

EMI Test Report

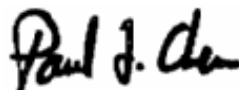
On Model Name: Green Rotary Laser Level
Model Numbers: 9203 / LM33CN / 320.48297 / 0810105000
Broad Name: N/A
Trade Mark: N/A
FCC ID: WDU0810105000

Prepared for Nanjing Chervon Industry Co., Ltd.

According to FCC Part 15, Class B

Test Report #: NAN-0712-1207SH-FCC
Prepared by: Cloud Feng
Reviewed by: Harry Zhao
QC Manager: Paul Chen

Test Report Released by:



Paul Chen

2008, June 12

Date

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.

Test Site Location: ECMG Worldwide Certification
Solution, Inc. (China)
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Pu Dong New Area, Shanghai,
P.R. China 201204

Tel: 86-21-51909300

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FCC Registration Number: 172634

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Administrative Data

Test Sample : Green Rotary Laser Level

Model Numbers : 9203 / LM33CN / 320.48297 / 0810105000

Model Tested : 9203

Trade Mark : N/A

Serial Number : Engineering Sample

Date Tested : 2008, April 25th

*Applicant : Nanjing Chervon Industry Co., Ltd.
No.9 Shengli West Road, Jiangning Economic &
Technical Development Zone, Nanjing, Jiangsu,
China*

Telephone : 86-25-52788297

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*Manufacturer : Nanjing Chervon Industry Co., Ltd.
No.9 Shengli West Road, Jiangning Economic &
Technical Development Zone, Nanjing, Jiangsu ,
China*

EUT Description

Nanjing Chervon Industry Co., Ltd., models 9203 (referred to as the EUT in this report) is a laser level. The green rotary-laser level projects a bright, pulsed, green laser 'dot' that rotates horizontally or vertically to form a visible line, describing a plane, that is projected onto surfaces 360° around the position of the tool.

As a 2-beam level, it can be used to accurately determine square alignment, such as when laying concrete foundations, "squaring off" a deck or porch, and when aligning fence and rail constructions.

The highest frequency generated by the EUT is 315 MHz, so the frequency range tested is from 30MHz - 2000MHz.

Type of Deriver

All the other models are identical to the original model 9203 except for the model number only for marketing propose.

Test Summary

The Electromagnetic Compatibility requirements on model 9203 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.

| Emission Tests | | | | |
|---|-----------------------|---|-------------------|---------------|
| Specifications | Description | Test Results | Test Point | Remark |
| FCC Part 15.107 (150kHz - 30MHz) | Conducted Emission | For 9203: Passed by 4.93 dB of QP Passed by 9.02 dB of AVE | AC Input Port | Attachment 1 |
| FCC Part 15.109 (30MHz - 2000MHz) | Radiated Emission | For 9203: Passed by 2.53 dB of QP | Enclosure | Attachment 2 |

Test Mode Justification

This device complies with Part 15 Class B of the FCC rules. The system was tested in the rotating mode.

EUT Exercise Software

The EUT is not programmable and doesn't use any software during the test.

Equipment Modification

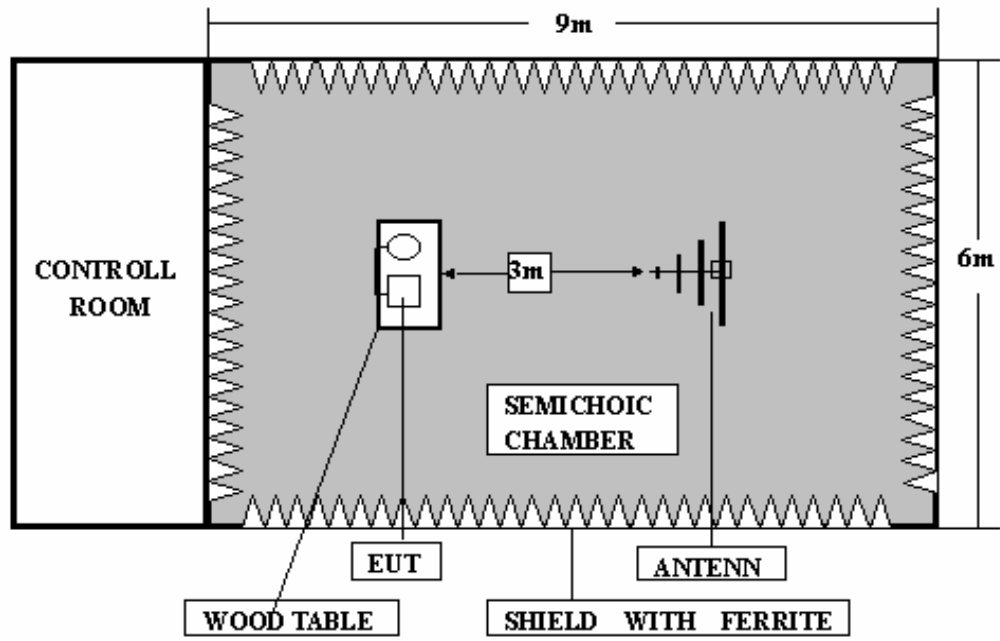
Any modifications installed previous to testing by Nanjing Chervon Industry Co., Ltd. will be incorporated in each production model sold or leased in United States.

