F2 Labs
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FCC SDoC Test Report

Manufacturer:	**Quest Technologies, Inc.** **55 Chastain Road Northwest, Suite 100** **Kennesaw, Georgia 30144 USA**
Applicant:	**SIP Technologies, LLC** **72070 Highway 1077** **Covington, Louisiana 70433 USA**
Product Description:	The Neo3 system consists of 2 boards housed in separate enclosures - Controller Board, High Voltage 03 Generator Board. The Controller board includes a microcontroller, LCD display, keypad, Low voltage power supply, relay for controlling power to a water cooler and power switches for controlling power to the air pump and 03 generator circuit located in the High Voltage 03 Generator board. The High Voltage Generator board consists of an air pump and a 10 KV pulse generator circuit. Using the keypad on the controller board, a user can program the times and the intervals for ozone generation. At the programmed times, the microcontroller applies power signals to the air pump and the ozone generator via a 3- conductor cable. The power signals turn on the high voltage and the air pump on the High Voltage 03 Generator board. The high voltage creates a corona across a glass tube through which air is pumped. In the first step, the oxygen molecules in the glass tube are broken into 2 atoms (2 0) by the corona. In the second step, each of these highly reactive atoms combines with an oxygen molecule to produce an ozone molecule (03). The Ozone thus produced is dissolved in water inside a cooler using a diffuser. During normal operation, the SIP/Neo3 ozonator turns on at a user programmed time and runs for a certain duration entered by a user using the 3 keys on the front panel. Please see the User's manual for details on programming. The Ozone generated is pumped into a water cooler.

The main controller board is equipped with a 10 A fuse on the 110/220 VAC supply voltage.

Equipment Under Test: **SIP NEO3[1]**
Model: **SIP NEO3***
**Denotes actual model tested as worst-case representative of product family that includes the following: SIP-OS-1001, SIP-OS-1002, SIP-OS-1003, SIP NEO3.*

[1]SIP is a trademark of SIP Technologies, LLC.

Equipment Category: **Digital Device**

Measurement Location: F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

Measurement Procedure: In accordance with ANSI C63.4:2014. A list of the measurement equipment is included with the test data.

Applicable Rules: **Federal Register CFR 47, Part 15, subpart B:2017***
- **Conducted Emissions, Part 15.107(b), Class A**

**Test results do not include radiated emissions, at request of client.*

Product Received: December 19, 2017

Testing Completed: March 22, 2018

Summary of Results: **In Compliance (with design changes noted in Exhibit II of this Test Report)***

**Test results do not include radiated emissions, at request of client.*

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Evaluation Conducted by: Michael Toth, EMC Lab Manager

Reviewed by: Ken Littell, Director of EMC & Wireless Operations

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Note: Complies/Does Not Comply criteria are based upon the following condition: Where the results are compared to published test standard or manufacturer specified limits, the Complies or Does Not Comply opinion is considered without applying the stated measurement of uncertainty.

Table of Contents

Document History:

Document Number	Description	Issue Date	Approved By
F2LQ9812A-04E	First Issue	April 25, 2018	K. Littell
F2LQ9812A-04E Rev. 1	Revision of manufacturer's name, addition of trademark information at client request.	May 15, 2018	K. Littell

Exhibit I

Test Procedure and Data Calculation

Test Item Condition:
The equipment to be tested was received in good condition.

Testing Algorithm:
EUT was set up in a normal operating mode, with device powered on and supplying power to a water cooler. The highest emissions were recorded in the data tables.

Conducted Emissions:
The equipment was installed on a non-conductive surface 10 cm above a GRP. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables. All data for conducted emissions can be found in Exhibit III.

Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor using a coverage factor of k=2. The Uncertainty for a laboratory are referred to as *U*lab. For Radiated and Conducted Emissions, the Expanded Uncertainty is compared to the *U*cispr values to determine if a specific margin is required to deem compliance.

