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Certification Test Report

FCC ID: 2ACWM-SONICLASS
IC: 7309A-SONICLASS

FCC Rule Part: 15.209
IC Radio Standards Specification: RSS-210

ACS Report Number: 14-2086.W06.1B

Applicant: STANLEY Convergent Security Solutions, Inc.
Model: SONIP ICLASS KP

Test Begin Date: **August 7, 2014**
Test End Date: **August 28, 2014**

Report Issue Date: December 9, 2014

ACCREDITED TESTING

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ACLASS, ANSI, or any agency of the Federal Government.

Reviewed by:

Thierry Jean-Charles
EMC Engineer
Advanced Compliance Solutions, Inc.

This report contains 18 pages

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210.

1.2 Product Description

The SONIP ICLASS KP is compatible with the SonIP iBase and FlexiBase Systems. The product has an integrated HID iCLASS reader that can be configured as an Arm/ Disarm reader or ingress access control. The keypad is a user interface for navigating, system programming, performing simple data entry, and controlling the SonIP iBase and FlexiBase System alarms and access control functions. The EUT includes a Liquid Crystal Display (LCD), with scrolling text, and an alphanumeric digital keypad.

Technical Details
Frequency of Operation: 13.56 MHz
Number of Channels: 1
Modulation: No modulation
Antenna: Magnetic Loop Antenna
Input Voltage: 5 VDC (through FlexiP unit)

Manufacturer Information:

STANLEY Convergent Security Solutions
1707 Orlando Central Parkway, Suite 500,
Orlando, FL 32809

Model Number: SONIP ICLASS KP

Test Sample Serial Number(s): 6443484, 6401325 (Power line conducted emissions at 13.56 MHz)

Test Sample Condition: The test samples were provided in good condition with no physical damage.

1.3 Test Methodology and Considerations

The EUT was evaluated for radiated and power line conducted emissions. The EUT was assessed in the orientation of typical installation. The EUT was powered and connected to FlexiP system through an EMT conduit per the manufacturer installation guidelines. For the power line conducted evaluation, the emissions at the 13.56 MHz fundamental frequency were measured with on a sample with a 50 Ohm load at the RF port. The radiated and remaining power line emission measurements were performed on an unmodified sample with the antenna connected.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 475089
Industry Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ACLASS program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1050 Multi-device Controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

