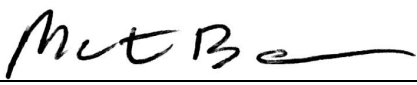
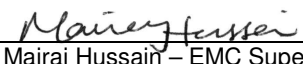




**BUREAU  
VERITAS**

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

# Test Report

Report No	EL2270-7
Client	AirPointe of New Hampshire
Address	35E Industrial Way Suite 101 Rochester, NH 03867
Phone	603-994-2200
Items tested FCC ID FRN	Tempora 433 WUS00040 0018228197
Equipment Type Equipment Code	Part 15 Security/Remote Control Transmitter DSC
FCC Rule Parts	47 CFR 15.231(a), 47 CFR 15.231(e)
Test Dates	December 15-16, 2011
Results	As detailed within this report
Prepared by	 Matthew Burman – Test Engineer
Authorized by	 Mairaj Hussain – EMC Supervisor
Issue Date	July 3, 2012
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 18 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 7-20-07 (DW)



## Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.231(a) and 47 CFR 15.231(e). The product is the Tempora 433. The operating frequency is 433.9MHz. It is powered by +3VDC coin cell batteries. Line Conducted Emissions was not performed.

We found that the product met the requirements without modification. Don Proulx from AirPointe was present during the testing. The test sample was received in good condition.

## Test Methodology

Testing was performed according to ANSI C63.4-2009 and ANSI C63.10-2009. Radiated emissions were maximized by rotating the device around its three orthogonal axes, as well as varying the test antenna's height and polarity. The EUT's antenna cannot be maximized separately. Fresh batteries were used for testing.

Frequency range investigated: 30MHz – 4.5GHz

Measurement distance: 30-4500MHz 3m

This device has no receiver portion.

The EUT is comprised of two portions of software, one which complies with 47 CFR 15.231(a), and the other which is 47 CFR 15.231(e). Under steady conditions, the EUT transmits every 10.26 seconds for duration of 11.25ms. Once motion is detected the EUT would transmit at a higher power for duration of 11.25ms for every 1.25 seconds.

Spurious emissions were tested using the highest power settings available.

### Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	



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EUT Configuration											
<b>Work Order:</b> L2270 <b>Company:</b> airPointe <b>Company Address:</b> 35E Industrial Way Rochester, NH 03867 <b>Contact:</b> Don Proulx <b>Person Present:</b> Don Proulx											
<b>MN</b>			<b>PN</b>			<b>SN</b>					
<b>EUT:</b>			T6521			---			Sample 1		
<b>EUT Description:</b> Tempora 433 - Active RFID Tag											
<b>EUT TX Frequency:</b> 433.9MHz											
<b>Support Equipment:</b>			<b>MN</b>			<b>SN</b>					
NONE											
<b>EUT Ports:</b>											
<b>Port Label</b>		<b>Port Type</b>	<b>No. of ports</b>	<b>No. Populated</b>	<b>Cable Type</b>	<b>Shielded</b>	<b>Ferrites</b>	<b>Length</b>	<b>Max Length</b>	<b>In/Out NEBS Type</b>	<b>Unpopulated Reason</b>
NONE											
<b>Software / Operating Mode Description:</b>											
EUT is transmitting a 433MHz signal											

**Test Results****Fundamental Emission****LIMIT**

<i>Fundamental Frequency</i>	<i>Field Strength of Fundamental (microvolts/meter)</i>	<i>Field Strength of Spurious Emission (microvolts/meter)</i>
260-470MHz	3,750 to 12,500	375 to 1,250

[15.231(a)]

<i>Fundamental Frequency</i>	<i>Field Strength of Fundamental (microvolts/meter)</i>	<i>Field Strength of Spurious Emission (microvolts/meter)</i>
260-470MHz	1,500 to 5,000	150 to 500

[15.231(e)]

Average Limit[dBμV/m] = 20log(16.6667(F[in MHz]) – 2833.3333) @ 3m

Example Calculation: 20log(16.6667(433.9) – 2833.3333) = 72.9dBμV/m @ 3m

**MEASUREMENT**

Fundamental Field Strength												
Date: 02-Jul-12			Company: Airpointe				Work Order: L2270					
Engineer: Matthew Burman			EUT Desc: Tempora 433				EUT Operating Voltage/Frequency: DC (battery)					
Temp: 24.6°C			Humidity: 31%				Pressure: 1006mBar					
Frequency Range: Fundamental							Measurement Distance: 3 m					
Notes: DCCF = 19.51dB							EUT Max Freq: 433.92MHz					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			47 CFR 15.231(a)		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
V peak	433.92	76.1	0.0	16.5	2.0	94.6				101.1	-6.5	Pass
V avg	433.92	56.6	0.0	16.5	2.0	75.1				81.1	-6.0	Pass
H peak	433.92	69.5	0.0	16.5	2.0	88.0				101.1	-13.1	Pass
H avg	433.92	50.0	0.0	16.5	2.0	68.5				81.1	-12.6	Pass
Test Site: EMI Chamber 1			Cable 1: Asset #1505				Cable 2: Asset #1506			Cable 3: ---		
Analyzer: Asset #1327			Preamp: ---				Antenna: Red-White			Preselector: ---		

