Testing Tomorrow's Technology

June 24, 2021

Mitch Kapa
SensorsCall
3423 Piedmont Rd NE
Atlanta, GA 30305

Dear Mr. Kapa:

It is our opinion that the SensorsCall, CareAlert Model CAX1SC meets the Supplier's Declaration of Conformity (SDoC) requirements of Part 15, Unintentional Radiators, Subpart B, Section 15.101 for a Class B Digital Device when tested for sections 15.107(a), Conducted Emissions and 15.109(a), Radiated Emissions per the configuration described in our enclosed test report. Additionally, this Model meets Canadian ISED ICES-003 – Information Technology Equipment (Including Digital Apparatus) – Limits and Methods of Measurement requirements.

Please keep the report in your files as proof that the product has been successfully tested.

If you have any questions, please don't hesitate to call. Thank you for your business.

Sincerely,

Alan Ghasiani
Consulting Engineer, President

Testing Tomorrow's Technology

Report of

Supplier's Declaration of Conformity (SDoC)
Per CFR 47
Part 15, Subpart B, for Unintentional Radiators,
Sections 15.107(a) for Conducted Emissions, Class B and 15.109(a) for Radiated Emissions, Class B

And

ISED ICES-003 – Information Technology Equipment (Including Digital Apparatus) – Limits and Methods of Measurement
for the

SensorsCall

CareAlert
Model: CAX1SC

Test Date(s): June 22, 2021

Issue Date: June 24, 2021

UST Project No: 21-0167

Total Number of Pages Contained Within This Report: 23

I certify that I am authorized to sign for the test facility and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US Tech (Agent Responsible For Test):

By: 

Name: Alan Ghasiani

Title: Consulting Engineer, President

Date: June 24, 2021

NVLAP LAB CODE 200162-0

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1 General Information

MEASUREMENT TECHNICAL SUMMARY
COMPANY NAME: SensorsCall
MODEL: CAX1SC

This report concerns (check one):
Original Test Report [X]
Test Report Update [ ]

Equipment type: Commercial [X] Residential [X] Class A [ ] Class B [X]

Summary of Test Results

FCC Rule	Description of Test	Result
Part 15.107	Power Line Conducted Emissions	PASS
Part 15.109	Radiated Emissions	PASS

1.1 Characterization of Test Sample

The test sample used was received by US Tech on June 22, 2021, in good operating condition.

1.2 Product Description

The Equipment under Test (EUT) is the SensorsCall, CareAlert, Model CAX1SC. The EUT is a device which is the physical portion of a well-being monitoring system. The CAX1SC uses various sensors to collect information about the environment and activity within a home and then a portion of that information sent to a back-end server which uses the information to inform the caregiver about the status of the occupant.

The EUT contains a modularly certified combination Wi-Fi & Bluetooth Module bearing FCC ID: 2AC7Z-ESP32WROVERB and IC: 21098-ESPWROVERB. The module is used in accordance with its grant requirements and has not been modified by SensorsCall.

Table 1. EUT and Peripherals

EUT/ MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID / IC	CABLES P/D
LED light/ SensorsCall (EUT)	CAX1SC	2123CA01031744	FCC ID: 2AC7Z-ESP32WROVERB IC: 21098-ESPWROVERB	P
USB power adapter/ SensorsCall	MF-05001000SA1	Engineering Sample	None	P
PERIPHERALS/ MANUFACTURER	**MODEL NUMBER**	**SERIAL NUMBER**	**FCC ID / IC**	**CABLES P/D**
Router/ TP-Link	TLWA801ND	217408001206	FCC ID: TE7WA801NDV5 IC: 8853A-WA801ND	D

P = Power, D = Data, S = Shielded, U = Unshielded

Table 2. Details of I/O Cables Attached to EUT

DESCRIPTION OF CABLE	DETAILS OF CABLE			CABLE LENGTH
USB cable	**Manufacturer and Part Number**			1.8 m
	SensorsCall			
	Shield Type	**Shield Termination**	**Type of Backshell**	
	N/A	N/A	N/A	

Shield Type
N/A = None
F = Foil
B = Braided
2B = Double Braided
CND = Could Not Determine

Shield Termination
N/A = None
360 = 360 Degrees
P = Pigtail/Drain Wire
CND = Could Not Determine
MU = Metal Unshielded

Type of Backshell
N/A = Not Applicable
PS = Plastic Shielded
PU = Plastic Unshielded
MS = Metal Shielded

1.3 Configuration of Tested System

The EUT was set up as follows:

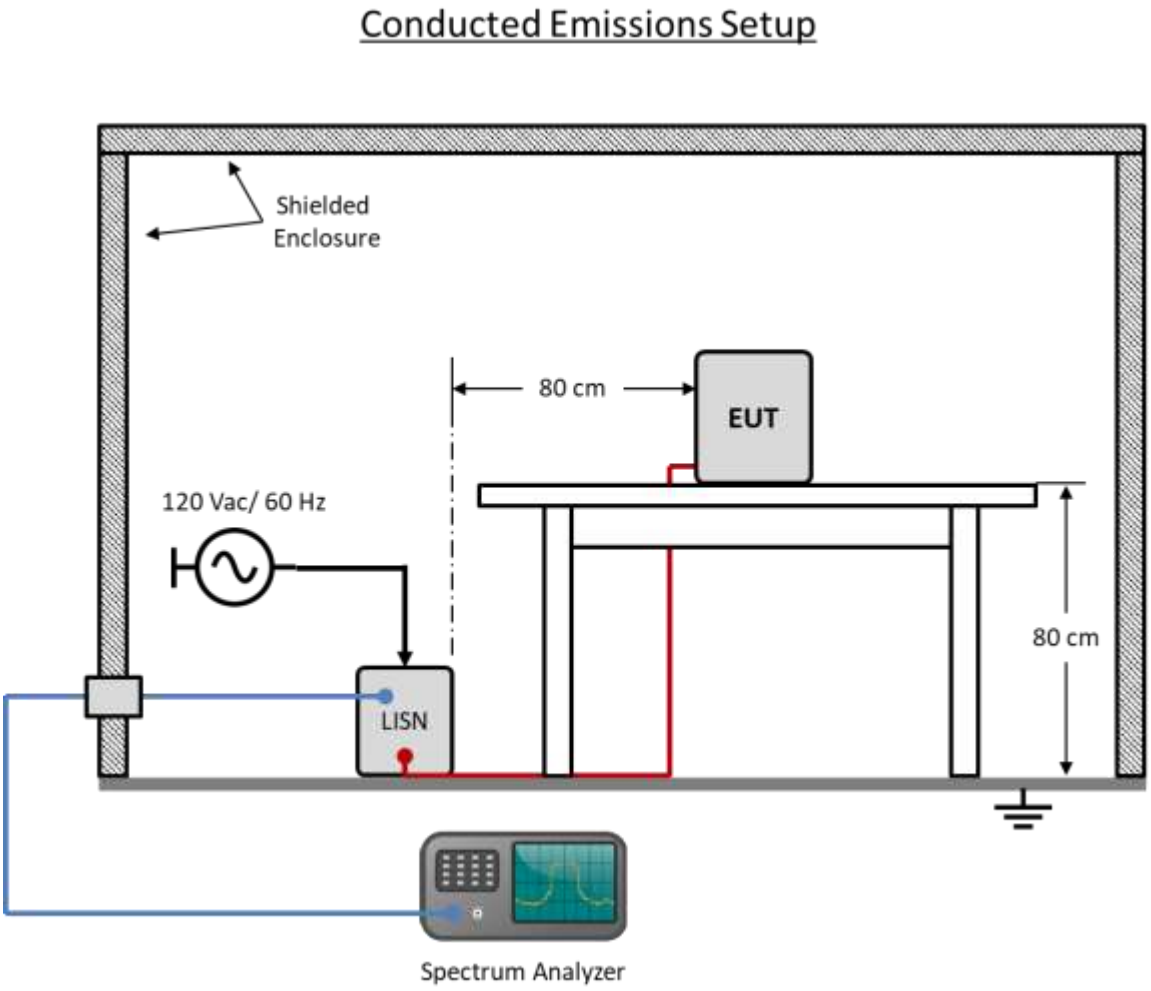

Figure 1. Block Diagram of Test Configuration for Conducted Emissions Test

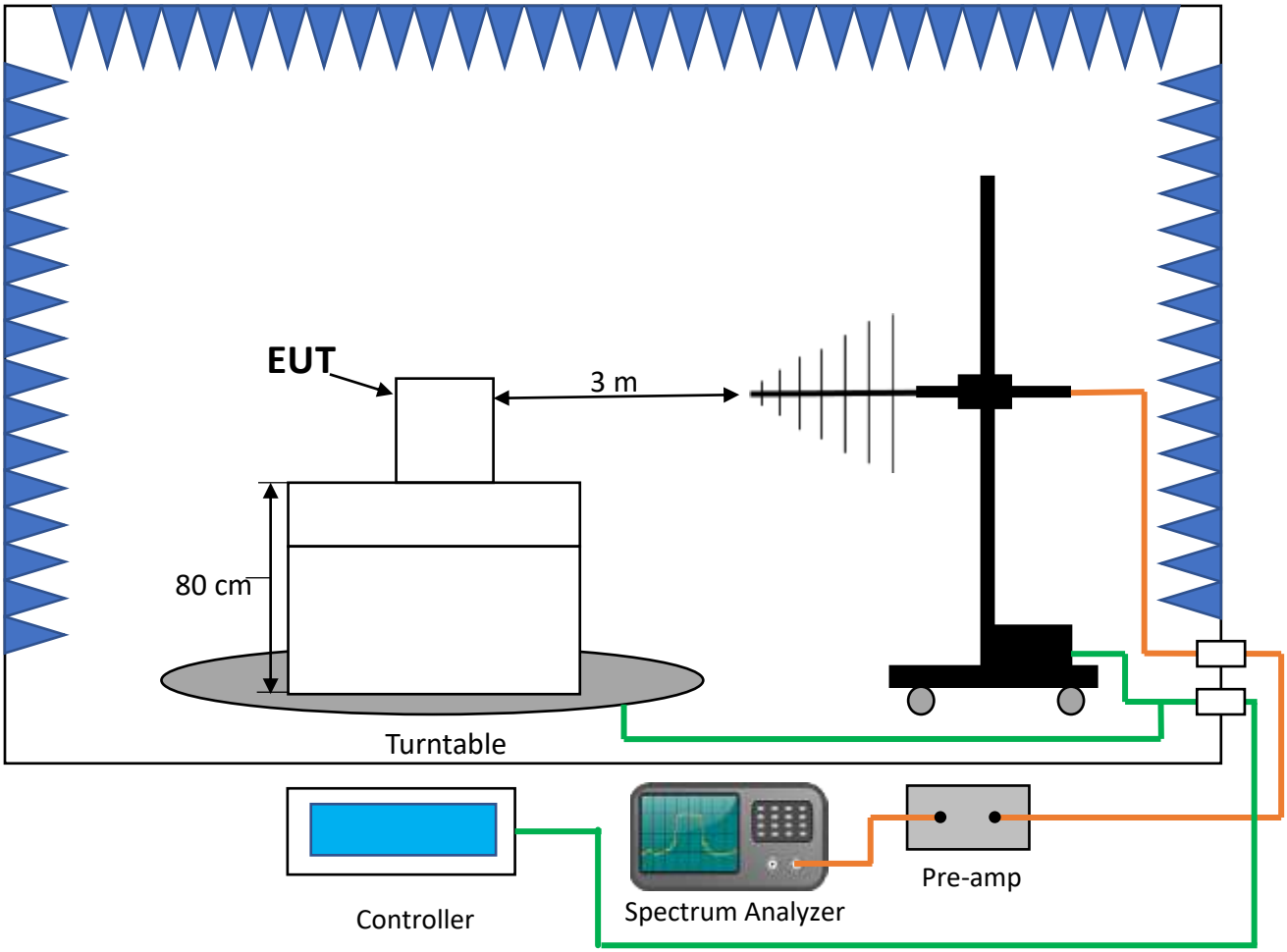

Figure 2. Block Diagram of Test Configuration for Radiated Emissions Test

1.4 Related Submittals

There are no related submittals with this product.

2 Tests and Measurements

2.1 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA, 30004. This site has been fully described and registered with the FCC under registration number US5301. Additionally, this site has also been fully described and submitted to Industry Canada (IC) and has been approved under file number 9900A-1. US Tech is an accredited laboratory under the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code: 200162-0.

The shielded semi anechoic EMC Chamber and the conducted disturbance measurement facilities used to collect the radiated and conducted emissions data are located at 3505 Francis Circle, Alpharetta, GA (USA). These test sites meet the descriptions given in Table A.1 of the standard.

2.1.1 Radiated Emissions Test Site (Shielded Semi Anechoic EMC Chamber)

The radiated emissions disturbance measurement facility consists of an 8.5 m long by 5.5 m wide and 5.6 m high shielded semi anechoic EMC Chamber. The chamber is lined with ferrite core and RF absorbers. The quiet zone is 2.0 m.

The test facility layout is shown in the figure below. A remotely controlled 2.0 m diameter flush-mounted turntable is provided for rotating (through at least 360 degrees) the EUT. A non-conductive table, 1.5 m long by 1.0 m wide by 0.8 m high is used in conjunction with the turntable for tabletop equipment. Electrical service for the EUT is provided through openings at the center of the turntable.

Provision for receiving antenna power and data wires is provided by junction boxes placed at the perimeter of the chamber. The receive antenna mast is remotely controlled and can be varied in height from 1 m to 4 m.

Power and data cables for the radiated disturbance measurement facility are run through PVC tubing under the raised floor or are laid directly upon the ground plane.

