



香 港 標 準 及 檢 定 中 心
Hong Kong Standards and Testing Centre

Date : 2004-12-23
No. : HM153020

TEST REPORT

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Applicant:

Ansen Electronics Company
Room 73-78, 2/F, Sino Industrial Plaza,
9 Kai Cheung Road, Kowloon Bay,
Kowloon, Hong Kong

Description of Samples:

Model name: WIRELESS PUSH BUTTON
(TRANSMITTER)
Model no.: D009
Brand name: Ansen
FCC ID: L5CD009TX

Date Samples Received: 2004-12-01

Date Tested: 2004-12-20

Investigation Requested: FCC Part 15 Subpart C

Conclusions:

The submitted product was deemed to have 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.

Remarks:

K C Lee, EMC
for Chief Executive

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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Applicant Details

Applicant

Ansen Electronics Company
Room 73-78, 2/F, Sino Industrial Plaza,
9 Kai Cheung Road, Kowloon Bay, Kowloon, Hong Kong

HKSTC Code Number for Applicant

ANE001

Manufacturer

Ansen Electronics Company
Chen Tung Industrial Zone,
Ning Tau Administrative District, Qiao Tau Zhen,
Dongguan, Guangdong, China

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1.3 Equipment Under Test [EUT]
Description of Sample

Product: WIRELESS PUSH BUTTON (TRANSMITTER)
Manufacturer: Ansen Electronics Company
Brand Name: Ansen
Model Number: D009
Input Voltage: 12Vd.c ("23A" button cell x 1)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is an Ansen Electronics Company, WIRELESS PUSH BUTTON (TRANSMITTER). The EUT is to transmit RF signal while each button is being pressed, Modulation by Data Code type is pulse modulation.

1.4 Date of Order

2004-12-01

1.5 Submitted Sample(s):

7 Samples per model

1.6 Test Duration

2004-12-20

1.7 Country of Origin

China

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1.8 Additional Information of EUT

User Manual
Part List
Circuit Diagram
Printed Circuit Board [PCB] Layout
Block diagram
FCC ID Label

| | Submitted | Not Available |
|------------------------------------|-------------------------------------|--------------------------|
| User Manual | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Part List | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Circuit Diagram | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Printed Circuit Board [PCB] Layout | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Block diagram | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| FCC ID Label | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

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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 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 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Radiated Emissions, 30MHz to 1GHz | FCC 47CFR 15.209 | ANSI C63.4:2003 | Class B | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Conducted Emissions on AC, 0.15MHz to 30MHz | FCC 47CFR 15.207 | ANSI C63.4:2003 | Class B | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Note: N/A - Not Applicable

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

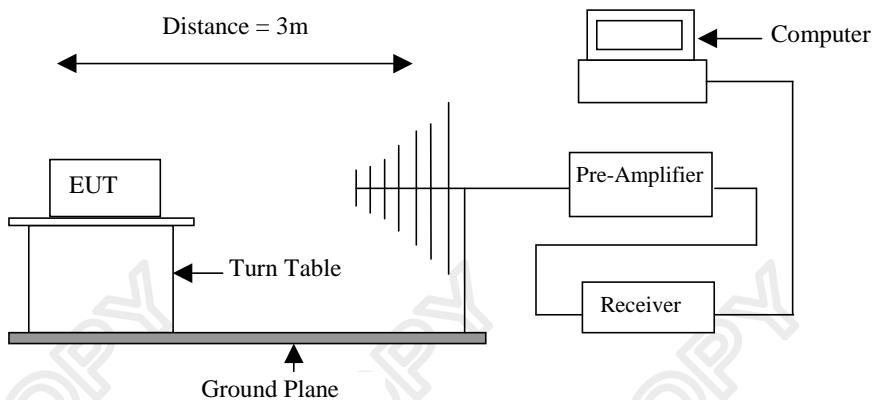
| | |
|--------------------|-------------------|
| Test Requirement: | FCC 47CFR 15.231a |
| Test Method: | ANSI C63.4:2003 |
| Test Date: | 2004-12-20 |
| Mode of Operation: | Tx mode |

Test Method:

The sample was placed 0.8m above the ground plane on the OATS *. 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.

*: OATS [Open Area Test Site] located at HKSTC 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] [μ V/m] | Field Strength of Fundamental Emission [Average] [μ V/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, μ V/m at 3 meters = $56.81818(F)-6136.3636$; for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F)-7083.3333$. The maximum permissible unwanted emission level is 20dB below the maximum permitted fundamental level.

