EMC TEST REPORT

Report Number: 101965930DEN-001
Project Number: G101965930

Report Issue Date: January 27, 2015

Product Designation: 3-D Mini Printer

Standards: EN 61000-6-3:2011
AS/NZ CISPR22:2010
FCC 47CFR Part 15 Subpart B: 2015
ICES-003: 2012

Tested by:	Client:
Intertek Testing Services NA, Inc. 1795 Dogwood St., Suite 200 Louisville, CO 80027	Aleph Objects Inc. 626 W 66th St. Loveland, CO 80538 USA

Report prepared by	Report reviewed by
(signature) Son La Project Engineer	*(signature)* Richard Georgerian Senior Project Engineer

TABLE OF CONTENTS

Intertek

1   Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2   Test Summary

Section	Test full name	Test date	Result
6	Radiated Emissions (FCC 47CFR Part 15 Subpart B / CISPR22 / ICES-003)	1/6/2015	Pass
7	Conducted Emissions (FCC 47CFR Part 15 Subpart B / CISPR22 / ICES-003)	1/7/2015	Pass
8	Telecom Port Conducted Emissions (FCC 47CFR Part 15 Subpart B / CISPR22 / ICES-003)	--	NA (2)

Notes:

(1)   Product tested as an unintentional radiator. Highest clock speed is at or above 108MHz to less than 500MHz. Measure to 2GHz.
(2)   Product does not provide telecommunications port and/or cables.

2.1   Test Facility

Intertek Denver's testing facilities are located at 1795 Dogwood St. Suite 200 Louisville, CO 80027. The testing facility is ISO17025:2005 accredited by A2LA, our lab code is 2506.02, our VCCI registration number under Article 15 is A-0160, our FCC registration no. 432519 and our IC lab no. 2042N.

Testing contained in this test report may not be covered under the laboratories scope of accreditation. A note will be placed in the specific test section for testing not coved under the laboratories scope.

3   Client Information

This EUT was tested at the request of:

Client: Aleph Objects Inc.
626 W 66th St.
Loveland, CO 80538
USA

Contact: Chris Wagner
Telephone: 970-377-1111
Fax: N/A
Email: chrisw@alephobjects.com

Manufacturer: Aleph Objects Inc.
626 W 66th St.
Loveland, CO 80538
USA

Intertek

4   Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
3-D Mini Printer	Aleph Objects Inc.	KT-PR0035	KT-PR0035-0051

Receive Date:	1/5/2014
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
A 3D printer that that extrudes plastic to form 3D objects.
Note: Mouse and keyboard is not subject under test.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
100-240Vac	1.70A @ 115Vac 1.00A @ 230Vac	50/60	1

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Mode 1: "Run" which is the EUT run at max speed.
2	Mode 2: "standby mode" EUT turn on but idle.

Software used by EUT:

No.	Descriptions of EUT Exercising
1	Aleph Objects internal program

4.1   Photo – Product Tested:

Support equipment shown with products under test.

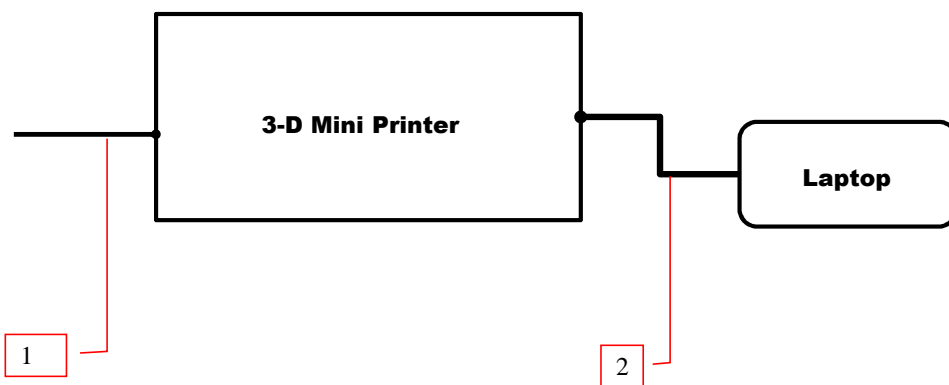| Power Cord | USB Cable | EUT | Laptop | AC/DC Adapter |

Intertek

5   System setup including cable interconnection details, support equipment and simplified block diagram

5.1   Method:

Configuration as required by Standard taking Precedence.
Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

5.2   EUT Block Diagram:

5.3   Support Data:

ID	Description	Length	Shielding	Ferrites
1	AC power cord	8 feet	None	None
2	USB Cable	8 feet	None	2

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Labtop	NOTEBOOK COMPUTER	W650SZ	8E10SC024068
AC/DC Adapter	DELTA ELECTRONICS, INC	ADP-90MD-BB	86DW45C0APJ

6   Radiated Emissions

6.1   Method:

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from FCC 15.109,ICES-003,CISPR22.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

6.2   Measurement Uncertainty:

For radiated emissions, Ulab(3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) < UCISPR(5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where   FS = Field Strength in dBmV/m
                    RA = Receiver Amplitude (including preamplifier) in dBmV
                    CF = Cable Attenuation Factor in dB
                    AF = Antenna Factor in dB
                    AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBmV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBmV/m. This value in dBmV/m was converted to its corresponding level in mV/m.

RA = 52.0 dBmV   To convert from dBmV to mV or mV the following was used:
AF = 7.4 dB/m
CF = 1.6 dB   UF = 10(NF / 20) where UF = Net Reading in mV
AG = 29.0 dB   NF = Net Reading in dBmV
FS = 32 dBmV/m

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
UF = 10(32 dBmV / 20) = 39.8 mV/m

Intertek

6.3   Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Notes	Cal Date	Cal Due
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	--	05/21/2014	5/21/2015
19937	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	--	3/25/2014	3/25/2015
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	--	3/27/2014	3/20/2015
18906	Amplifier	Mini-Circuits Lab	ZHL-42	N052792-2	--	5/23/2014	5/23/2015
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	Firmware ver. 4.43 SP3	01/29/2014	12/29/15

Software Utilized:

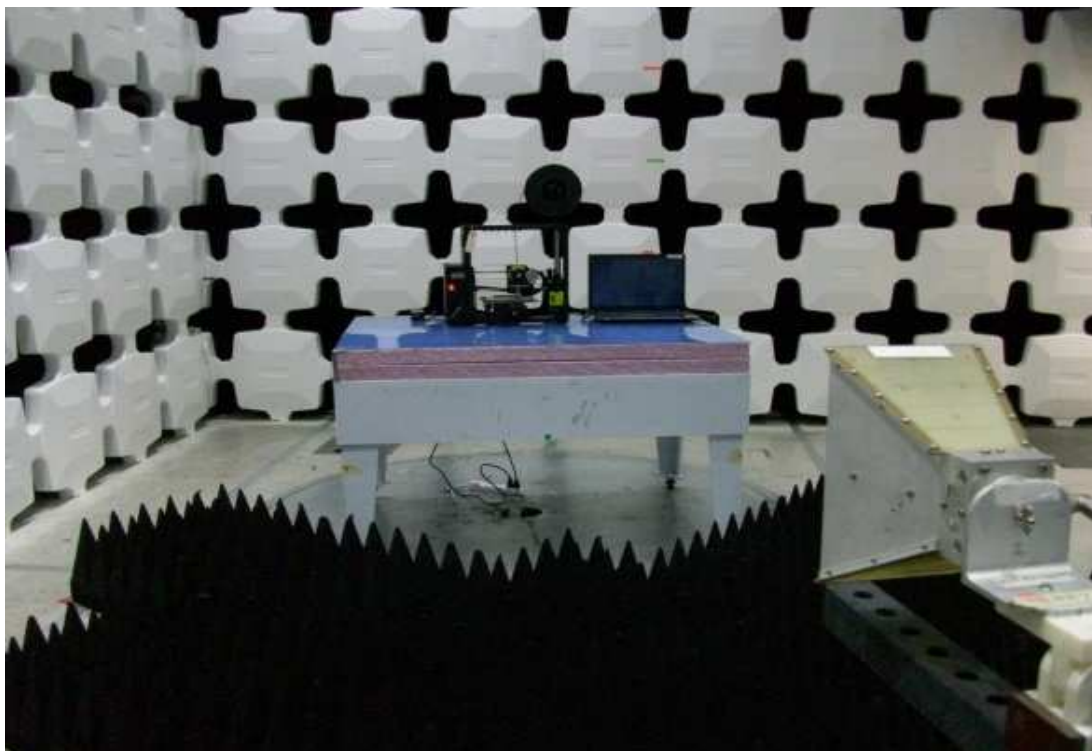| Name	Manufacturer	Version
SW-6: Software for Radiated and Conducted emissions	Intertek	OATS cvi, V.1.0

6.4   Results:

The sample tested was found   to Comply.

6.5   Setup Photographs:
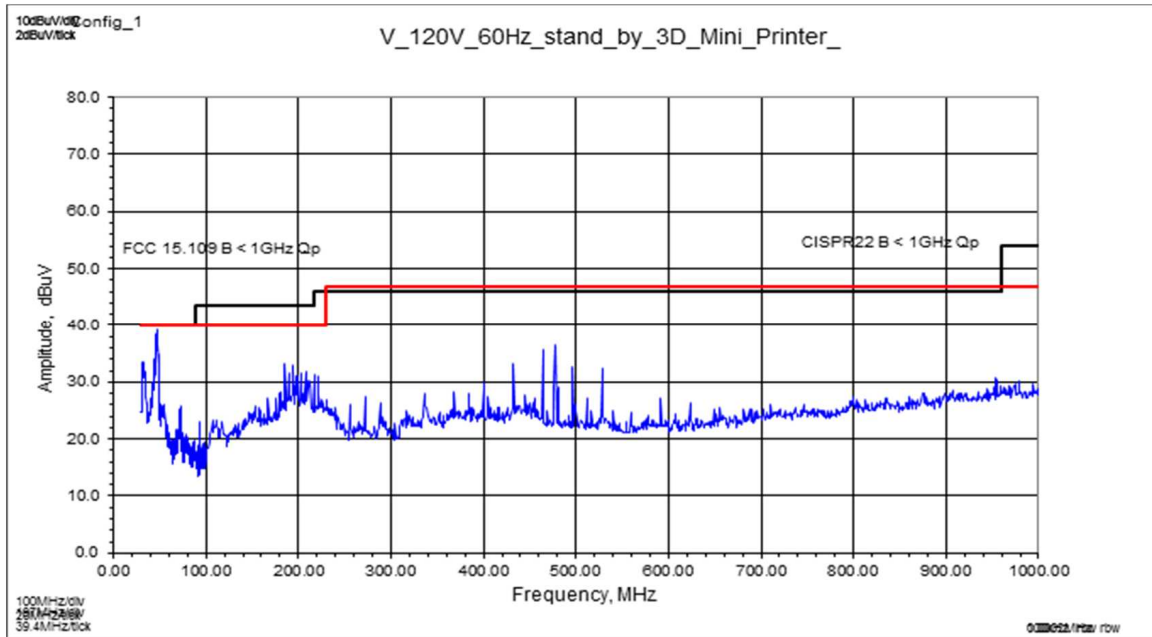

Test Setup – Front (30 MHz - 1000 MHz)
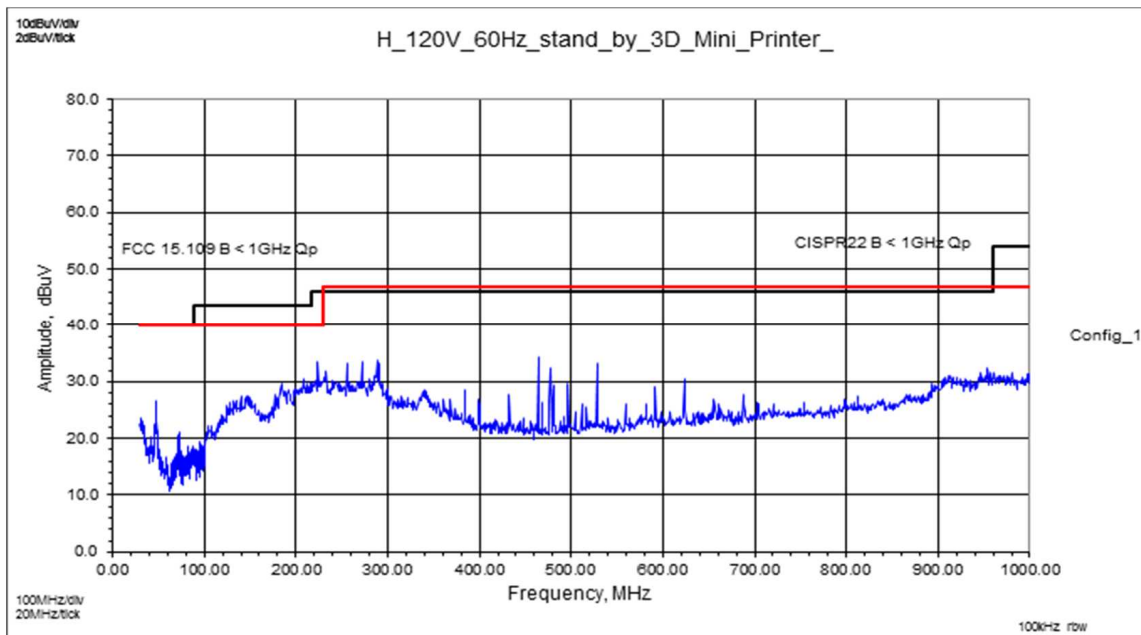

Test Setup – Front (1000 MHz - 4000 MHz)