*U*lab

Measurement Range	Combined Uncertainly	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	2.54	5.07dB
Radiated Emissions <1 GHz @ 10m	2.55	5.09dB
Radiated Emissions 1 GHz to 2.7 GHz	1.81	3.62dB
Radiated Emissions 2.7 GHz to 18 GHz	1.55	3.10dB
AC Power Line Conducted Emissions, 150kHz to 30 MHz	1.38	2.76dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	1.66	3.32dB

*U*cispr

Measurement Range	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	5.2dB
Radiated Emissions <1 GHz @ 10m	5.2dB
Radiated Emissions 1 GHz to 2.7 GHz	Under Consideration
Radiated Emissions 2.7 GHz to 18 GHz	Under Consideration
AC Power Line Conducted Emissions, 150kHz to 30 MHz	3.6dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	4.0dB

If *U*lab is less than or equal to *U*cispr, then:
- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If *U*lab is greater than *U*cispr in table 1, then:
- compliance is deemed to occur if no measured disturbance, increased by (*U*lab – *U*cispr), exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by (*U*lab – *U*cispr), exceeds the disturbance limit.

Note: Only measurements listed in the tables above that relate to tests included in this Test Report are applicable.

Exhibit II

EUT Configuration and Cables

Equipment Under Test (EUT):

Product Description: Ozonator

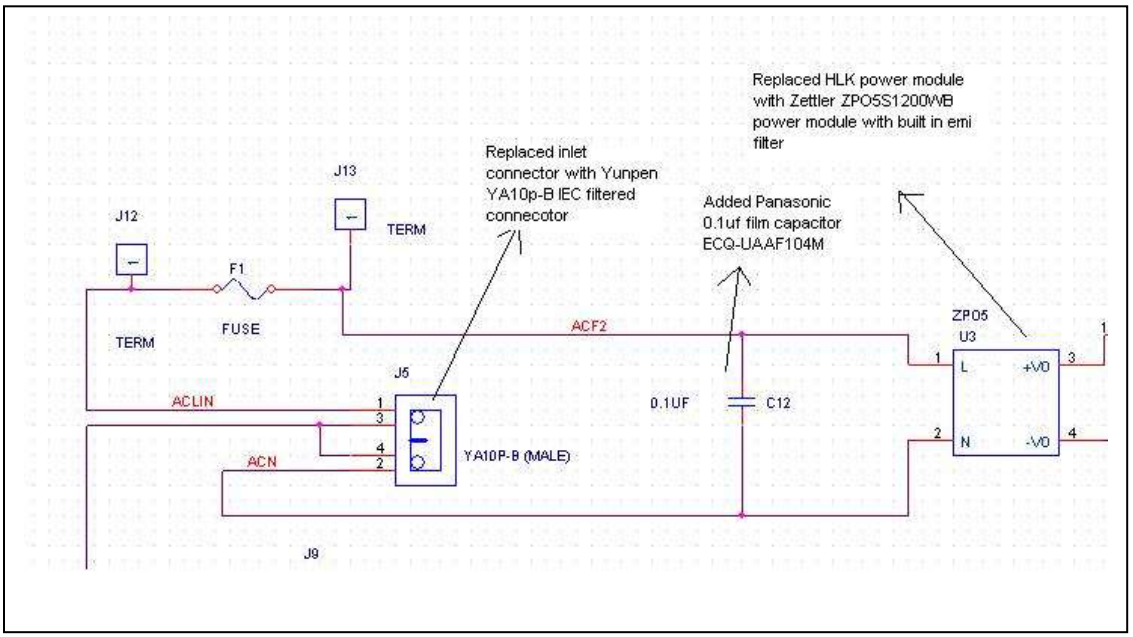
Device	Manufacturer	Model Number	Serial Number
SIP NEO3[1]	Quest Technologies, Inc.	SIP NEO3*	None Specified

[1]SIP is a trademark of SIP Technologies, LLC.

**Denotes actual model tested as worst-case representative of product family that includes the following: SIP-OS-1001, SIP-OS-1002, SIP-OS-1003, SIP NEO3.*

Note: The EUT tested included the following design changes made to the EUT by the manufacturer, necessary to meet Conducted Emissions requirements:

- Replaced Qualtekk 703W-00/54 connector with YA10P-B IEC filtered connector.
- Replaced HLK-5M12 power supply module with filtered Zettler ZP05S1200WB module.
- Removed common mode choke and 2200pf capacitors and added 0.1uf film capacitor.



