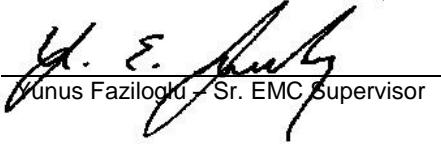




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VERITAS

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Test Report

Report No	ER0115-2
Client	Hanchett Entry Systems, Inc.
Address	10027 S. 51st Street Suite 102 Phoenix, AZ 85044
Phone	623-582-4626
Items tested	Aperio V3 Wireless Reader (Model: R100-V3)
FCC ID	VC3-R100V3
IC	7160A-R100V3
FRN	0016550824
Equipment Type	Digital Transmission System
Equipment Code	DTS
Emission Designator	2M84F1D
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 1
Test Dates	February 24 to March 24, 2017
Results	As detailed within this report
Prepared by	 Zachary Johnson - EMC Engineer
Authorized by	 Yunus Faziloglu - Sr. EMC Supervisor
Issue Date	5/12/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 19 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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Form Final Report REV 12-07-15



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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 15.247, ISED Canada RSS-247 Issue 1

EUT is an RFID reader module that communicates reading activity to a remote unit over the 2405MHz - 2475MHz frequency band.

All testing was performed according to the following rules/procedures/documents;
CFR 47 Part 15.247, RSS-247 Issue 1, RSS-Gen Issue 4, FCC KDB 558074 D01 DTS
Measurement Guidance v03r05 and ANSI C63.10-2013.

Emissions were maximized around 3 orthogonal planes (X, Y and Z).

EUT operating voltage is 3V DC via 2xAA batteries. It has an internal PCB surface mount antenna with 3.45dBi gain.

The following bandwidths were used during emissions testing.

Frequency	RBW	VBW
30MHz-1GHz	120kHz	1MHz
1GHz-25GHz	1MHz	3MHz

3 channels were tested as follows:

- 2405MHz: Low Channel
- 2440MHz: Mid Channel
- 2475MHz: High Channel

The environmental conditions during testing are documented on the associated data tables. We found that the product complied with the requirements above without modification. Test sample was received in good condition.



Product Tested - Configuration Documentation

EUT Configuration											
Work Order:	R0115										
Company:	AssaAbloy										
Company Address:	10027 S. 51st St. Ste. 102										
	Phoenix, AZ 85044										
Contact:	Baruch Spence										
EUT:		MN		PN			SN				
	R100-V3			--			Test Sample 1				
EUT Description:	Aperio V3 Wireless Reader										
EUT Max Frequency:	2475MHz										
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment	
Software Operating Mode Description:											
The EUT is a battery powered RFID reader which dumps collected data over 2.4GHz.											



Statement of Conformity

Aperio V3 Wireless Reader (Model: R100-V3) complied with the following requirements:

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	3.2		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1, 6.5			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	The antenna for this device is an internal PCB surface mount antenna with 3.45dBi gain.
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.
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.6				Occupied Bandwidth measurements were made.



