



F2 Labs
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INDUSTRY CANADA TEST REPORT

Manufacturer: **Senzar Acoustics, Inc.**
76 Sanderson Avenue
Lynn, Massachusetts 01902 USA

Applicant: Same as Above

Product Description: Professional Audio Amplifier with DSP. 4 Channels, 2 Bridged. Mono/Stereo Switch. 2 pairs input, 2 pairs output. Power supply with PFC.

Operating Voltage/Frequency: 230V/50 Hz; 120V/60 Hz (worst case)

Equipment Under Test: **Digital Audio Amplifier**
Trade Name: Senzar Acoustics, Inc.
Model: *DM3000.3**
**Denotes actual model tested as worst-case representative of product family that includes the following: DM3000.3, DC2800.4, DC3200.4, DX2800.4, DC3000.4 and DC4000.4.*

Equipment Category: **Information Technology Equipment**

Measurement Location: F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the Certification and Engineering Bureau, Industry Canada, Site Number 4730B-2.

Measurement Procedure: All measurements were performed according to Industry Canada outlined in Interference-Causing Equipment Standard for Digital Apparatus, ICES-003, Issue 6:2016 for Information Technology Equipment. A list of the measurement equipment is included with the test data.

Canadian Standards Association Standard CAN/CSA-CISPR 22-10, Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement

ANSI C63.4, *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz²* (latest published edition)

Applicable Rules: **ICES-003, Issue 6:2016 for Class B IT Equipment**

Testing Commenced: June 6, 2019

Testing Completed: June 6, 2019

Summary of Results: **In Compliance**

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:



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Reviewed by:

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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.

This report shall not be duplicated except in full without the written approval of F2 Labs.
Reports noted as a revision replace all previously issued reports and/or antecedent report revisions issued under this job number.

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Document History

Document Number	Description	Issue Date	Approved By
F2P20748-02E	First Issue	June 12, 2019	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 on and fan was running. The highest emissions were recorded in the data tables.

Radiated Emissions:

The EUT was tested at a distance of 3 meters. The emissions were maximized by rotating the table and raising/lowering the antenna mounted on a 4-meter mast. Cable and peripheral positions were also varied to produce maximum emissions. Both horizontal and vertical field components were measured. The output of the antenna was connected to the input of the receiver and emissions were measured in the range 30 MHz to 1000 MHz. For emissions measured below 1 GHz, a resolution bandwidth of 120kHz and a quasi-peak detector were used. If applicable, measurements above 1 GHz were made with a resolution bandwidth of 1 MHz and peak and average detectors. The raw measurements were corrected to allow for antenna factor and cable loss. All data for radiated emissions can be found in Exhibit III.

Conducted Emissions:

The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. 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 IV.

Sample of Field Strength Calculation:

$$E_a = V_a + AF + A_e - AG$$

Where E_a = Field Strength (dB μ V/m)

V_a = $20 \times \log_{10}$ (Measure RF voltage, μ V)

A_e = Cable Loss Factor, dB

AF = Antenna Factor dB (m⁻¹)

AG = Amplifier Gain

I.e., If the reading is 57.0 dB μ V, the antenna factor 8.0 dB, cable loss factor 1.0 dB and Amplifier gain is 25.0 dB, the field strength will be:

$$\begin{aligned} E_a(\text{dB}\mu\text{V/m}) &= 57 + 8 + 1 + (-25) \\ &= 41 \text{ dB}\mu\text{V/m} \end{aligned}$$

or

$$\begin{aligned} E_a(\mu\text{V/m}) &= 10^{(41/20)} \\ &= 112.20 \mu\text{V/m} \end{aligned}$$

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 Uncertainty	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: Professional Audio Amplifier with DSP. 4 Channels, 2 Bridged. Mono/Stereo Switch. 2 pairs input, 2 pairs output. Power supply with PFC.

