



STC Test Report

Date : 2007-07-16

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No. : HM159217

Applicant (BUV001)

GRANDEX INTERNATIONAL DEVELOPMENT LTD.
UNIT 2401, MILLION FORTUNE INDUSTRIAL CENTRE,
34-36 CHAI WAN, KOK STREET., TSUEN WAN,
HONG KONG

Manufacturer:

N/A

Description of Samples:

Product: RC Vehicles
Brand Name: N/A
Model Number: 61161
FCC ID: VC961070127

Date Samples Received:

2007-06-20, 2007-07-06

Date Tested:

2007-06-25 to 2007-07-06

Investigation Requested:

Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2006 and ANSI C63.4:2003 for FCC Certification.

Conclusions:

The submitted product COMPLIED with the requirements of
Federal Communications Commission [FCC] Rules and
Regulations Part 15. The tests were performed in accordance
with the standards described above and on Section 2.2 in this
Test Report.

Remarks:

For additional models details, see page 5.

LEE Kam Chuen,
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

The Hong Kong Standards and Testing Centre Ltd.

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List of Measurement Equipment

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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Applicant Details

Applicant

GRANDEX INTERNATIONAL DEVELOPMENT LTD.
UNIT 2401, MILLION FORTUNE INDUSTRIAL CENTRE,
34-36 CHAI WAN, KOK STREET., TSUEN WAN,
HONG KONG

Manufacturer

N/A

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1.3 Equipment Under Test [EUT] Description of Sample

Product: RC Vehicles
Manufacturer: N/A
Brand Name: N/A
Model Number: 61161
Additional Model Number: 61113, 61114, 61110, 61111, 61120, 61121
Rating: 9Vd.c ("6F22" size battery x 1)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a GRANDEX INTERNATIONAL DEVELOPMENT LTD., RC Vehicles. The transmitter is a 2 joystick transmitter. The EUT continues to transmit while joystick is being pressed, It is pulse transmitter, Modulation by IC, and type is pulse modulation.

1.4 Date of Order

2007-06-20, 2007-07-06

1.5 Submitted Sample(s):

2 Samples

1.6 Test Duration

2007-06-25 to 2007-07-06

1.7 Country of Origin

N/A

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2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2006 and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary					
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result	
				Pass	Failed
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.227	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

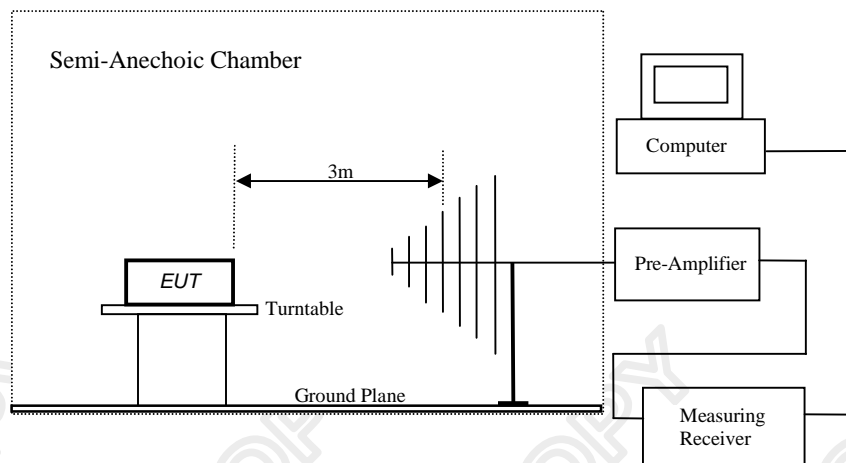
Test Requirement: FCC 47CFR 15.227
Test Method: ANSI C63.4:2003
Test Date: 2007-07-06
Mode of Operation: Tx mode

Test Method:

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

*: Semi-anechoic chamber located on the G/F of HKSTC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.227]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [$\mu\text{V/m}$]	Field Strength of Fundamental Emission [Average] [$\mu\text{V/m}$]
26.96-27.28	100,000	10,000