There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel.

Test System Details

| EUT | | | | | |
|--------------------------|--|-------|-----------------|----------------|---------------|
| Model tested: | 9203 | | | | |
| Model Numbers: | 9203 / LM33CN / 320.48297 / 0810105000 | | | | |
| Trade Mark: | N/A | | | | |
| Input Voltage: | AC 120V/60Hz | | | | |
| Serial Number: | Engineering Sample | | | | |
| Description: | Green Rotary Laser Level | | | | |
| Manufacturer: | Nanjing Chervon Industry Co., Ltd. | | | | |
| EUT Power Supply | | | | | |
| Model Name: | AC Adapter | | | | |
| Model Number: | HYCH0070501000S | | | | |
| Serial Number: | N/A | | | | |
| Input: | 100-240V, 50/60Hz, 190mA | | | | |
| Output: | 5V DC, 1000mA | | | | |
| Support Equipment | | | | | |
| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
| Signal Generator | HP | 8648C | 33623A037 09 | 11/29/07 | 11/28/08 |
| Cable Description | | | | | |
| Description | From | To | Length (Meters) | Shielded (Y/N) | Ferrite (Y/N) |
| Power Cable | Adapter | EUT | 1.2m | N | N |

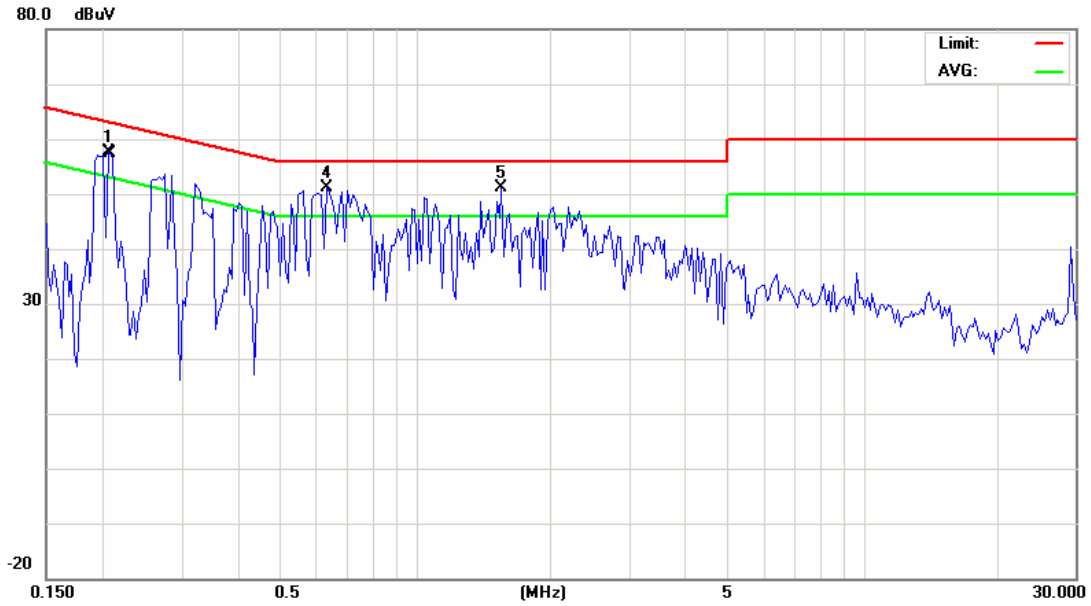
Configuration of Tested System



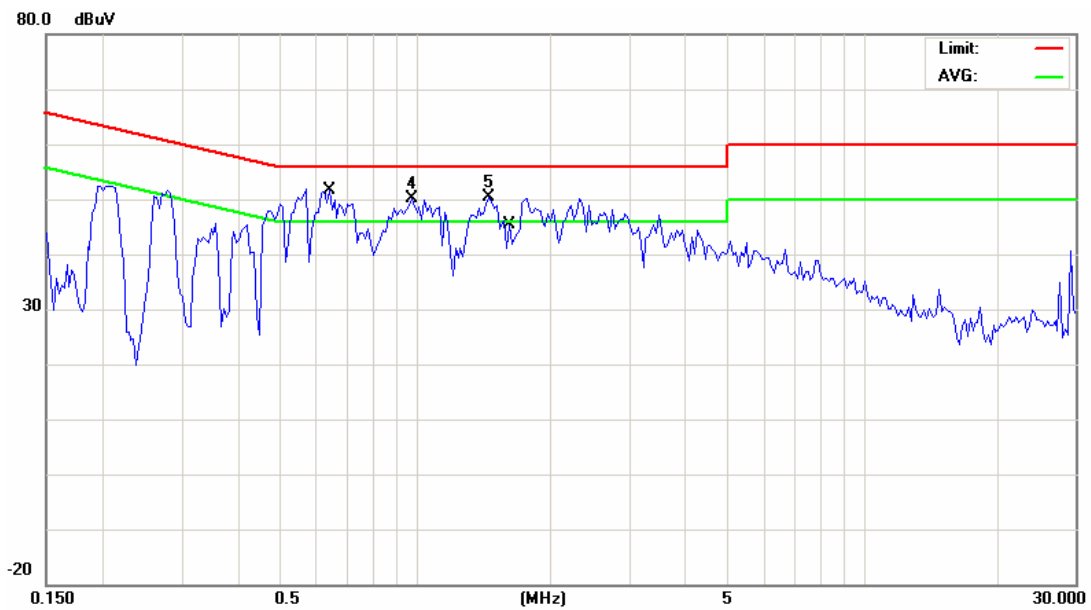
ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

| | | | |
|----------------------------------|---|-------------------------|-------------------------------|
| CLIENT: | Nanjing Chervon Industry Co., Ltd. | TEST REFERENCE: | FCC Part 15 subpart B Class B |
