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Job Number:	1001376611
Project Number:	11CA23573 Rev1
File Number:	MC15343
Date:	May 17, 2011
Model:	1D7471-1

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

Test Report Details

Tests Performed By:	**Underwriters Laboratories Inc.** **333 Pfingsten Rd.** **Northbrook, IL 60062**
Tests Performed For:	**Chamberlain Group Inc.** **845 Larch Av** **Elmhurst, IL 60126**
Applicant Contact: Phone: E-mail:	**Hank Sieradzki** **(630) 993-6564** **Hank.Sieradzki@chamberlaingroup.com**
Test Report Date:	**May 17, 2011**
Product Type:	**Periodic Transmitter**
Product standards	**FCC Part 15, Subpart C, 15.231 & RSS-210**
Model Number:	**1D7471-1**
EUT Category:	**Periodic Low Power 3 channel Transmitter**
Testing Start Date:	**May 5, 2011**
Date Testing Complete:	**May 6, 2011**
Overall Results:	**Compliant**

Report Directory

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
2001 May 25	Changed model number per customer request from 1D7471A to 1D7471-1	Bart Mucha	Michael Ferrer

1.0 G E N E R A L - Product Description

1.1 Equipment Description

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

1.2 Device Configuration During Test

1.2.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Periodic Transmitter	Chamberlain Group Inc.	1D7471-1	During testing EUT was described as model: 1D7471A
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	3.0	-	-	DC	-	Battery Operated

1.3 EUT Configurations

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

1.4 EUT Operation Modes

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

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.231	Code of Federal Regulations, Part 15, Radio Frequency Devices	2010
RSS-210	License - exempt Radio Apparatus (All Frequency Bands): Category I Equipment	Issue 8

2.4 Results Summary

This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*
Occupied Bandwidth	Compliant
Cease Operation	Compliant
Pulse Train and Duty Cycle	Compliant
Fundamental Frequency & Spurious Radiated Emissions	Compliant

Test Engineer:

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

Reviewer:

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

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

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

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

---------- Canada ----------

Radio Standards specifications	RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150

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

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

4.1 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.
Basic Standard	47 CFR Part 15.231(c)
Occupied Bandwidth Limits	
0.25% of Center Frequency (310MHz: 775kHz, 315MHz: 788kHz, 390MHz: 975kHz)	

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	%
10kHz	-20	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	56.0	111.6
315MHz	56.8	112.0
390MHz	55.2	117.2

Table 4 Occupied Bandwidth Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 30 2010	Dec 302011
Loop Antenna	-	-			

