CLAIMS

1. A speaker module, wherein the speaker module comprises a frame body (1), a speaker (2), and a passive vibration plate (3), and wherein the frame body (1) comprises a main portion (11) and a pipe (12);

the main portion (11) is provided with a first opening (111), a second opening (112), wherein the first opening (111) and the second opening (112) are located at two ends of the main portion (11) respectively; and

the speaker (2) is located at the first opening (111), the passive vibration plate (3) is located at the second opening (112), wherein the speaker (2) is opposite to the passive vibration plate (3); a cavity (110) is formed among the main portion (11), the speaker (2), and the passive vibration plate (3);

the pipe (12) is connected to a side of the main portion (11); and

one end of the pipe (12) communicates with the cavity (110), and the other end of the pipe (12) is provided with a vent (120);

a resonant frequency fr of the passive vibration plate (3) is greater than a resonant frequency fs of the speaker (2), wherein a ratio of the resonant frequency of the passive vibration plate (3) to an upper limit frequency of an operating frequency band of the speaker module is greater than 0.8 and less than 2;

wherein the passive vibration plate (3) is configured to compensate for the attenuation of the sound pressure level of the speaker module in the operating frequency band, which is caused by the resonance of the cavity (110) and the pipe (12).

2. The speaker module according to claim 1, wherein the resonant frequency of the passive vibration plate (3) is greater than a first frequency, and the first frequency is a resonant frequency of a system comprising the cavity (110) and the passive vibration plate (3).

3. The speaker module according to claim 1 or 2, wherein a ratio of the resonant frequency of the passive vibration plate (3) to the resonant frequency of the speaker (2) is greater than 1.5.

4. The speaker module according to any one of claims 1 to 5, wherein a ratio of mass of the passive vibration plate (3) to mass of a vibration assembly (23) of the speaker (2) is less than 0.5.

5. The speaker module according to any one of claims 1 to 6, wherein a ratio of an area of the passive vibration plate (3) to an area of a vibration plate (232) of the speaker (2) is greater than 0.5 and less than 2.

6. The speaker module according to any one of claims 1 to 5, wherein the vent (120) is configured to communicate with a rear cavity (200), and a ratio of a volume of the rear cavity (200) to a volume of the cavity (110) is greater than 10.

7. The speaker module according to any one of claims 1 to 6, wherein a ratio of a resonant frequency of the cavity (110) and the pipe (12) to the resonant frequency of the passive vibration plate (3) is greater than 0.5.

8. The speaker module according to any one of claims 1 to 7, wherein the speaker (2) closes the first opening (111), and the passive vibration plate (3) closes the second opening (112).

9. The speaker module according to any one of claims 1 to 8, wherein there are two first openings (111), and the two first openings (111) are opposite to each other; and

the speaker (2) comprises a first speaker (2a) and a second speaker (2b), the first speaker (2a) and the second speaker (2b) are located at the two first openings (111) respectively, and the first speaker (2a) abuts against the second speaker (2b).

10. The speaker module according to claim 9, wherein there are two second openings (112);

the passive vibration plate (3) comprises a first passive vibration plate (3a) and a second passive vibration plate (3b), and the first passive vibration plate (3a) and the second passive vibration plate (3b) are located at the two second openings (112) respectively; and

one cavity (110) is formed among the first speaker (2a), the first passive vibration plate (3a), and the frame body (1), one cavity (110) is formed among the second speaker (2b), the second passive vibration plate (3b), and the frame body (1), and each of the two cavities (110) communicates with the vent (120).

11. The speaker module according to any one of claims 1 to 10, wherein the speaker module further comprises a protective cover (4), and the protective cover (4) is connected to the frame body (1) and covers the passive vibration plate (3).

12. The speaker module according to any one of claims 1 to 11, wherein the speaker (2) comprises a support assembly (21), a magnetic circuit assembly (22), and the vibration assembly (23), and the vibration assembly (23) comprises a voice coil (231), the vibration plate (232), and a centering spider (233);

the support assembly (21) supports the magnetic circuit assembly (22) and the vibration assembly (23), and the magnetic circuit assembly (22) is configured to drive the voice coil (231) to vibrate; and

the vibration plate (232) is connected to the voice coil (231) and the support assembly (21), and the centering spider (233) is connected to the vibration plate (232) and the support assembly (21).

13. The speaker module according to claim 12, wherein there is a frame structure on a side that is of the support assembly (21) and that faces the cavity (110).

14. A speaker system, wherein the speaker system comprises a wall (300) and the speaker module (100) according to any one of claims 1 to 13;

a rear cavity (200) is formed on a first side of the wall (300), and a ratio of a volume of the rear cavity (200) to the volume of the cavity (110) of the speaker module (100) is greater than 10; and

the speaker module (100) is located on a second side of the wall (300), and the vent (120) of the speaker module (100) communicates with the rear cavity (200).

15. A vehicle, wherein the vehicle comprises the speaker module (100) according to any one of claims 1 to 13; and

the speaker module (100) is located inside the vehicle, and the vent (120) of the speaker module (100) communicates with the outside of the vehicle.