Device	Manufacturer	Model Number	Serial Number
Digital Audio Amplifier	Senzar Acoustics, Inc.	DM3000.3*	None Specified

**Denotes actual model tested as worst-case representative of product family that includes the following: DM3000.3, DC2800.4, DC3200.4, DX2800.4, DC3000.4 and DC4000.4.*

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): None

Cables:

Cable Function	Length	Shielded
AC Mains	>3m	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
USB	<3m	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

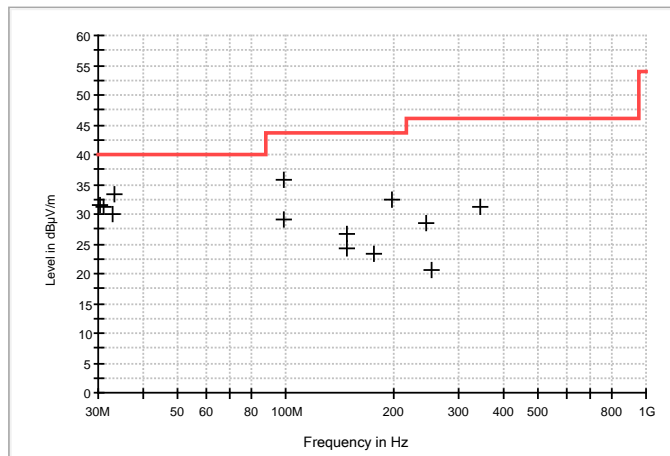
Exhibit III

Radiated Emissions

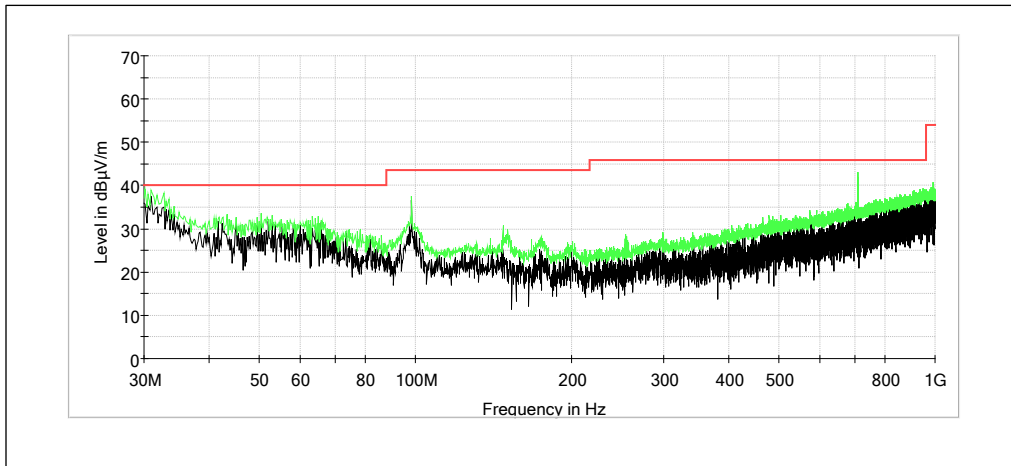
Test Date:	June 6, 2019	Test Engineer:	J. Chiller
Rule:	ICES-003 Issue 6	Air Temperature:	20.4° C
Limit:	Class B	Relative Humidity:	52%
Distance:	3m		
Test Results:	Complies		

120V/60 Hz (worst case)

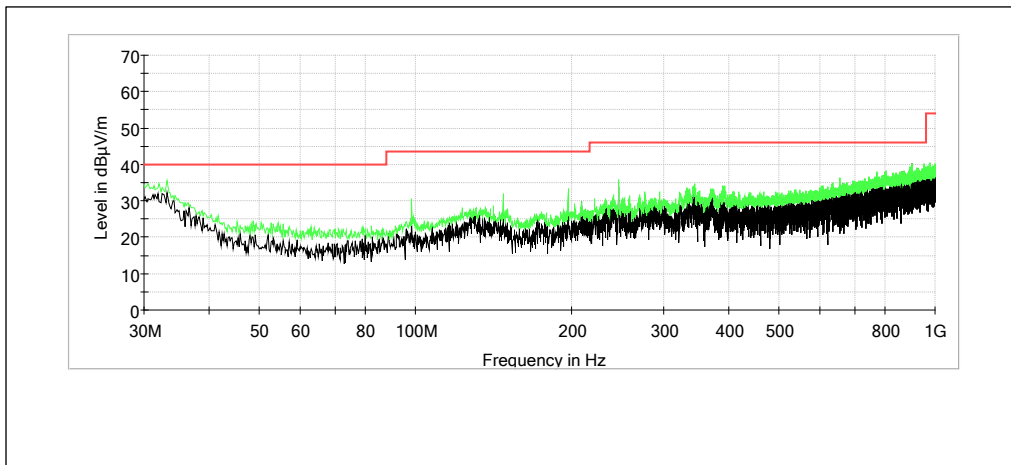
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (degrees)	Reading (dBµV)	Correction Factors (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.200000	V	100.00	3.00	23.5	8.1	31.60	40.00	-8.4
30.960000	V	100.00	234.00	23.8	7.5	31.30	40.00	-8.7
32.720000	V	100.00	29.00	24.1	6.0	30.10	40.00	-9.9
33.280000	H	100.00	7.00	27.7	5.6	33.30	40.00	-6.7
98.280000	H	100.00	220.00	32.9	-4.0	28.90	43.50	-14.6
98.280000	V	100.00	319.00	39.9	-4.0	35.90	43.50	-7.6
147.360000	V	100.00	210.00	27.0	-0.4	26.60	43.50	-16.9
147.360000	H	100.00	0.00	24.7	-0.4	24.30	43.50	-19.2
174.520000	V	100.00	210.00	24.8	-1.4	23.40	43.50	-20.1
196.640000	H	100.00	186.00	32.5	-0.1	32.40	43.50	-11.1
245.720000	H	100.00	357.00	28.5	-0.1	28.40	46.00	-17.6
254.080000	V	100.00	132.00	20.7	-0.1	20.60	46.00	-25.4
344.480000	H	100.00	7.00	28.3	3.1	31.40	46.00	-14.6



