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## Loudspeaker Test Report

Manufacturer: e2S

Type: Horn

Model: D1xL1FR008xxxA1x

For: e2S Warning Signals

Report No.: R.2058/LS/D1xL-008R-Gas-15W-S1

Prepared By: A. N Stacey, B.SC., MIOA(E), MInstSCE

September 2015

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## 1.00 Object

- 1.01 The object of this Report is to present measurements of the acoustic performance of the D1xL08RGas15WS1 device.

## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

- (i) Directivity Index [dB], tabulated and graphical
- (ii) Effective octave and wide band (100Hz to 10kHz) impedance
- (iii) Sensitivity [dB @ 1m,1W]:  
Pink noise  
Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
- (viii) Frequency response chart
- (ix) Impedance bode plot
- (x) Polar response charts

### 3.00 Method

- 3.01 The device was mounted in Free Space as shown in figure 1 - Mounting Method E.
- 3.02 The measurements were made in an anechoic chamber.
- 3.03 Measurements were made as detailed in AMS Test Method document No. IR141/LS/Handbook v.1.
- 3.04 All measurements were made in general accordance with BS EN 60268: Part 5: 2003.
- 3.05 The test signal for all sound pressure level measurements was band limited Pink noise (100Hz to 10kHz) with a 6dB Crest factor.

### 4.00 Results

- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
- 4.02 Tabulated values of Directivity Index, Sensitivity, Acoustic Power, Apportioned Power, Impedance and Expected Maximum SPL are shown in the Summary data sheet.
- 4.03 The Directivity Index has been calculated from 412 data points around the directivity balloon.

### 5.00 Notes

- 5.01 Sensitivity  
The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.
- 5.02 Polar Plots  
For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

## 6.00 Engineers Notes & Observations

The reference point is located at the geometric centre of the enclosure and in line with the mounting bolts.

The reference axis was made normal to the horn mouth and includes the reference point.

The impedance does not fall below 80% of the rated impedance within the frequency range 89Hz to 11.2kHz.

### Loudspeaker Information

Manufacturer : e2S  
Model Code : D1xL08RGas15WS1  
Type : Horn  
Colour : Red  
Serial No. : NM  
Batch No. : NA  
Other Markings : -  
Backbox : As supplied  
Grille : NA  
Weight (grams) : 3380  
Depth (mm) : 285  
Width (mm) : 182  
Height (mm) : 182  
Special Features : Explosion proof

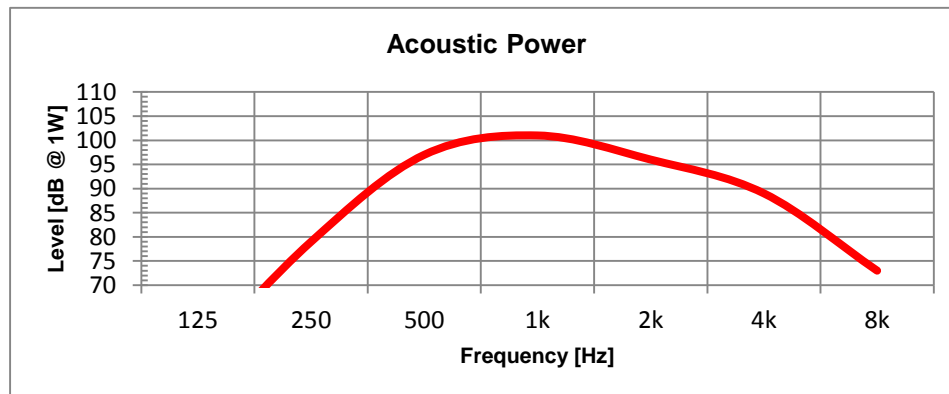
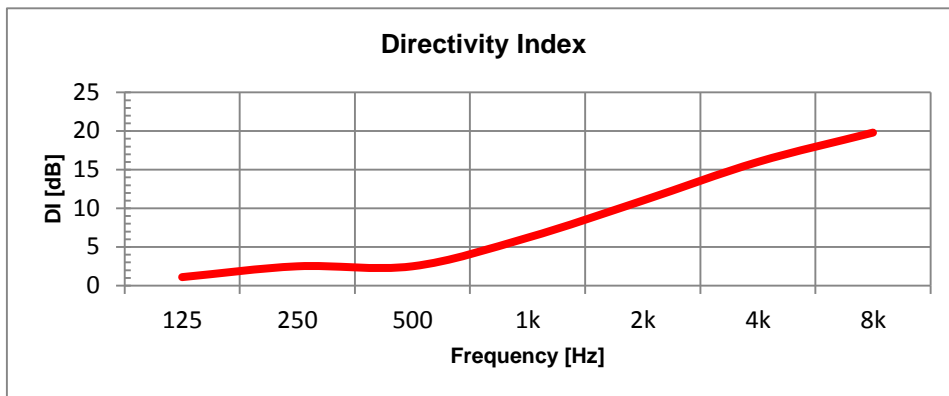
#### Internal Details

Driver Types/Sizes : NM  
Driver Serial No.(s) : NM  
Driver Markings : NM  
Damping Material : NA  
Available Tappings : 15W

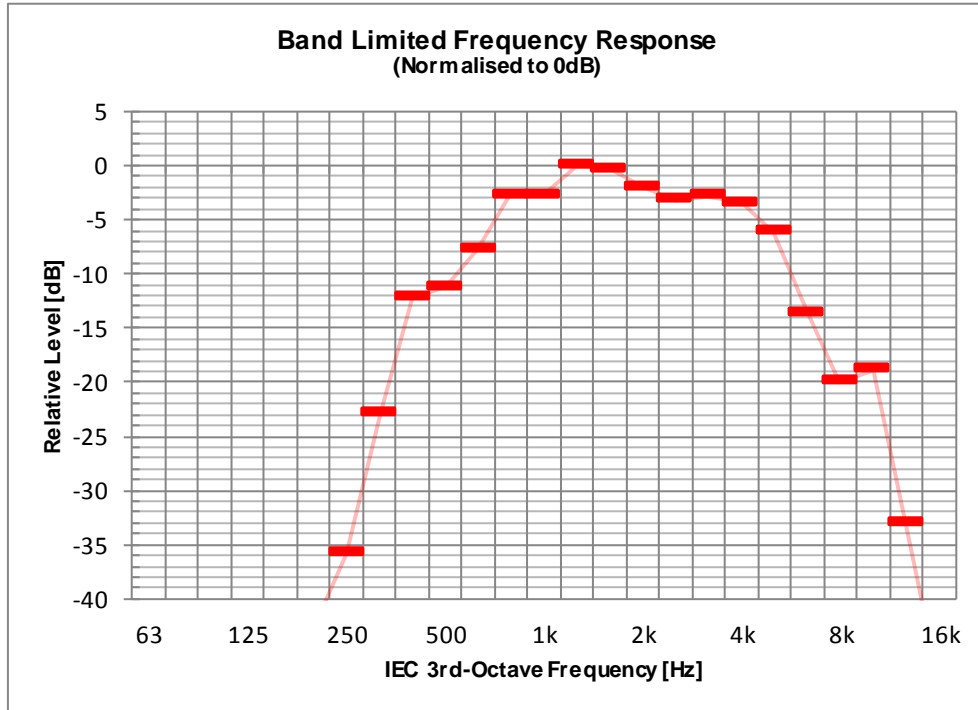
*NM = Not Measured, NA = Not Applicable*

Manufacturer : e2S  
 Model Code : D1xL08RGas15WS1  
 Mounting : Turntable  
 Measurement Distance [m] : 2.35  
 Test Voltage [V] : 6.16  
 Rated Noise Voltage [V] : 10.95  
 Rated Noise Power [W] : 15.00  
 Rated Impedance [Ohms] : 8.0  
 Minimum Impedance [Ohms] : 7 (88% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 8.8 (PF=0.994)  
 Effective Impedance (IEC Male) [Ohms] : 7.5 (PF=0.987)  
 Reference Axis Located at : 0 degrees

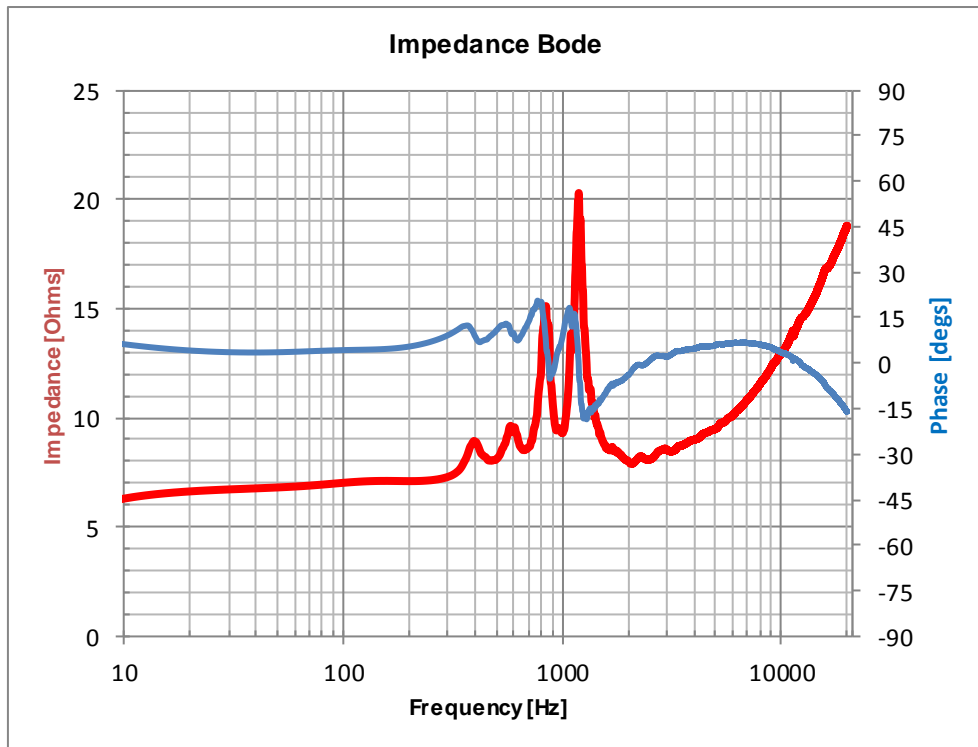
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	1.1	2.5	2.5	6.2	11.0	16.0	19.8		
Sensitivity [dB @ 1m,1W]	45	71	88	96	96	94	81	101	101
Sensitivity, IEC Male [dB @ 1m,1W]	50	75	89	91	85	76	58	94	93
Acoustic Power [dB-PWL @ 1W]	55	79	97	101	96	89	73		
Apportioned Power [%]	14	16	13	11	16	14	11		
Effective Impedance [Ohms]	7	7	9	11	8	9	11		
Oct' Sensitivity [dB @ 1m,1W/Oct]	54	80	98	106	106	104	91		
Expected Maximum SPL [dB @ 1m]	56	82	100	108	108	106	93	112	113



### D1xL08RGas15WS1



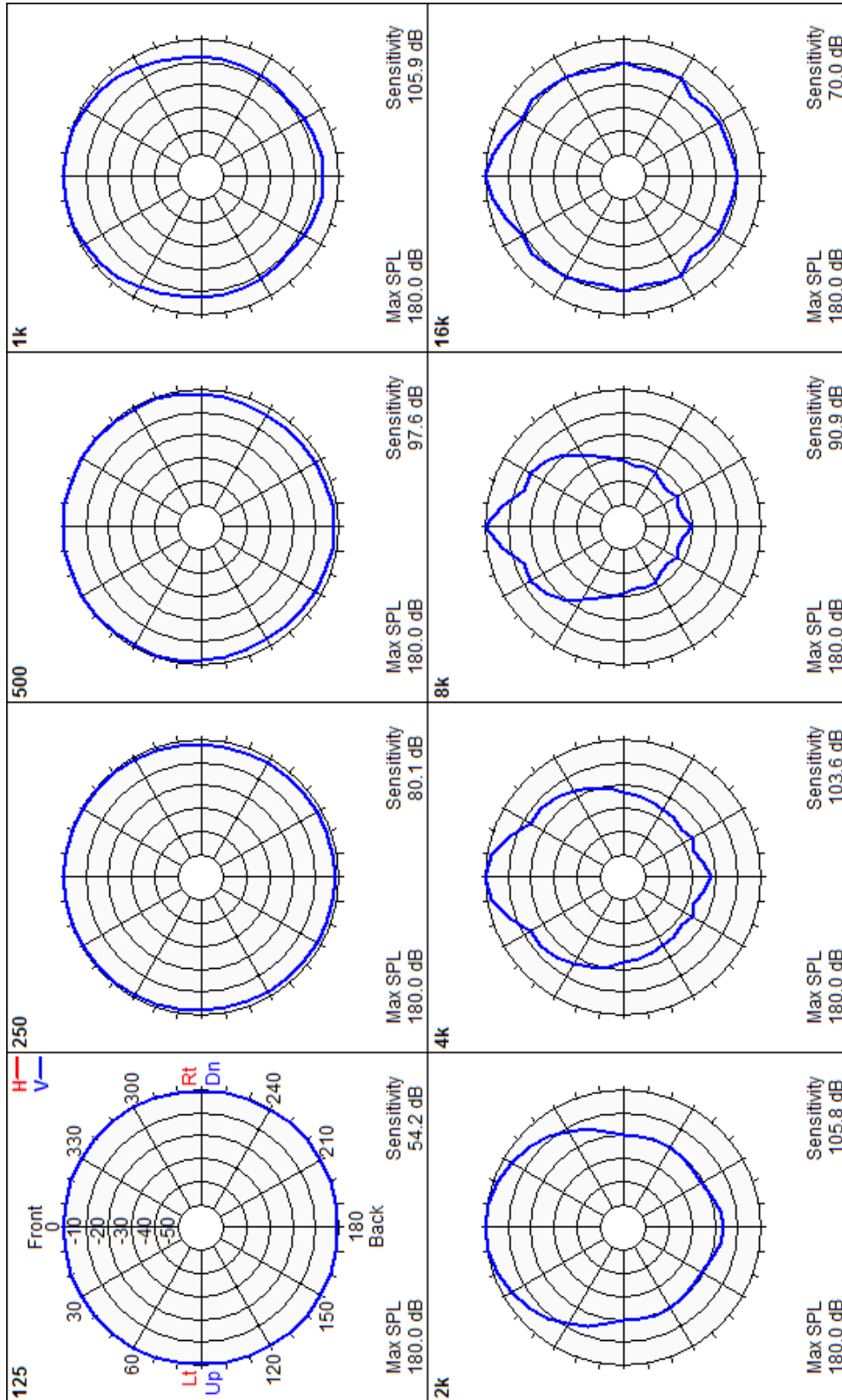
Test signal: Pink noise-6dBCF (100Hz-10kHz)



