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Production Test for Device

THOR Device

Serial Number: #07881

This device was tested according ISO 61672, ISO 60651 and the internal test specifications of the SINUS Messtechnik GmbH.

Date: 29-Nov-2018
Recommended Interval: 24 months
Next Production Test: Nov-2020

Operator:

Signature:

Kunze
.....

Summary

The results of the testing procedure can be found in the table below. Testing equipment:

Generator: DS360, Stanford Research Systems (serialnumber: 61374)
 calibration certificate (3612045) valid until: 10 Dec 2018

Software: testing program version is 1.20.22
 driver version is 6.0.48.808

All measured data can be ordered in MATLAB file format for an additional price.

The following Tests are done:

| Channel | <i>Apollo Firmware</i> | <i>Coupling</i> | <i>Frequency Response</i> | <i>Gain</i> | <i>Level Linearity</i> | <i>Inherent Noise</i> | <i>Phase Difference</i> | <i>THD</i> | <i>Third Octaves</i> |
|---------|------------------------|-----------------|---------------------------|-------------|------------------------|-----------------------|-------------------------|------------|----------------------|
| LEMO7_1 | passed | passed | passed | passed | passed | passed | passed | passed | passed |
| LEMO7_2 | passed | passed | passed | passed | passed | passed | passed | passed | passed |

The following pages only show the test results for channel 1. The results for the other channels are available from SINUS Messtechnik GmbH upon request.

Apollo Firmware Test passed!

| Part | ID | Serial Number |
|------------|---------|---------------|
| Digital | 161 | 230190 |
| AnalogBase | 257(ok) | 235203(ok) |
| Interface | 33(ok) | 232703(ok) |
| Connector | 1(ok) | 235664(ok) |
| Module | 258(ok) | 235757(ok) |

Coupling Test channel LEMO7_1 passed!Generator $V = 1V$

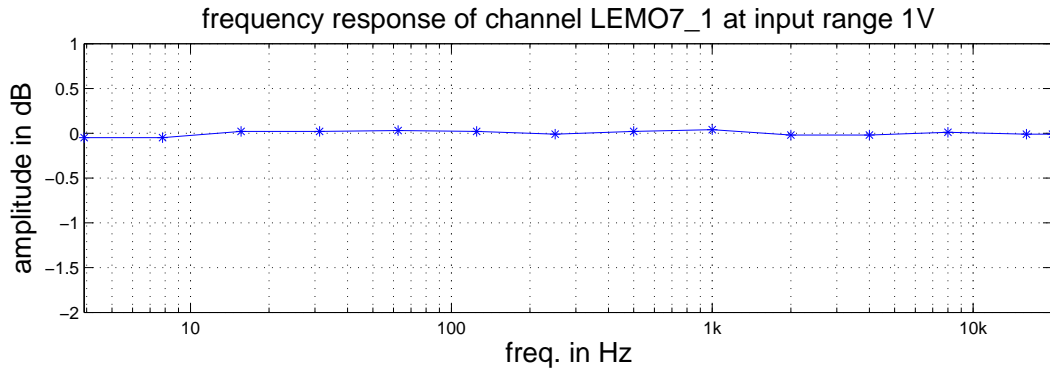
Gain Setting: 1

| Coupling | RMS Value (\bar{V}_{rms}) | Tol | MEAN Value (\bar{V}_{rms}) | Tol | Status |
|----------|-------------------------------|------|--------------------------------|---------------|--------|
| GND | 1.4403e-005(-97dBV) | <0.1 | -8.0934e-009(-162dBV) | abs<0.1 | ok |
| DC | None | | 0.50204(-6dBV) | <0.55 , >0.45 | ok |

Frequency Response Test channel LEMO7_1 passed!

Max. Tolerance is 0.2dB

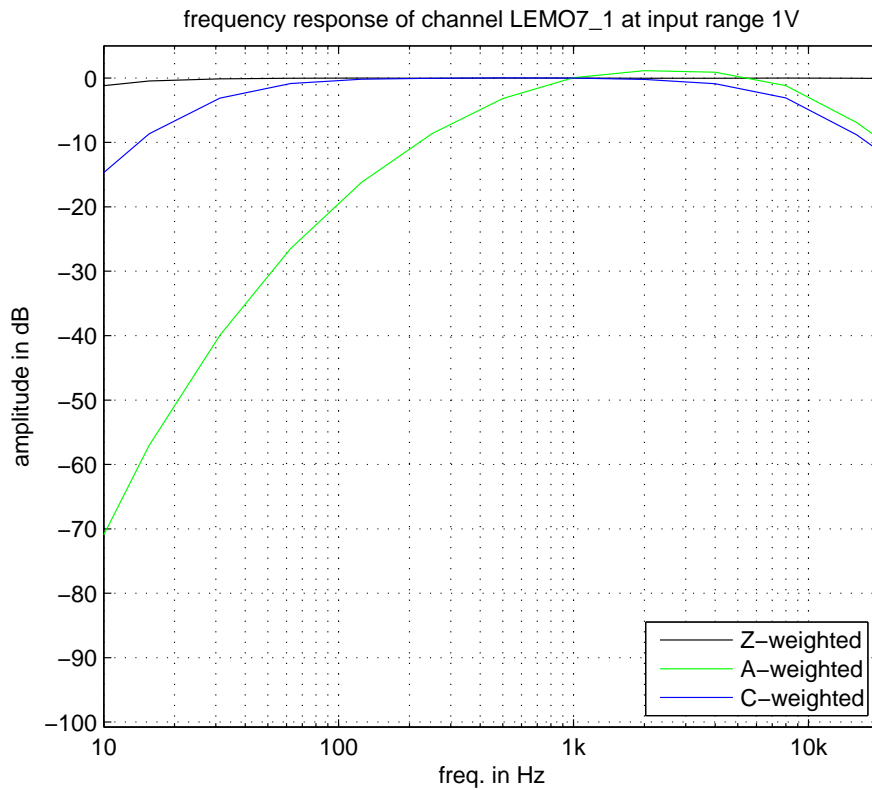
This test is done using DC coupling, 1V input range.



| | | | | | | | | | | | | | | |
|-----------------|--------|--------|-------|-------|-------|--------|--------|--------|---------|---------|---------|---------|----------|----------|
| frequency in Hz | 3.91 | 7.81 | 15.63 | 31.25 | 62.50 | 125.00 | 250.00 | 500.00 | 1000.00 | 2000.00 | 4000.00 | 8000.00 | 16000.00 | 20158.70 |
| amplitude in dB | -0.049 | -0.049 | 0.021 | 0.021 | 0.031 | 0.021 | -0.009 | 0.021 | 0.041 | -0.019 | -0.019 | 0.011 | -0.009 | -0.009 |

Frequency Response for Z, A and C-weighted sound levels (Test passed)

Tolerance according to EN 61672-1:2003 class 1 (checked frequency range is 10 Hz ... 20 kHz)



Gain Test channel LEMO7_1 passed!