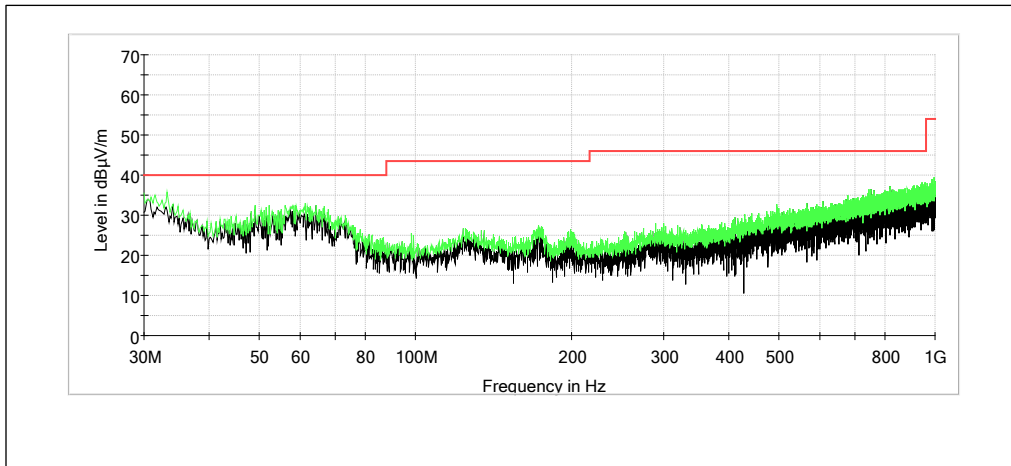
Characterization Scan: 120V/60 Hz, 30 MHz to 1000 MHz, Vertical



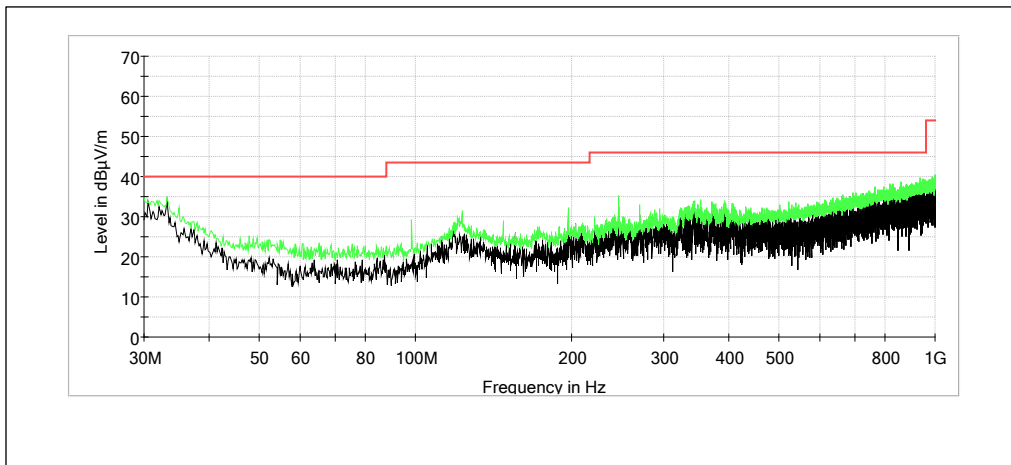
Characterization Scan: 120V/60 Hz, 30 MHz to 1000 MHz, Horizontal