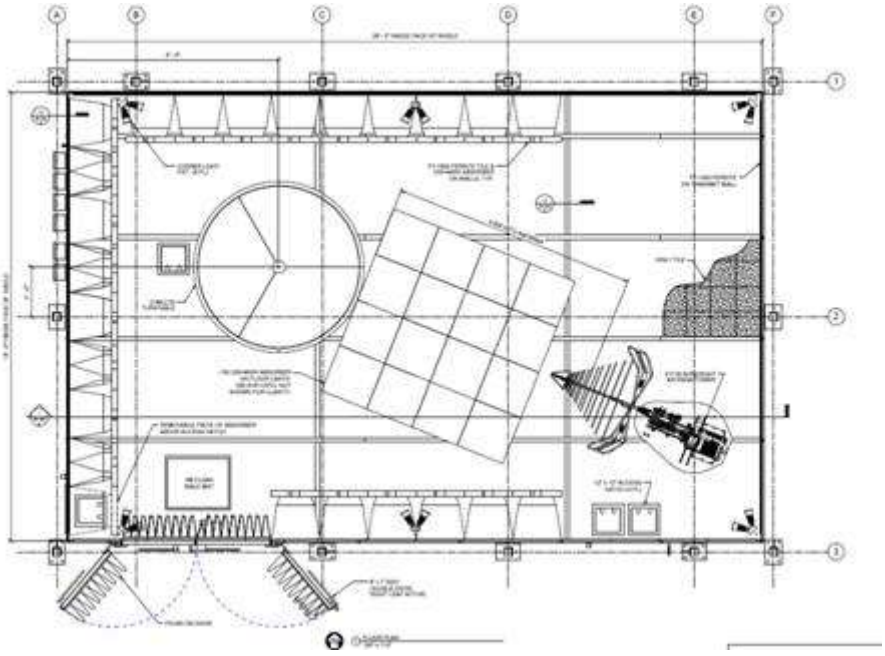

Figure 3. Radiated Emissions Disturbance Measurement Facility Diagram

2.2 Test Equipment

A list of test equipment used for these measurements is found in Table 3 below.

Table 3. Test Instruments and Accessories

INSTRUMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	CALIBRATION DUE DATE
SPECTRUM ANALYZER	8593E	HEWLETT PACKARD	3438A00787	1/29/2022 2 yr.
SPECTRUM ANALYZER	DSA815	RIGOL	DSA8A18030 0138	12/10/2021 2 yr.
BICONICAL ANTENNA	3110B	EMCO	9306-1708	6/27/2021 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9110-3236	8/22/2021 2 yr.
HORN ANTENNA	3115	EMCO	9107-3723	2/3/2023 2 yr.
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A02980	6/9/2022
PREAMP	8449B	HEWLETT-PACKARD	3008A00480	6/25/2022
LISN	9247-50-TS-50-N	Solar Electronics	955824 & 955825	6/9/2022

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.3 EUT Electrical Mode of Operation

The EUT is rated 100-240VAC, 0.5A, 50/60Hz. During testing, the EUT was connected to a USB extension cable and USB power adapter to provide constant power to the EUT. The power adapter was powered with a 120VAC/60Hz.

2.4 Test Software and /or Exercising of the EUT

The EUT was configured with the necessary software to simulate normal operation. The EUT was set to the highest light setting. No other software programming was required. A smart phone loaded with customer application was used to verify the wireless operation.

2.5 Test Procedure

The EUT was configured as shown in the following block diagram(s) and photograph(s). The EUT was tested per ANSI C63.4-2014, *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 GHz* paragraph 7 for conducted emissions and paragraph 8 for radiated emissions. Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter on the spectrum analyzer was OFF throughout the evaluation process. The EUT and Peripherals Table describe other instruments and accessories used to evaluate this product.

2.6 Rationale of Test Selection

The EUT, cable and wiring arrangement, and mode of operation that produced the emissions with the highest levels relative to the applicable limits was selected for final measurements.

In this case the EUT could only be tested while placed upright as it would be in its typical configuration. The test configuration photographs represent the final configuration used for testing.

2.7 Equipment Hardware Modifications

There were no modifications made to the EUT.

2.8 Deviation(s) or Additions to the Test Methods

No deviations or additions were used in this test.

2.9 Emissions Measurement Data

A router was used to exercise the wireless features of the EUT. The router was located away from the receive antenna during radiated emissions and for conducted emissions the router was positioned in a remote location. The intent was to ensure that the emissions from the router did not contribute to the emissions measurements since the router is not part of the EUT.

2.9.1 Conducted Emissions Test Data

Table 4. Conducted Emissions Data

150KHz to 30 MHz with Class B Limits						
Test: Power Line Conducted Emissions				**Client:** SensorsCall		
Project: 21-0167				**Model:** CAX1SC		
Frequency (MHz)	**Test Data (dBuv)**	**LISN+CL-PA (dB)**	**Results (dBuV)**	**AVG Limits (dBuV)**	**Margin (dB)**	**Detector PK, QP, or AVG**
120 VAC, 60 Hz Phase						
0.1523	41.67	0.07	41.74	55.9	14.1	**PK**
0.5000	33.19	2.68	35.87	46.0	10.1	**PK**
1.1267	31.71	0.87	32.58	46.0	13.4	**PK**
8.5583	28.07	0.36	28.43	50.0	21.6	**PK**
10.0670	26.57	0.51	27.08	50.0	22.9	**PK**
22.8500	25.49	1.08	26.57	50.0	23.4	**PK**
120 VAC, 60 Hz Neutral						
0.1500	42.10	0.13	42.23	56.0	13.8	**PK**
0.5008	32.69	0.05	32.74	46.0	13.3	**PK**
1.2000	31.78	0.51	32.29	46.0	13.7	**PK**
5.0000	29.53	0.56	30.09	46.0	15.9	**PK**
10.7500	26.69	0.72	27.41	50.0	22.6	**PK**
26.8330	25.38	1.98	27.36	50.0	22.6	**PK**