Test Setup – Rear (30 MHz - 4000 MHz)
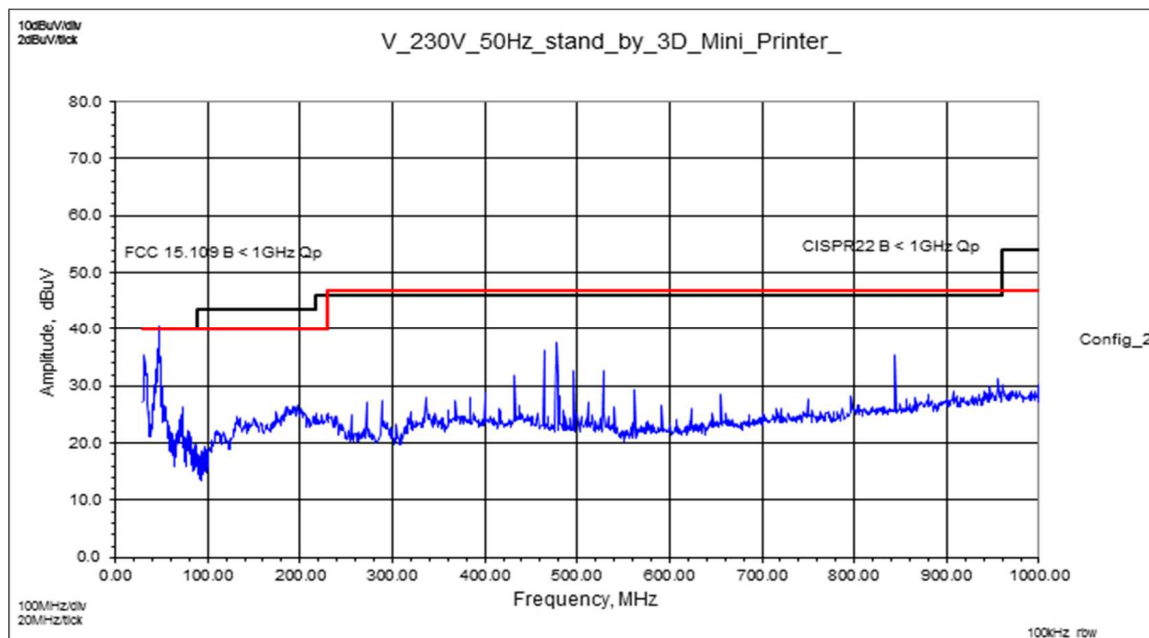
Intertek

6.6 Plots: Reference only.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 120V/60Hz (Vertical). Stand-By Mode.
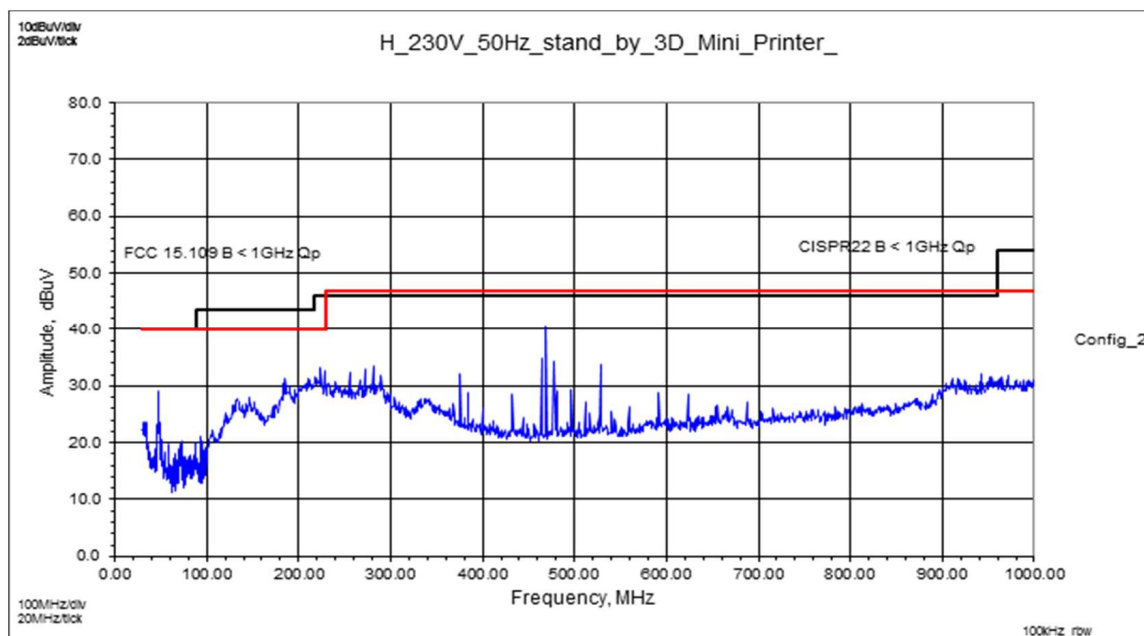Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 120V/60Hz (Horizontal).Stand-By Mode.
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 230V/50Hz (Vertical).Stand-By Mode..
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 230V/50Hz (Horizontal).Stand-By Mode.
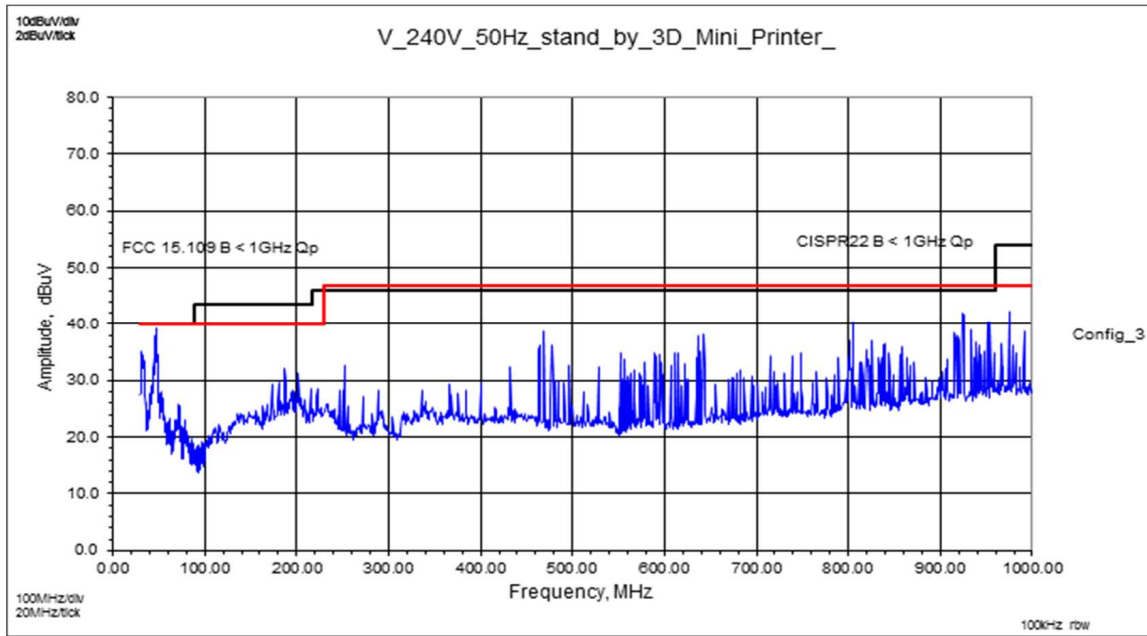Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 240V/50Hz (Vertical).Stand-By Mode.
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.
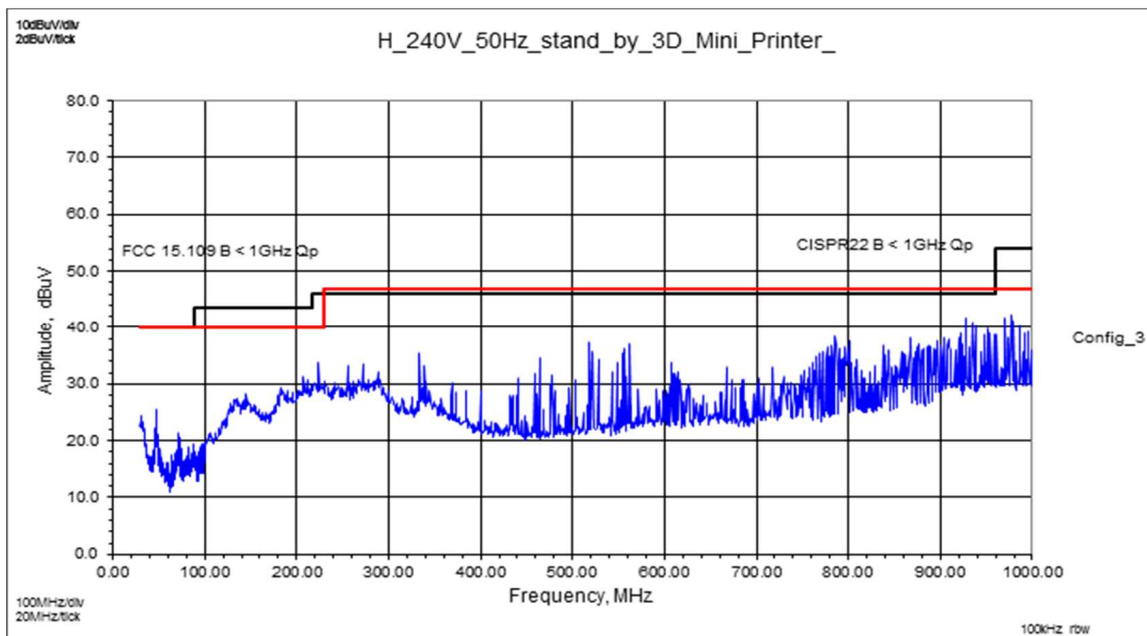

