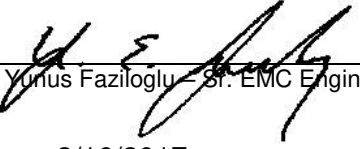




**BUREAU
VERITAS**

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Test Report

Report No	EQ0039-7
Client	Amazon Robotics LLC
Address	300 River Park Drive North Reading, MA 01864
Phone	(978) 276 - 2815
Items tested	H-DU User Interface
FCC ID	2AEZR-HUI433
IC	10244A-HUI433
FRN	0024656845
Equipment Type:	Part 15 Security/Remote Control Transmitter
Equipment Code:	DSC
FCC Rule Parts	CFR 47 FCC 15.231(e), RSS-210 Issue 9 Annex A.1.4
Test Dates	October 26 to 28, 2016 and Jan 16, 2017
Results	As detailed within this report
Prepared by	 Tuyen Truong – Test Engineer
Authorized by	 Yunus Faziloglu – Sr. EMC Engineer
Issue Date	<u>3/16/2017</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 16 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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Form Final Report REV 7-20-07 (DW)



Product Tested - Configuration Documentation

EUT Configuration										
Work Order:	Q0039									
Company:	Amazon Robotics LLC									
Company Address:	300 River Park Drive									
	North Reading, MA, 01864									
Contact:	Dao Keopadith									
	MN			PN			SN			
EUT:	H-DU User Interface			600-01051			#1			
EUT Description:	H-DU User Interface									
EUT Max Frequency:	433.3 MHz									
EUT Min Frequency:	0.125 MHz									
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
CAN cable	other	1	1	other	Yes	No	0.8	in	yes	
Host Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	max length (m)	in/out	comment
power supply	Power DC	1	1	other	No	No	0.2	0.2	in	
USB (laptop)	USB	1	1	USB	Yes	No	10	10	out	
Software Operating Mode Description:										
Cerberus manager 1.4.2.4. Hercules User Interface which contains the transmitter is set to transmit at 433.3 MHz with duration of 1.810 milliseconds at every 10-second period.										

Summary

This test report supports an application for certification of a transmitter operating pursuant to:
CFR 47 FCC 15.231(e), RSS-210 Issue 9 Annex A.1.4

Model: 600-01051

The product operates at 433.3MHz.

We found that the product met the above requirements without modifications. The test samples were received in good condition.



Test Methodology

Radiated emission testing was performed according to the procedures specified in ANSI C63.10 (2013) and RSS-Gen Issue 4. Radiated Emissions were maximized in the orientation at final installation. The device antenna is integral, therefore it could not be maximized separately.

Product is powered by 9VDC battery. Emissions on AC mains side of DC supply were tested with a 50 Ω /50 μ H LISN.

The EUT transmits every 10 seconds for duration of 1.810 milliseconds.

Highest EUT power setting was set at +10. Spurious emissions were tested at this level.

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

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-6GHz	1MHz	3MHz

Compliance Statement

RSS-GEN	RSP-100	RSS 210	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that vary the output power.
	3.1		15.19	The label is shown in the label exhibit.
	3.2		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
6.1, 6.5			15.31	The EUT was tested in accordance with the measurement standards in this section.
			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 an internal surface-mount ceramic chip antenna with 0.79dBi gain.
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	AC side of EUT Power Supply meet the limits in 15.207
		A.1.4	15.231(e)	Fundamental, harmonics and spurious emissions meet the corresponding limits
		A.1.4	15.231(e)	Corresponding timing requirements are met
6.6		A.1.3	15.231(c)	99% occupied bandwidth and 20dB emission bandwidth plots are included.