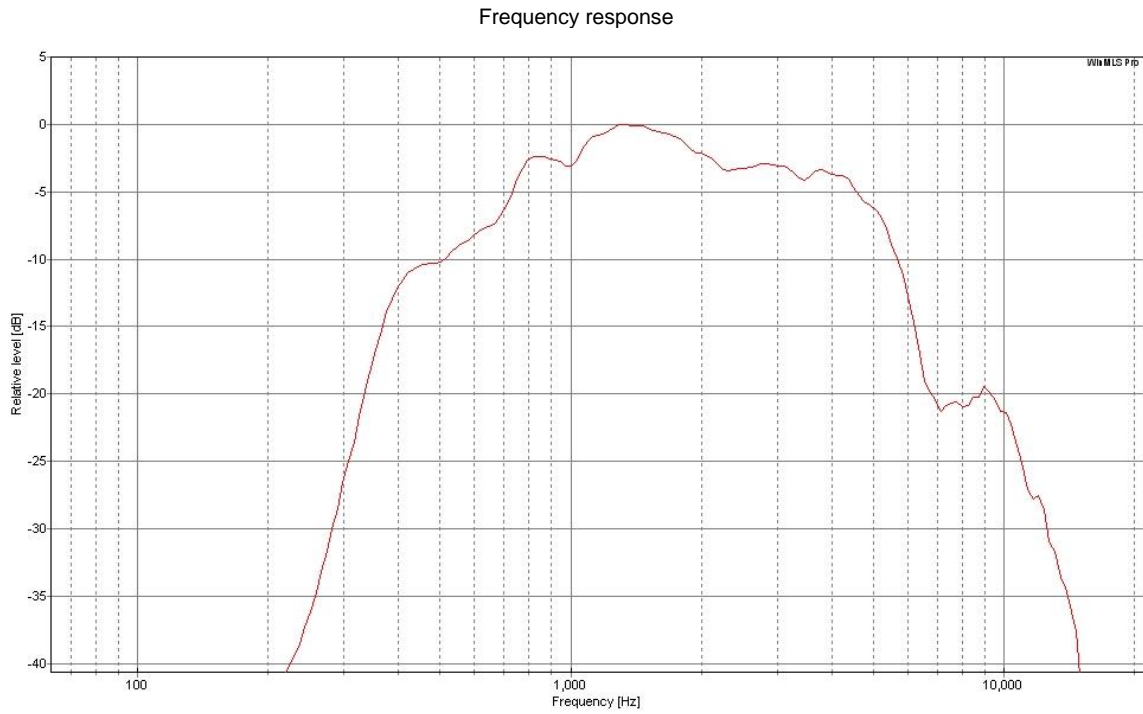
@ 15W

Test signal : Swept sine wave

D1xL08RGas15WS1




# D1xL08RGas15WS1

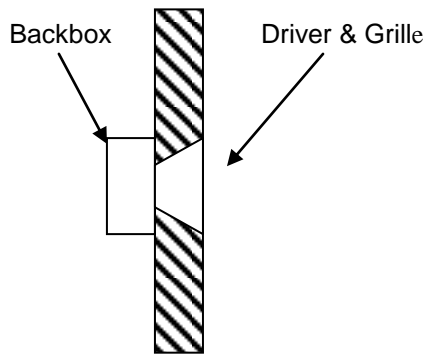


*Note:* The frequency response is derived using a Swept sine method.

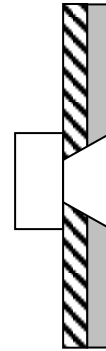
Signed: 

Countersigned: 

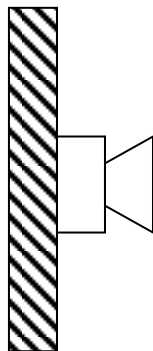
## Loudspeaker Mounting Methods



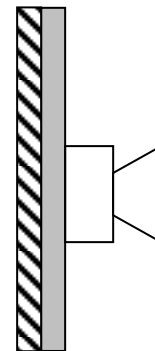
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



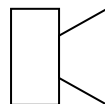
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1

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## Loudspeaker Test Report

Manufacturer: E2S Warning Signals

Type: Horn

Model: D1xL1FR008xxxD1x

For: E2S Warning Signals

Report No.: R.2058/LS/D1xL-008R-Dust-15W-S1

Prepared By: A. N Stacey, B.SC., MIOA(E), MInstSCE

September 2015

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## 1.00 Object

- 1.01 The object of this Report is to present measurements of the acoustic performance of the D1xL08RDus15WS1 device.

## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

- (i) Directivity Index [dB], tabulated and graphical
- (ii) Effective octave and wide band (100Hz to 10kHz) impedance
- (iii) Sensitivity [dB @ 1m,1W]:  
Pink noise  
Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
- (viii) Frequency response chart
- (ix) Impedance bode plot
- (x) Polar response charts

### 3.00 Method

- 3.01 The device was mounted in Free Space as shown in figure 1 - Mounting Method E.
- 3.02 The measurements were made in an anechoic chamber.
- 3.03 Measurements were made as detailed in AMS Test Method document No. IR141/LS/Handbook v.1.
- 3.04 All measurements were made in general accordance with BS EN 60268: Part 5: 2003.
- 3.05 The test signal for all sound pressure level measurements was band limited Pink noise (100Hz to 10kHz) with a 6dB Crest factor.

### 4.00 Results

- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
- 4.02 Tabulated values of Directivity Index, Sensitivity, Acoustic Power, Apportioned Power, Impedance and Expected Maximum SPL are shown in the Summary data sheet.
- 4.03 The Directivity Index has been calculated from 412 data points around the directivity balloon.

### 5.00 Notes

#### 5.01 Sensitivity

The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.

#### 5.02 Polar Plots

For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

## 6.00 Engineers Notes & Observations

The reference point is located at the geometric centre of the enclosure and in line with the mounting bolts.

The reference axis was made normal to the horn mouth and includes the reference point.

The impedance does not fall below 80% of the rated impedance within the frequency range 89Hz to 11.2kHz.

## Loudspeaker Information

Manufacturer : E2S Warning Signals  
Model Code : D1xL08RDus15WS1  
Type : Horn  
Colour : Red  
Serial No. : NM  
Batch No. : NA  
Other Markings : -  
Backbox : As supplied  
Grille : NA  
Weight (grams) : 3380  
Depth (mm) : 285  
Width (mm) : 182  
Height (mm) : 182  
Special Features : Explosion proof

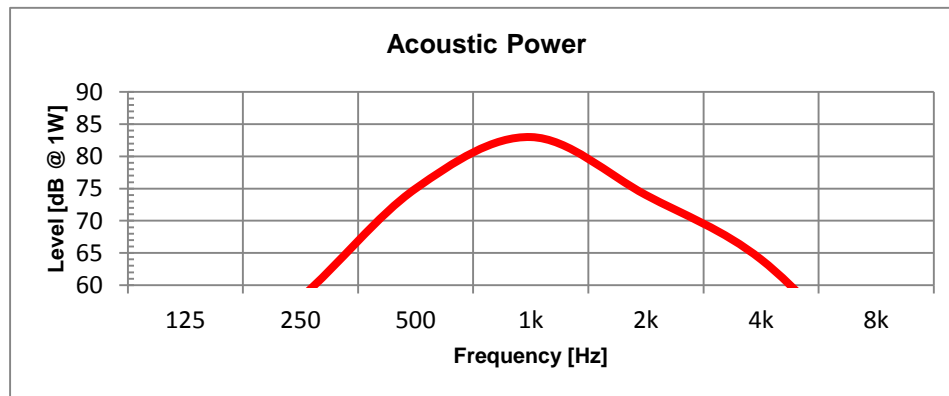
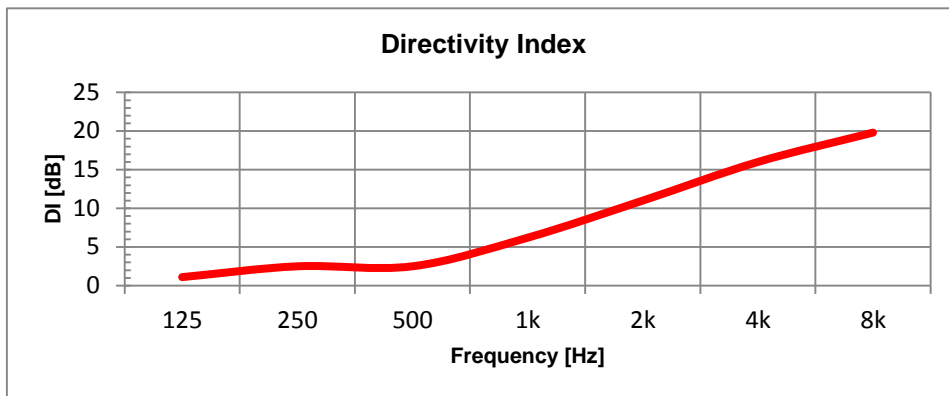
### Internal Details

Driver Types/Sizes : NM  
Driver Serial No.(s) : NM  
Driver Markings : NM  
Damping Material : NA  
Available Tappings : 15W

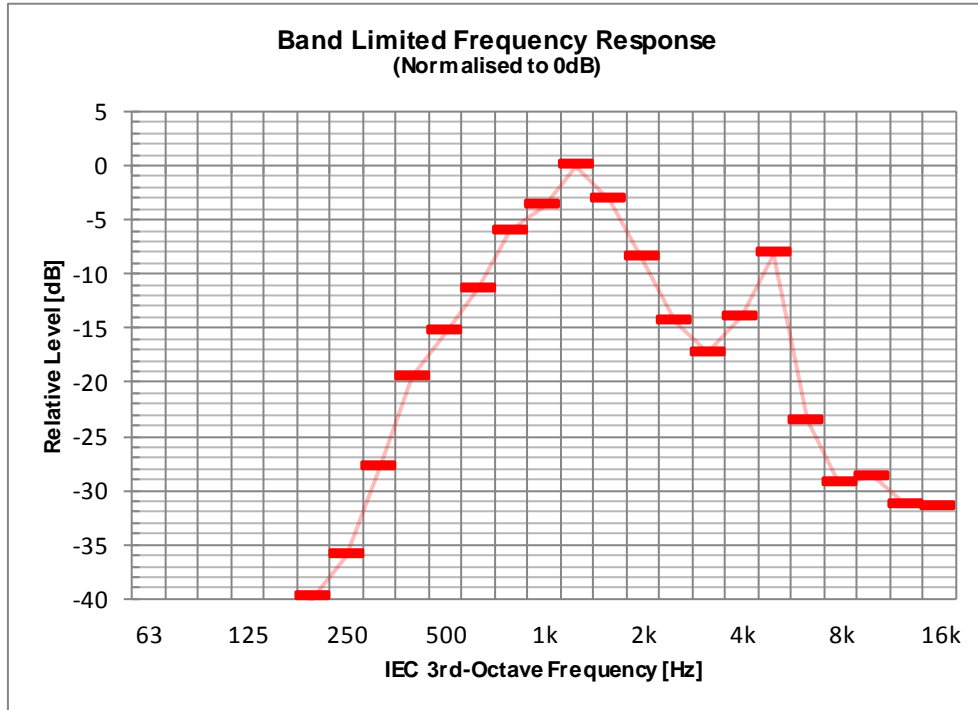
*NM = Not Measured, NA = Not Applicable*

Manufacturer : E2S Warning Signals  
 Model Code : D1xL08RDus15WS1  
 Mounting : Turntable  
 Measurement Distance [m] : 2.35  
 Test Voltage [V] : 6.16  
 Rated Noise Voltage [V] : 10.95  
 Rated Noise Power [W] : 15.00  
 Rated Impedance [Ohms] : 8.0  
 Minimum Impedance [Ohms] : 7 (88% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 8.4 (PF=0.989)  
 Effective Impedance (IEC Male) [Ohms] : 7.2 (PF=0.987)  
 Reference Axis Located at : 0 degrees

