



# TEST REPORT

**Report Number:** 101166168LAX-001

**Project Number:** G101166168

**Report Issue Date:** May 10, 2013

**Product Designation:** Tattletale  
Model: TTLDWC01 / TTLDWO01

**Standards:** FCC Part 15.231, 2013  
Industry Canada RSS 210 Issue 8, December 2010

**FCC ID:** EF400100  
**IC ID:** 1078A-00100

**Tested by:**  
Intertek Testing Services NA, Inc.  
25791 Commercentre Drive  
Lake Forest, CA 92630 USA

**Client:**  
Linear, LLC  
1950 Camino Vida Roble, Suite 150  
Carlsbad, CA 92008 USA

**Report prepared by**

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EMC Test Engineer  
&

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EMC Team Leader

**Report reviewed by**

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Transmitter Staff Engineer

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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested found to comply with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

## 2 Test Summary

TEST	FCC REFERENCE	IC REFERENCE	RESULTS
Radiated Emission	15.231(b)	RSS-210 A1.1.2	Complies
Out of Band Radiated Emission	15.231(b)	RSS-210 A1.1.2	Complies
AC Conducted Emission	15.207	ICES-003	Not Applicable*
20 dB Bandwidth	15.231(c)	RSS-210 A1.1.3	Complies
Transmitter Deactivation Time	15.231(a)	RSS-210 A1.1.1(a)	Complies
Antenna Requirement	15.203	-	Complies

(\*) Test not applicable due to EUT being battery operated.

### 3 Client Information

This EUT was tested at the request of:

**Company:** Linear, LLC.  
1950 Camino Vida Roble, Suite 150  
Carlsbad, CA 92008 USA

**Contact Person:** John Kuivinen  
**Telephone:** (760) 438-7138  
**Fax:** (760) 438-7043  
**Email:** johnk@linearcorp.com

#### 3.1 Overview of the EUT

Applicant: Linear, LLC  
Product Description: Tattletale  
Model Number: TTLDWC01 / TTLDWO01  
FCC Identifier: EF400100  
IC Identifier: 1078A-00100  
Transmitter activation: Manually operated. Deactivates within 5 seconds of being released.  
Fundamental Frequency (MHz): 433.9 MHz  
Antenna Requirement: The EUT uses a permanently connected internal antenna.  
Manufacturer name & address: Linear, LLC  
1950 Camino Vida Roble, Suite 150  
Carlsbad, CA 92008 USA

#### 3.2 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

**Temperature:** 10-40 ° C  
**Humidity:** 10-90 %  
**Atmospheric pressure:** 86-106 kPa

**4 Description of Equipment Under Test**

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Tattletale	Linear, LLC	TTLDWC01 / TTLDWO01	NA

Received Date:	05/06/2013
Received Condition:	Good
Type:	Production Sample

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Frequency	Number of Phases
Battery Operated	NA	NA	NA

**Operating modes of the EUT:**

No.	Descriptions of EUT Exercising
1	Normal mode of operation: <ul style="list-style-type: none"> <li>➤ The buttons on the EUT were pressed by an actuator</li> <li>➤ Transmitting continuously</li> </ul>

**4.1 Justification**

For emission testing, the test procedures, as described in American National Standards Institute C63.4-2009 & C63.10-2009, were employed. The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it).

If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is configured to transmit full power.

Each test was performed with a new battery.

**4.2 Software Exercise Program**

No special software program was required to exercise the EUT.

**4.3 Modifications Required for Compliance**

No modifications were made by Intertek.

**4.4 Additions, Deviations and Exclusions from Standards**

No additions, deviations or exclusions from the standard were made.

**5 System setup including cable interconnection details, support equipment and simplified block diagram**

**5.1 Method:**

Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

**5.2 EUT Block Diagram:**



**5.3 Data:**

ID	Description	Length	Shielding	Ferrites
1	NA	NA	NA	NA

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
NA	NA	NA	NA

**6 Radiated Emissions (FCC Part 15.231)**

<b>Date:</b>	05/10/2013	<b>Result:      PASS</b>
<b>Tested by:</b>	Meak Nget	
<b>Standard:</b>	FCC Part 15.231(b)	
<b>Test Point:</b>	Anechoic Chamber 3 meters distance	
<b>Operation mode:</b>	See Section 4	
<b>Note:</b>	Battery Operated	

**6.1 General**

Tests are performed in accordance with FCC Part 15.231(b).

Radiated emissions measurements were performed according to the procedures in ANSI C63.10 (2009). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Data Sheet**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

**6.2 Related Submittal(s) Grants**

This report is for use with an application for certification of a low power transmitter. Two transmitter are included in the application: TTLDWC01 (Normally Close) & TTLDO01 (Normally Open).

**6.3 Test Facility**

The 3 meter semi-anechoic chamber used to collect the radiated data is located in 25791 Commercentre Drive, Lake Forest, CA 92630 USA. This test facility is on file with the FCC and A2LA accredited.

**6.4 Sample Calculation:**

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follows:

$$FS = RA + AF + CF - AG - DCF \text{ (Duty Cycle Factor used Average measurements)}$$

- Where:
- FS = Field Strength in dB ( $\mu V/m$ )
  - RA = Receiver Amplitude (including preamplifier) in dB ( $\mu V$ )
  - CF = Cable Attenuation Factor in dB
  - AF = Antenna Factor in dB (1/m)
  - AG = Amplifier Gain in dB
  - DCF = Duty Cycle Factor, used Average measurements)

**6.5 Bench Top Measurement:**

***DCF = (Duty Cycle Factor, used Average measurements)***

- 1) Use the marker - delta function to determine the total transmission ON time (t), and period of the transmission (T).
- 2) If  $T < 0.1$  second, calculate the Duty Cycle correction factor as  $20\text{Log}(t/T)$ .
- 3) If  $T > 0.1$  second, calculate the Duty Cycle correction factor as  $20\text{Log}(t/0.1)$ .

