





Test Report

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

Report No	ER1807-4
Client	Honeywell International, Inc.
Address	1985 Douglas Drive N Golden Valley, MN 55422
Phone	860-739-4468
Items tested FCC ID IC	e7 Thermostat - Model Number: 201-528-100-BK, 201-528-100-WH HS9-201528100 573R-201528100
Equipment Type Equipment Code	Digital Transmission System DTS
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	07-20-2017 to 09-06-2017
Results	As detailed within this report
Prepared by	 Zachary Johnson - Test Engineer
Authorized by	 Jason Haley - Sr. EMC Engineer
Issue Date	11/2/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 27 of this report.

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



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Report REV Sep-08-2017 - YF



Summary

This test report supports an application for certification of a transmitter operating pursuant to:
CFR Title 47 FCC Part 15.247, ISSED Canada RSS-247 Issue 2

The product is the e7 Thermostat. It is a direct sequence spread spectrum transmitter that operates in the 2402MHz to 2480MHz frequency range.

Antenna Type: Surface Mount

Gain: 1.3dBi

We found that the product met the above requirements without modification.

Model tested: Core Thermostat 120V model –Bluetooth Transmitter

Test samples were received in good condition.

Test Methodology

All testing was performed according to the following rules/procedures/documents;
CFR 47 Part 15.247, RSS-247 Issue 2, RSS-Gen Issue 4, FCC KDB 558074 D01 DTS
Measurement Guidance v04 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity.

EUT operating voltage is 120V AC

The following bandwidths were used during radiated spurious and AC line conducted emissions testing.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-25GHz	1MHz	3MHz

Product Tested - Configuration Documentation

EUT Configuration										
Work Order:	R1807									
Company:	Honeywell International Inc.									
Company Address:	1985 Douglas Drive N									
	Golden Valley, MN 55422									
Contact:	Ravi Sagar									
	MN			PN			SN			
EUT:	e7 Thermostat			--			--			
EUT Description:	Thermostat									
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
H3 RS485	RS-485	1	1	-	No	No	0	in	no	Setup only
H4 BLE	other	1	1	other	No	No	1	in	yes	
5 Pin Mounting plate	other	1	1	other	No	No	0	in	no	Separate from EUT, used for saving settings
Zigbee connector	other	1	1	other	No	No	1	in	yes	
H2 (GND, 12V, and S5 Bus)					No	No	2	in	yes	
Software Operating Mode Description:										
Thermostat needs to be continuous pinging between 0 and 14 (8) in wire and wireless mode.										

Statement of Conformity

RSS-GEN	RSP-100	RSS 247	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	EUT employs 1.3dBi peak gain surface mount antenna.
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		RSS 247	15.247	The unit complies with AC line conducted emissions requirements.

Refer to Appendix A of this report for antenna port conducted measurements.

Test Results

****All test Data in this report refers to the Bluetooth Low Energy Transmission operating at 120V AC**

Radiated Spurious Emissions

LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

[15.247(d)]

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) and worst case emissions were observed in Y orientation. All the results below are for the worst case orientation only.

MEASUREMENTS / RESULTS

Worst Case Orientation Y used for Radiated testing, standing up straight

Curtis Straus - a Bureau Veritas Company				Work Order - R1807					
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 120VAC 60Hz					
30-1000MHz Horizontal Tabular Data				Test Site - CH1					
Operator: Mike Leonard				Temp; Humid; Pres - 24°C; 36%RH; 1007mBar					
BLE Mode 120VAC 60Hz Y Position									
Mid Channel									
			Adjusted QP						
Frequency	Raw QP Reading	Correction Factor	Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dB	Pass/Fail	centimeters	degrees	dB
94.726	36.6	-16.4	20.1	43.5	-23.4	PASS	224	202	
103.962	30.1	-13.8	16.3	43.5	-27.3	PASS	224	205	
648.808	21.5	-4.5	17	46	-29	PASS	105	115	
778.13	26.8	-3.2	23.6	46	-22.4	PASS	274	307	
821.64	30.5	-2.6	27.9	46	-18.1	PASS	142	194	-18.1
840.287	27.8	-2.7	25.1	46	-20.9	PASS	124	25	

