HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

September 30, 2022

S&C Electric Company
6001 North Ridge Blvd.
Chicago, IL 60626

Dear Muhammad Tabani,

Enclosed is the Wireless limited test report for compliance testing of the S&C Electric Company, TripSaver II Cutout-Mounted Recloser USB Dongle 2 as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15 Subpart C for Intentional Radiators and RSS-247 for DTS devices, Issue 2, February 2017 for Intentional Radiators.

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. If you have any questions regarding these results or if Eurofins can be of further service to you, please feel free to contact me.

Sincerely yours,
Eurofins Electrical and Electronic Testing NA, Inc.

Michelle Tawmging

Michelle Tawmging
Documentation Department

Reference: (\S&C Electric Company\WIR121609-FCC_RSS 247 Rev. 2)

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Electromagnetic Compatibility Criteria
Test Report

for the

S&C Electric Company
TripSaver II Cutout-Mounted Recloser USB Dongle 2

Tested under
the FCC Certification Rules
contained in
15.247 Subpart C for Intentional Radiators

the IC Certification Rules
contained in
RSS-247, Issue 2, February 2017 for Intentional Radiators

Report: WIR121609-FCC_RSS 247 Rev. 2

September 30, 2022

Prepared For:

S&C Electric Company
6001 North Ridge Blvd.
Chicago, IL 60626

Prepared By:
Eurofins Electrical and Electronic Testing NA, Inc.
914 West Patapsco Avenue,
Baltimore, MD 21230

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Report: WIR121609-FCC_RSS 247 Rev. 2

Donald Salguero, Project Engineer
Wireless Lab

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Part 15.247 and Industry Canada standard RSS-247, Issue 2, February 2017 under normal use and maintenance.

Michael Griffiths
Manager, Wireless Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	September 2, 2022	Initial Issue.
1	September 23, 2022	Overview and Output Power Results Sections Updated
2	September 30, 2022	Revised Output Power Section

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**er**z**
IC	**Innovation, Science and Economic Development Canada**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**er**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

I. Executive Summary

A. Purpose of Test

An EMC Wireless evaluation was performed to determine compliance of the S&C Electric Company TripSaver II Cutout-Mounted Recloser USB Dongle 2, with the requirements of Part 15, §15.247 and RSS-247 Issue 2. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the TripSaver II Cutout-Mounted Recloser USB Dongle 2. S&C Electric Company should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the TripSaver II Cutout-Mounted Recloser USB Dongle 2, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.247 and RSS-247 Issue 2, in accordance with S&C Electric Company, purchase order number 1162265. All tests were conducted using measurement procedure ANSI C63.10-2013.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-247 Issue 2, 2017; RSS-GEN Issue 5: 2021	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	RSS-GEN (6.8)	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-247(5.4)	Peak Power Output	Compliant
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-GEN (6.13), (8.9), & (8.10)	Radiated Spurious Emissions Requirements	Compliant

Table 1. Executive Summary of EMC Wireless Part 15.247 and RSS-247 ComplianceTesting

Eurofins Electrical and Electronic Testing NA, Inc. (Eurofins E&E North America) is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

II. Equipment Configuration

A. Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by S&C Electric Company to perform testing on the TripSaver II Cutout-Mounted Recloser USB Dongle 2, under S&C Electric Company's purchase order number 1162265.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the S&C Electric Company, TripSaver II Cutout-Mounted Recloser USB Dongle 2.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	TripSaver II Cutout-Mounted Recloser USB Dongle 2	
Model(s) Covered:	TripSaver II Cutout-Mounted Recloser USB Dongle 2	
EUT Specifications:	Primary Power: 5V DC	
	FCC ID: U3D-TSIIDONGLE2	
	IC: 5349C-TSIIDONGLE2	
	Type of Modulations:	DSSS, QPSK, CSS/ 250
	Equipment Code:	DTS
	Peak RF Output Power:	0.7 dBm; 0.00118 W per granted ID
	EUT Frequency Ranges:	2405-2480 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Donald Salguero	
Report Date(s):	September 30, 2022	

Table 2. EUT Summary Table

B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
RSS-247, Issue 2, February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN, Issue 5, February 2021	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 v05r02	Guidance For Performing Compliance Measurements On Digital Transmission Systems (DTS) Operating Under Section 15.247

Table 3. References

C. Test Site

Eurofins Electrical and Electronic Testing NA, Inc. (Eurofins E&E North America) is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 914 West Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins Electrical and Electronic Testing NA, Inc.

