Date: 2010-05-18
No. : DM103112

Applicant (SMH001): Reliance Controls Corporation
2001 Young Court Racine, WI 53404

Description of Sample(s): Submitted sample(s) said to be

Product:	Transmitter
Brand Name:	N/A
Model Number:	11034
FCC ID:	SPV-11035

Date Sample(s) Received: 2010-03-22

Date Tested: 2010-03-29, 2010-05-14

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 and ANSI C63.4:2003 for FCC Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark(s): ----

LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited

CONTENT:

1.0 General Details

1.1 Test Laboratory

STC (Dongguan) Company Limited
EMC Laboratory
68 Fumin Nan Road, Dalang, Dongguan, China

Telephone: (86 769) 81119888
Fax: (86 769) 81116222

1.2 Applicant Details

Applicant

Reliance Controls Corporation
2001 Young Court Racine, WI 53404

Manufacturer

SMART HERO ELECTRONIC PRODUCTS LIMITED(DONG GUAN)
118 Li Xiang Road, West, Shui Ping Village, DaLang, DongGuan, China

1.3 Equipment Under Test [EUT]
Description of Sample(s)

Submitted sample(s) said to be

Product:	Transmitter
Manufacturer:	SMART HERO ELECTRONIC PRODUCTS LIMITED(DONG GUAN)
Brand Name:	N/A
Model Number:	11034
Rating:	9Vd.c. with Jack; 9Vd.c.("6F22" size battery x 1)

The AC/DC adaptor was provided by the applicant with following details:-
Brand name: N/A; Model no.: N/A; Input: 120Va.c. 60Hz 4W, Output: 9Vd.c. 200mA.

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Reliance Controls Corporation, Transmitter. The transmitter is trigger transmitter. The EUT will automatically cease transmission after one packet has been sent. It is pulse transmitter. Modulation by IC; and type is amplitude modulation.

1.4 Date of Order

2010-03-22

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2010-03-29, 2010-05-14

1.7 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2009 and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231a	ANSI C63.4:2003	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐	☐
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

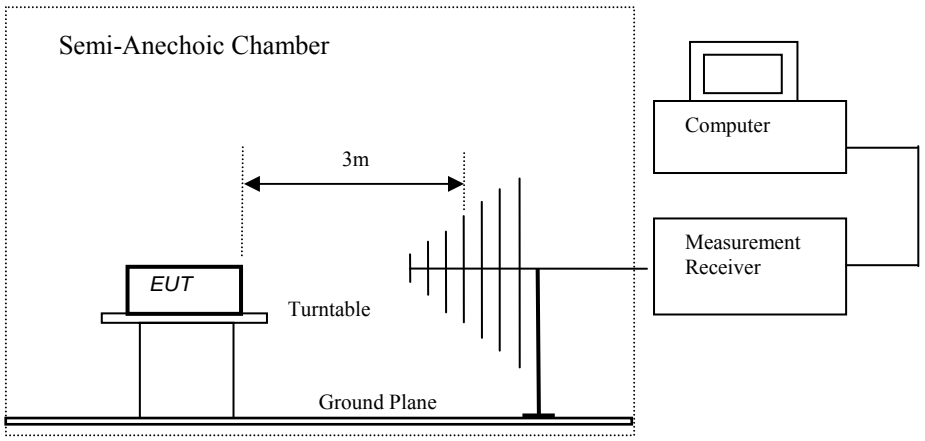
Test Requirement:	FCC 47CFR 15.231a
Test Method:	ANSI C63.4:2003
Test Date:	2010-05-14
Mode of Operation:	Tx mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*: Semi-anechoic chamber located on the STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

Test Setup:



Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [μV/m]	Field Strength of Spurious Emission [Average] [μV/m]
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750 *	125 to 375 *
174-260	3,750	375
260-470	3,750 to 12,500 *	375 to 1,250 *
Above 470	12,500	1,250

