



8x15x1.5 HAC Receiver

Order No.2403-263-0092



Change History

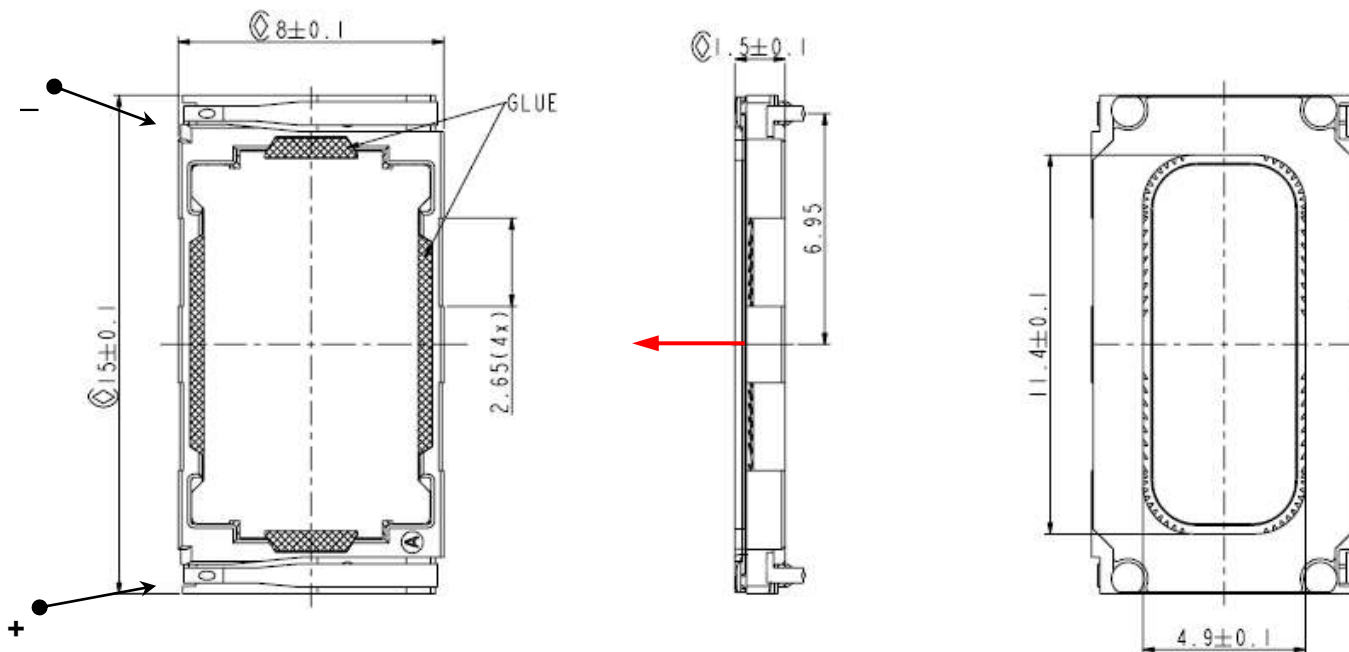
Status	Version	Date	ECR	Comment / Changes	Initials of owner
Draft	A1.0	09.30.10		Draft specification for first samples	Paul. Song
Draft	A1.1	10.20.10		Updated Chapter 2.1.	Paul. Song
Draft	A1.2	11.05.10		Updated the mechanical drawing of receiver[1.1]. Updated the part marking/labelling[1.3]. Updated the mass, material of basket and cover [1.4]. Updated the test results on baffle[2.1]. Updated the test results on BK 3.2 high leak[2.2]. Updated the mechanical drawing of baffle adapter[2.6]. Updated Environmental Tests[4].	Paul. Song
Draft	A1.3	11.23.10		Added Recommend PAD areas[1.1]. Added the limit for spring force[1.2]. Updated the part marking/labelling[1.3]. Added forces on component[1.4]. Updated the material of cover [1.5]. Changed the limit of Baffle test[2.1]. Added Maximum diaphragm excursion above the top of the surface[2.3]. Added Linear Displacement Volume[2.3]. Added Maximum Displacement Volume[2.3]. Removed Maximum usable excursion Xmax[2.3]. Added measure setup[2.8.1]. Updated Environmental Tests[4].	Paul. Song
Draft	A1.3.1	01.21.11		Removed Linear Displacement Volume[2.3]. Removed Maximum Displacement Volume[2.3]. Add weighting detail[2.4.1].	Paul. Song
Release	A 1.4	03.11.11		Updated the test results on baffle[2.1]. Updated the test results on BK 3.2 high leak[2.2]. Updated the characteristic field strength sensitivity and frequency response[2.5]. Updated test sweep range, steps and add microphone details[2.8]. Updated the schematic diagram measurement setup for Hearing Aid[2.9]. Updated the Packing Information[2.10].	Paul. Song
Release	A 1.4.1	03.22.11		Updated the Main Dimensions [1.1].	Paul. Song
Release	A 1.5	04.07.11		Updated the material of basket [1.5]. Updated the material of POT/ TOPPLATE[1.5].	Paul. Song
Release	A 1.5.1	04.29.11		Add tolerance to Nominal characteristic sensitivity[2.3]	Paul. Song

