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Job Number:	1001510344
Project Number:	12CA27273A
File Number:	MC15343
Date:	May 25, 2012
Model:	PPK3

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

Test Report Details

Tests Performed By:	**UL LLC** **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 25, 2012**
Product Type:	**Periodic Transmitter**
Product standards	**FCC Part 15, Subpart C, 15.231 & RSS-210**
Model Number:	**PPK3**
EUT Category:	**Wireless Device**
Testing Start Date:	**May 10, 2012**
Date Testing Complete:	**May 23, 2012**
Overall Results:	**Compliant**

UL LLC 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. UL LLC shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL LLC issued reports. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any 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

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 equipment under test is a multiple channel portable periodic transmitter operating at 310MHz, 315MHz and 390MHz.

1.2 Device Configuration During Test

1.2.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Periodic Transmitter	Chamberlain Group Inc.	PPK3	During testing this device was referenced to by sample number starting with SMP32304

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

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 Power Interface:

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

1.3 EUT Configurations

Mode #	Description
1	EUT with fresh batteries set to transmit.

1.4 EUT Operation Modes

Mode #	Description
1	EUT transmitting on 310MHz, 315MHz, and 390MHz.

1.5 Rational for EUT Configuration

Mode #	Description
1	The Fundamental frequencies were measured in various axis (X, Y, and Z) and worst case axis was established – Z Axis. All harmonics were measured based on the worst case axis found.

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL LLC 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 C, 15.231	Code of Federal Regulations, Part 15, Radio Frequency Devices	2010
RSS-210	License - exempt Radio Apparatus (All Frequency Bands): Category I Equipment	Issue 8

2.4 Results Summary

This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*
Line Conducted Emissions	N/A – EUT is battery operated only
Occupied Bandwidth	Compliant
Cease Operation	Compliant
Pulse Train and Duty Cycle	Compliant
Fundamental Frequency & Spurious Radiated Emissions	Compliant

Test Engineer:

Bartlomiej Mucha (Ext.41216)
Staff Engineer
International EMC Services
Conformity Assessment Services

Reviewer:

Michael Ferrer(Ext.41312)
Senior Project Engineer
International EMC Services
Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (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:

FCC	47 CFR Part 15 – Intentional Radiators
IC	RSS-210 and RSS-Gen License - exempt Radio Apparatus

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

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

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	47 CFR Part 15.231(c)
Occupied Bandwidth Limits	
0.25% of Center Frequency (310MHz: 775.0kHz, 315MHz: 787.5kHz, 390MHz: 975.0kHz)	

Table 1 Occupied Bandwidth Configuration Settings

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

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth	Occupied Bandwidth Requirements	
	dBc	% PWR
10kHz	-20	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	49.2	99.6
315MHz	50.8	89.6
390MHz	45.2	131.2

Table 4 Occupied Bandwidth Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 28 2011	Dec 31 2012
Generic Near Field Loop Antenna	-	-	-	-	-

