fourth possible implementation manner, the determining a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k subbands belong includes: sorting the vectors to which the quantized spectral coefficients of the k subbands belong, to obtain sorted vectors, where the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors include vectors whose values are all 0s in vectors to which the first group of decoded spectral coefficients belong, and the second group of vectors include vectors whose values are not all 0s in the vectors to which the first group of decoded spectral coefficients belong; selecting the first m vectors from the sorted vectors as the first type of vectors; and establishing a correspondence between the first type of vectors and the m vectors.

**[0022]** With reference to the fourth possible implementation manner of the second aspect, in a fifth possible implementation manner, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in ascending order of frequencies of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0023]** With reference to the fourth possible implementation manner of the second aspect, in a sixth possible implementation manner, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of quantized envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0024]** With reference to the third possible implementation manner of the second aspect, in a seventh possible implementation manner, the determining a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k subbands belong includes: selecting, in descending order of quantized envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors; and establishing a correspondence between the first type of vectors and the m vectors.

**[0025]** With reference to any implementation manner of the second possible implementation manner to the seventh possible implementation manner of the second aspect, in an eighth possible implementation manner, the method further includes: decoding global gains of the m vectors; and correcting the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

**[0026]** With reference to any implementation manner of the fourth possible implementation manner to the sixth possible implementation manner of the second aspect, in a ninth possible

of vectors include vectors whose values are all 0s in vectors to which the first group of decoded spectral coefficients belong, and the second group of vectors include vectors whose values are not all 0s in the vectors to which the first group of decoded spectral coefficients belong; select the first m vectors from the sorted vectors as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors.

**[0051]** With reference to the third possible implementation manner of the fourth aspect, in a fifth possible implementation manner, the second determining unit is specifically configured to select, in descending order of quantized envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors.

**[0052]** With reference to any implementation manner of the first possible implementation manner to the fifth possible implementation manner of the fourth aspect, in a sixth possible implementation manner, the device further includes: a correcting unit, where the decoding unit is further configured to decode global gains of the m vectors; and the correcting unit is configured to correct the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

**[0053]** With reference to the fourth possible implementation manner of the fourth aspect, in a seventh possible implementation manner, the device further includes a correcting unit, where the decoding unit is further configured to decode a first global gain and a second global gain; and the correcting unit is configured to correct, by using the first global gain, spectral coefficients that correspond to the first group of vectors and are in the normalized spectral coefficients of the m vectors, and correct, by using the second global gain, spectral coefficients that correspond to the second group of vectors and are in the normalized spectral coefficients of the m vectors, to obtain spectral coefficients of the m vectors.

**[0054]** With reference to the sixth possible implementation manner or the seventh possible implementation manner of the fourth aspect, in an eighth possible implementation manner, the device further includes an adding unit and a restoring unit, where the adding unit is configured to add together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain spectral coefficients of the k subbands; the restoring unit is configured to perform noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands, and restore a spectral coefficient of another subband in all the subbands except the k subbands, to obtain spectral coefficients of a first frequency band, where the first frequency band includes all the subbands; the correcting unit is further configured to correct

an algorithm such as a fast Fourier transform (Fast Fourier Transform, FFT) algorithm or a modified discrete cosine transform (Modified Discrete Cosine Transform, MDCT) algorithm. Subsequently, the encoding end may normalize a spectral coefficient of the frequency domain signal by using a global gain, and strip a normalized spectral coefficient to obtain subbands.

**[0076]** 110. Determine, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded, where i is a positive number, and k is a positive integer.

**[0077]** The quantity of available bits may refer to a total quantity of bits that can be used for encoding.

**[0078]** The first saturation threshold i may be predetermined. For example, the first saturation threshold i may be determined based on the following principle: When an average quantity of bits allocated for each spectral coefficient in a subband is greater than or equal to the first saturation threshold i, it may be considered that bits allocated to the subband reach saturation. The average quantity of bits allocated to each spectral coefficient may be a ratio of a quantity of bits allocated to the subband to a quantity of spectral coefficients of the subband. That bits allocated to the subband reach saturation may mean that even if more bits are allocated to the subband, performance of the subband is not obviously improved. The first saturation threshold i may be a positive number. Generally, $i \geq 1.5$.

**[0079]** Moreover, a threshold of the quantity of available bits may also be determined by using the first saturation threshold i and the quantity of spectral coefficients, and the quantity k of subbands to be encoded is further determined. For example, it is preset that $i = 2$, a total quantity of subbands is 4, there are two subbands having 64 spectral coefficients, and there are two subbands having 72 spectral coefficients; in this case, a minimum quantity of spectral coefficients included in three subbands is: $64 + 64 + 72 = 200$; therefore, a threshold of a quantity of available bits may be set to: $200^{*}\geq 2 = 400$; and when the quantity of available bits > 400, k is 4; when the quantity of available bits $\leq 400$, k is 3.

**[0080]** 120. Select, according to quantized envelopes of all subbands, k subbands from all the subbands, or select k subbands from all subbands according to a psychoacoustic model.

**[0081]** For example, the encoding end may select k subbands from all the subbands in descending order of quantized envelopes of all the subbands. Alternatively, the encoding end may determine importance of the subbands according to a psychoacoustic model, and may select k subbands in descending order of importance of the subbands.

