



Dynamic Loudspeaker

15×11×2.45 mm

Guts

GR1511S025YN7Z

Revision

Date	Version	Status	Changes	Approver
2024/1/16	V0.1	Draft	First release	AX

1. Scope

- 1.This document is the technical specification of Micro Dynamic Speaker.
2. Devices must comply with ROHS, REACH environmental protection standards.

2. Electro-Acoustic Characteristics

2.1 Test Conditions

Test Condition: $+25\pm 2^{\circ}\text{C}$, 25%~75% RH, 86~106Kpa, unless specified differently.

2.2 Limit Conditions

Operating Temperature Range: $-20^{\circ}\text{C}\sim 70^{\circ}\text{C}$.

Storage Temperature Range: $-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$

2.3 Typical Electroacoustic Parameters

Definition Of Sweep Frequency: 100 Hz to 20kHz with a R40(12th Octave) of test sequence.

No.	Parameter	Technical Specifications	Conditions	Unit
1	DC Resistance	$6\pm 10\%$		Ω
2	Rated AC Impedance	$7\pm 15\%$	@2kHz	Ω
3	Rated Power	1		W
4	Maximum Short Time Power	EQ		W
5	Resonance Frequency	$760\pm 10\%$	in 0.8cc back case (measured @2.65V) , 25°C	Hz
6	Sound Pressure Level-1	93.5 ± 3	@2kHz /2.65V/10cm SC Baffle in 0.8cc back case	dB
7	Sound Pressure Level-2	87 ± 3	@500Hz/2.65V/10cm SC Baffle in 0.8cc back case	dB
8	Frequency Response	According chapter 2.6	2.65V/10cm SC Baffle in 0.8cc back case	
9	Total Harmonic Distortion	According chapter 2.7	2.65V&EQ/10cm SC Baffle in 0.8cc back case	
10	Rub& Buzz	According chapter 2.8	2.65V&EQ/10cm SC Baffle in 0.8cc back case	
11	Listening condition	No Audible Rub & Buzz	2.2Vrms (Xmax) , in 0.8cc back case 100Hz~2kHz; sine wave , time: 1~2s; 2cycles	
12	Polarity	When a DC source's "+" polarity is attached to speaker's "+" polarity, "-" polarity is attached speaker's "-" polarity,the membrane will move forward.		