**6.6 Radiated Emission**

FCC Rule 15.231(b) and RSS-210 A1.1.2

The limit specified in section 15.231(b) was used.

**Procedure**

For radiated emission measurements, the EUT is placed on a plastic turntable. The signal is maximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 5000 MHz.

Analyzer resolution is:

100 kHz or greater for frequencies below 1000 MHz,

1 MHz for frequencies above 1000 MHz.

The Peak and Average values of the Field Strength of the fundamental frequency and harmonics were measured.

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

**6.7 Software Utilized:**

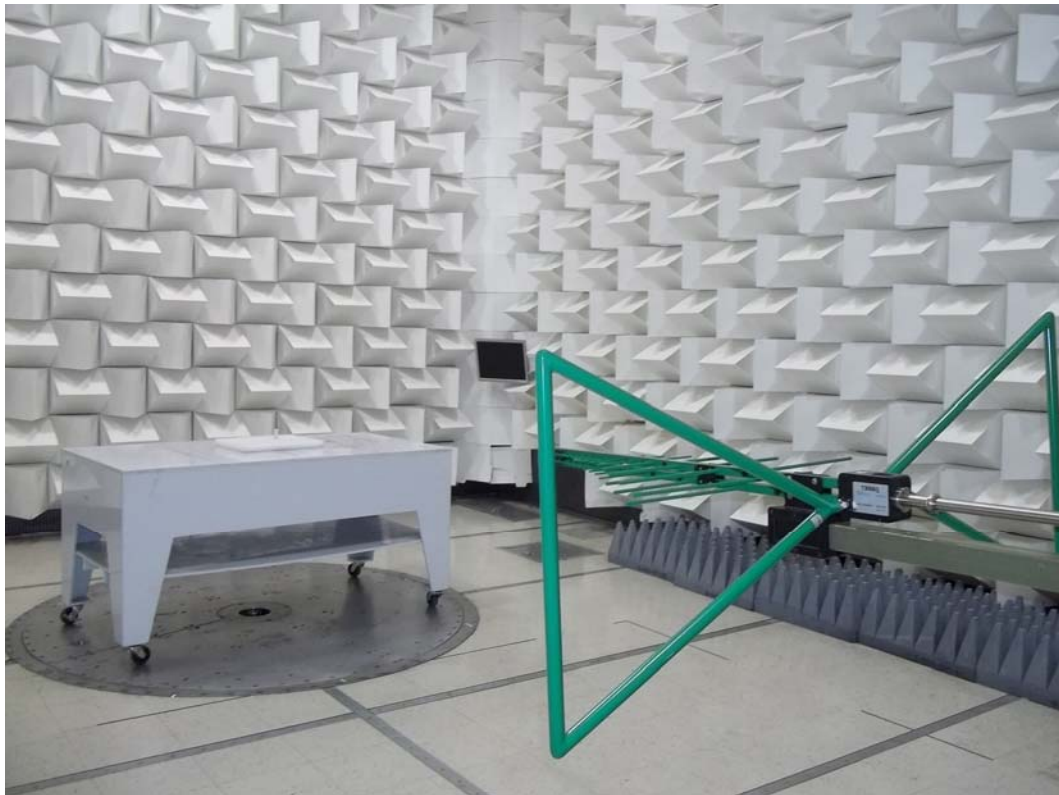
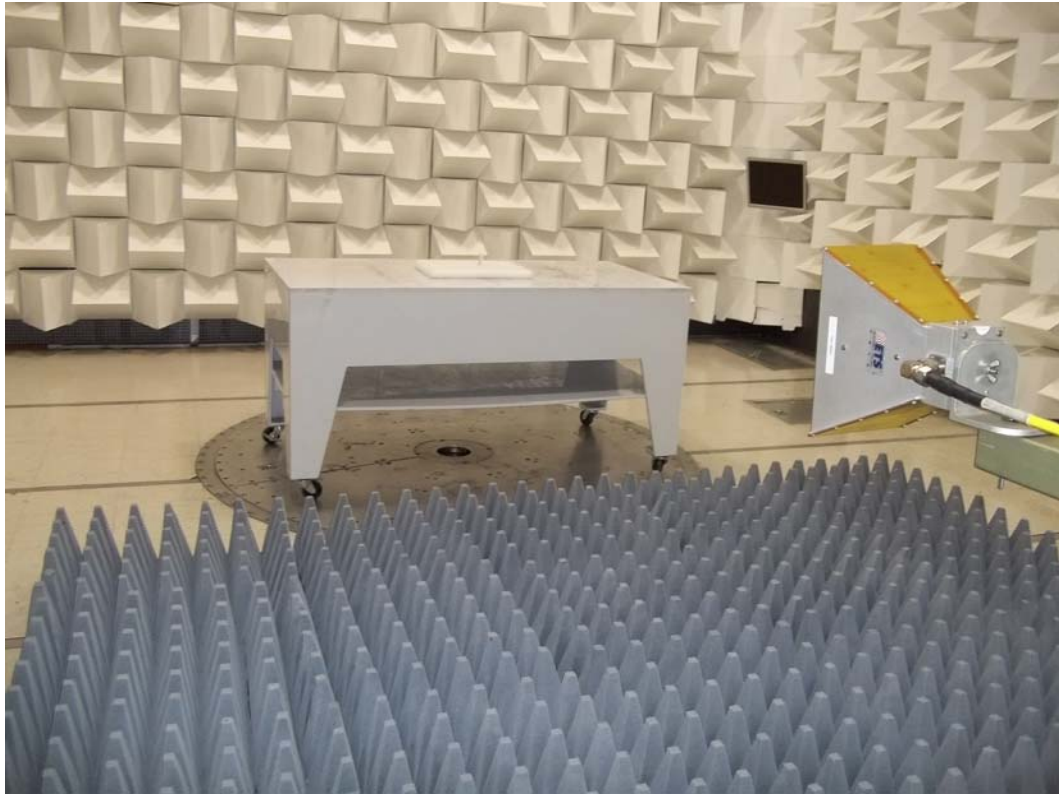
Description	Manufacturer	Version
Excel	Microsoft	Office 2010

**6.8 Results:**

- ❖ The sample tested was found to comply.



