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Indoor Location Using Ultrasounds

Edirol Input 1 and Microphone Amplifier Frequency Response

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1 Introduction

This report presents the frequency response of the sound card Edirol FA-66 and the microphone amplifier. In section 2 we present the frequency response of the sound card for several frequencies. After that, in section 3 we evaluate the frequency response of each microphone amplifier's channel.

2 Sound Card Frequency Response

In order to evaluate the sound card input 1 frequency response it was used a signal generator and an oscilloscope to measure the input amplitude. For the signal generator, it was used the Philips PM 5110 up to 100 KHz and the Circuitmate Function Generator FG2 above. Therefore, the sound card signal input was registered using the Electroacoustics Toolbox set to full scale voltage. Moreover, the input gain was set to the minimum value.

The sound card input 1 gain was measured for 44 different frequencies and register in table 1, moreover, this information is also register in the mat file edirol_in1_g.mat. Figure 1 presents the sound card frequency response.

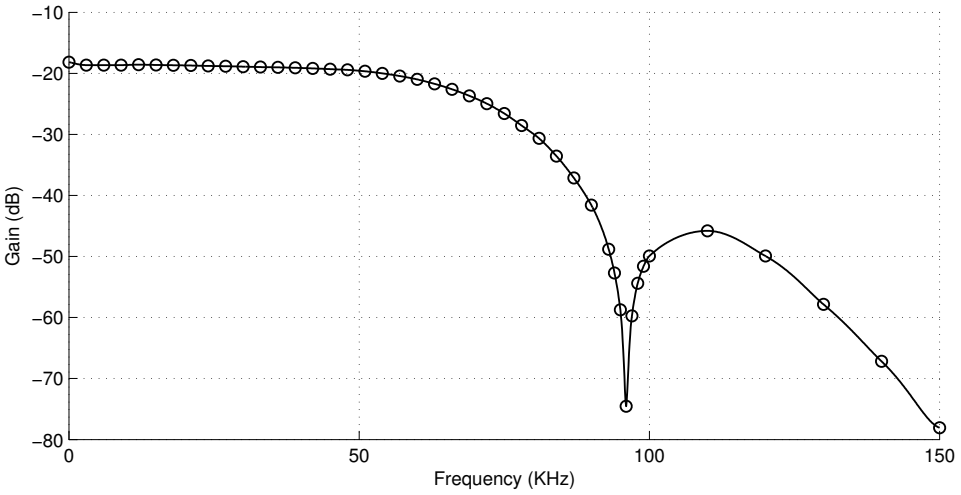

Figure 1: Edirol FA-66 Input 1 frequency response.

Frequency (KHz)	**Gain (V/V)**
0.0117	0.12357143
3	0.11687117
6	0.11687117
9	0.11687117
12	0.11779141
15	0.11717791
18	0.11656442
21	0.11595092
24	0.11503067
27	0.11441718
30	0.11349693
33	0.11257669
36	0.11196319
39	0.11104294
42	0.10981595
45	0.10828221
48	0.10679012
51	0.10401235
54	0.1
57	0.095061728
60	0.089197531
63	0.082098765
66	0.074074074
69	0.065432099
72	0.056481481
75	0.04691358
78	0.037345679
81	0.029320988
84	0.020987654
87	0.013888889
90	0.0083333333
93	0.003625
94	0.0023125
95	0.00115625
96	0.0001875
97	0.00103125
98	0.00190625
99	0.002625
100	0.0031875
110	0.005125
120	0.0031875
130	0.00128125
140	0.0004375
150	0.000125

Table 1: Edirol FA-66 Input 1 gain (potentiometer at minimum gain) for different frequencies.

3 Microphone Amplifier Frequency Response

In order to evaluate the microphone amplifier frequency response it was used the Audio Precision – Portable one plus. Moreover, the output voltage was kept between 3 and 8 V in order to avoid the noise and the amplitude distortion.