Figure 1 – 20dB Bandwidth Graph for 310MHz

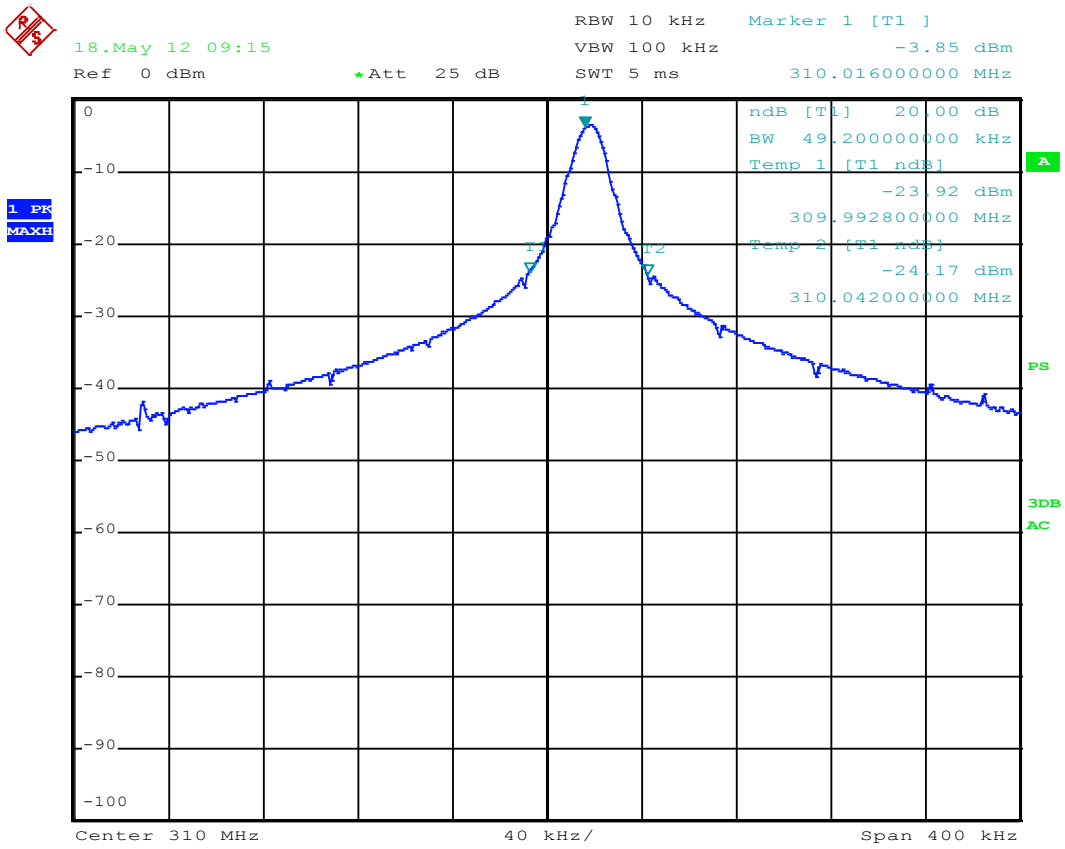


Figure 2 – 20dB Bandwidth Graph for 315MHz

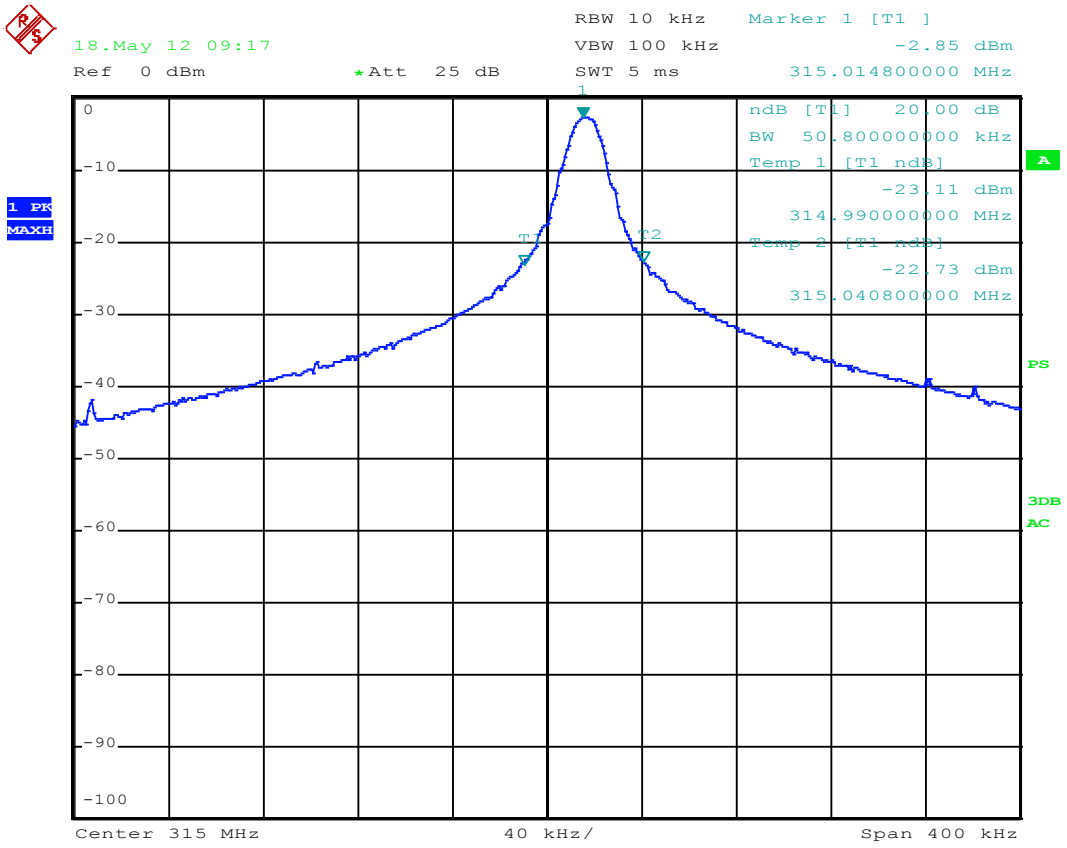


Figure 3 – 20dB Bandwidth Graph for 390MHz

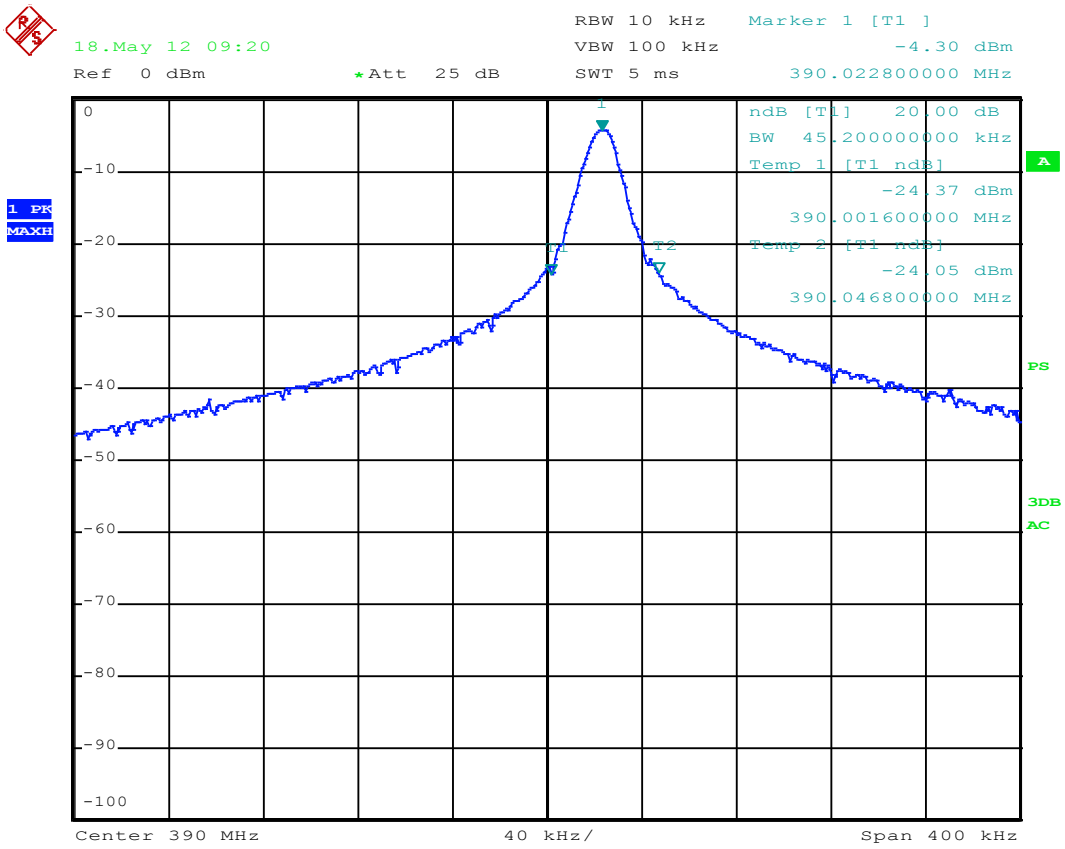


Figure 4 – 99% Bandwidth Graph for 310MHz

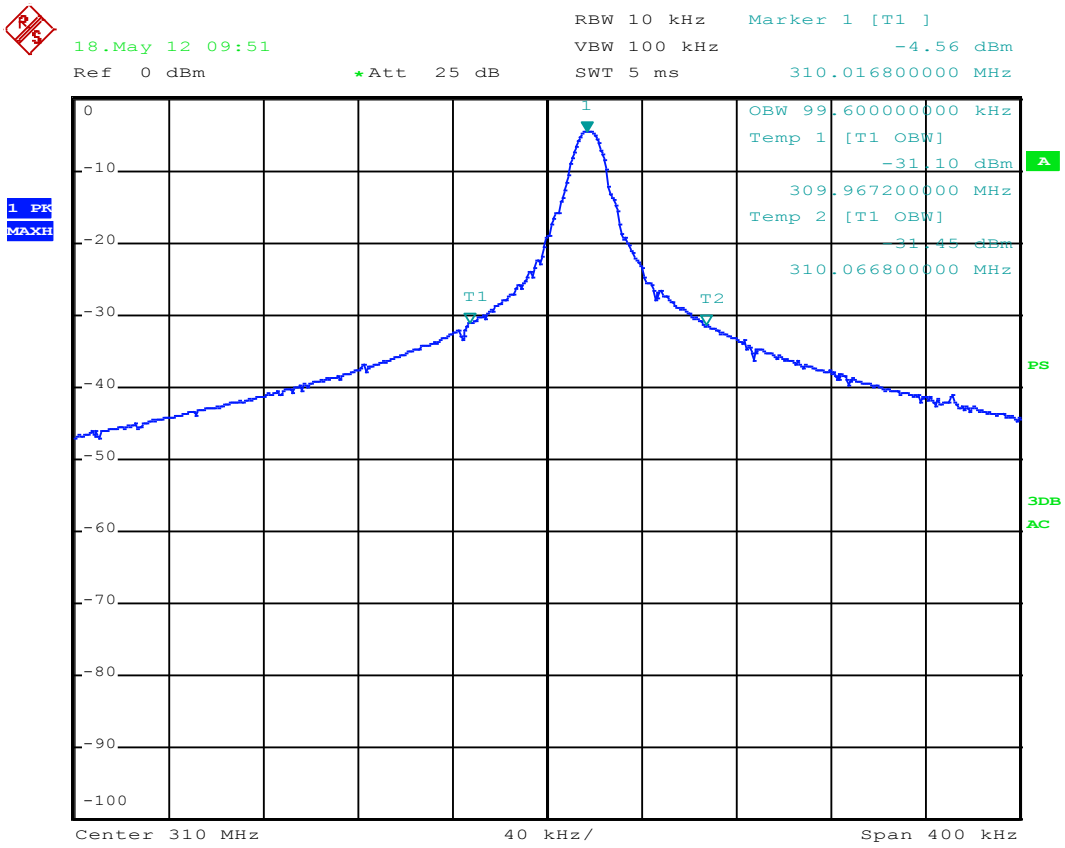


Figure 5 – 99% Bandwidth Graph for 315MHz

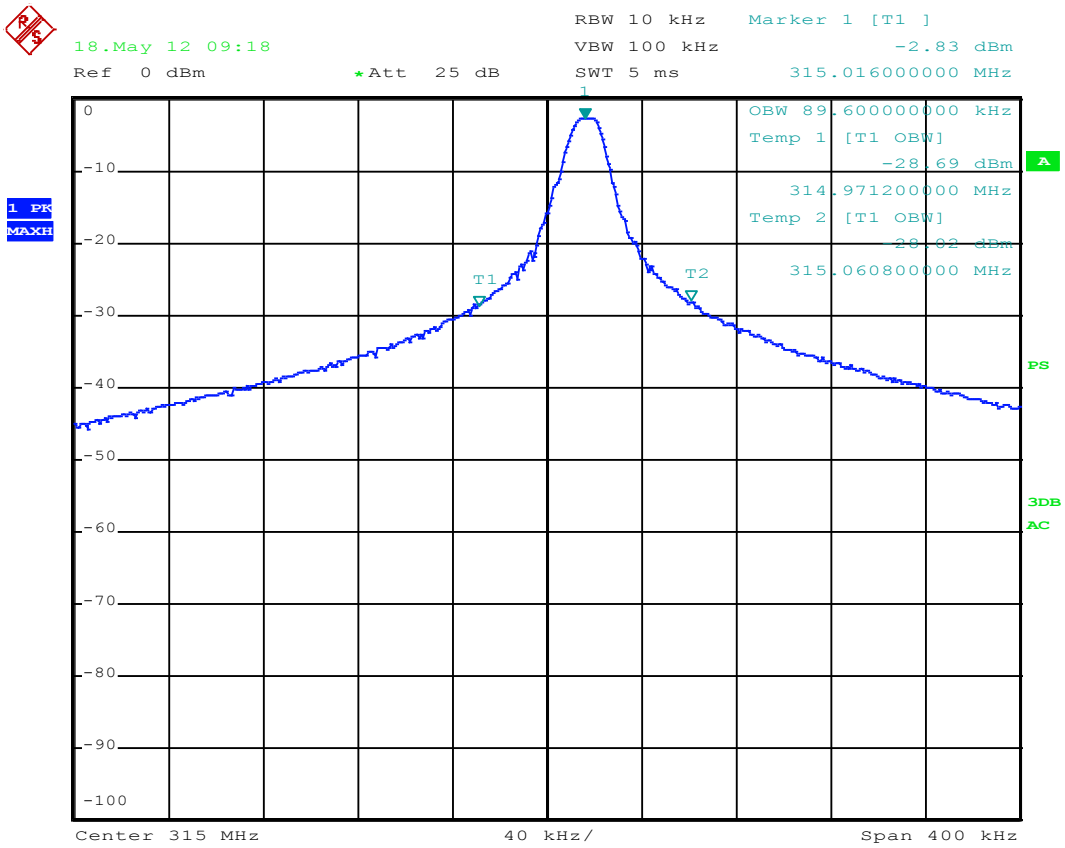
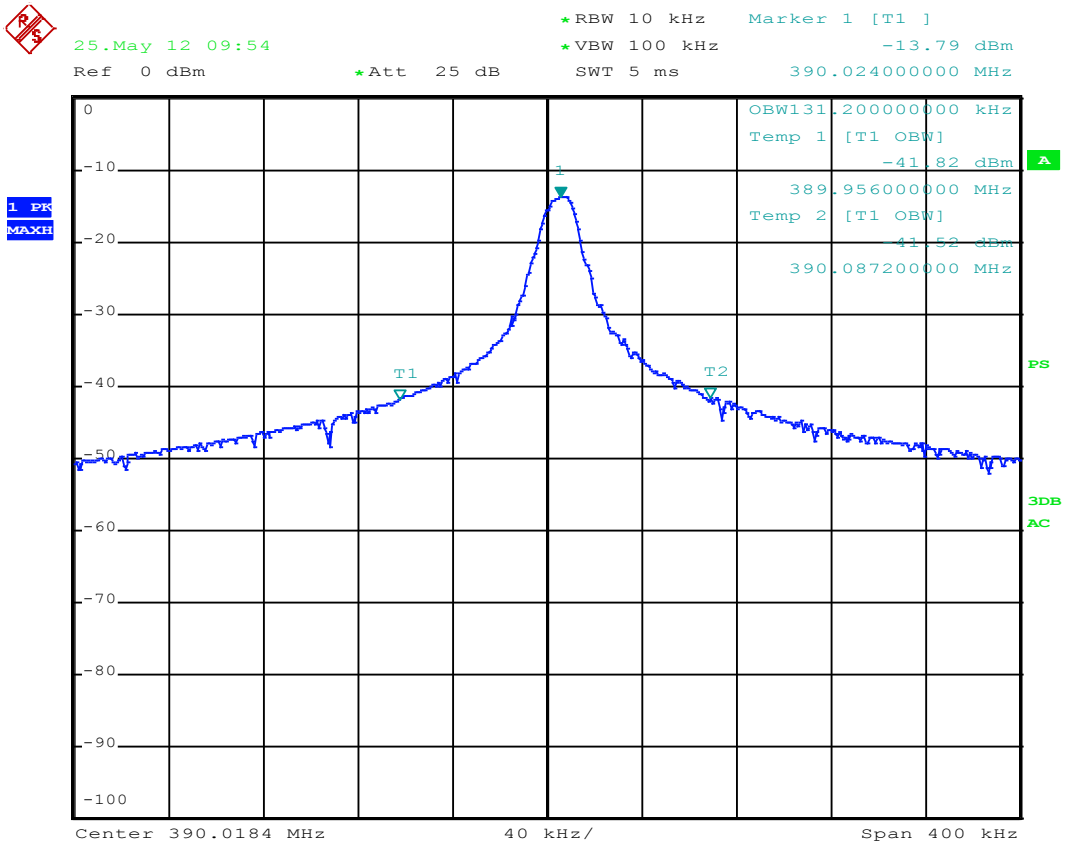


Figure 6 – 99% Bandwidth Graph for 390MHz



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	47 CFR Part 15.231(a)
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 #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 6 Cease Operation Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 28 2011	Dec 31 2012
Generic Near Filed Loop Antenna	-	-	-	-	-

