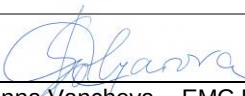
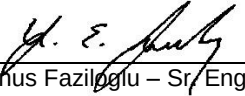




**BUREAU
VERITAS**

Test Report

Bureau Veritas Consumer Products Services, Inc.

Report No	ET2827-1
Client	Amazon Robotics LLC
Address	300 Riverpark Drive North Reading, MA 01864
Phone	(978) 276-2815
Items tested	User Interface UI, X-DU, NA (Model 600-01648-NA)
FCC ID	2AEZR-XUI
IC	10244A-XUI
FRN	0024656845
Equipment Type	Low Power Communication Device Transmitter
Equipment Code	DXX
Standards	CFR Title 47 FCC Part 15.249, RSS-210 Issue 9 Annex B.10
Test Dates	Nov 6-8, 2019
Results	As detailed within this report
Prepared by	 Anna Vancheva – EMC Engineer
Authorized by	 Yunus Faziloglu – Sr. Engineer
Issue Date	11/8/2019
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.

Bureau Veritas Consumer Products Services, Inc. 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.



**BUREAU
VERITAS**

Bureau Veritas Consumer Products Services, Inc.
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828

Contents

Contents	2
Product Tested - Configuration Documentation	3
Summary and Test Methodology	4
Compliance Statement	5
Modifications Required for Compliance	5
Test Results	6
<i>Fundamental Measurements</i>	6
Radiated Spurious Emissions	7
<i>Occupied Bandwidth (99%)</i>	11
Conducted Emissions	12
Measurement Uncertainty	15
Conditions of Testing	16

Form Final Report REV 2-16-07 (DW)



Product Tested - Configuration Documentation

EUT Configuration										
Work Order:	T2827									
Company:	Amazon Robotics LLC									
Company Address:	300 River Park Drive									
	North Reading, MA, 01864									
Contact:	Dao Keopadith									
	MN			PN			SN			
EUT:	600-01648-NA			600-01648-NA			--			
EUT Description:	User Interface UI, X-DU, NA									
EUT Max Frequency:	925 MHz									
EUT Min Frequency:	0.125 MHz									
EUT Components	MN			SN						
--	--			--						
Support Equipment	MN			SN						
XDU	X						000020			
Test Laptop	Lenovo W430						1525			
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
CAN cable	other	1	1	other	No	No	10	in	yes	
Software Operating Mode Description:										
Both 0.125MHz and 925MHz radios are transmitting during testing.										

Clock Frequencies	
frequencies (MHz)	0.125, 925



Reason for change
Original Release

Date Issued
September 23, 2019

Bureau Veritas Consumer Products Services, Inc.
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



Summary and Test Methodology

On Nov 6 through 8, 2019 we tested the User Interface UI, X-DU, NA (Model 600-01648-NA) for compliance with the following requirements:

CFR Title 47 FCC Part 15.249, RSS-210 Issue 9 Annex B.10

EUT transmits at 925MHz. Emissions were tested with the EUT in its intended installation orientation. EUT has an internal surface mount chip antenna with 3.32dBi gain.

Radiated emission testing was performed according to the procedures specified in ANSI C63.10-2013 and RSS-Gen Issue 5.

AC mains conducted emission testing was performed at an operating voltage of 120VAC/60Hz.

Following bandwidths were used during radiated and conducted spurious emissions testing.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-10GHz	1MHz	3MHz

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

Compliance Statement

RSS-GEN	RSP-100	RSS 210	Part 15	Comments
6.4			15.15(b)	There are no controls accessible to the user to 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.
3.2			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13.2			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1			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.
6.8			15.203	Antenna: Yageo ANT1204LL05R0915A Type: Internal surface mount chip Peak gain: 3.32dBi
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 mains emissions met the requirements of 15.207.
		B.10(a)	15.249(a)	The fundamental and harmonics met the limits in 15.249(a)
		B.10(b)	15.249(d)	Spurious emissions met the limits in 15.209.
6.7				99% emissions bandwidth plot is provided.

Modifications Required for Compliance

There were no modifications required for compliance.

