

FCC TEST REPORT

FCC ID : W6JTH3-3

Applicant : TiMOTION Technology Co., Ltd

Adress of Applicant : Shiyong Minying Industrial Zone, Hengli Town, Dongguan City,
Guangdong, 523465, China

Equipment Under Test (EUT) :

Product description : Wireless remote control

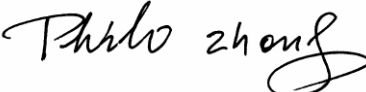
Model No. : TH3-1,TH3-2,TH3-3

Type of Modulation : ASK

Standards : FCC 15 Subpart C Paragraph 15.231

Date of Test : Jun.22, 2009

Test Engineer : Zero.Zhou

Reviewed By : 

PERPARED BY:

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3 Test Summary

| Test | Test Requirement | Test Method | Class / Severity | Result |
|---|-------------------|------------------|------------------|--------|
| Periodic operation | FCC PART 15: 2007 | ANSI C63.4: 2003 | Note | PASS |
| Band Edge | FCC PART 15: 2007 | ANSI C63.4: 2003 | Note | PASS |
| Radiated Emission (30MHz to 4GHz) | FCC PART 15: 2007 | ANSI C63.4: 2003 | N/A | PASS |
| Conducted Emission (150KHz to 30MHz) | FCC PART 15: 2007 | ANSI C63.4: 2003 | N/A | N/A |

Note: denote that for more details, please refer to the section Periodic operation and Band Edge.

4 General Information

4.1 Client Information

Applicant: TiMOTION Technology Co., Ltd.
Address: Shiyong Minying Industrial Zone, Hengli Town, Dongguan City, Guangdong, 523465, China

Manufacturer: TiMOTION Technology Co., Ltd.
Address: Shiyong Minying Industrial Zone, Hengli Town, Dongguan City, Guangdong, 523465, China

4.2 General Description of E.U.T.

Product description: Wireless remote control
Model No.: TH3-1, TH3-2, TH3-3
Model difference: Components of PCB and appearance of EUT are identical except input keys of panel, two keys for TH3-1, four keys for TH3-2 and six keys for TH3-3.

4.3 Details of E.U.T.

Power Supply: Battery 12VDC

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Wireless remote control. The standards used were FCC 15 Paragraph 15.231, Paragraph 15.205, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **IC – Registration No.:IC7760**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration IC7760, July 24, 2008.

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, June 24, 2008. compliance

4.7 Test Location

All Emissions tests were performed at:-

Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District, Shenzhen 518105, China.

5 Equipment Used during Test

| Equipment Name | Manufacturer Model | Equipment No | Internal No | Specification | Cal. Date | Due Date | Cert. No | Uncertainty |
|--|--|----------------|-------------|---------------|-----------|----------|-----------------|---|
| EMC Analyzer | Agilent/ E7405A | MY45114 943 | W2008001 | 9k-26.5GHz | Aug-08 | Aug-09 | Wws200 81596 | ±1dB |
| Trilog Broadband Antenne 30-3000 MHz | SCHWARZ BECK MESS- ELEKTROM / VULB9163 | 336 | W2008002 | 30-3000 MHz | Aug-08 | Aug-09 | | ±1dB |
| Broad-band Horn Antenna 1-18 GHz | SCHWARZ BECK MESS- ELEKTROM / VULB9163 | 667 | W2008003 | 1-18GHz | Aug-08 | Aug-09 | | f<10 GHz: ±1dB 10GHz<f< 18 GHz: ±1.5dB |
| Broadband Preamplifier 0.5-18 GHz | SCHWARZ BECK MESS- ELEKTROM / BBV 9718 | 9718-148 | W2008004 | 0.5-18GHz | Aug-08 | Aug-09 | | ±1.2dB |
| 10m Coaxial Cable with N-male Connectors usable up to 18GHz, | SCHWARZ BECK MESS- ELEKTROM / AK 9515 H | - | - | - | Aug-08 | Aug-09 | | - |
| 10m 50 Ohm Coaxial Cable with N-plug, individual length, usable up to 3(5)GHz, Connector | SCHWARZ BECK MESS- ELEKTROM / AK 9513 | | | | Aug-08 | Aug-09 | | |
| Positioning Controller | C&C LAB/ CC-C-IF | | | | N/A | N/A | | |
| Color Monitor | SUNSP0/ SP-14C | | | | N/A | N/A | | |
| Test Receiver | ROHDE&SC HWARZ/ ESPI | 101155 | W2005001 | 9k-3GHz | Jul-08 | Jul-09 | Wws200 80942 | ±1dB |
| EMI Receiver | Beijingkehuan | KH3931 | | 9k-1GHz | Aug-08 | Aug-09 | | |
| Two-Line V-Network | ROHDE&SC HWARZ/ ENV216 | 100115 | W2005002 | 50Ω/50μH | Jul-08 | Jul-09 | Wws200 80941 | ±10% |
| V-LISN | SCHWARZ | NSLK 8128 | 8128-259 | 9k-30MHz | Jul-08 | Jul-09 | | |

