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Project #:	SR9617354
Order Number:	10004850
File Number:	MC15343
Date:	March 15, 2013
Model:	1D7965

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

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Test Report Details

Tests Performed By: **UL LLC**
 333 Pfingsten Rd.
 Northbrook, IL 60062

Tests Performed For: **Chamberlain Group Inc.**
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Applicant Contact: **Hank Sieradzki**
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Test Report Date: **March 15, 2013**

Product Type: **Universal Periodic Transmitter (Bling)**

Product standards **FCC Part 15, Subpart C, 15.231 & RSS-210**

Model Number: **1D7965**

EUT Category: **Wireless Device**

Testing Start Date: **March 03, 2013**

Date Testing Complete: **March 05, 2013**

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.

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
none			

1.0 GENERAL - Product Description

1.1 Equipment Description

The equipment under test is a universal 1D7965 (Mini) portable push button transmitter used with various brand garage door operators. The transmitter uses 310MHz, 315MHz, and 390MHz. It is user programmable for use with specific garage door operators.

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.	1D7965	The model number 1D7965 is a part number.

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	-	1 x CR2032 Battery

1.3 EUT Configurations

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

1.4 EUT Operation Modes

Mode #	Description
1	EUT transmitting per specific configuration below with specific X, Y, Z orientation.

1.5 Rational for EUT Configuration

Mode #	Description												
1	<p>Below is a list of possible configurations. Configurations that were not tested (configuration 1) had same power amplifier setting, same frequency and same duty cycle number as the ones above.</p> <p>Worst case was determined by first setting the device to configuration 2. The fundamental frequencies were measured with the EUT in X-Axis, Y-Axis and Z-Axis and with the receiving antenna set to horizontal and vertical polarization. It was assumed that the worst case axis will remain unchanged for all other configurations.</p> <p>The worst case configurations are as follow: For 310MHz and 315MHz it was found that the X-Axis. For 390MHz it was found that the Y-Axis. See Appendix B for test setup photos and axis information.</p> <table border="1"> <thead> <tr> <th>Configuration #</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>1*</td> <td>310MHz, 315MHz, 390MHz (E-Code)</td> </tr> <tr> <td>2</td> <td>310MHz, 315MHz, 390MHz (F-Code)</td> </tr> <tr> <td>3</td> <td>315MHz (D-Code)</td> </tr> <tr> <td>4</td> <td>390MHz (D-Code)</td> </tr> <tr> <td>5</td> <td>390MHz (A-Code)</td> </tr> </tbody> </table>	Configuration #	Frequency	1*	310MHz, 315MHz, 390MHz (E-Code)	2	310MHz, 315MHz, 390MHz (F-Code)	3	315MHz (D-Code)	4	390MHz (D-Code)	5	390MHz (A-Code)
Configuration #	Frequency												
1*	310MHz, 315MHz, 390MHz (E-Code)												
2	310MHz, 315MHz, 390MHz (F-Code)												
3	315MHz (D-Code)												
4	390MHz (D-Code)												
5	390MHz (A-Code)												
* Configuration 1 has the same power setting and duty cycle as configuration 2. Only configuration 2 was tested.													

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	2012
RSS-210	License - exempt Radio Apparatus (All Frequency Bands): Category I Equipment	Issue 8

2.4 Results Summary

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

* Peak limit and margin to peak limit is not shown in the data. In all cases the duty cycle correction factor is less than 20dB thus no emission will be more than 20dB above the average level.

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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
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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 Configuration 2 Test Data

4.1.1 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: 775.00kHz)	
	0.25% of Center Frequency (315MHz: 787.50kHz)	
	0.25% of Center Frequency (390MHz: 975.00kHz)	

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	55.79	114.61
315MHz	55.50	121.63
390MHz	54.37	96.437

Figure 1 – Bandwidth Graph 310MHz - FCC

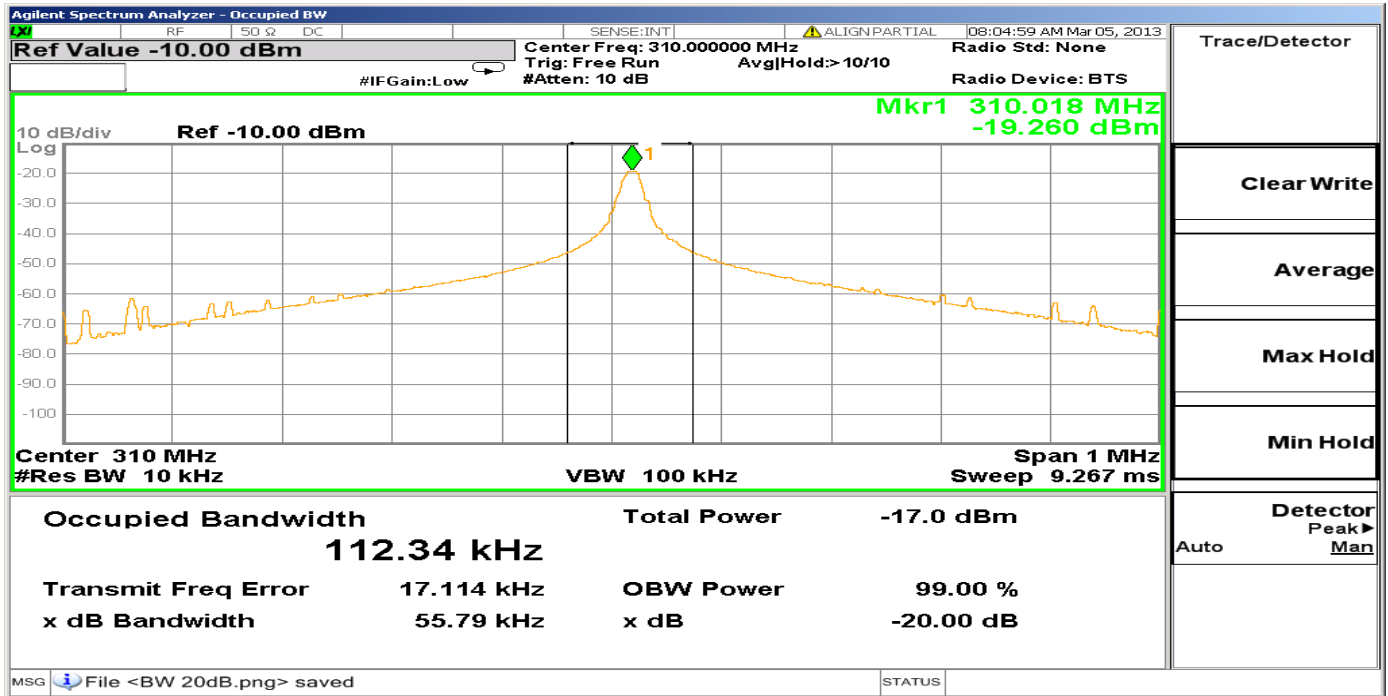


Figure 2 – Bandwidth Graph 310MHz – IC

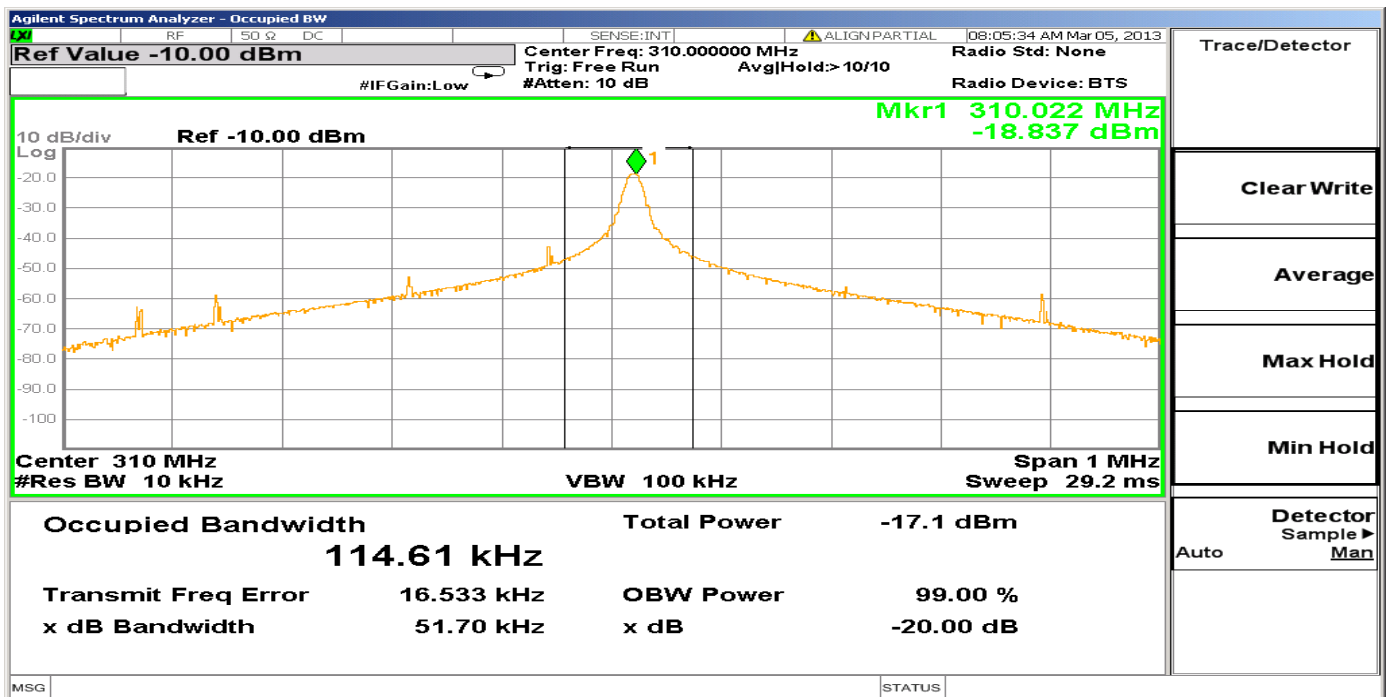


Figure 3 – Bandwidth Graph 315MHz – FCC

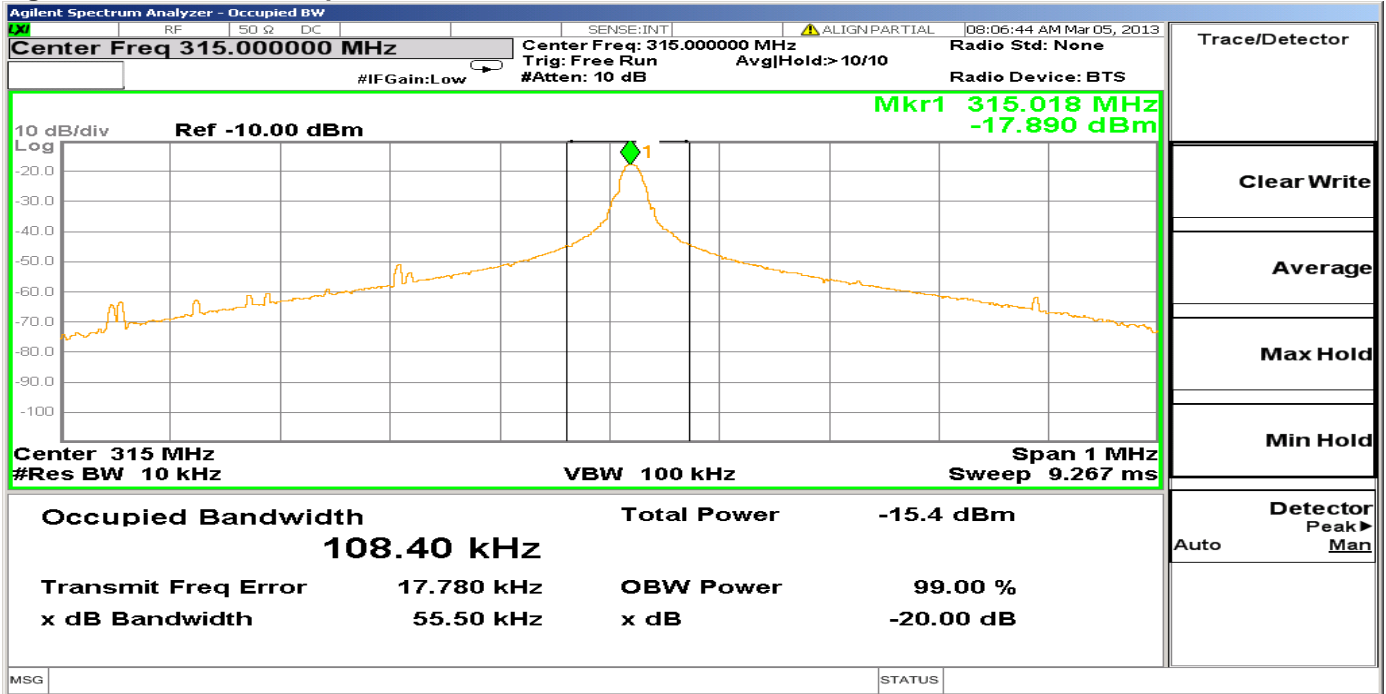


Figure 4 – Bandwidth Graph 315MHz - IC

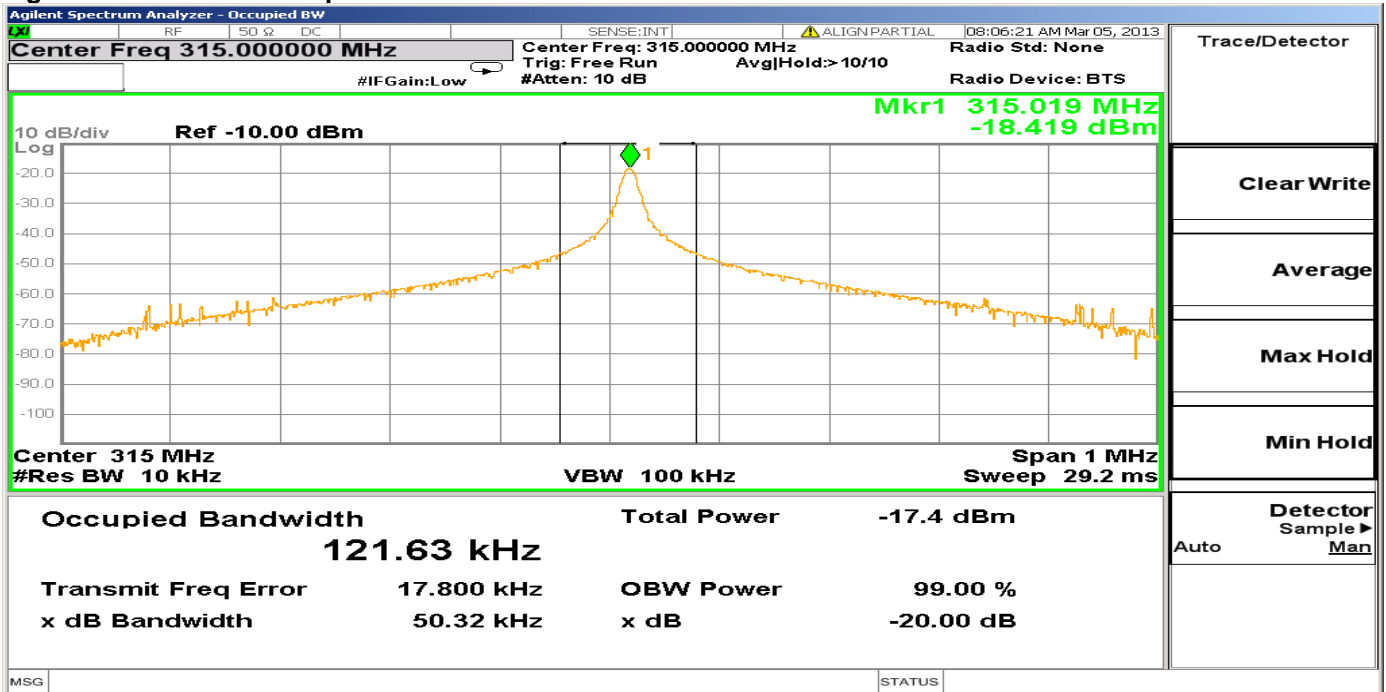


Figure 5 – Bandwidth Graph 390MHz – FCC

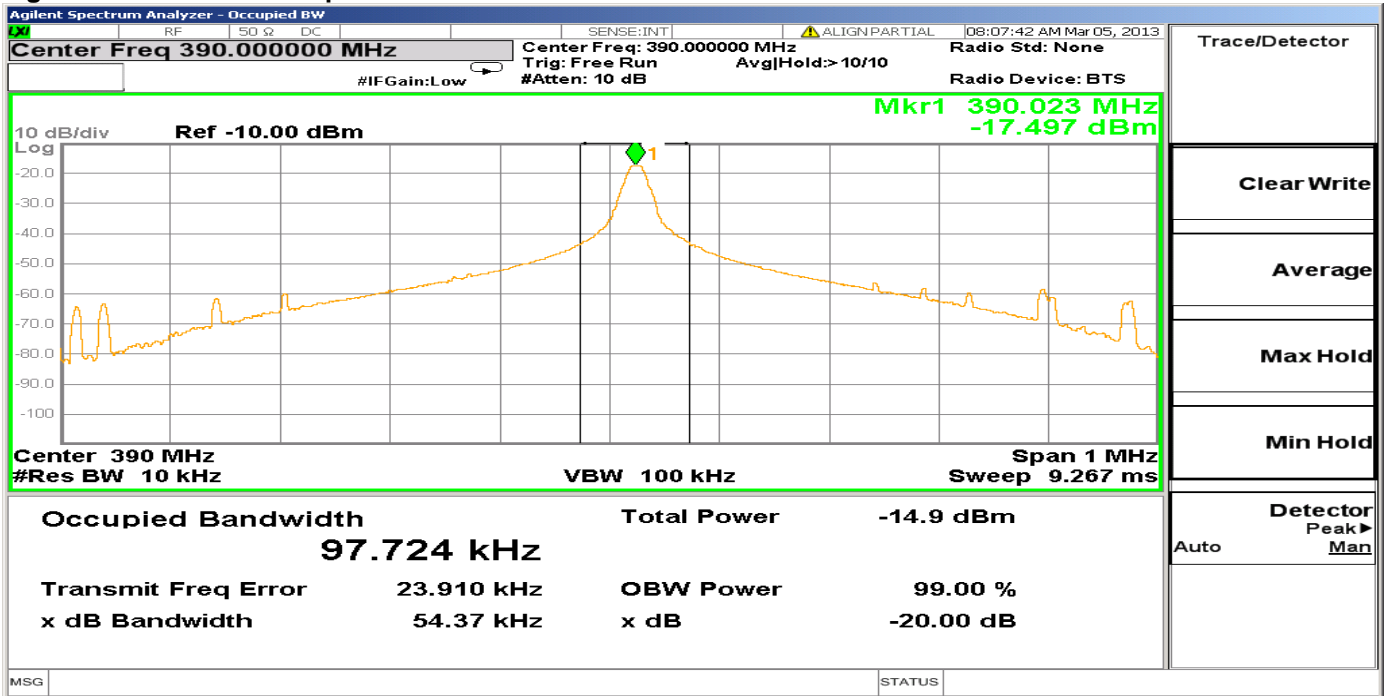
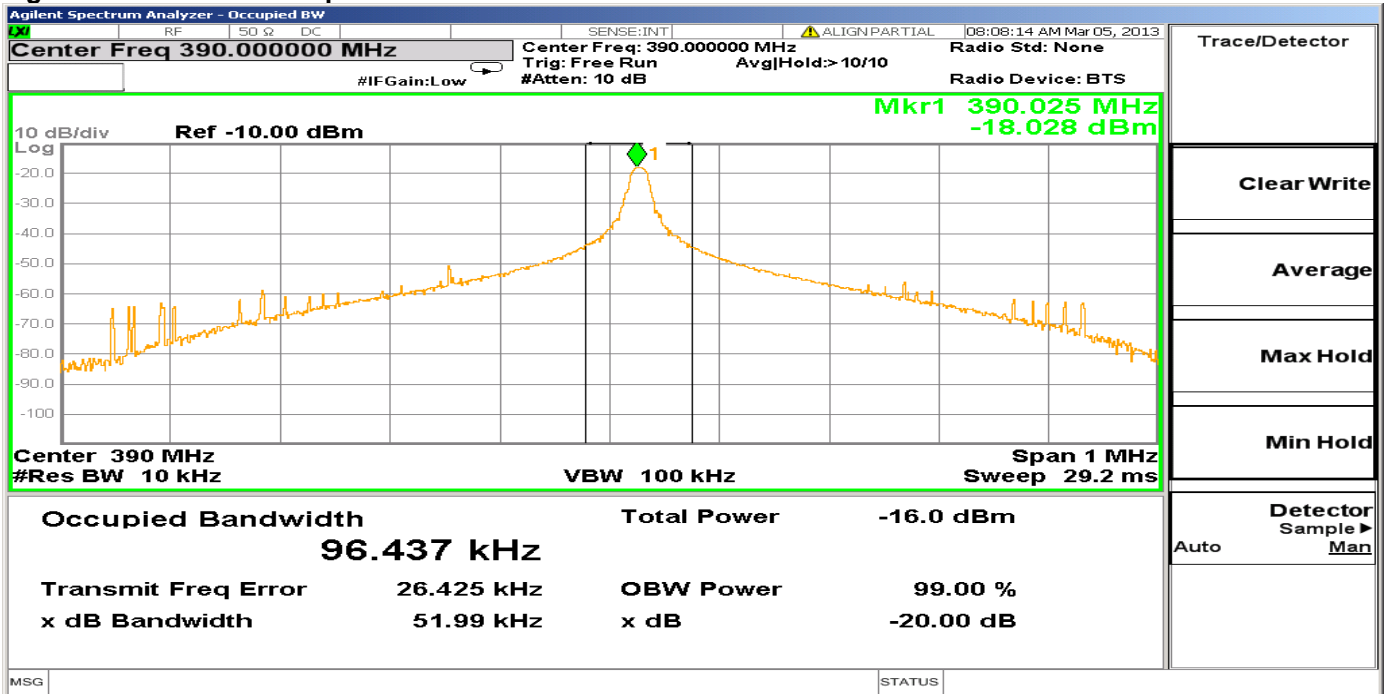


Figure 6 – Bandwidth Graph 390MHz – IC



4.1.2 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 4 Cease Operation Configuration Settings

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

Figure 7 Cease Operation Graph 310MHz



Figure 8 Cease Operation Graph 315MHz



Figure 9 Cease Operation Graph 390MHz



4.1.3 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.		

