NEMKO Test Report:	4L0547RUS1Rev1
Applicant:	Motorguide 835 West 41st Street Tulsa, OK 74107
Equipment Under Test: (E.U.T.)	DRC01 Remote Control Transmitter
FCC ID:	MVUDRC01
In Accordance With:	**FCC Part 15, Subpart C** For Low Power Transmitters Operating Periodically In The Band 40.66 - 40.77 MHz And Above 70 MHz
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	 Tom Tidwell, RF Group Manager
Date:	25 May, 2005
Total Number of Pages:	19

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Section 1. Summary of Test Results

Manufacturer:

Model No.:

Sample No.	Serial No.	Date Received	Modification Status
001	None	10/14/04	01550, Rev. B

N/A - Not modified from original state

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.231. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☒ New Submission ☐ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

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This report applies only to the items tested.

Summary Of Test Data

Name of Test	Paragraph No.	Results
Transmission Requirements	15.231(a)	Complies
Radiated Emissions	15.231(b)	Complies
Occupied Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	N/A
Alternate Field Strength Requirements	15.231(e)	N/A
Powerline Conducted Emissions	15.207	N/A

Footnotes:

This device operates with battery only.

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Range:	915 MHz (fixed)
Operating Frequency(ies) of Sample:	915 MHz
Type of Emission:	L1D
Emission Designator:	396KL1D
Supply Power Requirement:	3Vdc 20 mm Lithium coin cell
Duty Cycle Correction Factor:	-0.98 dB

Description of E.U.T.

The EUT is a momentarily operated keychain radio transmitter. The transmitter is used to control a boat motor.

Justification

The E.U.T. was configured for testing as per typical installation.

The following combinations were investigated to establish worst case configuration:

(1) Oriented in three orthogonal axis.

(2) Continuous transmit.

Section 3. Equipment Configuration

The device was mounted on a non-conductive stand. The device was tested in three orthogonal axis to determine worst-case orientation.

Section 4. Transmission Requirements

NAME OF TEST: Transmission Requirements	PARA. NO.: 15.231(a)
TESTED BY: David Light	DATE: 10/14/04

Minimum Standard:

15.231(a) Continuous transmissions such as voice, video or data transmissions are not permitted.

15.231(a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds after being released.

15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.

15.231(a)(3) Periodic transmissions at regular pre-determined intervals are not permitted. However polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

15.231(a)(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 pendency of the alarm.

Test Results: Complies..

Test Data: Compliance was determined by verification of technical specifications and a functional test on the equipment.

Rationale for Compliance with Transmission Requirements

15.231(a)(1) **15.231(a)(2) :**	☒ Manual activation ☐ Automatic activation	TX deactivation time:
15.231(a)(3) :	☐ Regular, predetermined transmissions ☐ Polling or supervisory transmissions	TX rate and duration: N/A
15.231(a)(4) :	☐ Alarm device operating during the pendancy of alarm condition	
	☒ Non-alarm device	

The transmitter is manually activated. There are no regular, predetermined transmissions. When the transmit button is released, the transmitter ceases transmission within 1.5 milliseconds. The information transmitted is a unique id code.

Section 5. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.231(b)
TESTED BY: David Light	DATE: 10/14//2004

Minimum Standard:

Permissible Field Strength Limits (Momentarily Operated Devices

Fundamental Frequency (MHz)	Field Strength of Fundamental Microvolts/Meter at 3 meters; (watts)	Field Strength of Unwanted Emissions Microvolts/Meter at 3 meters; (watts)
40.66 - 40.70	2,250	225
70-130	1, 250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (note 1)	3,750	375
260-470 (note 1)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

Notes:

# Use quasi-peak or averaging meter.	*For 130 - 174 MHz: FS (microvolts/m) = (56.82 x F) - 6136*
** Linear interpolation with frequency F in MHz*	*For 260 - 470 MHz: FS (microvolts/m) = (41.67 x F) - 7083*

Any emissions that fall within the restricted bands of 15.205 shall not exceed the following limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results: Complies. The worst-case emission level is 50.7 dBµV/m @ 3m at 1830 MHz. This is 3.3 dB below the specification limit.

Test Data: See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 1 MHz.

