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47 C.F.R. Part 15 FCC Rules, Subpart C
Test Results for the

AXON systems

J1 Wireless Transmission Device for Rotating Applications

Equipment:	Model J1-CS10
Client:	AXON Systems Ltd.
Address:	Fraunhoferweg 17 82266 Inning Germany

Test Report Number: FCCIR-AXON-06-06-12A
Date: August 10, 2012
Total Number of Pages: 33

NVLAP

NVLAP LAP Code: 200125-0
FCC Test Site Registration Number: 830450
Industry Canada Site Number 7868A-1

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1 IDENTIFICATION SUMMARY

1.1 Test Report

Test Report Number: FCCIR-AXON-06-06-12A
Test Report Date: August 10, 2012

Report written and approved by:

Date	Name	Signature
August 10, 2012	Peter J. Walsh, NCE	

1.2 Testing Laboratory

Walshire Labs, LLC
8545 126th Avenue North
Largo, FL 33773
USA

Telephone: (727) 530-8637
Internet: www.walshirelabs.com
Email: Peter_Walsh@walshirelabs.com

1.3 Limits and Reservations

The test results in this report apply only to the particular Device Under Test (DUT) and component Implementations Under Test (IUTs) declared in this test report. The results and associated conclusions apply only to the DUT while operating in the configuration and modes described herein. The test data contained herein is intended to be used by a TCB for the purpose of achieving FCC Part 15 certification of the DUT.

This test report shall not be reproduced except in full without the written permission of Walshire Labs or its assigns.

This report has been revised upon its TCB review. The site's FCC registration number has been added to the report. Under the exemptions section, an explanation was added as to why the ac conducted emissions test of 15.207(c) was not performed due to the fact that the equipment is directed powered by a DC power source, e.g. vehicle battery.

The test report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

1.4 Client Information

Name:	AXON Systems Ltd.
Street:	Fraunhoferweg 17
City:	Inning
State:	
Zip Code	82266
Country:	Germany
Phone:	+49 (0) 8143 - 444 038 - 0
Contact Person:	Gerhard Spitz
Phone:	+49 (0) 8143 - 444 038 - 13
Email:	g.spitz@axon-systems.com

1.5 Dates

Date of commission:	June 7, 2012
Date of receipt of DUT:	June 25, 2012
Date of test completion:	July 11, 2012

1.6 Device Under Test (DUT)

Name:	J1 Wireless
Version:	Model J1-CS10 Wireless Data Transmission for Rotating Applications
Serial Number:	33658
Antenna Type:	Loop
Nominal Gain:	< 0 dBi
Modulation Type:	FSK

2 GENERAL INFORMATION

2.1 Product Description

The system consists of three components: the J1-CS10 control unit, the JX-SR70 stator unit, and the J1-RD10 rotor unit. The system is used to make real-time, torque measurements in vehicles or industrial test equipment. The J1-CS10 is DC powered by a 9 – 36 VDC power source. Power is inductively supplied to the rotor assembly through the stator unit using a 22 kHz signal. The rotor assembly transmits torque data using an FSK modulated signal with a carrier frequency of 10.7 MHz. The control unit displays the torque readings.

Refer to the operational description exhibit for more detailed information.

2.2 Interface Cable Details

The interface cables were a 1.5 m long shielded DIN type cable used between the ring-stator unit and the control unit and a 1.8 m unshielded twisted pair DC power cable was used to power the control unit.

2.3 Peripheral Devices

No test support devices were used in the test set-up.

2.4 Test Methodology

Radiated emissions testing for 30 MHz and higher frequencies was performed according to ANSI C63.4-2003, the procedure referenced by Part 15, FCC Rules. Unless noted otherwise radiated emissions tests were performed at an antenna to EUT distance of 3 meters.

Radiated emissions measurements from 9 kHz to 30 MHz were made using an active loop antenna.

2.5 Test Facility

The 3-meter semi-anechoic test chamber and measurement facility used to collect the radiated and conducted data is located at 8545 126th Avenue N., Largo FL 33773. This site is NVLAP Accredited (200125-0). The site has been registered with the FCC under registration number 830450. The site has also been registered with Industry Canada, 2146A-1.

2.6 Deviations

No deviations were exercised during the course of the testing.

2.7 Exemptions

The DUT is not subject to Part 15, Subpart B as in accordance with the permitted exemptions in § 15.103 (a) or (c), it is either used either on a transportation vehicle or in industrial test equipment. The device is DC powered therefore Section 15.207(c) is not applicable.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The DUT was tested with a 12 VDC nominal input voltage though exploratory tests were also performed over the 9 – 36 VDC input voltage range to determine the effect of the input voltage upon the measured field strength. The shaft mounted 10.7 MHz transmitter was placed within the loop of the ring stator assembly. The control unit along with the ring-stator assembly supplied power to the 10.7 MHz transmitter inductively via a 22 kHz signal. The loop of the ring-stator assembly also performs as a receive antenna for the 10.7 MHz signal. Data from the torque transducer was sent to the control unit continuously and did not require any rotation of the drive shaft. As such, the drive shaft was kept stationary and in a normal, (horizontal) position. The control unit, drive shaft and ring-stator were positioned on a 0.8 m high non-conductive table. The drive shaft and ring-stator were positioned on the table to maximize the field strength based upon exploratory tests. This occurred with the ring stator's loop antenna parallel and in line with the receive loop antenna.

