

CLAIMS

1. A method of wireless communication operable at a wireless communication device, comprising:

monitoring a shared spectrum channel to detect a transmission of a technology-neutral signature waveform that is detectable by devices of two or more different systems to act as a channel occupation signal to facilitate sharing of a spectrum channel by the two or more different systems, the monitoring comprising:

sensing a signal on the shared spectrum channel;

determining an autocorrelation of the sensed signal; and

if the autocorrelation is greater than an autocorrelation threshold, determining that the shared spectrum channel carries the technology-neutral signature waveform;

if the technology-neutral signature waveform is detected from a first system the wireless communication device is configured to use, monitoring the shared spectrum channel for a first technology-specific waveform corresponding to the first system; and

if the technology-neutral signature waveform is not detected for a time greater than a threshold amount of time, determining that the shared spectrum channel is idle.

2. The method of claim 1, further comprising:

if the technology-neutral signature waveform is detected from a second system known to the wireless communication device, forgoing to use the shared spectrum channel for a back off time, or monitoring the shared spectrum channel for a second technology-specific waveform corresponding to the second system; and

if the technology-neutral signature waveform is detected from a third system with an unknown signature waveform, forgoing to use the shared spectrum channel for the back off time.

3. The method of claim 2, further comprising:

performing frequency error correction using the detected technology-neutral signature waveform.

4. The method of claim 2, further comprising:

determining a first cross-correlation between the detected technology-neutral signature waveform and a stored signature sequence corresponding to the first system corresponding to the wireless communication device; and

if the first cross-correlation is greater than a cross-correlation threshold, determining that the shared spectrum channel is occupied by the first system corresponding to the wireless communication device.

5. The method of claim 4, further comprising:

if the first cross-correlation is not greater than the cross-correlation threshold, determining a second cross-correlation between the detected technology-neutral signature waveform and a stored signature sequence corresponding to the second system known to the wireless communication device; and

if the second cross-correlation is greater than the cross-correlation threshold, determining that the shared spectrum channel is occupied by the second system known to the wireless communication device.

6. The method of claim 5, further comprising:

if the first cross-correlation is not greater than the cross-correlation threshold, and if the second cross-correlation is not greater than the cross-correlation threshold, determining that the shared spectrum channel is occupied by the third system with an unknown signature waveform.

7. The method of claim 1, wherein the shared spectrum channel is determined to be idle, the method further comprising:

transmitting a technology-neutral signature waveform to reserve the shared spectrum channel; and

communicating with one or more devices utilizing the first technology-specific waveform.

8. The method of claim 7, wherein the transmitting the technology-neutral signature waveform comprises:

transmitting the transmitted technology-neutral signature waveform having a sample rate R and a number of samples N ; and

repeating the transmitting of the transmitted technology-neutral signature waveform over K repetitions, wherein R , N , and K are positive integers, respectively.

9. The method of claim 7, wherein the transmitting the transmitted technology-neutral signature waveform comprises modulating the transmitted technology-neutral signature waveform utilizing binary phase shift keying (BPSK) or quadrature phase shift keying (QPSK).

10. The method of claim 7, further comprising:
selecting the transmitted technology-neutral signature waveform to have a peak-to-average power ratio (PAPR) below a PAPR threshold.

11. The method of claim 7, further comprising transmitting burst duration information with the transmitted technology-neutral signature waveform, the burst duration information indicating a duration of the first technology-specific waveform,
wherein the transmitting of the transmitted technology-neutral signature waveform further comprises repeating the transmitting of the burst duration information.

12. The method of claim 7, further comprising:
transmitting a follow-up waveform after the transmitted technology-neutral signature waveform, wherein the follow-up waveform carries payload information corresponding to the first technology-specific waveform.

13. A wireless communication device comprising:
a processor;
a memory communicatively coupled to the processor; and
a transceiver communicatively coupled to the processor,
wherein the processor and the memory are configured to:
monitor a shared spectrum channel to detect a transmission of a technology-neutral signature waveform that is detectable by devices of two or more different systems to act as a

channel occupation signal to facilitate sharing of a spectrum channel by the two or more different systems, by:

- sensing a signal on the shared spectrum channel;
- determining an autocorrelation of the sensed signal; and
- if the autocorrelation is greater than an autocorrelation threshold, determining that the shared spectrum channel carries the technology-neutral signature waveform;
- if the technology-neutral signature waveform is detected from a first system the wireless communication device is configured to use, monitor the shared spectrum channel for a first technology-specific waveform corresponding to the first system; and
- if the technology-neutral signature waveform is not detected for a time greater than a threshold amount of time, determine that the shared spectrum channel is idle.

14. The wireless communication device of claim 13, wherein the processor and the memory are further configured to:

- if the technology-neutral signature waveform is detected from a second system known to the wireless communication device, forgo using the shared spectrum channel for a back off time, or monitor the shared spectrum channel for a second technology-specific waveform corresponding to the second system; and
- if the technology-neutral signature waveform is detected from a third system with an unknown signature waveform, forgo using the shared spectrum channel for the back off time.

15. The wireless communication device of claim 14, wherein the processor and the memory are further configured to:

- perform frequency error correction using the detected technology-neutral signature waveform.