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, μV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Results:

Field Strength of Fundamental Emissions Peak Value					
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	E-Field Polarity
315.00	67.6	16.3	83.9	95.6	Horizontal

Field Strength of Spurious Emissions Peak Value					
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	E-Field Polarity
629.88	28.2	23.3	< 51.5	75.6	Horizontal
944.80	18.4	26.7	< 45.1	75.6	Horizontal
1259.80	16.8	31.1	< 47.9	75.6	Horizontal
+ 1574.70	< 1.0	38.8	< 39.8	75.6	Vertical
+ 1889.64	< 1.0	17.4	< 18.4	75.6	Vertical
+ 2204.58	< 1.0	17.2	< 18.2	75.6	Vertical
+ 2519.52	< 1.0	18.8	< 19.8	75.6	Vertical
+ 2834.46	< 1.0	19.7	< 20.7	75.6	Vertical
+ 3149.40	< 1.0	20.6	< 21.6	75.6	Vertical

Results of Tx on mode: PASS

	Average Value					
	Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	E-Field Polarity
*	315.00	58.0	16.3	74.3	75.6	Horizontal

	MHz	Level @3m dBμV	Factor dB/m	Strength dBμV/m	dBμV/m	Polarity
	629.88	18.6	23.3	< 41.9	55.6	Horizontal
	944.82	8.8	26.7	< 35.5	55.6	Horizontal
	1259.76	7.2	31.1	< 38.3	55.6	Horizontal
+	1574.70	< 1.0	38.8	< 39.8	55.6	Vertical
+	1889.64	< 1.0	17.4	< 18.4	55.6	Vertical
+	2204.58	< 1.0	17.2	< 18.2	55.6	Vertical
+	2519.52	< 1.0	18.8	< 19.8	55.6	Vertical
+	2834.46	< 1.0	19.7	< 20.7	55.6	Vertical
+	3149.40	< 1.0	20.6	< 21.6	55.6	Vertical

Remarks:

*: Adjusted by Duty Cycle = -9.6dB

FCC Limit for Average Measurement = 41.6667(314.93MHz)-7083.3333=6038.76μV/m

+: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.6dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of on mode (9 kHz to 30MHz): PASS

Emissions detected are more than 20 dB below the limit line(s).

Remark:
Correction Factor includes Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty: 30MHz to 1GHz 4.6dB

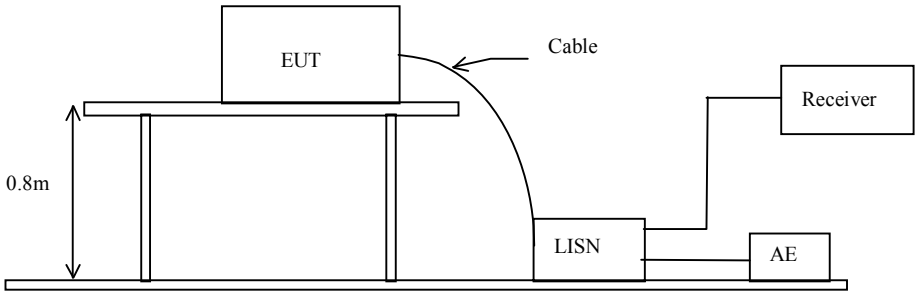
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2003
Test Date:	2010-03-29
Mode of Operation:	Tx mode

