

FCC PART 15B, CLASS B
MEASUREMENT AND TEST REPORT

For

G53 Limited

ROOM 1701, 17/F, FEE TAT COMMERCIAL CENTRE, 613 NATHAN ROAD,
MONGKOK HONG KONG

FCC ID: 2ADLMFRV513

| | |
|---|--|
| Report Type: Original Report | Product Type: 3G Smart Phone |
| Test Engineer: Sewen Guo <i>Sewen Guo</i> | |
| Report Number: RSZ150518003-00A | |
| Report Date: 2015-05-28 | |
| Reviewed By: RF Engineer Jimmy Xiao <i>Jimmy Xiao</i> | |
| Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn | |

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *G53 Limited's* product, model number: *Admiral 513 (FCC ID: 2ADLMFRV513)* or the "EUT" in this report was a *3G Smart Phone*, which was measured approximately: 146 mm (L) * 73 mm (W) * 13 mm (H), rated with input voltage: DC 3.7 V rechargeable Li-ion battery or DC 5.0V from adapter. The highest operating frequency is 1.3 GHz.

Adapter Information

Model: FJ-SW7280501000UU

Input: AC/100-240V, 50/60Hz, 0.3A Max

Output: DC5.0V, 1000 mA

**All measurement and test data in this report was gathered from production sample serial number: 1505108 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-05-18.*

Objective

This test report is prepared on behalf of *G53 Limited* in accordance with Part 2-Subpart J, Part 15-Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of the EUT with FCC Part 15 B.

Related Submittal(s)/Grant(s)

Part 15.247 DSS and DTS, Part 22H/24E PCE submissions with FCC ID: 2ADLMFRV513.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a manufacturer testing fashion.

EUT operation mode: Downloading (data transfer with computer)

EUT Exercise Software

“BurnIn test v5.3” exercise software was used.

Special Accessories

No special accessory.

Equipment Modifications

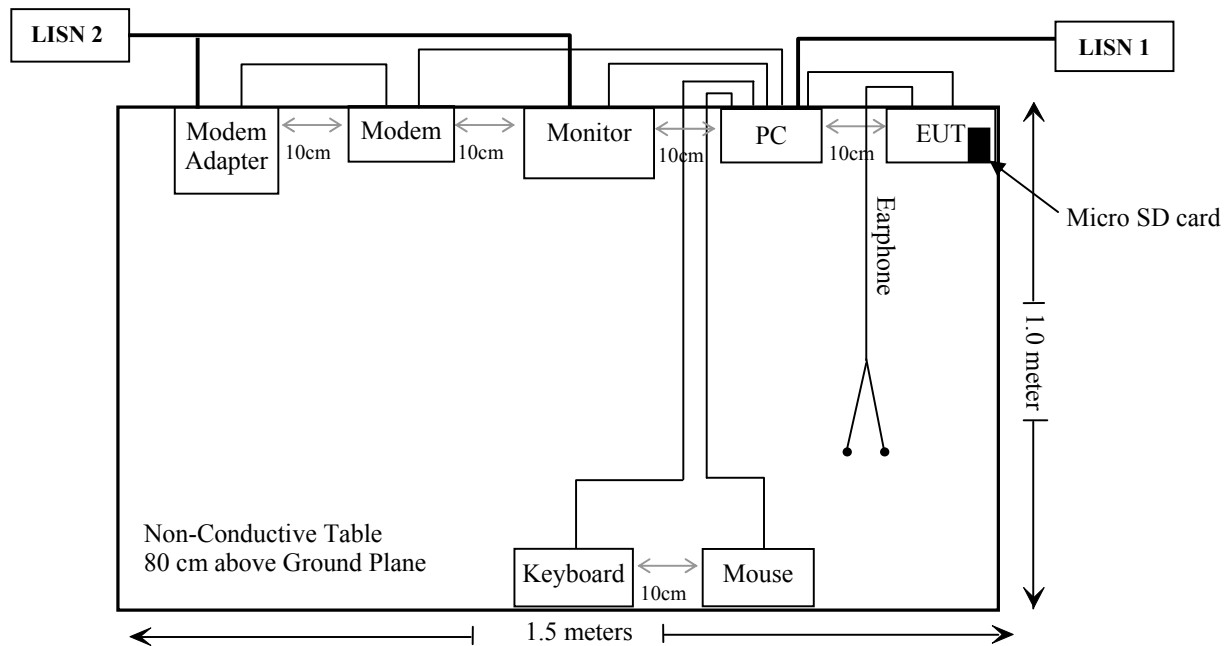
No modification was made to the EUT tested.

Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|---------------|-------------|--------------------------|
| DELL | PC | VOSTRO 220S | 127BP2X |
| DELL | LCD Monitor | E178WFPC | CN-OWY564-64180-7C4-2SQH |
| DELL | Keyboard | L100 | CNORH656658907BL05DC |
| DELL | Mouse | MOC5UO | G1900NKD |
| SAST | Modem | AEM-2100 | 0293 |
| Kingston | Micro SD card | 4 GB | N/A |
| PHILIPS | Earphone | SBCHP250 | N/A |

External I/O Cable

| Cable Description | Length (m) | From/Port | To |
|--------------------------------------|------------|-----------|-------------|
| Un-Shielding Detachable USB Cable | 1.5 | Host PC | Mouse |
| Un-Shielding Detachable Serial Cable | 1.5 | Host PC | Modem |
| Un-Shielding Detachable K/B Cable | 1.5 | Host PC | Keyboard |
| Un-Shielding Detachable VGA Cable | 1.5 | Host PC | LCD Monitor |
| Shielding Detachable Earphone Cable | 0.9 | EUT | Earphone |
| Un-shielding Detachable USB Cable | 1.0 | EUT | PC |

Block Diagram of Test Setup

SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Results |
|-----------|-----------------------------|------------|
| §15.107 | AC Line Conducted Emissions | Compliance |
| §15.109 | Radiated Spurious Emissions | Compliance |

Applicable Standard

Measurement Uncertainty

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

| Port | Expanded Measurement uncertainty |
|----------|--|
| AC Mains | 3.26 dB (k=2, 95% level of confidence) |
| CAT 3 | 3.70 dB (k=2, 95% level of confidence) |
| CAT 5 | 3.86 dB (k=2, 95% level of confidence) |
| CAT 6 | 4.64 dB (k=2, 95% level of confidence) |

The diagram illustrates a shielded test cell setup. A Vertical Reference Ground Plane is shown on the left. The EUT is positioned on a stand, with a distance of 40 cm from the Vertical Reference Ground Plane. The LISN is connected to the EUT and is bonded to the Horizontal Reference Ground Plane. The distance from the EUT to the Horizontal Reference Ground Plane is 80 cm. The Test Receiver is connected to the LISN and is also bonded to the Horizontal Reference Ground Plane. The Horizontal Reference Ground Plane is shown at the bottom of the diagram.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz |

Test Procedure

During the conducted emission test, the host PC was connected to the first LISN and the other relevant equipments were connected to the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|------------------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCS30 | 100176 | 2014-06-03 | 2015-06-03 |
| Rohde & Schwarz | LISN | ENV216 | 3560.6650.12-101613-Yb | 2014-12-01 | 2015-12-01 |
| Rohde & Schwarz | LISN | ESH3-Z5 | 100113 | NCR | NCR |
| Rohde & Schwarz | Transient Limiter | ESH3Z2 | DE25985 | 2014-10-15 | 2015-10-15 |
| Rohde & Schwarz | CE Test software | EMC 32 | V8.53 | NCR | NCR |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, the worst margin reading as below:

5.0 dB at 8.843810 MHz in the Line conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL., $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

