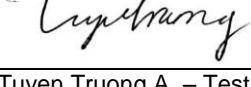




Test Report

BUREAU
VERITAS

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

Report No	EN3532-2
Client	Powercast Corporation Charlie Greene
Address	566 Alpha Drive Pittsburgh, PA 15238
Phone	412-436-4077
Items tested	LS1400
FCC ID	2AAMXLS1400
IC	11250A-LS1400
FRN	0002862225
Equipment Type	Part 15.247 Digitally Modulated
Equipment Code	DTS
FCC/IC Rule Parts	47 CFR 15.247, RSS-210 Issue 8, RSS GEN Issue 3
Test Dates	December 26 - 31, 2013 and January 10, 2014
Results	As detailed within this report
Prepared by	 <hr/> Tuyen Truong A. – Test Engineer
Authorized by	 <hr/>
Issue Date	<u>2/20/2014</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 26 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)



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Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.247. The product is the LS1400. It is a digitally modulated transmitter that operates in the range 902-928MHz. Product was tested with an on board antenna with a gain of 2.5dBi permanently attached.

We found that the product met the above requirements without modification. Charlie Greene from Powercast Corporation was present during the testing. The test sample was received in good condition.

Release Control Record

Issue No. Reason for change
1 Original Release

Date Issued
November 10, 2012



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Test Methodology

Radiated emission testing was performed according to the procedures specified in FCC Guidance for performing compliance measurement on DTS operating under section 15.247, April 19, 2013 and ANSI C63.10 (2009) and C63.4 (2009). Radiated Emissions were maximized by rotating the device around its axes as well as varying the test antenna's height and polarity. The device antenna cannot be maximized separately.

Conducted emission at the antenna port was not performed since EUT antenna was permanently attached.

The EUT operating voltage is 3.6Vdc (Battery Powered)

Low operating channel frequency = 902MHz

Mid operating channel frequency = 915MHz

High operating channel frequency = 927MHz

The following bandwidths were used during radiated spurious emissions.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-10GHz	1MHz	3MHz



Product Tested - Configuration Documentation

EUT Configuration									
Work Order: N3235 Company: Powercast Corporation Company Address: 566 Alpha Drive Pittsburgh, PA 15238 Contact: Charlie Greene									
EUT: LS1400									SN
EUT Description: Light Sensor EUT Max Frequency: <108MHz EUT TX Frequency: 902-928MHz									Sample 1
Support Equipment:									SN
none									
EUT Ports:									
Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Max Length	In/Out	NEBS Type
none									Unpopulated Reason
Software / Operating Mode Description:									
EUT is transmitting on one of three pre-programmed channels between 902-928MHz.									



Statement of Conformity

The LS1400 has been found to conform to the following parts of 47 CFR and as detailed below:

RSS-GEN	RSS 210	Part 15	Comments
5.3		15.15(b)	There are no controls accessible to the user that varies the output power above specified limits.
5.2		15.19	The label is shown in the label exhibit.
7.1.5		15.21	Information to the user is shown in the instruction manual exhibit.
		15.27	No special accessories are required for compliance.
		15.31	The EUT was tested in accordance with the measurement standards in this section.
		15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
		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.
7.1.4		15.203	EUT employs a unique antenna connector.
	2.6	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.
7.2.2		15.207	Not Applicable since EUT is battery powered.
	Annex 8	15.247	The unit complies with the requirements of 15.247
4.6.1		15.247	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

Engineer	Tuyen Truong A.
Date	12/27/2013
Site	Chamber 2
Environmental Conditions	22.4°C, 5%, 1013mb

6dB Bandwidth				
15:247(a)(2): Specifies that the minimum 6dB bandwidth shall be at least 500kHz.				
Frequency (MHz)	Mode	6dB BW (MHz)	Limit (kHz)	Margin (MHz)
902	DMSS	0.5875	>500	-0.088
915	DMSS	0.6750	>500	-0.175
927	DMSS	0.6500	>500	-0.150
Tested by: Tuyen Truong		RBW = 100KHz VBW = 300KHz		
Date: 12/27/2014		Analyzer: SA 1327		
Company: Powercast Corporation				
EUT: LS1400				

Rev. 1/3/2014	Spectrum Analyzers / Receivers/Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	SA EMI Chamber (1327)	9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	5/30/2014	5/30/2013
	Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
	EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	2/15/2014	2/15/2012
	Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/24/2014	9/24/2013
	Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Red-Black Biolog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015	1/28/2013
	Meteorological Meters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Temp./Humidity/Atm. Pressure Gauge	7400 Perception II	N/A	Davis	965		I	5/29/2014	5/29/2013
	TH A#1832	35519-044	Control Company		130318277	1832	II	6/13/2015	6/13/2013
	Cables	Range	Mfr		Cat	Calibration Due	Calibrated on		
	Asset #1782	9kHz - 18GHz	Florida RF		II	3/6/2014	3/6/2013		
	Asset #1787	9kHz - 18GHz	Florida RF		II	3/14/2014	3/14/2013		

