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# FCC CERTIFICATION RADIO MEASUREMENT TECHNICAL REPORT

On Model Name:SAGA1-K Series Industrial Radio Remote Control

Model Number : SAGA1-K1/K2/K3/K4

Trademark : 


FCC ID : NCT081K

Prepared for Gain Electronic Co., Ltd.

According to FCC Part 15 (2006), Subpart C
According to IC RSS-210

| | |
|---|---|
| *Test Report #:* | *KAO-0712-6704-FCC* |
| *Prepared by:* | *Cherry Chang* |
| *Reviewed by:* | *Harry Zhao* |
| *QC Manager:* | *Paul Chen* |

*Test Report Released by:* Paul J. Chen *2008 January 9*

*Paul Chen* *Date*

## *Test Location*

*Tests performed at Training Research Co., Ltd. in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.*

| | |
|---|---|
| *Test Site Location:* | *Training Research Co., Ltd.*<br>*No.255,Nanyang St., Shijr City,*<br>*Taipei Hsien 221,Taiwan* |
| *Tel:* | *886-2-2693-5155* |
| *Fax:* | *886-2-2693-4440* |
| *Registration Number:* | *93906* |

## *Accreditation Bodies*

*Training Research Co., Ltd. is a fully accredited Test Laboratory for ITE, ISM, MIL-STD and Telecommunications Products.*

*Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code # 200174-0.*

*TRC is ECMG's subcontract Lab.*
*TRC conduct the related EMC/RF test. ECMG collect and generate the report.*

# Table of Contents

## *Disclaimer Notice*

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## *Opinions and Interpretations*

*This test report relates to the abovementioned equipment under test (EUT). Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.*

## *Statement of Measurement Uncertainty*

*The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.*

## *Administrative Data*

*Test Sample: SAGA1-K Series Industrial Radio Remote Control*

*Model Number : SAGA1-K1/K2/K3/K4*

*Trade Mark :* 


*Date Tested : 2008 January 8*

*Applicant : Gain Electronic Co., Ltd.*
*4F-1,288-5,Hsin-Ya Rd, Chien-Chen Zone*
*Kaohsiung, Taiwan, R.O.C*

*Telephone : 886-7-812-5730*

*Fax : 886-7-815-7253*

*Manufacturer : Gain Electronic Co., Ltd.*
*4F-1,288-5,Hsin-Ya Rd, Chien-Chen Zone*
*Kaohsiung, Taiwan, R.O.C*

## *EUT Description*

*Gain Electronic Co., Ltd. Model number SAGA1-K1/K2/K3/K4 (referred to as the EUT in this test report) is a Industrial Radio Remote Control.*

*The SAGA1-K1/2/3/4 are having the same design structure and the main differences between K1,K2,K3 and K4 are just number of pushbuttons & relays.*

*SAGA1-K1*
*8 Single Step Pushbuttons.*

*SAGA1-K2*
*8 Double Step Pushbuttons.*

*SAGA1-K3*
*12 Single Step Pushbuttons.*

*SAGA1-K4*
*12 Double Step Pushbuttons.*

**Transmitter Unit**

Power: AA Size Battery x 4 Batteries
Emission Power: <10mW
Pushbutton Type : Single/Two Step
Dimension: 163x49x45mm (LxWxH)
Weight: Approx. 265 g (including batteries)

**Receiver Unit**

Power: 48/110/220/380VAC (50/60Hz) ، ± 20%
Relay: 5A/250VAC
Dimensions: 167x154x88mm (LxWxH)
Weight: about 1220 g (excluding wire cable)

**General Specification**

Frequency Range: 433.05~434.7875MHz
ID Code: $2^{20}$ sets
Channel Space: 25 KHz
Hamming Distance: ≥4
Housing Material: Reinforced Plastic and Glass Fiber
Protection Class: IP65
Operating Temp.: -40℃ ~ +85℃
Maximum Operating Range: Up to 100 Meters

## *Test Summary*

*The Electromagnetic Compatibility requirements on SAGA1-K2 TX 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 2* |
| *FCC Part 15.207* | *Conducted Limits* | *Test is not applicable, because EUT only employ battery power for operation.* | |
| *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 3* |
| *(b)* | *Field Strength of Fundamental and Spurious Emissions* | *Compliance* | *Attachment 4* |
| *(c)* | *Bandwidth 20dB* | *Compliance* | *Attachment 5* |
| *IC RSS-210* | *Bandwidth 99%* | *Compliance* | *Attachment 6* |

## *Test Mode Justification*

*The test modes (Lie, Stand ) were done for testing.*
*X,Y define Lie, Z define Stand.*

*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*

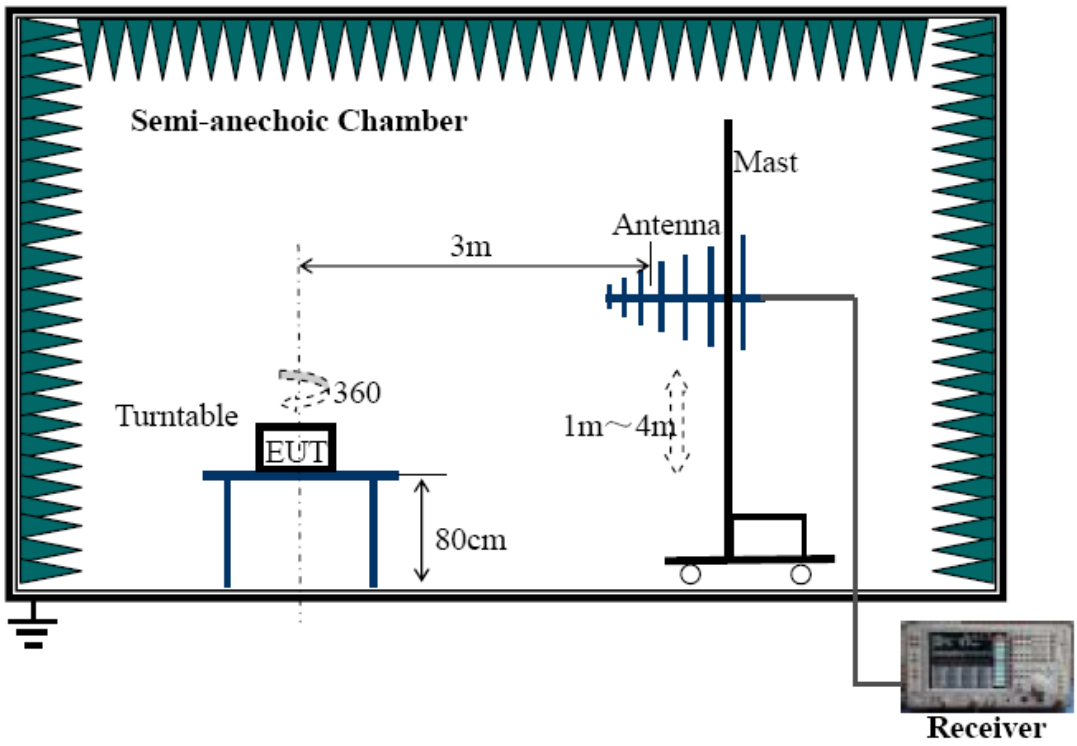
*Any modifications installed previous to testing by Gain Electronic Co., Ltd. will be incorporated in each production model sold or leased in United States.*

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

## Test System Details

| EUT | |
|---|---|
| Model Number: | SAGA1-K1/K2/K3/K4 |
| Trademark:: | |
| Serial Number: | Engineering Sample |
| Input Voltage: | 6V DC (4*1.5V AA battery) |
| Description: | Industrial Radio Remote Control |
| Manufacturer: | Gain Electronic Co., Ltd. |
| **Support Equipment** | |
| None | |
| **Cable Description** | |
| None | |

