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# FCC CERTIFICATION RADIO MEASUREMENT TECHNICAL REPORT

On Model Name: Remote Control -1

Model Number : JLD-1

Trademark : N/A

FCC ID : UQDJLD-1

Prepared for Jiaxing Refined Mechanics Hi-Tech Co., Ltd

According to FCC Part 15 (2006), Subpart C

*Test Report #:* *JIA-0608-0666SH-FCC*

*Prepared by:* *Chris Huang*

*Reviewed by:* *Harry Zhao*

*QC Manager:* *Paul Chen*

*Test Report Released by:* Paul J. Chen *2006, October 25*

*Paul Chen* *Date*

## *Test Location*

*Tests performed at EMC Compliance Management Group (China) in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.*

| | |
|---|---|
| *Test Site Location:* | *Jiangsu Electronic Products Supervision & Inspection Institute No 107 Ge lane ZhongQiao WuXi JiangSu, China* |
| *Tel:* | *86-510-85140038* |
| *Fax:* | *86-510-85140037* |
| *Registration Number:* | *399439* |

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## *Administrative Data*

*Test Sample : Remote Control -1*

*Model Number : JLD-1*

*Trade Mark : N/A*

*Date Tested : 2006, September 18*

*Applicant : Jiaxing Refined Mechanics Hi-Tech Co., Ltd*
*No.7 Henger Road, Wangjiangjing*
*Development Zone, Jiaxing, Zhejiang, China*

*Telephone : 86-573-2283296*

*Fax : 86-573-2283298*

*Applicant : Jiaxing Refined Mechanics Hi-Tech Co., Ltd*
*No.7 Henger Road, Wangjiangjing*
*Development Zone, Jiaxing, Zhejiang, China*

## *EUT Description*

*Jiaxing Refined Mechanics Hi-Tech Co., Ltd model number JLD-1 (referred to as the EUT in this test report) is a Remote Control -1. The transmitter is manually operated and has a button. It transmits once per push and will cease transmitting after the button is released.*

## *Test Summary*

*The Electromagnetic Compatibility requirements on TAT-E for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.*

| ***EMC Test Items*** *Reference FCC Part 15 (2006), Subpart C* | | | |
|---|---|---|---|
| ***Specification*** | ***Description*** | ***Test Results*** | ***Remark*** |
| *FCC Part 15.203* | *Antenna Requirement* | *Compliance* | *Attachment 1* |
| *FCC Part 15.205* | *Restricted Band of Operation* | *Compliance* | *Attachment 3* |
| *FCC Part 15.209* | *Radiated Emission Limits* | *Compliance* | *Refer to Attachment 4* |
| *FCC Part 15.231* | *Periodic Operation in the Band 40.66-40.70MHz and above 70MHz* | -- | -- |
| *(a)* | *Operation Mode* | *Compliance* | *Attachment 2* |
| *(b)* | *Field Strength of Fundamental and Spurious Emissions* | *Compliance* | *Attachment 4* |
| *(c)* | *Bandwidth* | *Compliance* | *Attachment 5* |

## *Test Mode Justification*

*The test modes (Lie, Side, Stand) were done for testing.*
*Note: Lie mode means let EUT put flat;*
*Side mode means let EUT stand with side;*
*Stand mode means let EUT stand up.*

*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.*

## *EUT Exercise Software*

*The device is not programmable and does not use software.*

## *Equipment Modification*

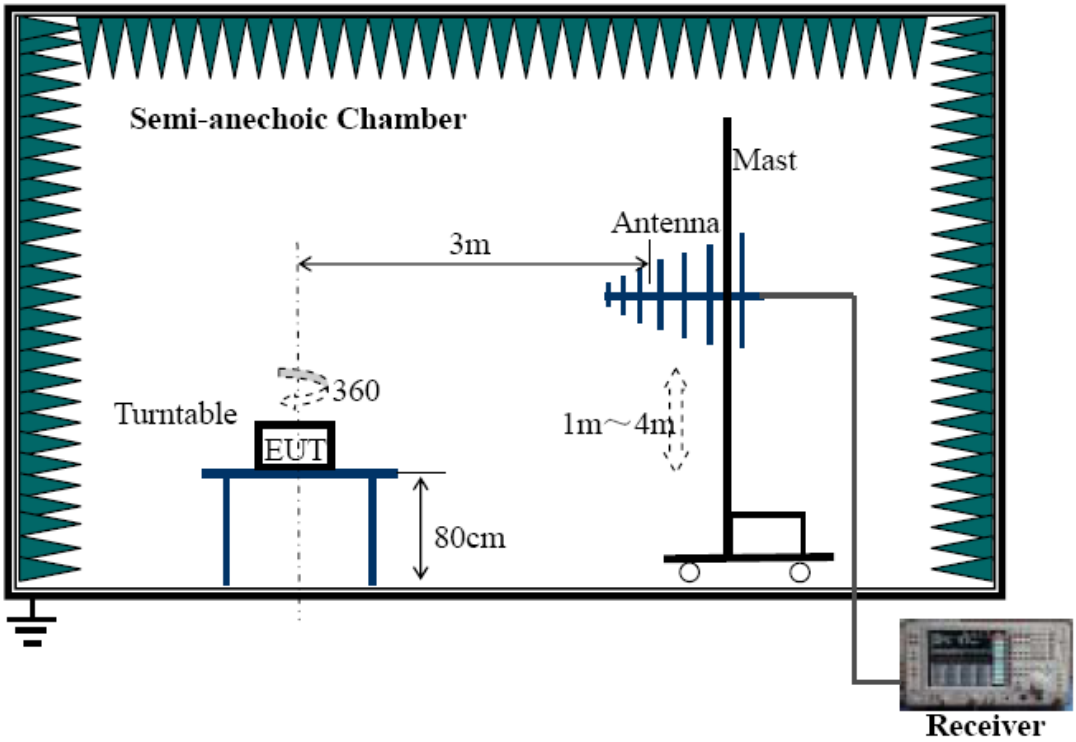
*Any modifications installed previous to testing by Jiaxing Refined Mechanics Hi-Tech Co., Ltd will be incorporated in each production model sold or leased in United States.*

*There were no modifications installed by EMC Compliance Management Group (China) test personnel.*

## Test System Details

| EUT | |
|---|---|
| Model Number: | JLD-1 |
| Trademark:: | N/A |
| Serial Number: | Engineering Sample |
| Input Voltage: | 12V DC (1*12V alkaline battery) |
| Description: | Remote Controller |
| Manufacturer: | Jiaxing Refined Mechanics Hi-Tech Co., Ltd |
| **Support Equipment** | |
| None | |
| **Cable Description** | |
| None | |

## *Configuration of Tested System*



## *EUT Sample Photos of JLD-1*

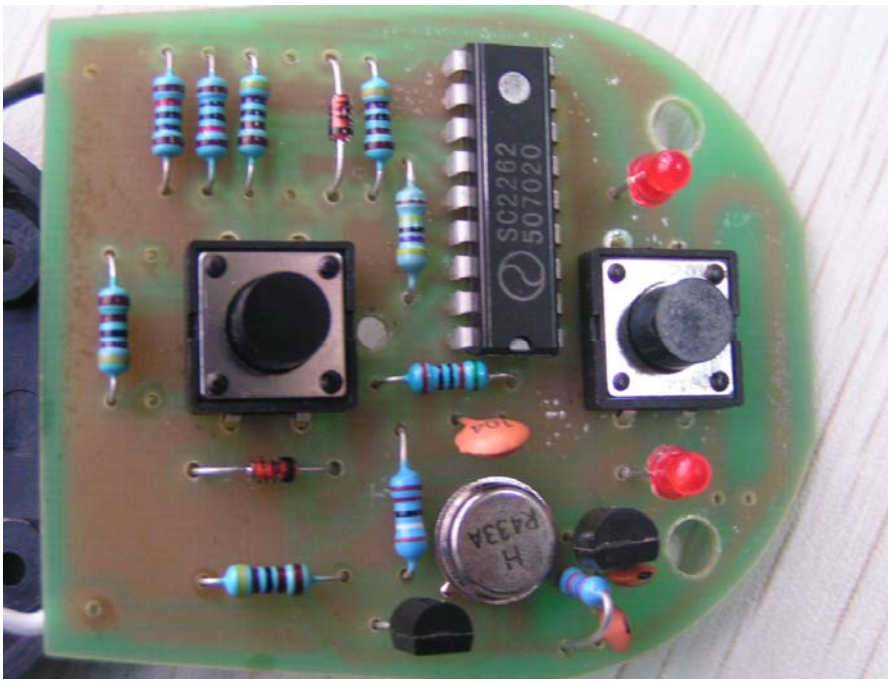
***Front View***

FCC ID UQDJLD-1
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.
MADE IN CHINA

