ReSpeaker Core v2 Specifications

ACOUSTIC & ELECTRICAL SPECIFICATIONS OF BOARD

Parameter	Conditions	Typ.	Units
Input Path [1]			
Sensitivity	Sensitivity @ 94dB SPL, 1KHz, pga[2]=50%	-10	dBFS
Signal to Noise Ratio	SNR @ 94dB SPL, 1KHz, pga=50%	55	dB
Total Harmonic Distortion	THD @ 94dB SPL, 1KHz, pga=50%	0.46	%
	10% THD @ 1KHz Sine wave, pga=100%	89	dB SPL
System Noise in Quiet Environment	noise @ quiet environment, pga=100%	-50	dB
	noise @ quiet environment, pga=50%	-65	dB
	noise @ quiet environment, pga=1%	-90	dB
Speaker Output			
THD+N	Po = 1.22W, F = 1kHz, RL = 8Ω	1.13	%
	Po = 1.67W, F = 1kHz, RL = 4Ω	0.68	%

[1] Input path: microphone + ADC

[2] ALSA PGA setting

ACOUSTIC & ELECTRICAL SPECIFICATIONS OF SINGLE MICROPHONE

TEST CONDITIONS: 23 ±2°C, 60-70% R.H., $V_{DD}(min) \le V_{DD} \le V_{DD}(max)$, no load, Gain = 20 dB, unless otherwise specified

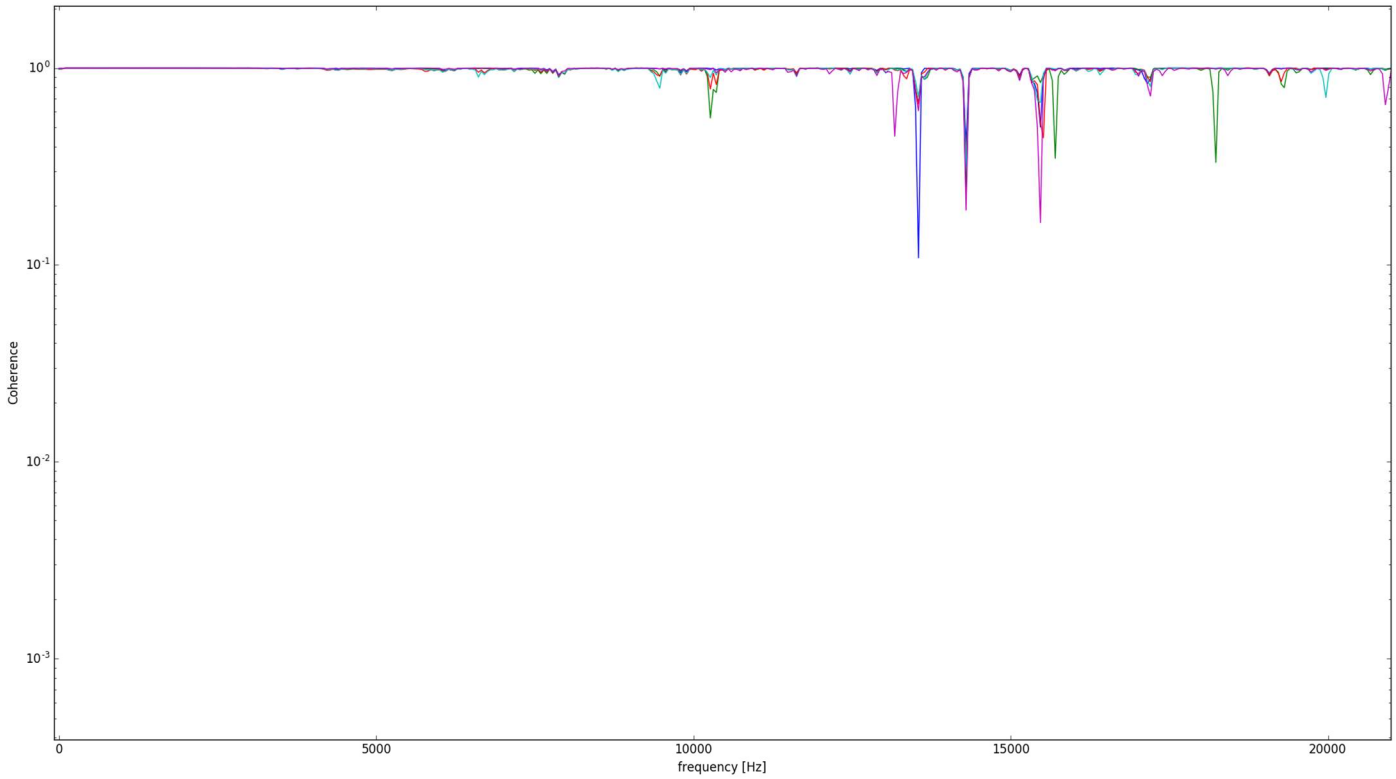
Parameter	Symbol	Condition	Limits			Unit
			Min.	Nom.	Max.	
Supply Voltage[1]	V_{DD}		1.5	---	3.6	V
Current Consumption[1]	I_{DD}		---	155	205	μA
Directivity			Omni-directional			
Sensitivity[1]	S	94 dB SPL @ 1kHz	-25	-22	-19	dBV/Pa
Signal to Noise Ratio	SNR	94 dB SPL @ 1kHz, A-weighted	---	59	---	dB(A)
Output Impedance	Z_{OUT}	@ 1kHz	---	---	400	Ω
Total Harmonic Distortion	THD	100 dB SPL @ 1kHz, Rload > 2kΩ	---	---	1	%
		115 dB SPL @ 1kHz, Rload > 2kΩ[2]	---	---	10	%
Polarity		Increasing sound pressure	Decreasing output voltage			