FCC/CISPR 22/ICES-003 Class B at 3m distance. 240V/50Hz (Horizontal).Stand-By Mode.
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.
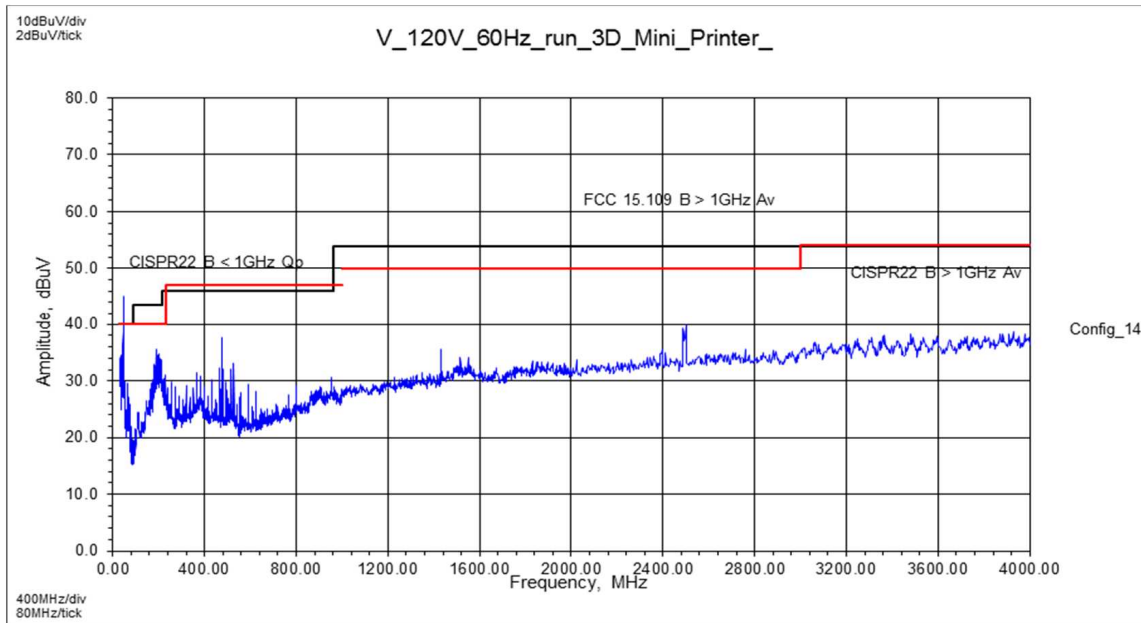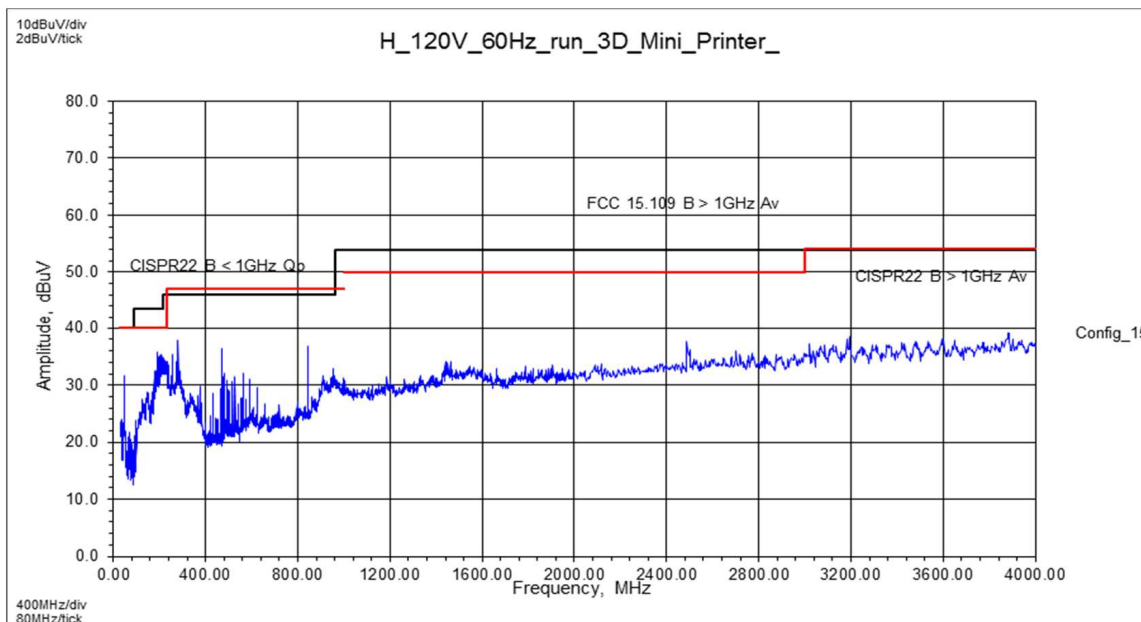
Intertek

FCC/CISPR 22/ICES-003/ICES-003 Class B at 3m distance. 120V/60Hz (Vertical). Run mode.
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 120V/60Hz (Horizontal). Run mode
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003/ICES-003 Class B at 3m distance. 230V/50Hz (Vertical). Run mode.
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B at 3m distance. 230V/50Hz (Horizontal). Run mode
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.
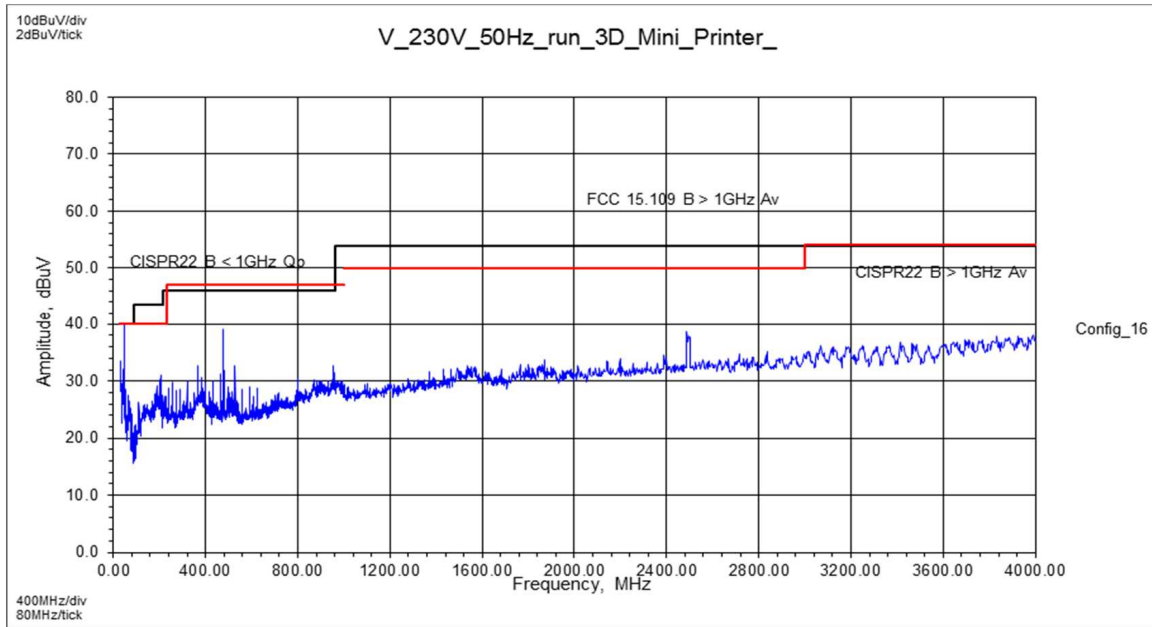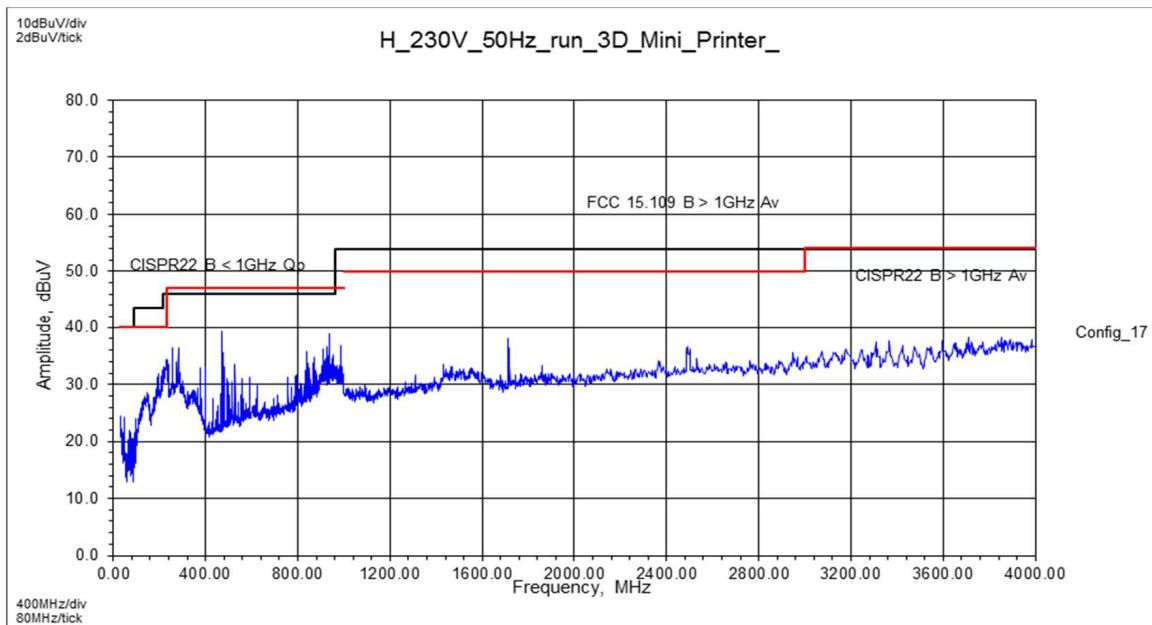
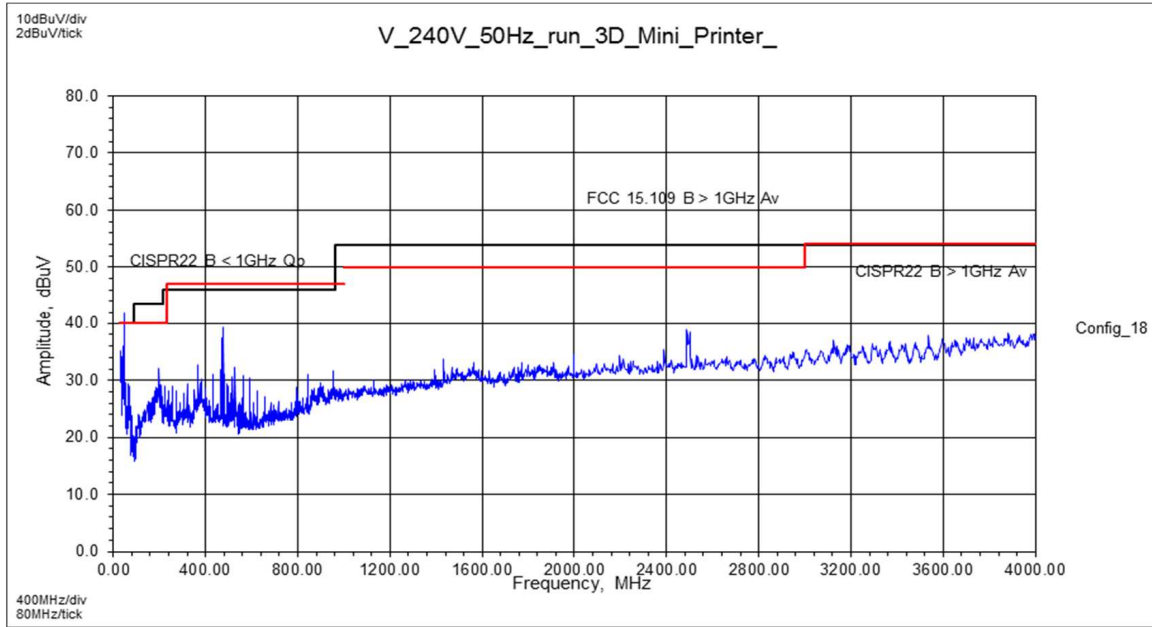**Intertek**

FCC/CISPR 22/ICES-003/ICES-003 Class B at 3m distance. 240V/50Hz (Vertical). Run mode.
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003/ICES-003 Class B at 3m distance. 240V/50Hz (Horizontal). Run mode
Max hold during 360 degree turntable rotation. Reference only to determine frequencies to be maximized.
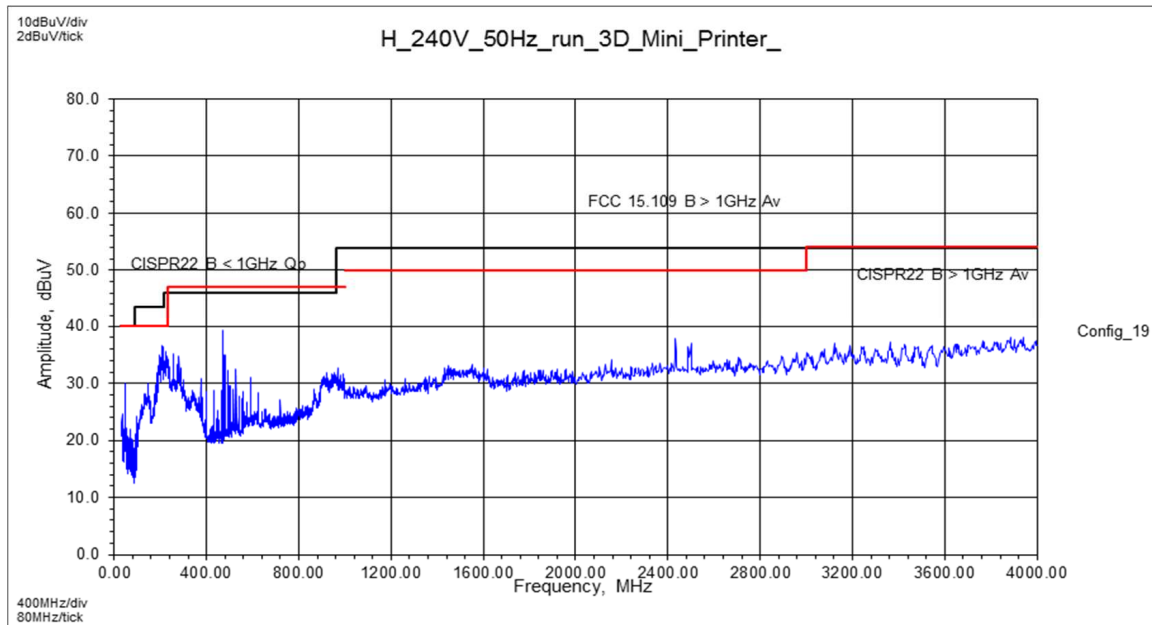
Intertek