| Equipment Name | Manufacturer Model | Equipment No | Internal No | Specification | Cal. Date | Due Date | Cert. No | Uncertainty |
|--|---|-----------------|-------------|--|-----------|----------|-----------------|---|
| | BECK MESS — ELEKTRON IK | | | | | | | |
| Absorbing Clamp | ROHDE&SC HWARZ/ MDS-21 | 100205 | W2005003 | impedance50 Ω loss : 17 dB | Jul-08 | Jul-09 | Wws200 80943 | ± 1 dB |
| 10m 50 Ohm Coaxial Cable with N- plug, indivi dual length, usa ble up to 3(5)GHZ, Connector s | SCHWARZ BECK MESS- ELEKTROM / AK 9514 | | | | Aug-08 | Aug-09 | | |
| Digital Power Analyzer | Em Test AG/Switzerla nd/ DPA 500 | V07451 03095 | W2008012 | Power: 2000VA Vol-range: 0- 300V Freq_range: 10-80Hz | Aug-08 | Aug-09 | Wwd200 81185 | Voltage distinguish:0 .025% Power_freq distinguish:0 .02Hz |
| Power Source | Em Test AG/Switzerla nd/ ACS 500 | V07451 03096 | W2008013 | Vol-range: 0- 300V Power_freq: 10-80Hz | | | | |
| Electrostat ic Discharge Simulator | Em Test AG/Switzerla nd/DITO | V07451 03094 | W2008005 | Contact discharge: 500V-10KV Air diacharge: 500V-16.5KV | Aug-08 | Aug-09 | Wwc200 82400 | 7.5A current will be changed in $V_m=1.5V$ |
| RF Generator | TESEQ GmbH/ NSG4070 | 25781 | W2008008 | Fraq-range: 9K-1GHz RF voltage: - 60 dBm- +10dBm | Aug-08 | Aug-09 | Wws200 81890 | Power_freq distinguish0. 1Hz RFelectricity distinguish 0.1 B |
| CDN M- Type | TESEQ GmbH/ CDN M016 | 25112 | W2008009 | Voltage correct factor 9.5 dB | Aug-08 | Aug-09 | Wwc200 82396 | 150K- 80MHz: ± 1 dB 80- 230MHz:-2- +3dB |
| EM-Clamp | TESEQ GmbH/ KEMZ 801 | 25453 | W2008010 | Freq_range: 0.15-1000 MHz | Aug-08 | Aug-09 | Wwc200 82397 | 0.3-400 MHz: ± 4 dB |

| Equipment Name | Manufacturer Model | Equipment No | Internal No | Specification | Cal. Date | Due Date | Cert. No | Uncertainty |
|---|---|--------------|-------------|---|-----------|----------|--------------|--|
| | | | | | | | | Other freq: ±5dB |
| Attenuator 6dB | TESEQ GmbH/ ATN6050 | 25365 | | | Aug-08 | Aug-09 | Wws200 81597 | |
| All Modules Generator | SCHAFFNE R/6150 | 34579 | W2008006 | voltage:200V-4.4KV Pulse current: 100A-2.2KA | Aug-08 | Aug-09 | Wwc200 82401 | voltage: ±10% Pulse current: ±10% |
| Capacitive Coupling Clamp | SCHAFFNE R/ CDN 8014 | 25311 | | | Aug-08 | Aug-09 | Wwc200 82398 | - |
| Signal and Data Line Coupling Network | SCHAFFNE R/ CDN 117 | 25627 | W2008011 | 1.2/50µS | Aug-08 | Aug-09 | Wwc200 82399 | - |
| AC Power Supply | TONGYUN/ DTDGC-4 | | | | Aug-08 | Aug-09 | Wws200 80944 | - |
| Exposure Level Tester ELT-400 | Narda Safety TEST Solutions/23 04/03 | M-0155 | w2008022 | Test freq range: 1—400kHz | Aug-08 | Aug-09 | Wwd200 81191 | Test uncertainty : 1—120kHz:±1.83%, 120 kHz-400 kHz: ±4.06% |
| Magnetic Field Probe 100cm ² | Narda Safety TEST Solutions/23 00/90.10 | M-1070 | w2008021 | Test freq range: 1—400kHz | | | | Test uncertainty : 1Hz-10Hz: ±16.2%, 10Hz - 120kHz:±2.2%, 120 kHz-400 kHz: ±4.7% |
| Active Loop Antenna Charger 10kHz-30MHz | Beijing Dazhi / ZN30900A | - | - | 10kHz-30MHz | Aug-08 | Aug-09 | | ±1dB |