2.4 Frequency Response

Test condition: sine wave, 100~20KHz, 1/12 OCT, 2.65V, 0.8cc back case, baffle

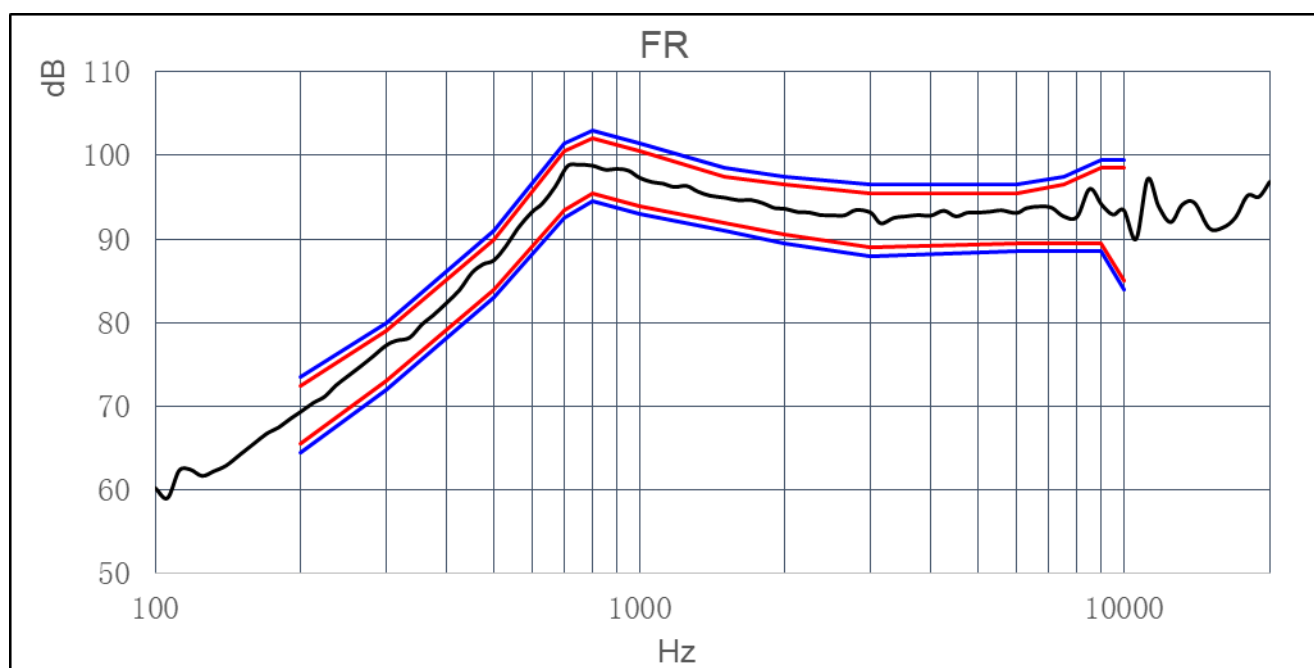


Fig. 2.4-1 Typical Frequency Response

FR (Hz)	Upper		FR (Hz)	Lower	
	Before Reliability	After Reliability		Before Reliability	After Reliability
200	72.5	73.5	200	65.5	64.5
300	79	80	300	73	72
500	90	91	500	84	83
700	100.5	101.5	700	93.5	92.5
800	102	103	800	95.5	94.5
1000	100.5	101.5	1000	94	93
1500	97.5	98.5	1500	92	91
2000	96.5	97.5	2000	90.5	89.5
3000	95.5	96.5	3000	89	88
6000	95.5	96.5	6000	89.5	88.5
7500	96.5	97.5	7500	89.5	88.5
9000	98.5	99.5	9000	89.5	88.5
10000	98.5	99.5	10000	85	84