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<b>Spectrum Analyzers / Receivers / Preselectors</b>	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
SA EMI Chamber (1327)	9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	5/30/2013
<b>Radiated Emissions Sites</b>	<b>FCC Code</b>	<b>IC Code</b>	<b>VCCI Code</b>			<b>Cat</b>	<b>Calibration Due</b>
EMI Chamber 1	719150	2762A-6	A-0015			II	2/16/2014
<b>Antennas</b>	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	1/28/2013
<b>Meteorological Meters</b>		<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
Temp/Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	4/4/2013
CHAMBER1 Thermohygrometer		35519-044	Control Company	72457642	1345	II	8/19/2013
<b>Cables</b>	<b>Range</b>		<b>Mfr</b>			<b>Cat</b>	<b>Calibration Due</b>
Asset #1505	9kHz - 18GHz		Florida RF			II	8/19/2012
Asset #1506	9kHz - 18GHz		Florida RF			II	2/2/2013

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



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**Fundamental Field Strength**

Date: 02-Jul-12			Company: Airpointe				Work Order: L2270					
Engineer: Matthew Burman			EUT Desc: Tempora 433				EUT Operating Voltage/Frequency: DC (battery)					
Temp: 24.6°C			Humidity: 31%				Pressure: 1006mBar					
Frequency Range: Fundamental							Measurement Distance: 3 m					
Notes: DCCF = 19.51dB							EUT Max Freq: 433.92MHz					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			47 CFR 15.231(e)		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
V peak	433.92	72.5	0.0	16.5	2.0	91.0				92.9	-1.9	Pass
V avg	433.92	53.0	0.0	16.5	2.0	71.5				72.9	-1.4	Pass
H peak	433.92	65.7	0.0	16.5	2.0	84.2				92.9	-8.7	Pass
H avg	433.92	46.2	0.0	16.5	2.0	64.7				72.9	-8.2	Pass
Test Site: EMI Chamber 1			Cable 1: Asset #1505				Cable 2: Asset #1506			Cable 3: ---		
Analyzer: Asset #1327			Preamp: ---				Antenna: Red-White			Preselector: ---		

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**Spectrum Analyzers / Receivers /Preselectors**

SA EMI Chamber (1327)	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
	9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	5/30/2013

**Radiated Emissions Sites**

EMI Chamber 1	FCC Code	IC Code	VCCI Code	Cat	Calibration Due
	719150	2762A-6	A-0015	II	2/16/2014

**Antennas**

Red-White Bilog	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
	30-2000MHz	JB1	Sunol	A091604-1	1105	I	1/28/2013

**Meteorological Meters**

Temp./Humidity/Atm. Pressure Gauge	MN	Mfr	SN	Asset	Cat	Calibration Due
CHAMBER1 Thermohygrometer	7400 Perception II	Davis	N/A	965	I	4/4/2013
	35519-044	Control Company	72457642	1345	II	8/19/2013

**Cables**

Asset #1505	Range	Mfr	Cat	Calibration Due
Asset #1506	9kHz - 18GHz	Florida RF	II	8/19/2012
	9kHz - 18GHz	Florida RF	II	2/2/2013

