The invention claimed is : ~~CLAIMS~~

1. A wireless networking system, comprising:

a base station device including processing circuitry configured to detect a transmission rate from a portion of a preamble of an incoming packet transmission signal and adapt a radio configuration to receive a remainder of the incoming packet transmission signal at the transmission rate, wherein the processing circuitry of the base station device includes :

a packet detection module that implements an adaptive sampling algorithm to collect samples of the preamble of the incoming packet transmission signal, the incoming packet transmission signal being received by a receiver of the base station device from a wireless device;

a classifier configured to receive the samples and to output a classification that indicates one or more encoding parameters of the incoming packet transmission signal; and

a radio configuration module that sends a configuration command to configure a radio of the base station device to receive a reminder of the incoming packet transmission signal according to the one or more encoding parameters indicated by the classification .

2. The wireless networking system of claim 1, wherein the base station device is configured to implement a low power wide area network and the incoming packet transmission signal is sent from the wireless device to the base station device according to a Long Range Wide Area Network (LoRaWAN) . ~~further includes:~~

~~a packet detection module that implements an adaptive sampling algorithm to collect samples of the preamble of the incoming packet transmission signal, the incoming packet transmission signal being received by a receiver of the base station device from a wireless device;~~

~~a classifier configured to receive the samples and to output a classification that indicates one or more encoding parameters of the incoming packet transmission signal; and~~

~~a radio configuration module that sends a configuration command to configure a radio of the base station device to receive a remainder of the incoming packet transmission signal according to the one or more encoding parameters indicated by the classification.~~

3. The wireless networking system of claim 1~~2~~, wherein the encoding parameters are not pre-negotiated between the wireless device and the base station device, prior to receiving the incoming packet transmission signal.

4. The wireless networking system of claim 1~~2~~, wherein

the wireless device is configured to:

set the encoding parameters to values selected at the wireless device from among a plurality of preset values for the encoding parameters, and

commence transmitting the incoming packet transmission signal according to the encoding parameters without engaging in any prior communications with the base station device to pre-negotiate the encoding parameters.

5. The wireless networking system of claim 1~~2~~, wherein the samples include samples taken from two symbols in a preamble of the packet signal, and an artificial intelligence model of the classifier uses a plurality of features of the samples to determine the classification, the plurality of features including a real component of the samples, an imaginary component of the samples, and a fast Fourier transform of the samples.

6. The wireless networking system of claim 5, wherein samples taken from two symbols or less are used by the artificial intelligence model to output the classification.

7. The wireless networking system of claim 5, wherein the artificial intelligence model is a multi-stage model and includes :

a first stage wherein a bandwidth classifier including a first convolutional neural network that classifies the incoming packet transmission signal into one of a plurality of bandwidth range classifications; and

a second stage wherein, for signals having bandwidths below the predetermined threshold, the signals are classified into one of multiple low bandwidth encoding classifications by a low bandwidth encoding classifier including a second convolutional neural network, and for signals above the predetermined threshold, the signals are classified into one of multiple high bandwidth encoding classifications by a high bandwidth encoding classifier including a third convolutional neural network.

8. The wireless networking system of claim 1, wherein the adaptive sampling algorithm is configured to :

filter the incoming packet transmission signal using one or more band pass filters to thereby generate a plurality of filtered incoming packet transmission signal components;

determine that the captured signal is sufficient to determine the one or more encoding parameters for one of the filtered incoming packet transmission signal components.

9. The wireless networking system of claim 1, wherein the classifier is an artificial intelligence model that includes at least one convolutional neural network.

10.~~7.~~ The wireless networking system of claim 1~~2~~, wherein the one or more encoding parameters include bandwidth and/or spreading factor.