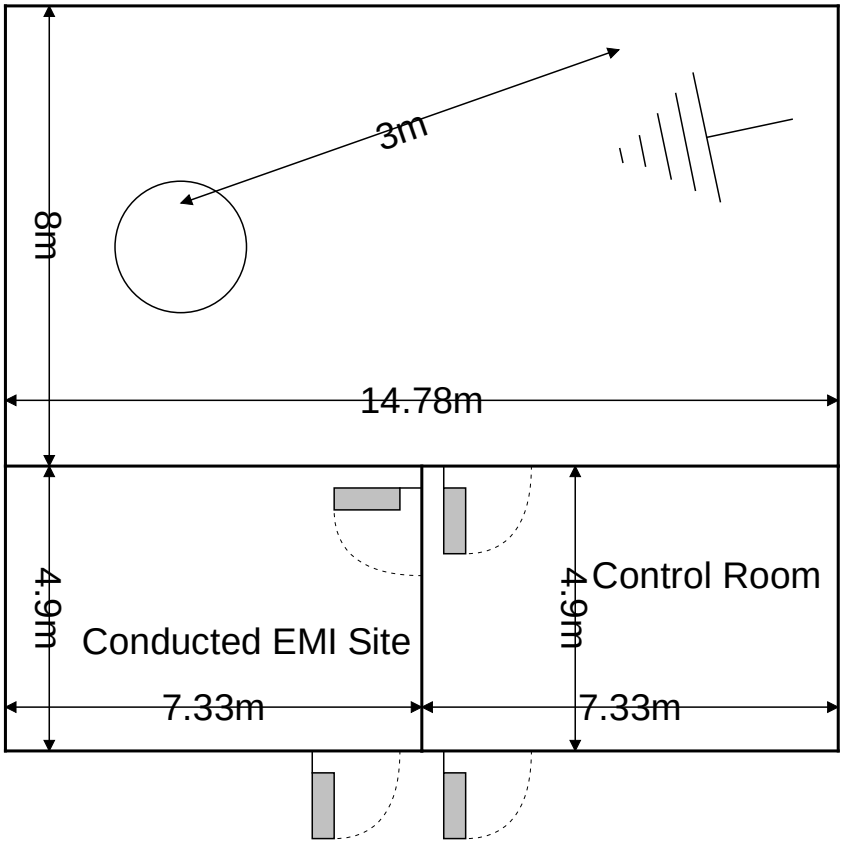

Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m^3. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 50 Ω/50 µH and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

A diagram of the room is shown below in figure 2.3.2-1:

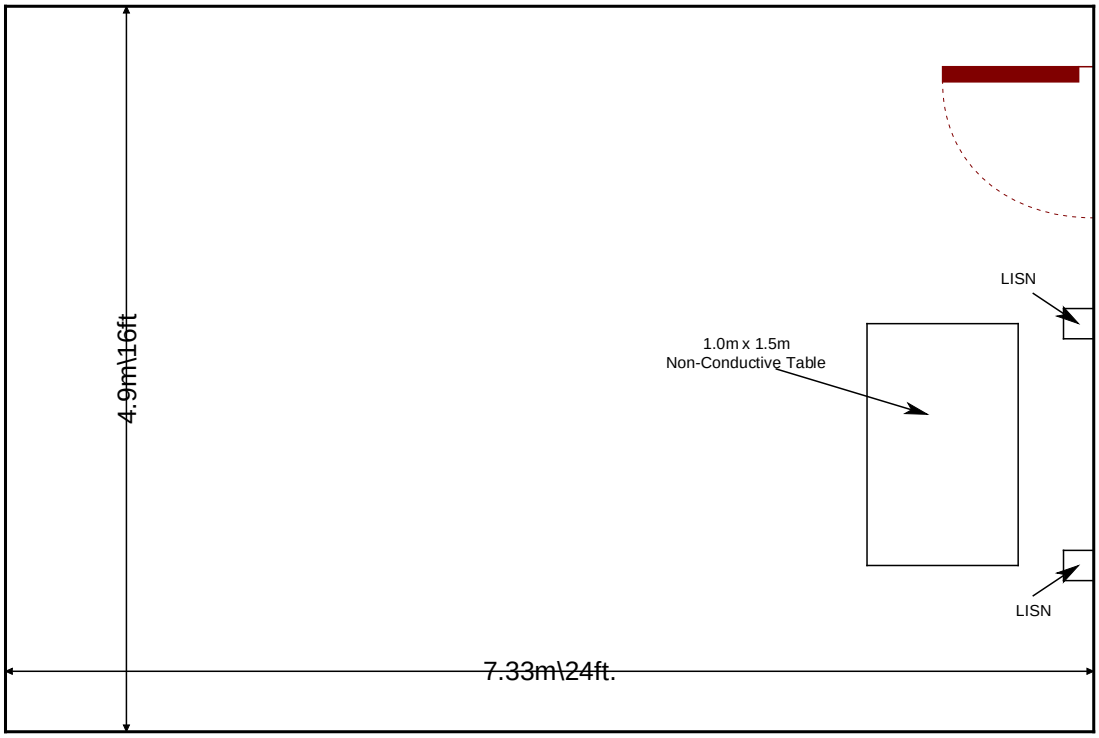

Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2014
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2014
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8 December 2010.
- Industry Canada Radio Standards Specification: RSS-Gen – General Requirements for Compliance of Radio Apparatus, Issue 4, November 2014.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
78	EMCO	6502	Antennas	9104-2608	2/5/2013	2/5/2015
2002	EMCO	3108	Antennas	2147	11/22/2013	11/22/2015
2004	EMCO	3146	Antennas	1385	11/22/2013	11/22/2015
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	12/31/2013	12/31/2014
2022	EMCO	LISN3825/2R	LISN	1095	9/9/2013	9/9/2015
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	2/27/2014	2/27/2015
2045	ACS Boca	Conducted Cable Set	Cable Set	2045	1/1/2014	1/1/2015
523	Agilent	E7405	Spectrum Analyzers	MY45103293	1/8/2013	1/8/2015
2095	ETS Lindgren	TILE4! - Version 4.2.A	Software	85242	NCR	NCR
3004	Teseq	CFL 9206A	Attenuators	34720	10/21/2013	10/21/2015