Figure 7 Cease Operation Graph for 310MHz

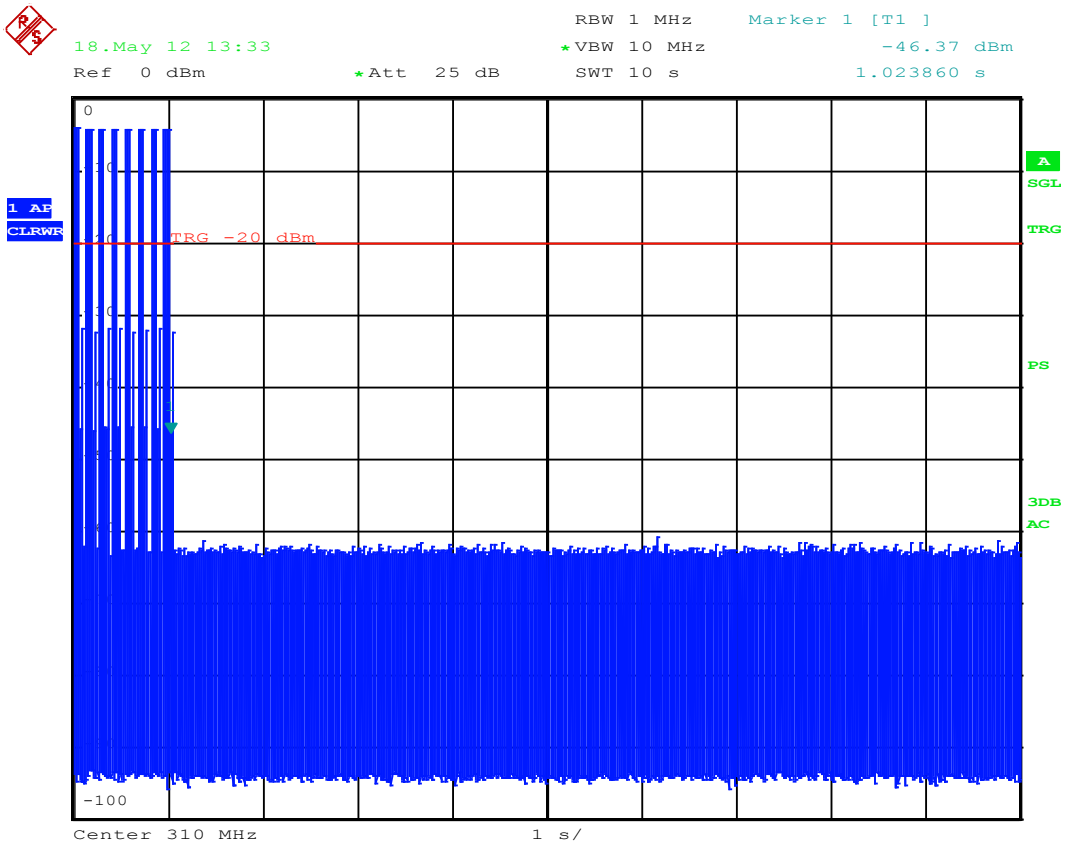


Figure 8 Cease Operation Graph for 315MHz

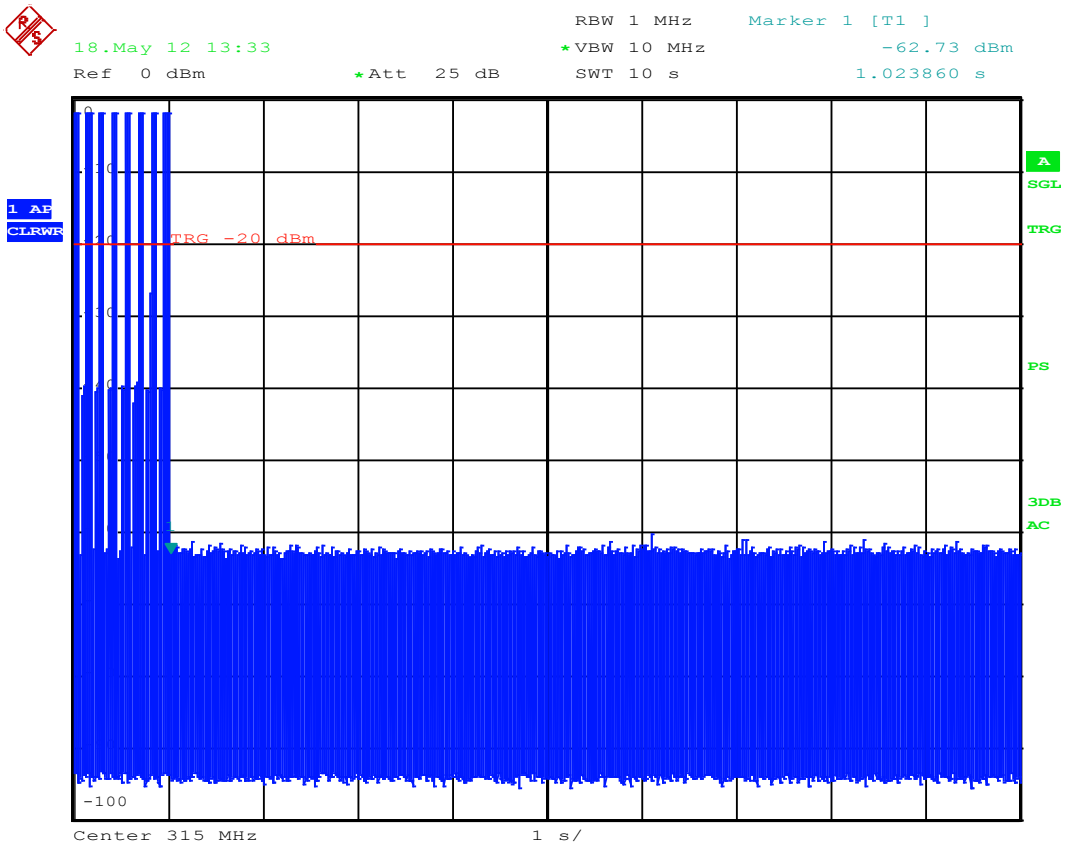
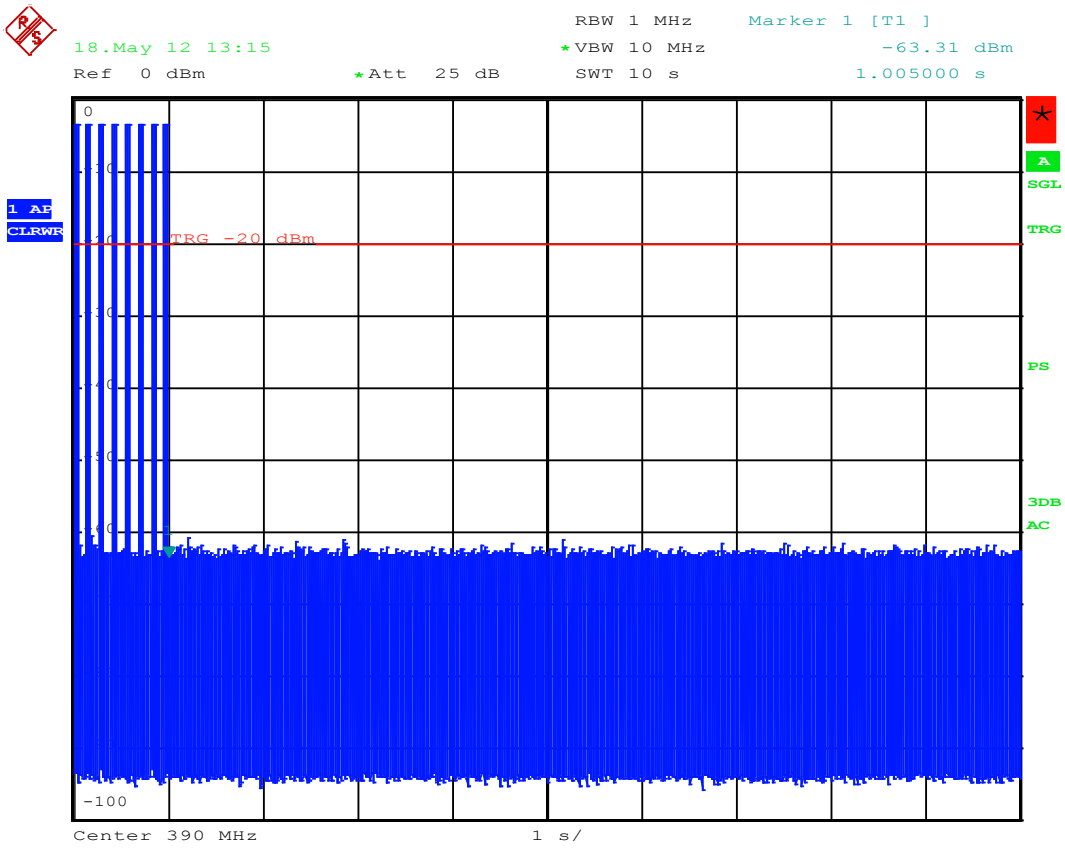


Figure 9 Cease Operation Graph for 390MHz



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 #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 8 Pulse Train Calculation

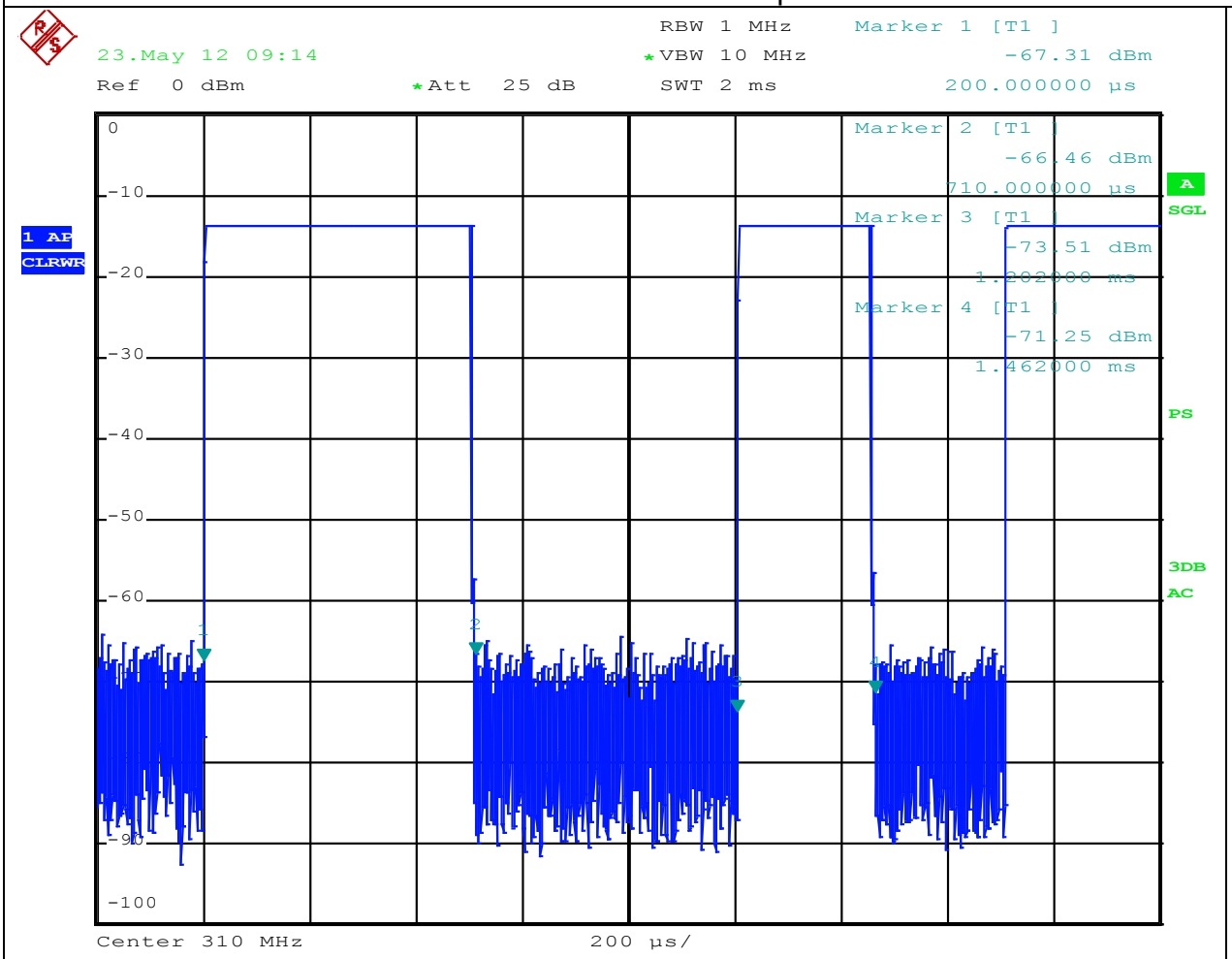
TX Frequency	Total TX time	Total Transmission time or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
310MHz	(53x0.260mS)+(17x0.510mS)	100ms	-12.98
315MHz	(66x0.260mS)+(8*0.510mS)	100ms	-13.45
390MHz	(51x0.260mS)+(18*0.510mS)	100ms	-12.98
Worst Case Duty Cycle: -12.98dB			

