



Test Report

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

Report No	ES3054-1
Client	Ideal Industries, Inc.
Address	Becker Place Sycamore, IL 60178
Phone	(815) 895-1295
Items tested	SRC2100
FCC ID	2AAMXSRC2100
IC	11250A-SRC2100
FRN	0002862225
Equipment Type	Digital Transmission System
Equipment Code	DTS
Emission Designator	753KG1D
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	October 23-24, 2018 and November 2, 2018
Results	As detailed within this report
Prepared by	 Christopher Bramley – Test Engineer
Authorized by	 Yunus Faziloglu – Sr. Engineer
Issue Date	1/18/2019
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 40 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)



Summary

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

The product is the SRC2100. It is a digitally modulated transmitter that operates in the 902.7 – 927.3MHz frequency range.

Antenna: Non-detachable PCB trace with 3.0dBi gain.

We found that the product met the above requirements without modification. 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 15.247, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 558074 D01 15.247 Measurement Guidance v05 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around three orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity. X orientation was found to be the worst and all radiated emissions tests were performed in this orientation. AC line conducted emissions testing was performed with a 50 Ω /50 μ H LISN. The EUT operating voltage was 120/277VAC at 60Hz.

RF measurements were performed at the antenna port on 3 channels as follows:

Low channel = 902.7MHz

Mid channel = 915MHz

High channel = 927.3MHz

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

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

Product Tested - Configuration Documentation

EUT Configuration										
Work Order:	S3054									
Company:	Ideal Industries									
Company Address:	Becker Place									
	Sycamore, IL 60178									
Contact:	Tim Tunnell									
	MN							SN		
EUT:	SRC2100							Sample 1		
EUT Description:	Single Room Controller									
EUT Tx Frequency:	902.7-927.3MHz									
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
AC Mains	Power AC	1	1	Power AC	No	No	1.5	in	yes	
Load	other	1	1	other	No	No	0.1	in	yes	Power output from Single Room Controller to AC Lighting Load
Dim	other	1	1	other	No	No	0.2	in	yes	0-10Vdc Dimming control
Software Operating Mode Description:										
The EUT was set to transmit at Low (902.7MHz), Mid (915MHz), and High (927.3MHz) channels.										

Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.4			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.
	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	The antenna for this device is non-detachable PCB trace with 3.0dBi 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	EUT meets the AC Line conducted emissions requirements of this section.
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.7				Occupied Bandwidth measurements were made.

Test Results**6dB Bandwidth****LIMIT**

The minimum 6 dB bandwidth shall be at least 500 kHz. [15.247(a) (2)]

MEASUREMENTS / RESULTS

6dB Bandwidth						
Date: 02-Nov-18		Company: Ideal Industries, Inc.		Work Order: S3054		
Engineer: Chris Bramley		EUT: SRC2100		Operating Voltage/Frequency: 120V/60Hz		
Temp: 23.1°C		Humidity: 49%		Pressure: 998mBar		
Frequency Range: 900-930MHz			Measurement Type: Conducted			
			Measurement Method: FCC 558074 D01 DTS Meas Guidance v05			
Notes:						
Frequency (MHz)			Reading (kHz)	6dB Bandwidth		
				Limit (kHz)	Margin (kHz)	Result (Pass/Fail)
902.7			651.8	≥500	152	Pass
915			652.9	≥500	153	Pass
927.3			653.5	≥500	154	Pass
Test Site: CEMI-3		Cable: Asset 2289		40dB Attenuator: Asset 2096		
Analyzer: EXA 1118473		Copyright Curtis-Straus LLC 2000				

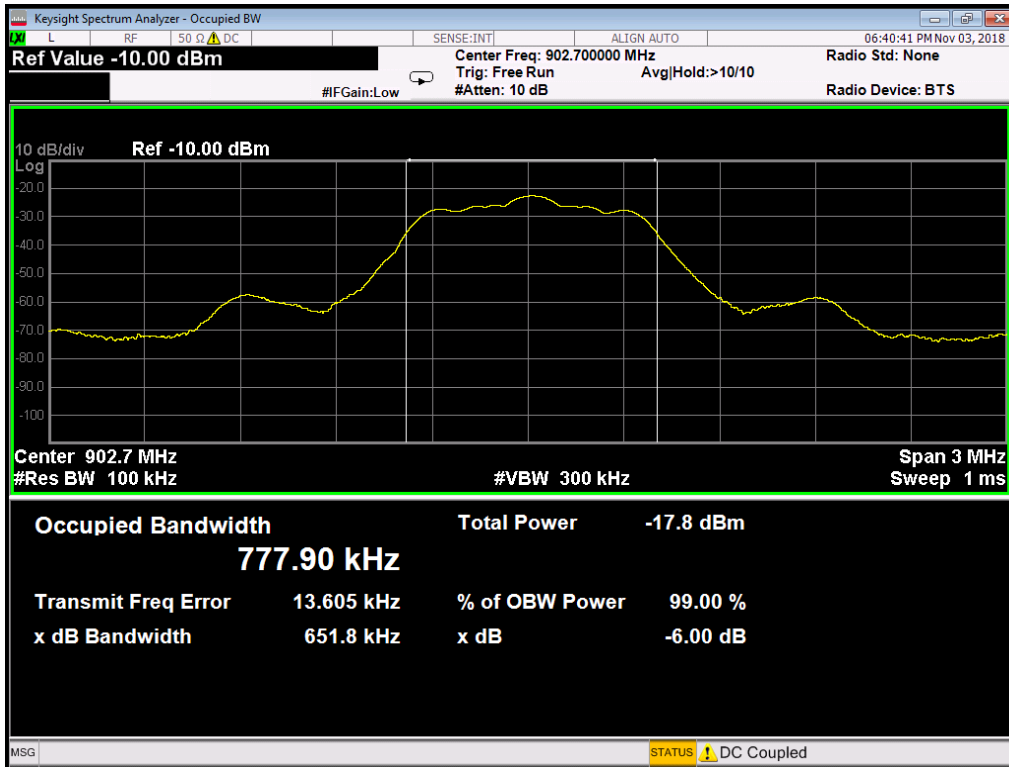
Rev. 10/31/2018

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	6/19/2019	6/19/2018
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 3	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
TH A#2078		HTC-1	HDE		2078	II	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/29/2019	1/29/2018
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
40dB 100W Attenuator	0.009-4000MHz	BW-40N100W+	Mini-Circuits	V N383401508	2096	II	10/9/2019	10/9/2018

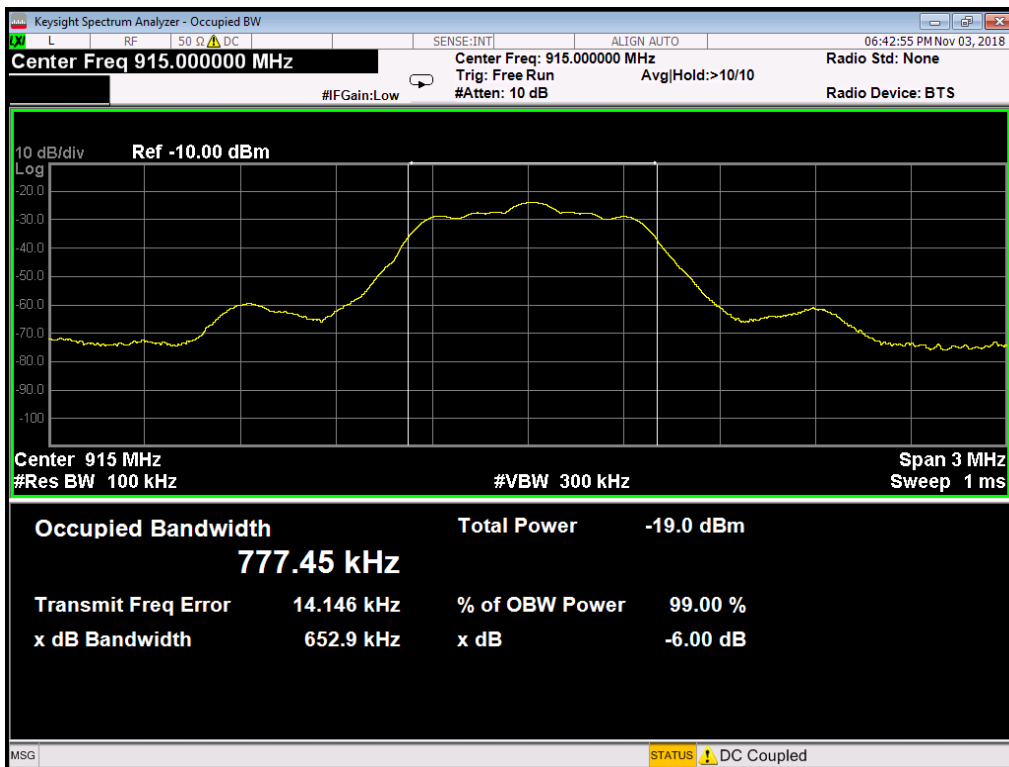
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



