ELP WW IP

Acoustic Test Report

Martin by HARMAN

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Title

ELP WW IP Acoustic Test Report

Test conditions

Test carried out according to ISO 3744:2010(E)

Device tested

Make: HARMAN Professional Denmark ApS

Model: ELP WW IP

Serial no: 15300326833

Software version: V: 1.0.04

Results

An image of the test setup can be found on Page 4. Test results are listed in Table 1 on Page 6. Figures of measurement results are shown in Appendix A on Page 8.

HARMAN Professional Denmark ApS, R&D QA are responsible for the test results given in this report.

Environment

Temperature: 24.4°C Ta

Humidity: 55.7 %RH

AC mains power: 230 V, 50 Hz

Background noise level: 8.10 dBA

Warm-up time: 30 minutes at full intensity.

Fixture placement: Fixture was placed at least one meter from walls and ceiling, as described in the Standard ISO 3744:2010(E)

Remarks

Test results apply only to the tested specimen.

Rev: (last five)	Made by:	Description:	Approved by:	Date approved:
A	Dana Yang	ELP WW IP Sound Measurement	Mark Buss	2020-10-09

Setup

The product was placed indoors in a semi-anechoic room in the external Lab of Harman Technology in Shenzhen, China (See Figure 1). The ceiling and walls were all acoustically absorbent and the floor was reflective. The main dimensions of the room were 4.0m * 3.6m * 2.6m (length * width * height).

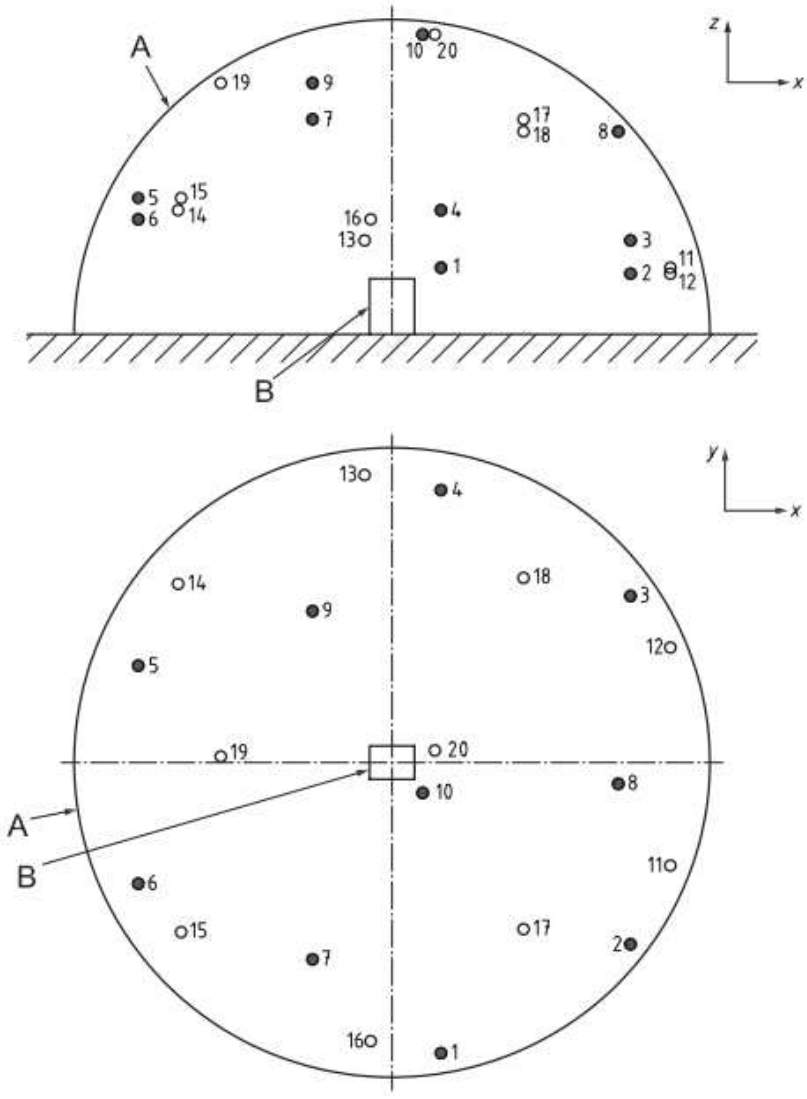
Figure 1: Test setup

The product was allowed a minimum 10 minutes of warm-up time before measurements were performed.

