Test Report



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

Report No	ES2174-1
Client	Powercast Corporation
Address	620 Alpha Dr. Pittsburgh, PA 15238
Phone	412-436-4077
Items tested FCC ID IC ID FRN	Powercaster Transmitter (Model: TX91501B) YESTX91501B 8985A-TX91501B 0019814789
Equipment Type Equipment Code Emission Designator	Digital Transmission System DTS 1M51G1D
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	August 31, 2018 to September 21, 2018
Results	As detailed within this report
Prepared by	Auk Jun Arik Zwirzer - Sr. EMC Engineer
Authorized by	Yupus Fazilogu - Sr. Engineer
Issue Date	0/23/18
Conditions of Issue	This Test Report is issued subject to the conditions stated in the ' <i>Conditions of Testing</i> ' section on page 51 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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page 1 of 52

Contents

0
.3
.4
.5
.6
.6
.7
.7
11
15
22
28
34
38
46
50
51

Form Final Report REV 12-07-15



Summary

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

The product is Powercaster Transmitter, Model Number: TX91501B. It is a transmitter that operates at 915MHz.

The CW (low data rate) mode was for testing only. Data will always be included in the transmission.

We found that the product met the above requirements with modification (see *Modifications Required for Compliance* section on page 6). The test sample was received in good condition.

Release Control Record Issue No. Reason fo

ue No. Reason for change 1 Original Release Date Issued October 23, 2018



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page 3 of 52

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 axes as well as varying the test antenna's height and polarity. Worst case orientation was found to be in upright position and all radiated emissions tests were performed in this orientation. EUT antenna is internal and therefore it cannot be maximized separately.

EUT operating voltage is 100-240VAC.

For AC line conducted emissions $50\Omega/50\mu H$ LISN was used.

Environmental conditions are shown on the associated data tables.

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

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





page 4 of 52

Product Tested - Configuration Documentation

					10	UT Co	onfiguration							
Work O	rder:	S2174												
Com	pany:	Powerc	ast Corporat	ion										
Company Add		620 Alj	pha Dr											
		Pittsbu	rgh, PA, 152	38										
Cor	ntact:	Dan Ha	arrist											
				MN				PN	I			SN		
	EUT:			91501B								Sample	e 1	
EUT Descri	ption:	915MH	Iz Transmitte	er										
EUT Max Frequ	ency:	915 MI												
EUT Min Frequ	ency:	915 MI	Hz											
EUT Components				MI	N						SN			
Radiated Unit				TX915	-						Sample	e 1		
Conducted Unit				TX915	-						Sample	e 2		
Phihong AC/DC Suppl	у			PSAC05F	R-050L6				Sample 1					
							-							
Port Label	Port	Туре	# ports	# populated	cable ty	уре	shielded		ferrites	length (m)	in/out	under test	comment	
AC Mains	Powe	r AC	1	1	Power A	С	No	No	0	1.47	in	yes		
Software Operating N														
Transmitting at 915MF	Iz in on	e of three	e modes: 8.33	3kbps, 16.67kbp	s, CW									
Performance Criteria	:													
EMI only														
					0	Clock I	Frequencies							
frequenci	es (MH	z) 915	i											





page 5 of 52

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 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
6.7				Occupied Bandwidth measurements were performed.

Modifications Required for Compliance

The seam between the board level shield fence and the shield cover was sealed using conductive tape.





page 6 of 52

Test Results

Bandwidth

LIMIT

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

MEASUREMENTS / RESULTS

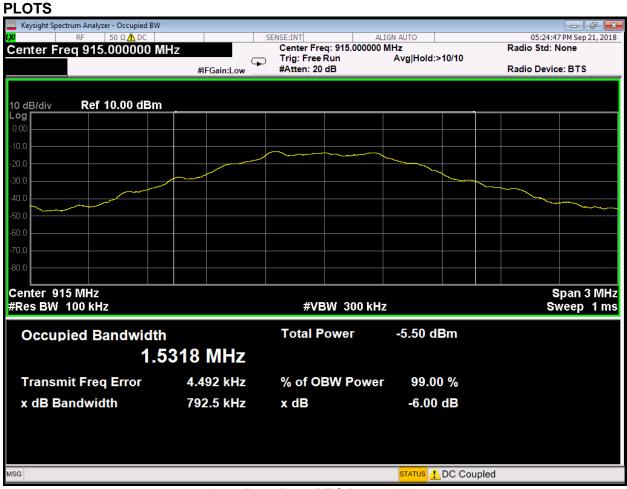
	6dB Bandwidth										
Date:	20-Sep-18	Com	pany: Power	cast					V	Vork Orde	er: S2174
Engineer:	Chris Bramley		EUT: TX-915	-01B			Oper	ating	g Voltage/	Frequenc	y: 5V DC
Temp:	Temp: 24.0°C Humidity: 47% Pressure: 1017mBar										
Fred	uency Range:	915MHz		Measurement	Type: Condu	cted					
	Measurement Method: FCC 558074 D01 DTS Meas Guidance v05										
Notes:											
									e	dB Band	width
Data Mode	Frequency		Reading							Margin	Result
(kbps)	(MHz)			(kHz)					(kHz)	(kHz)	(Pass/Fail)
16.67	915			793.9					≥500	294	Pass
8.33	915		792.6						≥500	293	Pass
CW	915		792.5						≥500	293	Pass
Test Site:		C	able: Asset	2289	40dB	Attenuator:	Asset 2	096			
	EXA 1118473									Copyright	Curtis-Straus LLC 2000
Rev. 9/19/2018 Spectrum Anal	yzers / Receivers /Pr	eselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration	Due Cal	ibrated on
	A Signal Analyzer(111		9KHz-26.5GHz	N9010A-526;N	AT	MY51170076	1118473	T	6/19/201	9 6	/19/2018
Conducted	d Test Sites (Mains / '	ſelco)	FCC Code		VCCI Code			Cat	Calibration	Due Cal	ibrated on
	CEMI 3		719150		A-0015			III	NA		N/A
	Meteorological Meters/Chambers Weather Clock (Pressure Only) TH A#2078				Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2078	Cat I	Calibration 5/15/202 3/22/201	20 5	ibrated on /15/2018 /22/2018
	Cables Asset #2289		Range 9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mfr Mini-Circuits	16021039		Cat II	Calibration 1/29/201		ibrated on /29/2018
	dB 100W Attenuators	Filters	Range 0.009-4000MHz	MN BW-40N100W+	Mfr Mini-Circuits	SN V N383401508	Asset 2096	Cat II	Calibration 10/2/201		ibrated on 0/2/2017

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





page 7 of 52



Low Data Rate DTS Bandwidth





Keysight Spectrum Analyzer - Occupied BW									
$RF = 50 \Omega \Lambda DC$		SENSE:INT AL	LIGN AUTO	05:29:57 PM Sep 21, 2018					
Center Freq 915.000000 M	Hz	Center Freq: 915.00000		Radio Std: None					
Center Tred 915.000000 M	112	Trig: Free Run	Avg Hold:>10/10						
	#IFGain:Low	#Atten: 20 dB	•	Radio Device: BTS					
10 dB/div Ref 10.00 dBm									
Log									
0.00									
-10.0									
-10.0									
-20.0									
-30.0									
and the second s									
-40.0				mark and the second sec					
-50.0									
co.o.									
-60.0									
-70.0									
-80.0									
-00.0									
Center 915 MHz				Span 3 MHz					
#Res BW 100 kHz		#\/B\M_200 KH	-	Sweep 1 ms					
#Res BW 100 KHZ		#VBW 300 kH	2	Sweep Tims					
Occurried Develoption		Total Power	-5.47 dBm						
Occupied Bandwidth		rotar Fower	-3.47 UBIII						
1 5	657 MHz								
1.0									
Transmit Freq Error	11.348 kHz	% of OBW Power	r 99.00 %						
x dB Bandwidth	792.6 kHz	x dB	-6.00 dB						
MSG 🕕 File <6dB 16.67.png> saved			STATUS 1. DC Coup	led					
The Youb To.or.phy Saved				icu					
	Middle Data Rate DTS Bandwidth								

iviladie Data Rate DIS Bandwidth





				- ē ×		
🗶 RF 50 Ω 🧥 DC			GN AUTO	05:27:03 PM Sep 21, 2018		
Center Freq 915.000000 MH	z	Center Freq: 915.000000		Radio Std: None		
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold:>10/10	Radio Device: BTS		
10 dB/div Ref 10.00 dBm	-					
Log 0.00						
-10.0						
-20.0						
-30.0						
-40.0				and		
- marine - marine -				and a second		
-50.0						
-60.0						
-70.0						
-80.0						
-00.0						
Center 915 MHz				Span 3 MHz		
#Res BW 100 kHz		#VBW 300 kHz		Sweep 1 ms		
		Total Power	-5.47 dBm			
Occupied Bandwidth		I Otal Fower	-3.47 UBIII			
1.5	644 MHz					
Transmit Freq Error	10.919 kHz	% of OBW Power	99.00 %			
x dB Bandwidth			-6.00 dB			
X dB Bandwidth	793.9 kHz	x dB	-0.00 aB			
MSG 🚺 File <6dB CW.png> saved			STATUS 1 DC Coup	ed		
		Data Rate DTS Band				

High Data Rate DTS Bandwidth





Peak Power

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

MEASUREMENTS / RESULTS

	Peak Output Power										
Date:	21-Sep-18		Company: Powercast				Work Orde	r: S2174			
Engineer:	Chris Bramley		EUT: TX-915-01	3		Operating	Voltage/Frequenc	y: 5V DC			
Temp:	24.0°C		Humidity: 47%		Pressure: 1010mBar						
Freq	uency Range:	915MHz	Measurement Type: Conducted								
	Measurement Method: FCC 558074 D01 DTS Meas Guidance v05										
Notes:	Average Metho	d Used - 8.3.2.2 Meth	od AVGSA-1								
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	-12.39	0.17	38.50	26.28	27.657	-1.38	Pass			
8.33	915.0	-12.63	0.17	38.50	26.04	27.657	-1.62	Pass			
CW	915.0	-12.17	0.17	38.50	26.50	27.657	-1.16	Pass			
Test Site:	CEMI-3		Cable: Asset 228	9	40dB Attenuator:	Asset 2096					
Analyzer:	EXA 1118473										
Peak Output Po	eak Output Power (dBm)= Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB) Copyright Curtis-Straus LLC 2000										