Table 9 Pulse Train Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 28 2011	Dec 31 2012
Generic Loop Near Field Antenna	-	-	-	-	-

Figure 10 Pulse Train Graphs for 310MHz

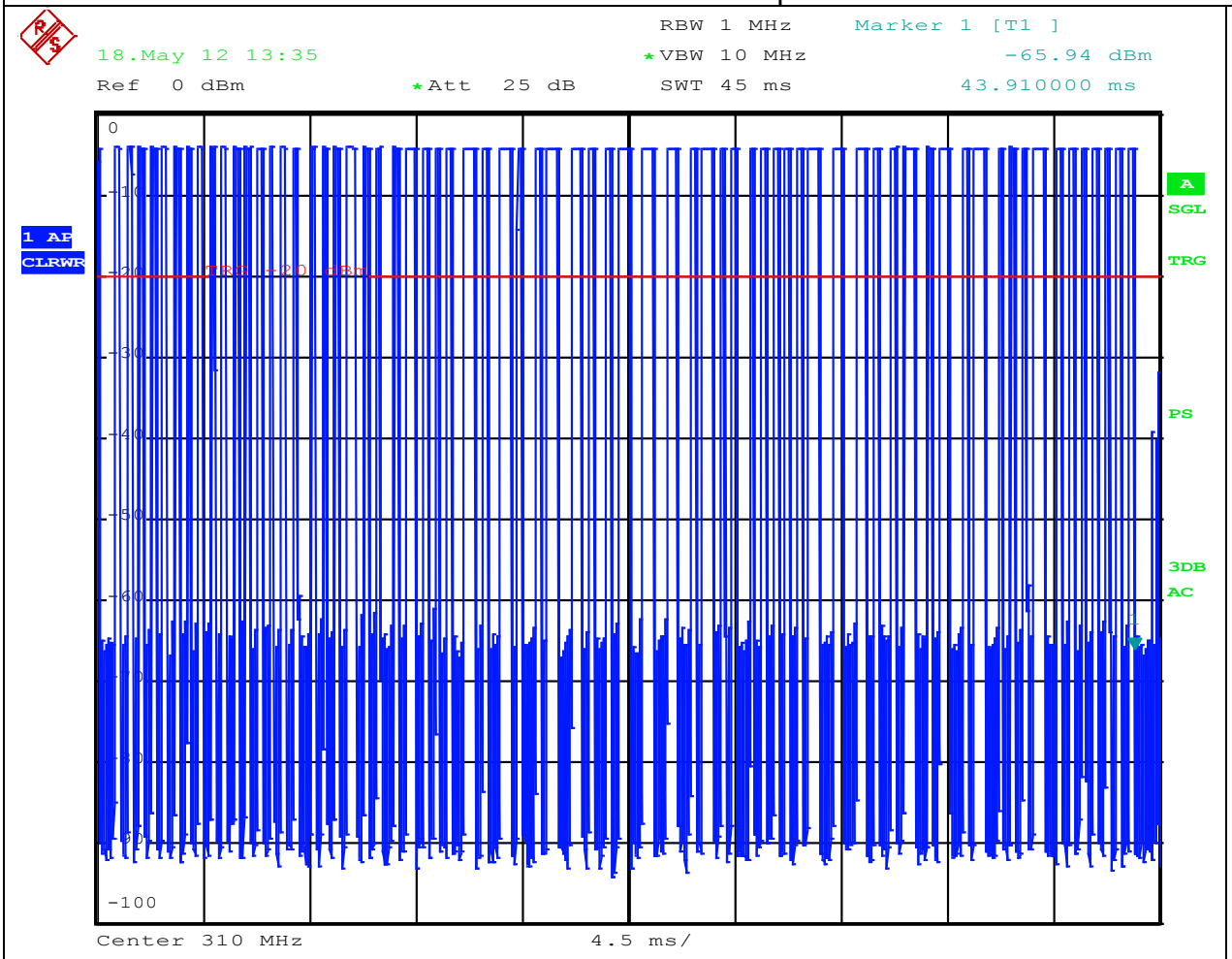
310MHz Pulse Capture



Short Pulse: 0.260mS, Long Pulse: 0.510mS

Pulse Duration mS

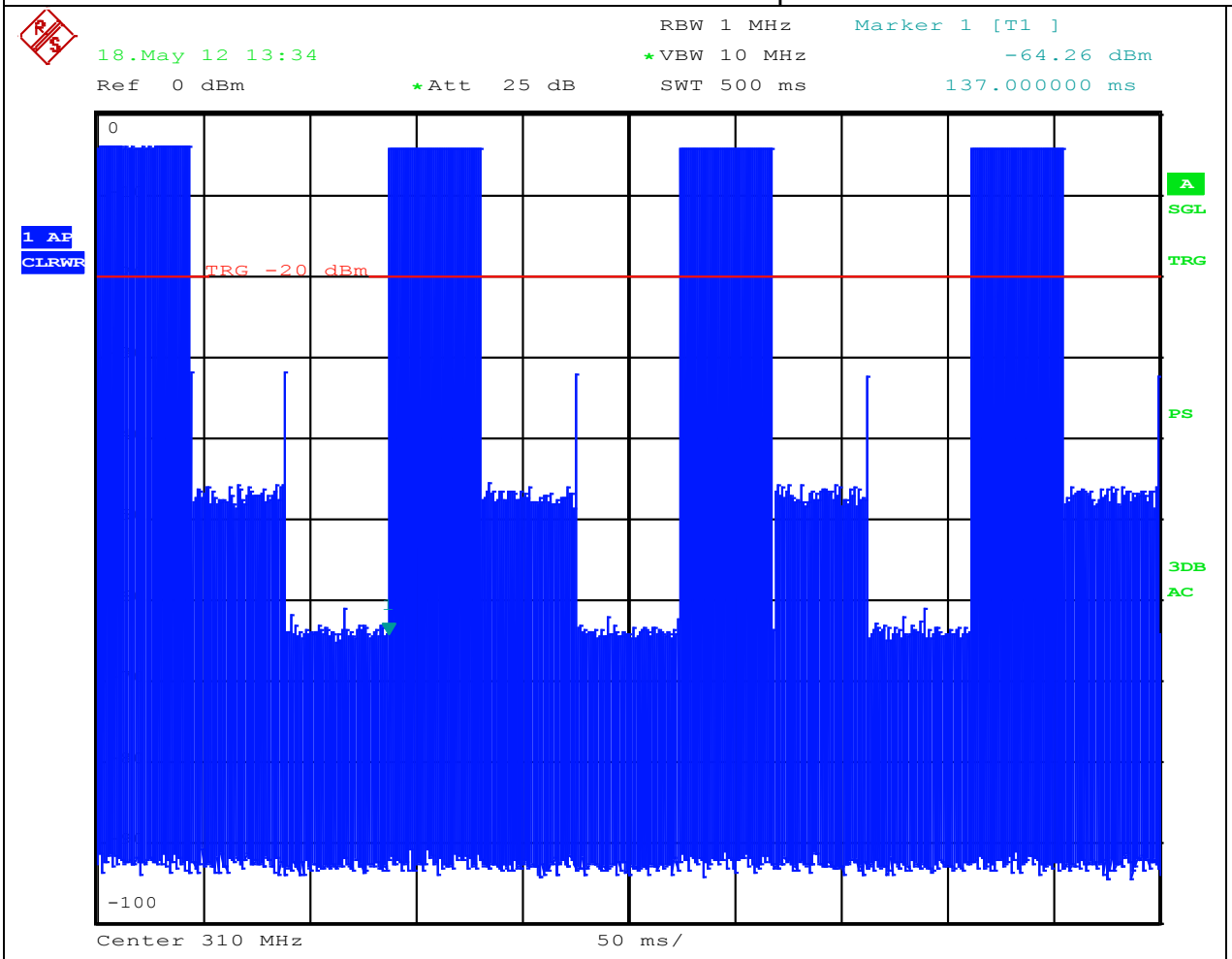
310MHz Pulse Capture



Number of Pulses

# of Short Pulses: 53, # of Long Pulses: 17

310MHz Pulse Capture