Calibrated at 1V (Gain: 0dB).

| Gain (V) | (dB) | mean (%) | min (%) | max (%) | Tol. (%) | status |
|----------|------|----------|---------|---------|----------|--------|
| 10 | -20 | 0.0 | 0.0 | 0.0 | 0.3 | pass |
| 1 | 0 | 0.0 | 0.0 | 0.0 | 0.3 | pass |

Checking internal calibration value passed (deviance: -0.35% Tol.: 5.1%).

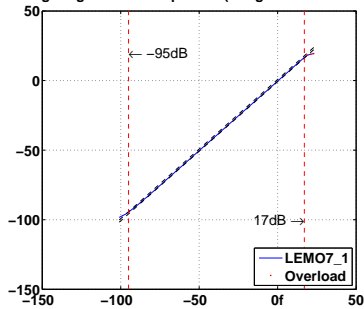
Level Linearity Test Normal Range channel LEMO7_1 passed!

Max. Tolerance is 0.8dB

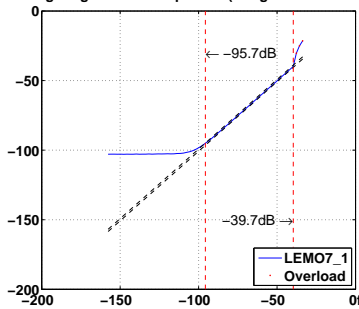
This test is done using AC coupling, 1Hz high pass switched on and ICP/200V off and in steps of 2dB

| Gain | Frequency | Z | | | A | | | C | | | | | |
|------|-----------|-------------|--------|--------|-------------|---------------|------|-------------|--------|---------------|-----|--------|----|
| | | Range in dB | Status | Tol. | Range in dB | Status | Tol. | Range in dB | Status | Tol. | | | |
| -20 | 15,849Hz | 17..-95 | 112 | passed | 85 | -39.7..-95.7 | 56 | passed | 34 | 8.5..-95.5 | 104 | passed | 80 |
| 0 | 15,849Hz | -3..-107 | 104 | passed | 85 | -59.7..-109.7 | 50 | passed | 34 | -11.5..-107.5 | 96 | passed | 80 |

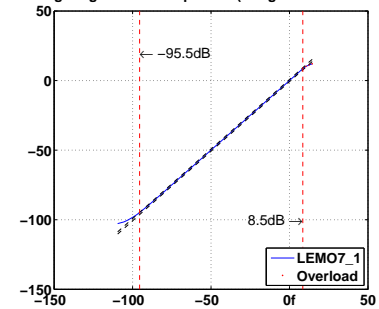
Level Linearity Test at 15.849Hz for Channel LEMO7_1
Z-weighting Gain -20dB passed (Range: 112dB Tol.: 85dB)



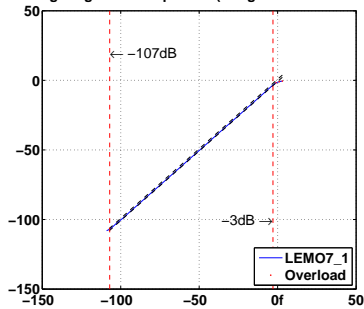
Level Linearity Test at 15.849Hz for Channel LEMO7_1
A-weighting Gain -20dB passed (Range: 56dB Tol.: 34dB)



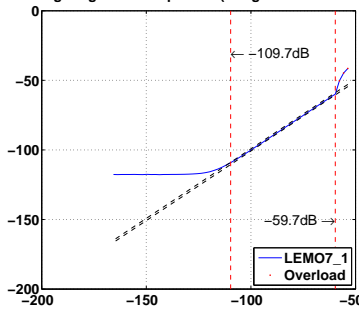
Level Linearity Test at 15.849Hz for Channel LEMO7_1
C-weighting Gain -20dB passed (Range: 104dB Tol.: 80dB)



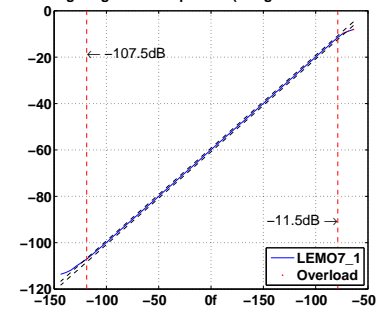
Level Linearity Test at 15.849Hz for Channel LEMO7_1
Z-weighting Gain 0dB passed (Range: 104dB Tol.: 85dB)



Level Linearity Test at 15.849Hz for Channel LEMO7_1
A-weighting Gain 0dB passed (Range: 50dB Tol.: 34dB)



Level Linearity Test at 15.849Hz for Channel LEMO7_1
C-weighting Gain 0dB passed (Range: 96dB Tol.: 80dB)



Inherent Noise Test channel LEMO7_1 passed!

Calibrated at 1V (Gain: 0dB).

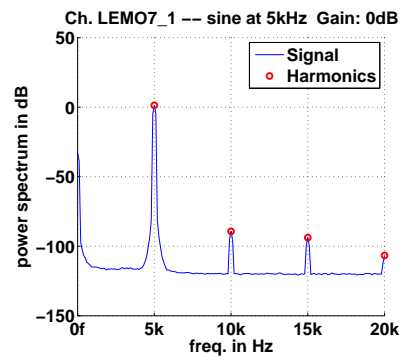
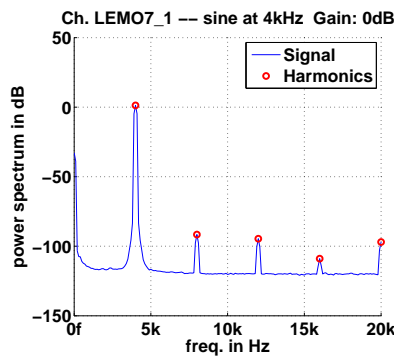
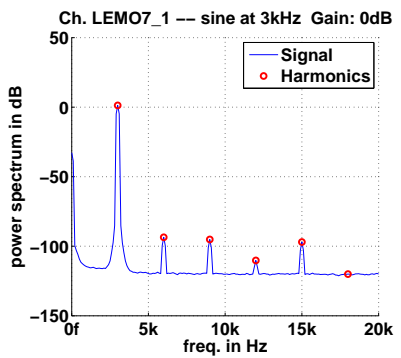
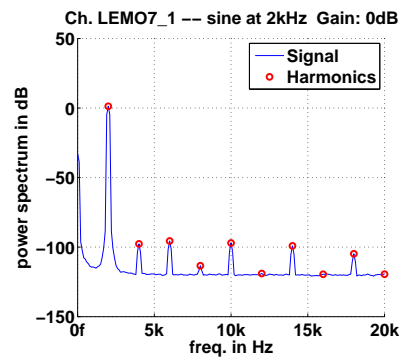
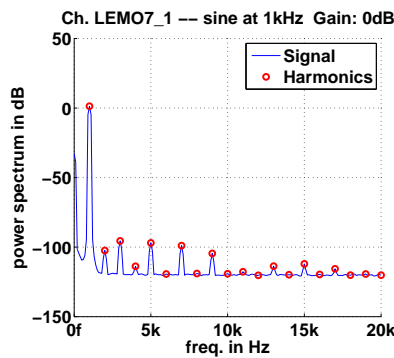
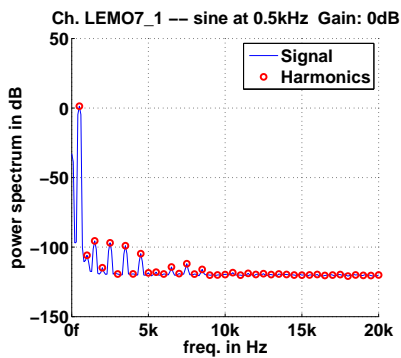
| Gain (dB) | time data (mV _{rms}) | Z (mV _{rms}) | A (mV _{rms}) | C (mV _{rms}) | Status |
|-----------|--------------------------------|------------------------|------------------------|------------------------|--------|
| -20 | 0.03642 (-89dBV) | 0.00796 (-102dBV) | 0.00516 (-106dBV) | 0.00621 (-104dBV) | pass |
| 0 | 0.00499 (-106dBV) | 0.00455 (-107dBV) | 0.00143 (-117dBV) | 0.00439 (-107dBV) | pass |