NCR=No Calibration Required

5 SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	EUT	Stanley Convergent Security Solutions	SONIP ICLASS KP	6443484, 6401325
2	Flexibase Controller	Stanley Convergent Security Solutions	Flexibase	QMS0309010
3	Power Supply	Basler Electric	BE11645 0CAA	N/A
4	Keypad	Stanley Convergent Security Solutions	SONIP ICLASS KP	N/A
5	Laptop	Lenovo	B570	WB 04757818
6	20V Laptop AC Adapter	Lenovo	ADP-65KH B	11S36001929ZZ2001C8KD7
7	Communication Receiver/Gateway	Bosch Security Systems	D6600	4998122626C
8	PSTN Simulator	Virtual Console, LLC	CH-8FXS-A	N/A
9	19.5V Power Supply	Targus	APA31US	F156121421002519-0A
10	Cobox	LANTRONIX	D6686	00-80-A3-94-3A-F7
11	12V Power Supply	Group West	48D-12-900	N/A
12	Ethernet Switch	Netgear	F5605 V3	1FM2963F03E9E
13	7.5V Power Supply	DVE	DSA-9W-09 FUS 07507	R090603018388

Table 5-2: Cable Description (Radiated Emissions)

Cable #	Cable Type	Length	Shield	Termination
A	Conduit	0.55m	Yes	EUT to Flexibase Controller
B	Extension Cord	0.9m	No	AC Adapter to AC Mains
C	Ethernet	10m	No	Flexibase Controller to Keypad
D	Power	16.15m	No	Flexibase Controller to Keypad
E	RJ11	20m	No	Flexibase Controller to PSTN Simulator
F	Power	1.8m	No	PSTN simulator to Power Supply
G	Power	1.16m	No	Power Supply to AC Mains
H	RJ11	2.1m	No	PSTN Simulator to Communication Receiver/Gateway
I	Power	1.8m	No	Communication Receiver Gateway to AC Mains
J	Serial	1.84m	No	Communication Receiver Gateway to Cobox
K	Power	1.8m	No	Cobox to Power Supply
L	Ethernet	2.15m	No	Cobox to Ethernet Switch
M	Ethernet	0.30m	No	Communication Receiver Gateway to Ethernet Switch
N	Ethernet	2.15m	No	Ethernet Switch to Laptop
O	Power	1.8m	No	Ethernet Switch to Power Supply
P	Power	1.8m	No	Power Supply to Laptop
Q	Power	1m	No	Power Supply to AC Mains
R	Ground Strap	1.83m	No	EUT to Ground