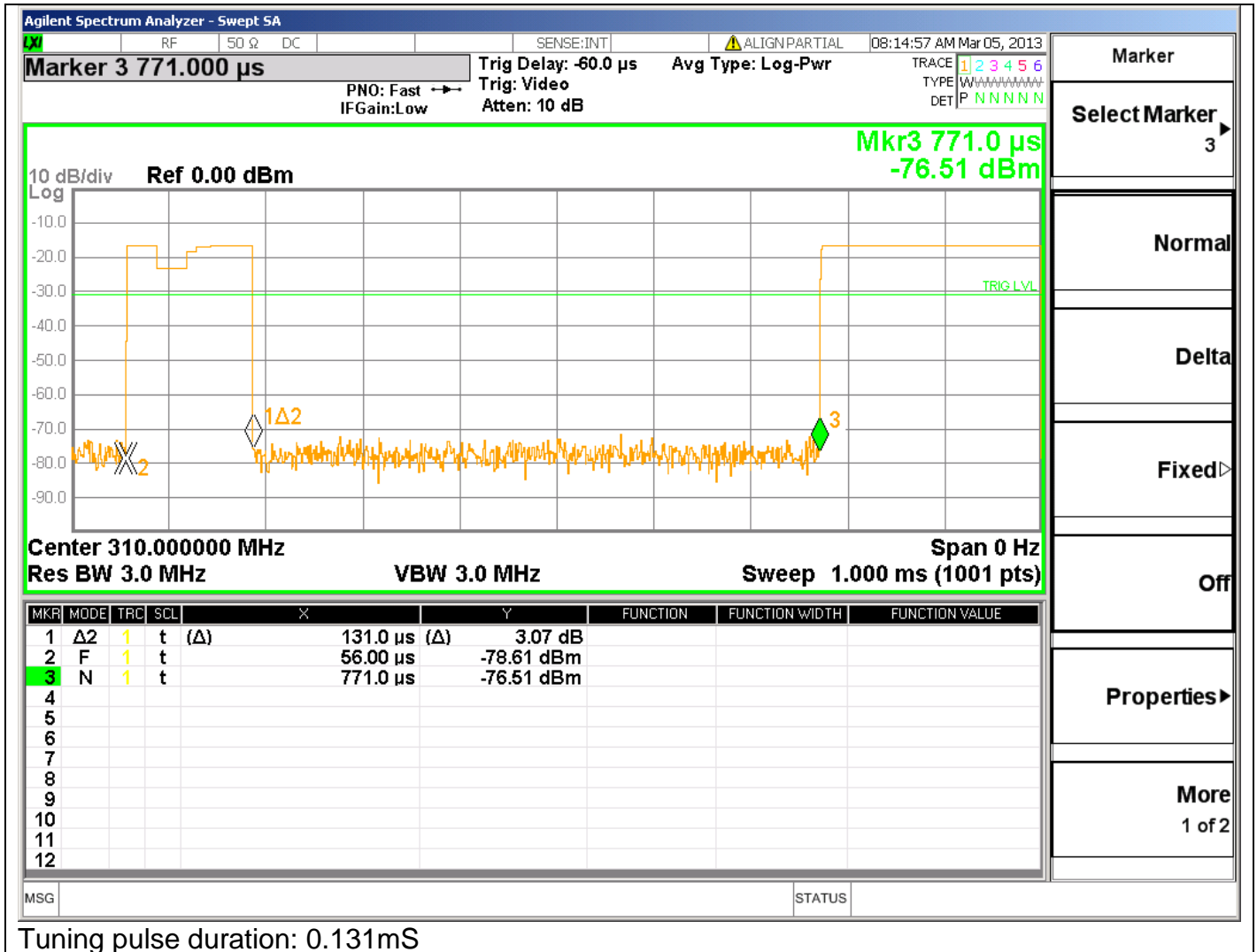
Table 5 Pulse Train Configuration Settings

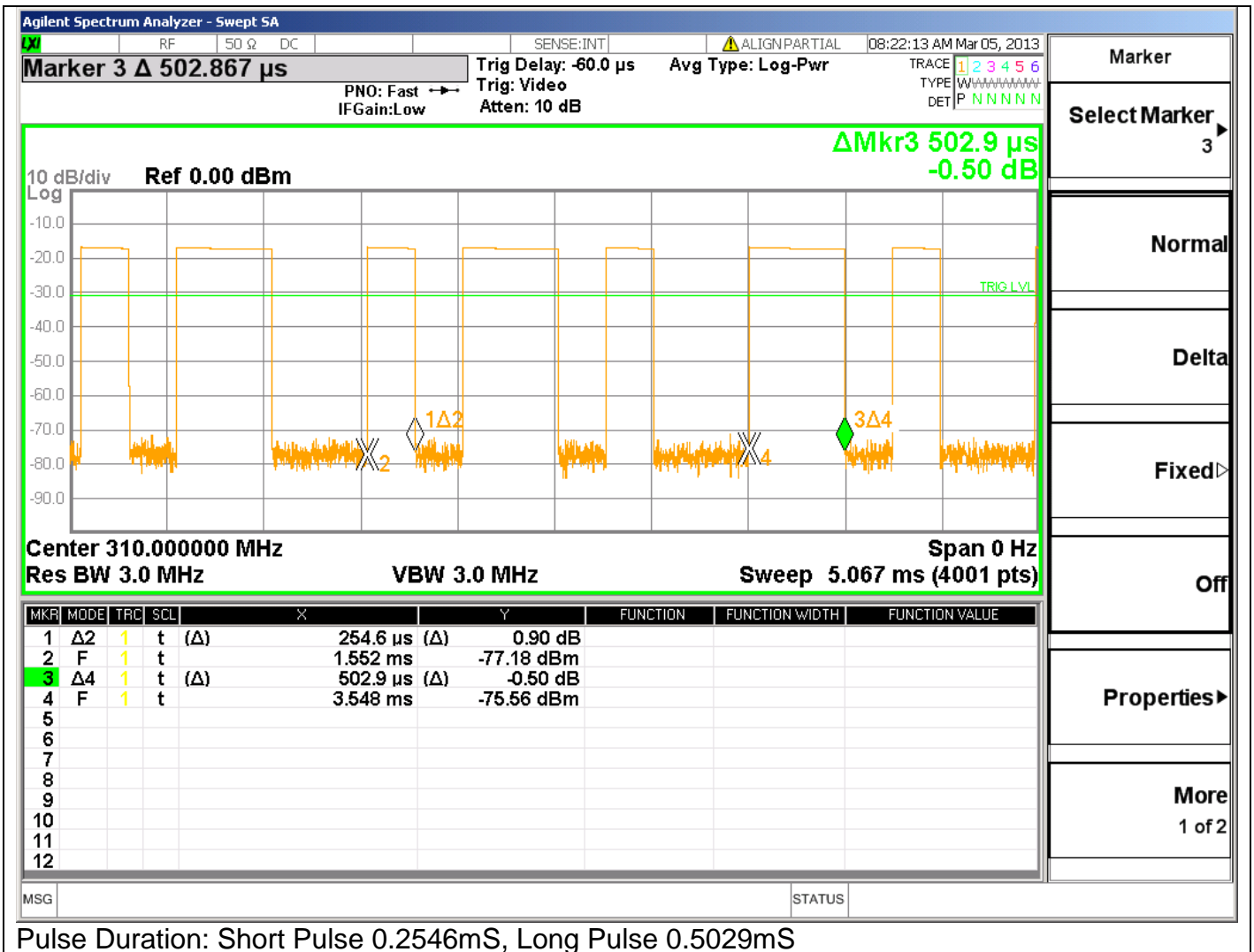
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 6 Pulse Train Calculation

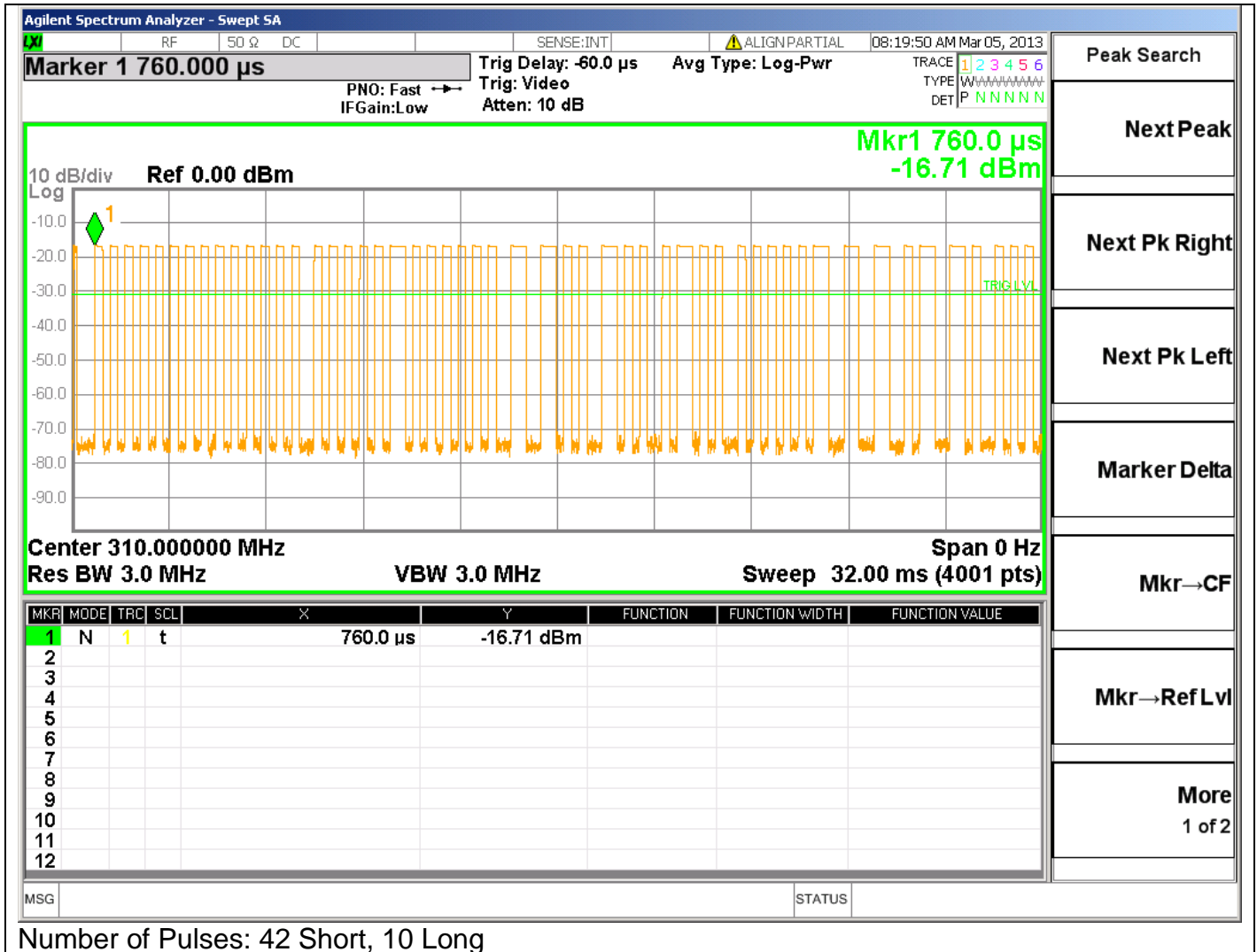
TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB)
			$20\log\left(\frac{PulseWidth}{Period}\right)$
310MHz	$(42 \times 0.2546) + (10 \times 0.5029)$	99.30	-16.01
315MHz	$(44 \times 0.2533) + (9 \times 0.5029)$	99.83	-16.08
390MHz	$(44 \times 0.2546) + (9 \times 0.5041)$	99.9	-16.05
Worst Case Duty Cycle: The manufacturer declared duty cycle as -16.01dB , worst case measured duty cycle is used for all radiated emissions data.			