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



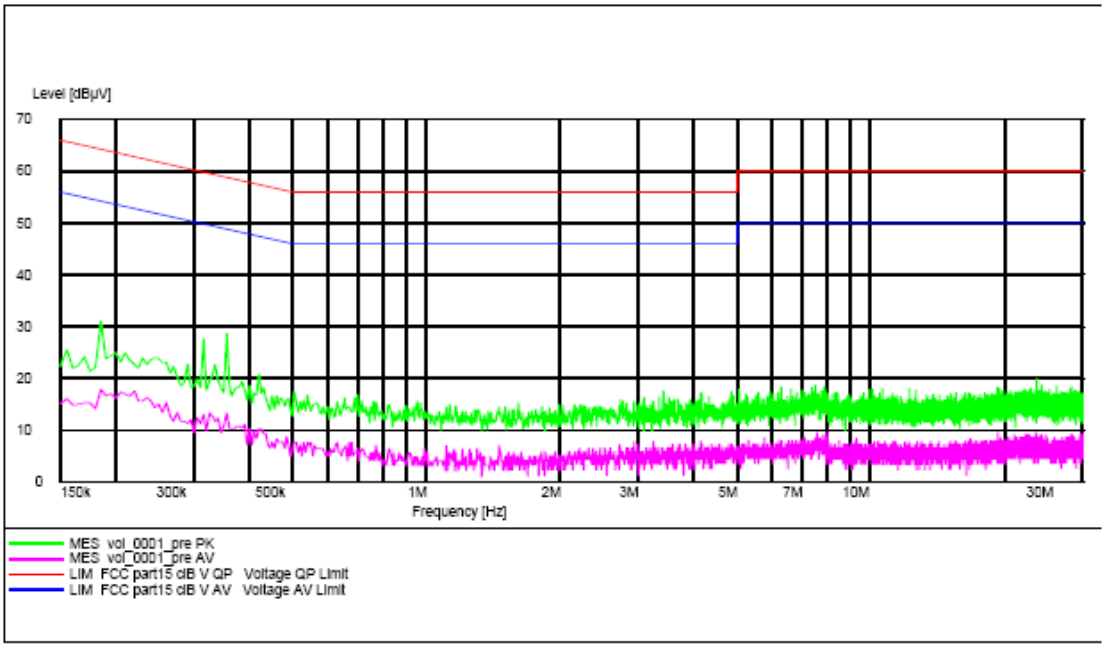
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Tx mode(L): PASS
Please refer to the following diagram for individual results.



Remark:
Calculated measurement uncertainty : 3.4dB

Limit for Conducted Emissions (FCC 47 CFR 15.207):

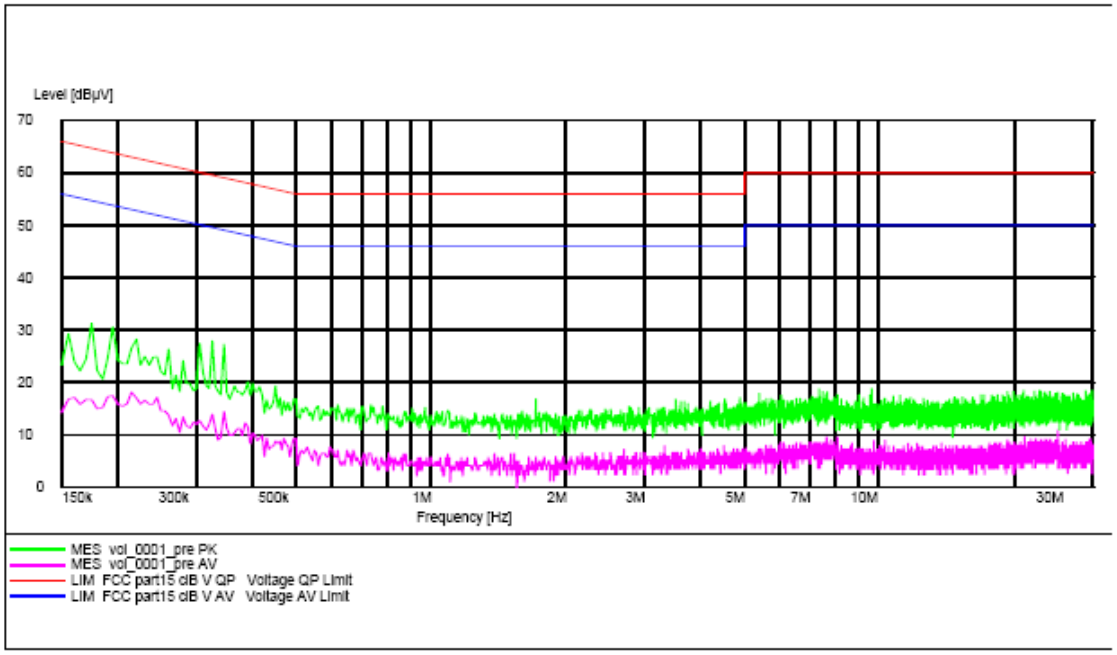
Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Tx mode(N): PASS