Measurement method

Measurements were carried out using a setup with 1 microphone. The microphone was in turn moved to the measurement positions described below.

Measurement setup at hemispherical measurement model, as Fixture 2



Key

- ● key microphone positions (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
- o additional microphone positions (11, 12, 13, 14, 15, 16, 17, 18, 19, 20)
- A measurement surface
- B reference box

Figure 2: Microphone Positions

Note：

1. R=1.5m.
2. S=2 π R^2 , Measurement surface area: 14.14 m^2 .
3. 10 key microphones were taken measurement, as the range of A-weighted sound pressure levels measured at position 1 to 10 does not exceed 10 dB, additional 11 to 20 can be not considered.
4. The dimensions of the reference box: 64 cm x 25 cm x 25 cm.

Instrumentation

Please refer to Page 8 for a full instrumentation list.

Results

The ELP WW IP was measured in 2 different scenarios:

1. Be set at 100% white output, the cooling mode is set to Regulated.
2. Be set at 100% white output, the cooling mode is set to Low.

Test positions and sound pressure levels are shown in Table 1.

Sound Pressure Levels		
Distance from fixture	Regulated **[dB(A)]**	Low **[dB(A)]**
LpA at 0m	40.45	39.81
LpA at 1m	32.45	31.81
LpA at 4m	20.45	19.81
LpA at 7m	15.55	14.91

The duration of the acoustical measurement for each position is 30s.

After calculated the time-averaged sound pressure levels of all positions and background noise, the difference between the two values is more than 15dB, therefore no correction for background noise shall be applied.

Table 1: Sound Pressure Levels

Sound Pressure Levels have been converted from Sound Power Levels using the formula: LpA = (LwA – $reduction_{distance}$)

Reductions used: 8dB(A)@1m, 20dB(A)@4m, 24.9dB(A)@7m

Noise level details

Appendix A displays measurement detail of noise level in Regulated Fan Mode scenario.

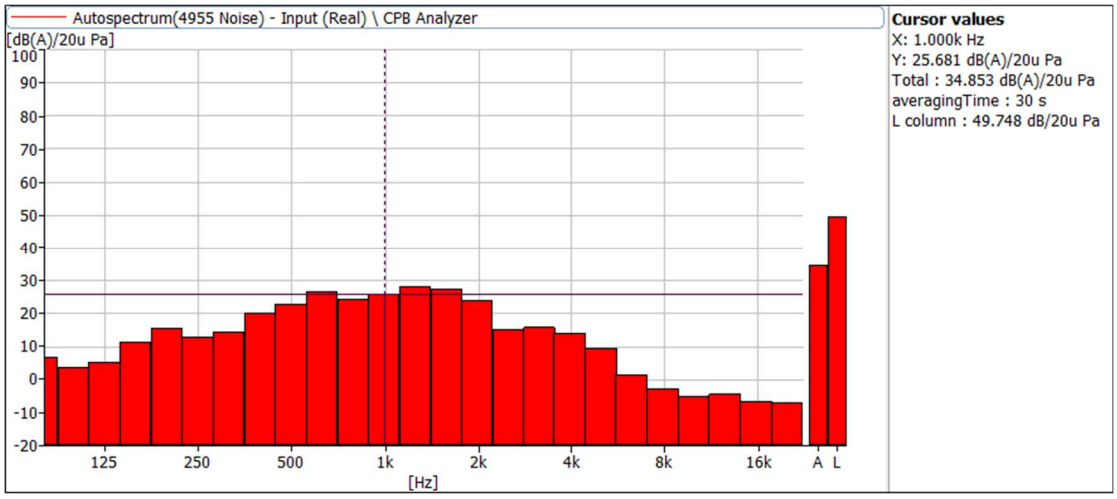
Instrumentation

Equipment	Maker	Type
No.:SZE029-2	Brüel & Kjær	Pulse analysis system
No.:SZE029-7	Brüel & Kjær	Microphone Type4955
No.:SZE029-3		Semi-anechoic room
No.:SZE039-5		Digital Barometer
No.:SZE020-14		Data logger for atmosphere & environment

