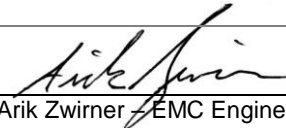
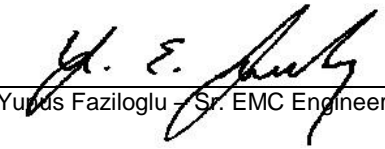




# Test Report

**CURTIS-STRAUS** Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Report No	ER2199-1
Client	Desktop Metal
Address	63 Third Avenue Burlington, MA 01803
Phone	978-224-1244
Items tested	BMD RFID
FCC ID	2AOIOBMDRFID
IC	23444-BMDRFID
FRN	0027059005
Equipment Code	DXX
Emission Designator	439KA1D
FCC/IC Rule Parts	CFR Title 47 FCC 15.225, ISED Canada RSS-210 Issue 9 Annex B.6
Test Dates	February 22-23, 2018
Results	As detailed within this report
Prepared by	 Arik Zwirner – EMC Engineer
Authorized by	 Yurcus Faziloglu – Sr. EMC Engineer
Issue Date	3/13/2018
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 15 of this report.

Curtis-Straus LLC is accredited to ISO/IEC 17025 by A2LA for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation. See our scope of accreditation at the end of this test report. Any opinions or interpretations expressed in this report are outside the scope of our A2LA accreditation as A2LA only accredits testing.

Testing Cert. No. 1627-01



**Curtis-Straus LLC, a wholly owned subsidiary of BV CPS**  
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



page 1 of 16

## Contents

Contents.....	2
Summary.....	3
Test Methodology.....	4
Product Tested - Configuration Documentation .....	5
Statement of Conformity .....	6
Test Results .....	7
Occupied Bandwidth .....	7
LIMIT: $\pm 100$ ppm RESULT: Pass .....	9
Radiated Spurious Emissions .....	10
AC Mains Conducted Emissions .....	13
<i>Measurement Uncertainty</i> .....	14
Conditions Of Testing.....	15

Form Final Report REV 7-20-07 (DW)



## Summary

This test report supports an application for certification of a transmitter operating pursuant to: CFR Title 47 FCC 15.225, ISED Canada RSS-210 Issue 9 Annex B.6.

The EUT is an RFID reader operating at 13.56MHz.

We found that the product met the above requirements without modification. The test sample was received in good condition.

### Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	March `14, 2018



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS  
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



### ***Test Methodology***

All the testing was performed according to the following rules/procedures/documents: CFR Title 47 FCC 15.225, ISED Canada RSS-210 Issue 9 Annex B.6, RSS-Gen Issue 4, and ANSI C63.10-2013.

Radiated emissions were maximized around the intended-use orientation of the device. EUT antenna is integral and therefore could not be maximized separately.



**Product Tested - Configuration Documentation**

EUT Configuration										
<b>Work Order:</b>	R2199									
<b>Company:</b>	Desktop Metal									
<b>Company Address:</b>	63 Third Avenue									
	Burlington, MA, 01803									
<b>Contact:</b>	James Sirois									
	MN			PN			SN			
<b>EUT:</b>	Desktop Metal RFID Module						Sample 1			
<b>EUT Description:</b>	RFID Module									
<b>EUT Max Frequency:</b>	72 MHz									
<b>EUT Min Frequency:</b>	13.56 MHz									
<b>Support Equipment</b>	MN						SN			
24V DC Supply	Sample #1									
Media Cartridge	--									
<b>Port Label</b>	<b>Port Type</b>	<b># ports</b>	<b># populated</b>	<b>cable type</b>	<b>shielded</b>	<b>ferrites</b>	<b>length (m)</b>	<b>in/out</b>	<b>under test</b>	<b>comment</b>
DC Power	Power DC	1	1	Power DC	No	No	2	in	yes	
<b>Software Operating Mode Description:</b>										
Constantly reading RFID tag.										
<b>Performance Criteria:</b>										
N/A/ Emissions only										
Clock Frequencies										
<b>frequencies (MHz)</b>	72, 16, 13.56									

