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SLM Testing to IEC61672-1

This chapter presents information for testing the sound level meter function of the System 824 according to IEC61672-1 Section 9.3. These data represent the performance of the instrument when used with the Larson Davis Model 377B41 microphone.

Reference Sound Pressure Level:

114 dB

Reference Level Range:

Mode	Reference Level Range
ISM	Normal
SSA	0 dB Gain
LOG	Normal
FFT	0 dB Gain
RTA	0 dB Gain
AUD	0 dB Gain
TAL	0 dB Gain

Microphone Reference Point:

Center of diaphragm of Model 377B41 microphone

Average Frequency Response Corrections

The following table presents the corrections for the average frequency response of the System 824 using a PRM902 preamplifier and a Model 377B41 free-field microphone, with and without a windscreen. This data include the effects of reflections and diffraction.

Frequency, Hz	0 ° Free Field Response dB	0° Free Field Corrections ¹ dB	Effect of Windscreen dB	Windscreen on 824, 0 ° Free Field dB	0 ° Free Field Corrections with Wind Screen on 824 dB ¹	Expanded uncertainty of Corrections @95% dB
251.19	0.0	0.0	0.0	0.0	0.0	0.25
316.23	0.0	0.0	0.0	0.0	0.0	0.25
398.11	0.0	0.0	0.0	0.0	0.0	0.25
501.19	0.0	0.0	0.0	0.0	0.0	0.25
630.96	0.0	0.0	0.0	0.0	0.0	0.25
794.33	0.0	0.0	0.0	0.0	0.0	0.25
1000.00	0.0	0.0	0.0	0.0	0.0	0.25
1059.25	0.0	0.0	0.0	0.0	0.0	0.25
1122.02	0.1	-0.1	0.1	0.1	-0.1	0.25
1188.50	0.1	-0.1	0.0	0.1	-0.1	0.25
1258.93	0.1	-0.1	0.0	0.1	-0.1	0.25
1333.52	0.2	-0.2	0.1	0.3	-0.3	0.25
1412.54	0.2	-0.2	0.1	0.3	-0.3	0.25
1496.24	0.2	-0.2	0.1	0.3	-0.3	0.25
1584.89	0.2	-0.2	0.2	0.3	-0.3	0.25
1678.80	0.2	-0.2	0.1	0.3	-0.3	0.25
1778.28	-0.2	0.2	0.2	0.0	0.0	0.25
1883.65	-0.2	0.2	0.2	0.1	-0.0	0.25
1995.26	-0.3	0.3	0.2	-0.1	0.1	0.30
2113.49	0.1	-0.1	0.3	0.3	-0.3	0.30
2238.72	0.1	-0.1	0.3	0.4	-0.4	0.30
2371.37	0.3	-0.3	0.3	0.6	-0.6	0.30
2511.89	0.2	-0.2	0.3	0.5	-0.5	0.30
2660.73	0.2	-0.2	0.3	0.5	-0.5	0.30
2818.38	0.1	-0.1	0.3	0.4	-0.4	0.30
2985.38	0.1	-0.1	0.3	0.4	-0.4	0.30
3162.28	-0.1	0.1	0.2	0.1	-0.1	0.30
3349.65	-0.1	0.1	0.1	0.0	0.0	0.30
3548.13	0.1	-0.1	0.0	0.1	-0.1	0.30
3758.37	0.4	-0.4	-0.1	0.3	-0.3	0.30
3981.07	0.2	-0.2	-0.2	0.0	0.0	0.35
4216.97	0.0	0.0	-0.2	-0.2	0.2	0.35
4466.84	0.1	-0.1	-0.3	-0.2	0.2	0.35
4731.51	0.0	0.0	-0.3	-0.3	0.3	0.35
5011.87	0.4	-0.4	-0.2	0.2	-0.2	0.35
5308.84	0.1	-0.1	-0.2	-0.1	-0.1	0.35
5623.41	0.0	0.0	-0.1	-0.1	0.1	0.35
5956.62	-0.1	0.1	-0.1	-0.2	0.2	0.35
6309.57	0.3	-0.3	0.0	0.3	-0.3	0.35