6 Conducted Emission Test

| | |
|-------------------|--|
| Test Requirement: | FCC Part15 Paragraph 15.207 |
| Test Method: | Based on FCC Part15 Paragraph 15.207 |
| Test Date: | N/A |
| Frequency Range: | 150kHz to 30MHz |
| Class: | Class B |
| Detector: | Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit |

6.1 Conducted Emission Test Data

Own to the EUT operate with battery, The test is not necessary to be performed.

7 Radiation Emission Test

| | |
|-----------------------|-------------------------------------|
| Test Requirement: | FCC Part15 Paragraph 15.231 |
| Test Method: | Based on FCC Part15 Paragraph 15.33 |
| Test Result: | PASS |
| Frequency Range: | 30MHz to 4GHz |
| Measurement Distance: | 3m |

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

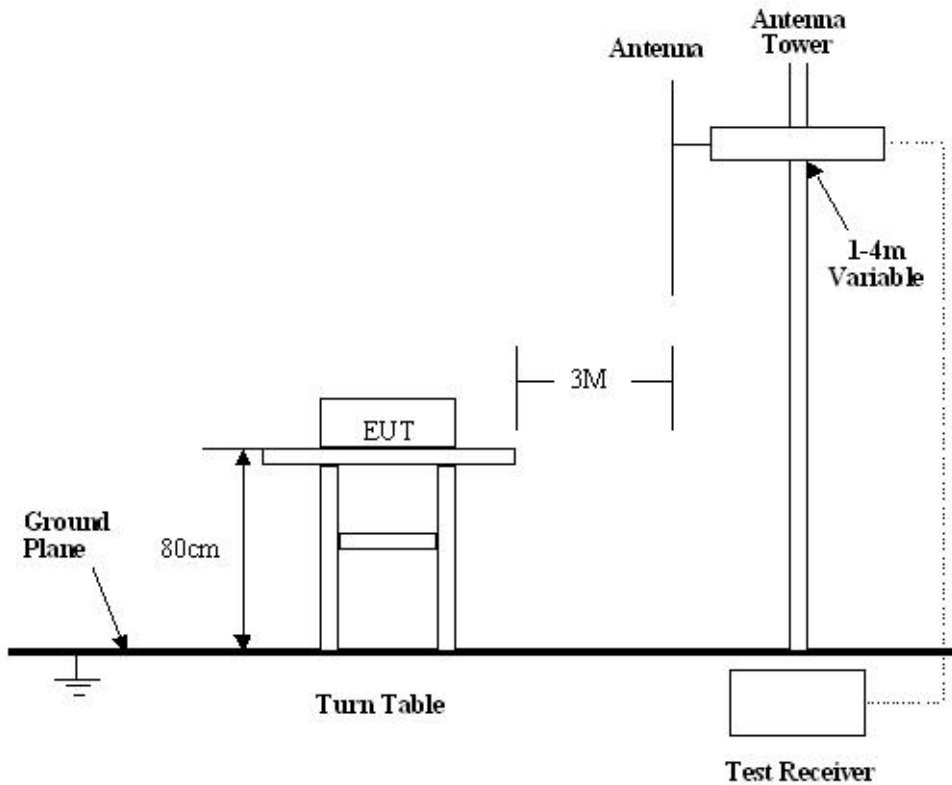
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is ± 5.03 dB.

7.3 Test Procedure

1. New battery were installed in the equipment under test for radiated emissions test.
2. This is a handheld device, The radiation emission should be tested under 3-axes position (lying, side and stand), After pre-test, It was found that the worse radiation emission was get at the lying position.
3. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
4. All data was recorded in the peak and average detection mode.
5. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.231, Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.231 Rules, the system was tested to 4000 MHz.