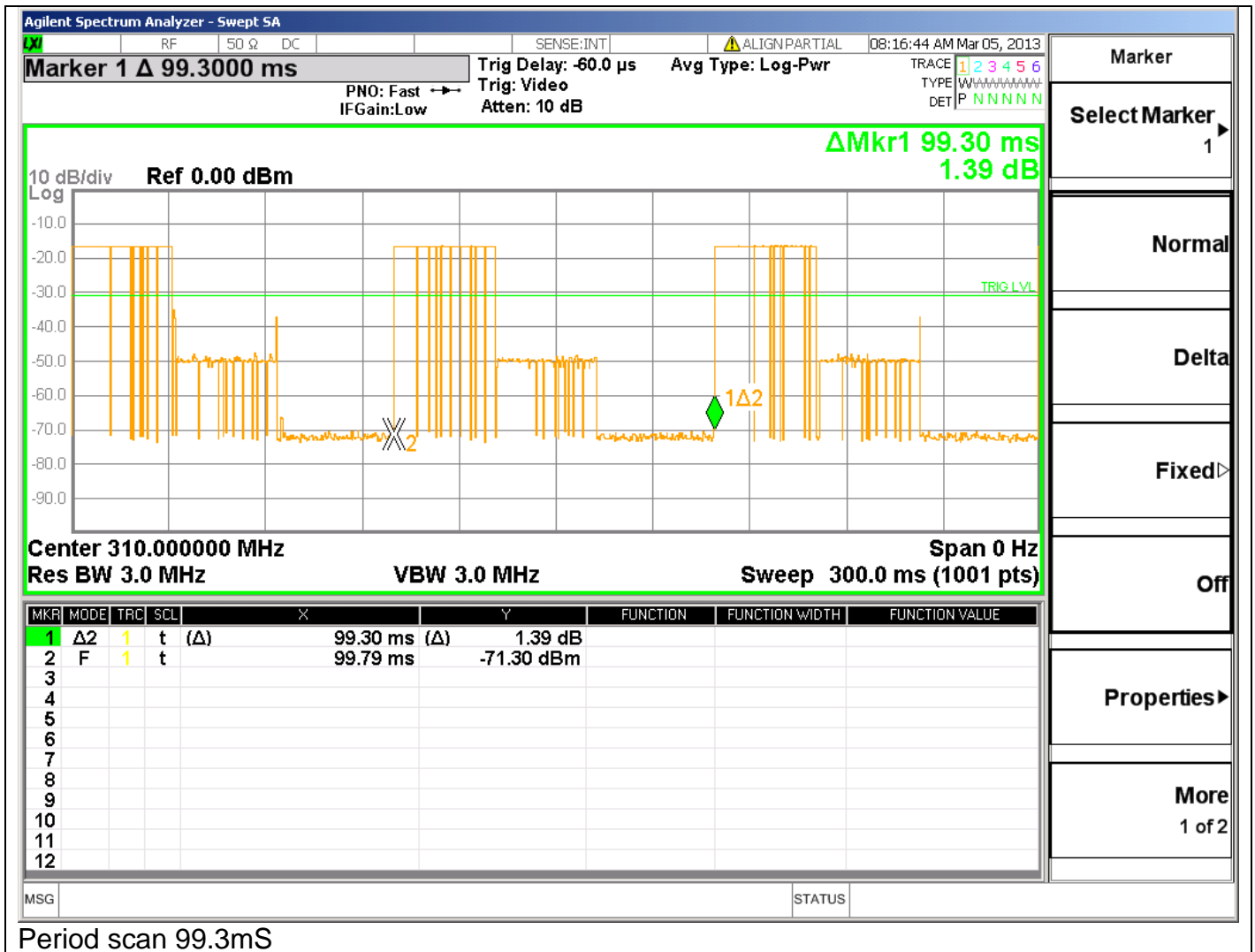
Figure 10 Pulse Train Graphs for 310MHz

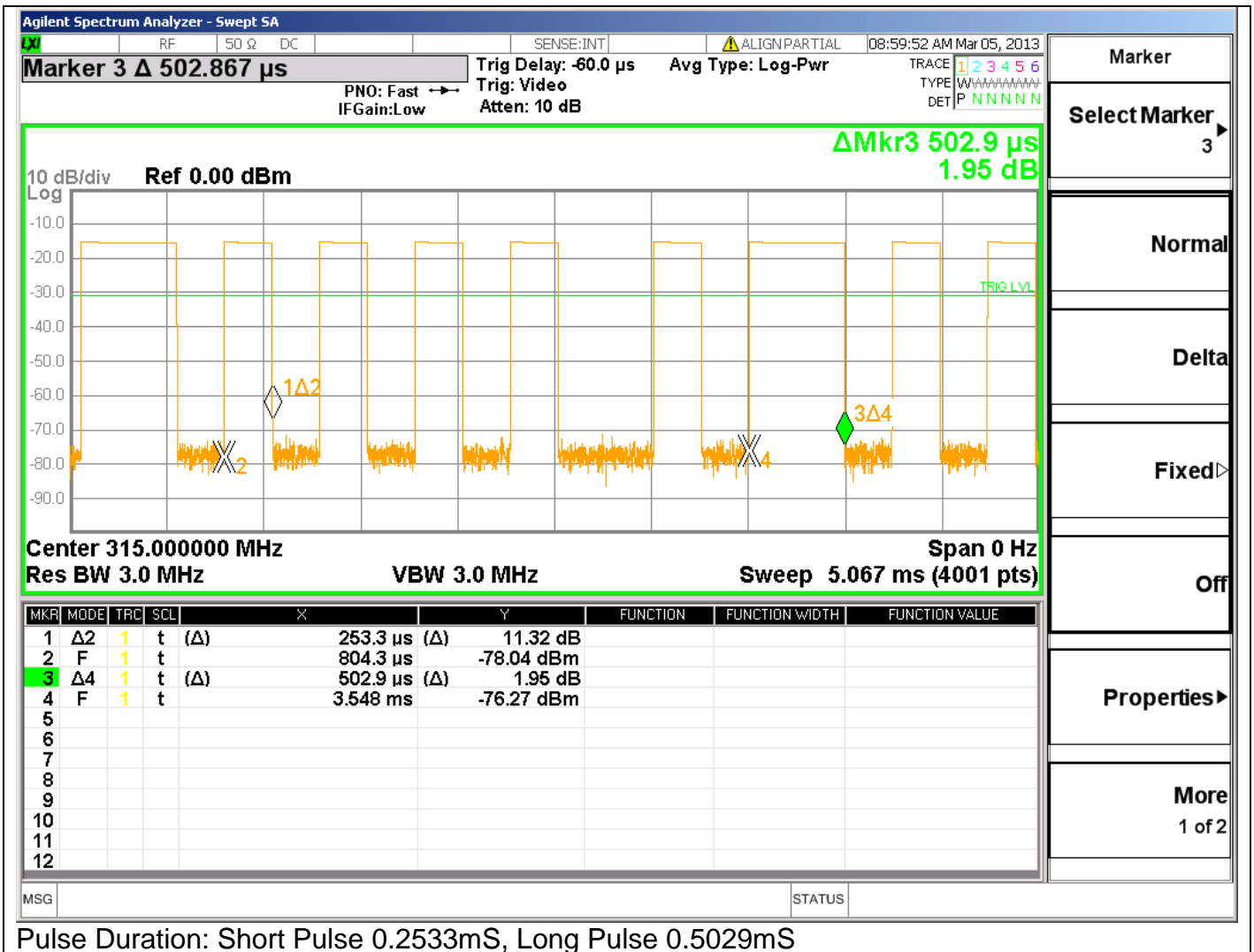




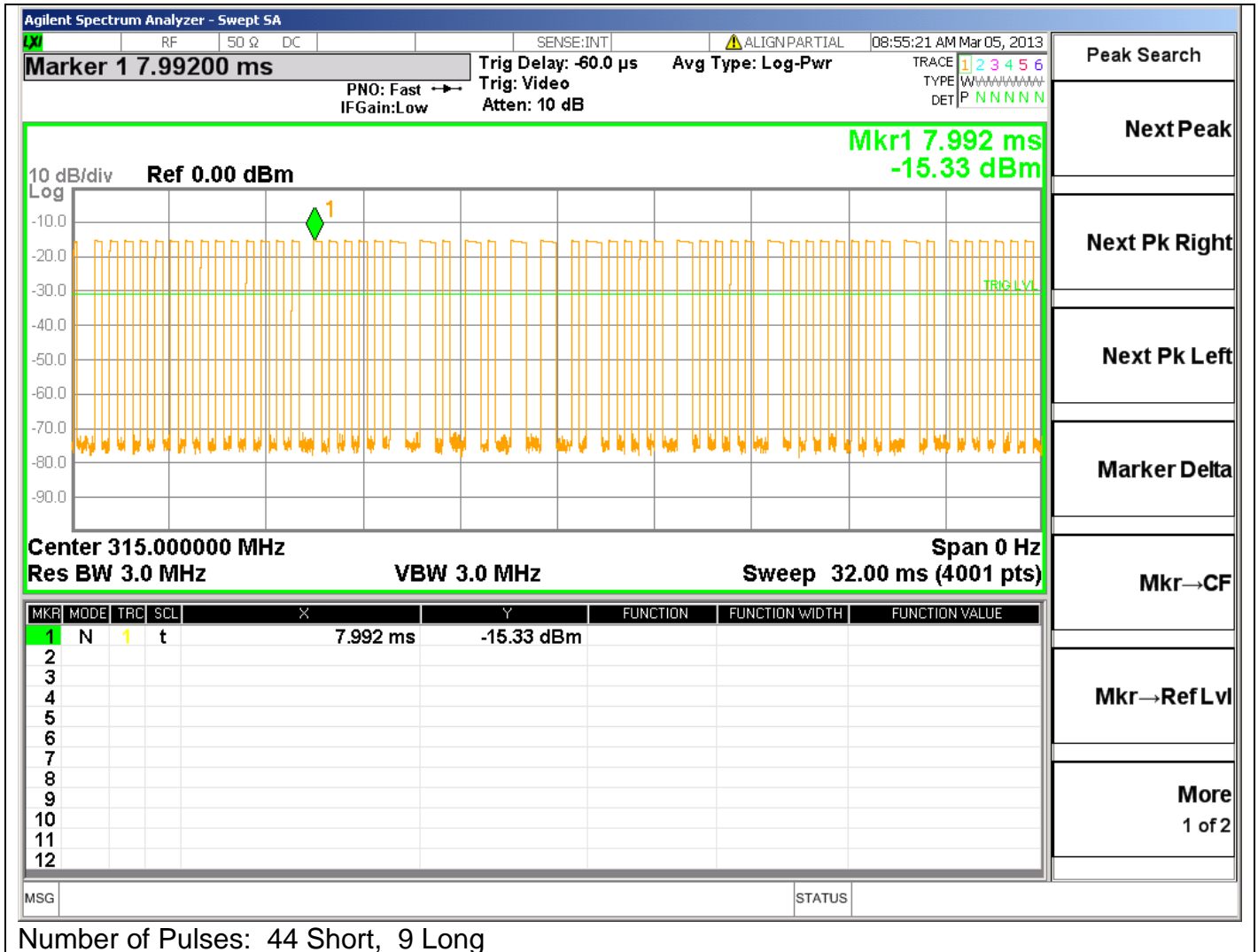
Pulse Duration: Short Pulse 0.2546mS, Long Pulse 0.5029mS







Pulse Duration: Short Pulse 0.2533mS, Long Pulse 0.5029mS

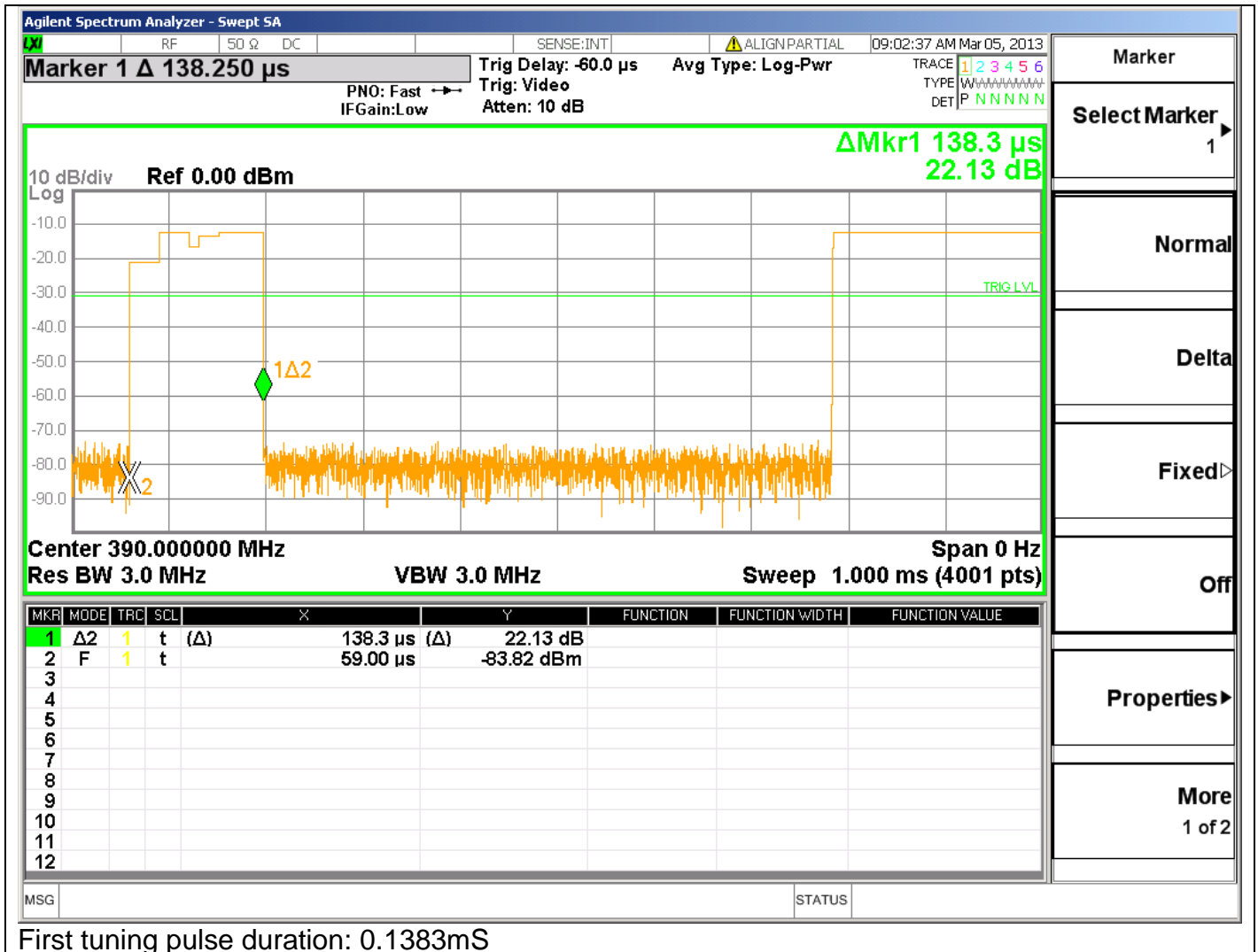


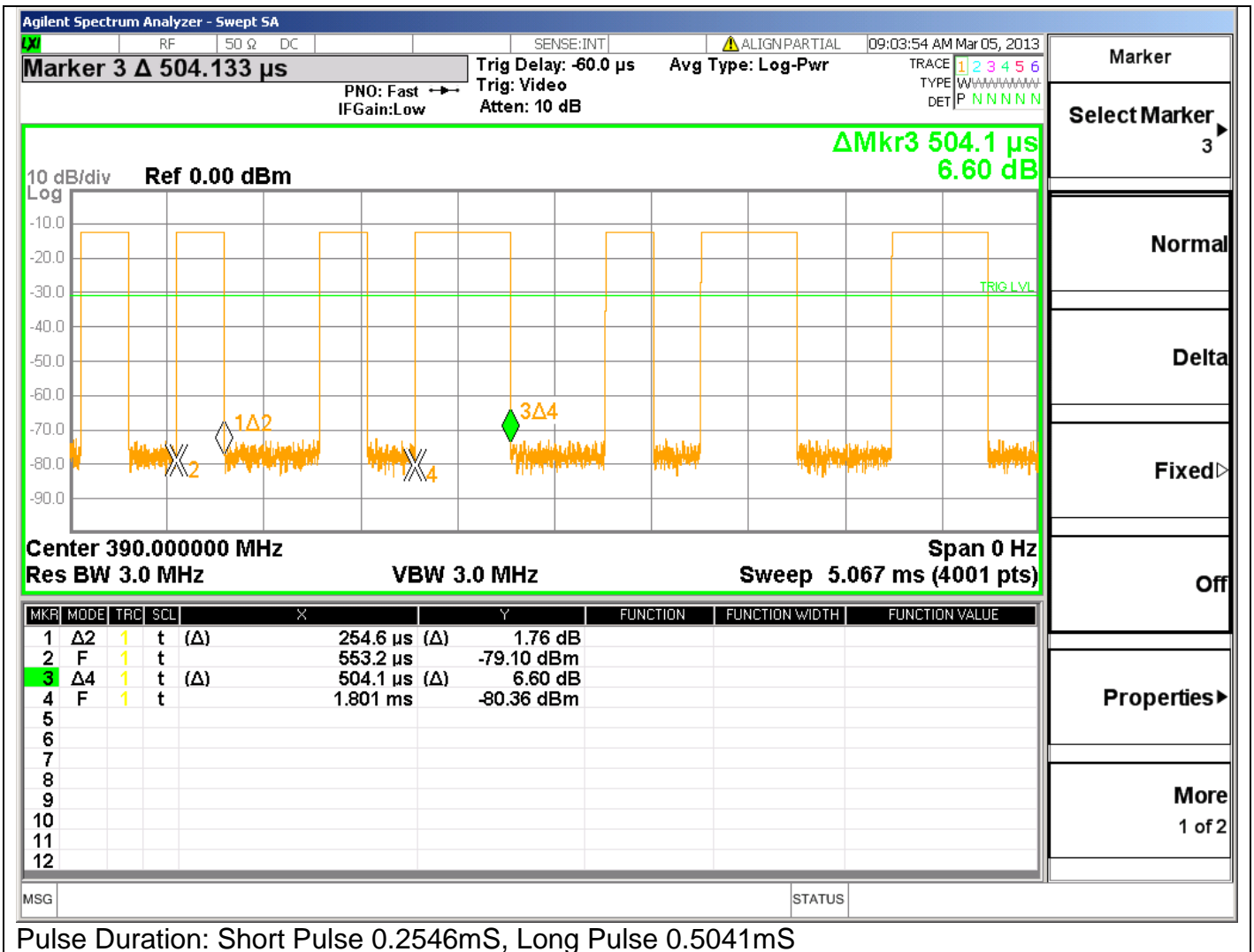
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More
1 of 2

Number of Pulses: 44 Short, 9 Long



Figure 12 Pulse Train Graphs for 390MHz





Pulse Duration: Short Pulse 0.2546mS, Long Pulse 0.5041mS



Period scan: 99.9mS

4.1.4 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
Out of band spurious emissions limit		
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	
	All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
310	75.32	95.32
315	75.62	95.62
390	79.24	99.24
Supplementary information: See section 4.1.3 for duty cycle information. Below 1GHz only emissions visible above the noise floor were the fundamental and the harmonics of the fundamental.		

Figure 13 Radiated Emissions Graph (Above 1GHz X-Axis)

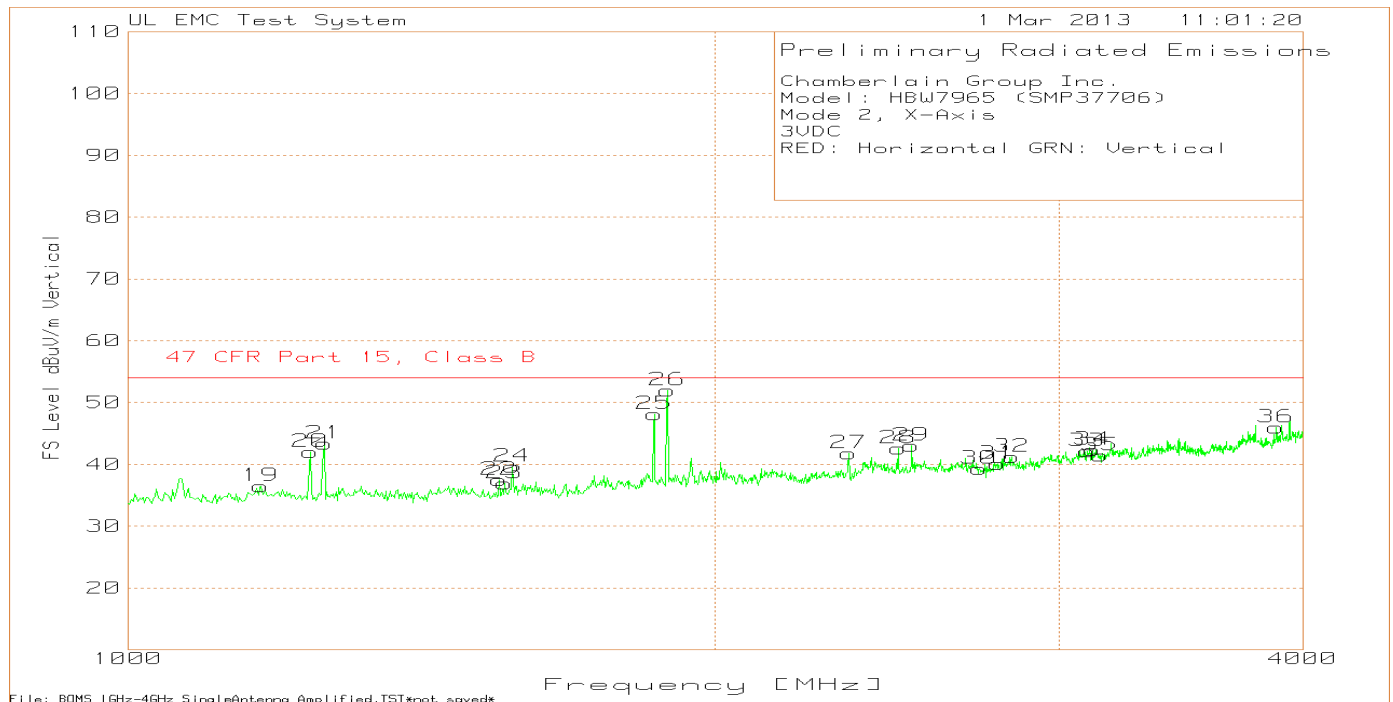
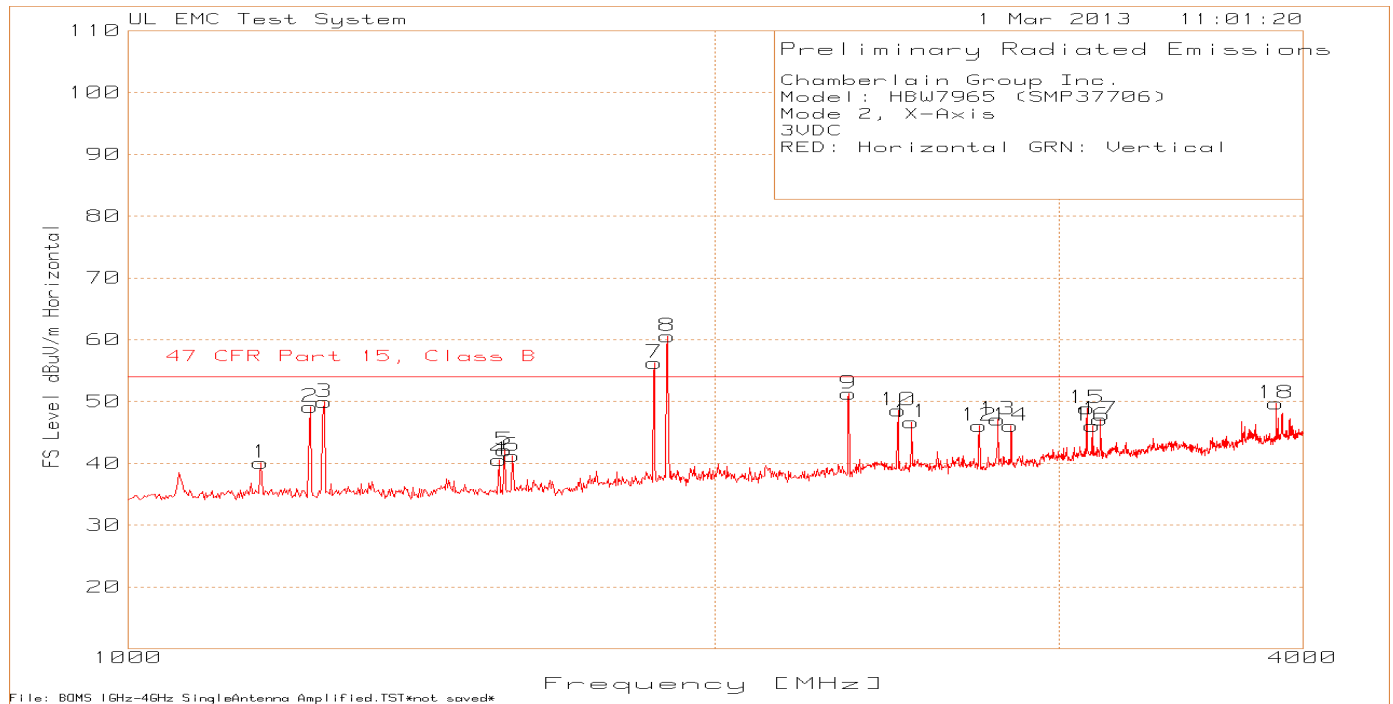


Figure 14 Radiated Emissions Graph (Above 1GHz Y-Axis)

