



AC Power-Line Harmonics per IEC / EN 61000-3-2

| | | | |
|--------------------------|--------------------------------------|-----------------|-----------------|
| Manufacturer: | Aleph Objects Inc | Project Number: | B40815 |
| Customer Representative: | Seth Sinnema | Test Area: | GP 2 |
| Model: | KT-PR0016 | S/N: | KT-PR0016-6616 |
| Standard Referenced: | EN55024: 2010 | Date: | August 18, 2014 |
| Temperature: | 25.6°C | Humidity: | 49% |
| Input Voltage: | 230VAC 50Hz | Pressure: | 839mb |
| Configuration of Unit: | Printing test gcode file off SD card | | |
| Test Engineer: | Mark Novak | | |

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Harmonics – Class-A per Ed. 3.0 (2006)(Run time) incl. inter-harmonics

EUT: KT-PR0016

Test category: Class-A per Ed. 3.0 (2006) (European limits)

Test date: 8/18/2014

Test duration (min): 12

Comment: B40815

Customer: Aleph Objects Inc

Tested by: mark Novak

Test Margin: 100

End time: 1:03:22 PM

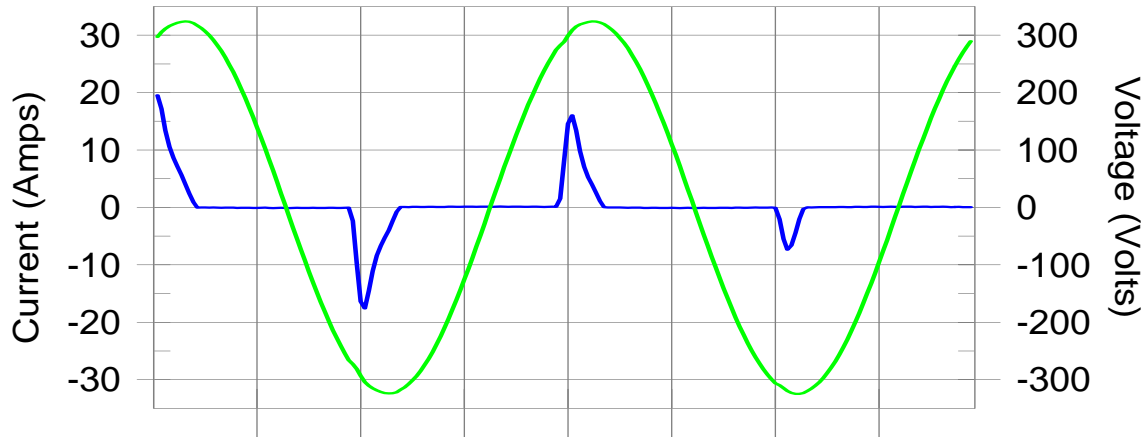
Start time: 12:51:01 PM

Data file name: H-000252.cts_data

Test Result: Fail (200% max - 90% avg used)

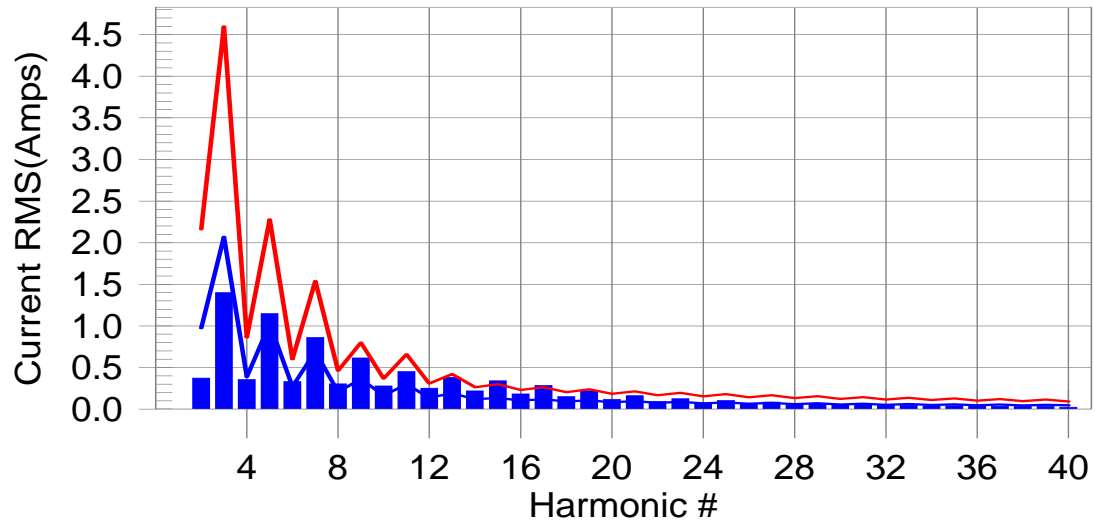
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Fail Worst harmonic was #15 with 227.46% of the limit.