Due to the low level of the field strength of both the 22 kHz and 10.7 MHz intentional emissions, the measurement distances were set closer than the prescribed limit distances. The final level of the 22 kHz emission was measured at 5 m. All other measurements were made at 3 m. The 40 dB per decade correction factor was used to extrapolate the 300 m and 30 m test limit distances to the measurement distances. The level of the 10.7 MHz emission was so low a near field probe was used to verify the presence of the signal and to perform an informative bandwidth measurement.

3.2 Special Accessories

No accessories were used.

3.3 Equipment Modifications

No modifications were needed to achieve compliance.

Signature:		Date:	July 11, 2012
Typed/Printed Name:	Peter J. Walsh		
Position:	Regulatory Lab Manager		

If modifications were needed to achieve compliance, the client shall acknowledge these by signing below.

Signature:		Date:	
Typed/Printed Name:			
Position:			

4 CONDUCTED EMISSIONS DATA

References: 47 C.F.R. § 15.207 (a)

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

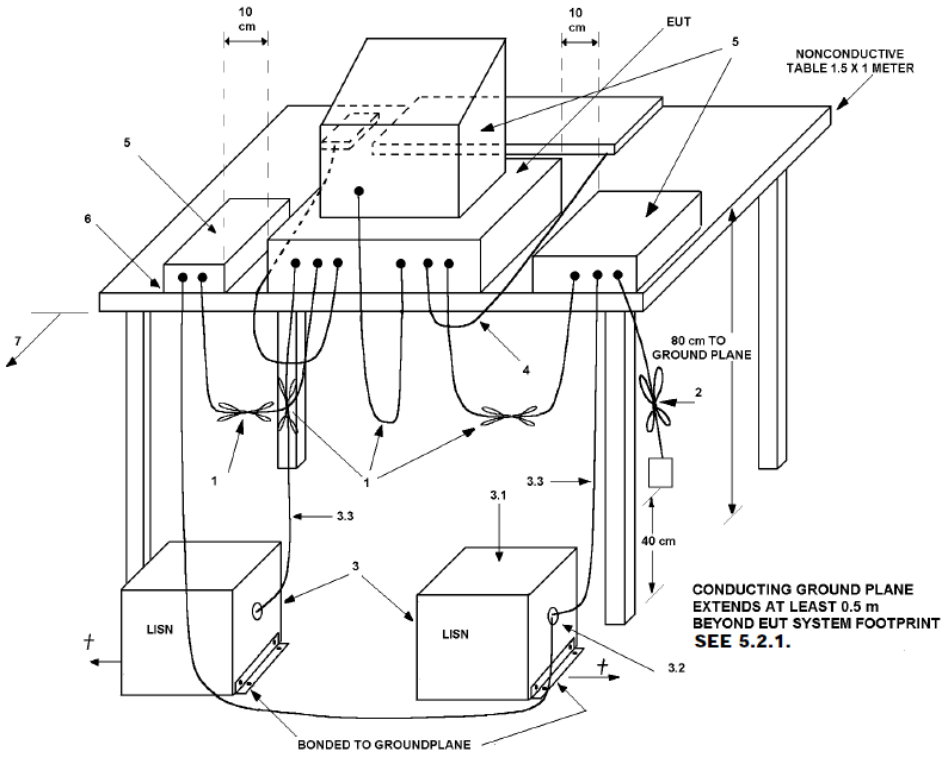
Table 4-1

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.1 Test Procedure

The test is performed in accordance with ANSI C63.4-2003 § 7. The test setup is consistent with ANSI C63.4-2003 Figure 10a as shown below. The test is performed in a semi-anechoic chamber. As such, the optional vertical conducting plane is not used.



LEGEND:

1) Interconnecting cables that hang closer than 40 cm to the groundplane shall be folded back and forth in the center forming a bundle 30 to 40 cm long (see 6.1.4 and 11.2.4).
2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m (see 6.1.4).
3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference groundplane (see 5.2.3 and 7.2.1).
   3.1) All other equipment powered from additional LISN(s).
   3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
   3.3) LISN at least 80 cm from nearest part of EUT chassis.
4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use (See 6.2.1.3 and 11.2.4).
5) Non-EUT components of EUT system being tested (see also Figure 13).
6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop (see 6.2.1.1 and 6.2.1.2).
7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the groundplane (see 5.2.2 for options).

Figure 10a—Test arrangement for conducted emissions

Conducted emissions measurements are first made using a peak detector and average detector simultaneously. The receiver then performs the final measurements using a quasi-peak detector for comparison with the quasi-peak limit and an average detector for comparison with the average limit.

4.2 Measured Data

Compliance Verdict: NONE

The unit is powered directly by a DC power source. As such, the conducted emissions test was not applicable.

Minimum Margin: **N/A dBµV**

Measurement Uncertainty: +/- 3.59 dB

Test Personnel:

July 9, 2012	Peter J. Walsh, NCE	Peter J. Walsh
Date	Name	Signature

4.3 Conducted Emissions Test Instrumentation

Type	Manufacturer/ Model No.	Serial Number	Calibration Due Date
EMI Receiver	Rohde & Schwarz ESCS 30	825788/002	11/3/2012
LISN	Rohde & Schwarz ESH3-Z5	840730/005	08/23/2012

Calibration and Traceability: All measuring and test equipment are calibrated and are traceable to the National Institute for Standards and Technology (NIST) and Methods.

4.4 Conducted Emissions Photographs

No photographs were taken as the test was not applicable.