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



**Analyzer Screen Plot**

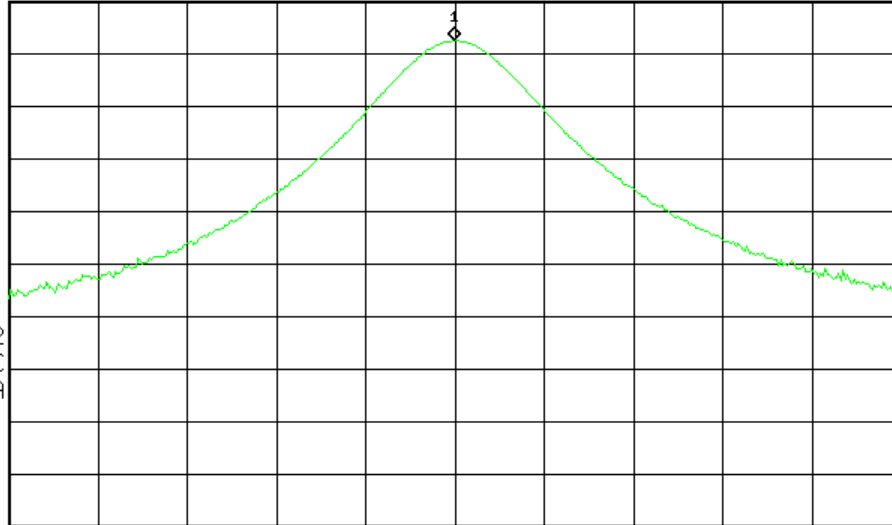
✱ Agilent 09:31:20 Jul 2, 2012

R T

Mkr1 433.9250 MHz  
72.48 dBμV

Ref 79.99 dBμV

#Atten 5 dB

Peak  
Log  
10  
dB/M1 S2  
S3 FC  
AA

Center 433.9 MHz

#Res BW 120 kHz

VBW 300 kHz

Span 1 MHz

Sweep 5 ms (401 pts)

C:\temp.gif file saved

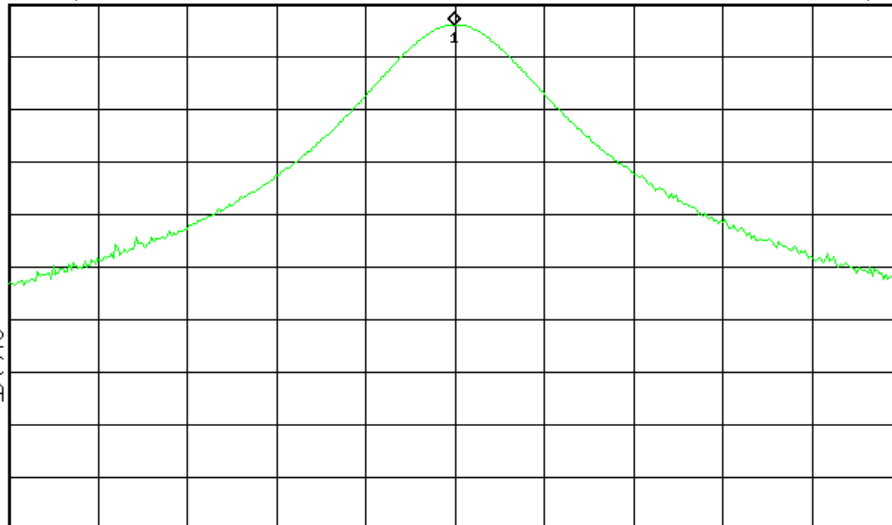
✱ Agilent 09:38:57 Jul 2, 2012

R T

Mkr1 433.9250 MHz  
76.12 dBμV

Ref 79.99 dBμV

#Atten 5 dB

Peak  
Log  
10  
dB/M1 S2  
S3 FC  
AA

Center 433.9 MHz

#Res BW 120 kHz

VBW 300 kHz

Span 1 MHz

Sweep 5 ms (401 pts)

C:\temp.gif file saved



**Bandwidth****LIMIT**

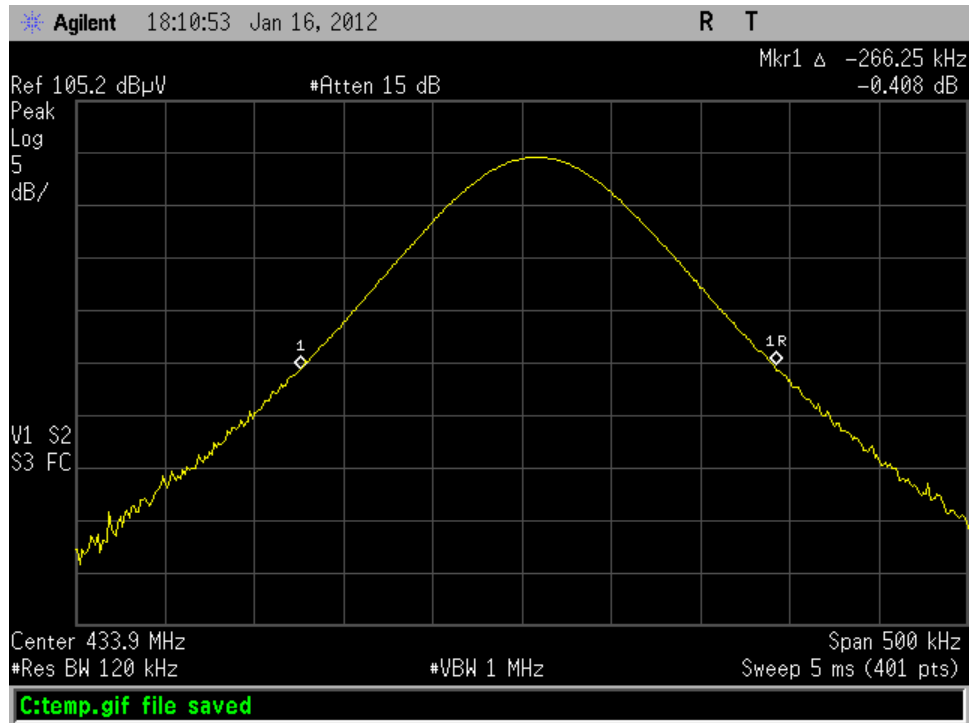
*"The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz...Bandwidth is determined at the points 20dB down from the modulated carrier". [15.231(c)]*