Test Results

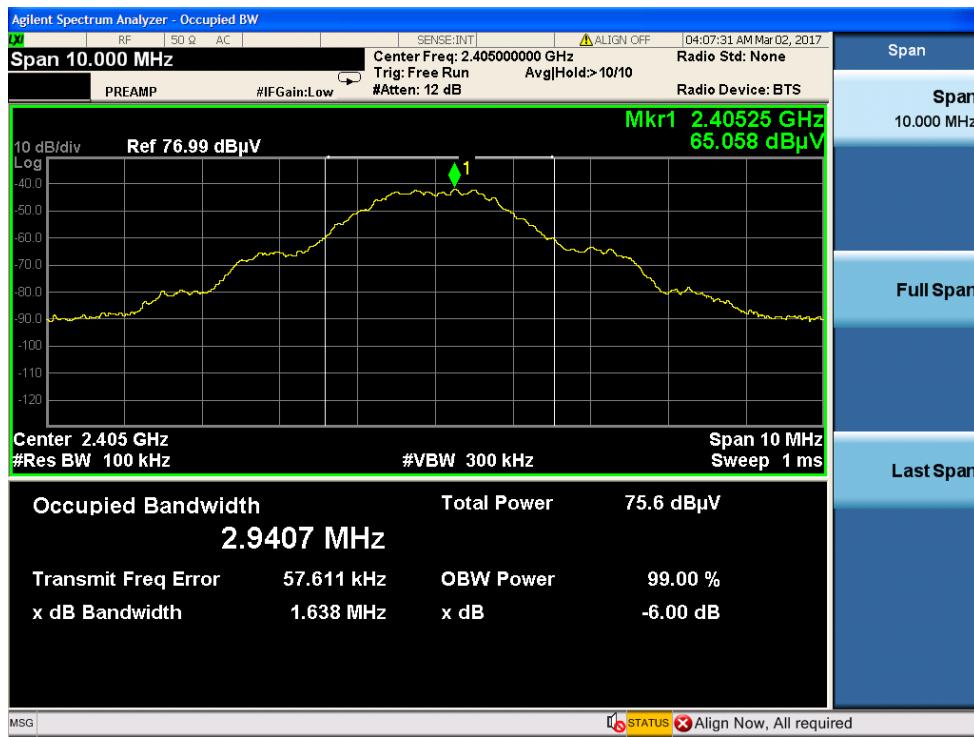
Bandwidth

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

MEASUREMENTS / RESULTS

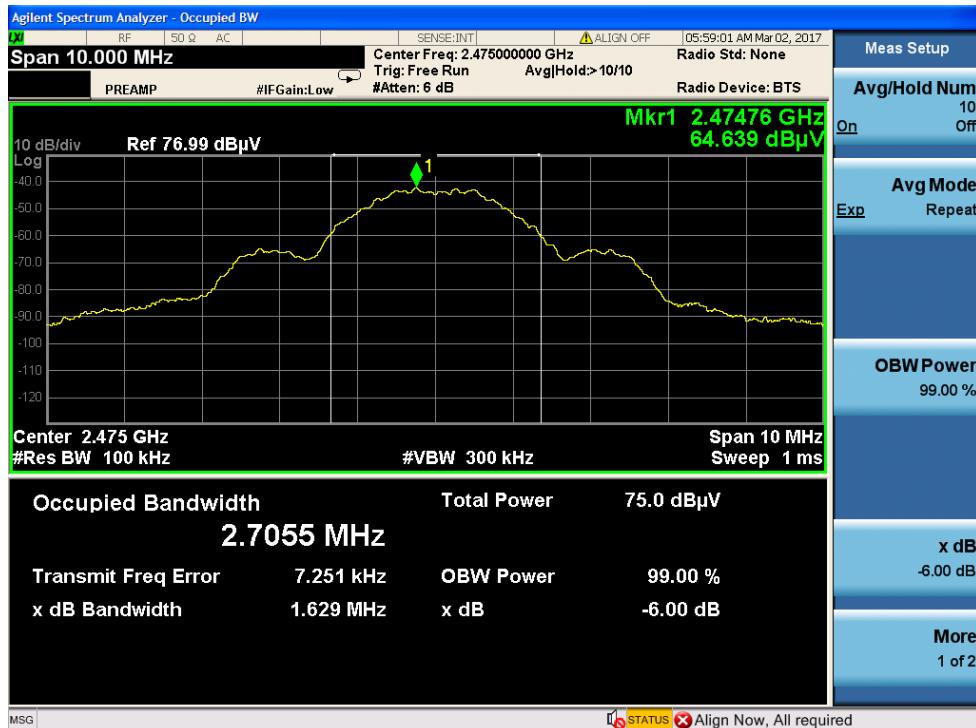
6dB Bandwidth										
Date: 01-Mar-17	Company: Assa Abloy		Work Order: R0115							
Engineer: Zac Johnson	EUT Desc: R100		EUT Operating Voltage/Frequency: 3V DC							
Temp: 22.2°C	Humidity: 33%		Pressure: 985mbar							
Frequency Range: 2405-2475MHz										
Notes: Per FCC KDB 558074 D01 DTS Meas Guidance v03r05 Section 8.2										
Antenna Polarization (H / V)	Frequency (MHz)	Reading (kHz)	6dB BW							
			Limit (kHz)	Margin (kHz)	Result (Pass/Fail)					
H	2405.0	1638	≥500	-1138	Pass					
H	2440.0	1645	≥500	-1145	Pass					
H	2475.0	1629	≥500	-1129	Pass					
Test Site: EMI Chamber 2	Cable 1: 2052 cbl		Cable 2: 2053 cbl		Cable 3: ---					
Analyzer: 2093 SA	Preamp: None		Antenna: Yellow Horn		Preselector: ---					

