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Job Number: 1001542838
Project Number: 12CA44791
File Number: MC15343
Date: October 10, 2012
Model: KLIK2C

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

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Test Report Details

Tests Performed By: **UL LLC**
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 Northbrook, IL 60062

Tests Performed For: **Chamberlain Group Inc.**
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Test Report Date: **October 10, 2012**

Product Type: **Universal Periodic Transmitter**

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

Model Number: **KLIK2C**

EUT Category: **Wireless Device**

Testing Start Date: **September 13, 2012**

Date Testing Complete: **October 10, 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.

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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 wall mount keypad transmitter used with various brand garage door operators. The transmitter uses 300MHz, 310MHz, 315MHz, 318MHz, 372.5MHz 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.	KLIK2C	During testing this device was referenced by KLIK2

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	9	-	-	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 per specific configuration

1.5 Rational for EUT Configuration

Mode #	Description																																								
1	Below is a list of possible configurations. Configurations that were not tested had same power amplifier setting, same frequency and same duty cycle number as the ones above.																																								
	<table border="1"> <thead> <tr> <th>CONFIG#</th> <th>Frequency</th> </tr> </thead> <tbody> <tr><td>14#</td><td>300MHz</td></tr> <tr><td>8#</td><td>310MHz</td></tr> <tr><td>7#</td><td>310MHz</td></tr> <tr><td>18#</td><td>310MHz</td></tr> <tr><td>16#</td><td>310MHz</td></tr> <tr><td>8#</td><td>315MHz</td></tr> <tr><td>3#</td><td>315MHz</td></tr> <tr><td>5#</td><td>315MHz</td></tr> <tr><td>12#</td><td>315MHz</td></tr> <tr><td>1#</td><td>318MHz</td></tr> <tr><td>9#</td><td>372.5MHz</td></tr> <tr><td>8#</td><td>390MHz</td></tr> <tr><td>2#</td><td>390MHz</td></tr> <tr><td>6#</td><td>390MHz</td></tr> <tr><td>19#</td><td>390MHz</td></tr> <tr><td>15#</td><td>390MHz</td></tr> <tr><td>11#</td><td>390MHz</td></tr> <tr><td>4#</td><td>390MHz</td></tr> <tr><td>13#</td><td>390MHz</td></tr> </tbody> </table>	CONFIG#	Frequency	14#	300MHz	8#	310MHz	7#	310MHz	18#	310MHz	16#	310MHz	8#	315MHz	3#	315MHz	5#	315MHz	12#	315MHz	1#	318MHz	9#	372.5MHz	8#	390MHz	2#	390MHz	6#	390MHz	19#	390MHz	15#	390MHz	11#	390MHz	4#	390MHz	13#	390MHz
CONFIG#	Frequency																																								
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4#	390MHz																																								
13#	390MHz																																								

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

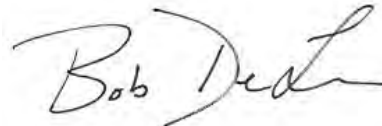
* Peak limit and margin to peak limit is not shown in the data. In all cases the duty cycle correction factor is less than 20dB thus no emission will be more then 20dB above the average level.

Test Engineer:



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

Reviewer:



Bob DeLisi
Sr. Staff Engineer
International EMC Services
Conformity Assessment Services

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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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Meter Reading (dBuV)} + \text{AF (dB/m)} + (-\text{Gain (dB)}) + \text{Cable Loss (dB)} \\ \text{Conducted Voltage (dBuV)} &= \text{Meter Reading (dBuV)} + \text{Cable Loss (dB)} + \text{LISN IL (dB)} \\ \text{Conducted Current (dBuA)} &= \text{Meter Reading (dBuV)} + \text{Cable Loss (dB)} - \text{Transducer Factor (dBohms)} \end{aligned}$$

4.1 Configuration 14# 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 (300MHz: 750kHz)		

Table 1 Occupied Bandwidth Configuration Settings

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

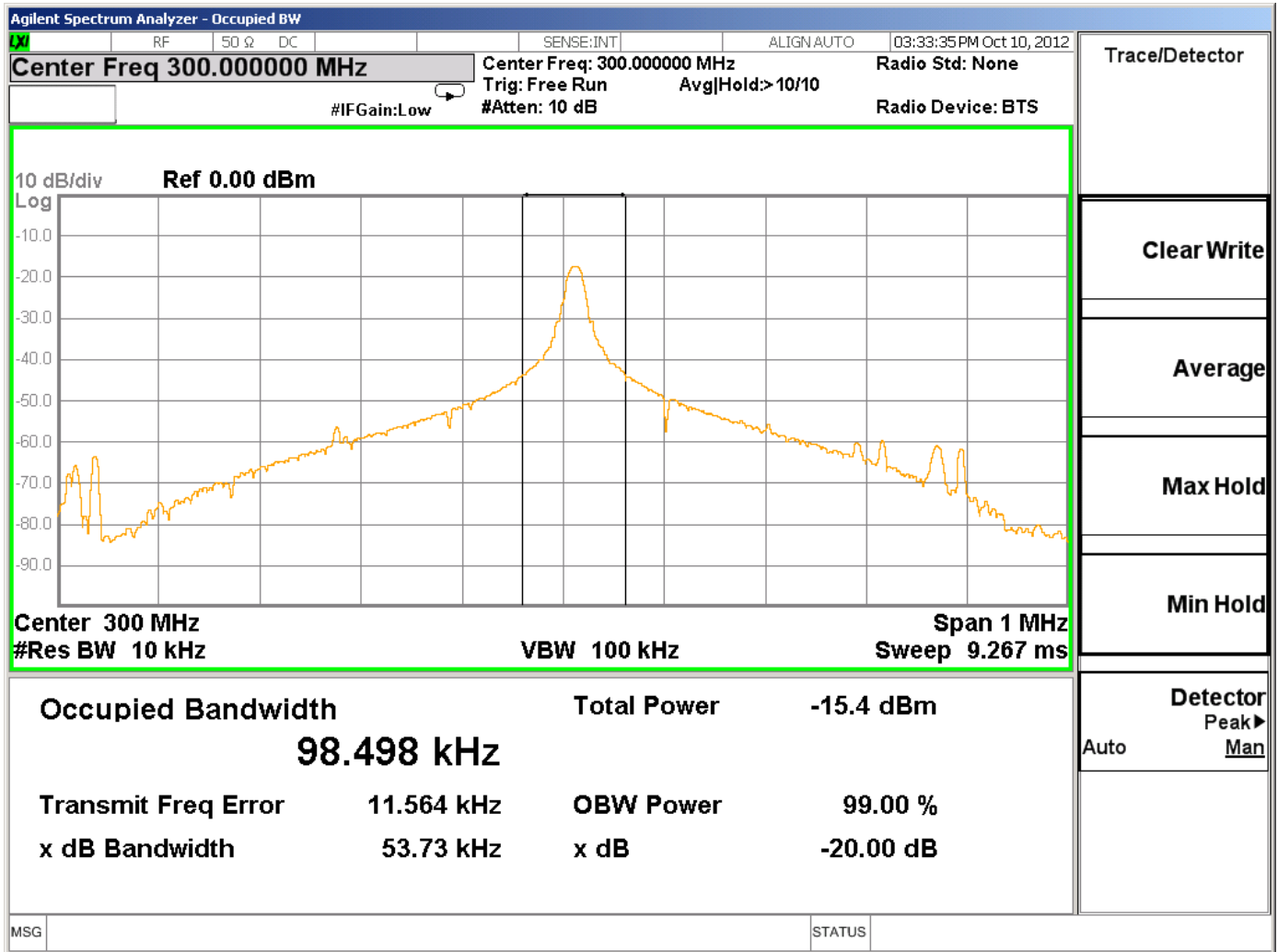
Table 2 Occupied Bandwidth Spectrum Analyzer Settings

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)
300MHz	53.73	98.498

Figure 1 – Bandwidth Graph



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 2 Cease Operation Graph



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.		

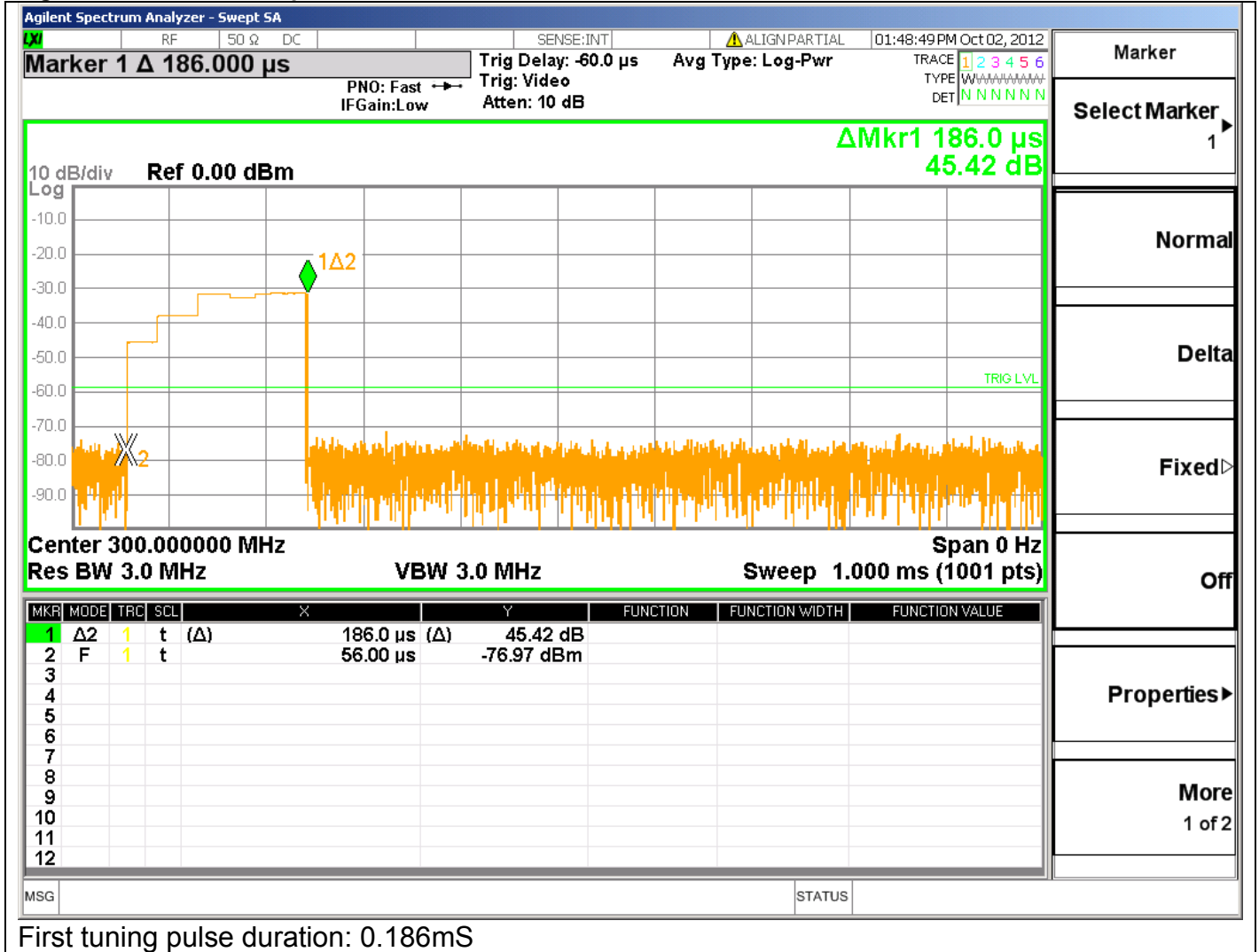
Table 5 Pulse Train Configuration Settings

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

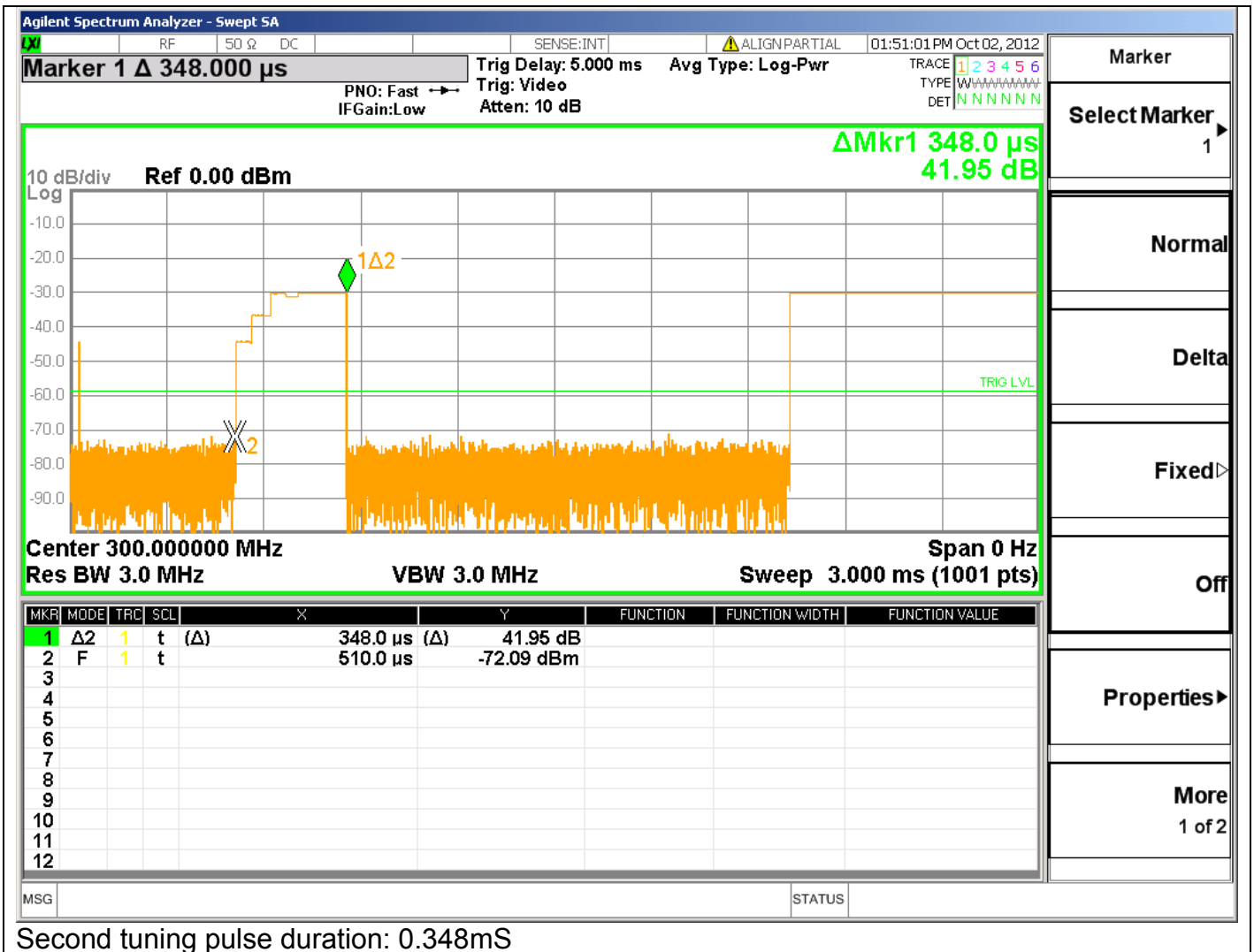
Table 6 Pulse Train Calculation

TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
300MHz	10x1.494	37ms	-7.87
Worst Case Duty Cycle: Worst case duty cycle was calculated by adding three sets of bursts over 100mS and the second tuning pulse. The manufacturer declares the worst case duty cycle at 8.1dB. The measured duty cycle is used for all radiated emissions.			

Figure 3 Pulse Train Graphs



First tuning pulse duration: 0.186mS







Number of pulses

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
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	
	All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
300	74.67	94.67
Supplementary information: See section 4.1.3 for duty cycle information.		

Figure 4 Radiated Emissions Graph (Below 1GHz)

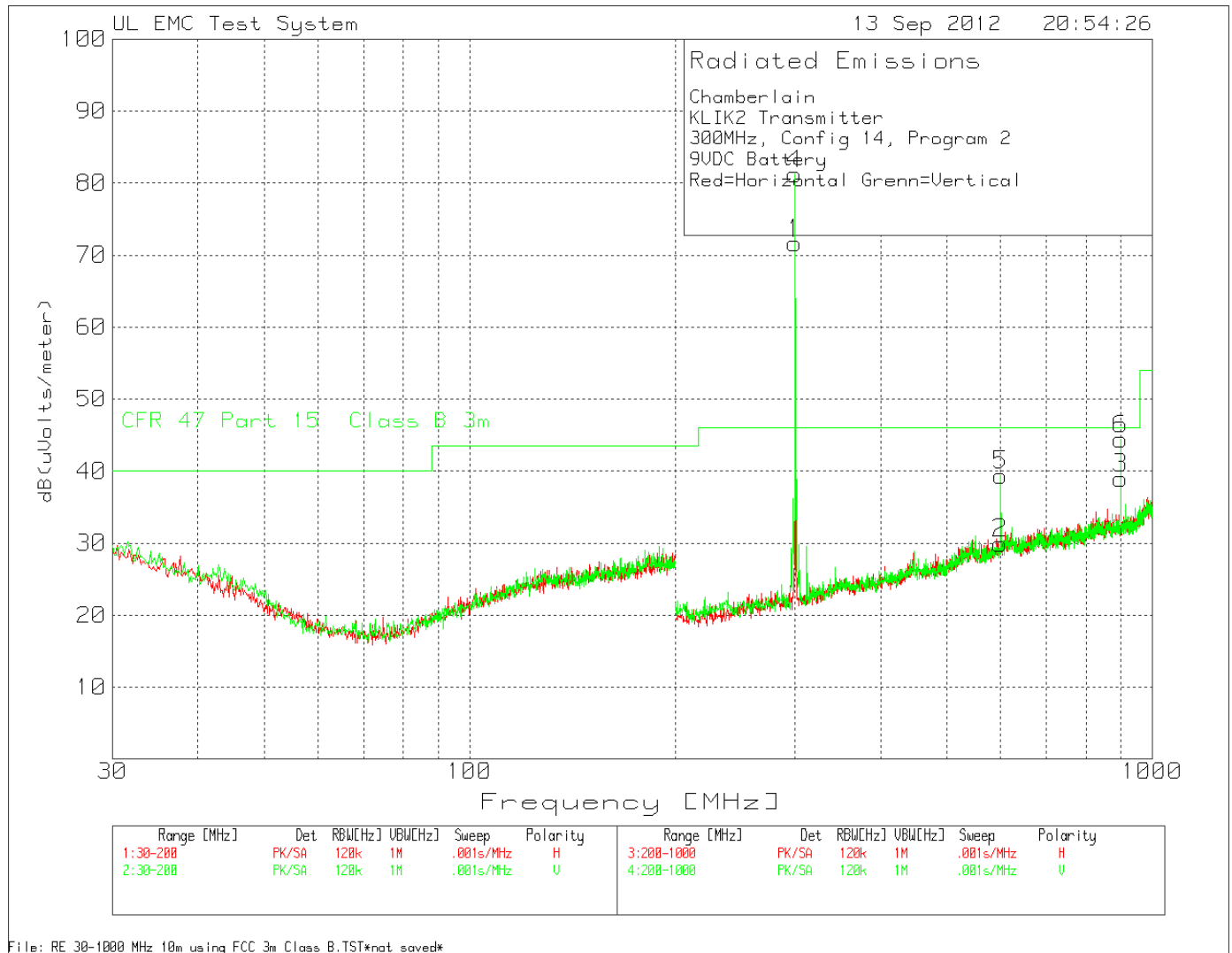


Figure 5 Radiated Emissions Graph (Above 1GHz)

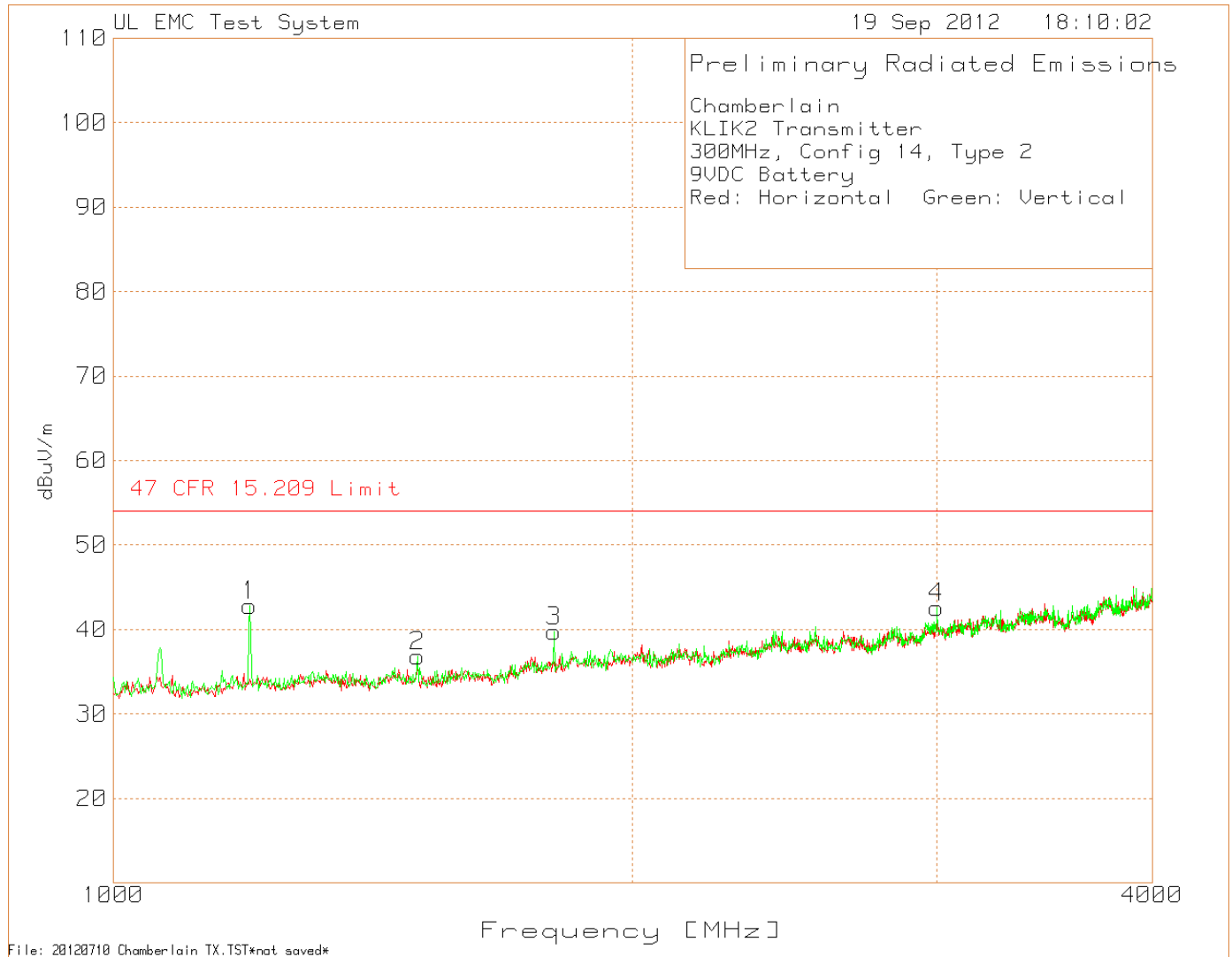


Table 7 - Radiated Emissions Data Points

Chamberlain KLIK2C Transmitter 300MHz, Config 14, Type 2 9VDC Battery Red: Horizontal Green: Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
300.013595	64.3	PK	13.9	2	80.2	-7.87	72.33	74.67	-2.34	176	110	Horz
300.013595	65.01	PK	13.9	2	80.91	-7.87	73.04	74.67	-1.63	84	158	Vert
600.025297	9	PK	19.9	3	31.9	-7.87	24.03	46	-21.97	309	226	Horz
600.025297	15.87	PK	19.9	3	38.77	-7.87	30.9	46	-15.1	241	102	Vert
900.036859	21.07	PK	23.1	3.7	47.87	-7.87	40	46	-6	190	306	Horz
900.036859	23.62	PK	23.1	3.7	50.42	-7.87	42.55	46	-3.45	267	115	Vert
1200.1834	77.95	PK	25	-56.73	46.22	-7.87	38.35	54	-15.65	41	126	Vert
1500.334	67.46	PK	25.2	-55.89	36.77	-7.87	28.9	54	-25.1	*	101	Vert
1800.534	67.89	PK	27	-55.14	39.75	-7.87	31.88	54	-22.12	*	101	Vert
3001.334	63.61	PK	30.1	-51.08	42.63	-7.87	34.76	54	-19.24	*	101	Vert