Figure 1 – 20dB Bandwidth Graph for 310MHz

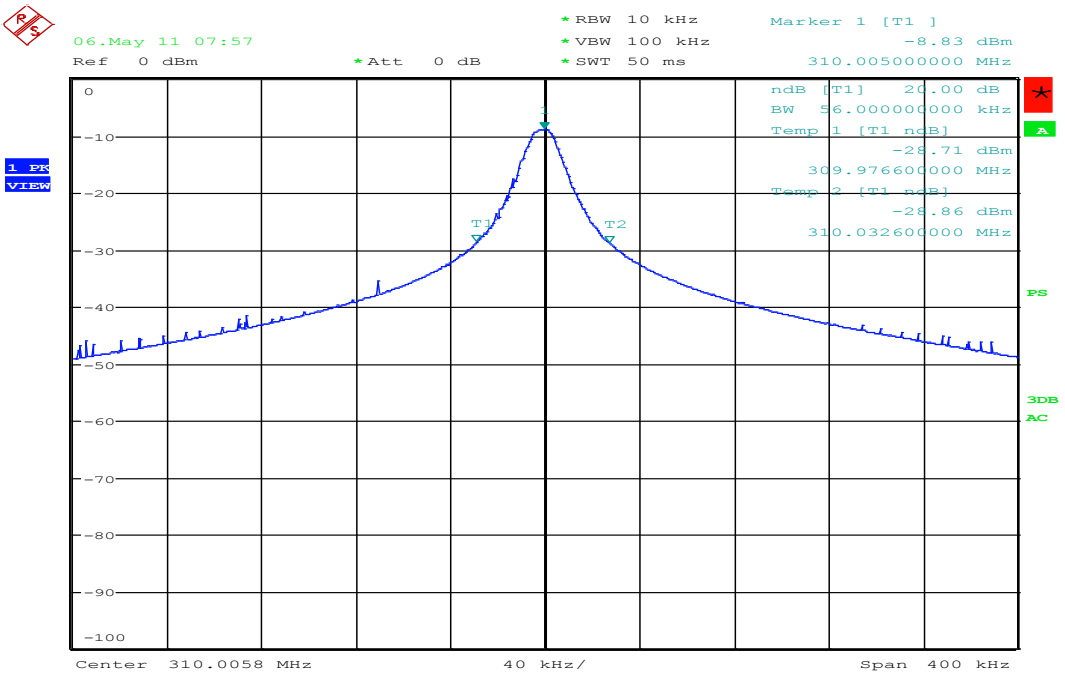


Figure 2 – 20dB Bandwidth Graph for 315MHz

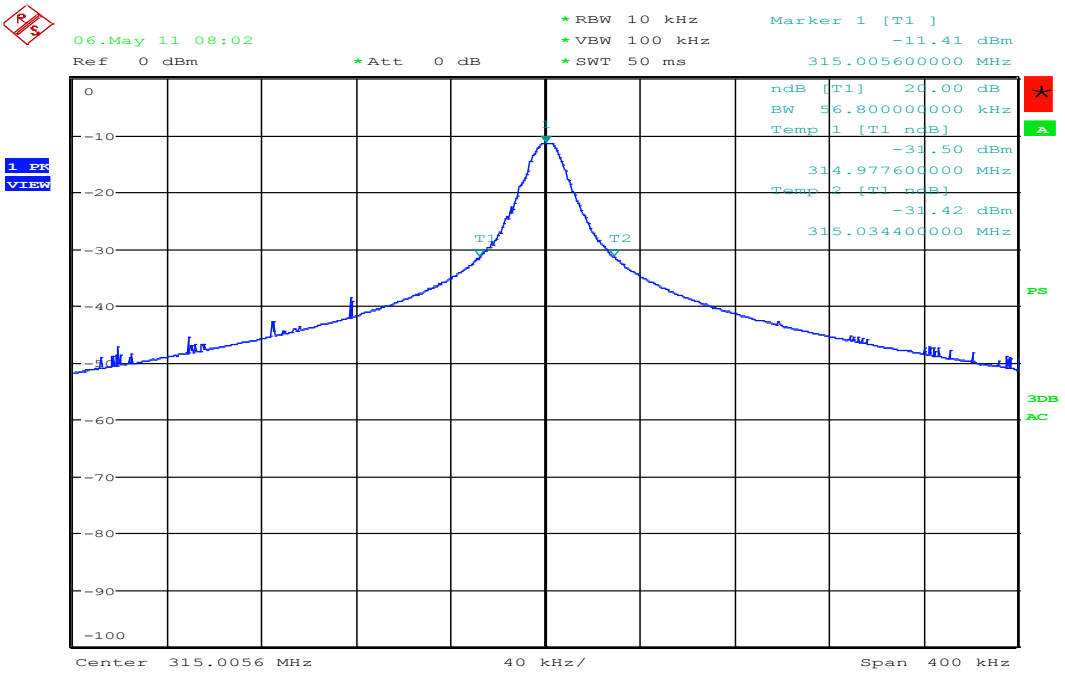


Figure 3 – 20dB Bandwidth Graph for 390MHz

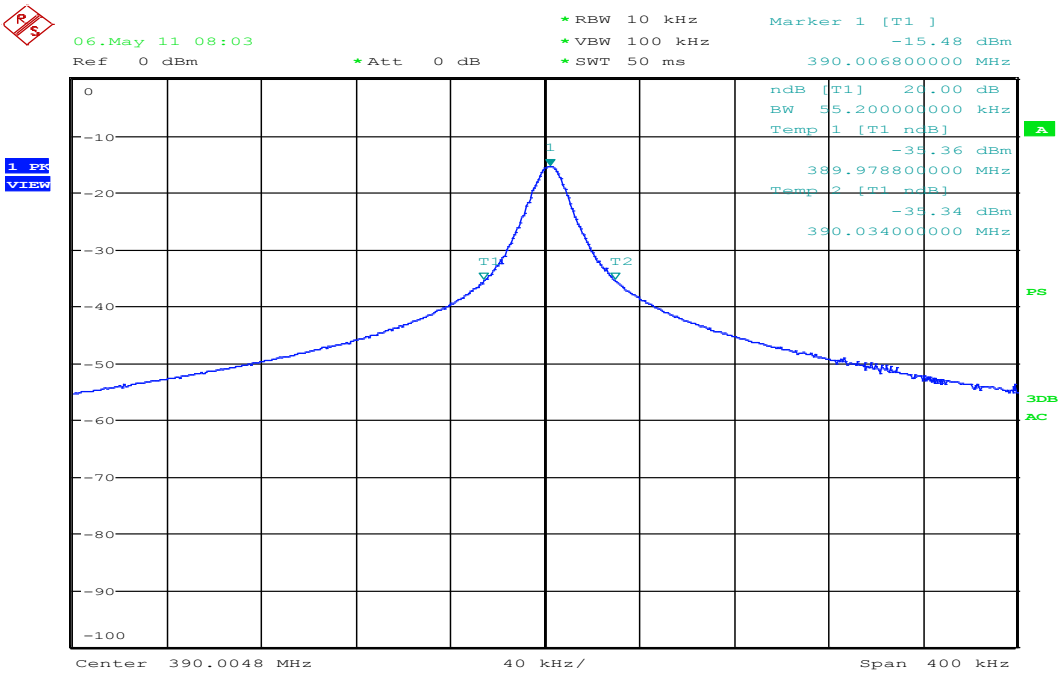


Figure 4 – 99% Bandwidth Graph for 310MHz

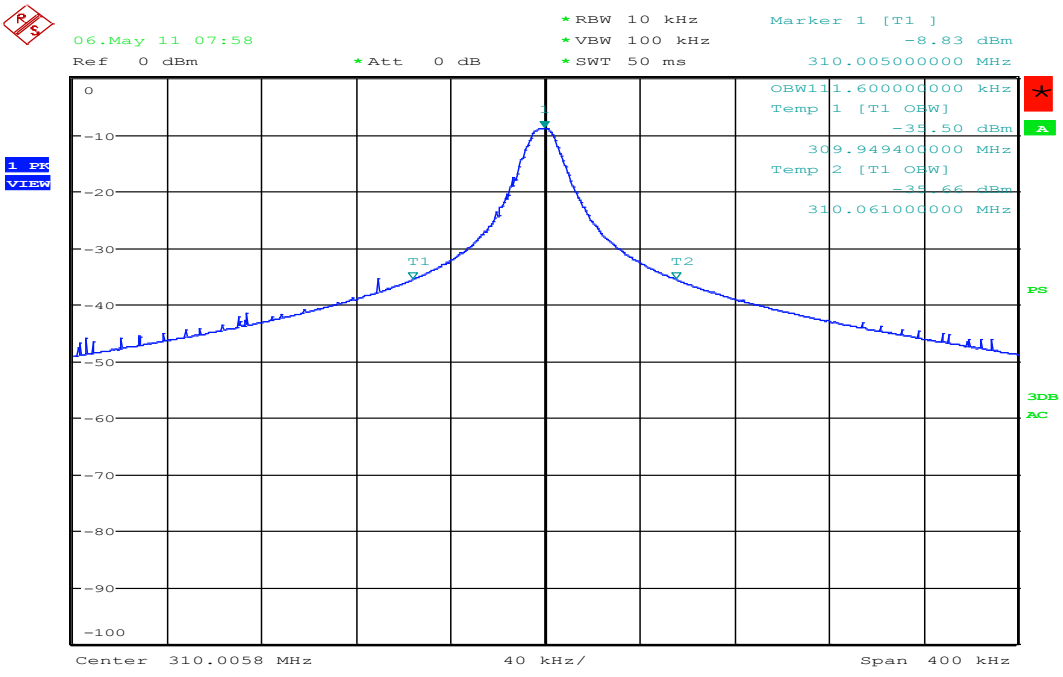


Figure 5 – 99% Bandwidth Graph for 315MHz

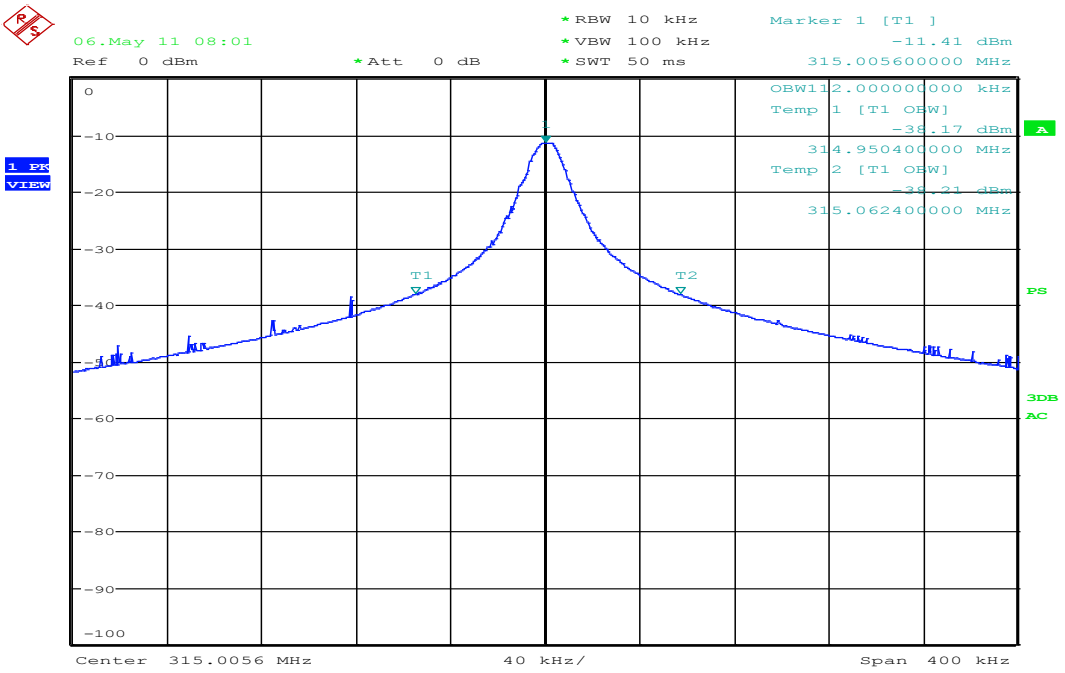
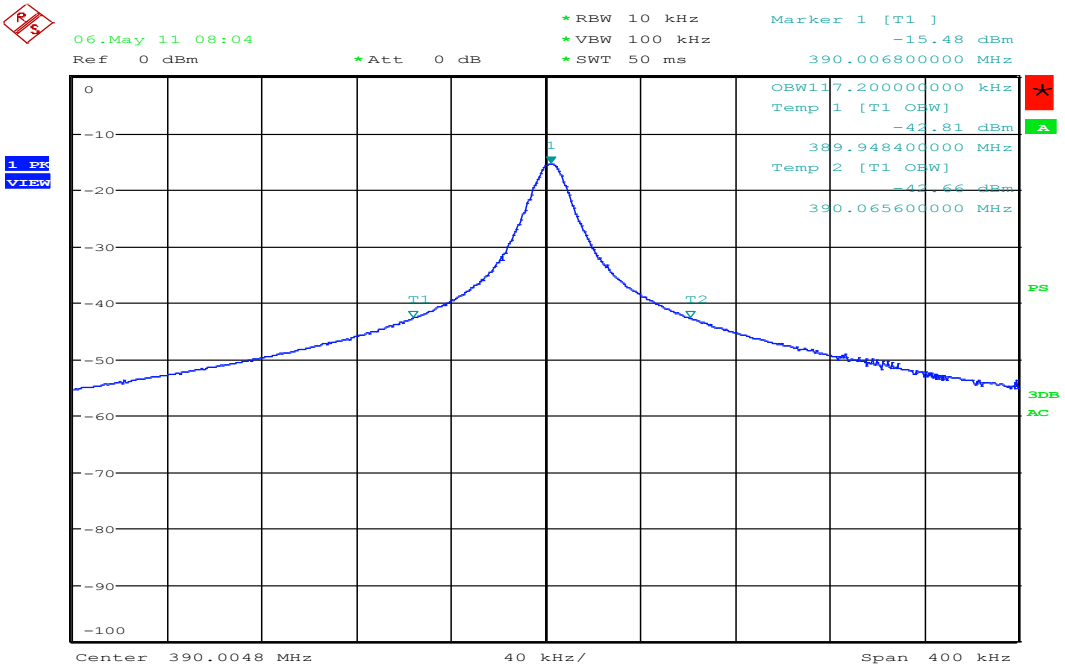


Figure 6 – 99% Bandwidth Graph for 390MHz



4.2 Test Conditions and Results – Cease Operation

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

Table 5 Cease Operation Configuration Settings

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

Table 6 Cease Operation Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 30 2010	Dec 302011
Loop Antenna	-	-			