THD Test channel LEMO7_1 passed!

Max. THD Tolerance is -80dB
 Measured at Gain: 0dB

$$\text{definition: } THD = \frac{P_2 + P_3 + \dots + P_n}{P_1}$$

| Frequency (Hz) | THD (dB) | THD+N (dB) | Number of Harmonics | Status |
|----------------|----------|------------|---------------------|--------|
| 500.0 | -92.8 | -92.8 | 39 | pass |
| 1000.0 | -92.7 | -92.1 | 19 | pass |
| 2000.0 | -92.2 | -91.0 | 9 | pass |
| 3000.0 | -91.4 | -90.3 | 5 | pass |
| 4000.0 | -90.3 | -89.5 | 4 | pass |
| 5000.0 | -89.2 | -88.4 | 3 | pass |



Third Octave Test according ISO 61260 class 0 channel LEMO7_1 passed!

This test is done using DC coupling, 1Hz high pass switched off and ICP/200V off and amplitude 17dBV
 The following Third Octaves are tested according ISO 61260 class 0

Tolerances marked with * are interpolated, due to generator and device frequency tolerances!

| f_m in Hz | G^{-4} | G^{-3} | G^{-2} | G^{-1} | $G^{-\frac{1}{2}}$ | $G^{-\frac{1}{2}}$ | $G^{-\frac{3}{8}}$ | $G^{-\frac{1}{4}}$ | $G^{-\frac{1}{8}}$ | G^0 | $G^{\frac{1}{8}}$ | $G^{\frac{1}{4}}$ | $G^{\frac{3}{8}}$ | $G^{\frac{1}{2}}$ | $G^{\frac{1}{2}}$ | G^1 | G^2 | G^3 | G^4 |
|-------------|----------|----------|----------|----------|--------------------|--------------------|--------------------|--------------------|--------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|--------|--------|---------|---------|
| upper lim | -75 | -62 | -42.5 | -18 | -2.3 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | -2.3 | -18 | -42.5 | -62 | -75 |
| lower lim | -Inf | -Inf | -Inf | -Inf | -4.5 | -4.5 | -1.1 | -0.4 | -0.2 | -0.15 | -0.2 | -0.4 | -1.1 | -4.5 | -4.5 | -Inf | -Inf | -Inf | -Inf |
| 15.625 | -86.73 | -66.76 | -47.31 | -22.79 | -3.18 | -3.17 | -0.57 | -0.06 | -0.05 | 0 | -0.04 | -0.02 | -0.33 | -3.26 | -3.24 | -31.19 | -92.43 | -110.66 | -121.08 |
| 19.686 | -78.34 | -80.82 | -52.22 | -24.93 | -3.29 | -3.32 | -0.48 | -0.06 | -0.06 | -0.08 | -0.03 | -0.02 | -0.42 | -3.03 | -3.02 | -26.37 | -57.06 | -86.33 | -122.64 |
| 24.803 | -104.72 | -68.03 | -49.17 | -23.9 | -3.18 | -3.17 | -0.5 | -0.03 | -0.03 | -0.03 | -0.08 | -0.11 | -0.43 | -3.25 | -3.2 | -27.04 | -57.78 | -101.7 | -123.95 |
| 31.25 | -86.74 | -66.76 | -47.27 | -22.84 | -3.22 | -3.28 | -0.55 | -0.07 | -0.06 | -0.03 | -0.06 | -0.03 | -0.28 | -3.27 | -3.27 | -31.02 | -92.19 | -110.81 | -123.49 |
| 39.373 | -78.24 | -80.89 | -52.26 | -24.88 | -3.26 | -3.29 | -0.47 | -0.03 | -0.02 | 0.03 | -0.02 | -0.07 | -0.4 | -3.01 | -3.04 | -26.35 | -57.07 | -86.37 | -123.57 |
| 49.606 | -105.76 | -68.08 | -49.2 | -23.81 | -3.2 | -3.17 | -0.54 | -0.02 | -0.02 | -0.03 | 0.01 | -0.02 | -0.45 | -3.14 | -3.19 | -27.04 | -57.72 | -104.08 | -121.77 |
| 62.5 | -86.72 | -66.77 | -47.18 | -22.78 | -3.16 | -3.14 | -0.49 | -0.02 | 0.02 | -0.04 | 0.02 | -0.03 | -0.33 | -3.35 | -3.31 | -31.15 | -93.96 | -111.28 | -120.05 |
| 78.745 | -78.24 | -80.78 | -52.19 | -24.84 | -3.31 | -3.31 | -0.46 | -0.05 | -0.05 | -0.02 | -0.03 | -0.03 | -0.39 | -3.04 | -3.04 | -26.34 | -57.07 | -86.38 | -123.07 |
| 99.213 | -105.75 | -68.02 | -49.2 | -23.81 | -3.24 | -3.18 | -0.51 | -0.01 | -0.06 | -0.04 | 0 | -0.07 | -0.43 | -3.2 | -3.22 | -27.05 | -57.84 | -102.68 | -119.54 |
| 125 | -86.72 | -66.68 | -47.21 | -22.8 | -3.22 | -3.23 | -0.51 | -0.04 | 0.01 | -0.07 | -0.03 | 0 | -0.26 | -3.26 | -3.26 | -31.09 | -93.59 | -111.07 | -120.94 |
| 157.49 | -78.33 | -80.87 | -52.2 | -24.88 | -3.3 | -3.32 | -0.51 | -0.07 | -0.04 | 0.01 | -0.05 | -0.05 | -0.34 | -3.06 | -3.07 | -26.37 | -57.06 | -86.4 | -119.66 |
| 198.425 | -106.05 | -68.01 | -49.22 | -23.83 | -3.23 | -3.19 | -0.47 | -0.07 | -0.04 | -0.03 | -0.05 | -0.03 | -0.38 | -3.13 | -3.17 | -27.06 | -57.76 | -103.96 | -120.44 |
| 250 | -86.74 | -66.77 | -47.23 | -22.84 | -3.12 | -3.16 | -0.56 | 0.01 | -0.1 | -0.02 | -0.13 | -0.02 | -0.37 | -3.29 | -3.28 | -31.07 | -94.98 | -111.24 | -120.38 |
| 314.98 | -78.33 | -80.9 | -52.26 | -24.95 | -3.35 | -3.33 | -0.48 | -0.11 | -0.07 | -0.05 | -0.07 | -0.03 | -0.38 | -3.08 | -3.08 | -26.36 | -57.05 | -86.39 | -119.33 |