Frequency, Hz	0 ° Free Field Response dB	0° Free Field Correctons ¹ dB	Effect of Windscreen dB	Windscreen on 824, 0 ° Free Field dB	0 ° Free Field Corrections with Wind Screen on 824 dB ¹	Expanded uncertainty of Corrections @95% dB
6683.4	0.5	-0.5	-0.2	0.3	-0.3	0.35
7079.46	-0.1	0.1	-0.2	-0.3	0.3	0.35
7498.94	0.1	-0.1	-0.3	-0.2	0.2	0.35
7943.28	0.5	-0.5	-0.5	-0.1	0.1	0.40
8413.95	0.2	-0.2	-0.4	-0.2	0.2	0.40
8952.51	0.5	-0.5	-0.3	0.2	-0.2	0.40
9440.61	0.7	-0.7	-0.5	0.2	-0.2	0.40
1000.00	0.7	-0.7	-0.3	0.5	-0.5	0.45
10592.54	0.5	-0.5	-0.6	0.0	0.0	0.45
11220.18	0.7	-0.7	-0.4	0.3	-0.3	0.45
11885.01	0.7	-0.7	-0.8	-0.1	0.1	0.45
12589.25	0.6	-0.6	-0.6	0.0	0.0	0.50
13335.21	0.1	-0.1	-0.6	-0.5	0.5	0.50
14125.38	0.3	-0.3	-0.7	-0.4	0.4	0.50
14962.36	0.8	-0.8	-0.8	0.0	0.0	0.50
15848.93	1.3	-1.3	-1.0	0.3	-0.3	0.60
16788.04	1.2	-1.2	-1.0	0.2	-0.2	0.60
17782.79	0.9	-0.9	-0.8	0.1	-0.1	0.60
18836.49	0.7	-0.7	-0.7	0.0	0.0	0.60
19952.62	0.5	-0.5	-1.0	-0.5	0.5	0.75

¹ Add numbers in this column to levels read on the 824 to correct the level at a specific frequency

Periodic Testing of A-Weighted Sound Levels

The following table presents adjustment data to be used to determine A-weighted sound levels equivalent to the response to plane sinusoidal sound waves incident from the reference direction produced by a calibrated multi-frequency sound calibrator and an electrostatic actuator.

Frequency, Hz	0 ° Free Field Corrections from B&K4226 Calibrator ¹ dB	0 ° Free Field Corrections with Wnd Screen from B&K4226 Calibrator ¹ dB	0 ° Free Field Corrections from B&K UA0033 Electrostatic Actuator ¹ dB	0 ° Free Field Corrections with Wnd Screen from B&K4226 Calibrator ¹ dB	Expanded uncertainty of Corrections @95% confidence, dB
31.62	0.1	0.1	0.0	0.0	0.25
63.10	0.1	0.1	0.0	0.0	0.25
125.89	0.1	0.1	0.0	0.0	0.25
251.19	0.1	0.1	0.0	0.0	0.25
501.19	0.0	0.0	-0.1	-0.1	0.25
1000.00	0.0	0.0	0.0	0.0	0.25
1995.26	-0.2	-0.1	-0.1	0.1	0.30
3981.07	1.3	1.3	1.3	1.3	0.35
7943.28	3.1	3.1	3.6	3.7	0.40
12589.25	6.0	6.0	6.4	6.4	0.50
15848.93	8.2	7.9	7.8	7.5	0.60

¹ Add numbers in this column to levels read on the 824 to correct the level at a specific frequency

A-Weighted Sound Levels at Upper and Lower Limits of the Linear Operating Range

The following table presents the nominal A-weighted sound levels at the upper and lower limits of the linear operating ranges for each level range. The starting point for testing the level linear errors of the reference range is 114 dB.

