CA918 Free-field Sound Source

Features:

- 3.5-inch high sensitivity loudspeaker
- Frequency response 125 Hz to 20 kHz (± 7 dB)
- Low distortion and low Q factor
- The spherical enclosure reduces the secondary radiation

Applications:

- The free-field sensitivity and frequency response measurement of microphone or sound level meter

Introduction

CA918 is a sound source designed to meet the requirements of free-field measurement of working standard microphone according to IEC 61094-8. It also can be used as free-field sound source required by IEC 62585, IEC 61672, GB/T 3785 and JJG 188 etc. to carry out the free-field sensitivity and frequency response measurement of microphone, sound level meter or other acoustic related equipment.

Generally, CA918 is used for determining the sensitivity of microphones in free-field by comparison. The basis of method is: a reference microphone is first used to determine the sound pressure at a specific point in a free-field, and it is then replaced by the microphone under test. Assuming that the acoustic centers of the two microphones can be located at the same point in the sound field, and that the sound field remains unchanged at that point, then the free-field sensitivity of the microphone under test can be determined from the ratio of the output voltage of the microphone under test to the output voltage of the reference microphone, and the free-field sensitivity of the reference microphone. In its most basic form the method is not only need to be implemented in a high quality free-field chamber or hemi-anechoic chamber, but also requires a high quality loudspeaker as the sound source.

The choice of loudspeaker used as the sound source has a significant impact on the frequency range and overall measurement uncertainty that can be achieved in the free-field calibration of a microphone. Ideally the loudspeaker should be sufficiently small to behave as a point source and maintain its omni-directional characteristics up to the maximum frequency of interest. Its sensitivity should be sufficiently high to generate the required sound pressure at the measurement locations, and its output should be stable with time. The frequency response should also be flat over the desired range of calibration.

Practical designs of loudspeaker rarely possess all of these characteristics and compromises need to be made.

In addition, since sound will radiate from the loudspeaker in all directions, the edges of the loudspeaker enclosure or mounting arrangement can potentially act as secondary radiation locations, which result in departures from the desired plane progressive wave sound field. It is therefore necessary to consider the design of enclosure to minimize these effects.

Consequently, as the sound source used in free-field, CA918 selects 3.5-inch high sensitivity loudspeaker unit, with mechanical Q factor (Qms) as 3.2 and the total Q factor (Qts) as 0.29. Such a low Q factor makes the loudspeaker have a wider frequency range, which can meet the requirements within the frequency range of 125 Hz to 20 kHz. The sensitivity up to 89.8dB makes it keep low distortion when reaching the specified sound pressure level. The nominal impedance of 4 Ω can reduce the requirement of the output voltage of the power amplifier to reach the maximum output power up to 30W. Besides, the enclosure of the sound source is designed as spherical, and the edge of the loudspeaker is tangent to the sphere, so that the secondary radiation caused by the enclosure is also spherical radiation, avoiding the formation of directivity.

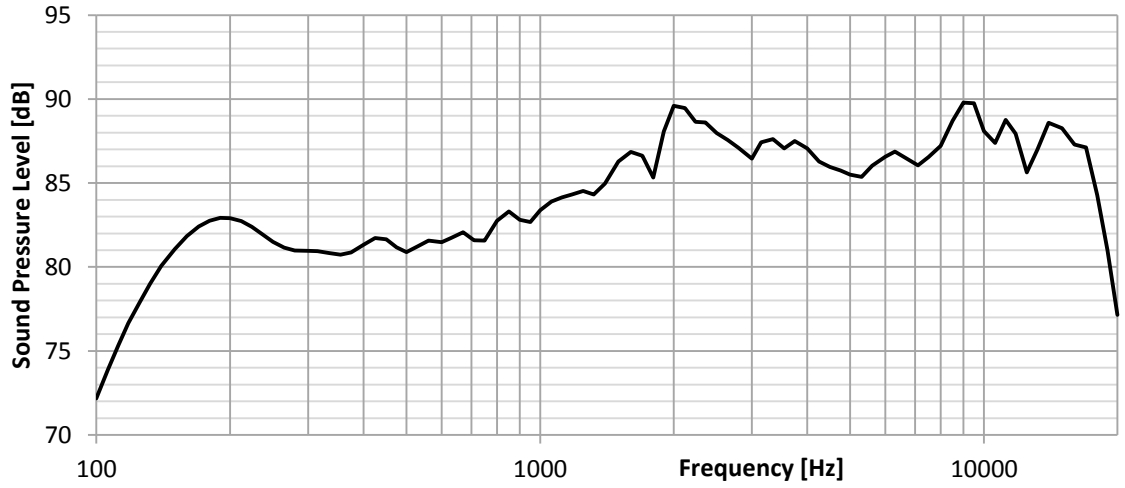
In conclusion, CA918 is a perfect design and excellent performance free-field sound source, which is an ideal choice for anechoic chamber.

Specifications

Frequency Response	125 Hz ~ 20 kHz (± 7 dB)
Reference Sound Level	84 dB
Total Distortion	≤ 3 %
Loudspeaker Unit	3.5-inch rubidium magnet loudspeaker unit with sensitivity 89.8dB and total Q factor 0.29
Nominal Impendence	4 Ω
Rated Power	15 W (continuous)
Peak Power	30 W (short duration: duty cycle 1/3, on time 50 s)
Input Connector	BNC
Dimension[1] (mm)	W150 x H150 x D161
Weight[1]	1.17 kg

Note 1: the data is only applicable to the sound source, not including the support rod.

Typical Free-field Frequency Response



CA918 Installed in Anechoic Chamber

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