Figure 7 Cease Operation Graph for 310MHz

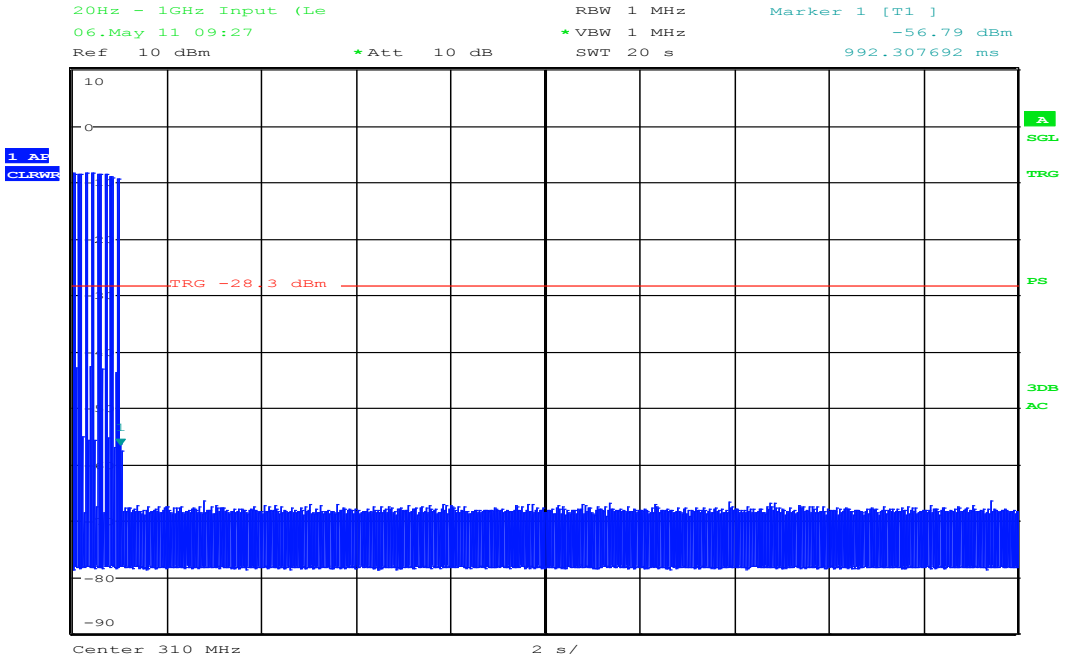


Figure 8 Cease Operation Graph for 315MHz

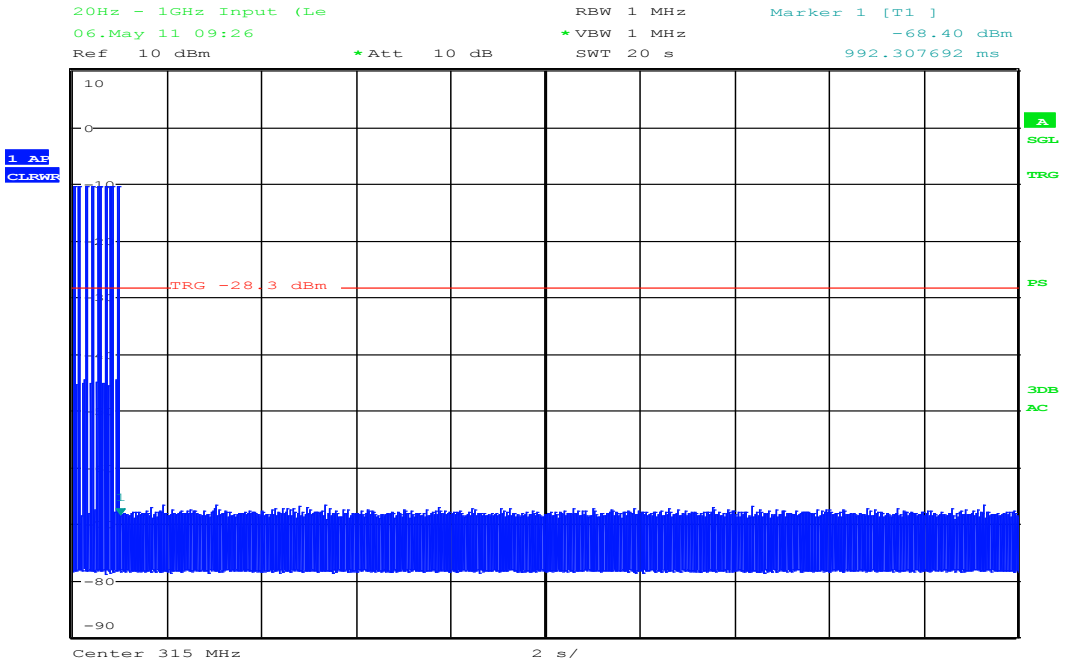
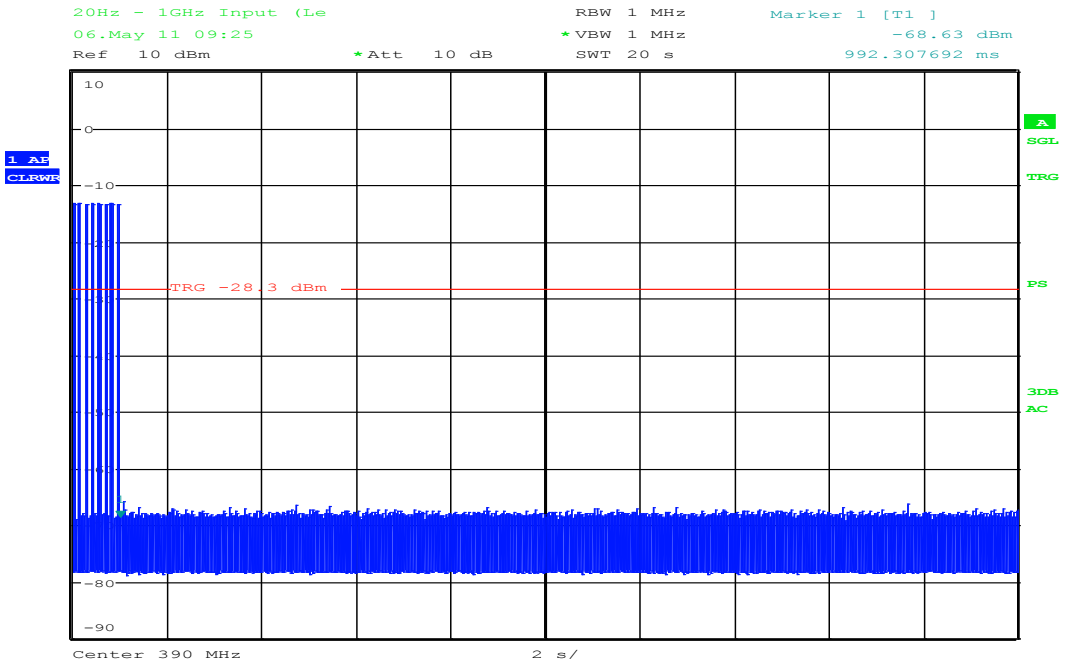


Figure 9 Cease Operation Graph for 390MHz



4.3 Test Conditions and Results – Pulse Train

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

Table 7 Pulse Train Configuration Settings

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

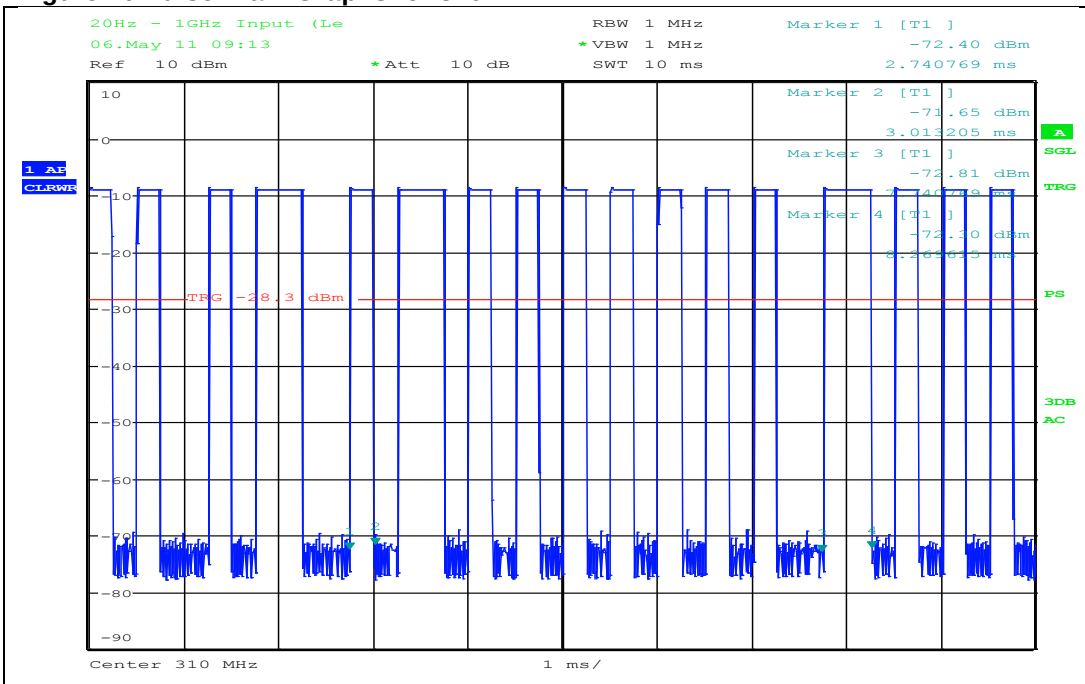
Table 8 Pulse Train Calculation

TX Frequency	Total TX time	Total Transmission time or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
310MHz	(50 x 0.272436) + (18 x 0.528846)	100ms	-12.71
315MHz	(55 x 0.272436) + (16 x 0.512821)	100ms	-12.69
390MHz	(55 x 0.272436) + (14 x 0.544872)	100ms	-12.91
Worst Case Duty Cycle: -12.69dB			

