Test Report

Bureau Veritas Consumer Products Services, Inc.

Report No	ET1639-1
Client	ASSA ABLOY Inc.
Address	110 Sargent Drive New Haven, CT 06511
Phone	203-821-5724
Items tested	IN-BIKP (Model BLE9117K)
FCC ID	U4A-MODBLE9117K
IC	6982A-MODBLE9117K
FRN	0016550824
Equipment Type	Part 15 Low Power Communication Device Transmitter
Equipment Code	DXX
Emission Designator	1K30A1D
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.225, ISED Canada RSS-210 Issue 9 Annex B.6
Test Dates	July 30 - Sep 4, 2019
Results	As detailed within this report
Prepared by	Anna Vancheva Anna Vancheva – EMC Engineer
Authorized by	Yunus Faziloglu – Sr. Engineer
Issue Date	9/23/2019
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 24 of this report.

Contents

Form Final Report REV 12-07-15

Summary and Test Methodology

Between July 30 and Sep 4, 2019 we tested the IN-BIKP (Model BLE9117K) for compliance with the following requirements:

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

EUT transmits at 13.56MHz. Emissions were measured with the EUT in its intended upright installation orientation. EUT has an internal non-detachable flex printed circuit antenna.

Radiated emission testing was performed according to the procedures specified in ANSI C63.10-2013 and RSS-Gen Issue 5.

AC mains conducted emission testing was performed for both 24VDC and PoE(48VDC) configurations.

Following bandwidths were used during radiated and conducted spurious emissions testing.

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

We found that the product met the above requirements with modification. See “Modifications Required for Compliance” section of this report. The test sample was received in good condition.

Product Tested - Configuration Documentation

EUT Configuration			
Work Order:	S1639		
Company:	Assa Abloy		
Company Address:	110 Sargent Drive		
	New Haven, CT 06511		
Contact:	Dave DeBiase		
	Product Marketing Name	Model Number	**SN**
EUT:	IN-BIKP	BLE9117K	1,2
EUT Description:	Lock Controller		
EUT Tx Frequency:	125kHz (LF RFID), 13.56MHz (HF RFID), 2402-2480MHz (BLE)		

Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
Ethernet Door	Ethernet	1	1	Ethernet	No	Yes	1.5	in	yes	
Power DC	Power DC	1	1	Power DC	No	No	5	in	yes	
Ethernet frame	Ethernet	1	1	Ethernet	Yes	No	4.5	in	yes	
Power AC	Power AC	1	1	Power DC	No	yes	5	in	yes	

Software Operating Mode Description:

All radios are transmitting during testing.

Compliance Statement

RSS-GEN	RSP-100	RSS 210	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	See "Modifications Required for Compliance" section below.
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	EUT has an internal non-detachable flex printed circuit 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
6.7				99% emissions bandwidth plot is provided.

Modifications Required for Compliance

PoE configuration for radiated emissions was tested with ferrite Laird 28B0473-200 on all four Ethernet pairs.

Test Results

Fundamental Reading

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

MEASUREMENTS / RESULTS

Radiated Emissions Table

Date: 30-Jul-19 **Company:** Assa Abloy **Work Order:** T1639
Engineer: AKZ, AV **EUT Operating Voltage/Frequency:** Battery
Temp: 23.2°C **Humidity:** 55% **Pressure:** 1007mbar
Frequency Range: Fundamental Reading at 13.56MHz **Measurement Distance:** 3 m
Notes:

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	FCC 15.209(a) Limit (dBµV/m)	FCC 15.209(a) Margin (dB)	FCC 15.209(a) Result (Pass/Fail)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)
Parallel:			---	---	---	---	---	---	---	---	---	---
	13.56	54.3	0.0	10.9	0.2	65.4	69.5	-4.1	PASS	---	---	---
			---	---	---	---	---	---	---	---	---	---
Perpendicular:			---	---	---	---	---	---	---	---	---	---
	13.56	48.9	0.0	10.9	0.2	60.0	69.5	-9.5	PASS	---	---	---
			---	---	---	---	---	---	---	---	---	---
Horizontal:			---	---	---	---	---	---	---	---	---	---
	13.56	42.7	0.0	10.9	0.2	53.8	69.5	-15.7	PASS	---	---	---
			---	---	---	---	---	---	---	---	---	---

