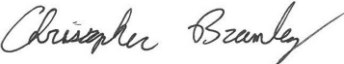
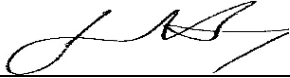




# Test Report



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

Report No	ER1610-1
Client	Powercast Corporation Dan Harrist
Address	620 Alpha Drive Pittsburgh, PA 15238
Phone	412-923-4770
Items tested	Powercast Transmitter
FCC ID	YESTX91503
IC ID	8985A-TX91503
FRN	0019814789
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	6/5/2017 -6/12/2017, 12/13/2017
Results	As detailed within this report
Prepared by	 Christopher Bramley – Test Engineer
Authorized by	 Jason Haley – Sr. Engineer
Issue Date	<u>12/22/17</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 35 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.



**Curtis-Straus LLC, a wholly owned subsidiary of BV CPS**  
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Form Final Report REV 12-07-15



## Summary

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

The Powercast Transmitter operates at 915MHz frequency range and has an antenna with 6dBi peak gain. It is powered by an external power supply.

We found that the product met the above requirements with modification (see page 6 for modification description). Test sample was received in good condition.



## Test Methodology

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

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

RF measurements were performed at the antenna port in 3 modes as follows:

- 915MHz: 16.67kbps data rate
- 915MHz: 8.33kbps data rate
- 915MHz: Unmodulated

AC line conducted emissions testing was performed with a 50Ω/50μH LISN.

The following bandwidths were used during radiated spurious emissions testing.

Frequency	RBW	VBW
150kHz-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-10GHz	1MHz	3MHz

## Product Tested - Configuration Documentation

EUT Configuration										
<b>Work Order:</b>	R1610									
<b>Company:</b>	Powercast Corporation									
<b>Company Address:</b>	620 Alpha Drive Pittsburgh, PA 15238									
<b>Contact:</b>	Charles Greene									
<b>EUT:</b>	MN TX91503			PN --			SN Sample 1, 2			
<b>EUT Description:</b>	RF Power Transmitter									
<b>EUT Max Frequency:</b>	915 MHz									
<b>EUT Components</b>	MN					SN				
CUI Inc AC Adapter	SMI18-5					SMI18-5-V-P12				
<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>
AC Mains	Power AC	1	1	Power AC	No	No	1	in	yes	
<b>Software Operating Mode Description:</b>										
Test software: button press changes data rate from 16.67kbps to 8.33kbps to unmodulated (test mode only)										



## Statement of Conformity

The Powercast Transmitter has been found to conform to the following parts of 47 CFR and RSS 247 as detailed below:

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.
	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, 6.1, 6.5			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	The antenna for this device is a permanently installed PCB antenna.
8.10			15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable
8.8			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
6.6				Occupied Bandwidth measurements were made.

## Modifications Required for Compliance

Radio: EMI Spurious – Restricted Bands

- Lowered the system voltage from 3.5V to 2.7V via resistor change. This lowered the gain on the PA. Increased the PA drive from the radio via software change.

# Test Results

## 6dB Bandwidth

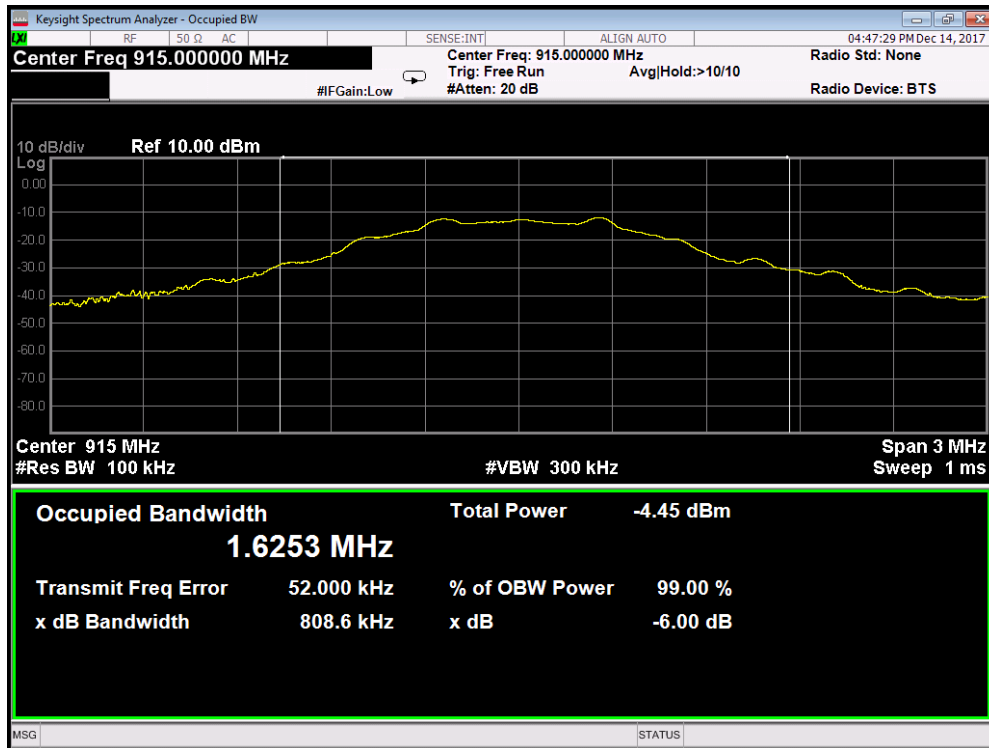
Limit: The minimum 6 dB bandwidth shall be at least 500 kHz.

[15.247(a) (2)]

### MEASUREMENTS / RESULTS

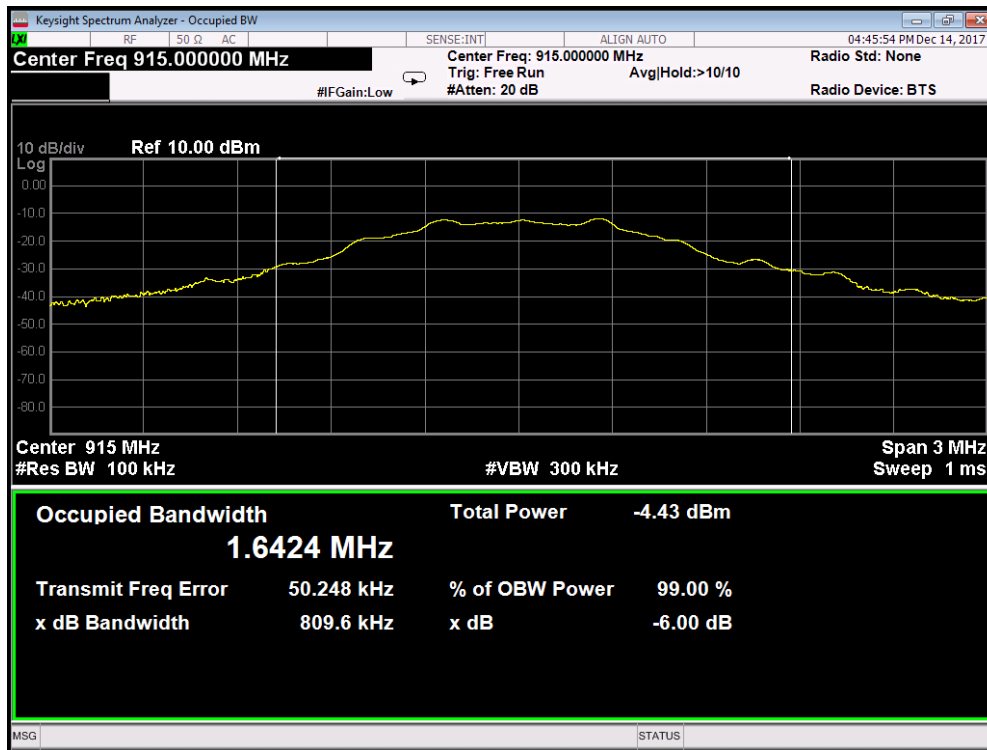
6dB Bandwidth						
Date: 13-Dec-17		Company: Powercast		Work Order: R1610		
Engineer: Chris Bramley		EUT: Powercast Transmitter		Operating Voltage/Frequency: 5V DC		
Temp: 21.4°C		Humidity: 32%		Pressure: 988mBar		
Frequency Range: 915MHz			Measurement Type: Conducted			
Measurement Method: FCC 558074 D01 DTS Meas Guidance v04						
Notes:						
Data Mode (kbps)	Frequency (MHz)	Reading (kHz)	6dB Bandwidth			
			Limit (kHz)	Margin (kHz)	Result (Pass/Fail)	
16.67	915	808.6	≥500	309	Pass	
8.33	915	809.6	≥500	310	Pass	
Unmodulated	915	806.3	≥500	306	Pass	
Test Site: EMC-3		Cable: Asset 2289		40dB Attenuator: Asset 2107		
Analyzer: EXA 1118472		Copyright Curtis-Straus LLC 2000				