| MODEL TESTED: | 9203 | PRODUCT: | Green Rotary Laser Level |
| MODEL NUMBERS: | 9203 / LM33CN / 320.48297 / 0810105000 | | |
| SERIAL NO.: | Engineering Sample | EUT DESIGNATION: | ITE equipment |
| TEMPERATURE: | 22°C | HUMIDITY: | 58% |
| ATM PRESSURE: | 102.1Pa | GROUNDING: | None |
| TESTED BY: | Cloud Feng | DATE OF TEST: | 2008, April 25 |
| SETUP METHOD: | ANSI C63.4-2003 | | |
| TEST PROCEDURE: | <p>a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.</p> <p>b. Connect EUT to the power mains through a line impedance stabilization network(LISN)</p> <p>c. The LISN provides 50ohm coupling impedance for the measuring instrument</p> <p>d. Both sides of AC line were checked for maximum conducted interference.</p> <p>e. The frequency range from 150KHz to 30MHz was searched..</p> <p>f. Set the test-receiver system to Peak Detect Function and Specified bandwidth.</p> <p>g. 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.</p> | | |
| TESTED RANGE: | 150kHz to 30MHz | | |
| TEST VOLTAGE: | 120VAC/60Hz | | |
| RESULTS: | <p>For 9203: The EUT meets the requirements of test reference for Conducted Emissions on line L by 4.93 dB of Quasi-Peak detector and by 9.02 dB of Average detector.</p> <p>The test results relate only to the equipment under test provided by client.</p> | | |
| CHANGES OR MODIFICATIONS: | There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel. | | |
| M. UNCERTAINTY: | Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB | | |

For 9203:



Line L Conducted Emission Graph



Line N Conducted Emission Graph

| Line L (Hot Lead) | | | | | | | | |
|--|-----------------|---------------------------|------------------|----------------|-----------------|----------------------------|-------------------|-----------------|
| Signal | Frequency (MHz) | Corrected QP Level (dBuV) | Limits QP (dBuV) | Margin QP (dB) | Frequency (MHz) | Corrected AVE Level (dBuV) | Limits AVE (dBuV) | Margin AVE (dB) |
| 1 | 0.213 | 55.15 | 63.08 | -7.93 | 0.213 | 36.25 | 53.08 | -16.83 |
| 2 | 0.635 | 51.03 | 56.00 | -4.97 | 0.635 | 35.46 | 46.00 | -10.54 |
| 3 | 1.564 | 51.07 | 56.00 | -4.93 | 1.564 | 36.98 | 46.00 | -9.02 |
| Line N (Neutral Lead) | | | | | | | | |
| Signal | Frequency (MHz) | Corrected QP Level (dBuV) | Limits QP (dBuV) | Margin QP (dB) | Frequency (MHz) | Corrected AVE Level (dBuV) | Limits AVE (dBuV) | Margin AVE (dB) |
| 1 | 0.649 | 48.85 | 56.00 | -7.15 | 0.649 | 31.05 | 46.00 | -14.95 |
| 2 | 0.983 | 50.11 | 56.00 | -5.89 | 0.983 | 28.29 | 46.00 | -17.71 |
| 3 | 1.464 | 50.28 | 56.00 | -5.72 | 1.464 | 28.64 | 46.00 | -17.36 |
| Note: All readings are using a bandwidth of 9 kHz, with a 30 ms sweep time. A video filter was not used. | | | | | | | | |

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|--|--------------|---------|------------|-----------|---------------|
| EMI Receiver | HP | 85462A | 3650A00363 | 11/29/07 | 11/28/08 |
| LISN | R&S | ESH3-Z5 | 844249/018 | 12/04/07 | 12/03/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