Sample Calculation at 0.1523 MHz:

Magnitude of Measured Frequency	41.67	dBuV
+Correction Factors	0.07	dB
Corrected Result	41.74	dBuV

Test Date: June 22, 2021

Tested by
Signature: _____ Name: John Freeman

2.9.2 Radiated Emissions Test Results

Table 5. Radiated Emissions Test Data below 1GHz

30 MHz to 1000 MHz with Class B Limits							
Test: Radiated Emissions				**Client:** SensorsCall			
Project: 21-0167				**Model:** CAX1SC			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK or QP**
35.18	42.86	-14.16	28.70	40.0	3m./VERT	11.3	**QP**
37.89	34.27	-14.75	19.52	40.0	3m./VERT	20.5	**QP**
49.80	50.25	-16.62	33.63	40.0	3m./VERT	6.4	**PK**
99.52	50.87	-15.12	35.75	43.5	3m./VERT	7.8	**PK**
101.55	52.35	-16.01	36.34	43.5	3m./HORZ	7.2	**PK**
115.50	49.24	-15.02	34.22	43.5	3m./HORZ	9.3	**PK**
120.40	45.85	-14.55	31.30	43.5	3m./HORZ	12.2	**PK**
122.20	42.49	-13.85	28.64	43.5	3m./VERT	14.9	**PK**
221.80	42.59	-13.82	28.77	46.0	3m./HORZ	17.2	**PK**
222.50	43.64	-13.92	29.72	46.0	3m./VERT	16.3	**PK**
491.80	46.74	-6.84	39.90	46.0	3m./VERT	6.1	**QP**
704.00	24.94	-1.94	23.00	46.0	3m./VERT	23.0	**QP**

Sample Calculation at 35.18 MHz:

Magnitude of Measured Frequency	42.86	dBuV
+Correction Factors	-14.16	dB
Corrected Result	28.70	dBuV

Test Date: June 22, 2021

Tested by
Signature: _____ Name: John Freeman

Table 6. Radiated Emissions Test Data above 1GHz

Above 1000 MHz with Class B Limits							
Test: Radiated Emissions				**Client:** SensorsCall			
Project: 21-0167				**Model:** CAX1SC			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK or QP**
1725.00	54.53	-7.82	46.71	54.0	3.0m./VERT	7.3	**PK**
1677.00	53.67	-8.24	45.43	54.0	3.0m./VERT	8.6	**PK**
All emissions were more than 20 dB below the limits.							

Sample Calculation at 1725.00 MHz:

Magnitude of Measured Frequency	54.53	dBuV
+Correction Factors	-7.82	dB
Corrected Result	46.71	dBuV