In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

Test Data - Radiated Emissions

Radiated Emissions

Page 1 of 1

Job No.: 4L0547 Date: 10/14/2004
Specification: CFR 47, 15.213 Temperature(°C): 31
Tested By: David Light Relative Humidity(%) 33
E.U.T.: MotorGuide Keychain Transmitter DRC01
Configuration: 01550 circuit board assembly, Rev. B production unit
Sample Number: 001, Rev. B
Location: AC 3 RBW: 1 MHz
Detector Type: Peak VBW: 1 MHz

All emissions below 1 GHz, excluding fundamental we measured using 100 kHz RBW

Test Equipment Used

Test Distance: 3 m

Antenna: 1304 and 0981 Directional Coupler: #N/A
Pre-Amp: 1016 Cable #1: 1484
Filter: 1481 Cable #2: 1485
Receiver: 1464 Cable #3: #N/A
Attenuator #1 #N/A Cable #4: #N/A
Attenuator #2: #N/A Mixer: #N/A

The spectrum below 30 MHz was searched using an active loop antenna (asset # 0981). From 1 MHz to 30 MHz a RBW of 10 kHz was used.

Additional equipment used:
Measurement Uncertainty: +/- .7 dB

Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Comment
0.915	52.5	23.4	1.9		77.8	94	-16.2	Peak RBW/VBW=1 MHz
0.915	56.8	23.4	1.9		82.1	94	-11.9	Peak RBW/VBW=1 MHz
1.830	46.8	27.1	2.6	33.0	43.5	74	-30.5	Peak
1.830	55.7	27.1	2.6	33.0	52.4	74	-21.6	Peak
1.830	34	27.1	2.6	33.0	30.7	54	-23.3	Average (Noise Floor)
1.830	54	27.1	2.6	33.0	50.7	54	-3.3	Average
2.746	44.2	29.1	3.4	33.1	43.6	54	-10.4	Peak - Vertical
2.746	47.2	29.1	3.4	33.1	46.6	54	-7.4	Peak - Horizontal

Notes:	Duty cycle factor = 20 Log(89.3ms/100ms) = -0.98 dB
	The spectrum was searched from 1 MHz to 10 GHz. All emissions within 20 dB of the limit are reported.

Radiated Photographs (Worst Case Configuration)

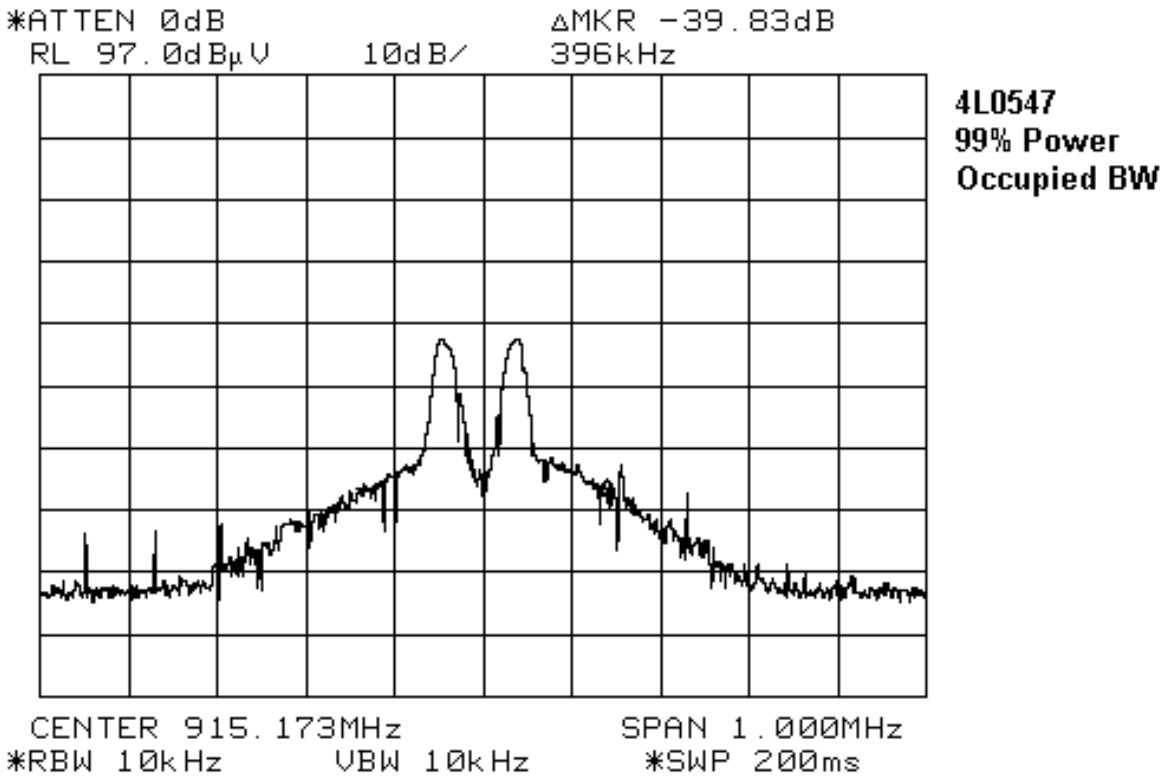
Section 6. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.231(c)
TESTED BY: David Light	DATE: 10/14/04

