November 04, 2004

Zonik Industrial Co., Ltd.
Rm. 1404, Blk. A, Wah Seng Ind. Bldg.,
14-18 Wong Chuk Yeung St.,
Shatin, N.T., Hong Kong.

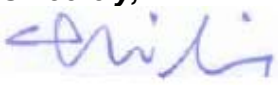
Dear Mr. Jacob Lai:

Enclosed you will find your file copy of a Part 90 report (FCC ID: SGDMKA382).

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,



Billy Chow
Senior Supervisor
Signed for and on behalf of
Intertek Hong Kong
ETL SEMKO

Enclosure

FCC ID: SGDMKA382

Zonik Industrial Co., Ltd.

Application
For
Certification

FCC Part 90.265(b)

(FCC ID: SGDMKA382)

Wireless Microphone

WO# 04159512
TC/sa
November 04, 2004

FCC ID: SGDMKA382

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

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Zonik Industrial Co., Ltd. - MODEL: MKA382
FCC ID: SGDMKA382

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

Equipment Type: Wireless Microphone

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.

If no, assumed Part 90, Subpart K for Special Frequencies or Frequency Bands - the new 47 CFR [10-01-03 Edition] provision.

Report prepared by:

Billy Chow
Intertek Testing Services
2/F., Garment Centre,
576, Castle Peak Road,
Kowloon, Hong Kong
Phone: 852-2173-8545
Fax: 852-2371-0914

Table of Contents

List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Tuning procedure	Tuning procedure	tuning.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Test Report	Bandwidth Plot	bw.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Modulation Characteristics	Modulation Frequency Response	mfr.pdf
Modulation Characteristics	Modulation Limiting	ml.pdf

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

This Equipment Under Test (EUT) is a one channel audio wireless FM microphone for its associated receiver. The primary function of the EUT is to modulate the audio signal to RF signal and then transmit the modulated signal. The operational frequency is 169.445MHz.

This EUT is powered by a new 9V battery and the power on LED lights up (on top of the body) when the switch push to ON position.

For electronic filing, 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 wireless microphone.

The certification procedure of receiver for this transmitter (with FCC ID: SGDWLR02) is being processed as the same time of this application.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2001). 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 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 (2001).

For simplifying of test, the unit was operated transmitting continuously.

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.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the typical 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 Zonik Industrial Co., Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

2.5 Measurement Uncertainly

When determining of the test conclusion, the measurement uncertainly of test has been considered.

2.6 Support Equipment List and Description

N/A

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

Billy Chow
Senior Supervisor - Home Entertainment Electronics
Intertek Testing Services Hong Kong Ltd.
Agent for Zonik Industrial Co., Ltd.

Signature

Novemer 05, 2004 Date

EXHIBIT 3

RF POWER OUTPUT

3.0 RF Power Output

Testing Procedures

1. The EUT shall be placed at 1.5m heights on a turntable vertically.
2. The test antenna shall be oriented initially for vertical polarization location 3m from the EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to measuring receiver and the quasi-peak detector is used for the measurement.
4. The transmitter shall be switch on, if possible, without modulation and the measuring receiver shall be turned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a tuned dipole (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, that is equal to the level note input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
18. Repeat above test procedures with the EUT placed horizontally.

Company: Zonik Industrial Co., Ltd. Date of Test: October 18, 2004
Model: MKA382
Worst Case Operating Mode: Transmitting

Table 1

Transmission Power
Pursuant to FCC section 90.265(b)

Assigned Frequency (MHz)	Measured Frequency (MHz)	Measured Power (mW)	Limit (mW)	Margin (mW)
169.445	169.445	0.0449	50	-49.9551

NOTES: 1. Negative sign in the column shows value below limit.