(Note: the antenna gain is 8.343dBi)

Rev. 9/19/2018								
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			Ш	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	1	5/15/2020	5/15/2018
TH A#2078		HTC-1	HDE		2078	Ш	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		Ш	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	Ш	10/2/2018	10/2/2017

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





page 11 of 52

PLOTS



Low Data Rate Fundamental Emission Output Power





10 dB/div Ref 0.00 dBm Con Con Con Con Con Con Con Con	Keysight Spectrum Analyzer - Channel P	ower							
Center Pred 315.000000 WHZ Free Num Avg/Hold Num Avg/Hold Num #Fig. Free Num Avg/Hold Num Radio Device: BTS Avg/Hold Num 10 dB/div Ref 0.00 dBm 0 0 0 10 dB/div Ref 0.00 dBm 0 0 0 0 10 dB/div Ref 0.00 dBm 0 0 0 0 10 dB/div Ref 0.00 dBm 0 0 0 0 0 20 0 0 0 0 0 0 0 0 20 0 0 0 0 0 0 0 0 0 20 0 0							Me	as Setup	
Avg/Hold Num #/FGain:Low #Atten: 20 dB Radio Device: BTS Avg/Hold Num 100 100 dB/div Ref 0.00 dBm 100 200 200 400 400 400 400 400 4	Center Freq 915.00000		Trig: Free Run Av	/g Hold:>100/100	Radio Stu	None			
10 dB/div Ref 0.00 dBm 10 dB/div 20 d 20 d			#Atten: 20 dB		Radio Dev	ice: BTS	Avg/Hold Num		
10 dB/div Ref 0.00 dBm 10 dF/div Ref 0.00 dBm 10 dF/							0	100	
Avg Mode 200 200 200 200 200 200 200 20		n					<u>On</u>	Οπ	
200 200 200 200 200 200 200 200								Ava Mode	
300 400 400 400 400 400 400 400 400 400	-20.0						Exp	-	
40.0 40.0	-30.0		·····						
Sond Integ BW Sond Integ BW <td< td=""><td></td><td></td><td></td><td>- Contraction of the second se</td><td></td><td></td><td></td><td></td></td<>				- Contraction of the second se					
1.5078 MHz 1.5078								Integ BW	
70.0						June		1.5078 MHz	
80.0 Image: Constraint of the state o	-60.0								
Solution Solution Span 2.5 MHz Center 915 MHz Span 2.5 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.467 ms Channel Power Power Spectral Density -12.63 dBm / 1.508 MHz -74.41 dBm /Hz	-70.0								
Center 915 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.467 ms Channel Power Power Spectral Density -12.63 dBm / 1.508 MHz -74.41 dBm /Hz PhNoise Op Fast Tuning Auto Mar	-80.0								
#Res BW 30 kHz #VBW 100 kHz Sweep 3.467 ms Channel Power Power Spectral Density -12.63 dBm / 1.508 MHz -74.41 dBm /Hz More	-90.0								
#Res BW 30 kHz #VBW 100 kHz Sweep 3.467 ms Channel Power Power Spectral Density -12.63 dBm / 1.508 MHz -74.41 dBm /Hz More									
Channel Power Power Spectral Density -12.63 dBm / 1.508 MHz -74.41 dBm /Hz PhNoise Op Fast Tuning Auto Mar			40/DW/ 400 kH-		Spar	1 2.5 MHz			
-12.63 dBm / 1.508 MHz -74.41 dBm /Hz	#Res BW 30 KHZ		#VBW TUUKHZ		Sweep	3.407 ms			
-12.63 dBm / 1.508 MHz -74.41 dBm /Hz			D	to - I Door -					
-12.63 dBm / 1.508 MHz -74.41 dBm /Hz	Channel Power		Power Sp	bectral Dens	ity			hNaiss Ont	
-12.63 dBm / 1.508 MHz -/4.41 dBm /Hz Auto Mar			_						
	– -12.63 dBm	/ 1.508 MHz	-74	.41 dBm	/Hz			Man	
								Marra	
								1 of 2	
ISG STATUS Coupled	MSG			STATUS	DC Cou	upled			

Middle Data Rate Fundamental Emission Output Power





🛄 Keysight Spectru	um Analyzer - Cł	hannel Power									
Center Free					NSE:INT reg: 915.000	000 MHz	ALIGN AUTO	07:08:16 P Radio Std	M Sep 22, 2018	M	eas Setup
Center Fred	q 915.00			Trig: Free	e Run		:>100/100				
		#I	FGain:Low	#Atten: 2	0 dB			Radio Dev	vice: BTS	Av	g/Hold Num 100
										On	Off
10 dB/div	Ref 0.00) _{dBm}									
Log -10.0											
											Avg Mode
-20.0										Exp	Repeat
-30.0			~~~~~								
-40.0											Integ BW
-50.0											1.5088 MHz
-60.0											
-70.0											
-80.0											
-90.0											
Center 915									n 2.5 MHz		
#Res BW 3	0 kHz			#VE	3W 100 I	(Hz		Sweep	3.467 ms		
Channe	el Power	r			Power	r Spectr	al Dens	sity			
											hNoise Opt
-12	2.39 dl	Bm <i>1 '</i>	1.509 M	Hz		74.18	dBm	/Hz		Auto	Fast Tuning ► Man
										ruto	man
											More
											1 of 2
MSG							STATU	s 🚺 DC Co	upled		

High Data Rate Fundamental Emission Output Power





Band Edge Measurements

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)]

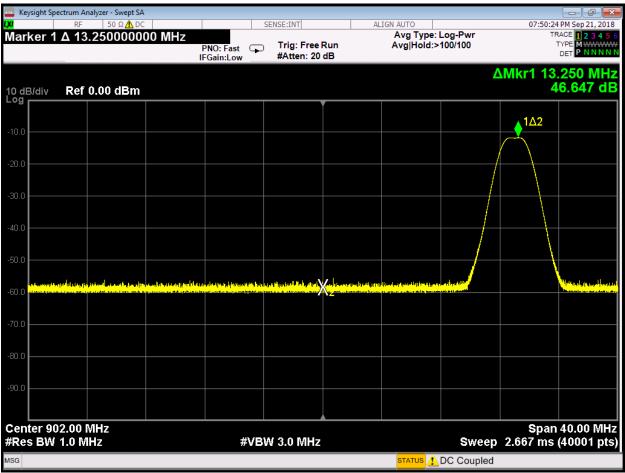
			Conducted	Bandeo	ige						
Date	: 20-Sep-18	Company	: Powercast						Work	Order:	S2174
Engineer	: Chris Bramley	EUT	Г: TX-915-01B			Ор	eratiı	ng Voltage	e/Frec	uency:	5V DC
Temp	: 24.0°C	Humidity	/: 47%	Pressure: 10	017mBar						
	Frequency Range: 90	2-928 MHz	Measure	ment Type: C	onducted						
Notes	S.										
			E	andedge Delta					Li	imit	Result
				(dB)					(dB)	(Pass/Fai
16.67kbps	Low Bandedge			41.3					2	: 30	Pass
Data Mode	High Bandedge			39.1					2	: 30	Pass
8.33kbps	Low Bandedge			39.6					≥	: 30	Pass
Data Mode	High Bandedge			38.6					\sim	: 30	Pass
CW	Low Bandedge			46.6						: 30	Pass
CVV	High Bandedge			47.2					\sim	: 30	Pass
Test Site	: CEMI-3	Cable	e: Asset 2289	40dB	Attenuator:	Asset 2					
	: EXA 1118473						(Copyright C	Curtis-S	Straus Ll	_C 2000
	zers / Receivers /Preselectors Signal Analyzer(1118473)	s Range 9KHz-26.5GHz	MN N9010A-526;N	Mfr AT	SN MY51170076	Asset 1118473	Cat I	Calibration 6/19/20		Calibra 6/19/2	
Conducted	Test Sites (Mains / Telco) CEMI 3	FCC Code 719150		VCCI Code A-0015			Cat ∭	Calibration NA	n Due	Calibra N/	
											Ą
	ogical Meters/Chambers r Clock (Pressure Only) TH A#2078		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2078	Cat I II	Calibration 5/15/20 3/22/20	20	Calibra 5/15/2 3/22/2	ed on 2018
	r Clock (Pressure Only)	Range 9KHz-26.5GHz	BA928	Mfr Oregon Scientific		831	1	5/15/202	20 19 n Due	5/15/2	ed on 2018 2018 2018 ed on

