Test Report

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

Report No	ER2719-1
Client	JADAK, a Business Unit of Novanta Corporation
Address	7279 William Barry Blvd N. Syracuse, NY 13212
Phone	315-701-0678
Items tested	M1-Mini (MN: SM-MN-SH)
FCC ID	2AAVI-SM-MN-SH
IC	11355A-SMMNSH
FRN	0022907778
Equipment Code	DXX - Part 15 Low Power Communication Device Transmitter
Emission Designator	963KA1D
Standards	CFR Title 47 FCC Part 15.225, ISED Canada RSS-210 Issue 9 Annex B.6
Test Dates	September 8 and 15, 2017
Results	As detailed within this report
Prepared by	Zack Johnson – Test Engineer
Authorized by	Yunus Faziloglu – Sr. EMC Engineer
Issue Date	3/29/2018
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 15 of this report.

Contents

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

Summary and Test Methodology

This test report supports a “Single Modular Approval” certification application for M1-Mini (MN: SM-MN-SH) operating under:

CFR Title 47 FCC Part 15.225, ISED Canada RSS-210 Issue 9 Annex B.6

EUT is an RFID reader module operating at 13.56MHz. All testing was performed in accordance with ANSI C63.10 2013. Emissions were maximized around 3 orthogonal planes (X, Y and Z). EUT has an integral loop antenna.

EUT is powered by USB.

We found that the product complied with the requirements above without modification. Test sample was received in good condition.

The environmental conditions during testing are documented on the associated data tables.

The following bandwidths were used during emissions testing.

Frequency	RBW	VBW
9kHz-150kHz	200Hz	1kHz
150kHz-30MHz	9kHz	30kHz
30MHz-1GHz	120kHz	1MHz

Issue No.	Reason for change	Date Issued
1	Original Release	March 29, 2018

Product Tested - Configuration Documentation

EUT Configuration			
Work Order:	R2719		
Company:	Jadak Technologies		
Company Address:	125 Middlesex Turnpike		
	Bedford, MA 01730		
Contact:	Harinath Reddy		
	MN	**PN**	**SN**
EUT:	SM-MN-SH	--	Test Sample 1
EUT Description:	M1-mini RFID reader		
EUT Max Frequency:	13.56 MHz		
EUT Min Frequency:	13.56 MHz		

Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
USB (mini)	USB	1	1	USB	Yes	No	2	in	yes	

Software Operating Mode Description:

RFID reader continuously reads a sample tag. 13.56MHz band.

Clock Frequencies	
frequencies (MHz)	13.56

Issue No.	Reason for change	Date Issued
1	Original Release	March 29, 2018

Statement of Conformity

M1-Mini (MN: SM-MN-SH) complied with the following requirements:

RSS-GEN	RSP-100	RSS 210	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	EUT has an integral loop 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.
			15.225	The unit complies with the requirements of 15.225
		Annex B.6		The unit complies with the requirements of RSS-210 Annex B.6
6.6				Occupied Bandwidth measurements were made.

Issue No.	Reason for change	Date Issued
1	Original Release	March 29, 2018

Test Results

Fundamental Emission

LIMIT

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters, (124 dBuV/m at 3m.)
[15.225 (a)]

MEASUREMENTS / RESULTS

Radiated Emissions Table

Date: 25-Sep-17 **Company:** Novanta Corporation **Work Order:** R2719
Engineer: Arik Zwirner **EUT Desc:** M1 Mini **EUT Operating Voltage/Frequency:** 120Vac/60Hz
Temp: 24°C **Humidity:** 37% **Pressure:** 1007mbar
Frequency Range: 13.56MHz **Measurement Distance:** 3 m
Notes:

Antenna Polarization (0° - 90°)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC 15.109 Limit (dBµV/m)	FCC 15.109 Margin (dB)	FCC 15.109 Result (Pass/Fail)
90	13.56	37.0	36.2	39.0	0.2	40.0	---	---	---	69.5	-29.5	PASS

Table Result: PASS by 29.5 dB

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: 1170725 **Preamp:** Asset #2311 **Antenna:** Sm Loop (high) **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.189

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

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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 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016

Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2311 PA	1-1000MHz	PAM-103	COM-POWER	441175	2311	II	2/4/2018	2/4/2017

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
2325 Horn	.2-2GHz	AH-220	COM-POWER	111055	2325	I	3/2/2019	3/2/2017
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016

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#2082		HTC-1	HDE		2082	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 #2051	9kHz - 18GHz	Florida RF	II	3/5/2018	3/5/2017
Asset #2054	9kHz - 18GHz	Florida RF	II	10/30/3017	10/30/2016

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

Radiated Spurious Emissions

LIMITS

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.
[15.225(d)]

No emissions found within 150kHz – 30MHz range and noise floor was more than 10dB below the limit.

