Polk's Model Craft Hobbies, Inc.

Application
For
Certification
(FCC ID: TGL-ART-84100-TX)

Transmitter

Sample Description : Live Steam 282 Loco
Model : ART-84100

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator,
mention 47 CFR [10-1-2004]

0511671
WL/at
October 19, 2005

FCC ID : TGL-ART-84100-TX

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Polk's Model Craft Hobbies, Inc. - MODEL: ART-84100
FCC ID: TGL-ART-84100-TX

October 19, 2005

This report concerns (check one:) Original Grant X Class II Change _____

Equipment Type: Low Power Transmitter (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ___ No X

If yes, defer until: _____ date

Company Name agrees to notify the Commission by: _____ date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No X

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-1-2004 Edition] provision.

Report prepared by:

Wilbur Ng
Intertek Testing Services
2/F., Garment Center,
576, Castle Peak Road,
HONG KONG
Phone: 852-2173-8502
Fax: 852-2742-9149

Table of Contents

List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission	radiated photos.doc
Test Report	Bandwidth Plot	bw.pdf
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The equipment under test (EUT) is a transmitter for a RC Locomotive operating at 49.860 MHz which is controlled by a crystal. The EUT is powered by a 9V battery. The EUT has eight buttons and a channel switch inside the cabinet. The Fast button is used to accelerate the speed of the locomotive. The Slow button is used to decelerate the speed of the locomotive. The two direction buttons are used to change the direction of the locomotive either forward and backward. The Emergency Stop button is used to stop the motion of the locomotive and light up the head light when pressed. The remaining three buttons are used to control the locomotive to generate sound effect. The Channel switch is used to select the communication code with the corresponding locomotive. Totally 64 different code settings are available for the user. The selection of different channel involves the changing of control code only. The locomotive can only be controlled by the controller when both of the settings are the same.

The brief circuit description is saved with filename : descri.pdf

1.2 Related Submittal(s) Grants

This is a single application for certification of a transmitter. The receiver for this transmitter is authorized by Certification procedure with FCC ID: TGL-ART-84100-RX.

1.3 Test Methodology

The radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section"** of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 2

SYSTEM TEST CONFIGURATION

2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The EUT was powered by a new 9V battery during test.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, and the Antenna of EUT was fully extended, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

For simplicity of testing, the unit was wired to transmit continuously.

2.2 EUT Exercising Software

There was no special software to exercise the device.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Equipment Modification

Any modifications installed previous to testing by Polk's Model Craft Hobbies, Inc. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

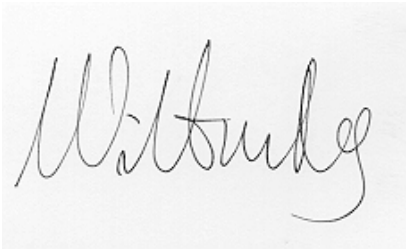
2.5 Support Equipment List and Description

This product was tested in a standalone configuration.

All the items listed under section 2.0 of this report are

Confirmed by:

Wilbur Ng
Manager
Intertek Testing Services
Agent for Polk's Model Craft Hobbies, Inc.



Signature

October 19, 2005 Date

EXHIBIT 3

EMISSION RESULTS

3.0 Emission Results

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

3.1 Field Strength Calculation (cont'd)

Example

Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB

AV = -10 dB

FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 dBμV/m

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

174.543 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos.doc

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 1.5 dB

TEST PERSONNEL:

Signature

Gary M. K. Li, Compliance Engineer
Typed/Printed Name

October 19, 2005
Date

Company: Polk's Model Craft Hobbies, Inc. Date of Test: June 6, 2005
Model: ART-84100
Mode: TX

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Distance Factor (-dB)	Net at 3m (dBµV/m)	Calculated at 30m (dBµV/m)	Limit at 30m (dBµV/m)	Margin (dB)
V	24.933	46.0	14	16.0	40.0	44.0	4.0	29.5	-25.5

Table 2

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	49.860	67.8	11	16	62.8	80.0	-17.2
H	99.738	40.9	11	16	35.9	43.5	-7.6
H	149.608	39.0	13	16	36.0	43.5	-7.5
H	174.543	39.0	19	16	42.0	43.5	-1.5
H	199.465	32.6	16	16	32.6	43.5	-10.9
H	224.403	29.6	18	16	31.6	46.0	-14.4
H	274.274	31.0	22	16	37.0	46.0	-9.0
H	299.195	31.1	22	16	37.1	46.0	-8.9
H	324.143	32.0	24	16	40.0	46.0	-6.0
H	349.065	22.0	24	16	30.0	46.0	-16.0

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3 meter distance were measured at 0.3 meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3 meter.

3. Negative value in the margin column shows emission below limit.

4. Loop antenna are used for the emission below 30 MHz.

*Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and peak detector data with average factor for frequencies over 1000 MHz.

Test Engineer: Gary M. K. Li

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename:
external photos.doc and internal photos.doc

EXHIBIT 5

PRODUCT LABELLING

5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf

EXHIBIT 6

TECHNICAL SPECIFICATIONS

6.0 Technical Specifications

For electronic filing, the block diagram and schematics are saved with filename: block.pdf and circuit.pdf

EXHIBIT 7

INSTRUCTION MANUAL

7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

EXHIBIT 8

MISCELLANEOUS INFORMATION

8.0 **Miscellaneous Information**

This miscellaneous information includes details of the measured bandwidth.

8.1 Measured Bandwidth

The plot saved in bw.pdf which shows the fundamental emission is confined in the specified band. The field strength of any emission appearing between the band edges and up to 10kHz above and below the band edges (49.81 and 49.91 MHz) is at least 26 dB below the carrier level. And at 49.81 & 49.91 MHz, there are at least 53 dB below the carrier level. It meets requirement of Section 15.235(b).

Figure 8.1 Bandwidth

8.2 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. The antenna of EUT was fully extended. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

8.2 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

1. When determining the test result, the Measurement Uncertainty of the test has been considered.

2. This test report is issued to the Company indicated based on the request of the Applicant of the product mentioned in this report.