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2585 **Cable 2:** Asset #2456 **Cable 3:** ---
Analyzer: Asset #2093 **Preamp:** None **Antenna:** Asset 2615 Loop **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.215

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

Test Equipment Used

Rev. 7/24/2019

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/21/2019

Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/7/2020

Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2615 Active Loop Antenna	9KHz-30MHz	6502	EMCO	2049	2615	I	10/30/2019

Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
Asset #2658		1235C97	Control Company	181683808	2658	I	4/3/2020

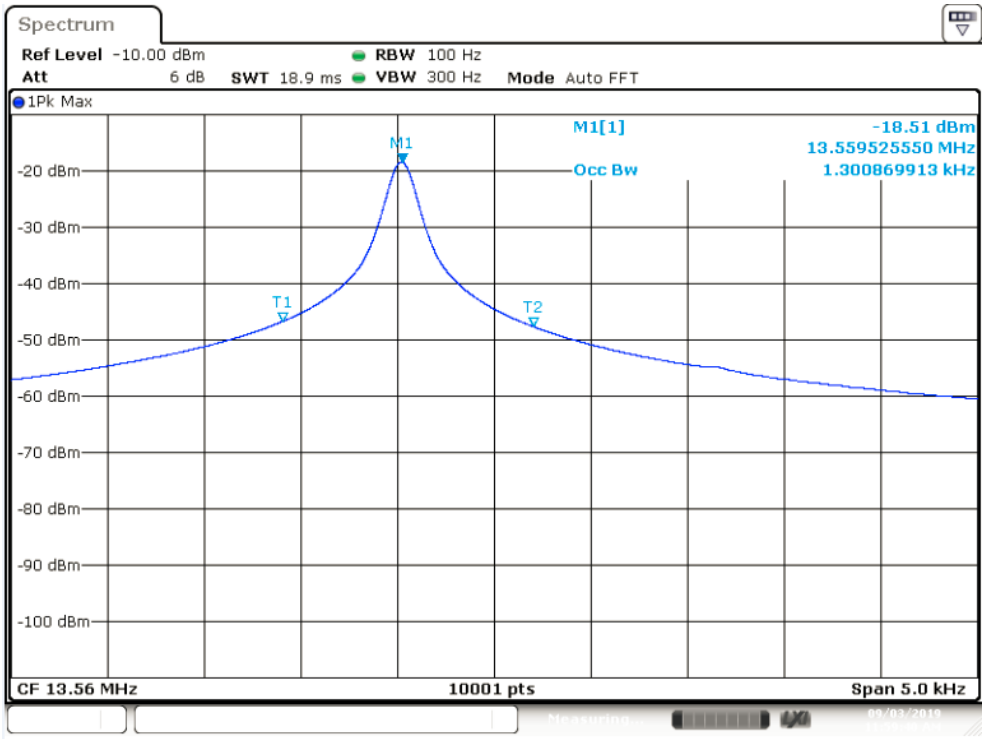
Cables	Range	Mfr	Cat	Calibration Due
Asset #2456	9KHz-18GHz	MegaPhase	II	10/31/2019
Asset #2464	9KHz-18GHz	MegaPhase	II	10/31/2019
Asset #2585	9KHz-18GHz	Pasternack	II	5/24/2020

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

99% 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]



Date: 3.SEP.2019 11:59:40

99% OBW = 1.30kHz

Test Equipment Used

Rev. 7/30/2019

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	5/30/2020	5/30/2019
FSV40 Signal Analyzer	10Hz-40GHz	FSV40	ROHDE & SCHWARZ	101551	2200	I	10/1/2019	10/1/2018
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp/Humidity Chamber #18		EPX-2H	Espec	137664	1645	I	1/2/2020	1/2/2019
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2595	9KHz-40GHz		Carlisle		2595	II	3/13/2020	3/13/2019
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2615 Active Loop Antenna	9KHz-30MHz	6502	EMCO	2049	2615	I	10/30/2019	10/30/2018

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

Emission Mask

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
(d) 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.

MEASUREMENTS / RESULTS

BLE9117K complied with the emission mask requirements without testing since the peak field strength at the fundamental frequency was measured to be below the FCC 15.209 limits. See data tables for Fundamental Emission.