**[0082]** 130. Perform a first-time encoding operation on spectral coefficients of the k subbands.

**[0083]** It should be understood that the first-time encoding herein may refer to the first-time encoding operation performed by the encoding end on the spectral coefficients in the encoding

$$m = \lfloor C/(j \times M) + 0.5 \rfloor \quad (2)$$

where C may indicate a quantity of remaining bits, and M may indicate a quantity of spectral coefficients included in each vector.

**[0099]** Optionally, as another embodiment, the encoding end may sort the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors. The encoding end may select the first m vectors from the sorted vectors, where the sorted vectors may be divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

**[0100]** It can be learned from the foregoing description that the candidate spectral coefficients are obtained by subtracting the quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands. Therefore, the vectors to which the candidate spectral coefficients belong may also be construed as being obtained by subtracting, from vectors to which the normalized spectral coefficients belong, the vectors to which the quantized spectral coefficients belong. Vectors whose values are all 0s may exist in the vectors to which the quantized spectral coefficients of the k subbands belong, and the vectors whose values are all 0s may refer to vectors that include spectral coefficients that are all 0s. The encoding end may sort the vectors to which the candidate spectral coefficients belong, to obtain the sorted vectors. In the sorted vectors, vectors obtained by subtracting, from vectors whose values are all 0s in the vectors to which the normalized spectral coefficients of the k subbands belong, the vectors whose values are all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong may be classified as the first group of vectors, and vectors obtained by subtracting the vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands from vectors whose values are not all 0s in the vectors to which the normalized spectral coefficients of the k subbands belong may be classified as the second group of vectors.

**[0101]** The first group of vectors may be arranged before the second group of vectors; therefore, ~~when the encoding end is to select m vectors,~~ the encoding end may select the first m vectors starting from the first group of vectors. For example, it is assumed that m is 5. If there are four vectors in the first group of vectors, the encoding end may select the four vectors from the first group of vectors, and then select one vector from the second group of vectors. If there are seven vectors in the first group of vectors, the encoding end may select the first five vectors from the first group of vectors. That is, when m vectors on which second-time encoding is to be performed are

**[0140]** Optionally, as another embodiment, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of quantized envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0141]** Optionally, as another embodiment, the decoding end may select, in descending order of quantized envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors. The decoding end may establish a correspondence between the first type of vectors and the m vectors.

**[0142]** Optionally, as another embodiment, the decoding end may decode global gains of the m vectors; and correct the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

**[0143]** The decoding end may correct a second group of decoded spectral coefficients, and herein, the decoding end may correct the normalized spectral coefficients of the m vectors by using the global gains of the m vectors obtained through decoding.

**[0144]** Optionally, as another embodiment, the decoding end may decode a first global gain and a second global gain; and correct, by using the first global gain, spectral coefficients that correspond to the first group of vectors and are in the normalized spectral coefficients of the m vectors, and correct, by using the second global gain, spectral coefficients that correspond to the second group of vectors and are in the normalized spectral coefficients of the m vectors, to obtain spectral coefficients of the m vectors.

**[0145]** It can be learned from the process of the embodiment of FIG. 1 that, the encoding end may normalize the spectral coefficients of the m vectors by using the two global gains. Therefore, correspondingly, the decoding end may correct the normalized spectral coefficients of the m vectors by using the two global gains.

**[0146]** Optionally, as another embodiment, the decoding end may add together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain normalized spectral coefficients of the k subbands. The decoding end may perform noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands, and restore a spectral coefficient of another subband in all the subbands except the k subbands, to obtain spectral coefficients of a first frequency band, where the first frequency band includes all the subbands. The ~~en~~decoding end may correct the spectral coefficients of the first frequency band by using the envelopes of all the subbands, to obtain normalized spectral coefficients of the first frequency band; and correct the normalized spectral coefficients of the first frequency band by

1 are quantized, to obtain eight quantized spectral coefficients being 00000000, which belong to vector 2b.

**[0179]** Corresponding quantized spectral coefficients are subtracted from normalized spectral coefficients, to obtain candidate spectral coefficients. For example, for vector 1a in subband 1, the corresponding eight quantized spectral coefficients being 40040240 are subtracted from the eight normalized spectral coefficients 51151151, to obtain new spectral coefficients 11111-111. For vector 1b in subband 1, the eight quantized spectral coefficients 00000000 are subtracted from eight normalized spectral coefficients 11111111, to obtain new spectral coefficients 11111111; and other spectral coefficients can also be obtained in the same manner. All the obtained new spectral coefficients are the candidate spectral coefficients, as shown in FIG. 4.

**[0180]** It can be seen from the foregoing description that the vectors to which the candidate spectral coefficients belong may also be construed as being obtained by subtracting, from the vectors to which the normalized spectral coefficients belong, the vectors to which the quantized spectral coefficients belong. Therefore, correspondingly, these candidate spectral coefficients also belong to nine vectors, which, to correspond to the foregoing normalized vectors and quantized vectors, may be numbered as vector 3a to vector 3i, as shown in FIG. 4. For example, quantized vector 2a is subtracted from vector 1a to obtain vector 3a, and quantized vector 2b is subtracted from vector 1b to obtain vector 3b.