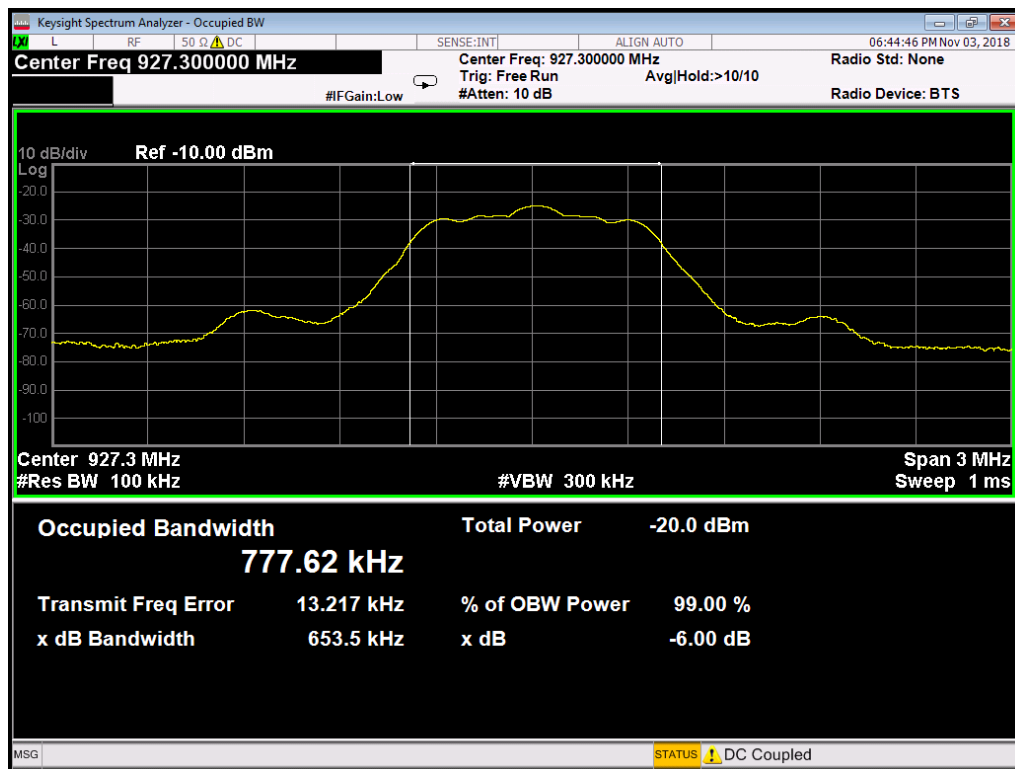
PLOT(S)



6dB Bandwidth – Low Channel



6dB Bandwidth – Mid Channel



6dB Bandwidth – High Channel

Output Power**LIMIT**

Conducted Output Power

1 Watt

[15.247(b) (3)]

Per ANSI C63.10 – 2013 Section 11.9.2.2.2 Method AVGSA-1

MEASUREMENTS / RESULTS

Peak Output Power								
Date: 02-Nov-18			Company: Ideal Industries, Inc.				Work Order: S3054	
Engineer: Chris Bramley			EUT: SRC2100				Operating Voltage/Frequency: 120V/60Hz	
Temp: 23.1°C			Humidity: 49%		Pressure: 998mBar			
Frequency Range: 900-930MHz					Measurement Type: Conducted			
Measurement Method: FCC 558074 D01 DTS Meas Guidance v05								
Notes: Average Method Used - 8.3.2.2 Method AVGSA-1								
Frequency		Peak Reading	Cable Loss	Attenuator Loss	Peak Output Power	Average Limit	Margin	Result
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(Pass/Fail)
902.7		-22.96	0.17	38.50	15.71	30	-14.29	Pass
915.0		-24.25	0.17	38.50	14.42	30	-15.58	Pass
927.3		-25.20	0.17	38.50	13.47	30	-16.53	Pass
Test Site: CEMI-3			Cable: Asset 2289		40dB Attenuator: Asset 2096			
Analyzer: EXA 1118473								
Peak Output Power (dBm)= Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)								
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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	6/19/2019	6/19/2018
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 3	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
TH A#2078		HTC-1	HDE		2078	II	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/29/2019	1/29/2018
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
40dB 100W Attenuator	0.009-4000MHz	BW-40N100W+	Mini-Circuits	V N383401508	2096	II	10/9/2019	10/9/2018

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



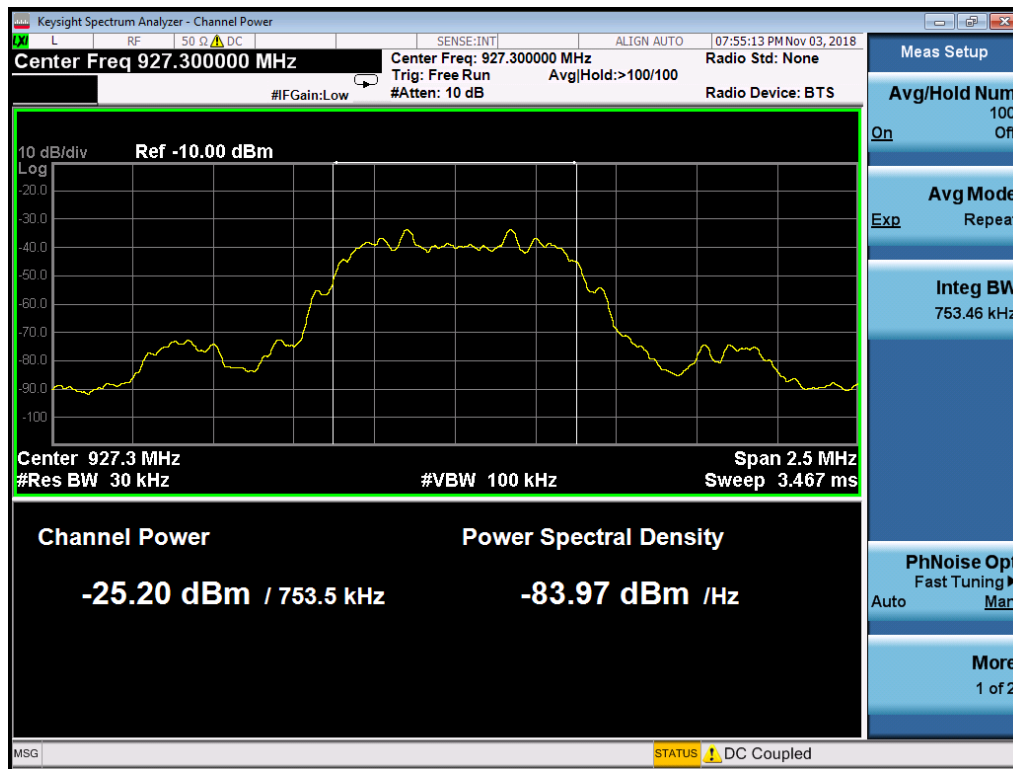
PLOTS



Channel Power – Low Channel



Channel Power – Mid Channel



Channel Power – High Channel

Band Edge (Conducted)

Band Edge readings must be more than 30dB below the value of the fundamental.