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

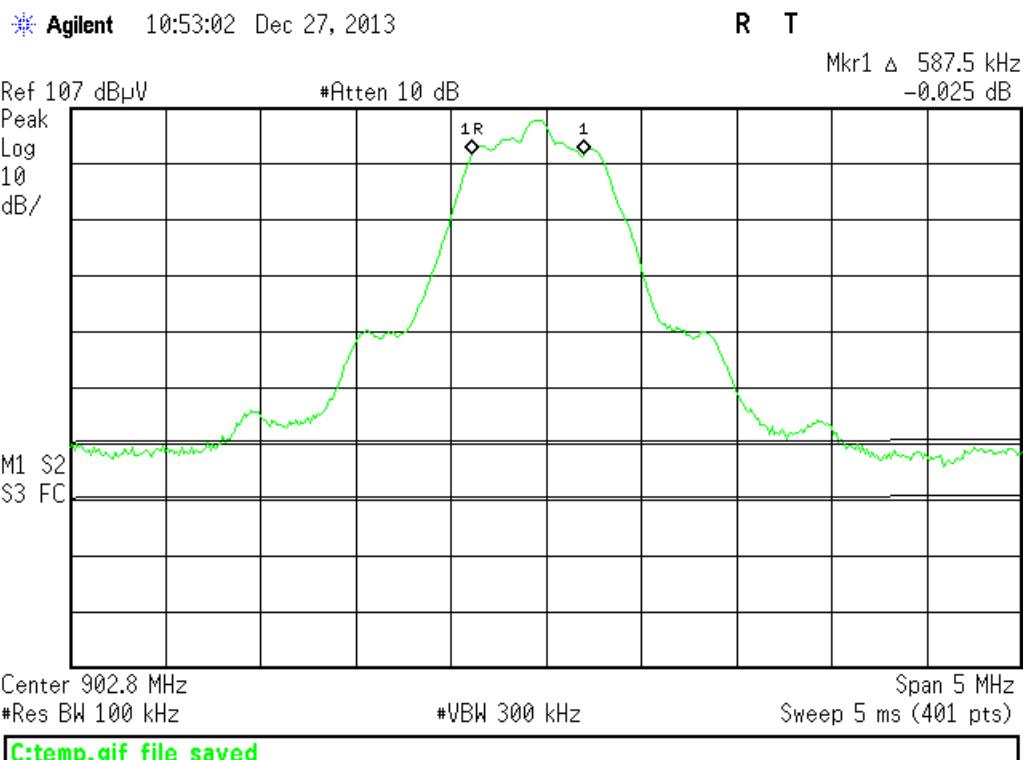
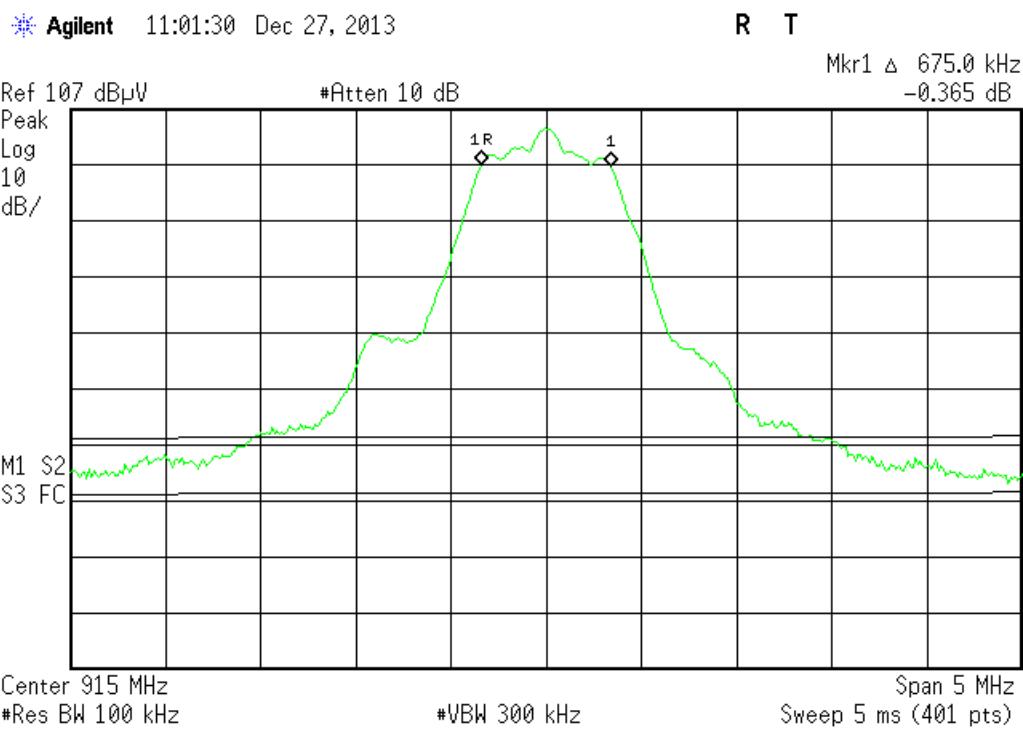


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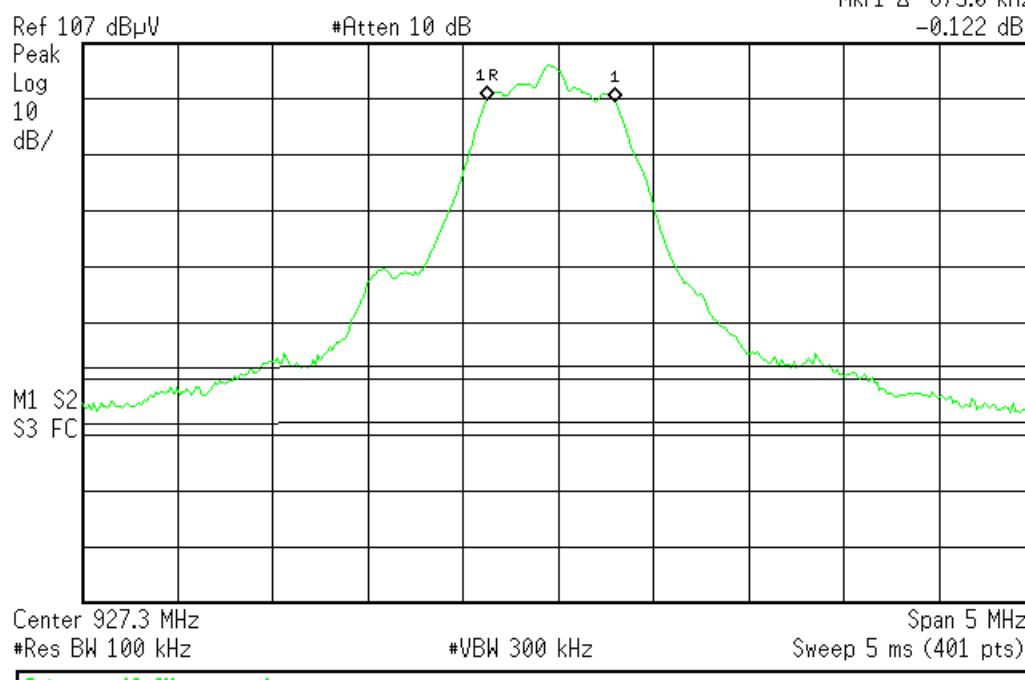
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Testing Cert. No. 1627-01

PLOT**Low Channel – 6dB Bandwidth****Mid Channel – 6dB Bandwidth**

* Agilent 11:07:41 Dec 27, 2013

R T

Mkr1 Δ 675.0 kHz
-0.122 dB

High Channel – 6 dB Bandwidth



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Fundamental Emission Output Power

LIMIT

Conducted Output Power

1 Watt

[15.247(b) (3)]

MEASUREMENTS / RESULTS

Engineer	Chris Bramley
Date	12/27/2013
Site	Chamber 2
Environmental Conditions	25.7°C, 5%, 1015mb

DTS Method 9.2.2.2 Method AVGSA-1 (Trace averaging with the EUT transmitting at full power throughout each sweep)

Maxixmum Conducted (average) Output Power						
Tested by:	Chris Bramley				WO: N3532	
Date:	12/27/2013				RBW = 30KHz	
Company:	Powercast Corporation				VBW = 100KHz	
EUT:	LS1400	Operating Voltage:			Limit = 1Watt or 30dBm	
TX Mode:	DMSS	Antenna Gain: 2.5dBi				
Channel (MHz)	Radiated Channel power (dBm)	Conducted Output power (dBm)		Limit (dBm)	Margin (dB)	Result
902.7	5.84	3.34		30	-26.66	pass
914.22	4.14	1.64		30	-28.36	pass
919.3	3.64	1.14		30	-28.86	pass

Note: Field strengths measured were converted to equivalent EIRP or Radiated Channel Power, then subtract with 2.5dBi antenna gain to obtain Conducted Output power (see Plots).