Characterization Scan: 230V/60 Hz, 30 MHz to 1000 MHz, Vertical



Characterization Scan: 230V/60 Hz, 30 MHz to 1000 MHz, Horizontal



Test Equipment Used:

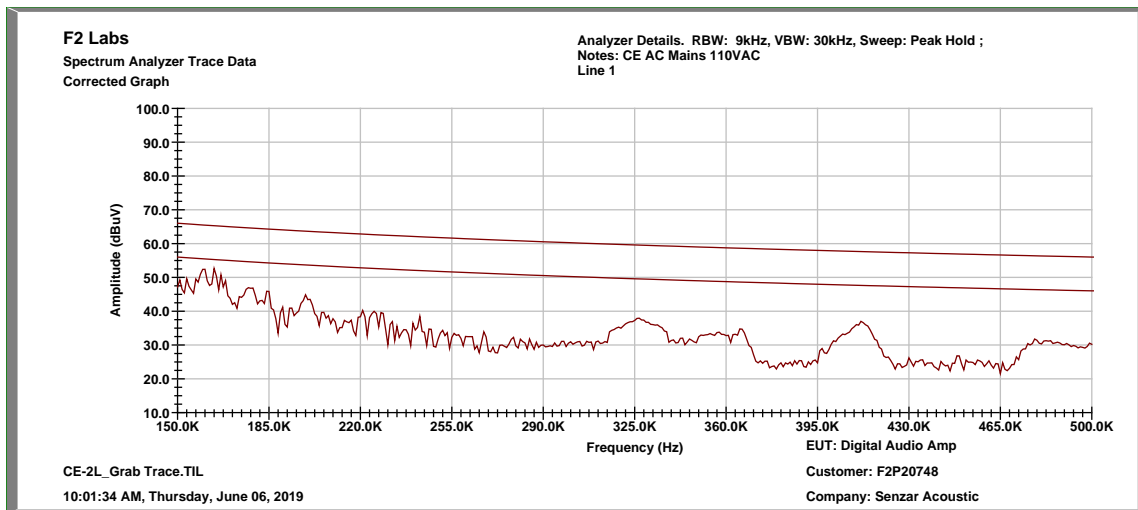
Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber 2014	CL166-E	AlbatrossProjects	B83117-DF435- T261	US140023	Aug. 30, 2019
Temp/Hum. Recorder	CL261	Extech	445814	04	Mar. 6, 2020
Receiver	CL151	Rohde & Schwarz	ESU40	100319	Oct. 25, 2019
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	Oct. 11, 2019
Pre-Amplifier	CL153	Agilent	83006-69007	MY39500791	Aug. 24, 2019
Software:	EMC 32, Version 8.53.0		Software Verified: June 6, 2019		