## Statement of Conformity

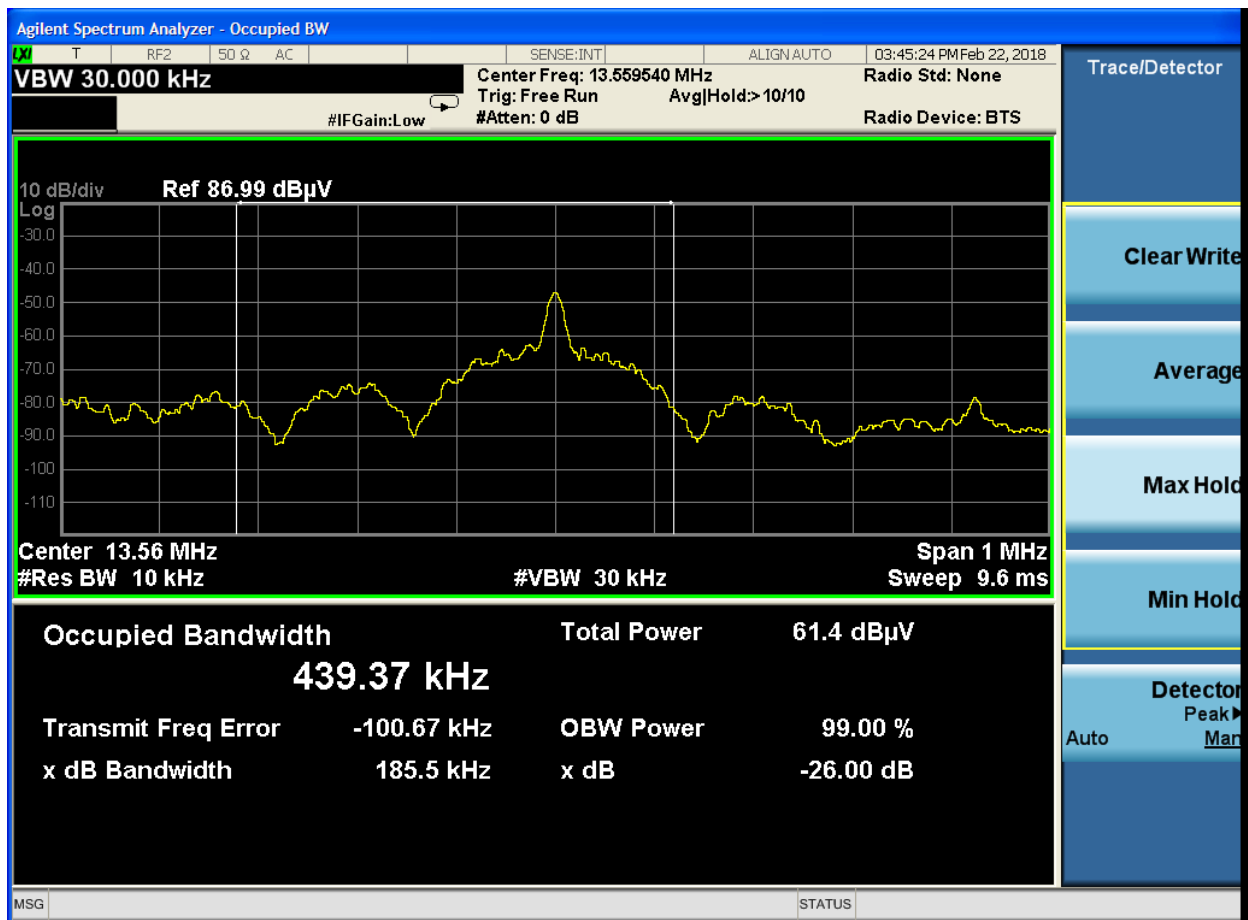
RSS-GEN	RSP-100	RSS-210	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	The antenna for this device is permanently attached.
8.10			15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable
8.8			15.207	The unit complies with the requirements of 15.207
			15.225	The unit complies with the requirements of 15.225
		Annex B.6		The unit complies with the requirements of RSS-210 Annex B.6.
6.6				Occupied Bandwidth measurements were made.



## Test Results

### Occupied Bandwidth

99% Occupied Bandwidth			
Date: 22-Feb-18		Company: Desktop Metal	
Engineer: Arik Zwimer		Work Order: R2199	
Temp: 23°C		Operating Voltage/Frequency: 120Vac/60Hz	
Humidity: 25%		Pressure: 1023mbar	
Frequency Range: 13.56MHz		Measurement Type: Radiated	
Notes:			
Frequency (MHz)	99% OBW (kHz)		
13.56MHz	439.37		
Test Site: CH-1		Attenuator: None	
Analyzer: 1168255		Cable: 1509, 2456	



## Occupied Bandwidth Test Equipment:

Rev. 2/20/2018

<b>Spectrum Analyzers / Receivers / Preselectors</b>									
Rental MXE EMI Receiver(1168255)	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	8/15/2018	8/15/2017	
<b>Radiated Emissions Sites</b>									
EMI Chamber 1	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on	
	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016	
<b>Preamps / Couplers Attenuators / Filters</b>									
Red	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	0.009-2000MHz	ZFL-1000-LN	CS	N/A	798	II	2/8/2019	2/8/2018	
<b>Antennas</b>									
Small Loop	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016	
<b>Meteorological Meters/Chambers</b>									
Weather Clock (Pressure Only)		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
TH A#2084		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
		HTC-1	HDE		2084	II	3/23/2018	3/23/2017	
<b>Cables</b>									
Asset #2051	Range		Mfr			Cat	Calibration Due	Calibrated on	
Asset #2456	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017	
	9kHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.