SIGNED BY: Cloud Feng
ENGINEER

REVIEWED BY: Hang Zhao
SENIOR ENGINEER

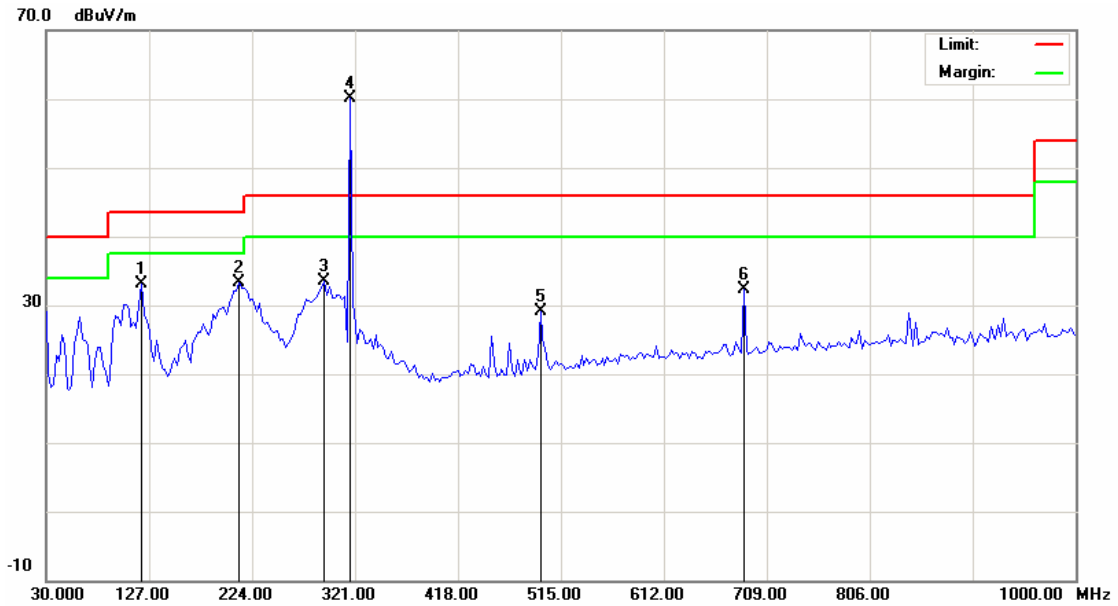
ATTACHMENT 2 - RADIATED EMISSION TEST RESULTS

| | | | |
|------------------------|---|-------------------------|--------------------------|
| CLIENT: | Nanjing Chervon Industry Co., Ltd. | TEST REFERENCE: | FCC Part 15, Class B |
| MODEL TESTED: | 9203 | PRODUCT: | Green Rotary Laser Level |
| MODEL NUMBERS: | 9203 / LM33CN / 320.48297 / 0810105000 | | |
| SERIAL NO.: | Engineering Sample | EUT DESIGNATION: | ITE equipment |
| TEMPERATURE: | 21°C | HUMIDITY: | 60% |
| ATM PRESSURE: | 102.1Pa | GROUNDING: | None |
| TESTED BY: | Cloud Feng | DATE OF TEST: | 2008, April 25 |
| SETUP METHOD: | ANSI C63.4-2003 | | |
| TEST PROCEDURE: | <p>a. The EUT was placed on a rotatable table with 0.8 meters above ground.</p> <p>b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower.</p> <p>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 polarizations of the antenna were set to make measurement.</p> <p>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.</p> <p>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 below 1GHz in about six maximal points and the results will be reported.</p> <p>f. A signal generator, not the matching transmitter, shall be used to radiate an unmodulated CW signal to a superregenerative receiver at its operating frequency in order to "cohere" or to resolve the individual components of the characteristic broadband emissions from such a receiver. The level of the signal may need to be increased for this to occur.</p> <p>Explanation of the Correction Factor are given as follows:</p> $FS = RA + AF + CF - AG$ <p>Where: FS = Field Strength; RA = Receiver Amplitude; AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor; AG = Amplifier Gain</p> | | |

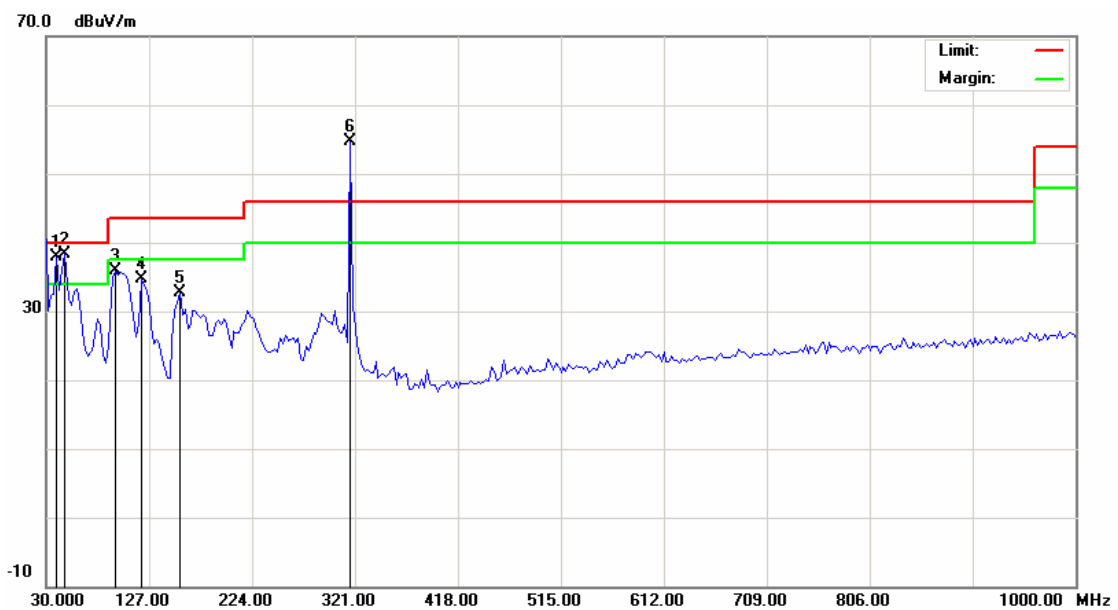
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| | |
|----------------------------------|---|
| TESTED RANGE: | 30MHz to 2000MHz |
| TEST VOLTAGE: | 120VAC / 60Hz |
| RESULTS: | <p>For 9203:</p> <p>The EUT meets the requirements of test reference for Radiated Emissions on horizontal polarization by 1.70 dB at 46.875 MHz.</p> |
| CHANGES OR MODIFICATIONS: | There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel. |
| M. UNCERTAINTY: | Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB |

**For 9203:
30MHz - 1GHz**



Field strength Emission Plot (Peak, Max Hold Mode Horizontal)



Field strength Emission Plot (Peak, Max Hold Mode Vertical)

30MHz-1000MHz

Horizontal

| Signal | Frequency (MHz) | Factor (dB) | Corrected QP Level dB(uV/m) | 3 Meter Limits dB(uV/m) | Margin (dB) | Angle of Turner (degree) | Height of Tower (cm) |
|--------|-----------------|-------------|-----------------------------|-------------------------|-------------|--------------------------|----------------------|
| 1 | 119.725 | 10.77 | 33.03 | 43.50 | -10.47 | 143 | 114 |
| 2 | 211.875 | 13.84 | 33.32 | 43.50 | -10.18 | 206 | 157 |
| 3 | 687.175 | 22.45 | 32.25 | 46.00 | -13.75 | 246 | 238 |

Vertical

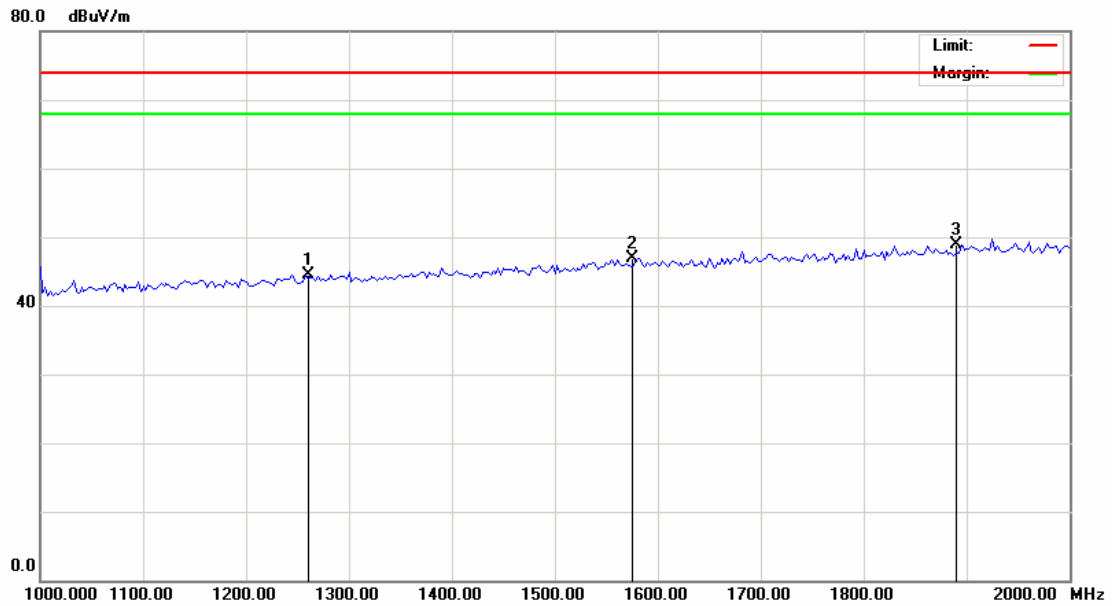
| Signal | Frequency (MHz) | Factor (dB) | Corrected QP Level dB(uV/m) | 3 Meter Limits dB(uV/m) | Margin (dB) | Angle of Turner (degree) | Height of Tower (cm) |
|--------|-----------------|-------------|-----------------------------|-------------------------|-------------|--------------------------|----------------------|
| 1 | 39.706 | 14.17 | 37.99 | 40.00 | -2.01 | 217 | 116 |
| 2 | 46.875 | 10.52 | 38.30 | 40.00 | -1.70 | 149 | 117 |
| 3 | 95.474 | 9.28 | 35.93 | 43.50 | -7.57 | 218 | 150 |