MEASUREMENTS / RESULTS

Conducted Bandedge				
Date: 02-Nov-18		Company: Ideal Industries, Inc.		Work Order: S3054
Engineer: Chris Bramley		EUT: SRC2100		Operating Voltage/Frequency: 120V/60Hz
Temp: 23.1°C		Humidity: 49%	Pressure: 998mBar	
Frequency Range: 902-928 MHz			Measurement Type: Conducted	
Notes:				
		Bandedge Delta (dB)	Limit	Result
			(dB)	(Pass/Fail)
902.7MHz	Low Bandedge	36.0	≥ 30	Pass
927.3MHz	High Bandedge	37.5	≥ 30	Pass
Test Site: CEMI-3		Cable: Asset 2289	40dB Attenuator: Asset 2096	
Analyzer: EXA 1118473		Copyright Curtis-Straus LLC 2000		

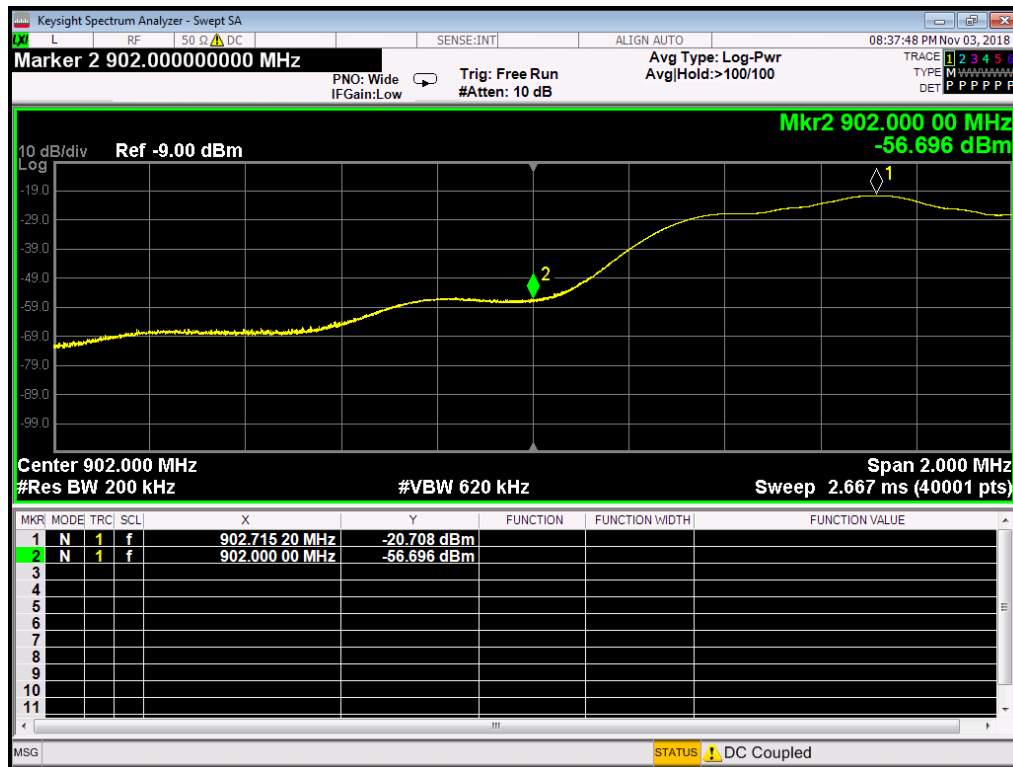
Rev. 10/31/2018

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	6/19/2019	6/19/2018
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 3	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
TH A#2078		HTC-1	HDE		2078	II	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/29/2019	1/29/2018
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
40dB 100W Attenuator	0.009-4000MHz	BW-40N100W+	Mini-Circuits	V N383401508	2096	II	10/9/2019	10/9/2018

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



PLOTS



Low Band Edge



High Band Edge

Radiated Spurious Emissions

LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

[15.247(d)]

MEASUREMENTS / RESULTS**Digital Modulation, 40Kbps for all channels**

Curtis Straus - a Bureau Veritas Company Work Order - S3054
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 120V 60Hz
 Top Peaks Vertical 30-1000MHz Test Site - CH2
 Operator: CCH² Conditions - 23.4°C; 35%RH; 1002mBar
 Notes: Witnessed by - N/A
 902MHz Low channel EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

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)
30.073	29.4	-7.6	21.8	40	-18.2	PASS	
210.105	40.2	-18.1	22	43.5	-21.5	PASS	
216.652	39.6	-17.7	21.9	46	-24.1	PASS	
218.18	39.5	-17.6	21.9	46	-24.1	PASS	
219.853	39.4	-17.5	21.9	46	-24.1	PASS	
759.052	32.7	-3.4	29.4	46	-16.6	PASS	-16.6

Curtis Straus - a Bureau Veritas Company Work Order - S3054
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 120V 60Hz
 Top Peaks Horizontal 30-1000MHz Test Site - CH2
 Operator: CCH² Conditions - 23.4°C; 35%RH; 1002mBar
 Notes: Witnessed by - N/A
 902MHz Low channel EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

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)
366.008	35.8	-13	22.8	46	-23.2	PASS	
370.931	35.8	-12.9	22.9	46	-23.1	PASS	
372.483	36.5	-12.9	23.6	46	-22.4	PASS	
374.083	36.8	-12.9	23.9	46	-22.1	PASS	
375.732	36.9	-12.9	24.1	46	-21.9	PASS	
813.93	31.4	-2.4	29	46	-17	PASS	-17

Curtis Straus - a Bureau Veritas Company Work Order - S3054
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 120V 60Hz
 Top Peaks Vertical 30-1000MHz Test Site - CH2
 Operator: CCH Conditions - 23.4°C; 35%RH; 1002mBar
 Notes: Witnessed by - N/A
 915MHz mid channel EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

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)
206.807	39.2	-17.6	21.6	43.5	-21.9	PASS	
208.456	39.8	-17.9	21.9	43.5	-21.6	PASS	
216.749	39.6	-17.7	21.9	46	-24.1	PASS	
218.326	39.9	-17.6	22.3	46	-23.7	PASS	
219.926	40	-17.5	22.5	46	-23.5	PASS	
797.876	31.8	-2.7	29.1	46	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company Work Order - S3054
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 120V 60Hz
 Top Peaks Horizontal 30-1000MHz Test Site - CH2
 Operator: CCH Conditions - 23.4°C; 35%RH; 1002mBar
 Notes: Witnessed by - N/A
 915MHz mid channel EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

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)
372.701	37.2	-12.9	24.3	46	-21.7	PASS	
374.253	37.6	-12.9	24.7	46	-21.3	PASS	
375.902	38.2	-12.9	25.3	46	-20.7	PASS	
377.527	36.1	-12.8	23.3	46	-22.7	PASS	
379.976	35.8	-12.7	23.1	46	-22.9	PASS	
778.622	31.8	-2.7	29.1	46	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company Work Order - S3054
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 120V 60Hz
 Top Peaks Vertical 30-1000MHz Test Site - CH2
 Operator: CCH² Conditions - 23.4°C; 35%RH; 1002mBar
 Notes: Witnessed by - N/A
 927MHz high channel EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

