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Job Number:	771356
File Number:	MC3181
Date:	October 9, 2007
Model:	OPB3
FCC ID	JLFOPB2

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

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1285 Walt Whitman Rd.
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Job Number: 771356 File Number: MC3181 Page 2 of 36
Model Number: OPB3
Client Name: Chamberlain Group Inc.
FCC ID: JLFOPB2

Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.**
1285 Walt Whitman Rd.
Melville, NY 11747

Tests Performed For: **Chamberlain Group Inc.**
845 Larch Av
Elmhurst, IL 60126

Applicant Contact: **Hank Sieradzki**
Phone: **(630) 993-6564**
E-mail: **Hank.Sieradzki@chamberlaingroup.com**

Test Report Date: **October 9, 2007**

Product Type: **3 Button Access Control**

Product standards **FCC Part 15, Subpart C, 15.231**

Model Number: **OPB3**

Sample Serial Number: **Not Applicable**

EUT Category: **Low Power Transmitter**

Testing Start Date: **September 17, 2007**

Date Testing Complete: **September 21, 2007**

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, A2LA, or any agency of the US government.

This report may contain test results that are not covered by the NVLAP or A2LA accreditation. The scope of accreditation is limited to the specific tests that are listed on the NVLAP and/or A2LA websites referenced at the end of this report.

Report Directory

1.0	GENERAL - Product Description.....	4
1.1	Equipment Description	4
1.2	Equipment Marking Plate	4
1.3	Device Configuration During Test	5
1.3.1	Equipment Used During Test:.....	5
1.3.2	Input/Output Ports:.....	5
1.3.3	EUT Internal Operating Frequencies:	5
1.3.4	Power Interface:.....	5
1.4	Block Diagram:	6
1.5	EUT Configurations	6
1.6	EUT Operation Modes.....	6
2.0	Summary	7
2.1	Deviations from standard test methods.....	7
2.2	Device Modifications Necessary for Compliance	7
2.3	Reference Standards	8
2.4	Results Summary	8
3.0	Calibration of Equipment Used for Measurement	9
4.0	EMISSIONS TEST RESULTS.....	9
4.1	Test Conditions and Results – OCCUPIED BANDWIDTH	10
4.2	Test Conditions and Results – CEASE OPERATION.....	14
4.3	Test Conditions and Results – PULSE TRAIN	17
4.4	Test Conditions and Results – RADIATED EMISSIONS.....	20
4.5	Fundamental Frequency And Spurious Emissions Measurement Limit Calculations	34
4.5.1	Limit Calculation.....	34
4.5.2	Spurious Emissions Limit.....	34
4.5.3	Radiated Emissions Limit conversion from mV/m to dBmV/m (accordance with paragraph 15.209)	34
4.5.4	Radiated Emissions test data obtained during measurements.	34
Appendix A		35
	Accreditations and Authorizations	35

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	--	--

1.0 G E N E R A L - Product Description

1.1 Equipment Description

- I. 3 Button Access Functionality
 - A. User presses button
 - B. 315 TX is enabled for 800ms while C is occurring.
 - C. Unit begins transmitting data packets (38kbps) on two alternating frequencies (Channel A and Channel B), spaced several Mhz apart.
 1. Transmits on Channel A for 11 ms
 2. Receives on Channel A for 11 ms looking for response
 3. Repeats 1 and 2 five times or until response is acquired
 4. If response, 3 Button Access goes idle.
 - D. If NO response, repeats 1-3 on Channel B

1.2 Equipment Marking Plate

Not Applicable

Job Number: 771356 File Number: MC3181 Page 5 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	3 Button Access	Chamberlain Group Inc.	OPB3	None
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.3.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	B	N	N	None
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 B = Battery					

1.3.3 EUT Internal Operating Frequencies:

Frequency (MHz)	Description	Frequency (MHz)	Description
315	Fundamental Frequency	-	-

1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	3	-	-	DC	-	Battery Powered
1	3	-	-	DC	-	Battery Powered

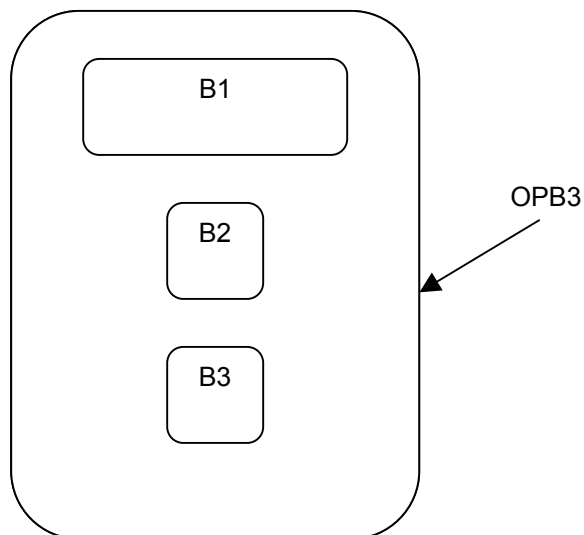
Job Number: 771356
Model Number: OPB3
Client Name: Chamberlain Group Inc.
FCC ID: JLFOPB2

File Number: MC3181

Page 6 of 36

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



1.5 EUT Configurations

Mode #	Description
1	Stand Alone

1.6 EUT Operation Modes

Mode #	Description
1	Transmit Mode
2	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

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart B	Code of Federal Regulations, Part 15, Radio Frequency Devices	2007
FCC Part 15, Subpart C	Code of Federal Regulations, Part 15, Radio Frequency Devices	2007
RSS-GEN, Issue 2	General Requirements and Information for the Certification of Radiocommunication Equipment	2007
RSS-210, Issue 7	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment	2007

Note: only occupied bandwidth requirements were measured for Industry Canada. All other testing required by RSS-GEN and RSS-210 is the responsibility of the manufacturer.

2.4 Results Summary

This product is considered a Periodic Transmitter

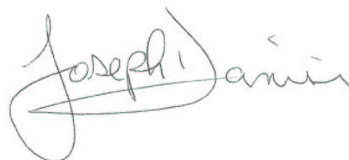
Requirement – Test	Result (Compliant / Non-Compliant)*
15.35 Pulse Train - Averaging Factor	Compliant
15.109 Radiated Emissions - Unintentional	Compliant
15.209 General Radiated Emissions	Compliant
15.231 Fundamental Radiated Emissions	Compliant
15.231 / A1.1.3 Occupied Bandwidth	Compliant
15.231 Cease Operation	Compliant

Test Engineer:



Bob DeLisi (Ext.22452)
Senior Staff Engineer
International EMC Services
Conformity Assessment Services-

Reviewer:



Joe Danisi(Ext.23055)
Lead Engineering Associate
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.

3.0 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, Radio Frequency Devices
--------------------------------------	----------------------------------

----- International -----

Industry Canada	RSS-GEN General Requirements and Information for the Certification of Radiocommunication Equipment, Issue 2
	RSS-210 Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 7

Industry Canada only applied to Occupied Bandwidth tests.