## *Configuration of Tested System*



## *EUT Sample Photos*


*Sample Photo 1*

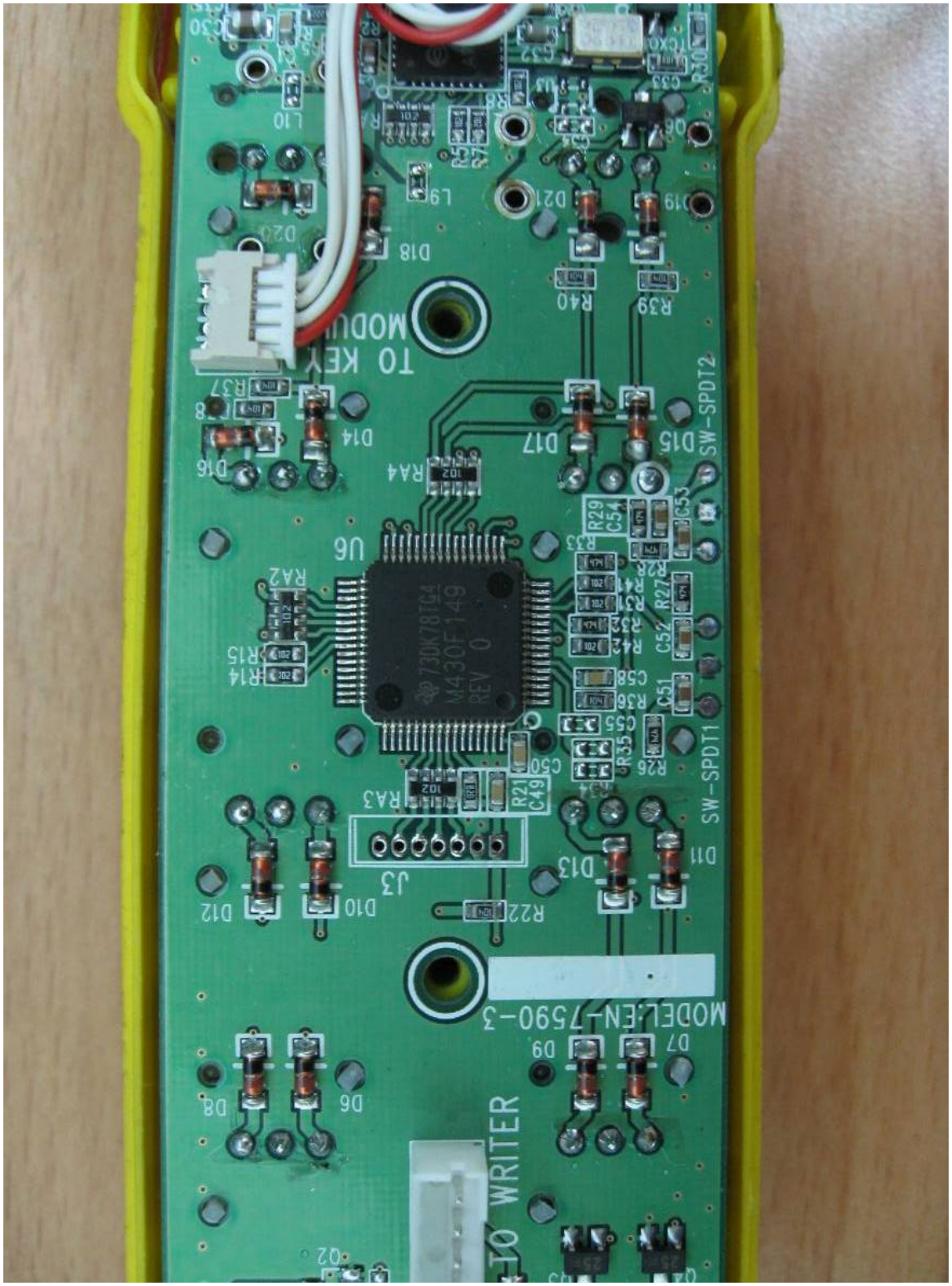

*Sample Photo 2*


*Sample Photo 3*

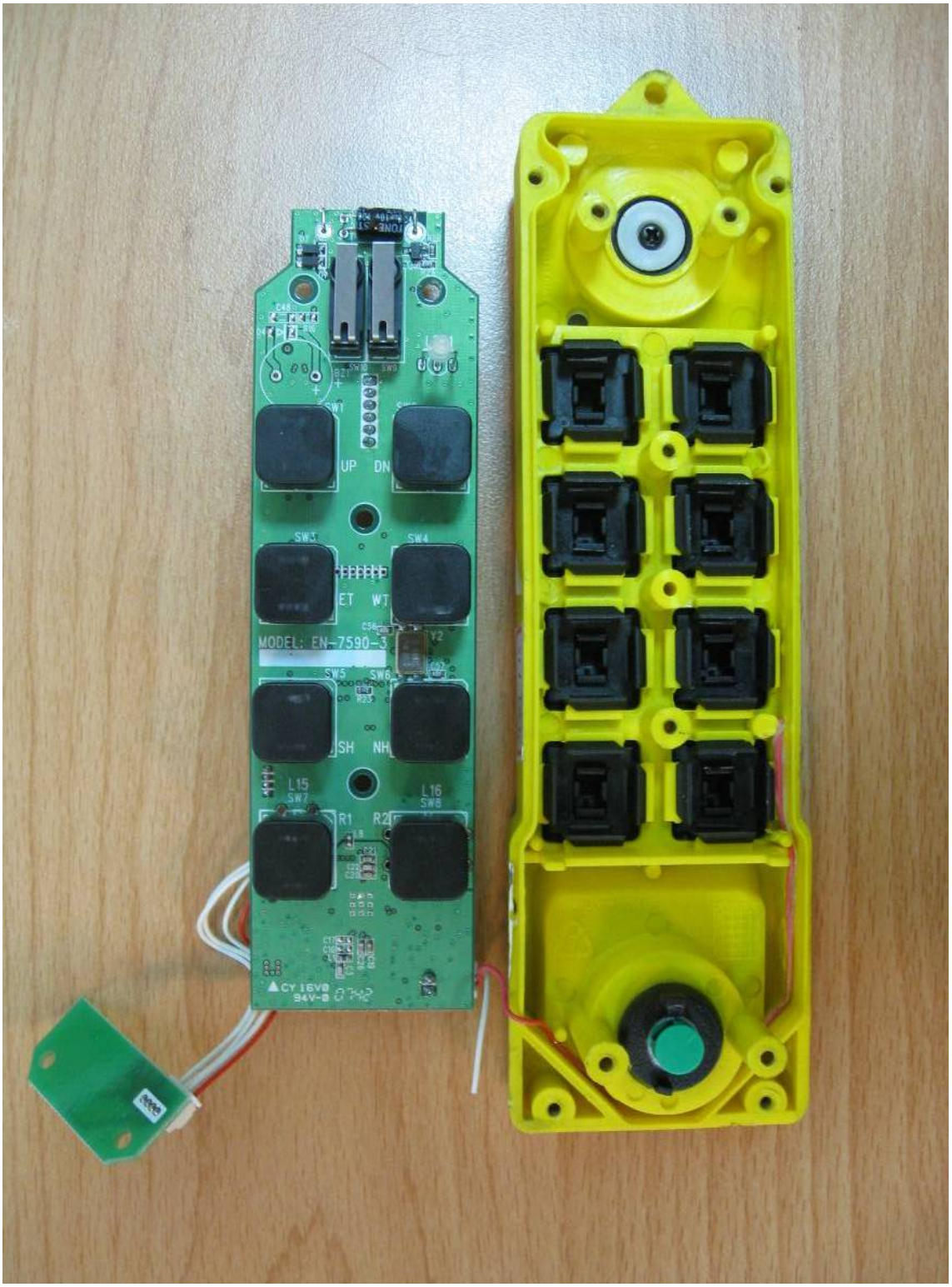

*Sample Photo 4*


*Sample Photo 5*

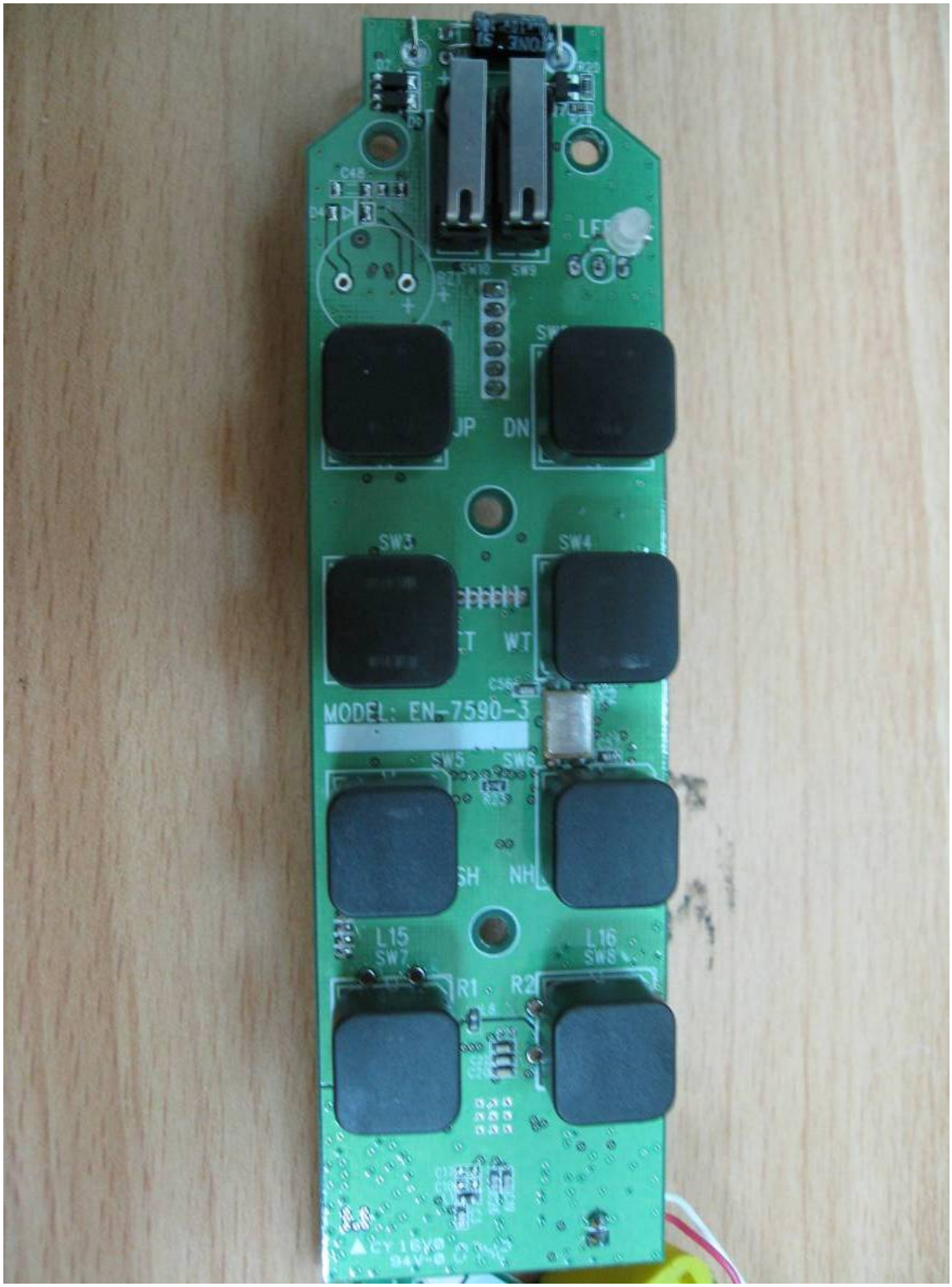

***Sample Photo 6***



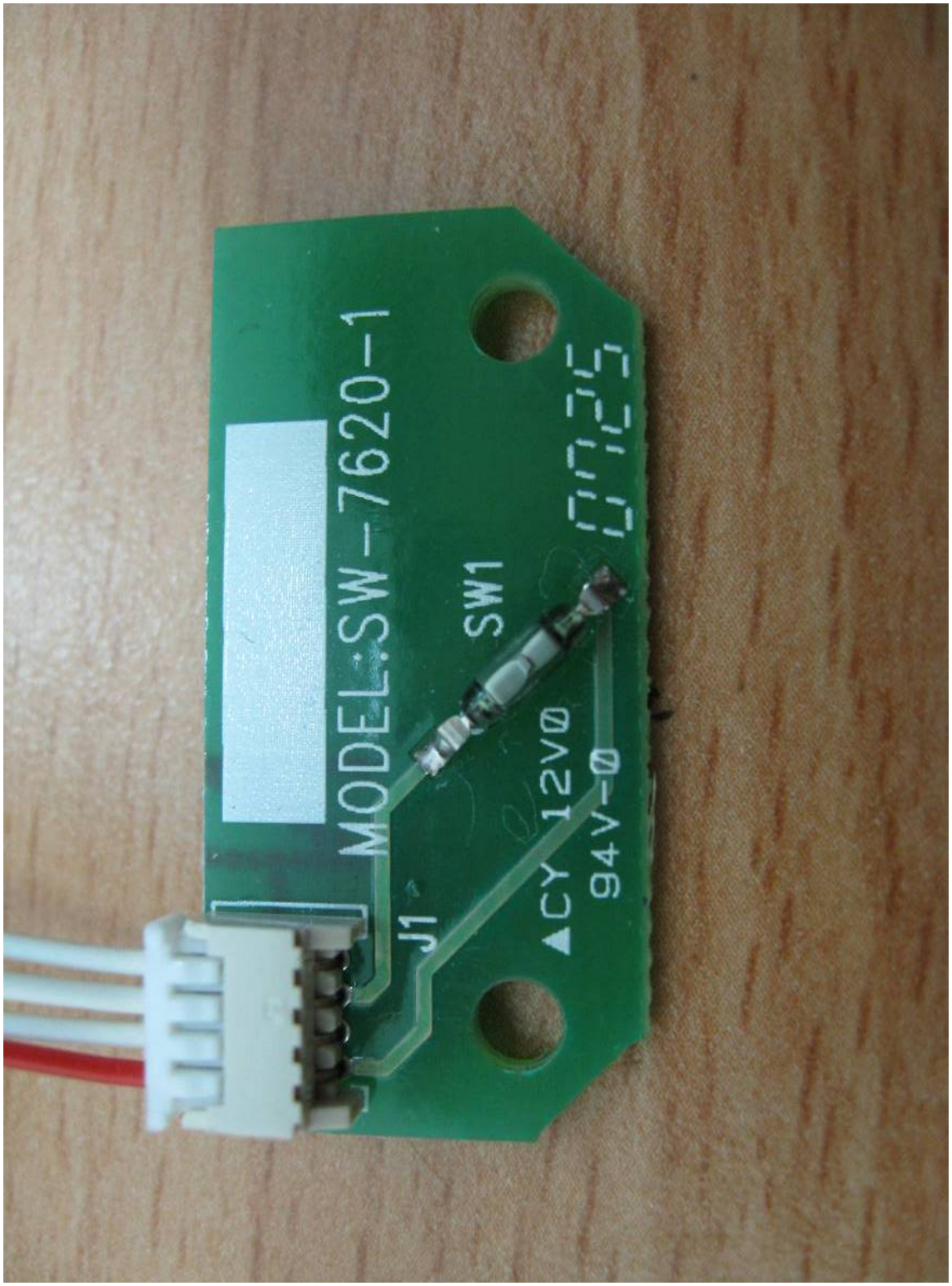

***Sample Photo 7***



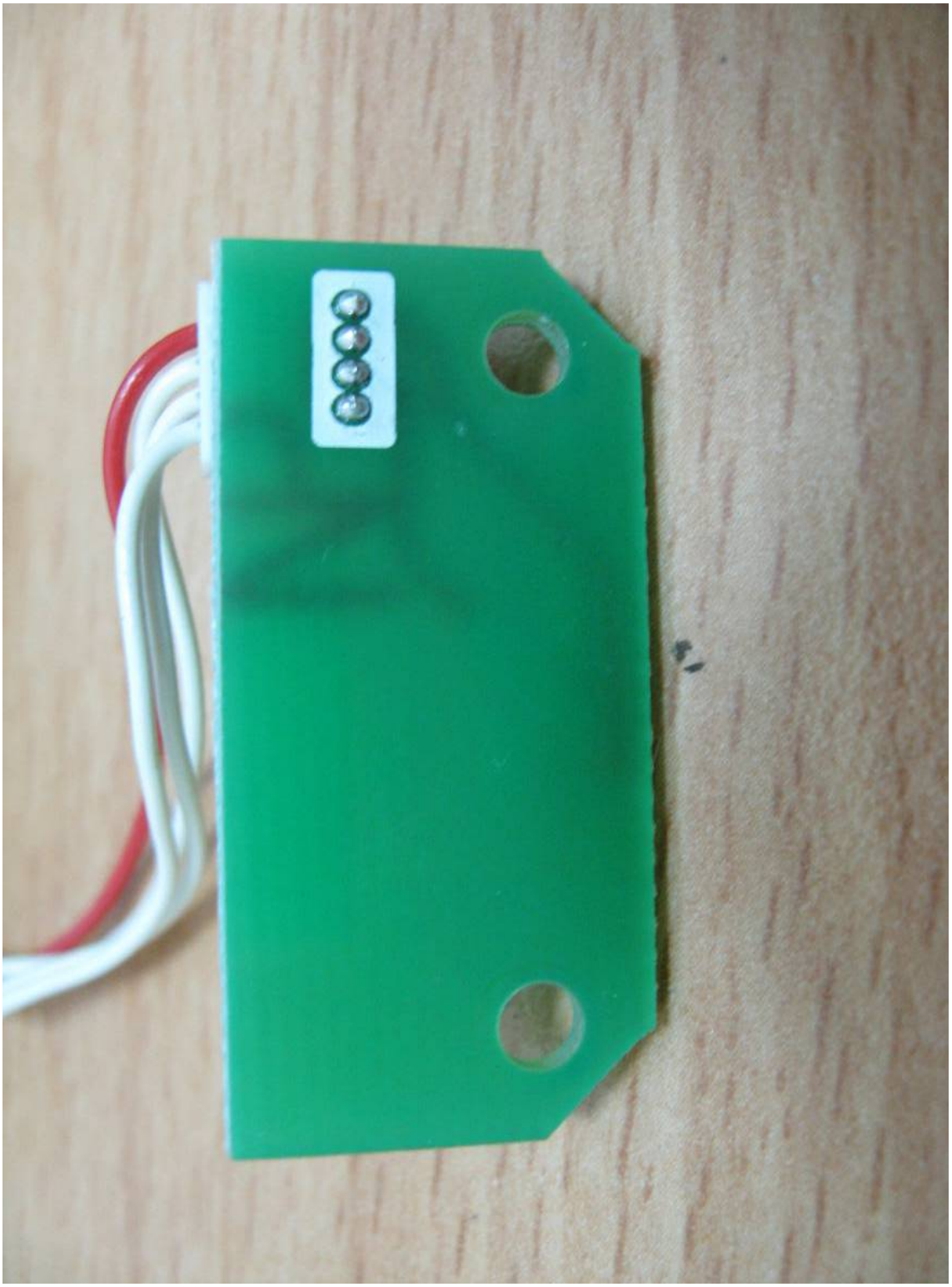

*Sample Photo 8*




*Sample Photo 9*




*Sample Photo 10*



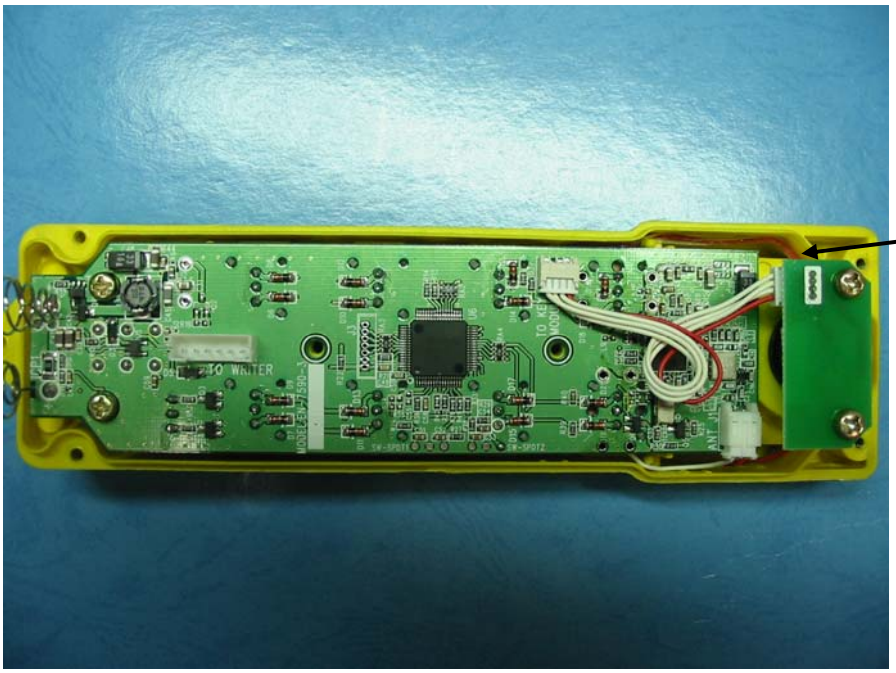
*Sample Photo 11*

## ATTACHMENT 1 – ANTENNA REQUIREMENT

| | | | |
|---|---|---|---|
| **CLIENT:** | Gain Electronic Co., Ltd. | **TEST RULE:** | FCC Part 15.203 (2006)<br>RSS 210 |
| **MODEL NUMBER:** | SAGA1-K2 TX | **PRODUCT:** | SAGA1-K Series Industrial Radio Remote Control |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 21°C | **HUMIDITY:** | 55%RH |
| **ATM PRESSURE:** | 101.8 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Naing-Win | **DATE OF TEST:** | 2008 January 8 |

| | |
|---|---|
| **SETUP STANDARD:** | 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:** | 6V DC (4*1.5V AA 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 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 – RESTRICTED BAND OF OPERATION

| | | | |
|---|---|---|---|
| **CLIENT:** | Gain Electronic Co., Ltd. | **TEST RULE:** | FCC 15.205 (2006 )<br>RSS 210 2.2(a) |
| **MODEL NUMBER:** | SAGA1-K2 TX | **PRODUCT:** | SAGA1-K Series Industrial Radio Remote Control |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 21°C | **HUMIDITY:** | 55%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Naing.Win | **DATE OF TEST:** | 2008 January 8 |

| | |
|---|---|
| **SETUP STANDARD:** | 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 6000MHz |