Curtis Straus - a Bureau Veritas Company				Work Order - R1807					
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 120VAC 60Hz					
30-1000MHz Vertical Tabular Data				Test Site - CH1					
Operator: Mike Leonard				Temp; Humid; Pres - 24°C; 36%RH; 1007mBar					
BLE Mode 120VAC 60Hz Y Position									
Mid 2440									
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dB	Pass/Fail	centimeters	degrees	dB
31.249	28.1	-5	23.1	40	-16.9	PASS	101	250	
37.538	39.2	-9.7	29.5	40	-10.5	PASS	107	295	
46.602	42.5	-16.1	26.4	40	-13.6	PASS	124	67	
53.077	50.1	-18.1	32	40	-8	PASS	132	70	-8
820.976	25.8	-2.6	23.2	46	-22.8	PASS	116	200	
840.003	27.6	-2.7	24.9	46	-21.2	PASS	100	340	

30-1000MHz Mid Channel

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 100-277VAC											
1-6GHz Horizontal Tabular Data				Test Site - Chamber1											
				Temp; Humid; Pres - 24.4°C; 45%RH; 1009mBar											



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Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 100-277VAC											
1-6GHz Vertical Tabular Data				Test Site - Chamber1											
				Temp; Humid; Pres - 24.4°C; 45%RH; 1009mBar											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeter	degrees	dB	dB
1443.7	28.1	18	-7.1	20.9	10.9	74	-53.1	PASS	54	-43.1	PASS	175	241		
2019.1	29.6	20.8	-3.9	25.7	16.9	74	-48.3	PASS	54	-37.1	PASS	281	201		
3781.8	33	24.3	0.3	33.3	24.6	74	-40.7	PASS	54	-29.4	PASS	200	30		
4959.7	37	33.6	3.3	40.3	36.9	74	-33.7	PASS	54	-17.1	PASS	189	69	-33.7	-17.1
5430.7	33.8	25.2	5.7	39.5	30.9	74	-34.5	PASS	54	-23.1	PASS	125	112		

1-6GHz Low Channel

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 100-277VAC											
1-6GHz Horizontal Tabular Data				Test Site - Chamber1											
				Temp; Humid; Pres - 24.4°C; 45%RH; 1009mBar											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeter	degrees	dB	dB
3881.4	33.8	25.1	0.7	34.5	25.8	74	-39.4	PASS	54	-28.2	PASS	125	243		
5551.5	35.9	25.2	5.8	41.7	31.1	74	-32.3	PASS	54	-22.9	PASS	125	315	-32.3	-22.9

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 100-277VAC											
1-6GHz Vertical Tabular Data				Test Site - Chamber1											
				Temp; Humid; Pres - 24.4°C; 45%RH; 1009mBar											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeter	degrees	dB	dB
3886.6	35	24.8	0.7	35.7	25.5	74	-38.3	PASS	54	-28.4	PASS	288	273		
4959.6	33.2	26.4	3.3	36.5	29.7	74	-37.5	PASS	54	-24.3	PASS	189	290		
5693	33.3	24.6	6.4	39.7	31	74	-34.3	PASS	54	-23	PASS	275	242	-34.3	-23

1-6GHz Mid Channel

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 100-277VAC											
1-6GHz Horizontal Tabular Data				Test Site - Chamber1											
				Temp; Humid; Pres - 24.4°C; 45%RH; 1009mBar											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeter	degrees	dB	dB
4608.1	35.3	24.8	2.1	37.4	26.9	74	-36.6	PASS	54	-27.1	PASS	178	43		
5727	33.5	24.9	6.3	39.7	31.2	74	-34.2	PASS	54	-22.8	PASS	201	119	-34.2	-22.8

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Radiated Emissions Electric Field 3m Distance				EUT Power Input - 100-277VAC											
1-6GHz Vertical Tabular Data				Test Site - Chamber1											
				Temp; Humid; Pres - 24.4°C; 45%RH; 1009mBar											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeter	degrees	dB	dB
3888.8	34.1	25.1	0.7	34.8	25.8	74	-39.2	PASS	54	-28.2	PASS	188	0		
3926.8	34.7	25	0.7	35.4	25.7	74	-38.5	PASS	54	-28.2	PASS	208	1		
4569.8	34.9	25.2	1.8	36.7	27	74	-37.3	PASS	54	-27	PASS	225	141		
4959.9	40.8	33.4	3.3	44.1	36.7	74	-29.9	PASS	54	-17.3	PASS	222	194	-29.9	-17.3
5696	32.7	24.9	6.4	39	31.3	74	-34.9	PASS	54	-22.7	PASS	300	108		