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 – OCCUPIED BANDWIDTH

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.		
Basic Standard		47CFR 15.231 / RSS-GEN / RSS-210	
Occupied Bandwidth Limits			
0.25% of f _o (0.788MHz)			

Table 1 Occupied Bandwidth Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	1
Supplementary information: None		

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth (MHz)	Occupied Bandwidth Requirements	
	dBc	%
0.010	-20	-
1% of Spectrum Analyzer Span	-	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Advantest	R3261C	5A229
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/ Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740

Job Number: 771356

File Number: MC3181

Page 11 of 36

Model Number: OPB3

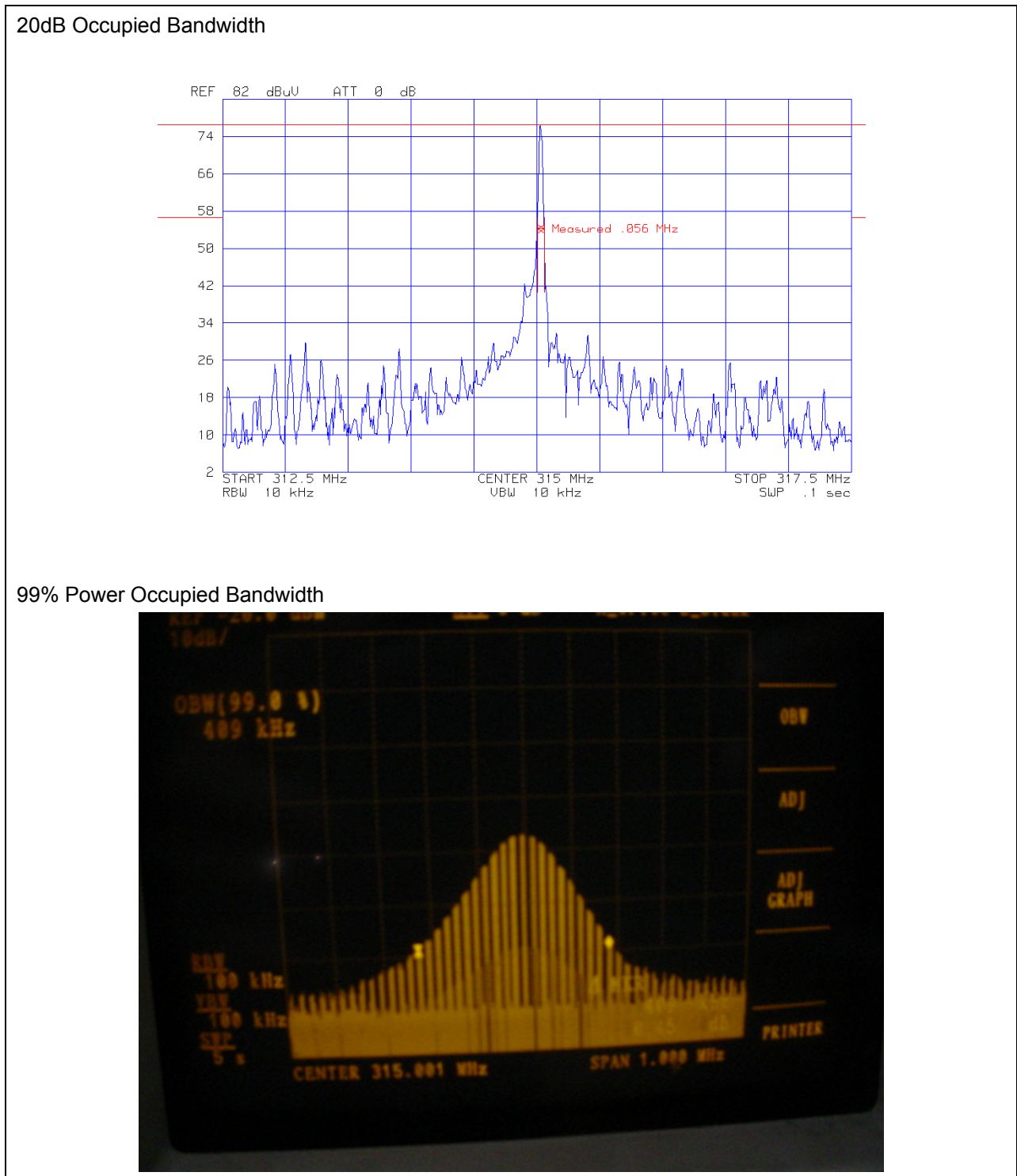
Client Name: Chamberlain Group Inc.

FCC ID: JLFOPB2

Figure 1 Test Setup for Occupied Bandwidth – 20dB Occupied Bandwidth



Figure 2 Occupied Bandwidth Graph



Job Number: 771356 File Number: MC3181 Page 13 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

Table 4 Occupied Bandwidth Results

Occupied Bandwidth Results	Measured (MHz)		Limit (MHz)	
	dBc	%	0.788	
	0.056	0.409	Pass	Pass
Supplementary information: None				

4.2 Test Conditions and Results – CEASE OPERATION

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	47CFR 15.231
Cease Operation Limits	
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.	

Table 5 Cease Operation Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	1
Supplementary information: None		

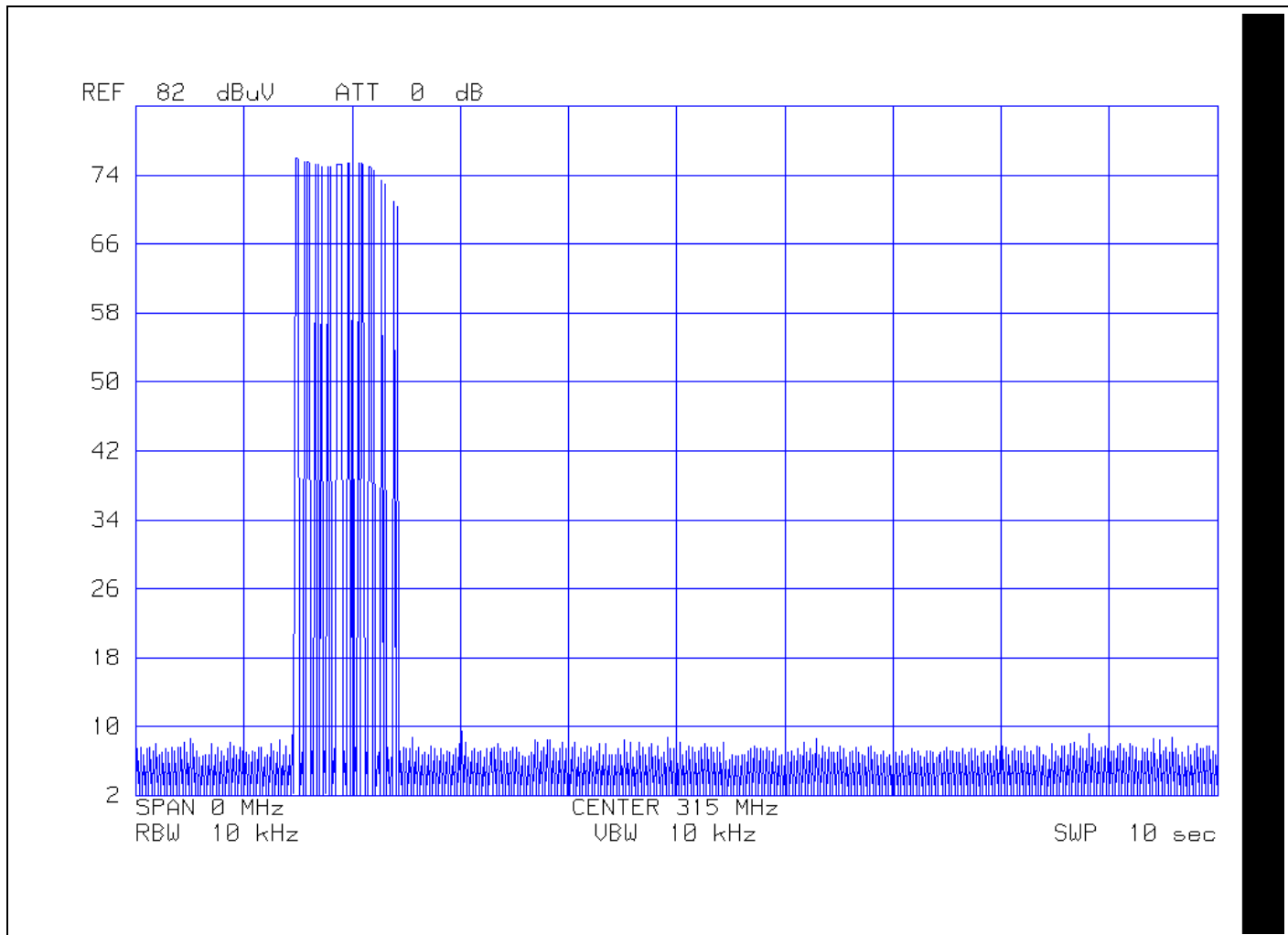
Table 6 Cease Operation Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Spectrum Analyzer	Advantest	R3261C	5A229
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/ Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740