Test Results

Fundamental Measurements

LIMITS

The field strength from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

[15.249(a)]

Radiated Emissions Table

Date: 06-Nov-19 Engineer: AV Temp: 24.1°C Humidity: 33% Pressure: 1010mbar							Work Order: T2827 EUT Operating Voltage/Frequency: 12VDC							
Frequency Range: 925MHz Fundamental							Measurement Distance: 3 m							
Notes: Peak readings.														
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			FCC 15.249				
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)		
							V	925.0	68.8	33.0	28.9	2.1	66.9	---
H	925.0	72.5	33.0	28.9	2.1	70.6	---	---	---	93.98	-23.4	---		
Test Site: EMI Chamber 2 Analyzer: ---			Cable 1: Asset #2464 Preamp: 2311			Cable 2: Asset #2455 Antenna: 1106			Cable 3: Asset #2606 Preselector: ---					
CSsoft Radiated Emissions Calculator			v1.017.215									Copyright Curtis-Straus LLC 2000		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Rev. 11/2/2019

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	5/30/2020	5/30/2019
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2		719150	2762A-7	A-0015	30-1000MHz	1686	I	12/7/2020	12/7/2018
Preamps / Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2311 PA		1-1000MHz	PAM-103	COM-POWER	441174	2311	II	10/14/2020	10/14/2019
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog		30-2000MHz	JB1	Sunol	A091604-2	1106	I	4/26/2021	4/26/2019
Meteorological Meters/Chambers			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018
Asset #2659			1235C97	Control Company	181683830	2659	I	4/3/2020	4/3/2019
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2606		9KHz-18GHz		MegaPhase			II	4/2/2020	4/2/2019
Asset #2455		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2464		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019

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



Radiated Spurious Emissions

30MHz-1GHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Notes:
Normal mode - transmitting at 4Hz
925 MHz Tx power set to 10
925 MHz and 125kHz transmitting radios

Work Order - T2827
EUT Power Input - 12VDC
Test Site - Ch 2
Conditions - 24.1°C; 32.5%RH;1009 mBar
Test Engineer - AV

Data Taken at 11:59:27 AM, Wednesday, November 06, 2019

Frequency (MHz)	Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Lim1: FCC_pt15_2 09 (dBμV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
30.073	31.7	-6.9	24.8	40	-15.2	PASS		150	45
41.543	39.9	-15.4	24.5	40	-15.5	PASS		100	0
43.556	41.8	-16.8	25.1	40	-14.9	PASS		100	180
45.714	42	-18.1	23.9	40	-16.1	PASS		100	45
59.973	48.9	-21	27.9	40	-12.1	PASS	-12.1	200	135
699.712	38.8	-5.1	33.8	46	-12.2	PASS		100	270

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Notes:
Normal mode - transmitting at 4Hz
925 MHz Tx power set to 10
925 MHz and 125kHz transmitting radios

Work Order - T2827
EUT Power Input - 12VDC
Test Site - Ch 2
Conditions - 24.1°C; 32.5%RH;1009 mBar
Test Engineer - AV

Data Taken at 11:59:28 AM, Wednesday, November 06, 2019

Frequency (MHz)	Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Lim1: FCC_pt15_2 09 (dBμV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
30.606	32.4	-7.2	25.2	40	-14.8	PASS	-14.8	250	180
45.666	42.8	-18.1	24.7	40	-15.3	PASS		150	135
122.756	33.1	-12.8	20.3	43.5	-23.2	PASS		250	90
156.173	37.7	-15.2	22.5	43.5	-21	PASS		150	315
267.068	36.5	-14.3	22.2	46	-23.8	PASS		200	135
790.917	32.6	-3.1	29.5	46	-16.5	PASS		150	225

1GHz-6GHz

Bureau Veritas Consumer Product Services Inc.

Work Order - T2827

Radiated Emissions Electric Field 3m Distance

EUT Power Input - 12VDC

Top Peaks Vertical 1-6GHz

Test Site - Ch 2

Notes:

Conditions - 24.1°C; 32.5%RH;1009 mBar

Normal mode - transmitting at 4Hz

Test Engineer - AV

925 MHz Tx power set to 10

925 MHz and 125kHz transmitting radios

Data Taken at 01:48:58 PM, Wednesday, November 06, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Average Limit (dB)	Average Limit Test Result (Pass/Fail)	Average Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
5013.13	54	-4.3	49.6	74	-24.4	PASS		54	-4.4	PASS		200	289
5272.75	55.1	-3.1	52	74	-22	PASS	-22	54	-2	PASS	-2	100	197
5284.13	52.7	-3.1	49.6	74	-24.4	PASS		54	-4.4	PASS		100	140
5315.5	51.7	-3	48.8	74	-25.2	PASS		54	-5.2	PASS		300	0
5974.88	49.5	-1.6	48	74	-26	PASS		54	-6	PASS		200	62

Bureau Veritas Consumer Product Services Inc.