PLOTS





Middle Channel DTS Bandwidth



High Channel DTS Bandwidth



Peak Power

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

MEASUREMENTS / RESULTS

Peak Output Power										Work Order: R0115																																																						
Company: Assa Abloy					EUT Operating Voltage/Frequency: 3V DC					Battery																																																						
Date: 01-Mar-17	Engineer: Zac Johnson	Temp: 22.2°C	Humidity: 33%	Pressure: 985mbar	Measurement Distance: 3 m					FCC 15.247																																																						
Frequency Range: 2405-2475MHz										FCC 15.247																																																						
Notes: Per FCC KDB 558074 D01 DTS Meas Guidance i03r05 Section 9.1.1																																																																
<table border="1"> <thead> <tr> <th>Antenna Polarization (H / V)</th> <th>Frequency (MHz)</th> <th>Reading (dBμV)</th> <th>Preamp Factor (dB)</th> <th>Antenna Factor (dB/m)</th> <th>Cable Factor (dB)</th> <th>Adjusted Reading (dBμV/m)</th> <th>Adjusted EIRP Reading (dBm)</th> <th>Antenna Gain (dBi)</th> <th>Adjusted Conducted Reading (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Result (Pass/Fail)</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>2405</td> <td>69.4</td> <td>0.0</td> <td>28.2</td> <td>3.2</td> <td>100.8</td> <td>5.6</td> <td>3.45</td> <td>2.15</td> <td>30.0</td> <td>-27.85</td> <td>Pass</td> </tr> <tr> <td>H</td> <td>2440</td> <td>68.0</td> <td>0.0</td> <td>28.2</td> <td>3.2</td> <td>99.4</td> <td>4.2</td> <td>3.45</td> <td>0.75</td> <td>30.0</td> <td>-29.25</td> <td>Pass</td> </tr> <tr> <td>H</td> <td>2475</td> <td>67.8</td> <td>0.0</td> <td>28.2</td> <td>3.3</td> <td>99.3</td> <td>4.1</td> <td>3.45</td> <td>0.65</td> <td>30.0</td> <td>-29.35</td> <td>Pass</td> </tr> </tbody> </table>													Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB μ V/m)	Adjusted EIRP Reading (dBm)	Antenna Gain (dBi)	Adjusted Conducted Reading (dBm)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)	H	2405	69.4	0.0	28.2	3.2	100.8	5.6	3.45	2.15	30.0	-27.85	Pass	H	2440	68.0	0.0	28.2	3.2	99.4	4.2	3.45	0.75	30.0	-29.25	Pass	H	2475	67.8	0.0	28.2	3.3	99.3	4.1	3.45	0.65	30.0	-29.35	Pass
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB μ V/m)	Adjusted EIRP Reading (dBm)	Antenna Gain (dBi)	Adjusted Conducted Reading (dBm)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)																																																				
H	2405	69.4	0.0	28.2	3.2	100.8	5.6	3.45	2.15	30.0	-27.85	Pass																																																				
H	2440	68.0	0.0	28.2	3.2	99.4	4.2	3.45	0.75	30.0	-29.25	Pass																																																				
H	2475	67.8	0.0	28.2	3.3	99.3	4.1	3.45	0.65	30.0	-29.35	Pass																																																				
Table Result: Pass by -27.85 dB										Worst Freq: 2405.0 MHz																																																						
Test Site: EMI Chamber 2				Cable 1: 2052				Cable 2: 2053				Cable 3: ---																																																				
Analyzer: 2093 SA				Preamp: None				Antenna: Yellow Horn				Preselector: ---																																																				
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																																																																
Adjusted EIRP = Adjusted Reading - 104.77 + 20*log(3)																																																																
Adjusted Conducted Reading = Adjusted EIRP - Antenna Gain																																																																