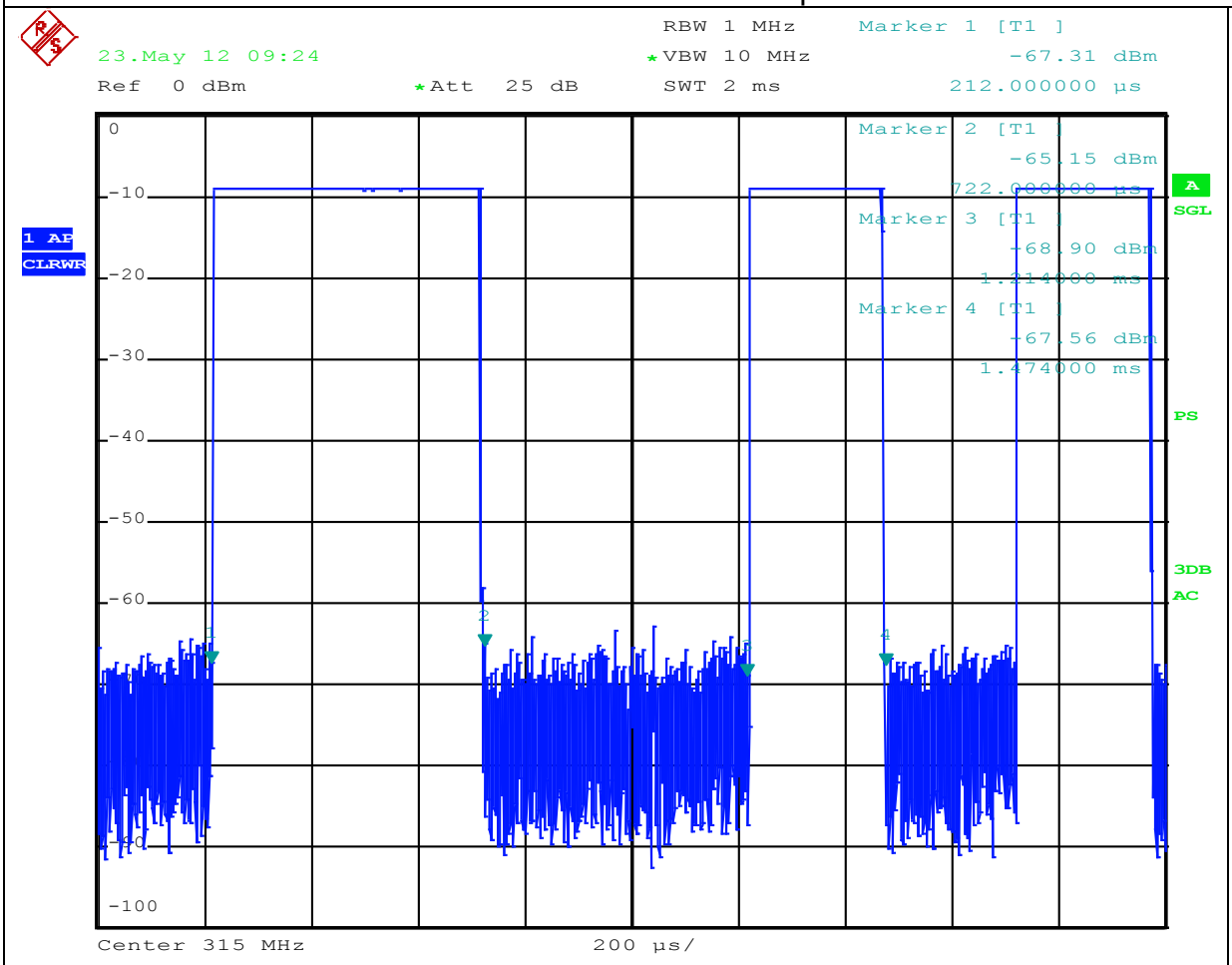


Period

Period:137mS, use 100mS for DC calculation

Figure 11 Pulse Train Graphs for 315MHz

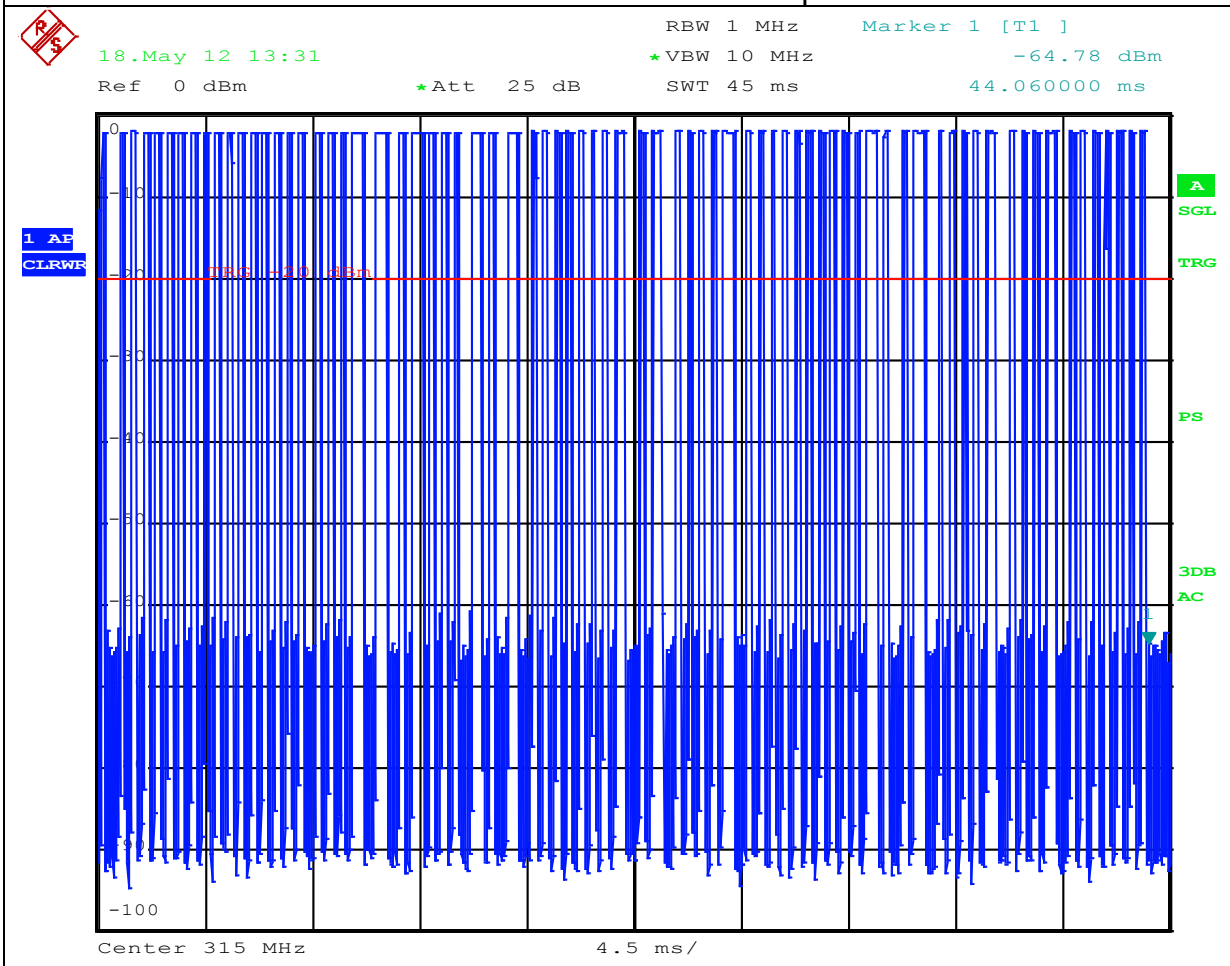
315MHz Pulse Capture



Pulse Duration mS

Short Pulse: 0.260mS, Long Pulse: 0.510mS

315MHz Pulse Capture



# of Short Pulses: 66 , # of Long Pulses: 8

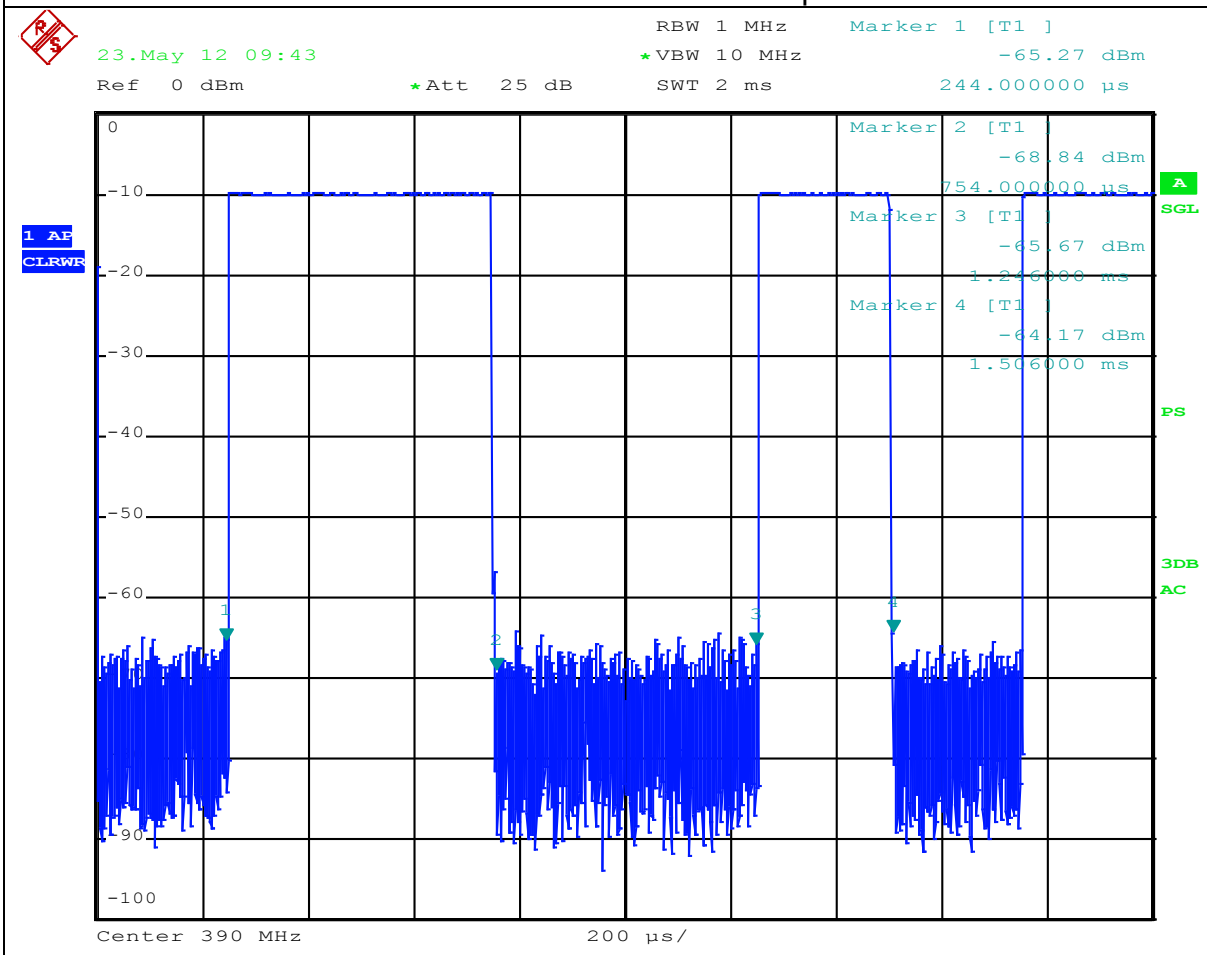
Number of Pulses

Period is the same as for 310MHz, (use 100mS for DC calculation)