Table 9 Pulse Train Test Equipment

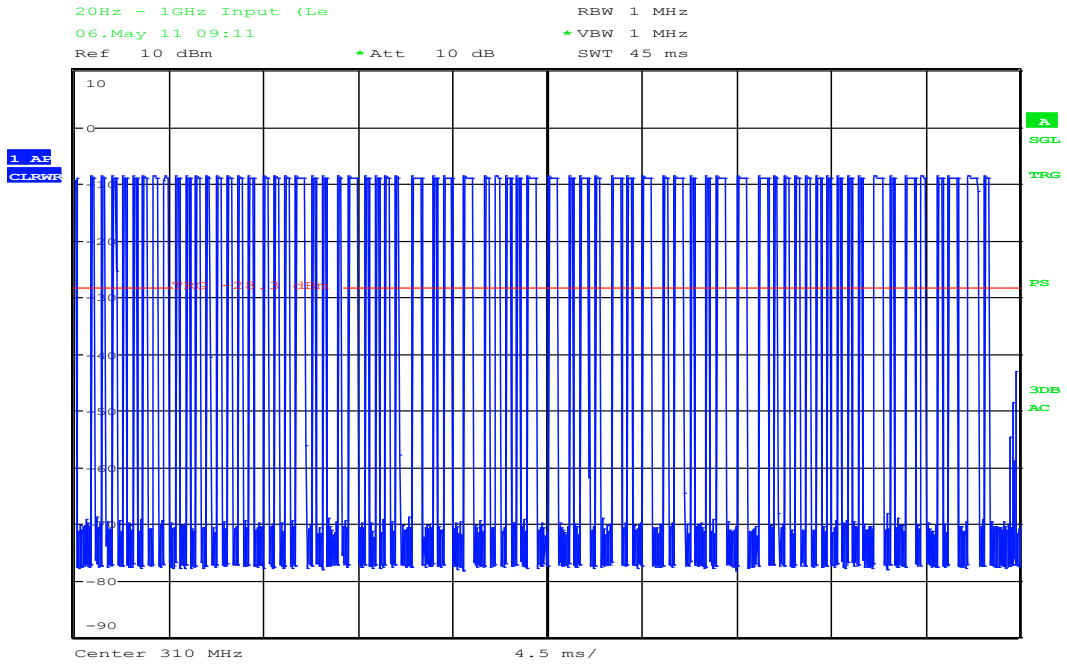
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 30 2010	Dec 302011
Loop Antenna	-	-			

Figure 10 Pulse Train Graphs for 310MHz



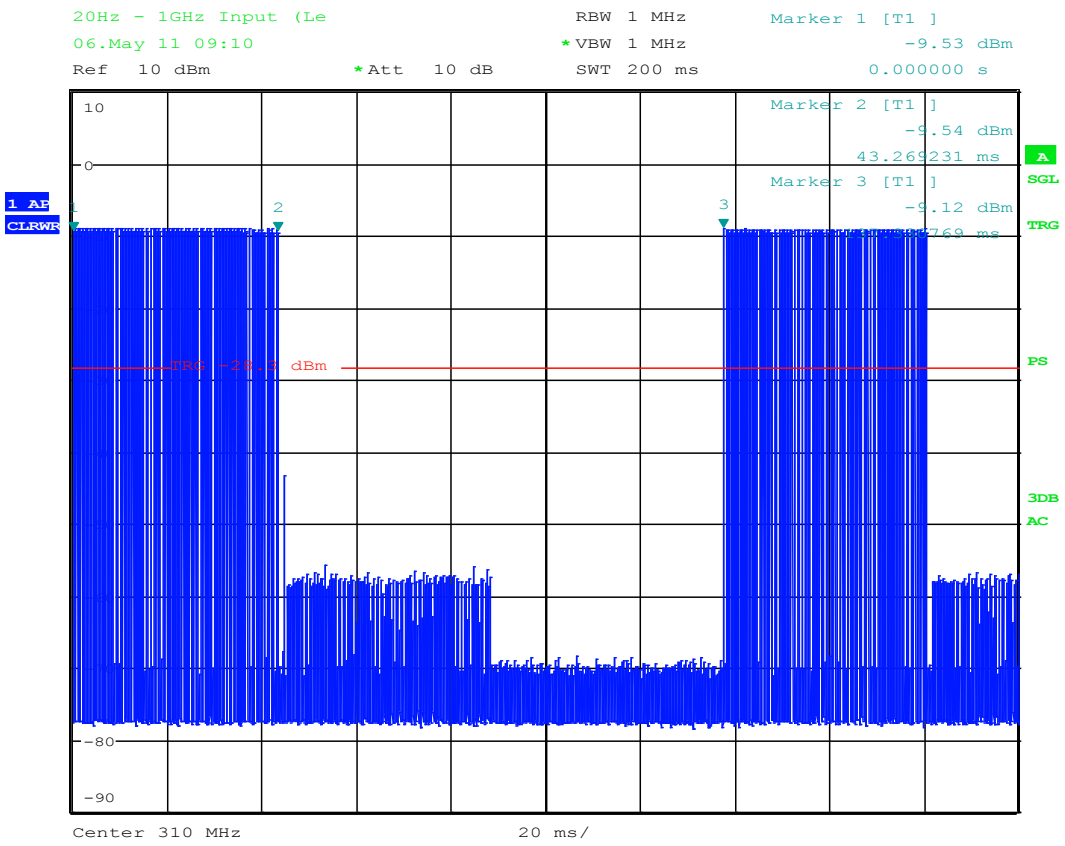
Short Pulse: 0.272436ms, Long Pulse: 0.528846mS

Pulse Duration mS



# of Short Pulses: 50, # of Long Pulses: 18

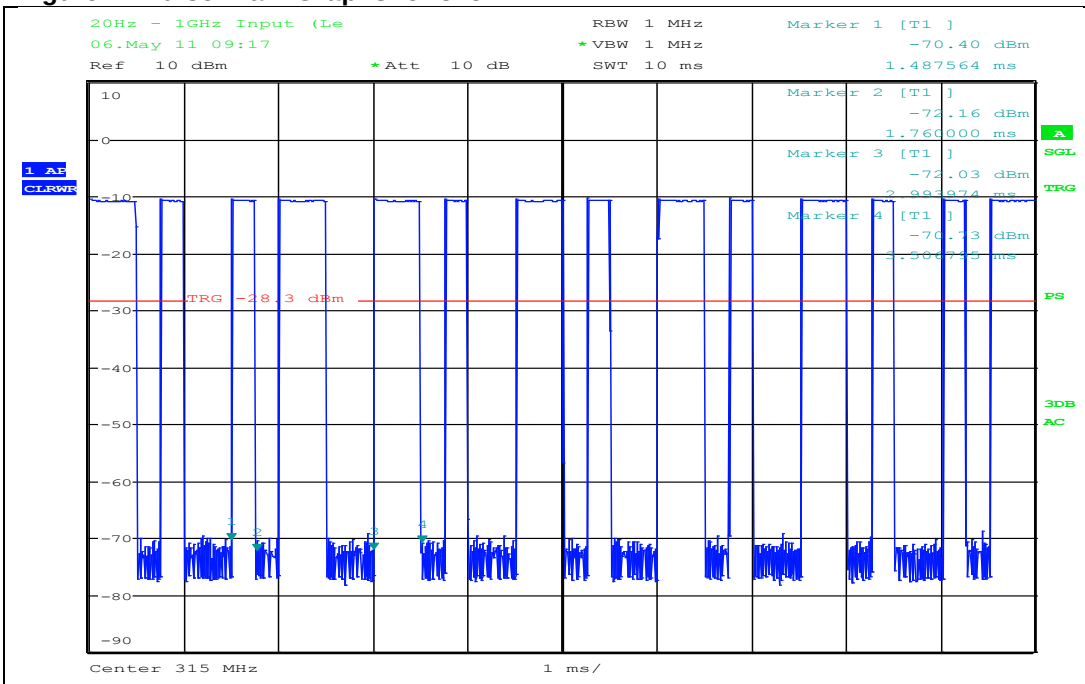
Number of Pulses



Period

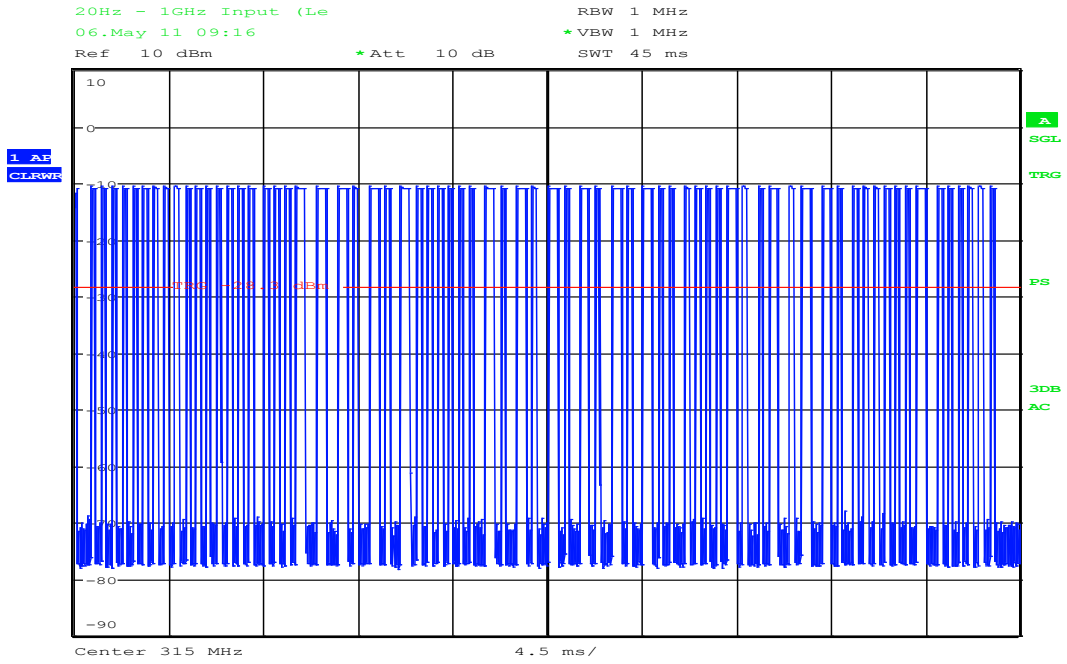
Period: 137.3mS, use 100mS for DC calculation