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty (dB)	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.45	2	95%
Radiated Emissions, (1 - 6 GHz)	±6.29	2	95%
Conducted Emission	±3.8	2	95%
CEV Telecom Port	±2.8	2	95%

Table 4. Uncertainty Calculations Summary

E. Description of Test Sample

The S&C Electric Company TripSaver II Cutout-Mounted Recloser USB Dongle 2 is the Equipment Under Test (EUT).

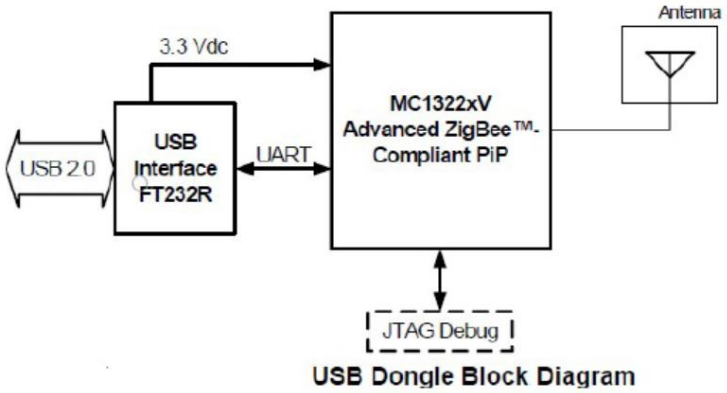

Figure 1. Block Diagram of Test Configuration

F. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Name/Description	Model Number	Part Number	Serial Number	Rev. #
USB Dongle 2	FDA-1868R2	N.A.	N.A.	N.A.

Table 5. Equipment Configuration

G. Support Equipment

Name/Description	Manufacturer	Model Number	Serial Number	*Customer Supplied Calibration Data
Computer	Dell	N.A.	N.A.	N.A.
Controller	S&C Electric Compantyy	N.A.	N.A.	N.A.

Table 6. Support Equipment

H. Mode of Operation

The USB dongle is an IEEE 802.15.4 compliant wireless node-based device. The application mode interfaces to the personal computer through a virtual COM port.

The TripSaver II Service Center Configuration software SCC v1.10 or higher is used to connect to the TripSaver II recloser to monitor status, change configuration or upgrade firmware. In standalone (offline) mode the SCC software can be used to prepare the settings before download to the recloser.

I. Method of Monitoring EUT Operation

TripSaverII Service Center Configuration software SCC v1.10 provides a signal strength indicator on the lower left corner of the screen. The minimum acceptable level for the signal strength to perform any configuration or firmware update is -87dBm.

J. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to S&C Electric Company upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement
RSS GEN 6.8 Antenna Requirement

Test Requirement: **FCC § 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Test Requirement: **RSS-GEN 6.8:** The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

Results: The EUT as tested is compliant the criteria of **§15.203** and **RSS GEN 6.8. EUT uses unique connector.**

Antenna Type: Whip Antenna
Impedance: 50Ω
Gain: 2.3dBi Peak

Test Engineer(s): Donald Salguero

Test Date(s): August 24, 2022

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output
RSS-247 (5.4) Transmitter Output Power

Test Requirements: **FCC §15.247(b):** The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
2400–2483.5	1.000

Table 7. Output Power Requirements from §15.247(b)

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the 9, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Procedure: The EUT was measured at the low, mid and high channels of each band at the maximum power level. Measurements were performed on a conducted set up with attenuator in line. Method stated in 11.9.2.2.4 of ANSI C63.10-2013 was used.

Test Requirements: **RSS (5.4)(4):** For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure (RSS): The EUT was measured at the low, mid and high channels of each band at the maximum power level. Measurements were performed on a conducted set up with attenuator in line. Method stated in 11.9.2.2.4 of ANSI C63.10-2013 was used.

Test Results: ***Measurements were taken for reference only. Their purpose was tuning up the level for radiated spurious emissions measurements. Granted power levels are not increasing.***

Max Output Power: 0.7 dBm; 0.00118 W per granted ID

Test Engineer(s): Donald Salguero

Test Date(s): August 24, 2022

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.209 Radiated Spurious Emissions Requirements and Band Edge
RSS-GEN (6.13), (8.9), & (8.10) Radiated Spurious Emissions and Restricted Band

Test Requirements: **FCC§15.247(d); §15.205:** Emissions outside the frequency band.