Figure 3 Test Setup for Cease Operation



Figure 4 Cease Operation Graph



4.3 Test Conditions and Results – PULSE TRAIN

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart A, 15.35
Pulse Train Limits	
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.	

Table 7 Pulse Train Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	1
Supplementary information: None		

Table 8 Pulse Train Calculation

Pulse Width (mS)	Total Transmission time or 100ms which ever is lesser	Average Correction Factor (dB) $20 \log \left(\frac{PulseWidth}{TotalTransmissionTime} \right)$
31.2	100	-10.12

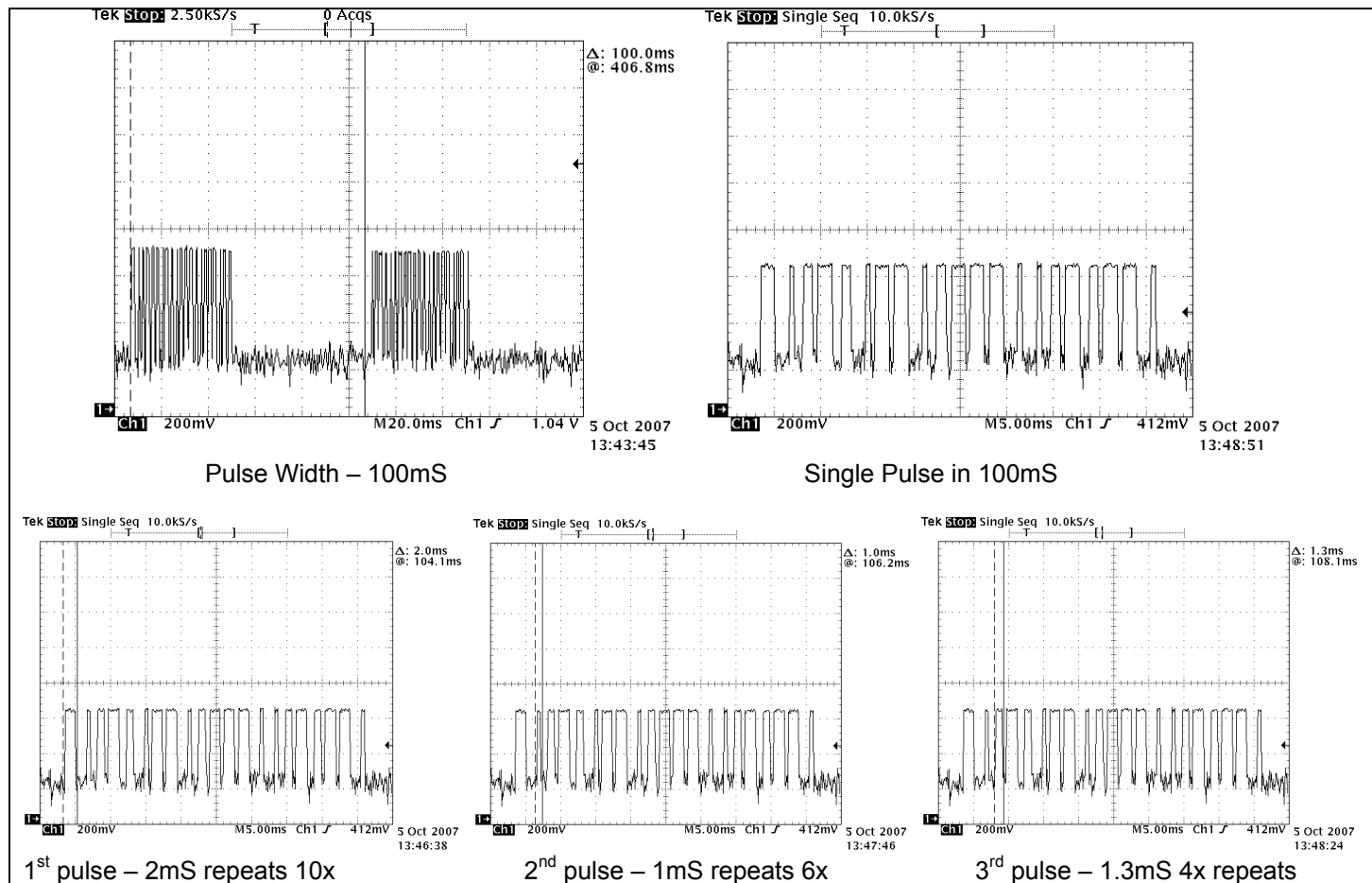
Table 9 Pulse Train Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Oscilloscope	Tektronix	TDS680B	5A258
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740

Figure 6 Test Setup for Pulse Train



Figure 7 Pulse Train Graph



4.4 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 3-meter. 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	15.207, 15.209 and 15.231		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	0.009 MHz – 1GHz	(3 meter measurement distance)	
Fully configured sample scanned over the following frequency range	1GHz – 5GHz	(3 meter measurement distance)	
Limits			
Frequency (MHz)	Limit (dBµV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious / Unintentional
0.009 – 0.490	128.5 – 93.8	-	-
0.490 – 1.705	73.8 – 63	-	-
1.705 – 30	69.5	-	-
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	
1000-10000	-	-	54
315	-	75.6	-
315-3150	-	-	55.6
Supplementary information: Spurious limits are only applied against products of the transmitter. All other emissions must meet the general limits.			

Table 10 Radiated Emissions EUT Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	1
1	1	2
Supplementary information: If the maximized peak of the fundamental or fundamental spurious emissions is less than the limit, no averaging factor was applied.		

