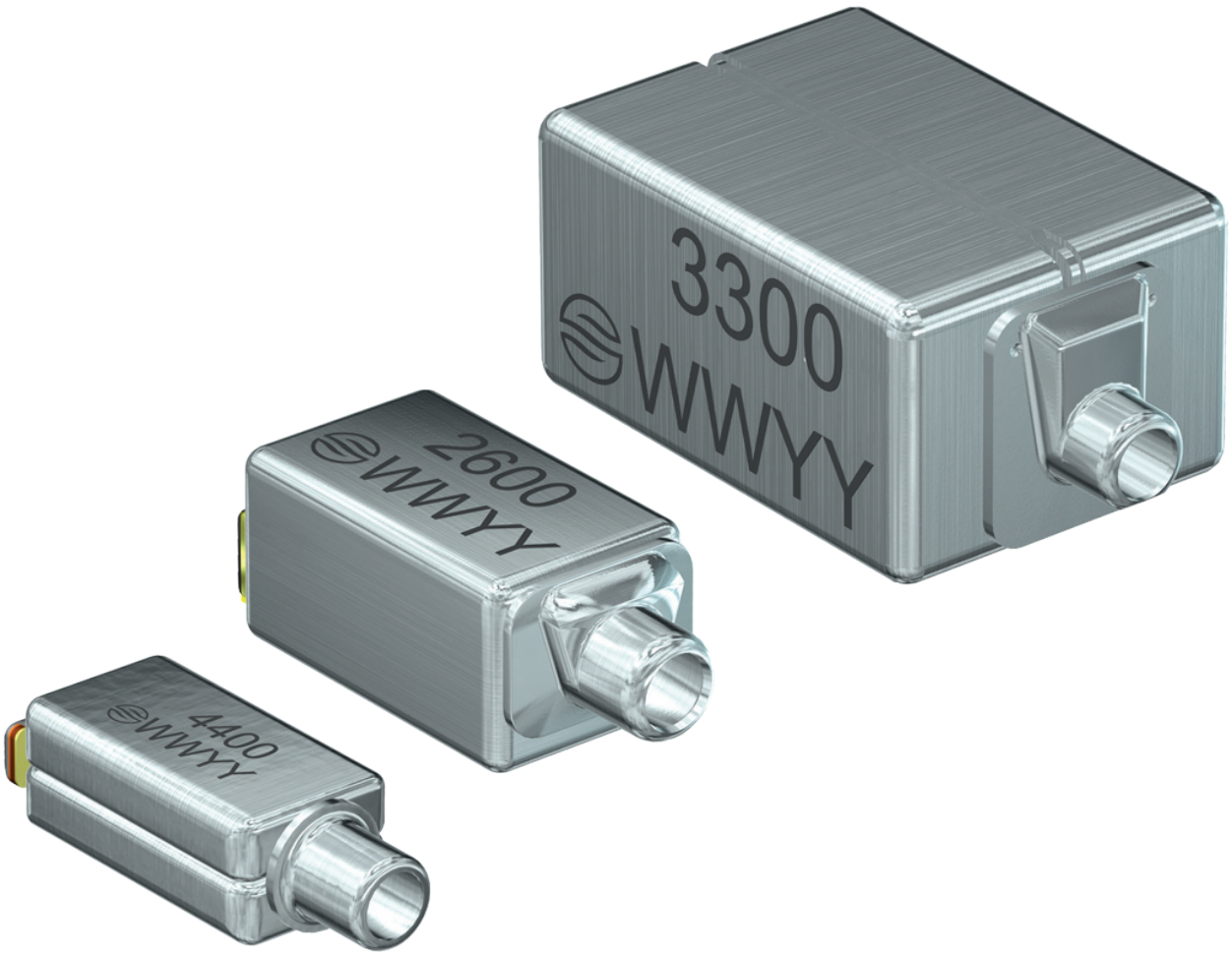

Introduction of Receivers

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Introduction

Sonion has a vast selection of receivers for hearing instruments ranging from different sizes to different impedance levels and SPL outputs. We can also accommodate a vast range of spouts and port locations, including the ability to attach a plastic spout for your custom applications.
For headsets, Sonion offers the choice of wire or flex print already assembled to the product. For special applications, gasket or mesh can be included. Note the contacts vary from product to product.

All hearing instrument receivers are based on a balanced armature design principle that offers the highest sound quality with low distortion. The receivers have features to block magnetic radiation and extra protection from shock. In some models the frequency response is shaped based on the need of the application, peaks can be dampened and low or high frequencies may be filtered out.

