Underwriters Laboratories Inc.
333 Pfingsten Rd.
Northbrook, IL 60062

www.ul.com/emc
(847) 272-8800

Job Number:	1001106475
Project Number:	09NK06851
File Number:	MC3181
Date:	May 15, 2009
Model:	CWA2000
FCC ID:	JLFCWA2000

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

Test Report Details

Tests Performed By:	**Underwriters Laboratories Inc.** **333 Pfingsten Rd.** **Northbrook, IL 60062**
Tests Performed For:	**Chamberlain Group Inc.** **845 Larch Av** **Elmhurst, IL 60126**
Applicant Contact: Phone: E-mail:	**Hank Sieradzki** **(630) 993-6564** **Hank.Sieradzki@chamberlaingroup.com**
Test Report Date:	**May 15, 2009**
Product Type:	**Short Range Transceiver**
Product standards	**FCC Part 15, Subpart C, 15.247**
Model Number:	**CWA2000**
EUT Category:	**Frequency Hopping Spread Spectrum Transmitter**
Testing Start Date:	**April 15, 2009**
Date Testing Complete:	**May 1, 2009**
Overall Results:	**Compliant**

Report Directory

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None			

1.0 G E N E R A L - Product Description

1.1 Equipment Description

The Vehicle Alert CWA module is an indoor unit that is capable of receiving signals from the transmitter. It then visually and audibly signals to homeowners that a sensor was activated and specifically which (assuming multiple sensors are learned) sensor was activated. The CWA will be plugged into the wall via an AC adapter (with an option to run on 4 “AA” batteries). The user will have an ability to adjust the volume of the audible buzzer. An easy wall mount option shall be provided

1.2 Device Configuration During Test

1.2.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Transceiver	Chamberlain Group Inc.	CWA2000	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	AC	N	N	External AC/DC Adapter

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
1	120Vac	-	-	60Hz	Single Phase	None
2	6VDC	-	-	DC	-	Battery

1.3 EUT Configurations

Mode #	Description
1	EUT in 10m chamber on 80cm support connected either to AC/DC Adapter or Battery for power source
2	EUT on test bench connected to AC adapter
3	EUT on 80cm above ground plane support connected to LISNs.

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

2.0 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

The EUT has dual power input – it can be powered from AC/DC adapter or directly from battery. Both power inputs are connected directly to the same circuit voltage regulator therefore testing only with external AC/DC adapter was considered required.

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	GTeneral 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 RSS-Gen 7.2.2	Compliant
Carrier Frequency Separation	47 CFR Part 15.247(a)(1) RSS-210 A8.1(b)	Compliant
20dB Bandwidth	47 CFR Part 15.247(a)(1)(i) RSS-210 A8.1(c)	Compliant
Number of Hopping Frequency	47 CFR Part 15.247(a)(1)(i) RSS-210 A8.1(c)	Compliant
Dwell Time	47 CFR Part 15.247(a)(1)(i) RSS-210 A8.1(c)	Compliant
Maximum Peak Output Power	47 CFR Part 15.247(b)(2) RSS-210 A8.4(1)	Compliant
Band Edge Compliance	47 CFR Part 15.247(d) RSS-210 A8.5	Compliant
Spurious Emissions	47 CFR Part 15.247(d) RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3	Compliant
99% Occupied Bandwidth	RSS-Gen 4.6	Compliant

Test Engineer:

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

Reviewer:

Michael Ferrer (41312)
Engineer
International EMC Services
Conformity Assessment Services

3.0 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.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

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

Code of Federal Regulations Title 47	Part 15, Subpart B, Radio Frequency Devices

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

4.1 Test Conditions and Results – MAINS TERMINAL – CONDUCTED EMISSIONS

Test Description	Measurements were made on a ground plane. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.

Basic Standard	FCC Part 15, Subpart C, 15.247	
UL LPG	80-EM-S0026	
	Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range	150kHz to 30MHz	Mains

Limits - Class B

Frequency (MHz)	Limit (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Supplementary information: None

Table 1 Conducted Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	3	2 and 3

Supplementary information: None

Table 2 Conducted Emissions Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Agilent	E7405A	EMC4242
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224
High Pass Filter	Solar Electronics	2803-150	885551
Attenuator	HP	8494B	2831A00838
LISN - L1	Solar	8602-50-TS-50-N	EMC4052
LISN - L2	Solar	8602-50-TS-50-N	EMC4064
FILE USED FOR TESTING			
CISPR 22_11 w_Dongle Line 1and2.TST			

Test Setup for Conducted Emissions

See Appendix B, Figure 19 for test setup photo

Figure 1 Conducted Emissions Graph TX, Hopping

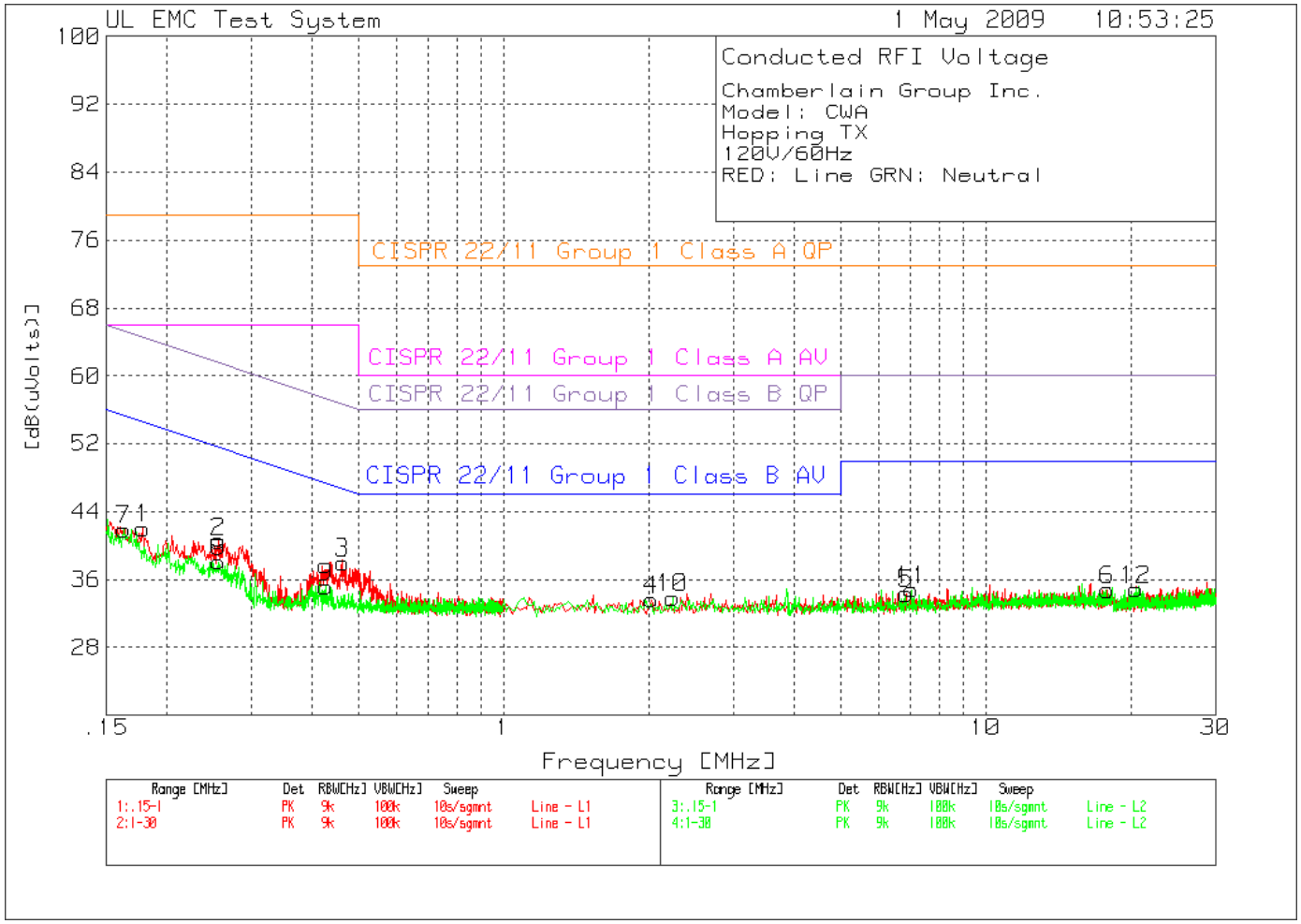


Table 3 Conducted Emissions Data Points TX, Hopping

Chamberlain Group Inc.
Model: CWA
Hopping TX
120V/60Hz
RED: Line GRN: Neutral

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line											
1	.17899	28.42 pk	12.2	1.4	42.02	79	66	64.5	54.5	-	-
				Margin [dB]		-36.98	-23.98	-22.48	-12.48	-	-
2	.25678	28.61 pk	11.1	.8	40.51	79	66	61.5	51.5	-	-
				Margin [dB]		-38.49	-25.49	-20.99	-10.99	-	-
3	.46468	26.99 pk	10.6	.4	37.99	79	66	56.6	46.6	-	-
				Margin [dB]		-41.01	-28.01	-18.61	-8.61	-	-
4	2.02745	22.84 pk	10.6	.2	33.64	73	60	56	46	-	-
				Margin [dB]		-39.36	-26.36	-22.36	-12.36	-	-
5	6.84631	23.46 pk	10.7	.2	34.36	73	60	60	50	-	-
				Margin [dB]		-38.64	-25.64	-25.64	-15.64	-	-
6	17.9022	23.31 pk	11.3	.2	34.81	73	60	60	50	-	-
				Margin [dB]		-38.19	-25.19	-25.19	-15.19	-	-
Neutral											
7	.16344	26.69 pk	13.5	1.7	41.89	79	66	65.3	55.3	-	-
				Margin [dB]		-37.11	-24.11	-23.41	-13.41	-	-
8	.25678	26.29 pk	11	.8	38.09	79	66	61.5	51.5	-	-
				Margin [dB]		-40.91	-27.91	-23.41	-13.41	-	-
9	.42791	24.16 pk	10.6	.4	35.16	79	66	57.3	47.3	-	-
				Margin [dB]		-43.84	-30.84	-22.14	-12.14	-	-
10	2.24451	23.16 pk	10.6	.1	33.86	73	60	56	46	-	-
				Margin [dB]		-39.14	-26.14	-22.14	-12.14	-	-
11	7.03443	23.92 pk	10.7	.2	34.82	73	60	60	50	-	-
				Margin [dB]		-38.18	-25.18	-25.18	-15.18	-	-
12	20.49252	23.06 pk	11.4	.4	34.86	73	60	60	50	-	-
				Margin [dB]		-38.14	-25.14	-25.14	-15.14	-	-

LIMIT 1: CISPR 22/11 Group 1 Class A QP
LIMIT 2: CISPR 22/11 Group 1 Class A AV
LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

Figure 2 Conducted Emissions Graph RX, Hopping

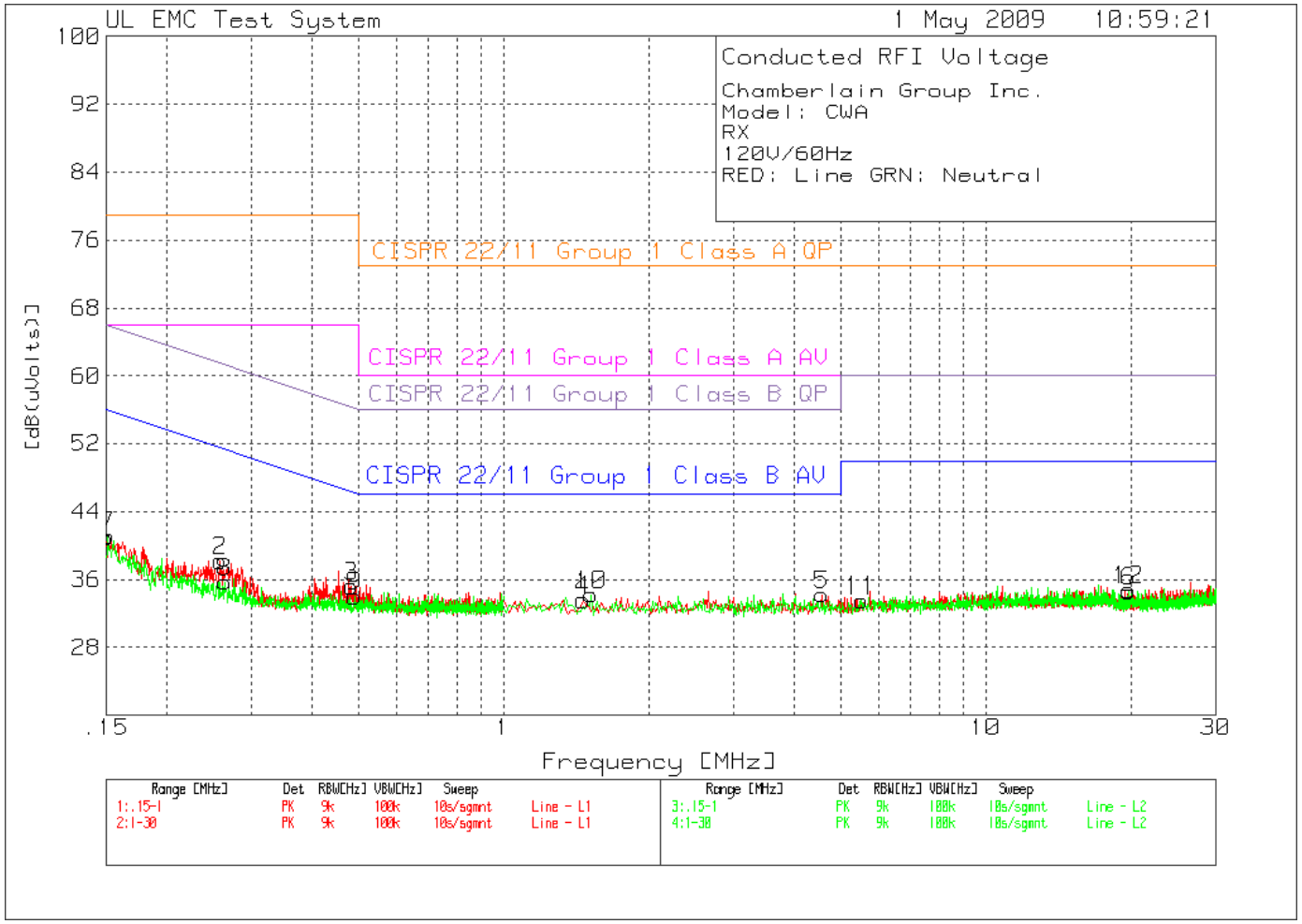


Table 4 Conducted Emissions Data Points RX, Hopping

Chamberlain Group Inc.
Model: CWA
RX
120V/60Hz
RED: Line GRN: Neutral

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line											
1	.15071	24.41 pk	14.7	1.8	40.91	79	66	66	56	-	-
				Margin [dB]		-38.09	-25.09	-25.09	-15.09	-	-
2	.2589	26.41 pk	11	.8	38.21	79	66	61.5	51.5	-	-
				Margin [dB]		-40.79	-27.79	-23.29	-13.29	-	-
3	.48448	24.22 pk	10.6	.4	35.22	79	66	56.3	46.3	-	-
				Margin [dB]		-43.78	-30.78	-21.08	-11.08	-	-
4	1.46307	22.92 pk	10.5	.2	33.62	73	60	56	46	-	-
				Margin [dB]		-39.38	-26.38	-22.38	-12.38	-	-
5	4.57435	23.42 pk	10.6	.2	34.22	73	60	56	46	-	-
				Margin [dB]		-38.78	-25.78	-21.78	-11.78	-	-
6	19.7979	22.9 pk	11.4	.3	34.6	73	60	60	50	-	-
				Margin [dB]		-38.4	-25.4	-25.4	-15.4	-	-
Neutral											
7	.15141	24.85 pk	14.5	1.8	41.15	79	66	65.9	55.9	-	-
				Margin [dB]		-37.85	-24.85	-24.75	-14.75	-	-
8	.26456	23.92 pk	11	.8	35.72	79	66	61.3	51.3	-	-
				Margin [dB]		-43.28	-30.28	-25.58	-15.58	-	-
9	.49156	23.16 pk	10.6	.3	34.06	79	66	56.1	46.1	-	-
				Margin [dB]		-44.94	-31.94	-22.04	-12.04	-	-
10	1.52096	23.63 pk	10.5	.1	34.23	73	60	56	46	-	-
				Margin [dB]		-38.77	-25.77	-21.77	-11.77	-	-
11	5.52944	22.73 pk	10.7	.1	33.53	73	60	60	50	-	-
				Margin [dB]		-39.47	-26.47	-26.47	-16.47	-	-
12	19.78343	22.99 pk	11.4	.4	34.79	73	60	60	50	-	-
				Margin [dB]		-38.21	-25.21	-25.21	-15.21	-	-