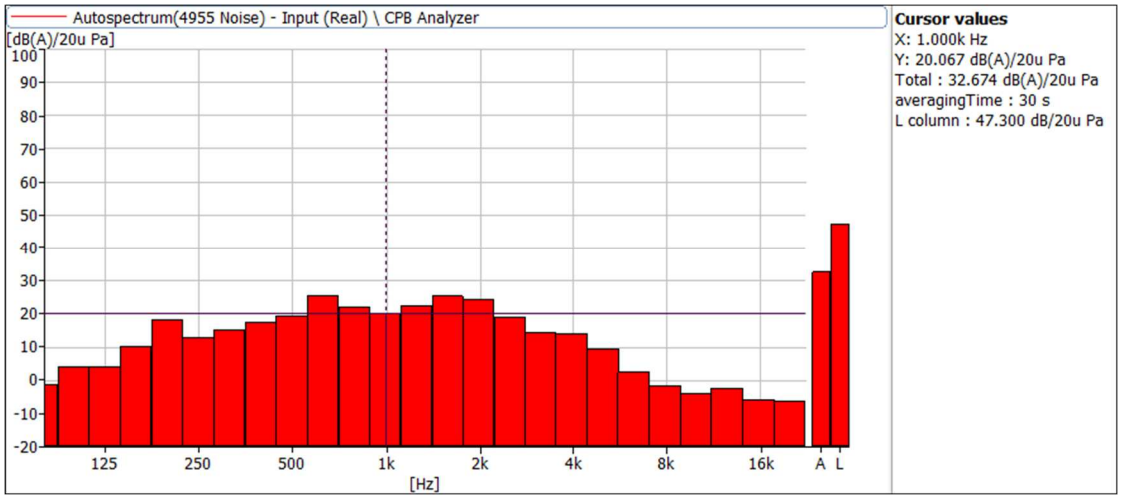
Table 2: Instruments Used

Appendix A: Measurement of Noise Level in Regulated Fan Mode

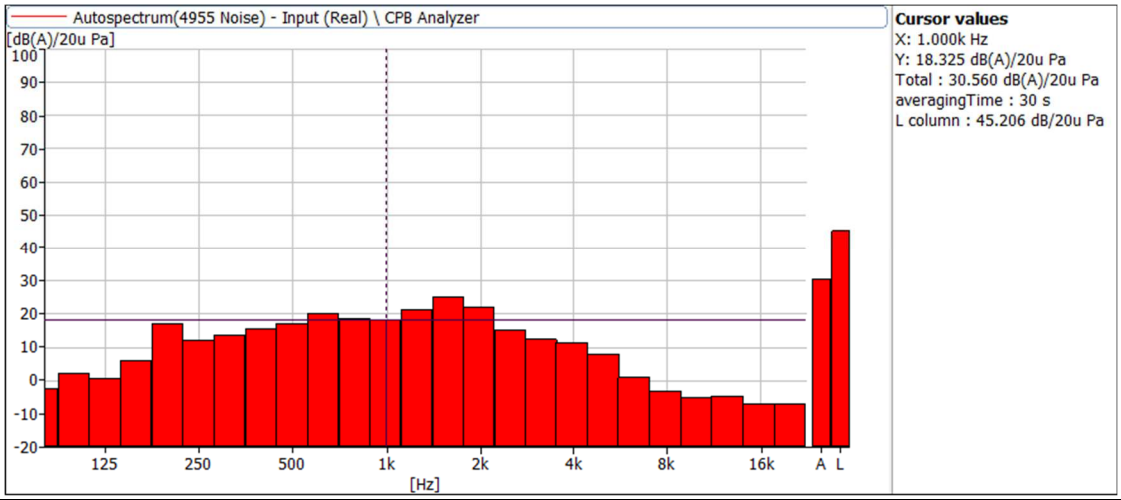
Position 1



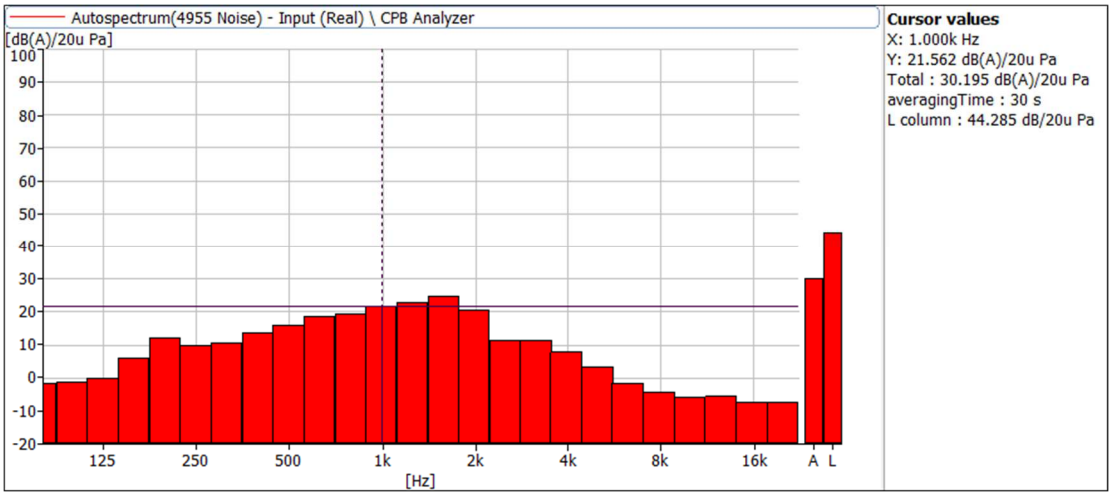