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





PLOTS

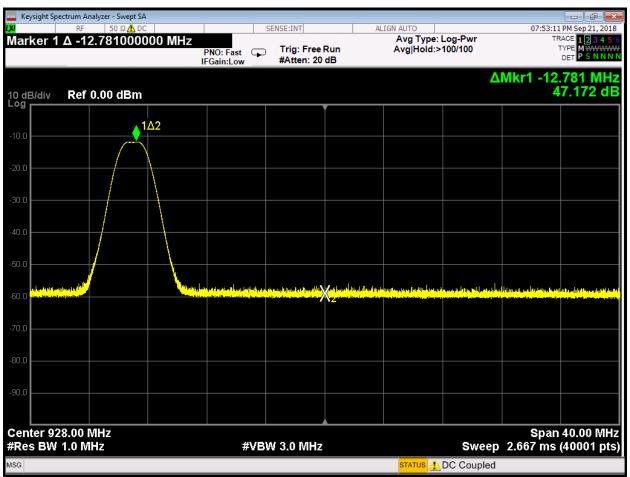


Low Data Rate Lower Band Edge





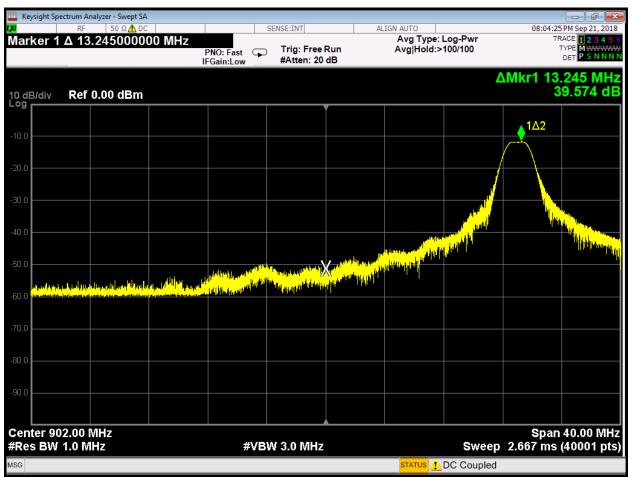
page 16 of 52



Low Data Rate Upper Band Edge



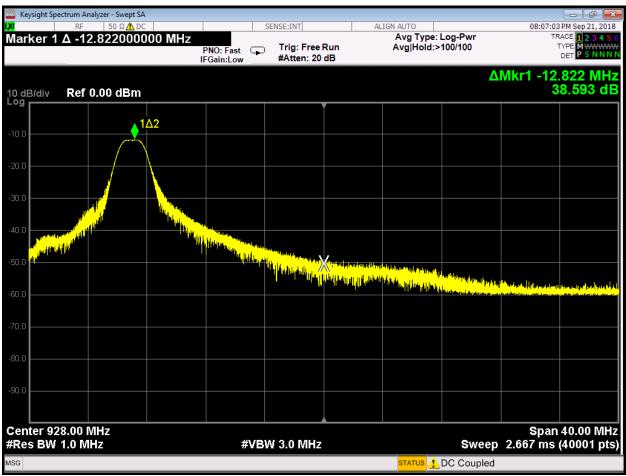




Mid Data Rate Lower Band Edge



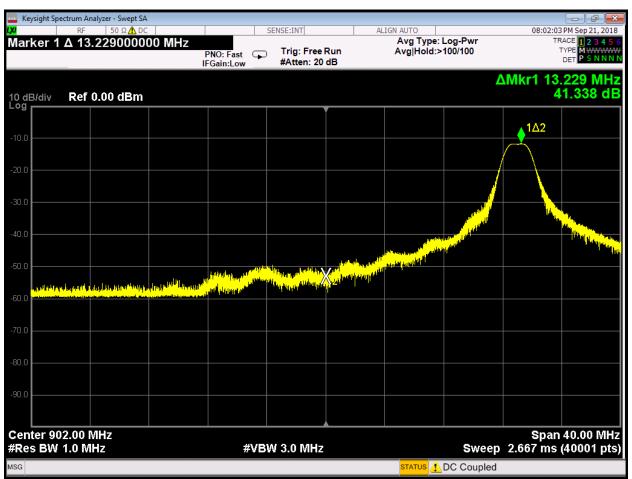




Mid Data Rate Upper Band Edge



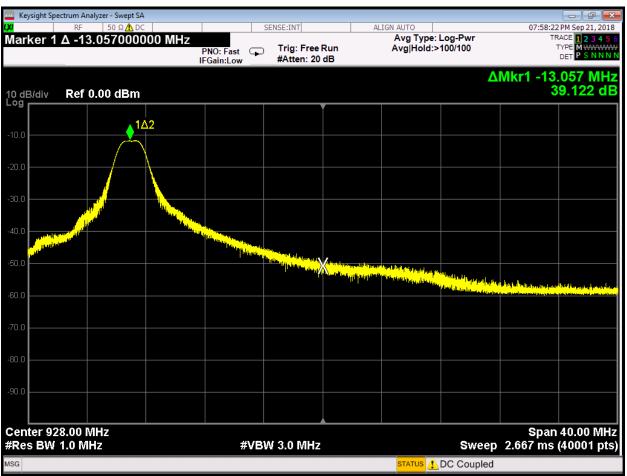




High Data Rate Lower Band Edge







High Data Rate Upper Band Edge





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

Low Data Rate:

30-1000MH Operator: Notes:	Emissions E Hz Horizon ZJ	ilectric Fiel tal Data	ld 3m Dista	nce mber 17, 2	018	Work Orde EUT Power Test Site - Conditions	Input - 12 CH-1	20V/60Hz 1%RH; 1013r	mBar				
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude		Margin to Lim1	Test Results Lim1	Worst Margin Lim1	Lim2: FCC_pt15_1 09 Class B	Margin to Lim2	Test Results Lim2	Worst Margin Lim2	Antenna Height	EUT Azimuth
(MHz) (dB/w) (dB/w/m) (dbµV/m) (dB) (Pass/Fail) (dB) (dBµV/m) (dB) (Pass/Fail) (dB) (dBµV/m) (dB) (Cm) (degrees)													
30.116	30.2	-7.8	22.5	40	-17.5	PASS	-17.5	40	-17.5	PASS	-17.5	232	245
55.793	43.9	-21.9	21.9	40	-18.1	PASS		40	-18.1	PASS		252	280
131.785	36.3	-14.7	21.6	43.5	-21.9	PASS		43.5	-21.9	PASS		225	295
490.945	32.1	-9.7	22.4	46	-23.6	PASS		46	-23.6	PASS		100	245
564.565	35.4	-8.3	27.1	46	-19	PASS		46	-19	PASS		194	80
775.156	25.4	-2.9	22.4	46	-23.6	PASS		46	-23.6	PASS		125	62
Radiated E 30-1000MH Operator: Notes:	Hz Vertical ZJ	ilectric Fiel Data	ld 3m Dista	nce mber 17, 2	018	Work Orde EUT Power Test Site - Conditions	· Input - 12 CH-1	20V/60Hz %RH; 1013i	nBar				
				Lim1:			Worst	Lim2:			Worst		
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	FCC_pt15_1 09_Class_B	Margin to Lim1	Test Results Lim1	Margin Lim1	FCC_pt15_1 09_Class_B	Margin to Lim2	Test Results Lim2	Margin Lim2	Antenna Height	EUT Azimuth
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
31.387	43	-8.8	34.2	40	-5.8	PASS	-5.8	40	-5.8	PASS	-5.8	125	160
34.891	43.9	-11.3	32.6	40	-7.4	PASS		40	-7.4	PASS		125	115
35.262	43.8	-11.6	32.2	40	-7.8	PASS		40	-7.8	PASS		109	87
55.844	55.6	-21.9	33.7	40	-6.3	PASS		40	-6.3	PASS		125	29
132.609	37.2	-14.8	22.4	43.5	-21.1	PASS		43.5	-21.1	PASS		125	196
814.548	25.2	-2.6	22.6	46	-23.4	PASS		46	-23.4	PASS		147	96





Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 3m Distance 1-6GHz Horizontal Data Operator: AKZ Notes: Zero data rate, upright orientation Work Order - S2174 EUT Power Input - 120Vac/60Hz Test Site - CH-1 Conditions - 24°C; 55%RH; 1010mBar

Data Taken at 04:12:55 PM, Friday, September 14, 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)	•	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1829.3	49.1	41.1	4.2	53.3	74	-20.7	PASS		45.3	54	-8.7	PASS		196	42
2746.1	44.5	35.6	7.2	51.7	74	-22.3	PASS		42.8	54	-11.2	PASS		225	219
3280.6	34.9	25.9	9.8	44.7	74	-29.3	PASS		35.7	54	-18.3	PASS		225	141
3661.5	46.6	38	10.7	57.3	74	-16.7	PASS	-16.7	48.8	54	-5.2	PASS	-5.2	225	141
4577.3	36.1	28.4	11.5	47.7	74	-26.3	PASS		39.9	54	-14.1	PASS		299	197
5487.2	36.8	27.5	13.8	50.6	74	-23.4	PASS		41.3	54	-12.7	PASS		207	117

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 3m Distance 1-6GHz Vertical Data Operator: AKZ Work Order - S2174 EUT Power Input - 120Vac/60Hz Test Site - CH-1 Conditions - 24°C; 55%RH; 1010mBar

Zero data rate, upright orientation

Notes:

Data Taken at 04:12:55 PM, Friday, September 14, 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)		Av Lim: FCC_pt15_2 09_Average (dBµV/m)			Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1829.6	48.9	41.5	4.2	53.1	74	-20.9	PASS		45.7	54	-8.3	PASS		284	3
2745.9	47.1	39.9	7.2	54.2	74	-19.8	PASS		47.1	54	-6.9	PASS	-6.9	175	0
3296.2	34.4	25.8	9.8	44.2	74	-29.8	PASS		35.6	54	-18.4	PASS		185	179
3661.5	41	31.8	10.7	51.7	74	-22.3	PASS		42.5	54	-11.5	PASS		100	173
4576.8	43.7	34.5	11.5	55.2	74	-18.8	PASS	-18.8	46	54	-8	PASS		175	163
5488.4	38.9	30.2	13.8	52.7	74	-21.3	PASS		43.9	54	-10.1	PASS		113	161

Radiated Emissions Electric Field 1m Distance EUT Power Input - 120V/60Hz 6-18GHz Horizontal Data Test Site - CH-1 Operator: ZJ Conditions - 23°C; 51%RH; 1013mBar Notes: CW Data Taken at 11:44:24 PM, Monday, September 17, 2018 Raw Peak Raw Avg Correction Adjusted PK Lim: Peak Peak Test Worst Peak Adjusted Av Lim: Avg Test Worst Avg Antenna									er - S2174	Work Ord			Company	au Veritas	us - a Bure	Curtis Stra
Operator: ZJ Conditions - 23°C; 51%RH; 1013mBar Notes: CW Data Taken at 11:44:24 PM, Monday, September 17, 2018 Raw Back Raw Avg. Correction Adjusted PK Lim: Ray								20V/60Hz	r Input - 12	EUT Powe		nce	ld 1m Dista	lectric Fie	Emissions I	Radiated E
Notes: CW Data Taken at 11:44:24 PM, Monday, September 17, 2018 Raw Back Raw Avg. Correction Pack FCC re15 109 Rock Raw Mart Back Avg. FCC ett5 109 Avg. Test. Wart Avg.									CH-1	Test Site -				ata	orizontal D	6-18GHz H
CW Data Taken at 11:44:24 PM, Monday, September 17, 2018 Raw Back Raw Avg. Correction Roke CC re15 109 Roke Ray Land Avg. ECC re15 109 Avg. Tort Word Avg.							mBar	L%RH; 1013	is - 23°C; 51	Condition					ZJ	Operator:
Data Taken at 11:44:24 PM, Monday, September 17, 2018 Adjusted Pk Lim: Adjusted Avg. Test Worst Avg.		Notes:														
Paur Book Raw Avg Correction Rook FCC nt1E 100 Rook Deck Test Worst Pack Avg FCC nt1E 100 Avg Test Worst Avg																CW
Paur Book Raw Avg Correction Rook FCC nt1E 100 Rook Deck Test Worst Pack Avg FCC nt1E 100 Avg Test Worst Avg																
Raw Back Raw Avg. Correction Rock ECC n15 100 Rock Rock Tect Wort Back Avg. ECC n15 100 Avg. Tect Wort Avg.																
Raw Back Raw Avg. Correction Rock ECC m15 100 Rock Rock Test Worst Back Avg. ECC m15 100 Avg. Test Worst Avg.											0019	mbor 17	day Sont	A DM Mor	n at 11.44.	Data Takor
Paul Paul Aver Correction Book ECC ntlE 109 Book Book Tart Worrt Book Aver ECC ntlE 109 Aver Tart Worrt Aver												, 	luay, septe		1 at 11.44.2	Data Takel
Raw Peak Raw Avg Correction Peak FCC_pt15_109_ Peak Peak lest Worst Peak Avg FCC_pt15_109_ Avg lest Worst Avg Antenna				A				Ward Daals	Deals Test	Deals		-	Compation	D	Davis Da als	
Frequency Reading Reading Factor Amplitude ClassB_Peak Margin Results Margin Amplitude ClassB_AVG Avg Margin Results Margin Height	EUT Azimuth		•	•			Ŭ									Froquency
		-	-			-		-		-	_			-	-	
(MHz) (dBµV) (dBµV) (dBµV/m) (dBµV/m) (dBµV/m) (dBµV/m) (dBµV/m) (dB) (em)	(degrees)	(cm)														
6407.5 50.3 40.3 6.5 56.8 83.5 -26.7 PASS -26.7 46.8 63.5 -16.7 PASS -16.7 ¹²⁵	239	125	-16.7	PASS	-16.7	63.5	46.8	-26.7	PASS	-26.7	83.5	56.8	6.5	40.3	50.3	6407.5