| **TEST VOLTAGE:** | 6VDC (4*1.5V AA battery) |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, FSK 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 test personnel. |
| **M. UNCERTAINTY:** | Freq. $\pm$ 2x10$^{-7}$ x Center Freq., Amp $\pm$ 2.6 dB |

## *FCC Restricted Band:*

| 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

## *IC Restricted Band:*

| MHz |
|---|
| 0.090-0.110 |
| 2.1735-2.1905 |
| 3.020-3.026 |
| 4.125-4.128 |
| 4.17725-4.17775 |
| 4.20725-4.20775 |
| 5.677-5.683 |
| 6.215-6.218 |
| 6.26775-6.26825 |
| 6.31175-6.31225 |
| 8.291-8.294 |
| 8.362-8.366 |
| 8.37625-8.38675 |
| 8.41425-8.41475 |
| 12.29-12.293 |
| 12.51975-12.52025 |
| 12.57675-12.57725 |
| 13.36-13.41 |
| 16.42-16.423 |
| 16.69475-16.69525 |
| 16.80425-16.80475 |
| 25.5-25.67 |
| 37.5-38.25 |

| MHz |
|---|
| 73-74.6 |
| 74.8-75.2 |
| 108-138 |
| 156.52475-156.52525 |
| 156.7-156.9 |
| 240-285 |
| 322-335.4 |
| 399.9-410 |
| 608-614 |
| 960-1427 |
| 1435-1626.5 |
| 1645.5-1646.5 |
| 1660-1710 |
| 1718.8-1722.2 |
| 2200-2300 |
| 2310-2390 |
| 2655-2900 |
| 3260-3267 |
| 3332-3339 |
| 3345.8-3358 |
| 3500-4400 |
| 4500-5150 |
| 5350-5460 |

| MHz |
|---|
| 7250-7750 |
| 8025-8500 |

| GHz |
|---|
| 9.0-9.2 |
| 9.3-9.5 |
| 10.6-12.7 |
| 13.25-13.4 |
| 14.47-14.5 |
| 15.35-16.2 |
| 17.7-21.4 |
| 22.01-23.12 |
| 23.6-24.0 |
| 31.2-31.8 |
| 36.43-36.5 |
| Above 38.6 |

**Note:** Certain frequency bands listed in Table 1 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard as well as in RSS-310.

## Ch1:

| Freq(MHz) | Amp(dBuV) | Margin(dB) | Limit(dBuV) | CF(dB) | Angle | Height | QP |
|---|---|---|---|---|---|---|---|
| * 436.19 | 72.10 | 26.10 | 80.79 | 0.56 | 254 | 1.00 | --- |
| 870.26 | 33.53 | -12.47 | 60.79 | 14.04 | 55 | 1.00 | --- |

***Test Data (Below 1GHz)***

## Ch70:

| Freq(MHz) | Amp(dBuV) | Margin(dB) | Limit(dBuV) | CF(dB) | Angle | Height | QP |