**MEASUREMENTS / RESULTS**

Bandwidth Measurement			
Engineer: Arik Zwirner		Temp: 23.0°C	
Date: 1-16-12		Humidity: 20%	
Site: EMI Chamber 1		Pressure: 1013mBar	
RBW = 120kHz			
Frequency (MHz)	20dB BW (MHz)	Limit (MHz)	Results (Pass/Fail)
433	0.26625	1.1	Pass



## Analyzer Plot



## Harmonics and Spurious Emissions

### LIMIT

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
260 - 470 MHz	3,750 to 12,500	375 to 1,250

[15.231(a)]

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
260-470MHz	1,500 to 5,000	150 to 500

[15.231(e)]

## MEASUREMENTS

Radiated Emissions Table													
Date: 02-Jul-12			Company: Airpointe						Work Order: L2270				
Engineer: Matthew Burman			EUT Desc: Tempora 433						EUT Operating Voltage/Frequency: DC (battery)				
Temp: 24.6°C			Humidity: 31%			Pressure: 1006mBar							
Frequency Range: 30-1000MHz							Measurement Distance: 3 m						
Notes: FCC 15.231(a) settings													
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			FCC Class B			
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	
v - avg	867.85	24.0	25.6	21.8	2.8	23.0	---	---	---	46.0	-23.0	Pass	
v - avg	867.85	4.5	25.6	21.8	2.8	3.5	---	---	---	46.0	-42.5	Pass	
h - pk	867.85	39.0	25.6	21.8	2.8	38.0	---	---	---	46.0	-8.0	Pass	
h - avg	867.85	19.5	25.6	21.8	2.8	18.5	---	---	---	46.0	-27.6	Pass	
Table Result:			Pass		by		-8.0 dB		Worst Freq:		867.85 MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #1507						Cable 2: Asset #1505			Cable 3: ---	
Analyzer: Asset #1327			Preamp: Orange						Antenna: Red-White			Preselector: ---	

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#### Spectrum Analyzers / Receivers / Preselectors

SA EMI Chamber (1327)

Range  
9kHz-13.2 GHzMN  
E4405BMfr  
AgilentSN  
MY45103416Asset  
1327Cat  
ICalibration Due  
5/30/2013

#### Radiated Emissions Sites

EMI Chamber 1

FCC Code  
719150IC Code  
2762A-6VCCI Code  
A-0015Cat  
IICalibration Due  
2/16/2014

#### Antennas

Red-White Bilog

Range  
30-2000MHzMN  
JB1Mfr  
SunolSN  
A091604-1Asset  
1105Cat  
ICalibration Due  
1/28/2013

#### Meteorological Meters

Temp./Humidity/Atm. Pressure Gauge  
CHAMBER1 ThermohyrometerMN  
7400 Perception II  
35519-044Mfr  
Davis  
Control CompanySN  
N/A  
72457642Asset  
965  
1345Cat  
I  
IICalibration Due  
4/4/2013  
8/19/2013

#### Cables

Asset #1505  
Asset #1506Range  
9kHz - 18GHz  
9kHz - 18GHzMfr  
Florida RF  
Florida RFCat  
II  
IICalibration Due  
8/19/2012  
2/2/2013

#### Preamps / Couplers Attenuators / Filters

Red-White

Range  
0.009-2000MHzMN  
ZFL-1000-LNMfr  
CSSN  
N/AAsset  
1258Cat  
IICalibration Due  
6/28/2013

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**Radiated Emissions Table**