Exhibit IV

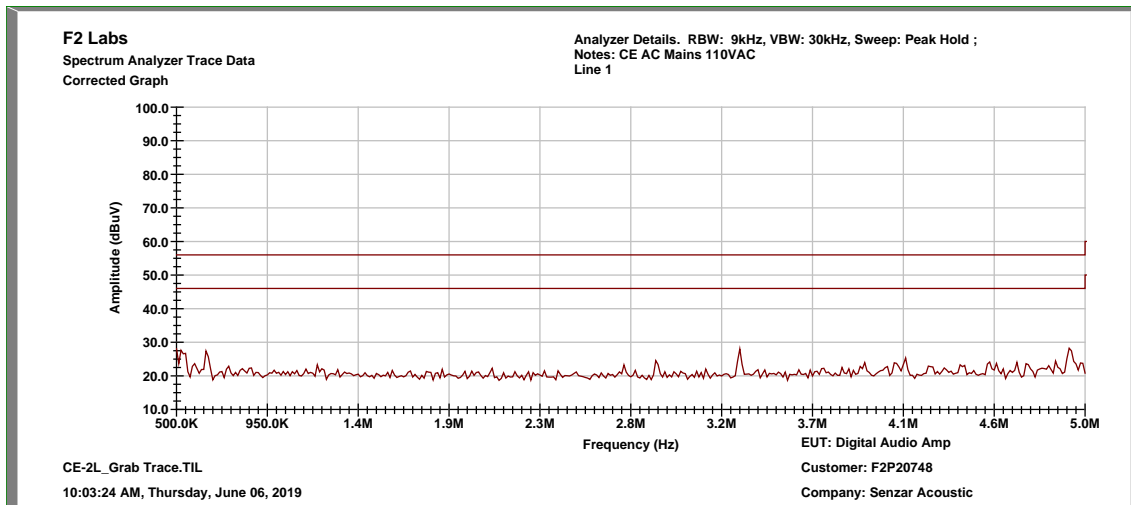
Conducted Data

Test Date:	June 6, 2019	Test Engineer:	J. Chiller
Rule:	ICES-003 Issue 6	Air Temperature:	20.4° C
Limit:	Class B	Relative Humidity:	52%
Test Results:	Complies		

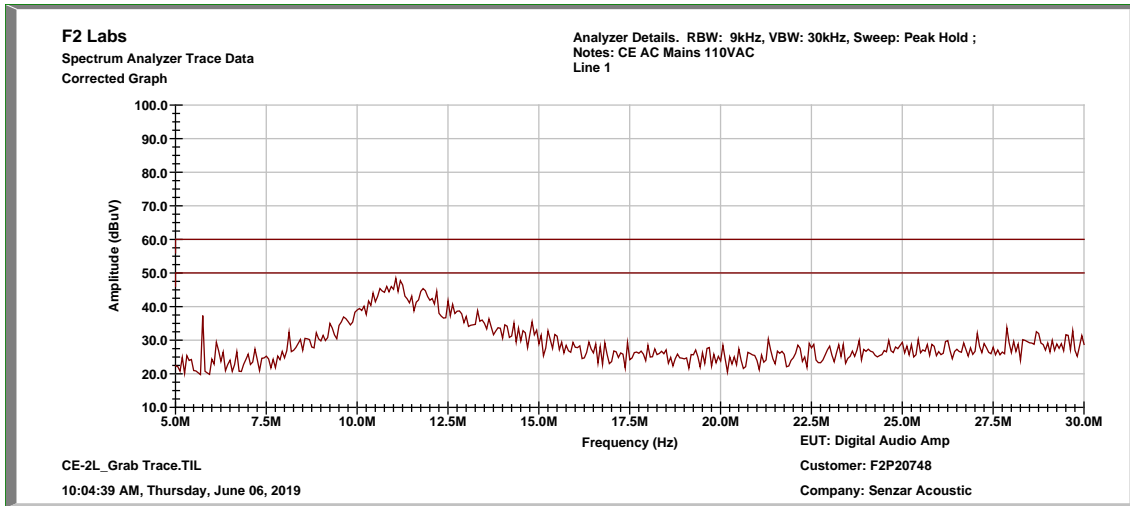
Conducted Test – Line 1: 0.15 MHz to 0.5 MHz