* Peak prescan data, not maximized

4.2 Configuration 8# 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 (310MHz: 775.0kHz, 315MHz: 787.5kHz, 390MHz: 975.0kHz)		

Table 8 Occupied Bandwidth Configuration Settings

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

Table 9 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 10 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	53.58	101.54
315MHz	52.26	106.74
390MHz	52.11	105.58

Figure 6 – Bandwidth Graph for 310MHz

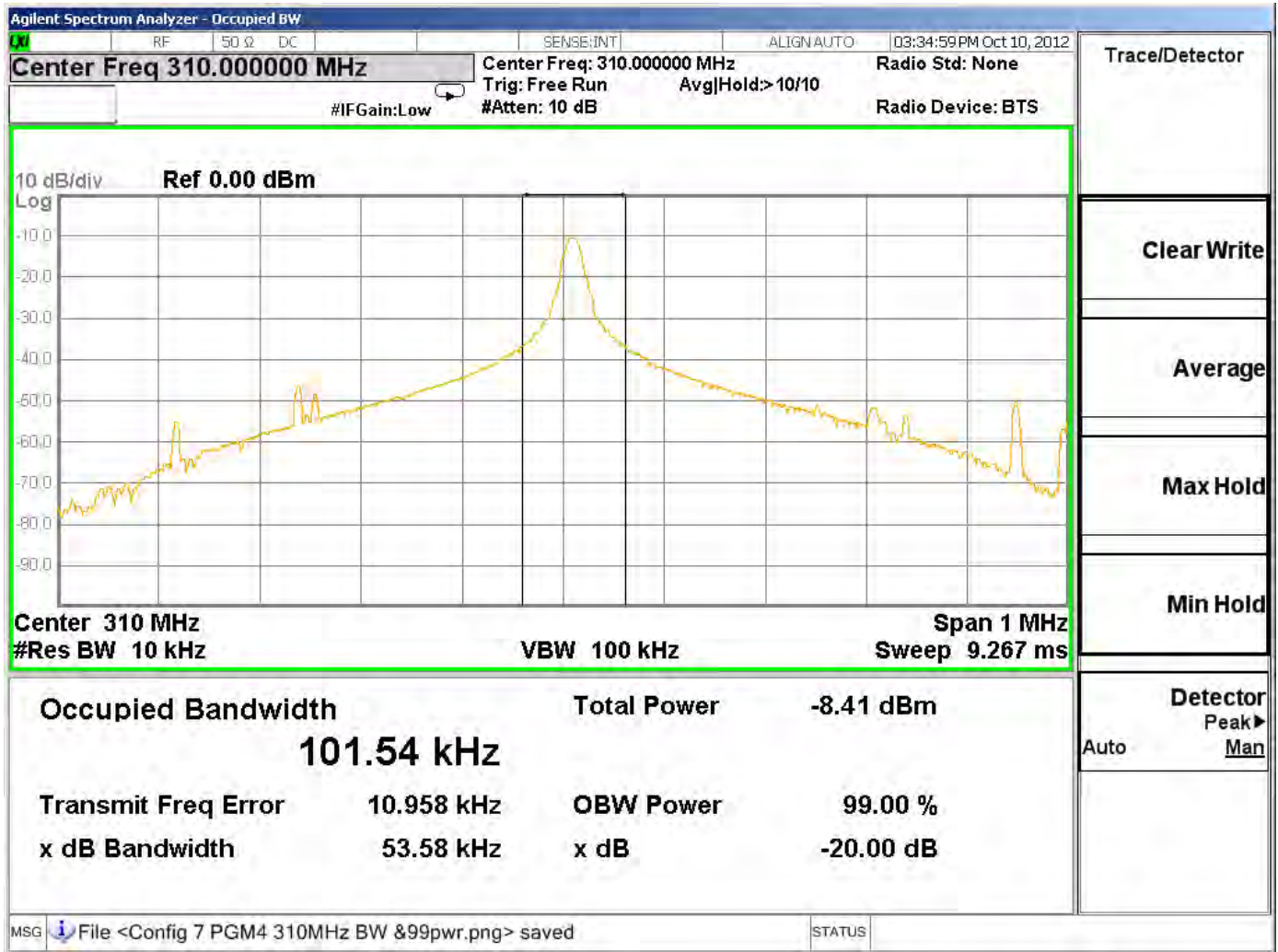


Figure 7 – Bandwidth Graph for 315MHz

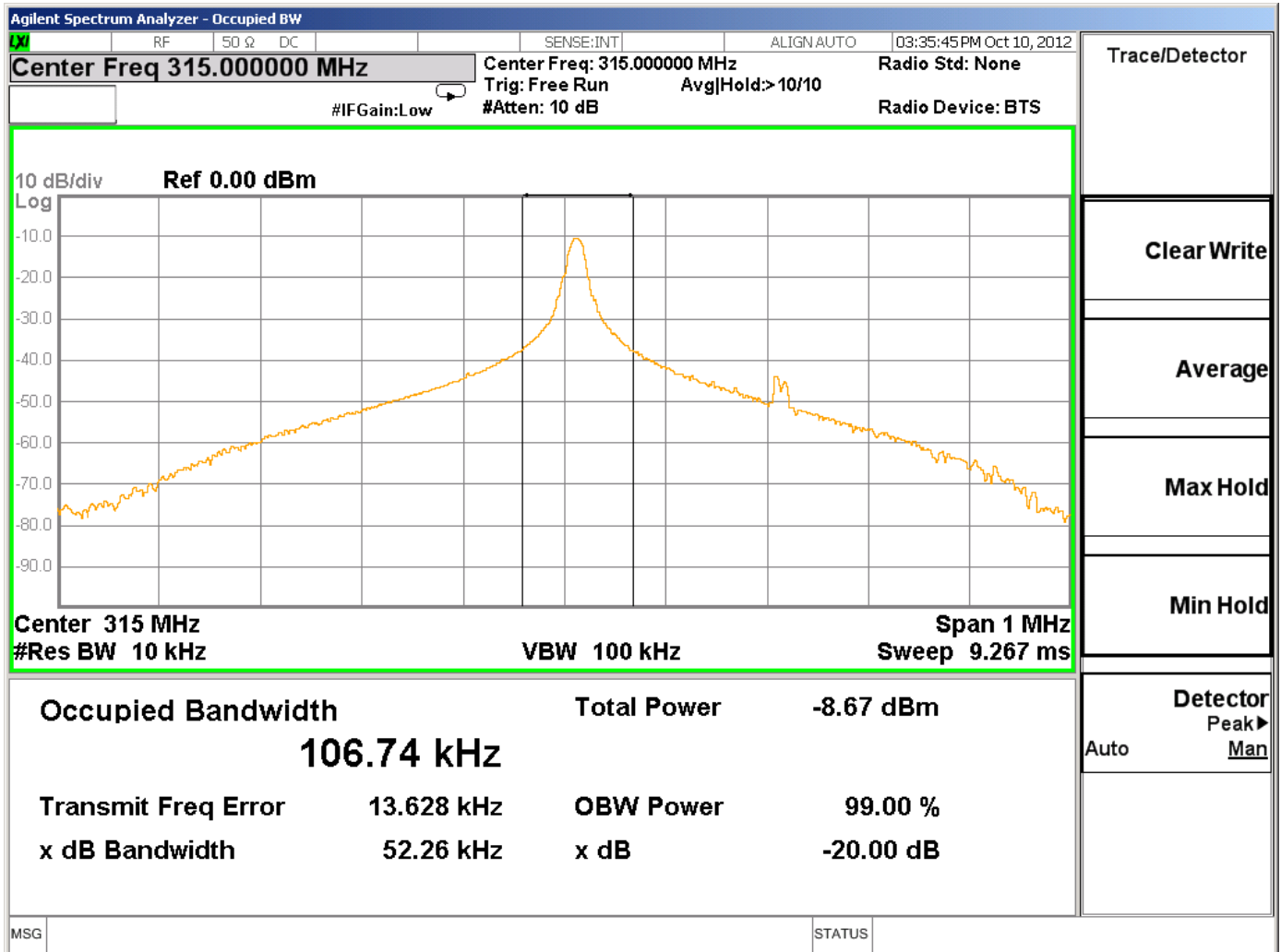
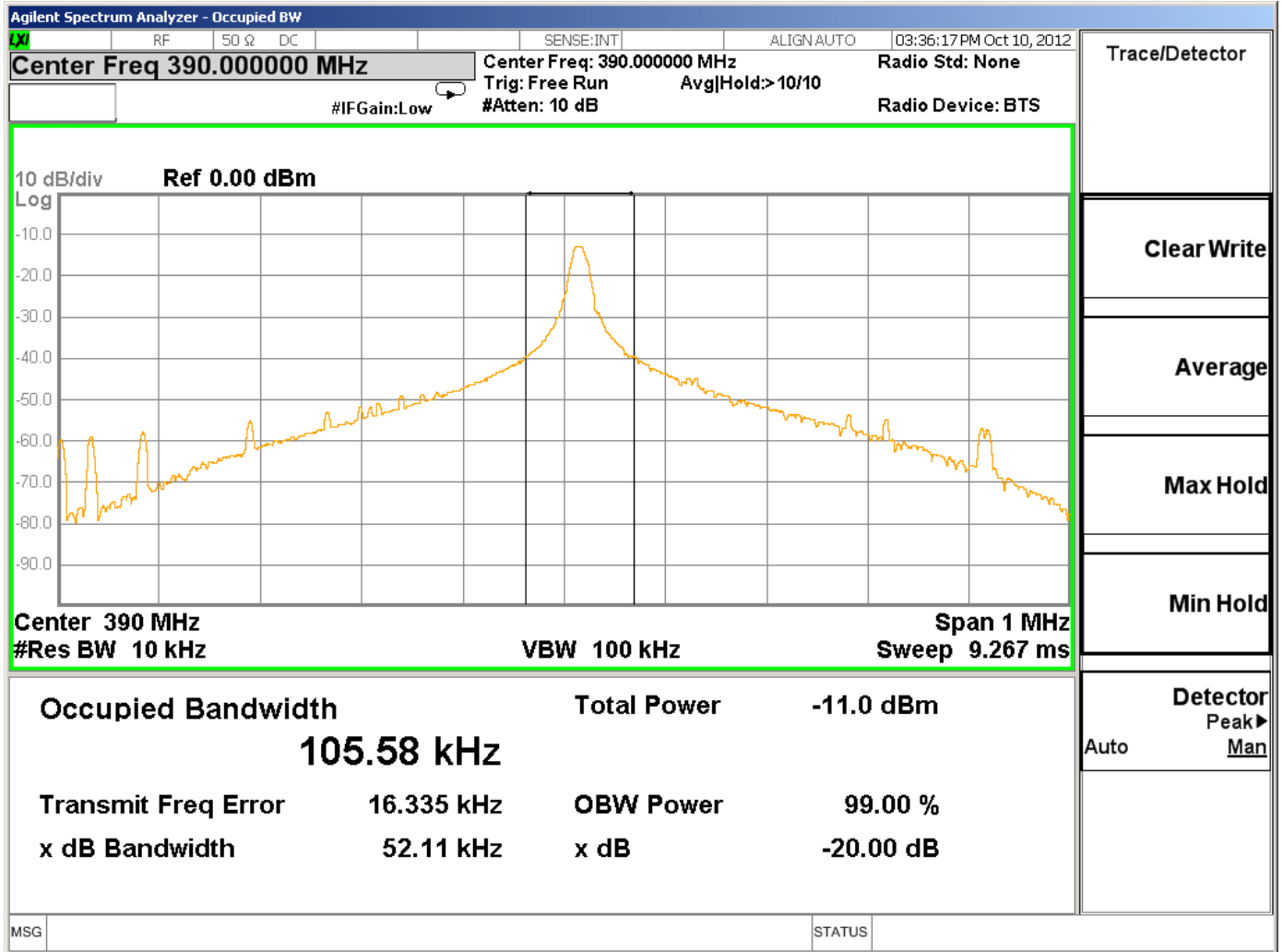


Figure 8 – Bandwidth Graph for 390MHz



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 11 Cease Operation Configuration Settings

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

Figure 9 Cease Operation Graph for 310MHz

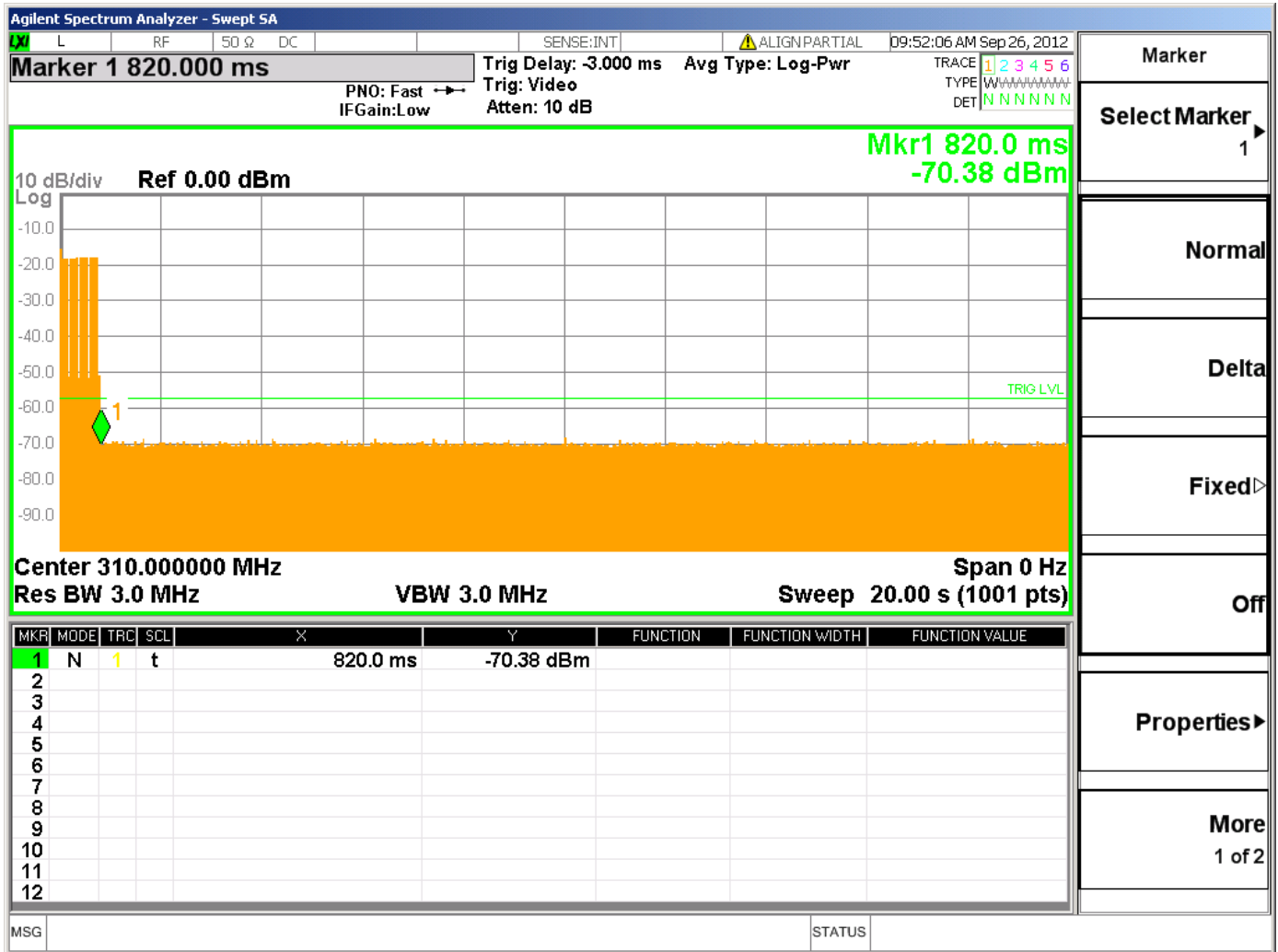


Figure 10 Cease Operation Graph for 315MHz

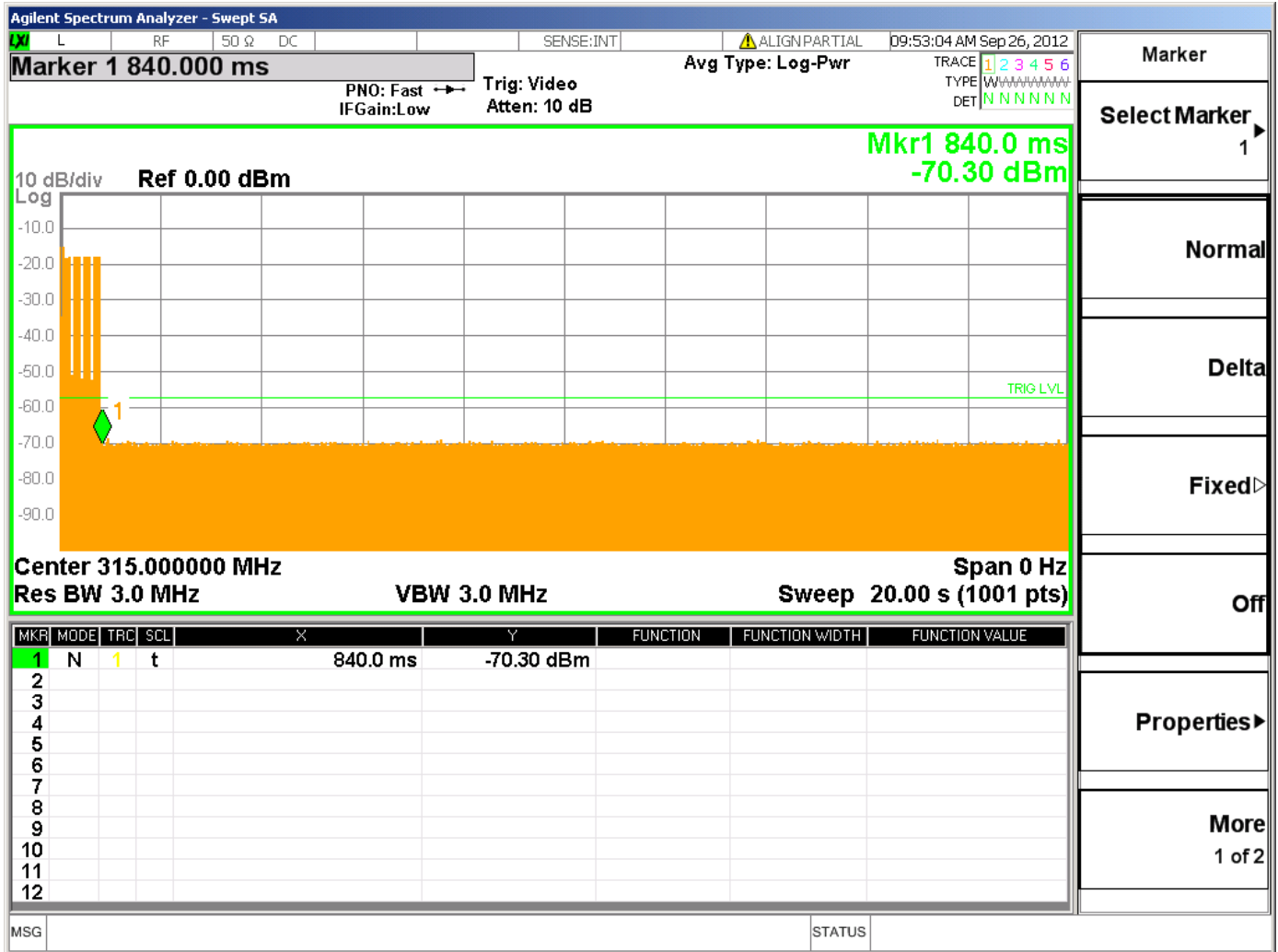
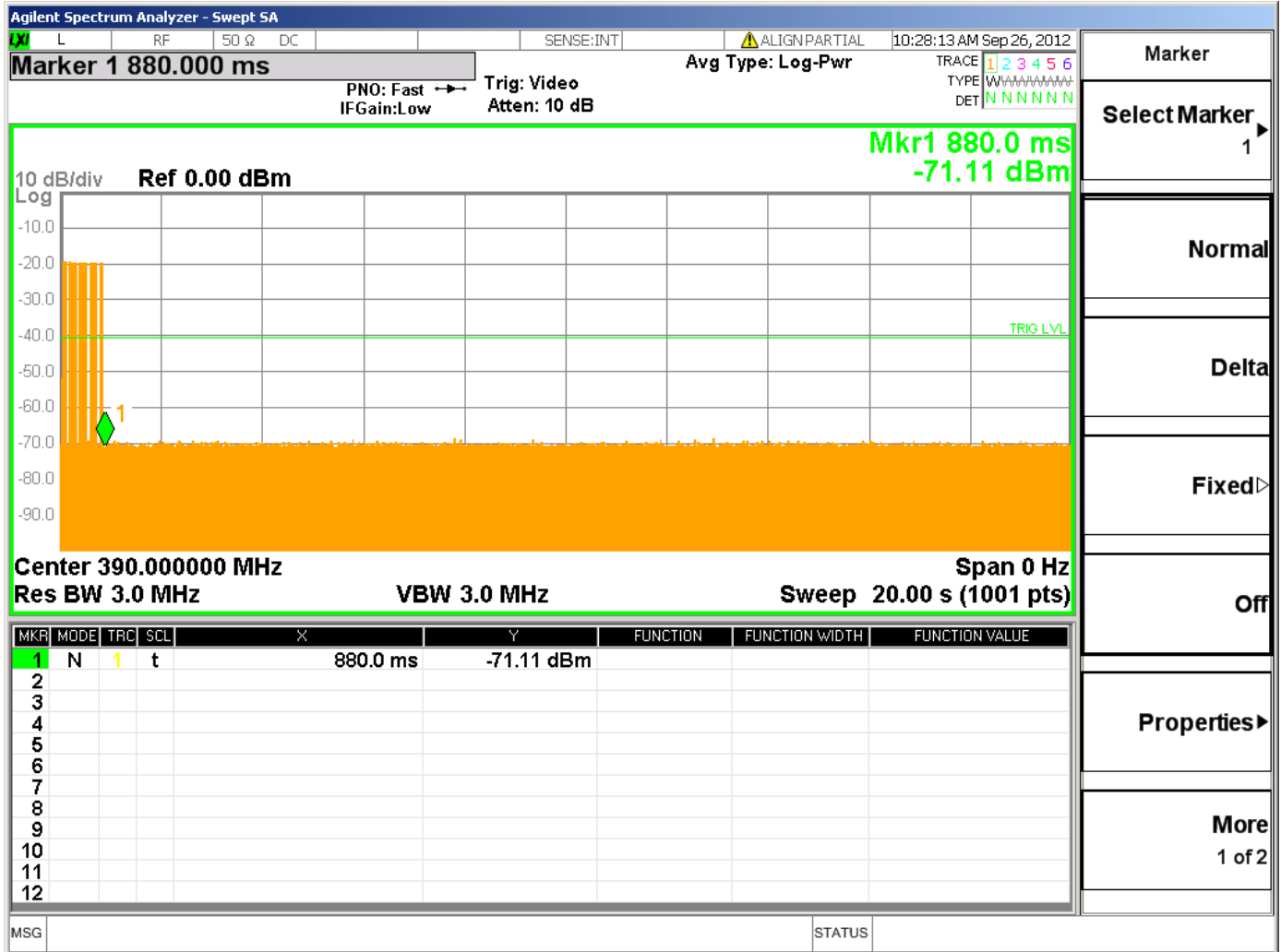


Figure 11 Cease Operation Graph for 390MHz



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.		