16. The wireless communication device of claim 14, wherein the processor and the memory are further configured to:

- determine a first cross-correlation between the detected technology-neutral signature waveform and a stored signature sequence corresponding to the first system corresponding to the wireless communication device; and

if the first cross-correlation is greater than a cross-correlation threshold, determine that the shared spectrum channel is occupied by the first system corresponding to the wireless communication device.

17. The wireless communication device of claim 16, wherein the processor and the memory are further configured to:

if the first cross-correlation is not greater than the cross-correlation threshold, determine a second cross-correlation between the detected technology-neutral signature waveform and a stored signature sequence corresponding to the second system known to the wireless communication device; and

if the second cross-correlation is greater than the cross-correlation threshold, determine that the shared spectrum channel is occupied by the second system known to the wireless communication device.

18. The wireless communication device of claim 17, wherein the processor and the memory are further configured to:

if the first cross-correlation is not greater than the cross-correlation threshold, and if the second cross-correlation is not greater than the cross-correlation threshold, determine that the shared spectrum channel is occupied by the third system with an unknown signature waveform.

19. The wireless communication device of claim 13, wherein if the shared spectrum channel is determined to be idle, the processor and the memory are further configured to:

transmit a technology-neutral signature waveform to reserve the shared spectrum channel; and

communicate with one or more devices utilizing the first technology-specific waveform.

20. The wireless communication device of claim 19, wherein the processor and the memory are further configured to transmit the technology-neutral signature waveform by:

transmitting the transmitted technology-neutral signature waveform having a sample rate R and a number of samples N ; and

repeating the transmitting of the transmitted technology-neutral signature waveform over K repetitions, wherein R, N, and K are positive integers, respectively.

21. The wireless communication device of claim 19, wherein the transmitting the transmitted technology-neutral signature waveform comprises modulating the transmitted technology-neutral signature waveform utilizing binary phase shift keying (BPSK) or quadrature phase shift keying (QPSK).

22. The wireless communication device of claim 19, wherein the processor and the memory are further configured to:

select the transmitted technology-neutral signature waveform to have a peak-to-average power ratio (PAPR) below a PAPR threshold.

23. The wireless communication device of claim 19, wherein the processor and the memory are further configured to:

transmit burst duration information with the transmitted technology-neutral signature waveform, the burst duration information indicating a duration of the first technology-specific waveform; and

transmit the transmitted technology-neutral signature waveform by repeating the burst duration information.

24. The wireless communication device of claim 19, wherein the processor and the memory are further configured to:

transmit a follow-up waveform after the transmitted technology-neutral signature waveform, wherein the follow-up waveform carries payload information corresponding to the first technology-specific waveform.

25. A non-transitory computer readable medium storing computer executable code comprising instructions operable at a wireless communication device for:

monitoring a shared spectrum channel to detect a transmission of a technology-neutral signature waveform that is detectable by devices of two or more different systems to act as a

channel occupation signal to facilitate sharing of a spectrum channel by the two or more different systems, the monitoring comprising:

- sensing a signal on the shared spectrum channel;
- determining an autocorrelation of the sensed signal; and

if the autocorrelation is greater than an autocorrelation threshold, determining that the shared spectrum channel carries the technology-neutral signature waveform;

if the technology-neutral signature waveform is detected from a first system the wireless communication device is configured to use, monitoring the shared spectrum channel for a first technology-specific waveform corresponding to the first system; and

if the technology-neutral signature waveform is not detected for a time greater than a threshold amount of time, determining that the shared spectrum channel is idle.

26. The non-transitory computer readable medium of claim 25, further comprising instructions for:

if the technology-neutral signature waveform is detected from a second system known to the wireless communication device, forgoing to use the shared spectrum channel for a back off time, or monitoring the shared spectrum channel for a second technology-specific waveform corresponding to the second system; and

if the technology-neutral signature waveform is detected from a third system with an unknown signature waveform, forgoing to use the shared spectrum channel for the back off time.

27. A wireless communication device comprising:

means for monitoring a shared spectrum channel to detect a transmission of a technology-neutral signature waveform that is detectable by devices of two or more different systems to act as a channel occupation signal to facilitate sharing of a spectrum channel by the two or more different systems, the monitoring comprising:

- sensing a signal on the shared spectrum channel;
- determining an autocorrelation of the sensed signal; and

if the autocorrelation is greater than an autocorrelation threshold, determining that the shared spectrum channel carries the technology-neutral signature waveform;

means for if the technology-neutral signature waveform is detected from a first system the wireless communication device is configured to use, monitoring the shared spectrum channel for a first technology-specific waveform corresponding to the first system; and

means for if the technology-neutral signature waveform is not detected for a time greater than a threshold amount of time, determining that the shared spectrum channel is idle.

28. The wireless communication device of claim 27, further comprising:

means for if the technology-neutral signature waveform is detected from a second system known to the wireless communication device, forgoing to use the shared spectrum channel for a back off time, or monitoring the shared spectrum channel for a second technology-specific waveform corresponding to the second system; and

means for if the technology-neutral signature waveform is detected from a third system with an unknown signature waveform, forgoing to use the shared spectrum channel for the back off time.