| 396.85 | -106.22 | -68.11 | -49.18 | -23.86 | -3.19 | -3.17 | -0.5 | 0.01 | 0 | -0.03 | 0 | -0.03 | -0.41 | -3.16 | -3.19 | -27.02 | -57.74 | -103.52 | -122.14 |
| 500 | -86.76 | -66.72 | -47.2 | -22.8 | -3.16 | -3.2 | -0.5 | -0.02 | 0 | -0.03 | -0.03 | 0 | -0.3 | -3.27 | -3.24 | -31.05 | -94.6 | -111.16 | -119.99 |
| 629.961 | -78.36 | -80.91 | -52.25 | -24.88 | -3.26 | -3.25 | -0.48 | -0.04 | 0.01 | -0.02 | -0.06 | -0.07 | -0.39 | -3.07 | -3.07 | -26.32 | -57.03 | -86.37 | -118.89 |
| 793.701 | -106.26 | -68.06 | -49.18 | -23.81 | -3.23 | -3.24 | -0.5 | -0.06 | -0.05 | -0.02 | 0 | -0.04 | -0.4 | -3.19 | -3.21 | -27 | -57.79 | -103.14 | -119.34 |
| 1000 | -86.79 | -66.73 | -47.25 | -22.79 | -3.21 | -3.21 | -0.56 | -0.01 | -0.03 | -0.01 | -0.02 | -0.01 | -0.36 | -3.32 | -3.32 | -31.11 | -92.92 | -110.77 | -118.4 |
| 1259.921 | -78.28 | -80.84 | -52.19 | -24.86 | -3.32 | -3.31 | -0.53 | -0.06 | -0.02 | -0.04 | -0.04 | -0.05 | -0.4 | -3.1 | -3.09 | -26.35 | -57.09 | -86.44 | -118.51 |
| 1587.401 | -106.16 | -68.01 | -49.16 | -23.86 | -3.23 | -3.24 | -0.54 | -0.09 | -0.06 | -0.04 | -0.05 | -0.06 | -0.4 | -3.19 | -3.2 | -27.06 | -57.82 | -102.36 | -116.28 |
| 2000 | -86.71 | -66.71 | -47.27 | -22.8 | -3.2 | -3.2 | -0.59 | -0.08 | -0.07 | -0.06 | -0.03 | -0.04 | -0.3 | -3.29 | -3.28 | -31.19 | -93.72 | -110.39 | -116.96 |
| 2519.842 | -78.26 | -80.89 | -52.22 | -24.92 | -3.29 | -3.28 | -0.52 | -0.11 | -0.07 | -0.07 | -0.09 | -0.07 | -0.45 | -3.11 | -3.11 | -26.36 | -57.09 | -86.37 | -114.44 |
| 3174.802 | -106.04 | -68.06 | -49.22 | -23.88 | -3.25 | -3.24 | -0.55 | -0.13 | -0.07 | -0.05 | -0.08 | -0.05 | -0.4 | -3.23 | -3.22 | -27.06 | -57.8 | -102.19 | -113.31 |
| 4000 | -86.74 | -66.76 | -47.29 | -22.82 | -3.21 | -3.22 | -0.53 | -0.06 | -0.03 | -0.06 | -0.06 | -0.08 | -0.33 | -3.29 | -3.29 | -31.12 | -93.18 | -108.53 | -112.39 |
| 5039.684 | -78.32 | -80.9 | -52.23 | -24.92 | -3.3 | -3.29 | -0.53 | -0.05 | -0.03 | -0.04 | -0.05 | -0.08 | -0.42 | -3.07 | -3.07 | -26.37 | -57.06 | -86.35 | -108.74 |
| 6349.604 | -105.48 | -68.07 | -49.22 | -23.85 | -3.2 | -3.2 | -0.55 | -0.07 | -0.02 | -0.05 | -0.07 | -0.06 | -0.43 | -3.21 | -3.22 | -27.03 | -57.79 | -101.84 | -109.92 |
| 8000 | -86.74 | -66.76 | -47.24 | -22.82 | -3.21 | -3.21 | -0.54 | -0.07 | -0.03 | -0.03 | -0.05 | -0.06 | -0.32 | -3.33 | -3.33 | -31.12 | -93.12 | -105.12 | -109.21 |
| 10079.368 | -78.31 | -80.75 | -52.23 | -24.89 | -3.34 | -3.34 | -0.51 | -0.06 | -0.06 | -0.02 | -0.04 | -0.04 | -0.43 | -3.08 | -3.08 | -26.39 | -57.08 | -86.35 | -106.59 |
| 12699.208 | -103.63 | -68.07 | -49.19 | -23.83 | -3.22 | -3.22 | -0.57 | -0.08 | -0.05 | -0.08 | -0.04 | -0.07 | -0.42 | -3.22 | -3.22 | -27.05 | -57.83 | -100.77 | -105.95 |
| 16000 | -86.72 | -66.72 | -47.23 | -22.85 | -3.21 | -3.22 | -0.56 | -0.1 | -0.05 | -0.05 | -0.08 | -0.05 | -0.33 | -3.3 | -3.31 | -31.15 | -92.82 | -102.43 | -105.18 |
| 20158.737 | -78.27 | -80.31 | -52.26 | -24.91 | -3.31 | -3.31 | -0.53 | -0.07 | -0.07 | -0.06 | -0.05 | -0.09 | -0.41 | -3.08 | -3.08 | -26.41 | -57.09 | -86.31 | -99.78 |
| 25398.417 | -99.8 | -68.06 | -49.21 | -23.87 | -3.21 | -3.21 | -0.55 | -0.11 | -0.08 | -0.1 | -0.09 | -0.1 | -0.49 | -3.25 | -3.25 | -27.06 | -57.83 | -98.11 | -98.69 |
| 32000 | -86.62 | -66.69 | -47.26 | -22.86 | -3.24 | -3.24 | -0.6 | -0.14 | -0.06 | -0.06 | -0.08 | -0.05 | -0.33 | -3.32 | -3.32 | -31.15 | -92.08 | -95.48 | -96.77 |
| 40317.474 | -78.24 | -78.68 | -52.28 | -24.92 | -3.32 | -3.32 | -0.5 | -0.09 | -0.03 | -0.06 | -0.06 | -0.1 | -0.42 | -3.09 | -3.09 | -26.36 | -57.09 | -85.91 | -95.55 |
| 50796.834 | -94.64 | -67.9 | -49.22 | -23.87 | -3.22 | -3.22 | -0.56 | -0.07 | -0.07 | -0.05 | -0.06 | -0.09 | -0.44 | -3.21 | -3.21 | -27.06 | -57.8 | -79.68 | -93.87 |
| 64000 | -86.17 | -66.51 | -47.27 | -22.82 | -3.2 | -3.21 | -0.59 | -0.07 | -0.05 | -0.06 | -0.07 | -0.06 | -0.36 | -3.31 | -3.31 | -31.13 | -70.39 | -92.29 | -90.38 |
| 80634.947 | -81.51 | -69.4 | -46.46 | -20.48 | -3.06 | -3.06 | -0.77 | -0.16 | -0.05 | -0.07 | -0.06 | -0.09 | -0.42 | -3.22 | -3.22 | -84.06 | -86.17 | -86.67 | -85.01 |