6.9 Test Setup Photographs:



**6.10 Test Data:**

Test: Radiated Emissions  
 Frequency Range: 30 MHz to 5000 MHz  
 Limits: FCC Part 15.231(b)  
 Measurement Distance: 3 meters

Measurement Uncertainty: 4.2 dB  
 Power Input: Battery Operated  
 EUT: TTLDWC01 / TTLDWO01  
 Test Mode: Transmitting continuously

FCC Part 15.231 ( X-Position-Horizontal Polarization)									
Frequency MHz	FS dB(uV/m)	Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	AF dB(1/m)	CF dB	DCF dB	Detector Pk/Av
*433.94	84.06	100.82	-16.76	66	0	16.6	1.46	0	Pk
	68.57	80.82	-12.25	66	0	16.6	1.46	15.49	Av
867.9	51.5	80.82	-29.32	28.4	0	20.7	2.4	0	Pk
	36.01	60.82	-24.39	28.4	0	20.7	2.4	15.49	Av
1301.67	41.79	80.82	-39.03	53	37.74	23.6	2.93	0	Pk
	26.3	60.82	-34.1	53	37.74	23.6	2.93	15.49	Av
1735.7	37.22	80.82	-43.60	47	38.22	25	3.44	0	Pk
	21.73	60.82	-38.67	47	38.22	25	3.44	15.49	Av
2169.67	50.45	80.82	-30.37	57	37.91	27.4	3.96	0	Pk
	34.96	60.82	-25.44	57	37.91	27.4	3.96	15.49	Av
3037.55	62.47	80.82	-18.35	66	37.75	29.6	4.62	0	Pk
	46.98	60.82	-13.42	66	37.75	29.6	4.62	15.49	Av
3471.28	60.826	80.82	-20.36	62.7	37.59	30.5	4.85	0	Pk
	44.97	60.82	-15.43	62.7	37.59	30.5	4.85	15.49	Av
3905.03	53.19	80.82	-27.63	52.4	36.91	32.4	5.3	0	Pk
	37.7	60.82	-22.7	52.4	36.91	32.4	5.3	15.49	Av
4338.92	46.69	80.82	-34.13	45.7	36.98	32.3	5.67	0	Pk
	31.2	60.82	-29.2	45.7	36.98	32.3	5.67	15.49	Av
Detectors/Bandwidths (Det/RBW/VBW)= (120kHz/300kHz) (mt=100mS/VBW 1 MHz)									

Quasi FS – (Final) Quasi Peak Field Strength

RA – Receiver (quasi peak) Amplitude

AG – Preamp Gain

AF – Antenna Factor

CF – Cable Factor

DCF- Duty Cycle Factor

**Calculation:** FS=RA+AF+CF-AG-DCF

Test Result:

(\*)The EUT PASSED Radiated Emission test with 11.83 dB Av margin at 433.94 MHz.

Deviations, Additions, or Exclusions: NONE

**6.11 Test Data:**

Test: Radiated Emissions  
 Frequency Range: 30 MHz to 5000 MHz  
 Limits: FCC Part 15.231(b)  
 Measurement Distance: 3 meters

Measurement Uncertainty: 4.2 dB  
 Power Input: Battery Operated  
 EUT: TTLDWC01 / TTLDWO01  
 Test Mode: Transmitting continuously

FCC Part 15.231 ( X-Position-Vertical Polarization)									
Frequency MHz	FS dB(uV/m)	Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	AF dB(1/m)	CF dB	DCF dB	Detector Pk/Av
*433.94	91.66	100.82	-9.16	73.6	0	16.6	1.46	0	Pk
	76.17	80.82	-4.65	73.6	0	16.6	1.46	15.49	Av
867.9	48.4	80.82	-32.42	25.3	0	20.7	2.4	0	Pk
	32.91	60.82	-27.49	25.3	0	20.7	2.4	15.49	Av
1301.67	44.8	80.82	-36.02	56.01	37.74	23.6	2.93	0	Pk
	29.31	60.82	-31.09	56.01	37.74	23.6	2.93	15.49	Av
1735.7	45.22	80.82	-35.6	55	38.22	25	3.44	0	Pk
	29.73	60.82	-30.67	55	38.22	25	3.44	15.49	Av
2169.67	53.45	80.82	-27.37	60	37.91	27.4	3.96	0	Pk
	37.96	60.82	-22.44	60	37.91	27.4	3.96	15.49	Av
3037.55	66.47	80.82	-14.35	70	37.75	29.6	4.62	0	Pk
	50.98	60.82	-9.42	70	37.75	29.6	4.62	15.49	Av
3471.28	64.86	80.82	-15.96	67.1	37.59	30.5	4.85	0	Pk
	49.37	60.82	-11.03	67.1	37.59	30.5	4.85	15.49	Av
3905.03	48.59	80.82	-32.23	47.8	36.91	32.4	5.3	0	Pk
	33.1	60.82	-27.3	47.8	36.91	32.4	5.3	15.49	Av
4338.92	47.09	80.82	-33.73	46.1	36.98	32.3	5.67	0	Pk
	31.6	60.82	-28.8	46.1	36.98	32.3	5.67	15.49	Av
Detectors/Bandwidths (Det/RBW/VBW)=( 120kHz/300kHz) (mt=100mS/VBW 1 MHz)									

Quasi FS – (Final) Quasi Peak Field Strength  
 RA – Receiver (quasi peak) Amplitude  
 AG – Preamp Gain  
 AF – Antenna Factor  
 CF – Cable Factor  
 DCF- Duty Cycle Factor

**Calculation:** FS=RA+AF+CF-AG-DCF

Test Result:

(\*)The EUT PASSED Radiated Emission test with 4.65 dB Av margin at 433.94 MHz.