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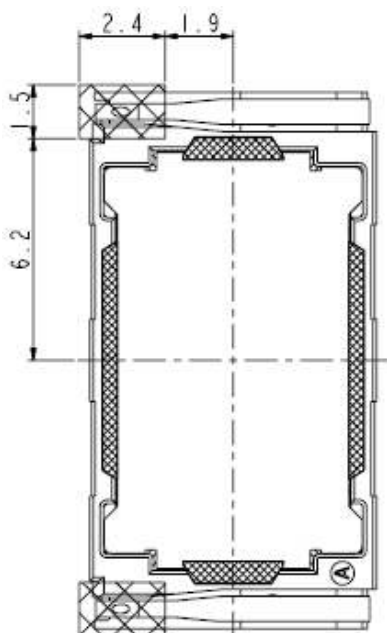
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1. Mechanical Characteristics

1.1. Main Dimensions

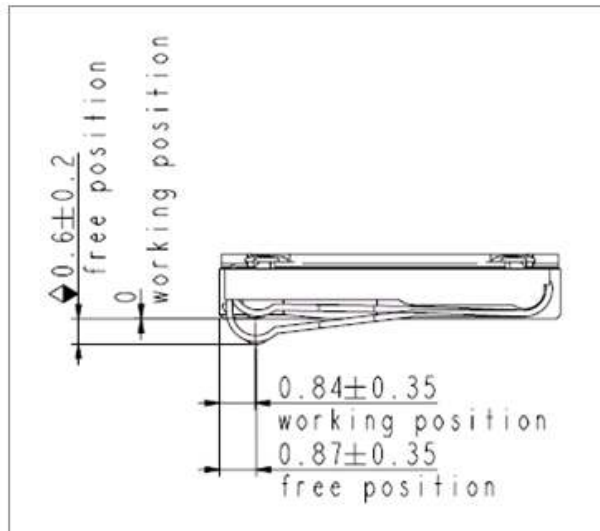
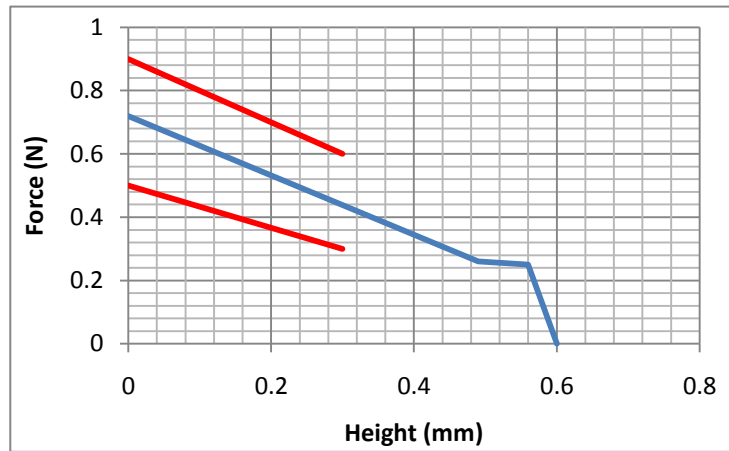


Positive voltage on pin '+' moves membrane in direction of red arrow!

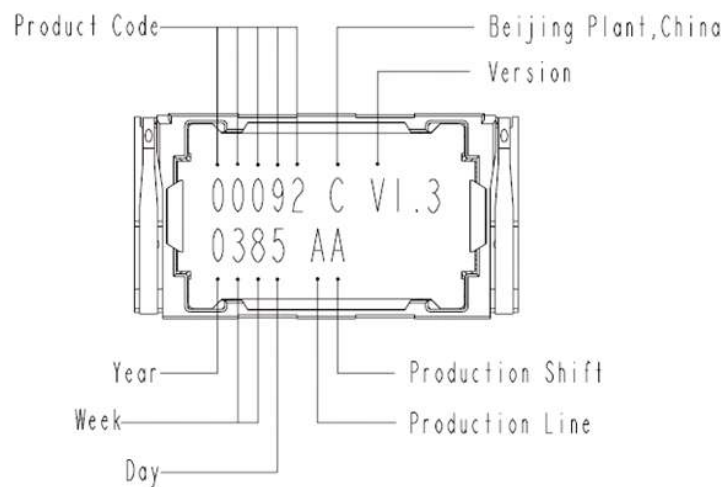


Recommend PAD layout

1.2. Spring Force

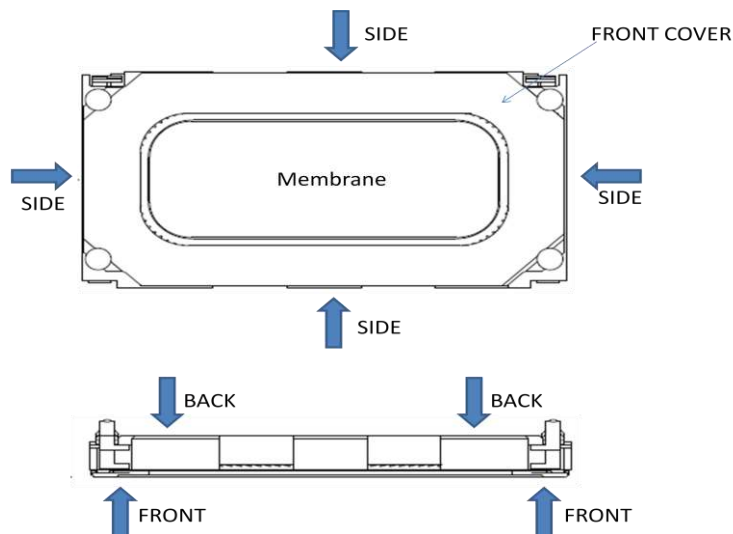


1.3. Part Marking/Labeling



(Numbers are generic example)