Coupling Test channel LEMO7_2 passed!Generator $V = 1V$

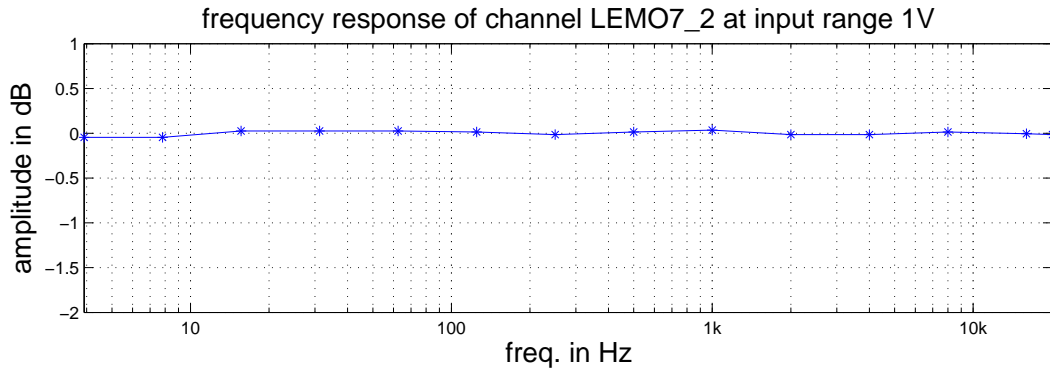
Gain Setting: 1

| Coupling | RMS Value (V_{rms}) | Tol | MEAN Value (V_{rms}) | Tol | Status |
|----------|-------------------------|------|--------------------------|---------------|--------|
| GND | 1.7898e-005(-95dBV) | <0.1 | -1.0679e-008(-159dBV) | abs<0.1 | ok |
| DC | None | | 0.5023(-6dBV) | <0.55 , >0.45 | ok |

Frequency Response Test channel LEMO7_2 passed!

Max. Tolerance is 0.2dB

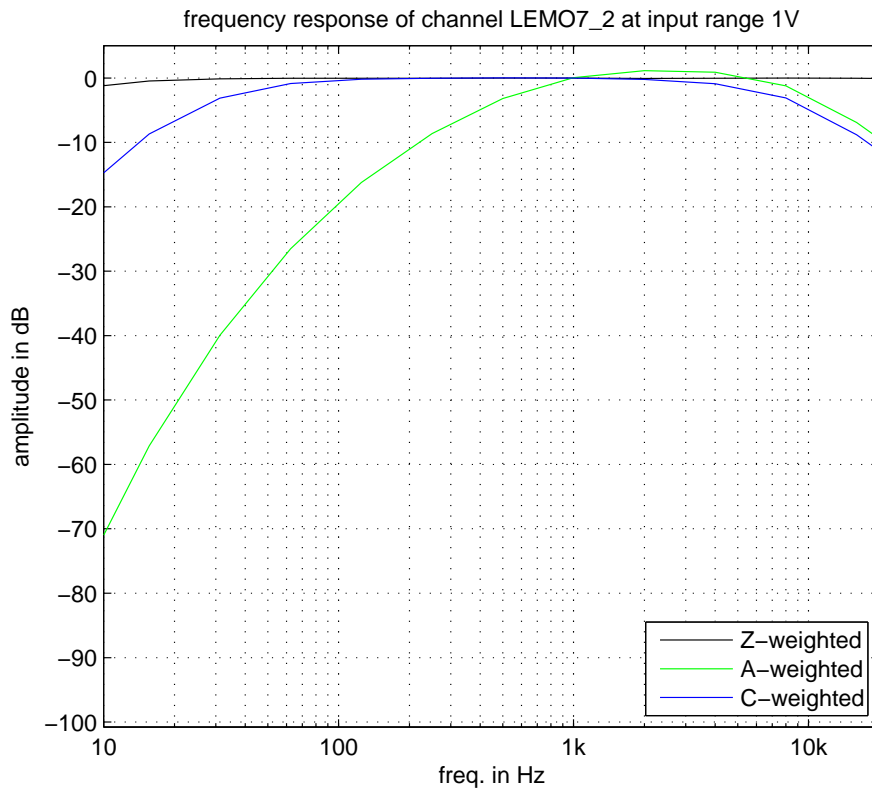
This test is done using DC coupling, 1V input range.



| | | | | | | | | | | | | | | |
|-----------------|--------|--------|-------|-------|-------|--------|--------|--------|---------|---------|---------|---------|----------|----------|
| frequency in Hz | 3.91 | 7.81 | 15.63 | 31.25 | 62.50 | 125.00 | 250.00 | 500.00 | 1000.00 | 2000.00 | 4000.00 | 8000.00 | 16000.00 | 20158.70 |
| amplitude in dB | -0.045 | -0.045 | 0.025 | 0.025 | 0.025 | 0.015 | -0.015 | 0.015 | 0.035 | -0.015 | -0.015 | 0.015 | -0.005 | -0.015 |

Frequency Response for Z, A and C-weighted sound levels (Test passed)

Tolerance according to EN 61672-1:2003 class 1 (checked frequency range is 10 Hz ... 20 kHz)



Gain Test channel LEMO7_2 passed!

Calibrated at 1V (Gain: 0dB).

| Gain (V) | (dB) | mean (%) | min (%) | max (%) | Tol. (%) | status |
|----------|------|----------|---------|---------|----------|--------|
| 10 | -20 | 0.0 | 0.0 | 0.0 | 0.3 | pass |
| 1 | 0 | 0.0 | 0.0 | 0.0 | 0.3 | pass |

Checking internal calibration value passed (deviance: -0.53% Tol.: 5.1%).

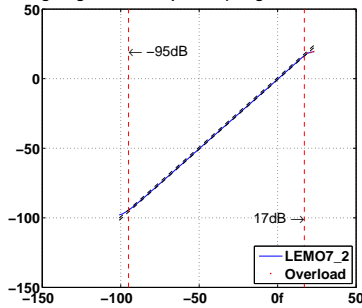
Level Linearity Test Normal Range channel LEMO7_2 passed!

