

Philips Respironics **TEST REPORT**

SCOPE OF WORK

EMC TESTING – TRILOGY EVO VENTILATOR WITH OBM

REPORT NUMBER

103284061LAX-005

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February 15, 2018

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EMC TEST REPORT (FULL COMPLIANCE)

Report Number: 103284061LAX-005

Project Number: G103284061

Report Issue Date: February 15, 2018

Model(s) Tested: Trilogy Evo Ventilator with OBM

Model(s) Partially Tested: None

Model(s) Not Tested but declared equivalent by the client: Trilogy Evo Ventilator

Standards: FCC CFR47 Part 15 Subpart C, December 2017

Intentional Radiator

§15.225, Operation within the bands 13.110-14.010 MHz

ISED RSS-210 Issue 9, August 2016 (Amendment November 2017)

License-Exempt Radio Apparatus: Category I Equipment

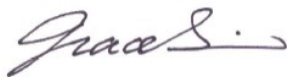
ISED RSS-Gen Issue 4, November 13, 2014

General Requirements for Compliance of Radio Apparatus

Tested by:
Intertek
25791 Commercentre Drive
Lake Forest, CA 92630
USA

Client:
Philips Respironics
1740 Golden Mile Highway
Monroeville, PA 15146
USA

Report prepared by



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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. 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. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	-
4	Description of Equipment Under Test and Variant Models	-
5	System Setup and Method	-
6	Field Strength at Fundamental and Radiated Emissions Outside of the band (FCC §15.225(a)(b)(c)(d); ISED RSS-210 §B.6a, b, c, d)	Compliant
7	Frequency Stability (FCC §15.225(e); ISED RSS-210 §B.6)	Compliant
8	Occupied Bandwidth (FCC §15.215(c); ISED RSS-Gen Issue 4 §6.6)	Compliant
9	AC Mains Conducted Emissions (FCC §15.207; ISED RSS-Gen Issue 4 §8.8)	Compliant
10	Revision History	-

3 Client Information

This EUT was tested at the request of:

Client: Philips Respironics
1740 Golden Mile Highway
Monroeville, PA 15146
USA

Contact: Jimmy Cheng
Telephone: 724-334-6935
Email: J.Cheng@Philips.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Philips Respironics
1001 Murry Ridge Lane
Murrysville, PA 15668
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Trilogy Evo Ventilator with OBM	Philips Respironics	Trilogy Evo Ventilator with OBM	HPP1513072E8C
Receive Date:	12/11/2017	Test Started	12/20/2017
Received Condition:	Good	Test Ended	01/30/2018
Type:	Production		

Description of Equipment Under Test (provided by client)

The Trilogy Evo2 Ventilator (Project codename: Helix) provides invasive and non-invasive positive pressure ventilation for the care of newborn (>2.5 kg) through adult patients. The ventilator can measure, display, record, and alarm SpO₂, FiO₂, CO₂, Respiratory Rate, and Heart Rate data when integrated with the appropriate accessories. The ventilator is suitable for use in institutional, home, and transport settings.

The EUT contains a 13.56 MHz NFC transmitter and an FCC and ISED certified transmitter module providing Bluetooth and Wi-Fi functionality.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
100 -240 Vac	2.5 A	50 Hz / 60 Hz	1

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Test Mode – Continuously Transmitting

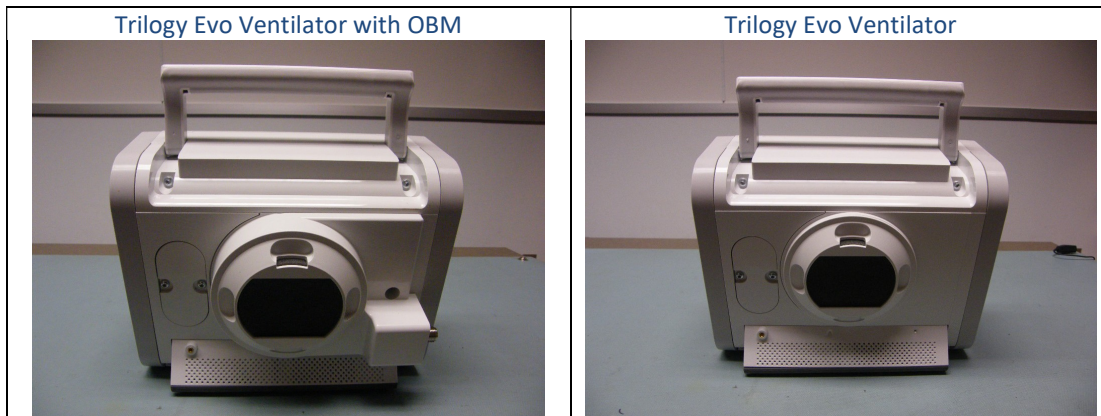
Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Under test mode, the EUT was programmed to transmit continuously during testing.

Radio/Receiver Characteristics	
Frequency Band(s)	13.56 – 13.56 MHz
Modulation Type(s)	ASK
Maximum Field Strength at Fundamental Test Channels	64.8 dBuV/m @ 3m
Occupied Bandwidth	598.4 kHz (99%)
Equipment Type	Standalone
Antenna Type and Gain	Internal PCB Antenna

Variant Models:

Per manufacturer, the only difference between the two hardware models (“Trilogy Evo Ventilator with OBM” and “Trilogy Evo Ventilator”) is that “Trilogy Evo Ventilator with OBM” has all the hardware, and “Trilogy Evo Ventilator” is identical, but with one subsection not populated. The parts removed in the variant model consists of a plug in Oxygen Blending module (OBM) containing a valve that regulates the flow of Oxygen into the unit, an air flow sensor, a pressure sensor and a wire harness that connects the sensor outputs and valve drive to the main portion of the unit. Multiple model numbers are for different markets. All radio tests were performed on model: Trilogy Evo Ventilator with OBM only. The results in this report are valid for the other model Trilogy Evo Ventilator as well.



The model/Type listed in the following table are the variation for the US and Canada markets.