Position 2



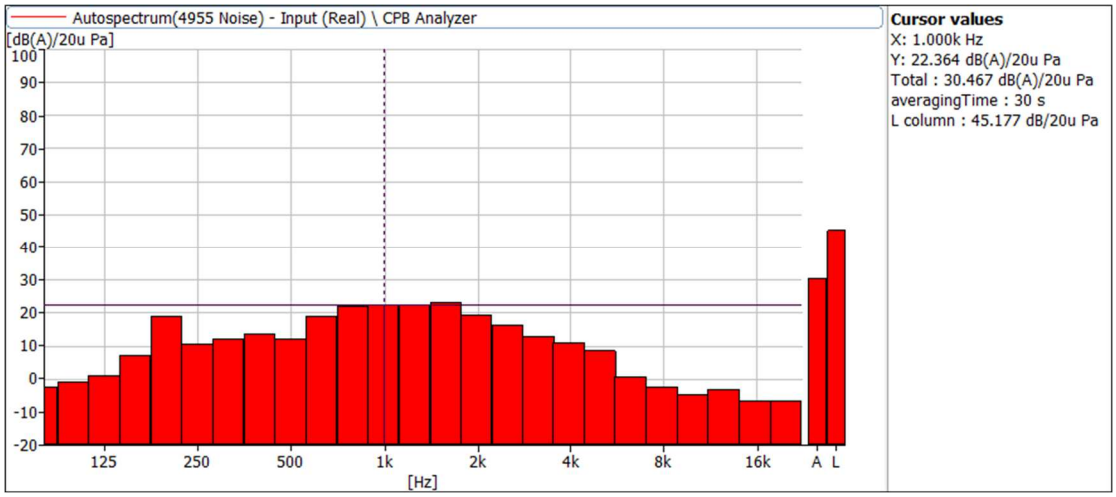
Position 3



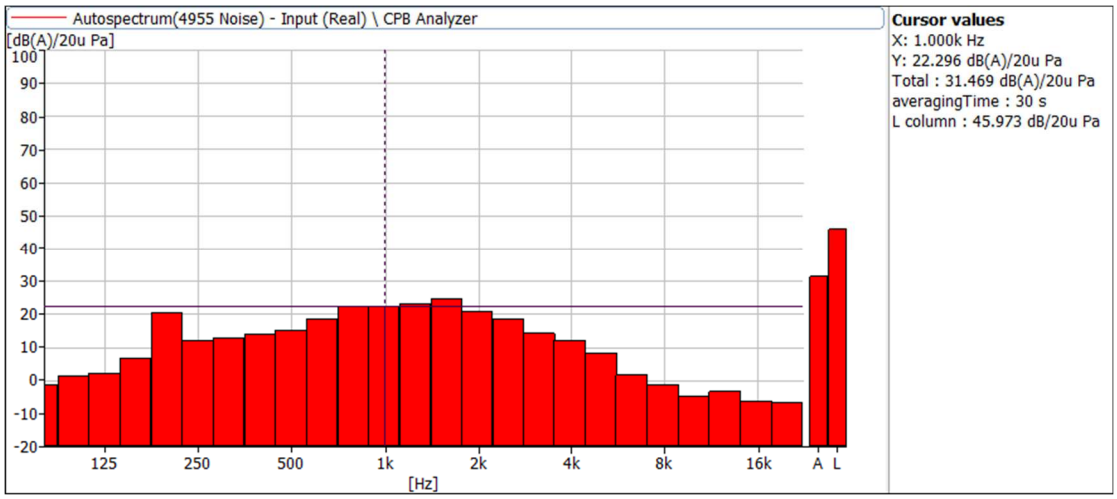
Position 4



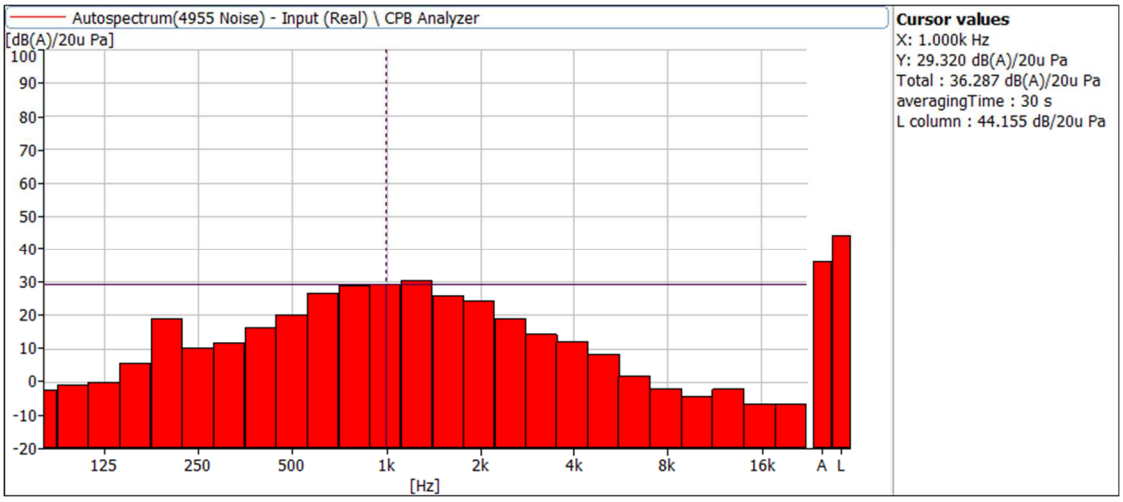
Position 5



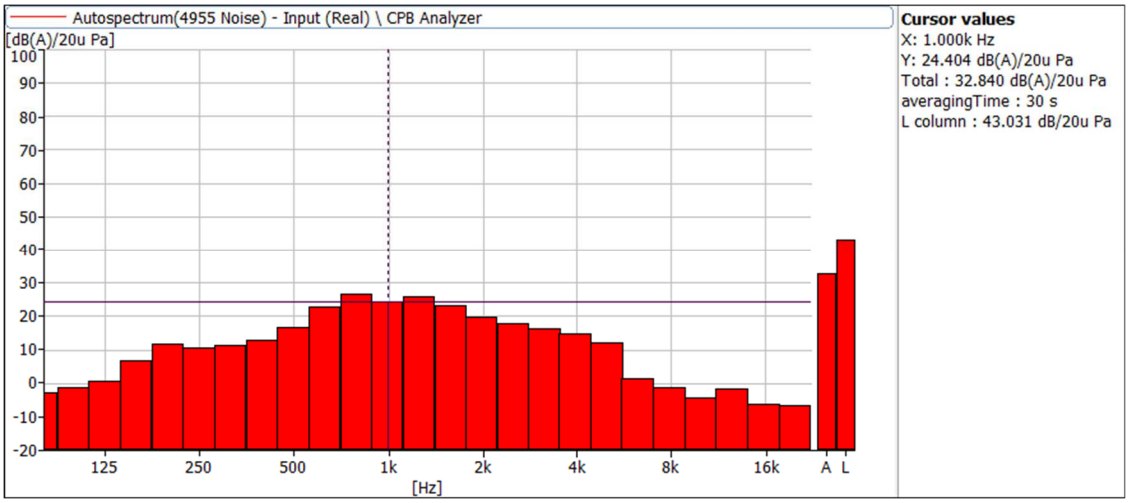
