



NVLAP LAB CODE 200707-0

# FCC PART 15.235



## EMI MEASUREMENT AND TEST REPORT

For

### Grandex International Development Ltd.

Unit 2401, Million Fortune Ind Ctr., 34-36 Chai Wan Kok Street,  
Tsuen Wan, Hong Kong

**FCC ID: VC99610549T**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Radio Remote Controller
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<b>Report Number:</b> RSZ10082081	
<b>Report Date:</b> 2010-09-01	
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**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. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, NIST, or any agency of the Federal Government.  
\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" (Rev.2)

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## GENERAL INFORMATION

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### Product Description for Equipment Under Test (EUT)

The *Grandex International Development Ltd*' s product, model number: 96105 (FCC ID: VC99610549T) or the "EUT" as referred to in this report is a *Radio Remote Controller*, which measures approximately 104 cm (L) x 93 cm (W) x 33 cm (H), rated input voltage: DC 9 V Battery.

*\* All measurement and test data in this report was gathered from production sample serial number: 1008006 (Assigned by BACL, Shenzhen). The EUT was received on 2010-08-20.*

### Objective

This Type approval report is prepared on behalf of *Grandex International Development Ltd* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, section 15.203, 15.205, 15.209 and 15.235 rules.

### Related Submittal(s)/Grant(s)

No Related Submittals.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect test data is located in 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 Laboratory 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 November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179 and Industrial Canada registration test site No.: 5500A. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



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The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

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## SYSTEM TEST CONFIGURATION

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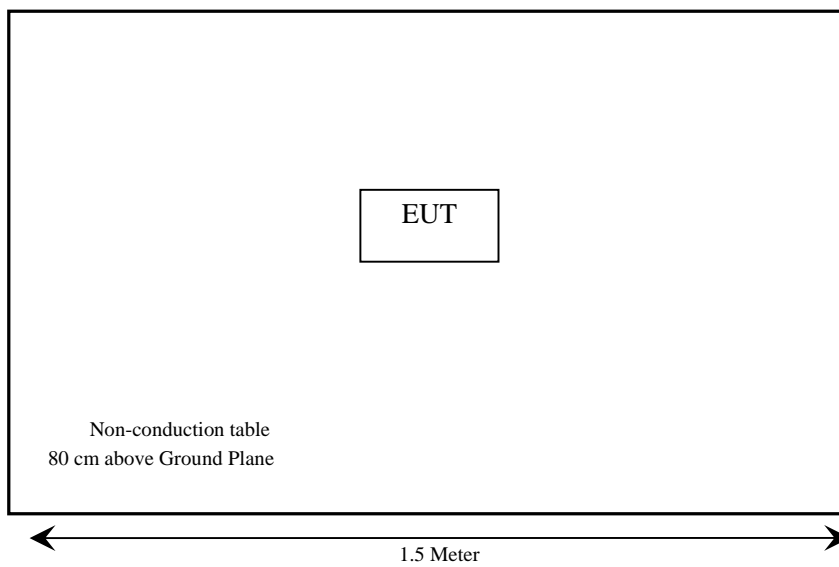
### Justification

The system was configured for test mode.

### Equipment Modifications

No modifications were made to the unit tested.

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.203	Antenna requirement	Compliance
§15.207(a)	Conducted Emissions	N/A*
§15.205; §15.209(a) §15.235(a)	Radiated Emissions	Compliance
§15.235(b)	Band Edge Testing	Compliance

Note: \* Battery operation only.

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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna 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.

This product has a permanent antenna, fulfill the requirement of this section.

**Result:** Compliance.

Please refer to the EUT photos.