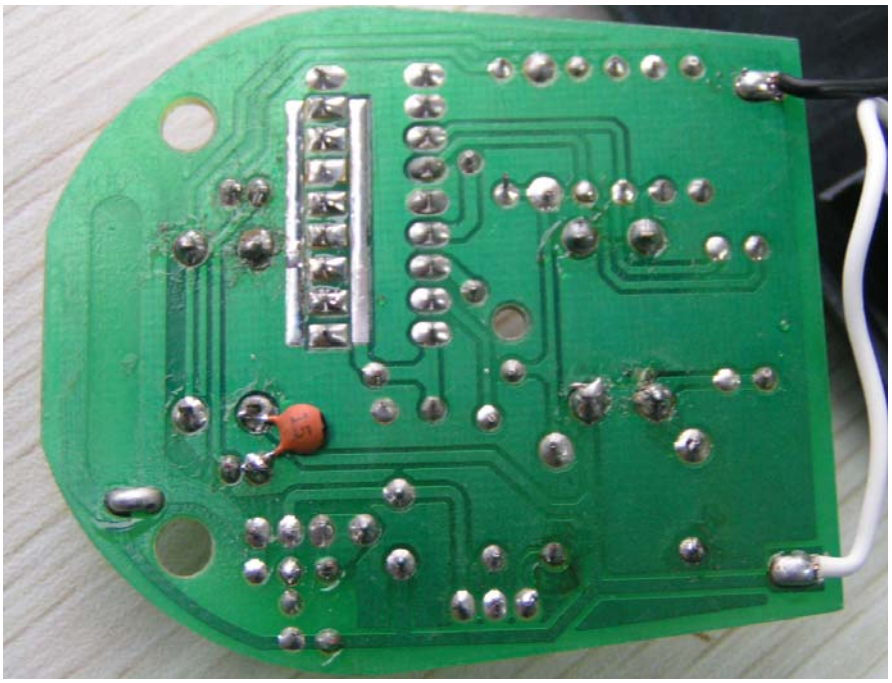
***Rear View***

*Uncovered #1*

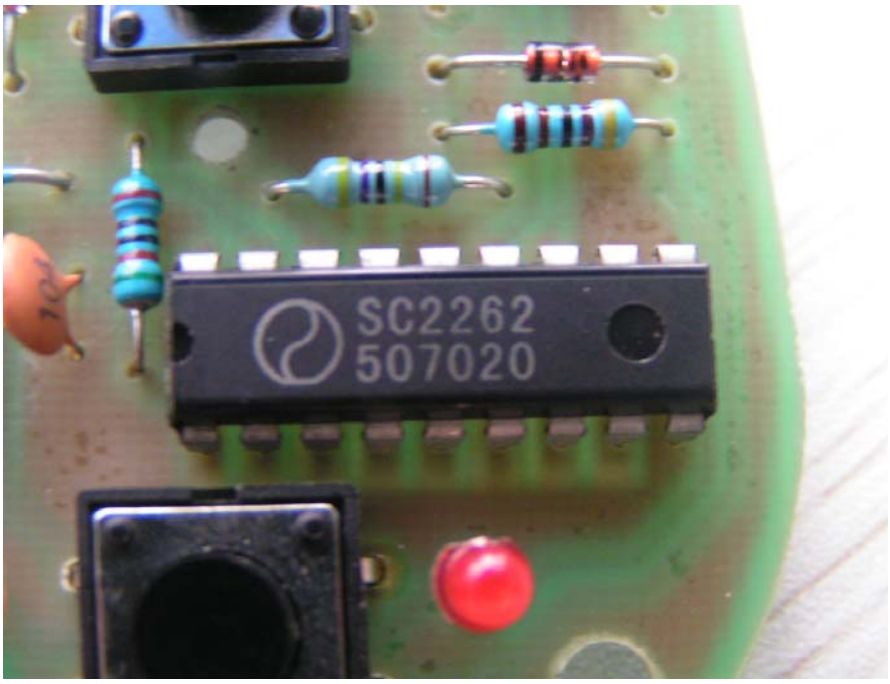
*Uncovered #2*




***Main Board Front View***



***Main Board Back View***




***Main Chip View***

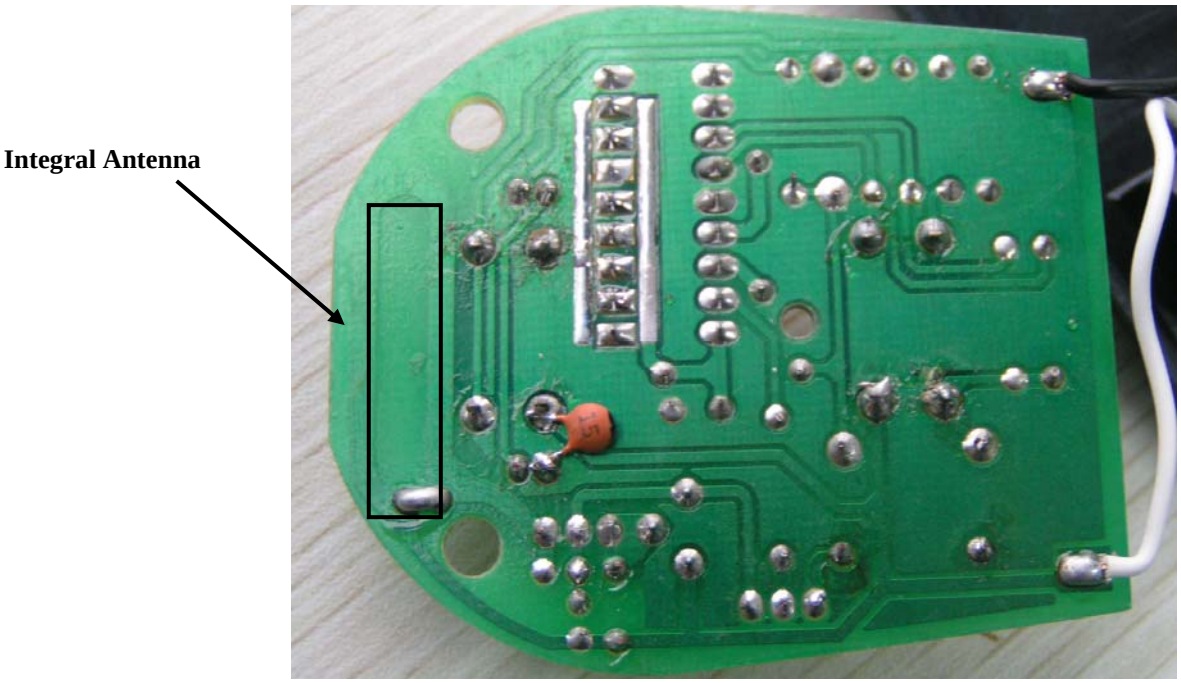
***Battery View***

# ATTACHMENT 1 – ANTENNA REQUIREMENT

| | | | |
|---|---|---|---|
| **CLIENT:** | Jiaxing Refined Mechanics Hi-Tech Co., Ltd | **TEST STANDARD:** | FCC Part 15.203 (2006) |
| **MODEL NUMBER:** | JLD-1 | **PRODUCT:** | Remote Control -1 |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 22°C | **HUMIDITY:** | 56%RH |
| **ATM PRESSURE:** | 101.8 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Shi Xiting | **DATE OF TEST:** | 2006, September 18 |

| | |
|---|---|
| **SETUP METHOD:** | N/A |
| **ANTENNA REQUIREMENT:** | An intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded. |
| **TEST VOLTAGE:** | 12V DC (1*12V alkaline battery) |
| **TEST STATUS:** | Normal Operation As Usual |
| **RESULTS:** | The EUT meets the Antenna requirement. The test results relate only to the equipment under test provided by client. |
| **CHANGES OR MODIFICATIONS:** | There were no modifications installed by EMC Compliance Management Group (China) test personnel. |
| **M. UNCERTAINTY:** | N/A |

| FCC Section | FCC Rules | Conclusion |
|---|---|---|
| 15.203 | *Described how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.*<br><br>*The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed:*<br><br>+ *The application (or intended use) of the EUT*<br><br>+ *The installation requirements of the EUT*<br><br>+ *The method by which the EUT will be marketed* | *The RF Device uses an integral antenna without connector.* |




*Integral Antenna without Connector View*

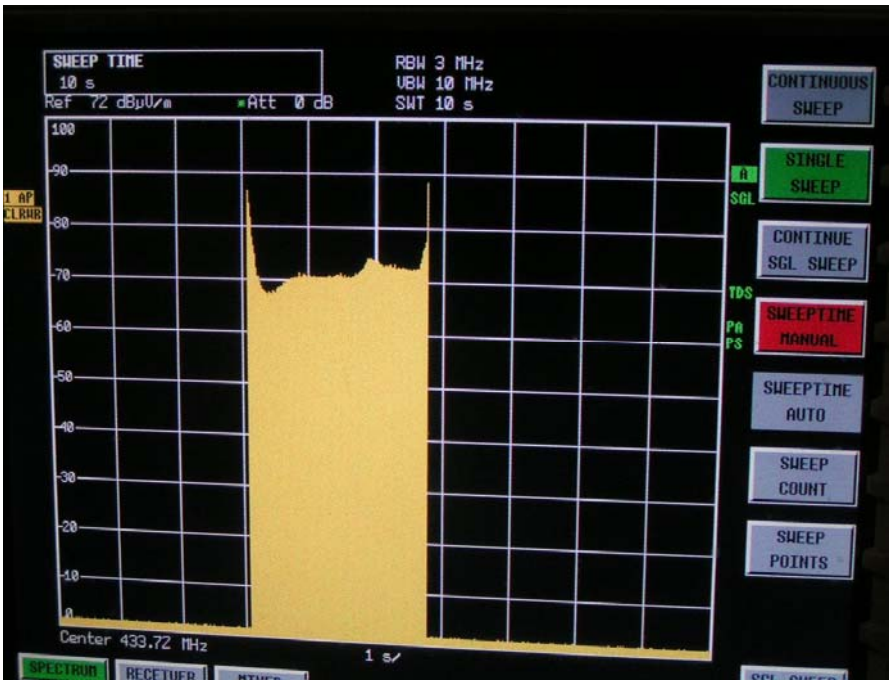
# ATTACHMENT 2 – OPERATION MODE

| | | | |
|---|---|---|---|
| **CLIENT:** | Jiaxing Refined Mechanics Hi-Tech Co., Ltd | **TEST STANDARD:** | FCC Part 15.231 (a) (2006) |
| **MODEL NUMBER:** | JLD-1 | **PRODUCT:** | Remote Control -1 |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 22°C | **HUMIDITY:** | 56%RH |
| **ATM PRESSURE:** | 101.8 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Shi Xiting | **DATE OF TEST:** | 2006, September 18 |