1.4. Forces on Component



State	Maximum Permanent Force[N]	Maximum Handling Force[N]
From Back To Front(cover)	10	15
Membrane	0	0
From Side to Side	5	10

1.5. Material List

- 1. MATERIAL of BASKET: PC
- 2. MATERIAL of MEMBRANE: POLYARYLATE - COMPOUND
- 3. MATERIAL of POT/ TOPPLATE: SOFT MAGNETIC IRON, Ni Plating
- 4. MATERIAL of MAGNET: Nd Fe B
- 5. MATERIAL of SPRING CONTACT: STAINLESS STEEL
- 6. PLATING of SPRING CONTACT: 2.5-3.5 μm Ni, 0.5-0.7 μm Au (CONTACT POINT)
- 7. MATERIAL of COVER: Brass CuZn, Ni Plating
- 8. DIMENSION: 8x15x1.5mm
- 9. MASS: 0.554 g
- 10.CONNECTIONS: SPRING CONTACT
- 11.DIRECTION of CONNECTOR: VERTICAL TO PCB (ORIENTATED)

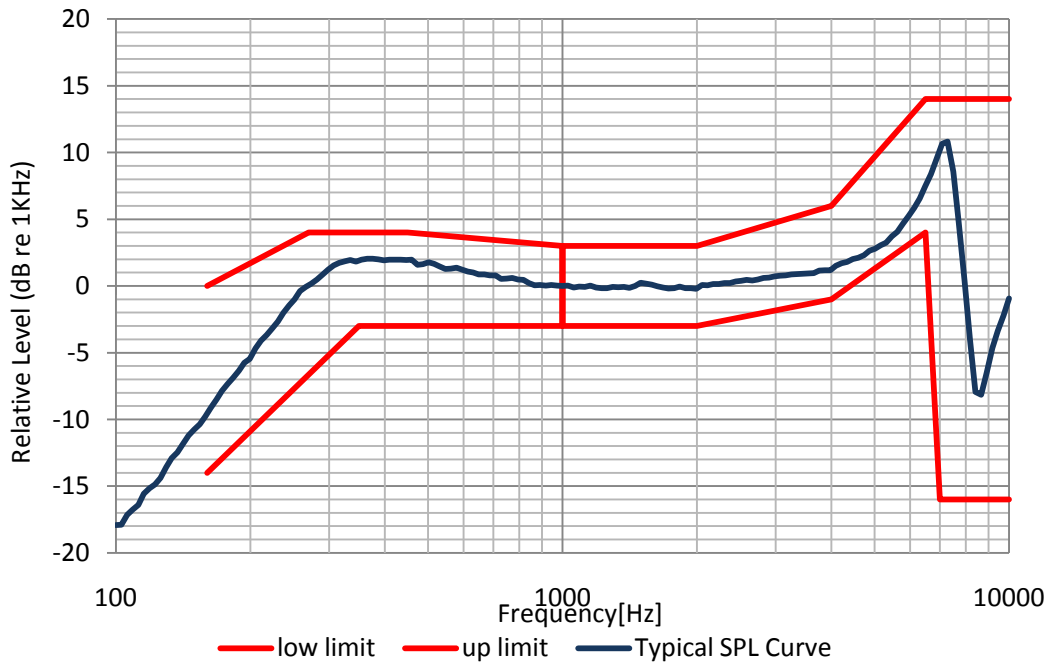
2. Electro-Acoustic Characteristics

2.1. Frequency response

TYPICAL FREQUENCY RESPONSE

measured on baffle according to chapter 2.6

(D=1cm; P=10mW @32Ω)