**[0181]** The nine vectors may include two groups of vectors. There are four vectors, that is, vector 3b, vector 3e, vector 3g, and vector 3i in the first group of vectors. There are five vectors, that is, vector 3a, vector 3c, vector 3d, vector 3f, and vector 3h in the second group of vectors. The first group of vectors are obtained by subtracting vectors whose values are all 0s in vector 2a to 2i. For example, vector 3b is obtained by subtracting vector 2b whose values are all 0s from vector 1b; vector 3e is obtained by subtracting vector 2e whose values are all 0s from vector 1e; and other vectors can also be obtained in the same manner. The second group of vectors are obtained by subtracting vectors whose values are not all 0s in vector 2a to 2i. For example, vector 3a is obtained by subtracting vector 1b whose values are not all 0s from vector 1a; vector 3c is obtained by subtracting vector 2c whose values are not all 0s from vector 1c; other vectors can also be obtained in the same manner.

**[0182]** As shown in FIG. 4, each group of vectors may be arranged in ascending order of frequencies of subbands, and vectors in a same subband may be arranged in an original order of the vectors. For example, in the first group of vectors, vector 3b belongs to subband 1, vector 3e belongs to subband 2, and vector 3g and vector 3i belong to subband 3. In the second group of vectors, vector 3a and vector 3c belong to subband 1, vector 3d and vector 3f belong to subband 2,

performed on k subbands that are selected from all subbands, which can reduce spectrum holes of a signal obtained through decoding, and therefore, can improve auditory quality of an output signal.

**[0212]** Optionally, as another embodiment, if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding operation, the first determining unit 610 may further determine, according to the quantity of remaining bits and a second saturation threshold j, a quantity m of vectors on which second-time decoding is to be performed, where j is a positive number, and m is a positive integer. The decoding unit 630 may further perform a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

**[0213]** Optionally, as another embodiment, the device 600 may further include a second determining unit 640. The second determining unit 640 may determine a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

**[0214]** Optionally, as another embodiment, the second determining unit 640 may determine a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k subbands belong, where the m vectors are in a one-to-one correspondence with the first type of vectors.

**[0215]** Optionally, as another embodiment, the second determining unit 640 may sort the vectors to which the quantized spectral coefficients of the k subbands belong, to obtain sorted vectors; select the first m vectors from the sorted vectors as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors, where the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors include vectors whose values are all 0s in vectors to which a first group of decoded spectral coefficients belong, and the second group of vectors include vectors whose values are not all 0s in the vectors to which the first group of decoded spectral coefficients belong.

**[0216]** Optionally, as another embodiment, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in ascending order of frequencies of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0217]** Optionally, as another embodiment, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of quantized envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0218]** Optionally, as another embodiment, the second determining unit 640 may select, in descending order of quantized envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors.

**[0219]** Optionally, as another embodiment, the device 600 may further include a correcting unit 650.

**[0220]** The decoding unit 630 may decode global gains of the m vectors.

**[0221]** The correcting unit 650 may correct the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

**[0222]** Optionally, as another embodiment, the decoding unit 630 may decode a first global gain and a second global gain.

**[0223]** The correcting unit 650 may correct, by using the first global gain, spectral coefficients that correspond to the first group of vectors and are in the normalized spectral coefficients of the m vectors, and correct, by using the second global gain, spectral coefficients that correspond to the second group of vectors and are in the normalized spectral coefficients of the m vectors, to obtain spectral coefficients of the m vectors.

**[0224]** Optionally, as another embodiment, the device 600 may further include an adding unit 660 and a restoring unit 670. The adding unit 660 may add together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain normalized spectral coefficients of the k subbands. The restoring unit 670 may perform noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands, and restore a spectral coefficient of another subband in all the subbands except the k subbands, to obtain spectral coefficients of a first frequency band, where the first frequency band includes all the subbands. The correcting unit 650 may correct the spectral coefficients of the first frequency band by using the envelopes of all the subbands, to obtain normalized spectral coefficients of the first frequency band. The correcting unit 650 may further correct the normalized spectral coefficients of the first frequency band by using a global gain of the first frequency band, to obtain a final frequency domain signal of the first frequency band.

**[0225]** Optionally, as another embodiment, the restoring unit 670 may determine a weighted value according to core layer decoding information; and weight spectral coefficients that are adjacent to the spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands and random noise by using the weighted value.

**[0226]** Optionally, as another embodiment, the restoring unit 670 may acquire signal

of frequencies of the subbands in which the vectors are located, and vectors in a same subband may be arranged in an original order of the vectors.

**[0241]** Optionally, as another embodiment, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of quantized envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0242]** Optionally, as another embodiment, the processor 720 may select, in descending order of quantized envelopes of subbands in which the vectors to which the candidate spectral coefficients belong are located, the m vectors from the vectors to which the candidate spectral coefficients belong.

**[0243]** Optionally, as another embodiment, the processor 720 may determine global gains of the spectral coefficients of the m vectors; normalize the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and quantize normalized spectral coefficients of the m vectors.