Curtis Stra	ius - a Bure	au Veritas	Company			Work Orde	er - S2174								
Radiated E	Emissions E	lectric Fiel	d 1m Dista	nce		EUT Powe	r Input - 12	0V/60Hz							
6-18GHz V	ertical Data	3				Test Site -	CH-1								
Operator:	ZJ					Condition	s - 23°C; 51	%RH; 1013	mBar						
Notes:															
CW															
Data Taker	n at 11:39:2	5 PM, Mon	iday, Septe	ember 17, 2	018										
				Adjusted	Pk Lim:				Adjusted	Av Lim:					
	Raw Peak	Raw Avg	Correction		FCC_pt15_109_	Peak	Peak	Worst Peak		FCC_pt15_109			Worst Avg	Antenna	
Frequency	Reading	Reading	Factor	Amplitude	ClassB_Peak	Margin	Results	Margin	Amplitude	_ClassB_AVG	Avg Margin	Avg Results	Margin	Height	EUT Azimuth
(MHz)	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
6402.5	44.3	34.4	6.5	50.8	83.5	-32.7	PASS	-32.7	40.9	63.5	-22.6	PASS	-22.6	100	10





Mid Data Rate:

Curtis Stra	us - a Bure	au Veritas	Company			Work Ord	er - S2174								
Radiated I	Emissions E	lectric Fiel	d 3m Dista	nce		EUT Powe	r Input - 12	OVac/60Hz							
1-6GHz Ho	orizontal Da	ta				Test Site -	CH-1								
Operator:	AKZ					Condition	s - 24°C: 55	%RH; 1010	mBar						
Notes:						0	,	,							
Mid data r	ate, uprigh	t orientati	on			0									
inia aata i	ace) aprila	c on cinculation				0									
Data Take	n at 03:26:5	0 PM, Frida	ay, Septem	ber 14, 201	18										
		,		Adjusted	Pk Lim:				Adjusted	Av Lim:			Worst		
	Raw Peak	Raw Avg	Correction	Peak	FCC pt15 2	Peak	Peak	Worst Peak		FCC pt15 2			Average	Antenna	
Frequency	Reading	Reading	Factor	Amplitude	09_Peak	Margin	Results	Margin	Amplitude	09_Average	Avg Margin	Avg Results	Margin	Height	EUT Azimuth
(MHz)	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
1829.3	49.1	40.7	4.2	53.3	74	-20.7	PASS		44.9	54	-9.1	PASS	-9.1	175	30
2745.9	43.4	33.6	7.2	50.6	74	-23.4	PASS		40.8	54	-13.2	PASS		183	223
3660.5	43.8	34.1	10.7	54.5	74	-19.5	PASS	-19.5	44.9	54	-9.1	PASS		225	236
4572.9	40.1	31.2	11.5	51.7	74	-22.3	PASS		42.7	54	-11.3	PASS		100	131
5492.4	36.6	28.1	13.7	50.3	74	-23.7	PASS		41.8	54	-12.2	PASS		187	130
Curtis Stra	us - a Bure	au Veritas	Company			Work Ord	er - S2174								
	Emissions E		• •	nce		EUT Powe	r Input - 12	0Vac/60Hz							
1-6GHz Ve	rtical Data					Test Site -	CH-1								
Operator:	AKZ					Condition	s - 24°C; 55	%RH; 1010	mBar						
Notes:						0									
Mid data r	ate, uprigh	t orientati	on			0									
	, , ,														
Data Take	n at 03:26:5	0 PM, Frida	ay, Septem	ber 14, 201	18										
				Adjusted	Pk Lim:				Adjusted	Av Lim:					
	Raw Peak	Raw Avg	Correction	Peak	FCC_pt15_2	Peak	Peak	Worst Peak		FCC_pt15_2			Worst Avg	Antenna	
Frequency	Reading	Reading	Factor	Amplitude	09_Peak	Margin	Results	Margin	Amplitude	09_Average	Avg Margin	Avg Results	Margin	Height	EUT Azimuth
(MHz)	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
1829.8	47.2	37.7	4.2	51.4	74	-22.6	PASS		41.9	54	-12.1	PASS		293	25
2743.9	46.9	38.3	7.2	54.1	74	-19.9	PASS		45.4	54	-8.6	PASS	-8.6	175	0
3661.5	41.6	29.4	10.7	52.3	74	-21.7	PASS		40.1	54	-13.9	PASS		125	196
4573	42.6	32.5	11.5	54.1	74	-19.9	PASS	-19.9	44	54	-10	PASS		202	167
5490	37.1	27.9	13.7	50.9	74	-23.1	PASS		41.6	54	-12.4	PASS		175	149

Note: 30-1000MHz and 6-10GHz were scanned for the low data rate and high data rate modes and were found passing. For this reason, these ranges were not tested for the mid data rate.





page 24 of 52

High Data Rate:

Curtis Stra	aus - a Bur	eau Verita	s Company			Work Orde	er - S2174							
Radiated	Emissions	Electric Fi	eld 3m Dista	ince		EUT Powe	r Input - 1	20V/60Hz						
30-1000M	1Hz Horizo	ntal Data				Test Site -	CH-1							
Operator	: ZJ					Condition	s - 23°C; 52	1%RH; 1013	mBar					
Notes:														
16.67kbps	s													
Data Take	en at 08:25	45 PM, Mo	onday, Sept	ember 17, 2	018									
				Lim1:			Worst	Lim2:				Worst		
	Raw QP	Correction	Adjusted OF	FCC_pt15_1	Margin to	Test Results	Margin	FCC_pt15_1	Margin	to Test R	esults	Margin	Antenna	EUT
Frequency	Reading	Factor	-	09_Class_B	Lim1	Lim1	Lim1	09_Class_B	Lim2		n2	Lim2	Height	Azimuth
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dbµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dB)	(Pass	/Fail)	(dB)	(cm)	(degrees)
30.643	29.7	-8.2	21.4	40	-18.6	PASS		40	-18.6		ss		117	290
56.584	43.7	-21.9	21.8	40	-18.2	PASS	-18.2	40	-18.2		ss	-18.2	257	289
133.454	36.3	-14.9	21.5	43.5	-22	PASS	10.2	43.5	-22		ss	10.2	225	205
564.462	36.3	-14.9	21.5	43.5	-22	PASS		43.5	-22		ss		225	295
	-	-	22.8					-					225	250
651.869	27	-5.6	-	46	-24.6	PASS		46	-24.6		SS		-	
809.849	25.2	-2.8	22.4	46	-23.6	PASS		46	-23.6	PA PA	SS		225	155
Curtis Stra	aus - a Bur	eau Verita	s Company			Work Orde	er - S2174							
			eld 3m Dista	ince		EUT Powe	r Input - 1	20V/60Hz						
	1Hz Vertica					Test Site -		-						
Operator								1%RH; 1013	mBar					
Notes:	. 23					condition	5 25 0, 5.	1/01013	mbai					
	c													
16.67kbps		:45 PM, Mc	onday, Sept		018									
16.67kbps Data Take	en at 08:25 Raw QP	Correction	Adjusted QF	Lim1: FCC_pt15_1	Margin to	Test Results	Worst Margin	Lim2: FCC_pt15_1	-			Worst Margin	Antenna	EUT
16.67kbps Data Take Frequency	en at 08:25 Raw QP Reading	Correction Factor	Adjusted QF Amplitude	Lim1: FCC_pt15_1 09_Class_B	Margin to Lim1	Lim1	Margin Lim1	FCC_pt15_1 09_Class_B	Lim2	Lin	n2	Margin Lim2	Height	Azimuth
16.67kbps Data Take Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QF Amplitude (dBμV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Margin to Lim1 (dB)	Lim1 (Pass/Fail)	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBµV/m)	Lim2 (dB)	Liı (Pass	n2 /Fail)	Margin Lim2 (dB)	Height (cm)	Azimuth (degrees)
16.67kbps Data Take Frequency (MHz) 33.242	en at 08:25 Raw QP Reading (dBμV) 45.6	Correction Factor (dB/m) -10.2	Adjusted QF Amplitude (dBμV/m) 35.3	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40	Margin to Lim1 (dB) -4.7	Lim1 (Pass/Fail) PASS	Margin Lim1	FCC_pt15_1 09_Class_B (dBμV/m) 40	Lim2 (dB) -4.7	Lin (Pass PA	m 2 /Fail) SS	Margin Lim2	Height (cm) 100	Azimuth (degrees) 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6	Correction Factor (dB/m) -10.2 -11.9	Adjusted QF Amplitude (dBµV/m) 35.3 30.7	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40	Margin to Lim1 (dB) -4.7 -9.3	Lim1 (Pass/Fail) PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40	Lim2 (dB) -4.7 -9.3	(Pass PA	n2 /Fail) SS SS	Margin Lim2 (dB)	Height (cm) 100 125	Azimuth (degrees) 155 1
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9	Correction Factor (dB/m) -10.2 -11.9 -21.9	Adjusted QF Amplitude (dBμV/m) 35.3 30.7 34	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40	Margin to Lim1 (dB) -4.7 -9.3 -6	Lim1 (Pass/Fail) PASS PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40	Lim2 (dB) -4.7 -9.3 -6	PA	m2 /Fail) SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100	Azimuth (degrees) 155 1 25
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8	Adjusted QF Amplitude (dBμV/m) 35.3 30.7 34 24.1	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5	Lim1 (Pass/Fail) PASS PASS PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 40 40	Lim2 (dB) -4.7 -9.3 -6 -19.5	(Pass PA PA PA PA	n2 /Fail) //SS //SS //SS //SS //SS //SS //SS //	Margin Lim2 (dB)	Height (cm) 100 125 100 101	Azimuth (degrees) 155 1 25 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9	Correction Factor (dB/m) -10.2 -11.9 -21.9	Adjusted QF Amplitude (dBμV/m) 35.3 30.7 34	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40	Margin to Lim1 (dB) -4.7 -9.3 -6	Lim1 (Pass/Fail) PASS PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40	Lim2 (dB) -4.7 -9.3 -6	(Pass PA PA PA PA	m2 /Fail) SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100	Azimuth (degrees) 155 1 25
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8	Adjusted QF Amplitude (dBμV/m) 35.3 30.7 34 24.1	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5	Lim1 (Pass/Fail) PASS PASS PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 40 40	Lim2 (dB) -4.7 -9.3 -6 -19.5	Lin (Pass PA PA PA PA PA PA	n2 /Fail) //SS //SS //SS //SS //SS //SS //SS //	Margin Lim2 (dB)	Height (cm) 100 125 100 101	Azimuth (degrees) 155 1 25 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595	Raw QP Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS	Margin Lim1 (dB)	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strau	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureau	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El	Raw QP Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El 1-6GHz Hor	Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Elerizontal Data	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5 43.5 46 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El 1-6GHz Hor Operator: /	Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Elerizontal Data	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12 - CH-1	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5 43.5 46 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated Ei 1-6GHz Hor Operator: A Notes:	Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Elerizontal Data	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12 - CH-1	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5 43.5 46 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated Ei 1-6GHz Hor Operator: / Notes:	Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Ele rizontal Data AKZ	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12 - CH-1	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5 43.5 46 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El 1-6GHz Hor Operator: / Notes: Max data ra	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Ele rizontal Data AKZ ate, upright	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3 orientation	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 46	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12 - CH-1	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5 43.5 46 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El 1-6GHz Hor Operator: / Notes: Max data ra	en at 08:25 Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Ele rizontal Data AKZ ate, upright	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3 orientation	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 46	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS der - S2174 rer Input - 12 - CH-1	Margin Lim1 (dB) -4.7	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 40 43.5 43.5 43.5 46 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4	Lin (Pass PA PA PA PA PA PA	n2 /Fail) SS SS SS SS SS	Margin Lim2 (dB)	Height (cm) 100 125 100 101 102	Azimuth (degrees) 155 1 25 155 155
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16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated Er 1-6GHz Hor Operator: A Notes: Max data raken Frequency (MHz)	en at 08:25 Raw QP Reading (dBµV) 45.6 42.6 55.9 38.9 37.4 25.3 25.3 us - a Bureat missions Ele rizontal Data AKZ ate, upright nat 02:32:13 Raw Peak Reading (dBµV)	Correction Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3 orientation PM, Friday, Raw Avg Reading (dBµV)	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 43.5 46 46 46 46 46	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site Conditio	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS PAS	Margin Lim1 (dB) -4.7 	FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 43.5 46	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 -23.8 -21.4 -23.8 -23.8 -21.4 -23.8	Avg Margin (dB)	n2 /Fail) SS SS SS SS SS Avg Result (Pass/Fail	Margin Lim2 (dB) -4.7	Height (cm) 100 125 100 101 102 155	Azimuth (degrees) 155 155 175 157
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16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated En 1-6GHz Hor Operator: A Notes: Max data ra Data Taken Frequency (MHz) 1726.1 1829.3	Raw QP Reading (dBμV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Ele rizontal Data AKZ ate, upright at 02:32:13 Raw Peak Reading (dBμV) 33.5 48.9	Соггесtion Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3 orientation PM, Friday, Raw Avg Reading (dBµV) (24.6 41.5	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance September 1 Adju Prection Bractor dB/m) (dBµ September 1 Adju Prection Adju Adju Adju Adju Adju Adju Adju Adju	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 43.5 46 ***********************************	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site Condition Site Condition (dB) -37.1 -20.9	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS PAS	Margin Lim1 (dB) -4.7 	Adjusted Awgi (dBµV/m) 40 40 40 40 40 43.5 43.5 44.5 44.5 43.5 44.5 44.5 44.5 44.5 44.5 44.5 44.5 44.5 44.5 44.5 44.5 44.6 44.5 44.5 44.5 44.5 44.5	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 -23.8 -21.4 -23.8 -23.9 -23.8 -23.8 -23.8 -23.8 -23.8 -23.9 -23.8 -23.9 -23.8 -23.9 -23.8 -23.9 -	Avg Margin (dB) -26 -8.3	n2 (Fail) (SS (SS (SS (SS (SS (SS (SS (SS (SS (S	Margin Lim2 (dB) -4.7	Height (cm) 100 125 100 101 102 155	Azimuth (degrees) 155 155 175 157 157 25 25 25 25 25 25 25 25 25 25 25 25 25
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El 1-6GHz Hor Operator: <i>J</i> Notes: Max data rate Data Taken Frequency (MHz) 1726.1 1829.3 2744.1	en at 08:25 Raw QP Reading (dBµV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Elerizontal Data AKZ ate, upright n at 02:32:13 Raw Peak Reading (dBµV) 33.5 48.9 40.3	Соггесtion Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3 orientation PM, Friday, Raw Avg (dBµV) (d 24.6 41.5 31.4	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance September 1 Adju rrection Factor dB/m) (dBµ Agju rrection Adju rrection Adju Adju Adju Rection Adju Adju Adju Adju Adju Adju Adju Adju	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 43.5 46 46 46 46 46 46 46 46 46 46	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site Condition : : : : : : : : : : : : : : : : : :	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS PAS	Margin Lim1 (dB) 4.7 	Adjusted Awg (dbμV/m) FCC_pt15_1 09_Class_B (dbμV/m) 40 40 40 40 43.5 43.5 43.5 43.5 43.5 43.5 440 40 43.5 43.5 440 40 43.5 46 43.5 46 40 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 44.5 46 43.5 46 44.5 46 45.7 38.6	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 -23.8 -23.8 -23.8 -23.8 -24.4 -23.8 -24.4 -23.8 -24.4 -23.8 -24.4 -23.8 -24.4 -24.7	Avg Margin (d8) -26 -8.3 -15.4	n2 /Fail) SS SS SS SS SS SS SS Avg Result (Pass/Fail PASS PASS PASS	Margin Lim2 (dB) 4.7	Height (cm) 100 125 100 101 102 155	Azimuth (degrees) 155 155 175 157 157
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Сигтіs Strat Radiated El 1-6GHz Hor Operator: / Notes: Max data ra Data Taken Frequency (MHz) 122.61 132.93 2744.1 3658.7	en at 08:25 Raw QP Reading (dBµV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Burean missions Elerizontal Data AKZ ate, upright at 02:32:13 Raw Peak Reading (dBµV) 33.5 48.9 40.3 41.8	Соггесtion Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co actric Field 3 orientation PM, Friday, Reading (dBµV) (d 24.6 41.5 31.4 33.2	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 22.1 22.1 22.2 mpany mDistance Adjusted of Amplitude dB/m 34 22.1 22.2	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 43.5 46 46 46 46 40 40 40 40 40 40 40 40 40 40	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site Condition : : : : : : : : : : : : : : : : : : :	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS PAS	Margin Lim1 (dB) 4.7 	FCC_pt15_1 09_Class_B (dBμV/m) 40 40 40 43.5 43.5 440 43.5 440 43.5 440 43.5 440 43.5 46 Adjusted Avg (dBµV/m) 48 28 45.7 38.6 43.9	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 -23.8 -21.4 -23.8 -23.8 -25.4 -23.8 -25.4 -23.8 -25.4 -	Avg Margin (dB) -26 -8.3 -15.4 -10.1	n2 (Fail) (SS (SS (SS (SS (SS (SS (SS (SS (SS (Pass/Fail (Pass) PASS (PASS (PASS (PASS (PASS) (PASS (PAS (PA	Margin Lim2 (dB) 4.7	Height (cm) 100 125 100 101 102 155 155 155 155 155 155 155	Azimuth (degrees) 155 155 155 175 157 57 57 57 57 57 57 57 57 57 57 57 57 5
16.67kbps Data Take Frequency (MHz) 33.242 35.543 56.708 132.83 138.481 791.595 Curtis Strat Radiated El 1-6GHz Hor Operator: <i>J</i> Notes: Max data raken Frequency (MHz) 1726.1 1829.3 2744.1	en at 08:25 Raw QP Reading (dBµV) 45.6 42.6 55.9 38.9 37.4 25.3 us - a Bureat missions Elerizontal Data AKZ ate, upright n at 02:32:13 Raw Peak Reading (dBµV) 33.5 48.9 40.3	Соггесtion Factor (dB/m) -10.2 -11.9 -21.9 -14.8 -15.3 -3.1 Veritas Co ectric Field 3 orientation PM, Friday, Raw Avg (dBµV) (d 24.6 41.5 31.4	Adjusted QF Amplitude (dBµV/m) 35.3 30.7 34 24.1 22.1 22.2 mpany m Distance September 1 Adju rrection Factor dB/m) (dBµ Agju rrection Adju rrection Adju Adju Adju Rection Adju Adju Adju Adju Adju Adju Adju Adju	Lim1: FCC_pt15_1 09_Class_B (dBµV/m) 40 40 40 43.5 43.5 43.5 46 ***********************************	Margin to Lim1 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 Work Or EUT Pow Test Site Condition : : : : : : : : : : : : : : : : : :	Lim1 (Pass/Fail) PASS PASS PASS PASS PASS PASS PASS PAS	Margin Lim1 (dB) 4.7 	Adjusted Awg (dbμV/m) FCC_pt15_1 09_Class_B (dbμV/m) 40 40 40 40 43.5 43.5 43.5 43.5 43.5 43.5 440 40 43.5 43.5 440 40 43.5 46 43.5 46 40 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 43.5 46 44.5 46 43.5 46 44.5 46 45.7 38.6	Lim2 (dB) -4.7 -9.3 -6 -19.5 -21.4 -23.8 -23.8 -23.8 -23.8 -23.8 -24.4 -23.8 -24.4 -23.8 -24.4 -23.8 -24.4 -23.8 -24.4 -24.7	Avg Margin (d8) -26 -8.3 -15.4	n2 /Fail) SS SS SS SS SS SS SS Avg Result (Pass/Fail PASS PASS PASS	Margin Lim2 (dB) 4.7	Height (cm) 100 125 100 101 102 155 155 155 155 155 155 155 155 155 15	Azimuth (degrees) 155 155 175 157 157 257 257 257 257 257 257 257 257 257 2





page 25 of 52

Work Order - S2174 EUT Power Input - 120Vac/60Hz Test Site - CH-1 Conditions - 24°C; 55%RH; 1010mBar