Deviations, Additions, or Exclusions: NONE

**6.12 Test Data:**

Test: Radiated Emissions  
 Frequency Range: 30 MHz to 5000 MHz  
 Limits: FCC Part 15.231(b)  
 Measurement Distance: 3 meters

Measurement Uncertainty: 4.2 dB  
 Power Input: Battery Operated  
 EUT: TTLDWC01 / TTLDWO01  
 Test Mode: Transmitting continuously

FCC Part 15.231 ( Y-Position-Horizontal Polarization)									
Frequency MHz	FS dB(uV/m)	Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	AF dB(1/m)	CF dB	DCF dB	Detector Pk/Av
433.94	86.86	100.82	-13.96	68.8	0	16.6	1.46	0	Pk
	66.87	80.82	-13.95	64.3	0	16.6	1.46	15.49	Av
867.9	51.5	80.82	-29.32	28.4	0	20.7	2.4	0	Pk
	30.71	60.82	-30.11	23.1	0	20.7	2.4	15.49	Av
1301.8	41.89	80.82	-38.93	53.1	37.74	23.6	2.93	0	Pk
	20.7	60.82	-40.12	47.4	37.74	23.6	2.93	15.49	Av
1735.7	47.42	80.82	-33.4	57.2	38.22	25	3.44	0	Pk
	26.33	60.82	-34.49	51.6	38.22	25	3.44	15.49	Av
2169.67	52.53	80.82	-28.29	59.08	37.91	27.4	3.96	0	Pk
	31.66	60.82	-29.16	53.7	37.91	27.4	3.96	15.49	Av
*3037.55	70.77	80.82	-10.05	74.3	37.75	29.6	4.62	0	Pk
	45.08	60.82	-15.74	64.1	37.75	29.6	4.62	15.49	Av
3471.28	65.16	80.82	-15.66	67.4	37.59	30.5	4.85	0	Pk
	40.07	60.82	-20.75	57.8	37.59	30.5	4.85	15.49	Av
3905.03	55.59	80.82	-25.23	54.8	36.91	32.4	5.3	0	Pk
	34	60.82	-26.82	48.7	36.91	32.4	5.3	15.49	Av
4338.92	47.49	80.82	-33.33	46.5	36.98	32.3	5.67	0	Pk
	17.6	60.82	-43.22	32.1	36.98	32.3	5.67	15.49	Av
Detectors/Bandwidths (Det/RBW/VBW)= (120kHz/300kHz) (mt=100mS/VBW 1 MHz)									

Quasi FS – (Final) Quasi Peak Field Strength  
 RA – Receiver (quasi peak) Amplitude  
 AG – Preamp Gain  
 AF – Antenna Factor  
 CF – Cable Factor  
 DCF- Duty Cycle Factor

**Calculation:** FS=RA+AF+CF-AG-DCF

Test Result:

(\*)The EUT PASSED Radiated Emission test with 9.63 dB margin at 3037.55 MHz.

Deviations, Additions, or Exclusions: NONE

**6.13 Test Data:**

Test: Radiated Emissions  
 Frequency Range: 30 MHz to 5000 MHz  
 Limits: FCC Part 15.231(b)  
 Measurement Distance: 3 meters

Measurement Uncertainty: 4.2 dB  
 Power Input: Battery Operated  
 EUT: TTLDWC01 / TTLDWO01  
 Test Mode: Transmitting continuously

FCC Part 15.231 ( Y-Position-Vertical Polarization)									
Frequency MHz	FS dB(uV/m)	Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	AF dB(1/m)	CF dB	DCF dB	Detector Pk/Av
*433.94	87.16	100.82	-13.66	69.1	0	16.6	1.46	0	Pk
	71.67	80.82	-9.15	69.1	0	16.6	1.46	15.49	Av
867.9	52.1	80.82	-28.72	29	0	20.7	2.4	0	Pk
	36.61	60.82	-24.21	29	0	20.7	2.4	15.49	Av
1301.8	39.99	80.82	-40.83	51.2	37.74	23.6	2.93	0	Pk
	24.5	60.82	-36.32	51.2	37.74	23.6	2.93	15.49	Av
1735.7	41.22	80.82	-39.6	51	38.22	25	3.44	0	Pk
	25.73	60.82	-35.09	51	38.22	25	3.44	15.49	Av
2169.67	52.45	80.82	-28.37	59	37.91	27.4	3.96	0	Pk
	36.96	60.82	-23.86	59	37.91	27.4	3.96	15.49	Av
3037.55	62.97	80.82	-17.85	66.5	37.75	29.6	4.62	0	Pk
	47.48	60.82	-13.34	66.5	37.75	29.6	4.62	15.49	Av
3471.28	55.83	80.82	-24.99	58.07	37.59	30.5	4.85	0	Pk
	40.34	60.82	-20.48	58.07	37.59	30.5	4.85	15.49	Av
3905.03	56.59	80.82	-24.23	55.8	36.91	32.4	5.3	0	Pk
	41.1	60.82	-19.72	55.8	36.91	32.4	5.3	15.49	Av
4338.92	52.99	80.82	-27.83	52	36.98	32.3	5.67	0	Pk
	37.5	60.82	-23.32	52	36.98	32.3	5.67	15.49	Av
Detectors/Bandwidths (Det/RBW/VBW)= (120kHz/300kHz) (mt=100mS/VBW 1 MHz)									

Quasi FS – (Final) Quasi Peak Field Strength  
 RA – Receiver (quasi peak) Amplitude  
 AG – Preamp Gain  
 AF – Antenna Factor  
 CF – Cable Factor  
 DCF- Duty Cycle Factor

**Calculation:** FS=RA+AF+CF-AG-DCF

Test Result: (\*)The EUT PASSED Radiated Emission test with 9.5 dB Av margin at 433.94 MHz.

