



Bureau Veritas Consumer Products Services Inc.

# Test Report

Report No	ET1800-7
Client	Harman International Industries Inc. Mark Bowman
Address	30001 Cabot Dr. Novi, MI 48377
Phone	1-248-254-7751
Items tested	INFO3.5 CSM MY20
FCC ID	2AHPN-BE2843
IC	6434C-BE2843
Equipment Type	Unlicensed National Information Infrastructure Device
Equipment Code	NII
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	07/13/2019 to 07/28/2019
Results	As detailed within this report

Prepared by

Christopher Hamel – EMC Engineer

Authorized by

Arik Zwirner – EMC Engineer

Issue Date

7/30/19

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.

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Report REV Sep-08-2017 - YF



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## Summary

This test report supports an application for certification of a transmitter operating pursuant to: CFR Title 47 FCC Part 15.407, ISED Canada RSS-247 Issue 2

The product is the INFO3.5 CSM MY20. It is a transmitter that operates in the following bands:  
UNII-1: 5.15GHz – 5.25GHz  
UNII-3: 5.725GHz – 5.85GHz

Antenna Type: Non-detachable internal PCB trace  
Gain: 5.05dBi

In INFO3.5 CSM MY20 2 resistors were moved on the main board. Software changes were also implemented that are not RF related. This report is a supplement to Bureau Veritas Consumer Products Services Inc. Test Report ES1636-2. Only radiated emissions in the 30MHz-1GHz frequency range were measured for this reason.

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

Modifications: none.

Test samples were received in good condition.



## ***Test Methodology***

All testing was performed according to the following rules/procedures/documents;  
CFR Title 47 FCC Part 15.407, RSS-247 Issue 2, RSS-Gen Issue 4, FCC KDB 789033 D02  
General UNII Test Procedures New Rules v01r04 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 13.8V DC

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

<b>Frequency</b>	<b>RBW</b>	<b>VBW</b>
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-40GHz	1MHz	3MHz

## Product Tested - Configuration Documentation

EUT Configuration										
<b>Work Order:</b>	T1800									
<b>Company:</b>	Harman International Industries Inc.									
<b>Company Address:</b>	30001 Cabot Dr. Novi MI 48377									
<b>Contact:</b>	Mark Bowman									
	MN			PN			SN			
<b>EUT:</b>	INFO3.5 CSM MY20			--			--			
<b>EUT Description:</b>	Automotive Infotainment Unit with Bluetooth/WLAN									
<b>EUT Max Frequency:</b>	5825 MHz									
<b>EUT Min Frequency:</b>	5825 MHz									
	MN			SN						
<b>EUT Components</b>	Head Unit			INFO3.5 CSM MY20						
	MN			SN						
<b>Support Equipment</b>	ADB Dev board									
	MN			SN						
<b>Port Label</b>	<b>Port Type</b>	<b># ports</b>	<b># populated</b>	<b>cable type</b>	<b>shielded</b>	<b>ferrites</b>	<b>length (m)</b>	<b>in/out</b>	<b>under test</b>	<b>comment</b>
USB Port	other	1	1	other	Yes	No	1.5	in	yes	
Power/Low speed signal	other	2	2	other	No	No	1	in	yes	
Display	other	1	1	other	Yes	No	1.5	in	yes	
Back up cam	other	1	1	other	Yes	No	2	in	yes	Orange Fakra
External 2.4G wifi	other	1	1	other	Yes	No		in	yes	Beige Fakra
GPS port	other	1	1	other	Yes	No	2	in	yes	Blue fakra Cable
AM/FM Antenna	other	2	2	other	Yes	No	2	in	yes	Black Fakra am and fm, Green FM only
Sdards	other	1	1	other	Yes	No	1.5	in	yes	Yellow Fakra Cable
<b>Software Operating Mode Description:</b>										
EUT placed in required test modes via commands supplied by client.										

### 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 a non-detachable internal PCB trace antenna with 5.05dBi 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	The unit complies with AC line conducted emissions requirements.

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

## Test Results

### Radiated Spurious Emissions

#### LIMITS

[15.407(b)(6)]: Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

[15.407(b)(7)]: The provisions of §15.205 apply to intentional radiators operating under this section.