1-6GHz High Channel

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 120VAC 60Hz											
6-18GHz Horizontal Tabular Data				Test Site - CH1											
Operator: Mike Leonard				Temp; Humid; Pres - 25°C; 50%RH; 1003mBar											
120VAC 60Hz															
BLE 2402MHz Position Y															
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
14076.4	39.3	30.4	17.4	56.8	47.9	83.5	-26.7	PASS	63.5	-15.6	PASS	164	283		
16279.6	37.7	28.5	15	52.7	43.5	83.5	-30.8	PASS	63.5	-20	PASS	150	313		
17749.7	36.1	25.9	24.2	60.3	50	83.5	-23.2	PASS	63.5	-13.5	PASS	124	51	-23.2	-13.5

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 120VAC 60Hz											
6-18GHz Vertical Tabular Data				Test Site - CH1											
Operator: Mike Leonard				Temp; Humid; Pres - 25°C; 50%RH; 1003mBar											
120VAC 60Hz															
BLE 2402MHz Position Y				EUT Maximum Frequency - 32MHz											
				Req. 1; Req. 2 - FCC Class B											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
8893.4	40.1	29.5	10.8	50.9	40.3	83.5	-32.6	PASS	63.5	-23.2	PASS	195	231		
14102.2	39.2	30	17.5	56.7	47.5	83.5	-26.8	PASS	63.5	-16	PASS	200	234		
15463	37.6	29.1	13.7	51.3	42.7	83.5	-32.2	PASS	63.5	-20.8	PASS	174	197		
17103.1	35.1	27.2	19.2	54.4	46.5	83.5	-29.1	PASS	63.5	-17	PASS	200	253		
17727.4	35.3	25.6	24.1	59.3	49.7	83.5	-24.2	PASS	63.5	-13.8	PASS	100	25	-24.2	-13.8

6-18GHz Low Channel

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 120VAC 60Hz											
6-18GHz Horizontal Tabular Data				Test Site - CH1											
Operator: Mike Leonard				Temp; Humid; Pres - 25°C; 50%RH; 1003mBar											
120VAC 60Hz															
BLE 2480MHz Position Y				EUT Maximum Frequency - 32MHz											
				Req. 1; Req. 2 - FCC Class B											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
7440.9	45.8	37.6	9.7	55.5	47.3	83.5	-28	PASS	63.5	-16.2	PASS	159	249		
10534.1	37.1	27.9	12.1	49.2	40	83.5	-34.3	PASS	63.5	-23.5	PASS	150	3		
14140.5	38.1	30.3	17.5	55.5	47.8	83.5	-28	PASS	63.5	-15.7	PASS	110	198		
17704.3	36	26.8	23.9	59.9	50.7	83.5	-23.6	PASS	63.5	-12.8	PASS	163	269	-23.6	-12.8

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Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 120VAC 60Hz											
6-18GHz Vertical Tabular Data				Test Site - CH1											
Operator: Mike Leonard				Temp; Humid; Pres - 25°C; 50%RH; 1003mBar											
120VAC 60Hz															
BLE 2480MHz Position Y				EUT Maximum Frequency - 32MHz											
				Req. 1; Req. 2 - FCC Class B											

6-18GHz Mid Channel

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 120 Vac											
6-18GHz Horizontal Tabular Data				Test Site - Chamber 1											
Operator: Nirak So				Temp; Humid; Pres - 25°C; 45%RH; 1015mBar											
2440MHz BLE Mode in Y position.															
				EUT Maximum Frequency - 32MHz											
				Req. 1; Req. 2 - FCC Class B											
								</							

Curtis Straus - a Bureau Veritas Company				Work Order - R1807											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 120 Vac											
6-18GHz Vertical Tabular Data				Test Site - Chamber 1											
Operator: Nirak So				Temp; Humid; Pres - 25°C; 45%RH; 1015mBar											
2440MHz BLE Mode in Y positon.															
				EUT Maximum Frequency - 32MHz											
				Req. 1; Req. 2 - FCC Class B											
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
None Found															
MHz	dBuV	dBuV	dB/m	dBuV/m	dBuV/m	dBuV/m	dB	Pass/Fail	dBuV/m	dB	Pass/Fail	cm	degrees	dB	dB