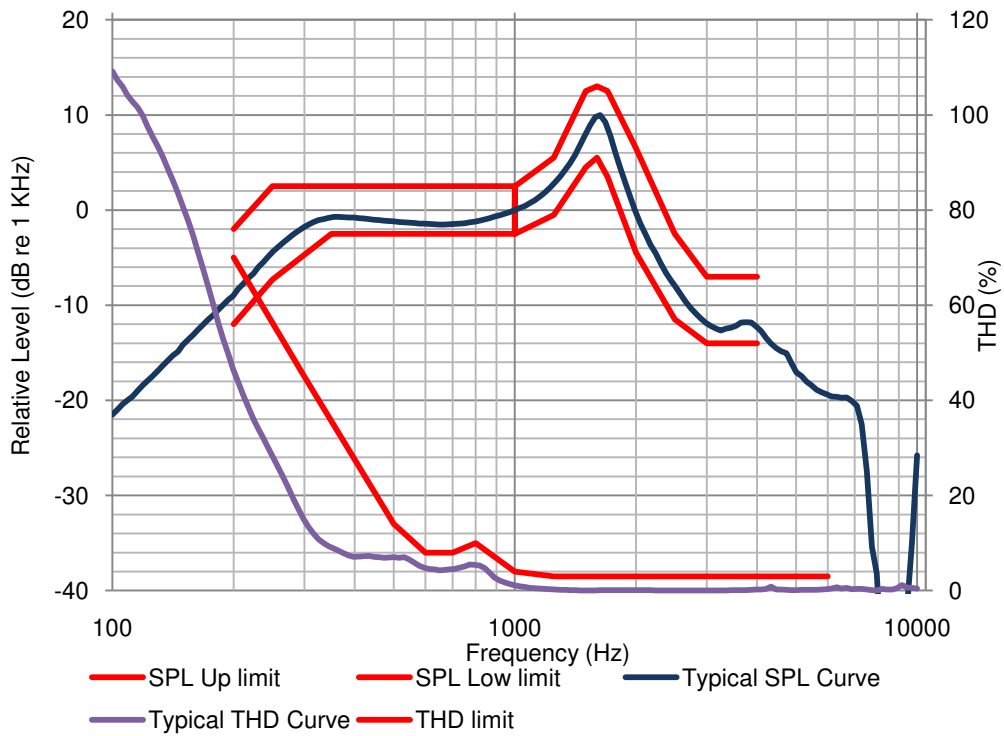


Tolerance window			
f [Hz]	lower limit [dB re1KHz]	f [Hz]	upper limit [dB re1KHz]
160	-14	160	0
350	-3	270	4
450	-3	450	4
999	-3	999	3
1000	0	1000	0
1001	-3	1001	3
2000	-3	2000	3
4000	-1	4000	6
6500	4	6500	14
7000	-16	10000	14
10000	-16		

2.2. Frequency response

TYPICAL FREQUENCY RESPONSE

measured on BK 3.2 high leak according to chapter 2.7
(P=10mW @32Ω, ERP)



Tolerance window				
f [Hz]	lower limit [dB re1KHz]	upper limit [dB re1KHz]	f [Hz]	upper limit [%]
200	-12	-2	200	70
250	-7.3	2.5	300	45
350	-2.5	2.5	500	14
999	-2.5	2.5	600	8
1000	0	0	700	8
1001	-2.5	2.5	800	10
1250	-0.5	5.5	1000	4
1500	4.5	12.5	1250	3
1600	5.5	13	6000	3
1700	3.5	12.5		
2000	-4.5	6.5		
2500	-11.5	-2.5		
3000	-14	-7		
4000	-14	-7		

2.3. Electro-Acoustic Parameters

Receiver mounted in baffle acc. to chapter 2.6 and 3.2 high leak ear acc. to chapter 2.7

1. Rated impedance	Z:	32Ω
2. Voice coil resistance	R:	28.8Ω±2.88Ω
3. Resonance frequency	f ₀ :	300Hz±45Hz
4. Maximum diaphragm excursion above the top of the surface:		0.2mm
5. Nominal characteristic sensitivity(@3.2 high leak; 1KHz, 10mW)		25.5±2.5 dBPa/V
6. Nominal characteristic sensitivity (@baffle, 10mW, 1cm; average from 1KHz to 3KHz)		89 dBPa re 20uPa
7. THD		according to chapter 2.2

2.4. Power Handling

Receiver mounted in lifetime test device (open rear/open front).

1. RATED NOISE POWER (500h, pink noise with the weighting, crest factor is 12dB)	10mW (RMS)
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Type	Order	F0[Hz]
High Pass	1	250
High Pass	10	100
Low Pass	10	3500

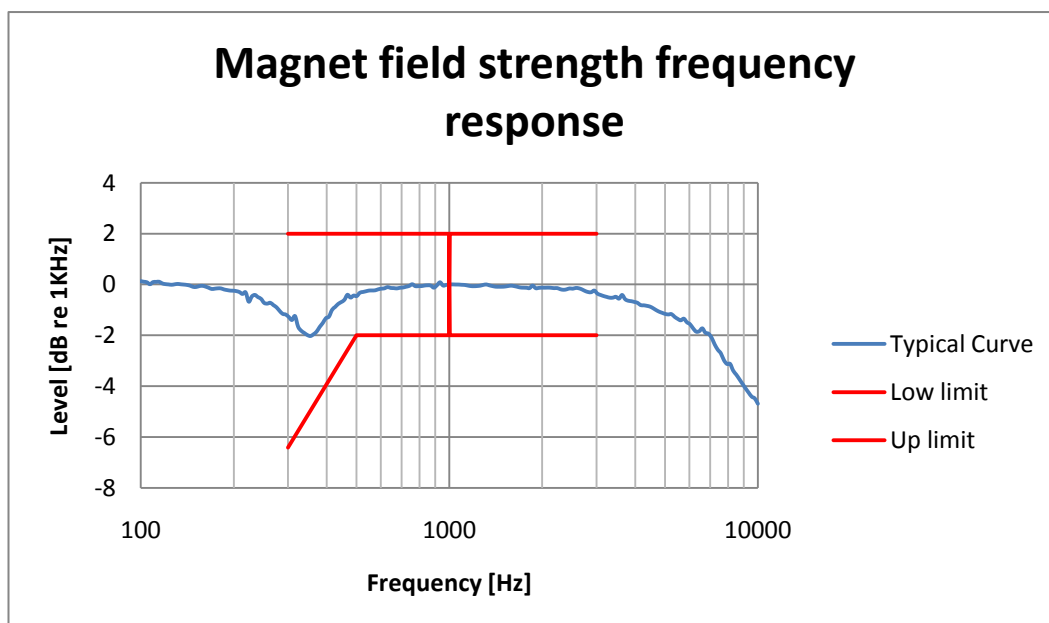
2. OVERLOAD POWER (50h, sinusoidal, 200Hz~6 KHz, allow increase R&B)	30mW (RMS)
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3. RATED SINUSOIDAL POWER (50h, sinusoidal, 200Hz~6 KHz, no damage)	10mW (RMS)
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2.5. Magnetic field for Hearing Aid characteristics

