Advanced
Compliance Laboratory

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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

Remote Transmitter

MODEL: CL-R1

FCC ID: OF7CLR1 & IC: 3575A-CLR1

May 24,2012

This report concerns (check one): Original grant __x__ Class II change _____
Equipment type: Low Power Intentional Radiator

Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes _____ no __x__
If yes, defer until: _____ (date)
Company agrees to notify the Commission by _____ (date)
of the intended date of announcement of the product so that the grant can be issued on that date.
Transition Rules Request per 15.37? yes _____ no __x__

Test Specification:
47 CFR FCC Part 15C & Industry Canada RSS-210/RSS-Gen

Report prepared for:	THE TORO COMPANY
Report prepared by:	Advanced Compliance Lab
Report number:	0048-120425-01

NVLAP®

Lab Code: 200101 **The test result in this report IS supported and covered by the NVLAP accreditation**

Table of Contents

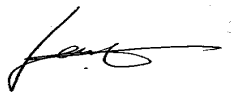
Figures

1. GENERAL INFORMATION

1.1 Verification of Compliance

EUT:	Remote Transmitter
Model:	CL-R1
Applicant:	THE TORO COMPANY
Test Type:	FCC Part 15C CERTIFICATION IC RSS-210 (Issue 8) & RSS-Gen CERTIFICATION
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Date:	04/25/2012 - 05/24/2012
Report Number:	0048-120425-01

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC/IC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



Wei Li
Lab Manager
Advanced Compliance Lab

Date May 24,2012

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC/IC ID	CABLE
Product	REMOTE TRANSMITTER (1)	FCC ID: OF7CLR1 IC: 3575A-CLR1	
Housing	PLASTICS		
Power Supply	+9Vdc Alkaline Battery		
Operation Freq.	906MHz ~ 922MHz		
Receiver	CL-R1(RX)	Verification	

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 (Registration No. 886209) and designated by IC as " Site IC 3130A". The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

1.6 Test Equipment

Manufacture	Model	Serial No.	Description	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	15/10/12
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	25/8/12
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/13
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/13
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/13
Electro-Meterics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	5/28/12
Fischer Custom	LISN-1	900-4-0008	Line Impedance Stabilization Networks	18/03/13
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	24/03/13

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

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2. PRODUCT LABELING

Toro Model: CL-R1
FCC ID: OF7CLR1 IC: 3575A-CLR1

This device complies with FCC Part 15 & ICRSS-210/RSS-Gen Rules. Operating is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Figure 2.1 ID Label
(Only ID shown on EUT)

Figure 2.2 Location of ID Label on EUT

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna was permanently attached to the EUT with max length, 3".
Testing was performed as EUT was continuously operated at the following frequency channels:

Low=906MHz, Middle= 914MHz, High=922MHz.

If applicable, fresh external battery shall be used for extended operating time.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 illustrate this system, which is tested standing along.

Figure 3.1 Radiated Test Setup

X - Polarization

Y - Polarization

Z-Polarization

N/A

Figure 3.2 Conducted Setup- Front

N/A

Figure 3.3 Conducted Setup- Rear

4. SYSTEM SCHEMATICS

See Attachment.

Figure 4.1 System Schematics

5. CONDUCTED EMISSION DATA

5.1 Test Methods and Conditions

The EUT was under normal operational mode during the conducted emission test. EMI Receiver was scanned from 150KHz to 30MHz with maximum hold mode for maximum emission. Recorded data was sent to the plotter to generate output in linear format. At the input of the spectrum analyzer, a HP transient limiter is inserted for protective purpose. This limiter has a 10 dB attenuation in the range of 150KHZ to 30MHZ. That factor was automatically compensated by the receiver, so the readings are the corrected readings. The reference of the plot is the CISPR 22 Class B limit in Figure 5.1 through Figure 5.2.

Conducted Emission Technical Requirements				
	Class A		**Class B**	
Frequency Range	**Quasi-Peak dBuV**	**Average dBuV**	**Quasi-Peak DBuV**	**Average dBuV**
150kHz –0.5MHz	79 (8912uV)	66 (1995uV)	66-56	56-46
0.5MHz-30MHz	73 (4467uV)	60 (1000uV)	---	---
0.5MHz- 5MHz	---	---	56	46 (250uV)
5MHz-30MHz	---	---	60	50

Emissions that have peak values close to the specification limit (if any) are also measured in the quasi-peak/average mode to determine compliance.