Modifications Required for Compliance

None

Issue No.
1

Reason for change
Original Release

Date Issued
March 11, 2015

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Test Results

Fundamental Emission LIMIT

<i>Fundamental Frequency</i>	<i>Field Strength of Fundamental (microvolts/meter)</i>	<i>Field Strength of Spurious Emission (microvolts/meter)</i>
260-470MHz [15.231(e)]	1,500 to 5,000 (Note1)	150 to 500 (Note 1)

Note 1: Linear interpolation

Amplitude (dBμV/m) = 20*log (16.6667*(Frequency (in MHz)) – 2833.3333)

Example Calculation: 20*log (16.6667(433.3) – 2833.3333) = 72.8 dBμV/m

MEASUREMENTS / RESULTS

Radiated Emissions Table												
Date: 28-Oct-16			Company: Amazon Robotics LLC						Work Order: Q0039			
Engineer: JH			EUT Desc: H-DU User Interface						EUT Operating Voltage/Frequency: Battery			
Temp: 23°C			Humidity: 25%			Pressure: 1005mBar						
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes: Power setting 10							EUT Max Freq: 433.3MHz					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)				FCC Part 15.231(e)		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
Vertical Peak	433.3	75.2	26.2	16.6	1.6	67.2				72.8	-5.6	Pass
Horizontal Peak	433.3	75.0	26.2	16.6	1.6	67.0				72.8	-5.8	Pass
Table Result: Pass by 5.6 dB Worst Freq: 433.3 MHz												
Test Site: EMI Chamber 1			Cable 1: Asset #2051				Cable 2: EMIR-HIGH-06			Cable 3: ---		
Analyzer: 1178898			Preamp: Green				Antenna: Red-Black			Preselector: ---		
CSsoft Radiated Emissions Calculator v 1.017.175												
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												
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Spectrum Analyzers / Receivers / Preselectors SA #5 (1178898)	Range 9kHz-26.5GHz	MN E4407B	Mfr Agilent	SN US40241082	Asset 1178898	Cat I	Calibration Due 12/30/2016	Calibrated on 12/30/2015
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/21/2017	Calibrated on 3/21/2015
Preamps / Couplers Attenuators / Filters Green	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 802	Cat II	Calibration Due 9/19/2017	Calibrated on 9/19/2016
Antennas Red-Black Bilog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 2/9/2017	Calibrated on 2/9/2015
Meteorological Meters Weather Clock (Pressure Only) TH A#2080		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2080	Cat I II	Calibration Due 4/28/2018 4/5/2017	Calibrated on 4/28/2016 4/5/2016
Cables Asset #2051 REMI-High-22	Range 9kHz - 18GHz 1- 18GHz		Mfr Florida RF C-S			Cat II II	Calibration Due 3/2/2017 2/14/2017	Calibrated on 3/2/2016 2/14/2016

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



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Bandwidth**LIMIT**

"The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz...Bandwidth is determined at the points 20dB down from the modulated carrier". [15.231(c)]