Date: 16-Jan-12			Company: Airpointe				Work Order: L2270					
Engineer: Arik Zwerner			EUT Desc: Tempora 433				EUT Operating Voltage/Frequency: DC (battery)					
Temp: 23°C			Humidity: 20%				Pressure: 1013mBar					
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes: Normal mode - Spurious Emissions							EUT Max Freq: 433.92MHz					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			FCC Class B		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
V	100.0	6.7	0.0	10.0	0.5	17.2	---	---	---	43.5	-26.3	Pass
V	200.0	6.9	0.0	12.7	0.8	20.4	---	---	---	43.5	-23.1	Pass
H	400.0	6.8	0.0	15.5	1.2	23.5	---	---	---	46.0	-22.5	Pass
H	500.0	7.1	0.0	17.6	1.5	26.2	---	---	---	46.0	-19.8	Pass
H	700.0	6.9	0.0	20.0	1.6	28.5	---	---	---	46.0	-17.5	Pass
H	900.0	7.3	0.0	22.2	2.2	31.7	---	---	---	46.0	-14.3	Pass
Table Result: Pass by -14.3 dB Worst Freq: 900.0 MHz												
Test Site: EMI Chamber 1			Cable 1: Asset #1508				Cable 2: Asset #1506			Cable 3: ---		
Analyzer: Asset #1327			Preamp: none				Antenna: Red-White			Preselector: ---		

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**Spectrum Analyzers / Receivers / Preselectors**  
SA EMI Chamber (1327)

<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	4/26/2012

**Radiated Emissions Sites**  
EMI Chamber 1

<b>FCC Code</b>	<b>IC Code</b>	<b>VCCI Code</b>	<b>Cat</b>	<b>Calibration Due</b>
719150	2762A-6	R-3032, G-106	I	3/12/2013

**Antennas**  
Red-White Bilog

<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
30-2000MHz	JB1	Sunol	A091604-1	1105	I	1/28/2013

**Meteorological Meters**  
Temp./Humidity/Atm. Pressure Gauge  
CHAMBER1 Thermohyrometer

<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>
7400 Perception II	Davis	N/A	965	I	4/4/2013
35519-044	Control Company	72457642	1345	II	8/19/2013

**Cables**Asset #1506  
Asset #1508

<b>Range</b>
9kHz - 18GHz
9kHz - 18GHz

<b>Mfr</b>
Florida RF
Florida RF

<b>Cat</b>	<b>Calibration Due</b>
II	8/19/2012
II	4/9/2012

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

**Radiated Emissions Table**

Date: 16-Jan-12				Company: Airpointe				Work Order: L2270							
Engineer: Arik Zwerner				EUT Desc: Tempora 433				EUT Operating Voltage/Frequency: DC (battery)							
Temp: 23°C				Humidity: 20%				Pressure: 1013mBar							
Frequency Range: 1-5GHz								Measurement Distance: 3 m							
Notes: Constant Transmit mode - Spurious Emissions Average = Peak minus DCCF (19.51dB)								EUT Max Freq: 433.92MHz							
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBμV)	Average Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBμV/m)	Adjusted Avg Reading (dBμV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	
H	1301.76	35.3	15.8	20.8	25.3	1.9	41.7	22.2	74.0	-32.3	Pass	54.0	-31.8	Pass	
H	1735.68	41.4	21.9	20.3	26.3	2.7	50.1	30.6	74.0	-23.9	Pass	54.0	-23.4	Pass	
H	2169.6	37.1	17.6	19.4	27.7	3.3	48.7	29.2	74.0	-25.3	Pass	54.0	-24.8	Pass	
H	2603.52	34.0	14.5	22.0	28.7	3.8	44.5	25.0	74.0	-29.5	Pass	54.0	-29.0	Pass	
H	3037.44	38.2	18.7	22.0	30.4	4.2	50.8	31.3	74.0	-23.2	Pass	54.0	-22.7	Pass	
H	3471.36	35.8	16.3	21.4	31.3	4.7	50.4	30.9	74.0	-23.6	Pass	54.0	-23.1	Pass	
H	3905.28	40.1	20.6	21.1	32.7	4.7	56.4	36.9	74.0	-17.6	Pass	54.0	-17.1	Pass	
H	4339.2	33.8	14.3	20.2	32.2	5.4	51.2	31.7	74.0	-22.8	Pass	54.0	-22.3	Pass	
V	4773.12	41.3	21.8	20.6	32.9	5.2	58.8	39.3	74.0	-15.2	Pass	54.0	-14.7	Pass	
Table Result:				Pass		by -14.7 dB		Worst Freq: 4773.12 MHz							
Test Site: EMI Chamber 1				Cable 1: Asset #1508				Cable 2: Asset #1506				Cable 3: ---			
Analyzer: Asset #1327				Preamp: Asset #1517				Antenna: Yellow Horn				Preselector: ---			