## Frequency Stability

Date: 23-Feb-18

Company: Desktop Metal

Engineer: AKZ

Work Order: R2199

Transmitter Nominal Frequency: 13.56MHz

Temperature	Voltage	Frequency	Frequency Delta
°C	VDC	(MHz)	ppm
20	20.40	13.559554	-0.1
	24.00	13.559555	Reference
	27.60	13.559555	0.0
-30	24.00	13.559560	0.4
50	24.00	13.559483	-5.3

Test Site: ENV Chamber 17

Antenna: Small Loop

Thermometer: 2078

Cable 1: REMI-05

DC Supply: 3150AFX

Analyzer: 1328

Voltmeter: 2426

LIMIT: ±100ppm RESULT: Pass

Rev. 2/20/2018

<b>Spectrum Analyzers / Receivers / Preselectors</b>	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	11/18/2018	11/18/2017
<b>Antennas</b>	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
<b>Meteorological Meters/Chambers</b>		<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
TH A#2078		HTC-1	HDE		2078	II	3/23/2018	3/23/2017
<b>Cables</b>	<b>Range</b>		<b>Mfr</b>			<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
REMI-05	9kHz - 2GHz		C-S			II	1/29/2019	1/29/2018
<b>RMS Voltmeters/Current Clamp</b>		<b>MN</b>	<b>Mnfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
DMM		117	Fluke	38360646WS	2426	I	8/2/2018	8/2/2017
<b>Environmental Chamber</b>		<b>MN</b>	<b>Mnfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
BMA		321	Bryant	SAF 17	ENV 21	I	3/1/2018	3/1/2017
<b>Power Supply</b>		<b>MN</b>	<b>Mnfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Asset # 2326		3150AFX	Pacific	---	2326	III	verified with DMM	verified with DMM

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS  
 One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828

page 9 of 16



## Radiated Spurious Emissions

**9kHz-1MHz:** No emissions were found within 20dB of the limit in the range 9kHz-1MHz.

1-30MHz:

Curtis Straus - a Bureau Veritas Company	Work Order - R2199
Radiated Emissions at 3m	EUT Power Input - 120Vac/60Hz
Top Peaks Parallel 1-30MHz	Test Site - CH-1
Operator: AKZ	Conditions - 23°C; 25%RH; 1023mBar
Notes:	
RFID Reader with tag/cartridge	EUT Maximum Frequency - 13.56MHz
Data Taken at 11:00:30 AM, Thursday, February 22, 2018	

Frequency (MHz)	Raw Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Lim: FCC_pt15_2 09 (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
1.185	24.8	20.6	45.4	66.1	-20.7	PASS	-20.7	315
1.834	22	16.9	38.9	69.5	-30.7	PASS		0
3.323	18	11.7	29.7	69.5	-39.9	PASS		135
4.885	20.9	8.7	29.6	69.5	-40	PASS		30
13.56	44.7	3.7	48.3	69.5	-21.2	PASS		240
30	16.7	1.2	17.8	40	-22.2	PASS		300



Curtis Straus - a Bureau Veritas Company

Radiated Emissions at 3m

Top Peaks Perpendicular 1-30MHz

Operator: AKZ

Notes:

RFID Reader with tag/cartridge

Work Order - R2199

EUT Power Input - 120Vac/60Hz

Test Site - CH-1

Conditions - 23°C; 25%RH; 1023mBar

EUT Maximum Frequency - 13.56MHz

Data Taken at 11:00:30 AM, Thursday, February 22, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Lim: FCC_pt15_2 09 (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
1.107	26	21.1	47.1	66.7	-19.6	PASS	-19.6	180
2.166	20.6	15.3	35.9	69.5	-33.6	PASS		45
2.863	19.6	13	32.6	69.5	-36.9	PASS		255
13.559	43.6	3.7	47.3	69.5	-22.3	PASS		150
27.119	30.1	2	32	69.5	-37.5	PASS		90
30	18.6	1.2	19.7	40	-20.3	PASS		105