2.5 THD

Test condition: sine wave, 100~20KHz, 1/12 OCT, 2.65V, 0.8cc back case, baffle

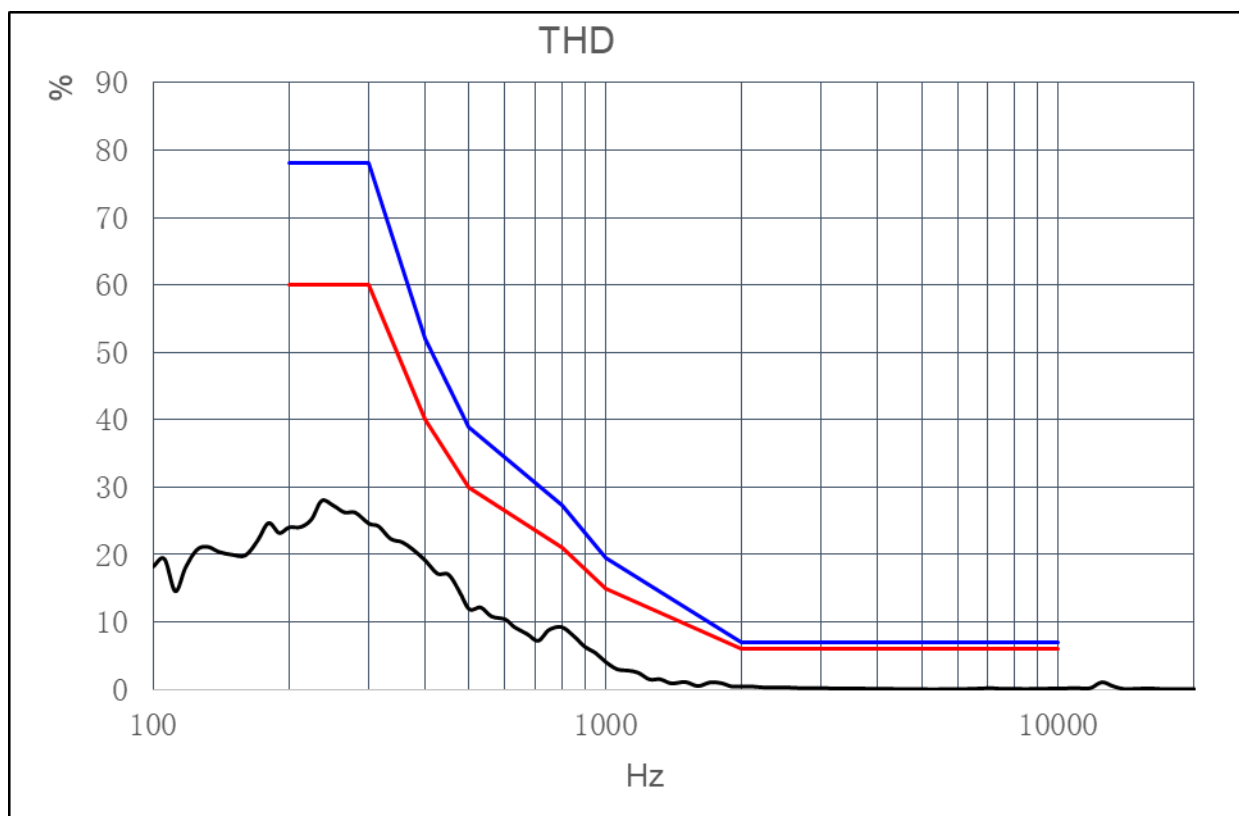


Fig. 2.5-1 THD

THD (Hz)	Before Reliability	After Reliability
200	60	78
300	60	78
400	40	52
500	30	39
800	21	27.3
1000	15	19.5
2000	6	7
10000	6	7