Radiated Spurious Emissions

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)]

9-150 kHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions, Electric Field, 3m Measurement
Top Peaks Parallel 9-150kHz
Notes:

Work Order - T1639
EUT Power Input - Battery
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 12:06:15 PM, Tuesday, July 30, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim: FCC_pt15_209_dBµV/m (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.028529	42.9	13.4	56.4	118.5	-62.1	PASS		135
0.046876	40.5	11.3	51.8	114.2	-62.4	PASS		300
0.077572	37.2	10.5	47.7	109.8	-62.1	PASS		255
0.092134	35.9	10.4	46.3	108.3	-62	PASS		105
0.124821	65.7	10.1	75.8	105.7	-29.9	PASS	-29.9	315
0.14302	32.4	10.1	42.4	104.5	-62.1	PASS		75

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions, Electric Field, 3m Measurement
Top Peaks Perpendicular 9-150kHz
Notes:

Work Order - T1639
EUT Power Input - Battery
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 12:06:15 PM, Tuesday, July 30, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim: FCC_pt15_209_dBµV/m (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.051917	39.8	11	50.8	113.3	-62.5	PASS		345
0.063909	38.3	10.8	49.1	111.5	-62.4	PASS		30
0.087082	36.6	10.5	47.1	108.8	-61.8	PASS		240
0.111405	35.2	10.1	45.3	106.7	-61.4	PASS		240
0.124807	61.9	10.1	72	105.7	-33.7	PASS	-33.7	315
0.13614	33.3	10.1	43.3	104.9	-61.6	PASS		15

150-1000kHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Parallel 150-1000kHz
Notes:

Work Order - T1639
EUT Power Input - Battery
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 02:27:10 PM, Tuesday, July 30, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/s)	Adjusted Peak Amplitude (dBµA/m)	Lim: FCC_pt15_209_dBµV/m (dBµA/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.372	42.5	9.9	52.4	96.2	-43.8	PASS		0
0.553	39.6	10.2	49.7	72.8	-23	PASS	-23	285
0.626	38.2	10.3	48.4	71.7	-23.3	PASS		330
0.767	34.9	10.4	45.3	69.9	-24.6	PASS		345
0.869	33.1	10.5	43.6	68.8	-25.2	PASS		285
0.968	31.8	10.6	42.4	67.9	-25.5	PASS		180

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Perpendicular 150-1000kHz
Notes:

Work Order - T1639
EUT Power Input - Battery
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 02:34:32 PM, Tuesday, July 30, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/s)	Adjusted Peak Amplitude (dBµA/m)	Lim: FCC_pt15_209_dBµV/m (dBµA/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.54	38.7	10.2	48.9	73	-24.1	PASS		240
0.621	37.2	10.3	47.5	71.8	-24.2	PASS		60
0.679	37.5	10.3	47.8	71	-23.2	PASS	-23.2	330
0.79	34.6	10.5	45.1	69.7	-24.6	PASS		210
0.878	33.3	10.5	43.8	68.7	-24.9	PASS		240
0.969	32	10.6	42.6	67.9	-25.3	PASS		180

1-30 MHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Parallel 1-30MHz
Notes:

Work Order - T1639
EUT Power Input - Battery
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 02:53:43 PM, Tuesday, July 30, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/s)	Adjusted Peak Amplitude (dBµA/m)	Lim: FCC_pt15_209_dBµV/m (dBµA/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
1.047	30	10.7	40.7	67.2	-26.5	PASS		330
2.325	22.6	10.6	33.2	69.5	-36.4	PASS		30
3.112	19.9	10.6	30.5	69.5	-39	PASS		210
12.921	24.2	11.2	35.3	69.5	-34.2	PASS		0
13.559	54.4	11.2	65.6	69.5	-4	PASS	-4	345
30	12.5	8.3	20.8	40	-19.2	PASS		0

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Perpendicular 1-30MHz
Notes:

Work Order - T1639
EUT Power Input - Battery
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 02:47:14 PM, Tuesday, July 30, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/s)	Adjusted Peak Amplitude (dBµA/m)	Lim: FCC_pt15_209_dBµV/m (dBµA/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
1.218	28.1	10.7	38.8	65.9	-27.1	PASS		120
1.918	24.7	10.6	35.3	69.5	-34.2	PASS		285
2.438	21.3	10.6	31.9	69.5	-37.6	PASS		90
3.128	20.1	10.6	30.8	69.5	-38.8	PASS		0
13.559	50.2	11.2	61.4	69.5	-8.2	PASS	-8.2	45
30	11.8	8.3	20	40	-20	PASS		165

In 9kHz-30MHz range, no emissions were found in receive loop antenna's "ground-parallel" orientation.