Work Order - T2827

Radiated Emissions Electric Field 3m Distance

EUT Power Input - 12VDC

Top Peaks Horizontal 1-6GHz

Test Site - Ch 2

Notes:

Conditions - 24.1°C; 32.5%RH;1009 mBar

Normal mode - transmitting at 4Hz

Test Engineer - AV

925 MHz Tx power set to 10

925 MHz and 125kHz transmitting radios

Data Taken at 01:48:58 PM, Wednesday, November 06, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
5225	53.9	-3.3	50.6	74	-23.4	PASS	-23.4	54	-3.4	PASS	-3.4	100	282
5273.5	52.6	-3.1	49.5	74	-24.5	PASS		54	-4.5	PASS		100	253
5287.88	52.5	-3.1	49.4	74	-24.6	PASS		54	-4.6	PASS		200	3
5315.13	51.5	-3	48.5	74	-25.5	PASS		54	-5.5	PASS		100	54
5953.88	49	-1.6	47.4	74	-26.6	PASS		54	-6.6	PASS		200	118

BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.

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



page 8 of 17

6GHz-10GHz

Bureau Veritas Consumer Product Services Inc.

Work Order - T2827

Radiated Emissions Electric Field 1m Distance

EUT Power Input - 12VDC

Top Peaks Vertical 6-18GHz

Test Site - Ch 2

Notes:

Conditions - 24.1°C; 32.5%RH;1009 mBar

Normal mode - transmitting at 4Hz

Test Engineer - AV

925 MHz Tx power set to 10

925 MHz and 125kHz transmitting radios

Data Taken at 02:06:46 PM, Wednesday, November 06, 2019

Frequency (MHz)	Raw Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
8327.1	49.5	4.5	54	83.5	-29.5	PASS		63.5	-9.5	PASS		150	54
9922.1	50	5.3	55.3	83.5	-28.2	PASS	-28.2	63.5	-8.2	PASS	-8.2	150	168

Bureau Veritas Consumer Product Services Inc.

Work Order - T2827

Radiated Emissions Electric Field 1m Distance

EUT Power Input - 12VDC

Top Peaks Horizontal 6-18GHz

Test Site - Ch 2

Notes:

Conditions - 24.1°C; 32.5%RH;1009 mBar

Normal mode - transmitting at 4Hz

Test Engineer - AV

925 MHz Tx power set to 10

925 MHz and 125kHz transmitting radios

Data Taken at 02:13:16 PM, Wednesday, November 06, 2019

Frequency (MHz)	Raw Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
8944.6	48.7	5	53.8	83.5	-29.7	PASS		63.5	-9.7	PASS		125	290
9559.1	49.3	5.4	54.7	83.5	-28.8	PASS	-28.8	63.5	-8.8	PASS	-8.8	175	2
9913.5	49.3	5.3	54.7	83.5	-28.8	PASS		63.5	-8.8	PASS		150	224

BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.

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



Test Equipment Used:

Rev. 11/2/2019

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	5/30/2020	5/30/2019
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2		719150	2762A-7	A-0015	30-1000MHz	1686	I	12/7/2020	12/7/2018
EMI Chamber 2		719150	2762A-7	A-0015	1-18GHz	1686	I	12/7/2020	12/7/2018
Preamps /Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2311 PA		1-1000MHz	PAM-103	COM-POWER	441174	2311	II	10/14/2020	10/14/2019
2111 HF Preamp		0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	10/14/2020	10/14/2019
2130 BRF		9KHz-10GHz	BRM18770	Micro-Tronics	1	2130	II	2/1/2020	2/1/2019
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog		30-2000MHz	JB1	Sunol	A091604-2	1106	I	4/26/2021	4/26/2019
Yellow Horn		1-18GHz	3115	EMCO	9608-4898	37	I	8/20/2020	8/20/2018
Meteorological Meters/Chambers			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018
Asset #2659			1235C97	Control Company	181683830	2659	I	4/3/2020	4/3/2019
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2606		9KHz-18GHz		MegaPhase			II	4/2/2020	4/2/2019
Asset #2455		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2464		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019