Period

Figure 12 Pulse Train Graphs for 390MHz

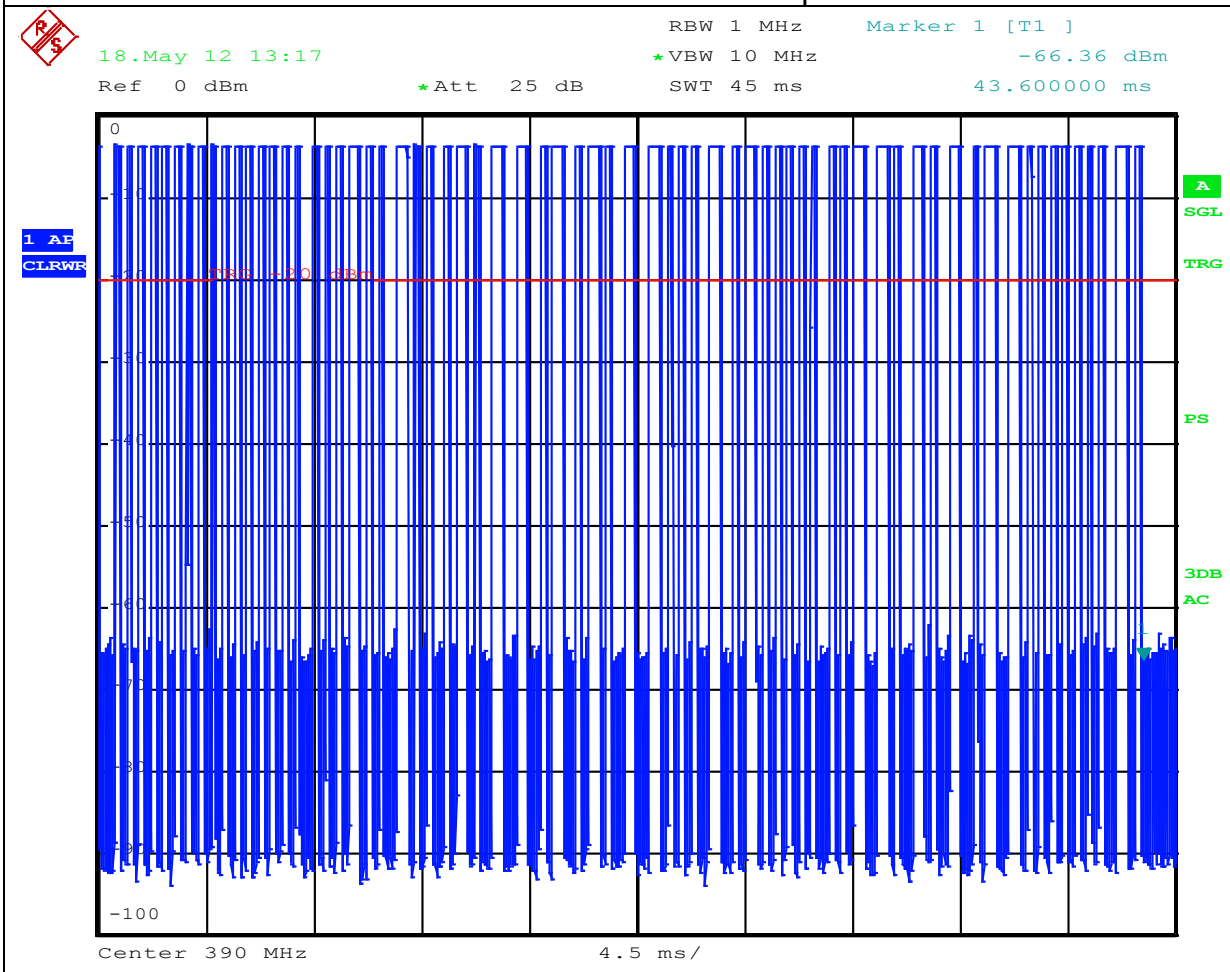
390MHz Pulse Capture



Pulse Duration mS

Short Pulse: 0.260mS, Long Pulse: 0.510mS

390MHz Pulse Capture



# of Short Pulses: 51, # of Long Pulses: 18

Number of Pulses

Period is the same as for 310MHz, (use 100mS for DC calculation)

Period

4.4 Test Conditions and Results – RADIATED EMISSIONS Fundamental and Spurious

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4:2003. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 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	47 CFR Part 15 subpart C, and RSS-210		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	3 meter distance	
	1GHz – 4GHz	3 meter distance	

Restricted Band Limits

Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Peak
30 - 88	40.00	NA
88 - 216	43.52	NA
216 - 960	46.02	NA
960 - 1000	54	NA
Above 1000 (FCC)	NA	*54 (at 3-meter)

Fundamental Frequency Limits and Non-restricted band Harmonic Limits

Frequency (MHz)	Limit (dBµV/m) @ 3m distance	
	Average - Fundamental	Peak - Fundamental
310	75.32	95.32
315	75.62	95.62
390	79.24	99.24

Supplementary information: *See section 4.3 for duty cycle information.

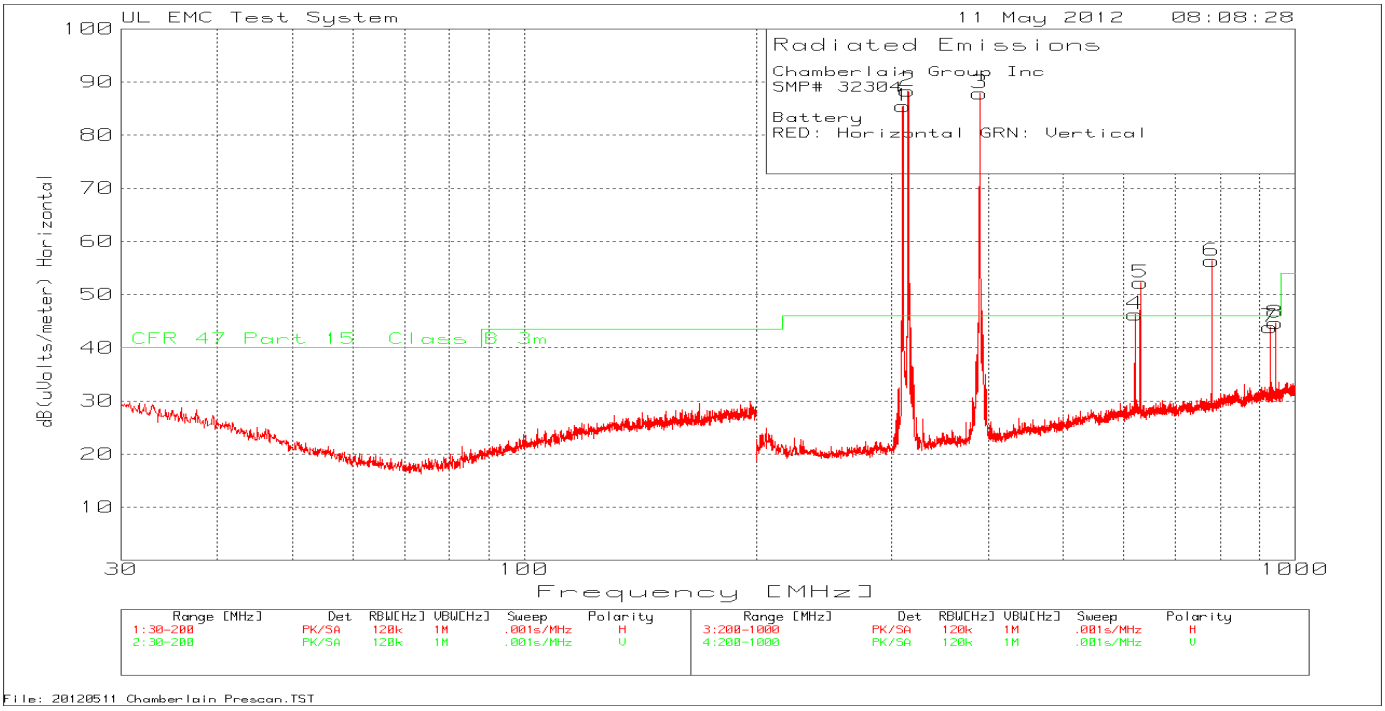
Table 10 Radiated Emissions EUT Configuration Settings

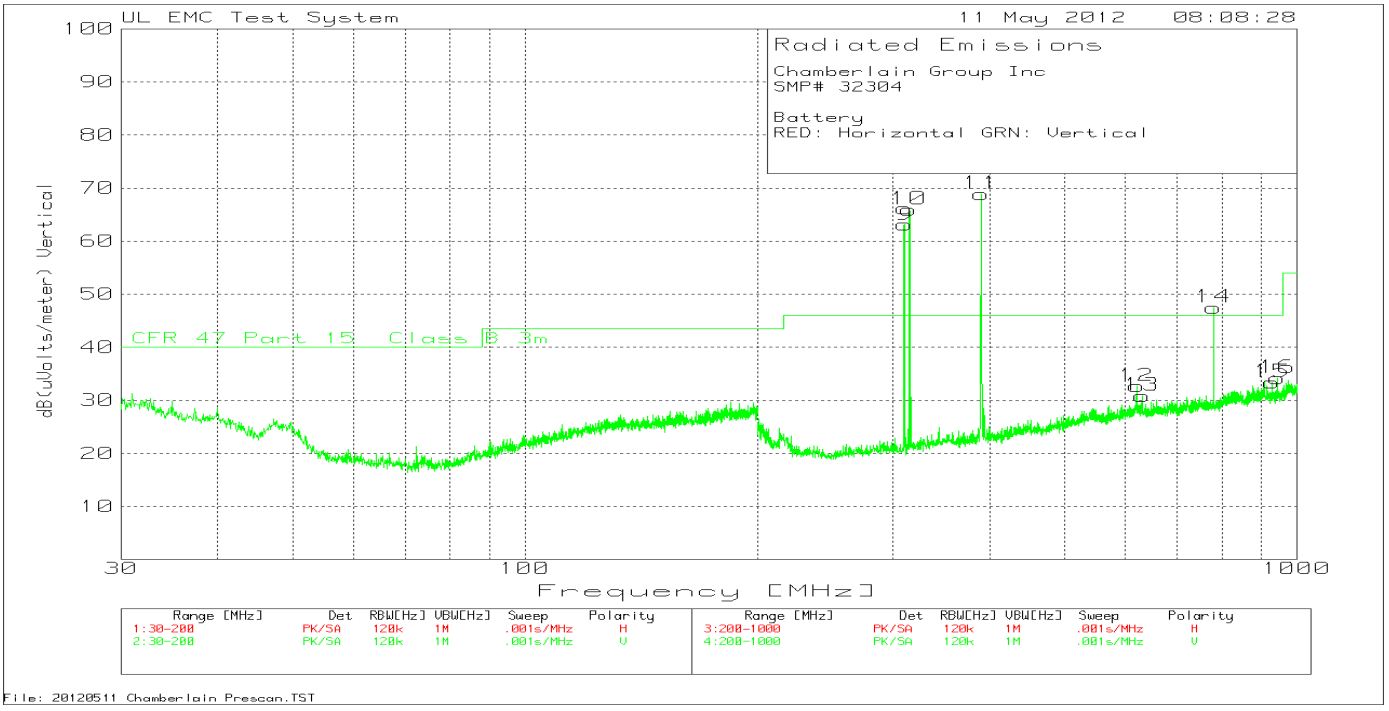
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 11 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20111228	20121231
Bicon Antenna	Chase	VBA6106A	EMC4078	20120117	20130131
Log-P Antenna	Chase	UPA6109	EMC4313	20110929	20120629
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20111227	20121231
Antenna Array	UL	BOMS	EMC4276	20111227	20121231