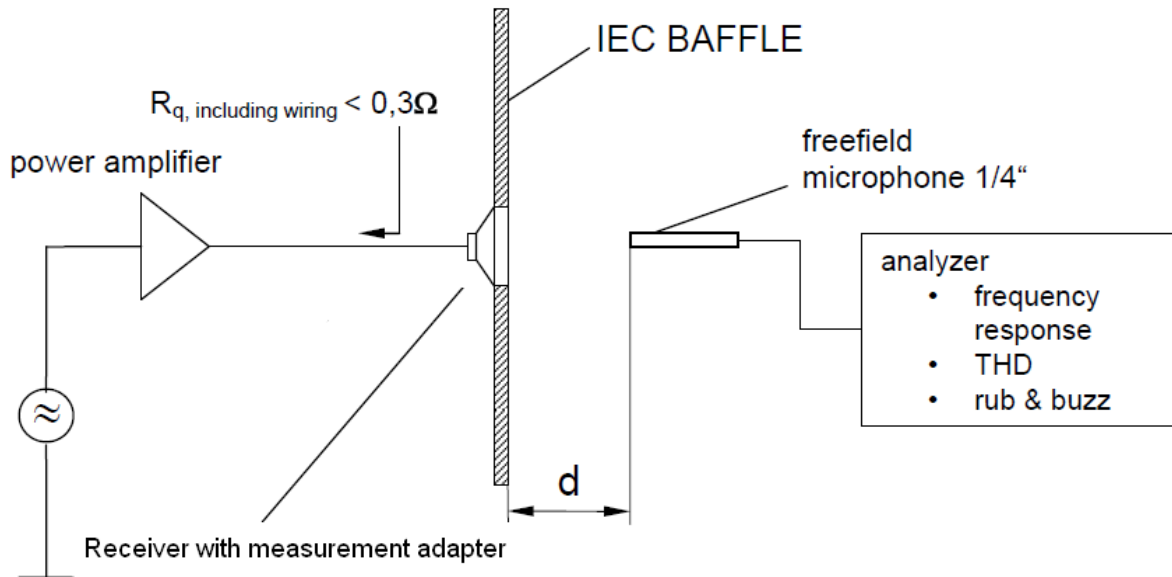
RECEIVER MOUNTED IN MEASUREMENT SETUP ACC. TO Chapter 2.9

1. CHARACT. FIELD STRENGTH SENSITIVITY
 at 566mV (10mW)1kHz, measurement plane 15mm
 Axial : 12.13 dB A/m per V
 Radial (Average of 4 Position): 4.50 dB A/m per V
2. FREQUENCY RESPONSE (AXIAL relative to value at 1kHz)



