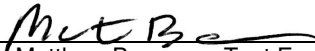





# Test Report



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

Report No	EK0169-1
Client	Powercast Corporation
Address	566 Alpha Drive Pittsburgh, PA 15238
Phone	412-436-4077
Items tested	Powercast Transmitter
FCC ID	YESTX91501
IC ID	8985A-TX91501
FRN	0019814789
Equipment Type	DSS
Equipment Code	Digital Spread Spectrum Transmitter
FCC/IC Rule Parts	47 CFR 15.247, RSS 210 issue 7 and RSS GEN issue 2
Test Dates	May 14, 2010 & July 6, 2010
Results	As detailed within this report
Prepared by	 Matthew Burman – Test Engineer
Authorized by	 Mairaj Hussain – EMC Supervisor
Issue Date	<u>9/23/2010</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 31 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 and RSS-210. The product is the Powercast Transmitter. It is a transmitter that operates in the range 902-928MHz.

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

The EUT does not have a receive mode.

**Test Methodology**

Radiated emission and AC Line conducted testing for 47 CFR Part 15.247 compliance was performed according to FCC test procedure for DTS published March 23, 2005. Radiated Emissions were maximized by rotating the device around three orthogonal axes as well as varying the test antenna’s height and polarity. The device antenna cannot be maximized separately.

The EUT is an intentional radiator that sends data and power to nearby devices. The EUT can send commands and identification data. The RF signal produced by EUT is DSSS with a fixed center frequency of 915MHz, and data is included by the EUT using ASK modulation. The maximum data rate is 16.67kbps. The EUT has a factory programmable data rate and power level, and it is not user adjustable. The EUT was tested at the minimum (no data), mid (8.33kbps), and maximum (16.67kbps) data rates and at the minimum and maximum power setting

Conducted emission at the antenna port was performed, as required by rule section.

No duty cycle correction factor was needed, therefore it was not measured

The EUT operating voltage is 5Vdc through an AC/DC power supply powered at 110Vac 60Hz.

The EUT operates only on channel centered at 915MHz.

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

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-25GHz	1MHz	3MHz

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	September 28, 2010



**Product Tested - Configuration Documentation**

EUT Configuration										
Work Order: K0169 Company: Powercast Corporation Company Address: 566 Alpha Drive Pittsburgh, PA 15238 Contact: Charlie Green										
			<b>MN</b>		<b>PN</b>			<b>SN</b>		
EUT:			TX-915-01		---			Sample #2		
Phihong Power Supply:			PSAC05R-050		---			Sample #1		
EUT Description: Powercast Transmitter										
EUT Tx Frequency: 915MHz										
<b>Support Equipment:</b>			<b>MN</b>			<b>SN</b>				
none			---			---				
<b>EUT Ports:</b>										
				<b>No.</b>				<b>Max</b>		<b>In/Out</b>
<b>Port Label</b>	<b>Port Type</b>	<b>No. of ports</b>	<b>Populated</b>	<b>Cable Type</b>	<b>Shielded</b>	<b>Ferrites</b>	<b>Length</b>	<b>Length</b>	<b>NEBS Type</b>	<b>Unpopulated Reason</b>
AC Mains	AC	1	1	2-wire AC	no	none	1.5m	1.5m	indoor	
<b>Software / Operating Mode Description:</b>										
EUT continues to transmit at 915MHz in different data rates										



## Statement of Conformity

The Powercast Transmitter has been found to conform to the following parts of 47 CFR and RSS 210 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.
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	The antenna for this device is hardwired to the PCB.
	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			Occupied Bandwidth measurements were made.

**Test Results**

**Bandwidth**

**LIMIT**

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

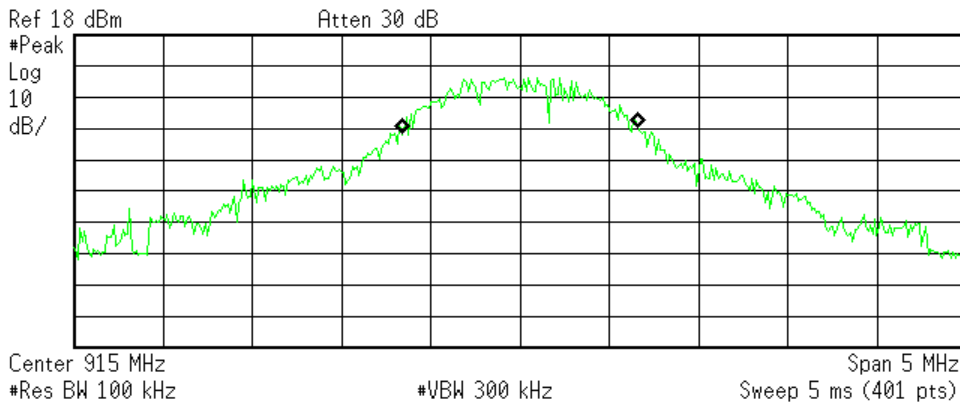
**MEASUREMENTS / RESULTS**

<b>Work Order: K0169</b>				
<b>Company: Powercast</b>				
<b>Engineer: MH</b>		<b>JDC</b>		
<b>Date: 5/14/2010</b>		<b>9/2/2010</b>		
<b>EUT:</b>		TX-915-01		
<b>EUT operating volatge and frequency:</b>		110V ac 60Hz		
<b>Temp: 24.6°C</b>		<b>Humidity: 48%</b>		<b>Pressure: 1012mbar</b>
<b>Temp: 25.6°C</b>		<b>Humidity: 41%</b>		<b>Pressure: 1010mbar</b>
<b>Mode</b>	<b>Frequency (MHz)</b>	<b>Reading (MHz)</b>	<b>Minimum Required (MHz)</b>	<b>Pass/Fail</b>
8.33kbps	915	0.820693	0.5	Pass
16.67kbps	915	0.760021	0.5	Pass
No data	915	0.807	0.5	Pass

**8.33kbps**

Agilent 17:47:59 May 14, 2010

R T



**Occupied Bandwidth**  
**1.3209 MHz**

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

**Transmit Freq Error** 919.792 Hz  
**x dB Bandwidth** 820.693 kHz\*

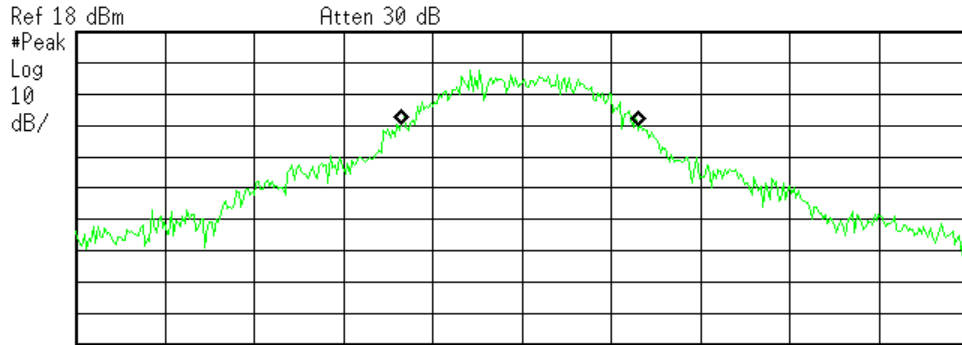
C:\temp.gif file saved



16.67kbps

Agilent 17:50:22 May 14, 2010

R T



Center 915 MHz Span 5 MHz  
 #Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth  
 1.3250 MHz

Occ BW % Pwr 99.00 %  
 x dB -6.00 dB

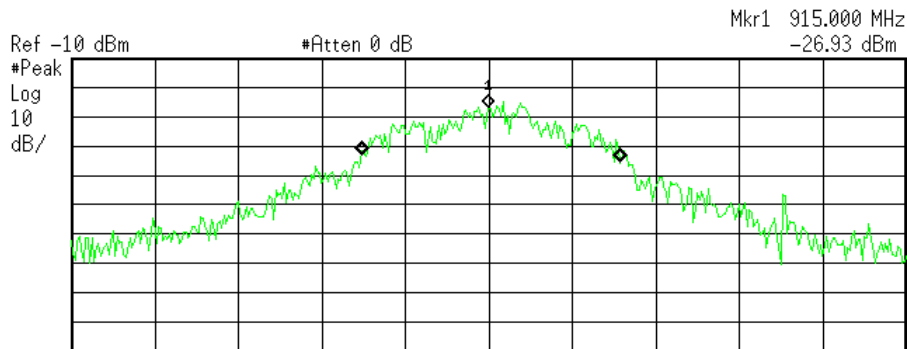
Transmit Freq Error -15.172 kHz  
 x dB Bandwidth 760.021 kHz\*

C:\temp.gif file saved

No Data Mode

Agilent 02:01:12 Sep 2, 2010

R T



Center 915 MHz Span 10 MHz  
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)

Occupied Bandwidth  
 3.1097 MHz

Occ BW % Pwr 99.00 %  
 x dB -6.00 dB

Transmit Freq Error 24.505 kHz  
 x dB Bandwidth 807.086 kHz\*



# Peak Power

## LIMIT

Conducted Output Power

1 Watt

[15.247(b) (3)]