EIRP (dBm) = Emeas adjusted dBuV/m +20*LOG(3m) - 104.7

Emeas adjusted = Reading SA – dB (Equipment Correction Factor)

Rev. 1/3/2014	Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	SA EMI Chamber (1327)	9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	5/30/2014	5/30/2013
	Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
	EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	2/15/2014	2/15/2012
	Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/24/2014	9/24/2013
	Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Red-Black Biolog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015	1/28/2013
	Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	Temp./Humidity/Atm. Pressure Gauge	7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013	
	TH A#1832	35519-044	Control Company	130318277	1832	II	6/13/2015	6/13/2013	
	Cables	Range	Mfr			Cat	Calibration Due	Calibrated on	
	Asset #1782	9kHz - 18GHz	Florida RF			II	3/6/2014	3/6/2013	
	Asset #1787	9kHz - 18GHz	Florida RF			II	3/14/2014	3/14/2013	

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



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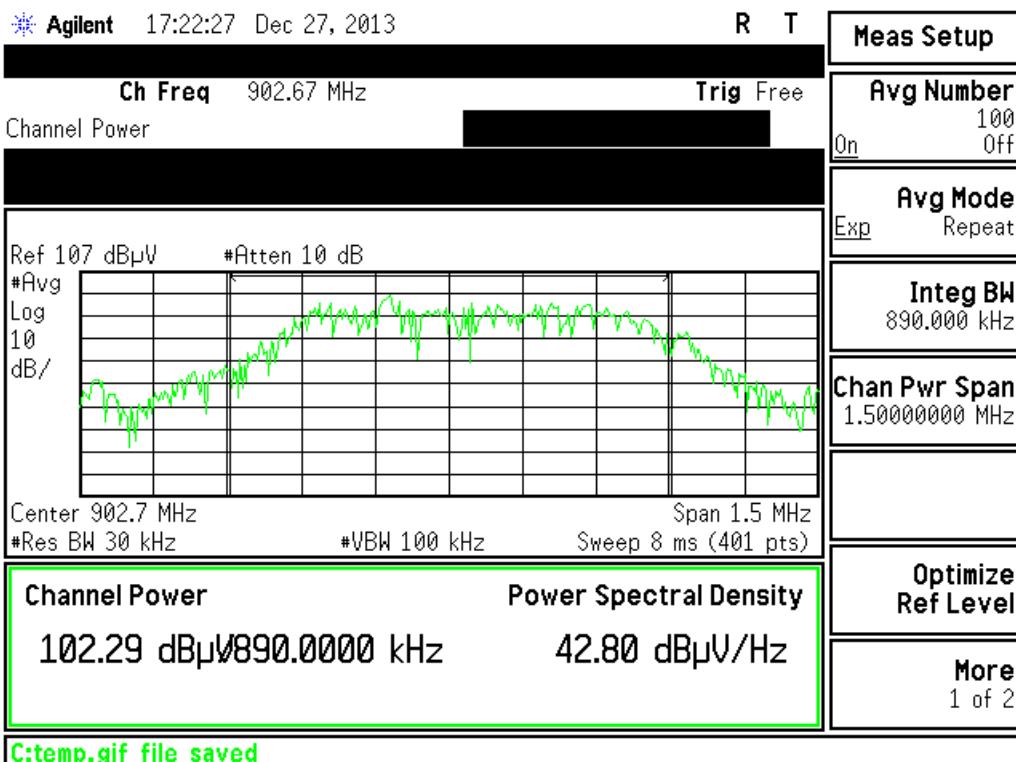
Testing Cert. No. 1627-01

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PLOTS (radiated channel power)



Low Channel – Channel Power

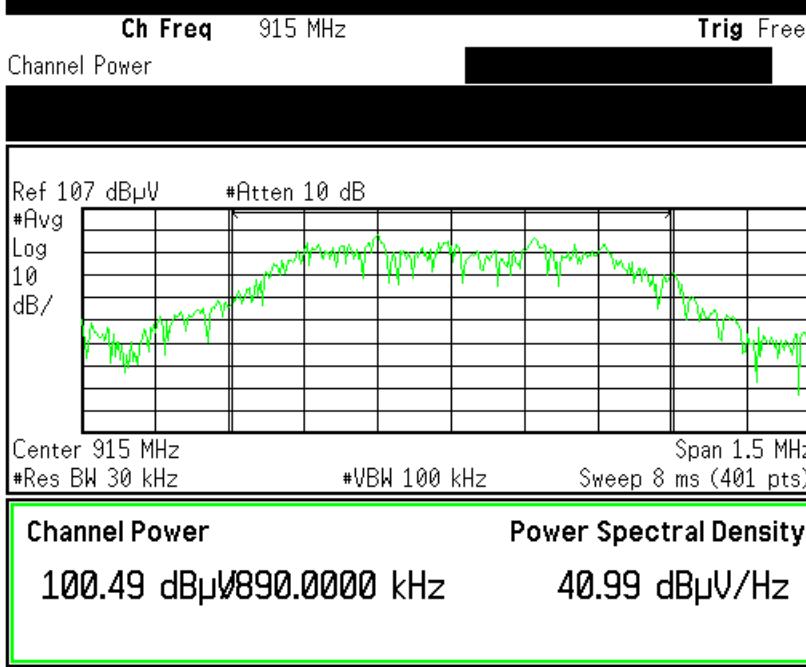


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* Agilent 17:48:08 Dec 27, 2013

R T



Meas Setup

Avg Number
100
On OffAvg Mode
Exp RepeatInteg BW
890.000 kHzChan Pwr Span
1.50000000 MHz

Optimize Ref Level

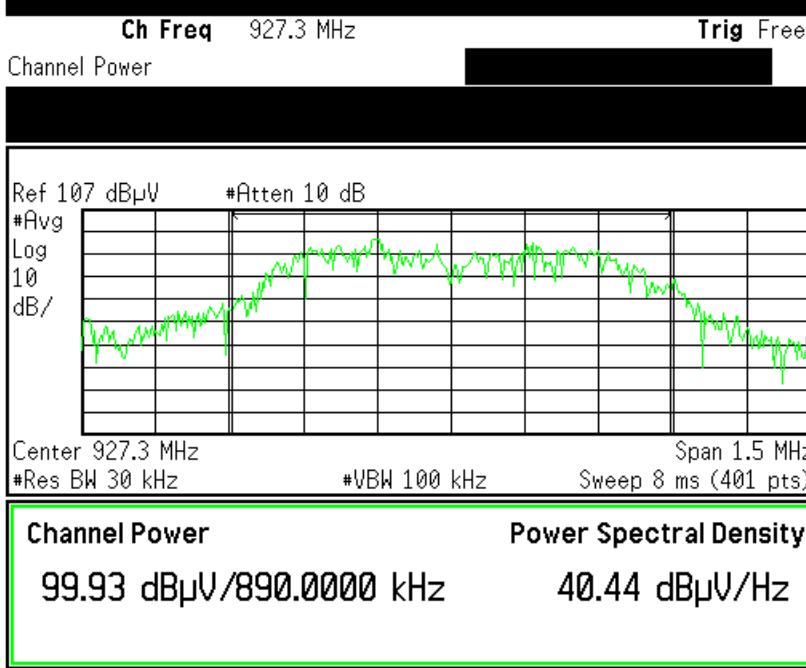
More
1 of 2

C:\temp.gif file saved

Mid Channel – Channel Power

* Agilent 17:44:25 Dec 27, 2013

R T



Meas Setup

Avg Number
100
On OffAvg Mode
Exp RepeatInteg BW
890.000 kHzChan Pwr Span
1.50000000 MHz