The microphone amplifier gain was measured for 41 different frequencies for each gain position and register in table 2, moreover, this information is also register in the mat file mic_g.mat. Figure 2 presents the microphone amplifier frequency response for each gain position.

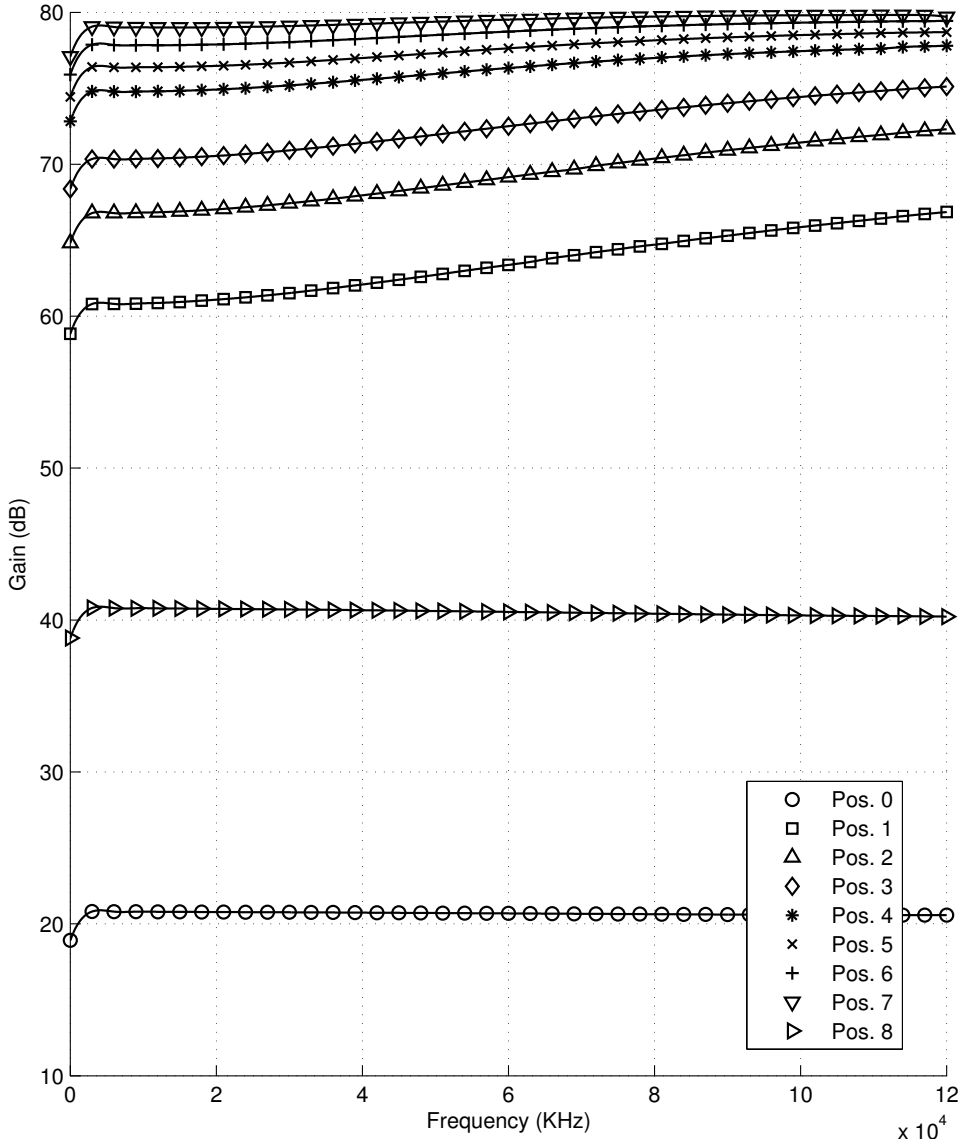

Figure 2: Microphone amplifier frequency response for each gain position.

