



TEST REPORT

Report No.: HK11050311-1

Hallmark Cards Inc.

Application
For
Certification
(Original Grant)
(FCC ID: SQ9QXG4729)
(IC: 5768A-QXG4729)

Transmitter

Prepared and Checked by:

Approved by:

Signed On File
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Date: May 18, 2011

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GENERAL INFORMATION

Hallmark Cards Inc.
MODEL: QXG4729
FCC ID: SQ9QXG4729
IC: 5768A-QXG4729

| | |
|---------------------------|--|
| Grantee: | Hallmark Cards Inc. |
| Grantee Address: | 2501 McGee, MD 166, 419580 Missouri, Kansas, U. S. A. |
| Contact Person: | Ronald Carlson |
| Tel: | 816 5074150 |
| Fax: | N/A |
| e-mail: | rcarlson@hallmark.com |
| Manufacturer: | Jetta Company Limited |
| Manufacturer Address: | Jetta House 19 On Kui Street, On Lok Tsuen, Fanling, N.T., Hong Kong. |
| Brand Name: | Hallmark |
| Model: | QXG4729 |
| Type of EUT: | Transmitter |
| Description of EUT: | Where's Santa's Stuff? A Seek & Find Adventure |
| Serial Number: | N/A |
| FCC ID / IC: | SQ9QXG4729 / 5768A-QXG4729 |
| Date of Sample Submitted: | May 06, 2011 |
| Date of Test: | May 13, 2011 |
| Report No.: | HK11050311-1 |
| Report Date: | May 18, 2011 |
| Environmental Conditions: | Temperature: +10 to 40°C Humidity: 10 to 90% |

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SUMMARY OF TEST RESULT

HALLMARK CARDS INC.
MODEL: QXG4729

FCC ID: SQ9QXG4729
IC: 5768A-QXG4729

| TEST SPECIFICATION | REFERENCE | RESULTS |
|--|-------------------------------|---------|
| Maximum Peak Output Power | 15.247(b), (c) / RSS-210 A8.4 | N/A |
| Hopping Channel Carrier Frequencies Separation | 15.247(e) / RSS-210 A8.1 | N/A |
| 20dB Bandwidth of the Hopping Channel | 15.247(a) / RSS-210 A8.1 | N/A |
| Number of Hopping Frequencies | 15.247(e) / RSS-210 A8.1 | N/A |
| Average Time of Occupancy of Hopping Frequency | 15.247(e) / RSS-210 A8.1 | N/A |
| Antenna Conducted Spurious Emissions | 15.247(d) / RSS-210 A8.5 | N/A |
| Radiated Spurious Emissions | 15.247(d) / RSS-210 A8.5 | N/A |
| RF Exposure Compliance | 15.247(i) / RSS-Gen 5.5 | N/A |
| Transmitter Power Line Conducted Emissions | 15.207 / RSS-Gen 7.2.2 | N/A |
| Transmitter Field Strength | 15.227 / RSS-310 3.8 | N/A |
| Transmitter Field Strength | 15.229 / RSS-210 A2.7 | N/A |
| Transmitter Field Strength, Bandwidth and Timing Requirement | 15.231(a) / RSS-210 A1.1.1 | Pass |
| Transmitter Field Strength, Bandwidth and Timing Requirement | 15.231(e) / RSS-210 A1.1.5 | N/A |
| Transmitter Field Strength and Bandwidth Requirement | 15.239 / RSS-210 A2.8 | N/A |
| Transmitter Field Strength and Bandwidth Requirement | 15.249 / RSS-210 A2.9 | N/A |
| Transmitter Field Strength and Bandwidth Requirement | 15.235 / RSS-310 3.9 | N/A |
| Receiver / Digital Device Radiated Emissions | 15.109 / ICES-003 | N/A |
| Digital Device Conducted Emissions | 15.107 / ICES-003 | N/A |

- Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 **General Description**

1.1 Product Description

The equipment under test (EUT) is a transmitter which is operating at 433.92MHz. The EUT is energized by 3 x 1.5V LR44 batteries. The EUT has 6 buttons, which is used to control the on/off of LED and sound portion of the corresponding receiver. Once user presses the buttons, the EUT would transmit for 4.38 seconds. It will stop to transmit after 4.38 seconds automatically.

Antenna Type : Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

The receiver for this transmitter has been authorized by Declaration of the Conformity procedure.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site 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 radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC and IC.

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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 device was powered by 3 x 1.5V LR44 batteries.

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 mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the RF signal continuously.

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 Hallmark Cards Inc. will be incorporated in each production model sold/leased in the United States and Canada.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

2.5 Measurement Uncertainty

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

2.6 Support Equipment List and Description

N/A.

