Test Report



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

Report No	ER0115-6
Client	Hanchett Entry Systems, Inc.
Address	10027 S. 51st Street Suite 102 Phoenix, AZ 85044
Phone	1-623-582-4626
Items tested FCC ID IC FRN	Aperio V3 Wireless Reader (Model: R100-V3) VC3-R100V3 7160A-R100V3 0016550824
Equipment Type Equipment Code Emission Designator	Part 15 Low Power Communication Device Transmitter DXX 2K43F1D
Standards	CFR Title 47 FCC Part 15.225, ISED Canada RSS-210 Issue 9 Annex B.6
Test Dates	February 24 to March 24, 2017
Results	As detailed within this report
Prepared by	Zachary Johnson - Test Ergineer
Authorized by	Yonus Fazilogly – Sr. EMC Engineer
Issue Date	5/12/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the ' <i>Conditions of Testing</i> ' section on page 12 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 13

Contents

Contents	2
Summary and Test Methodology	3
Product Tested - Configuration Documentation	
Statement of Conformity	5
Test Results	
Fundamental Emission	6
Radiated Spurious Emissions	7
Frequency Tolerance	9
Occupied Bandwidth	10
Measurement Uncertainty	11
Conditions Of Testing	

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



Summary and Test Methodology

This test report supports a "Limited Modular Approval" certification application for Aperio V3 Wireless Reader (Model: R100-V3) 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 operating voltage is 3V DC via 2xAA batteries.

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. 1 Reason for change Original Release Date Issued May 12, 2017



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page 3 of 13

Product Tested - Configuration Documentation

					EU	T Configuration						
Work O	rder:	R0115										
Com	pany:	Assa A	.bloy									
Company Add	lress:	10027	S. 51st St. St	e. 102								
		Phoeni	x, AZ 85044									
Col	Contact: Baruch Spence											
			MN PN SN									
]	EUT:		R	100-V3							Test Sam	ple 1
EUT Descrip			V3 Wireless	Reader								
EUT TX Frequ	ency:	13.56N	1Hz									
Support Equipment				MN	N					SN		
ASSA ABLOY Wirele	ss	AH30										
Hub												
Dell Laptop		Latitud	e									
				1		1	-		1			
Port Label	Port	t Type	# ports	# populated	cable typ	e shielded		ferrites	length (m)	in/out	under	comment
											test	
S . 8	(. J. D											
Software Operating M EAC Simulator 2.0100		escriptio	11:									
Aperio Programming A		ion vorci	op.15 1 227	6								
Aperio radio protocol v			011.13.1.3272	.0								
	0151011.	50										
Performance Criteria												
EUT monitors card read		ch shall c	continue to u	ndate card read e	vents in a lo	g displayed by EAG	C Sin	nulator softy	ware.			

Issue No. 1 Reason for change Original Release Date Issued May 12, 2017



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page 4 of 13

Statement of Conformity

Aperio V3 Wireless Reader (Model: R100-V3) 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	N/A. EUT is battery powered.
			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.