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)
214.979	40.4	-17.8	22.5	43.5	-21	PASS	
216.604	39.9	-17.7	22.1	46	-23.9	PASS	
218.131	39.5	-17.6	21.9	46	-24.1	PASS	
219.15	39.7	-17.6	22.2	46	-23.8	PASS	
220.702	39.1	-17.5	21.6	46	-24.4	PASS	
799.186	31.8	-2.7	29.1	46	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company Work Order - S3054
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 120V 60Hz
 Top Peaks Horizontal 30-1000MHz Test Site - CH2
 Operator: CCH² Conditions - 23.4°C; 35%RH; 1002mBar
 Notes: Witnessed by - N/A
 927MHz high channel EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

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)
366.517	35.7	-13	22.7	46	-23.3	PASS	
369.743	35.7	-12.9	22.8	46	-23.2	PASS	
373.016	36.9	-12.9	24	46	-22	PASS	
374.908	35.6	-12.9	22.7	46	-23.3	PASS	
376.217	36	-12.9	23.1	46	-22.9	PASS	
781.071	31.8	-2.6	29.1	46	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company

Radiated Emissions Electric Field 3m Distance

1-6GHz Vertical Data

Operator: CCH

Notes:

902MHz Low channel

Work Order - S3054

EUT Power Input - 120V 60Hz

Test Site - CH2

Conditions - 23.4°C; 35%RH; 1002mBar

Witnessed by - N/A

EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
3227.6	41.2	32.6	2.1	43.4	74	-30.6	PASS		34.7	54	-19.3	PASS	
4221	39.6	31.2	3.3	42.9	74	-31.1	PASS		34.6	54	-19.4	PASS	
5762.6	40.3	30.9	6.3	46.6	74	-27.4	PASS	-27.4	37.2	54	-16.8	PASS	-16.8

Curtis Straus - a Bureau Veritas Company

Radiated Emissions Electric Field 3m Distance

1-6GHz Horizontal Data

Operator: CCH

Notes:

902MHz Low channel

Work Order - S3054

EUT Power Input - 120V 60Hz

Test Site - CH2

Conditions - 23.4°C; 35%RH; 1002mBar

Witnessed by - N/A

EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
3519.5	41.6	32.6	2.7	44.3	74	-29.7	PASS		35.3	54	-18.7	PASS	
5930	39.5	30.8	6.8	46.4	74	-27.6	PASS	-27.6	37.6	54	-16.4	PASS	-16.4

Curtis Straus - a Bureau Veritas Company

Radiated Emissions Electric Field 3m Distance

1-6GHz Vertical Data

Operator: CCH

Notes:

915MHz mid channel

Work Order - S3054

EUT Power Input - 120V 60Hz

Test Site - CH2

Conditions - 23.4°C; 35%RH; 1002mBar

Witnessed by - N/A

EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
3525.4	42.2	32.7	2.6	44.8	74	-29.2	PASS		35.3	54	-18.7	PASS	
5907.9	39.5	30.9	6.8	46.4	74	-27.6	PASS	-27.6	37.7	54	-16.3	PASS	-16.3

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Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 915MHz mid channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
3471.4	42.3	32.6	2.3	44.6	74	-29.4	PASS		34.9	54	-19.1	PASS	
4229.9	40.9	31.3	3.3	44.2	74	-29.8	PASS		34.5	54	-19.5	PASS	
5885.6	38.5	30.8	6.7	45.2	74	-28.8	PASS	-28.8	37.6	54	-16.4	PASS	-16.4

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Vertical Data
 Operator: CCH
 Notes:
 927MHz high channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1204	40.1	32.3	-4.2	35.9	74	-38.1	PASS		28.1	54	-25.9	PASS	
3558.9	42.9	32.6	2.4	45.3	74	-28.7	PASS		35	54	-19	PASS	
5874.9	40.4	30.8	6.7	47.1	74	-26.9	PASS	-26.9	37.5	54	-16.5	PASS	-16.5

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 927MHz high channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
3477.4	42.6	32.6	2.4	45	74	-29	PASS		35	54	-19	PASS	
4207.7	39.7	31.3	3.4	43.1	74	-30.9	PASS		34.7	54	-19.3	PASS	
5675.3	39.2	30.8	5.9	45	74	-29	PASS	-29	36.7	54	-17.3	PASS	-17.3



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Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 902MHz Low channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
8710.2	37.9	30	14.1	52	83.5	-31.5	PASS		44.1	63.5	-19.4	PASS	
9942	39.4	30.3	16.3	55.7	83.5	-27.8	PASS	-27.8	46.7	63.5	-16.8	PASS	-16.8

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 902MHz Low channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
8688.4	38.2	30.1	14	52.3	83.5	-31.2	PASS		44.1	63.5	-19.4	PASS	
9964	40.1	30.4	16.2	56.3	83.5	-27.2	PASS	-27.2	46.6	63.5	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 915MHz mid channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
6536.6	39.2	30.3	12.6	51.8	83.5	-31.7	PASS		42.9	63.5	-20.6	PASS	
9989.5	40.3	30.6	16	56.3	83.5	-27.2	PASS	-27.2	46.6	63.5	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 915MHz mid channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
9728	38.4	30	16.2	54.6	83.5	-28.9	PASS	-28.9	46.2	63.5	-17.3	PASS	-17.3

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 927MHz high channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
9959.5	39.5	30.4	16.2	55.8	83.5	-27.7	PASS	-27.7	46.6	63.5	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 927MHz high channel

Work Order - S3054
 EUT Power Input - 120V 60Hz
 Test Site - CH2
 Conditions - 23.4°C; 35%RH; 1002mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 927MHz

Data Taken at October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_2 09_Average (dBμV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
8731.6	38.9	29.9	14	53	83.5	-30.5	PASS		44	63.5	-19.5	PASS	
9917.3	38.6	30.2	16.5	55.1	83.5	-28.4	PASS	-28.4	46.6	63.5	-16.9	PASS	-16.9

Rev. 10/23/2018

Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2093 MXE EMI Receiver		20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/16/2018	11/16/2017
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	12/21/2018	12/21/2016
EMI Chamber 2		719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018	12/21/2016
Preamps / Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2310 PA		1-1000MHz	PAM-103	COM-POWER	441175	2310	II	10/29/2018	10/29/2017
2111 HF Preamp		0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	11/19/2018	11/19/2017
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Brown Bilog		30-2000MHz	JB1	Sunol	A0032406	1218	I	1/13/2019	1/13/2017
Blue Horn		1-18Ghz	3117	ETS	157647	1861	I	2/14/2019	2/14/2017
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
TH A#2082			HTC-1	HDE		2082	II	3/22/2019	3/22/2018
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2051		9kHz - 18GHz		Florida RF			II	3/7/2019	3/7/2018
Asset #2054		9kHz - 18GHz		Florida RF			II	10/31/2018	10/31/2017
Asset #2464		9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017

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

Test Equipment Used



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Conducted Spurious Emissions