Conducted Test – Line 1: 0.5 MHz to 5.0 MHz

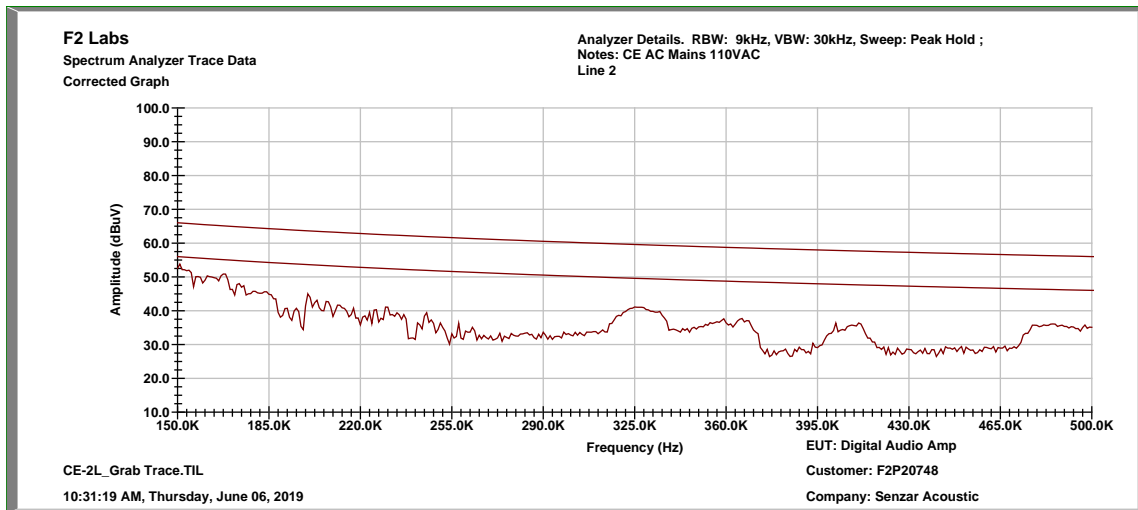


Conducted Test – Line 1: 5.0 MHz to 30.0 MHz

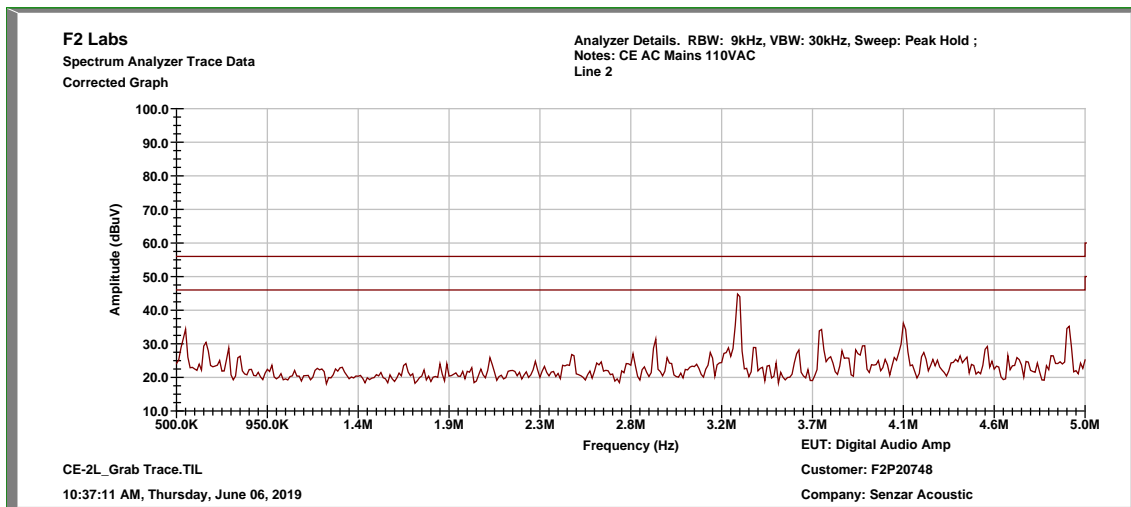


Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dB μ V)	Adjustment (dB)	Results (dB μ V)	Limit (dB μ V)	Margin (dB)
1	Line 1	0.1605	Quasi-Peak	33.21	11.678	44.89	65.438	-20.6
			Average	24.45	11.678	36.13	55.438	-19.3
2	Line 1	0.16925	Quasi-Peak	32.95	11.577	44.53	65.0	-20.5
			Average	24.38	11.577	35.96	55.0	-19.0
3	Line 1	11.4375	Quasi-Peak	31.3	10.785	42.09	60.0	-17.9
			Average	16.3	10.785	27.09	50.0	-22.9
4	Line 1	11.8125	Quasi-Peak	32.82	10.802	43.62	60.0	-16.4
			Average	25.9	10.802	36.70	50.0	-13.3