Test Engineer: Terry C. H. Chan

EXHIBIT 4

MODULATION CHARACTERISTICS

4.0 Modulation Characteristics

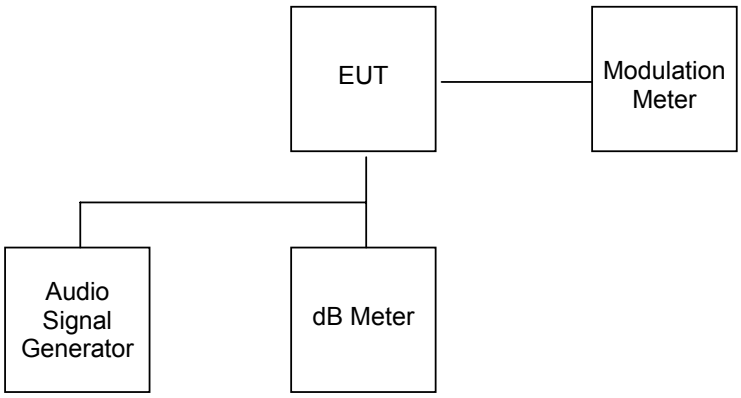
In order to satisfy the FCC section 2.1047(a) and 2.1047(b) requirement, Modulation Frequency Response and Modulation Limiting respectively. The characteristics plots are attached in Exhibit 4.1 & 4.2.

Plots for each test are included in the following sections.

4.1 Modulation Frequency Response

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Set the audio signal generator frequency to the sound pressure level 97.0dBSPL at the microphone of the EUT.

3. The frequency of the audio signal generator is changed from 100Hz to 5kHz.

4. Record the frequency deviation.

Company: Zonik Industrial Co., Ltd. Date of Test: October 18, 2004
Model: MKA382

Table 2

Modulation Frequency Response
Pursuant to FCC section 2.1047(a)

Modulation Frequency (Hz)	Frequency Deviation (kHz)	Modulation Index
100	12.2	122.00
200	12.0	60.00
300	5.3	17.67
400	3.5	8.75
500	3.0	6.00
600	2.7	4.50
700	1.8	2.57
800	1.6	2.00
900	1.6	1.78
1000	1.3	1.30
1500	0.9	0.60
2000	0.8	0.40
2500	0.6	0.24
3000	0.6	0.20
3500	0.6	0.17
4000	0.7	0.18
4500	0.7	0.16
5000	0.6	0.12

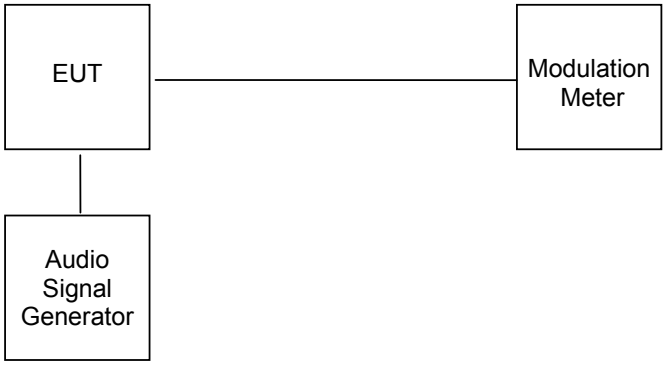
Test Engineer: Terry C. H. Chan

For electronic filing, the Modulation Frequency Response plots are saved with filename: mfr.pdf

4.2 Modulation Limiting

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Set the frequency of the audio signal generator to 500Hz and adjust the level from 67dBSPL to 120dBSPL. Record the output modulation index.

3. Record the maximum value of plus or minus peak frequency deviation.

4. Repeat the above procedure with frequency 500Hz, 1000Hz, 2500Hz & 5000Hz.

Company: Zonik Industrial Co., Ltd. Date of Test: October 18, 2004
Model: MKA382

Table 3

Modulation Limiting
Pursuant to FCC section 2.1047(b)

Modulation Input (dBSPL)	Frequency Deviation (kHz)			
	at 500Hz	at 1000Hz	at 2500Hz	at 5000Hz
67	No response	No response	No response	No response
77	No response	No response	No response	No response
87	0.8	No response	No response	No response
97	3.0	1.3	0.6	0.6
107	9.5	4.1	1.5	2.5
117	24.2	12.0	4.5	5.3
120	22.5	12.7	6.6	5.7

NOTE: No response if input level >120dBSPL.