**[0244]** Optionally, as another embodiment, the processor 720 may determine global gains of spectral coefficients of the first group of vectors and global gains of spectral coefficients of the second group of vectors; normalize spectral coefficients of vectors that belong to the first group of vectors and are in the m vectors by using the global gains of the spectral coefficients of the first group of vectors, and normalize spectral coefficients of vectors that belong to the second group of vectors and are in the m vectors by using the global gains of the spectral coefficients of the second group of vectors; and quantize normalized spectral coefficients of the m vectors.

**[0245]** Optionally, as another embodiment, the processor 720 may determine m according to the following equation (2).

**[0246]** Optionally, as another embodiment, the processor 720 may determine k according to the following equation (1).

**[0247]** Optionally, as another embodiment, if a signal is a transient signal, a fricative signal, or a long pitch signal, the processor 720 may determine, according to the quantity of available bits and the first saturation threshold i, the quantity k of subbands to be encoded.

**[0248]** For other functions and operations of the device 700 of FIG. 7, refer to processes involving the encoding end in the foregoing method embodiments of FIG. 1, FIG. 3, and FIG. 4. To avoid repetition, details are not described herein again.

**[0249]** FIG. 8 is a schematic block diagram of a signal decoding device according to another embodiment of the present invention. For example, a device 800 of FIG. 8 is a speech decoder or an audio decoder. The device 800 includes a memory 810 and a processor 820.

are all 0s in vectors to which a first group of decoded spectral coefficients belong, and the second group of vectors include vectors whose values are not all 0s in the vectors to which the first group of decoded spectral coefficients belong.

**[0257]** Optionally, as another embodiment, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in ascending order of frequencies of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0258]** Optionally, as another embodiment, in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of quantized envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

**[0259]** Optionally, as another embodiment, the processor 820 may select, in descending order of quantized envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors.

**[0260]** Optionally, as another embodiment, the processor 820 may decode global gains of the m vectors; and correct the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

**[0261]** Optionally, as another embodiment, the processor 820 may decode a first global gain and a second global gain; and correct, by using the first global gain, spectral coefficients that correspond to the first group of vectors and are in the normalized spectral coefficients of the m vectors, and correct, by using the second global gain, spectral coefficients that correspond to the second group of vectors and are in the normalized spectral coefficients of the m vectors, to obtain spectral coefficients of the m vectors.

**[0262]** Optionally, as another embodiment, the processor 820 may add together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain normalized spectral coefficients of the k subbands. The processor 820 may perform noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands, and restore a spectral coefficient of another subband in all the subbands except the k subbands, to obtain spectral coefficients of a first frequency band, where the first frequency band includes all the subbands. The processor 820 may correct the spectral coefficients of the first frequency band by using the envelopes of all the subbands, to obtain normalized spectral coefficients of the first frequency band. The processor 820 may further correct the normalized spectral coefficients of the

## CLAIMS

What is claimed is:

1. A signal encoding method, comprising:

determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded, wherein i is a positive number, and k is a positive integer;

selecting, according to quantized envelopes of all subbands, k subbands from all the subbands, or selecting k subbands from all the subbands according to a psychoacoustic model; and

performing a first-time encoding operation on spectral coefficients of the k subbands.

2. The method according to claim 1, wherein the performing a first-time encoding operation on spectral coefficients of the k subbands comprises:

normalizing the spectral coefficients of the k subbands, to obtain normalized spectral coefficients of the k subbands; and

quantizing the normalized spectral coefficients of the k subbands, to obtain quantized spectral coefficients of the k subbands.

3. The method according to claim 2, wherein the method further comprises:

if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time encoding operation, determining, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed, wherein j is a positive number, and m is a positive integer; and

performing a second-time encoding operation on spectral coefficients of the m vectors.

4. The method according to claim 3, wherein the determining, according to the quantity of remaining bits, the second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed comprises:

determining, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors on which second-time encoding is to be performed;

determining candidate spectral coefficients according to the quantized spectral coefficients of the k subbands, wherein the candidate spectral coefficients comprise spectral coefficients that are obtained by subtracting the corresponding quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands; and

selecting the m vectors from vectors to which the candidate spectral coefficients belong.

5. The method according to claim 4, wherein the selecting the m vectors from vectors to which the candidate spectral coefficients belong comprises:

sorting the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors; and

selecting the first m vectors from the sorted vectors, wherein

the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

6. The method according to claim 5, wherein in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in ascending order of frequencies of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

7. The method according to claim 5, wherein in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of quantized envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

8. The method according to claim 4, wherein the selecting the m vectors from vectors to which the candidate spectral coefficients belong comprises:

selecting, in descending order of quantized envelopes of subbands in which the vectors to which the candidate spectral coefficients belong are located, the m vectors from the vectors to which the candidate spectral coefficients belong.

9. The method according to any one of claims 3 to 8, wherein the performing a second-time encoding operation on spectral coefficients of the m vectors comprises:

determining global gains of the spectral coefficients of the m vectors;

normalizing the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and

quantizing normalized spectral coefficients of the m vectors.