Test condition: sine wave, 100~20KHz, 1/12 OCT, EQ, 0.8cc back case, baffle

2.6 R&B

Test condition: sine wave, 100~20KHz, 1/12 OCT, 2.65V, 0.8cc back case, baffle

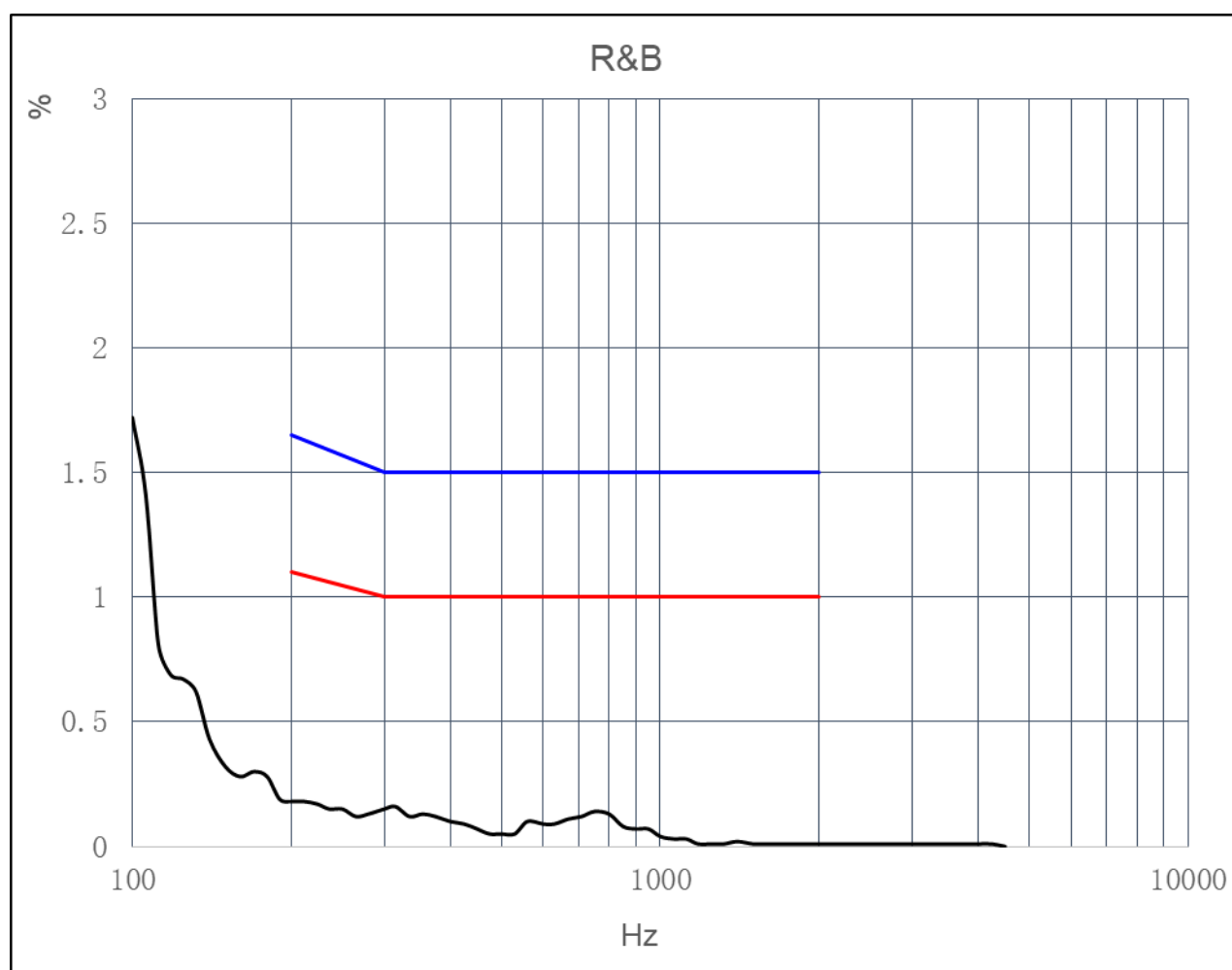
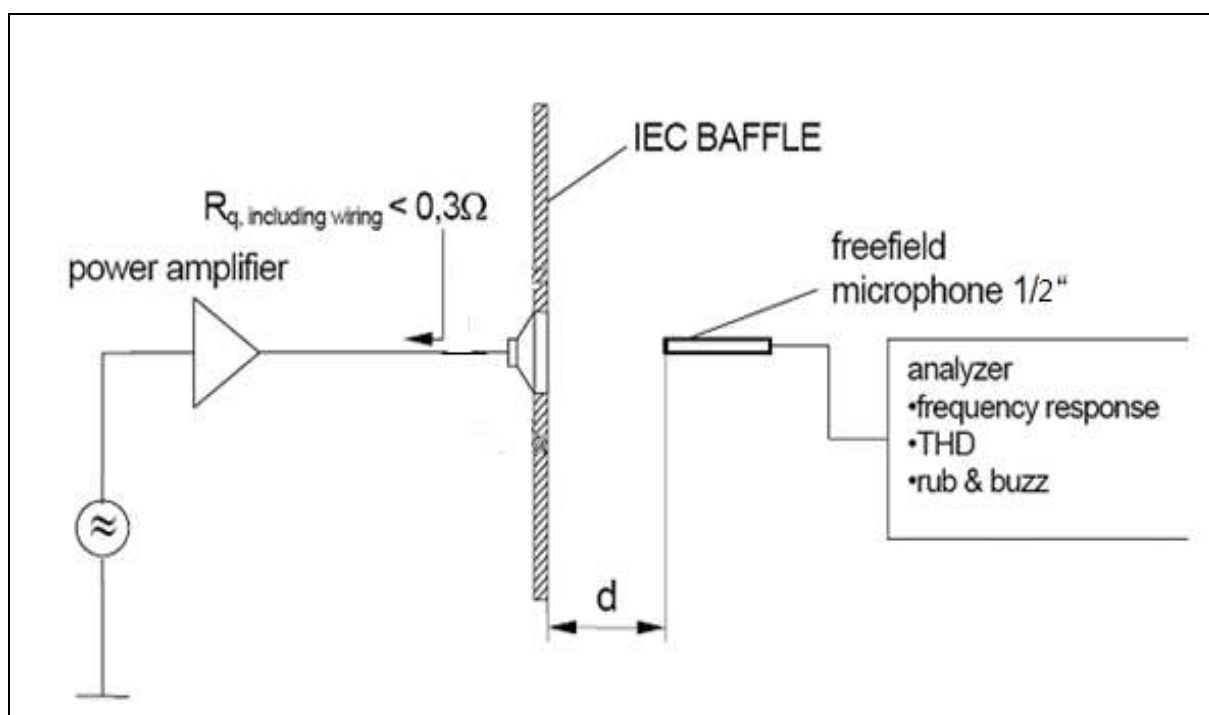


Fig. 2.6-1 R&B (10-35OCT harmonic wave)