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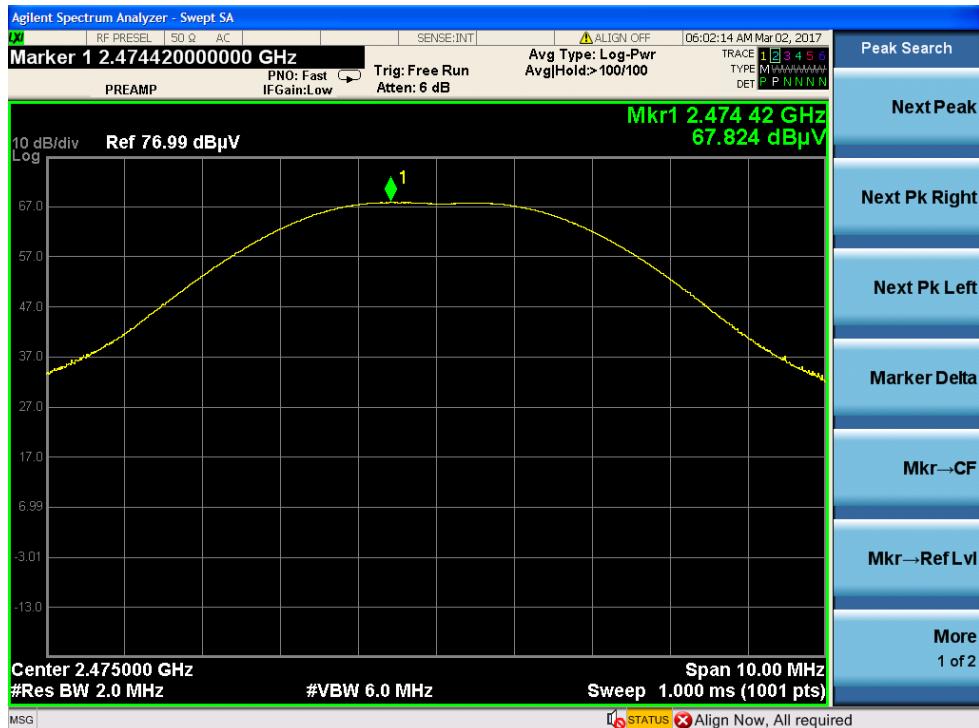


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Testing Cert. No. 1627-01



Middle Channel Peak Output Power



High Channel Peak Output Power



Radiated Spurious Emissions

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

Radiated Emissions Table - Bandedges											Work Order: R0115			
Date: 28-Feb-17		Company: Assa Abloy												
Engineer: Zac Johnson		EUT Desc: R100											EUT Operating Voltage/Frequency: 3V DC	
Temp: 22.9C		Humidity: 25%											Battery	
Frequency Range: Bandedges											Measurement Distance: 3 m			
Notes:											EUT Max Freq:			
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dB _µ V)	Average Reading (dB _µ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB _µ V/m)	Adjusted Avg Reading (dB _µ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dB _µ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB _µ V/m)	Margin (dB)	Result (Pass/Fail)
H	2483.5	18.5	18.5	0.0	28.4	3.3	50.2	50.2	74.0	-23.8	Pass	54.0	-3.8	Pass
H	2390.0	14.3	14.3	0.0	28.1	3.2	45.6	45.6	74.0	-28.4	Pass	54.0	-8.4	Pass
Table Result:		Pass by -3.8 dB												Worst Freq: 2483.5 MHz
Test Site: EMI Chamber 2 Analyzer: A2093			Cable 1: Asset #2052 Preamp: none			Cable 2: Asset #2053 Antenna: Yellow Horn			Cable 3: --- Preselector: ---			Copyright Curtis-Straus LLC 2000		
CSsoft Radiated Emissions Calculator v 1.017.168 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Rev. 2/26/2017	Spectrum Analyzers / Receivers/Preselectors		Range 20Hz-26.5GHz	MN N9038A	Mfr Agilent	SN MY51210181	Asset 2093	Cat I	Calibration Due 8/9/2017	Calibrated on 8/9/2016	
2093 MXE EMI Receiver		FCC Code 719150		IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Cat I		Calibration Due 4/29/2017	Calibrated on 4/29/2015	
Radiated Emissions Sites EMI Chamber 2		Antennas Yellow Horn		Range 1-18GHz	MN 3115	Mfr EMCO	SN 9608-4898	Asset 37	Cat I	Calibration Due 8/9/2018	Calibrated on 8/6/2016
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		Cables Asset #2052 Asset #2053		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2018 4/5/2017	Calibrated on 4/28/2016 4/5/2016	
9kHz - 18GHz 9kHz - 18GHz		Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF		Cat II II		Calibration Due 3/2/2017 10/1/3017	Calibrated on 3/2/2016 10/30/2016		