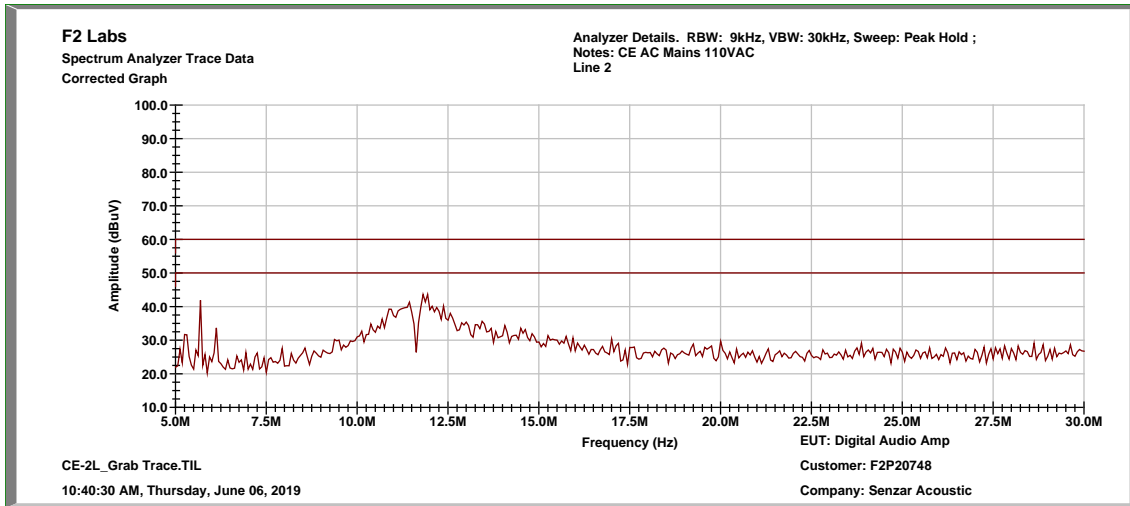
Conducted Test – Line 2: 0.15 MHz to 0.5 MHz



Conducted Test – Line 2: 0.5 MHz to 5.0 MHz



Conducted Test – Line 2: 5.0 MHz to 30.0 MHz

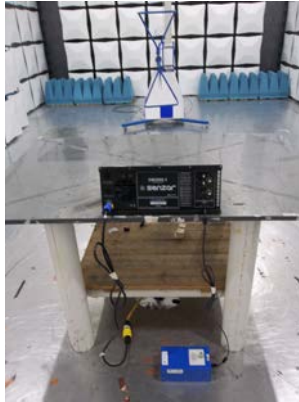


Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dB μ V)	Adjustment (dB)	Results (dB μ V)	Limit (dB μ V)	Margin (dB)
1	Line 2	0.154375	Quasi-Peak	35.52	12.216	47.74	65.762	-18.0
			Average	27.19	12.216	39.41	55.762	-16.4
2	Line 2	0.168375	Quasi-Peak	36.59	12.042	48.63	65.041	-16.4
			Average	24.86	12.042	36.90	55.041	-18.1
3	Line 2	3.29	Quasi-Peak	32.50	10.838	43.34	56.0	-12.7
			Average	29.91	10.838	40.75	46.0	-5.3
4	Line 2	5.687	Quasi-Peak	29.62	10.856	40.48	60.0	-19.5
			Average	24.59	10.856	35.45	50.0	-14.6
5	Line 2	11.937	Quasi-Peak	27.28	11.156	38.44	60.0	-21.6
			Average	15.03	11.156	26.19	50.0	-23.8

Exhibit V

Photographs

Radiated Emissions



Conducted Emissions



Exhibit VI

Modifications

No modifications were made to the EUT.

Exhibit VII

Labeling of Equipment

The manufacturer, importer or supplier shall meet the labeling requirements set out in **ICES-003 Section 8 or ICES-001 Section 6 as applicable, and in Notice 2014-DRS1003** for electronic labeling for every unit: (i) prior to marketing in Canada, for ITE manufactured in Canada and (ii) prior to importation into Canada, for imported ITE.

Each unit of an ITE model shall bear a label (see below) that represents the manufacturer's or the importer's SDoC with Innovation, Science and Economic Development Canada ICES-003 or ICES-001, as applicable.

The label shall be permanently affixed to the product or displayed electronically, and its text must be clearly legible. If the dimensions of the device are too small or if it is not practical to place the label on the product and electronic labeling has not been implemented, the label shall be, upon agreement with Innovation, Science and Economic Development Canada, placed in a prominent location in the user manual supplied with the product. The user manual may be in an electronic format and must be readily available.

Compliance Label: CAN ICES-3 (*)/NMB-3(*) or CAN ICES-1/NMB-1

*** Insert either "A" or "B" but not both to identify the applicable Class of ITE.**

If the product contains a certified module, labeling must include "Contains IC: XXXXXX-YYYYYYYYYYYY" where XXXXXX-YYYYYYYYYYYY is the module's certification number.