## 30-1000MHz:

Curtis Straus - a Bureau Veritas Company

Radiated Emissions Electric Field 3m Distance

30-1000MHz Horizontal Data

Operator: AKZ

Notes:

RFID Reader with tag/cartridge

Work Order - R2199

EUT Power Input - 120Vac/60Hz

Test Site - CH-1

Conditions - 23°C; 25%RH; 1023mBar

EUT Maximum Frequency - 13.56MHz

Data Taken at 10:21:00 AM, Thursday, February 22, 2018

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBμV/m)	Lim1: FCC_pt15_1 09_Class_B (dBμV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class _B (dBμV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
365.614	48.4	-12.9	35.6	46	-10.5	PASS		47.5	-11.9	PASS		107	174
373.115	48.5	-12.7	35.7	46	-10.3	PASS		47.5	-11.8	PASS		125	192
376.917	50.2	-12.7	37.5	46	-8.5	PASS	-8.5	47.5	-10	PASS	-10	109	191
378.57	47.9	-12.7	35.2	46	-10.8	PASS		47.5	-12.3	PASS		125	175
424.982	47.7	-11	36.7	46	-9.3	PASS		47.5	-10.8	PASS		100	53
427.027	48	-11	37	46	-9	PASS		47.5	-10.5	PASS		100	68



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828

page 11 of 16



Curtis Straus - a Bureau Veritas Company	Work Order - R2199
Radiated Emissions Electric Field 3m Distance	EUT Power Input - 120Vac/60Hz
30-1000MHz Vertical Data	Test Site - CH-1
Operator: AKZ	Conditions - 23°C; 25%RH; 1023mBar
Notes:	
RFID Reader with tag/cartridge	EUT Maximum Frequency - 13.56MHz

Data Taken at 10:21:00 AM, Thursday, February 22, 2018

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBμV/m)	Lim1: FCC_pt15_1 09_Class_B (dBμV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cspr_Class_B (dBμV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
45.152	50.5	-18.6	31.9	40	-8.1	PASS		40.5	-8.6	PASS		134	295
429.147	52.7	-11	41.7	46	-4.3	PASS	-4.3	47.5	-5.8	PASS	-5.8	107	110
442.381	50.1	-10.5	39.6	46	-6.4	PASS		47.5	-7.9	PASS		116	98
444.507	49.8	-10.5	39.4	46	-6.6	PASS		47.5	-8.1	PASS		100	114
446.87	48.1	-10.4	37.6	46	-8.4	PASS		47.5	-9.9	PASS		125	90
447.925	48.3	-10.4	37.9	46	-8.1	PASS		47.5	-9.6	PASS		113	115

## Spurious Emissions Test Equipment:

Rev. 2/20/2018

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1168255)	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	8/15/2018	8/15/2017
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red	0.009-2000MHz	ZFL-1000-LN	CS	N/A	798	II	2/8/2019	2/8/2018
2310 PA	1-1000MHz	PAM-103	COM-POWER	441175	2310	II	10/29/2018	10/29/2017
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Brown Bilog	30-2000MHz	JB1	Sunol	A0032406	1218	I	1/13/2019	1/13/2017
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
Large Loop	20Hz-5MHz	6511	EMCO	9704-1154	67	I	6/14/2018	6/14/2016
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2084		HTC-1	HDE		2084	II	3/23/2018	3/23/2017
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1509	9kHz - 18GHz		Florida RF			II	10/2/2018	10/2/2017
Asset #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2456	9kHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

## Transmitter Spectrum Mask

Since peak level of the 13.56MHz fundamental is below the FCC 15.209 and RSS-Gen limits, EUT complies with spectrum mask requirements by definition.



## AC Mains Conducted Emissions

Curtis Straus - a Bureau Veritas Company

Conducted Emissions per CISPR 16-2-1

Peak Detector Data

Notes:

EUT Line tested: 120VAC/60Hz; Neutral Phase

Work Order # - R2199

EUT Power Input - 120VAC/60Hz

Test Site - CEMI-6

Conditions: - 23°C; 24%RH; 1012mBar

Test Engineer - AKZ

Data Taken at 02:56:00 PM, Friday, February 23, 2018

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)	Av Lim: Mains_FCC&CISP R_Avg_Class_B (dBµV)	Margin to Avg Limit (dB)	Pk to Avg Limit Results (Pass/Fail)	Worst Margin (Avg Limit) (dB)
0.15	25.9	20.7	46.6	66	-19.4	PASS		56	-9.4	PASS	
0.347	19	20.8	39.8	59	-19.3	PASS		49	-9.3	PASS	
0.498	19.5	20.8	40.2	56	-15.8	PASS		46	-5.8	PASS	
0.528	15.5	20.8	36.2	56	-19.8	PASS		46	-9.8	PASS	
13.559	28.3	21	49.4	60	-10.6	PASS		50	-0.6	PASS	
27.119	28.2	21.1	49.4	60	-10.6	PASS	-10.6	50	-0.6	PASS	-0.6