6.8   Test Data: Radiated Electromagnetic Emissions

Test Method:	FCC/CISPR22/ICES-003	Test Area:	CC1	Temperature:	21.7 ºC
EUT Model #:	KT-PR0035	Test Date:	1/6/2015	Relative Humidity:	37.5 %
EUT Serial #:	KT-PR0035-0051	EUT Power:	100-240Vac, 50/60Hz	Air Pressure:	839.7 mbars

Manufacturer:	Aleph Objects Inc
EUT Description:	3-D Mini Printer
Notes:	

Level Key
Pk - Peak | Nb - Narrow Band
Qp - QuasiPeak | Bb - Broad Band
Av - Average

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
MHz	dBuV	Qp Av Pk Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.109 B <1GHz Qp	CISPR22 B <1GHz Qp	(MHz)	FCC 15.109 B <1GHz Qp	CISPR22 B <1GHz Qp
30 MHz to 1 GHz															
V_120V_60Hz_run_3D_Mini_Printer_Series_15															
35.04	39.18	Qp	0.40	17.17	28.18	0.00	28.56	V	1.00	114.6	- 11.44	- 11.44	0.120	40	40
47.15	55.63	Qp	0.77	9.42	28.15	0.00	37.67	V	1.00	236.7	- 2.33	- 2.33	0.120	40	40
53.90	43.78	Qp	0.77	7.62	28.13	0.00	24.04	V	1.00	268.3	- 15.96	- 15.96	0.120	40	40
63.24	41.98	Qp	0.77	7.72	28.12	0.00	22.36	V	1.00	359.9	- 17.64	- 17.64	0.120	40	40
188.76	42.81	Qp	0.92	11.20	27.61	0.00	27.32	V	1.00	320.4	- 16.21	- 12.68	0.120	44	40
477.86	37.78	Qp	1.50	17.31	28.27	0.00	28.32	V	1.01	59.1	- 17.70	- 18.68	0.120	46	47
H_120V_60Hz_run_3D_Mini_Printer_Series_16															
47.61	49.54	Qp	0.77	9.19	28.15	0.00	31.35	H	2.58	162.0	- 8.65	- 8.65	0.120	40	40
192.31	44.06	Qp	0.93	11.30	27.60	0.00	28.69	H	2.09	360.0	- 14.83	- 11.31	0.120	44	40
255.99	47.93	Qp	1.08	11.74	27.34	0.00	33.41	H	1.50	27.0	- 12.61	- 13.59	0.120	46	47
281.14	41.81	Qp	1.14	13.52	27.43	0.00	29.05	H	1.50	205.0	- 16.97	- 17.95	0.120	46	47
469.32	27.41	Qp	1.48	17.00	28.21	0.00	17.68	H	1.93	87.0	- 28.34	- 29.32	0.120	46	47
844.20	24.26	Qp	2.03	21.53	27.67	0.00	20.15	H	1.50	148.0	- 25.87	- 26.85	0.120	46	47
V_230V_50Hz_run_3D_Mini_Printer_Series_17															
32.00	36.19	Qp	0.40	19.40	28.19	0.00	27.80	V	1.00	116.9	- 12.20	- 12.20	0.120	40	40
47.50	47.90	Qp	0.77	9.25	28.15	0.00	29.77	V	1.00	0.0	- 10.23	- 10.23	0.120	40	40
72.34	39.09	Qp	0.77	8.10	28.10	0.00	19.86	V	1.00	0.0	- 20.14	- 20.14	0.120	40	40
204.36	40.56	Qp	0.96	11.22	27.54	0.00	25.19	V	1.00	322.0	- 18.33	- 14.81	0.120	44	40
367.99	45.05	Qp	1.32	15.22	27.86	0.00	33.73	V	1.14	9.4	- 12.29	- 13.27	0.120	46	47
477.45	45.46	Qp	1.50	17.30	28.26	0.00	35.99	V	1.00	72.9	- 10.03	- 11.01	0.120	46	47
H_230V_50Hz_run_3D_Mini_Printer_Series_18															
96.00	41.65	Qp	0.77	9.50	28.07	0.00	23.85	H	1.83	359.9	- 19.67	- 16.15	0.120	44	40
255.99	50.14	Qp	1.08	11.74	27.34	0.00	35.62	H	1.50	31.3	- 10.40	- 11.38	0.120	46	47
281.81	41.99	Qp	1.14	13.54	27.43	0.00	29.24	H	1.50	203.3	- 16.78	- 17.76	0.120	46	47

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
375.62	33.63	Qp	1.33	15.30	27.90	0.00	22.36	H	2.79	94.5	- 23.66	- 24.64	0.120	46	47
469.33	27.90	Qp	1.48	17.00	28.21	0.00	18.17	H	2.32	11.5	- 27.85	- 28.83	0.120	46	47
938.03	29.92	Qp	2.14	22.20	27.75	0.00	26.51	H	1.50	220.6	- 19.51	- 20.49	0.120	46	47

V_240V_50Hz_run_3D_Mini_Printer_Series_19

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
31.53	36.15	Qp	0.40	19.73	28.19	0.00	28.09	V	1.00	291.2	- 11.91	- 11.91	0.120	40	40
47.90	54.28	Qp	0.77	9.05	28.15	0.00	35.95	V	0.99	223.0	- 4.05	- 4.05	0.120	40	40
63.21	41.89	Qp	0.77	7.72	28.12	0.00	22.27	V	1.39	359.9	- 17.73	- 17.73	0.120	40	40
198.77	42.87	Qp	0.94	11.88	27.57	0.00	28.12	V	1.00	301.4	- 15.40	- 11.88	0.120	44	40
477.80	43.98	Qp	1.50	17.31	28.27	0.00	34.52	V	1.00	182.9	- 11.50	- 12.48	0.120	46	47
844.31	25.60	Qp	2.03	21.53	27.67	0.00	21.49	V	1.30	33.0	- 24.53	- 25.51	0.120	46	47

H_240V_50Hz_run_3D_Mini_Printer_Series_20

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
47.91	40.42	Qp	0.77	9.05	28.15	0.00	22.09	H	1.50	150.1	- 17.91	- 17.91	0.120	40	40
148.35	39.47	Qp	0.82	12.60	27.86	0.00	25.03	H	1.71	355.8	- 18.49	- 14.97	0.120	44	40
207.41	43.48	Qp	0.96	10.76	27.53	0.00	27.68	H	1.50	6.8	- 15.85	- 12.32	0.120	44	40
256.49	42.11	Qp	1.08	11.81	27.34	0.00	27.66	H	1.64	132.7	- 18.36	- 19.34	0.120	46	47
281.01	39.39	Qp	1.14	13.52	27.42	0.00	26.62	H	1.50	359.9	- 19.40	- 20.38	0.120	46	47
469.17	26.99	Qp	1.48	17.00	28.21	0.00	17.26	H	2.02	27.4	- 28.76	- 29.74	0.120	46	47

| FREQ | LEVEL | DET | CABLE | ANT | PREAMP | ATTEN | FINAL | POL | HGT | AZ | DELTA1 | DELTA2 | RBW | Limit 1 | Limit 2 |
		Qp Av Pk Rms									CISPR22 B > 1GHz Av	CISPR22 B > 1GHz Pk		CISPR22 B > 1GHz Av	CISPR22 B > 1GHz Pk
MHz	dBuV	Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)			(MHz)	Av	Pk

1 GHz to 4 GHz

V_120V_60Hz_run_3D_Mini_Printer_Series_21_1GHz-4GHz

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
1433.05	51.74	Pk	2.66	25.19	36.65	0.00	42.94	V	1.00	71.3	NA	- 27.06	1.000	NA	70
1551.28	49.75	Pk	2.78	25.36	36.67	0.00	41.22	V	1.00	264.0	NA	- 28.78	1.000	NA	70
2410.26	48.84	Pk	3.52	28.46	37.56	0.00	43.26	V	1.00	359.9	NA	- 26.74	1.000	NA	70
2500.00	55.06	Pk	3.59	28.67	37.65	0.00	49.67	V	1.00	342.0	NA	- 20.33	1.000	NA	70
2759.62	48.48	Pk	3.80	28.92	37.39	0.00	43.81	V	1.00	26.4	NA	- 26.19	1.000	NA	70
3365.39	47.86	Pk	4.26	31.09	36.90	0.00	46.31	V	1.50	359.9	- 7.69	- 27.69	1.000	54	74
1433.05	40.09	Av	2.66	25.19	36.65	0.00	31.29	V	1.00	71.3	- 18.71	NA	1.000	50	NA
1551.28	36.86	Av	2.78	25.36	36.67	0.00	28.33	V	1.00	264.0	- 21.67	NA	1.000	50	NA
2410.26	35.16	Av	3.52	28.46	37.56	0.00	29.58	V	1.00	359.9	- 20.42	NA	1.000	50	NA
2500.00	37.06	Av	3.59	28.67	37.65	0.00	31.67	V	1.00	342.0	- 18.33	NA	1.000	50	NA
2759.62	35.25	Av	3.80	28.92	37.39	0.00	30.58	V	1.00	26.4	- 19.42	NA	1.000	50	NA
3365.39	34.84	Av	4.26	31.09	36.90	0.00	33.29	V	1.50	359.9	- 20.71	NA	1.000	54	NA

H_120V_60Hz_run_3D_Mini_Printer_Series_22_1GHz-4GHz

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
1450.32	52.91	Pk	2.68	25.20	36.65	0.00	44.14	H	1.50	298.9	NA	- 25.86	1.000	NA	70
1786.86	49.44	Pk	3.00	26.57	37.10	0.00	41.91	H	1.50	179.0	NA	- 28.09	1.000	NA	70
2487.18	48.90	Pk	3.58	28.64	37.64	0.00	43.48	H	1.87	162.8	NA	- 26.52	1.000	NA	70
3019.29	48.14	Pk	4.01	30.34	37.36	0.00	45.13	H	1.62	144.8	NA	- 28.87	1.000	NA	74

