CLAIMS

1. An audio coding method, comprising:

performing a time-frequency transformation processing on a time-domain signal of a current audio frame, to obtain spectral coefficients of the current audio frame;

acquiring one or more reference coding parameters of the current audio frame;

determining whether the reference coding parameters satisfy any one of a set of parameter conditions; and

if any one of theparameter conditions is satisfied, coding the spectral coefficients of the current audio frame using a transform coded excitation (TCX) algorithm, or

if none of the parameter conditions is satisfied, coding the spectral coefficients of the current audio frame using a high quality transform coding (HQ) algorithm;

wherein the current frame comprises a subband z, and two subbands i and j; wherein the subband z and the subbands i and j are such that:

a highest frequency bin of the subband z is higher than a critical frequency bin F1, and F1 is in a range of 6.4 kHz to 12 kHz; and

a highest frequency bin of the subband i is lower than a highest frequency bin of the subband j, the highest frequency bin of the subband j is higher than a critical frequency bin F2, and F2 is in a range of 4.8 kHz to 8 kHz;

wherein the obtained reference coding parameters comprise:

a peak value of spectral coefficients that are located within the subband z, and an average value of spectral coefficients that are located within the subband z; and

an average energy of spectral coefficients that are located within the subband i, and an average energy of spectral coefficients that are located within the subband j;

and wherein the parameter conditions comprise a parameter condition as following:

the peak value of the spectral coefficients that are located within the subband z is greater than the average value of the spectral coefficients that are located within the subband z multiplied by a threshold T2; and

the average energy of the spectral coefficients that are located within the subband j is greater than a product of the average energy of the spectral coefficients that are located within the subband i multiplied by a threshold T4.

2. The method accoding to claim 1, wherein a highest frequency bin of the subband i is less than the highest frequency bin of the subband j; or

a highest frequency bin of the subband j is greater than a critical frequency bin F2;

a lowest frequency bin of the subband z is greater than or equal to the critical frequency bin F1.

3. The method according to claim 1 or 2, wherein the threshold T2 is no less than 1, or the threshold T2 is no less than 2, or the threshold T2 is no less than 3, or the threshold T2 is no less than 5; and

wherein the threshold T4 is no less than 0.5, or the threshold T4 is no less than 1, or the threshold T4 is no less than 2, or the threshold T4 is no less than 3.

4. The method according to any one of claims 1-3, wherein a range of frequency bins of the subband z is 8 kHz to 12 kHz, or 9 kHz to 11 kHz, or 8 kHz to 9.6 kHz, or 12 kHz to 14 kHz;

wherein a range of frequency bins of the subband i is 3.2 kHz to 6.4 kHz, or 3.2 kHz to 4.8 kHz, or 4.8 kHz to 6.4 kHz, or 0.4 kHz to 6.4 kHz, or 0.4 kHz to 3.6 kHz; and

wherein a range of frequency bins of the subband j is 6.4 kHz to 9.6 kHz, or 6.4 kHz to 8 kHz, or 8 kHz to 9.6 kHz, or 4.8 kHz to 9.6 kHz, or 4.8 kHz to 8 kHz.

5. An audio coding method, comprising:

performing a time-frequency transformation processing on a time-domain signal of a current audio frame, to obtain spectral coefficients of the current audio frame;

acquiring one or more reference coding parameters of the current audio frame;

determining whether the reference coding parameters satisfy any one of a set of parameter conditions; and

if any one of theparameter conditions is satisfied, coding the spectral coefficients of the current audio frame using a transform coded excitation (TCX) algorithm, or

if none of the parameter conditions is satisfied, coding the spectral coefficients of the current audio frame using a high quality transform coding (HQ) algorithm;

wherein the current frame comprises subband i and subband j;

wherein a highest frequency bin of the subband i is lower than a highest frequency bin of the subband j, the highest frequency bin of the subband j is higher than a critical frequency bin F2, and F2 is in a range of 4.8 kHz to 8 kHz;

wherein the obtained reference coding parameters comprise:

an average energy of spectral coefficients that are located within the subband i, and

an average energy of spectral coefficients that are located within the subband j;

and wherein the parameter conditions comprise a parameter condition as following:

the average energy of the spectral coefficients that are located within the subband j is greater than a product of the average energy of the spectral coefficients that are located within the subband i multiplied by a threshold T4.

6. The method according to claim 5, wherein the highest frequency bin of the subband i is lower than or equal to a lowest frequency bin of the subband j; or a lowest frequency bin of the subband j is higher than the critical frequency bin F2.

7. The method according to claim 5 or 6, wherein the threshold T4 is no less than 0.5, or the threshold T4 is no less than 1, or the threshold T4 is no less than 2, or the threshold T4 is no less than 3.