5.2 Test Data

Figure 5.1-5.2 show the neutral and line conducted emissions for the standard operation.

Highest Data for AC Line Conducted Emissions						
Frequency (MHz)						
Peak Reading (dBuV)						
Average Reading (dBuV*)						

* no need to show the average reading if the peak value is under average limit.

Test Personnel:

Tester Signature: _____

Typed/Printed Name: Edward Lee Date:

N/A

Fig. 5.1 Conducted Emission-Line

N/A

Fig. 5.2 Conducted Emission- Neutral

6. RADIATED EMISSION DATA

6.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dBμV/m
RA: Amplitude of EMI Receiver before correction in dBμV
AF: Antenna Factor in dB/m
CF: Cable Attenuation Factor in dB
AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

THE "DUTY CYCLE CORRECTION FACTOR" FOR SPURIOUS RADIATED EMISSIONS IS;
20 log * (12x2 ms / 100 ms) = -12.4 dB, WHICH WAS USED TO CORRECT THE AVERAGE RADIATED EMISSION READINGS.

6.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak detector and 9KHz IF bandwidth / 30KHz video bandwidth. For the range 30MHz - 1GHz, 100KHz IF bandwidth / 100KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. Up to 10^{th} harmonics were investigated.

6.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC/IC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 5.1.

Test Personnel: 

Typed/Printed Name: Edward Lee Date: May 24,2012

Radiated Test Data (CH-906MHz)

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak/QP Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
906	V,X	1.1	000	82.4*		94	-11.6
1812	V,X	1.1	090	60.0	47.6	54	-6.4
2718	V,X	1.1	000	52.6	40.2	54	-13.8
906	H,X	1.1	260	83.8*		94	-10.2
1812	H,X	1.0	260	60.5	48.1	54	-5.9
2718	H,X	1.0	270	53.2	40.8	54	-13.2
					-12.4		-12.4
906	V,Y	1.1	090	84.0*		94	-10.0
1812	V,Y	1.1	090	62.5	50.1	54	-3.9
2718	V,Y	1.1	090	54.7	42.3	54	-11.7
906	H,Y	1.1	180	89.7*		94	-4.3
1812	H,Y	1.0	180	63.3	50.9	54	-3.1
2718	H,Y	1.0	180	56.7	44.3	54	-9.7
					-12.4		-12.4
906	V,Z	1.1	090	90.2*		94	-3.8
1812	V,Z	1.1	000	64.3	51.9	54	-2.1
2718	V,Z	1.1	090	56.9	44.5	54	-9.5
906	H,Z	1.1	270	84.2*		94	-9.8
1812	H,Z	1.0	260	61.3	48.9	54	-5.1
2718	H,Z	1.0	230	53.8	41.4	54	-12.6

* All fundamentals are QP reading.

Radiated Test Data (CH-914MHz)

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak/QP Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
914	V,X	1.1	350	83.7*		94	-10.3
1828	V,X	1.1	000	60.2	47.8	54	-6.2
2712	V,X	1.1	350	56.4	44	54	-10
914	H,X	1.1	170	87.8*		94	-6.2
1828	H,X	1.0	180	63.0	50.6	54	-3.4
2742	H,X	1.0	270	56.5	44.1	54	-9.9
					-12.4		-12.4
914	V,Y	1.1	000	85.3*		94	-8.7
1828	V,Y	1.1	000	59.9	47.5	54	-6.5
2712	V,Y	1.1	300	53.4	41	54	-13
914	H,Y	1.1	180	88.6*		94	-5.4
1828	H,Y	1.0	150	62.7	50.3	54	-3.7
2742	H,Y	1.0	130	56.5	44.1	54	-9.9
					-12.4		-12.4
914	V,Z	1.1	270	90.0*		94	-4.0
1828	V,Z	1.1	270	63.5	51.1	54	-2.9
2712	V,Z	1.1	250	57.3	44.9	54	-9.1
914	H,Z	1.1	360	83.8*		94	-10.2
1828	H,Z	1.0	010	57.5	45.1	54	-8.9
2742	H,Z	1.0	000	53.0	40.6	54	-13.4

* All fundamentals are QP reading.