LIMIT 1: CISPR 22/11 Group 1 Class A QP
LIMIT 2: CISPR 22/11 Group 1 Class A AV
LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

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 5 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 6 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 7 Carrier Frequency Separation Results

Mode	Channel	Carrier Frequency Separation Limit	Channel Separation
TX Hopping	Low Side	> 20dB Bandwidth (aprx. 160kHz)	486.7kHz
	Middle		499.2kHz
	High Side		524.1kHz
	Overall Average		500kHz

Test Setup for Carrier Frequency Separation

See Appendix B, Figure 20 for test setup photo

Figure 3 Carrier Frequency Separation Graphs

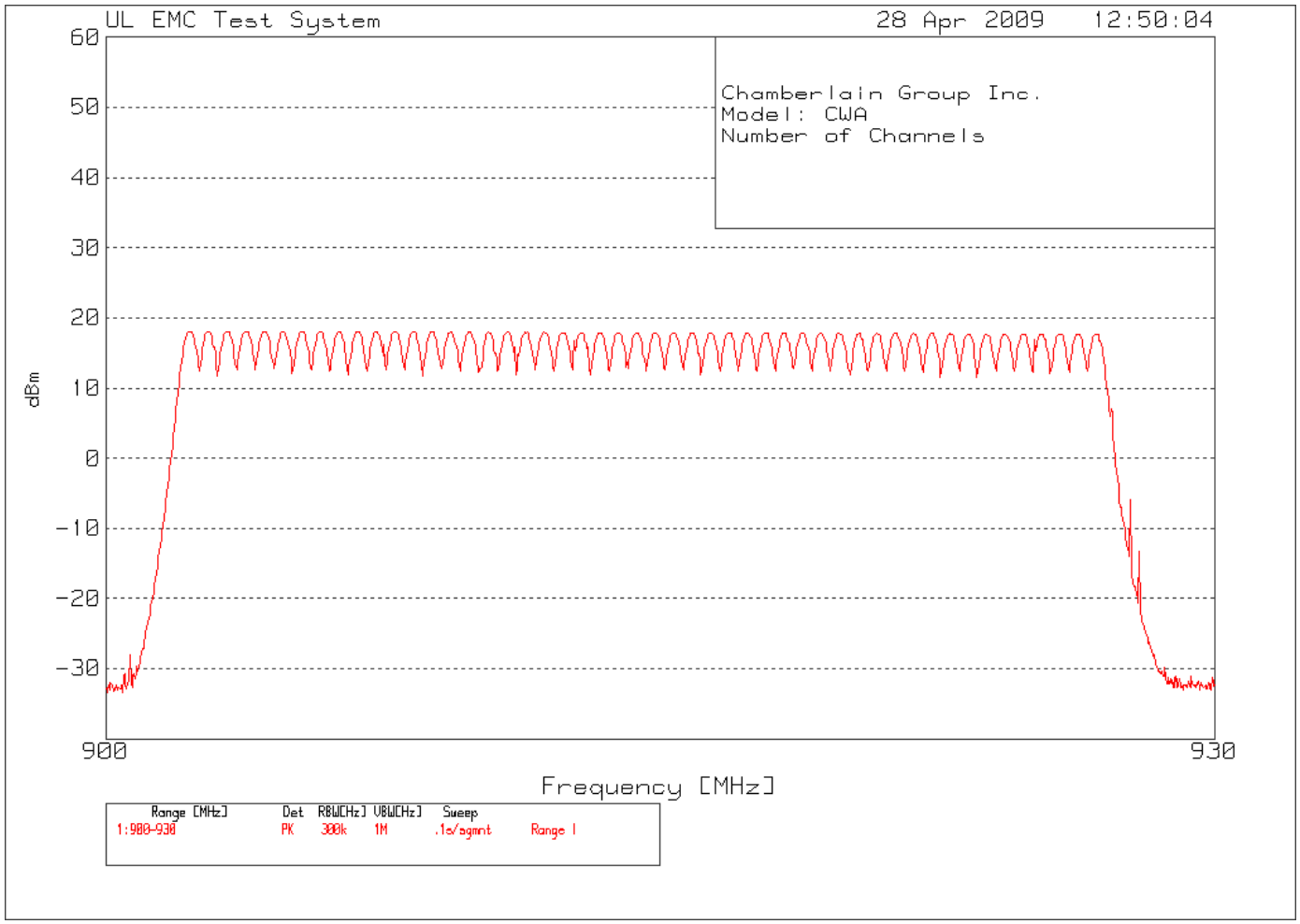


Table 8 Carrier Frequency Separation (Frequency List)

#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz
1	902.2338	11	907.213	21	912.2546	31	917.2712	41	922.2504
2	902.7205	12	907.7121	22	912.7288	32	917.7454	42	922.7371
3	903.2446	13	908.2488	23	913.228	33	918.2446	43	923.2363
4	903.7188	14	908.7105	24	913.7271	34	918.7687	44	923.7354
5	904.2429	15	909.2221	25	914.2512	35	919.218	45	924.2346
6	904.7421	16	909.7338	26	914.7504	36	919.7171	46	924.7587
7	905.2163	17	910.2329	27	915.2496	37	920.2662	47	925.2454
8	905.7404	18	910.7321	28	915.7238	38	920.7404	48	925.7321
9	906.2271	19	911.2313	29	916.2479	39	921.2646	49	926.2562
10	906.7138	20	911.7304	30	916.7221	40	921.7513	50	926.7429

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 9 20dB Bandwidth Configuration Settings

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

Table 10 20dB Bandwidth Test Equipment

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

Table 11 20dB Bandwidth Results

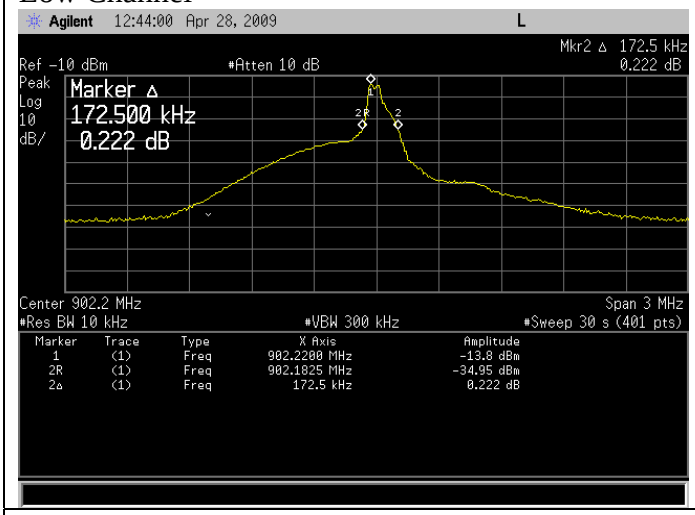
Mode	Channel	20dB Bandwidth
TX	Low	172.5kHz
	Middle	165.0kHz
	High	157.5kHz

Test Setup for 20dB Bandwidth

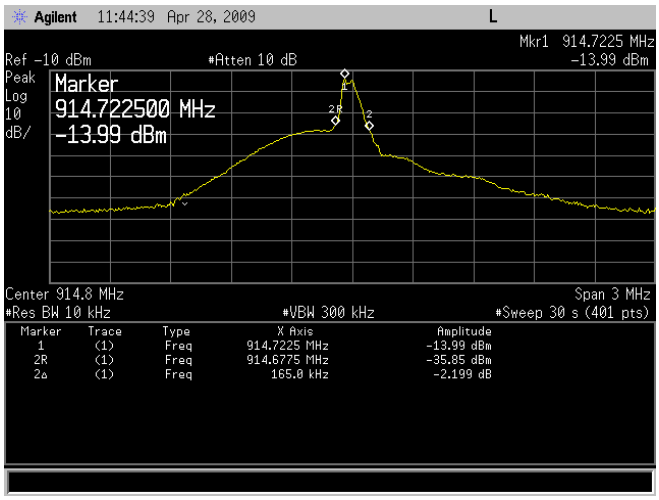
See Appendix B, Figure 20 for test setup photo

Figure 4 20dB Bandwidth Graphs

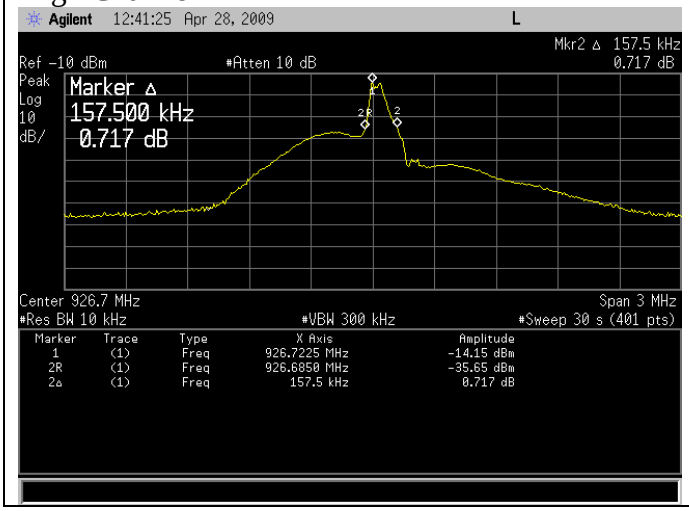
Low Channel



Middle Channel



High Channel



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 12 Number of Hopping Frequencies Configuration Settings

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

Table 13 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 14 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 20 for test setup photo

Figure 5 Number of Hopping Frequencies Graphs

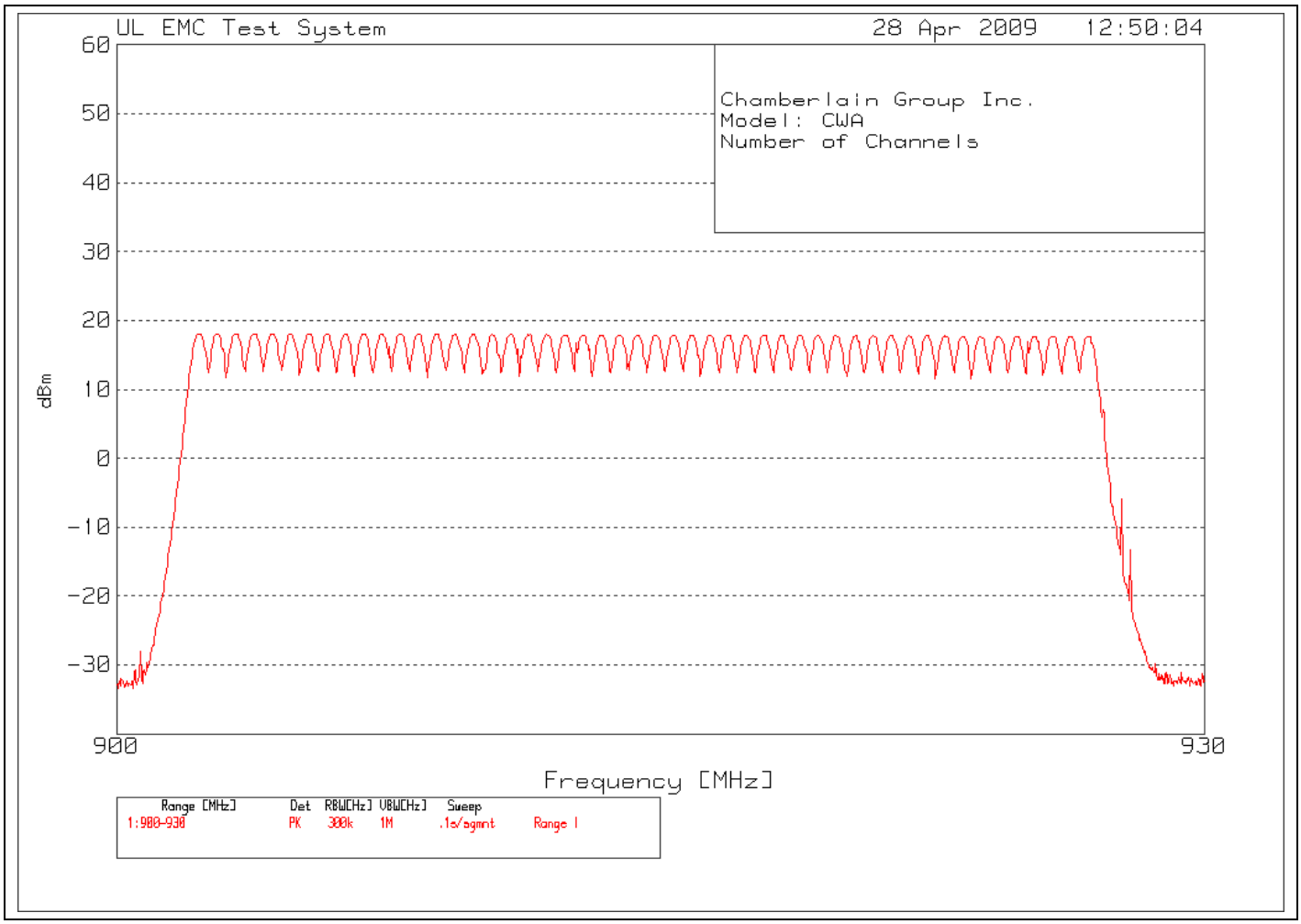


Table 15 Number of Hopping Channels (Frequency List)