8. The method according to any one of claims 5-7, wherein a range of frequency bins of the subband i is 3.2 kHz to 6.4 kHz, or 3.2 kHz to 4.8 kHz, or 4.8 kHz to 6.4 kHz, or 0.4 kHz to 6.4 kHz, or 0.4 kHz to 3.6 kHz; and

wherein a range of frequency bins of the subband j is 6.4 kHz to 9.6 kHz, or 6.4 kHz to 8 kHz, or 8 kHz to 9.6 kHz, or 4.8 kHz to 9.6 kHz, or 4.8 kHz to 8 kHz.

9. An audio coding method, comprising:

performing a time-frequency transformation processing on a time-domain signal of a current audio frame, to obtain spectral coefficients of the current audio frame;

acquiring one or more reference coding parameters of the current audio frame;

determining whether the reference coding parameters satisfy any one of a set of parameter conditions; and

if any one of theparameter conditions is satisfied, coding the spectral coefficients of the current audio frame using a transform coded excitation (TCX) algorithm, or

if none of the parameter conditions is satisfied, coding the spectral coefficients of the current audio frame using a high quality transform coding (HQ) algorithm;

wherein the current frame comprise subband x and subband y;

wherein a highest frequency bin of the subband x is lower than or equal to a lowest frequency bin of the subband y;

wherein the obtained reference coding parameters comprise:

a peak value of spectral coefficients that are located within the subband x, an average value of spectral coefficients that are located within the subband x, a peak value of spectral coefficients that are located within the subband y, and an average value of spectral coefficients that are located within the subband y;

and wherein the parameter conditions comprise a parameter condition as following:

a product of the peak value of spectral coefficients that are located within the subband x multiplied by the average value of coefficients that are located within the subband y is less than a product of the peak value of spectral coefficients that are located within the subband y multiplied by the average value of coefficients that are located within the subband

x and multiplied by a lowest value of an interval R1; or

a product of the peak value of spectral coefficients that are located within the subband x multiplied by the average value of coefficients that are located within the subband y is greater than a product of the peak value of spectral coefficients that are located within the subband y multiplied by the average value of coefficients that are located within the subband x and multiplied by a highest value of the interval R1.

10. The method according to claim 9, wherein the interval R1 is [0.5, 2], or the interval R1 is [0.4, 2.5], or the interval R1 is [0.8, 1.25].

11. The method according to claim 9 or 10, wherein a range of frequency bins of the subband x is 1 kHz to 2.6 kHz, and a range of frequency bins of the subband y is 4.8 kHz to 6.4 kHz.

12. An audio coder, comprising:

a time-frequency transformation unit, configured to perform a time-frequency transformation processing on a time-domain signal of a current audio frame, to obtain spectral coefficients of the current audio frame;

an acquiring unit, configured to acquire one or more reference coding parameters of the current audio frame; and

a coding unit, configured to determine whether the reference coding parameters satisfy any one of a set of parameter conditions; if any one of the parameter conditions is satisfied, code the spectral coefficients of the current audio frame using a transform coded excitation (TCX) algorithm, or if nonoe of the parameter conditions is satisfied, code the spectral coefficients of the current audio frame using a high quality transform coding (HQ) algorithm;

wherein the current frame comprises a subband z, and two subbands i and j; wherein the subband z and the subbands i and j are such that:

a highest frequency bin of the subband z is higher than a critical frequency bin F1, and F1 is in a range of 6.4 kHz to 12 kHz; and

a highest frequency bin of the subband i is lower than a highest frequency bin of the subband j, the highest frequency bin of the subband j is higher than a critical frequency bin F2, and F2 is in a range of 4.8 kHz to 8 kHz;

wherein the obtained reference coding parameters comprise:

a peak value of spectral coefficients that are located within the subband z, and an average value of spectral coefficients that are located within the subband z; and

an average energy of spectral coefficients that are located within the subband i, and an average energy of spectral coefficients that are located within the subband j;

and wherein the parameter conditions comprise a parameter condition as following:

the peak value of the spectral coefficients that are located within the subband z is greater than the average value of the spectral coefficients that are located within the subband z multiplied by a threshold T2; and

the average energy of the spectral coefficients that are located within the subband j is greater than a product of the average energy of the spectral coefficients that are located within the subband i multiplied by a threshold T4.

13. The audio coder accoding to claim 12, wherein a highest frequency bin of the subband i is less than the highest frequency bin of the subband j; or

a highest frequency bin of the subband j is greater than a critical frequency bin F2;

a lowest frequency bin of the subband z is greater than or equal to the critical frequency bin F1.

14. The audio coder according to claim 12 or 13, wherein the threshold T2 is no less than 1, or the threshold T2 is no less than 2, or the threshold T2 is no less than 3, or the threshold T2 is no less than 5; and

wherein the threshold T4 is no less than 0.5, or the threshold T4 is no less than 1, or the threshold T4 is no less than 2, or the threshold T4 is no less than 3.