Max. Tolerance is 0.8dB

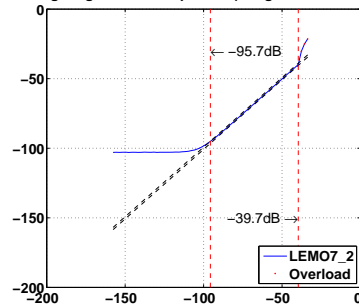
This test is done using AC coupling, 1Hz high pass switched on and ICP/200V off and in steps of 2dB

| Gain | Frequency | Z | | | A | | | C | | | | | |
|------|-----------|-------------|--------|--------|-------------|---------------|------|-------------|--------|---------------|-----|--------|----|
| | | Range in dB | Status | Tol. | Range in dB | Status | Tol. | Range in dB | Status | Tol. | | | |
| -20 | 15,849Hz | 17..-95 | 112 | passed | 85 | -39.7..-95.7 | 56 | passed | 34 | 8.5..-95.5 | 104 | passed | 80 |
| 0 | 15,849Hz | -3..-109 | 106 | passed | 85 | -59.7..-109.7 | 50 | passed | 34 | -11.5..-109.5 | 98 | passed | 80 |

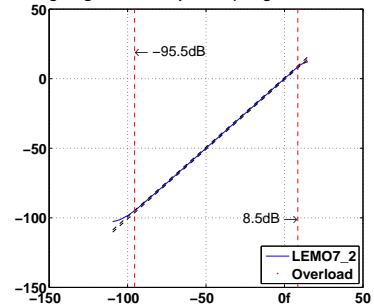
Level Linearity Test at 15.849Hz for Channel LEMO7_2
Z-weighting Gain -20dB passed (Range: 112dB Tol.: 85dB)



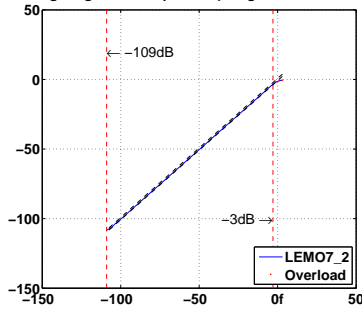
Level Linearity Test at 15.849Hz for Channel LEMO7_2
A-weighting Gain -20dB passed (Range: 56dB Tol.: 34dB)



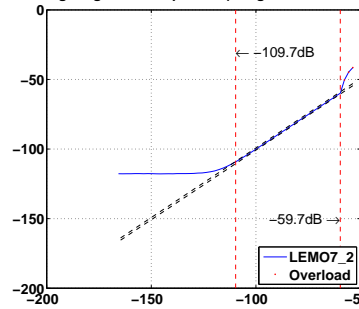
Level Linearity Test at 15.849Hz for Channel LEMO7_2
C-weighting Gain -20dB passed (Range: 104dB Tol.: 80dB)



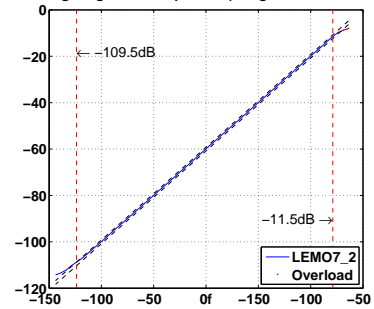
Level Linearity Test at 15.849Hz for Channel LEMO7_2
Z-weighting Gain 0dB passed (Range: 106dB Tol.: 85dB)



Level Linearity Test at 15.849Hz for Channel LEMO7_2
A-weighting Gain 0dB passed (Range: 50dB Tol.: 34dB)



Level Linearity Test at 15.849Hz for Channel LEMO7_2
C-weighting Gain 0dB passed (Range: 98dB Tol.: 80dB)



Inherent Noise Test channel LEMO7_2 passed!

Calibrated at 1V (Gain: 0dB).

| Gain (dB) | time data (mV _{rms}) | Z (mV _{rms}) | A (mV _{rms}) | C (mV _{rms}) | Status |
|-----------|--------------------------------|------------------------|------------------------|------------------------|--------|
| -20 | 0.03898 (-88dBV) | 0.00805 (-102dBV) | 0.00521 (-106dBV) | 0.00635 (-104dBV) | pass |
| 0 | 0.00513 (-106dBV) | 0.00452 (-107dBV) | 0.00143 (-117dBV) | 0.00436 (-107dBV) | pass |

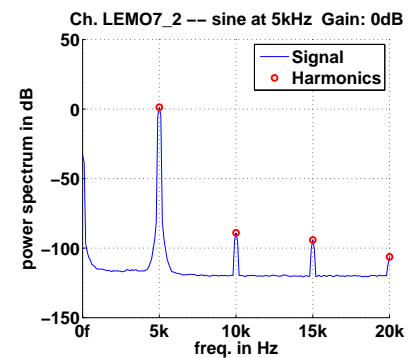
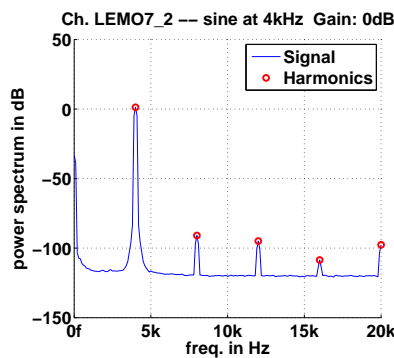
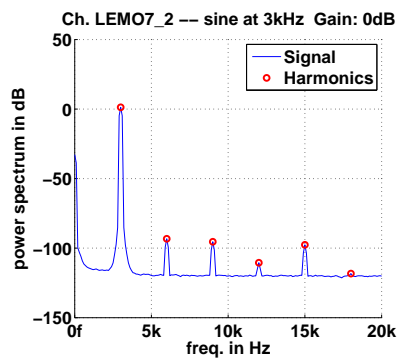
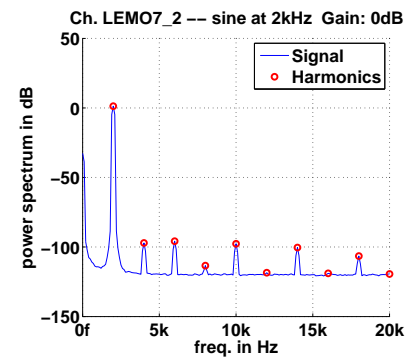
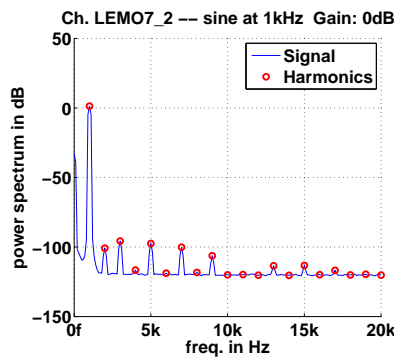
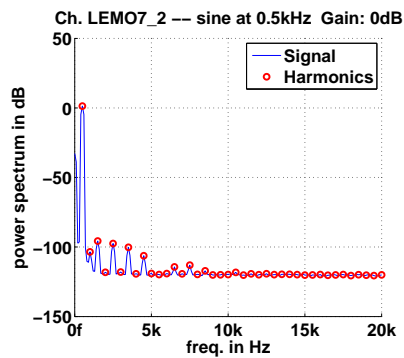
THD Test channel LEMO7_2 passed!