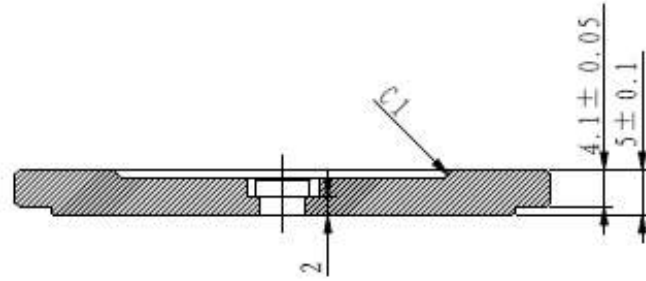
2.6. Measurement setup on baffle

2.6.1. Measured setup

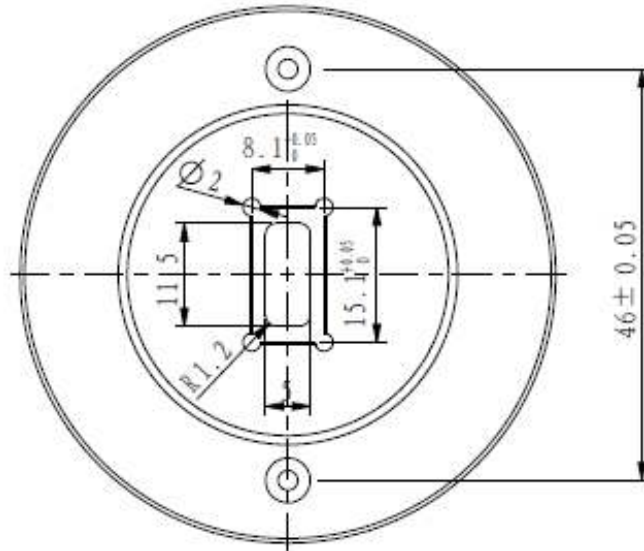


$D=1.0\text{cm.}$

2.6.2. Measured adapter

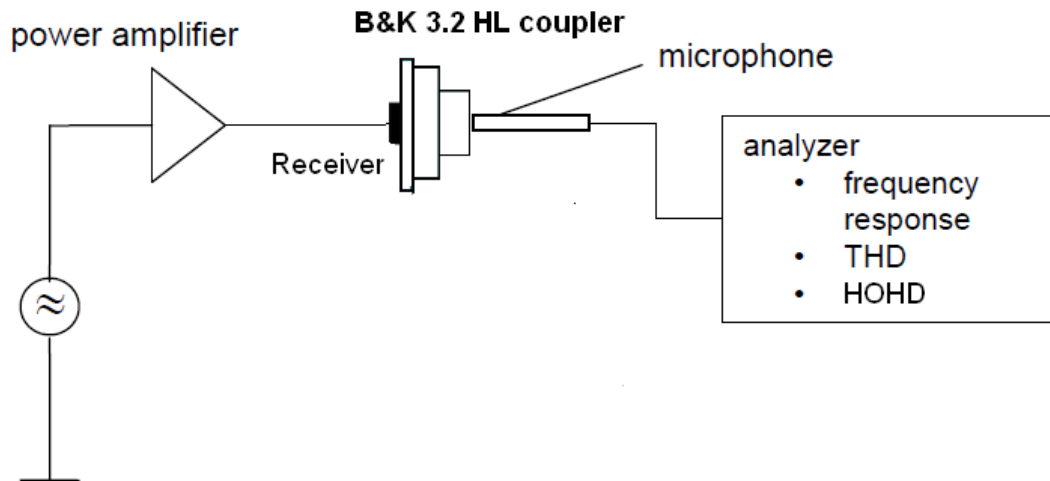


SECTION A-A

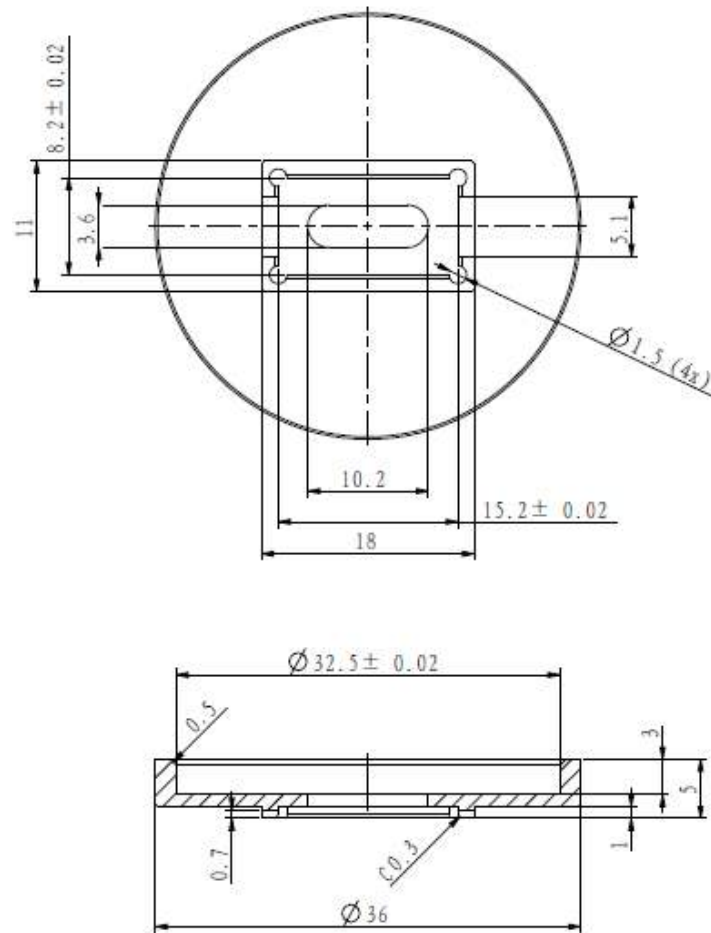


2.7. Measurement setup on BK 3.2 high leak

2.7.1. Measured setup



2.7.2. Measured adapter



2.8. Measured Parameters

1. Measure Setup

For the test on baffle, the test signal is cosine log sweep signal, from 10KHz to 100 Hz, 160 steps, used BK 4939 1/4" free field microphone, sn is 2624669.

For the test on BK3.2 high leak, the test signal is cosine log sweep signal, from 10KHz to 100 Hz, 160 steps, used BK 4195 Ear Simulator, sn is 2538591.

2. Sensitivity

Sensitivity is expressed in dB rel 1V/1Pa measured at input voltage of 0.566V using the measurement setup according chapter 2.7.

3. Frequency response

Frequency response on baffle is measured according to the test setup in chapter 2.6 at input voltage of 0.566V and checked against the tolerance window defined in chapter 2.1.