5 RADIATED EMISSIONS DATA

References: 47 C.F.R. § 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 the following table:

Table 5-1

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (3 m) (dBµV/m)
0.009 – 0.490	2400/F (kHz) @ 300 m	300
0.490 – 1.705	24000/F (kHz) @ 30 m	30
1.705 – 30.0	30 @ 30 m	30
30 - 88	100 @ 3 m**	40.0
88 - 216	150 @ 3 m **	43.5
216 - 960	200 @ 3 m **	46.0
Above 960	500 @ 3 m	54.0

*** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

The field strength limits for frequencies below 30 MHz were calculated for a measurement distance of 3 m and 5 m using the prescribed 40 dB/decade correction factor as shown in Figure 5-1.

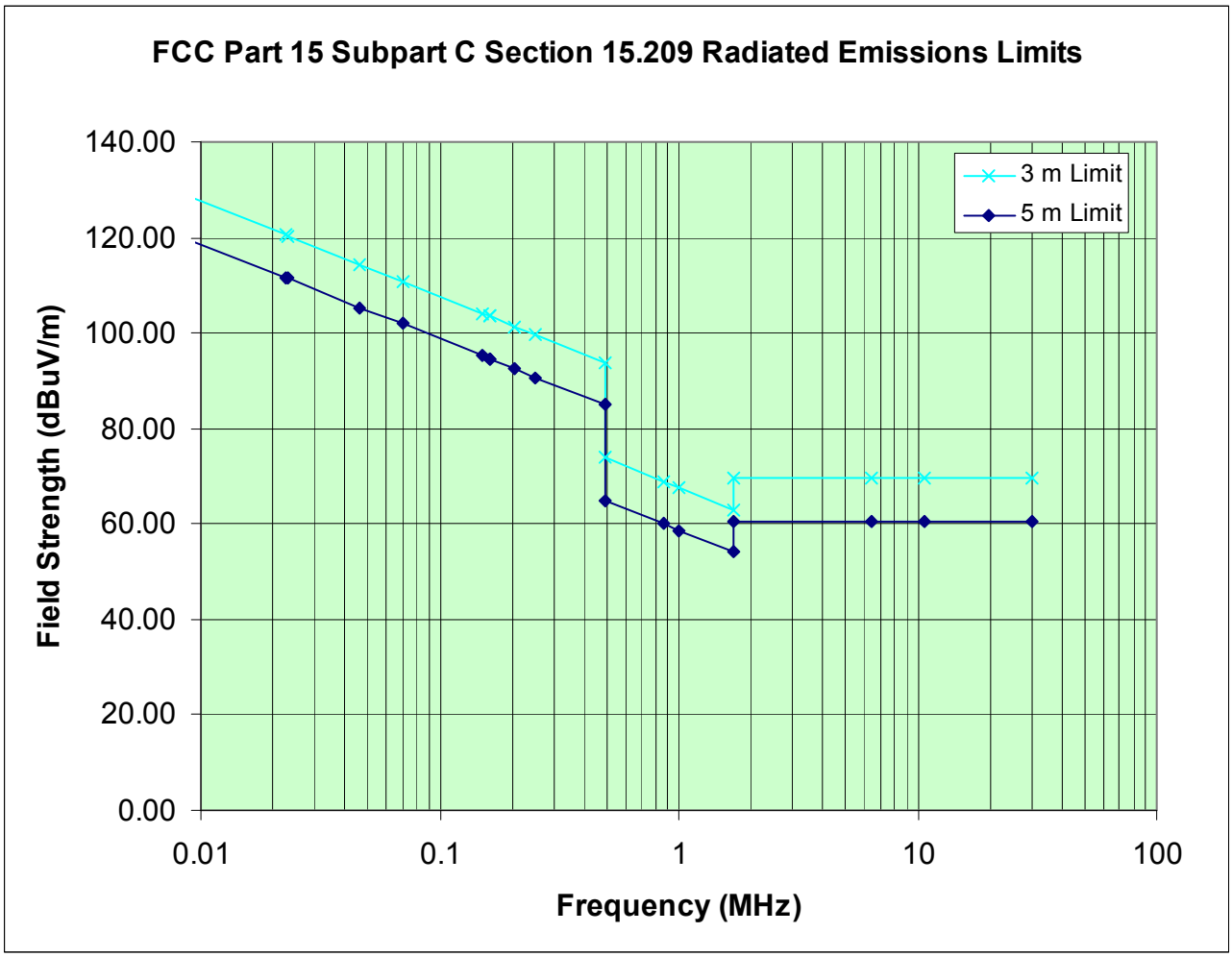


Figure 5-1 – Adjusted Field Strength Limits

References: 47 C.F.R. § 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:

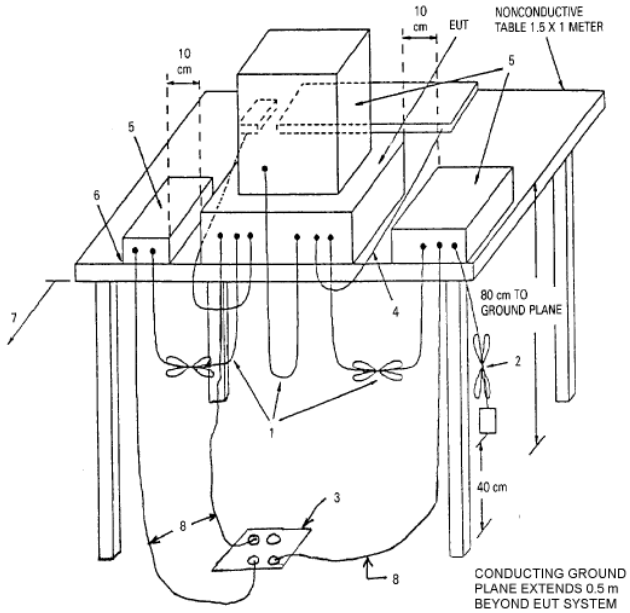
Table 5-2

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	2690 - 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])
13.36 - 13.41			

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

5.1 Test Procedure

The test for radiated emissions of 30 MHz and higher frequencies is performed in accordance with ANSI C63.4-2003 § 8. The test setup is consistent with ANSI C63.4-2003 Figure 11a below. The test is performed in a semi-anechoic chamber. For frequencies between 9 kHz and 30 MHz, a shielded magnetic loop antenna was used. As a guidance document FCC/OET MP-5 was used.