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**Spectrum Analyzers / Receivers / Preselectors**

	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
SA EMI Chamber (1327)	9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	4/26/2012

**Radiated Emissions Sites**

	FCC Code	IC Code	VCCI Code	Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	R-3032, G-106	I	3/12/2013

**Antennas**

	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Yellow Horn	1-18GHz	3115	EMCO	9608-4898	37	I	6/17/2013

**Meteorological Meters**

	MN	Mfr	SN	Asset	Cat	Calibration Due
Temp./Humidity/Atm. Pressure Gauge	7400 Perception II	Davis	N/A	965	I	4/4/2013
CHAMBER1 Thermohyrometer	35519-044	Control Company	72457642	1345	II	8/19/2013

**Cables**

	Range	Mfr	Cat	Calibration Due
Asset #1506	9kHz - 18GHz	Florida RF	II	8/19/2012
Asset #1508	9kHz - 18GHz	Florida RF	II	4/9/2012

**Preamps /Couplers Attenuators / Filters**

	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	3/29/2012

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

**Note:** 15.231(b)(3) states *“Spurious emissions shall be attenuated to the average...limits shown in this table [15.231(e)] or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.”* Since the emissions above meet the 15.209 limits, those limits are displayed in the data table to show worst case.



## Duty Cycle Correction Factor

## Duration of single pulse

Agilent 10:02:55 Jul 2, 2012

R T

Mkr1  $\Delta$  -11.25 ms  
1.162 dBRef 79.99 dB $\mu$ V

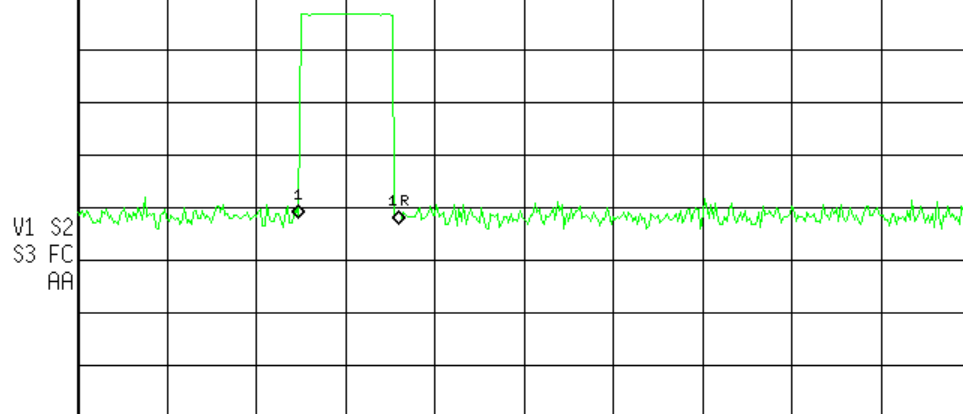
#Atten 5 dB

Peak

Log

10

dB/



Center 433.9 MHz

Res BW 120 kHz

VBW 300 kHz

Span 0 Hz  
Sweep 100 ms (401 pts)

C:\temp.gif file saved

## Silent Period

Agilent 10:00:23 Jul 2, 2012

R T

Mkr1  $\Delta$  -10.1 s  
-0.423 dBRef 79.99 dB $\mu$ V

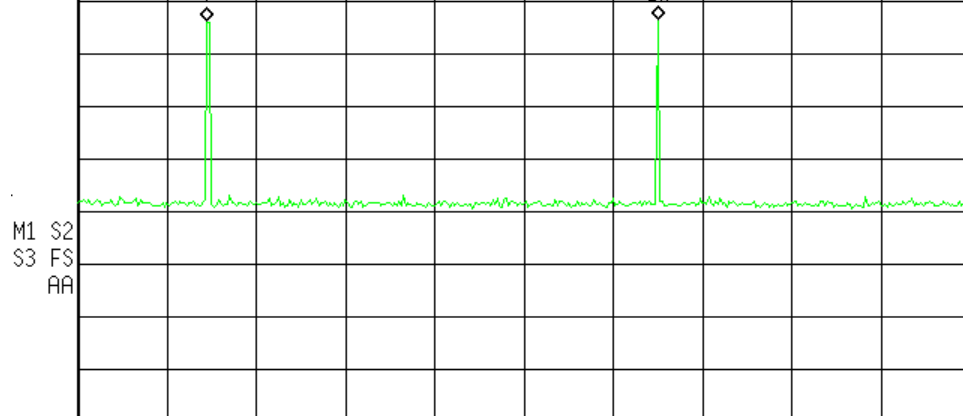
#Atten 5 dB

Peak

Log

10

dB/



Center 433.9 MHz

Res BW 120 kHz

VBW 300 kHz

Span 0 Hz  
Sweep 20 s (401 pts)