Overview of the Receivers

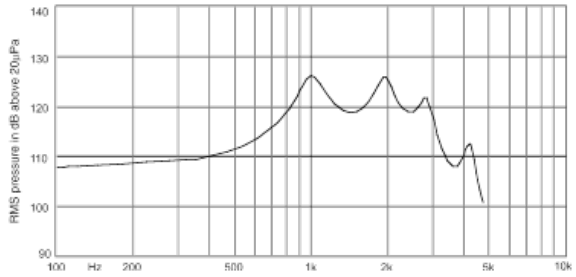
Family	Sensitivity at 500 Hz (0.35 mVA)	Max output at 500 Hz (5% THD)	Max Peak Output in BTE (50 mVA)	Max Peak Output in ITE (50 mVA)	Dimensions			Volume mm^3
					L	W	H	
Singles								
4100	93.5	100	125	115	5.00 [0.197]	2.70 [0.106]	0.98 [0.039]	13.2
E25S	97	107	132	122	5.98 [0.235]	2.55 [0.100]	1.87 [0.074]	28.5
2600U	104	113	138	124	5.20 [0.205]	3.05 [0.120]	2.60 [0.101]	41.2
2600U/7	104	113	138	124	5.20 [0.205]	3.28 [0.129]	2.72 [0.107]	46.8
2300	104	113	138	129	6.30 [0.248]	4.29 [0.169]	2.96 [0.117]	80.0
2400	104	113	136	125	6.30 [0.248]	4.29 [0.169]	2.96 [0.117]	80.0
3100	106.5	117	135	127	7.87 [0.310]	4.09 [0.161]	2.80 [0.110]	90.1
3500	108.5	119	137	129	7.87 [0.310]	4.09 [0.161]	2.80 [0.110]	90.1
1700	106	115	138	129	7.95 [0.313]	5.60 [0.220]	4.07 [0.160]	181.2
1900	109	122	139	129	7.95 [0.313]	5.60 [0.220]	4.07 [0.160]	181.2
2000	113.5	127	140	133	9.45 [0.372]	7.13 [0.281]	4.10 [0.161]	276.3
Duals								
4400	97	106	132	122	5.00 [0.197]	2.70 [0.106]	1.96 [0.077]	26.5
E50D	100	113	138	128	5.93 [0.234]	3.10 [0.122]	2.55 [0.100]	46.9
2800	107	119	140	130	5.25 [0.207]	3.05 [0.120]	5.26 [0.207]	84.2
E90D	105.5	118	138	132	6.10 [0.240]	4.30 [0.169]	3.40 [0.134]	89.2
3300U	110.5	123	140	133	7.87 [0.310]	5.20 [0.205]	4.09 [0.161]	167.4
3700U	113	125	142	135	7.87 [0.310]	5.20 [0.205]	4.09 [0.161]	167.4
3300	110.5	123	140	133	7.87 [0.310]	5.60 [0.220]	4.09 [0.161]	180.3
3700	113	125	142	135	7.87 [0.310]	5.60 [0.220]	4.09 [0.161]	180.3
3700Q	115	127	143	136	7.87 [0.310]	5.62 [0.221]	5.08 [0.200]	224.7
3800	121.5 (vented)	135 (vented)	143 (vented)	140 (vented)	7.87 [0.310]	5.60 [0.220]	4.09 [0.161]	180.3

All performance values are measured under acoustical loading with a 2cc coupler.

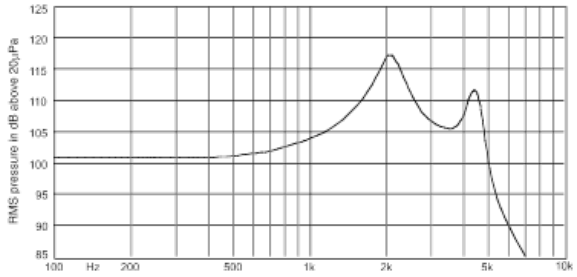
Response curve

Tubing/Couplers

The type of coupler used for the measurement is of major influence on the frequency response. For example: if a BTE coupler is used a number of 5 peaks can be found in the response. The same receiver measured on ITE coupler will show only 2 peaks.



Typical Response BTE



Typical Response ITE

Each peak has its origin. For the BTE coupler the peaks can be explained as follows:

- Peak 1: resonance of coupler volume
- Peak 2: set by resonance of the driver
- Peak 3: front volume and coupler tube length, but also compensation hole in diaphragm
- Peak 4: coupler
- Peak 5: hinge function of diaphragm.

The peaks found using ITE couplers have the following explanation:

- Peak 1: resonance of coupler volume and driver
- Peak 2: length of the tubing, diaphragm properties including compensation hole and frontvolume

Response shaping in receivers

The Sonion receiver program shows several response curves which are possible within one receiver family:

- Standard response: no means of damping
- Damped response type I: damping by means of a damping screen. Output at peaks is affected. No change in low frequency roll off
- Damped response type II: damping by means of a damping screen and internal modifications. These modifications consist of a number of five holes in the diaphragm instead of one compensation hole. The result is low frequency roll off, a low output at second peak and a damped first peak.
- Damped response type III: damping by means of internal modifications only. It consists of 5 holes in the diaphragm. The result is low frequency roll off, a damped second peak, but an undamped first peak.
- Back vented receivers: A large hole in the back volume of the receiver creates additional low frequency output. Especially useful in woofers for pro-audio applications or in UltraPower BTEs (note: to prevent feedback the receiver should be encapsulated inside a closed can).
- Tuned vent receivers: A small hole in the back volume of the receiver creates well controlled additional output at the very low frequencies (below 100Hz).

Special resopnse curves can be discussed on request.

Electrical parameters

The receiver will be driven from a power amplifier. In the hearing aid industry several types of amplifiers are used for which each type has its preferred receiver type.
Amplifiers are based upon several principles. The following classes are typically used.

Class A amplifier ▶ Receiver: ST type with bias
Single transistor output stage. In the set-up the transistor DC setting current is also going through the receiver coil.

Class B amplifier ▶ Receiver: CT type no bias
2 transistor output stage. Often used in high power applications. The output stage switches the signal over both receiver coil halves.

Class D amplifier ▶ Receiver: ST type, zero bias with preferred 2:1 impedance ratio.
Amplifier with an H-bridge output stage which is switched at a very high frequency (150 kHz to 5 MHz). Audio signal restored by modulation of pulse width or pulse density at clock frequency. This type of amplifier is found as output stage on DSP hybrids.

Coils
We can distinguish two types of coils:

ST - Standard two-terminal receiver	
Biased	To be used in Class A applications
Non-biased	To be used in voltage-driven applications like Class D

CT - Centre tapped receiver with three terminals	
Non-biased	To be used in push pull applications

The bias current ranges from 0 to 6.0mA and depends on impedance and R_{DC}.