LEGEND:

1) Interconnecting cables that hang closer than 40 cm to the groundplane shall be folded back and forth in the center, forming a bundle 30 to 40 cm long (see 6.1.4 and 11.2.4).
2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance. The total length shall not exceed 1 m (see 6.1.4).
3) If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the groundplane with the receptacle flush with the groundplane (see 6.1.4).
4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use (see 6.2.1.3 and 11.2.4).
5) Non-EUT components of EUT system being tested (see also Figure 13).
6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop (see 6.2.1.1 and 6.2.1.2).
7) No vertical conducting plane used (see 5.2.2).
8) Power cords drape to the floor and are routed over to receptacle (see 6.1.4).

Figure 11a—Test arrangement for radiated emissions tabletop equipment

The following data lists the significant emission frequencies, amplitude levels (including cable correction and antenna factors), plus the limit. The frequency range investigated was 9 kHz to 107 MHz. The highest frequency to which the DUT must be measured is 107 MHz as this is ten times the highest operating frequency (10.7 MHz) of the DUT.

5.2 Test Data

Compliance Verdict: PASS

Figure 5.2-1 shows the peak detector scan of the 9 kHz to 30 MHz band. The fundamental emissions did not lie in any restricted bands. In the 9 kHz to 150 kHz band, the resolution bandwidth was 200 Hz. In the 150 kHz to 30 MHz band the resolution bandwidth was 9 kHz. In this frequency range, the measurements were made with the loop antenna a fixed height of 1.5 m from the ground plane to the center of the antenna. The final measurement detector was quasi-peak except for the 9 to 90 kHz and 110 to 490 kHz bands in which case the prescribed average detector was used. The turntable was rotated 360 degrees to maximize the level of each measured emission.

There were no emissions within 20 dB of the limit in the 30 MHz to 107 MHz band that could be attributed to the 10.7 MHz radio. By design, the level of the 10.7 MHz signal is very low as it only has to transmit to the stator loop antenna within a distance of 5 cm. As the 10.7 MHz fundamental signal was not above the noise floor, its harmonics were likewise not discernable above the noise floor.

Table 5.2-1 shows the highest measured results.

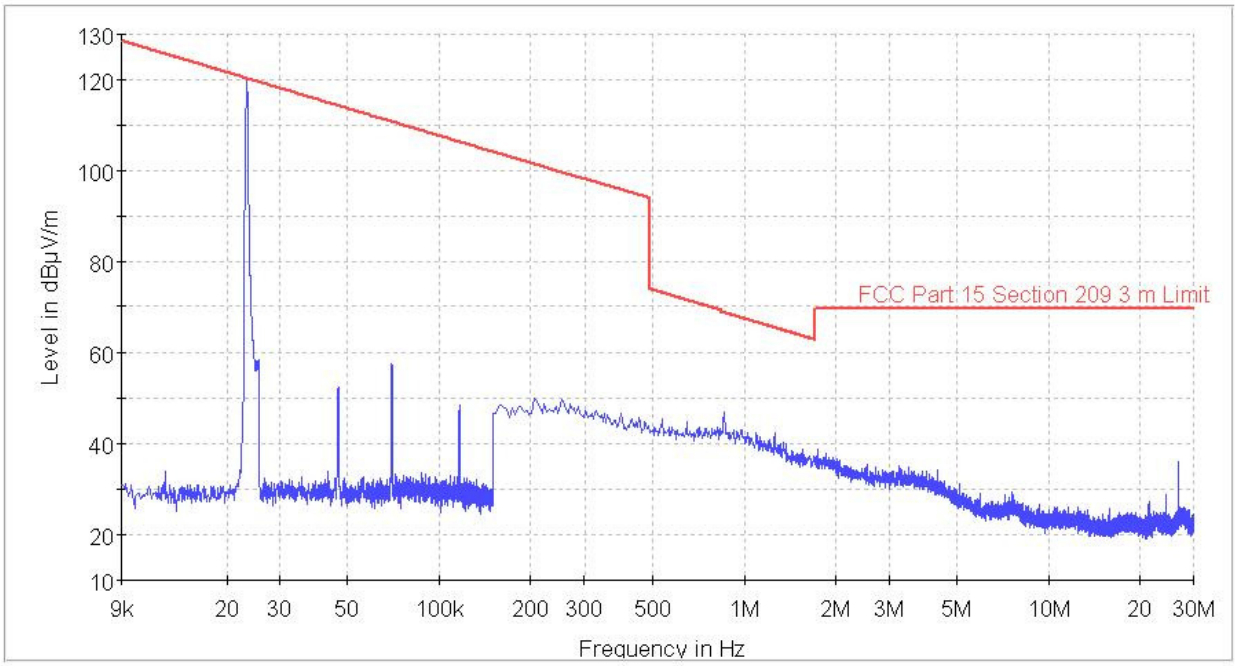


Figure 5.2-1 – Radiated Emissions Peak Detector Plot for the 9 kHz to 30 MHz Band