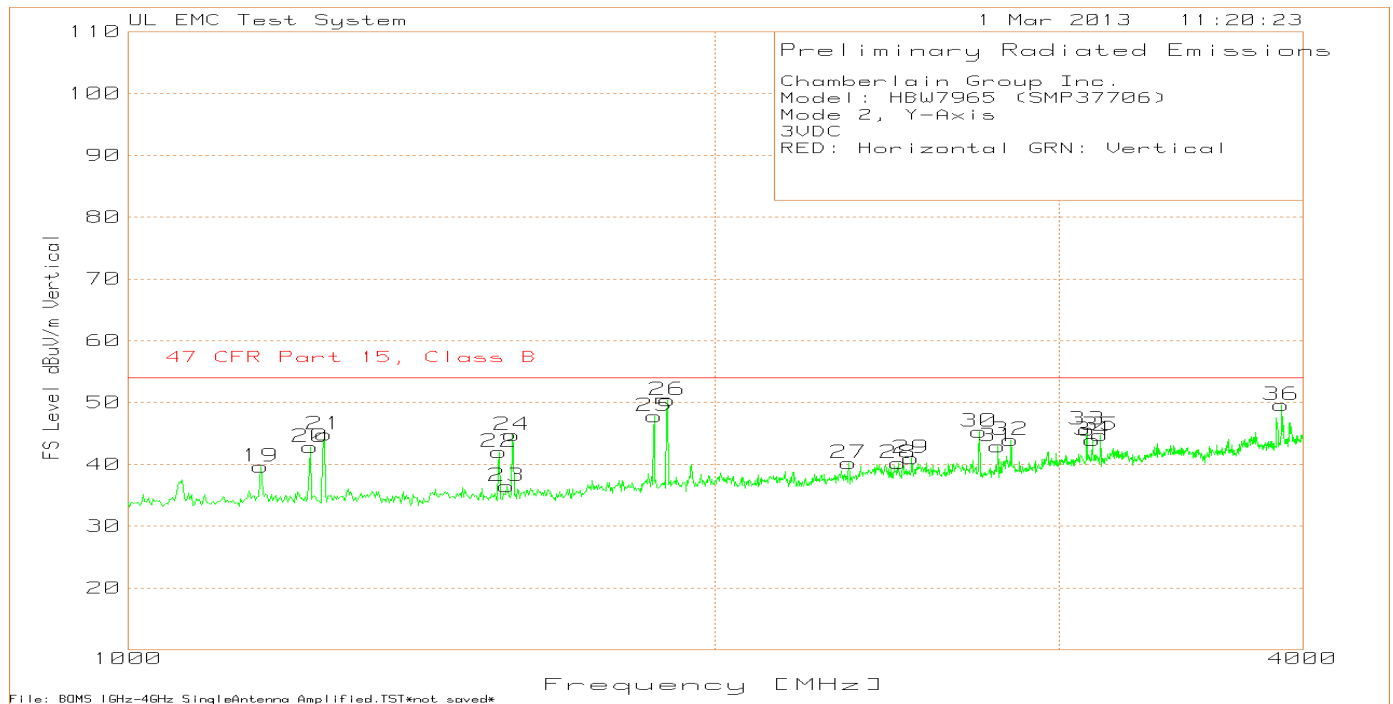
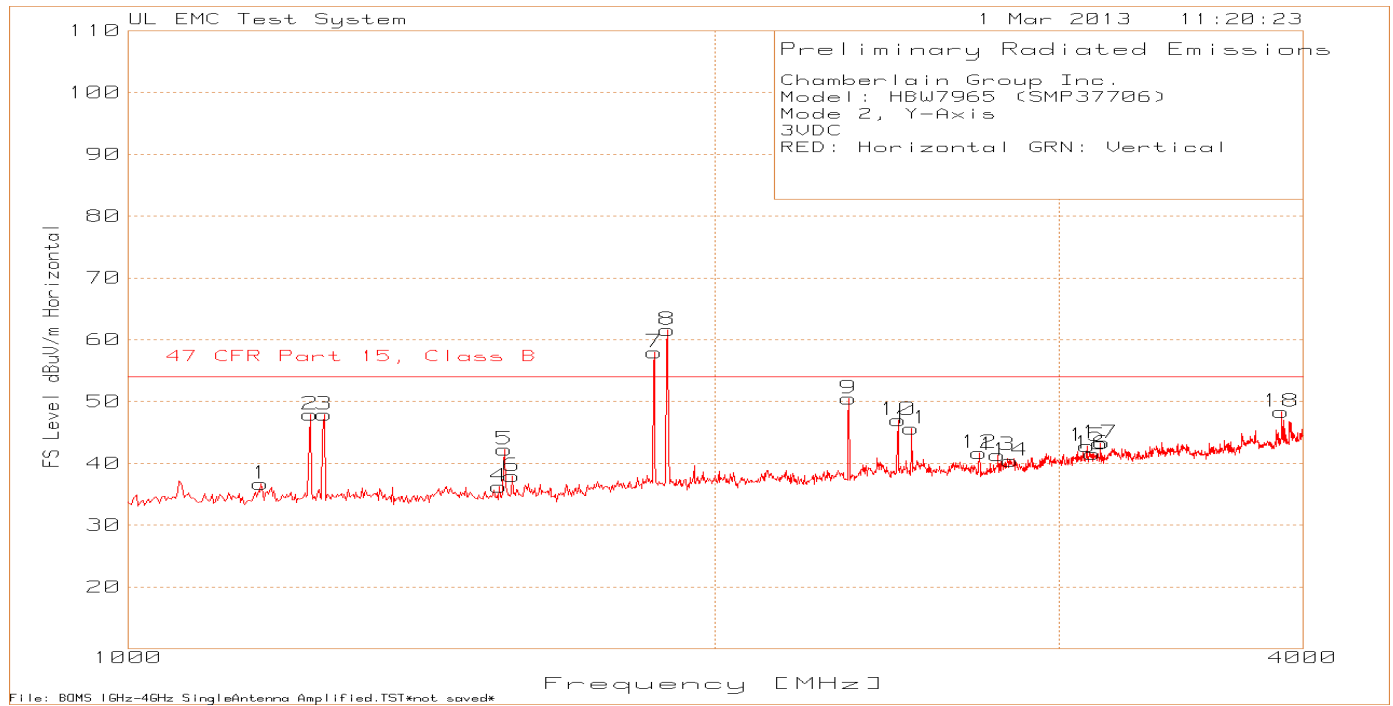


Table 7 - Radiated Emissions Data Points – for 310MHz and 315MHz Compliance (X-Axis)

Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
310.023	53.71	PK	14.1	2.1	69.91	-16.01	53.9	75.32	-21.42	351	101	Vert	1
310.022	69.63	PK	14.1	2.1	85.83	-16.01	69.82	75.32	-5.5	260	101	Horz	1
310.023	61.86	PK	14.1	2.1	78.06	-16.01	62.05	75.32	-13.27	352	224	Horz	2
310.023	67.03	PK	14.1	2.1	83.23	-16.01	67.22	75.32	-8.1	264	188	Vert	2
310.022	66.26	PK	14.1	2.1	82.46	-16.01	66.45	75.32	-8.87	266	201	Vert	3
310.024	64.79	PK	14.1	2.1	80.99	-16.01	64.98	75.32	-10.34	354	280	Horz	3
620.0432	31.33	PK	20.4	3	54.73	-16.01	38.72	46	-7.28	356	131	Horz	1
930.0665	33.28	PK	23.8	3.8	60.88	-16.01	44.87	46	-1.13	316	151	Horz	1
620.045	28.8	PK	20.4	3	52.2	-16.01	36.19	46	-9.81	262	171	Vert	1
930.064	25.78	PK	23.8	3.8	53.38	-16.01	37.37	46	-8.63	31	100	Vert	1
315.02	70.79	PK	14.3	2.1	87.19	-16.01	71.18	75.62	-4.44	269	101	Horz	1
315.0244	55.35	PK	14.3	2.1	71.75	-16.01	55.74	75.62	-19.88	351	101	Vert	1
315.021	68.18	PK	14.3	2.1	84.58	-16.01	68.57	75.62	-7.05	262	174	Vert	2
315.02	57.77	PK	14.3	2.1	74.17	-16.01	58.16	75.62	-17.46	0	101	Horz	2
315.021	65.62	PK	14.3	2.1	82.02	-16.01	66.01	75.62	-9.61	0	281	Horz	3
315.02	67	PK	14.3	2.1	83.4	-16.01	67.39	75.62	-8.23	257	202	Vert	3
630.0372	32.47	PK	20.7	3	56.17	-16.01	40.16	46	-5.84	0	125	Horz	1
945.0596	31.26	PK	23.9	3.8	58.96	-16.01	42.95	46	-3.05	326	148	Horz	1
630.034	29.89	PK	20.7	3	53.59	-16.01	37.58	46	-8.42	270	170	Vert	1
945.0616	23.39	PK	23.9	3.8	51.09	-16.01	35.08	46	-10.92	30	166	Vert	1
1170.113	72.33	PK	25	-57.24	40.09	-16.01	24.08	54	-29.92	*	100	Horz	1
1240.16	81.03	PK	25.1	-56.96	49.17	-16.01	33.16	54	-20.84	*	200	Horz	1
1260.173	81.81	PK	25.1	-56.92	49.99	-16.01	33.98	54	-20.02	*	200	Horz	1
1550.367	71.4	PK	25.2	-56.02	40.58	-16.01	24.57	54	-29.43	*	100	Horz	1
1560.374	72.61	PK	25.2	-55.65	42.16	-16.01	26.15	54	-27.85	*	100	Horz	1
1574.383	71.38	PK	25.2	-55.3	41.28	-16.01	25.27	54	-28.73	*	100	Horz	1
1860.1323	86.21	PK	27.1	-54.43	58.88	-16.01	42.87	54	-11.13	360	150	Horz	1
1890.1132	88.9	PK	27.2	-54.31	61.79	-16.01	45.78	54	-8.22	360	150	Horz	1
2340.2525	74.79	PK	28.1	-52.9	49.99	-16.01	33.98	54	-20.02	355	100	Horz	1
2480.987	72.39	PK	28.8	-52.57	48.62	-16.01	32.61	54	-21.39	*	100	Horz	1
2521.014	69.93	PK	28.9	-52.19	46.64	-16.01	30.63	54	-23.37	*	200	Horz	1
2731.154	69.39	PK	28.9	-52.19	46.1	-16.01	30.09	54	-23.91	*	150	Horz	1
2791.194	69.78	PK	28.9	-51.56	47.12	-16.01	31.11	54	-22.89	*	150	Horz	1
2835.223	68.01	PK	29	-50.92	46.09	-16.01	30.08	54	-23.92	*	100	Horz	1
3101.401	69.69	PK	30.5	-51.31	48.88	-16.01	32.87	54	-21.13	*	100	Horz	1

Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
3121.414	66.87	PK	30.6	-51.41	46.06	-16.01	30.05	54	-23.95	*	100	Horz	1
3151.434	68.26	PK	30.6	-51.71	47.15	-16.01	31.14	54	-22.86	*	150	Horz	1
3875.917	68.9	PK	32.6	-51.81	49.69	-16.01	33.68	54	-20.32	*	200	Horz	1
1170.113	68.74	PK	25	-57.24	36.5	-16.01	20.49	54	-33.51	*	200	Vert	1
1240.16	73.89	PK	25.1	-56.96	42.03	-16.01	26.02	54	-27.98	*	200	Vert	1
1260.173	75.23	PK	25.1	-56.92	43.41	-16.01	27.4	54	-26.6	*	150	Vert	1
1550.367	68.34	PK	25.2	-56.02	37.52	-16.01	21.51	54	-32.49	*	100	Vert	1
1560.374	67.37	PK	25.2	-55.65	36.92	-16.01	20.91	54	-33.09	*	200	Vert	1
1574.383	69.77	PK	25.2	-55.3	39.67	-16.01	23.66	54	-30.34	*	100	Vert	1
1860.574	75.52	PK	27.1	-54.44	48.18	-16.01	32.17	54	-21.83	*	100	Vert	1
1890.1323	80.16	PK	27.2	-54.31	53.05	-16.01	37.04	54	-16.96	217	100	Vert	1
2340.894	66.58	PK	28.1	-52.9	41.78	-16.01	25.77	54	-28.23	*	200	Vert	1
2480.987	66.34	PK	28.8	-52.57	42.57	-16.01	26.56	54	-27.44	*	150	Vert	1
2521.014	66.37	PK	28.9	-52.19	43.08	-16.01	27.07	54	-26.93	*	150	Vert	1
2731.154	62.64	PK	28.9	-52.19	39.35	-16.01	23.34	54	-30.66	*	100	Vert	1
2789.193	62.75	PK	28.9	-51.56	40.09	-16.01	24.08	54	-29.92	*	150	Vert	1
2839.226	63.24	PK	29	-50.96	41.28	-16.01	25.27	54	-28.73	*	100	Vert	1
3103.402	62.92	PK	30.5	-51.29	42.13	-16.01	26.12	54	-27.88	*	200	Vert	1
3121.414	63.12	PK	30.6	-51.41	42.31	-16.01	26.3	54	-27.7	*	100	Vert	1
3151.434	62.6	PK	30.6	-51.71	41.49	-16.01	25.48	54	-28.52	*	100	Vert	1
3877.919	65.12	PK	32.6	-51.79	45.93	-16.01	29.92	54	-24.08	*	200	Vert	1
Notes: 1 - Mode 2, F-Code, 310,315 and 390MHz, X-Axis 2 - Mode 2, F-Code, 310,315 and 390MHz, Y-Axis 3 - Mode 2, F-Code, 310,315 and 390MHz, Z-Axis * Peak Prescan Data, not maximized													

Table 8 - Radiated Emissions Data Points – for 390MHz Compliance (Y-Axis)

Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
390.027	52.51	PK	16.1	2.3	70.91	-16.01	54.9	79.24	-24.34	120	267	Vert	1
390.025	69.66	PK	16.1	2.3	88.06	-16.01	72.05	79.24	-7.19	82	101	Horz	1
390.0248	63.68	PK	16.1	2.3	82.08	-16.01	66.07	79.24	-13.17	360	173	Horz	2
390.0268	70.77	PK	16.1	2.3	89.17	-16.01	73.16	79.24	-6.08	278	138	Vert	2
390.026	70.32	PK	16.1	2.3	88.72	-16.01	72.71	79.24	-6.53	277	150	Vert	3
390.027	66.55	PK	16.1	2.3	84.95	-16.01	68.94	79.24	-10.3	0	189	Horz	3
780.0528	20.42	PK	22	3.4	45.82	-16.01	29.81	46	-16.19	162	100	Horz	2
779.9733	15.51	PK	22	3.4	40.91	-16.01	24.9	46	-21.1	214	203	Vert	2
1170.113	68.91	PK	25	-57.24	36.67	-16.01	20.66	54	-33.34	*	100	Horz	2
1240.16	79.72	PK	25.1	-56.96	47.86	-16.01	31.85	54	-22.15	*	200	Horz	2
1260.173	79.72	PK	25.1	-56.92	47.9	-16.01	31.89	54	-22.11	*	200	Horz	2
1550.367	67.1	PK	25.2	-56.02	36.28	-16.01	20.27	54	-33.73	*	100	Horz	2
1560.374	72.65	PK	25.2	-55.65	42.2	-16.01	26.19	54	-27.81	*	100	Horz	2
1574.383	68.05	PK	25.2	-55.3	37.95	-16.01	21.94	54	-32.06	*	100	Horz	2
1860.1954	86.77	PK	27.1	-54.43	59.44	-16.01	43.43	54	-10.57	0	150	Horz	2
1890.1323	90.35	PK	27.2	-54.31	63.24	-16.01	47.23	54	-6.77	0	150	Horz	2
2340.0992	75.21	PK	28.1	-52.91	50.4	-16.01	34.39	54	-19.61	360	100	Horz	2
2480.987	70.74	PK	28.8	-52.57	46.97	-16.01	30.96	54	-23.04	*	100	Horz	2
2521.014	68.89	PK	28.9	-52.19	45.6	-16.01	29.59	54	-24.41	*	100	Horz	2
2731.154	64.97	PK	28.9	-52.19	41.68	-16.01	25.67	54	-28.33	*	200	Horz	2
2791.194	64.05	PK	28.9	-51.56	41.39	-16.01	25.38	54	-28.62	*	200	Horz	2
2835.223	62.35	PK	29	-50.92	40.43	-16.01	24.42	54	-29.58	*	200	Horz	2
3101.401	63.62	PK	30.5	-51.31	42.81	-16.01	26.8	54	-27.2	*	100	Horz	2
3121.414	62.38	PK	30.6	-51.41	41.57	-16.01	25.56	54	-28.44	*	200	Horz	2
3151.434	64.42	PK	30.6	-51.71	43.31	-16.01	27.3	54	-26.7	*	200	Horz	2
3901.935	67.73	PK	32.6	-51.99	48.34	-16.01	32.33	54	-21.67	*	150	Horz	2
1170.113	71.85	PK	25	-57.24	39.61	-16.01	23.6	54	-30.4	*	100	Vert	2
1240.16	74.63	PK	25.1	-56.96	42.77	-16.01	26.76	54	-27.24	*	100	Vert	2
1260.173	76.65	PK	25.1	-56.92	44.83	-16.01	28.82	54	-25.18	*	100	Vert	2
1550.367	72.87	PK	25.2	-56.02	42.05	-16.01	26.04	54	-27.96	*	100	Vert	2
1564.376	66.8	PK	25.2	-55.5	36.5	-16.01	20.49	54	-33.51	*	100	Vert	2
1574.383	74.79	PK	25.2	-55.3	44.69	-16.01	28.68	54	-25.32	*	100	Vert	2
1860.574	75.08	PK	27.1	-54.44	47.74	-16.01	31.73	54	-22.27	*	100	Vert	2
1890.1403	80.23	PK	27.2	-54.31	53.12	-16.01	37.11	54	-16.89	84	200	Vert	2
2340.894	65.04	PK	28.1	-52.9	40.24	-16.01	24.23	54	-29.77	*	200	Vert	2
2480.987	64.03	PK	28.8	-52.57	40.26	-16.01	24.25	54	-29.75	*	100	Vert	2

Order #: 10004850 Project#: SR9617354
 Model Number: 1D7965
 Client Name: Chamberlain Group Inc.

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Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
2521.014	64.34	PK	28.9	-52.19	41.05	-16.01	25.04	54	-28.96	*	150	Vert	2
2731.154	68.64	PK	28.9	-52.19	45.35	-16.01	29.34	54	-24.66	*	100	Vert	2
2791.194	65.53	PK	28.9	-51.56	42.87	-16.01	26.86	54	-27.14	*	100	Vert	2
2835.223	65.88	PK	29	-50.92	43.96	-16.01	27.95	54	-26.05	*	100	Vert	2
3101.401	66.45	PK	30.5	-51.31	45.64	-16.01	29.63	54	-24.37	*	150	Vert	2
3121.414	64.72	PK	30.6	-51.41	43.91	-16.01	27.9	54	-26.1	*	100	Vert	2
3151.434	65.83	PK	30.6	-51.71	44.72	-16.01	28.71	54	-25.29	*	100	Vert	2
3901.935	68.94	PK	32.6	-51.99	49.55	-16.01	33.54	54	-20.46	*	100	Vert	2

Notes:

- 1 - Mode 2, F-Code, 310,315 and 390MHz, X-Axis
- 2 - Mode 2, F-Code, 310,315 and 390MHz, Y-Axis
- 3 - Mode 2, F-Code, 310,315 and 390MHz, Z-Axis
- * Peak Prescan Data, not maximized

4.2 Configuration 3 Test Data

4.2.1 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 (315MHz: 787.5kHz)		

Table 9 Occupied Bandwidth Configuration Settings

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

Table 10 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 11 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
315MHz	53.54	102.98