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

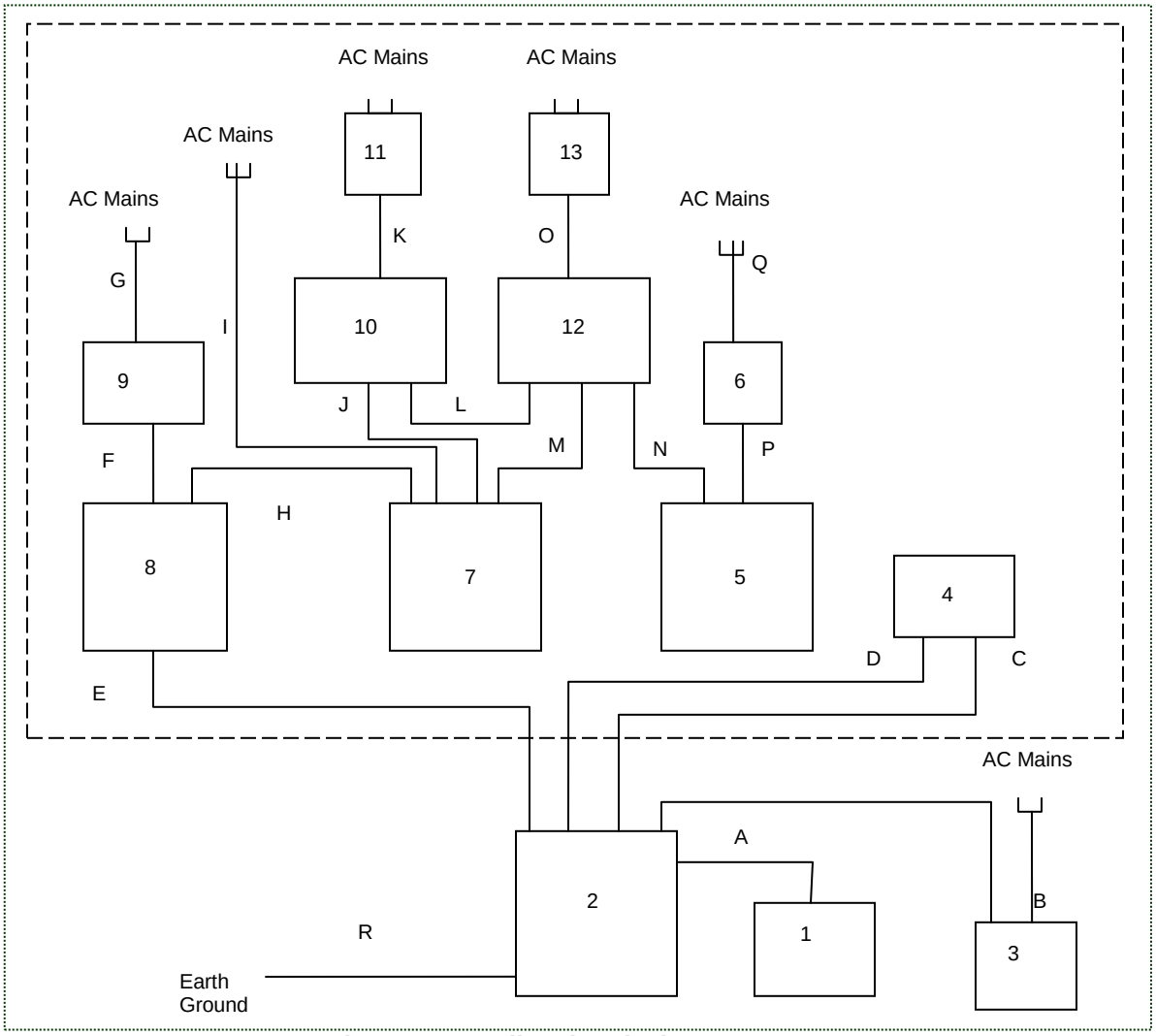

Figure 6-1: Radiated Emissions Setup

Note: The equipment enclosed within the dotted lines was set outside the test environment during both the radiated and power line conducted emissions evaluation.

7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The EUT uses a magnetic loop antenna that is soldered to the PCB. The antenna is not readily replaceable without damaging the equipment, thus meeting the requirements of the FCC Section 15.203.

7.2 20dB / 99% Bandwidth: FCC: Section 15.215 / IC RSS-Gen 6.6

7.2.1 Measurement Procedure

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected.

The 20 dB bandwidth was measured with the Span of the Spectrum Analyzer configured between two to five times the 20 dB bandwidth. The RBW of the SA was set to 1% to 5% of the occupied 20 dB bandwidth. The reference level was set to the highest amplitude signal observed. The bandwidth was measured 20 dB down from the reference level.

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission, including the emissions skirts. The RBW was set to 1% to 5% of the estimated bandwidth. The occupied 99% bandwidth was measured by using a delta marker at the lower and upper frequencies leading to 0.5% of the total power.

7.2.2 Measurement Results

Results are shown below.