11. A wireless networking system, comprising :

processing circuitry configured to execute :

a packet detection module that implements an adaptive sampling algorithm to collect samples of a preamble of an incoming packet transmission signal, the incoming packet transmission signal being received by a receiver from a wireless device;

a classifier including a neural network configured to receive the samples and to output a classification that indicates one or more encoding parameters of the incoming packet transmission signal; and

a radio configuration module that sends a configuration command to configure an associated radio to receive a reminder of the incoming packet transmission signal according to the one or more encoding parameters indicated by the classification.

~~8. The wireless networking system of claim 2, wherein the adaptive sampling algorithm is configured to:~~

~~filter the incoming packet transmission signal using one or more band pass filters to thereby generate a plurality of filtered incoming packet transmission signal components;~~

~~determine that the captured signal is sufficient to determine the one or more encoding parameters for one of the filtered incoming packet transmission signal components.~~

~~9. The wireless networking system of claim 2, wherein the classifier is an artificial intelligence model that includes at least one convolutional neural network.~~

~~10. The wireless networking system of claim 5, wherein the artificial intelligence model is a multi-stage model and includes:~~

~~a first stage wherein a bandwidth classifier including a first convolutional neural network that classifies the incoming packet transmission signal into one of a plurality of bandwidth range classifications; and~~

~~a second stage wherein, for signals having bandwidths below the predetermined threshold, the signals are classified into one of multiple low bandwidth encoding classifications by a low bandwidth encoding classifier including a second convolutional neural network, and for signals above the predetermined threshold, the signals are classified into one of multiple high bandwidth encoding classifications by a high bandwidth encoding classifier including a third convolutional neural network.~~

~~11. The wireless networking system of claim 1, wherein the base station device is configured to implement a low power wide area network and the incoming packet transmission signal is sent from the wireless device to the base station device according a LoRaWAN communication protocol.~~

~~12. A wireless networking method, comprising:~~

~~detecting a transmission rate from a portion of a preamble of an incoming packet transmission signal; and~~

~~adapting a radio to receive a remainder of the incoming packet transmission signal at the transmission rate.~~

12.~~13.~~ A wireless networking ~~The~~ method ~~of claim 12~~, ~~further~~ comprising:

detecting a transmission rate from a portion of a preamble of an incoming packet transmission signal, at least in part by~~via processing circuitry~~:

implementing an adaptive sampling algorithm to collect samples of the preamble of

the incoming packet transmission signal, the incoming packet transmission signal being received from a wireless device; and

receiving the samples at a classifier and outputting a classification that indicates one or more encoding parameters of the incoming packet transmission signal; and

adapting a radio to receive a remainder of the incoming packet transmission signal at the transmission rate, at least in part by :

sending a configuration command to configure the radio to receive a remainder of the incoming packet transmission signal according to the one or more encoding parameters indicated by the classification.

13. The method of claim 12, wherein the one or more encoding parameters include bandwidth and/or spreading factor.

14. The method of claim 12~~3~~, wherein the encoding parameters are not pre-negotiated between the wireless device and the base station device, prior to receiving the incoming packet transmission signal.

15. The method of claim 12~~3~~, wherein the samples include samples taken from two symbols in a preamble of the packet signal, and an artificial intelligence model of the classifier uses a plurality of features of the samples to determine the classification, the plurality of features including a real component of the samples, an imaginary component of the samples, and a fast Fourier transform of the samples.

16. The method of claim 15, wherein samples taken from two symbols or less are used by the artificial intelligence model to output the classification.

17. The method of claim 12, wherein the classifier is an artificial intelligence model that includes at least one convolutional neural network.

18. The method of claim 17, wherein the artificial intelligence model is a multi-stage model and includes :

a first stage wherein a bandwidth classifier including a first convolutional neural network that classifies the incoming packet transmission signal into one of a plurality of bandwidth range classifications; and

a second stage wherein, for signals having bandwidths below the predetermined threshold, the signals are classified into one of multiple low bandwidth encoding classifications by a low bandwidth encoding classifier including a second convolutional neural network, and for signals above the predetermined threshold, the signals are classified into one of multiple high bandwidth encoding classifications by a high bandwidth encoding classifier including a third convolutional neural network.