Data Taken at 02:32:13 PM, Friday, September 14, 2018

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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)	Margin	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	0	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1829.1	47.6	39.7	4.2	51.8	74	-22.2	PASS		43.9	54	-10.1	PASS		275	1
2745.9	46.5	38.3	7.2	53.7	74	-20.3	PASS	-20.3	45.5	54	-8.5	PASS	-8.5	192	5
3240.3	34.3	25.6	9.7	44	74	-30	PASS		35.3	54	-18.7	PASS		275	80
3661.3	39	30.9	10.7	49.7	74	-24.3	PASS		41.7	54	-12.3	PASS		281	175
4573.2	41.5	31.7	11.5	53	74	-21	PASS		43.3	54	-10.7	PASS		175	194
5490.8	36	28.3	13.7	49.8	74	-24.2	PASS		42.1	54	-11.9	PASS		125	198

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 1m Distance 6-186Hz Horizontal Data Operator: ZJ Notes: 16.67kbps Work Order - S2174 EUT Power Input - 120V/60Hz Test Site - CH-1 Conditions - 23°C; 51%RH; 1013mBar

Data Taken at 12:00:29 AM, Tuesday, September 18, 2018

Data Tar	en at 12.00.4	29 Alvi, Tue:	suay, septe	2111001 10, 2	.018										
				Adjusted	Pk Lim:				Adjusted	Av Lim:					
	Raw Peak	Raw Avg	Correction	Peak	FCC_pt15_109_Cl	Peak	Peak Test	Worst Peak	Avg	FCC_pt15_109_Cl		Avg Test	Worst Avg	Antenna	
Frequenc	y Reading	Reading	Factor	Amplitude	assB_Peak	Margin	Results	Margin	Amplitude	assB_AVG	Avg Margin	Results	Margin	Height	EUT Azimuth
(MHz)	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
6407.6	56.1	45.6	6.5	62.6	83.5	-20.9	PASS	-20.9	52.1	63.5	-11.4	PASS	-11.4	172	149

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 1m Distance Top Peaks Vertical 6-18GHz Operator: ZJ Notes: 16.67kbps

Work Order - S2174 EUT Power Input - 120V/60Hz Test Site - CH-1 Conditions - 23°C; 51%RH; 1013mBar

Data Taken at 11:55:57 PM, Monday, September 17, 2018

Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Pk Lim: FCC_pt15_109_Cl assB_Peak	•	Peak Limit Test Results		Av Lim: FCC_pt15_109_Cla ssB_AVG	•	Avg Limit Test Results	Avg Limit Worst Margin	Antenna Height	EUT Azimuth
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
6402.2	50.6	6.5	57.1	83.5	-26.4	PASS	-26.4	63.5	-6.4	PASS	-6.4	150	0
9960.6	43.9	9.4	53.3	83.5	-30.2	PASS		63.5	-10.2	PASS		175	82





Rev. 9/17/2018								
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	Ι	4/10/2019	4/10/2018
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	1	12/21/2018	12/21/2016
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	Ι	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	Ш	10/29/2018	10/29/2017
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	П	11/19/2018	11/19/2017
2130 BRF	9KHz-10GHz	BRM18770	Micro-Tronics	1	2130	Ш	1/10/2019	1/10/2018
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	1	2/28/2019	2/28/2017
Blue Horn	1-18Ghz	3117	ETS	157647	1861	Т	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	1	5/15/2020	5/15/2018
TH A#2077		HTC-1	HDE		2077	Ш	3/22/2019	3/22/2018
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2456	9KHz-18GHz		MegaPhase			Ш	10/29/2018	10/29/2017
Asset #2466	9KHz-18GHz		MegaPhase			Ш	10/29/2018	10/29/2017
Asset #2480	9KHz-18GHz		MegaPhase			Ш	10/29/2018	10/29/2017

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





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 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. [15.247(d)]

MEASUREMENTS / RESULTS

Keysight Sp	ectrum Analyzer - Swept S RF 50 Ω 🚹 I			SENSE:INT	AL	IGN AUTO		08:49:16	PM Sep 21, 201
arker 1	914.7612500	00 MHz	PNO: Fast 😱 IFGain:Low		Run	Avg Type: Avg Hold:>		TF	ACE 1 2 3 4 5 TYPE MWWW DET PNNNN
dB/div	Ref 0.00 dBm							Vlkr1 914 -12.	.761 MH 636 dBr
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.0									
	800 GHz 100 kHz		#VB	W 300 kHz			Sweep	Stop 1 93.33 ms	1.0000 GH (40001 pt
G						STATUS 🦺	DC Coupled	30.00 m3	(10001 pt

Low Data Rate:





	vsiaht Spect	rum Analyzer - Swept SA								
	/	RF 50 Ω 🛕 DC			SENSE:INT	ALI	IGN AUTO		08:59:43	PM Sep 21, 2018
Mar	ker 1 5	.4777250000	00 GHz	PNO: Fast 🕞			Avg Type: I Avg Hold:>		TR	ACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN
10 dE Log I	3/div	Ref 0.00 dBm						MI	(r1 5.477 -51.	725 GHz 147 dBm
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-20.0										
-30.0										
-40.0										
-40.0						1				
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-80.0										
-90.0										
Star	t 1.000	GHz							Stop 1	0.000 GHz
#Res	s BW 1.	.0 MHz		#VB	W 3.0 MHz			Sweep	16.00 ms	(40001 pts)
MSG							STATUS 🚺	DC Coupled		



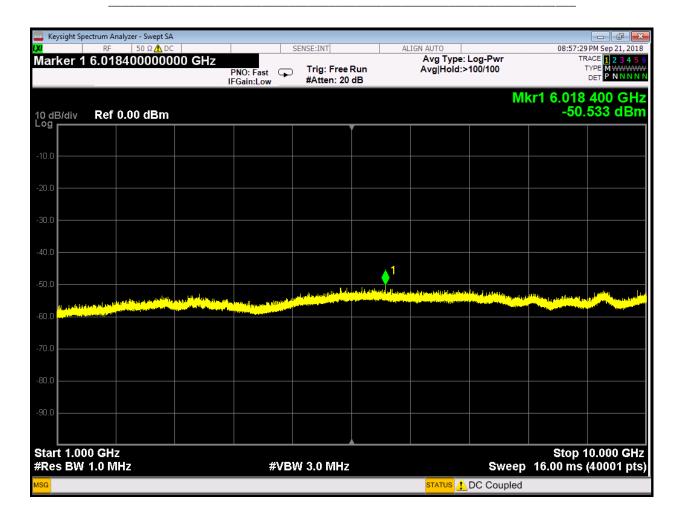


Keysight Spectrum Analyze								
₩ Marker 1 914.76		PNO: Fast	SENSE:INT		IGN AUTO Avg Type: I Avg Hold:>'		TR	PM Sep 21, 2018 ACE 1 2 3 4 5 6 YPE M WWWW
		Gain:Low	#Atten: 20		-			DET PNNNNN
10 dB/div Ref 0.0	0 dBm						икг1 914. -12.	761 MHz 658 dBm
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-80.0								
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Start 0.0300 GHz		40 (B)				C	Stop 1	.0000 GHz
#Res BW 100 kHz		#VB	W 300 kHz			Sweep DC Coupled	93.33 MS	(40001 pts)

Mid Data Rate:









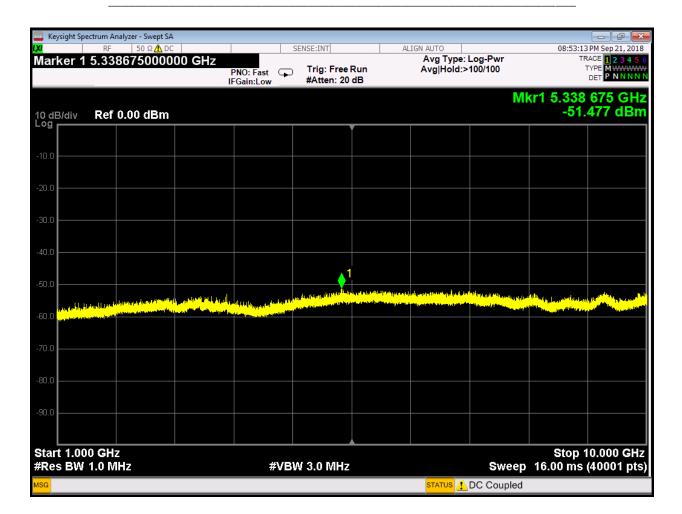


<u> </u>	vsight Spect		lyzer - Swept SA									
LXI .		RF	50 Ω 🔔 DC			SE	ENSE:INT	AL	IGN AUTO			PM Sep 21, 2018
Mar	ker 1 9	14.7	6125000	0 MHz	PNO: Fast (IFGain:Low	₽	Trig: Free F #Atten: 20		Avg Type: Avg Hold:>		1	ACE 123456 YPE M WWWW DET P N N N N N
10 dB Log i	3/div	Ref 0	.00 dBm							Γ	/kr1 914. -12.	761 MHz 723 dBm
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-90.0												
Star	t 0.030		,								Stop 4	
	s BW 1				#\	/BW	/ 300 kHz			Sweep	93.33 ms	.0000 GHz (40001 pts)
MSG									STATUS 🥂	DC Coupled		