3192.42	48.37	Pk	4.15	30.87	37.31	0.00	46.08	H	1.47	139.5	NA	- 27.92	1.000	NA	74
3602.56	48.95	Pk	4.41	31.60	37.79	0.00	47.18	H	1.50	0.0	NA	- 26.82	1.000	NA	74
1450.32	39.92	Av	2.68	25.20	36.65	0.00	31.15	H	1.50	298.9	- 18.85	NA	1.000	50	NA
1786.86	35.68	Av	3.00	26.57	37.10	0.00	28.15	H	1.50	179.0	- 21.85	NA	1.000	50	NA
2487.18	35.16	Av	3.58	28.64	37.64	0.00	29.74	H	1.87	162.8	- 20.26	NA	1.000	50	NA
3019.29	34.45	Av	4.01	30.34	37.36	0.00	31.44	H	1.62	144.8	- 22.56	NA	1.000	54	NA
3192.42	35.01	Av	4.15	30.87	37.31	0.00	32.72	H	1.47	139.5	- 21.28	NA	1.000	54	NA
3602.56	35.52	Av	4.41	31.60	37.79	0.00	33.75	H	1.50	0.0	- 20.25	NA	1.000	54	NA
V_230V_50Hz_run_3D_Mini_Printer_Series_23_1GHz-4GHz															
1370.19	47.97	Pk	2.60	25.16	36.74	0.00	38.99	V	1.00	138.3	NA	- 31.01	1.000	NA	70
1871.80	49.78	Pk	3.08	27.21	37.16	0.00	42.91	V	1.00	66.9	NA	- 27.09	1.000	NA	70
2487.28	49.08	Pk	3.58	28.64	37.64	0.00	43.66	V	1.18	216.5	NA	- 26.34	1.000	NA	70
2836.74	48.68	Pk	3.86	29.21	37.59	0.00	44.16	V	1.18	234.9	NA	- 25.84	1.000	NA	70
3125.00	48.70	Pk	4.09	30.80	37.37	0.00	46.22	V	1.10	125.3	NA	- 27.78	1.000	NA	74
3730.77	48.18	Pk	4.50	32.37	37.80	0.00	47.24	V	1.00	257.3	NA	- 26.76	1.000	NA	74
1370.19	35.01	Av	2.60	25.16	36.74	0.00	26.03	V	1.00	138.3	- 23.97	NA	1.000	50	NA
1871.80	36.68	Av	3.08	27.21	37.16	0.00	29.81	V	1.00	66.9	- 20.19	NA	1.000	50	NA
2487.28	35.31	Av	3.58	28.64	37.64	0.00	29.89	V	1.18	216.5	- 20.11	NA	1.000	50	NA
2836.74	35.41	Av	3.86	29.21	37.59	0.00	30.89	V	1.18	234.9	- 19.11	NA	1.000	50	NA
3125.00	35.47	Av	4.09	30.80	37.37	0.00	32.99	V	1.10	125.3	- 21.01	NA	1.000	54	NA
3730.77	34.51	Av	4.50	32.37	37.80	0.00	33.57	V	1.00	257.3	- 20.43	NA	1.000	54	NA
H_230V_50Hz_run_3D_Mini_Printer_Series_24_1GHz-4GHz															
1440.71	52.18	Pk	2.67	25.19	36.65	0.00	43.40	H	1.48	197.3	N/A	- 26.60	1.000	NA	70
1711.34	49.17	Pk	2.93	26.18	36.98	0.00	41.31	H	1.67	69.4	N/A	- 28.69	1.000	NA	70
2499.56	53.11	Pk	3.59	28.67	37.65	0.00	47.72	H	1.75	19.9	N/A	- 22.28	1.000	NA	70
3307.69	48.74	Pk	4.23	31.05	36.99	0.00	47.03	H	1.50	0.0	N/A	- 26.97	1.000	NA	74
3365.39	49.57	Pk	4.26	31.09	36.90	0.00	48.02	H	1.50	234.4	N/A	- 25.98	1.000	NA	74
3708.33	48.76	Pk	4.48	32.25	37.88	0.00	47.62	H	1.50	154.6	N/A	- 26.38	1.000	NA	74
1440.71	39.02	Av	2.67	25.19	36.65	0.00	30.24	H	1.48	197.3	- 19.76	NA	1.000	50	NA
1711.34	35.34	Av	2.93	26.18	36.98	0.00	27.48	H	1.67	69.4	- 22.52	NA	1.000	50	NA
2499.56	37.30	Av	3.59	28.67	37.65	0.00	31.91	H	1.75	19.9	- 18.09	NA	1.000	50	NA
3307.69	34.93	Av	4.23	31.05	36.99	0.00	33.22	H	1.50	0.0	- 20.78	NA	1.000	54	NA
3365.39	34.94	Av	4.26	31.09	36.90	0.00	33.39	H	1.50	234.4	- 20.61	NA	1.000	54	NA
3708.33	35.27	Av	4.48	32.25	37.88	0.00	34.13	H	1.50	154.6	- 19.87	NA	1.000	54	NA
V_240V_50Hz_run_3D_Mini_Printer_Series_25_1GHz-4GHz															
1432.69	50.69	Pk	2.66	25.19	36.65	0.00	41.89	V	1.00	287.2	N/A	- 28.11	1.000	NA	70
1996.80	49.01	Pk	3.19	27.20	37.23	0.00	42.16	V	1.00	150.1	N/A	- 27.84	1.000	NA	70
2387.82	54.86	Pk	3.50	28.38	37.52	0.00	49.22	V	1.00	134.4	N/A	- 20.78	1.000	NA	70
3125.00	48.51	Pk	4.09	30.80	37.37	0.00	46.03	V	1.00	207.8	N/A	- 27.97	1.000	NA	74
3535.26	49.00	Pk	4.37	31.41	37.65	0.00	47.13	V	1.00	88.2	N/A	- 26.87	1.000	NA	74
3884.62	47.72	Pk	4.59	32.86	36.98	0.00	48.19	V	1.00	285.3	N/A	- 25.81	1.000	NA	74
1432.69	38.42	Av	2.66	25.19	36.65	0.00	29.62	V	1.00	287.2	- 20.38	NA	1.000	50	NA
1996.80	35.26	Av	3.19	27.20	37.23	0.00	28.41	V	1.00	150.1	- 21.59	NA	1.000	50	NA

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
2387.82	36.38	Av	3.50	28.38	37.52	0.00	30.74	V	1.00	134.4	- 19.26	NA	1.000	50	NA
3125.00	35.41	Av	4.09	30.80	37.37	0.00	32.93	V	1.00	207.8	- 21.07	NA	1.000	54	NA
3535.26	35.64	Av	4.37	31.41	37.65	0.00	33.77	V	1.00	88.2	- 20.23	NA	1.000	54	NA
3884.62	34.12	Av	4.59	32.86	36.98	0.00	34.59	V	1.00	285.3	- 19.41	NA	1.000	54	NA

H_240V_50Hz_run_3D_Mini_Printer_Series_26_1GHz-4GHz

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
1551.28	49.55	Pk	2.78	25.36	36.67	0.00	41.02	H	1.53	359.9	N/A	- 28.98	1.000	NA	70
2153.85	48.49	Pk	3.31	27.72	37.31	0.00	42.21	H	1.53	354.0	N/A	- 27.79	1.000	NA	70
2432.69	50.87	Pk	3.54	28.52	37.61	0.00	45.32	H	1.50	228.5	N/A	- 24.68	1.000	NA	70
2500.00	54.94	Pk	3.59	28.67	37.65	0.00	49.55	H	1.50	65.9	N/A	- 20.45	1.000	NA	70
2897.44	48.51	Pk	3.91	29.58	37.56	0.00	44.44	H	1.50	220.9	N/A	- 25.56	1.000	NA	70
3121.80	49.53	Pk	4.09	30.79	37.37	0.00	47.04	H	1.50	35.8	N/A	- 26.96	1.000	NA	74
1551.28	36.83	Av	2.78	25.36	36.67	0.00	28.30	H	1.53	359.9	- 21.70	NA	1.000	50	NA
2153.85	35.37	Av	3.31	27.72	37.31	0.00	29.09	H	1.53	354.0	- 20.91	NA	1.000	50	NA
2432.69	35.61	Av	3.54	28.52	37.61	0.00	30.06	H	1.50	228.5	- 19.94	NA	1.000	50	NA
2500.00	37.45	Av	3.59	28.67	37.65	0.00	32.06	H	1.50	65.9	- 17.94	NA	1.000	50	NA
2897.44	35.12	Av	3.91	29.58	37.56	0.00	31.05	H	1.50	220.9	- 18.95	NA	1.000	50	NA
3121.80	35.33	Av	4.09	30.79	37.37	0.00	32.84	H	1.50	35.8	- 21.16	NA	1.000	54	NA

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
MHz	dBuV	Qp Av Pk Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.109 B > 1GHz Av	FCC 15.109 B > 1GHz Av	(MHz)	FCC 15.109 B > 1GHz Av	FCC 15.109 B > 1GHz Av

1 GHz to 4 GHz

V_120V_60Hz_run_3D_Mini_Printer_Series_21_1GHz-4GHz

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
1433.05	40.09	Av	2.66	25.19	36.65	0.00	31.29	V	1.00	71.3	- 22.69	- 22.69	1.000	54	54
1551.28	36.86	Av	2.78	25.36	36.67	0.00	28.33	V	1.00	264.0	- 25.65	- 25.65	1.000	54	54
2410.26	35.16	Av	3.52	28.46	37.56	0.00	29.58	V	1.00	359.9	- 24.40	- 24.40	1.000	54	54
2500.00	37.06	Av	3.59	28.67	37.65	0.00	31.67	V	1.00	342.0	- 22.31	- 22.31	1.000	54	54
2759.62	35.25	Av	3.80	28.92	37.39	0.00	30.58	V	1.00	26.4	- 23.40	- 23.40	1.000	54	54
3365.39	34.84	Av	4.26	31.09	36.90	0.00	33.29	V	1.50	359.9	- 20.69	- 20.69	1.000	54	54

H_120V_60Hz_run_3D_Mini_Printer_Series_22_1GHz-4GHz

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
1450.32	39.92	Av	2.68	25.20	36.65	0.00	31.15	H	1.50	298.9	- 22.82	- 22.82	1.000	54	54
1786.86	35.68	Av	3.00	26.57	37.10	0.00	28.15	H	1.50	179.0	- 25.83	- 25.83	1.000	54	54
2487.18	35.16	Av	3.58	28.64	37.64	0.00	29.74	H	1.87	162.8	- 24.24	- 24.24	1.000	54	54
3019.29	34.45	Av	4.01	30.34	37.36	0.00	31.44	H	1.62	144.8	- 22.54	- 22.54	1.000	54	54
3192.42	35.01	Av	4.15	30.87	37.31	0.00	32.72	H	1.47	139.5	- 21.26	- 21.26	1.000	54	54
3602.56	35.52	Av	4.41	31.60	37.79	0.00	33.75	H	1.50	0.0	- 20.23	- 20.23	1.000	54	54

V_230V_50Hz_run_3D_Mini_Printer_Series_23_1GHz-4GHz

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	DELTA1	DELTA2	RBW	Limit 1	Limit 2
1370.19	35.01	Av	2.60	25.16	36.74	0.00	26.03	V	1.00	138.3	- 27.95	- 27.95	1.000	54	54
1871.80	36.68	Av	3.08	27.21	37.16	0.00	29.81	V	1.00	66.9	- 24.17	- 24.17	1.000	54	54
2487.28	35.31	Av	3.58	28.64	37.64	0.00	29.89	V	1.18	216.5	- 24.09	- 24.09	1.000	54	54

Intertek

2836.74	35.41	Av	3.86	29.21	37.59	0.00	30.89	V	1.18	234.9	- 23.09	- 23.09	1.000	54	54
3125.00	35.47	Av	4.09	30.80	37.37	0.00	32.99	V	1.10	125.3	- 20.99	- 20.99	1.000	54	54
3730.77	34.51	Av	4.50	32.37	37.80	0.00	33.57	V	1.00	257.3	- 20.41	- 20.41	1.000	54	54
H_230V_50Hz_run_3D_Mini_Printer_Series_24_1GHz-4GHz															
1440.71	39.02	Av	2.67	25.19	36.65	0.00	30.24	H	1.48	197.3	- 23.74	- 23.74	1.000	54	54
1711.34	35.34	Av	2.93	26.18	36.98	0.00	27.48	H	1.67	69.4	- 26.50	- 26.50	1.000	54	54
2499.56	37.30	Av	3.59	28.67	37.65	0.00	31.91	H	1.75	19.9	- 22.07	- 22.07	1.000	54	54
3307.69	34.93	Av	4.23	31.05	36.99	0.00	33.22	H	1.50	0.0	- 20.76	- 20.76	1.000	54	54
3365.39	34.94	Av	4.26	31.09	36.90	0.00	33.39	H	1.50	234.4	- 20.59	- 20.59	1.000	54	54
3708.33	35.27	Av	4.48	32.25	37.88	0.00	34.13	H	1.50	154.6	- 19.85	- 19.85	1.000	54	54
V_240V_50Hz_run_3D_Mini_Printer_Series_25_1GHz-4GHz															
1432.69	38.42	Av	2.66	25.19	36.65	0.00	29.62	V	1.00	287.2	- 24.36	- 24.36	1.000	54	54
1996.80	35.26	Av	3.19	27.20	37.23	0.00	28.41	V	1.00	150.1	- 25.57	- 25.57	1.000	54	54
2387.82	36.38	Av	3.50	28.38	37.52	0.00	30.74	V	1.00	134.4	- 23.24	- 23.24	1.000	54	54
3125.00	35.41	Av	4.09	30.80	37.37	0.00	32.93	V	1.00	207.8	- 21.05	- 21.05	1.000	54	54
3535.26	35.64	Av	4.37	31.41	37.65	0.00	33.77	V	1.00	88.2	- 20.21	- 20.21	1.000	54	54
3884.62	34.12	Av	4.59	32.86	36.98	0.00	34.59	V	1.00	285.3	- 19.39	- 19.39	1.000	54	54
H_240V_50Hz_run_3D_Mini_Printer_Series_26_1GHz-4GHz															
1551.28	36.83	Av	2.78	25.36	36.67	0.00	28.30	H	1.53	359.9	- 25.68	- 25.68	1.000	54	54
2153.85	35.37	Av	3.31	27.72	37.31	0.00	29.09	H	1.53	354.0	- 24.89	- 24.89	1.000	54	54
2432.69	35.61	Av	3.54	28.52	37.61	0.00	30.06	H	1.50	228.5	- 23.92	- 23.92	1.000	54	54
2500.00	37.45	Av	3.59	28.67	37.65	0.00	32.06	H	1.50	65.9	- 21.92	- 21.92	1.000	54	54
2897.44	35.12	Av	3.91	29.58	37.56	0.00	31.05	H	1.50	220.9	- 22.93	- 22.93	1.000	54	54
3121.80	35.33	Av	4.09	30.79	37.37	0.00	32.84	H	1.50	35.8	- 21.14	- 21.14	1.000	54	54