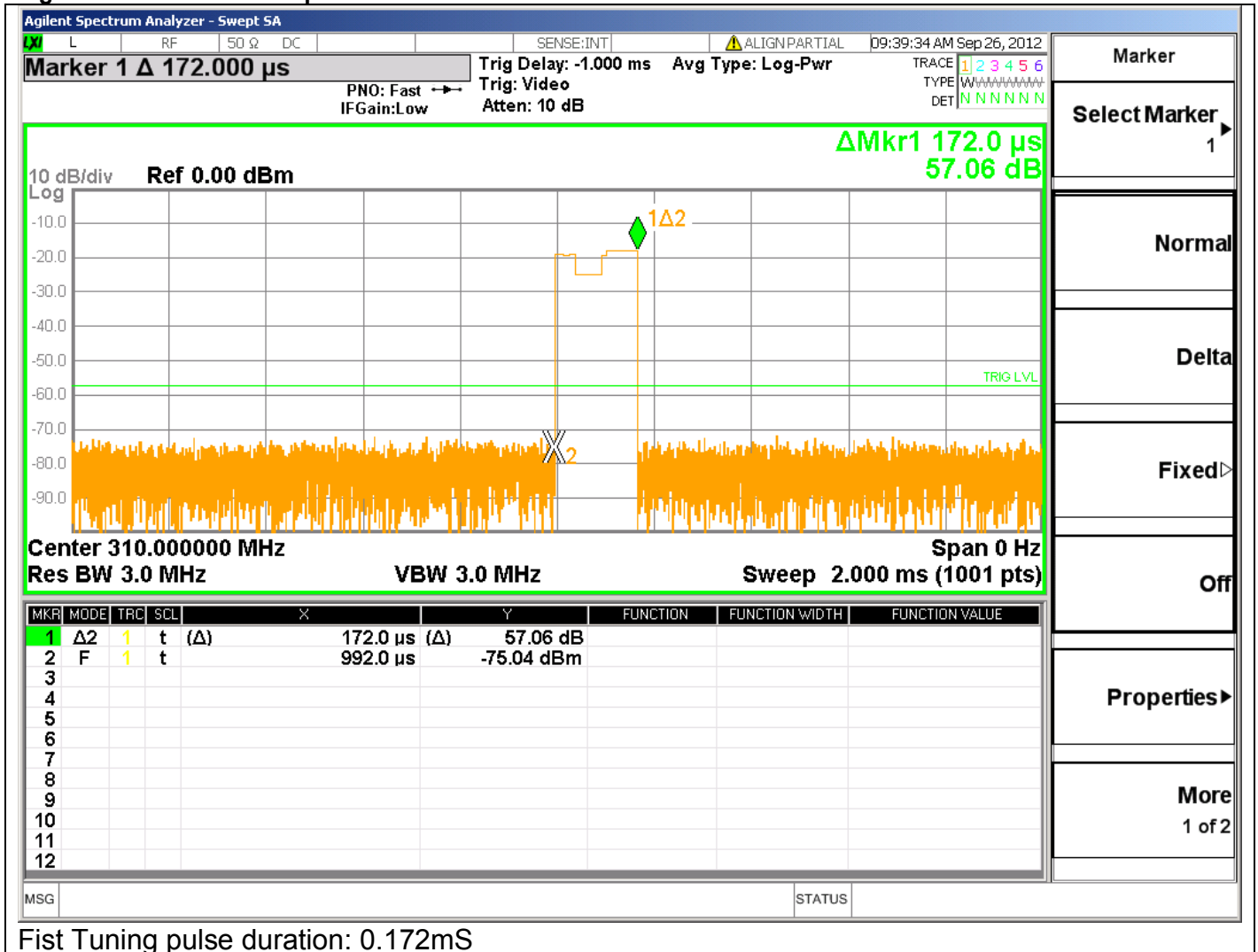
Table 12 Pulse Train Configuration Settings

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

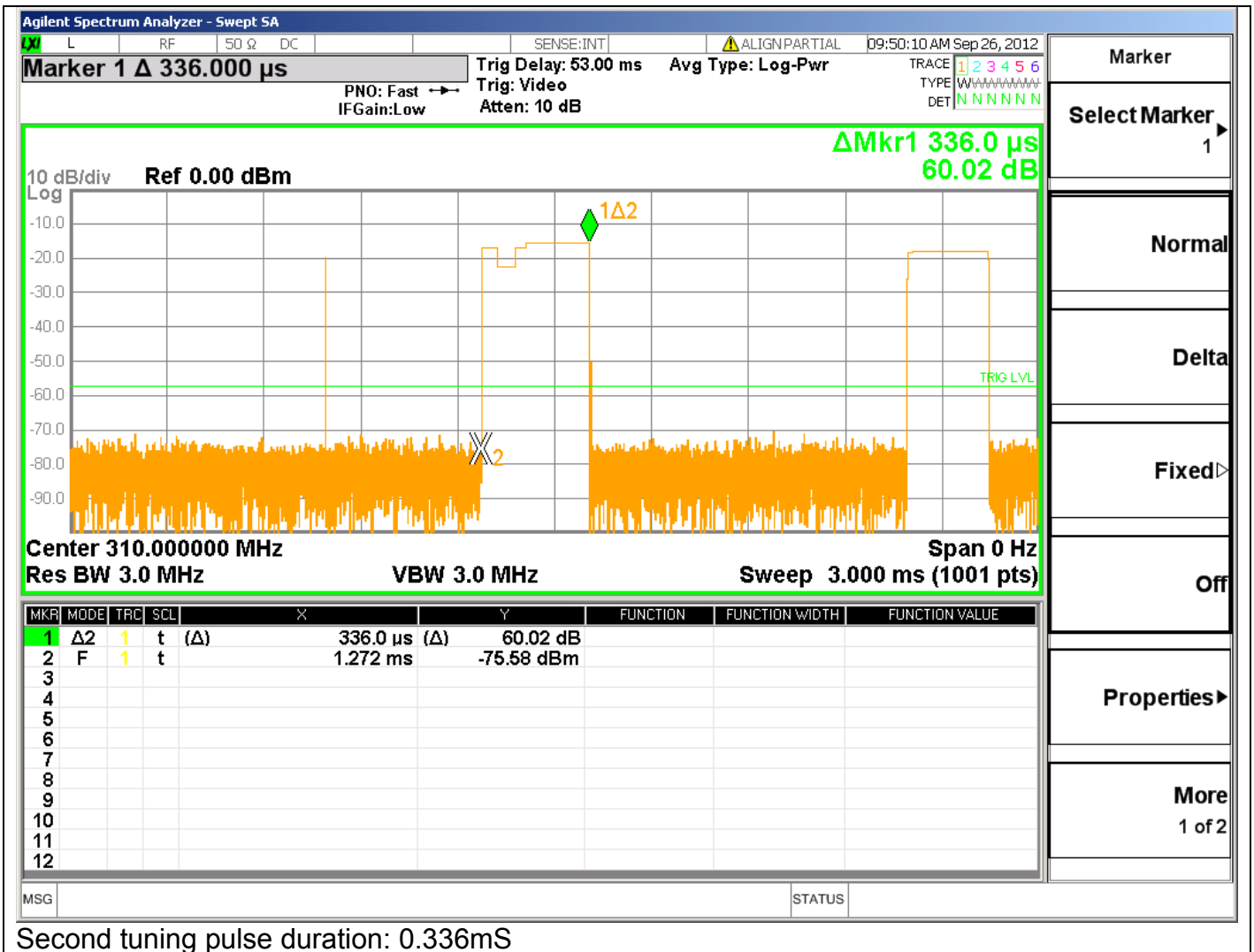
Table 13 Pulse Train Calculation

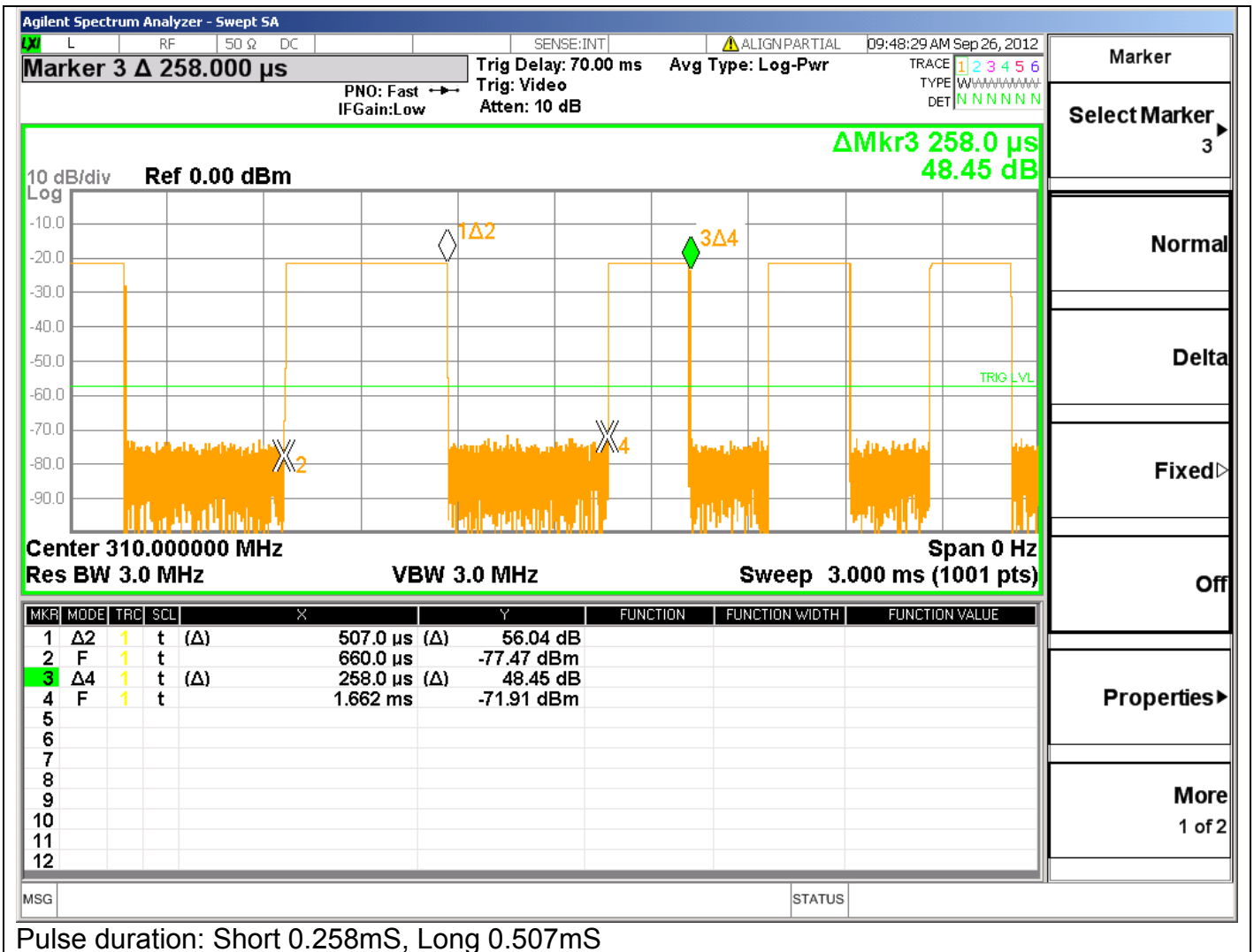
TX Frequency	Total TX time mS	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
310MHz	$(42 \times 0.258) + (10 \times 0.507) + 0.172 + 0.336$	100ms	-15.69
315MHz	$(44 \times 0.255) + (9 \times 0.507) + 0.33 + 0.18$	100ms	-15.75
390MHz	$(38 \times 0.255) + (11 \times 0.501) + 0.186 + 0.352$	99ms	-15.97
Worst Case Duty Cycle: For 310MHz and 315MHz worst case duty cycle was calculated over 100mS and the two initial tuning pulses were included in the tx on time. For 390MHz worst case duty cycle was calculated over 99mS. Manufacturer declared the duty cycle as -16.19dB. Measured duty cycle is used for all emissions data.			

Figure 12 Pulse Train Graphs for 310MHz



Fist Tuning pulse duration: 0.172mS







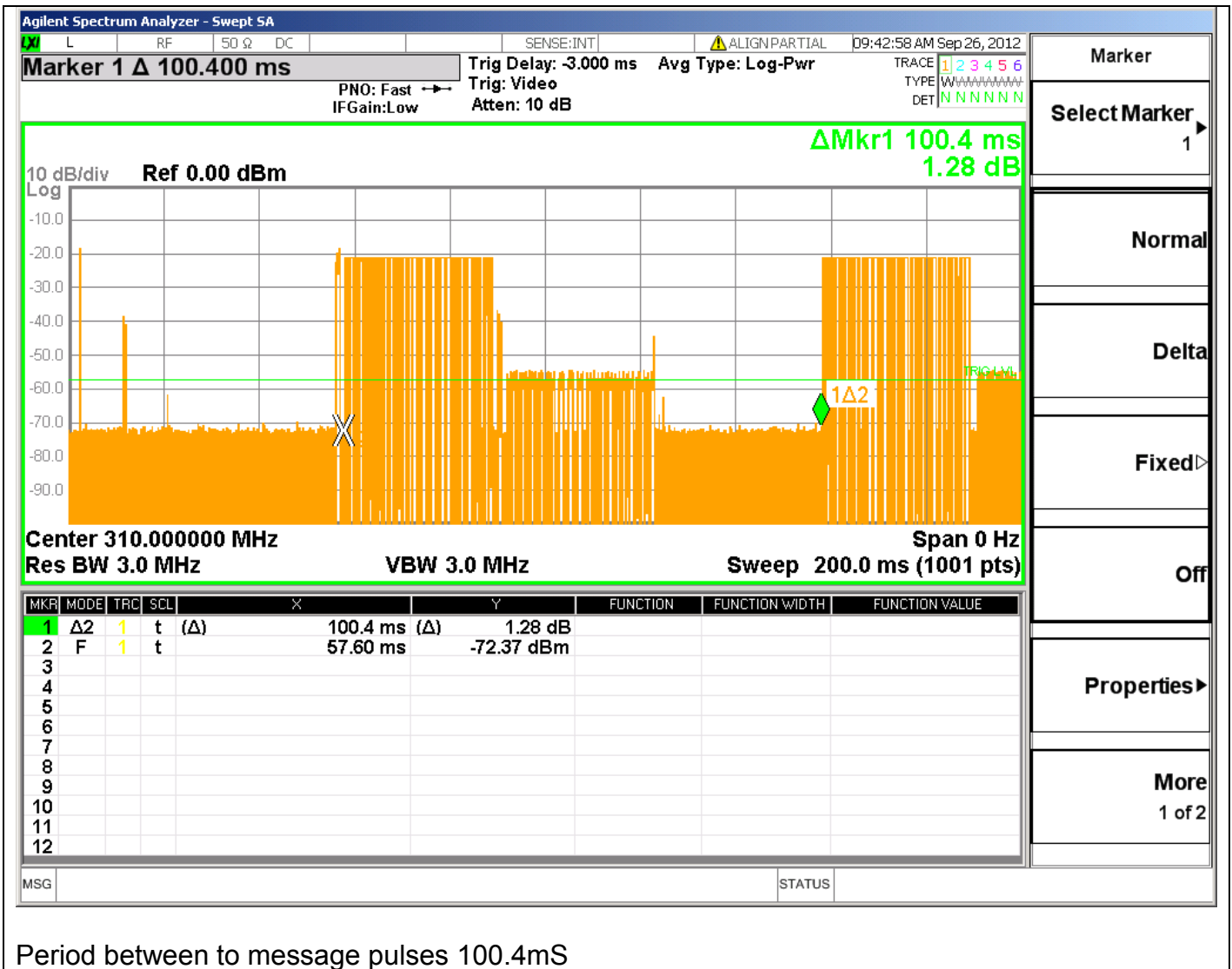
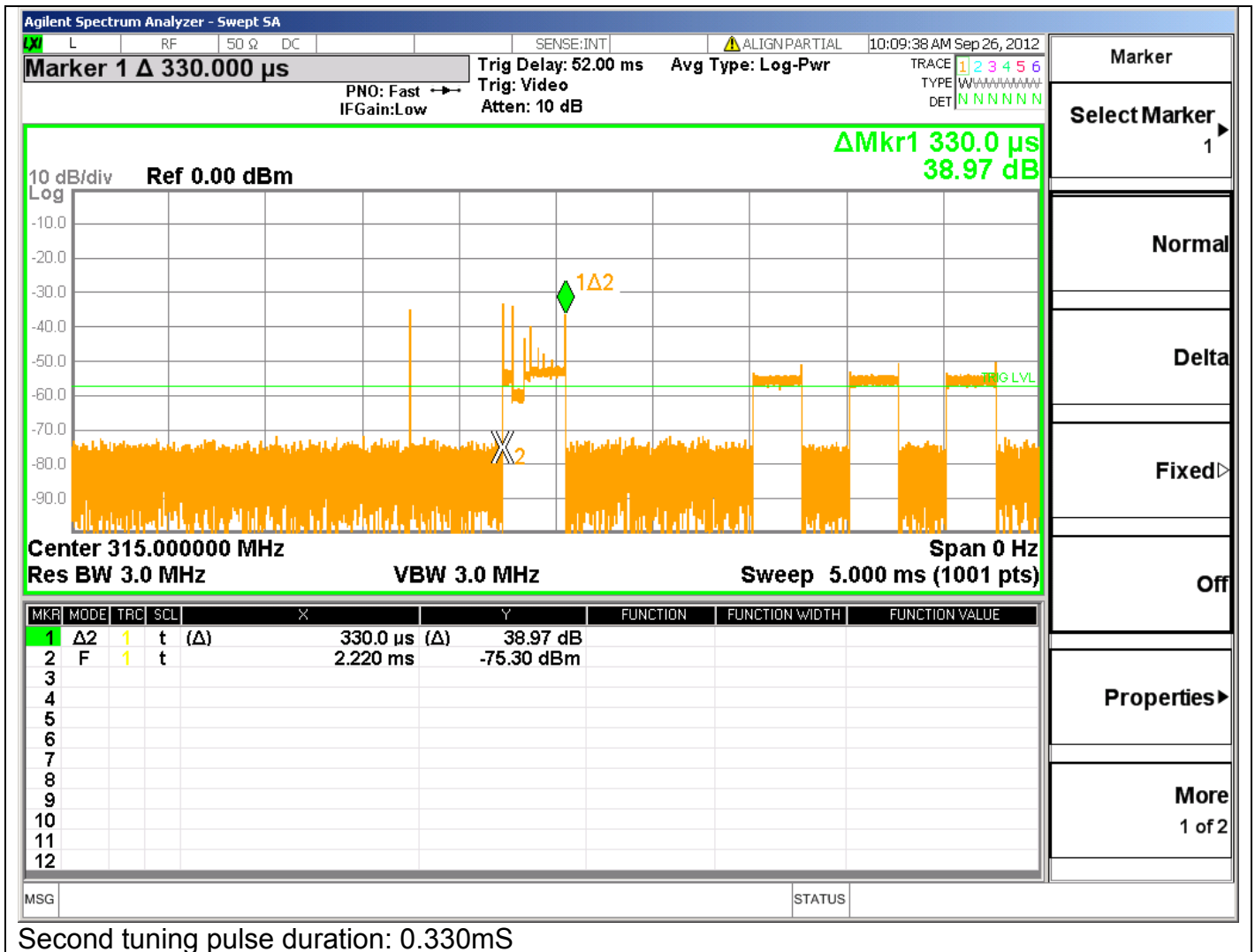
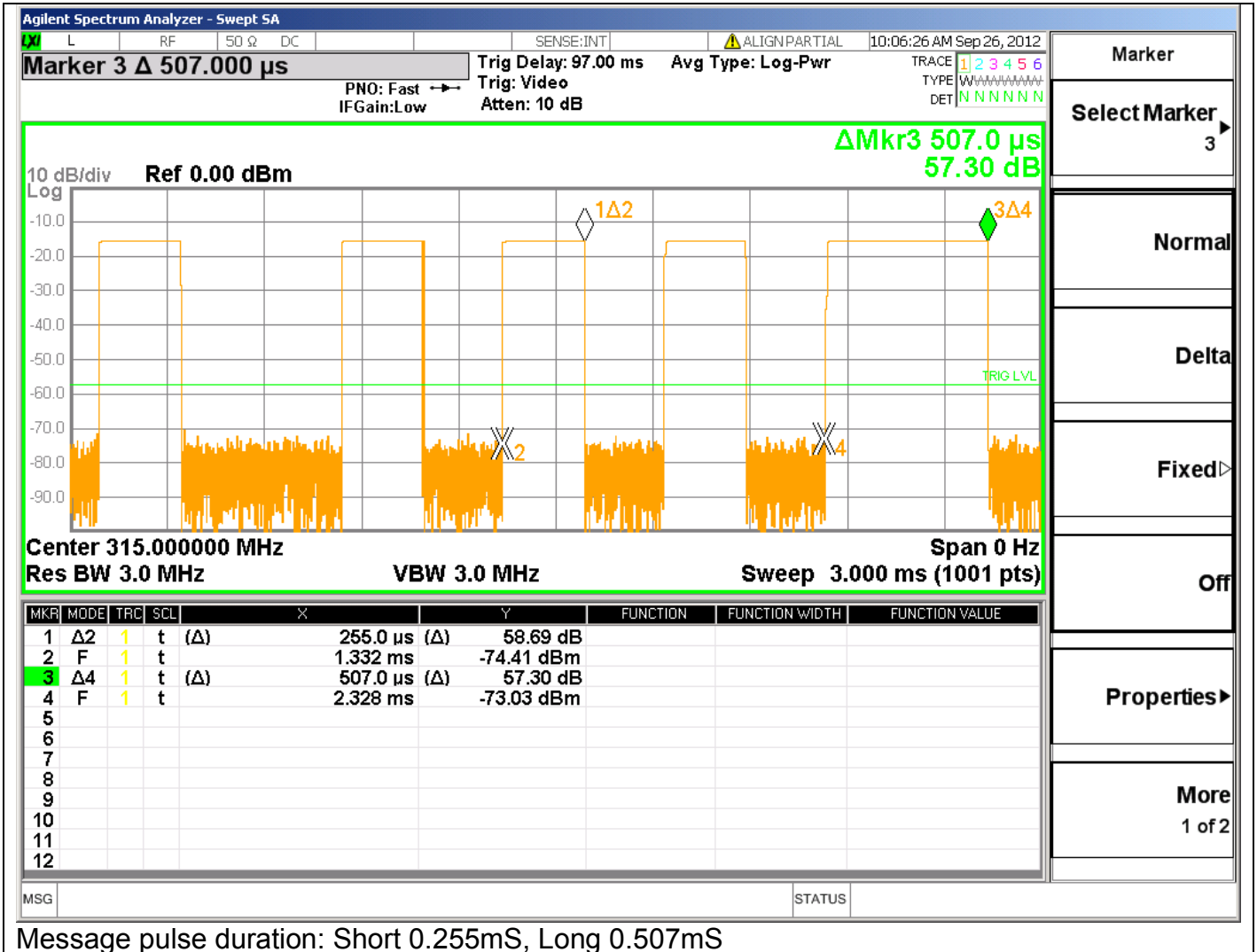
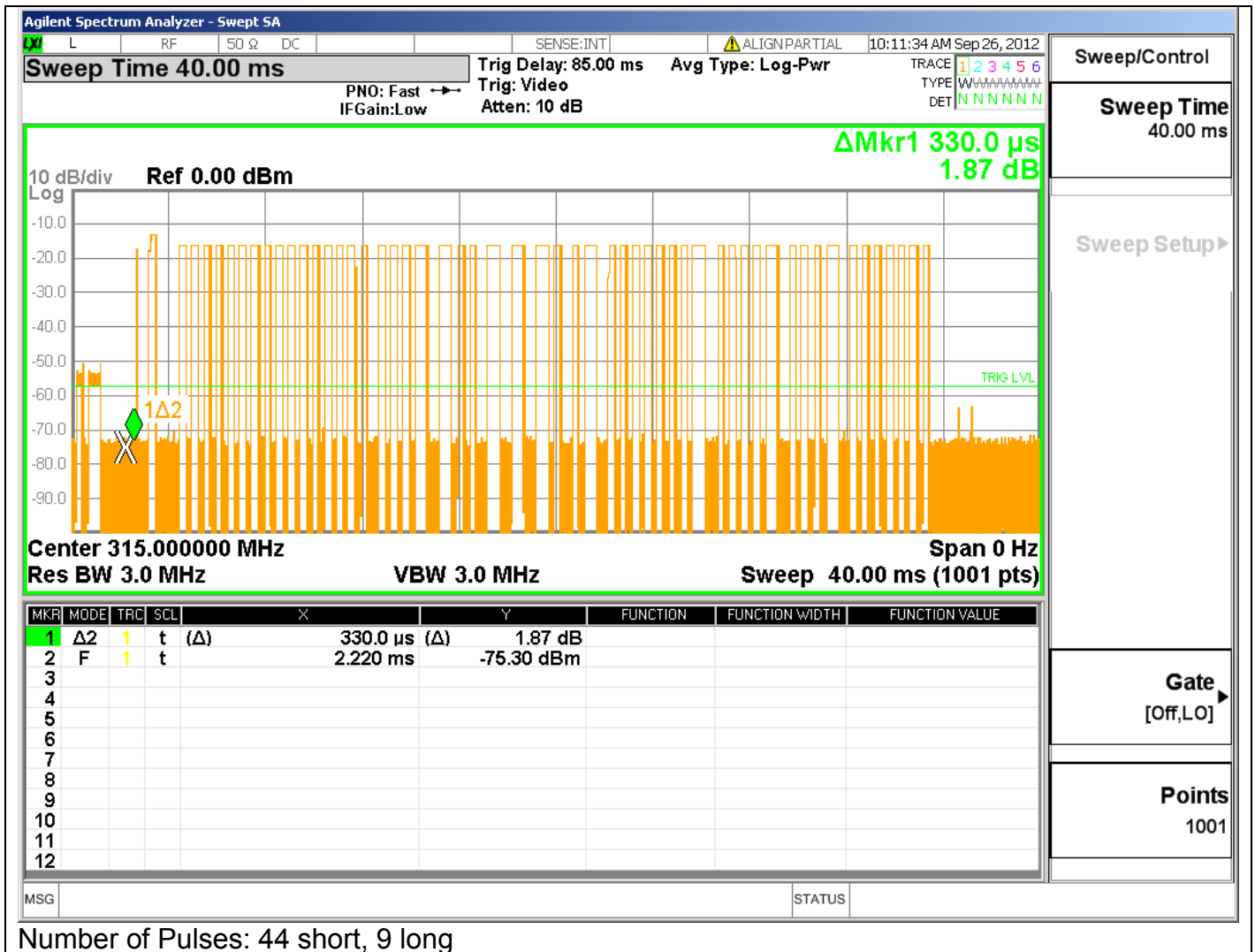