Test Engineer: Terry C. H. Chan

For electronic filing, the Modulation Limiting Characteristics plot is saved with filename ml.pdf

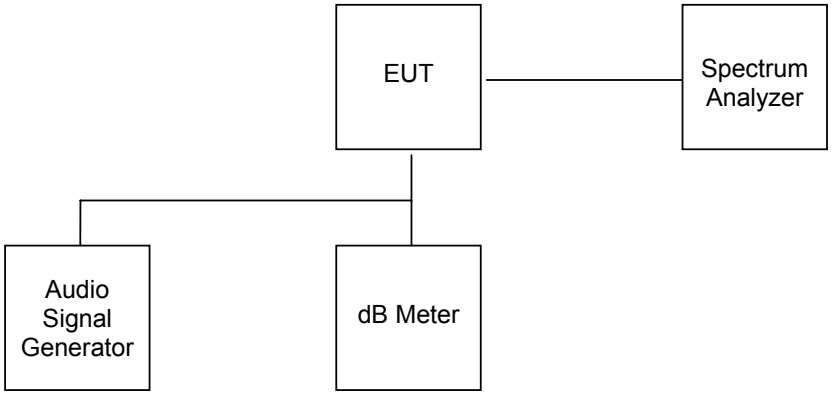
EXHIBIT 5

OCCUPIED BANDWIDTH

5.0 Occupied Bandwidth

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Other than single side band or independent sideband transmitters when modulated by a 2500Hz one at an input level 16dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.

3. The occupied bandwidth is measured with the spectrum analyzer set at 5kHz/div scan and 10dB/div.

4. The emission bandwidth shall not exceed the limit 54kHz.

5. The measured occupied Bandwidth is 14.0kHz for carrier frequency of 169.445MHz.

Test Engineer: Terry C. H. Chan

For electronic filing, the Bandwidth Plots are saved with filename: bw.pdf

EXHIBIT 6

SPURIOUS EMISSION

6.0 Spurious Emission

In order to satisfy the requirement, the spurious emission from the EUT are measured and shown in the Exhibit 6.1.

6.1 Field Strength of Spurious Radiation

Testing Procedures

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2001). All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

For electronic filing, set up photographs of the Worst Case Radiated Emission are saved with filename: radiated photos.pdf.

Company: Zonik Industrial Co., Ltd. Date of Test: October 18, 2004
Model: MKA382

Table 4

Field Strength of Spurious Radiated
Pursuant to FCC section 2.1053(a)

Polarization	Frequency (MHz)	Net at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)
V	33.889	30.2	82.2	-52.0
V	67.779	35.1	82.2	-47.1
V	84.727	63.9	82.2	-18.3
V	101.669	55.2	82.2	-27.0
V	118.614	50.8	82.2	-31.4
V	135.559	37.8	82.2	-44.4
V	152.513	56.3	82.2	-25.9
V	186.399	42.8	82.2	-39.4
V	203.340	31.4	82.2	-50.8
V	305.008	39.2	82.2	-43.0
V	321.957	55.3	82.2	-26.9
V	338.896	59.7	82.2	-22.5
V	474.460	41.8	82.2	-40.4
V	491.403	36.4	82.2	-45.8
V	508.346	39.2	82.2	-43.0
V	576.126	34.2	82.2	-48.0
V	593.067	38.3	82.2	-43.9
V	610.017	33.0	82.2	-49.2
V	643.908	37.8	82.2	-44.4
V	677.796	35.7	82.2	-46.5

NOTE:
1. Quasi-peak data for emission below 1000MHz.
2. Negative sign in margin column shows the value below the limit.
3. Any emissions and any other harmonics which are attenuated more than 20dB below the permissible value need not be recorded.
4. Horn Antenna and average detector is used for emission over 1000MHz.