Test Personnel:	Son La *SL*	Test Date:	1/6/2015
Supervising/Reviewing Engineer:	Richard Georgerian		
Standard:	FCC/CISPR22/ICES-003	Limit Applied:	Class B
Input Voltage:	100-240Vac, 50/60Hz		
Pretest Verification w/ Ambient Signals or BB Source:	__	Ambient Temperature:	21.7 ºC
		Relative Humidity:	37.5 %
		Atmospheric Pressure:	839.7 mbars

Example calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Spec. Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		(dBµV/m)
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

Deviations, Additions, or Exclusions: None

7   AC Mains Conducted Emissions

7.1   Method:

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from FCC 15.107,ICES-003,CISPR22.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

7.2   Measurement Uncertainty:

For conducted emissions, U_{lab}(3.1 dB in worst case) < U_{CISPR}(3.6 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculations

The following is how net line-conducted readings were determined:

NF = RF + LF + CF + AF
Where   NF = Net Reading in dBμV
            RF = Reading from receiver in dBμV
            LF = LISN or ISN Correction Factor in dB
            CF = Cable Correction Factor in dB
            AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
            NF = Net Reading in dBμV

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV
$UF = 10^{(49.1 \text{ dBμV} / 20)} = 285.1$ μV/m

7.3   Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Notes	Cal Date	Cal Due
18765	LISN	EMCO	3825/2	9202-1945	---	04/10/2014	04/10/2015
18885	Transient Limiter	Hewlett-Packard	11947A	3107A00700	---	04/17/2014	04/17/2015
18914	Single Phase LISN	EMCO	3816/NM	9408-1003	---	04/09/2014	04/09/2015
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	Firmware ver. 4.43 SP3	01/29/2014	12/29/15

Software Utilized:

Name	Manufacturer	Version
SW-6: Software for Radiated and Conducted emissions.	Intertek	OATS cvi, V.1.0

7.4   Results:

The sample tested was found   to Comply.

Test Setup - Front

Test Setup – Side

Intertek

Test Setup – Side

Test Setup – Side

7.6   Plots: Reference only.

FCC/CISPR 22/ICES-003 Class B. 120V/60Hz (Live). Stand-by mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.120V/60Hz (Neutral).Stand-by mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 120V/60Hz (Live). Stand-by mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.230V/50Hz (Neutral).Stand-by mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 240V/50Hz (Live). Stand-by mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.240V/50Hz (Neutral).Stand-by mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 120V/60Hz (Live). Run mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.120V/60Hz (Neutral).Run mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 230V/50Hz (Live). Run mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.230V/50Hz (Neutral).Run mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 240V/50Hz (Live). Run mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.240V/50Hz (Neutral).Run mode.
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 120V/60Hz (Live). Auxiliary - stand-by mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.120V/60Hz (Neutral).Auxiliary - stand-by mode
Max hold. Reference only to determine frequencies to be maximized.

Intertek

FCC/CISPR 22/ICES-003 Class B. 230V/50Hz (Live). Auxiliary - stand-by mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.230V/50Hz (Neutral).Auxiliary - stand-by mode
Max hold. Reference only to determine frequencies to be maximized.

Intertek

FCC/CISPR 22/ICES-003 Class B. 240V/50Hz (Live). Auxiliary - stand-by mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.240V/50Hz (Neutral).Auxiliary - stand-by mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 120V/60Hz (Live). Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.120V60Hz (Neutral).Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

Intertek

FCC/CISPR 22/ICES-003 Class B. 230V/50Hz (Live). Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.230V/50Hz (Neutral).Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 240V/50Hz (Live). Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.230V/50Hz (Neutral).Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B. 240V/50Hz (Live). Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

FCC/CISPR 22/ICES-003 Class B.240V/50Hz (Neutral).Auxiliary - run mode
Max hold. Reference only to determine frequencies to be maximized.

7.8   Test Data: Conducted Electromagnetic Emissions

Test Method:	FCC/CISPR22/ICES-003	Test Area:	CC1	Temperature:	21.7 °C
EUT Model #:	KT-PR0035	Test Date:	1/7/2015	Relative Humidity:	37.5 %
EUT Serial #:	KT-PR0035-0051	EUT Power:	100-240Vac, 50/60Hz	Air Pressure:	839.7 mbars

Manufacturer:	Aleph Objects Inc.
EUT Description:	3-D Mini Printer
Notes:	

Level Key

Pk - Peak	Nb - Narrow Band
Qp - QuasiPeak	Bb - Broad Band
Av - Average	

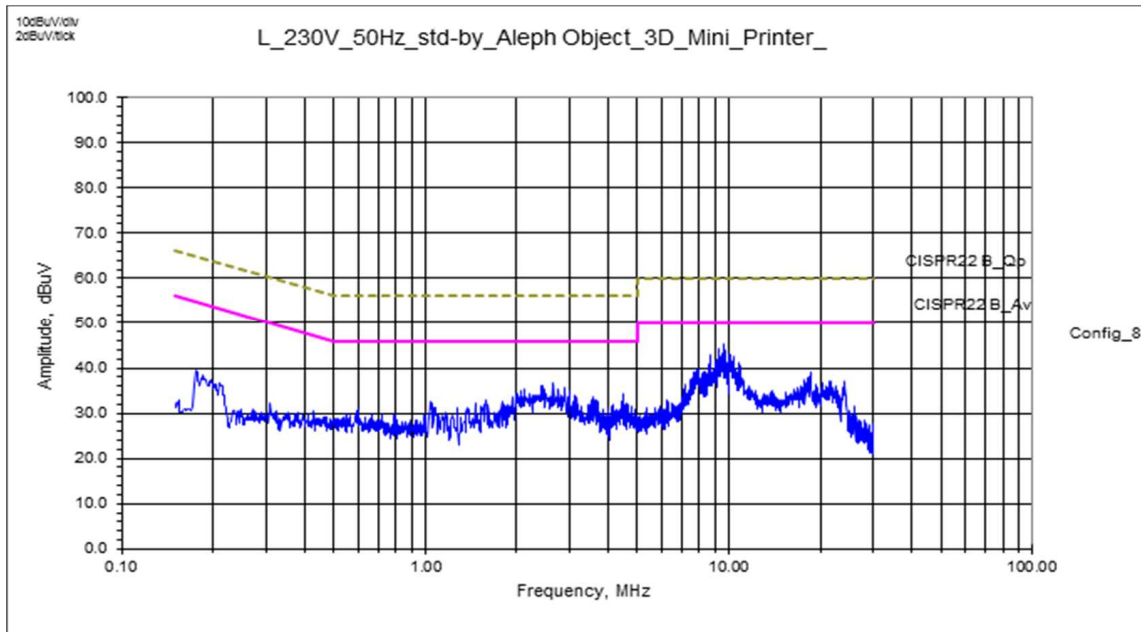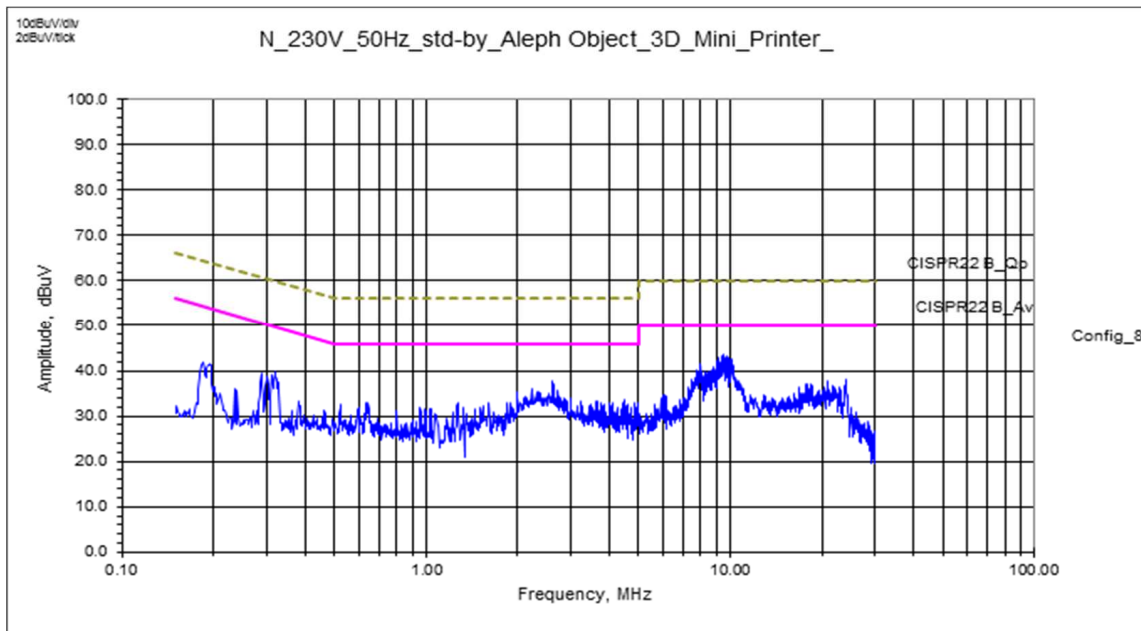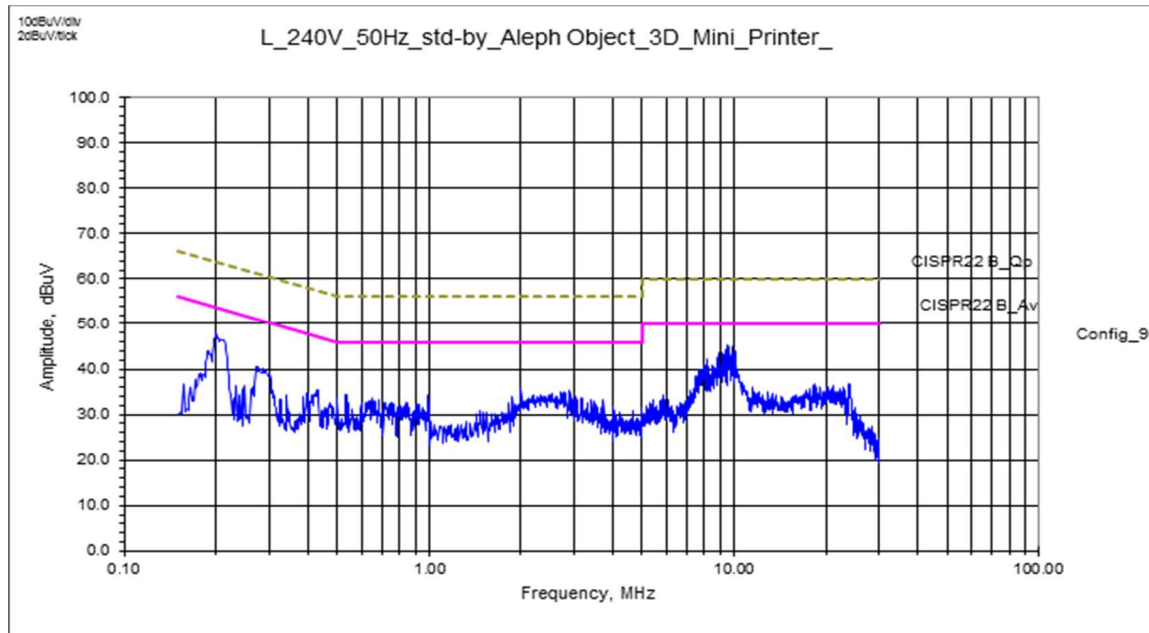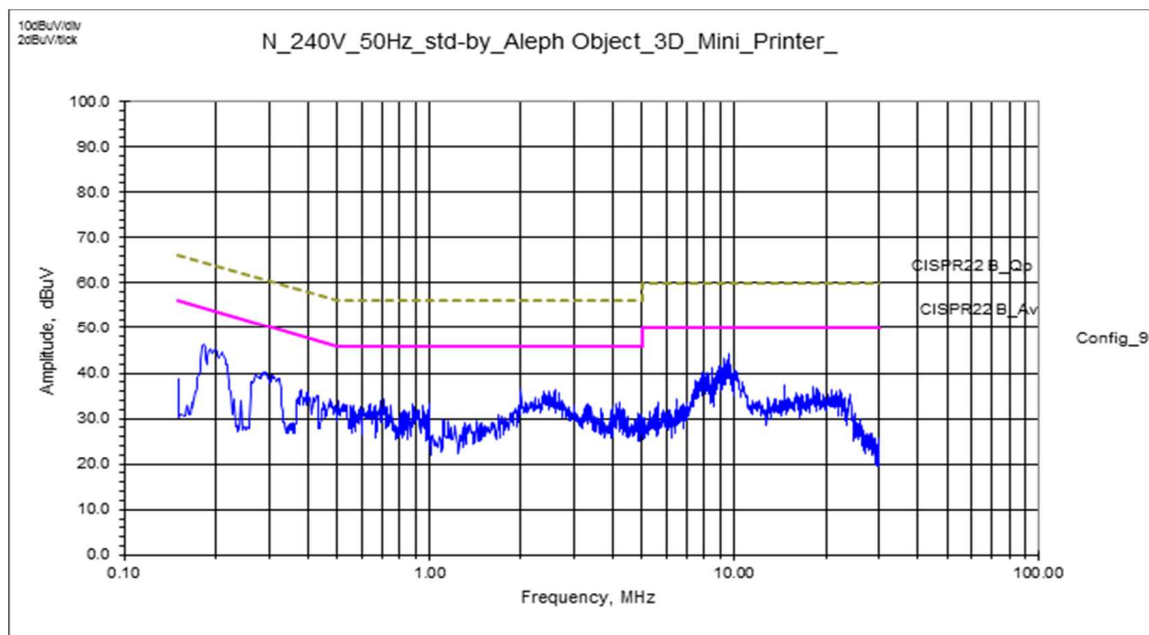| FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL	TEST POINT	DELTA1	DELTA2	RBW	Limit 1	Limit 2
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	Other - N - L1 - L2 - L3	CISPR22 B_Av	CISPR22 B_Qp	(MHz)	CISPR22 B_Av	CISPR22 B_Qp
L_120V_60Hz_Aleph Object_3D_Mini_Printer_													
0.181	34.80	Qp	0.10	0.13	0.00	10.30	45.33	Line 1	NA	- 19.09	0.009	NA	64
0.428	24.88	Qp	0.10	0.12	0.00	10.31	35.41	Line 1	NA	- 21.89	0.009	NA	57
1.999	23.99	Qp	0.20	0.08	0.00	10.32	34.59	Line 1	NA	- 21.41	0.009	NA	56
8.092	26.38	Qp	0.50	0.20	0.00	10.34	37.42	Line 1	NA	- 22.58	0.009	NA	60
10.077	29.54	Qp	0.60	0.28	0.00	10.34	40.77	Line 1	NA	- 19.23	0.009	NA	60
21.281	23.77	Qp	1.10	0.90	0.00	10.36	36.13	Line 1	NA	- 23.87	0.009	NA	60
0.181	20.83	Av	0.10	0.13	0.00	10.30	31.36	Line 1	- 23.06	NA	0.009	54	NA
0.428	13.28	Av	0.10	0.12	0.00	10.31	23.81	Line 1	- 23.49	NA	0.009	47	NA
1.999	20.28	Av	0.20	0.08	0.00	10.32	30.88	Line 1	- 15.12	NA	0.009	46	NA
8.092	20.46	Av	0.50	0.20	0.00	10.34	31.50	Line 1	- 18.50	NA	0.009	50	NA
10.077	23.32	Av	0.60	0.28	0.00	10.34	34.55	Line 1	- 15.45	NA	0.009	50	NA
21.281	16.89	Av	1.10	0.90	0.00	10.36	29.25	Line 1	- 20.75	NA	0.009	50	NA
N_120V_60Hz_Aleph Object_3D_Mini_Printer_													
0.182	31.85	Qp	0.10	0.13	0.00	10.30	42.38	Line 2	NA	- 22.00	0.009	NA	64
0.379	24.22	Qp	0.10	0.12	0.00	10.31	34.75	Line 2	NA	- 23.55	0.009	NA	58
0.600	20.88	Qp	0.10	0.11	0.00	10.32	31.40	Line 2	NA	- 24.60	0.009	NA	56
2.603	21.39	Qp	0.20	0.09	0.00	10.32	32.00	Line 2	NA	- 24.00	0.009	NA	56
9.505	27.56	Qp	0.60	0.28	0.00	10.34	38.78	Line 2	NA	- 21.22	0.009	NA	60
21.603	23.58	Qp	1.10	1.10	0.00	10.36	36.14	Line 2	NA	- 23.86	0.009	NA	60
0.182	18.31	Av	0.10	0.13	0.00	10.30	28.84	Line 2	- 25.54	NA	0.009	54	NA
0.379	11.64	Av	0.10	0.12	0.00	10.31	22.17	Line 2	- 26.13	NA	0.009	48	NA
0.600	10.55	Av	0.10	0.11	0.00	10.32	21.07	Line 2	- 24.93	NA	0.009	46	NA
2.603	14.52	Av	0.20	0.09	0.00	10.32	25.13	Line 2	- 20.87	NA	0.009	46	NA
9.505	21.71	Av	0.60	0.28	0.00	10.34	32.93	Line 2	- 17.07	NA	0.009	50	NA
21.603	16.42	Av	1.10	1.10	0.00	10.36	28.98	Line 2	- 21.02	NA	0.009	50	NA
L_230V_50Hz_Aleph Object_3D_Mini_Printer_													
0.203	34.82	Qp	0.10	0.13	0.00	10.30	45.35	Line 1	NA	- 18.14	0.009	NA	63