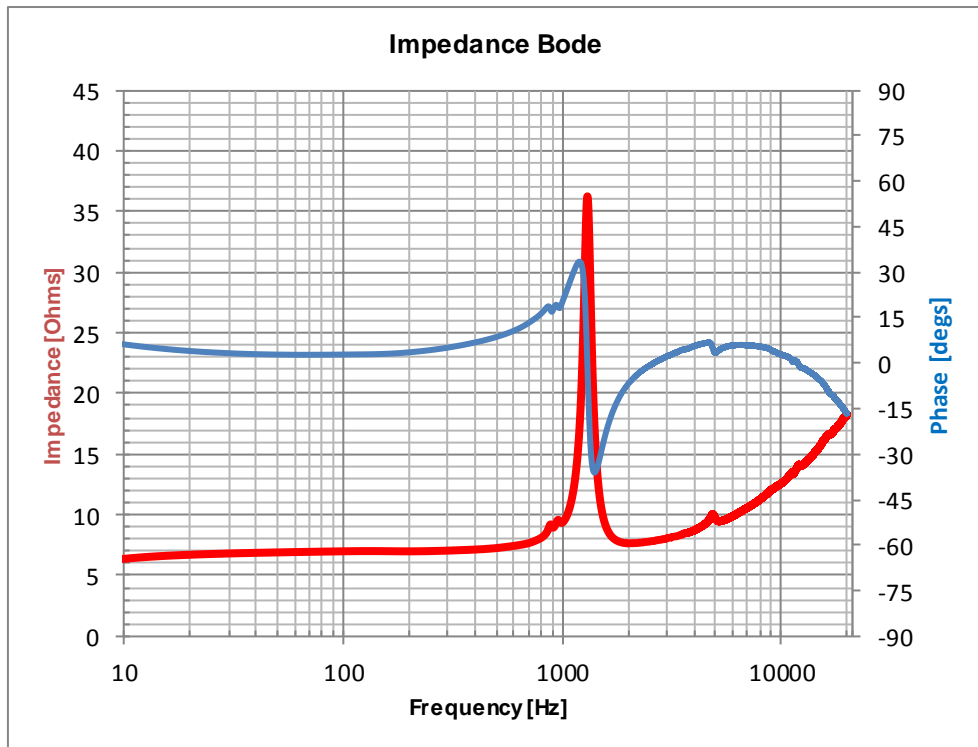
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	1.1	2.5	2.5	6.2	11.0	16.0	19.8		
Sensitivity [dB @ 1m,1W]	34	49	67	79	74	69	55	81	81
Sensitivity, IEC Male [dB @ 1m,1W]	39	54	68	73	63	52	31	75	74
Acoustic Power [dB-PWL @ 1W]	44	58	75	83	74	64	46		
Apportioned Power [%]	14	16	15	11	15	14	11		
Effective Impedance [Ohms]	7	7	7	11	8	9	11		
Oct' Sensitivity [dB @ 1m,1W/Oct]	44	59	76	88	84	79	64		
Expected Maximum SPL [dB @ 1m]	46	61	79	90	86	81	66	92	93



### D1xL08RDus15WS1



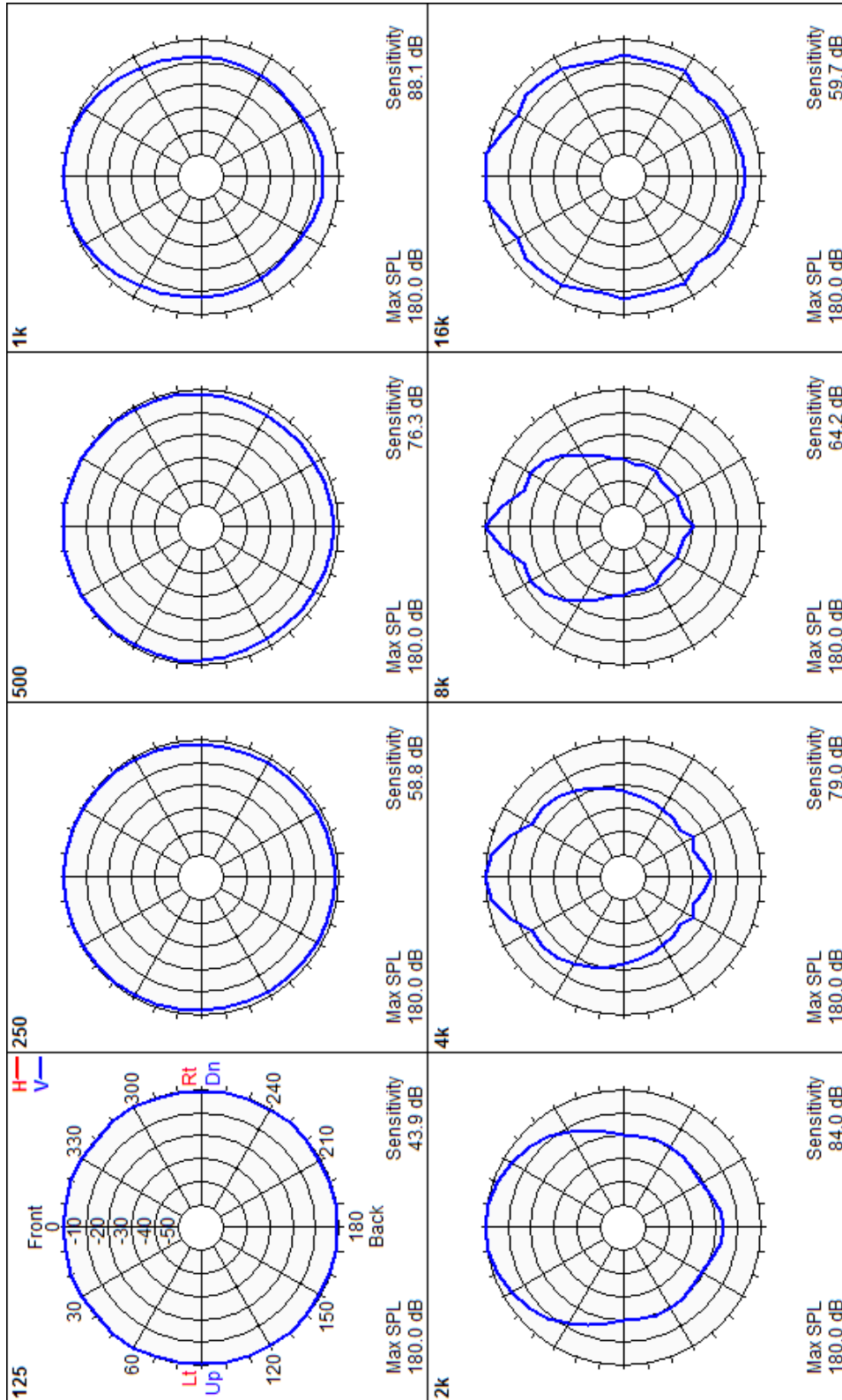
Test signal: Pink noise-6dBCF (100Hz-10kHz)



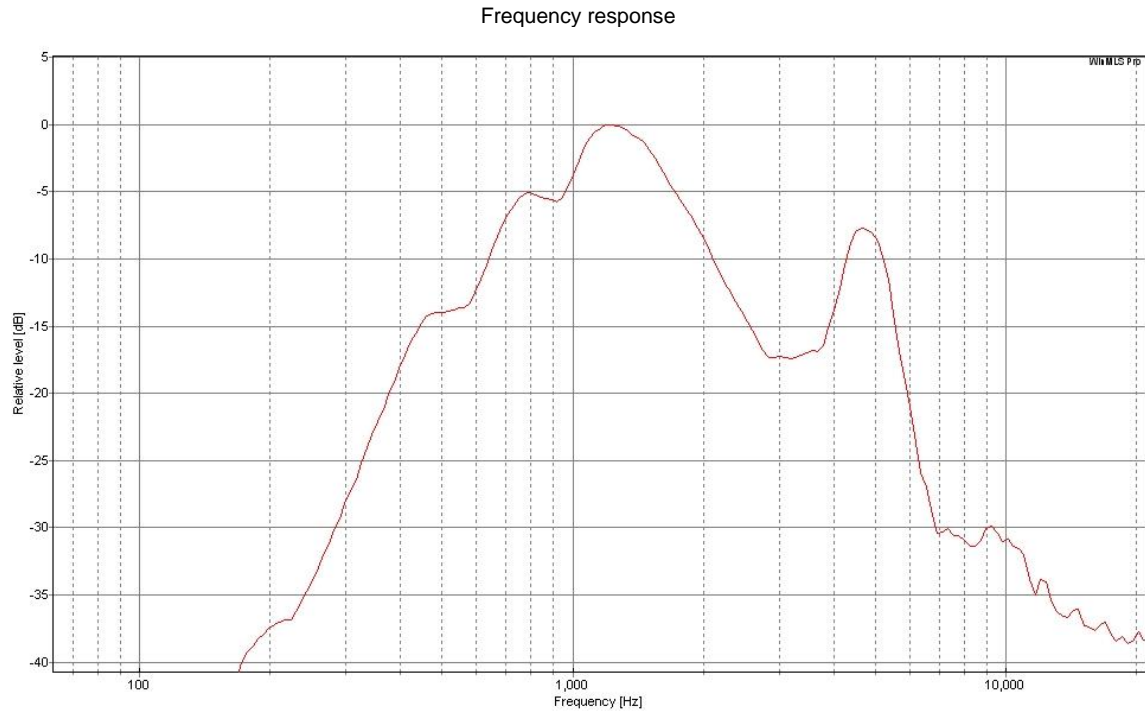
@ 15W

Test signal : Swept sine wave

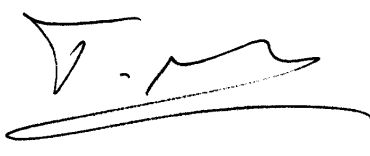
# D1xL08RDus15WS1




D1xL08RDus15WS1

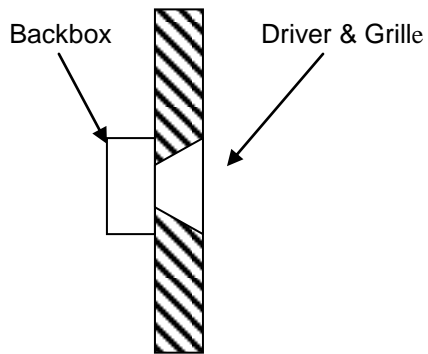


*Note:* The frequency response is derived using a Swept sine method.

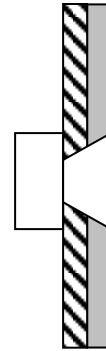
Signed: 

Countersigned: 

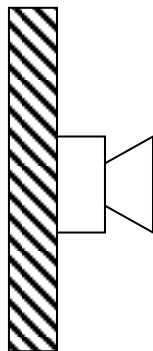
## Loudspeaker Mounting Methods



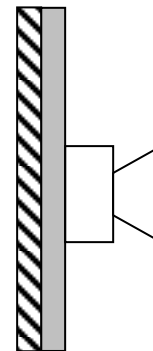
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



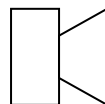
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1

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## Loudspeaker Test Report

Manufacturer: E2S Warning Signals

Type: Horn

Model: D1xL1FR016xxxA1x

For: E2S Warning Signals

Report No.: R.2058/LS/D1xL-016R-Gas-15W-S1

Prepared By: A. N Stacey, B.SC., MIOA(E), MInstSCE

September 2015

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## 1.00 Object

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## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

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Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
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- (ix) Impedance bode plot
- (x) Polar response charts

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- 3.02 The measurements were made in an anechoic chamber.
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- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
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#### 5.01 Sensitivity

The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.

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For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

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### Loudspeaker Information

Manufacturer : E2S Warning Signals  
Model Code : D1xL16RGas15WS1  
Type : Horn  
Colour : Red  
Serial No. : NM  
Batch No. : NA  
Other Markings : -  
Backbox : As supplied  
Grille : NA  
Weight (grams) : 3380  
Depth (mm) : 285  
Width (mm) : 182  
Height (mm) : 182  
Special Features : Explosion proof

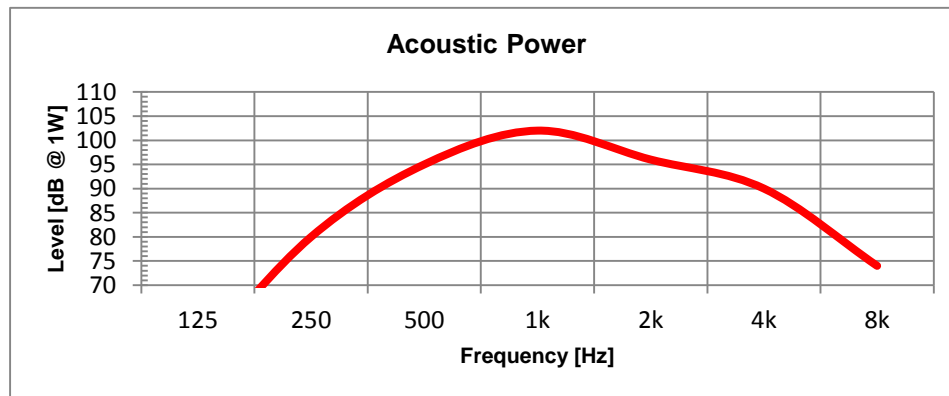
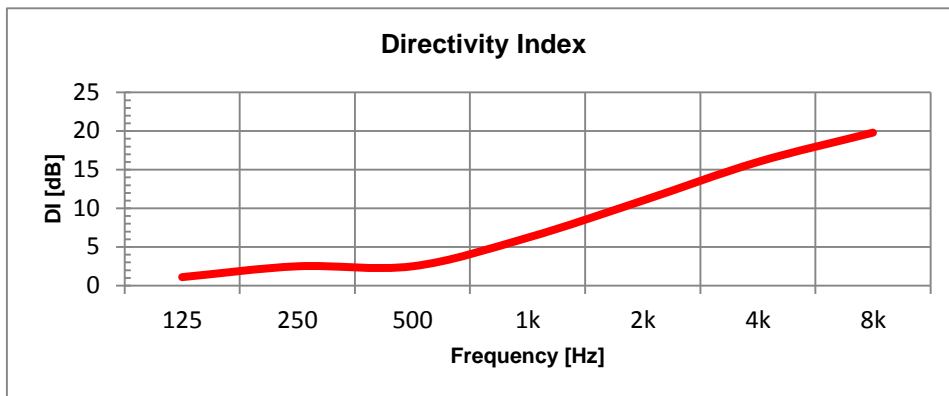
#### Internal Details

Driver Types/Sizes : NM  
Driver Serial No.(s) : NM  
Driver Markings : NM  
Damping Material : NA  
Available Tappings : 15W