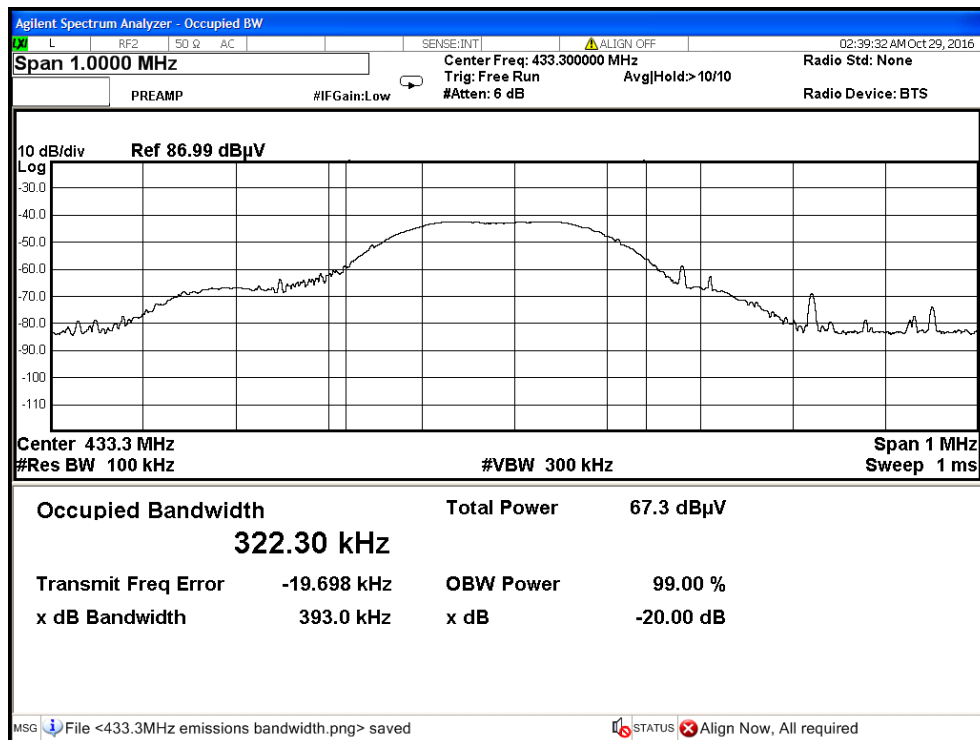
"The 99% bandwidth of momentarily operated devices shall be less or equal to 0.25% of the center frequency for devices operating between 70 MHz and 900 MHz." [RSS-210 Issue 9 A.1.3]

Max Limit: $0.25\% \times 433.3\text{MHz} = 1.08325\text{MHz}$

Rev. 12/8/2016

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
SA #5 (1178898)	9kHz-26.5GHz	E4407B	Agilent	US40241082	1178898	I	12/30/2016	12/30/2015
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	3/21/2017	3/21/2015
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-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	2/9/2017	2/9/2015
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#2080		HTC-1	HDE	C3166-1	2080	II	4/5/2017	4/5/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2051	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016
REMI-High-22	1- 18GHz		C-S			II	2/14/2017	2/14/2016

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



Harmonics and Spurious Emissions

LIMIT

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
260-470MHz	1,500 to 5,000	150 to 500 *

*Linear interpolations.
[15.231(e)]

MEASUREMENTS / RESULTS

Radiated Emissions Table												
Date: 26-Oct-16			Company: Amazon Robotics LLC						Work Order: Q0039			
Engineer: JH			EUT Desc: H-DU User Interface						EUT Operating Voltage/Frequency: 9VDC			
Temp: 23°C			Humidity: 23%			Pressure: 1019mBar						
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes:							EUT Max Freq: 433.3MHz					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			FCC Part 15.231(e)		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
V QP	92.502	40.9	25.9	8.3	0.7	24.0	---	---	---	43.5	-19.5	Pass
V QP	104.516	40.8	25.9	11.6	0.8	27.3	---	---	---	43.5	-16.2	Pass
V QP	113.931	35.0	25.9	13.5	0.8	23.4	---	---	---	43.5	-20.1	Pass
V QP	460.291	20.6	26.0	17.1	1.6	13.3	---	---	---	46.0	-32.7	Pass
V QP	498.72	20.3	25.9	17.8	1.7	13.9	---	---	---	46.0	-32.1	Pass
V QP	523.47	20.6	26.6	17.9	1.9	13.8	---	---	---	46.0	-32.2	Pass
H QP	30.993	19.3	25.8	21.0	0.4	14.9	---	---	---	40.0	-25.1	Pass
H QP	89.358	22.2	25.8	7.7	0.7	4.8	---	---	---	43.5	-38.7	Pass
H QP	155.028	20.6	25.9	12.5	1.0	8.2	---	---	---	43.5	-35.3	Pass
H QP	163.013	21.4	25.9	12.2	1.0	8.7	---	---	---	43.5	-34.8	Pass
H QP	820.953	21.0	26.2	21.7	2.1	18.6	---	---	---	46.0	-27.4	Pass
H QP	822.428	20.9	26.2	21.7	2.1	18.5	---	---	---	46.0	-27.5	Pass
Table Result: Pass by -16.2 dB							Worst Freq: 104.516 MHz					
Test Site: EMI Chamber 1			Cable 1: Asset #1784				Cable 2: Asset #2051			Cable 3: ---		
Analyzer: Rental SA#5			Preamp: Green				Antenna: Red-Black			Preselector: ---		
CSsoft Radiated Emissions Calculator v 1.017.175												
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												
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Spectrum Analyzers / Receivers/Preselectors SA #5 (1178898)	Range 9kHz-26.5GHz	MN E4407B	Mfr Agilent	SN US40241082	Asset 1178898	Cat I	Calibration Due 12/30/2016	Calibrated on 12/30/2015
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/21/2017	Calibrated on 3/21/2015
Preamps/Couplers Attenuators / Filters Green	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 802	Cat II	Calibration Due 9/19/2017	Calibrated on 9/19/2016
Antennas Red-Black Bilog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 2/9/2017	Calibrated on 2/9/2015
Meteorological Meters Weather Clock (Pressure Only) TH A#2080		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2080	Cat I II	Calibration Due 4/28/2018 4/5/2017	Calibrated on 4/28/2016 4/5/2016
Cables Asset #2051 REMI-High-22	Range 9kHz - 18GHz 1- 18GHz		Mfr Florida RF C-S			Cat II II	Calibration Due 3/2/2017 2/14/2017	Calibrated on 3/2/2016 2/14/2016