### PLOTS

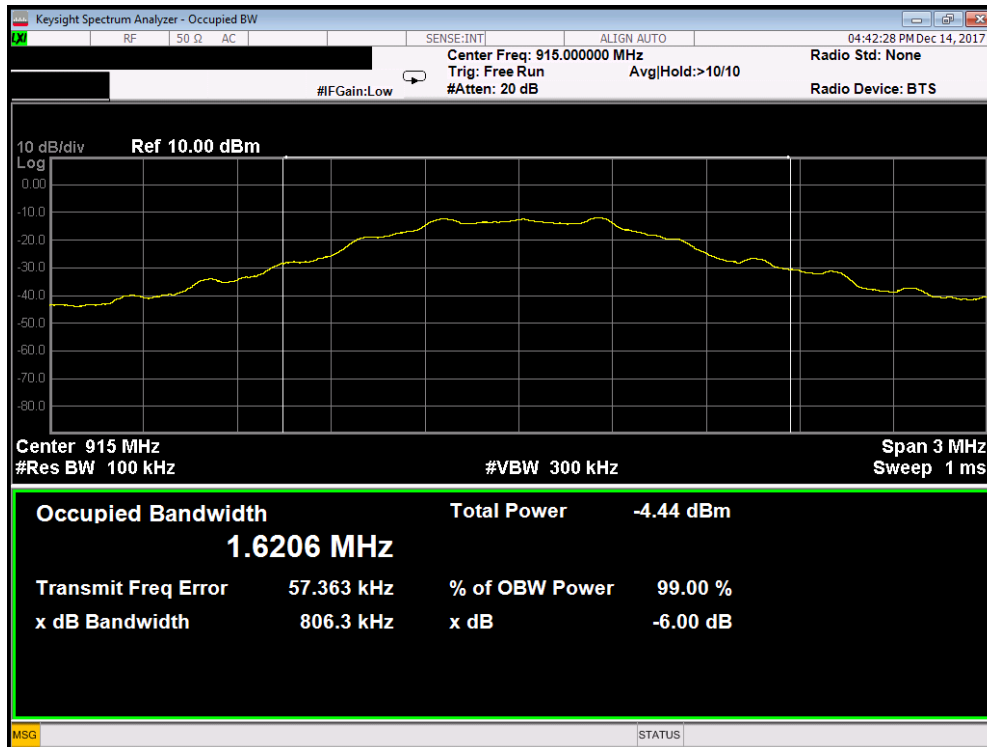


16.67kbps Data Mode





8.33kbps Data Mode



Unmodulated Mode



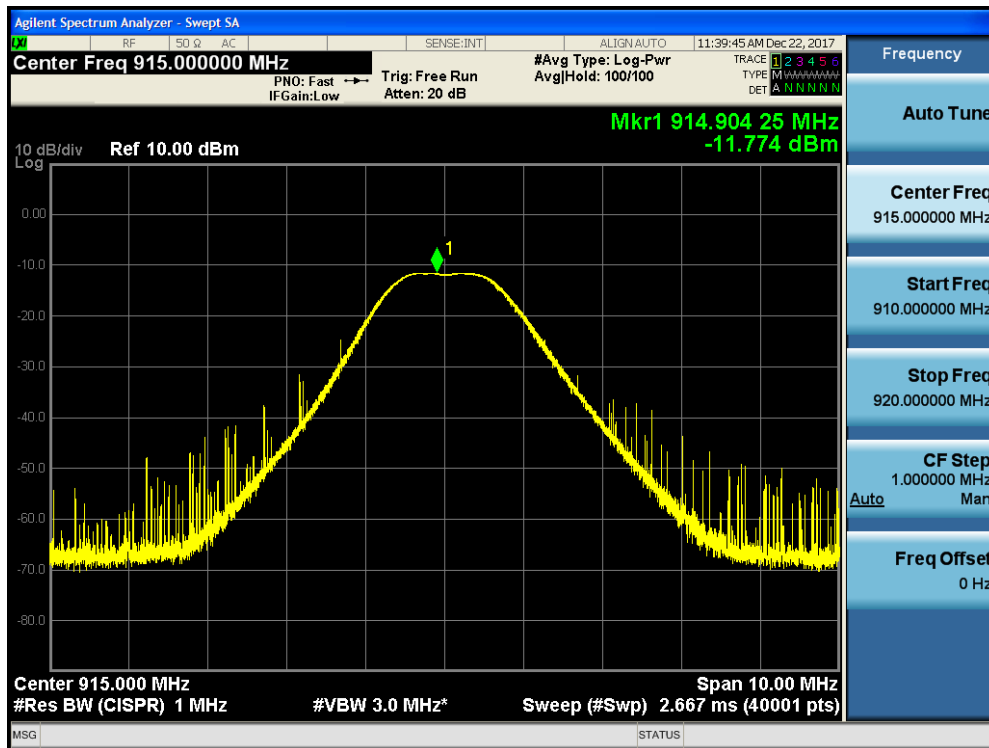
## Peak Output Power

LIMIT: 1 Watt Conducted Output Power  
[15.247(b) (3)]

### MEASUREMENTS / RESULTS

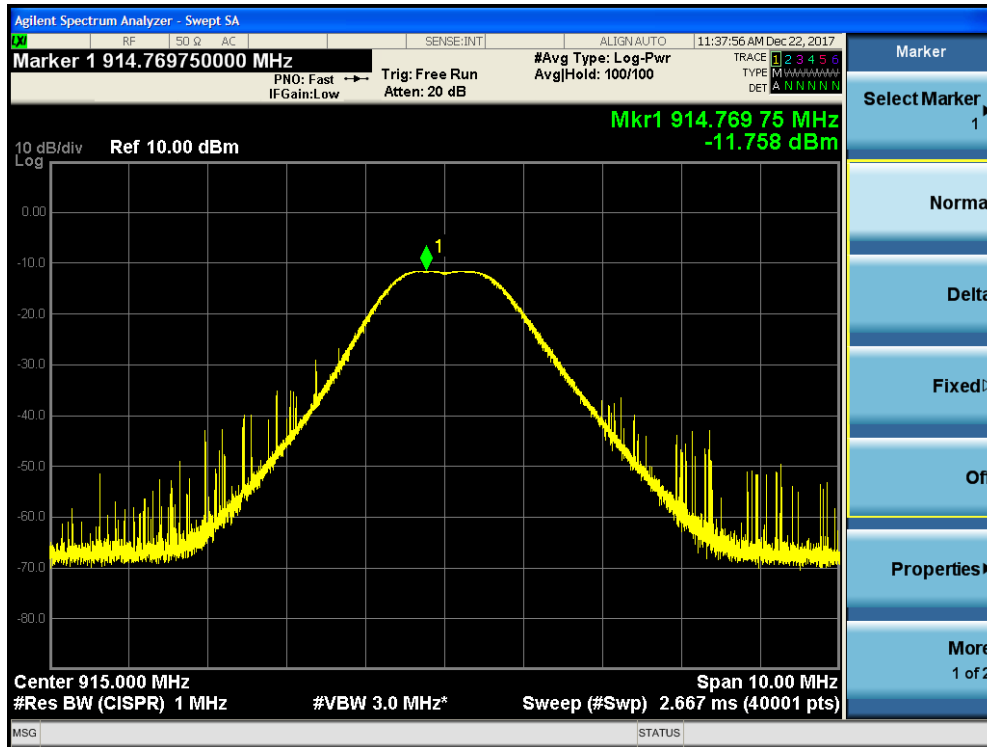
Peak Output Power								
Date: 22-Dec-17			Company: Powercast			Work Order: R1610		
Engineer: Jason Haley			EUT: Powercast Transmitter			Operating Voltage/Frequency: 5V DC		
Temp: 21.4°C			Humidity: 32%			Pressure: 997mBar		
Frequency Range: 915MHz			Measurement Type: Conducted			Measurement Method: FCC 558074 D01 DTS Meas Guidance v04		
Notes: Average Method Used								
Data Mode	Frequency	Peak Reading	Cable Loss	Attenuator Loss	Peak Output Power	Average Limit	Margin	Result
(kbps)	(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(Pass/Fail)
16.67	915.0	-11.77	0.44	40.03	28.70	30.0	-1.30	Pass
8.33	915.0	-11.76	0.44	40.03	28.71	30.0	-1.29	Pass
Unmodulated	915.0	-11.82	0.44	40.03	28.65	30.0	-1.35	Pass
Test Site: EMC-3			Cable: Asset 2213			40dB Attenuator: Asset 2107		
Analyzer: MXE								
Peak Output Power (dBm)= Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)						Copyright Curtis-Straus LLC 2000		

### PLOTS

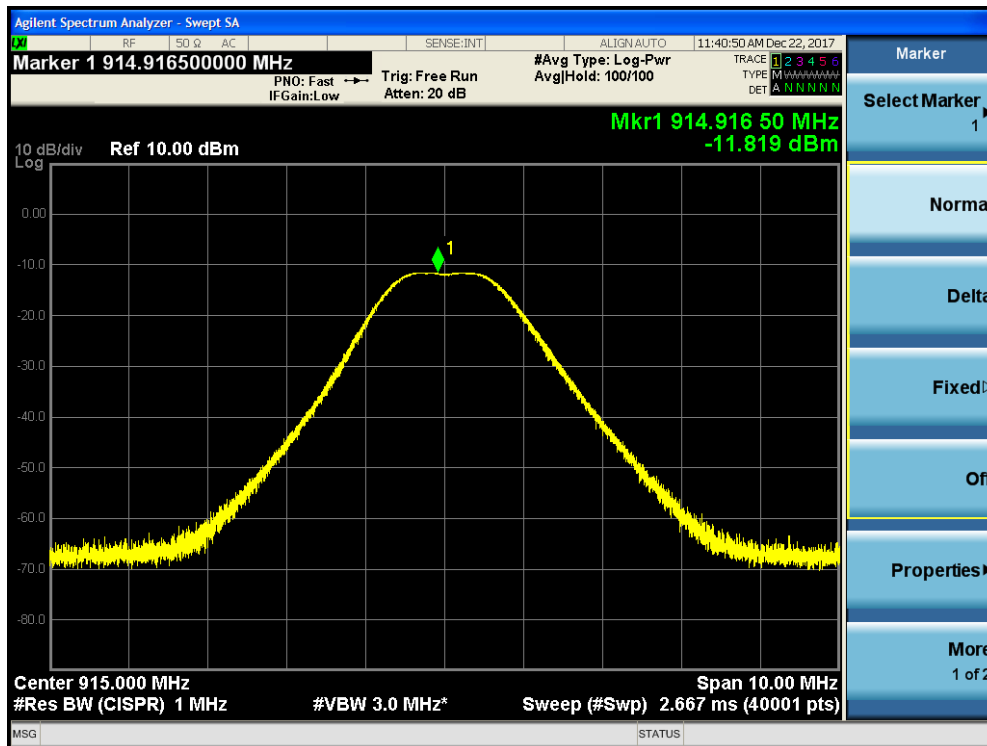


16.67kbps Data Mode





8.33kbps Data Mode



Unmodulated Mode

## Conducted Band Edge Measurements

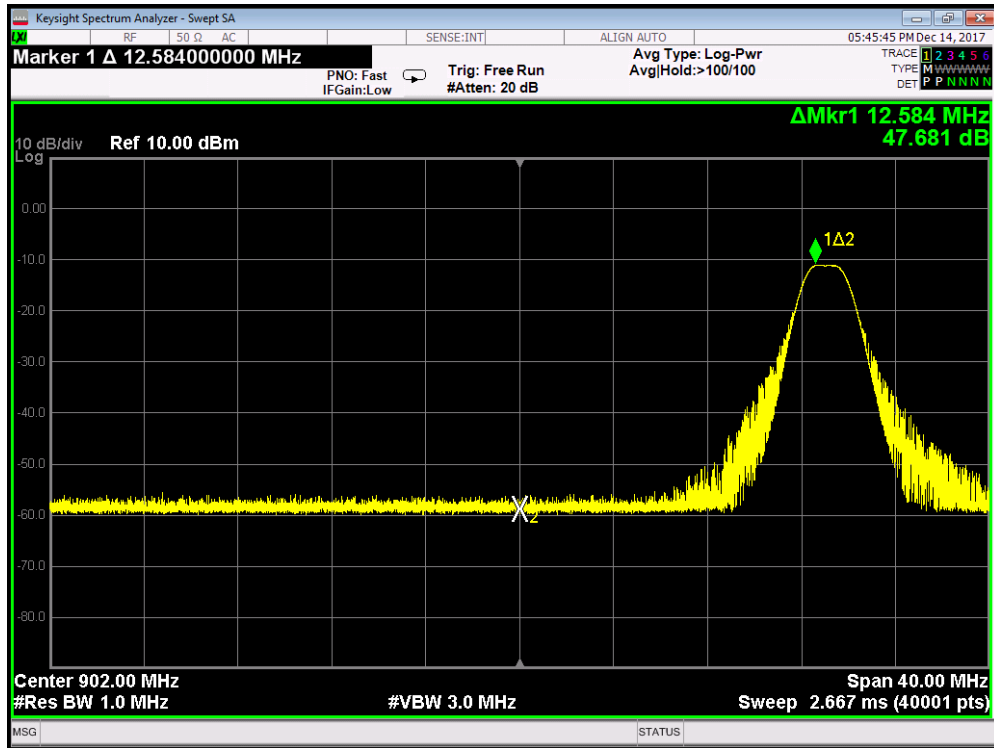
Limits: Emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the emission limits specified in Section 15.209(a).  
[15.247(d)]