10. The method according to any one of claims 5 to 7, wherein the performing a second-time encoding operation on spectral coefficients of the m vectors comprises:

determining global gains of spectral coefficients of the first group of vectors and global gains of spectral coefficients of the second group of vectors;

normalizing spectral coefficients of vectors that belong to the first group of vectors and are in the m vectors by using the global gains of the spectral coefficients of the first group of vectors, and normalizing spectral coefficients of vectors that belong to the second group of vectors and are in the

m vectors by using the global gains of the spectral coefficients of the second group of vectors; and

quantizing normalized spectral coefficients of the m vectors.

11. The method according to any one of claims 4 to 10, wherein the determining, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors on which second-time encoding is to be performed comprises:

determining m according to the following equation:

$m = \lfloor C/(j \times M) + 0.5 \rfloor$, wherein

C indicates a quantity of remaining bits, and M indicates a quantity of spectral coefficients comprised in each vector.

12. The method according to any one of claims 1 to 11, wherein the determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded comprises:

determining k according to the following equation:

$k = \lfloor B/(i \times L) + 0.5 \rfloor$, wherein

B indicates a quantity of available bits, and L indicates a quantity of spectral coefficients comprised in each subband.

13. The method according to any one of claims 1 to 12, wherein the determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded comprises:

if a signal is a transient signal, a fricative signal, or a long pitch signal, determining, according to the quantity of available bits and the first saturation threshold i, the quantity k of subbands to be encoded.

14. A signal decoding method, comprising:

determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be decoded, wherein i is a positive number, and k is a positive integer;

selecting, according to decoded envelopes of all subbands, k subbands from all the subbands, or selecting k subbands from all the subbands according to a psychoacoustic model; and

performing a first-time decoding operation, to obtain quantized spectral coefficients of the k subbands.

15. The method according to claim 14, wherein the method further comprises:

if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding operation, determining, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors on which second-time decoding is to be performed, wherein j is a positive number, and m is a positive integer;

and

performing a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

16. The method according to claim 15, wherein the method further comprises:

determining a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

17. The method according to claim 16, wherein the determining a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands comprises:

determining a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k subbands belong, wherein the m vectors are in a one-to-one correspondence with the first type of vectors.

18. The method according to claim 17, wherein the determining a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k subbands belong comprises:

sorting the vectors to which the quantized spectral coefficients of the k subbands belong, to obtain sorted vectors;

selecting the first m vectors from the sorted vectors as the first type of vectors; and

establishing a correspondence between the first type of vectors and the m vectors, wherein

the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors comprise vectors whose values are all 0s in vectors to which the first group of decoded spectral coefficients belong, and the second group of vectors comprise vectors whose values are not all 0s in the vectors to which the first group of decoded spectral coefficients belong.

19. The method according to claim 18, wherein in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in ascending order of frequencies of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

20. The method according to claim 18, wherein in each group of vectors of the first group of vectors and the second group of vectors, vectors in different subbands are arranged in descending order of envelopes of the subbands in which the vectors are located, and vectors in a same subband are arranged in an original order of the vectors.

21. The method according to claim 17, wherein the determining a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k

subbands belong comprises:

selecting, in descending order of envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors; and

establishing a correspondence between the first type of vectors and the m vectors.

22. The method according to any one of claims 16 to 21, wherein the method further comprises:

decoding global gains of the m vectors; and

correcting the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

23. The method according to any one of claims 18 to 20, wherein the method further comprises:

decoding a first global gain and a second global gain; and

correcting, by using the first global gain, spectral coefficients that correspond to the first group of vectors and are in the normalized spectral coefficients of the m vectors, and correcting, by using the second global gain, spectral coefficients that correspond to the second group of vectors and are in the normalized spectral coefficients of the m vectors, to obtain spectral coefficients of the m vectors.

24. The method according to claim 22 or 23, wherein the method further comprises:

adding together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain normalized spectral coefficients of the k subbands;

performing noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands, and restoring a spectral coefficient of another subband in all the subbands except the k subbands, to obtain spectral coefficients of a first frequency band, wherein the first frequency band comprises all the subbands; and

correcting the spectral coefficients of the first frequency band by using the envelopes of all the subbands, to obtain normalized spectral coefficients of the first frequency band; and correcting the normalized spectral coefficients of the first frequency band by using a global gain of the first frequency band, to obtain a final frequency domain signal of the first frequency band.

25. The method according to claim 24, wherein the adding together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain normalized spectral coefficients of the k subbands comprises:

adding together the spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands according to a correspondence between the normalized spectral

coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

26. The method according to claim 24 or 25, wherein the performing noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands comprises:

determining a weighted value according to core layer decoding information; and

weighting spectral coefficients that are adjacent to the spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands and random noise by using the weighted value.

27. The method according to claim 26, wherein the determining a weighted value according to core layer decoding information comprises:

acquiring signal classification information from the core layer decoding information; and

if the signal classification information indicates that a signal is a fricative signal, acquiring a predetermined weighted value; or

if the signal classification information indicates that a signal is another signal except a fricative signal, acquiring a pitch period from the core layer decoding information, and determining a weighted value according to the pitch period.