Table 5.2-1 – Radiated Emissions Levels

Frequency	Field Strength (dBµV/m)	Distance (m)	Detector	CF (dB)	Angle (degrees)	Adjusted Field Strength Limit (dBµV/m)	Margin (dB)
23.2 kHz	107.5	5	Average	14.4	180	111.4	3.9
46.5 kHz	58.2	3	Average	14.0	180	114.3	56.1
69.7 kHz	71.9	3	Average	13.9	184	110.7	38.8
161.1 kHz	40.7	3	Average	13.8	181	103.5	62.8
207.0 kHz	41.6	3	Average	13.7	170	101.3	59.7
252.7 kHz	41.7	3	Average	13.7	189	99.5	57.8
858.0 kHz	38.9	3	Quasipeak	14.2	180	68.9	30.0
6.37 MHz	21.8	3	Quasipeak	14.4	180	69.5	47.7
10.70 MHz	5.7	3	Quasipeak	15.1	180	69.5	63.8

***CF is the antenna correction factor plus cable loss.**

Minimum Margin: 3.9 dBµV/m

Measurement Uncertainty: +4.8 dB, -5.2 dB for 30 – 1000 MHz, 3.6 dB for 9 kHz – 30 MHz

Test Personnel:

July 11, 2012	Peter J. Walsh, NCE	
Date	Name	Signature

5.3 Test Instrumentation Used, Radiated Measurement

Type	Manufacturer/ Model No.	Serial Number	Calibration Due Date
EMI Receiver	Rohde & Schwarz ESCS 30	825788/002	11/3/2012
Spectrum Analyzer	Agilent E7405A	MY42000055	3/18/2013
Antenna	Chase EMC CBL6112B	2579	1/20/2014
Antenna	Com-Power AL-130	121033	4/17/2013

Calibration and Traceability: All measuring and test equipment are calibrated and are traceable to the National Institute for Standards and Technology (NIST) and Methods.

5.4 Field Strength Calculation

The field strength (FS) is calculated by adding the antenna correction factor (ACF) and cable loss (CL) and subtracting the amplifier gain (AG) if any to the measured reading. The formula and a sample calculation are:

FS = Reading (dBµV/m) + ACF (dB) + CL (dB) – AG (dB)

FS = 25 + 12.1 + 0.7 + 0 = 37.8 dBµV/m

The Rohde & Schwarz Model ESCS 30 receiver and Agilent E7405A spectrum analyzer have the capability of automatically performing the field strength calculations. The amplitude level displayed on the receiver or analyzer represents the total measured field strength. This level is directly compared to the appropriate FCC limit to determine the actual margin of the DUT.

5.5 Radiated Emissions Photographs

Photo 5.5-1 - Front View of the Radiated Emissions Test Set-up

Photo 5.5-2 - Rear View of the Radiated Emissions Test Set-up

Photo 5.5-3 - View of the Radiated Emissions 5 m Test Set-up

6 BANDWIDTH DATA

References: 2 C.F.R. § 2.202 Bandwidths

(a) Occupied bandwidth. The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example multichannel frequency-division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful.

(b) Necessary bandwidth. For a given class of emission, the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed, under specified conditions. Emissions useful for the good functioning of the receiving equipment as, for example, the emission corresponding to the carrier of reduced carrier systems, shall be included in the necessary bandwidth.

6.1 Test Procedure

The measurement is made of the signals radiated emissions using either the loop antenna or a near field probe. The spectrum analyzer's resolution bandwidth (RBW) is set much lower than the emission bandwidth and markers placed approximately 20 dB down from the peak emission on each side of the center frequency.

6.2 Test Data

Compliance Verdict: NONE

Figures 6.2-1 and 6.2-2 show the 20 dB bandwidth of the 23.2 kHz and 10.7 MHz signals respectively. Equipment operating under the general requirements of § 15.209 do not have a restriction on bandwidth. The measurements contained herein shall be considered as informative.