Figure 11 Pulse Train Graphs for 315MHz



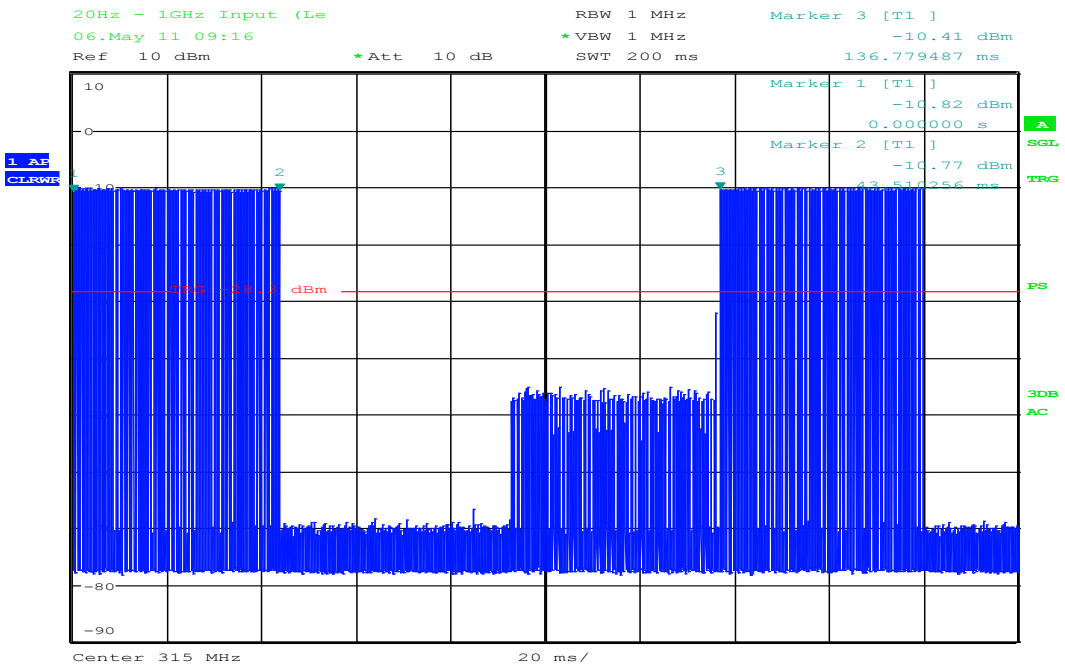
Short Pulse: 0.272436mS, Long Pulse 0.512821mS

Pulse Duration mS



# of Short Pulses: 55, # of Long Pulses: 16

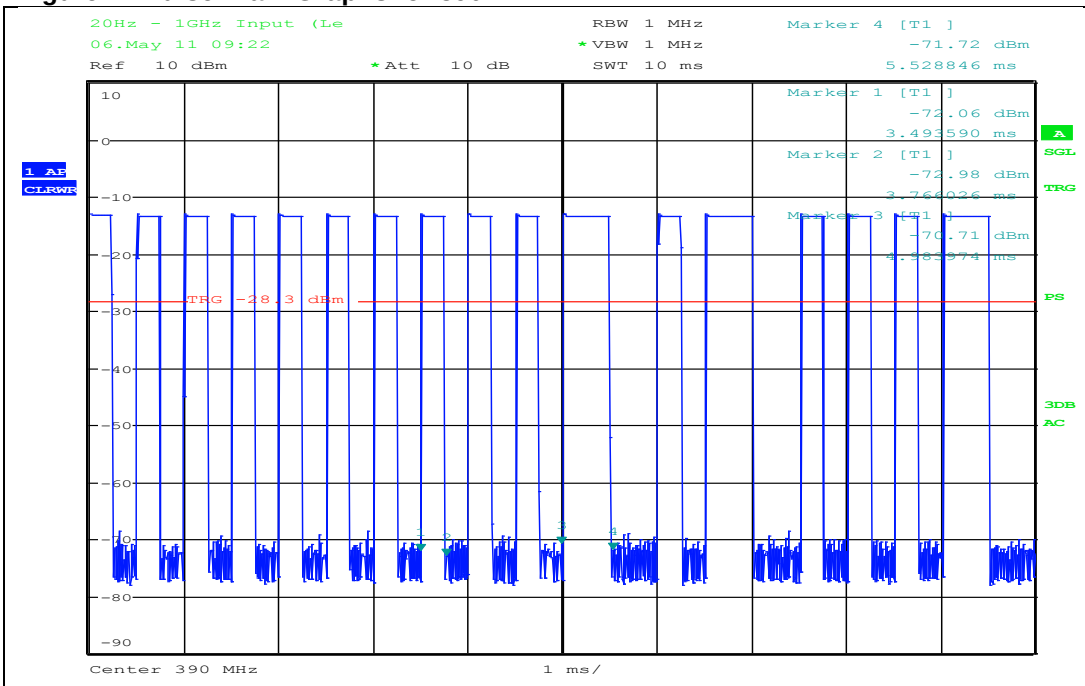
Number of Pulses



Period: 136.77ms (use 100mS for DC calculation)