Test Date: June 22, 2021

Tested by
Signature: _____ Name: John Freeman

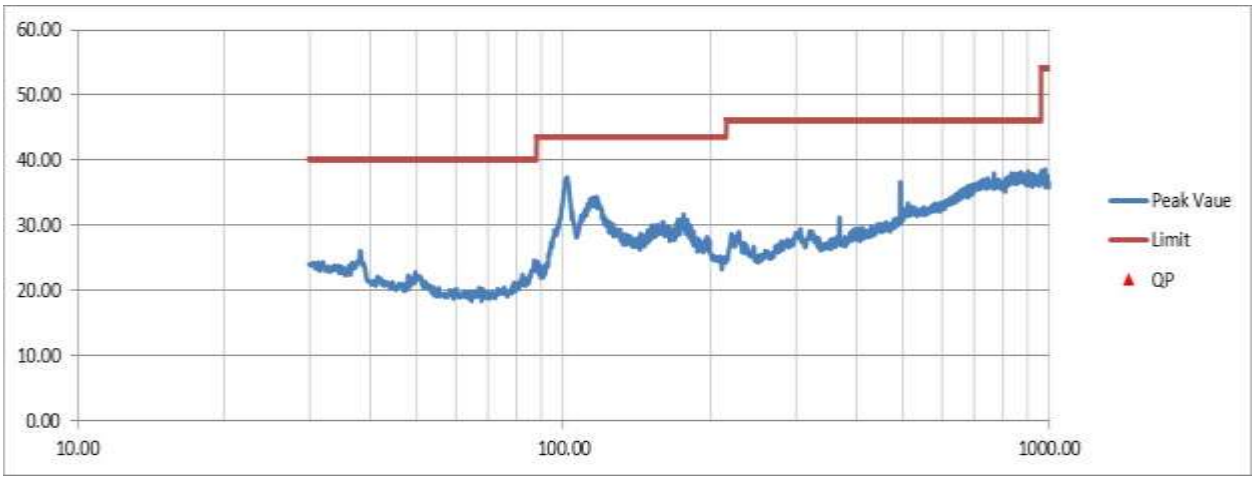

Figure 4. Horizontal Graph of EUT Emissions under 1000 MHz

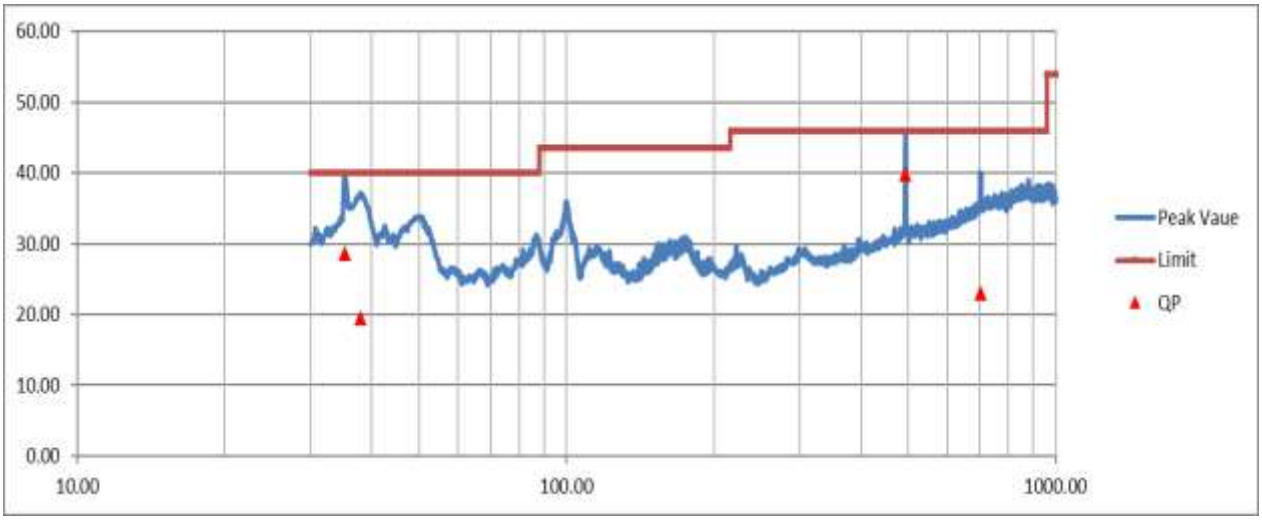

Figure 5. Vertical Graph of EUT Emissions under 1000 MHz

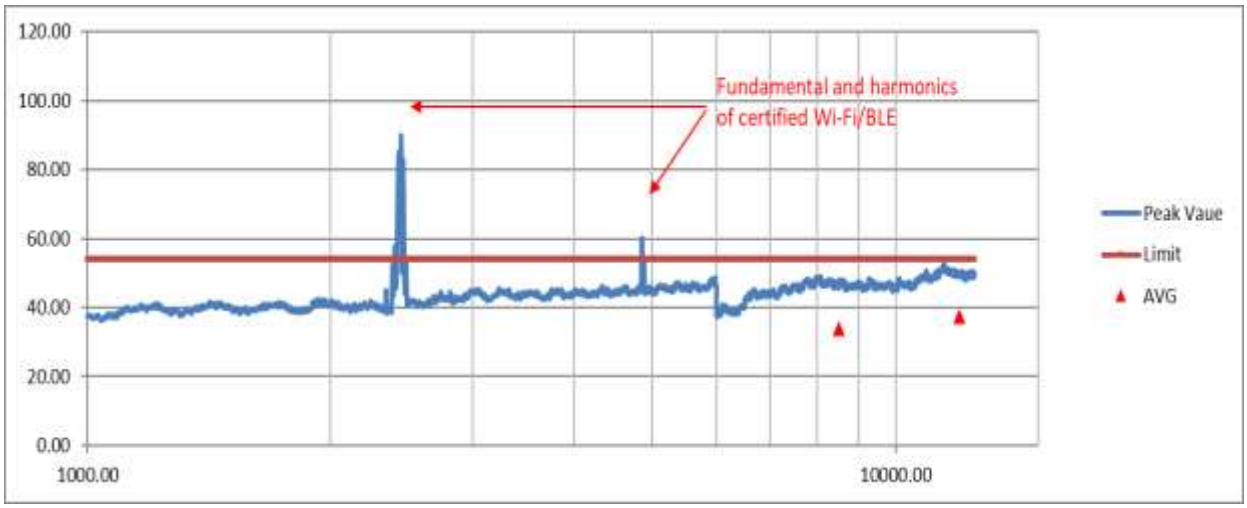

Figure 6. Horizontal Graph of EUT Emissions above 1000 MHz

Note: Fundamental and harmonics emissions from approved radio module identified above.