Multiple modules in a host must be displayed as "Contains IC: XXXXXX-YYYYYYYYYYYY1, XXXXXX-YYYYYYYYYYYY2, etc. (listing each module's IC number).

Notice 2014-DRS1003 (if electronic labeling is employed)

Devices with an integrated display screen may present the required label information electronically (e-label) in lieu of a physical label or nameplate. Devices without an integrated display screen are allowed to present the e-labeling information through an audio message or a host device display screen connected via physical connection, Bluetooth, Wi-Fi, etc. if the connection to a device with a display is mandatory for use. This applies to all devices subject to certification or registration requirements and to applicable Interference-Causing Equipment Standards (ICES) where Notice is referenced. Alternative methods of e-labeling, could be allowed on a case-by-case basis by the Department.

Information to be displayed

The Industry Canada registration number for terminal equipment devices, certification number for radio equipment, and model identification number.

Any other information required to be provided on the surface of the device unless such information is permitted to be included in the User's Manual or other packaging inserts.

(Notice 2014-DRS1003, cont'd)

Accessibility to the required information

Users shall be provided clear instructions on how to access the regulatory information stored electronically without requiring special access codes or accessories (i.e., SIM/USIM cards) or having to go through multiple steps (no more than three) in a device's menu.¹

Users shall be provided specific instructions which are easily accessible by the average user and included in the User's manual, operating instructions, packaging material inserts, or product related.²

The equipment authorization application must clearly include the instructions for accessing information as part of the label exhibit.

Labeling for Importation and Purchasing

Products utilizing e-labels are required to have a physical label on the product packaging at the time of importation, marketing and sales. For devices imported in bulk (not packaged individually), a removable adhesive label or, for devices in protective bags, a label on the bags is acceptable to meet this requirement.

Any removable label used shall survive normal shipping and handling and must only be removed by the customer after purchase. For devices already imported in individual packages ready for sale, the information may alternatively be provided on the package and shall contain: The IC certification number for radio equipment, registration number for terminal equipment, and model identification number.

Any other information required by specific requirements to be provided on the surface of the product unless such information is permitted to be included in the User's manual or other packaging inserts

Security

The above information must be programmed by the responsible party and the information must be secured in such manner that it cannot be modified or removed during the course of normal activities that a third-party (typical user) might be authorized to perform (e.g. installation of applications, accessing the menus, etc.).

User Manual/Packaging

All the applicable regulatory information required on the packaging or User Manual must be provided according to the applicable requirements even if it is displayed electronically. E-label displays may include regulatory information required to be placed in the User's Manual or on the packaging as per the applicable requirements. The following considerations must be taken into account for such information distribution.

If the primary User Manual/User Guide is provided by other electronic media (e.g., CD, or online) then as an option this information can also be provided as part of the e-label.

The e-label format must clearly differentiate between the information required to be on the surface of the device and the information required for the User's Manual or on the packaging.

(Notice 2014-DRS1003, cont'd)

Devices Approved as Certified Transmitter Modules

Devices approved as certified transmitter modules may have their IC certification number displayed electronically, if the module or the host in which it is integrated has a display screen. The general guidance for all transmitters discussed above also applies to such devices.

If the certified transmitter module provides a secure electronic exchange interface with authentication between the host with integrated display and the module to identify the correct IC certification, then the host can display the IC certification number on the host's built-in display. The module can be either user-installable or factory-installed. The application for equipment authorization for such modules must include a description of the secure electronic exchange protocol and the security of such arrangement.³

If the certified transmitter module does not provide a secure electronic exchange interface with authentication, the host manufacturer can electronically display the IC certification number on the host by factory-encoding the IC certification number of the module

Factory encoding must be secure and locked by the host manufacturer and not alterable by any third parties. The programmed information must display IC certification number of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows: "Contains transmitter module IC: XXXXXX-YYYYYYYYYYYY" where XXXXXX-YYYYYYYYYYYY is the module's certification number.

Multiple modules in a host can be electronically displayed as "Contains transmitter modules IC: XXXXXX-YYYYYYYYYYYY1, XXXXXX-YYYYYYYYYYYY2", etc.

¹The information can be in the firmware or software menus provided it is easily accessible and cannot be modified by the user.

²Information provided with the packaging material can be provided on the bags in which the device may be packed or with paper leaflets in the packaging material.

³The module must bear a label with its own IC certification number unless it also has an integrated display.