30-1000 MHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Notes:

Work Order - T1639
EUT Power Input - Ba
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 11:07:52 AM, Tuesday, July 30, 2019

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
30.364	33	-6.9	26.1	40	-13.9	PASS		150	270
40.646	38.6	-14.5	24.1	40	-15.9	PASS		100	270
257.635	48.5	-15.1	33.4	46	-12.6	PASS	-12.6	200	0
269.275	42.7	-13.9	28.8	46	-17.2	PASS		200	0
307.323	41.5	-13.1	28.5	46	-17.5	PASS		200	0
945.195	31.4	-1	30.4	46	-15.6	PASS		150	45

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Notes:

Work Order - T1639
EUT Power Input - Ba
Test Site - CH1
Conditions - 23.2°C; 54.7%RH; 1007mBar
Test Engineer - AV

BLE Mid channel activ. Radios under test LF(125 kHz) and HF(13.56 MHz).Battery

Data Taken at 11:07:52 AM, Tuesday, July 30, 2019

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
30.8	32.5	-7.2	25.3	40	-14.7	PASS		150	135
257.635	46.8	-15.1	31.7	46	-14.3	PASS		150	45
702.259	44.9	-5.1	39.8	46	-6.2	PASS	-6.2	150	45
703.519	39.1	-5.1	34	46	-12	PASS		200	45
937.484	31.8	-1.2	30.5	46	-15.5	PASS		100	135

Test Equipment Used

Rev. 7/24/2019

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/21/2019
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/7/2020
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
2311 PA	1-1000MHz	PAM-103	COM-POWER	441174	2311	II	10/29/2019
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	4/26/2021
2615 Active Loop Antenna	9KHz-30MHz	6502	EMCO	2049	2615	I	10/30/2019
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
Asset #2658		1235C97	Control Company	181683808	2658	I	4/3/2020
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
Asset #2456	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2464	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2585	9KHz-18GHz		Pasternack			II	5/24/2020

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

30-1000MHz PoE (48VDC)

Bureau Veritas Consumer Product Services Inc. — Work Order - T1639
Radiated Emissions Electric Field 3m Distance — EUT Power Input - POE (48Vdc)
Top Peaks Horizontal 30-1000MHz — Test Site - CH-1
Notes: — Conditions - 23.7°C; 56%RH; 1008mBar
BLE9117K, with ferrite: Laird 28B0473-200 on all four Ethernet pairs;
with metal escutcheon — Test Engineer - AKZ

Data Taken at 02:28:01 PM, Wednesday, July 31, 2019

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Lim2 Margin (dB)	Lim2 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
289.499	50.2	-13.5	36.7	46	-9.4	PASS		47.5	-10.8	PASS		100	225
292.506	50.3	-13.5	36.8	46	-9.2	PASS		47.5	-10.7	PASS		100	90
294.543	49.9	-13.5	36.4	46	-9.7	PASS		47.5	-11.1	PASS		100	90
297.526	50.6	-13.5	37.1	46	-8.9	PASS		47.5	-10.4	PASS		100	225

Data Taken at 02:28:01 PM, Wednesday, July 31, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
375.013	52.2	-11.1	41	46	-5	PASS		47.5	-6.5	PASS		100	79
625.036	48.8	-6.3	42.5	46	-3.6	PASS	-3.6	47.5	-5	PASS	-5	136	57

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Notes:
BLE9117K, with ferrite: Laird 28B0473-200 on all four Ethernet pairs;
with metal escutcheon

Work Order - T1639
EUT Power Input - POE (48Vdc)
Test Site - CH-1
Conditions - 23.7°C; 56%RH; 1008mBar
Test Engineer - AKZ