Below 1GHz

| | |
|------------------------------------|----------|
| Start Frequency | 30 MHz |
| Stop Frequency | 1000 MHz |
| Sweep Speed | Auto |
| IF Bandwidth | 120 KHz |
| Video Bandwidth | 100 KHz |
| Quasi-Peak Adapter Bandwidth | 120 KHz |
| Quasi-Peak Adapter Mode..... | Normal |
| Resolution Bandwidth | 100 KHz |

Above 1GHz

| | |
|------------------------------------|---------|
| Start Frequency | 1GHz |
| Stop Frequency | 4GHz |
| Sweep Speed | Auto |
| IF Bandwidth | 120 KHz |
| Video Bandwidth | 1 MHz |
| Quasi-Peak Adapter Bandwidth | 120 KHz |
| Quasi-Peak Adapter Mode..... | Normal |
| Resolution Bandwidth | 1MHz |

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

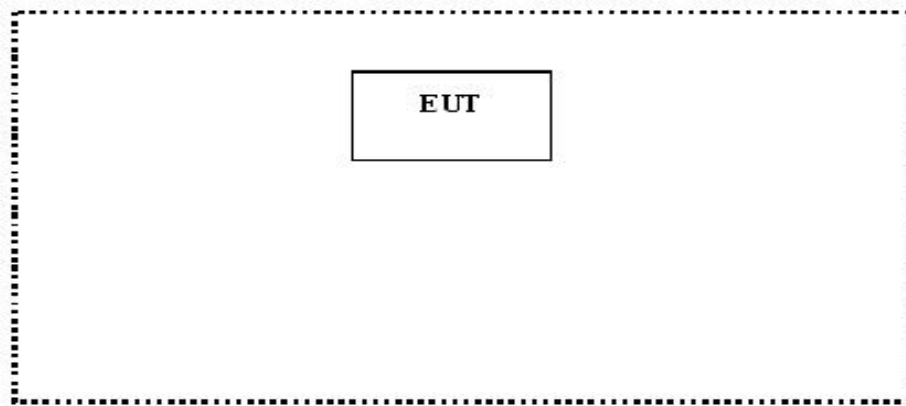
7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.231 standards.

7.8 EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



7.9 Radiated Emissions Limit

| Fundamental frequency (MHz) | Field strength of fundamental (microvolts/meter) | Field strength of spurious emissions (microvolts/meter) |
|-----------------------------|--|---|
| 40.66-40.70..... | 2,250..... | 225 |
| 70-130..... | 1,250..... | 125 |
| 130-174..... | \1\ 1,250 to 3,750 | \1\ 125 to 375 |
| 174-260..... | 3,750..... | 375 |
| 260-470..... | \1\ 3,750 to 12,500. | \1\ 375 to 1,250 |
| Above 470..... | 12,500..... | 1,250 |

7.10 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was established by adding
The meter reading of the spectrum analyer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared in terms of dB.The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS

33 20dBuV+10.36dB=30.36dBuV/m @3m

7.10.1 Radiated Emission Test Data

| | |
|--------------------|---|
| Test Voltage: | Battery 12VDC |
| Test Mode: | TX On |
| Temperature: | 24 °C |
| Humidity: | 52%RH |
| Test Result: | PASS |
| Receiver spurious: | N/A (this product is transmitter only.) |