Deviations, Additions, or Exclusions: NONE

**6.14 Test Data:**

Test: Radiated Emissions  
 Frequency Range: 30 MHz to 5000 MHz  
 Limits: FCC Part 15.231(b)  
 Measurement Distance: 3 meters

Measurement Uncertainty: 4.2 dB  
 Power Input: Battery Operated  
 EUT: TTLDWC01 / TTLDWO01  
 Test Mode: Transmitting continuously

FCC Part 15.231 ( Z-Position-Horizontal Polarization)									
Frequency MHz	FS dB(uV/m)	Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	AF dB(1/m)	CF dB	DCF dB	Detector Pk/Av
433.94	87.56	100.82	-13.26	69.5	0	16.6	1.46	0	Pk
	72.07	80.82	-8.75	69.5	0	16.6	1.46	15.49	Av
867.9	48.8	80.82	-32.02	25.7	0	20.7	2.4	0	Pk
	33.31	60.82	-27.51	25.7	0	20.7	2.4	15.49	Av
1301.8	40.69	80.82	-40.13	51.9	37.74	23.6	2.93	0	Pk
	25.2	60.82	-35.62	51.9	37.74	23.6	2.93	15.49	Av
1735.7	43.82	80.82	-37	53.6	38.22	25	3.44	0	Pk
	28.33	60.82	-32.49	53.6	38.22	25	3.44	15.49	Av
2169.67	53.15	80.82	-27.67	59.7	37.91	27.4	3.96	0	Pk
	37.66	60.82	-23.16	59.7	37.91	27.4	3.96	15.49	Av
*3037.55	68.87	80.82	-11.95	72.4	37.75	29.6	4.62	0	Pk
	53.38	60.82	-7.44	72.4	37.75	29.6	4.62	15.49	Av
3471.28	63.85	80.82	-16.97	66.09	37.59	30.5	4.85	0	Pk
	48.36	60.82	-12.46	66.09	37.59	30.5	4.85	15.49	Av
3905.03	62.19	80.82	-18.63	61.4	36.91	32.4	5.3	0	Pk
	46.7	60.82	-14.12	61.4	36.91	32.4	5.3	15.49	Av
4338.92	52.99	80.82	-27.83	52	36.98	32.3	5.67	0	Pk
	37.5	60.82	-23.32	52	36.98	32.3	5.67	15.49	Av
Detectors/Bandwidths (Det/RBW/VBW)= (120kHz/300kHz) (mt=100mS/VBW 1 MHz)									

Quasi FS – (Final) Quasi Peak Field Strength  
 RA – Receiver (quasi peak) Amplitude  
 AG – Preamp Gain  
 AF – Antenna Factor  
 CF – Cable Factor  
 DCF- Duty Cycle Factor

**Calculation:** FS=RA+AF+CF-AG-DCF

Test Result: (\*)The EUT PASSED Radiated Emission test with 8.75 dB Av margin at 433.9MHz.

Deviations, Additions, or Exclusions: NONE

**6.15 Test Data:**

Test: Radiated Emissions  
 Frequency Range: 30 MHz to 5000 MHz  
 Limits: FCC Part 15.231(b)  
 Measurement Distance: 3 meters

Measurement Uncertainty: 4.2 dB  
 Power Input: Battery Operated  
 EUT: TTLDWC01 / TTLDWO01  
 Test Mode: Transmitting continuously

FCC Part 15.231 ( Z-Position-Vertical Polarization)									
Frequency MHz	FS dB(uV/m)	Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	AF dB(1/m)	CF dB	DCF dB	Detector Pk/Av
*433.94	90.26	100.82	-10.56	72.2	0	16.6	1.46	0	Pk
	68.67	80.82	-12.15	66.1	0	16.6	1.46	15.49	Av
867.9	53.3	80.82	-27.52	30.2	0	20.7	2.4	0	Pk
	31.31	60.82	-29.51	23.7	0	20.7	2.4	15.49	Av
1301.8	39.89	80.82	-40.93	51.1	37.74	23.6	2.93	0	Pk
	19.1	60.82	-41.72	45.8	37.74	23.6	2.93	15.49	Av
1735.7	40.22	80.82	-40.6	50	38.22	25	3.44	0	Pk
	18.43	60.82	-42.39	43.7	38.22	25	3.44	15.49	Av
2169.67	53.45	80.82	-27.37	60	37.91	27.4	3.96	0	Pk
	31.66	60.82	-29.16	53.7	37.91	27.4	3.96	15.49	Av
3037.55	64.47	80.82	-16.35	68	37.75	29.6	4.62	0	Pk
	39.38	60.82	-21.44	58.4	37.75	29.6	4.62	15.49	Av
3471.28	56.46	80.82	-24.36	58.7	37.59	30.5	4.85	0	Pk
	31.57	60.82	-29.25	49.3	37.59	30.5	4.85	15.49	Av
3905.03	55.39	80.82	-25.43	54.6	36.91	32.4	5.3	0	Pk
	32	60.82	-28.82	46.7	36.91	32.4	5.3	15.49	Av
4338.92	45.59	80.82	-35.23	44.6	36.98	32.3	5.67	0	Pk
	17.6	60.82	-43.22	32.1	36.98	32.3	5.67	15.49	Av
Detectors/Bandwidths (Det/RBW/VBW)= (120kHz/300kHz) (mt=100mS/VBW 1 MHz)									

Quasi FS – (Final) Quasi Peak Field Strength  
 RA – Receiver (quasi peak) Amplitude  
 AG – Preamp Gain  
 AF – Antenna Factor  
 CF – Cable Factor  
 DCF- Duty Cycle Factor

**Calculation:** FS=RA+AF+CF-AG-DCF

Test Result:

(\*)The EUT PASSED Radiated Emission test with 10.56 dB Pk margin at 433.94 MHz.