#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz	#	Frequency MHz
1	902.2338	11	907.213	21	912.2546	31	917.2712	41	922.2504
2	902.7205	12	907.7121	22	912.7288	32	917.7454	42	922.7371
3	903.2446	13	908.2488	23	913.228	33	918.2446	43	923.2363
4	903.7188	14	908.7105	24	913.7271	34	918.7687	44	923.7354
5	904.2429	15	909.2221	25	914.2512	35	919.218	45	924.2346
6	904.7421	16	909.7338	26	914.7504	36	919.7171	46	924.7587
7	905.2163	17	910.2329	27	915.2496	37	920.2662	47	925.2454
8	905.7404	18	910.7321	28	915.7238	38	920.7404	48	925.7321
9	906.2271	19	911.2313	29	916.2479	39	921.2646	49	926.2562
10	906.7138	20	911.7304	30	916.7221	40	921.7513	50	926.7429

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 16 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 17 Dwell Time Test Equipment

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

Table 18 Dwell Time Results

Mode	Number of Channels	Maximum Time Allowed in 20s.	Measured Dwell Time in 20s.
TX Hopping Low Channel	50	400mS	363.35mS
TX Hopping Middle Channel	50	400mS	363.35mS
TX Hopping High Channel	50	400mS	365.50mS

Table 19 Duty Cycle Correction Factor

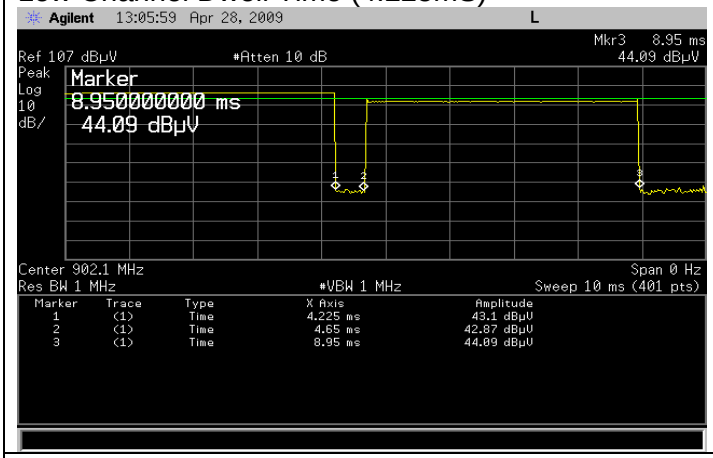
Mode	Number of TX in 100mS	TX Duration in 100mS	Duty Cycle Correction (dB) $20\times\log(\frac{TX\,(ms)}{100\,ms})$
TX Hopping Low Channel	1	4.225	-27.48dB
TX Hopping Middle Channel	1	4.225	-27.48dB
TX Hopping High Channel	1	4.250	-27.43dB

Test Setup for Dwell Time

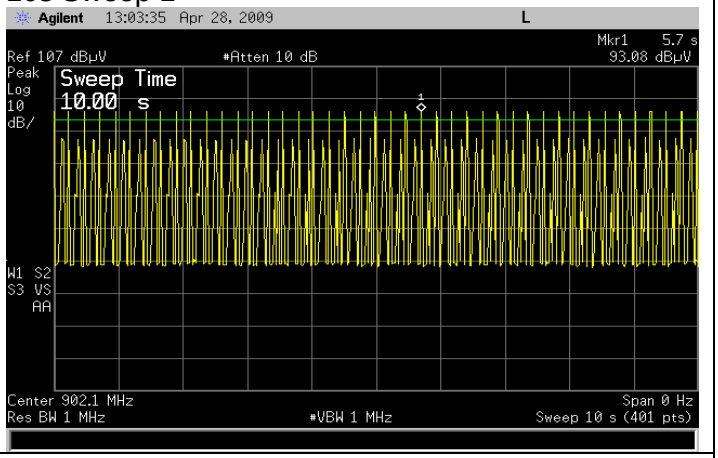
See Appendix B, Figure 20 for test setup photo

Figure 6 Dwell Time Graphs

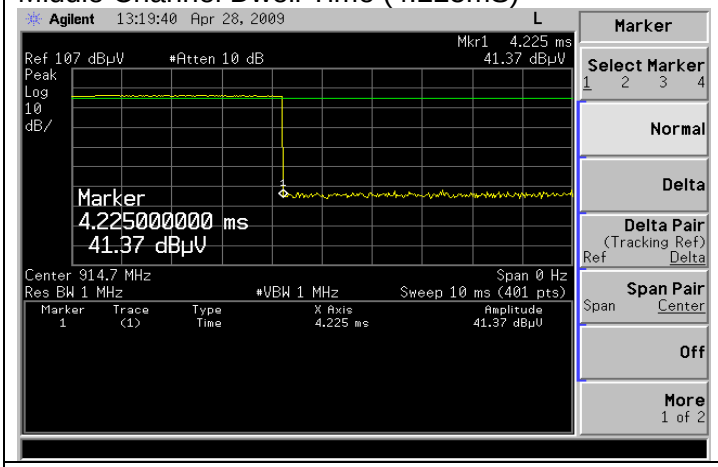
Low Channel Dwell Time (4.225mS)



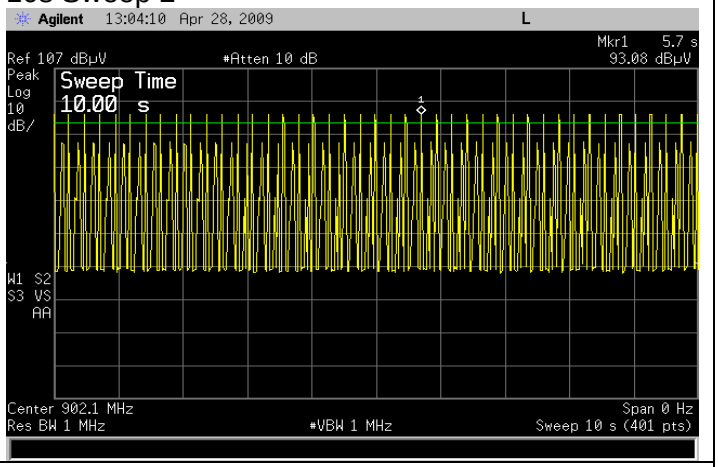
10s Sweep 1



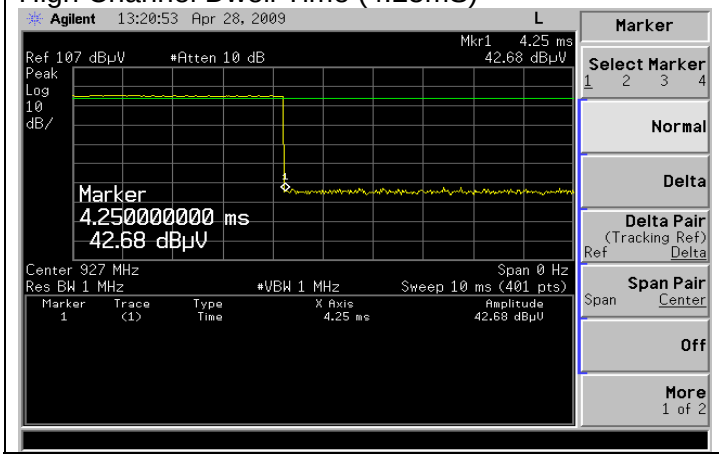
Middle Channel Dwell Time (4.225mS)



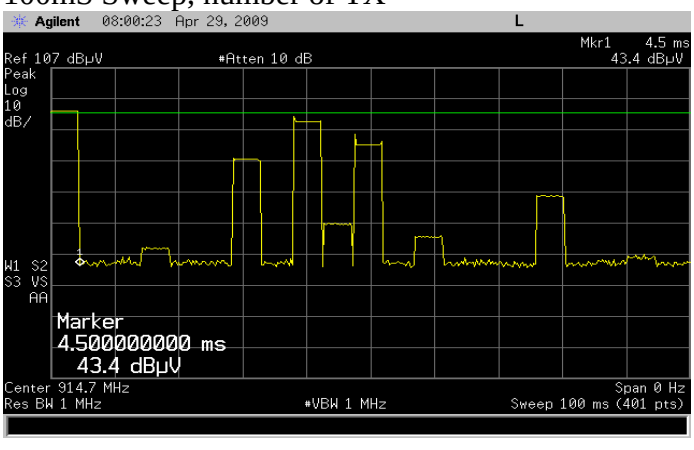
10s Sweep 2



High Channel Dwell Time (4.25mS)



100mS Sweep, number of TX



The number of transmitions plots show only the single channel. It was checked that the number of transmitions was the same on other channels do to equal channel use. The total number of transmitions counted in 20s is: 86. Total maximum transmit time: 365.5mS 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 20 Maximum Peak Output Power EUT Configuration Settings

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

Table 21 Maximum Peak Output Power Test Equipment

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

Table 22 Maximum Peak Output Power Results

Channel	Declared Antenna Gain	Limit (30dBm)	Power dBm	Power W
Low Channel	5.14dBi	30dBm	18.09	0.0643
Middle Channel	5.14dBi	30dBm	17.90	0.0617
High Channel	5.14dBi	30dBm	17.72	0.0592

Test setup for Maximum Peak Output Power

See Appendix B, Figure 20 for test setup photo

Figure 7 Maximum Peak Output Power Graph

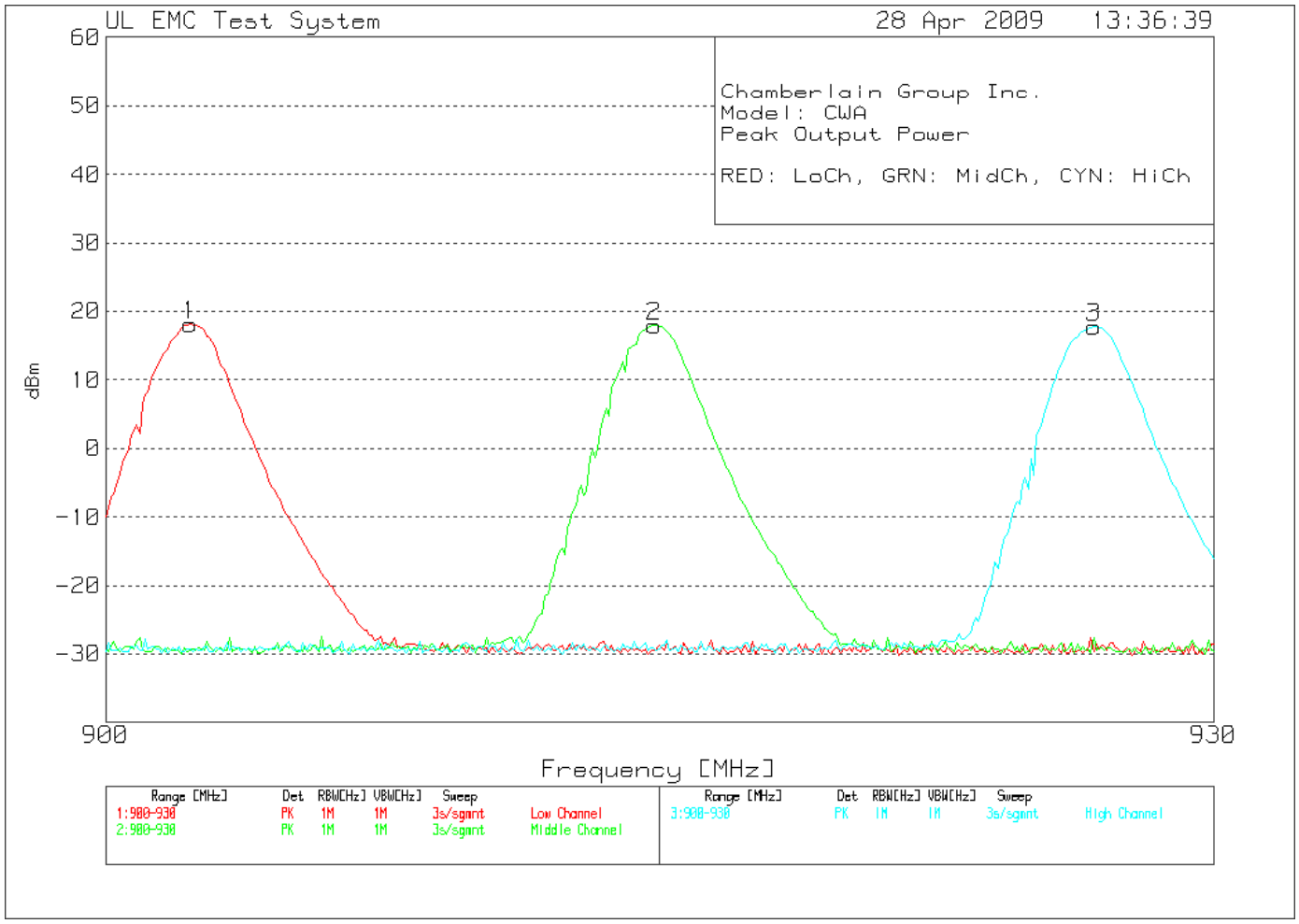


Table 23 Maximum Peak Output Power Emissions Data Points

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	93.09 pk	32	-107	18.09	-	-	-	-	-	-
Middle Channel 900 - 930MHz											
2	914.7375	92.9 pk	32	-107	17.9	-	-	-	-	-	-
High Channel 900 - 930MHz											
3	926.7	92.72 pk	32	-107	17.72	-	-	-	-	-	-

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 24 Band Edge Compliance EUT Configuration Settings

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

Table 25 Band Edge Compliance Test Equipment

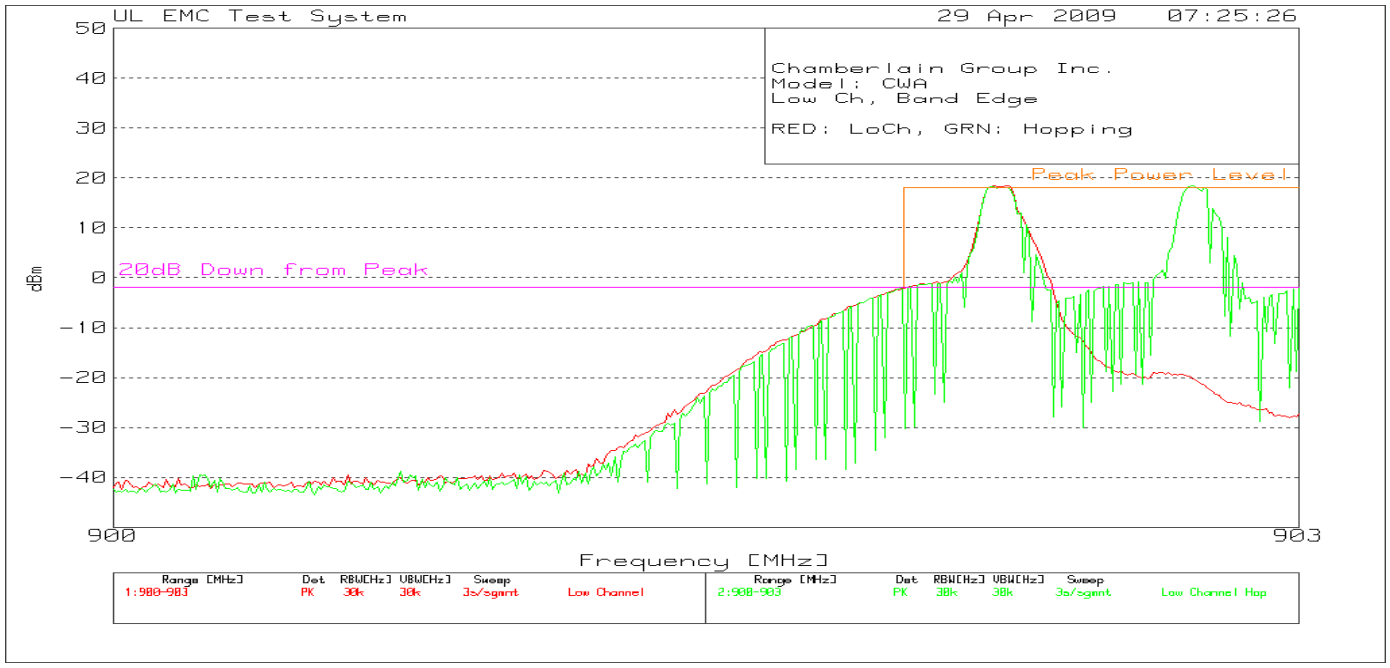
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Rhode & Schwartz	FSEK	EMC4182
Attenuator	Pasternek	PE7019-30	None