EUT antenna gain is 8.343dBi

## MEASUREMENTS / RESULTS

### High Power Setting

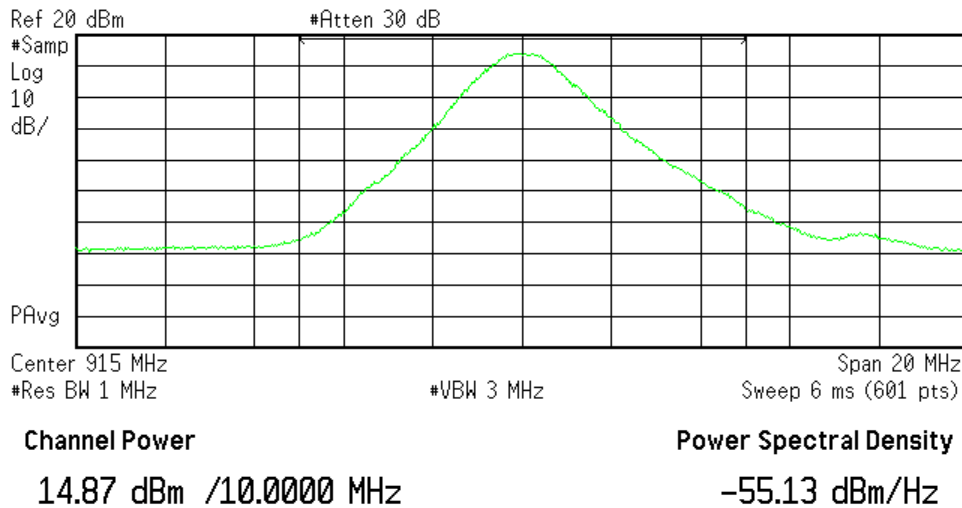
Peak Output Power												
Date: 06-Jul-10			Company: Powercast				Work Order: K0169					
Engineer: TT			EUT Desc: TX-915-01				EUT Operating Voltage/Frequency: 120Vac 60Hz					
Temp: 24.5°C			Humidity: 44%				Pressure: 1014mBar					
Frequency Range: 915MHz						Measurement Distance: Conductive						
Notes: RBW = 1MHz						Peak Output Power Option 2, Method 1						
Sample Detector						1 Watt = 30 dBm						
Frequency (MHz)	Reading (dBm)	Attenuator Factor (dB/m)	Adjusted Reading (dBm)	---			FCC 15.247 (b) (3)					
				Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)			
8.33kbps (orange led)	915.0	14.87	---	8.87	---	23.74	---	---	---	27.657	-3.917	Pass
16.67kbps (red led)	915.0	15.46	---	8.87	---	24.33	---	---	---	27.657	-3.327	Pass
No Data (green led)	915.0	17.43	---	8.87	---	26.3	---	---	---	27.657	-1.357	Pass
<b>Table Result:</b> Pass by -1.4 dB										<b>Worst Freq:</b> 915.0 MHz		
Test Site: EMC4 Analyzer: Asset #1491												

## PLOTS

### 8.33kbps mode – Orange LED

Agilent 21:57:04 Jul 6, 2010

R L



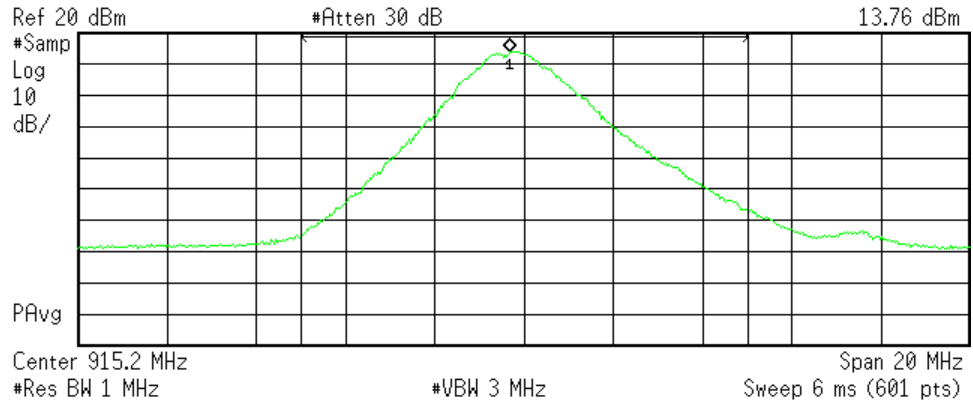


16.67kbps – Red LED

Agilent 22:05:31 Jul 6, 2010

R L

Mkr1 914.90 MHz  
13.76 dBm

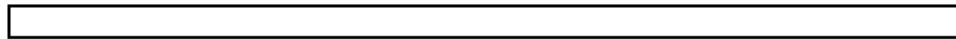


Channel Power

15.46 dBm /10.0000 MHz

Power Spectral Density

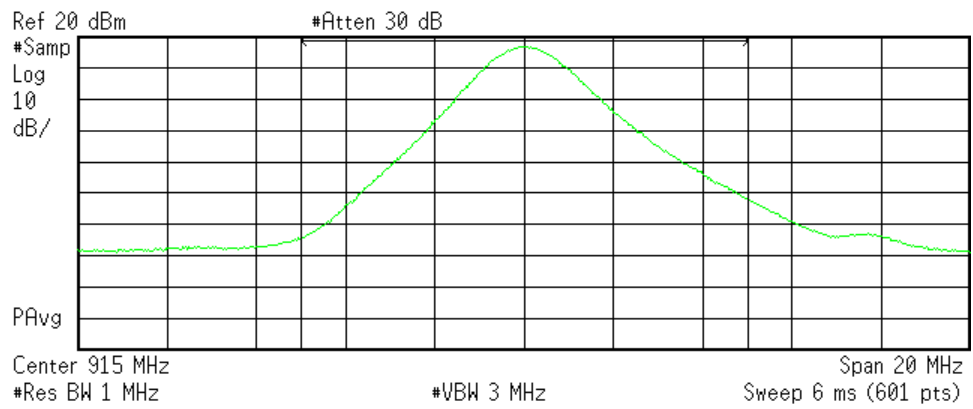
-54.54 dBm/Hz



No Data mode – Green LED

Agilent 22:20:08 Jul 6, 2010

R L



Channel Power

17.43 dBm /10.0000 MHz

Power Spectral Density

-52.57 dBm/Hz

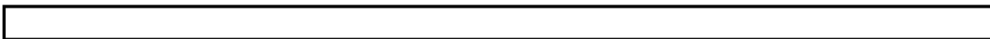
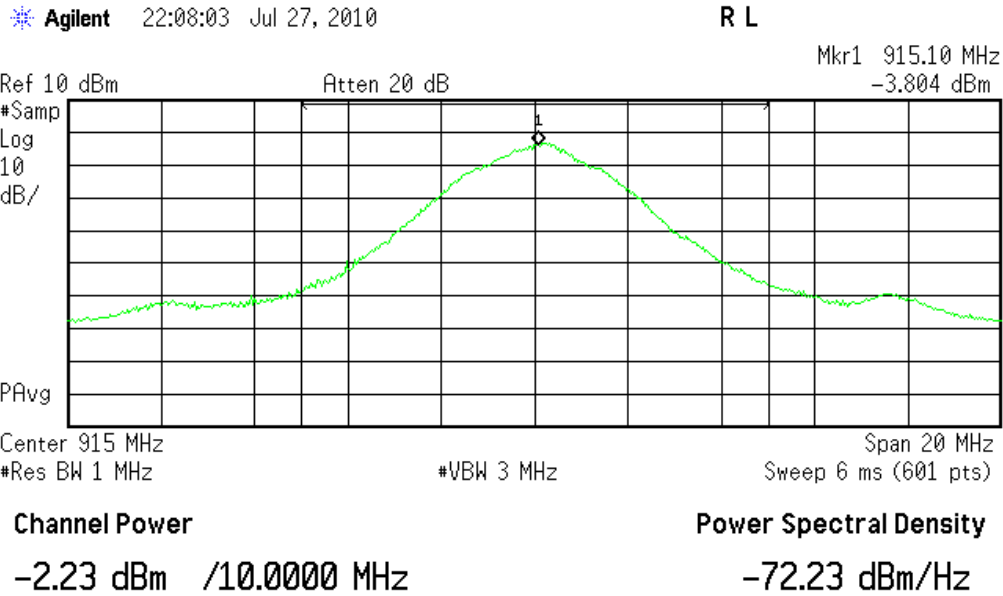