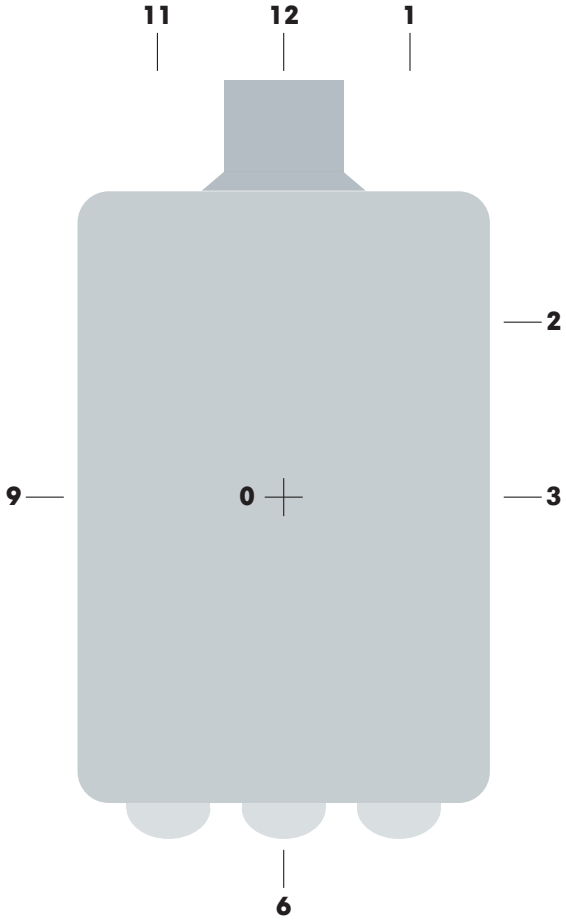
Impedance and R_{DC}
The impedance which is determined by the coil is limited by the coil size, maximum number of windings and wire gauge.

The value of the DC resistance R_{DC} is limited due to the relation of R_{DC} with the impedance. The ratio between the impedance and R_{DC} of the receiver can approximately be:

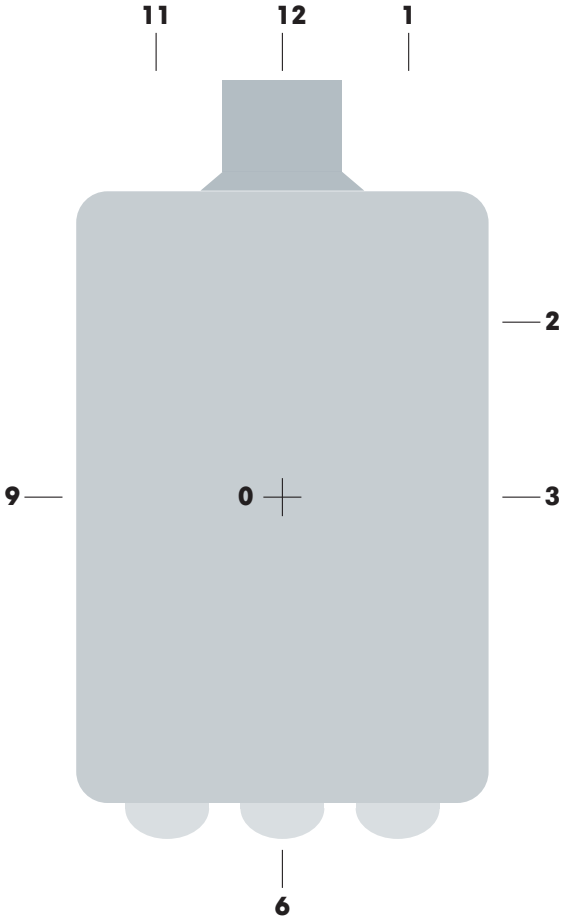
$Z_{coil} : R_{DC} = 4 : 1$ To be used in current driven applications.
$Z_{coil} : R_{DC} = 2 : 1$ Has less intermodulation distortion, is better suitable for voltage-driven applications.

Schematic of port locations

View: looking at the front (cover) of the receiver. The numbers correspond with positions on a clock face with terminals at 6 o'clock and they denote the location of the signal port. Letters give further information on port location and type.



Single receiver



Dual receiver

Standard positions

s tube on center line of thickness

Other positions

c tube off center line of thickness

n no tube

j spout on top of cover

Size comparison

Output & Size

SINGLE

							
	4100 **World's smallest**	**E25S** **RIC optimized**	**2600U** **High efficiency** **Great fit rate**	**2300** **Versatile &** **dependable**	**3500** **Slim power**	**1900** **Cost efficient** **power class**	**2000** **Legendary** **Super Power**
Size:	13mm³	28mm³	41 mm³	80 mm³	90 mm³	181 mm³	276 mm³
Efficiency*:	93.5 dB	97 dB	104 dB	104 dB	108.5 dB	109 dB	113.5 dB

DUAL

							
	4400 **World's smallest** **dual receiver**	**E50D** **3G dual receiver** **technology**	**2800** **Highly efficient** **dual power class**	**E90D** **Fit for power**	**3300U** **Standard power** **superior magrad**	**3700U** **Low frequency** **power boost**	**3800** **Venting for** **highest output**
Size:	27 mm³	47 mm³	84 mm3	89 mm³	167 mm³	167 mm³	180 mm³
Efficiency*:	97 dB	100 dB	107 dB	105.5 dB	110.5 dB	113 dB	121.5 dB

*) Efficiency at 500 Hz (0.35 mVA) measured in 2CC coupler

The 4100 receiver

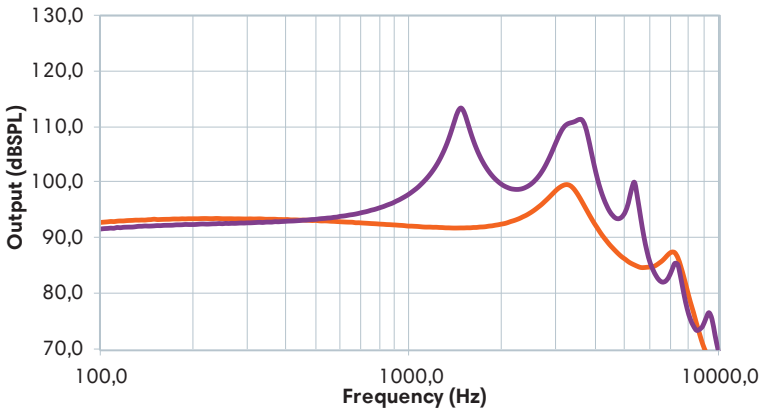
World's Smallest

Description

The 4100 receiver is part of our 4000-platform and it the world's smallest receiver with less than 1mm thickness. This is made possible with the proprietary and patented flat motion receiver technology – integrating the membrane and armature into one. Be surprised: The 4100 offers impressive output for its size. Bring ideas to life. The 4100 receiver can go where no receiver has been able to go before, opening a range of opportunities: Deepfit, tinnitus masking, pediatrics, vibration sensors,…..