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data
Operator: AKZ

Work Order - R2719
Temp; Humid; Pres - 24°C; 37%RH; 1007mBar
EUT Maximum Frequency - 13.56MHz

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)*	*(cm)*	*(degrees)*	*(dB)*
30.204	40.1	-14.3	25.7	40	-14.3	PASS	265	195	
192.047	55.6	-23.1	32.4	43.5	-11.1	PASS	100	247	-11.1
252.027	50.7	-23.3	27.4	46	-18.6	PASS	115	274	
275.771	49.9	-21.2	28.6	46	-17.4	PASS	132	106	
347.988	51.8	-19.9	31.9	46	-14.2	PASS	125	110	
444.304	47.1	-17	30.1	46	-15.9	PASS	258	245	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Vertical Data
Operator: AKZ

Work Order - R2719
Temp; Humid; Pres - 24°C; 37%RH; 1007mBar
EUT Maximum Frequency - 13.56MHz

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)*	*(cm)*	*(degrees)*	*(dB)*
75.771	57.9	-26.8	31	40	-9	PASS	105	332	
79.871	58.7	-27.3	31.4	40	-8.6	PASS	109	250	
83.981	60.4	-27.8	32.6	40	-7.4	PASS	125	271	-7.4
88.074	60.5	-27.8	32.7	43.5	-10.8	PASS	125	289	
95.92	58.3	-26.3	32.1	43.5	-11.5	PASS	148	250	
191.763	55.8	-23.2	32.7	43.5	-10.8	PASS	125	236	

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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 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2311 PA	1-1000MHz	PAM-103	COM-POWER	441175	2311	II	2/4/2018	2/4/2017
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
2325 Horn	.2-2GHz	AH-220	COM-POWER	111055	2325	I	3/2/2019	3/2/2017
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
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#2082		HTC-1	HDE		2082	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 #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2054	9kHz - 18GHz		Florida RF			II	10/30/3017	10/30/2016

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

Frequency Tolerance

LIMITS

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.
[15.225(e)]

MEASUREMENTS / RESULTS

Frequency Stability — ***Curtis-Straus LLC***

Engineer: Arik Zwirner **Company:** Jadak
Date: 15-Sep-17 **Work Order:** R2719
Spectrum Analyzer: Gold
Reference Frequency: 13.560445MHz at 120Vac/60Hz, 20°C
Required Tolerance: ±1.356kHz

Temperature (°C)	Supply Voltage (60Hz)	Center Frequency (MHz)	Frequency Deviation (kHz)	Results
-30	120 V	13.560313	-0.132	PASS
-20	120 V	13.560361	-0.084	PASS
-10	120 V	13.560470	0.025	PASS
0	120 V	13.560454	0.009	PASS
10	120 V	13.560453	0.008	PASS
20	120 V	13.560445	0.000	PASS
20	138 V (115%)	13.560445	0.000	PASS
20	102 V (85%)	13.560445	0.000	PASS
30	120 V	13.560439	-0.006	PASS
40	120 V	13.560432	-0.013	PASS
50	120 V	13.560425	-0.020	PASS

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Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	2/28/2018	2/28/2017
RMS Voltmeters/Current Clamp		**MN**	**Mnfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
D+I Verification DMM		115	Fluke	94470393	1295	I	6/5/2018	6/5/2017
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-20	9kHz - 2GHz		C-S			II	11/6/2017	11/6/2016
Environmental Chamber		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Environmental # 17 (Safety #21)		SGTH-31S	B.M.A.	2245	321	I	1/5/2018	1/8/2017

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

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)]

Curtis Straus - a Bureau Veritas Company
Conducted Emissions per CISPR 16-2-1
Quasi-peak Detector Data
Operator: AKZ

Work Order # - J2719
EUT Power Input - 120VAC/ 60Hz
Test Site - CEMI-1
Temp; Humid; Pres - 23°C; 50%RH; 1010mBar