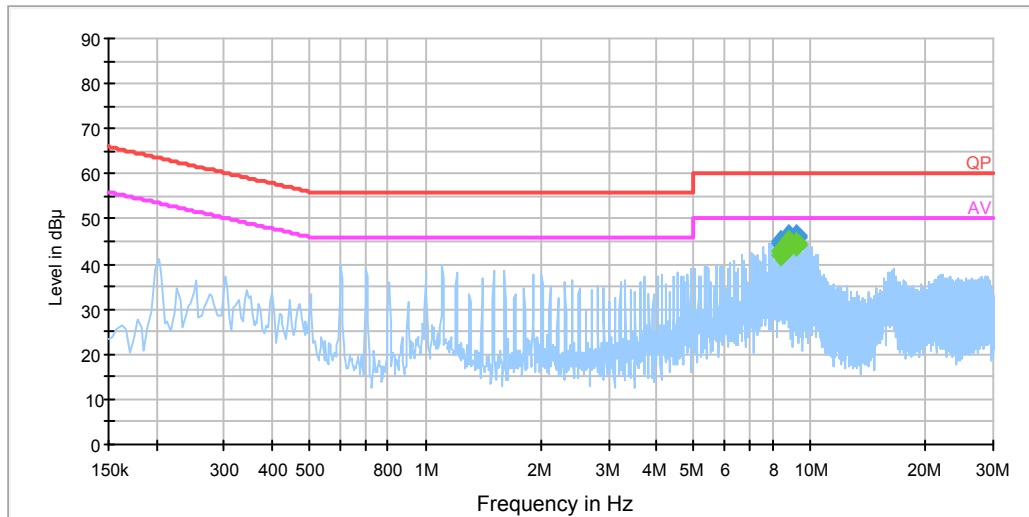
| | |
|---------------------------|-----------|
| Temperature: | 26 °C |
| Relative Humidity: | 51 % |
| ATM Pressure: | 101.0 kPa |

The testing was performed by Sewen Guo on 2015-05-25.