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



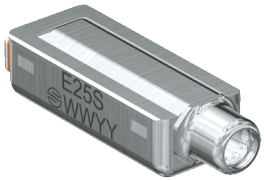
Performance	
Dimensions	0.98 x 2.70 x 5.00 mm
Volume	13.2 mm^3
Efficiency 0.35mVA at 500 Hz*	93.5 dB SPL
Max LF Output 5% THD at 500 Hz*	100 dB SPL
Max Peak Output 50 mVA at 500 Hz*	115 dB SPL
Shock	12 kg

Features
The world's smallest receiver, with a volume of only 13.2 mm^3
Ideal for Deep Fitting applications
For pediatric use
Tinnitus Masking Applications
MPO 125 dB SPL in 711 coupler

* 2CC ITE

The E25S receiver

RIC Optimized

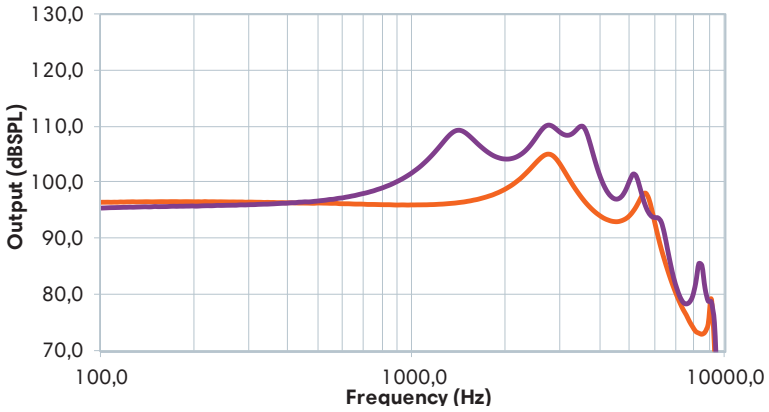


Description

E25S receiver has minimized cross section for better fit rates, especially in RIC applications. With the efficient single motor design it offers a cost effective solutions without compromising the performance. The E-series motor construction gives by design a low magnetic radiation.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	5.98 x 2.55 x 1.87 mm
Volume	28.5 mm^3
Efficiency 0.35mVA at 500 Hz*	97 dB SPL
Max LF Output 5% THD at 500 Hz*	107 dB SPL
Max Peak Output 50 mVA at 500 Hz*	122 dB SPL
Shock	12 kg

Features
Optimized for RIC applications
Minimized cross section
Efficient single motor design
Reduced vibration in spout direction

* 2CC ITE

The 2600(U) receiver

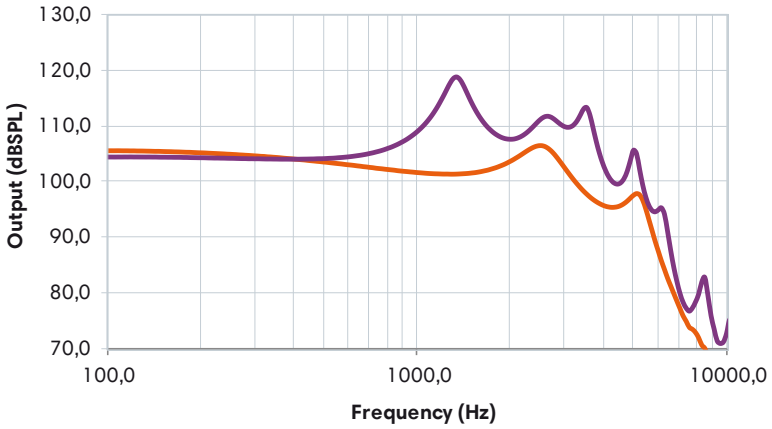
High Efficiency Great Fit Rate

Description

Sonion 2600(U) receiver is the industry standard receiver. It has high efficiency and high fit rate. The 2600 is ideal for miniBTEs applications. High output up to 126 dB SPL.
Mu-metal flak-jacket versions are available to improve the robustness (2600/3) and magnetic radiation (2600/7). We also offer several port locations and response curves.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	5.25 x 3.05 x 2.55 mm
Volume	41 mm^3
Efficiency 0.35mVA at 500 Hz*	104 dB SPL
Max LF Output 5% THD at 500 Hz*	113 dB SPL
Max Peak Output 50 mVA at 500 Hz*	126 dB SPL
Shock	14 kg

Features
Optimized for low current consumption
Wideband and shielded versions available
Improved shock performance and robustness

* 2CC ITE

The 2300 receiver

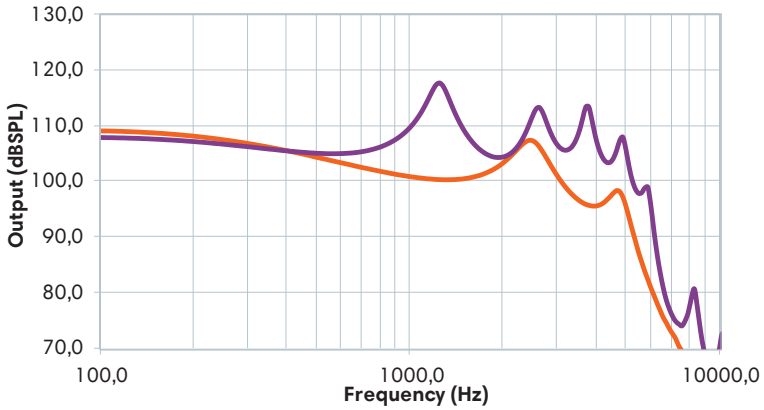
Versatile & Dependable

Description

The 2300 single receivers are good all round receivers that offer an excellent fit rate across most medium power hearing instruments. They are versatile and cost efficient.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	2.96 x 4.29 x 6.30 mm
Volume	80 mm^3
Efficiency 0.35mVA at 500 Hz*	104 dB SPL
Max LF Output 5% THD at 500 Hz*	113 dB SPL
Max Peak Output 50 mVA at 500 Hz*	129 dB SPL
Shock	14 kg