EUT Line tested: 120VAC/60Hz; Live Phase

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	QP Limit	Margin to QP Limit	QP Limit Results	Worst Margin (QP Limit)
MHz	*dBµV*	*dB*	*dBµV*	*dBµV*	*dB*	*Pass/Fail*	*dB*
0.15	23.902	20.7	44.6	66	-21.4	PASS	
0.164	25.36	20.7	46	65.3	-19.2	PASS	
0.221	19.838	20.7	40.5	62.8	-22.3	PASS	
0.257	18.643	20.7	39.3	61.5	-22.2	PASS	
0.472	22.22	20.6	42.8	56.5	-13.6	PASS	
0.538	24.217	20.6	44.8	56	-11.2	PASS	-11.2

Curtis Straus - a Bureau Veritas Company
Conducted Emiss CISPR Average Detector
Final Average Detector Data
Operator: AKZ

Work Order # - J2719
EUT Power Input - 120VAC/ 60Hz
Test Site - CEMI-1
Temp; Humid; Pres - 23°C; 50%RH; 1010mBar

EUT Line tested: 120VAC/60Hz; Live Phase

Frequency	Raw Avg Reading	Correction Factor	Adjusted Avg Amplitude	Avg Limit	Avg Margin	Avg Results	Worst Avg Margin
MHz	*dBµV*	*dB*	*dBµV*	*dBµV*	*dB*	*Pass/Fail*	*dB*
0.199	12.6	20.7	33.3	53.6	-20.4	PASS	
0.203	22.8	20.7	43.5	53.5	-10	PASS	
0.473	19.2	20.6	39.8	46.5	-6.7	PASS	
0.54	22.2	20.6	42.8	46	-3.2	PASS	-3.2
4.729	9.2	20.7	29.8	46	-16.2	PASS	
4.794	9.6	20.7	30.3	46	-15.7	PASS	

Curtis Straus - a Bureau Veritas Company
Conducted Emissions per CISPR 16-2-1
Quasi-peak Detector Data
Operator: AKZ

Work Order # - J2719
EUT Power Input - 120VAC/ 60Hz
Test Site - CEMI-1
Temp; Humid; Pres - 23°C; 50%RH; 1010mBar
EUT Line tested: 120VAC/60Hz; Neutral Phase

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	QP Limit	Margin to QP Limit	QP Limit Results	Worst Margin (QP Limit)
MHz	*dBµV*	*dB*	*dBµV*	*dBµV*	*dB*	*Pass/Fail*	*dB*
0.204	31.637	20.7	52.3	63.5	-11.1	PASS	
0.471	22.952	20.6	43.6	56.5	-12.9	PASS	
0.541	25.72	20.6	46.3	56	-9.7	PASS	-9.7
1.284	19.767	20.6	40.4	56	-15.6	PASS	
1.553	19.826	20.6	40.5	56	-15.5	PASS	
1.62	19.652	20.6	40.3	56	-15.7	PASS	

Curtis Straus - a Bureau Veritas Company
Conducted Emis: CISPR Average Detector
Final Average Detector Data
Operator: AKZ

EUT Line tested: 120VAC/60Hz; Neutral Phase
Work Order # - J2719
EUT Power Input - 120VAC/ 60Hz
Test Site - CEMI-1
Temp; Humid; Pres - 23°C; 50%RH; 1010mBar

Frequency	Raw Avg Reading	Correction Factor	Adjusted Avg Amplitude	Avg Limit	Avg Margin	Avg Results	Worst Avg Margin
MHz	*dBµV*	*dB*	*dBµV*	*dBµV*	*dB*	*Pass/Fail*	*dB*
0.202	24.8	20.7	45.5	53.5	-8.1	PASS	
0.474	23	20.6	43.6	46.4	-2.8	PASS	-2.8
0.539	20.5	20.6	41.1	46	-4.9	PASS	
1.217	19.6	20.6	40.2	46	-5.8	PASS	
1.554	20.5	20.6	41.2	46	-4.8	PASS	
1.622	17.8	20.6	38.4	46	-7.6	PASS	

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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
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
LISN Asset 1732	150kHz-30MHz	LI-150A	Com-Power	201094	1732	I	3/8/2018	3/8/2017
LISN Asset 1733	150kHz-30MHz	LI-150A	Com-Power	201095	1733	I	3/8/2018	3/8/2017
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI 1	719150		A-0015			III	NA	N/A
Meteorological Meters		**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#2083		HTC-1	HDE		2083	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-20	9kHz - 2GHz		C-S			II	11/6/2017	11/6/2016
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
20dB Attenuator-64	9kHz-2GHz			N/A		II	11/5/2017	11/5/2016