| | |
|---|---|
| **SETUP METHOD:** | N/A |
| **OPERATION MODE REQUIREMENT:** | (1) A manually operated transmitter shall employ a switch that will automatically the transmitter within not more than 5 seconds of being released.<br><br>(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.<br><br>(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used on security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.<br><br>(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition. |
| **TEST VOLTAGE:** | 12VDC (1*12V alkaline battery) |
| **TEST STATUS:** | Push the button for a while and then release it |
| **RESULTS:** | The EUT meets the operation mode requirement. The test results relate only to the equipment under test provided by client. |
| **CHANGES OR MODIFICATIONS:** | There were no modifications installed by EMC Compliance Management Group (China) test personnel. |
| **M. UNCERTAINTY:** | N/A |

| FCC Section | FCC Rules | Conclusion |
|---|---|---|
| 15.231 (a) | The provisions of this Section are restricted to periodic operation within the band 40.66 – 40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of 15.231 Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:<br><br>(1) A manually operated transmitter shall employ a switch that will automatically the transmitter within not more than 5 seconds of being released<br><br>(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.<br><br>(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used on security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.<br><br>(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety | The transmitter is manually controlled and employs a switch to start the transmitter. The switch will automatically deactivate the transmitting within not more than 5 seconds after being released.<br><br>The transmitter does not perform periodic transmissions. |

| | | |
|---|---|---|
| | *of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.* | |




***Plot of the duration***

***Description: Push the button on for a while and then release it, then the transmitting signal disappears at once.***

# ATTACHMENT 3 – RESTRICTED BAND OF OPERATION

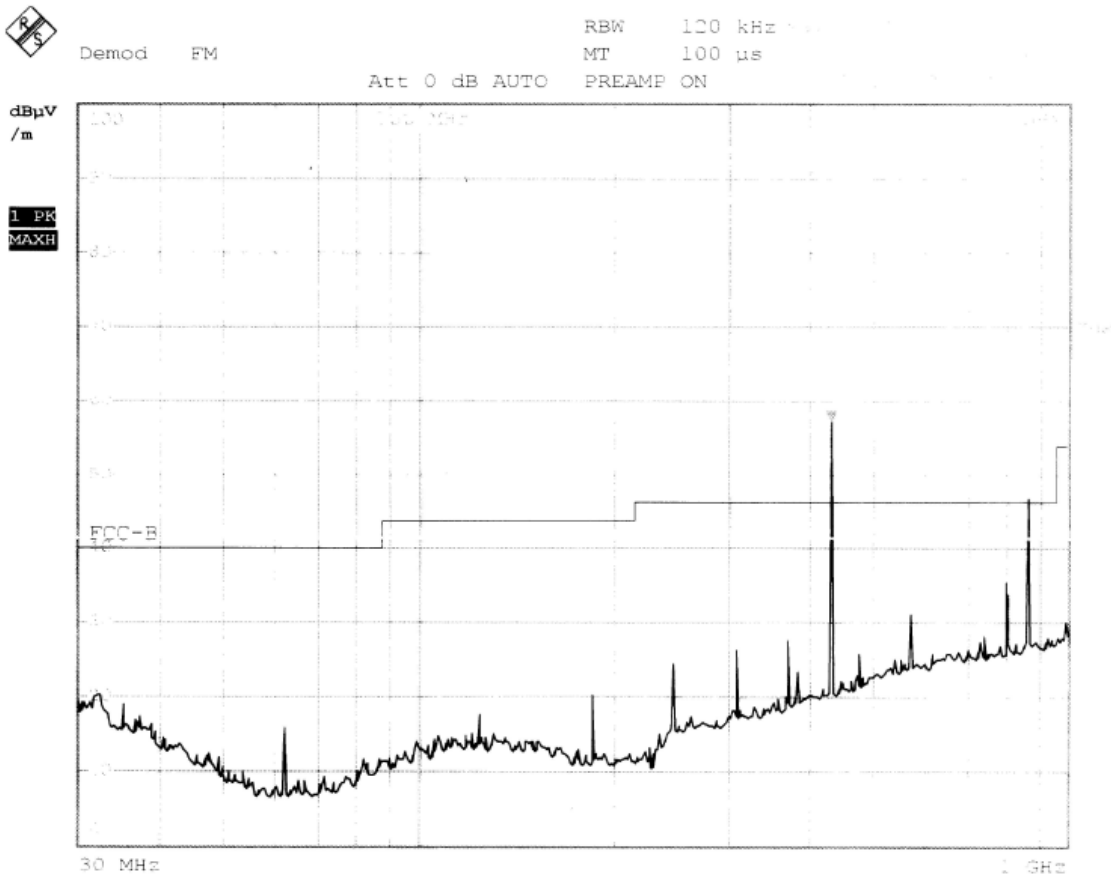
| | | | |
|---|---|---|---|
| **CLIENT:** | Jiaxing Refined Mechanics Hi-Tech Co., Ltd | **TEST STANDARD:** | FCC Part 15.231(b), FCC Part 15.35 |
| **MODEL NUMBER:** | JLD-1 | **PRODUCT:** | Remote Control -1 |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 22°C | **HUMIDITY:** | 56%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Shi Xiting | **DATE OF TEST:** | 2006, September 18 |

| | |
|---|---|
| **SETUP METHOD:** | ANSI C63.4 : 2003 |
| **RESTRICTED BANDS OF OPERATION REQUIREMENT:** | The only spurious emissions are permitted in any of the frequency bands listed below table of next page. |
| **TESTED RANGE:** | 30MHz to 5000MHz |
| **TEST VOLTAGE:** | 1x12V DC Battery |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, modulated |
| **RESULTS:** | The EUT meets the restricted bands of operation requirement. The test results relate only to the equipment under test provided by client. |
| **CHANGES OR MODIFICATIONS:** | There were no modifications installed by EMC Compliance Management Group (China) test personnel. |

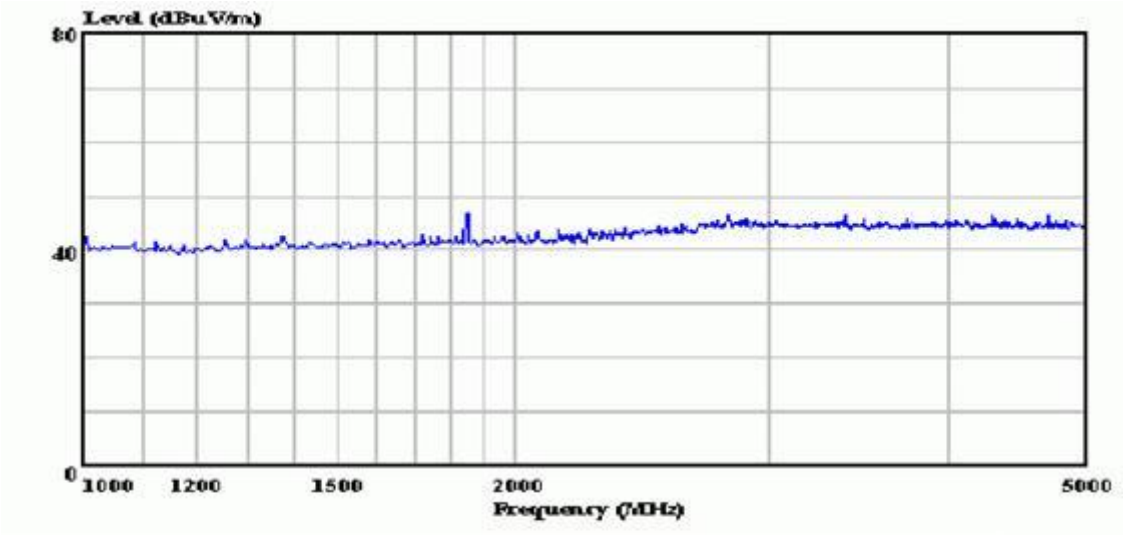
| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | | | |

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

## *Test Data (Below 1GHz)*



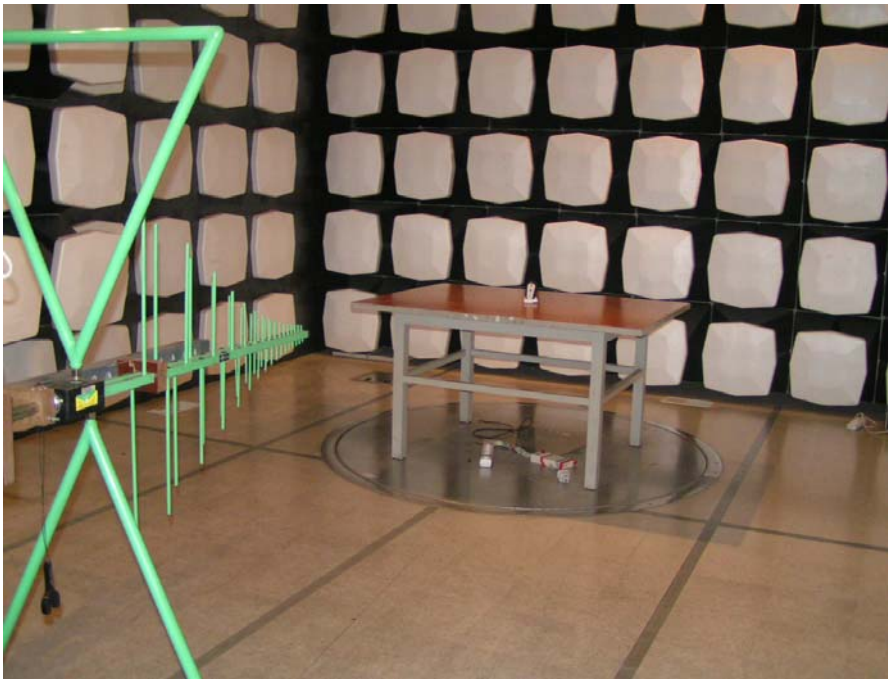
## *Test Data (Above 1GHz)*



| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| Spectrum | R&S | ESCI | 1166.595003 100065 | 11/23/05 | 11/22/06 |
| Spectrum Analyzer | Agilent | E4440A | US45303119 | 03/20/06 | 03/19/07 |
| Bilog Antenna | CHASE | CBL6112 | 117.0800.20 | 02/17/06 | 02/16/07 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9120 D | 513 | 02/10/06 | 02/09/07 |
| Anechoic Chamber | LINDGREN | FACT-3 | 601 | 01/10/06 | 01/09/07 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Shi-xiting _____ **REVIEWED BY:** Hang Zhao _____

**ENGINEER** **SENIOR ENGINEER**



*Field Strength Emissions Test Set-up (Below 1GHz)*

*Field Strength Emissions Test Set-up (Above 1GHz)*

# ATTACHMENT 4 –FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSIONS

| | | | |
|---|---|---|---|
| **CLIENT:** | Jiaxing Refined Mechanics Hi-Tech Co., Ltd | **TEST STANDARD:** | FCC Part 15.231(b), FCC Part 15.35 |
| **MODEL NUMBER:** | JLD-1 | **PRODUCT:** | Remote Control -1 |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 22°C | **HUMIDITY:** | 56%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Shi Xiting | **DATE OF TEST:** | 2006, September 18 |

| | |
|---|---|
| **SETUP METHOD:** | ANSI C63.4 : 2003, FCC Part 15.35 |
| **TEST PROCEDURE:** | a. The EUT was placed on a rotatable table with 0.8 meters above ground.<br>b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower.<br>c. The antenna was varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna were set to make measurement.<br>d. For each suspected emission the EUT was arranged to its worst case and then change the antenna tower height (from 1m to 4m) and turn table (from 0 degree to 360 degree) to find the maximum reading.<br>e. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.<br>f. Broadband antenna (Calibrated antenna) was used as receiving antenna below 1000MHz. Horn antenna were used as receiving antenna above 1000MHz.<br>g. The bandwidth is 120 kHz below 1000 MHz, and 1 MHz above 1000 MHz<br>Explanation of the Correction Factor are given as follows:<br>FS= RA + AF + CF - AG - DC<br>Where: FS = Field Strength<br>RA = Receiver Amplitude<br>AF = Antenna Factor<br>CF = Cable Attenuation Factor<br>AG = Amplifier Gain<br>DC = Duty Cycle Correction Factor |

**CONTINUE ON THE NEXT PAGE…**

| | |
|---|---|
| **TESTED RANGE:** | 30MHz to 5000MHz |
| **TEST VOLTAGE:** | 12VDC (1*12V alkaline battery) |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, modulated |
| **RESULTS:** | The EUT meets the requirements of field strength test. The test results only to the equipment under test provided by client. |
| **CHANGES OR MODIFICATIONS:** | There were no modifications installed by EMC Compliance Management Group (China) test personnel. |
| **M. UNCERTAINTY:** | Freq. ±2x10-7 x Center Freq., Amp ±2.6 dB |

## *Average value of the measured emissions:*

| Direction | Polarization | Frequency Type | Frequency (MHz) | Field Strength dB(μV/m) | Limit dB(μV/m) | Over Limit dB(μV/m) | Read Level dB(μV) | Factor (dB) | Duty cycle Correction Factor (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Lying | Horizontal | Fundamental | 433.77 | 60.53 | 80.82 | -21.85 | 77.34 | -6.68 | 10.13 |
| | | Spurious | 867.54 | 36.90 | 60.82 | -25.48 | 61.16 | -14.13 | 10.13 |
| | | Spurious | 1301.31 | 34.55 | 54.00 | -19.45 | 42.98 | 1.70 | 10.13 |
| | | Spurious | 1735.08 | 36.67 | 60.82 | -25.71 | 45.88 | 0.92 | 10.13 |
| | Vertical | Fundamental | 433.77 | 63.91 | 80.82 | -18.47 | 80.72 | -6.68 | 10.13 |
| | | Spurious | 867.54 | 42.66 | 60.82 | -19.72 | 66.92 | -14.13 | 10.13 |
| | | Spurious | 1301.31 | 34.85 | 54.00 | -19.15 | 43.28 | 1.70 | 10.13 |
| | | Spurious | 1735.08 | 37.14 | 60.82 | -25.24 | 46.35 | 0.92 | 10.13 |
| Side | Horizontal | Fundamental | 433.77 | 61.55 | 80.82 | -20.83 | 78.36 | -6.68 | 10.13 |
| | | Spurious | 867.54 | 41.06 | 60.82 | -21.32 | 65.32 | -14.13 | 10.13 |
| | | Spurious | 1301.31 | 37.59 | 54.00 | -16.41 | 46.02 | 1.70 | 10.13 |
| | | Spurious | 1735.08 | 36.66 | 60.82 | -25.72 | 45.87 | 0.92 | 10.13 |
| | Vertical | Fundamental | 433.77 | 62.53 | 80.82 | -19.85 | 79.34 | -6.68 | 10.13 |
| | | Spurious | 867.54 | 43.23 | 60.82 | -19.15 | 67.49 | -14.13 | 10.13 |
| | | Spurious | 1301.31 | 35.74 | 54.00 | -18.26 | 44.17 | 1.70 | 10.13 |
| | | Spurious | 1735.08 | 36.62 | 60.82 | -25.76 | 45.83 | 0.92 | 10.13 |
| Stand | Horizontal | Fundamental | 433.77 | 63.37 | 80.82 | -19.01 | 80.37 | -6.87 | 10.13 |
| | | Spurious | 867.54 | 44.22 | 60.82 | -18.16 | 68.48 | -14.13 | 10.13 |
| | | Spurious | 1301.31 | 34.83 | 54.00 | -19.17 | 43.26 | 1.70 | 10.13 |
| | | Spurious | 1735.08 | 36.12 | 60.82 | -26.26 | 45.33 | 0.92 | 10.13 |
| | Vertical | Fundamental | 433.77 | 61.83 | 80.82 | -20.55 | 78.64 | -6.68 | 10.13 |
| | | Spurious | 867.54 | 41.70 | 60.82 | -20.68 | 65.96 | -14.13 | 10.13 |
| | | Spurious | 1301.31 | 36.84 | 54.00 | -17.16 | 45.27 | 1.70 | 10.13 |
| | | Spurious | 1735.08 | 37.30 | 60.82 | -25.08 | 46.51 | 0.92 | 10.13 |

