



STC Test Report

Date : 2012-07-19

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No. : MH186941

Applicant (SMH001):

Golden Prosper Enterprises LTD.
Flat G, 8/F Kim Tak Bldg., 328-342 Nathan Road, Kowloon
Hong Kong

Description of Sample(s):

Submitted sample(s) said to be
Product: Transmitter
Brand Name: Broan-NuTone
Model Number: CP2
FCC ID: OQO-BNTXCP2

Date Sample(s) Received:

2012-06-27

Date Tested:

2012-07-12

Investigation Requested:

Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2011 and ANSI C63.4:2009 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):

Dr. LEE Kam Chuen

Authorized Signatory

ElectroMagnetic Compatibility Department

For and on behalf of

The Hong Kong Standards and Testing Centre Ltd.

The Hong Kong Standards and Testing Centre Ltd.

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1.0 General Details

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

Submitted sample(s) said to be

Product: Transmitter

Manufacturer: Dongguan Smart Hero Electronic Products Co., Ltd.
118 Li Xiang West Rd, Shuiping Village, Dalang Town,
Dongguan, Guangdong

Brand Name: Broan-NuTone

Model Number: CP2

Rating: 1.5Vd.c. ("LR1" size battery x 1)

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Golden Prosper Enterprises LTD., Transmitter. The transmitter is a manually operated transmitter. The EUT will automatically cease transmission after one packet has been sent. It is pulse transmitter. Modulation by IC; and type is ASK modulation.

1.3 Date of Order

2012-06-27

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2012-07-12

1.6 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2011 and ANSI C63.4:2009 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 C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

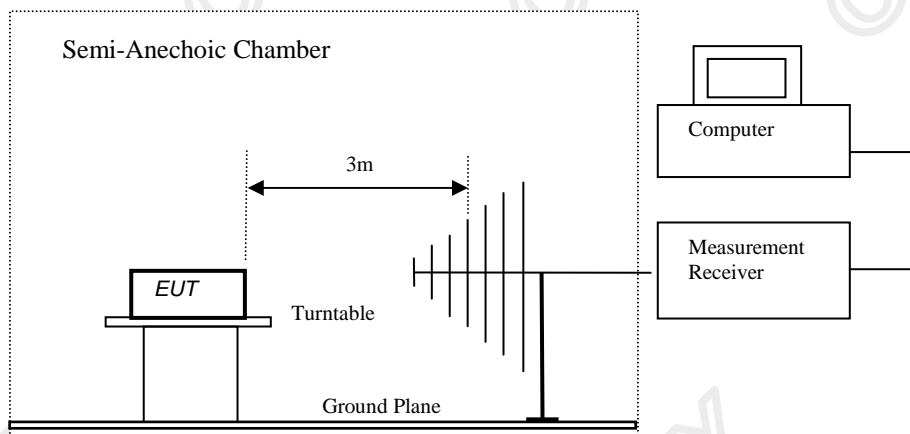
Test Requirement:	FCC 47CFR 15.231a
Test Method:	ANSI C63.4:2009
Test Date:	2012-07-12
Mode of Operation:	Tx mode

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 G/F of "The Hong Kong Standards and Testing Centre Ltd." with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



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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, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ 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/m	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
315.00	58.5	14.0	72.5	4217.0	60,416.8	Vertical

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
630.00	27.8	21.4	49.2	288.4	6,041.7	Vertical
945.00	31.7	27.0	58.7	861.0	6,041.7	Vertical
1260.00	< 1.0	32.2	< 33.2	< 45.7	6,041.7	Vertical
+ 1575.00	< 1.0	38.8	< 39.8	< 97.7	5,000.0	Vertical
1890.00	< 1.0	17.4	< 18.4	< 8.3	6,041.7	Vertical
+ 2205.00	< 1.0	17.2	< 18.2	< 8.1	5,000.0	Vertical
2520.00	< 1.0	18.8	< 19.8	< 9.8	6,041.7	Vertical
+ 2835.00	< 1.0	19.7	< 20.7	< 10.8	5,000.0	Vertical
3150.00	< 1.0	20.6	< 21.6	< 12.0	6,041.7	Vertical

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Results:

Field Strength of Fundamental Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
* 315.00	47.9	14.0	61.9	1244.5	6,041.7	Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
630.00	17.2	21.4	38.6	85.1	604.2	Vertical
945.00	21.1	27.0	48.1	254.1	604.2	Vertical
1260.00	< 1.0	32.2	< 33.2	< 45.7	604.2	Vertical
+ 1575.00	< 1.0	38.8	< 39.8	< 97.7	500.0	Vertical
1890.00	< 1.0	17.4	< 18.4	< 8.3	604.2	Vertical
+ 2205.00	< 1.0	17.2	< 18.2	< 8.1	500.0	Vertical
2520.00	< 1.0	18.8	< 19.8	< 9.8	604.2	Vertical
+ 2835.00	< 1.0	19.7	< 20.7	< 10.8	500.0	Vertical

Remarks:

*: Adjusted by Duty Cycle = -10.6dB

FCC Limit for Average Measurement = $41.6667(315.0\text{MHz}) - 7083.3333 = 6041.677\mu\text{V/m}$

+: 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 5.1dB

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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
Above 960	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 Tx mode (9 kHz to 30MHz): PASS

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

Result of Tx mode: PASS

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBμV/m	Limit @3m dBμV/m	Level @3m μV/m	Limit @3m μV/m
31.2	Vertical	32.7	40.0	43.2	100
60.1	Vertical	30.8	40.0	34.7	100
120.0	Vertical	29.5	43.5	29.9	150
60.5	Horizontal	33.5	40.0	47.3	100
312.0	Horizontal	32.3	46.0	41.2	200
548.4	Horizontal	37.0	46.0	70.8	200

Remark:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB

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3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.231a
Test Method:	ANSI C63.4:2009 (Section 13.1.7)
Test Date:	2012-07-12
Mode of Operation:	Tx 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.

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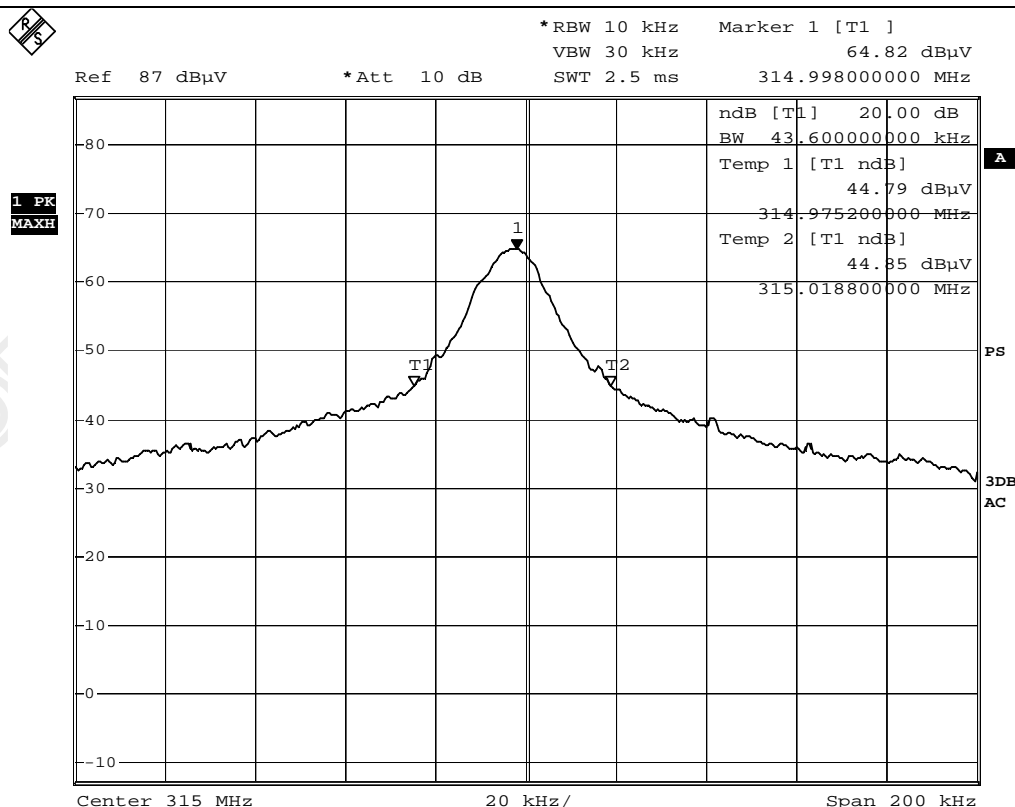
No. : MH186941

Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits * [kHz]
314.998	43.6	787.5