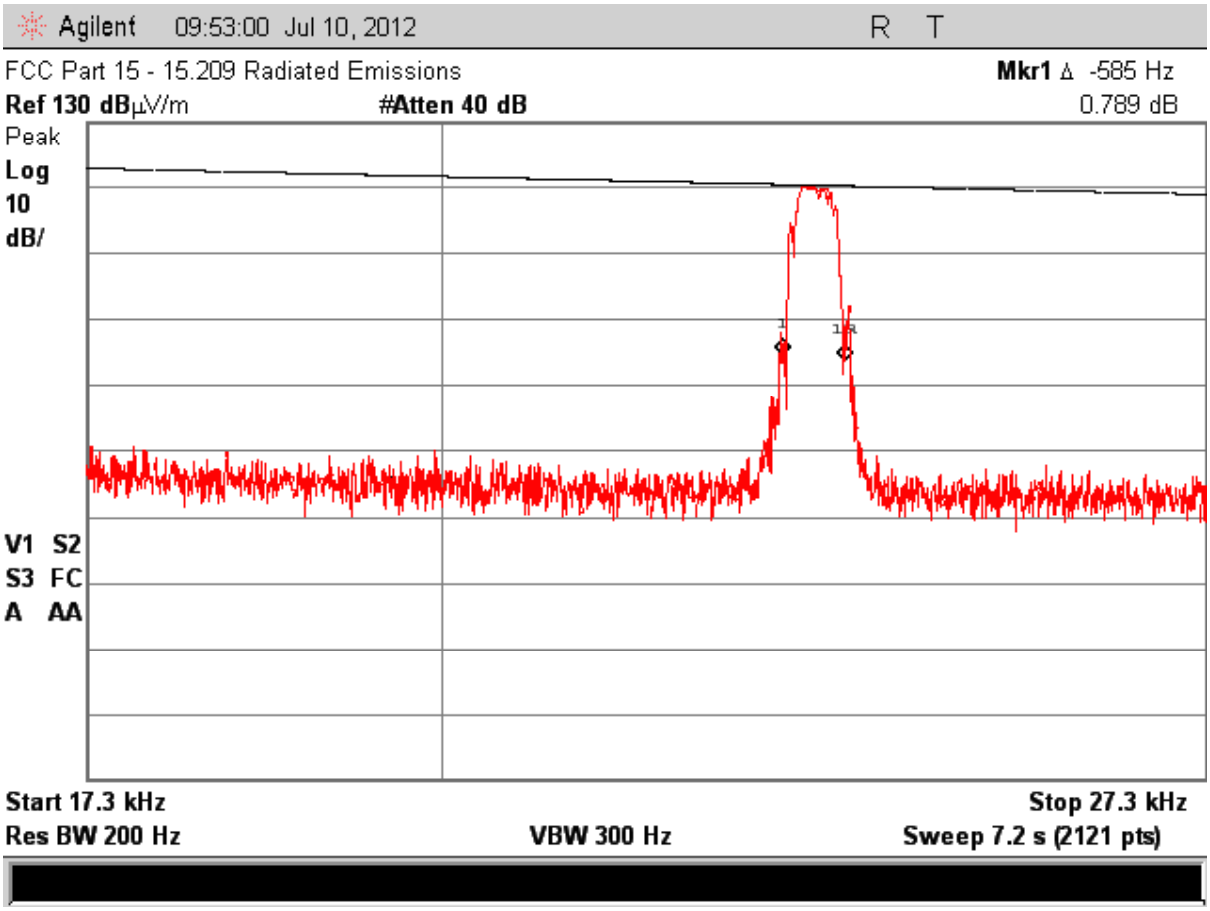


Figure 6.2-1 – 23.2 kHz Bandwidth

Notes:

The bandwidth of the 23.2 kHz signal was 585 Hz.

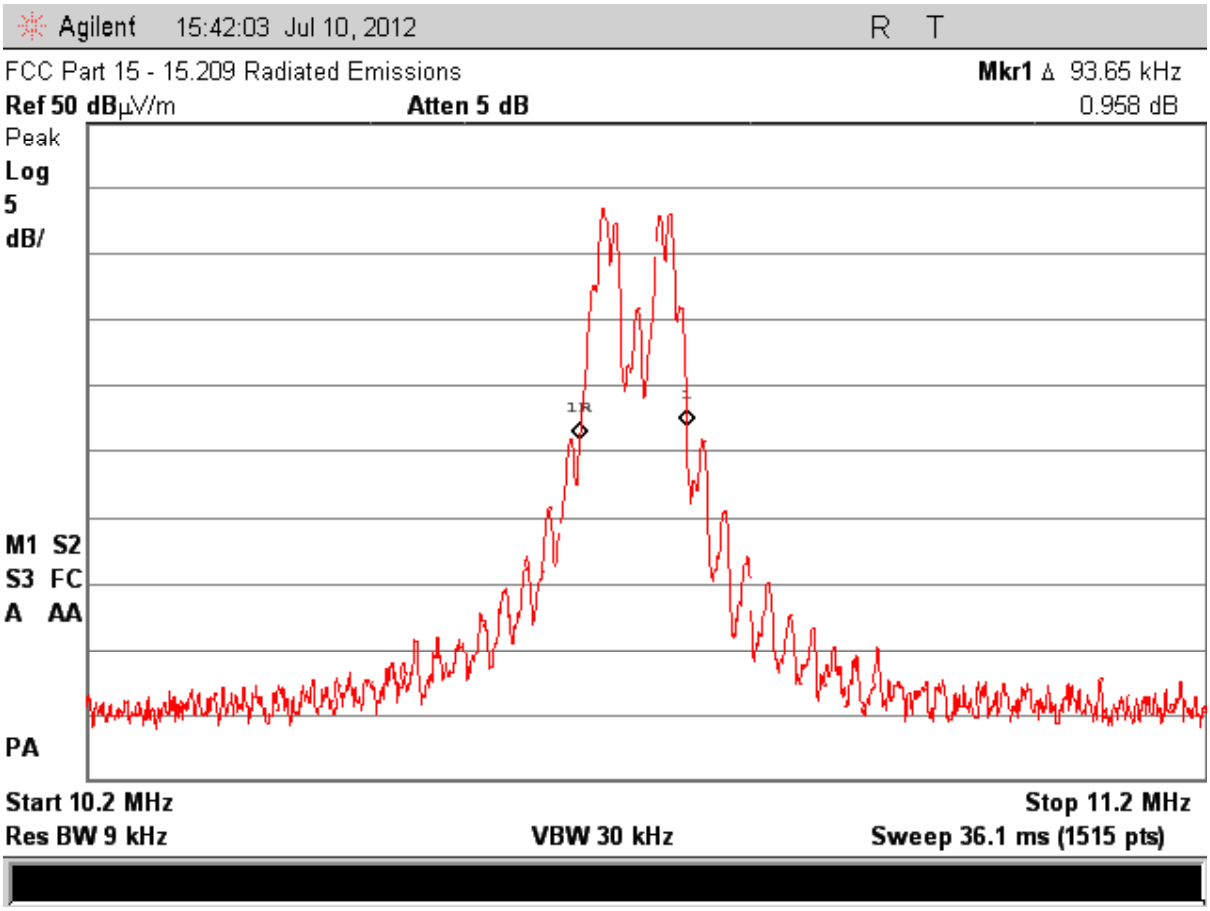


Figure 6.2-2 – 10.7 MHz Bandwidth

Notes:

The carrier frequency was 10.678 MHz. The frequency deviation was 58.7 kHz. The 20 dB bandwidth was 93.7 kHz.