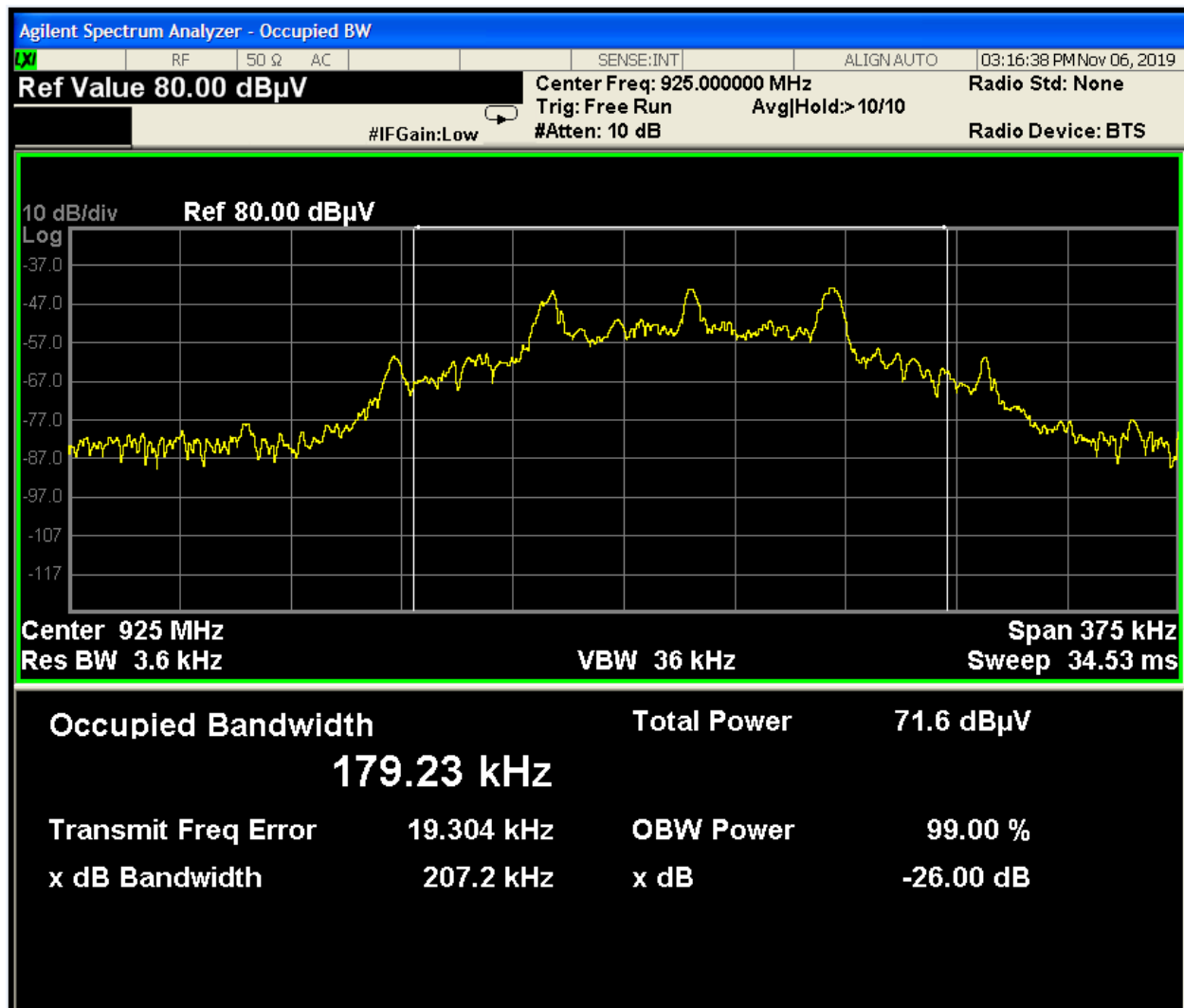
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



page 10 of 17

Occupied Bandwidth (99%)

Conducted Emissions

Bureau Veritas Consumer Product Services Inc.

Conducted Emissions per CISPR 16-2-1

Peak Detector Data

Notes:

925MHz and 125kHz transmitting - Line Phase

Work Order # - T2827

EUT Power Input - 12VDC

Test Site - CEMI-1

Conditions: - 22°C; 34.6%RH; 1009mBar

Test Engineer - AV

Data Taken at 11:03:26 AM, Friday, November 08, 2019

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)
0.159	42.3	20.2	62.4	65.5	-3.1	PASS	-3.1
0.185	36.9	20.3	57.2	64.3	-7.1	PASS	
0.217	33.9	20.2	54	62.9	-8.9	PASS	
0.281	31.3	20.2	51.5	60.8	-9.3	PASS	
0.311	28.2	20.2	48.4	59.9	-11.5	PASS	
0.36	26.1	20.2	46.3	58.7	-12.4	PASS	

Bureau Veritas Consumer Product Services Inc.