Features
All-round use in BTEs/ITEs
High output, great efficiency
2400 receiver is intended for high volume applications

* 2CC ITE

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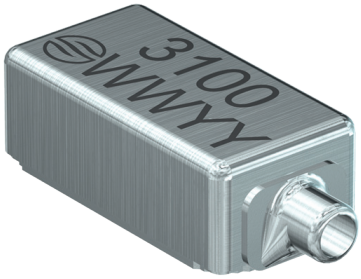
NL: +31 20 6068 100

The 31/3500 receiver

Slim Power

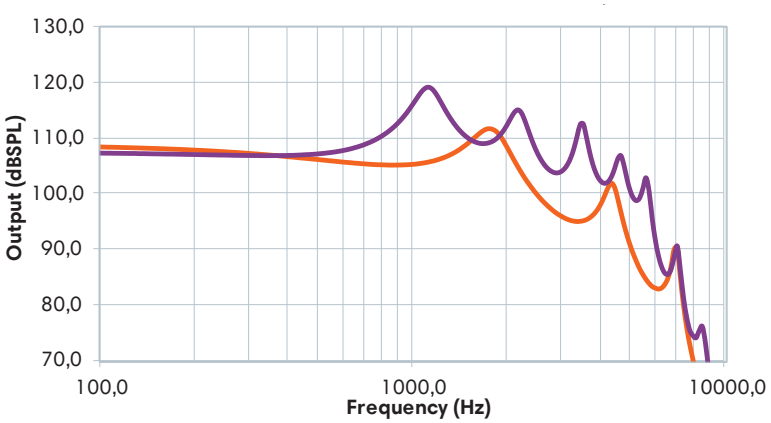


Description

The 3000 series receiver is ideal for applications where wide band frequency response, small size and high output are required . The E-shape armature provides high saturation level and excellent vibration properties.
Portfolio includes standard output, high output and wideband receiver options.
Ideal for Power RIC, Power ITE/ITC and BTE applications.
Based on our proven 3000-line technology.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	7.9 x 4.1 x 2.8 mm
Volume	90.1 mm^3
Efficiency 0.35mVA at 500 Hz*	106.5 dB SPL
Max LF Output 5% THD at 500 Hz*	117 dB SPL
Max Peak Output 50 mVA at 500 Hz*	127 dB SPL
Shock	12 kg

Features
Portfolio includes standard output, high output and wideband receiver options
Ideal for Power RIC, Power ITE/ITC and BTE applications
Based on our proven 3000-line technology

* 2CC ITE

1700 series receivers

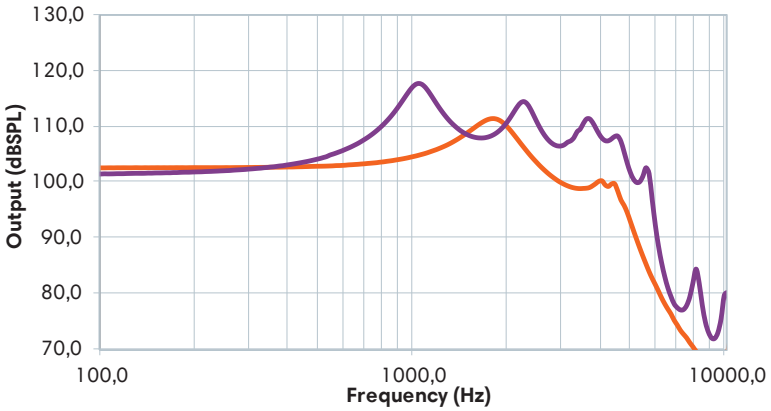
Developed for IEM

Description

The 1700 series is designed for 'In The Ear Monitoring' applications.
Available port locations for the 1700: 12c.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	7.95 x 5.60 x 4.07 mm
Volume	181.2 mm^3
Efficiency 0.35mVA at 500 Hz*	106 dB SPL
Max LF Output 5% THD at 500 Hz*	115 dB SPL
Max Peak Output 50 mVA at 500 Hz*	129 dB SPL
Shock	12 kg

Features
Developed for IEM products
High output with low THD
Broadband
Good sound quality

* 2CC ITE

The 1900 series receivers

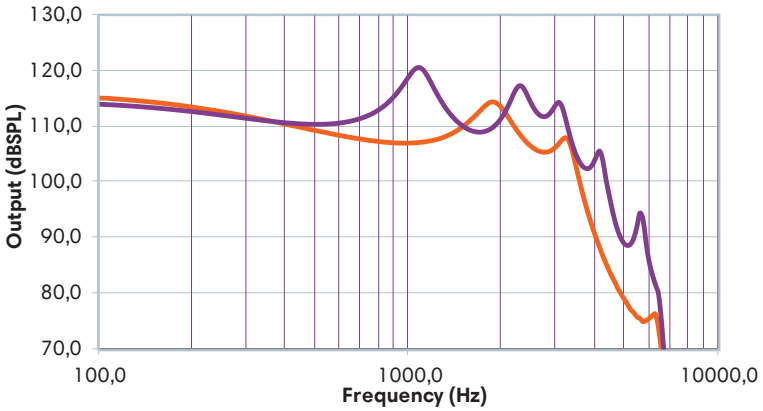
High power Cost efficient

Description

The 1900 series is best suited for “Behind The Ear” applications.
Available port locations for the 1900 are: 12s, 12c, 1s.
The available response curve is the standard response.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	7.95 x 5.60 x 4.07 mm
Volume	181 mm^3
Efficiency 0.35mVA at 500 Hz*	109 dB SPL
Max LF Output 5% THD at 500 Hz*	122 dB SPL
Max Peak Output 50 mVA at 500 Hz*	139 dB SPL
Shock	5.5 kg

Features
For BTE applications
Standard and vented types
Wide variety of spout locations