The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Accessories (Support Equipment):

Device	Manufacturer	Model Number	Serial Number
Water Cooler	Quest Technologies, Inc.	Turbo Water Cooler	None Specified

Cables:

Cable Function	Length	Shielded (Yes/No)
AC Mains Input	>3m	No
AC Mains Output	~~>3~~<3m	No
DC Output	<3m	No

Exhibit III

Conducted Data

Test Date(s):	March 22, 2018	**Test Engineer(s):**	M. Toth
Rule:	FCC CFR 47, Part 15, subpart B:2017, Conducted Emissions, Part 15.107(a), Class B	**Air Temperature:**	21.0º C
Test Results:	Complies*	**Relative Humidity:**	35%

**Complies with design changes noted in Section 4.1 of this Test Report.*

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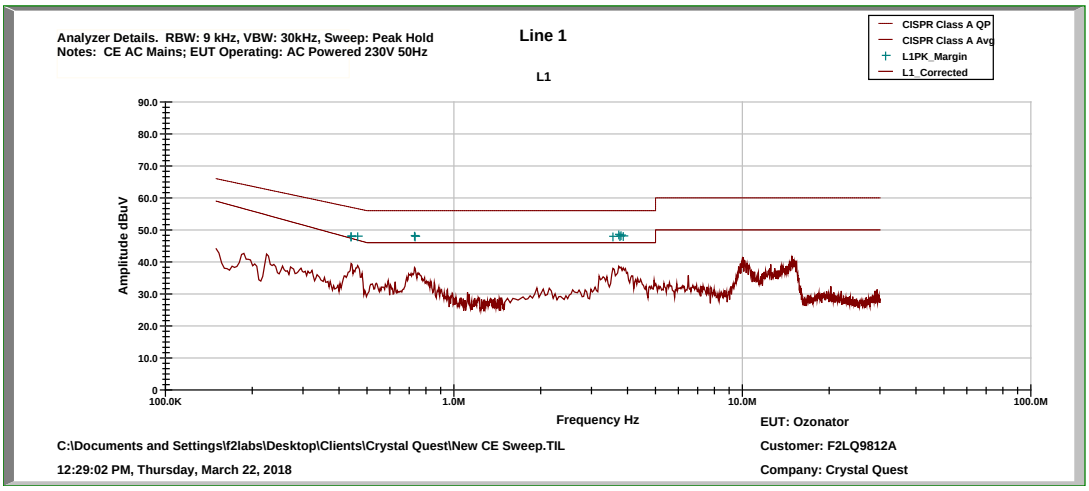
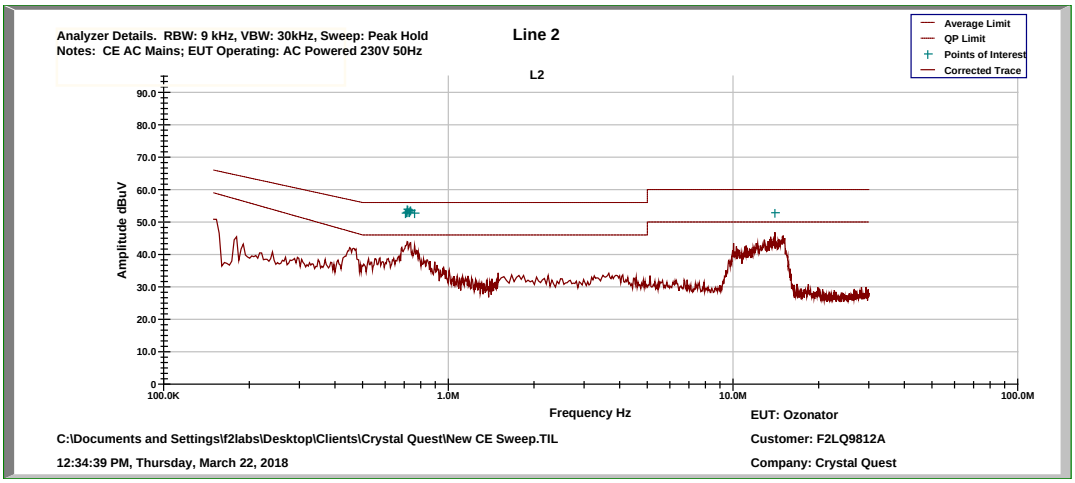
AC Mains Input, Conducted Test – Line 1: 0.15 MHz to 30.0 MHz