## *Peak value of the measured emissions:*

| Direction | Polarization | Frequency Type | Frequency (MHz) | Read Level dB(μV) | Factor (dB) | Field Strength dB(μV/m) | Limit dB(μV/m) | Over Limit dB(μV/m) |
|---|---|---|---|---|---|---|---|---|
| Lie | Horizontal | Fundamental | 433.77 | 77.34 | -6.68 | 70.66 | 100.82 | -30.16 |
| | | Spurious | 867.54 | 61.16 | -14.13 | 47.03 | 80.82 | -33.79 |
| | | Spurious | 1301.31 | 42.98 | 1.70 | 44.68 | 74.00 | -29.32 |
| | | Spurious | 1735.08 | 45.88 | 0.92 | 46.80 | 80.82 | -34.02 |
| | Vertical | Fundamental | 433.77 | 80.72 | -6.68 | 74.04 | 100.82 | -26.78 |
| | | Spurious | 867.54 | 66.92 | -14.13 | 52.79 | 80.82 | -28.03 |
| | | Spurious | 1301.31 | 43.28 | 1.70 | 44.98 | 74.00 | -29.02 |
| | | Spurious | 1735.08 | 46.35 | 0.92 | 47.27 | 80.82 | -33.55 |
| Side | Horizontal | Fundamental | 433.77 | 78.36 | -6.68 | 71.68 | 100.82 | -29.14 |
| | | Spurious | 867.54 | 65.32 | -14.13 | 51.19 | 80.82 | -29.63 |
| | | Spurious | 1301.31 | 46.02 | 1.70 | 47.72 | 74.00 | -26.28 |
| | | Spurious | 1735.08 | 45.87 | 0.92 | 46.79 | 80.82 | -34.03 |
| | Vertical | Fundamental | 433.77 | 79.34 | -6.68 | 72.66 | 100.82 | -28.16 |
| | | Spurious | 867.54 | 67.49 | -14.13 | 53.36 | 80.82 | -27.46 |
| | | Spurious | 1301.31 | 44.17 | 1.70 | 45.87 | 74.00 | -28.13 |
| | | Spurious | 1735.08 | 45.83 | 0.92 | 46.75 | 80.82 | -34.07 |
| Stand | Horizontal | Fundamental | 433.77 | 80.37 | -6.87 | 73.50 | 100.82 | -27.32 |
| | | Spurious | 867.54 | 68.48 | -14.13 | 54.35 | 80.82 | -26.47 |
| | | Spurious | 1301.31 | 43.26 | 1.70 | 44.96 | 74.00 | -29.04 |
| | | Spurious | 1735.08 | 45.33 | 0.92 | 46.25 | 80.82 | -34.57 |
| | Vertical | Fundament | 433.77 | 78.64 | -6.68 | 71.96 | 100.82 | -28.86 |
| | | Spurious | 867.54 | 65.96 | -14.13 | 51.83 | 80.82 | -28.99 |
| | | Spurious | 1301.31 | 45.27 | 1.70 | 46.97 | 74.00 | -27.03 |
| | | Spurious | 1735.08 | 46.51 | 0.92 | 47.43 | 80.82 | -33.39 |

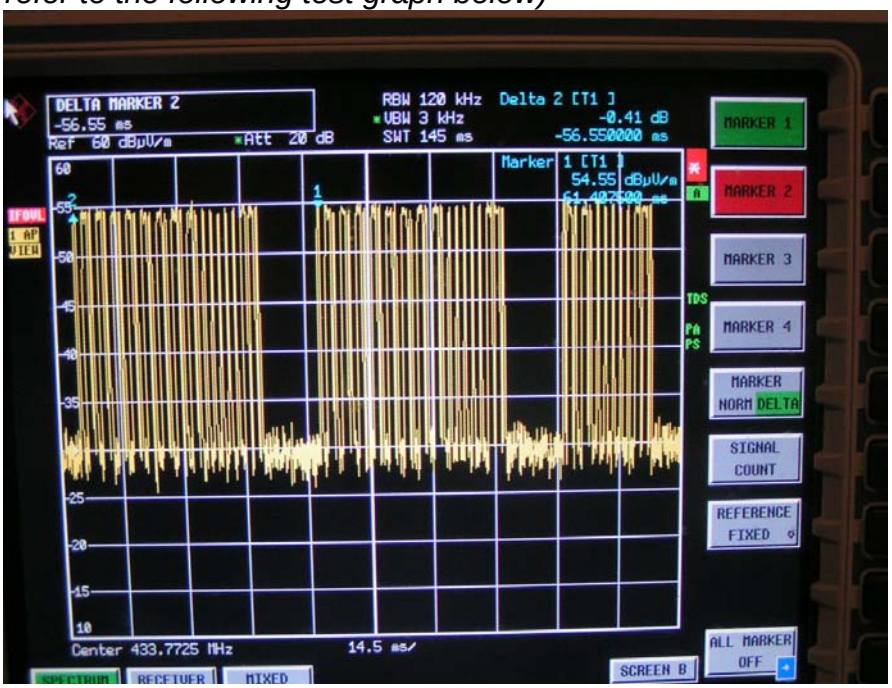
*Note:*

1. *Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follow:*
   *For fundamental frequency (F=433.77MHz)*
   *Average field Strength of Fundamental (dBuV/m)*
   *=20log (41.6667 x F – 7083.3333)*
   *=20log(41.6667x433.77 – 7083.3333)*
   *=80.82 dBuV/m*
   *Average field Strength of Spurious (dBuV/m) = 80.82 – 20 = 60.82 dBuV/m*

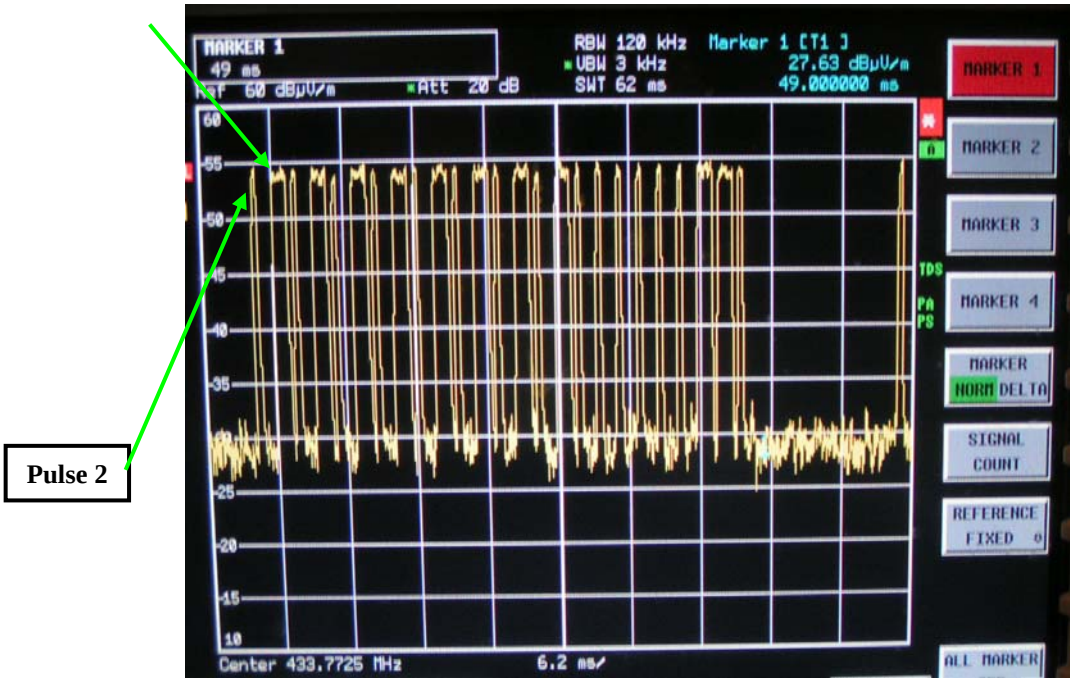
   *According to FCC 15.35(b), maximum permitted peak field strength is 20dB above the maximum permitted average emission limit.*

2. *Field Strength=Read Level + Factor – Duty Cycle Correction Factor*
   *Factor = Antenna Factor + Cable Loss - Preamp Factor*
   *Duty Cycle Correction Factor is calculated by averaging the sum of the pulse train.*
   *Correction factor is measured as follows:*
   *Keep the EUT in continuous transmission mode (modulated), and set the spectrum to the fundamental frequency and set the span width to 0 Hz. Then connect a storage oscilloscope to the video output of the spectrum that is used to detect the pulse train. Adjust the oscilloscope settings to observe the pulse train and determine the number and width of the pulses, as well as the period of the train.*
   *Duty Cycle Correction Factor at its minimum value (Worst case): 10.13dB*

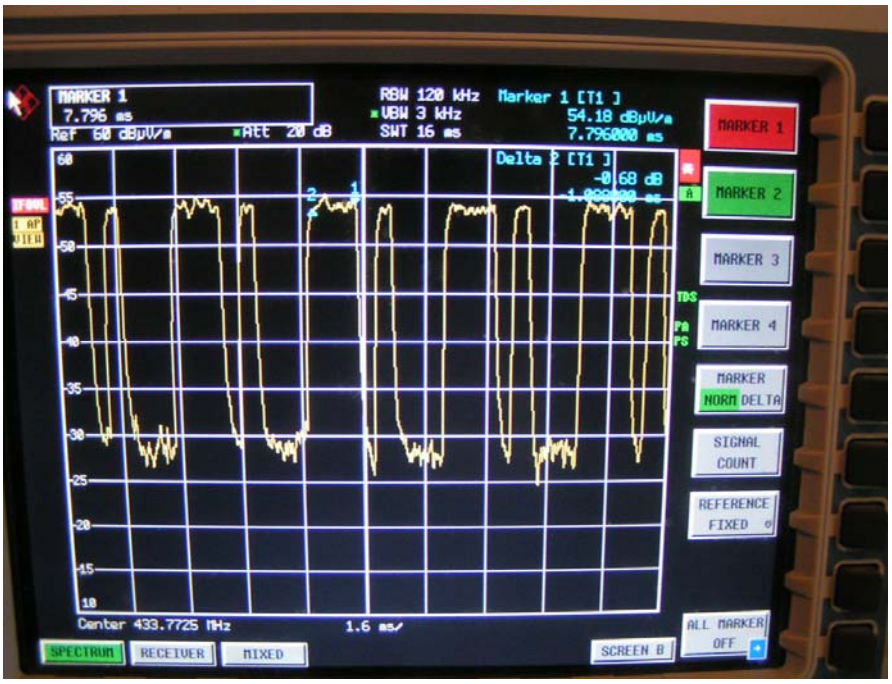
*For Extend mode:*
*Duty Cycle=20|log(10*Pulse 1+15*Pulse 2)/Period|*
*=20|log(10*1.088+15*0256)/56.55|*
*=20|log0.2603|=11.69dB*
*(please refer to the following test graph below)*