[15.407(b)(1)]: For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz

[15.407(b)(4)(i)]: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge

RSS-247 Issue 2 Section 6.2.1.2: For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p

RSS-247 Issue 2 Section 6.2.4.2: Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 Bm/MHz at 5 MHz above or below the band edges;

15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

-27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

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

#### MEASUREMENTS / RESULTS

Worst data rate was 802.11a 6Mbps for both UNII 1 and UNII 3. Channels were UNII 1 Low 5180MHz, UNII 1 Mid 5220MHz, UNII 1 High 5240MHz, UNII 3 Low 5745MHz, UNII 3 Mid 5785MHz, UNII 3 High 5825MHz.

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Vertical Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:

Test Engineer - CCH

802.11a 6Mbps unii1 low channel

EUT Maximum Frequency - 5835MHz

Data Taken at Saturday July 27, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
32.118	35.6	-8.4	27.2	40	-12.8	PASS	
646.505	35	-5.8	29.2	46	-16.8	PASS	
690.5	39.5	-5.5	34	46	-12	PASS	
828.624	38.8	-3.1	35.7	46	-10.3	PASS	-10.3
897.652	34.7	-2.1	32.6	46	-13.4	PASS	
966.73	33.8	-0.9	32.9	54	-21.1	PASS	

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:

Test Engineer - CCH

802.11a 6Mbps unii1 low channel

EUT Maximum Frequency - 5835MHz

Data Taken at Saturday July 27, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
759.538	41.6	-4	37.6	46	-8.4	PASS	
777.365	27	-3.7	23.3	46	-22.7	PASS	
784.482	41.1	-3.6	37.5	46	-8.5	PASS	
828.602	42.5	-3.1	39.4	46	-6.6	PASS	-6.6
897.666	37.9	-2.1	35.8	46	-10.2	PASS	
966.716	36	-0.9	35.2	54	-18.8	PASS	





Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Vertical Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii1 Mid channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Saturday July 27, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
30.898	29.5	-7.5	22	40	-18	PASS	
690.491	38.3	-5.5	32.8	46	-13.2	PASS	
759.604	31.5	-4	27.5	46	-18.5	PASS	
828.614	38.2	-3.1	35.1	46	-10.9	PASS	-10.9
897.656	33.2	-2.1	31.2	46	-14.8	PASS	
966.673	34.8	-0.9	33.9	54	-20.1	PASS	

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii1 Mid channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Saturday July 27, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
263.983	29.2	-14.2	14.9	46	-31.1	PASS	
345.251	45.8	-12.4	33.5	46	-12.5	PASS	
759.57	41.8	-4	37.7	46	-8.3	PASS	
828.584	41.9	-3.1	38.9	46	-7.1	PASS	-7.1
897.624	34.8	-2.1	32.7	46	-13.3	PASS	
966.699	34.9	-0.9	34	54	-20	PASS	



Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Vertical Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:

Test Engineer - CCH

802.11a 6Mbps unii1 High channel

EUT Maximum Frequency - 5835MHz

Data Taken at Saturday July 27, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
46.191	35.6	-18.4	17.1	40	-22.9	PASS	
47.29	35.7	-19	16.6	40	-23.4	PASS	
59.176	33.9	-21	12.9	40	-27.1	PASS	
66.091	33	-20.3	12.7	40	-27.3	PASS	
897.609	32.6	-2.1	30.5	46	-15.5	PASS	-15.5
966.686	35.2	-0.9	34.3	54	-19.7	PASS	

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:

Test Engineer - CCH

802.11a 6Mbps unii1 High channel

EUT Maximum Frequency - 5835MHz

Data Taken at Saturday July 27, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
621.458	38.5	-6.6	32	46	-14	PASS	
690.51	37.5	-5.5	32	46	-14	PASS	
759.537	41.7	-4	37.7	46	-8.3	PASS	
828.613	42	-3.1	38.9	46	-7.1	PASS	-7.1
897.656	37	-2.1	34.9	46	-11.1	PASS	
966.708	35.3	-0.9	34.4	54	-19.6	PASS	



Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Vertical Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii3 Low channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Friday July 26, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
32.454	32.6	-5.6	27	40	-13	PASS	
529.189	30.7	-6.3	24.4	46	-21.6	PASS	
536.994	32.2	-6	26.2	46	-19.8	PASS	
552.396	40.6	-5.7	34.9	46	-11.1	PASS	-11.1
951.555	24.8	0.4	25.2	46	-20.8	PASS	
957.563	25	0.5	25.6	46	-20.4	PASS	