### Low Power Setting

Peak Output Power											
Date: 27-Jul-10			Company: Powercast			Work Order: K0169					
Engineer: Tuyen Truong			EUT Desc: TX-915-01 with Low Power Setting			EUT Operating Voltage/Frequency: 120Vac 60Hz					
Temp: 24.1°C			Humidity: 41%			Pressure: 885 mBar					
Frequency Range: 915MHz				Measurement Distance: Conductive							
Notes: RBW = 1MHz				Peak Output Power Option 2, Method 1				Integrated BW = 10 MHz			
Sample Detector				1 Watt = 30 dBm							
Frequency (MHz)	Reading (dBm)	Attenuator Factor (dB/m)	Adjusted Reading (dBm)	FCC 15.247 (b) (3)							
				Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)					
8.33kbps (orange led)	915.0	-2.23	8.87	6.64	27.657	-21.017	Pass				
16.67kbps (red led)	915.0	-1.75	8.87	7.12	27.657	-20.537	Pass				
No Data (green led)	915.0	-0.17	8.87	8.7	27.657	-18.96	Pass				
<b>Table Result:</b> Pass by -19.0 dB							<b>Worst Freq:</b> 915.0 MHz				
Test Site: EMCS											
Analyzer: Asset #1491											

### PLOTS

#### 8.33kbps mode – Orange LED

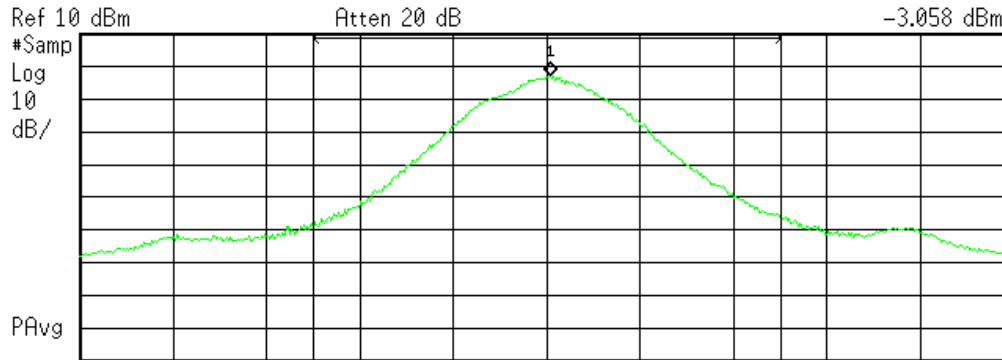


**16.67kbps – Red LED**

Agilent 22:12:06 Jul 27, 2010

R L

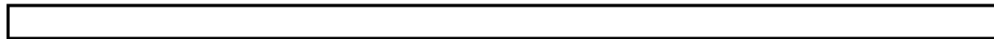
Mkr1 915.10 MHz  
-3.058 dBm



Ref 10 dBm Atten 20 dB  
#Samp Log 10 dB/  
Center 915 MHz #Res BW 1 MHz #VBW 3 MHz Span 20 MHz Sweep 6 ms (601 pts)

**Channel Power**  
-1.75 dBm /10.0000 MHz

**Power Spectral Density**  
-71.75 dBm/Hz

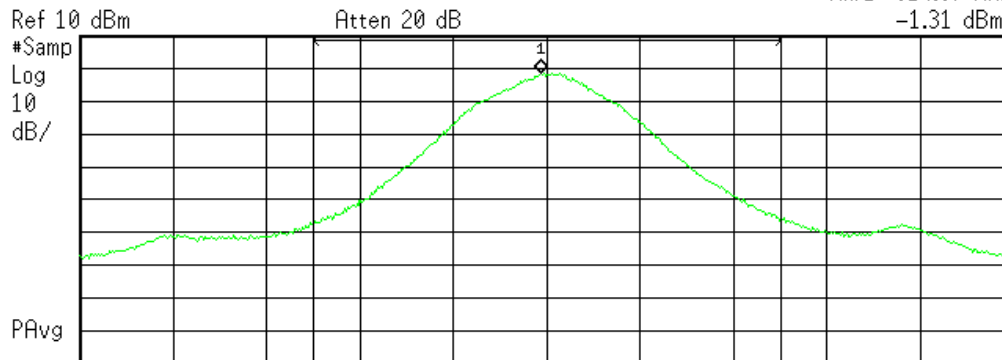


**No Data mode – Green LED**

Agilent 22:13:37 Jul 27, 2010

R L

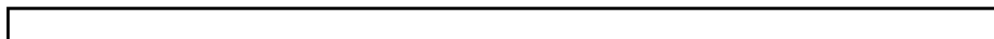
Mkr1 914.87 MHz  
-1.31 dBm



Ref 10 dBm Atten 20 dB  
#Samp Log 10 dB/  
Center 915 MHz #Res BW 1 MHz #VBW 3 MHz Span 20 MHz Sweep 6 ms (601 pts)

**Channel Power**  
-0.17 dBm /10.0000 MHz

**Power Spectral Density**  
-70.17 dBm/Hz



## Band Edge Measurements

### 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

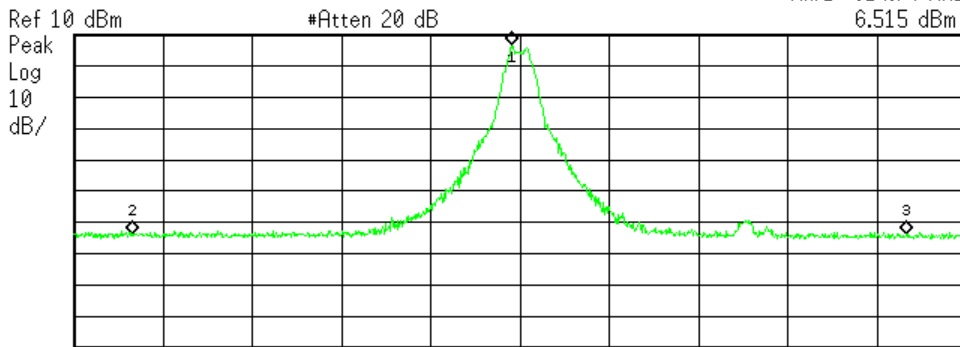
#### High Power Setting

#### 8.33kbps

Agilent 18:40:45 May 14, 2010

R T

Mkr1 914.74 MHz  
6.515 dBm



Start 900 MHz Stop 930 MHz  
#Res BW 100 kHz #VBW 3 MHz Sweep 9.99 ms (1000 pts)

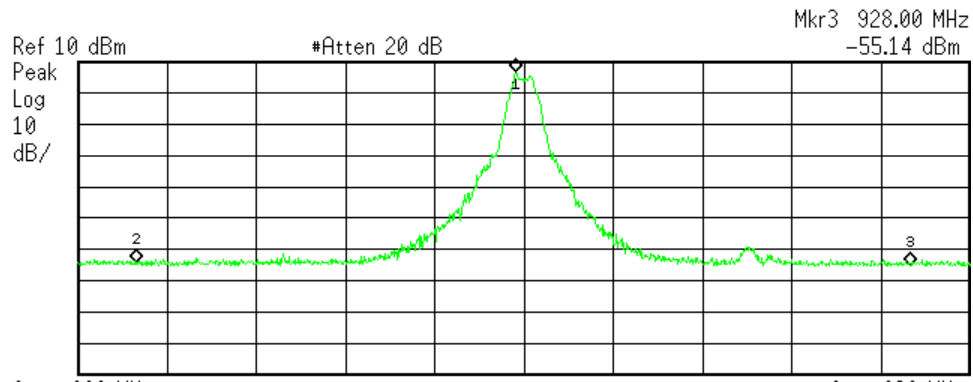
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	914.74 MHz	6.515 dBm
2	(1)	Freq	902.00 MHz	-53.79 dBm
3	(1)	Freq	928.00 MHz	-53.53 dBm

C:\temp.gif file saved

16.67kbps

Agilent 18:53:24 May 14, 2010

R T



Ref 10 dBm #Atten 20 dB Mkr3 928.00 MHz -55.14 dBm  
 Start 900 MHz Stop 930 MHz  
 #Res BW 100 kHz #VBW 3 MHz Sweep 9.99 ms (1000 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	914.71 MHz	6.702 dBm
2	(1)	Freq	902.00 MHz	-54.25 dBm
3	(1)	Freq	928.00 MHz	-55.14 dBm