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

Radiated Emissions Table											Work Order: R0115		
Date: 27-Feb-17		Company: Assa Abloy											
Engineer: Zac Johnson		EUT Desc: R100											EUT Operating Voltage/Frequency: 3V DC
Temp: 23.7C		Humidity: 26%											Battery
Frequency Range: 30-1000MHz											Measurement Distance: 3 m		
Notes: Worst Case Orientation Y													
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dB _µ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB _µ V/m)	--			FCC Class B			
							Limit (dB _µ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB _µ V/m)	Margin (dB)	Result (Pass/Fail)	
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	
H	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	
H	339.4	38.0	25.6	14.1	1.2	27.7	---	---	---	46.0	-18.3	Pass	
H	353.0	34.1	25.6	14.3	1.1	23.9	---	---	---	46.0	-22.1	Pass	
H	522.8	34.0	25.6	17.7	1.5	27.6	---	---	---	46.0	-18.4	Pass	
Table Result: Pass by -16.7 dB											Worst Freq: 164.8 MHz		
Test Site: EMI Chamber 1 Analyzer: Rental SA#2		Cable 1: Asset #2051 Preamp: Red-Brown		Cable 2: Asset #2054 Antenna: Red-White		Cable 3: --- Preselector: ---					Copyright Curtis-Straus LLC 2000		
CSsoft Radiated Emissions Calculator v 1.017.183 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor													



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Radiated Emissions Table

Date: 24-Mar-17		Company: Assa Abloy								Work Order: R0115											
Engineer: Zac Johnson		EUT Desc: R100								EUT Operating Voltage/Frequency: 3V DC											
Temp: 22.9C		Humidity: 25%								Pressure: 1021											
Frequency Range: 1GHz - 6GHz												Measurement Distance: 3 m									
Notes: Worst case orientation Y												EUT Max Freq: 2475MHz									
DCCF = -17.3dB																					
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average									
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)							
Low Channel V	4810.0	53.5	36.2	37.0	33.0	6.1	55.6	38.3	74.0	-18.4	Pass	54.0	-15.7	Pass							
Center Channel V	4880.0	50.8	33.5	37.1	33.0	5.9	52.6	35.3	74.0	-21.4	Pass	54.0	-18.7	Pass							
High Channel V	4950.0	52.2	34.9	37.1	33.1	5.8	54.0	36.7	74.0	-20.0	Pass	54.0	-17.3	Pass							
Table Result:		Pass		by -15.7 dB						Worst Freq:		4810.0 MHz									
Test Site: EMI Chamber 2		Cable 1: Asset #2053		Cable 2: Asset #2052		Cable 3: ---		Antenna: Orange Horn		Preselector: ---		Copyright Curtis-Straus LLC 2000									
Analyzer: Rental SA#2		Preamp: Asset #2111																			
CSsoft Radiated Emissions Calculator v.1.017.185																					
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																					

Radiated Emissions Table

Date: 28-Feb-17		Company: Assa Abloy								Work Order: R0115											
Engineer: Zac Johnson		EUT Desc: R100								EUT Operating Voltage/Frequency: 3V DC											
Temp: 22.9C		Humidity: 25%								Pressure: 1020											
Frequency Range: 6GHz-18GHz												Measurement Distance: 1 m									
Notes: Worst case orientation Y												EUT Max Freq: 2475MHz									
DCCF = -17.3dB																					
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average									
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)							
Low Channel H	7215.0	20.4	3.1	0.0	37.2	6.4	64.0	46.7	83.5	-19.5	Pass	63.5	-16.8	---							
Center Channel H	7320.0	27.0	9.7	0.0	37.6	6.3	70.9	53.6	83.5	-12.6	Pass	63.5	-9.9	---							
High Channel H	7425.0	22.3	5.0	0.0	37.6	6.3	66.2	48.9	83.5	-17.3	Pass	63.5	-14.6	---							
Table Result:		Pass		by -9.9 dB						Worst Freq:		7320.0 MHz									
Test Site: EMI Chamber 1		Cable 1: Asset #2051		Cable 2: Asset #2054		Cable 3: ---		Antenna: Orange Horn		Preselector: ---		Copyright Curtis-Straus LLC 2000									
Analyzer: Rental SA#2		Preamp: none																			
CSsoft Radiated Emissions Calculator v.1.017.183																					
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																					