5 System Setup and Method

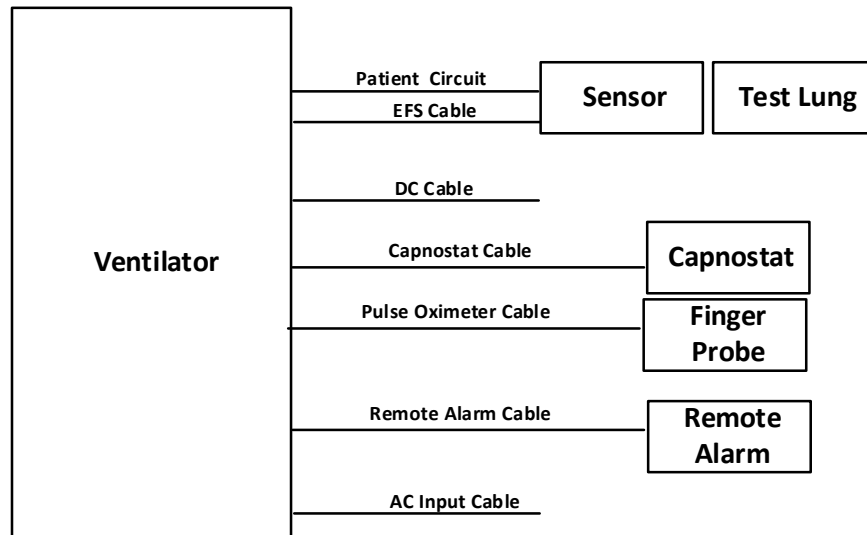
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	Capnostat Cable with attached eTCO2 adaptor. USB connector	3.4	Yes	Yes	Yes
2	USB Pulse Oximeter Cable with attached Pulse Oximeter. USB connector	2.2	Yes	Yes	Yes
3	EFS Cable. Circular connector (Vent side), pogo pins to sensor (other end)	2.5	No	Yes	Yes
4	Remote Alarm Cable. Phone jack	61	No	No	Yes
5	DC Power Cable. Circular connector (Vent side), ring terminals (other end)	1.8	No	No	Yes
6	AC Line Cord	4.3	No	No	Yes

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	Lenovo	80UD	MP147DKQ

5.1 Method:

Configuration as required by ANSI C63.10-2013.

5.2 Test Setup Block Diagram:



6 Field Strength at Fundamental and Radiated Emissions Outside the band

6.1 Performance Requirement(s)

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in FCC §15.209.

6.2 Method

Tests are performed in accordance with ANSI C63.10-2013.

Radiated Measurements Below 30 MHz

The measurement antenna is positioned with its plane perpendicular to the ground. The lowest height of the antenna is 1 m above the ground and is positioned at the 3 meters from the EUT. Radiated emissions are taken at three meters unless specified otherwise.

During the test the EUT is rotated and the measuring antenna angles are varied during the search for maximum signal level.

Radiated Measurements Above 30 MHz

During the test the EUT is rotated and the measuring antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless specified otherwise. If necessary, a pre-amplifier is used. Radiated emission measurements were performed from 9kHz to 1 GHz, with the following resolution bandwidths:

- 200Hz or greater for 9kHz to 150kHz
- 9 kHz or greater for 150kHz to 30 MHz
- 120 kHz or greater for 30MHz to 1000 MHz
- For those frequencies quasi-peak detector applies

Data includes of the worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, test setup diagrams and data tables of the emissions are included.

TEST SITE:

The test is performed in the 3-meter semi-anechoic chamber located at 25791 Commercentre Drive, Lake Forest, California 92630 USA. This test facility meets the requirements of CISPR 16-1-4 and has been accredited by A2LA. IC test site registration number is 2042T.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
Radiated Emissions, 3m	30-1000 MHz	4.3	6.3 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} 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 dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- 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 dB μ V 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB}\mu\text{V}$$

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

6.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
637	3m Semi-anechoic Chamber	Panashield	3 meter	25 331-D-Z	December 2015	December 2018
1669	EMI Test Receiver	R&S	ESW44	101636	07/14/2017	07/14/2018
1140	EMI Test Receiver	R&S	ESCI7	100825	02/21/2017	02/21/2018
1147	Bilog Antenna	TESEQ Gmbh	CBL 6112D	32852	11/16/2017	11/16/2018
590	Loop Antenna	EMCO	6502	9807-3213	07/27/2017	07/27/2018
1568	Pre-amp	Rhode & Schwarz	TS-PR1	102061	12/28/2016	12/28/2017
1517	Cable	R&S	TSPR-B7	101528	07/13/2017	07/13/2018
1518	Cable	R&S	TSPR-B7	101529	07/13/2017	07/13/2018
1002	Barometer Temp/Humidity	Omega	IBTHX-W	0440776	01/22/2017	01/22/2018

Software Utilized:

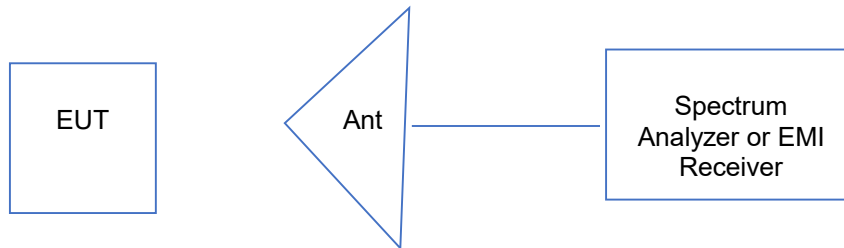
Name	Manufacturer	Version	Profile
N/A	N/A	N/A	N/A

6.4 Results:

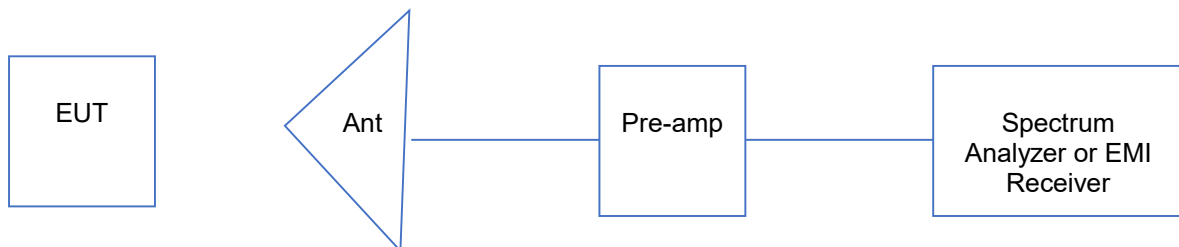
The sample tested was found to Comply.