6-18GHz High Channel

Radiated Emissions Table

Date: 29-Aug-17				Company: Inncom				Work Order: R1807							
Engineer: Zac Johnson				EUT Desc: Core Thermostat				EUT Operating Voltage/Frequency: 120V / 60Hz							
Temp: 24.2°C				Humidity: 35%				Pressure: 999mBar							
Frequency Range: 18-25GHz								Measurement Distance: 0.1 m							
Notes: 120V Bluetooth Mode Tested Center Channel								EUT Max Freq: 2480MHz							
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
									H/V	No Emissions Found			---	---	---
Table Result:				Pass by --- dB				Worst Freq: --- MHz							
Test Site: EMI Chamber 1				Cable 1: Asset #2328				Cable 2: ---				Cable 3: ---			
Analyzer: Brown SA				Preamp: 18-26.5GHz				Antenna: 18-26.5GHz Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.188															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

18-25GHz Mid Channel



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Radiated Band Edge

Radiated Emissions Table																			
Date: 17-Jul-17			Company: Inncom						Work Order: R1807										
Engineer: Zac Johnson			EUT Desc: Thermostat						EUT Operating Voltage/Frequency: 120V / 60Hz										
Temp: 25.2C			Humidity: 47%						Pressure: 1010										
Frequency Range: 2310-2500MHz									Measurement Distance: 3 m										
Notes: Bluetooth Mode									EUT Max Freq: 2480MHz										
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBμV)	Average Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBμV/m)	Adjusted Avg Reading (dBμV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average							
									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)					
H	2360.0	22.7	2.7	0.0	32.1	3.4	58.2	38.2	74.0	-15.8	Pass	54.0	-15.8	Pass					
H	2390.0	20.3	0.3	0.0	32.2	3.4	55.9	35.9	74.0	-18.1	Pass	54.0	-18.1	Pass					
H	2483.5	20.0	0.0	0.0	32.4	3.5	55.9	35.9	74.0	-18.1	Pass	54.0	-18.1	Pass					
H	2484.0	23.2	3.2	0.0	32.4	3.5	59.1	39.1	74.0	-14.9	Pass	54.0	-14.9	Pass					
Table Result:				Pass		by		-14.9 dB		Worst Freq:				2484.0 MHz					
Test Site: EMI Chamber 2					Cable 1: Asset #2052					Cable 2: Asset #2053					Cable 3: ---				
Analyzer: Rental SA#2					Preamp: none					Antenna: Blue Horn					Preselector: ---				
CSsoft Radiated Emissions Calculator v 1.017.188																			
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																			
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Test Equipment Used:

Test Equipment Used									
Rev. 7/29/2017									
Spectrum Analyzers / Receivers/Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	8/9/2017	8/9/2016	
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	
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/19/2017	9/19/2016	
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	8/12/2017	8/12/2015	
Meteorological Meters		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 #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017	
Asset #2054	9kHz - 18GHz		Florida RF			II	10/30/2017	10/30/2016	

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

Radiated Emissions 30-1000MHz

Rev. 7/26/2017									
Spectrum Analyzers / Receivers/Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	8/9/2017	8/9/2016	
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on	
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	
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	11/5/2017	11/5/2016	
2116 BRF	0.009-18000MHz	BRM50702	Micro-Tronics	G226	2116	II	11/26/2017	11/26/2016	
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	8/29/2018	8/29/2016	
Meteorological Meters		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#2078		HTC-1	HDE		2078	II	3/23/2018	3/23/2017	
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on	
Asset #1522	9kHz - 18GHz		Florida RF			II	2/11/2018	2/11/2017	
Asset #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017	
Asset #2054	9kHz - 18GHz		Florida RF			II	10/30/2017	10/30/2016	