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page 5 of 13

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

Date:	22-Feb-17		Company:	Assa Ablo	у						۷	Nork Orde	r: R0115	
Engineer:	Zac Johnson		EUT Desc:	R100				I	EUT Ope	rating	g Voltage/	Frequency	1: 3V DC	
Temp:	22.2C		Humidity:	31%		Pressu	re: 1030						Battery	
	Freque	ncy Range:	13.56MHz					Ν	/leasure	ment	Distance:	3 m		
Notes:	X: Upright Y:	On Side Z: (On Back											
Antenna			Preamp	Antenna	Cable	Adjusted						FCC 15.225		
Polarization	Frequency	Reading	Factor	Factor	Factor	Reading	Limit	Margin	Result		Limit	Margin	Result	
(0° - 90°)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fa	il)	(dBµV/m)	(dB)	(Pass/Fai	
Х	10.50													
0	13.56	52.1	25.5	39.0	0.3	65.9					124.0	-58.1	Pass	
90	13.56	49.1	25.5	39.0	0.3	62.9					124.0	-61.1	Pass	
Y														
Y 0	13.56	52.3	25.5	39.0	0.3	66.1					124.0	-57.9	Pass	
90	13.56	48.3	25.5	39.0	0.3	62.1					124.0	-61.9	Pass	
30	13.50	40.5	20.0		0.5	02.1					124.0	-01.5	1 455	
z														
0	13.56	41.8	25.5	39.0	0.3	55.6					124.0	-68.4	Pass	
90	13.56	25.0	25.5	39.0	0.3	38.8					124.0	-85.2	Pass	
Tabl	e Result:	Pass	by	-57.9						Wor	st Freq:		6 MHz	
	e Result: EMI Chamber	. 400			dB			Cable 2: /					6 MHz	
Test Site:		. 400	Cable 1:	-57.9 Asset #20	dB 51				Asset #2	054	st Freq:	13.56	6 MHz 3:	
Test Site: Analyzer: Ssoft Radiate	EMI Chamber Rental SA#3 ed Emissions C	1 alculator	Cable 1: Preamp: v 1.017.182	-57.9 Asset #20 Red-White	dB 51			Cable 2: / Antenna: S	Asset #2	054	st Freq:	13.56 Cable 3 Preselector	6 MHz 3: r:	
Test Site: Analyzer: Ssoft Radiate	EMI Chamber Rental SA#3	1 alculator	Cable 1: Preamp: v 1.017.182	-57.9 Asset #20 Red-White	dB 51				Asset #2	054	st Freq:	13.56 Cable 3 Preselector	6 MHz 3:	
Test Site: Analyzer: Ssoft Radiate djusted Read	EMI Chamber Rental SA#3 ed Emissions C ling = Reading	1 alculator - Preamp Fac	Cable 1: Preamp: v 1.017.182 ctor + Anter	-57.9 Asset #20 Red-White	dB 51 + Cable	Factor		Antenna: S	Asset #2 Sm Loop	054 (high)	st Freq:	13.56 Cable 3 Preselector Copyright Cu	6 MHz 3: r: ırtis-Straus LLC	
Test Site: Analyzer: Ssoft Radiate djusted Read	EMI Chamber Rental SA#3 ed Emissions C	1 alculator Preamp Fac	Cable 1: Preamp: v 1.017.182 ctor + Anter	-57.9 Asset #20 Red-White	dB 51 + Cable		Mfr Agilent		Asset #2	054	st Freq:	13.56 Cable 3 Preselector Copyright Cu	6 MHz 3: r:	
Test Site: Analyzer: Ssoft Radiate djusted Read	EMI Chamber Rental SA#3 ed Emissions C ling = Reading	1 alculator Preamp Face Cecivers /Pres Il Receiver ssions Sites	Cable 1: Preamp: v 1.017.182 ctor + Anter	-57.9 Asset #20 Red-White ma Factor Rar 20Hz-20 FCC	dB 51 + Cable nge 6.5GHz	Factor		Antenna: S	Asset #2 Sm Loop Asset	054 (high) Cat	st Freq:	13.56 Cable 3 Preselector Copyright Cu ion Due 2017 ion Due	6 MHz 3: r: rrtis-Straus LLC Calibrated	
Test Site: Analyzer: Ssoft Radiate djusted Read	EMI Chamber Rental SA#3 ad Emissions C ing = Reading Analyzers / Re 2093 MXE EM Radiated Emis	Acculator Preamp Fac Preamp Fac Il Receivers /Pres sions Sites nber 1 ttenuators / F	Cable 1: Preamp: v 1.017.182 ctor + Anter selectors	-57.9 Asset #20 Red-White ina Factor - Rar 20Hz-20 FCC (719 Rar	dB 51 + Cable 6.5GHz Code 150 nge	Factor MN N9038A IC Code	Agilent VCCI Code	Antenna: S SN MY51210181 Range	Asset #2 Sm Loop Asset	054 (high) Cat I Cat	St Freq: Calibrat 8/9/2 Calibrat	13.56 Cable 3 Preselector Copyright Cu 2017 ion Due 2017 ion Due 2017	6 MHz 3: r: rtis-Straus LLC Calibrated 8/9/2016 Calibrated	