Deviations, Additions, or Exclusions: NONE

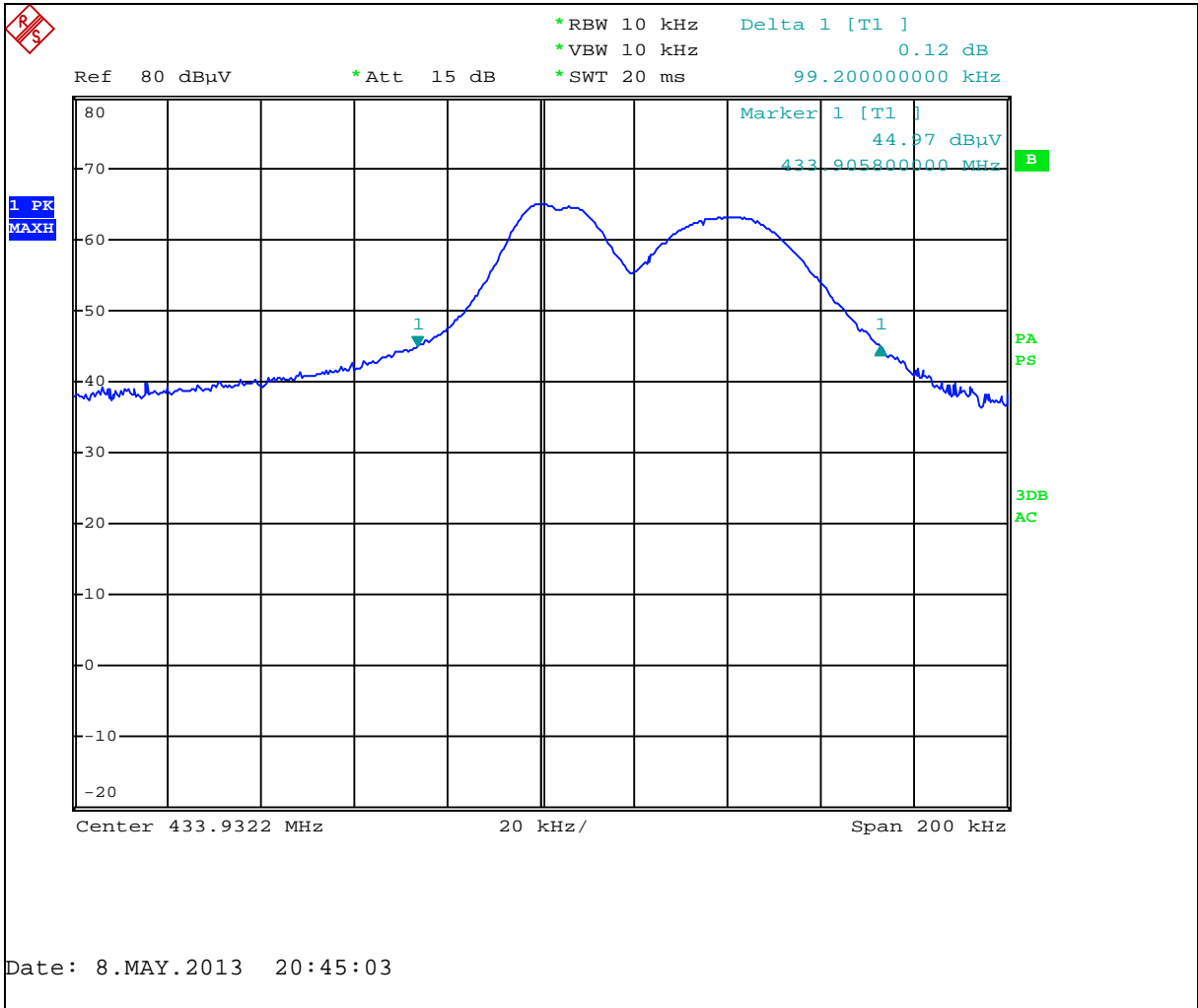
### 6.16 Occupied Bandwidth

The 15.231(c) emission bandwidth requirement: no wider than **0.25%** of the fundamental frequency

The worst-case (widest) emission bandwidth at 20 dB is 99.20 kHz, which is 0.022% of the fundamental frequency.

The following plots show the emission bandwidth of the transmitter:

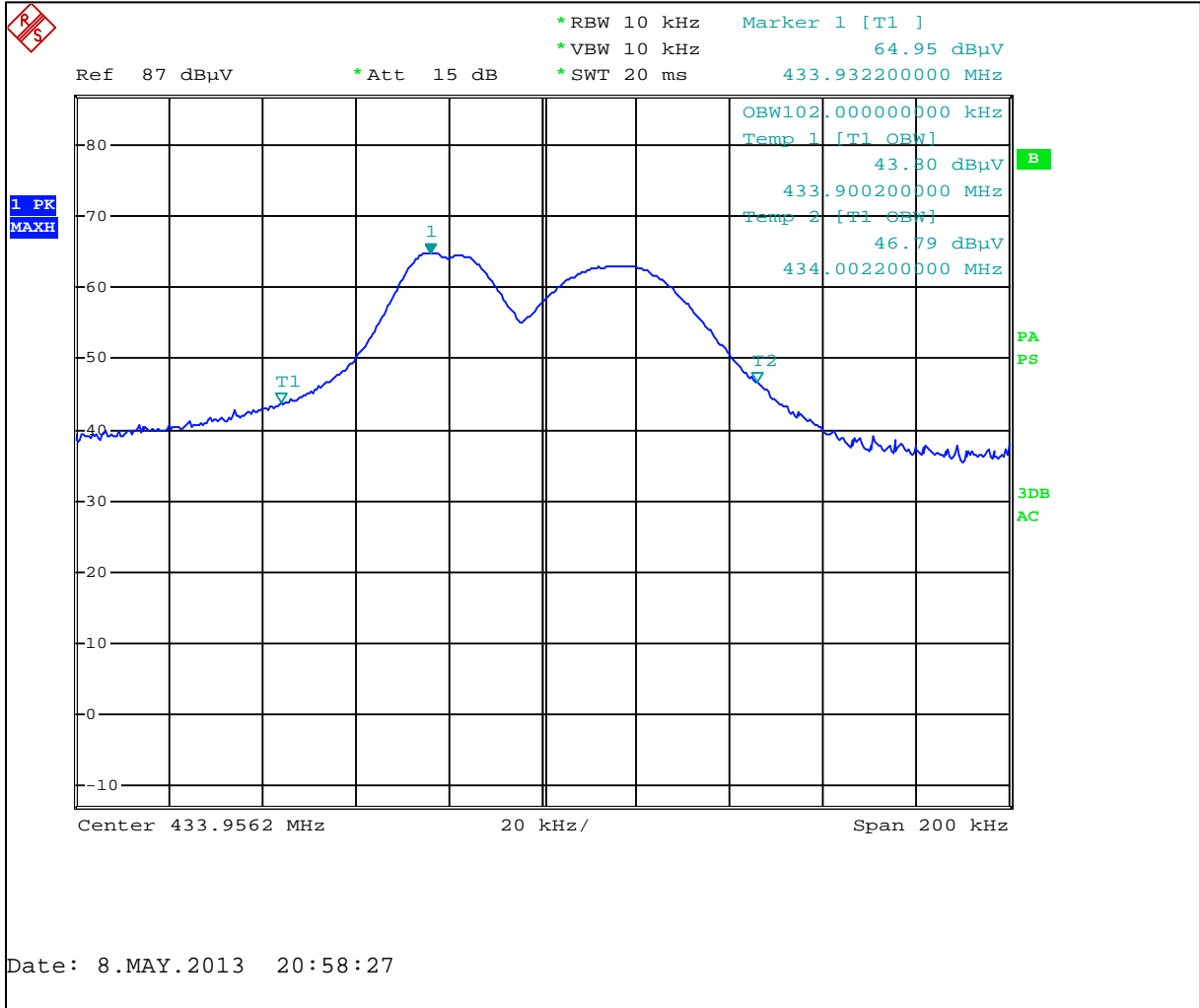
FCC 20dB BW





6.17 99% Occupied Bandwidth per RSS-210 A1.1.3

- o Industry Canada Occupied Bandwidth measured at 99%: 102.0 kHz



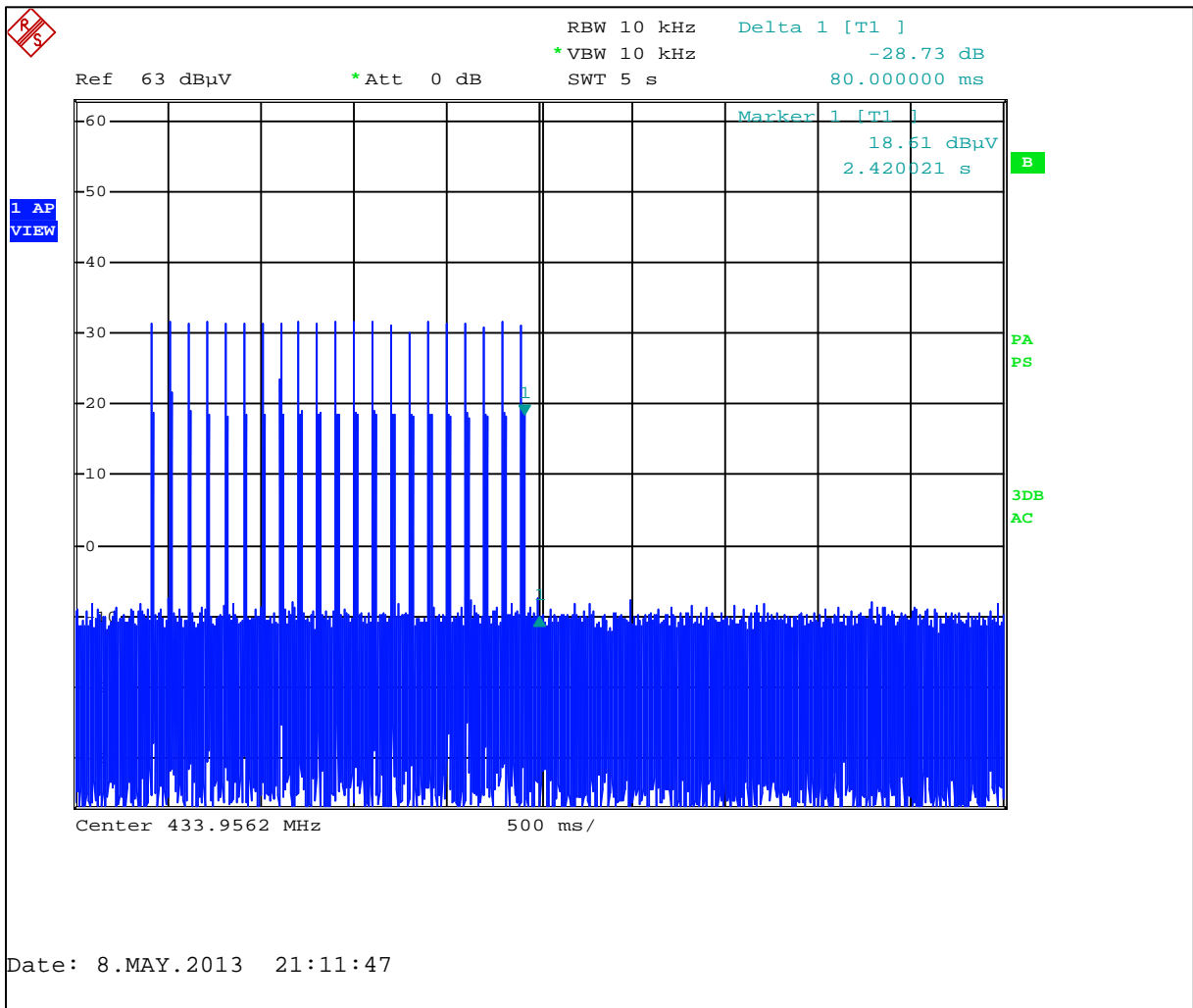
### 6.18 Transmitter Deactivation Time

FCC Rule 15.231(a) and RSS-210 A1.1.1  
Maximum allowed deactivation time: 5 Seconds

