Silver Manufactory Holdings Co., Ltd.

Application
For
Certification

40MHz and 49MHz Walkie Talkie

(FCC ID:N9BSV-5005)

WO# 9807835
CKL/at
October 27, 1998

FCC ID: N9BSV-5005

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Silver Manufactory Holdings Co., Ltd. - MODEL: 5005
FCC ID: N9BSV-5005

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

Equipment Type: Walkie Talkie (example: computer, modem, transmitter, 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 [10-1-96 Edition] provision.

Report prepared by:

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Test Report	Band Edges Emission Plot	emission.pdf
External Photo	External Photo	ophoto1.jpg, ophoto4 .jpg
Internal Photo	Internal Photo	iphoto1.jpg to iphoto8.jpg
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 CM5 Mission Communicator, model: 5005, is a 40MHz and 49MHz Walkie Talkie. It is a duplex transceiver and operated with 40.68MHz and 49.86MHz. It was powered by 9Vdc battery. The walkie talkie only have a volume switch for volume control and on/off function.

The brief circuit description is listed in the following:

- Q_6 (9018H) and associated circuit act as Tx amplifier and modulator.
- Q_5 (9018H) and associated circuit act as Oscillator.
- Q_4 (C1815) and associated circuit act as audio amplifier for transmitter.
- Q_1 (9018H) and associated circuit act as Rx amplifier.
- U_1 (LA1600) and associated circuit act as IF amplifier and mixer.
- Q_2 (C1815), Q_3 (C1815) and associated circuit act as audio amplifier for receiver.

1.2 Related Submittal(s) Grants

This is an Application for Certification of 40 and 49MHz transmitter. Two transmitters are included in this Application. This specific report details the emission characteristics of each transmitter. The receivers are subject to the verification authorization process, in accordance with 15.101(b). A verification report has been prepared for the receiver sections of each device.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). 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. 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.

EXHIBIT 2
SYSTEM TEST CONFIGURATION

2.0 **System Test Configuration**

2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions. The handset was powered by a fully charged battery.

For the measurements, the EUT is attached to a cardboard box and placed on the wooden turntable. If the base unit attaches to peripherals, they are connected and operational (as typical as possible). The handset is remotely located as far from the antenna and the base as possible to ensure full power transmission from the base. Else, the base is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater. All emissions greater than 20 dBµV/m are recorded.

Radiated emission measurement were performed from 30 MHz to 1000 MHz.

2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

2.3 Support Equipment List and Description

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

2.4 Equipment Modification

Any modifications installed previous to testing by Silver Manufactory Holdings Co., Ltd. will be incorporated in each production model sold/leased in the United States.

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

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

Confirmed by:

C. K. Lam
Assistant Manager
Intertek Testing Services
Agent for Silver Manufactory Holdings Co., Ltd.

Signature

October 27, 1998 Date

EXHIBIT 3
EMISSION RESULTS

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) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

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

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 dBµV/m
RR = RA - AG in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 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, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBµV/m

RR = 23.0 dBµV
LF = 9.0 dB

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

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

at 149.588 MHz

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

3.3 Radiated Emission Data - Base Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 3.3 dB

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TEST PERSONNEL:

Tester Signature

Wilson S. K. Loke, Engineer
Typed/Printed Name

October 27, 1998
Date

Company: Silver Manufactory Holdings Co., Ltd. Date of Test: October 12, 1998
Model: 5005
Mode : TX-Channel 40.68MHz

Table 1

Radiated Emissions (Section 15.229(a) &(c))

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	40.700	60.0	10	16	54.0	60.0	-6.0
H	81.374	40.0	7	16	31.0	40.0	-9.0
H	122.052	38.5	13	16	35.5	43.5	-8.0
H	162.730	29.5	16	16	29.5	43.5	-14.0
H	203.406	30.2	16	16	30.2	43.5	-13.3
H	244.106	29.4	20	16	33.4	46.0	-12.6

NOTES: 1. Peak Detector data

2. All measurements were made at 3 meters. 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 signs (-) in the margin column signify levels below the limits.

