



Test Report



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

Report No	EO3616-2
Client	Ideal Industries, Inc. Tim Tunnell
Address	566 Alpha Drive Pittsburgh, PA 15238
Phone	412-436-4077
Items tested	GW1100B
FCC ID	2AAMXGW1100B
IC	11250A-GW1100B
FRN	0002862225
Equipment Type	Part 15.247 Digitally Modulated
Equipment Code	DTS
FCC/IC Rule Parts	47 CFR 15.247, RSS-247 Issue 1
Test Dates	December 3, 11 and 22, 2014, January 9 and February 10, 2015
Results	As detailed within this report
Prepared by	 Tuyen Truong A. – Test Engineer
Authorized by	 Christopher Reynolds – EMC Supervisor
Issue Date	<u>10/29/2015</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 36 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 15.247. The product is the GW1100B. It is a digitally modulated transmitter that operates in the range 902.7-927.3MHz. Product was tested with two antenna using RP-SMA connectors with a gain of 2.5dBi.

We found that the product met the above requirements without modification. The test samples were received in good condition.

Issue No.	Reason for change	Date Issued
1	Original Release	January 6, 2016

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Test Methodology

Radiated emission and AC line conducted testing were performed according to the procedures specified in FCC Guidance v03r03 for performing compliance measurement on DTS operating under section 15.247, April 19, 2013 and ANSI C63.10 (2009). Radiated Emissions were maximized by rotating the device around its axes as well as varying the test antenna's height and polarity. The antenna was maximized separately.

Conducted emissions at the antenna port were performed, as required by rule section.

The EUT operating voltage is 120VAC, 60Hz

Low operating channel frequency = 902.7MHz

Mid operating channel frequency = 915MHz

High operating channel frequency = 927.3MHz

The following bandwidths were used during radiated spurious and line conducted 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: O3616 Company: Ideal Industries, Inc. Company Address: 566 Alpha Drive Pittsburgh, PA 15238 Contact: Charlie Greene											
MN						SN					
EUT: GW1100B I.T.E AC/DC Power Brick: CENB1020A2403B01 EUT Description: Gateway EUT Max Frequency: 360MHz EUT TX Frequency: 902.7-927.3MHz						Sample 1 Sample 1					
Support Equipment:						SN					
Linksyst Router SerialGear CAN						WRT54G2 V1 -- 214386					
EUT Ports:											
Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason	
Serial	RS485	1	1	3-wires	Yes	No	10m	TBD	Indoor		
Ethernet	RJ45	2	2	cat.5	No	No	10m	100m	Indoor		
Power	Power	1	1	2-wires	No	No	1.5m	>3m	Indoor		
USB	USB	1	0	N/A	N/A	N/A	N/A	N/A	N/A	Not used in this Config.	
Antenna	SMA	2	2	SMA Connector	Yes	No	20cm	TBD	Indoor		
Software / Operating Mode Description:											
EUT is transmitting on one of three pre-programmed channels (Low, Mid and High) between 902.7-927.3MHz.											
Performance Criteria:											
Emissions only											



Statement of Conformity

The GW1100 has been found to conform to the following parts of 47 CFR and as detailed below:

RSS-GEN	RSS-247	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.
8.4		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.
6.7		15.203	EUT employs two detachable antennas using RP-SMA connectors. Only one antenna can transmit at one time.
	5.5	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.
8.8		15.207	EUT meets the AC Line conducted emissions requirements of 15.207.
		15.247	The unit complies with the requirements of 15.247
	RSS-247		The unit complies with the requirements of RSS-247
6.6		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	Chris Bramley
Date	12/11/2014
Site	3M Indoor
Environmental Conditions	20°C, 23%, 1017mBar

6dB Bandwidth - Antenna 1

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)
902.7	DMSS	0.675	>500	-0.175
915	DMSS	0.670	>500	-0.170
927.3	DMSS	0.670	>500	-0.170

Tested by: Chris Bramley

RBW = 100KHz VBW = 300KHz

Date: 12/11/2014

Analyzer: Brown SA

Company: Ideal Industries, Inc.

Attenuator: PE7019-20 #791

EUT: GW1100B

6dB Bandwidth - Antenna 2

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)
902.7	DMSS	0.675	>500	-0.175
915	DMSS	0.670	>500	-0.170
927.3	DMSS	0.670	>500	-0.170

Tested by: Chris Bramley

RBW = 100KHz VBW = 300KHz

Date: 12/11/2014

Analyzer: Brown SA

Company: Ideal Industries, Inc.

Attenuator: PE7019-20 #791

EUT: GW1100B

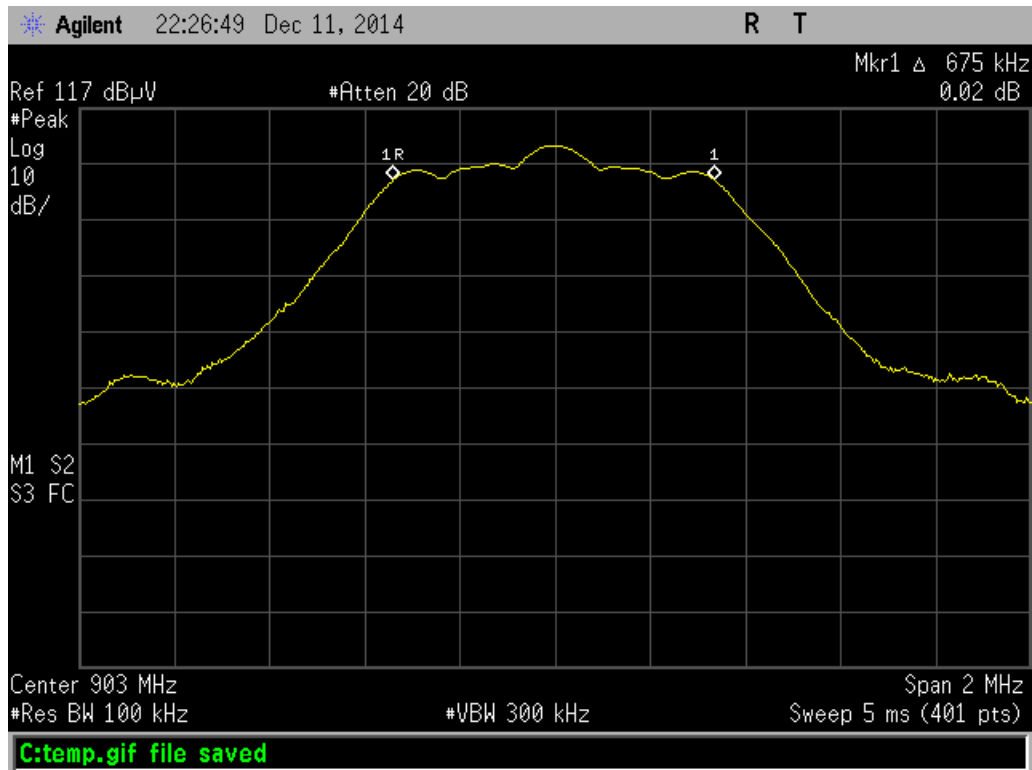


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Category	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Spectrum Analyzers / Receivers / Preselectors Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	5/12/2015	5/12/2014
Radiated Emissions Sites 1DCC-OATS-3M-I	FCC Code 719150	IC Code 2762A-8	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 5/17/2015	Calibrated on 5/17/2013
Preamps / Couplers Attenuators / Filters HF 20dB 50W Attenuator	Range 0.009-18 GHz	MN PE 7019-20	Mfr Pasternack	SN 1	Asset 791	Cat II	Calibration Due 7/14/2015	Calibrated on 7/14/2014
Meteorological Meters Weather Clock (Pressure Only) TH A#1828		MN BA928 35519-044	Mfr Oregon Scientific Control Company	SN C3166-1 130318292	Asset 831 1828	Cat I II	Calibration Due 3/19/2016 6/13/2015	Calibrated on 3/19/2014 6/13/2013

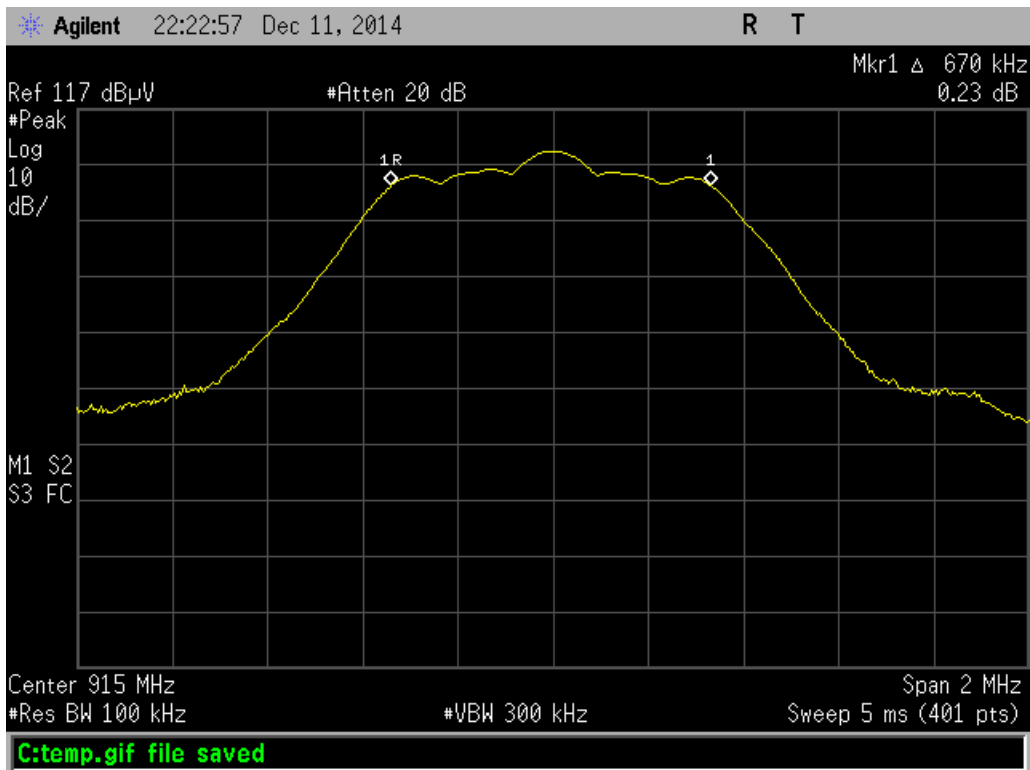
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

PLOT(s)

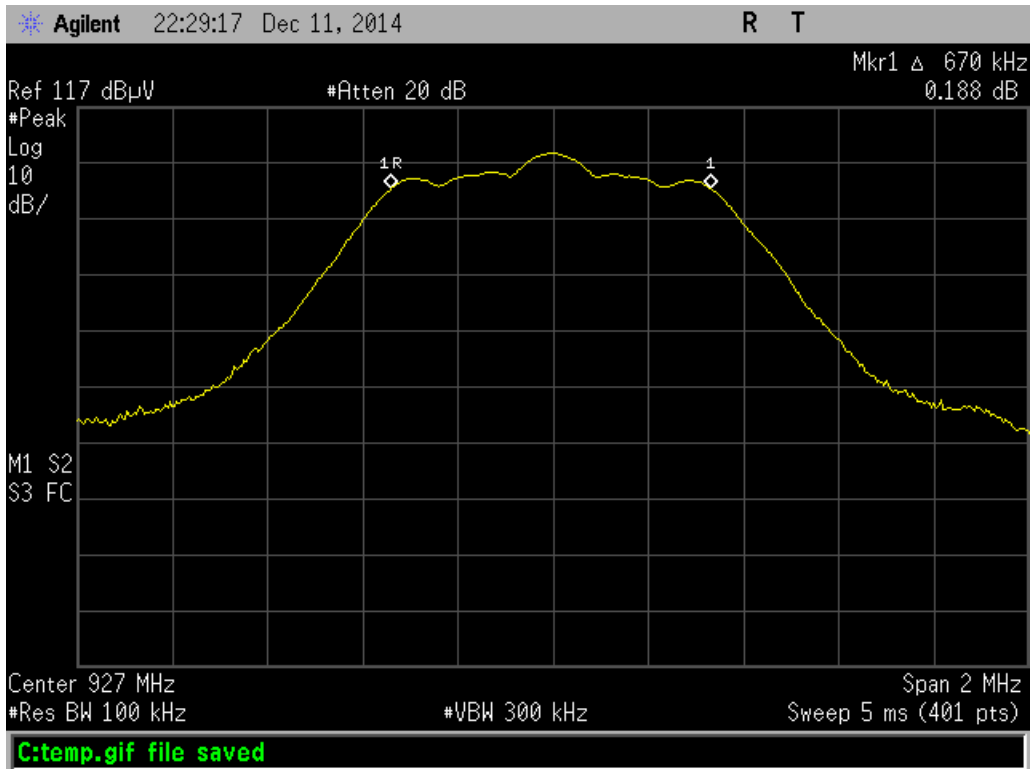


Low Channel – 6dB Bandwidth (Antenna 1)