	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
SLM (ISM)					
Normal Range	63 dB to 128 dB	19 dB to 128 dB	18 dB to 128 dB	21 dB to 128 dB	26 dB to 128 dB
Low Range	59 dB to 108 dB	18 dB to 108 dB	18 dB to 108 dB	19 dB to 108 dB	22 dB to 108 dB
SLM&RTA (SSA)					
0 dB Gain	83 dB to 128 dB	43 dB to 128 dB	43 dB to 128 dB	47 dB to 128 dB	49 dB to 128 dB
10 dB Gain	73 dB to 118 dB	33 dB to 118 dB	32 dB to 118 dB	35 dB to 118 dB	39 dB to 118 dB
20 dB Gain	64 dB to 108 dB	24 dB to 108 dB	23 dB to 108 dB	25 dB to 108 dB	29 dB to 108 dB
30 dB Gain	58 dB to 98 dB	19 dB to 98 dB	18 dB to 98 dB	20 dB to 98 dB	23 dB to 98 dB
40 dB Gain	58 dB to 88 dB	18 dB to 88 dB	17 dB to 88 dB	19 dB to 88 dB	22 dB to 88 dB
50 dB Gain	58 dB to 76 dB	18 dB to 78 dB	17 dB to 78 dB	19 dB to 78 dB	22 dB to 78 dB

Electrical Signal Input Device:

The electrical design of the input device to insert electrical signals into the preamplifier is a series 18pF ± 5% capacitor. The Larson Davis ADP005 is used for this purpose. The ADP005 can be used for noise floor testing by attaching the included short on the front of the ADP005.

Inherent Noise:

The inherent Noise on the low range in ISM mode or 50 dB gain in SSA mode:

Frequency Weighting	Total Noise ¹	Electrical Noise ²
A	16	7
C	19	13
Flat	24	21

¹ Combination of electronic and thermal noise of the microphone at 20°C measured in a sealed cavity and vibration isolated.

² Electronic noise of the instrument with an ADP005 adaptor in place of the microphone

Maximum Sound Pressure Level:

The highest sound pressure level the Larson Davis 824 is designed to accommodate at the level of overload is 128 dB. The peak-to-peak voltage at this level is 6.25 V_{pp} input through the ADP005.

Power Supply Voltage Range:

The battery power supply voltage range for which the System 824 conforms to this standard is 2.3 to 4.8 volts.

The System 824 will shut down if the battery is below 2.3 volts when used with alkaline batteries and below 3.3 volts when used with NiMH batteries.

Display Device

The display device will display all levels over the entire linear operating range on all ranges.

Stabilization Time Following Changes of Environmental Conditions:

The typical time interval needed to stabilize after changes in environmental conditions is as follows:

- For a temperature change of 5 °C, the time is 30 minutes
- For a static pressure change of 5 kPa, 15 seconds
- For a humidity change of 30% (non-condensing), 30 minutes

Electric Field Strength Above 10 V/m:

The Larson Davis model 824 was not tested for field strengths greater than 10 V/m.

Greatest Radio Frequency Emission Levels:

NOTE: For the specification of emission of and susceptibility to, radio frequency fields, the System 824 is classified as group X sound level meter.

The mode of operation of the 824 that produced the greatest radio frequency emission levels was with the 824 set to ISM mode and with an EXA010 (10' microphone extension cable) used to connect the PRM902 to the 824. All ranges were the same. Radio frequency emission in other modes

(LOG and SSA) are the same. Adding the RS232 cable did not increase the radio frequencies emission levels.

Effect of Electrostatic Discharges

The System 824 is not affected by electrostatic discharges.

Greatest Susceptibility to AC Power and Radio Frequency Fields:

The mode of operation of the 824 that produced the greatest susceptibility to A.C power frequency and radio frequency fields was with the 824 set to ISM mode, RS232 cable attached and with an EXA010 (10' microphone extension cable) between the PRM902 and the 824.

