CLAIMS

1. A signal transmission method, wherein the method comprises:

generating a full-wave radio frequency electrical signal;

converting the full-wave radio frequency electrical signal into a half-wave radio frequency optical signal, wherein the half-wave radio frequency optical signal is a radio frequency optical signal having a positive half-amplitude or a negative half-amplitude of the full-wave radio frequency electrical signal; and

sending the half-wave radio frequency optical signal.

2. The method according to claim 1, wherein the half-wave radio frequency optical signal is obtained by performing optical modulation on a positive half-amplitude signal of the full-wave radio frequency electrical signal relative to a direct current component, or the half-wave radio frequency optical signal is obtained by performing optical modulation on an inverted negative half-amplitude signal of the full-wave radio frequency electrical signal relative to the direct current component.

3. The method according to claim 1 or 2, wherein the converting the full-wave radio frequency electrical signal into the half-wave radio frequency optical signal comprises:

superimposing a first bias electrical signal on the full-wave radio frequency electrical signal, wherein the first bias electrical signal is a first bias voltage signal or a first bias current signal; and

performing optical modulation on the full-wave radio frequency electrical signal superimposed with the first bias electrical signal, to obtain the half-wave radio frequency optical signal.

4. The method according to claim 3, wherein the first bias electrical signal is the first bias voltage signal; and the performing optical modulation on the full-wave radio frequency electrical signal superimposed with the first bias electrical signal, to obtain the half-wave radio frequency optical signal comprises:

performing, via an electro-absorption modulated laser, optical modulation on the full-wave radio frequency electrical signal superimposed with the first bias voltage signal, to obtain the half-wave radio frequency optical signal.

5. The method according to claim 4, wherein the electro-absorption modulated laser comprises a laser diode and an electro-absorption modulator; and the performing, via the electro-absorption modulated laser, optical modulation on the full-wave radio frequency electrical signal superimposed with the first bias voltage signal, to obtain the half-wave radio frequency optical signal comprises:

generating a continuous light wave signal via the laser diode; and

modulating, via the electro-absorption modulator, the full-wave radio frequency electrical signal superimposed with the first bias voltage signal onto the continuous light wave signal, to obtain the half-wave radio frequency optical signal.

6. The method according to claim 3, wherein the first bias electrical signal is the first bias current signal; and the performing optical modulation on the full-wave radio frequency electrical signal superimposed with the first bias electrical signal, to obtain the half-wave radio frequency optical signal comprises:

performing, via a directly modulated laser, optical modulation on the full-wave radio frequency electrical signal superimposed with the first bias current signal, to obtain the half-wave radio frequency optical signal, wherein

a current corresponding to the first bias current signal is greater than or equal to a threshold current of the directly modulated laser, and a difference between the current corresponding to the first bias current signal and the threshold current is within a first range.

7. The method according to any one of claims 3 to 6, wherein

the first bias electrical signal satisfies: a ratio of coefficients of multiple spectral components corresponding to an electrical signal obtained by performing optical-to-electrical conversion on a first optical signal satisfies a first ratio, wherein the first optical signal is an optical signal obtained by performing optical modulation on an electrical signal for bias point detection superimposed with the first bias electrical signal.

8. The method according to claim 7, wherein the electrical signal for bias point detection is a low-frequency sine wave signal; and

an error between 0.32:0.5:0.21:0 and a ratio of a coefficient corresponding to a direct current component, a coefficient corresponding to a first-order harmonic component, a coefficient corresponding to a second-order harmonic component, and a coefficient corresponding to a third-order harmonic component that are corresponding to the electrical signal obtained by performing optical-to-electrical conversion on the first optical signal is within a second range.