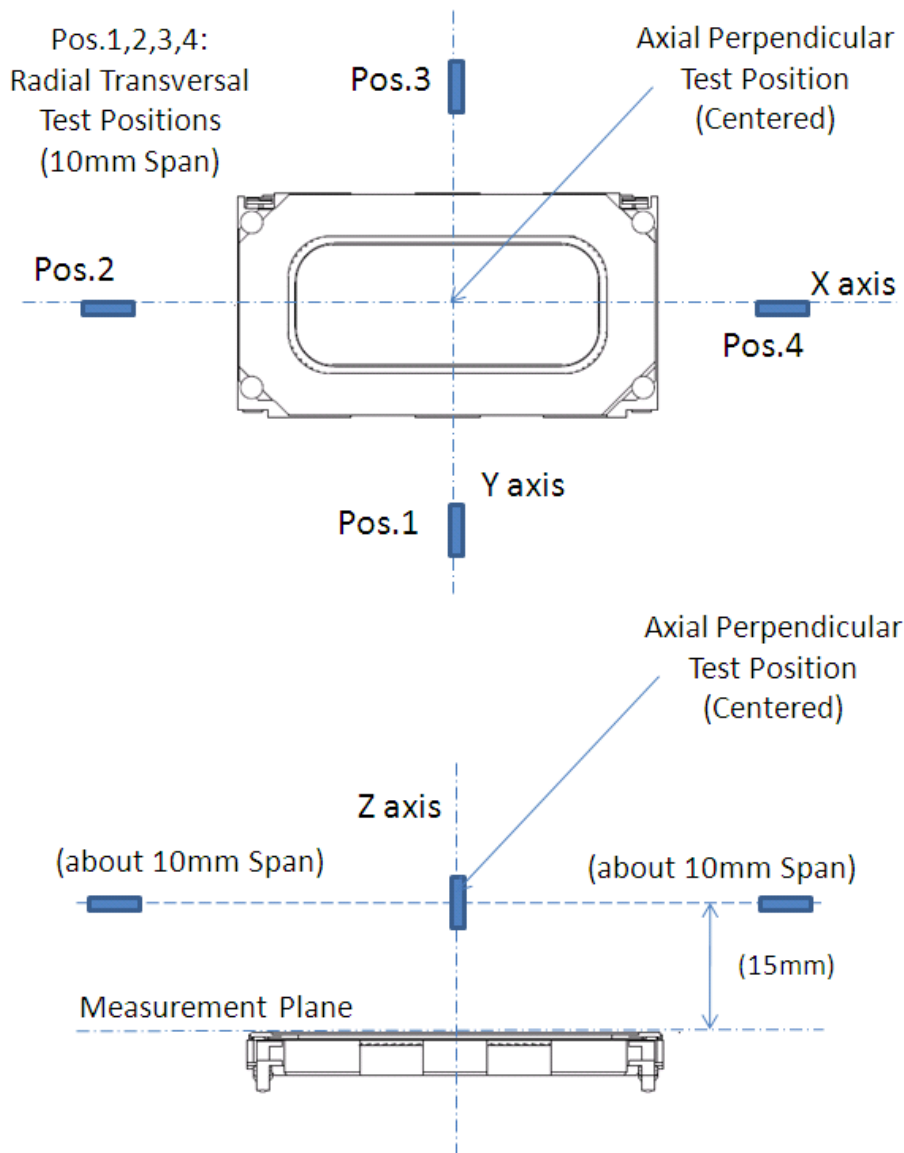
Frequency response on BK3.2 high leak is measured according to the test setup in chapter 2.7 at input voltage of 0.566V and checked against the tolerance window defined in chapter 2.2.

4. Total harmonic distortion (THD)

Is measured according to IEC 268-5 (2nd to 5th harmonics) and the test setup in chapter 2.7 at input voltage of 0.566V and checked against the tolerance window defined in chapter 2.2.

2.9. Measurement setup for Hearing Aid

Tests are conducted at Z (Axial) direction, Y and X (Radial) directions
Measurement Positions acc. to ANSI C63.19[4]



Receiver must be mounted on a **plastic surface, magnetic ambient levels be low as to not significantly affect the measurement, magnetic shielded chamber would be better.*

2.10. Packing information

See document: Packaging Instruction for 8x15x1.5 HAC Receiver 2403-263-00092-299.

2.11. Technical Delivery Terms

See Chapter 4.

3. Environmental Conditions

3.1. Storage

The transducer fulfils the specified data after treatment according to the conditions of

ETS 300 019-2-1 Specification of environmental test: Storage
Test spec. T 1.2: Weather protected, not temperature controlled storage locations.

3.2. Transportation

The transducer fulfils the specified data after treatment according to the conditions of

ETS 300 019-2-2 Specification of environmental test: Transportation
Test Spec. T 2.3: Public Transportation

3.3. Functionality

The transducer fulfils the specified data after treatment according to the conditions of

ETS 300 019-2-5 Specification of environmental test: Ground vehicle installations
Test spec. T 5.1: Protected installation

ETS 300 019-2-7 Specification of environmental test: Portable and non-stationary use
Test spec. T 7.3E: Partly weather protected and non-weather protected locations.

4. Environmental Tests

4.1. Qualification Tests

According to our milestone plan (Product Creation Process), a complete qualification test will be done at design validation on products, manufactured under serial conditions and 1x per year and product family. The qualification process covers all tests described under 4.5 and a complete inspection takes place.

4.2. Requalification Tests

1x per month and product family samples are taken and submitted to tests described under 4.5.2

4.3. Sample Size, Sequence

Unless otherwise stated 20 arbitrary new samples will be used to perform each test for both, qualification and requalification test as described under 4.1 and 4.2.

4.4. Period of Shelf-Life

The period of shelf-life is 5 years.