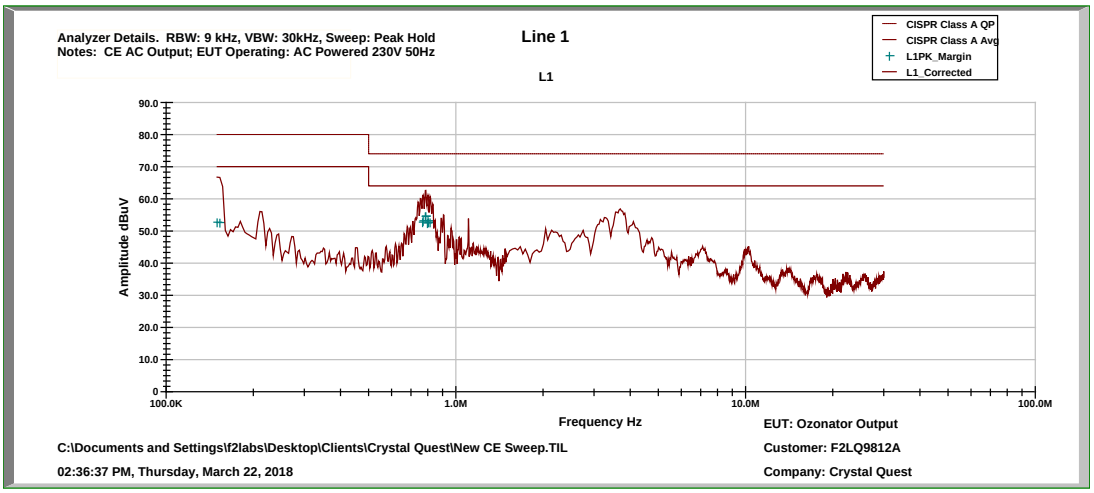
Top Discrete Measurements								
No.	**Conductor**	**Frequency (MHz)**	**Detector**	**Level (dBµV)**	**Adjustment (dB)**	**Results (dBµV)**	**Limit (dBµV)**	**Margin (dB)**
1	Line 1	0.44	Quasi-Peak	24.296	10.448	34.744	57.062	-22.318
		0.44	Average	18.810	10.448	29.258	47.380	-18.122
2	Line 1	0.44025	Quasi-Peak	24.874	10.448	35.322	57.057	-21.735
		0.44025	Average	19.895	10.448	30.343	47.374	-17.031
3	Line 1	0.463875	Quasi-Peak	26.580	10.430	37.010	56.623	-19.613
		0.463875	Average	21.745	10.430	32.175	46.811	-14.636
4	Line 1	0.7305	Quasi-Peak	25.486	10.336	35.822	56.0	-20.178
		0.7305	Average	19.496	10.336	29.832	46.0	-16.168
5	Line 1	0.733875	Quasi-Peak	24.526	10.336	34.862	56.0	-21.14
		0.733875	Average	19.923	10.336	30.259	46.0	-15.741
6	Line 1	3.55875	Quasi-Peak	20.772	10.308	31.080	56.0	-24.920
		3.55875	Average	12.986	10.308	23.294	46.0	-22.706
7	Line 1	3.7275	Quasi-Peak	21.577	10.311	31.888	56.0	-24.112
		3.7275	Average	14.593	10.311	24.904	46.0	-21.096
8	Line 1	3.76125	Quasi-Peak	21.922	10.309	32.231	56.0	-23.769
		3.76125	Average	14.484	10.309	24.793	46.0	-21.207
9	Line 1	3.795	Quasi-Peak	22.029	10.306	32.335	56.0	-23.665
		3.795	Average	16.375	10.306	26.681	46.0	-19.319
10	Line 1	3.8625	Quasi-Peak	22.515	10.302	32.817	56.0	-23.183
		3.8625	Average	15.107	10.302	25.409	46.0	-20.591