Test setup for Band Edge Compliance – Conducted

See Appendix B, Figure 20 for test setup photo

Figure 8 Conducted Band Edge Compliance Graph

Low Channel



High Channel

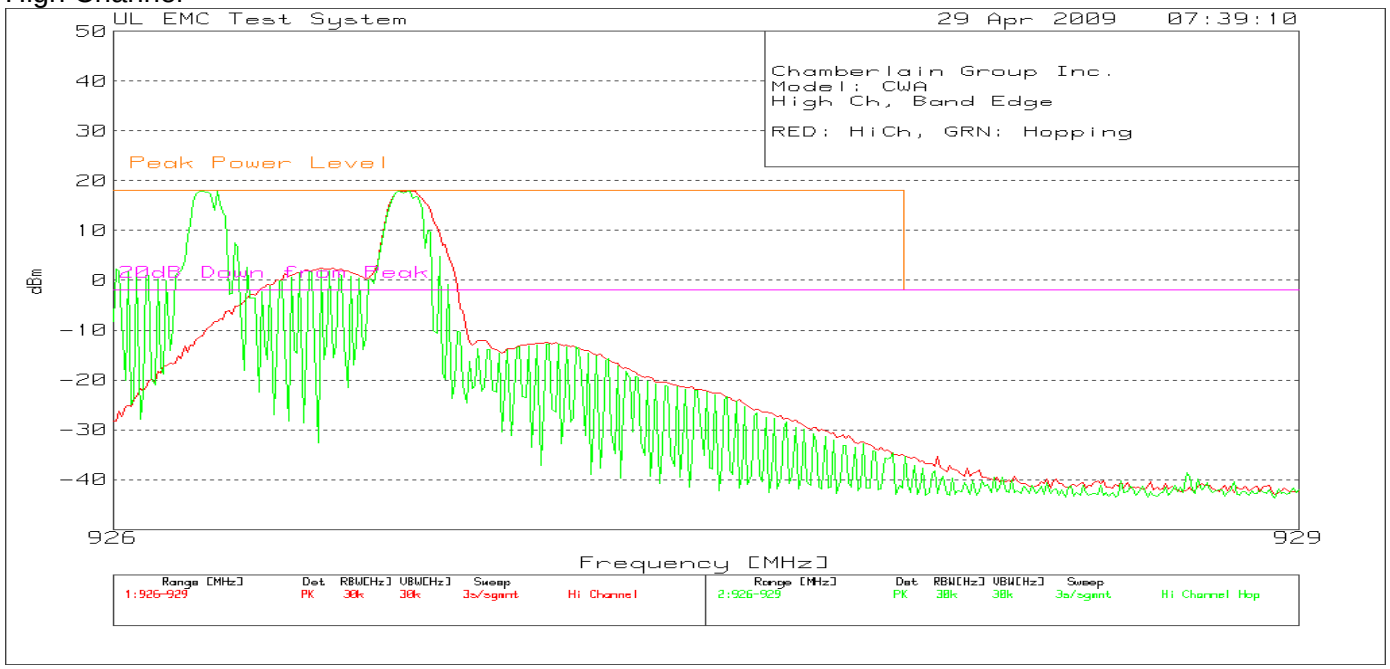


Table 26 Band Edge Compliance Data Points

Low Channel

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBm	Limit:1	2	3	4	5	6
Single Low Channel											
1	902.01	73.05 pk	32	-107	-1.95	18.1	-1.9	-	-	-	-
				Margin [dB]		-20.05	-.05	-	-	-	-
2	902.0025	72.91 pk	32	-107	-2.09	18.1	-1.9	-	-	-	-
				Margin [dB]		-20.19	-.19	-	-	-	-
3	901.995	72.87 pk	32	-107	-2.13		-1.9	-	-	-	-
				Margin [dB]			-.23	-	-	-	-
4	901.98	72.67 pk	32	-107	-2.33		-1.9	-	-	-	-
				Margin [dB]			-.43	-	-	-	-
Hopping Low Channel											
5	902.0175	73.25 pk	32	-107	-1.75	18.1	-1.9	-	-	-	-
				Margin [dB]		-19.85	.15	-	-	-	-
6	901.9875	72.82 pk	32	-107	-2.18		-1.9	-	-	-	-
				Margin [dB]			-.28	-	-	-	-

High Channel

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBm	Limit:1	2	3	4	5	6
Single Low Channel											
1	926.72	92.95 pk	32	-107	17.95	18.1	-1.9	-	-	-	-
				Margin [dB]		-.15	19.85	-	-	-	-
2	927.095	62.61 pk	32	-107	-12.39	18.1	-1.9	-	-	-	-
				Margin [dB]		-30.49	-10.49	-	-	-	-
3	927.8975	42.61 pk	32	-107	-32.39	18.1	-1.9	-	-	-	-
				Margin [dB]		-50.49	-30.49	-	-	-	-
4	928.28	35.69 pk	32	-107	-39.31		-1.9	-	-	-	-
				Margin [dB]			-37.41	-	-	-	-
Hopping High Channel											
5	926.7425	92.86 pk	32	-107	17.86	18.1	-1.9	-	-	-	-
				Margin [dB]		-.24	19.76	-	-	-	-
6	927.17	61.63 pk	32	-107	-13.37	18.1	-1.9	-	-	-	-
				Margin [dB]		-31.47	-11.47	-	-	-	-
7	927.7475	45.16 pk	32	-107	-29.84	18.1	-1.9	-	-	-	-
				Margin [dB]		-47.94	-27.94	-	-	-	-
8	928.0775	36.82 pk	32	-107	-38.18		-1.9	-	-	-	-
				Margin [dB]			-36.28	-	-	-	-

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.

-1.9dBm

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 27 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 28 SPURIOUS CONDUCTED EMISSIONS Test Equipment

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

Table 29 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 20 for test setup photo

Test setup for SPURIOUS EMISSIONS – Radiated

See Appendix B, Figure 21 for test setup photo

Figure 9 30MHz-1GHz Antenna Port Spurious Emissions Plots TX Mode, Low, Middle and High Channels.

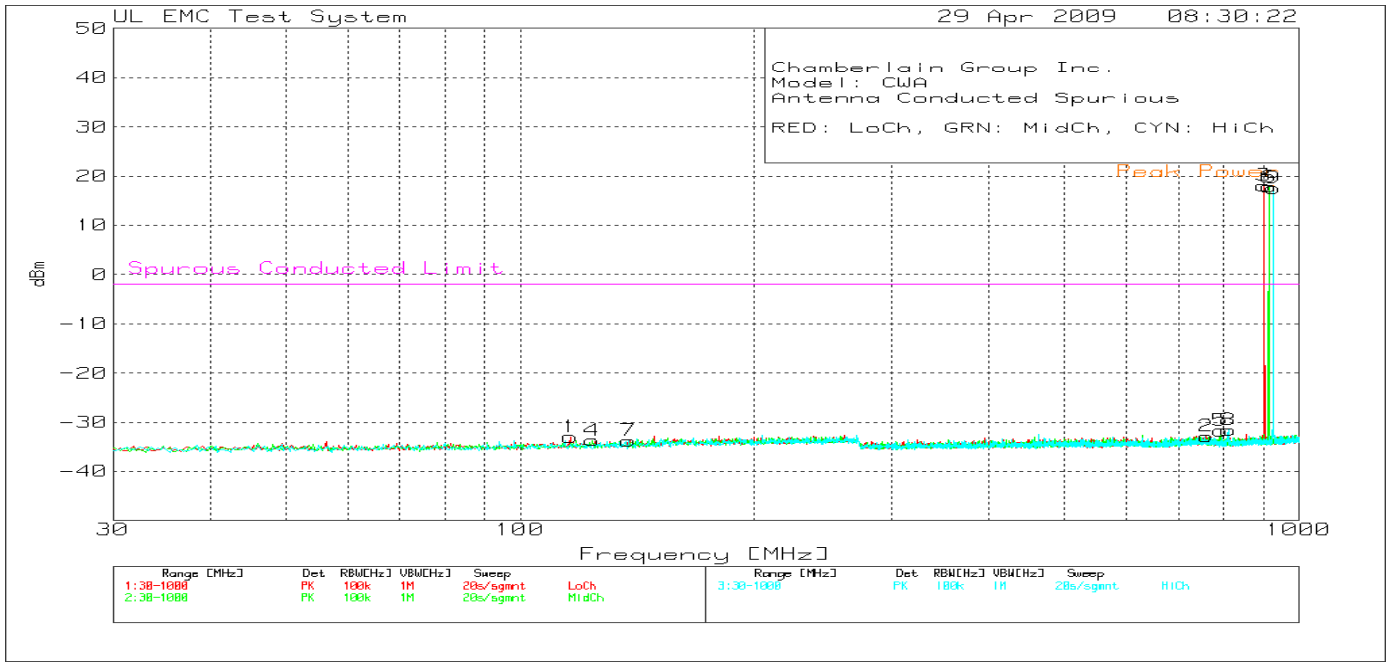
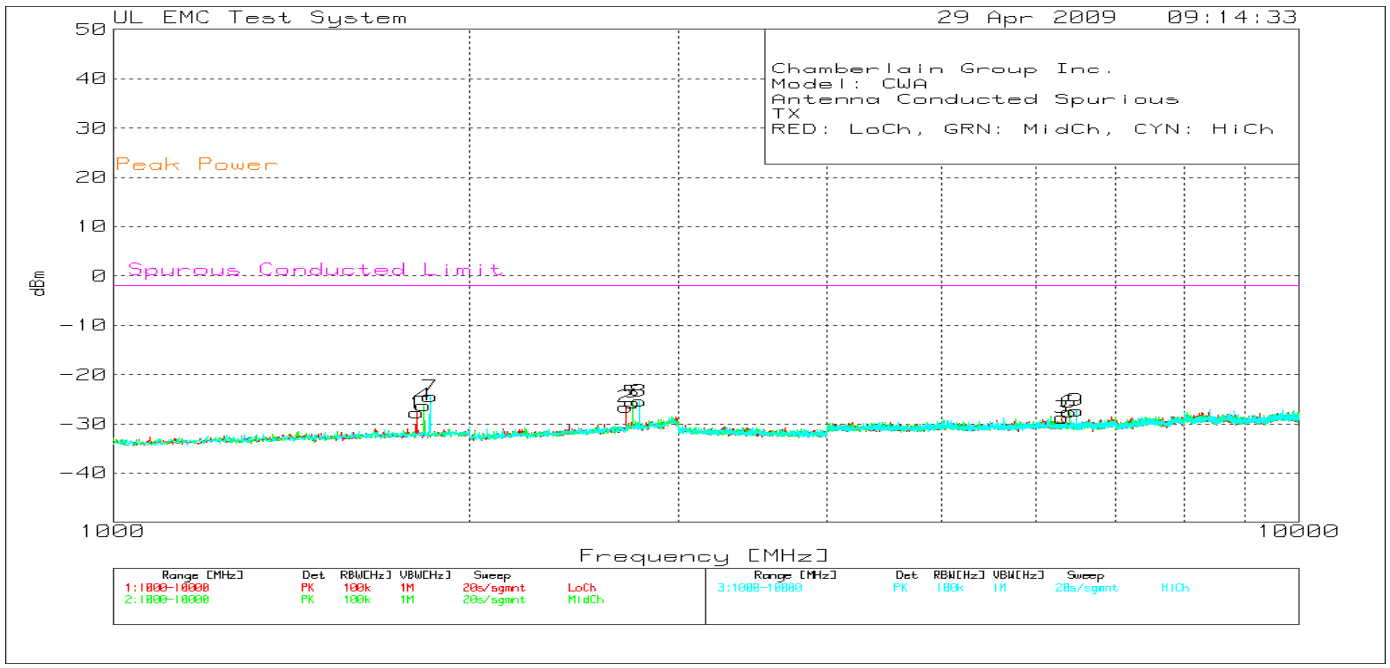


Figure 10 1GHz-10GHz Antenna Port Spurious Emissions Plots TX Mode, Low, Middle and High Channels.