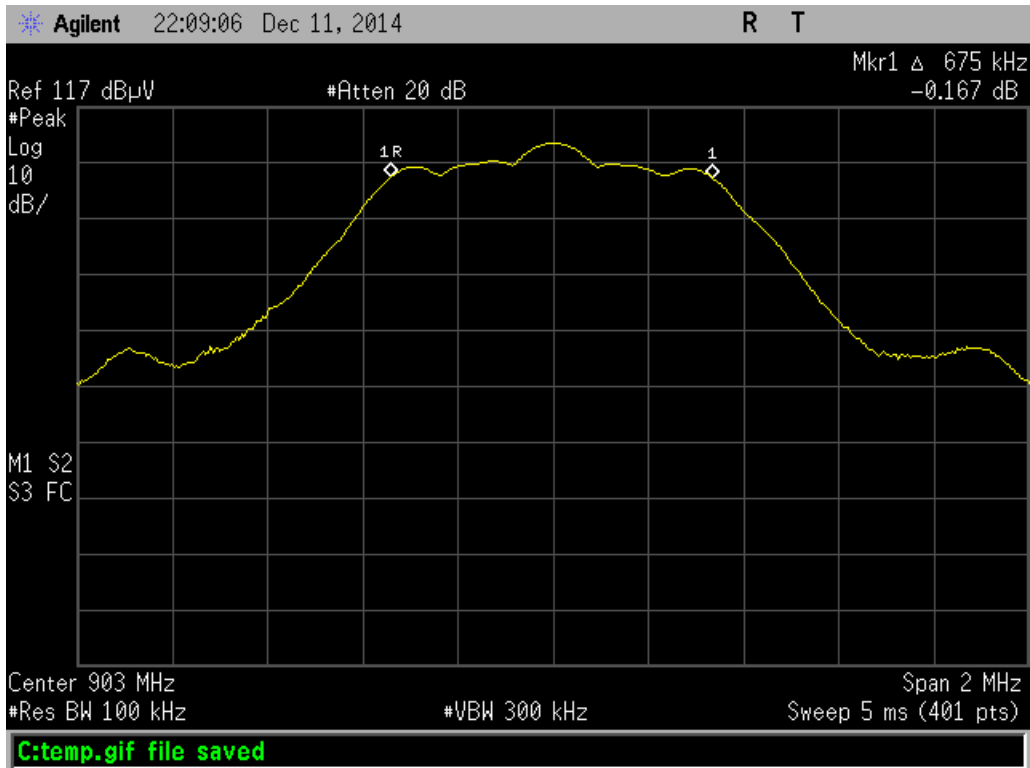




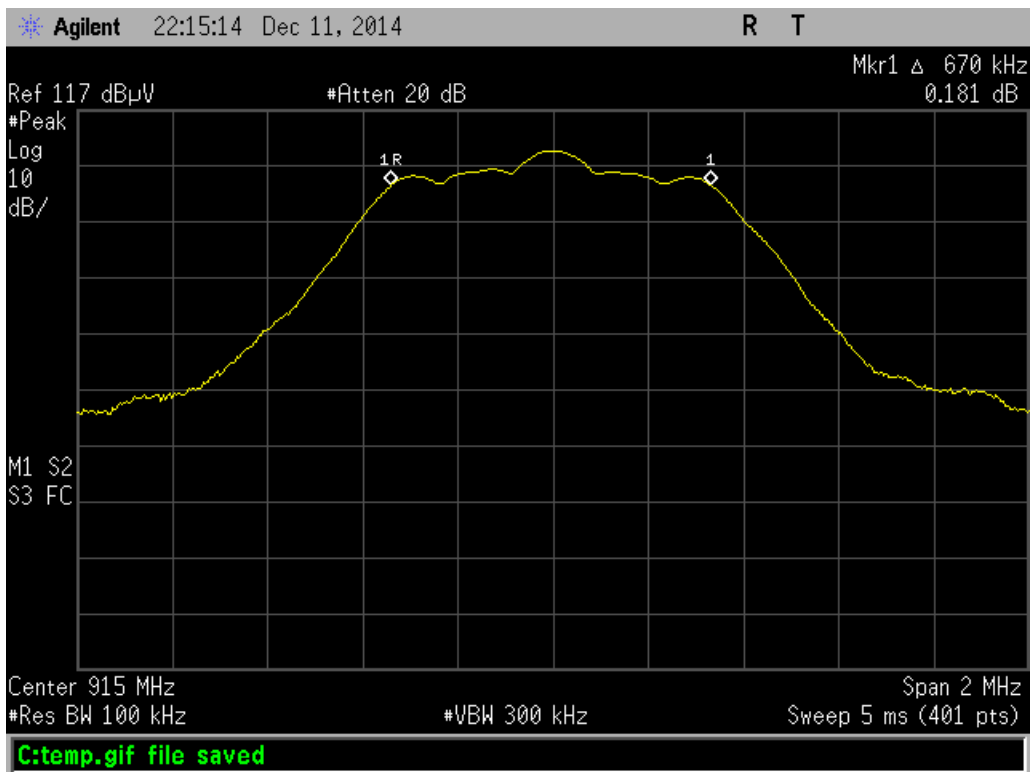
Mid Channel – 6dB Bandwidth (Antenna 1)



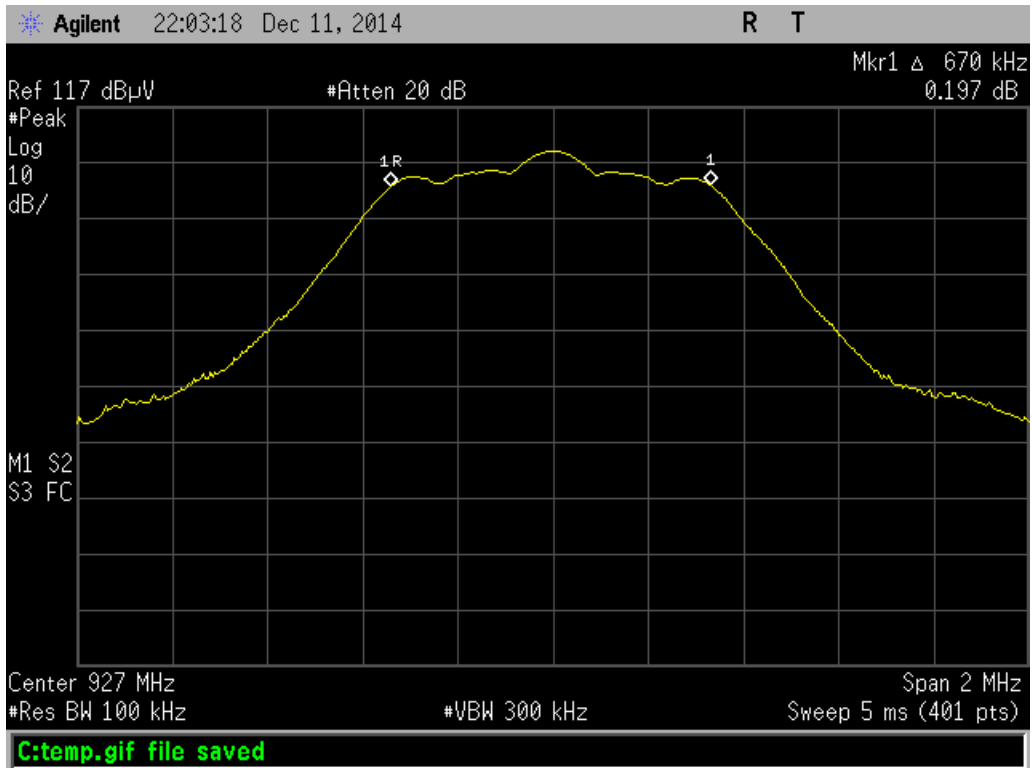
High Channel – 6 dB Bandwidth (Antenna 1)



Low Channel – 6dB Bandwidth (Antenna 2)



Mid Channel – 6dB Bandwidth (Antenna 2)



High Channel – 6 dB Bandwidth (Antenna 2)

Fundamental Emission Output Power

LIMIT

Conducted Output Power

1 Watt

[15.247(b) (3)]

MEASUREMENTS / RESULTS

Engineer	Chris Bramley
Date	12/11/2014
Site	3M Indoor
Environmental Conditions	20°C, 33%, 1017mBar

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

Maximum Conducted (average) Output Power - Antenna 1						
Tested by: Chris Bramley		Analyzer: Brown SA		WO: O3616		
Date: 12/11/2014		Attenuator: PE7019-20 #791		RBW = 30KHz		
Company: Ideal Industries, Inc.		Operating Voltage: 120Vac/60Hz		VBW = 100KHz		
EUT: GW1100B				Limit = 1Watt or 30dBm		
TX Mode: DMSS						
Channel (MHz)	Measured power (dBm)	Attenuator factor (dB)	Adjusted power measurement (dBm)	Limit (dBm)	Margin (dB)	Result
902.7	2.95	19.57	22.52	30	-7.48	Pass
915	2.15	19.57	21.72	30	-8.28	Pass
927.3	1.41	19.57	20.98	30	-9.02	Pass

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Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	5/12/2015	5/12/2014
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
1DCC-OATS-3M-I	719150	2762A-8	A-0015	30-1000MHz		II	5/17/2015	5/17/2013
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/14/2015	7/14/2014
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014
TH A#1828		35519-044	Control Company	130318292	1828	II	6/13/2015	6/13/2013

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



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Maximum Conducted (average) Output Power - Antenna 2

Tested by: Chris Bramley	Analyzer: Brown SA	WO: O3616
Date: 12/11/2014	Attenuator: PE7019-20 #791	RBW = 30KHz
Company: Ideal Industries, Inc.	Operating Voltage: 120Vac/60Hz	VBW = 100KHz
EUT: GW1100B		Limit = 1Watt or 30dBm

TX Mode: DMSS

Channel (MHz)	Measured power (dBm)	Attenuator factor (dB)	Adjusted power measurement (dBm)	Limit (dBm)	Margin (dB)	Result
902.7	3.36	19.57	22.93	30	-7.07	Pass
915	2.50	19.57	22.07	30	-7.93	Pass
927.3	1.77	19.57	21.34	30	-8.66	Pass

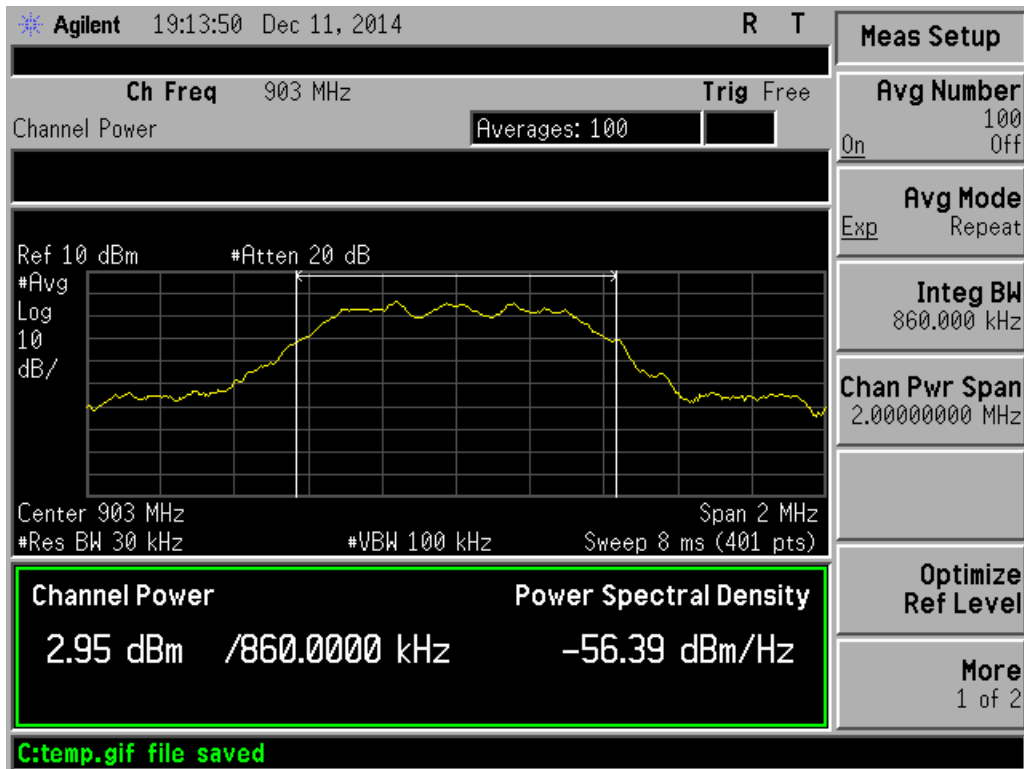
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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	5/12/2015	5/12/2014
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
1DCC-OATS-3M-I	719150	2762A-8	A-0015	30-1000MHz	II	5/17/2015	5/17/2013	
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/14/2015	7/14/2014
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only) TH A#1828	BA928 35519-044	Oregon Scientific Control Company	C3166-1 130318292	831 1828	I II	3/19/2016 6/13/2015	3/19/2014 6/13/2013	