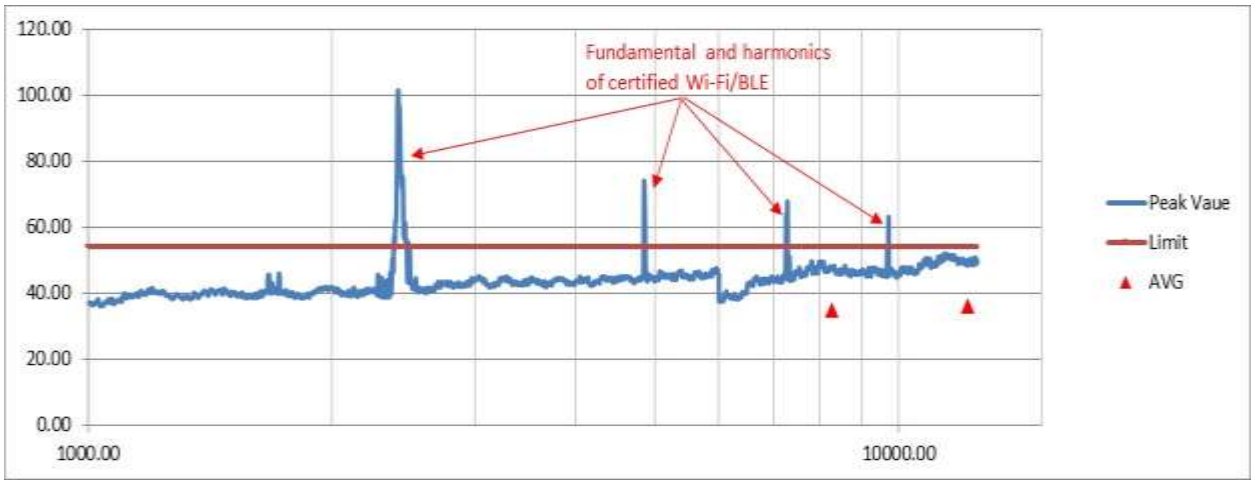

Figure 7. Vertical Graph of EUT Emissions above 1000 MHz

Note: Fundamental and harmonics emissions from approved radio module identified above.