| Frequency (MHz) | Detector | Antenna Polarization | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Turntable Angle (°) |
|-----------------|----------|----------------------|-------------------------|----------------|-------------|--------------------|---------------------|
| 315 | PK | Vertical | 59.54 | 95.62 | 36.08 | 1.6 | 45 |
| 315 | PK | Horizontal | 58.61 | 95.62 | 37.01 | 1.4 | 90 |
| 630 | PK | Vertical | 48.31 | 75.62 | 27.31 | 1.8 | 60 |
| 945 | PK | Vertical | 49.61 | 75.62 | 26.01 | 2 | 45 |
| 1260 | PK | Vertical | 35.37 | 74.00 | 38.63 | 1.7 | 100 |
| 1575 | PK | Vertical | 30.66 | 74.00 | 43.34 | 2 | 60 |
| 1890 | PK | Vertical | 27.6 | 74.00 | 46.4 | 1.8 | 90 |
| 2205 | PK | Vertical | 29.33 | 74.00 | 44.67 | 1 | 120 |
| 2520 | PK | Vertical | 28.41 | 74.00 | 45.59 | 1.6 | 110 |
| 2835 | PK | Vertical | 29.19 | 74.00 | 44.81 | 1.3 | 60 |
| 3150 | PK | Vertical | 29.49 | 74.00 | 44.51 | 1 | 45 |
| 630 | PK | Horizontal | 45.13 | 75.62 | 30.49 | 1.5 | 90 |
| 945 | PK | Horizontal | 43.54 | 75.62 | 32.08 | 1 | 90 |
| 1260 | PK | Horizontal | 30.21 | 74.00 | 43.79 | 1.5 | 110 |
| 1575 | PK | Horizontal | 30.10 | 74.00 | 43.9 | 1.6 | 120 |
| 1890 | PK | Horizontal | 29.33 | 74.00 | 44.67 | 2 | 90 |
| 2205 | PK | Horizontal | 31.22 | 74.00 | 42.78 | 1.3 | 120 |
| 2520 | PK | Horizontal | 28.98 | 74.00 | 45.02 | 1.5 | 110 |
| 2835 | PK | Horizontal | 31.22 | 74.00 | 42.78 | 1.4 | 100 |
| 3150 | PK | Horizontal | 39.68 | 74.00 | 34.32 | 2 | 80 |
| 315 | AV | Vertical | 54.15 | 75.62 | 21.47 | 1.6 | 45 |
| 315 | AV | Horizontal | 53.22 | 75.62 | 22.4 | 1.4 | 90 |
| 630 | AV | Vertical | 42.92 | 55.62 | 12.7 | 1.8 | 60 |
| 945 | AV | Vertical | 44.22 | 55.62 | 11.4 | 2 | 45 |
| 1260 | AV | Vertical | 29.98 | 54.00 | 24.02 | 1.7 | 100 |
| 1575 | AV | Vertical | 25.27 | 54.00 | 28.73 | 2 | 60 |
| 1890 | AV | Vertical | 22.21 | 54.00 | 31.79 | 1.8 | 90 |
| 2205 | AV | Vertical | 23.94 | 54.00 | 30.06 | 1 | 120 |
| 2520 | AV | Vertical | 23.02 | 54.00 | 30.98 | 1.6 | 110 |
| 2835 | AV | Vertical | 23.8 | 54.00 | 30.2 | 1.3 | 60 |
| 3150 | AV | Vertical | 24.1 | 54.00 | 29.9 | 1 | 45 |
| 630 | AV | Horizontal | 39.74 | 55.62 | 15.88 | 1.5 | 90 |
| 945 | AV | Horizontal | 38.15 | 55.62 | 17.47 | 1 | 90 |
| 1260 | AV | Horizontal | 24.82 | 54.00 | 29.18 | 1.5 | 110 |
| 1575 | AV | Horizontal | 24.71 | 54.00 | 29.29 | 1.6 | 120 |

| | | | | | | | |
|------|----|------------|-------|-------|-------|-----|-----|
| 1890 | AV | Horizontal | 23.94 | 54.00 | 30.06 | 2 | 90 |
| 2205 | AV | Horizontal | 25.83 | 54.00 | 28.17 | 1.3 | 120 |
| 2520 | AV | Horizontal | 23.59 | 54.00 | 30.41 | 1.5 | 110 |
| 2835 | AV | Horizontal | 25.83 | 54.00 | 28.17 | 1.4 | 100 |
| 3150 | AV | Horizontal | 39.68 | 54.00 | 14.32 | 2 | 80 |

Where F is the frequency in MHz, The formulas for calculating the maximum permitted fundamental field strengths are as follows:

- (1). For the band 130-174MHz, uV/m at 3 meters = $56.81818(F) - 6136.3636$;
- (2). For the band 260-470MHz, uV/m at 3 meters = $41.6667(F) - 7083.3333$.

Sample calculation of limit @ 315MHz

$$41.6667(315) - 7083.3333 = 6041.677 \text{ uV/m}$$

$$20\log(6041.677) = 75.62 \text{ dBuV/m limit @ 315MHz}$$

And

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

$$AV = \text{Peak} + 20\log_{10}(\text{duty cycle})$$

8 Antenna Requirement.

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section

9 Periodic Operation

The duty cycle was determined by the following equation:

To calculate the actual field intensity, The duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion, This device does meet the FCC requirement.

Duty Cycle(%)=

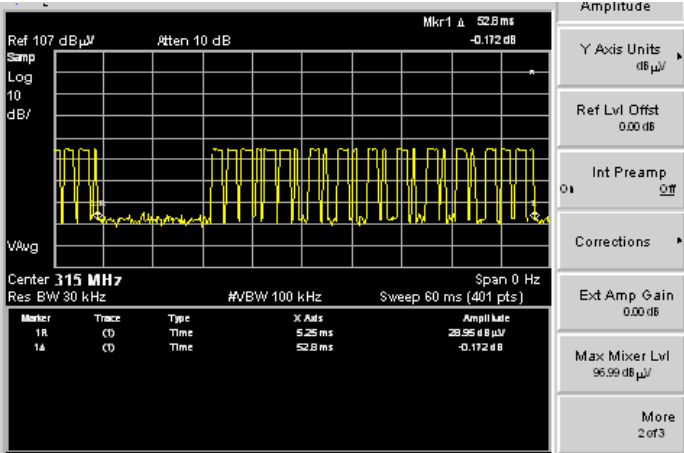
Total On interval in a complete pulse train/ Length of a complete pulse train * %