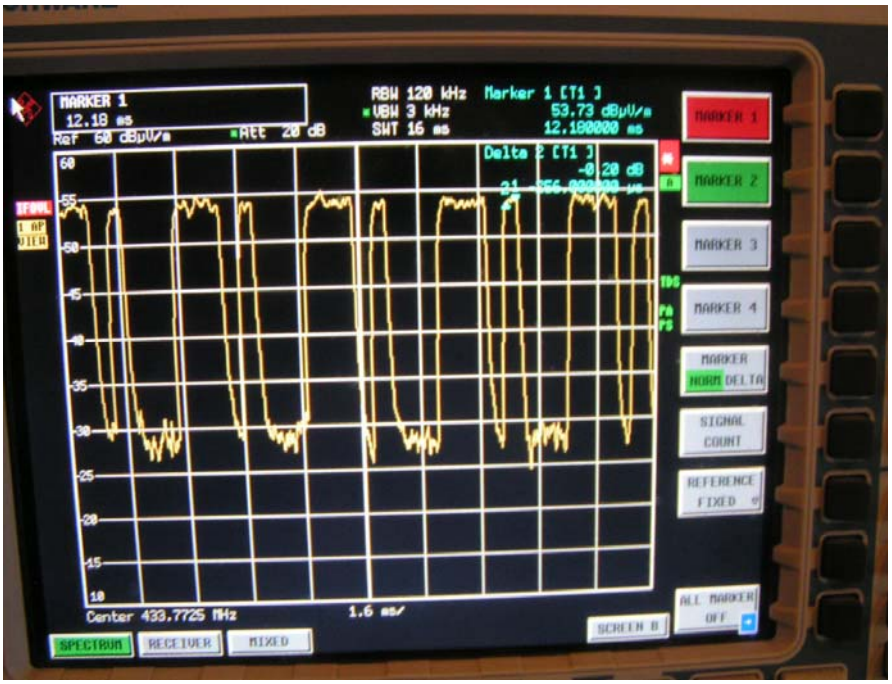

*Period=56.55ms*




*Pulse detail*

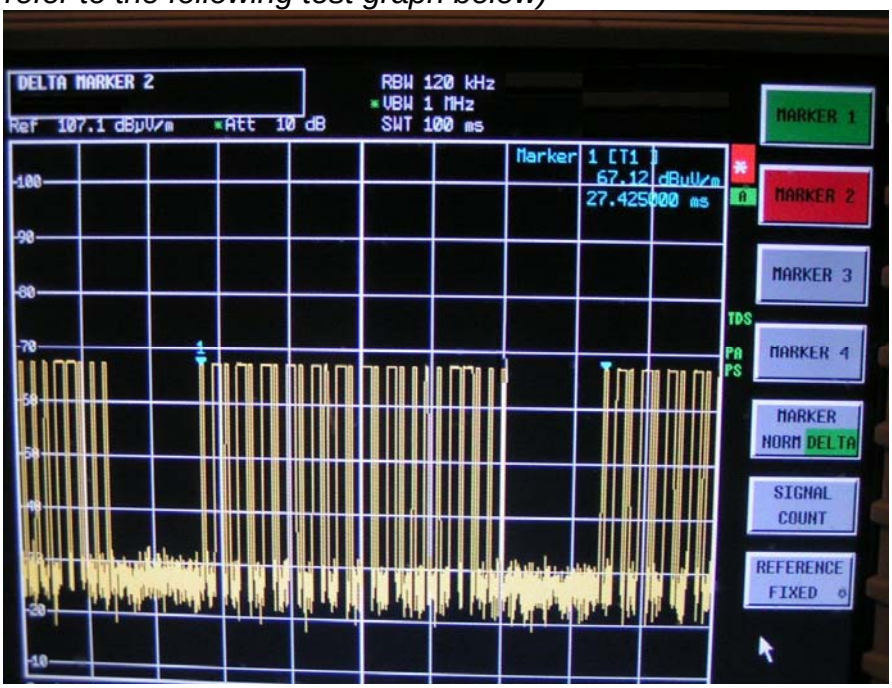



*Pulse 1=1.088ms*

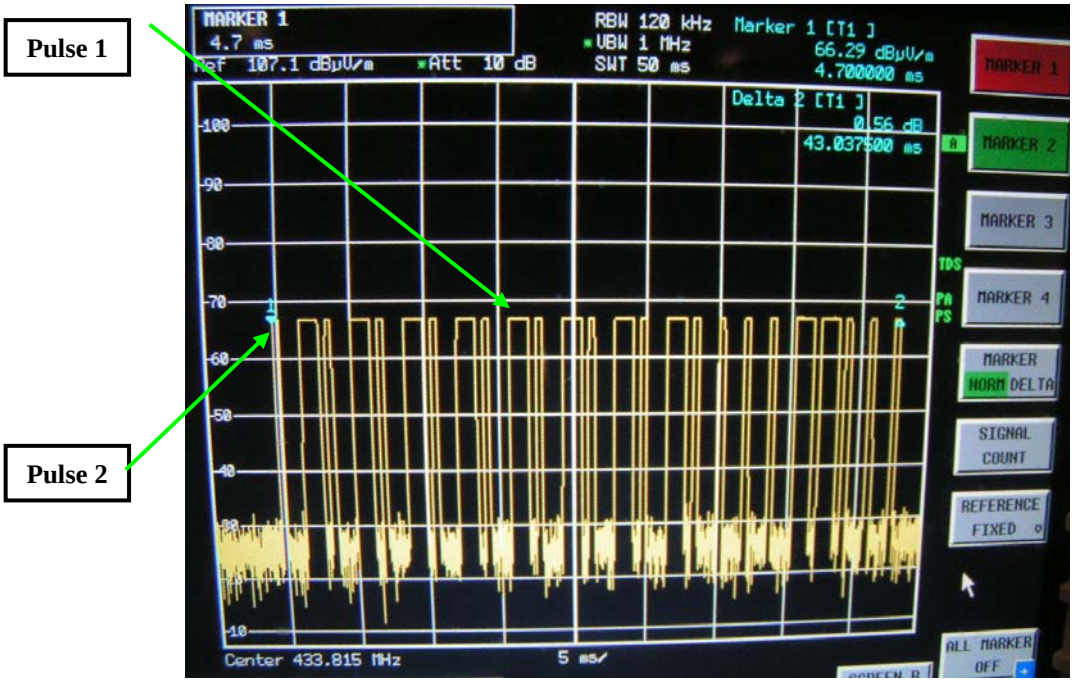



*Pulse 2=0.256ms*

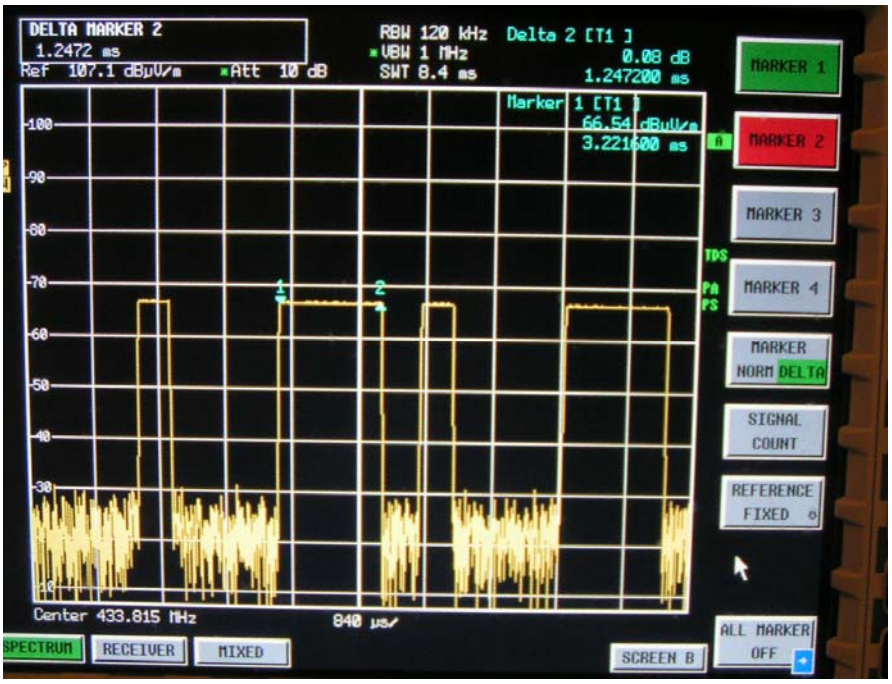
*For Retract mode:*
*Duty Cycle=20|log(10*Pulse 1+15*Pulse 2)/Period|*
*=20|log(10*1.2472+15*0.3568)/57.25|*
*=20|log0.3113|=10.13dB*
*(please refer to the following test graph below)*