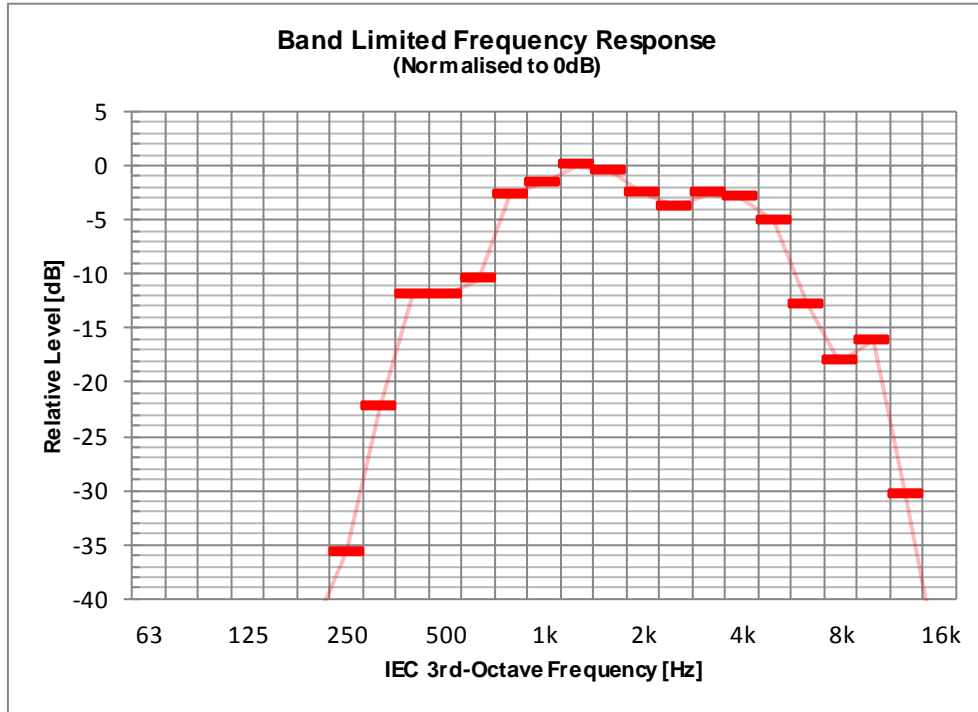
*NM = Not Measured, NA = Not Applicable*

Manufacturer : E2S Warning Signals  
 Model Code : D1xL16RGas15WS1  
 Mounting : Turntable  
 Measurement Distance [m] : 2.35  
 Test Voltage [V] : 8.59  
 Rated Noise Voltage [V] : 15.49  
 Rated Noise Power [W] : 15.00  
 Rated Impedance [Ohms] : 16.0  
 Minimum Impedance [Ohms] : 15.1 (94% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 18.3 (PF=0.995)  
 Effective Impedance (IEC Male) [Ohms] : 17 (PF=0.995)  
 Reference Axis Located at : 0 degrees

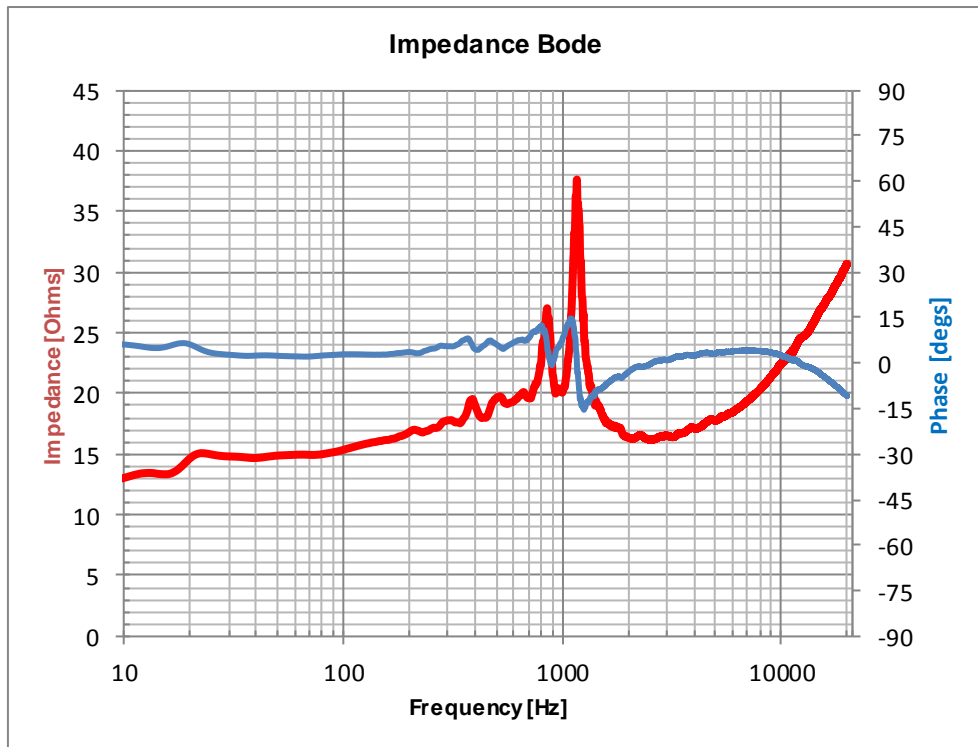
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	1.1	2.5	2.5	6.2	11.0	16.0	19.8		
Sensitivity [dB @ 1m,1W]	45	72	87	97	96	95	83	101	102
Sensitivity, IEC Male [dB @ 1m,1W]	50	76	88	92	85	77	60	94	93
Acoustic Power [dB-PWL @ 1W]	55	80	95	102	96	90	74		
Apportioned Power [%]	13	14	13	11	16	16	13		
Effective Impedance [Ohms]	16	17	19	23	17	17	20		
Oct' Sensitivity [dB @ 1m,1W/Oct]	55	81	96	107	106	104	93		
Expected Maximum SPL [dB @ 1m]	57	83	99	109	108	107	95	113	114



### D1xL16RGas15WS1



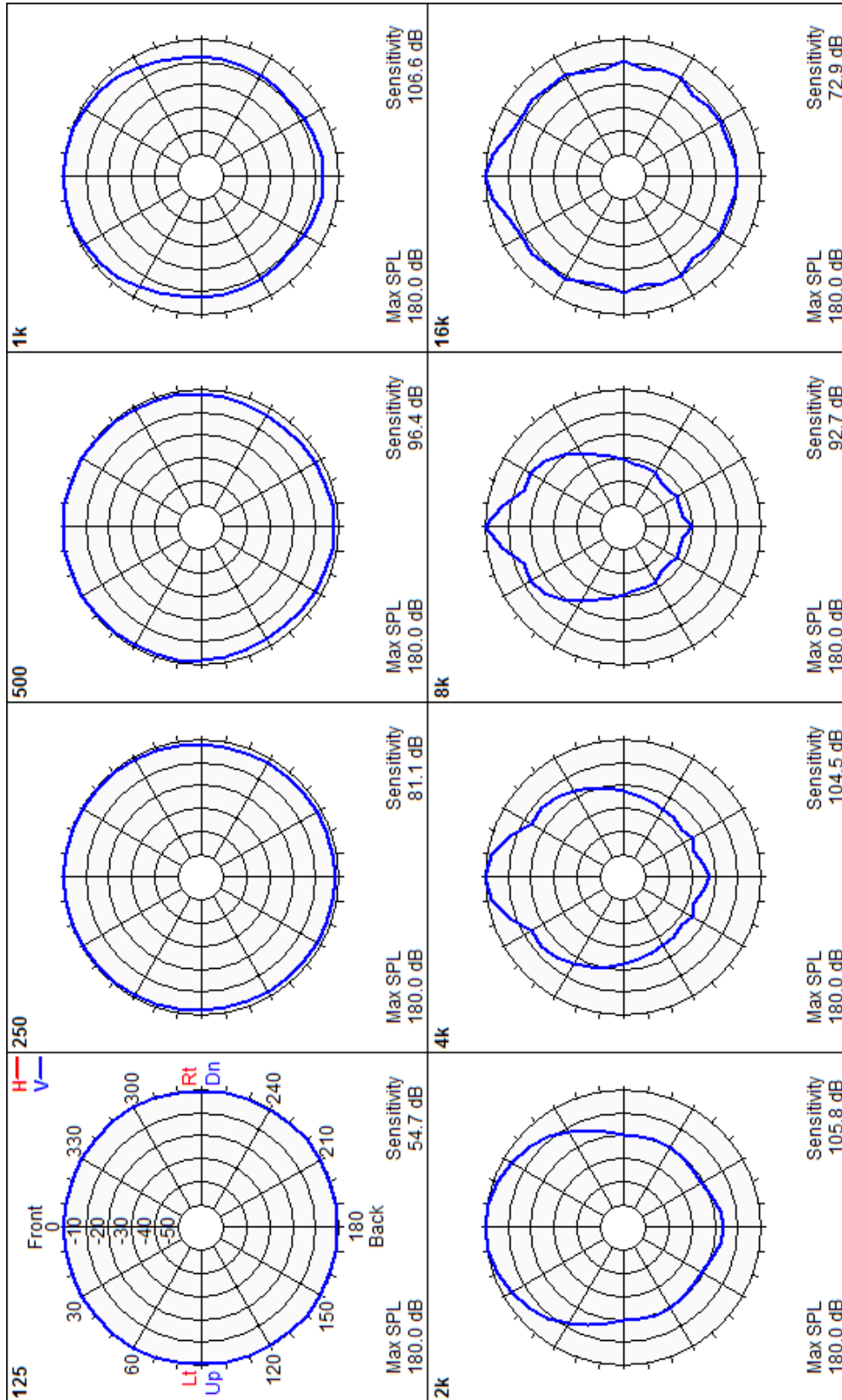
Test signal: Pink noise-6dBCF (100Hz-10kHz)



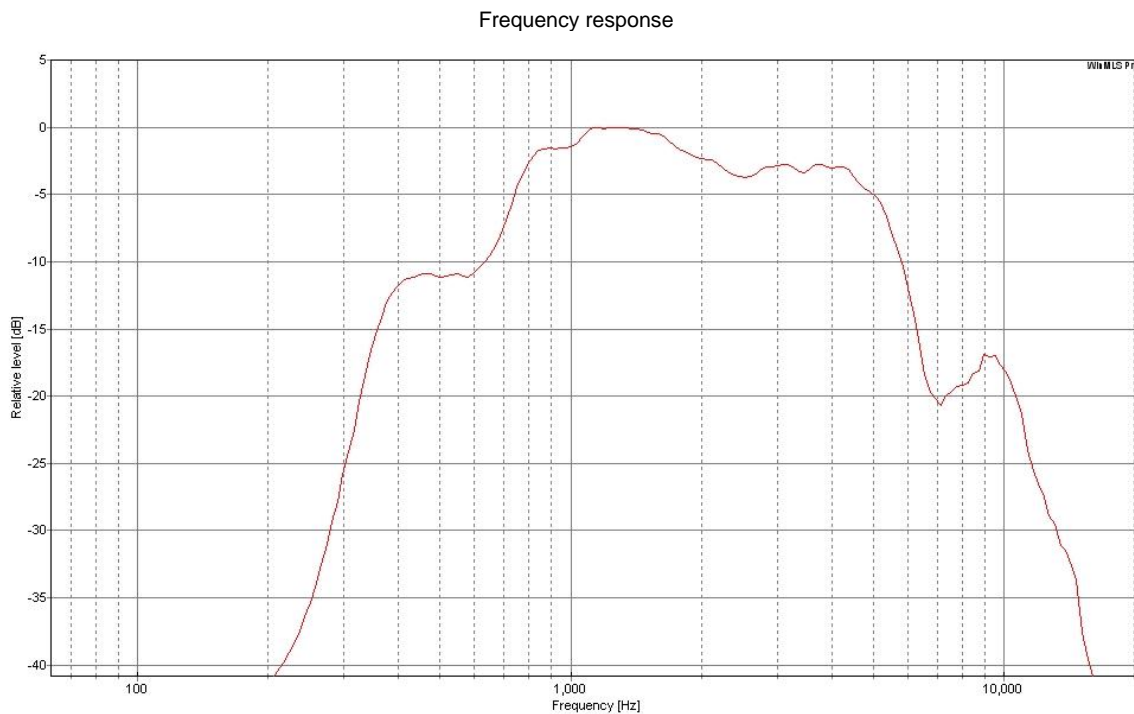
@ 15W

Test signal : Swept sine wave

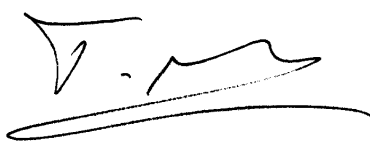
# D1xL16RGas15WS1




### D1xL16RGas15WS1

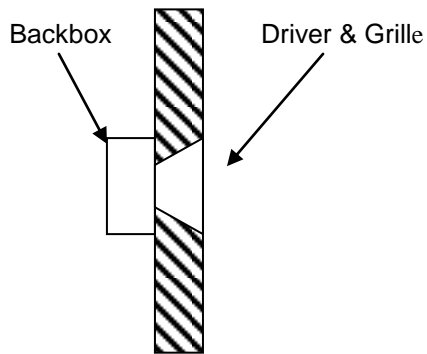


Note: The frequency response is derived using a Swept sine method.

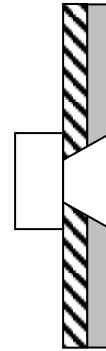
Signed: 

Countersigned: 

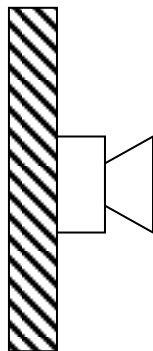
## Loudspeaker Mounting Methods



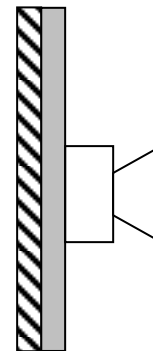
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



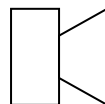
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1

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## Loudspeaker Test Report

Manufacturer: E2S Warning Signals

Type: Horn

Model: D1xL1FR016xxxD1x

For: E2S Warning Signals

Report No.: R.2058/LS/D1xL-016R-Dust-15W-S1

Prepared By: A. N Stacey, B.SC., MIOA(E), MInstSCE

September 2015

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## 1.00 Object

- 1.01 The object of this Report is to present measurements of the acoustic performance of the D1xL16RDus15WS1 device.

## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

- (i) Directivity Index [dB], tabulated and graphical
- (ii) Effective octave and wide band (100Hz to 10kHz) impedance
- (iii) Sensitivity [dB @ 1m,1W]:  
Pink noise  
Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
- (viii) Frequency response chart
- (ix) Impedance bode plot
- (x) Polar response charts

### 3.00 Method

- 3.01 The device was mounted in Free Space as shown in figure 1 - Mounting Method E.
- 3.02 The measurements were made in an anechoic chamber.
- 3.03 Measurements were made as detailed in AMS Test Method document No. IR141/LS/Handbook v.1.
- 3.04 All measurements were made in general accordance with BS EN 60268: Part 5: 2003.
- 3.05 The test signal for all sound pressure level measurements was band limited Pink noise (100Hz to 10kHz) with a 6dB Crest factor.

### 4.00 Results

- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
- 4.02 Tabulated values of Directivity Index, Sensitivity, Acoustic Power, Apportioned Power, Impedance and Expected Maximum SPL are shown in the Summary data sheet.
- 4.03 The Directivity Index has been calculated from 412 data points around the directivity balloon.

### 5.00 Notes

#### 5.01 Sensitivity

The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.

#### 5.02 Polar Plots

For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

## 6.00 Engineers Notes & Observations

The reference point is located at the geometric centre of the enclosure and in line with the mounting bolts.

The reference axis was made normal to the horn mouth and includes the reference point.

The impedance does fall below 80% of the rated impedance within the frequency range 89Hz to 11.2kHz.

## Loudspeaker Information

Manufacturer : E2S Warning Signals  
Model Code : D1xL16RDus15WS1  
Type : Horn  
Colour : Red  
Serial No. : NM  
Batch No. : NA  
Other Markings : -  
Backbox : As supplied  
Grille : NA  
Weight (grams) : 3  
Depth (mm) : 285  
Width (mm) : 182  
Height (mm) : 182  
Special Features : Explosion proof

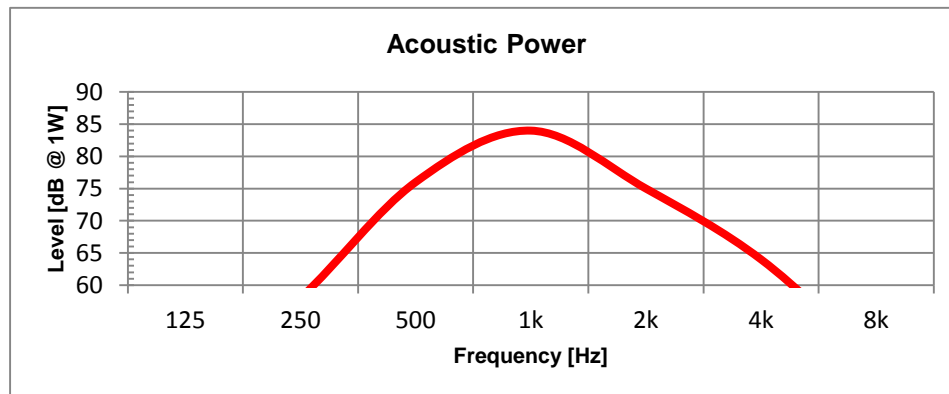
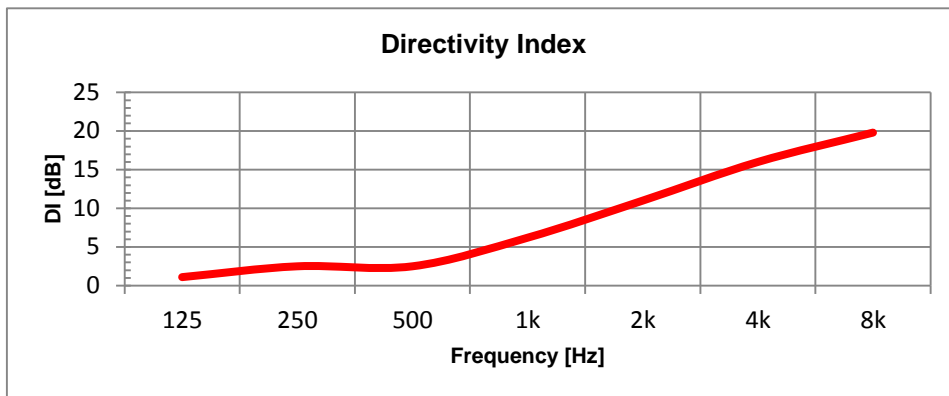
### Internal Details

Driver Types/Sizes : NM  
Driver Serial No.(s) : NM  
Driver Markings : NM  
Damping Material : NA  
Available Tappings : 15W

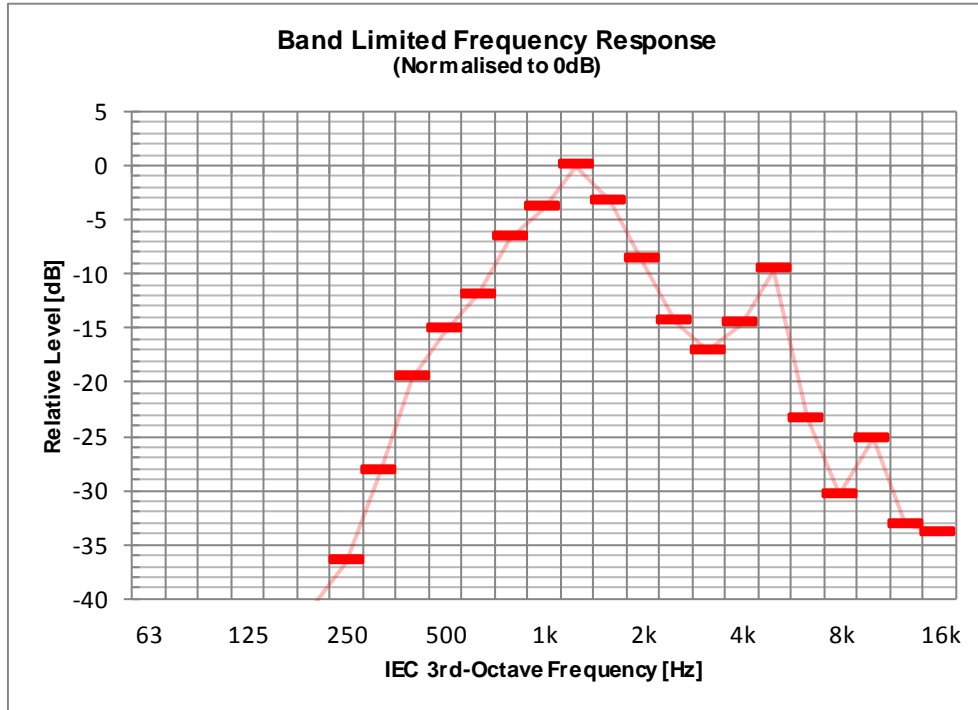
*NM = Not Measured, NA = Not Applicable*

Manufacturer : E2S Warning Signals  
 Model Code : D1xL16RDus15WS1  
 Mounting : Turntable  
 Measurement Distance [m] : 2.35  
 Test Voltage [V] : 8.71  
 Rated Noise Voltage [V] : 15.49  
 Rated Noise Power [W] : 15.00  
 Rated Impedance [Ohms] : 16.0  
 Minimum Impedance [Ohms] : 11.8 (74% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 14.1 (PF=0.987)  
 Effective Impedance (IEC Male) [Ohms] : 12.1 (PF=0.994)  
 Reference Axis Located at : 0 degrees

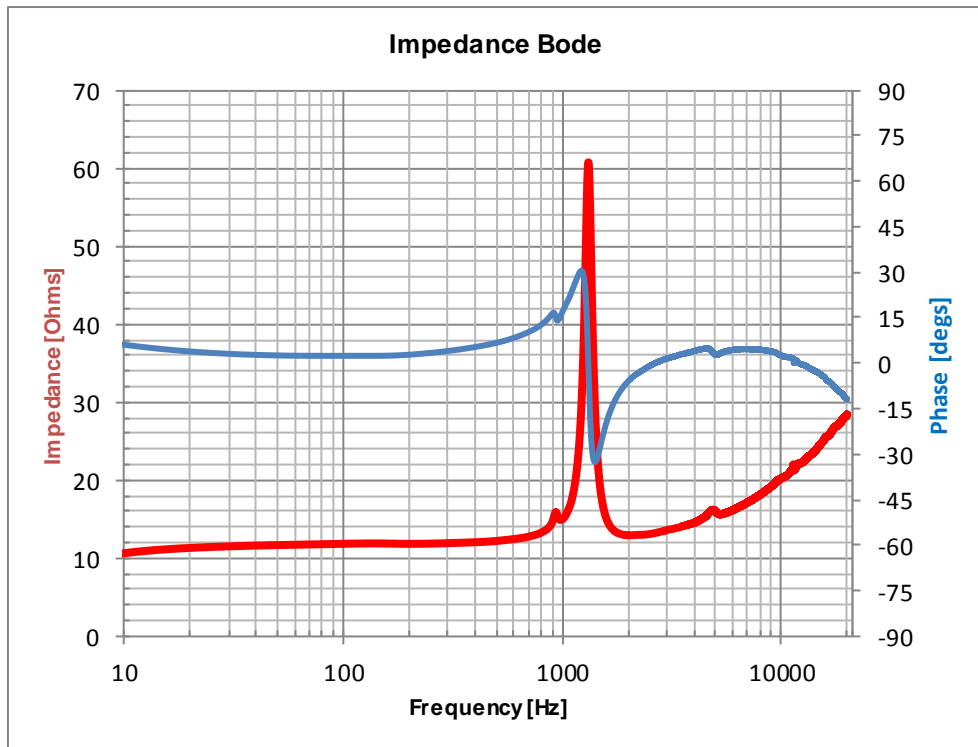
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	1.1	2.5	2.5	6.2	11.0	16.0	19.8		
Sensitivity [dB @ 1m,1W]	33	50	67	79	75	69	56	81	82
Sensitivity, IEC Male [dB @ 1m,1W]	38	54	68	74	63	52	33	75	75
Acoustic Power [dB-PWL @ 1W]	43	58	76	84	75	64	48		
Apportioned Power [%]	14	15	15	11	15	14	11		
Effective Impedance [Ohms]	12	12	12	17	14	15	18		
Oct' Sensitivity [dB @ 1m,1W/Oct]	43	59	77	89	85	79	66		
Expected Maximum SPL [dB @ 1m]	45	61	79	91	87	81	68	93	93



### D1xL16RDus15WS1



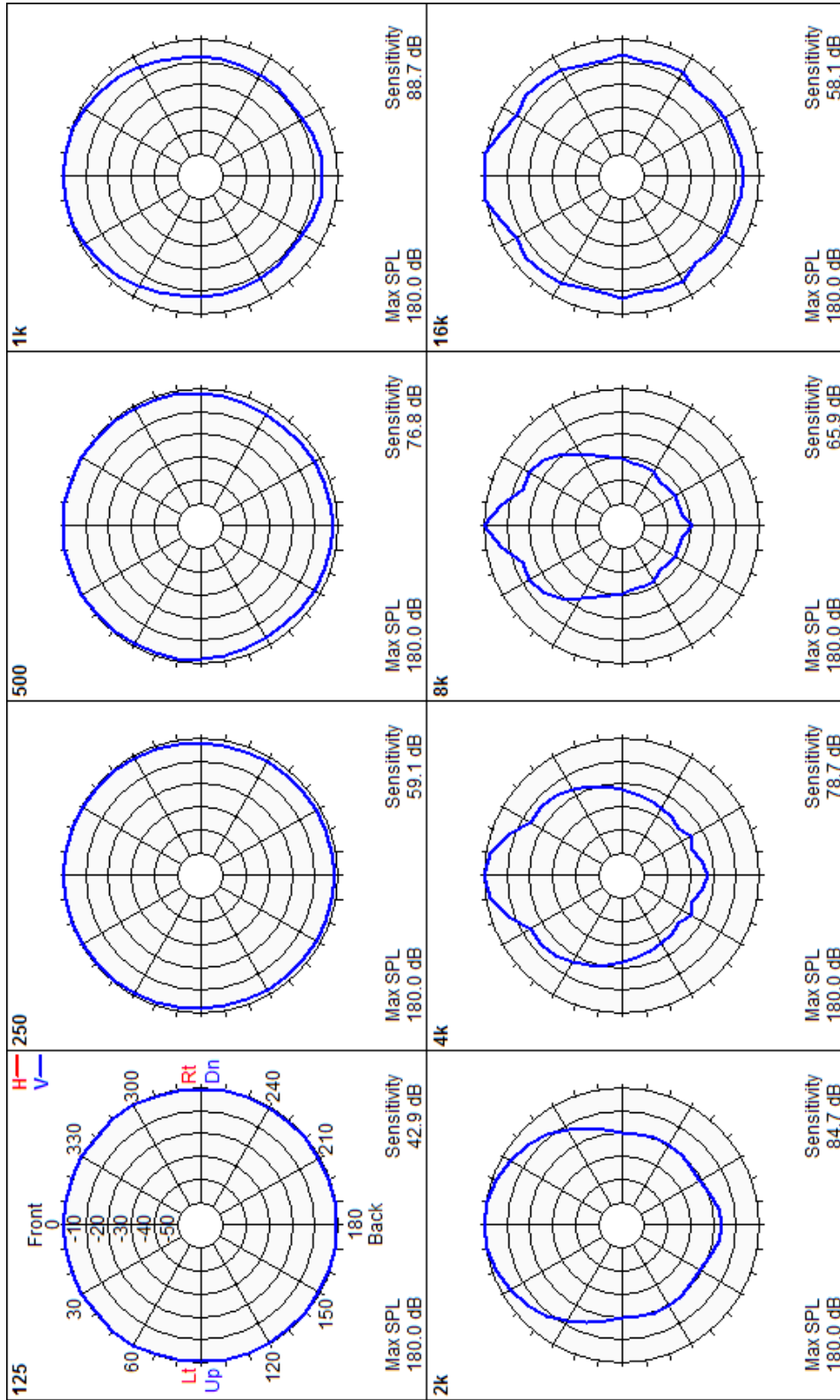
Test signal: Pink noise-6dBCF (100Hz-10kHz)