Data Taken at 02:28:01 PM, Wednesday, July 31, 2019

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Lim2 Margin (dB)	Lim2 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
34.608	47	-10	37	40	-3	PASS	-3	40.5	-3.5	PASS	-3.5	100	270
36.135	45.8	-11.1	34.6	40	-5.4	PASS		40.5	-5.9	PASS		100	225
37.348	43.4	-12	31.4	40	-8.6	PASS		40.5	-9.1	PASS		100	315
375.029	47.5	-11.1	36.3	46	-9.7	PASS		47.5	-11.2	PASS		100	135
625.022	46.4	-6.3	40	46	-6	PASS		47.5	-7.5	PASS		100	270
750.055	41.6	-4.2	37.4	46	-8.6	PASS		47.5	-10.1	PASS		150	225

Data Taken at 02:37:48 PM, Wednesday, July 31, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
34.645	46.5	-10	36.5	40	-3.5	PASS	-3.5	40.5	-4	PASS	-4	101	169

30-1000 MHz 24 VDC

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Notes:
BLE9117K with hard-wired 24V DC power

Work Order - T1639
EUT Power Input - 24V DC
Test Site - CH-1
Conditions - 23.7°C; 56%RH; 1008mBar
Test Engineer - AKZ

Data Taken at 04:28:17 PM, Wednesday, July 31, 2019

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Lim2 Margin (dB)	Lim2 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
381.091	53.8	-11.2	42.6	46	-3.4	PASS		47.5	-4.9	PASS		100	135
382.183	53.3	-11.2	42.2	46	-3.9	PASS		47.5	-5.3	PASS		100	135
386.184	52.5	-11.2	41.3	46	-4.7	PASS		47.5	-6.2	PASS		100	135
388.124	53.8	-11.2	42.6	46	-3.4	PASS		47.5	-4.9	PASS		100	135
397.218	52.1	-10.9	41.2	46	-4.8	PASS		47.5	-6.3	PASS		100	135

Data Taken at 04:28:17 PM, Wednesday, July 31, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
390.662	37.5	-11.1	26.4	46	-19.6	PASS	-19.6	47.5	-21.1	PASS	-21.1	100	108

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Notes:
BLE9117K with hard-wired 24V DC power

Work Order - T1639
EUT Power Input - 24V DC
Test Site - CH-1
Conditions - 23.7°C; 56%RH; 1008mBar
Test Engineer - AKZ

Data Taken at 04:28:17 PM, Wednesday, July 31, 2019

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Lim2 Margin (dB)	Lim2 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
380.194	51.1	-11.2	39.9	46	-6.1	PASS		47.5	-7.6	PASS		100	225
381.213	51.4	-11.2	40.2	46	-5.8	PASS		47.5	-7.3	PASS		100	225
387.178	51.9	-11.2	40.7	46	-5.3	PASS		47.5	-6.8	PASS		100	225
390.185	52.7	-11.1	41.6	46	-4.4	PASS		47.5	-5.9	PASS		100	225
391.204	51.6	-11.1	40.5	46	-5.5	PASS		47.5	-7	PASS		100	225

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
30-1000MHz Vertical Data
Notes:
BLE9117K with hard-wired 24V DC power

Work Order - T1639
EUT Power Input - 24V DC
Test Site - CH-1
Conditions - 23.7°C; 56%RH; 1008mBar
Test Engineer - AKZ

Data Taken at 04:28:17 PM, Wednesday, July 31, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: Cispr_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
174.687	46.6	-16.3	30.3	43.5	-13.2	PASS		40.5	-10.2	PASS	-10.2	152	29
390.032	45.4	-11.1	34.3	46	-11.7	PASS	-11.7	47.5	-13.2	PASS		144	260

Test Equipment Used

Rev. 7/24/2019							
Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/21/2019
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/7/2020
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
2311 PA	1-1000MHz	PAM-103	COM-POWER	441174	2311	II	10/29/2019
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	4/26/2021
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
Asset #2658		1235C97	Control Company	181683808	2658	I	4/3/2020
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
Asset #2456	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2464	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2585	9KHz-18GHz		Pasternack			II	5/24/2020
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.							