C:\temp.gif file saved

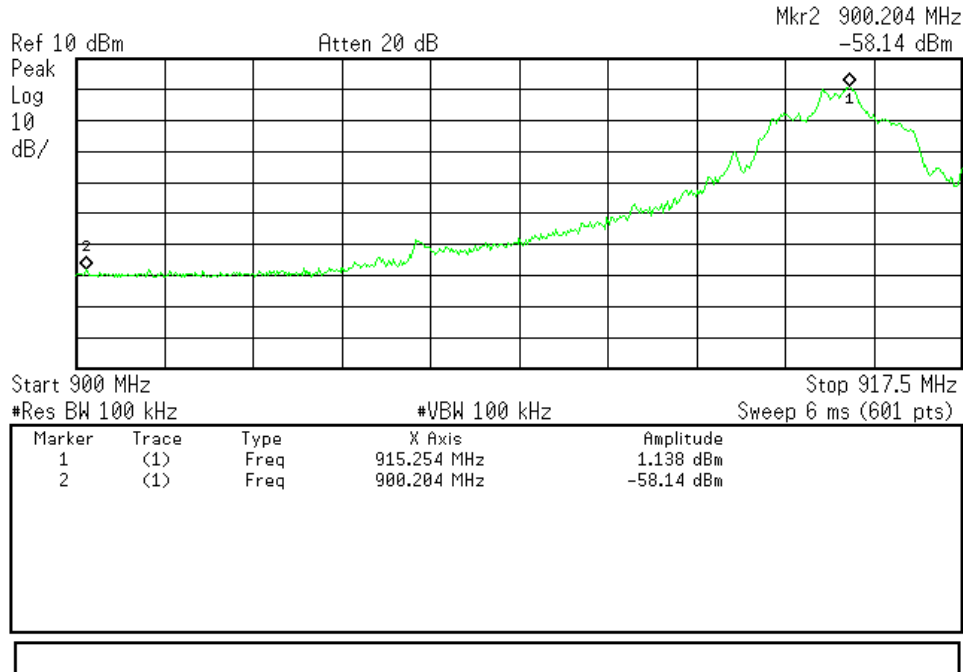


**Low Power Setting**

**16.67kbps (Worst Case)**

Agilent 22:41:13 Jul 27, 2010

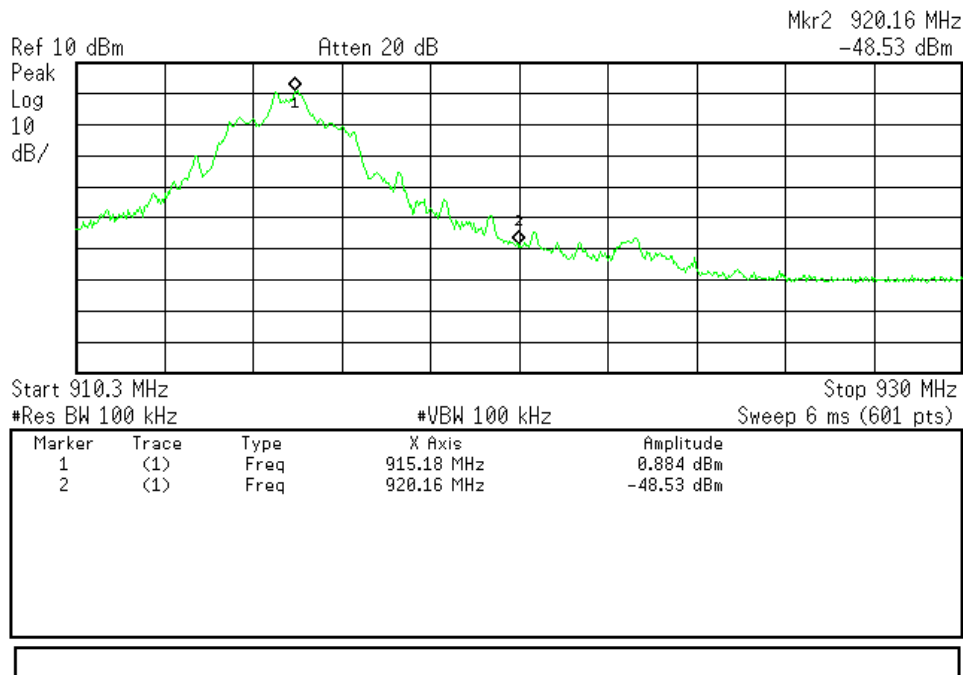
R L



**Lower Band Edge**

Agilent 22:43:50 Jul 27, 2010

R L



**Upper Band Edge**



# 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: 14-May-10			Company: Powercast				Work Order: K0169					
Engineer: AC			EUT Desc: TX-915-01				EUT Operating Voltage/Frequency: 110V/60Hz					
Temp: 25.4°C			Humidity: 22%				Pressure: 1005mBar					
Frequency Range: 30-1000MHz						Measurement Distance: 3 m						
Notes:												EUT Max Freq: 915 MHz
RBW: 120kHz; VBW:300kHz												
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
No Emissions Found												
<b>Table Result:</b> Pass by --- dB										<b>Worst Freq:</b> --- MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #1505				Cable 2: Asset #1507			Cable 3: ---		
Analyzer: Gold			Preamp: Red				Antenna: Red-Brown			Preselector: ---		

Radiated Emissions Table														
Date: 14-May-10			Company: Powercast				Work Order: K0169							
Engineer: MH			EUT Desc: TX-915-01				EUT Operating Voltage/Frequency: 110V/60Hz							
Temp: 25.4°C			Humidity: 22%				Pressure: 1005mBar							
Frequency Range: 1 - 10GHz						Measurement Distance: 3 m								
Notes: Restricted band												EUT Max Freq: 915 MHz		
RBW: 1MHz; VBW:1MHz and 30Hz														
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)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
H	3661.0	43.7	35.7	21.5	31.9	3.6	57.7	49.7	74.0	-16.3	Pass	54.0	-4.3	Pass
<b>Table Result:</b> Pass by -4.3 dB										<b>Worst Freq:</b> 3661.0 MHz				
Test Site: EMI Chamber 1			Cable 1: Asset #1505				Cable 2: Asset #1507			Cable 3: ---				
Analyzer: Gold			Preamp: Brown				Antenna: Orange Horn			Preselector: ---				



## Conducted Spurious Emissions

### LIMITS

In any 100kHz 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...

[15.247(d)]