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

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

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

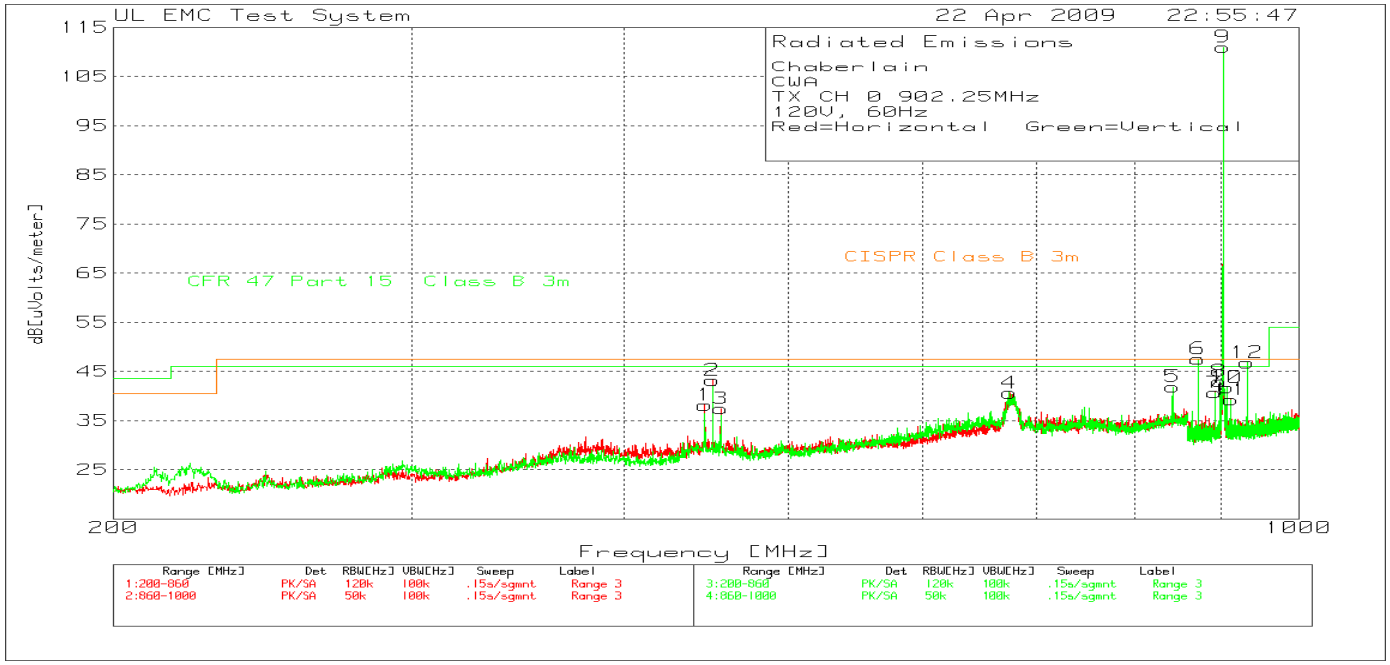


Figure 12 Radiated Spurious Emissions 1GHz – 10GHz, Low Channel

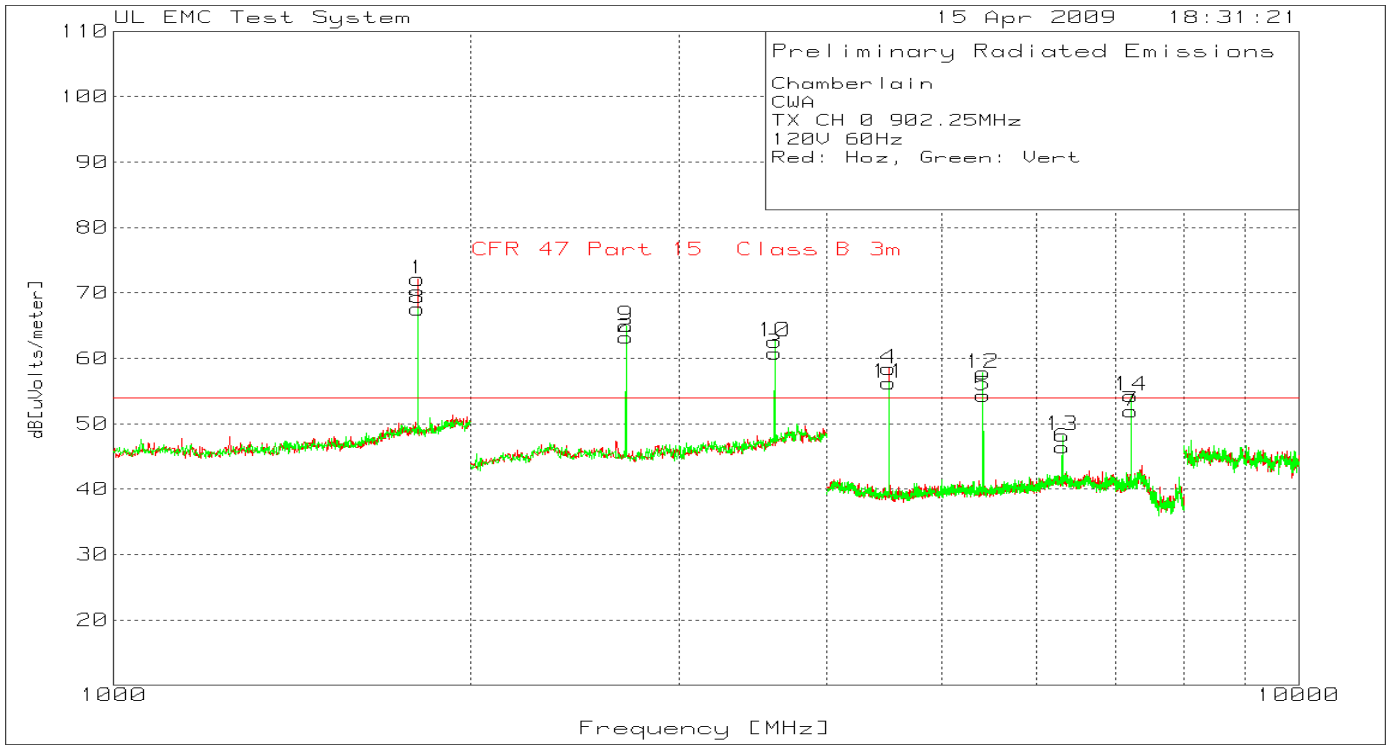


Table 30 Radiated Spurious Emissions 200MHz – 1GHz, Low Channel

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.

Chaberlain
CWA
TX CH 0 902.25MHz
120V, 60Hz
Red=Horizontal Green=Vertical

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	446.2358	18.42 pk	2.4	17.3	38.12	46	47.5	-	-	-	-
		Height:100 Horz	Margin [dB]			-7.88	-9.38	-	-	-	-
2	451.0726	23.35 pk	2.4	17.4	43.15	46	47.5	-	-	-	-
		Height:200 Horz	Margin [dB]			-2.85	-4.35	-	-	-	-
3	456.1292	17.49 pk	2.5	17.4	37.39	46	47.5	-	-	-	-
		Height:200 Horz	Margin [dB]			-8.61	-10.11	-	-	-	-
4	675.1033	16.81 pk	3.2	20.6	40.61	46	47.5	-	-	-	-
		Height:100 Horz	Margin [dB]			-5.39	-6.89	-	-	-	-
5	842.4117	15.44 pk	3.5	22.9	41.84	46	47.5	-	-	-	-
		Height:100 Vert	Margin [dB]			-4.16	-5.66	-	-	-	-
6	872.1739	21.11 pk	3.5	22.9	47.51	46	47.5	-	-	-	-
		Height:200 Vert	Margin [dB]			1.51	.01	-	-	-	-
7	892.1839	14.04 pk	3.6	23	40.64	46	47.5	-	-	-	-
		Height:101 Vert	Margin [dB]			-5.36	-6.86	-	-	-	-
8	897.7811	16.36 pk	3.6	23	42.96	46	47.5	-	-	-	-
		Height:200 Vert	Margin [dB]			-3.04	-4.54	-	-	-	-
9	902.1889	84.47 pk	3.5	23	110.97	46	47.5	-	-	-	-
		Height:200 Vert	Margin [dB]			64.97	63.47	-	-	-	-
10	906.6667	15.09 pk	3.6	23	41.69	46	47.5	-	-	-	-
		Height:200 Vert	Margin [dB]			-4.31	-5.81	-	-	-	-
11	912.1939	12.53 pk	3.6	23.1	39.23	46	47.5	-	-	-	-
		Height:200 Vert	Margin [dB]			-6.77	-8.27	-	-	-	-
12	932.2039	19.68 pk	3.7	23.4	46.78	46	47.5	-	-	-	-
		Height:200 Vert	Margin [dB]			.78	-.72	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m
LIMIT 2: CISPR Class B 3m

pk - Peak detector
qp - Quasi-Peak detector

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

Chamberlain
CWA
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	41.92 pk	3.59	26.6	72.11	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		18.11	-	-	-	-	-
2	2705.411	36.95 pk	4.13	22.1	63.18	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		9.18	-	-	-	-	-
3	3611.222	32.36 pk	5.24	23.2	60.8	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		6.8	-	-	-	-	-
4	4509.673	83.16 pk	-52.5	27.8	58.46	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		4.46	-	-	-	-	-
5	5414.276	76.56 pk	-50.15	27.9	54.31	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		.31	-	-	-	-	-
6	6316.211	65.21 pk	-48.02	29.2	46.39	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-7.61	-	-	-	-	-
7	7218.145	69.2 pk	-47.08	29.8	51.92	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-2.08	-	-	-	-	-
8	1805.611	37.39 pk	3.59	26.6	67.58	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		13.58	-	-	-	-	-
9	2705.411	38.75 pk	4.13	22.1	64.98	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		10.98	-	-	-	-	-
10	3611.222	34.13 pk	5.24	23.2	62.57	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		8.57	-	-	-	-	-
11	4509.673	80.94 pk	-52.5	27.8	56.24	54	-	-	-	-	-
		Height:101 Vert		Margin [dB]		2.24	-	-	-	-	-
12	5414.276	80.04 pk	-50.15	27.9	57.79	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		3.79	-	-	-	-	-
13	6316.211	67.01 pk	-48.02	29.2	48.19	54	-	-	-	-	-
		Height:101 Vert		Margin [dB]		-5.81	-	-	-	-	-
14	7218.145	71.53 pk	-47.08	29.8	54.25	54	-	-	-	-	-
		Height:101 Vert		Margin [dB]		.25	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

Chamberlain
CWA
TX CH 0 902.25MHz
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
2nd Harmonic - not restricted						**Duty Cycle Correction included in AV Margin**				
3rd Harmonic										
2706.7605	36.86 pk	4.13	22.1	63.09	74	-	-	-	-	-
Azimuth: 257	Height:128 Horz		Margin [dB]:	-10.91		-	-	-	-	-
2706.7605	32.42 av	4.13	22.1	58.65	54	Duty Cycle Correction: -27.4dB				
Azimuth: 257	Height:128 Horz		Margin [dB]:	-22.75		-	-	-	-	-
2706.7435	41.75 pk	4.13	22.1	67.98	74	-	-	-	-	-
Azimuth: 59	Height:113 Vert		Margin [dB]:	-6.02		-	-	-	-	-
2706.7435	38.54 av	4.13	22.1	64.77	54	Duty Cycle Correction: -27.4dB				
Azimuth: 59	Height:113 Vert		Margin [dB]:	-16.63		-	-	-	-	-
4thd Harmonic										
3608.9475	37.52 pk	5.23	23.2	65.95	74	-	-	-	-	-
Azimuth: 205	Height:150 Vert		Margin [dB]:	-8.05		-	-	-	-	-
3608.9475	33.21 av	5.23	23.2	61.64	54	Duty Cycle Correction: -27.4dB				
Azimuth: 205	Height:150 Vert		Margin [dB]:	-19.76		-	-	-	-	-
3608.9475	35.17 pk	5.23	23.2	63.6	74	-	-	-	-	-
Azimuth: 186	Height:100 Horz		Margin [dB]:	-10.4		-	-	-	-	-
3608.9475	30.09 av	5.23	23.2	58.52	54	Duty Cycle Correction: -27.4dB				
Azimuth: 186	Height:100 Horz		Margin [dB]:	-22.88		-	-	-	-	-
3608.9739	37.24 pk	5.23	23.2	65.67	74	-	-	-	-	-
Azimuth: 249	Height:148 Vert		Margin [dB]:	-8.33		-	-	-	-	-
3608.9739	32.97 av	5.23	23.2	61.4	54	Duty Cycle Correction: -27.4dB				
Azimuth: 249	Height:148 Vert		Margin [dB]:	-20		-	-	-	-	-
3608.9739	35.47 pk	5.23	23.2	63.9	74	-	-	-	-	-
Azimuth: 118	Height:100 Horz		Margin [dB]:	-10.1		-	-	-	-	-
3608.9739	30.73 av	5.23	23.2	59.16	54	Duty Cycle Correction: -27.4dB				
Azimuth: 118	Height:100 Horz		Margin [dB]:	-22.24		-	-	-	-	-
5th Harmonic										
4511.2263	81.74 pk	-52.5	27.8	57.04	74	-	-	-	-	-
Azimuth: 294	Height:118 Horz		Margin [dB]:	-16.96		-	-	-	-	-
4511.2263	78.52 av	-52.5	27.8	53.82	54	Duty Cycle Correction: -27.4dB				
Azimuth: 294	Height:118 Horz		Margin [dB]:	-27.58		-	-	-	-	-
4511.2263	79.24 pk	-52.5	27.8	54.54	74	-	-	-	-	-
Azimuth: 339	Height:127 Vert		Margin [dB]:	-19.46		-	-	-	-	-
4511.2263	75.6 av	-52.5	27.8	50.9	54	Duty Cycle Correction: -27.4dB				
Azimuth: 339	Height:127 Vert		Margin [dB]:	-30.5		-	-	-	-	-
6th Harmonic - not restricted										
7th Harmonic - not restricted										
8th Harmonic										
7317.9489	72.23 pk	-46.36	30.6	56.47	74	-	-	-	-	-
Azimuth: 183	Height:124 Vert		Margin [dB]:	-17.53		-	-	-	-	-
7317.9489	67.92 av	-46.36	30.6	52.16	54	Duty Cycle Correction: -27.4dB				
Azimuth: 183	Height:124 Vert		Margin [dB]:	-29.24		-	-	-	-	-
7317.9489	70.43 pk	-46.36	30.6	54.67	74	-	-	-	-	-
Azimuth: 74	Height:109 Horz		Margin [dB]:	-19.33		-	-	-	-	-
7317.9489	65.84 av	-46.36	30.6	50.08	54	Duty Cycle Correction: -27.4dB				
Azimuth: 74	Height:109 Horz		Margin [dB]:	-31.32		-	-	-	-	-
9th Harmonic - not visible										
10th Harmonic - not visible										