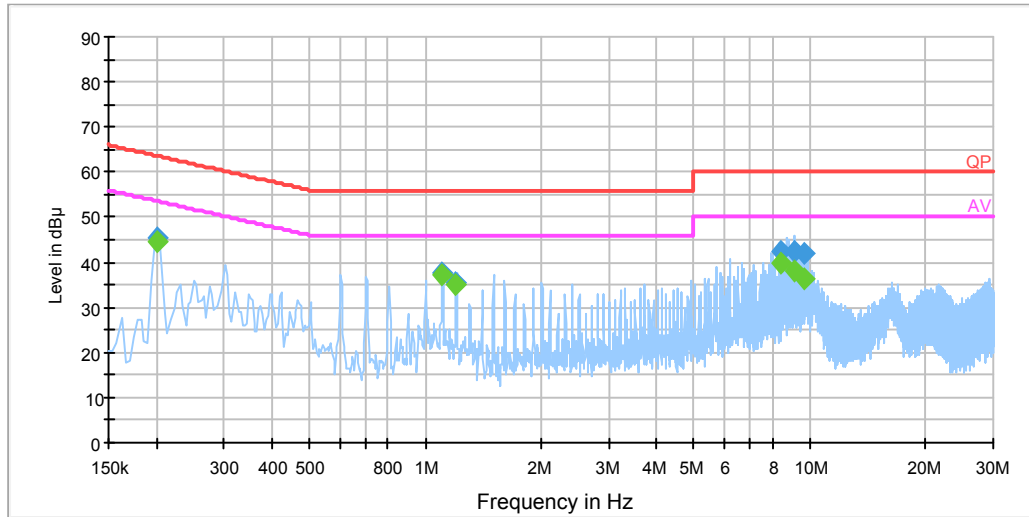
EUT Operation Mode: Downloading

AC 120V/60 Hz, Line

EMI Auto Test L



| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 8.443370 | 44.8 | 20.1 | 60.0 | 15.2 | QP |
| 8.443370 | 42.9 | 20.1 | 50.0 | 7.1 | Ave. |
| 8.444930 | 44.5 | 20.1 | 60.0 | 15.5 | QP |
| 8.444930 | 42.0 | 20.1 | 50.0 | 8.0 | Ave. |
| 8.741310 | 44.9 | 20.1 | 60.0 | 15.1 | QP |
| 8.741310 | 43.1 | 20.1 | 50.0 | 6.9 | Ave. |
| 8.843810 | 46.5 | 20.1 | 60.0 | 13.5 | QP |
| 8.843810 | 45.0 | 20.1 | 50.0 | 5.0 | Ave. |
| 9.245750 | 46.2 | 20.1 | 60.0 | 13.8 | QP |
| 9.245750 | 44.5 | 20.1 | 50.0 | 5.5 | Ave. |
| 9.247370 | 45.8 | 20.1 | 60.0 | 14.2 | QP |
| 9.247370 | 44.0 | 20.1 | 50.0 | 6.0 | Ave. |

AC 120V/60 Hz, Neutral**EMI Auto Test N**

| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.201500 | 45.5 | 20.0 | 63.5 | 18.1 | QP |
| 0.201500 | 44.4 | 20.0 | 53.5 | 9.2 | Ave. |
| 1.105410 | 37.7 | 20.0 | 56.0 | 18.3 | QP |
| 1.105410 | 37.4 | 20.0 | 46.0 | 8.6 | Ave. |
| 1.203910 | 35.5 | 20.0 | 56.0 | 20.5 | QP |
| 1.203910 | 34.9 | 20.0 | 46.0 | 11.1 | Ave. |
| 8.444870 | 42.6 | 20.1 | 60.0 | 17.4 | QP |
| 8.444870 | 39.7 | 20.1 | 50.0 | 10.3 | Ave. |
| 9.144810 | 42.5 | 20.1 | 60.0 | 17.5 | QP |
| 9.144810 | 37.9 | 20.1 | 50.0 | 12.1 | Ave. |
| 9.646750 | 42.1 | 20.1 | 60.0 | 17.9 | QP |
| 9.646750 | 36.3 | 20.1 | 50.0 | 13.7 | Ave. |

Note:

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §15.109

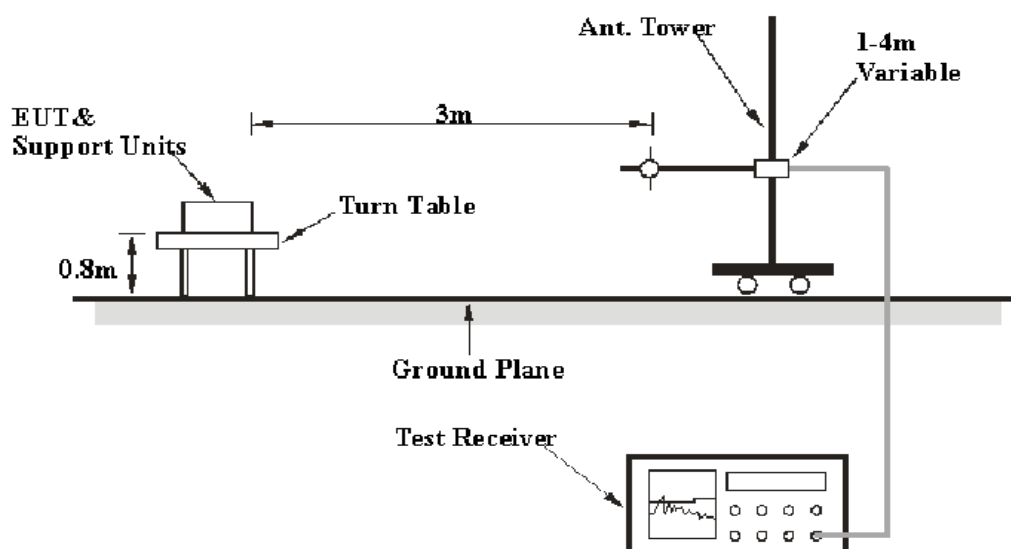
Measurement Uncertainty

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

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

| Frequency | Polarity | Measurement uncertainty |
|----------------|---------------------|--|
| 30 MHz~200 MHz | Horizontal | 4.62 dB (k=2, 95% level of confidence) |
| | Vertical | 4.54 dB (k=2, 95% level of confidence) |
| 200 MHz~1 GHz | Horizontal | 4.84 dB (k=2, 95% level of confidence) |
| | Vertical | 5.91 dB (k=2, 95% level of confidence) |
| 1 GHz~6 GHz | Horizontal/Vertical | 4.68 dB (k=2, 95% level of confidence) |
| Above 6 GHz | Horizontal/Vertical | 4.92 dB (k=2, 95% level of confidence) |

EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6.5 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | RBW | Video B/W | IF B/W | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz | 120 kHz | QP |
| Above 1 GHz | 1MHz | 3 MHz | / | PK |
| | 1MHz | 10 Hz | / | Ave. |

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|--------------------|-------------|---------------|------------------|----------------------|
| HP | Amplifier | HP8447E | 1937A01046 | 2015-05-06 | 2016-05-06 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101120 | 2014-11-03 | 2015-11-03 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-2 | 2014-12-07 | 2017-12-06 |
| Mini | Amplifier | ZVA-183-S+ | 5969001149 | 2015-04-24 | 2016-04-24 |
| A.H. System | Horn Antenna | SAS-200/571 | 135 | 2013-02-11 | 2016-02-10 |
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 837405/023 | 2014-08-22 | 2015-08-22 |
| TDK | Chamber | Chamber A | 2# | 2012-10-15 | 2015-10-15 |
| TDK | Chamber | Chamber B | 1# | 2014-07-22 | 2015-07-22 |
| R&S | Auto test Software | EMC32 | V9.10 | NCR | NCR |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B, the worst margin reading as below:

7.17 dB at 755.99 MHz in the Vertical polarization mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

| | |
|---------------------------|-----------|
| Temperature: | 26 °C |
| Relative Humidity: | 51 % |
| ATM Pressure: | 101.0 kPa |

The testing was performed by Sewen Guo on 2015-05-25.

*EUT Operation Mode: Downloading***30 MHz – 6.5 GHz**

| Frequency (MHz) | Receiver | | Turntable | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBμV/m) | FCC Part15B | |
|--------------------|-------------------|--------------------------|-----------|---------------|----------------|-----------------------------|------------------------------------|-------------------|----------------|
| | Reading (dBμV) | Detector (PK/QP/Ave.) | Degree | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 225.37 | 33.54 | QP | 167 | 1.1 | V | -15.4 | 18.14 | 46 | 27.86 |
| 314.98 | 27.46 | QP | 35 | 1.8 | V | -12.1 | 15.36 | 46 | 30.64 |
| 480.20 | 26.11 | QP | 17 | 1.5 | V | -8.6 | 17.51 | 46 | 28.49 |
| 500.10 | 42.46 | QP | 32 | 1.9 | V | -8.6 | 33.86 | 46 | 12.14 |
| 755.99 | 44.23 | QP | 87 | 1.4 | V | -5.4 | 38.83 | 46 | 7.17 |
| 960.05 | 36.32 | QP | 135 | 1.8 | H | -1.8 | 34.52 | 53.9 | 19.38 |
| 1550.21 | 50.27 | PK | 275 | 1.1 | V | 1.91 | 52.18 | 74 | 21.82 |
| 1550.21 | 39.69 | Ave. | 275 | 1.1 | V | 1.91 | 41.60 | 54 | 12.40 |
| 1876.37 | 48.21 | PK | 171 | 1.8 | V | 3.73 | 51.94 | 74 | 22.06 |
| 1876.37 | 38.66 | Ave. | 171 | 1.8 | V | 3.73 | 42.39 | 54 | 11.61 |

Note:

- 1) Correction Factor=Antenna factor (RX) + cable loss – amplifier factor
- 2) Corrected Amplitude = Correction Factor + Reading
- 3) Margin = Limit - Corrected Amplitude

******* END OF REPORT *******