Duty Cycle Correction Factor(dB)=20 * Log₁₀(Duty Cycle(%))

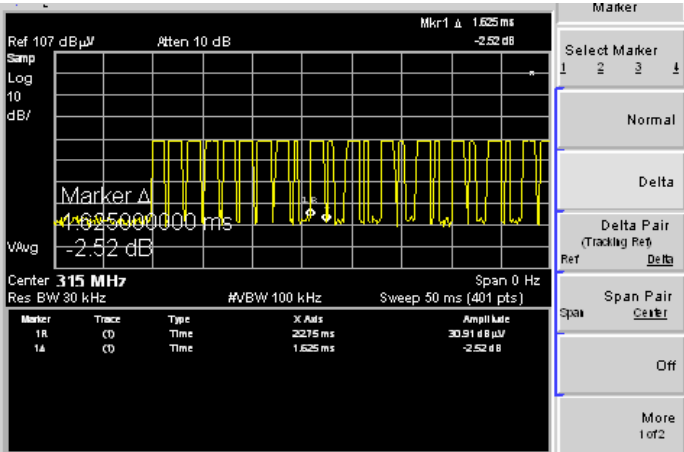
| Pulse Train | Number of Pulse | T(ms) | Total Time(ms) |
|-------------|-----------------|-------|----------------|
| Long Pulse | 14 | 1.625 | 22.75msec |
| Short Pulse | 9 | 0.625 | 5.625msec |

| | |
|---|------------|
| Total On interval in a complete pulse train | 52.8 msec |
| Length of a complete pulse train | 28.375msec |
| Duty Cycle(%) | 53.74% |
| Duty Cycle Correction Factor(dB) | 5.39 |

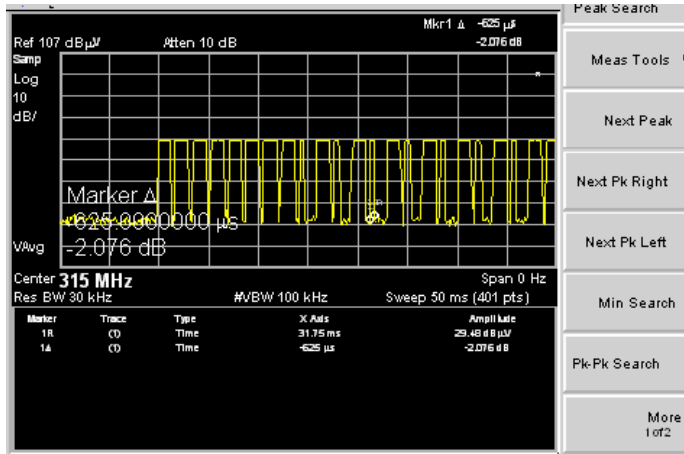
Refer to the duty cycle plot (as below), This device does meet the FCC requirement.
Length of a complete pulse train:



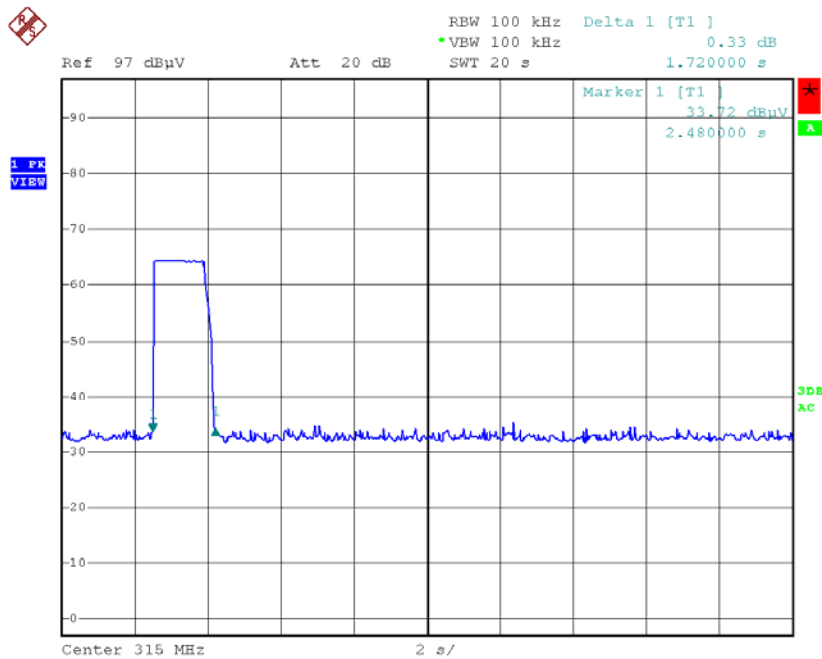
Long Pulse



Short Pulse:



We find a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter is 1.72 seconds, within not more than 5 seconds of being released.