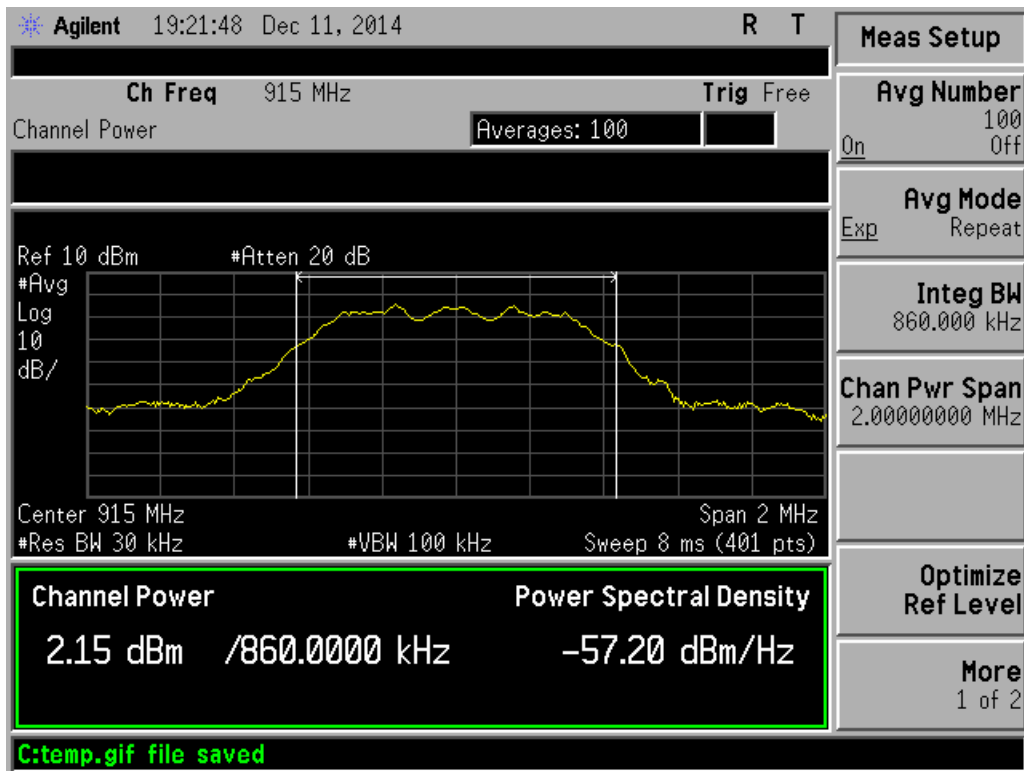
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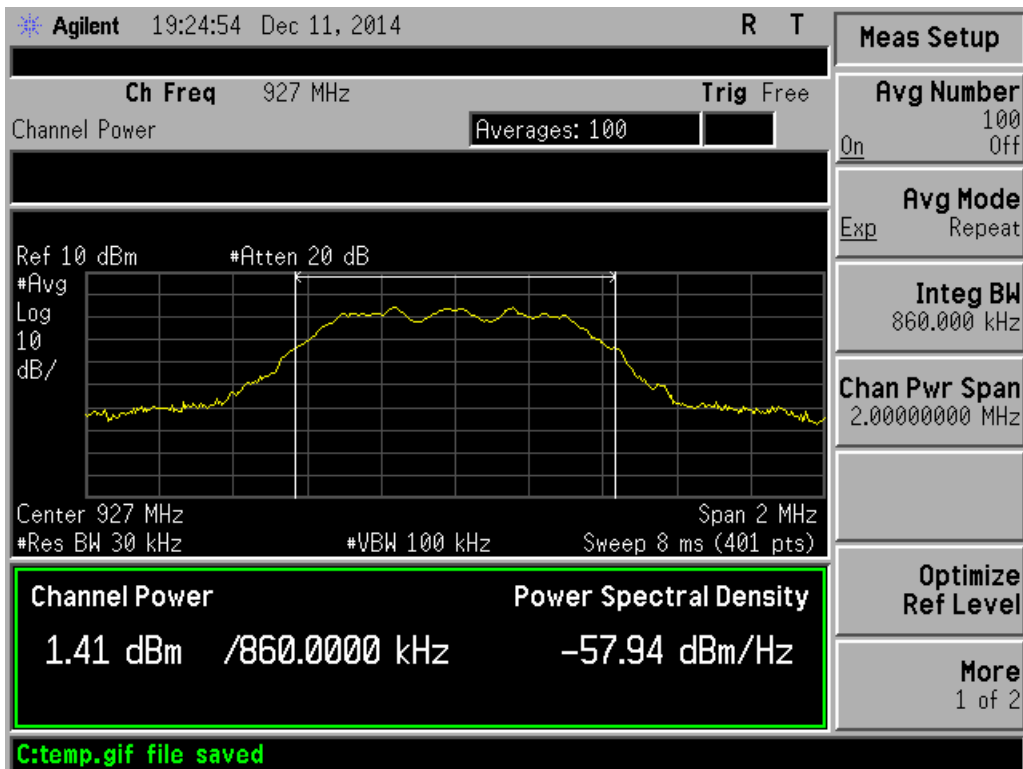
PLOTS



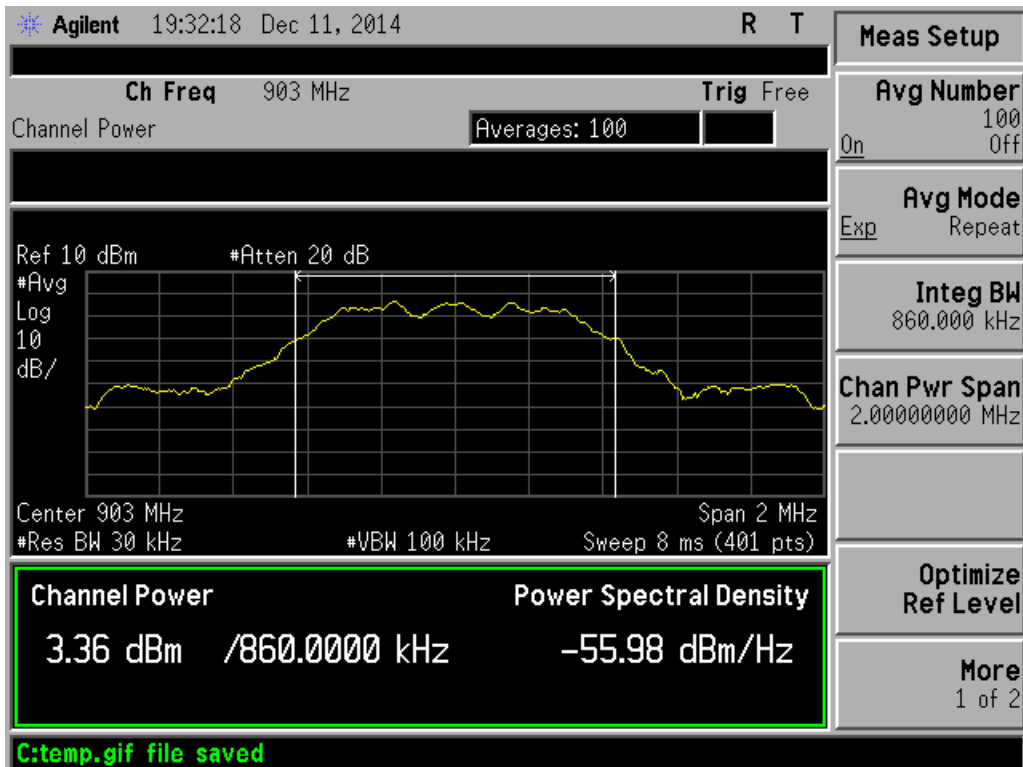
Low Channel – Channel Power (Antenna 1)



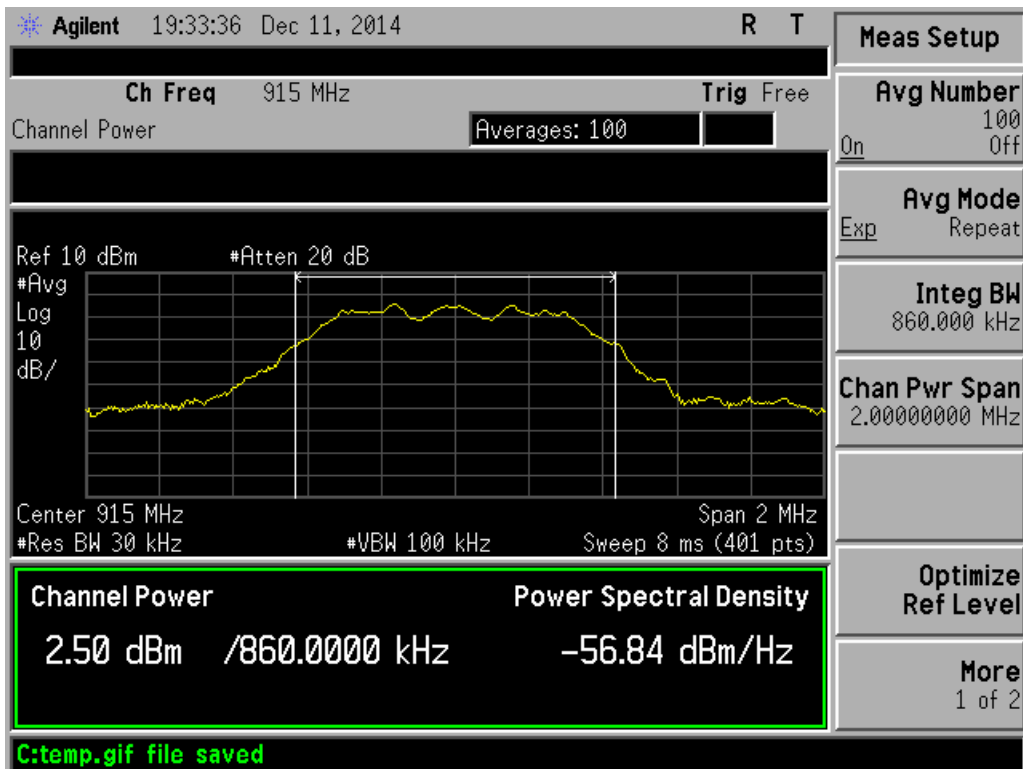
Mid Channel – Channel Power (Antenna 1)



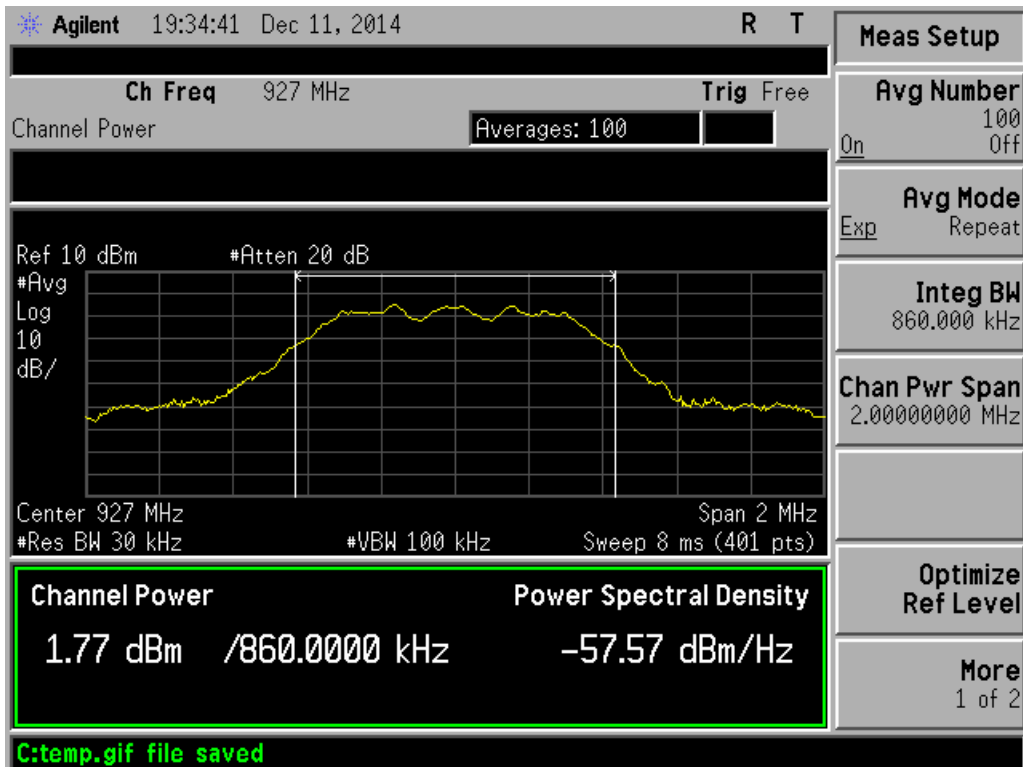
High Channel – Channel Power (Antenna 1)