6.3 Test Instrumentation Used, Bandwidth Measurement

Type	Manufacturer/ Model No.	Serial Number	Calibration Due Date
Spectrum Analyzer	Agilent E7405A	MY42000055	3/18/2013
Active Loop Antenna	Com-Power AL-130	121033	4/17/2013
Near Field Probe	Electro-metrics EHFP-30	196	No cal required.

Calibration and Traceability: All measuring and test equipment are calibrated and are traceable to the National Institute for Standards and Technology (NIST) and Methods.

6.4 Photograph of the Setup for Bandwidth Measurements

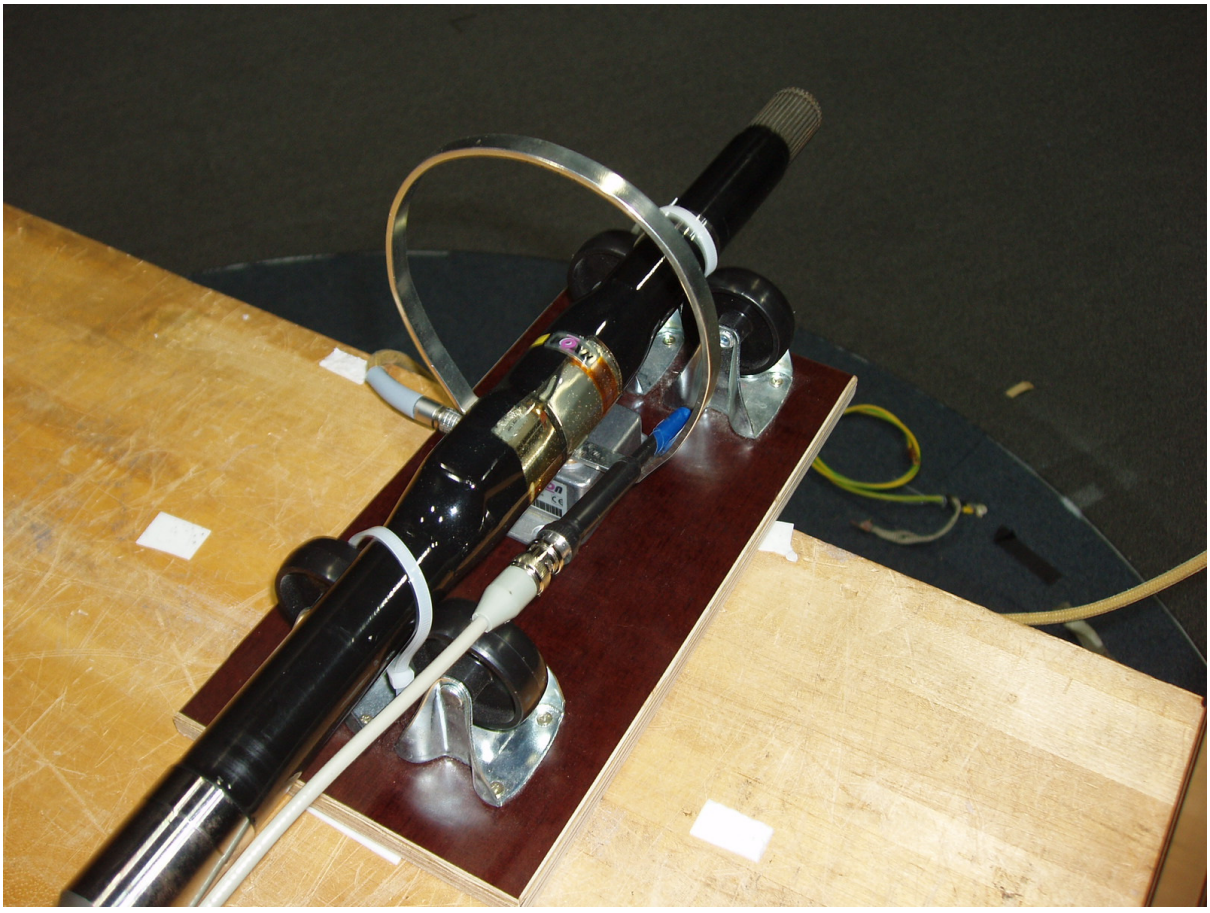


Photo 6.4-1 – Near Field Probe Placement

7 ANTENNA REQUIREMENT

References: 47 C.F.R. § 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

7.1 Test Procedure

Inspect the DUT.

7.2 Test Data

Compliance Verdict: PASS

This requirement is met because in practice the 10.7 MHz transmit antenna is encapsulated once mounted to the drive shaft making its replacement impossible. The 22 kHz stator loop is permanently attached. See Section 6.3 for photographs of the antennas.

7.3 Antenna Photographs

Photos 7.3-1 – 7.3-3 below show the DUT's antennas. Note the one mounted to the drive shaft is the 10.7 MHz transmit antenna. The outer ring stator coil shown in the first photo inductively supplies power to the unit using a 22 kHz switching frequency.