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3.0 Emission Results

Data is included of the 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 Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

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

where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where

- FS = Field Strength in dB μ V/m
- RR = RA - AG - AV in dB μ V
- LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V/m}$$

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 433.978 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

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.

Judgment: Passed by 0.1 dB

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Company: Hallmark Cards Inc.
Model: QXG4729
Mode: Transmitting

Date of Test: May 13, 2011

Table 1

Radiated Emissions
Pursuant to FCC Part 15 Section 15.231(a) Requirement

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp (dB) | Antenna factor (dB) | Average Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|--------------|---------------------|---------------------|--------------------|----------------------|-------------|
| V | 433.978 | 78.7 | 16 | 25.0 | 7.0 | 80.7 | 80.8 | -0.1 |
| V | 867.950 | 43.2 | 16 | 31.0 | 7.0 | 51.2 | 60.8 | -9.6 |
| H | *1301.925 | 67.9 | 34 | 26.1 | 7.0 | 53.0 | 54.0 | -1.0 |
| H | 1735.900 | 61.3 | 34 | 27.2 | 7.0 | 47.5 | 60.8 | -13.3 |
| V | 2169.875 | 58.2 | 34 | 29.4 | 7.0 | 46.6 | 60.8 | -14.2 |
| H | 2603.800 | 54.5 | 34 | 30.4 | 7.0 | 43.9 | 60.8 | -16.9 |
| V | 3037.825 | 52.5 | 34 | 31.9 | 7.0 | 43.4 | 60.8 | -17.4 |
| H | 3471.800 | 52.3 | 34 | 31.9 | 7.0 | 43.2 | 60.8 | -17.6 |
| H | *3905.775 | 50.3 | 34 | 33.3 | 7.0 | 42.6 | 54.0 | -11.4 |

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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 sign in the column shows value below limit.

4. Horn antenna is used for the emission over 1000MHz.

* Emission within restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

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4.0 **Equipment Photographs**

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

5.0 **Product Labelling**

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

6.0 **Technical Specifications**

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 **Instruction Manual**

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

This manual will be provided to the end-user with each unit sold/leased in the United States and Canada.

8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure and measured bandwidth.

8.1 **Measured Bandwidth**

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: bw.pdf. From the plot, the bandwidth is observed to be 506.0kHz, at 20dBc where the bandwidth limit is 1084.8kHz.

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

8.2 **Discussion Pulse Desensitivity**

Pulse desensitivity is not applicable for this device. The effective period (T_{eff}) is approximately 240 μ s for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 100kHz, so the pulse desensitivity factor is 0dB.

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8.3 Calculation of Average Factor

The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 28.68 ms

Effective period of the cycle = $420\ \mu\text{s} \times 6 + 480\ \mu\text{s} \times 2 + 1.98\ \text{ms} \times 2 + 660\ \mu\text{s} \times 6 + 240\ \mu\text{s} \times 2 + 960\ \mu\text{s}$

DC = $12.84 / 28.68$ (ms)

Therefore, the averaging factor is found by $20\log 0.4477 = -7.0\ \text{dB}$.

8.4 Emissions Test Procedures

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

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003. A typical or an unmodulated CW signal at the operating frequency of the EUT has been supplied to the EUT for all measurements. Such a signal is supplied by a signal generator and an antenna in close proximity to the EUT. The signal level is sufficient to stabilize the local oscillator of the EUT.

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. 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 EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

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. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

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.

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8.4 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 were made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden 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, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 Equipment List

| Equipment | EMI Test Receiver | Log Periodic Antenna | Biconical Antenna |
|----------------------|-------------------|----------------------|-------------------|
| Registration No. | EW-2500 | EW-0446 | EW-0954 |
| Manufacturer | ROHDESCHWARZ | EMCO | EMCO |
| Model No. | ESCI | 3146 | 3104C |
| Calibration Date | Jan 25, 2011 | Apr 26, 2010 | Apr 14, 2010 |
| Calibration Due Date | Jan 25, 2012 | Oct 26, 2011 | Oct 14, 2011 |

| Equipment | 14m Double Shield RF Cable (20MHz - 6GHz) | 14m Double Shield RF Cable (9kHz - 6GHz) | Spectrum Analyzer |
|----------------------|---|---|-------------------|
| Registration No. | EW-2528 | EW-2375 | EW-2188 |
| Manufacturer | RADIALL | RADIALL | AGILENTTECH |
| Model No. | nm / br5d / sma 14m | n m/br56/bnc m 14m | E4407B |
| Calibration Date | Dec 14, 2010 | Sep 11, 2010 | Dec 27, 2010 |
| Calibration Due Date | Dec 14, 2011 | Sep 12, 2011 | Dec 31, 2011 |