4.5. Testing Procedures

4.5.1. Storage Tests

Low Temperature Storage Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Low Temperature Storage (Ref. BSI BS EN-60068-2-1)	-40°C rel. humidity not controlled	168h	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin.

			E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.
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High Temperature Storage Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Dry Heat Storage (Ref. BSI BS EN-60068-2-2)	+85°C rel. humidity not controlled	168h	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.

Thermal shock Sequence

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Change of Temperature (Ref. IEC 60068-2-14)	-40°C for 30min and then move to +85°C for 30min; Transition time < 3 min; 20 cycles (40 shocks);	20 cycles	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.

Humidity Stress Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Damp heat, cyclic (Ref. IEC 60068-2-3)	85°C and 95% RH;	168hrs	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.

4.5.2. Operating Tests

Cold Operation Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Cold Operation Test (Ref. BSI BS EN-60068-2-2, Signal used to be agreed upon with RIM)	-20°C rel. humidity not controlled	72h	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.

Dry Heat Operation Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Dry Heat Operation (Ref. BSI BS EN-60068-2-1 Signal used to be agreed upon with RIM)	+70°C rel. humidity not controlled	500h	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.

4.5.3. Salt Mist Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Salt Mist (Ref. IEC 60068-2-52)	The part must be subjected to 2 hours spray of 5% NaCl salt mist, at 35°C then be left at 40°C and 95% RH for 22 hrs.	3 cycles	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.

4.5.4. Shock Resistance Test (Free Fall Test) - protected product

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Mechanical shock (Ref. IEC 60068-	Drop in test box or test adapter; Dropped onto	40 drops	Measurements of acoustic parameters shall be still

2-32)	concrete from 1.5m height; Two drops on each side (2x6); One drop on each edge (1x12); Two drops on each corner (2x8); In total of 40 drops		within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test there shall be no loose particles dissipated from the components during the test
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4.5.5. Impact Durability Test (Tumble Test) – protected product

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Impact durability (in a Tumble Tester) (Ref. IEC60068-2-32Ed)	Impact durability (in a Tumble Tester) DUT in drop Test adapter/Jig 170grams; Jig size: 120mm*60mm*18mm; 100drops, 1m Random drops on steel base.	100 drops, 1m DUT power off	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test there shall be no loose particles dissipated from the components during the test

4.5.6. G-Force Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
G-Force Test	Test adapter	/	Measurements of acoustic

	<p>170grams; Jig size: 120mm*60mm*18mm; 5000g, 0.2msec;</p>		<p>parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test There shall be no loose particles dissipated from the components during the test</p>
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4.5.7. Resistance to Electrostatic Discharge

Parameter	Test Method and Conditions	Duration	Evaluation Standard
<p>Resistance to ESD IEC61000-4-2 Level 4 (SPR c 2.5.1)</p>	<p>One pole is grounded and.the ESD pulse is applied to the other pole. The speaker must be stressed first with one polarisation and then with the other polarisation.DUT must be discharged between each ESD exposure. Level 4: contact +/- 8kV, air +/- 15kV</p>	<p>10 exposures on each polarity / 5 units DUT Power off</p>	<p>Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.</p>

4.5.8. Sine Vibration Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
<p>Sine Vibration Test (Ref. IEC 60068-2-6)</p>	<p>10–150 Hz, 50 m/sec² acceleration; 90 minute in each axis; 270 minutes (3 axes)</p>	<p>270minutes</p>	<p>Measurements of acoustic parameters shall be still within specification. Allowed deviations:</p>

	in total;		<p>Sensitivity is allowed to be within +/-3dB from initial value;</p> <p>The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin.</p> <p>E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test.</p> <p>There shall be no loose particles dissipated from the components during the test</p>
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4.5.9. Random Vibration Test

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Random Vibration Test Ref. IEC 60068-2-64	5 – 500 Hz, 0.01g ² /Hz; 100 minutes at each axis, total 300 minutes (3 axes)	300minutes	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value; The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test. There shall be no loose particles dissipated from the components during the test.

4.5.10. Mechanical Shock

Parameter	Test Method and Conditions	Duration	Evaluation Standard
Mechanical Shock Test Ref. IEC 60068-2-27	Peak acceleration 30G, 18 ms duration, 3.4m/s (half-sine); Six successive shocks shall be applied in each	18 shocks	Measurements of acoustic parameters shall be still within specification. Allowed deviations: Sensitivity is allowed to be within +/-3dB from initial value;

	<p>direction of three mutually perpendicular axes; In total of 18 shocks</p>		<p>The distortion shall not increase by more than a factor of 1.4 of the initial value measured at a single frequency bin. E.g.: distortion at frequency bin 400Hz which is initially 10% is allowed to be 14% after the test there shall be no loose particles dissipated from the components during the test.</p>
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5. Related Documents

- EN-60068-2 Environmental testing
- IPC-SM-785 Guidelines for Accelerated Reliability Testing of Surface Mount Solder Attachment
- IEC68-2-14 Temperature Change Testing Guideline
- IEC68-2-3,1984 Humidity and Temperature Test guideline
- IEC60068-2-52 Low air pressure environmental testing procedure
- IEC60068-2-32 Free fall Test Procedure
- IEC61000-4-2 ESD Test Guideline
- IEC68-2-27 Mechanical Shock Test Guideline