### MEASUREMENTS / RESULTS

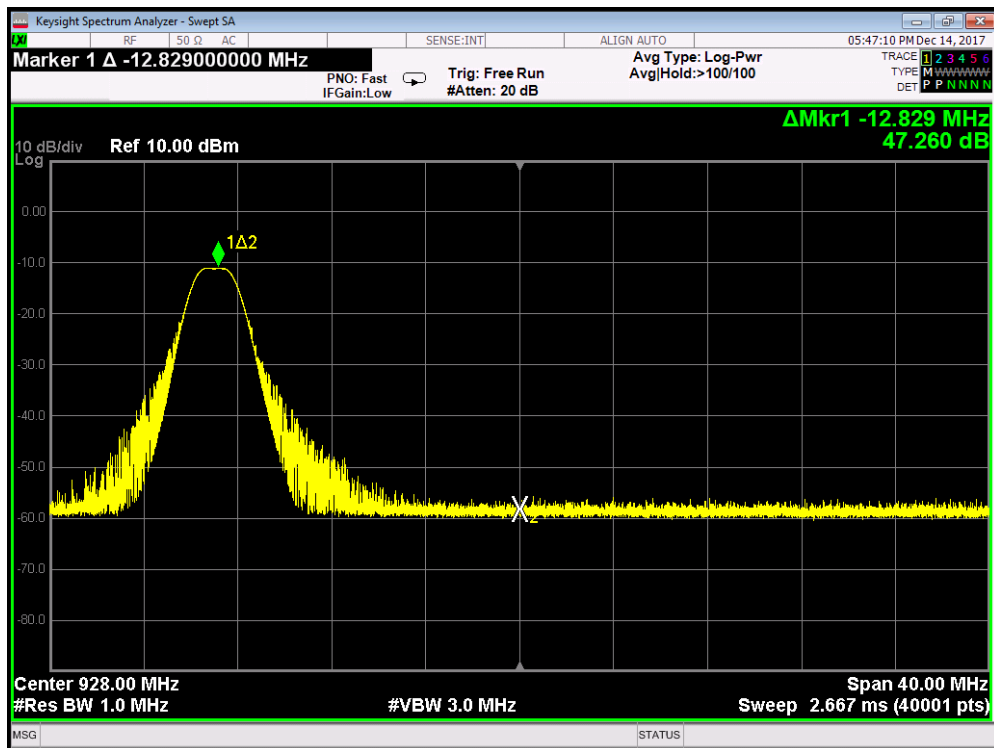
Conducted Bandedge				
Date: 13-Dec-17		Company: Powercast		Work Order: R1610
Engineer: Chris Bramley		EUT: Powercast Transmitter		Operating Voltage/Frequency: 5V DC
Temp: 21.4°C		Humidity: 32%		Pressure: 988mBar
Frequency Range: 902-928 MHz			Measurement Type: Conducted	
Notes:				
		Bandedge Delta (dB)	Limit (dB)	Result (Pass/Fail)
16.67kbps Data Mode	Low Bandedge	47.7	≥ 20	Pass
	High Bandedge	47.3	≥ 20	Pass
8.33kbps Data Mode	Low Bandedge	48.2	≥ 20	Pass
	High Bandedge	47.1	≥ 20	Pass
Unmodulated	Low Bandedge	46.4	≥ 20	Pass
	High Bandedge	46.9	≥ 20	Pass
Test Site: EMC-3		Cable: Asset 2289	40dB Attenuator: Asset 2107	
Analyzer: EXA 1118472		Copyright Curtis-Straus LLC 2000		