Table 7.2.2-1: 20dB / 99% Bandwidth

Frequency [MHz]	20dB Bandwidth [kHz]	99% Bandwidth [kHz]
13.56	0.682	1.427

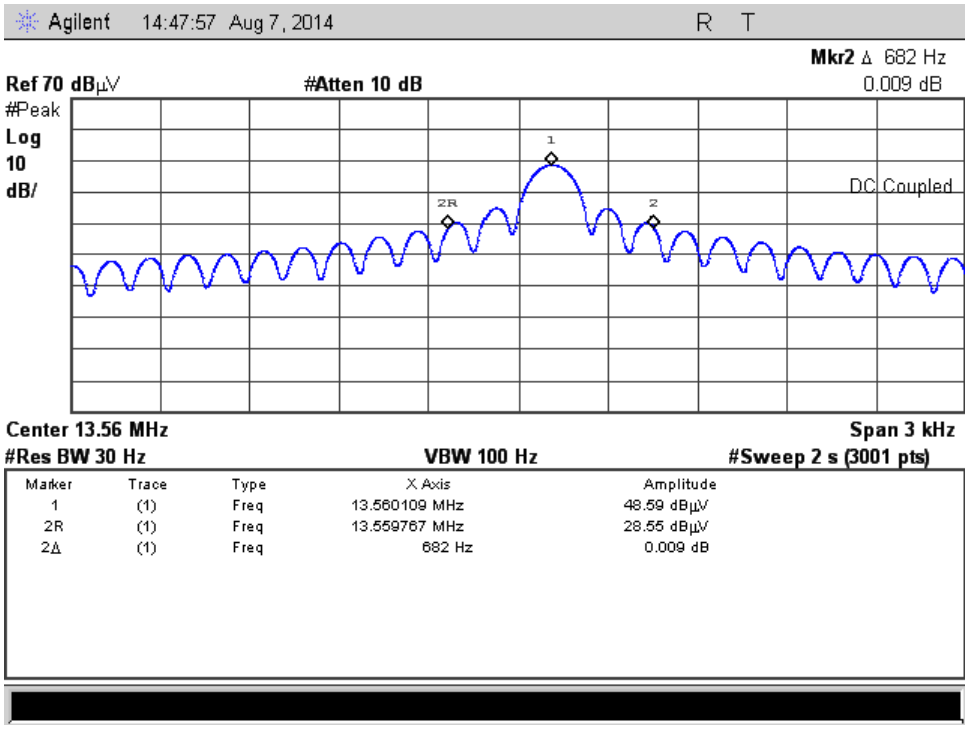

Figure 7.2.2-1: 20dB BW

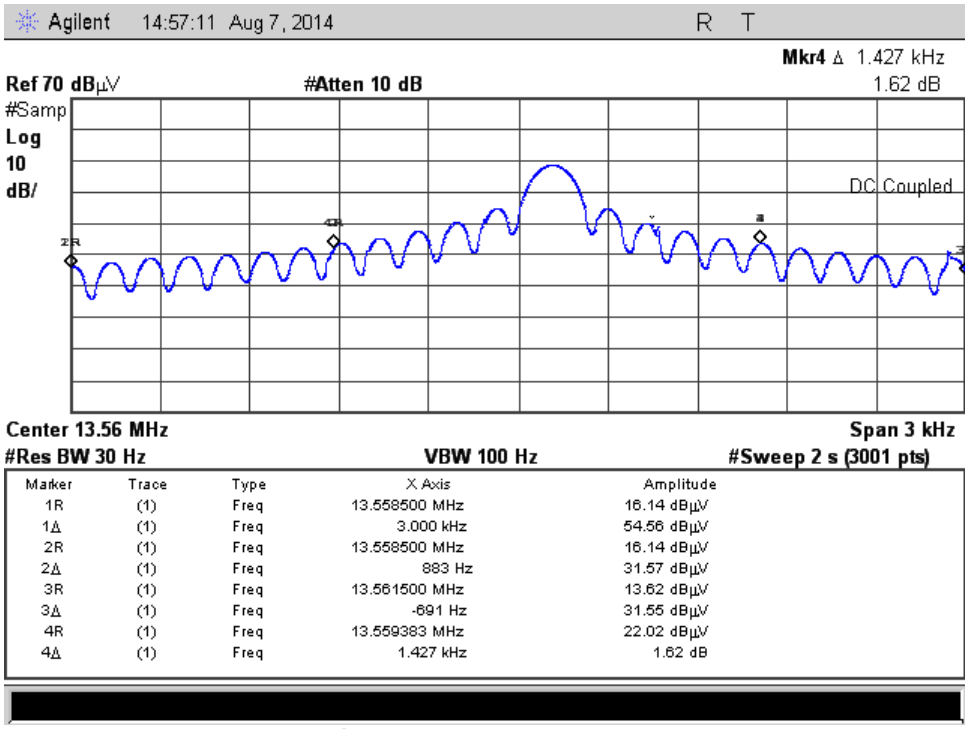

Figure 7.2.2-2: 99% OBW

7.3 Radiated Spurious Emissions – FCC: Section 15.209 / IC: RSS-210 2.5

7.3.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 10 kHz to 1GHz. Section 15.33(a)(4) specifies, if the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to frequency specified in 15.33(b)(1) for unintentional radiators. The upper frequency range for the digital device is 1000MHz which greater than the 10th harmonic of the fundamental frequency. The upper frequency range measured was 1000MHz.

Measurements below 30MHz were performed in a semi-anechoic chamber with a 3 meter separation distance between the EUT and measurement antenna. The EUT was rotated 360 and the loop antenna rotated about the vertical axis to maximize each emission. The magnetic loop receiving antenna was positioned with its center 1 meter above the ground.

The spectrum analyzer's resolution and video bandwidths were set to 200 Hz and 1000 Hz respectively for frequencies below 150 kHz and 9 kHz and 30 kHz respectively for frequencies above 150 kHz and below 30 MHz. For measurements in the frequency bands 9-90 kHz and 110-490 kHz, an average detector was used. When average measurements are specified, the peak emissions were also compared to a limit corresponding to 20 dB above the maximum