Figure 13 Pulse Train Graphs for 315MHz









Number of Pulses: 44 short, 9 long

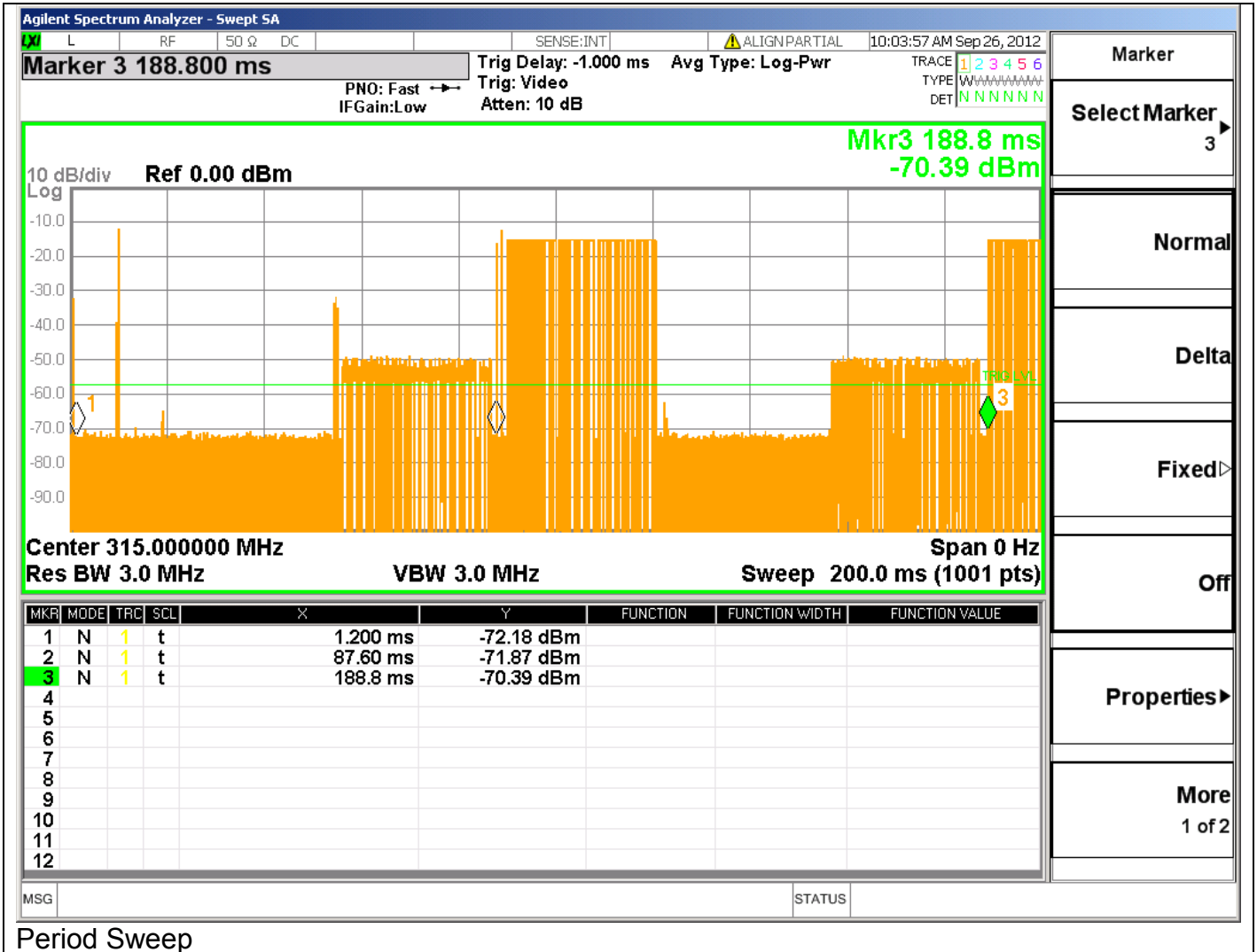
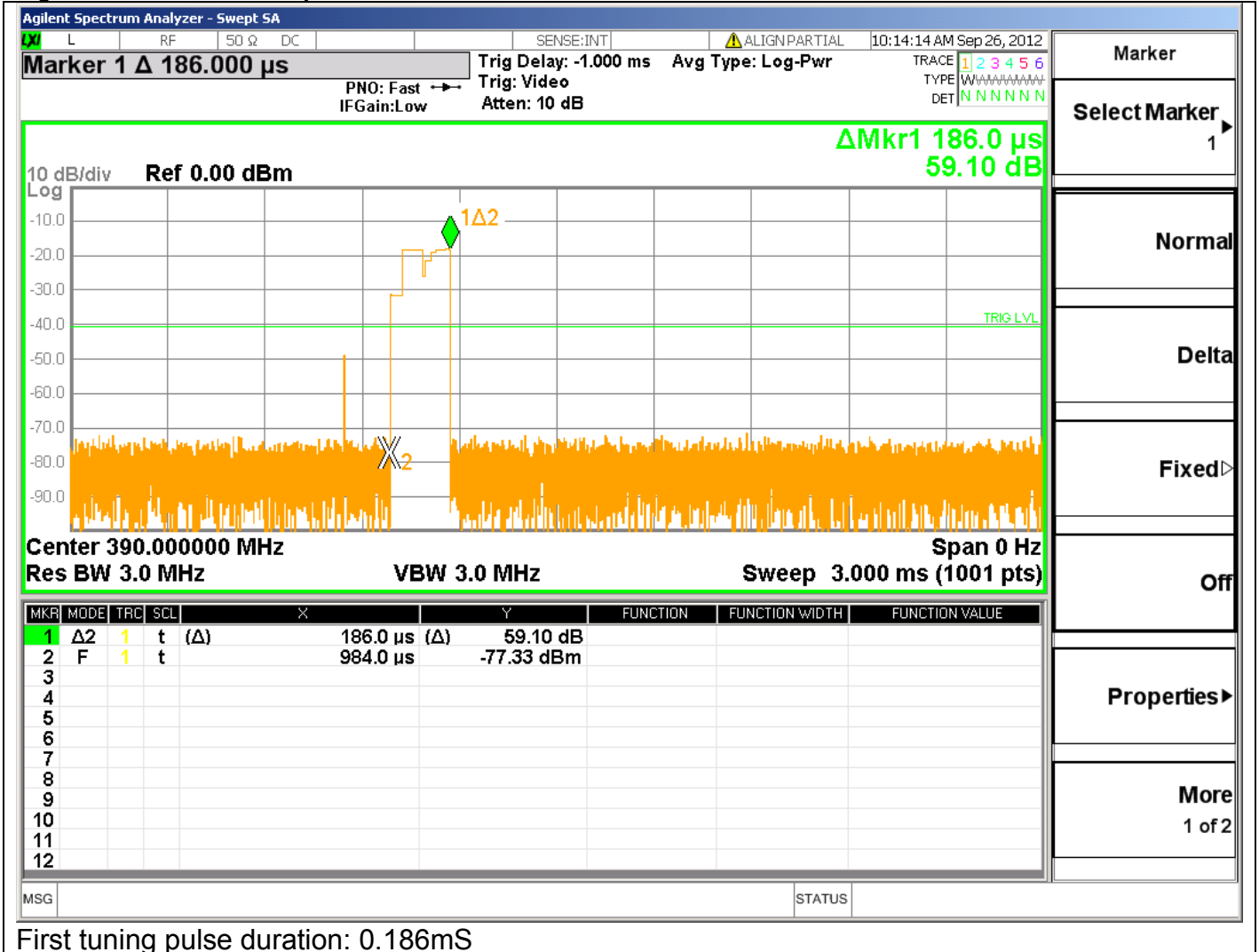


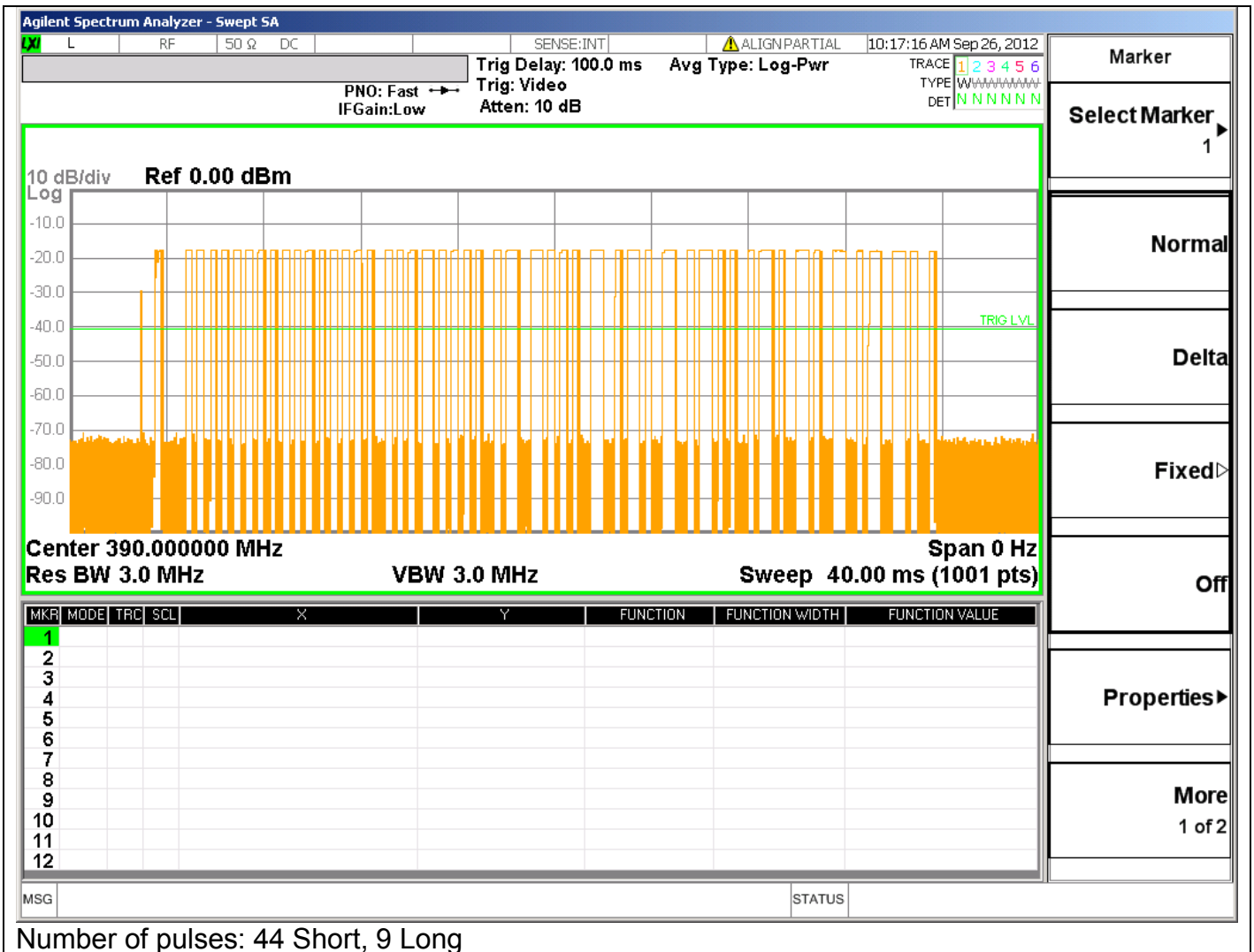
Figure 14 Pulse Train Graphs for 390MHz

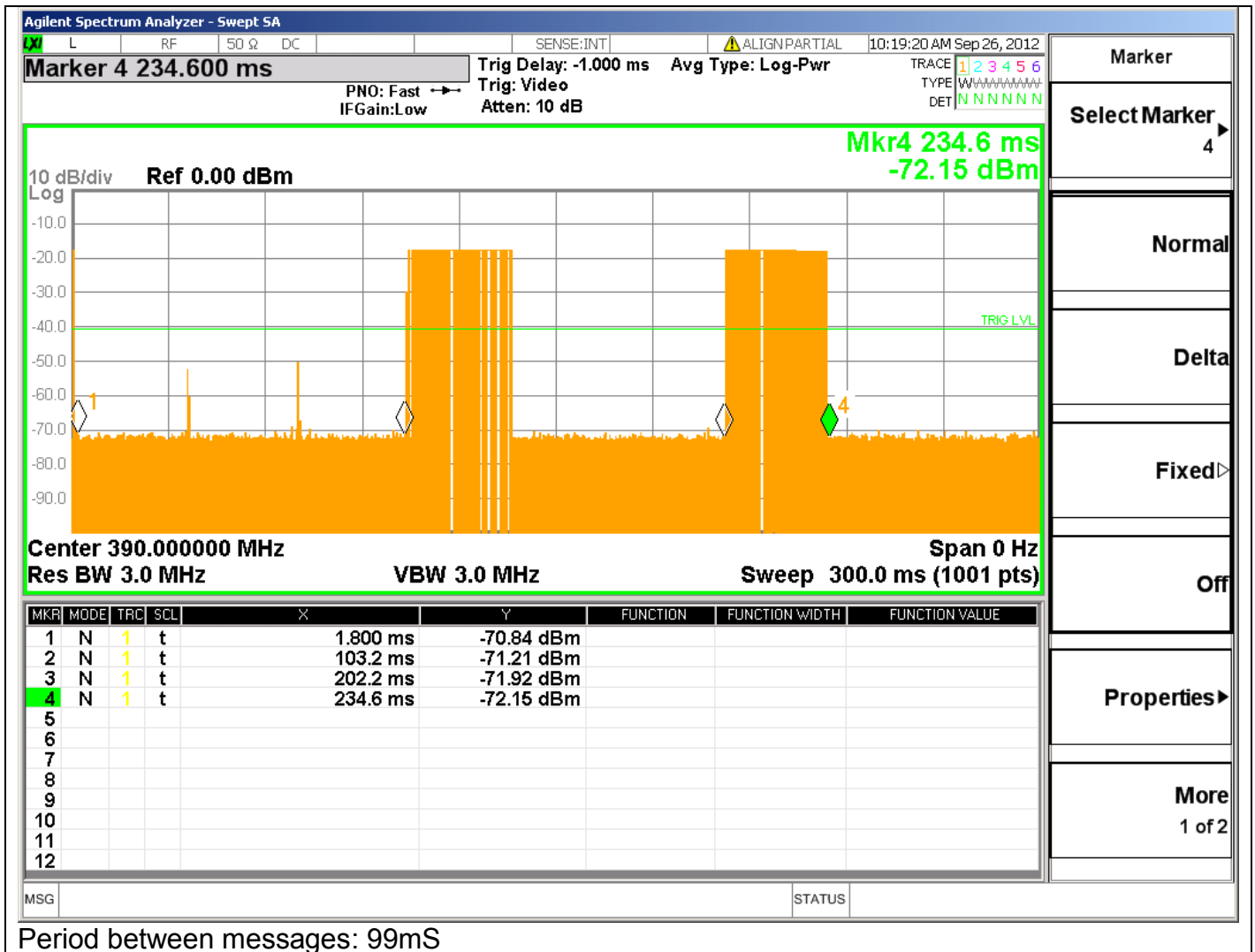


First tuning pulse duration: 0.186mS









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
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	
	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 4.2.3 for duty cycle information.		

Figure 15 Radiated Emissions Graph (Below 1GHz)

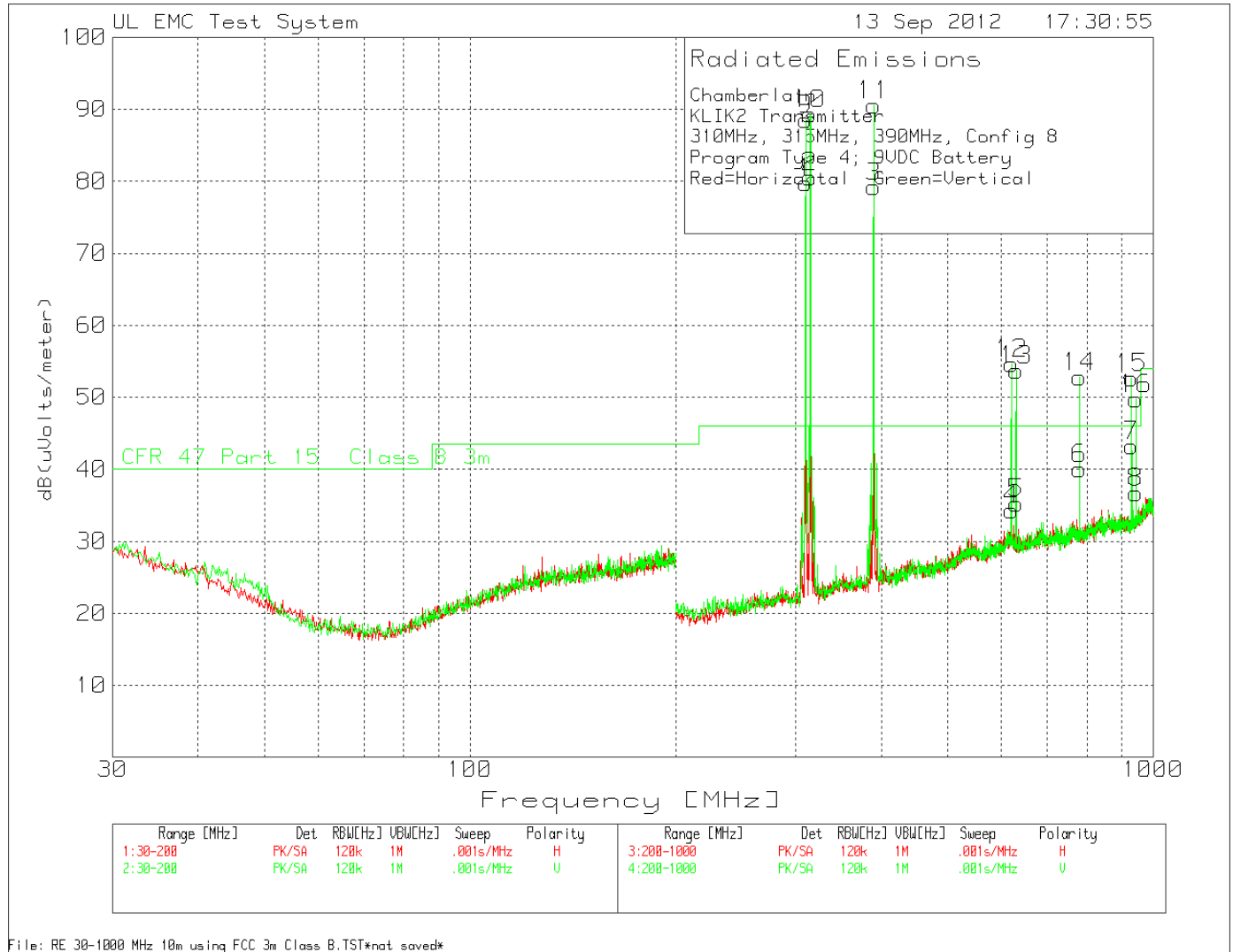


Figure 16 Radiated Emissions Graph (Above 1GHz)

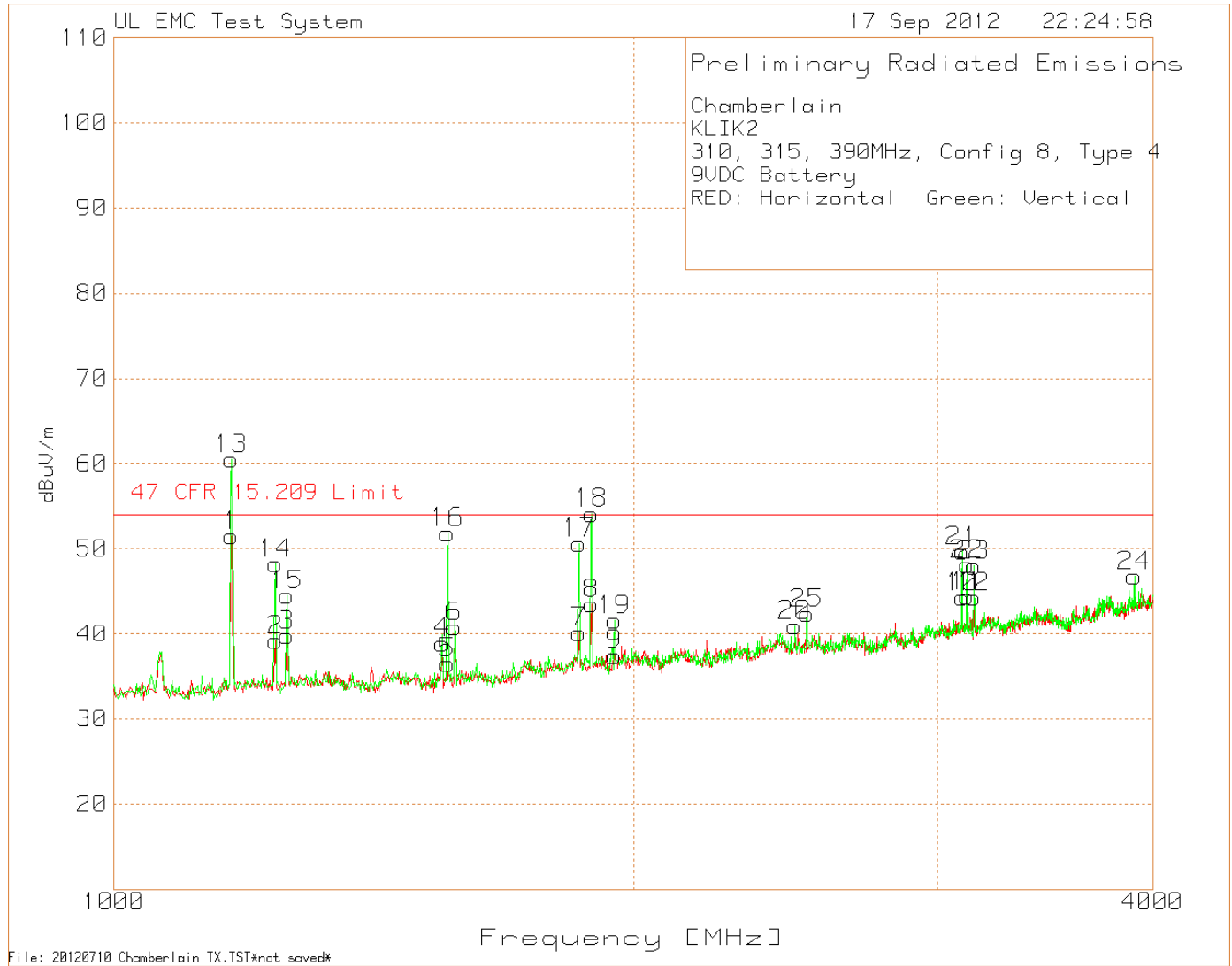


Table 14 - Radiated Emissions Data Points 310MHz

Chamberlain KLIK2C Transmitter 310MHz, 390MHz, Config 8 Type 4, 9VDC Battery Red: Horizontal Green: Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
310.0168	71.97	PK	14.1	2.1	88.17	-15.69	72.48	75.32	-2.84	257	102	Horz
310.0168	72.04	PK	14.1	2.1	88.24	-15.69	72.55	75.32	-2.77	338	155	Vert
620.0345	14.04	PK	20.3	3	37.34	-15.69	21.65	46	-24.35	349	116	Horz
620.0345	24.44	PK	20.3	3	47.74	-15.69	32.05	46	-13.95	324	105	Vert
930.051282	26.47	PK	23.6	3.8	53.87	-15.69	38.18	46	-7.82	273	277	Horz
930.051282	29.51	PK	23.6	3.8	56.91	-15.69	41.22	46	-4.78	340	108	Vert
1240.16	71.05	PK	25.1	-56.96	39.19	-15.69	23.5	54	-30.5	*	125	Horz
1550.367	69.76	PK	25.2	-56.02	38.94	-15.69	23.25	54	-30.75	*	125	Horz
1860.574	67.42	PK	27.2	-54.44	40.18	-15.69	24.49	54	-29.51	*	100	Horz
3101.401	65.14	PK	30.5	-51.31	44.33	-15.69	28.64	54	-25.36	*	100	Horz
1240.1263	79.64	PK	25.1	-56.96	47.78	-15.69	32.09	54	-21.91	31	120	Vert
1860.1112	78.64	PK	27.2	-54.43	51.41	-15.69	35.72	54	-18.28	191	103	Vert
2480.987	64.73	PK	28.8	-52.57	40.96	-15.69	25.27	54	-28.73	*	100	Vert
3100.2335	72.67	PK	30.5	-51.32	51.85	-15.69	36.16	54	-17.84	0	115	Vert

