CLAIMS

1. A method of generating a bitstream for an audio signal, comprising:

determining, using an immersive voice and audio services (IVAS) encoder, a coding mode indicator or coding tool indicator, the coding mode indicator or coding tool indicator indicating a coding mode or coding tool for the audio signal;

encoding, using the IVAS encoder, the coding mode indicator or coding tool indicator in a common header (CH) section of an IVAS bitstream;

determining, using the IVAS encoder, a mode header or tool header;

encoding, using the IVAS encoder, the mode or tool header in a tool header (TH) section of the IVAS bitstream, wherein the TH section follows the CH section, wherein the TH section includes data associated with an IVAS bitrate distribution control table;

determining, using the IVAS encoder, a metadata payload including spatial metadata;

encoding, using the IVAS encoder, the metadata payload in a metadata payload (MDP) section of the IVAS bitstream, where the MDP section follows the CH section; and

determining, using the IVAS encoder, an enhanced voice services (EVS) payload, the EVS payload including EVS coded bits for each channel or downmix channel of the audio signal; and

encoding, using the IVAS encoder, the EVS payload in an EVS payload (EP) section of the IVAS bitstream, where the EP section follows the CH section.

2. The method of claim 1, further comprising:

storing the IVAS bitstream on a non-transitory computer-readable medium or streaming the IVAS bitstream to a downstream device, wherein the coding mode or coding tool indicator, the mode header or tool header, the metadata payload and the EVS payload are extracted and decoded from the, CH, TH, MDP and EP sections of the IVAS bitstream, respectively, for use in reconstruction of the audio signal on the downstream device or another device.

3. A method of decoding a bitstream of an audio signal, comprising:

extracting and decoding, using an immersive voice and audio services (IVAS) decoder, a coding mode indicator or coding tool indicator in a common header (CH) section of an IVAS bitstream, the coding mode indicator or coding tool indicator indicating a coding mode or coding tool for the audio signal;

extracting and decoding, using the IVAS decoder, a mode header or tool header in the

Tool Header (TH) section of the IVAS bitstream, the TH section following the CH section, wherein the TH section includes data associated with an IVAS bitrate distribution control table;

extracting and decoding, using the IVAS decoder, a metadata payload from metadata payload (MDP) section of the IVAS bitstream, the MDP section following the CH section, the metadata payload including spatial metadata; and

extracting and decoding, using the IVAS decoder, an enhanced voice services (EVS) payload from an EVS payload (EP) section of the IVAS bitstream, the EP section following the CH section, the EVS payload including EVS coded bits for each channel or downmix channel of the audio signal.

4. The method of claim 3, further comprising:

controlling an audio decoder of a downstream device based on the coding mode indicator or coding tool indicator, the mode header or tool header, the EVS payload, and the metadata payload for use in reconstruction of the audio signal on the downstream device or another device, or storing a representation of the coding mode indicator or coding tool indicator, the mode header or tool header, the EVS payload, and the metadata payload on a non-transitory computer-readable medium.

5. The method of any of the preceding claims 1-4, wherein the CH is a multi-bit data structure, where one value of the multi-bit data structure corresponding to a spatial reconstruction (SPAR) coding mode and other values of the data structure correspond to other coding modes.

6. The method of any of the preceding claims 1-5, comprising storing in or reading from, respectively, the TH section of the IVAS bitstream, an index offset for computing a row index of the IVAS bitrate distribution control table.

7. The method of any of the preceding claims 1-6, comprising storing in or reading from, respectively, the MDP section of the IVAS bitstream:

a quantization strategy indicator;

a bitstream coding strategy indicator; and

quantized and coded real and imaginary parts of a set of coefficients.

8. The method of any of the preceding claims 1-7, wherein the EP section follows the MDP section to ensure efficient bitpacking, and a number of bits in the MDP section of the IVAS bitstream and a number of bits in the EP section of the IVAS bitstream vary in accordance with the IVAS bitrate distribution control table and a bitrate distribution algorithm to ensure that all available bits in an IVAS bitrate budget are utilized.

9. The method of any of the preceding claims 1-8, wherein a bitrate for each EVS coded channel or downmix channel is determined by a total available bits for EVS, a bitrate distribution control table and a bitrate distribution algorithm.

10. The method of claim 7, wherein the set of coefficients include prediction coefficients, direct coefficients, diagonal real coefficients and lower triangle complex coefficients, and wherein the prediction coefficients are variable bit length based on entropy coding, and the direct coefficients, diagonal real coefficients and lower triangle complex coefficients are variable bit length based on a downmix configuration and entropy coding.

11. The method of claim 7, wherein the quantization strategy indicator is a multi-bit data structure that indicates a quantization strategy, wherein the bitstream coding strategy indicator is a multi-bit data structure that indicates a number of bands of spatial metadata and a non-differential or time-differential entropy coding scheme, or wherein the quantization of the coefficients is according to an EVS bitrate distribution control strategy that includes metadata quantization and an EVS bitrate distribution.

12. The method of any of the preceding claims 1-11, comprising storing in or reading from, respectively, the EP section of the bitstream an EVS payload for EVS instances per 3rd generation partnership project (3GPP) technical specification (TS) 26.445.

13. The method of any of the preceding claims 3-12, further comprising:

determining a bitrate from the IVAS bitstream;

reading an index offset based on the TH section of the IVAS bitstream;

determining a table row index for the IVAS bitrate distribution control table using the index offset;

reading quantization strategy bits and coding strategy bits from a metadata payload (MDP) section in the IVAS bitstream;

unquantizing SPAR spatial metadata in the MDP section of the IVAS bitstream based on the quantization strategy bits and the coding strategy bits;

determining an Enhanced Voice Services (EVS) bitrate for each channel in the IVAS bitstream using a total available EVS bits, the IVAS bitrate distribution control table and a bitrate distribution algorithm;

reading EVS coded bits from the EP section of the IVAS bitstream based on the EVS bitrate;

decoding the EVS bits;

decoding the spatial metadata; and

generating first order Ambisonics (FoA) output using the decoded EVS bits and the decoded spatial metadata.

14. A system comprising:

one or more processors; and

a non-transitory computer-readable medium storing instructions that, upon execution by the one or more processors, cause the one or more processors to perform operations of any one of the method claims 1-13.

15. A non-transitory, computer-readable medium storing instructions that, upon execution by one or more processors, cause the one or more processors to perform operations of any one of the method claims 1-13.