Radiated Test Data (CH-922MHz)

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak/QP Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
922	V,X	1.2	270	82.0*		94	-12.0
1844	V,X	1.1	250	59.0	46.6	54	-7.4
2766	V,X	1.1	250	54.5	42.1	54	-11.9
922	H,X	1.1	160	86.5*		94	-7.5
1844	H,X	1.0	180	61.5	49.1	54	-4.9
2766	H,X	1.0	180	54.2	41.8	54	-12.2
					-12.4		-12.4
922	V,Y	1.2	020	84.3*		94	-9.7
1844	V,Y	1.1	030	58.0	45.6	54	-8.4
2766	V,Y	1.1	020	54.1	41.7	54	-12.3
922	H,Y	1.1	180	87.9*		94	-6.1
1844	H,Y	1.0	180	61.8	49.4	54	-4.6
2766	H,Y	1.0	170	54.0	41.6	54	-12.4
					-12.4		-12.4
922	V,Z	1.2	270	89.5*		94	-4.5
1844	V,Z	1.1	255	63.2	50.8	54	-3.2
2766	V,Z	1.1	260	54.7	42.3	54	-11.7
922	H,Z	1.1	350	83.0*		94	-11.0
1844	H,Z	1.0	010	56.6	44.2	54	-9.8
2766	H,Z	1.0	025	52.8	40.4	54	-13.6

* All fundamentals are QP reading.

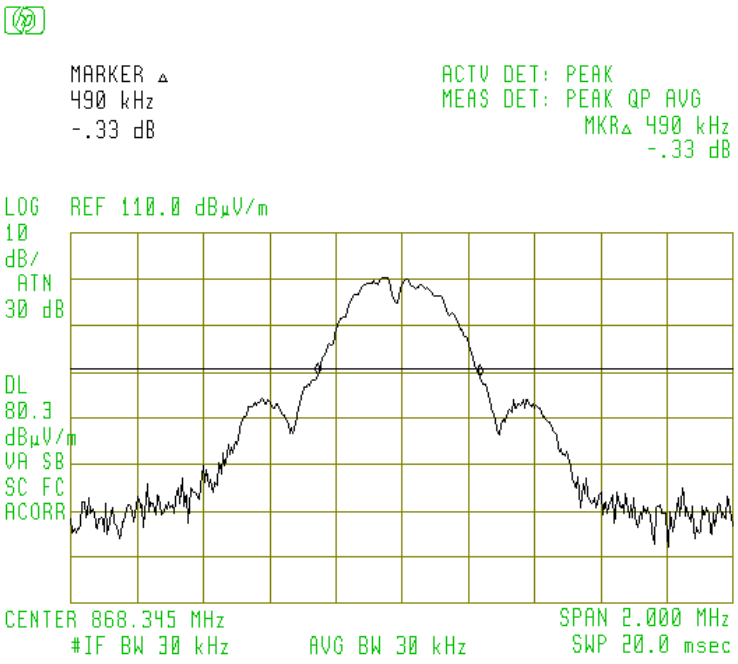
(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per FCC Part 15 Sec. 15.249 and IC RSS-210 Annex 2.9. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in FCC Part 15 Sec. 15.209 and IC RSS-210 Annex 7, whichever is higher.
(2) If each peak reading is less than the FCC/IC average limit, it'll be not necessary to show the measured/ calculated average reading.