*: FCC Limit for Bandwidth measurement
= (0.25%)(Center Frequency)
= (0.0025)(315.0)
= 787.5kHz

20dB Bandwidth of Fundamental Emission



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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2011/10/25	2012/10/25
EM219	BICONILOG ANTENNA	EMCO	3142C	00029071	2011/03/01	2013/03/01
EM229	EMI Test Receiver	R&S	ESIB40	100248	2012/05/03	2013/05/03
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2010/09/07	2012/09/07
EM293	MXA Signal Analyzer	Agilent Technologies	MY50510152	N/A	2011/11/10	2012/11/10

Remarks:-

CM Corrective Maintenance

N/A Not Applicable

TBD To Be Determined

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Appendix B

Duty Cycle Correction During 100msec

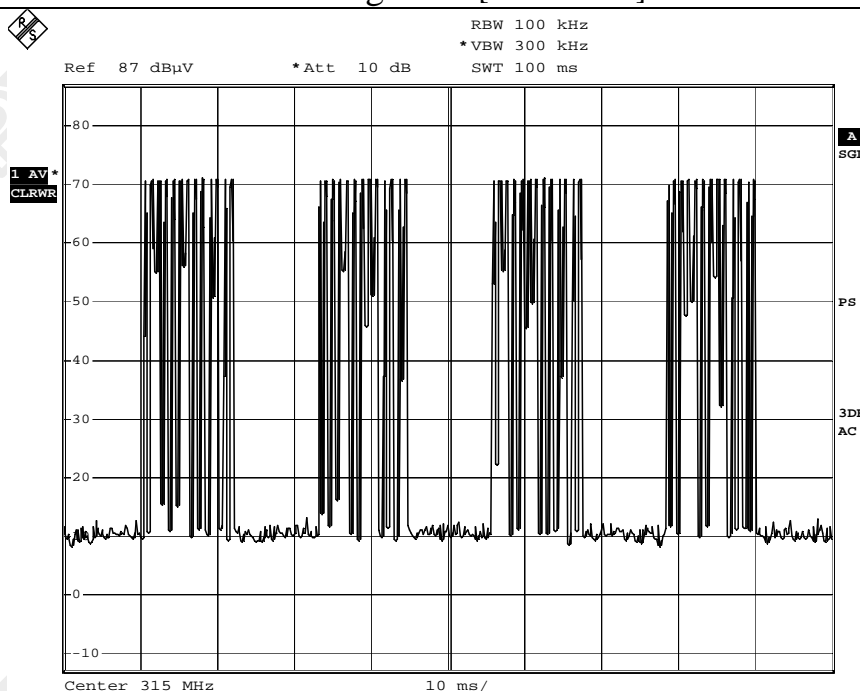
Each packet period (100msec) never exceeds a series of 40 (0.64msec) long and 12 (0.32msec) short pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered $(40 \times 0.64) + (12 \times 0.32)$ msec per 100msec = 29.44% duty cycle. Figure A through B shows the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = $20\text{Log}(0.2944) = -10.6\text{dB}$

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

Figure A [Pulse Train]



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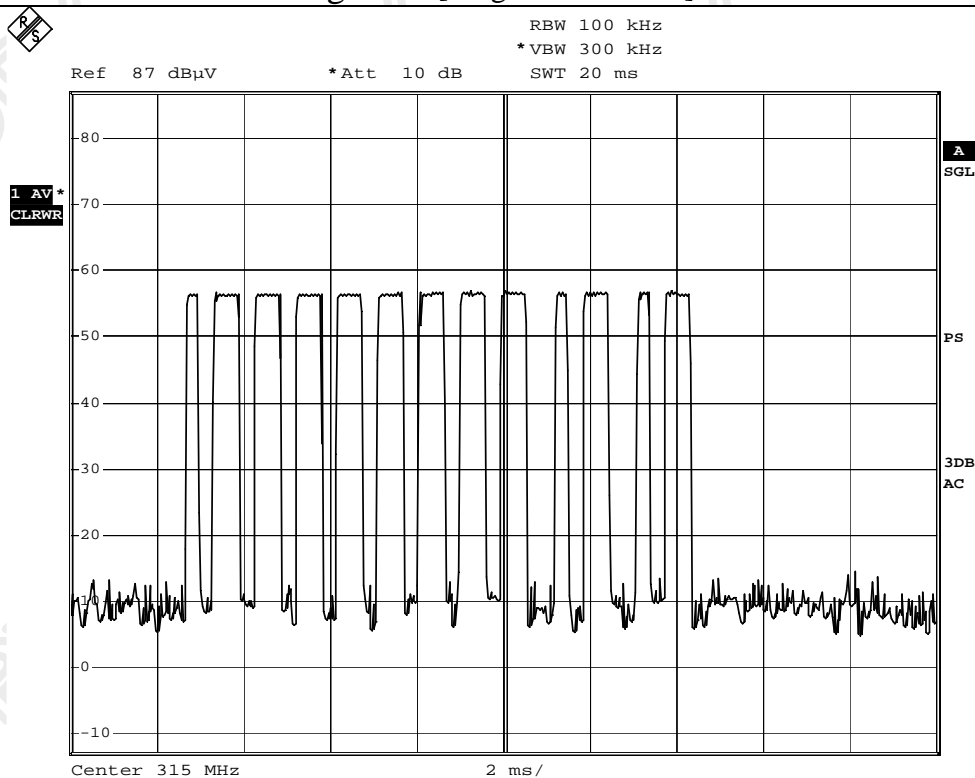
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Figure B [Single Pulse Train]