LIMIT 1: CFR 47 Part 15 Class B 3m

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

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

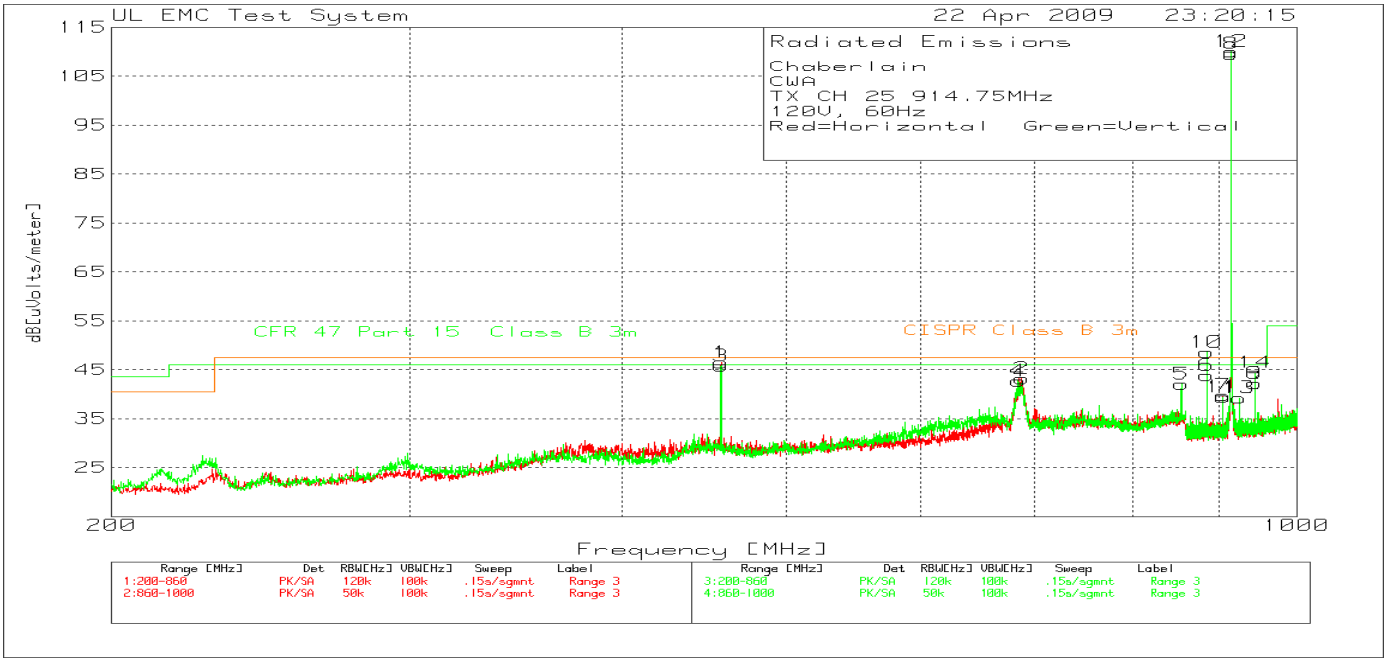


Figure 14 Radiated Spurious Emissions 1GHz – 10GHz, Middle Channel

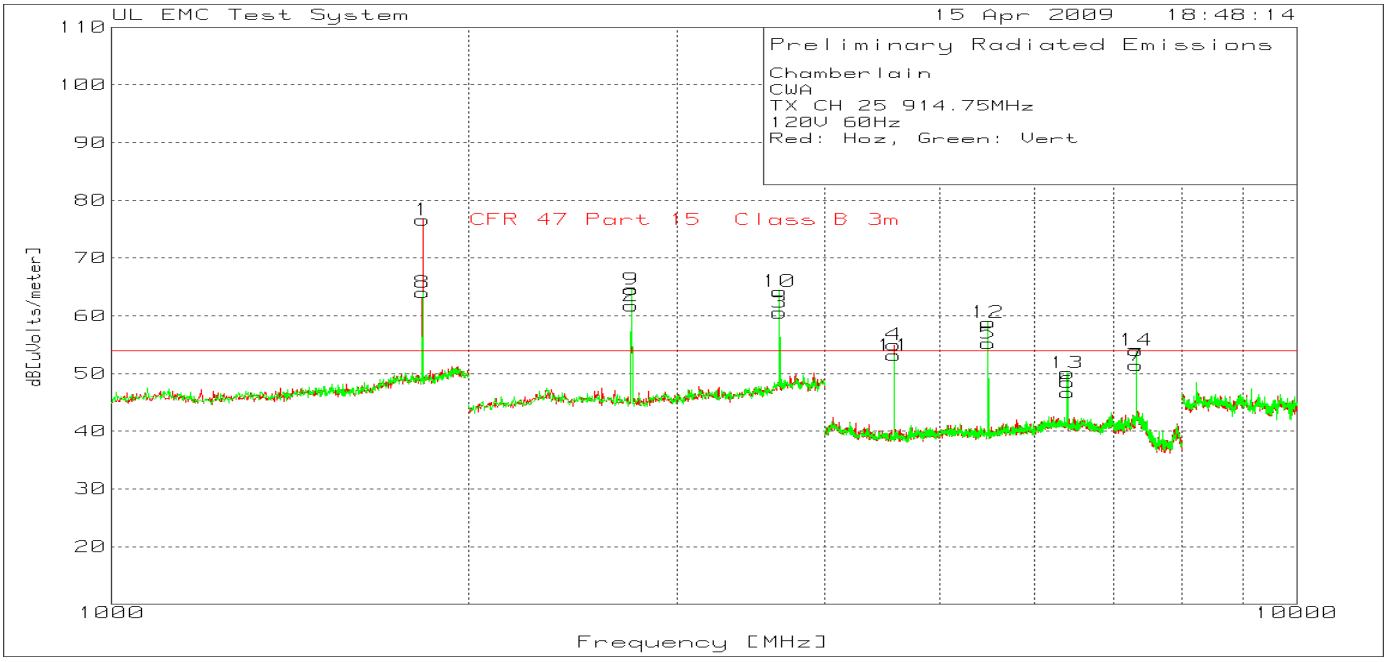


Table 32 Radiated Spurious Emissions 200MHz – 1GHz, Middle Channel

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.

Chaberlain
CWA
TX CH 25 914.75MHz
120V, 60Hz
Red=Horizontal Green=Vertical

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	457.4484	26.57 pk	2.5	17.4	46.47	46	47.5	-	-	-	-
		Height:200 Horz		Margin [dB]		.47	-1.03	-	-	-	-
2	688.2945	18.89 pk	3.4	20.9	43.19	46	47.5	-	-	-	-
		Height:101 Horz		Margin [dB]		-2.81	-4.31	-	-	-	-
6	884.6977	17.24 pk	3.6	23	43.84	46	47.5	-	-	-	-
		Height:101 Horz		Margin [dB]		-2.16	-3.66	-	-	-	-
7	904.7076	13.08 pk	3.6	23	39.68	46	47.5	-	-	-	-
		Height:101 Horz		Margin [dB]		-6.32	-7.82	-	-	-	-
8	914.7126	82.79 pk	3.6	23.2	109.59	46	47.5	-	-	-	-
		Height:101 Horz		Margin [dB]		63.59	62.09	-	-	-	-
9	944.7276	15 pk	3.7	23.5	42.2	46	47.5	-	-	-	-
		Height:101 Horz		Margin [dB]		-3.8	-5.3	-	-	-	-
3	457.4484	25.86 pk	2.5	17.4	45.76	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-.24	-1.74	-	-	-	-
4	684.9967	18.6 pk	3.3	20.8	42.7	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		-3.3	-4.8	-	-	-	-
5	854.9434	15.66 pk	3.5	22.9	42.06	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		-3.94	-5.44	-	-	-	-
10	884.6977	21.93 pk	3.6	23	48.53	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		2.53	1.03	-	-	-	-
11	904.7076	12.79 pk	3.6	23	39.39	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-6.61	-8.11	-	-	-	-
12	914.7126	83.25 pk	3.6	23.2	110.05	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		64.05	62.55	-	-	-	-
13	924.7176	12.32 pk	3.6	23.3	39.22	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-6.78	-8.28	-	-	-	-
14	944.7276	17.17 pk	3.7	23.5	44.37	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-1.63	-3.13	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m
LIMIT 2: CISPR Class B 3m

Table 33 Radiated Spurious Emissions 1GHz – 10GHz, Middle Channel

Chamberlain
CWA
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	46.33 pk	3.58	26.7	76.61	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		22.61	-	-	-	-	-
2	2745.491	35.63 pk	4.03	22.1	61.76	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		7.76	-	-	-	-	-
3	3659.319	31.56 pk	5.59	23.4	60.55	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		6.55	-	-	-	-	-
4	4573.716	79.75 pk	-52.47	27.7	54.98	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		.98	-	-	-	-	-
5	5488.993	77.34 pk	-50.24	28.1	55.2	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		1.2	-	-	-	-	-
6	6404.27	65.42 pk	-47.94	29.2	46.68	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-7.32	-	-	-	-	-
7	7319.546	67.2 pk	-46.37	30.6	51.43	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-2.57	-	-	-	-	-
8	1829.659	33.75 pk	3.58	26.7	64.03	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		10.03	-	-	-	-	-
9	2745.491	38.43 pk	4.03	22.1	64.56	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		10.56	-	-	-	-	-
10	3659.319	35.23 pk	5.59	23.4	64.22	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		10.22	-	-	-	-	-
11	4573.716	77.91 pk	-52.47	27.7	53.14	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-.86	-	-	-	-	-
12	5488.993	81 pk	-50.24	28.1	58.86	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		4.86	-	-	-	-	-
13	6401.601	68.8 pk	-47.91	29.2	50.09	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-3.91	-	-	-	-	-
14	7319.546	69.76 pk	-46.37	30.6	53.99	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-.01	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

Chamberlain
CWA
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 dB[uVolts/meter]	Limit:1	2	3	4	5	6
2nd Harmonic - not restricted						**Duty Cycle Correction included in AV Margin**				
3rd Harmonic										
2744.2405	37.46 pk	4.04	22.1	63.6	74	-	-	-	-	-
Azimuth: 162	Height:114	Horz	Margin [dB]:	-10.4		-	-	-	-	-
2744.2405	33.33 av	4.04	22.1	59.47	54	Duty Cycle Correction: -27.4dB				
Azimuth: 162	Height:114	Horz	Margin [dB]:	-21.93		-	-	-	-	-
2744.2405	39.72 pk	4.04	22.1	65.86	74	-	-	-	-	-
Azimuth: 74	Height:162	Vert	Margin [dB]:	-8.14		-	-	-	-	-
2744.2405	36.07 av	4.04	22.1	62.21	54	Duty Cycle Correction: -27.4dB				
Azimuth: 74	Height:162	Vert	Margin [dB]:	-19.19		-	-	-	-	-
4th Harmonic										
3658.9693	37.68 pk	5.6	23.4	66.68	74	-	-	-	-	-
Azimuth: 254	Height:129	Vert	Margin [dB]:	-7.32		-	-	-	-	-
3658.9693	33.69 av	5.6	23.4	62.69	54	Duty Cycle Correction: -27.4dB				
Azimuth: 254	Height:129	Vert	Margin [dB]:	-18.71		-	-	-	-	-
3658.9693	34.49 pk	5.6	23.4	63.49	74	-	-	-	-	-
Azimuth: 174	Height:113	Horz	Margin [dB]:	-10.51		-	-	-	-	-
3658.9693	29.31 av	5.6	23.4	58.31	54	Duty Cycle Correction: -27.4dB				
Azimuth: 174	Height:113	Horz	Margin [dB]:	-23.09		-	-	-	-	-
5th Harmonic										
4573.6974	79.1 pk	-52.47	27.7	54.33	74	-	-	-	-	-
Azimuth: 292	Height:116	Horz	Margin [dB]:	-19.67		-	-	-	-	-
4573.6974	75.39 av	-52.47	27.7	50.62	54	Duty Cycle Correction: -27.4dB				
Azimuth: 292	Height:116	Horz	Margin [dB]:	-30.78		-	-	-	-	-
4573.6974	77.74 pk	-52.47	27.7	52.97	74	-	-	-	-	-
Azimuth: 103	Height:104	Vert	Margin [dB]:	-21.03		-	-	-	-	-
4573.6974	74.11 av	-52.47	27.7	49.34	54	Duty Cycle Correction: -27.4dB				
Azimuth: 103	Height:104	Vert	Margin [dB]:	-32.06		-	-	-	-	-
6th Harmonic - not restricted										
7th Harmonic - not restricted										
8th Harmonic										
7317.9489	72.23 pk	-46.36	30.6	56.47	74	-	-	-	-	-
Azimuth: 183	Height:124	Vert	Margin [dB]:	-17.53		-	-	-	-	-
7317.9489	67.92 av	-46.36	30.6	52.16	54	Duty Cycle Correction: -27.4dB				
Azimuth: 183	Height:124	Vert	Margin [dB]:	-29.24		-	-	-	-	-
7317.9489	70.43 pk	-46.36	30.6	54.67	74	-	-	-	-	-
Azimuth: 74	Height:109	Horz	Margin [dB]:	-19.33		-	-	-	-	-
7317.9489	65.84 av	-46.36	30.6	50.08	54	Duty Cycle Correction: -27.4dB				
Azimuth: 74	Height:109	Horz	Margin [dB]:	-30.6		-	-	-	-	
9th Harmonic - very low										
10th Harmonic - very low										