Optimize Ref Level

More
1 of 2

C:\temp.gif file saved

High Channel – Channel Power



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Radiated Spurious Emissions

LIMITS

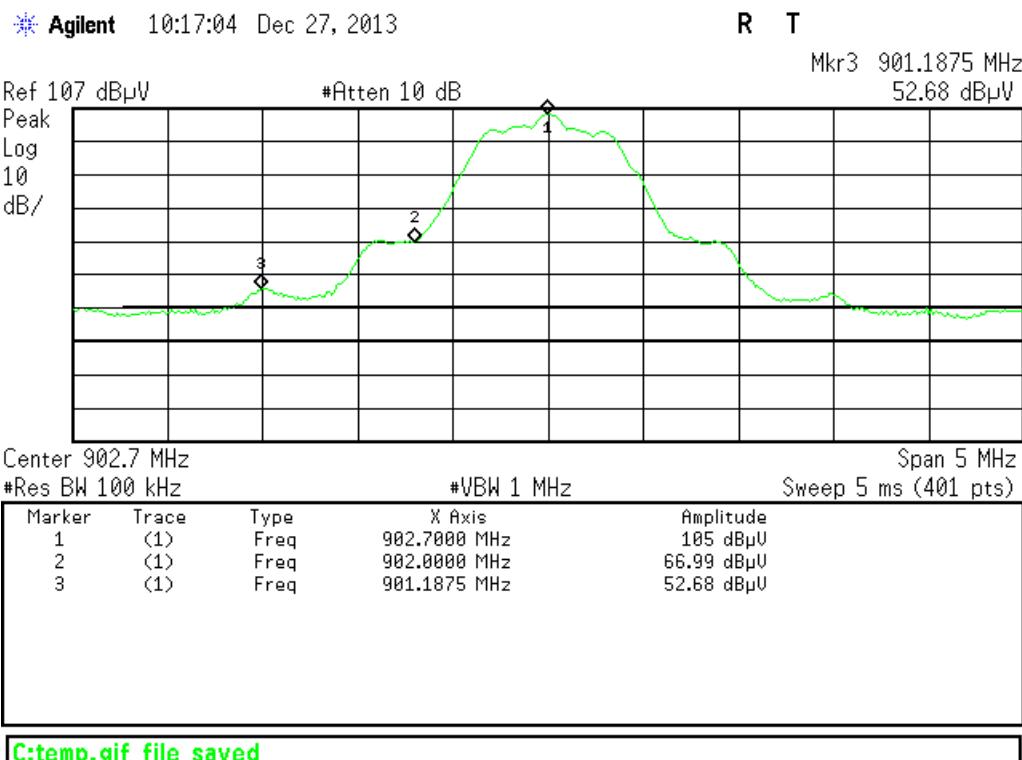
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth that contains the highest level of desired power based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB etc.

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)]