* 2CC BTE

The 2000 receiver

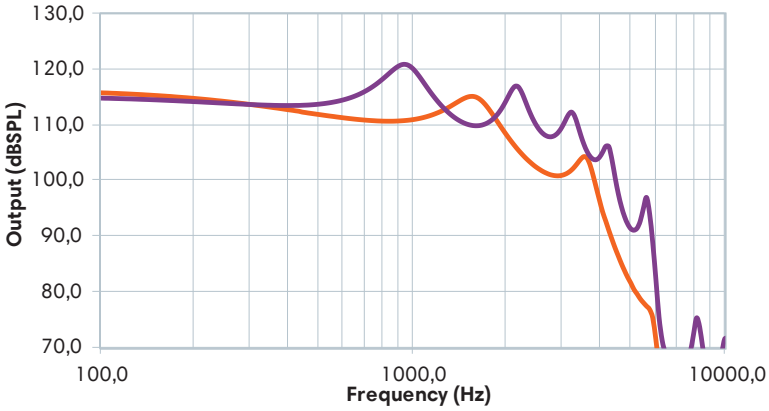
Legendary Super Power

Description

The 2000 series is best suited for 'Behind The Ear' applications.
Available port locations for the 2000: 12s, 12c, 1s, 1e, 2e, 11c, 5s, 6n.
The available response curve is the standard curve.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimension	9.5x7.1x4.1 mm
Volume	276 mm^3
Efficiency 0.35mVA at 500 Hz*	113.5 dB SPL
Max LF Output 5% THD at 500 Hz*	127 dB SPL
Max Peak Output 50 mVA at 500 Hz*	143 dB SPL
Shock	4 kg

Features
Ideal for ultra power BTE's
Highest output receiver MPO of 143 dB SPL
Vented versions available for low frequency output

* 2CC BTE

4400 series receivers

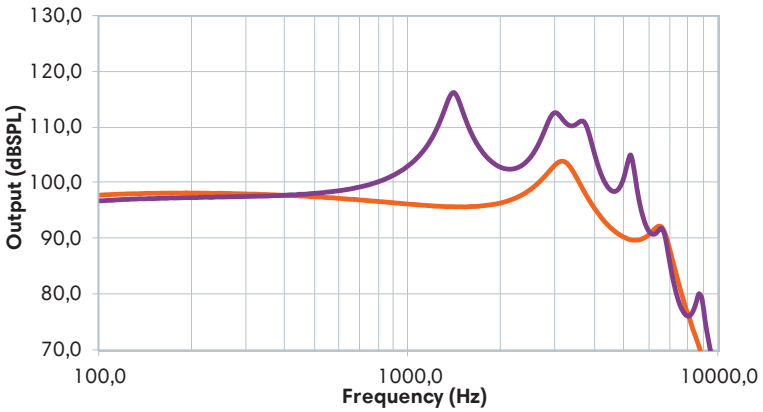
World's Smallest Dual Receiver

Description

The 4400 is the best in class dual receiver from Sonion. It is the ultimate receiver with dual motor that can reduce vibration and maintain low magnetic radiation. With its only 27 mm3 small size, the receiver can provide a high output of 122 dB SPL.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



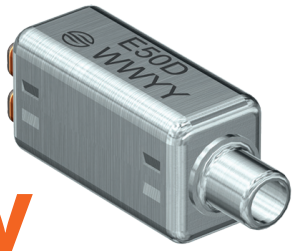
Performance	
Dimensions	5.00 x 2.70 x 1.96 mm
Volume	26.5 mm^3
Efficiency 0.35mVA at 500 Hz*	97 dB SPL
Max LF Output 5% THD at 500 Hz*	106 dB SPL
Max Peak Output 50 mVA at 500 Hz*	122 dB SPL
Shock	12 kg

Features
World smallest dual receiver
Optimized for use in CIC, ITE and RIC/RITE applications.
Maximum output of 122 dB SPL

* 2CC ITE

The E50D receiver

3G dual technology

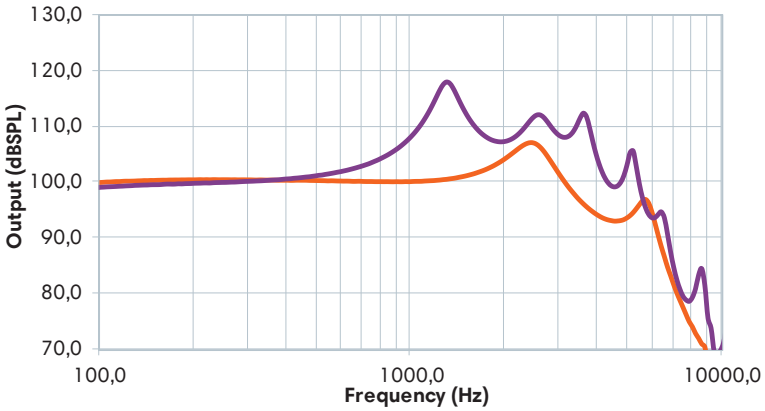


Description

With the E-series Sonion launched it's 3rd generation dual receiver technology. E50D motor construction results in a low magnetic radiation without any trade-offs. This makes it ideal in miniBTE and ITE applications in combination with a telecoil.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



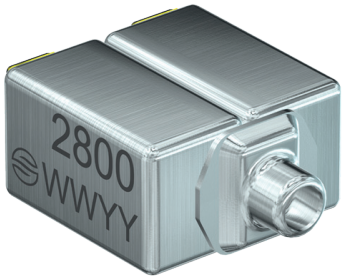
Performance	
Dimensions	5.9 x 2.6 x 3.1 mm
Volume	46.9 mm^3
Efficiency 0.35mVA at 500 Hz*	100 dB SPL
Max LF Output 5% THD at 500 Hz*	113 dB SPL
Max Peak Output 50 mVA at 500 Hz*	128 dB SPL
Shock	12 kg

Features
3rd generation dual technology
Low magnetic radiation
Low distortion
A versatile moderate power receiver