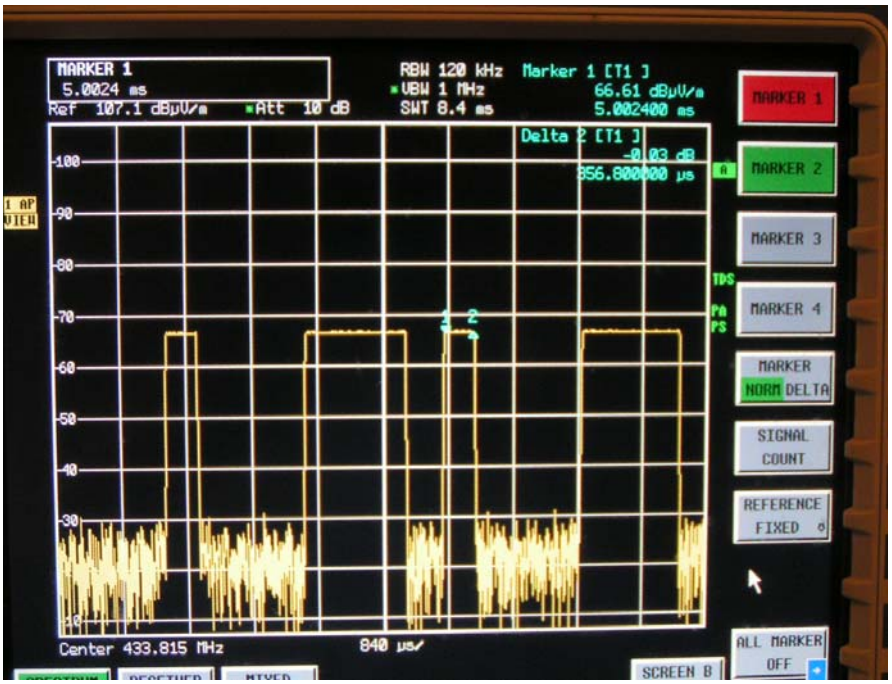

*Period=57.25ms*




*Pulse detail*




*Pulse 1=1.2472ms*



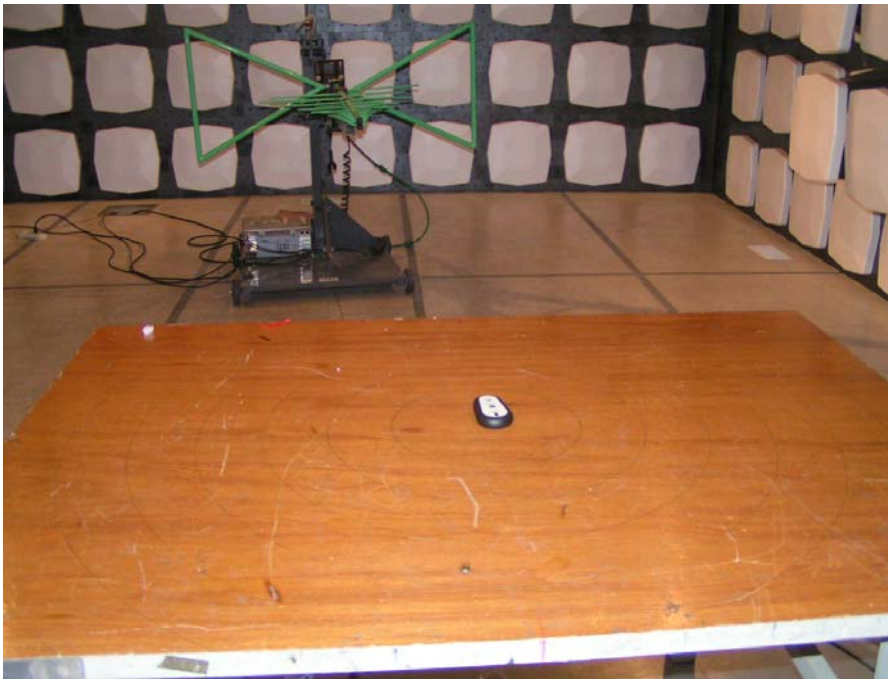

*Pulse 2=0.3568ms*

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| Spectrum | R&S | ESCI | 1166.595003 100065 | 11/23/05 | 11/22/06 |
| Spectrum Analyzer | Agilent | E4440A | US45303119 | 03/20/06 | 03/19/07 |
| Bilog Antenna | CHASE | CBL6112 | 117.0800.20 | 02/17/06 | 02/16/07 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9120 D | 513 | 02/10/06 | 02/09/07 |
| Anechoic Chamber | LINDGREN | FACT-3 | 601 | 01/10/06 | 01/09/07 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

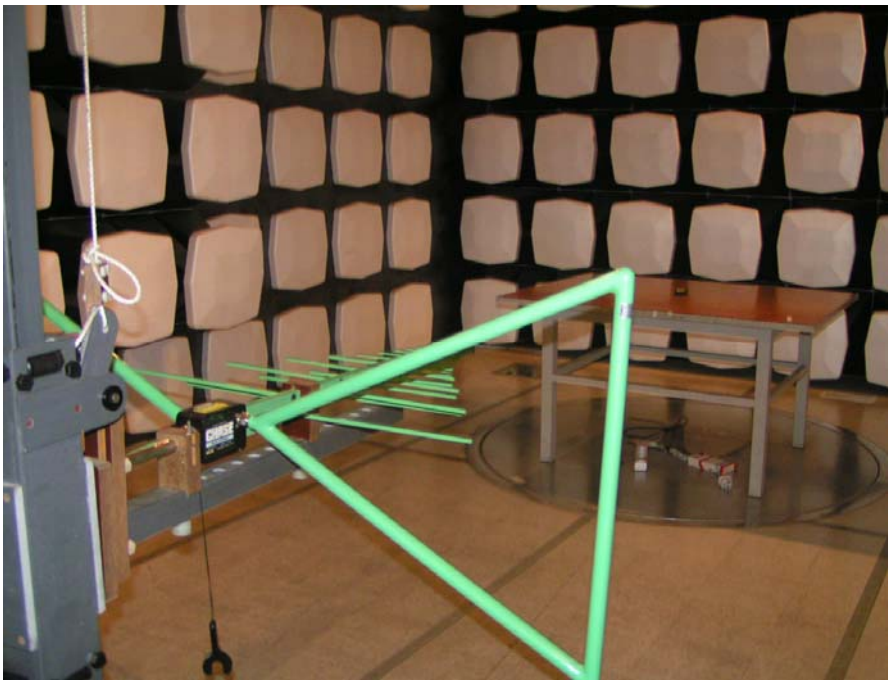
**SIGNED BY:** Shi-xiting _____ **REVIEWED BY:** Hang Zhao _____