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Radiated Emissions Table

Date: 26-Oct-16			Company: Amazon Robotics LLC						Work Order: Q0039						
Engineer: JH			EUT Desc: H-DU User Interface						EUT Operating Voltage/Frequency: 9VDC						
Temp: 23°C			Humidity: 23%						Pressure: 1019mBar						
Frequency Range: 1-6GHz									Measurement Distance: 3 m						
Notes:									EUT Max Freq: 433.3MHz						
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 15.209 High Frequency - Peak			FCC 15.209 High Frequency - Average			
									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	
Vertical	1679.6	25.0	17.4	17.9	26.4	4.6	38.1	30.5	74.0	-35.9	Pass	54.0	-23.5	Pass	
Vertical	5258.2	22.9	14.2	17.3	34.1	9.3	49.0	40.3	74.0	-25.0	Pass	54.0	-13.7	Pass	
Vertical	5989.7	24.6	14.6	17.1	34.6	10.2	52.3	42.3	74.0	-21.7	Pass	54.0	-11.7	Pass	
Horizontal	1290.6	27.0	18.6	18.6	26.0	4.0	38.4	30.0	74.0	-35.6	Pass	54.0	-24.0	Pass	
Horizontal	5999.9	25.2	14.7	17.1	34.6	10.2	52.9	42.4	74.0	-21.1	Pass	54.0	-11.6	Pass	
Table Result:				Pass		by		-11.6 dB		Worst Freq:				5999.9 MHz	
Test Site: EMI Chamber 1				Cable 1: EMIR-HIGH-22						Cable 2: Asset #2051				Cable 3: ---	
Analyzer: Rental SA#5				Preamp: Brown						Antenna: Black Horn				Preselector: ---	
CSsoft Radiated Emissions Calculator v 1.017.175															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															
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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
SA #5 (1178898)	9kHz-26.5GHz	E4407B	Agilent	US40241082	1178898	I	12/30/2016	12/30/2015
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	3/21/2017	3/21/2015
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	1-10GHz	CS	CS	N/A	1523	II	9/25/2017	9/25/2016
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#2080		HTC-1	HDE		2080	II	4/5/2017	4/5/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2051	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016
REMI-High-22	1- 18GHz		C-S			II	2/14/2017	2/14/2016

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



Timing Requirements

LIMIT

“Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section etc.

..Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.”