15. The audio coder according to any one of claims 12-14, wherein a range of frequency bins of the subband z is 8 kHz to 12 kHz, or 9 kHz to 11 kHz, or 8 kHz to 9.6 kHz, or 12 kHz to 14 kHz;

wherein a range of frequency bins of the subband i is 3.2 kHz to 6.4 kHz, or 3.2 kHz to 4.8 kHz, or 4.8 kHz to 6.4 kHz, or 0.4 kHz to 6.4 kHz, or 0.4 kHz to 3.6 kHz; and

wherein a range of frequency bins of the subband j is 6.4 kHz to 9.6 kHz, or 6.4 kHz to 8 kHz, or 8 kHz to 9.6 kHz, or 4.8 kHz to 9.6 kHz, or 4.8 kHz to 8 kHz.

16. An audio coder, comprising:

a time-frequency transformation unit, configured to perform a time-frequency transformation processing on a time-domain signal of a current audio frame, to obtain spectral coefficients of the current audio frame;

an acquiring unit, configured to acquire one or more reference coding parameters of the current audio frame; and

a coding unit, configured to determine whether the reference coding parameters satisfy any one of a set of parameter conditions; if any one of the parameter conditions is satisfied, code the spectral coefficients of the current audio frame using a transform coded excitation (TCX) algorithm, or if nonoe of the parameter conditions is satisfied, code the spectral coefficients of the current audio frame using a high quality transform coding (HQ) algorithm;

wherein the current frame comprises subband i and subband j;

wherein a highest frequency bin of the subband i is lower than a highest frequency bin of the subband j, the highest frequency bin of the subband j is higher than a critical frequency bin F2, and F2 is in a range of 4.8 kHz to 8 kHz;

wherein the obtained reference coding parameters comprise:

an average energy of spectral coefficients that are located within the subband i, and an average energy of spectral coefficients that are located within the subband j;

and wherein the parameter conditions comprise a parameter condition as following:

the average energy of the spectral coefficients that are located within the subband j is greater than a product of the average energy of the spectral coefficients that are located within the subband i multiplied by a threshold T4.

17. The audio coder according to claim 16, wherein the highest frequency bin of the subband i is lower than or equal to a lowest frequency bin of the subband j; or a lowest frequency bin of the subband j is higher than the critical frequency bin F2.

18. The audio coder according to claim 16 or 17, wherein the threshold T4 is no less than 0.5, or the threshold T4 is no less than 1, or the threshold T4 is no less than 2, or the threshold T4 is no less than 3.

19. The audio coder according to any one of claims 16-18, wherein a range of frequency bins of the subband i is 3.2 kHz to 6.4 kHz, or 3.2 kHz to 4.8 kHz, or 4.8 kHz to 6.4 kHz, or 0.4 kHz to 6.4 kHz, or 0.4 kHz to 3.6 kHz; and

wherein a range of frequency bins of the subband j is 6.4 kHz to 9.6 kHz, or 6.4 kHz to 8 kHz, or 8 kHz to 9.6 kHz, or 4.8 kHz to 9.6 kHz, or 4.8 kHz to 8 kHz.

20. An audio coder, comprising:

a time-frequency transformation unit, configured to perform a time-frequency transformation processing on a time-domain signal of a current audio frame, to obtain spectral coefficients of the current audio frame;

an acquiring unit, configured to acquire one or more reference coding parameters of the current audio frame; and

a coding unit, configured to determine whether the reference coding parameters satisfy any one of a set of parameter conditions; if any one of the parameter conditions is satisfied, code the spectral coefficients of the current audio frame using a transform coded excitation (TCX) algorithm, or if nonoe of the parameter conditions is satisfied, code the spectral coefficients of the current audio framc using a high quality transform coding (HQ) algorithm;

wherein the current frame comprise subband x and subband y;

wherein a highest frequency bin of the subband x is lower than or equal to a lowest

frequency bin of the subband y;

wherein the obtained reference coding parameters comprise:

a peak value of spectral coefficients that are located within the subband x, an average value of spectral coefficients that are located within the subband x, a peak value of spectral coefficients that are located within the subband y, and an average value of spectral coefficients that are located within the subband y;

and wherein the parameter conditions comprise a parameter condition as following:

a product of the peak value of spectral coefficients that are located within the subband x multiplied by the average value of coefficients that are located within the subband y is less than a product of the peak value of spectral coefficients that are located within the subband y multiplied by the average value of coefficients that are located within the subband x and multiplied by a lowest value of an interval R1; or

a product of the peak value of spectral coefficients that are located within the subband x multiplied by the average value of coefficients that are located within the subband y is greater than a product of the peak value of spectral coefficients that are located within the subband y multiplied by the average value of coefficients that are located within the subband x and multiplied by a highest value of the interval R1.

21. The audio coder according to claim 20, wherein the interval R1 is [0.5, 2], or the interval R1 is [0.4, 2.5], or the interval R1 is [0.8, 1.25].

22. The audio coder according to claim 20 or 21, wherein a range of frequency bins of the subband x is 1 kHz to 2.6 kHz, and a range of frequency bins of the subband y is 4.8 kHz to 6.4 kHz.