no phase change between two subsequent values of the second time-frequency-domain representation, if a corresponding value of the first time-

independently for different frequency bands, such that different phase rotations of the watermarked signal in different frequency bands are compensated independently by the differential decoder; and

wherein the synchronization determinator or the watermark detector is configured to jointly process a set of values of the second time-frequency-domain representation associated with a given time portion and different frequency bands, to obtain a synchronization information or a bit of the binary message data.

12. A portable watermark evaluation device, comprising:

a microphone configured to provide an electrical microphone signal; and

a watermark decoder according to one of the claims 7 to 11, wherein the watermark decoder is configured to receive a microphone signal as the watermarked signal.

13. A method for providing a watermarked signal in dependence on binary message data, the method comprising:

spreading the binary message data to a plurality of frequency bands or frequency subbands, to provide, in dependence on information units of the binary message data, a first time-frequency-domain representation, values of which represent the binary message data for a plurality of frequency bands or frequency subbands and time blocks wherein b(i,j) is the bit for the i-th frequency band or frequency subband and j-th time block;

deriving a second time-frequency-domain representation from the first time-frequency domain representation, such that the second time-frequency-domain representation comprises a plurality of values, wherein a value $b_{diff}(i,j)$ of the second time-frequency-domain representation is a function of a value $b_{diff}(i,j-1)$ of the second time-frequency-domain representation and of a value b(i,j) of the first time-frequency-domain representation and wherein a difference between two values of the second time-frequency-domain representation represents a corresponding value of the first time-frequency-domain representation, in order to obtain a differential encoding of the values of the first time-frequency-domain representation; and