Claims

1. Apparatus for decoding an encoded audio signal comprising an encoded core signal and parametric data, comprising:

a core decoder for decoding the encoded core signal to obtain a decoded core signal;

an analyzer for analyzing the decoded core signal before or after performing a frequency regeneration operation to provide an analysis result; and

a frequency regenerator for regenerating spectral portions not included in the decoded core signal using a spectral portion of the decoded core signal, the parametric data, and the analysis result,

wherein the analyzer is configured for detecting a splitting of a peak portion in the spectral portion of the decoded core signal or in a regenerated signal at a frequency border of the decoded core signal or at a frequency border between two regenerated spectral portions generated by using the same or different spectral portions of the decoded core signal or at a maximum frequency border of the regenerated signal, and

wherein the frequency regenerator is configured to changing the frequency border between the decoded core signal and the regenerated signal or to changing the frequency border between two regenerated spectral portions generated by using the same or different spectral portions of the decoded signal or to changing the maximum frequency border so that the splitting is reduced or eliminated.

2. Apparatus of claim 1,

wherein the analyzer is configured for analyzing the decoded core signal before or after frequency regeneration to locate one or more local spectral minima in the decoded core signal before or after frequency regeneration, and

wherein the analyzer is configured for providing the analysis result identifying the local spectral minima,

wherein the frequency regenerator is configured for regenerating the spectral portion, wherein one or more frequency tile borders in the spectral portion of the decoded signal or in the regenerated spectral portion are set at the one or more spectral minima.

3. Apparatus in accordance with one of the preceding claims,

wherein the frequency regenerator is configured for generating the preliminary regenerated signal having spectral portions not included in the decoded core signal using at least one spectral portion of the decoded core signal to obtain regenerated spectral portions,

wherein the frequency regenerator is configured for detecting artifact creating signal portions near a frequency border between the decoded core signal and a regenerated spectral portion or near a frequency border between two regenerated spectral portions generated by using the same or different spectral portions of the decoded core signal; and

wherein the frequency regenerator further comprises a manipulator for manipulating the preliminary regenerated signal or for manipulating control data in order to newly generate a regenerated signal using the manipulated control data being different from the control data used for generating the preliminary regenerated signal.

4. Apparatus of claim 3,

wherein the frequency regenerator comprises a tile generator being configured to derive the spectral portions using the one or more spectral portions of the decoded signal to obtain raw spectral portions,

wherein the manipulator is configured to manipulate the raw spectral portions or the frequency tile generator to obtain manipulated spectral portions, and

wherein the frequency regenerator further comprises a spectral envelope adjuster configured for performing an envelope adjustment of the manipulated spectral portions using the parametric data.

5. Apparatus in accordance with one of the preceding claims,

wherein the analyzer is configured to detect tonal signal portions positioned in a frequency detection range, the frequency detection range extending from a frequency border of a reconstruction range or between adjacent frequency tiles within the reconstruction range by a predetermined detection bandwidth being less than 20% of the bandwidth of a source frequency range or the reconstruction frequency range or a predetermined detection bandwidth being one Bark.

6. Apparatus of claim 5,

wherein the manipulator is configured to attenuate or remove spectral parts comprising tonal portions in the regenerated signal in the predetermined detection bandwidth.

7. Apparatus of claim 6,

wherein the manipulator is configured to determine a start spectral portion located in frequency at a start of the tonal signal and an end spectral portion located in frequency at an end frequency of the tonal portion, and to interpolate between the start frequency and the end frequency to obtain an interpolated signal portion, and to replace the tonal portion between the start frequency and the end frequency by the interpolated signal portion.

8. Apparatus of claim 6,

wherein the manipulator is configured to randomly or non-randomly generate spectral lines with an energy determined by a non-tonal signal portion of the decoded core signal or a non-tonal signal portion of the regenerated spectral portions.

9. Apparatus in accordance with one of claims 3 to 8,

wherein the analyzer is configured for detecting the artifact-creating signal portions at a certain frequency and wherein the manipulator is configured to control a tile generator so that the tile generator is configured to change a frequency border of the spectral portion of the decoded core signal or a frequency border of the regenerated spectral portion so that the artifact-creating signal portion is less artifact-creating or not artifact-creating.

10. Apparatus in accordance with one of the preceding claims, wherein the frequency regenerator comprises a tile generator, wherein the tile generator is configured to generate a first frequency tile for a first spectral portion and a second frequency tile for a second spectral portion using the same or different spectral portions of the decoded core signal,

wherein the lower frequency border of the second frequency tile coincides with an upper frequency border of the first frequency tile,

wherein the analyzer is configured to detect, whether a peak spectral portion is clipped by the lower frequency border of the second frequency tile or the upper frequency border of the first frequency tile or a lower frequency border of the first frequency tile and a predetermined gap filling start frequency of the decoded core signal, and

wherein the manipulator is configured to control the tile generator so that the tile generator generates modified frequency tiles having modified start or stop frequency borders that are modified so that the clipping is reduced or eliminated.