Low Channel – Channel Power (Antenna 2)



Mid Channel – Channel Power (Antenna 2)



High Channel – Channel Power (Antenna 2)

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)]

MEASUREMENTS / RESULTS

Radiated Emissions Table - FCC 15.247(d) - restricted band														
Date: 09-Jan-15			Company: Ideal Industries, Inc.			Work Order: Q3616								
Engineer: Tuyen Truong			EUT Desc: GW1100B			EUT Operating Voltage/Frequency: 120Vac/60Hz								
Temp: 23°C			Humidity: 2%			Pressure: 1005mBar								
Frequency Range: 30 to 1000MHz						Measurement Distance: 3 m								
Notes: EUT's Low, Mid and High channels were set to transmit via Antenna 1 and tested.						EUT Max Freq: 902.7-927.3MHz								
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	---			FCC 15.209				
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)		
No Emissions found from radio within the restricted bands within 10dB of the limit.														
Table Result: Pass						by			dB			Worst Freq: MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #1787			Cable 2: Asset #1505			Cable 3: ---					
Analyzer: Gold			Preamp: Green			Antenna: Red-Black			Preselector: ---					

Rev.1/9/2015

Spectrum Analyzers / Receivers/Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold		100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/28/2015	3/28/2014
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 1		719150	2762A-6	A-0015	30-1000MHz		II	3/15/2015	3/15/2014
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	9/14/2015	9/14/2014
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
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1787		9kHz - 18GHz		Florida RF			II	3/14/2015	3/14/2014
Asset #1505		9kHz - 18GHz		Florida RF			II	3/7/2015	3/7/2014
Meteorological Meters			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014
TH A#1832			35519-044	Control Company	130318277	1832	II	6/13/2015	6/13/2013

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



Radiated Emissions Table - FCC 15.247(d) - non restricted band

Date: 02-Dec-14		Company: Ideal Industries, Inc.				Work Order: O3616				
Engineer: Ahmed Ahmed		EUT Desc: GW1100B		EUT Operating Voltage/Frequency: 120Vac/60Hz						
Temp: 20°C		Humidity: 3%		Pressure: 1008mBar						
Frequency Range: 30-1000MHz				Measurement Distance: 3 m						
Notes: EUT's Low, Mid and High channels were set to transmit via Antenna 1 and tested. Adjusted Field Strength readings compared to Power Spectral Density (worst case) including the 2.5dBi Antenna Gain with the limit being 30dB below which corresponds to 72.1dBuV/m							EUT Max Freq: 902.7-927.3MHz			
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	FCC 15.247(d) - non restricted band			
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	
V	184.1	65.9	25.0	11.7	1.0	53.6	72.1	-18.5	Pass	
H	206.0	67.2	25.1	11.4	1.1	54.6	72.1	-17.5	Pass	
V	208.9	56.0	25.1	11.3	1.1	43.3	72.1	-28.8	Pass	
V	236.15	54.6	25.1	12.0	1.2	42.7	72.1	-29.4	Pass	
V	500.0	50.4	25.4	17.8	1.7	44.5	72.1	-27.6	Pass	
H	839.9	49.0	25.2	22.3	2.3	48.4	72.1	-23.7	Pass	
V	892.3	46.3	25.1	22.7	2.4	46.3	72.1	-25.8	Pass	
V	935.9	43.5	24.8	23.2	2.4	44.3	72.1	-27.8	Pass	
Table Result: Pass by -17.5 dB							Worst Freq: 206.0 MHz			
Test Site: EMI Chamber 2		Cable 1: Asset #1787			Cable 2: Asset #1506					
Analyzer: Gold		Preamp: Black			Antenna: Red-White					

Note: No emissions found within 10dB of the limit, which was set -30dB down from the peak of Power Spectral Density of the Fundamental frequency (worst case). (See section 15.247(e) – Power Spectral Density) (i.e. Worst Case Conducted Power Spectral Density Reading + Antenna Gain = EIRP then calculated field strength based off of $P = (Ed)^2/(30G)$. Field Strength – 30dB = Adjusted Limit dBuV/m

Rev.11/30/2014

Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat I	Calibration Due 3/28/2015	Calibrated on 3/28/2014
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/9/2015	Calibrated on 3/9/2014
Preamps / Couplers Attenuators / Filters Black	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 799	Cat II	Calibration Due 6/22/2015	Calibrated on 6/22/2014
Antennas Red-White Bilog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-1	Asset 1105	Cat I	Calibration Due 7/24/2015	Calibrated on 7/24/2013
Cables Asset #1787 Asset #1506	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/14/2015 3/7/2015	Calibrated on 3/14/2014 3/7/2014
Meteorological Meters Weather Clock (Pressure Only) TH A#1833		MN BA928 35519-044	Mfr Oregon Scientific Control Company	SN C3166-1 130318278	Asset 831 1833	Cat I II	Calibration Due 3/19/2016 6/13/2015	Calibrated on 3/19/2014 6/13/2013

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

Radiated Emissions Table

Date: 09-Jan-15		Company: Ideal Industries, Inc.				Work Order: O3616										
Engineer: Tuyen Truong		EUT Desc: GW1100B		EUT Operating Voltage/Frequency: 120Vac/60Hz												
Temp: 23°C		Humidity: 2%		Pressure: 1005mBar												
Frequency Range: 1-10GHz				Measurement Distance: 3 m												
Notes: EUT's Ant1 is transmitting - Low, Mid and High channels were tested HPF 1288							EUT Max Freq: 902.7-927.3MHz									
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBuV)	Average Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBuV/m)	Adjusted Avg Reading (dBuV/m)	FCC 15.209 High Frequency - Peak			FCC 15.209 High Frequency - Average				
									Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)		
TX via Antenna 1																
h	1830.0	43.46	34.8	17.6	27.3	3.2	56.4	47.7	74.0	-17.6	Pass	54.0	-6.3	Pass		
h	1806.0	44.81	38.3	17.6	27.2	3.3	57.7	51.2	74.0	-16.3	Pass	54.0	-2.8	Pass		
h	1854.0	38.68	29.8	17.6	27.4	3.2	51.7	42.8	74.0	-22.3	Pass	54.0	-11.2	Pass		
Table Result: Pass by -2.8 dB							Worst Freq: 1806.0 MHz									
Test Site: EMI Chamber 1		Cable 1: Asset #1787			Cable 2: Asset #1505			Cable 3: ---								
Analyzer: Gold		Preamp: Brown			Antenna: Orange Horn			Preselector: ---								



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Rev.1/9/2015

Spectrum Analyzers / Receivers /Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat I	Calibration Due 3/28/2015	Calibrated on 3/28/2014
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/15/2015	Calibrated on 3/15/2014
Preamps /Couplers Attenuators / Filters Brown High Pass Filter	Range 1-10GHz 0.03-9 GHz	MN CS VHP-16	Mfr CS Mini-Circuits	SN N/A NA	Asset 1523 1288	Cat II II	Calibration Due 4/10/2015 2/8/2015	Calibrated on 4/10/2014 1/8/2014
Antennas Orange Horn	Range 1-18GHz	MN 3115	Mfr EMCO	SN 0004-6123	Asset 390	Cat I	Calibration Due 10/13/2015	Calibrated on 10/13/2014
Cables Asset #1787 Asset #1505	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/14/2015 3/7/2015	Calibrated on 3/14/2014 3/7/2014
Meteorological Meters Weather Clock (Pressure Only) TH A#1832		MN BA928 35519-044	Mfr Oregon Scientific Control Company	SN C3166-1 130318277	Asset 831 1832	Cat I II	Calibration Due 3/19/2016 6/13/2015	Calibrated on 3/19/2014 6/13/2013

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

Radiated Emissions Table - FCC 15.247(d) - restricted band														
Date: 09-Jan-15			Company: Ideal Industries, Inc.				Work Order: O3616							
Engineer: Tuyen Truong			EUT Desc: GW1100B				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 23°C			Humidity: 2%				Pressure: 1005mBar							
Frequency Range: 30 to 1000MHz						Measurement Distance: 3 m								
Notes: EUT's Low, Mid and High channels were set to transmit via Antenna 2 and tested.						EUT Max Freq: 902.7-927.3MHz								
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	---			FCC 15.209				
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)		
No Emissions found from radio within the restricted bands within 10dB of the limit.														
Table Result:			by			dB			Worst Freq:			MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #1787			Cable 2: Asset #1505			Cable 3: ---					
Analyzer: Gold			Preamp: Green			Antenna: Red-Black			Preselector: ---					

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Spectrum Analyzers / Receivers /Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat I	Calibration Due 3/28/2015	Calibrated on 3/28/2014
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/15/2015	Calibrated on 3/15/2014
Preamps /Couplers Attenuators / Filters Green	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 802	Cat II	Calibration Due 9/14/2015	Calibrated on 9/14/2014
Antennas Red-Black Bilog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 1/28/2015	Calibrated on 1/28/2013
Cables Asset #1787 Asset #1505	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/14/2015 3/7/2015	Calibrated on 3/14/2014 3/7/2014
Meteorological Meters Weather Clock (Pressure Only) TH A#1832		MN BA928 35519-044	Mfr Oregon Scientific Control Company	SN C3166-1 130318277	Asset 831 1832	Cat I II	Calibration Due 3/19/2016 6/13/2015	Calibrated on 3/19/2014 6/13/2013

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Radiated Emissions Table - FCC 15.247(d) - non restricted band

Date: 09-Jan-15 **Company:** Ideal Industries, Inc. **Work Order:** O3616
Engineer: Tuyen Truong **EUT Desc:** GW1100B **EUT Operating Voltage/Frequency:** 120Vac/60Hz
Temp: 23°C **Humidity:** 2% **Pressure:** 1005mBar

Frequency Range: 30 to 1000MHz **Measurement Distance:** 3 m
Notes: EUT's Low, Mid and High channels were set to transmit via Antenna 2 and tested. **EUT Max Freq:** 902.7-927.3MHz
 Adjusted Field Strength readings compared to Power Spectral Density (worst case) including the 2.5dBi Antenna Gain
 with the limit being 30dB below which corresponds to 72.1dBuV/m

Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	FCC 15.247(d) - non restricted band		
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
h	150.15	66.1	25.5	12.2	0.9	53.7	72.1	-18.4	Pass
h	177.15	72.9	25.6	11.0	1.0	59.3	72.1	-12.8	Pass
h	181.875	72.2	25.6	10.9	1.0	58.5	72.1	-13.6	Pass
h	207.0	68.1	25.6	10.9	1.0	54.4	72.1	-17.7	Pass
h	212.25	70.7	25.6	10.5	1.0	56.6	72.1	-15.5	Pass
h	353.0	54.7	25.8	14.5	1.4	44.8	72.1	-27.3	Pass
h	451.0	57.0	25.8	16.9	1.5	49.6	72.1	-22.5	Pass
h	500.0	54.0	25.8	17.7	1.7	47.6	72.1	-24.5	Pass
v	550.0	56.8	25.6	18.3	1.7	51.2	72.1	-20.9	Pass
v	691.0	51.7	25.7	20.1	1.9	48.0	72.1	-24.1	Pass
h	835.1	43.0	25.6	21.8	2.2	41.4	72.1	-30.7	Pass
h	892.28	46.2	25.6	22.3	2.3	45.2	72.1	-26.9	Pass

Table Result: Pass by -12.8 dB **Worst Freq:** 177.15 MHz
Test Site: EMI Chamber 1 **Cable 1:** Asset #1505 **Cable 2:** Asset #1787 **Cable 3:** ---
Analyzer: Gold **Preamp:** Green **Antenna:** Red-Black **Preselector:** ---

Note: No emissions found within 10dB of the limit, which was set -30dB down from the peak of Power Spectral Density of the Fundamental frequency (worst case). (See section 15.247(e) – Power Spectral Density)