Current Test Result Summary (Run time)

EUT: KT-PR0016

Tested by: mark Novak

Test category: Class-A per Ed. 3.0 (2006) (European limits)

Test Margin: 100

Test date: 8/18/2014

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Data file name: H-000252.cts_data

Comment: B40815

Customer: Aleph Objects Inc

Test Result: Fail (200% max - 90% avg used) Source qualification: Normal

THC(A): 2.22 I-THD(%): 218.38 POHC(A): 0.214 POHC Limit(A): 0.251

Highest parameter values during test:

| | | | |
|----------------|--------|----------------|-------|
| V_RMS (Volts): | 228.74 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 19.525 | I_RMS (Amps): | 3.267 |
| I_Fund (Amps): | 1.100 | Crest Factor: | 9.133 |
| Power (Watts): | 243.1 | Power Factor: | 0.413 |

| Harm# | Harms(avg) | 90%Limit | %of Limit | Harms(max) | 200%Limit | %of Limit | Status |
|-------|------------|----------|-----------|------------|-----------|-----------|--------|
| 2 | 0.333 | 0.972 | 34.2 | 0.372 | 2.160 | 17.20 | Pass |
| 3 | 1.280 | 2.070 | 61.8 | 1.399 | 4.600 | 30.42 | Pass |
| 4 | 0.322 | 0.387 | 83.2 | 0.355 | 0.860 | 41.23 | Pass |
| 5 | 1.071 | 1.026 | 104.4 | 1.148 | 2.280 | 50.35 | Fail |
| 6 | 0.303 | 0.270 | 112.1 | 0.329 | 0.600 | 54.92 | Fail |
| 7 | 0.822 | 0.693 | 118.6 | 0.860 | 1.540 | 55.87 | Fail |
| 8 | 0.276 | 0.207 | 133.5 | 0.302 | 0.460 | 65.72 | Fail |
| 9 | 0.592 | 0.360 | 164.6 | 0.615 | 0.800 | 76.94 | Fail |
| 10 | 0.245 | 0.166 | 148.2 | 0.278 | 0.368 | 75.47 | Fail |
| 11 | 0.432 | 0.297 | 145.5 | 0.451 | 0.660 | 68.36 | Fail |
| 12 | 0.213 | 0.138 | 154.5 | 0.251 | 0.306 | 81.94 | Fail |
| 13 | 0.351 | 0.189 | 185.9 | 0.382 | 0.420 | 90.85 | Fail |
| 14 | 0.180 | 0.118 | 152.7 | 0.218 | 0.262 | 83.03 | Fail |
| 15 | 0.307 | 0.135 | 227.5 | 0.340 | 0.300 | 113.36 | Fail |
| 16 | 0.148 | 0.104 | 142.8 | 0.183 | 0.230 | 79.39 | Fail |
| 17 | 0.259 | 0.119 | 217.7 | 0.285 | 0.264 | 108.00 | Fail |
| 18 | 0.117 | 0.092 | 127.1 | 0.148 | 0.204 | 72.64 | Fail |
| 19 | 0.200 | 0.107 | 187.3 | 0.219 | 0.237 | 92.48 | Fail |