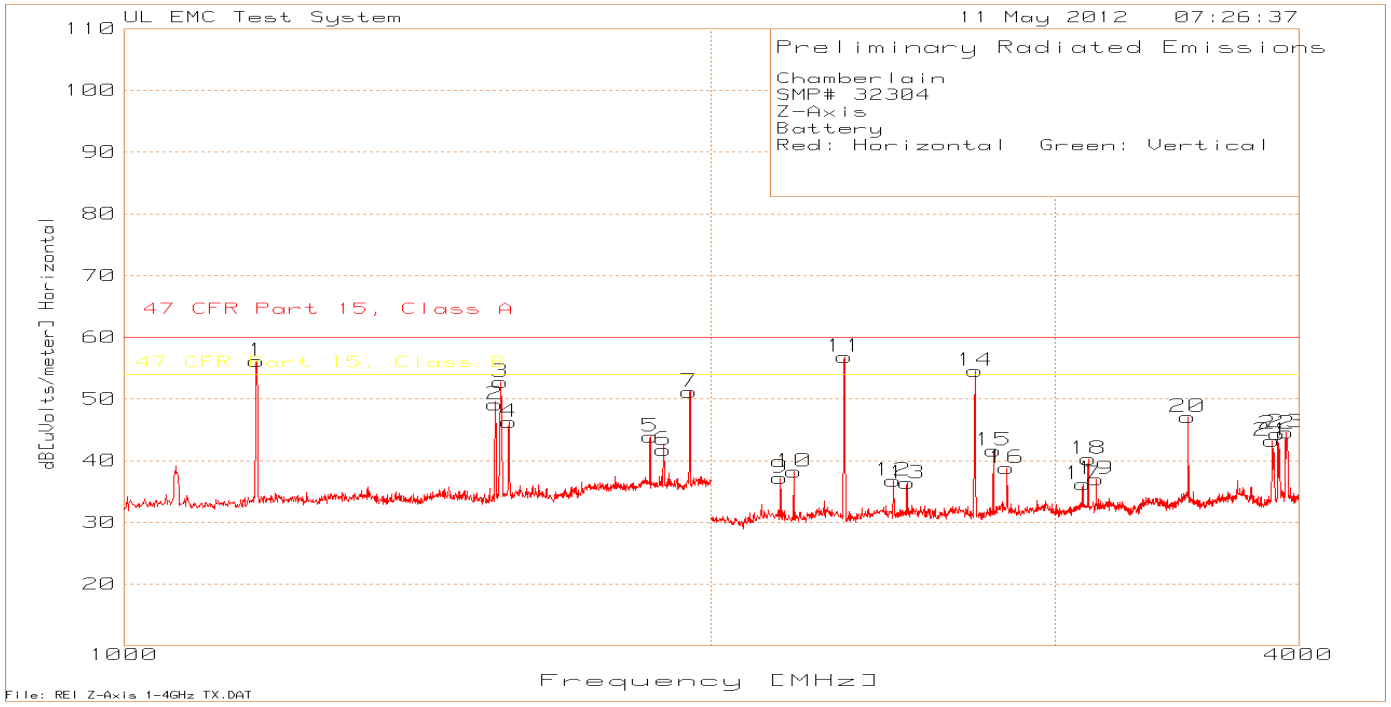
Figure 13 Radiated Emissions Graph (Below 1GHz) for 310MHz, 315MHz, and 390MHz

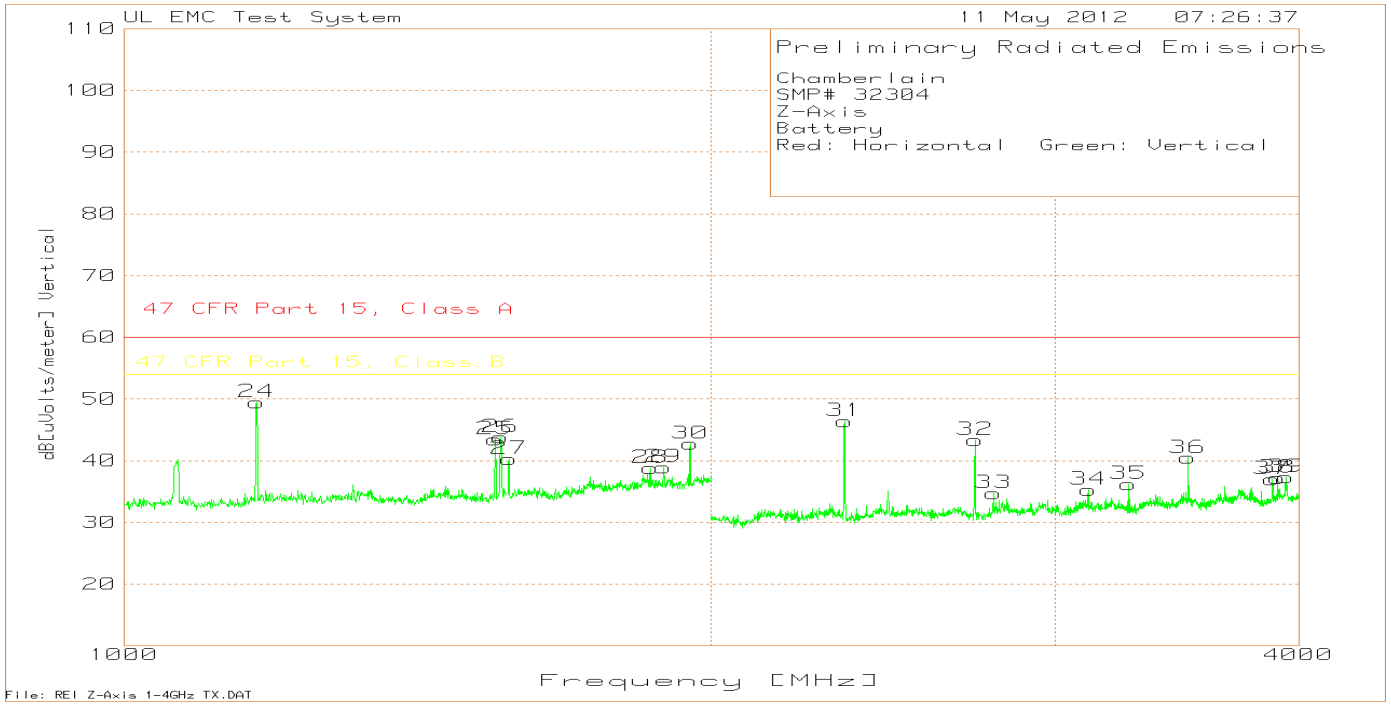




* Plots are included for visual reference only.

Figure 14 Radiated Emissions Graph (Above 1GHz) for 310MHz, 315MHz, and 390MHz





* Plots are included for visual reference only.

Table 12- Maximized Worst Case Radiated Emissions Data Points

Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Loss/Gain dB	Attenuator dB	Level dBuV/m	Duty Cycle Factor dB	Level with Duty Cycle dBuV/m	Limit dBuV/m	Margin	Azimuth [Degs]	Height [cm]	Polarity
310.0208	58.51	QP	13.7	2.1	10	84.31	-12.98	71.33	75.32	-3.99	46	103	Horz
310.0208	58.94	PK	13.7	2.1	10	84.74	-12.98	71.76	75.32	-3.56	46	103	Horz
310.0208	35.79	QP	13.7	2.1	10	61.59	-12.98	48.61	75.32	-26.71	158	311	Vert
310.0208	36.37	PK	13.7	2.1	10	62.17	-12.98	49.19	75.32	-26.13	158	311	Vert
315.01919	61.66	QP	14	2.1	10	87.76	-12.98	74.78	75.62	-0.84	133	104	Horz
315.01919	62.1	PK	14	2.1	10	88.2	-12.98	75.22	75.62	-0.4	133	104	Horz
315.0184	38.23	QP	14	2.1	10	64.33	-12.98	51.35	75.62	-24.27	147	318	Vert
315.0184	38.77	PK	14	2.1	10	64.87	-12.98	51.89	75.62	-23.73	147	318	Vert
390.0192	58.05	QP	16	2.3	10	86.35	-12.98	73.37	79.24	-5.87	22	103	Horz
390.0192	58.52	PK	16	2.3	10	86.82	-12.98	73.84	79.24	-5.4	22	103	Horz
390.01998	36.87	QP	16	2.3	10	65.17	-12.98	52.19	79.24	-27.05	175	111	Vert
390.01998	37.4	PK	16	2.3	10	65.7	-12.98	52.72	79.24	-26.52	175	111	Vert
620.03788	1.87	QP	20.2	3	10.1	35.17	-12.98	22.19	55.32	-33.13	203	130	Horz
620.03788	7.65	PK	20.2	3	10.1	40.95	-12.98	27.97	55.32	-27.35	203	130	Horz
620.03788	1.44	QP	20.2	3	10.1	34.74	-12.98	21.76	55.32	-33.56	231	102	Vert
620.03788	7.44	PK	20.2	3	10.1	40.74	-12.98	27.76	55.32	-27.56	231	102	Vert
629.9991	0.91	QP	20.4	3	10.1	34.41	-12.98	21.43	55.62	-34.19	354	140	Horz
629.9991	6.72	PK	20.4	3	10.1	40.22	-12.98	27.24	55.62	-28.38	354	140	Horz
629.9991	0.15	QP	20.4	3	10.1	33.65	-12.98	20.67	55.62	-34.95	181	107	Vert
629.9991	5.99	PK	20.4	3	10.1	39.49	-12.98	26.51	55.62	-29.11	181	107	Vert
780.052	22.67	QP	21.9	3.4	10.1	58.07	-12.98	45.09	59.24	-14.15	333	109	Horz
780.052	23.82	PK	21.9	3.4	10.1	59.22	-12.98	46.24	59.24	-13	333	109	Horz
780.052	13.45	QP	21.9	3.4	10.1	48.85	-12.98	35.87	59.24	-23.37	40	196	Vert
780.052	15.77	PK	21.9	3.4	10.1	51.17	-12.98	38.19	59.24	-21.05	40	196	Vert
930.05179	6.86	QP	23.4	3.8	10.1	44.16	-12.98	31.18	55.32	-24.14	81	154	Horz
930.05179	11.11	PK	23.4	3.8	10.1	48.41	-12.98	35.43	55.32	-19.89	81	154	Horz
930.05179	0.87	QP	23.4	3.8	10.1	38.17	-12.98	25.19	55.32	-30.13	162	120	Vert
930.05179	6.71	PK	23.4	3.8	10.1	44.01	-12.98	31.03	55.32	-24.29	162	120	Vert
945.05711	6.66	QP	23.5	3.8	10.1	44.06	-12.98	31.08	55.62	-24.54	115	153	Horz
945.05711	10.24	PK	23.5	3.8	10.1	47.64	-12.98	34.66	55.62	-20.96	115	153	Horz
945.05711	0.55	QP	23.5	3.8	10.1	37.95	-12.98	24.97	55.62	-30.65	180	142	Vert
945.05711	6.95	PK	23.5	3.8	10.1	44.35	-12.98	31.37	55.62	-24.25	180	142	Vert
1170.0511	91.41	PK	24.8	-57.24	0	58.97	-12.98	45.99	54	-8.01	95	133	Horz
1550.0631	81.92	PK	25.2	-56.02	0	51.1	-12.98	38.12	54	-15.88	81	103	Horz
1559.997	85.1	PK	25.2	-55.67	0	54.63	-12.98	41.65	54	-12.35	71	103	Horz
1950.1052	79.77	PK	27.4	-54.39	0	52.78	-12.98	39.8	54	-14.2	186	114	Horz
1170.0511	85.89	PK	24.8	-57.24	0	53.45	-12.98	40.47	54	-13.53	175	174	Vert
2340.1232	89.78	PK	21.7	-52.86	0	58.62	-12.98	45.64	54	-8.36	157	100	Horz
2729.9248	86.76	PK	22.1	-52.28	0	56.58	-12.98	43.6	54	-10.4	343	100	Horz