Results:

| Field Strength of Fundamental Emissions Peak Value | | | | | | |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Frequency MHz | Measured Level @3m dB μ V/m | Correction Factor dB μ V/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| 309.80 | 58.0 | 18.4 | 76.4 | 6606.9 | 58,250.1 | Horizontal |
| 619.60 | 22.5 | 23.0 | 45.5 | 188.4 | 5,825.0 | Horizontal |
| 929.40 | 16.4 | 26.7 | 43.1 | 142.9 | 5,825.0 | Horizontal |

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|--|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|------------------------|---------------------|
| Frequency MHz | Measured Level @3m dB μ V/m | Correction Factor dB μ V/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| + 1239.20 | < 1.0 | 32.2 | < 33.2 | < 45.7 | 5,000.0 | Vertical |
| + 1549.00 | < 1.0 | 38.8 | < 39.8 | < 97.7 | 5,000.0 | Vertical |
| 1858.80 | < 1.0 | 17.4 | < 18.4 | < 8.3 | 5,825.0 | Vertical |
| 2168.60 | < 1.0 | 17.2 | < 18.2 | < 8.1 | 5,825.0 | Vertical |
| 2478.40 | < 1.0 | 18.8 | < 19.8 | < 9.8 | 5,825.0 | Vertical |
| + 2788.20 | < 1.0 | 19.7 | < 20.7 | < 10.8 | 5,000.0 | Vertical |
| 3098.00 | < 1.0 | 20.6 | < 21.6 | < 12.0 | 5,825.0 | 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 μ V/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| 309.80 | 50.7 | 18.4 | 69.1 | 2851.0 | 5,825.0 | Horizontal |
| 619.60 | 15.2 | 23.0 | 38.2 | 81.3 | 582.5 | Horizontal |
| 929.40 | 9.1 | 26.7 | 35.8 | 61.7 | 582.5 | Horizontal |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|------------------------|---------------------|
| Frequency MHz | Measured Level @3m dB μ V/m | Correction Factor dB μ V/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| + 1239.20 | < 1.0 | 32.2 | < 33.2 | < 45.7 | 500.0 | Vertical |
| + 1549.00 | < 1.0 | 38.8 | < 39.8 | < 97.7 | 500.0 | Vertical |
| 1858.80 | < 1.0 | 17.4 | < 18.4 | < 8.3 | 582.5 | Vertical |
| 2168.60 | < 1.0 | 17.2 | < 18.2 | < 8.1 | 582.5 | Vertical |
| 2478.40 | < 1.0 | 18.8 | < 19.8 | < 9.8 | 582.5 | Vertical |
| + 2788.20 | < 1.0 | 19.7 | < 20.7 | < 10.8 | 500.0 | Vertical |
| 3098.00 | < 1.0 | 20.6 | < 21.6 | < 12.0 | 582.5 | Vertical |

Remarks:

*: Adjusted by Duty Cycle = -7.3dB

FCC Limit for Average Measurement = $41.6667(309.8\text{MHz})-7083.3333=5,825.01036\mu\text{V/m}$

+: 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 limit of FCC Rules Part 15 Section 15.209 were applied

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz $\pm 4.1\text{dB}$

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

| Frequency Range [MHz] | Quasi-Peak Limits [μ V/m] |
|--------------------------|-----------------------------------|
| 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.

Results :

| Radiated Emissions Quasi-Peak | | | | | | |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|------------------------|---------------------|
| Frequency MHz | Measured Level @3m dB μ V/m | Correction Factor dB μ V/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| NO EMISSION DETECTED WITHIN 20dB OF THE FCC LIMITS | | | | | | |

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ± 4.1 dB

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3.1.1 Conducted Emissions (0.15MHz to 30MHz)

| | |
|--------------------|------------------|
| Test Requirement: | FCC 47CFR 15.107 |
| Test Method: | ANSI C63.4:2003 |
| Test Date: | N/A |
| Mode of Operation: | N/A |

Results: N/A

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.

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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:

2004-12-20

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.