* Peak prescan data, not maximized

Table 15 - Radiated Emissions Data Points 315MHz

Chamberlain KLIK2C Transmitter 315MHz, Config 8, Program Type 4 9VDC Battery Red:Horizontal, Green:Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
315.014423	71.71	PK	14.2	2.1	88.01	-15.75	72.26	75.62	-3.36	202	101	Horz
315.014423	72.86	PK	14.2	2.1	89.16	-15.75	73.41	75.62	-2.21	112	158	Vert
630.025641	15.24	PK	20.6	3	38.84	-15.75	23.09	46	-22.91	200	178	Horz
630.025641	23.4	PK	20.6	3	47	-15.75	31.25	46	-14.75	283	178	Vert
945.048077	25.58	PK	23.6	3.8	52.98	-15.75	37.23	46	-8.77	222	281	Horz
945.044872	28.93	PK	23.6	3.8	56.33	-15.75	40.58	46	-5.42	287	117	Vert
1260.173	71.58	PK	25.1	-56.92	39.76	-15.75	24.01	54	-29.99	*	100	Horz
1260.173	76.29	PK	25.1	-56.92	44.47	-15.75	28.72	54	-25.28	*	125	Vert
1574.383	70.82	PK	25.3	-55.3	40.82	-15.75	25.07	54	-28.93	*	125	Horz
1890.594	70.38	PK	27.4	-54.32	43.46	-15.75	27.71	54	-26.29	*	100	Horz
1890.1082	82.93	PK	27.4	-54.31	56.02	-15.75	40.27	54	-13.73	198	102	Vert
3151.434	65.37	PK	30.6	-51.71	44.26	-15.75	28.51	54	-25.49	*	100	Horz
3151.434	69.06	PK	30.6	-51.71	47.95	-15.75	32.2	54	-21.8	*	125	Vert
2521.014	65.71	PK	28.9	-52.19	42.42	-15.75	26.67	54	-27.33	*	100	Vert

* Peak prescan data, not maximized

Table 16 - Radiated Emissions Data Points 390MHz

Chamberlain KLIK2C Transmitter 310MHz, 390MHz, Config 8 Type 4, 9VDC Battery Red: Horizontal Green: Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
390.019997	68.19	QP	16.1	2.3	86.59	-15.97	70.62	79.24	-8.62	264	321	Horz
390.019997	68.67	PK	16.1	2.3	87.07	-15.97	71.1	79.24	-8.14	264	321	Horz
390.019997	72.93	QP	16.1	2.3	91.33	-15.97	75.36	79.24	-3.88	335	126	Vert
390.019997	73.39	PK	16.1	2.3	91.79	-15.97	75.82	79.24	-3.42	335	126	Vert
780.039182	18.95	QP	21.8	3.4	44.15	-15.97	28.18	46	-17.82	49	116	Horz
780.039182	21.17	PK	21.8	3.4	46.37	-15.97	30.4	46	-15.6	49	116	Horz
780.040785	34.37	QP	21.8	3.4	59.57	-15.97	43.6	46	-2.4	278	133	Vert
780.040785	35.44	PK	21.8	3.4	60.64	-15.97	44.67	46	-1.33	278	133	Vert
1169.7826	95.06	PK	24.8	-57.23	62.63	-15.97	46.66	54	-7.34	36	220	Horz
1169.8487	98.6	PK	24.8	-57.24	66.16	-15.97	50.19	54	-3.81	54	129	Vert
1560.374	67.02	PK	25.2	-55.65	36.57	-15.97	20.6	54	-33.4	*	100	Horz
1560.374	82.33	PK	25.2	-55.65	51.88	-15.97	35.91	54	-18.09	*	100	Vert
1950.634	64.47	PK	27.4	-54.39	37.48	-15.97	21.51	54	-32.49	*	100	Horz
1950.634	68.56	PK	27.4	-54.39	41.57	-15.97	25.6	54	-28.4	*	100	Vert
3121.414	65.21	PK	30.6	-51.41	44.4	-15.97	28.43	54	-25.57	*	100	Horz
3120.1463	71.42	PK	30.6	-51.39	50.63	-15.97	34.66	54	-19.34	0	113	Vert
3901.935	66.09	PK	32.7	-51.99	46.8	-15.97	30.83	54	-23.17	*	100	Vert

* Peak prescan data, not maximized

4.3 Configuration 7# 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 (310MHz: 775.0kHz)		

Table 17 Occupied Bandwidth Configuration Settings

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

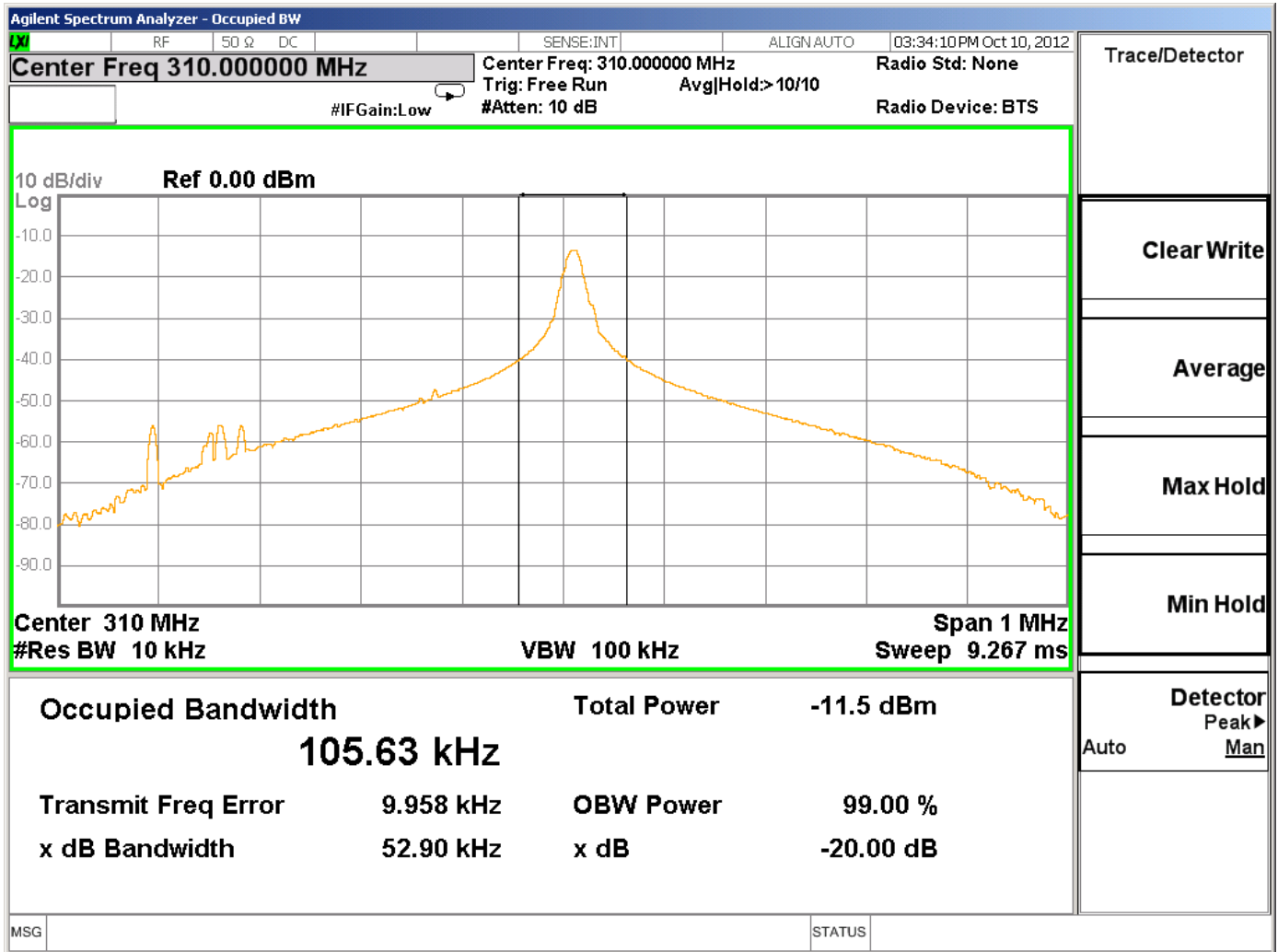
Table 18 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 19 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	52.9	105.63

Figure 17 – Bandwidth Graph



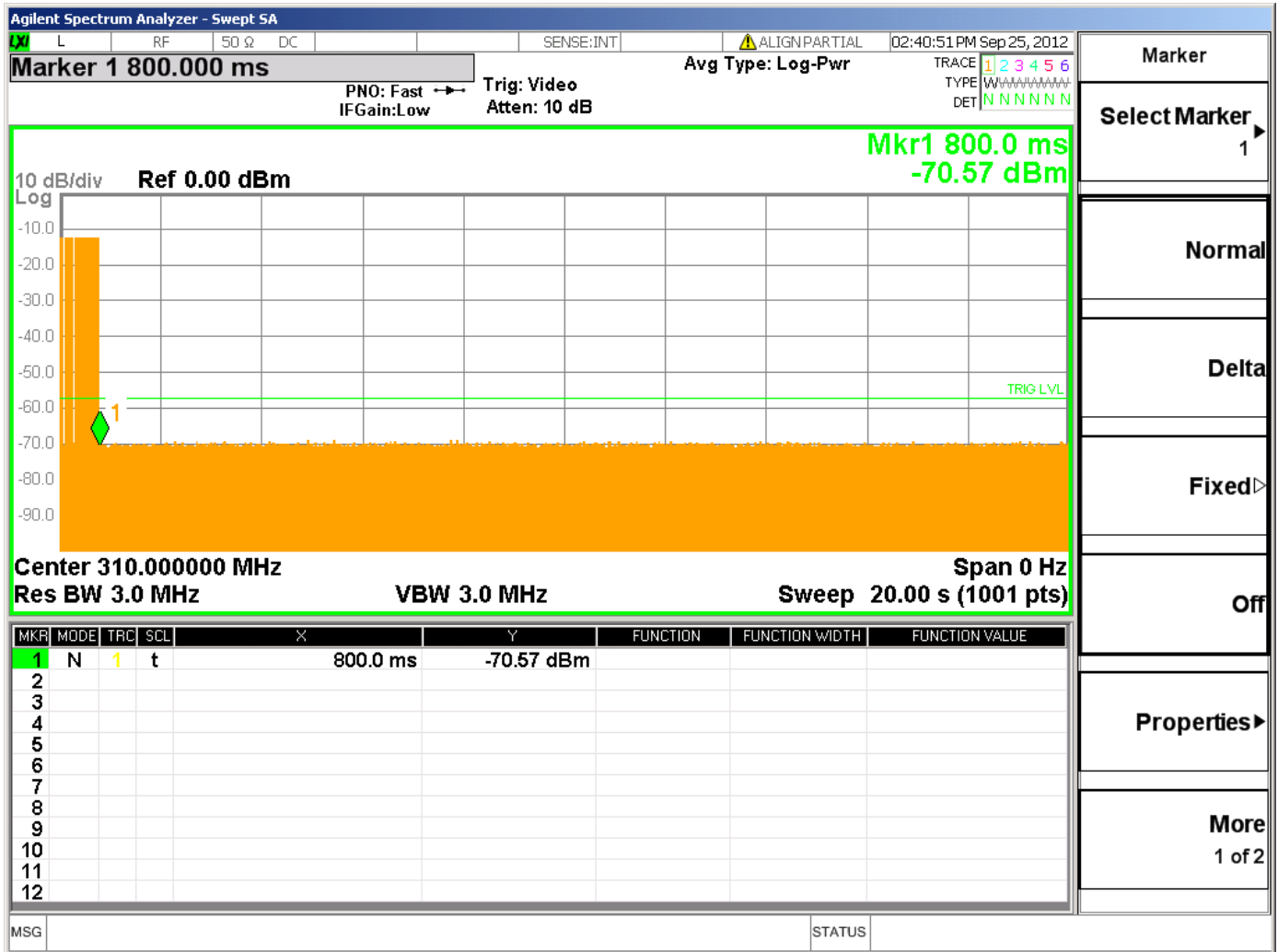
4.3.2 Test Conditions and Results – Cease Operation

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 20 Cease Operation Configuration Settings

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

Figure 18 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.		

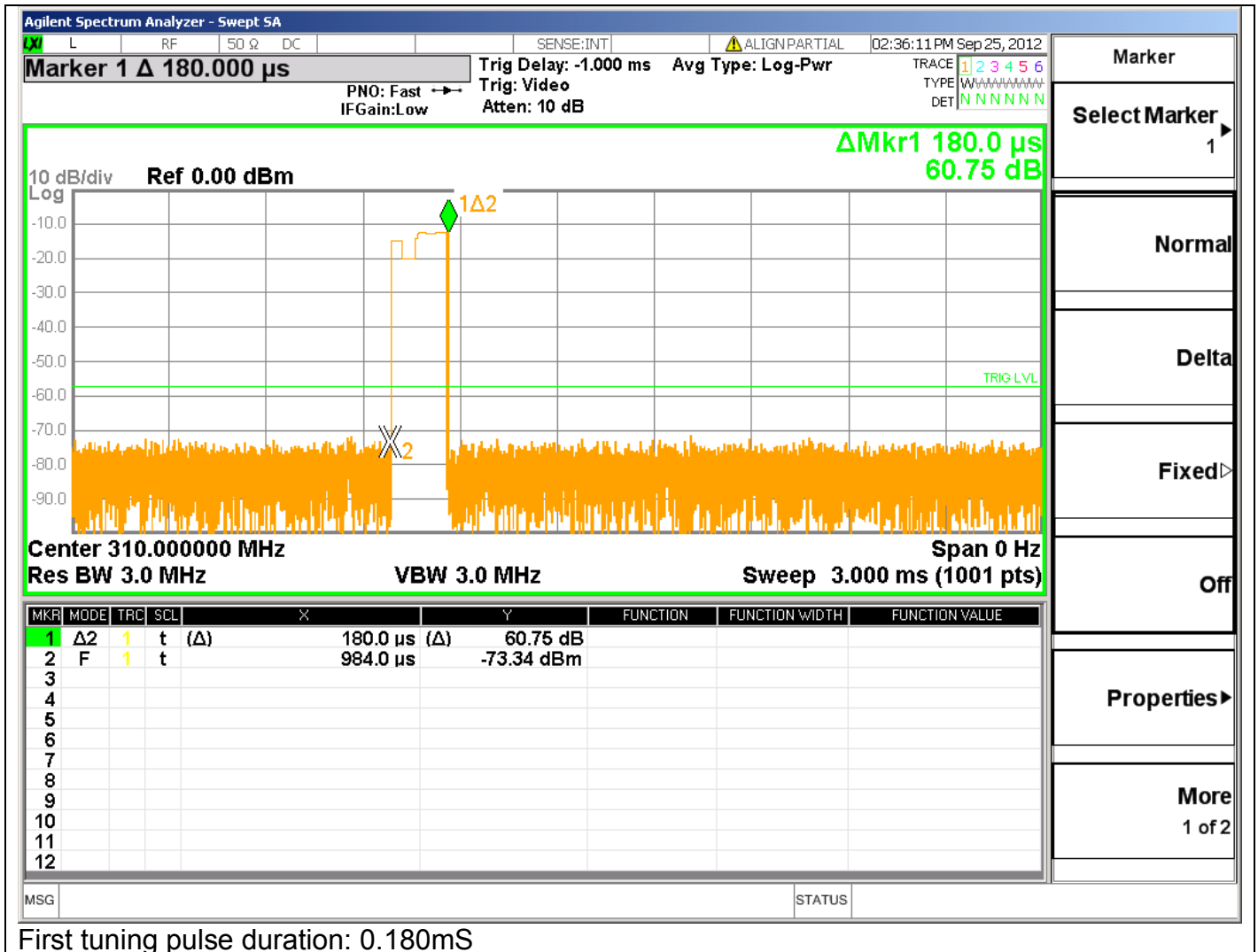
Table 21 Pulse Train Configuration Settings

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

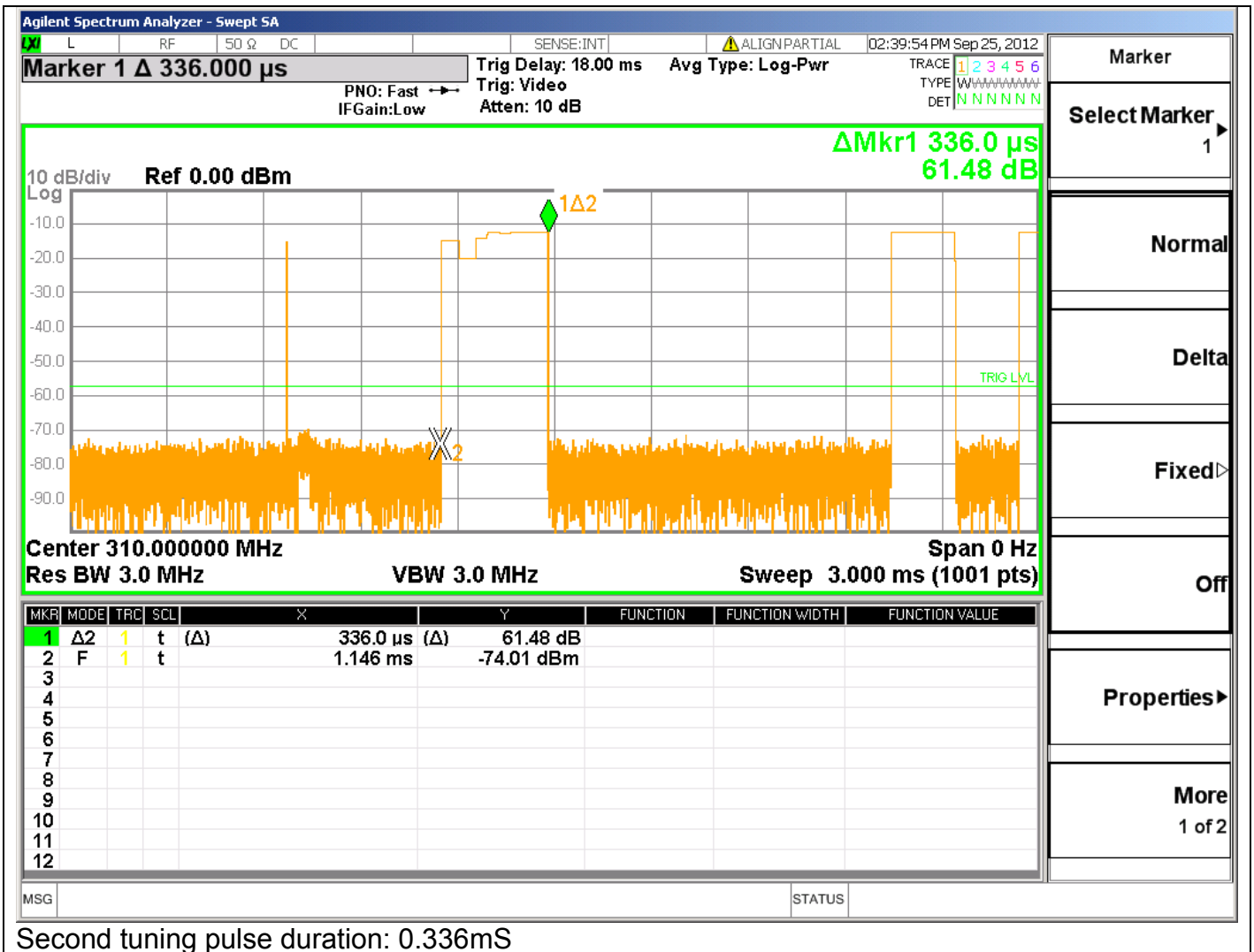
Table 22 Pulse Train Calculation

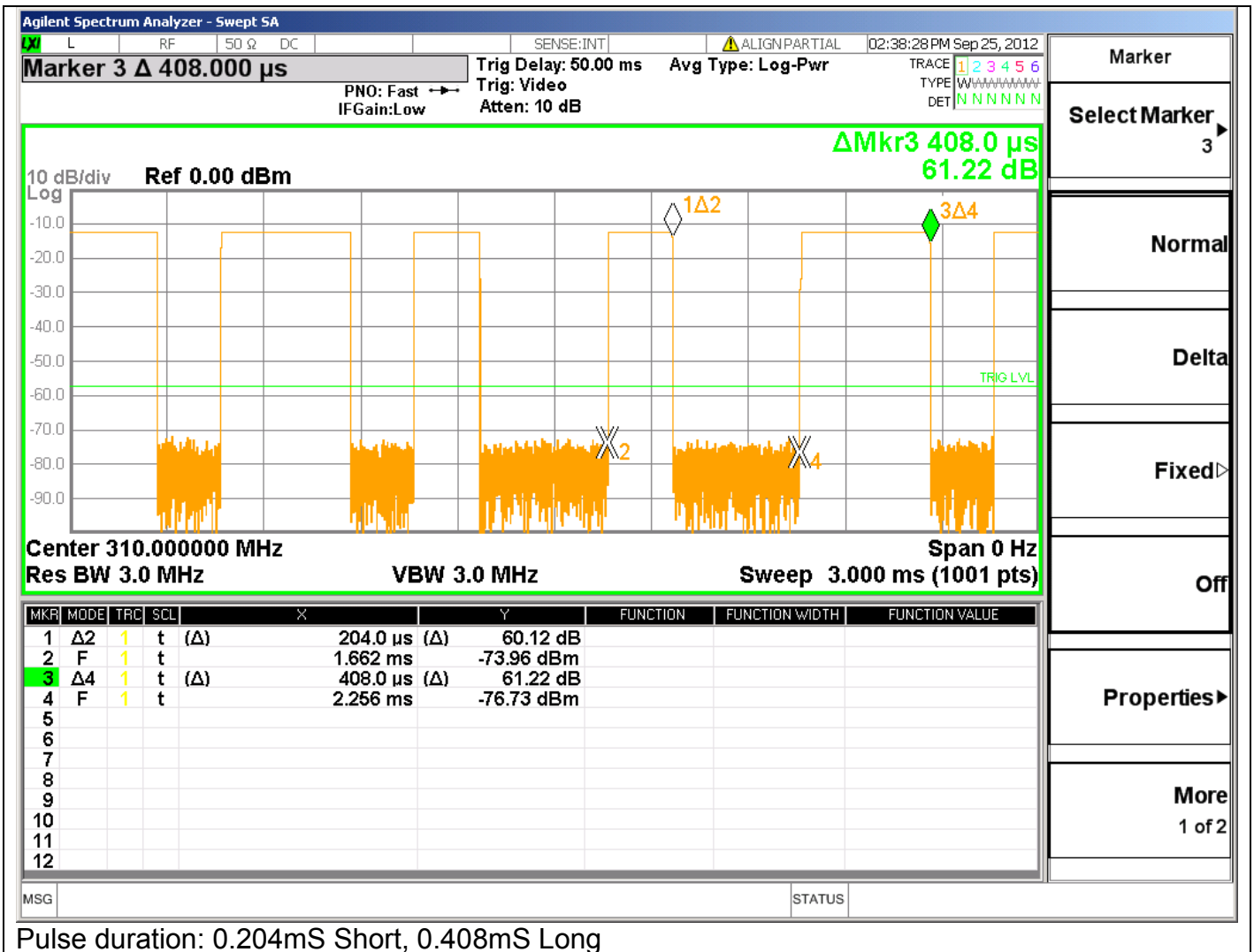
TX Frequency	Total TX time mS	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
310MHz	$(29 \times 0.204) + (42 \times 0.408mS) + 0.180 + 0.336$	100ms	-12.55dB
Worst Case Duty Cycle: Worst case duty cycle was determined at 100ms. The manufacturer declares worst case duty cycle at -12.36dB and this is used for radiated emissions data.			