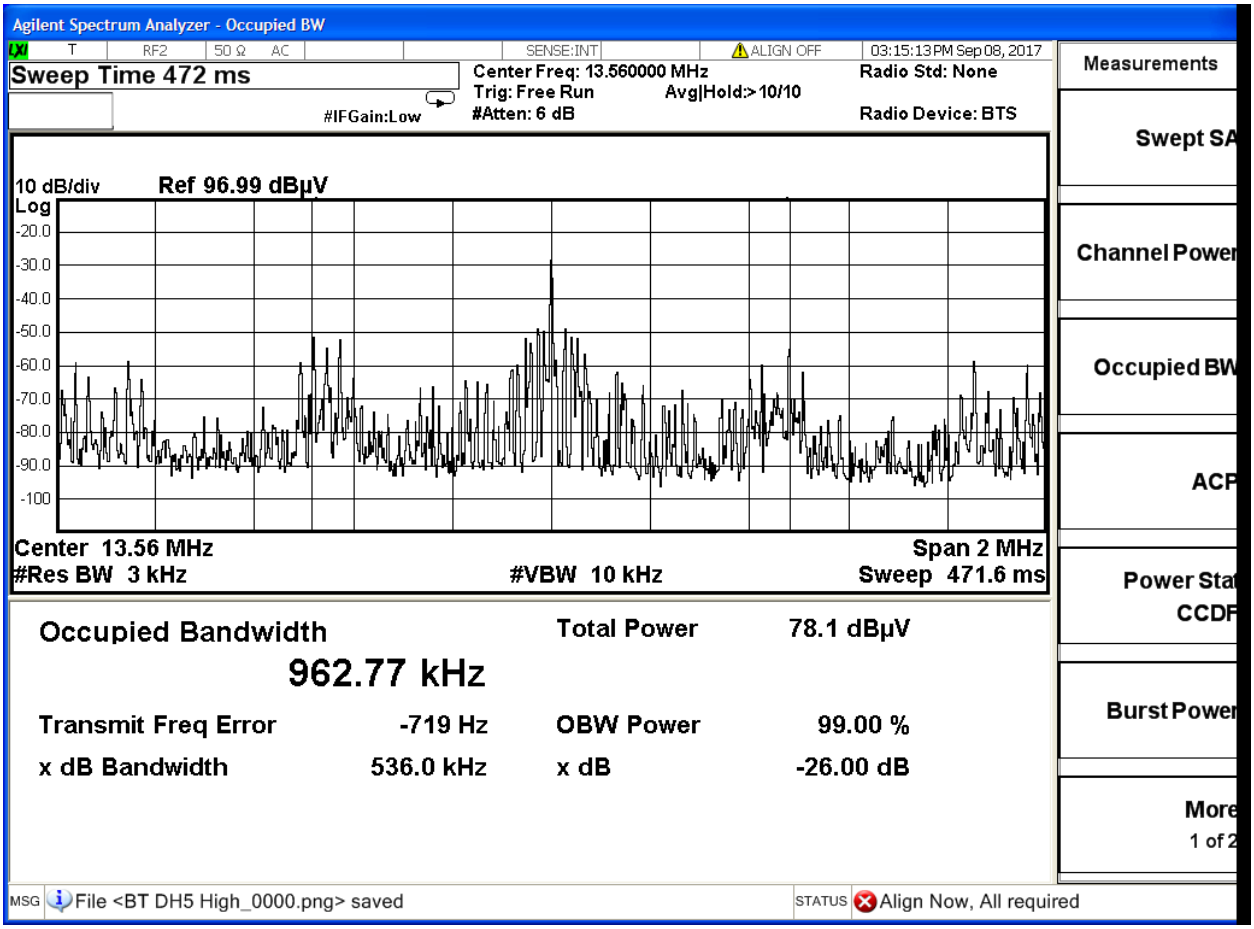
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

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]

99% Occupied Bandwidth = 962.77kHz



99% Occupied Bandwidth

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 CISPR	 5.6dB 4.6dB	 N/A 5.2dB (Ucispr)
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 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)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation: • Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	 3.4% 0.3dB	 5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		

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 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. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST

ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B)NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

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