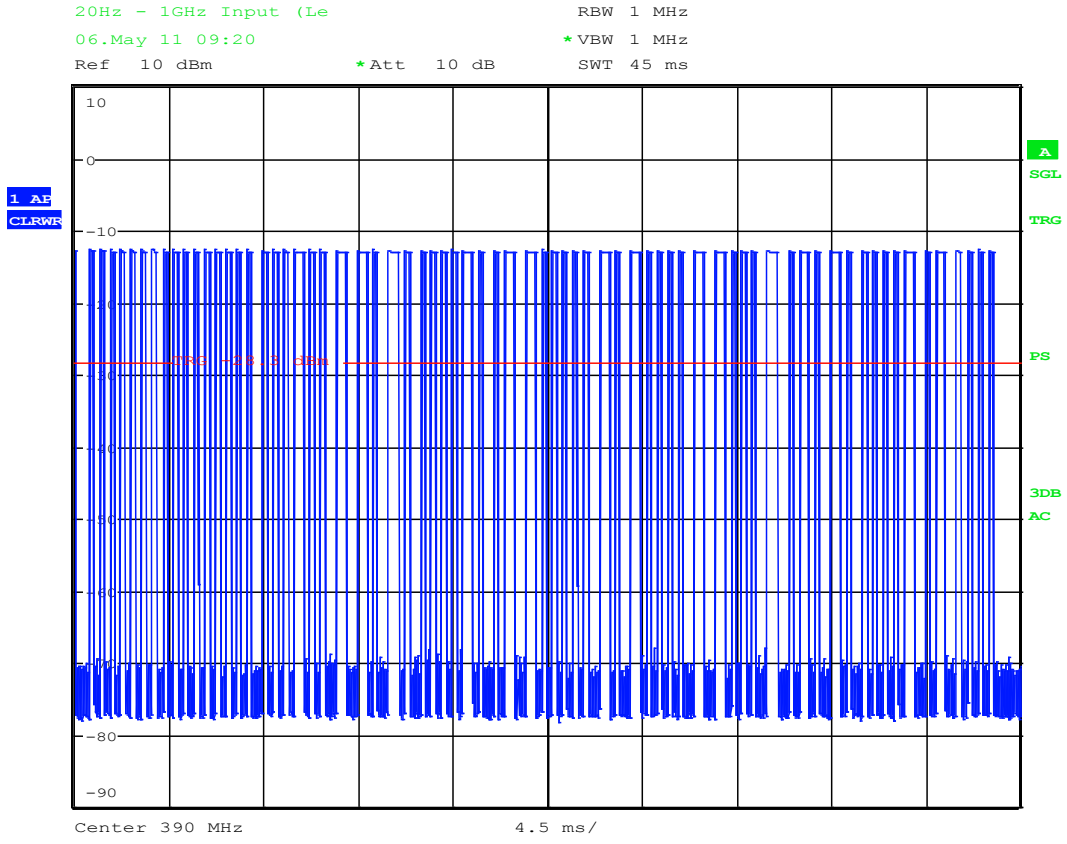
Period

Figure 12 Pulse Train Graphs for 390MHz

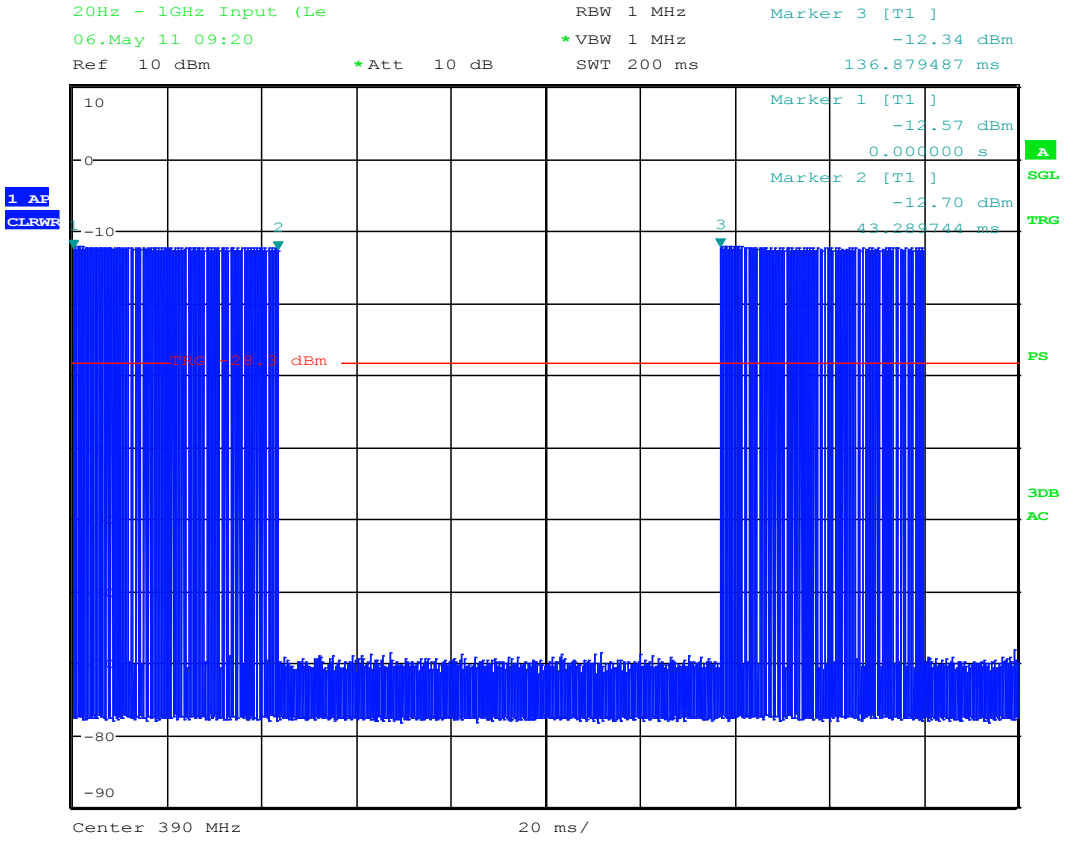


Short Pulse: 0.272436mS, Long Pulse 0.544872mS

Pulse Duration mS



Number of Pulses

# of Short Pulses: 55, # of Long Pulses: 14	
 Period: 136.8mS (used 100ms for duty cycle calculation)	Period

4.4 Test Conditions and Results – RADIATED EMISSIONS Fundamental and Spurious

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter or 3-meter as noted. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

Basic Standard		
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	10 meter distance
	1GHz – 4GHz	3 meter distance

Restricted Band Limits

Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Peak
30 - 88	29.54	NA
88 - 216	33.04	NA
216 - 960	35.54	NA
960 - 1000	43.54	NA
Above 1000 (FCC)	NA	*54 (at 3-meter)

Fundamental Frequency Limits and Non-restricted band Harmonic Limits

Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak - Fundamental	Quasi-Peak Harmonics
310	64.1	44.1
315	64.4	44.4
390	68.2	48.2

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

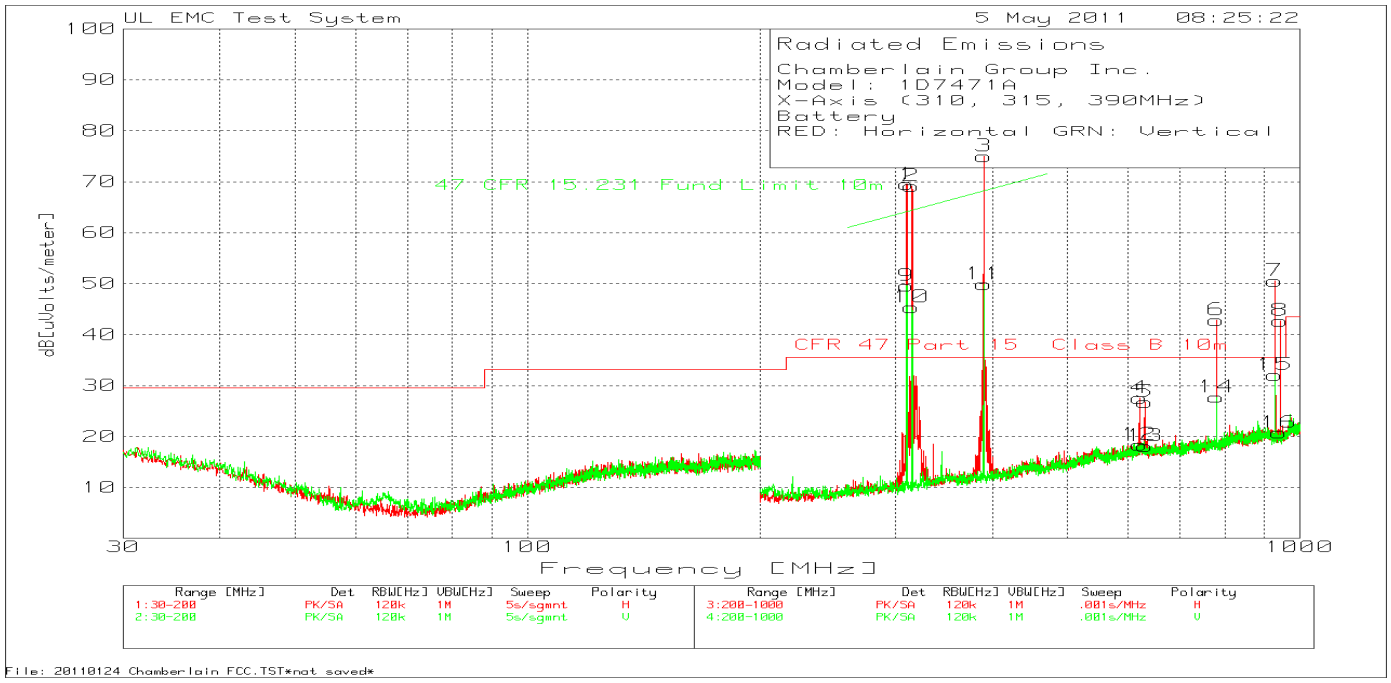
Table 10 Radiated Emissions EUT Configuration Settings

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

Table 11 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 30 2010	Dec 302011
Bicon Antenna	Chase	VBA6106A	EMC4078	Dec 02 2010	Dec 30 2011
Log-P Antenna	Chase	UPA6109	EMC4313	Jun 01 2010	Jun 01 2011
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	Dec 28 2010	Dec 30 2011
Antenna Array	UL	BOMS	EMC4276	Aug 1 2010	Aug 1 2011

Figure 13 Radiated Emissions Graph for 310MHz, 315MHz, and 390MHz



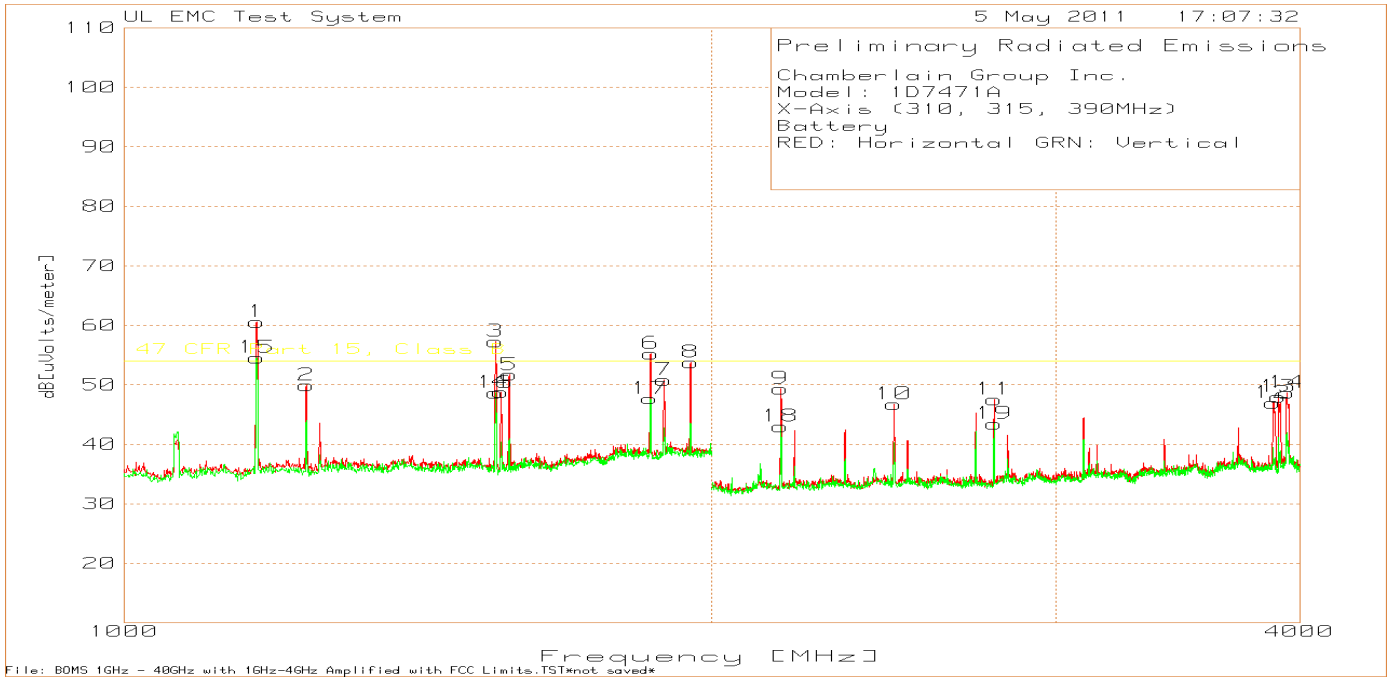


Table 12 Radiated Emissions Data Points for 310MHz, 315MHz, 390MHz – X Axis – Below 1GHz