Photo 7.3-1 – 22 kHz Antenna

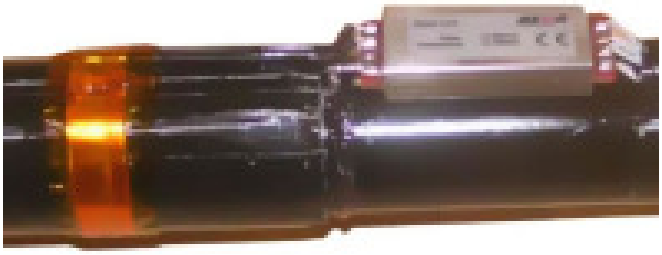


Photo 7.3-2 – 10.7 MHz Antenna

Photo 7.3-2 – 10.7 MHz Antenna Sealed on Drive Shaft

8 LABELING AND USER'S GUIDE REQUIREMENTS

8.1 FCC Label Statement

The FCC compliance label shall include the following information:

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.

The FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

The FCC id number will be: OPCJ1-CS10

Figure 8.1-1 below shows the label.

FCC ID: OPCJ1-CS10

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.

Figure 8.1-1 - Sample Label

8.2 Instruction Manual Statements

The instruction manual must contain the following statements:

- Changes or modifications not expressly approved by the responsible party could void the user's authority to operate the equipment.

- This device may only be used with the approved internal antenna that is shipped with the unit and installed per installation instructions. The use of any other antennas will invalidate the unit's FCC Part 15 certification.

- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication. Operating the device with the supplied antenna will ensure that this requirement is met.

- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

9 MPE CONSIDERATIONS

References: 47 C.F.R. § 1.1310

Radiofrequency radiation exposure limits.

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation."

Table 1—Limits for Maximum Permissible Exposure (MPE) **Frequency range (MHz)**	**Electric field strength (V/m)**	**Magnetic field strength (A/m)**	**Power density (mW/cm2)**	**Averaging time (minutes)**
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100.000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100.000			1.0	30
f = frequency in MHz				
* = Plane-wave equivalent power density				

Compliance with the FCC's maximum permitted RF exposure limits is met by the Axon J1 system by virtue of the following factors. The very low 23 kHz frequency used to power the rotor unit is below 300 kHz so no limits apply. The ultra low power of the 10.7 MHz transmitter results in a field strength level much lower than that permitted by an unintentional radiator.

ANNEX A NVLAP CERTIFICATE of ACCREDITATION

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200125-0

Walshire Labs, LLC
Largo, FL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2012-04-01 through 2013-03-31
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

ANNEX B DISCLOSURE STATEMENT

Walshire Labs, LLC represents to the client that testing was done in accordance with standard procedures as applicable and that reported test results are accurate within generally accepted commercial ranges of accuracy. Walshire Labs Inc. test reports only apply to the specific sample(s) tested. This report is the property of the client. This report shall not be reproduced except in full without the expressed written approval of Walshire Labs, LLC.

TERMS and CONDITIONS

ARTICLE 1 *- Services, Walshire Labs will:*

1.1 Act for Client in a professional manner, using the degree of care and skill ordinarily exercised by and consistent with the standards of the profession.

1.2 Provide only those services that lie within the technical and professional area of expertise and capability of the Lab.

1.3 Perform all technical services in accordance with accepted laboratory test principles and practices.

1.4 Use test equipment which has been calibrated within a period not exceeding the manufacturer's recommendation and which is traceable to the NIST.

1.6 Consider all reports to be the confidential property of the client, and distribute reports only to those persons designated by the client.

ARTICLE 2 *- Client's Responsibilities, The Client will:*

2.1 Provide all information necessary for proper performance of technical services.

2.2 Designate a person who is authorized to transmit instructions, receive information and test data reports, interpret and define Client's policies, and make decisions regarding technical services, as may be required at Clients expense.

2.3 Deliver without cost, representative samples of product for technical evaluation, together with any relevant data.

2.4 Furnish such labor and equipment necessary to handle sample product and to facilitate the technical evaluation.

2.5 The Client shall provide prior to the start of evaluation testing a signed Purchase Order for the amount agreed to by both parties.

ARTICLE 3 *- General Requirements.*

3.1 The only warranty made by Walshire Labs, in connection with services performed thereunder is that it will use that degree of care and skill as stated in Article 1.1 and 1.3 above. No other warranty, expressed or implied, is made or intended for services provided thereunder.

3.2 Walshire Labs shall supply technical services and prepare reports based solely on product samples submitted. The Client understands that application of the data to other devices is highly speculative and should be applied with extreme caution.

3.3 Walshire Labs agrees to exercise ordinary care in receiving, preserving, and shipping any test sample to be tested, but assumes no responsibility for damages, either direct or consequential, which arise or are alleged to arise from loss, damage or destruction of the sample due to the act of examination, modification or testing, or technical analysis, or circumstances beyond our control.

3.4 The Client recognizes that generally accepted error variances apply and agrees to consider such error variances in its use of test data.

3.5 It is agreed between Walshire Labs and Client that no distribution of any test reports, etc. shall be made to any third party without the prior written consent of both parties.

3.6 Test Reports may not be used by the Client to claim product endorsement by NVLAP or any agency of the U.S. Government.

ARTICLE 4 *- Payment.*

4.1 The Client agrees to pay for services and expenses as covered in the Purchase Order or modified by Article 2.2. Walshire Labs will present an invoice at the completion of work and will be paid within 15 days of receipt by Client.