28. The method according to any one of claims 24 to 27, wherein the restoring a spectral coefficient of another subband in all the subbands except the k subbands comprises:

selecting, from all the subbands, n subbands that are adjacent to the another subband except the k subbands, and restoring the spectral coefficient of the another subband except the k subbands according to spectral coefficients of the n subbands, wherein n is a positive integer; or

selecting p subbands from the k subbands, and restoring the spectral coefficient of the another subband except the k subbands according to spectral coefficients of the p subbands, wherein a quantity of bits allocated to each subband in the p subbands is greater than or equal to a second bit quantity threshold, wherein p is a positive integer.

29. The method according to any one of claims 15 to 28, wherein the determining, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors on which second-time decoding is to be performed comprises:

determining m according to the following equation:

$m = \lfloor C/(j \times M) + 0.5 \rfloor$, wherein

C indicates a quantity of remaining bits, and M indicates a quantity of spectral coefficients comprised in each vector.

30. The method according to any one of claims 14 to 29, wherein the determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be decoded comprises:

determining k according to the following equation:

$k = \lfloor B/(i \times L) + 0.5 \rfloor$, wherein

B indicates a quantity of available bits, and L indicates a quantity of spectral coefficients comprised in each subband.

31. The method according to any one of claims 14 to 30, wherein the determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be decoded comprises:

if a signal is a transient signal, a fricative signal, or a long pitch signal, determining, according to the quantity of available bits and the first saturation threshold i, the quantity k of subbands to be decoded.

32. A signal encoding device, comprising:

a determining unit, configured to determine, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded, wherein i is a positive number, and k is a positive integer;

a selecting unit, configured to: according to the quantity k of subbands that is determined by the determining unit, select, according to quantized envelopes of all subbands, k subbands from all the subbands, or select k subbands from all the subbands according to a psychoacoustic model; and

an encoding unit, configured to perform a first-time encoding operation on spectral coefficients of the k subbands selected by the selecting unit.

33. The device according to claim 32, wherein the encoding unit is specifically configured to: normalize the spectral coefficients of the k subbands, to obtain normalized spectral coefficients of the k subbands; and quantize the normalized spectral coefficients of the k subbands, to obtain quantized spectral coefficients of the k subbands.

34. The device according to claim 33, wherein

the selecting unit is further configured to: if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time encoding operation, determine, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed, wherein j is a positive number, and m is a positive integer; and

the encoding unit is further configured to perform a second-time encoding operation on spectral coefficients of the m vectors determined by the selecting unit.

35. The device according to claim 34, wherein the selecting unit is specifically configured to determine, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors to be encoded; determine candidate spectral coefficients according to the

quantized spectral coefficients of the k subbands, wherein the candidate spectral coefficients comprise spectral coefficients that are obtained by subtracting the corresponding quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands; and select the m vectors from vectors to which the candidate spectral coefficients belong.

36. The device according to claim 35, wherein the selecting unit is specifically configured to sort the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors; and select the first m vectors from the sorted vectors, wherein the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

37. The device according to claim 35, wherein the selecting unit is specifically configured to select, in descending order of quantized envelopes of subbands in which the vectors to which the candidate spectral coefficients belong are located, the m vectors from the vectors to which the candidate spectral coefficients belong.

38. The device according to any one of claims 34 to 37, wherein the encoding unit is specifically configured to determine global gains of the spectral coefficients of the m vectors; normalize the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and quantize normalized spectral coefficients of the m vectors.

39. The device according to claim 36, wherein the encoding unit is specifically configured to determine global gains of spectral coefficients of the first group of vectors and global gains of spectral coefficients of the second group of vectors; normalize spectral coefficients of vectors that belong to the first group of vectors and are in the m vectors by using the global gains of the spectral coefficients of the first group of vectors, and normalize spectral coefficients of vectors that belong to the second group of vectors and are in the m vectors by using the global gains of the spectral coefficients of the second group of vectors; and quantize normalized spectral coefficients of the m vectors.

40. The device according to any one of claims 35 to 39, wherein the selecting unit is specifically configured to determine m according to the following equation:

$m = \lfloor C/(j \times M) + 0.5 \rfloor$, wherein

C indicates a quantity of remaining bits, and M indicates a quantity of spectral coefficients comprised in each vector.

41. The device according to any one of claims 32 to 40, wherein the determining unit is

specifically configured to determine k according to the following equation:

$k = \lfloor B/(i \times L) + 0.5 \rfloor$, wherein

B indicates a quantity of available bits, and L indicates a quantity of spectral coefficients comprised in each subband.

42. The device according to any one of claims 32 to 41, wherein the determining unit is specifically configured to: if a signal is a transient signal, a fricative signal, or a long pitch signal, determine, according to the quantity of available bits and the first saturation threshold i, the quantity k of subbands to be encoded.

43. A signal decoding device, comprising:

a first determining unit, configured to determine, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be decoded, wherein i is a positive number, and k is a positive integer;

a selecting unit, configured to: according to the quantity k of subbands that is determined by the first determining unit, select, according to decoded envelopes of all subbands, k subbands from all the subbands, or select k subbands from all the subbands according to a psychoacoustic model; and

a decoding unit, configured to perform a first-time decoding operation, to obtain quantized spectral coefficients of the k subbands selected by the selecting unit.