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Correction dB	Level dBuV/m	Limit	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
310.0114	93.49	QP	-32.7	13.3	-12.69	61.4	64.1	-2.7	17	281	Horz
310.0114	93.92	PK	-32.7	13.3	-12.69	61.83	64.1	-2.27	17	281	Horz
310.0114	74.16	QP	-32.7	13.3	-12.69	42.07	64.1	-22.03	123	263	Vert
310.0114	74.66	PK	-32.7	13.3	-12.69	42.57	64.1	-21.53	123	263	Vert
315.005	92.41	QP	-32.7	13.4	-12.69	60.42	64.4	-3.98	15	281	Horz
315.005	92.85	PK	-32.7	13.4	-12.69	60.86	64.4	-3.54	15	281	Horz
315.005	72.13	QP	-32.7	13.4	-12.69	40.14	64.4	-24.26	117	269	Vert
315.005	72.64	PK	-32.7	13.4	-12.69	40.65	64.4	-23.75	117	269	Vert
390.01	94.95	QP	-32.1	15.3	-12.69	65.46	68.2	-2.74	261	261	Horz
390.01	95.45	PK	-32.1	15.3	-12.69	65.96	68.2	-2.24	261	261	Horz
390.01	77.29	QP	-32.1	15.3	-12.69	47.8	68.2	-20.4	130	319	Vert
390.01	77.94	PK	-32.1	15.3	-12.69	48.45	68.2	-19.75	130	319	Vert
620.0076	44.3	QP	-31.3	20.4	-12.69	20.71	44.1	-23.39	297	259	Horz
620.0076	45.72	PK	-31.3	20.4	-12.69	22.13	44.1	-21.97	297	259	Horz
620.0076	30.48	QP	-31.3	20.4	-12.69	6.89	44.1	-37.21	336	400	Vert
620.0076	34.55	PK	-31.3	20.4	-12.69	10.96	44.1	-33.14	336	400	Vert
630.0081	42.56	QP	-31.1	20.4	-12.69	19.17	44.4	-25.23	279	269	Horz
630.0081	44.24	PK	-31.1	20.4	-12.69	20.85	44.4	-23.55	279	269	Horz
630.0081	26.84	QP	-31.1	20.4	-12.69	3.45	44.4	-40.95	197	397	Vert
630.0081	32.26	PK	-31.1	20.4	-12.69	8.87	44.4	-35.53	197	397	Vert
780.0236	53.64	QP	-31.5	21.4	-12.69	30.85	48.2	-17.35	44	140	Horz
780.0236	54.84	PK	-31.5	21.4	-12.69	32.05	48.2	-16.15	44	140	Horz
780.0236	44.2	QP	-31.5	21.4	-12.69	21.41	48.2	-26.79	339	379	Vert
780.0236	45.88	PK	-31.5	21.4	-12.69	23.09	48.2	-25.11	339	379	Vert
930.0218	58.97	QP	-31.7	22.7	-12.69	37.28	44.1	-6.82	178	299	Horz
930.0218	62.1	PK	-31.7	22.7	-12.69	40.41	44.1	-3.69	178	299	Horz
930.0218	46.72	QP	-31.7	22.7	-12.69	25.03	44.1	-19.07	307	359	Vert
930.0218	49.68	PK	-31.7	22.7	-12.69	27.99	44.1	-16.11	307	359	Vert
945	52.18	QP	-31.5	22.8	-12.69	30.79	44.4	-13.61	179	104	Horz
945	53.64	PK	-31.5	22.8	-12.69	32.25	44.4	-12.15	179	104	Horz
945	40.62	QP	-31.5	22.8	-12.69	19.23	44.4	-25.17	307	328	Vert
945	42.73	PK	-31.5	22.8	-12.69	21.34	44.4	-23.06	307	328	Vert

Table 13 Radiated Emissions Data Points for 310MHz, 315MHz, 390MHz – X Axis – Above 1GHz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor db	Level dBuV/m	Limit 2 dBuV/m	Margin dB		Height [cm]	Polarity
Peak markers from scanned data												
1	1170.17	92.03	PK	-56.07	24.6	-12.69	47.87	54	-6.13		150	Horz
2	1240.24	81.06	PK	-56.01	24.9	-12.69	37.26	54	-16.74		200	Horz
3	1550.551	87.47	PK	-55.15	25	-12.69	44.63	54	-9.37		150	Horz
4	1560.561	78.76	PK	-54.94	25	-12.69	36.13	54	-17.87		150	Horz
5	1575.576	81.3	PK	-54.62	25	-12.69	38.99	54	-15.01		150	Horz
6	1860.861	81.72	PK	-53.87	27.4	-12.69	42.56	54	-11.44		100	Horz
7	1890.891	76.5	PK	-53.21	27.5	-12.69	38.1	54	-15.9		200	Horz
8	1950.951	79.77	PK	-53.47	27.5	-12.69	41.11	54	-12.89		200	Horz
9	2169.446	79.76	PK	-52.15	21.7	-12.69	36.62	54	-17.38		149	Horz
10	2480.32	76	PK	-51.2	22	-12.69	34.11	54	-19.89		149	Horz
11	2789.86	76.06	PK	-50.75	22.2	-12.69	34.82	54	-19.18		149	Horz
12	3875.917	74.13	PK	-51.03	23.9	-12.69	34.31	54	-19.69		200	Horz
13	3901.268	75.33	PK	-51.16	23.8	-12.69	35.28	54	-18.72		200	Horz
14	3941.294	74.88	PK	-50.2	24	-12.69	35.99	54	-18.01		200	Horz
15	1170.17	86.02	PK	-56.07	24.6	-12.69	41.86	54	-12.14		200	Vert
16	1549.55	78.82	PK	-55.13	25	-12.69	36	54	-18		200	Vert
17	1859.86	74.19	PK	-53.88	27.4	-12.69	35.02	54	-18.98		200	Vert
18	2169.446	73.46	PK	-52.15	21.7	-12.69	30.32	54	-23.68		200	Vert
19	2789.86	72.04	PK	-50.75	22.2	-12.69	30.8	54	-23.2		200	Vert
Maximized Data (only peaks close to the limit)												
	1170.0882	95.36	PK	-56.08	24.6	-12.69	51.19	54	-2.81	19	141	Horz
	1240	83.47	PK	-56.01	24.8	-12.69	39.57	54	-14.43	35	198	Horz
	1550.0281	89.62	PK	-55.14	25	-12.69	46.79	54	-7.21	3	115	Horz
	1560.014	79.22	PK	-54.95	25	-12.69	36.58	54	-17.42	183	112	Horz
	1575.0251	81.25	PK	-54.64	25	-12.69	38.92	54	-15.08	55	154	Horz
	1860.0251	85.21	PK	-53.88	27.4	-12.69	46.04	54	-7.96	192	128	Horz
	1889.985	78.92	PK	-53.25	27.5	-12.69	40.48	54	-13.52	190	201	Horz
	1950.0651	84.14	PK	-53.46	27.5	-12.69	45.49	54	-8.51	185	120	Horz
	2169.977	84.12	PK	-52.15	21.7	-12.69	40.98	54	-13.02	161	177	Horz
	3937.6934	74.99	PK	-50.22	24	-12.69	36.08	54	-17.92	240	196	Horz
	1169.98	89.4	PK	-56.08	24.6	-12.69	45.23	54	-8.77	107	188	Vert
	1550.0351	83.83	PK	-55.14	25	-12.69	41	54	-13	72	190	Vert

Table 14 Radiated Emissions Data Points for 310MHz, 315MHz, 390MHz – Y Axis – Below 1GHz

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor dB	Level dBuV/m	Limit 1	Margin dB	Azimuth [degs]	Height [cm]	Polarity
310	89.18	QP	-32.7	13.3	-12.69	57.09	64.1	-7.01	188	261	Horz
310	89.61	PK	-32.7	13.3	-12.69	57.52	64.1	-6.58	188	261	Horz
310	92.41	QP	-32.7	13.3	-12.69	60.32	64.1	-3.78	107	102	Vert
310	92.84	PK	-32.7	13.3	-12.69	60.75	64.1	-3.35	107	102	Vert
315.01	87.49	QP	-32.7	13.4	-12.69	55.5	64.4	-8.9	202	252	Horz
315.01	87.93	PK	-32.7	13.4	-12.69	55.94	64.4	-8.46	202	252	Horz
315.01	91.04	QP	-32.7	13.4	-12.69	59.05	64.4	-5.35	103	104	Vert
315.01	91.47	PK	-32.7	13.4	-12.69	59.48	64.4	-4.92	103	104	Vert
390.0064	84.9	QP	-32.1	15.3	-12.69	55.41	68.2	-12.79	197	190	Horz
390.0064	85.42	PK	-32.1	15.3	-12.69	55.93	68.2	-12.27	197	190	Horz
390.0064	92.32	QP	-32.1	15.3	-12.69	62.83	68.2	-5.37	97	399	Vert
390.0064	92.83	PK	-32.1	15.3	-12.69	63.34	68.2	-4.86	97	399	Vert
930.0135	58.39	QP	-31.7	22.7	-12.69	36.7	44.1	-7.4	202	301	Horz
930.0135	59.5	PK	-31.7	22.7	-12.69	37.81	44.1	-6.29	202	301	Horz
930.0135	56.07	QP	-31.7	22.7	-12.69	34.38	44.1	-9.72	296	172	Vert
930.0135	57.34	PK	-31.7	22.7	-12.69	35.65	44.1	-8.45	296	172	Vert
945.052	51.26	QP	-31.5	22.8	-12.69	29.87	44.4	-14.53	191	103	Horz
945.052	52.22	PK	-31.5	22.8	-12.69	30.83	44.4	-13.57	191	103	Horz
945.052	47.22	QP	-31.5	22.8	-12.69	25.83	44.4	-18.57	294	155	Vert
945.052	48.44	PK	-31.5	22.8	-12.69	27.05	44.4	-17.35	294	155	Vert