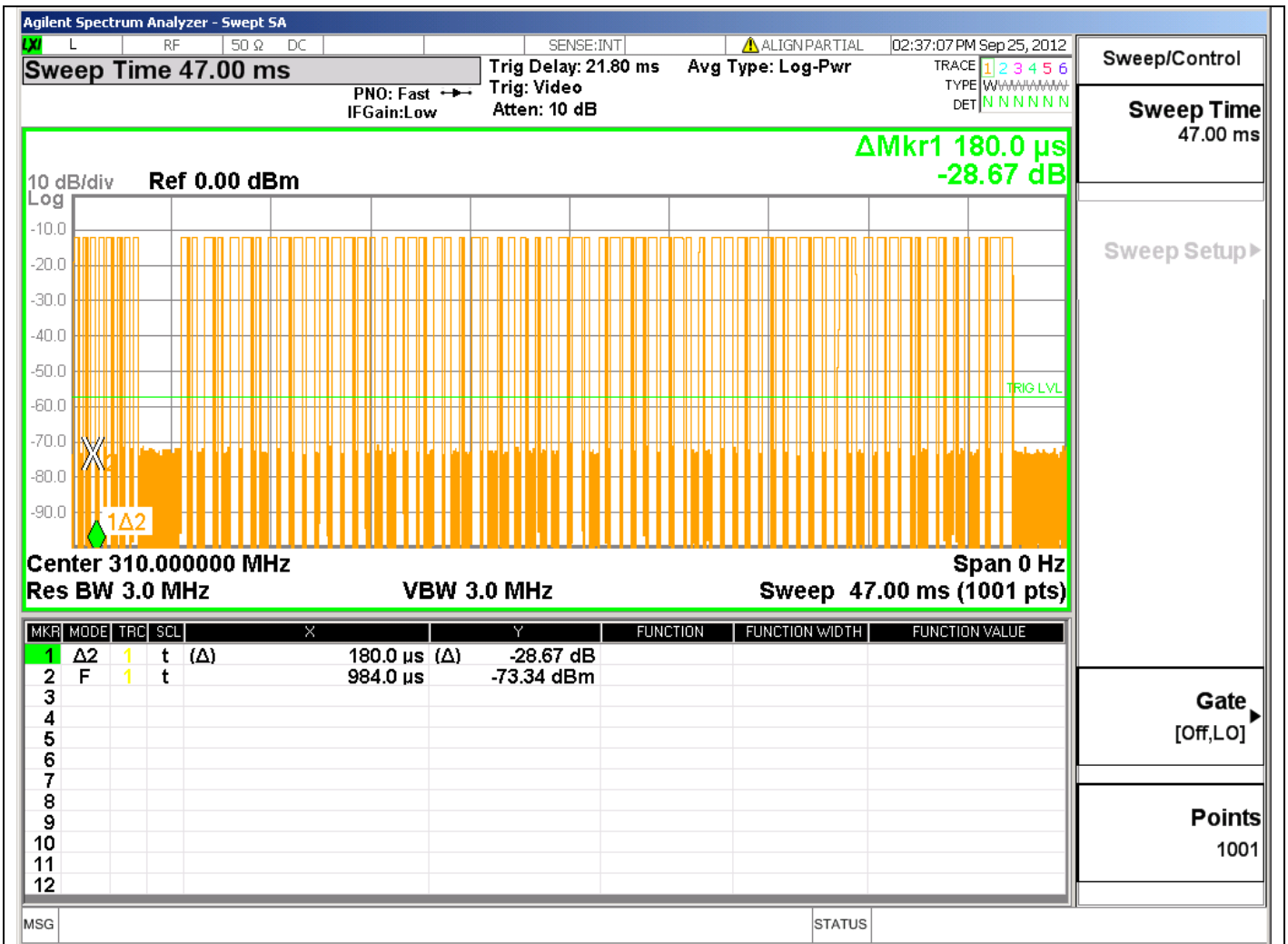
Figure 19 Pulse Train Graphs



First tuning pulse duration: 0.180mS







Number of Pulses: Short 29, Long 42

100mS sweep, tx duration.

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
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
310	75.32	95.32
Supplementary information: See section 4.3.3 for duty cycle information.		

Figure 20 Radiated Emissions Graph (Below 1GHz)

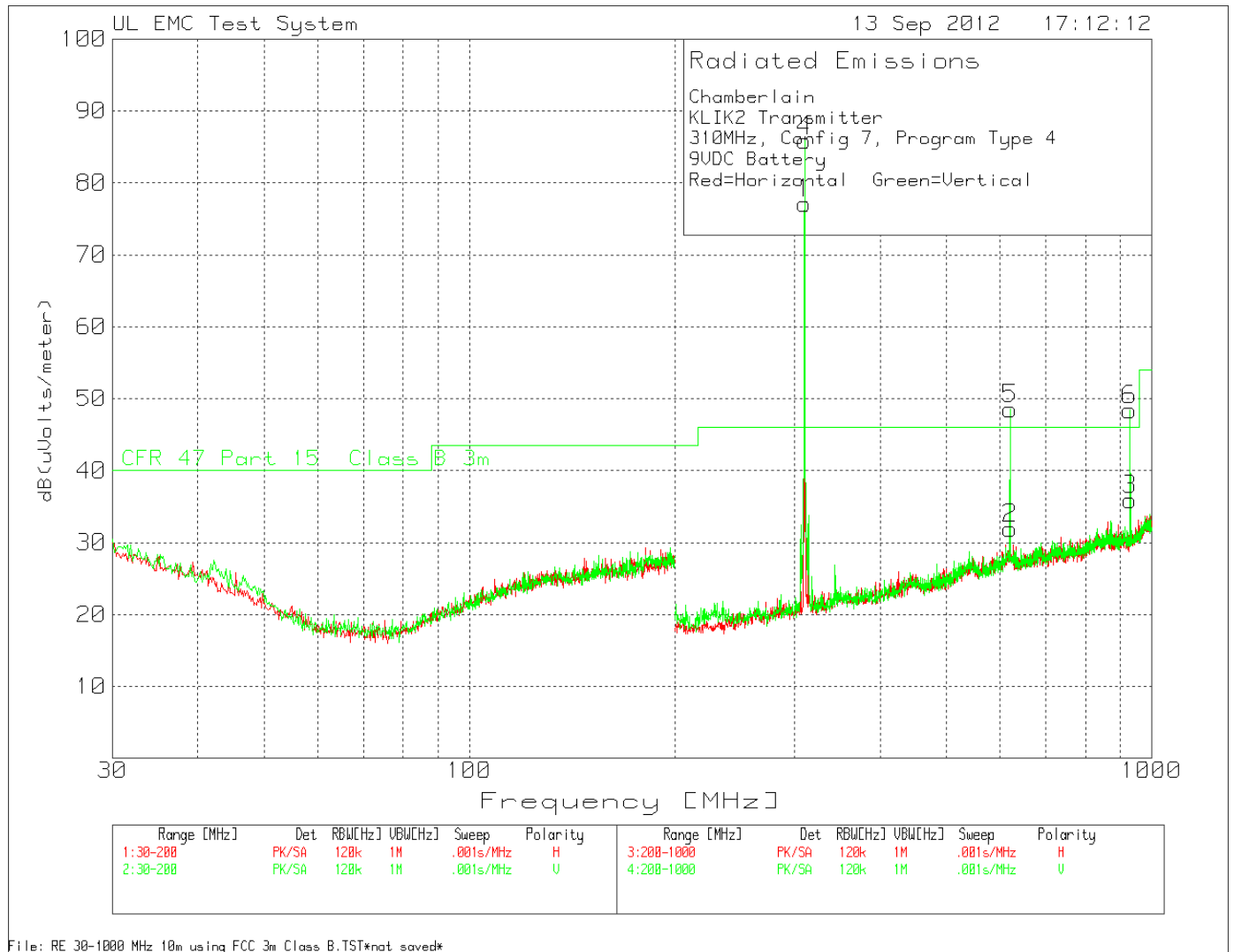


Table 23 - Radiated Emissions Data Points

Chamberlain KLIK2C Transmitter 310MHz, Config 7, Program Type 4 9VDC Battery Red:Horizontal, Green:Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
310.010413	68.76	PK	14.1	2.1	84.96	-12.36	72.6	75.32	-2.72	17	103	Horz
310.008803	69.58	PK	14.1	2.1	85.78	-12.36	73.42	75.32	-1.9	108	160	Vert
620.0256	12.57	PK	20.3	3	35.87	-12.36	23.51	46	-22.49	145	103	Horz
620.0304	18	PK	20.3	3	41.3	-12.36	28.94	46	-17.06	288	107	Vert
930.028	22.77	PK	23.6	3.8	50.17	-12.36	37.81	46	-8.19	224	296	Horz
930.0288	25.85	PK	23.6	3.8	53.25	-12.36	40.89	46	-5.11	291	117	Vert
1550.367	69.79	PK	25.2	-56.02	38.97	-12.36	26.61	54	-27.39	*	125	Horz
1860.574	67.79	PK	27.2	-54.44	40.55	-12.36	28.19	54	-25.81	*	125	Horz
3101.401	63.8	PK	30.5	-51.31	42.99	-12.36	30.63	54	-23.37	*	150	Horz
1240.16	73.71	PK	25.1	-56.96	41.85	-12.36	29.49	54	-24.51	*	125	Vert
1550.367	70.6	PK	25.2	-56.02	39.78	-12.36	27.42	54	-26.58	*	100	Vert
1860.0251	79.13	PK	27.2	-54.43	51.9	-12.36	39.54	54	-14.46	193	103	Vert
3101.401	67.41	PK	30.5	-51.31	46.6	-12.36	34.24	54	-19.76	*	150	Vert
* Peak prescan data, not maximized												

4.4 Configuration 18# 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 (310MHz: 775.0kHz)		

Table 24 Occupied Bandwidth Configuration Settings

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

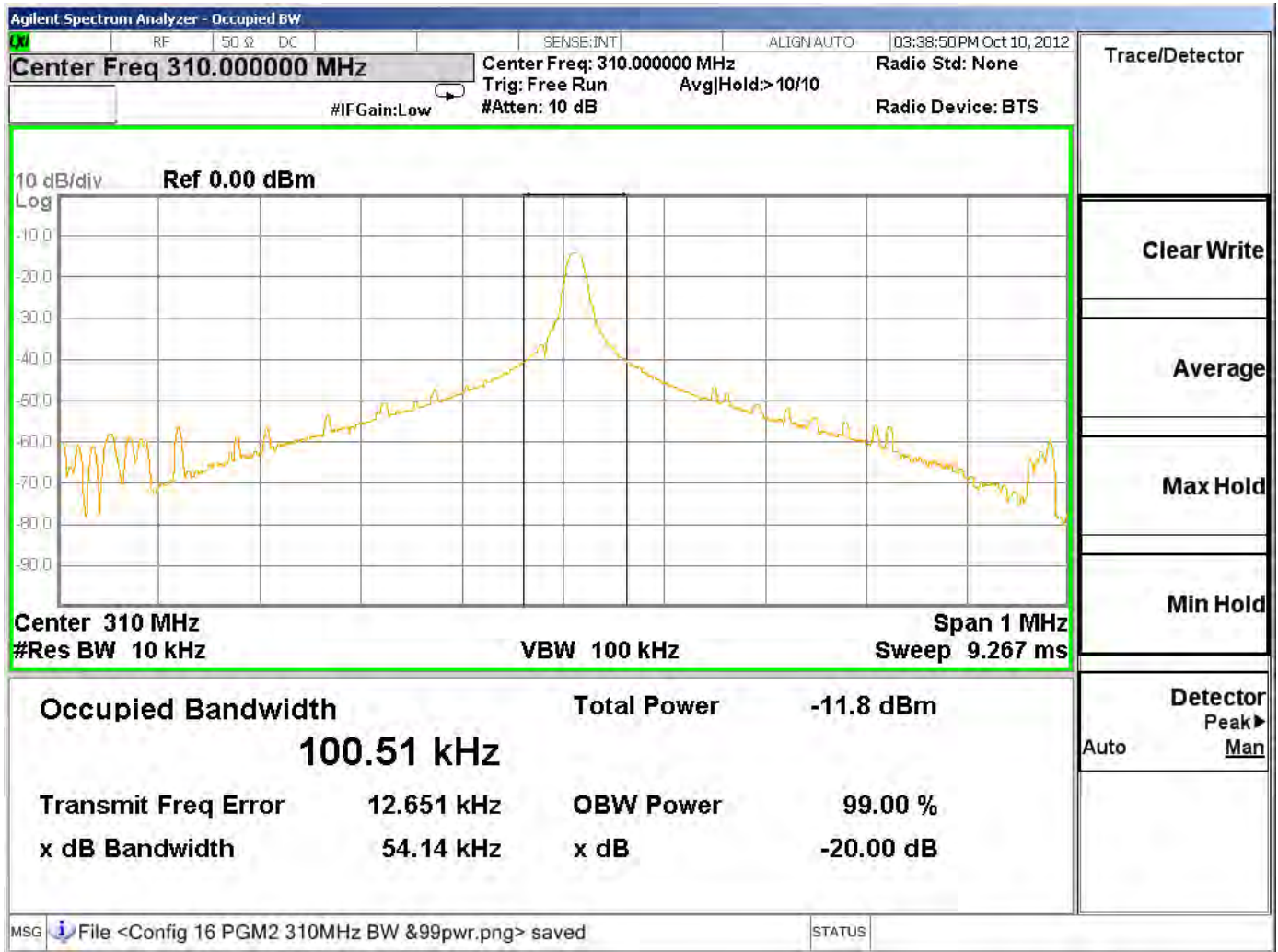
Table 25 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 26 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	54.14	100.51

Figure 22 – Bandwidth Graph



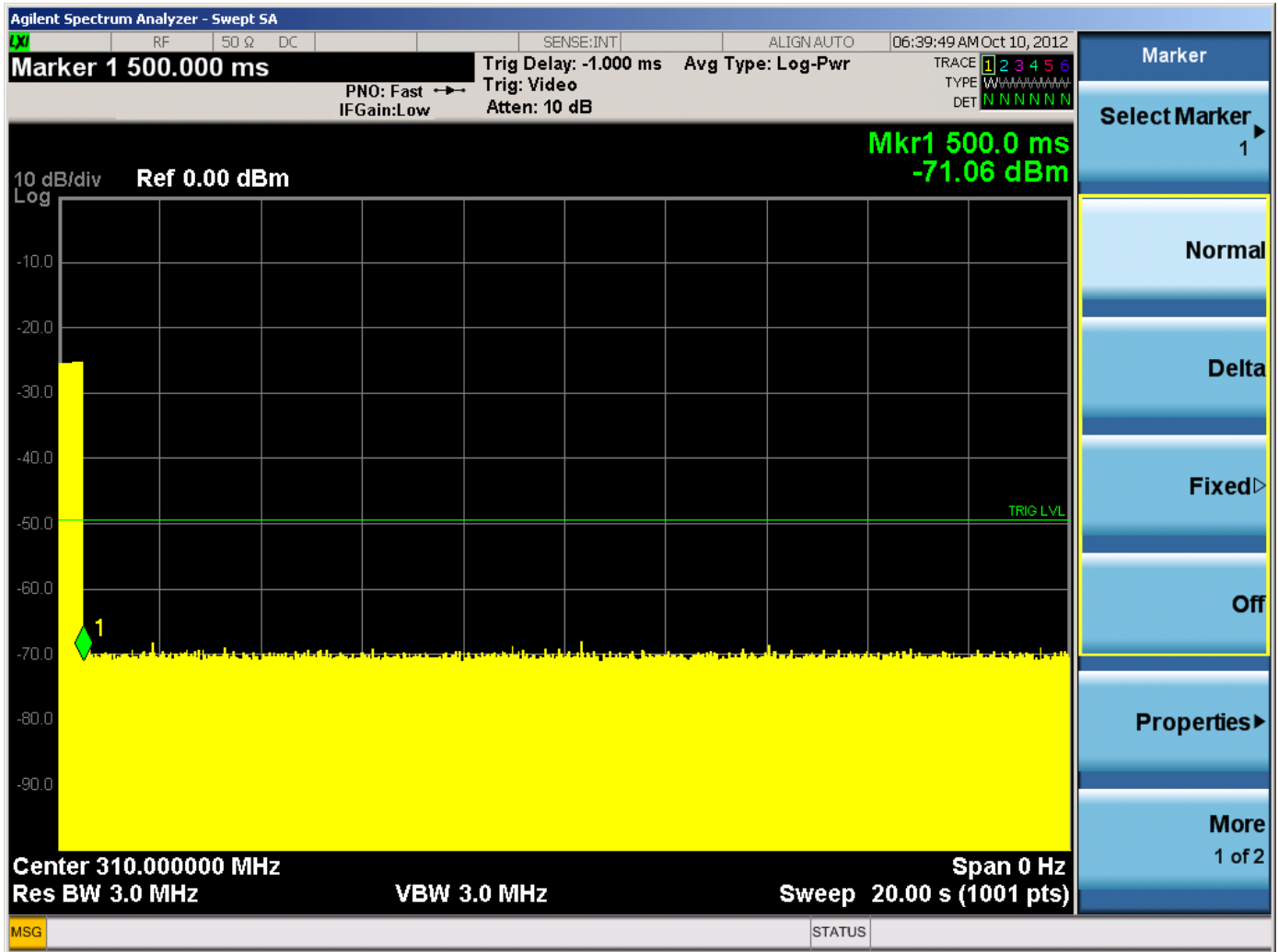
4.4.2 Test Conditions and Results – Cease Operation

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 27 Cease Operation Configuration Settings

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

Figure 23 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.		

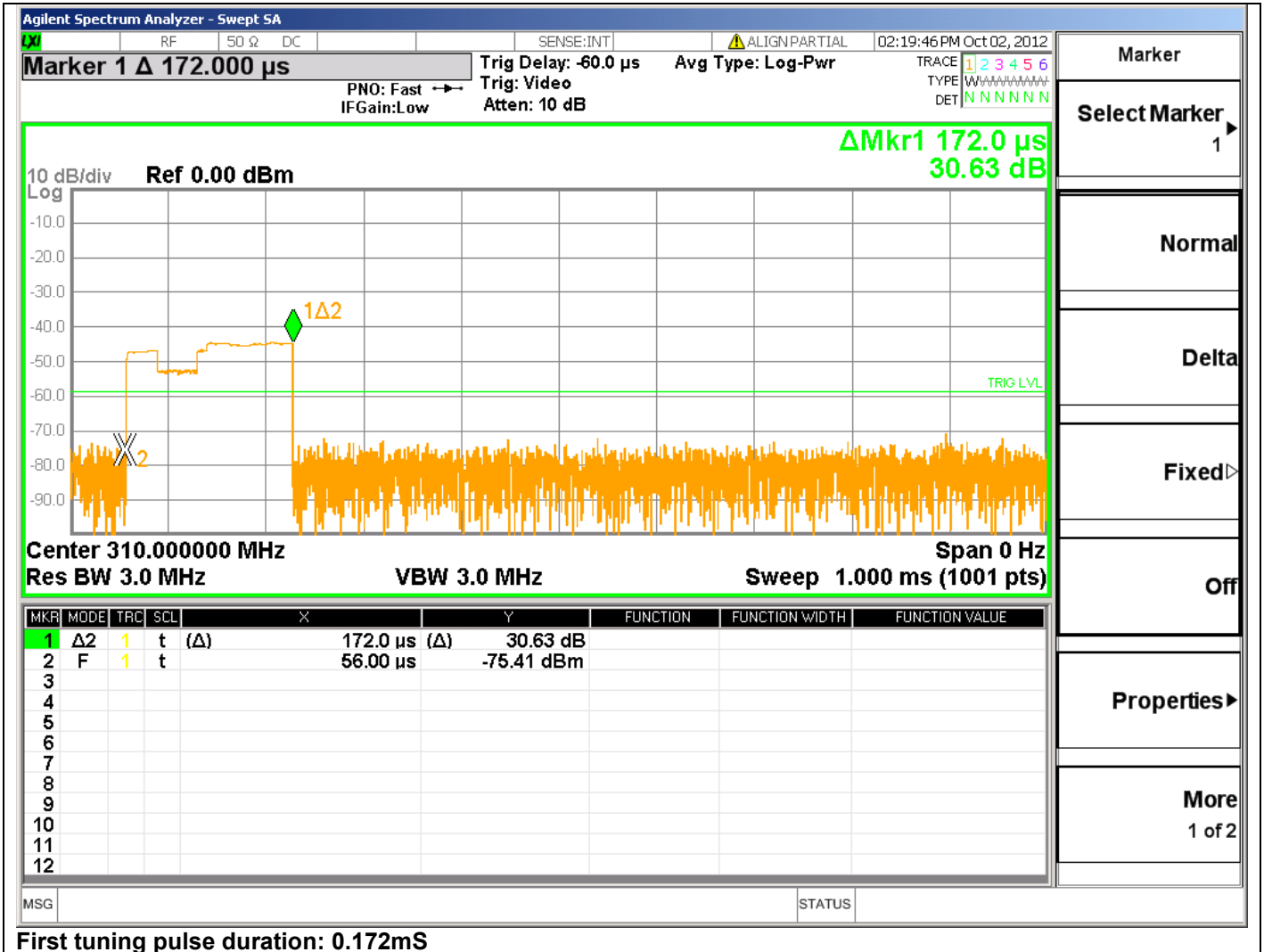
Table 28 Pulse Train Configuration Settings

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

Table 29 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	(8x2.01mS)	65.2mS	-12.15
Worst Case Duty Cycle: The worst case duty cycle was calculated over one message period. Manufacturer declared worst case duty cycle is -12.2dB. The measured duty cycle is used for all radiated emissions measurements.			