Date: 24.JUN.2009 15:22:17

10 Band Edge

| | |
|-------------------|--------------------------------------|
| Test Requirement: | FCC Part15 C |
| Test PASS: | Based on FCC Part15 Paragraph 15.231 |
| Test Date: | Result |
| Test mode: | TX On |
| Temperature: | 24 °C |
| Humidity: | 52%RH |

10.1 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 100KHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

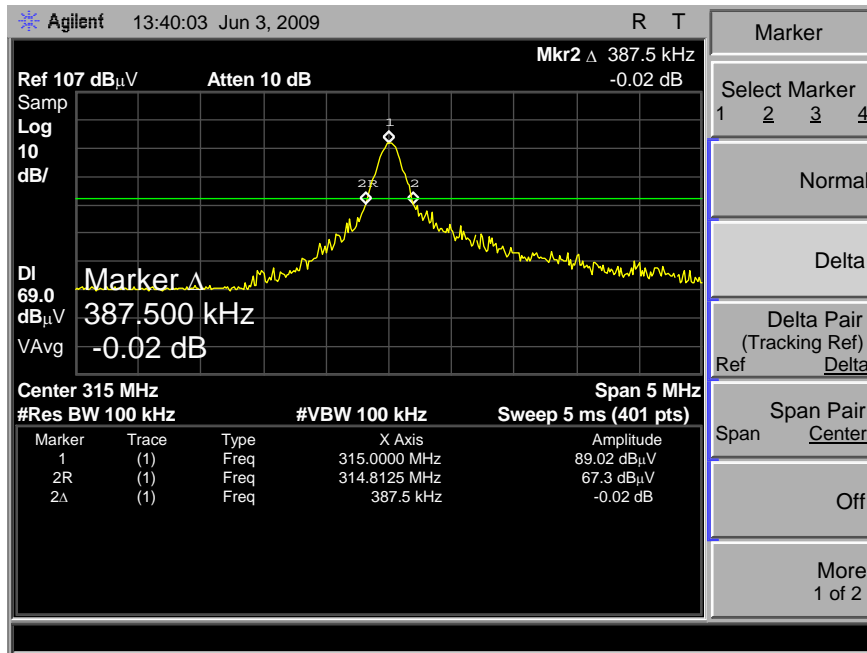
10.2 Band Edge

Requirements: The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

| Frequency (MHz) | Bandwidth Emission (KHz) | Limit (KHz) | Result |
|-----------------|--------------------------|-------------|--------|
| 315 | 387.5 | 787.5 | Pass |