High Data Rate:











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

		Pea	k Power S	pectral E	Density						
Date:	20-Sep-18	Company: Po	any: Powercast				Work Order: S2174				
Engineer:	Chris Bramley	EUT: TX	EUT: TX-915-01B				rating Voltage/	Frequency:	5V DC		
Temp:	24.0°C	Humidity: 47	% Pressure: 1017mBar								
Frequency Range: 915MHz Measurement Type: Conducted											
Measurement Method: FCC 558074 D01 DTS Meas Guidance v05											
Notes:	Average Method Use	ed - 8.4 Method AVC	GPSD-1	-							
Data Mode	Frequency	Peak Reading	Cable Loss	Attenuator Los	ss Peak l	PSD	Average Limit	Margin	Result		
(kbps)	(kbps) (MHz) (dBm)		(dB)	(dB)	(dBn	n)	(dBm)	(dB)	nooun		
16.67	915.0	-32.00	0.17	38.5	6.6	7	8.0	-1.33	Pass		
8.33	915.0	-32.21	0.17	38.5	6.4	6	8.0	-1.54	Pass		
CW	CW 915.0		0.17	38.5	7.07 8.0		8.0	-0.93	Pass		
Test Site:	CEMI-3	Cable: As	set 2289	40dB Attenuato	or: Asset 209	96					
Analyzer:	EXA 1118473						Copyright Curtis	s-Straus LLC	2000		
· · · ·	ng (dBm) + Cable Loss	s (dB) + Attenuator L	oss (dBm)								
	ers / Receivers /Preselecto Signal Analyzer(1118473)	ors Range 9KHz-26.5GHz	MN N9010A-526;N	Mfr AT	SN MY51170076	Asset 1118473	Cat Calibration		i ted on 2018		
Conducted Test Sites (Mains / Telco) FCC Code CEMI 3 719150				VCCI Code A-0015			Cat Calibration	Due Calibra N			
Meteorological Meters/Chambers Weather Clock (Pressure Only) TH A#2078			MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2078	Cat Calibration I 5/15/202 II 3/22/201	0 5/15/	1 ted on 12018 12018		
	Cables Asset #2289	FLC-1.5FT-SMSM+	Mfr Mini-Circuits	16021039		Cat Calibration		ited on 2018			
Preamps /Couplers Attenuators / Filters Ram 40dB 100W Attenuator 0.009-40			MN BW-40N100W+	Mfr Mini-Circuits	SN V N383401508	Asset 2096	Cat Calibration		ited on 2017		

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

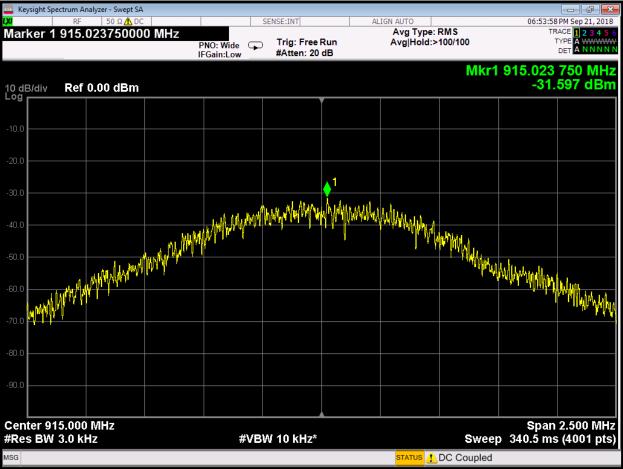




page 34 of 52

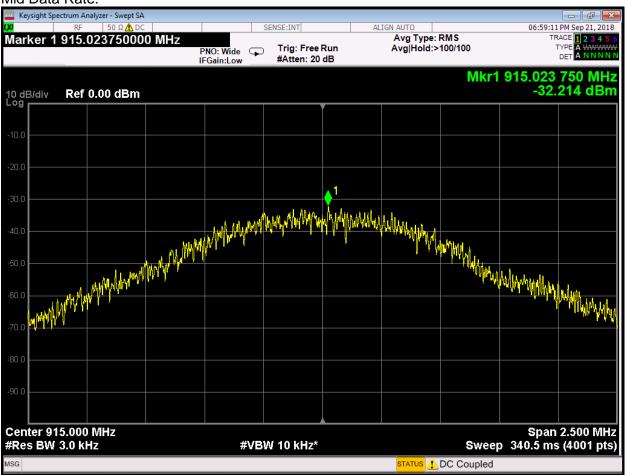
PLOTS

Low Data Rate:







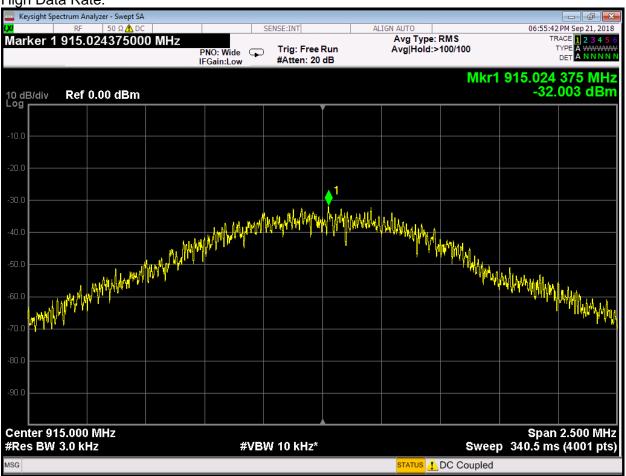


Mid Data Rate:









High Data Rate:





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	Work Order # - S2174
Conducted Emissions per CISPR 16-2-1	EUT Power Input - 120VAC/ 60Hz
Peak Detector Data	Test Site - CEMI-3
Notes:	Conditions: - 23.3°C; 47%RH; 1010mBar
EUT Line tested: 120VAC/60Hz; Neutral	Test Engineer - Chris Bramley
EUT Mode of Operation: CW Mode	Witnessed by - N/A

Data Taken at 06:02:38 PM, Friday, September 21, 2018

Frequency (MHz)	Raw Pk Reading (dBμV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBμV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.435	26.9	19.8	46.6	57.2	-10.5	PASS	-10.5
17.279	27.2	20.1	47.3	60	-12.7	PASS	
17.754	26.9	20.1	47	60	-13	PASS	
17.867	28.1	20.1	48.3	60	-11.7	PASS	
17.996	27.8	20.1	48	60	-12	PASS	
18.494	27.2	20.2	47.4	60	-12.6	PASS	

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: CW Mode

Work Order # - S2174 EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-3 Conditions: - 23.3°C; 47%RH; 1010mBar Test Engineer - Chris Bramley Witnessed by - N/A

Data Taken at 06:11:27 PM, Friday, September 21, 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)
0.436	23.4	19.8	43.1	47.1	-4	PASS	
0.436	24	19.8	43.8	47.1	-3.4	PASS	-3.4
0.436	23.8	19.8	43.6	47.1	-3.6	PASS	
17.856	15.3	20.1	35.5	50	-14.5	PASS	
17.857	16.4	20.1	36.5	50	-13.5	PASS	
18.207	15.9	20.2	36.1	50	-13.9	PASS	





Curtis Straus - a Bureau Veritas Company
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUT Line tested: 120VAC/60Hz; Phase
FUT Mode of Operation: CW Mode

Data Taken at 06:17:12 PM, Friday, September 21, 2018

Frequency (MHz)	Raw Pk Reading (dBμV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
17.2	26.3	20.1	46.4	60	-13.6	PASS	
17.874	26.2	20.2	46.3	60	-13.7	PASS	
17.959	26.2	20.2	46.3	60	-13.7	PASS	
18.002	26.5	20.2	46.6	60	-13.4	PASS	
18.069	26.6	20.2	46.7	60	-13.3	PASS	-13.3
18.298	26.3	20.2	46.5	60	-13.5	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: CW Mode Work Order # - S2174 EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-3 Conditions: - 23.3°C; 47%RH; 1010mBar Test Engineer - Chris Bramley Witnessed by - N/A

Data Taken at 06:17:12 PM, Friday, September 21, 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)
0.438	19	19.8	38.8	47.1	-8.3	PASS	-8.3
17.775	19.8	20.2	40	50	-10	PASS	
17.826	20.3	20.2	40.5	50	-9.5	PASS	
17.87	20.6	20.2	40.8	50	-9.2	PASS	
17.921	20.1	20.2	40.3	50	-9.7	PASS	
18.17	20.1	20.2	40.2	50	-9.8	PASS	





Curtis Straus - a Bureau Veritas Company	Work Order # - S2174
Conducted Emissions per CISPR 16-2-1	EUT Power Input - 120VAC/ 60Hz
Peak Detector Data	Test Site - CEMI-3
Notes:	Conditions: - 23.3°C; 47%RH; 1010mBar
EUT Line tested: 120VAC/60Hz; Neutral	Test Engineer - Chris Bramley
EUT Mode of Operation: 8.33kbps Mode	Witnessed by - N/A

Data Taken at 06:53:16 PM, Friday, September 21, 2018

Frequency (MHz)	Raw Pk Reading (dBμV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.44	26.5	19.8	46.3	57.1	-10.8	PASS	
0.467	28	19.8	47.8	56.6	-8.8	PASS	-8.8
17.246	28	20.1	48.1	60	-11.9	PASS	
17.662	27.6	20.1	47.8	60	-12.2	PASS	
17.764	28.3	20.1	48.5	60	-11.5	PASS	
17.832	27.8	20.1	47.9	60	-12.1	PASS	

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 Mode

Work Order # - S2174

EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-3 Conditions: - 23.3°C; 47%RH; 1010mBar Test Engineer - Chris Bramley Witnessed by - N/A