Test Site: Analyzer: Ssoft Radiate djusted Read	EMI Chamber Rental SA#3 dd Emissions C ing = Reading Analyzers / Re 2093 MXE EM Radiated Emis EMI Char	accivers /Pres Il Receivers /Pres Il Receiver ssions Sites mber 1 ttenuators / F hite	Cable 1: Preamp: v 1.017.182 ctor + Anter selectors	-57.9 Asset #20 Red-White ina Factor - Rar 20Hz-20 FCC (719 Rar	dB 51 + Cable nge 6.5GHz Code 150 nge 000MHz nge	MN N9038A IC Code 2762A-6 MN	Agilent VCCI Code A-0015 Mfr	SN MY51210181 Range 30-1000MHz SN	Asset #2 Sm Loop Asset 2093 Asset	054 (high) Cat I Cat II Cat	st Freq: Calibrat 8/9/2 Calibrat 3/21/. Calibrat	13.56 Cable 3 Preselector Copyright Cu 2017 ion Due 2017 ion Due /2017 ion Due	G MHz Galibrated 8/9/2016 Calibrated 3/21/2011 Calibrated	
Test Site: Analyzer: Ssoft Radiate djusted Read	EMI Chamber Rental SA#3 ed Emissions C ing = Reading 2093 MXE EM Radiated Emis EMI Char nps /Couplers A Red-W Anteni	1 calculator Preamp Face Preamp Face Preamp Face Present P	Cable 1: Preamp: v 1.017.182 ctor + Anter selectors	-57.9 Asset #20 Red-White ina Factor - Rar 20Hz-21 FCC 1 719 Rar 0.009-21 Rar	dB 51 + Cable nge 6.5GHz Code 150 nge 000MHz nge	MN N9038A IC Code 2762A-6 MN ZFL-1000-LN MN	Agilent VCCI Code A-0015 Mfr CS Mfr	SN MY51210181 Range 30-1000MHz SN N/A SN	Asset #2 Sm Loop Asset 2093 Asset 1258 Asset	054 (high) Cat I Cat II Cat II Cat	st Freq: Calibrat 8/9/2 Calibrat 3/21/: Calibrat 10/30 Calibrat	13.56 Cable 3 Presslector Copyright Cu 2017 ion Due 2017 ion Due /2017 ion Due 2018	6 MHz 3: r: Calibrated 8/9/2016 Calibrated 3/21/2019 Calibrated 10/30/201 Calibrated	
Test Site: Analyzer: Ssoft Radiate djusted Read av. 2/20/2017 Spectrum Pream	EMI Chamber Rental SA#3 de Emissions C ing = Reading 2093 MXE EM Radiated Emis EMI Char nps /Couplers A Red-W Antenn Small L	Accivers /Pres Preamp Fac Preamp Fac Presure /Pres Sites mber 1 ttenuators / F hite hite coop cal Meters Pressure Only)	Cable 1: Preamp: v 1.017.182 tor + Anter selectors	-57.9 Asset #20 Red-White ina Factor - Rar 20Hz-21 FCC 1 719 Rar 0.009-21 Rar	dB 51 + Cable nge 6.5GHz Code 150 nge 000MHz nge	MN N9038A IC Code 2762A-6 MN ZFL-1000-LN MN PLA-130/A	Agilent VCCI Code A-0015 Mfr CS Mfr ARA	SN MY51210181 Range 30-1000MHz SN N/A SN 1024	Asset #2 Sm Loop Asset 2093 Asset 1258 Asset 755	054 (high) Cat I Cat I Cat I Cat	Calibrat Calibrat 8/9/2 Calibrat 3/21/ Calibrat 10/30 Calibrat 6/14/	13.56 Cable 2 Preselector Copyright Cu 2017 ion Due 2017 ion Due 2017 ion Due 2018 ion Due 2018	6 MHz 3: 7: Calibrated 8/9/2016 Calibrated 3/21/2018 Calibrated 10/30/201 Calibrated 6/14/2016	
Test Site: Analyzer: Ssoft Radiate djusted Read w. 2/20/2017 Spectrum Pream	EMI Chamber Rental SA#3 dd Emissions C ing = Reading A Analyzers / Re 2093 MXE EM Radiated Emis EMI Char mps /Couplers A Red-W Anteni Small L Meteorologic Veather Clock (F	1 calculator Preamp Fac Preamp Fac accivers /Pres II Receiver ssions Sites mber 1 ttenuators / F hite nas coop cal Meters Pressure Only) 1080 es	Cable 1: Preamp: v 1.017.182 tor + Anter selectors	-57.9 Asset #20 Red-White ina Factor - Rar 20Hz-21 FCC 1 719 Rar 0.009-21 Rar	dB 51 + Cable 5.5GHz Code 150 nge 30MHz 30MHz	MN N9038A IC Code 2762A-6 MN ZFL-1000-LN MN PLA-130/A MN BA928	Agilent VCCI Code A-0015 Mfr CS Mfr ARA Mfr Oregon Scientific	SN MY51210181 Range 30-1000MHz SN N/A SN 1024 SN	Asset #2 Sm Loop Asset 2093 Asset 1258 Asset 755 Asset 831	054 (high) Cat I Cat I Cat I Cat I Cat	Calibrat 8/9/2 Calibrat 3/21/ Calibrat 10/30 Calibrat 6/14/ Calibrat 4/28/	13.56 Cable 3 Preselecto Copyright Cu ion Due 2017 ion Due 2017 ion Due 2018 ion Due 2018 ion Due 2018 ion Due 2018	Calibrated 3: Calibrated 8/9/2016 Calibrated 3/21/2011 Calibrated 10/30/201 Calibrated 6/14/2011 Calibrated 6/14/2011	