44. The device according to claim 43, wherein

the first determining unit is further configured to: if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding, determine, according to the quantity of remaining bits, the second saturation threshold j, and the first group of decoded spectral coefficients, a quantity m of vectors on which second-time decoding is to be performed, wherein j is a positive number, and m is a positive integer; and

the decoding unit is further configured to perform a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

45. The device according to claim 44, further comprising:

a second determining unit, configured to determine a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

46. The device according to claim 45, wherein the second determining unit is specifically configured to determine a correspondence between the m vectors and a first type of vectors in vectors to which the quantized spectral coefficients of the k subbands belong, wherein the m vectors are in a one-to-one correspondence with the first type of vectors.

47. The device according to claim 46, wherein the second determining unit is specifically

configured to sort the vectors to which the quantized spectral coefficients of the k subbands belong, to obtain sorted vectors; select the first m vectors from the sorted vectors as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors, wherein the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors comprise vectors whose values are all 0s in vectors to which the first group of decoded spectral coefficients belong, and the second group of vectors comprise vectors whose values are not all 0s in the vectors to which the first group of decoded spectral coefficients belong.

48. The device according to claim 46, wherein the second determining unit is specifically configured to select, in descending order of envelopes of subbands in which the vectors to which the quantized spectral coefficients of the k subbands belong are located, m vectors from the vectors to which the quantized spectral coefficients of the k subbands belong as the first type of vectors; and establish a correspondence between the first type of vectors and the m vectors.

49. The device according to any one of claims 44 to 48, further comprising a correcting unit, wherein

the decoding unit is further configured to decode global gains of the m vectors; and

the correcting unit is configured to correct the normalized spectral coefficients of the m vectors by using the global gains of the m vectors, to obtain spectral coefficients of the m vectors.

50. The device according to claim 47, further comprising a correcting unit, wherein

the decoding unit is further configured to decode a first global gain and a second global gain; and

the correcting unit is configured to correct, by using the first global gain, spectral coefficients that correspond to the first group of vectors and are in the normalized spectral coefficients of the m vectors, and correct, by using the second global gain, spectral coefficients that correspond to the second group of vectors and are in the normalized spectral coefficients of the m vectors, to obtain spectral coefficients of the m vectors.

51. The device according to claim 49 or 50, further comprising an adding unit and a restoring unit, wherein

the adding unit is configured to add together the quantized spectral coefficients of the k subbands and the spectral coefficients of the m vectors, to obtain spectral coefficients of the k subbands;

the restoring unit is configured to perform noise filling on a spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands, and restore a spectral coefficient of another subband in all the subbands except the k subbands, to obtain spectral coefficients of a first

frequency band, wherein the first frequency band comprises all the subbands;

the correcting unit is further configured to correct the spectral coefficients of the first frequency band by using the envelopes of all the subbands, to obtain normalized spectral coefficients of the first frequency band; and

the correcting unit is further configured to correct the normalized spectral coefficients of the first frequency band by using a global gain of the first frequency band, to obtain a final frequency domain signal of the first frequency band.

52. The device according to claim 51, wherein the adding unit is specifically configured to add together the spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands according to a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

53. The device according to claim 51 or 52, wherein the restoring unit is specifically configured to determine a weighted value according to core layer decoding information; and weight spectral coefficients that are adjacent to the spectral coefficient whose value is 0 in the normalized spectral coefficients of the k subbands and random noise by using the weighted value.

54. The device according to claim 53, wherein the restoring unit is specifically configured to acquire signal classification information from the core layer decoding information; and if the signal classification information indicates that a signal is a fricative signal, acquire a predetermined weighted value; or if the signal classification information indicates that a signal is another signal except a fricative signal, acquire a pitch period from the core layer decoding information, and determine a weighted value according to the pitch period.

55. The device according to any one of claims 51 to 54, wherein the restoring unit is specifically configured to select, from all the subbands, n subbands that are adjacent to the another subband except the k subbands, and restore the spectral coefficient of the another subband except the k subbands according to spectral coefficients of the n subbands, wherein n is a positive integer; or select p subbands from the k subbands, and restore the spectral coefficient of the another subband except the k subbands according to spectral coefficients of the p subbands, wherein a quantity of bits allocated to each subband in the p subbands is greater than or equal to a second bit quantity threshold, wherein p is a positive integer.

56. The device according to any one of claims 44 to 55, wherein the first determining unit is specifically configured to determine m according to the following equation:

$m = \lfloor C/(j \times M) + 0.5 \rfloor$, wherein

C indicates a quantity of remaining bits, and M indicates a quantity of spectral coefficients comprised in each vector.

57. The device according to any one of claims 43 to 56, wherein the first determining unit is specifically configured to determine k according to the following equation:

$k = \lfloor B/(i \times L) + 0.5 \rfloor$, wherein

B indicates a quantity of available bits, and L indicates a quantity of spectral coefficients comprised in each subband.

58. The device according to any one of claims 43 to 57, wherein the first determining unit is specifically configured to: if a signal is a transient signal, a fricative signal, or a long pitch signal, determine, according to the quantity of available bits and the first saturation threshold i, the quantity k of subbands to be decoded.