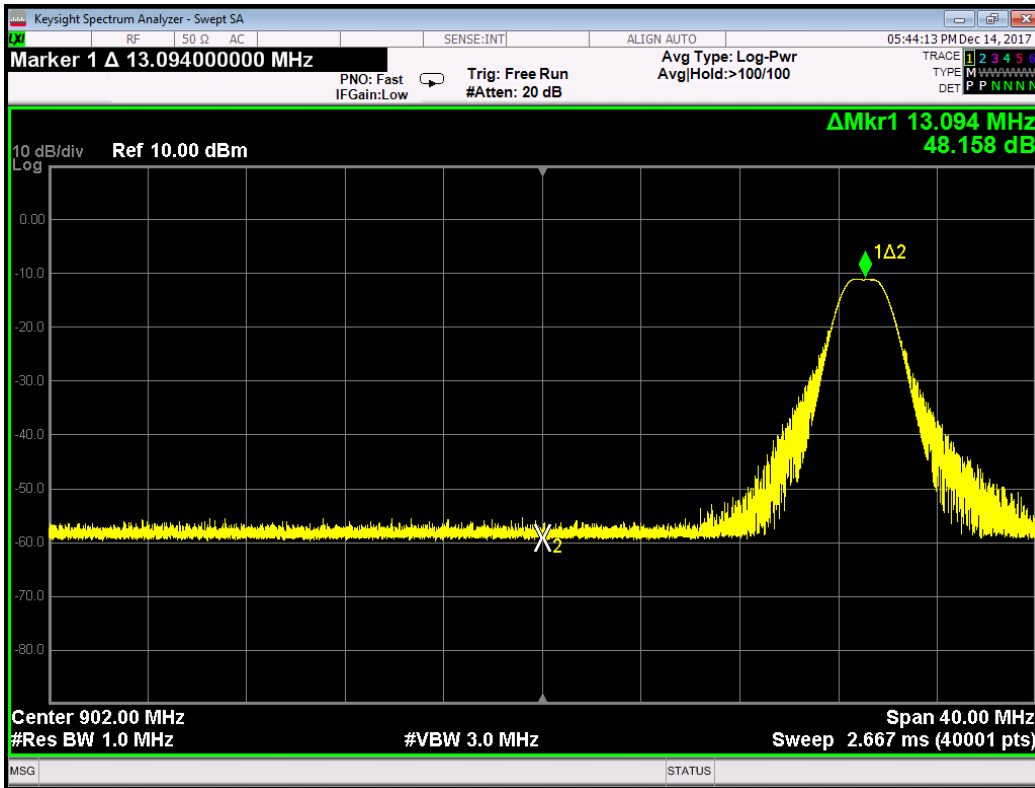
PLOTS



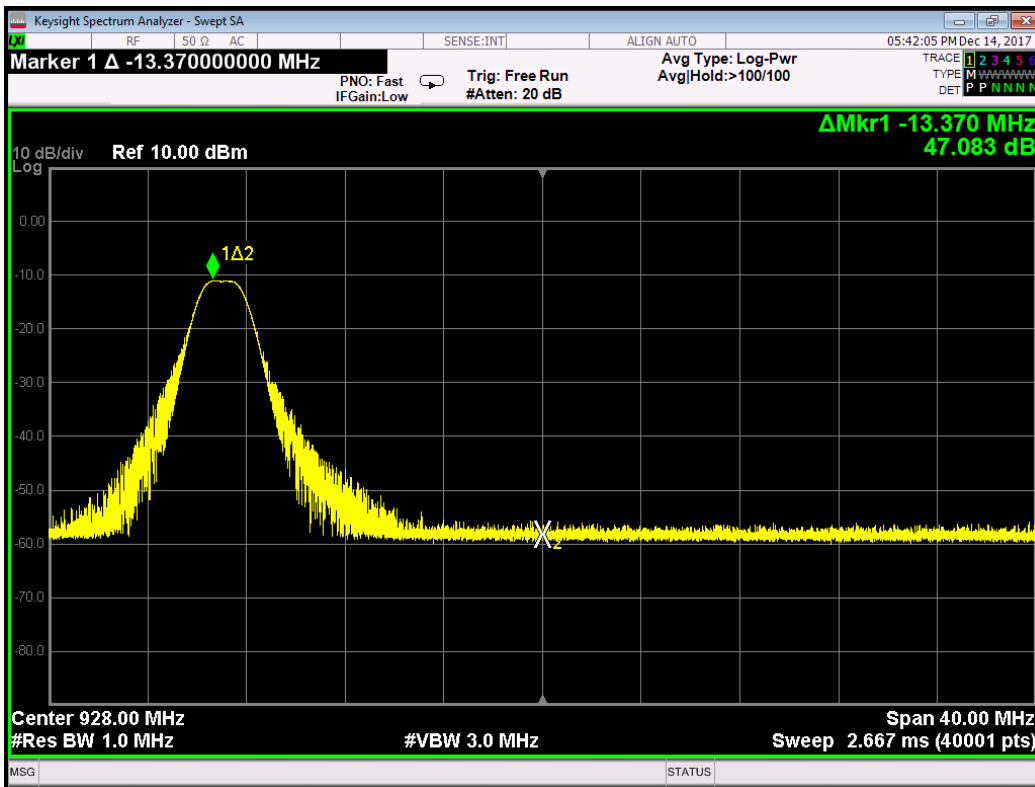
Low Band Edge - 16.67kbps Data Mode



High Band Edge - 16.67kbps Data Mode

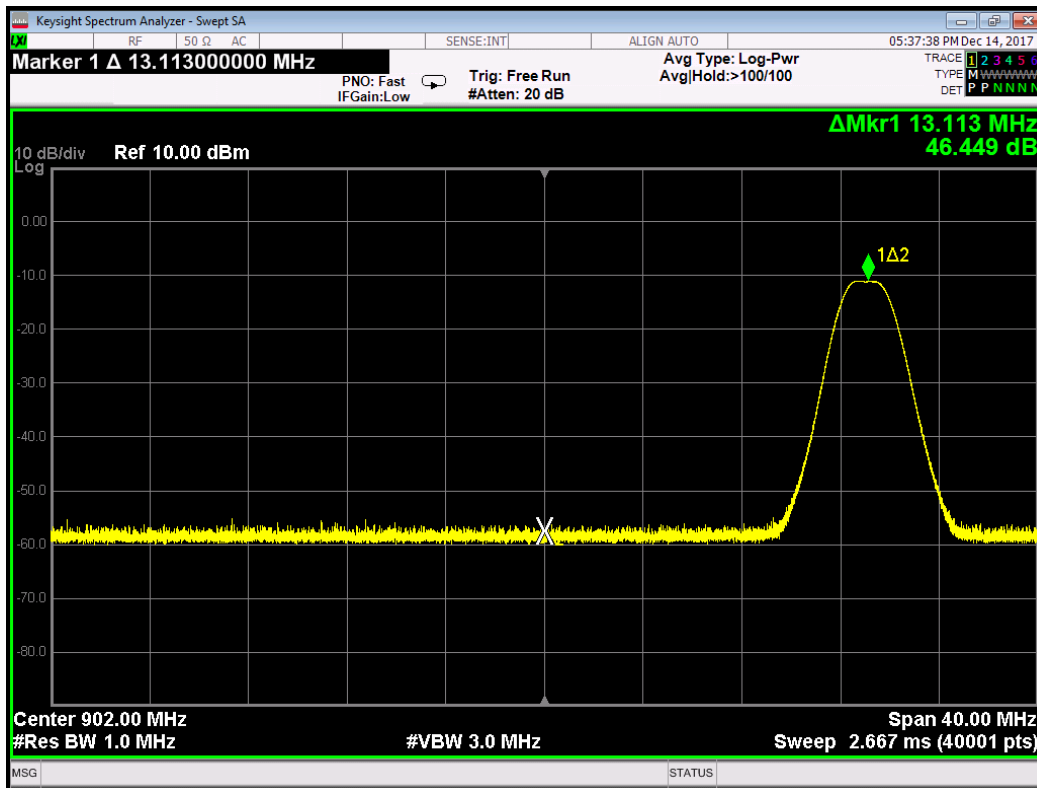


Low Band Edge - 8.33kbps Data Mode

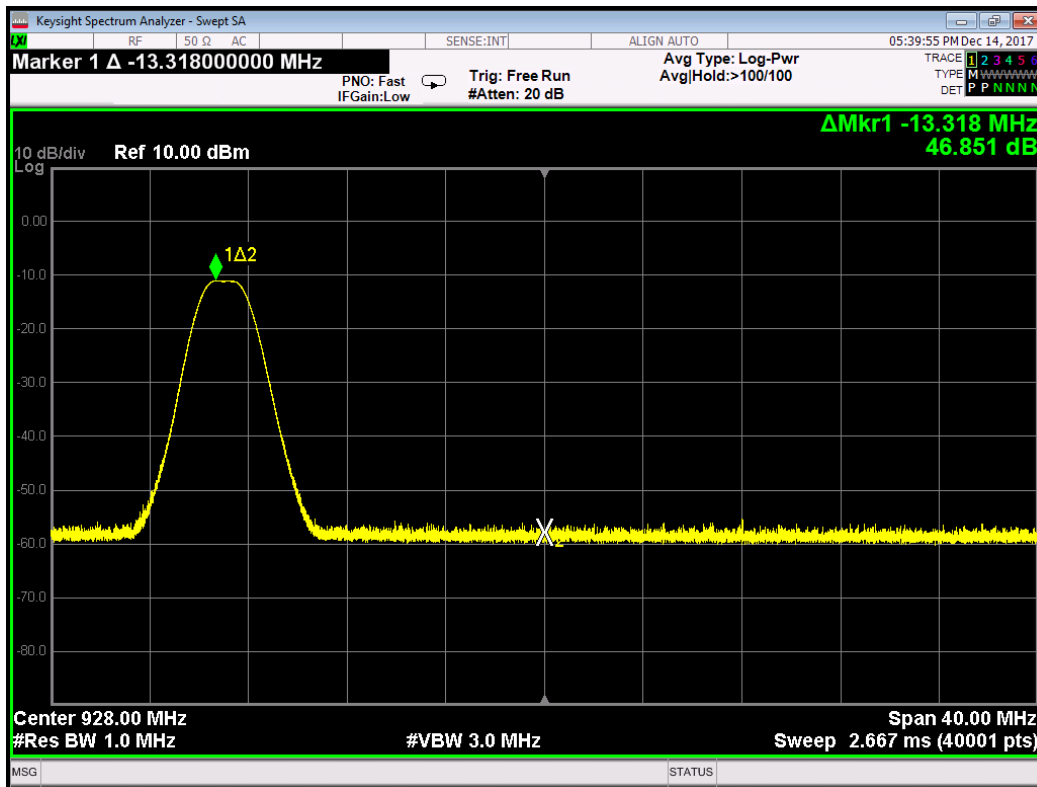


High Band Edge - 8.33kbps Data Mode





Low Band Edge - Unmodulated Mode



High Band Edge - Unmodulated Mode



### Radiated Spurious Emissions

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

#### MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company					Work Order - R1610				
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 120V				
30-1000MHz Vertical Tabular Data					Test Site - Chamber 2				
Operator: Chris Bramley					Temp; Humid; Pres - 24				
Notes:					Witnessed by - N/A				
EUT Tx at 915MHz					EUT Maximum Frequen				
8.33kbps Mode									

Frequency MHz	Raw QP Reading dBµV	Correction Factor dB/m	Adjusted QP Amplitude dBµV/m	Limit Req 1 dBµV/m	Margin Req 1 dB	Test Results Req 1 Pass/Fail	Antenna Height centimeters	EUT Azimuth degrees	Worst Margin Req 1 dB
45.908	46.7	-26	20.8	40	-19.2	PASS	100	138	
74.694	55.3	-27.1	28.2	40	-11.8	PASS	125	72	
173.262	57	-23.9	33.1	43.5	-10.4	PASS	100	178	-10.4
227.242	53.7	-23.7	30	46	-16	PASS	114	33	

Curtis Straus - a Bureau Veritas Company					Work Order - R1610				
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 120V				
30-1000MHz Horizontal Tabular Data					Test Site - Chamber 2				
Operator: Chris Bramley					Temp; Humid; Pres - 24				
Notes:					Witnessed by - N/A				
EUT Tx at 915MHz					EUT Maximum Frequen				
8.33kbps Mode									

Frequency MHz	Raw QP Reading dBµV	Correction Factor dB/m	Adjusted QP Amplitude dBµV/m	Limit Req 1 dbµV/m	Margin Req 1 dB	Test Results Req 1 Pass/Fail	Antenna Height centimeters	EUT Azimuth degrees	Worst Margin Req 1 dB
190.308	44.1	-23.5	20.6	43.5	-23	PASS	126	219	
227.101	54.8	-23.7	31.1	46	-14.9	PASS	111	318	-14.9
283.119	46.8	-21.4	25.4	46	-20.6	PASS	147	320	
466.398	43.5	-16.5	27	46	-19.1	PASS	139	309	
755.638	33.6	-10.9	22.7	46	-23.3	PASS	129	230	

30-1000MHz – 8.33kbps Data Mode



Curtis Straus - a Bureau Veritas Company				Work Order - R1610					
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 120V/60Hz					
30-1000MHz Horizontal Tabular Data				Test Site - Chamber 2					
Operator: Chris Bramley				Temp; Humid; Pres - 24.4°C; 47%RH; 1013r					
EUT Tx at 915MHz				Witnessed by - N/A					
16.67kbps Mode				EUT Maximum Frequency - 915MHz					
				Req. 1; Req. 2 - FCC 15.247					

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB
190.632	44.3	-23.5	20.8	43.5	-22.7	PASS	121	360	
225.827	55	-23.8	31.2	46	-14.8	PASS	103	324	-14.8
280.334	46.6	-21.4	25.2	46	-20.8	PASS	143	306	
466.354	43.5	-16.5	27	46	-19	PASS	140	352	
753.391	36	-11	24.9	46	-21.1	PASS	100	219	

Curtis Straus - a Bureau Veritas Company				Work Order - R1610					
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 120V/60Hz					
30-1000MHz Vertical Tabular Data				Test Site - Chamber 2					
Operator: Chris Bramley				Temp; Humid; Pres - 24.4°C; 47%RH; 1013r					
EUT Tx at 915MHz				Witnessed by - N/A					
16.67kbps Mode				EUT Maximum Frequency - 915MHz					
				Req. 1; Req. 2 - FCC 15.247					

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB
47.464	47.6	-26.6	21	40	-19	PASS	116	231	
73.831	55.2	-27.1	28.1	40	-11.9	PASS	125	112	
173.424	56.6	-23.9	32.8	43.5	-10.8	PASS	100	186	-10.8
226.911	55.9	-23.7	32.2	46	-13.8	PASS	100	70	

30-1000MHz - 16.67kbps Data Mode





Curtis Straus - a Bureau Veritas Company				Work Order - R1610					
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 120V/60Hz					
30-1000MHz Horizontal Tabular Data				Test Site - Chamber 2					
Operator: Chris Bramley				Temp; Humid; Pres - 24.4°C; 47%RH; 1013r					
EUT Tx at 915MHz				Witnessed by - N/A					
CW Mode				EUT Maximum Frequency - 915MHz					
				Req. 1; Req. 2 - FCC 15.247					

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB
226.419	54.2	-23.7	30.4	46	-15.6	PASS	125	6	-15.6
281.748	48.7	-21.4	27.3	46	-18.8	PASS	107	319	
751.877	36.1	-11	25	46	-21	PASS	125	20	

Curtis Straus - a Bureau Veritas Company				Work Order - R1610					
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 120V/60Hz					
30-1000MHz Vertical Tabular Data				Test Site - Chamber 2					
Operator: Chris Bramley				Temp; Humid; Pres - 24.4°C; 47%RH; 1013r					
EUT Tx at 915MHz				Witnessed by - N/A					
CW Mode				EUT Maximum Frequency - 915MHz					
				Req. 1; Req. 2 - FCC 15.247					

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB
74.68	55.2	-27.1	28.1	40	-11.9	PASS	117	115	
116.18	49.5	-22	27.5	43.5	-16.1	PASS	100	34	
172.322	55.9	-23.8	32.1	43.5	-11.4	PASS	125	196	-11.4
227.38	55.5	-23.7	31.8	46	-14.2	PASS	103	65	

30-1000MHz - Unmodulated Mode



Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)		20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016
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
Red-White		0.009-2000MHz	ZFL-1000-LN	CS	N/A	1258	II	10/30/2017	10/30/2016
1517 HF Preamp		1-20GHz	CS	CS	N/A	1517	II	8/14/2017	8/14/2016
2130 BRF		0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/7/2018	1/7/2017
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			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2078			HTC-1	HDE		2078	II	3/23/2018	3/23/2017
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2052		9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2053		9kHz - 18GHz		Florida RF			II	10/30/2017	10/30/2016

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

Curtis Straus - a Bureau Veritas Company  
 Radiated Emissions Electric Field 3m Distance  
 1-6GHz Horizontal Tabular Data  
 Operator: Chris Bramley  
 EUT Tx at 915MHz  
 16.67kbps Mode

Work Order - R1610  
 EUT Power Input - 120V/60Hz  
 Test Site - Chamber 2  
 Temp; Humid; Pres - 24.4°C; 47%RH; 1013mBar  
 Witnessed by - N/A  
 EUT Maximum Frequency - 915MHz  
 Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
2745.9	33.6	26	13.7	47.3	39.7	74	-26.7	PASS	54	-14.3	PASS	216	46		
3658.9	29.3	21.4	17.9	47.2	39.3	74	-26.8	PASS	54	-14.7	PASS	100	305		
4573.7	33.2	24	19.9	53.1	44	74	-20.8	PASS	54	-10	PASS	100	169	-20.8	-10
5488.2	29	19.8	22.7	51.8	42.5	74	-22.2	PASS	54	-11.5	PASS	215	156		

Curtis Straus - a Bureau Veritas Company  
 Radiated Emissions Electric Field 3m Distance  
 1-6GHz Vertical Tabular Data  
 Operator: Chris Bramley  
 EUT Tx at 915MHz  
 16.67kbps Mode

Work Order - R1610  
 EUT Power Input - 120V/60Hz  
 Test Site - Chamber 2  
 Temp; Humid; Pres - 24.4°C; 47%RH; 1013mBar  
 Witnessed by - N/A  
 EUT Maximum Frequency - 915MHz  
 Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
2745.9	31.9	25	13.7	45.6	38.7	74	-28.4	PASS	54	-15.2	PASS	125	60		
4576.5	32.8	24.5	20	52.7	44.5	74	-21.2	PASS	54	-9.5	PASS	212	98		
5488.8	31.1	24.1	22.7	53.8	46.8	74	-20.1	PASS	54	-7.2	PASS	275	154	-20.1	-7.2

1GHz-6GHz - 16.67kbps Data Mode



Curtis Straus - a Bureau Veritas Company  
 Radiated Emissions Electric Field 3m Distance  
 1-6GHz Horizontal Tabular Data  
 Operator: Chris Bramley  
 EUT Tx at 915MHz  
 8.33kbps Mode

Work Order - R1610  
 EUT Power Input - 120V/60Hz  
 Test Site - Chamber 2  
 Temp; Humid; Pres - 24.4°C; 47%RH; 1013mBar  
 Witnessed by - N/A  
 EUT Maximum Frequency - 915MHz  
 Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
1829.4	49.8	43.4	12.9	62.7	56.3	97.4	-34.7	PASS	97.4	-41.1	PASS	125	29		
2745.8	33.3	25.5	13.7	47	39.2	74	-27	PASS	54	-14.8	PASS	112	203		
4576.5	32.7	25	20	52.7	44.9	74	-21.3	PASS	54	-9	PASS	112	173		-9
5488.3	30.9	22	22.7	53.6	44.7	74	-20.3	PASS	54	-9.3	PASS	225	133	-20.3	

\*The limit for the second harmonic (1829.4MHz) is 30dB down from the fundamental.