[1] 100% tested

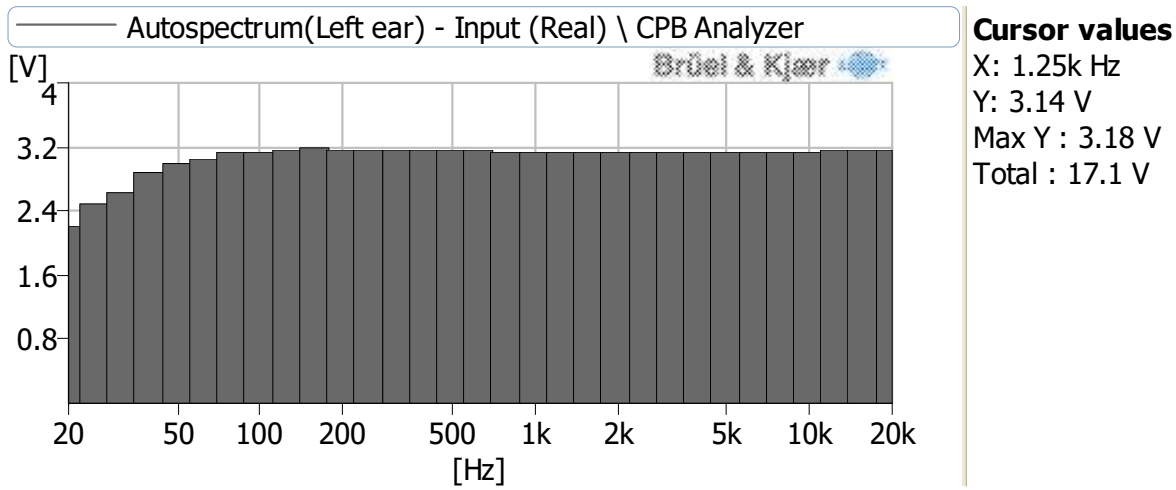
[2] For gain=20 dB, the condition is 95 dB SPL @ 1 kHz

COHERENCE BETWEEN MICROPHONE CHANNELS

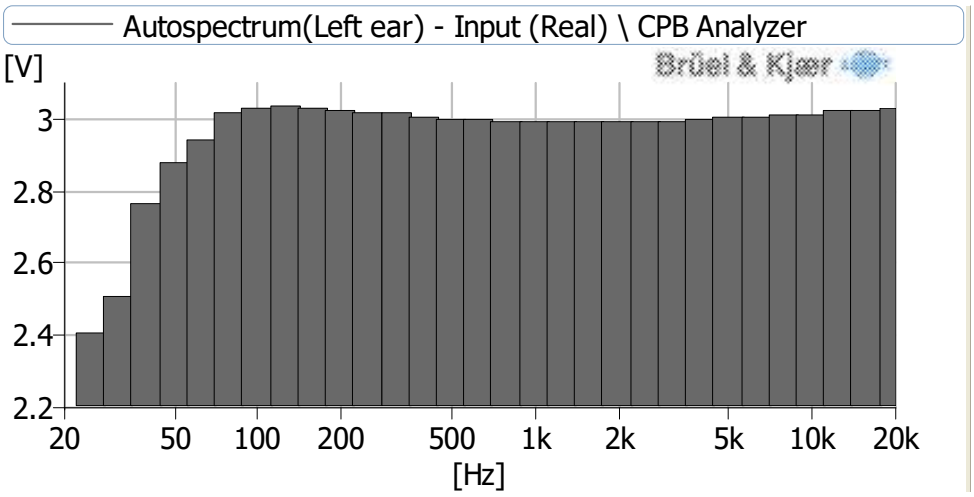
TEST CONDITIONS: In the anechoic laboratory, record 100Hz ~ 20KHz sweep signal, 5 seconds