6.5 Setup Diagram:

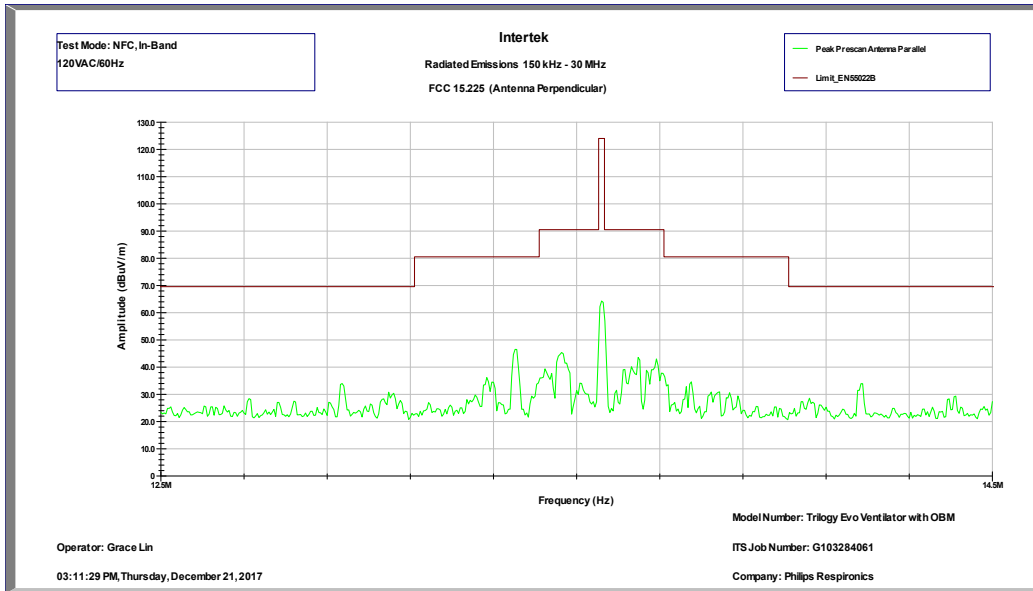
Below 30 MHz:



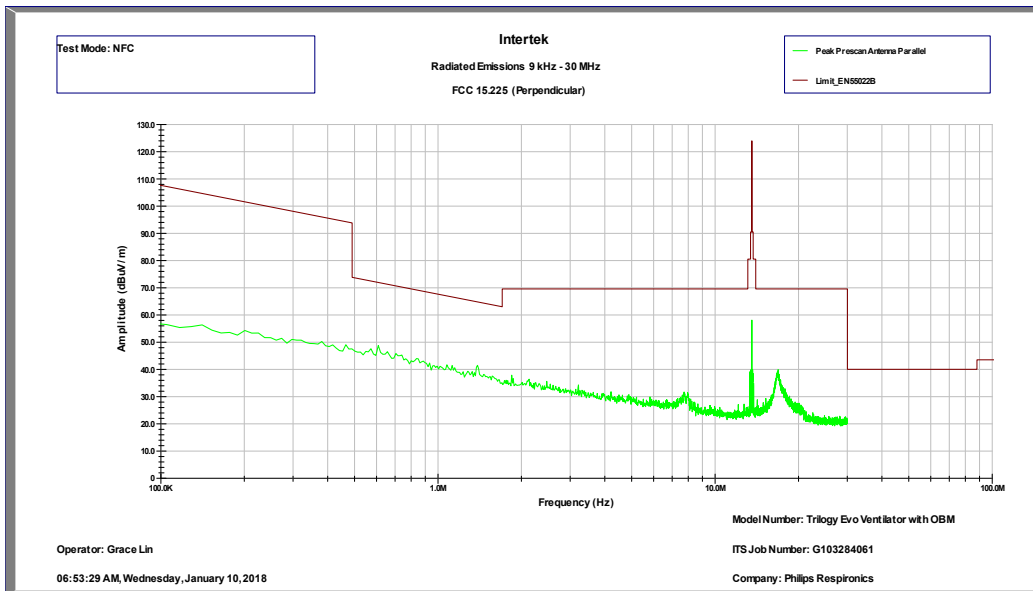
30 MHz – 1 GHz:



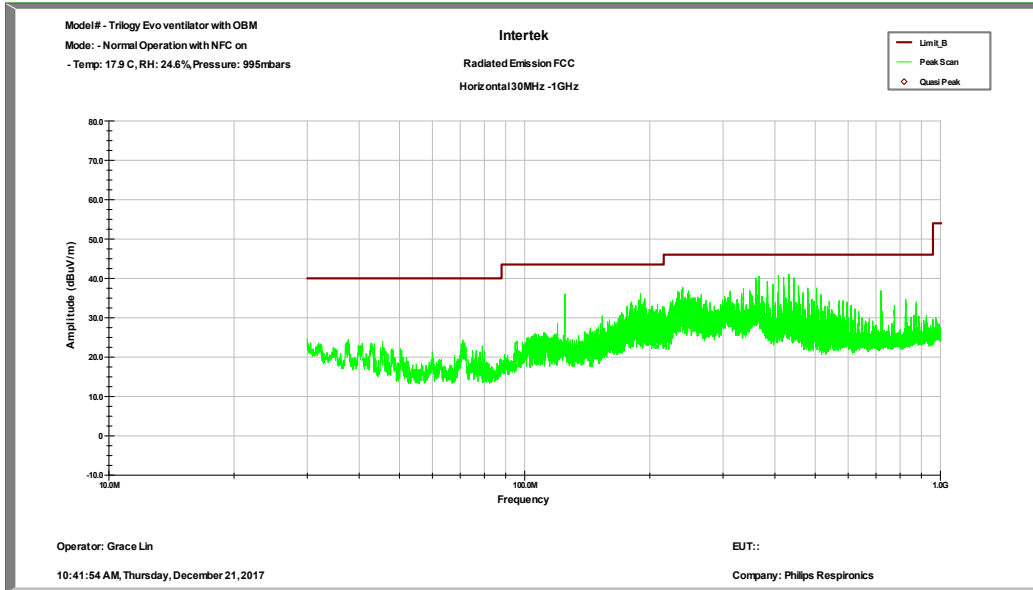
6.6 Plots/Data:



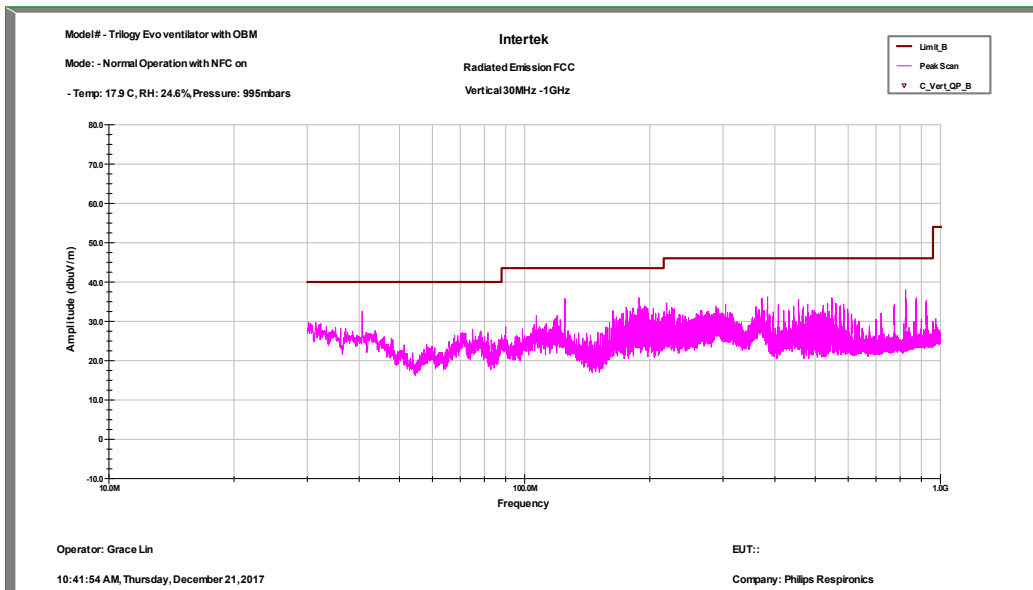
Field Strength at Fundamental



Radiated Emissions below 30 MHz, Antenna: Perpendicular (Worst case)



Radiated Emissions 30 MHz – 1GHz, Antenna: Horizontal



Radiated Emissions 30 MHz – 1GHz, Antenna: Vertical

Field Strength at Fundamental

Frequency	PK FS	Limit@3m	Margin	RA	AG	AF	CF	TT	Ant. HT	Ant. Pol.
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB(1/m)	dB	degree	cm	
13.56	64.8	124.0	-59.2	52.1	0.0	10.7	2.0	114.0	100	Perpendicular

Radiated Emissions – Out-of-band

Frequency	Quasi PK FS	Limit@3m	Margin	RA	AG	AF	CF	Ant Hgt	TT	Ant. Pol.
MHz	dBuV/m	dBuV/m	dB	dB	dB	dB	dB	cm	deg	
125.0	33.6	43.5	-9.9	41.9	29.1	18.2	2.7	221	280	H
190.0	30.1	43.5	-13.4	42.1	29.1	15.0	2.1	127	113	H
240.0	34.4	46.0	-11.6	43.8	28.9	17.4	2.1	124	55	H
365.9	36.1	46.0	-10.0	41.7	28.8	21.0	2.2	121	342	H
432.2	30.1	46.0	-15.9	34.1	28.9	22.5	2.4	118	195	H
720.0	28.1	46.0	-17.9	29.2	29.0	25.3	2.6	119	288	H
825.0	31.0	46.0	-15.0	30.9	28.5	26.0	2.6	175	325	V

<p>Test Personnel: <u>Grace Lin</u></p> <p>Product Standard: <u>FCC 15.225, ISED RSS-210</u></p> <p>Input Voltage: <u>120 Vac, 60 Hz</u></p> <p>Pretest Verification w/ BB Source: <u>Yes</u></p>	<p>Test Date: <u>12/21/2017, 01/10/2018</u></p> <p>Limit Applied: <u>FCC 15.225(a)(b)(c)(d), ISED RSS-210 §B.6a, b, c, d</u></p> <p>Ambient Temperature: <u>17.9 °C</u></p> <p>Relative Humidity: <u>24.6 %</u></p> <p>Atmospheric Pressure: <u>995 mbars</u></p>
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Deviations, Additions, or Exclusions: None

7 Frequency Stability

7.1 Performance Requirement(s)

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+ 50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.2 Method

Tests are performed in accordance with ANSI C63.10-2013, Sections 6.8.1 and 6.8.2.

The EUT was placed in an environmental test chamber. An EMI receiver was placed outside of the chamber and connected to a loop antenna inside of the chamber. For each temperature, the carrier frequency was recorded. In addition, the carrier frequency was recorded when the power was set to 85% and 115% of the rated voltage.

TEST SITE:

The test is performed in the PV laboratory located at 25791 Commercentre Drive, Lake Forest, California 92630 USA. This test facility meets the requirements of CISPR 16-1-4 and has been accredited by A2LA. ISED test site registration number is 2042T.