Table 11 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
9kHz-30MHz			
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Active Loop Antenna	EMCO	6507	ME5A-288
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Bicon Antenna	Schaffner	VBA6106A	43441
Log-P Antenna	Schaffner	UPA6109	44067
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Above 1GHz			
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Horn Antenna	Electro-Metrics	RGA-180	ME5-565
Preamp (1 - 26GHz)	HP	8449B	ME5-914
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268

Figure 8 Test setups for Radiated Emissions

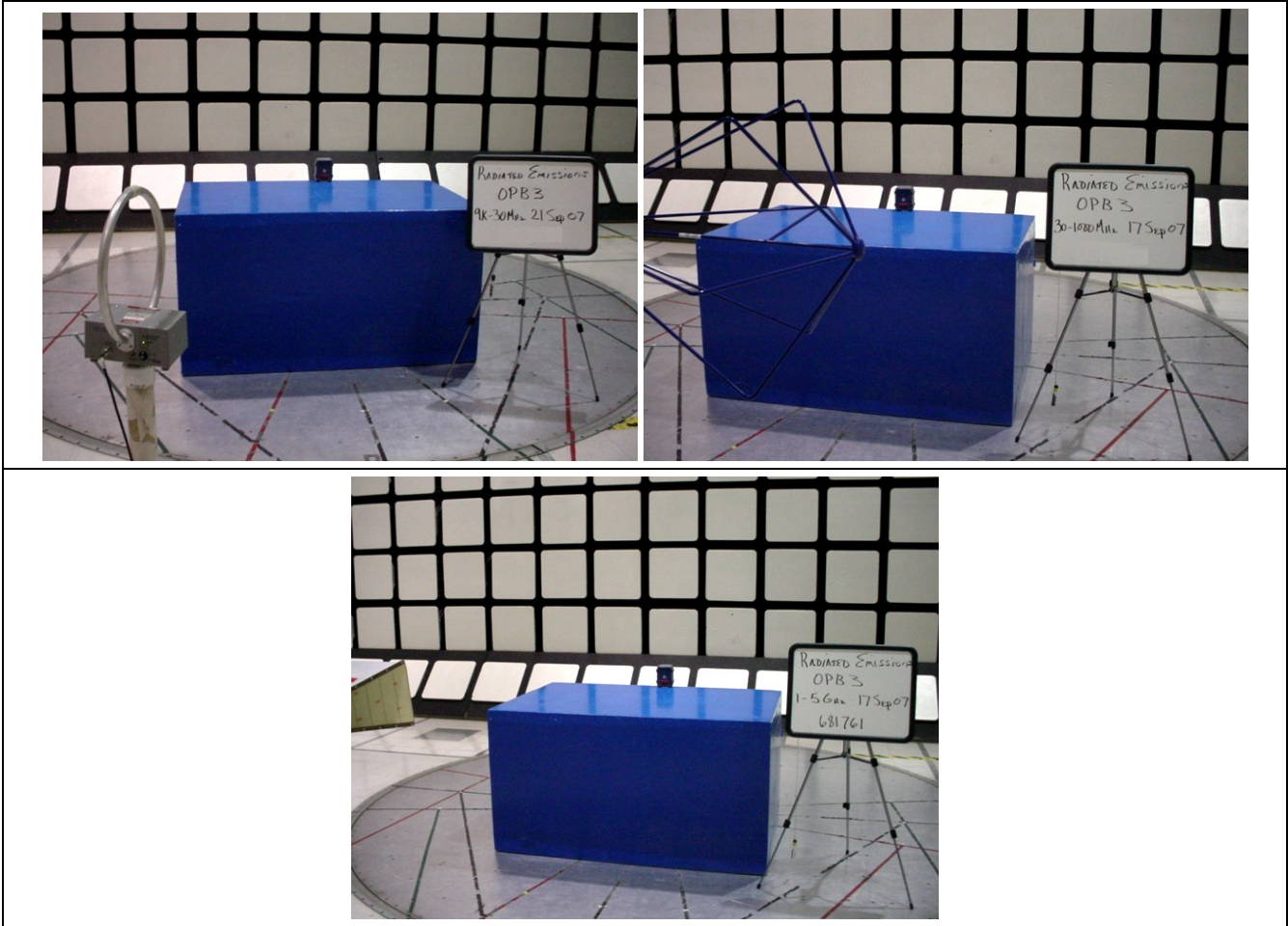
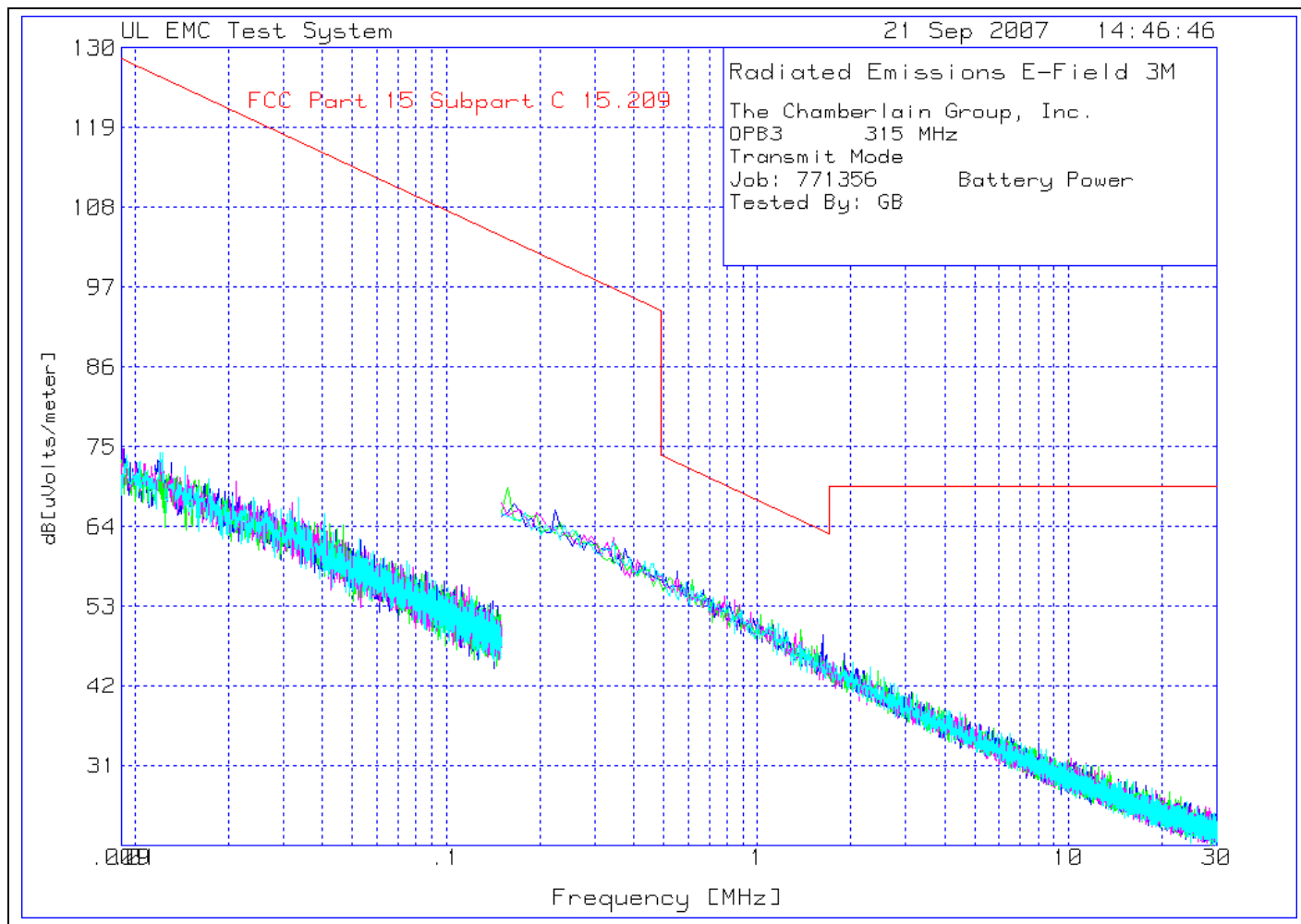


Figure 9 Radiated Emissions Graph

Job Number: 771356 File Number: MC3181 Page 24 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

Table 12 Radiated Emissions Data Points

The Chamberlain Group, Inc.