* Calculated limit = $10 \log_{10}(TP(W)) - 43 - 10 \log_{10}(TP)$
= -43dBW
= 82.2dBμV/m at 3m

Test Engineer: Terry C. H. Chan

EXHIBIT 7

FREQUENCY STABILITY

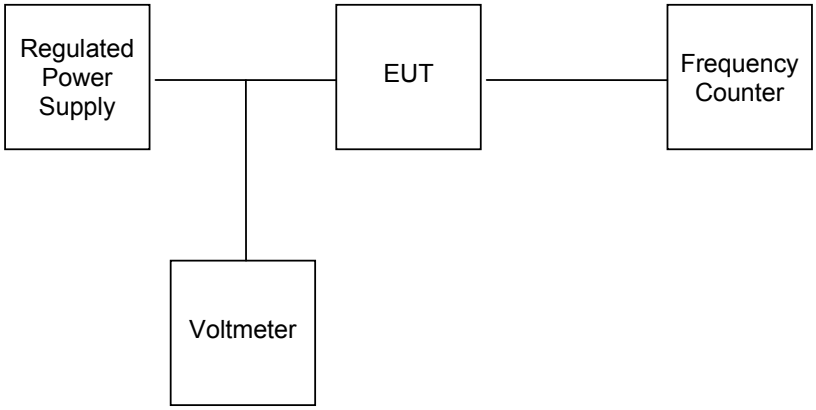
7.0 **Frequency Stability**

The frequency tolerance was tested in normal condition & over extreme ambient conditions with respect to voltage and temperature variation.

7.1 Frequency Stability - Voltage

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. For battery powered equipment, reduce primary supply voltage to the battery operating end point voltage which is specified by the manufacturer.

Company: Zonik Industrial Co., Ltd. Date of Test: October 18, 2004
Model: MKA382

Table 5

Power Supply Voltage Stability
Pursuant to FCC section 2.1055

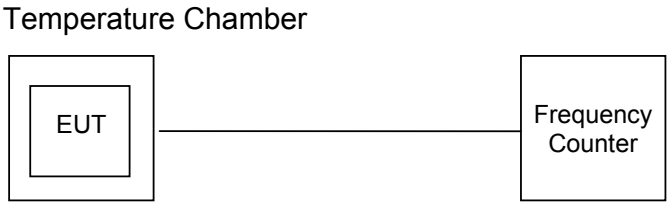
Manufacturer Specified Battery End Point Voltage (V)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (kHz)
5	169.445	169.44725	-2.25

Test Engineer: Terry C. H. Chan

7.2 Frequency Stability - Temperature

Testing Procedures

1. Set-up the test equipment in the following configuration:



2. Set the Temperature Chamber to -30°C and stabilize the EUT temperature for one hour. Turn the transmitter ON for two minutes.

3. Turn the EUT OFF

4. Repeat the above procedure with 10°C intervals from -30°C to 50°C

Company: Zonik Industrial Co., Ltd. Date of Test: October 18, 2004
Model: MKA382

Table 6

Temperature Stability
Pursuant to FCC section 2.1055

Temperature (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (kHz)
-30	169.445	169.4693	-24.3
-20	169.445	169.4683	-23.3
-10	169.445	169.4638	-18.8
0	169.445	169.4585	-13.5
10	169.445	169.4533	-8.3
20	169.445	169.4490	-4.0
30	169.445	169.4460	-1.0
40	169.445	169.4388	+6.2
50	169.445	169.4318	+13.2

Test Engineer: Terry C. H. Chan

EXHIBIT 8

EQUIPMENT PHOTOGRAPHS

8.0 Equipment Photographs

For electronic filing, photographs of the testes EUT are saved with filename external photos.pdf and internal photos.pdf for external and internal photos respectively.

EXHIBIT 9

PRODUCT LABELLING

9.0 **Product Labelling**

For electronic filing, the label and label location is saved with filename: label.pdf

EXHIBIT 10

TECHNICAL SPECIFICATIONS

10.0 **Technical Specifications**

For electronic filing, the block diagram and the schematic diagram of the Wireless Microphone are saved with filename block.pdf and circuit.pdf respectively.

EXHIBIT 11

INSTRUCTION MANUAL

11.0 Instruction Manual

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

Please note that the required FCC Information to the User can be found at the front of this manual.

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