Curtis Straus - a Bureau Veritas Company  
 Radiated Emissions Electric Field 3m Distance  
 1-6GHz Vertical Tabular Data  
 Operator: Chris Bramley  
 EUT Tx at 915MHz  
 8.33kbps Mode

Work Order - R1610  
 EUT Power Input - 120V/60Hz  
 Test Site - Chamber 2  
 Temp; Humid; Pres - 24.4°C; 47%RH; 1013mBar  
 Witnessed by - N/A  
 EUT Maximum Frequency - 915MHz  
 Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
2744.2	32.9	24.6	13.7	46.5	38.3	74	-27.4	PASS	54	-15.7	PASS	178	216		
4576.3	35	26.4	20	55	46.4	74	-19	PASS	54	-7.6	PASS	100	185		
5491.2	33	24	22.7	55.7	46.8	74	-18.3	PASS	54	-7.2	PASS	125	201	-18.3	-7.2

1GHz-6GHz – 8.33kbps Data Mode

Curtis Straus - a Bureau Veritas Company  
 Radiated Emissions Electric Field 3m Distance  
 1-6GHz Horizontal Tabular Data  
 Operator: Chris Bramley  
 EUT Tx at 915MHz  
 CW Mode

Work Order - R1610  
 EUT Power Input - 120V/60Hz  
 Test Site - Chamber 2  
 Temp; Humid; Pres - 24.4°C; 47%RH; 1013mBar  
 Witnessed by - N/A  
 EUT Maximum Frequency - 915MHz  
 Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
2744.2	35	27.7	13.7	48.7	41.4	74	-25.2	PASS	54	-12.6	PASS	111	184		
3659.4	29.6	21.6	17.9	47.5	39.4	74	-26.5	PASS	54	-14.5	PASS	184	303		
4576	32.3	23.7	20	52.3	43.6	74	-21.7	PASS	54	-10.3	PASS	111	173		-10.3
5488.3	29.8	20.8	22.7	52.5	43.5	74	-21.4	PASS	54	-10.5	PASS	184	146	-21.4	

Curtis Straus - a Bureau Veritas Company  
 Radiated Emissions Electric Field 3m Distance  
 1-6GHz Vertical Tabular Data  
 Operator: Chris Bramley  
 EUT Tx at 915MHz  
 CW Mode

Work Order - R1610  
 EUT Power Input - 120V/60Hz  
 Test Site - Chamber 2  
 Temp; Humid; Pres - 24.4°C; 47%RH; 1013mBar  
 Witnessed by - N/A  
 EUT Maximum Frequency - 915MHz  
 Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
2745.8	33.8	25.2	13.7	47.5	38.9	74	-26.5	PASS	54	-15.1	PASS	201	223		
3885.3	26.2	16.4	19.2	45.3	35.5	74	-28.6	PASS	54	-18.4	PASS	215	159		
4573.7	33.6	23.8	19.9	53.5	43.7	74	-20.4	PASS	54	-10.3	PASS	110	191	-20.4	
5488.3	30.6	22.3	22.7	53.3	45	74	-20.7	PASS	54	-9	PASS	125	156		-9

1GHz-6GHz - Unmodulated Mode



Rev. 7/23/2017

Spectrum Analyzers / Receivers /Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2093 MXE EMI Receiver		20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	8/9/2017	8/9/2016
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 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	441174	2310	II	2/4/2018	2/4/2017
Brown		1-10GHz	CS	CS	N/A	1523	II	9/25/2017	9/25/2016
2130 BRF		0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/7/2018	1/7/2017
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog		30-2000MHz	JB1	Sunol	A091604-2	1106	I	2/28/2019	2/28/2017
Black Horn		1-18GHz	3115	EMCO	9703-5148	56	I	8/29/2018	8/29/2016
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2078		HTC-1	HDE		2078	II	3/23/2018	3/23/2017	
Cables		Range	Mfr	Cat	Calibration Due	Calibrated on			
Asset #1509		9kHz - 18GHz	Florida RF	II	10/2/2017	10/2/2016			
Asset #2052		9kHz - 18GHz	Florida RF	II	3/5/2018	3/5/2017			
Asset #2053		9kHz - 18GHz	Florida RF	II	10/30/2017	10/30/2016			

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

Curtis Straus - a Bureau Veritas Company		Work Order - R1610	
Radiated Emissions Electric Field 1m Distance		EUT Power Input - 120V/60Hz	
6-10GHz Vertical Tabular Data		Test Site - Chamber 2	
Operator: Chris Bramley		Temp; Humid; Pres - 23.6°C; 50%RH; 1003mBar	
Notes:		Witnessed by - N/A	
EUT Tx at 915MHz		EUT Maximum Frequency - 915MHz	
8.33kbps Mode			

Frequency MHz	Raw Peak Reading dBµV	Raw Average Reading dBµV	Correction Factor dB/m	Adjusted Peak Amplitude dBµV/m	Adjusted Average Amplitude dBµV/m	Peak Limit dBµV/m	Peak Margin dB	Peak Results Pass/Fail	Average Limit dBµV/m	Average Margin dB	Average Results Pass/Fail	Antenna Height cm	EUT Azimuth degrees	Worst Peak Margin dB	Worst Average Margin dB
6406.6	48.8	38	24.2	73	62.2	83.5	-10.5	PASS	63.5	-1.3	PASS	200	219	-10.5	-1.3
7317.8	39.3	29.1	24.6	63.9	53.8	83.5	-19.6	PASS	63.5	-9.7	PASS	123	136		
8236.8	35.3	25.6	24.8	60.1	50.5	83.5	-23.4	PASS	63.5	-13	PASS	138	22		
9147	36.3	26.4	25.5	61.7	51.9	83.5	-21.8	PASS	63.5	-11.6	PASS	200	203		

Curtis Straus - a Bureau Veritas Company		Work Order - R1610	
Radiated Emissions Electric Field 1m Distance		EUT Power Input - 120V/60Hz	
6-18GHz Horizontal Tabular Data		Test Site - Chamber 2	
Operator: Chris Bramley		Temp; Humid; Pres - 23.6°C; 50%RH; 1003mBar	
Notes:		Witnessed by - N/A	
EUT Tx at 915MHz		EUT Maximum Frequency - 915MHz	
8.33kbps Mode			

Frequency MHz	Raw Peak Reading dBµV	Raw Average Reading dBµV	Correction Factor dB/m	Adjusted Peak Amplitude dBµV/m	Adjusted Average Amplitude dBµV/m	Peak Limit dBµV/m	Peak Margin dB	Peak Test Results Pass/Fail	Average Limit dBµV/m	Average Margin dB	Average Test Results Pass/Fail	Antenna Height cm	EUT Azimuth degrees	Worst Peak Margin dB	Worst Average Margin dB
6406.7	40.3	30.2	24.2	64.5	54.4	83.5	-19	PASS	63.5	-9.1	PASS	108	275		
7317.6	41	30.9	24.6	65.7	55.6	83.5	-17.8	PASS	63.5	-7.9	PASS	122	242	-17.8	-7.9
8237.2	34.7	24.4	24.8	59.5	49.2	83.5	-24	PASS	63.5	-14.3	PASS	128	170		
9147.1	35.8	25.2	25.5	61.3	50.6	83.5	-22.2	PASS	63.5	-12.9	PASS	200	122		

6GHz-18GHz – 8.33kbps Data Mode



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Curtis Straus - a Bureau Veritas Company	Work Order - R1610
Radiated Emissions Electric Field 1m Distance	EUT Power Input - 120V/60Hz
6-10GHz Horizontal Tabular Data	Test Site - Chamber 2
Operator: Chris Bramley	Temp; Humid; Pres - 23.6°C; 50%RH; 1003mBar
EUT Tx at 915MHz	Witnessed by - N/A
16.67kbps Mode	EUT Maximum Frequency - 915MHz
	Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
6406.5	44.9	31.7	24.2	69.1	55.9	83.5	-14.4	PASS	63.5	-7.6	PASS	120	128	-14.4	
7317.8	43.8	31.4	24.6	68.5	56	83.5	-15	PASS	63.5	-7.5	PASS	156	125		-7.5
8232.5	32.8	21.5	24.9	57.7	46.4	83.5	-25.8	PASS	63.5	-17.1	PASS	137	66		
9147.3	40.2	27.6	25.5	65.7	53.1	83.5	-17.8	PASS	63.5	-10.4	PASS	177	126		

Curtis Straus - a Bureau Veritas Company	Work Order - R1610
Radiated Emissions Electric Field 1m Distance	EUT Power Input - 120V/60Hz
6-10GHz Vertical Tabular Data	Test Site - Chamber 2
Operator: Chris Bramley	Temp; Humid; Pres - 23.6°C; 50%RH; 1003mBar
EUT Tx at 915MHz	Witnessed by - N/A
16.67kbps Mode	EUT Maximum Frequency - 915MHz
	Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
6406.5	50.1	38.8	24.2	74.3	63	83.5	-9.2	PASS	63.5	-0.5	PASS	185	192	-9.2	-0.5
7321.7	40.8	28.5	24.6	65.5	53.1	83.5	-18	PASS	63.5	-10.4	PASS	165	215		
8232.6	40.3	28.8	24.8	65.2	53.6	83.5	-18.3	PASS	63.5	-9.9	PASS	165	183		
9147.2	38.3	25.4	25.5	63.8	50.8	83.5	-19.7	PASS	63.5	-12.7	PASS	200	204		

6GHz-18GHz - 16.67kbps Data Mode

Curtis Straus - a Bureau Veritas Company	Work Order - R1610
Radiated Emissions Electric Field 1m Distance	EUT Power Input - 120V/60Hz
6-10GHz Horizontal Tabular Data	Test Site - Chamber 2
Operator: Chris Bramley	Temp; Humid; Pres - 23.6°C; 50%RH; 1003mBar
EUT Tx at 915MHz	Witnessed by - N/A
CW Mode	EUT Maximum Frequency - 915MHz
	Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
6403.1	44.6	31.6	24.2	68.8	55.8	83.5	-14.7	PASS	63.5	-7.7	PASS	124	101	-14.7	
7317.9	43.4	31.3	24.6	68.1	55.9	83.5	-15.4	PASS	63.5	-7.6	PASS	146	113		-7.6
8236.9	34.2	21.4	24.8	59	46.2	83.5	-24.5	PASS	63.5	-17.3	PASS	140	142		
9147.1	38.7	25.9	25.5	64.1	51.4	83.5	-19.4	PASS	63.5	-12.1	PASS	159	115		

Curtis Straus - a Bureau Veritas Company	Work Order - R1610
Radiated Emissions Electric Field 1m Distance	EUT Power Input - 120V/60Hz
6-10GHz Vertical Tabular Data	Test Site - Chamber 2
Operator: Chris Bramley	Temp; Humid; Pres - 23.6°C; 50%RH; 1003mBar
EUT Tx at 915MHz	Witnessed by - N/A
CW Mode	EUT Maximum Frequency - 915MHz
	Req. 1; Req. 2 - FCC 15.247

Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
6403.2	49	36.1	24.2	73.2	60.3	83.5	-10.3	PASS	63.5	-3.2	PASS	200	178	-10.3	-3.2
7321.7	39.9	27.9	24.6	64.5	52.5	83.5	-19	PASS	63.5	-11	PASS	164	214		
8232.5	40.8	29.4	24.9	65.7	54.3	83.5	-17.8	PASS	63.5	-9.2	PASS	168	195		
9147.2	40.4	27.8	25.5	65.9	53.3	83.5	-17.6	PASS	63.5	-10.2	PASS	164	214		

6GHz-18GHz - Unmodulated Mode



BUREAU VERITAS



Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors									
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016	
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	
Red-White	0.009-2000MHz	ZFL-1000-LN	CS	N/A	1258	II	10/30/2017	10/30/2016	
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	8/14/2017	8/14/2016	
2130 BRF	0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/7/2018	1/7/2017	
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									
		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2078		HTC-1	HDE		2078	II	3/23/2018	3/23/2017	
Cables									
	Range		Mfr			Cat	Calibration Due	Calibrated on	
Asset #2052	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017	
Asset #2053	9kHz - 18GHz		Florida RF			II	10/30/2017	10/30/2016	

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



BUREAU VERITAS



## Conducted Spurious Emissions

Limits: In any 100kHz 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 30dB below that in the 100kHz bandwidth that contains the highest level of desired power.