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)]

Radiated	Emissio	ons Tab	le									
	27-Feb-17		Company:	Assa Ablo	V					١	Nork Order:	R0115
Engineer:	Zac Johnson		EUT Desc:	R100					EUT Operat	ing Voltage	Frequency:	3V DC
Temp:	23.7C		Humidity:	26%		Pressure:	1017					Battery
	Freque	ncy Range:	9kHz-1MH	z					Measureme	nt Distance:	3 m	
Notes:	Worst Case C	rientation Y										
											FCC 15.209	
Antenna Polarization (0° - 90°)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	Limit	Margin	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
0/90	No emsissions		1-1	(UB/III)	(UB)	(dbµv/iii)	(dBµV/m)	(dB)	(FdSS/Fdll)	(ubµv/iii)	(UB)	Pass
							11					
Tabl	e Result:	Pass	by		dB				W	orst Freq:		MHz
Analyzer:	EMI Chamber Rental SA#2 ed Emissions C ing = Reading	alculator	Preamp: v 1.017.183			actor			Asset #2054 Sm Loop (lo		Cable 3: Preselector: Copyright Curtis	
	27-Feb-17 Zac Johnson	ons Tab	Company: EUT Desc:		у				FUT Operat		Nork Order: /Frequency:	
Temp:			Humidity:	26%		Pressure:	1017				,.	Battery
F		ncy Range:					-		Measureme	nt Distance:	3 m	Duttory
Notes:	Worst Case C										•	
Antenna			Preamp	Antenna	Cable	Adjusted					FCC 15.209	
Polarization	Frequency	Reading	Factor	Factor	Factor	Reading	Limit	Margin	Result	Limit	Margin	Result
(0° - 90°)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
0	2.07	21.2	25.7	51.1	0.1	46.7				69.5	-22.8	Pass
90 0	6.45 11.0	20.7 19.2	25.6 25.5	42.3 39.6	0.2 0.2	37.6 33.5				69.5 69.5	-31.9 -36.0	Pass Pass
90	11.0	18.8	25.5	39.6	0.2	33.1				69.5	-36.4	Pass
90	16.28	20.3	25.5	38.3	0.3	33.4				69.5	-36.1	Pass
0	22.72	20.6	25.5	37.6	0.3	33.0				69.5	-36.5	Pass
Tabl	e Result:	Pass	by	-22.8	dB				W	orst Freq:	2.07	MHz
		alculator	Preamp: v 1.017.183			actor			Asset #2054 Sm Loop (hi		Cable 3: Preselector: Copyright Curtis	