C:\temp.gif file saved



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The worst case duty cycle is represented by the two analyzer plots immediately above.

$$\text{DCCF} = 20 \cdot \log (10.58\text{ms}/100\text{ms})$$

$$\text{DCCF} = 20 \cdot \log (0.1058)$$

$$\text{DCCF} = -19.51\text{dB}$$

A 19.51dB Duty Cycle Correction Factor was used in this report.



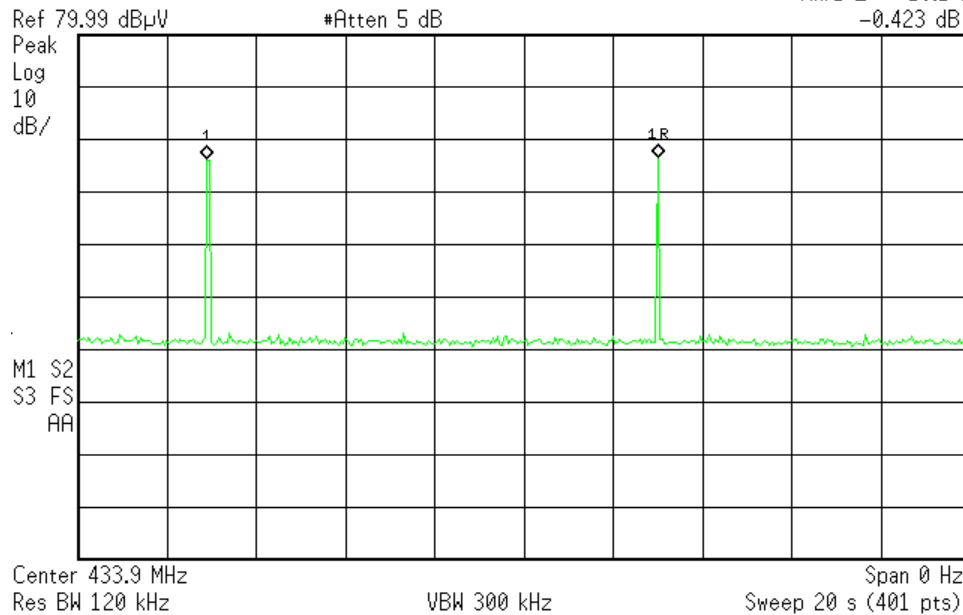
## Timing Requirements

### 15.231(a) - Timing

Agilent 10:00:23 Jul 2, 2012

R T

Mkr1  $\Delta$  -10.1 s  
-0.423 dB



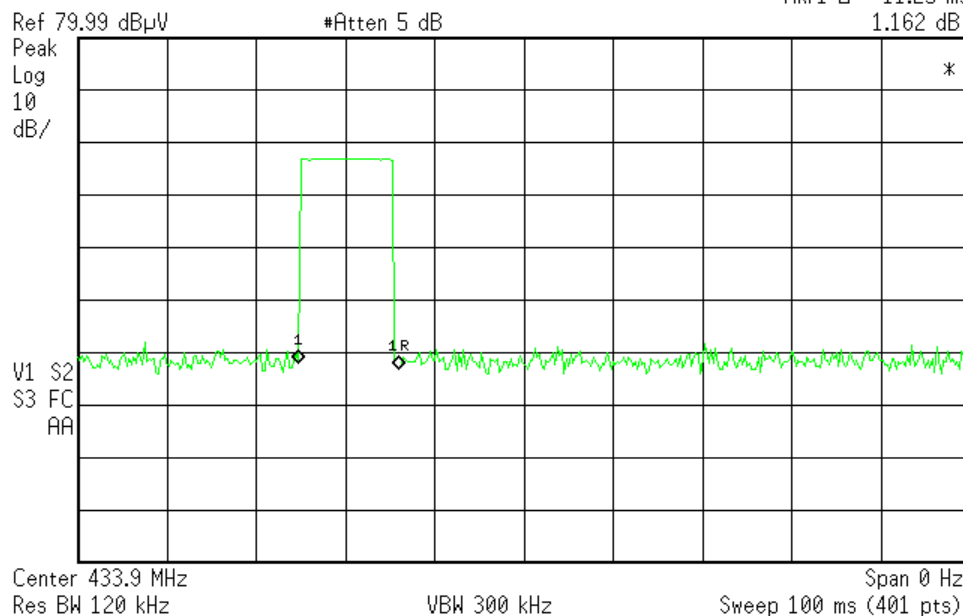
C:\temp.gif file saved

Timing while not in motion – duration between transmissions

Agilent 10:02:55 Jul 2, 2012

R T

Mkr1  $\Delta$  -11.25 ms  
1.162 dB



C:\temp.gif file saved

Timing while not in motion – single transmission



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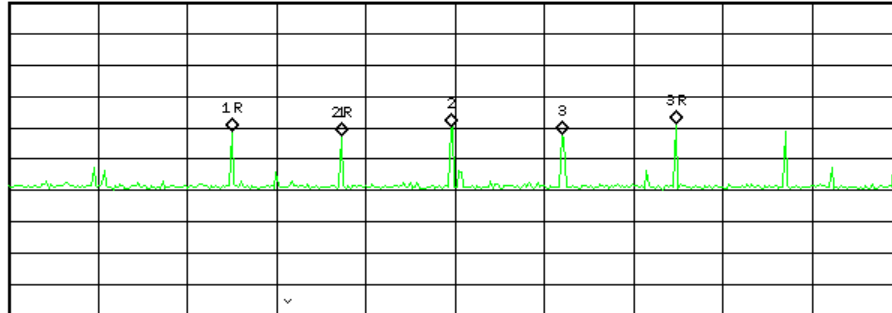
## 15.231(e) - Timing

Agilent 10:11:31 Jul 2, 2012

R T

Mkr3  $\Delta$  -1.275 s  
-3.601 dBRef 79.99 dB $\mu$ V

#Atten 5 dB

Peak  
Log  
10  
dB/

Center 433.9 MHz

Span 0 Hz

Res BW 120 kHz

VBW 300 kHz

Sweep 10 s (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Time	2.5 s	38.71 dB $\mu$ V
1 $\Delta$	(1)	Time	1.225 s	-1.17 dB
2R	(1)	Time	3.725 s	37.54 dB $\mu$ V