permitted average limit according to Part 15.35. All other emissions were measured using a Quasi-peak detector. The final measurements were then corrected by antenna correction factors and cable loss for comparison to the limits.

Measurements above 30 MHz were performed in a semi-anechoic chamber with a 3 meter separation distance between the EUT and measurement antenna. The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000 MHz, quasi-peak measurements were made using a resolution bandwidth (RBW) of 120 kHz and a video bandwidth (VBW) of 300 kHz.

7.3.2 Distance Correction for Measurements Below 30 MHz – Part 15.31

Radiated measurements were performed at a distance closer than 300 meters and 30m as required, according to Part 15.209. Therefore a correction factor was applied to account for propagation loss at the specified distance. The propagation loss was determined by using the square of an inverse linear distance extrapolation factor (40dB/decade) according to 15.31. A sample calculation of the distance correction factor is shown below for limits expressed at a 300m measurement distance and a 30m measurement distance.

Distance correction factor (300m Specified Test Distance) = 40*Log (Test Distance/300)
= 40*Log (3/300)
= - 80 dB

Distance correction factor (30m Specified Test Distance) = 40*Log (Test Distance/30)
= 40*Log (3/30)
= - 40 dB

7.3.3 Measurement Results

Radiated spurious emissions found in the band of 10 kHz to 1GHz are reported in the Table 7.3.3-1 below.