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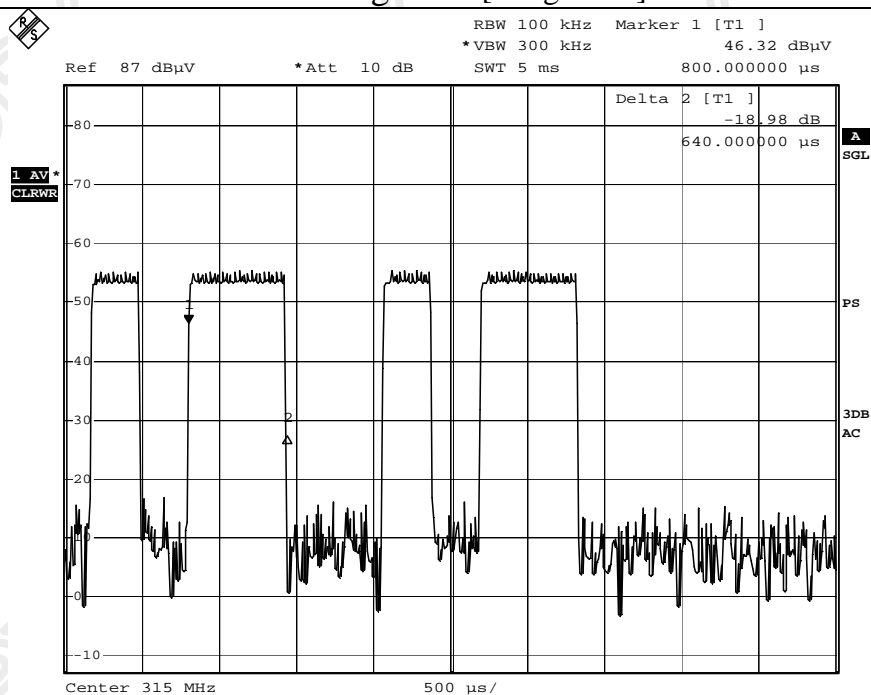
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Figure C [Long Pulse]