AC Mains Input, Conducted Test – Line 2: 0.15 MHz to 30.0 MHz



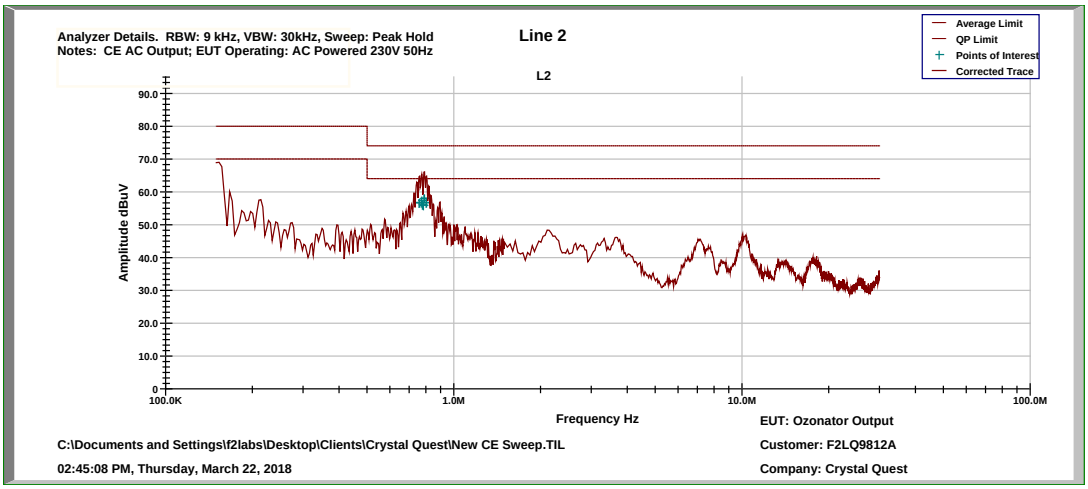
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBµV)	Adjustment (dB)	Results (dBµV)	Limit (dBµV)	Margin (dB)
1	Line 2	0.721616	Quasi-Peak	30.005	10.338	40.343	56.0	-15.657
		0.721616	Average	24.639	10.338	34.977	46.0	-11.023
2	Line 2	0.7305	Quasi-Peak	30.371	10.336	40.707	56.0	-15.293
		0.7305	Average	24.650	10.336	34.986	46.0	-11.014
3	Line 2	0.733875	Quasi-Peak	30.523	10.336	40.859	56.0	-15.141
		0.733875	Average	24.715	10.336	35.051	46.0	-10.949
4	Line 2	0.73725	Quasi-Peak	30.429	10.335	40.764	56.0	-15.236
		0.73725	Average	24.220	10.335	34.555	46.0	-11.445
5	Line 2	0.760875	Quasi-Peak	28.903	10.331	39.234	56.0	-16.77
		0.760875	Average	23.468	10.331	33.799	46.0	-12.201
6	Line 2	14.0212	Quasi-Peak	27.846	10.682	38.528	60.0	-21.472
		14.0212	Average	16.622	10.682	27.304	50.0	-22.696

AC Mains Output, Conducted Test – Line 1: 0.15 MHz to 30.0 MHz



Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBµV)	Adjustment (dB)	Results (dBµV)	Limit (dBµV)	Margin (dB)
1	Line 1	0.15	Quasi-Peak	55.119	11.555	66.674	80.0	-13.326
		0.15	Average	50.526	11.555	62.081	70.0	-7.919
2	Line 1	0.153375	Quasi-Peak	52.040	11.497	63.537	80.0	-16.463
		0.153375	Average	41.897	11.497	53.394	70.0	-16.606
3	Line 1	0.767625	Quasi-Peak	46.107	10.330	56.437	74.0	-17.563
		0.767625	Average	38.995	10.330	49.325	64.0	-14.675
4	Line 1	0.771	Quasi-Peak	50.028	10.329	60.357	74.0	-13.643
		0.771	Average	45.365	10.329	55.694	64.0	-8.306
5	Line 1	0.7845	Quasi-Peak	49.216	10.327	59.543	74.0	-14.46
		0.7845	Average	41.580	10.327	51.907	64.0	-12.093
6	Line 1	0.787875	Quasi-Peak	50.218	10.326	60.544	74.0	-13.456
		0.787875	Average	46.726	10.326	57.052	64.0	-6.948
7	Line 1	0.798	Quasi-Peak	45.946	10.323	56.269	74.0	-17.731
		0.798	Average	42.401	10.323	52.724	64.0	-11.276
8	Line 1	0.801375	Quasi-Peak	50.454	10.321	60.775	74.0	-13.225
		0.801375	Average	45.019	10.321	55.340	64.0	-8.660
9	Line 1	0.80475	Quasi-Peak	48.244	10.320	58.564	74.0	-15.436
		0.80475	Average	43.848	10.320	54.168	64.0	-9.832
10	Line 1	0.814875	Quasi-Peak	46.324	10.315	56.639	74.0	-17.361
		0.814875	Average	41.522	10.315	51.837	64.0	-12.163