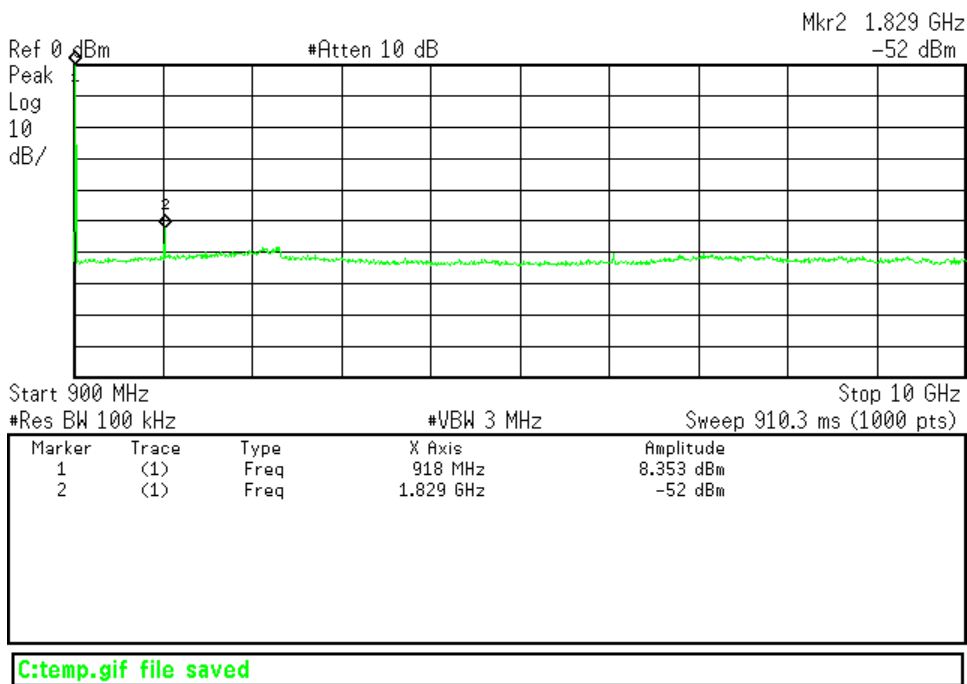
### MEASUREMENTS / RESULTS

#### High Power Setting

#### 8.33kbps

Agilent 18:37:38 May 14, 2010

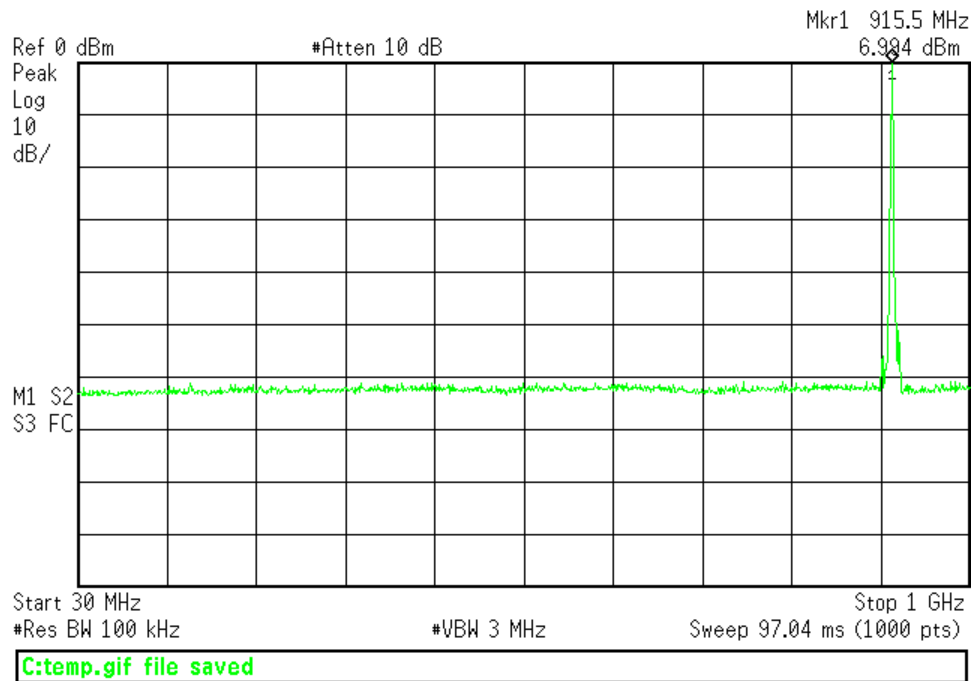
R T





Agilent 18:35:15 May 14, 2010

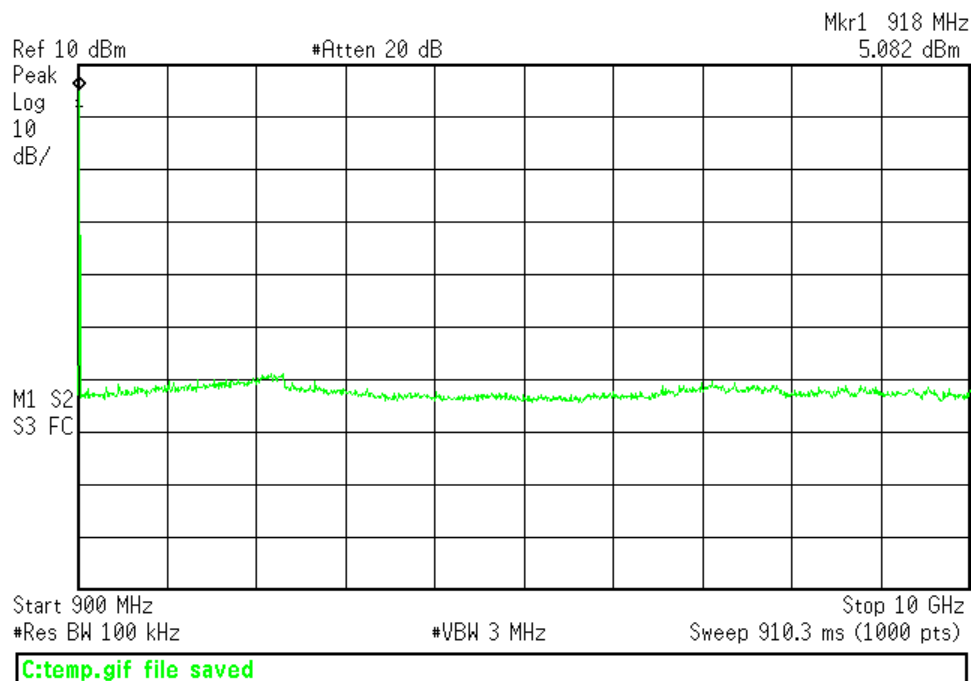
R T



### 16.67kbps

Agilent 18:45:49 May 14, 2010

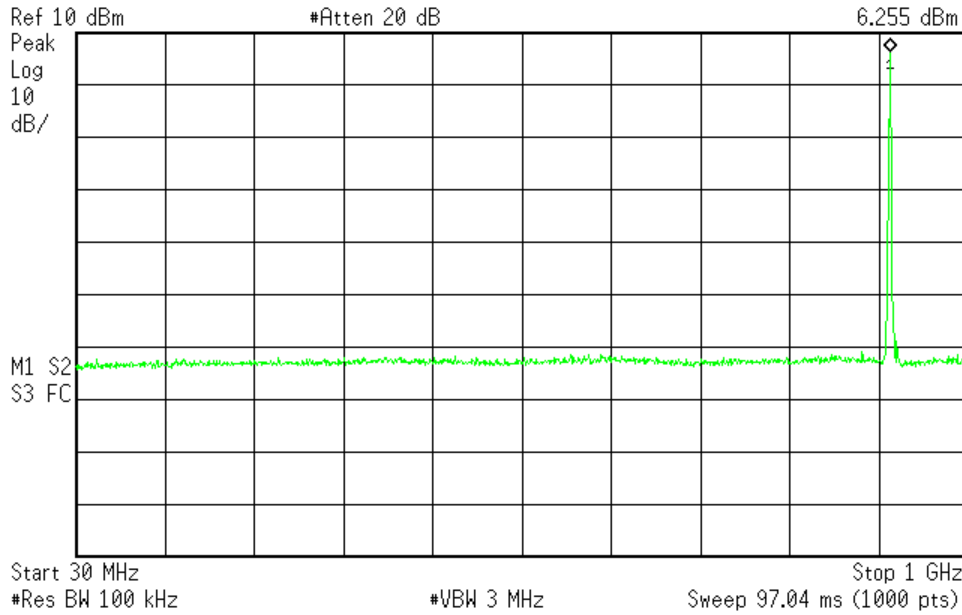
R T



Agilent 18:43:43 May 14, 2010

R T

Mkr1 914.6 MHz  
6.255 dBm



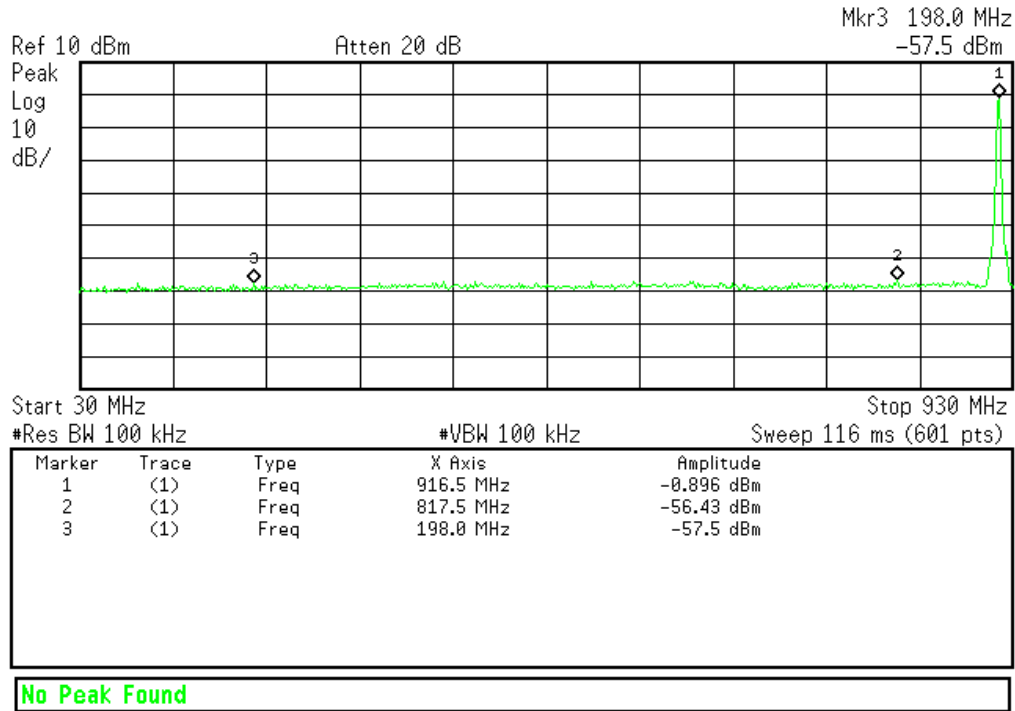
C:\temp.gif file saved



**Low Power Setting**  
**16.67 kbps**

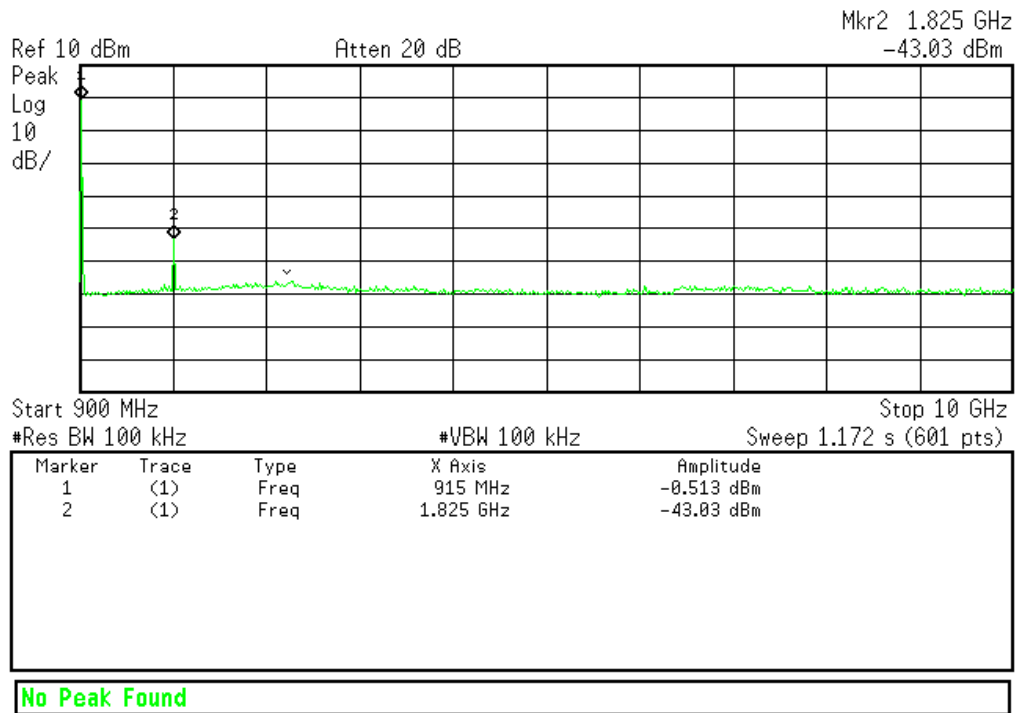
Agilent 22:45:44 Jul 27, 2010

R L



Agilent 22:50:01 Jul 27, 2010

R L



# Power Spectral Density

## LIMIT

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

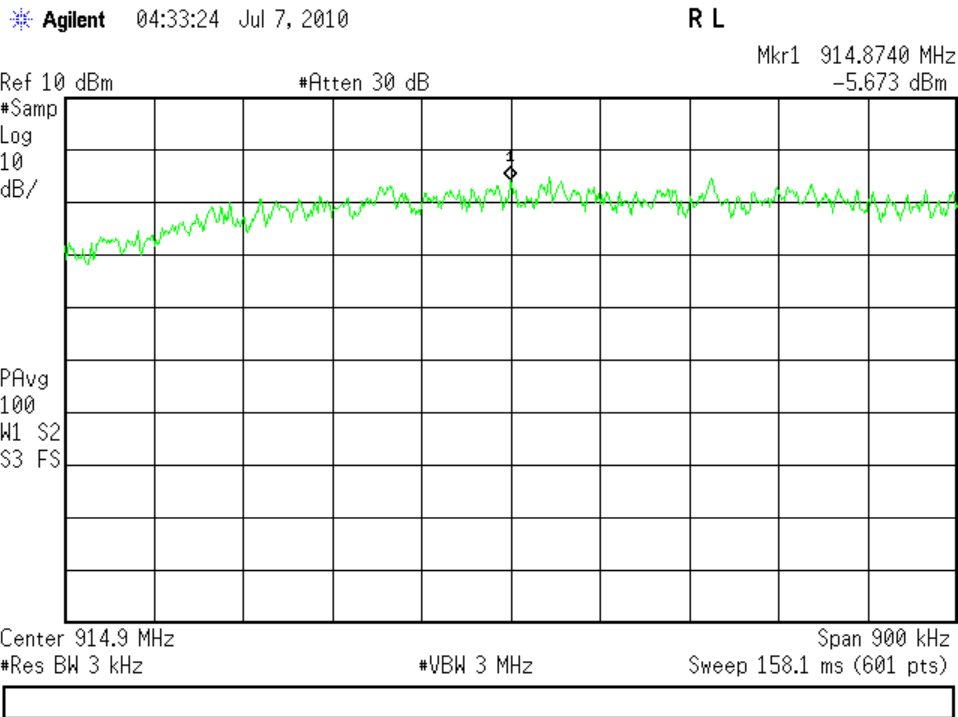
## MEASUREMENTS / RESULTS

### High Power Setting

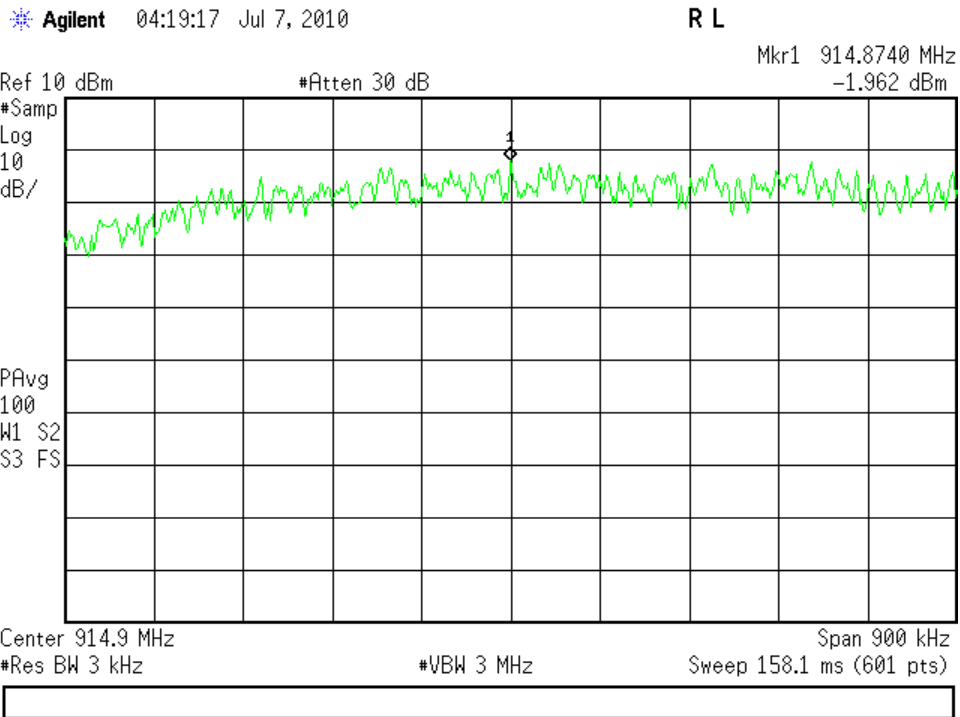
Power Spectral Density												
Date: 06-Jul-10			Company: Powercast			Work Order: K0169						
Engineer: TT			EUT Desc: TX-915-01			EUT Operating Voltage/Frequency: 120Vac 60Hz						
Temp: 24.5°C			Humidity: 44%			Pressure: 1014mBar						
Frequency Range: 915MHz						Measurement Distance: Conductive						
Notes: RBW = 3kHz			Span = 900kHz			PSD Option 2						
Sample Detector			Power Average Mode									
Frequency (MHz)	Reading (dBm)	Attenuator Factor (dBm)	Adjusted Reading (dBm)	FCC 15.247 (e)								
				Limit (dBm)	Margin (dB)	Result (Pass/Fail)						
No Data (green led)	914.874	-1.962	---	8.87	---	6.908	---	---	---	8.0	-1.092	Pass
8.33kbps (orange led)	914.874	-5.472	---	8.87	---	3.398	---	---	---	8.0	-4.602	Pass
16.67kbps (red led)	914.874	-5.673	---	8.87	---	3.197	---	---	---	8.0	-4.803	Pass
Test Site: EMC4												
Analyzer: Asset #1491												

## PLOTS

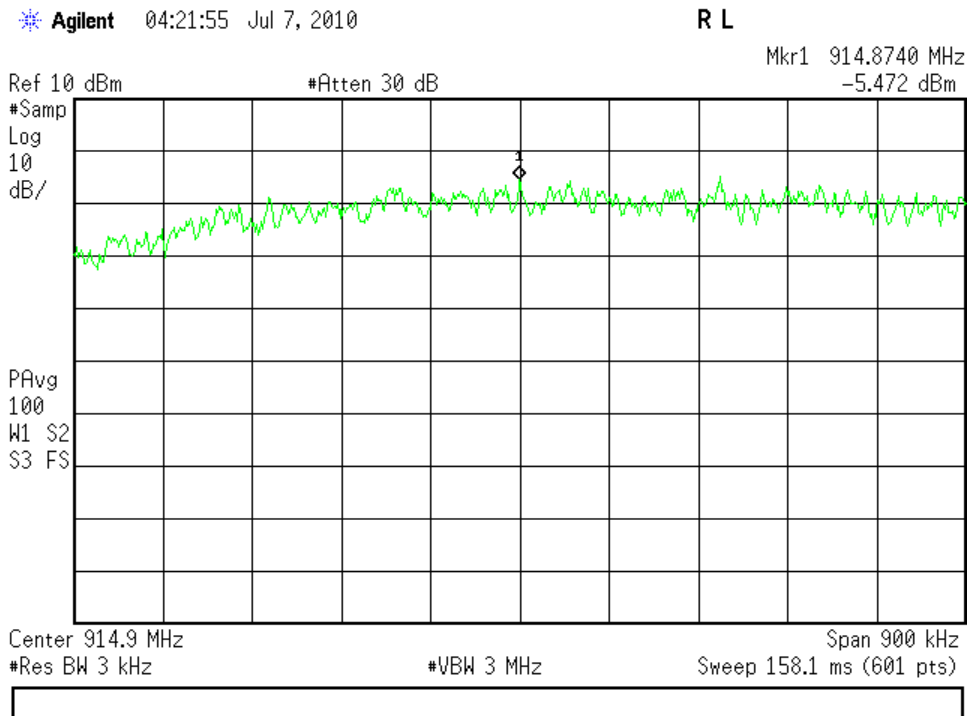
### 16.67 kbps – RED led



**No Data mode – Green LED**



**8.33 kbps – Orange LED**



### Low Power Setting

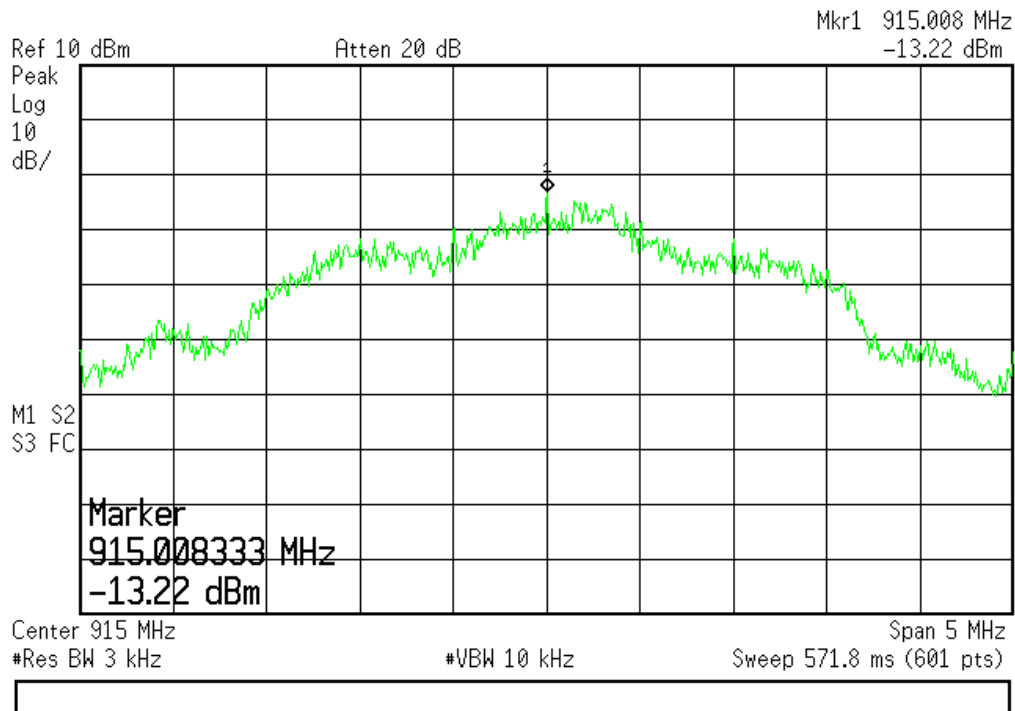
Power Spectral Density																																																														
Date: 27-Jul-10			Company: Powercast				Work Order: K0169																																																							
Engineer: Tuyen Truong			EUT Desc: TX-915-01 with Low Power Setting				EUT Operating Voltage/Frequency: 120Vac 60Hz																																																							
Temp: 24.1°C			Humidity: 41%				Pressure: 885 mBar																																																							
Frequency Range: 915MHz						Measurement Distance: Conductive																																																								
Notes: RBW = 3kHz			Span = 5 MHz																																																											
Peak Detector			Power Average Mode																																																											
<table border="1"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Frequency (MHz)</th> <th rowspan="2">Reading (dBm)</th> <th rowspan="2">Attenuator Factor (dBm)</th> <th rowspan="2">Adjusted Reading (dBm)</th> <th colspan="3">---</th> <th colspan="3">FCC 15.247 (e)</th> </tr> <tr> <th>Limit (dBμV/m)</th> <th>Margin (dB)</th> <th>Result (Pass/Fail)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Result (Pass/Fail)</th> </tr> </thead> <tbody> <tr> <td>No Data (green led)</td> <td>914.874</td> <td>-13.36</td> <td>---</td> <td>-4.49</td> <td>---</td> <td>---</td> <td>---</td> <td>8.0</td> <td>-12.49</td> <td>Pass</td> </tr> <tr> <td>8.33kbps (orange led)</td> <td>914.874</td> <td>-13.44</td> <td>---</td> <td>-4.57</td> <td>---</td> <td>---</td> <td>---</td> <td>8.0</td> <td>-12.57</td> <td>Pass</td> </tr> <tr> <td>16.67kbps (red led)</td> <td>914.874</td> <td>-13.22</td> <td>---</td> <td>-4.35</td> <td>---</td> <td>---</td> <td>---</td> <td>8.0</td> <td>-12.35</td> <td>Pass</td> </tr> </tbody> </table>														Frequency (MHz)	Reading (dBm)	Attenuator Factor (dBm)	Adjusted Reading (dBm)	---			FCC 15.247 (e)			Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)	No Data (green led)	914.874	-13.36	---	-4.49	---	---	---	8.0	-12.49	Pass	8.33kbps (orange led)	914.874	-13.44	---	-4.57	---	---	---	8.0	-12.57	Pass	16.67kbps (red led)	914.874	-13.22	---	-4.35	---	---	---	8.0	-12.35	Pass
	Frequency (MHz)	Reading (dBm)	Attenuator Factor (dBm)	Adjusted Reading (dBm)	---			FCC 15.247 (e)																																																						
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16.67kbps (red led)	914.874	-13.22	---	-4.35	---	---	---	8.0	-12.35	Pass																																																				
<b>Table Result:</b> Pass by -12.4 dB						<b>Worst Freq:</b> 915.0 MHz																																																								
Test Site: EMC4																																																														
Analyzer: Asset #1491																																																														

### PLOTS

#### 16.67 kbps – RED led

Agilent 22:32:45 Jul 27, 2010

R L

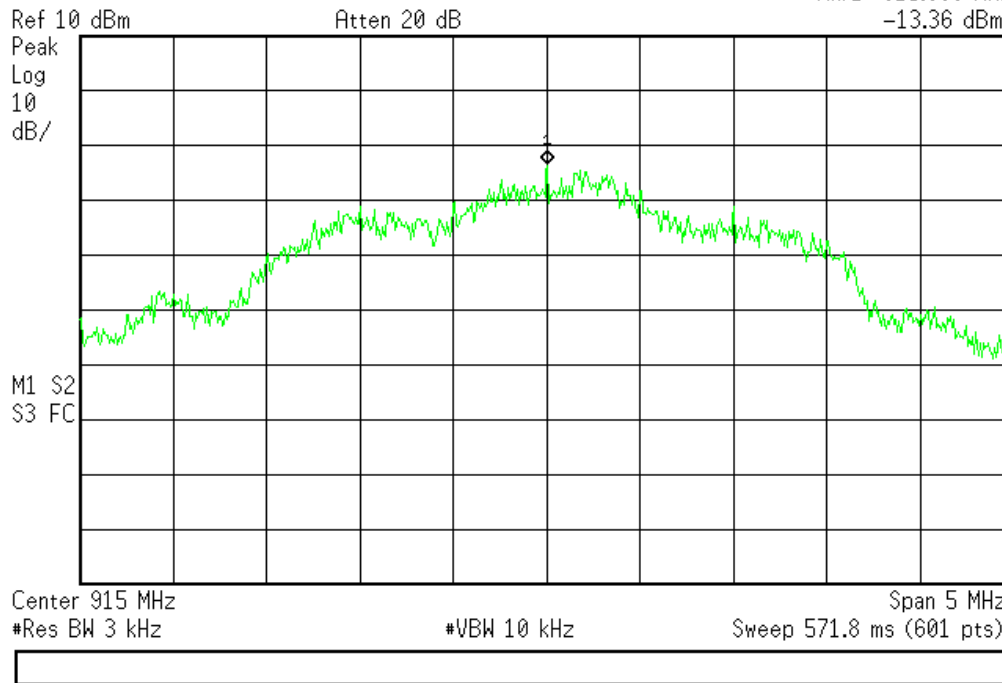


**No Data mode – Green LED**

Agilent 22:29:48 Jul 27, 2010

R L

Mkr1 915.008 MHz  
-13.36 dBm

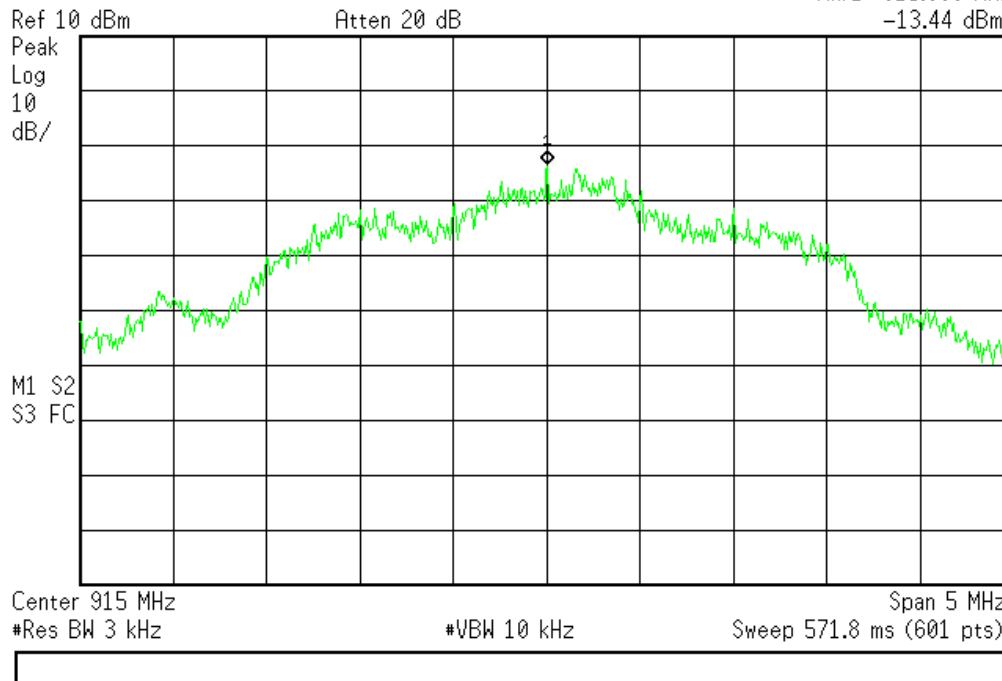


**8.33 kbps – Orange LED**

Agilent 22:31:25 Jul 27, 2010

R L

Mkr1 915.008 MHz  
-13.44 dBm



### 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

AC Mains Conducted Emissions										
Date: 14-May-10			Company: Powercast			Work Order: K0169				
Engineer: MH			EUT Desc: TX-915-01			Test Site: cemi3				
Temp: 24.1 °C			Humidity: 26%			Pressure: mBar				
Notes:										
Measurement Device: Red LISN						EUT Operating Voltage/Frequency: 110V/60Hz				
Range: 0.15-30MHz						Spectrum Analyzer: Red				
Frequency (MHz)	Q.P. Readings		Ave. Readings		Impedance Factor (dB)	FCC/CISPR B		FCC/CISPR B		Overall Result (Pass/Fail)
	QP1 (dBµV)	QP2 (dBµV)	AV1 (dBµV)	AV2 (dBµV)		qp Limit (dBµV)	qp Margin dB	AVE Limit (dBµV)	AVE Margin dB	
0.19	21.6	22.2	20.4	18.2	20.3	63.9	-21.4	53.9	-13.2	Pass
0.54	16.0	24.7	6.0	12.5	20.2	56.0	-11.1	46.0	-13.3	Pass
1.66	11.0	15.9	3.4	8.5	20.2	56.0	-19.9	46.0	-17.3	Pass
12.96	10.9	14.7	2.1	6.5	20.4	60.0	-24.9	50.0	-23.1	Pass
14.16	12.8	16.9	5.6	9.0	20.4	60.0	-22.7	50.0	-20.6	Pass
14.75	14.2	16.1	5.6	8.9	20.4	60.0	-23.5	50.0	-20.7	Pass
<b>Table Result:</b> Pass by -11.10 dB <b>Worst Freq:</b> 0.54 MHz										





## Voltage Variations

### REQUIREMENT

Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery powered equipment, the equipment tests shall be performed using a new battery.  
[15.31(e)]

### MEASUREMENTS / RESULTS

<b>Voltage Variations</b>			
<b>FCC 15.31 (e)</b>			
85% and 115% of nominal voltage			
<b>Test Engineer:</b> Matthew Burman		<b>Site:</b> EMC 4	
<b>Spectrum Analyzer:</b> Asset #1491		<b>Temp:</b> 25.4°C	
<b>Fluke Multimeter:</b> Asset #974		<b>Humidity:</b> 44%	
<b>RBW:</b> 100kHz		<b>Pressure:</b> 1015mbar	
<b>Span:</b> 5MHz			
Conductive Readings			
Voltage (Vac)	Center Frequency (MHz)	Peak Power (dBm)	Deviation (kHz)
120Vac 60Hz	914.863	10.400	---
138Vac 60Hz	914.863	10.410	0.000
102Vac 60Hz	914.863	10.400	0.000

## Occupied Bandwidth

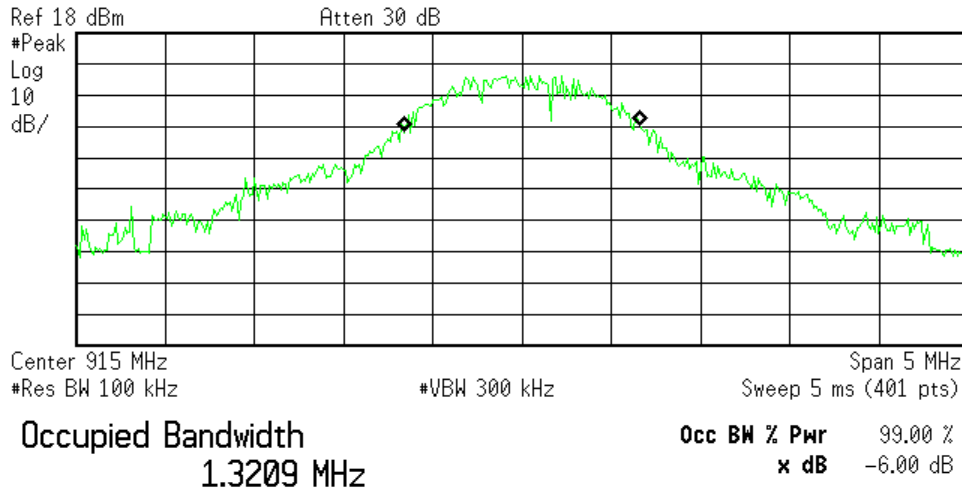
### REQUIREMENT

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]

8.33kbps

Agilent 17:47:59 May 14, 2010

R T



Transmit Freq Error 919.792 Hz  
 x dB Bandwidth 820.693 kHz\*

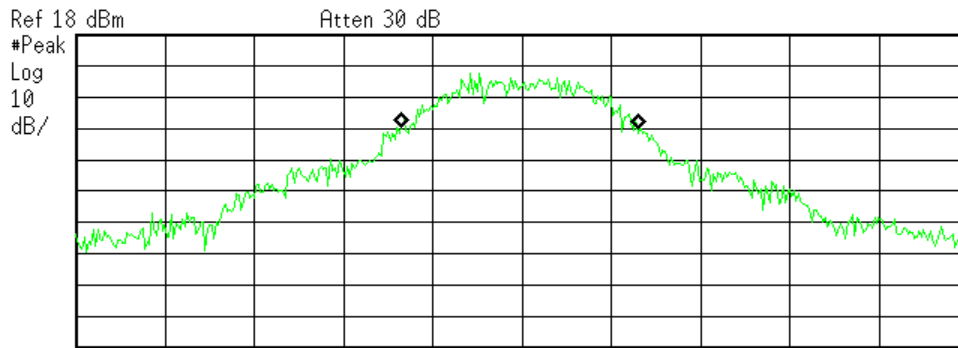
C:\temp.gif file saved



16.67kbps

Agilent 17:50:22 May 14, 2010

R T



Center 915 MHz Span 5 MHz  
#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)

Occupied Bandwidth  
1.3250 MHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

Transmit Freq Error -15.172 kHz  
x dB Bandwidth 760.021 kHz\*

C:\temp.gif file saved



### 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% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%

The above reflects a 95% confidence level



### Test Equipment Used

Rev: 7-Jul-2010

Spectrum Analyzers / Receivers /Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red		9kHz-1.8GHz	8591E	Agilent	3441A03559	24	I	10-Mar-2011
Gold		100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	9-Apr-2011
Rental SA #5		9kHz-26.5 GHz	E4407B	Agilent	MY44220066	1491	I	11-Feb-2011
LISNs/Measurement Probes		Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red LISN		9kHz-50MHz	8012-50-R-24-BNC	Solar	956348	753	I	19-Jul-2010
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code			Cat	Calibration Due
EMI Chamber 1		719150	2762A-6	R-3032, G-106			I	15-Feb-2011
Conducted Test Sites (Mains / Telco)		FCC Code		VCCI Code			Cat	Calibration Due
CEMI 3		719150		C-3362, T-1577			III	NA
Preamps /Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red		0.009-2000MHz	ZFL-1000-LN	CS	N/A	798	II	6-Apr-2011
Brown		1-18GHz	CS	CS	N/A	1523	II	17-Jul-2010
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-Brown Bilog		30-2000MHz	JB1	Sunol	A0032406	1218	I	11-Aug-2010
Orange Horn		1-18GHz	3115	EMCO	0004-6123	390	I	19-Jun-2011
RMS Voltmeters/Current Clamp			MN	Mnfr	SN	Asset	Cat	Calibration Due
True-RMS Multimeter			177	Fluke	83390025	974	I	2-Apr-2012
Meteorological Meters			MN	Mfr	SN	Asset	Cat	Calibration Due
Temp./Humidity/Atm. Pressure Gauge			7400 Perception II	Davis	N/A	965	I	6-Apr-2011
CEMI3 Thermohygrometer			35519-044	Control Company	72457729	1338	II	18-Aug-2011
CHAMBER1 Thermohygrometer			35519-044	Control Company	72457642	1345	II	18-Aug-2011
EMC4 Thermohygrometer			35519-044	Control Company	90823028	1496	II	20-Mar-2011

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



***Product Documentation***

The following documentation has been provided by the client for inclusion in this report.



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One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



## 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.



BUREAU  
VERITAS

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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.

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(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