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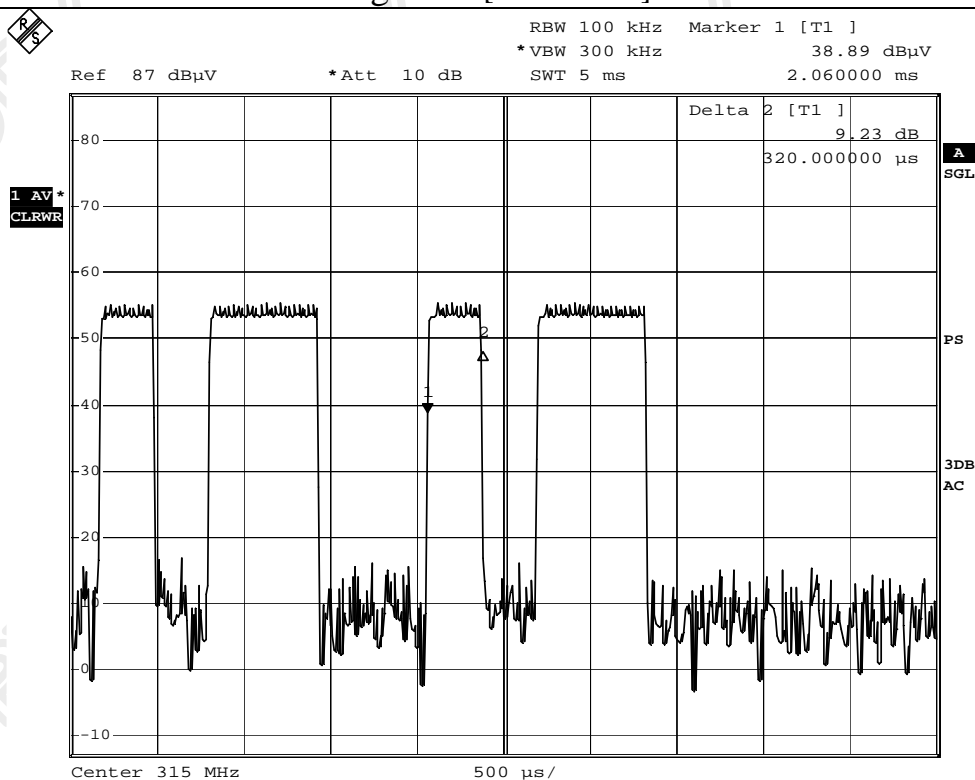
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Figure D [Short Pulse]



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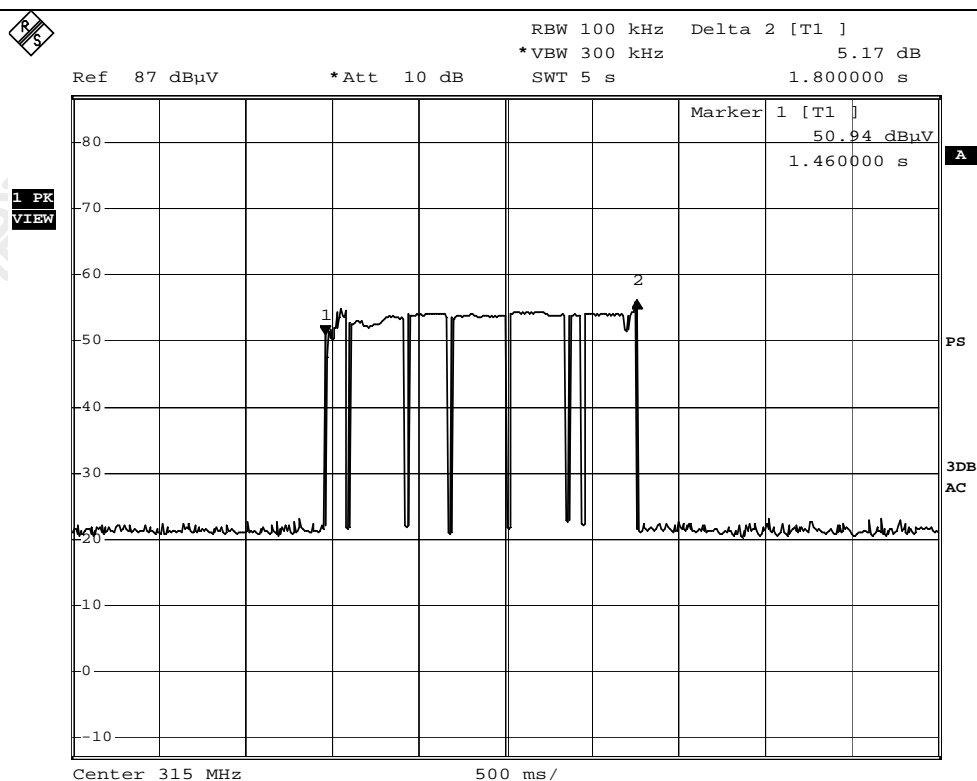
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Appendix C

Periodic Operation [FCC 47CFR 15.231(a2)]

According to FCC 47CFR15.231 (a1). A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter 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.