Data Taken at 06:53:16 PM, Friday, September 21, 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)
0.434	22.3	19.8	42	47.2	-5.1	PASS	-5.1
0.466	9.7	19.8	29.5	46.6	-17.1	PASS	
0.527	15.2	19.7	35	46	-11	PASS	
17.464	14.3	20.1	34.4	50	-15.6	PASS	
17.946	15.4	20.1	35.6	50	-14.4	PASS	
18.202	15.1	20.2	35.3	50	-14.7	PASS	





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 Mode

Data Taken at 06:23:41 PM, Friday, September 21, 2018

Frequency (MHz)	Raw Pk Reading (dBμV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
17.186	26.5	20.1	46.6	60	-13.4	PASS	
17.282	26.2	20.1	46.3	60	-13.7	PASS	
17.491	26.3	20.1	46.5	60	-13.5	PASS	
17.764	26.8	20.2	46.9	60	-13.1	PASS	
17.812	27.3	20.2	47.5	60	-12.5	PASS	-12.5
17.966	26.7	20.2	46.9	60	-13.1	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: 8.33kbps Mode

Work Order # - S2174

EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-3 Conditions: - 23.3°C; 47%RH; 1010mBar Test Engineer - Chris Bramley Witnessed by - N/A

Data Taken at 06:23:41 PM, Friday, September 21, 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)
0.438	17.5	19.8	37.3	47.1	-9.8	PASS	
17.32	19.5	20.1	39.6	50	-10.4	PASS	
17.421	19.7	20.1	39.9	50	-10.1	PASS	
17.762	20.7	20.2	40.9	50	-9.1	PASS	-9.1
17.802	20.4	20.2	40.5	50	-9.5	PASS	
17.95	20.2	20.2	40.4	50	-9.6	PASS	





Curtis Straus - a Bureau Veritas Company	Work Order
Conducted Emissions per CISPR 16-2-1	EUT Power I
Peak Detector Data	Test Site - C
Notes:	Conditions:
EUT Line tested: 120VAC/60Hz; Neutral	Test Engine
EUT Mode of Operation: 16.67kbps Mode	Witnessed b

Data Taken at 07:08:48 PM, Friday, September 21, 2018

Frequency (MHz)	Raw Pk Reading (dBμV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.437	26.6	19.8	46.3	57.1	-10.8	PASS	-10.8
0.472	25.9	19.8	45.7	56.5	-10.8	PASS	
17.509	27.3	20.1	47.5	60	-12.5	PASS	
17.898	27.1	20.1	47.2	60	-12.8	PASS	
18.103	28.4	20.1	48.6	60	-11.4	PASS	
18.162	27.7	20.1	47.8	60	-12.2	PASS	

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: 16.67kbps Mode

Work Order # - S2174

EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-3 Conditions: - 23.3°C; 47%RH; 1010mBar Test Engineer - Chris Bramley Witnessed by - N/A

Data Taken at 07:08:48 PM, Friday, September 21, 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)
0.435	22.4	19.8	42.2	47.2	-5	PASS	-5
0.467	6.4	19.8	26.1	46.6	-20.4	PASS	
0.528	16.9	19.7	36.7	46	-9.3	PASS	
17.865	15.9	20.1	36	50	-14	PASS	
17.921	13.4	20.1	33.5	50	-16.5	PASS	
18.007	14.7	20.1	34.9	50	-15.1	PASS	





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: 16.67kbps Mode

Data Taken at 07:14:33 PM, Friday, September 21, 2018

Frequency (MHz)	Raw Pk Reading (dBμV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISP R_QP_Class_B (dBμV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
16.931	26	20.1	46.1	60	-13.9	PASS	
17.243	25.4	20.1	45.6	60	-14.4	PASS	
17.27	25.3	20.1	45.5	60	-14.5	PASS	
17.608	26	20.1	46.2	60	-13.8	PASS	-13.8
17.77	25.5	20.2	45.7	60	-14.3	PASS	
17.867	25.7	20.2	45.9	60	-14.1	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: 16.67kbps Mode

Work Order # - S2174

EUT Power Input - 120VAC/ 60Hz Test Site - CEMI-3 Conditions: - 23.3°C; 47%RH; 1010mBar Test Engineer - Chris Bramley Witnessed by - N/A

Data Taken at 07:14:33 PM, Friday, September 21, 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)
0.437	17.9	19.8	37.6	47.1	-9.5	PASS	
17.72	19.1	20.1	39.3	50	-10.7	PASS	
17.811	20.4	20.2	40.6	50	-9.4	PASS	
17.859	20.4	20.2	40.5	50	-9.5	PASS	
17.913	21	20.2	41.1	50	-8.9	PASS	-8.9
17.957	19.3	20.2	39.5	50	-10.5	PASS	





Rev. 9/19/2018

RE	97. 9/19/2010								
	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	Т	6/19/2019	6/19/2018
	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	Т	6/20/2019	6/20/2018
	Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
	CEMI 3	719150		A-0015			ш	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	1	5/15/2020	5/15/2018
	TH A#2078		HTC-1	HDE		2078	Ш	3/22/2019	3/22/2018
	Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
	CEMI-12	9kHz - 2GHz		C-S			Ш	11/4/2018	11/4/2017
	Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	20dB Attenuator-05	9kHz-2GHz	2	Aeroflex/Weinschel	BS9092		Ш	8/4/2019	8/4/2018

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 6.7]

		99% C	ccupied Bandwidth	
Date:	20-Sep-18	Company: Powercast		Work Order: S2174
Engineer:	Chris Bramley	EUT: TX-915-01B		Operating Voltage/Frequency: 5V DC
Temp:	24.0°C	Humidity: 47%	Pressure: 1017mBar	
Fre	equency Range: 915M	/Hz N	leasurement Type: Conducted	
		Mea	surement Method: FCC 558074 D01 DT	S Meas Guidance v05
Notes:				
Data Mode	Frequency		99% OBW	
(kbps)	(MHz)		(MHz)	
16.67	915		1.509	
8.33	915		1.508	
CW	915		1.493	
Test Site:	CEMI-3	Cable: Asset 2289	40dB Attenuator: Asset 2096	
Analyzer:	EXA 1118473			Copyright Curtis-Straus LLC

Rev. 9/19/2018

Rev. 9/19/2016								
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			ш	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	1	5/15/2020	5/15/2018
TH A#2078		HTC-1	HDE		2078	Ш	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		Ш	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	Ш	10/2/2018	10/2/2017

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





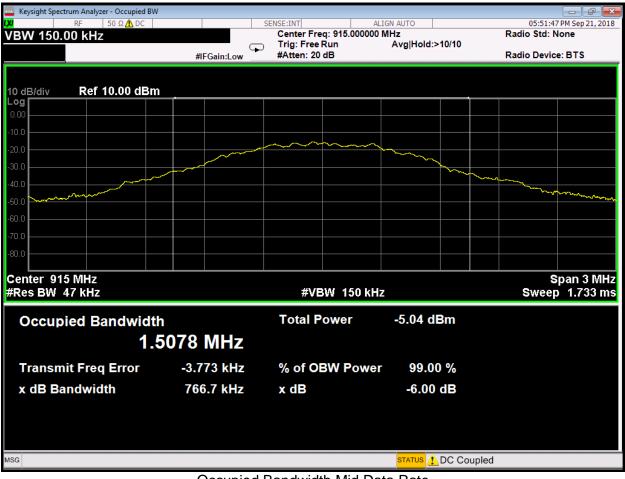
page 46 of 52

Keysight Spectrum Analyzer - Occupied BW				
🕅 RF 50 Ω 🔥 DC		SENSE:INT A	ALIGN AUTO	05:53:53 PM Sep 21, 2018
VBW 150.00 kHz		Center Freq: 915.00000		Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold:>10/10	Radio Device: BTS
10 dB/div Ref 10.00 dBm	1			
-10.0				
-20.0				
-40.0				
-60.0				
Center 915 MHz #Res BW 47 kHz		#VBW 150 kH	 Iz	Span 3 MHz Sweep 1.733 ms
Occupied Bandwidth		Total Power	-5.02 dBm	
1.4	931 MHz			
Transmit Freq Error	-6.710 kHz	% of OBW Powe	r 99.00 %	
x dB Bandwidth	766.9 kHz	x dB	-6.00 dB	
usg 🗼 File <occ 8.33.png="" bw=""> sav</occ>	ed		STATUS 🔔 DC Couple	ed
	Occupie	d Bandwidth Low D	ata Rate	

Occupied Bandwidth Low Data Rate







Occupied Bandwidth Mid Data Rate





Keysight Spectrum Analyzer - Occupied BW				
ΙΧ΄ RF 50 Ω <u>Λ</u> DC		SENSE:INT AL	IGN AUTO	05:55:47 PM Sep 21, 2018
VBW 150.00 kHz		Center Freg: 915.000000	MHz	Radio Std: None
VBVV 130:00 KHZ		Trig: Free Run	Avg Hold:>10/10	
	#IFGain:Low	#Atten: 20 dB		Radio Device: BTS
10 dB/div Ref 10.00 dBm				
Log				
0.00				
0.00				
-10.0				
-20.0				
-20.0				
-30.0				
-40.0				~~~~~
-40.0				Mundal and an
-50.0				
-60.0				
-70.0				
-80.0				
Center 915 MHz				Span 3 MHz
#Res BW 47 kHz		#VBW 150 kH	Z	Sweep 1.733 ms
Occupied Bandwidth		Total Power	-5.00 dBm	
Occupied Bandwidth		Total Fower	-3.00 uBm	
1.5	088 MHz			
1.5				
Transmit Freq Error	-4.349 kHz	% of OBW Power	r 99.00 %	
x dB Bandwidth	764.7 kHz	x dB	-6.00 dB	
	704.7 KHZ	X UB	-0.00 uB	
мsg File <occ bw="" cw.png=""> save</occ>	d		STATUS 🥂 DC Coup	ed
	Occupio	d Bandwidth High Da	ata Rato	

Occupied Bandwidth High Data Rate





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 Radiated Emissions (1-26.5GHz)	4.6dB 4.6dB	5.2dB (Ucispr)
Radiated Emissions (120:0012) Radiated Emissions (above 26:5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions	0.002	
NIST CISPR	3.9dB 3.6dB	N/A 3.6dB (Ucispr)
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 x 10 ⁻⁸	1 x 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		



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page 50 of 52

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

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.

 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.
 These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof

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.

The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
 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.
 Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company

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 were 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. CLIÉNT 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.





page 51 of 52

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 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. Rev.160009121(2)_#684340 v14CS





page 52 of 52