OPB3 315 MHz

Transmit Mode

Job:771356 Battery Power

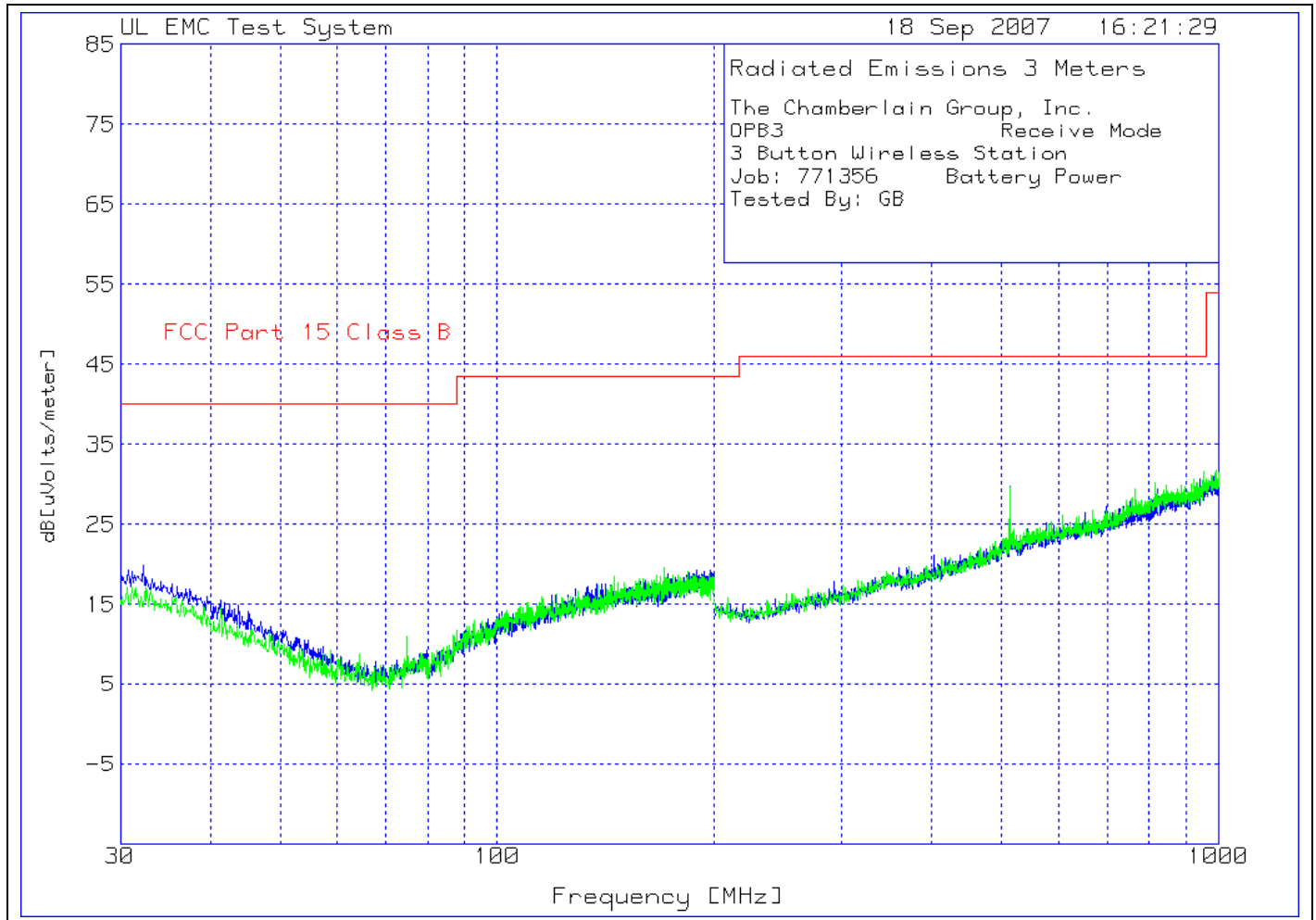
Tested By: GB

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
=====											
0°	.15 - 30MHz	-----									
5	.22464	50.57 pk	.1	15.6	66.27	100.6	-	-	-	-	-
	Azimuth:61	Height:100	Horz	Margin [dB]		-34.33	-	-	-	-	-
6	1.62048	33.41 pk	.1	15.5	49.01	63.4	-	-	-	-	-
	Azimuth:211	Height:100	Horz	Margin [dB]		-14.39	-	-	-	-	-
45°	.15 - 30MHz	-----									
4	.15746	53.49 pk	.1	15.7	69.29	103.7	-	-	-	-	-
	Azimuth:118	Height:120	Horz	Margin [dB]		-34.41	-	-	-	-	-
90°	.009 - .15MHz	-----									
2	.02113	46.91 pk	.2	23.2	70.31	121.1	-	-	-	-	-
	Azimuth:353	Height:140	Horz	Margin [dB]		-50.79	-	-	-	-	-
135°	.009 - .15MHz	-----									
1	.01222	46.37 pk	-.1	27.9	74.17	125.8	-	-	-	-	-
	Azimuth:358	Height:160	Horz	Margin [dB]		-51.63	-	-	-	-	-
3	.0336	47.01 pk	.1	20.9	68.01	117.1	-	-	-	-	-
	Azimuth:358	Height:160	Horz	Margin [dB]		-49.09	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector

Figure 10 Radiated Emissions Graph



Job Number: 771356 File Number: MC3181 Page 26 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

Table 13 Radiated Emissions Data Points

The Chamberlain Group, Inc.
 OPB3 Receive Mode
 3 Button Wireless Station
 Job:771356 Battery Power
 Tested By: GB