10.3 Band Edge Test Result

315.00MHz TX

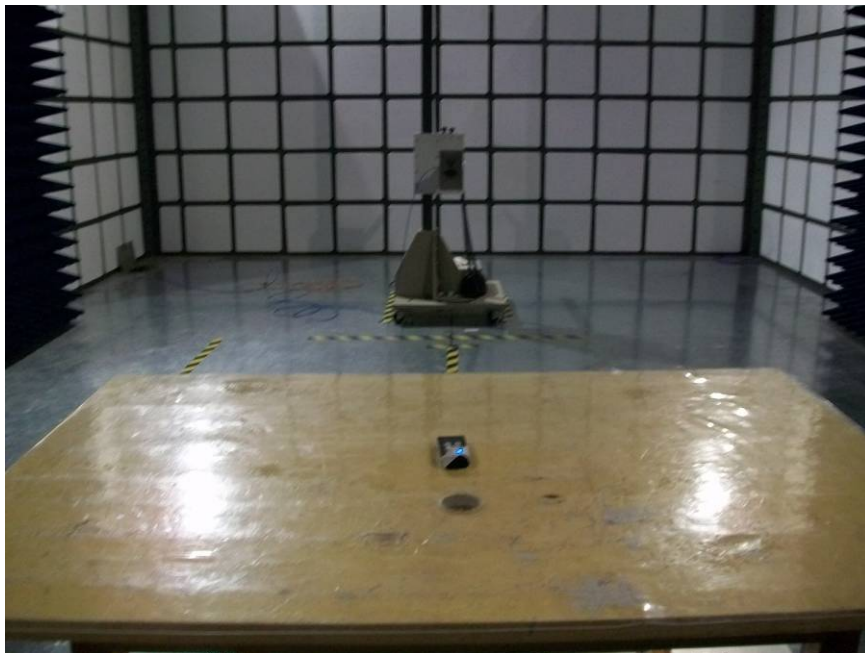


11 Photographs of Testing

11.1 Radiation Emission Test View For 30MHz-1000MHz



11.2 Radiation Emission Test View For 1GHz-4GHz



12 Photographs - Constructional Details

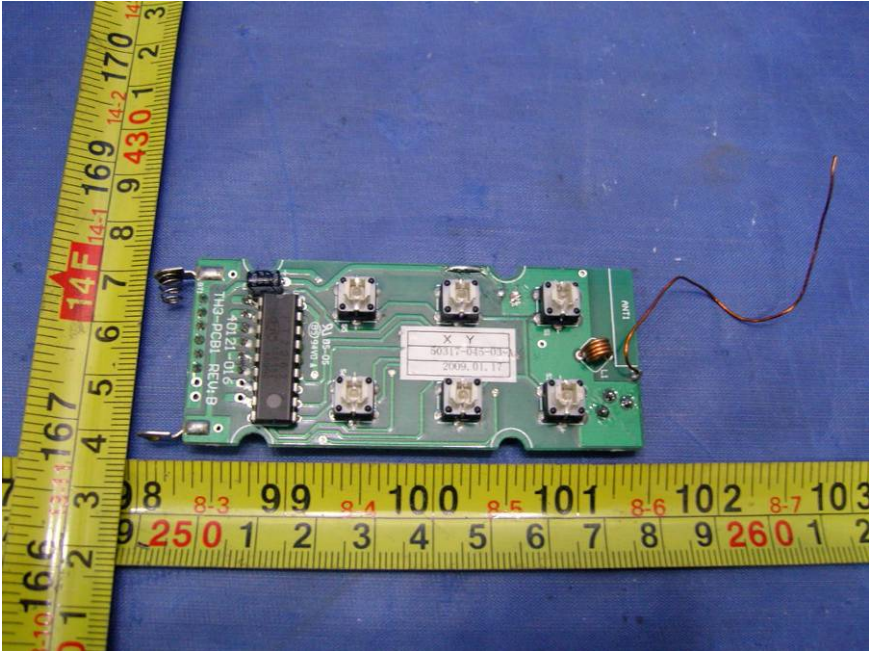
12.1 EUT - Front View



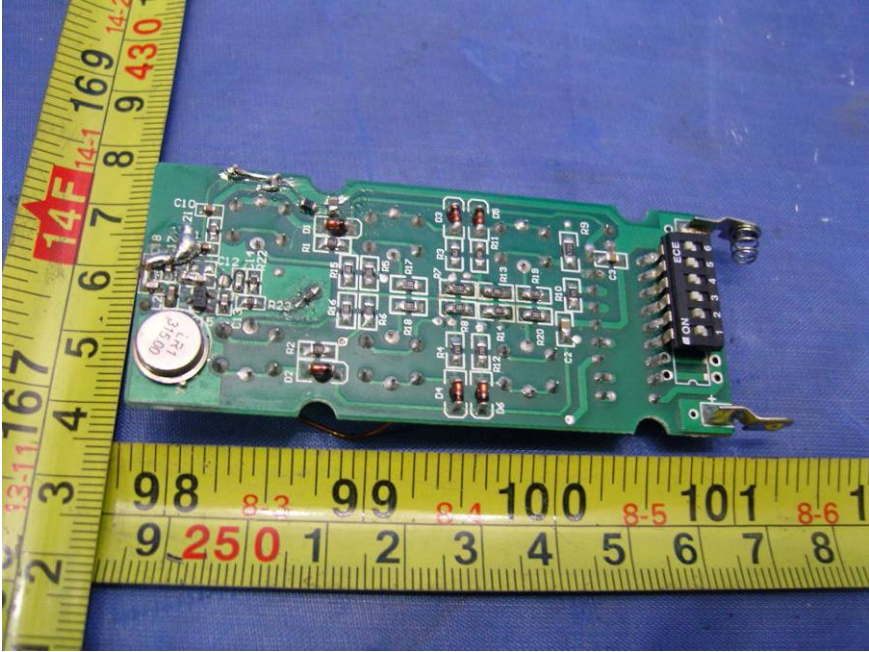
12.2 EUT - Back View



12.3 PCB-Front View



12.4 PCB-Back View



13 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation 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

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT
EUT Bottom View/proposed FCC Label Location