|---|---|---|---|---|---|---|---|
| * 438.61 | 73.49 | 27.49 | 80.85 | 0.67 | 77 | 1.00 | --- |
| 875.11 | 33.20 | -12.80 | 60.85 | 14.22 | 336 | 1.00 | --- |

***Test Data (Below 1GHz)***

## Ch1:

| 頻率 Frequency | 天線高度 Antenna height | 轉桌角度 Table angle | 干擾讀值 峰值 / 平均 Raw value Peak / Avg | | 校正參數 Correction factor | 校正後讀值 峰值 / 平均 Emission level Peak / Avg | | 限制值 峰值 / 平均 Limit Peak / Avg | | 餘裕 Margin |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | m | degree | dBuV | | dB/m | dBuV/m | | dBuV/m | | dB |
| 1731.25 | 1.00 | 210.00 | 36.24 | --- | 0.65 | 36.89 | --- | 73.96 | 53.96 | -17.07 |
| 2597.92 | 1.00 | 185.00 | 29.57 | --- | 7.61 | 37.18 | --- | 73.96 | 53.96 | -16.78 |
| 3464.58 | 1.00 | 40.00 | 29.08 | --- | 10.31 | 39.39 | --- | 73.96 | 53.96 | -14.57 |
| 4331.25 | 1.00 | 156.00 | 28.91 | --- | 12.96 | 41.87 | --- | 73.96 | 53.96 | -12.09 |

*Peak-----RBW:1MHZ VBW:1MHZ*
*Avg------ RBW:1MHZ VBW:10HZ*
*Sweep time:auto*

***Test Data (Above 1GHz)***

## Ch70:

| 頻率 Frequency | 天線高度 Antenna height | 轉桌角度 Table angle | 干擾讀值 峰值 / 平均 Raw value Peak / Avg | | 校正參數 Correction factor | 校正後讀值 峰值 / 平均 Emission level Peak / Avg | | 限制值 峰值 / 平均 Limit Peak / Avg | | 餘裕 Margin |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | m | degree | dBuV | | dB/m | dBuV/m | | dBuV/m | | dB |
| 1304.17 | 1.00 | 275.00 | 32.74 | --- | 0.78 | 33.52 | --- | 73.96 | 53.96 | -20.44 |
| 1739.58 | 1.00 | 175.00 | 48.24 | --- | 0.67 | 48.91 | --- | 73.96 | 53.96 | -5.05 |
| 2172.92 | 1.00 | 91.00 | 31.08 | --- | 5.19 | 36.27 | --- | 73.96 | 53.96 | -17.70 |
| 2606.25 | 1.00 | 314.00 | 29.40 | --- | 7.67 | 37.07 | --- | 73.96 | 53.96 | -16.89 |
| 3041.67 | 1.00 | 270.00 | 30.24 | --- | 9.30 | 39.54 | --- | 73.96 | 53.96 | -14.42 |
| 4347.92 | 1.00 | 299.00 | 28.57 | --- | 12.98 | 41.55 | --- | 73.96 | 53.96 | -12.41 |