Max. THD Tolerance is -80dB

Measured at Gain: 0dB

$$\text{definition: } THD = \frac{P_2 + P_3 + \dots + P_n}{P_1}$$

| Frequency (Hz) | THD (dB) | THD+N (dB) | Number of Harmonics | Status |
|----------------|----------|------------|---------------------|--------|
| 500.0 | -93.2 | -93.2 | 39 | pass |
| 1000.0 | -93.1 | -92.4 | 19 | pass |
| 2000.0 | -92.5 | -91.3 | 9 | pass |
| 3000.0 | -91.5 | -90.4 | 5 | pass |
| 4000.0 | -90.1 | -89.3 | 4 | pass |
| 5000.0 | -89.1 | -88.3 | 3 | pass |



Third Octave Test according ISO 61260 class 0 channel LEMO7_2 passed!

This test is done using DC coupling, 1Hz high pass switched off and ICP/200V off and amplitude 17dBV
 The following Third Octaves are tested according ISO 61260 class 0

Tolerances marked with * are interpolated, due to generator and device frequency tolerances!

| f_m in Hz | G^{-4} | G^{-3} | G^{-2} | G^{-1} | $G^{-\frac{1}{2}}$ | $G^{-\frac{1}{2}}$ | $G^{-\frac{3}{8}}$ | $G^{-\frac{1}{4}}$ | $G^{-\frac{1}{8}}$ | G^0 | $G^{\frac{1}{8}}$ | $G^{\frac{1}{4}}$ | $G^{\frac{3}{8}}$ | $G^{\frac{1}{2}}$ | $G^{\frac{1}{2}}$ | G^1 | G^2 | G^3 | G^4 |
|-------------|----------|----------|----------|----------|--------------------|--------------------|--------------------|--------------------|--------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|--------|--------|---------|---------|
| upper lim | -75 | -62 | -42.5 | -18 | -2.3 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | -2.3 | -18 | -42.5 | -62 | -75 |
| lower lim | -Inf | -Inf | -Inf | -Inf | -4.5 | -4.5 | -1.1 | -0.4 | -0.2 | -0.15 | -0.2 | -0.4 | -1.1 | -4.5 | -4.5 | -Inf | -Inf | -Inf | -Inf |
| 15.625 | -86.74 | -66.76 | -47.31 | -22.79 | -3.18 | -3.17 | -0.57 | -0.06 | -0.05 | 0 | -0.04 | -0.02 | -0.33 | -3.26 | -3.24 | -31.19 | -92.42 | -111.02 | -121.31 |
| 19.686 | -78.34 | -80.81 | -52.22 | -24.93 | -3.29 | -3.32 | -0.48 | -0.06 | -0.06 | -0.08 | -0.03 | -0.02 | -0.42 | -3.03 | -3.02 | -26.37 | -57.06 | -86.33 | -122.86 |
| 24.803 | -105.09 | -68.02 | -49.17 | -23.9 | -3.18 | -3.17 | -0.5 | -0.03 | -0.03 | -0.03 | -0.08 | -0.11 | -0.43 | -3.25 | -3.2 | -27.04 | -57.78 | -101.69 | -123.55 |
| 31.25 | -86.74 | -66.76 | -47.27 | -22.84 | -3.22 | -3.28 | -0.55 | -0.07 | -0.06 | -0.03 | -0.06 | -0.03 | -0.28 | -3.27 | -3.27 | -31.02 | -92.19 | -110.78 | -123.42 |
| 39.373 | -78.24 | -80.89 | -52.26 | -24.88 | -3.26 | -3.29 | -0.47 | -0.03 | -0.02 | 0.03 | -0.02 | -0.07 | -0.4 | -3.01 | -3.04 | -26.35 | -57.07 | -86.37 | -123.16 |
| 49.606 | -106.12 | -68.08 | -49.2 | -23.81 | -3.2 | -3.17 | -0.54 | -0.02 | -0.02 | -0.03 | 0.01 | -0.02 | -0.45 | -3.14 | -3.19 | -27.04 | -57.72 | -104.08 | -122.18 |
| 62.5 | -86.72 | -66.77 | -47.18 | -22.78 | -3.16 | -3.14 | -0.49 | -0.02 | 0.02 | -0.04 | 0.02 | -0.03 | -0.33 | -3.35 | -3.31 | -31.15 | -93.96 | -111.28 | -120.48 |
| 78.745 | -78.24 | -80.78 | -52.19 | -24.84 | -3.31 | -3.31 | -0.46 | -0.05 | -0.05 | -0.02 | -0.03 | -0.03 | -0.39 | -3.04 | -3.04 | -26.34 | -57.07 | -86.38 | -123.17 |
| 99.213 | -106.06 | -68.02 | -49.2 | -23.81 | -3.24 | -3.18 | -0.51 | -0.01 | -0.06 | -0.04 | 0 | -0.07 | -0.43 | -3.21 | -3.22 | -27.05 | -57.84 | -102.68 | -119.2 |
| 125 | -86.73 | -66.68 | -47.21 | -22.8 | -3.22 | -3.23 | -0.51 | -0.04 | 0.01 | -0.07 | -0.03 | 0 | -0.26 | -3.27 | -3.27 | -31.09 | -93.59 | -111.03 | -121.01 |
| 157.49 | -78.33 | -80.87 | -52.2 | -24.88 | -3.3 | -3.32 | -0.51 | -0.07 | -0.04 | 0.01 | -0.05 | -0.05 | -0.34 | -3.06 | -3.07 | -26.37 | -57.06 | -86.4 | -119.77 |
| 198.425 | -106.36 | -68.01 | -49.22 | -23.83 | -3.23 | -3.19 | -0.47 | -0.07 | -0.04 | -0.03 | -0.05 | -0.03 | -0.38 | -3.13 | -3.17 | -27.06 | -57.76 | -103.97 | -120.69 |
| 250 | -86.74 | -66.77 | -47.23 | -22.84 | -3.12 | -3.16 | -0.56 | 0.01 | -0.1 | -0.02 | -0.13 | -0.02 | -0.37 | -3.29 | -3.29 | -31.07 | -94.98 | -111.31 | -120.38 |
| 314.98 | -78.33 | -80.9 | -52.26 | -24.95 | -3.35 | -3.33 | -0.48 | -0.11 | -0.07 | -0.05 | -0.07 | -0.03 | -0.38 | -3.08 | -3.08 | -26.36 | -57.05 | -86.39 | -119.11 |
| 396.85 | -106.5 | -68.11 | -49.18 | -23.86 | -3.19 | -3.17 | -0.5 | 0.01 | 0 | -0.03 | -0.01 | -0.03 | -0.41 | -3.16 | -3.19 | -27.02 | -57.74 | -103.52 | -122.18 |