Figure 15 – Bandwidth Graph – FCC

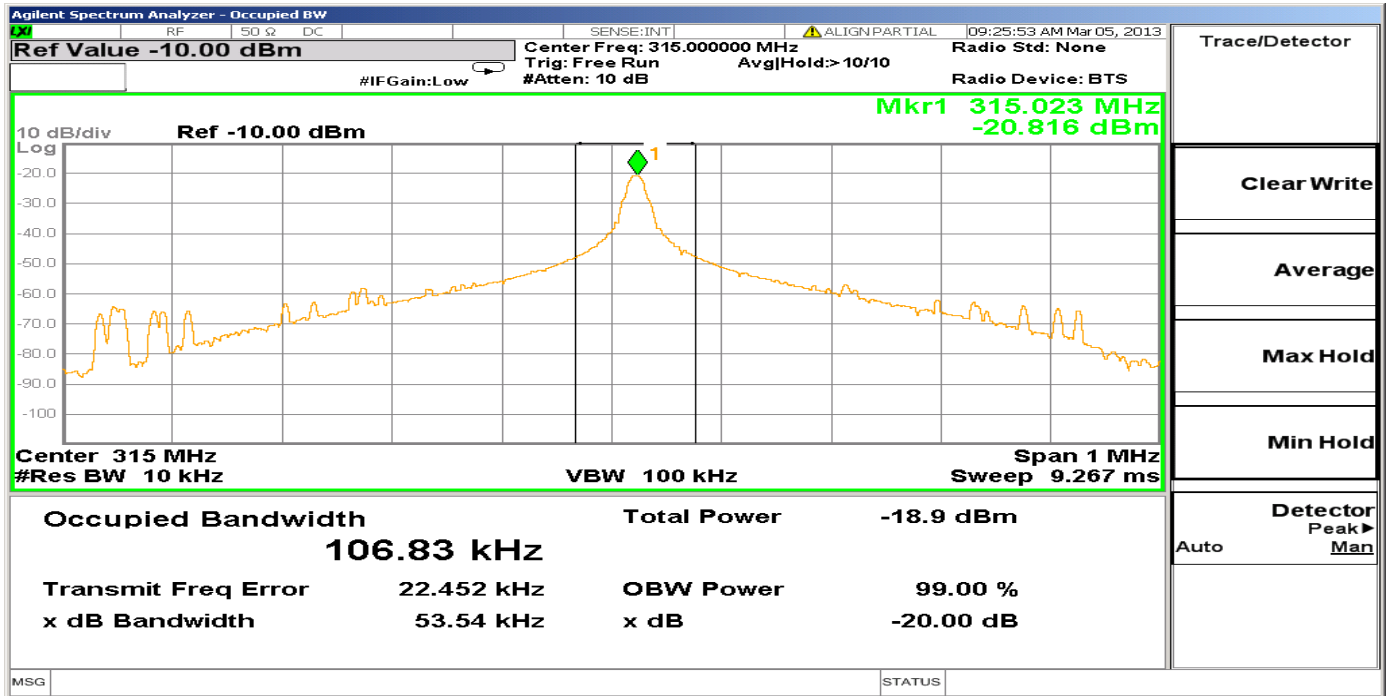
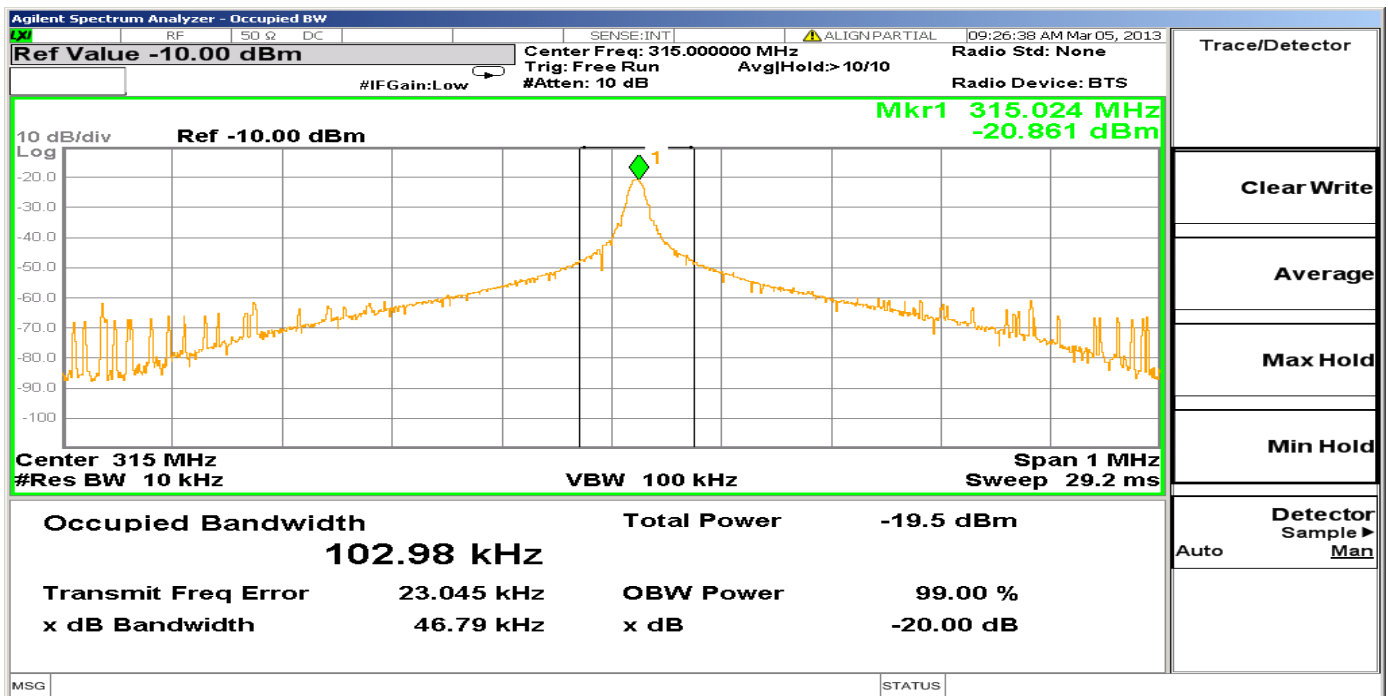


Figure 16 – Bandwidth Graph - IC



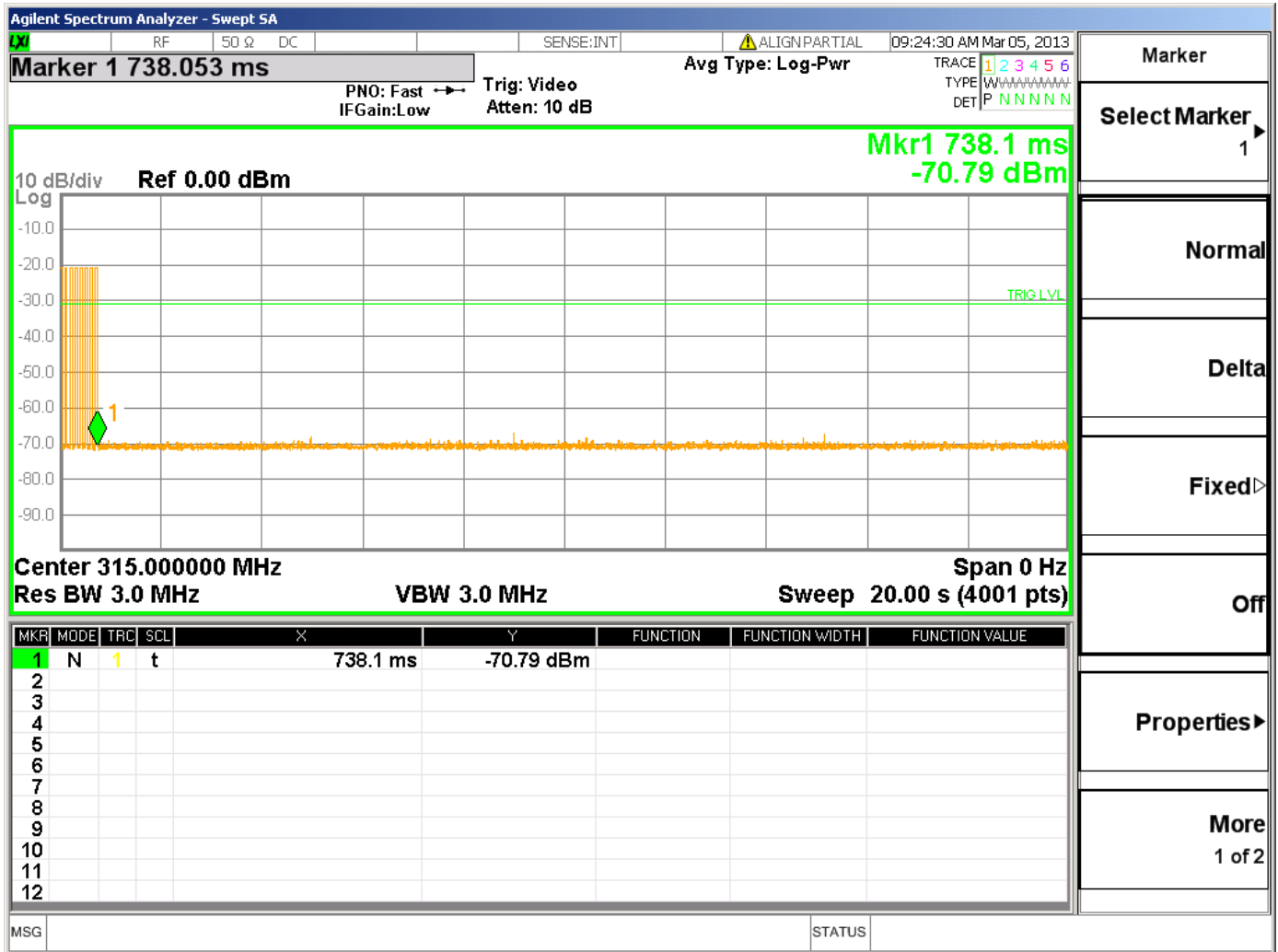
4.2.2 Test Conditions and Results – Cease Operation

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 12 Cease Operation Configuration Settings

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

Figure 17 Cease Operation Graph



4.2.3 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.		

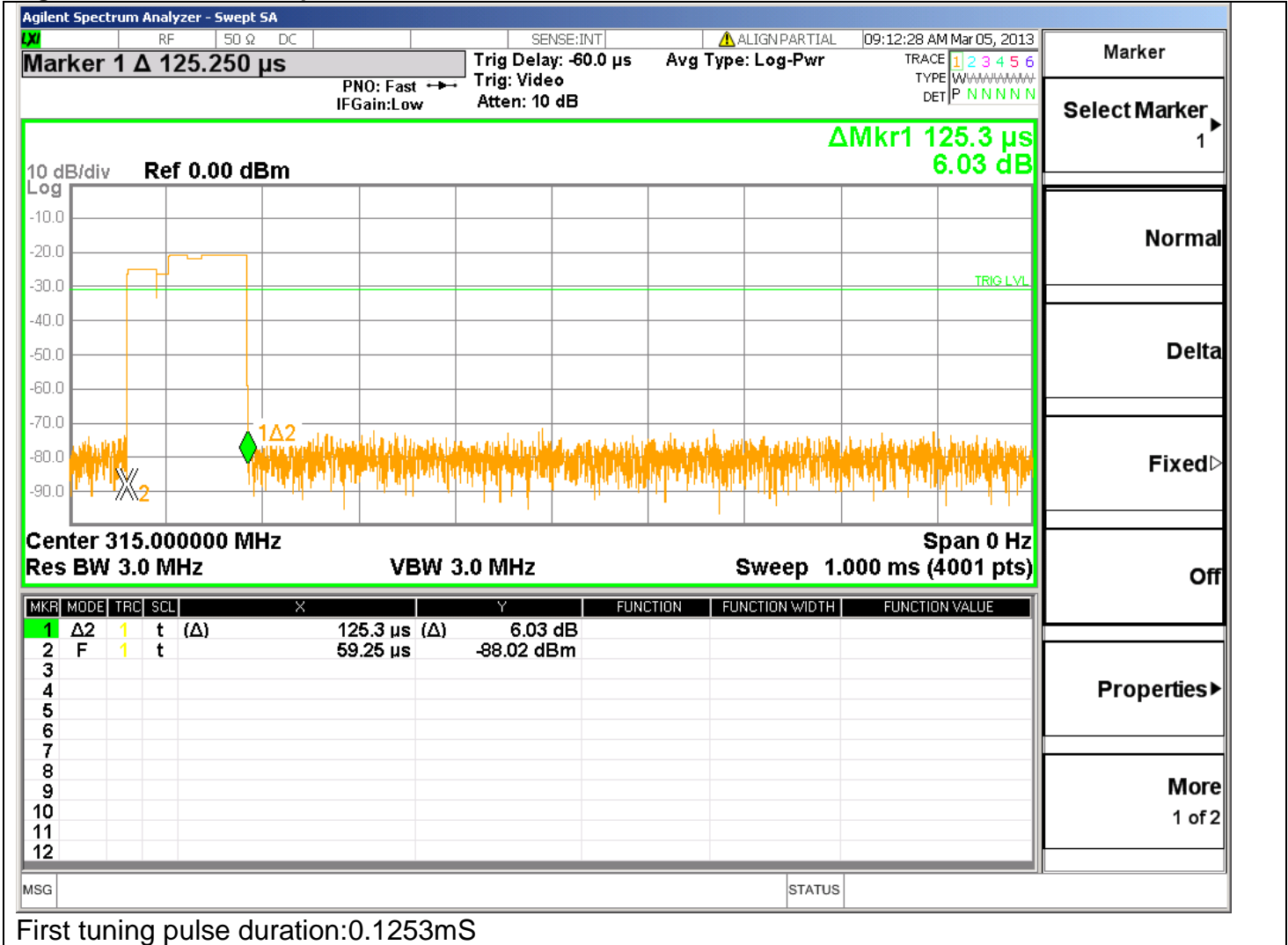
Table 13 Pulse Train Configuration Settings

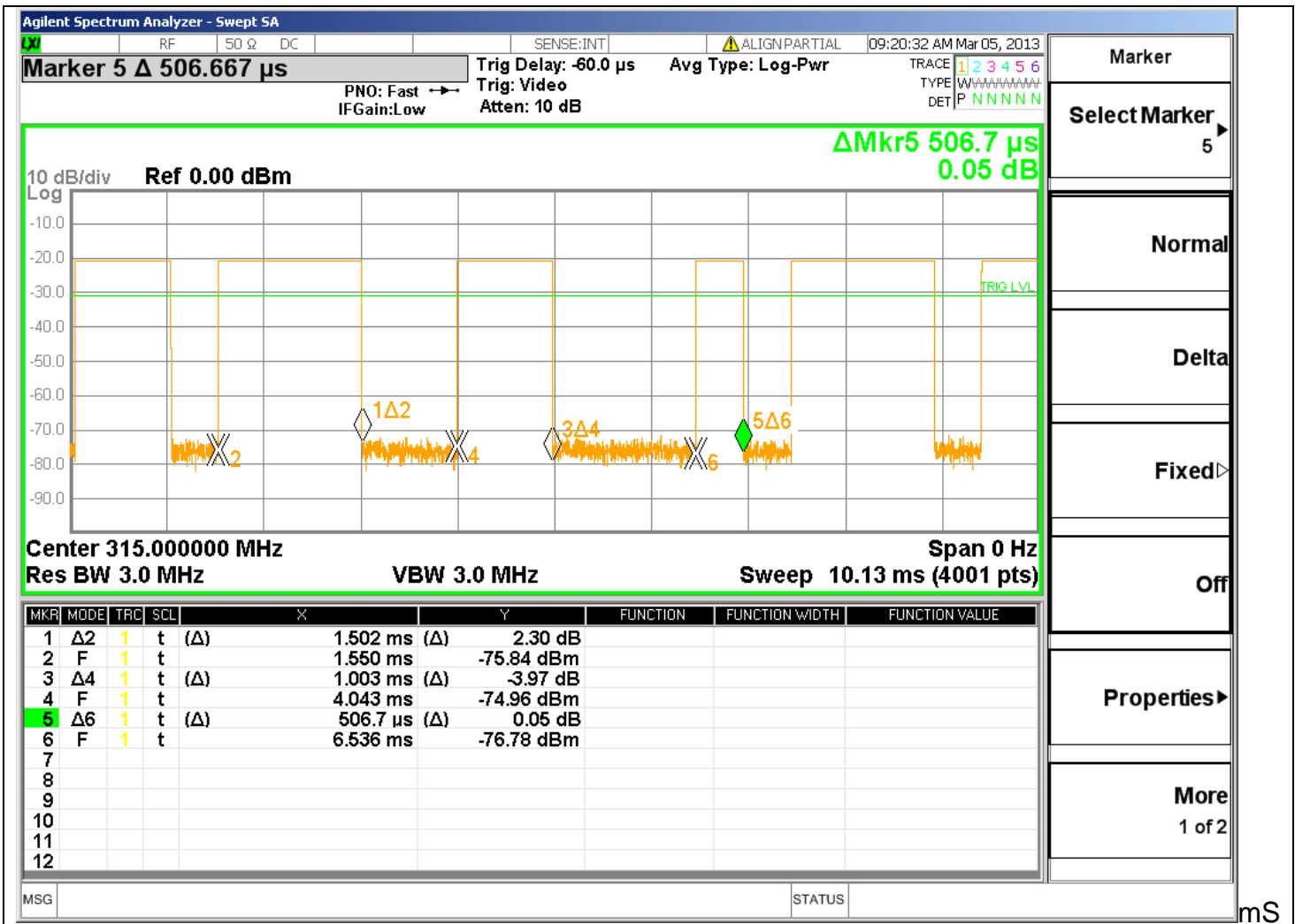
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 14 Pulse Train Calculation

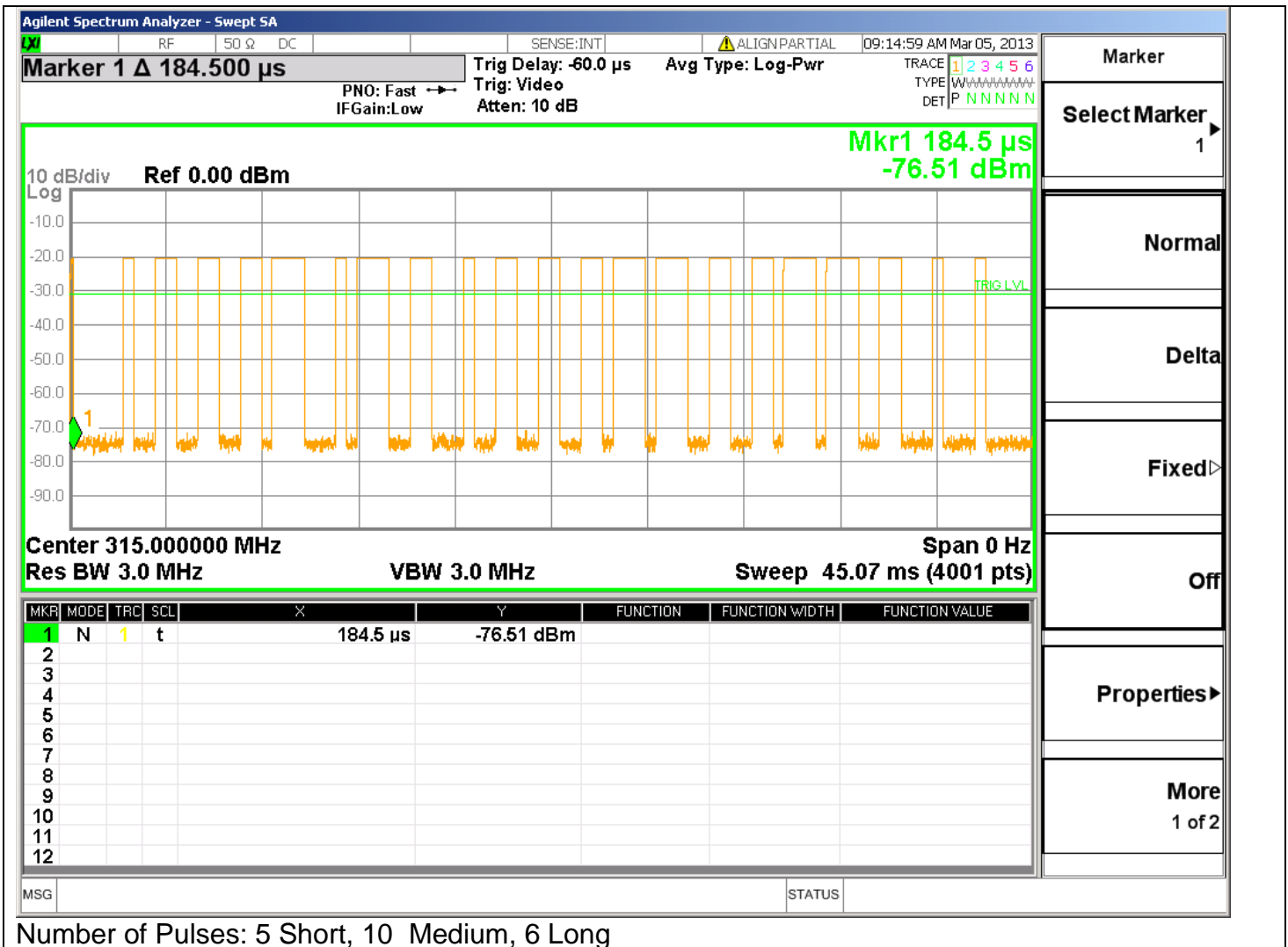
TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB)
			$20\log\left(\frac{PulseWidth}{Period}\right)$
390MHz	0.1253+(5x0.5067)+(10x1.003)+(6x1.502)	100	-13.271
Worst Case Duty Cycle: Worst case duty cycle was calculated over 100mS including the tuning pulse. The manufacturer declared duty cycle as -10.17dB and it is used for all radiated emissions data.			