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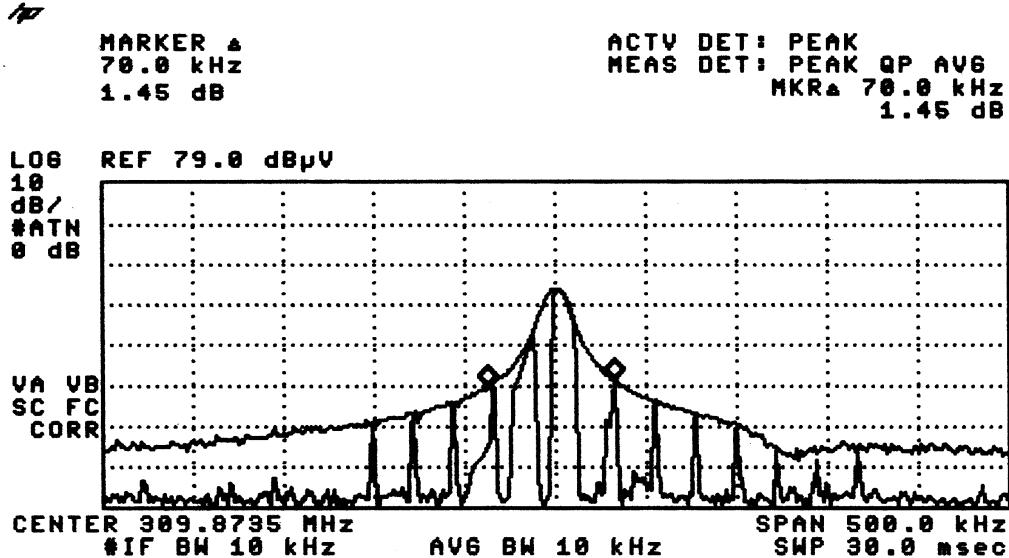
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Limits for 20 dB Bandwidth of Fundamental Emission:

| Frequency Range [MHz] | 20dB Bandwidth [KHz] | FCC Limits * [KHz] |
|--------------------------|-------------------------|-----------------------|
| 309.8 | 70 | 774.5 |

*: FCC Limit for Bandwidth measurement
= (0.25%)(Center Frequency)
=(0.0025)(309.8)
=774.5KHz

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 |
|---------|--|---|--------------------------------|--|----------|
| EM007 | SPECTRUM ANALYZER | HEWLETT PACKARD | HP85660B | 3144A21192 | 15/06/04 |
| EM008 | SPECTRUM ANALYZER DISPLAY | HEWLETT PACKARD | HP85662A | 3144A20514 | 15/06/04 |
| EM009 | QUASI PEAK ADAPTOR | HEWLETT PACKARD | HP85650A | 3303A01702 | 15/06/04 |
| EM010 | RF PRESELECTOR | HEWLETT PACKARD | HP85685A | 3221A01410 | 15/06/04 |
| EM011 | ATTENUATOR/SWITCH | HEWLETT PACKARD | HP11713A | 2508A10595 | 15/06/04 |
| EM012 | PRE-AMPLIFIER | HEWLETT PACKARD | HP8449B | 3008A00262 | 15/06/04 |
| EM013 | CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE | HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD | HP9000 HP A1097C HP9133L | 6226A60314 3151J39517 2623A02468 | 15/06/04 |
| EM020 | HORN ANTENNA | EMCO | 3115 | 4032 | 15/06/04 |
| EM022 | LOOP ANTENNA | EMCO | 6502 | 1189-2424 | 04/08/00 |
| EM072 | SIGNAL GENERATOR | HEWLETT PACKARD | 8640B | 1948A11892 | N/A |
| EM083 | HKSTC OPEN AREA TEST SITE | HKSTC | N/A | N/A | 08/11/02 |
| EM131 | PORTABLE SPECTRUM ANALYSER | HEWLETT PACKARD | 8595EM | 3710A00155 | 13/01/04 |
| EM145 | EMI TEST RECEIVER | R & S | ESCS 30 | 830245/021 | 02/08/03 |
| EM219 | BICONILOG ANTENNA | EMCO | 3142C | 00029071 | 28/10/03 |
| EM195 | ANTENNA POSITIONING MAST | EMCO | 2075 | 2368 | N/A |
| EM196 | MULTI-DEVICE CONTROLLER | EMCO | 2090 | 1662 | N/A |