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

Radiated Emissions 1-18GHz



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Rev. 8/25/2017

Spectrum Analyzers / Receivers / Preselectors Brown	Range 9kHz-26.5GHz	MN E4407B	Mfr Agilent	SN SG44210511	Asset 1510	Cat I	Calibration Due 7/26/2018	Calibrated on 7/26/2017
Preamps / Couplers Attenuators / Filters HF (Yellow)	Range 18-26.5GHz	MN AFS4-18002650-60-8P-4	Mfr CS	SN 467559	Asset 1266	Cat II	Calibration Due 9/16/2017	Calibrated on 9/16/2016
Antennas HF (White) Horn	Range 18-26.5GHz	MN 801-WLM	Mfr Waveline	SN 758	Asset 758	Cat III	Calibration Due Verify before Use	Calibrated on date of test
Meteorological Meters Weather Clock (Pressure Only) TH A#2084		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2084	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2328	Range 1 - 26.5GHz		Mfr Pasternack			Cat II	Calibration Due 2/6/2018	Calibrated on 2/6/2017

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

Radiated Emissions 18-25GHz

Rev. 9/10/2017

Spectrum Analyzers / Receivers / Preselectors Rental MXE EMI Receiver(1170725)	Range 20Hz-26.5GHz	MN N9038A	Mfr Agilent	SN MY51210151	Asset 1170725	Cat I	Calibration Due 12/22/2017	Calibrated on 12/22/2016
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Asset 1686	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Antennas Blue Horn	Range 1-18Ghz	MN 3117	Mfr ETS	SN 157647	Asset 1861	Cat I	Calibration Due 2/14/2019	Calibrated on 2/14/2017
Meteorological Meters Weather Clock (Pressure Only) TH A#2078		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2078	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2052 Asset #2053	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/5/2018 10/30/3017	Calibrated on 3/5/2017 10/30/2016

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

Radiated Bandedges and Worst Case



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AC Line Conducted Emissions LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBμV)	Average limit (dBμV)
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.

[47 CFR 15.207(a)]

MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company						Work Order # - R1807					
Conducted Emissions per CISPR 16-2-1						EUT Power Input - 120VAC/60 Hz					
Peak Detector Tabular Data - Voltage Measurement						Test Site - CEMI-2					
Operator: Michael Mehrmann						Temp; Humid; Pres - 23.3°C;44 %RH;1010 mBar					
EUT Line tested:120 VAC/60Hz; Phase						EUT Maximum Freq - 32MHz					
						Requirement - FCC/CISPR Class B					
Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Quasi-peak Limit	Margin to the QP Limit	Peak to QP Limit Results	Worst Margin	Average Limit	Margin to Average Limit	Peak to Avg Limit Results	Worst Margin
MHz	dBμV	dB	dBμV	dBμV	dB	Pass/Fail	dB	dBμV	dB	Pass/Fail	dB
10.776	26.9	20.2	47.1	60	-12.9	PASS		50	-2.9	PASS	
10.883	27.9	20.2	48.1	60	-11.9	PASS		50	-1.9	PASS	
10.945	27.7	20.2	47.9	60	-12.1	PASS		50	-2.1	PASS	
11.051	27.7	20.2	47.9	60	-12.1	PASS		50	-2.1	PASS	
11.12	28.2	20.2	48.4	60	-11.6	PASS	-11.6	50	-1.6	PASS	-1.6
11.194	27.1	20.2	47.4	60	-12.6	PASS		50	-2.6	PASS	

0.15-30MHz Hot Lead

Curtis Straus - a Bureau Veritas Company				Work Order # - R1807			
Conducted Emissions per CISPR 16-2-1				EUT Power Input - 120VAC/60 Hz			
Peak Detector Tabular Data - Voltage Measurement				Test Site - CEMI-2			
Operator: Michael Mehrmann				Temp; Humid; Pres - 23.3°C;44 %RH;1010 mBar			
EUT Line tested:120 VAC/60Hz; Neutral							
				EUT Maximum Freq - 32MHz			
				Requirement - FCC/CISPR Class B			
Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Quasi-peak Limit	Margin to the QP Limit	Peak to QP Limit Results	Worst Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
10.568	31.3	20.2	51.5	60	-8.5	PASS	-8.5
10.607	30.8	20.2	51	60	-9	PASS	
10.767	30.5	20.2	50.7	60	-9.3	PASS	
23.507	30.4	20.3	50.8	60	-9.2	PASS	
23.748	30.7	20.3	51	60	-9	PASS	
23.99	30.3	20.3	50.6	60	-9.4	PASS	