MEASUREMENTS / RESULTS

Plots

Radiated Band Edge

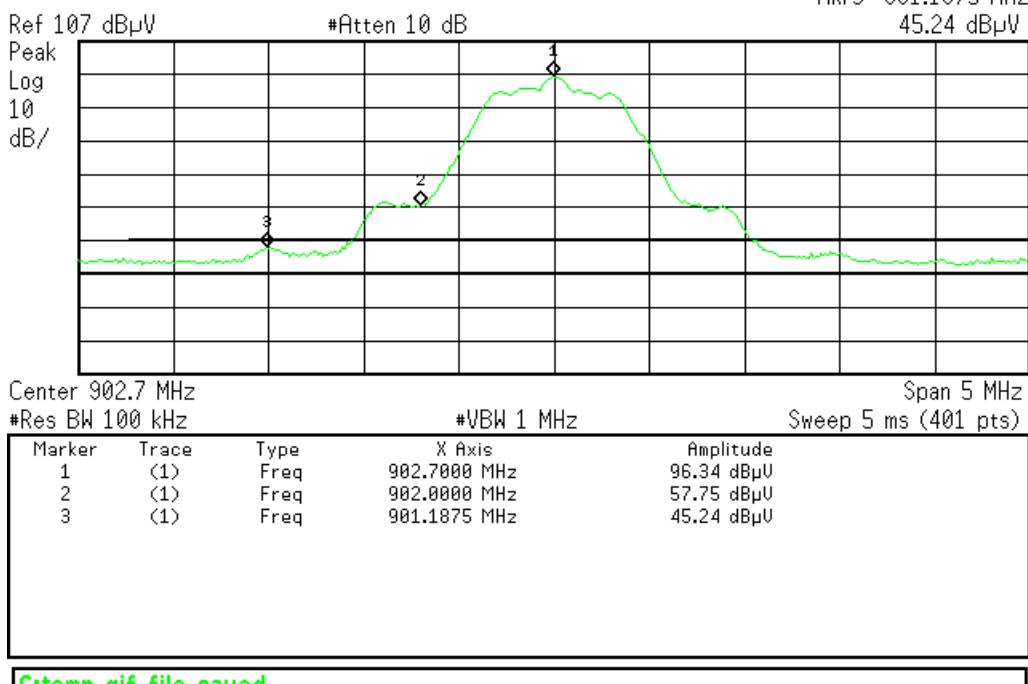


Lower Channel – Band-edge (<-30dBm) – Horizontal Polarity



* Agilent 10:12:22 Dec 27, 2013

R T

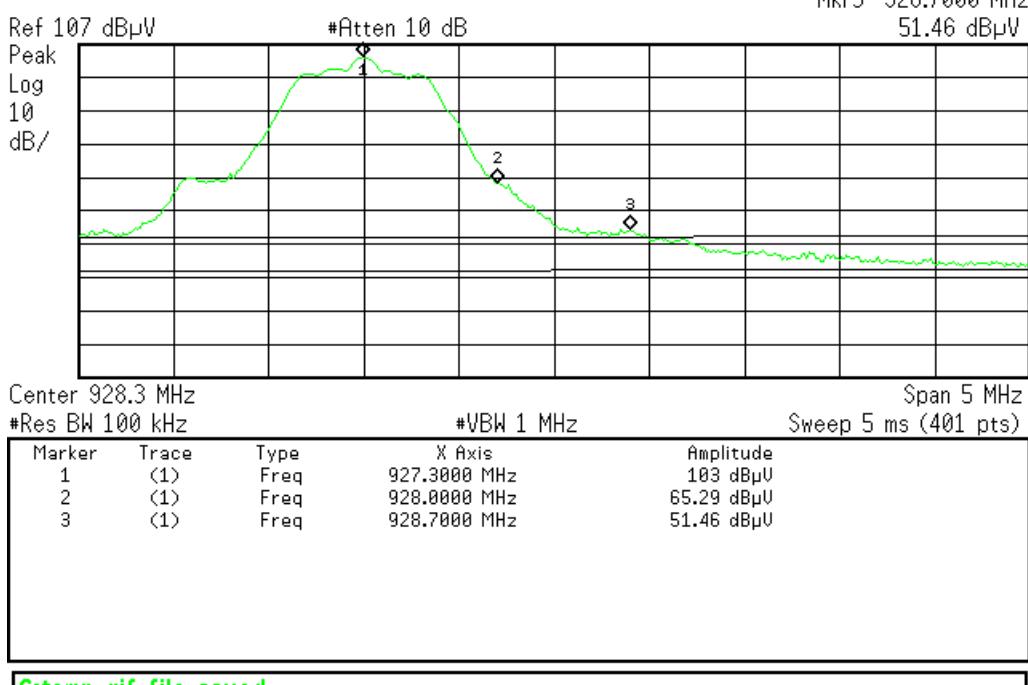
Mkr3 901.1875 MHz
45.24 dB μ V

C:\temp.gif file saved

Lower Channel – Band-edge (<-30dBm) – Vertical Polarity

* Agilent 10:35:35 Dec 27, 2013

R T

Mkr3 928.7000 MHz
51.46 dB μ V

C:\temp.gif file saved

Upper Channel – Band-edge (<-30dBm) – Horizontal Polarity

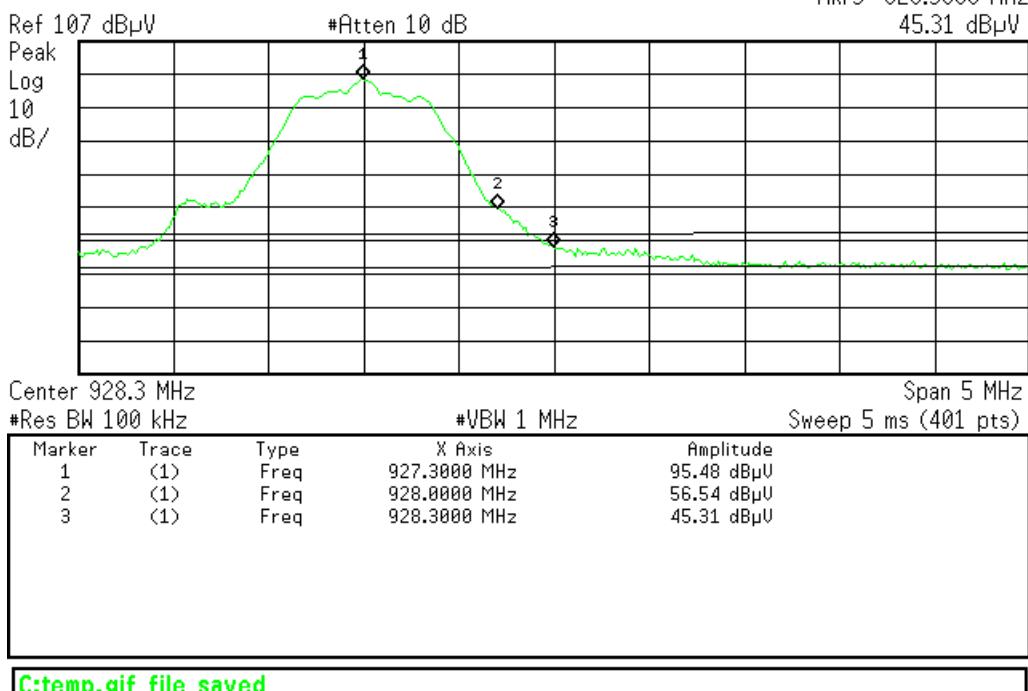


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* Agilent 10:38:36 Dec 27, 2013

R T

Mkr3 928.3000 MHz
45.31 dB μ V

Upper Channel – Band-edge (<-30dBm) – Vertical Polarity



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Radiated Spurious Emission Data

Radiated Emissions Table												
Date: 26-Dec-13	Company: Powercast Corporation						Work Order: N3532					
Engineer: Chris Bramley	EUT Desc: LS1400 - Light Sensor						EUT Operating Voltage/Frequency: 3.6Vdc					
Temp: 23.7°C	Humidity: 13%						Pressure: 1011mBar					
Frequency Range: 30-1000MHz		Measurement Distance: 3 m										
Notes: EUT Transmitting on Low channel - 902.7MHz							EUT Max Freq: <108MHz					
							EUT TX Freq: 902-928MHz					
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dB _{UV})	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB _{UV} /m)	---			FCC Class B		
							Limit (dB _{UV} /m)	Margin (dB)	Result (Pass/Fail)	Limit (dB _{UV} /m)	Margin (dB)	Result (Pass/Fail)
v	47.98	25.5	25.6	8.7	0.5	9.1	---	---	---	40.0	-30.9	Pass
v	58.9	22.7	25.6	7.1	0.5	4.7	---	---	---	40.0	-35.3	Pass
h	122.7	24.5	25.6	14.0	0.8	13.7	---	---	---	43.5	-29.8	Pass
v	172.0	25.4	25.7	11.3	0.9	11.9	---	---	---	43.5	-31.6	Pass
v	196.0	25.5	25.6	11.7	0.9	12.5	---	---	---	43.5	-31.0	Pass
v	454.0	23.6	25.8	17.0	1.5	16.3	---	---	---	46.0	-29.7	Pass
h	466.4	34.8	25.8	17.3	1.5	27.8	---	---	---	46.0	-18.2	Pass
h	490.9	24.6	25.9	17.8	1.5	18.0	---	---	---	46.0	-28.0	Pass
h	515.5	23.8	25.9	17.7	1.5	17.1	---	---	---	46.0	-28.9	Pass
h	564.6	22.6	25.8	18.6	1.7	17.1	---	---	---	46.0	-28.9	Pass
h	613.6	21.0	25.9	19.0	1.7	15.8	---	---	---	46.0	-30.2	Pass
h	662.7	23.5	25.8	19.9	1.8	19.4	---	---	---	46.0	-26.6	Pass
h	899.3	26.3	25.8	22.4	2.1	25.0	---	---	---	46.0	-21.0	Pass
Table Result: Pass by -18.2 dB							Worst Freq: 466.4 MHz					
Test Site: EMI Chamber 2			Cable 1: Asset #1782			Cable 2: Asset #1787						
Analyzer: Rental SA#2			Preamp: Green			Antenna: Red-Black						

Rev. 1/3/2014											
Spectrum Analyzers / Receivers / Preselectors Rental SA #2 (1860)	Range 9kHz-26.5 GHz	MN E7405A	Mfr Agilent	SN MY45104916	Asset 1860	Cat I	Calibration Due 4/15/2014	Calibrated on 4/15/2013			
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 2/15/2014	Calibrated on 2/15/2012			
Preamps / Couplers Attenuators / Filters Green	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 802	Cat II	Calibration Due 9/24/2014	Calibrated on 9/24/2013			
Antennas Red-Black Biolog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 1/28/2015	Calibrated on 1/28/2013			
Meteorological Meters Temp./Humidity/Atm. Pressure Gauge TH A#1833	MN 7400 Perception II 35519-044	Mfr Davis Control Company	SN N/A 130318278	Asset 965 1833	Cat I II	Calibration Due 5/29/2014 6/13/2015	Calibrated on 5/29/2013 6/13/2013				
Cables Asset #1782 Asset #1787	Range 9kHz - 18GHz 9kHz - 18GHz	Mfr Florida RF Florida RF			Cat II	Calibration Due 3/6/2014 3/14/2014	Calibrated on 3/6/2013 3/14/2013				