2 $\Delta$	(1)	Time	1.225 s	2.875 dB
3R	(1)	Time	7.475 s	41.45 dB $\mu$ V
3 $\Delta$	(1)	Time	-1.275 s	-3.601 dB

C:\temp.gif file saved

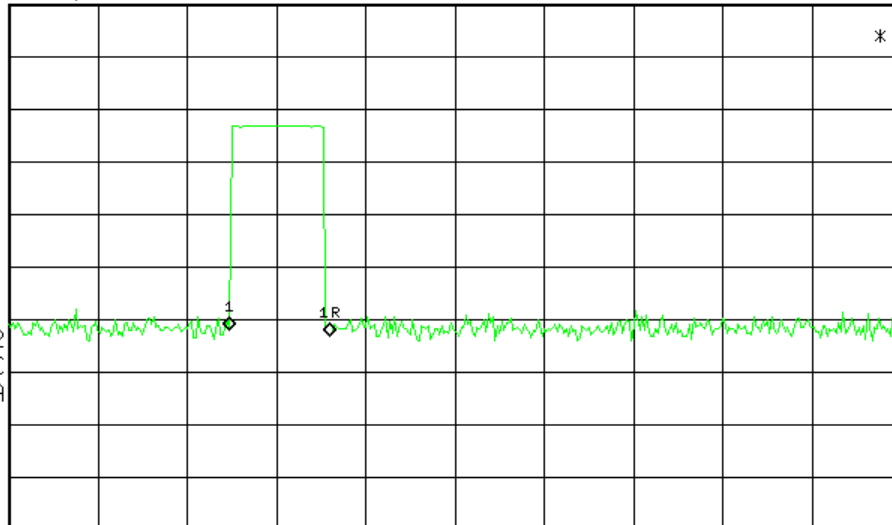
Timing while in motion – duration between transmissions

Agilent 10:02:55 Jul 2, 2012

R T

Mkr1  $\Delta$  -11.25 ms  
1.162 dBRef 79.99 dB $\mu$ V

#Atten 5 dB

Peak  
Log  
10  
dB/

Center 433.9 MHz

Span 0 Hz

Res BW 120 kHz

VBW 300 kHz

Sweep 100 ms (401 pts)

C:\temp.gif file saved

Timing while in motion – single transmission



## 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 (Ucisp)
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 (Ucisp)
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)	$3.23 \times 10^{-8}$	$1 \times 10^{-7}$
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 where such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.
13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST



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

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

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

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

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

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

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