page 7 of 13

Rev	2/20/2017	

Rev. 2/20/2017								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	8/9/2017	8/9/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		П	3/21/2017	3/21/2015
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-White	0.009-2000MHz	ZFL-1000-LN	CS	N/A	1258	П	10/30/2017	10/30/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	Т	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	1	4/28/2018	4/28/2016
TH A#2080		HTC-1	HDE		2080	П	4/5/2017	4/5/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2051	9kHz - 18GHz		Florida RF			Ш	3/2/2017	3/2/2016
Asset #2054	9kHz - 18GHz		Florida RF			П	10/1/3017	10/30/2016

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

Date:	27-Feb-17		Company:	Assa Ablo	у						1	Vork Orde	r: R0115
Engineer:	Zac Johnson		EUT Desc:	R100					EUT Ope	rating	g Voltage/	Frequency	y: 3V DC
Temp:	23.7C		Humidity:	26%		Pressu	Ire: 1017		-				Battery
	Freque	ncy Range:	30-1000MF	-17				,	loaguro	mont	Distance:	3 m	
Notes:	Worst Case O	, ,	00 1000101	12					licusure	ment	Distance.	0111	
			<u> </u>							-		FCC Class	s B
Antenna			Preamp	Antenna	Cable	Adjusted							
Polarization	Frequency	Reading	Factor	Factor	Factor	Reading	Limit	Margin	Result		Limit	Margin	Result
(H / V)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fa	ul)	(dBµV/m)	(dB)	(Pass/Fa
V	67.8	36.6	25.4	7.9	0.5	19.6					40.0	-20.4	Pass
V	98.9	33.8	25.4	9.4	0.6	18.4					43.5	-25.1	Pass
Н	149.3	34.0	25.4	12.2	0.9	21.7					43.5	-21.8	Pass
V	151.2	36.6	25.4	12.2	0.9	24.3					43.5	-19.2	Pass
V	164.8	39.5	25.5	12.0	0.8	26.8					43.5	-16.7	Pass
н	339.4	38.0	25.6	14.1	1.2	27.7					46.0	-18.3	Pass
н	353.0	34.1	25.6	14.3	1.1	23.9					46.0	-22.1	Pass
Н	522.8	34.0	25.6	17.7	1.5	27.6					46.0	-18.4	Pass
Tabl	e Result:	Pass	by	-16.7	dB					Mar	st Freg:	164 9	8 MHz
		1 400	-,	10.7	0.0					wor	si rieq:	104.0	0
Test Site:	EMI Chamber		,	Asset #20				Cable 2:	Asset #2		si rieq:	Cable 3	•
			Cable 1:	Asset #20	51			Cable 2: Antenna:		054	,		3:
Analyzer:	EMI Chamber Rental SA#2 ed Emissions C	1	Cable 1:	Asset #20 Red-Brown	51					054	,	Cable 3 Preselector	3: r:
Analyzer: Ssoft Radiate	Rental SA#2	1 alculator	Cable 1: Preamp: v 1.017.183	Asset #20 Red-Browr	51 1	Factor				054	,	Cable 3 Preselector	3: r:
Analyzer: Ssoft Radiate djusted Read	Rental SA#2 ed Emissions C ing = Reading -	1 alculator · Preamp Fac	Cable 1: Preamp: v 1.017.183 ctor + Anter	Asset #20 Red-Browr	51 1			Antenna:		054 te		Cable 3 Preselector Copyright Cu	3:
Analyzer: Ssoft Radiate djusted Read	Rental SA#2 ed Emissions C	1 alculator Preamp Fac	Cable 1: Preamp: v 1.017.183 ctor + Anter	Asset #20 Red-Browr	51 + Cable	Factor MN N9038A	Mfr Agilent			054	,	Cable 3 Preselector Copyright Cu	3: r:
Analyzer: Ssoft Radiate Ijusted Read	Rental SA#2 d Emissions C ing = Reading - Analyzers / Re	1 Preamp Fac ceivers /Prea II Receiver	Cable 1: Preamp: v 1.017.183 ctor + Anter	Asset #20 Red-Brown nna Factor Ran	51 + Cable nge 6.5GHz	MN		Antenna: SN MY51210181	Red-Whit Asset	054 te Cat	Calibrati	Cable 3 Preselector Copyright Cu ion Due 2017	3: r: rrtis-Straus LLC Calibrated
