





Test Report



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

Report No	EN1640-1 Issue 1
Client	Zoom Telephonics, Inc. Paul Prohodski
Address	207 South Street Boston, MA 02111
Phone	617-753-0500
Items tested	ZoomGuard MultiSensor P1
FCC ID	BDN0243WL
IC	1535A-0243
FRN	0009014168
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	August 5 and 7, 2013
Results	As detailed within this report
Prepared by	 Tuyen Truong A. – Test Engineer
Authorized by	 Mairaj Hussain – EMC Supervisor
Issue Date	9/18/2013
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 30 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 ZoomGuard MultiSensor P1. It is a digitally modulated transmitter that operates in the range 902-928MHz. Product was tested with an on board antenna with a gain of 7.3dBi.

We found that the product met the above requirements without modification. Paul Prohodski from Zoom Telephonics, Inc. 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



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Test Methodology

Testing for section 15.247 was performed according to FCC procedure for DTS measurements KDB publication # 558074 D01 v03r01 April 19, 2013. Radiated and AC mains conducted emissions were performed per ANSI C63.10 (2009) and C63.4 (2009). Radiated Emissions were maximized by rotating the device around its 3 orthogonal planes as well as varying the test antenna's height and polarity. The device antenna cannot be maximized separately.

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

The EUT operating voltage is 120VAC, 60Hz

Low operating channel frequency = 908MHz

Mid operating channel frequency = 914MHz

High operating channel frequency = 919MHz

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

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	300kHz
1-10GHz	1MHz	3MHz

Product Tested - Configuration Documentation

EUT Configuration										
Work Order: N1640 Company: Zoom Telephonics, Inc. Company Address: 207 South Street Boston, MA 02111 Contact: Paul Prohodski Person Present: Paul Prohodski										
					MN			SN		
EUT:					8110			Sample 1		
EUT Description: ZoomGuard MultiSensor P1 EUT Max Frequency: <108MHz EUT Tx Frequency: 902 - 928MHz										
Support Equipment:					MN			SN		
Table lamp					--			--		
EUT Ports:										
Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason
AC IN	Power Input	1	1	3 wire AC	No	None	1 m	1 m	NA	
AC OUT	Power Output	1	1	3 wire AC	No	None	1m	1m	NA	
Software / Operating Mode Description:										
EUT is constantly transmitting on one of the available channels. EUT is also tested in RX mode.										



Statement of Conformity

The ZoomGuard MultiSensor P1 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	Antenna is soldered to the board.
	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

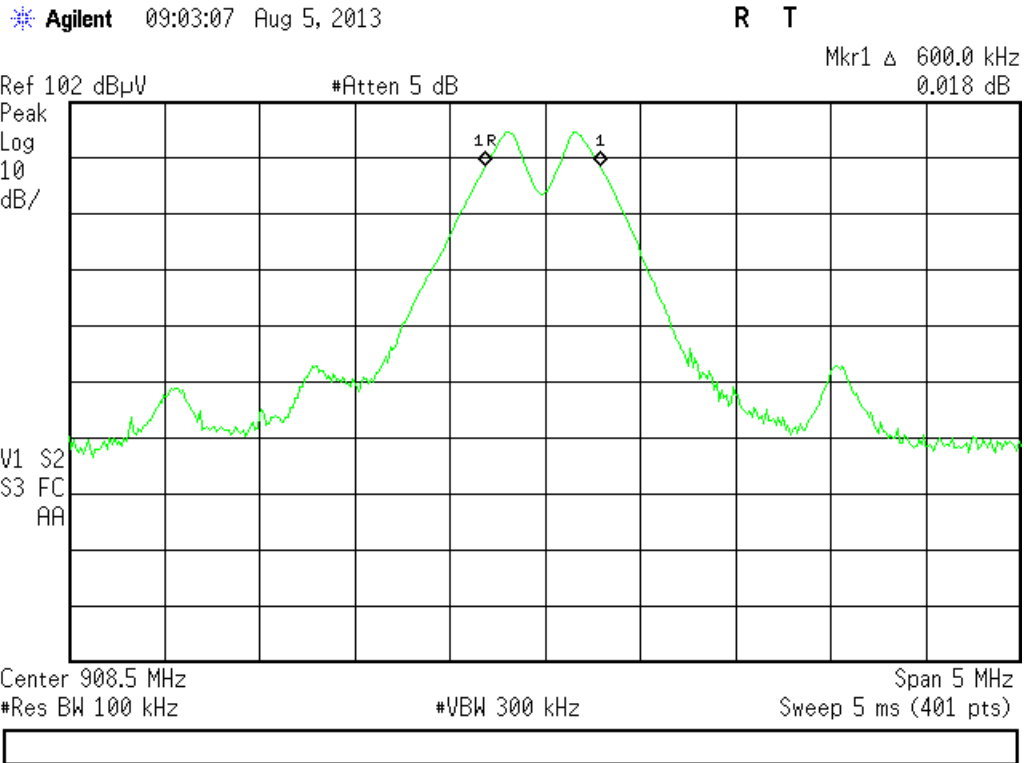
Engineer	Tuyen Truong A.
Date	8/5/2013
Site	Chamber 2
Environmental Conditions	22.4°C, 34%, 1013mb

6dB Bandwidth				
15:247(a)(2):		Specifies that the minimum 6dB bandwidth shall be at least 500kHz.		
Frequency (MHz)	Mode	6dB BW (MHz)	Limit (kHz)	Margin (MHz)
908.5	TX Stream	0.600	>500	-0.100
914	TX Stream	0.613	>500	-0.113
919.7	TX Stream	0.600	>500	-0.100
Tested by:	Tuyen Truong	RBW = 100KHz	VBW = 300KHz	
Date:	8/5/2013	Analyzer:	SA #2	
Company:	Zoom Telephonics, Inc	Attenuator:	PE7019-20 #791	
EUT:	ZoomGuard Multi-Sensor P1			

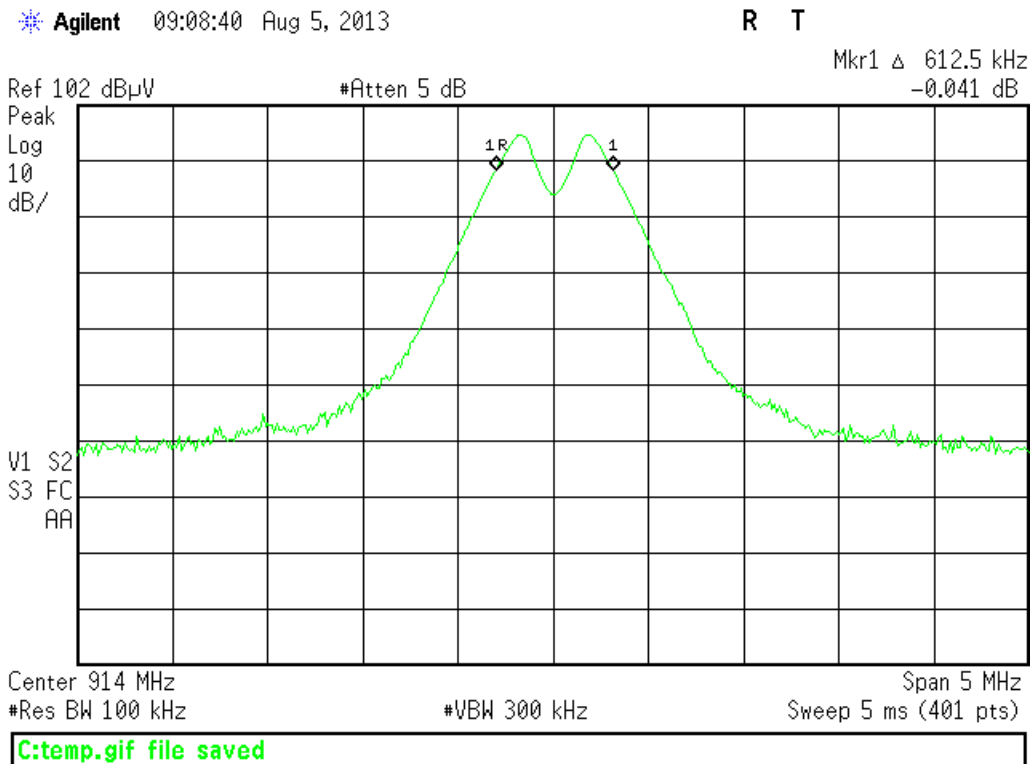
Measured 6dB bandwidth = 0.613MHz



PLOT



Channel 1 – 6dB Bandwidth



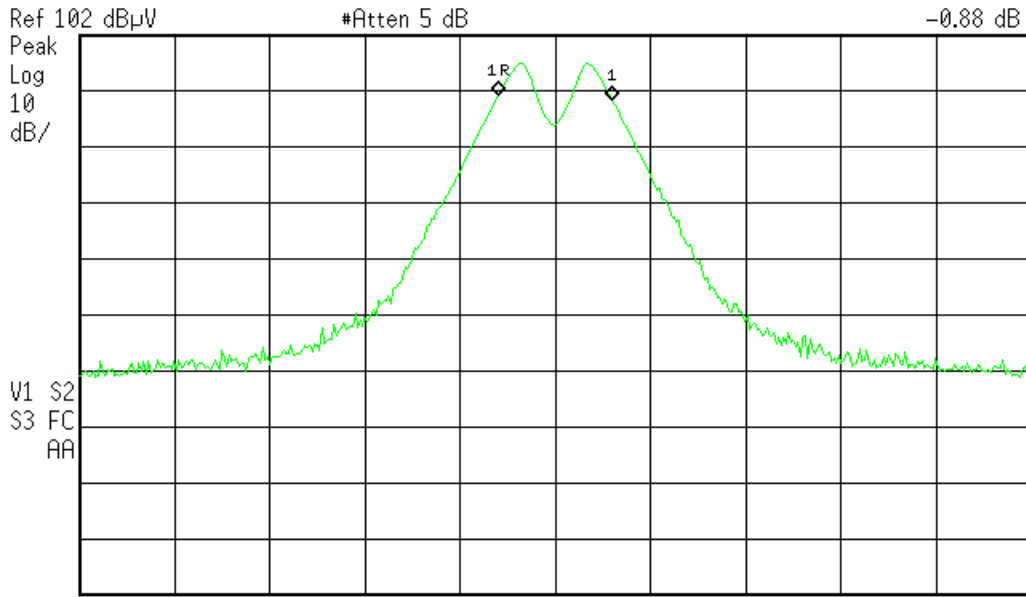
Channel 6 – 6dB Bandwidth



Agilent 09:17:25 Aug 5, 2013

R T

Mkr1 Δ 600.0 kHz
-0.88 dB



Center 919.7 MHz Span 5 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)

C:\temp.gif file saved

Channel 11 – 6 dB Bandwidth



Peak Power

LIMIT

Conducted Output Power

1 Watt

[15.247(b) (3)]

MEASUREMENTS / RESULTS

Engineer	Tuyen Truong
Date	8/05/2013
Site	Chamber 2
Environmental Conditions	23.9°C, 25%, 1015mb

Maximum Peak Conducted Output Power Level								
Tested by: Tuyen Truong			Analyzer: SA#2			RBW = 1MHz		
Date: 8/5/2013			Attenuator: PE7019-20 #791			VBW = 3MHz		
Company: Zoom Telephonics, Inc			EUT: ZoomGuard Multi-Sensor P1			Limit = 1Watt or 30dBm		
Channel (MHz)	mode	Power setting in ART	Measured power (dBm)	Attenuator factor (dB)	Adjusted power measurement (dBm)	Limit (dBm)	Margin (dB)	Result
908.62	TX Stream	8	-10.81	19.29	8.48	30	-21.52	pass
914.22	TX Stream	8	-10.60	19.29	8.69	30	-21.31	pass
919.3	TX Stream	8	-10.73	19.29	8.56	30	-21.44	pass

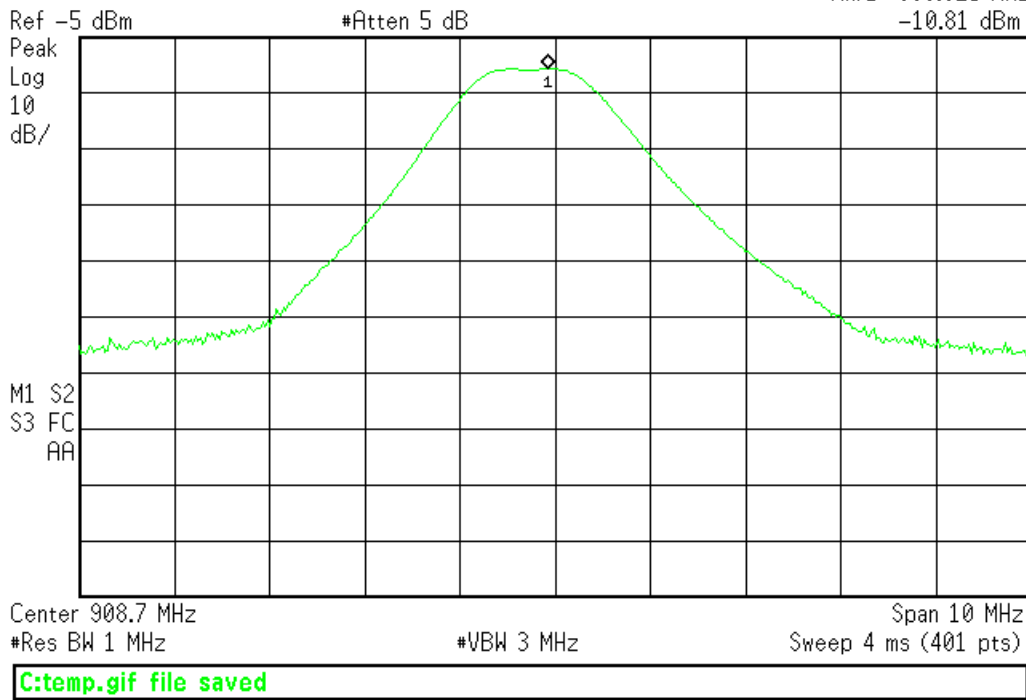


PLOTS

Agilent 09:35:11 Aug 5, 2013

R T

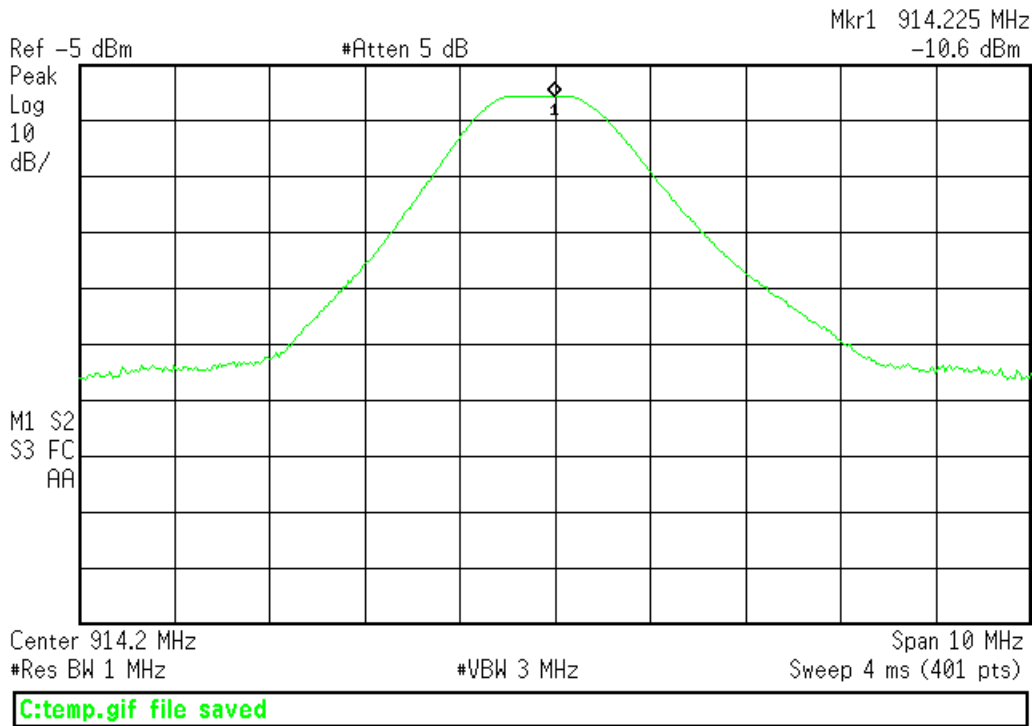
Mkr1 908.625 MHz
-10.81 dBm



Channel 1 – Channel Power

Agilent 09:34:08 Aug 5, 2013

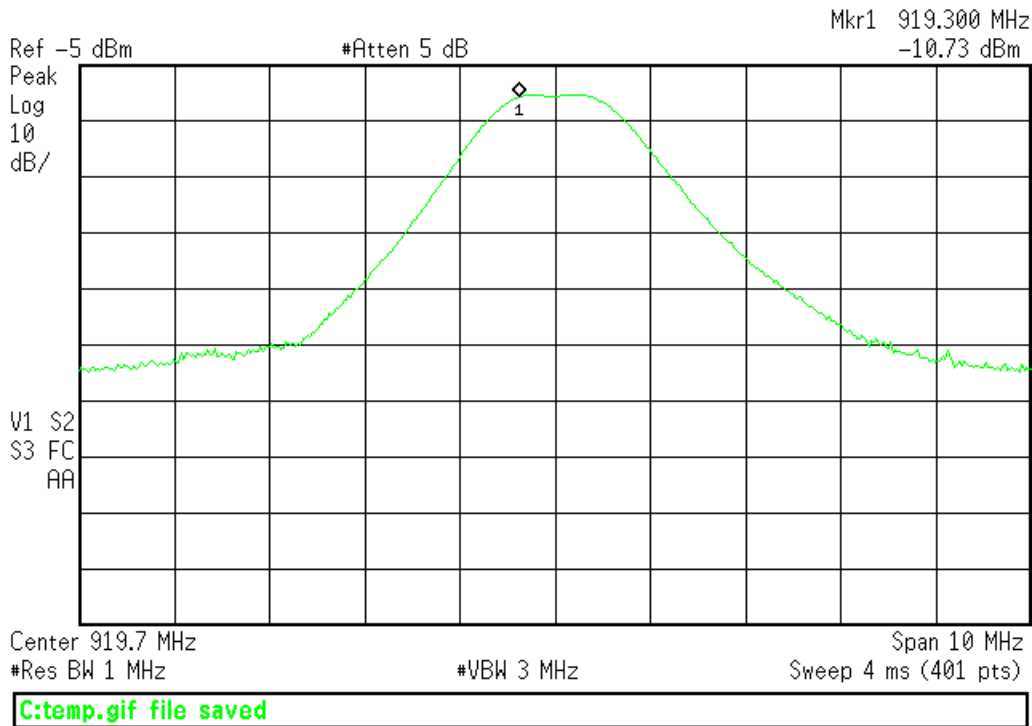
R T



Channel 6 – Channel Power

Agilent 09:25:47 Aug 5, 2013

R T



Channel 11 – Channel Power



Duty Cycle Correction Calculation

MEASUREMENTS / CALCULATIONS

Engineer	Tuyen Truong
Date	8/07/2013
Site	Chamber 2
Environmental Conditions	24.1°C, 31%, 1005mb

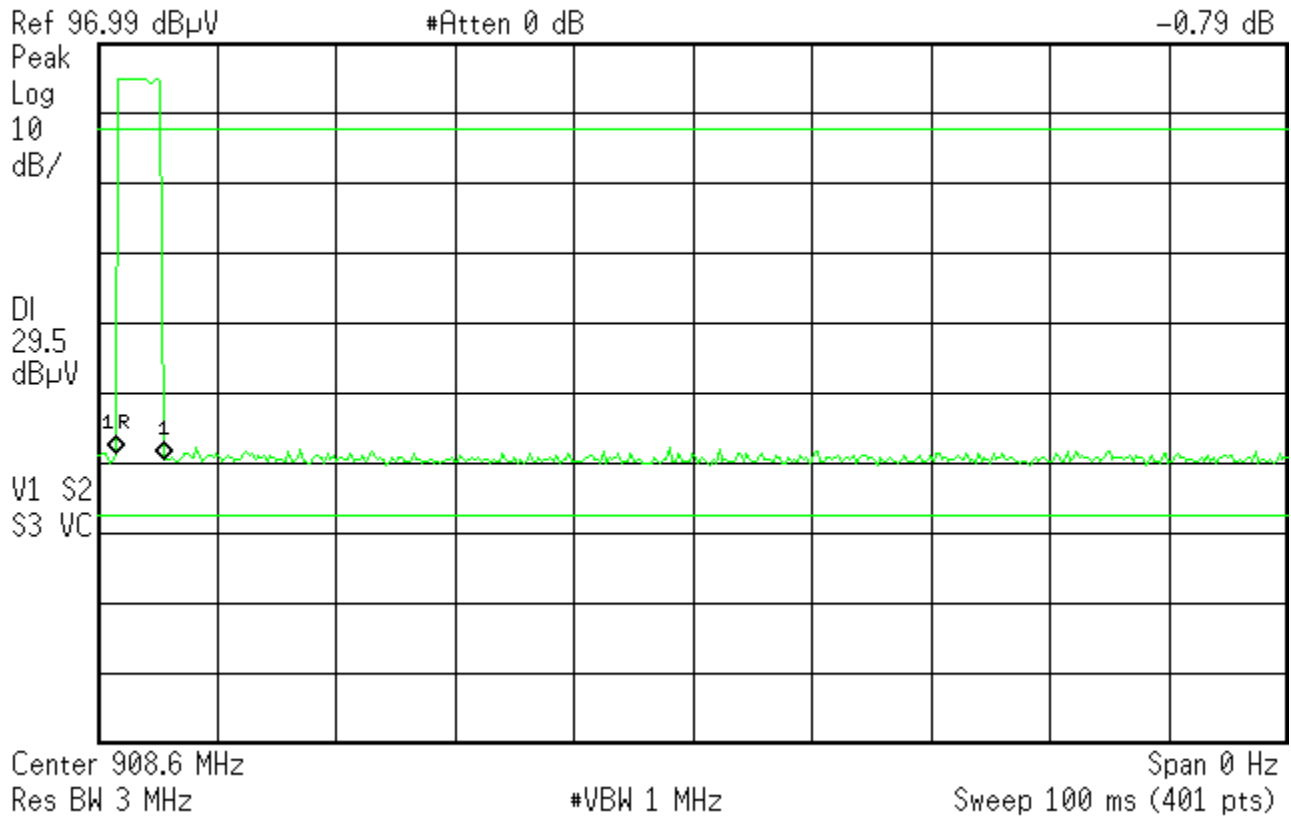
$$\begin{aligned}
 \text{DCCF} &= 20 \cdot \log(\text{total On Time} / 100\text{ms}) \\
 &= 20 \cdot \log(4/100) \\
 &= -27.9
 \end{aligned}$$

PLOTS

Agilent 13:55:40 Aug 7, 2013

R T

Mkr1 Δ 4 ms
-0.79 dB



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Individual Pulse On time – 4ms in 100ms Window



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

Spurious Radiated Emissions Table												
Date: 16-Jul-13			Company: ZOOM Telephonics, Inc.				Work Order: N1640					
Engineer: Tuyen Truong			EUT Desc: ZoomGuard Multi-Sensor P1				EUT Operating Voltage/Frequency: 120Vac/60Hz					
Temp: 24°C			Humidity: 36%				Pressure: 1015 mBar					
Frequency Range: 30 to 1000MHz							Measurement Distance: 3 m					
Notes: all 3 channels were checked TX mode							EUT Max Freq: <108MHz TX Freq: 902-928MHz range					
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	177.9	26.9	22.4	10.8	0.9	16.2	---	---	---	43.5	-27.3	Pass
v	241.0	28.9	22.4	11.6	1.1	19.2	---	---	---	46.0	-26.8	Pass
v	313.7	29.6	22.4	13.7	1.2	22.1	---	---	---	46.0	-23.9	Pass
v	437.0	28.4	22.2	16.5	1.6	24.3	---	---	---	46.0	-21.7	Pass
h	442.3	31.4	22.3	16.6	1.6	27.3	---	---	---	46.0	-18.7	Pass
h	544.0	32.6	22.1	18.1	1.7	30.3	---	---	---	46.0	-15.7	Pass
v	701.7	24.7	21.8	20.1	1.8	24.8	---	---	---	46.0	-21.2	Pass
h	883.6	34.3	21.6	22.0	2.1	36.8	---	---	---	46.0	-9.2	Pass
h	934.5	31.7	22.0	22.4	2.1	34.2	---	---	---	46.0	-11.8	Pass
v	992.7	25.5	22.0	22.9	2.2	28.6	---	---	---	54.0	-25.4	Pass
Table Result: Pass by -9.2 dB Worst Freq: 883.6 MHz												
Test Site: EMI Chamber 1			Cable 1: Asset #1781			Cable 2: Asset #1785			Cable 3: ---			
Analyzer: Rental SA#2			Preamp: Blue			Antenna: Red-Black			Preselector: ---			

Spurious Radiated Emissions (Restricted Band) Table														
Date: 16-Jul-13			Company: ZOOM Telephonics, Inc.				Work Order: N1640							
Engineer: Tuyen Truong			EUT Desc: ZoomGuard Multi-Sensor P1				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 24°C			Humidity: 36%				Pressure: 1015 mBar							
Frequency Range: 1 - 10GHz							Measurement Distance: 3 m (1-6GHz) and 1 m (6-10GHz)							
Notes: Total transmission time in 100millisecond period is 4ms Duty cycle correction factor is 20*log(total ON TIME/100ms) or -27.9dB							EUT Max Freq: <108MHz TX Freq: 902-928MHz range							
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)
First Channel														
h	2725.0	56.05	28.2	18.5	28.9	3.6	70.1	42.2	74.0	-3.9	Pass	54.0	-11.9	Pass
v	2725.0	50.03	22.1	18.5	28.9	3.6	64.0	36.1	74.0	-10.0	Pass	54.0	-17.9	Pass
v	3634.6	42.35	14.5	18.2	31.8	4.2	60.2	32.3	74.0	-13.8	Pass	54.0	-21.8	Pass
h	3637.5	42.74	14.8	18.2	31.8	4.2	60.5	32.6	74.0	-13.5	Pass	54.0	-21.4	Pass
Mid Channel														
v	2742.0	53.29	25.4	18.5	28.9	3.6	67.3	39.4	74.0	-6.7	Pass	54.0	-14.6	Pass
h	2742.0	51.18	23.3	18.5	28.9	3.6	65.2	37.3	74.0	-8.8	Pass	54.0	-16.7	Pass
h	3655.0	43.6	15.7	18.2	31.9	4.3	61.6	33.7	74.0	-12.4	Pass	54.0	-20.3	Pass
v	3656.0	42.03	14.1	18.2	31.9	4.3	60.0	32.1	74.0	-14.0	Pass	54.0	-21.9	Pass
Last Channel														
h	2758.0	54.18	26.3	18.5	28.9	3.6	68.2	40.3	74.0	-5.8	Pass	54.0	-13.7	Pass
v	2759.4	54.42	26.5	18.5	28.9	3.6	68.4	40.5	74.0	-5.6	Pass	54.0	-13.5	Pass
h	3678.0	44.64	16.7	18.2	32.0	4.3	62.7	34.8	74.0	-11.3	Pass	54.0	-19.2	Pass
v	3678.0	41.21	13.3	18.2	32.0	4.3	59.3	31.4	74.0	-14.7	Pass	54.0	-22.6	Pass
Table Result: Pass by -3.9 dB Worst Freq: 2725.0 MHz														
Test Site: EMI Chamber 1			Cable 1: Asset #1781			Cable 2: Asset #1785			Cable 3: ---					
Analyzer: Rental SA#2			Preamp: Brown			Antenna: Orange Horn			Preselector: ---					



Conducted Spurious Emissions

LIMITS

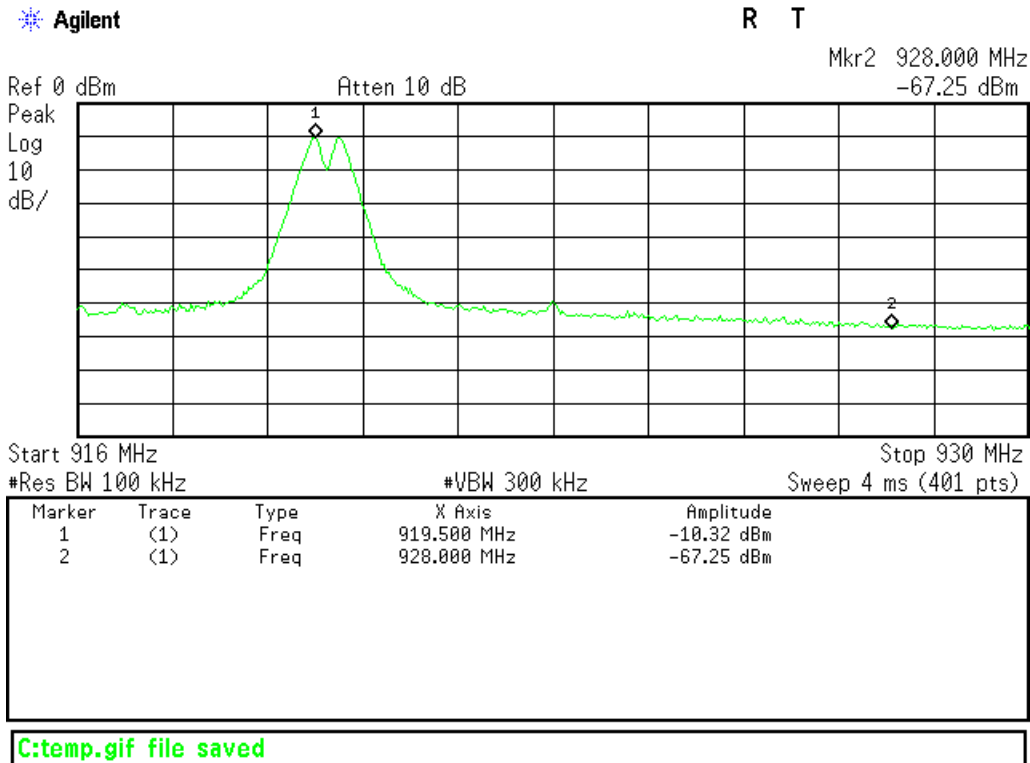
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least **20dB** below that in the 100kHz bandwidth that contains the highest level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

[15.247(d)]

MEASUREMENTS / RESULTS

Plots

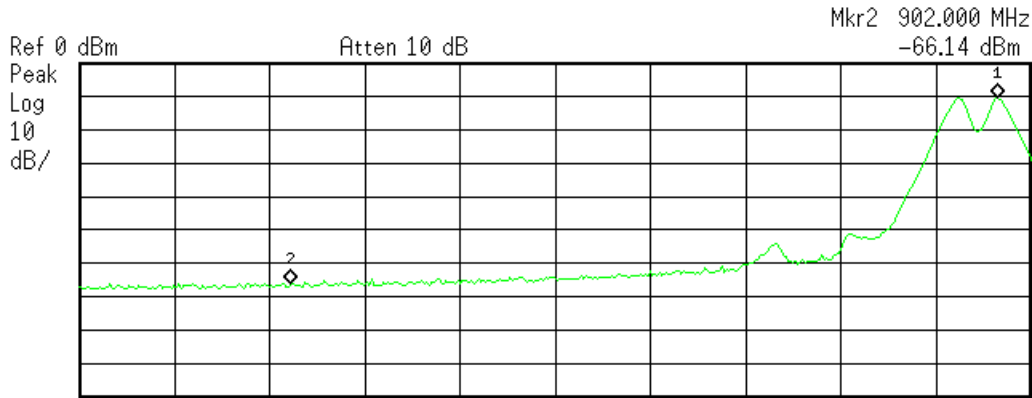
Conducted Band Edge



Channel 11 – Band-edge >-20dB

Agilent

R T



Start 900 MHz Stop 908.9 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	908.617 MHz	-10.59 dBm
2	(1)	Freq	902.000 MHz	-66.14 dBm

C:\temp.gif file saved

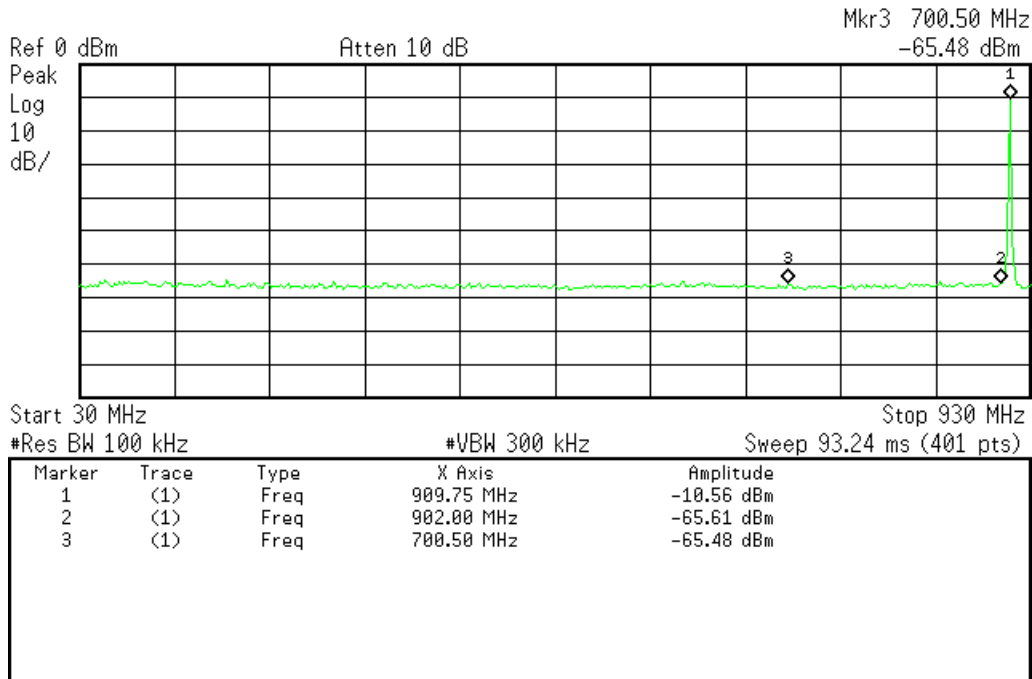
Channel 1 – Band-edge >20dB down



Conducted Spurious Emission

Agilent

R T

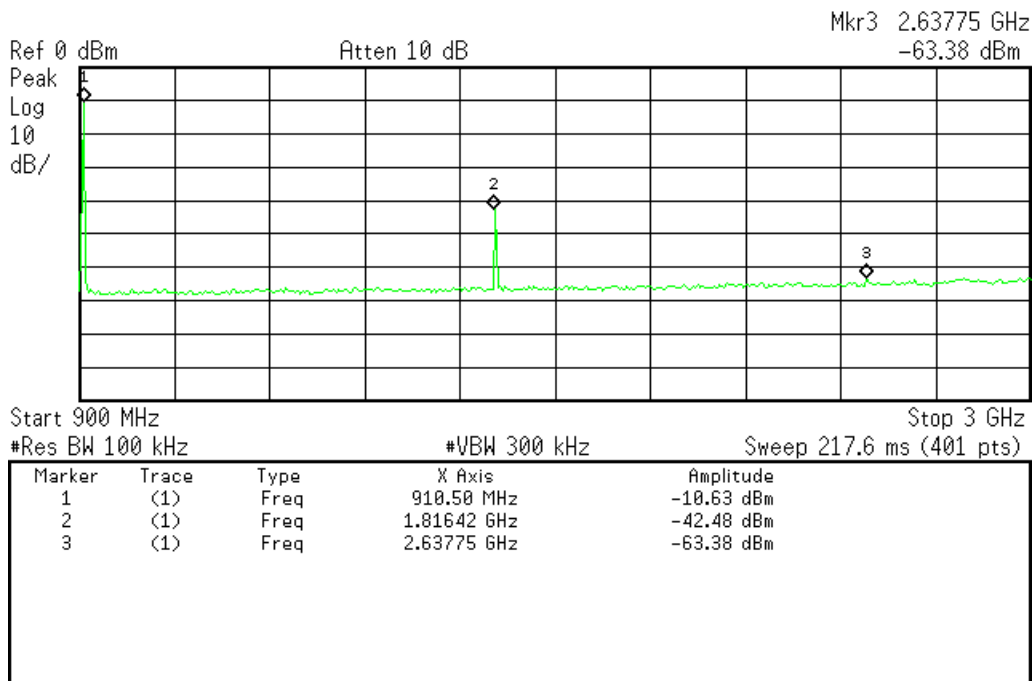


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Channel 1 – 30 - 930MHz

Agilent

R T



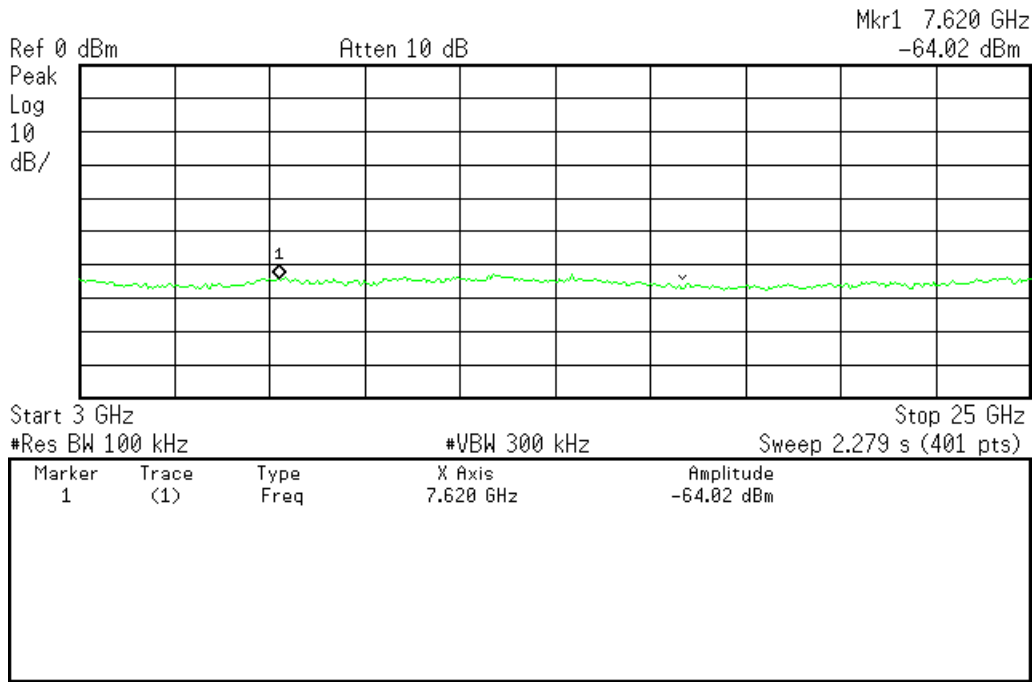
C:\temp.gif file saved

Channel 1 - 900 - 3000MHz



Agilent

R T

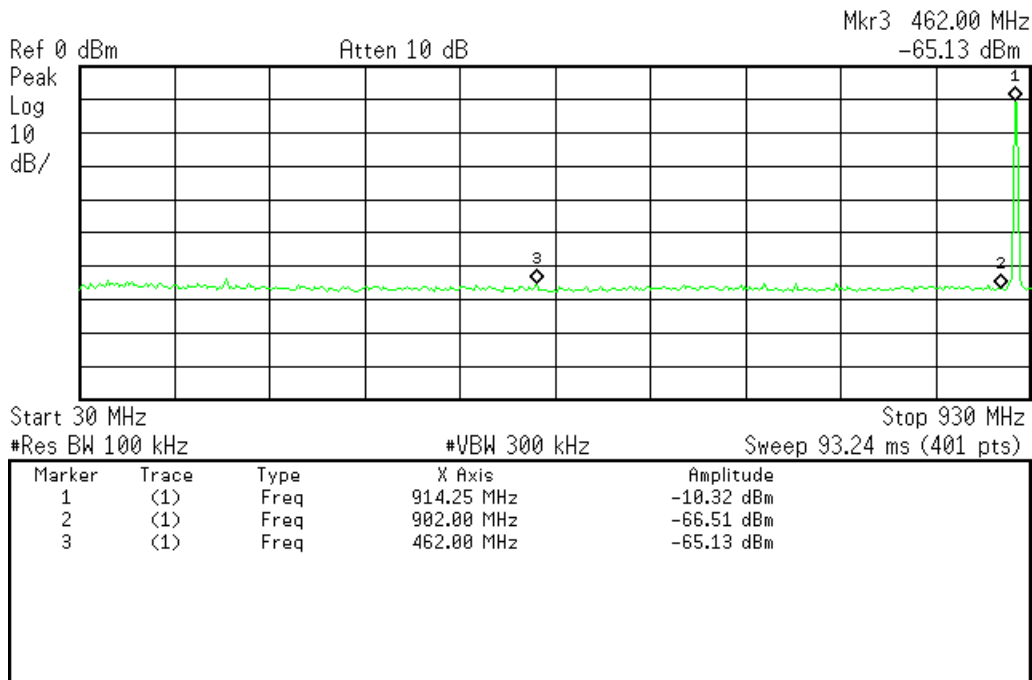


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Channel 1 - 3 - 25GHz

Agilent

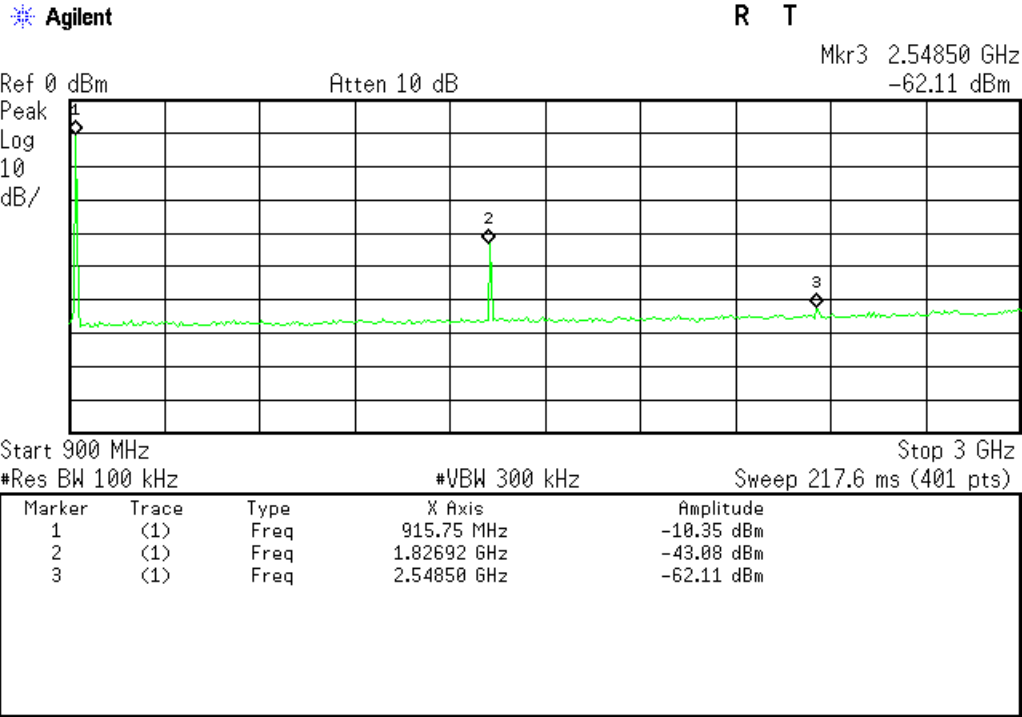
R T



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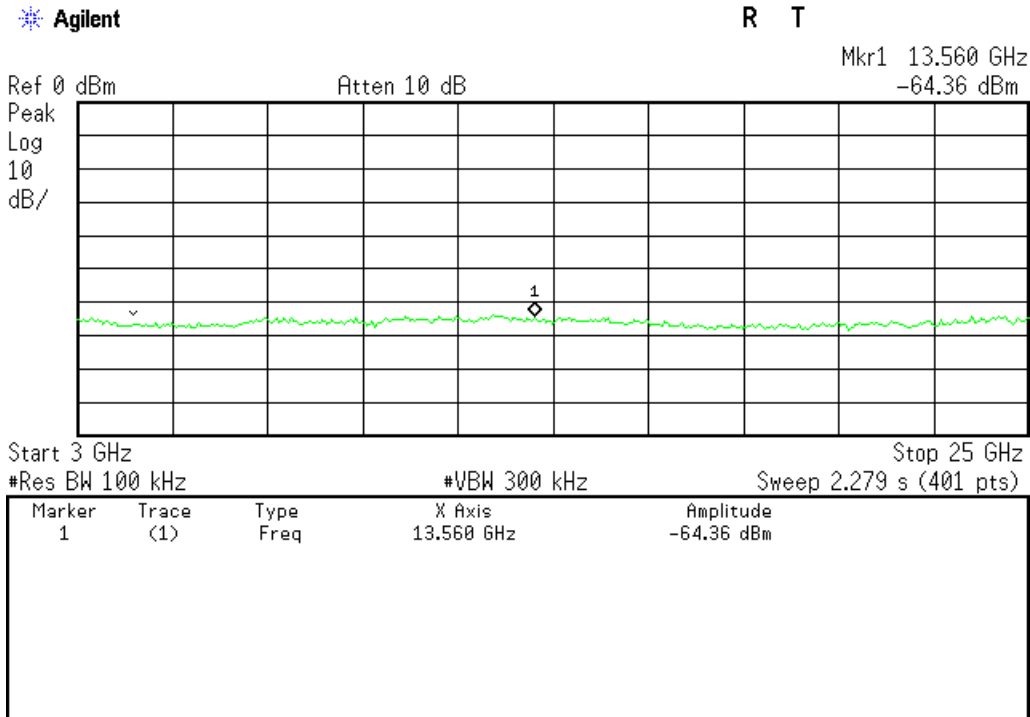
Channel 6 - 30 to 930MHz





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Channel 6 - 900 - 3000MHz



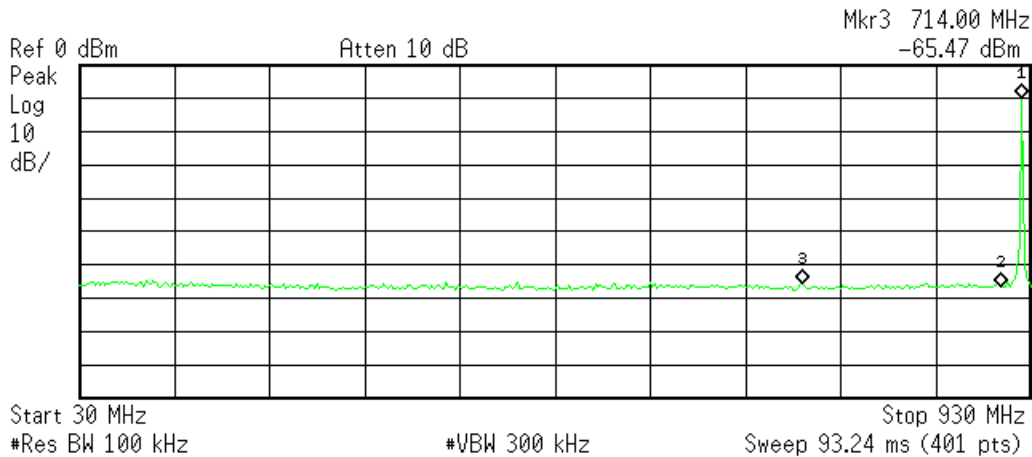
C:\temp.gif file saved

Channel 6 - 3 - 25GHz



Agilent

R T



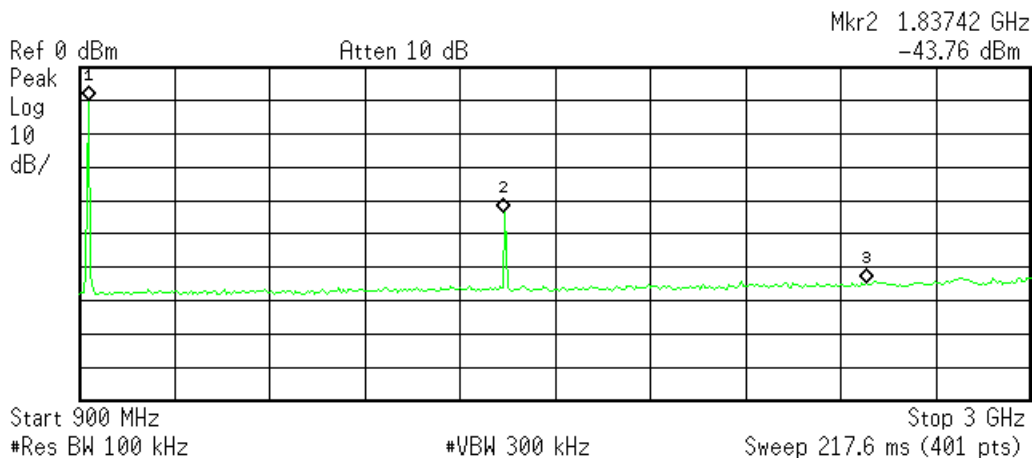
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	921.00 MHz	-10.19 dBm
2	(1)	Freq	902.00 MHz	-66.56 dBm
3	(1)	Freq	714.00 MHz	-65.47 dBm

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Channel 11 - 30 to 930MHz

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Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	921.00 MHz	-10.22 dBm
2	(1)	Freq	1.83742 GHz	-43.76 dBm
3	(1)	Freq	2.63775 GHz	-64.37 dBm

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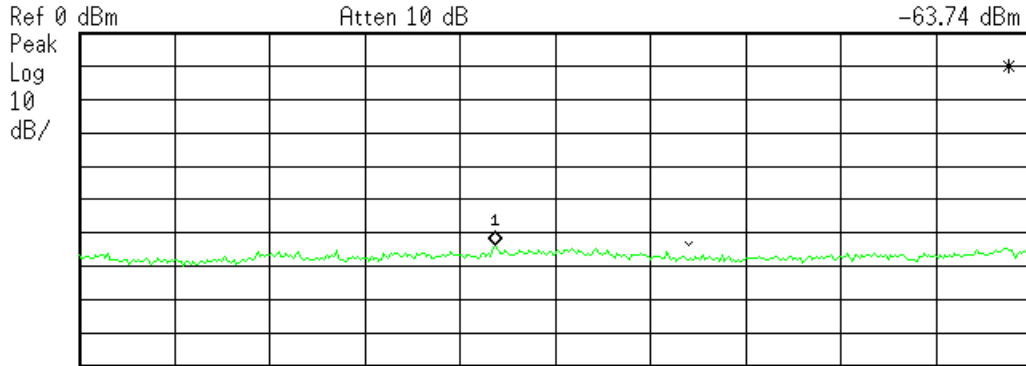
Channel 11 - 900 - 3000MHz



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Mkr1 12.625 GHz
-63.74 dBm



Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.279 s (401 pts)
Stop 25 GHz

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	12.625 GHz	-63.74 dBm

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Channel 11 - 3 - 25GHz



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

Engineer	Tuyen Truong A.
Date	8/5/2013
Site	Chamber 2
Environmental Conditions	23.1°C, 31%, 1005mb

15.247 (e) Maximum Power Spectral Density								
Tested by: Tuyen Truong								
Date: 8/5/2013 Brown SA								
Company: Zoom Telephonics, IPE7019-20 #791 RBW = 3KHz								
EUT: ZoomGuard Multi-Sensor P1 VBW = 10KHz								
channel (MHz)	mode	measured PSD (dBm)	attenuator factor (dB)	adjusted power measurement	bandwidth correction factor adjustment	limit (dBm)	margin (dB)	result
908.4	TX Stream	-14.10	19.29	5.19	0	8	-2.81	Pass
914	TX Stream	-14.05	19.29	5.24	0	8	-2.76	Pass
919.7	TX Stream	-14.45	19.29	4.84	0	8	-3.16	Pass

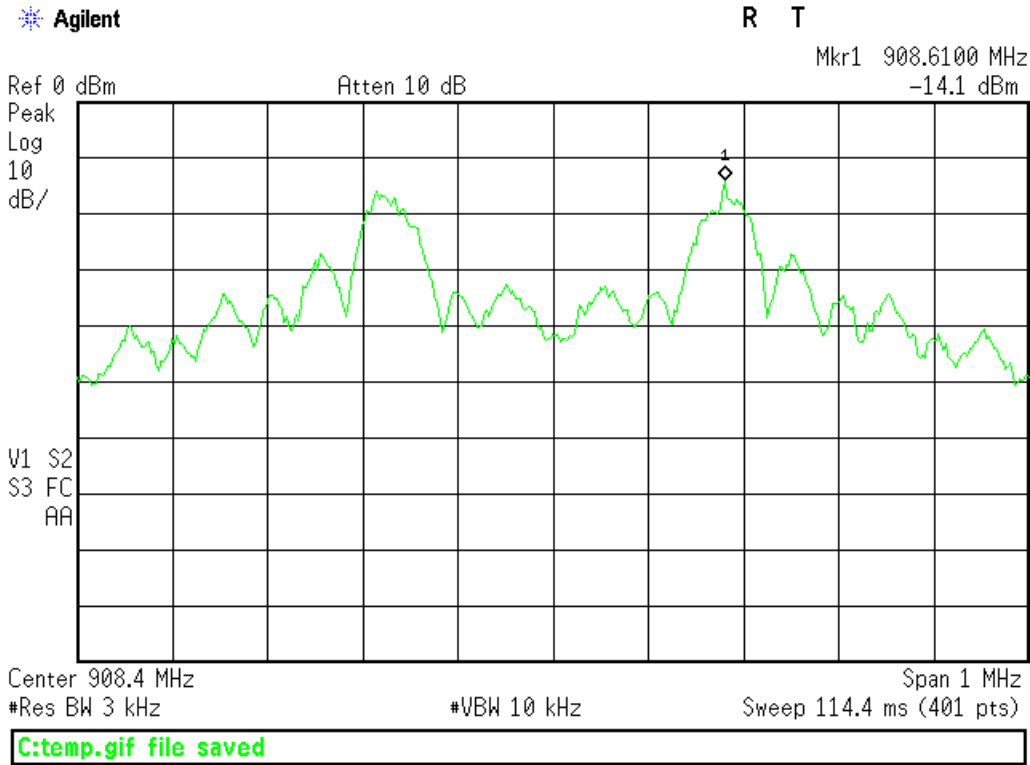
Rev. 10/6/2013

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013

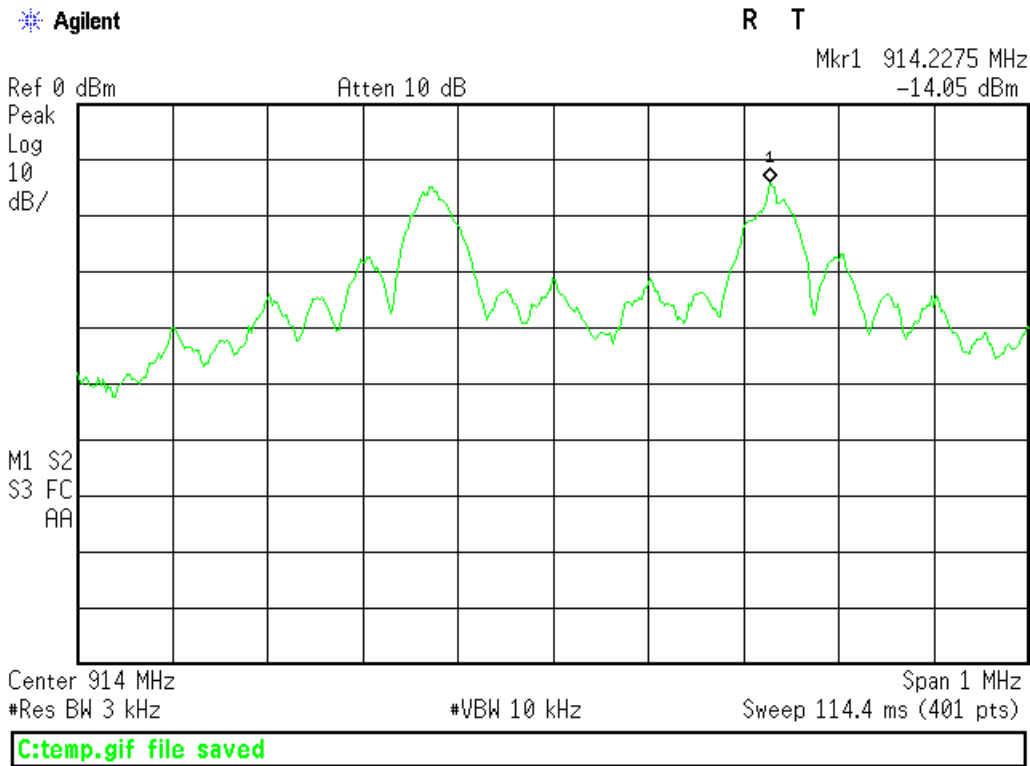
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



PLOTS



Channel 1 – PSD



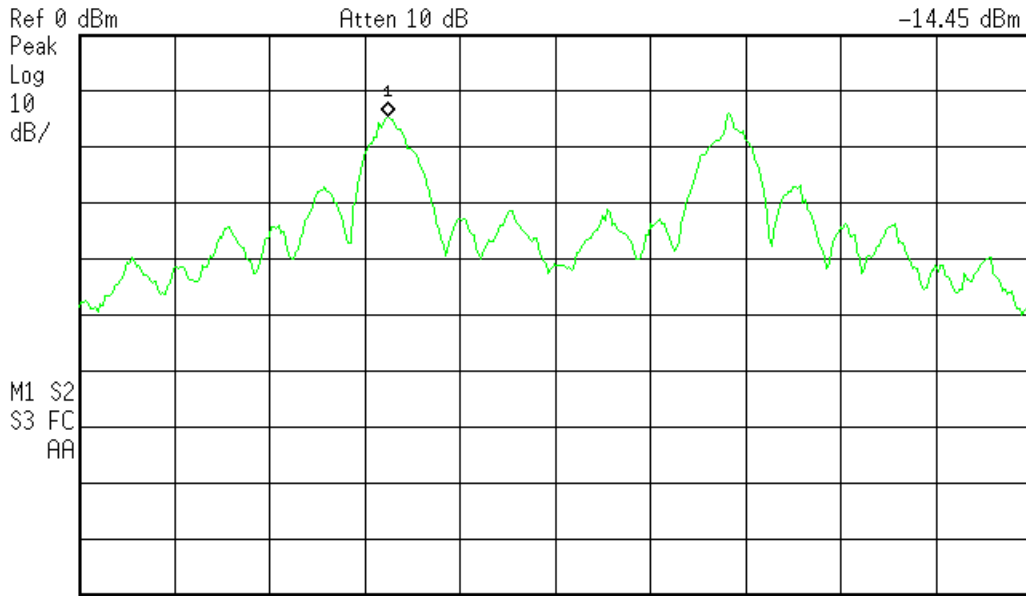
Channel 6 – PSD



Agilent

R T

Mkr1 919.4900 MHz
-14.45 dBm



Center 919.7 MHz
#Res BW 3 kHz #VBW 10 kHz Sweep 114.4 ms (401 pts) Span 1 MHz

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Channel 11 – 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	8/5/2013
Site	CEMI6
Environmental Conditions	23°C, 45%, 1009mb (8/05/ 2013)

AC Conducted Emissions Data Table

Date: 07-Aug-13		Company: Zoom Telephonics, Inc		Work Order: N1640										
Engineer: Tuyen Truong		EUT Desc: ZoomGuard Multi-Sensor P1		Pressure: 1009 mBar										
Temp: 23.0 °C		Humidity: 45%												
Notes:														
Frequency Range: 0.15 - 30 MHz														
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)
0.16	29.8	18.1	18.9	3.1	-0.1	-0.1	-0.2	-20.4	65.5	-15.1	Pass	55.5	-16.0	Pass
0.21	25.4	13.8	9.4	2.8	0.0	-0.1	-0.2	-20.4	63.1	-17.1	Pass	53.1	-23.1	Pass
0.26	25.2	14.8	13.2	6.6	0.0	-0.1	-0.1	-20.4	61.6	-15.8	Pass	51.6	-17.8	Pass
0.37	19.3	13.9	12.1	6.7	0.0	-0.1	-0.2	-20.4	58.6	-18.8	Pass	48.6	-15.9	Pass
0.69	12.7	15.8	2.3	5.7	0.0	-0.1	-0.2	-20.4	56.0	-19.6	Pass	46.0	-19.7	Pass
1.64	6.4	10.7	1.1	0.6	0.0	-0.1	-0.2	-20.4	56.0	-24.7	Pass	46.0	-24.3	Pass
4.33	8.1	9.1	-1.5	-1.4	0.0	-0.1	-0.2	-20.4	56.0	-26.3	Pass	46.0	-26.8	Pass
Result: Pass		Worst Margin: -15.1 dB				Frequency: 0.160 MHz								
Measurement Device: LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2)						Cable: CEMI-01		Spectrum Analyzer: SA EMI Chamber (1328)						
						Attenuator: 20dB Atten-4		Site: CEMI 6						

C-S CEMI Calculator Version 3.0.12

Equipment Factor Sheet rev: 7/24/2013



Occupied Bandwidth

REQUIREMENT

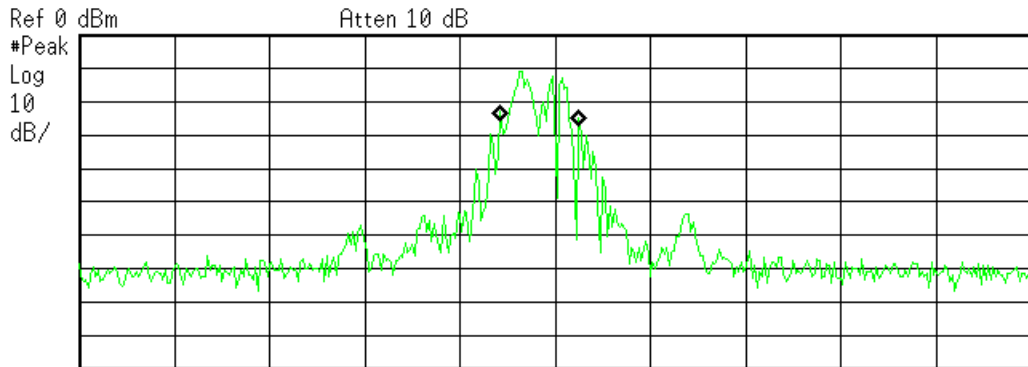
When an occupied bandwidth is no specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured. [RSS-GEN 4.6.1]

Engineer	Tuyen Truong
Date	8/5/2013
Site	Chamber 1
Environmental Conditions	23.9°C, 25%, 1015mb

Plots

Agilent

R T



Center 908.6 MHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)

Occupied Bandwidth
 842.5040 kHz

Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -159.791 kHz
 x dB Bandwidth 1.110 MHz*

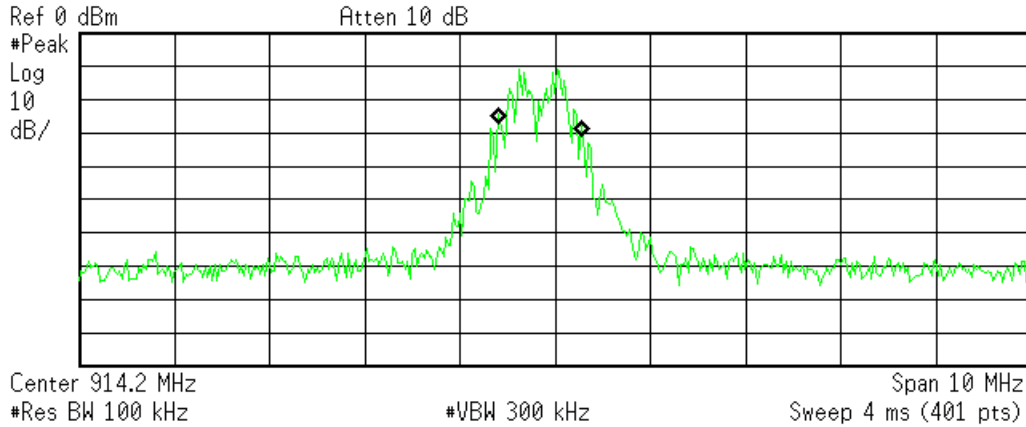
C:\temp.gif file saved

Channel 1 – Occupied Bandwidth



Agilent

R T



Occupied Bandwidth
870.8796 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

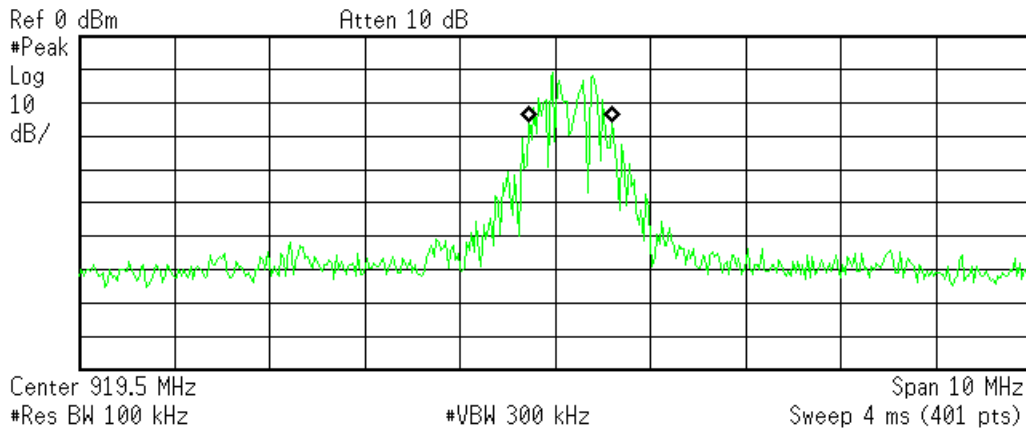
Transmit Freq Error -169.208 kHz
x dB Bandwidth 1.081 MHz*

C:\temp.gif file saved

Channel 6 – Occupied Bandwidth

Agilent

R T



Occupied Bandwidth
871.9166 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 162.169 kHz
x dB Bandwidth 1.089 MHz*

C:\temp.gif file saved

Channel 11 – Occupied Bandwidth



Test Equipment Used

Rev. 7/12/2013

Spectrum Analyzers / Receivers / Preselectors								
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	
Rental SA #2	9kHz-26.5 GHz	E7405A	Agilent	MY45104194	rental	I	12/8/2013	
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	12/19/2013	
Radiated Emissions Sites								
	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	2/16/2014	
Preamps / Couplers Attenuators / Filters								
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	
Blue	0.009-2000MHz	ZFL-1000-LN	CS	N/A	759	II	5/31/2014	
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pastemack	1	791	II	7/13/2014	
Brown	1-18GHz	CS	CS	N/A	1523	II	2/27/2014	
7/13/2013								
2/27/2013								
Antennas								
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015	
Orange Horn	1-18GHz	3115	EMCO	0004-6123	390	I	8/27/2013	
7/27/2011								
Cables								
	Range		Mfr			Cat	Calibration Due	
Asset #1781	9kHz - 18GHz		Florida RF			II	3/6/2014	
Asset #1785	9kHz - 18GHz		Florida RF			II	3/14/2014	
CEMI-01	9kHz - 2GHz		C-S			II	9/19/2013	
Meteorological Meters								
		MN	Mfr	SN	Asset	Cat	Calibration Due	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	3/20/2014	
CHAMBER1 Thermohyrometer		35519-044	Control Company	72457642	1345	II	8/19/2013	
CEMI6 Thermohyrometer		35519-044	Control Company	72457730	1344	II	8/19/2013	
8/19/2011								
LISNs/Measurement Probes								
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
LISN Asset 1726	150kHz-30MHz	LI-150A	Com-Power	201092	1726	I	1/11/2014	1/11/2013
LISN Asset 1727	150kHz-30MHz	LI-150A	Com-Power	201093	1727	I	1/2/2014	1/2/2013
Conducted Test Sites (Mains / Telco)								
	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 6	719150		A-0015			III	NA	N/A
Attenuators								
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20dB Atten-4	9kHz-2GHz			N/A		II	7/12/2014	12/7/2013

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)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



Conditions Of Testing

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

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



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

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

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

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

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

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

Rev.160009121(2)_#684340 v13CS