[FCC 15.231(e)] and [RSS-210 Issue 9 A.1.4(b)]

Rev. 12/8/2016

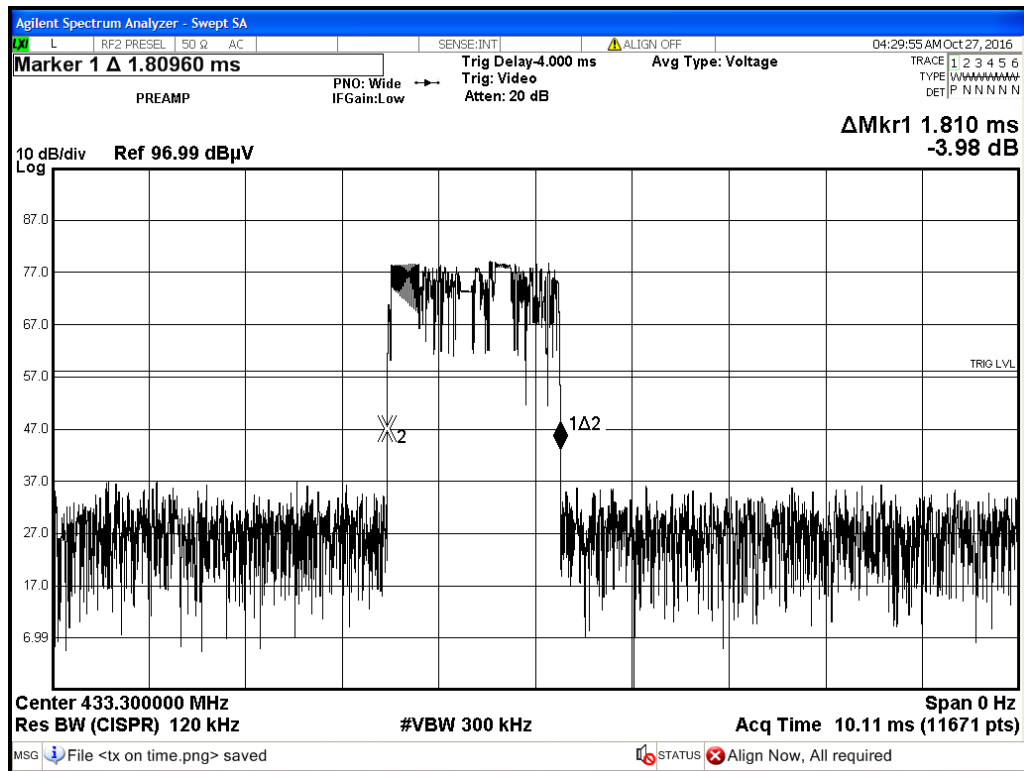
Spectrum Analyzers / Receivers / Preselectors SA #5 (1178898)	Range 9kHz-26.5GHz	MN E4407B	Mfr Agilent	SN US40241082	Asset 1178898	Cat I	Calibration Due 12/30/2016	Calibrated on 12/30/2015
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/21/2017	Calibrated on 3/21/2015
Preamps / Couplers Attenuators / Filters Green	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 802	Cat II	Calibration Due 9/19/2017	Calibrated on 9/19/2016
Antennas Red-Black Bilog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 2/9/2017	Calibrated on 2/9/2015
Meteorological Meters Weather Clock (Pressure Only) TH A#2080		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2080	Cat I II	Calibration Due 4/28/2018 4/5/2017	Calibrated on 4/28/2016 4/5/2016
Cables Asset #2051 REMI-High-22	Range 9kHz - 18GHz 1- 18GHz		Mfr Florida RF C-S			Cat II II	Calibration Due 3/2/2017 2/14/2017	Calibrated on 3/2/2016 2/14/2016