Transmission Period (1.8 s)



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Appendix D

Photographs of EUT

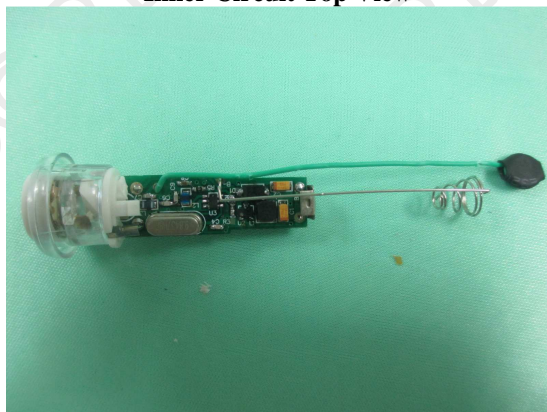
Front View of the product



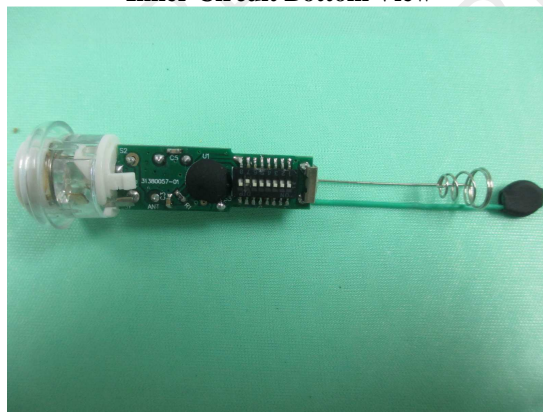
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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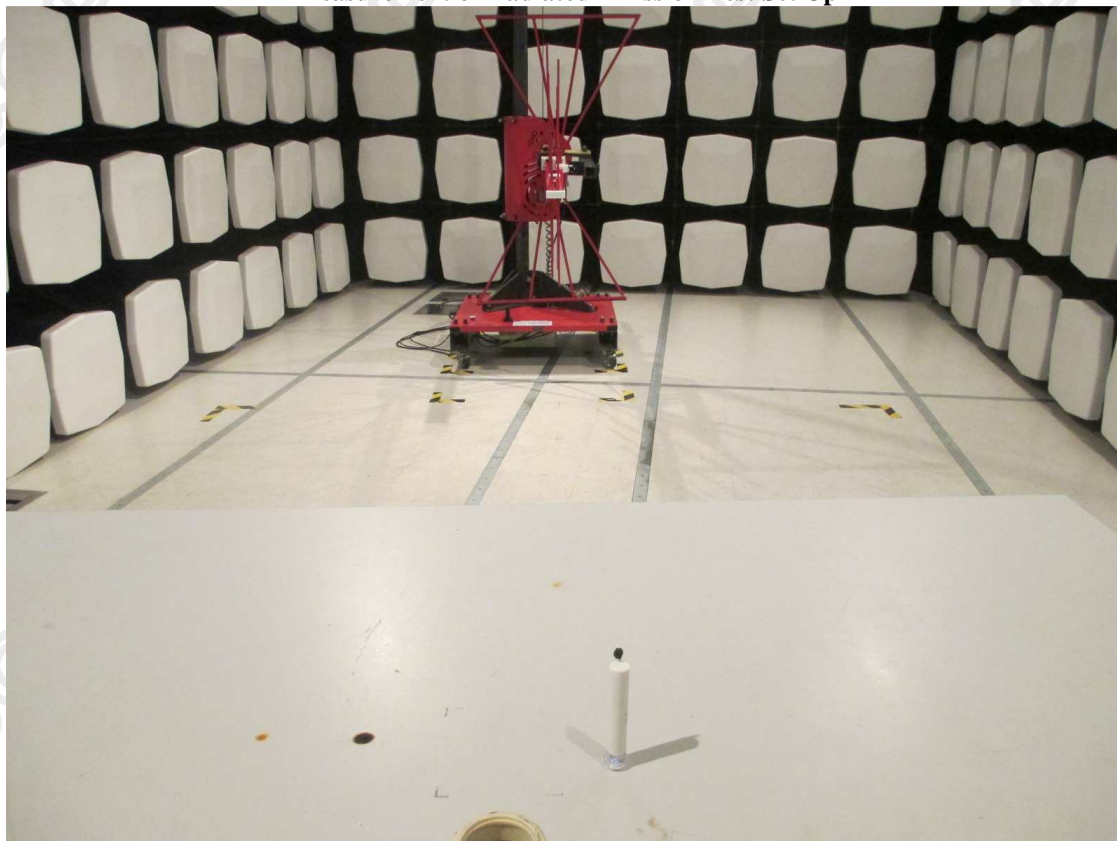
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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