9. The method according to any one of claims 3 to 8, wherein the method further comprises:

generating an electrical signal for bias point detection;

superimposing a second bias electrical signal on the electrical signal for bias point detection;

performing optical modulation on the electrical signal for bias point detection superimposed with the second bias electrical signal, to obtain a second optical signal; and

if a ratio of coefficients of multiple spectral components corresponding to an electrical signal obtained by performing optical-to-electrical conversion on the second optical signal satisfies the first ratio, determining the first bias electrical signal as the second bias electrical signal; or

if a ratio of coefficients of multiple spectral components corresponding to an electrical signal

obtained by performing optical-to-electrical conversion on the second optical signal does not satisfy the first ratio, adjusting the second bias electrical signal, and superimposing the adjusted second bias electrical signal on the electrical signal for bias point detection.

10. The method according to claim 1 or 2, wherein the converting the full-wave radio frequency electrical signal into the half-wave radio frequency optical signal comprises:

converting the full-wave radio frequency electrical signal into a first half-wave radio frequency electrical signal, wherein the first half-wave radio frequency electrical signal is a radio frequency electrical signal having a positive half-amplitude or a negative half-amplitude of the full-wave radio frequency electrical signal in analog domain; and

superimposing a third bias electrical signal on the first half-wave radio frequency electrical signal via a modulated laser, and performing optical modulation on the first half-wave radio frequency electrical signal superimposed with the third bias electrical signal, to obtain the half-wave radio frequency optical signal.

11. The method according to claim 10, wherein the first half-wave radio frequency electrical signal is a positive half-amplitude signal of the full-wave radio frequency electrical signal relative to the direct current component in analog domain, or the first half-wave radio frequency electrical signal is obtained by inverting a negative half-amplitude signal of the full-wave radio frequency electrical signal relative to the direct current component in analog domain.

12. The method according to claim 10 or 11, wherein the full-wave radio frequency electrical signal is an analog signal, and the converting the full-wave radio frequency electrical signal into the first half-wave radio frequency electrical signal comprises:

converting the full-wave radio frequency electrical signal into the first half-wave radio frequency electrical signal via a low-noise power amplifier, wherein

the low-noise power amplifier is a class-B low-noise power amplifier, a class-C low-noise power amplifier, or a class-AB low-noise power amplifier.

13. The method according to claim 10 or 11, wherein the full-wave radio frequency electrical signal is a digital signal, and the converting the full-wave radio frequency electrical signal into the first half-wave radio frequency electrical signal comprises:

converting the full-wave radio frequency electrical signal into a second half-wave radio frequency electrical signal, wherein the second half-wave radio frequency electrical signal is a radio frequency electrical signal having a positive half-amplitude or a negative half-amplitude of the full-wave radio frequency electrical signal in digital domain; and

performing digital-to-analog conversion on the second half-wave radio frequency electrical signal to obtain the first half-wave radio frequency electrical signal.

14. The method according to claim 13, wherein the second half-wave radio frequency

electrical signal is a positive half-amplitude signal of the full-wave radio frequency electrical signal relative to the direct current component in digital domain, or the second half-wave radio frequency electrical signal is obtained by inverting a negative half-amplitude signal of the full-wave radio frequency electrical signal relative to the direct current component in digital domain.

15. The method according to any one of claims 10 to 14, wherein the method further comprises: performing spectrum adjustment on the first half-wave radio frequency electrical signal by using a filtering function; and

the superimposing the third bias electrical signal on the first half-wave radio frequency electrical signal, and performing optical modulation on the first half-wave radio frequency electrical signal superimposed with the third bias electrical signal, to obtain the half-wave radio frequency optical signal comprises:

superimposing the third bias electrical signal on the spectrum-adjusted first half-wave radio frequency electrical signal, and performing optical modulation on the spectrum-adjusted first half-wave radio frequency electrical signal superimposed with the third bias electrical signal, to obtain the half-wave radio frequency optical signal.

16. The method according to any one of claims 10 to 15, wherein

the modulated laser is a directly modulated laser, the third bias electrical signal is a second bias current signal, and a current corresponding to the second bias current signal is greater than or equal to a threshold current of the directly modulated laser; or

the modulated laser is an electro-absorption modulated laser, the third bias electrical signal is a second bias voltage signal, and a voltage corresponding to the second bias voltage signal is greater than a first voltage.