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

Radiated Emissions Table														
Date: 03-Jan-14	Company: Powercast Corporation						Work Order: N3532							
Engineer: Tuyen Truong	EUT Desc: LS1400						EUT Operating Voltage/Frequency: 3.6Vdc							
Temp: 23.5°C	Humidity: 2%						Pressure: 1010mBar							
Frequency Range: 1 to 10GHz		Measurement Distance: 3 m												
Notes: All 3 orientations of EUT were checked.							EUT Max Freq: <108MHz							
							EUT TX Freq: 902-928MHz							
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dB _{UV})	Average Reading (dB _{UV})	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB _{UV} /m)	Adjusted Avg Reading (dB _{UV} /m)	FCC Class B High Frequency - Peak		FCC Class B High Frequency - Average			
									Limit (dB _{UV} /m)	Margin (dB)	Result (Pass/Fail)	Limit (dB _{UV} /m)	Margin (dB)	Result (Pass/Fail)
v	1075.0	34.07	24.3	19.6	25.6	2.2	42.3	32.5	74.0	-31.7	Pass	54.0	-21.5	Pass
h	2437.5	38.8	32.6	18.7	28.8	3.4	52.3	46.1	74.0	-21.7	Pass	54.0	-7.9	Pass
v	2975.0	34.98	23.2	18.3	30.3	3.7	50.7	38.9	74.0	-23.3	Pass	54.0	-15.1	Pass
v	3425.0	36.54	23.8	18.1	31.3	4.2	53.9	41.2	74.0	-20.1	Pass	54.0	-12.8	Pass
h	3612.5	35.5	26.9	18.2	31.6	4.4	53.3	44.7	74.0	-20.7	Pass	54.0	-9.3	Pass
v	4200.0	33.26	22.0	17.6	32.2	5.0	52.9	41.6	74.0	-21.1	Pass	54.0	-12.4	Pass
v	5326.5	33.46	21.0	17.2	34.4	5.6	56.3	43.8	74.0	-17.7	Pass	54.0	-10.2	Pass
Table Result: Pass by -7.9 dB		Worst Freq: 2437.5 MHz												
Test Site: EMI Chamber 2			Cable 1: Asset #1782			Cable 2: Asset #1787			Cable 3: --					
Analyzer: SA#2			Preamp: Brown			Antenna: Black Horn			Preselector: --					



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Spectrum Analyzers / Receivers /Preselectors Rental SA #2 (1860)	Range 9kHz-26.5 GHz	MN E7405A	Mfr Agilent	SN MY45104916	Asset 1860	Cat I	Calibration Due 4/15/2014	Calibrated on 4/15/2013
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 2/15/2014	Calibrated on 2/15/2012
Preamps /Couplers Attenuators / Filters Brown	Range 1-18GHz	MN CS	Mfr CS	SN N/A	Asset 1523	Cat II	Calibration Due 2/27/2014	Calibrated on 2/27/2013
Antennas Black Horn	Range 1-18GHz	MN 3115	Mfr EMCO	SN 9703-5148	Asset 56	Cat I	Calibration Due 8/5/2015	Calibrated on 8/5/2013
Meteorological Meters Temp./Humidity/Atm. Pressure Gauge TH A#1833	MN 7400 Perception 35519-044	Mfr Davis Control Company	SN N/A	Asset 965 130318278	Cat I II	Calibration Due 5/29/2014 6/13/2015	Calibrated on 5/29/2013 6/13/2013	
Cables Asset #1782 Asset #1787	Range 9kHz - 18GHz 9kHz - 18GHz	Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/6/2014 3/14/2014	Calibrated on 3/6/2013 3/14/2013	

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



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Testing Cert. No. 1627-01

Power Spectral Density

LIMIT

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

MEASUREMENTS / RESULTS

Engineer	Chris Bramley
Date	12/27/2013
Site	Chamber 2
Environmental Conditions	25.7°C, 5%, 1015mb

DTS Method 10.3 AVGPSD-1 (trace averaging with EUT transmitting at full power throughout each sweep)

Power Spectral Density Data

15.247 (e) Maximum Power Spectral Density								
Tested by: Chris Bramley Date: 12/27/2013 SA#: 1327 Company: Powercast Corp. RBW = 3KHz EUT: LS1400 Antenna Gain: 2.5dBi VBW = 10KHz								
channel (MHz)	mode	measured PSD (dBm)	attenuator factor (dB)	conducted power measurement	bandwidth correction factor adjustment	limit (dBm)	margin (dB)	result
902	DMSS	-8.16	0	-10.66	0	8	-18.66	Pass
915	DMSS	-9.56	0	-12.06	0	8	-20.06	Pass
927	DMSS	-8.76	0	-11.26	0	8	-19.26	Pass

Note: Field strengths measured were converted to equivalent EIRP for measured Power Spectral Density, then subtract with 2.5dBi antenna gain to obtain Conducted power measurement (see Plots).

$$\text{EIRP (dBm)} = \text{Emeas adjusted dBuV/m} + 20 \cdot \text{LOG}(3m) - 104.7$$

Emeas adjusted = Reading SA – dB (Equipment Correction Factor)

Rev. 1/3/2014	Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	SA EMI Chamber (1327)	9kHz-13.2 GHz	E4405B	Agilent	MY45103416	1327	I	5/30/2014	5/30/2013
	Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
	EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	2/15/2014	2/15/2012
	Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/24/2014	9/24/2013
	Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Red-Black BiLog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015	1/28/2013
	Meteorological Meters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Temp./Humidity/Atm. Pressure Gauge	7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013	
	TH A#1832	35519-044	Control Company	130318277	1832	II	6/13/2015	6/13/2013	
	Cables	Range	Mfr		Cat	Calibration Due	Calibrated on		
	Asset #1782	9kHz - 18GHz	Florida RF		II	3/6/2014	3/6/2013		
	Asset #1787	9kHz - 18GHz	Florida RF		II	3/14/2014	3/14/2013		