R&B (Hz)	Before Reliability	After Reliability
200	1.1	1.65
300	1	1.5
2000	1	1.5

2.7 Measurement System Setup



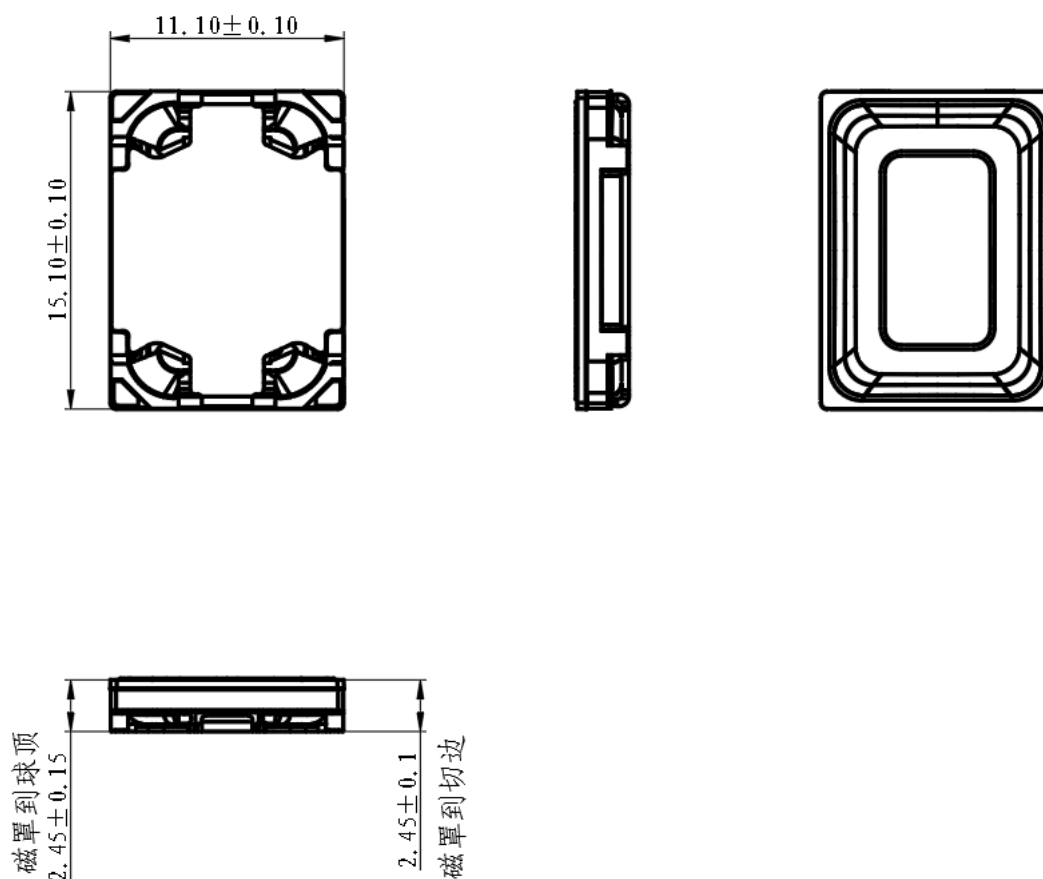
Test conditions:

Input : rated power&EQ(100~2KHz,R40)

Sweep frequency range:100Hz to 20KHz,sinusoidal signal,1/12 Oct

3. Mechanical Layout and Dimensions

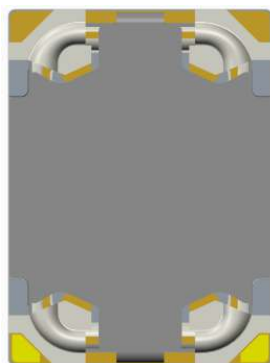
3.1 Main Dimensions



Remark:

- 1、 "*"Critical Dimension
- 2、 Unmarked tolerance: ± 0.15 mm
- 3、 Dimensions with () are reference dimension
- 4、 Unit: mm

3.2 Magnetic Polarity



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The membrane moves forward

**N****S**

When a DC source's "+" pole is attached to speaker's "+" pole, "-" pole is attached speaker's "-" pole, the membrane will move forward.