Rev.1/9/2015

Equipment Category	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Spectrum Analyzers / Receivers / Preselectors Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/28/2015	3/28/2014
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/15/2015	Calibrated on 3/15/2014
Preamps / Couplers Attenuators / Filters Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/14/2015	9/14/2014
Antennas Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015	1/28/2013
Cables Asset #1787 Asset #1505	9kHz - 18GHz 9kHz - 18GHz		Florida RF Florida RF			II II	3/14/2015 3/7/2015	3/14/2014 3/7/2014
Meteorological Meters Weather Clock (Pressure Only) TH A#1832		MN BA928 35519-044	Mfr Oregon Scientific Control Company	SN C3166-1 130318277	Asset 831 1832	Cat I II	Calibration Due 3/19/2016 6/13/2015	Calibrated on 3/19/2014 6/13/2013

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Radiated Emissions Table

Date: 09-Jan-15		Company: Ideal Industries, Inc.				Work Order: O3616								
Engineer: Tuyen Truong		EUT Desc: GW1100B				EUT Operating Voltage/Frequency: 120Vac/60Hz								
Temp: 23°C		Humidity: 2%				Pressure: 1005mBar								
Frequency Range: 1-10GHz						Measurement Distance: 3 m (1-6GHz) and 1m (6-10GHz)								
Notes: EUT's Low, Mid and High channels were set to transmit via Ant2 and tested HPF 1288										EUT Max Freq: 902.7-927.3MHz				
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBuV)	Average Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBuV/m)	Adjusted Avg Reading (dBuV/m)	FCC 15.209 High Frequency - Peak			FCC 15.209 High Frequency - Average		
									Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
h	1830.0	45.54	39.6	17.6	27.3	3.2	58.4	52.5	74.0	-15.6	Pass	54.0	-1.5	Pass
h	1806.0	46.34	40.1	17.6	27.2	3.3	59.2	53.0	74.0	-14.8	Pass	54.0	-1.0	Pass
h	1854.0	43.68	37.7	17.6	27.4	3.2	56.7	50.7	74.0	-17.3	Pass	54.0	-3.3	Pass
h	2470.0	38.79	27.5	18.4	28.3	4.0	52.7	41.4	74.0	-21.3	Pass	54.0	-12.6	Pass
h	2980.0	38.02	26.1	18.6	29.8	4.5	53.7	41.8	74.0	-20.3	Pass	54.0	-12.2	Pass
h	4830.0	36.16	23.5	16.9	32.8	6.1	58.2	45.5	74.0	-15.8	Pass	54.0	-8.5	Pass
Table Result:		Pass by -1.0 dB						Worst Freq: 1806.0 MHz						
Test Site: EMI Chamber 1			Cable 1: Asset #1787			Cable 2: Asset #1505			Cable 3: ---					
Analyzer: Gold			Preamp: Brown			Antenna: Orange Horn			Preselector: ---					

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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/28/2015	3/28/2014
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	3/15/2015	3/15/2014
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	1-10GHz	CS	CS	N/A	1523	II	4/10/2015	4/10/2014
High Pass Filter	0.03-9 GHz	VHP-16	Mini-Circuits	NA	1288	II	2/8/2015	1/8/2014
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Orange Horn	1-18GHz	3115	EMCO	0004-6123	390	I	10/13/2015	10/13/2014
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #1787	9kHz - 18GHz	Florida RF			II	3/14/2015	3/14/2014	
Asset #1505	9kHz - 18GHz	Florida RF			II	3/7/2015	3/7/2014	
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014	
TH A#1832	35519-044	Control Company	130318277	1832	II	6/13/2015	6/13/2013	

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Conducted 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 ...

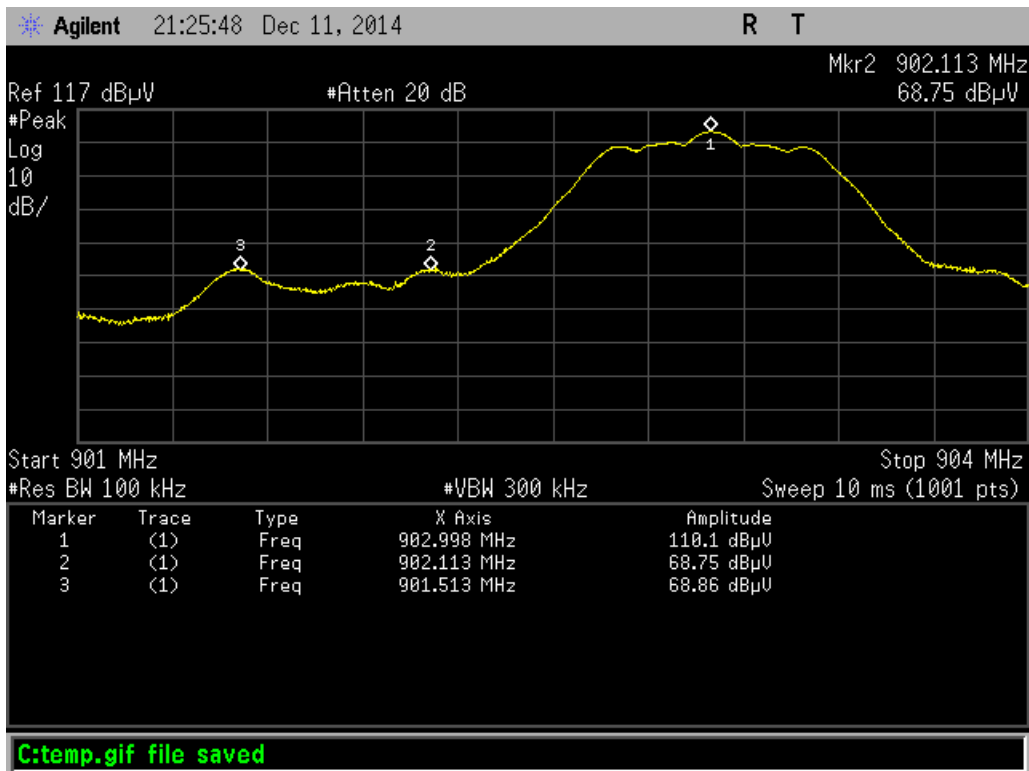
[15.247(d)]

MEASUREMENTS / RESULTS

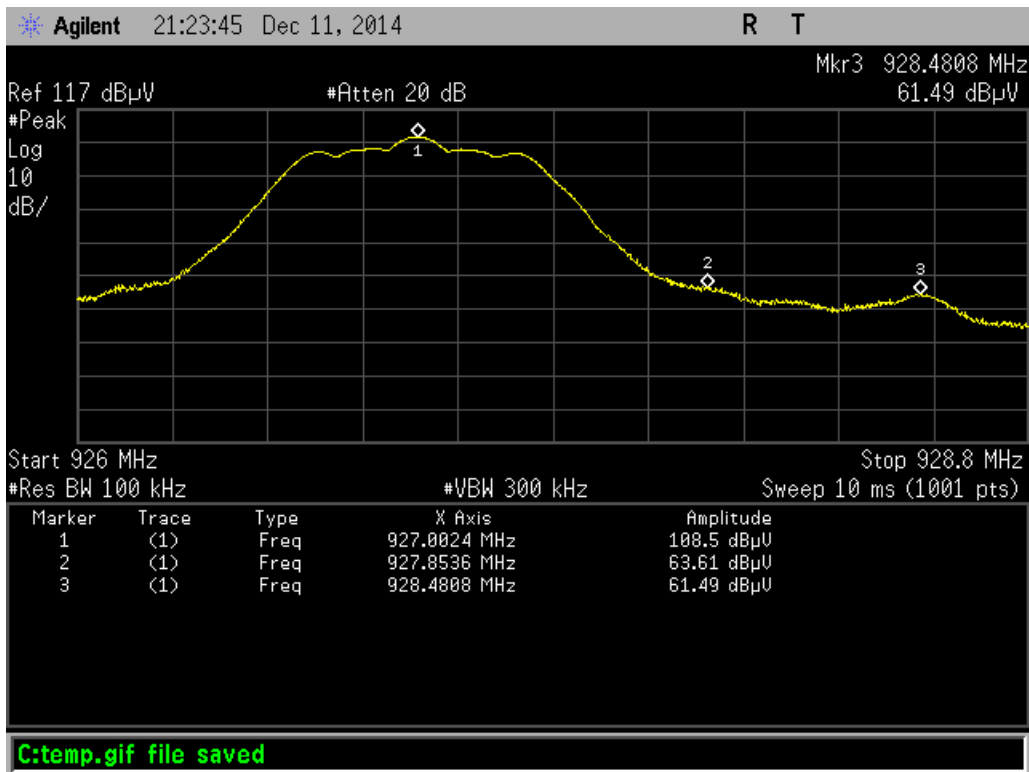
Engineer	Chris Bramley / Tuyen Truong
Date	12/11/2014 and 12/22/2014
Site	3M indoor
Environmental Conditions	20°C, 33%, 1017mBar

Conducted Band Edge

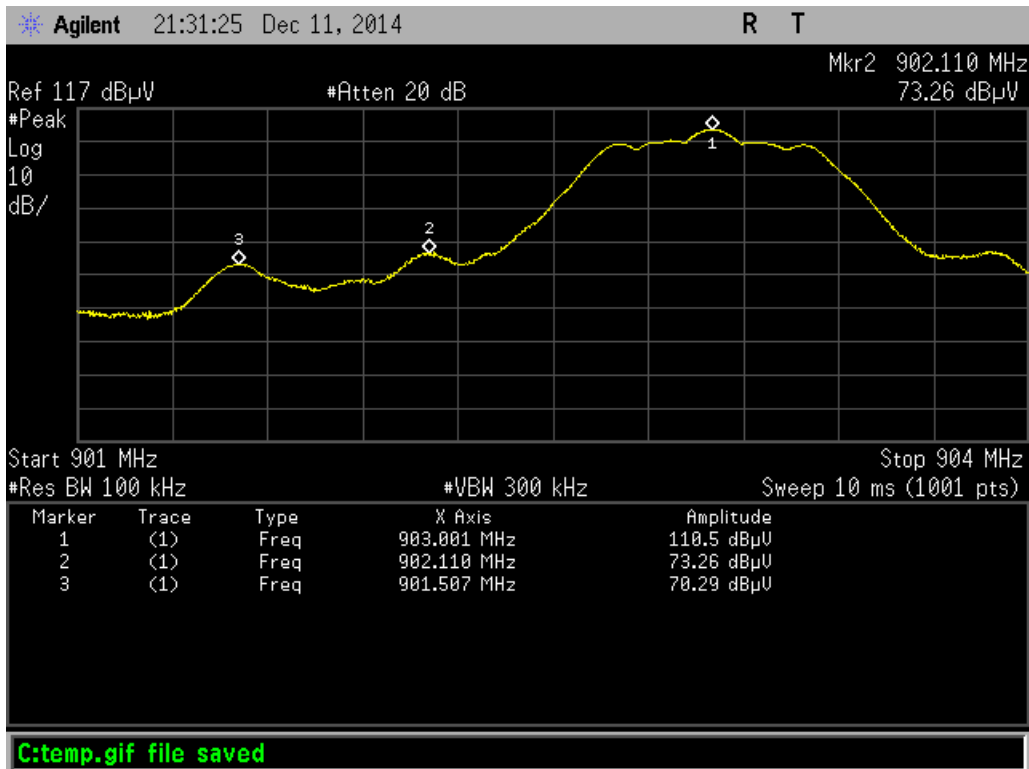
Plot(s)