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

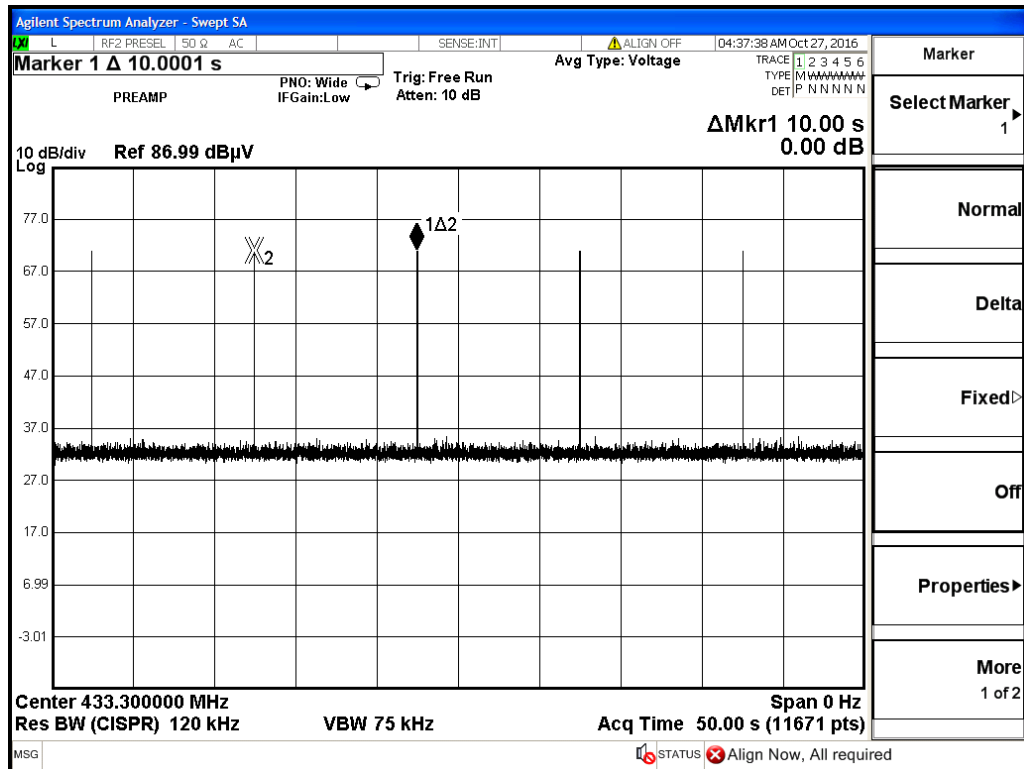
See plots on next page.



Plot(s)



Single transmission (Closed up view)



Transmission Duration – Period

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

AC Side of a DC Supply Conducted Emissions														
Date: 16-Jan-17							Company: Amazon Robotics				Work Order: Q0039			
Engineer: Bryan Valcourt							EUT Desc: Hercules User Interface							
Temp: 23.2 °C							Humidity: 32%				Pressure: 1016mbar			
Notes: Tx power set at +10. QP readings meet average limits														
Frequency Range: 0.15MHz - 30MHz										EUT Input Voltage/Frequency: 12VDC				
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor	ATTN Factor	FCC 15.207			FCC 15.207		
	QP1 (dBμV)	QP2 (dBμV)	AVG1 (dBμV)	AVG2 (dBμV)	L1 (dB)	L2 (dB)			QP Limit (dBμV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBμV)	Margin (dB)	Result (Pass/Fail)
0.15	28.5	30.1	28.5	30.1	-0.1	-0.2	-0.1	-19.4	66.0	-16.3	Pass	56.0	-6.3	Pass
4.65	24.9	24.6	24.9	24.6	-0.1	-0.1	-0.1	-19.4	56.0	-11.5	Pass	46.0	-1.5	Pass
5.37	26.9	24.5	26.9	24.5	-0.1	-0.1	-0.1	-19.5	60.0	-13.5	Pass	50.0	-3.5	Pass
9.68	18.4	16.9	18.4	16.9	-0.1	-0.1	-0.1	-19.5	60.0	-21.9	Pass	50.0	-11.9	Pass
15.98	16.1	15.4	16.1	15.4	-0.1	-0.1	-0.2	-19.5	60.0	-24.1	Pass	50.0	-14.1	Pass
21.53	20.8	19.1	20.8	19.1	-0.1	-0.2	-0.2	-19.4	60.0	-19.4	Pass	50.0	-9.4	Pass
22.13	19.7	18.4	19.7	18.4	-0.1	-0.2	-0.2	-19.4	60.0	-20.5	Pass	50.0	-10.5	Pass
Result: Pass							Worst Margin: -1.5 dB			Frequency: 4.652 MHz				
Measurement Device: LISN ASSET 1730(Line 1) LISN ASSET 1731(Line 2)							Cable: CEMI-11			Spectrum Analyzer: Rental SA #5				
Attenuator: 20dB Attenuator-60							Site: CEMI 1							
C-S CEMI Calculator Version 3.0.14														
Adjusted Reading = Raw Reading + LISN Insertion Loss + Cable Loss + Attenuation														
Equipment Factor Sheet rev: 2/25/2017														