[15.247(d)]

## MEASUREMENTS / RESULTS

9kHz to 10GHz frequency range was investigated for 3 data rates (8.33kbps, 16.67kbps, and Unmodulated) and no emissions within 30dB of their corresponding fundamentals were observed.

Rev. 6/1/2017

Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118470)		9kHz-26.5GHz	N9010A-526;M	AT	MY51170093	1118470	I	1/3/2018	1/3/2017
LISNs/Measurement Probes		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
LISN Asset 1791		9kHz-30MHz	NNLK 8121	Schwarzbeck	NNLK 8121-603	1791	I	6/23/2017	6/23/2016
Conducted Test Sites (Mains / Telco)		FCC Code	VCCI Code				Cat	Calibration Due	Calibrated on
CEMI 5		719150	A-0015				III	NA	NA
Meteorological Meters		MN		Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only) TH A#2083		BA928		Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
		HTC-1		HDE		2083	II	3/23/2018	3/23/2017
Cables		Range	Mfr				Cat	Calibration Due	Calibrated on
CEMI-13		9kHz - 2GHz	C-S				II	10/2/2017	1/2/2016
Attenuators		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20dB Attenuator-01		9kHz-2GHz			N/A		II	10/2/2017	10/2/2016

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 3kHz band during any time interval of continuous transmission. [15.247(e)]

### MEASUREMENTS / RESULTS

Peak Power Spectral Density								
Date: 13-Dec-17		Company: Powercast			Work Order: R1610			
Engineer: Chris Bramley		EUT: Powercast Transmitter			Operating Voltage/Frequency: 5V DC			
Temp: 21.4°C		Humidity: 32%		Pressure: 988mBar				
Frequency Range: 915MHz			Measurement Type: Conducted					
						Measurement Method: FCC 558074 D01 DTS Meas Guidance v04		
Notes: Average Method Used								
Data Mode	Frequency	Peak Reading	Cable Loss	Attenuator Loss	Peak PSD	Average Limit	Margin	Result
(kbps)	(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
16.67	915.0	-34.73	0.24	40.03	5.54	8.0	-2.46	Pass
8.33	915.0	-34.40	0.24	40.03	5.87	8.0	-2.13	Pass
Unmodulated	915.0	-34.31	0.24	40.03	5.97	8.0	-2.04	Pass
Test Site: EMC-3		Cable: Asset 2289		40dB Attenuator: Asset 2107				
Analyzer: EXA 1118472				Copyright Curtis-Straus LLC 2000				
PSD(dBm) = Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dBm)								

Rev. 12/10/2017

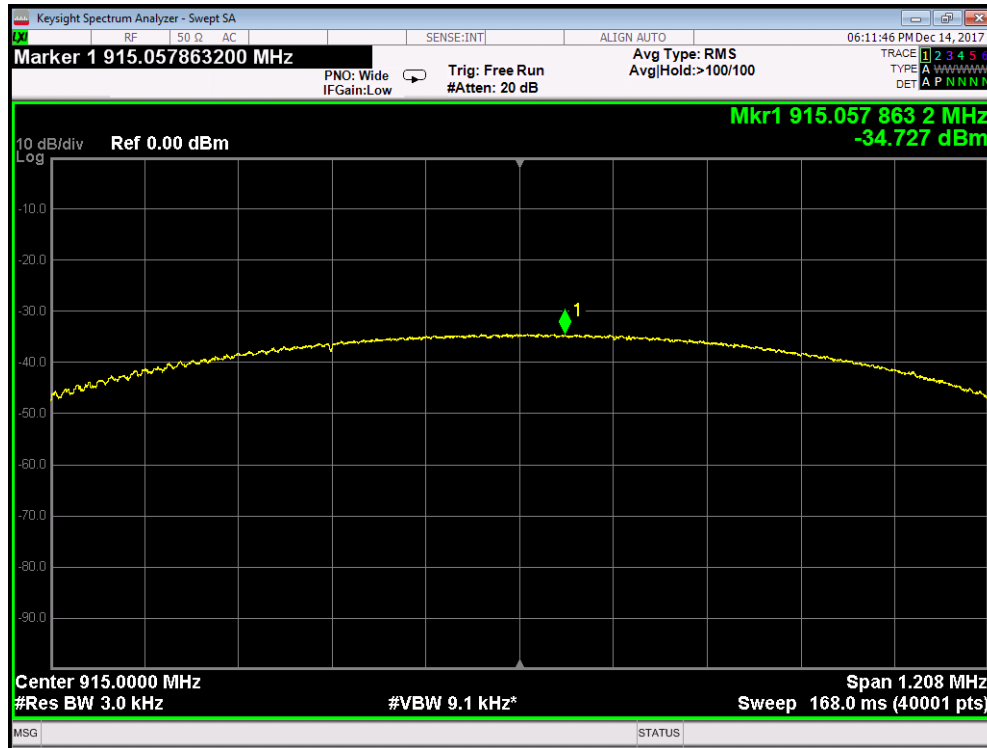
Spectrum Analyzers / Receivers/Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	7/25/2018	7/25/2017
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
API - 40dB 100W Attenuator	0.009-18GHz	48-40-34	API Weinschel	CG7990	2107	II	10/4/2018	10/4/2017
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021039		II	1/27/2018	1/27/2017
Meteorological Meters/Chambers	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2077	HTC-1	HDE		2077	II	3/23/2018	3/23/2017	

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

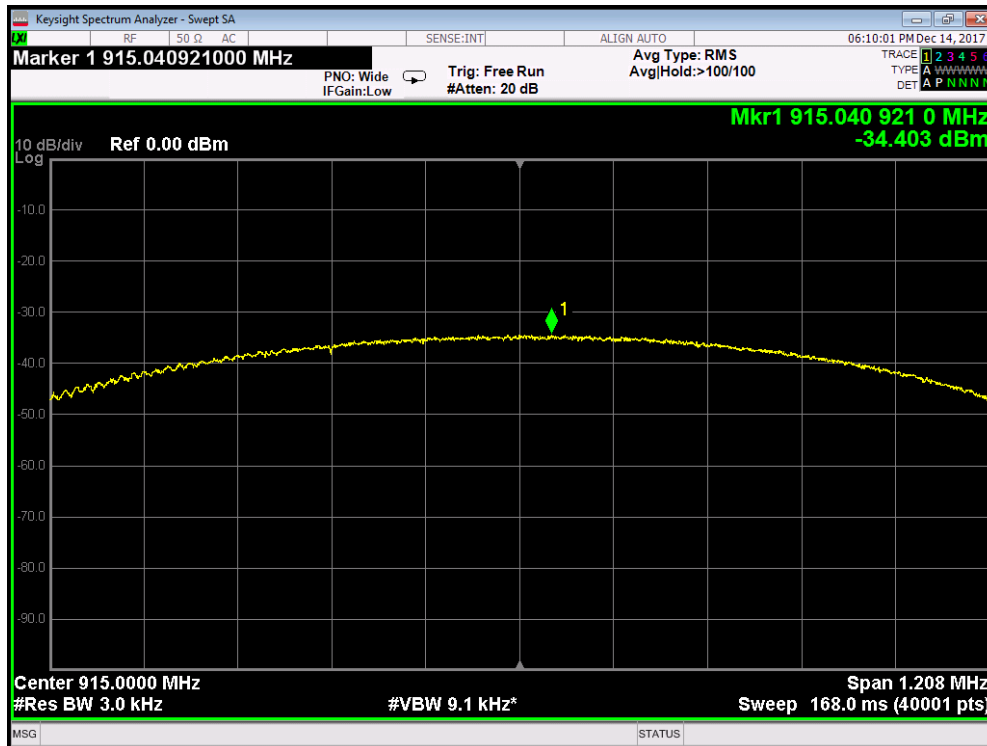




PLOTS

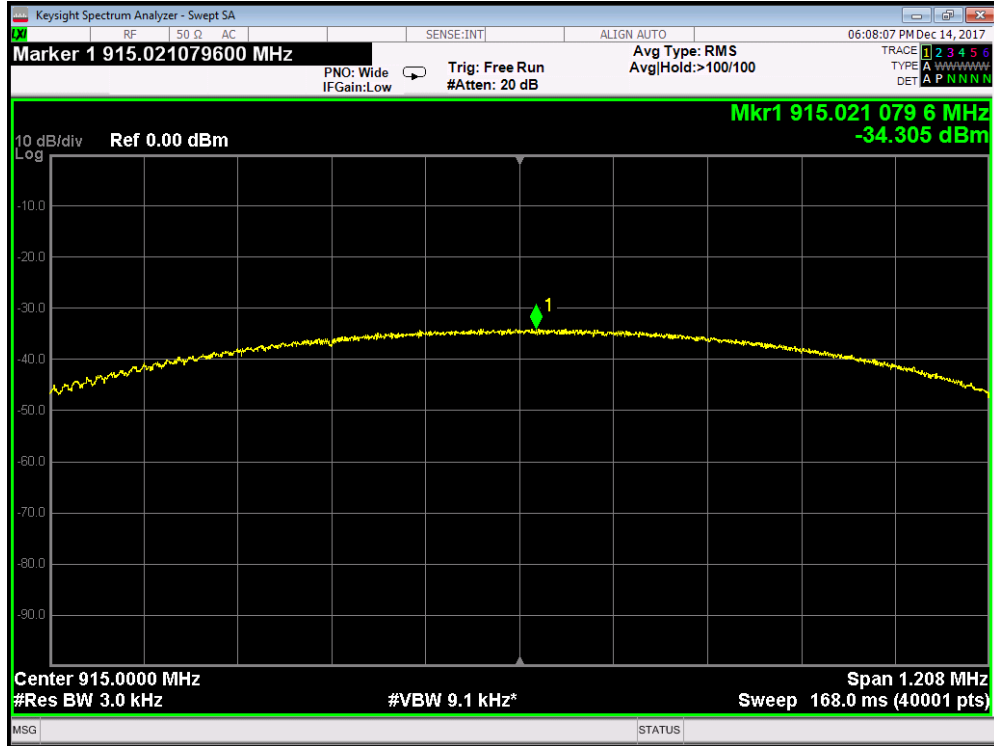


16.67kbps Data Mode



8.33kbps Data Mode





Unmodulated Mode

## AC Line Conducted Emissions

Limits:

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

\*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

## MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company Conducted Emissions per CISPR 16-2-1 Peak Detector Data Notes: EUT Line tested: 120VAC/60Hz; Neutral EUT Mode of Operation: 8.33kbps	Work Order # - R1610 EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-1 Conditions: - 20.8°C; 31%RH; 996mBar Test Engineer - JH Witnessed by - none
--	---

Data Taken at 03:13:07 PM, Tuesday, December 19, 2017

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)
0.159	28.8	20.9	49.7	65.5	-15.9	PASS	
0.228	24.1	20.9	44.9	62.5	-17.6	PASS	
0.439	21.4	20.9	42.3	57.1	-14.8	PASS	
0.464	21.2	20.8	42	56.6	-14.6	PASS	
0.534	28.7	20.8	49.5	56	-6.5	PASS	-6.5
0.569	16.4	20.8	37.2	56	-18.8	PASS	