Please refer to the following diagram for individual results.



Remark:
Calculated measurement uncertainty : 3.4dB

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.231a
Test Method:	ANSI C63.4:2003 (Section 13.1.7)
Test Date:	2010-05-14
Mode of Operation:	On mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

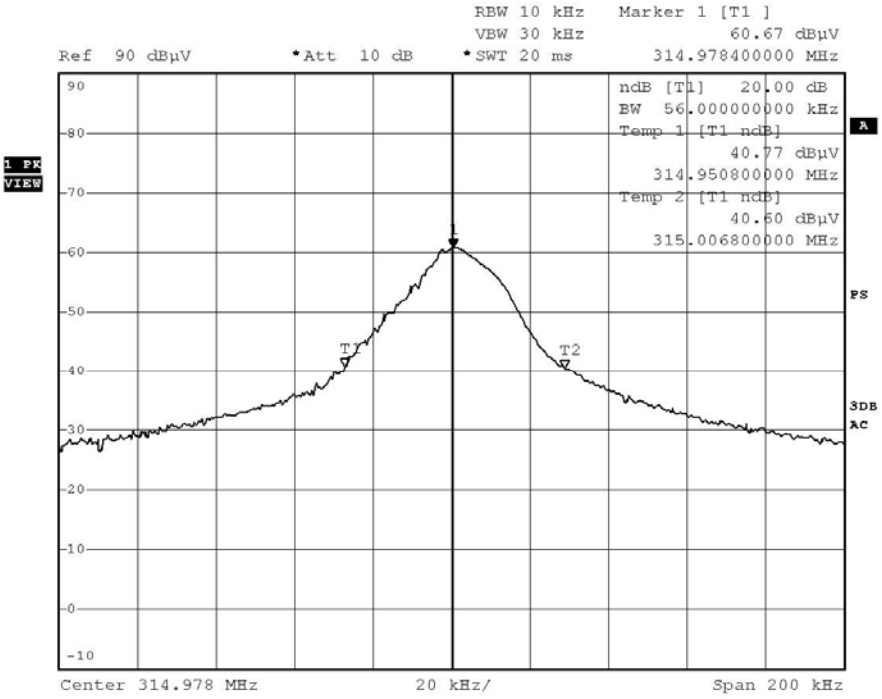
As Test Setup of clause 3.1.1 in this test report.

Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]	FCC Limits * [KHz]
315.0	56.0	787

*: FCC Limit for Bandwidth measurement = (0.25%)(Center Frequency)
=(0.0025)(314.9784)
= 787KHz

20dB Bandwidth of Fundamental Emission



Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	100314	2010.03.16
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	100388	2009.09.25
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2008.11.06
EMD062	Double-Ridged Waveguide	ETS.LINDGREN	3117	00075933	2008.11.06
EMD084	MULTI-DVICE CONTROLLER	ETS.LINDGREN	2090	00060107	N/A
EMD088	Video Contol Unit	ETS.LINDGREN	Y21953A	2601073	N/A
EMD093	Monitor	ViewSonic	VA9036	Q8X064201876	N/A
EMD102	Intelligent Frequency	Ainuo lnstrument Co., Ltd	AN97005SS	79707454	N/A
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A

Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EMD003	IMPULSEGRENZER PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100071	2010.03.16
EMD004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ESH3-Z5	100102	2010.03.16
EMD009	Passive Voltage Probe	ROHDE & SCHWARZ	ESH2-Z3	100020	2010.03.16
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	100388	2009.09.25
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2009.07.27
EMD103	Intelligent Frequency	Ainuo lnstrument Co., Ltd	AN97005SS	79707455	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A

Remarks:-
CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

Appendix B

Duty Cycle Correction During 100msec

Each packet period (100msec) never exceeds a series of 65 long (0.48msec), 10 short (0.2msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 65x0.48msec+10x0.2msec=33.2% duty cycle. Figure A through D show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.332)=-9.6dB

The following figures [Figure A to Figure D] showed the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]

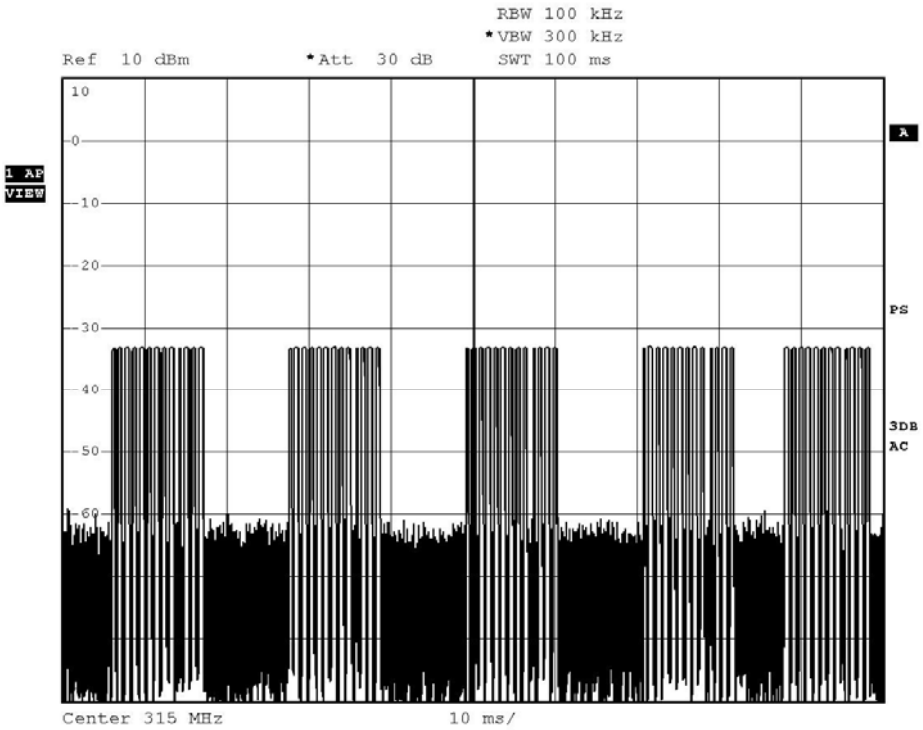


Figure B [Long Pulse]

