





# Test Report



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

Report No	EN3532-6
Client	Powercast Corporation Charlie Greene
Address	566 Alpha Drive Pittsburgh, PA 15238
Phone	412-436-4077
Items tested	GW1100
FCC ID	2AAMXGW1100
IC	11250A-GW1100
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	January 16-17, 20 and 22, 2014
Results	As detailed within this report
Prepared by	 Tuyen Truong A. – Test Engineer
Authorized by	 Christopher Reynolds – EMC Supervisor
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 38 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 GW1100. It is a digitally modulated transmitter that operates in the range 902-928MHz.

We found that the product met the above requirements with modification. Specifically, two ferrites were installed on the serial cable: Fair-Rite Products part number 0461178281 (straight-through). 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	Date Issued
1	Original Release	November 10, 2012



**Test Methodology**

Radiated emission and AC Line conducted testing were 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 antennas were maximized separately.

Conducted emission at the antenna ports were performed, as required by rule section.

The EUT operating voltage is 120VAC, 60Hz

Low operating channel frequency = 902MHz

Mid operating channel frequency = 915MHz

High operating channel frequency = 927MHz

The following bandwidths were used during radiated spurious and line conducted emissions.

<b>Frequency</b>	<b>RBW</b>	<b>VBW</b>
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										
<b>MN</b>					<b>SN</b>					
EUT: GW1100 I.T.E AC/DC Power Brick CENB1020A2403B01 EUT Description: Gateway EUT Max Frequency: 360MHz EUT TX Frequency: 902-928MHz					Sample 1 Sample 1					
<b>Support Equipment:</b>					<b>SN</b>					
Linksys Router WRT54G2 V1 SerialGear CAN --					-- 214386					
<b>EUT Ports:</b>										
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	
Antenna	SMA	2	2	SMA Connector	Yes	No	20cm	TBD	Indoor	
<b>Software / Operating Mode Description:</b>										
EUT is transmitting on one of three pre-programmed channels between 902-928MHz.										



## Statement of Conformity

The GW1100 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	EUT meets the AC Line conducted emissions requirements of 15.207.
	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	1/16/2014
Site	Chamber 2
Environmental Conditions	23°C, 23%, 1001mb

## 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	DMSS	0.6525	>500	-0.153
915	DMSS	0.6600	>500	-0.160
927	DMSS	0.6600	>500	-0.160

**Tested by:** Tuyen Truong      **RBW =** 100KHz    **VBW =** 300KHz  
**Date:** 1/16/2014                      **Analyzer:** GOLD SA  
**Company:** Powercast Corporation      **Attenuator:** PE7019-20 #791  
**EUT:** GW1100

## 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	DMSS	0.6600	>500	-0.160
915	DMSS	0.6525	>500	-0.153
927	DMSS	0.6600	>500	-0.160

**Tested by:** Tuyen Truong      **RBW =** 100KHz    **VBW =** 300KHz  
**Date:** 1/16/2014                      **Analyzer:** GOLD SA  
**Company:** Powercast Corporation      **Attenuator:** PE7019-20 #791  
**EUT:** GW1100

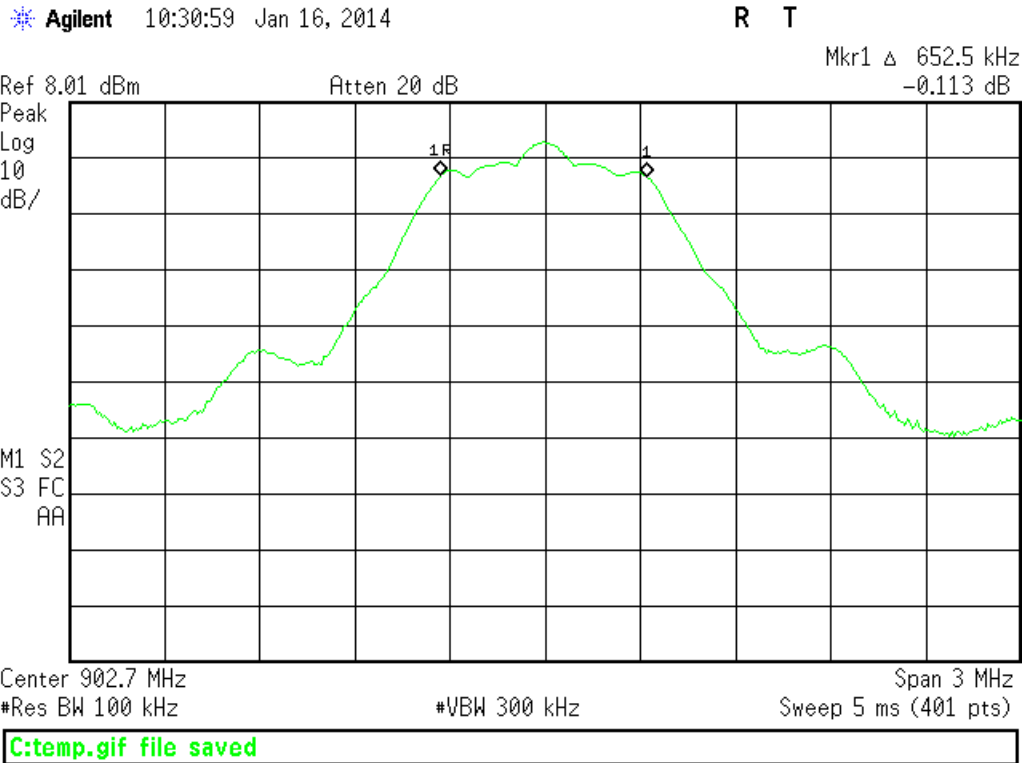


Rev. 1/16/2014

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
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Temp./Humidity/Atm. Pressure Gauge TH A#1832		7400 Perception II 35519-044	Davis Control Company	N/A 130318277	965 1832	I II	5/29/2014 6/13/2015	5/29/2013 6/13/2013

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

**PLOT**



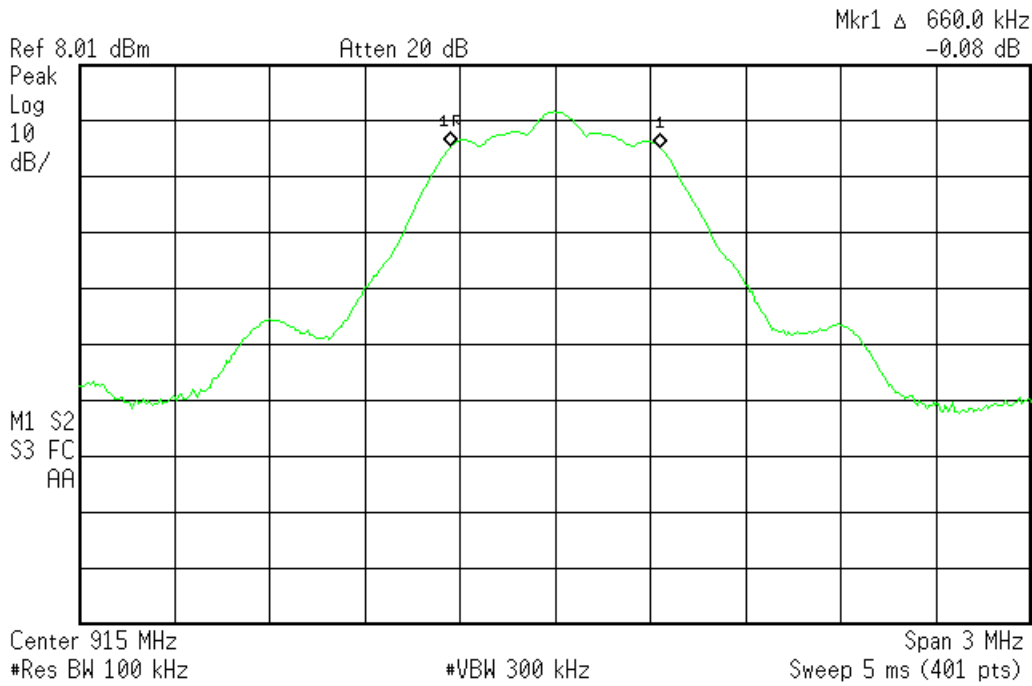
Low Channel – Antenna 1 – 6dB Bandwidth





Agilent 10:33:40 Jan 16, 2014

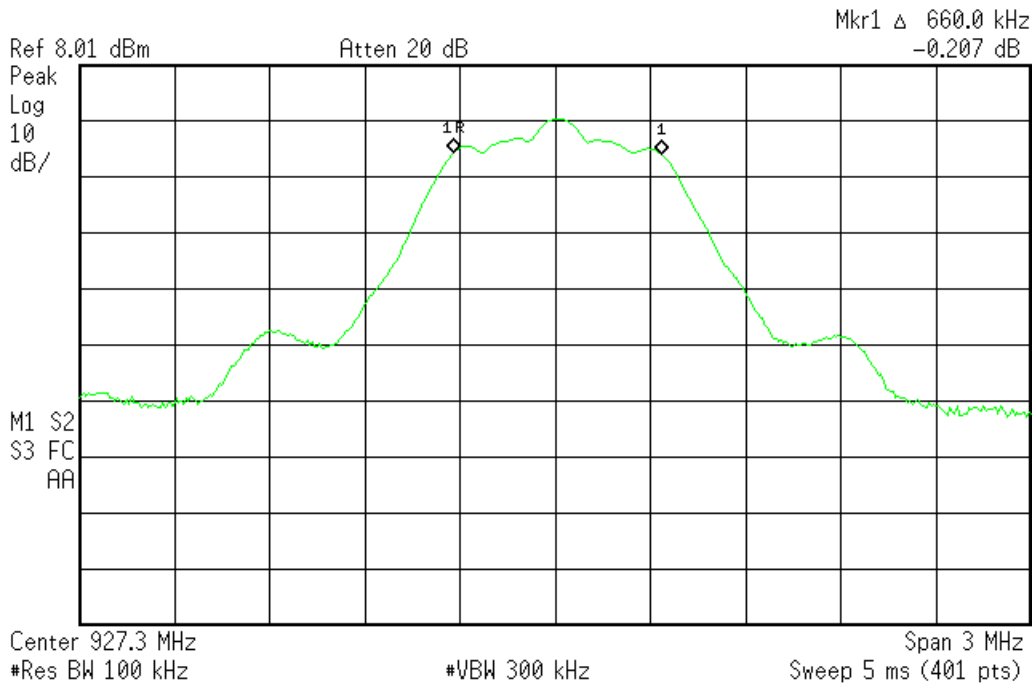
R T



Mid Channel – Antenna 1 – 6dB Bandwidth

Agilent 10:35:14 Jan 16, 2014

R T

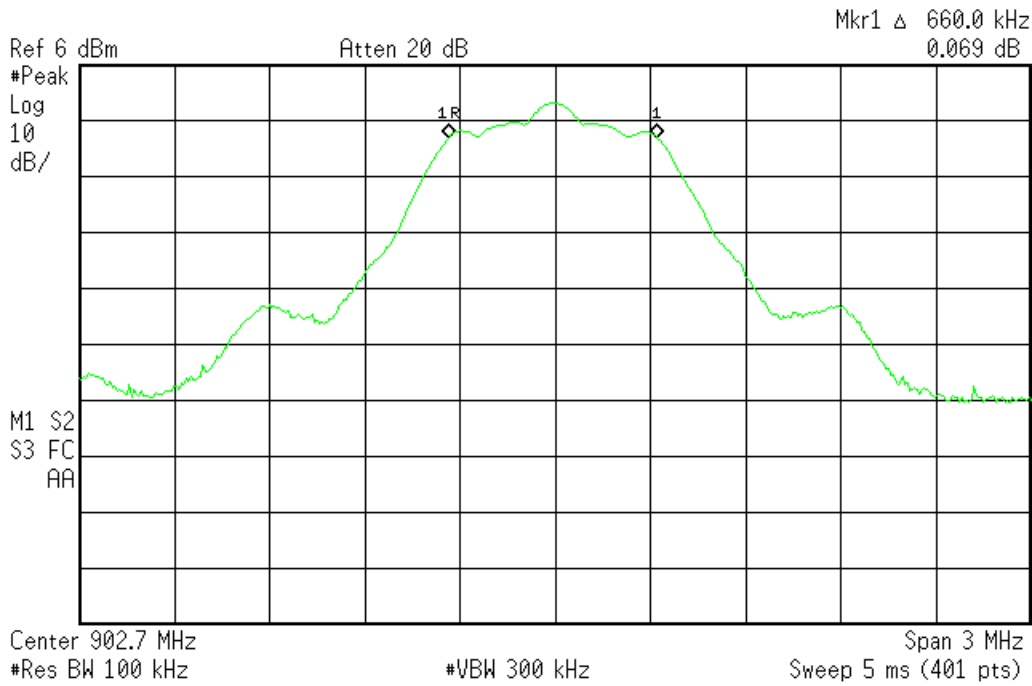


High Channel- Antenna 1 – 6 dB Bandwidth



Agilent 13:57:55 Jan 16, 2014

R T

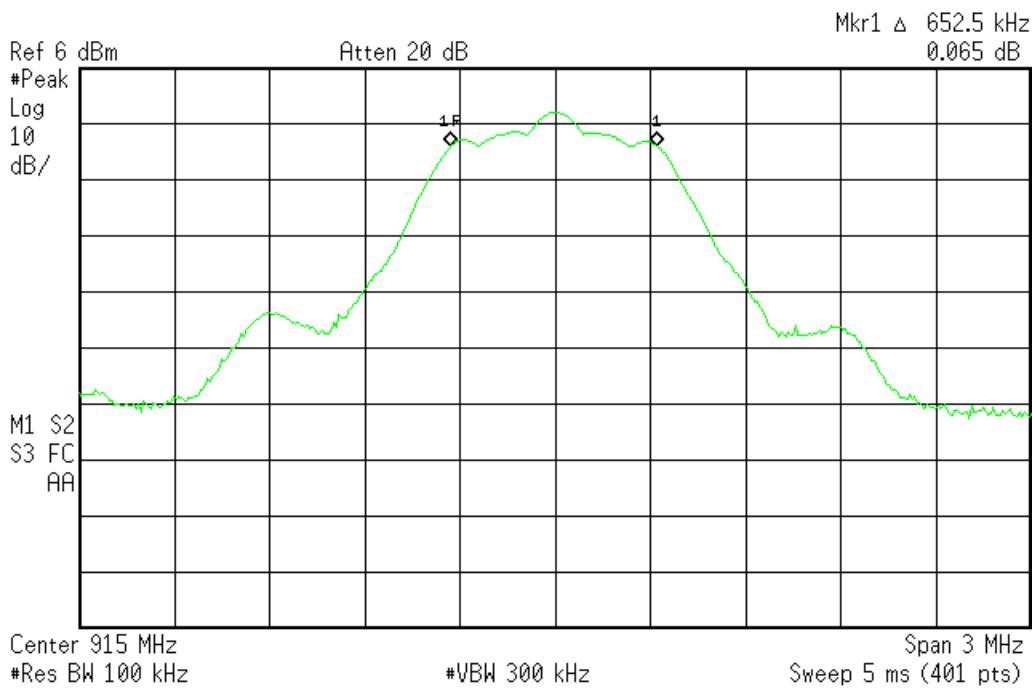


C:\temp.gif file saved

Low Channel – Antenna 2 – 6dB Bandwidth

Agilent 14:00:02 Jan 16, 2014

R T



C:\temp.gif file saved

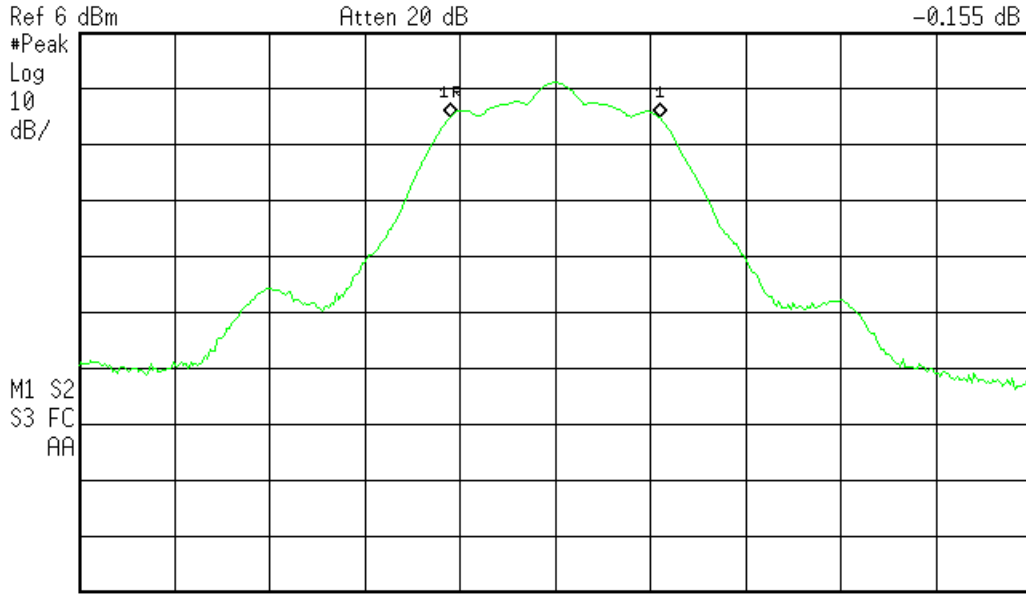
Mid Channel – Antenna 2 – 6dB Bandwidth



Agilent 14:01:02 Jan 16, 2014

R T

Mkr1  $\Delta$  660.0 kHz  
-0.155 dB



Center 927.3 MHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Span 3 MHz  
Sweep 5 ms (401 pts)

C:\temp.gif file saved

High Channel- Antenna 2 – 6 dB Bandwidth



### Fundamental Emission Output Power

**LIMIT**

Conducted Output Power

1 Watt

[15.247(b) (3)]

**MEASUREMENTS / RESULTS**

Engineer	Tuyen Truong
Date	1/16/2014
Site	Chamber 2
Environmental Conditions	23°C, 23%, 1001mb

**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						
<b>Tested by:</b> Tuyen Truong		<b>Analyzer:</b> GOLD SA			<b>WO:</b> N3532	
<b>Date:</b> 1/16/2014		<b>Attenuator:</b> PE7019-20 #791			<b>RBW =</b> 30KHz	
<b>Company:</b> Powercast Corporation		<b>Operating Voltage:</b> 120Vac/60Hz			<b>VBW =</b> 100KHz	
<b>EUT:</b> GW1100					<b>Limit =</b> 1Watt or 30dBm	
<b>TX Mode:</b> DMSS						
Channel (MHz)	Measured power (dBm)	Attenuator factor (dB)	Adjusted power measurement (dBm)	Limit (dBm)	Margin (dB)	Result
902.7	0.18	19.29	19.47	30	-10.53	pass
914.22	-0.99	19.29	18.30	30	-11.70	pass
927.3	-2.02	19.29	17.27	30	-12.73	pass

Maximum Conducted (average) Output Power - Antenna 2						
<b>Tested by:</b> Tuyen Truong		<b>Analyzer:</b> GOLD SA			<b>WO:</b> N3532	
<b>Date:</b> 1/16/2014		<b>Attenuator:</b> PE7019-20 #791			<b>RBW =</b> 30KHz	
<b>Company:</b> Powercast Corporation		<b>Operating Voltage:</b> 120Vac/60Hz			<b>VBW =</b> 100KHz	
<b>EUT:</b> GW1100					<b>Limit =</b> 1Watt or 30dBm	
<b>TX Mode:</b> DMSS						
Channel (MHz)	Measured power (dBm)	Attenuator factor (dB)	Adjusted power measurement (dBm)	Limit (dBm)	Margin (dB)	Result
902.7	-1.32	19.29	17.97	30	-12.03	pass
914.22	-2.27	19.29	17.02	30	-12.98	pass
927.3	-3.24	19.29	16.05	30	-13.95	pass



Rev. 1/16/2014

<b>Spectrum Analyzers / Receivers/Preselectors</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Gold		100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/18/2014	3/18/2013
<b>Radiated Emissions Sites</b>		<b>FCC Code</b>	<b>IC Code</b>	<b>VCCI Code</b>	<b>Range</b>		<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
EMI Chamber 2		719150	2762A-7	A-0015	30-1000MHz		II	2/15/2014	2/15/2012
<b>Preamps/Couplers Attenuators / Filters</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
HF 20dB 50W Attenuator		0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
<b>Meteorological Meters</b>			<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
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

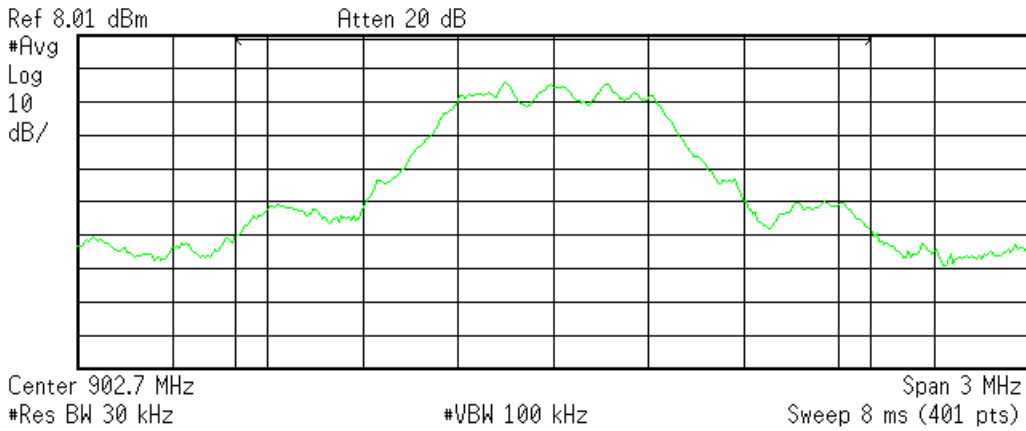
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



**PLOTS**

Agilent 11:27:30 Jan 16, 2014

R T



**Channel Power**

**Power Spectral Density**

0.18 dBm /2.0000 MHz

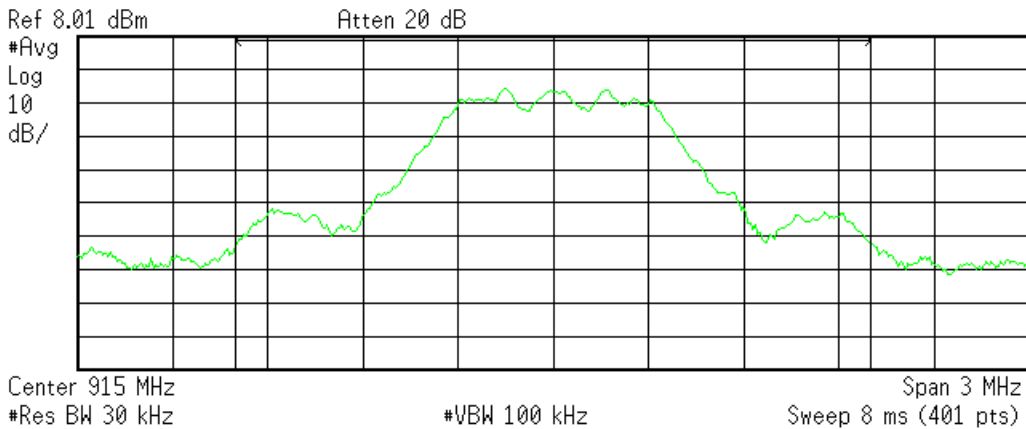
-62.83 dBm/Hz

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Low Channel – Antenna 1 – Channel Power

Agilent 11:29:42 Jan 16, 2014

R T



**Channel Power**

**Power Spectral Density**

-0.99 dBm /2.0000 MHz

-64.00 dBm/Hz

C:\temp.gif file saved

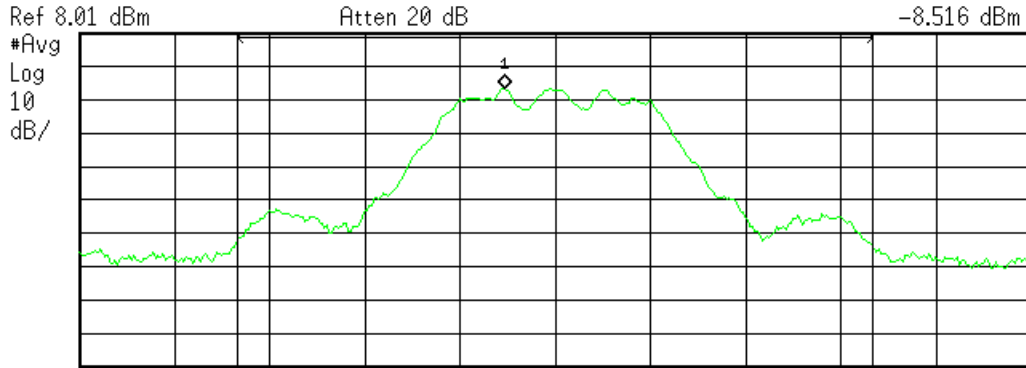
Mid Channel – Antenna 1 – Channel Power



Agilent 11:21:38 Jan 16, 2014

R T

Mkr1 927.1425 MHz  
-8.516 dBm



Center 927.3 MHz Span 3 MHz  
#Res BW 30 kHz #VBW 100 kHz Sweep 8 ms (401 pts)

**Channel Power**  
-2.02 dBm /2.0000 MHz

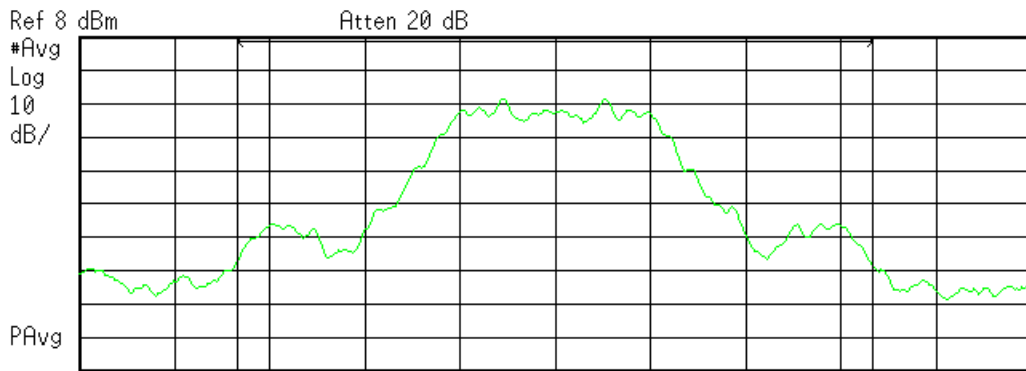
**Power Spectral Density**  
-65.03 dBm/Hz

C:\temp.gif file saved

High Channel – Antenna 1 – Channel Power

Agilent 14:18:30 Jan 16, 2014

R T



Center 902.7 MHz Span 3 MHz  
#Res BW 30 kHz #VBW 100 kHz Sweep 8 ms (401 pts)

**Channel Power**  
-1.32 dBm /2.0000 MHz

**Power Spectral Density**  
-64.33 dBm/Hz

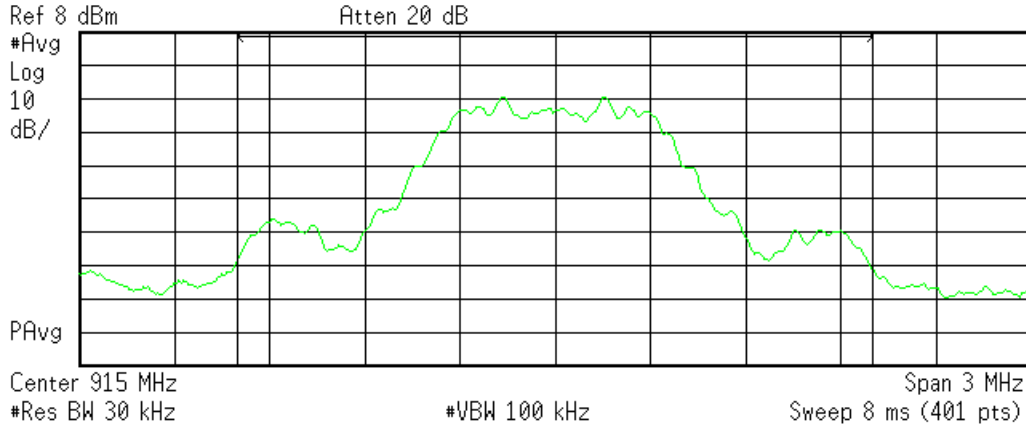
C:\temp.gif file saved

Low Channel – Antenna 2 – Channel Power



Agilent 14:22:20 Jan 16, 2014

R T



**Channel Power**

-2.27 dBm /2.0000 MHz

**Power Spectral Density**

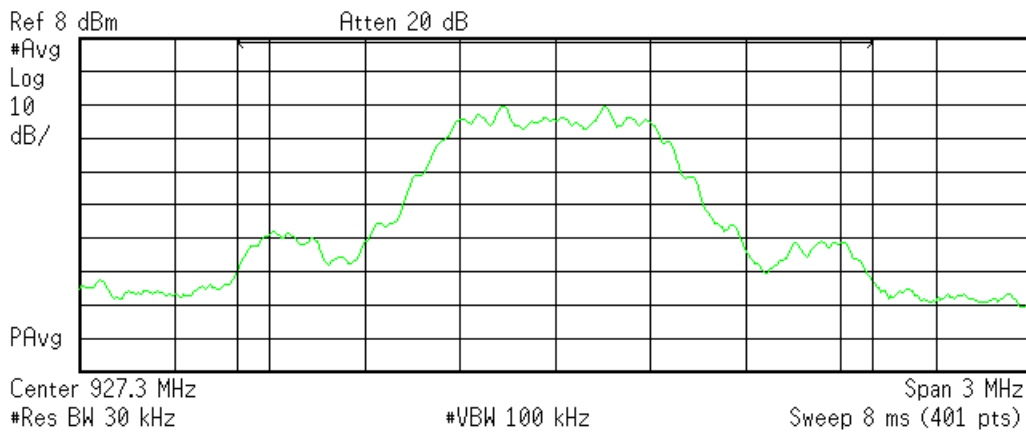
-65.28 dBm/Hz

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Mid Channel – Antenna 2 – Channel Power

Agilent 14:26:13 Jan 16, 2014

R T



**Channel Power**

-3.24 dBm /2.0000 MHz

**Power Spectral Density**

-66.25 dBm/Hz

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High Channel – Antenna 2 – Channel Power





# Radiated Spurious Emissions

## LIMITS

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

## MEASUREMENTS / RESULTS

Radiated Emissions Table												
Date: 25-Mar-14			Company: Powercast				Work Order: N3532					
Engineer: Arik Zwirner			EUT Desc: GW1100				EUT Operating Voltage/Frequency: 120Vac/60Hz					
Temp: 25°C			Humidity: 2%				Pressure: 1011mBar					
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes: Added (2) ferrites to Serial Cable. Fair-Rite PN:0461178281(straight through). Antenna 1												
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	---			FCC Class B		
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
V	50.0	49.8	25.4	8.8	0.6	33.8	---	---	---	40.0	-6.2	Pass
V	75.0	45.7	25.4	8.7	0.7	29.7	---	---	---	40.0	-10.3	Pass
V	77.3	46.2	25.4	8.6	0.7	30.1	---	---	---	40.0	-9.9	Pass
V	208.0	41.5	25.4	11.3	1.2	28.6	---	---	---	43.5	-14.9	Pass
V	250.0	45.6	25.3	12.2	1.4	33.9	---	---	---	46.0	-12.1	Pass
H	300.0	47.1	25.2	13.9	1.5	37.3	---	---	---	46.0	-8.7	Pass
H	550.0	33.8	25.5	18.8	2.0	29.1	---	---	---	46.0	-16.9	Pass
H	718.2	45.4	23.9	20.8	2.4	44.7	---	---	---	46.0	-1.3	Pass
H	725.0	42.8	23.8	20.8	2.4	42.2	---	---	---	46.0	-3.8	Pass
H	952.0	36.7	24.7	23.4	2.6	38.0	---	---	---	46.0	-8.0	Pass
<b>Table Result:</b> Pass by -1.3 dB <b>Worst Freq:</b> 718.2 MHz												
Test Site: EMI Chamber 1			Cable 1: Asset #1505				Cable 2: Asset #1507			Cable 3: ---		
Analyzer: Asset #1327			Preamp: Red				Antenna: Red-White			Preselector: ---		

Rev. 3/15/2014

<b>Spectrum Analyzers / Receivers / Preselectors</b> SA EMI Chamber (1327)	<b>Range</b> 9kHz-13.2 GHz	<b>MN</b> E4405B	<b>Mfr</b> Agilent	<b>SN</b> MY45103416	<b>Asset</b> 1327	<b>Cat</b> I	<b>Calibration Due</b> 3/15/2015	<b>Calibrated on</b> 3/15/2014
<b>Radiated Emissions Sites</b> EMI Chamber 1	<b>FCC Code</b> 719150	<b>IC Code</b> 2762A-6	<b>VCCI Code</b> A-0015	<b>Range</b> 30-1000MHz		<b>Cat</b> II	<b>Calibration Due</b> 3/16/2014	<b>Calibrated on</b> 2/16/2012
<b>Preamps / Couplers Attenuators / Filters</b> Red	<b>Range</b> 0.009-2000MHz	<b>MN</b> ZFL-1000-LN	<b>Mfr</b> CS	<b>SN</b> N/A	<b>Asset</b> 798	<b>Cat</b> II	<b>Calibration Due</b> 2/4/2015	<b>Calibrated on</b> 2/4/2014
<b>Antennas</b> Red-White Bilog	<b>Range</b> 30-2000MHz	<b>MN</b> JB1	<b>Mfr</b> Sunol	<b>SN</b> A091604-1	<b>Asset</b> 1105	<b>Cat</b> I	<b>Calibration Due</b> 7/24/2015	<b>Calibrated on</b> 7/24/2013
<b>Meteorological Meters</b> Temp./Humidity/Atm. Pressure Gauge TH A#1830		<b>MN</b> 7400 Perception II 35519-044	<b>Mfr</b> Davis Control Company	<b>SN</b> N/A 130320003	<b>Asset</b> 965 1830	<b>Cat</b> I II	<b>Calibration Due</b> 5/29/2014 6/13/2015	<b>Calibrated on</b> 5/29/2013 6/13/2013
<b>Cables</b> Asset #1505 Asset #1507	<b>Range</b> 9kHz - 18GHz 9kHz - 18GHz		<b>Mfr</b> Florida RF Florida RF			<b>Cat</b> II II	<b>Calibration Due</b> 3/7/2015 2/23/2015	<b>Calibrated on</b> 3/7/2014 2/23/2014

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



Radiated Emissions Table															
Date: 22-Jan-14				Company: Powercast Corporation				Work Order: N3532							
Engineer: Tuyen Truong				EUT Desc: GW1100				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 25°C				Humidity: 2%				Pressure: 1001mBar							
Frequency Range: 1 to 10GHz							Measurement Distance: 3 m (1-6GHz); 1m (6-10GHz)								
Notes: all orientations of EUT were checked.											EUT Max Freq: 360MHz				
Antenna 1 is on											TX Frequency: 902-928MHz				
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 Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	
v	1805.0	48.73	37.2	21.1	27.1	2.8	57.5	46.0	74.0	-16.5	Pass	54.0	-8.0	Pass	
h	1805.0	48.8	41.1	21.1	27.1	2.8	57.6	49.9	74.0	-16.4	Pass	54.0	-4.1	Pass	
h	2250.0	51.07	37.4	22.3	28.0	3.3	60.1	46.4	74.0	-13.9	Pass	54.0	-7.6	Pass	
h	2975.0	52.87	40.0	22.4	30.3	3.7	64.5	51.6	74.0	-9.5	Pass	54.0	-2.4	Pass	
v	2975.0	52.42	40.0	22.4	30.3	3.7	64.0	51.6	74.0	-10.0	Pass	54.0	-2.4	Pass	
v	3187.5	50.52	36.7	22.4	31.3	4.0	63.4	49.6	74.0	-10.6	Pass	54.0	-4.4	Pass	
h	3425.0	49.9	37.5	22.0	31.3	4.2	63.4	51.0	74.0	-10.6	Pass	54.0	-3.0	Pass	
<b>Table Result:</b> Pass by -2.4 dB											<b>Worst Freq:</b> 2975.0 MHz				
Test Site: EMI Chamber 2				Cable 1: Asset #1782				Cable 2: Asset #1787				Cable 3: ---			
Analyzer: Brown				Preamp: Asset #1517				Antenna: Black Horn				Preselector: ---			

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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown (1328)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/18/2014	4/18/2013
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
EMI Chamber 2	719150	2762A-7	A-0015	>1GHz	I	5/16/2015	5/16/2013	
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	9/11/2014	9/11/2013
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	8/5/2015	8/5/2013
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Temp./Humidity/Atm. Pressure Gauge	7400 Perception	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 #1787	9kHz - 18GHz	Florida RF	II	3/14/2014	3/14/2013			
Asset #1782	9kHz - 18GHz	Florida RF	II	3/6/2014	3/6/2013			

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



**Radiated Emissions Table**

<b>Date:</b> 17-Jan-14		<b>Company:</b> Powercast Corporation					<b>Work Order:</b> N3532					
<b>Engineer:</b> Chris Bramley		<b>EUT Desc:</b> GW1100 Sensor					<b>EUT Operating Voltage/Frequency:</b> 120V/60Hz					
<b>Temp:</b> 25.7°C		<b>Humidity:</b> 10%					<b>Pressure:</b> 1005mBar					
<b>Frequency Range:</b> 30-1000MHz							<b>Measurement Distance:</b> 3 m					
<b>Notes:</b> TX on Low Channel (902.7MHz) - Antenna 2 (2) Ferrites - Fair-Rite PN:0461178281 on Serial Cable (straight through)							<b>EUT Max Freq:</b> 360MHz <b>TX Frequency:</b> 902-928MHz(TX)					
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	---			FCC Class B		
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
v	48.0	50.2	25.6	8.7	1.5	34.8	---	---	---	40.0	-5.2	Pass
v	50.0	49.4	25.6	7.9	1.5	33.2	---	---	---	40.0	-6.8	Pass
v	84.75	48.1	25.6	7.5	1.9	31.9	---	---	---	40.0	-8.1	Pass
v	147.6	50.7	25.7	12.4	2.5	39.9	---	---	---	43.5	-3.6	Pass
v	162.1	53.0	25.7	12.0	2.9	42.2	---	---	---	43.5	-1.3	Pass
v	164.5	50.8	25.7	11.9	2.7	39.7	---	---	---	43.5	-3.8	Pass
v	176.4	50.6	25.7	11.0	2.7	38.6	---	---	---	43.5	-4.9	Pass
v	177.0	51.7	25.7	11.0	2.7	39.7	---	---	---	43.5	-3.8	Pass
v	177.6	51.0	25.7	10.9	2.7	38.9	---	---	---	43.5	-4.6	Pass
v	178.9	52.1	25.7	10.9	2.7	40.0	---	---	---	43.5	-3.5	Pass
v	181.3	52.7	25.7	10.9	2.7	40.6	---	---	---	43.5	-2.9	Pass
h	250.0	53.0	25.7	11.6	3.4	42.3	---	---	---	46.0	-3.7	Pass
h	266.7	52.0	25.7	12.9	3.3	42.5	---	---	---	46.0	-3.5	Pass
h	400.0	51.6	25.8	15.5	3.7	45.0	---	---	---	46.0	-1.0	Pass
h	500.0	47.8	25.9	17.7	3.4	43.0	---	---	---	46.0	-3.0	Pass
v	550.0	41.9	25.7	18.3	3.1	37.6	---	---	---	46.0	-8.4	Pass
v	600.0	44.2	25.9	18.5	3.6	40.4	---	---	---	46.0	-5.6	Pass
h	700.0	44.9	25.8	20.3	3.6	43.0	---	---	---	46.0	-3.0	Pass
<b>Table Result:</b> Pass by 1.0 dB							<b>Worst Freq:</b> 400.0 MHz					
<b>Test Site:</b> EMI Chamber 2		<b>Cable 1:</b> Asset #1782					<b>Cable 2:</b> Asset #1787					
<b>Analyzer:</b> Gold		<b>Preamp:</b> Green					<b>Antenna:</b> Red-Black					
<b>Preselector:</b> Asset #1511												

Rev. 1/16/2014

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
EMI Chamber Preselector	9kHz-1.8GHz	EM-2701	Electro-Metrics	539	1511	II	8/4/2014	8/4/2013
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	SN	Asset	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.



Radiated Emissions Table															
Date: 20-Jan-14				Company: Powercast Corporation				Work Order: N3532							
Engineer: Tuyen Truong				EUT Desc: GW1100				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 21°C				Humidity: 5%				Pressure: 999mBar							
Frequency Range: 1 to 10GHz							Measurement Distance: 3 m (1-6GHz); 1m (6-10GHz)								
Notes: all orientations of EUT were checked.											EUT Max Freq: 360MHz				
Antenna 2 is on											TX Frequency: 902-928MHz(TX)				
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
v	1805.0	46.49	35.0	21.1	27.1	3.0	55.5	44.0	74.0	-18.5	Pass	54.0	-10.0	Pass	
h	1805.0	47.65	35.8	21.1	27.1	3.0	56.7	44.8	74.0	-17.3	Pass	54.0	-9.2	Pass	
v,nf	2678.0	51.7	37.6	22.8	29.2	3.6	61.7	47.6	74.0	-12.3	Pass	54.0	-6.4	Pass	
h,nf	2983.0	51.76	39.0	22.4	30.4	3.6	63.4	50.6	74.0	-10.6	Pass	54.0	-3.4	Pass	
v,nf	2994.0	51.79	39.2	22.3	30.5	3.6	63.6	51.0	74.0	-10.4	Pass	54.0	-3.0	Pass	
h,nf	3425.0	50.61	37.6	22.0	31.3	4.0	63.9	50.9	74.0	-10.1	Pass	54.0	-3.1	Pass	
v,nf	3435.0	49.4	37.6	22.0	31.3	4.0	62.7	50.9	74.0	-11.3	Pass	54.0	-3.1	Pass	
<b>Table Result:</b> Pass by -3.0 dB											<b>Worst Freq:</b> 2994.0 MHz				
Test Site: EMI Chamber 1				Cable 1: Asset #1781				Cable 2: Asset #1786				Cable 3: ---			
Analyzer: Rental SA#1				Preamp: Asset #1517				Antenna: Black Horn				Preselector: ---			

Rev. 1/16/2014

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown (1328)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/18/2014	4/18/2013
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	2/16/2014	2/16/2012
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
High Pass Filter	0.03-9 GHz	VHP-16	Mini-Circuits	NA	1288	II	1/8/2015	1/8/2014
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	9/11/2014	9/11/2013
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	8/5/2015	8/5/2013
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Temp./Humidity/Atm. Pressure Gauge		7400	Perceptic	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 #1781	9kHz - 18GHz		Florida RF			II	3/6/2014	3/6/2013
Asset #1786	9kHz - 18GHz		Florida RF			II	3/14/2014	3/14/2013



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## Conducted Spurious Emissions

### LIMITS

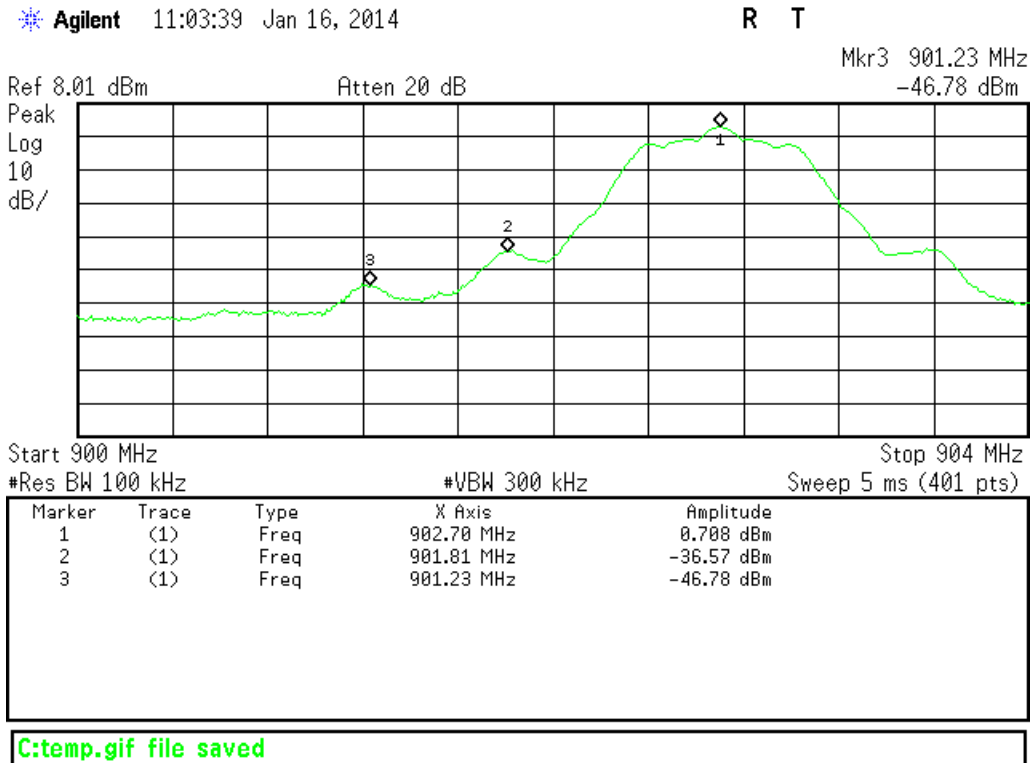
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth that contains the highest level of 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

#### Plots

#### Conducted Band Edge

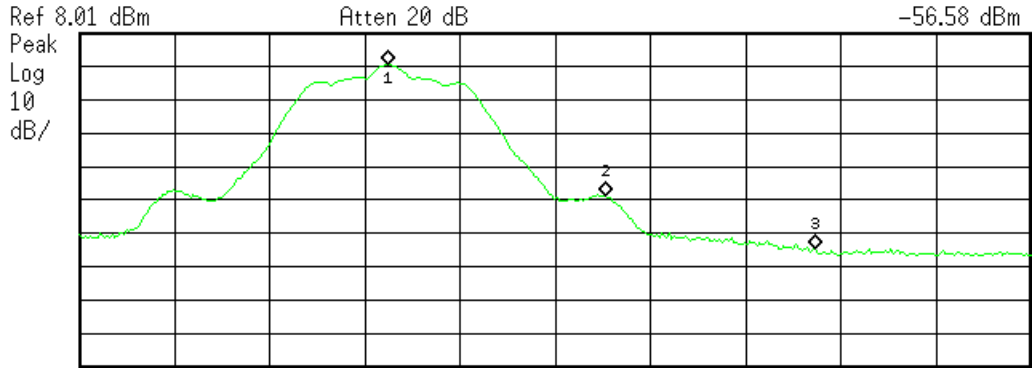


Lower Channel – Antenna 1 – Band-edge (<-30dBm)

Agilent 11:05:25 Jan 16, 2014

R T

Mkr3 929.09 MHz  
-56.58 dBm



Start 926 MHz Stop 930 MHz  
#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	927.30 MHz	-1.664 dBm
2	(1)	Freq	928.21 MHz	-40.81 dBm
3	(1)	Freq	929.09 MHz	-56.58 dBm

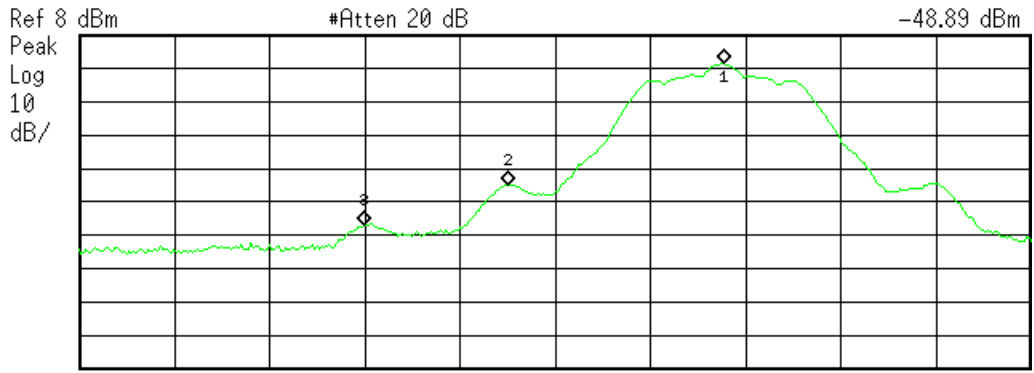
C:\temp.gif file saved

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

Agilent 13:37:02 Jan 22, 2014

R T

Mkr3 901.20 MHz  
-48.89 dBm



Start 900 MHz Stop 904 MHz  
#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	902.71 MHz	-0.801 dBm
2	(1)	Freq	901.80 MHz	-36.78 dBm
3	(1)	Freq	901.20 MHz	-48.89 dBm

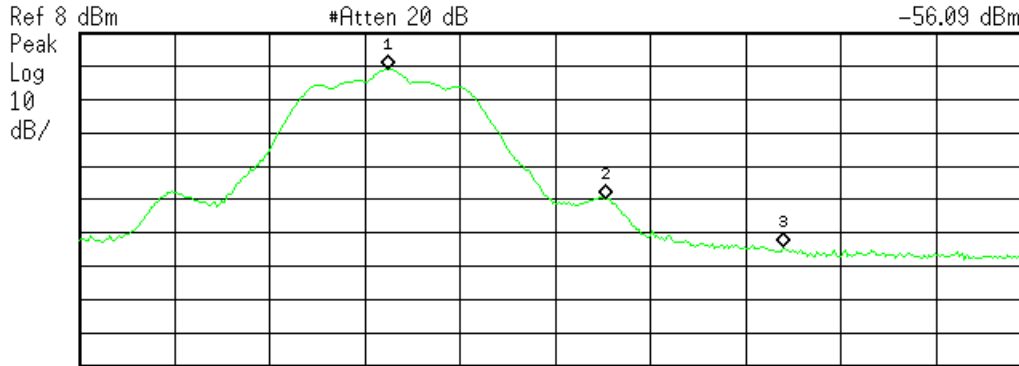
Lower Channel – Antenna 2 – Band-edge (<-30dBm)



Agilent 13:38:18 Jan 22, 2014

R T

Mkr3 928.96 MHz  
-56.09 dBm



Start 926 MHz #Res BW 100 kHz #VBW 300 kHz Stop 930 MHz Sweep 5 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	927.30 MHz	-3.031 dBm
2	(1)	Freq	928.21 MHz	-41.93 dBm
3	(1)	Freq	928.96 MHz	-56.09 dBm

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

Rev. 1/16/2014

Category	Item	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Spectrum Analyzers / Receivers / Preselectors	Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/18/2014	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	HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
	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

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



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## Conducted Spurious Emission

Conducted Spurious Emissions at the Antenna Port:

For these scans, the spectrum analyzer was set to the following:

Span: 250MHz  
 Resolution Bandwidth: 100kHz  
 Video Bandwidth: 1MHz  
 Points per sweep: 8001

The frequency range 30MHz-10GHz was tested on both antenna ports 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 of each port were tested.

Rev. 3/9/2014

Spectrum Analyzers / Receivers /Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown (1328)		9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/18/2014	4/18/2013
Preamps/Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 40dB 25W Attenuator		0.009-18 GHz	PE 7017-40	pasternack	NA	1513	II	7/13/2014	7/13/2013
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#1826		35519-044		Control Company	130318328	1826	II	6/13/2015	6/13/2013
Cables		Range	Mfr				Cat	Calibration Due	Calibrated on
Asset #1522		9kHz - 18GHz	Florida RF				II	2/23/2015	2/23/2014

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	Tuyen Truong A.
Date	1/16/2014
Site	Chamber 2
Environmental Conditions	22.4°C, 34%, 1013mb

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								
<b>Tested by:</b> Tuyen Truong								
<b>Date:</b> 1/15/2014			<b>Analyzer:</b> Asset 1327					
<b>Company:</b> Powercast Corporation			<b>Attenuation:</b> PE7019-20 #791			<b>RBW =</b> 3KHz		
<b>EUT:</b> GW1100			<b>VBW =</b> 10KHz					
channel (MHz)	mode	measured PSD (dBm)	attenuator factor (dB)	adjusted power measurement	bandwidth correction factor adjustment	limit (dBm)	margin (dB)	result
902	DMSS	-13.97	19.29	5.32	0	8	-2.68	Pass
915	DMSS	-14.140	19.29	5.15	0	8	-2.85	Pass
927	DMSS	-15.62	19.29	3.67	0	8	-4.33	Pass

15.247 (e) Maximum Power Spectral Density - Antenna 2								
<b>Tested by:</b> Tuyen Truong								
<b>Date:</b> 1/15/2014			<b>Analyzer:</b> Asset 1327					
<b>Company:</b> Powercast Corporation			<b>Attenuation:</b> PE7019-20 #791			<b>RBW =</b> 3KHz		
<b>EUT:</b> GW1100			<b>VBW =</b> 10KHz					
channel (MHz)	mode	measured PSD (dBm)	attenuator factor (dB)	adjusted power measurement	bandwidth correction factor adjustment	limit (dBm)	margin (dB)	result
902	DMSS	-15.59	19.29	3.70	0	8	-4.3	Pass
915	DMSS	-15.950	19.29	3.34	0	8	-4.66	Pass
927	DMSS	-16.92	19.29	2.37	0	8	-5.63	Pass

Rev. 1/16/2014

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
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
Meteorological Meters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Temp./Humidity/Atm. Pressure Gauge TH A#1832	7400 Perception II	35519-044	Davis Control Company	N/A 130318277	965 1832	I II	5/29/2014 6/13/2015	5/29/2013 6/13/2013

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



PLOTS

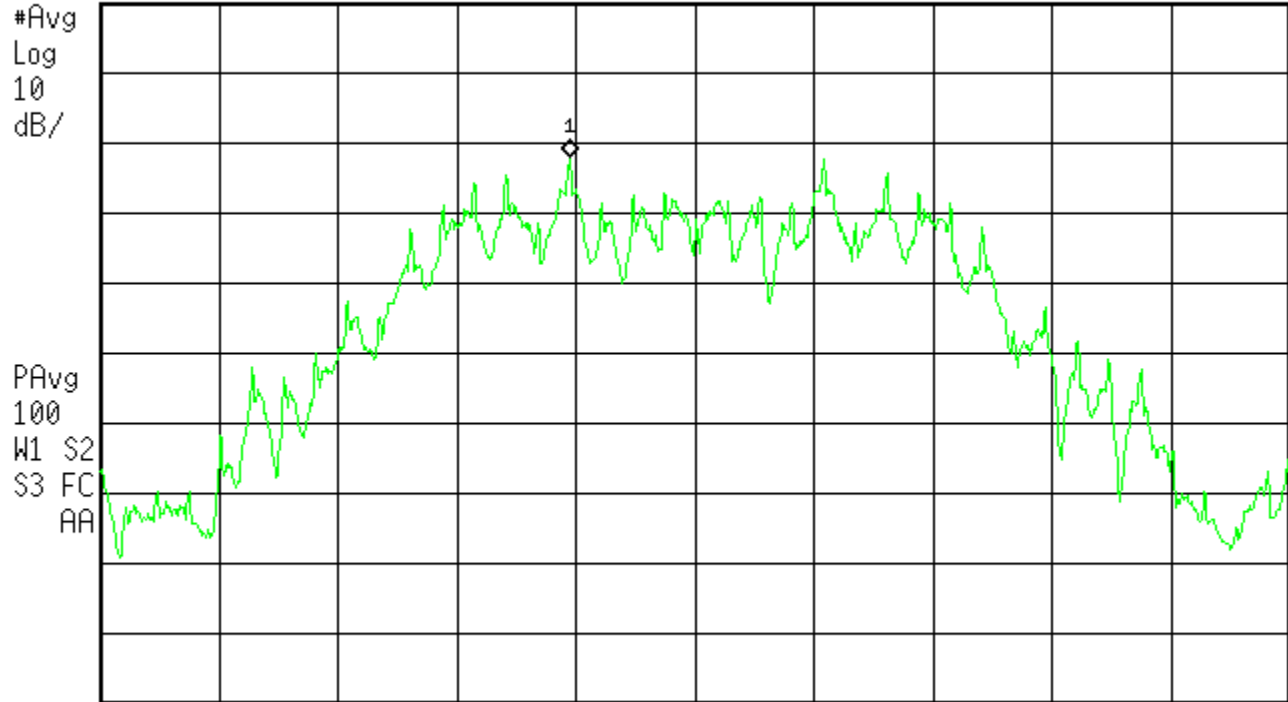
Agilent 13:19:51 Jan 16, 2014

R T

Mkr1 902.5416 MHz  
-13.97 dBm

Ref 8.01 dBm

Atten 20 dB



Center 902.7 MHz

Span 1.5 MHz

#Res BW 3 kHz

#VBW 10 kHz

Sweep 271.2 ms (1000 pts)

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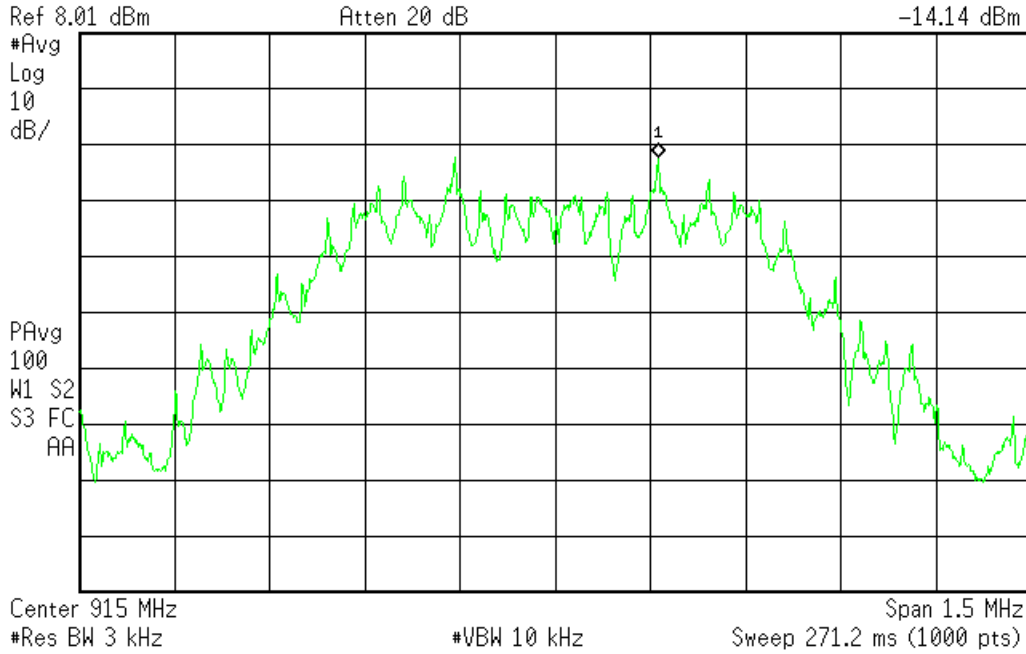
Channel Low – Antenna 1 – PSD



Agilent 13:21:51 Jan 16, 2014

R T

Mkr1 915.1614 MHz  
-14.14 dBm



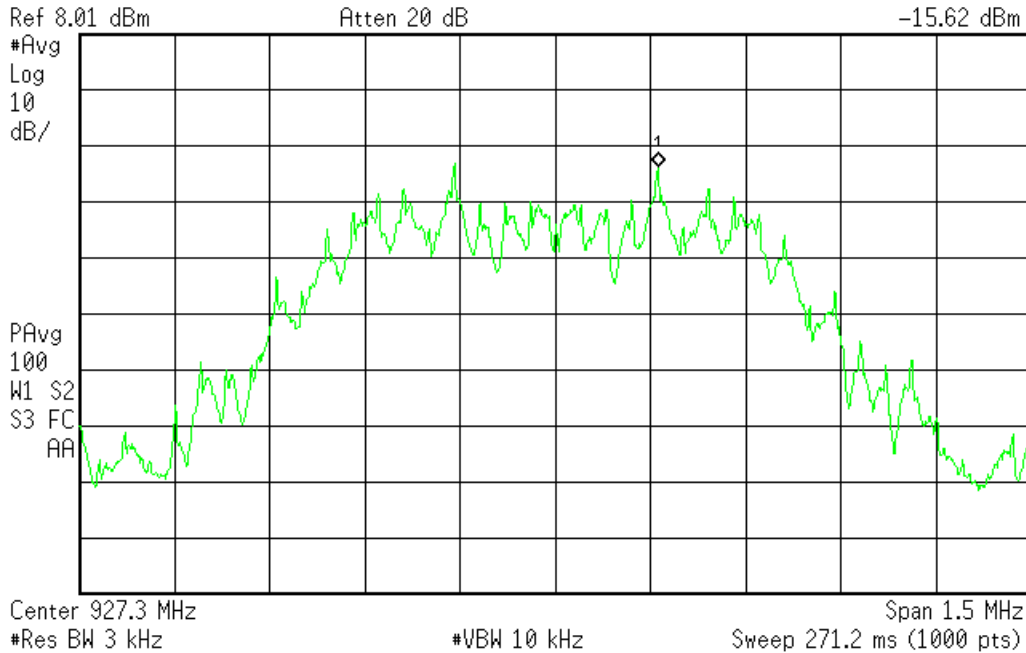
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Channel Mid – Antenna 1 – PSD

Agilent 13:30:53 Jan 16, 2014

R T

Mkr1 927.4614 MHz  
-15.62 dBm



C:\temp.gif file saved

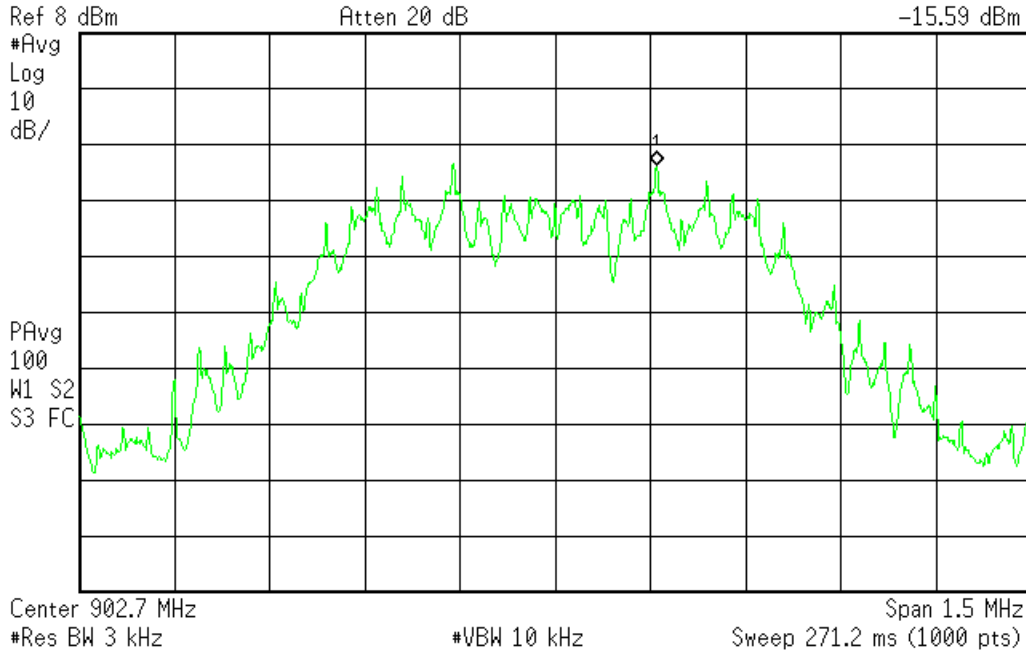
Channel High – Antenna 1 – PSD



Agilent 14:32:50 Jan 16, 2014

R T

Mkr1 902.8599 MHz  
-15.59 dBm



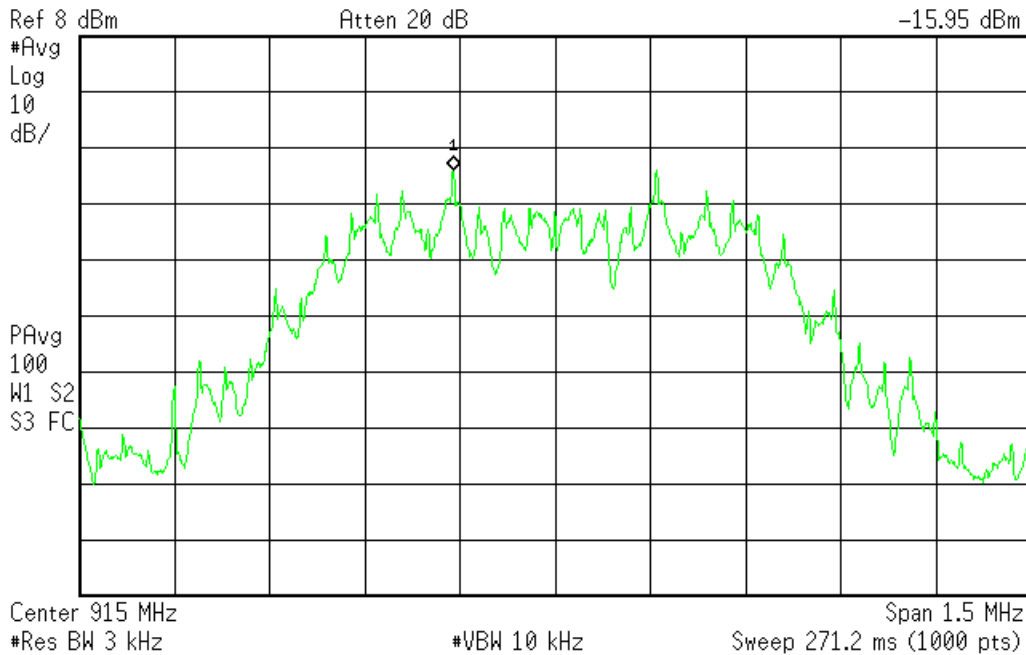
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Channel Low – Antenna 2 – PSD

Agilent 14:35:48 Jan 16, 2014

R T

Mkr1 914.8401 MHz  
-15.95 dBm



C:\temp.gif file saved

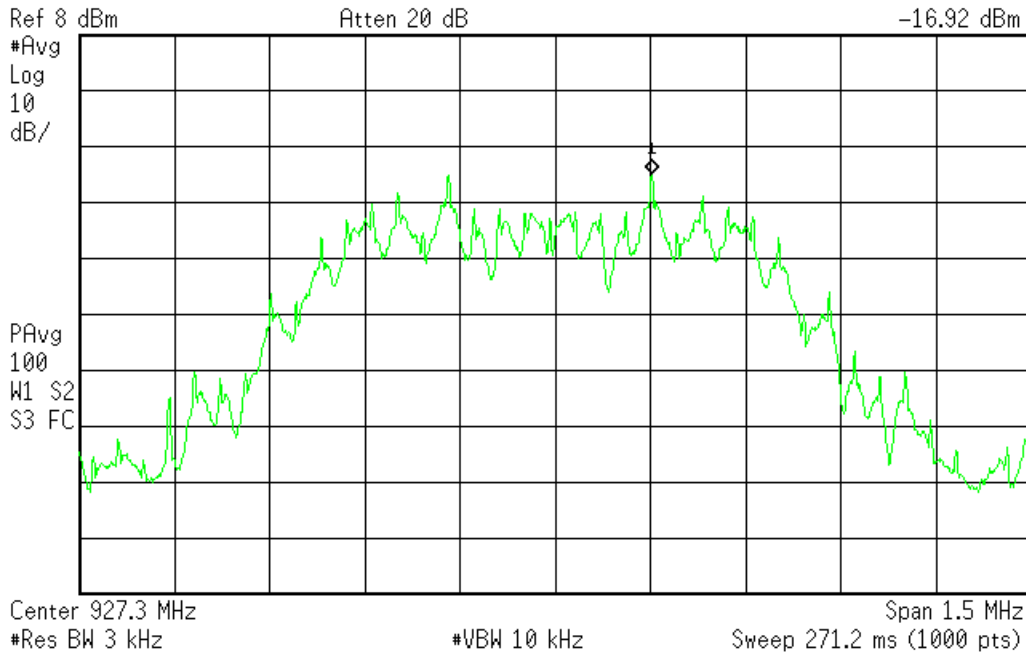
Channel Mid – Antenna 2 – PSD



Agilent 14:30:43 Jan 16, 2014

R T

Mkr1 927.4599 MHz  
-16.92 dBm



C:\temp.gif file saved

Channel High – Antenna 2 – PSD



## 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)]

## MEASUREMENTS / RESULTS

Engineer	Tuyen Truong
Date	Jan 22, 2014
Site	CEMI2
Environmental Conditions	20°C, 24%, 999mb

### AC Conducted Emissions Data Table

Date: 22-Jan-14		Company: Powercast Corporation		Work Order: N3505										
Engineer: Tuyen Truong		EUT Desc: GW1100		Pressure: 999 mBar										
Temp: 20.0 °C		Humidity: 24%												
Notes: EUT is transmitting on Antenna 1														
Frequency Range: 0.15-30MHz														
EUT Input Voltage/Frequency: 120Vac/60Hz														
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC/CISPR Class B			FCC/CISPR Class B		
	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)
0.17	24.2	34.7	16.9	16.0	-0.1	-0.1	-0.2	-19.4	65.1	-10.8	Pass	55.1	-18.5	Pass
0.31	29.6	28.8	23.9	23.5	0.0	-0.1	-0.2	-19.4	60.0	-10.9	Pass	50.0	-6.5	Pass
0.34	27.1	24.4	20.3	17.8	0.0	-0.1	-0.2	-19.4	59.2	-12.5	Pass	49.2	-9.3	Pass
0.73	23.9	19.0	14.7	9.5	0.0	0.0	-0.2	-19.4	56.0	-12.5	Pass	46.0	-11.7	Pass
1.61	21.8	17.5	13.2	11.1	0.0	-0.1	-0.2	-19.4	56.0	-14.6	Pass	46.0	-13.1	Pass
14.27	17.6	13.4	10.9	9.2	-0.1	-0.1	-0.3	-19.4	60.0	-22.6	Pass	50.0	-19.3	Pass
<b>Result: Pass</b>				<b>Worst Margin: -6.5 dB</b>				<b>Frequency: 0.308 MHz</b>						
Measurement Device: LISN ASSET 1730(Line 1) LISN ASSET 1731(Line 2)						Cable: CEMI-02		Spectrum Analyzer: Yellow						
						Attenuator: 20dB Attenuator-36		Site: CEMI2						

C-S CEMI Calculator Version 3.0.13

Equipment Factor Sheet rev: 12/11/2013

### AC Conducted Emissions Data Table

Date: 22-Jan-14		Company: Powercast Corporation		Work Order: N3505										
Engineer: Tuyen Truong		EUT Desc: GW1100		Pressure: 999 mBar										
Temp: 20.0 °C		Humidity: 24%												
Notes: EUT is transmitting on Antenna 2														
Frequency Range: 0.15-30MHz														
EUT Input Voltage/Frequency: 120Vac/60Hz														
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC/CISPR Class B			FCC/CISPR Class B		
	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)
0.17	24.2	34.7	16.9	16.0	-0.1	-0.1	-0.2	-19.4	65.1	-10.8	Pass	55.1	-18.5	Pass
0.31	28.6	27.1	23.2	19.9	0.0	-0.1	-0.2	-19.4	60.0	-11.8	Pass	50.0	-7.2	Pass
0.34	27.1	24.4	20.3	17.8	0.0	-0.1	-0.2	-19.4	59.2	-12.5	Pass	49.2	-9.3	Pass
0.73	23.9	19.0	14.7	9.5	0.0	0.0	-0.2	-19.4	56.0	-12.5	Pass	46.0	-11.7	Pass
1.61	21.8	17.5	13.2	11.1	0.0	-0.1	-0.2	-19.4	56.0	-14.6	Pass	46.0	-13.1	Pass
14.27	17.6	13.4	10.9	9.2	-0.1	-0.1	-0.3	-19.4	60.0	-22.6	Pass	50.0	-19.3	Pass
<b>Result: Pass</b>				<b>Worst Margin: -7.2 dB</b>				<b>Frequency: 0.308 MHz</b>						
Measurement Device: LISN ASSET 1730(Line 1) LISN ASSET 1731(Line 2)						Cable: CEMI-02		Spectrum Analyzer: Yellow						
						Attenuator: 20dB Attenuator-36		Site: CEMI2						

C-S CEMI Calculator Version 3.0.13

Equipment Factor Sheet rev: 12/11/2013



Rev. 1/16/2014

<b>Spectrum Analyzers / Receivers/Preselectors</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Yellow		9kHz-2.9GHz	8594E	Agilent	3523A01958	100	I	6/3/2014	6/3/2013
<b>LISNs/Measurement Probes</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
LISN Asset 1730		150kHz-30MHz	LI-150A	Com-Power	201090	1730	I	2/14/2014	2/14/2013
LISN Asset 1731		150kHz-30MHz	LI-150A	Com-Power	201091	1731	I	2/14/2014	2/14/2013
<b>Conducted Test Sites (Mains / Telco)</b>		<b>FCC Code</b>	<b>VCCI Code</b>				<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
CEMI 2		719150	A-0015				III	NA	N/A
<b>Meteorological Meters</b>			<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Temp./Humidity/Atm. Pressure Gauge			7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013
TH A#1830			35519-044	Control Company	130320003	1830	II	6/13/2015	6/13/2013
<b>Cables</b>		<b>Range</b>		<b>Mfr</b>			<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
CEMI-02		9kHz - 2GHz		C-S			II	3/26/2014	3/26/2013
<b>Attenuators</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
20dB Attenuator-36		9kHz-2GHz			N/A		II	4/15/2014	4/15/2013

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



## 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	Jan 16, 2014
Site	Chamber 2
Environmental Conditions	23.°C, 23%, 1001mb

## Occupied Bandwidth - Antenna 1

Frequency (MHz)	Mode	99% Occupied Bandwidth (MHz)
902	DMSS	0.7545
915	DMSS	0.7502
927	DMSS	0.7510

**Tested by:** Tuyen Truong      **RBW = 100KHz**    **VBW = 300KHz**  
**Date:** 1/16/2014                      **Analyzer:** GOLD SA  
**Company:** Powercast Corporation      **Attenuator:** PE7019-20 #791  
**EUT:** GW1100

## Occupied Bandwidth - Antenna 2

Frequency (MHz)	Mode	99% Occupied Bandwidth (MHz)
902	DMSS	0.7495
915	DMSS	0.7496
927	DMSS	0.7466

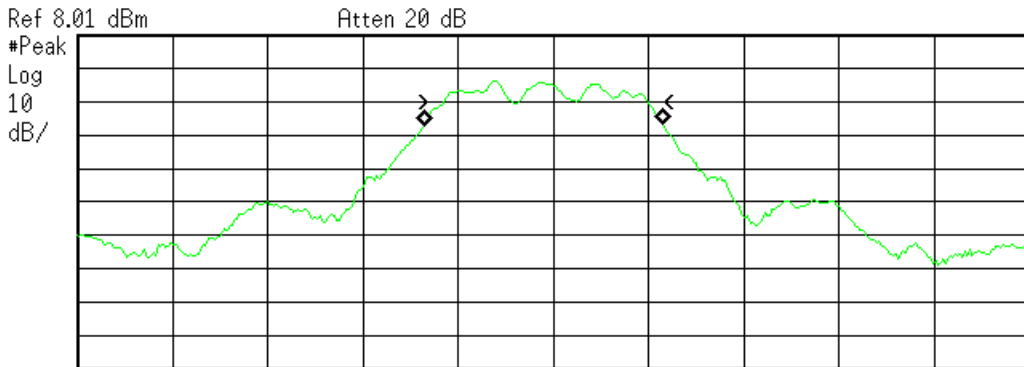
**Tested by:** Tuyen Truong      **RBW = 100KHz**    **VBW = 300KHz**  
**Date:** 1/16/2014                      **Analyzer:** GOLD SA  
**Company:** Powercast Corporation      **Attenuator:** PE7019-20 #791  
**EUT:** GW1100



Plots

Agilent 10:49:29 Jan 16, 2014

R T



Ref 8.01 dBm Atten 20 dB  
 #Peak  
 Log  
 10  
 dB/  
 Center 902.7 MHz Span 3 MHz  
 #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth  
 754.4846 kHz

Occ BW % Pwr 99.00 %  
 x dB -6.00 dB

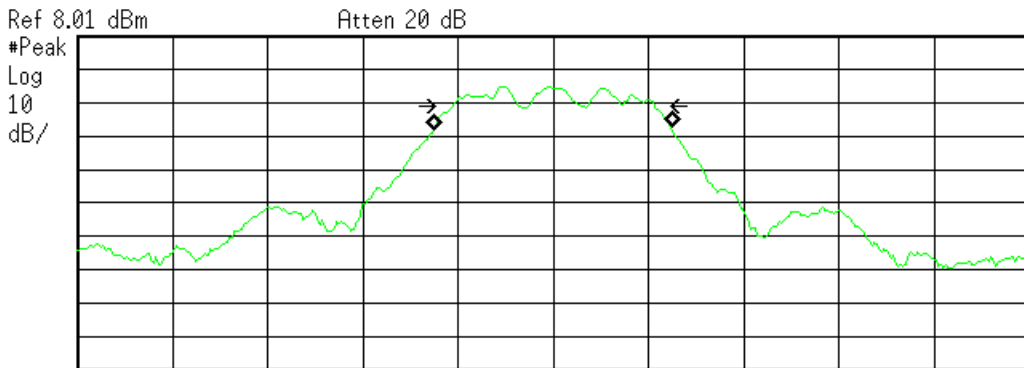
Transmit Freq Error -30.535 kHz  
 x dB Bandwidth 641.892 kHz

C:\temp.gif file saved

Low Channel – Antenna 1 – Occupied Bandwidth

Agilent 10:51:03 Jan 16, 2014

R T



Ref 8.01 dBm Atten 20 dB  
 #Peak  
 Log  
 10  
 dB/  
 Center 915 MHz Span 3 MHz  
 #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth  
 750.2078 kHz

Occ BW % Pwr 99.00 %  
 x dB -6.00 dB

Transmit Freq Error -3.389 kHz  
 x dB Bandwidth 641.189 kHz

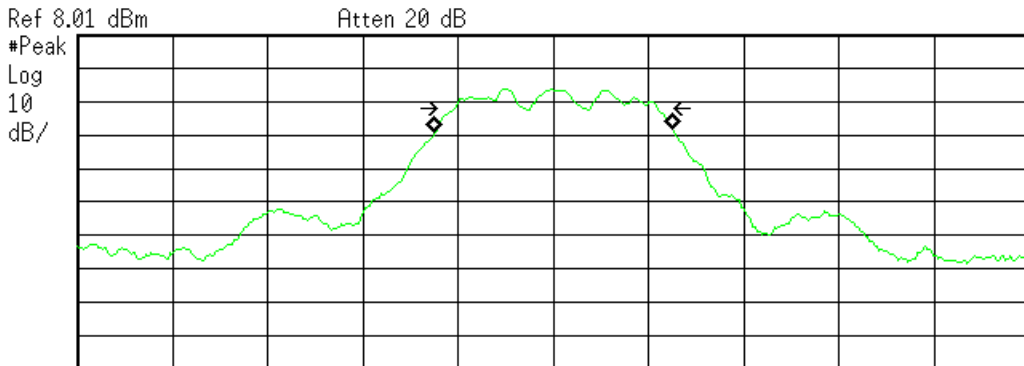
C:\temp.gif file saved

Mid Channel – Antenna 1 – Occupied Bandwidth



Agilent 10:46:53 Jan 16, 2014

R T



Ref 8.01 dBm Atten 20 dB  
 #Peak  
 Log  
 10  
 dB/

Center 927.3 MHz Span 3 MHz  
 #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

**Occupied Bandwidth**  
 751.0294 kHz

**Occ BW % Pwr** 99.00 %  
**x dB** -6.00 dB

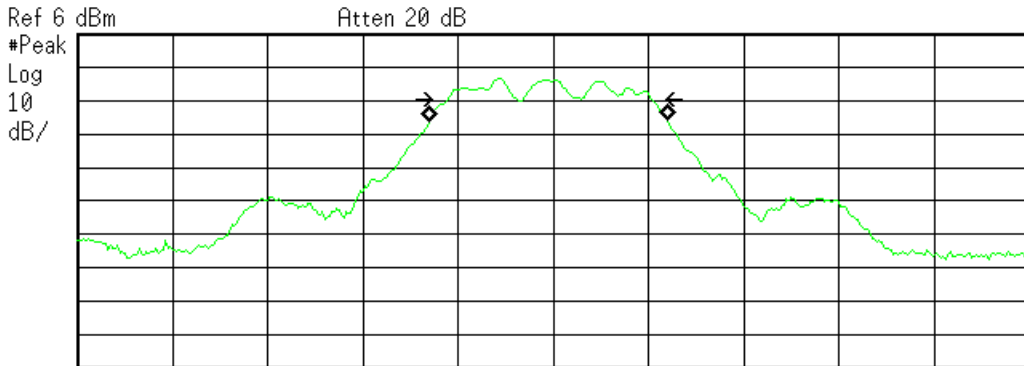
**Transmit Freq Error** 2.502 kHz  
**x dB Bandwidth** 641.615 kHz

C:\temp.gif file saved

High Channel – Antenna 1 – Occupied Bandwidth

Agilent 14:08:32 Jan 16, 2014

R T



Ref 6 dBm Atten 20 dB  
 #Peak  
 Log  
 10  
 dB/

Center 902.7 MHz Span 3 MHz  
 #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)

**Occupied Bandwidth**  
 749.5298 kHz

**Occ BW % Pwr** 99.00 %  
**x dB** -6.00 dB

**Transmit Freq Error** -14.832 kHz  
**x dB Bandwidth** 641.854 kHz

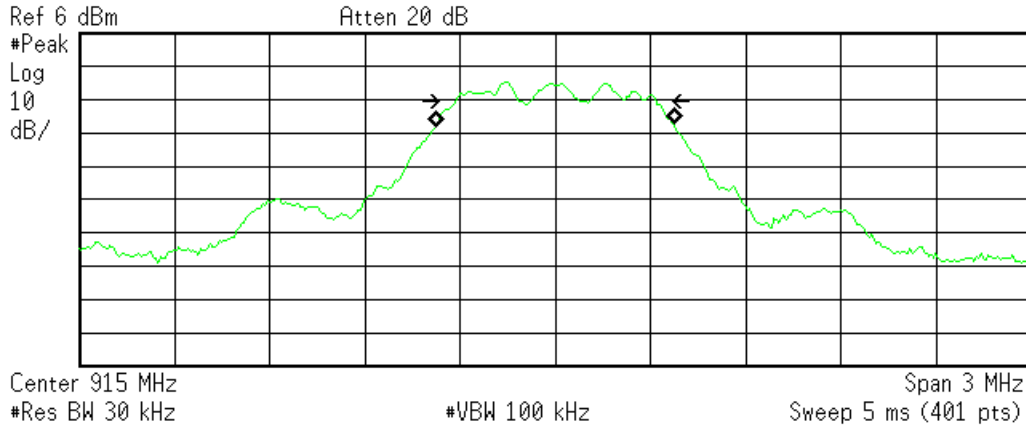
C:\temp.gif file saved

Low Channel – Antenna 2 – Occupied Bandwidth



Agilent 14:10:15 Jan 16, 2014

R T



Occupied Bandwidth  
749.6106 kHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

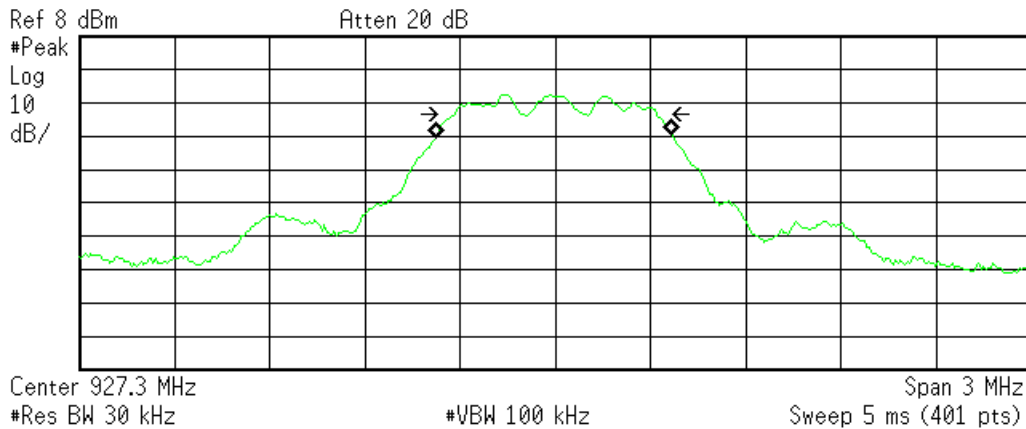
Transmit Freq Error -2.136 kHz  
x dB Bandwidth 637.166 kHz

C:\temp.gif file saved

Mid Channel - Antenna 2 - Occupied Bandwidth

Agilent 14:06:43 Jan 16, 2014

R T



Occupied Bandwidth  
746.6900 kHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

Transmit Freq Error -3.179 kHz  
x dB Bandwidth 641.369 kHz

C:\temp.gif file saved

High Channel - Antenna 2 - Occupied Bandwidth



Rev. 1/16/2014

<b>Spectrum Analyzers / Receivers/Preselectors</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
Gold		100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/18/2014	3/18/2013
<b>Radiated Emissions Sites</b>		<b>FCC Code</b>	<b>IC Code</b>	<b>VCCI Code</b>	<b>Range</b>		<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
EMI Chamber 2		719150	2762A-7	A-0015	30-1000MHz		II	2/15/2014	2/15/2012
<b>Preamps/Couplers Attenuators / Filters</b>		<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
HF 20dB 50W Attenuator		0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
<b>Meteorological Meters</b>			<b>MN</b>	<b>Mfr</b>	<b>SN</b>	<b>Asset</b>	<b>Cat</b>	<b>Calibration Due</b>	<b>Calibrated on</b>
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

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



### 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)	$3.23 \times 10^{-8}$	$1 \times 10^{-7}$
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4%	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.



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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