**ENGINEER** **SENIOR ENGINEER**

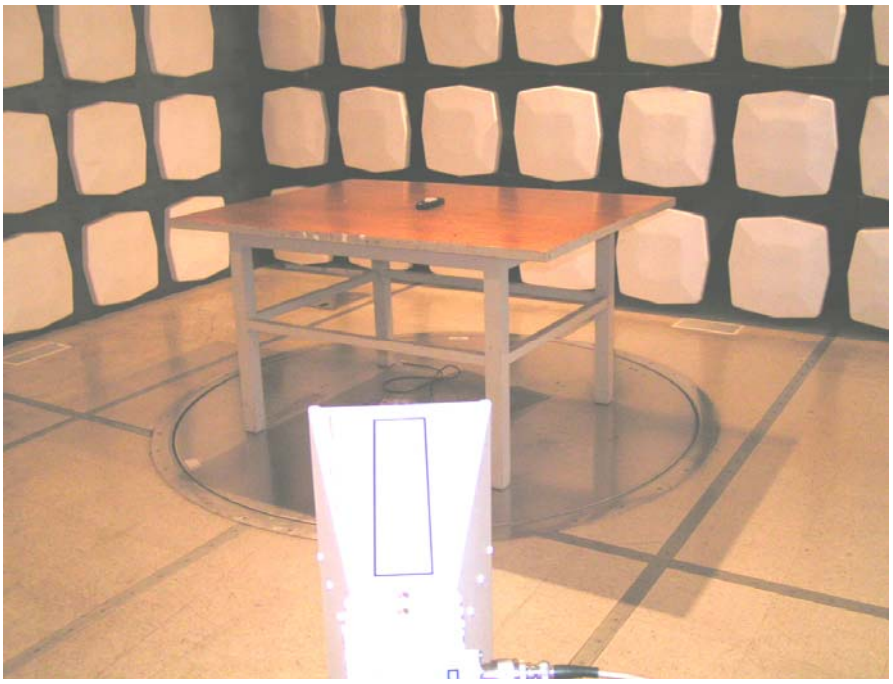
## *For the transmitter lying mode*



***Field Strength Emissions Test Set-up – Front View (Below 1GHz)***

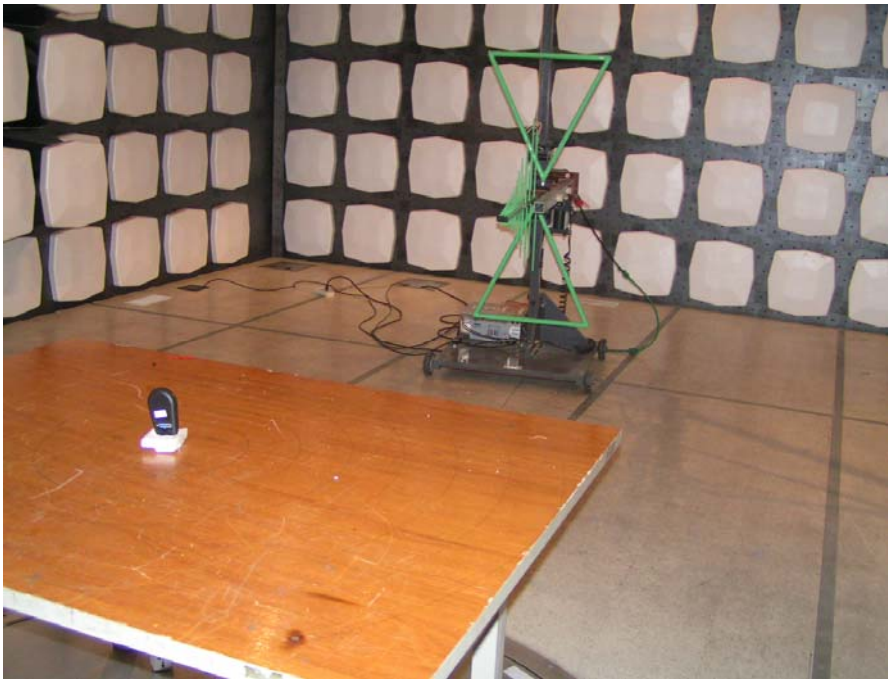


***Field Strength Emissions Test Set-up – Rear View (Below 1GHz)***

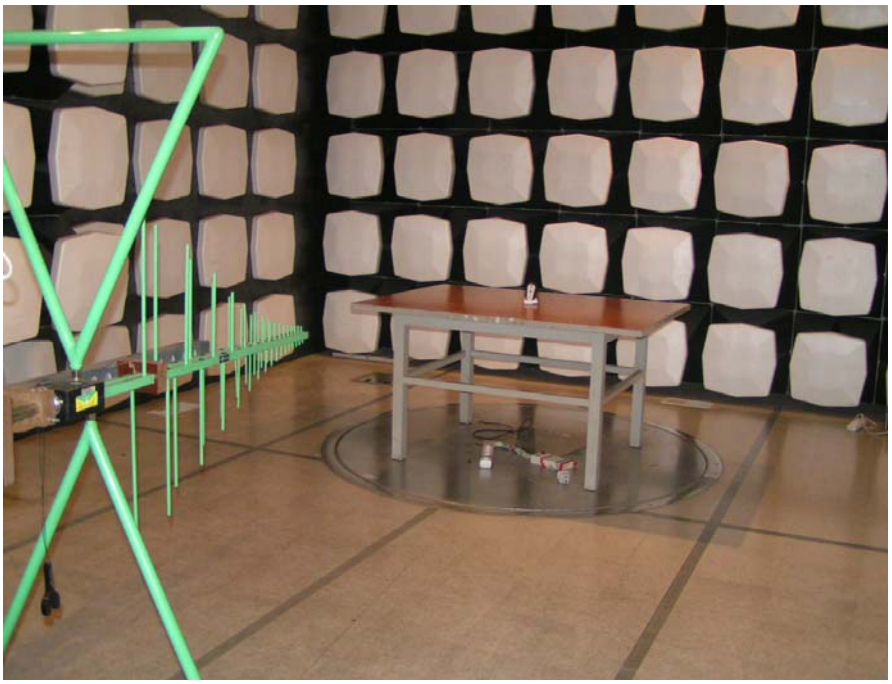


***Field Strength Emissions Test Set-up – Front View (Above 1GHz)***

## *For the transmitter stand mode*



***Field Strength Emissions Test Set-up – Front View (Below 1GHz)***



***Field Strength Emissions Test Set-up – Rear View (Below 1GHz)***

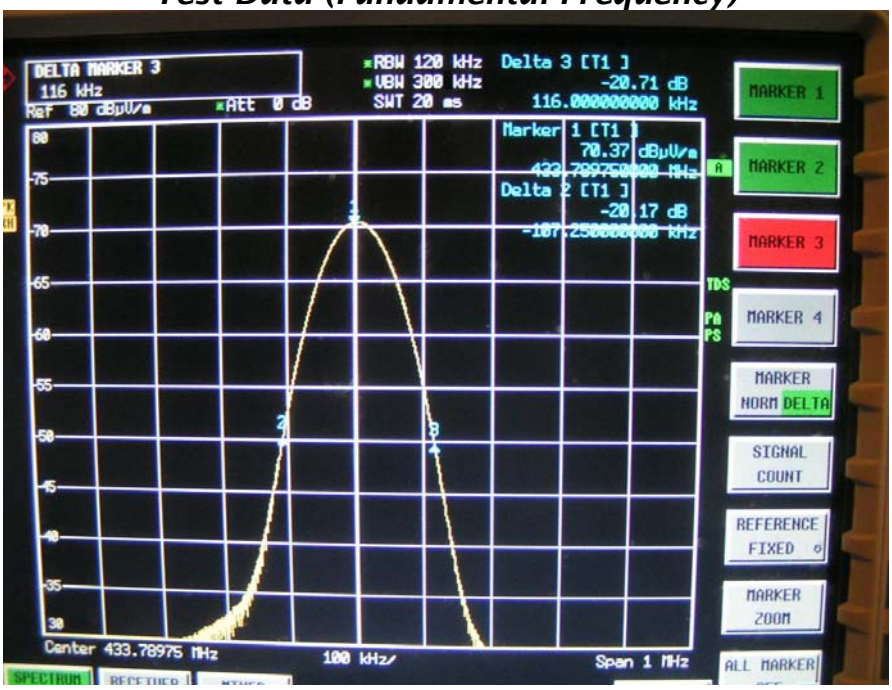
***Field Strength Emissions Test Set-up – Front View (Above 1GHz)***

# ATTACHMENT 5– BANDWIDTH TEST

| | | | |
|---|---|---|---|
| **CLIENT:** | Jiaxing Refined Mechanics Hi-Tech Co., Ltd | **TEST STANDARD:** | FCC Part 15.231 (C) |
| **MODEL TESTED:** | JLD-1 | **PRODUCT:** | Remote Control -1 |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 22°C | **HUMIDITY:** | 56%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Shi Xiting | **DATE OF TEST:** | 2006, September 18 |

| | |
|---|---|
| **SETUP METHOD:** | ANSI C63.4 - 2003 |
| **BANDWIDTH REQUIREMENT:** | 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. |
| **TEST VOLTAGE:** | 12VDC (1*12V alkaline battery) |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, modulated |
| **RESULTS:** | The EUT meets the bandwidth requirement. The test results relate only to the equipment under test provided by client. |
| **CHANGES OR MODIFICATIONS:** | There were no modifications installed by EMC Compliance Management Group (China) test personnel. |
| **M. UNCERTAINTY:** | Freq. $\pm 2x10^{-7}$ x Center Freq., Amp $\pm$2.6 dB |

## *Test Data (Fundamental Frequency)*



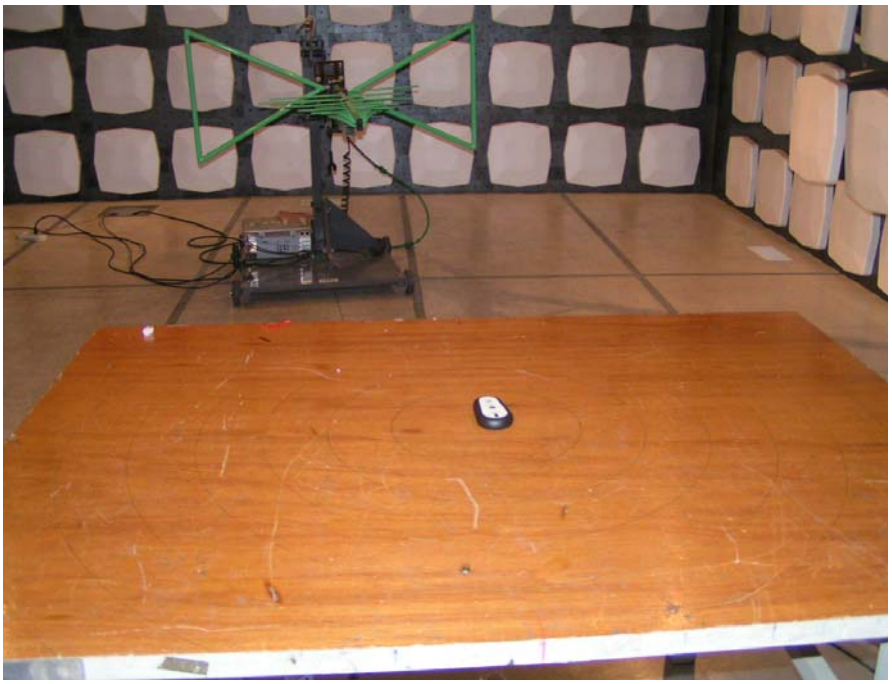

*20dB Bandwidth*

| *Frequency (MHz)* | | | *Test Result (MHz)* | *Bandwidth Limit (MHz) ($F_{center}$ x 0.25%)* | *Conclusion* |
|---|---|---|---|---|---|
| *Center* | *Left* | *Right* | | | |
| *433.789* | *0.10725* | *0.11600* | *0.22325* | *1.0845* | *Compliance* |

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| Spectrum | R&S | ESCI | 1166.595003<br>100065 | 11/23/05 | 11/22/06 |
| Bilog Antenna | CHASE | CBL6112 | 117.0800.20 | 02/17/06 | 02/16/07 |
| Anechoic Chamber | LINDGREN | FACT-3 | 601 | 01/10/06 | 01/09/07 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Shi-xiting _____ **REVIEWED BY:** Hangzhao _____

**ENGINEER** **SENIOR ENGINEER**



***Bandwidth Test Set-up***