Spectrum Analyzers / Receivers/Preselectors			Range 20Hz-26.5GHz	MN N9038A	Mfr Agilent	SN MY51210181	Asset 2093	Cat I	Calibration Due 8/9/2017	Calibrated on 8/9/2016
Radiated Emissions Sites			FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz	Cat II	Calibration Due 3/21/2017	Calibrated on 3/21/2015	
EMI Chamber 1			719150	2762A-6	A-0015	1-18GHz	I	Calibration Due 5/23/2017	Calibrated on 5/23/2015	
Preamps /Couplers Attenuators / Filters			Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS COM-POWER	SN N/A 551063	Asset 1258 2111	Cat II	Calibration Due 10/30/2017	Calibrated on 10/30/2016
Red-White A#2111 HF Preamp			0.5-18GHz	PAM-118A		551063	2111	II	Calibration Due 11/5/2017	Calibrated on 11/5/2016
Antennas Red-Brown Bilog Orange Horn			Range 30-2000MHz 1-18GHz	MN JB1 3115	Mfr Sunol EMC	SN A0032406 0004-6123	Asset 1218 390	Cat I	Calibration Due 10/13/2018	Calibrated on 10/13/2016
Weather Clock (Pressure Only) TH A#2080			MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2080	Cat I	Calibration Due 4/13/2019	Calibrated on 4/13/2018	
Cables Asset #1505 Asset #2051 Asset #2054			Range 9kHz - 18GHz	Mfr Florida RF	SN 831	Asset 1218 390	Cat I	Calibration Due 3/2/2017	Calibrated on 3/2/2016	
			9kHz - 18GHz	Mfr Florida RF	SN 831	Asset 1218 390	Cat II	Calibration Due 4/5/2017	Calibrated on 4/5/2016	
			9kHz - 18GHz	Mfr Florida RF	SN 831	Asset 1218 390	Cat II	Calibration Due 10/1/2017	Calibrated on 10/30/2016	



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Radiated Emissions Table

Date: 01-Mar-17	Company: Assa Abloy	Work Order: R0115													
Engineer: Zac Johnson	EUT Desc: R100	EUT Operating Voltage/Frequency: 3V DC													
Temp: 22.2C	Humidity: 33%	Battery													
Frequency Range: 18GHz-25GHz		Measurement Distance: 0.1 m													
Notes: Worst case orientation Y		EUT Max Freq: 2475MHz													
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
No Emissions Found	---	---	---	---	---	---	---	---	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	
Table Result: Pass		by --- dB						Worst Freq: --- MHz							
Test Site: EMI Chamber 2		Cable 1: EMIR-HIGH-07		Cable 2: ---		Cable 3: ---									
Analyzer: Rental SA#2		Preamp: 18-26.5GHz		Antenna: 18-26.5GHz Horn		Preselector: ---								Copyright Curtis-Straus LLC 2000	
CSsoft Radiated Emissions Calculator v 1.017.183															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Rev. 2/26/2017

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 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	9/16/2017	9/16/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only) TH A#2081	BA928 HTC-1	Oregon Scientific HDE	C3166-1	831 2081	I II	4/28/2018 4/5/2017	4/28/2016 4/5/2016	
Cables	Range	Mfr			Cat	Calibration Due	Calibrated on	
REMI-High-07	1 - 26.5GHz	TRU-21B0707-120	TRU		II	8/14/2017	8/14/2016	

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



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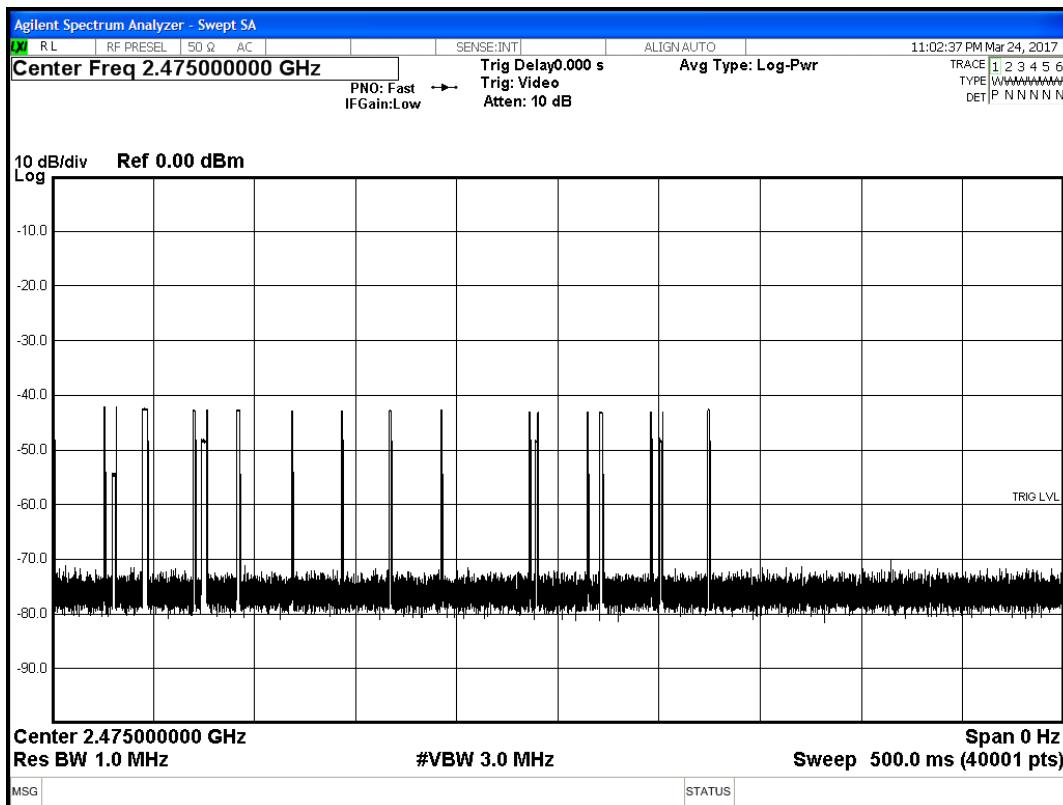
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Duty-Cycle Correction Factor