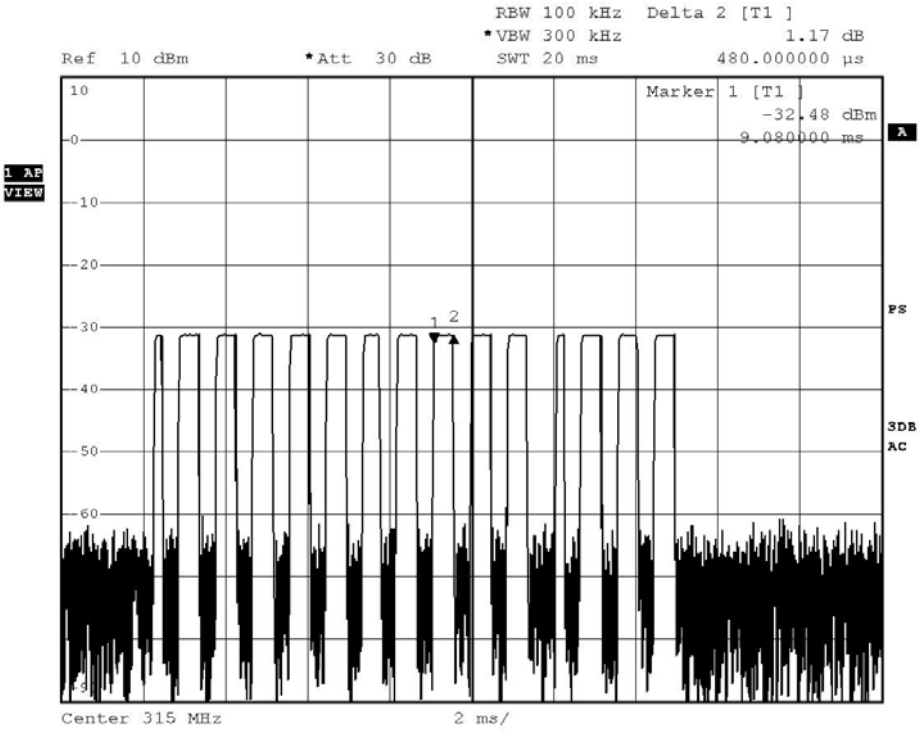


Figure C [Short Pulse 1]