Figure 15 Radiated Spurious Emissions 200MHz – 1GHz, High Channel

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

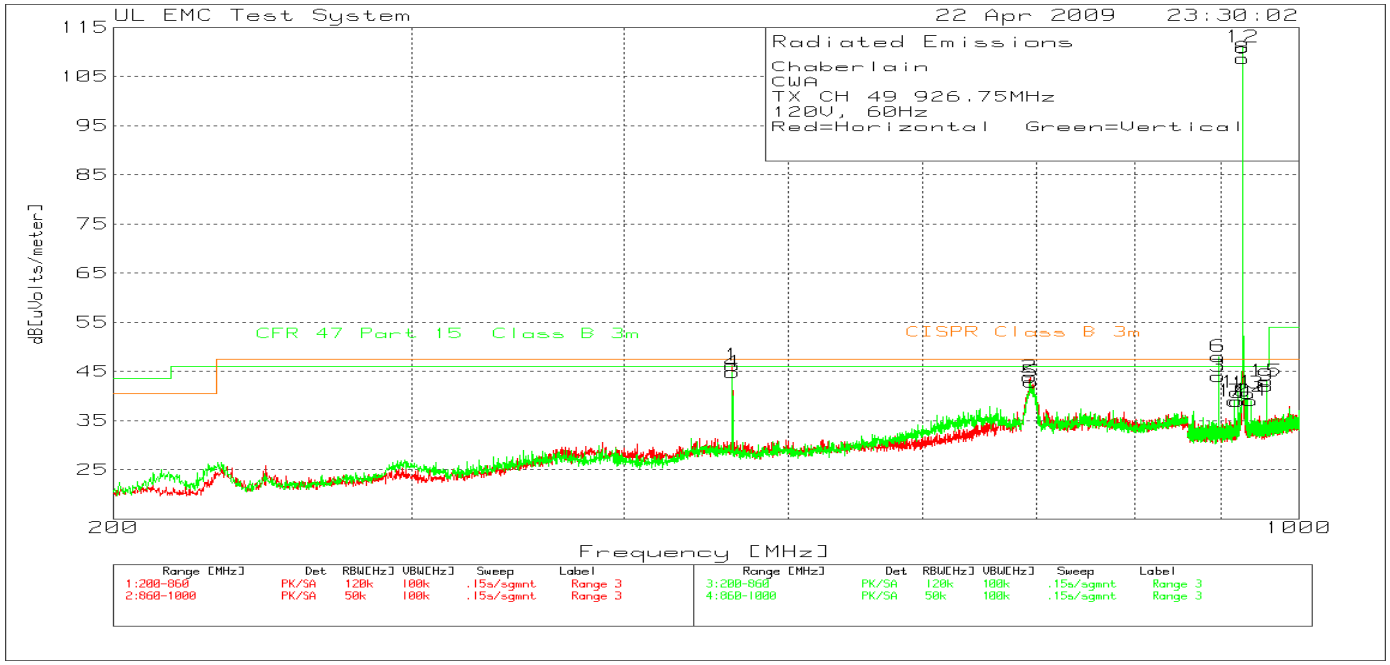


Figure 16 Radiated Spurious Emissions 1GHz – 10GHz, High Channel

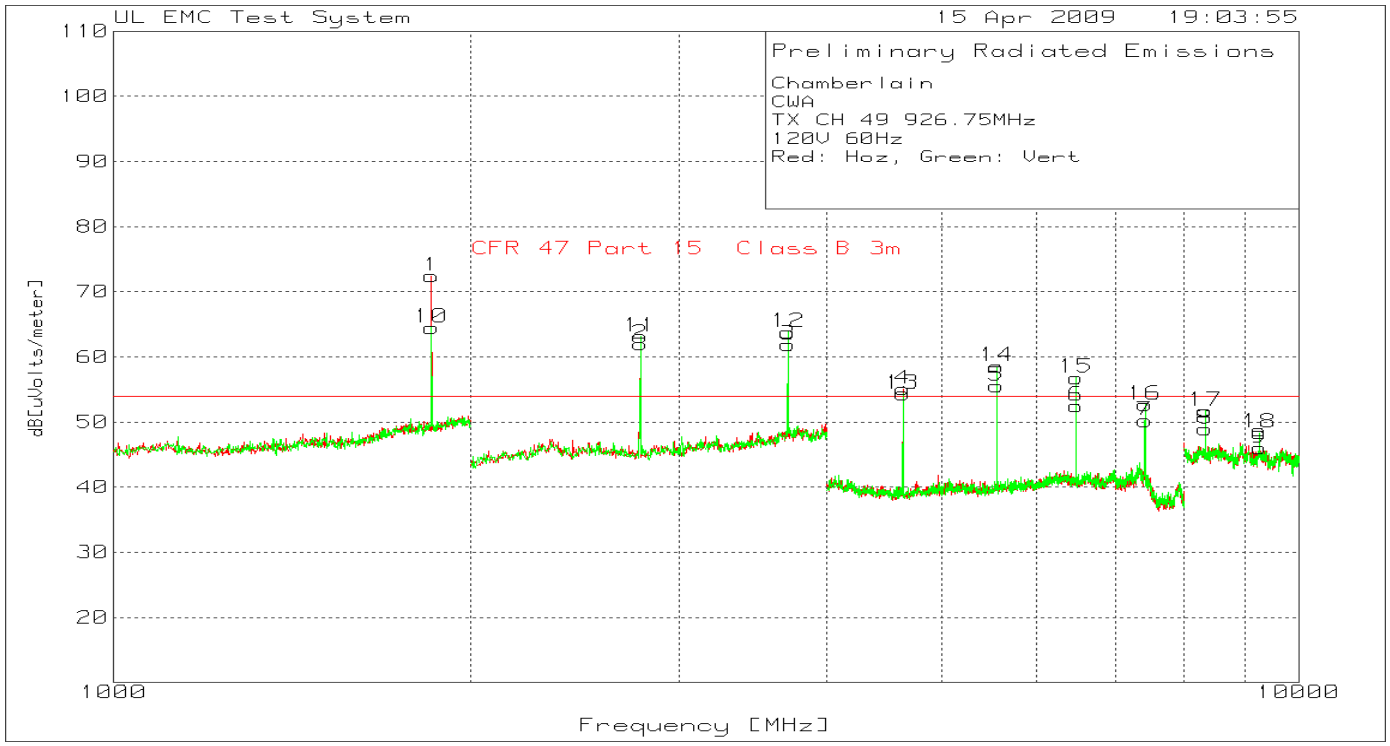


Table 34 Radiated Spurious Emissions 200MHz – 1GHz, High Channel

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.

Chaberlain
CWA
TX CH 49 926.75MHz
120V, 60Hz
Red=Horizontal Green=Vertical

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	463.3844	26.22 pk	2.5	17.5	46.22	46	47.5	-	-	-	-
		Height:200 Horz		Margin [dB]		.22	-1.28	-	-	-	-
2	694.0107	19.66 pk	3.2	21	43.86	46	47.5	-	-	-	-
		Height:100 Horz		Margin [dB]		-2.14	-3.64	-	-	-	-
3	896.7316	17.5 pk	3.5	23	44	46	47.5	-	-	-	-
		Height:100 Horz		Margin [dB]		-2	-3.5	-	-	-	-
7	920.1699	11.91 pk	3.6	23.4	38.91	46	47.5	-	-	-	-
		Height:100 Horz		Margin [dB]		-7.09	-8.59	-	-	-	-
8	926.7466	81.77 pk	3.6	23.3	108.67	46	47.5	-	-	-	-
		Height:100 Horz		Margin [dB]		62.67	61.17	-	-	-	-
9	956.7616	14.69 pk	3.7	23.6	41.99	46	47.5	-	-	-	-
		Height:100 Horz		Margin [dB]		-4.01	-5.51	-	-	-	-
4	463.3844	24.85 pk	2.5	17.5	44.85	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-1.15	-2.65	-	-	-	-
5	695.1099	18.64 pk	3.2	21	42.84	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		-3.16	-4.66	-	-	-	-
6	896.7316	21.52 pk	3.5	23	48.02	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		2.02	.52	-	-	-	-
10	916.7416	12.04 pk	3.6	23.3	38.94	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-7.06	-8.56	-	-	-	-
11	920.1699	13.76 pk	3.6	23.4	40.76	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-5.24	-6.74	-	-	-	-
12	926.7466	84.09 pk	3.6	23.3	110.99	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		64.99	63.49	-	-	-	-
13	933.2534	13.42 pk	3.7	23.4	40.52	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		-5.48	-6.98	-	-	-	-
14	936.7516	11.94 pk	3.7	23.4	39.04	46	47.5	-	-	-	-
		Height:200 Vert		Margin [dB]		-6.96	-8.46	-	-	-	-
15	956.7616	15.71 pk	3.7	23.6	43.01	46	47.5	-	-	-	-
		Height:100 Vert		Margin [dB]		-2.99	-4.49	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m
LIMIT 2: CISPR Class B 3m

Table 35 Radiated Spurious Emissions 1GHz – 10GHz, High Channel

Chamberlain
CWA
TX CH 49 926.75MHz
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	1853.707	41.87 pk	3.74	26.8	72.41	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		18.41	-	-	-	-	-
2	2781.563	35.55 pk	4.24	22.2	61.99	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		7.99	-	-	-	-	-
3	3707.415	32.66 pk	5.75	23.5	61.91	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		7.91	-	-	-	-	-
4	4632.422	79.68 pk	-52.32	27.7	55.06	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		1.06	-	-	-	-	-
5	5561.041	77.79 pk	-50.52	28.3	55.57	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		1.57	-	-	-	-	-
6	6486.991	71.69 pk	-48.32	29.1	52.47	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-1.53	-	-	-	-	-
7	7415.61	66.66 pk	-47.43	31	50.23	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-3.77	-	-	-	-	-
8	8340.681	62.45 pk	-50.02	36.5	48.93	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-5.07	-	-	-	-	-
9	9266.533	59.05 pk	-49.39	36.4	46.06	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-7.94	-	-	-	-	-
10	1853.707	33.96 pk	3.74	26.8	64.5	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		10.5	-	-	-	-	-
11	2781.563	36.71 pk	4.24	22.2	63.15	54	-	-	-	-	-
		Height:149 Vert		Margin [dB]		9.15	-	-	-	-	-
12	3707.415	34.57 pk	5.75	23.5	63.82	54	-	-	-	-	-
		Height:149 Vert		Margin [dB]		9.82	-	-	-	-	-
13	4632.422	78.97 pk	-52.32	27.7	54.35	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		.35	-	-	-	-	-
14	5561.041	80.74 pk	-50.52	28.3	58.52	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		4.52	-	-	-	-	-
15	6486.991	76.03 pk	-48.32	29.1	56.81	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		2.81	-	-	-	-	-
16	7415.61	69.09 pk	-47.43	31	52.66	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-1.34	-	-	-	-	-
17	8340.681	65.24 pk	-50.02	36.5	51.72	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		-2.28	-	-	-	-	-
18	9266.533	61.32 pk	-49.39	36.4	48.33	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		-5.67	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m

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

Chamberlain
CWA
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
2nd Harmonic - not restricted						**Duty Cycle Correction included in AV Margin**				
3rd Harmonic -										
2780.2515	37.48 pk	4.25	22.2	63.93	74	-	-	-	-	-
Azimuth: 0	Height:100 Horz		Margin [dB]:	-10.07		-	-	-	-	-
2780.2515	33.19 av	4.25	22.2	59.64	54	Duty Cycle Correction: -27.4dB				
Azimuth: 0	Height:100 Horz		Margin [dB]:	-21.76		-	-	-	-	-
2780.2515	39.49 pk	4.25	22.2	65.94	74	-	-	-	-	-
Azimuth: 62	Height:134 Vert		Margin [dB]:	-8.06		-	-	-	-	-
2780.2515	36.01 av	4.25	22.2	62.46	54	Duty Cycle Correction: -27.4dB				
Azimuth: 62	Height:134 Vert		Margin [dB]:	-18.94		-	-	-	-	-
4th Harmonic - very low										
3706.982	37.7 pk	5.74	23.5	66.94	74	-	-	-	-	-
Azimuth: 244	Height:128 Vert		Margin [dB]:	-7.06		-	-	-	-	-
3706.982	33.5 av	5.74	23.5	62.74	54	Duty Cycle Correction: -27.4dB				
Azimuth: 244	Height:128 Vert		Margin [dB]:	-18.66		-	-	-	-	-
3706.982	34.73 pk	5.74	23.5	63.97	74	-	-	-	-	-
Azimuth: 108	Height:108 Horz		Margin [dB]:	-10.03		-	-	-	-	-
3706.982	29.42 av	5.74	23.5	58.66	54	Duty Cycle Correction: -27.4dB				
Azimuth: 108	Height:108 Horz		Margin [dB]:	-22.74		-	-	-	-	-
5th Harmonic										
4633.7275	79.09 pk	-52.33	27.7	54.46	74	-	-	-	-	-
Azimuth: 285	Height:100 Horz		Margin [dB]:	-19.54		-	-	-	-	-
4633.7275	70.92 av	-52.33	27.7	46.29	54	Duty Cycle Correction: -27.4dB				
Azimuth: 285	Height:100 Horz		Margin [dB]:	-35.11		-	-	-	-	
4633.7275	75.87 pk	-52.33	27.7	51.24	74	-	-	-	-	-
Azimuth: 115	Height:114 Vert		Margin [dB]:	-22.76		-	-	-	-	-
4633.7275	71.55 av	-52.33	27.7	46.92	54	Duty Cycle Correction: -27.4dB				
Azimuth: 115	Height:114 Vert		Margin [dB]:	-34.48		-	-	-	-	-
6th Harmonic - not restricted										
7th Harmonic - not restricted										
8th Harmonic										
7413.9988	71.09 pk	-47.45	31	54.64	74	-	-	-	-	-
Azimuth: 232	Height:110 Vert		Margin [dB]:	-19.36		-	-	-	-	-
7413.9988	66.61 av	-47.45	31	50.16	54	Duty Cycle Correction: -27.4dB				
Azimuth: 232	Height:110 Vert		Margin [dB]:	-31.24		-	-	-	-	-
7413.9988	70.41 pk	-47.45	31	53.96	74	-	-	-	-	-
Azimuth: 70	Height:100 Horz		Margin [dB]:	-20.04		-	-	-	-	-
7413.9988	66.03 av	-47.45	31	49.58	54	Duty Cycle Correction: -27.4dB				
Azimuth: 70	Height:100 Horz		Margin [dB]:	-31.82		-	-	-	-	-
9th Harmonic										
8340.6862	66.9 pk	-50.02	36.5	53.38	74	-	-	-	-	-
Azimuth: 98	Height:150 Vert		Margin [dB]:	-20.62		-	-	-	-	-
8340.6862	57.89 av	-50.02	36.5	44.37	54	Duty Cycle Correction: -27.4dB				
Azimuth: 98	Height:150 Vert		Margin [dB]:	-37.03		-	-	-	-	-
8340.6862	66.64 pk	-50.02	36.5	53.12	74	-	-	-	-	-
Azimuth: 225	Height:108 Horz		Margin [dB]:	-20.88		-	-	-	-	-
8340.6862	56.9 av	-50.02	36.5	43.38	54	Duty Cycle Correction: -27.4dB				
Azimuth: 225	Height:108 Horz		Margin [dB]:	-38.02		-	-	-	-	-
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 – 10GHz	3 meter distance
Limits - Class B			
Frequency (MHz)		Limit (dBµV/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 36 Radiated Emissions EUT Configuration Settings

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

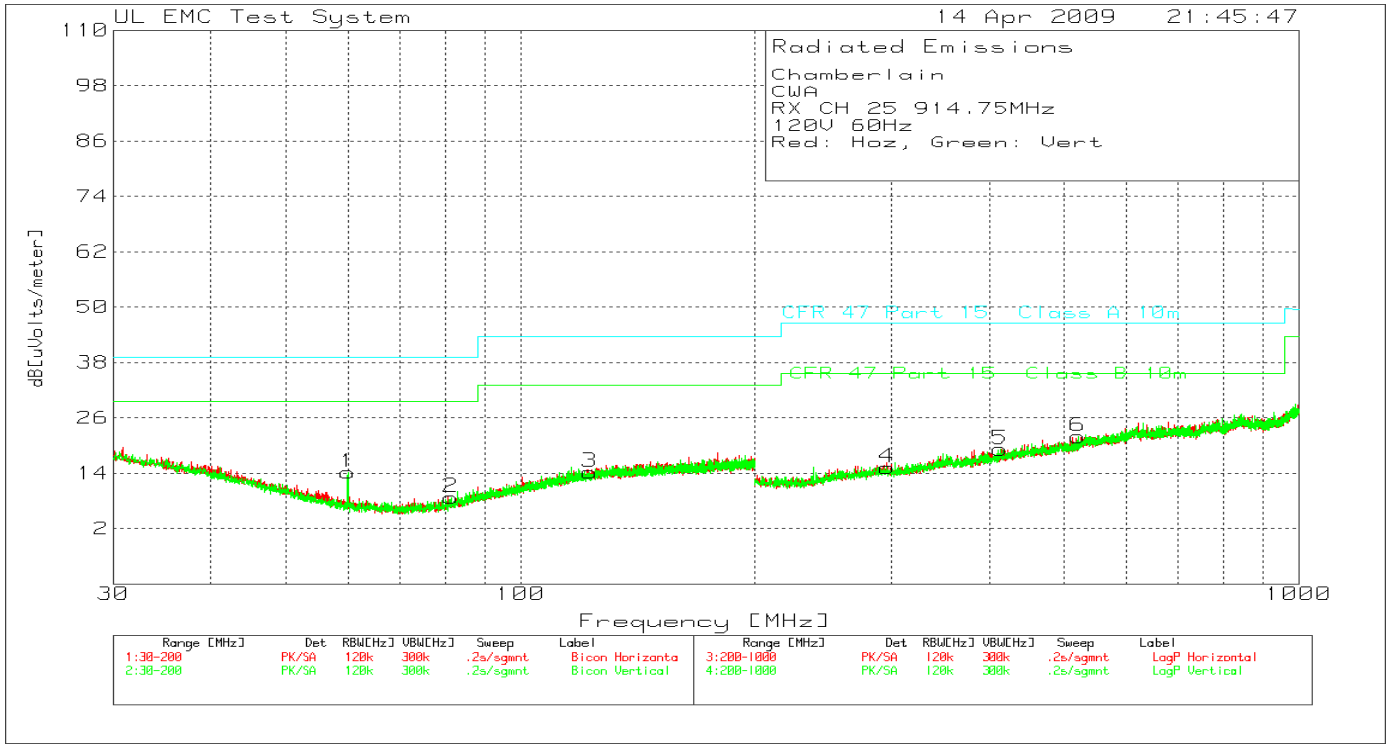
Table 37 Radiated Emissions Test Equipment

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

Test setup for Radiated Emissions

See Appendix B, Figure 22 for test setup photo.