| 20 | 0.089 | 0.083 | 107.3 | 0.117 | 0.184 | 63.32 | Fail |
| 21 | 0.143 | 0.096 | 148.6 | 0.162 | 0.214 | 75.56 | Fail |
| 22 | 0.067 | 0.075 | 88.7 | 0.091 | 0.167 | 54.71 | Pass |
| 23 | 0.103 | 0.088 | 117.0 | 0.126 | 0.196 | 64.29 | Fail |
| 24 | 0.051 | 0.069 | 74.4 | 0.075 | 0.153 | 48.78 | Pass |
| 25 | 0.079 | 0.081 | 98.1 | 0.103 | 0.180 | 57.28 | Pass |
| 26 | 0.041 | 0.064 | 63.6 | 0.064 | 0.142 | 45.25 | Pass |
| 27 | 0.063 | 0.075 | 83.7 | 0.083 | 0.167 | 49.90 | Pass |
| 28 | 0.032 | 0.059 | 53.7 | 0.057 | 0.132 | 43.13 | Pass |
| 29 | 0.046 | 0.070 | 66.5 | 0.065 | 0.155 | 41.95 | Pass |
| 30 | 0.024 | 0.055 | 43.4 | 0.050 | 0.123 | 40.77 | Pass |
| 31 | 0.032 | 0.065 | 48.8 | 0.052 | 0.145 | 36.16 | Pass |
| 32 | 0.018 | 0.052 | 34.0 | 0.043 | 0.115 | 37.78 | Pass |
| 33 | 0.022 | 0.061 | 36.0 | 0.045 | 0.136 | 32.81 | Pass |
| 34 | 0.014 | 0.049 | 28.6 | 0.039 | 0.108 | 35.59 | Pass |
| 35 | 0.017 | 0.058 | 29.2 | 0.039 | 0.129 | 30.15 | Pass |
| 36 | 0.012 | 0.046 | 25.7 | 0.035 | 0.102 | 34.26 | Pass |
| 37 | 0.014 | 0.055 | 25.6 | 0.034 | 0.122 | 28.34 | Pass |
| 38 | 0.010 | 0.044 | 22.7 | 0.033 | 0.097 | 33.79 | Pass |
| 39 | 0.012 | 0.052 | 23.3 | 0.032 | 0.115 | 27.79 | Pass |
| 40 | 0.006 | 0.046 | 14.6 | 0.023 | 0.092 | 25.03 | Pass |

Voltage Source Verification Data (Run time)

EUT: KT-PR0016

Tested by: mark Novak

Test category: Class-A per Ed. 3.0 (2006) (European limits)

Test Margin: 100

Test date: 8/18/2014

Start time: 12:51:01 PM

End time: 1:03:22 PM

Test duration (min): 12

Data file name: H-000252.cts_data

Comment: B40815

Customer: Aleph Objects Inc

Test Result: Fail (200% max - 90% avg used)

Source qualification: Normal

Highest parameter values during test:

| | | | |
|-----------------|--------|----------------|-------|
| Voltage (Vrms): | 228.74 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 19.525 | I_RMS (Amps): | 3.267 |
| I_Fund (Amps): | 1.100 | Crest Factor: | 9.133 |
| Power (Watts): | 243.1 | Power Factor: | 0.413 |