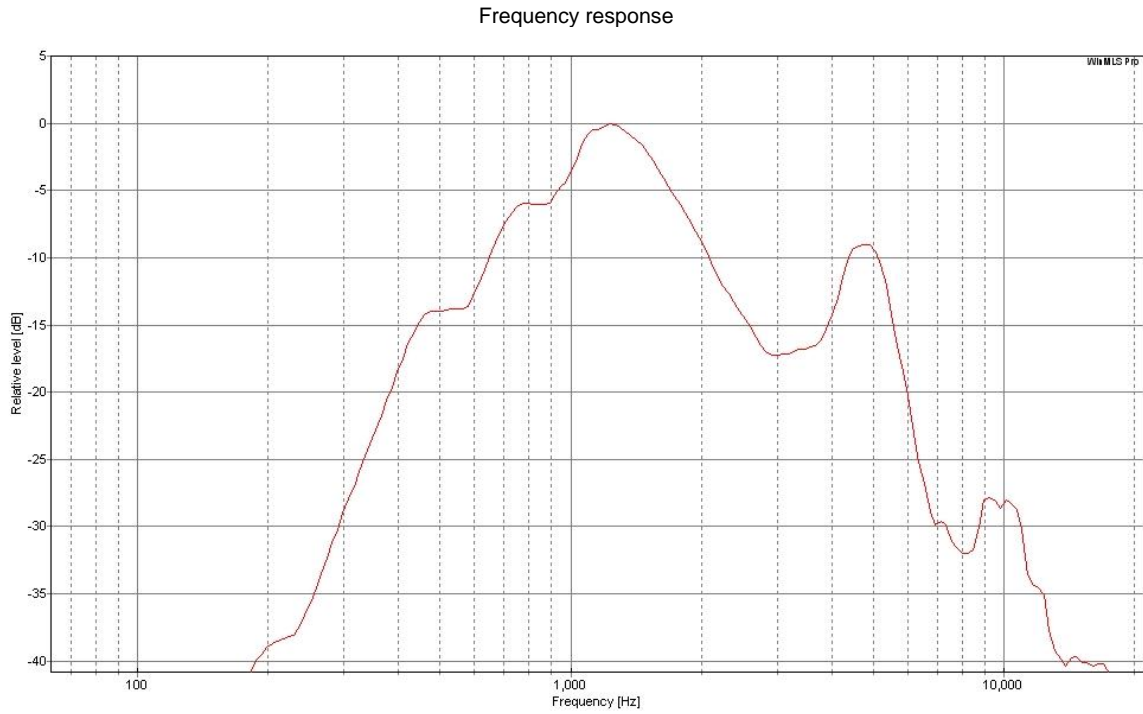
@ 15W

Test signal : Swept sine wave

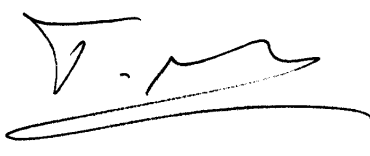
# D1xL16RDus15WS1




# D1xL16RDus15WS1

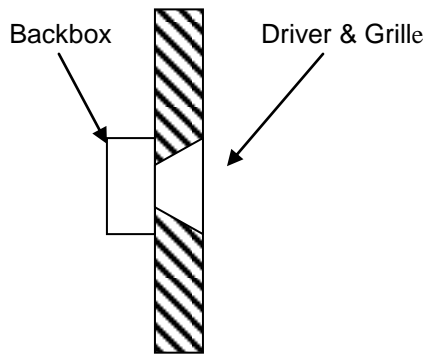


*Note:* The frequency response is derived using a Swept sine method.

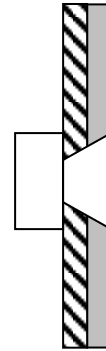
Signed: 

Countersigned: 

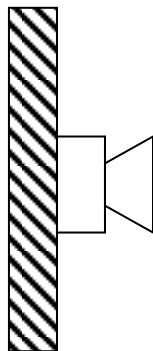
## Loudspeaker Mounting Methods



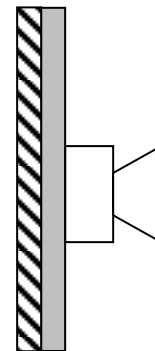
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



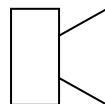
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1

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## Loudspeaker Test Report

Manufacturer: E2S Warning Signals

Type: Horn

Model: D1xL1FV070xxxA1x

For: E2S Warning Signals

Report No.: R.2058/LS/D1xL1-070V-Gas-15W-S1

Prepared By: A. N Stacey, B.SC., MIOA(E), MInstSCE

September 2015

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## 1.00 Object

- 1.01 The object of this Report is to present measurements of the acoustic performance of the D1xL70VGas15WS1 device.

## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

- (i) Directivity Index [dB], tabulated and graphical
- (ii) Effective octave and wide band (100Hz to 10kHz) impedance
- (iii) Sensitivity [dB @ 1m,1W]:  
Pink noise  
Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
- (viii) Frequency response chart
- (ix) Impedance bode plot
- (x) Polar response charts

### 3.00 Method

- 3.01 The device was mounted in Free Space as shown in figure 1 - Mounting Method E.
- 3.02 The measurements were made in an anechoic chamber.
- 3.03 Measurements were made as detailed in AMS Test Method document No. IR141/LS/Handbook v.1.
- 3.04 All measurements were made in general accordance with BS EN 60268: Part 5: 2003.
- 3.05 The test signal for all sound pressure level measurements was band limited Pink noise (100Hz to 10kHz) with a 6dB Crest factor.

### 4.00 Results

- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
- 4.02 Tabulated values of Directivity Index, Sensitivity, Acoustic Power, Apportioned Power, Impedance and Expected Maximum SPL are shown in the Summary data sheet.
- 4.03 The Directivity Index has been calculated from 412 data points around the directivity balloon.

### 5.00 Notes

#### 5.01 Sensitivity

The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.

#### 5.02 Polar Plots

For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

## 6.00 Engineers Notes & Observations

The reference point is located at the geometric centre of the enclosure and in line with the mounting bolts.

The reference axis was made normal to the horn mouth and includes the reference point.

The impedance does not fall below 80% of the rated impedance within the frequency range 89Hz to 11.2kHz.

## Loudspeaker Information

Manufacturer : E2S Warning Signals  
Model Code : D1xL70VGas15WS1  
Type : Horn  
Colour : Red  
Serial No. : NM  
Batch No. : NA  
Other Markings : -  
Backbox : As supplied  
Grille : NA  
Weight (grams) : 4260  
Depth (mm) : 285  
Width (mm) : 182  
Height (mm) : 182  
Special Features : Explosion proof

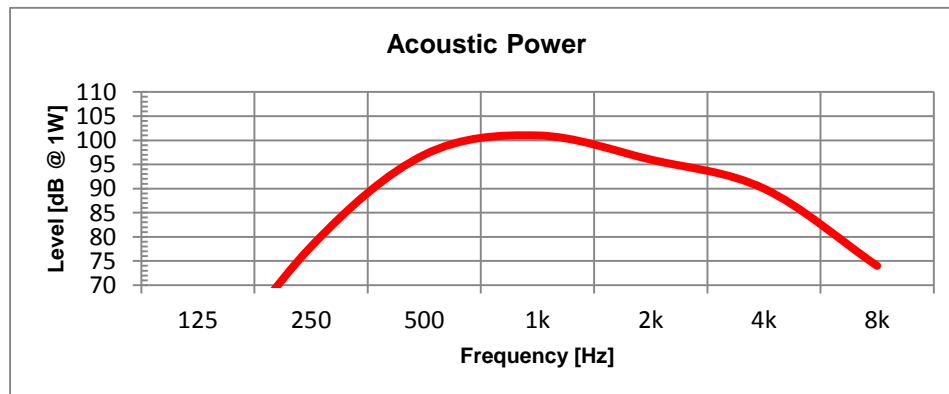
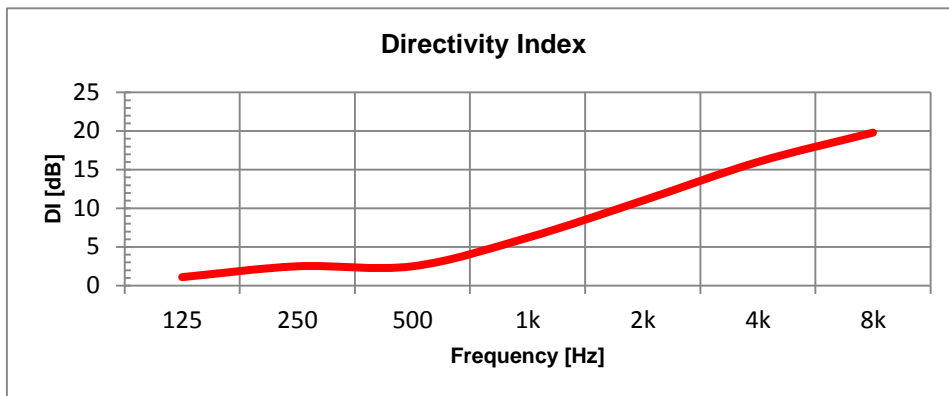
### Internal Details

Driver Types/Sizes : NM  
Driver Serial No.(s) : NM  
Driver Markings : NM  
Damping Material : NA  
Available Tappings : 15W (70V)

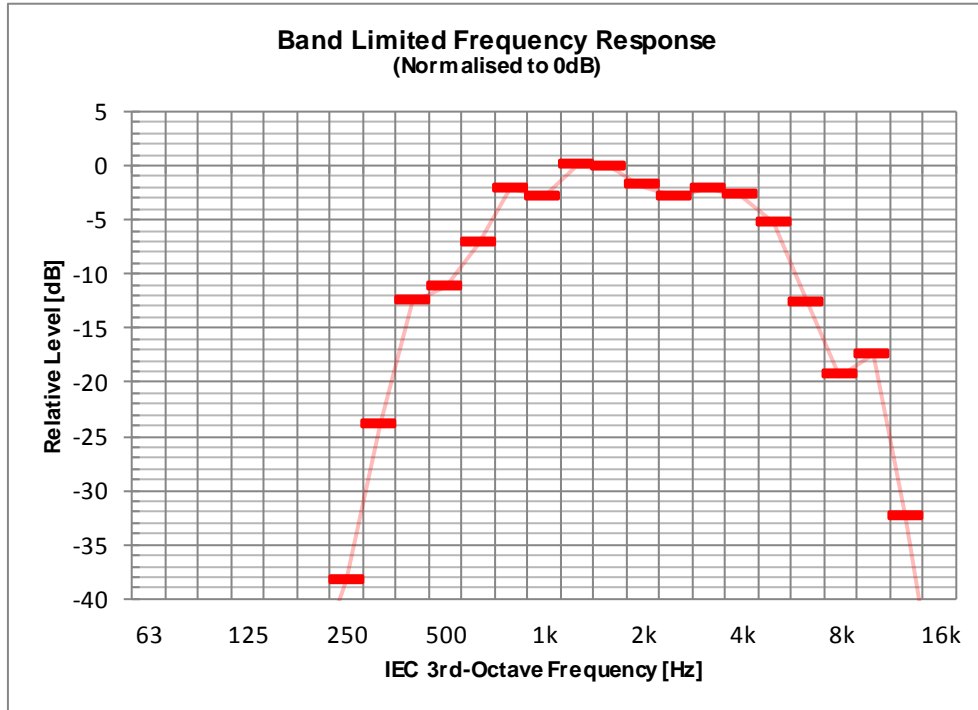
*NM = Not Measured, NA = Not Applicable*

Manufacturer : E2S Warning Signals  
 Model Code : D1xL70VGas15WS1  
 Mounting : Turntable  
 Measurement Distance [m] : 2.35  
 Test Voltage [V] : 39.40  
 Rated Noise Voltage [V] : 70.00  
 Rated Noise Power [W] : 15.00  
 Rated Impedance [Ohms] : 326.6  
 Minimum Impedance [Ohms] : 273.6 (84% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 366.8 (PF=0.774)  
 Effective Impedance (IEC Male) [Ohms] : 368.8 (PF=0.798)  
 Reference Axis Located at : 0 degrees

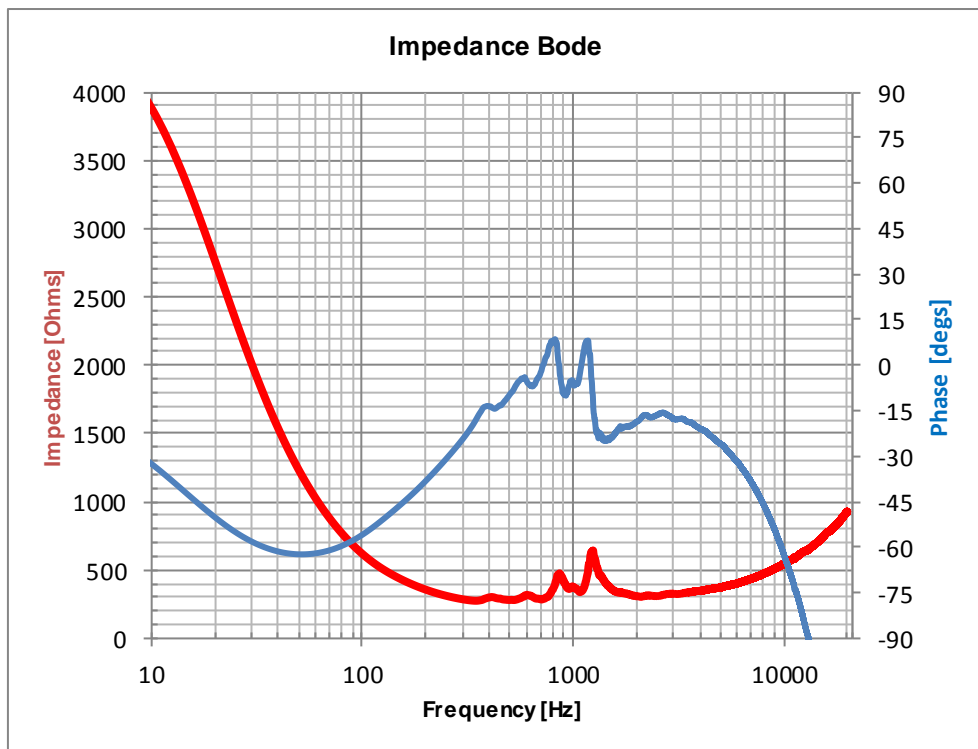
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	1.1	2.5	2.5	6.2	11.0	16.0	19.8		
Sensitivity [dB @ 1m,1W]	39	69	88	96	96	95	82	101	102
Sensitivity, IEC Male [dB @ 1m,1W]	44	74	89	91	85	77	59	94	93
Acoustic Power [dB-PWL @ 1W]	48	78	97	101	96	90	74		
Apportioned Power [%]	7	12	13	10	13	12	9		
Effective Impedance [Ohms]	499	314	291	391	326	348	465		
Oct' Sensitivity [dB @ 1m,1W/Oct]	48	79	98	106	106	104	92		
Expected Maximum SPL [dB @ 1m]	50	81	100	108	108	106	94	113	113