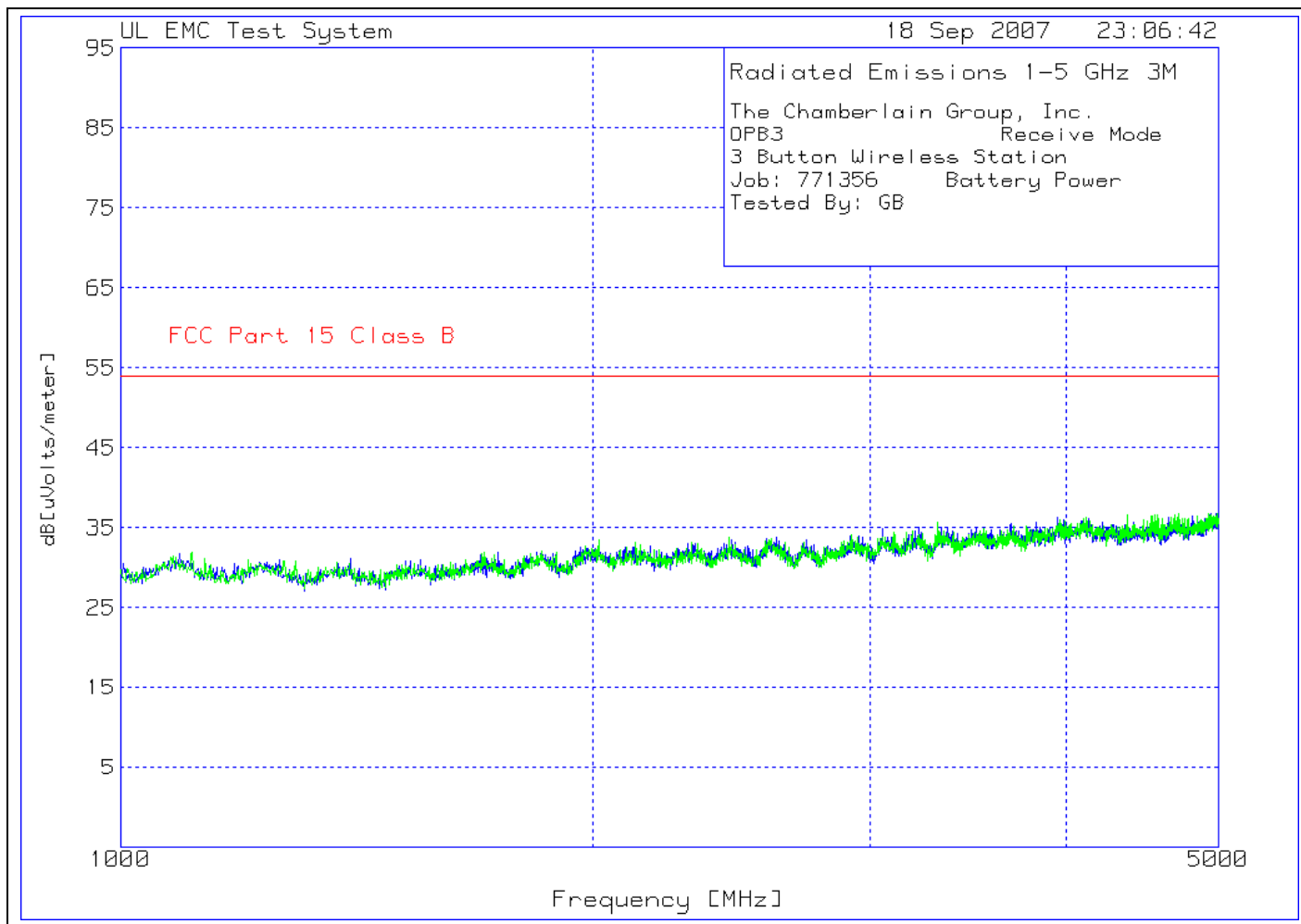
No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
Horizontal 30 - 200MHz -----										
1	32.2682	2.27 pk	-.3	17.9	19.87	40	-	-	-	-
	Azimuth:2	Height:100	Horz	Margin [dB]		-20.13	-	-	-	-
2	133.429	3.19 pk	0	14.1	17.29	43.5	-	-	-	-
	Azimuth:143	Height:400	Horz	Margin [dB]		-26.21	-	-	-	-
Vertical 30 - 200MHz -----										
3	30.6805	.64 pk	-.4	16.9	17.14	40	-	-	-	-
	Azimuth:358	Height:101	Vert	Margin [dB]		-22.86	-	-	-	-
4	74.9099	4.39 pk	-.1	6.7	10.99	40	-	-	-	-
	Azimuth:343	Height:101	Vert	Margin [dB]		-29.01	-	-	-	-
5	170.5137	3.52 pk	.1	15.9	19.52	43.5	-	-	-	-
	Azimuth:178	Height:101	Vert	Margin [dB]		-23.98	-	-	-	-
Horizontal 200 - 1000MHz -----										
6	403.3356	4.16 pk	.7	16.3	21.16	46	-	-	-	-
	Azimuth:23	Height:300	Horz	Margin [dB]		-24.84	-	-	-	-
7	513.2755	10.29 pk	.9	18.5	29.69	46	-	-	-	-
	Azimuth:15	Height:200	Horz	Margin [dB]		-16.31	-	-	-	-
Vertical 200 - 1000MHz -----										
8	513.2755	9.93 pk	.9	18.7	29.53	46	-	-	-	-
	Azimuth:222	Height:101	Vert	Margin [dB]		-16.47	-	-	-	-

LIMIT 1: FCC Part 15 Class B

pk - Peak detector

qp - Quasi-Peak detector

Figure 11 Radiated Emissions Graph



Job Number: 771356 File Number: MC3181 Page 28 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

Table 14 Radiated Emissions Data Points

The Chamberlain Group, Inc.
 OPB3 Receive Mode
 3 Button Wireless Station
 Job:771356 Battery Power
 Tested By: GB

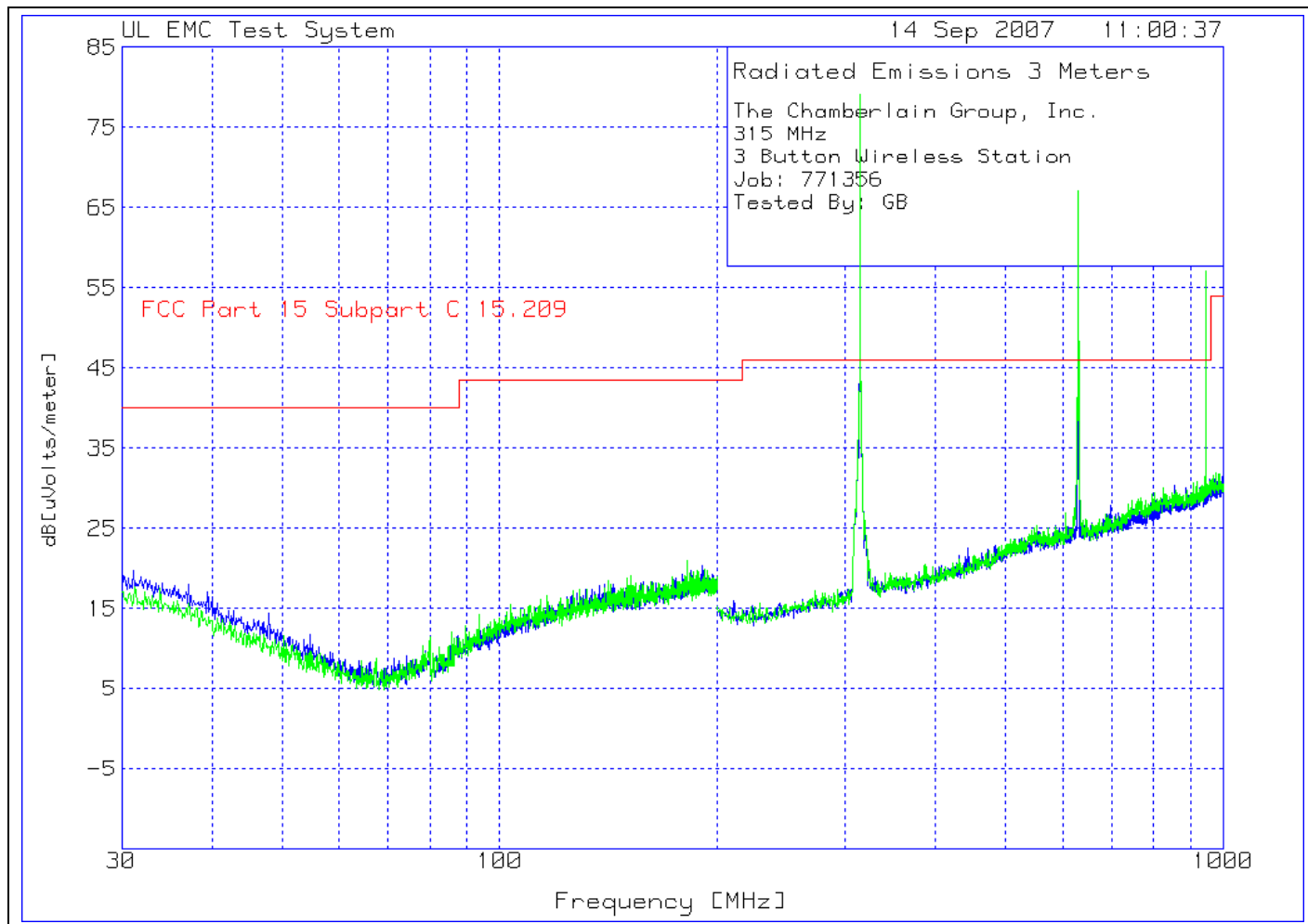
No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2500MHz -----											
1	1090.09	41.37 pk	-35	25.4	31.77	54	-	-	-	-	-
	Azimuth:133	Height:101	Horz	Margin [dB]	-22.23	-	-	-	-	-	-
2	1740.24	39.18 pk	-33.8	26.5	31.88	54	-	-	-	-	-
	Azimuth:356	Height:101	Horz	Margin [dB]	-22.12	-	-	-	-	-	-
3	2322.823	37.47 pk	-32.9	28.5	33.07	54	-	-	-	-	-
	Azimuth:278	Height:101	Horz	Margin [dB]	-20.93	-	-	-	-	-	-
Horizontal 2500 - 5000MHz -----											
4	3225.484	36.3 pk	-32.1	30.8	35	54	-	-	-	-	-
	Azimuth:251	Height:101	Horz	Margin [dB]	-19	-	-	-	-	-	-
5	3687.458	34.75 pk	-31.1	31.9	35.55	54	-	-	-	-	-
	Azimuth:3	Height:101	Horz	Margin [dB]	-18.45	-	-	-	-	-	-
6	4648.099	33.82 pk	-30.1	32.6	36.32	54	-	-	-	-	-
	Azimuth:33	Height:200	Horz	Margin [dB]	-17.68	-	-	-	-	-	-

LIMIT 1: FCC Part 15 Class B

pk - Peak detector

qp - Quasi-Peak detector

Figure 12 Radiated Emissions Graph



Job Number: 771356 File Number: MC3181 Page 30 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

Table 15 Radiated Emissions Data Points

The Chamberlain Group, Inc.
 315 MHz
 3 Button Wireless Station
 Job:771356

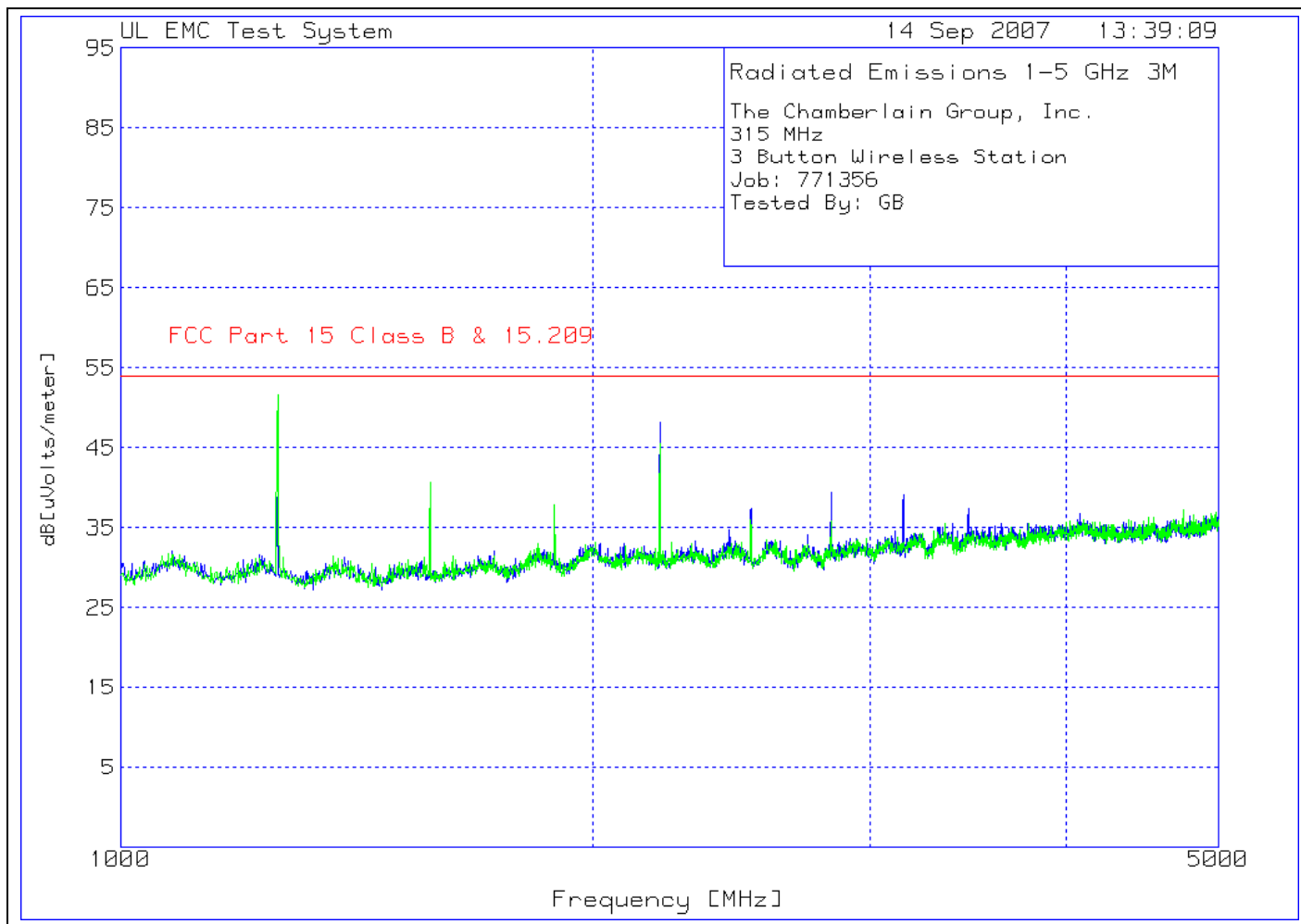
Tested By: GB

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	Averaging	Corrected Level	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]		Factor	dB[uVolts/meter]			
[MHz]	[dB(uV)]	[dB]	[dB]							
=====										
Horizontal 200 - 1000MHz										
314.985	62.23 pk	.5	14.1	76.83	75.6	-10.12	66.72	-	-	-
Azimuth: 187		Height:104	Horz	Margin [dB]:	-8.88	-	-	-	-	-
629.9958	39.09 pk	1.2	20.4	60.69	55.6	-10.12	50.57	-	-	-
Azimuth: 183		Height:119	Horz	Margin [dB]:	-5.03	-	-	-	-	-
945.009	25.46 pk	1.6	23.6	50.66	55.6	-	-	-	-	-
Azimuth: 349		Height:145	Horz	Margin [dB]:	-4.94	-	-	-	-	-
Vertical 200 - 1000MHz										
314.988	63.34 pk	.5	14.3	78.14	75.6	-10.12	68.02	-	-	-
Azimuth: 34		Height:137	Vert	Margin [dB]:	-7.58	-	-	-	-	-
629.9994	43.34 pk	1.2	20.7	65.24	55.6	-10.12	55.12	-	-	-
Azimuth: 108		Height:110	Vert	Margin [dB]:	-0.48	-	-	-	-	-
945.003	34.1 pk	1.6	24.2	60.32	55.6	-10.12	50.20	-	-	-
Azimuth: 199		Height:119	Vert	Margin [dB]:	-5.40	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.231

pk - Peak detector (maximized peak values)