Conducted Emission

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL |
|---------|-------------------------------------|----------------------------------|------------|---------------------|----------|
| EM078 | VARIAC | SHANGHAI VOLTAGE | TDGC-3/0.5 | N/A | CM |
| EM081 | SMALL SCREENED ROOM | MIKO INST HK | N/A | N/A | 17/10/03 |
| EM119 | LISN | R & S | ESH3-Z5 | 0831.5518.52 | 01/10/02 |
| EM127 | ISOLATION TRANSFORMER 220 TO 300 | WING SUN | N/A | N/A | CM |
| EM142 | PULES LIMITER | R & S | ESH3Z2 | 357.8810.52 | 07/07/03 |
| EM181 | EMI TEST RECEIVER | R & S | ESIB7 | 100072 | 06/01/04 |
| EM154 | SHIELDING ROOM | SIEMENA MATSUSHITA COMPONENTS | N/A | 803-740-057- 99A | 17/10/03 |
| EM197 | LISN | EMCO | 4825/2 | 1193 | 08/04/03 |

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

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Appendix B

Duty Cycle Correction During 100msec

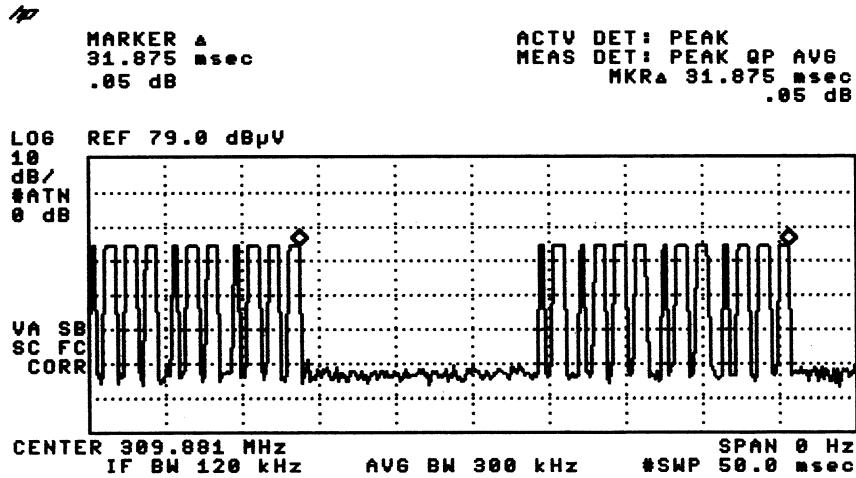
Each function key sends a different series of characters, but each packet period (31.875msec) never exceeds a series of 13 long (750 μ sec) and short (300 μ sec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered $13 \times 750\mu\text{sec} / 31.875\text{msec} = 43.1\%$ duty cycle. Figure A through C show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = $20\log(0.431) = -7.3\text{dB}$

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

Figure A [Pulse Train]



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Figure B [Long Pulse]

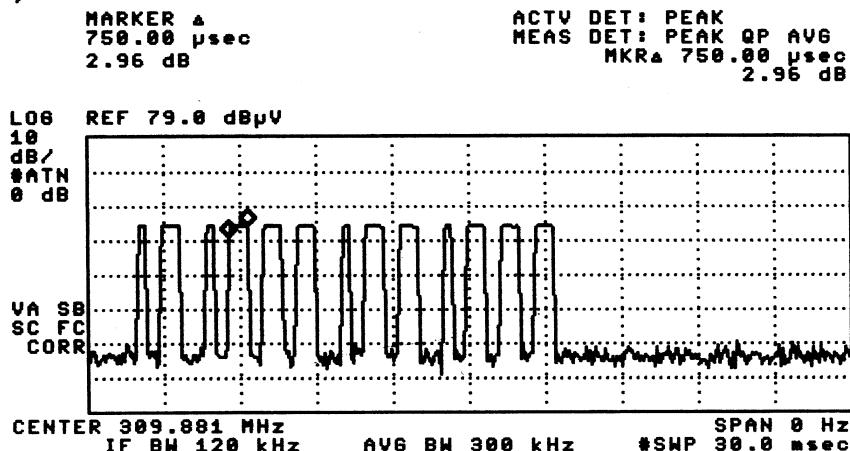
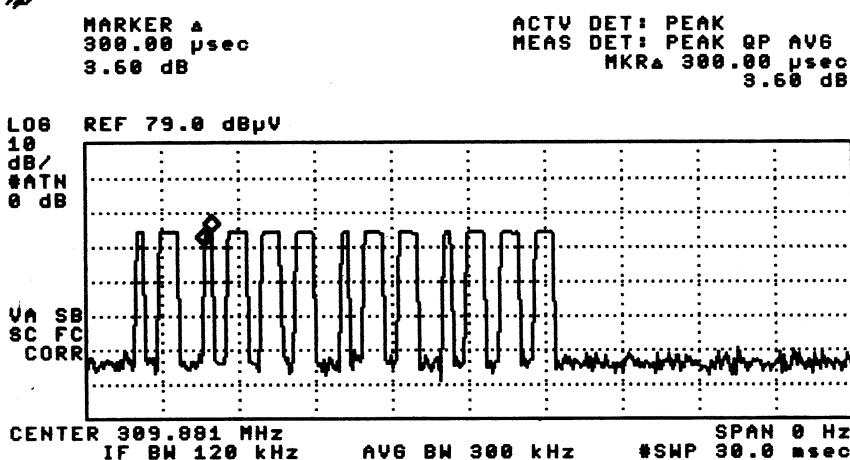