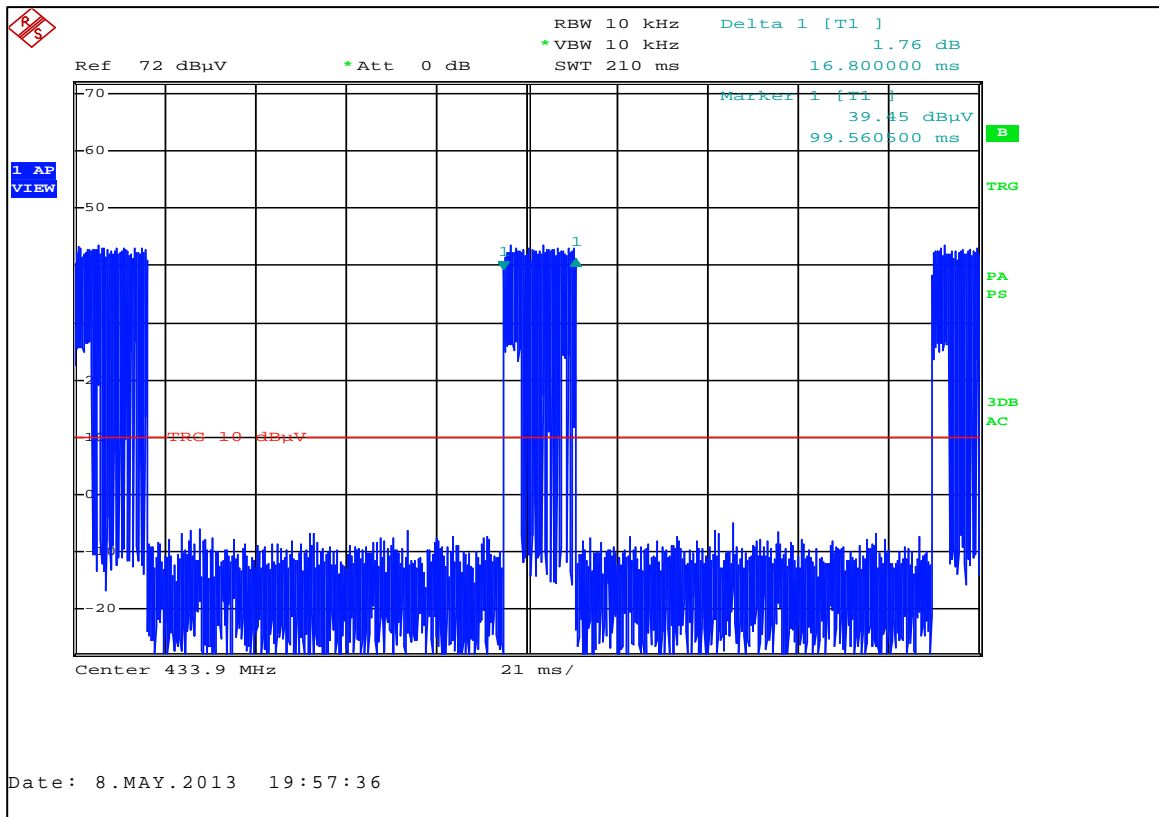
Manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

#### Test Results: Pass

Tattletale stopped transmitting within not more than 5 seconds of being released. Actual time = 2.42 seconds.



6.19 Duty Cycle Time Graphs



100mS @ 10ms / div

Time on = 16.8 ms

**Duty Cycle Calculation**

**Sample Calculation:**

If  $T \leq 0.1$  second, calculate the Duty Cycle correction factor as  $20\text{Log}(t/T)$ .

If  $T > 0.1$  second, calculate the Duty Cycle correction factor as  $20\text{Log}(t/0.1)$

**Result:**

The duty cycle was calculated by measuring one pulse train in a 100 ms period. The pulse train consists of only "1 Short" 16.8 ms pulse.

Total ON time = 16.80 ms

Duty Cycle calculation:  $20\text{Log}(16.8/100) = -15.49$  dB

**7 AC Mains Conducted Emissions (FCC Part 15.207)**

<b>Date:</b>	n/a	<b>Result: N/A</b>
<b>Tested by:</b>	n/a	
<b>Standard:</b>	FCC Part 15.207	
<b>Test Point:</b>	Line 1 and Line 2	
<b>Operation mode:</b>	See Section 4.1	
<b>Note:</b>	Not Applicable. EUT is battery operated	

**7.1 Results:**

❖ Not Applicable. The EUT being battery Operated.

**8 Measurement Uncertainty & Test Equipment Used**

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of  $k = 2$ , providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	4.2 dB	
AC mains Conducted emissions, 150kHz to 30 MHz	2.6 dB	

**8.1 Test Equipment Used:**

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
EMI Test Receiver	Rohde & Schwarz	ESCI7	100825	1140	02/19/2014	☒
Biconilog Antenna	TESEQ	CBL 6112D	32852	1147	01/05/2014	☒
Barometer Temp/Humidity	MicroServer	Omega	846078	1016	01/12/2014	☒
Horn Antenna	A.H Systems, Inc.	SAS-571	1513	1093	08/28/2013	☒
HP Preamplifier	HP	8449B	3008A01168	00583	04/09/2014	☒

**9 Revision History**

<b>Revision Number</b>	<b>Revision Contents</b>	<b>Date</b>	<b>Prepared By</b>	<b>Reviewed By</b>
None				