Minimum Standard: 15.231(c) 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.

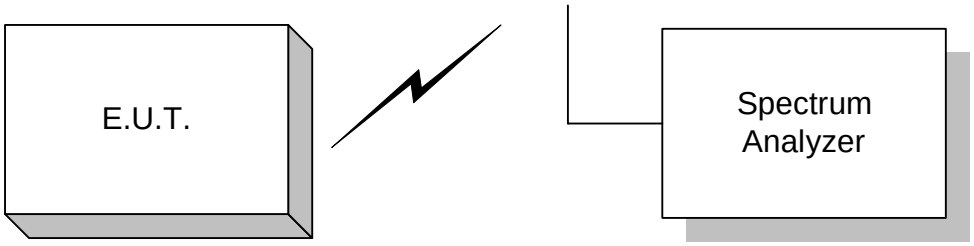
Test Results: Complies. See attached graph.

Test Data: See attached graph.

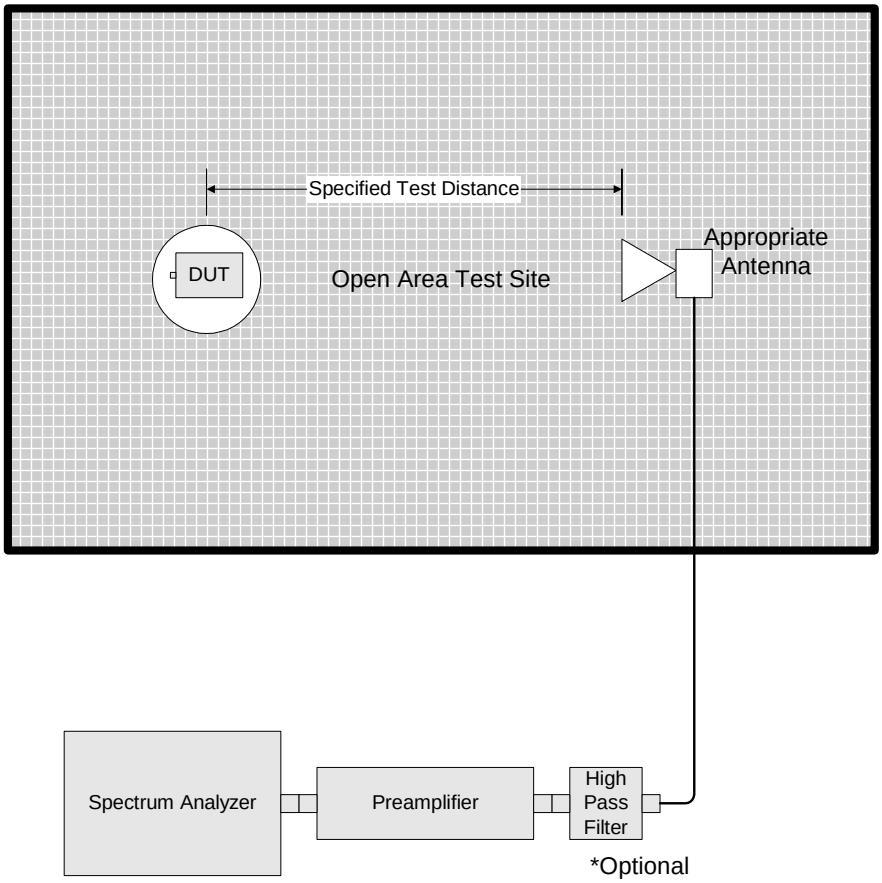


Section 7. Block Diagrams

Occupied Bandwidth, Duty Cycle

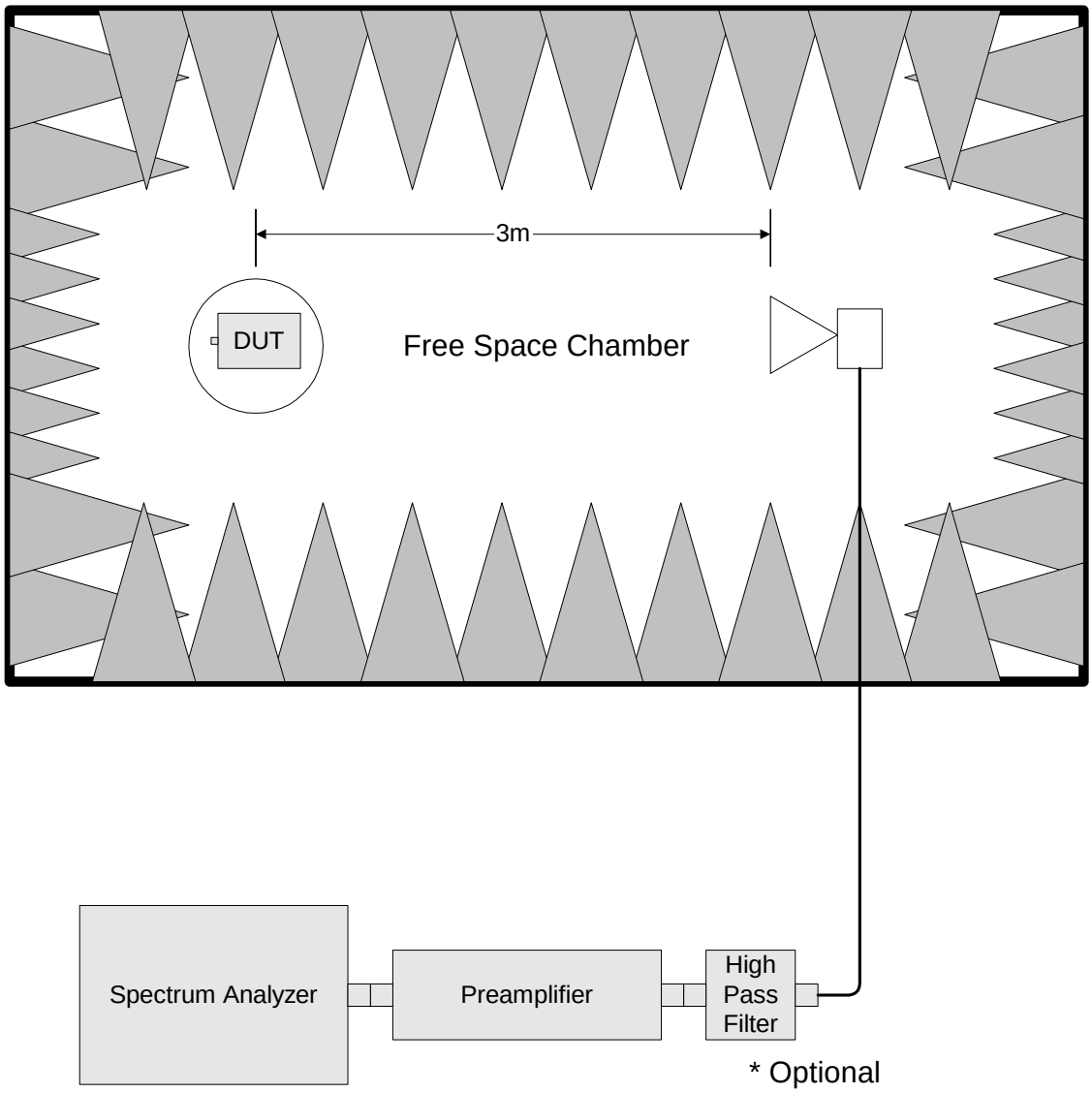


Outdoor Test Site For Radiated Emissions



Radiated Emissions 30 MHz - 1 GHz

The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.



Radiated Emissions above 1 GHz

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/03	11/12/04
1481	Microwave Highpass Filter	K & L 3DH1-2000/T8000-0/0	4	Cal B4 Use	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/04	01/15/05
1484	Cable 2.0-18.0 GHz	Storm PR90-010-072	N/A	08/26/04	08/26/05
1485	Cable 2.0-18.0 GHz	Storm PR90-010-216	N/A	08/02/04	08/02/05