* 2CC ITE

The 2800U series receivers

High efficiency dual power

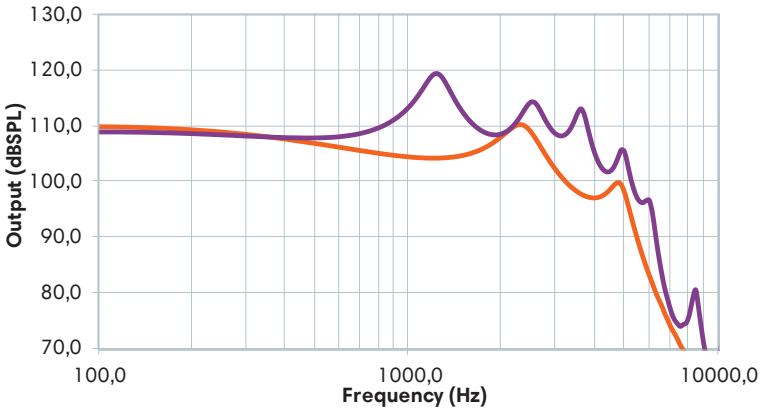


Description

The 2800U series is designed for “Behind The Ear” and “In The Ear” applications. This product is a dual driver system consisting of two 2600U drivers.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	5.25 x 3.05 x 5.10 mm
Volume	84 mm^3
Efficiency 0.35mVA at 500 Hz*	107 dB SPL
Max LF Output 5% THD at 500 Hz*	119 dB SPL
Max Peak Output 50 mVA at 500 Hz*	130 dB SPL
Shock	14 kg

Features
Using the high efficiency of a dual 2600 receiver: high output in a small package
Great fit rate for power ITE applications
Based on our proven 2600-line technology

* 2CC ITE

DK: +45 4630 6666
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NL: +31 20 6068 100

The E90D receiver

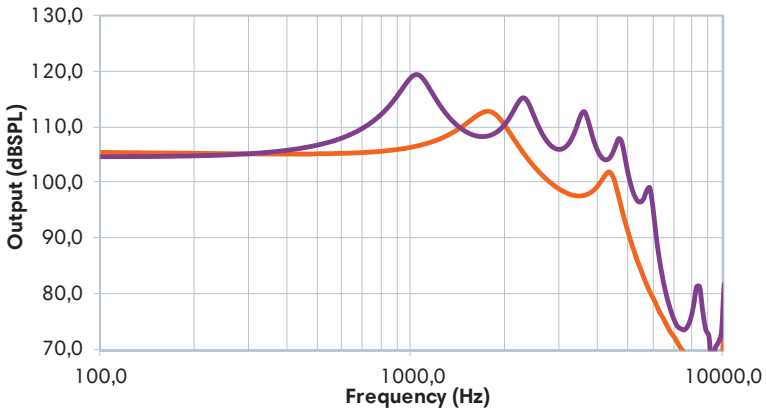
Fit for Power

Description

The E90D offers high maximum output with a very low magnetic radiation. This makes it an ideal receiver for BTE and power BTE applications where you don't want to compromise on performance.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



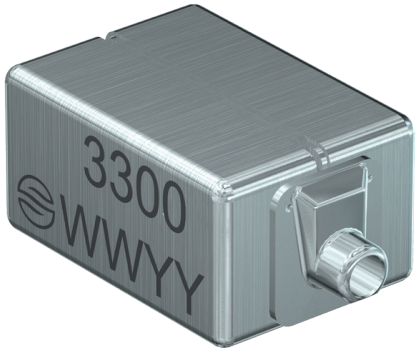
Performance	
Dimensions	6.1x4.3x3.4 mm
Volume	89.2 mm^3
Efficiency 0.35mVA at 500 Hz*	105.5 dB SPL
Max LF Output 5% THD at 500 Hz*	118 dB SPL
Max Peak Output 50 mVA at 500 Hz*	132 dB SPL
Shock	12 kg

Features
Dual receiver
Best in class, LF max output
Low magrad
Rounded corners for better fit rates
Great for Power BTEs and RICs

* 2CC ITE

The 3300/3700 series receivers

Power Dual Receiver

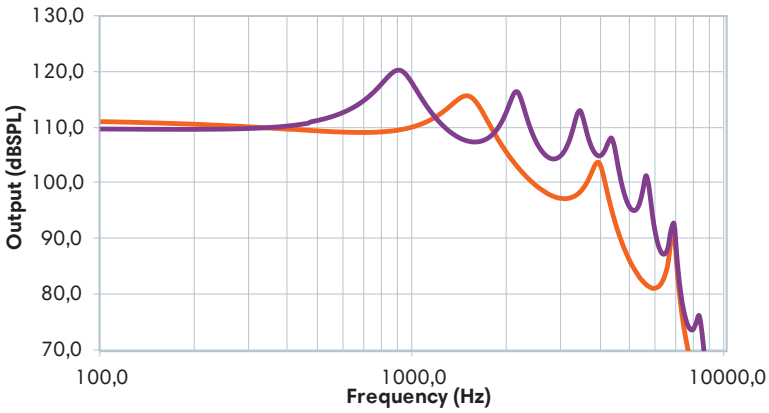


Description

The 3300 series is designed for “Behind The Ear” applications.
Available port locations for the 3300 are: 12s, 1s.
The standard dual driver receiver is the 3300. The 3700 version has smaller bandwidth compared to the 3300 but has extra output available.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	7.9 x 5.6 x 4.1 mm
Volume	180 mm^3
Efficiency 0.35mVA at 500 Hz*	110.5 dB SPL
Max LF Output 5% THD at 500 Hz*	123 dB SPL
Max Peak Output 50 mVA at 500 Hz*	140 dB SPL
Shock	12 kg

Features
Dual receiver
Up to 30dB reduction in mechanical vibration
Perfect for higher power premium BTE applications
3700: High output version

* 2CC BTE

DK: +45 4630 6666
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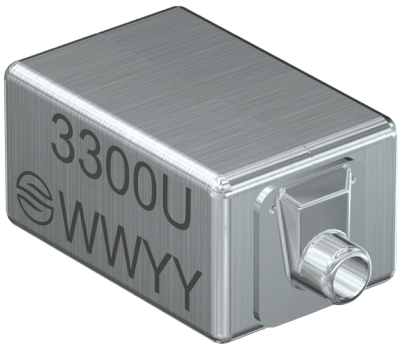
PRC: +86 512 6832 3401
NL: +31 20 6068 100

The 3300U receiver

Extend the Reach!