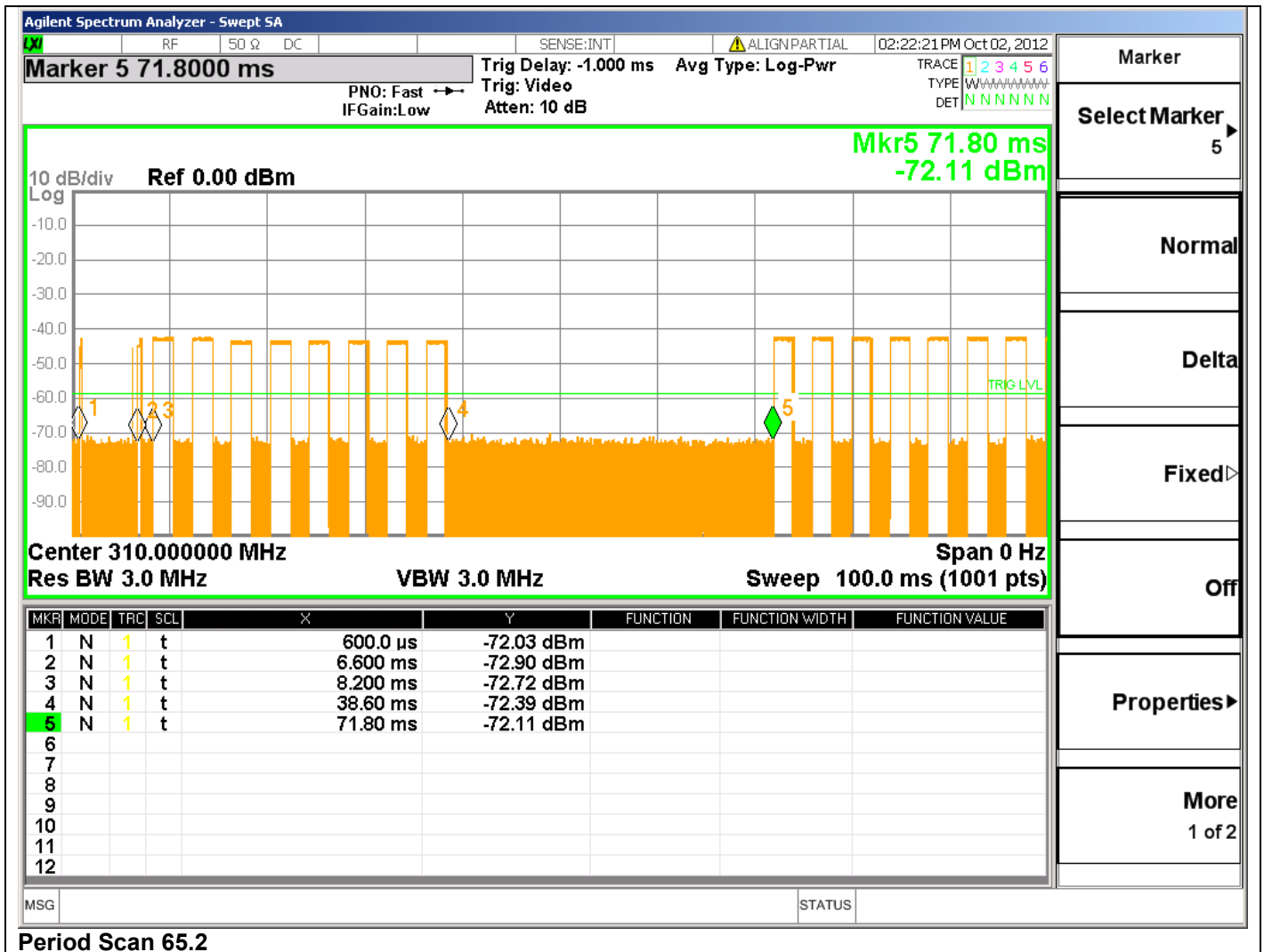
Figure 24 Pulse Train Graphs



First tuning pulse duration: 0.172mS







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
310	75.32	95.32
Supplementary information: See section 4.4.3 for duty cycle information.		

Figure 25 Radiated Emissions Graph (Below 1GHz)

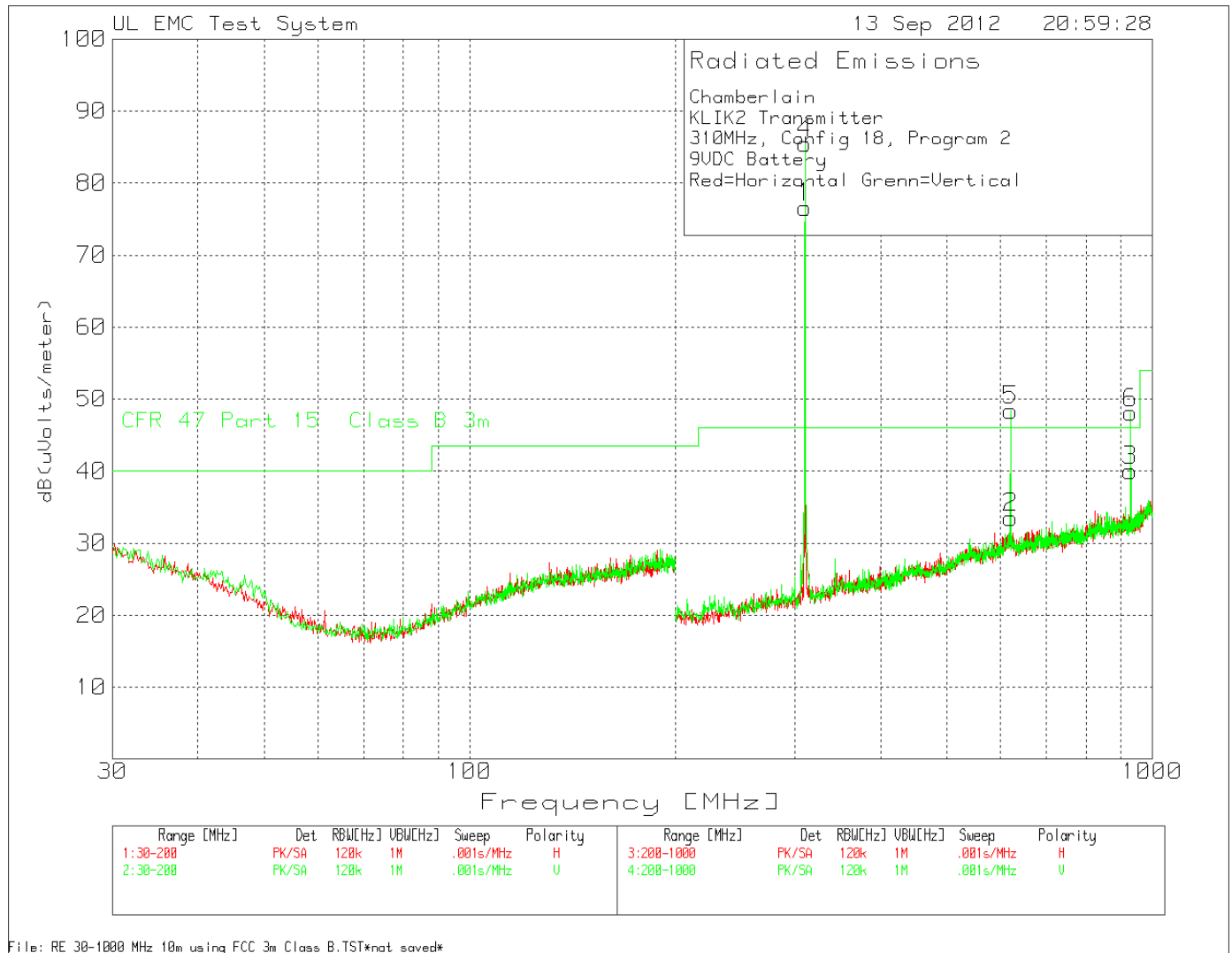


Figure 26 Radiated Emissions Graph (Above 1GHz)

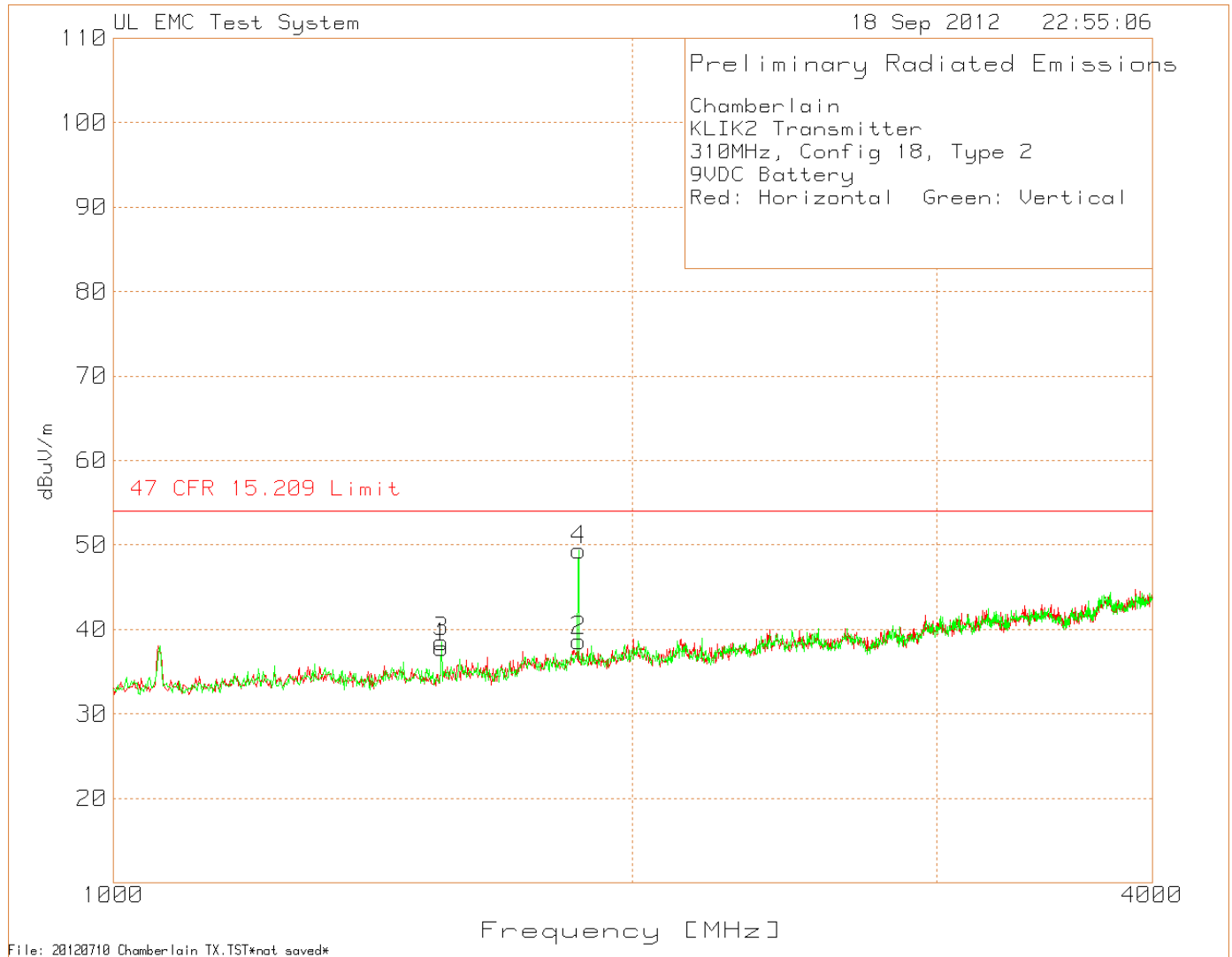


Table 30 - Radiated Emissions Data Points

Chamberlain KLIK2C Transmitter 310MHz, Config 18, Type 2 9VDC Battery Red: Horizontal Green: Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
310.016003	68.74	PK	14.1	2.1	84.94	-12.15	72.79	75.32	-2.53	170	102	Horz
310.0144	69.14	PK	14.1	2.1	85.34	-12.15	73.19	75.32	-2.13	86	154	Vert
620.028846	8.99	PK	20.3	3	32.29	-12.15	20.14	46	-25.86	278	225	Horz
620.028846	17.98	PK	20.3	3	41.28	-12.15	29.13	46	-16.87	253	102	Vert
930.044872	22.4	PK	23.6	3.8	49.8	-12.15	37.65	46	-8.35	194	281	Horz
930.044872	25.59	PK	23.6	3.8	52.99	-12.15	40.84	46	-5.16	269	113	Vert
1550.367	68.66	PK	25.2	-56.02	37.84	-12.15	25.69	54	-28.31	*	125	Horz
1860.574	65.86	PK	27.2	-54.44	38.62	-12.15	26.47	54	-27.53	*	125	Horz
1550.367	69.37	PK	25.2	-56.02	38.55	-12.15	26.4	54	-27.6	*	101	Vert
1860.0351	78.34	PK	27.2	-54.43	51.11	-12.15	38.96	54	-15.04	187	106	Vert

* Peak prescan data, not maximized

4.5 Configuration 16# Test Data

4.5.1 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)		

Table 31 Occupied Bandwidth Configuration Settings

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

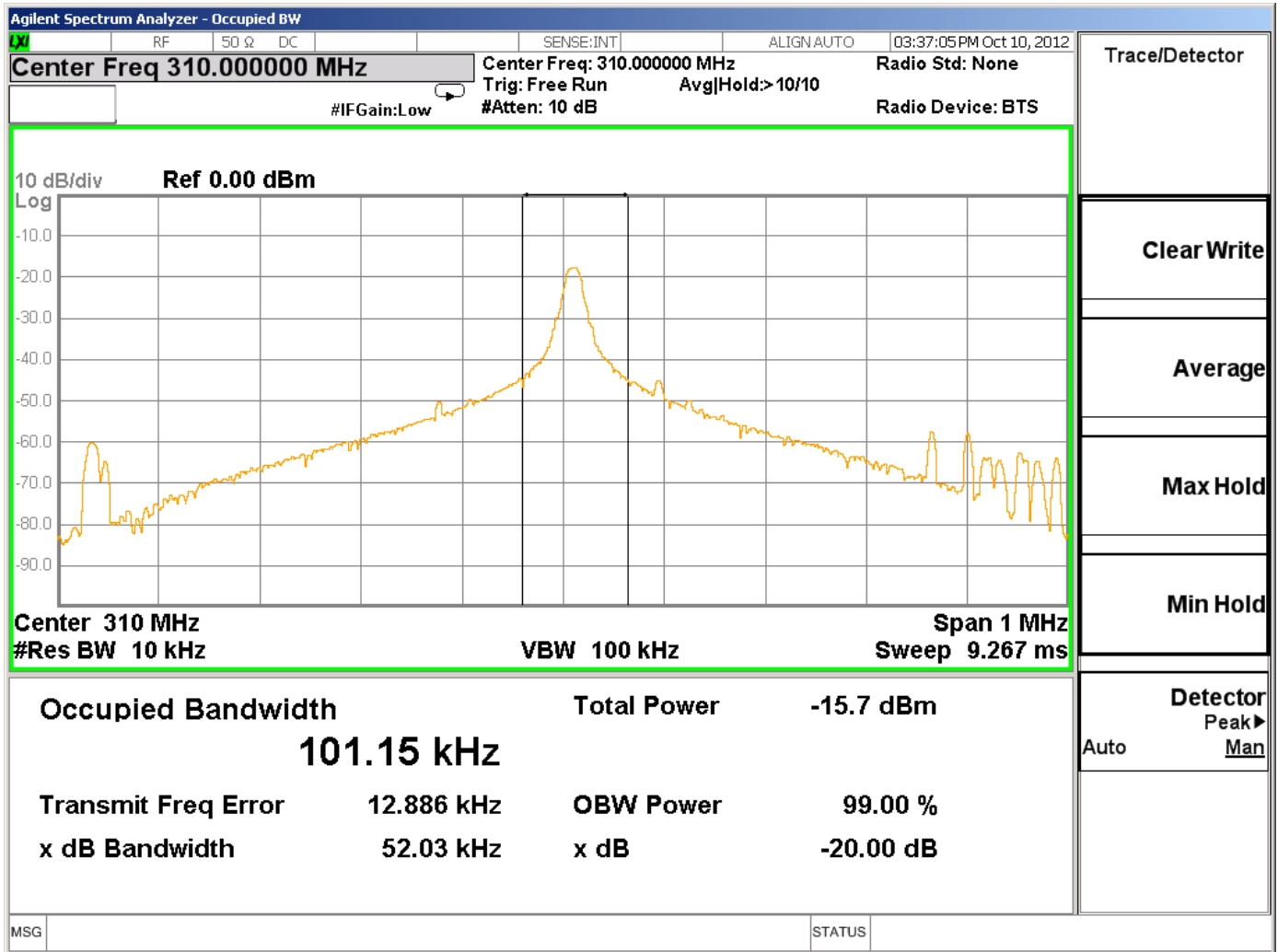
Table 32 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 33 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	52.03	101.15

Figure 27 – Bandwidth Graph



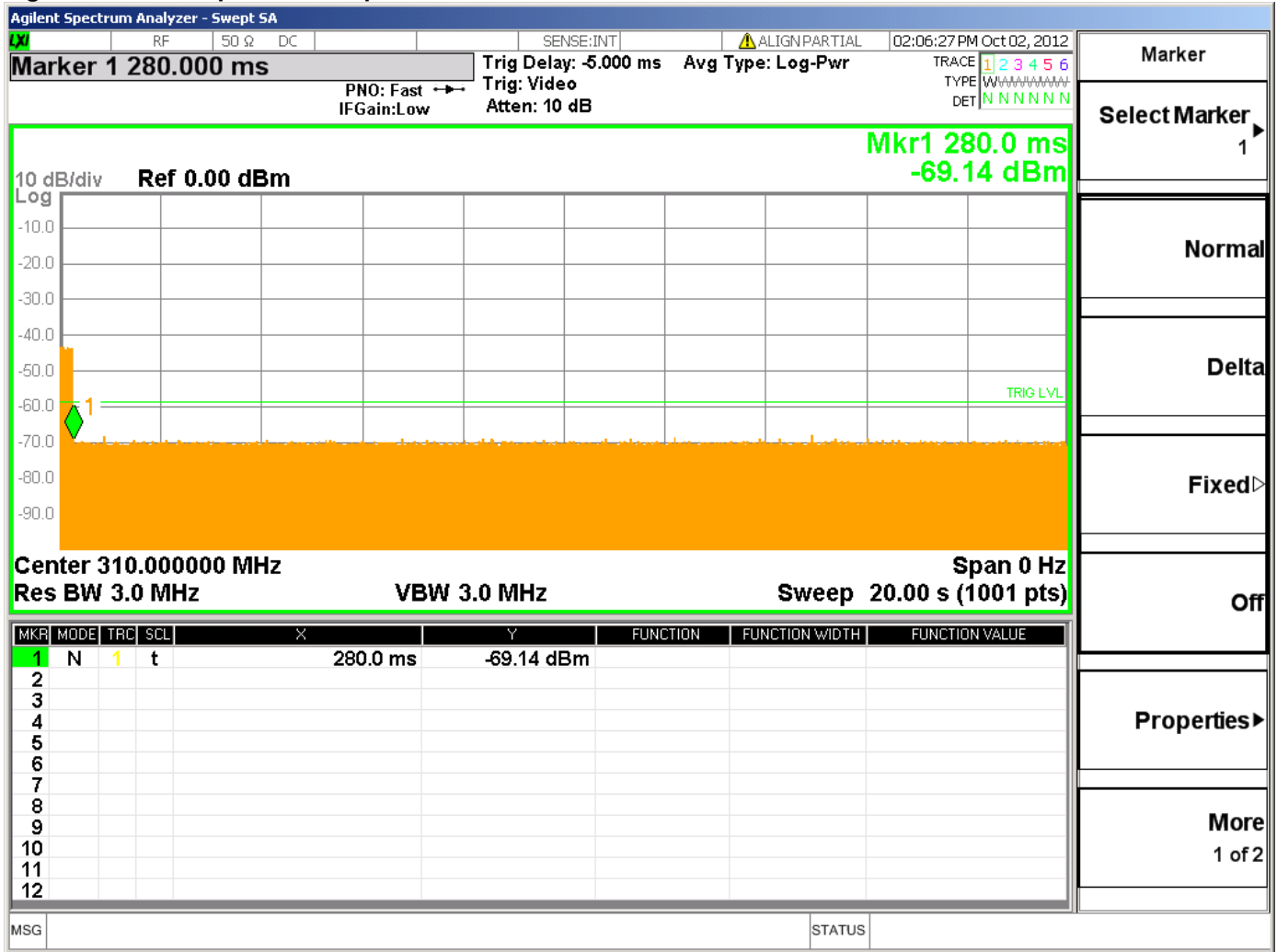
4.5.2 Test Conditions and Results – Cease Operation

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 34 Cease Operation Configuration Settings

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

Figure 28 Cease Operation Graph



4.5.3 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.		

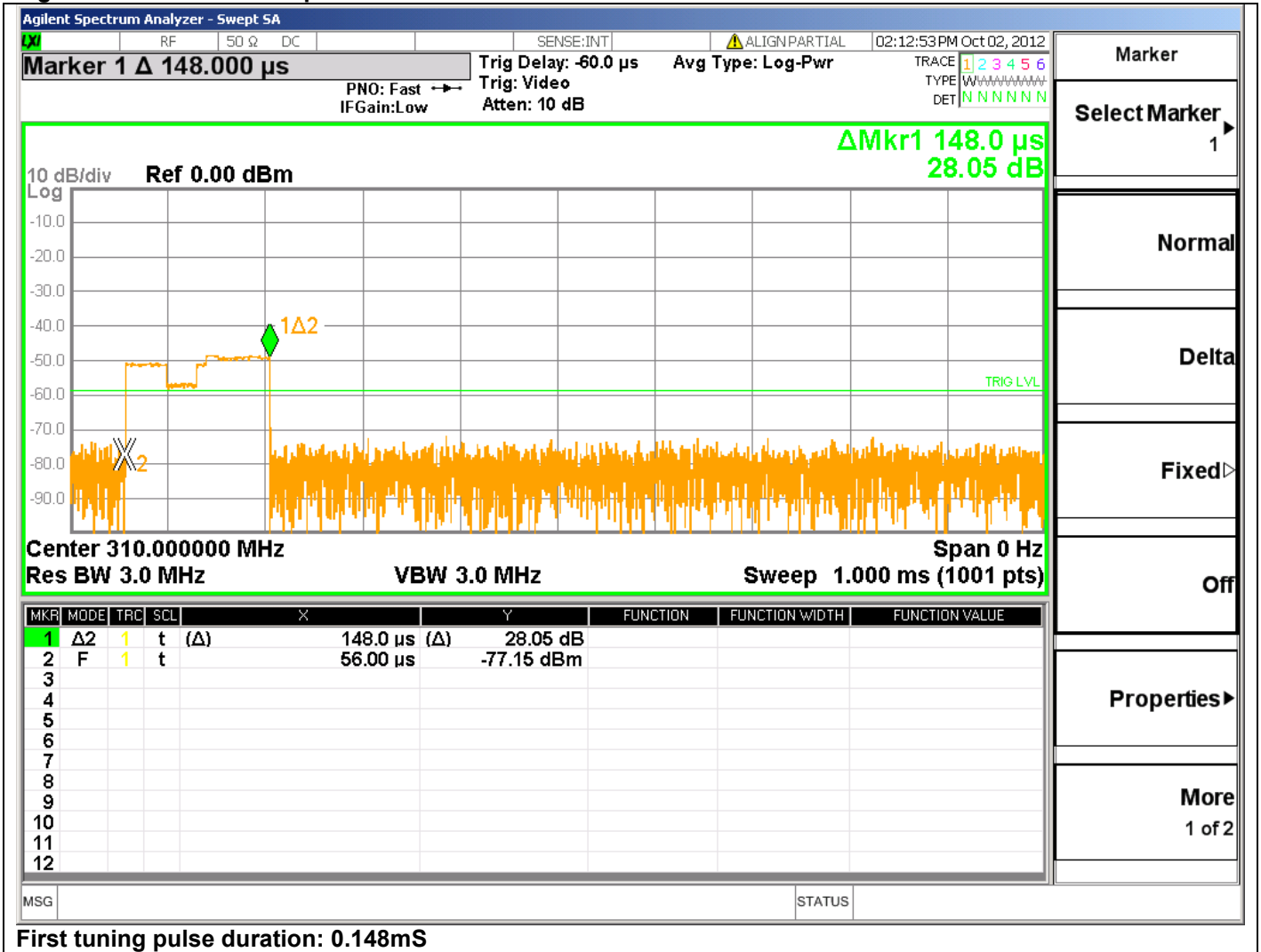
Table 35 Pulse Train Configuration Settings