Table 7.3.3-1: Radiated Spurious Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	Pk	Qpk	(H/V)	(dB)	Pk	Qpk	Pk	Qpk	Pk	Qpk
Fundamental Frequency										
13.56	---------	56.34	V	11.42	---------	67.76	--------	69.5	--------	1.7
Spurious Emissions (Harmonics)										
27.12	---------	30.33	V	9.98	---------	40.31	--------	69.5	---------	29.2
40.68	---------	37.13	H	-14.75	---------	22.38	--------	40	---------	17.6
40.68	---------	53.39	V	-14.75	---------	38.64	--------	40	---------	1.4
94.92	---------	60.11	H	-17.77	---------	42.34	--------	43.5	---------	1.2
94.92	---------	60.41	V	-17.77	---------	42.64	--------	43.5	---------	0.9
Spurious Emissions (Non-Harmonics)										
75.436	---------	48.96	H	-18.23	---------	30.73	--------	40	---------	9.3
86.1713	---------	48.78	H	-18.54	---------	30.24	--------	40	---------	9.8
88.2468	---------	48.22	H	-18.35	---------	29.87	--------	43.5	---------	13.6
30.65	---------	51.87	V	-13.82	---------	38.05	--------	40	---------	1.9
53.17	---------	51.07	V	-16.12	---------	34.95	--------	40	---------	5.1
61.3449	---------	48.42	V	-17.08	---------	31.33	--------	40	---------	8.7
64.75	---------	53.81	V	-17.44	---------	36.37	--------	40	---------	3.6
74.97	---------	52.87	V	-18.21	---------	34.66	--------	40	---------	5.3
124.996	---------	50.67	V	-13.85	---------	36.82	--------	43.5	---------	6.7
141.3	---------	53.02	V	-13.37	---------	39.65	--------	43.5	---------	3.9
143.293	---------	47.29	V	-13.37	---------	33.92	--------	43.5	---------	9.6
145.399	---------	46.58	V	-13.34	---------	33.24	--------	43.5	---------	10.3

7.3.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation : Average/Quasi-Peak Limit < 30MHz
Measurement Distance 30m @ 13.56 MHz

Limit (dBuV/m) = 20*log(30) - Distance Correction Factor (Section 7.3.2)
Limit (dBuV/m) =29.54 + 40
Limit (dBuV/m) = 69.54

Example Calculation: Quasi-Peak
Corrected Level: 56.34 + 11.42 = 67.76 dBµV/m
Margin: 69.5 dBµV/m – 67.76 dBµV/m = 1.7dB

7.4 Power Line Conducted Emissions – FCC: Section 15.207, RSS-Gen 8.8

7.4.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150 kHz to 30 MHz with the spectrum analyzer's resolution bandwidth set to 9 kHz and the video bandwidth set to 30 kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.4.2 Measurement Results

Results are shown below.

Table 7.7.2-1: Conducted EMI Results

☒ Line 1 ☒ Line 2 ☐ Line 3
☐ Line 4
☐ To Ground ☒ Floating
☐ Telecom Port _____
☒ dBµV ☐ dBµA

Plot Number: 14-2086CE02
Power Supply Description: N/A

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
Line 1									
0.166	15.35	8.535	10.10	25.45	18.63	65.16	55.16	39.7	36.5
0.48	12.44	6.487	10.08	22.52	16.57	56.34	46.34	33.8	29.8
1.696	19.38	5.606	10.11	29.49	15.72	56.00	46.00	26.5	30.3
13.56	31.19	18.05	10.70	41.89	28.75	60.00	50.00	18.1	21.2
19.71	19.05	13.99	10.83	29.88	24.82	60.00	50.00	30.1	25.2
25	26.73	25.13	11.12	37.85	36.25	60.00	50.00	22.2	13.8
27.12	40.15	22.6	11.20	51.35	33.80	60.00	50.00	8.6	16.2
Line 2									
0.163287	18.94	9.935	10.08	29.02	20.01	65.30	55.30	36.3	35.3
1.566	16.02	9.269	10.08	26.10	19.35	56.00	46.00	29.9	26.7
13.56	34.87	20.61	10.65	45.52	31.26	60.00	50.00	14.5	18.7
20.26	14.45	8.534	10.85	25.30	19.38	60.00	50.00	34.7	30.6
25	23.79	22.08	11.05	34.84	33.13	60.00	50.00	25.2	16.9
27.12	38.4	21.02	11.13	49.53	32.15	60.00	50.00	10.5	17.8
28.6856	29.62	26.01	11.20	40.82	37.21	60.00	50.00	19.2	12.8

Note: For the measurements of the emission levels at 13.56 MHz, the antenna was disconnected and the RF port was terminated with a 50 Ohm matching load impedance.

8 CONCLUSION

In the opinion of ACS, Inc. the SONIP ICLASS KP submitted by STANLEY Convergent Security Solutions, Inc. meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT