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Job Number:	1001106475
Project Number:	09NK06851B
File Number:	MC3181
Date:	May 15, 2009
Model:	CWPIR
FCC ID:	JLFCWPIR

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

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Job #: 1001106475 File #: MC3181 Project #: 09NK06851B
Model Number: CWPIR
Client Name: Chamberlain Group Inc.

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FCC ID:JLFCWPIR

Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.
333 Pfingsten Rd.
Northbrook, IL 60062**

Tests Performed For: **Chamberlain Group Inc.
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Applicant Contact: **Hank Sieradzki**
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Test Report Date: **May 15, 2009**

Product Type: **Short Range Transceiver**

Product standards **FCC Part 15, Subpart C, 15.247**

Model Number: **CWPIR**

EUT Category: **Frequency Hopping Spread Spectrum Transmitter**

Testing Start Date: **April 15, 2009**

Date Testing Complete: **May 1, 2009**

Overall Results: Compliant

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, NIST, A2LA, or any agency of the US government.

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None			

1 GENERAL - Product Description**1.1 Equipment Description**

The Vehicle Alert PIR is an outdoor unit that detects movement within a specified range and sends signals to an indoor CWA module. One CWA can handle a maximum of 4 PIRs. The outdoor PIR module shall run on 4 "AA" batteries. The PIR shall operate in the 902-928 MHz band and shall hop equally in 50 pseudo-random frequencies lying in this band.

1.2 Device Configuration During Test**1.2.1 Equipment Used During Test:**

Use	Product Type	Manufacturer	Model	Comments
EUT	Transceiver	Chamberlain Group Inc.	PIR	None
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.2.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	DC	N	N	Battery Operated
Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

1.2.3 EUT Internal Operating Frequencies:

Frequency (MHz)	Description
16	Microchip Internal RC Oscillator
30	Crystal Oscillator 30 MHz

1.2.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
2	6VDC	-	-	DC	-	Battery

1.3 EUT Configurations

Mode #	Description
1	EUT in 10m chamber on 80cm support powered by Battery.
2	EUT on test bench.

1.4 EUT Operation Modes

Mode #	Description
1	EUT Transmitting on either Low, Middle or High Channels
2	EUT Transmitting in hopping mode (all channels)
3	EUT in IDLE / Standby / Receive Mode

2 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

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2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.247	Code of Federal Regulations, Part 15, Radio Frequency Devices	2008
RSS-210, Issue 7	Low-Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment	June 2007
RSS-Gen, Issue 2	General Requirements and Information for the Certification of Radiocommunication Equipment	June 2007

2.4 Results Summary

This product is considered Class B

Requirement – Test	Requirement – Test	Result (Compliant / Non-Compliant)*
Conducted Emissions	47 CFR Part 15.207	N/A – EUT Battery Operated Only
	RSS-Gen 7.2.2	
Carrier Frequency Separation	47 CFR Part 15.247(a)(1)	Complaint
	RSS-210 A8.1(b)	
20dB Bandwidth	47 CFR Part 15.247(a)(1)(i)	Complaint
	RSS-210 A8.1(c)	
Number of Hopping Frequency	47 CFR Part 15.247(a)(1)(i)	Complaint
	RSS-210 A8.1(c)	
Dwell Time	47 CFR Part 15.247(a)(1)(i)	Complaint
	RSS-210 A8.1(c)	
Maximum Peak Output Power	47 CFR Part 15.247(b)(2)	Complaint
	RSS-210 A8.4(1)	
Band Edge Compliance	47 CFR Part 15.247(d)	Complaint
	RSS-210 A8.5	
Spurious Emissions	47 CFR Part 15.247(d)	Complaint
	RSS-210 A8.5	
	RSS-Gen 7.2.1 and 7.2.3	
99% Occupied Bandwidth	RSS-Gen 4.6	Complaint

Test Engineer:



Bartlomiej Mucha (Ext.41216)
Senior Project Engineer
International EMC Services
Conformity Assessment Services-

Reviewer:



Michael Ferrer
Engineer
International EMC Services
Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

3 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

----- United States -----

Code of Federal Regulations Title 47	Part 15, Radio Frequency Devices
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Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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4.1 Test Conditions and Results – MAINS TERMINAL – CONDUCTED EMISSIONS

EUT is battery operated only. Test not required.

4.2 Test Conditions and Results – Carrier Frequency Separation

Test Description	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
Basic Standard	47 CFR Part 15.247(a)(1) RSS-210, A8.1(b)

Table 1 Carrier Frequency Separation Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	2
Supplementary information: Separation frequencies were measured for each channel and then averaged.		

Table 2 Carrier Frequency Separation Test Equipment

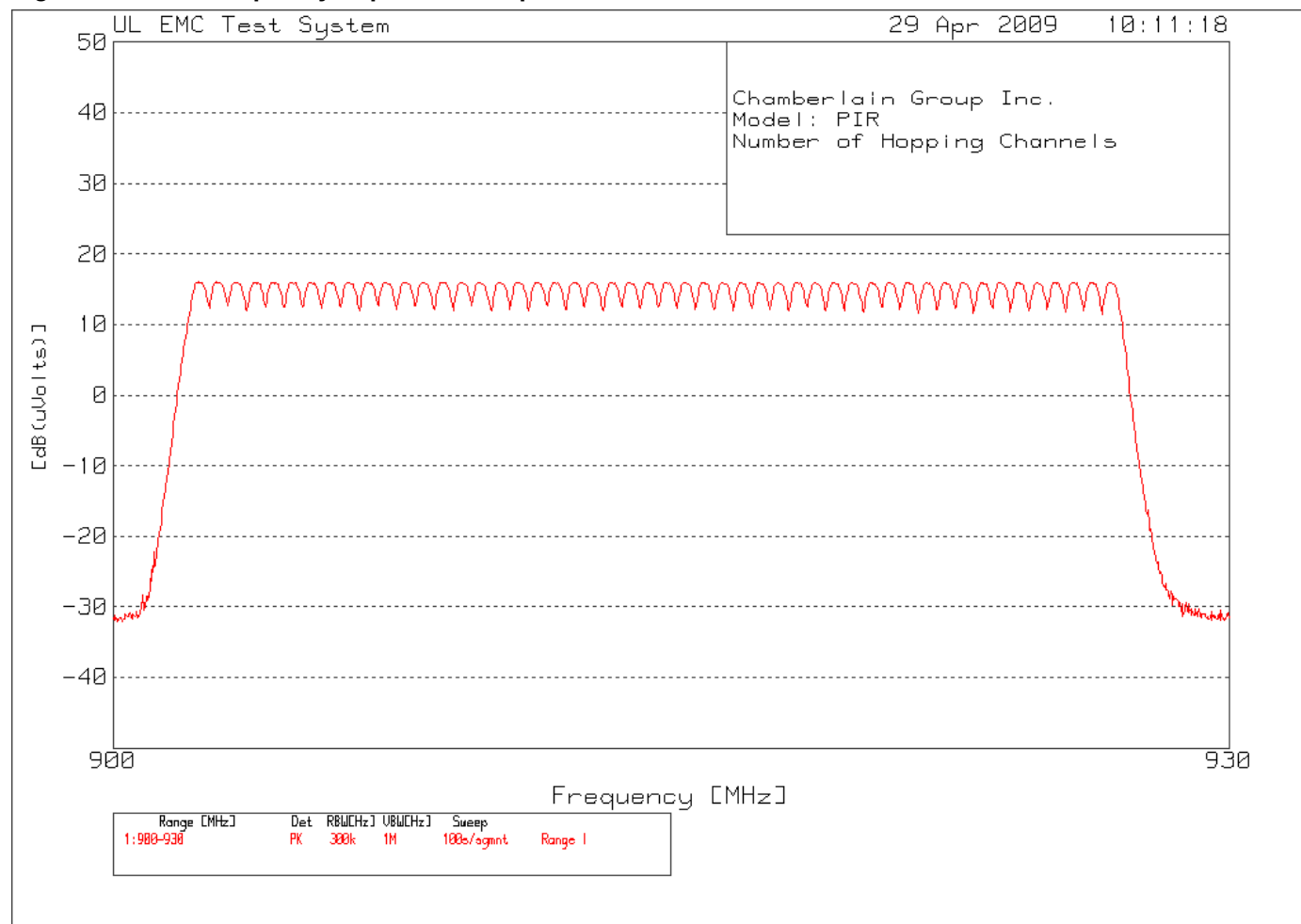
Test Equipment Used			
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405A	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

Table 3 Carrier Frequency Separation Results

Mode	Channel	Carrier Frequency Separation Limit	Channel Separation
TX Hopping	Low Side	> 20dB Bandwidth (aprx. 160kHz)	499.1kHz
	Middle		499.1kHz
	High Side		499.1kHz
	Overall Average		500kHz

Test Setup for Carrier Frequency Separation

See Appendix B, Figure 17 for test setup photo

Figure 1 Carrier Frequency Separation Graphs**Table 4 Carrier Frequency Separation (Frequency List)**

#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz
1	902.2962	11	907.2629	21	912.3045	31	917.2962	41	922.3128
2	902.7953	12	907.812	22	912.8037	32	917.7953	42	922.787
3	903.2945	13	908.2612	23	913.3278	33	918.2945	43	923.3361
4	903.7937	14	908.7854	24	913.777	34	918.7687	44	923.7854
5	904.2928	15	909.2845	25	914.3012	35	919.3178	45	924.3095
6	904.7671	16	909.7837	26	914.8003	36	919.817	46	924.8336
7	905.2912	17	910.3078	27	915.2745	37	920.3411	47	925.3328
8	905.7903	18	910.8319	28	915.7737	38	920.8278	48	925.807
9	906.2895	19	911.3311	29	916.3228	39	921.2895	49	926.3062
10	906.7887	20	911.8053	30	916.797	40	921.8136	50	926.8053

4.3 Test Conditions and Results – 20dB Bandwidth

Test Description	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
Basic Standard	47 CFR Part 15.247(a)(1)(i) RSS-210, A8.1(b)

Table 5 20dB Bandwidth Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	1
Supplementary information: None		

Table 6 20dB Bandwidth Test Equipment

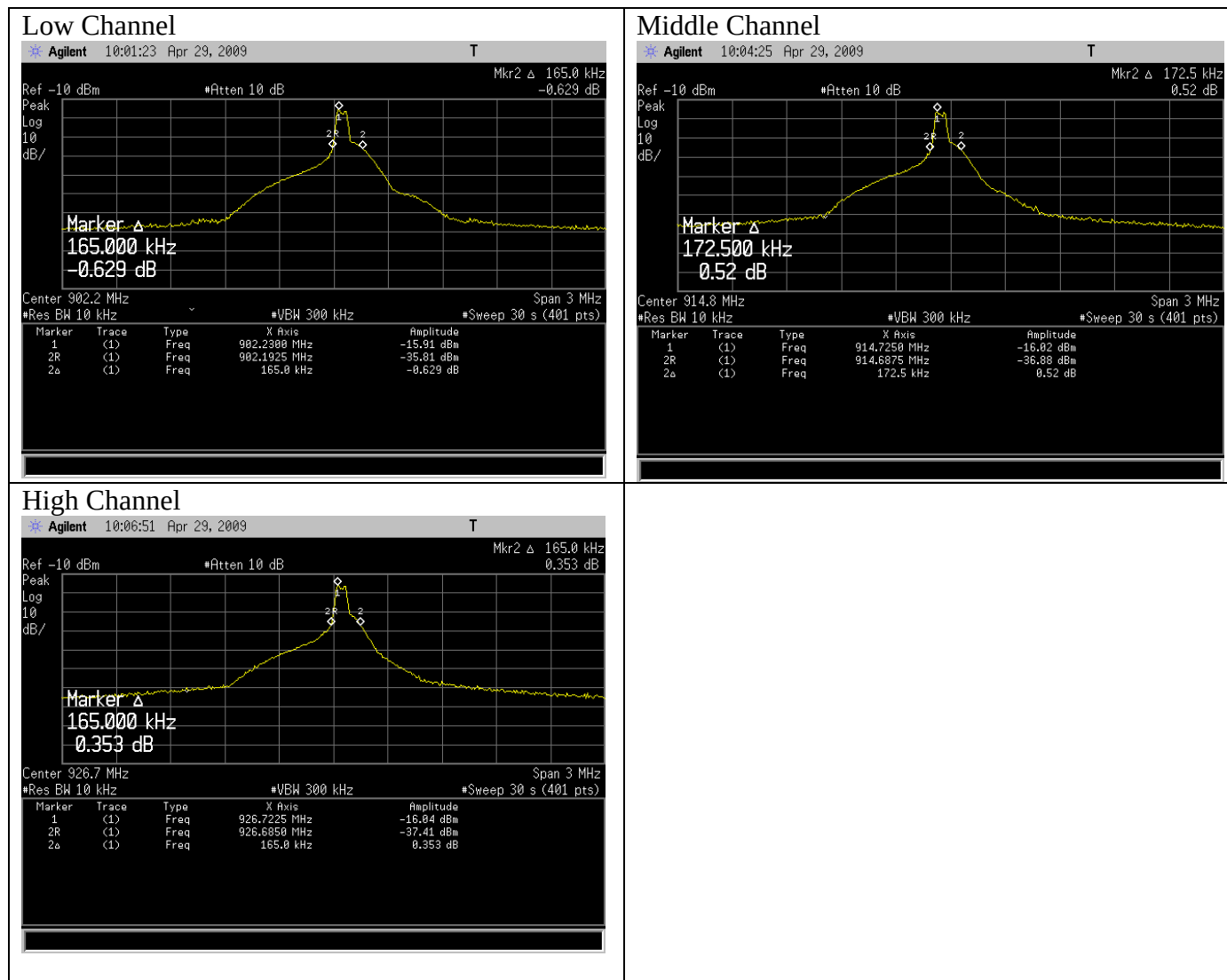
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405A	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

Table 7 20dB Bandwidth Results

Mode	Channel	20dB Bandwidth
TX	Low	165kHz
	Middle	172.5kHz
	High	165kHz

Test Setup for 20dB Bandwidth

See Appendix B, Figure 17 for test setup photo

Figure 2 20dB Bandwidth Graphs

4.4 Test Conditions and Results – Number of Hopping Frequencies

Test Description	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.	
Basic Standard	47 CFR Part 15.247(a)(1)(i) RSS-210, A8.1(d)	

Table 8 Number of Hopping Frequencies Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	2
Supplementary information: None		

Table 9 Number of Hopping Frequencies Test Equipment

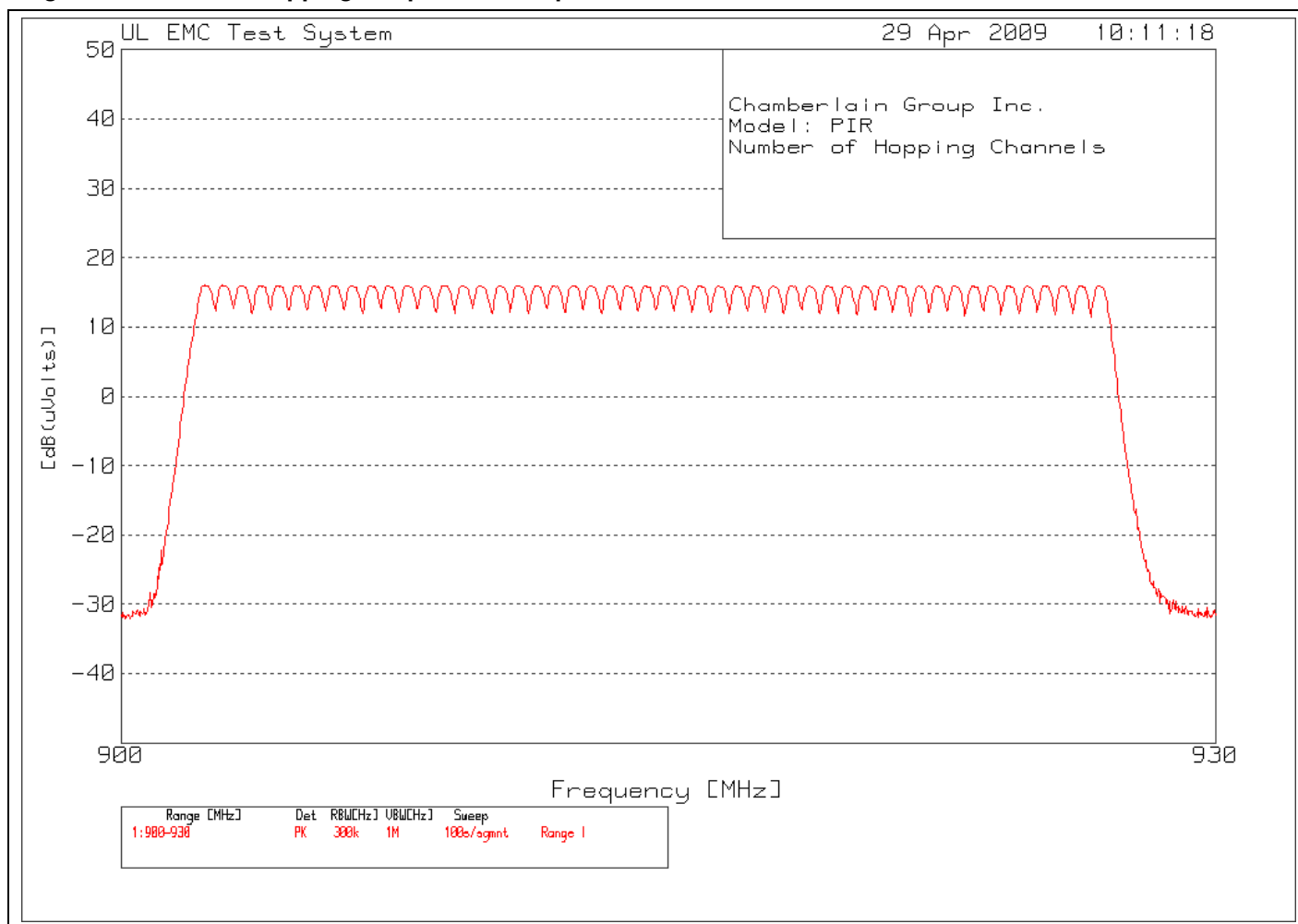
Test Equipment Used			
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

Table 10 Number of Hopping Frequencies Results

Mode	Number of Channels	Minimum Number Required
TX, Hopping	50	50

Test Setup for Number of Hopping Frequencies

See Appendix B, Figure 17 for test setup photo

Figure 3 Number of Hopping Frequencies Graphs**Table 11 Number of Hopping Channels (Frequency List)**

#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz
1	902.2962	11	907.2629	21	912.3045	31	917.2962	41	922.3128
2	902.7953	12	907.812	22	912.8037	32	917.7953	42	922.787
3	903.2945	13	908.2612	23	913.3278	33	918.2945	43	923.3361
4	903.7937	14	908.7854	24	913.777	34	918.7687	44	923.7854
5	904.2928	15	909.2845	25	914.3012	35	919.3178	45	924.3095
6	904.7671	16	909.7837	26	914.8003	36	919.817	46	924.8336
7	905.2912	17	910.3078	27	915.2745	37	920.3411	47	925.3328
8	905.7903	18	910.8319	28	915.7737	38	920.8278	48	925.807
9	906.2895	19	911.3311	29	916.3228	39	921.2895	49	926.3062
10	906.7887	20	911.8053	30	916.797	40	921.8136	50	926.8053

4.5 Test Conditions and Results – Dwell Time and Duty Cycle Correction

Test Description	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
Basic Standard	47 CFR Part 15.247(a)(1)(i) RSS-210, A8.1(d)

Table 12 Dwell Time Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	2
Supplementary information: Duty cycle also measured/calculated for use in radiated spurious measurements		

Table 13 Dwell Time Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

Table 14 Dwell Time Results

Mode	Number of Channels	Maximum Time Allowed in 20s.	Measured Dwell Time in 20s.
TX Hopping Low Channel	50	400mS	346.45 mS
TX Hopping Middle Channel	50	400mS	348.50mS
TX Hopping High Channel	50	400mS	346.45mS

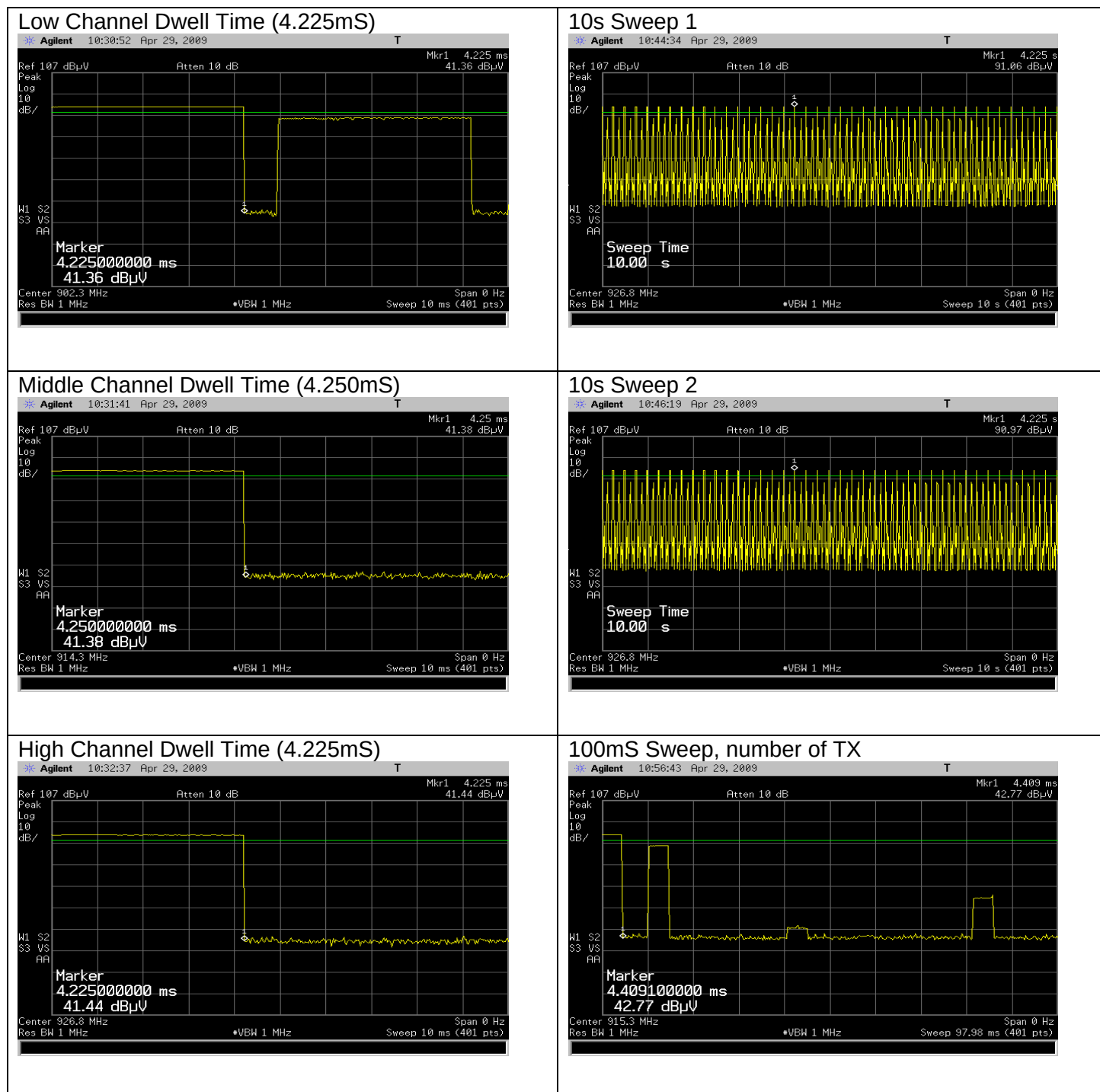
Table 15 Duty Cycle Correction Factor

Mode	Number of TX in 100mS	TX Duration in 100mS	Duty Cycle Correction (dB) $20 \times \log\left(\frac{TX (ms)}{100ms}\right)$
TX Hopping Low Channel	1	4.225	-27.48dB
TX Hopping Middle Channel	1	4.250	-27.43dB
TX Hopping High Channel	1	4.225	-27.48dB

Test Setup for Dwell Time

See Appendix B, Figure 17 for test setup photo

Figure 4 Dwell Time Graphs



The number of transmissions plots show only the single channel. It was checked that the number of transmissions was the same on other channels do to equal channel use. The total number of transmissions counted in 20s is: 82. Total maximum transmit time: 348.5ms within 20s.

4.6 Test Conditions and Results – Maximum Peak Output Power

Test Description	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.	
Basic Standard	47 CFR Part 15.247(b)(2) RSS-210, A8.4(2)	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	902MHz – 928MHz	Antenna Conducted
Limits		
Frequency (MHz)	Limit mW	
	Peak	
902 - 928	1000 (30dBm – gain of Antenna over 6dBi)	
Supplementary information: None		

Table 16 Maximum Peak Output Power EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	1
Supplementary information: None		

Table 17 Maximum Peak Output Power Test Equipment

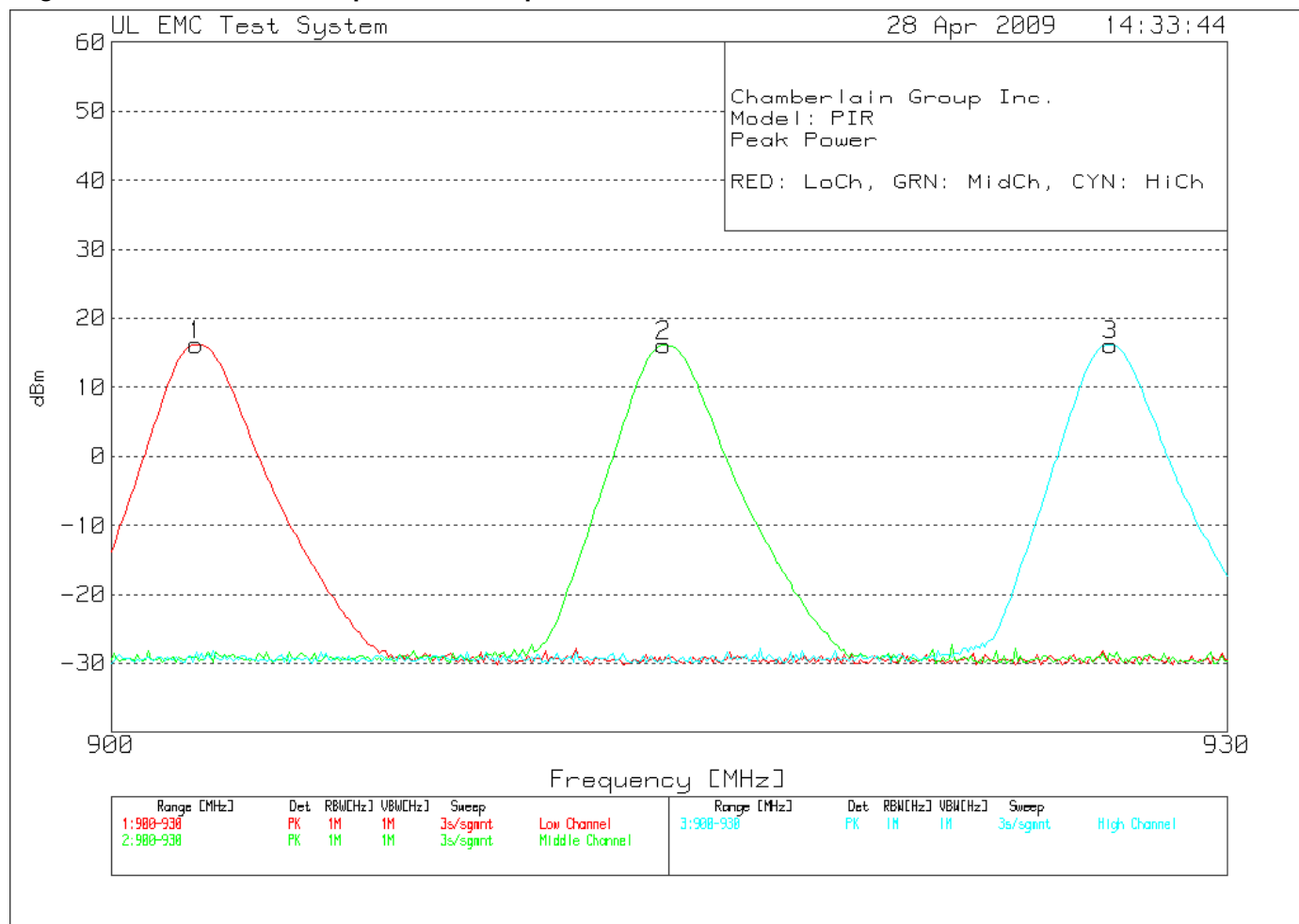
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405A	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

Table 18 Maximum Peak Output Power Results

Channel	Limit (30dBm)	Power dBm	Power W
Low Channel	30dBm	16.18	0.0415
Middle Channel	30dBm	16.08	0.0406
High Channel	30dBm	16.10	0.0407

Test setup for Maximum Peak Output Power

See Appendix B, Figure 17 for test setup photo

Figure 5 Maximum Peak Output Power Graph**Table 19 Maximum Peak Output Power Emissions Data Points**

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBm	Limit:1	2	3	4	5	6
Low Channel 900 - 930MHz											
1	902.25	91.18 pk	32	-107	16.18	-	-	-	-	-	-
				Margin [dB]		-	-	-	-	-	-
Middle Channel 900 - 930MHz											
2	914.7375	91.08 pk	32	-107	16.08	-	-	-	-	-	-
				Margin [dB]		-	-	-	-	-	-
High Channel 900 - 930MHz											
3	926.8125	91.1 pk	32	-107	16.1	-	-	-	-	-	-
				Margin [dB]		-	-	-	-	-	-

pk - Peak detector

4.7 Test Conditions and Results – Band Edge Compliance

Test Description	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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section15.205(c)).	
Basic Standard	47 CFR Part 15.247(d) RSS-210, A8.5	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	852MHz – 978MHz	Antenna Conducted
Limits		
Frequency (MHz)	Limits	
	Antenna Conducted – 20dB below the fundamental	
Below 902MHz and Above 928MHz	Aprox. -1.9dBm (See Data Table Below)	
Supplementary information: Only Antenna Conducted Measurements required. No restricted bands close to the allocated frequency band.		

Table 20 Band Edge Compliance EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	1 and 2
Supplementary information: None		

Table 21 Band Edge Compliance Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Rhode & Schwartz	FSEK	EMC4182
Attenuator	Pasternek	PE7019-30	None

Test setup for Band Edge Compliance – Conducted

See Appendix B, Figure 17 for test setup photo

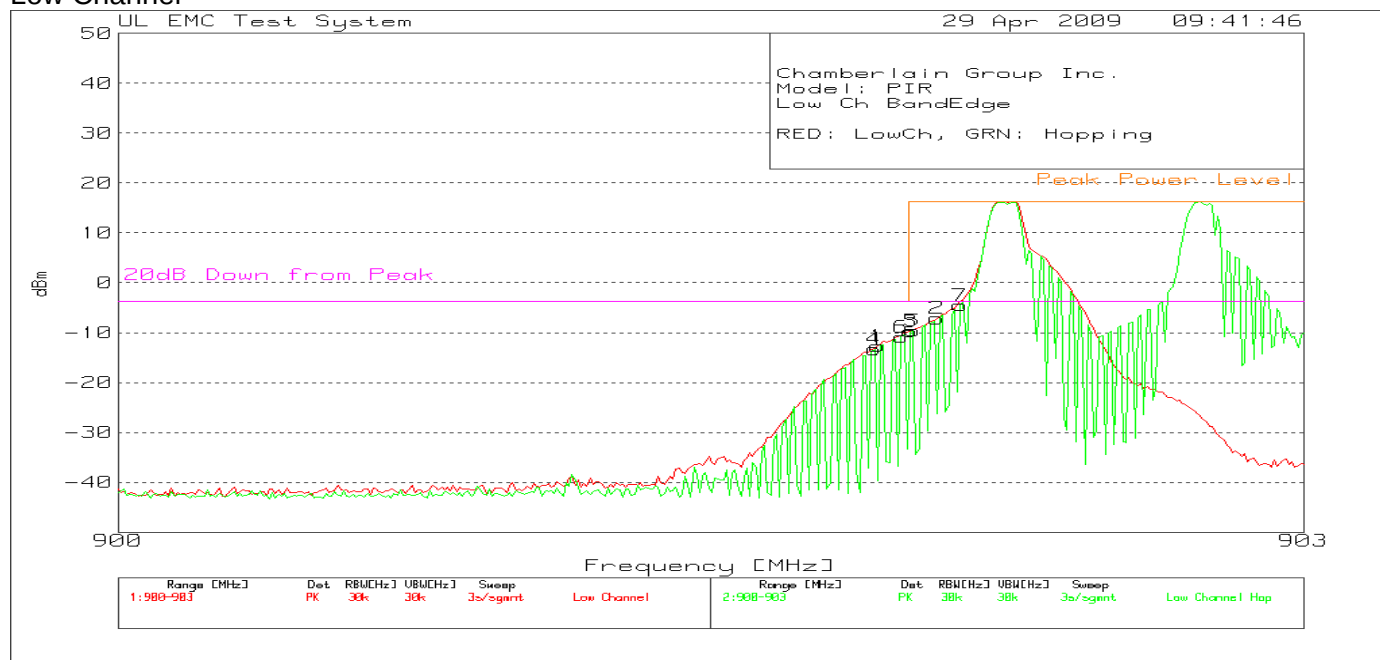
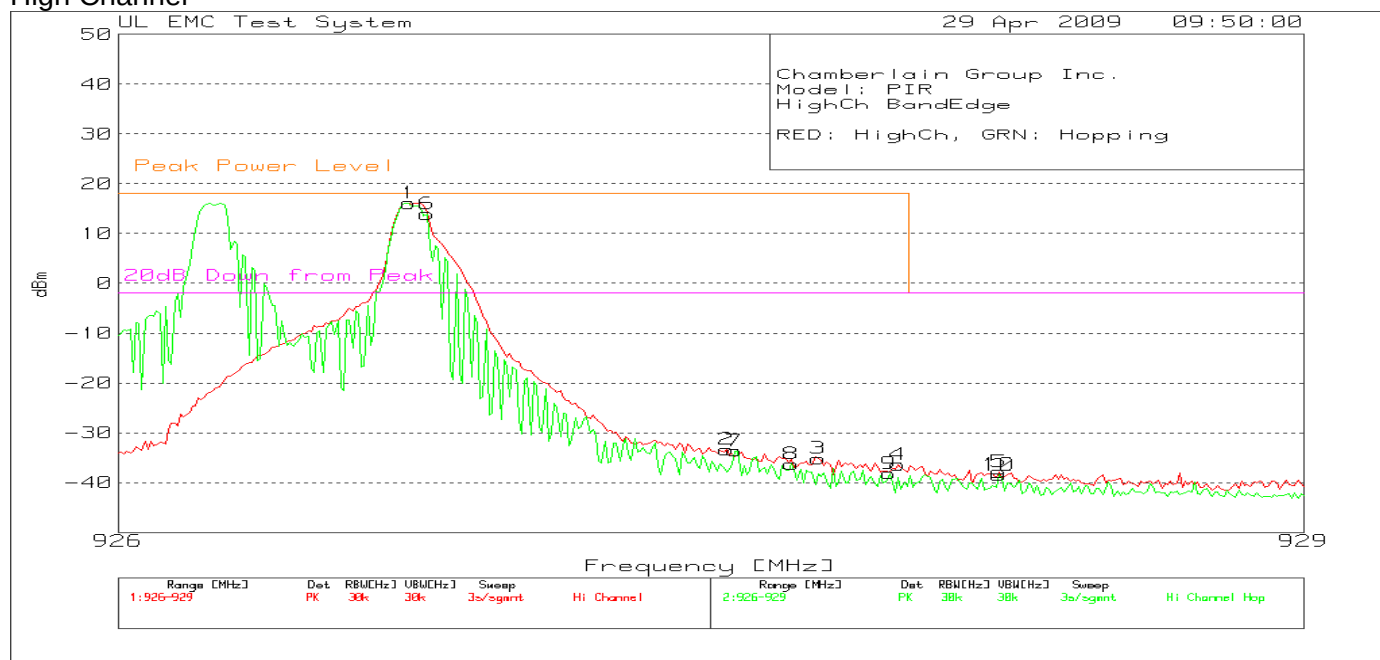
Figure 6 Conducted Band Edge Compliance Graph**Low Channel****High Channel**

Table 22 Band Edge Compliance Data Points**Low Channel**

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBm	Limit:1	2	3	4	5	6

Low Channel 900 - 903MHz -----											
1	901.92	62.29 pk	32	-107	-12.71	0	-3.8	-	-	-	-
				Margin [dB]		-12.71	-8.91	-	-	-	-
2	902.07	67.85 pk	32	-107	-7.15	16.2	-3.8	-	-	-	-
				Margin [dB]		-23.35	-3.35	-	-	-	-
3	902.0025	65.21 pk	32	-107	-9.79	16.2	-3.8	-	-	-	-
				Margin [dB]		-25.99	-5.99	-	-	-	-

Low Channel Hop 900 - 903MHz -----											
4	901.9125	61.65 pk	32	-107	-13.35	0	-3.8	-	-	-	-
				Margin [dB]		-13.35	-9.55	-	-	-	-
5	902.01	65.38 pk	32	-107	-9.62	16.2	-3.8	-	-	-	-
				Margin [dB]		-25.82	-5.82	-	-	-	-
6	901.98	64.1 pk	32	-107	-10.9	0	-3.8	-	-	-	-
				Margin [dB]		-10.9	-7.1	-	-	-	-
7	902.13	70.47 pk	32	-107	-4.53	16.2	-3.8	-	-	-	-
				Margin [dB]		-20.73	-.73	-	-	-	-

High Channel

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBm	Limit:1	2	3	4	5	6

Hi Channel 926 - 929MHz -----											
1	926.735	91.1 pk	32	-107	16.1	18.1	-1.9	-	-	-	-
				Margin [dB]		-2	18	-	-	-	-
2	927.5375	41.64 pk	32	-107	-33.36	18.1	-1.9	-	-	-	-
				Margin [dB]		-51.46	-31.46	-	-	-	-
3	927.77	39.83 pk	32	-107	-35.17	18.1	-1.9	-	-	-	-
				Margin [dB]		-53.27	-33.27	-	-	-	-
4	927.9725	38.61 pk	32	-107	-36.39	18.1	-1.9	-	-	-	-
				Margin [dB]		-54.49	-34.49	-	-	-	-
5	928.2275	37.12 pk	32	-107	-37.88	0	-1.9	-	-	-	-
				Margin [dB]		-37.88	-35.98	-	-	-	-

Hi Channel Hop 926 - 929MHz -----											
6	926.78	88.95 pk	32	-107	13.95	18.1	-1.9	-	-	-	-
				Margin [dB]		-4.15	15.85	-	-	-	-
7	927.56	41.37 pk	32	-107	-33.63	18.1	-1.9	-	-	-	-
				Margin [dB]		-51.73	-31.73	-	-	-	-
8	927.7025	38.71 pk	32	-107	-36.29	18.1	-1.9	-	-	-	-
				Margin [dB]		-54.39	-34.39	-	-	-	-
9	927.95	36.82 pk	32	-107	-38.18	18.1	-1.9	-	-	-	-
				Margin [dB]		-56.28	-36.28	-	-	-	-
10	928.2275	36.5 pk	32	-107	-38.5	0	-1.9	-	-	-	-
				Margin [dB]		-38.5	-36.6	-	-	-	-

LIMIT 1: Peak Power Level

LIMIT 2: 20dB Down from Peak

pk - Peak detector

4.8 Test Conditions and Results – SPURIOUS EMISSIONS (Antenna Conducted and Radiated)

Test Description	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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section15.205(c)).		
Basic Standard	47 CFR Part 15.247(d) RSS-210, A8.5 RSS-Gen 7.2.1 and 7.2.3		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	3 meter distance and / or antenna port	
Fully configured sample scanned over the following frequency range	1GHz – 10GHz	3 meter distance and / or antenna port	
Limits (Antenna Conducted)			
All emissions must be 20dB below the level of the fundamental frequency. -3.82dBm			
Limits (Radiated – Restricted Bands Only)			
Frequency (MHz)	Limit (dBμV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
30 – 88	29.54	-	-
88 – 216	33.06	-	-
216-960	35.56	-	-
960-1000	43.52	-	-
1,000-25,000	-	-	54
Supplementary information: Below 1GHz, spectrum was checked. All emissions related to the transmitter below 1GHz are not in the restricted band therefore only antenna conducted limits apply (20dB below the peak level of the fundamental).			

Table 23 SPURIOUS EMISSIONS EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1 and 2	1 and 2
Supplementary information: None		

Table 24 SPURIOUS CONDUCTED EMISSIONS Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405A	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

Table 25 SPURIOUS RADIATED EMISSIONS Test Equipment

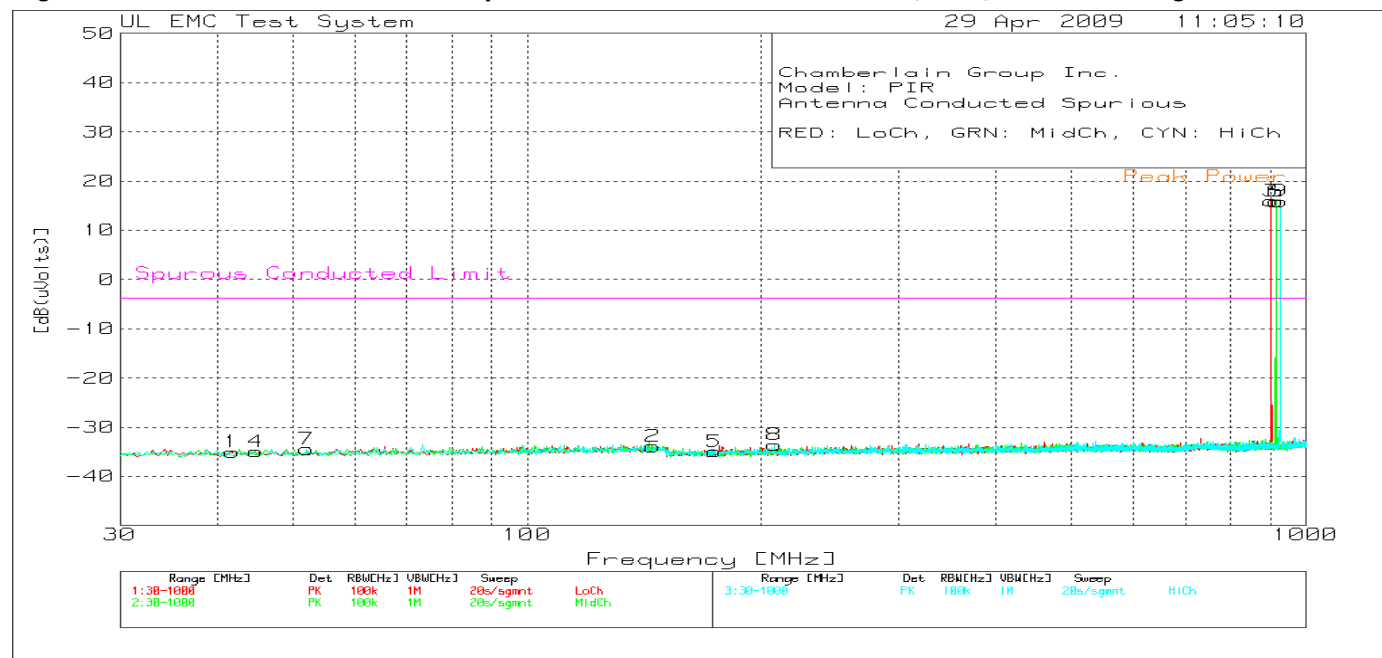
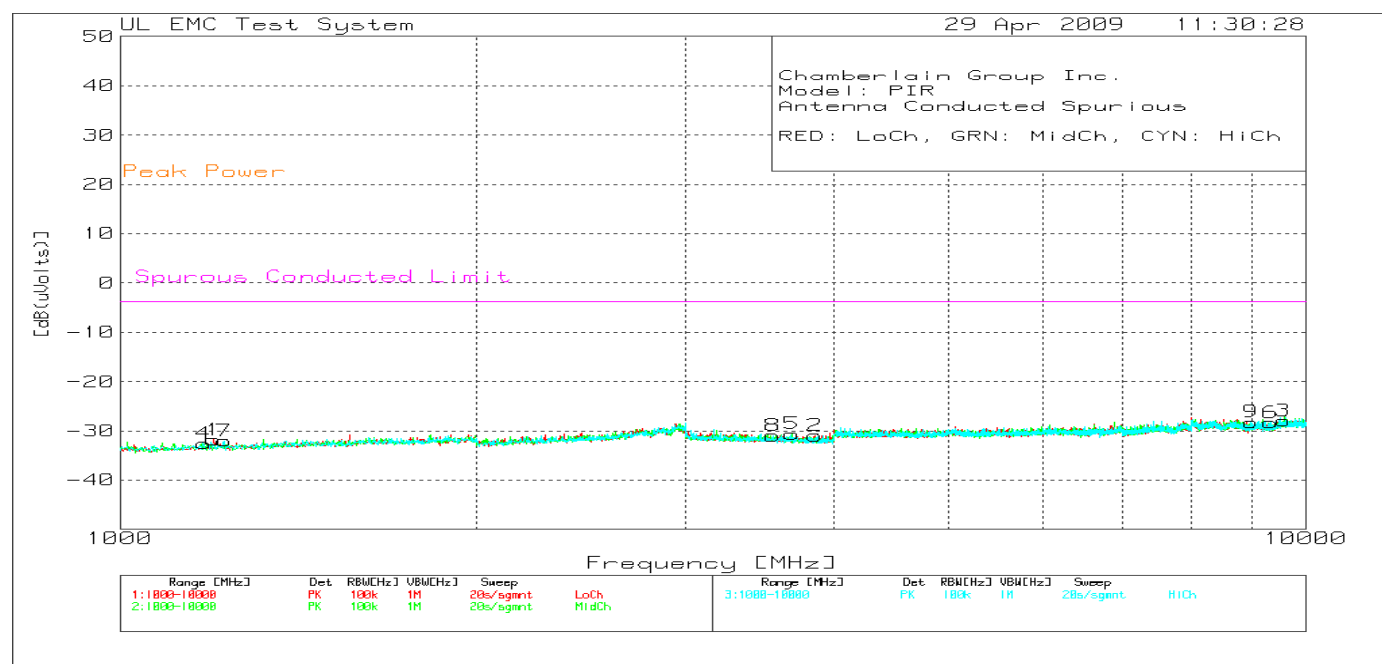
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Rhode & Schwartz	ESU	EMC4323
Bicon Antenna	Chase	VBA6106A	EMC4078
Log-P Antenna	Chase	UPA6109	EMC4258
Spectrum Analyzer	Rhode & Schwartz	FSEK	EMC4182
Antenna Array	UL	BOMS	EMC4276

Test setup for SPURIOUS EMISSIONS – Antenna conducted

See Appendix B, Figure 17 for test setup photo

Test setup for SPURIOUS EMISSIONS – Radiated

See Appendix B, Figure 18 for test setup photo

Figure 7 30MHz-1GHz Antenna Port Spurious Emissions Plots TX Mode, Low, Middle and High Channels.**Figure 8 1GHz-10GHz Antenna Port Spurious Emissions Plots TX Mode, Low, Middle and High Channels.**

No spurious emissions within 20dB of the limit were recorded.

Figure 9 Radiated Spurious Emissions 200MHz – 1GHz, Low Channel

Below 200MHz there were no emissions related to the transmitter.

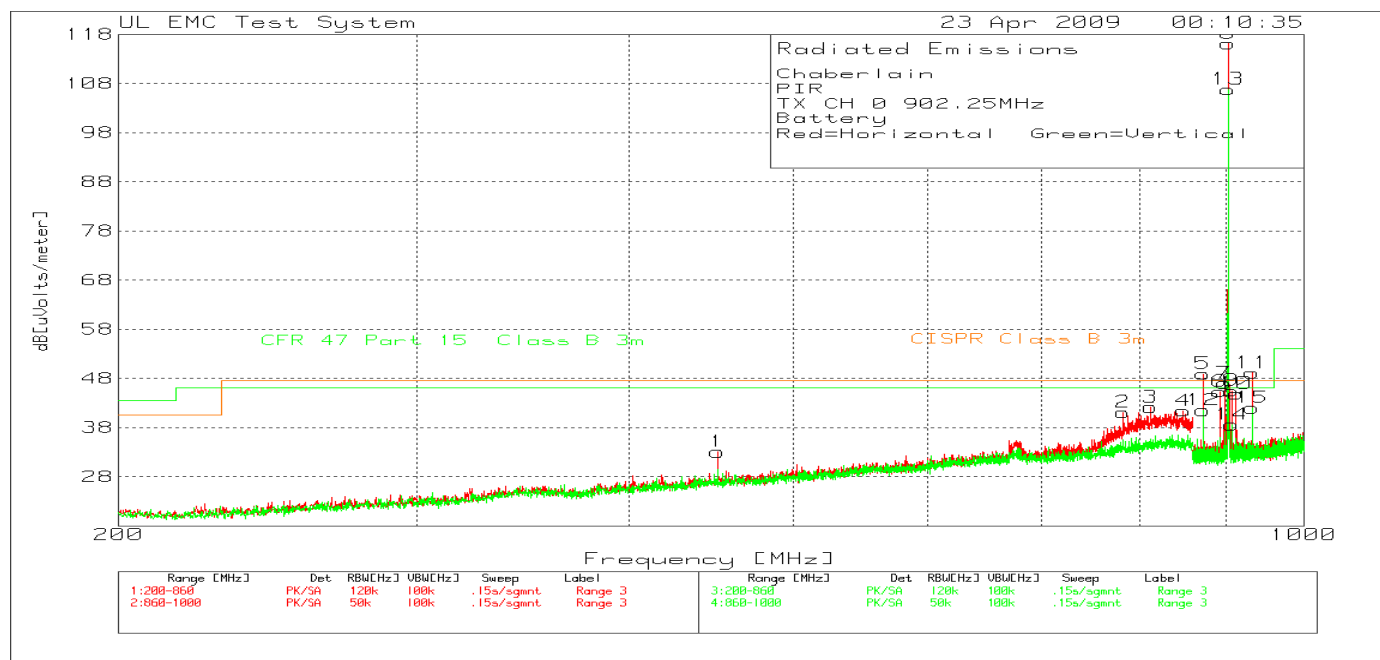


Figure 10 Radiated Spurious Emissions 1GHz – 10GHz, Low Channel

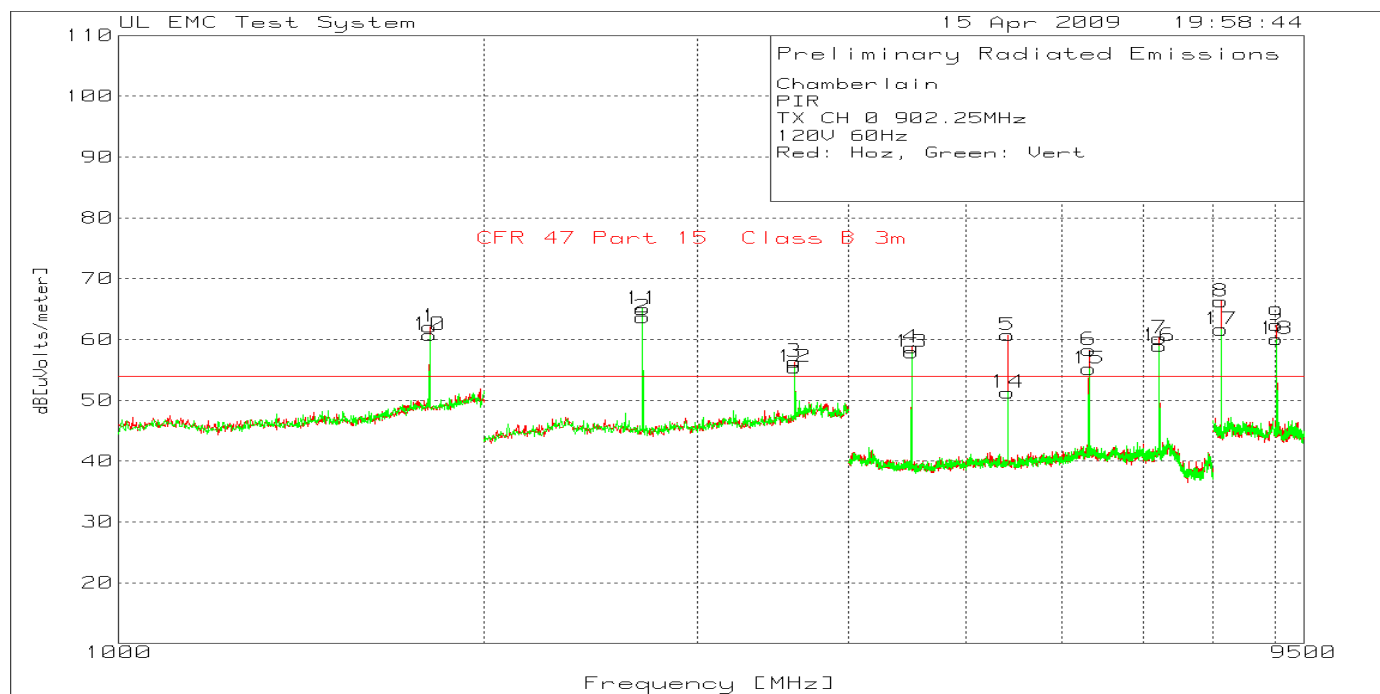


Table 26 Radiated Spurious Emissions 200MHz – 1GHz, Low Channel

None of the spurious emissions detected above the noise floors in frequency range of 200MHz – 1GHz are in the restricted band therefore final radiated emission measurements were not required.

Chamberlain

PIR

TX CH 0 902.25MHz

Battery

Red: Hoz, Green: Vert

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
1	841.1192	43.53 pk	-31.9	23	34.63	-	-	46.4	35.6	-	-
		Height:301	Horz	Margin [dB]	-	-	-	-11.77	- .97	-	-
2	846.9148	43.02 pk	-31.9	22.8	33.92	-	-	46.4	35.6	-	-
		Height:101	Horz	Margin [dB]	-	-	-	-12.48	-1.68	-	-
3	872.2958	46.68 pk	-32	22.3	36.98	-	-	46.4	35.6	-	-
		Height:101	Horz	Margin [dB]	-	-	-	-9.42	1.38	-	-
4	892.2808	44.45 pk	-32	22.6	35.05	-	-	46.4	35.6	-	-
		Height:101	Horz	Margin [dB]	-	-	-	-11.35	- .55	-	-
5	902.2733	112.83 pk	-31.9	22.3	103.23	-	-	46.4	35.6	-	-
		Height:101	Horz	Margin [dB]	-	-	-	56.83	67.63	-	-
6	912.2658	44.83 pk	-31.9	22.2	35.13	-	-	46.4	35.6	-	-
		Height:101	Horz	Margin [dB]	-	-	-	-11.27	- .47	-	-
7	932.2508	46.13 pk	-31.9	22.8	37.03	-	-	46.4	35.6	-	-
		Height:101	Horz	Margin [dB]	-	-	-	-9.37	1.43	-	-
8	872.2958	42.73 pk	-32	22.3	33.03	-	-	46.4	35.6	-	-
		Height:202	Vert	Margin [dB]	-	-	-	-13.37	-2.57	-	-
9	892.2808	40.11 pk	-32	22.6	30.71	-	-	46.4	35.6	-	-
		Height:300	Vert	Margin [dB]	-	-	-	-15.69	-4.89	-	-
10	902.2733	107.38 pk	-31.9	22.3	97.78	-	-	46.4	35.6	-	-
		Height:202	Vert	Margin [dB]	-	-	-	51.38	62.18	-	-
11	912.2658	39.61 pk	-31.9	22.2	29.91	-	-	46.4	35.6	-	-
		Height:202	Vert	Margin [dB]	-	-	-	-16.49	-5.69	-	-
12	932.2508	41.62 pk	-31.9	22.8	32.52	-	-	46.4	35.6	-	-
		Height:400	Vert	Margin [dB]	-	-	-	-13.88	-3.08	-	-

LIMIT 3: CFR 47 Part 15 Class A 10m

LIMIT 4: CFR 47 Part 15 Class B 10m

pk - Peak detector

qp - Quasi-Peak detector

Model Number: CWPIR

Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Table 27 Radiated Spurious Emissions 1GHz – 10GHz, Low Channel

Chamberlain

PIR

TX CH 0 902.25MHz

120V 60Hz

Red: Hoz, Green: Vert

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
1	1805.611	31.9 pk	3.59	26.6	62.09	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-11.91	-	-	-	-	-
10	1805.611	30.53 pk	3.59	26.6	60.72	74	-	-	-	-	-
		Height:100	Vert	Margin	[dB]	-13.28	-	-	-	-	-
2	2705.411	37.47 pk	4.13	22.1	63.7	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-10.3	-	-	-	-	-
11	2705.411	38.81 pk	4.13	22.1	65.04	74	-	-	-	-	-
		Height:100	Vert	Margin	[dB]	-8.96	-	-	-	-	-
3	3611.222	27.87 pk	5.24	23.2	56.31	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-17.69	-	-	-	-	-
12	3611.222	27.03 pk	5.24	23.2	55.47	74	-	-	-	-	-
		Height:150	Vert	Margin	[dB]	-18.53	-	-	-	-	-
4	4509.673	83.4 pk	-52.5	27.8	58.7	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-15.3	-	-	-	-	-
13	4509.673	82.63 pk	-52.5	27.8	57.93	74	-	-	-	-	-
		Height:100	Vert	Margin	[dB]	-16.07	-	-	-	-	-
5	5414.276	82.96 pk	-50.15	27.9	60.71	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-13.29	-	-	-	-	-
14	5414.276	73.56 pk	-50.15	27.9	51.31	74	-	-	-	-	-
		Height:100	Vert	Margin	[dB]	-22.69	-	-	-	-	-
6	6316.211	77.1 pk	-48.02	29.2	58.28	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-15.72	-	-	-	-	-
15	6316.211	74 pk	-48.02	29.2	55.18	74	-	-	-	-	-
		Height:149	Vert	Margin	[dB]	-18.82	-	-	-	-	-
7	7218.145	77.51 pk	-47.08	29.8	60.23	74	-	-	-	-	-
		Height:100	Horz	Margin	[dB]	-13.77	-	-	-	-	-
16	7218.145	76.21 pk	-47.08	29.8	58.93	74	-	-	-	-	-
		Height:100	Vert	Margin	[dB]	-15.07	-	-	-	-	-
8	8120.24	79.98 pk	-49.9	36.2	66.28	74	-	-	-	-	-
		Height:149	Horz	Margin	[dB]	-7.72	-	-	-	-	-
17	8120.24	75.35 pk	-49.9	36.2	61.65	74	-	-	-	-	-
		Height:150	Vert	Margin	[dB]	-12.35	-	-	-	-	-
9	9022.044	76.19 pk	-49.92	36.1	62.37	74	-	-	-	-	-
		Height:149	Horz	Margin	[dB]	-11.63	-	-	-	-	-
18	9022.044	73.89 pk	-49.92	36.1	60.07	74	-	-	-	-	-
		Height:150	Vert	Margin	[dB]	-13.93	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Model Number: CWPIR

Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Chamberlain
PIR
TX CH 0 902.25MHz
120V 60Hz
Red: Hoz, Green: Vert

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							

See previous page for peak data.

2nd Harmonic - not restricted

Duty Cycle Correction included in AV Margin

3rd Harmonics

2706.6353	36.48 av	4.13	22.1	62.71	54	Duty Cycle Correction: -27.4dB				
Azimuth: 182	Height:103	Horz	Margin	[dB]:	-18.69	-	-	-	-	-

2706.6353	39.64 av	4.13	22.1	65.87	54	Duty Cycle Correction: -27.4dB				
Azimuth: 191	Height:113	Vert	Margin	[dB]:	-15.53	-	-	-	-	-

4thd Harmonic

3608.8928	25.73 av	5.23	23.2	54.16	54	Duty Cycle Correction: -27.4dB				
Azimuth: 193	Height:108	Horz	Margin	[dB]:	-27.24	-	-	-	-	-

3608.8928	27.77 av	5.23	23.2	56.2	54	Duty Cycle Correction: -27.4dB				
Azimuth: 189	Height:130	Vert	Margin	[dB]:	-25.2	-	-	-	-	-

5th Harmonic

4511.1062	82.28 av	-52.5	27.8	57.58	54	Duty Cycle Correction: -27.4dB				
Azimuth: 230	Height:121	Horz	Margin	[dB]:	-23.42	-	-	-	-	-

4511.1062	82 av	-52.5	27.8	57.3	54	Duty Cycle Correction: -27.4dB				
Azimuth: 157	Height:141	Vert	Margin	[dB]:	-24.1	-	-	-	-	-

6th Harmonic - Low Channel Only

5413.4379	80.96 av	-50.17	27.9	58.69	54	Duty Cycle Correction: -27.4dB				
Azimuth: 205	Height:117	Horz	Margin	[dB]:	-22.71	-	-	-	-	-

5413.4379	72.64 av	-50.17	27.9	50.37	54	Duty Cycle Correction: -27.4dB				
Azimuth: 182	Height:142	Vert	Margin	[dB]:	-31.03	-	-	-	-	-

7th Harmonic - not restricted

8th Harmonic - not restricted

9th Harmonic

8120.1022	77.97 av	-49.89	36.2	64.28	54	Duty Cycle Correction: -27.4dB				
Azimuth: 197	Height:157	Horz	Margin	[dB]:	-17.12	-	-	-	-	-

8120.1022	76.26 av	-49.89	36.2	62.57	54	Duty Cycle Correction: -27.4dB				
Azimuth: 164	Height:139	Vert	Margin	[dB]:	-18.83	-	-	-	-	-

10th Harmonic

9022.3206	73 av	-49.92	36.1	59.18	54	Duty Cycle Correction: -27.4dB				
Azimuth: 42	Height:101	Horz	Margin	[dB]:	-22.22	-	-	-	-	-

9022.3206	71.51 av	-49.92	36.1	57.69	54	Duty Cycle Correction: -27.4dB				
Azimuth: 191	Height:159	Vert	Margin	[dB]:	-23.71	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Figure 11 Radiated Spurious Emissions 200MHz – 1GHz, Middle Channel

Below 200MHz there were no emissions related to the transmitter.

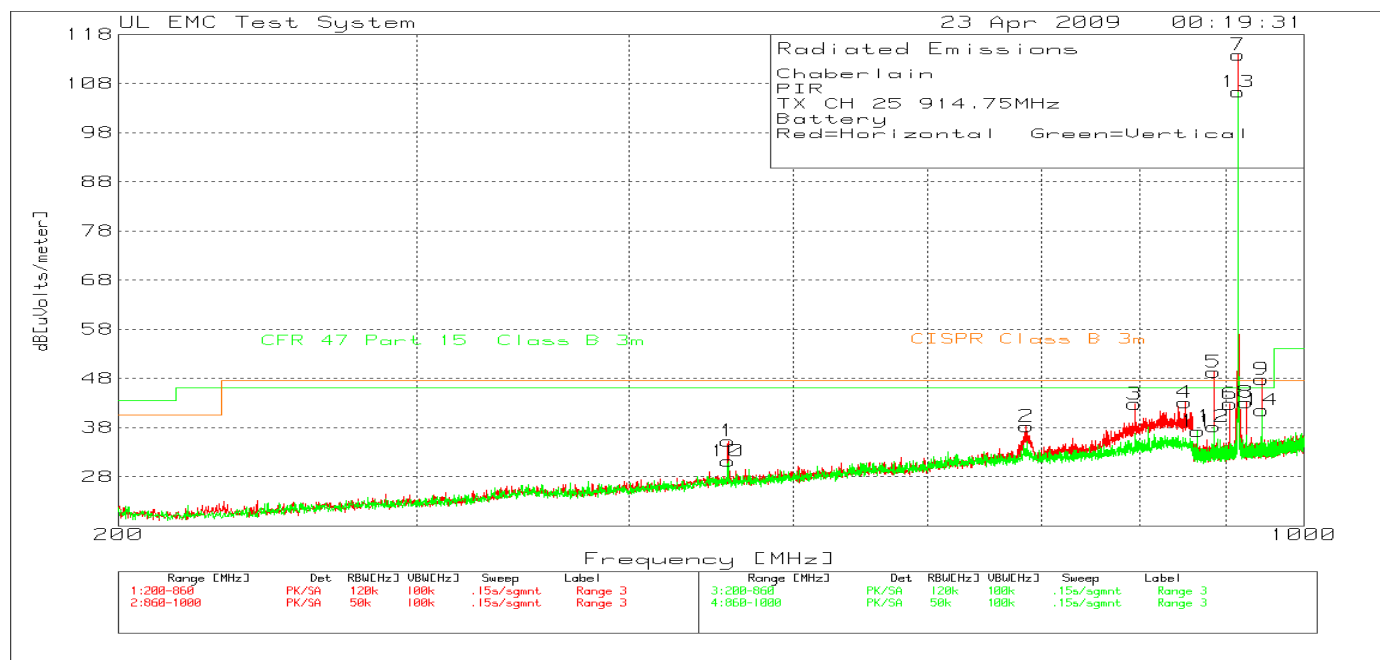


Figure 12 Radiated Spurious Emissions 1GHz – 10GHz, Middle Channel

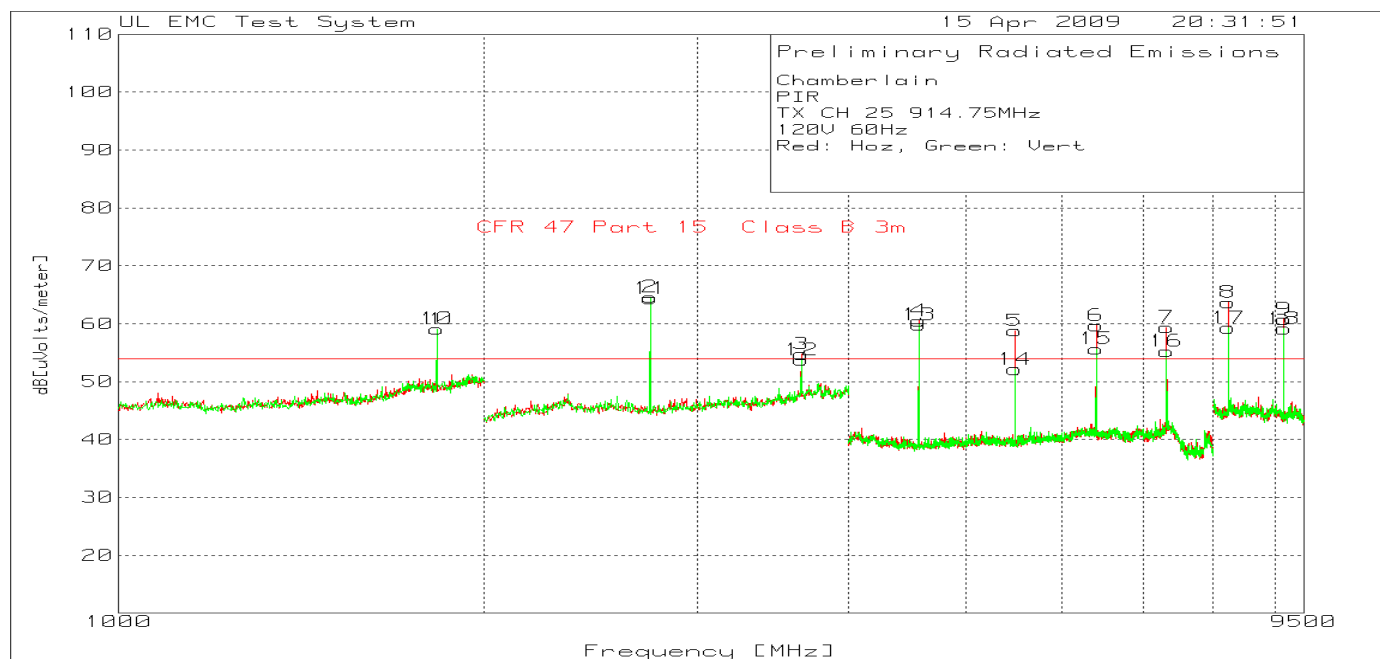


Table 28 Radiated Spurious Emissions 200MHz – 1GHz, Middle Channel

None of the spurious emissions detected above the noise floors in frequency range of 200MHz – 1GHz are in the restricted band therefore final radiated emission measurements were not required.

Chamberlain
PIR
TX CH 25 914.75MHz
Battery
Red: Hoz, Green: Vert

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
1	686.0355	41.84 pk	-31.1	20.2	30.94	-	-	46.4	35.6	-	-
		Height:400	Horz	Margin [dB]		-	-	-15.46	-4.66	-	-
2	863.3025	43.17 pk	-31.8	22.5	33.87	-	-	46.4	35.6	-	-
		Height:103	Horz	Margin [dB]		-	-	-12.53	-1.73	-	-
3	884.8863	45.6 pk	-31.8	22.6	36.4	-	-	46.4	35.6	-	-
		Height:103	Horz	Margin [dB]		-	-	-10	.8	-	-
4	904.8713	43.92 pk	-32.1	22.3	34.12	-	-	46.4	35.6	-	-
		Height:103	Horz	Margin [dB]		-	-	-12.28	-1.48	-	-
5	914.8639	112.61 pk	-31.8	22.3	103.11	-	-	46.4	35.6	-	-
		Height:103	Horz	Margin [dB]		-	-	56.71	67.51	-	-
6	924.8564	43.19 pk	-32	22.9	34.09	-	-	46.4	35.6	-	-
		Height:303	Horz	Margin [dB]		-	-	-12.31	-1.51	-	-
7	944.8414	45.99 pk	-31.8	22.6	36.79	-	-	46.4	35.6	-	-
		Height:103	Horz	Margin [dB]		-	-	-9.61	1.19	-	-
8	884.8863	41.77 pk	-31.8	22.6	32.57	-	-	46.4	35.6	-	-
		Height:201	Vert	Margin [dB]		-	-	-13.83	-3.03	-	-
9	904.8713	39.89 pk	-32.1	22.3	30.09	-	-	46.4	35.6	-	-
		Height:201	Vert	Margin [dB]		-	-	-16.31	-5.51	-	-
10	914.8639	107.01 pk	-31.8	22.3	97.51	-	-	46.4	35.6	-	-
		Height:201	Vert	Margin [dB]		-	-	51.11	61.91	-	-
11	944.8414	42.89 pk	-31.8	22.6	33.69	-	-	46.4	35.6	-	-
		Height:201	Vert	Margin [dB]		-	-	-12.71	-1.91	-	-

LIMIT 3: CFR 47 Part 15 Class A 10m

LIMIT 4: CFR 47 Part 15 Class B 10m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Model Number: CWPIR

Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Table 29 Radiated Spurious Emissions 1GHz – 10GHz, Middle Channel

Chamberlain

PIR

TX CH 25 914.75MHz

120V 60Hz

Red: Hoz, Green: Vert

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
1	1829.659	28.78 pk	3.58	26.7	59.06	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-14.94	-	-	-	-	-
10	1829.659	28.81 pk	3.58	26.7	59.09	74	-	-	-	-	-
		Height:150	Vert	Margin [dB]		-14.91	-	-	-	-	-
2	2745.491	38.47 pk	4.03	22.1	64.6	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-9.4	-	-	-	-	-
11	2745.491	38.25 pk	4.03	22.1	64.38	74	-	-	-	-	-
		Height:100	Vert	Margin [dB]		-9.62	-	-	-	-	-
3	3659.319	25.78 pk	5.59	23.4	54.77	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-19.23	-	-	-	-	-
12	3659.319	24.76 pk	5.59	23.4	53.75	74	-	-	-	-	-
		Height:150	Vert	Margin [dB]		-20.25	-	-	-	-	-
4	4573.716	85.29 pk	-52.47	27.7	60.52	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-13.48	-	-	-	-	-
13	4573.716	84.6 pk	-52.47	27.7	59.83	74	-	-	-	-	-
		Height:150	Vert	Margin [dB]		-14.17	-	-	-	-	-
5	5488.993	80.92 pk	-50.24	28.1	58.78	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-15.22	-	-	-	-	-
14	5488.993	74.28 pk	-50.24	28.1	52.14	74	-	-	-	-	-
		Height:100	Vert	Margin [dB]		-21.86	-	-	-	-	-
6	6404.27	78.41 pk	-47.94	29.2	59.67	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-14.33	-	-	-	-	-
15	6404.27	74.38 pk	-47.94	29.2	55.64	74	-	-	-	-	-
		Height:150	Vert	Margin [dB]		-18.36	-	-	-	-	-
7	7319.546	75.13 pk	-46.37	30.6	59.36	74	-	-	-	-	-
		Height:100	Horz	Margin [dB]		-14.64	-	-	-	-	-
16	7319.546	71 pk	-46.37	30.6	55.23	74	-	-	-	-	-
		Height:100	Vert	Margin [dB]		1.23	-	-	-	-	-
8	8231.463	76.13 pk	-48.83	36.4	63.7	74	-	-	-	-	-
		Height:150	Horz	Margin [dB]		9.7	-	-	-	-	-
17	8231.463	71.73 pk	-48.83	36.4	59.3	74	-	-	-	-	-
		Height:149	Vert	Margin [dB]		5.3	-	-	-	-	-
9	9148.297	75.25 pk	-50.77	36.3	60.78	74	-	-	-	-	-
		Height:150	Horz	Margin [dB]		6.78	-	-	-	-	-
18	9148.297	73.63 pk	-50.77	36.3	59.16	74	-	-	-	-	-
		Height:149	Vert	Margin [dB]		5.16	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Model Number: CWPIR

Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Chamberlain
PIR
TX CH 25 914.75MHz
120V 60Hz
Red: Hoz, Green: Vert

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
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See previous page for peak data.

2nd Harmonic - not restricted

Duty Cycle Correction included in AV Margin

3rd Harmonic

2744.2204	37.58 av	4.04	22.1	63.72	54	Duty Cycle Correction: -27.4dB			
Azimuth: 173	Height:101	Horz	Margin	[dB]:	-17.68	-	-	-	-

2744.2204	39.38 av	4.04	22.1	65.52	54	Duty Cycle Correction: -27.4dB			
Azimuth: 184	Height:115	Vert	Margin	[dB]:	-15.88	-	-	-	-

4th Harmonic

3658.9078	24.48 av	5.6	23.4	53.48	54	Duty Cycle Correction: -27.4dB			
Azimuth: 199	Height:103	Horz	Margin	[dB]:	-27.92	-	-	-	-

3658.9078	26.56 av	5.6	23.4	55.56	54	Duty Cycle Correction: -27.4dB			
Azimuth: 165	Height:109	Vert	Margin	[dB]:	-25.84	-	-	-	-

5th Harmonic

4573.6393	84.04 av	-52.47	27.7	59.27	54	Duty Cycle Correction: -27.4dB			
Azimuth: 234	Height:105	Horz	Margin	[dB]:	-22.13	-	-	-	-

4573.6393	83.2 av	-52.47	27.7	58.43	54	Duty Cycle Correction: -27.4dB			
Azimuth: 157	Height:123	Vert	Margin	[dB]:	-22.97	-	-	-	-

6th Harmonic - not restricted

7th Harmonic - not restricted

8th Harmonic

7317.7605	72.61 av	-46.36	30.6	56.85	54	Duty Cycle Correction: -27.4dB			
Azimuth: 251	Height:101	Horz	Margin	[dB]:	-24.55	-	-	-	-

7317.7605	73.8 av	-46.36	30.6	58.04	54	Duty Cycle Correction: -27.4dB			
Azimuth: 189	Height:115	Vert	Margin	[dB]:	-23.36	-	-	-	-

9th Harmonic

8232.6513	74.2 av	-48.79	36.4	61.81	54	Duty Cycle Correction: -27.4dB			
Azimuth: 194	Height:155	Horz	Margin	[dB]:	-19.59	-	-	-	-

8232.6513	72.55 av	-48.79	36.4	60.16	54	Duty Cycle Correction: -27.4dB			
Azimuth: 162	Height:145	Vert	Margin	[dB]:	-21.24	-	-	-	-

10th Harmonic

9147.3968	72.34 av	-50.77	36.3	57.87	54	Duty Cycle Correction: -27.4dB			
Azimuth: 41	Height:122	Horz	Margin	[dB]:	-23.53	-	-	-	-

9147.3968	73.2 av	-50.77	36.3	58.73	54	Duty Cycle Correction: -27.4dB			
Azimuth: 195	Height:147	Vert	Margin	[dB]:	-22.67	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Figure 13 Radiated Spurious Emissions 200MHz – 1GHz, High Channel

Below 200MHz there were no emissions related to the transmitter.

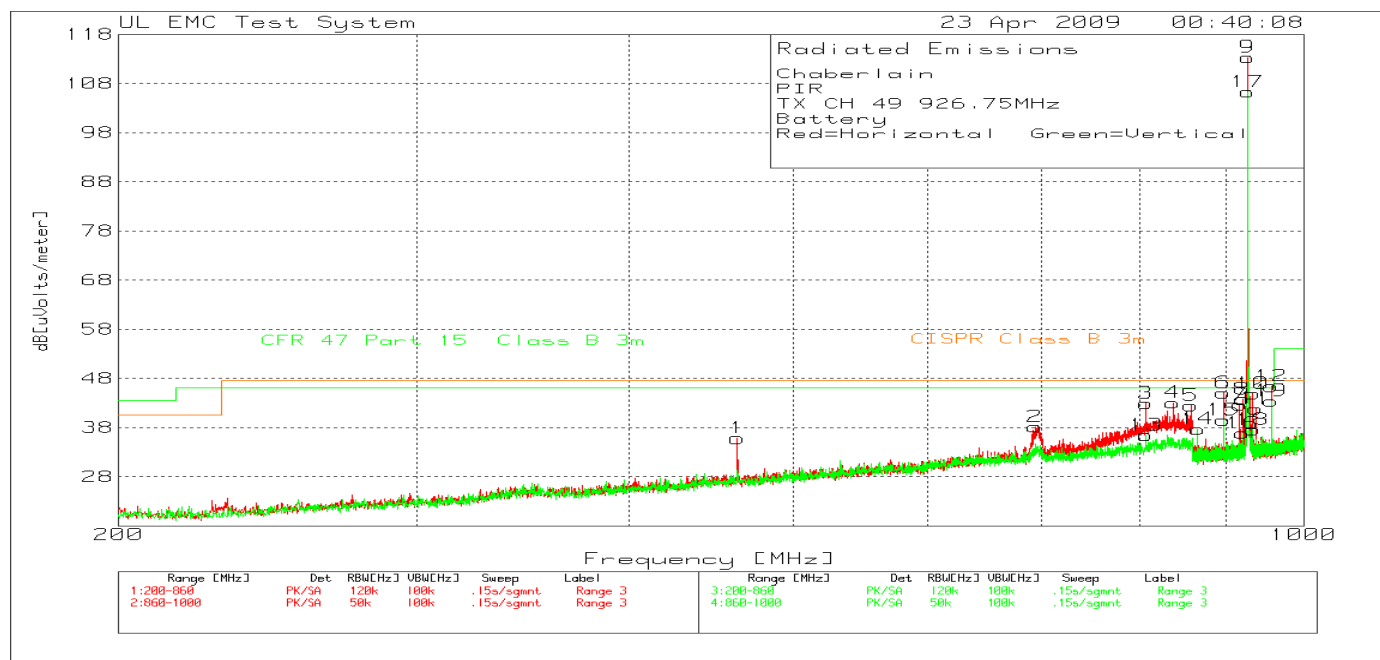


Figure 14 Radiated Spurious Emissions 1GHz – 10GHz, High Channel

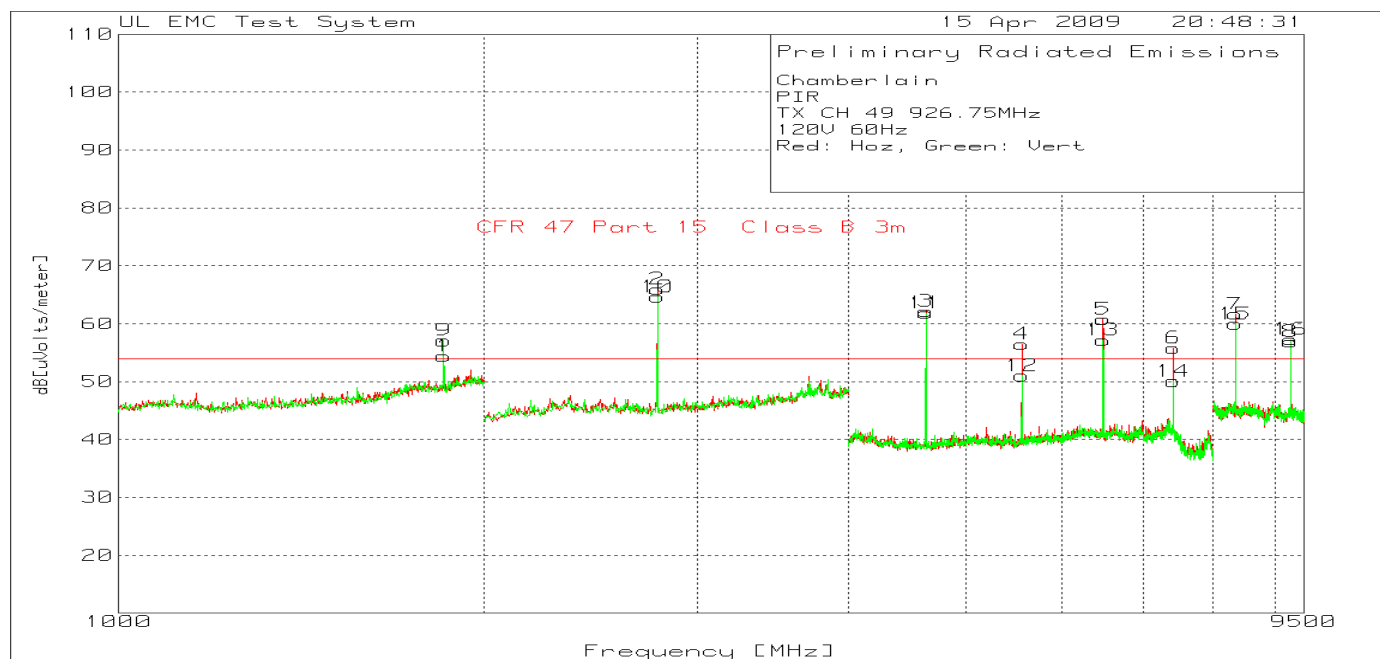


Table 30 Radiated Spurious Emissions 200MHz – 1GHz, High Channel

None of the spurious emissions detected above the noise floors in frequency range of 200MHz – 1GHz are in the restricted band therefore final radiated emission measurements were not required.

Chamberlain
PIR
TX CH 49 926.75MHz
Battery
Red=Horizontal Green=Vertical

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
1	463.3844	15.81 pk	2.5	17.5	35.81	46	47.5	-	-	-
		Height:200	Horz	Margin [dB]	-10.19	-11.69	-	-	-	-
2	694.4504	13.91 pk	3.2	21	38.11	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-7.89	-9.39	-	-	-	-
3	807.0153	17.41 pk	3.4	22.1	42.91	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-3.09	-4.59	-	-	-	-
4	837.1352	16.73 pk	3.4	22.9	43.03	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-2.97	-4.47	-	-	-	-
5	857.5816	16.02 pk	3.5	22.9	42.42	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-3.58	-5.08	-	-	-	-
6	896.7316	18.56 pk	3.5	23	45.06	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-.94	-2.44	-	-	-	-
7	916.7416	15.69 pk	3.6	23.3	42.59	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-3.41	-4.91	-	-	-	-
8	920.1699	16.77 pk	3.6	23.4	43.77	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-2.23	-3.73	-	-	-	-
9	926.7466	86.37 pk	3.6	23.3	113.27	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	67.27	65.77	-	-	-	-
10	933.2534	17.77 pk	3.7	23.4	44.87	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-1.13	-2.63	-	-	-	-
11	936.7516	14.68 pk	3.7	23.4	41.78	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	-4.22	-5.72	-	-	-	-
12	956.7616	19.08 pk	3.7	23.6	46.38	46	47.5	-	-	-
		Height:101	Horz	Margin [dB]	.38	-1.12	-	-	-	-
13	807.0153	10.95 pk	3.4	22.1	36.45	46	47.5	-	-	-
		Height:200	Vert	Margin [dB]	-9.55	-11.05	-	-	-	-
14	865.6672	11.37 pk	3.5	22.8	37.67	46	47.5	-	-	-
		Height:101	Vert	Margin [dB]	-8.33	-9.83	-	-	-	-
15	896.7316	13.02 pk	3.5	23	39.52	46	47.5	-	-	-
		Height:101	Vert	Margin [dB]	-6.48	-7.98	-	-	-	-
16	920.1699	9.81 pk	3.6	23.4	36.81	46	47.5	-	-	-
		Height:101	Vert	Margin [dB]	-9.19	-10.69	-	-	-	-
17	926.7466	79.37 pk	3.6	23.3	106.27	46	47.5	-	-	-
		Height:200	Vert	Margin [dB]	60.27	58.77	-	-	-	-
18	933.2534	10.44 pk	3.7	23.4	37.54	46	47.5	-	-	-
		Height:200	Vert	Margin [dB]	-8.46	-9.96	-	-	-	-
19	956.7616	16.07 pk	3.7	23.6	43.37	46	47.5	-	-	-
		Height:200	Vert	Margin [dB]	-2.63	-4.13	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

LIMIT 2: CISPR Class B 3m

Table 31 Radiated Spurious Emissions 1GHz – 10GHz, High Channel

Chamberlain

PIR

TX CH 49 926.75MHz

120V 60Hz

Red: Hoz, Green: Vert

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
1	1853.707	23.87 pk	3.74	26.8	54.41	74	-	-	-	-
		Height:100	Horz	Margin [dB]	-19.59	-	-	-	-	-
9	1853.707	26.58 pk	3.74	26.8	57.12	74	-	-	-	-
		Height:150	Vert	Margin [dB]	-16.88	-	-	-	-	-
2	2781.563	39.54 pk	4.24	22.2	65.98	74	-	-	-	-
		Height:100	Horz	Margin [dB]	-8.02	-	-	-	-	-
10	2781.563	38.2 pk	4.24	22.2	64.64	74	-	-	-	-
		Height:100	Vert	Margin [dB]	-9.36	-	-	-	-	-
3	4632.422	86.79 pk	-52.32	27.7	62.17	74	-	-	-	-
		Height:100	Horz	Margin [dB]	-11.83	-	-	-	-	-
11	4632.422	86.45 pk	-52.32	27.7	61.83	74	-	-	-	-
		Height:150	Vert	Margin [dB]	-12.17	-	-	-	-	-
4	5561.041	78.7 pk	-50.52	28.3	56.48	74	-	-	-	-
		Height:100	Horz	Margin [dB]	-17.52	-	-	-	-	-
12	5561.041	73.26 pk	-50.52	28.3	51.04	74	-	-	-	-
		Height:150	Vert	Margin [dB]	-22.96	-	-	-	-	-
5	6486.991	80.01 pk	-48.32	29.1	60.79	74	-	-	-	-
		Height:100	Horz	Margin [dB]	-13.21	-	-	-	-	-
13	6486.991	76.38 pk	-48.32	29.1	57.16	74	-	-	-	-
		Height:100	Vert	Margin [dB]	-16.84	-	-	-	-	-
6	7415.61	72.22 pk	-47.43	31	55.79	74	-	-	-	-
		Height:100	Horz	Margin [dB]	-18.21	-	-	-	-	-
14	7415.61	66.51 pk	-47.43	31	50.08	74	-	-	-	-
		Height:100	Vert	Margin [dB]	-23.92	-	-	-	-	-
7	8339.679	75.19 pk	-50.02	36.5	61.67	74	-	-	-	-
		Height:150	Horz	Margin [dB]	-12.33	-	-	-	-	-
15	8339.679	73.51 pk	-50.02	36.5	59.99	74	-	-	-	-
		Height:150	Vert	Margin [dB]	-14.01	-	-	-	-	-
8	9268.537	69.84 pk	-49.37	36.4	56.87	74	-	-	-	-
		Height:150	Horz	Margin [dB]	-17.13	-	-	-	-	-
16	9268.537	70.25 pk	-49.37	36.4	57.28	74	-	-	-	-
		Height:150	Vert	Margin [dB]	-16.72	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Model Number: CWPIR

Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Chamberlain
PIR
TX CH 49 926.75MHz
120V 60Hz
Red: Hoz, Green: Vert

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
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See previous page for peak data.

2nd Harmonic - not restricted

Duty Cycle Correction included in AV Margin

3rd Harmonic -										
2780.1583	38.15 av	4.25	22.2	64.6	54					
Azimuth: 178	Height:101	Horz	Margin [dB]:	-16.8						
						Duty Cycle Correction:	-27.4dB			

2780.1583	39.23 av	4.25	22.2	65.68	54					
Azimuth: 189	Height:112	Vert	Margin [dB]:	-15.72						
						Duty Cycle Correction:	-27.4dB			

4th Harmonic - not detected

5th Harmonic										
4633.5942	84.97 av	-52.33	27.7	60.34	54					
Azimuth: 231	Height:103	Horz	Margin [dB]:	-21.06						
						Duty Cycle Correction:	-27.4dB			

4633.5942	84.56 av	-52.33	27.7	59.93	54					
Azimuth: 166	Height:139	Vert	Margin [dB]:	-21.47						
						Duty Cycle Correction:	-27.4dB			

6th Harmonic - not restricted

7th Harmonic - not restricted

8th Harmonic										
7413.8457	71.45 av	-47.45	31	55	54					
Azimuth: 250	Height:100	Horz	Margin [dB]:	-26.4						
						Duty Cycle Correction:	-27.4dB			

7413.8457	71.82 av	-47.45	31	55.37	54					
Azimuth: 186	Height:113	Vert	Margin [dB]:	-26.03						
						Duty Cycle Correction:	-27.4dB			

9th Harmonic										
8340.6062	75.31 av	-50.02	36.5	61.79	54					
Azimuth: 171	Height:147	Horz	Margin [dB]:	-19.61						
						Duty Cycle Correction:	-27.4dB			

8340.6062	72.65 av	-50.02	36.5	59.13	54					
Azimuth: 215	Height:143	Vert	Margin [dB]:	-22.27						
						Duty Cycle Correction:	-27.4dB			

10th Harmonic - not restricted

4.9 Test Conditions and Results – RADIATED EMISSIONS

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter or 3-meter as noted. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard		
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	10 meter distance
	1GHz – 9.5GHz	3 meter distance
Limits - Class B		
Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-Peak	Average
30 to 88	29.54	NA
88 to 216	33.06	NA
216 to 960	35.56	NA
960 to 1,000	43.52	NA
Above 1GHz	NA	54
Supplementary information: None		

Table 32 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	3
Supplementary information: None		

Table 33 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323
Bicon Antenna	Chase	VBA6106A	EMC4078
Log-P Antenna	Chase	UPA6109	EMC4258
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182
Antenna Array	UL	BOMS	EMC4276

Job #: 1001106475 File #: MC3181 Project #: 09NK06851B

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Model Number: CWPIR

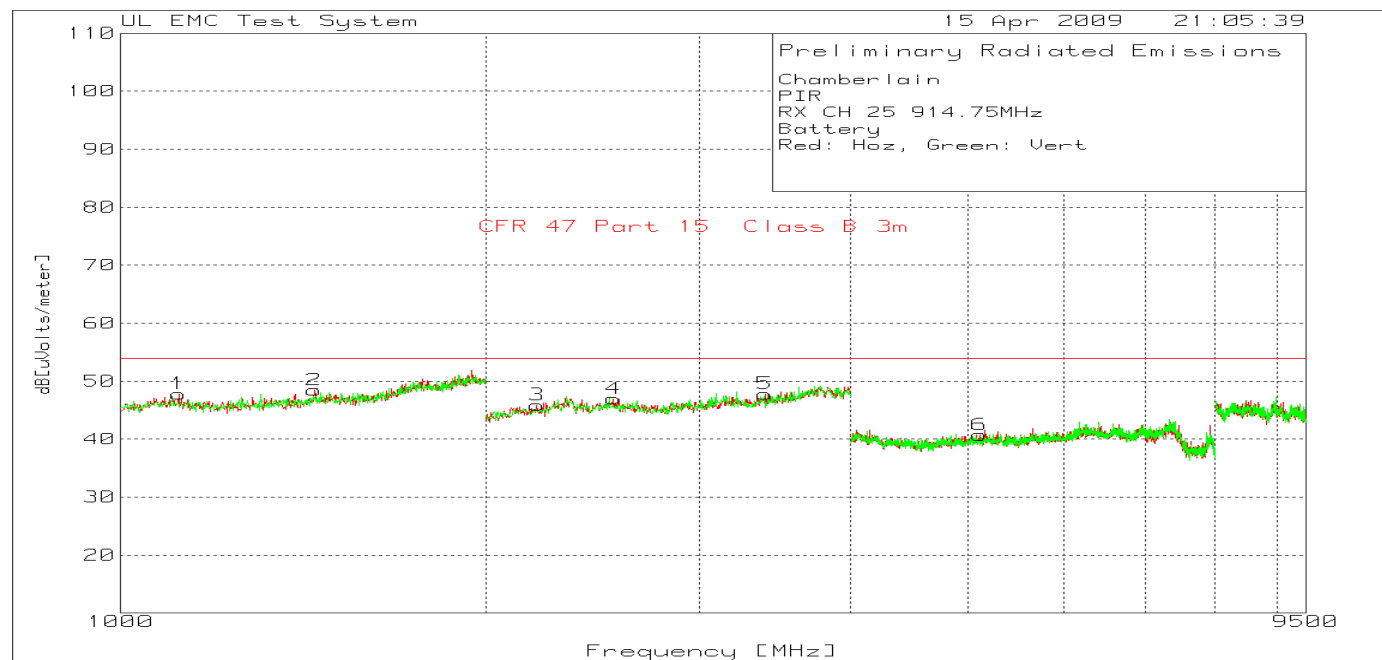
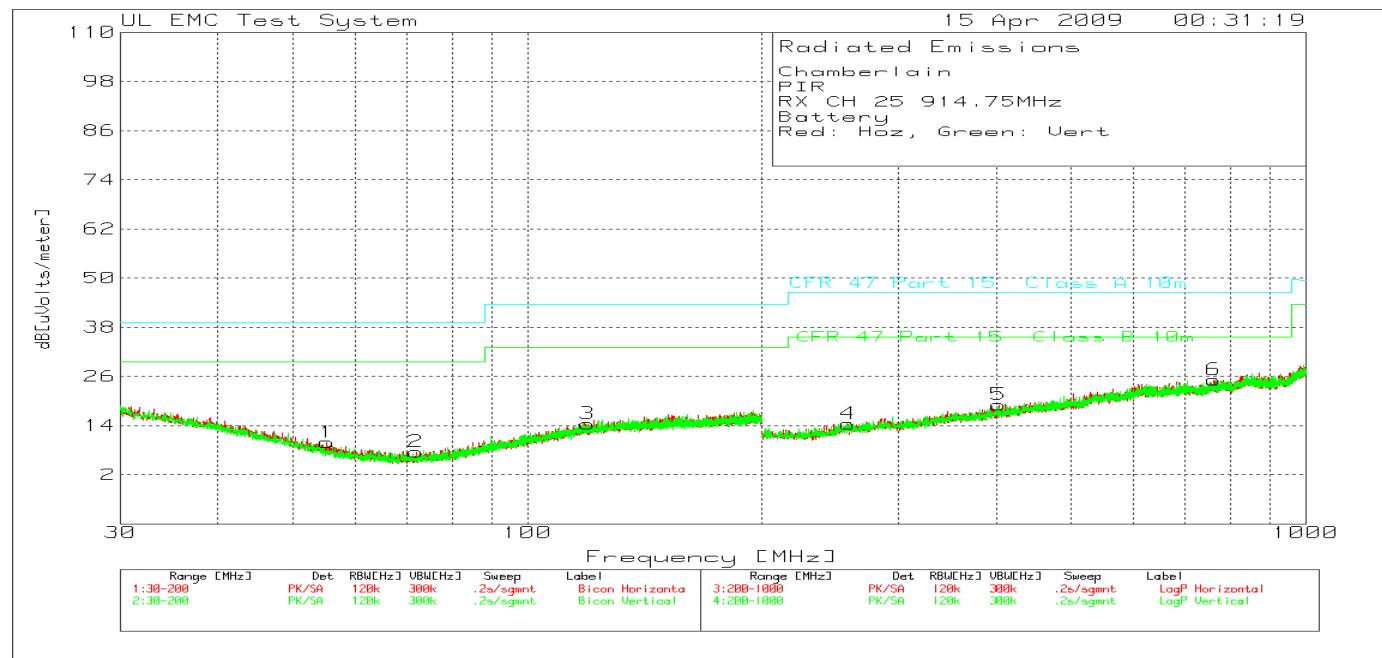
Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Test setup for Radiated Emissions

See Appendix B, Figure 18 for test setup photo.

Figure 15 Radiated Emissions Graph



Model Number: CWPIR

Client Name: Chamberlain Group Inc.

FCC ID:JLFCWPIR

Table 34 Radiated Emissions Data Points

Chamberlain
PIR
RX CH 25 914.75MHz
Battery
Red: Hoz, Green: Vert

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
1	55.2261	32.14 pk	-30.3	8	9.84	-	-	39.1	29.6	-	-
		Height:100	Horz	Margin [dB]	-	-	-	-29.26	-19.76	-	-
2	71.8736	31.51 pk	-30.3	6.3	7.51	-	-	39.1	29.6	-	-
		Height:100	Horz	Margin [dB]	-	-	-	-31.59	-22.09	-	-
3	119.353	31.27 pk	-30.1	13.2	14.37	-	-	43.5	33.1	-	-
		Height:300	Horz	Margin [dB]	-	-	-	-29.13	-18.73	-	-
4	258.1564	35.18 pk	-33.2	12.4	14.38	-	-	46.4	35.6	-	-
		Height:299	Horz	Margin [dB]	-	-	-	-32.02	-21.22	-	-
5	402.8479	35.74 pk	-32.4	15.7	19.04	-	-	46.4	35.6	-	-
		Height:299	Horz	Margin [dB]	-	-	-	-27.36	-16.56	-	-
6	761.5788	35.23 pk	-31.4	21.3	25.13	-	-	46.4	35.6	-	-
		Height:299	Horz	Margin [dB]	-	-	-	-21.27	-10.47	-	-

LIMIT 3: CFR 47 Part 15 Class A 10m

LIMIT 4: CFR 47 Part 15 Class B 10m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Chamberlain
PIR
RX CH 25 914.75MHz
Battery
Red: Hoz, Green: Vert

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
1	1116.232	20.51 pk	3.09	24.2	47.8	54	-	-	-	-	-
		Height:149	Horz	Margin [dB]	-6.2	-	-	-	-	-	-
2	1444.89	19.92 pk	3.44	25.1	48.46	54	-	-	-	-	-
		Height:100	Horz	Margin [dB]	-5.54	-	-	-	-	-	-
3	2204.409	19.91 pk	4.15	21.8	45.86	54	-	-	-	-	-
		Height:150	Horz	Margin [dB]	-8.14	-	-	-	-	-	-
4	2549.098	20.7 pk	4.04	22.2	46.94	54	-	-	-	-	-
		Height:150	Horz	Margin [dB]	-7.06	-	-	-	-	-	-
5	3398.798	19.86 pk	4.42	23.5	47.78	54	-	-	-	-	-
		Height:100	Horz	Margin [dB]	-6.22	-	-	-	-	-	-
6	5115.41	62.8 pk	-50.16	28.1	40.74	54	-	-	-	-	-
		Height:100	Horz	Margin [dB]	-13.26	-	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

4.10 Test Conditions and Results – 99% Bandwidth

Test Description	When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emissions bandwidth, as calculated or measured. The transmitter shall be operated at its maximum carrier power measured under normal test condition.	
Basic Standard	RSS-Gen, 4.6	

Table 35 20dB Bandwidth Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	2	1 and 2
Supplementary information: None		

Table 36 20dB Bandwidth Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405A	EMC4242
Attenuator w/ Cable	Pasternek	PE7019-30	None

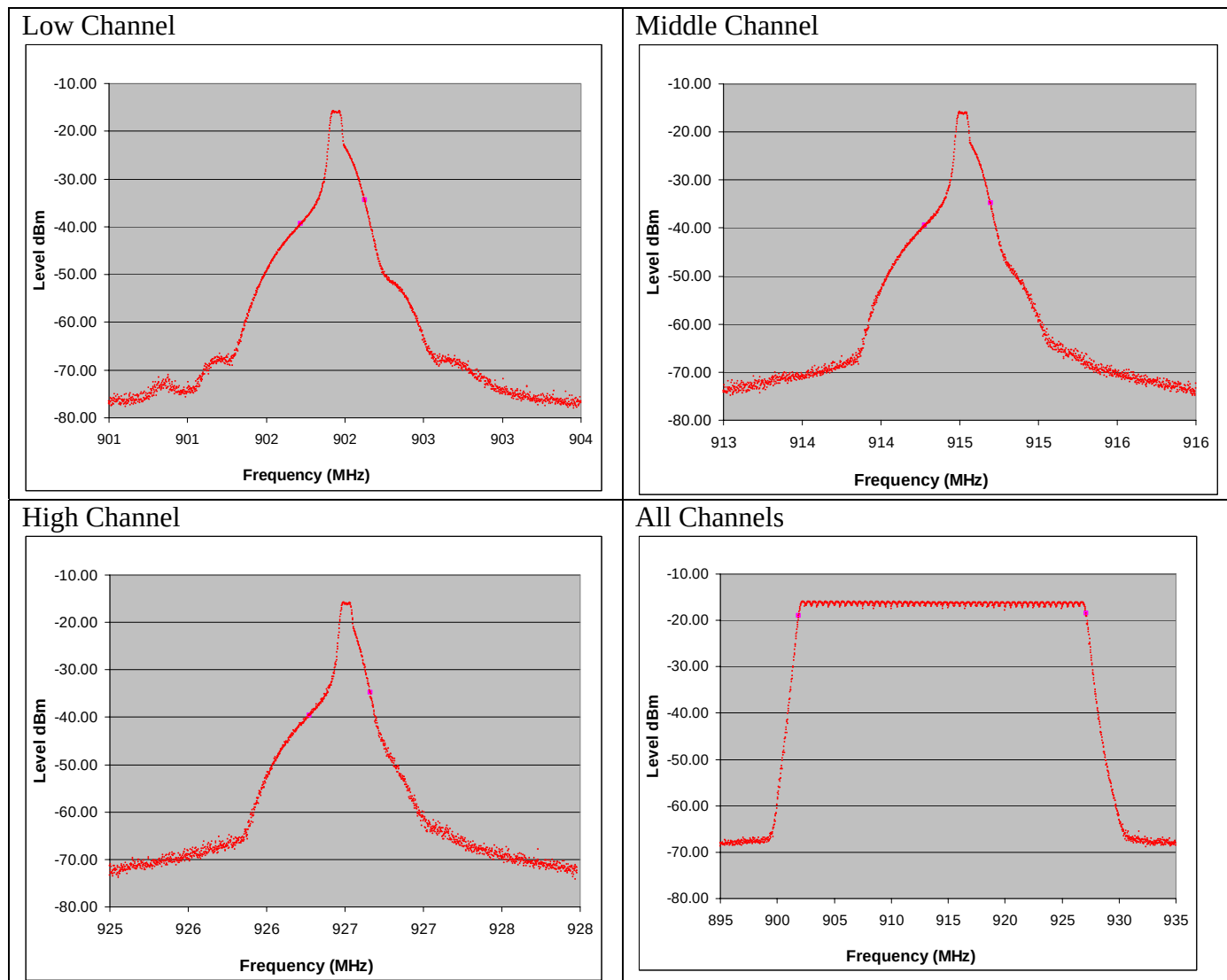
Table 37 20dB Bandwidth Results

Mode	Channel	99% Power Bandwidth
TX	Low	405.000 kHz
	Middle	416.250 kHz
	High	386.250 kHz
	All Channels Hopping	25,225.000 kHz

Test Setup for 20dB Bandwidth

See Appendix B, Figure 17 for test setup photo

Figure 16 - 99% Power Bandwidth Plots



Job #: 1001106475 File #: MC3181 Project #: 09NK06851B
Model Number: CWPIR
Client Name: Chamberlain Group Inc.

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FCC ID:JLFCWPIR

5 IMMUNITY TEST RESULTS

Immunity testing was not performed nor required by the standard.

Appendix A

Accreditations and Authorizations



NVLAP Lab code: 100414-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1004140.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91044).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2180



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: Radiated Emissions R-621, Conducted Emissions C-642.



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6

Appendix B

Test Setup Photos

Figure 17 Antenna Conducted Measurements Test Setup



Figure 18 Radiated Emissions Test Setup