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii3 Low channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Friday July 26, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
533.112	34.2	-6.1	28	46	-18	PASS	
535.533	33.6	-6	27.6	46	-18.4	PASS	
537.278	33.8	-6	27.8	46	-18.2	PASS	
552.415	40.5	-5.7	34.9	46	-11.1	PASS	-11.1
759.564	33.2	-2.7	30.5	46	-15.5	PASS	
947.105	24.2	0.3	24.5	46	-21.5	PASS	



Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Vertical Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii3 Mid channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Friday July 26, 2019

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBμV/m)	Lim1: FCC_pt15_2 09 (dBμV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
32.556	34.1	-5.6	28.4	40	-11.6	PASS	
533.038	33.7	-6.1	27.6	46	-18.4	PASS	
536.033	33.2	-6	27.2	46	-18.8	PASS	
552.394	40.7	-5.7	35	46	-11	PASS	-11
759.541	36.2	-2.7	33.5	46	-12.5	PASS	
966.696	32.9	0.5	33.4	54	-20.6	PASS	

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii3 Mid channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Friday July 26, 2019

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBμV/m)	Lim1: FCC_pt15_2 09 (dBμV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
32.806	35.4	-5.8	29.6	40	-10.4	PASS	-10.4
528.496	34.5	-6.3	28.2	46	-17.8	PASS	
534.861	32.4	-6	26.4	46	-19.6	PASS	
537.977	34.4	-6	28.4	46	-17.6	PASS	
552.422	40.3	-5.7	34.6	46	-11.4	PASS	
956.17	26.5	0.5	27	46	-19	PASS	



Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Vertical Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii3 High channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Friday July 26, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
32.8	34.8	-5.8	29	40	-11	PASS	-11
536.4	34	-6	28	46	-18	PASS	
538.441	32.6	-5.9	26.6	46	-19.4	PASS	
552.4	40	-5.7	34.3	46	-11.7	PASS	
759.565	36.7	-2.7	34	46	-12	PASS	
897.682	30.3	-0.7	29.6	46	-16.4	PASS	

Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data

Work Order - T1800  
 EUT Power Input - 13.8V DC  
 Test Site - CH1

Conditions - 24.2°C; 41%RH; 1010mBar

Notes:  
 802.11a 6Mbps unii3 High channel

Test Engineer - CCH  
 EUT Maximum Frequency - 5835MHz

Data Taken at Friday July 26, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
32.769	33.4	-5.8	27.6	40	-12.4	PASS	
528.376	35.1	-6.3	28.7	46	-17.3	PASS	
537.296	34.7	-6	28.6	46	-17.4	PASS	
552.364	37.8	-5.7	32.1	46	-13.9	PASS	
759.571	36.6	-2.7	33.9	46	-12.1	PASS	-12.1
949.188	24.8	0.3	25.2	46	-20.8	PASS	



Rev. 7/24/2019							
<b>Spectrum Analyzers / Receivers /Preselectors</b>							
	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/21/2019
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	5/30/2020
<b>Radiated Emissions Sites</b>							
	<b>FCC Code</b>	<b>IC Code</b>	<b>VCCI Code</b>	<b>Range</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/7/2020
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/7/2020
<b>Preamps/Couplers Attenuators / Filters</b>							
	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
2311 PA	1-1000MHz	PAM-103	COM-POWER	441174	2311	II	10/29/2019
185710 Rental PA	9KHz-1GHz	310	SONOMA INSTRUMENT	185710		II	4/16/2020
<b>Antennas</b>							
	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	4/26/2021
Red-Brown Bilog	30-2000MHz	JB1	Sunol	A0032406	1218	I	3/11/2021
<b>Meteorological Meters/Chambers</b>							
		<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
Asset #2659		1235C97	Control Company	181683830	2659	I	4/3/2020
Asset #2660		1235C97	Control Company	181659682	2660	I	4/3/2020
<b>Cables</b>							
	<b>Range</b>		<b>Mfr</b>			<b>Cat</b>	<b>Calibration Due</b>
Asset #2456	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2464	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2465	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2466	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2585	9KHz-18GHz		Pasternack			II	5/24/2020
Asset #2606	9KHz-18GHz		MegaPhase			II	4/2/2020

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

TEU



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



## Measurement Uncertainty

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

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz)		
NIST	5.6dB	N/A
CISPR	4.6dB	5.2dB (Ucisp)
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)	$3.23 \times 10^{-8}$	$1 \times 10^{-7}$
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4%	5%
Adjacent channel power	0.3dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	1.9dB	3dB
Conducted emission of receivers	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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