

Antennacraft

Application
For
Certification
(FCC ID: VWCHDMS9100R)
Superregenerative Receiver

07272032
TC/el
December 20, 2007

- The evaluation data of the report will be kept for 3 years from the date of issuance.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Intertek Testing Services Hong Kong Ltd.

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

INTERTEK TESTING SERVICES

LIST OF EXHIBITS

INTRODUCTION

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labelling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual
<i>EXHIBIT 8:</i>	Miscellaneous Information
<i>EXHIBIT 9:</i>	Confidentiality Request

INTERTEK TESTING SERVICES

MEASUREMENT / TECHNICAL REPORT

Antennacraft – MODEL: HDMS9100

FCC ID: VWCHDMS9100R

December 20, 2007

This report concerns (check one:) Original Grant ☒ Class II Change ☐

Equipment Type: Superregenerative Receiver (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

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 ☒

If no, assumed Part 15, Subpart B for unintentional radiator – the new 47 CFR [05-04-07 Edition] provision.

Report prepared by:	Ho Wai Kin, Ben Intertek Testing Services Hong Kong Ltd. 2/F., Garment Center, 576 Castle Peak Road, Kowloon, Hong Kong. Phone: 852-2173-8505 Fax: 852-2371-0914
---------------------	--

INTERTEK TESTING SERVICES

Table of Contents

1.0	<u>General Description</u>	2
1.1	Product Description	2
1.2	Related Submittal(s) Grants	2
1.3	Test Methodology	3
1.4	Test Facility	3
2.0	<u>System Test Configuration</u>	5
2.1	Justification	5
2.2	EUT Exercising Software	5
2.3	Special Accessories	5
2.4	Equipment Modification	6
2.5	Measurement Uncertainty	6
2.6	Support Equipment List and Description	6
3.0	<u>Emission Results</u>	8
3.1	Field Strength Calculation	9
3.2	Radiated Emission Configuration Photograph	11
3.3	Radiated Emission Data	12
3.4	Conducted Emission Configuration Photograph	15
3.5	Conducted Emission Data	16
4.0	<u>Equipment Photographs</u>	18
5.0	<u>Product Labelling</u>	20
6.0	<u>Technical Specifications</u>	22
7.0	<u>Instruction Manual</u>	24
8.0	<u>Miscellaneous Information</u>	26
8.1	Stabilization Waveform	27
8.2	Emissions Test Procedures	28
9.0	<u>Confidentiality Request</u>	31

INTERTEK TESTING SERVICES

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.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
Test Report	Conducted Emission Test Result	conducted.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
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
Cover Letter	Confidentiality Request	request.pdf
Test Report	Stabilization Waveform	superreg.pdf

INTERTEK TESTING SERVICES

EXHIBIT 1

GENERAL DESCRIPTION

INTERTEK TESTING SERVICES

1.0 **General Description**

1.1 Product Description

This Equipment Under Test (EUT) is outdoor TV antenna with RF remote control (receiver). The main function of the EUT is used to receive the broadcasting TV signal. It can allow you rotate the antenna in difference positions either clockwise or counterclockwise for best reception. It is powered by an AC/DC adaptor (Model: U120025D, Input 120VAC, Output 12VDC 250mA). There are two 75ohm terminals at the back of EUT, one is used to connect the TV, another is used to connect second video source to the TV. Beside the 75ohm terminal, three terminals are used for connect the motor of the antenna system. Two buttons in the front panel is used to select the antenna direction. The LCD display is used indicate the antenna direction and which channel receiving. On the other hand, the antenna direction and the channel receiving can be controlled by the remote control that use 433.92MHz RF signal. In addition, it equipped with/without CEA-909 interface at the back of the unit, this is a standard an antenna control interface for receiving terrestrial transmissions. The primary use is to facilitate television reception. The receiver controls the antenna apparatus to optimize the signal automatically for best reception by adjusting its configuration.

Antenna Type: Internal, Integral

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

1.2 Related Submittal(s) Grants

The Certification procedure of transmitter for this receiver (with FCC ID: VWCHDMS9100T) is being processed as the same time of this application.

INTERTEK TESTING SERVICES

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Radiated Emission measurement was performed in Open Area Test Sites and Conducted Emission was performed in Shield Room. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. 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 fully placed on file with the FCC.

INTERTEK TESTING SERVICES

EXHIBIT 2

SYSTEM TEST CONFIGURATION

INTERTEK TESTING SERVICES

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 AC/DC Adaptor (Model: U120025D, Input: 120VAC, Output: 12VDC 250mA).

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. The step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

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 turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

For simplicity of testing, the unit was operated to receive 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.

INTERTEK TESTING SERVICES

2.4 Equipment Modification

Any modifications installed previous to testing by Antennacraft will be incorporated in each production model sold / leased in the United States.