Other Spurious outside of the band 902-928MHz

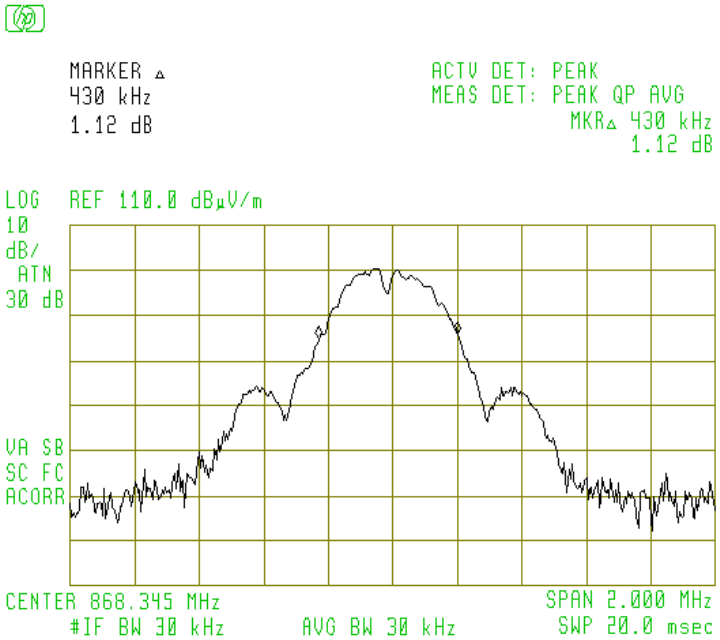
(the worst case of investigated L, M, H channel operation modes)

Frequency (MHz)	Polarity (V,H) Position X	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Peak Reading After Correction (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
892	V			43.0		46.5	-3.5
924	V			43.1		46.5	-3.4
892	H			42.0		46.5	-4.5
924	H			41.2		46.5	-5.3

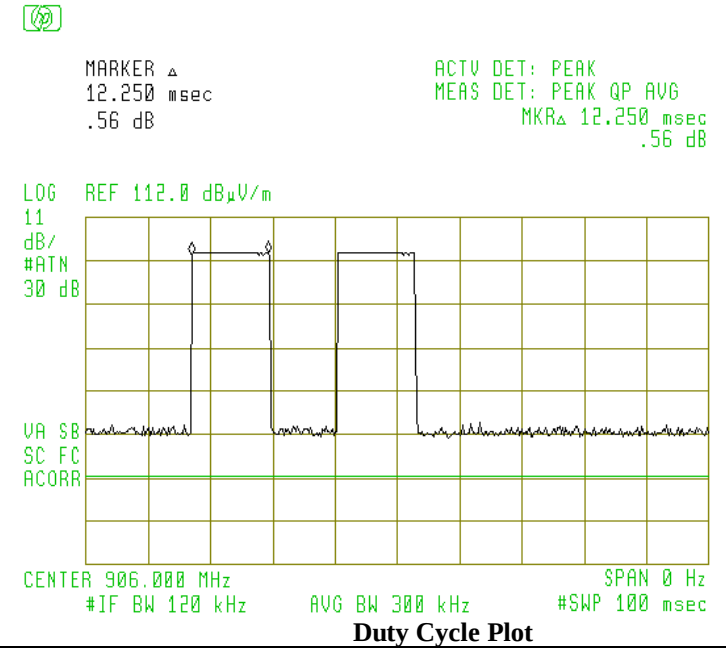
Comparing to the limit defined in FCC Part 15 Sec. 15.209 and IC RSS-210, no other significant emissions were found.



20dB Bandwidth Plot



99% Bandwidth Plot



Duty Cycle Plot

6.4 EUT RECEIVING MODE VERIFICATION

Radiated Test Data for Receiving Mode
(the worst case of investigated L, M, H channel operation modes)

Frequency (MHz)	Polarity (V,H) Position X	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Peak Reading After Correction (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
42.3	V	1.2	235	31.4		40.0	-8.6
145.6	V	1.1	270	32.9		43.5	-10.6
165.2	V	1.1	180	33.4		43.5	-10.1
300	V	1.1	180	31.9		46.5	-14.6
332	V	1.1	000	32.6		46.5	-13.9
772	V	1.0	045	39.7		46.5	-6.8
45.7	H	1.4	090	29.9		40.0	-10.1
143.9	H	1.4	090	32.8		43.5	-10.7
163.9	H	1.4	235	34.1		43.5	-9.4
304	H	1.1	000	31.0		46.5	-15.5
412	H	1.0	000	33.3		46.5	-13.2
790	H	1.0	270	38.4		46.5	-8.1

(1) Receiving mode spurious emissions shall be lower than the limit defined in FCC Part 15 Sec. 15.209 and IC RSS-Gen.
(2) If each peak reading is less than the FCC/IC average limit, it'll be not necessary to show the measured/ calculated average reading.

7. PHOTOS OF TESTED EUT

The following photos show the inside details of the EUT.