0.320	27.00	**Qp**	0.10	0.12	0.00	10.31	37.53		Line 1		NA	- 22.18	0.009	NA	60
1.180	16.73	**Qp**	0.20	0.08	0.00	10.32	27.33		Line 1		NA	- 28.67	0.009	NA	56
2.654	21.78	**Qp**	0.20	0.09	0.00	10.32	32.39		Line 1		NA	- 23.61	0.009	NA	56
9.896	28.54	**Qp**	0.60	0.28	0.00	10.34	39.76		Line 1		NA	- 20.24	0.009	NA	60
18.685	22.89	**Qp**	1.10	0.71	0.00	10.35	35.05		Line 1		NA	- 24.95	0.009	NA	60
0.203	23.11	**Av**	0.10	0.13	0.00	10.30	33.64		Line 1		- 19.85	NA	0.009	53	NA
0.320	15.29	**Av**	0.10	0.12	0.00	10.31	25.82		Line 1		- 23.89	NA	0.009	50	NA
1.180	10.40	**Av**	0.20	0.08	0.00	10.32	21.00		Line 1		- 25.00	NA	0.009	46	NA
2.654	13.77	**Av**	0.20	0.09	0.00	10.32	24.38		Line 1		- 21.62	NA	0.009	46	NA
9.896	22.30	**Av**	0.60	0.28	0.00	10.34	33.52		Line 1		- 16.48	NA	0.009	50	NA
18.685	17.87	**Av**	1.10	0.71	0.00	10.35	30.03		Line 1		- 19.97	NA	0.009	50	NA
N_230V_50Hz_Aleph Object_3D_Mini_Printer_															
0.204	32.35	**Qp**	0.10	0.13	0.00	10.30	42.88		Line 2		NA	- 20.56	0.009	NA	63
0.302	26.86	**Qp**	0.10	0.12	0.00	10.31	37.39		Line 2		NA	- 22.79	0.009	NA	60
0.621	20.42	**Qp**	0.10	0.11	0.00	10.32	30.94		Line 2		NA	- 25.06	0.009	NA	56
2.469	22.52	**Qp**	0.20	0.09	0.00	10.32	33.13		Line 2		NA	- 22.87	0.009	NA	56
9.521	26.76	**Qp**	0.60	0.28	0.00	10.34	37.98		Line 2		NA	- 22.02	0.009	NA	60
18.784	21.16	**Qp**	1.10	0.80	0.00	10.35	33.41		Line 2		NA	- 26.59	0.009	NA	60
0.204	21.39	**Av**	0.10	0.13	0.00	10.30	31.92		Line 2		- 21.52	NA	0.009	53	NA
0.302	14.81	**Av**	0.10	0.12	0.00	10.31	25.34		Line 2		- 24.84	NA	0.009	50	NA
0.621	8.89	**Av**	0.10	0.11	0.00	10.32	19.41		Line 2		- 26.59	NA	0.009	46	NA
2.469	15.11	**Av**	0.20	0.09	0.00	10.32	25.72		Line 2		- 20.28	NA	0.009	46	NA
9.521	20.63	**Av**	0.60	0.28	0.00	10.34	31.85		Line 2		- 18.15	NA	0.009	50	NA
18.784	15.76	**Av**	1.10	0.80	0.00	10.35	28.01		Line 2		- 21.99	NA	0.009	50	NA
L_240V_50Hz_Aleph Object_3D_Mini_Printer_															
0.187	36.83	**Qp**	0.10	0.13	0.00	10.30	47.36		Line 1		NA	- 16.82	0.009	NA	64
0.291	27.17	**Qp**	0.10	0.13	0.00	10.31	37.70		Line 1		NA	- 22.78	0.009	NA	60
0.634	20.72	**Qp**	0.10	0.11	0.00	10.32	31.24		Line 1		NA	- 24.76	0.009	NA	56
2.000	24.33	**Qp**	0.20	0.08	0.00	10.32	34.93		Line 1		NA	- 21.07	0.009	NA	56
9.367	28.68	**Qp**	0.60	0.25	0.00	10.34	39.87		Line 1		NA	- 20.13	0.009	NA	60
18.846	22.61	**Qp**	1.10	0.72	0.00	10.35	34.79		Line 1		NA	- 25.21	0.009	NA	60
0.187	23.92	**Av**	0.10	0.13	0.00	10.30	34.45		Line 1		- 19.73	NA	0.009	54	NA
0.291	14.72	**Av**	0.10	0.13	0.00	10.31	25.25		Line 1		- 25.23	NA	0.009	50	NA
0.634	11.27	**Av**	0.10	0.11	0.00	10.32	21.79		Line 1		- 24.21	NA	0.009	46	NA
2.000	20.65	**Av**	0.20	0.08	0.00	10.32	31.25		Line 1		- 14.75	NA	0.009	46	NA
9.367	22.55	**Av**	0.60	0.25	0.00	10.34	33.74		Line 1		- 16.26	NA	0.009	50	NA
18.846	17.15	**Av**	1.10	0.72	0.00	10.35	29.33		Line 1		- 20.67	NA	0.009	50	NA
N_240V_50Hz_Aleph Object_3D_Mini_Printer_															
0.191	32.73	**Qp**	0.10	0.13	0.00	10.30	43.26		Line 2		NA	- 20.74	0.009	NA	64
0.323	23.69	**Qp**	0.10	0.12	0.00	10.31	34.22		Line 2		NA	- 25.41	0.009	NA	60
0.642	20.47	**Qp**	0.10	0.11	0.00	10.32	30.99		Line 2		NA	- 25.01	0.009	NA	56
2.006	21.07	**Qp**	0.20	0.08	0.00	10.32	31.67		Line 2		NA	- 24.33	0.009	NA	56

FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL		TEST POINT		DELTA1	DELTA2	RBW	Limit 1	Limit 2
9.543	27.52	**Qp**	0.60	0.28	0.00	10.34	38.74		Line 2		NA	- 21.26	0.009	NA	60
17.917	19.82	**Qp**	1.10	0.72	0.00	10.35	31.99		Line 2		NA	- 28.01	0.009	NA	60
0.191	19.80	**Av**	0.10	0.13	0.00	10.30	30.33		Line 2		- 23.67	NA	0.009	54	NA
0.323	12.12	**Av**	0.10	0.12	0.00	10.31	22.65		Line 2		- 26.98	NA	0.009	50	NA
0.642	9.68	**Av**	0.10	0.11	0.00	10.32	20.20		Line 2		- 25.80	NA	0.009	46	NA
2.006	14.18	**Av**	0.20	0.08	0.00	10.32	24.78		Line 2		- 21.22	NA	0.009	46	NA
9.543	21.56	**Av**	0.60	0.28	0.00	10.34	32.78		Line 2		- 17.22	NA	0.009	50	NA
17.917	14.40	**Av**	1.10	0.72	0.00	10.35	26.57		Line 2		- 23.43	NA	0.009	50	NA
FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL		TEST POINT		DELTA1	DELTA2	RBW	Limit 1	Limit 2
		Qp Av Pk							Other -		CISPR22	CISPR22		CISPR22	CISPR22
MHz	dBuV		+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]		N - L1 - L2 - L3		B_Av	B_Qp	(MHz)	B_Av	B_Qp
AUX -Laptop- Accessory Side															
L_120V_60Hz_Aux_Aleph Object_3D_Mini_Printer_															
0.154	38.11	**Qp**	0.10	0.12	0.00	10.30	48.63		Line 1		NA	- 17.14	0.009	NA	66
0.628	35.71	**Qp**	0.10	0.06	0.00	10.32	46.19		Line 1		NA	- 9.81	0.009	NA	56
0.922	26.40	**Qp**	0.20	0.06	0.00	10.32	36.98		Line 1		NA	- 19.02	0.009	NA	56
2.071	20.60	**Qp**	0.20	0.07	0.00	10.32	31.19		Line 1		NA	- 24.81	0.009	NA	56
6.675	11.84	**Qp**	0.40	0.15	0.00	10.33	22.73		Line 1		NA	- 37.27	0.009	NA	60
22.981	15.30	**Qp**	1.10	1.62	0.00	10.36	28.38		Line 1		NA	- 31.62	0.009	NA	60
0.154	27.61	**Av**	0.10	0.12	0.00	10.30	38.13		Line 1		- 17.64	NA	0.009	56	NA
0.628	21.15	**Av**	0.10	0.06	0.00	10.32	31.63		Line 1		- 14.37	NA	0.009	46	NA
0.922	13.11	**Av**	0.20	0.06	0.00	10.32	23.69		Line 1		- 22.31	NA	0.009	46	NA
2.071	9.61	**Av**	0.20	0.07	0.00	10.32	20.20		Line 1		- 25.80	NA	0.009	46	NA
6.675	4.78	**Av**	0.40	0.15	0.00	10.33	15.67		Line 1		- 34.33	NA	0.009	50	NA
22.981	8.76	**Av**	1.10	1.62	0.00	10.36	21.84		Line 1		- 28.16	NA	0.009	50	NA
N_120V_60Hz_Aux_Aleph Object_3D_Mini_Printer_															
0.154	41.31	**Qp**	0.10	- 0.13	0.00	10.30	51.58		Line 2		NA	- 14.19	0.009	NA	66
0.628	28.72	**Qp**	0.10	- 0.06	0.00	10.32	39.08		Line 2		NA	- 16.92	0.009	NA	56
2.686	17.86	**Qp**	0.20	- 0.07	0.00	10.32	28.30		Line 2		NA	- 27.70	0.009	NA	56
5.897	13.89	**Qp**	0.40	- 0.12	0.00	10.33	24.50		Line 2		NA	- 35.50	0.009	NA	60
12.788	9.21	**Qp**	0.82	- 0.39	0.00	10.35	20.00		Line 2		NA	- 40.00	0.009	NA	60
22.019	16.80	**Qp**	1.10	- 1.48	0.00	10.36	26.78		Line 2		NA	- 33.22	0.009	NA	60
0.154	30.09	**Av**	0.10	- 0.13	0.00	10.30	40.36		Line 2		- 15.41	NA	0.009	56	NA
0.628	15.08	**Av**	0.10	- 0.06	0.00	10.32	25.44		Line 2		- 20.56	NA	0.009	46	NA
2.686	7.98	**Av**	0.20	- 0.07	0.00	10.32	18.42		Line 2		- 27.58	NA	0.009	46	NA
5.897	5.64	**Av**	0.40	- 0.12	0.00	10.33	16.25		Line 2		- 33.75	NA	0.009	50	NA
12.788	1.85	**Av**	0.82	- 0.39	0.00	10.35	12.64		Line 2		- 37.36	NA	0.009	50	NA
22.019	10.02	**Av**	1.10	- 1.48	0.00	10.36	20.00		Line 2		- 30.00	NA	0.009	50	NA
L_230V_50Hz_Aux_Aleph Object_3D_Mini_Printer_															
0.226	40.15	**Qp**	0.10	0.09	0.00	10.30	50.64		Line 1		NA	- 11.94	0.009	NA	63
0.319	28.51	**Qp**	0.10	0.07	0.00	10.31	38.99		Line 1		NA	- 20.75	0.009	NA	60

0.632	30.92	Qp	0.10	0.06	0.00	10.32	41.40	Line 1	NA	- 14.60	0.009	NA	56
1.000	22.30	Qp	0.20	0.06	0.00	10.32	32.88	Line 1	NA	- 23.12	0.009	NA	56
7.179	17.32	Qp	0.40	0.17	0.00	10.33	28.22	Line 1	NA	- 31.78	0.009	NA	60
29.968	19.13	Qp	1.40	1.24	0.00	10.36	32.14	Line 1	NA	- 27.86	0.009	NA	60
0.226	21.41	Av	0.10	0.09	0.00	10.30	31.90	Line 1	- 20.68	NA	0.009	53	NA
0.319	15.91	Av	0.10	0.07	0.00	10.31	26.39	Line 1	- 23.35	NA	0.009	50	NA
0.632	19.79	Av	0.10	0.06	0.00	10.32	30.27	Line 1	- 15.73	NA	0.009	46	NA
1.000	11.84	Av	0.20	0.06	0.00	10.32	22.42	Line 1	- 23.58	NA	0.009	46	NA
7.179	9.07	Av	0.40	0.17	0.00	10.33	19.97	Line 1	- 30.03	NA	0.009	50	NA
29.968	14.85	Av	1.40	1.24	0.00	10.36	27.86	Line 1	- 22.14	NA	0.009	50	NA
N_230V_50Hz_Aux_Aleph Object_3D_Mini_Printer_													
0.228	41.16	Qp	0.10	- 0.09	0.00	10.30	51.47	Line 2	NA	- 11.06	0.009	NA	63
0.315	33.10	Qp	0.10	- 0.07	0.00	10.31	43.43	Line 2	NA	- 16.41	0.009	NA	60
0.649	30.42	Qp	0.10	- 0.06	0.00	10.32	40.78	Line 2	NA	- 15.22	0.009	NA	56
2.788	15.42	Qp	0.22	- 0.07	0.00	10.32	25.88	Line 2	NA	- 30.12	0.009	NA	56
7.372	18.36	Qp	0.42	- 0.16	0.00	10.33	28.96	Line 2	NA	- 31.04	0.009	NA	60
29.968	20.42	Qp	1.40	- 1.22	0.00	10.36	30.96	Line 2	NA	- 29.04	0.009	NA	60
0.228	23.84	Av	0.10	- 0.09	0.00	10.30	34.15	Line 2	- 18.38	NA	0.009	53	NA
0.315	17.01	Av	0.10	- 0.07	0.00	10.31	27.34	Line 2	- 22.50	NA	0.009	50	NA
0.649	18.10	Av	0.10	- 0.06	0.00	10.32	28.46	Line 2	- 17.54	NA	0.009	46	NA
2.788	5.32	Av	0.22	- 0.07	0.00	10.32	15.78	Line 2	- 30.22	NA	0.009	46	NA
7.372	10.17	Av	0.42	- 0.16	0.00	10.33	20.77	Line 2	- 29.23	NA	0.009	50	NA
29.968	16.04	Av	1.40	- 1.22	0.00	10.36	26.58	Line 2	- 23.42	NA	0.009	50	NA
L_240V_50Hz_Aux_Aleph Object_3D_Mini_Printer_													
0.228	47.58	Qp	0.10	0.09	0.00	10.30	58.07	Line 1	NA	- 4.46	0.009	NA	63
0.315	42.25	Qp	0.10	0.07	0.00	10.31	52.73	Line 1	NA	- 7.11	0.009	NA	60
0.630	36.95	Qp	0.10	0.06	0.00	10.32	47.43	Line 1	NA	- 8.57	0.009	NA	56
0.996	29.38	Qp	0.20	0.06	0.00	10.32	39.96	Line 1	NA	- 16.04	0.009	NA	56
7.444	23.60	Qp	0.44	0.18	0.00	10.33	34.55	Line 1	NA	- 25.45	0.009	NA	60
9.768	14.76	Qp	0.60	0.26	0.00	10.34	25.97	Line 1	NA	- 34.03	0.009	NA	60
0.228	29.17	Av	0.10	0.09	0.00	10.30	39.66	Line 1	- 12.87	NA	0.009	53	NA
0.315	24.16	Av	0.10	0.07	0.00	10.31	34.64	Line 1	- 15.20	NA	0.009	50	NA
0.630	26.21	Av	0.10	0.06	0.00	10.32	36.69	Line 1	- 9.31	NA	0.009	46	NA
0.996	19.66	Av	0.20	0.06	0.00	10.32	30.24	Line 1	- 15.76	NA	0.009	46	NA
7.444	15.80	Av	0.44	0.18	0.00	10.33	26.75	Line 1	- 23.25	NA	0.009	50	NA
9.768	9.05	Av	0.60	0.26	0.00	10.34	20.26	Line 1	- 29.74	NA	0.009	50	NA
N_240V_50Hz_Aux_Aleph Object_3D_Mini_Printer_													
0.228	37.58	Qp	0.10	- 0.09	0.00	10.30	47.89	Line 2	NA	- 14.64	0.009	NA	63
0.315	32.62	Qp	0.10	- 0.07	0.00	10.31	42.95	Line 2	NA	- 16.89	0.009	NA	60
0.657	30.82	Qp	0.10	- 0.06	0.00	10.32	41.18	Line 2	NA	- 14.82	0.009	NA	56
0.993	22.81	Qp	0.20	- 0.06	0.00	10.32	33.27	Line 2	NA	- 22.73	0.009	NA	56
7.612	16.81	Qp	0.47	- 0.17	0.00	10.34	27.45	Line 2	NA	- 32.55	0.009	NA	60

30.000	29.15	**Qp**	1.40	- 1.22	0.00	10.36	39.69		Line 2		NA	- 20.31	0.120	NA	60
0.228	22.23	**Av**	0.10	- 0.09	0.00	10.30	32.54		Line 2		- 19.99	NA	0.009	53	NA
0.315	18.61	**Av**	0.10	- 0.07	0.00	10.31	28.94		Line 2		- 20.90	NA	0.009	50	NA
0.657	19.44	**Av**	0.10	- 0.06	0.00	10.32	29.80		Line 2		- 16.20	NA	0.009	46	NA
0.993	13.55	**Av**	0.20	- 0.06	0.00	10.32	24.01		Line 2		- 21.99	NA	0.009	46	NA
7.612	9.38	**Av**	0.47	- 0.17	0.00	10.34	20.02		Line 2		- 29.98	NA	0.009	50	NA
30.000	21.84	**Av**	1.40	- 1.22	0.00	10.36	32.38		Line 2		- 17.62	NA	0.120	50	NA

Test Personnel:	Son La *SL*	Test Date:	1/7/2015
Supervising/Reviewing Engineer:	Richard Georgerian		
Standard:	FCC/CISPR22/ICES-003	Limit Applied:	Class B
Input Voltage:	100-240Vac, 50/60Hz		
Pretest Verification w/ Ambient Signals or BB Source:	--	Ambient Temperature:	21.7 ºC
		Relative Humidity:	37.5 %
		Atmospheric Pressure:	839.7 mbars

Example calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Spec. Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		(dBµV/m)
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

Deviations, Additions, or Exclusions: None

8   Telecom Port Conducted Emissions-not applicable

8.1   Method:

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from CISPR22.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

8.2   Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Notes	Cal Date	Cal Due
None	N/A						

Software Utilized:

Name	Manufacturer	Version
None		

8.3   Results:

Product has no telecom ports or cables - test not applicable.

9   Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty ±	Notes
Radiated emissions, 10kHz to 30 MHz	4.2 dB	
Radiated emissions, 30 to 200 MHz HP	3.6 dB	
Radiated emissions, 30 to 200 MHz VP	4.5 dB	
Radiated emissions, 200 to 1000 MHz HP	3.7 dB	
Radiated emissions, 200 to 1000 MHz VP	3.7 dB	
Radiated emissions, 1 to 18 GHz	5.4 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.3 dB	
Disturbance Power 30 to 1000 MHz	3.3 dB	
Telecom Port Conducted emissions, Voltage	4.8 dB	
Harmonics	-	Meets the requirements specified by the standard.
Flicker	-	Meets the requirements specified by the standard.
ESD	4.4%	
Radiated RF field immunity 80MHz to 2.7GHz	2.2 dB	
EFT	4.3%	
Surge	4.3%	
Conducted RF immunity	2.1 dB	
Power frequency magnetic field immunity	2.3 dB	
Voltage dips / interruptions immunity	0.3 mV	

Intertek

10   Revision History

Revision Level	Date	Report Number	Notes
0	01/27/2015	101965930DEN-001	Original Issue

Appendix A: Modifciations not required