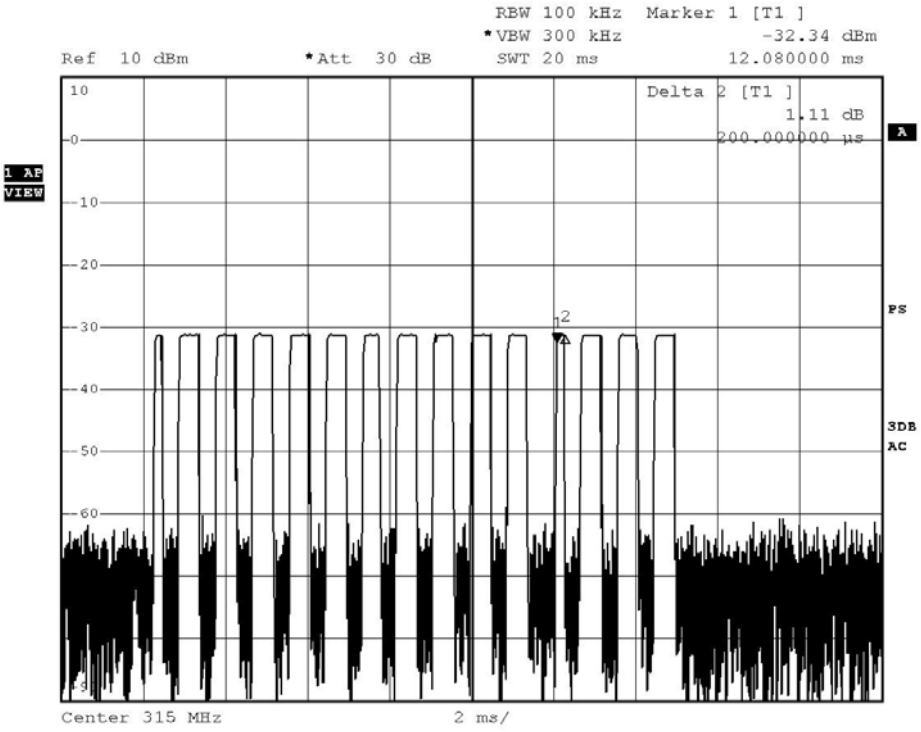
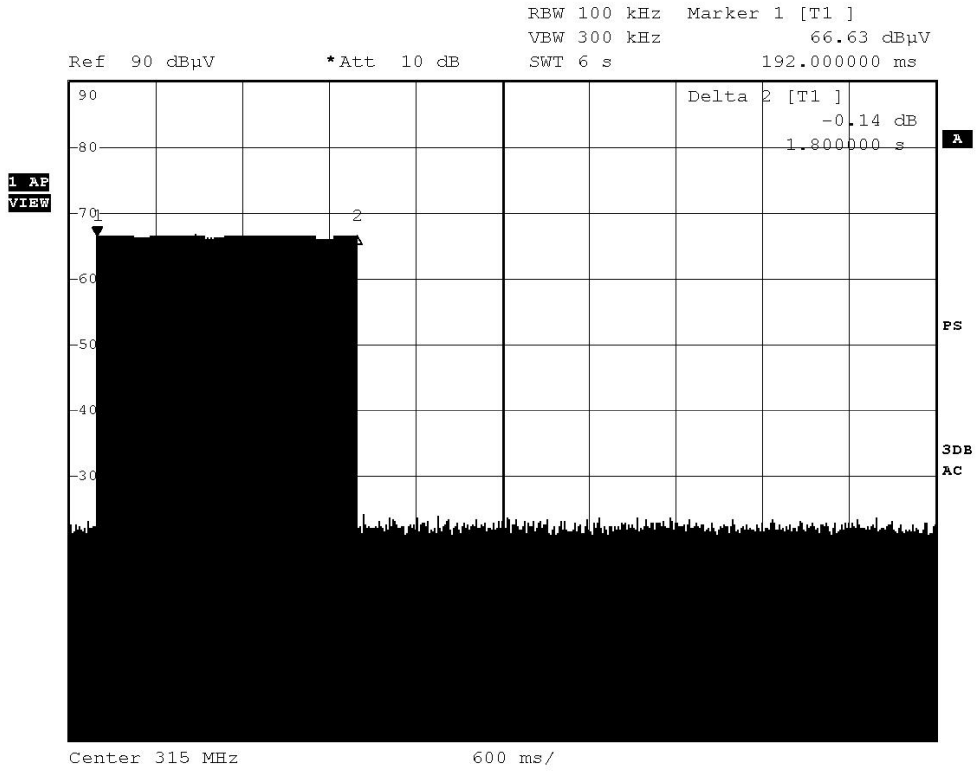