Conducted Emissions per CISPR 16-2-1, CISPR Average Detector

Final Average Detector Data

Notes:

925MHz and 125kHz transmitting - Line Phase

Work Order # - T2827

EUT Power Input - 12VDC

Test Site - CEMI-1

Conditions: - 22°C; 34.6%RH; 1009mBar

Test Engineer - AV

Data Taken at 11:03:26 AM, Friday, November 08, 2019

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC&CISP R_Avg_Class_B (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.151	15.7	20.1	35.8	56	-20.2	PASS	
0.152	15.7	20.1	35.8	55.9	-20.1	PASS	
0.163	15.7	20.1	35.8	55.3	-19.5	PASS	
0.194	15.7	20.2	35.8	53.9	-18	PASS	-18
0.243	12.8	20.2	33	52	-19	PASS	
0.26	12	20.2	32.2	51.4	-19.3	PASS	

BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.

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



Bureau Veritas Consumer Product Services Inc.

Conducted Emissions per CISPR 16-2-1

Peak Detector Data

Notes:

925MHz and 125kHz transmitting- Neutral Phase

Work Order # - T2827

EUT Power Input - 12 VDC

Test Site - CEMI-1

Conditions: - 22°C; 34.6%RH; 1009mBar

Test Engineer - AV

Data Taken at 11:41:02 AM, Friday, November 08, 2019

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)
0.15	29	20.1	49.1	66	-16.9	PASS	-16.9
0.158	27.8	20.2	48	65.6	-17.6	PASS	
0.199	24.1	20.2	44.3	63.6	-19.3	PASS	
0.229	20.9	20.2	41.1	62.5	-21.4	PASS	
0.259	19.5	20.2	39.7	61.5	-21.7	PASS	
0.295	20.2	20.2	40.4	60.4	-20	PASS	

Bureau Veritas Consumer Product Services Inc.

Conducted Emissions per CISPR 16-2-1, CISPR Average Detector

Final Average Detector Data

Notes:

925MHz and 125kHz transmitting- Neutral Phase

Work Order # - T2827

EUT Power Input - 12 VDC

Test Site - CEMI-1

Conditions: - 22°C; 34.6%RH; 1009mBar

Test Engineer - AV

Data Taken at 11:41:02 AM, Friday, November 08, 2019

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.194	5.8	20.2	25.9	53.9	-28	PASS	
0.294	15.9	20.2	36.1	50.4	-14.3	PASS	-14.3
21.784	9.3	20.6	29.9	50	-20.1	PASS	
26.74	12.9	20.6	33.5	50	-16.5	PASS	
27.731	13.4	20.6	34	50	-16	PASS	
29.709	14.2	20.6	34.8	50	-15.2	PASS	

BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.

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



page 13 of 17

Test Equipment Used:

Rev. 11/2/2019

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118473)	9KHz-26.5GHz	N9010A-526;N	AT	MY51170076	1118473	I	7/22/2020	7/22/2019
LISNs/Measurement Probes	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
LISN Asset 1726	150kHz-30MHz	LI-150A	Com-Power	201092	1726	I	4/10/2020	4/10/2019
LISN Asset 1727	150kHz-30MHz	LI-150A	Com-Power	201093	1727	I	4/10/2020	4/10/2019
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/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018
Asset #2655		1235C97	Control Company	181683829	2655	I	4/3/2020	4/3/2019
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
CEMI-02	9kHz - 2GHz		C-S			II	4/10/2020	4/10/2019
Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20dB Attenuator-64	9kHz-2GHz			N/A		II	11/15/2019	11/15/2018

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 [no table (i.e. floor standing)]	4.6dB	5.2dB (Ucisp)
CISPR[table present]	6.0dB	
Radiated Emissions (1-26.5GHz) [no table (i.e. floor standing)]	4.6dB	N/A
Radiated Emissions (1-26.5GHz) [table present]	6.3dB	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% 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		



BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



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," "BVCPSS," "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.



BUREAU
VERITAS

Bureau Veritas Consumer Products Services, Inc.
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



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