### D1xL70VGas15WS1



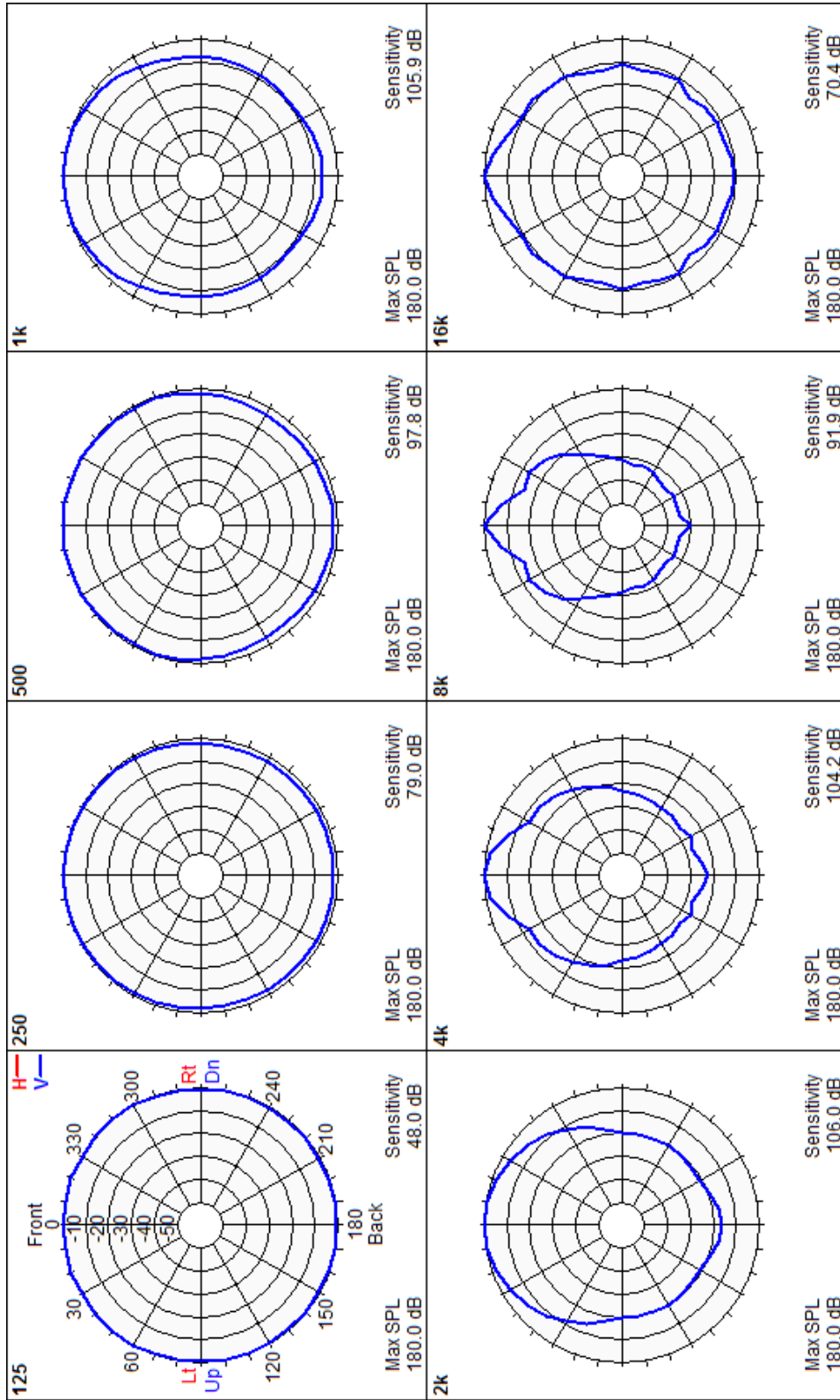
Test signal: Pink noise-6dBCF (100Hz-10kHz)



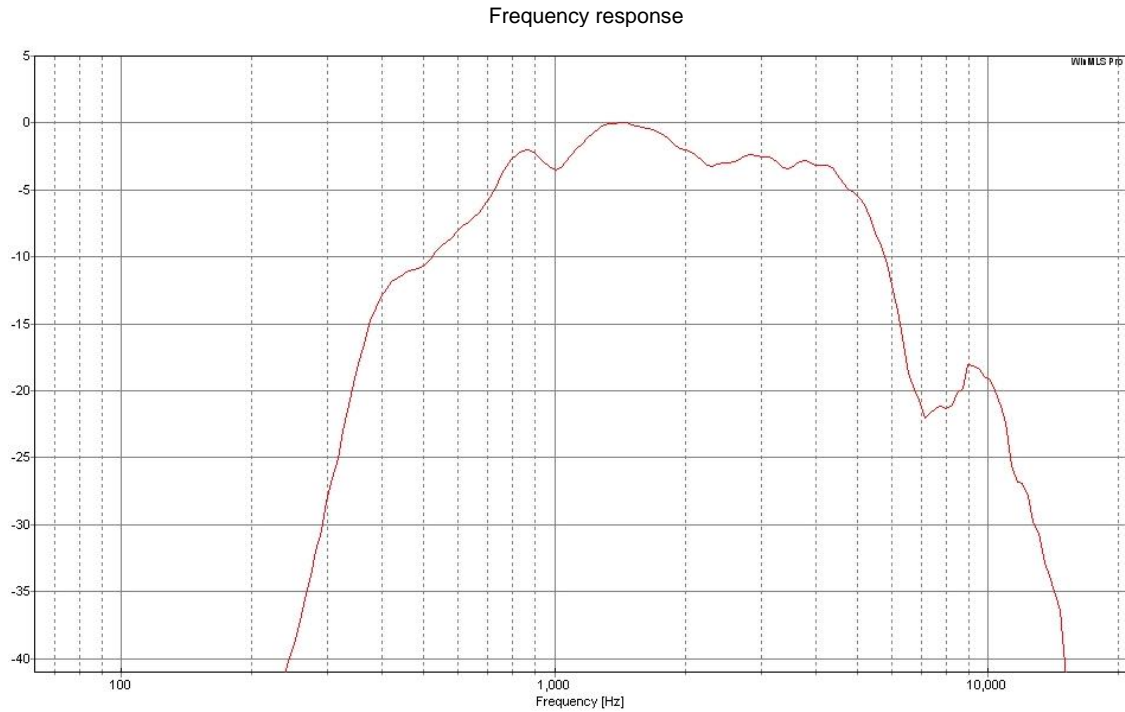
@ 15W

Test signal : Swept sine wave

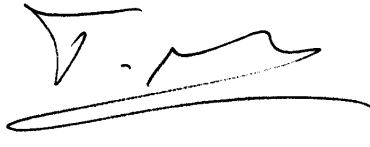
# D1xL70V/Gas15WS1




### D1xL70VGas15WS1

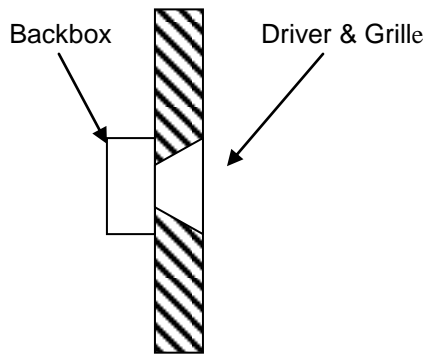


*Note:* The frequency response is derived using a Swept sine method.

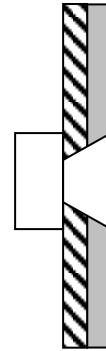
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Countersigned: 

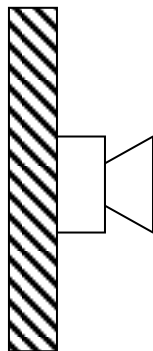
## Loudspeaker Mounting Methods



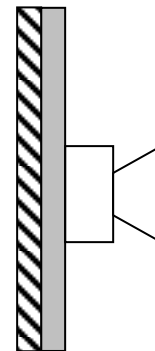
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



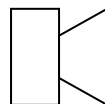
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1

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## Loudspeaker Test Report

Manufacturer: E2S Warning Signals

Type: Horn

Model: D1xL1FV070xxxD1x

For: E2S Warning Signals

Report No.: R.2058/LS/D1xL1-070V-Dust-15W-S1

Prepared By: A. N Stacey, B.SC., MIOA(E), MInstSCE

September 2015

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## 1.00 Object

- 1.01 The object of this Report is to present measurements of the acoustic performance of the D1xL70VDus15WS1 device.

## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

- (i) Directivity Index [dB], tabulated and graphical
- (ii) Effective octave and wide band (100Hz to 10kHz) impedance
- (iii) Sensitivity [dB @ 1m,1W]:  
Pink noise  
Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
- (viii) Frequency response chart
- (ix) Impedance bode plot
- (x) Polar response charts

### 3.00 Method

- 3.01 The device was mounted in Free Space as shown in figure 1 - Mounting Method E.
- 3.02 The measurements were made in an anechoic chamber.
- 3.03 Measurements were made as detailed in AMS Test Method document No. IR141/LS/Handbook v.1.
- 3.04 All measurements were made in general accordance with BS EN 60268: Part 5: 2003.
- 3.05 The test signal for all sound pressure level measurements was band limited Pink noise (100Hz to 10kHz) with a 6dB Crest factor.

### 4.00 Results

- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
- 4.02 Tabulated values of Directivity Index, Sensitivity, Acoustic Power, Apportioned Power, Impedance and Expected Maximum SPL are shown in the Summary data sheet.
- 4.03 The Directivity Index has been calculated from 412 data points around the directivity balloon.

### 5.00 Notes

- 5.01 Sensitivity  
The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.
- 5.02 Polar Plots  
For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

## 6.00 Engineers Notes & Observations

The reference point is located at the geometric centre of the enclosure and in line with the mounting bolts.

The reference axis was made normal to the horn mouth and includes the reference point.

The impedance does fall below 80% of the rated impedance within the frequency range 89Hz to 11.2kHz.

### Loudspeaker Information

Manufacturer : E2S Warning Signals  
Model Code : D1xL70VDus15WS1  
Type : Horn  
Colour : Red  
Serial No. : NM  
Batch No. : NA  
Other Markings : -  
Backbox : As supplied  
Grille : NA  
Weight (grams) : 4260  
Depth (mm) : 285  
Width (mm) : 182  
Height (mm) : 182  
Special Features : Explosion proof

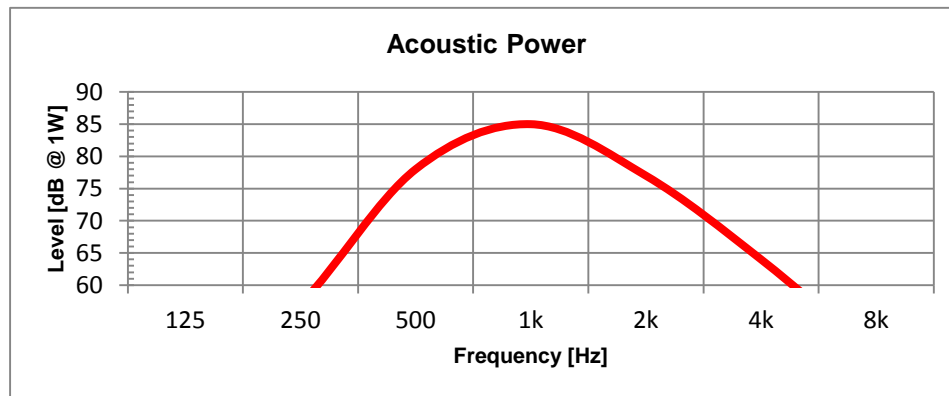
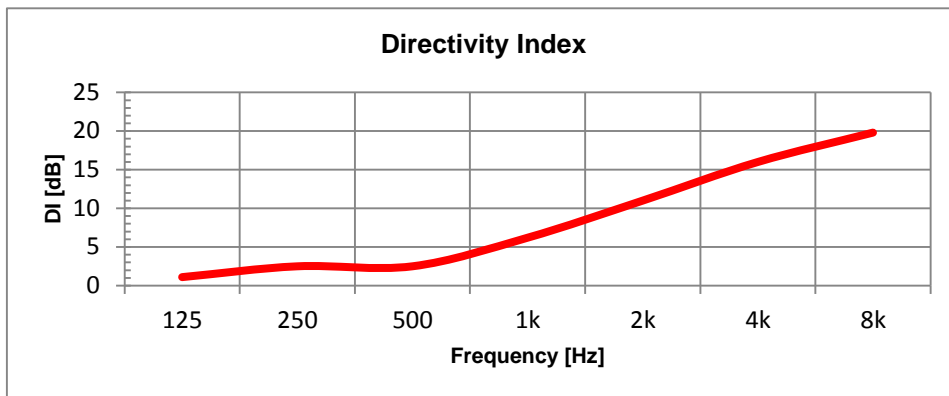
#### Internal Details

Driver Types/Sizes : NM  
Driver Serial No.(s) : NM  
Driver Markings : NM  
Damping Material : NA  
Available Tappings : 15W (70V)