4. Reliability Tests

4.1 Acceptable Standard

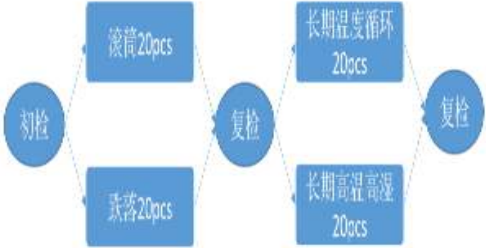
- (1) After reliability test, The samples shall be stored under normal conditions such as in ordinary rooms or laboratories. Unless otherwise noted, the recovery period shall be 4 hours at least before performance testing.
- (2) After reliability test, all samples must meet the requirements specified in section 2.
- (3) F0 : After reliability test, If F0 is within the specification limits, That's ok. If F0 is out of the specification limits, It's ok If variation is less than 60HZ;

4.2 Test Project

Project		Condition	Quantity	Standards
	Long term rated power load test	Swept sine + pink noise at rated power 100 hours , 25°C Measurements to be taken at least 2h recovery time	10	The Speaker should meet the spec
	Short term maximum power load test	The speaker is fed with pink noise of 1.13 times the rated power 1 second on/59 second off,60times Measurements to be taken at least 2h recovery time	10	The Speaker should meet the spec
	High and low temperature load	Low temperature: -20 ° C, 48h high temperature: + 65 ° C, 168h rated power, pink noise signal	10	The Speaker should meet the spec
	High temperature and humidity with the rated power	Temperature : +65°C Humidity : 95% Duration : 120 hours rated power, pink noise signal	10	The Speaker should meet the spec
	F0 sweep frequency	The sample is at the limit amplitude of Xmax voltage and works for 120h ,Sweep frequency range F0±100Hz Swept sine	10	Voice coil can not be broken, short circuit, loose coil, Dc resistance change is less than 10%
	Voice coil damage 1	Inspect the samples before test, apply5V DC voltage, 5pcs SPK + connect to power +, SPK - connect to power -, 5pcs SPK + connect to power -, SPK - connect to power +, last for 1min	10	Voice coil can not be broken, short circuit, loose coil, voice coil lodging less than30°

Specifications			
Voice coil damage 2	Signal level Xmax voltage 200hz-3.5KHz 48 hours Swept sine	10	Voice coil can not be broken, short circuit, loose coil, Dc resistance change is less than 10%
Tmax	When the frequency is 3KHz, the sample is at the design limit temperature(120+10℃) corresponding voltage and works for 120h Swept sine	10	The Speaker should meet the spec
Salt spray test	Sodium Chloride Solution with salt spray concentration of 5% was continuously sprayed for 24h at 35 °C, then moved out for 24h of drying and carried out 2 cycles. PH=6.5-7.2	10	50 times the microscope to observe the surface of PAD, the coating is not shedding, crease wrinkle, separation, corrosion and other phenomena, the surface corrosion product area is less than the area of the critical area of 5%,OK
Temperature shock	High temperature :+85℃ , 30min Low temperature : -40℃ , 30min Change time : <20s Total Cycle : 100times	10	The Speaker should meet the spec
High temperature storage	Temperature : +85℃ Duration : 96 hours	10	The Speaker should meet the spec
Low temperature storage	Temperature : -40℃ Duration : 96 hours	10	The Speaker should meet the spec
Long term high humidity and temperature storage	Temperature +65℃ humidity :95%RH Duration : 96 hours	10	Should not have structural damage, magnetic circuit fall off, diaphragm damage
Tumble test	Total of 300 random drops in drop test adapter (180g) onto steel base surface from 1m height, Check after every 50 drops	20	The Speaker should meet the spec
Drop test	In drop test adapter(180g) onto griotte surface from 1.5m height,40times	20	The Speaker should meet the spec

Specifications

<p>Combined Test</p>	<p>1. 20pcs tumble test, 20pcs drop test, then test performance 2. Take 10pcs samples after test do high and low temperature load test and Long term high humidity and temperature operation</p>  <pre> graph LR A((初检)) --> B[滚筒 20pcs] A --> C[跌落 20pcs] B --> D((复检)) C --> D D --> E[长期温度循环 20pcs] D --> F[长期高湿高湿 20pcs] E --> G((复检)) F --> G </pre>	<p>40</p> <p>1) After tumbling test & drop test: electro-acoustic specifications should be OK 2) After high and low temperature load test and Long term high humidity and temperature operation: Samples are not allowed to have structural damage (including magnetic circuit), broken membrane, broken wire and silent functional failure.</p>
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5. Packaging and Environmental Conditions

5.1 Packaging

TBD

5.2 Environmental Conditions

Storage Condition: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

Operation Condition: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$