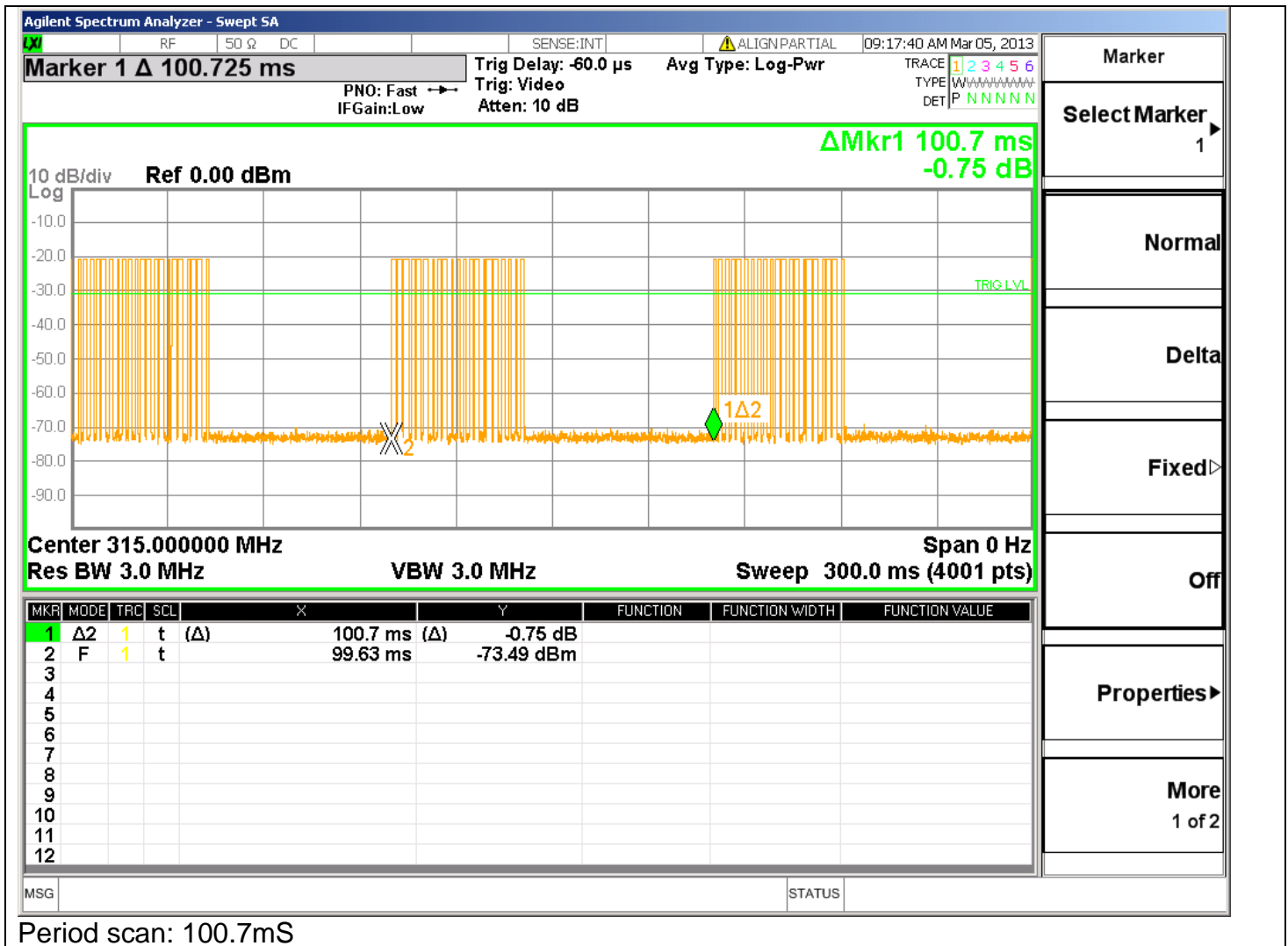
Figure 18 Pulse Train Graphs for 390MHz





Pulse Duration: Short Pulse 0.5067mS, Medium Pulse 1.003mS, Long Pulse 1.502mS





4.2.4 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
Out of band spurious emissions limits		
Frequency (MHz)	Limit (dB μ V/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 (dB μ V/m) @ 3m distance	
	All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
315	75.62	95.62
Supplementary information: See section 4.2.3 for duty cycle information. Below 1GHz only emissions visible above the noise floor were the fundamental and the harmonics of the fundamental.		

Figure 19 Radiated Emissions Graph (Above 1GHz)

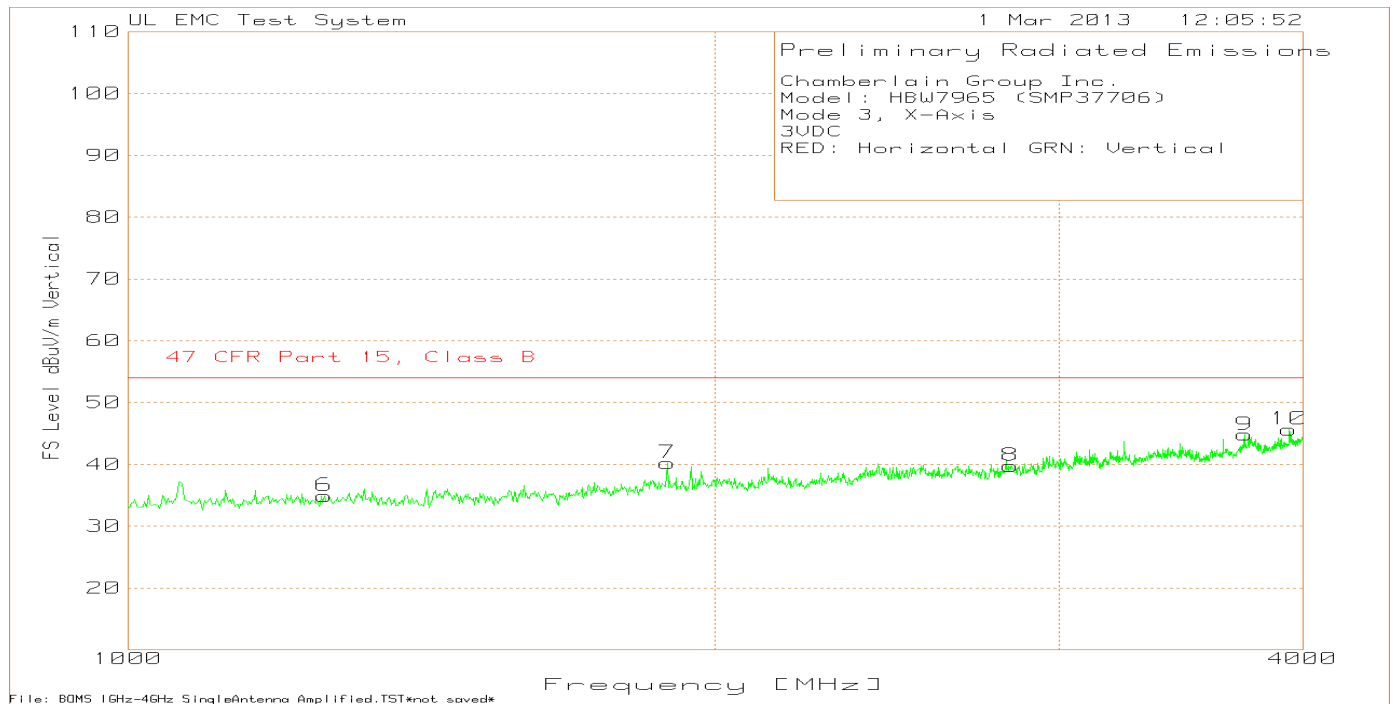
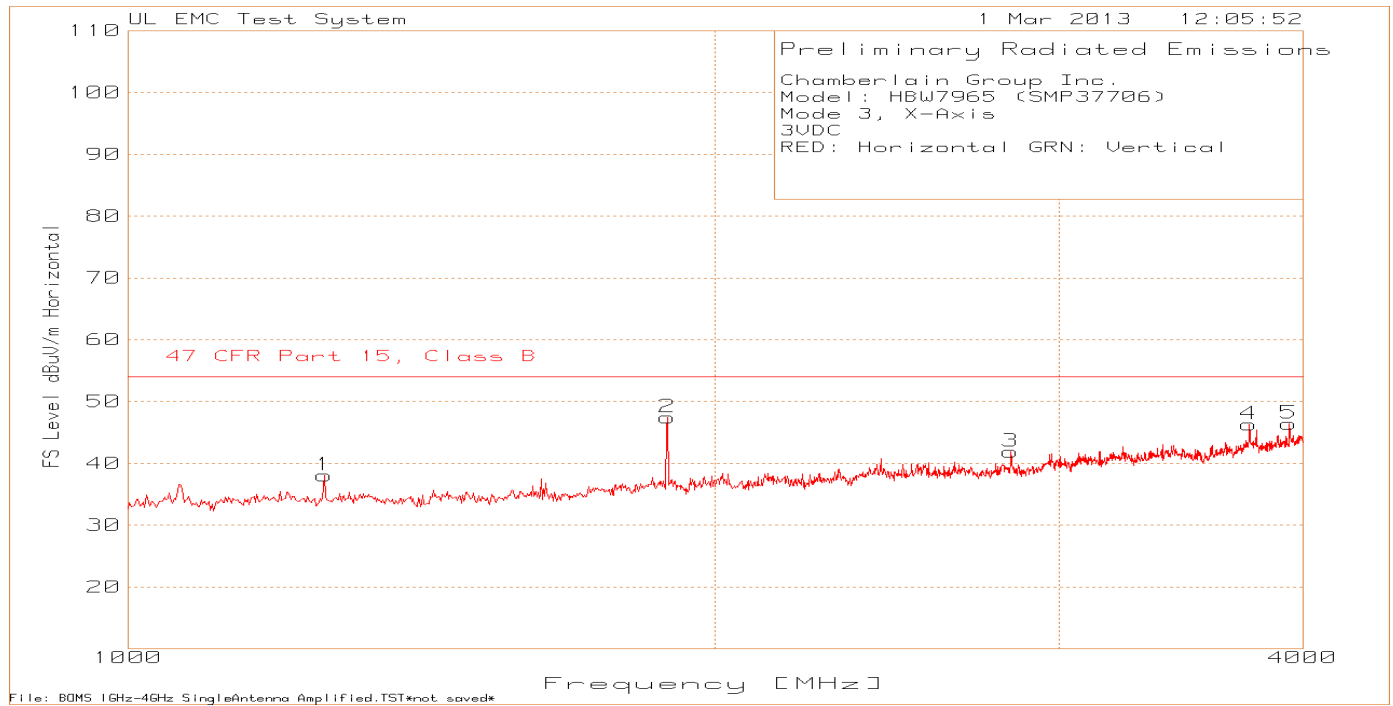


Table 15 - Radiated Emissions Data Points 315MHz

Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
315.024	66.07	PK	14.3	2.1	82.47	-10.17	72.3	75.62	-3.32	88	100	Horz	2
315.0245	50.38	PK	14.3	2.1	66.78	-10.17	56.61	75.62	-19.01	192	135	Vert	2
630.0453	15.42	PK	20.7	3	39.12	-10.17	28.95	46	-17.05	174	142	Horz	2
945.068	20.43	PK	23.9	3.8	48.13	-10.17	37.96	46	-8.04	141	148	Horz	2
630.052	13.63	PK	20.7	3	37.33	-10.17	27.16	46	-18.84	255	159	Vert	2
945.063	12.98	PK	23.9	3.8	40.68	-10.17	30.51	46	-15.49	30	100	Vert	2
1260.173	69.91	PK	25.1	-56.92	38.09	-10.17	27.92	54	-26.08	*	200	Horz	2
1890.594	74.59	PK	27.2	-54.32	47.47	-10.17	37.3	54	-16.7	*	150	Horz	2
2835.223	63.86	PK	29	-50.92	41.94	-10.17	31.77	54	-22.23	*	100	Horz	2
3755.837	65.25	PK	32.2	-51.09	46.36	-10.17	36.19	54	-17.81	*	200	Horz	2
3937.959	66.03	PK	32.6	-52.17	46.46	-10.17	36.29	54	-17.71	*	150	Horz	2
1260.173	66.73	PK	25.1	-56.92	34.91	-10.17	24.74	54	-29.26	*	200	Vert	2
1890.594	67.38	PK	27.2	-54.32	40.26	-10.17	30.09	54	-23.91	*	100	Vert	2
2833.222	61.66	PK	29	-50.92	39.74	-10.17	29.57	54	-24.43	*	150	Vert	2
3733.823	63.65	PK	32.1	-50.96	44.79	-10.17	34.62	54	-19.38	*	100	Vert	2
3937.959	65.23	PK	32.6	-52.17	45.66	-10.17	35.49	54	-18.51	*	200	Vert	2

Notes:
 2 - Mode 3, X-Axis
 * Peak Prescan Data, not maximized

4.3 Configuration 4 Test Data

4.3.1 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 (390MHz: 975.0kHz)		

Table 16 Occupied Bandwidth Configuration Settings

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

Table 17 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 18 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
390MHz	52.65	102.97

Figure 20 – Bandwidth Graph – FCC

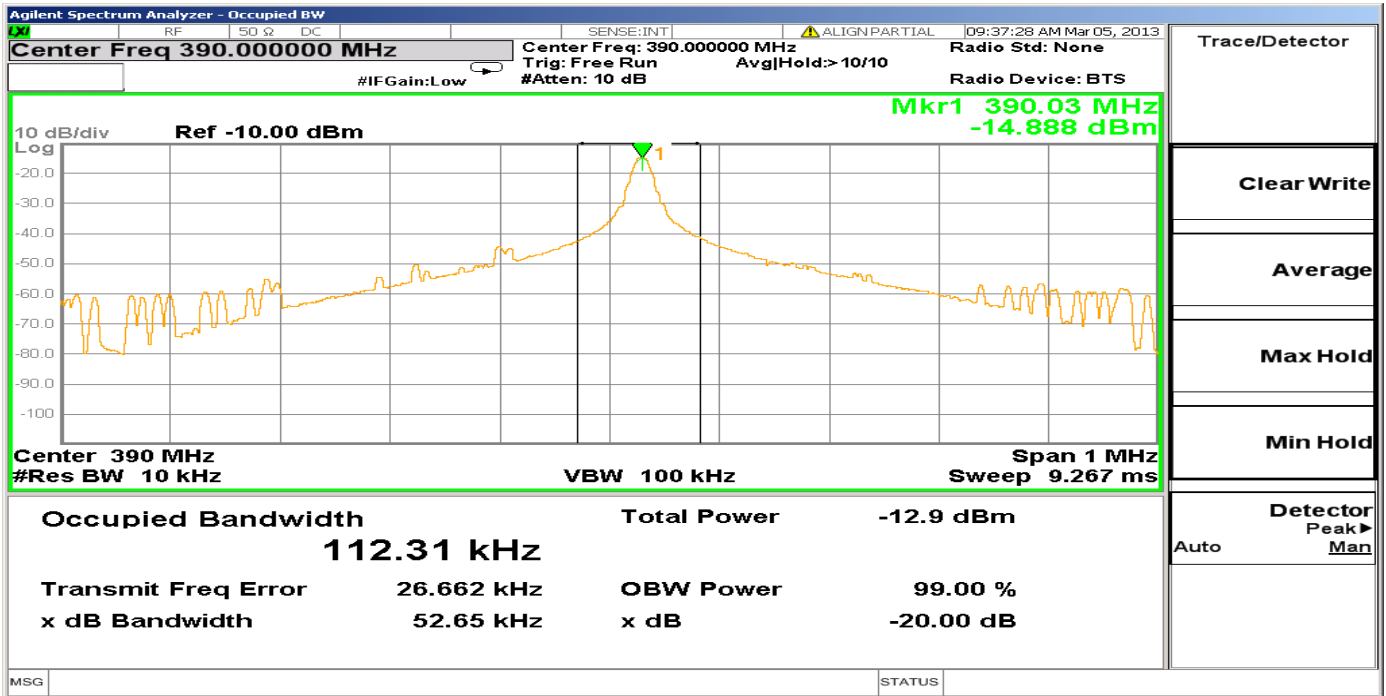
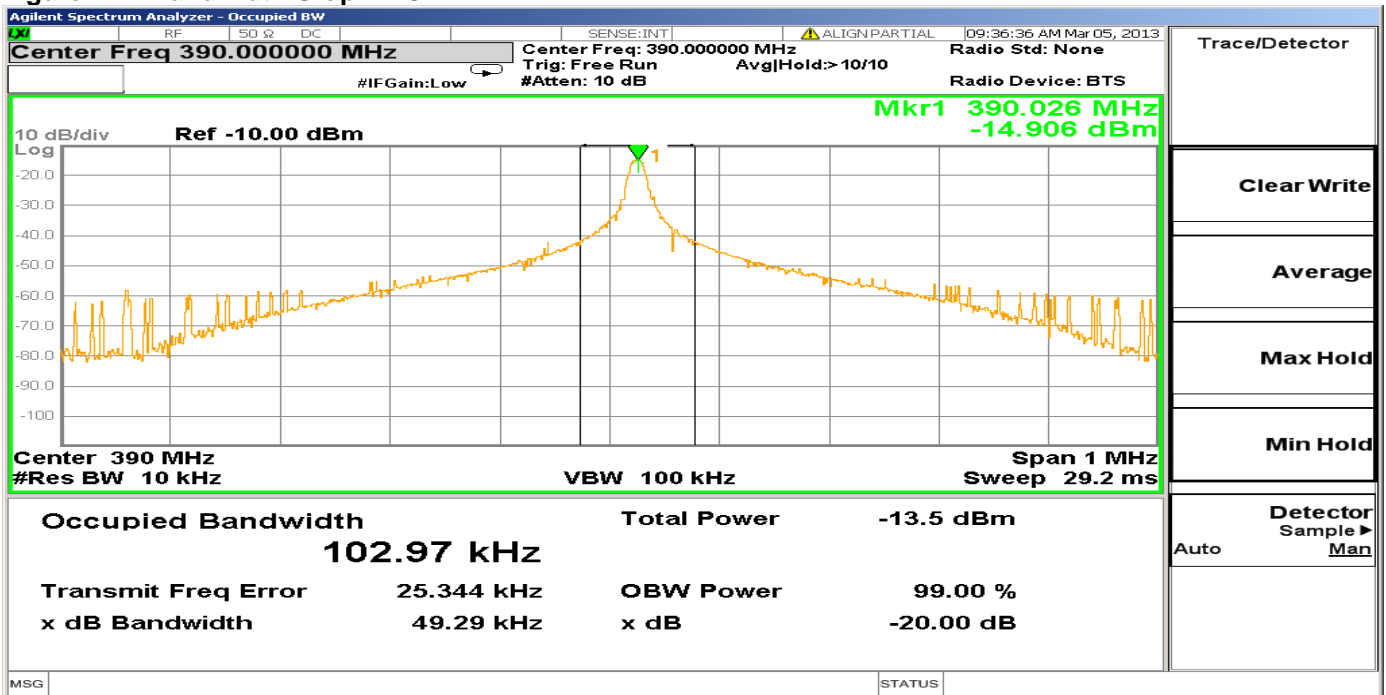


Figure 21 – Bandwidth Graph - IC



4.3.2 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 19 Cease Operation Configuration Settings

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

Figure 22 Cease Operation Graph



4.3.3 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.		