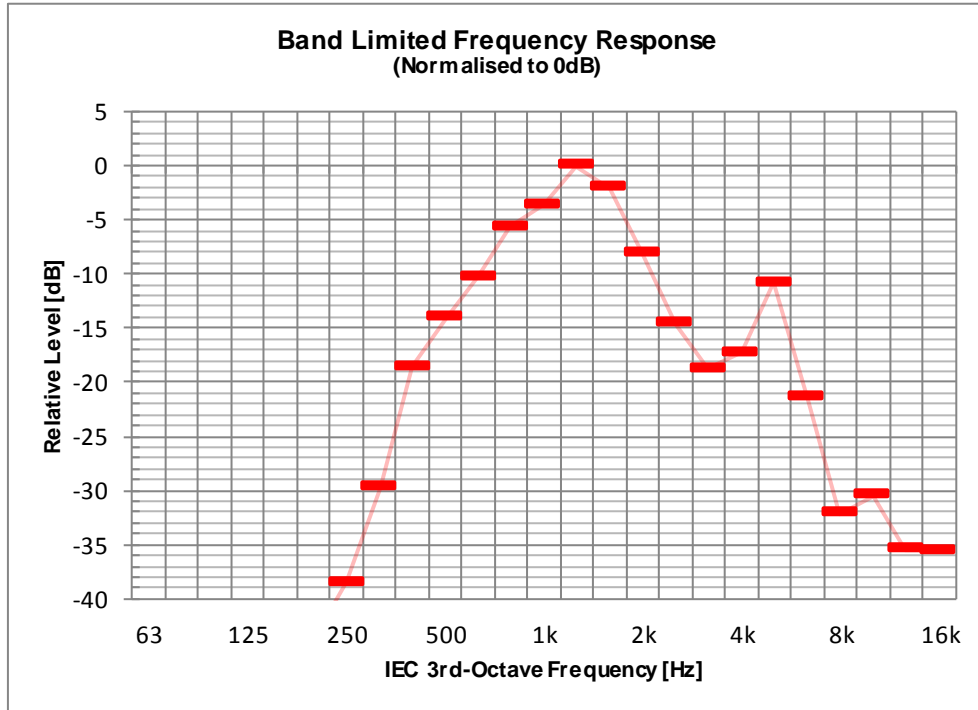
*NM = Not Measured, NA = Not Applicable*

Manufacturer : E2S Warning Signals  
 Model Code : D1xL70VDus15WS1  
 Mounting : Turntable  
 Measurement Distance [m] : 2.35  
 Test Voltage [V] : 39.30  
 Rated Noise Voltage [V] : 70.00  
 Rated Noise Power [W] : 15.00  
 Rated Impedance [Ohms] : 326.6  
 Minimum Impedance [Ohms] : 258.2 (79% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 351.2 (PF=0.778)  
 Effective Impedance (IEC Male) [Ohms] : 364.4 (PF=0.79)  
 Reference Axis Located at : 0 degrees

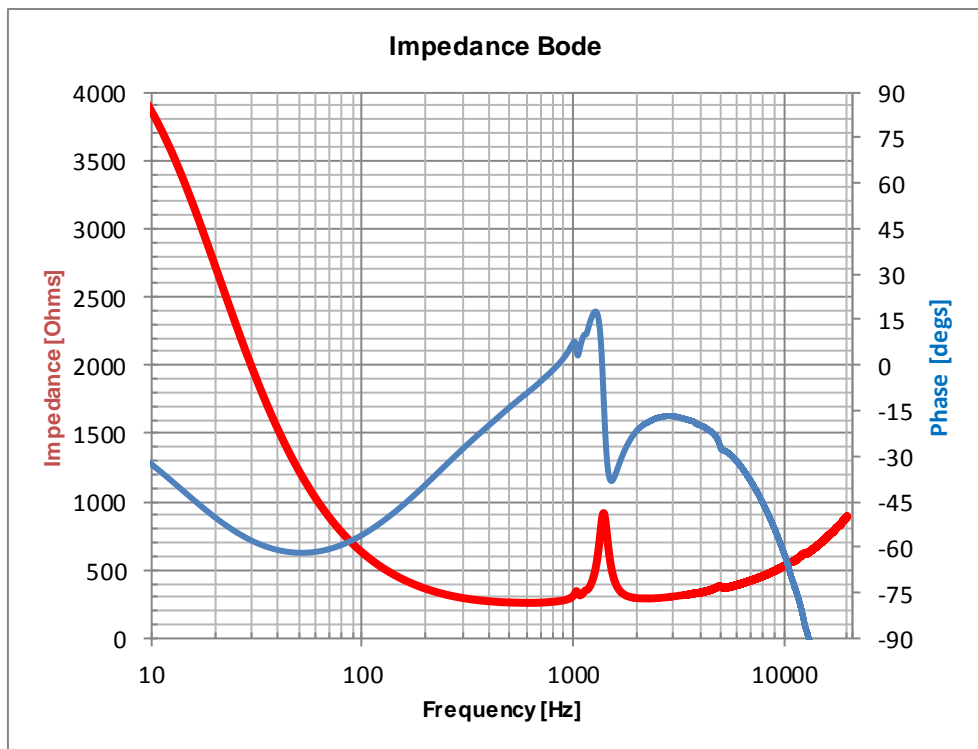
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	1.1	2.5	2.5	6.2	11.0	16.0	19.8		
Sensitivity [dB @ 1m,1W]	32	49	70	80	77	69	57	82	83
Sensitivity, IEC Male [dB @ 1m,1W]	37	54	70	75	65	51	34	77	76
Acoustic Power [dB-PWL @ 1W]	41	57	78	85	77	64	49		
Apportioned Power [%]	6	11	14	12	13	12	9		
Effective Impedance [Ohms]	507	321	264	329	329	336	452		
Oct' Sensitivity [dB @ 1m,1W/Oct]	41	59	79	90	87	78	67		
Expected Maximum SPL [dB @ 1m]	43	61	81	92	89	80	69	94	95



D1xL70VDus15WS1



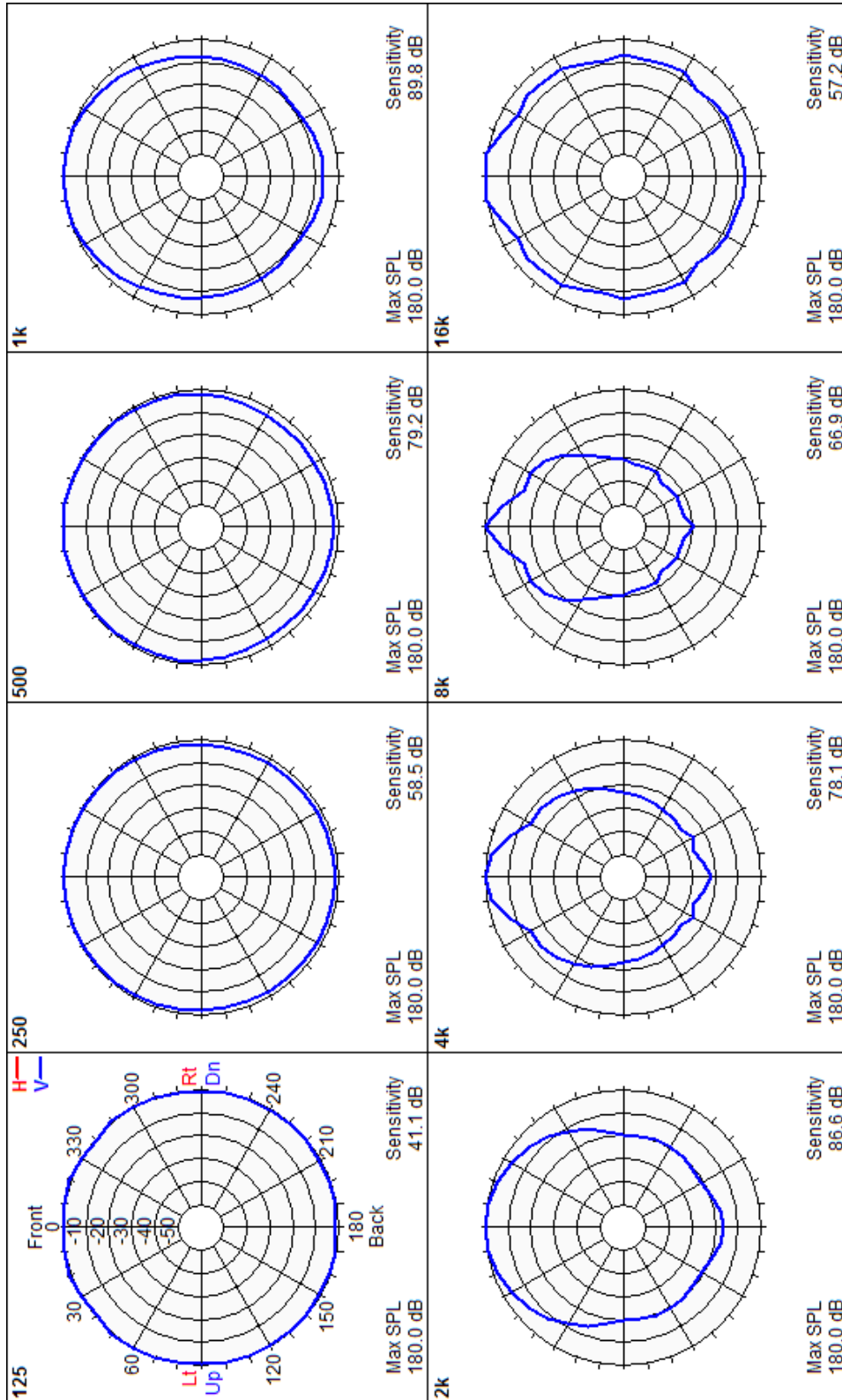
Test signal: Pink noise-6dBCF (100Hz-10kHz)



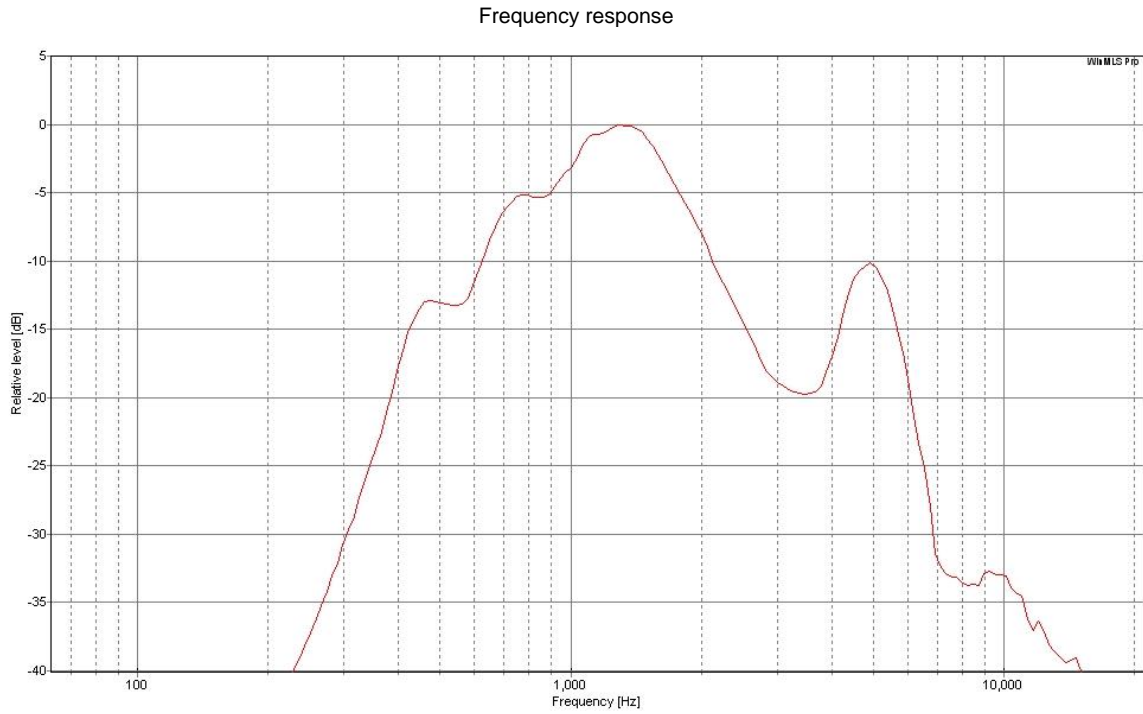
@ 15W

Test signal : Swept sine wave

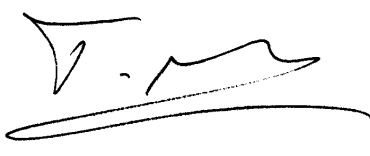
# D1xL70VDus15WS1




D1xL70VDus15WS1

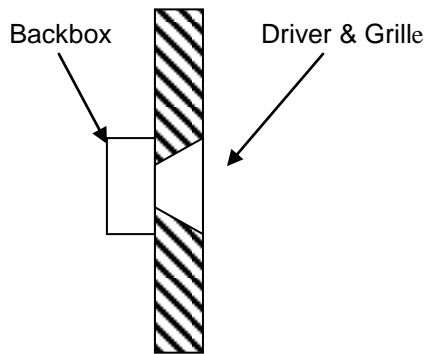


*Note:* The frequency response is derived using a Swept sine method.

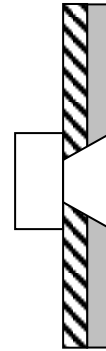
Signed: 

Countersigned: 

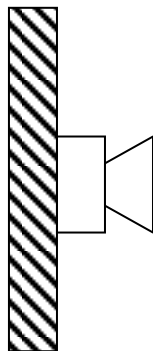
## Loudspeaker Mounting Methods



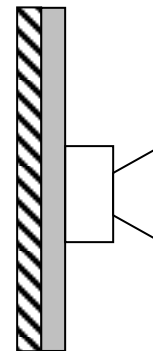
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



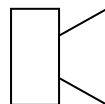
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1