Figure 8. Radiated Emissions Test Setup Photo, Close-up

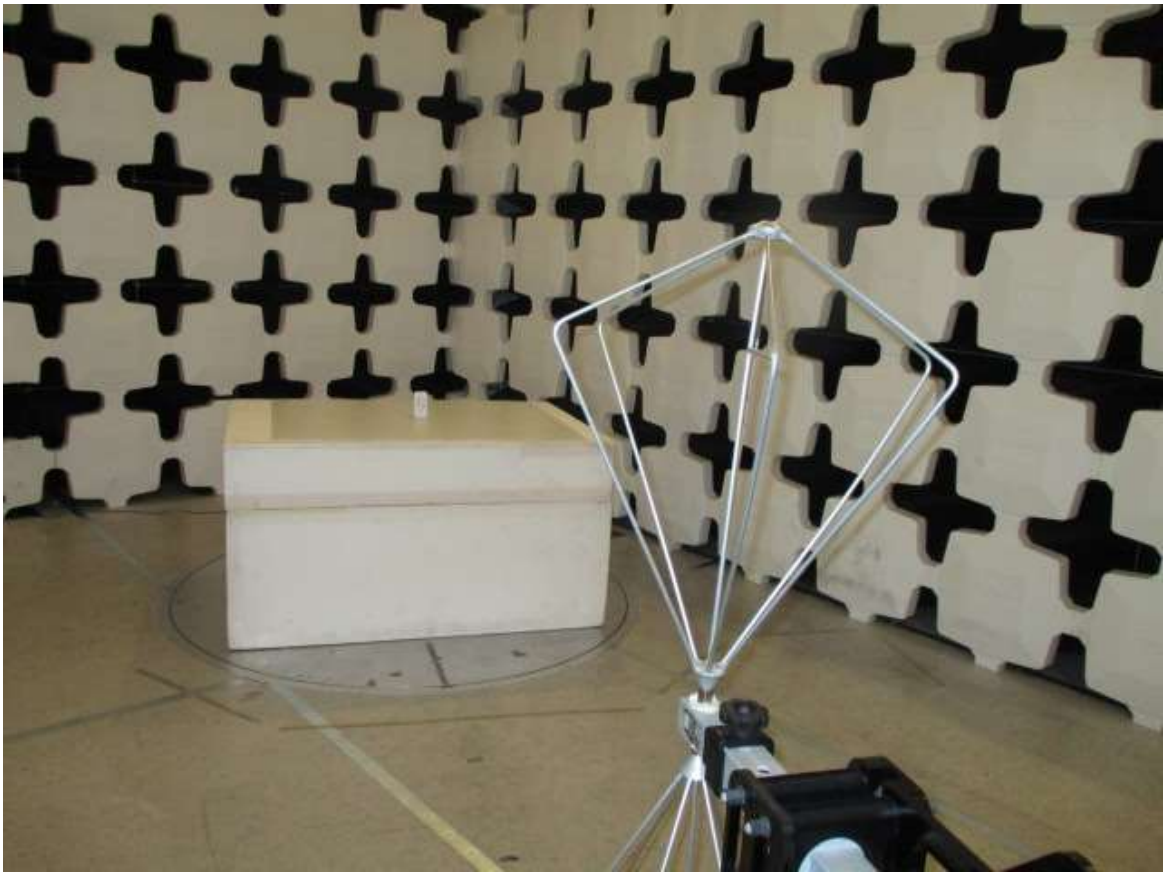

Figure 9. Radiated Emissions Test Setup Photo, 30 – 200 MHz

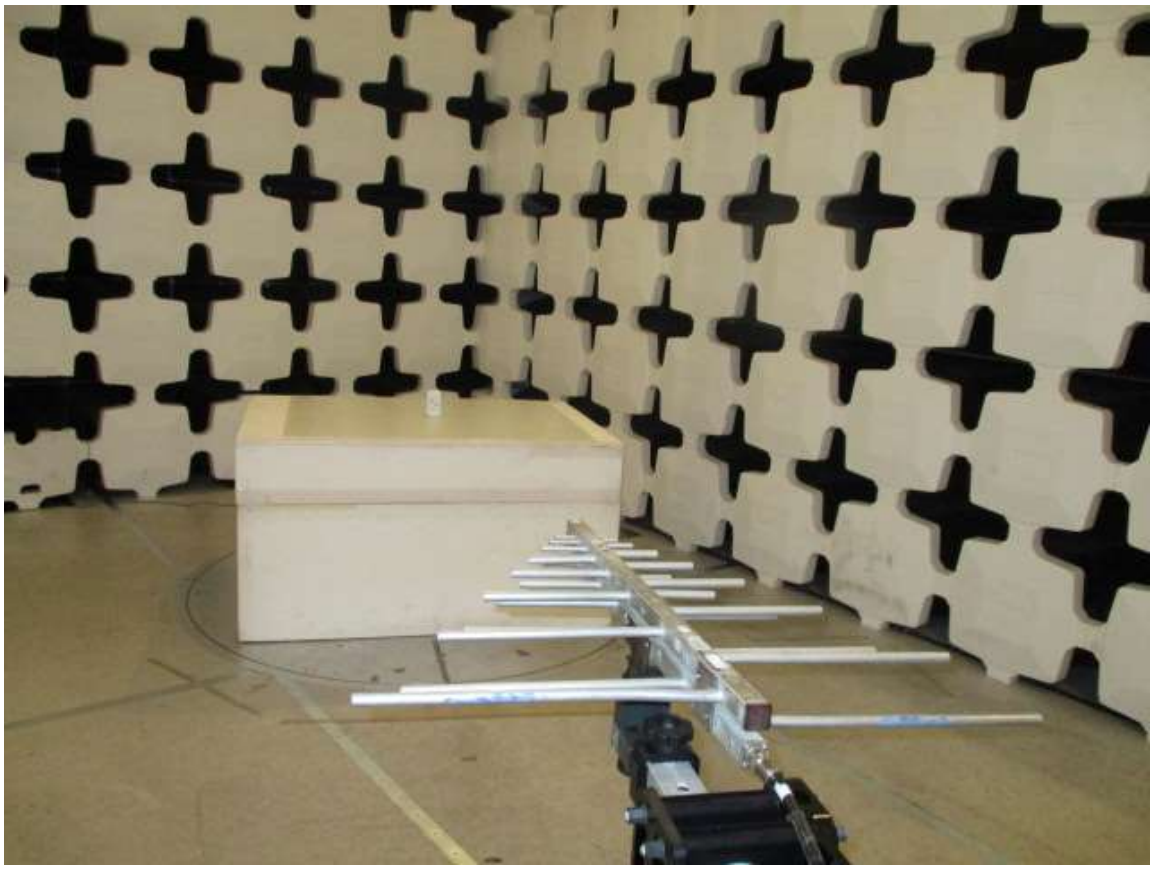

Figure 10. Radiated Emissions Test Setup Photo, 200 – 1000 MHz

Figure 11. Radiated Emissions Test Setup Photo, above 1 GHz

Figure 12. Conducted Emissions Test Setup Photo

2.9.3 Measurement Uncertainty

2.9.3.1 Conducted Emissions Measurement Uncertainty

Measurement uncertainty (within a 95% confidence level) for this test is ± 2.85 dB.

2.9.3.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.40 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.19 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.08 dB (3 m distance).

3 Test Results

The EUT meets the Technical Requirements of CFR 47 of the US Code, Part 15 Subpart B, Unintentional Radiators, per paragraph 15.107 for a Class A Digital Device. The EUT also meets Technical Requirements of the Innovation, Science and Economic Development (ISED) Canada ICES-003.

The EUT meets the Technical Requirements of CFR 47 of the US Code, Part 15 Subpart B, Unintentional Radiators, per paragraph 15.109 for a Class A Digital Device. The EUT also meets Technical Requirements of the Innovation, Science and Economic Development (ISED) Canada ICES-003.