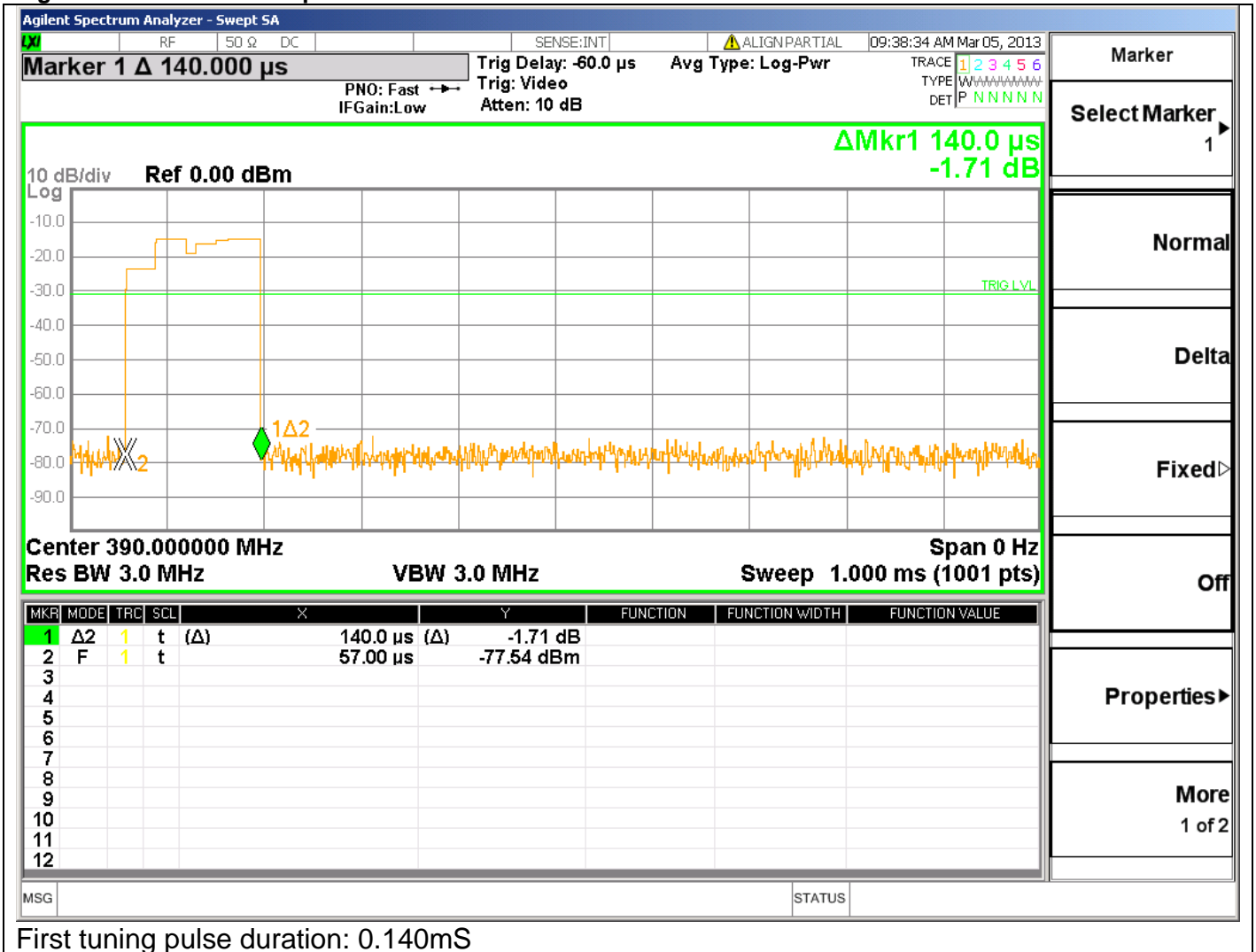
Table 20 Pulse Train Configuration Settings

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

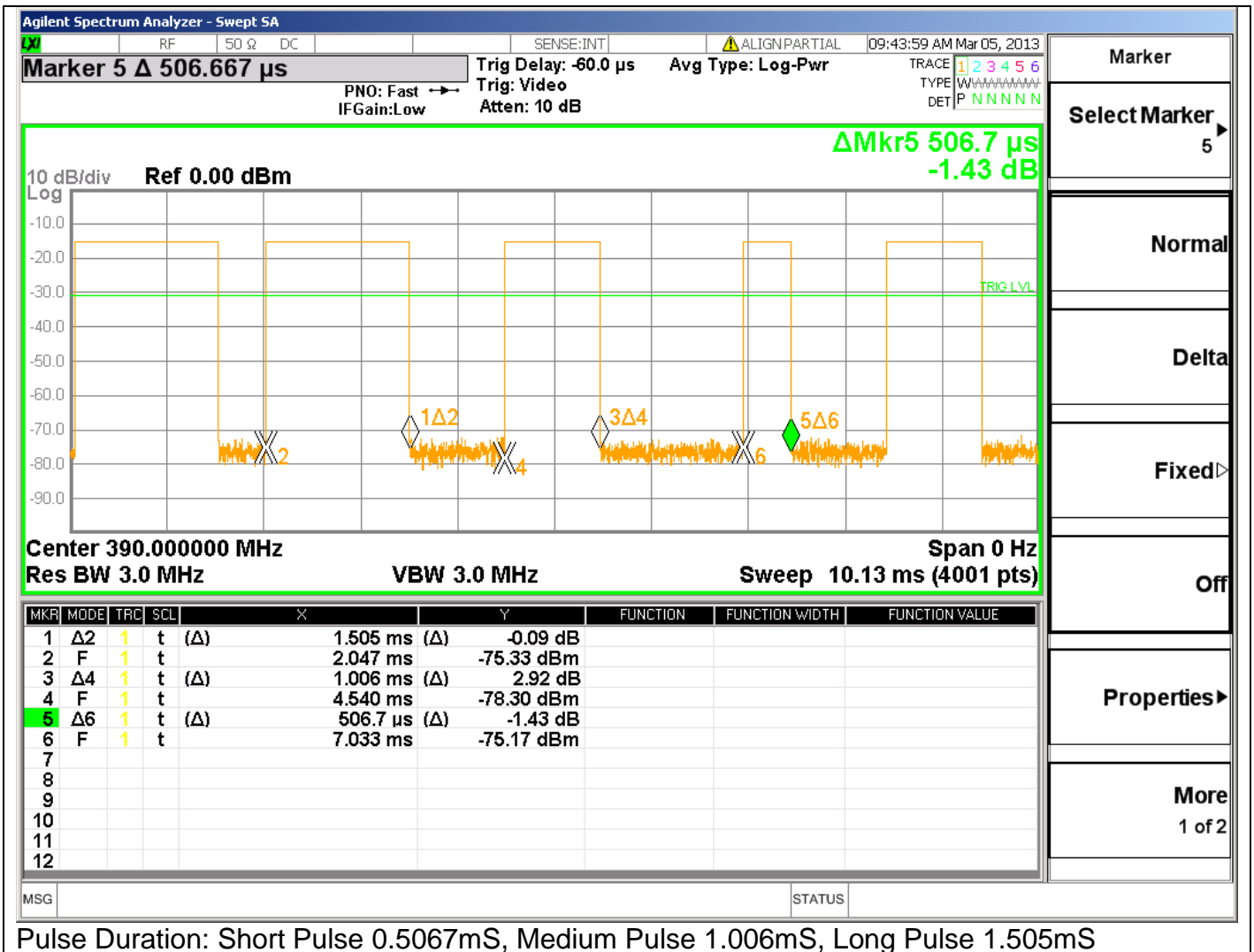
Table 21 Pulse Train Calculation

TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB)
			$20\log\left(\frac{PulseWidth}{Period}\right)$
390MHz	$0.140+(5 \times 0.5067)+(7 \times 1.006)+(9 \times 1.505)$	100	-12.67
Worst Case Duty Cycle: Worst case duty cycle was calculated over 100ms including the tuning pulses. The manufacturer declared duty cycle as -10.17dB and it is used for all radiated emissions data.			

Figure 23 Pulse Train Graphs for 390MHz



First tuning pulse duration: 0.140ms





Number of Pulses: 5 Short, 7 Medium, 9 Long



4.3.4 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
Out of band spurious emissions		
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	
	All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
390	79.24	99.24
Supplementary information: See section 4.3.3 for duty cycle information. Below 1GHz only emissions visible above the noise floor were the fundamental and the harmonics of the fundamental.		

Figure 24 Radiated Emissions Graph (Above 1GHz)

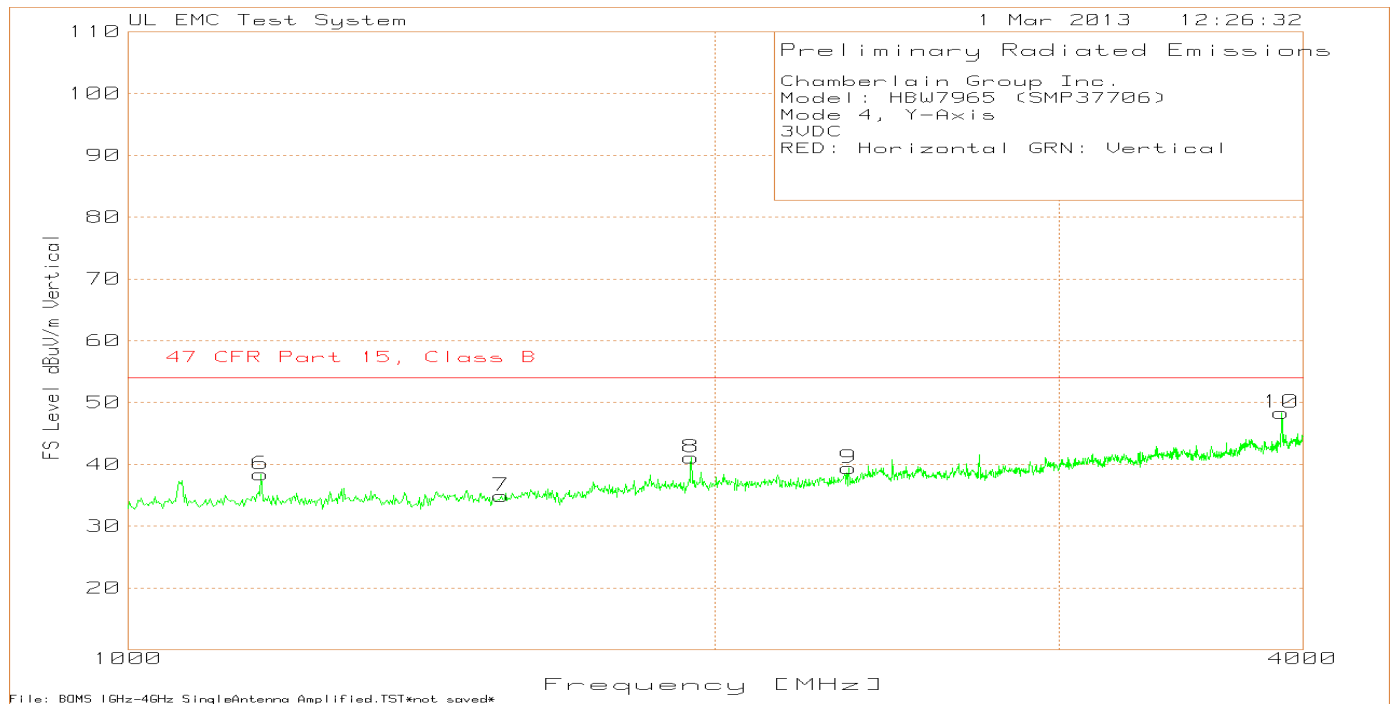
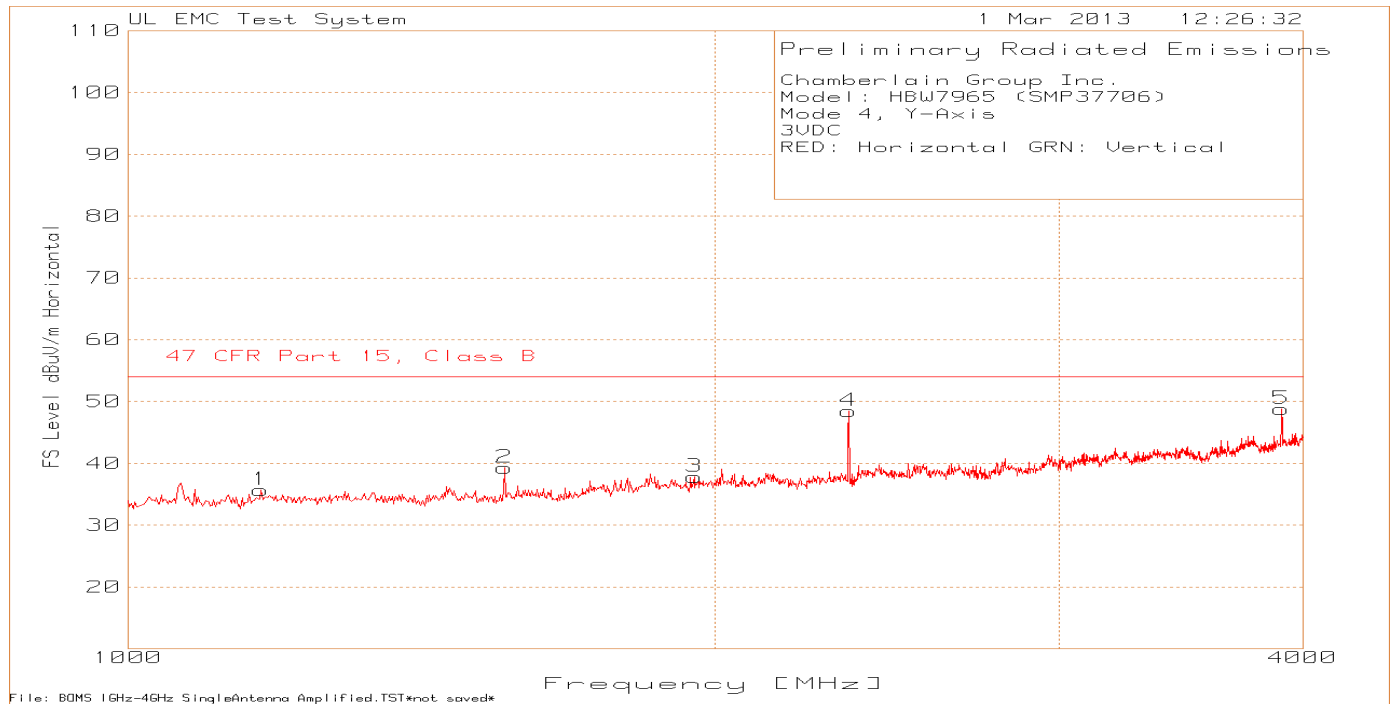


Table 22 - Radiated Emissions Data Points

Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
390.027	60.64	PK	16.1	2.3	79.04	-10.17	68.87	79.24	-10.37	0	171	Horz	1
390.029	68	PK	16.1	2.3	86.4	-10.17	76.23	79.24	-3.01	278	138	Vert	1
779.9726	11.4	PK	22	3.4	36.8	-10.17	26.63	46	-19.37	220	201	Vert	1
779.9466	19.75	PK	22	3.4	45.15	-10.17	34.98	46	-11.02	152	101	Horz	1
1170.113	67.89	PK	25	-57.24	35.65	-10.17	25.48	54	-28.52	*	200	Horz	1
1560.374	69.75	PK	25.2	-55.65	39.3	-10.17	29.13	54	-24.87	*	100	Horz	1
1950.634	64.91	PK	27.3	-54.39	37.82	-10.17	27.65	54	-26.35	*	150	Horz	1
2340.894	73.27	PK	28.1	-52.9	48.47	-10.17	38.3	54	-15.7	*	100	Horz	1
3901.935	68.2	PK	32.6	-51.99	48.81	-10.17	38.64	54	-15.36	*	150	Horz	1
1170.113	70.6	PK	25	-57.24	38.36	-10.17	28.19	54	-25.81	*	150	Vert	1
1554.37	65.65	PK	25.2	-55.93	34.92	-10.17	24.75	54	-29.25	*	200	Vert	1
1944.63	68.18	PK	27.3	-54.42	41.06	-10.17	30.89	54	-23.11	*	100	Vert	1
2340.894	64.24	PK	28.1	-52.9	39.44	-10.17	29.27	54	-24.73	*	200	Vert	1
3901.935	67.76	PK	32.6	-51.99	48.37	-10.17	38.2	54	-15.8	*	100	Vert	1

Notes:
 1 - Mode 4, D-Code, 390MHz, Y-Axis
 * Peak Prescan Data, Not Maximized

4.4 Configuration 5 Test Data

4.4.1 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 (390MHz: 975.0kHz)		

Table 23 Occupied Bandwidth Configuration Settings

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

Table 24 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 25 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
390MHz	52.72	106.19

Figure 25 – Bandwidth Graph – FCC

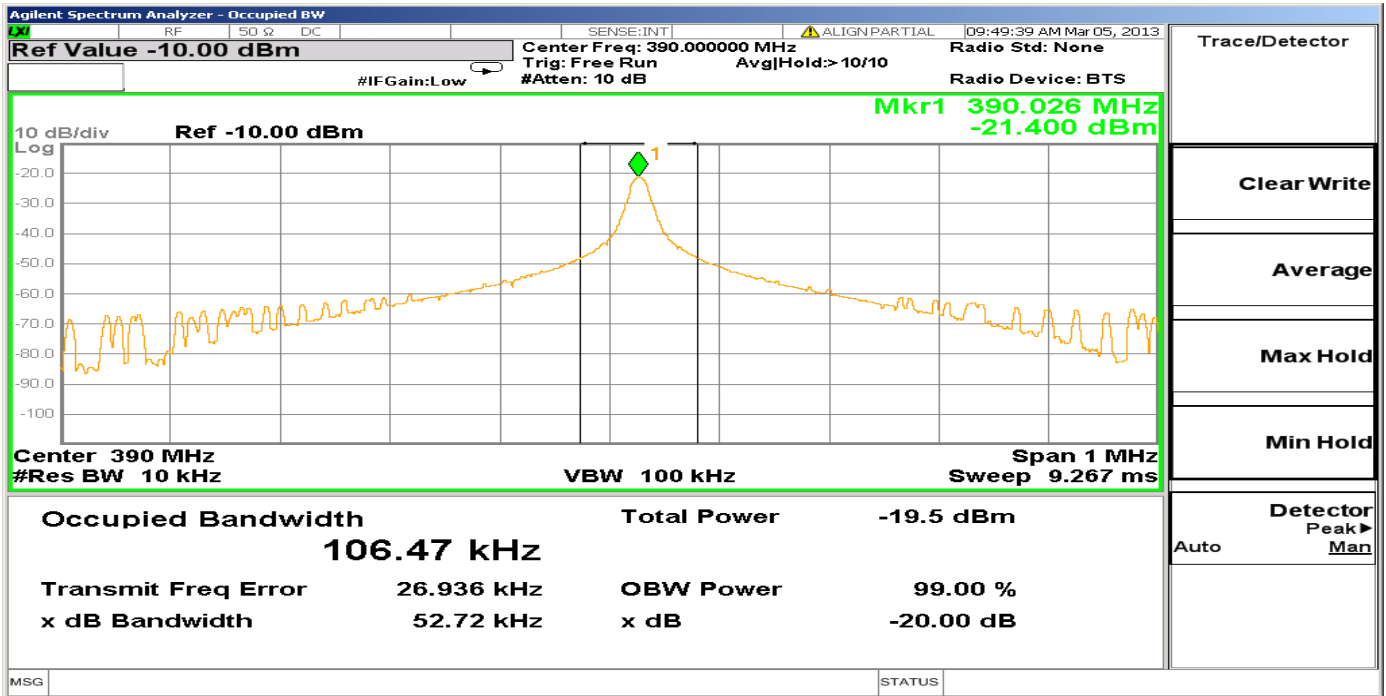
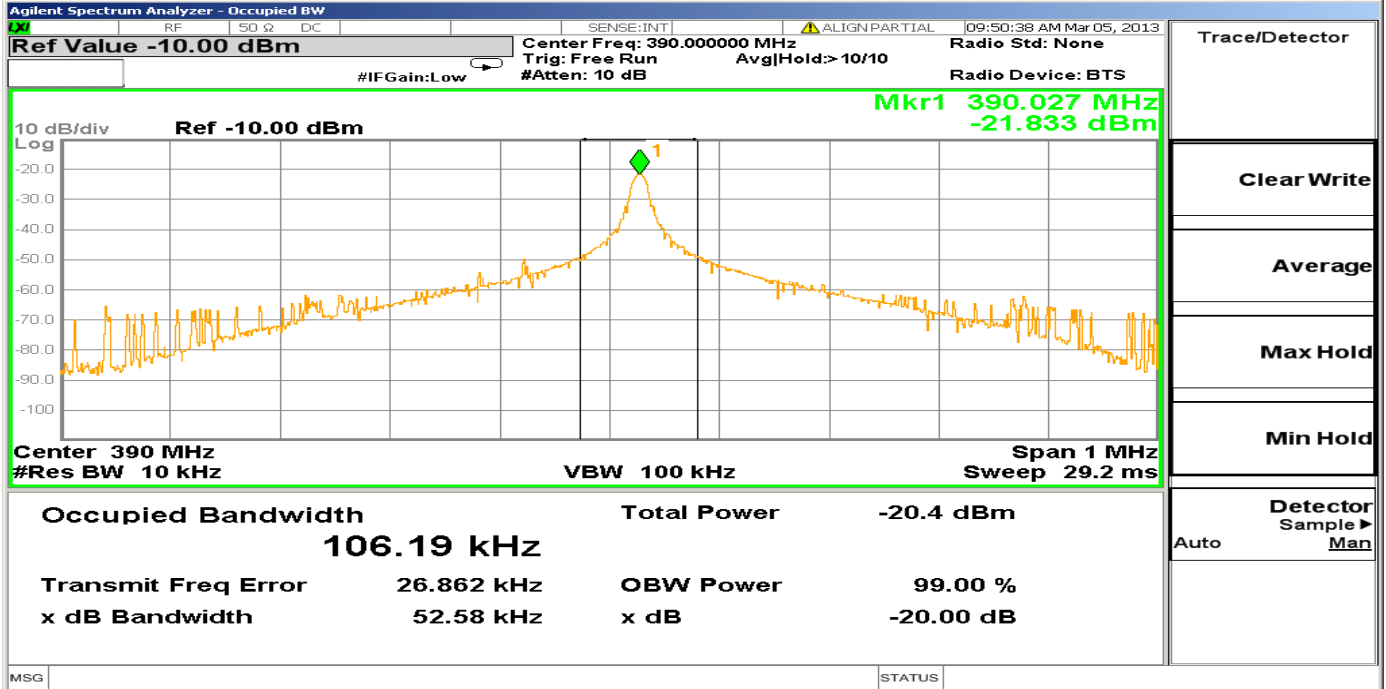