Freq. (KHz)	**Pos. 0**	**Pos. 1**	**Pos. 2**	**Pos. 3**	**Pos. 4**	**Pos. 5**	**Pos. 6**	**Pos. 7**	**Pos. 8**
0.01	8.8325	875.25	1743	2624	4378	5271.4	6240	7160	87.2
3	10.98	1096.7	2183.5	3290	5491	6606.3	7824	8972	109.55
6	10.973	1097.2	2183.5	3289	5485	6595.2	7808	8948	109.45
9	10.967	1100.2	2188.5	3293	5486	6592.1	7798	8926	109.35
12	10.957	1105.5	2198	3305	5497	6600	7796	8914	109.22
15	10.95	1113.8	2212	3323	5517	6615.9	7804	8914	109.08
18	10.942	1124.8	2230.5	3349	5547	6644.4	7824	8922	108.95
21	10.935	1137.8	2255	3379	5584	6676.2	7850	8930	108.8
24	10.928	1153.2	2283	3418	5632	6722.2	7886	8952	108.65
27	10.922	1171.2	2316	3463	5687	6774.6	7932	8980	108.5
30	10.915	1191.2	2353.5	3513	5748	6833.3	7982	9014	108.33
33	10.905	1213.8	2393	3569	5817	6900	8040	9054	108.17
36	10.9	1237	2435	3627	5889	6973	8102	9094	108
39	10.89	1263	2483	3691	5968	7047.6	8162	9140	107.8
42	10.88	1289.5	2532	3759	6047	7125.4	8232	9186	107.6
45	10.87	1318	2583	3831	6129	7204.8	8302	9236	107.42
48	10.862	1347	2638.5	3904	6213	7288.9	8370	9282	107.2
51	10.852	1377.8	2694	3980	6299	7368.3	8440	9330	107
54	10.842	1410.8	2750.5	4059	6386	7452.4	8508	9374	106.8
57	10.832	1442.2	2808.5	4140	6474	7533.3	8576	9422	106.57
60	10.825	1475	2868	4220	6557	7614.3	8644	9464	106.35
63	10.815	1508.8	2928	4303	6641	7693.7	8706	9504	106.12
66	10.805	1553	2989	4383	6726	7771.4	8768	9544	105.92
69	10.795	1587.5	3045	4465	6807	7844.4	8826	9578	105.7
72	10.785	1624.5	3126	4547	6884	7914.3	8884	9610	105.5
75	10.777	1660.5	3192	4630	6959	7981	8934	9642	105.28
78	10.768	1698	3257	4710	7027	8044.4	8988	9664	105.08
81	10.757	1730	3321	4790	7099	8109.5	9030	9692	104.82
84	10.75	1768	3386	4868	7165	8166.7	9074	9712	104.62
87	10.74	1805	3453	4947	7227	8222.2	9112	9730	104.4
90	10.73	1840	3516	5023	7285	8271.4	9148	9746	104.2
93	10.722	1878	3579	5097	7339	8319	9182	9760	104
96	10.715	1915	3642	5172	7390	8363.5	9210	9768	103.8
99	10.707	1951.5	3707	5244	7437	8404.8	9238	9778	103.6
102	10.7	1988	3770	5313	7481	8442.9	9264	9784	103.45
105	10.695	2024.5	3831	5382	7522	8479.4	9288	9792	103.3
108	10.692	2060	3895	5447	7561	8511.1	9310	9796	103.17
111	10.69	2097	3950	5515	7596	8544.4	9330	9800	103.05
114	10.69	2134	4015	5579	7685	8571.4	9346	9800	102.95
117	10.69	2168.5	4071	5642	7733	8592.1	9358	9794	102.8
120	10.688	2201.5	4125	5697	7757	8607.9	9364	9660	102.65

Table 2: Microphone amplifier gain for each gain position and frequency.