7.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
1052	Environmental Test Chamber	ESPEC	EWSX376-22CW	3211372	06/14/2017	06/14/2018
1669	EMI Test Receiver	R&S	ESW44	101636	07/14/2017	07/14/2018
590	Loop Antenna	EMCO	6502	9807-3213	07/27/2017	07/27/2018
1002	Barometer Temp/Humidity	Omega	IBTHX-W	0440776	01/22/2017	01/22/2018

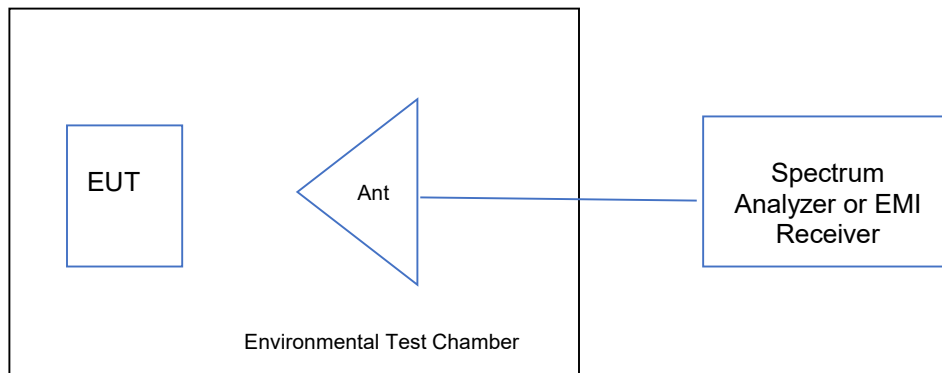
Software Utilized:

Name	Manufacturer	Version	Profile
N/A	N/A	N/A	N/A

7.4 Results:

The sample tested was found to Comply.

7.5 Test Setup Diagram:



7.6 Plots/Data:

Temperature (°C)	Carrier (MHz)	Supply Voltage		Frequency Deviation	
		(Vac)	(%)	(kHz)	(%)
-30	13.560045550	120	100	0.0455	0.0003
-20	13.560039160	120	100	0.0392	0.0003
-10	13.560036160	120	100	0.0362	0.0003
0	13.560031770	120	100	0.0318	0.0002
10	13.560033470	120	100	0.0335	0.0002
20	13.560032970	120	100	0.0330	0.0002
20	13.560032470	102	85	0.0325	0.0002
20	13.560031470	138	115	0.0315	0.0002
30	13.560033470	120	100	0.0335	0.0002
40	13.560033170	120	100	0.0332	0.0002
50	13.560035560	120	100	0.0356	0.0003

<p>Test Personnel: <u>Grace Lin / Martin Liu</u></p> <p>Product Standard: <u>FCC 15.225</u></p> <p>Input Voltage: <u>120 Vac, 60 Hz</u></p> <p>Pretest Verification w/ BB Source: <u>N/A</u></p>	<p>Test Date: <u>12/22/2017</u></p> <p>Limit Applied: <u>FCC 15.225</u></p> <p>Ambient Temperature: <u>20 °C</u></p> <p>Relative Humidity: <u>45.8 %</u></p> <p>Atmospheric Pressure: <u>991.5 mbars</u></p>
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Deviations, Additions, or Exclusions: None

8 Occupied Bandwidth

8.1 Performance Requirement(s)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.

8.2 Method

Tests are performed in accordance with ANSI C63.10-2013.

The EUT was setup to transmit in normal operating condition. Measurements were made with the loop antenna in close proximity of the EUT. Following the procedures of ANSI 63.10, the 20dB bandwidth measurements were taken. The following plots show Occupied Bandwidth.

TEST SITE:

The test is performed in the wireless laboratory located at 25791 Commercentre Drive, Lake Forest, California 92630 USA. This test facility meets the requirements of CISPR 16-1-4 and has been accredited by A2LA. ISED test site registration number is 2042T.

8.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
1669	EMI Test Receiver	R&S	ESW44	101636	07/14/2017	07/14/2018
590	Loop Antenna	EMCO	6502	9807-3213	07/27/2017	07/27/2018
1002	Barometer Temp/Humidity	Omega	IBTHX-W	0440776	01/22/2017	01/22/2018

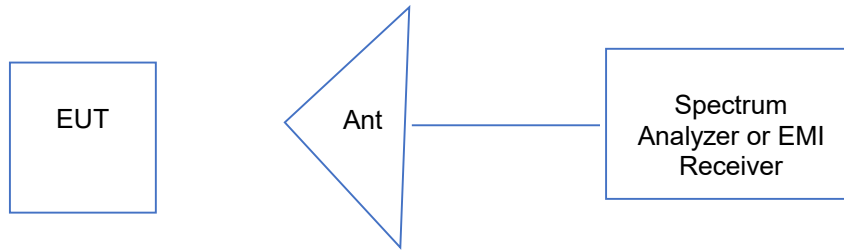
Software Utilized:

Name	Manufacturer	Version	Profile
N/A	N/A	N/A	N/A

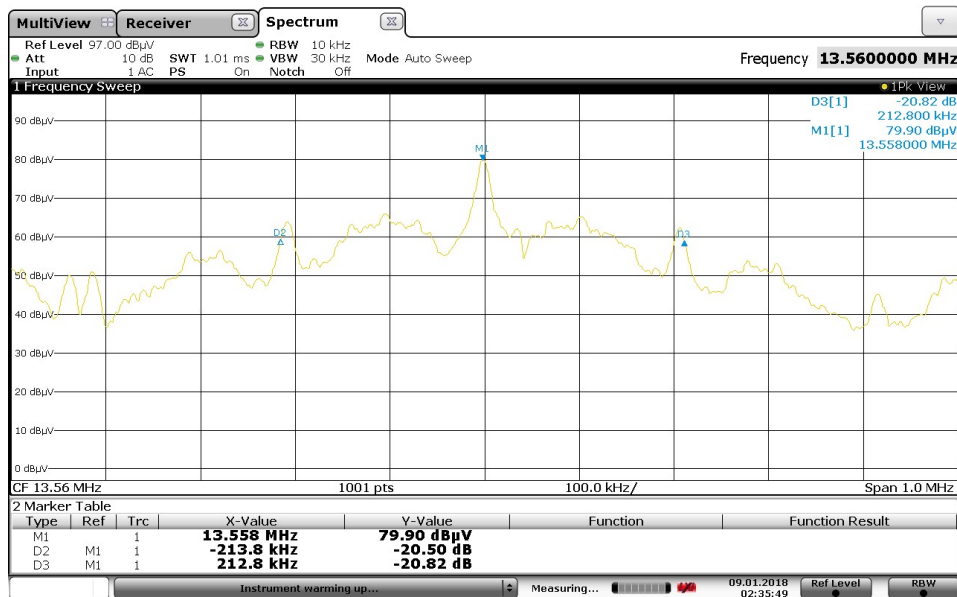
8.4 Results:

The sample tested was found to Comply.