AC Mains Output, Conducted Test – Line 2: 0.15 MHz to 30.0 MHz



Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBµV)	Adjustment (dB)	Results (dBµV)	Limit (dBµV)	Margin (dB)
1	Line 2	0.7575	Quasi-Peak	53.659	10.332	63.991	74.0	-10.009
		0.7575	Average	49.001	10.332	59.333	64.0	-4.667
2	Line 2	0.760875	Quasi-Peak	50.370	10.331	60.701	74.0	-13.299
		0.760875	Average	45.366	10.331	55.697	64.0	-8.303
3	Line 2	0.771	Quasi-Peak	52.685	10.329	63.014	74.0	-10.986
		0.771	Average	47.057	10.329	57.386	64.0	-6.614
4	Line 2	0.774375	Quasi-Peak	53.103	10.328	63.431	74.0	-10.569
		0.774375	Average	48.421	10.328	58.749	64.0	-5.251
5	Line 2	0.77775	Quasi-Peak	47.437	10.328	57.765	74.0	-16.24
		0.77775	Average	41.078	10.328	51.406	64.0	-12.594
6	Line 2	0.7845	Quasi-Peak	50.362	10.327	60.689	74.0	-13.311
		0.7845	Average	46.884	10.327	57.211	64.0	-6.789
7	Line 2	0.787875	Quasi-Peak	54.508	10.326	64.834	74.0	-9.166
		0.787875	Average	50.341	10.326	60.667	64.0	-3.333
8	Line 2	0.79125	Quasi-Peak	51.429	10.325	61.754	74.0	-12.246
		0.79125	Average	46.806	10.325	57.131	64.0	-6.869
9	Line 2	0.801375	Quasi-Peak	52.618	10.321	62.939	74.0	-11.061
		0.801375	Average	49.488	10.321	59.809	64.0	-4.191
10	Line 2	0.80475	Quasi-Peak	53.115	10.320	63.435	74.0	-10.565
		0.80475	Average	47.999	10.320	58.319	64.0	-5.681

Test Equipment Used:

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Temp/Hum. Rec.	CL119	Extech	RH520	H005869	Dec. 28, 2018
Transient Limiter	CL102	Hewlett Packard	11947A	3107A03325	Mar. 8, 2019
Software:	Tile Version 3.4.B.3.		Software Verified: Mar. 22, 2018		
Spectrum Analyzer	CL147	Agilent	E7402A	MY45101241	Nov. 16, 2018
LISN	CL181	Com-Power	LI-125A	191226	June 24, 2018
LISN	CL182	Com-Power	LI-125A	191225	June 24, 2018

Exhibit IV

Modifications

No modifications were made to the EUT that contained the design changes outlined in Exhibit II of this Test Report.

Exhibit V

Photographs

Conducted Emissions

AC Mains Input

AC Mains Output

Exhibit VI

Labeling of Equipment

It will be the responsibility of the manufacturer or importer to permanently affix the appropriate label when marketing the equipment.

The label shall bear the following statement per FCC 15.19(a)(1)-(5):

(1) Receivers associated with the operation of a licensed radio service, *e.g.,* FM broadcast under part 73 of this chapter, land mobile operation under part 90 of this chapter, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules for use with cable television service.

(3) **All other devices shall bear the following statement in a conspicuous location on the device:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is impracticable to label it with the statement specified under paragraph (a) of this section in a font that is four-point or larger, and the device does not have a display that can show electronic labeling, then the information required by this paragraph shall be placed in the user manual and must also either be placed on the device packaging or on a removable label attached to the device.

Note: If the product contains a pre-approved wireless module, a label is also required to show the product contains an approved wireless module. The following is an example of what the label should state:

Contains FCC ID: XXXXXXX

§2.1074 Identification.

Devices subject to authorization under Supplier's Declaration of Conformity may be labeled with the following logo on a voluntary basis as a visual indication that the product complies with the applicable FCC requirements. The use of the logo on the device does not alleviate the requirement to provide the compliance information required by §2.1077.

§2.1077 Compliance information.

(a) If a product must be tested and authorized under Supplier's Declaration of Conformity, a compliance information statement shall be supplied with the product at the time of marketing or importation, containing the following information:

(1) Identification of the product, *e.g.,* name and model number;

(2) A compliance statement as applicable, *e.g.,* for devices subject to part 15 of this chapter as specified in §15.19(a)(3) of this chapter, that the product complies with the rules; and

(3) The identification, by name, address and telephone number or Internet contact information, of the responsible party, as defined in §2.909. The responsible party for Supplier's Declaration of Conformity must be located within the United States.

Exhibit VII

Manual Requirements

FCC Manual Statement: §15.21 Information to user.

Note: This requirement applies to all devices unless exempted by 15.103:

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Manual Statement: §15.105 Digital Devices Statement

For all Class A Digital Devices, the following statement must be included in the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For all Class B Digital Devices, the following statement must be included in the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.