Figure 26 – Bandwidth Graph – IC



4.4.2 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 26 Cease Operation Configuration Settings

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

Figure 27 Cease Operation Graph



4.4.3 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 27 Pulse Train Configuration Settings

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

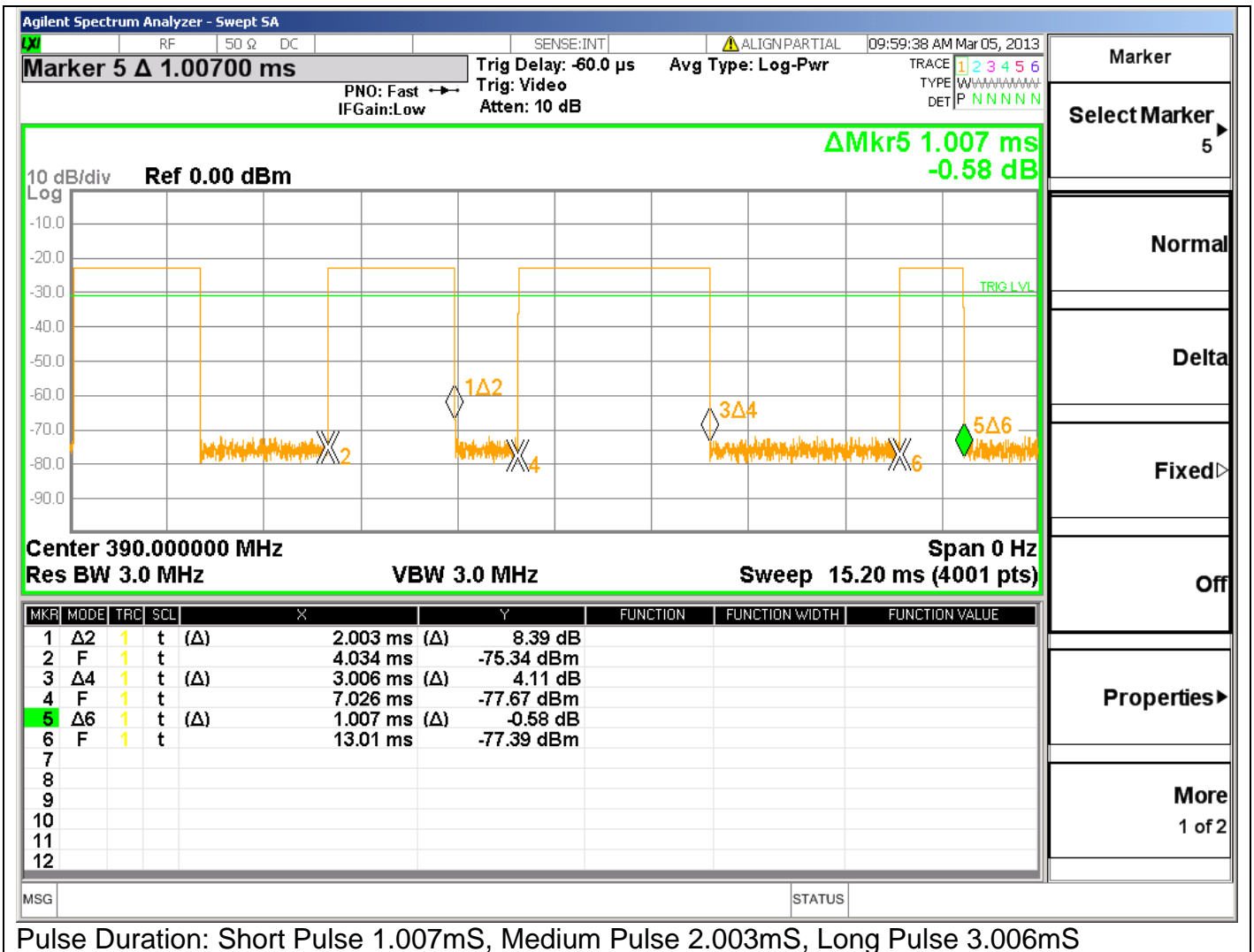
Table 28 Pulse Train Calculation

TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
390MHz	(3x1.007)+(5x2.003)+(3x3.006)	76.37	-10.79
Worst Case Duty Cycle: Worst case duty cycle was calculated over normal period of 76.4mS not including the tuning pulses. The manufacturer declared duty cycle as -6.74dB and it is used for all radiated emissions data.			

Figure 28 Pulse Train Graphs for 390MHz

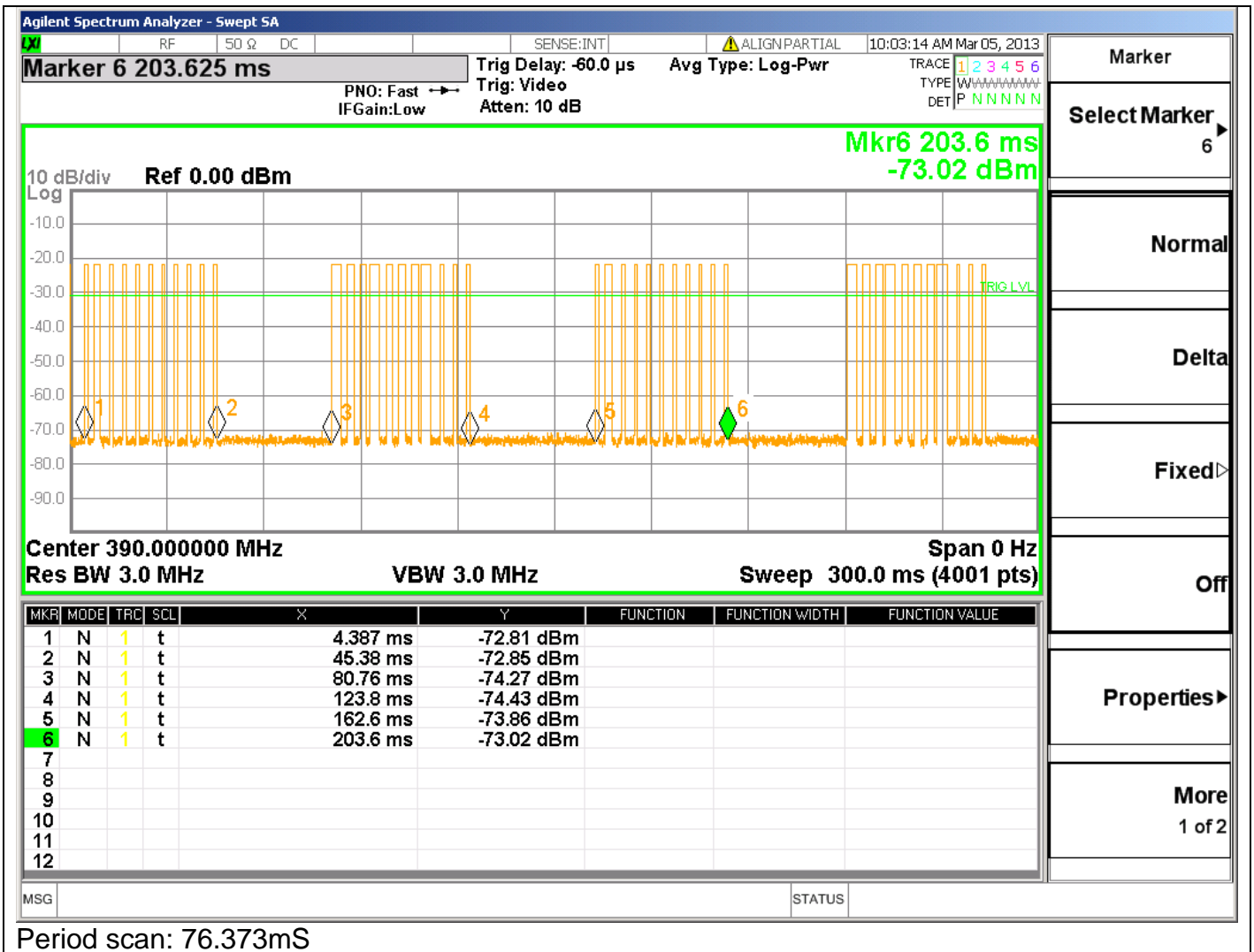


First tuning pulse duration: 0.139mS



Pulse Duration: Short Pulse 1.007mS, Medium Pulse 2.003mS, Long Pulse 3.006mS





4.4.4 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 (dB μ V/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 (dB μ V/m) @ 3m distance	
	All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
390	79.24	99.24
Supplementary information: See section 4.4.3 for duty cycle information. Below 1GHz only emissions visible above the noise floor were the fundamental and the harmonics of the fundamental.		

Figure 29 Radiated Emissions Graph (Above 1GHz)

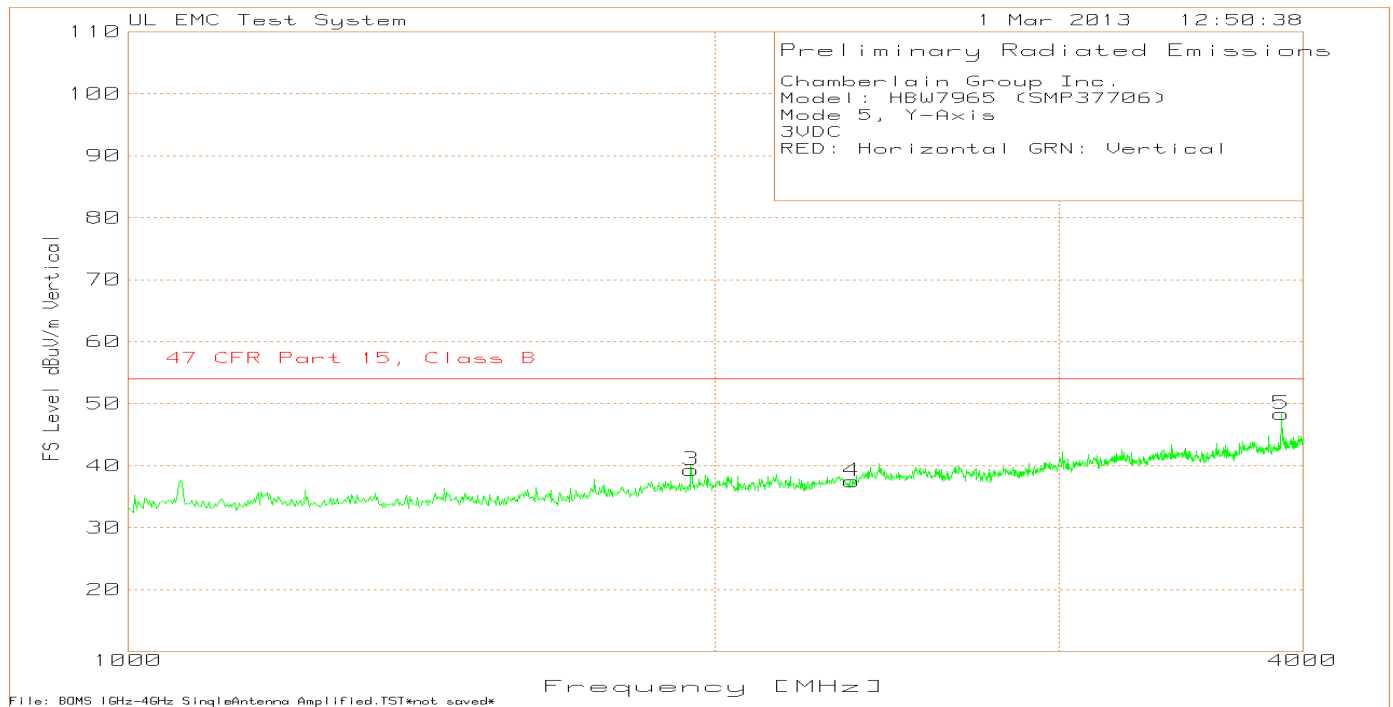
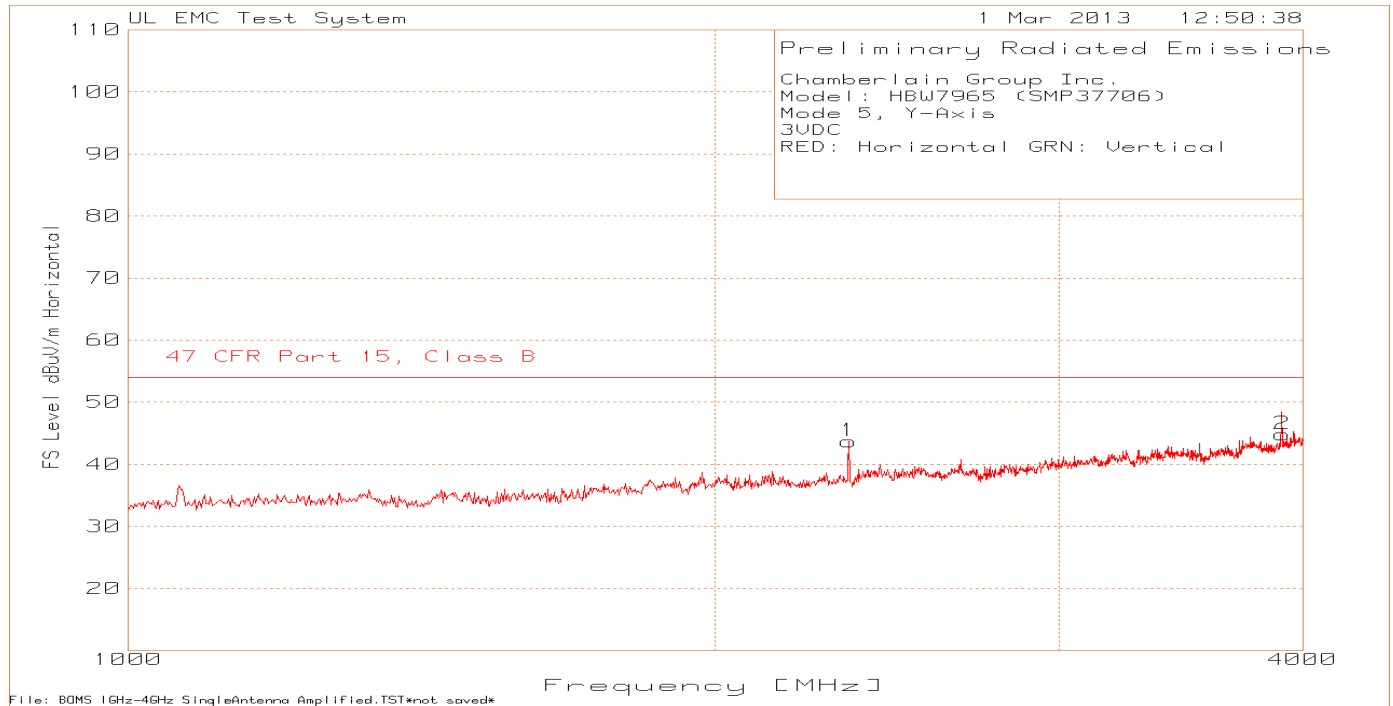


Table 29 - Radiated Emissions Data Points

Test Frequency MHz	Meter Reading	Detector	AF dB	Path L/G dB	Level dBuV/m	Duty Cycle dB	Level with DC dBuV/m	Limit dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity	Notes
390.0258	53.67	PK	16.1	2.3	72.07	-6.74	65.33	79.24	-13.91	360	172	Horz	1
390.0268	60.64	PK	16.1	2.3	79.04	-6.74	72.3	79.24	-6.94	279	141	Vert	1
780.0159	14.4	PK	22	3.4	39.8	-6.74	33.06	46	-12.94	336	100	Horz	1
780.0117	5.57	PK	22	3.4	30.97	-6.74	24.23	46	-21.77	360	101	Vert	1
2340.894	68.51	PK	28.1	-52.9	43.71	-6.74	36.97	54	-17.03	*	100	Horz	1
3907.939	63.93	PK	32.6	-51.73	44.8	-6.74	38.06	54	-15.94	*	149	Horz	1
1944.63	66.38	PK	27.3	-54.42	39.26	-6.74	32.52	54	-21.48	*	100	Vert	1
2350.901	62.2	PK	28.2	-52.88	37.52	-6.74	30.78	54	-23.22	*	150	Vert	1
3901.935	67.78	PK	32.6	-51.99	48.39	-6.74	41.65	54	-12.35	*	100	Vert	1

Notes:
 1 - Mode 5, A-Code, 390MHz, Y-Axis
 * Peak Prescan Data, Not Maximized

Appendix A

Test Equipment Used

Test Equipment Used for Near Field Measurements					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Spectrum analyzer	Agilent	PXA	EMC4360	20121226	20131226
Generic Di-pole Antenna	-	-	-	-	-

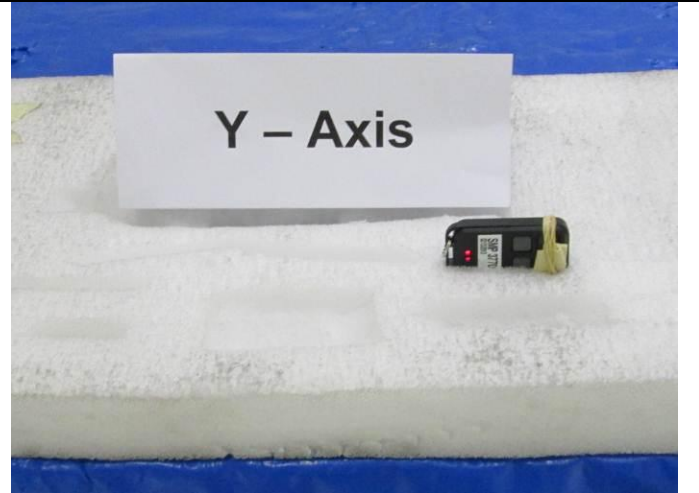
Test Equipment Used for Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20121227	20131231
Bicon Antenna	Electro-Metircs	EM-6912A	EMC4070	20120806	20130831
Log-P Antenna	Chase	UPA6109	EMC4313	20120807	20130831
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20121226	20131231
Antenna Array	UL	BOMS	EMC4276	20111227	20131231

Appendix B

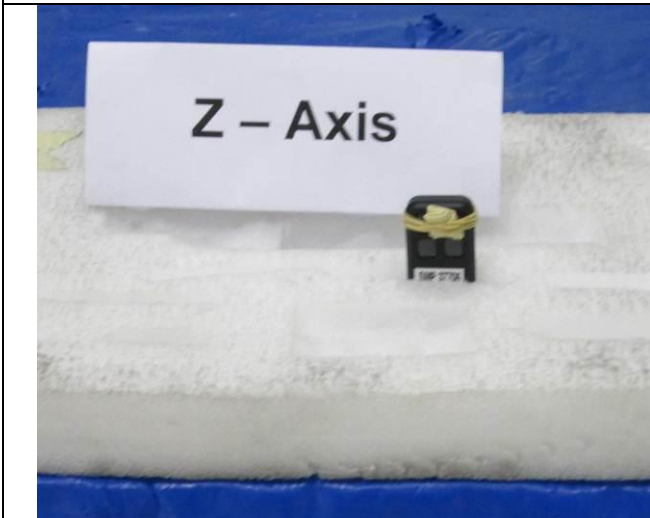
Test Setup Photos



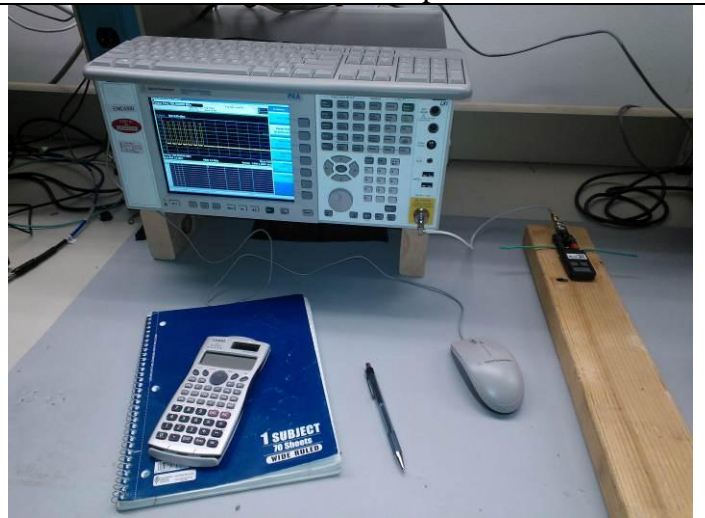
X-Axis Setup



Y-Axis Setup



Z-Axis setup



Near Field Setup



Radiated Emissions setup

Appendix C

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

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