| Harm# | Harmonics V-rms | Limit V-rms | % of Limit | Status |
|-------|-----------------|-------------|------------|--------|
| 2 | 0.023 | 0.457 | 4.96 | OK |
| 3 | 0.515 | 2.058 | 25.02 | OK |
| 4 | 0.025 | 0.457 | 5.52 | OK |
| 5 | 0.132 | 0.915 | 14.43 | OK |
| 6 | 0.031 | 0.457 | 6.74 | OK |
| 7 | 0.107 | 0.686 | 15.56 | OK |
| 8 | 0.019 | 0.457 | 4.11 | OK |
| 9 | 0.184 | 0.457 | 40.14 | OK |
| 10 | 0.021 | 0.457 | 4.55 | OK |
| 11 | 0.132 | 0.229 | 57.56 | OK |
| 12 | 0.025 | 0.229 | 10.73 | OK |
| 13 | 0.087 | 0.229 | 38.15 | OK |
| 14 | 0.024 | 0.229 | 10.52 | OK |
| 15 | 0.150 | 0.229 | 65.75 | OK |
| 16 | 0.025 | 0.229 | 10.92 | OK |
| 17 | 0.144 | 0.229 | 63.18 | OK |
| 18 | 0.027 | 0.229 | 11.72 | OK |
| 19 | 0.128 | 0.229 | 55.78 | OK |
| 20 | 0.020 | 0.229 | 8.56 | OK |
| 21 | 0.092 | 0.229 | 40.12 | OK |
| 22 | 0.018 | 0.229 | 7.98 | OK |
| 23 | 0.048 | 0.229 | 20.86 | OK |
| 24 | 0.017 | 0.229 | 7.64 | OK |
| 25 | 0.051 | 0.229 | 22.45 | OK |
| 26 | 0.015 | 0.229 | 6.62 | OK |
| 27 | 0.060 | 0.229 | 26.16 | OK |
| 28 | 0.014 | 0.229 | 5.93 | OK |
| 29 | 0.044 | 0.229 | 19.14 | OK |
| 30 | 0.012 | 0.229 | 5.23 | OK |
| 31 | 0.035 | 0.229 | 15.14 | OK |
| 32 | 0.010 | 0.229 | 4.16 | OK |
| 33 | 0.024 | 0.229 | 10.61 | OK |
| 34 | 0.008 | 0.229 | 3.66 | OK |
| 35 | 0.017 | 0.229 | 7.37 | OK |
| 36 | 0.008 | 0.229 | 3.34 | OK |
| 37 | 0.026 | 0.229 | 11.55 | OK |
| 38 | 0.008 | 0.229 | 3.38 | OK |
| 39 | 0.021 | 0.229 | 9.33 | OK |
| 40 | 0.010 | 0.229 | 4.35 | OK |



AC Power-Line Harmonics per IEC / EN 61000-3-2

Manufacturer: Aleph Objects Inc
Customer Representative: Seth Sinnema
Model: KT-PR0016
Standard Referenced: EN55024: 2010

Project Number: B40815
Test Area: GP 2
S/N: KT-PR0016-6616
Date: August 18, 2014

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Figure H1. AC Power Line Harmonics Test Setup.



AC Power-Line Harmonics per IEC / EN 61000-3-2

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| Manufacturer: | <u>Aleph Objects Inc</u> | Project Number: | <u>B40815</u> |
| Customer Representative: | <u>Seth Sinnema</u> | Test Area: | <u>GP 2</u> |
| Model: | <u>KT-PR0016</u> | S/N: | <u>KT-PR0016-6616</u> |
| Standard Referenced: | <u>EN55024: 2010</u> | Date: | <u>August 18, 2014</u> |

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Test Equipment List

| ID Number | Manufacturer | Model # | Serial # | Description | Cal Date | Cal Due |
|-----------|------------------------------------|-------------------|----------|--|------------|------------|
| 1295 | California Instruments Corporation | CTS-115-230 | S72726 | PACS-1 Power Analyzer Compliance Test System | 01/13/2013 | 01/13/2015 |
| 1296 | California Instruments Corporation | 50011X208-150/300 | S59159 | 5k VA AC Power Source | 01/13/2013 | 01/13/2015 |
| 1536 | Extech Instruments | 445715 | Z315811 | Hygro-Thermometer | 03/21/2014 | 03/21/2015 |