Analyzer: Ssoft Radiate djusted Read	Rental SA#2 ed Emissions C ing = Reading - Analyzers / Re 2093 MXE EM	1 alculator Preamp Fac ceivers /Pres Il Receiver ssions Sites	Cable 1: Preamp: v 1.017.183 ctor + Anter	Asset #20 Red-Brown ma Factor Rar 20Hz-20	51 + Cable nge 5.5GHz Code	MN N9038A	Agilent	Antenna: SN	Red-Whit Asset	054 te Cat	Calibrati 8/9/2	Cable 3 Preselector Copyright Cu ion Due 2017	3: r: rtis-Straus LLC Calibrated 8/9/2016
Analyzer: Ssoft Radiate djusted Read	Rental SA#2 ed Emissions C ing = Reading - Analyzers / Re 2093 MXE EM Radiated Emis	1 alculator Preamp Fac Il Receiver sions Sites nber 1 ttenuators / F	Cable 1: Preamp: v 1.017.183 ctor + Anter selectors	Asset #20 Red-Brown Ina Factor Ran 20Hz-20 FCC 0 719 Ran	51 + Cable nge 5.5GHz Code 150 nge	MN N9038A IC Code	Agilent VCCI Code	Antenna: SN MY51210181 Range	Red-Whit Asset	054 te Cat I Cat	Calibrati 8/9/2 Calibrati	Cable 3 Preselector Copyright Cu ion Due 2017 ion Due 2017 ion Due	Calibrated 8/9/2016 Calibrated 3/21/2015
Analyzer: Ssoft Radiate Ijusted Read v. 2/26/2017 Spectrum	Rental SA#2 ed Emissions C ing = Reading - Analyzers / Re 2093 MXE EM Radiated Emis EMI Chan aps /Couplers A	1 alculator Preamp Fac receivers /Pres Il Receiver assions Sites nber 1 ttenuators / F hite	Cable 1: Preamp: v 1.017.183 ctor + Anter selectors	Asset #20 Red-Brown Ina Factor Ran 20Hz-20 FCC 0 719 Ran	51 + Cable nge 6.5GHz Code 150 nge 000MHz nge	MN N9038A IC Code 2762A-6 MN	Agilent VCCI Code A-0015 Mfr	Antenna: SN MY51210181 Range 30-1000MHz SN	Asset 2093 Asset	054 te Cat I Cat II Cat	Calibrati 8/9/2 Calibrati 3/21/: Calibrati	Cable 3 Preselection Copyright Cu ion Due 2017 ion Due 2017 ion Due 2017	Calibrated 8/9/2016 Calibrated 3/21/2015 Calibrated 10/30/201 Calibrated
Analyzer: Ssoft Radiate Ijusted Read v. 2/26/2017 Spectrum Pream	Rental SA#2 d Emissions C ing = Reading - Analyzers / Re 2093 MXE EM Radiated Emis EMI Chan nps /Couplers A Red-Wil Antenn Red-Brown Meteorologic	1 alculator Preamp Face Preamp Face Il Receiver ssions Sites nber 1 ttenuators / F hite nas n Bilog cal Meters	Cable 1: Preamp: v 1.017.183 ctor + Anter selectors	Asset #20 Red-Brown Ina Factor 20Hz-20 FCC 719 Rat 0.009-20 Rat	51 + Cable nge 6.5GHz Code 150 nge 000MHz nge	MN N9038A IC Code 2762A-6 ZFL-1000-LN JB1 JB1	Agilent VCCI Code A-0015 Mfr CS Mfr Sunol Mfr	Antenna: SN MY51210181 Range 30-1000MHz SN N/A SN A0032406 SN	Asset 2093 Asset 1258 Asset 1218 Asset	Cat I Cat I Cat I Cat I Cat I Cat I Cat	Calibrati 8/9/2 Calibrati 3/21/; Calibrati 10/30 Calibrati 1/13/2 Calibrati	Cable 3 Preselection Copyright Cu ion Due 2017 ion Due 2017 ion Due 2017 ion Due 2019 ion Due	Calibrated 8/9/2016 Calibrated 3/21/2015 Calibrated 10/30/2010 Calibrated 1/13/2017 Calibrated