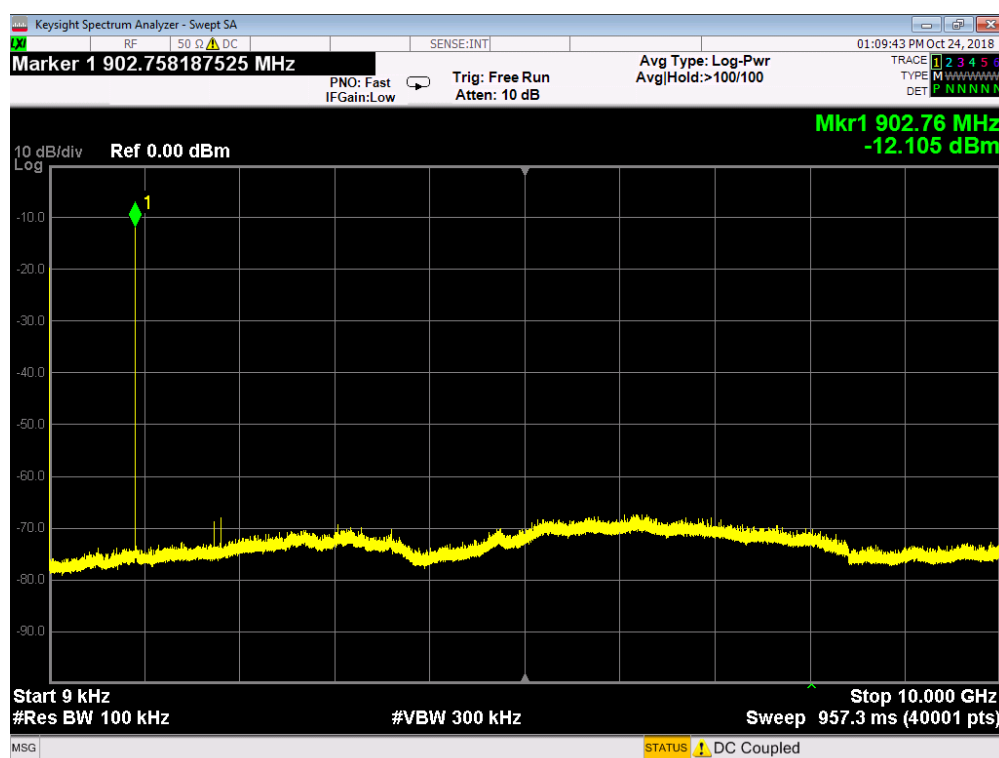
LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth that contains the highest level of desired power based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB ...

[15.247(d)]

Conducted spurious emissions at the antenna port were measured in accordance with ANSI C63.10-2013 Section 11.11.

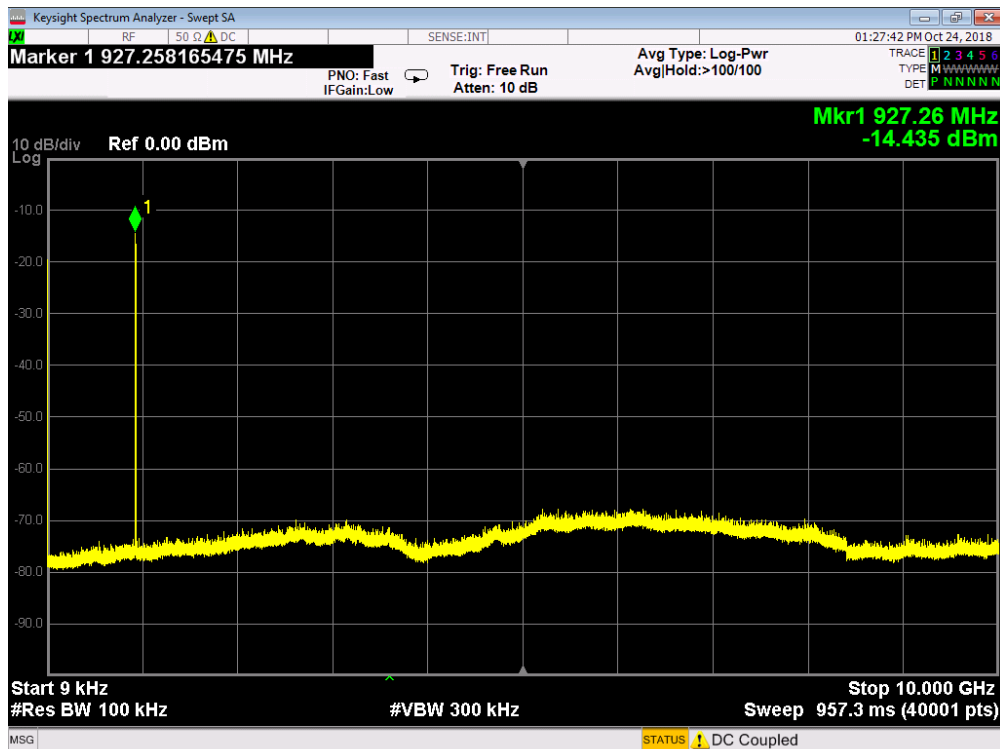
Frequency range up to 10GHz was investigated for all 3 channels (low, middle and high) at the EUT antenna port. No emissions within 30dB of their corresponding fundamental were found.



Low Channel



Mid Channel



High Channel

Rev. 10/22/2018

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	8/10/2019	8/10/2018
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/23/2019	3/23/2018
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
TH A#2084		HTC-1	HDE		2084	II	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021039		II	1/29/2019	1/29/2018

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



Power Spectral Density

LIMIT

...the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

[15.247(e)]

MEASUREMENTS / RESULTS

Peak Power Spectral Density								
Date: 02-Nov-18			Company: Ideal Industries, Inc.			Work Order: S3054		
Engineer: Chris Bramley			EUT: SRC2100			Operating Voltage/Frequency: 120V/60Hz		
Temp: 23.1°C			Humidity: 49%		Pressure: 998mBar			
Frequency Range: 900-930MHz			Measurement Type: Conducted					
Measurement Method: FCC 558074 D01 DTS Meas Guidance v05								
Notes: Average Method Used - 8.4 Method AVGPSPD-1								
Frequency		Peak Reading	Cable Loss	Attenuator Loss	Peak PSD	Average Limit	Margin	Result
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
902.7		-32.94	0.17	38.5	5.73	8.0	-2.27	Pass
915.0		-33.98	0.17	38.5	4.69	8.0	-3.31	Pass
927.3		-35.25	0.17	38.5	3.42	8.0	-4.58	Pass
Test Site: CEMI-3			Cable: Asset 2289		40dB Attenuator: Asset 2096			
Analyzer: EXA 1118473			Copyright Curtis-Straus LLC 2000					
PSD(dBm) = Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dBm)								

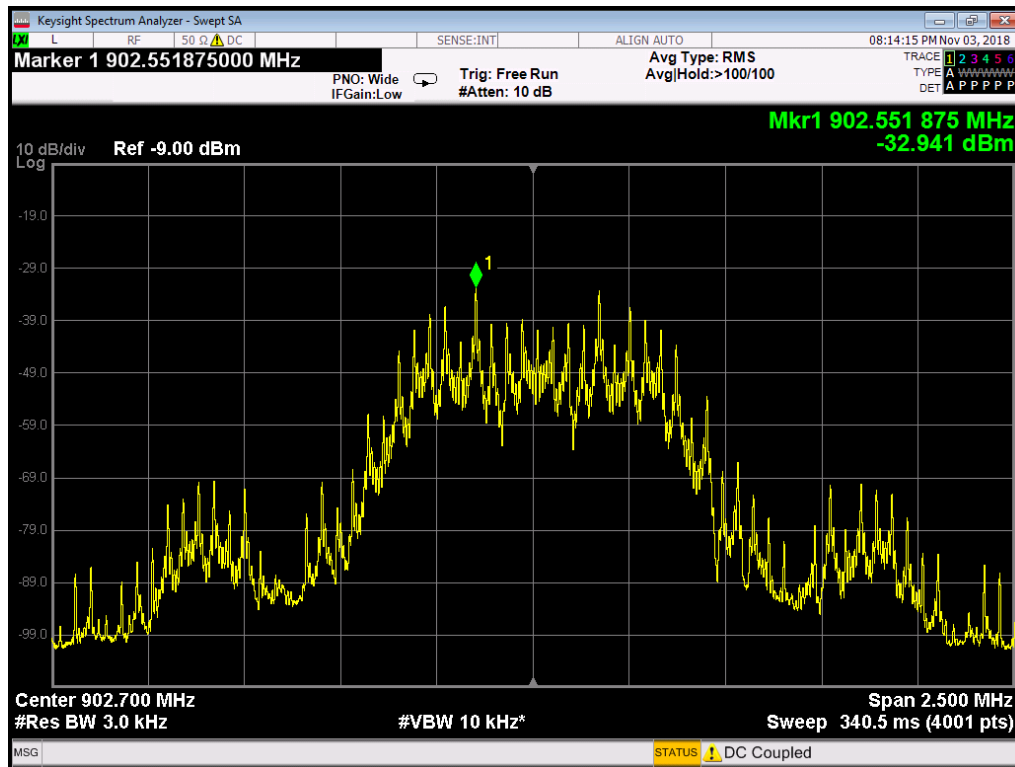
Rev. 10/31/2018

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	6/19/2019	6/19/2018
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 3	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
TH A#2078		HTC-1	HDE		2078	II	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/29/2019	1/29/2018
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
40dB 100W Attenuator	0.009-4000MHz	BW-40N100W+	Mini-Circuits	V N383401508	2096	II	10/9/2019	10/9/2018