Table 15 Radiated Emissions Data Points for 310MHz, 315MHz, 390MHz – Y Axis – Above 1GHz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor dB	Level dBuV/m	Limit 2	Margin 2[dB]		Height [cm]	Polarity
Peak markers from scanned data												
1	1170.17	92.45	PK	-56.07	24.6	-12.69	48.29	54	-5.71		200	Horz
2	1550.551	86.62	PK	-55.15	25	-12.69	43.78	54	-10.22		150	Horz
3	1560.561	78.62	PK	-54.94	25	-12.69	35.99	54	-18.01		200	Horz
4	1575.576	80.33	PK	-54.62	25	-12.69	38.02	54	-15.98		150	Horz
5	1860.861	80.44	PK	-53.87	27.4	-12.69	41.28	54	-12.72		200	Horz
6	1890.891	74.79	PK	-53.21	27.5	-12.69	36.39	54	-17.61		200	Horz
7	1950.951	79.24	PK	-53.47	27.5	-12.69	40.58	54	-13.42		150	Horz
8	2169.446	76.81	PK	-52.15	21.7	-12.69	33.67	54	-20.33		150	Horz
9	1170.17	85.18	PK	-56.07	24.6	-12.69	41.02	54	-12.98		149	Vert
10	1240.24	80.62	PK	-56.01	24.9	-12.69	36.82	54	-17.18		149	Vert
11	1550.551	79.51	PK	-55.15	25	-12.69	36.67	54	-17.33		100	Vert
12	1860.861	76.1	PK	-53.87	27.4	-12.69	36.94	54	-17.06		149	Vert
13	2789.86	75.79	PK	-50.75	22.2	-12.69	34.55	54	-19.45		150	Vert
14	3938.626	75.64	PK	-50.21	24	-12.69	36.74	54	-17.26		100	Vert
Maximized Data (only peaks close to the limit)												
	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor dB	Level dBuV/m	Limit 2	Margin 2[dB]	Azimuth [degs]	Height [cm]	Polarity
	1170.0631	94.57	PK	-56.08	24.6	-12.69	50.4	54	-3.6	2	149	Horz
	1549.999	90.22	PK	-55.14	25	-12.69	47.39	54	-6.61	169	147	Horz
	1860.0301	83.79	PK	-53.88	27.4	-12.69	44.62	54	-9.38	0	159	Horz
	1950.0451	82.97	PK	-53.46	27.5	-12.69	44.32	54	-9.68	171	153	Horz
	1170.0401	87.52	PK	-56.08	24.6	-12.69	43.35	54	-10.65	242	103	Vert

Table 16 Radiated Emissions Data Points for 310MHz, 315MHz, 390MHz – Z Axis – Below 1GHz

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor dB	Level dBuV/m	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
310.0015	80.31	QP	-32.7	13.3	-12.69	48.22	64.1	-15.88	18	199	Horz
310.0015	80.75	PK	-32.7	13.3	-12.69	48.66	64.1	-15.44	18	199	Horz
310.0015	92.66	QP	-32.7	13.3	-12.69	60.57	64.1	-3.53	120	102	Vert
310.0015	93.08	PK	-32.7	13.3	-12.69	60.99	64.1	-3.11	120	102	Vert
315.006	79.42	QP	-32.7	13.4	-12.69	47.43	64.4	-16.97	38	202	Horz
315.006	79.9	PK	-32.7	13.4	-12.69	47.91	64.4	-16.49	38	202	Horz
315.006	91.51	QP	-32.7	13.4	-12.69	59.52	64.4	-4.88	293	100	Vert
315.006	91.95	PK	-32.7	13.4	-12.69	59.96	64.4	-4.44	293	100	Vert
390.0093	79.71	QP	-32.1	15.3	-12.69	50.22	68.2	-17.98	11	397	Horz
390.0093	79.71	QP	-32.1	15.3	-12.69	50.22	68.2	-17.98	11	397	Horz
390.0093	80.24	PK	-32.1	15.3	-12.69	50.75	68.2	-17.45	11	397	Horz
390.0093	80.24	PK	-32.1	15.3	-12.69	50.75	68.2	-17.45	11	397	Horz
390.0093	91.93	QP	-32.1	15.3	-12.69	62.44	68.2	-5.76	302	102	Vert
390.0093	92.44	PK	-32.1	15.3	-12.69	62.95	68.2	-5.25	302	102	Vert
930.0217	49.13	QP	-31.7	22.7	-12.69	27.44	44.1	-16.66	191	362	Horz
930.0217	53.28	PK	-31.7	22.7	-12.69	31.59	44.1	-12.51	191	362	Horz
930.0217	59.98	QP	-31.7	22.7	-12.69	38.29	44.1	-5.81	150	168	Vert
930.0217	64.19	PK	-31.7	22.7	-12.69	42.5	44.1	-1.6	150	168	Vert
945.015	43.41	QP	-31.5	22.8	-12.69	22.02	44.4	-22.38	32	106	Horz
945.015	47.3	PK	-31.5	22.8	-12.69	25.91	44.4	-18.49	32	106	Horz
945.015	53.33	QP	-31.5	22.8	-12.69	31.94	44.4	-12.46	166	162	Vert
945.015	57.48	PK	-31.5	22.8	-12.69	36.09	44.4	-8.31	166	162	Vert

Table 17 Radiated Emissions Data Points for 310MHz, 315MHz, 390MHz – Z Axis – Above 1GHz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB		Height [cm]	Polarity
Peak markers from scanned data												
1	1170.17	79.07	PK	-56.07	24.6	-12.69	34.91	54	-19.09		150	Horz
2	1240.24	80	PK	-56.01	24.9	-12.69	36.2	54	-17.8		200	Horz
3	1550.551	78.11	PK	-55.15	25	-12.69	35.27	54	-18.73		150	Horz
4	1860.861	76.25	PK	-53.87	27.4	-12.69	37.09	54	-16.91		200	Horz
5	2169.446	67.64	PK	-52.15	21.7	-12.69	24.5	54	-29.5		100	Horz
6	2480.32	72.08	PK	-51.2	22	-12.69	30.19	54	-23.81		100	Horz
7	1170.17	93.18	PK	-56.07	24.6	-12.69	49.02	54	-4.98		100	Vert
8	1550.551	85.96	PK	-55.15	25	-12.69	43.12	54	-10.88		150	Vert
9	1575.576	79.68	PK	-54.62	25	-12.69	37.37	54	-16.63		100	Vert
10	1860.861	78.44	PK	-53.87	27.4	-12.69	39.28	54	-14.72		200	Vert
11	1950.951	79.14	PK	-53.47	27.5	-12.69	40.48	54	-13.52		150	Vert
12	2169.446	79.87	PK	-52.15	21.7	-12.69	36.73	54	-17.27		200	Vert
13	2480.32	75.73	PK	-51.2	22	-12.69	33.84	54	-20.16		100	Vert
Maximized Data (only peaks close to the limit)												
	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	DC Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Azimuth [degs]	Height [cm]	Polarity
	Maximized Data (only peaks close to the limit)											
	1170.0782	94.92	PK	-56.08	24.6	-12.69	50.75	54	-3.25	10	148	Vert
	1550.0351	88.71	PK	-55.14	25	-12.69	45.88	54	-8.12	3	114	Vert
	1860.0551	81.25	PK	-53.88	27.4	-12.69	42.08	54	-11.92	258	129	Vert
	1949.995	80.33	PK	-53.46	27.5	-12.69	41.68	54	-12.32	324	116	Vert

Appendix A - Accreditations and Authorizations

NVLAP Lab code: 100414-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see http://ts.nist.gov/ts/htdocs/210/214/scopes/1004140.htm

FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91044).

Industry Canada Industrie Canada

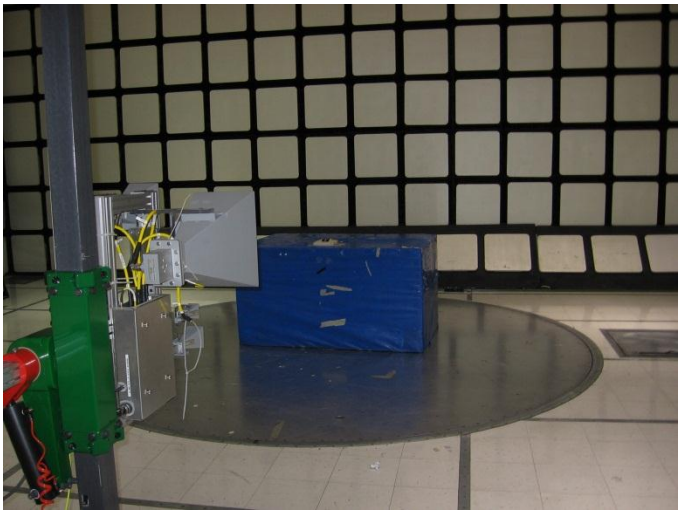
Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2180

VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: Radiated Emissions R-621, Conducted Emissions C-642.

ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).

NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 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

Appendix B – Test Setup Photos



Radiated Emissions Test Setup Photos

BW & DC Test Setup Photos