Test Engineer: Wilson S. K. Loke

Company: Silver Manufactory Holdings Co., Ltd. Date of Test: October 12, 1998
Model: 5005
Mode : TX-Channel 49.86MHz

Table 2

Radiated Emissions (Section 15.235(a) & (b))

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	49.870	69.5	11	16	64.5	80.0	-15.5
H	99.716	39.8	11	16	34.8	43.5	-8.7
H	149.588	43.2	13	16	40.2	43.5	-3.3
H	199.451	27.2	16	16	27.2	43.5	-16.3
H	249.312	28.8	20	16	32.8	46.0	-13.2
H	299.170	22.5	22	16	28.5	46.0	-17.5

NOTES: 1. Peak Detector data

2. All measurements were made at 3 meters. 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 signs (-) in the margin column signify levels below the limits.

Test Engineer: Wilson S. K. Loke

EXHIBIT 4
FREQUENCY DEVIATION

4.0 **Frequency Deviation**

Two stability tests were performed -- Frequency stability versus input voltage and frequency stability versus temperature. For both measurements, a 1 GHz frequency counter with temperature controlled time base is used.

The counter is coupled to the transmitter by coiling a pickup wire over the transmitter antenna or directly attaching it to the antenna, assuming a 50Ω antenna is used.

The frequency stability is measured at room temperature by varying the supply voltage (AC or DC, as required) from 85% through 115% of normal operating voltage. This test is not applicable if the unit uses battery power. For battery powered equipment, the batteries are new and fully charged.

Stability versus temperature testing is carried out with the aid of a Tabai Espec Corp, Model PR-3F(W) environmental chamber. The following procedure is followed during testing:

1. Cool the device to -20^{o}C and allow it to stabilize for 30 minutes. Record the frequency.

2. Heat the oven to +50^{o}C and allow it to stabilize for 30 minutes. Record the frequency of operation.

3. Compare the measurements and a room temperature measurement against the assigned frequency tolerance.

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency.

4.1.1 Measurement Data - Section 15.229(d)

Channel Frequency

Channel	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance %
1	46.68000	40.68052	0.00128

4.1.2 Measurement Data

Frequency Stability

Frequency Stability versus Source Voltage

	Voltage (Vdc)	**Assigned Frequency (kHz)**	**Measured Frequency (kHz)**	**Frequency deviation (kHz)**	**Tolerance % (x 10^{-3})**
Nominal	9.6V	40,680.00	40,680.52	0.52	1.28
85 %	8.16V	40,680.00	40,680.45	0.45	1.11
115 %	11.04V	40,680.00	40,680.59	0.59	1.45

Frequency Stability versus Temperature

Temperature (°C)	**Assigned Frequency (kHz)**	**Measured Frequency (kHz)**	**Frequency deviation (kHz)**	**Tolerance (%) (x 10^{-3})**
-20	40,680.00	40,680.87	0.87	2.14
25	40,680.00	40,680.52	0.52	1.28
50	40,680.00	40,680.04	0.04	0.10

Notes: All readings taken at base of antenna.

Legend (where appropriate)

* No emission was recorded at this environment. Thus, no frequency deviation can be found.

Test Results : From the table, the largest deviation from nominal frequency was 870 Hz, which was 0.00214% compared to the standard test frequency. The required minimum standard is 0.01% in §15.229(d)

EXHIBIT 5
BAND EDGES EMISSION

5.0 **Band Edge Emission**

The first plot shows the fundamental emission is confined in specified band. The field strength of any emission appearing between the band edges (40.66MHz & 40.70MHz) is at least 54dB below the carrier level. It meets the requirement of section 15.226(c).

The second plot shows the fundamental emission is confined in specified band. The field strength of any emission appearing between the bandeges and up to 10kHz above below the band edges (49.81 and 49.91MHz) is at least 65dB below the carrier level. It meets the requirement of Section 15.235(b).

EXHIBIT 6
EQUIPMENT PHOTOGRAPHS

6.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: ophoto1.jpg to ophoto4.jpg & iphoto1.jpg to iphoto8.jpg

EXHIBIT 7
PRODUCT LABELLING

7.0 **Product Labelling**

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

EXHIBIT 8
TECHNICAL SPECIFICATIONS

8.0 **Technical Specifications**

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

EXHIBIT 9
INSTRUCTION MANUAL

9.0 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 on Page 8 of this manual.

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