Figure 13 Radiated Emissions Graph



Job Number: 771356 File Number: MC3181 Page 32 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

Table 16 Radiated Emissions Data Points

The Chamberlain Group, Inc.
 315 MHz
 3 Button Wireless Station
 Job:771356
 Tested By: GB

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]							
=====										
Horizontal 1000 - 2500MHz										
1259.9295	46.24 pk	-34.7	25.3	36.84	54	55.6	-	-	-	-
Azimuth: 74	Height:167	Horz	Margin	[dB]:	-17.16	-18.76	-	-	-	-
1575.0251	42.1 pk	-34.1	25.7	33.7	54	*	-	-	-	-
Azimuth: 68	Height:154	Horz	Margin	[dB]:	-20.3	*	-	-	-	-
1890.0163	39.29 pk	-33.6	27.3	32.99	54	55.6	-	-	-	-
Azimuth: 260	Height:183	Horz	Margin	[dB]:	-21.01	-22.61	-	-	-	-
2205.005	55.2 pk	-33.2	28.3	50.3	54	*	-	-	-	-
Azimuth: 198	Height:108	Horz	Margin	[dB]:	-3.7	*	-	-	-	-
Horizontal 2500 - 5000MHz										
2520.0939	44.42 pk	-32.8	28.9	40.52	54	55.6	-	-	-	-
Azimuth: 41	Height:146	Horz	Margin	[dB]:	-13.48	-15.08	-	-	-	-
2835.0351	44.09 pk	-32.5	29.7	41.29	54	*	-	-	-	-
Azimuth: 26	Height:146	Horz	Margin	[dB]:	-12.71	*	-	-	-	-
3150.0251	37.93 pk	-32.2	30.6	36.33	54	55.6	-	-	-	-
Azimuth: 226	Height:189	Horz	Margin	[dB]:	-17.67	-19.27	-	-	-	-
3465.0351	41.15 pk	-31.3	31.5	41.35	54	55.6	-	-	-	-
Azimuth: 0	Height:110	Horz	Margin	[dB]:	-12.65	-14.25	-	-	-	-
4081	33.47 pk	-30.4	32.5	35.57	54	*	-	-	-	-
Azimuth: 1	Height:141	Horz	Margin	[dB]:	-18.43	*	-	-	-	-
Vertical 1000 - 2500MHz										
1260.0321	62.16 pk	-34.7	25.4	52.86	54	55.6	-	-	-	-
Azimuth: 165	Height:182	Vert	Margin	[dB]:	-1.14	-2.74	-	-	-	-
1574.995	57.21 pk	-34.1	25.7	48.81	54	*	-	-	-	-
Azimuth: 249	Height:119	Vert	Margin	[dB]:	-5.19	*	-	-	-	-
1889.9349	45.05 pk	-33.6	27.2	38.65	54	55.6	-	-	-	-
Azimuth: 345	Height:198	Vert	Margin	[dB]:	-15.35	-16.95	-	-	-	-
2205.0251	52.22 pk	-33.2	28.1	47.12	54	*	-	-	-	-
Azimuth: 184	Height:134	Vert	Margin	[dB]:	-6.88	*	-	-	-	-

* Frequency located in a restricted band and only subject to 15.209 limits.
 LIMIT 1: FCC Part 15.209 / 15.231
 LIMIT 2: FCC Part 15.231

pk - Peak detector (maximized peak values)
 qp - Quasi-Peak detector

Job Number: 771356 File Number: MC3181 Page 33 of 36
 Model Number: OPB3
 Client Name: Chamberlain Group Inc.
 FCC ID: JLFOPB2

The Chamberlain Group, Inc.
 315 MHz
 3 Button Wireless Station
 Job:771356
 Tested By: GB

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]							
=====										
Vertical 2500 - 5000MHz										
2520.0441	41.39 pk	-32.8	28.8	37.39	54	55.6	-	-	-	-
Azimuth: 232	Height:127	Vert	Margin	[dB]:	-16.61	-18.21	-	-	-	-
2835.005	41.04 pk	-32.5	29.8	38.34	54	*	-	-	-	-
Azimuth: 6	Height:108	Vert	Margin	[dB]:	-15.66	*	-	-	-	-
4746.0301	31.45 pk	-30	33	34.45	54	*	-	-	-	-
Azimuth: 155	Height:195	Vert	Margin	[dB]:	-19.55	*	-	-	-	-

* Frequency located in a restricted band and only subject to 15.209 limits.
 LIMIT 1: FCC Part 15.209
 LIMIT 2: FCC Part 15.231

pk - Peak detector (maximized peak values)
 qp - Quasi-Peak detector

Job Number: 771356 File Number: MC3181 Page 34 of 36
Model Number: OPB3
Client Name: Chamberlain Group Inc.
FCC ID: JLFOPB2

4.5 Fundamental Frequency And Spurious Emissions Measurement Limit Calculations

4.5.1 Limit Calculation

Fundamental Frequency is $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$.
Limit = $41.6667(315\text{MHz}) - 7083.3333$
Limit = $20 \cdot \log(\text{mV/m})$
Limit = $20 \cdot \log(6041.6772)$
Limit = 75.6dBuV/m

4.5.2 Spurious Emissions Limit

20dB lower than Fundamental Limit
Limit = $75.6\text{dBuV/m} - 20\text{dB}$
Limit = 55.6dBuV/m

4.5.3 Radiated Emissions Limit conversion from mV/m to dBmV/m (accordance with paragraph 15.209)

Radiated Emissions Limit (dBmV/m) = $20 \cdot \log(\text{mV/m})$
Radiated Emissions Limit (dBmV/m) = $20 \cdot \log(90)$
Radiated Emissions Limit (dBmV/m) = 39.1

4.5.4 Radiated Emissions test data obtained during measurements.

Field Strength (dBmV/m) = Measured field strength (dBmV/m) + Antenna Factor (dB) + Cable Factor (dB)
Field Strength (dBmV/m) = $25.46\text{dBuV} + 22.8\text{dB/m} + 1.5\text{dB}$
Field Strength (dBmV/m) = 82.2dBuV/m

Appendix A

Accreditations and Authorizations



NVLAP Lab code: 100255-0

NVLAP: Recognized under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC EN17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1002550.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. 91040).



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 2181



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-797, (Conducted Emissions) C-832, C-833, C-834 and (Conducted Emissions - Telecommunications Ports) T-160.



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