17. The method according to claim 16, wherein

the second bias current signal is a third bias current signal corresponding to a third optical signal with a largest signal-to-noise ratio in multiple third optical signals;

the multiple third optical signals are in one-to-one correspondence with multiple third bias current signals, and each third optical signal in the multiple third optical signals is obtained by performing optical modulation on the first half-wave radio frequency electrical signal superimposed with a third bias current signal corresponding to the third optical signal; and

currents respectively corresponding to the multiple third bias current signals are different from each other, and the currents respectively corresponding to the multiple third bias current signals are all greater than or equal to the threshold current.

18. The method according to claim 16, wherein

the second bias voltage signal is a third bias voltage signal corresponding to a fourth optical signal with a smallest adjacent channel leakage power ratio in multiple fourth optical signals;

the multiple fourth optical signals are in one-to-one correspondence with multiple third bias voltage signals, and each fourth optical signal in the multiple fourth optical signals is obtained by performing optical modulation on the first half-wave radio frequency electrical signal superimposed with a third bias voltage signal corresponding to the fourth optical signal; and

voltages respectively corresponding to the multiple third bias voltage signals are different from each other, and the voltages respectively corresponding to the multiple third bias voltage signals are all greater than or equal to the first voltage.

19. The method according to any one of claims 1 to 18, wherein

the full-wave radio frequency electrical signal is a signal that undergoes digital pre-distortion processing.

20. A signal transmission method, wherein the method comprises:

receiving a half-wave radio frequency optical signal, wherein the half-wave radio frequency optical signal is a radio frequency optical signal having a positive half-amplitude or a negative half-amplitude of a full-wave radio frequency electrical signal; and

converting the half-wave radio frequency optical signal into the full-wave radio frequency electrical signal.

21. The method according to claim 20, wherein the half-wave radio frequency optical signal is obtained by performing optical modulation on a positive half-amplitude signal of the full-wave radio frequency electrical signal relative to a direct current component, or the half-wave radio frequency optical signal is obtained by performing optical modulation on an inverted negative half-amplitude signal of the full-wave radio frequency electrical signal relative to the direct current component.

22. The method according to claim 20 or 21, wherein

the full-wave radio frequency electrical signal obtained by converting the half-wave radio frequency optical signal is a fundamental frequency signal in an electrical signal obtained by performing optical-to-electrical conversion on the half-wave radio frequency optical signal.

23. The method according to claim 22, wherein the converting the half-wave radio frequency optical signal into the full-wave radio frequency electrical signal comprises:

performing optical-to-electrical conversion on the half-wave radio frequency optical signal via a photoelectric detector, to obtain a first electrical signal, wherein a passband of the photoelectric detector covers a spectrum of the fundamental frequency signal; and

filtering the first electrical signal via a bandpass filter, to obtain the full-wave radio frequency electrical signal, wherein a passband of the bandpass filter comprises only the spectrum of the fundamental frequency signal.

24. The method according to claim 22, wherein the converting the half-wave radio frequency

optical signal into the full-wave radio frequency electrical signal comprises:

performing optical-to-electrical conversion on the half-wave radio frequency optical signal via a photoelectric detector, to obtain a first electrical signal, and determining the full-wave radio frequency electrical signal in the first electrical signal, wherein a passband of the photoelectric detector comprises only a spectrum of the fundamental frequency signal.

25. A communication apparatus, comprising a memory and a processor, wherein

the memory is configured to store instructions or a computer program; and

the processor is configured to execute the computer program or the instructions stored in the memory, to cause the communication apparatus to perform the method according to any one of claims 1 to 19, or cause the communication apparatus to perform the method according to any one of claims 20 to 24.

26. A communication system, wherein the communication system comprises a first communication apparatus and a second communication apparatus, wherein

the first communication apparatus is configured to perform the method according to any one of claims 1 to 19; and

the second communication apparatus is configured to perform the method according to any one of claims 20 to 24.

27. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and when the computer program is run, the method according to any one of claims 1 to 19 or the method according to any one of claims 20 to 24 is implemented.