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110----------	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505----------	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905----------	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128----------	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775----------	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775----------	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218----------	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825----------	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225----------	123–138	2200–2300	14.47–14.5
8.291–8.294----------	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366----------	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675----------	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475----------	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293----------	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025----------	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725----------	322–335.4	3600–4400	([2])

Table 8. Restricted Bands of Operation

[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.
[2] Above 38.6

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 9.

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 9. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedures: Method stated in 11.12.1 of ANSI C63.10-2013 was used for measurement. Method stated in 6.3, 6.5 and 6.6 of ANSI C63.10-2013 were also used. Radiated test setup was used. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes and plots shown are cumulative result of all three axes rotation and horizontal and vertical receiving antenna polarization. Plots shown are corrected for both antenna correction factor and distance, cable and compared to a 3 m limit line. Spurious emissions were not observed above18GHz.

Test Requirements:

RSS-GEN (6.13): In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:

(a) If the equipment operates below 10 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

When limits are expressed in absolute terms, compliance with the emission limits below 1000 MHz shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limits can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Above 1000 MHz, compliance with the emission limits shall be demonstrated using an average detector with a minimum resolution bandwidth of 1 MHz.

RSS-GEN (8.9): Except when the requirements applicable to a given device state otherwise, emissions from license−exempt transmitters shall comply with the field strength limits shown in the table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

General Field Strength Limits for License-Exempt Transmitters at Frequencies Above 30 MHz	
Frequency (MHz)	**Field Strength (µV/m at 3 meters)**
30 – 88	100
88 – 216	150
216 – 960	200
Above 960*	500
*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.	

RSS-GEN (8.10): Restricted bands are designated primarily for safety-of-life services (distress calling and certain aeronautical bands), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following restrictions apply:

1. Fundamental components of modulation of license-exempt radio apparatus shall not fall within the restricted bands except for apparatus complying under RSS-287;
2. Unwanted emissions that fall into restricted bands shall comply with the limits specified in RSS-Gen; and
3. Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Test Procedures: Method stated in 11.12.1 of ANSI C63.10-2013 was used for measurement. Method stated in 6.3 , 6.5 and 6.6 of ANSI C63.10-2013 were also used. Radiated test setup was used. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes and plots shown are cumulative result of all three axes rotation and horizontal and vertical receiving antenna polarization. Plots shown are corrected for both antenna correction factor and distance, cable and compared to a 3 m limit line.

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.247(d) and § 15.209** and **RSS-GEN (6.13), (8.9), & (8.10)**.

Test Engineer(s): Donald Salguero

Test Date(s): August 24 – August 25, 2022

Start Frequency			1 GHz			Stop Frequency			18 GHz	
Measurement Distance			3 Meters			Detector			Peak	
Channel Frequency	Frequency	Polarity	Antenna Height	Turtable Position	Measured	Correction Factor	Corrected Reading	Limit	Margin	Results
MHz	GHz	Horizontal/ Vertical	cm	Degrees	dBµV	dB	dBµV/m	dBµV/m	dB	Pass/Fail
2405	7.168	H	26.17	289.5	53.198	-14.75	38.444	74	-35.556	Pass
2405	14.174	H	107.65	25.4	44.835	-0.72	44.113	74	-29.887	Pass
2405	5.333	V	180.6	23.5	58.539	-23.48	35.06	74	-38.94	Pass
2405	14.164	V	107.08	64	46.553	-1.36	45.189	74	-28.811	Pass
2440	12.035	H	111.78	112.2	48.842	-6.39	42.455	74	-31.545	Pass
2440	14.049	H	106.82	111.7	46.122	-1.62	44.503	74	-29.497	Pass
2440	3.986	V	203.52	291.6	62.367	-27.87	34.501	74	-39.499	Pass
2440	13.878	V	107	291.7	44.514	-2.92	41.591	74	-32.409	Pass
2480	12.025	H	225.52	202.7	49.204	-6.33	42.876	74	-31.124	Pass
2480	14.36	H	107.52	113	44.998	-1.28	43.719	74	-30.281	Pass
2480	7.04	V	182	113.8	54.572	-15.47	39.099	74	-34.901	Pass
2480	14.322	V	107.08	153.9	45.995	-1.83	44.166	74	-29.834	Pass
Start Frequency			1 GHz			Stop Frequency			18 GHz	
Measurement Distance			3 Meters			Detector			Average	
Channel Frequency	Frequency	Polarity	Antenna Height	Turtable Position	Measured	Correction Factor	Corrected Reading	Limit	Margin	Results
MHz	GHz	Horizontal/ Vertical	cm	Degrees	dBµV	dB	dBµV/m	dBµV/m	dB	Pass/Fail
2405	7.168	H	26.17	289.5	42.21	-14.754	27.46	54	-26.54	Pass
2405	14.174	H	107.65	25.4	33.51	-0.722	32.79	54	-21.21	Pass
2405	5.333	V	180.6	23.5	46.34	-23.479	22.86	54	-31.14	Pass
2405	14.164	V	107.08	64	34.37	-1.364	33	54	-21	Pass
2440	12.035	H	111.78	112.2	37.66	-6.387	31.27	54	-22.73	Pass
2440	14.049	H	106.82	111.7	33.69	-1.619	32.07	54	-21.93	Pass
2440	3.986	V	203.52	291.6	47.21	-27.866	19.34	54	-34.66	Pass
2440	13.878	V	107	291.7	33.84	-2.922	30.91	54	-23.09	Pass
2480	12.025	H	225.52	202.7	37.97	-6.328	31.64	54	-22.36	Pass
2480	14.36	H	107.52	113	33.97	-1.279	32.69	54	-21.31	Pass
2480	7.04	V	182	113.8	43.21	-15.473	27.74	54	-26.26	Pass
2480	14.322	V	107.08	153.9	33.65	-1.829	31.82	54	-22.18	Pass