Results of Tx Mode: PASS

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μV	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
27.145	50.80	10.4	61.2	1,148.2	100,000	Vertical

Field Strength of Fundamental Emissions Average							
Frequency MHz	Measured Level @3m dB μV	Adjusted by Duty Cycle dB	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
27.145	46.9	-3.9	10.4	57.3	732.8	10,000	Vertical

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty: 30MHz to 1GHz $\pm 5.2\text{dB}$

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Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Tx Mode: PASS

Radiated Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dB μV	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
54.29	10.2	9.1	19.3	9.2	100	Vertical
81.44	< 1.0	8.1	< 9.1	< 2.9	100	Vertical
108.58	< 1.0	10.7	< 11.7	< 3.8	150	Vertical
135.73	< 1.0	10.2	< 11.2	< 3.6	150	Vertical
162.87	11.8	9.9	21.7	12.2	150	Vertical
190.02	< 1.0	12.4	< 13.4	< 4.7	150	Vertical
217.16	< 1.0	12.8	< 13.8	< 4.9	200	Vertical
244.31	< 1.0	15.0	< 16.0	< 6.3	200	Vertical
271.45	< 1.0	16.1	< 17.1	< 7.2	200	Vertical

Remarks:

No further spurious emissions found between lowest internal frequency and 30MHz

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty: 30MHz to 1GHz $\pm 5.2\text{dB}$

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3.2 20dB Bandwidth of Fundamental Emission

Test Requirement: FCC 47 CFR 15.227
Test Method: ANSI C63.4:2003 (Section 13.1.7)
Test Date: 2007-07-06
Mode of Operation: On mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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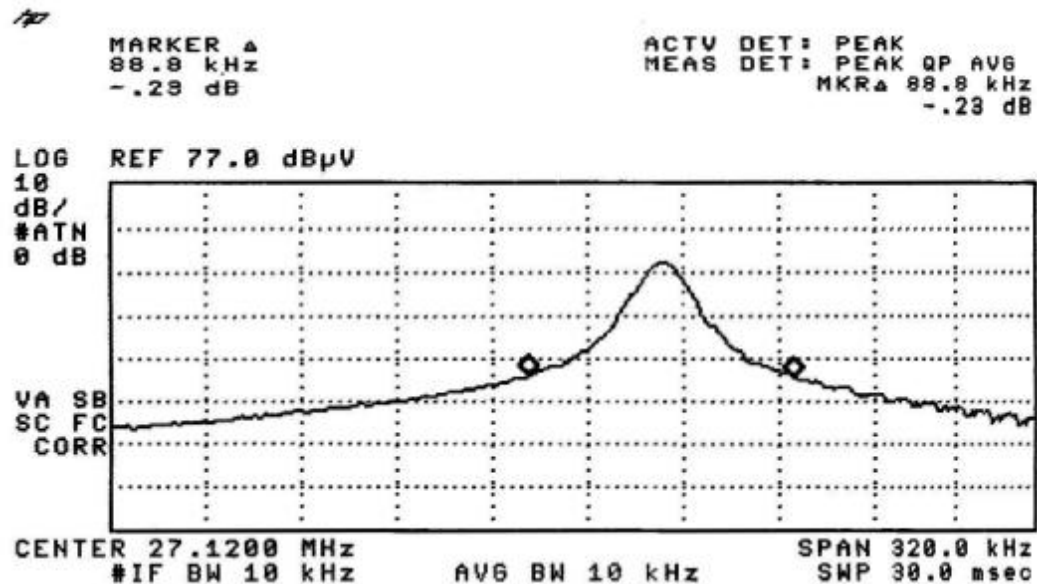
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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]	FCC Limits [MHz]
27.145	88.8	within 26.96-27.28