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

2.5 Measurement Uncertainty

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

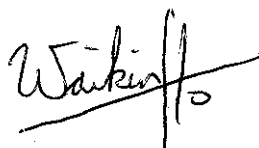
2.6 Support Equipment List and Description

1. Antenna with Motor
2. CEA909 Control Box
3. Associated Transmitter with FCC ID: VWCHDMS9100T

All the items listed under section 2.0 of this report are

Confirmed by:

*Ho Wai Kin, Ben
Supervisor
Intertek Testing Services Hong Kong Ltd.
Agent for Antennacraft*



Signature

December 20, 2007

Date

INTERTEK TESTING SERVICES

EXHIBIT 3

EMISSION RESULTS

INTERTEK TESTING SERVICES

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.

INTERTEK TESTING SERVICES

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 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

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:

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

INTERTEK TESTING SERVICES

3.1 Field Strength Calculation (cont'd)

Example

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

$$RA = 62.0\text{dB}\mu\text{V}$$

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

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

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

$$PD = 0\text{dB}$$

$$AV = -10\text{dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32\text{dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8\mu\text{V/m}$$

INTERTEK TESTING SERVICES

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at
904.350MHz

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

INTERTEK TESTING SERVICES

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 7.1dB margin

TEST PERSONNEL:



Signature

Terry C. H. Chan, Compliance Engineer
Typed / Printed Name

December 20, 2007
Date

INTERTEK TESTING SERVICES

Company: Antennacraft
Model: HDMS9100
Worst Case Operating Mode: Receiving

Date of Test: November 23, 2007

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	441.401	27.3	16	26.0	37.3	46.0	-8.7
H	445.930	28.4	16	26.0	38.4	46.0	-7.6
H	454.908	27.4	16	26.0	37.4	46.0	-8.6
H	900.828	22.1	16	32.0	38.1	46.0	-7.9
H	902.114	22.0	16	32.0	38.0	46.0	-8.0
H	904.350	22.9	16	32.0	38.9	46.0	-7.1
H	1350.100	46.8	33	26.1	39.9	54.0	-14.1
H	1353.806	47.9	33	26.1	41.0	54.0	-13.0
H	1354.701	47.7	33	26.1	40.8	54.0	-13.2

- 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 value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Terry C. H. Chan

INTERTEK TESTING SERVICES

Company: Antennacraft
Model: HDMS9100
Worst Case Operating Mode: Antenna Rotating

Date of Test: November 23, 2007

Table 2

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	35.042	35.8	16	10.0	29.8	40.0	-10.2
V	47.518	37.0	16	11.0	32.0	40.0	-8.0
V	68.724	40.1	16	8.0	32.1	40.0	-7.9
H	134.816	34.2	16	14.0	32.2	43.5	-11.3
H	250.920	29.4	16	20.0	33.4	46.0	-12.6
H	347.584	25.0	16	24.0	33.0	46.0	-13.0

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 value in the margin column shows emission below limit.

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

Test Engineer: Terry C. H. Chan

INTERTEK TESTING SERVICES

3.4 Conducted Emission Configuration Photograph

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photos.pdf.

INTERTEK TESTING SERVICES

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission are saved with filename: conducted.pdf. The data table lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by >20dB margin

TEST PERSONNEL:



Signature

Terry C. H. Chan, Compliance Engineer
Typed / Printed Name

December 20, 2007
Date

INTERTEK TESTING SERVICES

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

INTERTEK TESTING SERVICES

4.0 **Equipment Photographs**

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

INTERTEK TESTING SERVICES

EXHIBIT 5

PRODUCT LABELLING

INTERTEK TESTING SERVICES

5.0 **Product Labelling**

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

INTERTEK TESTING SERVICES

EXHIBIT 6

TECHNICAL SPECIFICATIONS

INTERTEK TESTING SERVICES

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.

INTERTEK TESTING SERVICES

EXHIBIT 7

INSTRUCTION MANUAL

INTERTEK TESTING SERVICES

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.

INTERTEK TESTING SERVICES

EXHIBIT 8

MISCELLANEOUS INFORMATION

INTERTEK TESTING SERVICES

8.0 **Miscellaneous Information**

This miscellaneous information includes details of the stabilizing process (including a plot of the stabilized waveform), the test procedure and calculation of the factors such as pulse desensitization.

INTERTEK TESTING SERVICES

8.1 Stabilization Waveform (for Superregenerative Receiver)

Previous to the testing, the superregenerative receiver was stabilized as outlined in the test procedure. For the electronic filing, the plot saved with filename: superreg.pdf show the fundamental emission when a signal generator was used to stabilize the receiver. Please note that the antenna was placed as close as possible to the EUT for clear demonstration of the waveform and that accurate readings are not possible from this plot.

INTERTEK TESTING SERVICES

8.2 Emissions Test Procedures

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

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

The 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 axes to obtain maximum emission levels. The antenna height and polarization are 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 8.2.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9kHz to 2000MHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

INTERTEK TESTING SERVICES

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 100kHz or greater when frequency is below 1000MHz. 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 1000MHz, a resolution bandwidth of 1MHz is used.

Measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1GHz, 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.

INTERTEK TESTING SERVICES

EXHIBIT 9

CONFIDENTIALITY REQUEST

INTERTEK TESTING SERVICES

9.0 **Confidentiality Request**

For electronic filing, a confidentiality request is saved with filename: request.pdf.