Figure D [Transmission Period (1.8 s)]



Appendix C

Periodic Operation [FCC 47CFR 15.231(a2)]

According to FCC 47CFR15.231 (a2). A transmitter automatically activated must automatically deactivate within not more than 5 seconds of being released. The EUT ceases transmission almost immediately upon being released and appears to finish the current packet being transmitted. Therefore the longest period of time the transmitter should take to deactivate is a packet length.

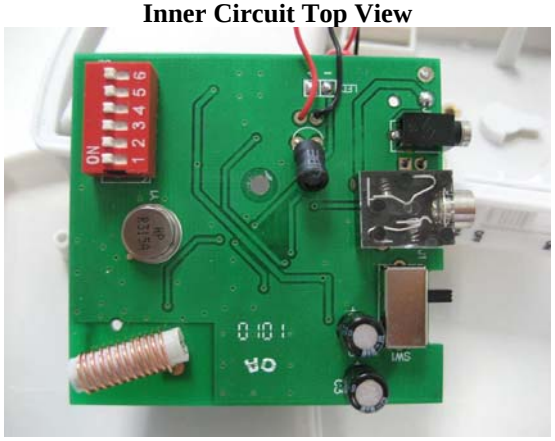
Appendix D

Photographs of EUT

Front View of the product

Rear View of the product

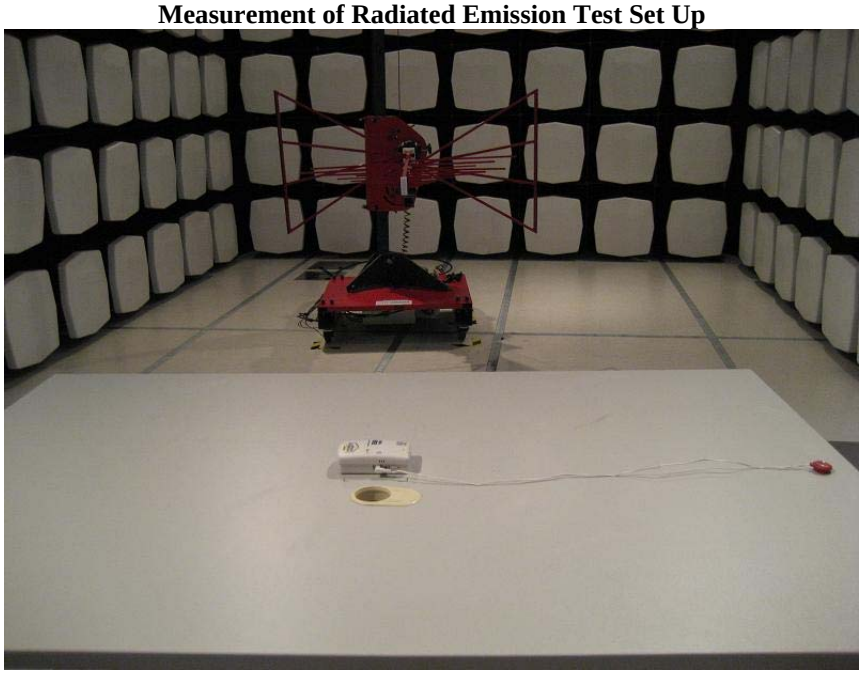
Inner Circuit Top View



Inner Circuit Bottom View

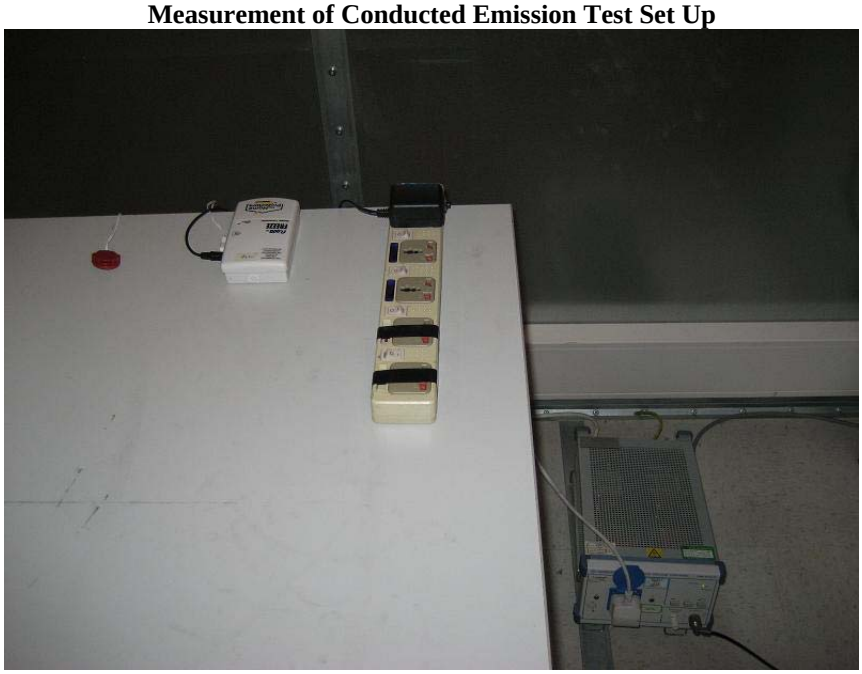
Photographs of EUT

Measurement of Radiated Emission Test Set Up



Photographs of EUT

Measurement of Conducted Emission Test Set Up



******* End of Test Report *******