| 500 | -86.76 | -66.72 | -47.2 | -22.8 | -3.16 | -3.2 | -0.5 | -0.02 | 0 | -0.03 | -0.03 | 0 | -0.3 | -3.27 | -3.24 | -31.05 | -94.6 | -111.14 | -120.43 |
| 629.961 | -78.36 | -80.91 | -52.25 | -24.88 | -3.26 | -3.25 | -0.48 | -0.04 | 0 | -0.02 | -0.06 | -0.07 | -0.39 | -3.07 | -3.07 | -26.32 | -57.03 | -86.37 | -119.11 |
| 793.701 | -106.55 | -68.06 | -49.18 | -23.81 | -3.23 | -3.24 | -0.5 | -0.06 | -0.05 | -0.02 | 0 | -0.04 | -0.4 | -3.19 | -3.21 | -27 | -57.79 | -103.14 | -119.12 |
| 1000 | -86.79 | -66.73 | -47.25 | -22.79 | -3.21 | -3.21 | -0.56 | -0.01 | -0.03 | -0.01 | -0.02 | -0.01 | -0.36 | -3.32 | -3.32 | -31.11 | -92.93 | -110.82 | -118.7 |
| 1259.921 | -78.28 | -80.84 | -52.19 | -24.86 | -3.32 | -3.31 | -0.53 | -0.06 | -0.02 | -0.04 | -0.04 | -0.05 | -0.4 | -3.1 | -3.09 | -26.35 | -57.09 | -86.44 | -118.16 |
| 1587.401 | -106.44 | -68.01 | -49.16 | -23.86 | -3.23 | -3.24 | -0.54 | -0.09 | -0.06 | -0.04 | -0.05 | -0.06 | -0.4 | -3.19 | -3.2 | -27.06 | -57.82 | -102.36 | -116.18 |
| 2000 | -86.71 | -66.71 | -47.27 | -22.8 | -3.2 | -3.2 | -0.59 | -0.08 | -0.07 | -0.06 | -0.03 | -0.04 | -0.3 | -3.29 | -3.28 | -31.19 | -93.71 | -110.38 | -116.68 |
| 2519.842 | -78.26 | -80.89 | -52.22 | -24.92 | -3.29 | -3.28 | -0.52 | -0.11 | -0.07 | -0.07 | -0.09 | -0.07 | -0.45 | -3.11 | -3.11 | -26.36 | -57.09 | -86.37 | -113.94 |
| 3174.802 | -106.29 | -68.06 | -49.22 | -23.88 | -3.25 | -3.24 | -0.55 | -0.13 | -0.07 | -0.05 | -0.08 | -0.05 | -0.4 | -3.23 | -3.22 | -27.06 | -57.8 | -102.18 | -113.42 |
| 4000 | -86.74 | -66.76 | -47.29 | -22.82 | -3.21 | -3.22 | -0.53 | -0.06 | -0.03 | -0.06 | -0.06 | -0.08 | -0.33 | -3.29 | -3.29 | -31.12 | -93.17 | -108.57 | -112.39 |
| 5039.684 | -78.32 | -80.9 | -52.23 | -24.92 | -3.3 | -3.29 | -0.53 | -0.05 | -0.03 | -0.04 | -0.05 | -0.08 | -0.43 | -3.07 | -3.07 | -26.37 | -57.06 | -86.35 | -108.84 |
| 6349.604 | -105.73 | -68.07 | -49.22 | -23.85 | -3.2 | -3.2 | -0.55 | -0.06 | -0.02 | -0.05 | -0.07 | -0.06 | -0.43 | -3.21 | -3.22 | -27.03 | -57.79 | -101.84 | -110 |
| 8000 | -86.74 | -66.76 | -47.24 | -22.82 | -3.21 | -3.21 | -0.54 | -0.07 | -0.03 | -0.03 | -0.05 | -0.06 | -0.32 | -3.33 | -3.33 | -31.12 | -93.12 | -105.12 | -109.08 |
| 10079.368 | -78.31 | -80.77 | -52.23 | -24.89 | -3.34 | -3.34 | -0.51 | -0.06 | -0.06 | -0.02 | -0.04 | -0.04 | -0.43 | -3.08 | -3.08 | -26.39 | -57.08 | -86.36 | -106.71 |
| 12699.208 | -103.84 | -68.07 | -49.19 | -23.83 | -3.22 | -3.22 | -0.57 | -0.08 | -0.05 | -0.08 | -0.04 | -0.07 | -0.42 | -3.22 | -3.22 | -27.05 | -57.83 | -100.8 | -106.03 |
| 16000 | -86.73 | -66.72 | -47.23 | -22.85 | -3.21 | -3.22 | -0.56 | -0.1 | -0.05 | -0.05 | -0.08 | -0.05 | -0.33 | -3.3 | -3.31 | -31.15 | -92.81 | -102.38 | -105.12 |
| 20158.737 | -78.27 | -80.36 | -52.26 | -24.91 | -3.31 | -3.31 | -0.53 | -0.07 | -0.07 | -0.06 | -0.05 | -0.09 | -0.41 | -3.08 | -3.08 | -26.41 | -57.09 | -86.32 | -99.82 |
| 25398.417 | -99.93 | -68.06 | -49.21 | -23.87 | -3.21 | -3.21 | -0.55 | -0.11 | -0.08 | -0.1 | -0.09 | -0.1 | -0.49 | -3.25 | -3.25 | -27.06 | -57.83 | -98.1 | -98.74 |
| 32000 | -86.63 | -66.7 | -47.27 | -22.86 | -3.24 | -3.24 | -0.6 | -0.14 | -0.06 | -0.06 | -0.08 | -0.06 | -0.33 | -3.32 | -3.32 | -31.15 | -92.08 | -95.47 | -96.76 |
| 40317.474 | -78.25 | -78.9 | -52.28 | -24.92 | -3.32 | -3.32 | -0.5 | -0.09 | -0.03 | -0.06 | -0.06 | -0.1 | -0.42 | -3.09 | -3.09 | -26.36 | -57.09 | -85.91 | -95.56 |
| 50796.834 | -94.75 | -67.93 | -49.22 | -23.87 | -3.22 | -3.22 | -0.56 | -0.07 | -0.07 | -0.05 | -0.06 | -0.09 | -0.44 | -3.21 | -3.21 | -27.07 | -57.81 | -79.68 | -93.9 |
| 64000 | -86.2 | -66.54 | -47.27 | -22.82 | -3.21 | -3.21 | -0.59 | -0.07 | -0.06 | -0.07 | -0.07 | -0.07 | -0.36 | -3.32 | -3.32 | -31.13 | -70.4 | -92.27 | -90.38 |
| 80634.947 | -81.52 | -69.49 | -46.46 | -20.48 | -3.06 | -3.07 | -0.77 | -0.16 | -0.05 | -0.08 | -0.06 | -0.09 | -0.43 | -3.23 | -3.23 | -84.07 | -86.21 | -86.63 | -84.92 |

Phase Test passed!

Tolerance is 0.3 °

| gain | frequency | phase difference | to channel | status |
|--------|-----------|------------------|------------|--------|
| -20 dB | 20000 Hz | 0.00000 ° | LEMO7_1 | pass |
| -20 dB | 20000 Hz | 0.00225 ° | LEMO7_2 | pass |
| 0 dB | 20000 Hz | 0.00000 ° | LEMO7_1 | pass |
| 0 dB | 20000 Hz | 0.00704 ° | LEMO7_2 | pass |