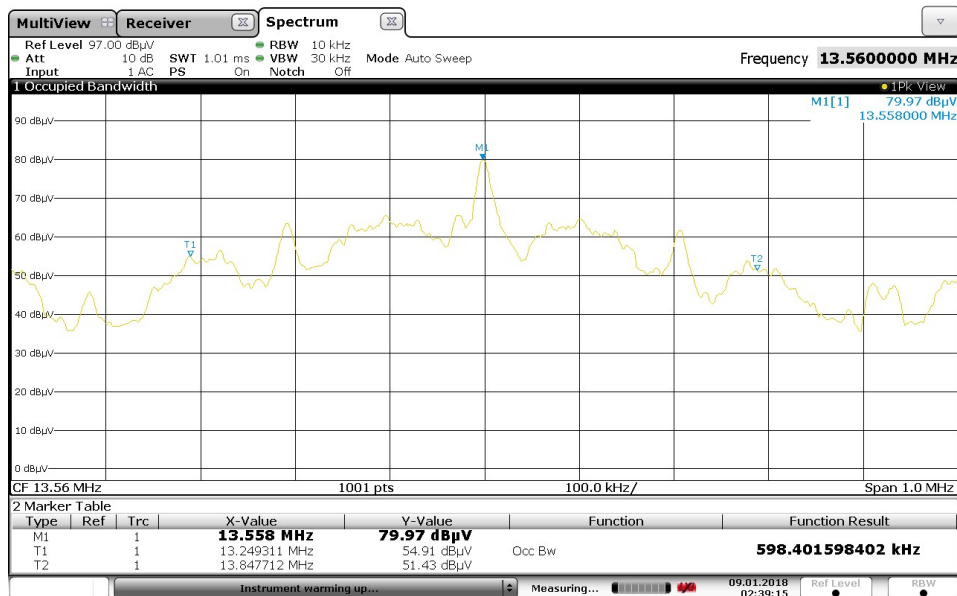
8.5 Setup Diagram:



8.6 Plots/Data:



02:35:50 09.01.2018



02:39:16 09.01.2018

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
13.56	426.6	598.4

Test Personnel:	Grace Lin	Test Date:	01/08/2018
Product Standard:	FCC 15.225 ISED RSS-210	Limit Applied:	FCC 15.215(c), ISED RSS-Gen I4 §6.6
Input Voltage:	120 Vac, 60 Hz	Ambient Temperature:	22.4 °C
Pretest Verification w/ BB Source:	N/A	Relative Humidity:	56.9 %
		Atmospheric Pressure:	988.8 mbars

Deviations, Additions, or Exclusions: None

9 AC Mains Conducted Emissions

9.1 Performance Criterion

Frequency Band MHz	Class B Limit dB(μ V)		Class A Limit dB(μ V)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15-0.50	66 to 56 *	56 to 46 *	79	66
0.50-5.00	56	46	73	60
5.00-30.00	60	50	73	60

*Note: *Decreases linearly with the logarithm of the frequency
At the transition frequency the lower limit applies.*

9.2 Method

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

TEST SITE:

The test is performed in the 3 meter semi-anechoic chamber located at 25791 Commercentre Drive, Lake Forest, California 92630 USA. This test facility meets the requirements of CISPR 16-1-4 and has been accredited by A2LA. IC test site registration number is 2042T.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
AC Line Conducted Emissions	150 kHz - 30 MHz	2.1 dB	3.4dB

As shown in the table above our conducted emissions U_{lab} is less than the corresponding U_{CISPR} 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 dB μ V

RF = Reading from receiver in dB μ V

LF = LISN or ISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 285.1 \mu\text{V/m}$$

9.3 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
637	3m Semi-anechoic Chamber	Panashield	3 meter	25 331-D-Z	December 2015	December 2018
1140	EMI Test Receiver	R&S	ESCI7	100825	02/21/2017	02/21/2018
667	LISN	Teseq	NNB 51	36060	12/26/2017	12/26/2018
1470	Cable	MegaPhase	TM18-N1N1	-	06/16/2017	06/16/2018
1002	Barometer Temp/Humidity	Omega	IBTHX-W	0440776	01/22/2017	01/22/2018

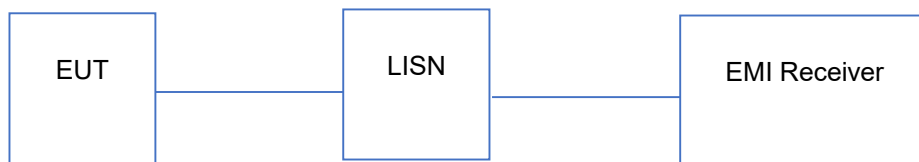
Software Utilized:

Name	Manufacturer	Version	Profile
Tile	Quantum Change	4.1	Master CE FCC

9.4 Results:

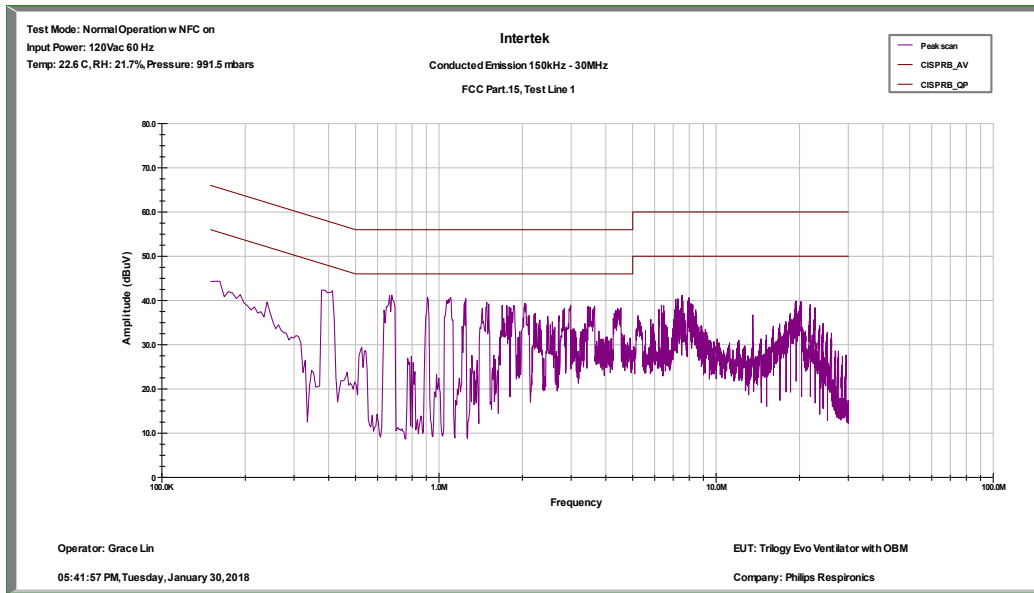
The sample tested was found to Comply.

9.5 Test Setup Diagram:



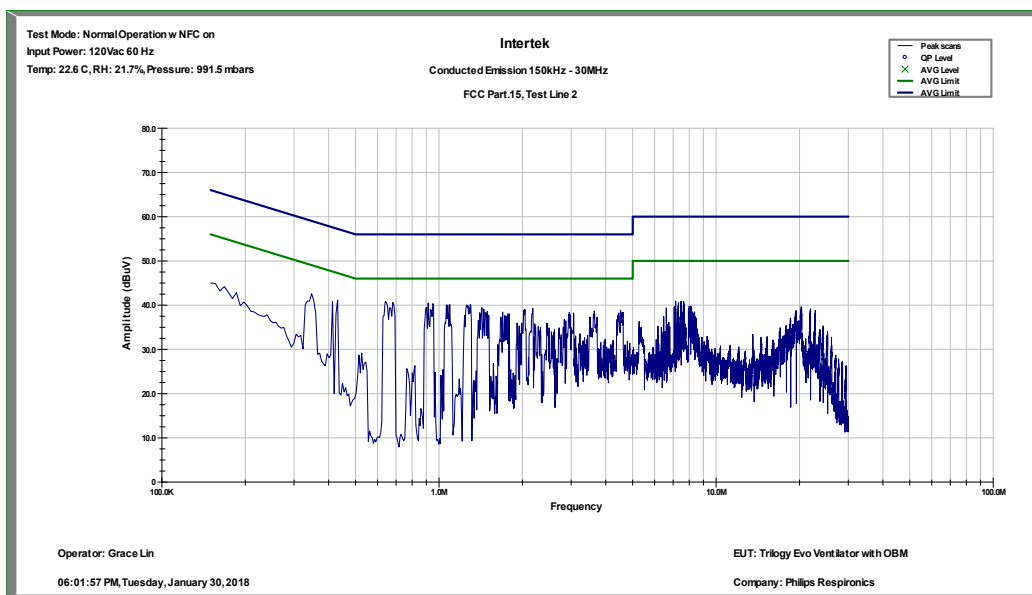
9.6 Plots/Data:

Line 1, NFC terminated:



Frequency	AVG Level	QP Level	AVG Limit	QP Limit	AVG Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.152	10.7	36.3	56.0	66.0	-45.2	-29.7
0.404	26.1	38.8	48.8	58.8	-22.6	-20.0
0.686	16.4	35.6	46.0	56.0	-29.6	-20.4
0.909	20.0	35.4	46.0	56.0	-26.0	-20.6
1.095	2.2	33.5	46.0	56.0	-43.8	-22.5
1.245	8.4	32.2	46.0	56.0	-37.6	-23.8
1.480	17.1	35.1	46.0	56.0	-28.9	-20.9
7.532	10.9	28.6	50.0	60.0	-39.1	-31.4
19.347	13.9	29.8	50.0	60.0	-36.2	-30.2

Line 2, NFC terminated:



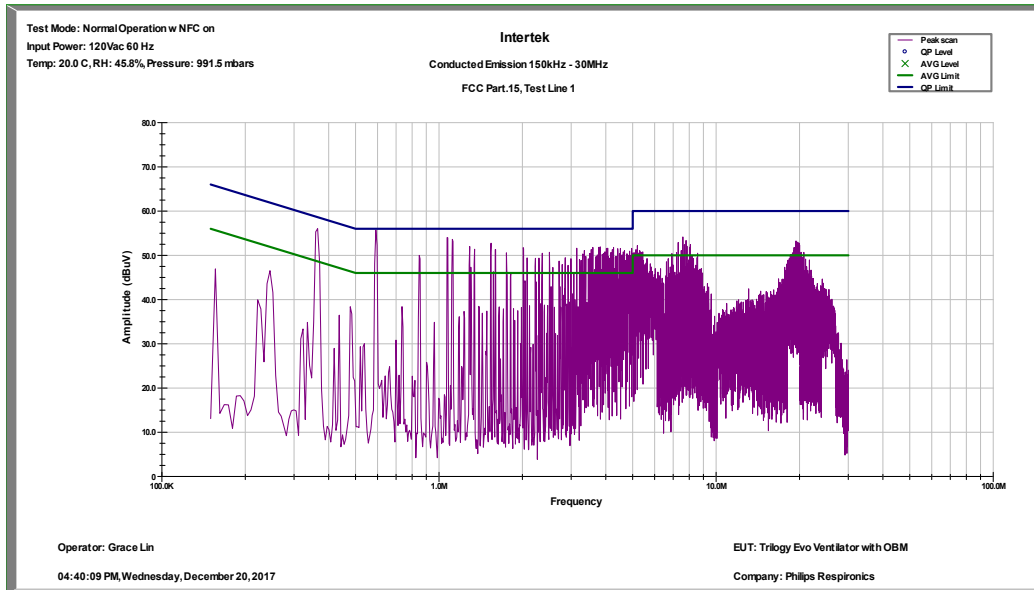
Frequency	AVG Level	QP Level	AVG Limit	QP Limit	AVG Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.152	6.5	42.3	56.0	66.0	-49.4	-23.6
0.347	0.6	39.1	50.4	60.4	-49.8	-21.2
0.432	-1.6	21.7	47.9	57.9	-49.5	-36.2
0.642	22.3	37.8	46.0	56.0	-23.7	-18.2
0.686	14.6	36.5	46.0	56.0	-31.4	-19.5
0.916	19.4	36.2	46.0	56.0	-26.6	-19.8
1.054	4.8	18.3	46.0	56.0	-41.2	-37.7
1.294	3.0	19.8	46.0	56.0	-43.0	-36.2
7.478	11.1	29.4	50.0	60.0	-38.9	-30.6
8.137	12.5	31.1	50.0	60.0	-37.5	-28.9
20.310	17.6	28.1	50.0	60.0	-32.4	-31.9

Test Personnel: Grace Lin
 Product Standard: FCC 15.225
 Input Voltage: 120 Vac, 60 Hz
 Pretest Verification w/
 BB Source: N/A

Test Date: 01/30/2018
 Limit Applied: FCC 15.207
 Ambient Temperature: 22.6 °C
 Relative Humidity: 21.7 %
 Atmospheric Pressure: 991.5 mbars

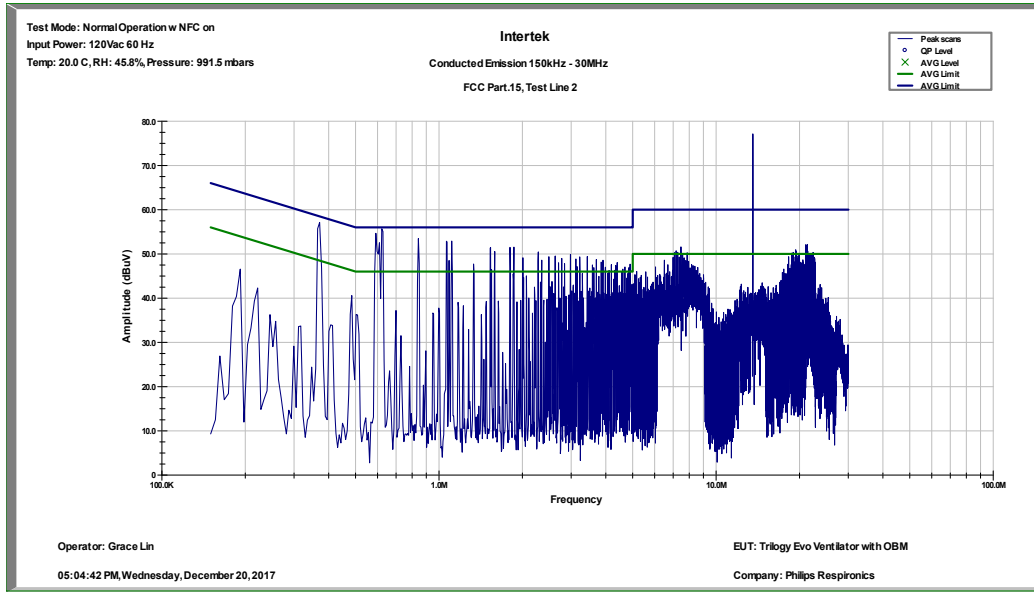
Deviations, Additions, or Exclusions: None

Line 1, NFC On:



Frequency	AVG Level	QP Level	AVG Limit	QP Limit	AVG Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.369	47.1	52.9	49.8	59.8	-2.7	-6.8
0.594	40.4	53.0	46.0	56.0	-5.6	-3.0
1.067	34.7	52.0	46.0	56.0	-11.3	-4.0
1.282	29.0	49.7	46.0	56.0	-17.0	-6.3
1.545	26.8	50.2	46.0	56.0	-19.2	-5.8
2.013	23.3	49.0	46.0	56.0	-22.7	-7.0
2.510	23.7	47.2	46.0	56.0	-22.3	-8.8
4.554	29.5	46.8	46.0	56.0	-16.5	-9.2
4.952	27.9	48.9	46.0	56.0	-18.1	-7.1

Line 2, NFC On:



Frequency	AVG Level	QP Level	AVG Limit	QP Limit	AVG Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.375	46.5	53.7	49.6	59.6	-3.1	-5.9
0.593	39.6	52.6	46.0	56.0	-6.4	-3.4
0.630	35.1	51.4	46.0	56.0	-10.9	-4.6
0.846	37.7	51.9	46.0	56.0	-8.3	-4.1
1.060	30.0	50.0	46.0	56.0	-16.0	-6.0
1.117	34.0	51.0	46.0	56.0	-12.0	-5.0
1.527	19.1	48.1	46.0	56.0	-26.9	-7.9
1.868	27.4	49.5	46.0	56.0	-18.6	-6.5

Test Personnel: Grace Lin
 Product Standard: FCC 15.225
 Input Voltage: 120 Vac, 60 Hz
 Pretest Verification w/
 BB Source: N/A

Test Date: 12/20/2017
 Limit Applied: FCC 15.207
 Ambient Temperature: 20 °C
 Relative Humidity: 45.8 %
 Atmospheric Pressure: 991.5 mbars

10 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	02/15/2018	103284061LAX-005	GL	KV	Original Issue