Curtis Straus - a Bureau Veritas Company				Work Order # - R1807			
Conducted Emissions per CISPR 16-2-1				EUT Power Input - 120VAC/60 Hz			
Final Average Detector Tabular Data - Voltage Measurement				Test Site - CEMI-2			
Operator: Michael Mehrmann				Temp; Humid; Pres - 23.3°C;44 %RH;1010 mBar			
EUT Line tested:120 VAC/60Hz; Neutral							
				EUT Maximum Freq - 32MHz			
				Requirement - FCC/CISPR Class B			
Frequency	Raw Average Reading	Correction Factor	Adjusted Average Amplitude	Average Limit	Average Margin	Average Results	Worst Average Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
23.426	24.6	20.3	44.9	50	-5.1	PASS	
23.669	25.2	20.3	45.6	50	-4.4	PASS	
23.748	25.5	20.3	45.9	50	-4.1	PASS	-4.1
23.83	24.6	20.3	45	50	-5	PASS	
23.906	24	20.3	44.4	50	-5.6	PASS	
24.07	25.2	20.3	45.6	50	-4.4	PASS	

0.15-30MHz Neutral Lead

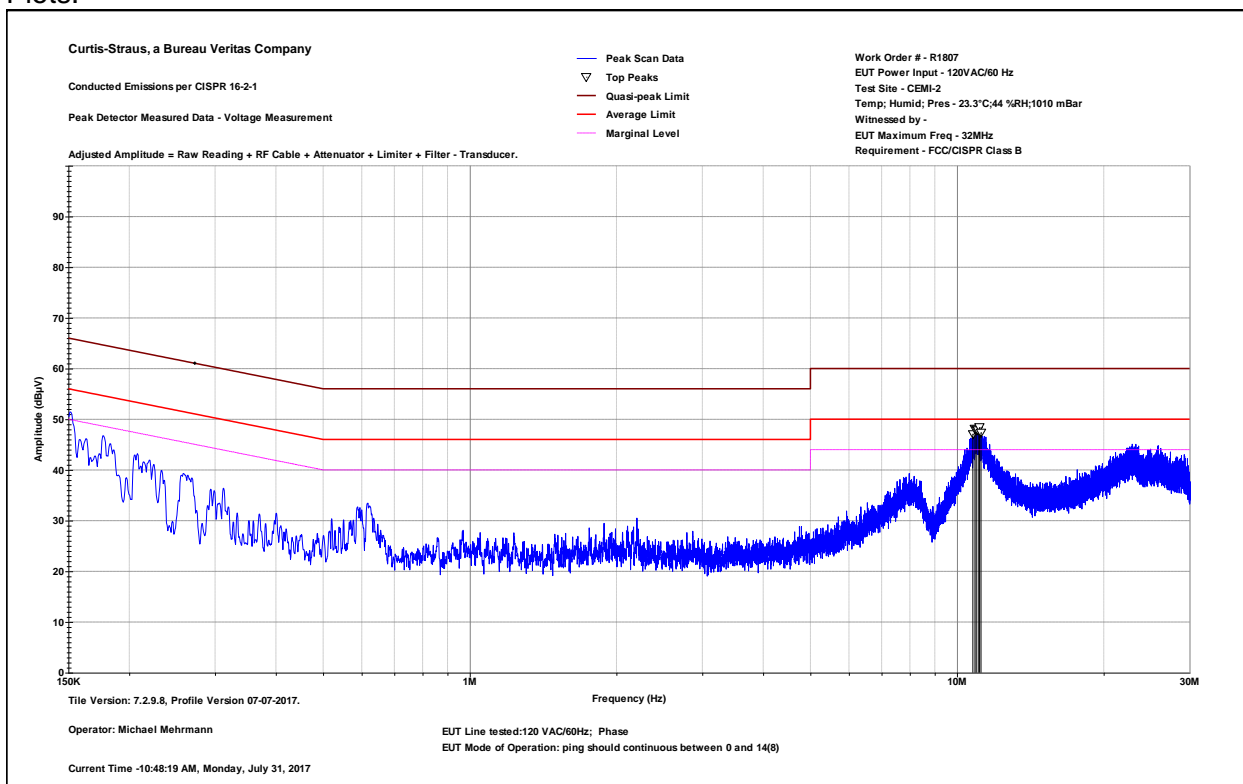
Test Equipment Used:

Rev. 9/10/2017

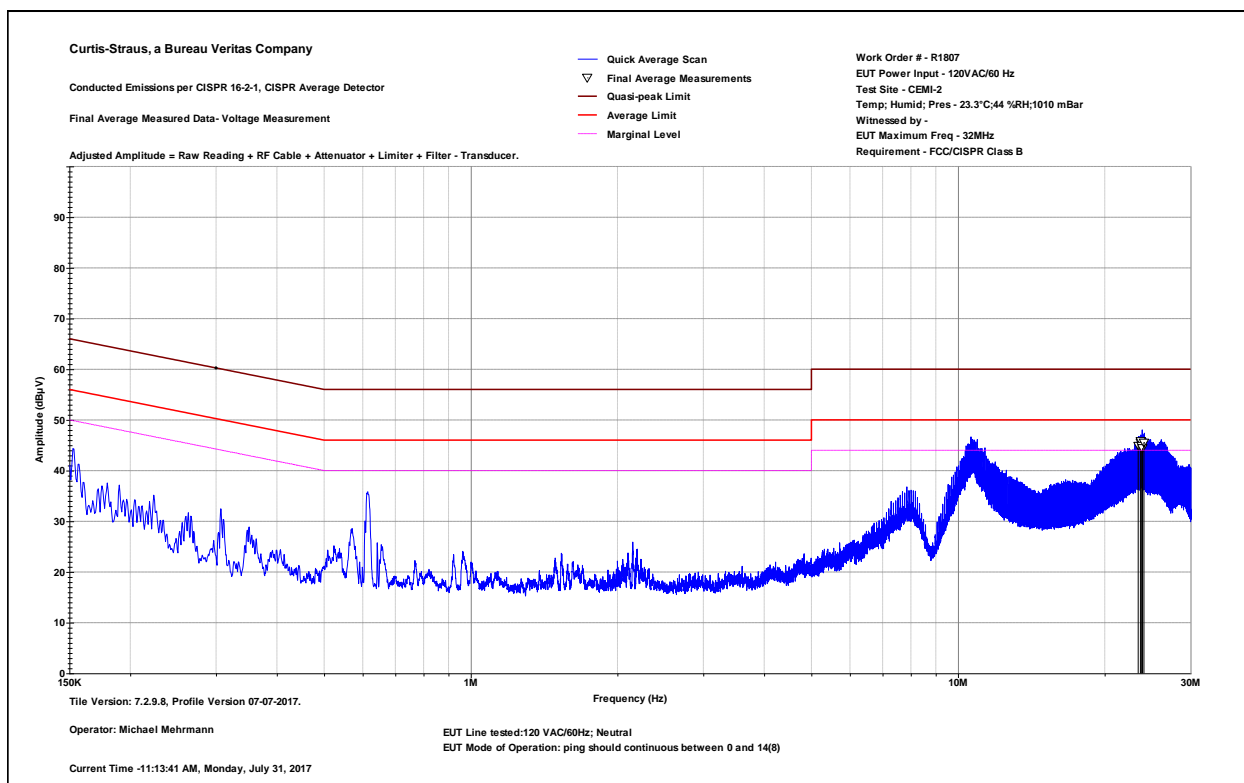
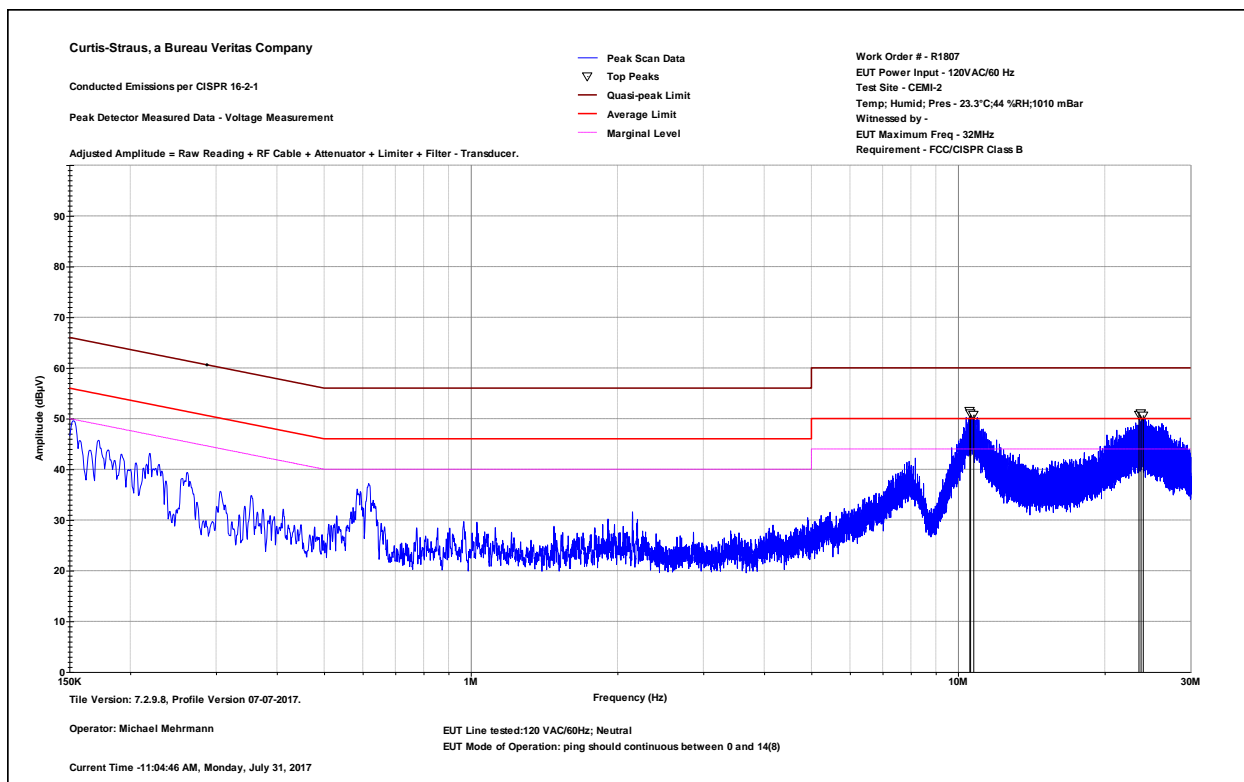
Spectrum Analyzers / Receivers / Preselectors
Rental EXA Signal Analyzer(1118473)**Range** 9KHz-26.5GHz
MN N9010A-526;N**Mfr** AT**SN** MY51170076
Asset 1118473**Cat** I
Calibration Due 5/19/2018**Calibrated on** 5/19/2017**LISNs/Measurement Probes**
LISN Asset 1791**Range** 9KHz-30MHz
MN NNLK 8121**Mfr** Schwarzbeck**SN** NNLK 8121-603
Asset 1791**Cat** I
Calibration Due 6/28/2018**Calibrated on** 6/28/2017**Conducted Test Sites (Mains / Telco)**
CEMI 2**FCC Code** 719150**VCCI Code** A-0015**Cat** III
Calibration Due NA**Calibrated on** N/A**Meteorological Meters**
Weather Clock (Pressure Only)
TH A#2079**MN** BA928
HTC-1**Mfr** Oregon Scientific
HDE**SN** C3166-1
Asset 831
2079**Cat** I
Calibration Due 4/28/2018
3/23/2018**Calibrated on** 4/28/2016
3/23/2017**Cables**
CEMI-14**Range** 9KHz - 2GHz**Mfr** C-S**Cat** II
Calibration Due 10/2/2017**Calibrated on** 1/2/2016**Attenuators**
20dB Attenuator-05**Range** 9kHz-2GHz**MN** 2**Mfr** Aeroflex/Weinschel**SN** BS9092
Asset**Cat** II
Calibration Due 8/8/2018**Calibrated on** 8/8/2017

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

Plots:



0.15-30MHz Hot Lead



0.15-30MHz Neutral Lead



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)	5.6dB	N/A
NIST	4.6dB	5.2dB (Ucisp)
CISPR		
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 (Ucisp)
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)	3.23×10^{-8}	1×10^{-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%	5%
	0.3dB	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.



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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.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
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