20dB Bandwidth of Fundamental Emission



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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262
EM020	HORN ANTENNA	ETS-Linggren	3115	4032
EM022	LOOP ANTENNA	ETS-Linggren	6502	1189-2424
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892
EM083	OPEN AREA TEST SITE	HKSTC	N/A	N/A
EM131	EMC ANALYZER	HEWLETT PACKARD	8595EM	3710A00155
EM145	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCS 30	830245/021
EM195	ANTENNA POSITIONING MAST	ETS-Linggren	2075	2368
EM196	MULTI-DEVICE CONTROLLER	ETS-Linggren	2090	1662
EM215	MULTI-DEVICE CONTROLLER	ETS-Linggren	2090	00024676
EM216	MINI MAST SYSTEM	ETS-Linggren	2075	00026842
EM217	ELECTRIC POWERED TURNTABLE	ETS-Linggren	2088	00029144
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--
EM219	BICONILOG ANTENNA	ETS-Linggren	3142C	00029071
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB40	100248

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A
EM119	LISN	ROHDE & SCHWARZ	ESH3-Z5	0831.5518.52
EM127	ISOLATION TRANSFORMER 220 TO 300V	WING SUN	N/A	N/A
EM233	PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100314
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057-99A
EM197	LISN	ETS-Linggren	4825/2	1193

Remarks:-

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

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Appendix B

Duty Cycle Correction During 100msec

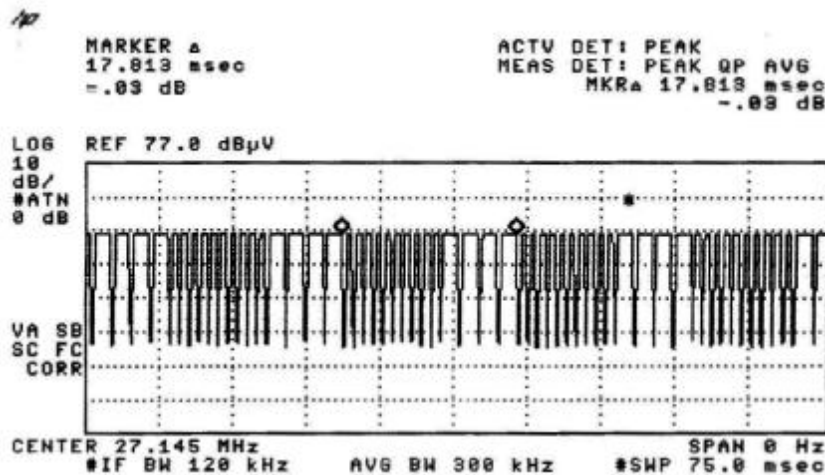
Each function key sends a different series of characters, but each packet period (17.813msec) never exceeds a series of 4 long (1.5msec) and 10 short (525µsec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered $4 \times 1.5\text{msec} + 10 \times 525\mu\text{sec}$ per 17.813msec = 63.1% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = $20\text{Log}(0.631) = -3.9\text{dB}$

The following figures [Figure A to Figure C] show the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]



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Figure B [Long Pulse]

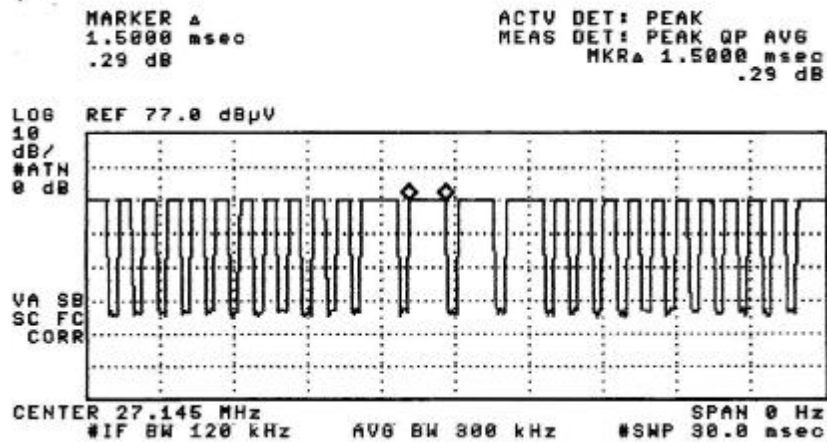
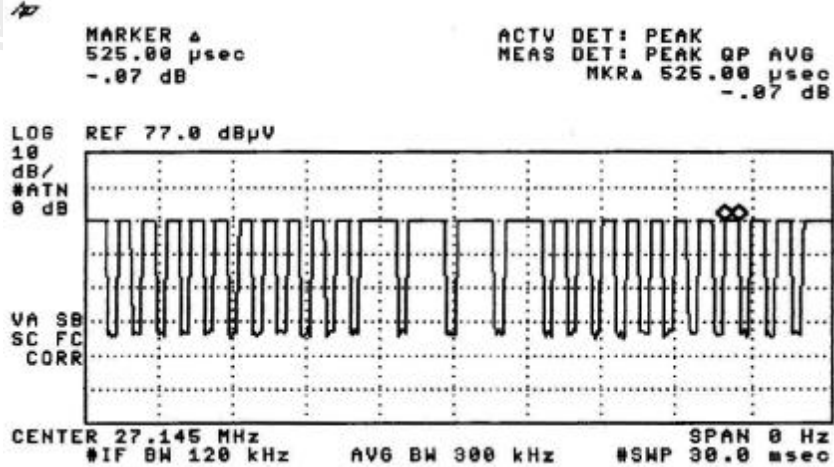