Table 10. Cabinet Spurious Emissions above 1GHz, Test Results

Start Frequency			30 MHz			Stop Frequency			1 GHz	
Measurement Distance			3 Meters			Detector			Quasi-Peak	
Channel Frequency	Frequency	Polarity	Antenna Height	Turtable Position	Measured	Correction Factor	Corrected Reading	Limit	Margin	Results
MHz	MHz	Horizontal/ Vertical	cm	Degrees	dBµV	dB	dBµV/m	dBµV/m	dB	Pass/Fail
2440	779.819	H	122.34	246.1	3.65	28.82	32.46	46	-13.54	Pass

Table 11. Cabinet Spurious Emissions below 1GHz, Test Results

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T4681	Spectrum Analyzer (PSA)	Agilent Technologies	E4448A	10/15/2021	4/15/2023
1T4409	EMI Receiver	Rohde & Schwarz	ESIB7	2/16/2022	8/31/2023
1T6658	Spectrum Analyzer	Agilent Technologies	E4407B	9/7/2021	3/7/2023
1T4751	Antenna - Bilog	Sunol Sciences	JB6	6/1/2022	12/1/2023
1T4576	Antenna, Active Horn	Com-Power	AHA-118	7/8/2022	1/31/2024
1T4744	Antenna, Horn	ETS-Lindgren	3116	3/4/2021	9/4/2022
1T4752	Pre-Amplifier	Miteq	JS44-18004000-35-8P	Func Verify	Func Verify
1T8743	Preamplifier	A.H. Systems, Inc.	PAM-0118P	Func Verify	Func Verify
1T4300B	Semi-Anechoic 3m Chamber sVSWR	EMC TEST SYSTEMS	NONE	9/30/2021	9/30/2023
1T4300	SEMI-ANECHOIC CHAMBER (NSA)	EMC TEST SYSTEMS	NONE	8/19/2021	8/31/2023

Table 12. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

V. Certification & User's Manual Information

Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

Certification & User's Manual Information

1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(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, 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 is verified to comply 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 not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

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.

Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of 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 own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of 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 when the equipment is operated in a residential 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. 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.

B. ICES-003 Procedural & Labeling Requirements

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section for every ITE unit:

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

The presence of the label on the ITE represents the manufacturer's or importer's Self-Declaration of Compliance (SDoC) to Innovation, Science and Economic Development Canada ICES-003. Each unit of an ITE model shall bear a label indicating the model's compliance with ICES-003.

The label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. When the dimension of the device is too small or it is otherwise not practical to place the label on the ITE, the label shall be placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

Labeling Requirements:

Innovation, Science and Economic Development Canada ICES-003 Compliance Label:

CAN ICES-3 (B)/NMB-3(B)

End of Report