*Peak-----RBW:1MHZ VBW:1MHZ*
*Avg------ RBW:1MHZ VBW:10HZ*
*Sweep time:auto*

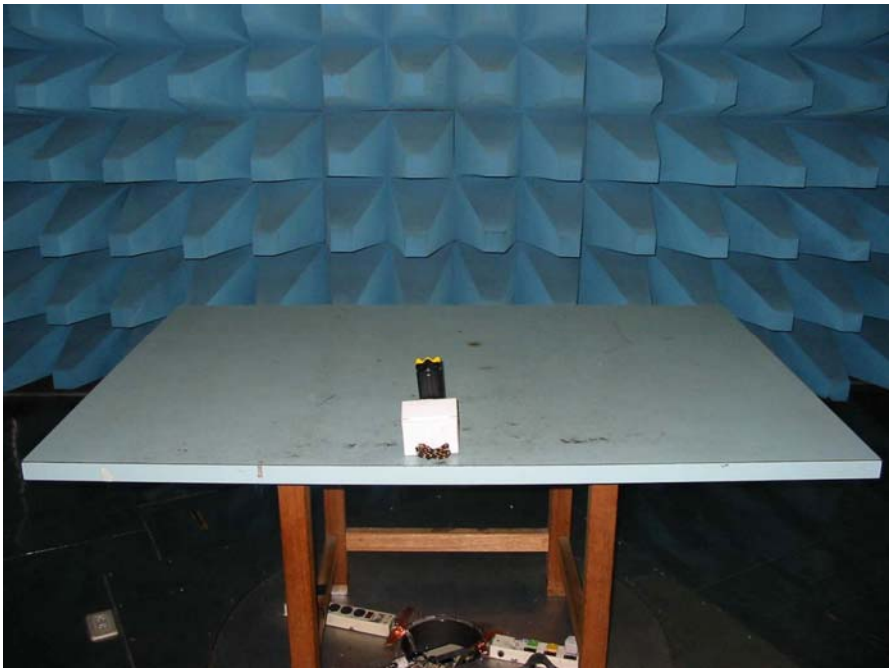
***Test Data (Above 1GHz)***

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| EMI Receiver | 8546A | HP | 3520A00242 | 09/06/06 | 03/05/08 |
| RF Filter Section | 85460A | HP | 3448A00217 | 09/06/06 | 03/05/08 |
| Small Biconical Antenna (30MHz to 1GHz) | UBAA9114&BBVU9135 | Schwarzeck | 127 | 12/07/06 | 03/06/08 |
| Pre-amplifier | PA1F(1-6G) | TRC | 1FAC | 04/10/07 | 04/10/08 |
| Auto Switch Box (>30MHz) | ASB-01 | TRC | 9904-01 | 04/10/07 | 04/10/08 |
| Coaxial Cable (Double shielded, 15meter) | A30A30-0058-50FS-15M | Jyebao | SMA-01 | 04/10/07 | 04/10/08 |
| Coaxial Cable (1.1 meter) | A30A30-0058-50FS-1M | Jyebao | SMA-02 | 04/10/07 | 04/10/08 |
| Spectrum Analyzer | 8564E | HP | 3720A00840 | 12/11/06 | 03/10/08 |
| Microwave Preamplifier | 84125C | HP | US36433002 | 04/20/07 | 04/19/08 |
| Horn Antenna | 3115 | EMCO | 9104-3668 | 02/05/07 | 02/05/08 |
| Standard Guide Horn Antenna | 84125-80008 | HP | 18-26.5GHz | 12/14/07 | 12/13/08 |
| Standard Guide Horn Antenna | 84125-80001 | HP | 26.5-40GHz | 12/14/07 | 12/14/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Naing-Win **REVIEWED BY:** **Harry**

**ENGINEER** **SENIOR ENGINEER**

*Radiated Emissions Test Set-up (Below 1GHz)*



*Radiated Emissions Test Set-up (Above 1GHz)*

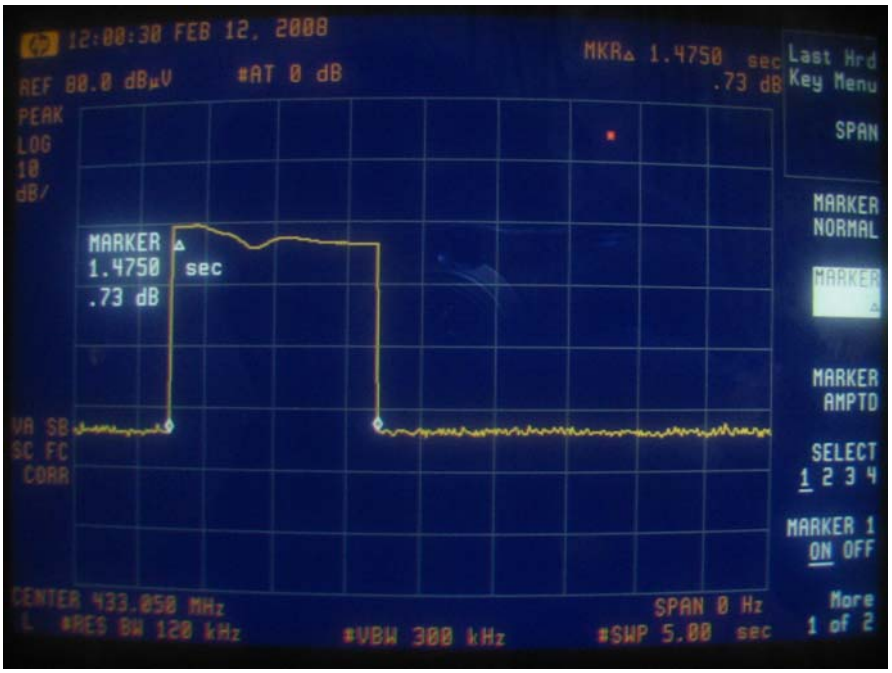
## ATTACHMENT 3 – OPERATION MODE

| | | | |
|---|---|---|---|
| **CLIENT:** | Gain Electronic Co., Ltd. | **TEST RULE:** | FCC Part 15.231 (a) (2006)<br>RSS 210 A1.1.1(b) |
| **MODEL NUMBER:** | SAGA1-K2 TX | **PRODUCT:** | SAGA1-K Series Industrial Radio Remote Control |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 21°C | **HUMIDITY:** | 55%RH |
| **ATM PRESSURE:** | 101.8 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Naing.Win | **DATE OF TEST:** | 2008 January 8 |

| | |
|---|---|
| **SETUP STANDARD:** | 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) 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>(3) 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:** | 6VDC (4*1.5V AA battery) |
| **TEST STATUS:** | Normal Operation As Usual |
| **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 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 of life, when activated to signal an alarm, may operate during the | The transmitter operates manually and does not perform periodic transmissions. |

| | | |
|---|---|---|
| | *pendency of the alarm condition.* | |




*From the picture, the sweep time is 5 seconds. And the signal is around 1.5 second after the push button released according to this picture.*
*( Test Result = 1.5 sec <  5 sec. )*

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| EMI Receiver | 8546A | HP | 3520A00242 | 09/06/06 | 03/05/08 |
| RF Filter Section | 85460A | HP | 3448A00217 | 09/06/06 | 03/05/08 |
| Small Biconical Antenna (30MHz to 1GHz) | UBAA9114&BBVU9135 | Schwarzeck | 127 | 12/07/06 | 03/06/08 |
| Pre-amplifier | PA1F(1-6G) | TRC | 1FAC | 04/10/07 | 04/10/08 |
| Auto Switch Box (>30MHz) | ASB-01 | TRC | 9904-01 | 04/10/07 | 04/10/08 |
| Coaxial Cable (Double shielded, 15meter) | A30A30-0058-50FS-15M | Jyebao | SMA-01 | 04/10/07 | 04/10/08 |
| Coaxial Cable (1.1 meter) | A30A30-0058-50FS-1M | Jyebao | SMA-02 | 04/10/07 | 04/10/08 |
| Spectrum Analyzer | 8564E | HP | 3720A00840 | 12/11/06 | 03/10/08 |
| Microwave Preamplifier | 84125C | HP | US36433002 | 04/20/07 | 04/19/08 |
| Horn Antenna | 3115 | EMCO | 9104-3668 | 02/05/07 | 02/05/08 |
| Standard Guide Horn Antenna | 84125-80008 | HP | 18-26.5GHz | 12/14/07 | 12/13/08 |
| Standard Guide Horn Antenna | 84125-80001 | HP | 26.5-40GHz | 12/14/07 | 12/14/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Naing-Win **REVIEWED BY:** **Harry**

