

29 October, 2002

*Atom Industrial Ltd.
Unit 1003-5, 10/F., Westley Square,
48 Hoi Yuen Road,
Kwun Tong, Kowloon, Hong Kong.*

Dear Mr. Chan Wing Fai:

Enclosed you will find your file copy of a Part 15 report (FCC ID: NOYRF98).

*For your reference, TCB will normally take another 15-20 days for reviewing the report.
Approval will then be granted when no query is sorted.*

Please contact me if you have any questions regarding the enclosed material.

Sincerely,

A handwritten signature in black ink, appearing to read 'Alfred Lo', with a stylized, cursive script.

*Alfred Lo
Senior Technical Supervisor*

Enclosure

FCC ID: NOYRF98

Atom Industrial Ltd.

Application
For
Certification
(FCC ID: NOYRF98)

Superheterodyne Receiver

WO# 0214337
LC/sa
29 October, 2002

FCC ID: NOYRF98

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- This report shall not be reproduced except in full without prior authorization from Intertek Testing Services Hong Kong Limited
- For Terms And Conditions of the services, it can be provided upon request.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2713 8888 Fax: (852) 2745 8306

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LIST OF EXHIBITS

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MEASUREMENT/TECHNICAL REPORT

Atom Industrial Ltd - MODEL: RCA WHP140
FCC ID: NOYRF98

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

Equipment Type: Superheterodyne Receiver (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 B for unintentional radiator - the new 47 CFR [12-18-01 Edition] provision.

Report prepared by:

Alfred Lo
Intertek Testing Services
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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.pdf
External Photo	External Photo	ophoto.pdf
Internal Photo	Internal Photo	iphoto.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

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 **General Description.**

1.1 Product Description

This Equipment Under Test (EUT) is a 900MHz wireless audio receiver for its associated RF transmitter (912-913MHz). The primary function of the EUT is use to receive the modulated RF signal from it's associated transmitter and then demodulate the RF signal into audio sound. It is powered by two AA size batteries. It consists the power "ON/OFF" button, "Tuning" knob and volume switch for product on/off, frequency tuning and volume control respectively. An indicating light which equipped on the headphone is use to indicate the power on status (in red) and glow green when the channel is properly tuned. Moreover, it can be found that the bare wire type antenna (35cm) was inside the plastic head band, and it was shown on the external photo in the following page.

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

1.2 Related Submittal(s)

The Certification procedure of transmitter (with FCC ID: NOYRF83) for this receiver is being processed at the same time of this application.

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1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated measurement was performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site 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 placed on file with the FCC.

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EXHIBIT 2

SYSTEM TEST CONFIGURATION

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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 (1992).

The EUT is powered by 2 new "AA" size batteries.

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

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 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 in receiving mode continuously.

2.2 EUT Exercising Software

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

2.3 Special Accessories

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

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2.4 Equipment Modification

Any modifications installed previous to testing by Atom Industrial Ltd 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

N/A

All the items listed under section 2.0 of this report are:

Confirmed by:

*Alfred Lo
Senior Technical Supervisor - Home Entertainment Electronics
Intertek Testing Services Hong Kong Ltd.
Agent for Atom Industrial Ltd*



Signature

29 October, 2002 Date

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EXHIBIT 3

EMISSION RESULTS

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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.

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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:

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

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3.1 Field Strength Calculation (cont'd)

Example

Assume a receiver reading of 62.0 dB μ V 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

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

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

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

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

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

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

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

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

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at
836.149 MHz

For electronic filing, the front view and back view of the test configuration photographs are saved with filename: radiated.pdf respectively.

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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 6.4 dB margin

The radiated emissions test was observed up to 5GHz.

TEST PERSONNEL:



Signature

Lawrence H. C. Chow, Compliance Engineer
Typed/Printed Name

29 October, 2002
Date

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Company: Atom Industrial Ltd.
Model: RCA WHP140
Worst case operating mode: Receiving

Date of Test: 21 October, 2002

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	836.149	33.8	21.8	16	39.6	46.0	-6.4
H	1672.298	37.9	26.5	34	30.4	54.0	-23.6
H	2508.447	46.5	29.1	34	41.6	54.0	-12.4
H	3344.596	36.3	31.4	34	33.7	54.0	-20.3
H	4180.745	32.5	34.2	34	32.7	54.0	-21.3
H	5016.894	29.1	35.2	34	30.3	54.0	-23.7

- NOTES:
1. Peak Detector is used below 1000MHz 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 and average detector are used for the emission over 1000MHz.

The corresponding limit as per 15.109 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Lawrence H. C. Chow

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EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

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4.0 **Equipment Photographs**

For electronic filing, photographs of the tested EUT are saved with filename: ophoto.pdf for external photo, and iphoto.pdf for internal photo.

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EXHIBIT 5

PRODUCT LABELLING

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5.0 **Product Labelling**

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

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EXHIBIT 6

TECHNICAL SPECIFICATIONS

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.

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EXHIBIT 7

INSTRUCTION MANUAL

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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.

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EXHIBIT 8

MISCELLANEOUS INFORMATION

8.0 **Miscellaneous Information**

This miscellaneous information includes details of the test procedure and calculation of factors such as pulse desensitization and averaging factor (calculation and timing diagram).

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8.1 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

This device is a superheterodyne receiver. The emission are continuous, and no desensitization of the measurement equipment occurs.

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8.2 Calculation of Average Factor

It is not necessary to apply average factor to the measurement results.

8.3 Emissions Test Procedures

This device is a superheterodyne receiver. It is not necessary to apply average factor to the measurement result.

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

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 1992.

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 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 8.2.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the 5GHz, whichever is lower. For line conducted emissions, the range scanned is 450 kHz to 30 MHz.

8.3 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 - 1992.

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.

Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.