## FCC §15.205, §15.209(a) & §15.235(a) - RADIATED EMISSIONS

### Applicable Standard

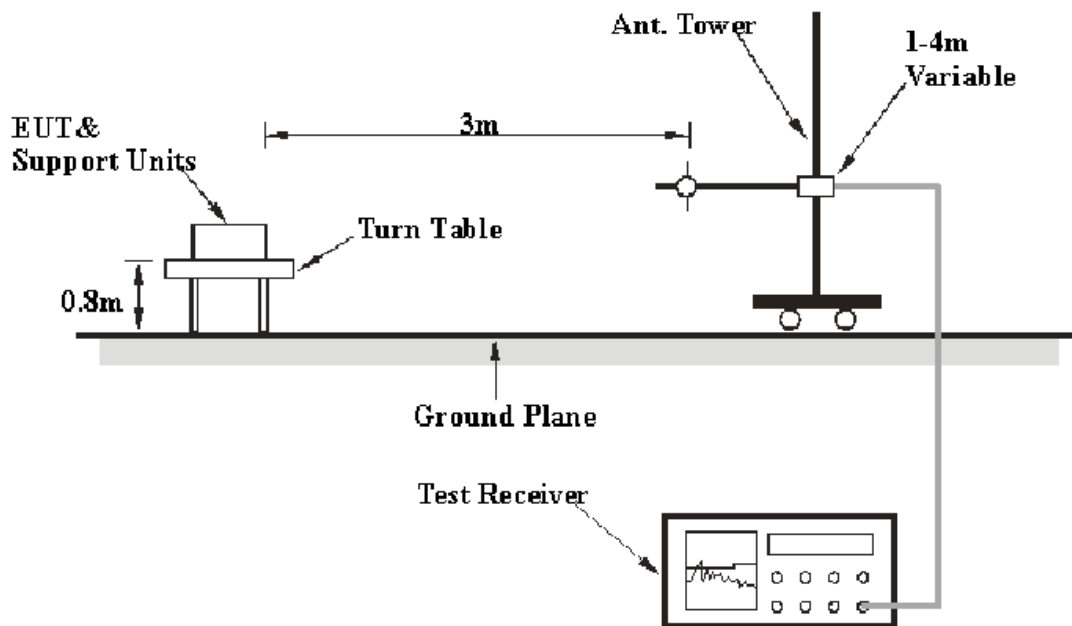
FCC Part 15.205, 15.209 and 15.235

### 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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC part 15.205, 15.209 and 15.235 limits.



## EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

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

<i>Frequency Range</i>	<i>R B/W</i>	<i>Video B/W</i>	<i>IF B/W</i>
30 – 1000 MHz	100 kHz	100 kHz	120 kHz

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
HP	Amplifier	HP8447E	1937A01046	2010-08-02	2011-08-01
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2010-04-12	2011-04-12

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Procedure

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

All fundamental data was recorded in the Average and Peak detection mode.

All Spurious data was recorded in the Quasi-Peak detection mode.

## 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 maximum 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 Part 15.209 & 15.235, with the worst margin reading of:

**17.4 dB at 49.86 MHz in the Vertical polarization**

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 ° C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101 kPa

The testing was performed by Chris You on 2010-08-27.

Test Mode: Transmitting

Frequency (MHz)	Corrected Amplitude (dB $\mu$ V/m)	Test Antenna		Turntable Position (deg)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector (PK/QP/Ave)	Remark
		Height (cm)	Polarity (H/V)					
49.86	62.6	208.0	V	81.0	80.00	17.4	Ave	Fund.
99.800000	19.0	127.0	H	149.0	40.0	21.0	QP	harmonic
897.217250	25.0	276.0	H	340.0	46.0	21.0	QP	harmonic
30.035706	17.5	122.0	V	95.0	40.0	22.5	QP	harmonic
49.86	57.5	150.0	H	98.0	80.00	22.5	Ave	Fund.
49.86	63.1	238.0	V	199.0	100.00	36.9	PK	Fund.
49.86	58.5	160.0	H	110.0	100.00	41.5	PK	Fund.

\*Note 1: The Duty cycle is 100%

\*Note 2: The worst-case is located in stand orientation for fundamental.

\*Note 3: The worst-case is located in lie orientation for spurious emissions.

## FCC §15.235(b) - BAND EDGES TESTING

### Applicable Standard

The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §15.209. All signals exceeding 20 microvolts/meter at 3 meters shall be reported in the application for certification.

### Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the test receiver setup with the START and STOP frequencies set to the EUT's operation band.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
HP	Amplifier	HP8447E	1937A01046	2010-08-02	2011-08-01
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2010-04-12	2011-04-12

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Data

#### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

The testing was performed by Chris You on 2010-08-09.

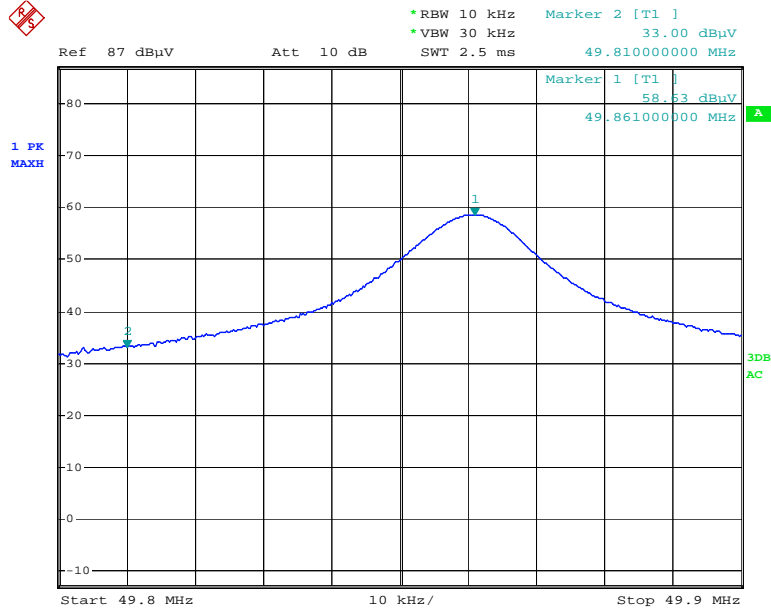
Test Mode: Transmitting

Indicated		Table Angle Degree	Ant. Height (m)	Detector PK/QP/Ave	Correction Factor			Cord. Amp. (dBµV/m)	Part 15.235/15.209	
Freq. (MHz)	S.A. Reading (dBµV)				Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)		Limit (dBµV/m)	Margin (dB)
49.81	33.00	120	1.5	PK	9.60	0.33	25.90	17.03	40	22.97
49.91	33.85	275	1.5	PK	9.60	0.33	25.90	17.88	40	22.12

**Result:** Compliance.

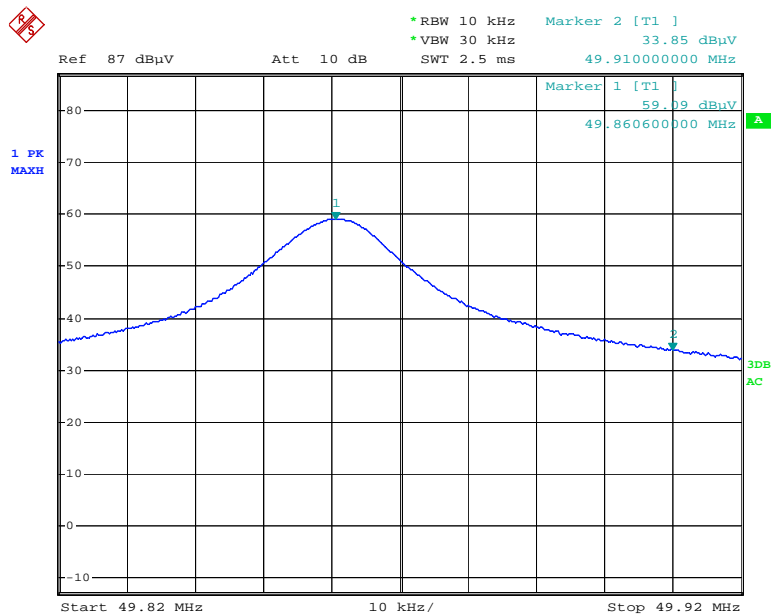
Please refer to the plot attached.

### Plot of Band Edge- Left Side



Date: 9.AUG.2010 11:27:01

### Plot of Band Edge- Right Side



Date: 9.AUG.2010 11:25:39

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