CLAIMS

1. A device comprising: a multichannel encoder configured to: receive at least a first audio signal and a second audio signal; perform a downmix operation on the first audio signal and the second audio signal to generate a mid signal; generate a low-band mid signal and a high-band mid signal based on the mid signal, the low-band mid signal corresponding to a low frequency portion of the mid signal and the high-band mid signal corresponding to a high frequency portion of the mid signal; determine, based at least partially on a voicing value corresponding to the low-band mid signal and a gain value corresponding to the high-band mid signal, a value of a non harmonic high band flag associated with the high-band mid signal, wherein the non harmonic high band flag corresponds to whether the high-band mid signal is harmonic or non harmonic; generate a first high band mixing gain and a second high band mixing gain based at least in part on the non harmonic high band flag; and generate a bitstream based at least in part on the first high band mixing gain and the second high band mixing gain.

2. The device of claim 1, wherein the multi-channel encoder is further configured to: generate a non-linear harmonic excitation based on a low-band excitation signal, the low-band excitation signal based on the low-band mid signal; generate modulated noise based on the non-linear harmonic excitation; and control, based on the non harmonic high band flag, mixing of the non-linear harmonic excitation and the modulated noise to generate a high-band mid excitation signal.

3. The device of claim 2, wherein the multi-channel encoder is further configured to generate the high-band mid signal by applying the first high band mixing gain to the non-linear harmonic excitation and applying the second high band mixing gain to the modulated noise prior to generating the high-band mid excitation signal.

4. The device of claim 1, wherein the multi-channel encoder is further configured to: determine a gain frame parameter corresponding to a frame of the high-band mid signal; compare the gain frame parameter to a threshold; and in response to the gain frame parameter being greater than the threshold, modify the value of the non harmonic high band flag.

5. The device of claim 4, wherein the multi-channel encoder is further configured to: generate a synthesized version of the high-band mid signal based on the high-band mid excitation signal; and compare the frame of the high-band mid signal to a frame of the synthesized version of the high-band mid signal to generate the gain frame parameter.

6. The device of claim 4, wherein the first high band mixing gain and the second high mixing gain are modified based on the modified value of the non harmonic high band flag.

7. The device of claim 1, wherein the multi-channel encoder includes a stereo encoder that generates a non-reference high band excitation signal at least partially based on the non harmonic high band flag during an inter-channel band width extension (ICBWE) encoding operation.

8. The device of claim 1, wherein the multi-channel encoder is integrated into a mobile device or a base station.

9. The device of claim 1, wherein the first high band mixing gain and the second high mixing gain are also based on a gain in a previous frame.

10. The device of claim 1, wherein the first high band mixing gain and the second high mixing gain are also based on low band voice factors.

11. The device of claim 1, further comprising a transmitter configured to transmit a speech packet including the non harmonic high band flag to a second device.

12. The device of claim 1, wherein the high-band mid signal is non harmonic includes a determination of whether the non harmonic is strongly harmonic or weakly harmonic.

13. The device of claim 12, wherein the non harmonic high band flag has a value of 1 when the non harmonic is strongly harmonic, and the non harmonic high band flag has a value of 2 when the non harmonic is weakly harmonic.

14. The device of claim 13, wherein the value of the non harmonic high band flag is determined based on a support vector machine or a neural network.

15. A method comprising: receiving at least a first audio signal and a second audio signal at a multi-channel encoder; performing a downmix operation on the first audio signal and the second audio signal to generate a mid signal; generating a low-band mid signal and a high-band mid signal based on the mid signal, the low-band mid signal corresponding to a low frequency portion of the mid signal and the high-band mid signal corresponding to a high frequency portion of the mid signal; determining, based at least partially on a voicing value corresponding to the low-band mid signal and a gain value corresponding to the high-band mid signal, a value of a non harmonic high band flag associated with the high-band mid signal; generating a first high band mixing gain and a second high band mixing gain based at least in part on the non harmonic high band flag, wherein the non harmonic high band flag corresponds to whether the high-band mid signal is harmonic or non harmonic; and generating a bitstream based at least in part on the first high band mixing gain and the second high band mixing gain.

16. The method of claim 15, further comprising: generating a non-linear harmonic excitation based on a low-band excitation signal, the low-band excitation signal based on the low-band mid signal; generating modulated noise based on the non-linear harmonic excitation; and controlling, based on the non harmonic high band flag, mixing of the non-linear harmonic excitation and the modulated noise to generate a high-band mid excitation signal.

17. The method of claim 16, wherein the multi-channel encoder is further configured to generate

the high-band mid signal by applying the first high band mixing gain to the non-linear harmonic excitation and applying the second high band mixing gain to the modulated noise prior to generating the high-band mid excitation signal.

18. The method of claim 16, further comprising: determining a gain frame parameter corresponding to a frame of the high-band mid signal; comparing the gain frame parameter to a threshold; and in response to the gain frame parameter being greater than the threshold, modifying the value of the non harmonic high band flag.

19. The method of claim 18, wherein determining the gain frame parameter comprises: generating a synthesized version of the high-band mid signal based on the high-band mid excitation signal; and comparing the frame of the high-band mid signal to a frame of the synthesized version of the high-band mid signal.

20. The method of claim 18, wherein the first high band mixing gain and the second high mixing gain are modified based on the modified value of the non harmonic high band flag.

21. The method of claim 15, wherein determining the value of the non harmonic high band flag, generating the high-band mid excitation signal, and generating the bitstream are performed at a mobile device or at a base station.

22. The method of claim 15, wherein the first high band mixing gain and the second high mixing gain are also based on a gain in a previous frame.

23. The method of claim 15, wherein the first high band mixing gain and the second high mixing gain are also based on low band voice factors.

24. The method of claim 15, further comprising transmitting a speech packet including the non harmonic high band flag to a second device.

25. The method of claim 15, wherein the high-band mid signal is non harmonic includes a determination of whether the non harmonic is strongly harmonic or weakly harmonic.

26. The method of claim 25, wherein the non harmonic high band flag has a value of 1 when the non harmonic is strongly harmonic, and the non harmonic high band flag has a value of 2 when the non harmonic is weakly harmonic.

27. The method of claim 26, wherein the value of the non harmonic high band flag is determined based on a support vector machine or a neural network.