Analyzer: soft Radiate justed Read v. 2/26/2017 Spectrum Pream	Rental SA#2 ed Emissions C ing = Reading - Analyzers / Re 2093 MXE EM Radiated Emis EMI Chan nps /Couplers A Red-Wi Antenr Red-Brown	1 alculator Preamp Face Preamp Face II Receiver ssions Sites nber 1 ttenuators / F hite nas n Bilog cal Meters ressure Only)	Cable 1: Preamp: v 1.017.183 ctor + Anter selectors	Asset #20 Red-Brown Ina Factor 20Hz-20 FCC 719 Rat 0.009-20 Rat	51 + Cable nge 6.5GHz Code 150 nge 000MHz nge	MN N9038A IC Code 2762A-6 MN ZFL-1000-LN MN JB1	Agilent VCCI Code A-0015 Mfr CS Mfr Sunol	Antenna: SN MY51210181 Range 30-1000MHz SN N/A SN A0032406	Asset 2093 Asset 1258 Asset 1218	054 te Cat I Cat I Cat I Cat I Cat	Calibrati 8/9/2 Calibrati 3/21/2 Calibrati 10/30 Calibrati 1/13/2	Cable 3 Preselector Copyright Cu ion Due 2017 ion Due 2017 ion Due 2019 ion Due 2019	Calibrated 8/9/2016 Calibrated 8/9/2016 Calibrated 3/21/2012 Calibrated 10/30/201 Calibrated
Analyzer: Ssoft Radiate Ijusted Read v. 2/26/2017 Spectrum Pream	Rental SA#2 d Emissions C ing = Reading - Analyzers / Re 2093 MXE EM Radiated Emis EMI Chan ups /Couplers Al Red-WI Antenr Red-Browr Meteorologic Veather Clock (P TH A#2 Cable	1 alculator Preamp Fac receivers /Pres II Receiver asions Sites nber 1 ttenuators / F hite nas n Bilog cal Meters tressure Only) 080	Cable 1: Preamp: v 1.017.183 ctor + Anter selectors	Asset #20: Red-Brown Ina Factor - 20Hz-20 FCC - 719 Rar 30-200 Rar 30-200	51 + Cable nge 6.5GHz Code 150 nge 000MHz nge 00MHz	MN N9038A IC Code 2762A-6 ZFL-1000-LN MN JB1 MN BA928	Agilent VCCI Code A-0015 Mfr CS Mfr Sunol Mfr Oregon Scientific HDE Mfr	Antenna: SN MY51210181 Range 30-1000MHz SN N/A SN A0032406 SN	Asset 2093 Asset 1258 Asset 1218 Asset 831	054 te Cat I Cat I Cat I Cat I Cat I Cat Cat Cat Cat Cat Cat Cat Cat Cat Cat	Calibrati 8/9/2 Calibrati 3/21/; Calibrati 10/30 Calibrati 1/13/2 Calibrati 4/28/; 4/5/2 Calibrati	Cable 3 Preselector Copyright Cu ion Due 2017 ion Due 2017 ion Due 2017 ion Due 2019 ion Due 2019 ion Due 2018 2017	Calibrated 8/9/2016 Calibrated 3/21/2011 Calibrated 10/30/201 Calibrated 1/13/201 Calibrated 4/28/2011 Calibrated 4/28/2011 Calibrated 4/2/2016
Analyzer: Ssoft Radiate Ijusted Read v. 2/26/2017 Spectrum Pream	Rental SA#2 d Emissions C ing = Reading Analyzers / Re 2093 MXE EM Radiated Emis EMI Chan apps /Couplers A Red-Wil Antenr Red-Brown Meteorologic Veather Clock (P TH A#2	1 alculator Preamp Fac Il Receiver sions Sites nber 1 ttenuators / F hite nas n Bilog cal Meters ressure Only) 080	Cable 1: Preamp: v 1.017.183 ctor + Anter selectors	Asset #20 Red-Brown Inna Factor - 20Hz-21 FCC 1 719 Rat 0.009-21 Rat 30-200	51 + Cable nge 6.5GHz Code 150 nge 000MHz nge 00MHz	MN N9038A IC Code 2762A-6 ZFL-1000-LN MN JB1 MN BA928	Agilent VCCI Code A-0015 Mfr CS Sunol Mfr Oregon Scientific HDE	Antenna: SN MY51210181 Range 30-1000MHz SN N/A SN A0032406 SN	Asset 2093 Asset 1258 Asset 1218 Asset 831	Cat Cat Cat Cat Cat Cat Cat Cat	Calibrati 8/9/2 Calibrati 3/21/: Calibrati 10/30. Calibrati 1/13/ Calibrati 4/28/ 4/5/2	Cable 3 Preselector Copyright Cu ion Due 2017 ion Due 2017 ion Due 2017 ion Due 2019 ion Due 2019 ion Due 2018 2017	Calibrated 8/9/2016 Calibrated 3/21/201 Calibrated 10/30/201 Calibrated 1/13/201 Calibrated 4/28/201 4/5/2016