Neutral Lead, 8.33kbps Rate, Peak Data



Curtis Straus - a Bureau Veritas Company Conducted Emissions per CISPR 16-2-1, CISPR Average Detector Final Average Detector Data Notes: EUT Line tested: 120VAC/60Hz; Neutral EUT Mode of Operation: 8.33kbps	Work Order # - R1610 EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-1 Conditions: - 20.8°C; 31%RH; 996mBar Test Engineer - JH Witnessed by - none
---	---

Data Taken at 03:13:07 PM, Tuesday, December 19, 2017

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)
0.155	8.7	20.9	29.5	55.7	-26.2	PASS	
0.16	8.7	20.9	29.6	55.5	-25.9	PASS	
0.225	9.8	20.9	30.6	52.6	-22	PASS	
0.533	20	20.8	40.8	46	-5.2	PASS	-5.2
0.534	19.9	20.8	40.7	46	-5.3	PASS	
0.538	19.1	20.8	39.9	46	-6.1	PASS	

Neutral Lead, 8.33kbps Rate, Average Data

Curtis Straus - a Bureau Veritas Company Conducted Emissions per CISPR 16-2-1 Peak Detector Data Notes: EUT Line tested: 120VAC/60Hz; Phase EUT Mode of Operation: 8.33kbps	Work Order # - R1610 EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-1 Conditions: - 20.8°C; 31%RH; 996mBar Test Engineer - JH Witnessed by - none
--	---

Data Taken at 03:32:46 PM, Tuesday, December 19, 2017

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)
0.155	33.5	20.9	54.5	65.7	-11.3	PASS	
0.192	32	20.9	53	64	-11	PASS	
0.222	29.7	20.9	50.7	62.7	-12.1	PASS	
0.273	27.9	20.9	48.8	61	-12.2	PASS	
0.476	21.8	20.9	42.6	56.4	-13.8	PASS	
0.534	28.5	20.9	49.4	56	-6.6	PASS	-6.6

Phase Lead, 8.33kbps Rate, Peak Data



Curtis Straus - a Bureau Veritas Company Conducted Emissions per CISPR 16-2-1, CISPR Average Detector Final Average Detector Data Notes: EUT Line tested: 120VAC/60Hz; Phase EUT Mode of Operation: 8.33kbps	Work Order # - R1610 EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-1 Conditions: - 20.8°C; 31%RH; 996mBar Test Engineer - JH Witnessed by - none
Data Taken at 03:32:46 PM, Tuesday, December 19, 2017	

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)
0.154	13.4	20.9	34.3	55.8	-21.5	PASS	
0.459	12	20.9	32.9	46.7	-13.8	PASS	
0.534	20	20.9	40.9	46	-5.1	PASS	-5.1
0.537	19.4	20.9	40.2	46	-5.8	PASS	
0.539	19.1	20.9	39.9	46	-6.1	PASS	
27.977	-6.4	21.1	14.7	50	-35.3	PASS	

**Phase Lead, 8.33kbps Rate, Average Data**

Rev. 12/18/2017

<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>	<b>Calibrated on</b>
Rental EXA Signal Analyzer(1118473)	9KHz-26.5GHz	N9010A-526;N	AT	MY51170076	1118473	I	5/19/2018	5/19/2017
<b>LISNs/Measurement Probes</b>	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
LISN Asset 1730	150kHz-30MHz	LI-150A	Com-Power	201090	1730	I	3/22/2018	3/22/2017
LISN Asset 1731	150kHz-30MHz	LI-150A	Com-Power	201091	1731	I	3/22/2018	3/22/2017
<b>Conducted Test Sites (Mains / Telco)</b>	<b>FCC Code</b>	<b>VCCI Code</b>		<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>		
CEMI 1	719150	A-0015		III	NA	NA		
<b>Meteorological Meters/Chambers</b>		<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2077		HTC-1	HDE		2077	II	3/23/2018	3/23/2017
<b>Cables</b>	<b>Range</b>		<b>Mfr</b>			<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
CEMI-15	9kHz - 2GHz		C-S			II	10/2/2018	10/2/2017
<b>Attenuators</b>	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
20dB Attenuator-64	9kHz-2GHz			N/A		II	11/6/2018	11/8/2017

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



Curtis Straus - a Bureau Veritas Company						Work Order # - R1610	
Conducted Emissions per CISPR 16-2-1						EUT Power Input - 120VAC/ 60Hz	
Peak Detector Tabular Data - Voltage Measurement						Test Site - CEMI- 5	
Operator: ZJ						Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar	
						EUT Maximum Freq - 915MHz	
						Requirement - FCC/CISPR Class B	
Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Quasi-peak Limit	Margin to the QP Limit	Peak to QP Limit Results	Worst Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.15	28	20.1	48	66	-18	PASS	
0.168	27.8	20.1	47.9	65.1	-17.2	PASS	
0.222	25.1	20.1	45.2	62.7	-17.5	PASS	
0.462	20.4	20.1	40.5	56.7	-16.2	PASS	
0.493	20.4	20.1	40.4	56.1	-15.7	PASS	
0.534	28.2	20.1	48.3	56	-7.7	PASS	-7.7
EUT Line tested: 120VAC/60Hz; Positive							
EUT Mode of Operation: 16.67kbps							

Hot Lead, 16.67kbps Rate, Peak Data

Curtis Straus - a Bureau Veritas Company						Work Order # - R1610	
Conducted Emissions per CISPR Average Detector						EUT Power Input - 120VAC/ 60Hz	
Final Average Detector Tabular Data - Voltage Measurement						Test Site - CEMI- 5	
Operator: ZJ						Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar	
						EUT Maximum Freq - 915MHz	
						Requirement - FCC/CISPR Class B	
Frequency	Raw Average Reading	Correction Factor	Adjusted Average Amplitude	Average Limit	Average Margin	Average Results	Worst Average Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.151	9.1	20.1	29.2	56	-26.7	PASS	
0.151	9.2	20.1	29.2	56	-26.7	PASS	
0.153	9.2	20.1	29.2	55.8	-26.6	PASS	
0.183	9.1	20.1	29.2	54.4	-25.2	PASS	
0.532	19.9	20.1	40	46	-6	PASS	-6
0.536	18.6	20.1	38.6	46	-7.4	PASS	
EUT Line tested: 120VAC/60Hz; Positive							
EUT Mode of Operation: 16.67kbps							



Hot Lead, 16.67kbps Rate, Average Data

Curtis Straus - a Bureau Veritas Company							Work Order # - R1610	
Conducted Emissions per CISPR 16-2-1							EUT Power Input - 120VAC/ 60Hz	
Peak Detector Tabular Data - Voltage Measurement							Test Site - CEMI- 5	
Operator: ZJ							Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar	
							EUT Maximum Freq - 915MHz	
							Requirement - FCC/CISPR Class B	
Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Quasi-peak Limit	Margin to the QP Limit	Peak to QP Limit Results	Worst Margin	
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB	
0.162	38.1	20.1	58.2	65.4	-7.2	PASS		
0.196	35.4	20.1	55.5	63.8	-8.3	PASS		
0.225	32.5	20.1	52.6	62.6	-10.1	PASS		
0.257	31.3	20.1	51.4	61.5	-10.1	PASS		
0.436	24.6	20.1	44.7	57.1	-12.5	PASS		
0.527	29.3	20.1	49.4	56	-6.6	PASS	-6.6	
Mod: 120VAC/60Hz; Positive Mod of Operation: 16.67kbps								

Neutral Lead, 16.67kbps Rate, Peak Data

Curtis Straus - a Bureau Veritas Company							Work Order # - R1610	
Conducted Emissions per CISPR Average Detector							EUT Power Input - 120VAC/ 60Hz	
Final Average Detector Tabular Data - Voltage Measurement							Test Site - CEMI- 5	
Operator: ZJ							Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar	
							EUT Maximum Freq - 915MHz	
							Requirement - FCC/CISPR Class B	
Frequency	Raw Average Reading	Correction Factor	Adjusted Average Amplitude	Average Limit	Average Margin	Average Results	Worst Average Margin	
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB	
0.157	14.5	20.1	34.6	55.6	-21	PASS		
0.158	14.5	20.1	34.6	55.5	-21	PASS		
0.163	14.5	20.1	34.6	55.3	-20.7	PASS		
0.434	13.4	20.1	33.4	47.2	-13.7	PASS		
0.442	13.1	20.1	33.1	47	-13.9	PASS		
0.535	20.2	20.1	40.3	46	-5.7	PASS	-5.7	
EUT Line tested: 120VAC/60Hz; Positive EUT Mode of Operation: 16.67kbps								



Neutral Lead, 16.67kbps Rate, Average Data

Curtis Straus - a Bureau Veritas Company				Work Order # - R1610			
Conducted Emissions per CISPR 16-2-1				EUT Power Input - 120VAC/ 60Hz			
Peak Detector Tabular Data - Voltage Measurement				Test Site - CEMI- 5			
Operator: ZJ				Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar			
				EUT Maximum Freq - 915MHz			
				Requirement - FCC/CISPR Class B			
Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Quasi-peak Limit	Margin to the QP Limit	Peak to QP Limit Results	Worst Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.154	30.1	20.1	50.2	65.8	-15.5	PASS	
0.196	24.6	20.1	44.6	63.8	-19.1	PASS	
0.228	23.2	20.1	43.3	62.5	-19.2	PASS	
0.409	19.3	20.1	39.3	57.7	-18.3	PASS	
0.441	21.1	20.1	41.2	57	-15.9	PASS	
0.534	28.1	20.1	48.1	56	-7.9	PASS	-7.9
EUT Line tested: 120VAC/60Hz; Neutral							
EUT Mode of Operation: CW							

Hot Lead, CW Mode, Peak Data

Curtis Straus - a Bureau Veritas Company				Work Order # - R1610			
Conducted Emissions per CISPR Average Detector				EUT Power Input - 120VAC/ 60Hz			
Final Average Detector Tabular Data - Voltage Measurement				Test Site - CEMI- 5			
Operator: ZJ				Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar			
				EUT Maximum Freq - 915MHz			
				Requirement - FCC/CISPR Class B			
Frequency	Raw Average Reading	Correction Factor	Adjusted Average Amplitude	Average Limit	Average Margin	Average Results	Worst Average Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.535	19.4	20.1	39.5	46	-6.5	PASS	-6.5
EUT Line tested: 120VAC/60Hz; Neutral							
EUT Mode of Operation: CW							

Hot Lead, CW Mode, Average Data





Curtis Straus - a Bureau Veritas Company				Work Order # - R1610			
Conducted Emissions per CISPR 16-2-1				EUT Power Input - 120VAC/ 60Hz			
Peak Detector Tabular Data - Voltage Measurement				Test Site - CEMI- 5			
Operator: ZJ				Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar			
				EUT Maximum Freq - 915MHz			
				Requirement - FCC/CISPR Class B			
Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Quasi-peak Limit	Margin to the QP Limit	Peak to QP Limit Results	Worst Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.162	41.4	20.1	61.5	65.4	-3.9	PASS	-3.9
0.193	36.1	20.1	56.2	63.9	-7.7	PASS	
0.254	31.6	20.1	51.7	61.6	-9.9	PASS	
0.302	29.8	20.1	49.8	60.2	-10.3	PASS	
0.43	24.2	20.1	44.2	57.3	-13	PASS	
0.531	28.9	20.1	49	56	-7	PASS	
EUT Line tested: 120VAC/60Hz; Neutral							
EUT Mode of Operation: CW							