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

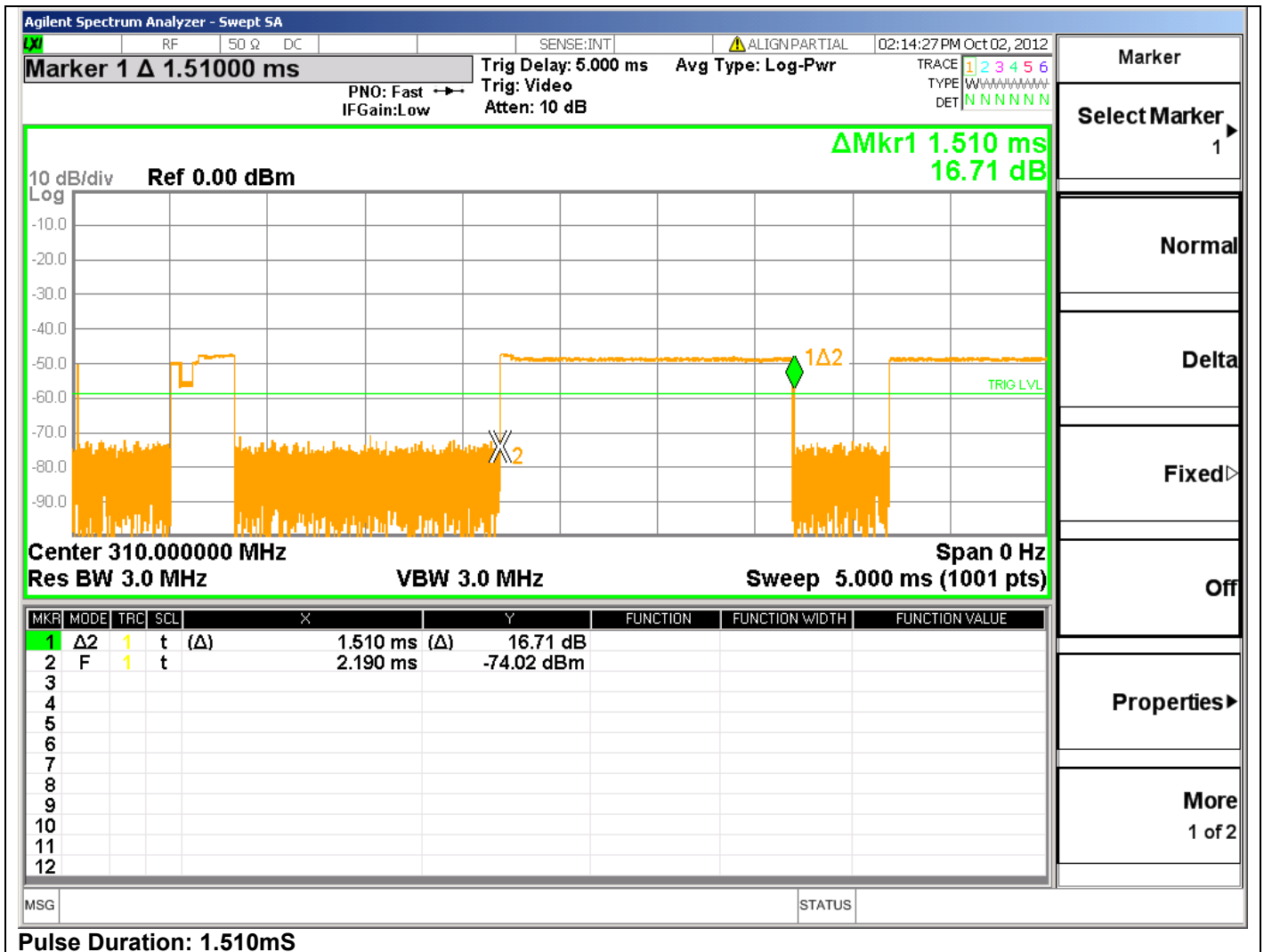
Table 36 Pulse Train Calculation

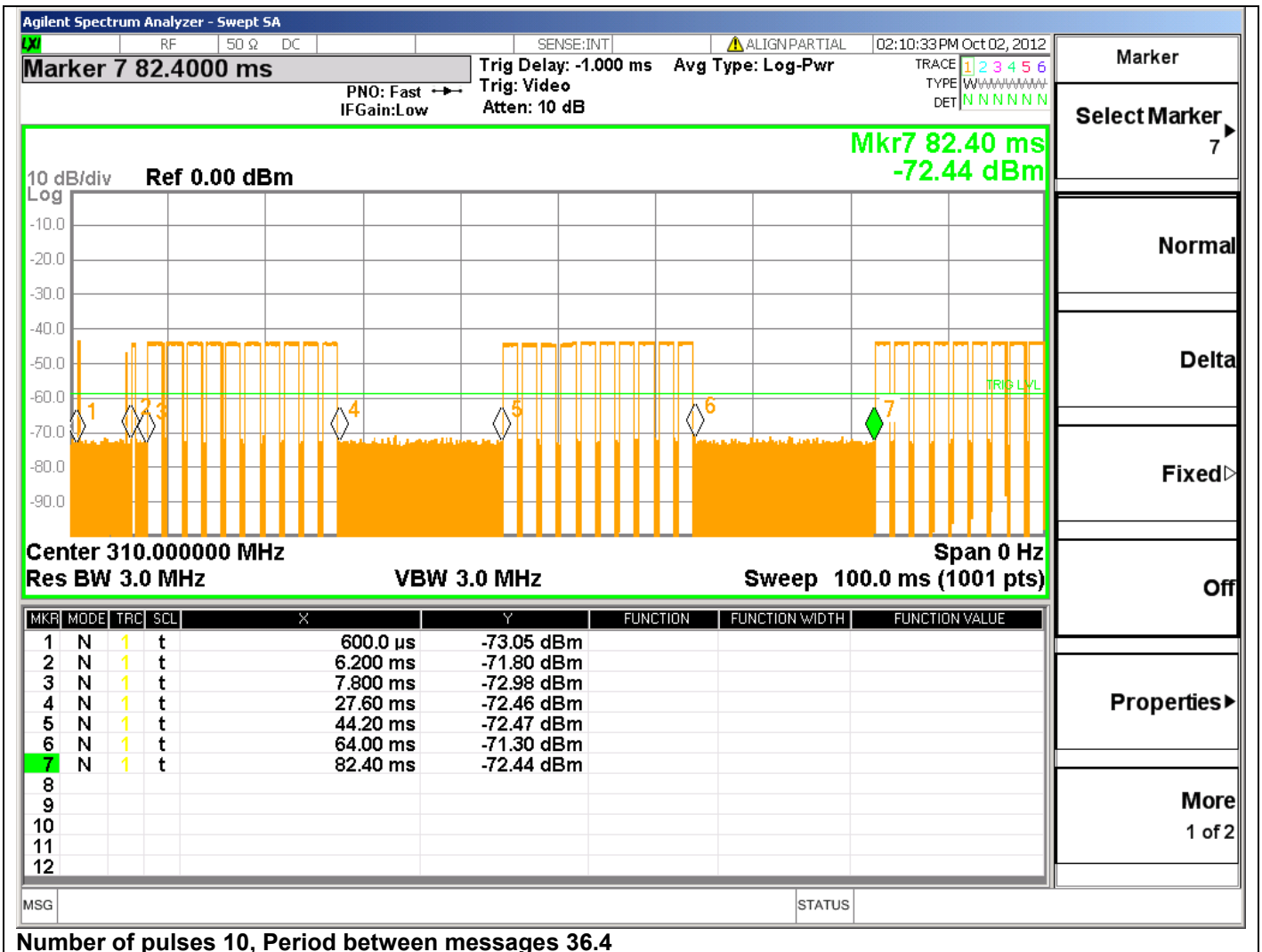
TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
310MHz	10x1.510	36.4mS	-7.64
Worst Case Duty Cycle: Worst case duty cycle was calculated over single message period and it did not include the tuning pulses. The manufacturer declared worst case duty cycle is -8.1dB. The measured value is used for all radiated emissions data.			

Figure 29 Pulse Train Graphs









4.5.4 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	
	All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
310	75.32	95.32
Supplementary information: See section 4.5.3 for duty cycle information.		

Figure 30 Radiated Emissions Graph (Below 1GHz)

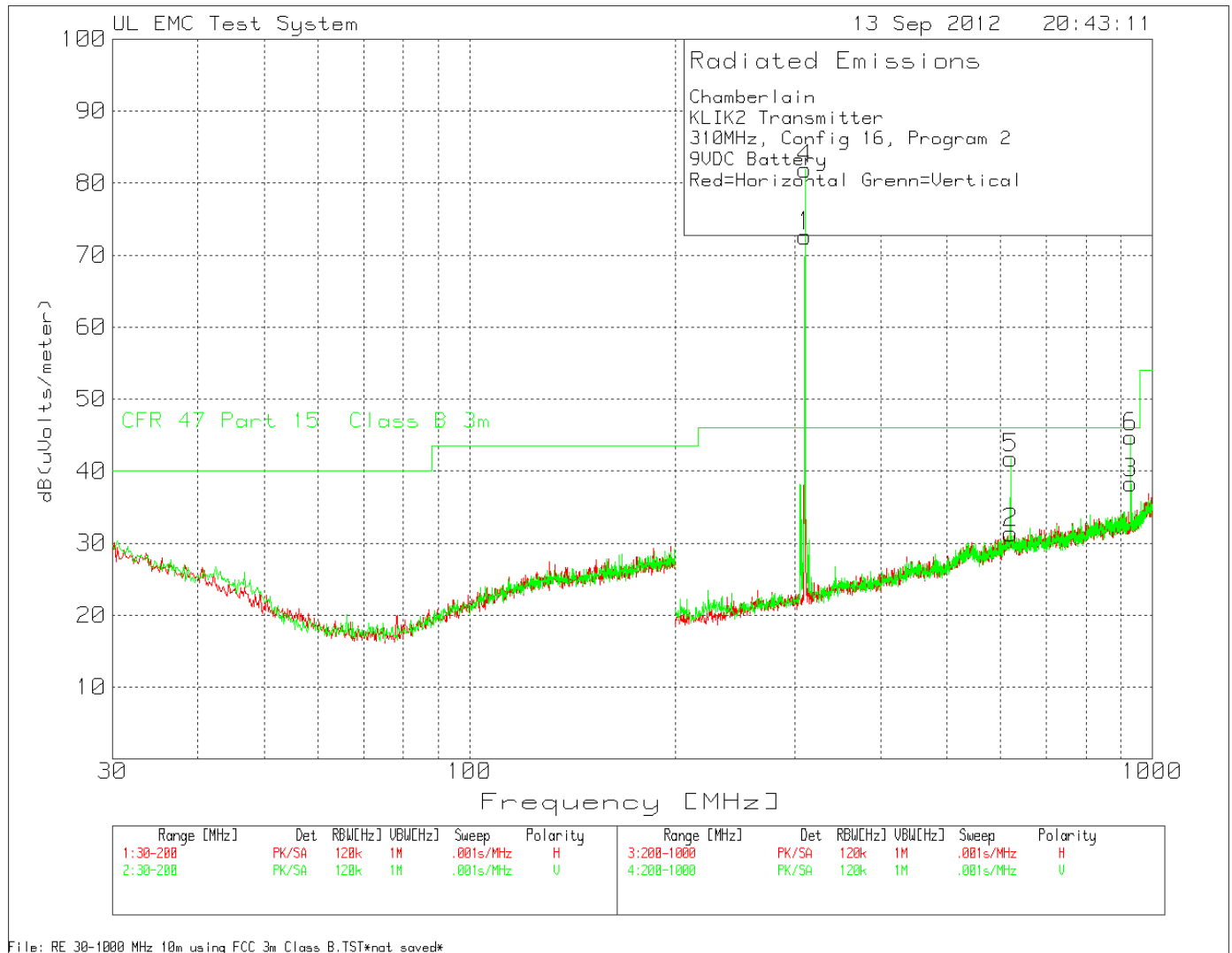


Figure 31 Radiated Emissions Graph (Above 1GHz)

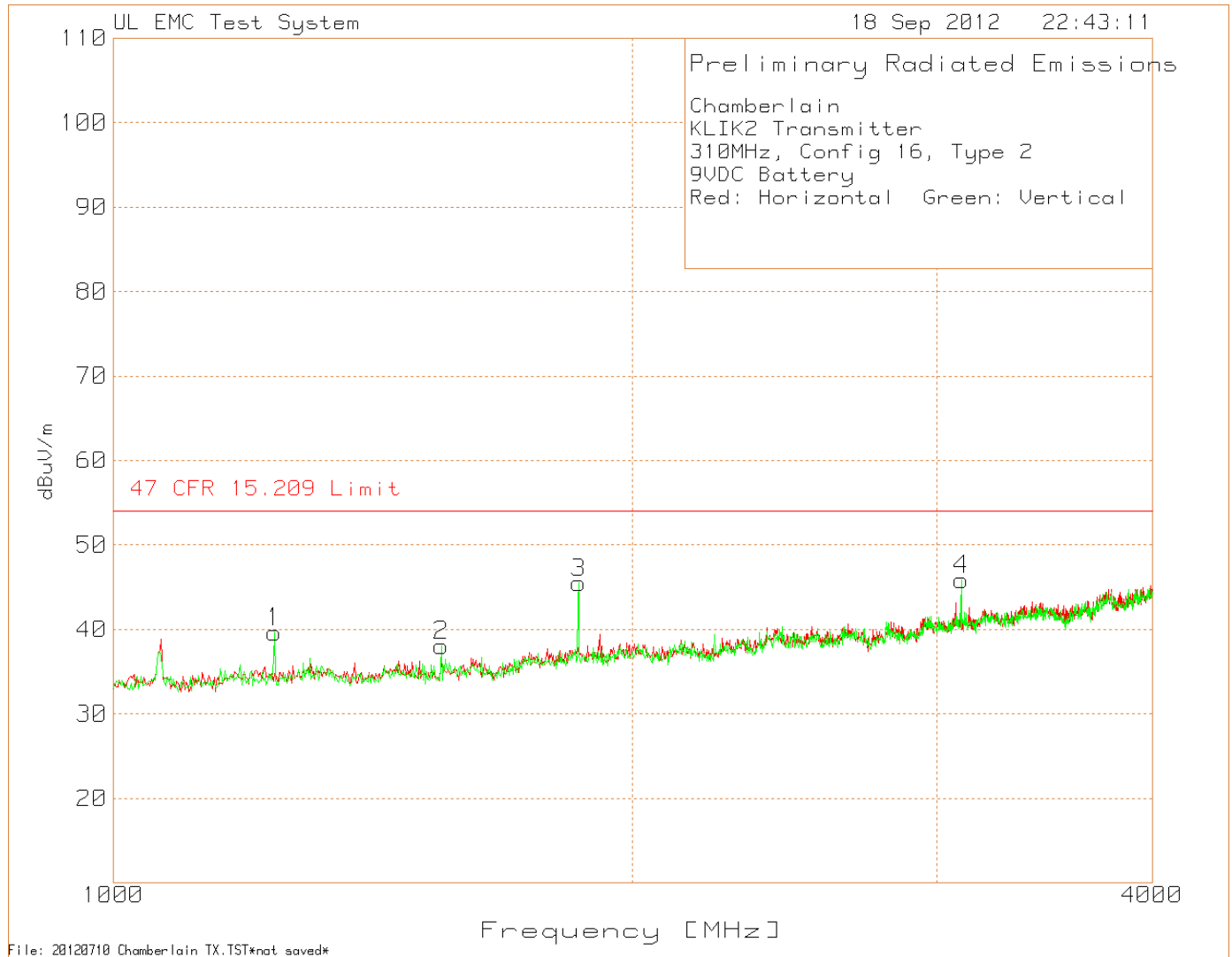


Table 37 - Radiated Emissions Data Points

Chamberlain KLIK2C Transmitter 310MHz, Config 16, Type 2 9VDC Battery Red: Horizontal Green: Vertical												
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 @ 3m dBuV/m	Margin dB	Azimuth [Degs]	Height [cm]	Polarity
310.012797	64.84	PK	14.1	2.1	81.04	-7.64	73.4	75.32	-1.92	170	102	Horz
310.012797	65.34	PK	14.1	2.1	81.54	-7.64	73.9	75.32	-1.42	85	155	Vert
620.024039	7.23	PK	20.3	3	30.53	-7.64	22.89	46	-23.11	275	227	Horz
620.024039	14.8	PK	20.3	3	38.1	-7.64	30.46	46	-15.54	251	102	Vert
930.036859	19.09	PK	23.6	3.8	46.49	-7.64	38.85	46	-7.15	197	279	Horz
930.036859	22.33	PK	23.6	3.8	49.73	-7.64	42.09	46	-3.91	270	113	Vert
1240.16	71.49	PK	25.1	-56.96	39.63	-7.64	31.99	54	-22.01	*	125	Vert
1550.367	68.88	PK	25.2	-56.02	38.06	-7.64	30.42	54	-23.58	*	100	Vert
1860.574	72.71	PK	27.2	-54.44	45.47	-7.64	37.83	54	-16.17	*	100	Vert
3101.401	66.69	PK	30.5	-51.31	45.88	-7.64	38.24	54	-15.76	*	100	Vert

* Peak prescan data, not maximized

Configuration 3# Test Data

4.5.5 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 38 Occupied Bandwidth Configuration Settings

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

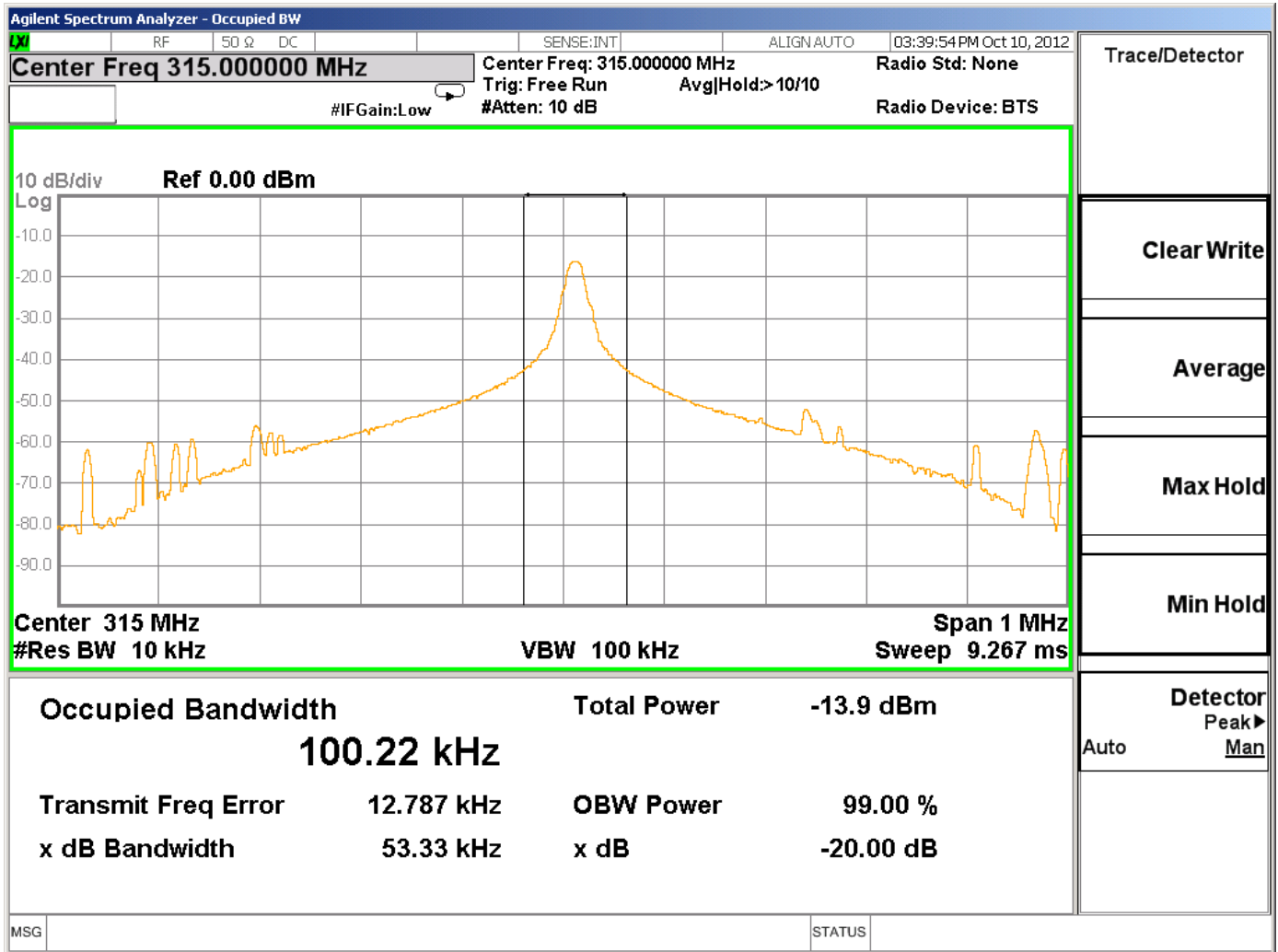
Table 39 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 40 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
315MHz	53.33	100.22

Figure 32 – Bandwidth Graph



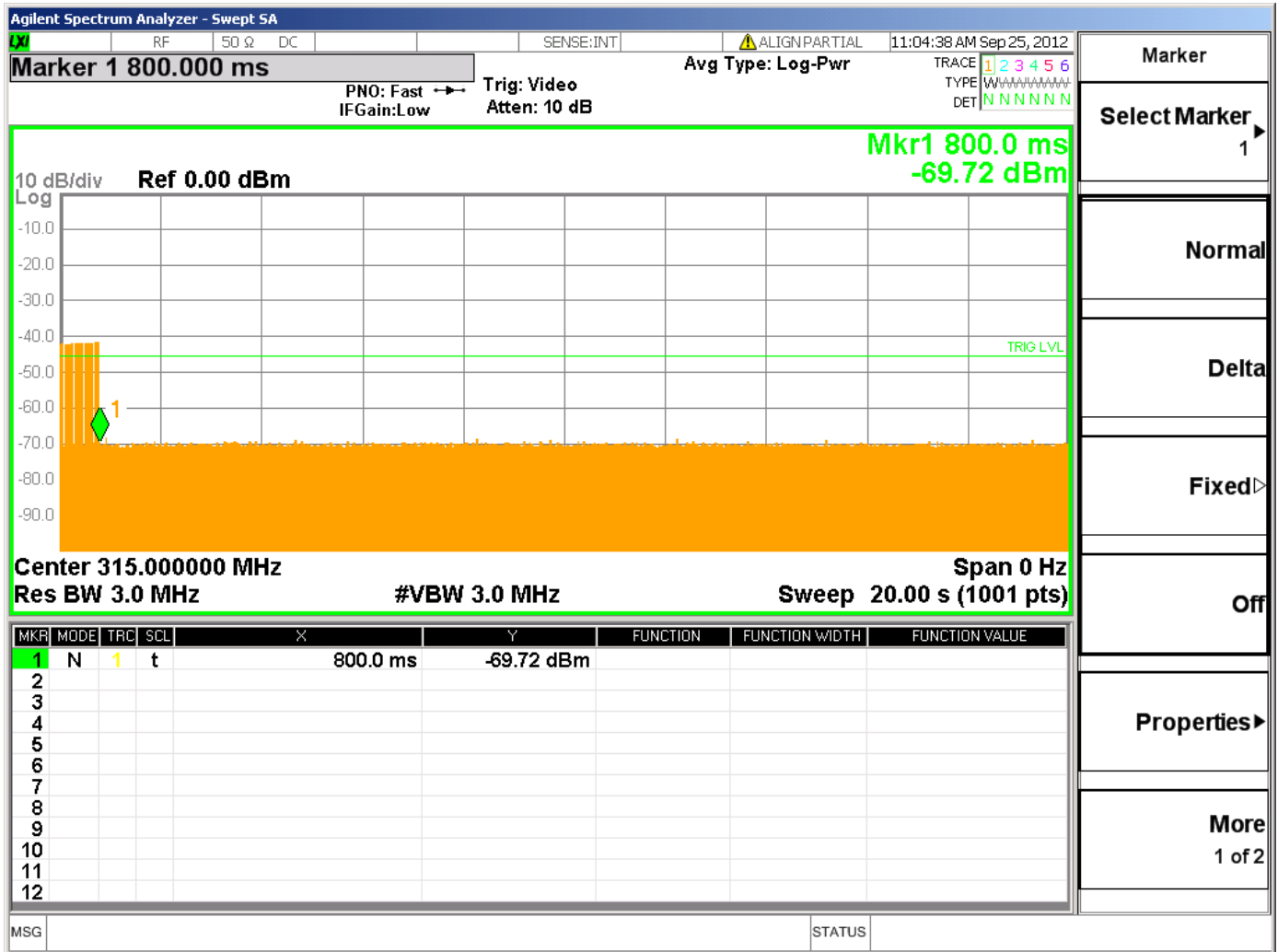
4.5.6 Test Conditions and Results – Cease Operation

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 41 Cease Operation Configuration Settings

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

Figure 33 Cease Operation Graph



4.5.7 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 42 Pulse Train Configuration Settings

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

Table 43 Pulse Train Calculation

TX Frequency	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
315MHz	$(7 \times 0.51) + (4 \times 1.01) + (10 \times 1.5)$	97.8ms	-12.63
Worst Case Duty Cycle Duty cycle was calculated over one period using only the message pulses. Manufacturer declared duty cycle is -13.55dB. Measured value is used for all emissions data.			

Figure 34 Pulse Train Graphs