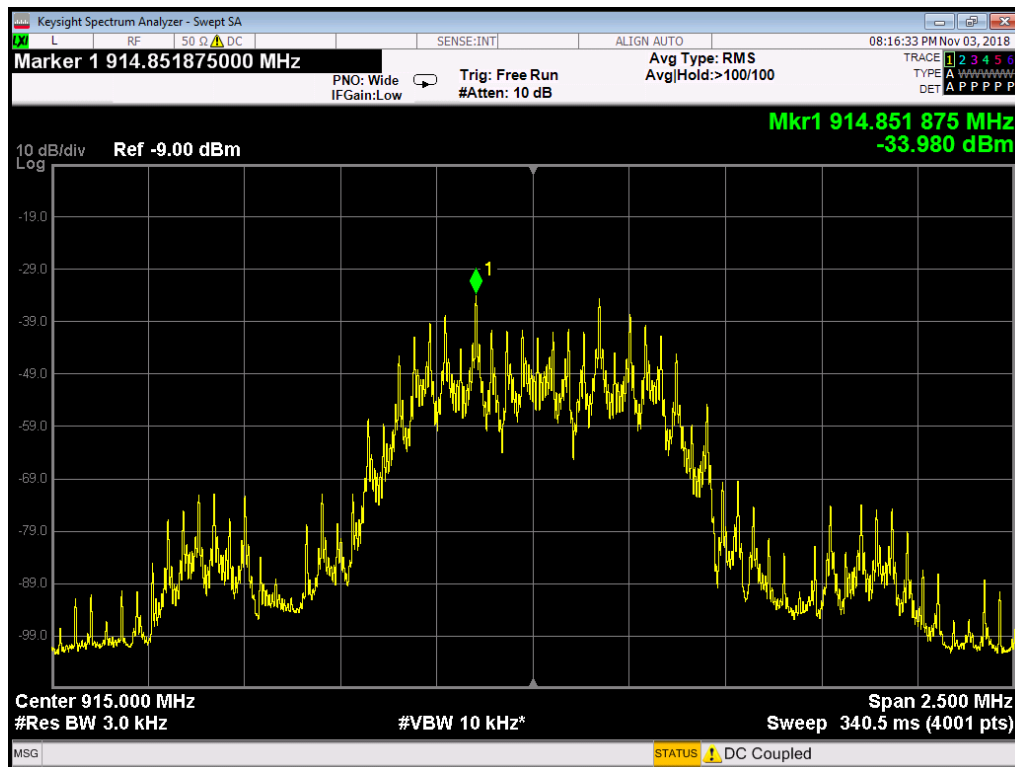
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



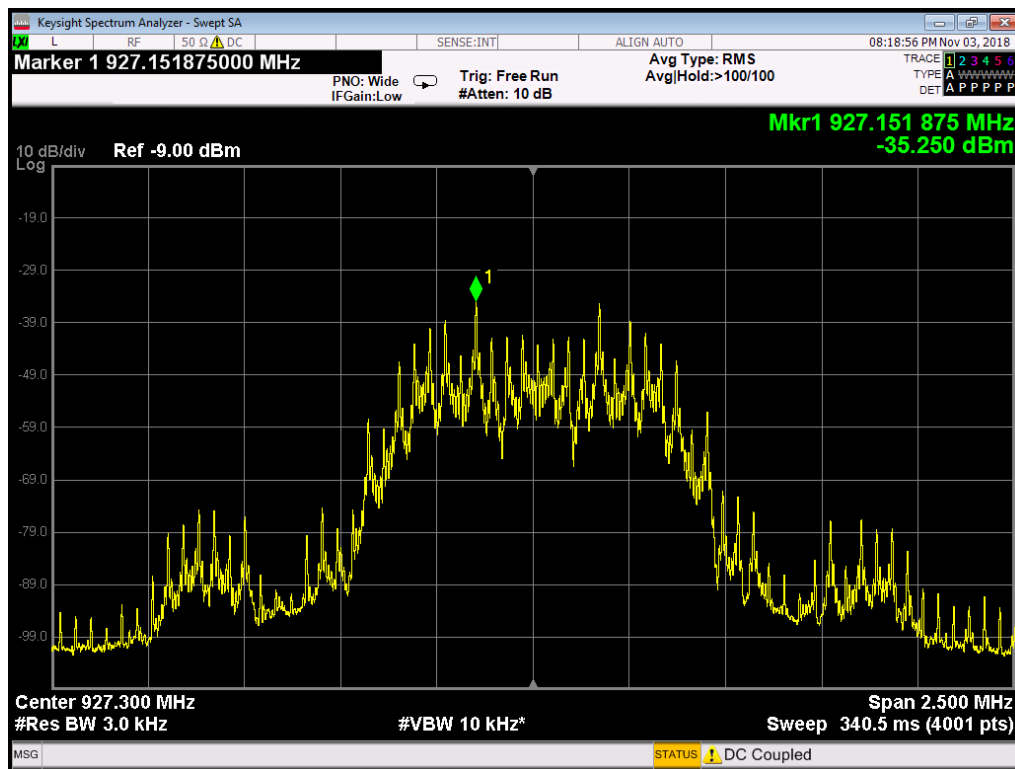
PLOTS



PSD – Low Channel



PSD – Mid Channel



PSD – High Channel

AC Line Conducted Emissions**LIMITS**

Frequency of emission (MHz)	Quasi-peak limit (dB μ V)	Average limit (dB μ V)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company

Conducted Emissions per CISPR 16-2-1

Quasi-peak Detector Data

Notes:

EUT Line tested: 120VAC/60Hz; Phase

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 120VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 05:53:01 PM, Friday, November 02, 2018

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB)	Adjusted QP Amplitude (dBμV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to QP Limit (dB)	QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.513	32.144	18.7	50.9	56	-5.1	PASS	-5.1
0.598	30.47	18.7	49.2	56	-6.8	PASS	
0.854	30.484	18.7	49.2	56	-6.8	PASS	
1.707	29.573	18.8	48.3	56	-7.7	PASS	
1.962	29.627	18.8	48.4	56	-7.6	PASS	
2.046	29.131	18.8	47.9	56	-8.1	PASS	

Curtis Straus - a Bureau Veritas Company

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

Quick Average Detector Data

Notes:

EUT Line tested: 120VAC/60Hz; Phase

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 120VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 05:49:42 PM, Friday, November 02, 2018

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)
0.858	19.5	18.7	38.1	46	-7.9	PASS	-7.9
0.941	19.3	18.7	37.9	46	-8.1	PASS	
1.284	18.9	18.7	37.6	46	-8.4	PASS	
1.542	17.7	18.8	36.5	46	-9.5	PASS	
1.634	18	18.8	36.7	46	-9.3	PASS	
1.972	17.4	18.8	36.2	46	-9.8	PASS	

120V 60Hz Line

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Curtis Straus - a Bureau Veritas Company

Conducted Emissions per CISPR 16-2-1

Quasi-peak Detector Data

Notes:

EUT Line tested: 120VAC/60Hz; Neutral

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 120VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 05:42:53 PM, Friday, November 02, 2018

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB)	Adjusted QP Amplitude (dBμV)	QP Lim: Mains_FCC&CISPR R_QP_Class_B (dBμV)	Margin to QP Limit (dB)	QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.793	18.933	18.7	37.6	56	-18.4	PASS	-18.4
1.146	11.11	18.7	29.8	56	-26.2	PASS	
1.957	11.551	18.8	30.3	56	-25.7	PASS	
2.218	5.806	18.8	24.6	56	-31.4	PASS	
2.325	10.82	18.8	29.6	56	-26.4	PASS	
2.395	12.386	18.8	31.2	56	-24.8	PASS	

Curtis Straus - a Bureau Veritas Company

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

Quick Average Detector Data

Notes:

EUT Line tested: 120VAC/60Hz; Neutral

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 120VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 05:39:21 PM, Friday, November 02, 2018

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC&CISPR R_Avg_Class_B (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.155	31	18.8	49.8	55.7	-5.9	PASS	
0.524	20.8	18.7	39.5	46	-6.5	PASS	
0.887	22.3	18.7	41	46	-5	PASS	-5
1.227	21.8	18.7	40.5	46	-5.5	PASS	
1.314	21.2	18.7	39.9	46	-6.1	PASS	
1.578	21.2	18.8	40	46	-6	PASS	

120V 60Hz Neutral

Curtis Straus - a Bureau Veritas Company

Conducted Emissions per CISPR 16-2-1

Quasi-peak Detector Data

Notes:

EUT Line tested: 277VAC/60Hz; Phase

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 277VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 07:27:34 PM, Tuesday, November 20, 2018

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB)	Adjusted QP Amplitude (dBμV)	QP Lim: Mains_FCC&CISPR_QP_Class_A (dBμV)	Margin to QP Limit (dB)	QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.581	34.612	18.7	53.3	73	-19.7	PASS	
0.997	34.625	18.7	53.3	73	-19.7	PASS	
1.079	36.88	18.7	55.6	73	-17.4	PASS	-17.4
1.328	34.039	18.7	52.7	73	-20.3	PASS	
1.822	35.217	18.8	54	73	-19	PASS	
1.911	30.093	18.8	48.9	73	-24.1	PASS	
1.989	34.574	18.8	53.3	73	-19.7	PASS	
2.08	22.239	18.8	41	73	-32	PASS	
2.581	17.975	18.8	36.8	73	-36.2	PASS	
2.65	33.28	18.8	52.1	73	-20.9	PASS	
2.874	21.085	18.8	39.9	73	-33.1	PASS	
3.544	29.848	18.8	48.7	73	-24.3	PASS	
3.637	32.248	18.8	51.1	73	-21.9	PASS	

Curtis Straus - a Bureau Veritas Company

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

Quick Average Detector Data

Notes:

EUT Line tested: 277VAC/60Hz; Phase

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 277VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 07:27:34 PM, Tuesday, November 20, 2018

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC&CISPR_Avg_Class_A (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.153	35.7	18.8	54.5	66	-11.5	PASS	-11.5
1.003	23.7	18.7	42.4	60	-17.6	PASS	
1.084	24.4	18.7	43.1	60	-16.9	PASS	
1.165	23.8	18.7	42.4	60	-17.6	PASS	
1.25	25	18.7	43.7	60	-16.3	PASS	
1.832	23.5	18.8	42.3	60	-17.7	PASS	

277V 60Hz Line

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Curtis Straus - a Bureau Veritas Company

Conducted Emissions per CISPR 16-2-1

Quasi-peak Detector Data

Notes:

EUT Line tested: 277VAC/60Hz; Neutral

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 277VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 07:32:26 PM, Tuesday, November 20, 2018

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB)	Adjusted QP Amplitude (dBμV)	QP Lim: Mains_FCC&CISP R_QP_Class_A (dBμV)	Margin to QP Limit (dB)	QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.494	35.956	18.7	54.7	79	-24.3	PASS	
0.575	35.433	18.7	54.2	73	-18.8	PASS	
0.988	34.098	18.7	52.8	73	-20.2	PASS	
1.069	36.937	18.7	55.6	73	-17.4	PASS	
1.233	37.65	18.7	56.3	73	-16.7	PASS	-16.7
1.316	36.053	18.7	54.7	73	-18.3	PASS	
2.795	34.445	18.8	53.3	73	-19.7	PASS	
3.535	33.238	18.8	52.1	73	-20.9	PASS	

Curtis Straus - a Bureau Veritas Company

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

Quick Average Detector Data

Notes:

EUT Line tested: 277VAC/60Hz; Neutral

EUT Mode of Operation: Tx on Low Channel (902.7MHz)

Work Order # - S3054

EUT Power Input - 277VAC/ 60Hz

Test Site - CEMI-3

Conditions: - 22.9°C; 51%RH; 998mBar

Test Engineer - Chris Bramley

Witnessed by - N/A

Data Taken at 07:32:25 PM, Tuesday, November 20, 2018

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC&CISP R_Avg_Class_A (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.151	33.1	18.8	51.9	66	-14.1	PASS	-14.1
1.069	25.6	18.7	44.3	60	-15.7	PASS	
1.151	25.8	18.7	44.4	60	-15.6	PASS	
1.23	24.4	18.7	43.1	60	-16.9	PASS	
1.315	24.8	18.7	43.5	60	-16.5	PASS	
1.973	23.7	18.8	42.5	60	-17.5	PASS	

277V 60Hz Neutral

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Rev. 10/31/2018

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	6/19/2019	6/19/2018
LISNs/Measurement Probes		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
LISN Asset 1728		150kHz-30MHz	LI-150A	Com-Power	201084	1728	I	5/16/2019	5/16/2018
LISN Asset 1729		150kHz-30MHz	LI-150A	Com-Power	201085	1729	I	5/16/2019	5/16/2018
Conducted Test Sites (Mains / Telco)		FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 3		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
TH A#2078			HTC-1	HDE		2078	II	3/22/2019	3/22/2018
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
CEMI-02		9kHz - 2GHz		Pasternack			II	7/31/2019	7/31/2018
Attenuators		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20dB Attenuator-60		9kHz-2GHz			N/A		II	9/29/2019	9/29/2018

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

TEU

Occupied Bandwidth

REQUIREMENT

When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is its 99% emission bandwidth, as calculated or measured.

[RSS-GEN Issue 5 Section 6.7]

MEASUREMENTS / RESULTS

99% Occupied Bandwidth									
Date: 02-Nov-18			Company: Ideal Industries, Inc.				Work Order: S3054		
Engineer: Chris Bramley			EUT: SRC2100				Operating Voltage/Frequency: 120V/60Hz		
Temp: 23.1°C			Humidity: 49%		Pressure: 998mBar				
Frequency Range: 900-930MHz					Measurement Type: Conducted				
					Measurement Method: FCC 558074 D01 DTS Meas Guidance v05				
Notes:									
Frequency (MHz)								99% OBW (kHz)	
902.7								753.15	
915								752.45	
927.3								753.46	
Test Site: CEMI-3			Cable: Asset 2289		40dB Attenuator: Asset 2096				
Analyzer: EXA 1118473			Copyright Curtis-Straus LLC 2000						