Neutral Lead, CW Mode, Peak Data

Curtis Straus - a Bureau Veritas Company				Work Order # - R1610			
Conducted Emissions per CISPR Average Detector				EUT Power Input - 120VAC/ 60Hz			
Final Average Detector Tabular Data - Voltage Measurement				Test Site - CEMI- 5			
Operator: ZJ				Temp; Humid; Pres - 22.6°C; 49%RH; 1010mBar			
				EUT Maximum Freq - 915MHz			
				Requirement - FCC/CISPR Class B			
Frequency	Raw Average Reading	Correction Factor	Adjusted Average Amplitude	Average Limit	Average Margin	Average Results	Worst Average Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.149	1.7	20.1	21.8				
0.15	14.6	20.1	34.6	56	-21.4	PASS	
0.15	14.5	20.1	34.6	56	-21.4	PASS	
0.153	14.5	20.1	34.6	55.8	-21.3	PASS	
0.154	14.5	20.1	34.6	55.8	-21.2	PASS	
0.428	13.4	20.1	33.5	47.3	-13.8	PASS	
0.532	21.5	20.1	41.6	46	-4.4	PASS	-4.4
EUT Line tested: 120VAC/60Hz; Neutral							
EUT Mode of Operation: CW							

Neutral Lead, CW Mode, Average Data



Rev. 8/5/2017

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	7/25/2018	7/25/2017	
Conducted Test Sites (Mains / Telco)									
	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on	
CEMI 5	719150		A-0015			III	NA	N/A	
Meteorological Meters									
		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2082		HTC-1	HDE		2082	II	3/23/2018	3/23/2017	
Cables									
	Range		Mfr			Cat	Calibration Due	Calibrated on	
CEMI-15	9kHz - 2GHz		C-S			II	10/2/2017	1/2/2016	
Attenuators									
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
20dB Attenuator-01	9kHz-2GHz			N/A		II	10/2/2017	10/2/2016	
LISNs/Measurement Probes									
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
LISN Asset 1730	150kHz-30MHz	LI-150A	Com-Power	201090	1730	I	3/22/2018	3/22/2017	
LISN Asset 1731	150kHz-30MHz	LI-150A	Com-Power	201091	1731	I	3/22/2018	3/22/2017	

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



### Occupied Bandwidth

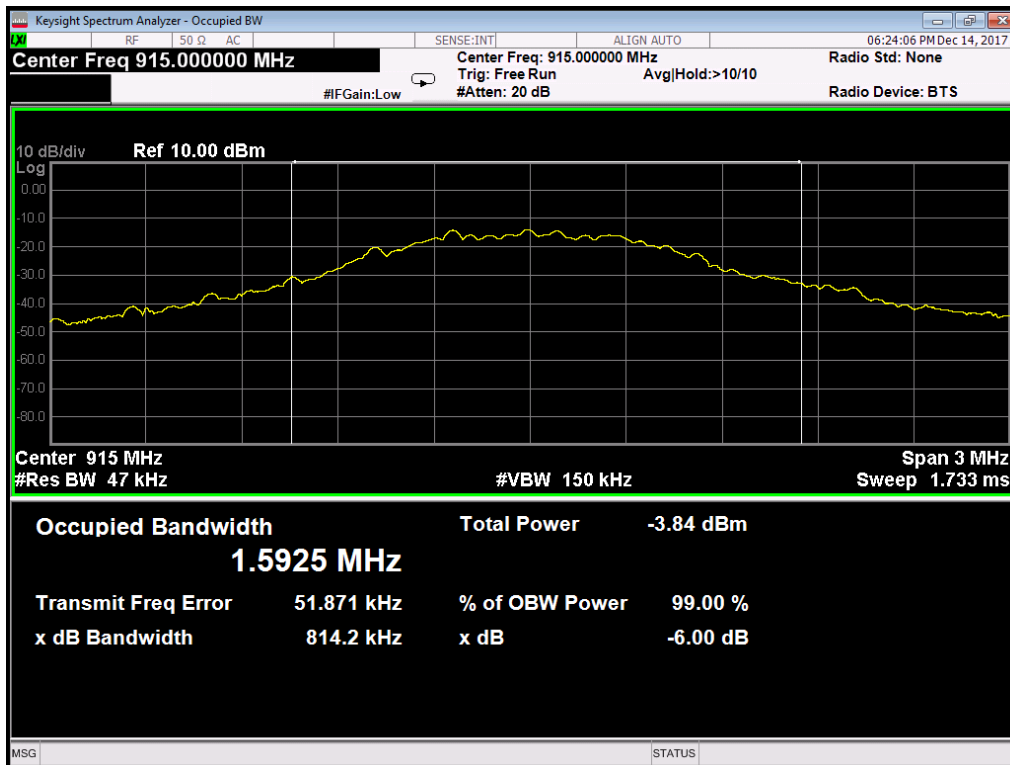
Requirement: When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is its 99% emission bandwidth, as calculated or measured.

[RSS-GEN 6.6]

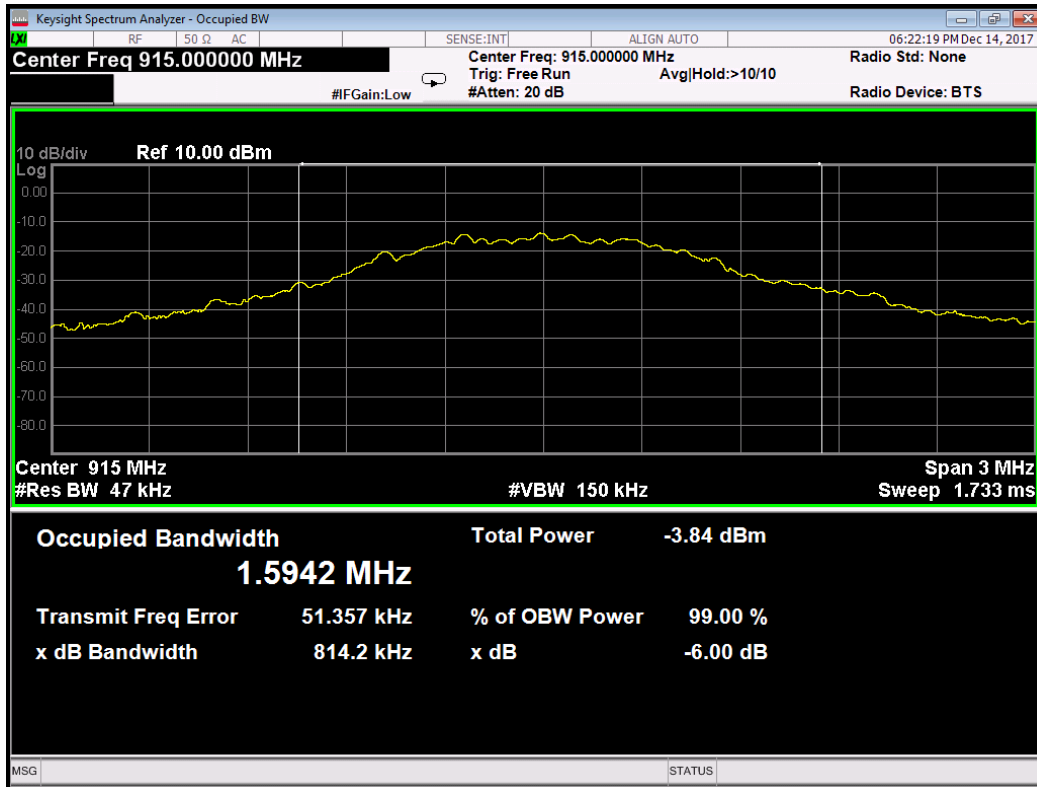
### MEASUREMENTS / RESULTS

99% Occupied Bandwidth			
Date: 13-Dec-17	Company: Powercast	Work Order: R1610	
Engineer: Chris Bramley	EUT: Powercast Transmitter	Operating Voltage/Frequency: 5V DC	
Temp: 21.4°C	Humidity: 32%	Pressure: 988mBar	
Frequency Range: 915MHz		Measurement Type: Conducted	
Measurement Method: FCC 558074 D01 DTS Meas Guidance v04			
Notes:			
Data Mode (kbps)	Frequency (MHz)	99% OBW (MHz)	
16.67	915	1.5942	
8.33	915	1.5925	
Unmodulated	915	1.5928	
Test Site: EMC-3	Cable: Asset 2289	40dB Attenuator: Asset 2107	
Analyzer: EXA 1118472			Copyright Curtis-Straus LLC 2000

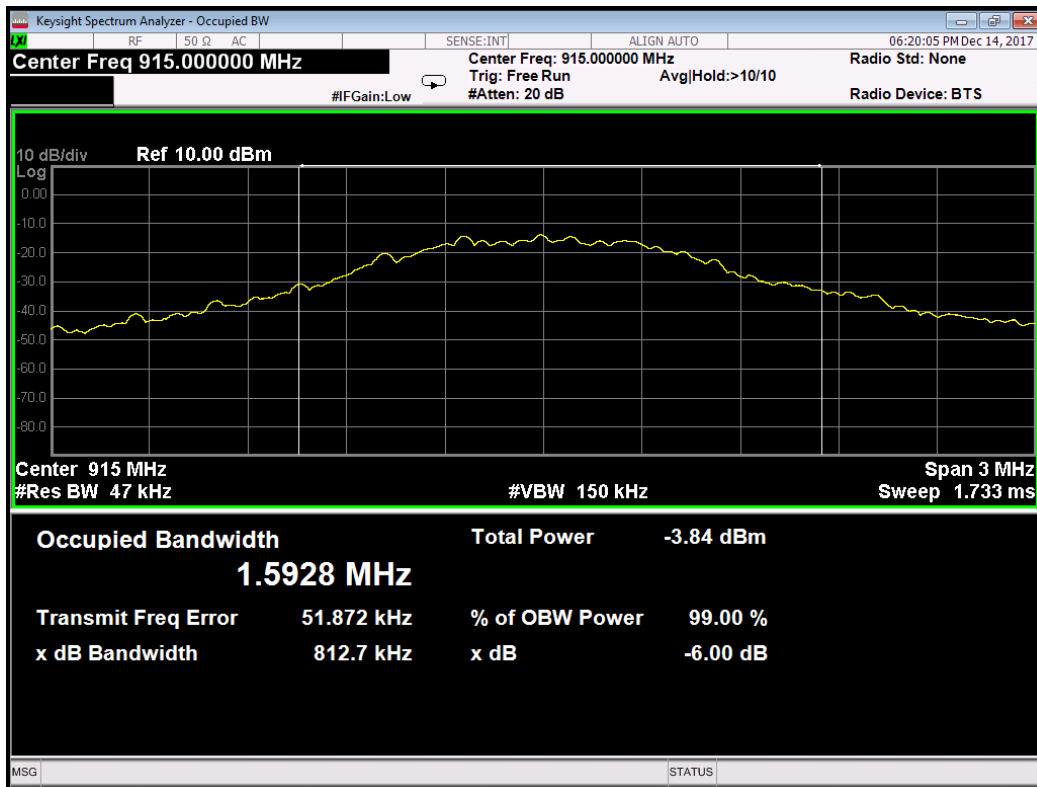
### PLOTS



8.33kbps Data Mode



16.67kbps Data Mode



Unmodulated Mode

### 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 (Ucisprr)
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)	$3.23 \times 10^{-8}$	$1 \times 10^{-7}$
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% 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



## 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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