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

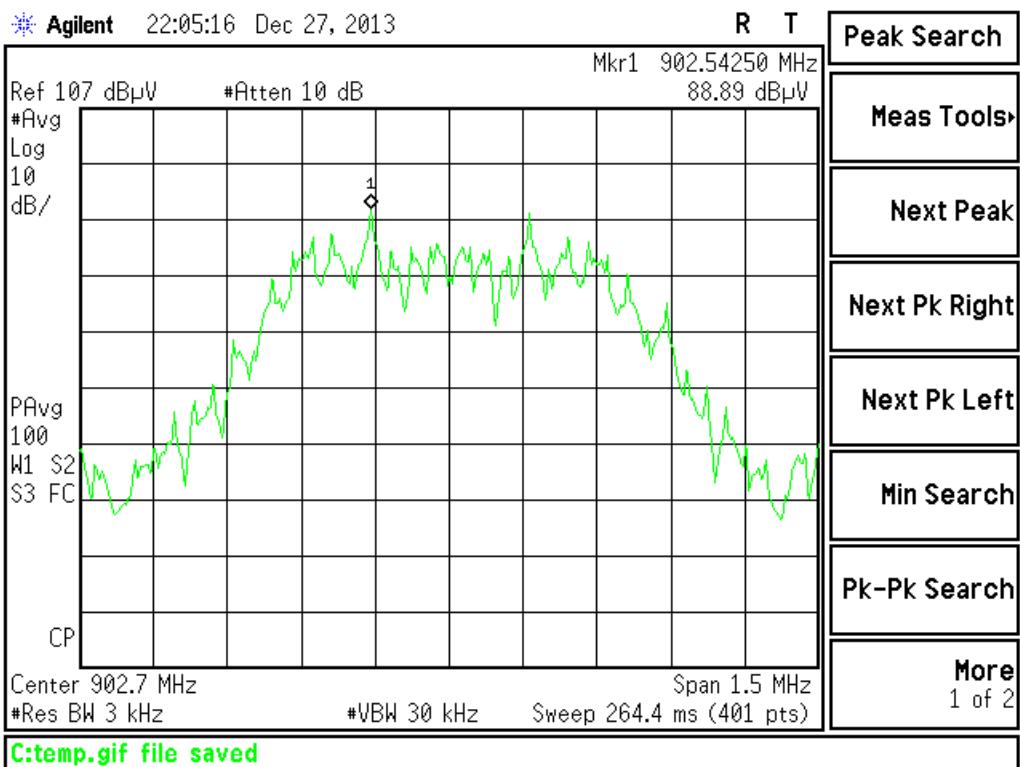


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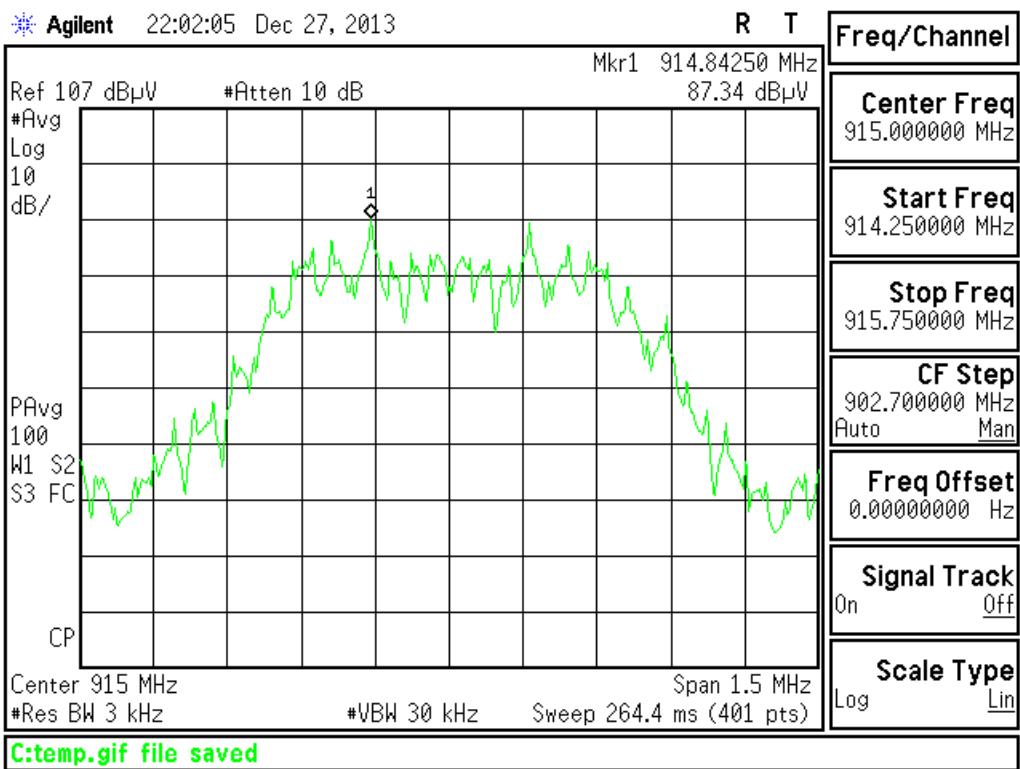
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PLOTS

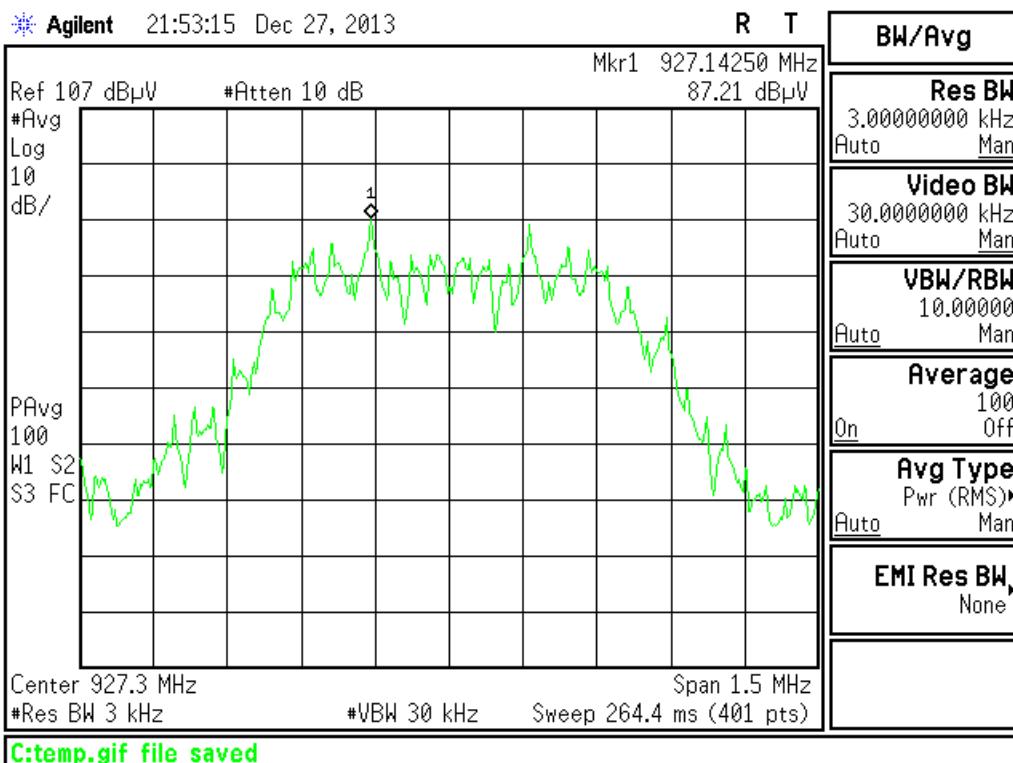


Channel Low – PSD



Channel Mid – PSD





Channel High – PSD



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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 4.6.1]