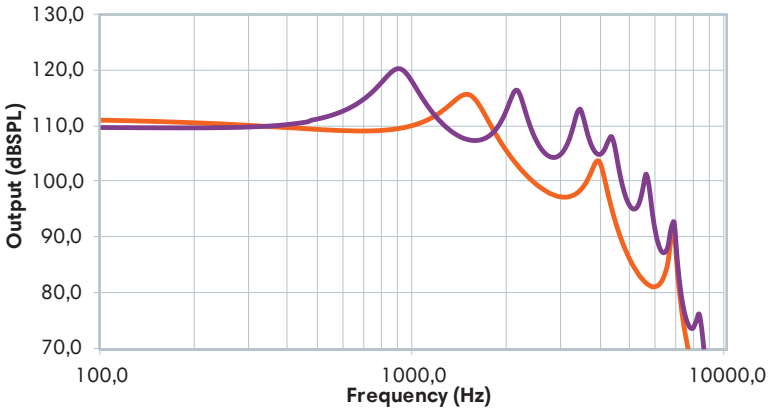


Description

The 33/3700U has reduced thickness to increase the fit rate. It has the same acoustical DNA as the standard 33/3700 receivers. Secondly the magnetic radiation has been improved, giving 10-20 reduction compared to the standard products.
This makes it ideal for super power BTEs or other power applications.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



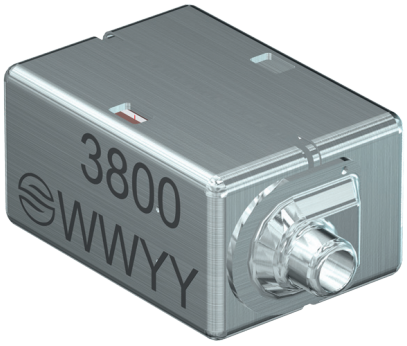
Performance	
Dimensions	7.9 x 5.2 x 4.1 mm
Volume	167.4 mm^3
Efficiency 0.35mVA at 500 Hz*	110.5 dB SPL
Max LF Output 5% THD at 500 Hz*	123 dB SPL
Max Peak Output 50 mVA at 500 Hz*	140 dB SPL
Shock	12 kg

Features
Dual receiver
Premium higher power receiver
Standard 3300/3700 with reduced magrad and less height
3700U: High output version with 142 dB output

* 2CC BTE

The 3800 receiver

Ultra High Power

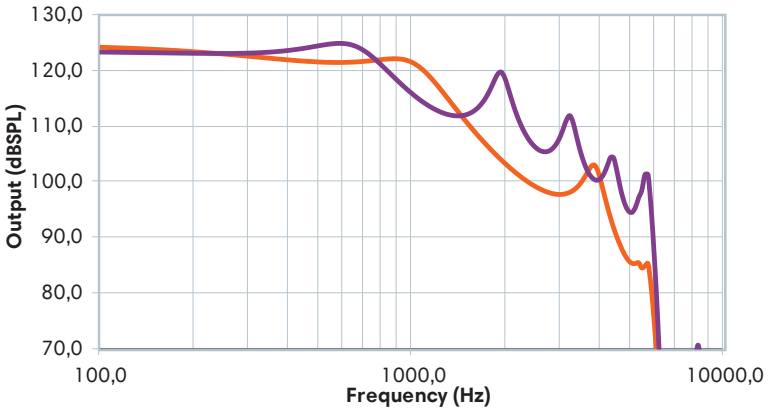


Description

3800 offers ultra high power in a small size. The dual design makes it possible to reach high gain levels in a small super power BTE design.
This receiver uses back venting to further optimize the low frequency output. It is also a unique woofer for pro-audio applications.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	7.9x5.6x6.1mm
Volume	180 mm^3
Efficiency 0.35mVA at 500 Hz*	121.5 dB SPL
Max LF Output 5% THD at 500 Hz*	127 dB SPL
Max Peak Output 50 mVA at 500 Hz*	143 dB SPL
Shock	8 kg

Features
Dual receiver
Up to 30 dB reduction in mechanical vibration
Perfect for higher power premium BTE applications
Back vented receiver

* 2CC BTE

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The 3700Q receiver

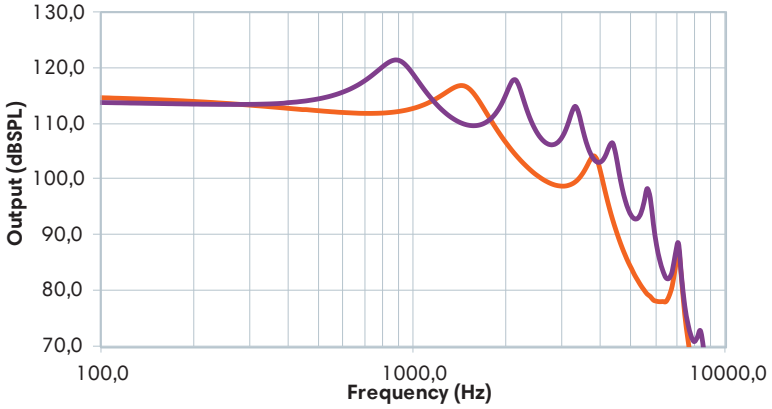
Low frequency power boost

Description

3700Q offers a low frequency power boost. Ideal for super power BTE applications.

Typical response curve

Measurement conditions: 0.35 mVA into 2CC ITE (orange) and 2CC BTE (purple).



Performance	
Dimensions	7.9 x 5.7 x 5.1 mm
Volume	225 mm^3
Efficiency 0.35mVA at 500 Hz*	115 dB SPL
Max LF Output 5% THD at 500 Hz*	127 dB SPL
Max Peak Output 50 mVA at 500 Hz*	142 dB SPL
Shock	8 kg

Features
Dual receiver
Up to 30 dB reduction in mechanical vibration
Added volume for increased LF output

* 2CC BTE

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