Figure C [Short Pulse]



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Appendix C

Periodic Operation [FCC 47CFR 15.231a]

According to FCC 47CFR15.231a. A transmitter manually activated must automatically deactivate within not more than 5 seconds of being released. The transmitter is a 1 button transmitter. The EUT continues to transmit while the button is being pressed. 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.

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Appendix D

Photographs of EUT

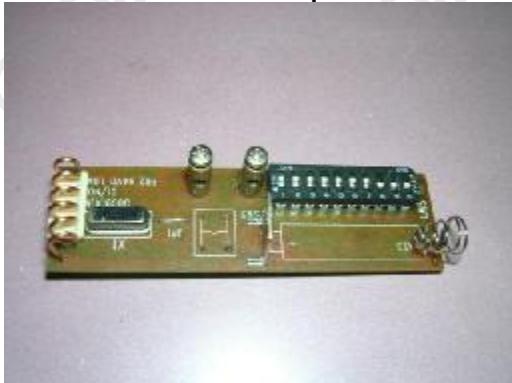
Front View of the product



Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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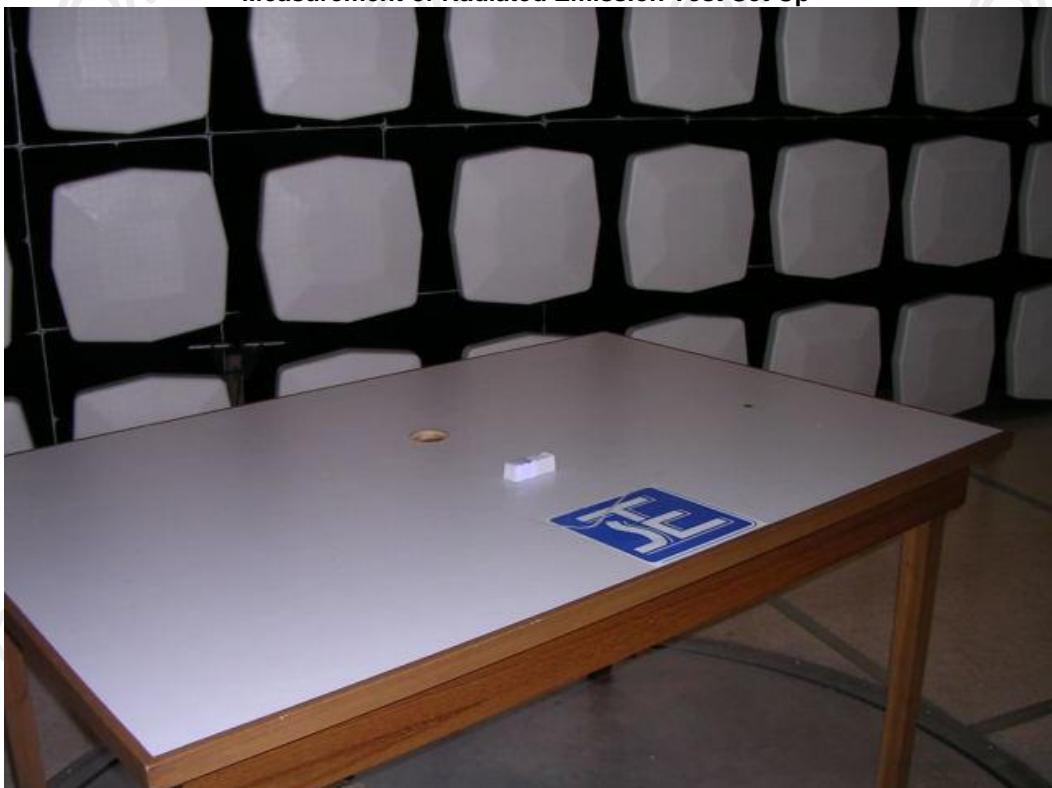
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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