Engineer	Tuyen Truong
Date	1/10/2014
Site	Chamber 2
Environmental Conditions	25.7°C, 5%, 1015mb



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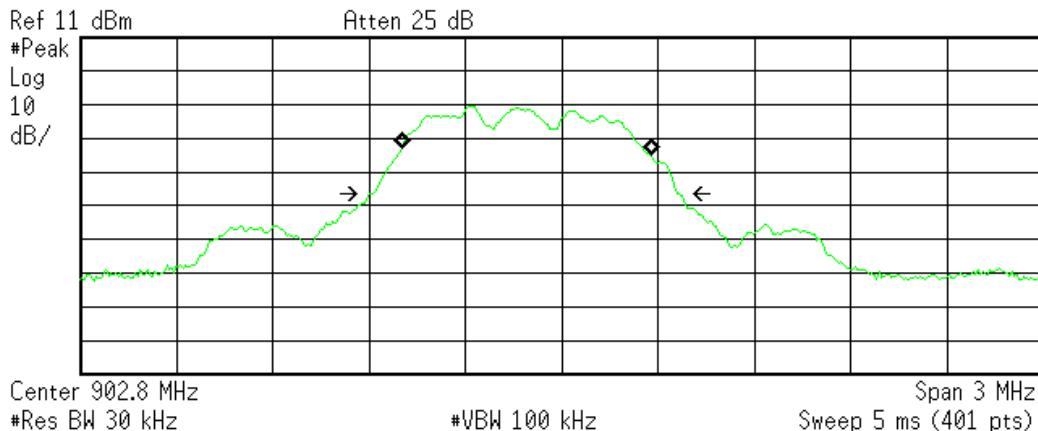
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Plots

* Agilent 13:29:27 Jan 10, 2014

R T



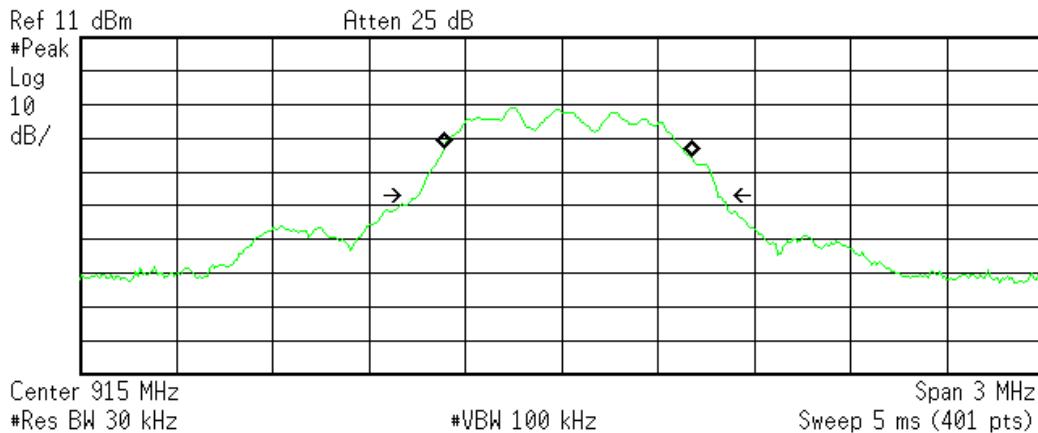
Transmit Freq Error -112.257 kHz
x dB Bandwidth 951.718 kHz

C:\temp.gif file saved

Low Channel – Occupied Bandwidth

* Agilent 15:19:08 Jan 10, 2014

R T



Transmit Freq Error 16.869 kHz
x dB Bandwidth 934.124 kHz

C:\temp.gif file saved

Mid Channel – Occupied Bandwidth

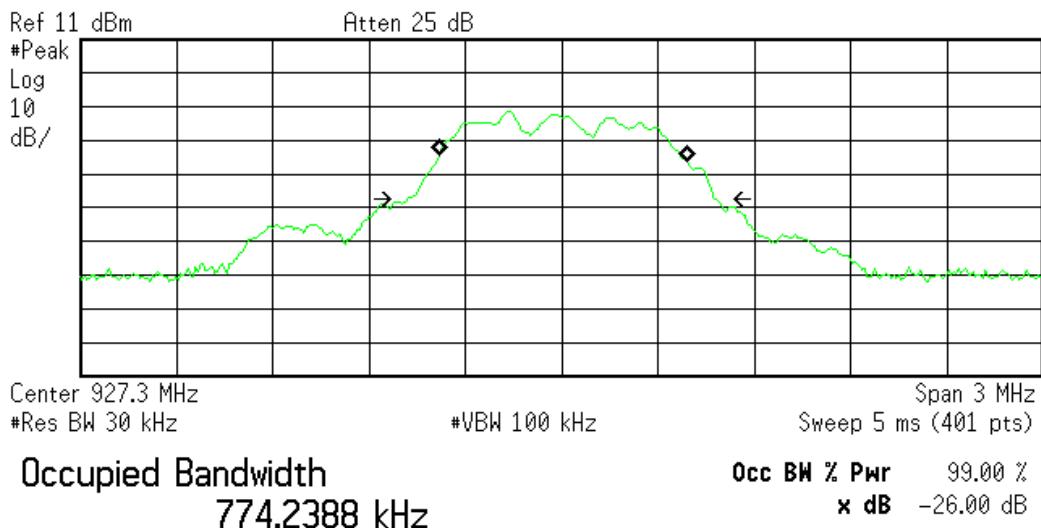


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⌘ Agilent 15:21:41 Jan 10, 2014

R T



Transmit Freq Error 4.411 kHz
 x dB Bandwidth 964.583 kHz

C:\temp.gif file saved

High Channel – Occupied Bandwidth

Rev. 1/9/2014

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/18/2014	3/18/2013
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	2/15/2014	2/15/2012
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/24/2014	9/24/2013
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black BiLog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015	1/28/2013
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Temp./Humidity/Atm. Pressure Gauge	7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013	
TH A#1833	35519-044	Control Company	130318278	1833	II	6/13/2015	6/13/2013	
Cables	Range	Mfr			Cat	Calibration Due	Calibrated on	
Asset #1782	9kHz - 18GHz	Florida RF			II	3/6/2014	3/6/2013	
Asset #1787	9kHz - 18GHz	Florida RF			II	3/14/2014	3/14/2013	

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



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Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz) NIST CISPR	5.6dB 4.6dB	N/A 5.2dB (Ucispr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions NIST CISPR	3.9dB 3.6dB	N/A 3.6dB (Ucispr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS**," "**BUREAU VERITAS CONSUMER PRODUCTS SERVICES**," "**BVCP**," "**MTL**," "**ACTS**," "**MTL-ACTS**" and **CURTIS-STRAU** (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.



13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

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

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

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

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

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

Rev.160009121(2) #684340 v13CS



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