Set-up/Configuration: ANSI C63.4-2003

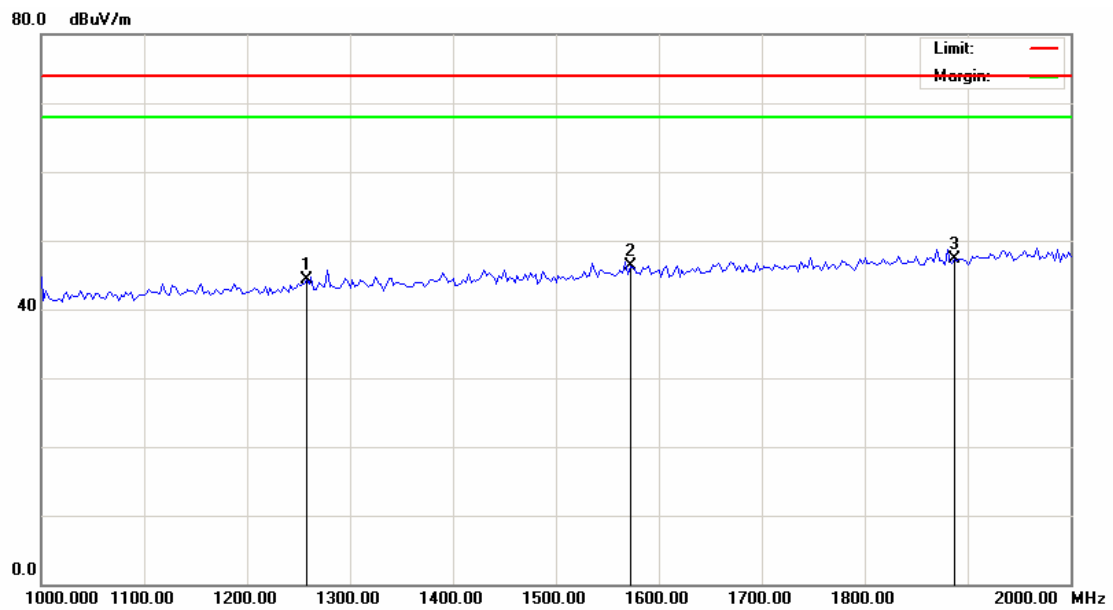
Comments: None

Note: All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.

1GHZ- 2GHZ



Horizontal Radiated Emission Plot (Peak, Max Hold Mode)



Vertical Radiated Emission Plot (Peak, Max Hold Mode)

| 1000MHz-2000MHz | | | | | | | | |
|--|-----------------|-------------|-----------------------------|-----------------------------|-------------|-----------------------------|----------------------------|-------------|
| Horizontal | | | | | | | | |
| Signal | Frequency (MHz) | Factor (dB) | Corrected PK Level (dBuV/m) | 3 Meter PK Limits (dB uV/m) | Margin (dB) | Corrected AV Level (dBuV/m) | 3 Meter AV Limits (dBuV/m) | Margin (dB) |
| 1 | 1258.72 | 24.6 | 44.5 | 74.0 | -29.5 | 32.5 | 54.0 | -21.5 |
| 2 | 1573.40 | 26.6 | 46.8 | 74.0 | -27.2 | 35.5 | 54.0 | -18.5 |
| 3 | 1888.08 | 28.5 | 48.8 | 74.0 | -25.2 | 38.7 | 54.0 | -15.3 |
| Vertical | | | | | | | | |
| Signal | Frequency (MHz) | Factor (dB) | Corrected PK Level (dBuV/m) | 3 Meter PK Limits (dB uV/m) | Margin (dB) | Corrected AV Level (dBuV/m) | 3 Meter AV Limits (dBuV/m) | Margin (dB) |
| 1 | 1258.72 | 24.6 | 44.3 | 74.0 | -29.7 | 38.4 | 54.0 | -15.6 |
| 2 | 1573.40 | 26.6 | 46.2 | 74.0 | -27.8 | 42.6 | 54.0 | -11.4 |
| 3 | 1888.08 | 28.5 | 47.2 | 74.0 | -26.8 | 41.8 | 54.0 | -12.2 |
| Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used. | | | | | | | | |

| Test Equipment | Manufacturer | Model | Serial No. | Last Cal. | Cal. Due Date |
|--|--------------|--------|------------|-----------|---------------|
| EMI Receiver | HP | 85462A | 3650A00363 | 11/29/07 | 11/28/08 |
| Broadband Antenna | Sunol | JB5 | A110503 | 11/29/07 | 11/28/08 |
| Note: All testing were performed using internationally recognized standards. All test instruments were calibrated. | | | | | |

SIGNED BY: *Cloud Feng*
ENGINEER

REVIEWED BY: *Hongzhan*
SENIOR ENGINEER