Curtis Straus - a Bureau Veritas Company  
Conducted Emissions per CISPR 16-2-1  
Peak Detector Data  
Notes:  
EUT Line tested: 120VAC/60Hz; Live Phase

Work Order # - R2199  
EUT Power Input - 120VAC/ 60Hz  
Test Site - CEMI-6  
Conditions:- 23°C; 24%RH; 1023mBar  
Test Engineer - AKZ

Data Taken at 03:21:37 PM, Friday, February 23, 2018

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Margin to Avg Limit (dB)	Pk to Avg Limit Results (Pass/Fail)	Worst Margin (Avg Limit) (dB)
0.207	24.8	20.8	45.6	63.3	-17.8	PASS		53.3	-7.8	PASS	
0.51	18.3	20.8	39	56	-17	PASS		46	-7	PASS	
0.578	14.8	20.8	35.6	56	-20.4	PASS		46	-10.4	PASS	
0.609	12.3	20.8	33.1	56	-22.9	PASS		46	-12.9	PASS	
13.559	28.2	21	49.3	60	-10.7	PASS	-10.7	50	-0.7	PASS	-0.7
27.119	27.1	21.1	48.2	60	-11.8	PASS		50	-1.8	PASS	

## AC Mains Conducted Emissions Test Equipment:

Rev. 2/20/2018

<b>Spectrum Analyzers / Receivers /Preselectors</b> Rental EXA Signal Analyzer(1118473)	<b>Range</b> 9KHz-26.5GHz	<b>MN</b> N9010A-526;N	<b>Mfr</b> AT	<b>SN</b> MY51170076	<b>Asset</b> 1118473	<b>Cat</b> I	<b>Calibration Due</b> 5/19/2018	<b>Calibrated on</b> 5/19/2017
<b>LISNs/Measurement Probes</b> LISN Asset 2092	<b>Range</b> 9KHz-30MHz	<b>MN</b> NNLK 8121	<b>Mfr</b> Schwarzbeck	<b>SN</b> NNLK 8121-662	<b>Asset</b> 2092	<b>Cat</b> I	<b>Calibration Due</b> 7/25/2018	<b>Calibrated on</b> 7/25/2017
<b>Conducted Test Sites (Mains / Telco)</b> CEMI 6	<b>FCC Code</b> 719150		<b>VCCI Code</b> A-0015			<b>Cat</b> III	<b>Calibration Due</b> NA	<b>Calibrated on</b> N/A
<b>Meteorological Meters/Chambers</b> Weather Clock (Pressure Only) TH A#2078		<b>MN</b> BA928 HTC-1	<b>Mfr</b> Oregon Scientific HDE	<b>SN</b> C3166-1	<b>Asset</b> 831 2078	<b>Cat</b> I II	<b>Calibration Due</b> 4/28/2018 3/23/2018	<b>Calibrated on</b> 4/28/2016 3/23/2017
<b>Cables</b> CEMI-12	<b>Range</b> 9kHz - 2GHz		<b>Mfr</b> C-S			<b>Cat</b> II	<b>Calibration Due</b> 11/4/2018	<b>Calibrated on</b> 11/4/2017
<b>Attenuators</b> 20dB Attenuator-64	<b>Range</b> 9kHz-2GHz	<b>MN</b>	<b>Mfr</b>	<b>SN</b> N/A	<b>Asset</b>	<b>Cat</b> II	<b>Calibration Due</b> 11/6/2018	<b>Calibrated on</b> 11/8/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



## Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz)		
NIST	5.6dB	N/A
CISPR	4.6dB	5.2dB (Ucisprr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions		
NIST	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucisprr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	$3.23 \times 10^{-8}$	$1 \times 10^{-7}$
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



## Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "BUREAU VERITAS," "BUREAU VERITAS CONSUMER PRODUCTS SERVICES," "BVCPS," "MTL," "ACTS," "MTL-ACTS" and "CURTIS-STRAUS" (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only where such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims



including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.

13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

Rev.160009121(2)\_#684340 v13CS