Temperature Stability

Limit: 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.
[FCC 15.225]

MEASUREMENTS / RESULTS

13.56MHz * 0.01% = 1356Hz Allowable tolerance

Frequency Stability					
Date:	23-Aug-19			**Work Order:**	T1639
Engineer:	Anna Vancheva		**BLE9117K**		
Notes:	Powered by PSU 9V DC				
Temperature	**Frequency Delta**	**Limit**	**Verdict**		
°C	**(Hz)**	**(Hz)**	**Pass/Fail**		
-20	1,000	± 1356	Pass		
-10	800	± 1356	Pass		
0	800	± 1356	Pass		
10	800	± 1356	Pass		
20	-400	± 1356	Pass		
30	800	± 1356	Pass		
40	800	± 1356	Pass		
50	800	± 1356	Pass		
Test Site:	WTS Chamber 18		**Analyzer:**	101551	
Antenna:	Loop 2615		**Cable:**	2595	

Frequency Stability					
Date:	04-Sep-19			**Work Order:**	T1639
Engineer:	Anna Vancheva				
Notes:	Voltage variation				
Temperature	**20°C**				
Rated V min	**9**	**85% V Min**	**7.65**		
Rated V Max	24	115% V Max	27.60		
Voltage	**Frequency Delta**	**Limit**	**Verdict**		
(Volts)	**(Hz)**	**(Hz)**	**Pass/Fail**		
7.65	62	± 1356	Pass		
9.00	REF	± 1356	Pass		
24.00	REF	± 1356	Pass		
27.60	-17	± 1356	Pass		
Test Site:	WTS Chamber 18		**Analyzer:**	101551	
Antenna:	Loop 2615		**Cable:**	2595	

Test Equipment Used

Rev. 7/30/2019

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	5/30/2020	5/30/2019
FSV40 Signal Analyzer	10Hz-40GHz	FSV40	ROHDE & SCHWARZ	101551	2200	I	10/1/2019	10/1/2018
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp/Humidity Chamber #18		EPX-2H	Espec	137664	1645	I	1/2/2020	1/2/2019
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2595	9KHz-40GHz		Carlisle		2595	II	3/13/2020	3/13/2019
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2615 Active Loop Antenna	9KHz-30MHz	6502	EMCO	2049	2615	I	10/30/2019	10/30/2018

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)]

MEASUREMENTS / RESULTS

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUT Line tested: Line Phase
EUT Mode of Operation: 24 VDC

Work Order # - T1639
EUT Power Input - 24VDC
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 12:38:55 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.158	38.8	20.2	59	65.6	-6.5	PASS	-6.5
0.194	34.3	20.2	54.4	63.9	-9.4	PASS	
0.219	35.1	20.2	55.3	62.8	-7.5	PASS	
0.247	32.2	20.3	52.4	61.9	-9.4	PASS	
0.375	28.4	20.1	48.5	58.4	-9.9	PASS	
13.559	30.4	20.5	50.9	60	-9.1	PASS	

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1, CISPR Average Detector
Final Average Detector Data
Notes:
EUT Line tested: Line Phase
EUT Mode of Operation: 24 VDC

Work Order # - T1639
EUT Power Input - 24VDC
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 12:38:55 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Avg Reading (dBµV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBµV)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.149	2.4						
0.155	15.2	20.1	35.3	55.7	-20.4	PASS	
0.168	15.1	20.1	35.3	55	-19.8	PASS	
0.175	15.2	20.3	35.5	54.7	-19.2	PASS	
0.218	13.5	20.2	33.7	52.9	-19.2	PASS	
0.393	10.2	20	30.2	48	-17.8	PASS	-17.8
0.574	7.3	19.9	27.1	46	-18.9	PASS	

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUT: Neutral
EUT Mode of Operation: 24V DC

Work Order # - T1639
EUT Power Input - 24VDC
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 12:19:42 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.207	31.1	20.3	51.4	63.3	-11.9	PASS	
0.251	29.2	20.3	49.5	61.7	-12.2	PASS	
0.278	29.8	20.2	50	60.9	-10.8	PASS	
0.336	30.4	20.2	50.5	59.3	-8.8	PASS	-8.8
0.419	26.5	20.1	46.7	57.5	-10.8	PASS	
13.56	30.6	20.5	51.1	60	-8.9	PASS	

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1, CISPR Average Detector
Final Average Detector Data
Notes:
EUT: Neutral
EUT Mode of Operation: 24V DC