AC Side of a DC Supply Conducted Emissions														
Date: 16-Jan-17							Company: Amazon Robotics					Work Order: Q0039		
Engineer: Bryan Valcourt							EUT Desc: Hercules User Interface					Pressure: 1016mbar		
Temp: 23.2 °C							Humidity: 32%							
Notes: Tx power set at -25. QP readings meet average limits														
Frequency Range: 0.15MHz - 30MHzEUT Input Voltage/Frequency: 12VDC														
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC 15.207			FCC 15.207		
	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)			QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
0.16	28.1	32.0	28.1	32.0	-0.1	-0.1	0.0	-19.4	65.6	-13.9	Pass	55.6	-3.9	Pass
4.66	25.4	25.6	25.4	25.6	-0.1	-0.1	-0.1	-19.4	56.0	-10.8	Pass	46.0	-0.8	Pass
5.09	24.7	23.2	24.7	23.2	-0.1	-0.1	-0.1	-19.4	60.0	-15.7	Pass	50.0	-5.7	Pass
6.77	24.1	23.4	24.1	23.4	-0.1	-0.1	-0.1	-19.5	60.0	-16.3	Pass	50.0	-6.3	Pass
15.98	15.8	15.3	15.8	15.3	-0.1	-0.1	-0.2	-19.5	60.0	-24.5	Pass	50.0	-14.5	Pass
21.87	21.4	20.0	21.4	20.0	-0.1	-0.2	-0.2	-19.4	60.0	-18.8	Pass	50.0	-8.8	Pass
Result: Pass							Worst Margin: -0.8 dB			Frequency: 4.661 MHz				
Measurement Device: LISN ASSET 1730(Line 1) LISN ASSET 1731(Line 2)							Cable: CEMI-11			Spectrum Analyzer: Rental SA #5				
Attenuator: 20dB Attenuator-60							Site: CEMI 1							
C-S CEMI Calculator Version 3.0.14 Adjusted Reading = Raw Reading + LISN Insertion Loss + Cable Loss + Attenuation														
Equipment Factor Sheet rev: 2/25/2017														



Rev. 1/15/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016
LISNs/Measurement Probes	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
LISN Asset 1730	150kHz-30MHz	LI-150A	Com-Power	201090	1730	I	3/10/2017	3/10/2016
LISN Asset 1731	150kHz-30MHz	LI-150A	Com-Power	201091	1731	I	3/10/2017	3/10/2016
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 1	719150		A-0015			III	NA	N/A
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#2082		HTC-1	HDE		2082	II	4/5/2017	4/5/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
CEMI-11	9kHz - 2GHz		C-S			II	10/2/2017	1/2/2016
Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20dB Attenuator-60	9kHz-2GHz			N/A		II	4/12/2017	4/12/2016

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)	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.



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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