**ENGINEER** **SENIOR ENGINEER**

## *ATTACHMENT 4 –FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSIONS*

| | | | |
|---|---|---|---|
| **CLIENT:** | Gain Electronic Co., Ltd. | **TEST RULE:** | FCC Part 15.231(b), FCC Part 15.35<br>RSS 210 A1.1.2 |
| **MODEL NUMBER:** | SAGA1-K2 TX | **PRODUCT:** | SAGA1-K Series Industrial Radio Remote Control |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 21°C | **HUMIDITY:** | 53%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Naing.Win | **DATE OF TEST:** | 2008 January 8 |

| | |
|---|---|
| **SETUP STANDARD:** | 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 6000MHz |
| **TEST VOLTAGE:** | 6VDC (4*1.5V AA battery) |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, FSK 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 test personnel. |
| **M. UNCERTAINTY:** | Freq. ± 2x10-7 x Center Freq., Amp ± 2.6 dB |

*Peak value of the measured emissions:*

## Ch1:

| 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) |
|---|---|---|---|---|---|---|---|---|
| X | Horizontal | Fundamental | 433.050 | 71.54 | 0.56 | 72.10 | 80.7 | -8.6 |
| | | Spurious | 870.26 | 19.49 | 14.04 | 33.53 | 60.7 | -27.17 |
| | | Spurious | 1731.25 | 36.24 | 0.65 | 37.49 | 60.7 | -23.21 |
| | | Spurious | 2597.92 | 29.57 | 7.61 | 37.78 | 60.7 | -22.92 |
| | | Spurious | 3464.58 | 29.08 | 10.31 | 39.99 | 60.7 | -20.71 |
| | | Spurious | 4331.25 | 28.91 | 12.96 | 42.47 | 60.7 | -18.23 |
| | Vertical | Fundamental | 433.050 | 60.12 | 0.56 | 60.68 | 80.7 | -20.2 |
| | | Spurious | 870.26 | 18.75 | 14.04 | 32.79 | 60.7 | -27.91 |
| | | Spurious | 1731.25 | 33.91 | 0.65 | 35.16 | 60.7 | -25.54 |
| | | Spurious | 2597.92 | 30.90 | 7.61 | 39.11 | 60.7 | -21.59 |
| | | Spurious | 3464.58 | 29.58 | 10.31 | 40.49 | 60.7 | -18.21 |
| | | Spurious | 4331.25 | 29.08 | 12.96 | 42.64 | 60.7 | -18.06 |
| Y | Horizontal | Fundamental | 433.050 | 72.48 | 0.56 | 73.04 | 80.7 | -7.66 |
| | | Spurious | 870.26 | 18.84 | 14.04 | 32.88 | 60.7 | -27.88 |
| | | Spurious | 1731.25 | 35.58 | 0.65 | 36.83 | 60.7 | -23.87 |
| | | Spurious | 2597.92 | 30.74 | 7.61 | 38.95 | 60.7 | -21.75 |
| | | Spurious | 3464.58 | 29.41 | 10.31 | 40.32 | 60.7 | -20.38 |
| | | Spurious | 4331.25 | 28.74 | 12.96 | 42.3 | 60.7 | -18.4 |
| | Vertical | Fundamental | 433.050 | 61.78 | 0.56 | 62.34 | 80.7 | -18.36 |
| | | Spurious | 870.26 | 18.22 | 14.04 | 32.26 | 60.7 | -28.44 |
| | | Spurious | 1731.25 | 35.08 | 0.65 | 36.33 | 60.7 | -24.37 |
| | | Spurious | 2597.92 | 30.57 | 7.61 | 38.78 | 60.7 | -21.92 |
| | | Spurious | 3464.58 | 30.41 | 10.31 | 41.32 | 60.7 | -19.38 |
| | | Spurious | 4331.25 | 29.74 | 12.96 | 43.3 | 60.7 | -17.4 |
| Z | Horizontal | Fundamental | 433.050 | 65.63 | 0.56 | 66.15 | 80.7 | -14.55 |
| | | Spurious | 870.26 | 19.54 | 14.04 | 33.58 | 60.7 | -27.12 |
| | | Spurious | 1731.25 | 36.58 | 0.65 | 37.83 | 60.7 | -22.87 |
| | | Spurious | 2597.92 | 29.57 | 7.61 | 37.78 | 60.7 | -22.92 |
| | | Spurious | 3464.58 | 30.24 | 10.31 | 41.15 | 60.7 | -19.55 |
| | | Spurious | 4331.25 | 28.74 | 12.96 | 42.3 | 60.7 | -18.4 |
| | Vertical | Fundamental | 433.050 | 70.55 | 0.56 | 71.17 | 80.7 | -9.53 |
| | | Spurious | 870.26 | 18.59 | 14.04 | 32.63 | 60.7 | -28.07 |
| | | Spurious | 1731.25 | 34.74 | 0.65 | 35.99 | 60.7 | -24.71 |
| | | Spurious | 2597.92 | 29.74 | 7.61 | 37.95 | 60.7 | -22.75 |
| | | Spurious | 3464.58 | 30.24 | 10.31 | 41.15 | 60.7 | -19.55 |
| | | Spurious | 4331.25 | 28.58 | 12.96 | 42.14 | 60.7 | -18.56 |

*Factor: Amplifier + Cable less + Antenna factor*

## Ch 70:

| 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) |
|---|---|---|---|---|---|---|---|---|
| X | Horizontal | Fundamental | 434.774 | 72.82 | 0.67 | 73.49 | 80.7 | -7.21 |
| | | Spurious | 875.11 | 18.98 | 14.22 | 33.20 | 60.7 | -27.5 |
| | | Spurious | 1304.17 | 32.74 | 0.78 | 34.12 | 60.7 | -26.58 |
| | | Spurious | 1739.58 | 48.24 | 0.67 | 49.51 | 60.7 | -11.19 |
| | | Spurious | 2172.92 | 31.08 | 5.19 | 36.87 | 60.7 | -23.83 |
| | | Spurious | 2606.25 | 29.40 | 7.67 | 37.67 | 60.7 | -23.03 |
| | | Spurious | 3041.67 | 30.24 | 9.30 | 40.14 | 60.7 | -20.56 |
| | | Spurious | 4347.92 | 28.57 | 12.98 | 42.15 | 60.7 | -18.55 |
| | Vertical | Fundamental | 434.774 | 61.42 | 0.67 | 62.09 | 80.7 | -18.61 |
| | | Spurious | 875.11 | 18.82 | 14.22 | 33.04 | 60.7 | -27.66 |
| | | Spurious | 1304.17 | 33.08 | 0.78 | 34.46 | 60.7 | -26.24 |
| | | Spurious | 1739.58 | 40.24 | 0.67 | 41.51 | 60.7 | -19.19 |
| | | Spurious | 2172.92 | 31.91 | 5.19 | 37.7 | 60.7 | -23 |
| | | Spurious | 2606.25 | 29.57 | 7.67 | 37.84 | 60.7 | -22.86 |
| | | Spurious | 3041.67 | 30.41 | 9.30 | 40.31 | 60.7 | -20.39 |
| | | Spurious | 4347.92 | 28.90 | 12.98 | 42.48 | 60.7 | -18.22 |
| Y | Horizontal | Fundamental | 434.774 | 73.93 | 0.67 | 74.60 | 80.7 | -6.1 |
| | | Spurious | 875.11 | 19.61 | 14.22 | 33.83 | 60.7 | -26.87 |
| | | Spurious | 1304.17 | 32.74 | 0.78 | 34.12 | 60.7 | -26.58 |
| | | Spurious | 1739.58 | 43.58 | 0.67 | 44.85 | 60.7 | -15.85 |
| | | Spurious | 2172.92 | 31.74 | 5.19 | 37.53 | 60.7 | -23.17 |
| | | Spurious | 2606.25 | 30.07 | 7.67 | 38.34 | 60.7 | -22.36 |
| | | Spurious | 3041.67 | 30.07 | 9.30 | 39.97 | 60.7 | -20.73 |
| | | Spurious | 4347.92 | 28.57 | 12.98 | 42.15 | 60.7 | -18.55 |
| | Vertical | Fundamental | 434.774 | 55.88 | 0.67 | 56.50 | 80.7 | -24.2 |
| | | Spurious | 875.11 | 19.47 | 14.22 | 33.69 | 60.7 | -27.01 |
| | | Spurious | 1304.17 | 32.91 | 0.78 | 34.29 | 60.7 | -26.41 |
| | | Spurious | 1739.58 | 44.41 | 0.67 | 45.68 | 60.7 | -15.02 |
| | | Spurious | 2172.92 | 31.41 | 5.19 | 37.2 | 60.7 | -23.5 |
| | | Spurious | 2606.25 | 30.07 | 7.67 | 38.34 | 60.7 | -22.36 |
| | | Spurious | 3041.67 | 29.91 | 9.30 | 39.81 | 60.7 | -20.89 |
| | | Spurious | 4347.92 | 28.74 | 12.98 | 42.32 | 60.7 | -18.38 |
| Z | Horizontal | Fundamental | 434.774 | 68.43 | 0.67 | 69.10 | 80.7 | -11.6 |
| | | Spurious | 875.11 | 20.11 | 14.22 | 34.33 | 60.7 | -26.37 |
| | | Spurious | 1304.17 | 35.24 | 0.78 | 36.62 | 60.7 | -24.08 |
| | | Spurious | 1739.58 | 51.08 | 0.67 | 52.35 | 60.7 | -8.35 |
| | | Spurious | 2172.92 | 33.91 | 5.19 | 39.7 | 60.7 | -21 |
| | | Spurious | 2606.25 | 31.57 | 7.67 | 39.84 | 60.7 | -20.86 |
| | | Spurious | 3041.67 | 30.41 | 9.30 | 40.31 | 60.7 | -20.39 |
| | | Spurious | 4347.92 | 29.90 | 12.98 | 43.48 | 60.7 | -17.22 |
| | Vertical | Fundamental | 434.774 | 71.7 | 0.67 | 72.37 | 80.7 | -8.33 |
| | | Spurious | 875.11 | 18.66 | 14.22 | 32.88 | 60.7 | -27.82 |
| | | Spurious | 1304.17 | 33.91 | 0.78 | 35.29 | 60.7 | -25.41 |
| | | Spurious | 1739.58 | 43.91 | 0.67 | 45.18 | 60.7 | -15.52 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Z | Vertical | Fundamental | 2172.92 | 33.41 | 5.19 | 39.2 | 60.7 | -21.5 |
| | | Spurious | 2606.25 | 32.74 | 7.67 | 41.01 | 60.7 | -19.69 |
| | | Spurious | 3041.67 | 31.91 | 9.30 | 41.81 | 60.7 | -18.89 |
| | | Spurious | 4347.92 | 29.24 | 12.98 | 42.82 | 60.7 | -17.88 |