AUDIO OUT FREQUENCY RESPONCE

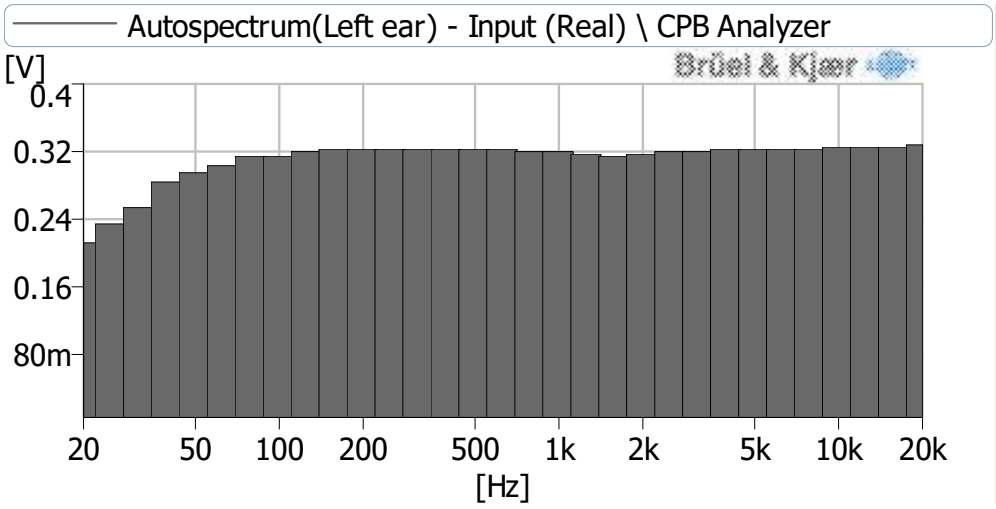


SPEAKER RL = 8Ω



Cursor values
X: 1.25k Hz
Y: 2.99 V
Max Y : 3.04 V
Total : 16.37 V

SPEAKER RL = 4Ω



Cursor values
X: 1.25k Hz
Y: 0.32 V
Max Y : 0.33 V
Total : 1.73 V

HEADSET RL=32Ω

ACOUSTIC & ELECTRICAL SPECIFICATIONS OF ADC

	Parameter	Test Conditions	Min.	Typ.	Max.	Units
ADC Input Path Performance	MIC1/2/3/4 via ADC to I2S DLDOIN=ALDOin=5.0V, VCC_I2S=VCC_DIO=3.3V					
	DR(A-weighted)	PGA=0dB		108		dB
	THD+N			-90		dB
	DR(A-weighted)	PGA=12dB		106		dB
	THD+N			-84		dB
	DR(A-weighted)	PGA=24dB		100		dB
	THD+N			-83		dB
	DR(A-weighted)	PGA=30dB		95		dB

	THD+N			-83		dB
	Crosstalk (L/R)	10mV, 1KHz, 30dB Gain		90		dB
ADC Input Path Performance	MICBIAS1/2/3/4 without bypass capacitor DLDOIN=ALDOin=5.0V, VCC_I2S=VCC_DIO=3.3V					
	Output Scale		1.5	2.1	3.4	V
	Bias Current			4		mA
	Noise Level		1.7	4		uV

ACOUSTIC SPECIFICATIONS OF CLOSED-SOURCE SOFTWARE

Parameter	Conditions	Min.	Typ.	Max.	Units
Noise Suppression Ratio	Dynamic, pga=100%		20		dB
Echo Suppresstion Ratio	Dynamic, pga=100%		25		dB
DoA Resolution	--		30		degree
DoA Accuracy Rate [1]	50 dB dynamic noise, pga=100%, 2 meters		95		%
Wake-up Distance	50 dB dynamic noise, pga=100%		3 [2]	7	m
	30 dB dynamic noise, pga=100%			10	m
ASR Distance	50 dB dynamic noise, pga=100%			4	m
Wake-up Success Rate	50 dB dynamic noise, pga=100%, 3 meters	90			%
False Trigger Rate	--	See spec of hotword engine [3]			

[1] ±30° to real direction

[2] With detection success rate ≧ 90%

[3] Snowboy hotword engine