Figure C [Short Pulse]



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Appendix C

Photographs of EUT

Front View of the product



Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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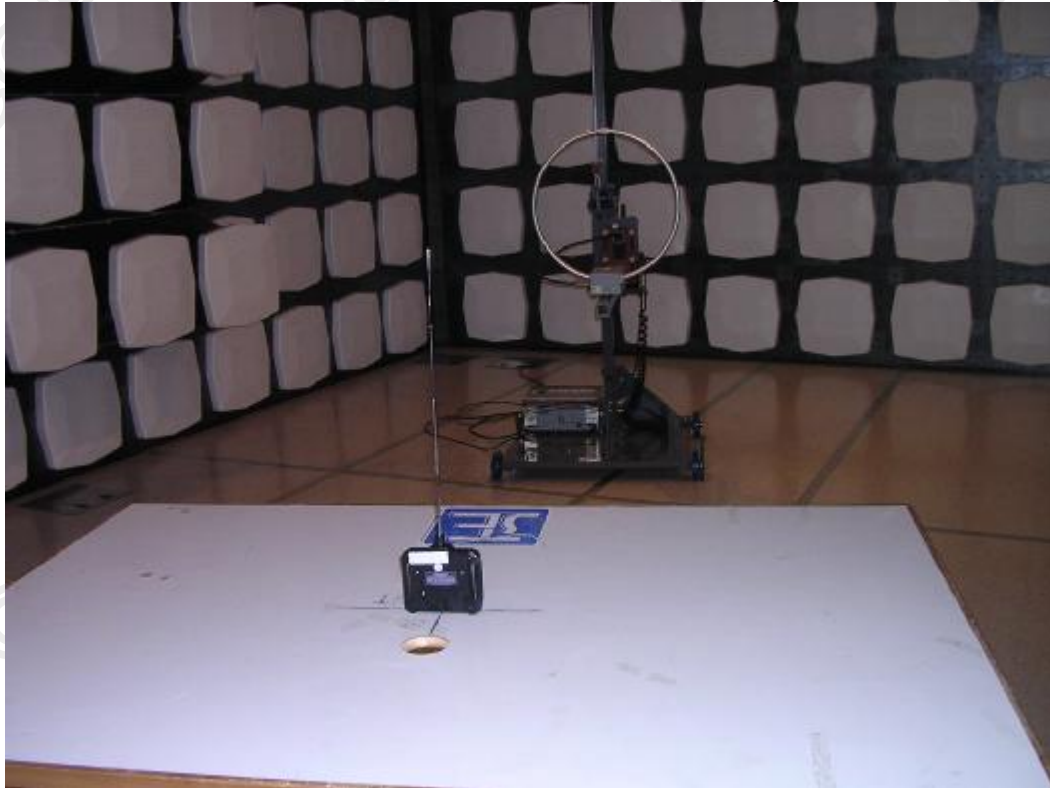
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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