Position 6



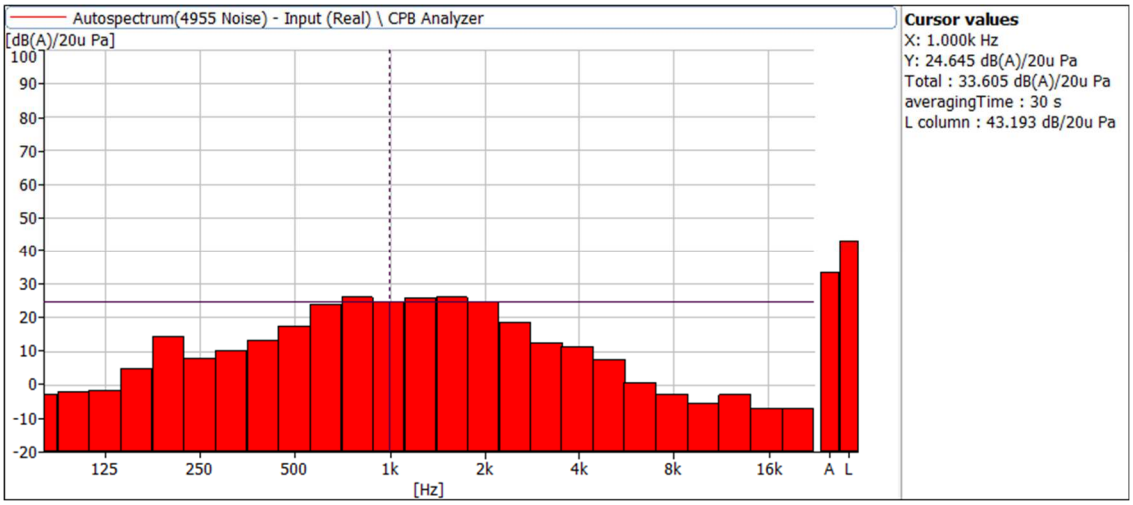
Position 7



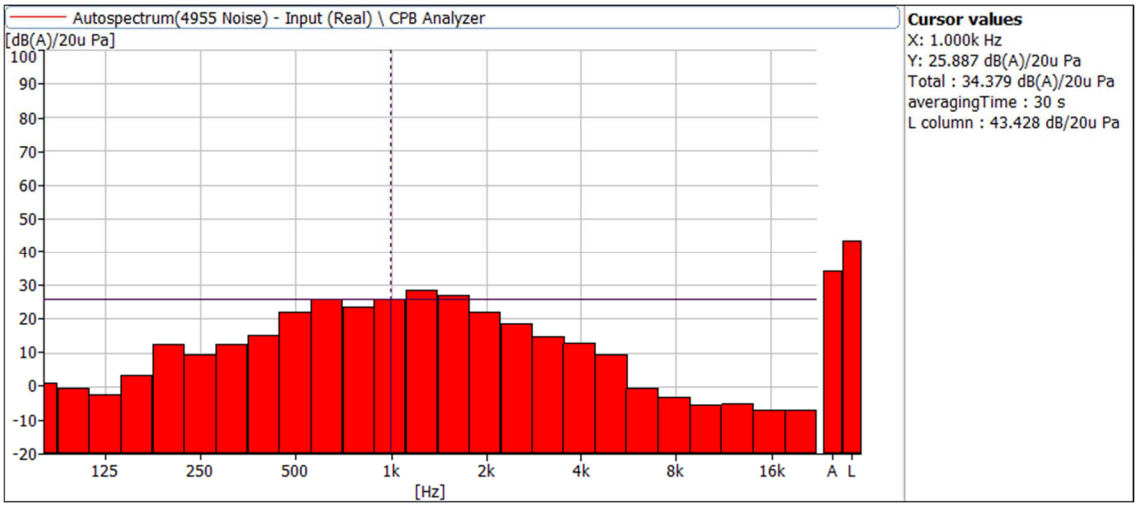
Position 8



Position 9



Position 10


Autospectrum(4955 Noise) - Input (Real) \ CPB Analyzer
[dB(A)/20u Pa]
100
90
80
70
60
50
40
30
20
10
0
-10
-20
125
250
500
1k
2k
4k
8k
16k
A
L
[Hz]
Cursor values
X: 1.000k Hz
Y: 25.887 dB(A)/20u Pa
Total : 34.379 dB(A)/20u Pa
averagingTime : 30 s
L column : 43.428 dB/20u Pa