## CLAIMS

1. A signal encoding method, comprising:

determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded, wherein i is a positive number, and k is a positive integer;

selecting, according to quantized envelopes of all subbands, k subbands from all the subbands, or selecting k subbands from all the subbands according to a psychoacoustic model; and

performing a first-time encoding operation on spectral coefficients of the k subbands.

2. The method according to claim 1, wherein the performing a first-time encoding operation on spectral coefficients of the k subbands comprises:

normalizing the spectral coefficients of the k subbands, to obtain normalized spectral coefficients of the k subbands; and

quantizing the normalized spectral coefficients of the k subbands, to obtain quantized spectral coefficients of the k subbands.

3. The method according to claim 2, wherein the method further comprises:

if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time encoding operation, determining, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed, wherein j is a positive number, and m is a positive integer; and

performing a second-time encoding operation on spectral coefficients of the m vectors.

4. The method according to claim 3, wherein the determining, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed comprises:

determining, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors on which second-time encoding is to be performed;

determining candidate spectral coefficients according to the quantized spectral coefficients of the k subbands, wherein the candidate spectral coefficients comprise spectral coefficients that are obtained by subtracting the corresponding quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands; and

selecting the m vectors from vectors to which the candidate spectral coefficients belong.

5. The method according to claim 4, wherein the selecting the m vectors from vectors to which the candidate spectral coefficients belong comprises:

sorting the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors;

and

selecting the first m vectors from the sorted vectors, wherein

the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

6. The method according to any one of claims 3 to 5, wherein the performing a second-time encoding operation on spectral coefficients of the m vectors comprises:

determining global gains of the spectral coefficients of the m vectors;

normalizing the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and

quantizing normalized spectral coefficients of the m vectors.

7. A signal decoding method, comprising:

determining, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be decoded, wherein i is a positive number, and k is a positive integer;

selecting, according to decoded envelopes of all subbands, k subbands from all the subbands, or selecting k subbands from all the subbands according to a psychoacoustic model; and

performing a first-time decoding operation, to obtain quantized spectral coefficients of the k subbands.

8. The method according to claim 7, wherein the method further comprises:

if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding operation, determining, according to the quantity of remaining bits and a second saturation threshold j, a quantity m of vectors on which second-time decoding is to be performed, wherein j is a positive number, and m is a positive integer; and

performing a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

9. The method according to claim 8, wherein the method further comprises:

determining a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

10. A signal encoding device, comprising:

a determining unit, configured to determine, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be encoded, wherein i is a positive number, and k is a positive integer;

a selecting unit, configured to: according to the quantity k of subbands that is determined by the determining unit, select, according to quantized envelopes of all subbands, k subbands from all the subbands, or select k subbands from all the subbands according to a psychoacoustic model; and

an encoding unit, configured to perform a first-time encoding operation on spectral coefficients of the k subbands selected by the selecting unit.

11. The device according to claim 10, wherein the encoding unit is specifically configured to: normalize the spectral coefficients of the k subbands, to obtain normalized spectral coefficients of the k subbands; and quantize the normalized spectral coefficients of the k subbands, to obtain quantized spectral coefficients of the k subbands.

12. The device according to claim 11, wherein

the selecting unit is further configured to: if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time encoding operation, determine, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed, wherein j is a positive number, and m is a positive integer; and

the encoding unit is further configured to perform a second-time encoding operation on spectral coefficients of the m vectors determined by the selecting unit.

13. The device according to claim 12, wherein the selecting unit is specifically configured to determine, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors to be encoded; determine candidate spectral coefficients according to the quantized spectral coefficients of the k subbands, wherein the candidate spectral coefficients comprise spectral coefficients that are obtained by subtracting the corresponding quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands; and select the m vectors from vectors to which the candidate spectral coefficients belong.

14. The device according to claim 13, wherein the selecting unit is specifically configured to sort the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors; and select the first m vectors from the sorted vectors, wherein the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

15. The device according to any one of claims 10 to 14, wherein the encoding unit is specifically configured to determine global gains of the spectral coefficients of the m vectors;

normalize the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and quantize normalized spectral coefficients of the m vectors.

16. A signal decoding device, comprising:

a first determining unit, configured to determine, according to a quantity of available bits and a first saturation threshold i, a quantity k of subbands to be decoded, wherein i is a positive number, and k is a positive integer;

a selecting unit, configured to: according to the quantity k of subbands that is determined by the first determining unit, select, according to decoded envelopes of all subbands, k subbands from all the subbands, or select k subbands from all the subbands according to a psychoacoustic model; and

a decoding unit, configured to perform a first-time decoding operation, to obtain quantized spectral coefficients of the k subbands selected by the selecting unit.

17. The device according to claim 16, wherein

the first determining unit is further configured to: if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding, determine, according to the quantity of remaining bits, the second saturation threshold j, and the first group of decoded spectral coefficients, a quantity m of vectors on which second-time decoding is to be performed, wherein j is a positive number, and m is a positive integer; and

the decoding unit is further configured to perform a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

18. The device according to claim 17, further comprising:

a second determining unit, configured to determine a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.