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 $\pm 0.01\%$ 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

Date: 12-Apr-17	Company:	Assa Abloy	Work Order: R0115								
Engineer: Zac Johnson	EUT:	R100									
Notes: 2 Fresh AA Batteries Used											
Temperature	Frequency Delta	Limit	Verdict								
°C	(Hz)	(Hz)	Pass/Fail								
-20	25	± 1356	Pass								
-10	50	± 1356	Pass								
0	0	± 1356	Pass								
10	0	± 1356	Pass								
20	Ref	± 1356	Pass								
30	-25	± 1356	Pass								
40	25	± 1356	Pass								
50	-25	± 1356	Pass								
Test Site: ENV Chambe	r 17	Analyze	r: 118470 SA								
Antenna: Small Loop		Cable	EMIR-03								

Rev. 4/10/2017

Spectrum Analyzers / Receivers /Preselectors Rental EXA Signal Analyzer(1118470)	Range 9KHz-26.5GHz	MN N9010A-526;M	Mfr AT	SN MY51170093	Asset 1118470	Cat I	Calibration Due 1/3/2018	Calibrated on 1/3/2017
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
CRFI-RFI-03	9kHz - 2GHz		C-S			Ш	2/4/2018	2/4/2017
All equipment is calibrated using standards traceable to NIST	For other nationally	y recognized calil	oration	standard.				





page 9 of 13

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 = 2.432KHz

*Resolution Bandwidth higher than 1-5% due to narrowness of emission being measured

Keysight Spectrum Analyzer - Occupied	BW					
₩ RF 50 Ω AC Ref Value 100.00 dBµV		SENSE:INT	ALIGN OFF	12:10:13 PM / Radio Std: N		Trace/Detector
		Trig: Free Run Avg Hold:>10/10				
	#IFGain:Low #/	Atten: 10 dB	Radio Devic	e: BTS		
10 dB/div Ref 100.00 d	BμV					
90.0						
80.0						Clear Write
70.0						
60.0						
50.0			<u> </u>			Average
40.0						J
30.0						
20.0						
10.0					~~	Max Hold
Center 13.56 MHz				Span	10 kHz	
#Res BW 1 kHz		#VBW 3 kHz		Sweep	9.6 ms	Min Hold
Occupied Bandwid	ith	Total Powe	er 69.6	dBµV		
Coccupied Ballanie						
	2.432 kHz					Detector Peak►
Transmit Freq Error	128 Hz	z % of OBW I	Power 99	.00 %		Auto <u>Man</u>
x dB Bandwidth	1.559 kHz	z x dB	-6	00 dB		
			0.			
MSG			STATUS	Align Nov	v All require	ad .
mou			STATUS		v An require	su l

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	5.6dB	N/A
CISPR	4.6dB	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 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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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 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

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.





page 12 of 13

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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