11. Apparatus in accordance with one of the preceding claims, wherein the core decoder is configured to obtain frequency domain decoded spectral portions comprising a first set of first spectral portions being represented by spectral values different from a zero representation and wherein a second set of second spectral portions is represented by the zero representation for spectral values, wherein the parametric information is provided for the second set of the second spectral portions, wherein the frequency regenerator is configured to use decoded spectral portions from the first set of first spectral portions to regenerate the spectral portions within a reconstruction band that are not included in the first set of first

spectral portions, and wherein the apparatus further comprises a frequency-time converter for converting the regenerated spectral portions and the spectral portions of the decoded core signal into a time representation.

12. Apparatus in accordance with one of the preceding claims,

wherein the core decoder is configured to output modified discrete cosine transform (MDCT) spectral values, and

wherein the frequency-time converter comprises a processor for performing an inverse MDCT transform applying an overlap-add processing to subsequently obtained MDCT frames.

13. Apparatus in accordance with one of the preceding claims,

wherein the frequency regenerator is configured to generate a preliminary regenerated signal,

wherein the frequency regenerator is configured for detecting tonal components in the preliminary regenerated signal;

wherein the frequency regenerator is configured to adjust transition frequencies between a source range and a reconstruction range or between adjacent frequency tiles in the reconstruction range based on a result of the detecting to generate a regenerated signal,

wherein the regenerator is furthermore configured for removing tonal components located in a detection range around the transition frequencies;

wherein the frequency regenerator further comprises a cross-over filter for cross-over filtering a signal with removed tonal components in a cross-over range around the transition frequencies; and

wherein the frequency regenerator further comprises a spectral envelope shaper for spectral envelope shaping a result of the cross-filter using the parametric data.

14. Method of decoding an encoded audio signal comprising an encoded core signal and parametric data, comprising:

decoding the encoded core signal to obtain a decoded core signal;

analyzing the decoded core signal before or after performing a frequency regeneration operation to provide an analysis result; and

regenerating spectral portions not included in the decoded core signal using a spectral portion of the decoded core signal, the parametric data, and the analysis result

wherein the analyzing comprises detecting a splitting of a peak portion in the spectral portion of the decoded core signal or in a regenerated signal at a frequency border of the decoded core signal or at a frequency border between two regenerated spectral portions generated by using the same or different spectral portions of the decoded core signal or at a maximum frequency border of the regenerated signal, and

wherein the regenerating comprises changing the frequency border between the decoded core signal and the regenerated signal or changing the frequency border between two regenerated spectral portions generated by using the same or different spectral portions of the decoded signal or changing the maximum frequency border so that the splitting is reduced or eliminated.

15. Apparatus for decoding an encoded audio signal comprising an encoded core signal and parametric data, comprising:

a core decoder for decoding the encoded core signal to obtain a decoded core signal;

a frequency regenerator for regenerating spectral portions not included in the decoded core signal using a spectral portion of the decoded core signal, the parametric data, and an analysis result to obtain a regenerated signal,

wherein the frequency regenerator is configured to generate a preliminary regenerated signal using parameters for the generation of the preliminary regenerated signal,

an analyzer for analyzing the preliminary regenerated signal to detect artifact-creating signal portions as the analysis result, and

wherein the frequency regenerator further comprises a manipulator for manipulating the preliminary regenerated signal in order to obtain the regenerated signal or for performing a further regeneration with parameters being different from the parameters for the generation of the preliminary regenerated signal in order to obtain the regenerated signal in which the artifact-creating signal portions are reduced or eliminated.

16. Method of decoding an encoded audio signal comprising an encoded core signal and parametric data, comprising:

decoding the encoded core signal to obtain a decoded core signal;

regenerating spectral portions not included in the decoded core signal using a spectral portion of the decoded core signal, the parametric data, and an analysis result to obtain a regenerated signal,

wherein the regenerating comprises generating a preliminary regenerated signal using parameters for the generation of the preliminary regenerated signal,

analyzing the preliminary regenerated signal to detect artifact-creating signal portions as the analysis result, and

wherein the regenerating further comprises manipulating the preliminary regenerated signal in order to obtain the regenerated signal or performing a further regeneration with parameters being different from the parameters for the generation of the preliminary regenerated signal in order to obtain the regenerated signal in which the artifact-creating signal portions are reduced or eliminated.

17. Computer program for performing, when running on a computer or a processor, the method of claim 14 or 16.