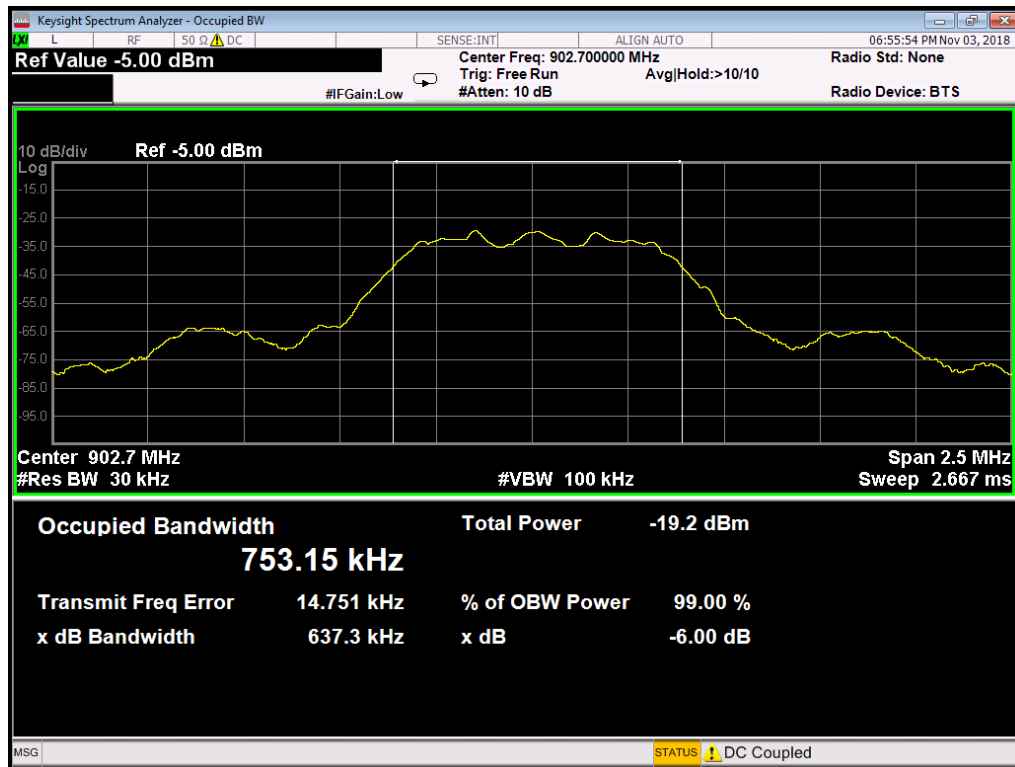
Rev. 10/31/2018

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	6/19/2019	6/19/2018
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 3	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
TH A#2078		HTC-1	HDE		2078	II	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/29/2019	1/29/2018
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
40dB 100W Attenuator	0.009-4000MHz	BW-40N100W+	Mini-Circuits	V N383401508	2096	II	10/9/2019	10/9/2018

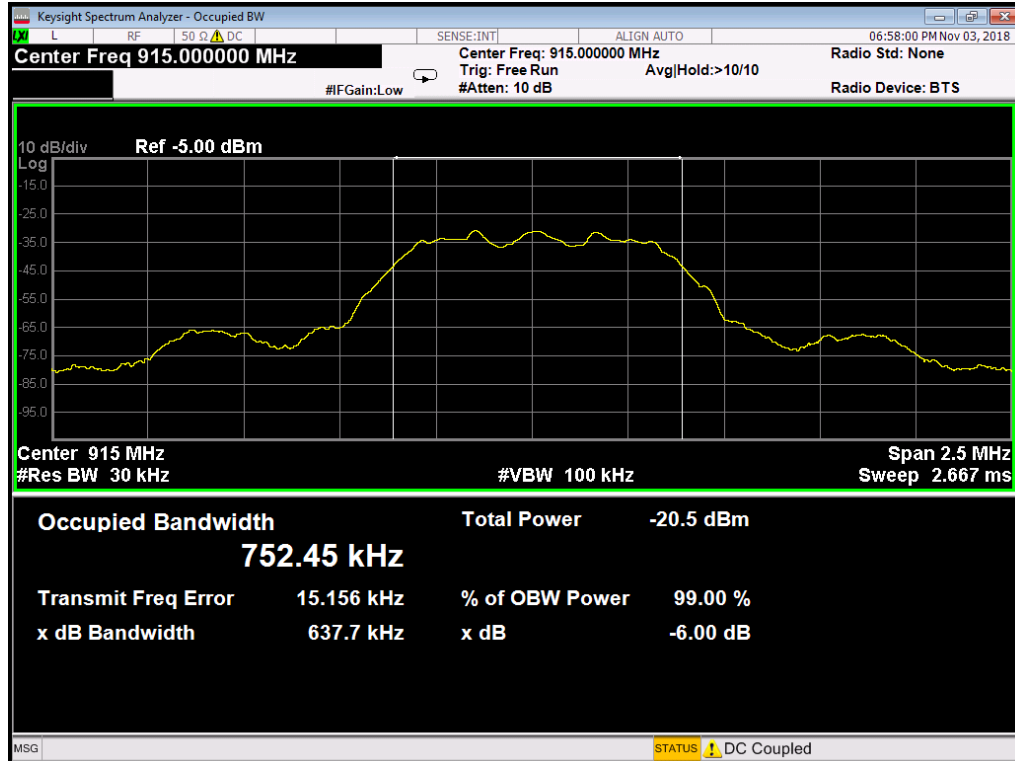
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



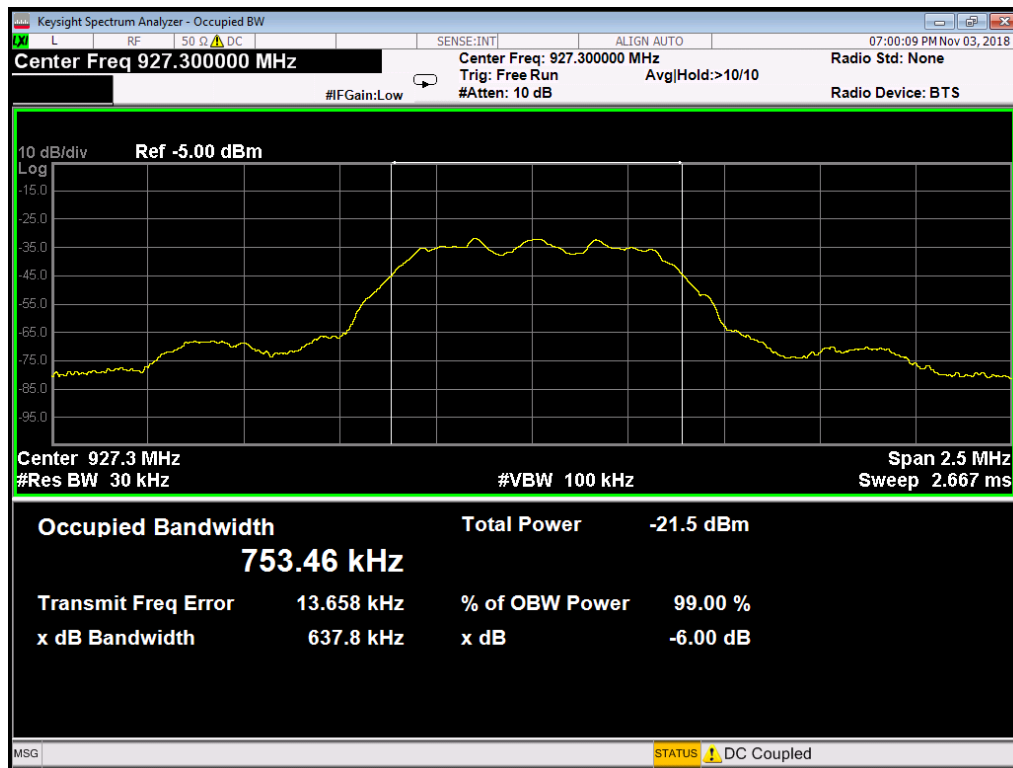
Plot(s)



Occupied Bandwidth – Low Channel



Occupied Bandwidth – Middle Channel



Occupied Bandwidth – High Channel

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 (Ucisprr)
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 (Ucisprr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-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



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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.

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.