*Factor:Amplifier + Cable less + Antenna factor*

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

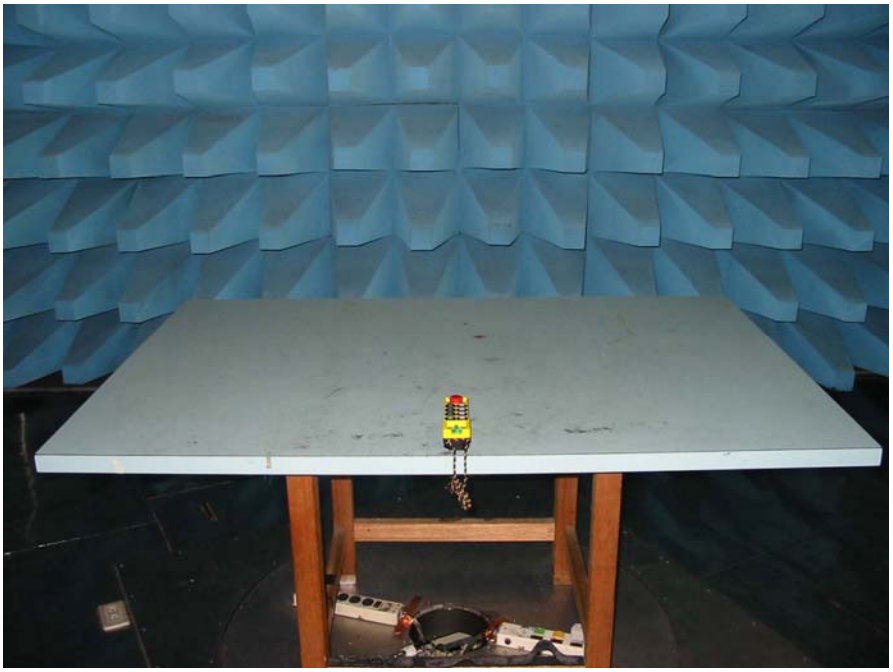
*Duty Cycle Correction Factor is calculated by averaging the sum of the pulse train. Correction factor is measured as follows:*
*Keep the EUT in continuous transmission mode (modulated), and set the spectrum to the fundamental frequency and set the span width to 0 Hz. Then connect a storage oscilloscope 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 maximum value*
*Duty Cycle=20|log 100%=0*

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| EMI Receiver | 8546A | HP | 3520A00242 | 09/06/06 | 03/05/08 |
| RF Filter Section | 85460A | HP | 3448A00217 | 09/06/06 | 03/05/08 |
| Small Biconical Antenna (30MHz to 1GHz) | UBAA9114&BBVU9135 | Schwarzeck | 127 | 12/07/06 | 03/06/08 |
| Pre-amplifier | PA1F(1-6G) | TRC | 1FAC | 04/10/07 | 04/10/08 |
| Auto Switch Box (>30MHz) | ASB-01 | TRC | 9904-01 | 04/10/07 | 04/10/08 |
| Coaxial Cabel (Double shielded, 15meter) | A30A30-0058-50FS-15M | Jyebao | SMA-01 | 04/10/07 | 04/10/08 |
| Coaxial Cabel (1.1 meter) | A30A30-0058-50FS-1M | Jyebao | SMA-02 | 04/10/07 | 04/10/08 |
| Spectrum Analyzer | 8564E | HP | 3720A00840 | 12/11/06 | 03/10/08 |
| Microwave Preamplifier | 84125C | HP | US36433002 | 04/20/07 | 04/19/08 |
| Horn Antenna | 3115 | EMCO | 9104-3668 | 02/05/07 | 02/05/08 |
| Standard Guide Horn Antenna | 84125-80008 | HP | 18-26.5GHz | 12/14/07 | 12/13/08 |
| Standard Guide Horn Antenna | 84125-80001 | HP | 26.5-40GHz | 12/14/07 | 12/14/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Naing.Win **REVIEWED BY:** **Harry**

**ENGINEER** **SENIOR ENGINEER**

*Field Strength Emissions Test Set-up*



*Field Strength Emissions Test Set-up*

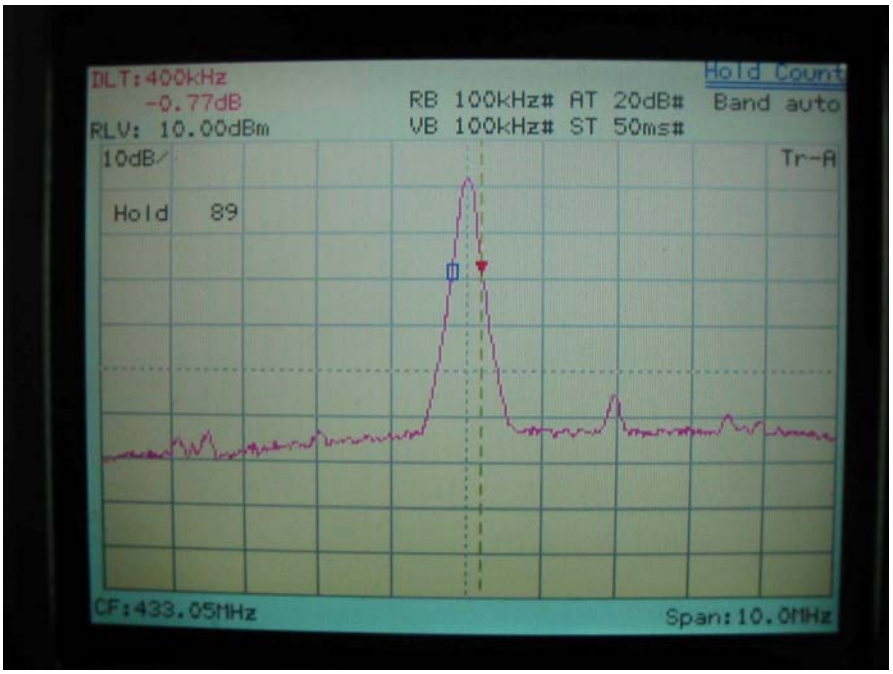
*Field Strength Emissions Test Set-up*

## ATTACHMENT 5 – 20dB BANDWIDTH TEST For FCC Test

| | | | |
|---|---|---|---|
| **CLIENT:** | Gain Electronic Co., Ltd. | **TEST RULE:** | FCC Part 15.231 (C)<br>IC RSS-210 A1.1.3 |
| **MODEL TESTED:** | SAGA1-K2 TX | **PRODUCT:** | SAGA1-K Series Industrial Radio Remote Control |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 21°C | **HUMIDITY:** | 53%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Naing.Win | **DATE OF TEST:** | 2008 January 8 |

| | |
|---|---|
| **SETUP STANDARD:** | 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:** | 6VDC (4*1.5V AA battery) |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, FSK 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 test personnel. |
| **M. UNCERTAINTY:** | Freq. $\pm$ $2x10^{-7}$ x Center Freq., Amp $\pm$ 2.6 dB |

## *Test Data (Fundamental Frequency)*




*433.05MHz Ch1 20dB BW*


*434.78MHz Ch70 20dB BW*

*So, Ch1 20dB Bandwidth =400kHz*

*Ch70 20dB Bandwidth =400kHz*

| *Frequency (MHz)* | *Bandwidth Limit (MHz) ($F_{center}$ x 0.25%)* | *Test Result (MHz) ($F_{end}$-$F_{start}$)* | *Conclusion* |
|---|---|---|---|
| *Center* | | | |
| *Ch1 433.05* | *1.0826* | *0.4* | *Compliance* |
| *Ch70 434.78* | *1.0869* | *0.4* | *Compliance* |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | |

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| EMI Receiver | 8546A | HP | 3520A00242 | 09/06/06 | 03/05/08 |
| RF Filter Section | 85460A | HP | 3448A00217 | 09/06/06 | 03/05/08 |
| Small Biconical Antenna (30MHz to 1GHz) | UBAA9114&BBVU9135 | Schwarzeck | 127 | 12/07/06 | 03/06/08 |
| Pre-amplifier | PA1F(1-6G) | TRC | 1FAC | 04/10/07 | 04/10/08 |
| Auto Switch Box (>30MHz) | ASB-01 | TRC | 9904-01 | 04/10/07 | 04/10/08 |
| Coaxial Cabel (Double shielded, 15meter) | A30A30-0058-50FS-15M | Jyebao | SMA-01 | 04/10/07 | 04/10/08 |
| Coaxial Cabel (1.1 meter) | A30A30-0058-50FS-1M | Jyebao | SMA-02 | 04/10/07 | 04/10/08 |
| Spectrum Analyzer | 8564E | HP | 3720A00840 | 12/11/06 | 03/10/08 |
| Microwave Preamplifier | 84125C | HP | US36433002 | 04/20/07 | 04/19/08 |
| Horn Antenna | 3115 | EMCO | 9104-3668 | 02/05/07 | 02/05/08 |
| Standard Guide Horn Antenna | 84125-80008 | HP | 18-26.5GHz | 12/14/07 | 12/13/08 |
| Standard Guide Horn Antenna | 84125-80001 | HP | 26.5-40GHz | 12/14/07 | 12/14/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Naing.Win **REVIEWED BY:** **Harry**

**ENGINEER** **QC**

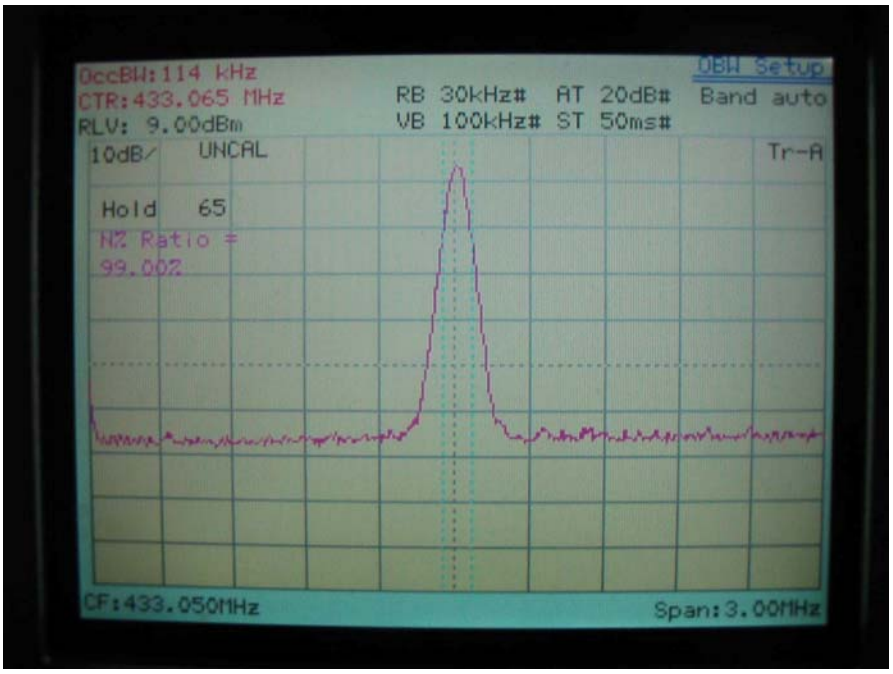
***Bandwidth Test Set-up***

## ATTACHMENT 6 – 99 % BANDWIDTH TEST- For IC Test

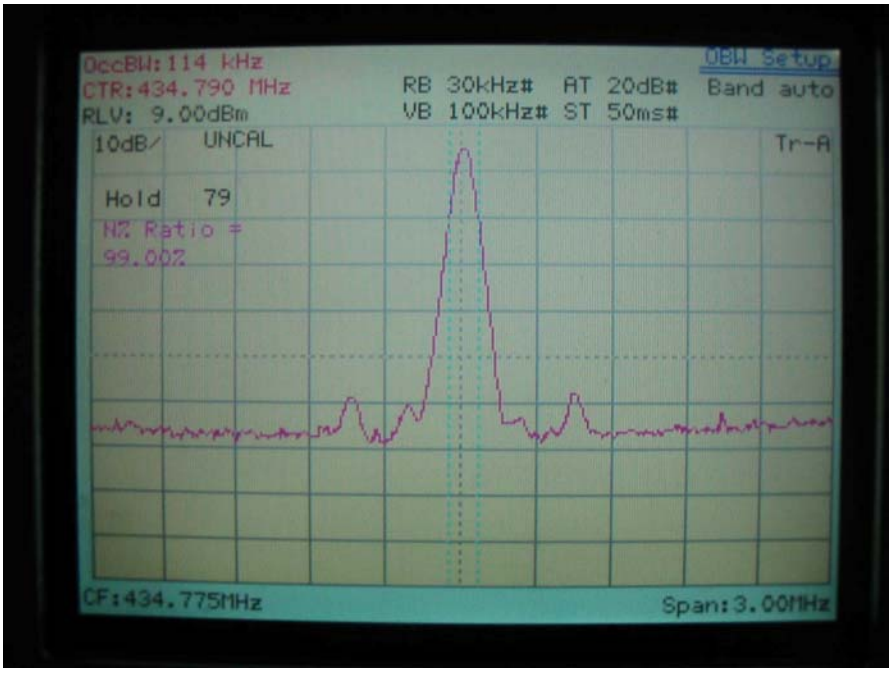
| | | | |
|---|---|---|---|
| **CLIENT:** | Gain Electronic Co., Ltd. | **TEST RULE:** | IC RSS-210 A1.1.3 |
| **MODEL TESTED:** | SAGA1-K2 TX | **PRODUCT:** | SAGA1-K Series Industrial Radio Remote Control |
| **SERIAL NO.:** | Engineering Sample | **EUT DESIGNATION:** | RF Equipment |
| **TEMPERATURE:** | 21°C | **HUMIDITY:** | 53%RH |
| **ATM PRESSURE:** | 101.6 kPa | **GROUNDING:** | No Grounding |
| **TESTED BY:** | Naing.Win | **DATE OF TEST:** | 2008 January 9 |

| | |
|---|---|
| **SETUP STANDARD:** | 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. |
| **TEST VOLTAGE:** | 6VDC (4*1.5V AA battery) |
| **TEST STATUS:** | Keep Tx in continuous transmission mode, FSK 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 test personnel. |
| **M. UNCERTAINTY:** | Freq. $\pm$ $2x10^{-7}$ x Center Freq., Amp $\pm$ 2.6 dB |

## *Test Data (Fundamental Frequency)*




*433.05MHz Ch1 99% BW*




*434.775MHz Ch70 99% BW*

*So, Ch1 99% Bandwidth =114kHz*

*Ch70 99% Bandwidth =114kHz*

| *Frequency (MHz)* | *Bandwidth Limit (MHz) ($F_{center}$ x 0.25%)* | *Test Result (MHz) ($F_{end}$-$F_{start}$)* | *Conclusion* |
|---|---|---|---|
| *Center* | | | |
| *Ch1 433.05* | *1.0826* | *0.114* | *Compliance* |
| *Ch70 434.775* | *1.0869* | *0.114* | *Compliance* |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | |

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| EMI Receiver | 8546A | HP | 3520A00242 | 09/06/06 | 03/05/08 |
| RF Filter Section | 85460A | HP | 3448A00217 | 09/06/06 | 03/05/08 |
| Small Biconical Antenna (30MHz to 1GHz) | UBAA9114&BBVU9135 | Schwarzeck | 127 | 12/07/06 | 03/06/08 |
| Pre-amplifier | PA1F(1-6G) | TRC | 1FAC | 04/10/07 | 04/10/08 |
| Auto Switch Box (>30MHz) | ASB-01 | TRC | 9904-01 | 04/10/07 | 04/10/08 |
| Coaxial Cabel (Double shielded, 15meter) | A30A30-0058-50FS-15M | Jyebao | SMA-01 | 04/10/07 | 04/10/08 |
| Coaxial Cabel (1.1 meter) | A30A30-0058-50FS-1M | Jyebao | SMA-02 | 04/10/07 | 04/10/08 |
| Spectrum Analyzer | 8564E | HP | 3720A00840 | 12/11/06 | 03/10/08 |
| Microwave Preamplifier | 84125C | HP | US36433002 | 04/20/07 | 04/19/08 |
| Horn Antenna | 3115 | EMCO | 9104-3668 | 02/05/07 | 02/05/08 |
| Standard Guide Horn Antenna | 84125-80008 | HP | 18-26.5GHz | 12/14/07 | 12/13/08 |
| Standard Guide Horn Antenna | 84125-80001 | HP | 26.5-40GHz | 12/14/07 | 12/14/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

**SIGNED BY:** Naing.Win **REVIEWED BY:** **Harry**

**ENGINEER** **QC**

***Bandwidth Test Set-up***