Work Order # - T1639
EUT Power Input - 24VDC
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 12:19:42 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Avg Reading (dBµV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBµV)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.189	13.3	20.2	33.5	54.1	-20.6	PASS	
0.225	11.6	20.2	31.8	52.6	-20.8	PASS	
0.235	11.4	20.2	31.7	52.3	-20.6	PASS	
0.264	13.5	20.2	33.8	51.3	-17.6	PASS	
0.379	10.4	20	30.4	48.3	-17.9	PASS	
13.557	20.5	20.5	41	50	-9	PASS	-9

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUTBLE9117K: Line
EUT Mode of Operation: PoE

Work Order # - T1639
EUT Power Input - PoE (48VDC)
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 04:39:44 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.184	37.3	20.3	57.5	64.3	-6.8	PASS	
0.213	34.9	20.2	55.1	63.1	-8	PASS	
0.269	29.3	20.2	49.5	61.2	-11.7	PASS	
0.629	26.8	20.2	47	56	-9	PASS	
0.734	26.6	19.9	46.5	56	-9.5	PASS	
Frequency (MHz)	**Raw QP Reading (dBµV)**	**Factor (dB)**	**Amplitude (dBµV)**	**Mains_FCC&CISP (dBµV)**	**Limit (dB)**	**QP Limit Results (Pass/Fail)**	**(QP Limit) (dB)**
10.975	18.271	20.5	38.8	60	-21.2	PASS	-21.2

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1, CISPR Average Detector
Final Average Detector Data
Notes:
EUTBLE9117K: Line
EUT Mode of Operation: PoE

Work Order # - T1639
EUT Power Input - PoE (48 VDC)
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 04:39:44 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Avg Reading (dBµV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBµV)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.157	15.1	20.2	35.3	55.6	-20.4	PASS	
0.159	15.2	20.2	35.3	55.5	-20.2	PASS	
0.231	19.9	20.2	40.1	52.4	-12.3	PASS	
0.629	25.2	20.2	45.4	46	-0.6	PASS	-0.6
0.733	25.2	19.9	45.1	46	-0.9	PASS	
13.56	19.2	20.5	39.7	50	-10.3	PASS	

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUT:BLE9117K Neutral
EUT Mode of Operation: PoE

Work Order # - T1639
EUT Power Input - PoE (48 VDC)
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 04:21:25 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.157	33	20.2	53.2	65.6	-12.4	PASS	
0.419	27	20.1	47.2	57.5	-10.3	PASS	
0.522	30.9	20	50.9	56	-5.1	PASS	
0.73	29.7	20	49.7	56	-6.3	PASS	
0.837	23.3	20.2	43.5	56	-12.5	PASS	
Frequency (MHz)	**Raw QP Reading (dBµV)**	**Factor (dB)**	**Amplitude (dBµV)**	**Mains_FCC&CISP (dBµV)**	**Limit (dB)**	**QP Limit Results (Pass/Fail)**	**(QP Limit) (dB)**
0.63	24.738	20.2	44.9	56	-11.1	PASS	-11.1

Bureau Veritas Consumer Product Services Inc.
Conducted Emissions per CISPR 16-2-1, CISPR Average Detector
Final Average Detector Data
Notes:
EUT:BLE9117K Neutral
EUT Mode of Operation: PoE

Work Order # - T1639
EUT Power Input - PoE (48 VDC)
Test Site - CEMI-2
Conditions: - 22.5°C; 48.8%RH; 1009mBar
Test Engineer - AV

Data Taken at 04:21:25 PM, Monday, August 05, 2019

Frequency (MHz)	Raw Avg Reading (dBµV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBµV)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.524	16.7	20	36.7	46	-9.3	PASS	
0.629	23.9	20.2	44.1	46	-1.9	PASS	-1.9
0.734	24.1	19.9	44	46	-2	PASS	

Test Equipment Used

Rev. 7/30/2019

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1168255)	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	8/23/2019	8/23/2018
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	3/19/2020	3/19/2019
LISN Asset 1733	150kHz-30MHz	LI-150A	Com-Power	201095	1733	I	3/19/2020	3/19/2019
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI 2	719150		A-0015			III	NA	N/A
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018
Asset #2655		1235C97	Control Company	181683829	2655	I	4/3/2020	4/3/2019
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-02	9kHz - 2GHz		C-S			II	4/10/2020	4/10/2019

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

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.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
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