Figure 17 Radiated Emissions Graph



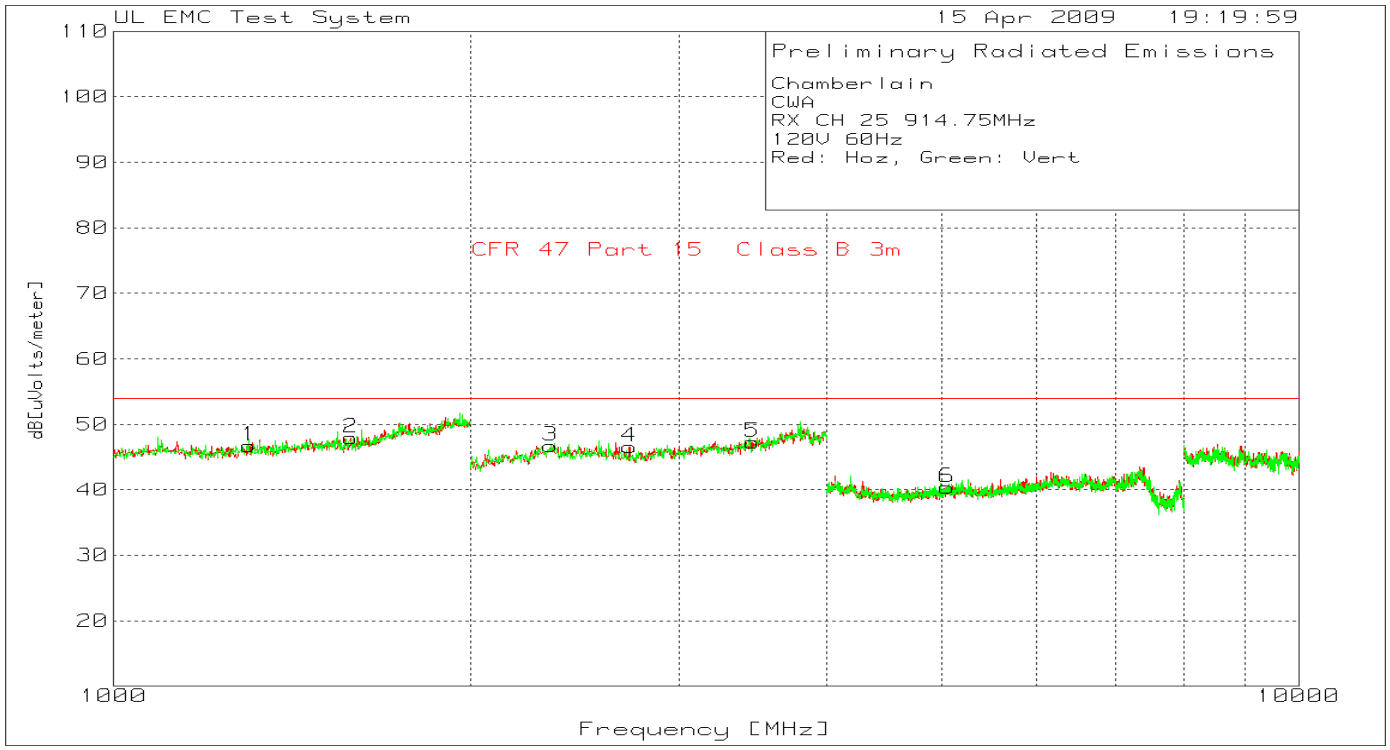


Table 38 Radiated Emissions Data Points

Chamberlain
CWA
RX 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	59.9825	37.63 pk	-30.3	6.8	14.13	-	-	39.1	29.6	-	-
		Height:200 Vert		Margin [dB]		-	-	-24.97	-15.47	-	-
2	81.3865	31.6 pk	-30.3	7.4	8.7	-	-	39.1	29.6	-	-
		Height:100 Vert		Margin [dB]		-	-	-30.4	-20.9	-	-
3	122.6655	30.78 pk	-30.1	13.5	14.18	-	-	43.5	33.1	-	-
		Height:299 Vert		Margin [dB]		-	-	-29.32	-18.92	-	-
4	295.5284	35.1 pk	-32.9	13	15.2	-	-	46.4	35.6	-	-
		Height:300 Vert		Margin [dB]		-	-	-31.2	-20.4	-	-
5	413.0402	35.57 pk	-32.2	15.8	19.17	-	-	46.4	35.6	-	-
		Height:402 Vert		Margin [dB]		-	-	-27.23	-16.43	-	-
6	519.96	35.81 pk	-31.8	17.9	21.91	-	-	46.4	35.6	-	-
		Height:103 Vert		Margin [dB]		-	-	-24.49	-13.69	-	-

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

Chamberlain
CWA
RX 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	1300.601	18.85 pk	3.17	24.7	46.72	54	-	-	-	-	-
		Height:101 Horz		Margin [dB]		-7.28	-	-	-	-	-
2	1585.17	18.73 pk	3.59	25.6	47.92	54	-	-	-	-	-
		Height:101 Horz		Margin [dB]		-6.08	-	-	-	-	-
3	2336.673	20.64 pk	4.38	21.7	46.72	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-7.28	-	-	-	-	-
4	2725.451	20.26 pk	4.18	22.1	46.54	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-7.46	-	-	-	-	-
5	3458.918	19.21 pk	4.55	23.5	47.26	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-6.74	-	-	-	-	-
6	5046.031	63.17 pk	-50.72	27.9	40.35	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-13.65	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 3m
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 39 20dB Bandwidth Configuration Settings

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

Table 40 20dB Bandwidth Test Equipment

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

Table 41 20dB Bandwidth Results

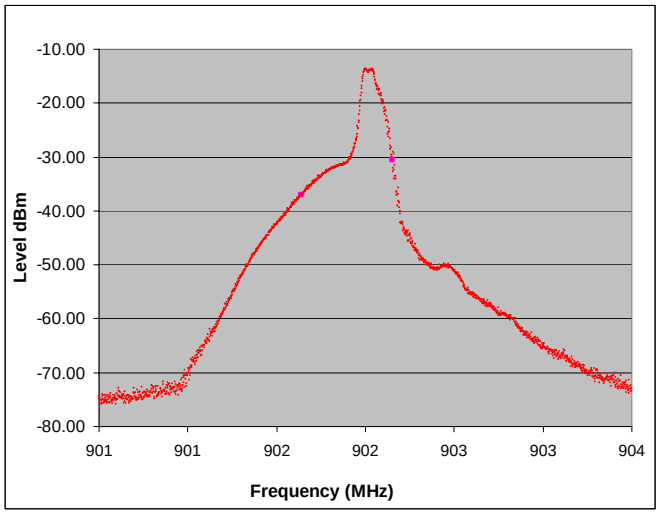
Mode	Channel	99% Power Bandwidth
TX	Low	513.750 kHz
	Middle	525.000 kHz
	High	536.250 kHz
	All Channels Hopping	25.200 MHz

Test Setup for 20dB Bandwidth

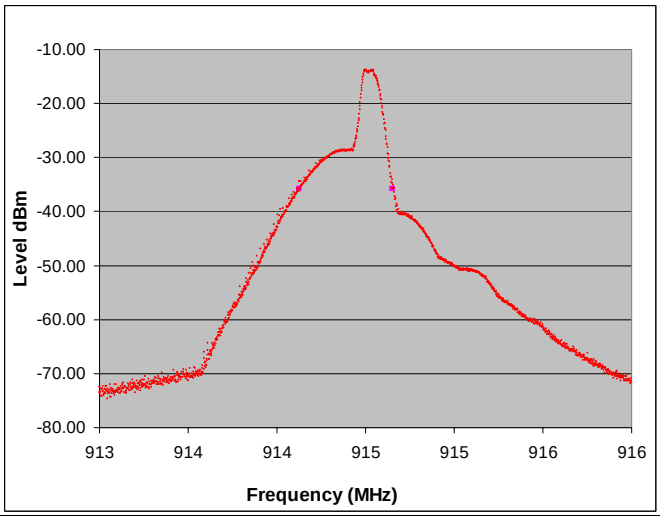
See Appendix B, Figure 20 for test setup photo

Figure 18 - 99% Power Bandwidth Plots

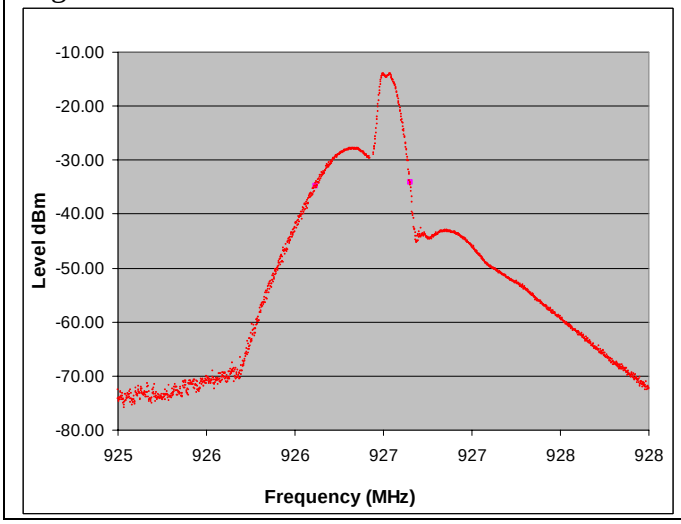
Low Channel



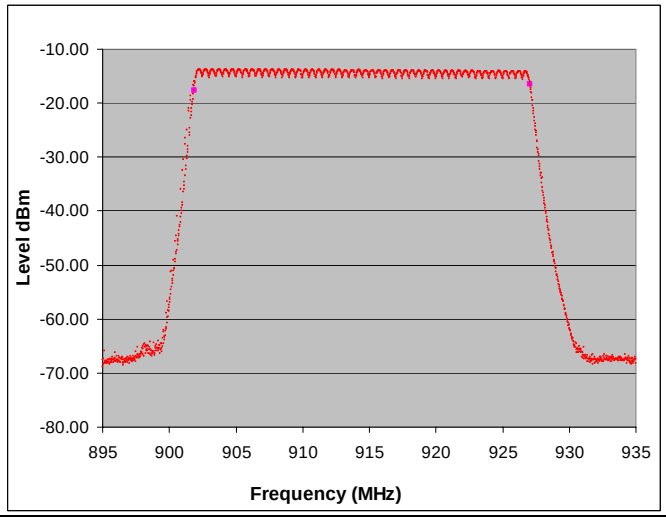
Middle Channel



High Channel



All Channels



5.0 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 19 Line Conducted Emissions Test Setup

Figure 20 Antenna Conducted Measurements Test Setup

Figure 21 Radiated Emissions Test Setup

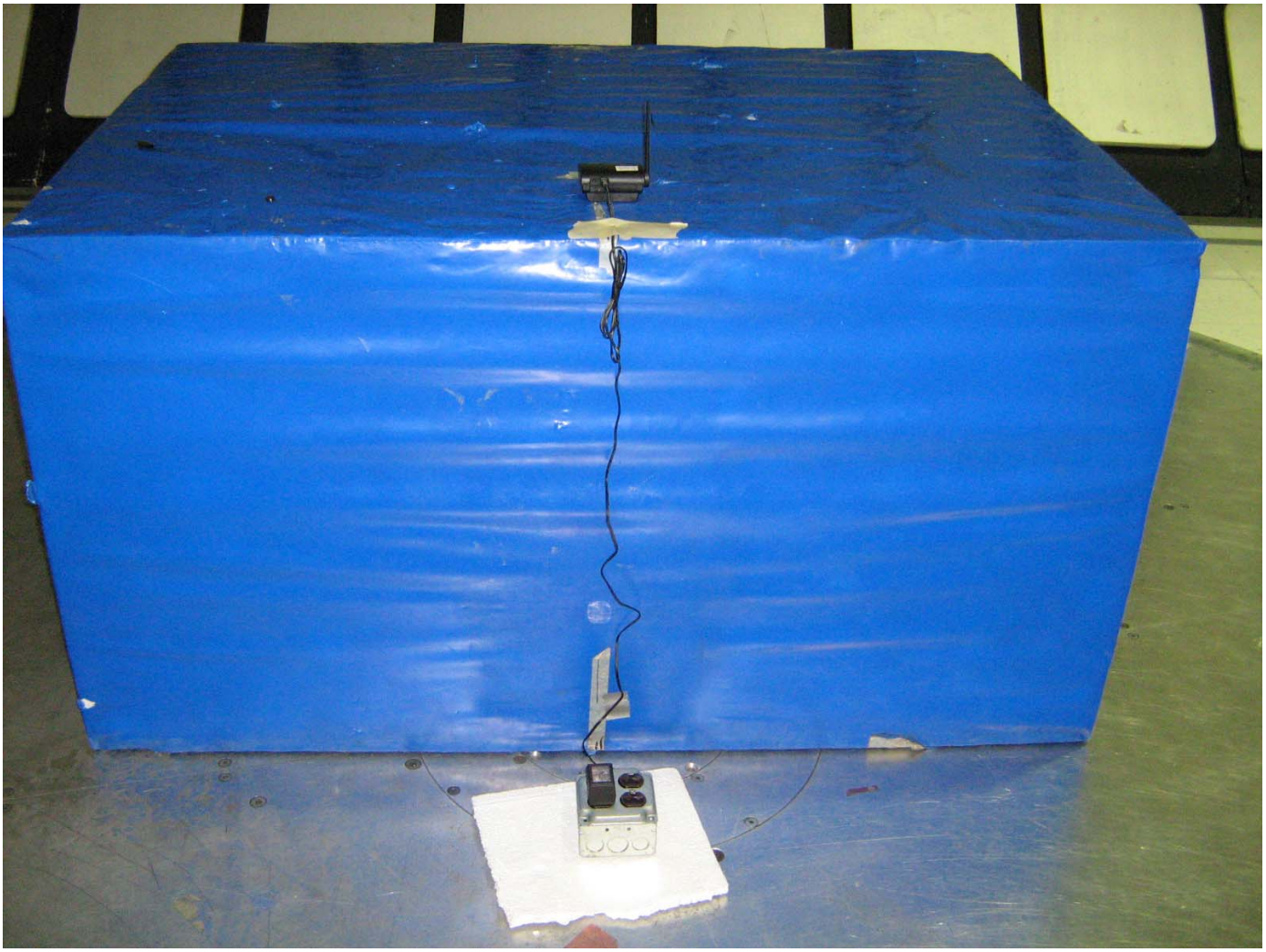


Figure 22 Radiated Emissions Test Setup