Software used to calculate duty-cycle over worst case 100ms window from trace data points of the plot above.

Duty-Cycle = 13.6%

DCCF = $20 \times \log(13.6/100) = -17.3\text{dB}$



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Power Spectral Density

Limit: The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission. [15.247(e)]

MEASUREMENTS / RESULTS

Peak Power Spectral Density											FCC 15.247													
Date: 01-Mar-17			Company: Assa Abloy			Work Order: R0115																		
Engineer: Zac Johnson			EUT Desc: R100			EUT Operating Voltage/Frequency: 3V DC																		
Temp: 22.2°C			Humidity: 33%			Pressure: 985mbar					Battery													
Frequency Range: 2405-2475MHz											Measurement Distance: 3 m													
Notes: Per FCC KDB 558074 D01 DTS Meas Guidance v03r05 Section 10.2																								
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB μ V/m)	Adjusted EIRP Reading (dBm)	Antenna Gain (dBi)	Adjusted Conducted Reading (dBm)		Limit (dBm)	Margin (dB)	Result (Pass/Fail)											
H	2405	53.2	0.0	28.2	3.2	84.6	-10.6	3.45	-14.05	8.0	-22.05	Pass												
H	2440	52.9	0.0	28.2	3.2	84.3	-10.9	3.45	-14.35	8.0	-22.35	Pass												
H	2475	53.2	0.0	28.2	3.3	84.7	-10.5	3.45	-13.95	8.0	-21.95	Pass												
Table Result: Pass by -21.95 dB											Worst Freq: 2475.0 MHz													
Test Site: EMI Chamber 2			Cable 1: 2052 cbl			Cable 2: 2053 cbl			Cable 3: ---															
Analyzer: 2093 SA			Preamp: None			Antenna: Yellow Horn			Preselector: ---															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																								
Adjusted EIRP = Adjusted Reading - 10.47 + 20*log(3)																								
Adjusted Conducted Reading = Adjusted EIRP - Antenna Gain																								

PLOTS



PSD Low Channel



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PSD Mid Channel



PSD High Channel



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Occupied Bandwidth

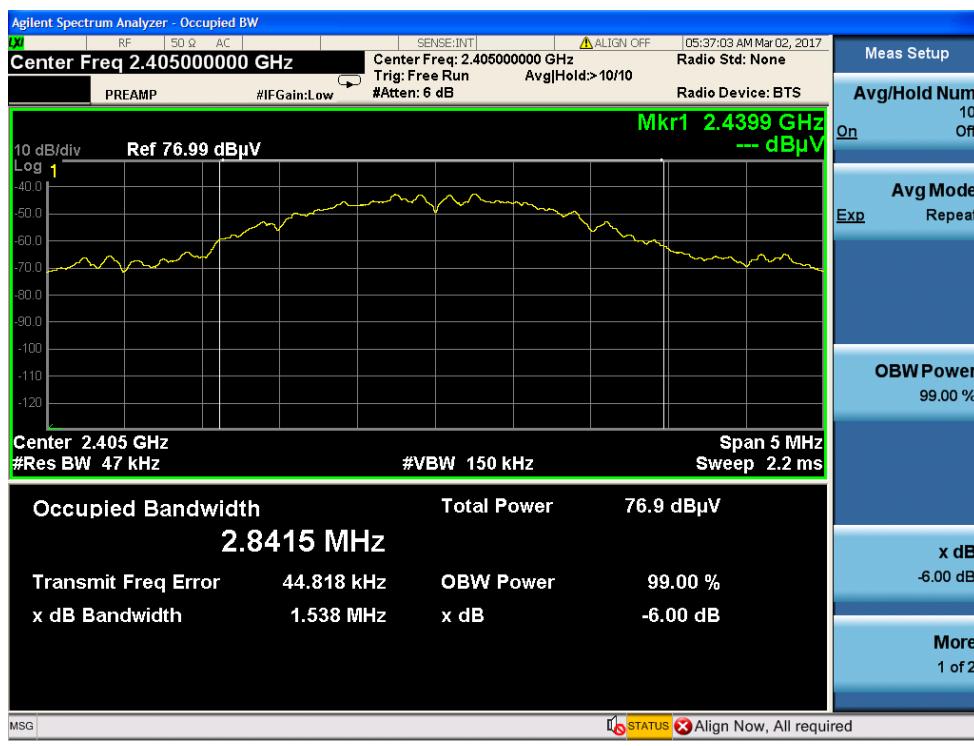
Requirement: When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