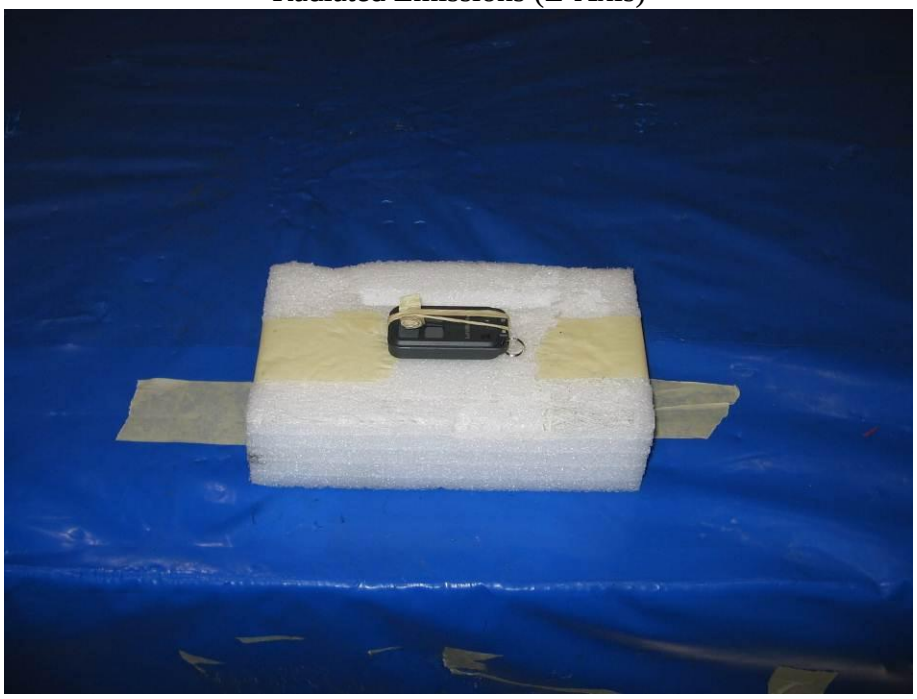
Table 13- Above 1GHz Marker peak data (all points with less than 6dB margin were maximized above).

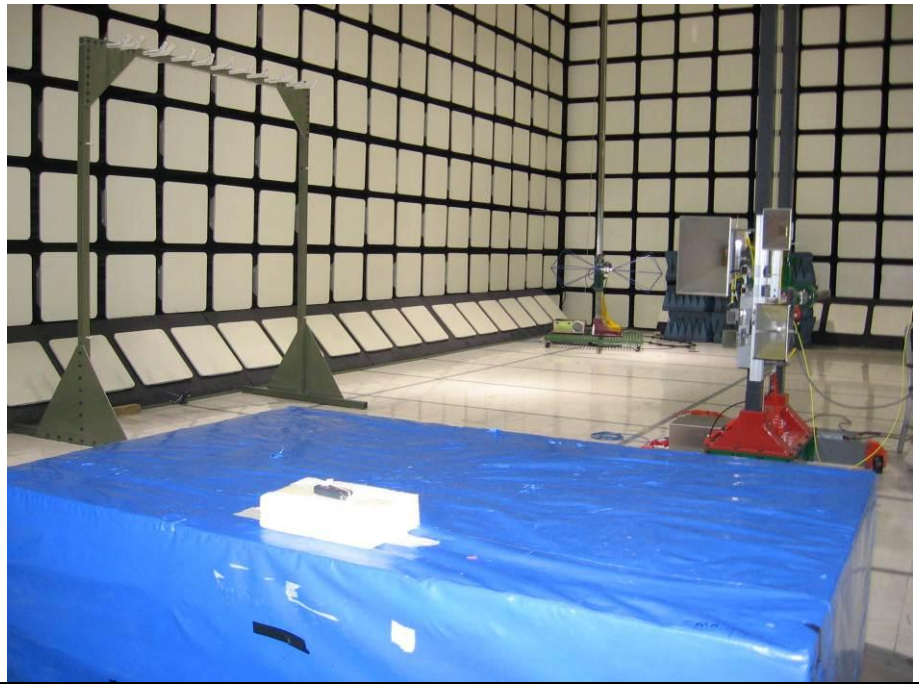
Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Loss/Gain dB	Level dBuV/m	Duty Cycle Factor dB	Level with Duty Cycle dBuV/m	Limit dBuV/m	Margin	Height [cm]	Polarity
1170.17	88.63	PK	24.8	-57.23	56.2	-12.98	43.22	54	-10.78	150	Horz
1549.55	79.9	PK	25.2	-56.02	49.08	-12.98	36.1	54	-17.9	99	Horz
1560.561	83.21	PK	25.2	-55.64	52.77	-12.98	39.79	54	-14.21	99	Horz
1575.576	76.3	PK	25.3	-55.28	46.32	-12.98	33.34	54	-20.66	99	Horz
1860.861	71.15	PK	27.2	-54.44	43.91	-12.98	30.93	54	-23.07	150	Horz
1889.89	68.64	PK	27.4	-54.3	41.74	-12.98	28.76	54	-25.24	150	Horz
1949.95	78.11	PK	27.4	-54.39	51.12	-12.98	38.14	54	-15.86	150	Horz
2169.446	68.05	PK	21.7	-52.53	37.22	-12.98	24.24	54	-29.76	99	Horz
2204.136	69.73	PK	21.8	-53.23	38.3	-12.98	25.32	54	-28.68	99	Horz
2340.227	87.99	PK	21.7	-52.86	56.83	-12.98	43.85	54	-10.15	99	Horz
2480.32	67.07	PK	22	-52.25	36.82	-12.98	23.84	54	-30.16	99	Horz
2520.347	66.62	PK	22.1	-52.34	36.38	-12.98	23.4	54	-30.6	99	Horz
2729.82	84.78	PK	22.1	-52.27	54.61	-12.98	41.63	54	-12.37	99	Horz
2789.86	71.08	PK	22.2	-51.64	41.64	-12.98	28.66	54	-25.34	99	Horz
2835.223	67.67	PK	22.3	-51.13	38.84	-12.98	25.86	54	-28.14	99	Horz
3100.734	64.44	PK	22.6	-50.84	36.2	-12.98	23.22	54	-30.78	99	Horz
3120.747	68.85	PK	22.7	-51.24	40.31	-12.98	27.33	54	-26.67	99	Horz
3150.1	66.02	PK	22.9	-51.9	37.02	-12.98	24.04	54	-29.96	99	Horz
3510.34	74.29	PK	23.5	-50.73	47.06	-12.98	34.08	54	-19.92	99	Horz
3875.917	71.41	PK	23.9	-52.03	43.28	-12.98	30.3	54	-23.7	99	Horz
3901.268	72.7	PK	23.8	-52.14	44.36	-12.98	31.38	54	-22.62	99	Horz
3938.626	72.65	PK	24	-52.03	44.62	-12.98	31.64	54	-22.36	99	Horz
1170.17	81.92	PK	24.8	-57.23	49.49	-12.98	36.51	54	-17.49	100	Vert
1549.55	74.28	PK	25.2	-56.02	43.46	-12.98	30.48	54	-23.52	100	Vert
1560.561	74.27	PK	25.2	-55.64	43.83	-12.98	30.85	54	-23.15	100	Vert
1575.576	70.28	PK	25.3	-55.28	40.3	-12.98	27.32	54	-26.68	100	Vert
1860.861	66.1	PK	27.2	-54.44	38.86	-12.98	25.88	54	-28.12	100	Vert
1890.891	65.81	PK	27.4	-54.33	38.88	-12.98	25.9	54	-28.1	100	Vert
1950.951	69.72	PK	27.4	-54.39	42.73	-12.98	29.75	54	-24.25	100	Vert
2340.227	77.53	PK	21.7	-52.86	46.37	-12.98	33.39	54	-20.61	150	Vert
2729.82	73.55	PK	22.1	-52.27	43.38	-12.98	30.4	54	-23.6	150	Vert
2789.86	64.22	PK	22.2	-51.64	34.78	-12.98	21.8	54	-32.2	150	Vert
3120.747	63.8	PK	22.7	-51.24	35.26	-12.98	22.28	54	-31.72	150	Vert
3274.183	65.34	PK	22.8	-51.95	36.19	-12.98	23.21	54	-30.79	150	Vert
3510.34	67.69	PK	23.5	-50.73	40.46	-12.98	27.48	54	-26.52	150	Vert
3875.917	65.14	PK	23.9	-52.03	37.01	-12.98	24.03	54	-29.97	101	Vert
3901.268	65.56	PK	23.8	-52.14	37.22	-12.98	24.24	54	-29.76	101	Vert
3938.626	65.4	PK	24	-52.03	37.37	-12.98	24.39	54	-29.61	150	Vert

Appendix A

Test Setup Photos

Radiated Emissions (Z-Axis)





Near Field Measurements

Appendix B

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/standards/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 2004/108/EC, Annex III (2-3). 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