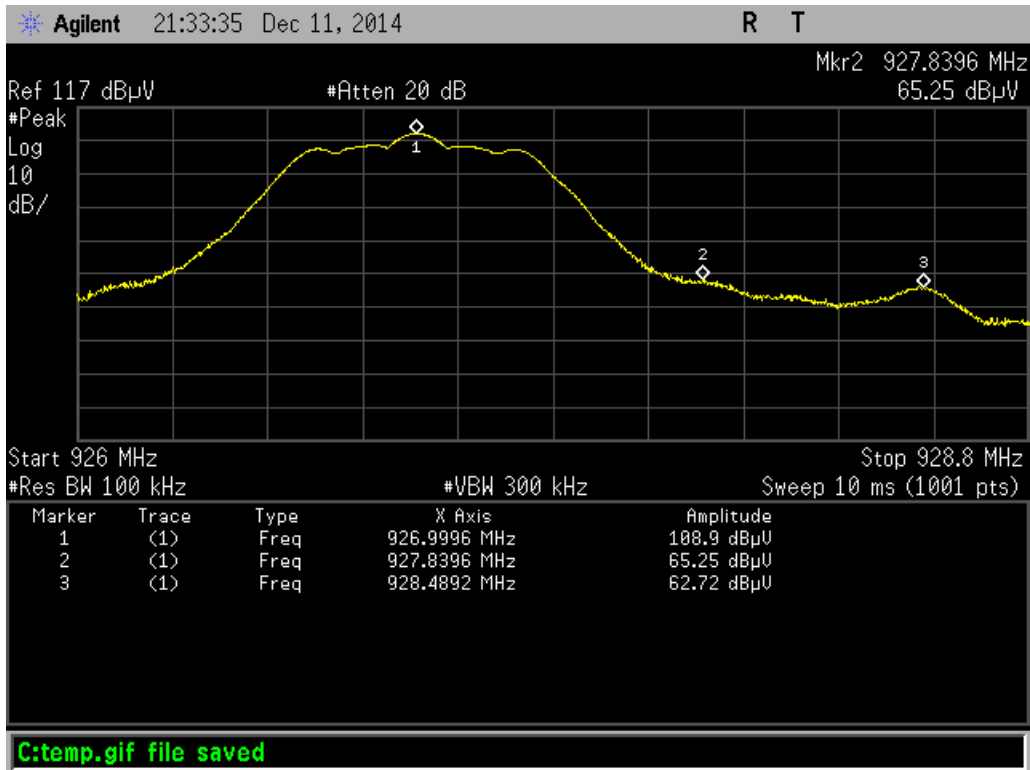
Lower Channel – Band-edge (<-30dBm) – Antenna 1



Upper Channel – Band-edge (<-30dBm) – Antenna 1



Lower Channel – Band-edge (<-30dBm) – Antenna 2



Upper Channel – Band-edge (<-30dBm) – Antenna 2

Conducted Spurious Emission

Conducted Spurious Emissions at the Antenna Port:
For these scans, the spectrum analyzer was set to the following:

Span: 400MHz or less
Resolution Bandwidth: 100 KHz
Video Bandwidth: 300 KHz
Points per sweep: 8192

The frequency range 30MHz-10GHz was tested at EUT antenna port and no emissions were found within 10dB of the limit, which was set at 30dB below the power of the transmit frequency. The low, mid, and high channels were tested. Both antenna ports were tested.

Conducted Spurious Emissions Table												
Date: 22-Dec-14			Company: Ideal Industries Inc.				Work Order: O3616					
Engineer: Tuyen Truong			EUT Desc: GW1100B									
Temp: 21°C			Humidity: 29%				Pressure: 1015mBar					
Frequency Range: 30MHz-10GHz												
Notes: NF - Noise Floor												
	Frequency (MHz)	Reading (dBµV)	Attn Factor (dB)			Adjusted Reading (dBµV/m)	---			---		
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
<i>Fundamental</i>	927.0	108.5	19.7	---	---	128.2	---	---	---	N/A	N/A	N/A
Worst Case NF	2985.0	59.1	20.0	---	---	79.1	---	---	---	98.2	-19.1	Pass
Table Result: Pass			by --- dB				Worst Freq: --- MHz					
Test Site: 3MIndoor			Cable 1: ---				Cable 2: ---			Cable 3: ---		
Analyzer: Brown			Preamp: ---				Antenna: ---			Attenuator: 791		
Adjusted Reading = Reading + Attenuation Factor												

Rev. 12/6/2014

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	5/12/2015	5/12/2014
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
1DCC-OATS-3M-I	719150	2762A-8	A-0015	30-1000MHz	II	5/17/2015	5/17/2013	
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/14/2015	7/14/2014
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014	
TH A#1830	35519-044	Control Company	130320003	1830	II	6/13/2015	6/13/2013	

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



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	12/09/2014
Site	3M Indoor
Environmental Conditions	20°C, 23%, 1017mb

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

15.247 (e) Maximum Power Spectral Density - Antenna 1								
Tested by: Chris Bramley								
Date: 12/11/2014			Analyzer: Brown SA					
Company: Ideal Industries, Inc.			Attenuation: PE7019-20 #791		RBW = 3KHz		Span = 1.5MHz	
EUT: GW1100B					VBW = 10KHz		Sweep = 1001 pts	
channel (MHz)	mode	measured PSD (dBm)	attenuator factor (dB)	adjusted power measurement	bandwidth correction factor adjustment	limit (dBm)	margin (dB)	result
902.7	DMSS	-15.15	19.57	4.42	0	8	-3.58	Pass
915	DMSS	-15.68	19.57	3.89	0	8	-4.11	Pass
927.3	DMSS	-16.90	19.57	2.67	0	8	-5.33	Pass

15.247 (e) Maximum Power Spectral Density - Antenna 2								
Tested by: Chris Bramley								
Date: 12/11/2014			Analyzer: Brown SA					
Company: Ideal Industries, Inc.			Attenuation: PE7019-20 #791		RBW = 3KHz		Span = 1.5MHz	
EUT: GW1100B					VBW = 10KHz		Sweep = 1001 pts	
channel (MHz)	mode	measured PSD (dBm)	attenuator factor (dB)	adjusted power measurement	bandwidth correction factor adjustment	limit (dBm)	margin (dB)	result
902.7	DMSS	-14.86	19.57	4.71	0	8	-3.29	Pass
915	DMSS	-15.64	19.57	3.93	0	8	-4.07	Pass
927.3	DMSS	-16.71	19.57	2.86	0	8	-5.14	Pass

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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	5/12/2015	5/12/2014
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
1DCC-OATS-3M-I	719150	2762A-8	A-0015	30-1000MHz	II	5/17/2015	5/17/2013	
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/14/2015	7/14/2014
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only) TH A#1828	BA928 35519-044	Oregon Scientific Control Company	C3166-1 130318292	831 1828	I II	3/19/2016 6/13/2015	3/19/2014 6/13/2013	

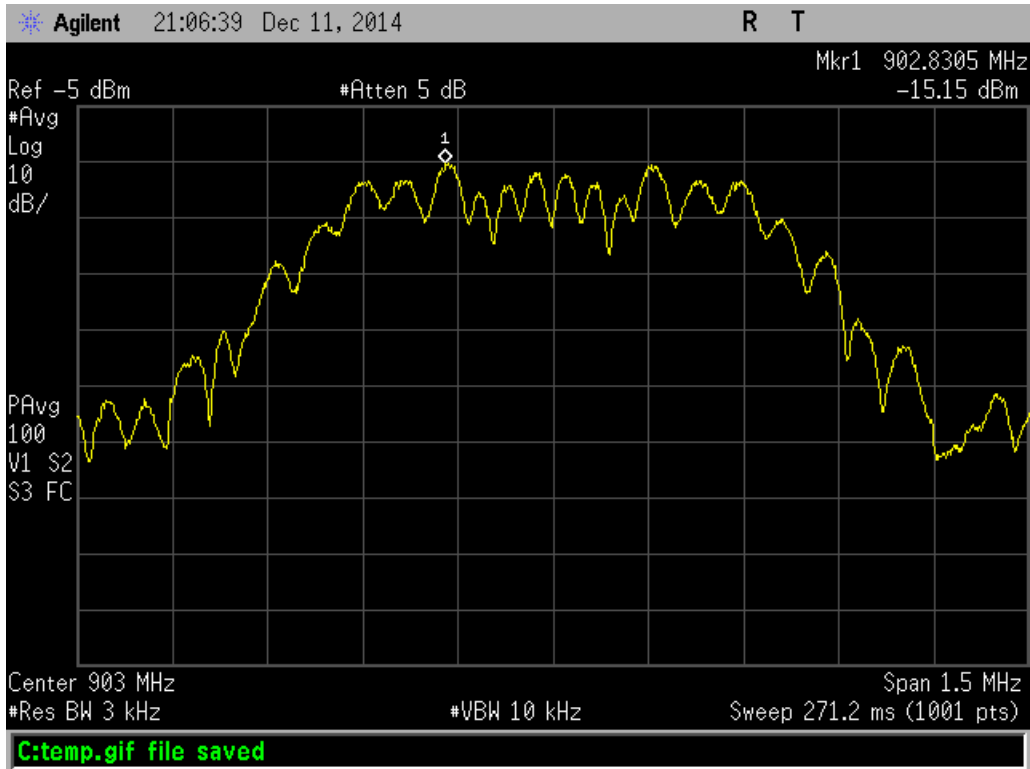
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



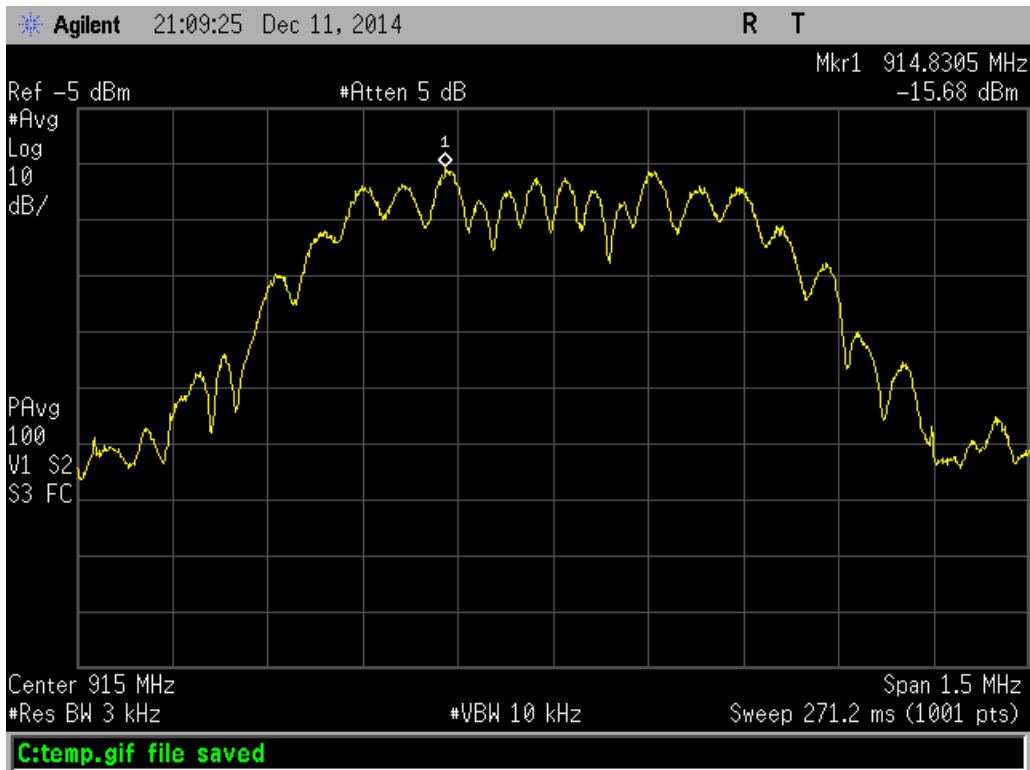
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PLOTS

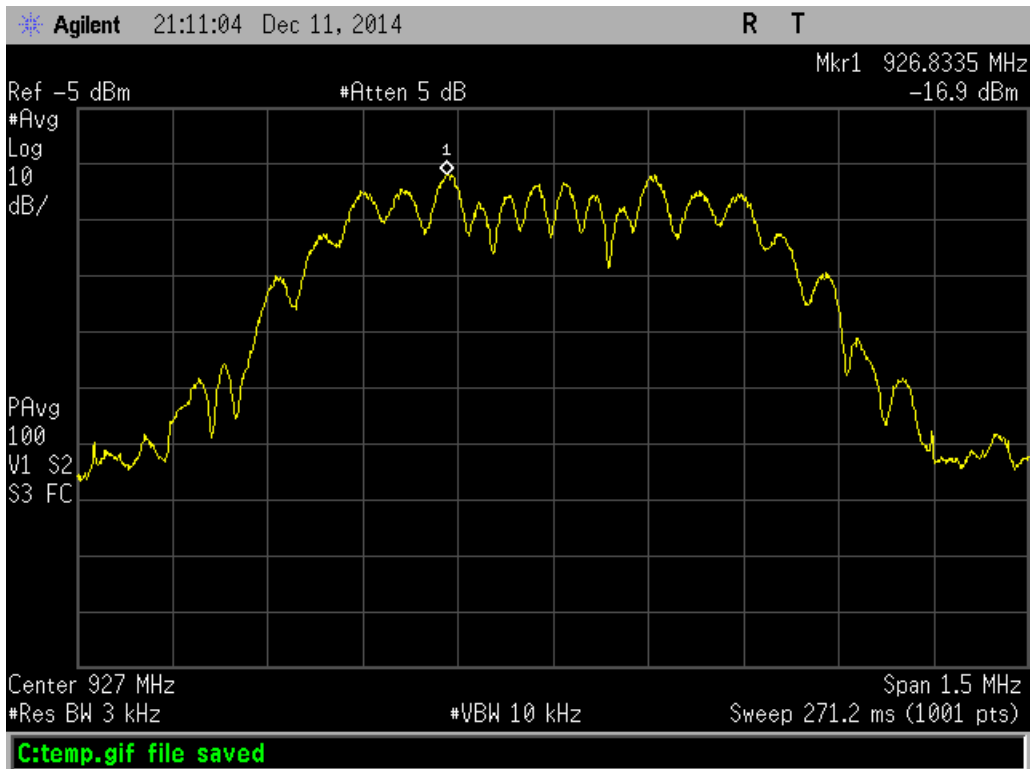


Channel Low – PSD (Antenna 1)

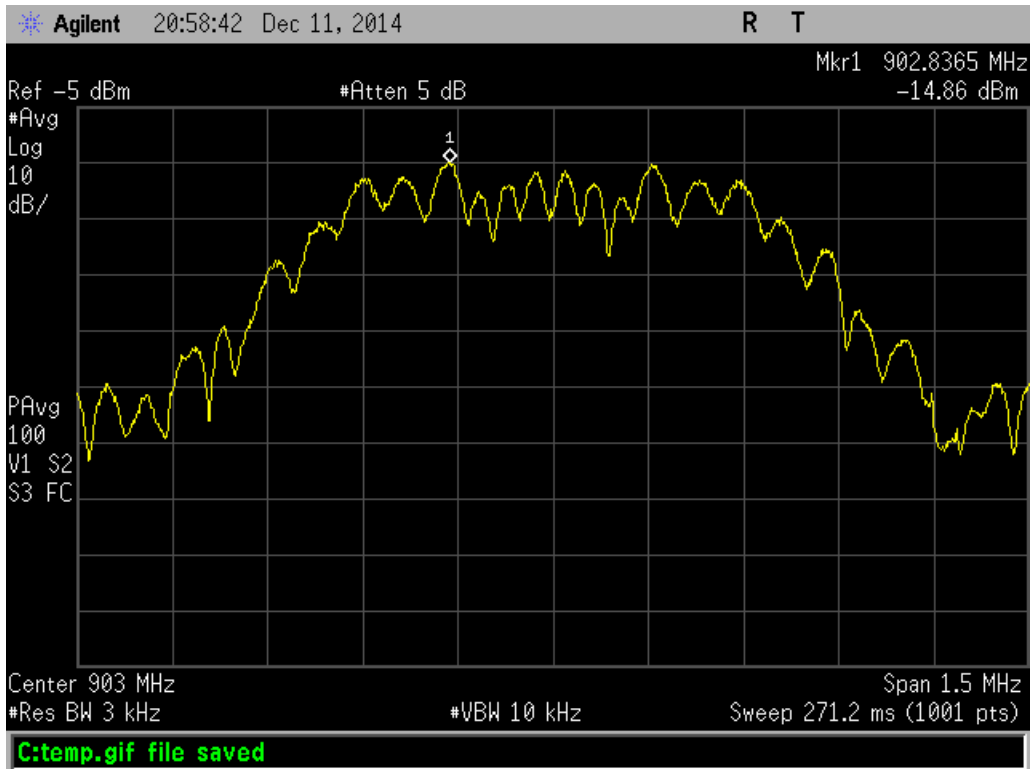


Channel Mid – PSD (Antenna 1)

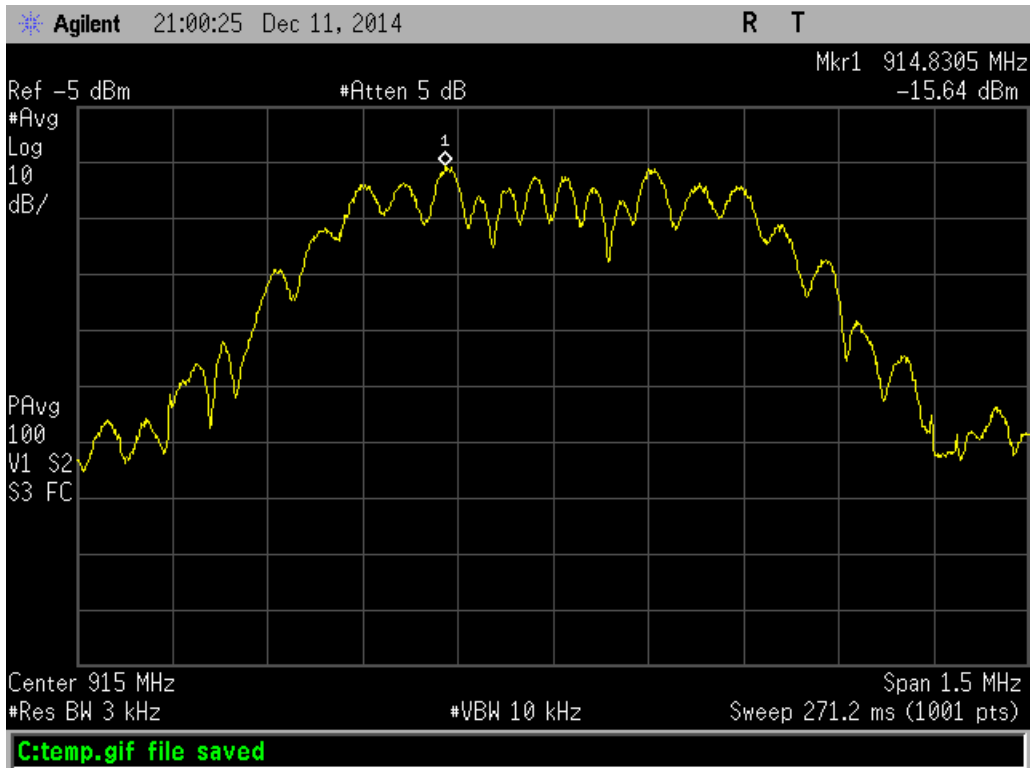




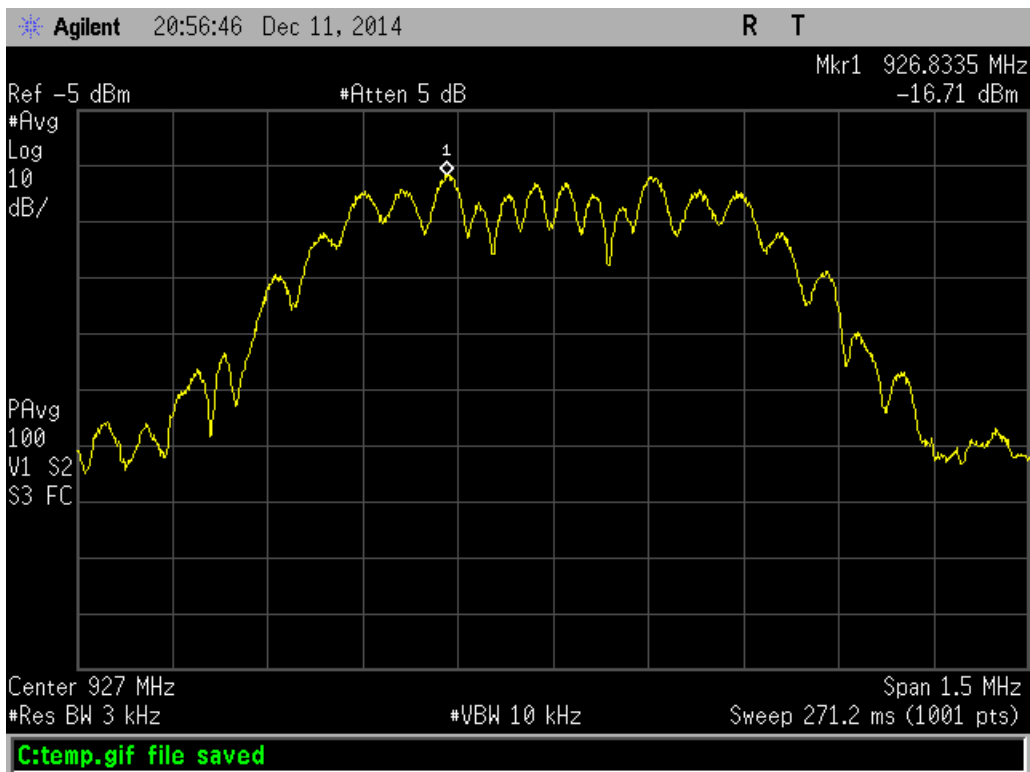
Channel High – PSD (Antenna 1)



Channel Low – PSD (Antenna 2)



Channel Mid – PSD (Antenna 2)



Channel High – PSD (Antenna 2)

AC Line Conducted Emissions LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)] as measured using a 50 µH/50 ohms line impedance stabilization network (LISN).

MEASUREMENTS / RESULTS

AC Conducted Emissions Data Table														
Date: 03-Dec-14			Company: Ideal Industries, Inc.						Work Order: O3616					
Engineer: Ahmed Ahmed			EUT Desc: GW1100B						Pressure: 1008 mBar					
Temp: 23.0 °C			Humidity: 20%											
Notes: TX on Antenna 1														
Frequency Range: 0.15-30 EUT Input Voltage/Frequency: 120Vac/60Hz														
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC 15.207			FCC 15.207		
	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)			QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
0.16	35.4	35.3	21.9	22.2	-0.1	-0.1	0.0	-19.9	65.7	-10.3	Pass	55.7	-13.5	Pass
0.21	28.6	30.4	19.5	21.8	-0.1	-0.1	0.0	-19.9	63.4	-13.0	Pass	53.4	-11.6	Pass
0.73	23.0	24.2	15.1	15.9	0.0	0.0	-0.1	-19.9	56.0	-11.9	Pass	46.0	-10.2	Pass
1.12	21.7	21.8	13.3	14.3	0.0	0.0	-0.1	-19.9	56.0	-14.2	Pass	46.0	-11.7	Pass
8.32	18.7	18.8	14.8	14.7	-0.1	0.0	-0.2	-19.9	60.0	-21.1	Pass	50.0	-15.1	Pass
9.50	21.0	18.1	15.0	14.1	-0.1	0.0	-0.2	-19.9	60.0	-18.9	Pass	50.0	-14.9	Pass
Result: Pass			Worst Margin: -10.2 dB						Frequency: 0.727 MHz					
Measurement Device: LISN ASSET 1732(Line 1) LISN ASSET 1733(Line 2)						Cable: CEMI-11			Spectrum Analyzer: Reference EMI Test Receiver					
						Attenuator: 20dB Attenuator-08			Site: CEMI5					

AC Conducted Emissions Data Table														
Date: 03-Dec-14			Company: Ideal Industries, Inc.						Work Order: O3616					
Engineer: Ahmed Ahmed			EUT Desc: GW1100B						Pressure: 1008 mBar					
Temp: 23.0 °C			Humidity: 20%											
Notes: TX on Antenna 1														
Frequency Range: 0.15-30 EUT Input Voltage/Frequency: 120Vac/60Hz														
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC 15.207			FCC 15.207		
	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)			QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
0.16	33.3	29.8	21.9	20.4	-0.1	-0.1	0.0	-19.9	65.7	-12.4	Pass	55.7	-13.8	Pass
0.21	29.5	30.3	21.2	22.4	-0.1	-0.1	-0.1	-19.9	63.4	-13.1	Pass	53.4	-11.0	Pass
0.73	23.0	24.5	15.0	16.5	0.0	0.0	-0.1	-19.9	56.0	-11.6	Pass	46.0	-9.6	Pass
1.12	21.0	23.0	13.0	15.3	0.0	0.0	-0.1	-19.9	56.0	-13.0	Pass	46.0	-10.7	Pass
8.32	19.4	19.2	15.6	15.5	-0.1	0.0	-0.2	-19.9	60.0	-20.5	Pass	50.0	-14.3	Pass
9.50	19.0	18.2	15.3	14.0	-0.1	0.0	-0.2	-19.9	60.0	-20.9	Pass	50.0	-14.6	Pass
Result: Pass			Worst Margin: -9.6 dB						Frequency: 0.727 MHz					
Measurement Device: LISN ASSET 1732(Line 1) LISN ASSET 1733(Line 2)						Cable: CEMI-11			Spectrum Analyzer: Reference EMI Test Receiver					
						Attenuator: 20dB Attenuator-08			Site: CEMI5					

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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
MXE EMI Receiver	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	11/5/2015	11/5/2014	
LISNs/Measurement Probes	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
LISN Asset 1732	150kHz-30MHz	LI-150A	Com-Power	201094	1732	I	2/10/2015	2/10/2014	
LISN Asset 1733	150kHz-30MHz	LI-150A	Com-Power	201095	1733	I	2/10/2015	2/10/2014	
Conducted Test Sites (Mains / Telco)	FCC Code	VCCI Code	Cat	Calibration Due	Calibrated on				
CEMI 5	719150	A-0015	III	NA	N/A				
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on		
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014		
TH A#1828	35519-044	Control Company	130318292	1828	II	6/13/2015	6/13/2013		
Cables	Range	Mfr	Cat	Calibration Due	Calibrated on				
CEMI-11	9kHz - 2GHz	C-S	II	5/3/2015	5/3/2014				
Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
20dB Attenuator-08	9kHz-2GHz	PE7000-20	Pasternack	N/A		II	7/26/2015	7/26/2014	

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



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Occupied Bandwidth

REQUIREMENT

When an occupied bandwidth is no 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]

MEASUREMENTS / RESULTS

Occupied Bandwidth		
Frequency (MHz)	Mode	99% Occupied Bandwidth (KHz)
902.7	DMSS	779.5183
915	DMSS	770.8663
927.3	DMSS	767.3045
Tested by: Tuyen Truong Date: 2/10/2015 Company: Ideal Industries, Inc. EUT: GW1100B		
RBW = 30KHz VBW = 100KHz Analyzer: Gold SA Attenuator: PE7019-20 #791 Temp/Humidity/Pressure: 20° Celcius, 3% and 1011mBar		

Occupied Bandwidth		
Frequency (MHz)	Mode	99% Occupied Bandwidth (KHz)
902.7	DMSS	795.1586
915	DMSS	774.2376
927.3	DMSS	772.0105
Tested by: Tuyen Truong Date: 2/10/2015 Company: Ideal Industries, Inc. EUT: GW1100B		
RBW = 30KHz VBW = 100KHz Analyzer: Gold SA Attenuator: PE7019-20 #791 Temp/Humidity/Pressure: 20° Celcius, 3% and 1011mBar		

Rev. 2/6/2015

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/20/2016	1/20/2015
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
1DCC-OATS-3M-I	719150	2762A-8	A-0015	30-1000MHz	II	5/17/2015	5/17/2013	
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only) TH A#1830	BA928 35519-044	Oregon Scientific Control Company	C3166-1 130320003	831 1830	I II	3/19/2016 6/13/2015	3/19/2014 6/13/2013	
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/14/2015	7/14/2014

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

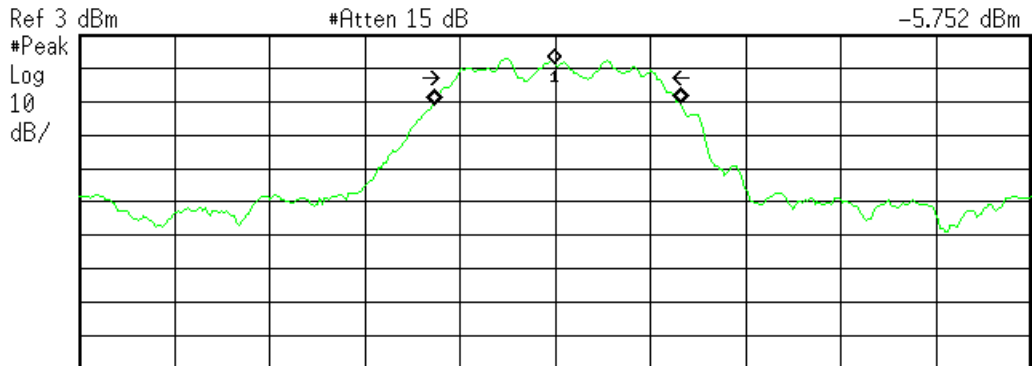


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Plot(s)

Agilent 12:22:21 Feb 10, 2015 R T
 Mkr1 903.0000 MHz
 -5.752 dBm



Ref 3 dBm #Atten 15 dB
 Center 903 MHz Span 3 MHz
 #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

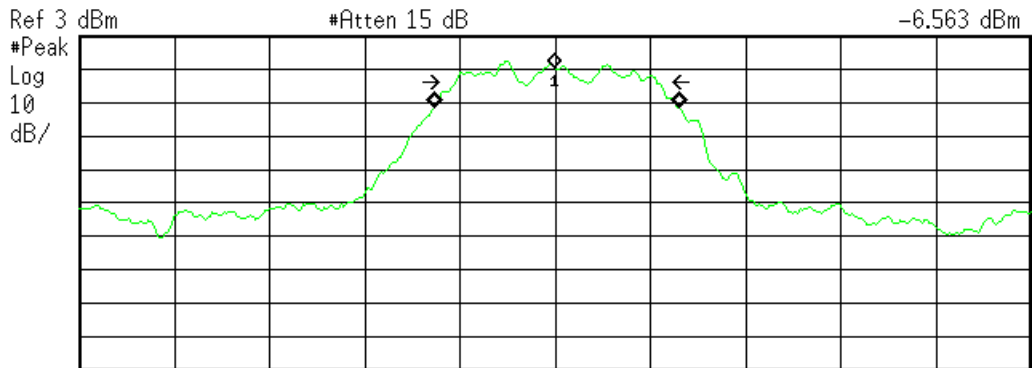
Occupied Bandwidth **Occ BW % Pwr** 99.00 %
 779.5183 kHz **x dB** -6.00 dB

Transmit Freq Error 4.613 kHz
x dB Bandwidth 635.374 kHz

C:\temp.gif file saved

Low Channel – Occupied Bandwidth (Antenna 1)

Agilent 12:26:26 Feb 10, 2015 R T
 Mkr1 915.0000 MHz
 -6.563 dBm



Ref 3 dBm #Atten 15 dB
 Center 915 MHz Span 3 MHz
 #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
 770.8663 kHz **x dB** -6.00 dB

Transmit Freq Error 5.289 kHz
x dB Bandwidth 634.586 kHz

C:\temp.gif file saved

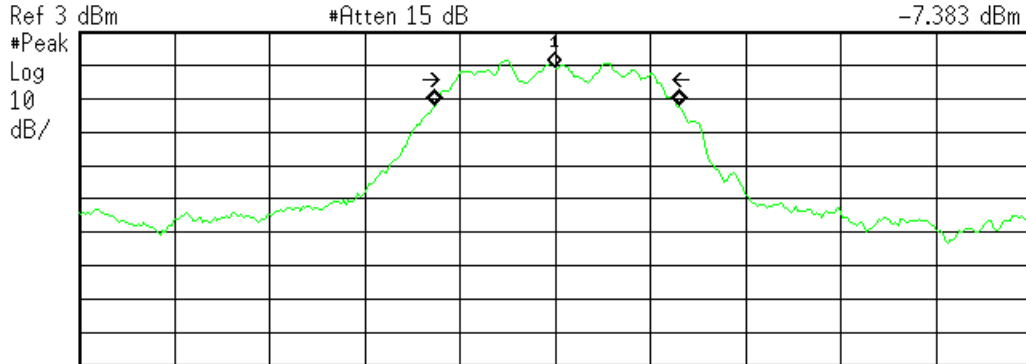
Mid Channel – Occupied Bandwidth (Antenna 1)



Agilent 12:30:10 Feb 10, 2015

R T

Mkr1 927.0000 MHz
-7.383 dBm



Center 927 MHz Span 3 MHz
#Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth
767.3045 kHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

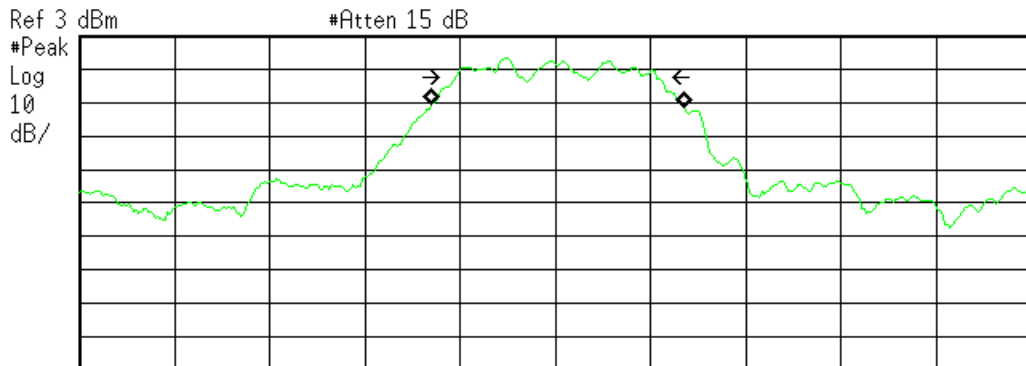
Transmit Freq Error 2.834 kHz
x dB Bandwidth 634.415 kHz

C:\temp.gif file saved

High Channel – Occupied Bandwidth (Antenna 1)

Agilent 12:11:37 Feb 10, 2015

R T



Center 903 MHz Span 3 MHz
#Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth
795.1586 kHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 7.476 kHz
x dB Bandwidth 636.490 kHz

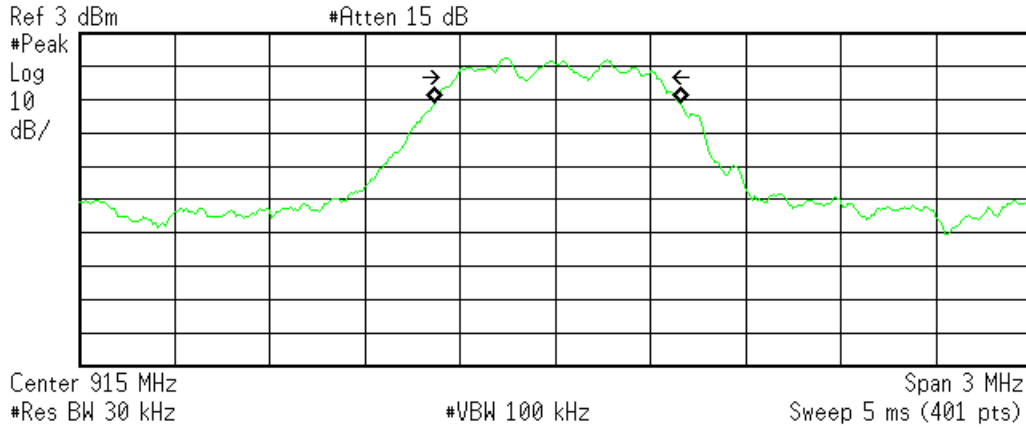
Option not installed

Low Channel – Occupied Bandwidth (Antenna 2)



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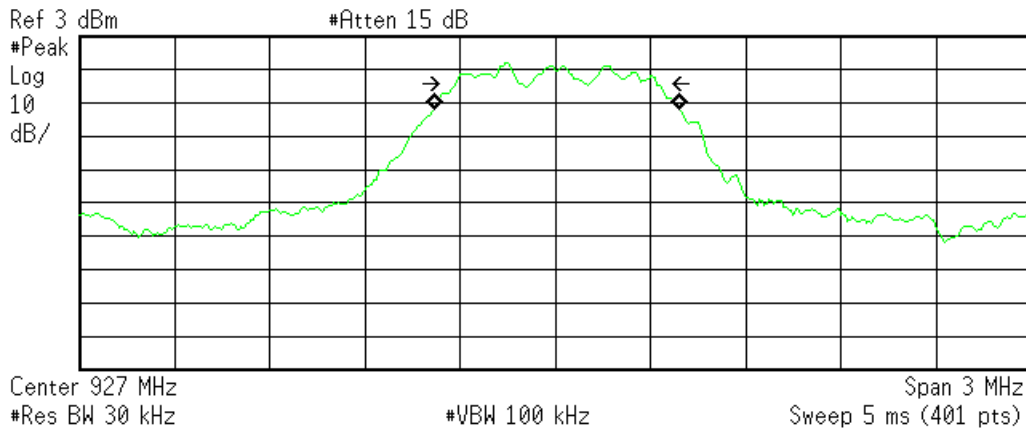


Occupied Bandwidth **774.2376 kHz** **Occ BW % Pwr** 99.00 %
x dB -6.00 dB

Transmit Freq Error 6.958 kHz
x dB Bandwidth 635.075 kHz

C:\temp.gif file saved

Mid Channel – Occupied Bandwidth (Antenna 2)



Occupied Bandwidth **772.0105 kHz** **Occ BW % Pwr** 99.00 %
x dB -6.00 dB

Transmit Freq Error 4.201 kHz
x dB Bandwidth 634.948 kHz

C:\temp.gif file saved

High Channel – Occupied Bandwidth (Antenna 2)

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 (Ucisprr)
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 (Ucisprr)
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%	5%
Adjacent channel power	0.3dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	1.9dB	3dB
Conducted emission of receivers	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.



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

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

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

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

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

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
Rev.160009121(2)_#684340 v14CS