[RSS-GEN 6.6]

MEASUREMENTS / RESULTS

99% Occupied Bandwidth			
Date: 01-Mar-17	Company: Assa Abloy	Work Order: R0115	
Engineer: Zac Johnson	EUT Desc: R100	EUT Operating Voltage/Frequency: 3V DC	
Temp: 22.2°C	Humidity: 33%	Pressure: 985mbar	Battery
Frequency Range: 2405-2475MHz		Measurement Distance: 3 m	
Notes: Per RSS-Gen Section 6.6			
Antenna Polarization (H/V)	Frequency (MHz)	99% Occupied Bandwidth (kHz)	
H	2405	2842	
H	2440	2729	
H	2475	2651	
Test Site: EMI Chamber 2	Cable 1: 2052 cbl	Cable 2: 2053 cbl	Cable 3: ---
Analyzer: 2093 SA	Preamp: None	Antenna: Yellow Horn	Preselector: ---

PLOTS



Occupied Bandwidth Low Channel



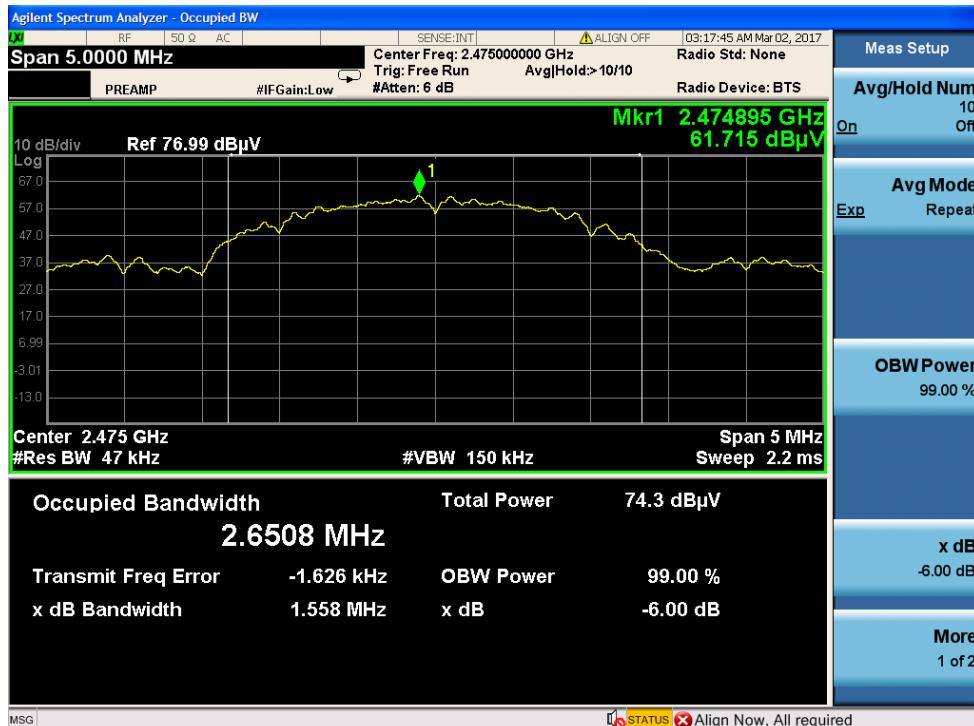
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Occupied Bandwidth Center Channel



Occupied Bandwidth High Channel



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 (Ucispqr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions		
NIST	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucispqr)
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.



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

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND INrecognition 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. Rev.160009121(2)_#684340 v14CS



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